ULTRASONIX

SONIX SERIES ULTRASOUND SYSTEM
USER MANUAL

Ultrasonix Medical Corporation

SONIX Series Ultrasound System
User Manual

US Patents 6,911,008 – 6,558,326 – 6,325,759

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CHAPTER 1: INTRODUCTION

1.1   AUDIENCE

This user manual is a reference for operators using a SONIX Series ultrasound system. It is designed for a reader familiar with ultrasound imaging techniques; it does not provide training in sonography or clinical practices. Before using the system the operator must have ultrasound training.

Note: This is not a service manual. The SONIX Series Service Manual *is available for qualified service personnel.*

1.2   CONVENTIONS

The following conventions are used in this manual:

- cross-references for such things as tables, page numbers, sections and chapters are in bold face, non-italic type (e.g., **Chapter 2: SONIX Introduction**). When the manual is in digital format (PDF), these cross-references are links that can be followed by clicking on them
- words that are **bold** and *italic* refer to items on the LCD display (i.e., onscreen)
- words that are **bold** and **CAPITALIZED** refer to buttons, dials and toggle buttons located on the operator console
- "Press" and "Turn" indicate the actions required to activate the operator console buttons, toggle buttons and dials
- "Tap" indicates the action required to activate a touch screen item
- "Select", "Check" or "Click" indicate the various actions available to choose items from onscreen pages, menus, dialog boxes, etc. The console trackball is used to position the onscreen arrow and flashing cursor
- the **SELECT** button on the operator console acts much as the "left-click" on a mouse. It will set the cursor location for text entry or select an onscreen item. Use the trackball to position the cursor
- to "right-click", as with a mouse, press the **UPDATE** button on the operator console
- a "*Warning*" describes precautions necessary to prevent injury or loss of life
- a "*Caution*" describes precautions necessary to protect the SONIX system and its associated products
- a "*Note*" contains helpful information
- items marked "*IMPORTANT*" contain vital information that must be understood and followed, but which will not endanger either personnel or equipment
- a highlighted "*Note*" describes helpful hidden functionality
- when the steps in the operating instructions must be performed in a specific order, the steps are numbered
- instructions separated by ">" indicate that multiple items must be selected (e.g., "From the *User Settings* menu, select *Admin… > Status Bar*" indicates that the user must first click the "*Admin…*" option, then when the next dialog is presented, click the "*Status Bar*" option)
- bulleted lists present information in list format, but do not imply a sequence.

1.3 UPDATES

Updated user manuals will be available for all future SONIX ultrasound system updates.

1.4 OP SOFTWARE ON A CEP HARDWARE PLATFORM

Some hardware options are available only to users running OP software on the CEP hardware platform. When this applies, headings will be followed by (CEP), e.g., **2.5.2 Power Panel (CEP)**.

Note: All references to "CEP" or "CEP system" in this manual refer to the CEP hardware platform running OP software.

Occasionally, there will also be headings followed by **(OP, SP, RP and 01)**, meaning the information applies only to the OP/SP/RP/01 hardware platform, e.g., **2.5.1 Power Panel (OP, SP, RP and 01)**.

Additionally, some hardware options are available only in specific geographic locations. Where this applies, the heading will specify that the section applies only to "Canada and USA" or to "International" versions (e.g., **2.8.1 Retractable Power Cord or Cable Reel: Canada and USA (CEP)** and **2.8.2 Power Cord: OP, SP, RP, 01 and International (CEP)**).

Note: In the example **2.8.1 Retractable Power Cord or Cable Reel: Canada and USA (CEP)***, not only is the hardware option available only in "Canada and USA" it also available only on the CEP hardware platform (CEP).*

1.5 VOLTAGE DISCLAIMER (CEP)

The CEP system voltage setting is configured in the factory. Do **not** change this setting in the field.

It is the user's responsibility to ensure the SONIX CEP is used only under the electrical conditions dictated by Ultrasonix Medical Corp. Failure to comply with these conditions may result in damage to the system which is not covered by the Ultrasonix warranty.

Caution: For users running the 120V system, always ensure the utility supply voltage is 120 VAC nominal.

For users running the 220V–240V system, always ensure the utility supply voltage is 220-240 VAC nominal.

1.6 CONNECTIVITY DISCLAIMER

Caution: System networking options are intended for use inside your organization's firewall. Organizations that elect to configure/use the networking functionality provided by Ultrasonix are assuming all liabilities and risks associated with that decision.

1.7 PRIVACY DISCLAIMER

To protect patient data, Ultrasonix strongly recommends regular patient/image file back-up and purging of older patient files stored on the system. Refer to **Chapter 11: Connectivity and Peripherals** for details on transferring patient data.

IMPORTANT: The contents of the system hard drive may include Personal Health Information that must be protected as per Federal privacy and Health Insurance Portability & Accountability Act (HIPAA) regulations. In order to ensure regulatory compliance, Ultrasonix will not remove the system hard drive – and the patient data it contains – from the customer site.

In the event the hard drive must be removed from the system, it will be returned to the customer. Final disposition of the hard drive and its data will remain the customer's responsibility.

1.8 LICENSE AGREEMENT

All SONIX computer programs have been patented by Ultrasonix Medical Corporation (Ultrasonix). Such programs are licensed under the following software license agreement:

Ultrasonix, or its suppliers, retain(s) ownership of and title to any computer program supplied with the Equipment and to the trade secrets embodied in such computer programs. Subject to the Buyer's acceptance and fulfillment of the obligations in this paragraph, Ultrasonix grants the Buyer a personal, non-transferable, perpetual, non-exclusive license to use any computer program supplied with the Equipment that is necessary to operate the Equipment solely on the medium in which such program is delivered for the purpose of operating the Equipment in accordance with the instructions set forth in the operator's manuals supplied with the Equipment and for no other purpose whatsoever. Buyer may not reverse – assemble, reverse – compile or otherwise reverse – engineer such computer programs nor may Buyer make a copy of such program or apply any techniques to derive the trade secrets embodied therein. In the event of a failure by Buyer to comply with the terms of this license, the license granted by this paragraph shall terminate. Further, because unauthorized use of such computer programs will leave Ultrasonix without an adequate remedy at law, Buyer agrees that injunctive or other equitable relief will be appropriate to restrain such use, threatened or actual. Buyer further agrees that (i) any of the Ultrasonix suppliers of software is a direct and intended beneficiary of this end-user sublicense and may enforce it directly against Buyer with respect to software supplied by such supplier, and (ii) NO SUPPLIER OF ULTRASONIX SHALL BE LIABLE TO BUYER FOR ANY GENERAL, SPECIAL, DIRECT, INDIRECT, CONSEQUENTIAL INCIDENTAL OR OTHER DAMAGES ARISING OUT OF THE SUBLICENSE OF THE COMPUTER PROGRAMS SUPPLIED WITH THE EQUIPMENT.

1.9 TRADEMARKS AND PATENTS

Ultrasonix SONIX systems are protected under US patents 6,911,008 – 6,558,326 – 6,325,759.

Windows$^©$ is a trademark of Microsoft Corporation.

DICOM$^®$ (Digital Imaging and Communications in Medicine) is the registered trademark of the National Electrical Manufacturers Association (NEMA) for its standards publications relating to digital communications of medical information.

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CHAPTER 2: SONIX INTRODUCTION

Congratulations on your purchase of the Ultrasonix SONIX Ultrasound system. The SONIX is a high quality, easy to use diagnostic ultrasound system that is stable, highly mobile and designed to be convenient and comfortable to operate.

The various system components, including the LCD display, LCD display lift system, operator console with keyboard, base, cart, and transducers, may be configured to better support system use. The console soft touch controls are arranged in a manner that allows easy access.

2.1   SYSTEM COMPONENTS

Figure 2-1: SONIX System
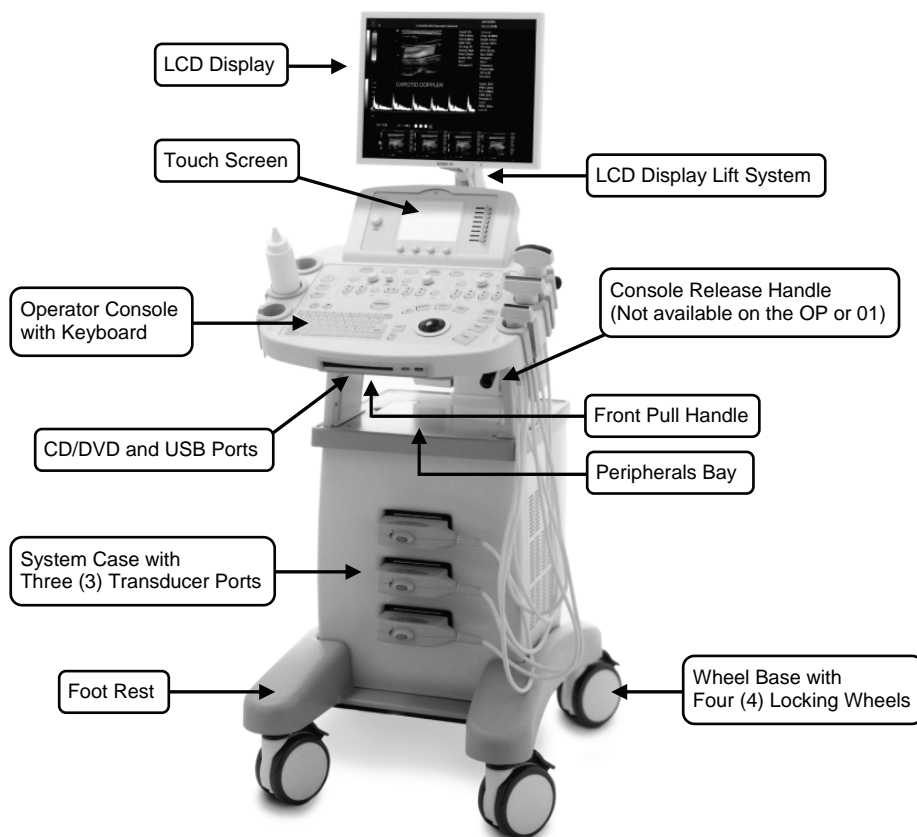
Note: The rear wheels on the SONIX SP and RP are directionally locking, while the front wheels lock in a single position. All SONIX OP, 01 and CEP wheels lock in a single position.

Several additional features are available on the SONIX CEP hardware platform but are not visible in **Figure 2-2**. Refer to the following sections for more details:

- **2.6.2 UPS EMERGENCY POWER OFF Switch (CEP)**
- **2.7 Barcode Reader** (also available for the SONIX OP/SP/RP)
- **2.8 Power Cord**
- **2.9 Wireless Adapter** (also available for the SONIX OP/SP/RP)
- **2.11 Cable Hooks (CEP)**

Figure 2-2: SONIX System (CEP)
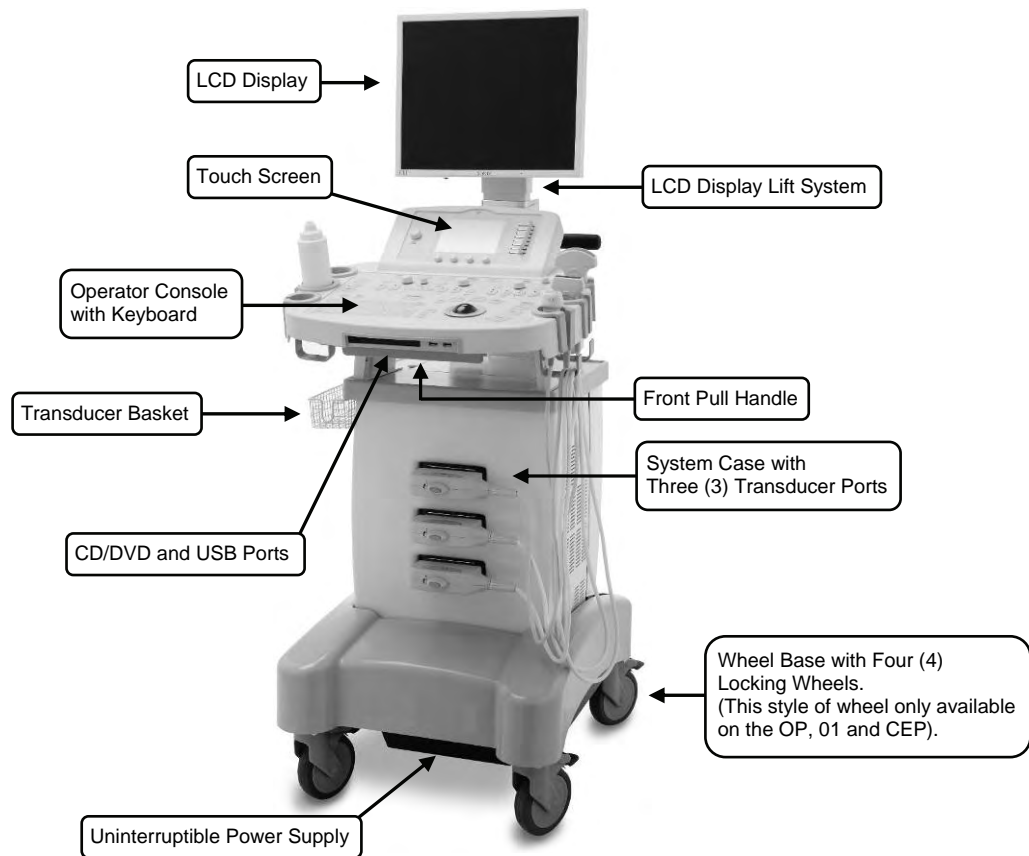
Note: All SONIX OP, 01 and CEP wheels lock in a single position.

2.2 OPERATOR CONSOLE

The operator console comprises a panel with patient management, system setup and ultrasound imaging controls: trackball, buttons, dials, toggle buttons, touch screen and keyboard. These operator controls enable SONIX functions such as selecting transducers, changing imaging modes, adjusting parameters like *Time Gain Compensation* (*TGC*), *Depth* and others.

Buttons light up when the feature/functionality is available for use. For instance, the buttons used for adjusting the *Color* imaging parameter will not light up on the console until the **COLOR** imaging mode button is selected.

Figure 2-3: SONIX Operator Console

Note: Some features may not be available on all system configurations. Refer to **Appendix B: System Specifications** *for details.*

Table 2-1: SONIX Operator Console Controls

Location	System Control	Functionality
1	Power Button	Turns system ON/OFF. Refer to **9.2.1 System Settings** to configure for *Fast Boot*.
2	**ID** Button	Provides access to the *Exam Management* page.
3	**PROBE** Button	Provides access to transducer selection keys on touch screen.
4	**MENU** Button	Provides access to setup menus.
5	**PICTOGRAM** Button	Turns on/off application-specific *Pictogram* graphics. Tap *Pictogram* and dial through the various icons. • trackball positions orientation marker • touch screen *Rotate* dial pivots orientation marker.
6	**ARROW** Button	Turns on/off *Arrow* graphic on the image field. Trackball positions and rotates the *Arrow* graphic.
7	Keyboard	QWERTY keyboard used for text entry (i.e., patient data, system setup, image text, etc.).
8	**QSONIX** Button	Provides: • Quick exam start-up • SONIX Operator Console Tutorial • Online support access.
9	**TEXT** Button	Activates the keyboard for *Text* entry and displays *Application*-specific *Annotation* buttons on the touch screen.
10	**DEL** Button	Deletes the most recent *Text* or *Annotation* entry. Provides "delete character" functionality during data entry mode (*Exam Management* page).
11	Trackball	Used to position the onscreen arrow graphic, flashing text cursor, arrow cursor, calipers, etc.
12	**DEL** Button	In *Measure* mode, deletes most recently saved measurement. Deletes selected thumbnail image.
13	**MEASURE** Button	Initiates/closes the *Measurement/Calculation* package. Removes measurements from frozen image field. *Note: Application-specific measurement tabs are available on the touch screen.*
14	**SELECT** Button	Provides a wide variety of functions depending on the imaging state (e.g., select and set measurements, set *Annotation Home* location, select onscreen keys, etc.) as well as "Left Click" mouse button functionality.
15	**UPDATE** Button	Provides a wide variety of functions depending on the imaging state (e.g., toggle between image fields on dual/quad image, toggle between *2D* and *Doppler Trace* image fields, toggles the active caliper, etc) as well as "Right Click" mouse button functionality.

	16	**FREEZE** Button	Pause/resume a live image.
Print Controls	17	**PRINT 1** Button	First of three (3) programmable buttons used to auto-store/print images or *CINE* loops to a configured printer, archiver, etc.
	18	**PRINT 2** Button	Second of three (3) programmable buttons used to auto-store/print images or *CINE* loops to a configured printer, archiver, etc.
	19	**PRINT 3/ARCHIVE** Button	Third of three (3) programmable buttons used to auto-store/print images or *CINE* loops to a configured printer, archiver, etc., or set to provide access to the *Exam Management/Image Review* system.
B-Mode/2D and M-Mode Controls	20	**B-MODE/2D** Button/Dial	Activates (press dial) *2D/B-Mode* imaging mode and controls *2D Gain* (turn dial) and *M-Mode Gain*.
	21	**DUAL/QUAD** Button	Activates *Dual* (press once) and *Quad* (press twice) split screen imaging. **UPDATE** button toggles between image fields. Press **B-MODE** to return to single screen imaging.
	22	**M-MODE** Button	Activates *M-Mode* imaging. **B-MODE** dial controls *M-Mode Gain*. **UPDATE** button activates *M-Mode Sweep*.
	23	**FOCUS** Toggle Button	Adjusts the location of the image focal zone UP or DOWN on the image field.
	24	**DEPTH** Toggle Button	Adjusts the *2D* imaging depth UP (less depth) or DOWN (more depth).
	25	**ZOOM** Toggle Button	Adjusts the *2D* magnification UP (more magnification) or DOWN (less magnification). Trackball used to pan image.
	26	**FREQ** Toggle Button	Adjusts the *2D* image *Frequency* UP or DOWN : • *Harmonics* (if available) • *Resolution* (high frequency) • *General* • *Penetration* (low frequency) • *EPI (Extended Pulse Imaging)* (greater penetration).
Color Doppler Controls	27	**COLOR** Doppler Button/Dial	Activates (press dial) *Color Doppler* imaging mode and controls *Color Doppler Gain* (turn dial). Controls *Power Doppler Gain*.
	28	**INVERT** Button	Reverses the direction of the *Color Doppler Map*.
	29	**PRF** Toggle Button	Adjusts the *Color Doppler PRF* (*Pulse Repetition Frequency*) UP (higher *PRF*) or DOWN (lower *PRF*).
	30	**WF** Toggle Button	Adjusts the *Color Doppler Wall Filter* UP (more filtering) or DOWN (less filtering).
	31	**POWER DOPPLER** Button	Activates/deactivates the *Color Power Doppler* imaging mode. The **COLOR DOPPLER** dial controls the *Color Power Gain*.
	32	**STEER** Toggle Button	Adjusts the steering angle dependent on the active imaging mode: • *Color Doppler* Region of Interest (ROI) box • *PW Doppler* sample line • *B-Mode/2D* beam on linear transducers.

PW Doppler Controls	33	**PULSED DOPPLER** Button/Dial	Activates/deactivates (press dial) **Pulsed Wave** (**PW**) **Doppler** imaging mode and controls **PW Doppler Gain** (turn dial). **UPDATE** button switches between **Trace** and **2D** image.
			*Note: To adjust the **PW** gate size on full screen **2D/Doppler** cursor, turn the **PULSED DOPPLER** dial.*
	34	**CW** Button	Not available in this release.
	35	**BASE** Toggle Button	Adjusts **PW Doppler Trace Baseline** UP or DOWN.
	36	**PRF** Toggle Button	Adjusts **PW Doppler PRF** UP (higher **PRF**) or DOWN (lower **PRF**).
	37	**INVERT** Button	Reverses direction of **PW Doppler Trace**.
	38	**ANGLE CORRECT** Button/Dial	Activates (press dial) **PW** angle correct feature. Each subsequent press toggles through 0, +60, -60 degrees. Turn dial right or left to adjust angle correct in 2 degree increments up or down.
	39	**RESEARCH** Button	Activates/deactivates optional **Research** imaging package.
			Note: Not available on the OP, SP or 01.
	40	**WORKSHEET** Button	SONIX CEP (E-Med) software only.
			Note: Not available with OP/SP/RP/01 software.
	41	**ELASTOGRAPHY** Button	Activates/deactivates optional **Elastography** imaging package
			*Note: Only available in specific markets with OP/SP/RP software. Refer to **Appendix B: System Specifications** for more details.*
	42	**SPATIAL COMPOUND** Button	Activates/deactivates **Spatial Compounding** imaging mode.
	43	**3D/4D** Button	Activates/deactivates optional **Standard** and **Advanced 3D** and **4D** imaging modes.
	44	**OPTIMIZE** Button	Activates/deactivates auto-optimize feature for **Doppler Trace**.
	45	**ACOUSTIC POWER** Button/Dial	Adjusts (turn dial) **Acoustic Power** and toggles (press dial) **MI**, **TIS**, **TIC**, **TIB** display depending on the active imaging mode.
			⚠ *Warning: Refer to **A.1.1 ALARA Principle and Output Displays**.*
	46	**TGC** Slide Pods	Adjusts **TGC** (**Time Gain Compensation**) curve.
	47 – 50	Touch Screen Dials	Four (4) dials that control touch screen options which change depending on the imaging mode/state.
			*Note: In measure mode, if **<</>>** appears on the touch screen key the measurement can be performed using different methods. Tap to select the measurement. Turn the touch screen dial directly below the desired measurement to page through the various method choices available. The method selected appears in an information bubble to the bottom right of the image screen. Refer to **Chapter 7: Clinical Analysis** for further details.*

51	Touch Screen	Displays touch screen menus which change depending on the imaging mode/state.
		Note: The active tab on a touch screen menu will be indicated by a "dot" pattern below the tab name.
52	**AUDIO VOLUME** Dial	Adjusts audio volume of the ***Doppler*** signal.
53	Microphone Vent	Future – voice command feature.

2.3   SYSTEM CASE

The system case contains the system PC and the System Case Connectivity Panel. Three transducer ports are available at the front of the system case.

Caution: Access to the System Case Connectivity Panel (through the top of the system case) should be restricted to qualified service personnel only. Contact your local service representative for further information.

Refer to the *SONIX Series Service Manual* for complete details about the system case.

⚠ *Warning: Do not touch the patient and the transducer ports simultaneously.*

2.4   BACK CONNECTIVITY PANEL

The Back Connectivity Panel is located on the tower which extends up from the back of the system case. Refer to **11.2 Back Connectivity Panel** for connectivity details.

2.5   POWER PANEL

The Power Panel is located on the back lower portion of the system case.

Note: If the system does not power up, ensure the power cord is plugged in and the main power switch on the back of the system case is turned to the ON position. The Main Power switch is not required for regular power shut downs and should remain in the ON position.

2.5.1   Power Panel (OP, SP, RP and 01)

It includes the power cord plug, main power switch, voltage switch and fuse.

2.5.2   Power Panel (CEP)

It includes the power cord, main power switch and fuse.

2.6 UPS (CEP)

SONIX CEP is delivered with a UPS running on a lithium ion battery. The UPS, located at the bottom of the system, ensures that no data is lost when the system is temporarily unplugged and moved around. For more details, refer to **11.6 UPS (CEP)**.

⚠️ *Warnings:*

NEVER *let liquid from any source enter the UPS. Failure to do this may result in accidental* ***shorts, shocks or electrocutions.***

DO NOT attempt to service this product yourself. *Attempting to open the UPS may cause exposure to lethal voltages within the unit even when it is apparently not operating and the input wiring is disconnected from the electrical source. Should the UPS require maintenance or replacement, only qualified Ultrasonix Service Technicians may perform service as detailed in the Service Manual.*

For UPS and battery service issues, contact Ultrasonix Technical Support.

2.6.1 UPS Use Model

Ultrasonix recommends that all users adhere to the following use model. ***Failure to adhere to this use model may lead to premature battery failure.*** In these circumstances, battery replacement will not be covered by the warranty.

The UPS is intended to facilitate system portability, **i.e., a properly charged UPS can protect against the loss of data while the machine is *temporarily unplugged*** and moved to a new location. Unless the system was properly powered down before being unplugged, make sure that it is reconnected to a power outlet within a few minutes.

When the system is running on battery power, it cannot be left unplugged for long periods. For details on battery usage limitations and recharge alerts, refer to **Table 11-3** and **Table 11-4**, respectively, in **Chapter 11: Connectivity and Peripherals**.

Note: While unplugged, the rechargeable UPS battery maintains a charge for a limited time, regardless of whether the system is powered on or not. Leaving the machine plugged in while unattended will prevent automated shutdown and prolong battery life.

Battery recharge time is exponential. Recharging for 10 to 30 minutes will only generate 2-10 minutes of battery life. However, recharging – uninterrupted – for 60 minutes will generate 60 minutes of battery life.

If the battery has been completely depleted, always leave it plugged in for a minimum of one (1) hour before attempting to run on battery power only.

As an added precaution, always shut down the CEP system by pressing the console **POWER** button for approximately one (1) second.

2.6.2   UPS EMERGENCY POWER OFF Switch (CEP)

In the event of any emergency that requires the shutdown of all power (e.g., to prevent fire or shock), the CEP is equipped with an **EMERGENCY POWER OFF (EPO)** switch at the bottom, rear of the system. Once the EPO switch is pressed, unplug the power cord from the wall outlet.

> **IMPORTANT:** *Use this switch **only** in the event of an emergency. Once turned off, the CEP will be **completely** disabled until your internal service provider or a certified Ultrasonix Service Technician can reset the system.*
>
> *For more details on this switch, refer to* **11.6.1 UPS Battery Sleep Mode (CEP)**.

2.7   BARCODE READER

An optional pre-configured, third-party barcode reader is available. This allows the operator to scan certain patient data for quick and reliable data entry. The results of the scan are entered directly into the fields on the *QSONIX Input Patient Information* dialog and the *Exam Management* page – providing the cursor is present in the relevant field when the barcode is scanned.

Refer to **11.7 Connecting the Barcode Reader** for details on connecting the barcode reader to the various hardware platforms.

⚠️ *Warnings:*

USE OF CONTROLS or adjustments or performance of procedures other than those specified in the manufacturer's User's Guide (delivered with system) may result in hazardous laser light exposure.

NEVER *attempt to look at the laser beam, even if the barcode reader appears to be non-functional.*

NEVER *point the laser beam in anyone's eyes.*

USE OF OPTICAL *instruments with the laser equipment will increase eye hazard.*

UNDER NO CIRCUMSTANCES *should users or technicians attempt to open or service the laser scanner. Attempting to open the barcode reader may cause exposure to hazardous laser light. Should the barcode reader require maintenance or replacement, contact Ultrasonix Technical Support.*

2.8 POWER CORD

Power cord length and type are hardware platform dependant.

2.8.1 Retractable Power Cord or Cable Reel: Canada and USA (CEP)

The nine (9) foot long (2.75m), medical grade, retractable power cord easily keeps the cable out of the way when the machine is being moved. Additionally, because it allows the user to extract only as much cable as is necessary for the space in which the system is being used, it helps to ensure a neater, and therefore safer, work environment.

Refer to **11.8.1 Unwinding/Retracting the Power Cord: Canada and USA (CEP)** for more details.

> ⚠️ *Warnings:*
>
> ***DO NOT*** *attempt to open the cable reel which houses the retractable power cord as this may cause physical injury and/or exposure to lethal voltages. It may also damage the cable reel, leading to further hazards when operating the system. Should the cable reel require maintenance or replacement, contact Ultrasonix Technical Support.*
>
> ***DO NOT*** *use excessive force when extending or retracting the cord. This can cause the cord to separate from the reel and potentially expose anyone in the vicinity to lethal voltages.*
>
> ***DO NOT*** *extend the cable into traffic areas as this can cause a tripping hazard.*
>
> ***DO NOT*** *let go of the plug end of the cable while it is rewinding. Guide it gently back into its housing. If left to rewind on its own, the cable's whipping effect may cause injury.*

> *Cautions:*
>
> *Always unwind/rewind the cable by pulling/releasing from behind the system, not from the side.*
>
> ***DO NOT*** *extend the power cord past the red warning label.*

2.8.2 Power Cord: OP, SP, RP, 01 and International (CEP)

OP, SP, RP, 01 and International CEP systems come equipped with a 15 foot long (4.6m), country-specific, medical grade power cord.

2.9 WIRELESS ADAPTER

In addition to the standard, hard-wired network connection, the system supports a wireless adapter which is delivered standard with CEP hardware and is an option with OP, SP and RP hardware.

Refer to **11.9 Wireless** for details on connecting the wireless adapter and **9.2.2.3 Wireless Settings** for wireless configuration.

Caution: *System networking options are intended for use <u>inside</u> your organization's firewall. Organizations that elect to configure/use the networking functionality provided by Ultrasonix are assuming all liabilities and risks associated with that decision.*

Caution: *For details on FCC regulations as they apply to the wireless adapter, refer to the manufacturer's User Guide included with the system.*

2.10 TRANSDUCER BASKET (CEP)

The SONIX CEP comes equipped with a factory-installed transducer basket sized to hold the Ultrasonix *EC9-5/10 Endocavity Transducer*. The basket end-notches allow the transducer cable to hang freely.

Figure 2-4: Transducer Basket

2.11 CABLE HOOKS (CEP)

There are two (2) retractable cable hooks located on the operator console, directly behind either side of the touch screen. These cable hooks are to be used at the discretion of the *Operator* in order to keep the various cables (barcode reader, transducers, etc) off the floor.

Figure 2-5: Cable Hooks

Retracted   **Extended**

2.12 CONSOLE COVER

The CEP comes with a clear, medical grade, plastic console cover to help keep the system clean. For replacement covers and those users with an OP, SP or RP, refer to the latest price list for details on purchasing this item.

See **11.10 Console Cover** for details on installing or replacing the console cover.

CHAPTER 3: GETTING STARTED

This chapter provides a step-by-step guide through the basic operation of the SONIX Ultrasound System.

3.1   TURNING ON SYSTEM

To Turn on the System:

1. Connect the AC power cord to the back of the system case.

2. Plug in the power cord (hospital-grade electrical outlet recommended).

3. Press the console **POWER** button. Refer to **2.2 Operator Console** to view the button's exact location.

    *Note: If the system does not power up, ensure the Main Power switch on the back of the system case is turned to the ON position ("—"). Refer to **2.5 Power Panel** for main power switch location. The Main Power switch is not required for regular power shut downs and should remain in the ON position.*

3.2   CONNECTING TRANSDUCERS

The connection ports for the SONIX transducers are located on the front of the SONIX system case. Refer to **2.1 System Components** for location of transducer ports.

To Connect/Disconnect a Transducer:

1. Turn the latch <u>counter-clockwise</u> to the Open or Unlock position.

2. Insert the transducer connector into the connection port with the cable directed to the right of the system.

    Caution: The 4D transducer <u>must</u> be inserted into the upper most transducer connection port to ensure proper function.

3. Ensure the transducer is snugly in place and turn the latch <u>clockwise</u> to lock it in place.

4. Turn the latch counter-clockwise to unlock (open) and remove the transducer.

    Note: When a new exam is initiated, the transducer used in the most recent exam will still be selected <u>if</u> it is still connected. If it's no longer connected, the system will default to the first available transducer. This default transducer selection is not affected even if the system is turned off between exams.

3.3 QSONIX FEATURE

The **QSONIX** button provides three (3) basic functions:

- Quick Exam Start-up (**1**)
- Operator Console Tutorial (**2**)
- Online Support Access. (**3**)

Figure 3-1: Welcome to QSONIX
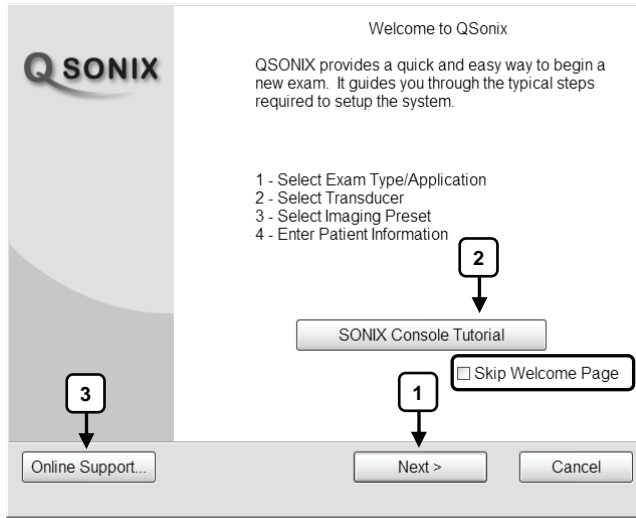
*Note: By default, the **Welcome to QSONIX** screen will appear the first time the **QSONIX** button is pressed. If desired, after initial access to the **QSONIX** feature, use the trackball and **SELECT** button to check the **Skip Welcome Page** checkbox in order to remove hide this page.*

3.3.1 Quick Exam Start-Up

The Quick Exam Start-up feature provides a series of dialog boxes which guide the user through the steps required to begin an exam:

1. Select the *Exam Type/Application*.
2. Select the transducer.
3. Select the *Imaging Preset*.
4. Enter the basic patient data.
5. Begin the exam.

To Begin the Quick Exam Start-up:

1. Press the console **QSONIX** button.
2. If the *Welcome to QSONIX* page appears on the LCD display, select *Next*.

*Note: If the **Welcome to QSONIX** page has been set to "skip", it can be reset to appear by selecting the **Welcome Page** button (which is only visible when the page is skipped). Select **Skip** to prevent the **Welcome Page** from appearing the next time the **QSONIX** button is selected.*

3. Click on the desired **Exam Type/Application** and the system will automatically move to the next page.
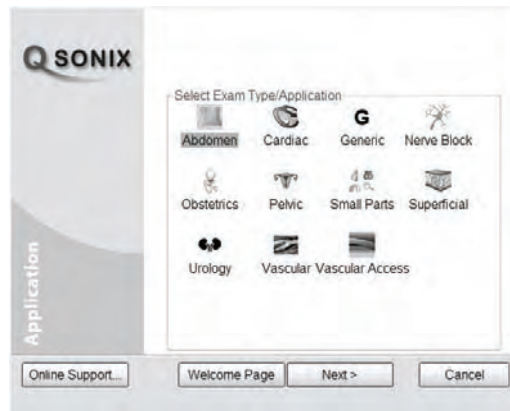
4. Click on the desired transducer and the system will automatically move to the next page.

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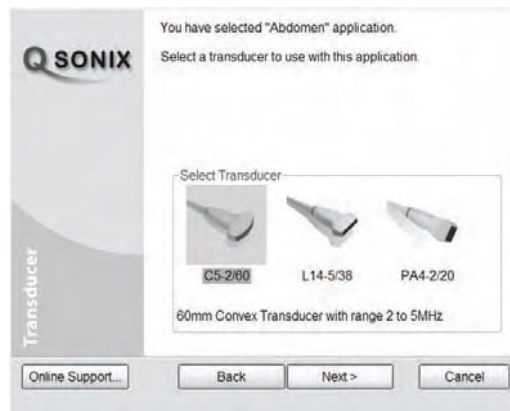
*Note: Only transducers currently connected to the system and applicable to the previously-selected **Exam Type/Application** will be available. If the selected **Application** is not compatible with the currently connected transducers, the system will prompt for a different transducer.*

*Users can also click **Back** twice and select a different **Application**.*

---

5. Click on the desired *Imaging Preset* and the system will automatically move to the next page.
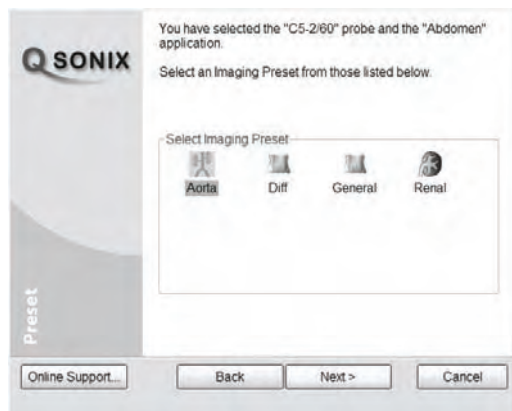
Note: *If a* ***Preset*** *has been hidden, it will not be available for selection from* ***QSONIX***. *Refer to* **9.1.1.1 Show/Hide Imaging Presets** *for details.*

6. Use the keyboard to enter data in the *Input Patient Information* fields. Press **TAB** on the keyboard to move through the data fields.

The *Insert (Symbol)* tool enables the insertion of text symbols not available on the keyboard (e.g., punctuation marks, symbols and letters from other languages).

More… links to the full *Exam Management* page.
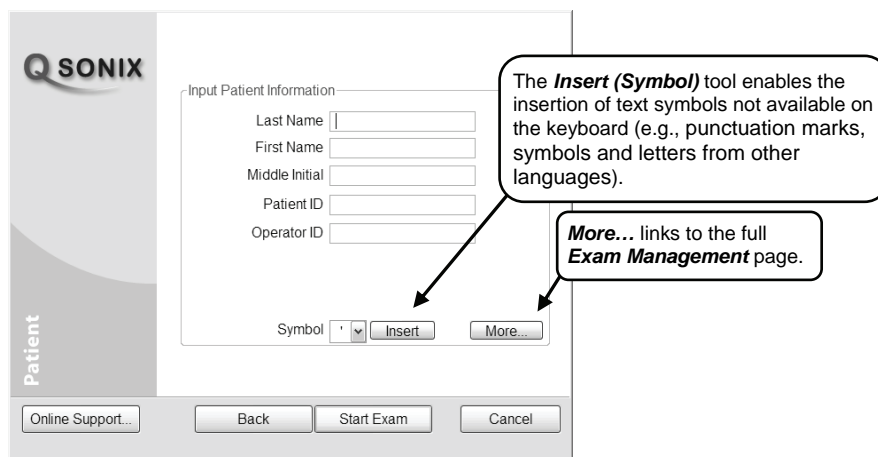
Note: *If additional patient information is required select* ***More…*** *to open the full* ***Exam Management*** *data entry page. Refer to* **Chapter 4: Patient Management** *for complete details on* ***Exam Management*** *data entry.*

7. Select *Start Exam* to begin imaging.

3.3.2 Operator Console Tutorial

This feature provides a brief overview of the functionality of the operator console buttons, toggle buttons, dials, etc.

To Access the Operator Console Tutorial:

1. Press the console **QSONIX** button to access the *Welcome to QSONIX* page.
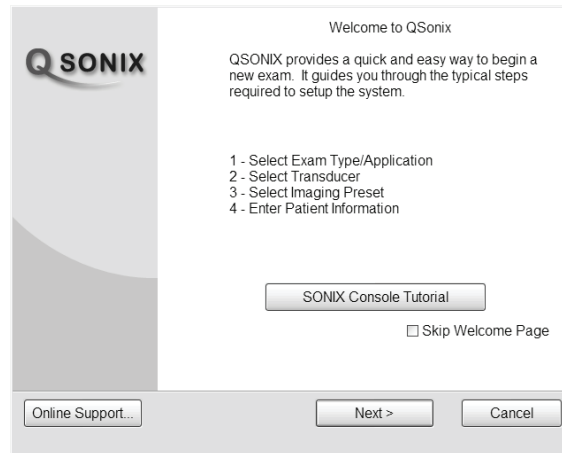
Note: If the **Welcome to QSONIX** *page does not appear, click the* **Welcome Page** *button.*

2. Select *SONIX Console Tutorial* and a brief, onscreen description will be presented when any console button, dial or knob is activated.
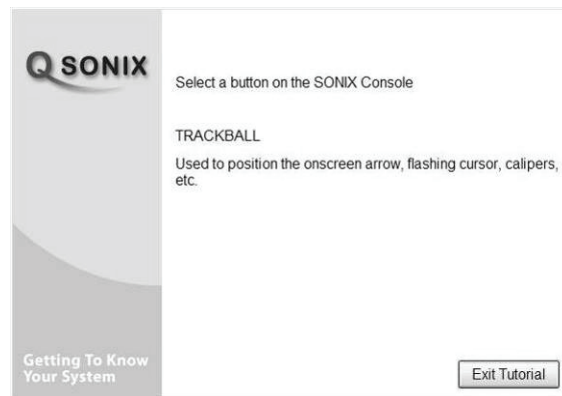
3. Select *Exit Tutorial* to return to the *Welcome to QSONIX* page.

3.3.3   Online User Manual Access

Once User Manuals are present on the system, users will be able to access a cross-referenced, searchable PDF version of the User Manual by pressing a pre-mapped "hot-key" on the console keyboard.

---

*Note: It is not possible to view the User Manual PDF if the console **TEXT** button (8.1) is active or when a SONIX dialog (e.g., **Exam Management**) or Windows dialog (**Date and Time Properties**) is open.*

To configure the system to present the PDF in the desired language, refer to **User Manual Language** in **Table 9-11: System Settings Configuration Options**.

To Access the User Manual PDF:

1. Ensure the console **TEXT** button is not active and that all Windows dialog boxes are closed.

2. Press the console keyboard "**u**" key.

To Close the User Manual PDF:

1. Click the "**X**" in the upper right corner of the PDF window.

3.3.4   Online Live Chat Support

The *Online Support* feature is a real-time help discussion with the Ultrasonix Technical Support team. Refer to **9.2.2 Network** to configure the system for live chat support and network connectivity.

To Access Online Live Chat Support:

1.   Press the console **QSONIX** button.

2.   Select *Online Support…* from the bottom left side of the *Welcome to QSONIX* page.

> Online Support...
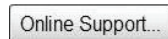
3.   Use the keyboard to type in the desired message in the text box.
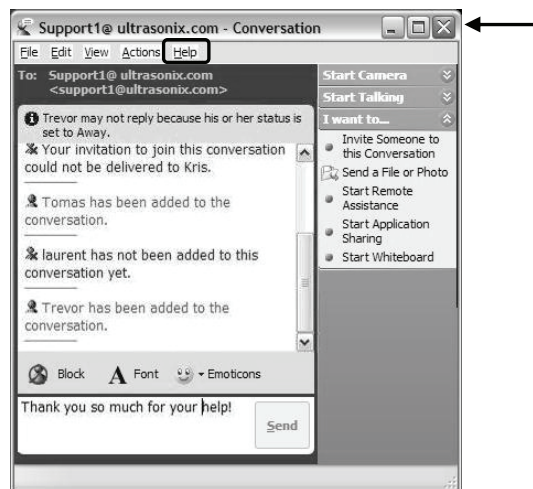
4.   Click the *Send* button to send the message.

5.   To close the *Online Chat* window, select the "**X**" in the red box in the upper right corner of the window.

> *Note: For details on the various options available in this window, refer to the **Help** menu in the **Online Chat** window.*

CHAPTER 4: PATIENT MANAGEMENT

Exam Management functionality allows users to enter patient/exam-related data into the system. Entering patient-specific data automatically creates a unique file in which the patient/exam data is stored.

4.1   ENTERING PATIENT DATA

The *Exam Management* page is sectioned into *Patient* Information, *Application Information* and *Exam Information* data entry areas. If applicable, data can be accessed via the storage/database tabs at the bottom right side of the page (*Local* and *Worklist*).

Figure 4-1: Exam Management Page

Table 4-1: Exam Management Page Options

OK	Saves the changes made to the *Exam Management* page and returns to imaging.
	*Note: If a unique **Patient ID** is not entered manually the system will create one automatically (e.g., {C9B3F82B-BE52-4C79-8C45-28375D69F8C9}).*
Cancel	Cancels any changes made to the *Exam Management* page and returns to live imaging. *Cancel* will not undo the *End Exam* function.
End Exam	Ends the current exam session, clears the *Patient*, *Application* and *Exam* data fields and clears the printer queue (e.g., if printer image sheet is set for 2x2 and only two (2) images were saved, ending the exam signals the system that no more images are coming to fill up the sheet and sends the image sheet to the printer). All measurements visible on the LCD display are cleared.
	*Note: Before ending an exam, ensure the active image and/or each page of the current **Report** have been saved/printed using the console **PRINT 1**, **2** or **3** button (**9.2.4 Print Keys**). Saving the image/**Report** will allow it to be recalled via the **Review** button on the **Exam Management** page.*
Clear	Clears the *Patient* and *Exam* data fields. *Clear* will also "end" the current exam if one is open.
Search Worklist	Enables a *DICOM* or *PracticeHwy*™ *Worklist* search.
	*Note: If **PracticeHwy** has been enabled, **DICOM** will not be active even if a **DICOM** server is available. **DICOM** and **PracticeHwy** cannot be used at the same time.*
Insert (Symbol)	Use to insert text symbol(s) not available on the console keyboard (e.g., punctuation marks, symbols and letters from other languages).
Review	Opens the *Image Management* page for the current patient or patient(s) selected from *Local* file storage.
Delete	Removes the currently selected patient(s) from *Local* file storage.
Update Worklist	Use to update *DICOM Worklist* data.
	*Note: This button will only be available if the system is configured for **DICOM** (**9.2.3 DICOM Configuration**). In order to actually update **Worklist** data, the system must also have an active connection to a **DICOM** server.*

To Access the Exam Management Page:

1. Press the console **ID** button.

4.1.1　Patient Information

Figure 4-2: Data Fields for Patient Information

Table 4-2: Patient Information Fields

Patient ID	Enter the *Patient Identifier* using letters and/or numbers. The system automatically creates a unique *Patient ID* if one is not entered manually (e.g., {C9B3F82B-BE52-4C79-8C45-28375D69F8C9}).
	Note: The ***Patient ID*** *cannot be changed after the patient file has been created (i.e., an exam has begun).*
Last Name *First Name* *Middle Name*	Enter the patient's *Last*, *First* and *Middle Names* – any of which can be modified at any point during the exam.
DOB *(Date Of Birth)*	Enter the patient's *Date of Birth* in the required format (e.g., *mm/dd/yyyy*) which is controlled through the *Regional Settings* options selected in **9.2.1 System Settings**.
	Note: A ***DOB*** *entry will auto-populate the* ***Age*** *field.*
Age	Rather than entering a specific *DOB*, enter the patient's actual *Age*.
	Note: The ***Age*** *field will auto-populate if a* ***DOB*** *is entered.*
Sex	Select the patient's gender: *Female*, *Male*, *Other* or *Unknown*.
Accession #	Enter the exam's *Accession Number*.
	Note: This field auto-populates when the ***DICOM Worklist*** *is used.*
Insurance #	Enter the patient's *Insurance Number*.

Note: During imaging, if ***Patient ID***, ***Name***, ***LMP***, etc. are not displayed at the top of the image screen, the system may be setup to hide this patient data. For details, refer to **General Options** in **Table 9-25: Patient Settings** for details.*

Note: All these fields can be completed using the barcode reader. Simply ensure the cursor is in the required field and scan the <u>relevant</u> barcode.

To Enter Patient Information Manually:

1. Press the console **ID** button.

2. Use the keyboard, trackball and console **SELECT** button to enter the patient information as required.

Patient Information			
Patient ID		DOB (mm/dd/yyyy) [mm/dd/yyyy]	Age [ ] y [ ] m
Last Name		Sex [Unknown ▼]	
First Name		Accession #	
Middle Name		Insurance #	

*Note: The **TAB** key may be used to move through the various data fields and the **ENTER** key to make drop-down menu selections.*

To Enter Patient Information with the Barcode Reader:

1. Press the console **ID** button.

2. With the cursor in the *Patient ID* field, scan the relevant patient barcode with the barcode reader.

3. Continue entering the patient/exam data as required.

Note: Fields that will accept data entry via the keyboard will also accept data scanned with the barcode reader. Simply ensure that the cursor is located in the required field then scan the relevant barcode.

4.1.2 Application Information

Use this section of the *Exam Management* page to select the appropriate *Application* (*Cardiac*, *Follicular*, *Gynecology*, *OB* or *Other*) in order to enter application-specific data (e.g., for *OB*, enter *LMP*, *Para*, *Gravida*, *Aborta*, etc.).

*Note: The **Application** selected here is not tied to an **Imaging Preset** or **Exam Type/Application**.*

Table 4-3: Application Information Fields

Cardiac	• *Height* and *Weight* have both *Metric* and *Imperial* measurement options • *BSA* (*Body Surface Area*) is calculated and displayed when *Height/Weight* is entered • *HR* (*Heart Rate*) *bpm* (*beats per minute*) can be entered manually for use in *Cardiac* calculations during imaging. *Note: If no **HR** is entered, then it must be measured during imaging in order to be able to perform many of the different **Cardiac** calculations.*
Follicular *OR* *GYN*	 • *LMP* (*Last Menstrual Period*) • *Exp. Ovul.* (*Expected Date of Ovulation*) • *Day of Cycles* • *Gravida*, *Para* and *Aborta* fields.

OB

- *LMP* auto-calculates *GA* (*Gestational Age*) and *EDD* (*Estimated Date of Delivery*)
- *GA* auto-calculates *EDD*
- *EDD* auto-calculates *GA*

  Note: LMP or GA will display at the top of the image field in the selected Windows date format (e.g., mm/dd/yyyy). Both weeks (w) and days (d) are used to auto-calculate EDD. If the GA and EDD are entered manually, the LMP entry will be removed.

- *Gravida*, *Para* and *Aborta* fields
- *Fetus #* defaults to *1*. Enter up to 3 for multiple gestations

  Note: Entering a 2 or 3 is required in order to record measurements on 2 or 3 separate fetuses (i.e., to activate multiple measurement packages (where 1 = A, 2 = B and 3 = C in reports))

- *BBT* (*Basal Body Temperature*) can be entered in *°C* (Celsius) or *°F* (Fahrenheit)

  Note: BBT is only available if it was selected in **9.2.6 Patient Settings***.*

- *Previous Exam* enables the entry of previous OB exam data for fetal trending (refer to **4.1.2.1 OB Previous Exams** for details).

Other

- *Height* and *Weight* have both metric and imperial measurement options
- *BSA* is auto-calculated and displayed once *Height/Weight* is entered.

To Enter Application-Specific Data:

1. Press the console **ID** button.

2. Tab to the ***Application*** drop-down menu on the right side of the ***Application Information*** section.

3. Select the desired ***Application*** from the drop-down menu.
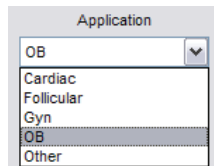
Application
OB ⌄
Cardiac
Follicular
Gyn
OB
Other

> ***Note:*** *The* **TAB** *key may be used to move through the various data fields and the* **ENTER** *key to make drop-down menu selections.*

4. The application-related data entry fields to the left side of the ***Application Information*** section change with the selection of the various applications.

> ***Note:*** *The Application selected here is not tied to an* ***Imaging Preset*** *or* ***Exam Type/Application***.

4.1.2.1 OB Previous Exams

To Enter Previous OB Exam Data for Fetal Trending:

1. Press the console **ID** button.

2. Select **OB** as the **Application** type.

3. Select **Previous Exam** from the **Application Information** data entry section.

4. When the previous exam data entry page is presented, use the keyboard and trackball to enter the previous exam date and corresponding fetal measurement data (**BPD**, **HC**, etc.) for the fetus(es) as required.

Fetus A	Date (mm/dd/yyyy)	BPD (mm)	HC (mm)	AC (mm)	FL (mm)	CRL (mm)	HL (mm)	TTD (mm)	EFW (g)

Clear   OK   Cancel

Note: The **TAB** *key may be used to move through the page.*

5. Select **OK** to save the data and return to the **Exam Management** page or **Cancel** to exit without saving.

6. The data entered is plotted on the growth graphs as part of the OB report package.

Note: Trending data from previous exams stored on the system does not appear in this list. Instead, it is displayed on the individual trending graph OB report pages with an active patient.

4.1.3   Exam Information

Figure 4-3: Exam Information Fields

Table 4-4: Exam Information Fields

Reporting Physician	Enter name of the **Reporting Physician** manually or select from drop-down menu of previously entered and currently active physician names.
Referring Physician	Enter name of the **Referring Physician** manually or select from drop-down menu of previously entered and currently active physician names. **Referring Physician** auto-populates when the patient is selected from **DICOM Worklist**.
Operator ID	Enter name or initials of the **Operator** or select from drop-down menu of previously entered and currently active **Operator IDs**. **Operator ID** appears at the top of the screen during imaging.
Exam Type	Enter **Exam Type** manually or select from drop-down menu of previously entered and currently active **Exam Types**. **Exam Type** auto-populates based on the **Exam Type/Application** chosen when starting an exam via the **QSONIX** button. It will also auto-populate when the patient is selected from the **DICOM** or **PracticeHwy Worklist**. In either case, the selection can be modified.
Clinical Indication	Enter **Clinical Indication** manually or select from drop-down menu of previously entered and currently active **Clinical Indications**. **Clinical Indication** auto-populates when the patient is selected from **DICOM Worklist**, but can be modified.
Custom Label 1, 2, 3	Enter user-defined data manually or select from drop-down menu of previously entered and currently active data.

Note: Refer to **9.2.6 Patient Settings** *for details on adding, editing and maintaining data for the following fields:* **Reporting Physician, Referring Physician, Operator ID** *and* **Custom Label 1, 2,** *and* **3**.

Note: All these fields can be completed using the barcode reader. Simply ensure the cursor is in the required field and scan the <u>relevant</u> *barcode.*

To Enter Exam Information Manually:

1. Press the console **ID** button.

2. Enter *Exam Information* as required. Once entered, the text is available for recall from the drop-down menu.

    Note: Use the **TAB** *or* **ENTER** *key to move around the* **Exam Information** *fields. Drop-down menu selections can be made with the trackball and* **SELECT** *button.*

To Enter Exam Information with the Barcode Reader:

1. Press the console **ID** button.

2. With the cursor in the *Reporting Physician* field, scan the relevant patient barcode with the barcode reader.

3. Continue entering the patient/exam data as required.

    Note: Fields that will accept data entry via the keyboard will also accept data scanned with the barcode reader. Simply ensure that the cursor is located in the required field then scan the <u>relevant</u> *barcode.*

4.2 SELECTING A TRANSDUCER

To Select/Change a Transducer:

1. Press the console **PROBE** button.

2. Up to three (3) options are presented on the touch screen listing the transducers connected to the system.

   > *Note: If an **Exam Type/Application** is active at the time the **PROBE** button is pressed, any connected transducer that does not support the active **Application** will be shown with a line through the transducer name – temporarily removing it from the pool of currently selectable transducers.*

3. Tap the name of the transducer required for the exam and the system will move to live imaging.

4.3 SELECTING AN APPLICATION AND IMAGING PRESET

Imaging Presets specific to each *Application* are available with each of the system transducers. The *Applications* and *Presets* vary depending on the transducer type. Additional user-defined *Imaging Presets* may be created and stored with the factory installed or default *Presets*.

To Select/Change an Application or Imaging Preset:

1. Ensure the relevant transducer has been selected (**4.2 Selecting a Transducer**).

2. A *Presets* tab appears on the touch screen with two sections. The upper section lists the *Applications* available for the selected transducer and the lower section lists the associated *Imaging Presets*. Tap the desired *Application*.

3. The system will update the lower portion of the *Presets* tab with the available *Imaging Presets* for the selected *Application*. Tap the desired *Imaging Preset* and the system will move to live imaging.

   > *Note: If an **Imaging Preset** has been hidden, it will not be available for selection from the touch screen (or **QSONIX**). This option applies to both default and user-defined **Imaging Presets**. Refer to **9.1.1.1 Show/Hide Imaging Presets**, for more details.*

4.4 BEGINNING AN EXAM FOR A NEW PATIENT

To Begin an Exam for a New Patient (Manual Entry):

1. Press the console **ID** button.

2. The *Exam Management* page will be presented on the LCD display.

   *Note: The text cursor defaults to the **Patient ID** field unless a current exam is open. To end the current exam session, click the **End Exam** button near the top right corner of the page.*

3. Enter *Patient Information* as required.

   *Note: The **Patient ID** cannot be edited once the exam is underway.*

4. Under *Application Information*, select the appropriate *Application* in order to access the *Application*-specific data fields (e.g., for *Cardiac*, complete the *Height*, *Weight*, *BSA* and *HR* fields).

   *Note: The **Application** selected here is not tied to **Imaging Presets** or **Exam Type/Application**.*

5. Enter *Exam Information* as required.

6. To save the changes and move to live imaging, select *OK* on the *Exam Management* page or tap *OK* on the touch screen.

   *Note: The **Patient ID**, **Name** and **Operator ID** details appear at the top of the image field during an exam. When applicable, **LMP** and **GA** will also be presented.*

   *If the above-listed fields are relevant to the imaging session but are not displayed, the system may be configured to hide patient data. Refer to **General Options** in **Table 9-25** for details.*

To Begin an Exam for a New Patient (Barcode Reader):

1. Press the console **ID** button.

2. The *Exam Management* page will be presented on the LCD display.

3. With the cursor in the *Patient ID* field, scan the relevant patient barcode with the barcode reader.

4. Continue entering the patient/exam data as required.

   Note: Fields that will accept data entry via the keyboard will also accept data scanned with the barcode reader. Simply ensure that the cursor is located in the required field then scan the <u>relevant</u> barcode.

4.5   ENDING AN EXAM

To End the Current Exam Session:

1. Press the console **ID** button.

2. Tap *End Exam* on the touch screen or select *End Exam* from the *Exam* Management page.

> *Note: Before ending an exam, ensure the active image and/or each page of the current Report have been saved/printed using the console **PRINT 1**, **2** or **3** button (**9.2.4 Print Keys**). Saving the image/**Report** will allow it to be recalled via the **Review** button on the **Exam Management** page.*

4.6   STORAGE/DATABASE TABS

To the bottom right of the *Exam Management* page is a series of up to three (3) vertical *Storage* tabs:

Table 4-5: Storage/Database Tabs

Local	Select this tab to display a list of patients stored in local memory.
Worklist	Select this tab to display the patient list recently retrieved from either the *DICOM Worklist* server or *PracticeHwy*.
	*Note: This tab is available only when the system is configured for **DICOM** or **PracticeHwy Worklist**. **DICOM** and **PracticeHwy** cannot be configured for use at the same time.*
Hide	Select this tab to blank out the patient data on the *Exam Management* page. This feature provides data privacy.

4.6.1 Local

Using data entered in **4.1.1 Patient Information**, the system maintains and displays a database containing patient details.

Figure 4-4: Local Database

Table 4-6: Local Database

(Patient) ID	*Patient Identifier* as entered in the *Patient Information* section.
Last Name *First Name* *Middle Name*	Patient's *Last*, *First* and *Middle Names* as entered in the *Patient Information* section.
Birthdate	Patient's *Birthdate* as entered in the *Patient Information* section.
Sex	Patient's *Sex* as entered in the *Patient Information* section.
Insurance (#)	Patient's *Insurance Number* (if applicable) as entered in the *Patient Information* section.
Last Exam	Date of the *Last Exam* performed on the patient (if applicable).
(Number of) Images	Total number of *Images* stored for the patient's most recent exam.

4.6.1.1 Manipulating the Local Database

To Manually Select a Previously Stored Patient from the Local Database:

1. Press the console **ID** button.

2. Select the *Local* tab near the bottom of the *Exam Management* page to display a list of locally stored (on the system hard drive) patients.

ID	Last Name	First Name	Middle Name	Birthdate	Sex	Insurance	Last Study	Images	
100	SMITH	TEST					7/19/2005	2	Local
2000	LAST	FIRST	M				7/19/2005	4	
									Worklist
									Hide

3. Use the trackball and **SELECT** button to select a patient and auto-populate the data fields.

4. Modify patient and exam data fields as required.

> *Note: The (Patient) ID cannot be modified.*

5. Select *OK* to save the data and move to live imaging.

> *Note: When a new exam is initiated, the transducer used in the most recent exam will still be selected if it is still connected. If it's no longer connected, the system will default to the first available transducer. This default transducer selection is not affected even if the system is turned off between exams.*

To Search the Local Database for a Previously Stored Patient:

1. Press the console **ID** button.

2. Select the *Local* tab near the bottom of the *Exam Management* page to display a list of locally stored (on the system hard drive) patients.

3. Use the keyboard and trackball to enter the patient search data in *Patient Information* (*Patient ID* or *Name*, etc.).

> *Note: The Local Database narrows the list of patients that match the entered search criteria.*

4. When the list has been narrowed sufficiently (e.g., to one *Patient ID* or all patients with the desired *Last Name*), use the trackball and **SELECT** button to choose the desired patient.

5. Press **ENTER**.

To Change the Layout of the Patient Data Columns:

1. Press the console **ID** button.

2. Use the trackball to position the arrow cursor over the *Field Header* to be moved.

ID	Last Name	First Name	Middle Name	Birthdate	Sex	Insurance	Last Study	Images	
100	SMITH	TEST					7/19/2005	2	Local
2000	LAST	FIRST	M				7/19/2005	4	Worklist
									Hide

Field Header

3. Hold down the **SELECT** button and simultaneously use the trackball to drag the column to the desired location.

> *Note: To change the order of the list (e.g., from numerical by **Patient ID** number to alphabetical by **Last Name**), position the cursor over the relevant **Field Header** and press **SELECT**. To reverse the order press **SELECT** again.*

4.6.2 DICOM Worklist

The system must be configured for *DICOM Worklist* and connected to a DICOM server in order for the *Worklist* database feature to function. For setup instructions, refer to **9.2.3 DICOM Configuration**.

*Note: The data in the fields available on the actual search page are dependant upon the data entered into DICOM: **Patient ID**, **Last Name**, **First Name**, **Accession #**, **Start Date (mm/dd/yyyy)**, **End Date (mm/dd/yyyy)**, **Exam Type**, **Procedure ID**, **Station AE Title**, **Station Location** and **Modality Type**.*

Figure 4-5: Exam Management Page (DICOM Worklist)

Figure 4-6: DICOM Worklist Search Page

4.6.2.1 Manipulating the DICOM Worklist Database

To Perform a DICOM Worklist Search:

1. Press the console **ID** button.

2. Select *Search Worklist* from the *Exam Management* page.

3. When the *Worklist Search Criteria* page appears on the screen enter the patient search data (*Patient ID* or *Name*, etc.).

Search Criteria					
Patient ID		Start Date (mm/dd/yyyy)	12/01/2006	Station AE Title	
Last Name		End Date (mm/dd/yyyy)	12/01/2006	Station Location	
First Name		Exam Type		Modality Type	US
Accession #		Procedure ID			Search

*Note: Worklist text fields can be searched with wildcards, e.g., entering **SMI*** in the **Last Name** field will find all names beginning with **SMI**.*

4. Select *Search* to update the *Worklist* with the results of the advanced search.

Note: The parameters from the last search will be retained for the duration of the current (computer-defined) date.

*Note: **Worklist Search** results are limited to a maximum of 100 records. Any result list longer than 100 records will be truncated.*

To Select a Patient from the DICOM Worklist:

1. Press the console **ID** button.

2. Select the *Worklist* tab to display the ***DICOM Worklist*** database.

3. If the desired patient is not available on the list, select ***Update Worklist*** to refresh the data.

   Note: Updates will be based upon the last search performed.

4. Select the desired patient and the patient data fields will auto-populate.

5. Modify patient and exam data fields as required.

   *Note: The **Patient ID** cannot be modified.*

   *Modifications to auto-populated **Worklist** fields (**Name** and **Accession #**) are not recommended.*

6. Select ***OK*** to save the data, create a patient in the ***Local*** database and move to live imaging.

   Note: The patient file is automatically deleted at the end of the exam if no images or measurements are stored to the system for this patient.

   Note: When a new exam is initiated, the transducer used in the most recent exam will still be selected <u>if</u> it is still connected. If it no longer connected, the system will default to the first available transducer. This default transducer selection is not affected even if the system is turned off between exams.

4.6.3 PracticeHwy Worklist

Users wishing to configure the system for use with *PracticeHwy* must contact Ultrasonix Technical Support.

*Note: An Internet connection must be available and configured for use with **Remote Support** (**9.2.2.5 Online Remote Support***) in order to allow Ultrasonix Technical Support to install the relevant software add-ons.*

Figure 4-7: Exam Management Page (PracticeHwy Worklist)

Figure 4-8: PracticeHwy Worklist Search Page

4.6.3.1   Manipulating the PracticeHwy Worklist Database

To Perform a PracticeHwy Worklist Search:

1. Press the console **ID** button.

2. Select the *Worklist* tab to display the *PracticeHwy Worklist* database.

    *Note: Once the **Search Worklist** button is selected, the **PracticeHwy Worklist** will automatically be transferred, regardless of whether or not the **Cancel** button is clicked.*

3. If desired, select a specific patient and click *OK* to return to the *Exam Management* page.

    *Note: If a specific patient was selected in step 3, she will become the active patient upon return to the **Exam Management** page.*

4.6.4   Hide

Selecting the *Hide* tab will instantly blank all patient data visible in the *Local* or *Worklist* database. This is very useful when an *Operator* needs to quickly protect the privacy of patient data that would otherwise be visible to anyone within viewing distance.

To reveal patient data, simply click another database tab.

Figure 4-9: Hide Tab
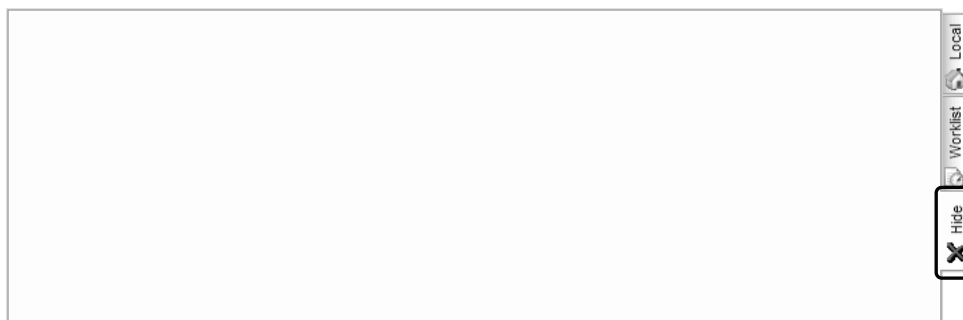
4.7 USER-DEFINED PRESETS FOR NON-3D/4D FORMATS

User-defined *Presets* may be created and saved to the selected *Application*. They are presented for selection along with factory defaults when selecting *Transducer*, *Application* and *Preset*. Refer to **9.1.1 Presets** for details on user-defined *Presets*.

In addition to standard *Presets*, the SONIX also allows users to create and save user-defined *3D/4D Presets*. Because a 3D/4D image must be acquired before a user-defined *3D/4D Preset* can be created, refer to **9.1.4 Presets – 3D/4D** for more details.

Note: **9.1.4 Presets – 3D/4D** *does not apply to* **__Advanced__ 4D Presets**.

During imaging, a user-defined *Preset* name is shown on the LCD display in square brackets (e.g., **[User-Defined Preset]**). On the touch screen, user-defined *Presets* are presented in italics (e.g., *User-Defined Preset*).

To Save User-Defined Presets:

1. Select a *Preset* similar to the required user-defined *Preset*.

2. Adjust the imaging parameters (e.g., *Depth*, *Dynamic Range*, *Gain*, *Sector Size*, *Default Color Direction*, etc.).

3. Tap the *Presets* tab on the touch screen.

4. Tap *Save Preset…* on the bottom of the touch screen.

5. When prompted, select the appropriate response to the question *Would you like to overwrite (Yes) or create a new Preset (No)*?

6. From the *Select Application* drop-down menu on the *Save Preset* dialog, chose the appropriate *Application* under which the new *Preset* will be stored (e.g., *Obstetrics*, *Pelvic*, *Abdomen*, *Vascular*, *Small Parts*, etc.).

SAVE PRESET

Select Application

Small Parts

Preset Name

|

OK   Cancel

7. Use the keyboard to enter a *Preset Name*.

8. Select *OK* to save the *Preset* or *Cancel* to exit without saving.

9. The user-defined *Preset* will now be available on the *Imaging Presets* page under the selected *Application*.

Note: For more details on the ***Imaging Presets*** *page, refer to* **9.1.1 Presets**.

CHAPTER 5: IMAGING

The SONIX buttons controlling key imaging modes are organized into specific sections on the operator console (i.e., *2D*, *Color*, *Doppler*, *Print*, etc.). Refer to **2.2 Operator Console** for layout details.

Additional imaging controls are accessible on the touch screen when a specific imaging mode is active. Touch screen imaging controls are organized by tab for each active imaging mode.

Note: Not all imaging modes or features are available with all system configurations. Refer to **Appendix B: System Specifications** *for feature availability.*

5.1   2D/M-MODE

When first entering *M-Mode*, all factory supplied *Imaging Presets* will default to the maximum *Zoom* setting.

Note: *This will not affect* <u>*user-defined*</u> ***Presets****.*

5.1.1   2D (B-Mode)

2D or *B-Mode* is the default imaging mode on the SONIX system. The key *2D* imaging controls are located to the upper right portion of the operator console with the exception of the **2D STEER** button which is located between the *Color* and *Doppler* controls:

Figure 5-1: 2D/B-Mode Field Locations During Imaging
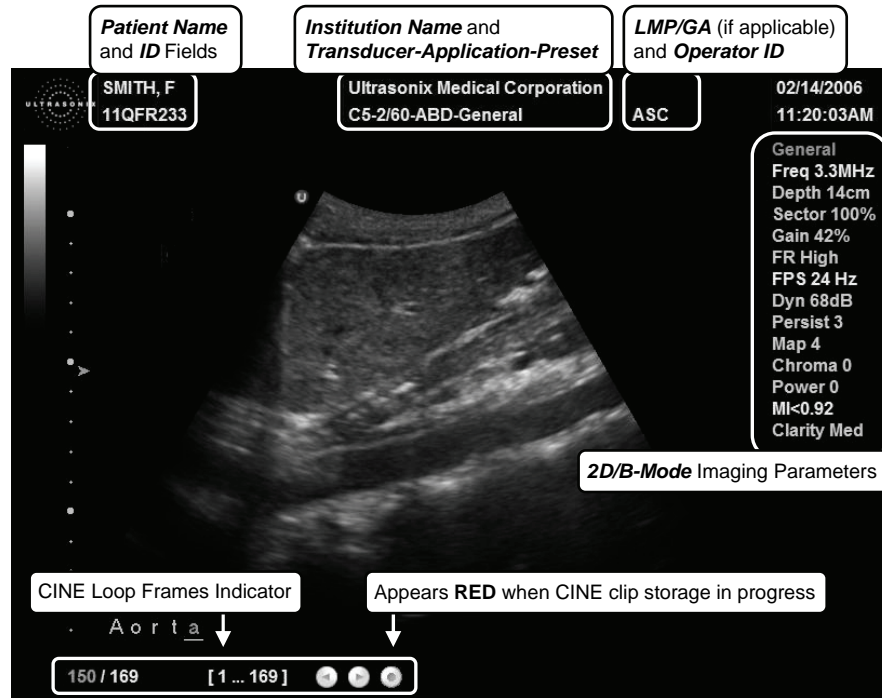
Note: Refer to **9.2.6 Patient Settings** *for details on* **LMP** *vs.* **GA** *selection.*

The system's broadband transducers provide a range of imaging *Frequencies*:

- *Harmonics*: artifact reduction (not available with all transducers)
- *Resolution*: highest frequency
- *General*: standard imaging frequency
- *Penetration*: lowest frequency
- *EPI*: greater penetration and improved contrast resolution for the technically difficult patient.

   Note: EPI is only available for use with the C5-2/60 curved array transducer.

Figure 5-2: 2D/B-Mode Onscreen Imaging Parameters

Image Optimization: **Harmonics Resolution**, **General**, **Penetration EPI (Extended Pulse Imaging)**

Depth Indicator

B-Mode Gain

Frame Rate

Persistence

Acoustic Power Output

Mechanical or **Thermal Index**

General
Freq 3.3MHz
Depth 14cm
Sector 100%
Gain 42%
FR High
FPS 24 Hz
Dyn 68dB
Persist 3
Map 4
Chroma 0
Power 0
MI<0.92
Clarity Med

Freq – frequency of transducer in MHz or **Freq = EPI** - Transducer **Frequency** optimized for **EPI**

Sector size in % or Ext (Extended Field of View/trapezoid)

Frames per Second

Dynamic Range

B-Mode Map

Chroma Map

Clarity = Speckle Reduction (**Off**, **Med**, **High**)

Table 5-1: 2D Imaging Console Controls

B-MODE button/dial	Turn to adjust overall **Gain**. Press to exit other imaging modes and return to **2D** imaging.
FREQ toggle button	Press up or down to adjust the transducer **Frequency**: **Penetration**, **General**, **Resolution**, **Harmonics** and **EPI**. *Note: The **Harmonics** setting is not supported by all transducers.*
ZOOM toggle button	Press up or down to **Zoom** the image in or out. Press **B-MODE** to exit **ZOOM**.
DEPTH toggle button	Press up or down to adjust the imaging **Depth** up or down.
FOCUS toggle button	Press up or down to adjust focal zone position up or down.
DUAL/QUAD button	Press once to activate **DUAL** and twice to activate **QUAD** imaging.
M-MODE button	Press to activate **M-MODE** imaging.
STEER toggle button	Press to steer the **2D** beam on linear transducers. This function is not available when **COLOR** or **DOPPLER** imaging modes are active.

The **TGC** slide pods located to the right of the touch screen are used to adjust the **Time Gain Compensation**.

*Note: Press the **B-MODE** button/dial to exit other imaging modes (**Color**, **PW Doppler**, **M-Mode**, **Panoramic**, **3D**, etc.) at any time during the imaging session and return to **2D** imaging.*

Additional **2D** imaging parameters are available on the touch screen under the **B-Mode** tab.

Table 5-2: 2D/B-Mode Touch Screen Controls (tap to activate)

Reverse	Tap to **Reverse** the image orientation right/left.
HD Zoom	Tap to activate **HD Zoom**. Use the trackball to position the ROI.
	Note: **UPDATE** *moves to **HD Zoom** imaging.*
	SELECT *enables ROI resizing with the trackball. Press **SELECT** again to accept the resized ROI and return to ROI repositioning or **UPDATE** to move directly to imaging.*
Biopsy	Tap to display **Biopsy** guidelines.
	Note: *This option is only available for the following transducers: C5-2/60, C7-3/50, EC9-5/10, L9-4/38, L14-5/38 and L14-5W/60.*
	*To change the onscreen orientation of the **Biopsy Guide**, refer to **9.1.10 Biopsy Guide Settings**.*
	*For details on **Biopsy** use, refer to the instructions included with the Biopsy Starter Kits.*
Pano	Tap to activate the **Panoramic** imaging mode.

Note: *Press "I" on the keyboard to invert the image orientation by 180°. Press "I" again to revert to the original image orientation.*

Table 5-3: 2D/B-Mode Touch Screen Controls: (tap to activate, dial to adjust)

Fr Rate	Adjusts the **Frame Rate**, up to 60 **Frames per Second** (**FPS**).
Sector	Adjusts the image **Sector** size.
	Note: *Extended **Field of View** (**FOV**) and trapezoid imaging if available.*
Focus Span	Adjusts the distance between focal zones.
Focus #	Adjusts the number of transmit focal zones on the screen. The maximum number of focal zones varies depending on which transducer is selected.
	Note: *Increasing the number of focal zones may reduce the **Frame Rate**.*
Clarity	Adjusts the level of Speckle Reduction: **Off**, **Med**, **High**.
Dyn **(Dynamic Range)**	Adjusts the overall image contrast resolution in 1 dB increments.
	Displayed **Dynamic Range** varies from 45dB to 105dB. Complete system **Dynamic Range** is 262dB.
	Note: *An increase in dB increases the level of grays displayed.*
Chroma	Adjusts the color **Maps** of the **2D** image: 0 to 7.
Persist	Adjusts the level of visual smoothing of the **2D** image.
Map	Adjusts the grayscale **Map**: 1 to 9.

To Adjust the Imaging Frequency (Image Optimization):

1. Press the console **FREQ** toggle button.

2. Press up/down on the toggle button to increase/decrease the 2D imaging transmit frequency.

> *Note: To increase the **Frequency**, press the toggle button up once for **Resolution** and twice for **Harmonics**. (The latter option is transducer dependant.)*
>
> *To decrease the **Frequency**, press the toggle button down once for **Penetration** and twice for **EPI**.*

To Select/Adjust Touch Screen 2D Imaging Parameters:

1. Tap the *B-Mode* tab on the touch screen.

2. Tap the desired selection touch screen (e.g., ***Persistence***).

3. Use the touch screen dial below the column containing the desired selection to make the adjustment to the imaging parameter (e.g., turn dial left to decrease ***Persistence*** or right to increase ***Persistence***).

5.1.2 Clarity (Speckle Reduction)

Clarity imaging mode enhances the 2D image by performing adaptive filtering of the image. *Clarity* provides improved visibility of real structures with various levels of speckle reduction: *Off*, *Medium*, *High*. The default *Clarity* level for most imaging *Presets* is *Medium*.

To Adjust the Clarity (Speckle Reduction) Imaging Mode:

1. Tap the *2D/B-Mode* tab on the touch screen.

2. Tap *Clarity* on the touch screen menu.

3. Use the touch screen dial below *Clarity* to adjust the level of speckle reduction. The *Clarity* level is stated at the bottom of the 2D imaging parameters listed to the right of the image field.

5.1.3 Spatial Compound Imaging

To Activate Real Time Spatial Compound Imaging:

1. Press the console **SPATIAL COMPOUND** button.

2. To exit *Spatial Compound* imaging, press **SPATIAL COMPOUND**.

Note: Spatial Compound imaging is available as an option with some transducers, but is not available during Color imaging modes.

5.1.4 2D Zoom Imaging

To Activate the Zoom Feature:

1. On a live or frozen image, press the console **ZOOM** toggle button up to the desired level of magnification.

2. Use the trackball to reposition the magnified field of view.

Note: Repositioning of the Zoom field of view is only possible after the image is magnified off the image field.

3. To reduce the level of magnification, press the **ZOOM** toggle button down to the desired level.

4. To exit the *Zoom* feature, press the **B-MODE** button to return to 2D imaging.

5.1.5 Dual Imaging Format

Refer to *Screen Layouts…* (**Table 9-11**) for details on configuring the default active image (*Left Side* or *Right Side*) and the *Auto-Switch on Start* setting.

Figure 5-3: Dual Image
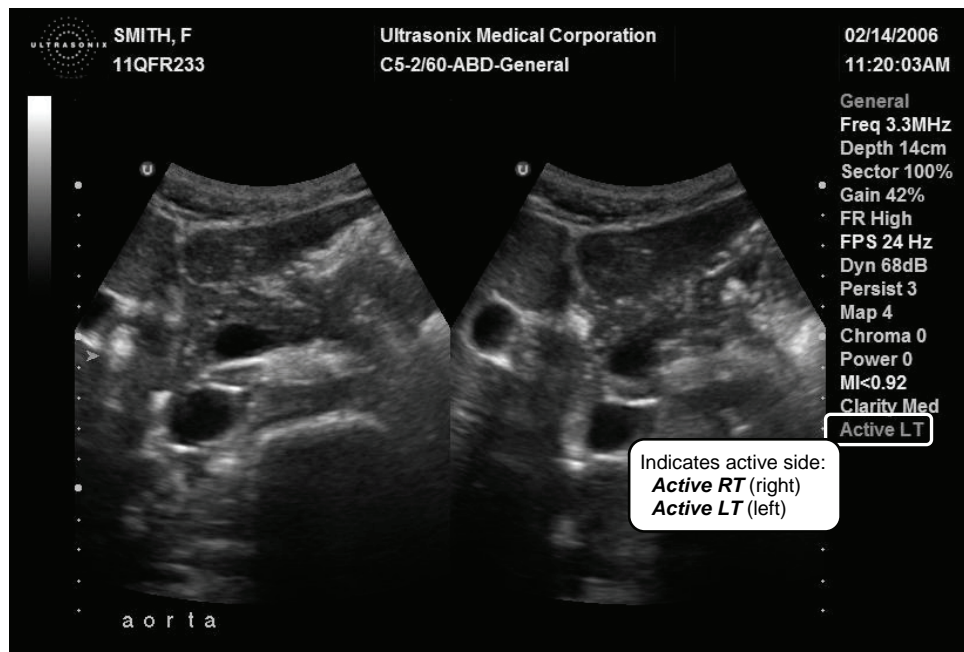
To Activate Dual Imaging:

1. Press the console **DUAL/QUAD** button once.

2. When a live image appears on the left side of the LCD display (*Active LT*), press **UPDATE** to freeze the *Active LT* image and unfreeze (i.e., make active) the *Active RT* image, in one step.

   Note: As an alternative, press **FREEZE** *to freeze the right image. Pressing* **UPDATE** *will then toggle between the frozen images. Press* **FREEZE** *again at any time to activate the current image.*

3. Press **UPDATE** to toggle back and forth between the dual images, freezing the inactive image and unfreezing the newly active image.

4. Press **B-MODE** to exit *Dual* imaging.

   Note: Color Doppler is available during Dual but not Quad imaging.

5.1.6 Quad Imaging Format

Figure 5-4: Quad Image
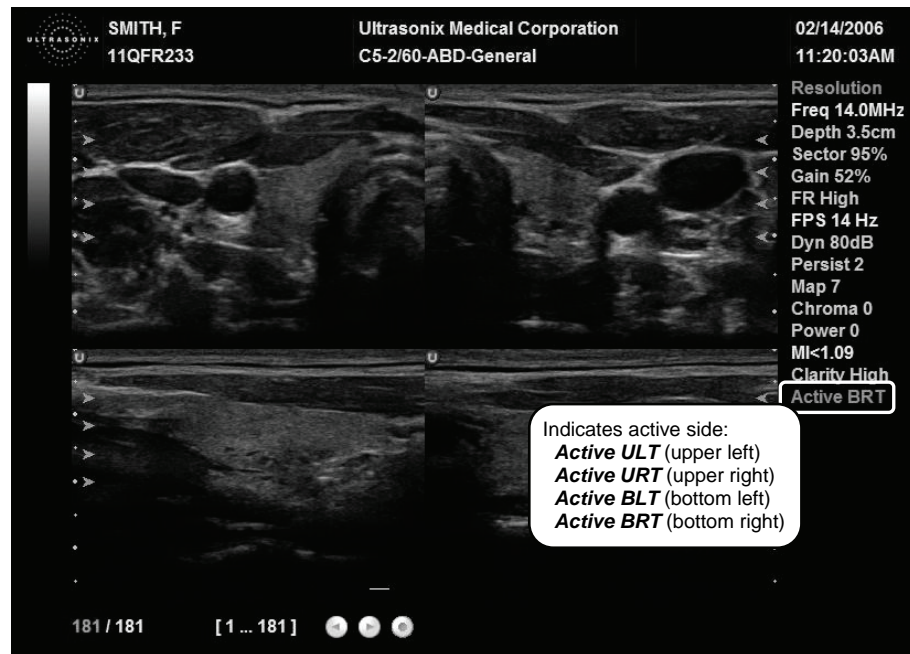
To Activate the Quad Imaging Format:

1. Press the console **DUAL/QUAD** button twice.

2. When a live image appears on the upper left side of the LCD display (*Active ULT*), press **UPDATE** to freeze the *Active ULT* image and unfreeze (i.e., make active) the upper right (*URT*) quadrant, in one step.

   Note: As an alternative, press **FREEZE** *to freeze the active image. Press* **UPDATE** *to move to the next quadrant which will also contain a frozen image. Press* **FREEZE** *to activate it or* **UPDATE** *to move to the next quadrant.*

3. Press **UPDATE** again to freeze the current image and move to the next quadrant.

   Note: **UPDATE** *toggles through the images sequentially: **ULT, URT, BLT, BRT**.*

4. Continue pressing **UPDATE** to move through the four (4) images as required. Depending on the method selected above (**UPDATE** only or **FREEZE** and **UPDATE**), the images will be active or frozen, respectively.

5. Press **DUAL/QUAD** or **B-MODE** to exit *Quad* imaging.

   *Note: Color Doppler is available during **Dual** but not **Quad** imaging.*

5.1.7 M-Mode Imaging Mode

The following *M-Mode* imaging parameters are available on the touch screen during active *M-Mode* imaging.

Table 5-4: M-Mode Touch Screen Controls (tap to activate, dial to adjust)

Sweep	Adjusts the speed of *M-Mode Sweep*: *Low*, *Medium* or *High*.
M Zoom	Adjusts the amount of *M-Mode* magnification. Use the trackball to reposition *M-Zoom* location.
Chroma	Adjusts the color of the *M-Mode Sweep*: 0 to 5.
Map	Adjusts the grayscale *Map*: 1 to 3.
Layout	Tap *Layout* to cycle through to the next *Split Imaging* display type. The default is 1:1. The four (4) *Split Imaging* options are, in order: *Split 1:1*....................... ½ Imaging Mode – ½ Trace (top/bottom configuration) *Large Trace* .... ⅓ Imaging Mode – ⅔ Trace *Small Trace*................. ⅔ Imaging Mode – ⅓ Trace *Side by Side* .... ½ Imaging Mode – ½ Trace (side by side configuration).

To Activate M-Mode Imaging:

1. Press the console **M-MODE** button.

2. A live full screen 2D image appears with an *M-Mode* cursor.

    Note: Refer to **Layout** *in* **Table 5-4** *and the* **Imaging Modes** *section of* **Table 9-11: System Settings Configuration Options** *to customize the M-Mode display settings and screen layouts.*

3. Press **UPDATE**.

4. On the touch screen, tap/dial *M Zoom*, *Sweep*, *Chroma* and *Map* to make any required adjustments.

5. Press **M-MODE** or **B-MODE** to exit *M-Mode* imaging mode and return to 2D imaging.

To Select/Adjust Touch Screen M-Mode Imaging Parameters:

1. Tap the touch screen *M-Mode* tab.

2. Tap desired selection (e.g., *Chroma*).

3. Use the touch screen dial below the column containing the desired selection to make the adjustment to the imaging parameter.

5.1.8 CINE Clip Storage and Thumbnail Image/Clip Review

5.1.8.1 CINE Clip Storage

To Store a 2D, 2D/Color or 4D CINE Clip:

1. Press the console **FREEZE** button.

2. The image field will freeze and display the *CINE* touch screen controls.

3. If not currently active, tap the touch screen *CINE* tab.

> *Note: Refer to* **Chapter 6: Advanced 3D/4D Imaging** *for details on capturing a 3D/4D image.*

The following *CINE* clip storage controls are available on the touch screen with a frozen 2D or 4D image.

Table 5-5: CINE Touch Screen Controls (tap to activate)

Play Fwd	Select to *Play Forward* the available *CINE* frames.
Play Rev	Select to play in reverse the available *CINE* frames.
Stop	Select to *Stop* the *CINE* frames from playing.
Record	Select to store the selected *CINE* frames to the system.

Table 5-6: CINE Touch Screen Controls (tap to activate, dial to adjust)

FrmByFrm Fast	Use to select currently displayed frame, 10 frames at a time.
FrmByFrm	Use to select currently displayed frame, one (1) frame at a time.
Start Fast	Use to select start frame for *CINE clip*, 10 frames at a time.
Start	Use to select start frame for *CINE clip*, one (1) frame at a time.
End Fast	Use to select end frame for *CINE clip*, 10 frames at a time.
End	Use to select end frame for *CINE clip*, one (1) frame at a time.
Play Speed	Use to select *CINE Play Speed* (⅛, ¼, ½, full (1) or double (2)).

Notes:

*CINE clip storage is not available for **M-Mode** and **PW**.*

*Changes made to **Depth**, **Gain**, etc., will reset the number of frames available for review or storage.*

CINE loop storage is a retrospective acquisition.

To Select/Adjust Touch Screen CINE Controls:

1. Tap the touch screen *CINE* tab.

2. Tap desired selection (e.g., ***Start Fast***).

3. Use the touch screen dial below the column containing the desired selection to make the adjustment to the ***CINE clip***.

Figure 5-5: CINE Frame Indicators (located at bottom left of the image field on frozen image)

Current Frame/Total # of Frames Available

Start… End Frames
(Select ***Start*** and ***End Frames*** for clip storage)

Appears **RED** when ***CINE clip*** storage is in progress.

126 / 126   [1 ... 126]
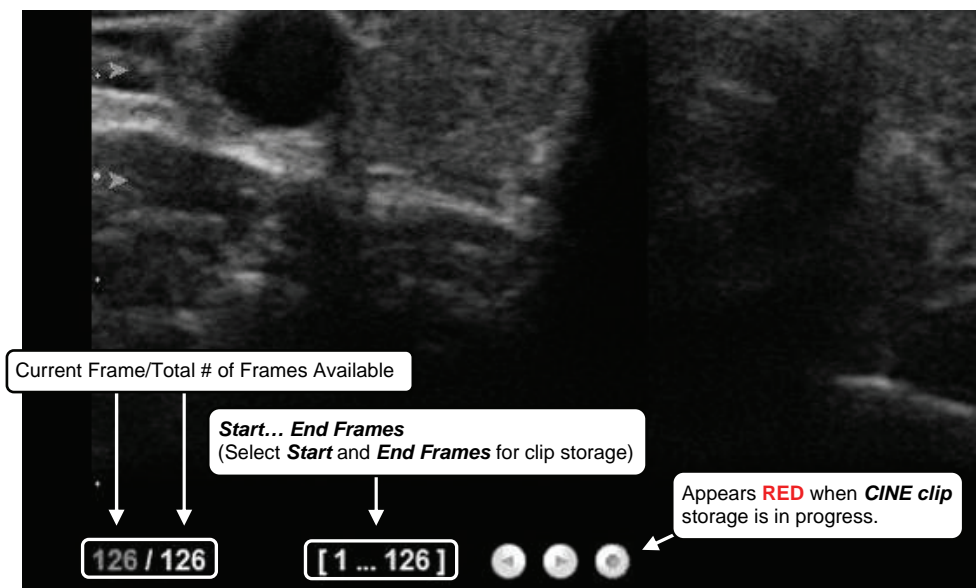
5.1.8.2 Stored Thumbnail Review

The *Stored Thumbnail Review* is displayed at the bottom of the LCD display.

To Review a Thumbnail Image/CINE Clip:

1. Move the trackball arrow over the desired thumbnail and press the console **SELECT** button.

2. Press **SELECT** again to return to imaging mode.

   *Note: If the trackball arrow is not available, it may be occupied by other imaging or measurement modes. To retrieve it, press the **SELECT** button to release the cursor from the active mode.*

The following *CINE Clip Review* controls are available on the touch screen.

Table 5-7: CINE Review Touch Screen Controls (tap to activate)

Toggle Repeat	Select to toggle between two methods of reviewing the stored loop. • repeat clip over/loop (indicated by curved arrow) • stop clip at end (indicated by straight arrow).
Exit	Select to *Exit* the clip review and return to 2D imaging.
Play	Select to *Play* the clip forward.
Pause	Select to *Pause* the stored clip.

Table 5-8: CINE Review Touch Screen Controls (tap to activate, dial to adjust)

FrmByFrm	Use to select currently displayed frame, one (1) frame at a time.
Speed	Use to select *CINE* review play *Speed* (⅛, ¼, ½, full (1) or double (2)).

To Select/Adjust Touch Screen CINE Review Controls:

1. Tap the touch screen *Review* tab.

2. Tap desired selection (e.g., *Speed*).

3. Use the touch screen dial below the column containing the desired selection to make the adjustment to the *CINE Review*.

5.2   COLOR/POWER DOPPLER

Color Doppler is used to detect blood flow and determine flow direction. *Power Doppler* is more sensitive to low flow rate in small vessels, but offers no directional information. *Color Power Doppler* is *Power Doppler* with a red/blue color map providing directional flow information.

Figure 5-6: Color Doppler Image
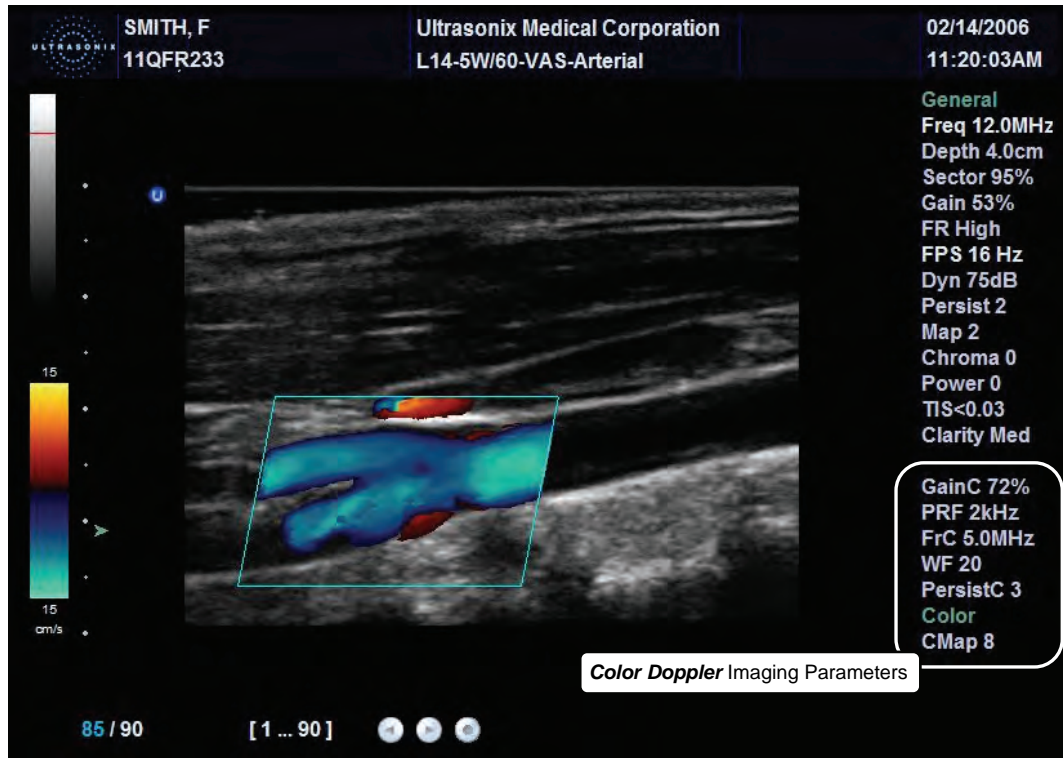
Figure 5-7: Color Doppler Imaging Parameters
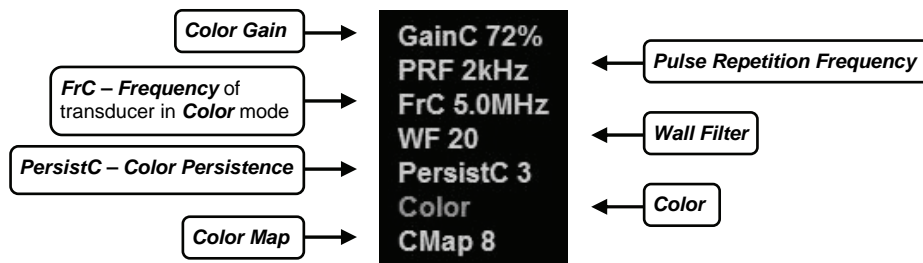
The key **Color/Power Doppler** imaging controls are located in the upper center position of the operator console.

Table 5-9: Color Doppler Console Controls

COLOR button/dial	Press to select **Color Doppler** imaging. Turn to adjust **Color Gain**.
POWER DOPPLER button	Press to activate **Power Doppler** imaging.
WF toggle button	Press up or down to adjust the **Color Wall Filter** higher or lower.
PRF toggle button	Press up or down to adjust the **Color Doppler Pulse Repetition Frequency** up or down.
INVERT button	Press to Invert the direction of the **Color Map**.
STEER toggle button	Press to **Steer** the **Color** ROI box right or left.

Additional **Color/Power Doppler** image optimization controls are available on the touch screen **Color** tab when the **Color** imaging mode is active:

Table 5-10: Color Doppler Touch Screen Controls (tap to activate)

Simult 2D/Col	Tap to activate/deactivate simultaneous side-by-side split screen: • left side: live **2D/Color** • right side: live **2D**.

Table 5-11: Color Doppler Touch Screen Controls: (tap to activate, dial to adjust)

Baseline	Adjusts the **Color Doppler Baseline**.
Priority	Adjusts the **Color Doppler 2D Priority**.
Persistence	Adjusts the **Color Doppler Persistence**.
Map	Adjusts the **Color Doppler Map**. Choose from any of 10 different color **Maps**.
Freq	Adjusts the **Frequency** of the **Color Doppler**.
Box Height	Adjusts the size of the **Color** ROI box vertically.
Fr Rate	Adjusts the image **Frame Rate**. *Note: Decreasing the **Frame Rate** increases color quality providing higher color line density. Increasing the **Frame Rate** decreases color quality.*
Box Width	Adjusts the size of the **Color** ROI box horizontally.

To Select/Adjust Touch Screen Color Imaging Parameters:

1. Tap the touch screen *Color* tab.

2. Tap the desired selection (e.g., *Persistence*).

3. Use the touch screen dial below the column containing the desired selection to make the adjustment to the imaging parameter (e.g., turn dial left to decrease the amount of *Persistence*/turn dial right to increase the amount of *Persistence*).

5.2.1   Color Doppler Imaging Mode

To Activate Color Doppler Imaging Mode:

1. Press the console **COLOR** button. A live, full screen 2D image with *Color* ROI box is displayed.

2. Use the trackball to position the *Color* ROI box to the area of interest.

3. Press **SELECT** to toggle control of the trackball to resize the *Color* ROI box.

4. Use the trackball to resize the *Color* ROI box or use the touch screen controls to make the horizontal and vertical *Color* ROI box adjustments.

   Note: During multiple mode imaging (e.g., 2D/Color/PW Doppler) use the SELECT button to toggle control of the trackball for Color ROI box positioning, Color ROI box resizing and PW cursor/Gate positioning. Alternate controls are available on the Color tab to resize the Color ROI box. The Color ROI box moves with the PW cursor.

5. Press **COLOR** to exit *Color Doppler* imaging.

5.2.2 Color Power Doppler Imaging Mode

To Activate Color Power Doppler Imaging Mode:

1. Press the console **POWER DOPPLER** button. A live full screen 2D image with *Color Power* ROI box is displayed.

2. Use the trackball to position the *Color Power* ROI box to the area of interest.

3. Press **SELECT** to toggle control of the trackball to resize the *Color Power* ROI box.

4. Use the trackball to resize the *Color Power* ROI box or use the touch screen controls to make the horizontal and vertical *Color Power* ROI box adjustments.

    > *Note: During multiple mode imaging (e.g.,* ***2D/Color/PW Doppler****) use the* **SELECT** *button to toggle control of the trackball for* **Color** *ROI box positioning,* **Color** *ROI box resizing and* **PW** *cursor/****Gate*** *positioning. Alternate controls are available on the* **Color** *tab to resize the* **Color** *ROI box. The* **Color** *ROI box moves with the* **PW** *cursor.*

5. Press **POWER DOPPLER** to exit *Color Doppler* imaging.

5.2.3 Simultaneous 2D/Color and 2D

To Activate Split Screen with Simultaneous Live 2D/Color and Live 2D:

1. Activate *Color* imaging mode.

2. Tap the touch screen *Color* tab.

3. Tap *Simult 2D/Color*.

    > *Note: The live, 2D image with* **Color** *is displayed on the left side of the image field and the same live, 2D image without* **Color** *is simultaneously displayed on the right side of the image field. Freezing the image will freeze both sides simultaneously.*

4. To exit the simultaneous *2D/Color* and 2D imaging mode, tap *Simult 2D/Color* located under the touch screen *Color* tab.

5.3 PULSED WAVE (PW) DOPPLER AND TRIPLEX

Figure 5-8: Pulsed Wave Doppler Image
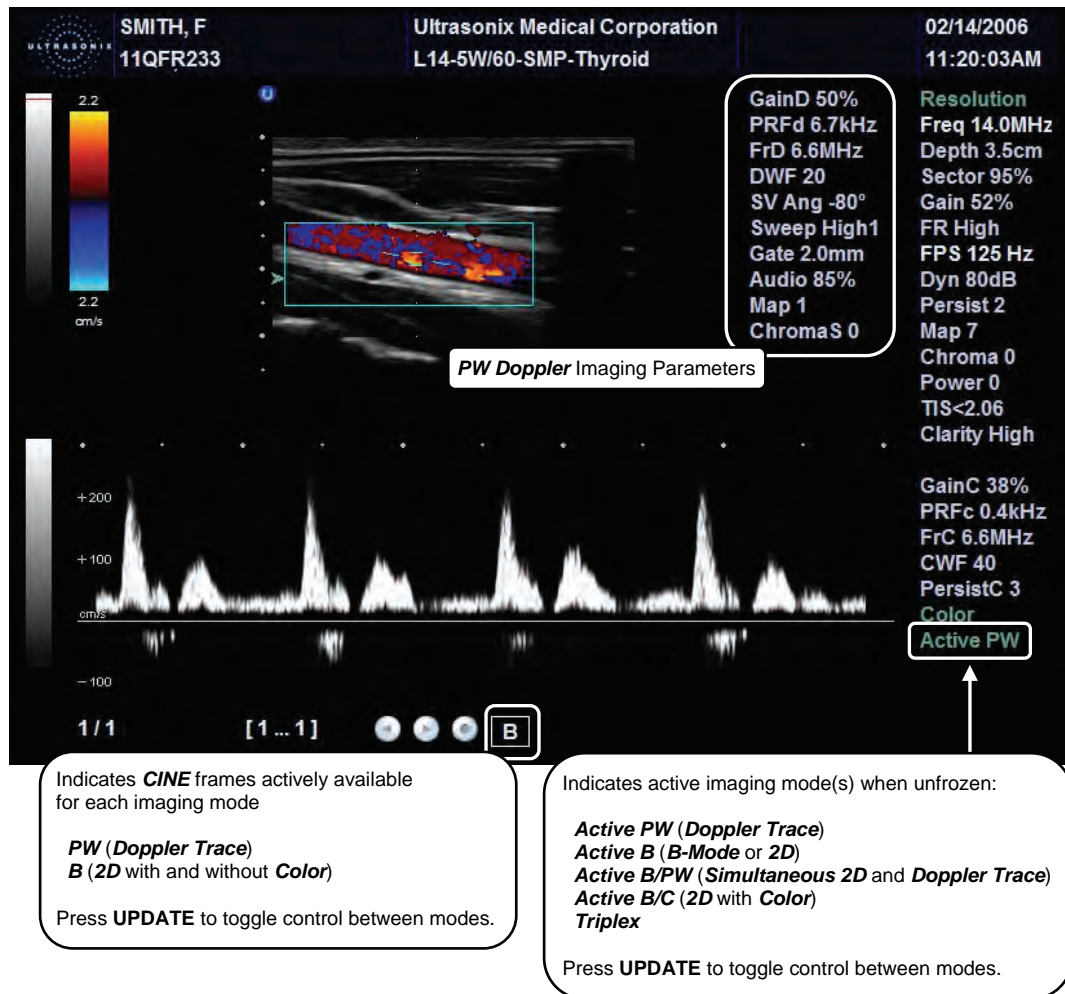
Figure 5-9: PW Doppler Imaging Parameters

Doppler Gain → GainD 50%

PRFd 6.7kHz ← Doppler Pulse Repetition Frequency

FrD – Doppler Transmit Frequency → FrD 6.6MHz

DWF 20 ← Doppler Wall Filter

Sample Volume Angle → SV Ang -80°

Sweep High1 ← *Sweep*: *Low*, *Medium*, *High*, *Extra High*

Gate size → Gate 2.0mm

Audio 85% ← *Audio* Volume

Grayscale Map → Map 1

ChromaS 0 ← Chroma Spectrum
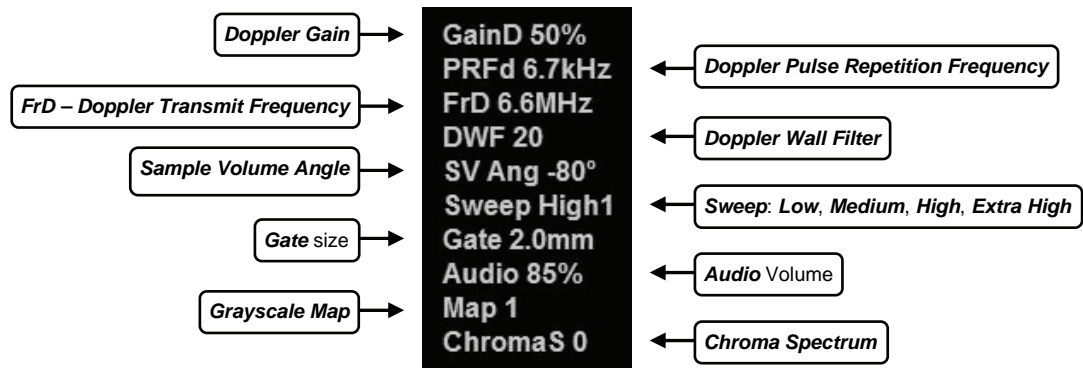
The key **PW Doppler** imaging controls are positioned to the upper left portion of the operator console:

Table 5-12: Doppler Console Controls

PW button/dial	Press to activate **PW Doppler** mode/turn to adjust **PW Doppler Gain**.
CW button	Not available in this release.
BASE toggle button	Press up or down to adjust the **Doppler Trace Baseline** up or down.
PRF toggle button	Press up or down to adjust the **Doppler PRF** up or down.
INVERT button	Press to **Invert** the direction of the **Doppler Trace**.
ANGLE CORRECT button/dial	Press to toggle between +60, -60 and 0 degree **Doppler** **ANGLE CORRECT** selections. Turn the dial to make angle corrections in 2 degree increments.
STEER button	Press to **Steer Doppler** cursor angle right or left. Also used to steer **Color** ROI box and **2D** linear image field.

The **DOPPLER VOLUME** control dial is located to the left of the touch screen on the operator console.

Additional **PW Doppler** imaging parameters are available on the touch screen to optimize the **Live Doppler Trace**.

Table 5-13: Doppler Touch Screen Controls (tap to activate, dial to adjust)

Trace On/Off	Activates/deactivates live spectral **Doppler Trace** display with measurement values.
Triplex	Available when **Color** and **Pulsed Doppler** imaging modes are activated. Tap to activate/deactivate **Triplex** imaging mode.
Sweep	Adjusts the **Sweep** speed of **Doppler Trace** (**Low**, **Medium**, **High**, **Extra High**).
Reject	Adjusts the **Doppler** spectrum threshold.
Gate (Sample Volume)	Adjusts the **PW Sample Volume Gate** size.
	*Note: To adjust the **Gate** size in full screen **2D/PW** cursor, turn the* **PULSED DOPPLER** *dial.*
Map	Adjusts the grayscale **Map** of the **Doppler Trace**.
Chroma	Adjusts the color **Map** of the **Doppler Trace** (0 to 7).
Freq	Adjusts the **Doppler** transmit **Frequency**.
WF (Wall Filter)	Adjusts the **Doppler Wall Filter**.
Layout	The default **Split Imaging** type is 1:1. Tap **Layout** to cycle through to the next display type. The four (4) options are, in order: **Split 1:1**........................½ Imaging Mode – ½ Trace (top/bottom configuration) **Large Trace** ....⅓ Imaging Mode – ⅔ Trace **Small Trace** ....⅔ Imaging Mode – ⅓ Trace **Side by Side** ....½ Imaging Mode – ½ Trace (side by side configuration).

To Select/Adjust Touch Screen PW Doppler Imaging Parameters:

1. Tap the touch screen **PW Doppler** tab.

2. Tap the desired selection (e.g., **PW Gate** size).

3. Use the dial below the relevant touch screen column to adjust the imaging parameter (e.g., turn dial left to decrease **Gate** size/turn dial right to increase **Gate** size).

5.3.1 Pulsed Wave (PW) Doppler Imaging Mode

To Activate PW Doppler Imaging Mode:

1. Press the console **PULSED DOPPLER** button.

   > *Note: Refer to* **Layout** *in* **Table 5-13** *and* **9.2.1 System Settings** *(Imaging Modes) to customize the* **Doppler** *display settings and screen layouts.*

   > *Note: To adjust the* **Sample Volume Gate** *size in full screen* **2D/PW** *cursor, turn the* **PW** *button/dial.*

2. Use the trackball to position the *Doppler* cursor/*Gate* to the area of interest.

3. Press **UPDATE** to display a live *Doppler Trace* and a frozen *2D* image/cursor.

4. Press **UPDATE** to toggle back and forth between *PW Trace* and *2D*/cursor.

5. Press **B-MODE** to exit *PW* imaging mode.

5.3.2   Triplex Imaging Mode

Triplex imaging mode combines live *2D/Color Doppler* with live *PW Doppler* imaging modes, allowing the user to image with *2D/Color* and *PW Doppler* modes simultaneously.

*Caution: Triplex imaging may diminish the quality of the **2D/Color** image and may cause **Doppler** artifacts.*

Table 5-14: Triplex Touch Screen Controls (tap to activate)

Triplex	Tap to activate/deactivate *Triplex* imaging mode.
	*Note: Once **Triplex** is active, press the console **UPDATE** button to toggle through **Active PW**, **Active B/C** and **Triplex** imaging modes.*
Layout	The default *Split Imaging* type is 1:1. Tap *Layout* to cycle through to the next display type. The four (4) options are, in order: *Split 1:1* .... ½ Imaging Mode – ½ Trace (top/bottom configuration) *Large Trace*................. ⅓ Imaging Mode – ⅔ Trace *Small Trace*................. ⅔ Imaging Mode – ⅓ Trace *Side by Side*............... ½ Imaging Mode – ½ Trace (side by side configuration).

To Activate Triplex Imaging Mode:

1.   Activate *Color* and *Pulsed Doppler* imaging modes.

2.   Press the console **UPDATE** button.

3.   Tap *Triplex* on the touch screen.

   *Note: Once **Triplex** is active, press the console **UPDATE** button to toggle through **Active PW**, **Active B/C** and **Triplex** imaging modes.*

4.   If required, tap *Layout* to move to the appropriate *Split Imaging* selection.

5.   To return to *Duplex* imaging, tap *Triplex* on the touch screen.

5.4   ELASTOGRAPHY

Elastography is used to measure tissue stiffness.

Note: Elastography is a licensed option that is not available in all markets. Consult your local dealer or Ultrasonix Technical Support to determine availability in your area.

Elastography is only available with a linear transducer.

Figure 5-10: Elastography Image
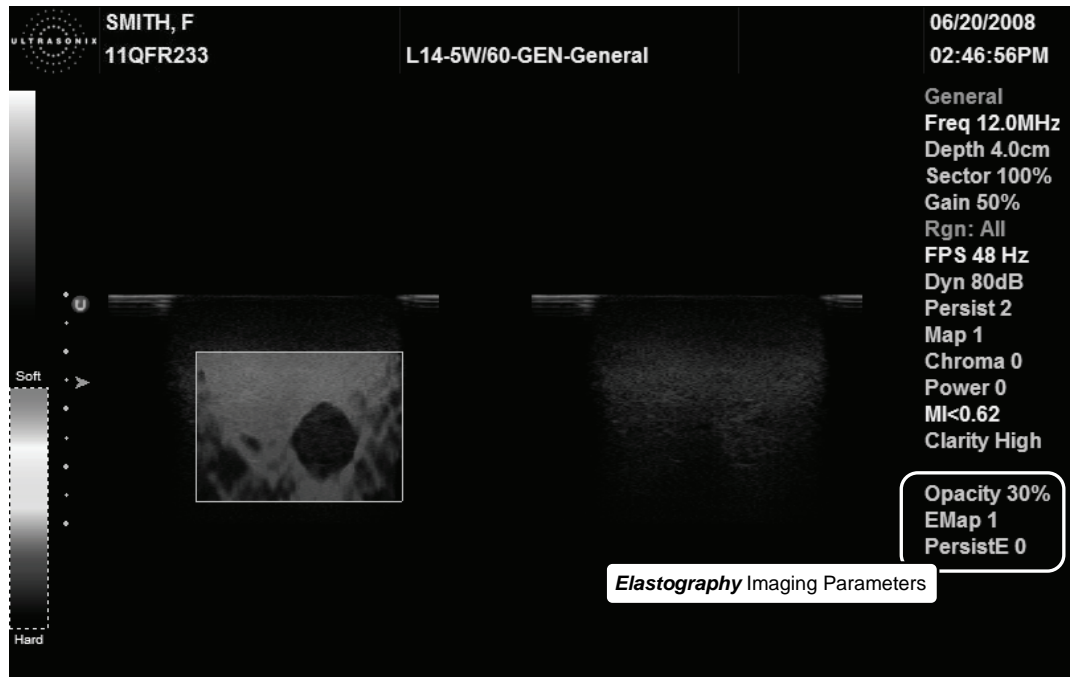
Figure 5-11: Elastography Imaging Parameters

Table 5-15: Elastography Console Controls

ELASTOGRAPHY Button	Press to activate *Elastography*.
	Note: The console **ELASTOGRAPHY** *button is found directly to the left of the* **SPATIAL COMPOUND** *button. Refer to item* ***41*** *in the* **Table 2-1***.*

Table 5-16: Elastography Touch Screen Controls (tap to activate, dial to adjust)

Region	Adjusts the visible *Elastography Region* that is overlaid on the 2D image based on the selected tissue stiffness: *Soft*, *Med*(*ium*), *Hard* or *All*.
	Note: Region coloration can be adjusted with the Map setting.
Opacity	Adjusts the *Elastography* image *Opacity* overlaid on the 2D image. The range is 0 to 100% with 10% increments.
Map	Adjusts the *Elastography Color Map*. There are four (4) options, including grayscale.
Persist	Adjusts the *Elastography Persistence*. The range is 0 to 6.

To Activate Elastography Imaging Mode:

1. Press the console **PROBE** button.

2. Select a linear transducer.

3. Press the console **ELASTOGRAPHY** button.

5.5   PANORAMIC IMAGING MODE

Panoramic imaging enables the user to generate a panoramic view of the 2D ultrasound image field, which is much wider than the typical transducer field of view.

Panoramic images are composed of several standard ultrasound images acquired as the transducer is moved along the anatomical area of interest in a direction parallel to the transducer array. The resulting compound or composite image displays a large cross section of the area of interest which can then be viewed, measured, labeled and archived.

Figure 5-12: Panoramic Image

*Caution: Measurements performed on the acquired **Panoramic** image may be inaccurate as the accuracy of the geometric re-composition is very user-dependent. Measurements performed on the acquired **Panoramic** image should be used for informational purposes only.*

To Activate the Panoramic (Pano) Imaging Mode:

1. Tap the touch screen *Pano* button during live 2D imaging.

2. A progress bar with the message "*Loading Panoramic Tables…*" will appear onscreen.

   *Note: This may take a few seconds. The **Panoramic** feature is ready to use when a white **Pano** ROI box appears on the 2D image.*

3. To begin acquiring a *Panoramic* image, position the left side of the anatomical area of interest within the *Pano* ROI box.

4. Press **UPDATE** or tap *Start/Stop* on the touch screen to begin the *Panoramic* acquisition.

5. Move the transducer along a path parallel to the transducer array in the area of interest. For best results move the transducer at a slow and steady pace.

6. When a suitable *Pano* image is acquired, press the console **FREEZE** or **UPDATE** button or tap *Start/Stop* on the touch screen.

7. The generated *Panoramic* image appears in the image field.

8. Tap *Exit* to exit the *Panoramic* imaging mode and return to 2D imaging.

   *Caution: Measurements performed on the acquired **Panoramic** image may be inaccurate as the accuracy of the geometric re-composition is very user-dependent. Measurements performed on the acquired **Panoramic** image should be used for informational purposes only.*

5.6 FREEHAND 3D AND STANDARD 3D/4D IMAGING

The following 3D/4D image optimization parameters are available on the touch screen.

Table 5-17: 3D/4D Main Touch Screen Controls (tap to activate, dial to adjust)

VR	Displays only the **Volume Rendering** of the 3D/4D image.
A|VR	Displays side-by-side, split-screen view of the **Acquisition Plane** (*A*) image with a **3D/4D VR** image.
C|VR	Displays side-by-side, split-screen view of the **Coronal** (*C*) **Plane** image with a **3D/4D VR** image.
A|B C|VR	Displays *A*, *B* (**Transverse**) and *C* plane images along with a **3D/4D VR** image.
Save Volume	Tap to save the volume data. This allows **Operators** to reopen the 3D image (and manipulate its settings) during the exam, so long as it remains the **Current** exam. It can also be reopened later using the **Review** option on the **Exam Management** page. Images that have been saved using the **Save Volume** option will be marked with a 3D box icon. *Note: To access the 3D version of the image press the console* **ID** *button and select the relevant patient/exam from the* **Patients** *tab. Click* **OK** *to review the exam session. Select the appropriate image from the thumbnails at the bottom of the exam screen and configure the 3D image as desired.*
Reset	Returns many settings to their defaults.
Exit	Exits 3D/4D imaging.
Quality	Tap/dial to adjust image **Quality**. There are three (3) available levels: **Low Medium** and **High**. For 4D images, **Quality**, in conjunction with **FOV**, creates the **Volumes per Second** (**VPS**) setting recorded on the bottom of the LCD display. *Note: Not available for* **Freehand 3D**. *This setting is not affected by* **Reset**.
FOV	Tap/dial to adjust the **Field of View** (**FOV**) of the rendered 3D/4D image. This setting ranges from 5° to 60° (in 5° increments) and is tracked across the bottom of the LCD display. *Note: The* **FOV** *can be adjusted during 4D imaging only.* For 4D images, **FOV**, in conjunction with **Quality**, creates the **Volumes per Second** (**VPS**) setting recorded on the bottom of the LCD display. *Note: Not available for* **Freehand 3D**. *This setting is not affected by* **Reset**.
Threshold	Tap/dial to suppress image artifacts or noise with a **Threshold** adjustment. **Reset** applies to this option. *Note: The* **Dynamic Range** *of the image will be optimized automatically based on the selected* **Threshold** *setting.*
Transp	Adjusts image **Transparency** settings on the LCD display. **Reset** applies to this option.
X-axis	Rotates the selected image about the **X-axis**.
Y-axis	Rotates the selected image about the **Y-axis**.
Z-axis	Rotates the selected image about the **Z-axis**.
VR Orient	Sets the **Orientation** of the **VR**. **Reset** applies to this option. *Note: This setting is tracked under* **Current Display** *on the right side of the LCD display.*

Note: 3D/4D Advanced > Sculpt… options (below) cannot be applied during image acquisition.

*During 4D image acquisition, if the **Sculpt…** option is selected without pressing the console **FREEZE** button, image acquisition will be suspended, although the 4D transducer will continue to operate. Once the user exits **Sculpt…**, image acquisition will resume.*

Table 5-18: 3D/4D Advanced Touch Screen Controls (tap to activate, dial to adjust)

Sculpt…	***Lasso (inside)***	Traces a freehand ***Lasso*** around the desired area and deletes all items inside the shape.
	Lasso (outside)	Traces a freehand ***Lasso*** around the desired area and deletes all items outside the shape.
	Rect (inside)	Traces a ***Rectangle*** around the desired area and deletes all items inside the shape.
	Rect (outside)	Traces a ***Rectangle*** around the desired area and deletes all items outside the shape.
	Ellipse (inside)	Traces an ***Ellipse*** around the desired area and deletes all items inside the shape.
	Ellipse (outside)	Traces an ***Ellipse*** around the desired area and deletes all items outside the shape.
	Undo All	Undoes all the edits made during the session.
		Note: *A session is considered ended once the user exits **Sculpt…**. Re-entering **Sculpt…** is considered a new session even if the same image is being edited.*
	Undo Last	Undoes the edits made during the session, one at a time, in reverse order.
	Exit	***Exits Sculpt…***.
	VR Orient	Sets the ***Orientation*** of the selected image.
		Note: *This setting is tracked under **Current Display** on the right side of the LCD display.*
X-axis		Rotates the selected image about the ***X-axis***.
Y-axis		Rotates the selected image about the ***Y-axis***.
Z-axis		Rotates the selected image about the ***Z-axis***.

Table 5-19: 3D/4D Display Touch Screen Controls (tap to activate, dial to adjust)

Slice Lines	Displays the actual slices of the 3D image as determined by the *A*, *B* and *C Planes*. To view their position without *Slice Lines* selected, turn on *Reference Planes*.
Reference Planes	Displays the positioning of the three dimensional planes as they would appear in the *VR* or *MPR Rendering*, without actually "slicing" the planes through the image. To view the actual slices, turn on *Slice Lines*.
Boundary Box	Inserts a yellow, 3D box that represents the outer edges of the 3D/4D data.
Axes	Displays the color-coded *Axes* markers through the *VR* image.
Save Preset	Once the settings have been adjusted as desired, tap to save as a user-defined *3D/4D Preset*.
Quality	Tap/dial to adjust the *Quality* of the image(s). There are three (3) available levels: *Low Medium* and *High*. For 4D images, *Quality*, in conjunction with *FOV*, creates the *Volumes per Second* (*VPS*) setting recorded on the bottom of the LCD display. *Note: Not available for Freehand 3D. This setting is not affected by Reset.*
FOV	Tap/dial to adjust the *Field of View* (*FOV*) of the rendered 3D/4D image. This setting ranges from 5° to 60° (in 5° increments) and is tracked across the bottom of the LCD display. *Note: The FOV can be adjusted during 4D imaging only.* For 4D images, *FOV*, in conjunction with *Quality*, creates the *Volumes per Second* (*VPS*) setting recorded on the bottom of the LCD display. *Note: Not available for Freehand 3D. This setting is not affected by Reset.*
Background	Tap/dial to adjust the color of the LCD display *Background*. This setting has a range of 1 to 101, inclusive, where 1 is the darkest and 101 is the lightest. *Note: This setting is tracked under Current Display on the right side of the LCD display. This setting is not affected by Reset.*
Contrast	Adjusts *VR* image *Contrast* settings on the LCD display. *Reset* applies to this option.
VR Map	Tap/dial to adjust the coloration of the *VR* image using pre-defined color *Maps*. The range for this setting is 01 to 19, inclusive. *Reset* applies to this option. *Note: This setting is tracked under Current Display on the right side of the LCD display.*
Smooth	Tap/dial to adjust the smoothness of the rendered 3D/4D image. This setting ranges from 0 to 3, inclusive and is tracked across the bottom of the LCD display (4D images only). *Note: Not available for Freehand 3D. This setting is not affected by Reset.*
MPR Map	Tap/dial to adjust the coloration of the *MPR* images using pre-defined color *Maps*. The range for this setting is 01 to 34, inclusive. *Reset* applies to this option. *Note: This setting is tracked under Current Display on the right side of the LCD display.*
VR View	Tap/dial to adjust the position from which the *VR* is viewed. There are six (6) positions available: *Top*, *Bottom*, *Left*, *Right*, *Front* and *Back*. *Reset* applies to this option. *Note: This setting is tracked under Current Display on the right side of the LCD display.*

Once a 3D/4D image has been captured, there are several editing parameters available on the LCD display.

Figure 5-13: Sample 3D/4D Image Display

Table 5-20: Image Quadrants

Green: Acquisition Plane (*A*)	**Blue**: Transverse Plane (*B*) Perpendicular to the Acquisition Plane
Red: Coronal Plane (*C*)	*Volume Rendering (VR)* AND/OR *MPR Rendering*

*Note: 4D images default to the **A|VR** dual image screen.*

*For more information on adjusting the items in **Current Display**, refer to the appropriate fields in the tables beginning on page **5-26**.*

Figure 5-14: Acquisition Diagram
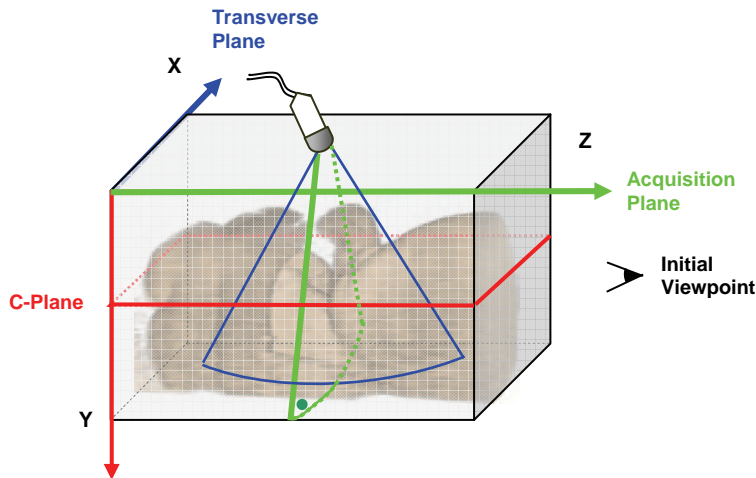
This diagram demonstrates the various planes and axes of a 3D image once it has been acquired and <u>before</u> any changes are made to it. Remember that once an image has been edited (e.g., the **MPR ROI** has been altered) the positions of the planes shown here will have been altered as well. Once changes have been made, use the touch screen **Reset** button on **3D/4D Main** to return the image to its original geometric position.

*Note: Using **Reset** will also return other settings to their original positions, including: **Threshold, VR View** and **Contrast**.*

Table 5-21: 3D/4D Visualization options (edit using trackball and console SELECT button)

3D Rendering	**Enable MPR ROI**	Select to view the Region of Interest (ROI) in each view of the image. By default, this field will be selected after every image capture.
		*Note: **Enable MPR ROI** cannot be selected at the same time as **Section Plane**.*
		Select the radio button for **Position** to adjust the positioning of the image in relation to the ROI (which will display as solid lines during **Position** adjustment).
		Select the radio button for **Size** to adjust the size of the ROI (which will display as dotted lines during **Size** adjustment).
Section Planes	**Show VR**	Select **Section Planes** to view to the intersection point of all planes on the **VR** or **MPR Rendering**.
		*Note: **Section Planes** cannot be selected at the same time as **Enable MPR ROI**.*
		Select **Show VR** to adjust the intersection point of all planes on the **VR** or **MPR Rendering**.
Exit		Select to **Exit** the current editing session.

*Note: To move a selected item (e.g., the **Acquisition Plane** ROI) use the trackball to position the cursor, press the console **SELECT** button and use the trackball to drag the desired item to its new position. Press **SELECT** again to complete the action.*

5.6.1 Freehand 3D Imaging (All Non-4D SONIX Transducers)

Configuration for *Freehand 3D* imaging is controlled through **9.1.7 3D Settings**. The *3D Config* dialog box may be configured to appear after image acquisition or not to display at all. In the latter case the freehand imaging parameters are controlled via the touch screen, before image acquisition.

Freehand 3D images are acquired by moving the transducer in either a *Parallel* or *Fan* motion.

Table 5-22: Freehand 3D Image Configuration Options (touch screen/dial or dialog box)

Paral (Parallel)	Select *Paral* as the *Scan Type* to measure the *Length* of a linear path in centimeters. The selection range is 1 cm to 25 cm, with adjustments available in 1 cm increments.
	Note: Slide the transducer along a linear path.
Fan	Select *Fan* as the *Scan Type* to measure a pivot *Angle* in degrees. The selection range is 5° to 90°, with adjustments available in 5° increments.
	Note: Pivot the transducer in a rocking motion.

To Obtain a Freehand 3D Image with Configuration BEFORE Acquisition:

1. Press the console **3D/4D** button.

2. On the touch screen, tap the desired *Preset* name.

3. Turn the dial below *Scan Type* to select either *Paral* or *Fan*.

4. The associated value option will automatically change to the appropriate measurement type: *Length* for *Parallel* or *Angle* for *Fan*.

5. Turn the dial below the associated value until it reaches the desired setting.

6. Position the transducer to one side of the anatomical area of interest.

7. Press **UPDATE** to begin the acquisition.

8. Move the transducer over the area of interest in a motion relevant to the *Scan Type* selection made in Step 3, above (*Parallel* or *Fan*).

9. Press the console **FREEZE** button to complete the acquisition.

   Note: If the process takes too long, the system will complete the image automatically before the **FREEZE** *button is pressed and present the following message bubble.*
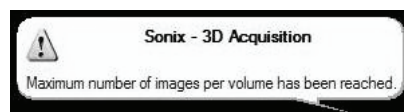
10. The acquired image will be rendered to the LCD display in the *A|B|C|VR* format.

   Note: Use the **3D/4D Main** *touch screen selections to change the viewing format.*

To Obtain a Freehand 3D Image with Configuration AFTER Acquisition:

1.   Press the console **3D/4D** button.

2.   On the touch screen, tap the desired *Preset* name.

3.   Position the transducer to one side of the anatomical area of interest.

4.   Press **UPDATE** to begin the acquisition.

5.   Move the transducer over the area of interest in either a *Parallel* or *Fan* motion.

6.   Press the console **FREEZE** button to complete the acquisition.

> *Note: If the process takes too long, the system will complete the image automatically before the* **FREEZE** *button is pressed and present the following message bubble.*

7.   Select the freehand *Scan Type* from the *3D Config* dialog: *Parallel* or *Fan*.
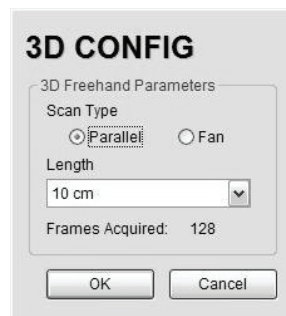
> *Note: The* **Scan Type** *selected should match the motion used to acquire the image: **Parallel** or **Fan**.*

8.   Select the appropriate *Length* or *Angle* setting from the drop-down menu.

9.   Select *OK* to complete the configuration.

10. The acquired image will be rendered to the LCD display in the *A|B|C|VR* format.

> *Note: Use the* **3D/4D Main** *touch screen selections to change the viewing format.*

5.6.2 3D Imaging (SONIX 4D Transducer)

To Obtain a 3D Image with a SONIX 4D Transducer:

1. Press the console **PROBE** button.

2. A list of available transducers will be presented on the touch screen.

   > *Caution: The 4D transducer <u>must</u> be inserted into the upper most transducer connection port to ensure proper function. Refer to* **3.2 Connecting Transducers** *for details on connecting transducers.*

3. Tap the appropriate transducer name on the touch screen.

4. Tap the *Presets* tab.

5. Tap the desired *Application*.

6. Tap the desired *Preset*.

7. Press the console **3D/4D** button.

8. Tap the *3D* button on the touch screen.

9. Position the 4D transducer over the area of interest.

10. Press **UPDATE** to begin the acquisition.

    > *Note: Hold the transducer steady while the image is being acquired.*

11. The acquired *3D* rendering with its associated views will be presented on the LCD display.

    > *Note: See* **5.6.5 3D/4D Image Formats for the LCD Display** *for details on image views.*

5.6.3 4D Imaging (SONIX 4D Transducer)

To Obtain a 4D Image Using a SONIX 4D Transducer:

1. Press the console **PROBE** button.

2. A list of available transducers will be presented on the touch screen.

3. Tap the appropriate 4D transducer name on the touch screen.

4. Press the console **3D/4D** button.

5. Position the 4D transducer over the area of interest.

6. Press **UPDATE** to begin the acquisition.

7. The acquired 4D rendering with its associated *Acquisition Plane* will be presented on the LCD display.

8. Slowly move the transducer over the area of interest.

9. Press the console **FREEZE** button to complete the acquisition.

> *Note: See* **5.6.5 3D/4D Image Formats for the LCD Display** *for details on image views.*

5.6.4 4D-Specific LCD Display Details

When a 4D image is acquired, the LCD display will have an additional line across the bottom. These settings are not available onscreen with 3D images.

*Note: For details on manipulating the **CINE** options, refer to* **5.1.8 CINE Clip Storage and Thumbnail Image/Clip Review***.*

Figure 5-15: 4D-Specific LCD Display Details

CINE
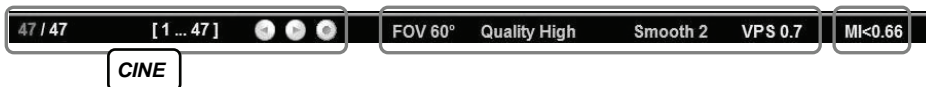
Table 5-23: Additional Advanced 3D/4D LCD Display Details

FOV *(Field of View)*	Refer to **Table 5-17** and **Table 5-19** for details on this setting. *Note: For 4D images, **FOV**, in conjunction with **Quality**, automatically creates the **Volumes per Second** (**VPS**) setting.*
Quality	Refer to Table 5-17 and **Table 5-19** for details on this setting. *Note: For 4D images, **FOV**, in conjunction with **Quality**, automatically creates the **Volumes per Second** (**VPS**) setting.*
VPS *(Volumes per Second)*	*VPS* is auto-calculated based on the *FOV* and *Quality* settings. It cannot be edited.
MI (Mechanical Index)	The *MI* is displayed for informational purposes only.

5.6.5 3D/4D Image Formats for the LCD Display

There are four (4) different image formats available for the LCD display: *VR*, *A|VR*, *C|VR* and *A|B|C|VR*.

After acquiring a *Freehand 3D* or 3D image, the LCD display will default to the *A|B|C|VR* option, while a 4D acquisition will default to *A|VR*.

Figure 5-16: 3D/4D Image Presentation Formats
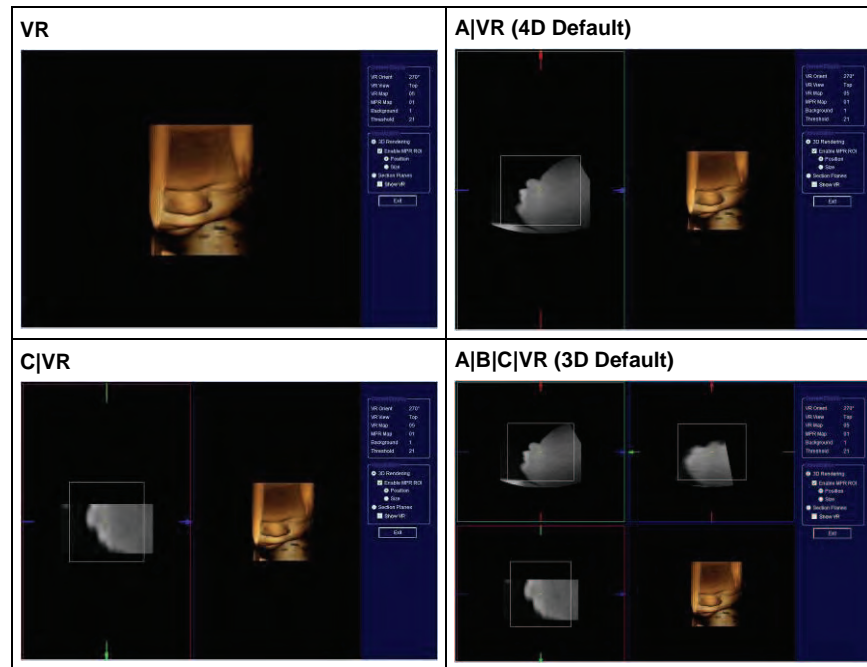
*Note: If the **Show VR** radio button is not selected in the **Visualization** menu on the LCD display, then the **MPR Rendering** will be displayed in place of the **VR** image.*

Figure 5-17: MPR Rendering Presentation Settings
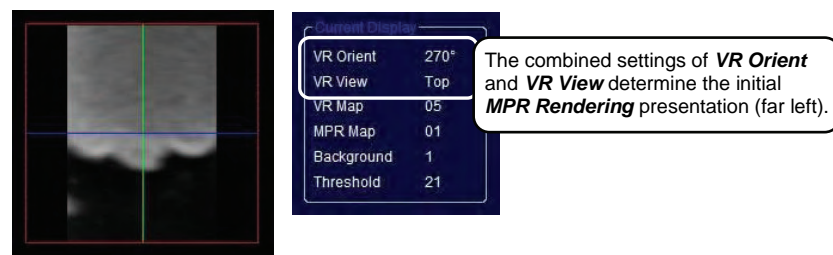
To Change the Format of a Rendered 3D/4D Image on the LCD Display:

1. Tap the *3D* or *4D* touch screen tab.

2. Make the appropriate selection on the *3D/4D Main* touch screen panel: *VR*, *A|VR*, *C|VR* or *A|B|C|VR*.

> *Note: The image format can also be changed during 4D image acquisition. Refer to page 5-41 for details on optimizing a 4D image during acquisition.*

5.6.6   Optimizing a 3D Image

A 3D image can only be optimized after it has been acquired. Both the image and its environment can be optimized in several ways, including: *Quality**, *Display**, *Threshold*, *Transparency*, *VR Orient*, *Background*, *Contrast*, *VR Map*, *Smooth**, *MPR Map* and *VR View*.

For a comprehensive list of options for editing a 3D image and its environment, refer to the tables beginning on page **5-26**.

> *Note: Options marked with an asterisk (*) are not available for **Freehand 3D** images.*

To Optimize a 3D Image AFTER Acquisition:

1. Acquire a *Freehand 3D* or 3D image using the instructions in **5.6.1** or **5.6.2**.

2. Once the image has been rendered to the screen, tap *3D/4D Main* on the touch screen.

3. Tap the desired image presentation format: *VR*, *A|VR*, *C|VR* or *A|B|C|VR*.

4. Tap the desired tab on the touch screen: *3D/4D Main*, *3D/4D Advanced* or *3D/4D Display*.

5. Tap/dial to make the necessary changes, tapping page tabs to move through the touch screens as necessary.

6. To adjust the *Visualization* options on the LCD display, check the *3D Rendering* radio button.

7. Check *Enable MPR ROI*, then the *Position* radio button to adjust the location of the ROI rectangle (solid line).
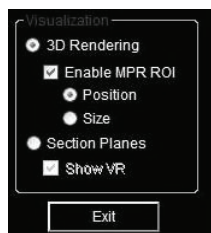
8. Press the console **SELECT** button then use the trackball to drag the image to the desired position (in either the *A*, *B* or *C Plane*).

9. Press **SELECT** again to lock in the *Position* of the ROI rectangle.

10. To change the size of the ROI rectangle (dotted line), check the *Size* radio button.

11. Press the console **SELECT** button, then use the trackball to drag the ROI rectangle to the desired dimension (in either the *A*, *B* or *C Plane*).

12. Press **SELECT** again to lock in the *Size* of ROI rectangle.

13. To view/edit the intersection point of all planes on the image, check the *Section Planes* radio button on the LCD display (*Visualization* option).

*Note: Select the **Show VR** checkbox or not as desired.*

*The plane shown is controlled by the combined settings of **VR View** and **VR Orient** which are listed to the right under **Current Display** (e.g., **VR Orient** = 270° and **VR View** = Top).*

14. To adjust the intersection point of the *Section Planes*, move the cursor over the right hand (or bottom right hand) image on the LCD display.

15. Press and hold the console **SELECT** button then use the trackball to drag the image's *Section Planes* to the desired intersection point.

*Note: To make it easier to determine the location of the intersection point, tap **3D/4D Display** and turn on/off any combination of **Slice Lines**, **Reference Planes**, **Axes** or the **Boundary Box**.*

16. Release the **SELECT** button once the desired effect has been achieved.

*Note: If desired, the image can be set to rotate freely. Refer to **5.6.8 3D/4D Active Rotation** for details on this functionality.*

17. To undo the changes made to the image, tap *Reset* on *3D/4D Main*.

Note: Reset will return many, but not all, settings to their original positions.

5.6.7 Optimizing a 4D Image

A 4D image can be optimized during acquisition, or after it has been acquired. Both the image and its environment can be optimized in several ways, including: *Quality*, *Display*, *Threshold*, *Transparency*, *VR Orient*, *Background*, *Contrast*, *VR Map*, *Smooth*, *MPR Map* and *VR View*.

For a comprehensive list of options for editing a 4D image and its environment, refer to the tables beginning on page **5-26**.

To Optimize a 4D Image AFTER Acquisition:

1. Acquire a 4D image following the instructions in **5.6.3**.

2. Once the image has been rendered to the screen, tap *4D Main* on the touch screen.

3. Tap the desired image presentation format: *VR*, *A|VR*, *C|VR* or *A|B|C|VR*.

4. Tap the desired tab on the touch screen: *4D Main*, *4D Advanced* or *4D Display*.

   Note: Once a 4D image has been acquired, the touch screen will have a fourth tab: CINE. Refer to 5.1.8 CINE Clip Storage and Thumbnail Image/Clip Review for details on CINE manipulation.

5. Tap/dial to make the necessary changes, tapping page tabs to move through the touch screens as necessary.

6. To adjust the *Visualization* options on the LCD display, check the *3D Rendering* radio button.

7. Check *Enable MPR ROI*, then the *Position* radio button to adjust the location of the ROI rectangle (solid line).

8. Press the console **SELECT** button then use the trackball to drag the image to the desired position (in either the *A*, *B* or *C Plane*).

9. Press **SELECT** again to lock in the *Position* of ROI rectangle.

10. To change the size of the ROI rectangle (dotted line), check the *Size* radio button.

11. Press the console **SELECT** button, then use the trackball to drag the ROI rectangle to the desired dimension (in either the *A*, *B* or *C Plane*).

12. Press **SELECT** again to lock in the *Size* of ROI rectangle.

---

13. To view/edit the intersection point of all planes on the image, check the ***Section Planes*** radio button on the LCD display (***Visualization*** option).

*Note: Select the **Show VR** checkbox or not as desired.*

*The plane shown is controlled by the combined settings of **VR View** and **VR Orient** which are listed to the right under **Current Display** (e.g., VR Orient = 270° and **VR View** = Top).*

14. To adjust the intersection point of the ***Section Planes***, move the cursor over the right hand (or bottom right hand) image on the LCD display.

15. Press and hold the console **SELECT** button then use the trackball to drag the image's ***Section Planes*** to the desired intersection point.

*Note: To make it easier to determine the location of the intersection point, tap **3D/4D Display** and turn on/off any combination of **Slice Lines**, **Reference Planes**, **Axes** or the **Boundary Box**.*

16. Release the **SELECT** button once the desired effect has been achieved.

*Note: If desired, the image can be set to rotate freely. Refer to **5.6.8 3D/4D Active Rotation** for details on this functionality.*

17. To undo the changes made to the image, tap ***Reset*** on ***3D/4D Main***.

*Note: **Reset** will return many, but not all, settings to their original positions.*

To Optimize a 4D Image DURING Acquisition:

1. Acquire a 4D image following the instructions in **5.6.3**, but do not freeze the image, instead, simply allow it to keep acquiring data.

2. Tap *4D Main* on the touch screen.

3. Tap the desired image presentation format: *VR*, *A|VR*, *C|VR* or *A|B|C|VR*.

4. Tap the desired tab on the touch screen: *4D Main*, *4D Advanced* or *4D Display*. Once the touch screen page presents the desired options, tap/dial to make the necessary changes.

   > *Note: 4D Advanced Sculpt…* options cannot be applied during image acquisition.
   >
   > *During 4D acquisition, if the* **Sculpt…** *option is selected without pressing the console* **FREEZE** *button, image acquisition will be suspended, although the 4D transducer will continue to operate. Once the user exits* **Sculpt…** *image acquisition will resume.*

5. Tap/dial to make the necessary changes, tapping page tabs to move through the touch screens as necessary.

6. To adjust the *Visualization* options on the LCD display, check the *3D Rendering* radio button.

7. Check *Enable MPR ROI*, then the *Position* radio button to adjust the location of the ROI rectangle (solid line).

8. Press the console **SELECT** button, then use the trackball to drag the image to the desired position (in either the *A*, *B* or *C Plane*).

9. Press **SELECT** again to lock in the *Position* of ROI rectangle.

10. To change the size of the ROI rectangle (dotted line), check the *Size* radio button.

11. Press the console **SELECT** button, then use the trackball to drag the ROI rectangle to the desired size (in either the *A*, *B* or *C Plane*).

12. Press **SELECT** again to lock in the *Size* of ROI rectangle.

13. To view/edit the intersection point of all planes on the image, check the **Section Planes** radio button on the LCD display (**Visualization** option).

Note: Select the Show VR checkbox or not as desired.

The plane shown is controlled by the combined settings of VR View and VR Orient which are listed to the right under Current Display (e.g., VR Orient = 270° and VR View = Top).

14. To adjust the intersection point of the **Section Planes**, move the cursor over the right hand (or bottom right hand) image on the LCD display.

15. Press and hold the console **SELECT** button then use the trackball to drag the image's **Section Planes** to the desired intersection point.

Note: To make it easier to determine the location of the intersection point, tap 3D/4D Display and turn on/off any combination of Slice Lines, Reference Planes, Axes or the Boundary Box.

16. Release the **SELECT** button once the desired effect has been achieved.

Note: If desired, the image can be set to rotate freely. Refer to 5.6.8 3D/4D Active Rotation for details on this functionality.

17. To undo the changes made to the image, tap **Reset** on **3D/4D Main**.

Note: Reset will return many, but not all, settings to their original positions.

5.6.8   3D/4D Active Rotation

If desired, the *VR* or *MPR Rendering* can be set to rotate the *Freehand 3D*, *3D* and *4D* images.

To Initiate/End 3D/4D Active Rotation:

1. Acquire a *Freehand 3D*, *3D* or *4D* image following the instructions in **5.6.1**, **5.6.2** or **5.6.3**, respectively.

    Note: Active Rotation can also be done <u>during</u> the acquisition of a 4D image. The 4D image that is set to rotate will be static and although the 4D transducer will continue to function, it is not acquiring data. Once **Active Rotation** is stopped, the 4D transducer will once again begin to acquire a live 4D image.

2. Tap *3D/4D Main* on the touch screen.

3. Tap the desired image presentation format: *VR*, *A|VR*, *C|VR* or *A|B|C|VR*.

4. Tap the desired tab on the touch screen: *3D/4D Main*, *3D/4D Advanced* or *3D/4D Display*. Once the touch screen page presents the available options, tap/dial to make the necessary changes.

5. To initiate *Active Rotation*, press and hold the console **SELECT** button.

6. Keep the trackball moving when releasing the console **SELECT** button.

    Note: The trackball's speed and angle of movement will determine the rotation's speed and angle of movement.

7. To end *Active Rotation*, position the cursor over the rotating image and press the console **SELECT** button.

8. Ensure that the trackball is stationary, then release the **SELECT** button.

9. The image will once again be stationary, however, the image will remain in whatever position it was in just prior to freezing it. It will <u>not</u> return to its original position unless the *3D/4D Main Reset* button is tapped.

    Note: Reset will return many, but not all, settings to their original positions.

Table 5-24: Sample VR Image with Axes, Boundary Box and Reference Planes

Axes: green, blue and red arrows.

Boundary Box: exterior yellow box.

Reference Planes: green, blue and red boxes.
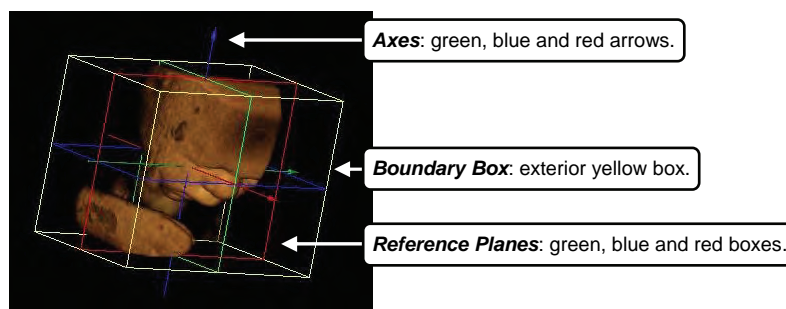
5.6.9   4D and CINE

Once a 4D image has been acquired, the touch screen will have a fourth tab: *CINE*. Refer to **5.1.8 CINE Clip Storage and Thumbnail Image/Clip Review** for details on *CINE* manipulation.

*Note: A 4D image must be frozen before the **CINE** option can be applied.*

5.6.10   User-Defined Presets for 3D/4D

As with other imaging formats, user-defined *3D/4D Presets* can be designed/saved for future use.

During imaging, a user-defined *Preset* name is shown on the LCD display in square brackets (e.g., **[User-Defined Preset]**). On the touch screen, user-defined *Presets* are presented in italics (e.g., *User-Defined Preset*).

All available *3D/4D Presets* (both factory default and user-defined) are listed under *User Settings*, *Presets*. Refer to **9.1.4 Presets – 3D/4D** for more details.

*Note: Unlike other user-defined **Presets**, renaming or deleting user-defined **3D/4D Presets** is handled through **User Settings, 3D**. Refer to **9.1.7 3D Settings** for details.*

To Save a User-Defined 3D Preset During Freehand 3D Image Acquisition:

1. Obtain a *Freehand 3D* image, following the steps detailed in either of the two sets of *Freehand 3D* instructions (page **5-31** or **5-32**).

    *Note: It doesn't matter if **Freehand 3D** image configuration is done before or after the image is acquired.*

2. To save the image configurations as a *Preset*, tap the *3D Display* tab.

3. Tap *Save Preset*.

    SAVE PRESET

    Preset Name

    |

    OK   Cancel

4. Use the keyboard to type in a *Preset Name*.

    *Note: Duplicate **Preset Names** are not allowed. If a duplicate name is entered, the system will present the **Invalid Preset Name** warning bubble. If this happens, click **Cancel** to exit, or type in a different name and select **OK** to accept it.*

5. Select *OK* to save the *Preset Name* or *Cancel* to exit without saving.

To Save a User-Defined 3D Preset After Image Acquisition:

1. Obtain a 3D image, following the steps detailed in **5.6.2 3D Imaging (SONIX 4D Transducer)**.

2. Optimize the image as required (**5.6.6 Optimizing a 3D Image**).

3. Tap the *4D Display* tab.

4. Tap *Save Preset*.

SAVE PRESET

Preset Name

| |
| OK | Cancel |

5. Use the keyboard to type in a *Preset Name*.

> *Note: Duplicate **Preset Names** are not allowed. If a duplicate name is entered, the system will present the **Invalid Preset Name** warning bubble. If this happens, click **Cancel** to exit or type in a different name and select **OK** to accept it.*

6. Select *OK* to save the *Preset Name* or *Cancel* to exit without saving.

To Save a User-Defined 4D Preset After Image Acquisition:

1. Obtain a 4D image, following the steps detailed in **5.6.3 4D Imaging (SONIX 4D Transducer)**.

2. Optimize the image as required (**5.6.7 Optimizing a 4D Image**).

3. Tap the *4D Display* tab.

4. Tap *Save Preset*.

SAVE PRESET

Preset Name

| |
| OK | Cancel |

5. Use the keyboard to type in a *Preset Name*.

> *Note: Duplicate **Preset Names** are not allowed. If a duplicate name is, the system will present the **Invalid Preset Name** warning bubble. If this happens, and click **Cancel** to exit or type in a different name and select **OK** to accept it.*

6. Select *OK* to save the *Preset Name* or *Cancel* to exit without saving.

CHAPTER 6: ADVANCED 3D/4D IMAGING

Advanced 3D/4D Imaging is only available to customers who have purchased the license for this option. The following items are required to use this module:

- software upgrade (existing clients only)
- *Advanced 3D/4D Imaging* license key
- software dongle (refer to **11.4 Advanced 3D/4D Software Dongle** for details on dongle location).

IMPORTANT: *The software dongle supplied by Ultrasonix must be connected to connection point **7** on the System Case Connectivity Panel <u>at all times</u> in order to access **Advanced 3D/4D Imaging**.*

If the software dongle is misplaced or goes missing for any reason, it is the customer's responsibility to <u>purchase</u> a new one.

Contact Ultrasonix Technical Support for pricing on a replacement dongle.

Note: *The **3D/4D** settings available in **MENU > Presets > 3D/4D** are <u>only</u> applicable to the standard 3D/4D module. Because **Advanced 3D/4D** is self-contained, user-configurable options can only be accessed/edited from within the **Advanced 3D/4D** module itself.*

6.1   ENTERING ADVANCED 3D/4D IMAGING

When first entering *Advanced 3D/4D Imaging*, the following touch screen will be presented.

Figure 6-1: 3D/4D Main Touch Screen Controls
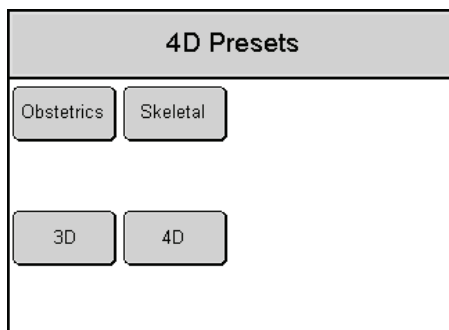
Table 6-1: 4D Presets Touch Screen Controls (tap to activate)

Obstetrics	Tap to select *OB* presets.
Skeletal	Tap to select *Skeletal* presets (for any non-*OB 3D/4D* imaging).
3D	Tap to select *3D* imaging. When *3D* is selected the *4D* transducer will only scan once (i.e., it will make only a single sweep to create a *3D* volume).
4D	Tap to select *4D* imaging. When *4D* is selected the 4D transducer will scan continuously until the console **FREEZE** button is pressed or *4D* is exited. This will create a *CINE* file.

To Enter Advanced 3D/4D Imaging:

1. Ensure a 4D transducer is connected to the system.

    Note: The 4D transducer <u>must</u> be inserted into the upper most transducer connection port to ensure proper function.

    Refer to **3.2 Connecting Transducers** *for details on connecting transducers.*

2. Press the console **PROBE** button.

3. A list of available transducers will be presented on the touch screen.

4. Tap the appropriate 4D transducer name on the touch screen.

5. Ensure a patient is active (i.e., press the console **ID** button to select a patient and move to imaging).

6. Press the console **3D/4D** button.

    *Note: If no patient is active, the following dialog will be presented. Click **Yes** to move to the **Exam Management** page and select a patient.*

7. Tap *Obstetrics* or *Skeletal* on the touch screen.

8. Tap *3D* or *4D* on the touch screen.

9. Press the console **UPDATE** button to begin imaging.

6.2 TOUCH SCREEN OPTIONS

Advanced 3D/4D Imaging has three (3) different touch screen options that available immediately upon entering **3D/4D** mode. An additional two (2) touch screens are available as well.

The first is the standard **CINE** touch screen that appears after a 4D image is acquired.

*Note: These are the same **CINE** options that are available with standard imaging (**5.1.8 CINE Clip Storage and Thumbnail Image/Clip Review**).*

The second is the **4D Measurements** touch screen which is presented when the console **MEASURE** is pressed.

Note: Many touch screen options are also available from the LCD display.

6.2.1 4D Main

Use **4D Main** to switch between image presentation formats and basic imaging parameters (e.g., **Threshold**, **Quality** and **FOV**).

Figure 6-2: 4D Main Touch Screen Controls
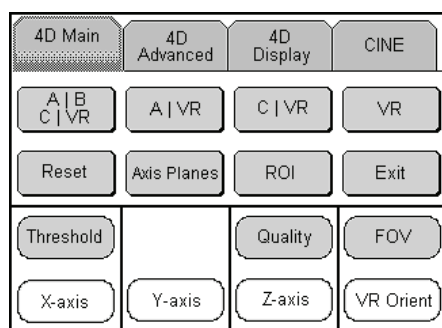
Table 6-2: 4D Main Touch Screen Controls (tap to activate, dial to adjust)

A|B C|VR	Displays **A**, **B** (**Transverse**) and **C** (**Coronal**) plane images along with a **3D/4D VR** image.
A|VR	Displays side-by-side, split-screen view of the **Acquisition Plane** (**A**) image with a **3D/4D Volume Rendering** (**VR**) of the image.
VR	Displays only the **Volume Rendering** of the **3D/4D** image.
C|VR	Displays side-by-side, split-screen view of the **Coronal Plane** (**C**) image with a **3D/4D VR** image.

A|VR	Displays side-by-side, split-screen view of the *Acquisition Plane* (*A*) image with a *3D/4D V*R image.
Reset	Returns many settings to their defaults, including settings on the various LCD display menus.…
	Note: Refer to the tables in **6.3** *for details on which LCD display menu options are* **Reset** *with this key.*
Axis Planes	Also known as Niche Mode, *Axis Planes* display the *A*, *B* and *C Planes* as well as the *Reference Planes*.
ROI	*Region of Interest* (*ROI*).
Exit	Exits *3D/4D* imaging.
Threshold	Tap/dial to suppress image artifacts or noise with a *Threshold* adjustment. This setting has a range of 0 to 100, inclusive, where 0 is no noise suppression and 100 is as much noise suppression as possible.
	Note: The **Dynamic Range** *of the image will be optimized automatically based on the selected* **Threshold** *setting.*
Quality	Tap/dial to adjust image *Quality*. There are three (3) available levels: *Low*, *Medium* and *High*.
	For *4D* images, *Quality*, in conjunction with *FOV*, creates the *Volumes per Second* (*VPS*) setting recorded on the bottom of the LCD display (**6.3.6**).
FOV *(Field of View)*	Tap/dial to adjust the *Field of View* (*FOV*) of the rendered *3D/4D* image. This setting ranges from 5° to 60° (in 5° increments) and is tracked across the bottom of the LCD display (**6.3.6**).
	FOV, in conjunction with *Quality*, creates the *Volumes per Second* (*VPS*) setting recorded on the bottom of the LCD display (**6.3.6**).
X-axis	Rotates the selected image about the *X-axis*.
Y-axis	Rotates the selected image about the *Y-axis*.
Z-axis	Rotates the selected image about the *Z-axis*.
VR Orient	Sets the *Orientation* of the *VR*.

Note: To exit **3D/4D imaging** *at any time, tap the* **4D Main** *tab then tap* **Exit**.

6.2.2   4D Advanced

4D Advanced is used to edit image contents. It consists of two (2) pages of touch screen controls: *4D Advanced* and *Sculpt…*.

Note: 4D Advanced, Sculpt… options (below) cannot be applied during image acquisition.

Figure 6-3: 4D Advanced Touch Screen Controls
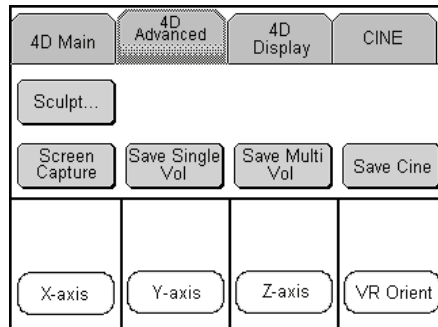
Figure 6-4: 4D Sculpt Touch Screen Controls
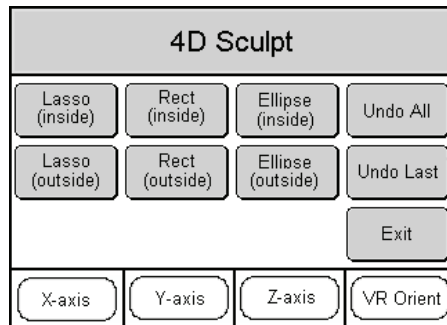
Table 6-3: 4D Advanced and Sculpt… Touch Screen Controls (tap to activate, dial to adjust)

Sculpt…	*Lasso (inside)*	Traces a freehand *Lasso* around the desired area and deletes all items inside the shape.
	Lasso (outside)	Traces a freehand *Lasso* around the desired area and deletes all items outside the shape.
	Rect (inside)	Traces a *Rectangle* around the desired area and deletes all items inside the shape.
	Rect (outside)	Traces a *Rectangle* around the desired area and deletes all items outside the shape.
	Ellipse (inside)	Traces an *Ellipse* around the desired area and deletes all items inside the shape.
	Ellipse (outside)	Traces an *Ellipse* around the desired area and deletes all items outside the shape.
	Undo All	Undoes all the edits made to an image at any time within the first 24 hours after the image is saved.
	Undo Last	Undoes the edits made to an image at any time within the first 24 hours after the image is saved, one at a time, in reverse order.
	Exit	Exits *Sculpt…*.
Screen Capture		Tap to save everything on the LCD display, including the current image as well as all onscreen data.
Save Single Vol		After acquiring an image, tap to save the last frame as a single image. Images that have been saved using the *Save Single Vol* option will be marked with a 3D box icon. *Note: Saving a CINE loop as single Volume does not affect the original CINE loop.* *Once saved, the image can be reopened and edited only for the next 24 hours.*
Save Multi Vol		After acquiring a *CINE* loop, tap to save all *Volumes* from the *CINE*. Images that have been saved using the *Save Multi Vol* option will be marked with a 3D box icon. *Note: Saving a CINE loop as multiple Volumes does not affect the original CINE loop.* *Once saved, images can be reopened and edited only for the next 24 hours.*
Save CINE		Tap to save the acquired 4D images as a *CINE* loop. Images that have been saved using the Save CINE option will be marked with movie symbol. *Note: A 4D CINE loop can also be saved as a Single or Multi Volume, in which case it will be marked with both a movie symbol and a box icon.*
X-axis		Rotates the selected image about the X-axis.
Y-axis		Rotates the selected image about the Y-axis.
Z-axis		Rotates the selected image about the Z-axis.
VR Orient		Sets the *Orientation* of the *VR*.

6.2.3   4D Display

4D Display options are used to edit the following settings of only the *VR*: *Map*, *Contrast* and *Background*.

Figure 6-5: 4D Display Touch Screen Controls
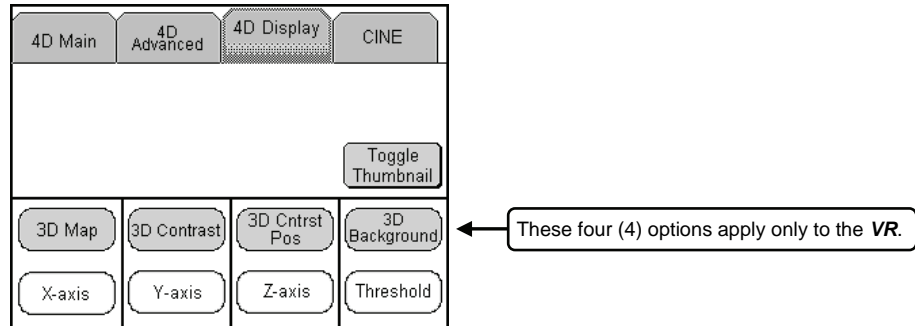
Table 6-4: 4D Display Touch Screen Controls (tap to activate, dial to adjust)

Toggle Thumbnail	Tap to display/conceal *Thumbnails* of the current image. A 3D image will display only one (1) *Thumbnail*, while a 4D image will display one (1) *Thumbnail* for each captured *Volume* (or frame in the *CINE* loop).
3D Map	Tap/dial to adjust the coloration of the *VR* image using pre-defined color *Maps*. The range for this setting is 0 to 15, inclusive (for all *Presets*).
	When the *3D Map* setting on the touch screen is adjusted, the *MAP* setting on the LCD display will also change.
	Note: In MEASURE MODE, the MAP setting will change, but the effect will only be visible in DISPLAY, SLICE, RENDER and USERSET MODES (6.3).
3D Contrast	Tap/dial to adjust the *Contrast* settings of the *VR* on the LCD display.
	Initially, *Contrast* adjustments are based on the center of the image. To change this, change the default of the *3D Cntrst Pos* setting.
	When the *3D Contrast* setting on the touch screen is adjusted, the *CONTRAST* setting on the LCD display will also change.
	Note: In MEASURE MODE, the CONTRAST setting will change, but the effect will only be visible in DISPLAY, SLICE, RENDER and USERSET MODES (6.3).

3D Cntrst Pos	Tap/dial to adjust the **3D Cntrst Pos** (**Contrast Position**) of the **VR** on the LCD display. Once moved from the default center position, **3D Contrast** adjustments will be centered on the new **3D Cntrst Pos** setting.
	When the **3D Cntrst Pos** setting on the touch screen is adjusted, the **CONTRAST POSITION** setting on the LCD display will also change.
	*Note: This setting can also be adjusted onscreen with the **CONTRAST POSITION** button if **DISPLAY, SLICE, RENDER** or **USERSET MODE** has been selected (**6.3**).*
3D Background	Tap/dial to adjust the color of the **VR Background** on the LCD display. This setting has a range of 1 to 101, inclusive, where 1 is the darkest and 101 is the lightest.
	When the **3D Background** setting on the touch screen is adjusted, the **BACKGROUND** setting on the LCD display will also change.
	*Note: This setting can also be adjusted onscreen with the **BACKGROUND** button if **DISPLAY, SLICE, RENDER** or **USERSET MODE** has been selected (**6.3**).*
X-axis	Rotates the selected image about the **X-axis**.
Y-axis	Rotates the selected image about the **Y-axis**.
Z-axis	Rotates the selected image about the **Z-axi**s.
Threshold	Tap/dial to suppress image artifacts or noise with a **Threshold** adjustment.
	*Note: The **Dynamic Range** of the image will be optimized automatically based on the selected **Threshold** setting.*

6.2.4 4D CINE

The *CINE* controls available here are identical to the ones available in regular *2D* imaging (**5.1.8 CINE Clip Storage and Thumbnail Image/Clip Review**).

Figure 6-6: 4D CINE Touch Screen Controls
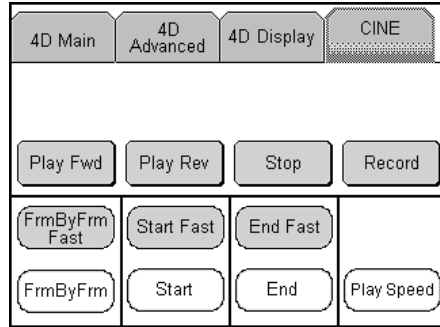
Table 6-5: 4D CINE Touch Screen Controls (tap to activate, dial to adjust)

Play Fwd	Select to *Play Forward* the available *CINE* frames.
Play Rev	Select to play in reverse the available *CINE* frames.
Stop	Select to *Stop* the *CINE* frames from playing.
Record	Select to store the selected *CINE* frames to the system.
FrmByFrm Fast	Use to select currently displayed frames, 10 frames at a time.
FrmByFrm	Use to select currently displayed frame, one (1) frame at a time.
Start Fast	Use to select start frame for *CINE* clip, 10 frames at a time.
Start	Use to select start frame for *CINE* clip, one (1) frame at a time.
End Fast	Use to select end frame for *CINE* clip, 10 frames at a time.
End	Use to select end frame for *CINE* clip, one (1) frame at a time.
Play Speed	Use to select *CINE Play Speed* (⅛, ¼, ½, full (1) or double (2)).

6.2.5 4D Measurements

The *Measurement* options available here are also available in *MEASURE MODE* on the LCD display (**6.3.2**).

*Note: To add **Text** and **Arrows** to the image, use the onscreen **MEASURE MODE Annotation** options (refer to **Table 6-8** for details).*

Figure 6-7: 4D Measurements Touch Screen Controls
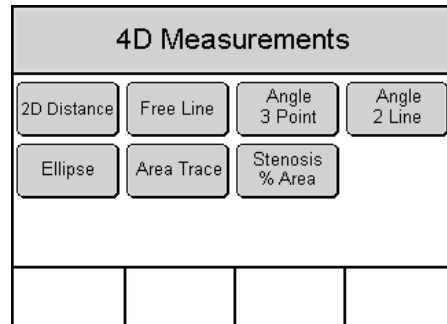
Table 6-6: 4D Measurement Touch Screen Controls (tap to activate)

2D Distance	Measures the straight line *Distance* between two (2) user-set end points.
Free Line	Measures the freehand drawn *Distance* between two (2) user-set end points.
Angle 3 point	Measures an *Angle* based on three (3) user-set points.
Angle 2 Line	Measures the *Angle* between two (2) user-defined straight lines.
Ellipse	Measures *Area* based on a user-drawn *Ellipse*.
Area Trace	Measures the *Area* of a freehand traced, enclosed shape.
Stenosis % Area	Measures *Stenosis* percentage based on the *Area* of a user-drawn *Ellipse*.

*Note: Use the trackball to position the cursor and the console **SELECT** button to anchor the calipers for each step of each measurement.*

6.3   LCD DISPLAY OPTIONS

In addition to those offered on the touch screen, users have a wide variety of *Display Mode* options and editing parameters available on the LCD display. There are five (5) separate onscreen menus or modes:

- *DISP.* (*DISPLAY MODE*)
- *MEAS.* (*MEASURE MODE*)
- *SLICE* (*SLICE MODE*)
- *REN.* (*RENDER MODE*)
- *USER* (*USERSET MODE*).

Note: Only the current image or images that were saved <u>less</u> than 24 hours previously can be edited.

Figure 6-8: Default Image

*Note: Use the trackball and console **SELECT** button to click on the various onscreen buttons.*

*To move a slider to a new position, position the mouse arrow over the slider, press the console **SELECT** button then use the trackball to move the slider. Press **SELECT** again to anchor the slider in the new position.*

6.3.1 Display Mode

DISPLAY MODE enables users to changes the presentation format of the image displayed. It also allows the user to switch the active plane between *A*, *B* and *C*.

Figure 6-9: DISPLAY MODE

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*Note: Use the trackball and console **SELECT** button to click on the various onscreen buttons.*

*To move a slider to a new position, position the mouse arrow over the slider, press the console **SELECT** button then use the trackball to move the slider. Press **SELECT** again to anchor the slider in the new position.*

Table 6-7: DISPLAY MODE Options

A|B ***C|VR***	Displays ***A***, ***B*** (***Transverse***) and ***C*** (***Coronal***) plane images along with a ***3D/4D VR*** image.
	Note: *This option is also available from the* ***4D Main*** *touch screen (***6.2.1***).*
A|B ***C|*** ⌗	***Axis Planes*** (also known as Niche Mode) display the ***A***, ***B*** and ***C Planes*** as well as the ***Reference Planes***.
	Note: *This option is also available from the* ***4D Main*** *touch screen (***6.2.1***).*
A|VR	This default image presentation setting displays side-by-side, split-screen view of the ***Acquisition Plane*** (***A***) image with a ***3D/4D VR*** of the image.
	Note: *This option is also available from the* ***4D Main*** *touch screen (***6.2.1***).*
C|VR	Displays side-by-side, split-screen view of the ***Coronal Plane*** (***C***) image with a ***3D/4D VR*** image.
	Note: *This option is also available from the* ***4D Main*** *touch screen (***6.2.1***).*
VR	Select this option to display only the ***Volume Rendering***. This will, be default, make the ***VR*** the active plane.
	Note: *This option is also available from the* ***4D Main*** *touch screen (***6.2.1***).*
A|B|C	Select ***A***, ***B*** or ***C*** to change the active plane on the LCD display.
ZOOM	***ZOOM*** the image from 50% to 400%.
	Note: *The console* ***ZOOM*** *button can also be used to perform this action.*
	The touch screen ***Reset*** *button applies to this setting.*
REFERENCE SLICE	Enables users to choose the ***Slice*** to be viewed. Use the ***A|B|C|*** ⌗ option (**above**) to select the active plane for the ***Reference Slice***.
	Note: Axis Planes *(also known as Niche Mode) must be selected for display in order for this option to be active.*
	The touch screen ***Reset*** *button applies to this setting.*

IMAGE SETTINGS	***ABC***	Depending on the active plane selected (**above**), e.g., ***A***, ***B*** or ***C***, clicking this option will force the ***IMAGE SETTING*** options to be applied that plane rather than the ***VR***.
		Note: *The touch screen* ***Reset*** *button applies to this setting.*
	3D	After selecting ***VR*** as the active image (**above**), clicking this option will force the ***IMAGE SETTING*** options to be applied the ***VR***.
		Note: *The touch screen* ***Reset*** *button applies to this setting.*
	MAP	Adjusts the coloration of the ***VR*** image using pre-defined color ***Maps***. The range for this setting is 0 to 15, inclusive (for all ***Presets***).
		Note: *This setting can also be adjusted from the* ***4D Display*** *touch screen with the* ***3D Map*** *button (***6.2.3***).*
		The touch screen ***Reset*** *button applies to this setting.*

IMAGE SETTINGS – cont'd	**BACKGROUND**	Adjusts the *Background* color of the of the *VR* image. This setting has a range of 1 to 101, inclusive, where 1 is the darkest and 101 is the lightest.
		Note: This setting can also be adjusted from the 4D Display touch screen with the 3D Background button (6.2.3).
		The touch screen Reset button applies to this setting.
	CONTRAST	Adjusts the *Contrast* settings of the *VR* image.
		Initially, *Contrast* adjustments are based on the center of the image. To change this, change the default of the *CONTRAST POS* setting.
		Note: This setting can also be adjusted from the 4D Display touch screen with the 3D Contrast button (6.2.3).
		The touch screen Reset button applies to this setting.
	CONTRAST POS	Adjusts the *Contrast Position* of the *VR* image. Once moved from the default center position, *Contrast* adjustments will be centered on the new *Contrast Position* setting.
		Note: This setting can also be adjusted from the 4D Display touch screen with the 3D Cntrst Pos button (6.2.3).
		The touch screen Reset button applies to this setting.

Figure 6-10: DISPLAY MODE – Axis Planes (Niche Mode)

6.3.2 Measure Mode

MEASURE MODE enables users to perform measurements directly on the frozen or recalled image. The various types of measurements have between two (2) and four (4) options each, but only one measurement of any type can be active at any given time.

Selecting the relevant radio button will activate the desired measurement type, while performing a complete measurement will post the result onscreen. Each measurement that is taken is added to the onscreen list until or unless the *CLEAR* button is selected.

Use the *Text* button to add annotations and the *Arrow* button to emphasize things in the image. Tap the *Screen Capture* button on the touch screen to save a copy of the image with measurements (**6.2.2 4D Advanced**).

Note: In order to be available for measurements/edits, a recalled image must be <u>less</u> than 24 hours old.

Figure 6-11: MEASURE MODE
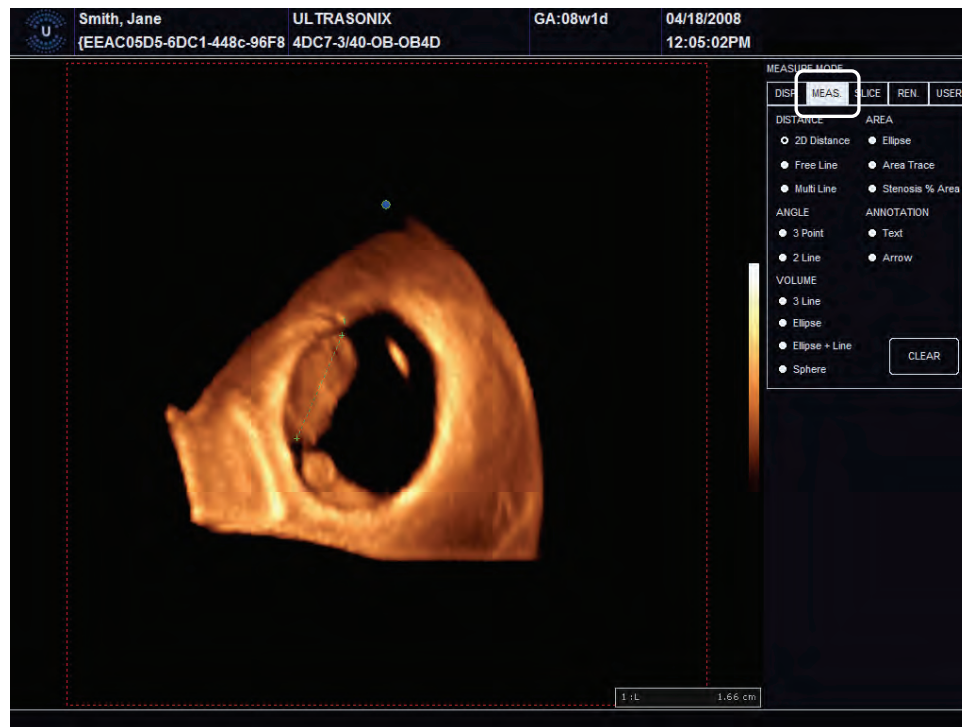
*Note: Use the trackball and console **SELECT** button to click on the various onscreen buttons.*

*Use the trackball to position the cursor and the console **SELECT** button to anchor the calipers for each step of each measurement.*

Table 6-8: MEASURE MODE Options

DISTANCE	*2D Distance*	Measures the straight line *Distance* between two (2) user-set end points.
	Free Line	Measures the freehand drawn *Distance* between two (2) user-set end points.
	Multi-Line	Measures the total straight line *Distance* between three (3) or more user-set points (e.g., where the straight lines run from point A to point B to point C, etc.).
AREA	*Ellipse*	Measures *Area* based on a user-drawn *Ellipse*.
	Area Trace	Measures the *Area* of a freehand traced, enclosed shape.
	Stenosis % Area	Measures *Stenosis* percentage based on the *Area* of a user-drawn *Ellipse*.
ANGLE	*3 point*	Measures an *Angle* based on three (3) user-set points.
	2 Line	Measures the *Angle* between two (2) user-defined straight lines.
ANNOTATION	*Text*	Uses the console keyboard to type text entries onto the image. Press the console keyboard **ENTER** button to save the text entry to the onscreen image.
	Arrow	Uses the console **SELECT** button to place *Arrows* as required.
VOLUME	*3 Line*	Not in use.
	Ellipse	Not in use.
	Ellipse + Line	Not in use.
	Sphere	Not in use.
CLEAR		*Clears* all measurements, *Text* and *Arrows* from the image.

*Note: The default **MEASURE MODE** is with no measurement settings selected.*

6.3.3 Slice Mode

SLICE MODE enables users to select detailed views of individual slices of the *A*, *B* or *C* plane. These slices can be positioned on the ***Horizontal***, ***Vertical*** or at a user-determined ***Angle***.

Figure 6-12: SLICE MODE

Note: *Use the trackball and console* **SELECT** *button to click on the various onscreen buttons.*

To move a slider to a new position, position the mouse arrow over the slider, press the console **SELECT** *button then use the trackball to move the slider. Press* **SELECT** *again to anchor the slider in the new position.*

Figure 6-13: SLICE MODE Layout Segments

Slice Diagram	-3/xx mm	-2/xx mm
-1/xx mm	0/0.000mm	1/xx mm
2/xx mm	3/xx mm	4/xx mm

Slice Diagram	0/0.000mm
1/xx mm	2/xx mm

Slice Diagram	0/0.000mm

*Note: Where "**xx mm**" refers to the number of millimeters the segment is from the center **Slice** of the image. The center **Slice** will always be labeled **0/0.000mm**.*

The measurement will always be to three (3) decimal places.

Default entry settings show the **DISPLAY MODE** active plane as segment **0** (**Figure 6-13**) with the **Slice** diagram focused on the centre of the image.

Table 6-9: SLICE MODE Options

		Note: Refer to **Figure 6-13** *to determine the meaning of the layout segments.*
LAYOUT	*3 by 3*	Displays **SLICE MODE** images in a **3 x 3 Layout**. The center **Slice** (segment **0**) is both the active image and the plane that was last selected in **DISPLAY MODE**.
		The top left segment represents the entire image with the **Slice** data overlaid. The remaining segments show the actual slice data, including position from the center (-3 to 4) and the distance from the distance from the center in millimeters (mm).
		Note: Refer to **Figure 6-13** *to determine the order in which the slices are presented.*
		This is the default setting.
	2 by 2	Displays **SLICE MODE** images in a **2 x 2 Layout**, with the top, right **Slice** as the active image.
		Note: Refer to **Figure 6-13** *to determine the order in which the slices are presented.*
	Side by Side	Displays **SLICE MODE** images in a **Side by Side Layout**, with the right hand **Slice** as the active image.
		Note: Refer to **Figure 6-13** *to determine the order in which the slices are presented.*
	Single	Displays the **SLICE MODE** image as a **Single** image.

SLICING		*Note: Move the cursor into the **Slice Diagram** and press **SELECT** to move the center marker.*
	Vertical	Select **Vertical** to have the **Slicing** cut vertically though the image.
	Horizontal	Select **Horizontal** to have the **Slicing** cut vertically though the image.
	Angle	Select **Angle** to enable the user to set the specific **Slicing Angle**.
		*Note: To set the **Angle**, move the cursor into the **Slice Diagram** and press **SELECT** to set one end of the **Angle** caliper. Move the cursor to a second position and press **SELECT** again.*
SPACING		Resets the **Spacing** between slices. The range for this option is 50% to 200%.
		*Note: The actual measurement (in mm) will be displayed under each slice (**Figure 6-12**).*
PREV		Select **PREV** to move the active image to the previous **Slice** in the chosen **Layout**.
		*Note: Refer to **Figure 6-13** to determine the order in which the slices are presented.*
NEXT		Select **NEXT** to move the active image to the next **Slice** in the chosen **LAYOUT**.
		*Note: Refer to **Figure 6-13** to determine the order in which the slices are presented.*
ZOOM		**ZOOM** the active image from 50% to 400%.
		*Note: The console **ZOOM** button can also be used to perform this action.*
		*The touch screen **Reset** button applies to this setting.*
IMAGE SETTING	**ABC**	Depending on the active plane selected (e.g., **A**, **B** or **C**), clicking this option will force the **IMAGE SETTING** options to be applied to that plane rather than the **VR**.
		*Note: The touch screen **Reset** button applies to this setting.*
	3D	After selecting **VR** as the active image, clicking this option will force the **IMAGE SETTING** options to be applied the **VR**.
		IMAGE SETTING changes to the **VR** will not be visible in **SLICE MODE**.
		*Note: The touch screen **Reset** button applies to this setting.*
	MAP	Adjusts the coloration of the active plane using pre-defined color **Maps**. The range for this setting is 0 to 15, inclusive (for all **Presets**).
		*Note: This setting can also be adjusted from the **4D Display** touch screen with the **3D Map** button (**6.2.3**), but only if **3D** (**above**) is selected on the LCD display. **3D Map** changes will apply to the **VR**.*
		*The touch screen **Reset** button applies to this setting.*

IMAGE SETTING – cont'd	**BACKGROUND**	Adjusts the ***Background*** color of the active plane. This setting has a range of 1 to 101, inclusive, where 1 is the darkest and 101 is the lightest.
		Note: *This setting can also be adjusted from the **4D Display** touch screen with the **3D Background** button (**6.2.3**), but <u>only</u> if **3D (above**) is selected on the LCD display. **3D Map** changes will apply to the **VR**.*
		*The touch screen **Reset** button applies to this setting.*
	CONTRAST	Adjusts the ***Contrast*** settings of the slice(s).
		Initially, ***Contrast*** adjustments are based on the center of the image. To change this, change the default setting of the ***CONTRAST POS*** setting.
		Note: *This setting can be adjusted from the **4D Display** touch screen with the **3D Contrast** button (**6.2.3**) but <u>only</u> if **3D (above**) is selected on the LCD display. **3D Contrast** changes will apply to the **VR**.*
		*The touch screen **Reset** button applies to this setting.*
	CONTRAST POS	Adjusts the ***Contrast Position*** of the slice(s). Once moved from the default center position, ***Contrast*** adjustments will be centered on the new ***Contrast Position*** setting.
		Note: *This setting can also be adjusted from the **4D Display** touch screen with the **3D Cntrst Pos** button (**6.2.3**) but <u>only</u> if **3D (above**) is selected on the LCD display. **3D Cntrst Pos** changes will apply to the **VR**.*
		*The touch screen **Reset** button applies to this setting.*

6.3.4 Render Mode

RENDER MODE enables users to configure image style (grayscale or negative), surface settings (*Smooth*, *X-ray*, etc) and image direction (*Top*, *Bottom*, etc).

Figure 6-14: RENDER MODE

Note: Use the trackball and console SELECT button to click on the various onscreen buttons.

To move a slider to a new position, position the mouse arrow over the slider, press the console SELECT button then use the trackball to move the slider. Press SELECT again to anchor the slider in the new position.

Table 6-10: RENDER MODE Options

Gray		Presents a grayscale image of the **VR**.
Inverse		Presets a negative-style image of the **VR**.
Color		Not in use.
Glass		Not in use.
ALGORITHM 1	**Surface smooth**	Select to smooth the surface rendering of the image.
	Surface	Unmodified version of the **VR**, i.e., presents the image as it was scanned.
		Note: This is the default setting.
	Max	Renders voxels with **Maximum** intensity along the visualization plane.
	Min	Renders voxels with **Minimum** intensity along the visualization plane.
	X-ray	Provides **X-ray**-like representation of the **Volume** model.
	Light	Displays the image in a sliding scale of brightness. Elements of the image that are closer to the user are lighter, while elements that are more distant are darker.
RENDERING DIRECTION		Selects the direction from which the image is rendered: **Front**, **Back**, **Left**, **Right**, **Top** or **Bottom**.
ZOOM		**ZOOM** the active image from 50% to 400%.
		*Note: The console **ZOOM** button can also be used to perform this action.*
		*The touch screen **Reset** button applies to this setting.*
REFERENCE SLICE		Enables users to choose the **Slice** to be viewed from the active plane.
		*Note: **Axis Planes** (also known as Niche Mode) must be selected for display in order for this option to be active.*
		*The touch screen **Reset** button applies to this setting.*
IMAGE SETTINGS	**ABC**	Selecting **ABC** will force the **IMAGE SETTING** options to be applied to the 2D planes (**A**, **B** and **C**) rather than the **VR**.
		*Note: The touch screen **Reset** button applies to this setting.*
	3D	Selecting **3D** will force the **IMAGE SETTING** options to be applied to the **VR**.
		*Note: The touch screen **Reset** button applies to this setting.*
	MAP	Adjusts the coloration of the active image(s) (based on the selection of the **ABC** or **VR** buttons, above) using pre-defined color **Maps**. The range for this setting is 0 to 15, inclusive (for all **Presets**).
		*Note: For the **VR**, this setting can also be adjusted from the **4D Display** touch screen with the **3D Map** button (**6.2.3**).*
		*The touch screen **Reset** button applies to this setting.*

IMAGE SETTINGS – cont'd	**BACKGROUND**	Adjusts the **Background** color of the active image(s) (based on the selection of the **ABC** or **VR** buttons, above). This setting has a range of 1 to 101, inclusive, where 1 is the darkest and 101 is the lightest.
		Note: For the VR, this setting can also be adjusted from the 4D Display touch screen with the 3D Background button (6.2.3).
		The touch screen Reset button applies to this setting.
	CONTRAST	Adjusts the **Contrast** settings of the active image(s) (based on the selection of the **ABC** or **VR** buttons, above).
		Initially, **Contrast** adjustments are based on the center of the image. To change this, change the default of the **CONTRAST POS** setting.
		Note: For the VR, this setting can also be adjusted from the 4D Display touch screen with the 3D Contrast button (6.2.3).
		The touch screen Reset button applies to this setting.
	CONTRAST POS	Adjusts the **Contrast Position** of the active image(s) (based on the selection of the **ABC** or **VR** buttons, above). Once moved from the default center position, **Contrast** adjustments will be centered on the new **Contrast Position** setting.
		Note: For the VR, this setting can also be adjusted from the 4D Display touch screen with the 3D Cntrst Pos button (6.2.3).
		The touch screen Reset button applies to this setting.

6.3.5 Userset Mode

USERSET MODE enables the users to:

- return system *Presets* to factory defaults
- create/edit user-defined *Presets*
- select a default *Preset*
- load different *Presets* as required.

Figure 6-15: USERSET MODE

*Note: Use the trackball and console **SELECT** button to click on the various onscreen buttons.*

*To move a slider to a new position, position the mouse arrow over the slider, press the console **SELECT** button then use the trackball to move the slider. Press **SELECT** again to anchor the slider in the new position.*

Table 6-11: USERSET MODE Options

USER 1	Pre-configured for use with the *Skeletal Preset* option presented on the first 3D/4D touch screen (**Figure 6-1**). ***Note:*** *Ultrasonix does not recommend editing the **Preset** parameters for **USER 1**.* *The **4D Main** touch screen **Reset** button applies to this setting.*
USER 2	Pre-configured for use with the *Obstetrics Preset* option presented on the first 3D/4D touch screen (**Figure 6-1**). ***Note:*** *Ultrasonix does not recommend editing the **Preset** parameters for **USER 2**.* *The **4D Main** touch screen **Reset** button applies to this setting.*
USER 3	Identical to *User 2*, but can be edited and saved as a user-defined *Preset*. ***Note:*** *The **Preset** name (**User 3**) cannot be edited.*
USER 4	Identical to *User 2*, but can be edited and saved as a user-defined *Preset*. ***Note:*** *The **Preset** name (**User 4**) cannot be edited.*
USER 5	Identical to *User 2*, but can be edited and saved as a user-defined *Preset*. ***Note:*** *The **Preset** name (**User 5**) cannot be edited.*
DEFAULT	Allows users to choose which of the five (5) *USERS* will be the *Default*.
LOAD	Allows users to *Load* a different *Preset* as required.
SAVE	After making changes to one of the three (3) editable *Presets* (*User 3*, *4*, or *5*), click the *Save* button to save the edits as a user-defined *Preset*.
ZOOM	*ZOOM* the active image from 50% to 400%. ***Note:*** *The console* **ZOOM** *button can also be used to perform this action.* *The touch screen **Reset** button applies to this setting.*
REFERENCE SLICE	Enables users to choose the *Slice* to be viewed from the active plane. ***Note: Axis Planes*** *(also known as Niche Mode) must be selected for display in order for this option to be active.* *The touch screen **Reset** button applies to this setting.*
IMAGE SETTINGS — **ABC**	Selecting *ABC* will force the *IMAGE SETTING* options to be applied to the 2D planes (*A*, *B* and *C*) rather than the *VR*. ***Note:*** *The touch screen **Reset** button applies to this setting.*
IMAGE SETTINGS — **3D**	Selecting *3D* will force the *IMAGE SETTING* options to be applied to the *VR*. ***Note:*** *The touch screen **Reset** button applies to this setting.*

IMAGE SETTINGS – cont'd	**MAP**	Adjusts the coloration of the active image(s) (based on the selection of the **ABC** or **VR** buttons, above) using pre-defined color **Maps**. The range for this setting is 0 to 15, inclusive (for all **Presets**).
		*Note: For the **VR**, this setting can also be adjusted from the **4D Display** touch screen with the **3D Map** button (**6.2.3**).*
		*The touch screen **Reset** button applies to this setting.*
	BACKGROUND	Adjusts the **Background** color of the active image(s) (based on the selection of the **ABC** or **VR** buttons, above). This setting has a range of 1 to 101, inclusive, where 1 is the darkest and 101 is the lightest.
		*Note: For the **VR**, this setting can also be adjusted from the **4D Display** touch screen with the **3D Background** button (**6.2.3**).*
		*The touch screen **Reset** button applies to this setting.*
	CONTRAST	Adjusts the **Contrast** settings of the active image(s) (based on the selection of the **ABC** or **VR** buttons, above).
		Initially, **Contrast** adjustments are based on the center of the image. To change this, change the default of the **CONTRAST POS** setting.
		*Note: For the **VR**, this setting can also be adjusted from the **4D Display** touch screen with the **3D Contrast** button (**6.2.3**).*
		*The touch screen **Reset** button applies to this setting.*
	CONTRAST POS	Adjusts the **Contrast Position** of the active image(s) (based on the selection of the **ABC** or **VR** buttons, above). Once moved from the default center position, **Contrast** adjustments will be centered on the new **Contrast Position** setting.
		*Note: For the **VR**, this setting can also be adjusted from the **4D Display** touch screen with the **3D Cntrst Pos** button (**6.2.3**).*
		*The touch screen **Reset** button applies to this setting.*

6.3.6   Additional LCD Display Details

Once an image has been acquired, the LCD display will have an additional line across the bottom.

Figure 6-16: Additional LCD Display Details

| FOV 55° | Quality Med | VPS 2.0 | MI<0.39 | GainB 42% |

Table 6-12: Additional Advanced 3D/4D LCD Display Details

FOV *(Field of View)*	This setting is controlled on the ***3D/4D Main*** touch screen (**6.2.1**).
	*Note: For **4D** images, **FOV**, in conjunction with **Quality**, automatically creates the **Volumes per Second** (**VPS**) setting.*
Quality	This setting is controlled on the ***3D/4D Main*** touch screen (**6.2.1**). There are three options: ***Low***, ***Medium*** and ***High***.
	*Note: For **4D** images, **FOV**, in conjunction with **Quality**, automatically creates the **Volumes per Second** (**VPS**) setting.*
VPS *(Volumes per Second)*	***VPS*** is auto-calculated based on the ***FOV*** and ***Quality*** settings. It cannot be edited.
MI *(Mechanical Index)*	The ***MI*** is displayed for informational purposes only.
GainB	The ***GainB*** setting is taken from the last ***Gain*** setting used while in ***2D B-Mode***.
	*Note: To edit this setting, the operator must exit **Advanced 3D/4D** and enter **2D B-Mode**.*

6.4 IMAGE ACQUISITION

3D and 4D images are acquired in similar manners, although the final outcome is different. A 3D acquisition results in a single image while a 4D acquisition results in a **CINE** file. Once acquired, these images can then be edited or optimized (**6.5 Optimization/Editing of Acquired Images**).

Once a 3D or 4D image has been acquired, the operator has the ability to optimize the image.

Note: Refer to 6.2 and 6.3 for details on the available image optimization parameters.

Figure 6-17: Acquisition Diagram
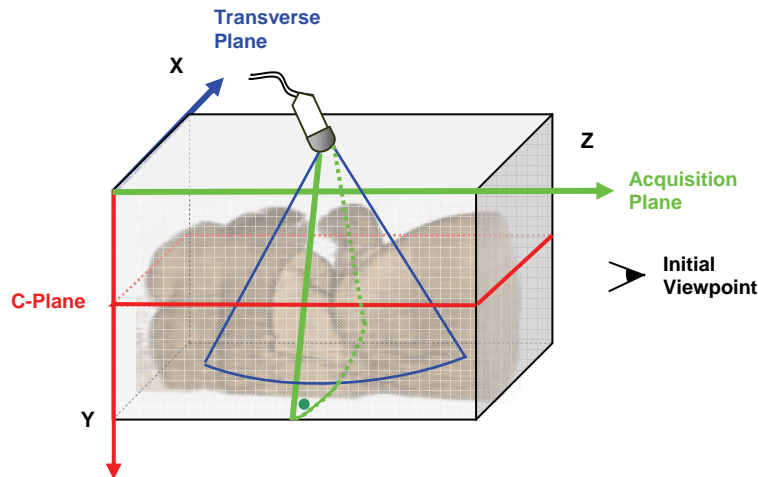
This diagram demonstrates the various planes and axis of an acquired **3D** image in its original state. Remember that once an image has been edited or optimized (**6.5 Optimization/Editing of Acquired Images**), the positions of the planes shown here will have been altered as well.

Note: Once changes have been made, use the touch screen Reset button on 4D Main to return the image to its original geometric position and ROI.

On occasion, color is used to highlight the **A**, **B** and **C Planes**.

Figure 6-18: Image Quadrants

Green: Acquisition Plane (*A*)	Blue: Transverse Plane (*B*) Perpendicular to the Acquisition Plane
Red: Coronal Plane (*C*)	*Volume Rendering (VR)*

6.4.1 3D Imaging

To Acquire a 3D Image with an Ultrasonix 4D Transducer:

1. Ensure a 4D transducer is connected to the system.

   Note: The 4D transducer must be inserted into the upper most transducer connection port to ensure proper function.

   Refer to **3.2 Connecting Transducers** *for details on connecting transducers.*

2. Press the console **PROBE** button.

3. A list of available transducers will be presented on the touch screen.

4. Tap the appropriate 4D transducer name on the touch screen.

5. Ensure a patient is active (i.e., press the console **ID** button to select a patient and move to imaging).

6. Press the console **3D/4D** button.

   Note: If no patient is active, the following dialog will be presented. Click **Yes** *to move to the* **Exam Management** *page and select a patient.*

7. Tap *Obstetrics* or *Skeletal* on the touch screen.

8. Tap *3D* on the touch screen.

9. Position the 4D transducer over the area of interest.

10. Press the console **UPDATE** button to begin the acquisition.

    Note: Hold the transducer steady while the image is being acquired.

11. The acquired *3D* rendering will be presented on the LCD display in the default format *A/VR*.

6.4.2 4D Imaging

To Acquire a 4D Image:

1. Ensure a 4D transducer is connected to the system.

   Note: The 4D transducer <u>must</u> be inserted into the upper most transducer connection port to ensure proper function.

   Refer to **3.2 Connecting Transducers** *for details on connecting transducers.*

2. Press the console **PROBE** button.

3. A list of available transducers will be presented on the touch screen.

4. Tap the appropriate 4D transducer name on the touch screen.

5. Ensure a patient is active (i.e., press the console **ID** button to select a patient and move to imaging).

6. Press the console **3D/4D** button.

   *Note: If no patient is active, the following dialog will be presented. Click **Yes** to move to the **Exam Management** page and select a patient.*

7. Tap *Obstetrics* or *Skeletal* on the touch screen.

8. Press the console **3D/4D** button.

9. Position the 4D transducer over the area of interest.

10. Press the console **UPDATE** button to begin the acquisition.

11. Slowly move the transducer over the area of interest.

12. Press the console **FREEZE** button to complete the acquisition.

13. The final image of acquired *4D CINE* file will be presented on the LCD display in the default format *A|VR*.

6.5 OPTIMIZATION/EDITING OF ACQUIRED IMAGES

A *3D or 4D* image can only be optimized after it has been acquired and saved per the options on the *4D Advanced* touch screen: *Screen Capture*, *Save Single Vol*, *Save Multi Vol* and *Save CINE* (**6.2.2 4D Advanced**).

Note: Saved images can only be accessed for editing for 24 hours. Once 24 hours have passed, the images can be viewed, but not edited.

When selecting a saved image for optimization, ensure the original 4D transducer is connected to the system (i.e., if the original image was acquired with the 4DC7 transducer, ensure the 4DC7 transducer is connected to the system).

Both the image and its environment can be optimized in several ways, including: *Threshold*, *Quality*, *Background*, *Contrast*, *Zoom*, *Slice* options and *Rendering* details. Measurements can also be performed.

For a comprehensive list of options for editing a *3D/4D* image and its environment, refer to **6.2** and **6.3**.

---

*Note: Image optimization must be completed <u>after</u> acquisition (**6.4 Image Acquisition**).*

To Select an Image for Optimization/Editing:

1. Press the console **ID** button.

2. From the *Exam Management* page, select the relevant patient and click *OK*.

3. If there are any saved images less than 24 hours old, they will be presented as thumbnails on the bottom left of the imaging screen.

4. Click on the desired thumbnail to open the image for editing.

6.6   4D AND CINE

Once a *4D* image has been acquired, the touch screen will have a fourth tab: *CINE*. Refer to **6.2.4 4D CINE** for details on *CINE* manipulation.

*Note: A **4D** image must be frozen before **CINE** options can be applied.*

6.7   PRESETS

Advanced 3D/4D Imaging is delivered with two (2) default *Presets*: *USER 1* (*Skeletal*) and *USER 2* (*Obstetrics*). After acquiring a *3D/4D* image, *USER 1* or *USER 2* will be the active *Preset*, depending on whether *Skeletal* or *Obstetrics* was chosen as the *Preset* on the touch screen.

Advanced 3D/4D also provides the user with the ability to create up to three (3) user-defined *Presets*.

6.7.1   Resetting Factory Defaults

In the event that *USER 1* (*Skeletal*) and/or *USER 2* (*Obstetrics*) were edited, *USERSET MODE* provides the ability to return these *Presets* to their factory default settings, *providing the changes have not been saved.*

*Note: Ultrasonix does not recommend editing the **Preset** parameters for **USER 1** and **2**.*

To Reset USER 1 and USER 2 to Factory Defaults:

*Note: Ultrasonix does not recommend editing the factory default **Preset** parameters for **USER 1** and **2**.*

1. Ensure an image has been acquired.
2. Tap the *4D Main* tab on the touch screen.
3. Tap the *Reset* button.

   *Note: This will reset both **USER 1** and **USER 2**.*

6.7.2 Selecting a Default USER (Preset)

For convenience, Ultrasonix has configured *Advanced 3D/4D* to enable the user to select a default *Preset* to be applied to every image immediately after acquisition. When this default is not appropriate, the user has the option to load a different one (**6.7.4 Loading Presets**).

To Set the Default USER (Preset) on Entry:

1. Ensure an image has been acquired.

2. On the LCD display, move to *USERSET MODE*.

3. Click on the *USER/Preset* to be defaulted to upon entry.

    *Note: This setting will override the choice made on the touch screen (where **Skeletal** = **USER 1** and **Obstetrics** = **USER 2**).*

4. Click *DEFAULT*.

6.7.3 User-Defined Presets

While *USER 1* and *USER 2* are predefined, the three (3) remaining *Presets* (*USERS 3*, *4* and *5*) are can be edited and saved as user-defined *Presets*.

---
*Note: Before editing, **USER 3**, **USER 4** and **USER 5** are identical to **USER 2**. They cannot be renamed.*

To Create a User-Defined Preset:

1. Ensure an image has been acquired.

2. Move through the touch screen and LCD display options, making changes as required (refer to **6.2** and **6.3** for details on the available parameters).

3. On the LCD display, move to *USERSET MODE*.
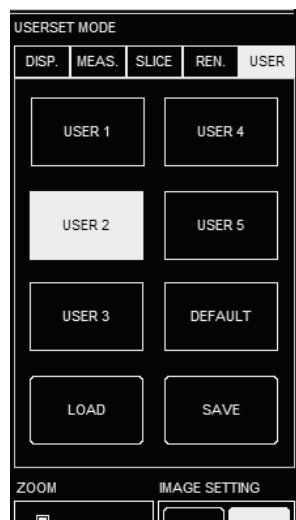
4. Click on *USER 3*, *4* or *5*.

---
*Note: Ultrasonix does not recommend editing the **Preset** parameters for **USER 1** and **2**.*

---

5. To save the parameters of the new *Preset*, click *SAVE*.

6.7.4   Loading Presets

Although a *Preset* (*Skeletal* or *Obstetrics*) is selected from the touch screen prior to acquiring an image, in order to apply the edited parameters of *USER 1*, *2*, *3*, *4* or *5* <u>after</u> acquisition, the *Preset* must be loaded.

*Note: The exception to this is if the user has already selected a default Preset (**6.7.2 Selecting a Default USER (Preset)**).*

To Load a Preset:

1. Ensure an image has been acquired.

2. On the LCD display, move to *USERSET MODE*.

3. Click on one of the four (4) *USER Presets* not currently active.

4. Click *LOAD* to activate the selected *Preset*.

CHAPTER 7: CLINICAL ANALYSIS

Measurements provide the user with the functionality to perform clinical analysis on an ultrasound image. They range from simple measurements that calculate **Length**, **Circumference**, **Area**, **Volume**, etc., to measurement packages that use calculation formulas to determine **Fetal Age**, **Heart Rate**, etc.

The reporting feature takes the **Application**-specific measurement values and generates a printable document that includes patient and facility information, labeled measurement values and calculation results. Some reports contain auto-generated graphs.

The various SONIX configurations provide **Basic** and **Application**-specific measurement/calculation packages:

- **Obstetrics**: **Fetal Biometry**, **Early OB** and **AFI**
- **Pelvic**: **Pelvic**, **Lt Follicle** and **Rt Follicle**

 Note: Lt Follicle and Rt Follicle include up to three (3) measurements each for a total of 24 different follicles per ovary.

- **Vascular**: **2D Vascular**
- **Cardiac**: **Ao/LA/LVO** and **Lt Ventricle**.

 Note: Cardiac does not support Duplex and Triplex imaging.

- **Urology**: **Prostate**, **PreV Blad**, **PostV Blad**, **Rt Kidney** and **Lt Kidney**
- **Basic**: **Dist**, **Area "|"**, **Volume**, **% Area Red "|"**, **% Diam Red**, and **Hip Angle**.

The measurement/calculation package defaults to the **Exam Type/Application** selected. For example, the **Obstetrical** calculation package is the default when an **OB Application** is selected. To access measurements specific to an alternate **Application**, tap **Select App** on the touch screen.

Table 7-1: Console Measurement Buttons

MEASURE	Use to activate the *Measurements* package. On a frozen image with measurements already recorded, press **MEASURE** to remove all the measurements on the frozen image screen.
	Note: Pressing **MEASURE** *does not delete the measurements from the* ***Report***.
DEL	Removes measurements from the screen (located to the left of the **MEASURE** button). If saved to a ***Report***, it will remove the measurement from the ***Report***. Continue to press **DEL** for each of the measurements to be deleted.
	Note: To delete one specific measurement when more than one is visible onscreen, move the cursor closest to the one to be deleted and press the console **UPDATE** *button to select it.*
SELECT	Selects, sets and activates calipers, ellipse, etc.
UPDATE	Toggles between the calipers prior to finalizing (setting) the measurement.
BACKSPACE	Corrects an incorrect move on a trace measurement.

*Note: When several methods of performing a measurement are available, a "**<<|>>**" appears on the touch screen button. Tap the selected measurement button and turn the dial beneath the selection to choose the preferred method. The method selected appears in a message bubble on the lower right corner of the LCD display and becomes the default.*

*e.g., for **Area**,* [% Area Red «|»] *measurement is set to **Continual Trace***

ⓘ Sonix - Calcs

Area set to 'Continual Trace'

7.1   2D BASIC MEASUREMENTS

2D Basic measurements are accessible by tapping *Basic* on the touch screen when the *Measurement* feature is active.

7.1.1   2D Linear Measurement

Figure 7-1: 2D Image with Linear Measurement
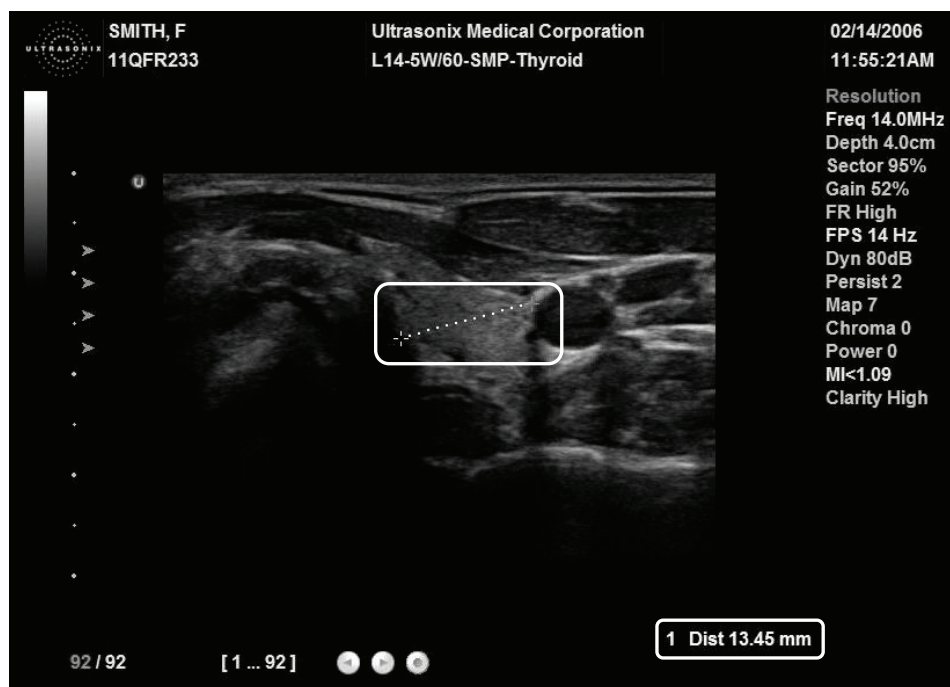
To Perform a Linear Measurement:

1. With a frozen 2D image, press the console **MEASURE** button.

2. A caliper will appear on the image on the LCD display. Use the trackball to position the first caliper.

3. Press **SELECT** to set the first caliper and activate the second caliper.

4. Use the trackball to position the second caliper.

    Note: To reposition the first caliper, press **UPDATE** *to toggle control between the two calipers.*

5. Press **SELECT** to set the measurement. The measurement value will appear on the bottom of the LCD display.

7.1.2 Area or Circumference (Area/Circ) Measurement

There are two (2) methods of performing the *Area/Circumference* measurement: *Ellipse* and *Trace*.

7.1.2.1 Trace Method Area or Circumference Measurement

To Perform a Trace Method Area or Circumference Measurement:

1. With a frozen 2D image, press the console **MEASURE** button.

2. If the *Basic* measurement tab is not active on the touch screen, tap *Basic* to activate it.

3. A caliper will appear on the image on the LCD display.

4. To select the desired method, tap *Area/Circ <</>>* on the touch screen and turn the dial directly below it until the desired method flashes on the lower right portion of the LCD display (e.g., *SONIX – Calcs Area set to "Continual Trace"*).

5. Use the trackball to position the caliper at the start position.

6. Press **SELECT** to set the first caliper.

   Note: Use the keyboard **BACKSPACE** *key to delete the previous trace move/position. Press* **BACKSPACE** *several times to undo several previous positions. Alternatively, use* **DEL***, located next to the* **MEASURE** *button.*

7. Use the trackball to trace the *Circumference* of the area of interest.

8. Press **SELECT** to set the trace.

9. The *Area* and *Circumference* values will appear on the bottom right of the LCD display.

7.1.2.2 Ellipse Method Area or Circumference Measurement

To Perform an Ellipse Method Area or Circumference Measurement:

1. With a frozen 2D image, press the console **MEASURE** button.

2. If the *Basic* measurement tab is not active on the touch screen, tap *Basic* to activate it.

3. A caliper will appear on the image on the LCD display.

4. To select the desired method, tap *Area/Circ <</>>* on the touch screen and turn the dial directly below it until the desired method flashes on the lower right portion of the LCD display (e.g., *SONIX Calcs – Area set to "Ellipse"*).

5. Use the trackball to position the first caliper.

6. Press **SELECT** to set the caliper position and activate the second caliper of the *Ellipse*.

7. Use the trackball to position the second caliper.

8. Press **SELECT** to set the second caliper position and activate the *Ellipse* sides.

9. Use the trackball to increase/decrease the sides of the *Ellipse*.

   Note: Press **UPDATE** *to toggle control of the calipers/*Ellipse *prior to completion of the measurement.*

10. Press **SELECT** to complete the Ellipse measurement.

11. The *Area* and *Circumference* values will appear on the bottom right of the LCD display.

7.1.3 Volume Calculation

To Perform a Volume Calculation:

1. With a frozen 2D image, press the console **MEASURE** button.

2. A caliper will appear on the image on the LCD display.

3. If the *Basic* measurement tab is not active on the touch screen, tap *Basic* to activate it.

4. Tap *Volume* to view a second touch screen menu with *L* (*Length*), *H* (*Height*) and *W* (*Width*).

5. Use the track ball to position the first caliper.

   *Note: By default, the touch screen **Length** option will be selected for the first measurement, **Height** will always be second and **Width**, last.*

6. Press **SELECT** to set the caliper position and activate the second caliper.

   *Note: Press **UPDATE** to toggle control of the calipers prior to completion of each linear measurement.*

7. Use the trackball to position the second caliper.

8. Press **SELECT** to set the second caliper position and complete the measurement.

   *Note: On the touch screen, an asterisk beside the **L, H** or **W** indicates that that specific measurement has been completed.*

9. Repeat steps 5 through 8 until all three (3) linear measurements have been completed. The three (3) measurement values with auto-calculated *Volume* results will be presented on the bottom right of the LCD display.

10. Tap *Cancel* to exit the *Volume* calculation sequence.

    Notes:

    *All three (3) measurements must be completed to calculate the **Volume**.*

    *Between **FREEZE** and **UNFREEZE**, until the **Volume** calculation is complete, the measurement values will reappear on the LCD display each time the console **MEASURE** button is pressed.*

7.1.4 Percent Diameter Reduction Calculation (% Diam Red)

To Perform a % Diameter Reduction:

1. With a frozen 2D image, press the console **MEASURE** button.

2. A caliper will appear on the image on the LCD display.

3. If the *Basic* measurement tab is not active on the touch screen, tap *Basic* to activate it.

4. Tap *% Diam Red* on the touch screen.

   *Note: The first caliper set is used for the outer measurement of the **% Diameter Reduction** and the second caliper set is used for the inner measurement.*

5. Use the trackball to position the first caliper of the outer measurement.

6. Press **SELECT** to set the caliper position and activate the second caliper for the outer measurement.

   *Note: Press **UPDATE** to toggle control of the calipers prior to completion of the linear measurement.*

7. A second caliper appears on the LCD display. Use the trackball to position the second caliper of the outer measurement.

8. Press **SELECT** to set the second caliper.

9. Use the trackball to position the first caliper of the inner measurement.

10. Press **SELECT** to set the caliper position and activate the second caliper of the inner measurement.

11. A second caliper appears on the LCD display. Use the trackball to position the second caliper of the inner measurement.

12. Press **SELECT** to set the second caliper.

13. The resulting *% Diameter Reduction* will be presented on the bottom right of the LCD display along with the inner and outer diameter measurements that were used in the calculation.

7.1.5 Percent Area Reduction Calculation (% Area Red)

Two (2) methods of performing the outer and inner *% Area Reduction* measurements are available – *Ellipse* and *Trace*.

To select the desired method, tap *% Area Red* on the touch screen and turn the dial below it. The selected method appears in a message bubble on the lower right portion of the LCD display.

Figure 7-2: % Area Reduction
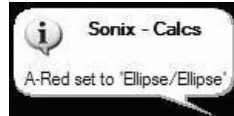
Note: The first caliper set is used for the outer measurement of the *% Area Reduction* *and the second caliper set is used for the inner measurement.*

Table 7-2: Percent Area Reduction Calculation Methods

Ellipse/Ellipse	Uses the *Ellipse* method for both outer and inner measurements.
Ellipse/Trace	Uses the *Ellipse* method for the outer measurement and the *Trace* method for the inner measurement.
Trace/Trace	Uses the *Trace* method for both outer and inner measurements.
Trace/Ellipse	Uses the *Trace* method for the outer measurement and the *Ellipse* method for the inner measurement.

7.1.5.1 Ellipse/Ellipse Method of Percent Area Reduction Calculation (% Area Red)

To Perform an Ellipse/Ellipse Method % Area Reduction:

1. With a frozen 2D image, press the console **MEASURE** button.

2. A caliper will appear on the LCD display.

3. If the *Basic* measurement tab is not active on the touch screen, tap *Basic* to activate it.

4. Tap *% Area Red* on the touch screen, turn the touch screen dial directly below it and select *Ellipse/Ellipse*.

5. Use the trackball to position the first caliper of the outer *Ellipse*.

6. Press **SELECT** to set the caliper position and activate the second caliper of the outer *Ellipse*.

7. Use the trackball to position the second caliper.

8. Press **SELECT** to set the second caliper position and activate the outer *Ellipse* sides.

9. Use the trackball to increase/decrease the sides of the outer *Ellipse*.

   Note: Press **UPDATE** *to toggle control of the calipers/ellipse prior to completion of the Ellipse measurement.*

10. Press **SELECT** to complete the outer measurement.

11. Use the trackball to position the first caliper of the inner *Ellipse*.

12. Press **SELECT** to set the caliper position and activate the second caliper of the inner *Ellipse*.

13. Use the trackball to position the second caliper.

14. Press **SELECT** to set the second caliper position and activate the inner *Ellipse* sides.

15. Use the trackball to increase/decrease the sides of the inner *Ellipse*.

16. Press **SELECT** to complete the inner measurement.

17. The resulting *% Area Reduction* will be presented on the bottom right of the LCD display along with the inner and outer measurements that were used in the calculation.

7.1.5.2 Ellipse/Trace Method of Percent Area Reduction Calculation (% Area Red)

To Perform an Ellipse/Trace Method % Area Reduction:

1. With a frozen 2D frozen image, press the console **MEASURE** button.

2. A caliper will appear on the LCD display.

3. If the *Basic* measurement tab is not active on the touch screen, tap *Basic* to activate it.

4. Tap *% Area Red* on the touch screen, turn the touch screen dial directly below it and select *Ellipse/Trace*.

5. Use the trackball to position the first caliper of the outer ellipse.

6. Press **SELECT** to set the caliper position and activate the second caliper of the outer *Ellipse*.

7. Use the trackball to position the second caliper.

8. Press **SELECT** to set the second caliper position and activate the outer *Ellipse* sides.

9. Use the trackball to increase/decrease the sides of the outer *Ellipse*.

   Note: Press **UPDATE** *to toggle control of the calipers/ellipse prior to completion of the* *Ellipse* *measurement.*

10. Press **SELECT** to complete the outer measurement.

11. Use the trackball to position the second caliper at the start position of the inner *Trace* measurement.

12. Press **SELECT** to set the second caliper.

13. Use the trackball to trace the circumference the area of interest.

14. Press **SELECT** to set the second caliper position.

15. The resulting *% Area Reduction* will be presented on the bottom right of the LCD display along with the inner and outer measurements that were used in the calculation.

7.1.5.3 Trace/Trace Method of Percent Area Reduction Calculation (% Area Red)

To Perform a Trace/Trace Method % Area Reduction:

1. With a frozen 2D image, press the console **MEASURE** button.

2. A caliper will appear on the LCD display.

3. If the *Basic* measurement tab is not active on the touch screen, tap *Basic* to activate it.

4. Tap *% Area Red* on the touch screen, turn the touch screen dial directly below it and select *Trace/Trace*.

5. Use the trackball to position the first caliper at the start position.

6. Press **SELECT** to set the first caliper.

7. Use the trackball to trace the circumference the area of interest.

   > *Note: Use the keyboard* **BACKSPACE** *key to delete the previous* **Trace** *move/position. Press* **BACKSPACE** *several times to undo several previous positions.*

8. Press **SELECT** to set the *Trace*.

9. Use the trackball to position the second caliper at the start position.

10. Press **SELECT** to set the second caliper.

11. Use the trackball to trace the circumference the area of interest.

12. Press **SELECT** to set the second caliper position.

13. The resulting *% Area Reduction* will be presented on the bottom right of the LCD display along with the inner and outer measurements that were used in the calculation.

7.1.5.4 Trace/Ellipse Method of Percent Area Reduction Calculation (% Area Red)

To Perform a Trace/Ellipse Method % Area Reduction:

1. With a frozen 2D image, press the console **MEASURE** button.

2. A caliper will appear on the LCD display.

3. If the *Basic* measurement tab is not active on the touch screen, tap *Basic* to activate it.

4. Tap *% Area Red* on the touch screen, turn the touch screen dial directly below it and select *Trace/Ellipse*.

5. Use the trackball to position the first caliper at the start position.

6. Press **SELECT** to set the first caliper.

7. Use the trackball to trace the circumference the area of interest.

> *Note: Use the keyboard* **BACKSPACE** *key to delete the previous* **Trace** *move/position. Press* **BACKSPACE** *several times to undo several previous positions.*

8. Press **SELECT** to set the *trace*.

9. Use the trackball to position the first caliper of the inner *Ellipse*.

10. Press **SELECT** to set the caliper position and activate the second caliper of the inner *Ellipse*.

11. Use the trackball to position the second caliper.

12. Press **SELECT** to set the second caliper position and activate the inner *Ellipse* sides.

13. Use the trackball to increase/decrease the sides of the inner *Ellipse*.

> *Note: Press* **UPDATE** *to toggle control of the calipers/ellipse prior to completion of the* **Ellipse** *measurement.*

14. Press **SELECT** to complete the inner measurement.

15. The resulting *% Area Reduction* will be presented on the bottom right of the LCD display along with the inner and outer measurements that were used in the calculation.

7.2   M-MODE BASIC MEASUREMENTS

7.2.1   M-Mode Heart Rate Measurement

To Perform an M-Mode Heart Rate Measurement:

1. With a frozen *M-Mode* image, press the console **MEASURE** button.

2. A *Measurements* tab appears on the touch screen. By default the *HR* caliper appears on the *M-Mode Sweep*.

   > *Note: The default measurements shown are predetermined based on **Application** and imaging mode. To access measurements for different **Applications**, tap **Select App** on the touch screen and select an alternate **Application**.*

3. Use the trackball to position the caliper on the *M-Mode Sweep* to the first beat.

4. Press **SELECT** to set the first cursor and activate a second caliper.

5. Use the trackball to position the second caliper to the next beat.

   > *Note: The default **Heart Rate** measurement requires one heart beat. Refer to **9.1.6 Measurements** to change the number of beats required for the **HR** calculation.*

6. To reposition either cursor press **UPDATE** to toggle control between the two calipers.

7. Press **SELECT** to set the measurement. The *Heart Rate* value will be presented on the bottom right of the LCD display.

7.2.2   M-Mode Slope Measurement (Time, Slope and Distance)

To Perform an M-Mode Slope Measurement:

1. With a frozen *M-Mode* image, press the console **MEASURE** button.

2. A *Measurements* tab appears on the touch screen. A caliper appears on the *M-Mode Sweep*.

3. Tap *Slope* on the touch screen.

4. Use the trackball to position the first caliper on the *M-Mode Sweep*.

5. Press **SELECT** to set the first cursor and activate a second caliper.

6. Use the trackball to position the second caliper to the desired location.

7. Press **SELECT** to set the measurement. The *Time*, *Distance* and *Slope* values will be presented on the bottom right of the LCD display.

7.3 PW DOPPLER BASIC MEASUREMENTS

When several methods of performing a measurement are available, tap the selected measurement on the touch screen and turn the touch screen dial beneath the selection to choose the preferred method. The method selected appears in a message bubble on the lower right corner of the LCD display (e.g., *Continual Manual Doppler Trace* versus *Point by Point Manual Doppler Trace*).

7.3.1 Velocity Measurement(s)

> *Note: Refer to* **9.1.6 Measurements** *to configure the* **Display Options** *for* **Velocity***. There are six (6) available* **Velocity** *display values:* **PSV, EDV, PSVPG, EDVPG, RI, SD***.*

To Perform a Velocity Measurement:

1. With a frozen *Doppler Trace*, press the console **MEASURE** button.

2. A *Measurements* tab appears on the touch screen. By default the caliper appears on the *Doppler Trace*.

   > *Note: The default measurements shown are predetermined based on* **Application** *and imaging mode. To access measurements for different* **Applications***, tap* **Select App** *on the touch screen and select an alternate* **Application***.*

3. Use the trackball to position the caliper to the peak velocity. A *Peak Systolic Velocity* (*PSV*) value appears on the LCD display.
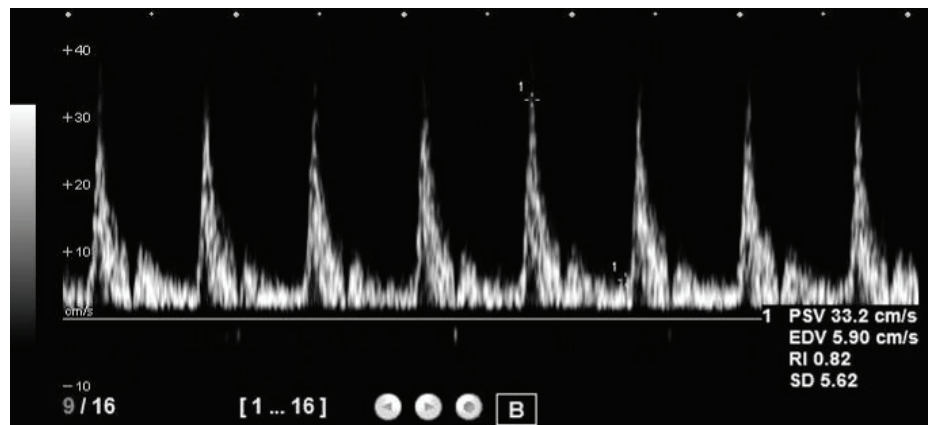
4. Press **SELECT** to set the first caliper and begin a second *Velocity* measurement.

5. Use the trackball to position the second caliper.

6. An *End Diastolic Velocity* (*EDV*) value with associated *Resistive Index* (*RI*) and *Systolic/Diastolic Ratio* (*SD*) will be presented on the LCD display.

7.3.2   Doppler Manual Trace Measurement

Note: *Refer to* **9.1.6 Measurements** *to configure the* ***Doppler Trace*** *display values. There are 11 available* ***Doppler Trace*** *display values:* ***PSV, EDV, AVp, AVm, AT, DT, VTI, PGr, RI, PI, SD.***

7.3.2.1   Doppler Manual Trace Measurement – Continual Method

Note: *To ensure the most accurate results, position the first caliper at the start of the waveform and set the last caliper at end diastole for manual* ***Doppler Traces****.*

To Perform a Manual Doppler Trace, Using the Continual Method:

1. With a frozen ***Doppler Trace***, press the console **MEASURE** button.

2. A ***Measurements*** tab appears on the touch screen. By default the caliper appears on the ***Doppler Trace***.

3. Tap ***D-Trace*** on the touch screen to assign the caliper to ***D-Trace***, turn the touch screen dial directly below it and select ***SONIX – Calcs Trace set to Continual Trace***.

    Note: *The selected method will appear in a message bubble on the lower right portion of the LCD display.*

4. Use the trackball to position the first caliper at the start of the desired ***Doppler Waveform***.

5. Press **SELECT** to set the start position.

6. Use the trackball to draw the trace along the desired ***Waveform*** right up to the point of end diastole.

7. Press **SELECT** to end and set the ***Trace***.

    Note: *Use the keyboard* **BACKSPACE** *key to correct an incorrect move on a* ***Trace*** *measurement.*

8. The ***Trace*** values will be presented on the LCD display.

7.3.2.2 Doppler Manual Trace Measurement – Point by Point Method

> *Note: To ensure the most accurate results, position the first caliper at the start of the waveform and set the last caliper at end diastole for manual **Doppler Traces**.*

To Perform a Manual Doppler Trace, Using the Point by Point Method:

1. With a frozen *Doppler Trace*, the console **MEASURE** button.

2. A *Measurements* tab appears on the touch screen. By default the caliper appears on the *Doppler Trace*.

3. Tap *D-Trace* on the touch screen to assign the caliper to *D-Trace*, turn the touch screen dial directly below it and select *SONIX – Calcs Trace set to Point by Point*.

    > *Note: The selected method will appear in a message bubble on the lower right portion of the LCD display.*

4. Use the trackball to position the first caliper at the start of the desired *Doppler Waveform*.

5. Press **SELECT** to set the start position.

    > *Note: Use the keyboard **BACKSPACE** key to correct an incorrect move on a **Trace** measurement.*

6. Use the trackball to position the next trace position along the *Doppler Trace*.

7. Press **UPDATE** to set the next caliper position.

8. Continue until the point of end diastole.

9. Press **SELECT** to end and set the *Trace*.

10. The *Trace* values will be presented on the LCD display.

7.3.3 Doppler Auto Trace Measurement (D-Range)

To Perform an Auto Doppler Trace (D-Range):

1. With a frozen *Doppler Trace*, press the console **MEASURE** button.

2. A *Measurements* tab appears on the touch screen. By default the caliper appears on the *Doppler Trace*.

3. Tap *D-Range* on the touch screen to assign the caliper to *D-Range*.

4. Use the trackball to position the first caliper.

5. Press **SELECT** to set it.

6. The second caliper appears on the screen. Use the trackball to position it.

7. Press **SELECT** to set the *D-Range*.

8. The *Trace* values will be presented on the screen.

7.3.4 Doppler Heart Rate Measurement

To Perform a Doppler Heart Rate:

1. With a frozen *Doppler Trace*, press the console **MEASURE** button.

2. A *Measurements* tab appears on the touch screen. By default the caliper appears on the *Doppler Trace*.

3. Tap *HR* on the touch screen.

4. Use the trackball to position the caliper on the *Doppler Trace* to the first beat.

   *Note: The default **Heart Rate** measurement requires one heart beat. Refer to **9.1.6 Measurements** to change the number of beats required for the **HR** calculation.*

5. Press **SELECT** to set the first caliper and activate a second caliper.

6. Use the trackball to position the second caliper to the desired next beat.

7. Press **SELECT** to set the measurement. The *Heart Rate* value will be presented on the screen.

7.4 APPLICATION-SPECIFIC MEASUREMENT/CALCULATION

⚠ *Warnings:*

Various factors may affect the accuracy of Obstetrical measurements.

*Ensure the system **Date/Time** is configured correctly.*

*Ensure the desired **Obstetrical** calculation author has been selected for each parameter.*

*Ensure the saved **Obstetrical** measurement data from the previous exam has been deleted prior to saving new **Obstetrical** measurement data.*

*Ensure correct fetus (**A**, **B** or **C**) is selected on the **Measurements** touch screen prior to performing obstetrical measurements.*

Fetal labels are not displayed with the measurement on the image field. Ultrasonix recommends that the user annotate the image as required to differentiate the measurements.

Notes:

*For twin and triplet obstetrical (OB) measurements, ensure fetus number is "2" or "3" on the **Exam Management** page.*

*Selection of OB **Doppler** measurements **MCA** (**Middle Cerebral Artery**) and **Umb A** (**Umbilical Artery**) enable a two (2) velocity measurement to be made which displays **PSV, EDV, RI** and **SD** ratio results. To obtain a **PI** (**Pulsatility Index**) measurement for **MCA** or **Umb A**, select **MCA – PI** or **Umb A – PI** to enable a **Doppler Trace** measurement which displays **PSV, EDV, RI, SD** and **PI** results.*

An asterisk (*) beside the parameter label on the touch screen implies a measurement has been previously saved to report.

Figure 7-3: Sample Application-Specific Measurement
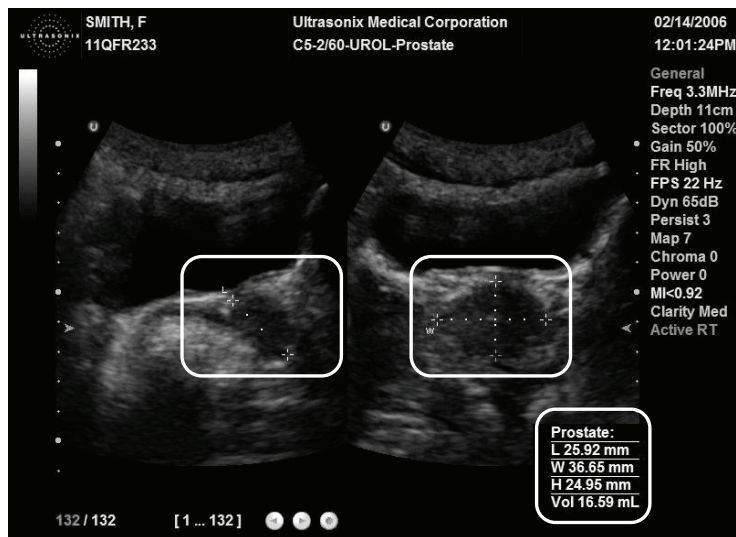
To Assign an Application-Specific Label to a Measurement:

1. With a frozen *2D*, *M-Mode* or *Doppler* image, press the console **MEASURE** button.

2. A *Measurements* tab appears on the touch screen. A default caliper appears on the image.

   *Note: The default measurements shown are predetermined based on **Application** and imaging mode. To access measurements for different **Applications**, tap **Select App** on the touch screen and select an alternate **Application**.*

3. Tap the desired label from the touch screen menu and use the trackball to position the first caliper.

4. Press **SELECT** to activate the second caliper.

5. Use the trackball to position the caliper.

6. To reposition either caliper, press **UPDATE** to toggle control between the two calipers.

7. Press **SELECT** to set the measurement. The measurement value appears on the image screen and is stored to the *Application*-specific report page.

8. To delete the measurement either unfreeze the image or press **DEL** to the left of the **MEASURE** button. Press the **MEASURE** button to remove all the measurements from the frozen image screen.

   *Note: For additional details on performing a particular type of measurement (e.g., **HC** requires a **Circumference – Trace or Ellipse**), refer to **7.1**, **7.2** and **7.3** under **Basic Measurements**.*

7.5   REPORTS/CLINICAL ANALYSIS

7.5.1   Reports for all Applications

Reports are not saved to the patient file. In order to access them after an exam has ended, individual pages must either be printed or stored (refer to **9.2.4 Print Keys** for setup details on the **PRINT 1**, **PRINT 2** and **PRINT 3/ARCHIVE** console buttons).

All *Reports* have the following things in common:

- controls that are available using the touch screen/dials and on *Report* pages via the console
- a *Comment* section where extra data may be entered using the keyboard (maximum of 10 lines).

---
*Note: To view a **Report** (if available), tap **Report** from the **Measurements** touch screen. Tap **Exit Report** to exit the report page.*

To Access the Report Pages for the Active Patient/Exam:

1. During an exam, after taking at least one measurement (and while the console **MEASURE** button is still active), tap *Report* on the touch screen.

   ---
   *Note: The **Report** type and its associated measurements are dependent upon the **Preset** chosen for the exam.*

   ---

2. For *OB Reports*, use the trackball and **SELECT** button to page through the *Report*.

3. To exit the *Report*, select the *Close* button on the LCD display or tap *Report* on the touch screen.

   ---
   *Note: In order to access an individual report page after an exam has ended, it must either be printed or stored (refer to **9.2.4 Print Keys** for setup details on the console **PRINT 1**, **PRINT 2** and **PRINT 3/ARCHIVE** buttons).*

7.5.2   Obstetrics Report

An ***OB Report*** includes items/functionality that may not be available with all report types:

- page number total recorded at bottom of each page, e.g., "***Page 1 of 1***" or "***Page 3 of 6***"
- graphs
- ability to delete specific measurements.

To Delete Obstetrical Biometry Measurements from Report:

1. With a frozen image, press the console **MEASURE** button.

2. A ***Measurements*** tab appears on the touch screen. If the default tab is not ***OB***, choose the ***OB*** application using ***Select App*** on the touch screen.

3. Tap the biometry label (e.g., ***BPD***) of the measurement to be deleted.

    Note: Biometric labels with associated measurements are marked with an asterisk (*).

4. Tap ***History*** on the bottom of the touch screen.

5. A list of the selected biometry's three (3) most recently saved measurements will appear on the touch screen.

6. Tap the measurement to be deleted.

7. Tap ***Delete*** and the measurement will be removed from the ***OB Report*** pages.

    Caution: In the case of twins or triplets, ensure the correct fetus is selected prior to deleting the OB parameter measurement.

8. Tap ***Back*** on the touch screen to return to ***OB***.

Figure 7-4: Sample Obstetrical Report (Pages 1 and 2)

As with this **Print** button, anything that is "grayed" out is not available for use.

Use these three (3) buttons to move directly to specific pages of the **Obstetrics Report**. The buttons will vary by **Report** page (e.g., the **Graphs** selection will not be available on the actual **Graphs** page of this report.)

Page number

Available only for **OB Reports**.

Figure 7-5: Sample Obstetrical Report (Pages 3 and 4)

Each item on the *OB Report Anatomy Checklist* page has a small, editable *Comment* field.

Use *Select/Clear All* to select/deselect all items in the *Anatomy Checklist* at the same time.

Figure 7-6: Sample Obstetrical Report (Pages 5 and 6)

CHAPTER 8: TEXT, ANNOTATIONS AND PICTOGRAMS

Text, *Annotations* and *Pictograms* enable the user to label images prior to image transfer and storage.

8.1   TEXT AND ANNOTATIONS

The SONIX system enables users to add *Text* (via the keyboard) or *Preset Annotations* (listed on the touch screen) to the image field. *Annotations* are predefined by *Application* but can also be customized by users (**9.1.2 Presets – Annotations**). An *Annotation Arrow* is available as well as an *Auto-Complete* text feature that anticipates the word being entered (**9.1.5 Annotations**).

8.1.1   Keyboard Text

To Enter Keyboard Text:

1. Press the console **TEXT** button

2. A *Text* cursor appears on the image screen.

3. Use the trackball to position the *Text* cursor as required.

4. Use the keyboard to enter the desired text.

    > *Note: When the **Auto-Complete** function is active (**9.1.5 Annotations**), enter the first letter(s) of the preset word and the rest of the word will be presented in blue. If more than one preset word with the same first letter exists, use the **TAB** key to cycle through all the preset words beginning with that letter. To set the selected preset word, press **ENTER** on the keyboard.*

5. Use the trackball to relocate the *Text* cursor as required.

6. Use the keyboard backspace arrow to remove the letter(s) to the left of the *Text* cursor.

7. Press **TEXT** to exit *Text/Annotation* mode.

8.1.2 Set Text Home Position

Once a *Text/Annotation* cursor **Home Position** has been set, it will remain until/unless it is reset.

To Set the Text Home Position:

1. Press the console **TEXT** button.

2. Use the trackball to position the cursor in the desired **Home Position**.

3. Tap *Set Home* on the touch screen to set the **Home Position**.

    Note: Tap **Home Position** *on the touch screen to automatically reposition the cursor to the previously-defined* **Text Home Position**.

8.1.3 Application-Specific Annotations

To Enter Application-Specific Annotations:

1. Press the console **TEXT** button

2. Once the *Text/Annotation* cursor location is presented on the screen, use the trackball to reposition the cursor as required.

3. Tap the desired *Annotation* from the selection presented on the touch screen.

    Note: To modify the preset **Annotations***, refer to* **9.1.2 Presets – Annotations***.*

4. Repeat steps 2 and 3 as many times as required.

5. Press **TEXT** to exit *Text/Annotation* mode.

8.1.4 Deleting Text/Annotation

To Delete All Text/Annotations:

1. Press the console **TEXT** button

2. Press **DEL** (below the console **TEXT** button) to delete all user-entered *Text/Annotations* from the image field.

   > *Note: Alternatively, move the cursor to the desired position and use the keyboard* **BACKSPACE** *arrow to remove the letter(s) to the left of the* ***Text*** *cursor.*
   >
   > *To remove the most recently entered* ***Annotation****, select* ***Delete Last*** *from the touch screen while in* ***Text*** *mode. Repeating this action will delete each subsequent entry in reverse order.*

3. Press **TEXT** to exit *Text/Annotation* mode.

8.1.5 Text Arrow

Users can enter multiple *Text Arrows* on a single image.

To Enter the Text Arrow:

1. Press the console **ARROW** button.

2. When the arrow appears on the image screen, use the trackball to position/rotate it.

3. Press the **SELECT** button to place the positioned arrow on the image.

4. Repeat steps 2 and 3 as many times as necessary.

5. Archive the image (**PRINT 1**, **2**, or **3**) to save it with the arrows visible.

6. Press **ARROW** to remove the *Text* arrow(s).

   > *Note: Once the console* **FREEZE** *button is pressed – either before or after the* ***Text*** *arrows are added – when the* **FREEZE** *button is pressed again (i.e., when the image is unfrozen) the* ***Text*** *arrows will be removed* <u>*without*</u> *having to press* **ARROW** *as described in step 6.*

8.2 PICTOGRAMS

Pictograms are predefined, *Application*-specific icons that enable users to label the imaging feature. Customizing the availability of specific *Pictograms* within *Presets* is controlled through **9.1.3 Presets – Pictograms**.

To Activate a Pictogram:

1. Press the console **PICTOGRAM** button.

2. Rotate the knob below the *Pictogram* heading on the touch screen to move through the various *Pictograms* available.

3. Once the desired *Pictogram* is located, press **PICTOGRAM** again.
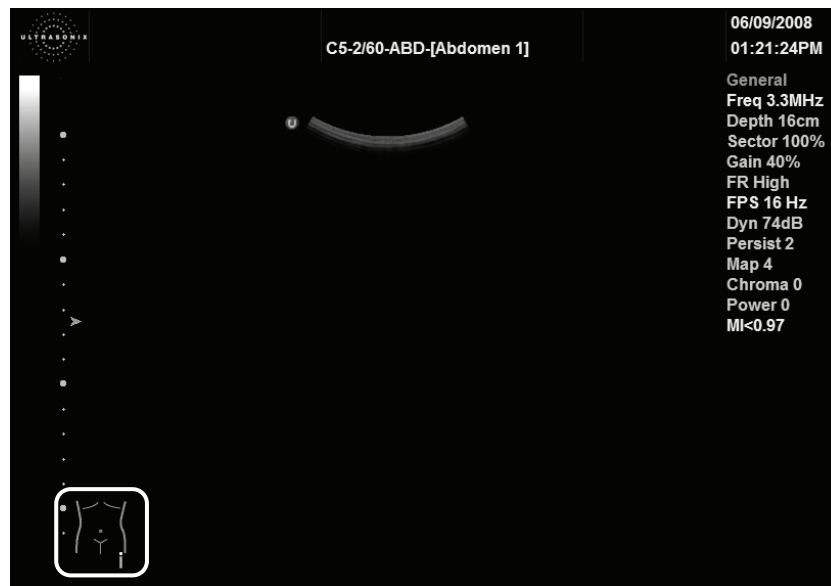
4. Press **SELECT**, then use the trackball to position the *Pictogram* orientation marker to the desired location on the *Pictogram*.

5. To rotate the *Pictogram* orientation marker, tap *Rotate* on the touch screen and turn the knob associated until the desired position is reached.

6. Once positioned as required, press **SELECT** again.

7. To re-access the *Pictogram* functions after performing other imaging functions, press **PICTOGRAM** again and repeat steps 2 to 6.

8. To hide the *Pictogram* from view, tap the *Hide* button on the touch screen.

CHAPTER 9: SYSTEM SETUP

The various features and settings of the SONIX ultrasound system can be customized via one of the three (3) System Setup menus: *User*, *Admin*(*istrator*) and *Service…* menu level password protection applies as follows:

- *Users Settings*: <u>no</u> password protection
- *Admin Settings*: <u>optional</u> password protection
- *Service Settings*: <u>always</u> password protected. Only qualified Ultrasonix Medical Corporation service personnel can access this menu.

The following tables provide a quick overview of the system's setup menus. Refer to the related sections later in this chapter for further details on any particular setup option.

Table 9-1: User Settings Menu

Presets	View and manage imaging *Presets* with their associated *Annotations* and *Pictograms*.
Annotations	Toggle on/off the three (3) global *Annotation* settings.
	*Note: Customization of **Preset**-specific **Annotations** is handled through **Presets**.*
Measurements	Configure graphic settings, including connection points, text and caliper sizes as well as colors for connection points and calipers.
	Use *OB Settings* to configure fetal age, growth and weight calculations based on a variety of authors (such as Hadlock), or create custom age and growth tables.
	Set *Pregnancy Weeks*, *Heart Rate Beats* and *Volume Units*.
	Select *Display Options* for *Area*, *Velocity* and *Doppler Traces*.
3D	Set default configuration for *Freehand 3D* image acquisition. Set display timing for *3D Config* dialog box.
	Note: These settings do not apply to **Chapter 6: Advanced 3D/4D Imaging**.
Display	Set options for the LCD display and touch screen.
DICOM Server	Select any one of three (3) *DICOM Storage* and/or *Print* servers.
Biopsy Guide	Select the imaging screen *Biopsy Guide* orientation.
SONIX Live	Activate/deactivate *Streaming Video*.
Admin…	Access the *Admin Settings* menu.

Note: The software version number is displayed across the bottom of this menu.

Table 9-2: Admin Settings Menu

System	Customize the *Institution Name*.
	Configure *Regional* options, *Imaging Modes*, *Shutdown Options*, *Auto-Freeze* and *User Data*.
	Reset system to *Factory Defaults*.
	Set a single, *Administrator Password*.
Network	Configure settings for: *Network* (*LAN* (Local Area Network) or dialup), *TCP/IP* (Transmission Control Protocol/Internet Protocol), *E-mail* and *Online Support*.
	Caution: System networking options are intended for use <u>inside</u> your organization's firewall. Organizations that elect to configure/use the networking functionality provided by Ultrasonix are assuming all liabilities and risks associated with that decision.
DICOM	Enable and configure *DICOM Storage*, *Print* and *Worklist*.
Print Keys	Set the *Store*, *Print*, *Archive* parameters for the three (3) console **PRINT** buttons.
Peripherals	Configure *Peripherals*: *Paper Printer*, *LCD Display*, *VCR/Photo*, *Footswitch* and (Image) *Brightness/Contrast*.
Patient	Customize entry of *Patient* information using a variety of options, including: show/hide fields, create new fields, allow/disallow editing of specific fields, and selection of gender and application defaults.
Status Bar	Configure which *Status Bar* icons are visible on the LCD display.
Capture	Configure *Capture* settings for still images, video output and *CINE* loop storage.
Software Updates	Update system software via the Internet, CD/DVD or a USB memory stick.
Licensing	View and add *License* details.
Service…	Access the *Service Mode* dialog.

Table 9-3: Service Settings Menu

Service Settings	The system is delivered with this option under *Password* protection.
	Note: Only qualified Ultrasonix Medical Corporation service personnel can access this menu.

*Note: Use the trackball and **SELECT** button to close each menu and exit the menu system, one menu at a time. To exit the entire menu system in one step, press the console **MENU** button.*

Be sure to save whatever edits are in progress <u>before</u> exiting, otherwise changes may be lost.

To Access the System Menus:

1. Press the console **MENU** button and the *User Settings* menu will be presented.
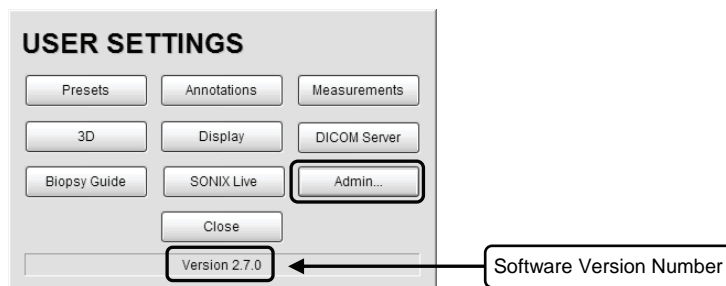
2. From the *User Settings* menu, select *Admin…* to access *Admin Settings*.
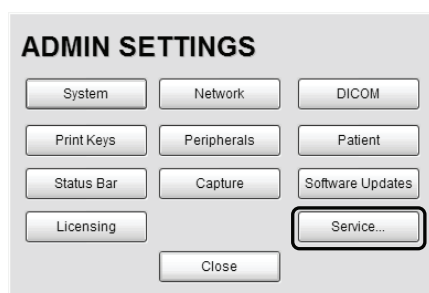
3. From the *Admin Settings* menu, select *Service…* to access the *Service Mode* dialog.
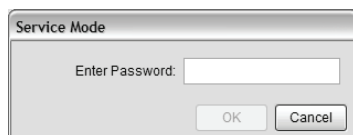
*Note: To exit the entire menu system in one step, press the console **MENU** button.*

9.1 USER SETTINGS

9.1.1 Presets

Presets Setup enables users to manage factory default and user-defined *Imaging Presets*.

There are two (2) types of user-defined *Presets*: *2D* and *3D/4D*. Each type is created in a different manner. Refer to **4.7 User-Defined Presets for Non-3D/4D Formats** to create user-defined *2D Presets* and **9.1.4 Presets – 3D/4D** for more details on user-defined *3D/4D Presets*.

Note: 3D/4D Preset setting and configuration details in this chapter do not apply to **Chapter 6: Advanced 3D/4D Imaging***.*

*The **Preset** list is transducer dependent. Ensure that the desired transducer is connected to the system in order to view its associated **Preset**(**s**).*

Figure 9-1: Presets Setup
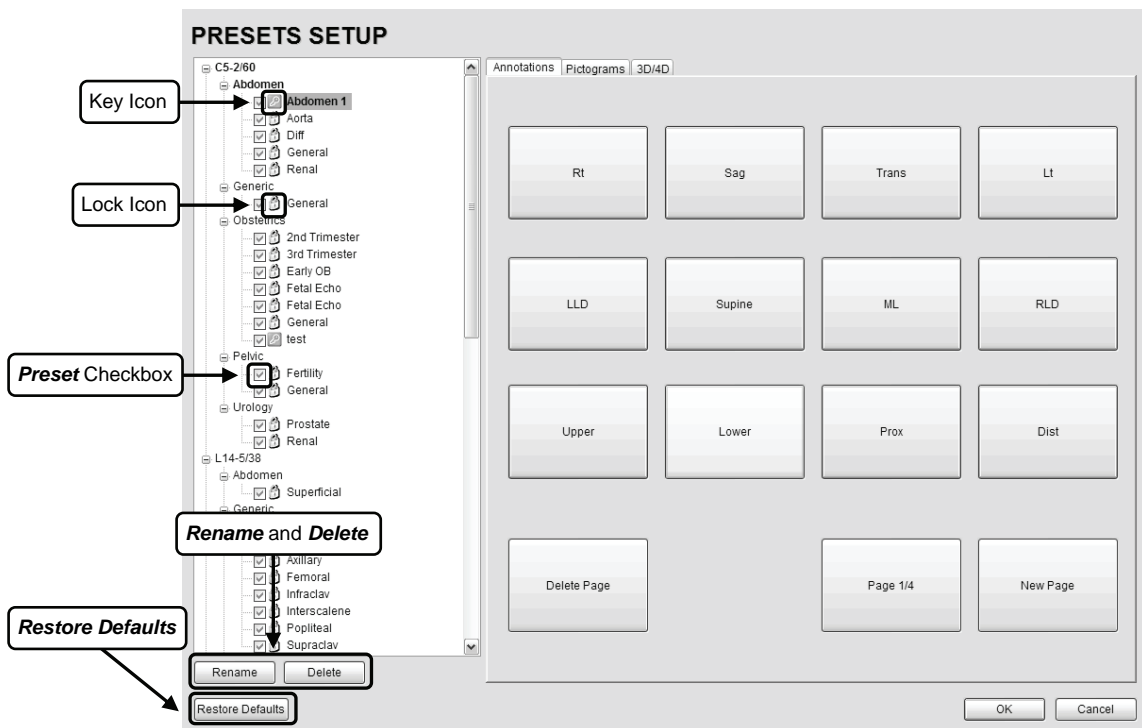
*Note: **Rename** and **Delete** are only available if a user-defined **Preset** has been selected.*

Default settings are locked (as indicated by the lock icon adjacent to the *Preset* name). Additional user-definable aspects of the default settings are available through the three (3) tabs on the *Presets Setup* page: *Annotations*, *Pictograms* and *3D/4D*.

User-defined **Presets** are marked with a key icon. These cannot be locked.

The left-hand menu displays all currently available **Presets**, both default and custom. Each **Application** is delivered with at least one default **Preset**.

Caution: Restore Defaults restores <u>all</u> Presets Setup changes to their factory settings.

To Access the Presets Setup Page:

1. Press the console **MENU** button.

2. Select **Presets**.

To Rename a Previously Created User-Defined Preset:

1. Press the console **MENU** button.

2. Select **Presets**.

3. Highlight the user-defined **Preset** to be renamed.

4. Click the **Rename** button.

5. Type a new, unique name in the **Rename Preset** message box.

6. Select **OK** to accept the changes and exit or **Cancel** to exit without saving.

To Delete a User-Defined Imaging Preset:

1. Press the console **MENU** button.

2. Select **Presets**.

3. Highlight the user-defined **Preset** to be deleted.

4. Click the **Delete** button.

5. Select **Yes** to confirm the deletion or **No** to cancel the operation.
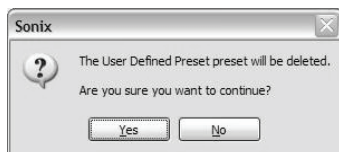
9.1.1.1 Show/Hide Imaging Presets

Preset availability can be controlled using its associated checkbox. When selected, as indicated by the presence of the green check mark, the **Preset** will be available from both the touch screen and the **QSONIX Imaging Preset** selection dialog (providing the applicable transducer is connected). When deselected, the **Preset** will not be available/visible on the either the touch screen or the **QSONIX Imaging Preset** selection dialog and therefore will not be available for use in an exam.

When <u>all</u> **Presets** for a given **Exam Type/Application** are deselected, that **Exam Type/Application** will not be displayed in **QSONIX** or as a **Preset** on the touch screen.

Figure 9-2: Show/Hide Imaging Presets
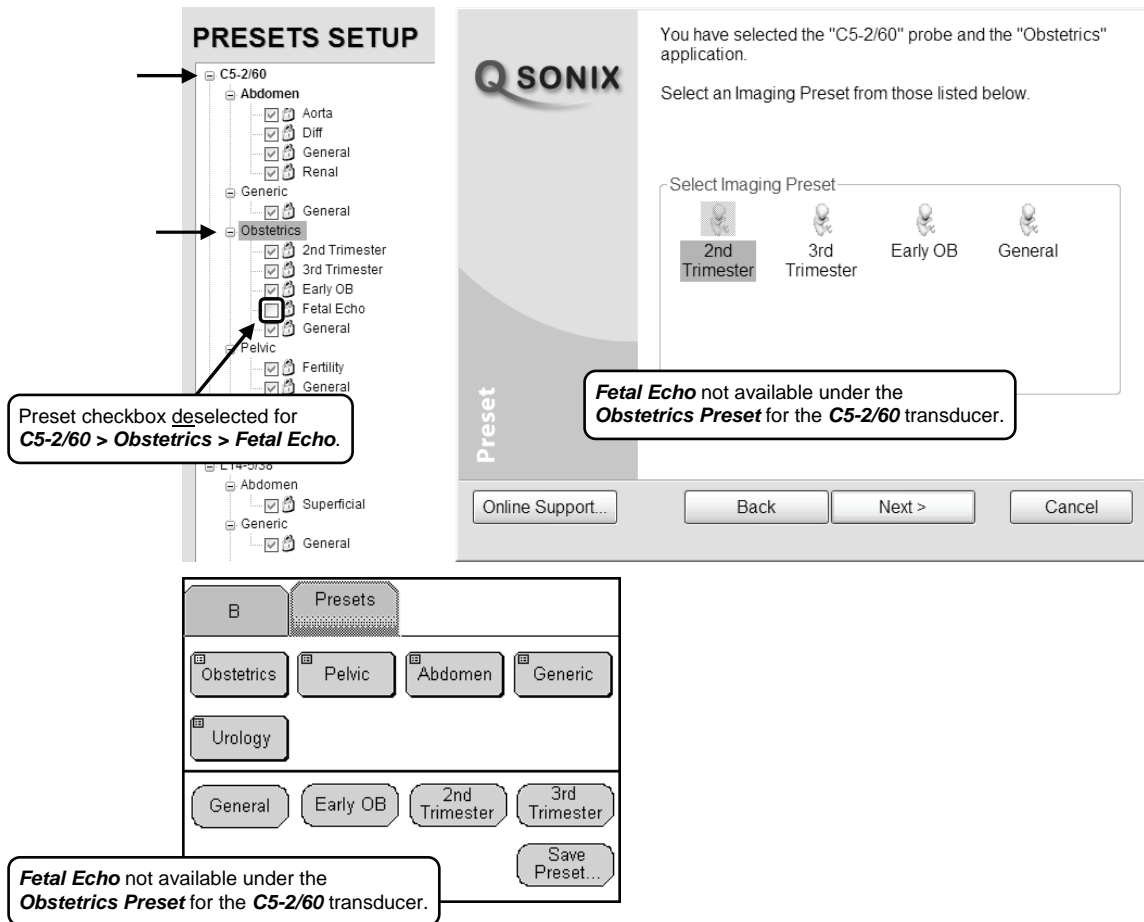
*Note: This show/hide function applies to both default and user-defined **Presets**.*

To Show/Hide an Imaging Preset (on the Touch Screen and QSONIX Imaging Preset Dialog):

1. Press the console **MENU** button.

2. Select *Presets*.

3. Select/deselect the relevant checkbox.

PRESETS SETUP

☐ C7-3/50
   ☐ Abdomen
      ☑ Aorta
      ☑ Diff
      ☑ General
      ☑ Renal
   ☐ Generic
      ☑ General
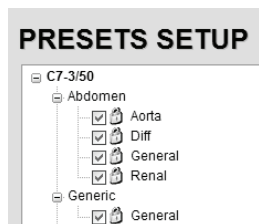
4. Select *OK* to accept the changes or *Cancel* to exit without saving.

9.1.2 Presets – Annotations

The ability to manipulate the text of a specific *Annotation* attached to either a user-defined or default *Presets* is handled through the *Annotations* tab on the *Presets Setup* page. *Annotation* text appears by *Application* on the console touch screen.

Note: Refer to **9.1.5 Annotations** *for details on global* **Annotation** *settings.*

Figure 9-3: Presets Setup – Annotations
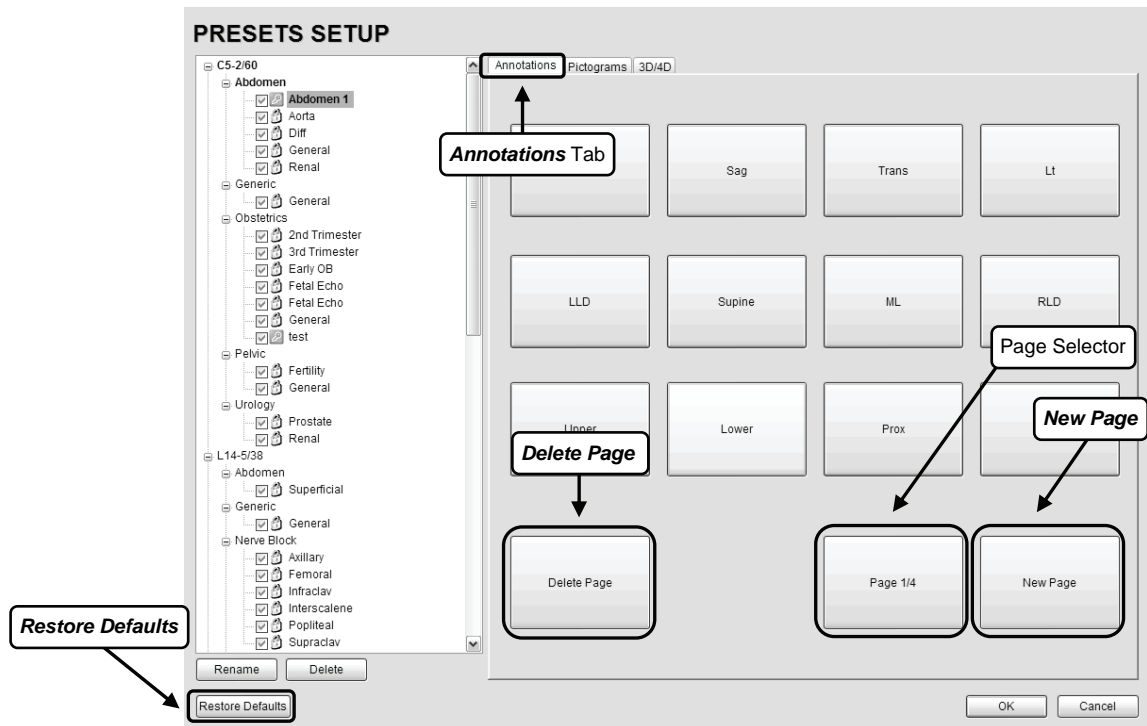
Note: The order in which **Annotations** *appear here is matched on the touch screen during* **Text** *entry (***8.1 Text and Annotations***).*

9.1.2.1 Modify Annotations

Changes can only be made to the *Annotations* of one *Preset* at a time. Additionally, the system allows users to define/change the *Home Position* for the *Annotation* cursor. Once set, whenever the *Home Position* touch screen button is tapped, the *Text* cursor will move directly to that spot.

Note: Refer to **8.1.2 Set Text Home Position** *to define the* *Text/Annotation cursor* *Home Position*.

To Modify a Preset's Annotations:

1. Press the console **MENU** button.

2. Select *Presets*.

3. Highlight the relevant *Preset* from the left hand menu.

4. Highlight the relevant *Annotation* space on the right hand side of the LCD display.

5. Use the keyboard to type in the new *Annotation*.

Note: If multiple pages of *Annotations* *are required, press the* *New Page* *button as often as necessary to create the desired number of* *Annotation* *spaces.*

Alternatively, if multiple pages already exist, move through them using the onscreen page selection button, making changes as required.

---

6. Select *OK* to accept the changes and exit or *Cancel* to exit without saving.

9.1.3   Presets – Pictograms

The ability to attach/detach specific *Pictograms* to both user-defined and default *Presets* is handled via the *Pictograms* tab in *Presets Setup*. Re-ordering the sequence in which they will appear on the touch screen during a scanning session is managed here as well.

Figure 9-4: Presets Setup – Pictograms
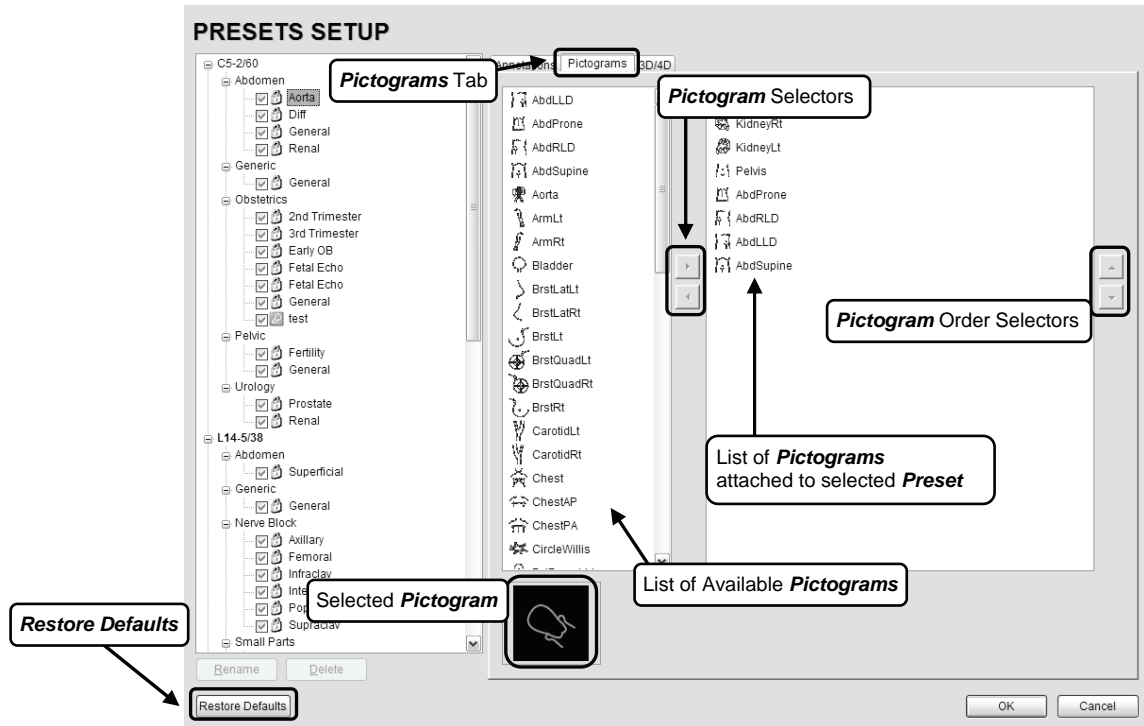
9.1.3.1 Modify the Pictograms Attached to Presets

To Add Pictograms to an Imaging Preset:

1. Press the console **MENU** button.
2. Select *Presets*.
3. On the *Presets Setups* page, click the *Pictograms* tab.
4. Highlight the relevant *Preset* in the left hand column.
5. From the list of available *Pictograms*, highlight the relevant *Pictogram*.
6. Use the right facing selector button to move the item to the list of selected *Pictograms*.
7. Repeat Steps 5 and 6 as many times as required.
8. Select *OK* to accept the changes and exit or *Cancel* to exit without saving.

To Delete Pictograms from an Imaging Preset:

1. Press the console **MENU** button.
2. Select *Presets*.
3. On the *Presets Setups* page, click the *Pictograms* tab.
4. Highlight the relevant *Preset* in the left hand column.
5. Highlight the relevant *Pictogram* in the list of selected *Pictograms*.
6. Use the left facing selector button to delete the item from the list of selected *Pictograms*.
7. Repeat Steps 5 and 6 as many times as required.
8. Select *OK* to accept the changes and exit or *Cancel* to exit without saving.

To Reorder Selected Pictograms Attached to an Imaging Preset:

1. Press the console **MENU** button.
2. Select *Presets*.
3. On the *Presets Setups* page, click the *Pictograms* tab.
4. Highlight the relevant *Preset* in the left hand column.
5. Highlight the relevant *Pictogram* in the list of selected *Pictograms*.
6. Use the order (up/down) selector buttons to move the item to another place in the list of selected *Pictograms*.
7. Repeat Steps 5 and 6 as many times as required.
8. Select *OK* to accept the changes and exit or *Cancel* to exit without saving.

9.1.4   Presets – 3D/4D

The ability to attach/detach specific *3D/4D Presets* to both user-defined and default *Presets* is handled via the *3D/4D* tab in *Presets Setup*.

Default settings are locked (as indicated by the lock icon adjacent to the *3D/4D Preset* name) and cannot be edited.

User-defined *Presets* are marked with a key icon. These cannot be locked and can be renamed or deleted through **9.1.7 3D Settings**. To create a user-defined, *3D/4D Preset*, refer to **4.7 User-Defined Presets for Non-3D/4D Formats**.

During imaging, a user-defined *Preset* name is shown on the LCD display in square brackets (e.g., **[User-Defined Preset]**). On the touch screen, user-defined *Presets* are presented in italics (e.g., *User-Defined Preset*).

Note: These settings do not apply to **Chapter 6: Advanced 3D/4D Imaging**.

Figure 9-5: Presets Setup – 3D/4D
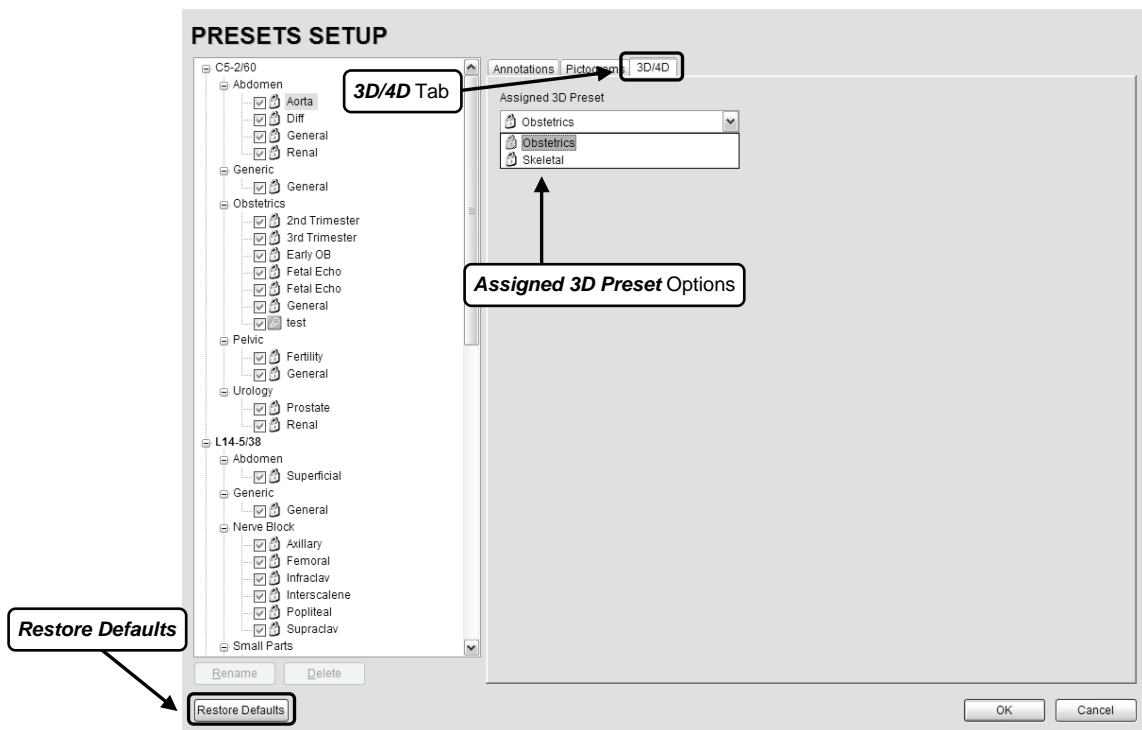
To View the 3D/4D Imaging Selection Attached to Presets:

1. Press the console **MENU** button.

2. Select *Presets*.

3. On the *Presets Setups* page, click on the *3D/4D* tab.

   > *Note:* If a 4D transducer is not connected to the SONIX, then the **4D Imaging Presets** normally available will not be present in the left hand column on the LCD display.

4. Use the trackball and **SELECT** button to view the *Presets* listed in the drop-down menu.

9.1.5 Annotations

There are three (3) global *Annotation* settings available.

Figure 9-6: (Global) Annotations Settings
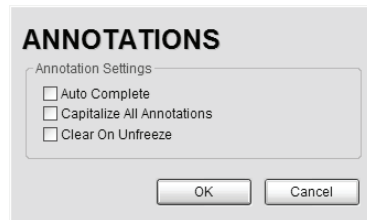
Table 9-4: (Global) Annotation Settings

Auto-Complete	When selected, this feature automatically fills in a word when the first letter(s) is entered on the LCD display. If more than one *Preset* begins with the same letter use the **TAB** key to move through the list or continue typing the *Preset* name. When enough of the name has been completed in order to jump to the correct entry, the desired *Preset* name will appear onscreen and can be selected.
Capitalize All Annotations	When selected, this feature will automatically force the first letter of each word in the *Annotation* to be typed as an upper case character.
Clear on Unfreeze	When selected, this feature will automatically clear the *Annotations* from the image field with un**FREEZE**. If this option has not been selected, the text will remain on the image field until the user deletes it.

To Access the Global Annotation Settings Dialog:

1. Press the console **MENU** button.

2. Select *Annotations*.

   Note: Refer to **9.1.2 Presets – Annotations** *for details on configuring **Preset**-specific Annotations.*

9.1.6 Measurements

The **Measurements** dialog enables users to customize the onscreen appearance of calipers, caliper labels and certain display details of the measurement/calculation packages. When the console **MEASURE** button is pressed, **Measurements** are available on the touch screen based on clinical **Application**.

Figure 9-7: Measurements Settings

⚠ **Warning:** *Ultrasonix does not endorse user-defined **Measurements**, **Calculations** and **Tables** for diagnostic purposes. All user-defined **Measurements**, **Calculations** and **Tables** are used at the **Operator's** discretion and risk only.*

Table 9-5: Measurement Options

Graphics	***Show Connection Points***	Select to display the connection points (dotted line) between the linear calipers.
	Display Text	Allows the selection of one (1) of four (4) measurement label font size options: **Small**, **Regular**, **Medium** and **Large**.
	Caliper Size	Allows the selection of one (1) of four (4) caliper size options: **Small**, **Regular**, **Medium** and **Large**.
	Connection Point Color	Allows the selection of the color of the caliper connection points (dots) between the linear calipers. The default is turquoise.
	Caliper Color	Allows the selection of the color of the caliper end points. The default is turquoise.
	Caution: *Some caliper sizes/colors, font sizes or dot colors may not appear clearly on the image screen, stored image or printed/recorded image. To ensure clear visualization of the caliper, label font and connection points, Ultrasonix recommends setting the caliper graphics to at least **Regular** or **Medium**.*	
	Note: *To ensure the caliper modifications have been activated, switch imaging modes after exiting the **Setup** menus.*	

Other	*OB Settings…*	Refer to **Appendix E: Obstetrical Tables** for a complete list of *OB Settings*.
		*Note: Factory default **OB** tables cannot be modified or deleted.*
	Pregnancy Weeks	Defines the number of weeks used to calculate the *EDD* based on *LMP*. Range: 35 – 45 weeks.
	Heart Rate Beats	Number of beats used to measure the *HR* and *FHR* on an *M-Mode* and *Doppler Trace*. Range: 1 – 7 beats.
	Volume Units	Type of unit used to display *Volume* calculation: ml or cc.
	⚠	*Warning: Ultrasonix does not endorse user-defined **Measurements**, **Calculations** and **Tables** for diagnostic purposes. All user-defined **Measurements**, **Calculations** and **Tables** are used at the **Operator's** discretion and risk only.*

Display Options	Refer to **9.1.6.1 Display Options for Measurement/Calculation Values**.

To Access the Measurements Settings:

1. Press the console **MENU** button.

2. Select *Measurements*.

9.1.6.1 Display Options for Measurement/Calculation Values

Select the *Display Option*(*s*) that will be presented onscreen when the corresponding measurement is being taken. For example, when measuring *Area*, if *AR* and *CIR* are selected as the *Display Options*, then *Area* and *Circumference* calculations will be displayed onscreen

Figure 9-8: Display Options – Onscreen Examples

Table 9-6: Display Options for Measurement/Calculation Values

Measurement	Option	Definition
Area	**AR**	Area
	CIR	Circumference
	SA	Short Axis
	LA	Long Axis
Velocity	**PSV**	Peak Systolic Velocity
	EDV	End Diastolic Velocity
	PSVPG	Peak Systolic Velocity Pressure Gradient
	EDVPG	End Diastolic Velocity Pressure Gradient
	RI	Resistive Index
	SD	Systolic/Diastolic Ratio
Doppler Trace	**PSV**	Peak Systolic Velocity
	EDV	End Diastolic Velocity
	AVp	Peak Average Velocity
	AVm	Mean Average Velocity
	AT	Acceleration Time
	DT	Deceleration Time
	VTI	Velocity Time Integral
	PGr	Pressure Gradient
	RI	Resistive Index
	PI	Pulsatility Index
	SD	Systolic/Diastolic Ratio
Doppler Trace (Cardiac)	**PV**	Peak Velocity
	PGr	Pressure Gradient
	VTI	Velocity Time Integral
	MV	Mean Velocity
	MGr	Mean Pressure Gradient

To Set the Measurement Display Options:

1. Press the console **MENU** button.

2. Select *Measurements*.

3. Under *Display Options*, select a measurement type from the first drop-down menu: *Area*, *Velocity*, *Doppler Trace* or *Doppler Trace (Cardiac)*.

4. Select the desired measurement/calculation from the second drop-down menu (e.g., if *Area* was selected in step 3, select *AR*, *CIR*, *SA*, *LA*, or any combination thereof).

5. Select *OK* to accept the changes and exit or *Cancel* to exit without saving.

9.1.6.2 Managing OB Settings

To Set the Obstetrical Calculation Authors:

1. Press the console **MENU** button.

2. Select *Measurements > OB Settings…*.

OB SETTINGS

Author Selection

Fetal Age
```
AC    ▼    None    ▼
```

Fetal Growth
```
AC    ▼    None    ▼
```

Estimated Fetal Weight
```
None    ▼
```

Birth Weight
```
None    ▼
```

[Tables...]

[OK]   [Cancel]

3. Select author/measurement options for *Fetal Age* and *Fetal Growth* from the drop-down menus.

4. Select *Estimated Fetal Weight* and *Birth Weight* authors from the drop-down menus.

5. Select *OK* to accept the changes and exit or *Cancel* to exit without saving.

⚠ *Warning: Various factors may affect the accuracy of **Obstetrical** measurements. Ensure:*

- system *Date* and *Time* are configured correctly.

- desired *Obstetrical* calculation author has been selected for each parameter.

9.1.6.3 Managing OB Tables

⚠️ *Warning:* *Ultrasonix does not endorse user-defined **Measurements**, **Calculations** and **Tables** for diagnostic purposes. All user-defined **Measurements**, **Calculations** and **Tables** are used at the **Operator's** discretion and risk only.*

To Create New Obstetrical Calculation Authors and Look-up Tables:

1. Press the console **MENU** button.

2. Select **Measurements > OB Settings… > Tables**.

3. Click **Create Author**.

4. Enter a new **Table Author** and select **Create** to save the name to the author list.
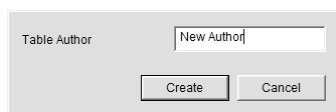
5. Highlight the newly created author and select **Create Table**.

*Note: Default Tables are locked (as indicated by the lock icon adjacent to the **Table** name) and cannot be edited/deleted. User-created **Tables** are marked with a key icon and can be edited/deleted.*

6. From the **Based** on drop-down menu, select the desired parameter (**BPD**, **HC**, etc.).

7. Select the desired table **Range Representation**: **Percentile**, **Standard Deviation** or **None**.

8. Select the desired **Table Type**: **Age Table** or **Growth Table**.

9. From the **Measurement** drop-down menu, select the desired unit: **cm**, **cm2**, **g**, **mm**, **mm2** or **ratio**.

    *Note: AC and HC are assumed to be **Circumference** measurements.*

10. Select **Save** to accept the changes and return to the **OB Table Editor** or **Cancel** to exit without saving.

To Enter Data into a New OB table:

1. Press the console **MENU** button.

2. Select *Measurements > OB Settings… > Tables*.

3. Select the newly created *Table* (listed under the user-defined author).

*Note: The right-hand section of the screen will show the columns for the previously-defined **Table** parameters. For example, this **Table** was configured as follows:*

***Based on** = **AC**, **Range Representation** = **None**, **Table Type** = **Age Table** and **Measurement** = **mm**.*

4. Enter *Table* data as required. Use *Insert Row* and *Delete Row* buttons to simplify this process.

⚠ *Warning: When entering **Gestational Age** values, use "days" or "weeks+days"*

e.g., 86 (days) = 12+2 (or 12 weeks + 2 days), 84 (days) = 12+0 (or 12 weeks).

The system assumes all entries are in days unless a plus (+) sign is entered, in which case the number is assumed to be in weeks and is converted to the equivalent number of days.

5. Select the *Save & Exit* button to save any newly entered/edited data and exit the page, *Save* to save any newly entered/edited data but remain in the *OB Table Editor* or *Exit* to cancel any newly entered/edited data and exit the page.

9.1.7 3D Settings

3D Settings enables users to configure the *3D Config* parameters (available during *Freehand 3D* imaging) and to manage user-defined *3D/4D Presets*.

Note: These settings do not apply to **Chapter 6: Advanced 3D/4D Imaging**.

The *3D Config* dialog can be configured to appear after *Freehand 3D* image acquisition or only when requested (via the touch screen during an exam). This setting applies to all *3D/4D Presets* used during freehand image acquisition.

Additionally, user-defined *3D/4D Presets* (marked with a key icon) can be renamed or deleted here.

Note: Default **Presets** *are marked with a lock icon adjacent to the* **Preset** *name. They cannot be renamed or deleted.*

During imaging, a user-defined *Preset* name is shown on the LCD display in square brackets (e.g., **[User-Defined Preset]**). On the touch screen, user-defined *Presets* are presented in italics (e.g., *User-Defined Preset*).

Figure 9-9: 3D Settings

To Configure 3D Settings for Freehand Image Acquisition:

1.   Press the console **MENU** button.

2.   Select *3D*.

3.   Select/deselect the *Provide 3D Freehand Options After Acquisition* checkbox.

Note: This is a global option and applies to all **3D/4D Presets***.*

4.   Select *OK* to accept the change and exit or *Cancel* to exit without saving.

To Rename User-Defined 3D/4D Presets:

1. Press the console **MENU** button.

2. Select *3D*.

3. Highlight the user-defined *3D/4D Preset* to be renamed.

    Note: User-defined Presets are marked with a key icon.

4. Click the *Rename* button.

5. Use the keyboard to enter a new name in the *Save Preset* dialog box.

    Note: The system will not allow duplicate Preset names. If a duplicate name is entered, a message bubble will prompt for a different name.

6. Select *OK* to accept the *Preset Name* and exit or *Cancel* to exit without saving.

To Delete User-Defined 3D Presets:

1. Press the console **MENU** button.

2. Select *3D*.

3. Highlight the user-defined *3D/4D Preset* to be deleted.

    Note: User-defined Presets are marked with a key icon.

4. Click the *Delete* button.

5. Select *Yes* to accept the deletion and exit or *No* to exit without deleting the *Preset*.
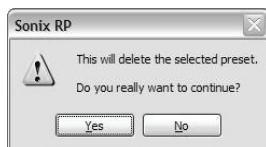
9.1.8 Display Settings

The *Display Settings* dialog enables the adjustment of various display parameters:

Figure 9-10: Display Settings

Table 9-7: Image screen display options

Screen Format	Image w/ Thumbnails	Displays image screen with high resolution image field and thumbnail images below.
		Note: Ultrasonix recommends using this setting.
	Image Only	Displays a full screen image field with no thumbnail images. This setting provides a larger image field for viewing the LCD display from a distance (e.g., during surgical procedures) but has a reduced image resolution.
		Caution: The option to display the full screen image field may result in some portions of the report page being clipped with video out image transfer (VCR, thermal printers, etc.).
Screen Brightness		Adjusts the overall brightness of the LCD display.
Contrast & Brightness		Opens the *Contrast & Brightness* adjustment controls on the console touch screen.

To Configure the Display Settings:

1. Press the console **MENU** button.

2. Select *Display*.

3. Configure the *Display Settings* as required.

4. Select *OK* to accept the changes and exit or *Cancel* to exit without saving.

9.1.9 DICOM Server Selection

DICOM Server Selection enables users to select any one (1) of three (3) servers for *DICOM Storage* and *DICOM Print*.

---

*Note: Before selecting a **DICOM Server(s)**, **DICOM Storage** and/or **DICOM Print** must be configured (**9.2.3 DICOM Configuration**).*

Figure 9-11: DICOM Server Selection

Table 9-8: DICOM Server Selection

DICOM Storage	Server 1 Server 2 Server 3	Select the radio button for the appropriate **DICOM Storage** server.
		*Note: Before making a selection, **DICOM Storage** settings must be configured (**9.2.3.1** DICOM Storage Configuration).*
DICOM Print	Server 1 Server 2 Server 3	Select the radio button for the appropriate **DICOM Print** server.
		*Note: Before making a selection, **DICOM Print** settings must be configured (**9.2.3.2 DICOM Print Configuration**).*

To Select a DICOM Storage and/or DICOM Print Server:

1. Press the console **MENU** button.

2. Select *DICOM Server*.

3. Select the radio button for *Server 1*, *Server 2* or *Server 3* as required for *DICOM Storage* and *DICOM Print*.

   ---
   *Note: **DICOM Storage** and/or **DICOM Print** will only be available for selection if they have been previously configured (**9.2.3.1** and/or **9.2.3.2**).*
   ---

4. Select *OK* to accept the changes and exit or *Cancel* to exit without saving.

9.1.10 Biopsy Guide Settings

Using the *Guide Orientation* options, users can set the onscreen *Biopsy Guide Orientation* to either *Diagonal* or *Central*, as required.

---

*Note: The **Central Biopsy Guide Orientation** option applies only to the L14-5/38 transducer.*

Figure 9-12: Biopsy Guide Settings
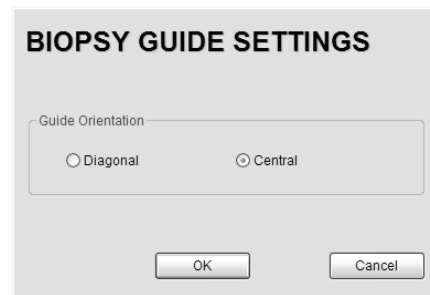
Table 9-9: Biopsy Guide Settings

Diagonal	Sets the imaging screen *Biopsy Guide Orientation* to the *Diagonal*. This is the default setting.
Central	Sets the *Biopsy Guide Orientation* to the (vertical) center of the imaging screen.

To Configure the Biopsy Guide Settings:

1. Press the console **MENU** button.

2. Select *Biopsy Guide*.

3. Select the radio button for the desired *Guide Orientation*.

9.1.11   SONIX Live Setup

SONIX Live allows remote users to view live imaging as *Streaming Video* using the *VLC Media Player* or *Windows Media Player* (*WMP*). When both *SONIX Live* and the *Status Bar* icon are activated and *Streaming Video* is underway, the *SONIX Live* icon will appear on the imaging screen (refer to **9.2.7 Status Bar** for details on the *SONIX Live* icon).

---

*Note: Because **Streaming Video** may cause a noticeable decrease in overall system performance, Ultrasonix recommends activating **SONIX Live** only when video streaming is required.*

---

*Note: VLC Media Player is freeware available from VideoLAN. The SONIX system is delivered with the server-side software ready for use. Client-side software must be downloaded from the VideoLAN website. Refer to **9.1.11.1 SONIX Live and VLC Media Player** for details on downloading and setup.*

Figure 9-13: SONIX Live Setup

---

*Note: A network connection (**9.2.2**) must be configured and active in order to use **SONIX Live**.*

Table 9-10: SONIX Live Settings

Setup			
		Activate/Deactivate SONIX Live	After configuring **SONIX Live** (both for the SONIX system and the receiving PC), use **Activate/Deactivate SONIX Live** to ensure it is running only when necessary.
			*Note: Because **Streaming Video** may cause a noticeable decrease in overall system performance, Ultrasonix recommends activating **SONIX Live** only when video streaming is required.*
	Select Streaming Client	**SONIX Live Viewer**	The radio button selects the **SONIX Live Viewer** (**VLC**) rather than **Windows Media Player**.
		Stream to Address	Select from the drop-down menu (for multicasting) or type in the relevant **Stream to IP Address** of the client.
			Two (2) multicast **IP Addresses** are provided (**226.19.0.1** and **226.19.0.2**) for selection from the drop-down menu. If this is not sufficient, use an **IP Address** from the following range: **224.0.0.0** to **239.255.255.255**.
		Port	The default **Stream to Port** (**1234**) should not need to be changed.
		Show Advanced Options — **Frame Rate**	The default **Frame Rate** is **10** which should be sufficient for most applications. If the setting must be changed, select from the drop-down menu or type in the relevant number.
		Windows Media Player	The radio button selects **Windows Media Player** rather than the **SONIX Live Viewer**.
			*Note: It is not possible to multicast (i.e., broadcast **SONIX Live** to more than one client PC) with **Windows Media Player**.*
		Local IP Address	This setting auto-completes using the system's **Local IP Address**.

To Access SONIX Live Settings:

1. Press the console **MENU** button.

2. Select **SONIX Live**.

To Activate/Deactivate SONIX Live:

> *Note: Before activating **SONIX Live**, be sure to configure the relevant settings (**9.1.11.1 SONIX Live and VLC Media Player** or **9.1.11.2 SONIX Live and Windows Media Player**).*
>
> *Because **Streaming Video** may cause a noticeable decrease in overall system performance, Ultrasonix recommends activating **SONIX Live** only when video streaming is required.*

1. Press the console **MENU** button.

2. Select the *SONIX Live* Button.

3. Click the *Activate/Deactivate SONIX Live* button.

> *Note: Relevant message bubbles will be displayed whenever **SONIX Live** is activated or deactivated.*

> *The **SONIX Live** icon will only be visible if it has been enabled (refer to **9.2.7 Status Bar** for more details).*

4. Select *OK* to accept the changes or *Cancel* to exit without saving.

9.1.11.1 SONIX Live and VLC Media Player

To Download the VLC Media Player Software for use on the Remote Computer:

> *Note: Each remote computer must have a configured copy of the **VLC** software.*

1. Open the web browser and go to the website: http://www.videolan.org/vlc/.

2. Follow the links to download the latest *self-extracting* Windows version of the **0.8.6** VLC software.

> *Note: The SONIX will only support remote viewing with **VLC Media Player** on a PC running Windows XP.*
>
> *When planning to multicast, Ultrasonix recommends downloading the **VLC** software to a USB key to simplify the multi-PC installation process.*

To Install the VLC Software on the Remote PC:

1. Open *Windows Explorer* and move to the directory containing the downloaded VLC software.

2. Open (or run) the self-extracting *VLC* installation software.

3. When prompted, select *English* as the *Installer Language* and click *OK*.

4. Click *Next* to continue past the *Welcome* screen.
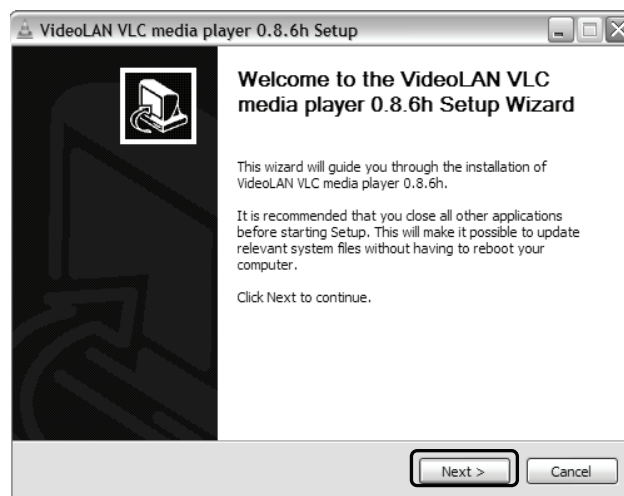
5. Read the *License Agreement* and click *I agree* to continue.
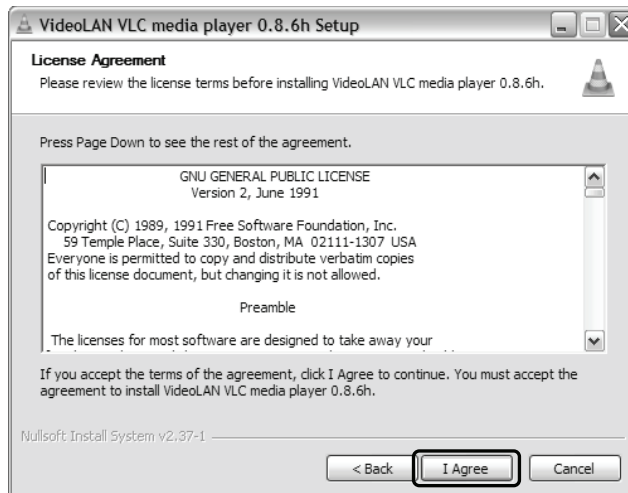
6. On the *Choose Components* dialog, select *Custom* as the type of installation.
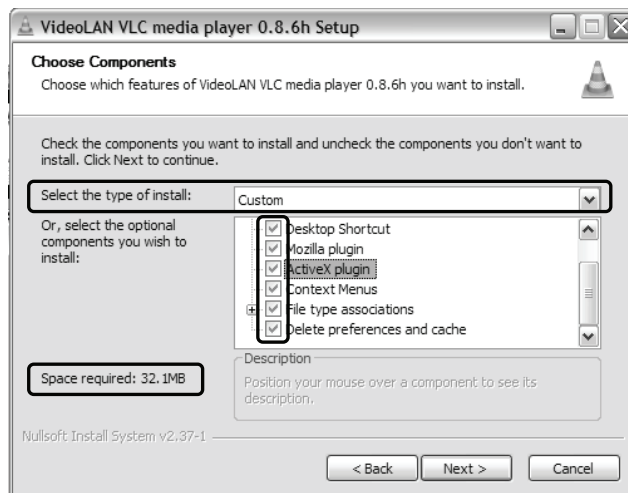
7. Select the checkboxes for <u>all</u> available optional components and click *Next*.

    Note: Ensure the target PC has enough space to complete the installation.

8. Click *Install* to accept the default *Destination Folder* and begin the install.
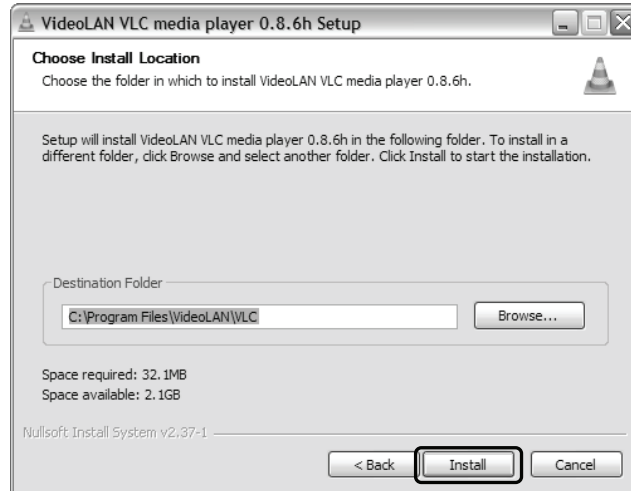
*Note: To change the **Destination Folder** location/name, check **Browse** and follow the instructions.*

9. When the installation is done, click *Finish*.

To Configure the VLC Software on the Remote PC:

1. Launch the *VLC Media Player* software.

2. Click the *Settings* menu and select *Preferences…*.
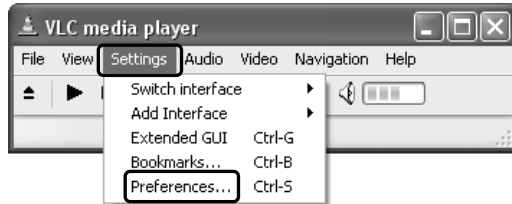
3. Click the **+** (plus) signs to expand *Video* and *Output modules*.
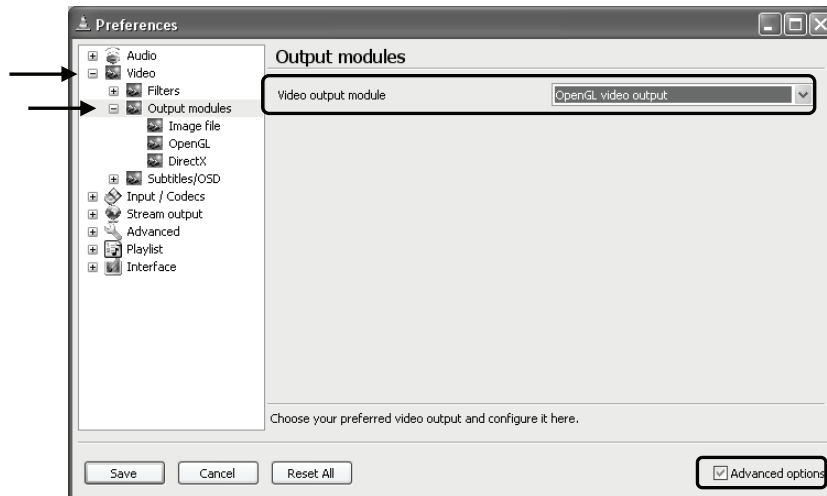
4. Check *Advanced options*.

5. From the *Video output module* drop-down menu select *OpenGL video output*.

6. Click the **+** (plus) signs to close *Output modules* and *Video*.

7. Click the **+** (plus) signs to expand *Input/Codecs* and *Other codecs*.
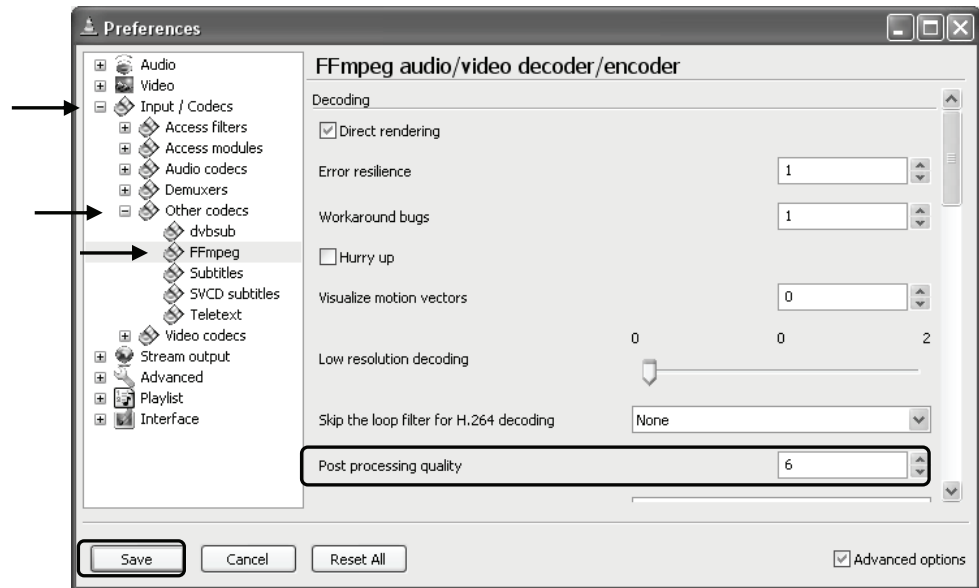
8. Select *FFmpeg*.

9. Set the *Post processing quality* field to *6*.

10. Click *Save*.

11. Click the *Open* button.
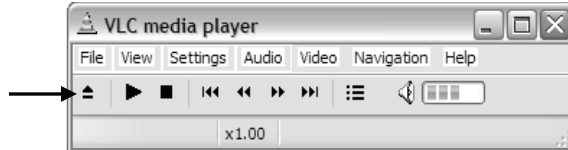
12. Select the **Network** tab.
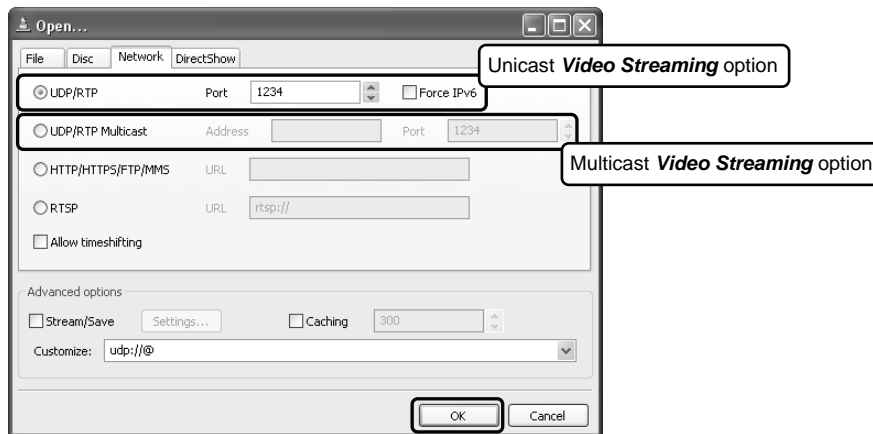
13. Check the appropriate **UDP/RTP** radio button.

---
*Note: For unicasting, select **UDP/RTP**.*

*For multicasting, select **UDP/RTP Multicast** and enter the multicast **IP Address** in the **Address** field.*

---

14. Ensure the **Port** is set to **1234**.

15. Click **OK**.

To Configure SONIX Live Streaming Video for VLC Media Player on the SONIX:

1. Press the console **MENU** button.

2. Select *SONIX Live*.

3. Check the *SONIX Live Viewer* radio button.

4. Select a *Stream to Address* from the drop-down menu or type one in using the keyboard.

5. If required, select the *Show Advanced Options* checkbox and edit the *Frame Rate*.

6. Click the *Activate SONIX Live* button.

> *Note: Relevant message bubbles will be displayed whenever **SONIX Live** is activated or deactivated.*
>
>
>
> *The **SONIX Live** icon will only be visible if it has been enabled (refer to **9.2.7 Status Bar** for more details).*

7. Select *OK* to accept the changes or *Cancel* to exit without saving.

9.1.11.2 SONIX Live and Windows Media Player

To Configure SONIX Live Streaming Video with Windows Media Player on the SONIX:

1. Press the console **MENU** button.

2. Select *SONIX Live*.

3. Check the *Windows Media Player* radio button.

4. Click the *Activate SONIX Live* button.

> *Note:* Relevant message bubbles will be displayed whenever *SONIX Live* is activated or deactivated.

> The *SONIX Live* icon will only be visible if it has been enabled (refer to **9.2.7 Status Bar** for more details).

5. Select *OK* to accept the changes or *Cancel* to exit without saving.

To Configure SONIX Live Streaming Video with Windows Media Player on the Remote Computer:

*Note: Be sure to have the **SONIX Live IP Address** handy before beginning this process.*

1. After turning on the remote computer, open the **Windows Media Player** program.

2. From the **File** menu, select **Open URL…**.
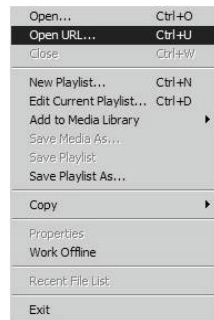
3. In the **Open URL** dialog, enter the **SONIX Live IP Address** followed by ":8080". For example, if the relevant **IP Address** is 127.0.0.1, type in http://127.0.0.1:8080.
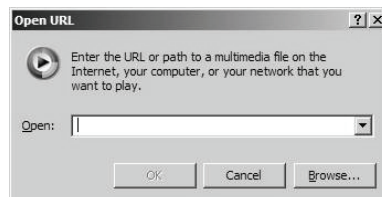
4. Click the **OK** button and the **SONIX Live** video stream will be displayed in the **Windows Media Player**.

9.2 ADMIN SETTINGS

Admin or *Administrator Settings* allow the system administrator to configure high level *System* parameters as well as perform certain *System Maintenance* functions.

Typically, the *System* parameters are set during initial installation and only require limited access and adjustment. By default, *Admin Settings* are not delivered with an active *Password*, however, at their discretion, each institution has the option to apply *Password* protection (see page **9-44** for details).

Figure 9-14: Admin Settings Menu
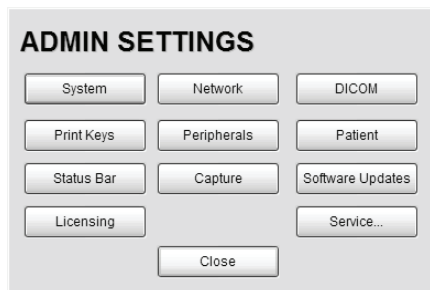
To Access Admin Settings:

1. Press the console **MENU** button.

2. Select *Admin…* to access the *Admin Settings* menu.

9.2.1 System Settings

System Settings are used to configure the *Institution Name*, *Regional* parameters, *Imaging Modes*, *Shutdown Options*, *User Data* settings, *Auto-Freeze* and *Admin Password*.

Figure 9-15: System Settings

Table 9-11: System Settings Configuration Options

Institution Name			Enter the ***Institution Name*** using the keyboard. The text entered here appears at the top of the image field.
Regional	*Language Settings…*	*Interface Language*	Select the desired language for the user interface.
		User Manual Language	Select the default PDF ***User Manual Language***. Refer to **3.3.3** for details on accessing the PDF User Manual.
			*Note: If no **User Manuals** are available on the system, then this option will inaccessible (grayed out).*
		Keyboard Layout	Select the desired keyboard language. During imaging, to access the non-English ***Keyboard Layout*** language, press **FN+K**. If it becomes necessary to again access the English language keyboard, press **FN+J**. Use these two (2) key sequences to toggle between the English and the second keyboard language as required.
			*Note: There is no correlation between **Interface Languages** and **Keyboard Layout**. For example, when English is used as the **Interface Language**, it is possible to select Turkish or Korean as the language for **Keyboard Layout**.* *Additionally, because **Keyboard Layout** selections are controlled by Windows rather than Ultrasonix, there are many more **Keyboard Layouts** to choose from than there are **Interface Languages**.*
	Internal Settings…		Select country-specific parameters, including ***Date*** and ***Time*** formats and ***Number*** display modes.
	Date/Time…		Configure the actual ***Date*** and ***Time*** (based on the ***Date/Time*** format selected in ***Internal Settings…***).

Imaging Modes		*Direct M-Mode*		Selecting ***Direct M-Mode*** automatically displays split-screen ***2D/M-Mode Sweep*** immediately after pressing **M-MODE**. Deselecting ***Direct M-Mode*** displays a full screen 2D with an ***M-Mode*** cursor line immediately after pressing **M-MODE**. Press the **UPDATE** button to activate ***M-Mode Sweep***.
		Direct Doppler		Selecting ***Direct Doppler*** automatically displays split-screen ***2D/Doppler Trace*** immediately after activating ***Doppler*** mode. Deselecting ***Direct Doppler*** displays a full screen 2D with ***Doppler SV*** (***Sample Volume***) cursor immediately after pressing **DOPPLER**. Press the **UPDATE** button to activate the ***Doppler Trace***.
	Screen Layouts…	*Initial Active Display*	*Left Side*	When scanning in ***B-Mode***, selecting ***Left Side*** will ensure the left image is the active image when the console **DUAL/QUA**D button is pressed. ***Left Side*** is the default setting.
			Right Side	When scanning in ***B-Mode***, selecting ***Right Side*** will ensure the right image is the active image when the console **DUAL/QUAD** button is pressed.
		Auto-Switch on Start		Selecting this option will ensure that the selected side is active after the console **DUAL/QUAD** button is pressed, but then that image will immediately freeze and the active image will move to the opposite side. For example, if ***Left Side*** is set as ***Initial Active Display*** and ***Auto-Switch on Start*** is selected, after pressing the console **DUAL/QUAD** button, the ***Left Side*** image will be presented as active, then immediately freeze and active imaging will move to the ***Right Side***.
Shutdown Options		*Confirm Shutdown*		Forces the system to request confirmation when powering down.
		Enable Fast Boot (Hibernation mode)		Selecting ***Enable Fast Boot*** allows the system to power up faster by reducing the amount of initial system auto-testing.
				Note: *Ultrasonix recommends occasionally deselecting this feature and powering the system off and on once in order to ensure maximum system performance.*
Auto-Freeze		*Enable*		Enables ***Auto-Freeze***, which deactivates any transducer that is connected but not currently in use.
		Wait		Once ***Auto-Freeze*** is enabled, ***Wait*** controls the number of minutes a stationary transducer will remain active before ***Auto-Freeze*** is triggered. Deactivating/freezing transducer usage will help to prolong its life span. Select a setting of 5 to 120 minutes. The default is ***Auto-Freeze Enabled***, with a 10 minute ***Wait*** time.
				Note: *To reactivate (or unfreeze) the transducer/imaging session, simply press the console* **FREEZE** *button.*

User Data	**Import**		Imports user-configured **System Settings** from an external storage device (USB key, CD, DVD, etc). Settings must have been previously exported from a SONIX system.
			*Note: Ultrasonix does not recommend importing user-defined **Presets** created with a previous software version as they may not be compatible for use with a more recent software update.*
		Imaging Presets	Imports all user-defined **Imaging Prese**t data.
		3D/4D Presets	Imports all user-defined **Standard 3D/4D Preset** data.
		Preset Assignments	Imports all Preset data as configured under **MENU > Admin… > Presets** (e.g., **Annotations** and **Pictograms**).
		Settings	Imports all user-defined **Settings** that are not explicitly specified in any other Import option (e.g., **Measurements**, **DICOM**, **Network**, **Peripherals**, **Patient**, etc).
		Local Data Definitions	Imports all user-editable **Field Setting** data from the **Patient Settings** dialog (page **9-76**).
	Export		Exports user-configured **System Settings** to an external storage device (USB key, CD, DVD, etc).
		Imaging Presets	Exports all user-defined **Imaging Preset** data.
		3D/4D Presets	Exports all user-defined **Standard 3D/4D Preset** data.
		Preset Assignments	Exports all **Preset** data as configured under **MENU > Admin… > Presets** (e.g., **Annotations** and **Pictograms**).
		Settings	Exports all user-defined **Settings** that are not explicitly specified in any other **Export** option (e.g., **Measurements**, **DICOM**, **Network**, **Peripherals**, **Patient**, etc).
		System Logs	Exports copies of all current **System Logs**.
			Note: These cannot be imported.
		Licenses	Copies existing license settings into a text file.
			Note: To re-import licensing details, contact Ultrasonix Technical Support. Be sure to have license.txt *handy.*
		Local Data Definitions	Exports all user-editable **Field Setting** data from the **Patient Settings** dialog (page **9-76**).
	Restore Factory		Resets the system to the default settings installed during manufacturing.
Admin Password…			Creates/removes a global, administration level **Password** in order to protect **Admin Settings** configuration.
Insert (Symbol)			Use to insert text symbol(s) not available on console keyboard (e.g., punctuation marks, symbols and letters from other languages).

To Access System Settings:

1. Press the console **MENU** button.

2. Select *Admin… > System*.

To Password Protect Admin Settings Access:

1. Press the console **MENU** button.

2. Select *Admin… > System > Admin Password…*.

3. Enter a *Password* when prompted by the dialog.

```
Set Password

    New Password:  [                    ]

                    [  OK  ]  [ Cancel ]
```
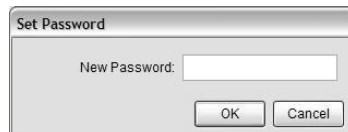
4. Select *OK* to accept the *Password* and exit or *Cancel* to exit without saving.

To Configure PDF User Manual Language:

1. Press the console **MENU** button.

2. Select *Admin… > System > Language Settings…*.

3. From the *User Manual Language* drop-down menu, select the desired language.

   Note: If this option is inaccessible (grayed out), there are no PDF User Manuals available on the system.

4. Select *Close* to accept the language selection and exit.

To Export User Data:

1. Connect the external USB storage device on which the *Export* will be saved.

2. Press the console **MENU** button.

3. Select *Admin… > System > Export…*.

4. Check the item(s) to be exported.

EXPORT

Select Items to Export

Item
☐ Imaging Presets
☐ 3D/4D Presets
☐ Preset Assignments
☐ Settings
☐ System Logs
☐ Licenses
☐ Local Data Definitions

[Select All] [Clear All]

Device Status

External Storage Detected (F:\)

[OK] [Cancel]

*Note: Use **Select All** to check all items at one time and **Clear All** to clear all checkboxes.*

5. Select *OK* to begin the export process or *Cancel* to exit without exporting.

6. If *OK* is selected in the previous step, a completion dialog will be presented when the export process has finished (this will take approximately 15-45 seconds).

To Import User Data:

> *Note: Ultrasonix does <u>not</u> recommend importing user-defined **Presets** created with a previous software version as they may not be compatible for use with a more recent software update.*

1. Connect the external USB storage device from which the data will be imported.

2. Press the console **MENU** button.

3. Select **Admin… > System > Import…**.

4. Check the item(s) to be imported.
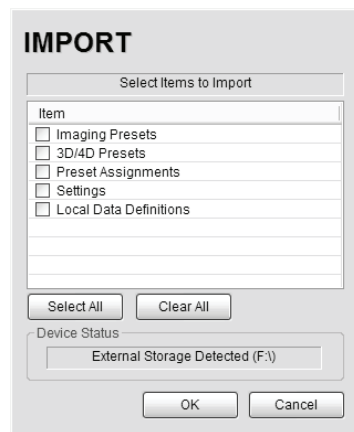
> *Note: Use **Select All** to check all items at one time and **Clear All** to clear all checkboxes.*

5. Select **OK** to begin the import process or **Cancel** to exit without importing.

9.2.2 Network

The **Network** setup dialog allows users to configure the system's network, either through a hard-wired LAN or Dialup connection or via a wireless network.

Note: Refer to **Appendix B: System Specifications** *for wireless availability on the various system configurations.*

The **Online Remote Support** button is used to connect with an online Ultrasonix technician. Ultrasonix Technical Support will help configure this option should it ever be required.

Caution: System networking options are intended for use <u>inside</u> your organization's firewall. Organizations that elect to configure/use the networking functionality provided by Ultrasonix are assuming all liabilities and risks associated with that decision.

Caution: For details on FCC regulations as they apply to the wireless adapter, refer to the manufacturer's User Guide included with the system.

Figure 9-16: Network Dialog

Note: A network connection is <u>required</u> to use any of the following: **DICOM**, **PracticeHwy**, **Online Support**, **Online Remote Support** *and* **SONIX Live**.

Table 9-12: Network Settings

Network Setup	**Internet Connection Using LAN** **OR** **Dialup Connection**		Select *Internet Connection* type: *LAN* or *Dialup*.
	Account Information	**Phone Number**	If *Dialup* was selected in the previous step, enter the telephone number for the Internet Service Provider (ISP).
		User Name	Enter the *User Name* for the *Dialup* ISP account.
		Password	Enter the *Password* that will protect the *Dialup* connection to the Internet.
	Timeout (Seconds)		Enter the *Timeout* limitation (in number of seconds).
			Note: If the system fails to connect within the proscribed time limit, it will stop trying.
	Connect		Click to *Connect* using the *Dialup* settings.
	TCP/IP Settings…		Click to configure *TCP/IP Settings*. Refer to **9.2.2.1 Ethernet (LAN) Network Configuration** for details.
	Wireless Settings…		Click to configure *Wireless Settings*. Refer to **9.2.2.3 Wireless Settings** for details.
	Online Remote Support		After receiving a *PIN* (Personal Identification Number) from Ultrasonix, use this option to connect to the Internet. This will allow an Ultrasonix Support technician to remotely access the system to resolve any issues that may have arisen.
E-Mail Setup	**Server Address**		Enter the *Outgoing* (*SMTP*) *Server Address* here.
	Server Port		Enter the *Outgoing Server Port* number here.
Online Support	**Enabled**		Select this checkbox to enable *Online Support*.
	Add		Use to *Add* extra, non-Ultrasonix *Online Support* IP addresses.
			Note: Ultrasonix Online Support addresses are added automatically.
	Delete		Use to *Delete* extra, non-Ultrasonix *Online Support* IP addresses.

*Note: Ultrasonix recommends that **Network** connections be configured using the settings provided by your IT Department.*

9.2.2.1 Ethernet (LAN) Network Configuration

To Configure an Ethernet (LAN) Connection (If Available):

1. Connect an RJ45 cable to the NET or LAN port located on the Back Connectivity Panel.

2. Press the console **MENU** button.

3. Select *Admin… > Network > Internet Connection using LAN*.

4. Under *Online Support*, ensure the *Enabled* checkbox has been selected.

5. Click *TCP/IP Settings…*.

6. Under *General*, select *Obtain an IP address automatically* or *Use the following IP address* and enter the assigned static *IP address*, *Subnet mask*, and *Default gateway*.

7. Select *OK* and press the console **MENU** button to exit the menu system.

Note: It may be necessary to restart in order for the changes to take affect.

9.2.2.2 Dialup Network Configuration

To Configure a Dial-up Connection (If Available):

1. Connect an RJ11 cable to the PHONE port located on the Back Connectivity Panel.

2. Press the console **MENU** button.

3. Select *Admin… > Network > Dialup Internet Connection*.

4. Under *Online Support*, ensure the *Enabled* checkbox has been selected.

5. Complete the *Account Information* and *Options* sections: *Phone Number*, *Username*, *Password* and *Timeout*.

6. Select *OK* and press the console **MENU** button to exit the menu system.

Note: While the system is dialing out, the current dialing status to the ISP will be displayed.

9.2.2.3 Wireless Settings

Figure 9-17: Wireless Network Connection Setup
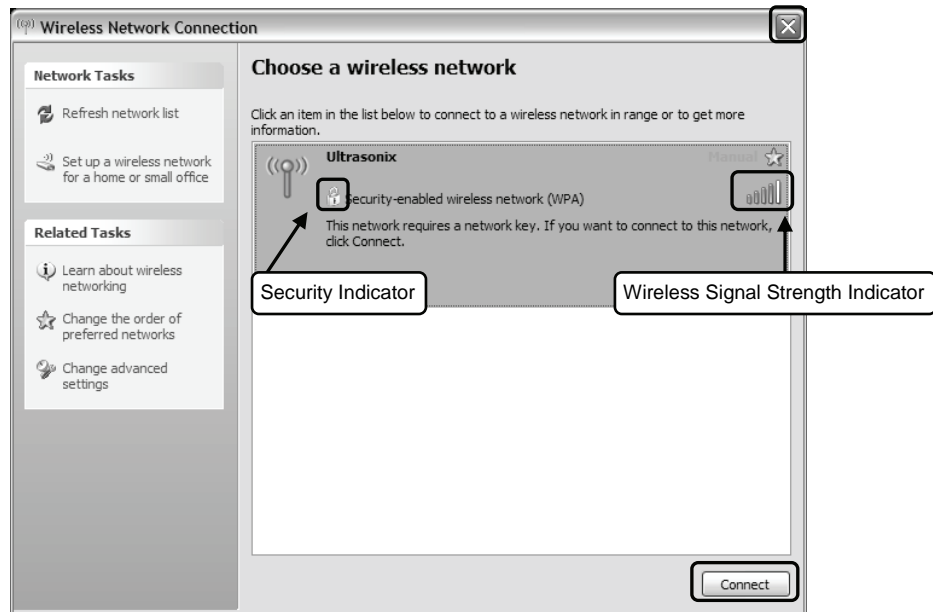
Table 9-13: Wireless Network Connection Options

Wireless Signal Strength Indicator 100% 75% 50% 25% 0%	Denotes the strength of the wireless signal (%). If selected in **9.2.7 Status Bar** this icon will also appear on the LCD display.
Security Indicator	This indicator is dependant upon the type of wireless network in use. If no **Lock** icon is present, then the wireless network has no security. A **Lock** icon will be present for **WEP** (**Wired Equivalent Privacy**) and **WPA** (**Wi-Fi Protected Access**) wireless networks, indicating that wireless security has been configured. When a wireless network is in place, it will be necessary to obtain your institution's **Network Key** in order to login. *Note: Ask your IT department for the **Network Key**.*
Connect/Disconnect	Used to **Connect/Disconnect** from the wireless network.

To Configure Wireless Network Connection Options (If Available):

> *Note: Always consult with your IT department when configuring a wireless connection.*

1. Press the console **MENU** button.

2. Select *Admin… > Network > Wireless Settings…*.

3. Configure the wireless connection following the onscreen directions in the *Wireless Network Connection* dialog.

> *Note: **Wireless Network Connection** options are controlled by MS Windows, not Ultrasonix.*

9.2.2.4 Online (Chat) Support

> *Note: A network connection is <u>required</u> for online **Chat Support**.*

To Add Extra Online Chat Support IP Addresses:

1. Press the console **MENU** button.

2. Select *Admin… > Network*.

3. Ensure the *Online Support Enabled* box is checked.

4. Enter the *Contact IP address* (above *Add* and *Delete*).

5. Click *Add*.

6. Select *OK* to accept the settings and exit or *Cancel* to exit without saving.

9.2.2.5 Online Remote Support

Online Remote Support allows Ultrasonix Technical Support to view and control the SONIX for diagnostic purposes.

*Note: A network connection is <u>required</u> for **Online Remote Support**.*

To Configure Online Remote Support:

1. Press the console **MENU** button.

2. Select *Admin… > Network > Online Remote Support*.

3. Enter the **PIN** (**Personal Identification Number**) provided by Ultrasonix Technical Support.

   *Note: The **PIN** is valid for 20 minutes only, so be sure to use it right away.*

4. When prompted, select **Download > Run > Run** in order to install the required programs.

5. The SONIX can now be remotely controlled.

9.2.3 DICOM Configuration

The system uses the *Digital Imaging and Communications in Medicine* (*DICOM*) standard to share medical information with other digital imaging systems. The SONIX, by means of the *DICOM* protocol, communicates with *Storage*, *Print* and *Modality Worklist Service Class Providers*.

DICOM Storage and *Print* options each have a choice of three (3) different *Servers* for which *Settings* can be configured.

*Note: A **Server** must be active in order to configure **Settings**, however, deactivating that Server does not erase the settings. Refer to **9.1.9 DICOM Server Selection** for details on changing active **Storage** and **Print Servers** during imaging.*

Refer to **9.2.2 Network** to configure the system for network connectivity.

To Configure for DICOM Connectivity:

1. Press the console **MENU** button.

2. Select *Admin… > DICOM*.

3. Select/deselect the appropriate *Turn on…* checkbox beside the desired feature (*Storage*, *Print* or *Worklist*) in order to activate/deactivate access to a *DICOM* feature.

4. Select/deselect the appropriate *Server* radio button to activate/deactivate access to that *Server's Settings* button.

9.2.3.1 DICOM Storage Configuration

The **DICOM Storage Settings** dialog offers basic and advanced settings for configuring the SONIX system for **DICOM** image storage.

Figure 9-18: DICOM Configuration – DICOM Storage

To Configure the DICOM Storage Setting:

1. Press the console **MENU** button.

2. Select **Admin… > DICOM**.

3. Check **Turn on DICOM Storage**.

4. Check the radio button for the desired **Server** (**Server 1**, **2** or **3**).

5. Click the associated **Settings** button.

6. An onscreen dialog with four (4) tabs will be presented: **AE** (**Application Entity**) **Configuration**, **Storage Settings**, **Brightness/Contrast** and **Storage Commitment**.

7. Configure the four (4) dialogs as required.

8. Repeat these instructions for as many of the three (3) available **Servers** as necessary.

The **DICOM Storage AE Configuration** dialog enables configuration of **AE** properties.

Figure 9-19: DICOM Storage Settings – AE Configuration

Table 9-14: DICOM Storage Settings – AE Configuration Settings

Local Host Properties – Service Class User (SCU) – SONIX System	
Application Entity Title	**AE Title** of the SONIX system.
Port	Listening **Port** of the SONIX system (unused).
IP Address	Unique identifier of the SONIX system (informational only).
Remote Host Properties – Service Class Provider (SCP) – DICOM Storage Server	
Application Entity Title	**AE Title** of the **Storage SCP**.
Port	Listening **Port** of the **Storage SCP**.
IP Address	Unique identifier of **Storage SCP**.
Connection Test	Select to send verification request to **DICOM Storage** device (ping to verify connection).
Insert (Symbol)	Use to insert text symbol(s) not available on the console keyboard (e.g., punctuation marks, symbols and letters from other languages).

The **DICOM Storage Settings** dialog specifies how images are stored.

Figure 9-20: DICOM Storage Settings – Storage Settings

Table 9-15: DICOM Storage Settings – Storage Settings

Storage Options	**Store Grayscale Images** Select to store images in grayscale format.	
	Convert BGR to RGB	Select to swap the color components of the image pixel data – the blue colors are swapped with the red colors.
	Lossy Compression Quality	Select the quality (1% – 100%) of image compression.
Storage Folder	Select the location (local or remote) where the images will be stored.	
	Note: If a value is specified, the **AE Configuration** and **Storage Commitment** dialogs are disabled – images can not be stored to an **SCP**.	
Script Location	Select the location of the script that will be run immediately before images are stored (e.g. a script to run filters on images before storing them).	
Show Error Balloons	Select to enable the display of **DICOM Storage** error messages (e.g., **Failed to connect to DICOM**).	
Insert (Symbol)	Use to insert text symbol(s) not available on the console keyboard (e.g., punctuation marks, symbols and letters from other languages).	

The **DICOM Storage Brightness/Contrast** dialog changes the **Brightness** and **Contrast** settings. These settings are applied to the images that are sent to the **SCP**, not the images stored locally.

The effects of these settings can be seen in the **Before** and **After** images.

Figure 9-21: DICOM Storage Settings – Brightness/Contrast
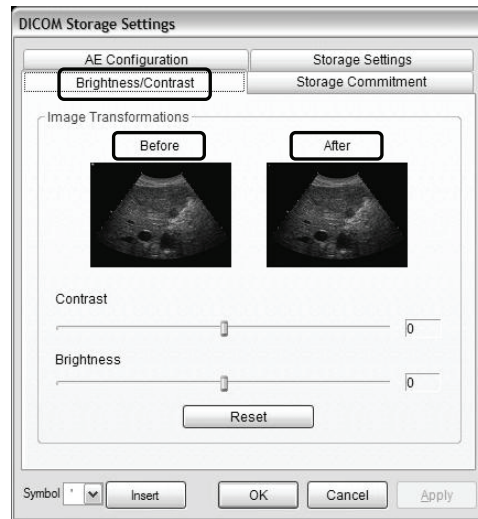
Table 9-16: DICOM Storage Settings – Brightness/Contrast

Contrast	Adjusts the level of *Contrast* applied to the images.
Brightness	Adjusts the level of *Brightness* applied to the images.
Reset	Resets the values of *DICOM Storage Brightness* and *Contrast* back to zero. *Note: To adjust the **Brightness/Contrast** settings, position the trackball arrow over the **Brightness** or **Contrast** slider. Press and hold the **SELECT** button while moving the trackball left or right to the desired position.*

The *DICOM Storage Commitment* dialog enables configuration of the *Storage Commitment AE*.

Check *Turn on Storage Commitment* to enable the *Storage Commitment* feature.

Figure 9-22: DICOM Storage Settings – Storage Commitment

Table 9-17: DICOM Storage Settings – Storage Commitment

Turn on Storage Commitment	Select to enable *Storage Commitment* functionality.
Local Host Properties of Storage Commitment – SCU – SONIX System	
SCU AE Title	*AE Title* of the SONIX system.
SCU Port	Listening *Port* of the SONIX system.
SCU Host Name	*Host Name* of the SONIX system *SCU* (informational only).
Remote Host Properties – SCP – DICOM Storage Server	
SCP AE Title	*AE Title* of the *Storage Commitment SCP*.
SCP Port	Listening port of the *Storage Commitment SCP*.
SCP Host Name	*Host Name* of the *Storage Commitment SCP*.
Storage Commitment Listener AE	
AE Title	*AE Title* of the *Storage Commitment Listener SCU*.
Port	Listening *Port*.
Packet Data Unit (PDU) Size	*PDU* size in bytes.
Insert (Symbol)	Use to insert text symbol(s) not available on the console keyboard (e.g., punctuation marks, symbols and letters from other languages).

9.2.3.2   DICOM Print Configuration

DICOM Print Settings offer basic and advanced settings for configuring the SONIX system for *DICOM Print*.

Figure 9-23: DICOM Configuration – DICOM Print

To Configure DICOM Print Settings:

1.   Press the console **MENU** button.

2.   Select *Admin… > DICOM*.

3.   Check *Turn on DICOM Prin*t.

4.   Check the radio button for the desired *Server* (*Server 1*, *2* or *3*).

5.   Click the associated *Settings* button.

6.   An onscreen dialog with four (4) tabs will be presented: *AE Configuration*, *Print Settings*, *Advanced Print Settings* and *Brightness/Contrast*.

7.   Configure the four (4) dialogs as required.

8.   Repeat these instructions for as many of the three (3) available *Servers* as necessary.

The **DICOM Print AE Configuration** dialog enables configuration of **AE** properties.

Figure 9-24: DICOM Print Settings – AE Configuration

Table 9-18: DICOM Print Settings – AE Configuration

Local Host Properties – SCU – SONIX System	
Application Entity Title	***AE Title*** of the SONIX system.
Port	Listening ***Port*** of the SONIX system (unused).
IP Address	Unique identifier of the SONIX system (informational only).
Remote Host Properties – SCP – DICOM Print Server	
Application Entity Title	***AE Title*** of the ***Print SCP***.
Port	Listening ***Port*** of the ***Print SCP***.
IP Address	Unique identifier of ***Print SCP***.
Connection Test	Select to send verification request to ***DICOM Print*** device (ping to verify connection).
Insert (Symbol)	Use to insert text symbol(s) not available on the console keyboard (e.g., punctuation marks, symbols and letters from other languages).

The **DICOM Print Settings** dialog enables configuration of general print properties.

Figure 9-25: DICOM Print Settings – Print Settings
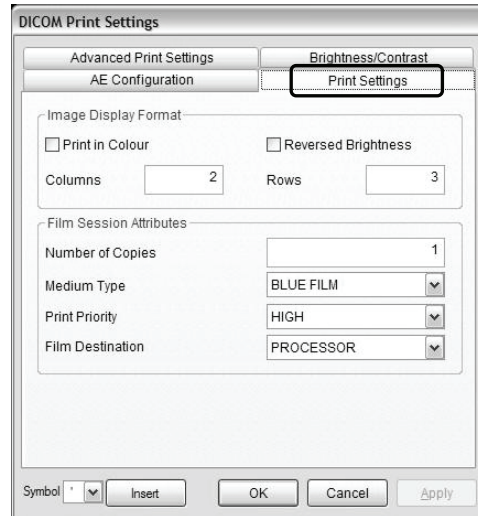
Table 9-19: DICOM Print Settings – Print Settings

Image Density Format	**Print in Color**	Select to print images in color. Deselect to print grayscale (default).
	Reversed Brightness	Select to print images in *Reversed Brightness*.
	Columns	Select the number of *Columns* per page.
	Rows	Select the number of *Rows* per page.
Film Session Attributes	**Number of Copies**	Select the *Number of Copies* of each page to be printed.
	Medium Type	Select the type of medium on which the images will be printed: *Paper*, *Clear*, *Film* or *Blue Film*.
	Print Priority	Select the print job priority: *High*, *Medium* or *Low*.
	Film Destination	Select the location to which the print job will be sent: *Processor* or *Magazine*.
Insert (Symbol)		Use to insert text symbol(s) not available on the console keyboard (e.g., punctuation marks, symbols and letters from other languages).

The **Advanced Print Settings** dialog enables configuration of advanced printing options.

Figure 9-26: DICOM Print Settings – Advanced Print Settings

Table 9-20: DICOM Print Settings – Advanced Print Settings

Film Box Attributes	**Orientation**	Select the **Orientation** of the print page.
	Size	Select the **Size** of the print page.
	Magnification	Select the method of **Magnification**.
	Smoothing	Select the **Smoothing**.
		*Note: This option is printer-specific and only available if **Cubic Magnification** is selected in the previous field.*
	Trim	Select **Yes** or **No** to use a border (**Trim**) on each page.
	Border Density	Enter the **Border Density** in hundredths of **OD** (**Optical Density**).
	Empty Density	Enter the **Empty Density** in hundredths of **OD**.
	Minimum Density	Enter the minimum image density.
	Maximum Density	Enter the maximum image density.
	Configuration	Enter printer-specific **Configuration** information.
Image Box Attributes	**Polarity**	Enter the type of **Polarity** to be used.
	Image Size	Enter the printer-specific Image **Size** in mm.
Insert (Symbol)		Use to insert text symbol(s) not available on the console keyboard (e.g., punctuation marks, symbols and letters from other languages).

The *DICOM Print Brightness/Contrast* dialog changes the **Brightness** and **Contrast** settings. These settings are applied to the images that are sent to the **SCP**, not to the images stored locally.

The effect of these settings can be seen in the **Before** and **After** images.

Figure 9-27: DICOM Print Settings – Brightness/Contrast
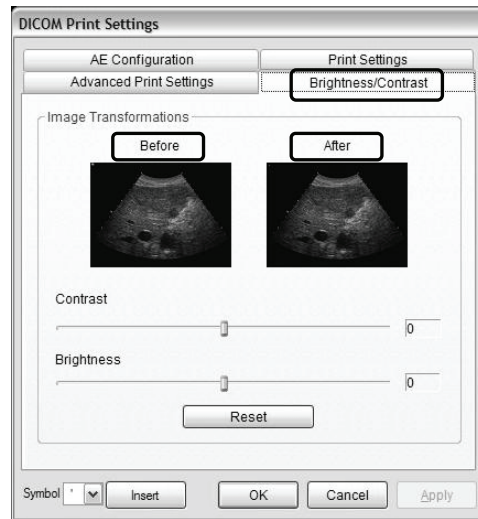
Table 9-21: DICOM Print Settings – Brightness/Contrast

Contrast	Adjusts the level of **Contrast** applied to the images.
Brightness	Adjusts the level of **Brightness** applied to the images.
Reset	Resets the values of **DICOM Print Brightness** and **Contrast** back to zero.
	Note: *To adjust the* **Brightness/Contrast** *settings, position the trackball arrow over the* **Brightness** *or* **Contrast** *slider. Press and hold the* **SELECT** *button while moving the trackball left or right to the desired position.*

9.2.3.3 DICOM Worklist Configuration

DICOM Worklist Settings offer advanced settings for configuring the *DICOM Worklist SCU*.

Figure 9-28: DICOM Configuration – DICOM Worklist

To Configure DICOM Worklist Settings:

1. Press the console **MENU** button.
2. Select *Admin… > DICOM*.
3. Check *Turn on DICOM Print*.
4. Click the associated *Settings* button.
5. An onscreen dialog with one (1) tab will be presented: *AE Configuration*.
6. Configure the dialog as required.

The **DICOM Worklist AE Configuration** dialog enables configuration of **AE** properties.

Figure 9-29: DICOM Worklist Settings– AE Configuration

Table 9-22: DICOM Worklist Settings – AE Configuration

Local Host Properties SCU – SCU – SONIX System	
Application Entity Title	**AE Title** of the SONIX system.
Port	Listening **Port** of the SONIX system (unused).
IP Address	Unique identifier of the SONIX system (informational only).
Remote Host Properties – SCP – DICOM Worklist Server	
Application Entity Title	**AE Title** of the **Worklist SCP**.
Port	Listening **Port** of the **Worklist SCP**.
IP Address	Unique identifier of **Worklist SCP**.
Connection Test	Select to send verification request to **DICOM Worklist** device (ping to verify connection).
Insert (Symbol)	Use to insert text symbol(s) not available on the console keyboard (e.g., punctuation marks, symbols and letters from other languages).

9.2.4 Print Keys

Print Keys allows users to configure the three (3) console **PRINT** buttons.

There are three (3) *Print Keys* setup dialogs that correspond to the three (3) console **PRINT** buttons. Once configured, pressing the console **PRINT 1**, **PRINT 2** or **PRINT 3/ARCHIVE** button will produce the defined action.

Note: Multiple actions can be configured and performed per **PRINT** *button.*

Figure 9-30: Print Keys
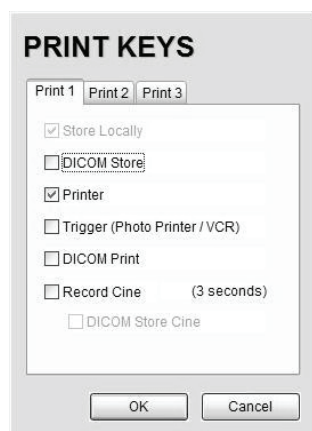
Table 9-23: Print Keys Settings

Store Locally	This setting is always selected by default and can only be deselected (or reselected) if: • *Trigger* is selected • no other *Print Keys* options are selected. When selected, regardless of other settings, images will always be saved to the system's local storage. *Note: Access to locally stored images is through* **Patient Management – Image Review**.
DICOM Store	Sends images to a *DICOM* archiver. Refer to **9.2.3 DICOM Configuration** for more setup details.
Printer	Sends output to a *Paper Printer*. Refer to **9.2.5 Peripherals** for details on printer setup.
Trigger (Photo Printer/VCR)	Sends a *Trigger* signal to attached video printers (e.g., *Thermal Printer*). *Note: To select* **Store Locally** *(above), all other options must be deselected.*

DICOM Print	Sends images to a *DICOM* printer. Refer to **9.2.3 DICOM Configuration** for more setup details.
Record CINE	Enables the system to be configured to record a *CINE* loop. Loop duration is configured through **9.2.8 Capture Settings**.
DICOM Store CINE	Enables the user to send animated *DICOM* to a *DICOM* archiver (**9.2.3 DICOM Configuration**).
Archive	Toggles access between imaging and the *Patient Review* screen.
	Note: This function is only accessible via the console **PRINT 3/ARCHIVE** *button (**Print 3** tab).*

To Configure Print Keys:

1. Press the console **MENU** button.

2. Select *Admin… > Print Keys*.

3. Select the desired tab: *Print 1*, *Print 2* or *Print 3*.

4. Configure the individual *Print Keys* as required.

5. Select *OK* to accept the changes and exit or *Cancel* to exit without saving.

9.2.5   Peripherals

The *Peripherals* setup dialogs enable software configuration for the various peripherals that are approved for connection to the system. For installation details of the specific connections involved, refer to **Chapter 11: Connectivity and Peripherals**.

Figure 9-31: Peripherals
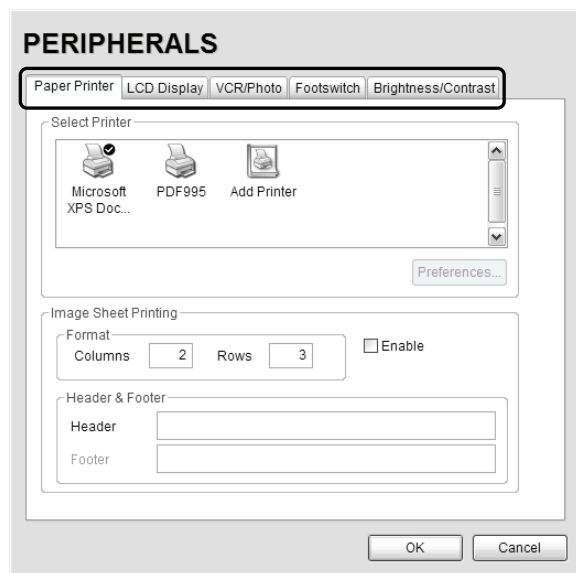
To Access the Peripherals Dialog:

1. Press the console **MENU** button.

2. Select *Admin… > Peripherals*.

3. Select the relevant *Peripherals* dialog tab: *Paper Printer*, *LCD Display*, *VCR/Photo*, *Footswitch* or *Brightness/Contrast*.

9.2.5.1 Paper Printer

The *Paper Printer* dialog is used to configure a laser or inkjet paper printer connected to the system. If the printer is connected via a parallel or USB port, the system will recognize the printer and subsequently list it as a recognized printer in the *Select Printer* section of the dialog.

Figure 9-32: Peripherals – Paper Printer
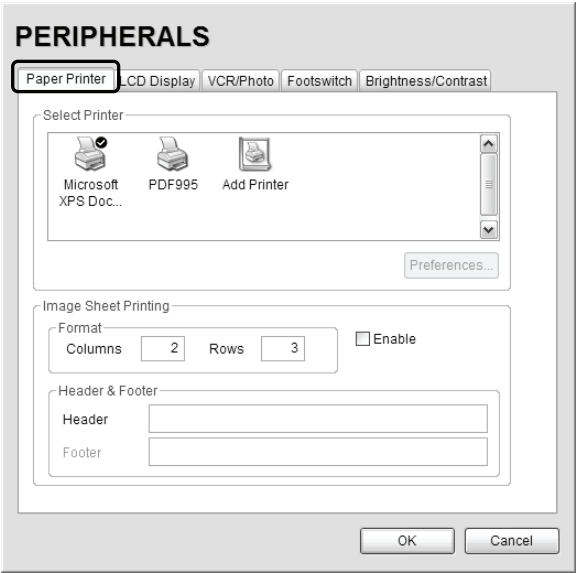
Table 9-24: Paper Printer Settings

Select Printer			Select a *Paper Printer* from the options presented.
Preferences			Click this button to configure *Preferences* for the selected printer.
Image Sheet Printing	*Format*	*Columns*	Select the number of print *Columns*.
		Rows	Select the number of print *Rows*.
		Enable	Select to allow *Image Sheet Printing*.
	Header & Footer	*Header*	Enter text to be printed in each *Header*.
		Footer	*Note: This field is always disabled.*

To Configure the System for a Paper Printer:

1. Press the console **MENU** button.

2. Select *Admin… > Peripherals*.

3. Select the *Paper Printer* tab.

4. Select the printer from the list of recognized printers. For multiple printers, press the console **UPDATE** button and select *Set as Default Printer* from the onscreen menu.

   *Note: The selected printer can be a network or a local printer and can be configured for specific formats by selecting **Preferences**.*

5. To select/deselect *Image Sheet Printing* (e.g., 2x3 image sheets), check/uncheck the *Enable* box.

6. Enter the number of *Columns* and *Rows* desired in the text boxes provided.

7. To add an optional *Header* to the image sheet (or to supply special commands. as required), enter the desired text in the space provided.

   *Note: To configure a console **PRINT** button to send images to the default printer, refer to **9.2.4 Print Keys**.*

   *To send partial print pages (e.g., 3 images remaining on a 4 image/sheet format) at the end of an exam, press the console **ID** button and select **End Exam**.*

9.2.5.2 LCD Display

Adjust the following LCD display settings as required: *Saturation*, *Hue*, *Gamma*, *Brightness*, *Contrast*, *Color Mode* and *Gain* (*Red*, *Green* and *Blue*).

*Note: Click the **Restore Factory** button to reconfigure the LCD display to factory settings.*

Figure 9-33: Peripherals – LCD Display
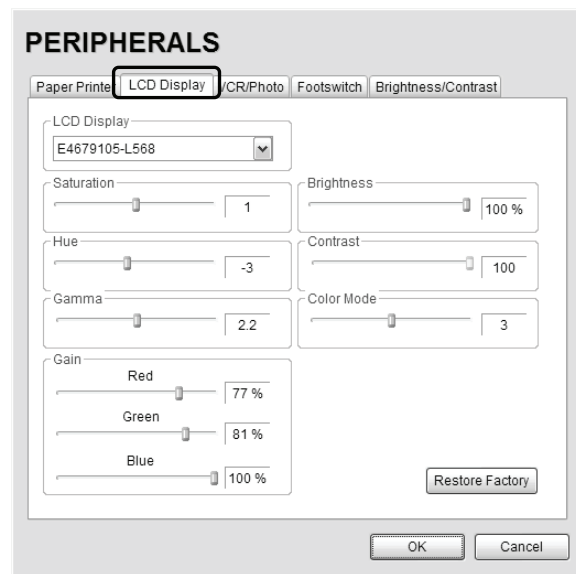
To Adjust the LCD Display Settings:

1. Press the console **MENU** button.

2. Select *Admin… > Peripherals*.

3. Select the *LCD Display* tab.

4. Position the trackball arrow over the desired setting slider.

5. Press and hold the **SELECT** button while moving the trackball to the desired position.

   *Note: Click the **Restore Factory** button to reconfigure the LCD display to factory settings.*

6. Repeat steps 4 and 5 as many times as required.

7. Select *OK* to accept the changes and exit or *Cancel* to exit without saving.

9.2.5.3 VCR/Photo

Output video includes only the image area (or full screen when a dialog such as the **Exam Management** page, 3D/4D rendering screen or **Image Review** pages are displayed on the screen). The output video does not include the thumbnail images.

Use the **VCR/Photo** dialog to enable/disable the live output video (**Video Out**).

Figure 9-34: Peripherals – VCR/Photo
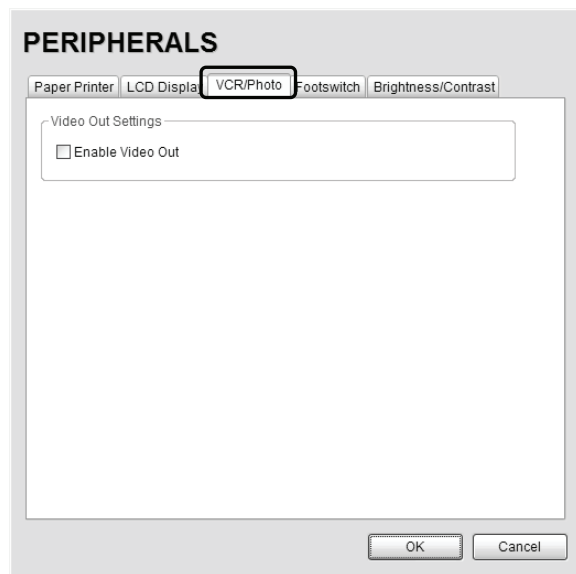
To Enable VCR/Photo Functionality:

1. Press the console **MENU** button.

2. Select **Admin… > Peripherals**.

3. Select the **VCR/Photo** tab.

4. Select/deselect **Enable Video Out** as required.

5. Select **OK** to accept the changes and exit or **Cancel** to exit without saving.

9.2.5.4 Footswitch

The *Footswitch* dialog allows the user to configure the desired operation for the *Footswitch*. There are three (3) settings: *None*, *Print* or *Freeze*.

Figure 9-35: Peripherals – Footswitch
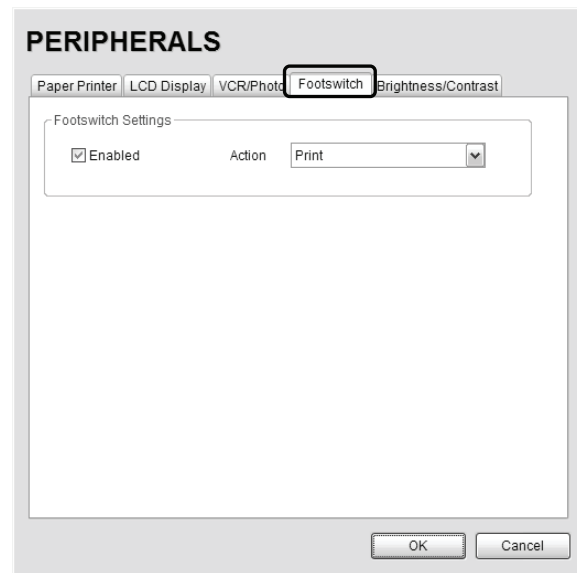
To Configure the Footswitch Settings:

1. Press the console **MENU** button.

2. Select *Admin… > Peripherals*.

3. Select the *Footswitch* tab.

4. Check *Enabled*.

5. Select the desired action from the drop-down menu: *Print* or *Freeze*.

6. Select *OK* to accept the changes and exit or *Cancel* to exit without saving.

9.2.5.5 Brightness/Contrast

The **Brightness/Contrast** dialog allows users to change the **Brightness/Contrast** of images transferred to peripherals to ensure optimum quality.

*Note: The **Brightness/Contrast** values set on this tab are not applied to the image on the screen or images stored to the system.*

The effects of the **Brightness/Contrast** settings are seen in the **Before** and **After** images.

*Note: Click the **Reset** button to restore **Brightness/Contrast** settings to factory defaults.*

Figure 9-36: Peripherals – Brightness/Contrast
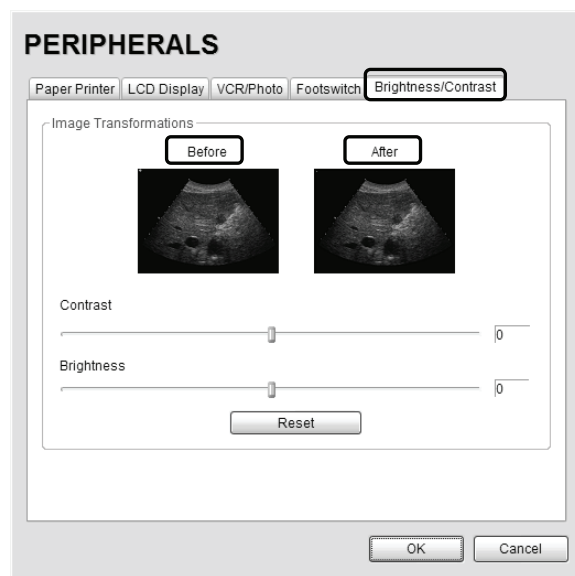
To Adjust the Brightness/Contrast Settings:

1. Press the console **MENU** button.

2. Select **Admin… > Peripherals**.

3. Select the **Brightness/Contras**t tab.

4. Position the trackball arrow over the **Brightness** or **Contrast** slider.

5. Press and hold the **SELECT** button while moving the trackball to the desired position.

    *Note: Click the **Reset** button to restore **Brightness/Contrast** settings to factory defaults.*

6. Select **OK** to accept the changes and exit or **Cancel** to exit without saving.

9.2.6 Patient Settings

Patient Settings allows users to configure options for the *Exam Management* page and the onscreen display of patient data.

Figure 9-37: Patient Settings

Table 9-25: Patient Settings

Field Settings	Select/deselect the *Field Setting* data entry fields as required. Selected fields will appear on the *Exam Management* page and, where applicable, in the relevant databases (as described in **4.6 Storage/Database Tabs**).	
	Last Name *First Name* *Middle Name* *DOB* *Age* *Sex* *Accession #* *Insurance #*	When selected, these fields will be available under *Patient Information* (**4.1.1**).
	BBT	When selected, *BBT* will be available for under *Application Information* (**4.1.2**).
		Note: BBT is only applicable when the Application is set to OB.

Field Settings – cont'd		*Note:* Users are able to add/edit/delete data in the following fields. Deleting data does not affect existing patients. *Once deleted, the data can be re-added at a later date either here or on the **Exam Management** page.*	
		Reporting Physician Referring Physician Operator ID	When selected, these fields will be available under **Exam Information** (**4.1.3**).
		Exam Type	When selected, this field will be available under **Exam Information** (**4.1.3**).
			*Caution: When using **PracticeHwy**, always delete <u>all</u> **Exam Types** from this list.*
		Clinical Indication	When selected, this field will be available under **Exam Information** (**4.1.3**).
		Custom 1, 2, 3	Use these three (3) user-defined data entry fields to create the desired label in the **Field Title** text entry box (e.g., Nationality). The customized label appears as one of the data entry fields under **Exam Information** (**4.1.3**).
General Options		**General Options** control the ability to include/exclude or display/hide certain fields in the Patient Bar on the imaging screen.	
	Patient Information Bar Display Options	**Patient ID OR Accession #**	The option selected here (**Patient ID** or **Accession #**) will be displayed in the Patient Information Bar along the top of the monitor during an exam.
		LMP OR GA	The option selected here (LMP or GA) will be displayed in the Patient Information Bar along the top of the monitor during an exam – providing **LMP** and/or **GA** data was entered for the patient in question.
			*Note: If **GA** is chosen, it will only be visible if an **OB Preset** is selected.*
	Hide Patient Information		Select/deselect this field to display/hide the Patient Information during an exam.
	Capitalize Patient Names and Patient ID		Select this option to capitalize all letters in a patient's name or identification number.

Default Selection Settings	*Default Sex*	*Default to last selected sex* *OR* *Select default sex*	When *Default to last selected sex* is chosen, opening a fresh *Exam Management* page will result in the *Sex* field being populated with the same gender that was selected in the last *Exam Management* page. When *Select default sex* is chosen, the user must select a specific *Sex* from the drop-down menu. The *Sex* selected will then become the default and be automatically entered in the *Sex* field of every new patient record that is created. There are four (4) choices available: *Female*, *Male*, *Other* and *Unknown*. *Caution: When using **PracticeHwy**, <u>always</u> set the **Select default sex** option to **Female**.*
	Default Application	*Default to last selected application* *OR* *Select default application*	When *Default to last selected application* is chosen, opening a fresh *Exam Management* page will result in the *Application* field being populated with the same *Application* that was selected in the last *Exam Management* page. When *Select default application* is chosen, the user must select a specific *Application* from the drop-down menu. The *Application* selected will then become the default and be automatically entered in the *Application* field of every new patient record that is created. There are five (5) choices available: *Cardiac*, *Follicular*, *OB*, *Gyn* and *Other*.

To Access the Patient Settings Dialog:

1. Press the console **MENU** button.
2. Select *Admin… > Patient*.

To Configure Patient Settings:

1. Press the console **MENU** button.
2. Select *Admin… > Patient*.
3. Configure the *Patient Settings* as required.
4. Select *OK* to accept the changes and exit or *Cancel* to exit without saving.

9.2.7 Status Bar

When **Status indicators** are enabled, the system will present the relevant icons at the bottom right of the LCD display. Read the definitions carefully as not all icons will always be visible – even if the relevant option has been activated.

By default, all **Status Bar** options are unchecked.

Figure 9-38: Status Bar

Table 9-26: Status Bar – Displayed Indicators

DICOM Store status Active Success Failure	Indicates the system is connected to a **DICOM Storage** server. This icon will be visible for only a short period of time. When a user accesses the **DICOM Storage** server, the icon will be presented while the operation is underway.
	Note: A **Network** connection must exist in order to have access to a **DICOM** network.
DICOM Print status Active Success Failure	Indicates the system is connected to a **DICOM Print** device. This icon will be visible for only a short period of time. When the **DICOM Print** device is in use, the icon will be presented while the job is printing.
	Note: A **Network** connection must exist in order to have access to a **DICOM** network.
DICOM Worklist status Success Failure	Indicates the system is connected to a **DICOM Worklist** server. This icon will be visible only when the **DICOM Worklist** server is being accessed.
	Note: A **Network** connection must exist in order to have access to a **DICOM** network.

Network connection	Indicates whether or not a hard-wired network connection is available.
Connected Not Connected	

Power status	Specifies the power source in use: **Wall Plug** (AC power) or **Battery**.
Wall Plug Battery	*Note: If **Battery** power is available, the icon displayed will be the appropriate **Battery Level** icon (see below).* *Ultrasonix recommends selecting this option so users will always be aware of the power source in use.*

Battery level	Displays the approximate amount of **Battery** power remaining.
≥80% ≤79% ≤59% ≤39% ≤19%	*Note: The level will rise over time when the system is connected to an AC power source or fall when it is running solely off the UPS battery.*

CINE recording	When **CINE Recording** is underway, this icon will be visible during the recording process.

CD/DVD Burning	Indicates that a CD or DVD is being burned.

Wireless signal strength	Denotes the strength of the wireless signal (%).
100% 75% 50% 25% 0%	*Note: If a wireless network is not available and active, the relevant icon will not be presented – even if this option is enabled.*

SONIX Live	When **SONIX Live** is activated, the **Connected** icon will be visible on the LCD Display.
Connected Not Connected	

SONIX Live IP Address	When **SONIX Live** is activated and this is option is selected, the **IP Address** at which remote users can view the video will be presented in the LCD display.
	*Note: The **IP Address** displayed will depend upon the viewer selected: **Windows Media Player** or **VLC Media Player**.* *If the relevant staff has been informed of the **IP Address**, activating this option is unnecessary.* *Additionally, <u>to maintain data privacy, do not enable this option</u> and direct staff to view the current **SONIX Live IP Address** via the **SONIX Live** dialog (**MENU > SONIX Live**).*

To Access Status Bar Indicators:

1. Press the console **MENU** button.
2. Select *Admin… > Status Bar*.

To Configure Status Bar Indicators:

1. Press the console **MENU** button.
2. Select *Admin… > Status Bar*.
3. Select/deselect *Displayed Indicators* as required.
4. Select *OK* to accept the changes and exit or *Cancel* to exit without saving.

9.2.8 Capture Settings

The *Capture Settings* dialog allows the user to select between *Image* and *Full Screen* for image storage and to configure the loop storage record time.

Figure 9-39: Capture Settings

Table 9-27: Capture Settings

Still Image	Local Storage	Select between *Full Screen* and *Image* for still image storage.
		Note: Image includes image field, imaging parameters and patient data bar. Thumbnail images are not included.
		Full screen includes the entire display, including the thumbnails.
	Video Output	Unused.
Loops	Compressor	Select the AVI movie *Compressor* type. *MS-CRAM* is the default.
		Caution: This setting should not be changed without a thorough understanding of Compressor types.
	Quick Record Time	Select the *Quick Record Time* (1 to 30 seconds) for post recording (retrospective acquisition). Refer to **9.2.4 Print Keys** to configure the console **PRINT** button for *Quick Record*.
		Quick Record is only available for 2D or 2D/Color imaging.
		Note: Selecting a longer record time may slow down system performance.

To Configure Capture Settings:

1. Press the console **MENU** button.

2. Select *Admin… > Capture*.

3. Configure *Capture Settings* as required.

4. Select *OK* to accept the changes and exit or *Cancel* to exit without saving.

9.2.9   Software Update

This option allows users to install software updates via the Internet, from a CD/DVD, or with a USB key.

*Note: Access to **Software Update** is available only with a valid warranty license.*

Figure 9-40: Software Updates
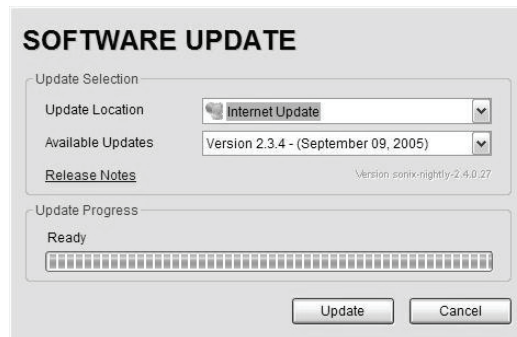
Table 9-28: Software Updates

Update Selection	**Update Location**	**Internet Update**	If the system is connected to the Internet, an automatic search for available software updates occurs. If successful, the **Available Updates** drop-down menu auto-populates with the software revisions available for download. The latest revision is automatically selected but older software revisions may also be available.
		DVD-RAM Drive (E:)	If the update is located on a CD or DVD, it can be accessed via the **DVD-RAM Drive** which can be selected from the **Available Updates** drop-down menu.
		Removable Disk	If a removable disk (e.g., USB key or thumb drive) containing the update has been inserted in a USB port on the Front Connectivity Panel, it will be available for selection from the **Available Updates** drop-down menu.
	Available Updates		Select to choose the appropriate update. Options in this drop-down menu are limited by the selection made in the **Update Location** drop-down menu.
	Release Notes		Click to view the **Release Notes** associated with the **Available Updates** selection.
			*Note: An Internet connection is required to access **Release Notes**.*
Update Progress			Lets the user know when the update is complete or **Ready**.

To Perform a Software Update:

1. Press the console **MENU** button.

2. Select *Admin… > Software Updates*.

3. Select an *Update Location* from the drop-down menu:

    *Note: In order to be available in the **Update Location** drop-down menu, the CD/DVD and/or USB key must be inserted prior to selecting the **Software Update** option from the **Admin Settings** menu.*

4. Select *Release Notes* to view the selected software's revision history.

    *Note: An Internet connection is required to access **Release Notes**.*

5. Select *Update* to begin the update process or *Cancel* to exit without updating.

    *Note: The **Update Progress** bar displays the download progress. Upon completion, the **Software Update** will be auto-installed and the system will restart automatically.*

9.2.10 Licensing

Licensing displays the *Options* available on the SONIX system. *Status* and *Expiry* dates (when applicable) of enabled features are also displayed.

Figure 9-41: Licensing
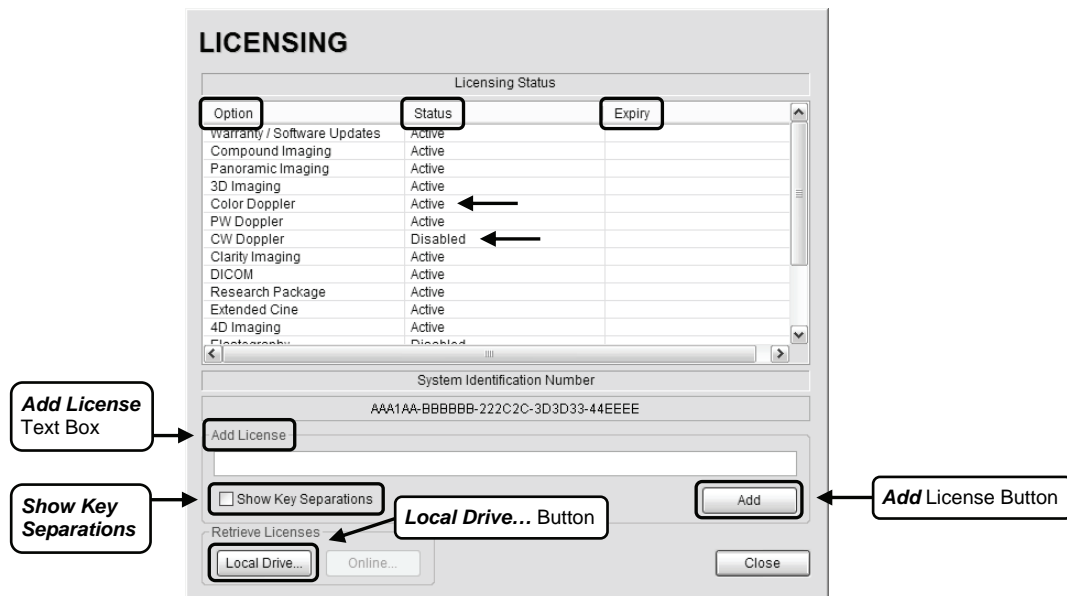
Note: Contact your Ultrasonix representative for details on obtaining a new license key and enabling additional features.

To Access the Licensing Dialog:

1. Press the console **MENU** button.

2. Select *Admin… > Licensing*.

To Enter a New Licensing Key:

1. Press the console **MENU** button.

2. Select *Admin… > Licensing*.

3. The *Licensing Status* list details the specifics of the system's *Options*, their *Status* (*Active*, *Disabled*, *Expired*, etc.) and the applicable *Expiry* date.

   *Note: An **Option** that has its **Status** listed as "**Active**" but has no entry in the **Expiry** field will never expire.*

4. Enter the new license key in the *Add License* text box.

   Notes:

   *If the new license key is being entered manually, select the **Show Key Separations** checkbox to enable the entry of the key block-by-block.*

   If it is typed in as one long text string, the dashes ("-") will also have to be entered in order to ensure the license key format conforms to the required standard.

   *If the new license key has been received in an electronic format that lends itself to the standard "copy and paste" method, do not select the **Show Key Separations** checkbox. Simply copy the key and paste it into the **Add License** text box as one long string, with the formatting intact.*

   *If the new license key is available on the local hard drive, click the **Local Drive…** button and choose the appropriate file (*.key) to import/enable the new license.*

5. Click *Add* to add the new license key.

6. Check to ensure the new license has been added then click *Close* to exit the *Licensing* dialog.

9.3 SERVICE MENU

Access to *Service* is password protected and restricted to certified, Ultrasonix Service representatives.

CHAPTER 10: IMAGE STORAGE, REVIEW AND TRANSFER

The **Exam Management** option includes a (local) patient/exam management system with image storage, review and transfer.

10.1 IMAGE STORAGE

Each time a new patient is entered into the system, a local file is created for that patient. All saved images and CINE clips are stored in the patient file and organized by exam date and type. This image/CINE data may be retrieved at any time and transferred to a printer, **DICOM** archiver, **PracticeHwy**, etc.

Hard drive capacity for patient data storage is 160 gigabytes. Depending on the number/type of images involved, the system can store more than 50,000 exams.

Note: Ultrasonix recommends regular patient/image file back-up and purging of older patient files stored on the system.

10.2 IMAGE REVIEW

Figure 10-1: Exam Management/Image Review

To Access the Image Review Page (Method 1 – Current Patient):

1. Press the console **PRINT3/ARCHIVE** button to view the current exam images.

    Note: Refer to **9.2.4** *to configure* ***Print Keys****.*

To Access the Image Review Page (Method 2 – Active Patient Exam):

1. During a patient exam, press the console **ID** button to open the ***Exam Management*** page.

2. Select ***Review*** to view the current exam images.

To Access the Image Review Page (Method 3 – Local Patient Database):

1. Press the console **ID** button.

2. Click the ***Local*** tab.

3. Select the desired ***Patient***(***s***) from the ***Local*** database.

    Note: To select multiple ***Patients*** *at the same time press and hold the console* **SHIFT** *key, then use the trackball and* **SELECT** *button to highlight the relevant* ***Patients****.*

    To select all ***Patients*** *at the same time, tap the touch screen* ***Select All*** *button.*

4. Click ***Review*** and the ***Image Review*** page will be presented with the exam files for the selected ***Patient***(***s***).

Figure 10-2: Image Review

Patient Name: Jones, Linda
Date of Birth: 12/17/1972
Patient ID: 8303

Patient data for currently displayed image file.

Check *Patient(s)* and *Exam(s)* file for image transfer or deletion.

Check to select individual images for image transfer or deletion.

White arrow head indicates more images. The trackball arrow cursor triggers scrolling of thumbnails both to the right and left.

Table 10-1: Image Review Screen

Patient Name	Patient(*s*) selected from the *Exam Management* page.
Exam Date/Exam Type	Displays the exam files/images for the *Patient* selected (above). The number of images and *CINE* clips stored appears in the far right column of this section.
	By default, if only one patient file is listed under *Patient Name*, the system will display the images from that patient's most recent exam.
	If multiple *Patients Names* are listed, select each of the patients individually to access a list the exam dates for that patient.
Layout	Sets up the image display area: *Single*, *2x2*, *3x3*, *4x4*, *5x5*, *6x6*.
	Note: The default Layout is Single. However, if the default Layout is changed (e.g., to 2x2), the next time Image Review is entered the system will default to the last Layout selection (in this example, 2x2).

Image Management	Queue Size: x Kb	Lists the size of selected items (where *x* equals the total number of kilobytes in the queue).
	Transfer…	*Transfers* items to the selected destination.
	Clear…	*Clears* selected items from the queue.
		Note: Clear does not delete items from the system hard drive.
	Delete…	*Deletes* the selected items from the system hard drive.
	Full Screen	Moves to a *Full Screen* display of the selected image. Use the console **PRINT 1**, **2** or **3** button to print the *Full Screen* display.
		Note: Press the console SELECT button to close the Full Screen display.

Note: Stored CINE clips are identified by a small movie symbol on the lower right of the image thumbnail. Once selected, the movie will replay in the Review window.

The image thumbnails on the bottom of the screen represent all the available images for the exam under review. To scroll through the thumbnails, use the trackball to move the cursor over to the right or left side of the thumbnails.

Table 10-2: Image Management Touch Screen Controls (tap to activate)

Exit	Tap to *Exit* the *Image Management* page.
Select All	Tap to *Select All* patients/patient files/images for image transfer or deletion.
Transfer…	Tap to initiate image transfer and display the *Select Storage Destination* page.
Delete…	Tap to *Delete* the patient(s), patient exam file(s) and/or image(s) selected via checkboxes.
Add Patient	Tap to add the next patient to the queue (selected via checkboxes).
Add Exam	Tap to add the next exam to the queue (selected via checkboxes)
Add Image	Tap to add the next image to the queue (selected via checkboxes).
Clear Queue	Tap to uncheck (deselect) all the selected patient(s), patient exam file(s) and image(s).

Table 10-3: Image Management Touch Screen Controls (tap to activate, dial to adjust)

Image	Tap *Image* then use the associated touch screen dial to select the image(s) displayed. Dial right to select the next image available. Dial left to select the previous image.
Thumbnail	Tap *Thumbnail* then use the associated touch screen dial to move through the thumbnail images. Dial right to select the next thumbnail. Dial left to select the previous thumbnail.
Layout	Tap *Layout* then use the associated touch screen dial to change the display *Layout*: (*Single*, *2x2*, *3x3*, etc.).
Patient	Tap *Patient* then use the associated touch screen dial to page through the list of available patients. Press **SELECT** to select highlighted patient.
Exam	Tap *Exam* then use the associated touch screen dial to page through the list of available exams. Press **SELECT** to select the highlighted exam file.

Table 10-4: CINE Review Touch Screen Controls (tap to activate)

Toggle Repeat	Select to toggle between two methods of reviewing the stored loop: • repeat the clip/loop, as indicated by curved arrow • stop clip at end as indicated by straight arrow.
Exit	Select to *Exit* the clip review and return to 2D imaging.
Play	Select to view the clip.
Pause	Select to *Pause* viewing of the stored clip.

Table 10-5: CINE Review Touch Screen Controls (tap to activate, dial to adjust)

FrmByFrm	Use to select currently displayed frame, one (1) frame at a time.
Speed	Use to select *CINE* review play speed: ⅛, ¼, ½, full (1/1) or double (2/2).

Figure 10-3: Image Selection/Deselection

Uncheck to deselect individual images.

Check to select individual images for image transfer or deletion.
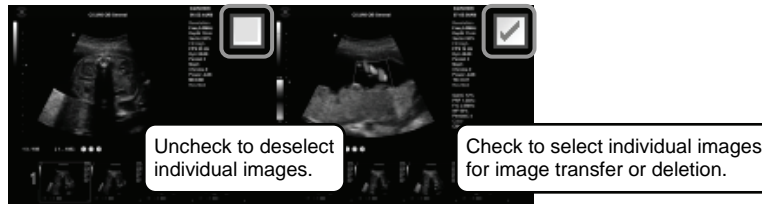
To Select/Adjust the CINE Review Controls:

1. Tap *Review* on the touch screen menu.

2. Tap the desired selection on the touch screen menu (e.g., *Speed*).

3. Use the dial below the selected touch screen button to make the adjustment to the *CINE* review.

10.2.1 Deleting Image(s)/Exam(s)

To Delete Individual Images:

1. Select the desired patient and exam date to display the images.

2. To select the desired image(s), use the trackball and **SELECT** button to place a check in the associated box(es) as shown in **Figure 10-3**.

3. Select *Delete* from the menu on the LCD display.

> *Note: Select **Clear** to reset the screen and deselect the patient(s), exam(s) and image(s). **Clear** does not delete the images, it simply resets the screen by unchecking the selections.*

To Delete a Complete Exam:

1. Select the desired *Patient* and *Exam Date*.

2. Select *Delete* from the menu on the LCD display or tap *Delete* on the touch screen.

> *Note: Select **Clear** to reset the screen and deselect the patient(s), exam(s) and image(s). **Clear** does not delete the images, it simply resets the screen by unchecking the selections.*

10.3 IMAGE TRANSFER

The image management system enables users to transfer stored images and **CINE** clips to a storage medium: **DICOM Archiver** or **Printer**, **PracticeHwy**, CD, USB key or DVD.

Notes:

To select an entire exam, check the checkbox for the desired exam.

To select all exams for a patient, check the checkbox for the desired patient.

To select only desired images, open each exam and check the checkbox for the desired images.

Figure 10-4: Select Storage Destination Dialog
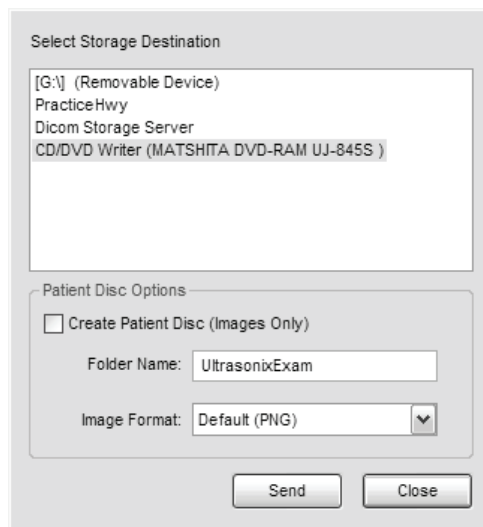
Table 10-6: Select Storage Destination Options

Storage Destination			All available storage options will be listed here, including all printers currently attached to the system, either locally or via the network: ***DICOM Archiver*** or ***Printer***, ***PracticeHwy***, CD, USB key or DVD.
			Note: *A USB key, CD or DVD must be connected to the system in order to have it appear in the list of **Storage Destinations**.*
Patient Disc Options		**Create Patient Disc (Images Only)**	Creates a CD/DVD with just images (database and measurement data are not included). If multiple patients are selected with this option, all images will be in one file.
		Folder Name	Images written to a CD/DVD will be written into the ***Folder Name*** entered here. The default is ***UltrasonixExam***.
	Image Format		Enables the selection of seven (7) different image formats.
		Default (PNG) ***(Portable Network Graphics)***	Selecting anything other than ***Default (PNG)*** will extend the image transfer time as *.PNG* images will have to be converted to the new format. The average *.PNG* image size is 100Kb.
		JPEG	***Joint Photographic Experts Group*** image format.
		Bitmap (BMP)	Converting the image to a ***Bitmap (BMP)*** increases the image size as follows: • 800 x 600 ***Bitmap*** image = approximately 2Mb • 1024 x 768 ***Bitmap*** image = approximately 3Mb.
		GIF	***Graphics Interchange File*** or ***Format*** image.
		DCM	***DICOM*** image format. ***Note:*** *These images will be readable by any **PACS** system that reads **DICOM 3.0** formatted files.*
		DCM JPEG	***DICOM*** image in ***JPEG*** format. ***Note:*** *These images will be readable by any **PACS** system that reads **DICOM 3.0** formatted files.*
		DCM JPEG lossless	***DICOM*** image in a lossless ***JPEG*** format. ***Note:*** *These images will be readable by any **PACS** system that reads **DICOM 3.0** formatted files.*

To Transfer Patient Exams:

1. Select the desired *Patient*(*s*), *Exam Date* and/or images.

    *Note: The amount of space required is listed under **Image Management** as **Queue Size**.*
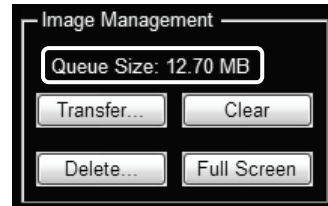
2. Select *Transfer…*.

    *Note: Select **Clear** to reset the screen and deselect the patient(s), exam(s) and image(s). **Clear** does not delete the images, it simply resets the screen by unchecking the selections.*

3. Select the desired *Storage Destination*.
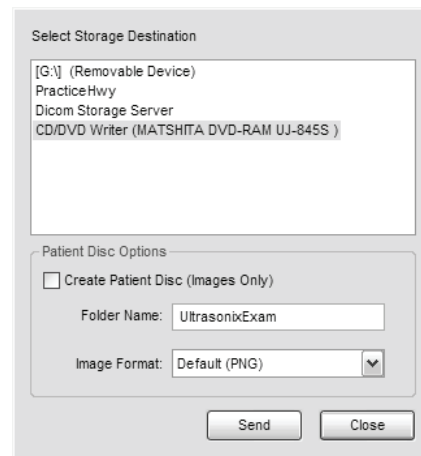
    *Note: All connected Ultrasonix-approved digital storage peripherals will appear in the list of **Storage Destinations**.*

    *If **PracticeHwy** or a **DICOM Storage Server** is connected, they will also be available for selection.*

4. If required, select *Create Patient Disc (Images Only)*.

5. If required, change the default *Folder Name* (*UltrasonixExam*) using the console keyboard.

6. Select the desired *Image Format* (*Default (PNG)*, *JPEG*, *Bitmap (BMP)*, *GIF*, *DCM*, *DCM JPEG* or *DCM JPEG lossless*).
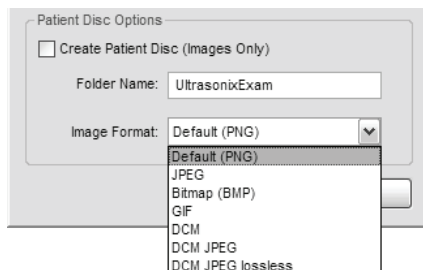
7. Select *Send* to transfer the files and/or images or *Close* to exit without transferring.

Note: The original files will remain unchanged on the local hard drive.

*Note: If the **Queue** jams during transfer/print, press **SHIFT+ID**. This will display the relevant **Queue**, enabling the user to delete the job and release the function.*

CHAPTER 11: CONNECTIVITY AND PERIPHERALS

The system includes a wide range of connectivity features that allow the user to simultaneously connect a variety of peripherals. Refer to **9.2.5** and the *SONIX Series Service Manual* for further details on peripheral connectivity.

⚠️ **Warning:** *Do not touch the patient and the transducer ports simultaneously.*

11.1 SYSTEM CASE CONNECTIVITY PANEL

The System Case Connectivity Panel is accessible from the top of the system case.

Caution: *The system case contains the system PC and internal connectivity panel. Access to the connectivity panel (through the top of the system case) should be restricted to qualified service personnel only. Contact your local service representative for further information.*

Figure 11-1: System Case Connectivity Panel (SX1.0)
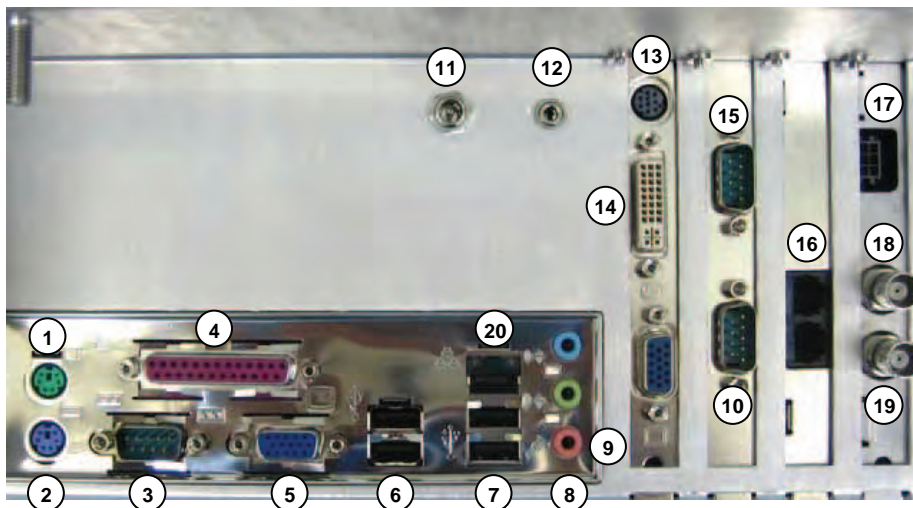
Figure 11-2: System Case Connectivity Panel (SX1.1)
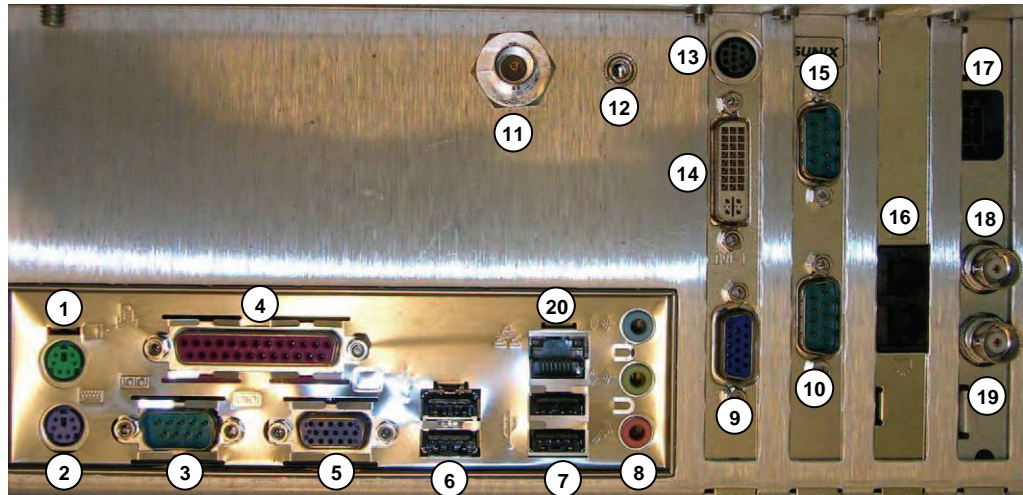
Figure 11-3: System Case Connectivity Panel (SX1.1 mod)
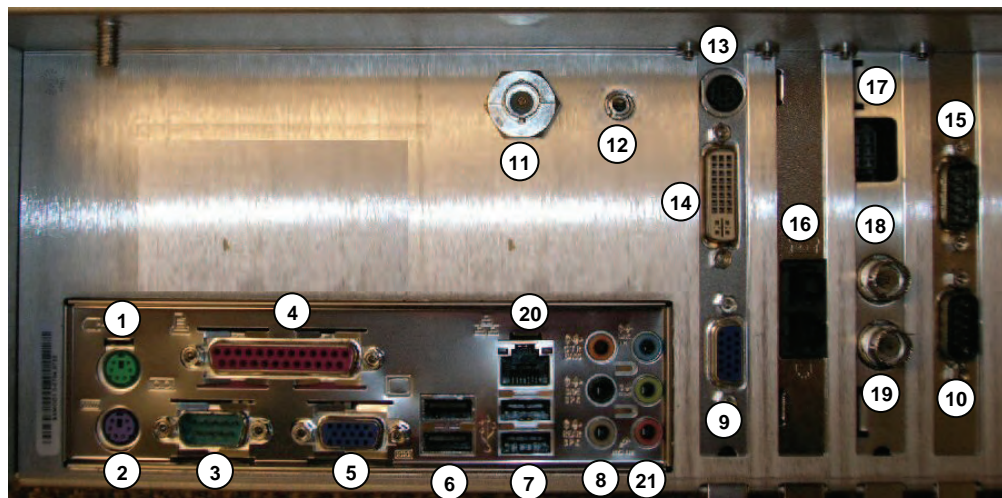
Figure 11-4: System Case Connectivity Panel (OP/SP SX1.2/1.3-FI)
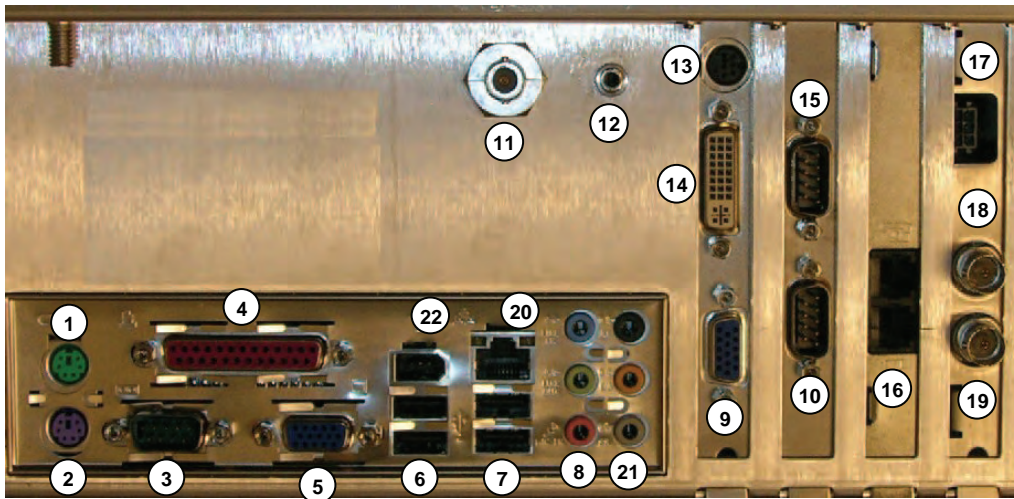
Figure 11-5: System Case Connectivity Panel (OP/SP SX1.2/1.3-F)
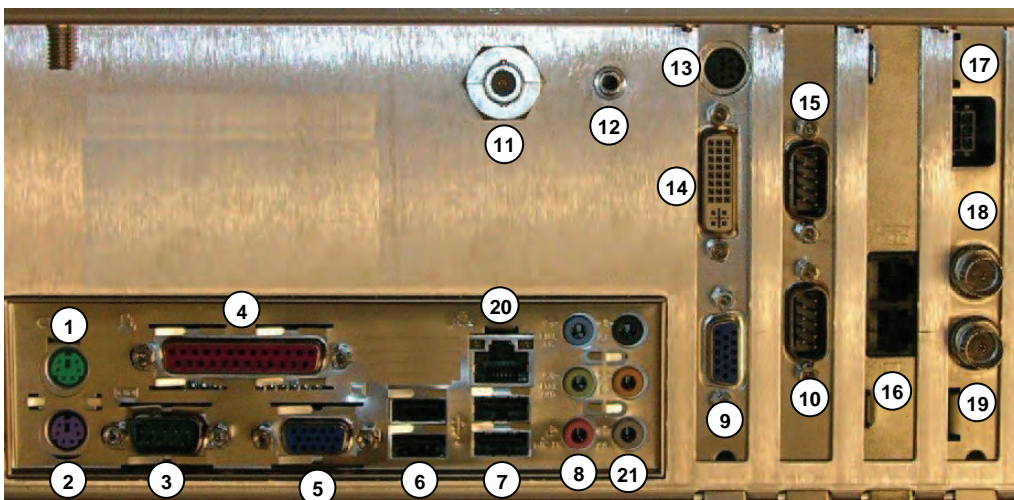
Figure 11-6: System Case Connectivity Panel (OP/SP SX1.4)
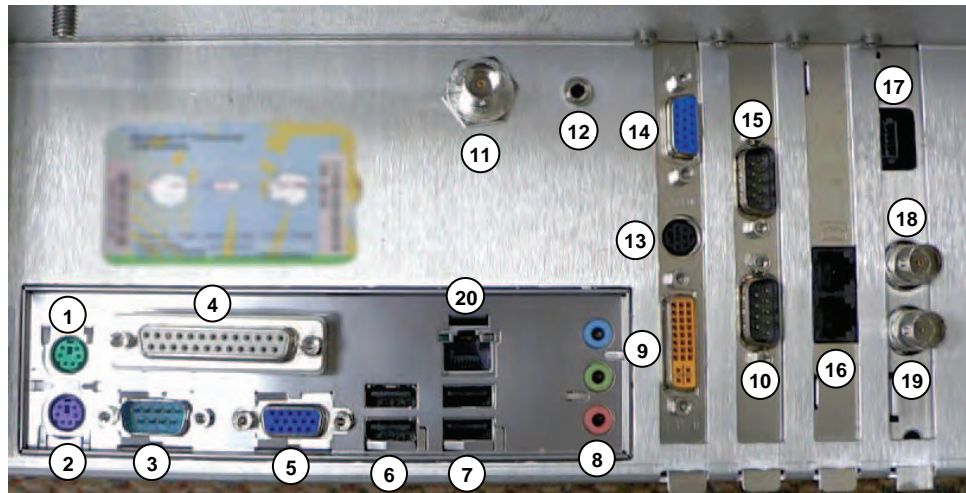
Figure 11-7: System Case Connectivity Panel (CEP SX3.0)
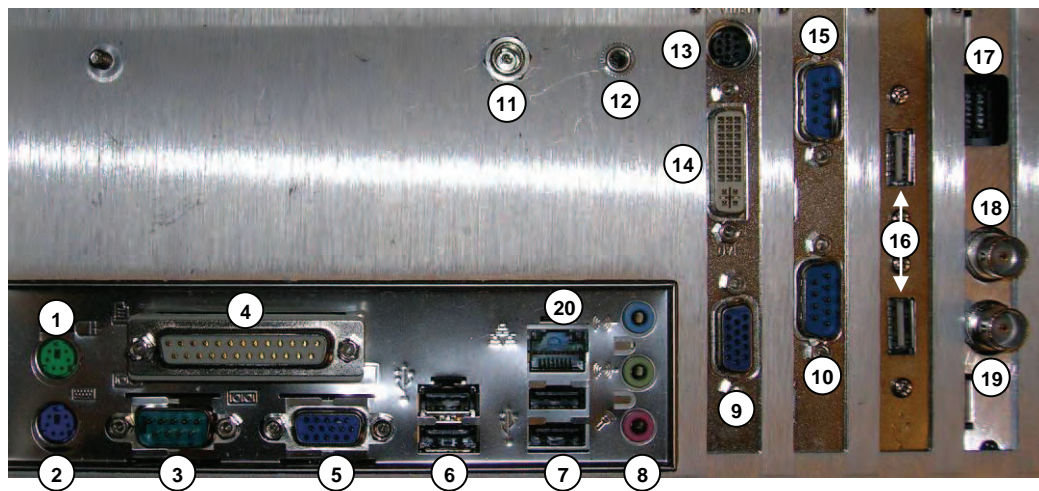
Figure 11-8: System Case Connectivity Panel (CEP SXmod 3.1)
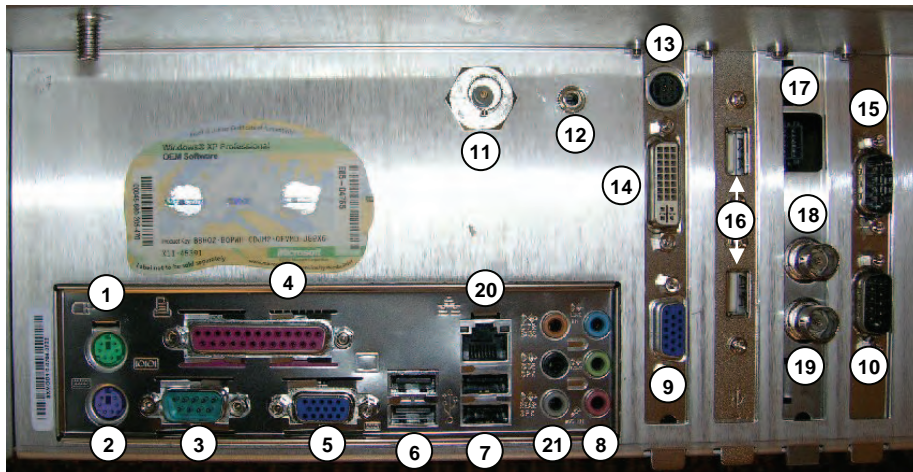
Figure 11-9: System Case Connectivity Panel (CEP SX3.2/3.3-FI)
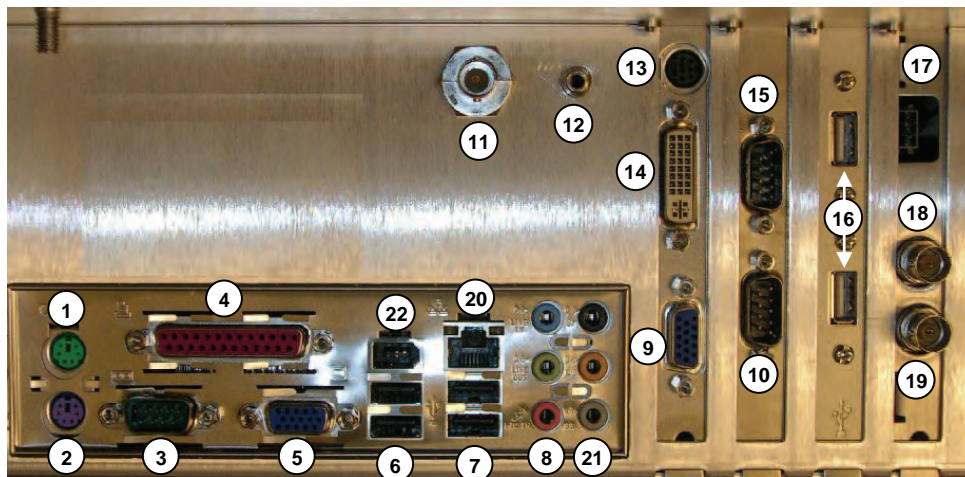
Figure 11-10: System Case Connectivity Panel (CEP SX3.2/3.3-F)
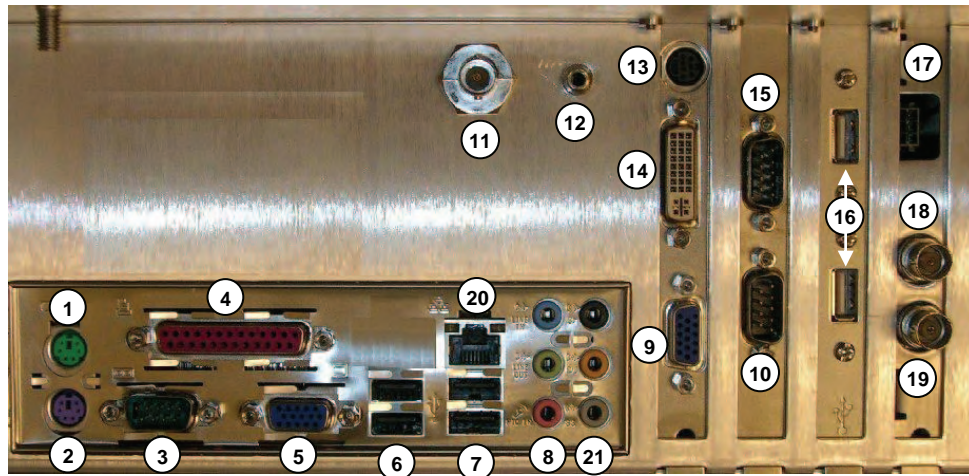
Figure 11-11: System Case Connectivity Panel (CEP SX3.4)
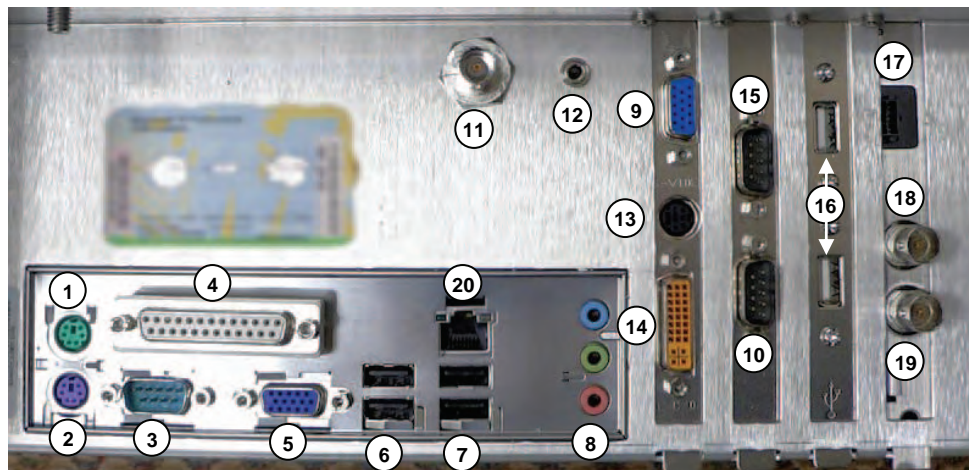
Table 11-1: System Case Connectivity Panel

1	PS2 Mouse port	Used by the operator console trackball.
2	PS2 Keyboard port	Used by the operator console keyboard.
3	RS232 Serial port	Used by the operator console.
4	Parallel port	A factory installed dongle is connected to this port is required to activate selected system features. Additionally, this port may be used to connect an Ultrasonix-approved parallel-port printer.
5	Video output port	Disabled.
6	USB ports (2) **OP/SP:** **CEP:**	**OP/SP:** Used by the two (2) USB ports at the front of operator console and the USB connector from the LCD display. **CEP:** Used by the two (2) USB ports at the front of the operator console and the USB port on the rear of the CEP operator console (barcode reader connection).
7	USB ports (2) **OP/SP:** **CEP:**	**OP/SP:** Two (2) additional USB ports. These ports may be used to connect printers and other Ultrasonix-approved USB peripherals. Use to connect the barcode reader and wireless adapter. **CEP:** Used by the LCD display and wireless adapter.
8	Sound connections	Line-in (blue): may be used to connect an Ultrasonix-approved audio input device. System Speaker connection (green). System Microphone connection: Disabled.
9	Video VGA output **OR** Digital Video DVI video output	Not in use. Refer to item **14**, **below**.
10	RS232 Serial Port **OP/SP:** **CEP:**	**OP/SP:** May be used to connect an Ultrasonix-approved RS232 serial device. **CEP:** Used by the UPS.
11	Speaker power connector	Used by the system speakers.
12	System Power Switch **OP/SP:** **CEP:**	**OP/SP:** Used as the ON/OFF switch by the operator console. **CEP:** Used as the ON/OFF switch by the operator console and UPS.

13	Video outputs	Connected to a video splitter module that outputs Black & White (B&W) and Color video. It will look like one of these four (4) photos.
		*Note: The B&W and Color video outputs are typically routed to the Back Connectivity Panel. These may also be connected directly to a video output device. Refer to **11.2 Back Connectivity Panel** for details.*
		In the event that an S-Video connector is required (e.g., the four (4) wire video output cable pictured to the right) but has not been supplied, contact Ultrasonix Technical Support.
14	Digital Video DVI video output	Used by the system's LCD display. A DVI splitter may be used to connect additional Ultrasonix-approved DVI Video output devices.
	OR	
	Video VGA output	Refer to item **9**, **above**.
15	RS232 Serial port	Used by the operator console.
16	**OP/SP:** Two (2) modem connections	The modem line is typically routed directly to the Back Connectivity Panel. It may also be connected directly to a phone/fax line from this location.
	CEP: Two (2) USB ports	Used by the internal modem (where applicable). The second USB port is unused.
17	Console power connector	Used by the operator console.
18	Freeze Bayonet Neill Concelman (BNC)	May be used to trigger a freeze or print function by connecting directly to an Ultrasonix-approved switching device, such as a *Footswitch*.
		Refer to **9.2.5 Peripherals** to configure the trigger action of the switching device.
19	Print BNC	Port may be connected directly to an Ultrasonix-approved triggered device, such as a video printer.
		Refer to **9.2.4 Print Keys** to configure the **PRINT** keys.
20	Ethernet	The Ethernet connection is typically routed to the Back Connectivity Panel. It may also be connected directly to the Ethernet from this location. This port supports 10/100Mb.
21	Additional audio connections	Not in use.
22	IEEE 1394 Port	Not in use.
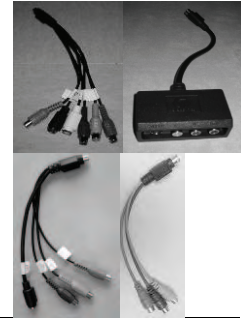
11.2 BACK CONNECTIVITY PANEL

The Back Connectivity Panel can be accessed from the back of the system. The connectors are routed internally to the System Case Connectivity Panel which enables easy configuration.

Table 11-2: Back Connectivity Panel (Standard Configuration)

B&W OUT or **B&W VIDEO**	Use to connect an Ultrasonix-approved video output device such as a B&W video printer or a frame grabber.	
COL OUT or **COL VIDEO**	Use to connect an Ultrasonix-approved, video output device such as a color video printer, VCR or a frame grabber.	
NET (Network) or **LAN**	Use to connect the system to a network. This port supports 10Mb/100Mb.	
PHONE	Use to connect the modem to a phone line. This will allow the system to be configured for Online Support (refer to **9.2.2.2** for details on configuring a dialup connection).	

Figure 11-12: Back Connectivity Panel

11.3 FRONT CONSOLE CONNECTIVITY

Figure 11-13: Console Front
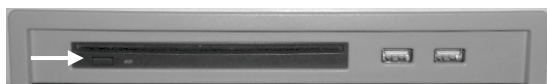
The system provides (two) 2 USB ports and a DVD/CD writer at the front of the operator console. These USB ports can be used to connect Ultrasonix-approved USB devices (such as a USB thumb drive) for image file transfer.

Note: Below and to the left side of the CD/DVD slot is a black button. Press this to release the CD/DVD from the drive.

11.4 ADVANCED 3D/4D SOFTWARE DONGLE

Connect the software dongle to either of the two (2) USB ports at connection point **7** (refer to the figures at the beginning of this chapter to determine the location of connection point **7**).

Figure 11-14: Advanced 3D/4D Software Dongle
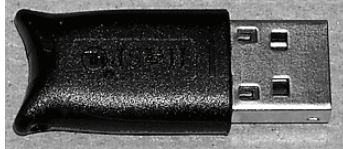
Figure 11-15: Advanced 3D/4D Software Dongle (Connected to System Case Connectivity Panel)

Connected Dongle (with power on)
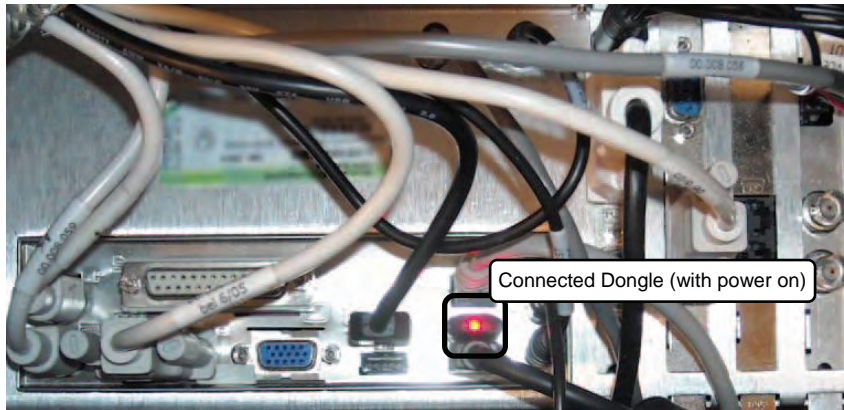
IMPORTANT: *The software dongle is supplied by Ultrasonix and must be attached to connection point* **7** *on the System Case Connectivity Panel* <u>at all times</u> *in order to access Advanced 3D/4D Imaging.*

If the software dongle is misplaced or goes missing for any reason, it is the customer's responsibility to <u>***purchase***</u> ***a new one.***

Contact Ultrasonix Technical Support for pricing on a replacement dongle.

11.5 ULTRASONIX-APPROVED DEVICES

⚠️ **Warning:** *Refer to the Service Manual for connection of AC power for third-party peripherals. The internal AC connector should only be used with Ultrasonix-certified, third-party peripherals.*

The power drawn from the internal AC peripheral power cable must not exceed 150W.

The following peripherals have been approved for use with the system:

- USB thumb drive connected to USB port
- SONY B&W Video printer connected to B&W Video and Trigger output
- SONY VCR and SONY DVD Recorder connected to RGB-Sync
- Canon i80 InkJet Printer connected to Parallel Port.

Note: *Refer to the most recent Ultrasonix price list to determine the exact makes/models of Ultrasonix-approved devices.*

11.6 UPS (CEP)

When the system arrives, the UPS battery will be turned off and may be completely drained of power. During installation, the technician will ensure that the system – and therefore the UPS – is left plugged in, allowing it to completely charge the battery. This will take approximately 3.5 hours.

As a data safety measure, Ultrasonix has configured the UPS alert system to ensure an optimal warning time for UPS battery recharging.

⚠ *Warnings:*

*NEVER let liquid from any source enter the UPS. Failure to do this may result in accidental **shorts, shocks or electrocutions***.

DO NOT attempt to service this product yourself. *Attempting to open the UPS may cause exposure to lethal voltages within the unit even when it is apparently not operating and the input wiring is disconnected from the electrical source. Should the UPS require maintenance or replacement, only qualified Ultrasonix Service Technicians may perform service as detailed in the Service Manual.*

For UPS and battery service issues, contact Ultrasonix Technical Support.

*Caution: In order to effectively protect exam data for the current patient, pay particular attention to the details in **Table 11-3** and **Table 11-4**, respectively.*

The system is delivered with a built-in screen saver utility. If it remains inactive for a predetermined period of time, the LCD display will enter screen saver mode and the phrase "***Always Plug in AC Power***" will scroll continuously across the screen.

Although the Battery Recharge Alerts (**Table 11-4**) will continue to function, it will not be possible to see the onscreen warnings. The screen saver's message "***Always Plug in AC Power***" serves to remind users of the intent of the Battery Recharge Alerts' audible alarm.

Table 11-3: Battery Usage Limitations

Scanning Time Limit (Active and Frozen Imaging)	Ultrasonix does not recommend leaving the system unplugged even when imaging is frozen.
	Caution: The system should only be unplugged (without shutting down) for the few moments it takes to move it to a new location.
	Ignoring these instructions may result in data loss and battery failure.
Recharge Time	To fully charge the battery, Ultrasonix recommends keeping the system plugged in continuously for 3.5 hours.
	Note: If required, the system can continue to be used while the battery is charging. However, if the system is unplugged and moved during the recharge cycle, it may require more than 3.5 hours to fully charge.

Table 11-4: Battery Recharge Alerts

Alert Level 2	While unplugged, if the battery charge falls below a predetermined level, the system will emit an audible alarm and present the following message on the **Status Bar** (bottom right of the LCD display). Both the message and the alarm will continue so long as the system remains unplugged. **Urgent: Plug in AC Power.**
	Caution: To protect patient data and prolong battery life, connect the system to an AC power source immediately.
Alert Level 1	If **Alert Level 2** is ignored (i.e., if the system is <u>not</u> connected to an AC power source), after a predetermined time the tone of the audible alarm will alter and the following message will be presented onscreen – *in front of any imaging that may be underway*: Battery power low. System will shutdown in 2 minutes. Please connect to A/C power. There will also be a **Status Bar** message that will count down the two (2) minute warning (in seconds). If the counter reaches zero (0) before the system is plugged into an AC power outlet, the system will automatically shutdown. **Shutting down in xx seconds.** Before restarting the system, connect the power cord to an AC outlet. If the system is not plugged in before it is turned on, it will simply shut itself down again. Additionally, because the UPS remains in **Standby** mode even when it is powered off, the battery will continue to drain so it must be plugged in <u>immediately</u> after the shutdown process.
	Caution: Ignoring these instructions may result in data loss and battery failure. *To fully charge the battery after an **Alert Level 1** automated shutdown, leave the system plugged in continuously for 3.5 hours. If the charging cycle must be interrupted, Ultrasonix recommends leaving the system plugged in for a minimum of one (1) hour before unplugging it. Once the system has been moved, it should be reconnected to a power source immediately and allowed to continue charging for the full 3.5 hours.* *Failure to follow these recommendations may result in premature battery failure which is not covered by the system warranty.*

Note: Battery Recharge Alerts are pre-programmed and <u>cannot</u> be edited or deleted by the user.

11.6.1 UPS Battery Sleep Mode (CEP)

There are two (2) circumstances under which the UPS battery will automatically enter sleep mode:

- if an *Alert Level 1* is ignored and the system is not plugged in to recharge, after a short period of time the battery will drain to the point where it automatically enters sleep mode
- if the system is powered off and left unplugged for an extended period of time, the battery will continue to drain even though the system is not in use. If the battery charge falls below the level at which an *Alert Level 1* would occur, the battery will automatically enter sleep mode.

Proper use of the system, as discussed in **2.6.1 UPS Use Model** and **11.6 UPS (CEP)** will ensure that neither of these circumstances ever applies.

To Wake the UPS Battery from Sleep Mode:

1. Plug the system in to a power outlet that is known to be working.

   Note: If the power light on the LCD display is not lit, then battery is likely in sleep mode.

2. Press the console **POWER** button for approximately 1 second to wake the battery from "sleep" mode (a clicking sound may be heard).

LCD Display Power Light
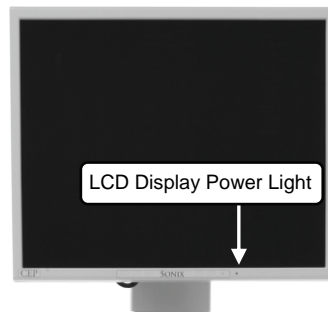
   Note: If the battery is in sleep mode, the power light on the LCD display will light up.

3. Press the console **POWER** button a second time and the CEP should begin the boot process.

4. If the CEP fails to wake, the EPO switch may have been pressed and the UPS breakers will need to be reset. Contact your internal service provider or Ultrasonix Technical Support.

5. If the CEP boots correctly, leave the system plugged in and recharging – uninterrupted – for at least 60 minutes to attain approximately 60 minutes of battery life. (To attain a full battery charge, leave the unit plugged in for an uninterrupted period of approximately 3.5 hours).

   Note: If desired, the system can be powered off and left plugged in to recharge or it can be used – without being unplugged – during the recharging period.

11.6.2 UPS EMERGENCY POWER OFF Switch (CEP)

In the event of any emergency that requires the shutdown of all power (e.g., to prevent fire or shock), the CEP is equipped with a red, EMERGENCY POWER OFF (EPO) switch at the bottom, rear of the system. Once the EPO switch is pressed, unplug the power cord from the wall outlet.

Caution: DO NOT use the EPO switch as a regular shutdown option.

Use this switch only in the event of an emergency (e.g., to prevent fire or shock). Once the EPO switch has been pressed, the CEP will be <u>completely</u> disabled until your internal service provider or a certified Ultrasonix Service Technician can reset the system.

Service calls that result from misuse of the EPO switch are not covered under the system Warranty and may not be covered by the Service Contract.

To Activate an Emergency Shutdown:

1. At the bottom, rear of the system, lift the clear plastic protective cover and press the red EPO switch.

Canada and USA   UPS **EMERGENCY POWER OFF** (**EPO**) Switch   International
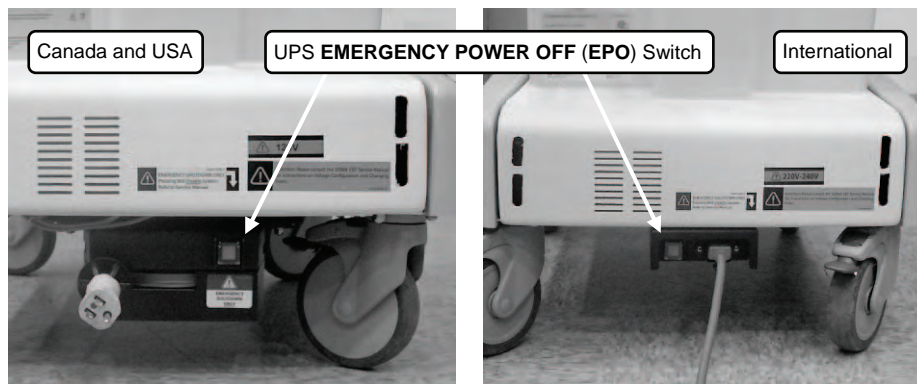
2. Unplug the power cord from the wall outlet.

3. Call your internal service provider or Ultrasonix Technical Support.

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*IMPORTANT: Use this switch <u>**only**</u> in the event of an emergency. Once turned off, the CEP will be <u>**completely**</u> disabled until your internal service provider or a certified Ultrasonix Service Technician can reset the system.*

*If the **EMERGENCY POWER OFF** switch is pressed, contact your internal service provider or Ultrasonix Technical Support immediately.*

11.7 CONNECTING THE BARCODE READER

The barcode reader comes standard with CEP hardware and is available as an option on OP, SP and RP platforms.

Figure 11-16: Barcode Reader

⚠️ *Warnings:*

USE OF CONTROLS or adjustments or performance of procedures other than those specified in the manufacturer's User's Guide (delivered with system) may result in hazardous laser light exposure.

NEVER attempt to look at the laser beam, even if the barcode reader appears to be non-functional.

NEVER point the laser beam in anyone's eyes.

USE OF OPTICAL instruments with the laser equipment will increase eye hazard.

UNDER NO CIRCUMSTANCES should users or technicians attempt to open or service the laser scanner. Attempting to open the barcode reader may cause exposure to hazardous laser light. Should the barcode reader require maintenance or replacement, contact Ultrasonix Technical Support.

Caution: Do not apply ultrasound gel to the barcode reader.

11.7.1 CEP

Simply plug the barcode reader's USB connector into the USB port on the back of the operator console. To keep it handy, store the barcode reader in one of the smaller transducer holders.

Figure 11-17: Rear Console USB Port Connection for the Barcode Reader (CEP)

USB port connector for barcode reader (CEP)
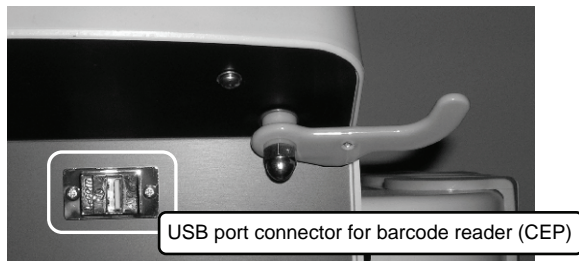
11.7.2 SONIX OP/SP/RP

Plug the barcode reader's USB connector into one of the USB ports at connection point **7** on the System Case Connectivity Panel (refer to the figures in **11.1 System Case Connectivity Panel** for location details on this connection). To keep it handy, store the barcode reader in one of the smaller transducer holders.

11.8 POWER CORD

11.8.1 Unwinding/Retracting the Power Cord: Canada and USA (CEP)

Before plugging in the retractable power cord, move the SONIX into the desired position. Gently pull the cord from its housing until it is long enough to comfortably reach the power connection. There should be a small amount of slack so that the cord is not under tension, but not so much that it pools on the floor, causing a possible tripping hazard or interfering with the smooth operation of the system wheels.

Two (2) colored labels on the power cord mark the maximum lengths to which the cord should be extended. The first label (yellow) is at 7' (2.15m) and indicates that the user should exercise caution as the cord is approaching its maximum length. The second label (red) is at 9' (2.75m) and indicates that the cord should <u>not</u> be extended any further.

To retract the cord back into its housing, grasp the cable plug firmly in one hand, then pull gently on the cable end nearest the base of the system until one (1) click is heard/felt. At this point, release the cable – but not the plug – and it will automatically retract until it encounters the resistance caused by retaining hold of the plug.

Figure 11-18: Retractable Power Cord   **Figure 11-19: Power Cord Warning Labels**

Warnings:

DO NOT *attempt to open the cable reel which houses the retractable power cord as this may cause physical injury and/or exposure to lethal voltages. It may also damage the cable reel, leading to further hazards when operating the system. Should the cable reel require maintenance or replacement, contact Ultrasonix Technical Support.*

DO NOT *use excessive force when extending or retracting the cord. This can cause the cord to separate from the reel and potentially expose anyone in the vicinity to lethal voltages.*

DO NOT *extend the cable into traffic areas as this can cause a tripping hazard.*

DO NO*T let go of the plug end of the cable while it is rewinding. Guide it gently back into its housing. If left to rewind on its own, the cable's whipping effect may cause injury.*

Cautions:

Always unwind/rewind the power cord by pulling/releasing from behind the system, not from the side.

DO NOT *extend the power cord past the red warning label.*

11.8.2 Power Cord: International (CEP)

When the system is unplugged, the power cord on the International CEP model can be wrapped around the power cable hooks to keep it tidy yet easily accessible.

Figure 11-20: Retractable Power Cord: International (CEP)
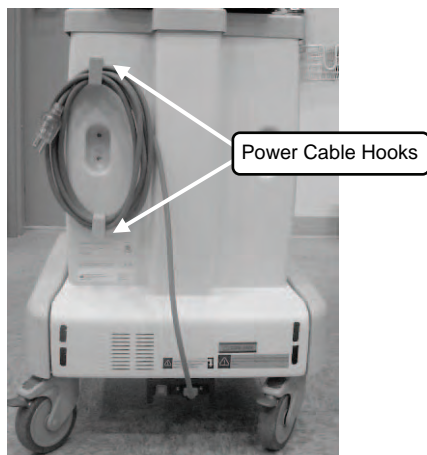
11.8.3 Power Cord: OP, SP, RP and 01

When the system is unplugged, the power cord on the OP, SP, RP and 01 models can be wrapped around the power cable hooks to keep it tidy yet easily accessible.

Figure 11-21: Power Cord: OP, SP, RP and 01
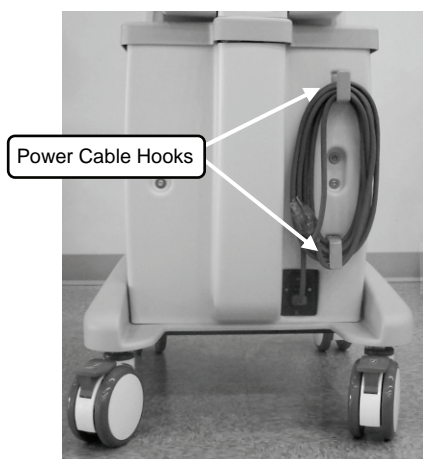
11.9 WIRELESS

The SONIX CEP is delivered with a wireless adapter (for installation on the back of the LCD display) which should be configured during installation (**9.2.2.3 Wireless Settings**).

The wireless option can also be ordered pre-installed on the OP, SP and RP platforms. When purchased at a later date (i.e., for a non-factory installed wireless adapter), refer to **11.9.2 SONIX OP/SP/RP** for connection details.

Caution: *System networking options are intended for use <u>inside</u> your organization's firewall. Organizations that elect to configure/use the networking functionality provided by Ultrasonix are assuming all liabilities and risks associated with that decision.*

Caution: *For details on FCC regulations as they apply to the wireless adapter, refer to the manufacturer's User Guide included with the system.*

Each adapter is delivered with a bracket and two (2) set screws which are used to gently tighten the adapter in the bracket so it cannot move once it is secured to the system.

Note: *Use the set screws to secure the wireless adapter in the bracket <u>after</u> attaching it to the LCD display.*

Figure 11-22: Wireless Bracket with Set Screws

11.9.1 CEP

To attach the bracket to the back of the LCD display, remove the bottom left thumbscrew then reattach it in the same place, making sure to first thread the thumbscrew through the wireless adapter bracket.

Figure 11-23: CEP Wireless Connection
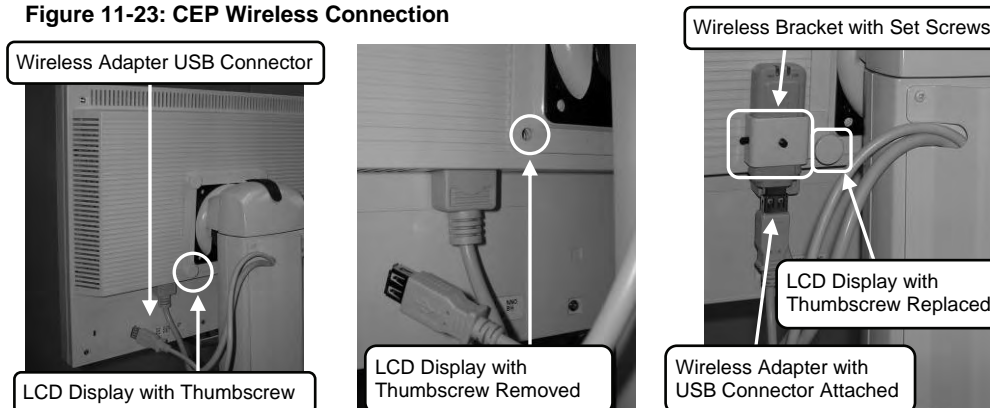
Note: Before making the USB connection, be sure that the cover protecting the wireless adapter's USB connector has been removed.

11.9.2 SONIX OP/SP/RP

To attach the bracket to the back of the LCD display, remove the bottom left thumbscrew, thread the thumbscrew through the wireless adapter bracket and reattach it in the same place. Connect the other end of the cable to a spare USB port on the System Case Connectivity Panel.

Figure 11-24: CEP Wireless Connection
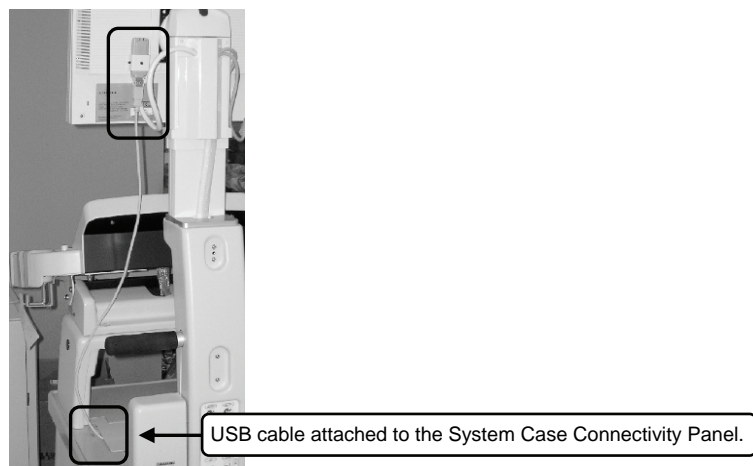
11.10 CONSOLE COVER

The SONIX CEP comes with the console cover installed, however, if a replacement cover is ever purchased, it will have to be installed. Users running an OP, SP, RP or 01 can purchase a console cover which will then need to be installed.

To Install the First Console Cover (OP, SP, RP and 01):

1. Place the console cover over the console, taking the time to align it properly.

2. Gently lift the front section of the cover and remove the paper backing from the Velcro.

3. Press the Velcro into place, taking care to ensure that exposed glue is positioned correctly.

4. Repeat steps 2 and 3 for the top of the console.

5. Make sure the cover sits behind the **TGC SLIDE PODS**.

6. Repeat steps 2 and 3 for the left and, then the right hand side of the console until the console cover is snugly attached.

To Install a Replacement Console Cover:

1. Remove the old console cover.

2. Place the new console cover face down on a table.

3. Taking care not to put any pressure on the plastic itself, gently peel apart all the Velcro fastenings, discarding the excess strip of fastening.

4. Place the console cover over the console – without pressing together any of the Velcro strips.

Note: Be sure to take the time to align the cover properly.

5. Gently smooth all the Velcro fasteners into place, starting across the bottom, then moving to the top and the sides.

6. Make sure the cover sits behind the **TGC SLIDE PODS**.

APPENDIX A: SAFETY

A.1   SAFETY

This section contains important information about the safe use of the SONIX ultrasound system. Much of the information is required by various regulatory agencies and should be read prior to using the SONIX ultrasound system.

A.1.1   ALARA Principle and Output Displays

The Acoustic Power Output Display for the SONIX ultrasound system meets FDA requirements and the guidance standards set out by AIUM and NEMA: "*Standard for Real-Time Display of Thermal and Mechanical Acoustic Output Indices on Diagnostic Ultrasound Equipment*".

The SONIX system provides real-time Mechanical Index (MI) and Thermal Index (TI) acoustic power output display values depending on the transducer and imaging mode.

- *MI*: *Mechanical Index* (2D imaging)
- *TIB*: *Thermal Index – Bone*
- *TIC*: *Thermal Index – Cranial*
- *TIS*: *Thermal Index – Soft Tissue*.

To Change the Index Value Displayed:

1. Press the console **ACOUSTIC POWER** button/dial.

2. Press several times to toggle through the *MI*, *TIS*, *TIC* and *TIB* values available to display depending on the imaging mode.

    *Note: The **MI** and **TI** values are displayed to the right of the image field and are updated as changes – which affect the acoustic power output – are made to the system.*

The ALARA principle, provided by AIUM in *Ultrasound Medical Safety – Implementing ALARA*, guides the ultrasound user on the prudent use of diagnostic ultrasound. Display of the acoustic power output value enables the ultrasound user to better implement the ALARA principle. The ultrasound user can determine the right balance of ultrasound exposure benefits to risks by using acoustic power output levels that are As Low As Reasonably Achievable (ALARA). Without compromising diagnostic quality, patient ultrasound exposure should be kept to a minimum while using the lowest output power possible.

A.2 BASIC PRECAUTIONS

DO NOT operate the SONIX Ultrasound System in the presence of flammable anesthetics.

NEVER allow water or other liquids onto the keyboard, operator console or interior of the system case.

ALWAYS handle transducers with care. Dropping the transducer or allowing it to strike a hard surface can damage the transducer elements and the acoustic lens. Such a collision can also crack the transducer housing and destroy its electrical safety features.

To avoid the risk of electrical shock, before using the transducer, inspect the transducer face, housing and cable. DO NOT use the transducer if the transducer or cable is damaged.

ALWAYS turn off the system before cleaning or changing fuses.

To avoid the risk of electrical shock and fire hazard, inspect the power supply, AC power cord and plug on a regular basis. Ensure they are not damaged.

Follow local governing ordinances and recycling plans regarding disposal or recycling of device components.

Keep the system clean. Carefully follow the procedures described later in this manual for cleaning the system, transducers and cooling fans.

ALWAYS FREEZE the system when not imaging to prevent the transducer from overheating or use the *Auto-Freeze* function to ensure the system freezes after a specified period of inactivity (**9.2.1 System Settings**).

Ensure the monitor and operator console are secure when imaging is being done or when the system is left unattended.

ALWAYS choose the appropriate transducer and parameters for the type of clinical application.

When scanning subjects, always work to use As Low As Reasonably Achievable (ALARA) acoustic scanning energies. Refer to **A.1.1 ALARA Principle and Output Displays** before using the SONIX. Do not use more than the minimum energy necessary to conduct an ultrasound exam. This is especially necessary where fetal and cephalic scans are being conducted.

DO NOT remove panels or covers from the system base.

ALWAYS power the system from a grounded outlet.

Ultrasonix does not recommend the use of transducer covers containing natural rubber latex and talc as these ingredients are known to cause an allergic reaction in some individuals. Refer to "21 CFR 801.437" user labeling for more details on latex use.

Where intracavity transducers are used in clinical applications of semi- critical nature (e.g., trans-rectal, trans-vaginal, trans-esophageal), any covers used will be STERILE and have received regulatory clearance for use.

⚠ *Warning: The SONIX ultrasound system may produce physiological effects of ultrasound which may cause danger to the patient and operator.*

Caution: Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous exposure to ultrasonic energy.

Caution: Contact Ultrasonix if repairs are needed on the system. Repairs and component maintenance must be carried out by Ultrasonix authorized personnel only.

A.3   UPS PRECAUTIONS (CEP)

⚠️ *Warnings:*

NEVER *let liquid from* <u>*any*</u> *source enter the UPS. Failure to do this may result in accidental* ***shorts, shocks or electrocutions****.*

DO NOT attempt to service this product yourself*. Attempting to open the UPS may cause exposure to lethal voltages within the unit even when it is apparently not operating and the input wiring is disconnected from the electrical source. Should the UPS require maintenance or replacement, only qualified Ultrasonix Service Technicians may perform service as detailed in the Service Manual.*

For UPS and battery service issues, contact Ultrasonix Technical Support.

A.4   SYMBOL DEFINITIONS

Table A-1: SONIX System Symbols

Symbol	Location	Meaning
∿	On the serial plate that indicates the serial number and electrical rating.	Alternating current.
🧍	On transducers.	Patient applied part meets the isolation requirements for type B applied part.
🧍	On inputs of ECG module.	Patient applied part meets the isolation requirements for type BF applied part.
⚡	On the warning/caution labels (rear of system).	Caution: Dangerous Voltages. Do not remove cover or back. Refer servicing to qualified service personnel.
⚠️	On the warning/caution labels.	Attention: Consult accompanying documents.

A.5 ELECTRICAL SAFETY REQUIREMENTS

A.5.1 SONIX OP/SP/RP/01 and CEP

The SONIX Ultrasound System is classified in accordance with the IEC 60601-1, the standard for Medical Electrical Equipment as follows.

Table A-2: SONIX System Electrical Safety

Standard	IEC 60601-1
Type of protection against electrical shock	Class I
Degree of protection against electrical shock	Type B
Degree of protection against ingress of water	Ordinary

⚠ *Warning: Accessory equipment connected to the analog and digital interfaces must be certified according to the respective IEC standards (IEC 60950 for data processing equipment and IEC 60601-1 for medical equipment). Furthermore, all configurations shall comply with the system standard IEC 60601-1. Any person who connects additional equipment to the signal input part or signal output part configures a medical system and is therefore responsible for ensuring that the system complies with the requirements of the system standard IEC 60601-1-1. If you have any additional questions, contact Ultrasonix Technical Support.*

A.5.2 SONIX CEP System

⚠ *Warning: If the SONIX CEP utility supply voltage exceeds the acceptable range, the internal circuitry protection feature will not allow the system to power up nor will it allow the battery to charge.*

The system voltage setting is configured in the factory. Do **not** change this setting in the field.

It is the user's responsibility to ensure the SONIX CEP is used only under the electrical conditions dictated by Ultrasonix Medical Corp. Failure to comply with these conditions may result in damage to the system which is not covered by the Ultrasonix warranty.

Caution: For users running the 120V system, always ensure the utility supply voltage is 120 VAC nominal.

For users running the 220V–240V system, always ensure the utility supply voltage is 220-240 VAC nominal.

A.5.3 Additional Hardware

Table A-3: Barcode Reader Electrical Safety

UL (Underwriter's Laboratory)	UL listed for US and Canada UL 60950 C22.2 No. 60950
Laser Class	CDRH and IEC Laser Class 1 – In accordance with IEC 60825-1:1993 + A1:1997 + A22001 Class 1

Note: For details on the wireless adapter, refer to the manufacturer's User Guide included with the system.

A.6 EMC (ELECTRO-MAGNETIC COMPATIBILITY) REQUIREMENTS

A.6.1 SONIX OP/SP/RP/01 and CEP

The SONIX Ultrasound System has special precautions regarding EMC. Always install and use according to the EMC information provided in the relevant Service Manual.

Portable and mobile RF communications equipment can affect the SONIX Ultrasound System.

Transducer cables have to be raised above the ground during scanning.

Warning: The use of accessories, transducers and cables other than those specified by Ultrasonix may result in increased emissions or decreased immunity of the SONIX.

A.6.2 Additional Hardware

Table A-4: Barcode Reader

Electro-Magnetic Compatibility	Class B: FCC Part 15 ICES-003 European Union Directive 89/336/EEC

Note: For details on the wireless adapter, refer to the manufacturer's User Guide included with the system.

A.7 ENVIRONMENTAL CONDITIONS

A.7.1 SONIX OP/SP/RP/01

Table A-5: SONIX OP/SP/RP/01 System Operating Environment

Ambient Operational Temperature	61° to 95° F (16° to 35° C)
Internal Operational Humidity	10% to 80% (non-condensing)
Storage Conditions	-4° to 140° F (-20° to 60° C)
Storage Humidity	10% to 90% (non-condensing)

A.7.2 SONIX CEP

Table A-6: SONIX CEP Operating Environment

Ambient Operational Temperature	61° to 95° F (16° to 35° C)
Internal Operational Temperature	61° to 131° F (16° to 55° C)
Internal Operational Humidity	10% to 80% (non-condensing)
Storage Conditions	+5° to +122° F (-15° to +50° C)
Storage Humidity	10% to 90% (non-condensing)

⚠ *Warning: Operate in an indoor environment only, free from moisture, flammable liquids, gases, corrosive substances, strong electrical or magnetic fields and equipment that generates high frequency waves.*

Ultrasonix cannot guarantee the proper performance of the SONIX CEP if used in the above-listed conditions.

A.7.3 Additional Hardware

Table A-7: Barcode Reader

Operating Temperature	32° to 104° F (0° to 40° C)
Storage Temperature	-40° to 140° F (-40° to 60° C)
Humidity	5% to 95% relative humidity, non-condensing
Light Levels	Up to 4842 Lux (footcandles)
Shock	Designed to withstand 1.5 m (5') drops
Contaminants	Sealed to resist airborne particulate contaminants
Ventilation	None required

Table A-8: Wireless Adapters

Operating Temperature	32° to 104° F (0° to 40° C)
Storage Temperature	-4° to 158° F (-20° to 70° C)
Humidity	80% maximum, non-condensing

Note: For more details on the wireless adapter, refer to the manufacturer's User Guide included with the system.

A.8 LIMITING TRANSDUCER SURFACE HEATING

Ultrasonix has ensured that the transducer surface temperature in still air does not exceed 50°C and applied on tissue does not exceed 43°C.

Surface heating may be created by transmitting energy on the same area of a transducer at a high rate. This heating may occur, for example, during Pulsed Wave Doppler or Color Doppler imaging. The only SONIX transducer where this surface heating issue could be an issue is the EC9-5/10 transducer. To limit the surface heating, SONIX software conditions are used to prevent the same area on the transducer from being excited to a rate of less than 100us. Thorough testing has shown no noticeable EC9-5/10 transducer surface heating. For added security the SONIX system high voltage excitation power circuit contains "Polyswitches" that ensure no more than a specified current can be drawn from these high-voltages circuits.

A.9 LATEX

Ultrasonix does not recommend the use of transducer covers containing natural rubber latex and talc as these ingredients are known to cause an allergic reaction in some individuals. Refer to "21 CFR 801.437" user labeling for more details on latex use.

APPENDIX B: SYSTEM SPECIFICATIONS

Note: Optional features may not be available on all system configurations. Ultrasonix Medical Corporation reserves the right to alter system specifications at any time.

✔ – Standard   ♦ – Optional   ⊘ – Not Applicable

Table B-1: SONIX Series System Specifications

	OP/CEP[1]	SP	RP	01
CLINICAL APPLICATIONS				
Abdominal	✔	✔	✔	✔
Vascular	✔	✔	✔	✔
Small Parts/Breast	✔	✔	✔	✔
Obstetrical/Gynecological/Fertility[2]	✔[2]	✔[2]	✔[2]	✔[2]
Superficial	✔	✔	✔	✔
Musculoskeletal	✔	✔	✔	✔
Prostate	✔	✔	✔	✔
Basic Adult Cardiac	✔	✔	✔	✔
Vascular Access	✔	✔	✔	✔
Nerve Block	✔	✔	✔	✔
IMAGING MODES				
B, Dual B, Quad B	✔	✔	✔	✔
B/M-Mode	✔	✔	✔	✔
Color, Power and Directional Power Doppler	✔	✔	✔	✔
Split B/Color Mode	✔	✔	✔	✔
Pulsed Wave Doppler (mono and duplex)	✔	✔	✔	✔
Triplex Mode	✔	✔	✔	✔
Extended Pulse Imaging (EPI)	♦	♦	♦	♦
Elastography[3]	♦[3]	♦[3]	♦[3]	♦[3]
Clarity (Adaptive Image Adjustment)	✔	✔	✔	✔
Real-time Spatial Compound Imaging	✔	✔	✔	✔
Tissue Harmonic Imaging (THI)	✔	✔	✔	✔
Trapezoidal Imaging (linear transducers)	✔	✔	✔	✔
Tint (Chroma)	✔	✔	✔	✔
Panoramic Imaging	✔	✔	✔	✔
Freehand 3D Imaging	♦	✔	✔	♦
Standard 3D/4D Imaging	⊘	✔	✔	⊘
Advanced 3D/4D Imaging	⊘	✔	✔	⊘
MEASUREMENTS AND ANALYSIS				
Obstetrical calculation and report package	✔	✔	✔	✔
Gyn/Fertility calculation and report package (with PracticeHwy compatibility)	✔	✔	✔	✔
Basic Cardiac calculation and report package	✔	✔	✔	✔
Vascular calculation and report package	✔	✔	✔	✔
Use of HTML-based reports and tables	✔	✔	✔	✔
Third party reporting package compatibility 　　PracticeHwy 　　Sonultra 　　Digisonics	 ✔ ✔ ✔	 ✔ ✔ ✔	 ✔ ✔ ✔	 ⊘ ⊘ ⊘

	OP/CEP[1]	SP	RP	01
BROADBAND TRANSDUCERS				
PA4-2/20 broadband (2-4MHz), 20mm, 75" (1m90) cable, phased array	♦	♦	♦	♦
4DC6-3/40 broadband (3-6MHz), 40mm radius, 75" (1m90) cable, 4D motor-driven electronic curved array	⊘	⊘	⊘	⊘
4DC7-3/40 broadband (3-7 MHz) 40 mm radius, 75" (1mm90) cable, 4D motor-driven electronic curved array	⊘	♦	♦	⊘
MC9-5/12 broadband (4-9MHz), 12mm radius, 75" (1m90) cable, microconvex	♦	♦	♦	♦
C5-2/60 broadband (2-5MHz), 60mm radius, 75" (1m90) cable, curved array	♦	♦	♦	♦
C7-3/50 broadband (3-7 MHz), 50mm radius, 75" (1m90) cable, curved array	♦	♦	♦	♦
EC9-5/10 broadband (5-9MHz), 10mm radius, 75" (1m90) cable, endocavity microconvex array	♦	♦	♦	♦
L-9-4/38 broadband (4-9 MHz), 38mm, 75" (1m90) cable, linear array	♦	♦	♦	♦
L14-5/38 broadband (5-14MHz), 38mm, 75" (1m90) cable, linear array	♦	♦	♦	♦
L14-5W/60 broadband (5-14MHz), 60mm, 75" (1m90) cable, wide linear array	♦	♦	♦	♦
PHYSICAL CHARACTERISTICS				
Footprint: 53cm x 71cm (21" x 28")	✓	✓	✓	✓
Height (with adjustable 17" LCD display): 142 – 155 cm (56" – 61")	✓	✓	✓	⊘
Height (with adjustable 15" LCD display): 137 – 150 cm (54" – 59")	⊘	⊘	⊘	✓
Weight: 75 kg (166 lbs)	✓/⊘	✓	✓	✓
Weight 108 kg (238 lbs)	⊘/✓	⊘	⊘	⊘
ErgoMetrics console	⊘	✓	✓	⊘
TFT (Active Matrix) 17" LCD display	✓	✓	✓	⊘
TFT (Active Matrix) 15" LCD display	⊘	⊘	⊘	✓
Transducer connectors	3	3	3	3
Peripherals Bay	✓	✓	✓	✓
SYSTEM PARAMETERS				
Digital broadband channels	512/1024	1024	1024	512
Maximum frames/sec	223	223	>500	223
Maximum Display Size	1024x768	1024x768	1600x1200	1024x768
Dynamic range (Internal)	262dB	262dB	262dB	262dB
Dynamic range (Display)	45–105dB	45–105dB	45–105dB	45–105dB
STORAGE AND CONNECTIVITY				
DICOM service classes (Print/Store/Worklist)	✓	✓	✓	✓
Hard-drive storage	✓	✓	✓	✓
Still image storage (PNG, JPEG, , BMP, GIF, DCM, DCM JPEG, DCM JPEG lossless)	✓	✓	✓	✓
CINE loop storage & trim (AVI)	✓	✓	✓	✓
Front-load integrated CD and DVD-Writer	✓	✓	✓	✓
Front-load USB 2.0 ports (2)	✓	✓	✓	✓
Built-in Firewall	✓	✓	✓	✓
Video output – Composite Color	✓	✓	✓	✓
Video output – Composite B&W	✓	✓	✓	✓
Video output – Separate VGA output	✓	✓	✓	✓
Video output – S-Video out	✓	✓	✓	✓
Video output – Digital video DVI output	✓	✓	✓	✓
Video input – S-Video	✓	✓	✓	✓
Serial connector	✓	✓	✓	✓
Parallel and USB standard inkjet or laser printer output	✓	✓	✓	✓
Integrated modem and Network connection	✓	✓	✓	✓
Wireless networking	♦/✓	♦	♦	⊘
Streaming video (SONIX Live)	♦/✓	♦	♦	⊘

	OP/CEP[1]	SP	RP	01
PERIPHERALS				
Color Video Printer	♦	♦	♦	♦
B/W Video Printer	♦	♦	♦	♦
VHS Video Cassette recorder	♦	♦	♦	♦
Footswitch (User-supplied)				
Barcode Reader (Pre-programmed to support the following barcode symbologies: UPC, EAN, Interleaved 2 of 5, Codabar, Code 3 of 9, Code 93, Code 128)	♦/✓	♦	♦	◌
Wireless Adapter (802.11b/g compatible)	♦/✓	♦	♦	◌
Uninterruptible Power Supply (UPS)				

Power Cord
    Canada and USA: Medical Grade Retractable Power Cord/Cable Reel, 9' (2.75m)
    Medical Grade, Country-Specific Power Cord, 15' (4.6m)
	◌/✓
	✓/✓
		◌
		✓
			◌
			✓
				◌
				✓

Console cover	♦/✓	♦	♦	♦
CINE MEMORY				
Up to 4 minutes of data (Transducer/sector size dependant)	✓	✓	✓	✓
Total available memory	>2048 fr	>2048 fr	>2048 fr	>2048 fr
USER INTERFACE				

QSONIX
    Quick Exam Start-up
    Operator Console Tutorial
    Online Support Access[4]
	✓	✓	✓	✓

Universal language option	✓	✓	✓	✓
TGC, B-Mode Gain	✓	✓	✓	✓
Color Gain, Spectral Gain	✓	✓	✓	✓
Depth selection from 2 to 24 cm (transducer dependent)	✓	✓	✓	✓
Focus (up to 5 transmit zones with span)	✓	✓	✓	✓
Focus (up to 10 transmit zones with span)	✓	✓	✓	✓
Persistence (B-Mode)	✓	✓	✓	✓
Persistence (Color and Spectral Doppler)	✓	✓	✓	✓
Acoustic Power	✓	✓	✓	✓
Dynamic Range	✓	✓	✓	✓
Sector Size	✓	✓	✓	✓
Zoom	✓	✓	✓	✓
Color Maps	✓	✓	✓	✓
Line density (B-Mode)	✓	✓	✓	✓
Line density (Color and Spectral Doppler)	✓	✓	✓	✓
Steer (B-Mode)	✓	✓	✓	✓
Steer (Color and Spectral Doppler)	✓	✓	✓	✓
Baseline, PRF (Color and Spectral Doppler)	✓	✓	✓	✓
Display method (scroll or moving bar, Spectral Doppler, B/M)	✓	✓	✓	✓
Sweep Speed (M-Mode, PW)	✓	✓	✓	✓
Automatic optimization key (Spectral Doppler)	✓	✓	✓	✓
Easy-to-use Interface	✓	✓	✓	✓
LCD touch screen command centre	✓	✓	✓	✓
User-programmable PRINT keys	✓	✓	✓	✓
Text, Annotations, Pictograms	✓	✓	✓	✓
PRESETS				
Default presets	✓	✓	✓	✓
User-defined presets	✓	✓	✓	✓

	OP/CEP[1]	SP	RP	01
REMOTE SUPPORT[4]				
Real-time live chat support	✓	✓	✓	✓
Ultrasonix remote system diagnostic capability	✓	✓	✓	✓
1-Step Software upgrades (CD-ROM or Internet)	✓	✓	✓	✓
NON-CLINICAL APPLICATIONS (FOR INVESTIGATIONAL USE ONLY)				
Research Package	◌	◌	♦	◌
Pre-beamforming realtime acquisition software	◌	◌	♦	◌
RF mode	◌	◌	♦	◌
SDK for Client Applications	◌	◌	♦	◌

1 Refers to systems running OP software on a CEP hardware platform.
   Where there is a single icon marking the column (e.g., ✓), the icon applies to both the OP and CEP platforms.
   Where there are two icons separated by a slash (e.g., (♦/✓), the first refers to the OP platform and the second to the CEP platform.

2 Ultrasonix Medical Corporation is not responsible for misdiagnosis from customized measurements.

3 Not available in all markets. Consult your dealer or Ultrasonix Technical Support to determine availability in your area.

4 Where available. Requires Internet connection and ISP.

APPENDIX C: TRANSDUCER SPECIFICATIONS

C.1 TRANSDUCER SPECIFICATIONS

Table C-1: Transducer Specifications

Transducer Name	Type	Applications
PA4-2/20	Phased Array	Abdomen, Cardiac (Adult), OB/Gyn
4DC6-3/40	3D Abdominal	Obstetrics, Abdomen, Gyn
4DC7-3/40	3D Abdominal	Obstetrics, Abdomen, Gyn
4DEC9-5/10	3D Endocavity	Transvaginal, Transrectal
EC9-5/10	Endocavity	Transvaginal, Transrectal
C5-2/60	Convex	Abdomen, Obstetrics, Gyn/Fertility
C7-3/50	Convex	Abdomen, Obstetrics, Gyn/Fertility
MC9-4/12	Microconvex	Nerve Block, Vascular Access, Pediatric, Abdomen
L9-4/38	Linear	Breast, Small parts, Vascular, Vein Care
L14-5/38	Linear	Small parts, Superficial, Msk, Vascular, Superficial Abd
L14-5W/60	Wide Linear	Small parts, Superficial, Msk, Vascular, Superficial Abd

C.2 MEASUREMENT ACCURACY

Table C-2: Transducers Used for Advanced 3D/4D Measurement Accuracy Tests

Transducer Name	Type	Applications
4DC7-3/40	3D Abdominal	Obstetrics, Abdomen, Gyn
4DEC9-5/10	3D Endocavity	Transvaginal, Transrectal

Table C-3: Advanced 3D/4D Measurement Accuracy Test Results

Test Parameter	Probe	System Error		Test Method	Estimated uncertainty between the Trials
		Relative Error (Trial 1)	Relative Error (Trial 2)		
Linear Distance	3D Abdominal	± 0.50%	± 1.00%	Multipurpose Phantom^	
	3D Endocavity	± 0.50%	±1.00%	Multipurpose Phantom^	
	Max. Value Among Probes	± 0.50%	± 1.00%		± 0.50%
Freeline Distance	3D Abdominal	± 1.00%	± 2.00%	Multipurpose Phantom^	
	3D Endocavity	± 1.50%	± 1.50%	Multipurpose Phantom^	
	Max. Value Among Probes	± 1.50%	± 2.00%		± 0.50%
Angle 2 Lines	3D Abdominal	± 0.33%	± 0.90%	Multipurpose Phantom^	
	3D Endocavity	± 1.30%	± 0.90%	Multipurpose Phantom^	
	Max. Value Among Probes	± 1.30%	± 0.90%		± 0.40 %
Angle 3 Points	3D Abdominal	± 0.81%	± 1.90%	Multipurpose Phantom^	
	3D Endocavity	± 0.83%	± 0.93%	Multipurpose Phantom^	
	Max. Value Among Probes	± 0.83%	± 1.90%		± 1.07%
Area Ellipse	3D Abdominal	± 1.89%	± 1.89%	Multipurpose Phantom^	
	3D Endocavity	± 2.30%	± 2.20%	Multipurpose Phantom^	
	Max. Value Among Probes	± 2.30%	± 2.20%		± 0.10%
Area Ellipse	3D Abdominal	± 1.89%	± 1.89%	Multipurpose Phantom^	
	3D Endocavity	± 2.2 %	± 2.35%	Multipurpose Phantom^	
	Max. Value Among Probes	± 2.20%	± 2.35%		± 0.15%
Stenosis % Area	3D Abdominal	± 1.91%	± 1.89%	Multipurpose Phantom^	
	3D Endocavity	± 2.30 %	± 2.40%	Multipurpose Phantom^	
	Max. Value Among Probes	± 2.30%	± 2.40%		± 0.10%

^   Pin targets were located between a depth of 2 to 4 cm in the multipurpose phantom.

Table C-4: Advanced 3D/4D Measurement Accuracy Field Definitions

Field	Definition
Relative Error Trial 1	Test was performed in *Advanced 3D/4D* mode so the ROI filled as much of the measurement screen.
Relative Error Trial 2	Test was performed in *Advanced 3D/4D* mode so the ROI filled as much of the measurement screen.
Max. Value Among Probes	Maximum error or range among all probes (except in the lower range where the minimum values were used) was chosen for presentation.
Estimated Uncertainty	Difference between the Trial 1 and Trial 2 errors. Indicates the possible uncertainty when taking measurements.

Table C-5: Measurement Accuracy Test Results

Test Parameter	Probe	System Error		Range		Test Method	Estimated uncertainty between the Best and Worst System Settings
		Best System Setting	Worst System Setting	Min	Max		
2D MEASUREMENT TEST							
Axial Distance	Linear	± 0.55%	± 1.00%	0.07mm	90.20 mm	Multipurpose Phantom***	
	Convex	± 0.50%	± 0.20%	0.14mm	240.98 mm	Multipurpose Phantom***	
	Phased Array	± 0.45%	± 0.90%	0.12mm	240.33 mm	Multipurpose Phantom***	
	Max. Value Among Probes	± 0.55%	± 1.00%	0.07mm	240.98 mm	Multipurpose Phantom***	± .45% {1%}
Lateral Distance	Linear §	± 1.10%	± 1.07%	0.07mm	84.26 mm	Multipurpose Phantom***	
	Convex §	± 1.30%	± 1.20%	0.14mm	383.02 mm	Multipurpose Phantom***	
	Phased Array #	± 2.10%	± 1.77%	0.12mm	334.11 mm	Multipurpose Phantom***	
	Max. Value Among Probes	± 2.10%	± 1.77%	0.07mm	383.02 mm	Multipurpose Phantom***	± 0.33% {1%}
Diagonal Distance	Linear ^	± 1.79%	± 0.45%	0.10mm	97.69 mm	Multipurpose Phantom***	
	Convex ^	± 0.89%	± 2.23%	0.21mm	282.12 mm	Multipurpose Phantom***	
	Phased Array^^	± 1.50%	± 1.53%	0.16 mm	47.91 mm	Multipurpose Phantom***	
	Max. Value Among Probes	± 1.79%	± 2.23%	0.10 mm	282.12 mm	Multipurpose Phantom***	± 0.44% {1%}
Area (Ellipse)	Linear	± 1.66%	± 2.08%	0.00 cm^2	114.01 cm^2	Multipurpose Phantom***	
	Convex	± 1.80%	± 1.40%	0.00 cm^2	836.3 cm^24	Multipurpose Phantom***	
	Phased Array	± 2.56%	± 2.69%	0.00 cm^2	717.80 cm^2	Multipurpose Phantom***	
	Max. Value Among Probes	± 2.56%	± 2.69%	0.00 cm^2	836.34 cm^2	Multipurpose Phantom***	± 0.13% {1%}
Area (Continual Trace)	Linear	± 1.66%	± 2.08%	1.76 cm^2	145.64 cm^2	Multipurpose Phantom***	
	Convex	± 1.80%	± 1.40%	0.00 cm^2	1084.84 cm^2	Multipurpose Phantom***	
	Phased Array	± 2.56%	± 2.69%	0.00 cm^2	925.54 cm^2	Multipurpose Phantom***	
	Max. Value Among Probes	± 2.56%	± 2.69%	0.00 cm^2	1084.84 cm^2	Multipurpose Phantom***	± 0.13% {1%}
Circumference (Ellipse)	Linear	± 1.56%	± 1.51%	1.47 mm	384.89 mm	Multipurpose Phantom***	
	Convex	± 1.84%	± 1.70%	2.95 mm	1039.46 mm	Multipurpose Phantom***	
	Phased Array	± 2.97%	± 2.50%	2.34 mm	962.29 mm	Multipurpose Phantom***	
	Max. Value Among Probes	± 2.97%	± 2.50%	1.47 mm	1039.46 mm	Multipurpose Phantom***	± 0.47% {1%}
Circumference (Continual Trace)	Linear	± 1.56%	± 1.51%	1.76 mm	483.98 mm	Multipurpose Phantom***	
	Convex	± 1.84%	± 1.70%	1.91 mm	1326.17 mm	Multipurpose Phantom***	
	Phased Array	± 2.97%	± 2.50%	1.86 mm	1225.97 mm	Multipurpose Phantom***	
	Max. Value Among Probes	± 2.97%	± 2.50%	1.76 mm	1326.17 mm	Multipurpose Phantom***	± 0.47% {1%}

M-MODE TEST

Heart Rate (HR)	Linear	± 1.65%	± 2.13%	8.58 bpm	15000.00 bpm Ultrasonix Test Equipment	
	Convex	± 1.08%	± 4.81%	8.58 bpm	15000.00 bpm Ultrasonix Test Equipment	
	Phased Array	± 1.88%	± 3.40%	8.58 bpm	15000.00 bpm Ultrasonix Test Equipment	
	Max. Value Among Probes	± 1.88%	± 4.81%	8.58 bpm	15000.00 bpm Ultrasonix Test Equipment	± 2.93% {3%}
Distance (D) Linear	Linear	± 0.65%	± 0.15%	0.04 mm	88.70 mm Multipurpose Phantom***	
	Convex	± 2.15%	± 2.15%	0.04 mm	237.98 mm Multipurpose Phantom***	
	Phased Array	± 2.55%	± 2.00%	0.04 mm	237.98 mm Multipurpose Phantom***	
	Max. Value Among Probes	± 2.55%	± 2.15%	0.04 mm	237.98 mm Multipurpose Phantom***	± 0.40% {1%}
Time (Tm)	Linear	± 0.00%	± 4.00%	0.00 s	7.00 s Ultrasonix Test Equipment	
	Convex	± 1.00%	± 4.00%	0.00 s	7.00 s Ultrasonix Test Equipment	
	Phased Array	± 3.00%	± 4.00%	0.00 s	7.00 s Ultrasonix Test Equipment	
	Max. Value Among Probes	± 3.00%	± 4.00%	0.00 s	7.00 s Ultrasonix Test Equipment	± 1.00% {1%}

PW MODE TEST

Velocity Calipers (V)	Linear	± 9.63%	± 9.31%	0.00 cm/s	240.63 cm/s **Doppler Phantom*	
	Convex	± 5.18%	± 2.74%	0.00 cm/s	481.25 cm/s **Doppler Phantom*	
	Phased Array	± 2.59%	± 6.62%	0.00 cm/s	481.25 cm/s **Doppler Phantom*	
	Max. Value Among Probes	± 9.63%	± 9.31%	0.00 cm/s	481.25 cm/s **Doppler Phantom*	± 0.32% {1%}
Heart Rate Linear	Linear	± 0.15%	± 0.43%	7.92 bpm	15000.00 bpm Doppler Phantom*	
	Convex	± 1.33%	± 2.13%	7.92 bpm	15000.00 pbm Doppler Phantom*	
	Phased Array	± 0.47%	± 0.30%	7.92 bpm	15000.00 bpm Doppler Phantom*	
	Max. Value Among Probes	± 1.33%	± 2.13%	7.92 bpm	15000.00 bpm Doppler Phantom*	± 0.80% {1%}
Time (Tm)	Linear	± 0.00%	± 0.00%	0.00 s	7.57 s Doppler Phantom*	
	Convex	± 2.00%	± 2.00%	0.00 s	7.57 s Doppler Phantom*	
	Phased Array	± 1.00%	± 1.00%	0.00 s	7.57 s Doppler Phantom*	
	Max. Value Among Probes	± 2.00%	± 2.00%	0.00 s	7.57 s Doppler Phantom*	± 0.00% {0%}

*   Optmizer, RMI 1425 A, Doppler Phantom.
**   The errors of the PW velocity measurements are based on the reference measured value obtained from the GE Voluson 730 PRO with Probe: RAB 4-BP.
***   Gammex, Model 403 GS LE, Multipurpose Phantom.
§   Horizontal Pins were located at a depth of 2cm in the multipurpose phantom.
#   Horizontal Pins were located at a depth of 12cm in the multipurpose phantom.
^   Pin targets were located between a depth of 2 to 4 cm in the multipurpose phantom.
^^   Pin targets located between a depth of 10 and 12 cm in the multipurpose phantom.
{ }   The estimated uncertainty that is rounded towards infinity.

Table C-6: Field Definitions

Field	Definition
Best System Setting	Test was performed so the ROI filled as much of the measurement screen as possible.
Worst System Setting	Test was performed using the maximum setting of the measurement axis.
Max. Value Among Probes	Maximum error or range among all probes (except in the lower range where the minimum values were used) was chosen for presentation.
Estimated Uncertainty	Difference between the Worst Setting and Best Setting errors. Indicates the possible uncertainty when taking measurements using different scales of the axis.

Table C-7: Transducers Used for Measurement Accuracy Tests

Transducer Name	Type	Applications
L14-5/38	Linear	Small parts, Superficial, Msk, Vascular, Superficial Abd
C5-2/60	Convex	Abdomen, Obstetrics, Gyn/Fertility
PA4-2/20	Phased Array	Abdomen, Cardiac (Adult), OB/Gyn

C.3 ACOUSTIC OUTPUT REPORTING TABLES

Below are copies of the **Acoustic Output Reporting Tables for Track 3** for all transducers and all modes (provide data where global maximum displayed index exceeds 1.0)

The following notes apply to **ALL** Acoustic Output Reporting Tables for **ALL** transducers/modes:

a) This index is not required for this operating mode; see section 4.1.3.1 of the *Standard for real-time display of thermal and mechanical acoustic output indices on diagnostic ultrasound equipment* (AIUM/NEMA 1998b)

b) This probe is not intended for trans-cranial or neonatal cephalic uses.

c) This formulation for TIS is less than that for an alternate formulation in this mode.

\# No data are reported for this operating condition since the global maximum index value is not reported for the reason listed.

Table C-8: Transducer Model PA4-2/20 (Operating Mode: B)

Index Label			MI	TIS			TIB	TIC
				scan	non-scan		non-scan	
					$A_{aprt} \leq 1$	$A_{aprt}+$		
Global Maximum Index Value			0.62	(a)	(a)	(a)	(a)	(a)
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	0.88					
	W_o	[mW]		(a)	(a)		(a)	(a)
	min of $[W_{.3}(z_1) : I_{TA.3}(z_1)]$	[mW]				(a)		
	Z_1	[cm]				(a)		
	z_{bp}	[cm]				(a)		
	z_{sp}	[cm]	4.47				(a)	
	$d_{eq}(z_{sp})$	[cm]					(a)	
	f_c	[MHz]	2.00	(a)	(a)	(a)	(a)	(a)
	Dim of A_{aprt} — Elev. (Y) [cm]			(a)	(a)	(a)	(a)	(a)
	Dim of A_{aprt} — Azi. (X) [cm]			(a)	(a)	(a)	(a)	(a)
Other Information	PD	[μsec]	0.67					
	PRF	[Hz]	22					
	$p_r@PII_{max}$	[MPa]	1.19					
	$d_{eq}@PII_{max}$	[cm]						
	Focal Length	[cm]		(a)	(a)	(a)		(a)
	$I_{PA.3}@MI_{max}$	[W/cm^2]	32					
Operating Control Conditions	Control 1							
	Control 2							
	Control 3							
	Control n							

ISPTA.3 [mW/cm2] = 0

Table C-9: Transducer Model PA4-2/20 (Operating Mode: Color Flow)

Index Label			MI	TIS			TIB	TIC
				scan	non-scan		non-scan	
					$A_{aprt} \leq 1$	$A_{aprt}+$		
Global Maximum Index Value			0.44	0.87	(c)	(c)	(a)	1.34
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	0.62					
	W_o	[mW]		91	(c)		(a)	92
	min of $[W_{.3}(z_1) : I_{TA.3}(z_1)]$	[mW]				(c)		
	Z_1	[cm]				(c)		
	z_{bp}	[cm]				(c)		
	z_{sp}	[cm]	4.96				(a)	
	$d_{eq}(z_{sp})$	[cm]					(a)	
	f_c	[MHz]	2.00	2.00	(c)	(c)	(a)	2.00
	Dim of A_{aprt} — X [cm]			1.20	(c)	(c)	(a)	1.20
	Dim of A_{aprt} — Y [cm]			1.00	(c)	(c)	(a)	1.92
Other Information	PD	[μsec]	0.82					
	PRF	[Hz]	171					
	$p_r@PII_{max}$	[MPa]	0.87					
	$d_{eq}@PII_{max}$	[cm]						
	Focal Length	[cm]		5.03	(c)	(c)		5.03
	$I_{PA.3}@MI_{max}$	[W/cm^2]	14					
Operating Control Conditions	Control 1							
	Control 2							
	Control 3							
	Control n							

ISPTA.3 [mW/cm2] = 1.91

Table C-10: Transducer Model PA4-2/20 (Operating Mode: M)

Index Label			MI	TIS scan	TIS non-scan $A_{aprt}\leq1$	TIS non-scan $A_{aprt}H$	TIB non-scan	TIC
Global Maximum Index Value			0.56	0.08	(c)	(c)	(c)	0.12
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	0.80					
	W_o	[mW]		8	(c)		(c)	8
	min of [$W_{.3}(z_1)$: $I_{TA.3}(z_1)$]	[mW]				(c)		
	z_1	[cm]				(c)		
	z_{bp}	[cm]				(c)		
	z_{sp}	[cm]	4.47				(c)	
	$d_{eq}(z_{sp})$	[cm]					(c)	
	f_c	[MHz]	2.00	2.00	(c)	(c)	(c)	2.00
	Dim of A_{aprt} Elev. (Y)	[cm]		1.20	(c)	(c)	(c)	1.20
	Dim of A_{aprt} Azi. (X)	[cm]		1.00	(c)	(c)	(c)	1.92
Other Information	PD	[µsec]	0.79					
	PRF	[Hz]	276					
	p_r@PII_{max}	[MPa]	1.09					
	d_{eq}@PII_{max}	[cm]						
	Focal Length	[cm]		5.03	(c)	(c)		5.03
	$I_{PA.3}$@MI_{max}	[W/cm^2]	23					
Operating Control Conditions	Control 1							
	Control 2							
	Control 3							
	Control n							

ISPTA.3 [mW/cm2] = 5.07

Table C-11: Transducer Model PA4-2/20 (Operating Mode: PW Doppler)

Index Label			MI	TIS scan	TIS non-scan $A_{aprt}\leq1$	TIS non-scan $A_{aprt}+$	TIB non-scan	TIC
Global Maximum Index Value			0.23	(c)	(c)	0.52	1.10	2.41
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	0.32					
	W_o	[mW]		(c)	(c)		109	109
	min of [$W_{.3}(z_1)$: $I_{TA.3}(z_1)$]	[mW]				109.00		
	z_1	[cm]				4.90		
	z_{bp}	[cm]				1.70		
	z_{sp}	[cm]	4.47				4.09	
	$d_{eq}(z_{sp})$	[cm]					1.13	
	f_c	[MHz]	2.00	(c)	(c)	2.00	2.00	2.00
	Dim of A_{aprt} Elev. (Y)	[cm]		(c)	(c)	1.20	12.00	1.20
	Dim of A_{aprt} Azi. (X)	[cm]		(c)	(c)	0.84	0.84	0.84
Other Information	PD	[µsec]	2.55					
	PRF	[Hz]	1250					
	p_r@PII_{max}	[MPa]	0.44					
	d_{eq}@PII_{max}	[cm]						
	Focal Length	[cm]		(c)	(c)	4.90		4.90
	$I_{PA.3}$@MI_{max}	[W/cm^2]	3					
Operating Control Conditions	Control 1							
	Control 2							
	Control 3							
	Control n							

ISPTA.3 [mW/cm2] = 32.29

Table C-12: Transducer Model 4DC6-3/40 (Operating Mode: B)

Index Label			MI	TIS			TIB	TIC
				scan	non-scan		non-scan	
					$A_{aprt} \leq 1$	$A_{aprt} \eta$		
Global Maximum Index Value			0.41	(a)	(a)	(a)	(a)	(a)
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	0.75					
	W_o	[mW]		(a)	(a)		(a)	(a)
	min of $[W_{.3}(z_1) : I_{TA.3}(z_1)]$	[mW]				(a)		
	Z_1	[cm]				(a)		
	z_{bp}	[cm]				(a)		
	z_{sp}	[cm]	4.71				(a)	
	$d_{eq}(z_{sp})$	[cm]					(a)	
	f_c	[MHz]	3.33	(a)	(a)	(a)	(a)	(a)
	Dim of A_{aprt} X [cm]			(a)	(a)	(a)	(a)	(a)
	Dim of A_{aprt} Y [cm]			(a)	(a)	(a)	(a)	(a)
Other Information	PD	[µsec]	0.67					
	PRF	[Hz]	17					
	$p_r@PII_{max}$	[MPa]	1.29					
	$d_{eq}@PII_{max}$	[cm]						
	Focal Length X [cm]			(a)	(a)	(a)		(a)
	Focal Length Y [cm]			(a)	(a)	(a)		(a)
	$I_{PA.3}@MI_{max}$	[W/cm^2]	22					
Operating Control Conditions	Control 1							
	Control 2							
	Control 3							
	Control n							

ISPTA.3 [mW/cm2] = 0

Table C-13: Transducer Model 4DC6-3/40 (Operating Mode: Color Flow)

Index Label			MI	TIS			TIB	TIC
				scan	non-scan		non-scan	
					$A_{aprt} \leq 1$	$A_{aprt}($		
Global Maximum Index Value			0.44	0.01	(c)	(c)	(a)	0.03
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	0.70					
	W_o	[mW]		1	(c)		(a)	1
	min of $[W_{.3}(z_1) : I_{TA.3}(z_1)]$	[mW]				(c)		
	Z_1	[cm]				(c)		
	z_{bp}	[cm]				(c)		
	z_{sp}	[cm]	4.71				(a)	
	$d_{eq}(z_{sp})$	[cm]					(a)	
	f_c	[MHz]	2.50	2.50	(c)	(c)	(a)	2.50
	Dim of A_{aprt} X [cm]			1.00	(c)	(c)	(a)	1.00
	Dim of A_{aprt} Y [cm]			0.80	(c)	(c)	(a)	0.80
Other Information	PD	[µsec]	1.66					
	PRF	[Hz]	171					
	$p_r@PII_{max}$	[MPa]	1.05					
	$d_{eq}@PII_{max}$	[cm]						
	Focal Length X [cm]			4.71	(c)	(c)		4.71
	Focal Length Y [cm]			4.71	(c)	(c)		4.71
	$I_{PA.3}@MI_{max}$	[W/cm^2]	11					
Operating Control Conditions	Control 1							
	Control 2							
	Control 3							
	Control n							

ISPTA.3 [mW/cm2] = 3.09

Table C-14: Transducer Model 4DC6-3/40 (Operating Mode: M)

Index Label			MI	TIS scan	TIS non-scan $A_{aprt} \le 1$	TIS non-scan $A_{aprt} \eta$	TIB non-scan	TIC
Global Maximum Index Value			0.43	0.03	(c)	(c)	(c)	0.02
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	0.78					
	W_o	[mW]		2	(c)		(c)	2
	min of $[W_{.3}(z_1) : I_{TA.3}(z_1)]$	[mW]				(c)		
	z_1	[cm]				(c)		
	z_{bp}	[cm]				(c)		
	z_{sp}	[cm]	4.71				(c)	
	$d_{eq}(z_{sp})$	[cm]					(c)	
	f_c	[MHz]	3.33	3.33	(c)	(c)	(c)	3.33
	Dim of A_{aprt} X [cm]			1.00	(c)	(c)	(c)	1.00
	Dim of A_{aprt} Y [cm]			2.56	(c)	(c)	(c)	2.56
Other Information	PD	[µsec]	0.67					
	PRF	[Hz]	279					
	p_r@PII$_{max}$	[MPa]	1.34					
	d_{eq}@PII$_{max}$	[cm]						
	Focal Length X [cm]			4.71	(c)	(c)		4.71
	Focal Length Y [cm]			4.71	(c)	(c)		4.71
	$I_{PA.3}$@MI$_{max}$	[W/cm²]	21					
Operating Control Conditions	Control 1							
	Control 2							
	Control 3							
	Control n							

ISPTA.3 [mW/cm2] = 48.81

Table C-15: Transducer Model 4DC6-3/40 (Operating Mode: PW Doppler)

Index Label			MI	TIS scan	TIS non-scan $A_{aprt} \le 1$	TIS non-scan $A_{aprt}($	TIB non-scan	TIC
Global Maximum Index Value			0.16	(c)	0.40	(c)	0.36	0.82
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	0.25					
	W_o	[mW]		(c)	34		33	33
	min of $[W_{.3}(z_1) : I_{TA.3}(z_1)]$	[mW]				(c)		
	z_1	[cm]				(c)		
	z_{bp}	[cm]				(c)		
	z_{sp}	[cm]	4.71				4.71	
	$d_{eq}(z_{sp})$	[cm]					0.41	
	f_c	[MHz]	2.50	(c)	2.50	(c)	2.50	2.50
	Dim of A_{aprt} X [cm]			(c)	1.00	(c)	1.00	1.00
	Dim of A_{aprt} Y [cm]			(c)	0.80	(c)	0.80	0.80
Other Information	PD	[µsec]	2.46					
	PRF	[Hz]	1250					
	p_r@PII$_{max}$	[MPa]	0.37					
	d_{eq}@PII$_{max}$	[cm]						
	Focal Length X [cm]			(c)	4.71	(c)		4.71
	Focal Length Y [cm]			(c)	4.71	(c)		4.71
	$I_{PA.3}$@MI$_{max}$	[W/cm²]	2					
Operating Control Conditions	Control 1							
	Control 2							
	Control 3							
	Control n							

ISPTA.3 [mW/cm2] = 48.81

Table C-16: Transducer Model 4DC7-3/40 (Operating Mode: B)

Index Label			MI	TIS			TIB	TIC
				scan	non-scan		non-scan	
					$A_{aprt} \leq 1$	$A_{aprt}+$		
Global Maximum Index Value			0.50	(a)	(a)	(a)	(a)	(a)
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	0.91					
	W_o	[mW]		(a)	(a)		(a)	(a)
	min of [$W_3(z_1) : I_{TA.3}(z_1)$]	[mW]				(a)		
	Z_1	[cm]				(a)		
	z_{bp}	[cm]				(a)		
	z_{sp}	[cm]	4.87				(a)	
	$d_{eq}(z_{sp})$	[cm]					(a)	
	f_c	[MHz]	3.33	(a)	(a)	(a)	(a)	(a)
	Dim of A_{aprt}	X [cm]		(a)	(a)	(a)	(a)	(a)
		Y[cm]		(a)	(a)	(a)	(a)	(a)
Other Information	PD	[µsec]	0.56					
	PRF	[Hz]	32					
	p_r@PII_{max}	[MPa]	1.59					
	d_{eq}@PII_{max}	[cm]						
	Focal Length	X [cm]		(a)	(a)	(a)		(a)
		Y [cm]		(a)	(a)	(a)		(a)
	$I_{PA.3}$@MI_{max}	[W/cm²]	38					
Operating Control Conditions	Control 1							
	Control 2							
	Control 3							
	Control n							

ISPTA.3 [mW/cm2] = 1

Table C-17: Transducer Model 4DC7-3/40 (Operating Mode: Color Flow)

Index Label			MI	TIS			TIB	TIC
				scan	non-scan		non-scan	
					$A_{aprt} \leq 1$	$A_{aprt}H$		
Global Maximum Index Value			0.51	1.10	(c)	(c)	(a)	0.77
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	0.96					
	W_o	[mW]		66	(c)		(a)	89
	min of [$W_3(z_1) : I_{TA.3}(z_1)$]	[mW]				(c)		
	Z_1	[cm]				(c)		
	z_{bp}	[cm]				(c)		
	z_{sp}	[cm]	1.26				(a)	
	$d_{eq}(z_{sp})$	[cm]					(a)	
	f_c	[MHz]	3.50	3.50	(c)	(c)	(a)	3.50
	Dim of A_{aprt}	Elev (Y) [cm]		1.20	(c)	(c)	(a)	1.20
		Azi. (X) [cm]		1.00	(c)	(c)	(a)	5.50
Other Information	PD	[µsec]	1.20					
	PRF	[Hz]	360					
	p_r@PII_{max}	[MPa]	1.12					
	d_{eq}@PII_{max}	[cm]						
	Focal Length	X [cm]		5.50	(c)	(c)		5.50
		Y [cm]		5.50	(c)	(c)		5.50
	$I_{PA.3}$@MI_{max}	[W/cm²]	36					
Operating Control Conditions	Control 1							
	Control 2							
	Control 3							
	Control n							

ISPTA.3 [mW/cm2] = 15.72

Table C-18: Transducer Model 4DC7-3/40 (Operating Mode: M)

Index Label			MI	TIS			TIB	TIC
				scan	non-scan		non-scan	
					$A_{aprt} \leq 1$	$A_{aprt}+$		
Global Maximum Index Value			0.48	0.14	(c)	(c)	(c)	0.16
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	0.88					
	W_o	[mW]		9	(c)		(c)	19
	min of $[W_{.3}(z_1) : I_{TA.3}(z_1)]$	[mW]				(c)		
	Z_1	[cm]				(c)		
	z_{bp}	[cm]				(c)		
	z_{sp}	[cm]	4.87				(c)	
	$d_{eq}(z_{sp})$	[cm]					(c)	
	f_c	[MHz]	3.33	3.33	(c)	(c)	(c)	3.33
	Dim of A_{aprt}	X [cm]		1.20	(c)	(c)	(c)	1.20
		Y [cm]		1.00	(c)	(c)	(c)	5.50
Other Information	PD	[µsec]	0.56					
	PRF	[Hz]	301					
	p_r@PII_{max}	[MPa]	1.54					
	d_{eq}@PII_{max}	[cm]						
	Focal Length	X [cm]		5.00	(c)	(c)		5.00
		Y [cm]		5.00	(c)	(c)		5.00
	$I_{PA.3}$@MI_{max}	[W/cm^2]	38					
Operating Control Conditions	Control 1							
	Control 2							
	Control 3							
	Control n							

ISPTA.3 [mW/cm2] = 7.7

Table C-19: Transducer Model 4DC7-3/40 (Operating Mode: PW Doppler)

Index Label			MI	TIS			TIB	TIC
				scan	non-scan		non-scan	
					$A_{aprt} \leq 1$	$A_{aprt}H$		
Global Maximum Index Value			0.40	(c)	(c)	1.24	3.16	2.25
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	0.74					
	W_o	[mW]		(c)	(c)		122	122
	min of $[W_{.3}(z_1) : I_{TA.3}(z_1)]$	[mW]				74.00		
	Z_1	[cm]				2.06		
	z_{bp}	[cm]				2.03		
	z_{sp}	[cm]	4.34				4.34	
	$d_{eq}(z_{sp})$	[cm]					0.30	
	f_c	[MHz]	3.50	(c)	(c)	3.50	3.50	3.50
	Dim of A_{aprt}	Elev (Y) [cm]		(c)	(c)	1.20	1.20	1.20
		Azi. (X) [cm]		(c)	(c)	1.00	1.20	1.20
Other Information	PD	[µsec]	2.30					
	PRF	[Hz]	1250					
	p_r@PII_{max}	[MPa]	1.25					
	d_{eq}@PII_{max}	[cm]						
	Focal Length	X [cm]		(c)	(c)	8.00		8.00
		Y [cm]		(c)	(c)	8.00		8.00
	$I_{PA.3}$@MI_{max}	[W/cm^2]	20					
Operating Control Conditions	Control 1							
	Control 2							
	Control 3							
	Control n							

ISPTA.3 [mW/cm2] = 600.41

Table C-20: Transducer Model 4DEC9-5/10 (Operating Mode: B)

Index Label			MI	TIS			TIB	TIC
				scan	non-scan		non-scan	
					$A_{aprt} \leq 1$	$A_{aprt} \square$		
Global Maximum Index Value			0.68	0.37	7.66	5.11	20.36	6.32
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	1.51					
	W_o	[mW]		15.73	321.88		321.88	321.88
	min of [$W_{.3}(z_1)$: $I_{TA.3}(z_1)$]	[mW]				48.57		
	Z_1	[cm]				3.04		
	z_{bp}	[cm]				1.91		
	z_{sp}	[cm]	3.04				3.04	
	$d_{eq}(z_{sp})$	[cm]					12.69	
	f_c	[MHz]	5.00	5.00	5.00	5.00	5.00	5.00
	Dim of A_{aprt} (Y) [cm]			2.55	2.55	2.55	2.55	2.55
	Dim of A_{aprt} (X) [cm]			0.50	0.50	0.50	0.50	0.50
Other Information	PD	[µsec]	0.37					
	PRF	[Hz]	99					
	p_r@PII_{max}	[MPa]	2.56					
	d_{eq}@PII_{max}	[cm]					2.23	
	Focal Length FL_x [cm]			3.00	3.00	3.00		3.00
	Focal Length FL_y [cm]			3.00	3.00	3.00		3.00
	$I_{PA.3}$@MI_{max}	[W/cm^2]	0.35					
Operating Control Conditions	Control 1 Depth		60	[mm]				
	Control 2 Focus		35	[mm]				
	Control 3 Gate		?	[mm]				
	Control 4 Preset		Penetration					

ISPTA.3 [mW/cm2] = 345.55

Table C-21: Transducer Model 4DEC9-5/10 (Operating Mode: Color Flow)

Index Label			MI	TIS			TIB	TIC
				scan	non-scan		non-scan	
					$A_{aprt} \leq 1$	$A_{aprt} \square$		
Global Maximum Index Value			(a)	1.24	11.69	7.80	25.14	9.63
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	1.27					
	W_o	[mW]		52.01	491.00		491.00	491.00
	min of [$W_{.3}(z_1)$: $I_{TA.3}(z_1)$]	[mW]				14.28		
	Z_1	[cm]				3.04		
	z_{bp}	[cm]				1.91		
	z_{sp}	[cm]	3.04				3.04	
	$d_{eq}(z_{sp})$	[cm]					15.68	
	f_c	[MHz]	5.00	5.00	5.00	5.00	5.00	5.00
	Dim of A_{aprt} (Y) [cm]			2.55	2.55	2.55	2.55	2.55
	Dim of A_{aprt} (X) [cm]			0.50	0.50	0.50	0.50	0.50
Other Information	PD	[µsec]	0.35					
	PRF	[Hz]	10000					
	p_r@PII_{max}	[MPa]	2.14					
	d_{eq}@PII_{max}	[cm]					5.09	
	Focal Length FL_x [cm]			3.00	3.00	3.00		3.00
	Focal Length FL_y [cm]			3.00	3.00	3.00		3.00
	$I_{PA.3}$@MI_{max}	[W/cm^2]	0.16					
Operating Control Conditions	Control 1 Depth		60	[mm]				
	Control 2 Focus		35	[mm]				
	Control 3 Gate		?	[mm]				
	Control 4 Preset		Penetration					

ISPTA.3 [mW/cm2] = 158.74

Table C-22: Transducer Model 4DEC9-5/10 (Operating Mode: M)

Index Label			MI	TIS scan	TIS non-scan $A_{aprt}\leq1$	TIS non-scan $A_{aprt}\surd$	TIB non-scan	TIC
Global Maximum Index Value			(a)	0.06	7.66	5.11	8.01	6.32
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	1.51					
	W_o	[mW]		2.43	321.88		321.88	321.88
	min of [$W_{.3}(z_1)$: $I_{TA.3}(z_1)$]	[mW]				48.57		
	Z_1	[cm]				3.04		
	z_{bp}	[cm]				1.91		
	z_{sp}	[cm]	3.04				3.04	
	$d_{eq}(z_{sp})$	[cm]					12.69	
	f_c	[MHz]	5.00	5.00	5.00	5.00	5.00	5.00
	Dim of A_{aprt} (Y)	[cm]		2.55	2.55	2.55	2.55	2.55
	Dim of A_{aprt} (X)	[cm]		0.50	0.50	0.50	0.50	0.50
Other Information	PD	[μsec]	0.37					
	PRF	[Hz]	84					
	p_r@PII_{max}	[MPa]	2.56					
	d_{eq}@PII_{max}	[cm]					2.23	
	Focal Length FL_x	[cm]		3.00	3.00	3.00		3.00
	Focal Length FL_y	[cm]		3.00	3.00	3.00		3.00
	$I_{PA.3}$@MI_{max}	[W/cm^2]	0.29					
Operating Control Conditions	Control 1 Depth		60 [mm]					
	Control 2 Focus		35 [mm]					
	Control 3 Gate		? [mm]					
	Control 4 Preset		Penetration					

ISPTA.3 [mW/cm2] = 293.19

Table C-23: Transducer Model 4DEC9-5/10 (Operating Mode: PW Doppler)

Index Label			MI	TIS scan	TIS non-scan $A_{aprt}\leq1$	TIS non-scan $A_{aprt}\square$	TIB non-scan	TIC
Global Maximum Index Value			(a)	1.04	7.70	5.14	20.40	6.34
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	1.20					
	W_o	[mW]		43.56	323.29		323.29	323.29
	min of [$W_{.3}(z_1)$: $I_{TA.3}(z_1)$]	[mW]				37.13		
	Z_1	[cm]				3.04		
	z_{bp}	[cm]				1.91		
	z_{sp}	[cm]	3.04				3.04	
	$d_{eq}(z_{sp})$	[cm]					12.72	
	f_c	[MHz]	5.00	5.00	5.00	5.00	5.00	5.00
	Dim of A_{aprt} (Y)	[cm]		2.55	2.55	2.55	2.55	2.55
	Dim of A_{aprt} (X)	[cm]		0.50	0.50	0.50	0.50	0.50
Other Information	PD	[μsec]	2.14					
	PRF	[Hz]	4000					
	p_r@PII_{max}	[MPa]	2.04					
	d_{eq}@PII_{max}	[cm]					2.56	
	Focal Length FL_x	[cm]		3.00	3.00	3.00		3.00
	Focal Length FL_y	[cm]		3.00	3.00	3.00		3.00
	$I_{PA.3}$@MI_{max}	[W/cm^2]	0.59					
Operating Control Conditions	Control 1 Depth		60 [mm]					
	Control 2 Focus		30 [mm]					
	Control 3 Gate		6.5 [mm]					
	Control 4 Preset		Penetration					

ISPTA.3 [mW/cm2] = 592.88

Table C-24: Transducer Model 4DEC9-5/10 (Operating Mode: PW+B)

Index Label			MI	TIS			TIB	TIC
				scan	non-scan		non-scan	
					$A_{aprt} \leq 1$	A_{aprt}		
Global Maximum Index Value			(a)	0.00	8.94	5.14	8.18	7.36
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	1.20					
	W_o	[mW]		0.05	375.31		375.31	375.31
	min of [$W_{.3}(z_1) : I_{TA.3}(z_1)$]	[mW]				37.13		
	Z_1	[cm]				3.04		
	z_{bp}	[cm]				1.91		
	z_{sp}	[cm]	3.04				3.04	
	$d_{eq}(z_{sp})$	[cm]					13.71	
	f_c	[MHz]	5.00	5.00	5.00	5.00	5.00	5.00
	Dim of A_{aprt}	(Y) [cm]		2.55	2.55	2.55	2.55	2.55
		(X) [cm]		0.50	0.50	0.50	0.50	0.50
Other Information	PD	[µsec]	2.14					
	PRF	[Hz]	4000					
	p_r@PII_{max}	[MPa]	2.04					
	d_{eq}@PII_{max}	[cm]					2.76	
	Focal Length	FL_x [cm]		3.00	3.00	3.00		3.00
		FL_y [cm]		3.00	3.00	3.00		3.00
	$I_{PA.3}$@MI_{max}	[W/cm^2]	0.65					
Operating Control Conditions	Control 1 Depth		60	[mm]				
	Control 2 Focus		30	[mm]				
	Control 3 Gate		6.5	[mm]				
	Control 4 Preset		Penetration					

ISPTA.3 [mW/cm2] = 648.73

Table C-25: Transducer Model EC9-5/10 (Operating Mode: B)

	Index Label		MI	TIS scan	TIS non-scan $A_{aprt}\leq1$	TIS non-scan $A_{aprt}\Box$	TIB non-scan	TIC
	Global Maximum Index Value		0.50	(a)	(a)	(a)	(a)	(a)
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	1.11					
	W_o	[mW]		(a)	(a)		(a)	(a)
	min of $[W_{.3}(z_1):I_{TA.3}(z_1)]$	[mW]				(a)		
	Z_1	[cm]				(a)		
	z_{bp}	[cm]				(a)		
	z_{sp}	[cm]	2.04				(a)	
	$d_{eq}(z_{sp})$	[cm]					(a)	
	f_c	[MHz]	5.00	(a)	(a)	(a)	(a)	(a)
	Dim of A_{aprt}	Elev. (Y) [cm]		(a)	(a)	(a)	(a)	(a)
		Azi. (X) [cm]		(a)	(a)	(a)	(a)	(a)
Other Information	PD	[µsec]	0.47					
	PRF	[Hz]	44					
	$p_r@PII_{max}$	[MPa]	1.57					
	$d_{eq}@PII_{max}$	[cm]						
	Focal Length	[cm]		(a)	(a)	(a)		(a)
	$I_{PA.3}@MI_{max}$	[W/cm^2]	43					
Operating Control Conditions	Control 1							
	Control 2							
	Control 3							
	Control n							

ISPTA.3 [mW/cm2] = 1

Table C-26: Transducer Model EC9-5/10 (Operating Mode: Color Flow)

	Index Label		MI	TIS scan	TIS non-scan $A_{aprt}\leq1$	TIS non-scan $A_{aprt}H$	TIB non-scan	TIC
	Global Maximum Index Value		0.33	0.49	(c)	(c)	(a)	0.31
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	0.86					
	W_o	[mW]		16	(c)		(a)	19
	min of $[W_{.3}(z_1):I_{TA.3}(z_1)]$	[mW]				(c)		
	Z_1	[cm]				(c)		
	z_{bp}	[cm]				(c)		
	z_{sp}	[cm]	1.54				(a)	
	$d_{eq}(z_{sp})$	[cm]					(a)	
	f_c	[MHz]	6.66	6.66	(c)	(c)	(a)	6.66
	Dim of A_{aprt}	Elev. (Y) [cm]		0.70	(c)	(c)	(a)	0.70
		Azi. (X) [cm]		1.00	(c)	(c)	(a)	2.62
Other Information	PD	[µsec]	0.58					
	PRF	[Hz]	204					
	$p_r@PII_{max}$	[MPa]	1.23					
	$d_{eq}@PII_{max}$	[cm]						
	Focal Length	[cm]		5.39	(c)	(c)		5.39
	$I_{PA.3}@MI_{max}$	[W/cm^2]	30					
Operating Control Conditions	Control 1							
	Control 2							
	Control 3							
	Control n							

ISPTA.3 [mW/cm2] = 3.49

Table C-27: Transducer Model EC9-5/10 (Operating Mode: M)

Index Label			MI	TIS scan	TIS non-scan $A_{aprt}{\leq}1$	TIS non-scan $A_{aprt}\square$	TIB non-scan	TIC
Global Maximum Index Value			0.53	0.10	(c)	(c)	(c)	0.10
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	1.18					
	W_o	[mW]		4	(c)		(c)	6
	min of [$W_{.3}(z_1)$: $I_{TA.3}(z_1)$]	[mW]				(c)		
	Z_1	[cm]				(c)		
	z_{bp}	[cm]				(c)		
	z_{sp}	[cm]	1.54				(c)	
	$d_{eq}(z_{sp})$	[cm]					(c)	
	f_c	[MHz]	5.00	5.00	(c)	(c)	(c)	5.00
	Dim of A_{aprt} Elev. (Y)	[cm]		0.70	(c)	(c)	(c)	0.70
	Dim of A_{aprt} Azi. (X)	[cm]		1.00	(c)	(c)	(c)	2.62
Other Information	PD	[µsec]	0.47					
	PRF	[Hz]	301					
	p_r@PII_{max}	[MPa]	1.54					
	d_{eq}@PII_{max}	[cm]						
	Focal Length	[cm]		1.54	(c)	(c)		4.90
	$I_{PA.3}$@MI_{max}	[W/cm^2]	48					
Operating Control Conditions	Control 1							
	Control 2							
	Control 3							
	Control n							

ISPTA.3 [mW/cm2] = 6.79

Table C-28: Transducer Model EC9-5/10 (Operating Mode: PW Doppler)

Index Label			MI	TIS scan	TIS non-scan $A_{aprt}{\leq}1$	TIS non-scan $A_{aprt}\underline{H}$	TIB non-scan	TIC
Global Maximum Index Value			0.36	(c)	0.25	(c)	0.05	0.28
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	0.93					
	W_o	[mW]		(c)	8		8	8
	min of [$W_{.3}(z_1)$: $I_{TA.3}(z_1)$]	[mW]				(c)		
	Z_1	[cm]				(c)		
	z_{bp}	[cm]				(c)		
	z_{sp}	[cm]	1.54				4.90	
	$d_{eq}(z_{sp})$	[cm]					0.43	
	f_c	[MHz]	6.66	(c)	6.66	(c)	6.66	6.66
	Dim of A_{aprt} Elev. (Y)	[cm]		(c)	0.70	(c)	0.70	0.70
	Dim of A_{aprt} Azi. (X)	[cm]		(c)	0.21	(c)	0.21	0.21
Other Information	PD	[µsec]	2.19					
	PRF	[Hz]	1250					
	p_r@PII_{max}	[MPa]	1.32					
	d_{eq}@PII_{max}	[cm]						
	Focal Length	[cm]		(c)	4.90	(c)		4.90
	$I_{PA.3}$@MI_{max}	[W/cm^2]	30					
Operating Control Conditions	Control 1							
	Control 2							
	Control 3							
	Control n							

ISPTA.3 [mW/cm2] = 80.79

Table C-29: Transducer Model C5-2/60 (Operating Mode: B)

Index Label			MI	TIS scan	TIS non-scan $A_{aprt}{\leq}1$	TIS non-scan $A_{aprt}{+}$	TIB non-scan	TIC
Global Maximum Index Value			1.06	(a)	(a)	(a)	(a)	(a)
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	1.93					
	W_o	[mW]		(a)	(a)		(a)	(a)
	min of [$W_{.3}(z_1)$: $I_{TA.3}(z_1)$]	[mW]				(a)		
	Z_1	[cm]				(a)		
	z_{bp}	[cm]				(a)		
	z_{sp}	[cm]	3.66				(a)	
	$d_{eq}(z_{sp})$	[cm]					(a)	
	f_c	[MHz]	3.33	(a)	(a)	(a)	(a)	(a)
	Dim of A_{aprt} Elev (Y) [cm]			(a)	(a)	(a)	(a)	(a)
	Dim of A_{aprt} Azi. (X) [cm]			(a)	(a)	(a)	(a)	(a)
Other Information	PD	[µsec]	0.45					
	PRF	[Hz]	24					
	$p_r@PII_{max}$	[MPa]	2.95					
	$d_{eq}@PII_{max}$	[cm]						
	Focal Length X [cm]			(a)	(a)	(a)		(a)
	Focal Length Y [cm]			(a)	(a)	(a)		(a)
	$I_{PA.3}@MI_{max}$	[W/cm^2]	158					
Operating Control Conditions	Control 1							
	Control 2							
	Control 3							
	Control n							

ISPTA.3 [mW/cm2] = 2

Table C-30: Transducer Model C5-2/60 (Operating Mode: Color Flow)

Index Label			MI	TIS scan	TIS non-scan $A_{aprt}{\leq}1$	TIS non-scan $A_{aprt}H$	TIB non-scan	TIC
Global Maximum Index Value			1.03	3.75	(c)	(c)	(a)	2.69
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	1.93					
	W_o	[mW]		225	(c)		(a)	337
	min of [$W_{.3}(z_1)$: $I_{TA.3}(z_1)$]	[mW]				(c)		
	Z_1	[cm]				(c)		
	z_{bp}	[cm]				(c)		
	z_{sp}	[cm]	2.22				(a)	
	$d_{eq}(z_{sp})$	[cm]					(a)	
	f_c	[MHz]	3.50	3.50	(c)	(c)	(a)	3.50
	Dim of A_{aprt} Elev (Y) [cm]			1.20	(c)	(c)	(a)	1.20
	Dim of A_{aprt} Azi. (X) [cm]			1.00	(c)	(c)	(a)	6.40
Other Information	PD	[µsec]	0.97					
	PRF	[Hz]	171					
	$p_r@PII_{max}$	[MPa]	2.52					
	$d_{eq}@PII_{max}$	[cm]						
	Focal Length X [cm]			4.70	(c)	(c)		4.70
	Focal Length Y [cm]			4.70	(c)	(c)		4.70
	$I_{PA.3}@MI_{max}$	[W/cm^2]	162					
Operating Control Conditions	Control 1							
	Control 2							
	Control 3							
	Control n							

ISPTA.3 [mW/cm2] = 27.01

Table C-31: Transducer Model C5-2/60 (Operating Mode: M)

Index Label			MI	TIS scan	TIS non-scan $A_{aprt}\leq1$	TIS non-scan $A_{aprt}+$	TIB non-scan	TIC
Global Maximum Index Value			0.98	0.48	(c)	(c)	(c)	0.68
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	1.79					
	W_o	[mW]		30	(c)		(c)	30
	min of [$W_{.3}(z_1)$: $I_{TA.3}(z_1)$]	[mW]				(c)		
	Z_1	[cm]				(c)		
	z_{bp}	[cm]				(c)		
	z_{sp}	[cm]	3.60				(c)	
	$d_{eq}(z_{sp})$	[cm]					(c)	
	f_c	[MHz]	3.33	3.33	(c)	(c)	(c)	3.33
	Dim of A_{aprt} Elev (Y) [cm]			1.20	(c)	(c)	(c)	1.20
	Dim of A_{aprt} Azi. (X) [cm]			1.00	(c)	(c)	(c)	6.40
Other Information	PD	[µsec]	0.64					
	PRF	[Hz]	282					
	p_r@PII_{max}	[MPa]	2.71					
	d_{eq}@PII_{max}	[cm]						
	Focal Length X [cm]			3.60	(c)	(c)		3.60
	Focal Length Y [cm]			3.60	(c)	(c)		3.60
	$I_{PA.3}$@MI_{max}	[W/cm^2]	100					
Operating Control Conditions	Control 1							
	Control 2							
	Control 3							
	Control n							

ISPTA.3 [mW/cm2] = 18.06

Table C-32: Transducer Model C5-2/60 (Operating Mode: PW Doppler)

Index Label			MI	TIS scan	TIS non-scan $A_{aprt}\leq1$	TIS non-scan $A_{aprt}H$	TIB non-scan	TIC
Global Maximum Index Value			0.60	(c)	(c)	2.71	3.73	4.98
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	1.12					
	W_o	[mW]		(c)	(c)		246	246
	min of [$W_{.3}(z_1)$: $I_{TA.3}(z_1)$]	[mW]				163.00		
	Z_1	[cm]				1.89		
	z_{bp}	[cm]				1.85		
	z_{sp}	[cm]	3.66				6.36	
	$d_{eq}(z_{sp})$	[cm]					0.32	
	f_c	[MHz]	3.50	(c)	(c)	3.50	3.50	3.50
	Dim of A_{aprt} Elev (Y) [cm]			(c)	(c)	1.20	1.20	1.20
	Dim of A_{aprt} Azi. (X) [cm]			(c)	(c)	1.00	1.00	1.00
Other Information	PD	[µsec]	2.25					
	PRF	[Hz]	1250					
	p_r@PII_{max}	[MPa]	1.73					
	d_{eq}@PII_{max}	[cm]						
	Focal Length X [cm]			(c)	(c)	8.00		8.00
	Focal Length Y [cm]			(c)	(c)	8.00		8.00
	$I_{PA.3}$@MI_{max}	[W/cm^2]	57					
Operating Control Conditions	Control 1							
	Control 2							
	Control 3							
	Control n							

ISPTA.3 [mW/cm2] = 658.66

Table C-33: Transducer Model C7-3/50 (Operating Mode: B)

Index Label			MI	TIS scan	TIS non-scan $A_{aprt}\leq1$	TIS non-scan $A_{aprt}+$	TIB non-scan	TIC
Global Maximum Index Value			0.71	(a)	(a)	(a)	(a)	(a)
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	1.30					
	W_o	[mW]		(a)	(a)		(a)	(a)
	min of [$W_{.3}(z_1)$: $I_{TA.3}(z_1)$]	[mW]				(a)		
	Z_1	[cm]				(a)		
	z_{bp}	[cm]				(a)		
	z_{sp}	[cm]	2.39				(a)	
	$d_{eq}(z_{sp})$	[cm]					(a)	
	f_c	[MHz]	3.33	(a)	(a)	(a)	(a)	(a)
	Dim of A_{aprt} X	[cm]		(a)	(a)	(a)	(a)	(a)
	Dim of A_{aprt} Y	[cm]		(a)	(a)	(a)	(a)	(a)
Other Information	PD	[µsec]	0.40					
	PRF	[Hz]	24					
	p_r@PII_{max}	[MPa]	1.71					
	d_{eq}@PII_{max}	[cm]						
	Focal Length X	[cm]		(a)	(a)	(a)		(a)
	Focal Length Y	[cm]		(a)	(a)	(a)		(a)
	$I_{PA.3}$@MI_{max}	[W/cm²]	57					
Operating Control Conditions	Control 1							
	Control 2							
	Control 3							
	Control n							

ISPTA.3 [mW/cm2] = 1

Table C-34: Transducer Model C7-3/50 (Operating Mode: Color Flow)

Index Label			MI	TIS scan	TIS non-scan $A_{aprt}\leq1$	TIS non-scan $A_{aprt}H$	TIB non-scan	TIC
Global Maximum Index Value			0.62	1.30	(c)	(c)	(a)	1.07
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	1.31					
	W_o	[mW]		61	(c)		(a)	130
	min of [$W_{.3}(z_1)$: $I_{TA.3}(z_1)$]	[mW]				(c)		
	Z_1	[cm]				(c)		
	z_{bp}	[cm]				(c)		
	z_{sp}	[cm]	2.90				(a)	
	$d_{eq}(z_{sp})$	[cm]					(a)	
	f_c	[MHz]	4.50	4.50	(c)	(c)	(a)	4.50
	Dim of A_{aprt} X	[cm]		1.20	(c)	(c)	(a)	1.20
	Dim of A_{aprt} Y	[cm]		1.00	(c)	(c)	(a)	6.09
Other Information	PD	[µsec]	0.86					
	PRF	[Hz]	162					
	p_r@PII_{max}	[MPa]	2.06					
	d_{eq}@PII_{max}	[cm]						
	Focal Length X	[cm]		4.75	(c)	(c)		4.75
	Focal Length Y	[cm]		4.75	(c)	(c)		4.75
	$I_{PA.3}$@MI_{max}	[W/cm²]	51					
Operating Control Conditions	Control 1							
	Control 2							
	Control 3							
	Control n							

ISPTA.3 [mW/cm2] = 7.13

Table C-35: Transducer Model C7-3/50 (Operating Mode: M)

Index Label			MI	TIS			TIB	TIC
				scan	non-scan		non-scan	
					$A_{aprt}{\leq}1$	$A_{aprt}\square$		
Global Maximum Index Value			0.62	0.12	(c)	(c)	(c)	0.07
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	1.13					
	W_o	[mW]		8	(c)		(c)	8
	min of [$W_{.3}(z_1)$: $I_{TA.3}(z_1)$]	[mW]				(c)		
	Z_1	[cm]				(c)		
	z_{bp}	[cm]				(c)		
	z_{sp}	[cm]	2.90				(c)	
	$d_{eq}(z_{sp})$	[cm]					(c)	
	f_c	[MHz]	3.33	3.33	(c)	(c)	(c)	3.33
	Dim of A_{aprt}	Elev. (Y) [cm]		1.20	(c)	(c)	(c)	1.20
		Azi. (X) [cm]		1.00	(c)	(c)	(c)	6.09
Other Information	PD	[μsec]	0.40					
	PRF	[Hz]	293					
	p_r@PII_{max}	[MPa]	1.57					
	d_{eq}@PII_{max}	[cm]						
	Focal Length	X [cm]		2.90	(c)	(c)		2.90
		Y [cm]		2.90	(c)	(c)		2.90
	$I_{PA.3}$@MI_{max}	[W/cm^2]	42					
Operating Control Conditions	Control 1							
	Control 2							
	Control 3							
	Control n							

ISPTA.3 [mW/cm2] = 4.97

Table C-36: Transducer Model C7-3/50 (Operating Mode: PW Doppler)

Index Label			MI	TIS			TIB	TIC
				scan	non-scan		non-scan	
					$A_{aprt}{\leq}1$	$A_{aprt}\text{H}$		
Global Maximum Index Value			0.52	(c)	(c)	1.47	1.58	2.83
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	0.97					
	W_o	[mW]		(c)	(c)		137	137
	min of [$W_{.3}(z_1)$: $I_{TA.3}(z_1)$]	[mW]				88.00		
	Z_1	[cm]				1.83		
	z_{bp}	[cm]				1.81		
	z_{sp}	[cm]	4.55				5.55	
	$d_{eq}(z_{sp})$	[cm]					0.26	
	f_c	[MHz]	3.50	(c)	(c)	3.50	3.50	3.50
	Dim of A_{aprt}	Elev. (Y) [cm]		(c)	(c)	1.20	1.20	1.20
		Azi. (X) [cm]		(c)	(c)	0.96	0.96	0.96
Other Information	PD	[μsec]	2.24					
	PRF	[Hz]	1250					
	p_r@PII_{max}	[MPa]	1.69					
	d_{eq}@PII_{max}	[cm]						
	Focal Length	X [cm]		(c)	(c)	8.00		8.00
		Y [cm]		(c)	(c)	8.00		8.00
	$I_{PA.3}$@MI_{max}	[W/cm^2]	44					
Operating Control Conditions	Control 1							
	Control 2							
	Control 3							
	Control n							

ISPTA.3 [mW/cm2] = 678.71

Table C-37: Transducer Model MC9-4/12 (Operating Mode: B)

Index Label			MI	TIS scan	TIS non-scan $A_{aprt} \leq 1$	TIS non-scan A_{aprt}	TIB non-scan	TIC
Global Maximum Index Value			0.72	(c)	1.37	(c)	0.00	0.90
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	1.77					
	W_o	[mW]		(c)	48.04		48.04	48.04
	min of [$W_{.3}(z_1) : I_{TA.3}(z_1)$]	[mW]				(c)		
	Z_1	[cm]				(c)		
	z_{bp}	[cm]				2.00		
	z_{sp}	[cm]	2.85				2.85	
	$d_{eq}(z_{sp})$	[cm]					4.75	
	f_c	[MHz]	6.00	6.00	6.00	6.00	6.00	6.00
	Dim of A_{aprt} X	[cm]		(c)	2.79	2.79	2.79	2.79
	Dim of A_{aprt} Y	[cm]		(c)	0.50	0.50	0.50	0.50
Other Information	PD	[μsec]	10.35					
	PRF	[Hz]	25					
	p_r@PII_{max}	[MPa]	3.19					
	d_{eq}@PII_{max}	[cm]					-	
	Focal Length FL_X	[cm]		3.00	3.00	3.00		3.00
	Focal Length FL_Y	[cm]		3.00	3.00	3.00		3.00
	$I_{PA.3}$@MI_{max}	[W/cm²]	0.00					
Operating Control Conditions	Control 1 Depth		60	[mm]			PII.3 [mJ/cm²]	11.5603
	Control 2 Focus		33	[mm]				
	Control 3 Gate		-	[mm]			ITA [mW/cm²]	0
	Control 4 Preset		GEN–General				ITA.3 [mW/cm²]	0

ISPTA.3 [mW/cm2] = 289.008

Table C-38: Transducer Model MC9-4/12 (Operating Mode: Color Flow)

Index Label			MI	TIS scan	TIS non-scan $A_{aprt} \leq 1$	TIS non-scan A_{aprt}	TIB non-scan	TIC
Global Maximum Index Value			0.58	(c)	1.28	(c)	0.00	1.01
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	1.30					
	W_o	[mW]		(c)	53.62		53.62	53.62
	min of [$W_{.3}(z_1) : I_{TA.3}(z_1)$]	[mW]				(c)		
	Z_1	[cm]				(c)		
	z_{bp}	[cm]				2.00		
	z_{sp}	[cm]	2.45				2.45	
	$d_{eq}(z_{sp})$	[cm]					5.45	
	f_c	[MHz]	5.00	5.00	5.00	5.00	5.00	5.00
	Dim of A_{aprt} X	[cm]		(c)	2.79	2.79	2.79	2.79
	Dim of A_{aprt} Y	[cm]		(c)	0.50	0.50	0.50	0.50
Other Information	PD	[μsec]	10.26					
	PRF	[Hz]	2277					
	p_r@PII_{max}	[MPa]	1.99					
	d_{eq}@PII_{max}	[cm]					-	
	Focal Length FL_X	[cm]		3.00	3.00	3.00		3.00
	Focal Length FL_Y	[cm]		3.00	3.00	3.00		3.00
	$I_{PA.3}$@MI_{max}	[W/cm²]	0.00					
Operating Control Conditions	Control 1 Depth		70	[mm]			PII.3 [mJ/cm²]	0.0602
	Control 2 Focus		50	[mm]			ISTPA (B+Color)	265.887
	Control 3 Gate		-	[mm]			ITA [mW/cm²]	0
	Control 4 Preset		GEN–General				ITA.3 [mW/cm²]	0

ISPTA.3 [mW/cm2] = 402.986

Table C-39: Transducer Model MC9-4/12 (Operating Mode: M)

Index Label			MI	TIS			TIB	TIC
				scan	non-scan		non-scan	
					$A_{aprt}{\leq}1$	$A_{aprt}\square$		
Global Maximum Index Value			0.72	(c)	1.37	(c)	0.00	0.90
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	1.77					
	W_o	[mW]		(c)	48.04		48.04	48.04
	min of [$W_{.3}(z_1)$: $I_{TA.3}(z_1)$]	[mW]				(c)		
	Z_1	[cm]				(c)		
	z_{bp}	[cm]				2.00		
	z_{sp}	[cm]	2.85				2.85	
	$d_{eq}(z_{sp})$	[cm]					4.75	
	f_c	[MHz]	6.00	6.00	6.00	6.00	6.00	6.00
	Dim of A_{aprt} X [cm]			(c)	2.79	2.79	2.79	2.79
	Y [cm]			(c)	0.50	0.50	0.50	0.50
Other Information	PD	[µsec]	10.35					
	PRF	[Hz]	84					
	p_r@PII_{max}	[MPa]	3.19					
	d_{eq}@PII_{max}	[cm]					-	
	Focal Length FL_X [cm]			3.00	3.00	3.00		3.00
	FL_Y [cm]			3.00	3.00	3.00		3.00
	$I_{PA.3}$@MI_{max}	[W/cm^2]	0.00					
Operating Control Conditions	Control 1 Depth		60	[mm]			PII.3 [mJ/cm^2]	2.1074
	Control 2 Focus		33	[mm]				
	Control 3 Gate		-	[mm]			ITA [mW/cm^2]	0
	Control 4 Preset		GEN–General				ITA.3 [mW/cm^2]	0

ISPTA.3 [mW/cm2] = 177.017

Table C-40: Transducer Model MC9-4/12 (Operating Mode: PW Doppler)

Index Label			MI	TIS			TIB	TIC
				scan	non-scan		non-scan	
					$A_{aprt}{\leq}1$	$A_{aprt}\blacklozenge$		
Global Maximum Index Value			0.33	(c)	1.35	(c)	0.00	0.81
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	0.84					
	W_o	[mW]		(c)	42.98		42.98	42.98
	min of [$W_{.3}(z_1)$: $I_{TA.3}(z_1)$]	[mW]				(c)		
	Z_1	[cm]				(c)		
	z_{bp}	[cm]				2.00		
	z_{sp}	[cm]	2.35				2.35	
	$d_{eq}(z_{sp})$	[cm]					4.61	
	f_c	[MHz]	6.60	6.60	6.60	6.60	6.60	6.60
	Dim of A_{aprt} X [cm]			(c)	2.79	2.79	2.79	2.79
	Y [cm]			(c)	0.50	0.50	0.50	0.50
Other Information	PD	[µsec]	10.13					
	PRF	[Hz]	6700					
	p_r@PII_{max}	[MPa]	1.44					
	d_{eq}@PII_{max}	[cm]					-	
	Focal Length FL_X [cm]			3.00	3.00	3.00		3.00
	FL_Y [cm]			3.00	3.00	3.00		3.00
	$I_{PA.3}$@MI_{max}	[W/cm^2]	0.00					
Operating Control Conditions	Control 1 Depth		60	[mm]			PII.3 [mJ/cm^2]	0.0602
	Control 2 Focus		47	[mm]			ISTPA (B+PW)	184.965
	Control 3 Gate		2	[mm]			ITA [mW/cm^2]	0
	Control 4 Preset		GEN–General				ITA.3 [mW/cm^2]	0

ISPTA.3 [mW/cm2] = 403.407

Table C-41: Transducer Model MC9-4/12 (Operating Mode: PW+B)

Index Label			MI	TIS scan	TIS non-scan $A_{aprt}\leq1$	TIS non-scan $A_{aprt}\square$	TIB non-scan	TIC
Global Maximum Index Value			0.33	(c)	2.32	(c)	0.00	1.38
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	0.84					
	W_o	[mW]		(c)	73.73		73.73	73.73
	min of [$W_{.3}(z_1)$: $I_{TA.3}(z_1)$]	[mW]				(c)		
	Z_1	[cm]				(c)		
	z_{bp}	[cm]				2.00		
	z_{sp}	[cm]	2.35				2.35	
	$d_{eq}(z_{sp})$	[cm]					6.04	
	f_c	[MHz]	6.60	6.60	6.60	6.60	6.60	6.60
	Dim of A_{aprt} X [cm]			(c)	2.79	2.79	2.79	2.79
	Dim of A_{aprt} Y [cm]			(c)	0.50	0.50	0.50	0.50
Other Information	PD	[µsec]	10.13					
	PRF	[Hz]	6700					
	p_r@PII_{max}	[MPa]	1.44					
	d_{eq}@PII_{max}	[cm]					-	
	Focal Length FL_X [cm]			3.00	3.00	3.00		3.00
	Focal Length FL_Y [cm]			3.00	3.00	3.00		3.00
	$I_{PA.3}$@MI_{max}	[W/cm^2]	0.00					
Operating Control Conditions	Control 1 Depth		60	[mm]		PII.3 [mJ/cm^2]		0.0602
	Control 2 Focus		47	[mm]		ISTPA (B+PW)		184.965
	Control 3 Gate		2	[mm]		ITA [mW/cm^2]		0
	Control 4 Preset		GEN–General			ITA.3 [mW/cm^2]		0

ISPTA.3 [mW/cm2] = 508.372

Table C-42: Transducer Model L9-4/38 (Operating Mode: B)

Index Label			MI	TIS scan	TIS non-scan $A_{aprt}\leq 1$	TIS non-scan $A_{aprt}\square$	TIB non-scan	TIC
Global Maximum Index Value			0.91	(a)	(a)	(a)	(a)	(a)
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	2.04					
	W_o	[mW]		(a)	(a)		(a)	(a)
	min of [$W_{.3}(z_1)$: $I_{TA.3}(z_1)$]	[mW]				(a)		
	Z_1	[cm]				(a)		
	z_{bp}	[cm]				(a)		
	z_{sp}	[cm]	1.86				(a)	
	$d_{eq}(z_{sp})$	[cm]					(a)	
	f_c	[MHz]	5.00	(a)	(a)	(a)	(a)	(a)
	Dim of A_{aprt}	Elev. (Y) [cm]		(a)	(a)	(a)	(a)	(a)
		Azi. (X) [cm]		(a)	(a)	(a)	(a)	(a)
Other Information	PD	[µsec]	0.35					
	PRF	[Hz]	42					
	$p_r@PII_{max}$	[MPa]	2.81					
	$d_{eq}@PII_{max}$	[cm]						
	Focal Length	[cm]		(a)	(a)	(a)		(a)
	$I_{PA.3}@MI_{max}$	[W/cm^2]	217					
Operating Control Conditions	Control 1							
	Control 2							
	Control 3							
	Control n							

ISPTA.3 [mW/cm2] = 3

Table C-43: Transducer Model L9-4/38 (Operating Mode: Color Flow)

Index Label			MI	TIS scan	TIS non-scan $A_{aprt}\leq 1$	TIS non-scan $\overline{A_{aprt}H}$	TIB non-scan	TIC
Global Maximum Index Value			0.71	0.38	(c)	(c)	(a)	0.34
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	1.42					
	W_o	[mW]		12	(c)		(a)	25
	min of [$W_{.3}(z_1)$: $I_{TA.3}(z_1)$]	[mW]				(c)		
	Z_1	[cm]				(c)		
	z_{bp}	[cm]				(c)		
	z_{sp}	[cm]	2.20				(a)	
	$d_{eq}(z_{sp})$	[cm]					(a)	
	f_c	[MHz]	4.00	6.66	(c)	(c)	(a)	6.66
	Dim of A_{aprt}	Elev. (Y) [cm]		0.70	(c)	(c)	(a)	0.70
		Azi. (X) [cm]		1.00	(c)	(c)	(a)	3.84
Other Information	PD	[µsec]	0.49					
	PRF	[Hz]	169					
	$p_r@PII_{max}$	[MPa]	1.92					
	$d_{eq}@PII_{max}$	[cm]						
	Focal Length	[cm]		5.36	(c)	(c)		5.36
	$I_{PA.3}@MI_{max}$	[W/cm^2]	75					
Operating Control Conditions	Control 1							
	Control 2							
	Control 3							
	Control n							

ISPTA.3 [mW/cm2] = 6.17

Table C-44: Transducer Model L9-4/38 (Operating Mode: M)

Index Label			MI	TIS scan	TIS non-scan $A_{aprt}{\leq}1$	TIS non-scan $A_{aprt}\square$	TIB non-scan	TIC
Global Maximum Index Value			0.93	0.32	(c)	(c)	(c)	0.77
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	2.07					
	W_o	[mW]		10	(c)		(c)	57
	min of [$W_{.3}(z_1)$: $I_{TA.3}(z_1)$]	[mW]				(c)		
	Z_1	[cm]				(c)		
	z_{bp}	[cm]				(c)		
	z_{sp}	[cm]	1.85				(c)	
	$d_{eq}(z_{sp})$	[cm]					(c)	
	f_c	[MHz]	5.00	6.67	(c)	(c)	(c)	6.67
	Dim of A_{aprt} Elev (Y) [cm]			0.70	(c)	(c)	(c)	0.70
	Dim of A_{aprt} Azi. (X) [cm]			1.00	(c)	(c)	(c)	3.84
Other Information	PD	[μsec]	0.36					
	PRF	[Hz]	313					
	p_r@PII_{max}	[MPa]	2.85					
	d_{eq}@PII_{max}	[cm]						
	Focal Length	[cm]		5.60	(c)	(c)		5.60
	$I_{PA.3}$@MI_{max}	[W/cm^2]	212					
Operating Control Conditions	Control 1							
	Control 2							
	Control 3							
	Control n							

ISPTA.3 [mW/cm2] = 24.09

Table C-45: Transducer Model L9-4/38 (Operating Mode: PW Doppler)

Index Label			MI	TIS scan	TIS non-scan $A_{aprt}{\leq}1$	TIS non-scan $A_{aprt}H$	TIB non-scan	TIC
Global Maximum Index Value			0.22	(c)	1.36	(c)	1.06	1.24
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	0.57					
	W_o	[mW]		(c)	43		43	43
	min of [$W_{.3}(z_1)$: $I_{TA.3}(z_1)$]	[mW]				(c)		
	Z_1	[cm]				(c)		
	z_{bp}	[cm]				(c)		
	z_{sp}	[cm]	3.17				3.17	
	$d_{eq}(z_{sp})$	[cm]					0.16	
	f_c	[MHz]	6.66	(c)	6.66	(c)	6.66	6.66
	Dim of A_{aprt} Elev (Y) [cm]			(c)	0.70	(c)	0.70	0.70
	Dim of A_{aprt} Azi. (X) [cm]			(c)	0.84	(c)	0.84	0.84
Other Information	PD	[μsec]	2.14					
	PRF	[Hz]	1250					
	p_r@PII_{max}	[MPa]	1.19					
	d_{eq}@PII_{max}	[cm]						
	Focal Length X [cm]			(c)	4.00	(c)		4.00
	Focal Length Y [cm]			(c)	4.00	(c)		4.00
	$I_{PA.3}$@MI_{max}	[W/cm^2]	15					
Operating Control Conditions	Control 1							
	Control 2							
	Control 3							
	Control n							

ISPTA.3 [mW/cm2] = 378.27

Table C-46: Transducer Model L14-5/38 (Operating Mode: B)

Index Label			MI	TIS scan	TIS non-scan $A_{aprt}\le1$	TIS non-scan $A_{aprt}\square$	TIB non-scan	TIC
Global Maximum Index Value			0.75	(a)	(a)	(a)	(a)	(a)
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	1.94					
	W_o	[mW]		(a)	(a)		(a)	(a)
	min of [$W_{.3}(z_1) : I_{TA.3}(z_1)$]	[mW]				(a)		
	Z_1	[cm]				(a)		
	z_{bp}	[cm]				(a)		
	z_{sp}	[cm]	1.26				(a)	
	$d_{eq}(z_{sp})$	[cm]					(a)	
	f_c	[MHz]	6.67	(a)	(a)	(a)	(a)	(a)
	Dim of A_{aprt} Elev. (Y)	[cm]		(a)	(a)	(a)	(a)	(a)
	Dim of A_{aprt} Azi. (X)	[cm]		(a)	(a)	(a)	(a)	(a)
Other Information	PD	[μsec]	2.90					
	PRF	[Hz]	37					
	$p_r@PII_{max}$	[MPa]	2.59					
	$d_{eq}@PII_{max}$	[cm]						
	Focal Length X	[cm]		(a)	(a)	(a)		(a)
	$I_{PA.3}@MI_{max}$	[W/cm²]	225					
Operating Control Conditions	Control 1							
	Control 2							
	Control 3							
	Control n							

ISPTA.3 [mW/cm2] = 2

Table C-47: Transducer Model L14-5/38 (Operating Mode: Color Flow)

Index Label			MI	TIS scan	TIS non-scan $A_{aprt}\le1$	TIS non-scan $A_{aprt}H$	TIB non-scan	TIC
Global Maximum Index Value			0.45	0.38	(c)	(c)	(a)	0.20
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	0.90					
	W_o	[mW]		12	(c)	(c)	(a)	15
	min of [$W_{.3}(z_1) : I_{TA.3}(z_1)$]	[mW]						
	Z_1	[cm]						
	z_{bp}	[cm]						
	z_{sp}	[cm]	3.68				(a)	
	$d_{eq}(z_{sp})$	[cm]					(a)	
	f_c	[MHz]	4.00	6.66	(c)	(c)	(a)	6.66
	Dim of A_{aprt} Elev. (Y)	[cm]		0.70	(c)	(c)	(a)	0.70
	Dim of A_{aprt} Azi. (X)	[cm]		1.00	(c)	(c)	(a)	3.84
Other Information	PD	[μsec]	0.39					
	PRF	[Hz]	156					
	$p_r@PII_{max}$	[MPa]	1.49					
	$d_{eq}@PII_{max}$	[cm]						
	Focal Length	[cm]		5.62	(c)	(c)		5.61
	$I_{PA.3}@MI_{max}$	[W/cm²]	32					
Operating Control Conditions	Control 1							
	Control 2							
	Control 3							
	Control n							

ISPTA.3 [mW/cm2] = 1.93

Table C-48: Transducer Model L14-5/38 (Operating Mode: M)

Index Label			MI	TIS scan	TIS non-scan $A_{aprt}\leq 1$	TIS non-scan $A_{aprt}\square$	TIB non-scan	TIC
Global Maximum Index Value			0.75	0.34	(c)		(c)	0.34
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	1.93					
	W_o	[mW]		11	(c)		(c)	36
	min of [$W_{.3}(z_1) : I_{TA.3}(z_1)$]	[mW]				(c)		
	Z_1	[cm]				(c)		
	z_{bp}	[cm]				(c)		
	z_{sp}	[cm]	1.58				(c)	
	$d_{eq}(z_{sp})$	[cm]					(c)	
	f_c	[MHz]	6.67	6.67	(c)	(c)	(c)	6.67
	Dim of A_{aprt} Elev. (Y)	[cm]		0.70	(c)	(c)	(c)	0.70
	Azi. (X)	[cm]		1.00	(c)	(c)	(c)	3.84
Other Information	PD	[μsec]	0.29					
	PRF	[Hz]	314					
	p_r@PII_{max}	[MPa]	2.77					
	d_{eq}@PII_{max}	[cm]						
	Focal Length	[cm]		5.61	(c)	(c)		5.61
	$I_{PA.3}$@MI_{max}	[W/cm²]	191					
Operating Control Conditions	Control 1							
	Control 2							
	Control 3							
	Control n							

ISPTA.3 [mW/cm2] = 17.23

Table C-49: Transducer Model L14-5/38 (Operating Mode: PW Doppler)

Index Label			MI	TIS scan	TIS non-scan $A_{aprt}\leq 1$	TIS non-scan $A_{aprt}H$	TIB non-scan	TIC
Global Maximum Index Value			0.29	(c)	0.95	(c)	1.46	0.87
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	0.76					
	W_o	[mW]		(c)	30		30	30
	min of [$W_{.3}(z_1) : I_{TA.3}(z_1)$]	[mW]				(c)		
	Z_1	[cm]				(c)		
	z_{bp}	[cm]				(c)		
	z_{sp}	[cm]	1.71				1.71	
	$d_{eq}(z_{sp})$	[cm]					0.21	
	f_c	[MHz]	6.66	(c)	6.66	(c)	6.66	6.66
	Dim of A_{aprt} Elev. (Y)	[cm]		(c)	0.70	(c)	0.70	0.70
	Azi. (X)	[cm]		(c)	0.84	(c)	0.84	0.84
Other Information	PD	[μsec]	2.16					
	PRF	[Hz]	1250					
	p_r@PII_{max}	[MPa]	1.13					
	d_{eq}@PII_{max}	[cm]						
	Focal Length X	[cm]		(c)	4.00	(c)		4.00
	Focal Length Y	[cm]		(c)	4.00	(c)		4.00
	$I_{PA.3}$@MI_{max}	[W/cm²]	18					
Operating Control Conditions	Control 1							
	Control 2							
	Control 3							
	Control n							

ISPTA.3 [mW/cm2] = 386.67

Table C-50: Transducer Model L14-5W/60 (Operating Mode: B)

	Index Label		MI	TIS			TIB	TIC
				scan	non-scan		non-scan	
					$A_{aprt}{\le}1$	$A_{aprt}\square$		
	Global Maximum Index Value		0.76	(a)	(a)	(a)	(a)	(a)
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	1.97					
	W_o	[mW]		(a)	(a)		(a)	(a)
	min of [$W_{.3}(z_1) : I_{TA.3}(z_1)$]	[mW]				(a)		
	Z_1	[cm]				(a)		
	z_{bp}	[cm]				(a)		
	z_{sp}	[cm]	1.19				(a)	
	$d_{eq}(z_{sp})$	[cm]					(a)	
	f_c	[MHz]	6.67	(a)	(a)	(a)	(a)	(a)
	Dim of A_{aprt}	Elev. (Y) [cm]		(a)	(a)	(a)	(a)	(a)
		Azi. (X) [cm]		(a)	(a)	(a)	(a)	(a)
Other Information	PD	[µsec]	0.30					
	PRF	[Hz]	34					
	$p_r@PII_{max}$	[MPa]	2.60					
	$d_{eq}@PII_{max}$	[cm]						
	Focal Length	X [cm]		(a)	(a)	(a)		(a)
	$I_{PA.3}@MI_{max}$	[W/cm^2]	172					
Operating Control Conditions	Control 1							
	Control 2							
	Control 3							
	Control n							

ISPTA.3 [mW/cm2] = 2

Table C-51: Transducer Model L14-5W/60 (Operating Mode: Color Flow)

	Index Label		MI	TIS			TIB	TIC
				scan	non-scan		non-scan	
					$A_{aprt}{\le}1$	$A_{aprt}\underline{H}$		
	Global Maximum Index Value		0.66	0.43	(c)	(c)	(a)	0.48
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	1.46					
	W_o	[mW]		18	(c)		(a)	41
	min of [$W_{.3}(z_1) : I_{TA.3}(z_1)$]	[mW]				(c)		
	Z_1	[cm]				(c)		
	z_{bp}	[cm]				(c)		
	z_{sp}	[cm]	1.80				(a)	
	$d_{eq}(z_{sp})$	[cm]					(a)	
	f_c	[MHz]	5.00	6.66	(c)	(c)	(a)	6.66
	Dim of A_{aprt}	Elev. (Y) [cm]		0.70	(c)	(c)	(a)	0.70
		Azi. (X) [cm]		1.00	(c)	(c)	(a)	5.89
Other Information	PD	[µsec]	0.81					
	PRF	[Hz]	156					
	$p_r@PII_{max}$	[MPa]	2.00					
	$d_{eq}@PII_{max}$	[cm]						
	Focal Length	X [cm]		5.40	(c)	(c)		5.40
	$I_{PA.3}@MI_{max}$	[W/cm^2]	75					
Operating Control Conditions	Control 1							
	Control 2							
	Control 3							
	Control n							

ISPTA.3 [mW/cm2] = 9.48

Table C-52: Transducer Model L14-5W/60 (Operating Mode: M)

Index Label			MI	TIS			TIB	TIC
				scan	non-scan		non-scan	
					$A_{aprt} \leq 1$	$A_{aprt}\square$		
Global Maximum Index Value			0.71	0.19	(c)	(c)	(c)	0.40
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	1.83					
	W_o	[mW]		5	(c)		(c)	36
	min of [$W_{.3}(z_1) : I_{TA.3}(z_1)$]	[mW]				(c)		
	Z_1	[cm]				(c)		
	z_{bp}	[cm]				(c)		
	z_{sp}	[cm]	1.80				(c)	
	$d_{eq}(z_{sp})$	[cm]					(c)	
	f_c	[MHz]	6.67	6.67	(c)	(c)	(c)	6.67
	Dim of A_{aprt}	Elev. (Y) [cm]		0.70	(c)	(c)	(c)	0.70
		Azi. (X) [cm]		1.00	(c)	(c)	(c)	5.88
Other Information	PD	[µsec]	0.31					
	PRF	[Hz]	314					
	p_r@PII_{max}	[MPa]	2.78					
	d_{eq}@PII_{max}	[cm]						
	Focal Length	X [cm]		6.00	(c)	(c)		6.00
	$I_{PA.3}$@MI_{max}	[W/cm²]	116					
Operating Control Conditions	Control 1							
	Control 2							
	Control 3							
	Control n							

ISPTA.3 [mW/cm2] = 11.34

Table C-53: Transducer Model L14-5W/60 (Operating Mode: PW Doppler)

Index Label			MI	TIS			TIB	TIC
				scan	non-scan		non-scan	
					$A_{aprt} \leq 1$	$A_{aprt}H$		
Global Maximum Index Value			0.35	(c)	2.60	(c)	3.41	1.91
Assoc. Acoustic Param.	$P_{r.3}$	[MPa]	0.91					
	W_o	[mW]		(c)	82		82	82
	min of [$W_{.3}(z_1) : I_{TA.3}(z_1)$]	[mW]				(c)		
	Z_1	[cm]				(c)		
	z_{bp}	[cm]				(c)		
	z_{sp}	[cm]	1.37				1.37	
	$d_{eq}(z_{sp})$	[cm]					0.29	
	f_c	[MHz]	6.66	(c)	6.66	(c)	6.66	6.66
	Dim of A_{aprt}	Elev. (Y) [cm]		(c)	0.70	(c)	0.70	0.70
		Azi. (X) [cm]		(c)	1.29	(c)	1.29	1.29
Other Information	PD	[µsec]	2.11					
	PRF	[Hz]	1250					
	p_r@PII_{max}	[MPa]	1.25					
	d_{eq}@PII_{max}	[cm]						
	Focal Length	X [cm]		(c)	5.00	(c)		5.00
		Y [cm]		(c)	5.00	(c)		5.00
	$I_{PA.3}$@MI_{max}	[W/cm²]	28					
Operating Control Conditions	Control 1							
	Control 2							
	Control 3							
	Control n							

ISPTA.3 [mW/cm2] = 667.64

C.4   ULTRASOUND INDICATIONS FOR USE TABLES

Table C-54: SONIX Ultrasound Scanner – Diagnostic Ultrasound Indications for Use Form

Intended use: Diagnostic ultrasound imaging or fluid flow analysis of the human body as follows:

Clinical Application	Mode of Operation									
	A	B	M	PWD	CWD	Color Doppler	Amplitude Doppler	Color Velocity Doppler	Combined (Specify)	Other (Specify)
Ophthalmic										
Fetal		P	P	P		P	P	P	P(*1)	P(*2)
Abdominal		P	P	P	P	P	P	P	P(*1)	P(*2)
Intraoperative (specify)		P	P	P		P	P	P	P(*1)	P(*2)
Intraoperative Neurological		P	P	P		P	P	P	P(*1)	P(*2)
Pediatric		P	P	P	P	P	P	P	P(*1)	P(*2)
Small Organ (specify)		P	P	P		P	P	P	P(*1)	P(*2)
Neonatal Cephalic		P	P	P		P	P	P	P(*1)	P(*2)
Adult Cephalic		P	P	P		P	P	P	P(*1)	P(*2)
Cardiac		P	P	P	P	P	P	P	P(*1)	P(*2)
Transesophageal		P	P	P		P	P	P	P(*1)	P(*2)
Transrectal		P	P	P		P	P	P	P(*1)	P(*2)
Transvaginal		P	P	P		P	P	P	P(*1)	P(*2)
Transurethral										
Transcranial Doppler		P	P	P		P	P	P	P(*1)	P(*2)
Intravascular										
Peripheral Vascular		P	P	P		P	P	P	P(*1)	P(*2)
Laparoscopic										
MSK Conventional		P	P	P		P	P	P	P(*1)	P(*2)
MSK Superficial		P	P	P		P	P	P	P(*1)	P(*2)
Vascular Access		P	P	P		P	P	P	P(*1)	P(*2, *4)
Nerve Block		P	P	P		P	P	P	P(*1)	P(*2, *3)
Other (specify)										

N = **N**ew indication; P = **P**reviously cleared
Additional Comments:

Small Organ: Breast, Thyroid, Testicle

Intraoperative: Abdominal organs and vascular

*1. B/M, B/PWD, B/CWD, B/CFM/PWD, B/AD/PWD, B/DPD/PWD, B/CFM/CWD, B/AD/CWD, B/DPD/CWD.
*2. Freehand 3D imaging, Live 3D imaging, Directional Power Doppler (DPD), Imaging for guidance of biopsy.
*3. Imaging for guidance of nerve block injections.
*4. Imaging for guidance of central or peripheral lines.

DIAGNOSTIC ULTRASOUND INDICATIONS FOR USE FORM

Table C-55: PA4-2/20 Phased Array 2.8 MHz Transducer

Intended use: Diagnostic ultrasound imaging or fluid flow analysis of the human body as follows:

Clinical Application	Mode of Operation									
	A	B	M	PWD	CWD	Color Doppler	Amplitude Doppler	Color Velocity Doppler	Combined (Specify)	Other (Specify)
Ophthalmic										
Fetal										
Abdominal		P	P	P		P	P	P	P(*1)	P(*2)
Intraoperative (specify)										
Intraoperative Neurological										
Pediatric		P	P	P		P	P	P	P(*1)	P(*2)
Small Organ (specify)										
Neonatal Cephalic		P	P	P		P	P	P	P(*1)	P(*2)
Adult Cephalic		P	P	P		P	P	P	P(*1)	P(*2)
Cardiac		P	P	P		P	P	P	P(*1)	P(*2)
Transesophageal										
Transrectal										
Transvaginal										
Transurethral										
Transcranial Doppler		P	P	P		P	P	P	P(*1)	P(*2)
Intravascular										
Peripheral Vascular										
Laparoscopic										
MSK Conventional										
MSK Superficial										
Vascular Access										
Nerve Block										
Other (specify)										

N = **N**ew indication; **P** = **P**reviously cleared

Additional Comments:

      *1. B/M, B/PWD, B/CWD, B/CFM/PWD, B/AD/PWD, B/DPD/PWD, B/CFM/CWD, B/AD/CWD, B/DPD/CWD.
      *2. Freehand 3D imaging, Directional Power Doppler (DPD).

DIAGNOSTIC ULTRASOUND INDICATIONS FOR USE FORM

Table C-56: 4DC6-3/40 Motorized Convex 3.5 MHz 40mm Radius Transducer

Intended use: Diagnostic ultrasound imaging or fluid flow analysis of the human body as follows:

Clinical Application	Mode of Operation									
	A	B	M	PWD	CWD	Color Doppler	Amplitude Doppler	Color Velocity Doppler	Combined (Specify)	Other (Specify)
Ophthalmic										
Fetal		P	P	P		P	P	P	P(*1)	P(*2)
Abdominal		P	P	P		P	P	P	P(*1)	P(*2)
Intraoperative (specify)										
Intraoperative Neurological										
Pediatric		P	P	P		P	P	P	P(*1)	P(*2)
Small Organ (specify)		P	P	P		P	P	P	P(*1)	P(*2)
Neonatal Cephalic										
Adult Cephalic										
Cardiac										
Transesophageal										
Transrectal										
Transvaginal										
Transurethral										
Transcranial Doppler										
Intravascular										
Peripheral Vascular		P	P	P		P	P	P	P(*1)	P(*2)
Laparoscopic										
MSK Conventional		P	P	P		P	P	P	P(*1)	P(*2)
MSK Superficial		P	P	P		P	P	P	P(*1)	P(*2)
Vascular Access										
Nerve Block										
Other (specify)										

N = **N**ew indication; **P** = **P**reviously cleared

Additional Comments:

Small Organ: Breast, Thyroid, Testicle

*1. B/M, B/PWD, B/CWD, B/CFM/PWD, B/AD/PWD, B/DPD/PWD, B/CFM/CWD, B/AD/CWD, B/DPD/CWD.
*2. Live 3D imaging, Directional Power Doppler (DPD).

DIAGNOSTIC ULTRASOUND INDICATIONS FOR USE FORM

Table C-57: 4DC7-3/40 Motorized Convex 3.5 MHz 40mm Radius Transducer

Intended use: Diagnostic ultrasound imaging or fluid flow analysis of the human body as follows:

Clinical Application	Mode of Operation									
	A	B	M	PWD	CWD	Color Doppler	Amplitude Doppler	Color Velocity Doppler	Combined (Specify)	Other (Specify)
Ophthalmic										
Fetal		P	P	P		P	P	P	P(*1)	P(*2)
Abdominal		P	P	P		P	P	P	P(*1)	P(*2)
Intraoperative (specify)										
Intraoperative Neurological										
Pediatric		P	P	P		P	P	P	P(*1)	P(*2)
Small Organ (specify)		P	P	P		P	P	P	P(*1)	P(*2)
Neonatal Cephalic										
Adult Cephalic										
Cardiac										
Transesophageal										
Transrectal										
Transvaginal										
Transurethral										
Transcranial Doppler										
Intravascular										
Peripheral Vascular		P	P	P		P	P	P	P(*1)	P(*2)
Laparoscopic										
MSK Conventional		P	P	P		P	P	P	P(*1)	P(*2)
MSK Superficial		P	P	P		P	P	P	P(*1)	P(*2)
Vascular Access										
Nerve Block										
Other (specify)										

N = **N**ew indication; **P** = **P**reviously cleared

Additional Comments:

Small Organ: Breast, Thyroid, Testicle

       *1. B/M, B/PWD, B/CWD, B/CFM/PWD, B/AD/PWD, B/DPD/PWD, B/CFM/CWD, B/AD/CWD, B/DPD/CWD.
       *2. Live 3D imaging, Directional Power Doppler (DPD).

DIAGNOSTIC ULTRASOUND INDICATIONS FOR USE FORM

Table C-58: 4DEC9-5/10 Microconvex Endocavity 6.6 MHz 10mm Radius Transducer

Intended use: Diagnostic ultrasound imaging or fluid flow analysis of the human body as follows:

Clinical Application	Mode of Operation									
	A	B	M	PWD	CWD	Color Doppler	Amplitude Doppler	Color Velocity Doppler	Combined (Specify)	Other (Specify)
Ophthalmic										
Fetal										
Abdominal										
Intraoperative (specify)										
Intraoperative Neurological										
Pediatric										
Small Organ (specify)										
Neonatal Cephalic										
Adult Cephalic										
Cardiac										
Transesophageal										
Transrectal		P	P	P		P	P	P	P(*1)	P(*2)
Transvaginal		P	P	P		P	P	P	P(*1)	P(*2)
Transurethral										
Transcranial Doppler										
Intravascular										
Peripheral Vascular										
Laparoscopic										
MSK Conventional										
MSK Superficial										
Vascular Access										
Nerve Block										
Other (specify)										

N = **N**ew indication; **P** = **P**reviously cleared

Additional Comments:

Small Organ: Breast, Thyroid, Testicle

*1. B/M, B/PWD, B/CWD, B/CFM/PWD, B/AD/PWD, B/DPD/PWD, B/CFM/CWD, B/AD/CWD, B/DPD/CWD.
*2. Live 3D imaging, Directional Power Doppler (DPD), Imaging for guidance of biopsy.

DIAGNOSTIC ULTRASOUND INDICATIONS FOR USE FORM

Table C-59: EC9-5/10 Microconvex Endocavity 6.6 MHz 10mm Radius Transducer

Intended use: Diagnostic ultrasound imaging or fluid flow analysis of the human body as follows:

Clinical Application	Mode of Operation									
	A	B	M	PWD	CWD	Color Doppler	Amplitude Doppler	Color Velocity Doppler	Combined (Specify)	Other (Specify)
Ophthalmic										
Fetal										
Abdominal										
Intraoperative (specify)										
Intraoperative Neurological										
Pediatric										
Small Organ (specify)										
Neonatal Cephalic										
Adult Cephalic										
Cardiac										
Transesophageal										
Transrectal		P	P	P		P	P	P	P(*1)	P(*2)
Transvaginal		P	P	P		P	P	P	P(*1)	P(*2)
Transurethral										
Transcranial Doppler										
Intravascular										
Peripheral Vascular										
Laparoscopic										
MSK Conventional										
MSK Superficial										
Vascular Access										
Nerve Block										
Other (specify)										

N = **N**ew indication; **P** = **P**reviously cleared

Additional Comments:

*1. B/M, B/PWD, B/CWD, B/CFM/PWD, B/AD/PWD, B/DPD/PWD, B/CFM/CWD, B/AD/CWD, B/DPD/CWD.
*2. Freehand 3D imaging, Directional Power Doppler (DPD), Imaging for guidance of biopsy.

DIAGNOSTIC ULTRASOUND INDICATIONS FOR USE FORM

Table C-60: C5-2/60 Convex 3.2 MHz 60mm Radius Transducer

Intended use: Diagnostic ultrasound imaging or fluid flow analysis of the human body as follows:

Clinical Application	Mode of Operation									
	A	B	M	PWD	CWD	Color Doppler	Amplitude Doppler	Color Velocity Doppler	Combined (Specify)	Other (Specify)
Ophthalmic										
Fetal		P	P	P		P	P	P	P(*1)	P(*2)
Abdominal		P	P	P		P	P	P	P(*1)	P(*2)
Intraoperative (specify)										
Intraoperative Neurological										
Pediatric		P	P	P		P	P	P	P(*1)	P(*2)
Small Organ (specify)		P	P	P		P	P	P	P(*1)	P(*2)
Neonatal Cephalic										
Adult Cephalic										
Cardiac										
Transesophageal										
Transrectal										
Transvaginal										
Transurethral										
Transcranial Doppler										
Intravascular										
Peripheral Vascular		P	P	P		P	P	P	P(*1)	P(*2)
Laparoscopic										
MSK Conventional		P	P	P		P	P	P	P(*1)	P(*2)
MSK Superficial		P	P	P		P	P	P	P(*1)	P(*2)
Vascular Access										
Nerve Block										
Other (specify)										

N = **N**ew indication; **P** = **P**reviously cleared

Additional Comments:

Small Organ: Breast, Thyroid, Testicle

*1. B/M, B/PWD, B/CWD, B/CFM/PWD, B/AD/PWD, B/DPD/PWD, B/CFM/CWD, B/AD/CWD, B/DPD/CWD.
*2. Freehand 3D imaging, Directional Power Doppler (DPD), Imaging for guidance of biopsy.

DIAGNOSTIC ULTRASOUND INDICATIONS FOR USE FORM

Table C-61: C7-3/50 Convex 6 MHz 50mm Radius Transducer

Intended use: Diagnostic ultrasound imaging or fluid flow analysis of the human body as follows:

Clinical Application	Mode of Operation									
	A	B	M	PWD	CWD	Color Doppler	Amplitude Doppler	Color Velocity Doppler	Combined (Specify)	Other (Specify)
Ophthalmic										
Fetal		P	P	P		P	P	P	P(*1)	P(*2)
Abdominal		P	P	P		P	P	P	P(*1)	P(*2)
Intraoperative (specify)										
Intraoperative Neurological										
Pediatric		P	P	P		P	P	P	P(*1)	P(*2)
Small Organ (specify)		P	P	P		P	P	P	P(*1)	P(*2)
Neonatal Cephalic		P	P	P		P	P	P	P(*1)	P(*2)
Adult Cephalic		P	P	P		P	P	P	P(*1)	P(*2)
Cardiac										
Transesophageal										
Transrectal										
Transvaginal										
Transurethral										
Transcranial Doppler										
Intravascular										
Peripheral Vascular		P	P	P		P	P	P	P(*1)	P(*2)
Laparoscopic										
MSK Conventional		P	P	P		P	P	P	P(*1)	P(*2)
MSK Superficial		P	P	P		P	P	P	P(*1)	P(*2)
Vascular Access										
Nerve Block										
Other (specify)										

N = **N**ew indication; **P** = **P**reviously cleared

Additional Comments:

Small Organ: Breast, Thyroid, Testicle

   *1. B/M, B/PWD, B/CWD, B/CFM/PWD, B/AD/PWD, B/DPD/PWD, B/CFM/CWD, B/AD/CWD, B/DPD/CWD.
   *2. Freehand 3D imaging, Directional Power Doppler (DPD), Imaging for guidance of biopsy.

DIAGNOSTIC ULTRASOUND INDICATIONS FOR USE FORM

Table C-62: MC9–4/12 Microconvex 6 MHz 12mm Transducer

Intended use: Diagnostic ultrasound imaging or fluid flow analysis of the human body as follows:

Clinical Application	Mode of Operation									
	A	B	M	PWD	CWD	Color Doppler	Amplitude Doppler	Color Velocity Doppler	Combined (Specify)	Other (Specify)
Ophthalmic										
Fetal		P	P	P		P	P	P	P(*1)	P(*2)
Abdominal		P	P	P		P	P	P	P(*1)	P(*2)
Intraoperative (specify)										
Intraoperative Neurological										
Pediatric		P	P	P		P	P	P	P(*1)	P(*2)
Small Organ (specify)		P	P	P		P	P	P	P(*1)	P(*2)
Neonatal Cephalic		P	P	P		P	P	P	P(*1)	P(*2)
Adult Cephalic		P	P	P		P	P	P	P(*1)	P(*2)
Cardiac										
Transesophageal										
Transrectal										
Transvaginal										
Transurethral										
Transcranial Doppler										
Intravascular										
Peripheral Vascular		P	P	P		P	P	P	P(*1)	P(*2)
Laparoscopic										
MSK Conventional		P	P	P		P	P	P	P(*1)	P(*2)
MSK Superficial		P	P	P		P	P	P	P(*1)	P(*2)
Vascular Access		P	P	P		P	P	P	P(*1)	P(*2, *4)
Nerve Block		P	P	P		P	P	P	P(*1)	P(*2, *3)
Other (specify)										

N= **N**ew indication; **P** = **P**reviously cleared

Additional Comments:

Small Organ: Breast, Thyroid, Testicle

    *1. B/M, B/PWD, B/CWD, B/CFM/PWD, B/AD/PWD, B/DPD/PWD, B/CFM/CWD, B/AD/CWD, B/DPD/CWD.
    *2. Freehand 3D imaging, Directional Power Doppler (DPD), Imaging for guidance of biopsy.
    *3. Imaging for guidance of nerve block injections.
    *4. Imaging for guidance of central or peripheral lines.

DIAGNOSTIC ULTRASOUND INDICATIONS FOR USE FORM

Table C-63: L9-4/38 Linear 6.5 MHz 38mm Transducer

Intended use: Diagnostic ultrasound imaging or fluid flow analysis of the human body as follows:

Clinical Application	Mode of Operation									
	A	B	M	PWD	CWD	Color Doppler	Amplitude Doppler	Color Velocity Doppler	Combined (Specify)	Other (Specify)
Ophthalmic										
Fetal		P	P	P		P	P	P	P(*1)	P(*2)
Abdominal		P	P	P		P	P	P	P(*1)	P(*2)
Intraoperative (specify)										
Intraoperative Neurological										
Pediatric		P	P	P		P	P	P	P(*1)	P(*2)
Small Organ (specify)		P	P	P		P	P	P	P(*1)	P(*2)
Neonatal Cephalic		P	P	P		P	P	P	P(*1)	P(*2)
Adult Cephalic		P	P	P		P	P	P	P(*1)	P(*2)
Cardiac										
Transesophageal										
Transrectal										
Transvaginal										
Transurethral										
Transcranial Doppler										
Intravascular										
Peripheral Vascular		P	P	P		P	P	P	P(*1)	P(*2)
Laparoscopic										
MSK Conventional		P	P	P		P	P	P	P(*1)	P(*2)
MSK Superficial		P	P	P		P	P	P	P(*1)	P(*2)
Vascular Access										
Nerve Block										
Other (specify)										

N = **N**ew indication; **P** = **P**reviously cleared

Additional Comments:

Small Organ: Breast, Thyroid, Testicle

*1. B/M, B/PWD, B/CWD, B/CFM/PWD, B/AD/PWD, B/DPD/PWD, B/CFM/CWD, B/AD/CWD, B/DPD/CWD.
*2. Freehand 3D imaging, Directional Power Doppler (DPD), Imaging for guidance of biopsy.

DIAGNOSTIC ULTRASOUND INDICATIONS FOR USE FORM

Table C-64: L14-5/38 Linear 8 MHz 38mm Transducer

Intended use: Diagnostic ultrasound imaging or fluid flow analysis of the human body as follows:

Clinical Application	Mode of Operation									
	A	B	M	PWD	CWD	Color Doppler	Amplitude Doppler	Color Velocity Doppler	Combined (Specify)	Other (Specify)
Ophthalmic										
Fetal		P	P	P		P	P	P	P(*1)	P(*2)
Abdominal		P	P	P		P	P	P	P(*1)	P(*2)
Intraoperative (specify)										
Intraoperative Neurological										
Pediatric		P	P	P		P	P	P	P(*1)	P(*2)
Small Organ (specify)		P	P	P		P	P	P	P(*1)	P(*2)
Neonatal Cephalic		P	P	P		P	P	P	P(*1)	P(*2)
Adult Cephalic		P	P	P		P	P	P	P(*1)	P(*2)
Cardiac										
Transesophageal										
Transrectal										
Transvaginal										
Transurethral										
Transcranial Doppler										
Intravascular										
Peripheral Vascular		P	P	P		P	P	P	P(*1)	P(*2)
Laparoscopic										
MSK Conventional		P	P	P		P	P	P	P(*1)	P(*2)
MSK Superficial		P	P	P		P	P	P	P(*1)	P(*2)
Vascular Access		P	P	P		P	P	P	P(*1)	P(*2, *4)
Nerve Block		P	P	P		P	P	P	P(*1)	P(*2, *3)
Other (specify)										

N = **N**ew indication; **P** = **P**reviously cleared

Additional Comments:

Small Organ: Breast, Thyroid, Testicle

*1. B/M, B/PWD, B/CWD, B/CFM/PWD, B/AD/PWD, B/DPD/PWD, B/CFM/CWD, B/AD/CWD, B/DPD/CWD.
*2. Freehand 3D imaging, Directional Power Doppler (DPD), Imaging for guidance of biopsy.
*3. Imaging for guidance of nerve block injections.
*4. Imaging for guidance of central or peripheral lines.

DIAGNOSTIC ULTRASOUND INDICATIONS FOR USE FORM

Table C-65: L14-5W/60 Wide Linear 8 MHz 60mm Transducer

Intended use: Diagnostic ultrasound imaging or fluid flow analysis of the human body as follows:

Clinical Application	Mode of Operation									
	A	B	M	PWD	CWD	Color Doppler	Amplitude Doppler	Color Velocity Doppler	Combined (Specify)	Other (Specify)
Ophthalmic										
Fetal		P	P	P		P	P	P	P(*1)	P(*2)
Abdominal		P	P	P		P	P	P	P(*1)	P(*2)
Intraoperative (specify)										
Intraoperative Neurological										
Pediatric		P	P	P		P	P	P	P(*1)	P(*2)
Small Organ (specify)		P	P	P		P	P	P	P(*1)	P(*2)
Neonatal Cephalic		P	P	P		P	P	P	P(*1)	P(*2)
Adult Cephalic		P	P	P		P	P	P	P(*1)	P(*2)
Cardiac										
Transesophageal										
Transrectal										
Transvaginal										
Transurethral										
Transcranial Doppler										
Intravascular										
Peripheral Vascular		P	P	P		P	P	P	P(*1)	P(*2)
Laparoscopic										
MSK Conventional		P	P	P		P	P	P	P(*1)	P(*2)
MSK Superficial		P	P	P		P	P	P	P(*1)	P(*2)
Vascular Access										
Nerve Block										
Other (specify)										

N = **N**ew indication; **P** = **P**reviously cleared

Additional Comments:

Small Organ: Breast, Thyroid, Testicle

*1. B/M, B/PWD, B/CWD, B/CFM/PWD, B/AD/PWD, B/DPD/PWD, B/CFM/CWD, B/AD/CWD, B/DPD/CWD.
*2. Freehand 3D imaging, Directional Power Doppler (DPD), Imaging for guidance of biopsy.

APPENDIX D: MAINTENANCE AND CLEANING

D.1 TRANSDUCERS

D.1.1 Guidelines

Ultrasonix recommends inspecting the SONIX transducers prior to each use:

- Ensure the transducers are always clean before they are used. There must be no ultrasound gel (from previous imaging), any debris, films or unusual odors present.
- Ensure there are no cracks or other damage to the transducers before they are used. Inspect the transducer surfaces for cracks and feel for cracks with finger tips as well.

Where endocavity transducers are being used in clinical applications of a semi-critical nature (e.g., trans-rectal or trans-vaginal), ensure the transducer is covered with the appropriate STERILE transducer cover/sheath which has received regulatory clearance for use.

D.1.2 Ultrasound Coupling Gels

The following ultrasound coupling gels are recommended for use with SONIX transducers:

Table D-1: Recommended Ultrasound Coupling Gels

Gel Name	Manufacturer	Address
Aquasonic 100	Parker Laboratories, Inc	286 Eldridge Road Fairfield, NJ, 07004 USA Ph (800) 631-8888 Fax (973) 276-9510
Clear Image	Sonotech, Inc.	774 Marine Drive Bellingham, WA 98225 USA Ph (360) 671-9121 Fax (360) 671-9024
Echo-Oil®	Echo Ultrasound	R.D.#2. Box 118 Reedsville, PA 17084 USA
Echotrack®	Echo Ultrasound	R.D.#2. Box 118 Reedsville, PA 17084 USA
Ecogel 100& 200	Echo-Med Pharmaceutical Inc.	7050 Bramalea Road Unit C58 Mississauga, ON L5S 1S9 Canada Ph (905) 405-1050 Fax (905) 405-0775

Do not use gels that contain any of the following solutions:

- Acetone
- Methanol
- Denatured ethyl alcohol
- Mineral oil
- Iodine
- Any lotions or gels that contain perfume.

If there are any questions, contact Ultrasonix Medical Corporation.

D.1.3 Cleaning/Disinfecting Recommendations and Warnings for all Non-Invasive Transducers

⚠ *Warnings:*

Never sterilize the transducer with sterilization techniques such as autoclave, ultraviolet, gamma radiation, gas, steam, or heat sterilization techniques. Severe damage will result using the above sterilization techniques.

Use of precleaning solutions should be restricted to the external transducer face. DO NOT get solution on any other areas or surfaces of the transducer. This includes transducer connectors and contacts.

*Some chemicals such as phenol, benzothonium chloride, pHisohex, benzoyl peroxide, hydrogen peroxide are commonly found in clinic and hospital settings, while others are found in antibacterial skin cleaners or lotions. **Use of these chemicals will cause damage to your transducer.***

***DO NOT** use sterilization or disinfection methods that have not been recommended by Ultrasonix. Severe damage will result. Contact Ultrasonix if you have any doubt about sterilization or disinfection methods.*

⚠ *Warning: Any transducer suspected of being contaminated with **Creutzfeld Jacob** disease material cannot be cleaned or sterilized.*

Contact Ultrasonix Medical Corporation to obtain instructions on the proper disposal of these transducers.

Remove the ultrasound transmission gel with a dry or water-moistened soft cloth. It is recommended that transducers are reprocessed as soon as is reasonably practical following use.

Note: Repeated processing has minimal effect on these transducers. End of life is normally determined by wear and damage due to use. Disassembly is not required.

D.1.3.1 Cleaning (Non-Invasive Transducers)

To Clean a Transducer:

1. After every patient exam, wipe the ultrasound transmission gel off the transducer.

2. Wipe the transducer and cable with a soft, dry or water-moistened cloth.

3. Wipe the transducer with either:

    - a recommended disinfectant (refer to **Table D-2**)
    - Metrizyme
    - Klenzyme

4. Remove any residue with a soft cloth moistened in water. Do not allow cleaning solutions or isopropyl alcohol to air dry on the transducer.

Table D-2: Recommended Disinfectants for Cleaning Non-Invasive Transducers

High level disinfectants	Low level disinfectants
- Cidex plus ^{TM} - Wavicide$^{®}$-01 - Omnicide ^{TM}	- Sani-Cloth - T-spray

D.1.3.2 Disinfecting (Non-Invasive Transducers)

The disinfectant solution may be used in accordance with the label instructions.

Table D-3: Recommended Disinfectants for Disinfecting Non-Invasive Transducers

High level disinfectants	Low level disinfectants
- Cidex plus ^{TM} - Wavicide$^{®}$-01 - Omnicide ^{TM}	- Sani-Cloth - T-spray

D.1.3.3 Sterilization (Non-Invasive Transducers)

Sterilization of transducers is not possible. Follow the instructions for disinfection (above) instead.

D.1.3.4 Maintenance (Non-Invasive Transducers)

Cautions:

DO NOT drop the transducers.

DO NOT hit the transducers against any surface that can dislodge or damage any of the transducer components.

DO NOT pinch or kink the transducer cable.

DO NOT use a brush to clean the transducer. (Use a soft cloth.)

DO NOT immerse the transducer scan head past the first seam in any liquid.

DO NOT soak the transducer for extended periods of time.

DO NOT rinse or immerse near the strain relief.

DO NOT use coupling gels and cleaning agents that have not been recommended by Ultrasonix.

DO NOT use sterilization or disinfection methods that have not been recommended by Ultrasonix. Severe damage will result. Contact Ultrasonix if you have any doubt about sterilization or disinfection methods. Use of non-recommended cleaning agents may cause damage to the housing and will void transducer warranties.

DO NOT use chemicals such as phenol, benzothonium chloride, pHisohex, benzoyl peroxide, hydrogen peroxide – commonly found in hospitals or clinics. These chemicals will damage the transducer.

D.1.3.5 Inspection and Testing (Non-Invasive Transducers)

Inspect the transducers prior to each use:

- always ensure the transducers are clean before they are used. There must be no ultrasound gel (from previous imaging), debris, films, or unusual odors present
- ensure there are no cracks or other damage to the transducers before they are used. Inspect the transducer surfaces for cracks and feel for cracks with finger tips as well.

Cautions:

DO NOT use transducers if they are found to be cracked, damaged or broken.

DO NOT use the transducer if the transducer cable insulation is damaged, thereby exposing the wiring.

D.1.3.6 Storing and Packaging (Non-Invasive Transducers)

Always ensure the transducer is clean and disinfected before storing/packing it. This will help to avoid contaminating the transducer holders or the foam lining of the carrying case.

- store in one of the transducer holders
- avoid storing the transducer in areas with extreme temperatures or in direct sunlight.

After placing a transducer in its carrying case, wrap the case in bubble wrap and place the wrapped case in a cardboard box.

D.1.4 Cleaning/Disinfecting Recommendations and Warnings for all Invasive Transducers

⚠️ *Warnings:*

Never sterilize the transducer with sterilization techniques such as autoclave, ultraviolet, gamma radiation, gas, steam, or heat sterilization techniques. Severe damage will result using the above sterilization techniques.

Use of precleaning solutions should be restricted to the external transducer face. DO NOT get solution on any other areas or surfaces of the transducer. This includes transducer connectors and contacts.

*Some chemicals such as phenol, benzothonium chloride, pHisohex, benzoyl peroxide, hydrogen peroxide are commonly found in clinic and hospital settings, while others are found in antibacterial skin cleaners or lotions. **Use of these chemicals will cause damage to your transducer.***

Avoid transducer contact with strong solvents such as acetone, freon and other industrial cleansers.

DO NOT use sterilization or disinfections methods that have not been recommended by Ultrasonix. Severe damage will result. Contact Ultrasonix if you have any doubt about sterilization or disinfection methods.

⚠️ *Warning: Any transducer suspected of being contaminated with **Creutzfeld Jacob** disease material cannot be cleaned or sterilized.*

Contact Ultrasonix Medical Corporation to obtain instructions on the proper disposal of these transducers.

Remove the ultrasound transmission gel with a dry or water-moistened soft cloth. It is recommended that transducers are reprocessed as soon as is reasonably practical following use.

Note: Repeated processing has minimal effect on these transducers. End of life is normally determined by wear and damage due to use. Disassembly is not required.

D.1.4.1 Cleaning (Invasive Transducers)

Disinfect the transducer prior to the first exam and following each exam thereafter.

To Clean a Transducer:

1. Unplug the transducer.

2. Wash the transducer head and cable with soap and water to remove any protein buildup; however do not rinse or immerse the transducer near the strain relief.

3. Disinfect the transducer with one of these disinfectants:

   - Cidex plus ™
   - Wavicide®-01
   - Omnicide ™

4. Remove the transducer from the disinfectant and rinse it thoroughly with sterile water.

5. Check the transducer for any residual organic material. If the residual glutaraldehyde is higher than 10ppm, disinfect the transducer again.

> *Note: Where endocavity transducers are being used in clinical applications of a semi-critical nature (e.g., trans-rectal or trans-vaginal), ensure the transducer is covered with the appropriate sterile transducer cover/sheath which has received regulatory clearance for use.*

D.1.4.2 Disinfecting (Invasive Transducers)

The disinfectant solution may be used in accordance with the label instructions.

Table D-4: Recommended Disinfectants for Disinfecting Invasive Transducers

High level disinfectants

- Cidex plus ™
- Wavicide®-01
- Omnicide ™

D.1.4.3 Sterilization (Invasive Transducers)

Sterilization of transducers is not possible. Follow the instructions for disinfection (above) instead.

D.1.4.4 Maintenance (Invasive Transducers)

Cautions:

DO NOT drop the transducers.

DO NOT hit the transducers against any surface that can dislodge or damage any of the transducer components.

DO NOT pinch or kink the transducer cable.

DO NOT use a brush to clean the transducer. (Use a soft cloth.)

DO NOT immerse the transducer scan head past the first seam in any liquid.

DO NOT soak the transducer for extended periods of time.

DO NOT rinse or immerse near the strain relief.

DO NOT use coupling gels and cleaning agents that have not been recommended by Ultrasonix.

DO NOT use sterilization or disinfection methods that have not been recommended by Ultrasonix. Severe damage will result. Contact Ultrasonix if you have any doubt about sterilization or disinfection methods. Use of non-recommended cleaning agents may cause damage to the housing and will void transducer warranties.

DO NOT use chemicals such as phenol, benzothonium chloride, pHisohex, benzoyl peroxide, hydrogen peroxide – commonly found in hospitals or clinics. These chemicals will damage the transducer.

D.1.4.5 Inspection and Testing (Invasive Transducers)

Inspect the transducers prior to each use:

- always ensure the transducers are clean before they are used. There must be no ultrasound gel (from previous imaging), debris, films, or unusual odors present
- ensure there are no cracks or other damage to the transducers before they are used. Inspect the transducer surfaces for cracks and feel for cracks with finger tips as well.

Cautions:

DO NOT use transducers if they are found to be cracked, damaged, or broken.

DO NOT use the transducer if the transducer cable insulation is damaged, thereby exposing the wiring.

D.1.4.6 Storing and Packaging (Invasive Transducers)

Always ensure the transducer is clean and disinfected before storing/packing it. This will help to avoid contaminating the transducer holders or the foam lining of the carrying case.

- store in one of the transducer holders
- store the transducer separately from other instruments to avoid inadvertent transducer damage
- if storing the transducer in the original case or in a drawer, make sure the transducer is thoroughly dry
- avoid storing the transducer in areas with extreme temperatures or in direct sunlight.

After placing a transducer in its carrying case, wrap the case in bubble wrap and place the wrapped case in a cardboard box.

D.2 SHIPPING TRANSDUCERS FOR SERVICE

It is the customer's responsibility to ensure:

- each transducer is disinfected prior to shipping (**D.1.3** and **D.1.4**)
- the transducer is properly packaged for shipment (**D.1.3.6** and **D.1.4.6**)
- all shipping waybills/paperwork is completed as per the relevant regulations and laws.

D.3 SYSTEM COMPONENTS

Ultrasonix recommends the following cleaning instructions for all <u>external</u> surfaces, including the cart, cables and connectors.

Cautions:

Power off and unplug the system before cleaning.

Do not spill or spray water on the controls, transducer connection receptacle, or transducer ports.

D.3.1 LCD Display

Cautions:

Power off and unplug the system prior to cleaning the LCD display.

DO NOT apply cleaning solutions directly to any surface of the LCD display.

DO NOT scratch the LCD display.

DO NOT use paper towels to clean the LCD display as they may cause damage and scratches.

NEVER use cleaning products containing any of the following on either the cabinet or the screen:

- *Abrasives*
- *Acetone*
- *Alcohol (Ethanol, Methanol or Isopropyl)*
- *Ammonia*
- *Benzene*
- *Solvents*
- *Wax.*

D.3.1.1 LCD Display Cabinet

Apply a small amount of one of the following recommended cleaning solutions to a soft, non-abrasive cloth and wipe down the cabinet:

- Water
- Mild detergent (PH level at or near 7) and water solution.

D.3.1.2 LCD Display Screen

Apply a small amount of water to a soft, non-abrasive cloth. Stroke the cloth across the display in one direction, moving from the top of the display to the bottom.

Caution: Computer wipes may be used <u>only</u> if they specifically state they are designed for LCD displays.

D.3.2 Touch Screen

Cautions:

Power off and unplug the system prior to cleaning the touch screen on the operator console.

DO NOT apply the cleaning solution directly to the touch screen.

DO NOT scratch the touch screen.

DO NOT use paper towels to clean the console touch screen as they may cause damage and scratches.

Apply a small amount of one of the following recommended cleaning solutions to a soft, non-abrasive cloth:

- Water
- 1% Isopropyl Alcohol.

D.3.3 Operator Console

Cautions:

Power off and unplug the system prior to cleaning the operator console.

DO NOT apply cleaning solutions directly to the operator console.

Apply a small amount of one of the following recommended cleaning solutions to a soft, non-abrasive cloth:

- Water
- Mild detergent (PH level at or near 7) and water solution.

D.3.4 Operator Console Cover

Cautions:

Power off and unplug the system prior to cleaning the console cover.

DO NOT apply cleaning solutions directly to the console cover.

Apply a small amount of one of the following recommended cleaning solutions to a soft, non-abrasive cloth and wipe the console cover:

- Water
- Mild detergent (PH level at or near 7) and water solution.

D.3.5 Barcode Reader

⚠ *Warning:* *Disconnect the barcode reader prior to cleaning.*

Caution: *DO NOT apply cleaning solutions directly to the barcode reader.*

Note: *Barcode reader usage should not entail patient contact.*

Apply a small amount of one of the following recommended cleaning solutions to a soft, non-abrasive cloth and wipe the barcode reader:

- Water
- Mild detergent (PH level at or near 7) and water solution.

D.3.6 Power Cord

D.3.6.1 Retractable Power Cord or Cable Reel: Canada and USA (CEP)

Cautions:

Power off and unplug the system prior to cleaning.

DO NOT apply cleaning solutions directly to the retractable power cord.

Apply a small amount of one of the following recommended cleaning solutions to a soft, non-abrasive cloth. Pull the retractable power cord out to its maximum extension and wipe:

- Water
- Mild detergent (PH level at or near 7) and water solution.

D.3.6.2 Power Cord (OP, SP, RP, 01 and CEP International)

Cautions:

Power off and unplug the system prior to cleaning.

DO NOT apply cleaning solutions directly to the power cord.

Apply a small amount of one of the following recommended cleaning solutions to a soft, non-abrasive cloth and wipe the power cord:

- Water
- Mild detergent (PH level at or near 7) and water solution.

D.3.7 Wireless Adapter

⚠️ *Warning: Disconnect the wireless adapter and remove it from the bracket prior to cleaning.*

Caution: DO NOT apply cleaning solutions directly to the wireless adapter.

Note: Wireless adapter usage should not entail patient contact.

Apply a small amount of one of the following recommended cleaning solutions to a soft, non-abrasive cloth and wipe the wireless adapter:

- Water
- Mild detergent (PH level at or near 7) and water solution.

D.3.8 Transducer Basket (CEP)

Caution: Disconnect the transducer basket from the system prior to cleaning as per the directions on the label affixed to the system (below).

Apply a small amount of one of the following recommended cleaning solutions to a soft, non-abrasive cloth and wipe the transducer basket:

- Water
- Mild detergent (PH level at or near 7) and water solution.

Reinstall the transducer basket when cleaning is complete.

APPENDIX E: OBSTETRICAL TABLES

The following OB author/parameter combinations are available on the SONIX system.

Table E-1: Fetal Age

Parameter	Authors	Parameter	Authors
AC	BCWomen's Hadlock Hansmann Tokyo	FL	BCWomen's Hadlock Hansmann Merz Osaka Tokyo
APTD	Tokyo (No age table – for EFW only)	FTA	Osaka
BPD	BCWomen's Hadlock Hansmann Osaka Tokyo	GS	Hansmann Nyberg Rempen
		HC	BCWomen's Hadlock Hansmann
CEREB	Hill	HL	Jeanty
		OFD	Hansmann
CRL	BCWomen's Hadlock Hansmann Osaka Rempen	TL	Jeanty
		TTD	Hansmann Tokyo (No age table – for EFW only)
		UL	Jeanty

Table E-2: Fetal Growth

Parameter	Authors		Parameter	Authors
AC	BCWomen's Hadlock Tokyo		FL	BCWomen's Hadlock Jeanty Osaka Tokyo
AFI	Moore		FTA	Osaka
BPD	BCWomen's Hadlock Osaka Tokyo		HC	BCWomen's Hadlock
			HL	Jeanty
CRL	BCWomen's Hadlock Osaka			

Table E-3: Estimated Fetal Weight

Parameter	Authors	
EFW	Hadlock	(AC/BPD/FL/HC) (AC/FL/HC) (AC/BPD/FL) (AC/FL)
	Hansmann Shepard Tokyo Osaka	

Table E-4: Fetal Growth Ratios

Parameter	Authors
CI (HC)	Hadlock
FL/AC	Hadlock
FL/BPD	Hohler
FL/HC	Hadlock
HC/AC	Campbell

Table E-5: Birth Weight

Parameter	Authors
BW	Doubilet Hadlock Osaka

> ⚠ *Warning: Ultrasonix does not endorse user-defined **Measurements**, **Calculations** and **Tables** for diagnostic purposes. All user-defined **Measurements**, **Calculations** and **Tables** are used at the operator's discretion and risk only.*

APPENDIX F: REFERENCES

F.1 OB REFERENCES

AFI (Amniotic Fluid Index)

Jeng, C. J., et al. "Amniotic Fluid Index Measurement with the Four Quadrant Technique During Pregnancy." <u>The Journal of Reproductive Medicine</u>, 35:7 (July 1990), 674-677.

Moore, T. R, et al. "The amniotic fluid index in normal human pregnancy." <u>American Journal of Obstetrics and Gynecology,</u> (1990) 162: 1168-1173

EFW (Estimated Fetal Weight)

Hadlock, F., et al. "Estimated of Fetal Weight with the Use of Head, Body, and Femur Measurements, A Prospective Study." <u>American Journal of Obstetrics and Gynecology</u>, 151:13 (February 1, 1985), 333-337.

Hansmann, M., et al. <u>Ultrasound Diagnosis in Obstetrics and Gynecology</u>. New York: Springer-Verlag, (1986), 154.

Osaka University. <u>Ultrasound in Obstetrics and Gynecology</u>. (July 20, 1990), 103-105

Shepard, M.J., V.A. Richards, R.L. Berkowitz, et al. "An Evaluation of Two Equations for Predicting Fetal Weight by Ultrasound." <u>American Journal of Obstetrics and Gynecology</u>, 142:1 (January 1, 1982), 47-54.

Tokyo, Shinozuka, N. FJSUM, et al. "Standard Values of Ultrasonographic Fetal Biometry." <u>Japanese Journal of Medical Ultrasonics</u>, 23:12 (1996), 880, Equation 1

FL/AC Ratio (Femur Length/Abdominal Circumference)

Hadlock, F.P., R.L. Deter, R.B. Harrist, E. Roecker, and S.K. Park. "A Date Independent Predictor of Intrauterine Growth Retardation: Femur Length/Abdominal Circumference Ratio," <u>American Journal of Roentgenology</u>, 141: (November 1983), 979-984.

FL/BPD Ratio (Femur Length/Biparietal Diameter)

Hohler, C.W. & T.A. Quetel. "Comparison of Ultrasound Femur Length and Biparietal Diameter in Late Pregnancy," <u>American Journal of Obstetrics and Gynecology</u>, 141:7 (Dec. 1 1981), 759-762.

FL/HC Ratio (Femur Length/Head Circumference)

Hadlock, F.P., R.B. Harrist, Y. Shah, & S/K. Park. "The Femur Length/Head Circumference Relation in Obstetric Sonography." <u>Journal of Ultrasound in Medicine</u>, 3: (October 1984), 439-442.

HC/AC Ratio (Head Circumference/Abdominal Circumference)

Campbell, S., Thomas Alison. "Ultrasound Measurements of the Fetal Head to Abdomen Circumference Ratio in the Assessment of Growth Retardation," <u>British Journal of Obstetrics and Gynaecology</u>, 84: (March 1977), 165-174.

F.1.1 Gestational Age Tables

AC (Abdominal Circumference)

Hadlock, F., et al. "Estimated Fetal Age: Computer-Assisted Analysis of Multiple Fetal Growth Parameters." Radiology, 152: (1984), 497-501.

Hansmann, M., et al. Ultrasound Diagnosis in Obstetrics and Gynecology. New York: Springer-Verlag, (1986), 431.

Lessoway, V A. et al. "Ultrasound Fetal Biometry Charts for a North American Caucasian Population." Journal of Clinical Ultrasound, Vol. 26, No 9 (1998), 433-453.

Tokyo, Shinozuka, N. FJSUM, et al. "Standard Values of Ultrasonographic Fetal Biometry." Japanese Journal of Medical Ultrasonics, 23:12 (1996), 885

BPD (Biparietal Diameter)

Hadlock,F., et al. "Estimated Fetal Age: Computer-Assisted Analysis of Multiple Fetal Growth Parameters." Radiology, 152 : 1984), 497-501.

Hansmann, M., et al. Ultrasound Diagnosis in Obstetrics and Gynecology. New York: Springer-Verlag, (1986), 440.

Lessoway, V A. et al. "Ultrasound Fetal Biometry Charts for a North American Caucasian Population." Journal of Clinical Ultrasound, Vol 26, No 9 (1998), 433-453.

Osaka University. Ultrasound in Obstetrics and Gynecology. (July 20, 1990), 98

Tokyo, Shinozuka, N. FJSUM, et al. "Standard Values of Ultrasonographic Fetal Biometry." Japanese Journal of Medical Ultrasonics, 23:12 (1996), 885

Cereb (Cerebellum)

Hill, Lyndon, M., et al. "The Transverse Cerebellar Diameter in Estimating Gestational Age in the Large for Gestational Age Fetus." Obstetrics and Gynecology, (June 1990) Vol. 75, No. 6, 981-985

CI (Cephalic Index)

Hadlock FP, et al., "Estimating Fetal Age: Effects on Head Shape on BPD," American Journal Roentgen, 1981; 137:83-85

CRL (Crown Rump Length)

Hadlock, F., et al. "Fetal Crown-Rump Length: Re-evaluation of Relation to Menstrual Age (5-18 weeks) with High-Resolution, Real-Time Ultrasound." Radiology, 182: (February 1992), 501-505.

Hansmann, M., et al. Ultrasound Diagnosis in Obstetrics and Gynecology. NewYork: Springer-Verlag, (1986), 439.

Lessoway, V A. et al. "Ultrasound Fetal Biometry Charts for a North American Caucasian Population." Journal of Clinical Ultrasound, Vol. 26, No 9 (1998), 433-453.

Osaka University. Ultrasound in Obstetrics and Gynecology. (July 20, 1990)

Rempen, German Society for Gynecology and Obstetrics, March 1991, Issue 15, Vol 1, pp. 23 -28

FL (Femur Length)

Hadlock, F., et al. "Estimated Fetal Age: Computer-Assisted Analysis of Multiple Fetal Growth Parameters." Radiology, 152: (1984), 497-501.

Hansmann, M., et al. Ultrasound Diagnosis in Obstetrics and Gynecology. New York: Springer-Verlag, (1986), 431.

Lessoway, V A. et al. "Ultrasound Fetal Biometry Charts for a North American Caucasian Population." Journal of Clinical Ultrasound, Vol. 26, No 9 (1998), 433-453.

Merz, German Society for Gynecology and Obstetrics, March 1991, Issue 15, Vol. 1, pp. 23 -28

Osaka University. Ultrasound in Obstetrics and Gynecology. (July 20, 1990), 101-102

Tokyo, Shinozuka, N. FJSUM, et al. "Standard Values of Ultrasonographic Fetal Biometry." Japanese Journal of Medical Ultrasonics, 23:12 (1996), 886

FTA (Fetal Trunk Area)

Osaka University. Ultrasound in Obstetrics and Gynecology. (July 20, 1990), 99-100

GS (Gestational Sac)

> Hansmann, M., et al. <u>Ultrasound Diagnosis in Obstetrics and Gynecology</u>. New York: Springer-Verlag, (1986)
>
> Nyberg, D.A., et al. "Transvaginal Ultrasound." <u>Mosby Yearbook</u>, (1992), 76.
>
> Rempen, <u>German Society for Gynecology and Obstetrics</u>, March 1991, Issue 15, Vol. 1, pp. 23 -28

HC (Head Circumference)

> Hadlock, F., et al. "Estimated Fetal Age: Computer-Assisted Analysis of Multiple Fetal Growth Parameters." <u>Radiology</u>, 152: (1984), 497-501.
>
> Hansmann, M., et al. <u>Ultrasound Diagnosis in Obstetrics and Gynecology</u>. New York: Springer-Verlag, (1986), 431.
>
> Lessoway, V A. et al. "Ultrasound Fetal Biometry Charts for a North American Caucasian Population." <u>Journal of Clinical Ultrasound</u>, Vol. 26, No 9 (1998), 433-453.

HL (Humeral Length)

> Jeanty P, et al. "Estimation of Gestational Age from Measurements of Fetal Long Bones." <u>Journal of Ultrasound Medicine</u> (1984) 3:75-79

OFD (Occipito-Frontal Diameter)

> Hansmann, M., et al. <u>Ultrasound Diagnosis in Obstetrics and Gynecology</u>. New York: Springer-Verlag, (1986), 431.

TL (Tibial Length)

> Jeanty, P, et al. "Estimation of Gestational Age from Measurements of Fetal Long Bones." <u>Journal of Ultrasound Medicine</u> (1984) 3:75-79

TTD (Transverse Trunk Diameter)

> Hansmann, M., et al. <u>Ultrasound Diagnosis in Obstetrics and Gynecology</u>. New York: Springer-Verlag, (1986), 431.

UL (Ulnar Length)

> Jeanty P, et al. "Estimation of Gestational Age from Measurements of Fetal Long Bones." <u>Journal of Ultrasound Medicine</u> (1984) 3:75-79

F.1.2 Growth Analysis Tables

AC (Abdominal Circumference)

Hadlock, F., et al. "Estimated Fetal Age: Computer-Assisted Analysis of Multiple Fetal Growth Parameters." <u>Radiology</u>, 152: (1984), 497-501.

Lessoway, V A. et al. "Ultrasound Fetal Biometry Charts for a North American Caucasian Population." <u>Journal of Clinical Ultrasound</u>, Vol. 26, No 9 (1998), 433-453.

Tokyo, Shinozuka, N. FJSUM, et al. "Standard Values of Ultrasonographic Fetal Biometry." <u>Japanese Journal of Medical Ultrasonics</u>, 23:12 (1996)

BPD (Biparietal Diameter)

Hadlock, F., et al. "Estimated Fetal Age: Computer-Assisted Analysis of Multiple Fetal Growth Parameters." <u>Radiology</u>, 152: (1984), 497-501.

Lessoway, V A. et al. "Ultrasound Fetal Biometry Charts for a North American Caucasian Population." <u>Journal of Clinical Ultrasound</u>, Vol. 26, No 9 (1998), 433-453.

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Tokyo, Shinozuka, N. FJSUM, et al. "Standard Values of Ultrasonographic Fetal Biometry." <u>Japanese Journal of Medical Ultrasonics</u>, 23:12 (1996)

CRL (Crown Rump Length)

Hadlock, F., et al. "Fetal Crown-Rump Length: Re-evaluation of Relation to Menstrual Age (5-18 weeks) with High-Resolution, Real-Time Ultrasound." <u>Radiology</u>, 182: (February 1992), 501-505.

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Osaka University. <u>Ultrasound in Obstetrics and Gynecology</u>. (July 20, 1990)

EFW (Estimated Fetal Weight)

Hadlock, F., et al. "In Utero Analysis of Fetal Growth: A Sonographic Weight Standard." <u>Radiology</u>, 181: (1991), 129-133.

Osaka University. <u>Ultrasound in Obstetrics and Gynecology</u>. (July 20, 1990)

FL (Femur Length)

Hadlock, F., et al. "Estimated Fetal Age: Computer-Assisted Analysis of Multiple Fetal Growth Parameters." <u>Radiology</u>, 152: (1984), 497-501.

Jeanty P., E. et al. "Ultrasonic Evaluation of Fetal Limb Growth." <u>Radiology</u> (1982)143: 751-754

Lessoway, V A. et al. "Ultrasound Fetal Biometry Charts for a North American Caucasian Population." <u>Journal of Clinical Ultrasound</u>, Vol 26, No 9 (1998), 433-453.

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Tokyo, Shinozuka, N. FJSUM, et al. "Standard Values of Ultrasonographic Fetal Biometry." <u>Japanese Journal of Medical Ultrasonics</u>, 23:12 (1996)

FTA (Fetal Trunk Area)

Osaka University. <u>Ultrasound in Obstetrics and Gynecology</u>. (July 20, 1990), 99-100

HC (Head Circumference)

Hadlock, F., et al. "Estimated Fetal Age: Computer-Assisted Analysis of Multiple Fetal Growth Parameters." <u>Radiology</u>, 152: (1984), 497-501.

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HC/AC (Head Circumference/Abdominal Circumference)

Campbell S., Thomas Alison. "Ultrasound Measurements of the Fetal Head to Abdomen Circumference Ratio in the Assessment of Growth Retardation," <u>British Journal Obstetrics and Gynaecology</u>, 84: (March 1977), 165-174.

HL (Humeral Length)

Jeanty P., E. et al. "Ultrasonic Evaluation of Fetal Limb Growth." <u>Radiology</u> (1982) 143: 751-754

F.2 GENERAL AND CARDIAC REFERENCES

ACC (Acceleration)

Zwiebel, W.J. Introduction to Vascular Ultrasonography. 4th ed., W.B. Saunders Company, (2000), 52.

AT (Acceleration Time) & DT (Deceleration Time)

Oh, J.K., J.B. Seward, A.J.Tajik. The Echo Manual. 2nd ed., Lippincott, Williams, and Wikins, (1999), 219.

CSA (Cross Sectional Area)

Reynolds, Terry. The Echocardiographer's Pocket Reference. 2nd ed., School of Cardiac Ultrasound, Arizona Heart Institute, (2000), 383.

ET (Elapsed Time)

Redberg, Rita F., MD and Vogel, Robert A., MD, et al. "Task force #3 – what is the Spectrum of Current and Emerging Techniques for the Noninvasive Measurement of Atherosclerosis?" Journal of the American College of Cardiology. (June 4, 2003), 41:11, 1886-1898.

% Area Red and % A Red (Percent Area Reduction)

Taylor K.J.W., P.N. Burns, P. Breslau. Clinical Applications of Doppler Ultrasound, Raven Press, N.Y., (1988), 130-136.

Zwiebel W.J., J.A. Zagzebski, A.B. Crummy, et al. "Correlation of peak Doppler frequency with lumen narrowing in carotid stenosis." Stroke, 3: (1982), 386-391.

% Diam Red and % D Red (Percent Diameter Reduction)

Handa, Nobuo et al., "Echo-Doppler Velocimeter in the Diagnosis of Hypertensive Patients: The Renal Artery Doppler Technique," Ultrasound in Medicine and Biology, 12:12 (1986), 945-952.

PGr (Pressure Gradient) mmHG

Oh, J.K., J.B. Seward, A.J. Tajik. The Echo Manual. 2nd ed., Lippincott, Williams, and Wilkins, (1999), 64.

PHT (Pressure Half Time)

Reynolds, Terry. The Echocardiographer's Pocket Reference. 2nd ed., School of Cardiac Ultrasound, Arizona Heart Institute, (2000), 391.

PI (Pulsatility Index)

Kurtz, A.B. W.D. Middleton. Ultrasound-the Requisites. Mosby Year Book., Inc., (1996), 469.

RI (Resistive Index)

Kurtz, A.B., W.D. Middleton. Ultrasound-the Requisites. Mosby Year Book., (1996), 467.

VTI (Velocity Time Integral)

Reynolds, Terry. The Echocardiographer's Pocket Reference. 2nd ed., School of Cardiac Ultrasound, Arizona Heart Institute, (2000), 383.

APPENDIX G: GLOSSARY

% A Red	Percent Area Reduction
% Area Red ...	Percent Area Reduction
% D Red	Percent Diameter Reduction
% Diam Red ..	Percent Diameter Reduction
2D	Two Dimensional
3D	Three Dimensional
4D	Four Dimensional (Live 3D)
4DC	4D Curved Array Transducer
Abd	Abdomen
AC	Abdominal Circumference
AC	Alternating Current (power supply)
ACC	Acceleration
AD	Angio Doppler
Admin	Administrative/Administrator
AE	Application Entity (DICOM)
AFI	Amniotic Fluid Index
AFV	Amniotic Fluid Volume
AIUM	American Institute of Ultrasound in Medicine
ALARA	As Low As Reasonably Achievable
Ao	Aorta
AO/LA	Aorta/Left Atrium
AoV	Aortic Valve
AP	Anterior Posterior
APD	Anterior Posterior Diameter
APTD	Anterior Posterior Thorax Diameter
AR	Area
AT	Acceleration Time
AUA	Average Ultrasound Age
AV	Aortic Valve
AVI	Audio Video Interleave
AVm	Mean Average Velocity

AVp	Peak Average Velocity
B/M-Mode	2D and M-Mode
Base	Baseline (i.e., Doppler Baseline)
BBT	Basal Body Temperature
BGR	Blue Green Red
BMP	Bitmap
BNC	Bayonet Neill Concelman
BPD	Biparietal Diameter
BLT	Bottom Left
BRT	Bottom Right
BSA	Body Surface Area
Calcs	Calculations
Card	Cardiology
CCA	Common Carotid Artery
CD	Compact Disc
Cereb	Cerebellum
CEREB	Cerebellum
CFM	Color Flow Mode
CI	Cephalic Index
CIR	Circumference
Cntrst Pos	Contrast Position
COR	Coronal
CRL	Crown Rump Length
CSA	Cross Sectional Area
CW	Continuous Wave
CWD	Continuous Wave Doppler
DCM	DICOM
DEL	Delete
DICOM	Digital Imaging and Communications in Medicine
DISP	Display

DIST...............Distal		**GS**..................Gestational Sac	
Dist................Distance		**Gyn**................Gynecology	
DPD................Directional Power Doppler		**HC**..................Head Circumference	
DT...................Deceleration Time		**HIPAA** ....Health Insurance Portability & Accountability Act	
DVD................Digital Video Device		**HL** ....Humeral Length	
Dyn ....Dynamic Range		**HR**..................Heart Rate	
EC ....Endocavity		**ICA**.................Internal Carotid Artery	
ECA................External Carotid Artery		**ICT** ....Intracavity Transducer	
EDD................Estimated Date of Delivery		**IP**....................Internet Protocol	
EDV................End Diastolic Velocity		**ISP** ....Internet Service Provider	
EDVPG ....EDV Pressure Gradient		**IT**....................Information Technology (e.g., IT Department)	
EF...................Ejection Fraction		**IVS** ....Interventricular Septum	
EFW ....Estimated Fetal Weight		**IVSd**...............Interventricular Septum diastole	
EMC ....Electro-Magnetic Compatibility		**IVSs** ....Interventricular Septum systole	
EPI..................Extended Pulse Imaging		**JPEG** ....Joint Photographic Experts Group	
EPSS ....E Point Septal Separation		**Kb** ....Kilobyte	
ET...................Elapsed Time		**LA** ....Long Axis	
EV...................Endovaginal		**LA** ....Left Atrium	
FDA................U.S. Food and Drug Administration		**LAN** ....Local Area Network	
FHR ....Fetal Heart Rate		**LAT**................Lateral	
FL ....Femur Length		**LCD** ....Liquid Crystal Display	
FOV................Field Of View		**LMP** ....Last Menstrual Period	
FPS ....Frames per second		**LONG** ....Longitudinal	
FR...................Frame Rate		**LOV** ....Left Ovary	
FrD ....Doppler Transmit Frequency		**LT**...................Left	
Freq ....Frequency		**LVDd** ....Left Ventricular Diameter diastole	
Frm ....Frame		**LVDs** ....Left Ventricular Diameter systole	
FrRate............Frame Rate		**LVOT** ....Left Ventricular Outflow Tract	
FTA ....Fetal Trunk Area		**LVPWd**...........Left Ventricular Posterior Wall diastole	
Fwd................Forward		**LVPWs** ....Left Ventricular Posterior Wall systole	
GA ....Gestational Age		**Max**................Maximum	
Gb ....Gigabyte		**Mb**..................Megabyte	
Gen ....General		**MCA**...............Middle Cerebral Artery	
GIF ....Graphics Interchange File or Format			

MEAS. .... Measure	**Picto**............... Pictogram
MED .... Medial	**PIN** .... Personal Identification Number
MGr .... Mean Gradient	**PNG** .... Portable Network Graphics
MI .... Mechanical Index	**Pos** .... Position
Min .... Minimum	**POS** .... Position
M-M .... Motion Mode	**PostV Blad** ..... Post Void Bladder
MPEG .... Moving Picture Experts Group	**PreV Blad** .... Pre Void Bladder
MPG .... Moving Picture (Experts) Group	**PRF** .... Pulse Repetition Frequency
MPR .... Multiplanar Reconstruction	**PROX** .... Proximal
Multi .... Multiple	**PSV** .... Peak Systolic Velocity
Msk .... Musculoskeletal	**PSVPG** .... PSV Pressure Gradient
MV .... Mean Velocity	**PV** .... Peak Velocity
MV .... Mitral Valve	**PV** .... Pulmonary Valve
NEMA .... National Electrical Manufacturers Association	**PW** .... Pulsed Wave Doppler
NET .... Network	**PWD** .... Power Doppler
NF .... Nuchal Fold	**Q** .... Quadrant (e.g., AFI)
NT .... Nuchal Thickness	**Rad** .... Radius
NTSC .... National Television Standards Committee	**Rect** .... Rectangle
OB .... Obstetrics	**Res** .... Resolution
OD .... Optical Density	**RF** .... Radio Frequency
OEM .... Original Equipment Manufacturer	**RGB** .... Red Green Blue
OFD .... Occipital-Frontal Diameter	**RI** .... Resistive Index
OOD .... Outer Orbital Diameter	**ROI** .... Region of Interest
PA .... Phased Array	**ROV** .... Right Ovary
PAL .... Phased Alternating Line	**RT** .... Right
Pano .... Panoramic Imaging Mode	**RVDd** .... Right Ventricular Dimension diastole
PDF .... Portable Document Format	**RVDs** .... Right Ventricular Dimension systole
Pel .... Pelvis	**RVOT** .... Right Ventricular Outflow Tract
Pen .... Penetration	**RVWd** .... Right Ventricular Wall diastole
Persist .... Persistence	**RVWs** .... Right Ventricular Wall systole
PGr .... Pressure Gradient	**SA** .... Short Axis
PHT .... Pressure Half Time	**SAG** .... Sagital
PI .... Pulsatility Index	**SCP** .... Service Class Provider
	SCU .... Service Class User

SD	Standard Deviation	**TTD**	Transverse Trunk Diameter
SD	Systolic/Diastolic Ratio	**TV**	Tricuspid Valve
SDK	Software Development Kit	**UI**	User Interface
SEL	Select	**UL**	Ulnar Length
Simult	Simultaneous	**UL**	Underwriter's Laboratory
SMTP	Simple Mail Transport Protocol	**ULT**	Upper Left
SV	Sample Volume	**Umb A**	Umbilical Artery
SV	Stroke Volume	**URL**	Uniform Resource Locator
TCP	Transfer Control Protocol	**URT**	Upper Right
TCP/IP	Transmission Control Protocol/Internet Protocol	**US**	Ultrasound
TFT	Thin Film Technology	**USB**	Universal Serial Bus
TGC	Time Gain Compensation	**VAC**	Volts Alternating Current
THI	Tissue Harmonic Imaging	**VCR**	Video Cassette Recorder
TI	Thermal Index	**Vel**	Velocity
TIB	Thermal Index – Bone	**Vol**	Volume
TIC	Thermal Index – Cranial	**VPS**	Volumes per Second
TIS	Thermal Index – Soft Tissue	**VR**	Volume Rendering
TL	Tibia Length	**VTI**	Velocity Time Integral
TRANS	Transverse	**WF**	Wall Filter
Transp	Transparency	**WWW**	World Wide Web
		YS	Yolk Sack