

z.one



z.one *ultra sp* 4.2 QUICK REFERENCE GUIDE



SmartCart *sp*, Scan Engine & Scan Module

NEXT GENERATION OF ULTRASOUND





ZONARE Medical Systems, Inc.

420 North Bernardo Avenue
Mountain View, California 94043
www.zonare.com
Customer Service: (877) 913-9663 or (650) 316-3199

Subsidiaries

Europe

ZONARE Medical Systems GmbH

Henkestrasse 91
91052 Erlangen, Germany
(+49) 9131-974 94-0 www.zonare.de
Sales Support by e-mail info@zonare.de
For international service, contact your local authorized dealer or use the contact information above. Toll-free live-voice support is not available outside the United States.

Germany

Zonare Medical Systems GmbH

Henkestrasse 91
D-91052 Erlangen, Germany
T 49.9131.974.94.0
F 49.9131.974.94.10
www.zonare.de

UK

Zonare Medical Systems UK Limited

Westacott Business Center, Suite A8
Westacott Way, Littlewick Green
Maidenhead
Berkshire SL6 3RT, UK
T 44.8448.711.811
F 44.8448.711.810
www.zonare.co.uk

Canada

Zonare Canada

464 Osborne Street
Beaverton ON L0K 1A0
Canada
T 1.866.966.2730
F 705.426.1554

© 2009 ZONARE Medical Systems, Inc. All rights reserved.



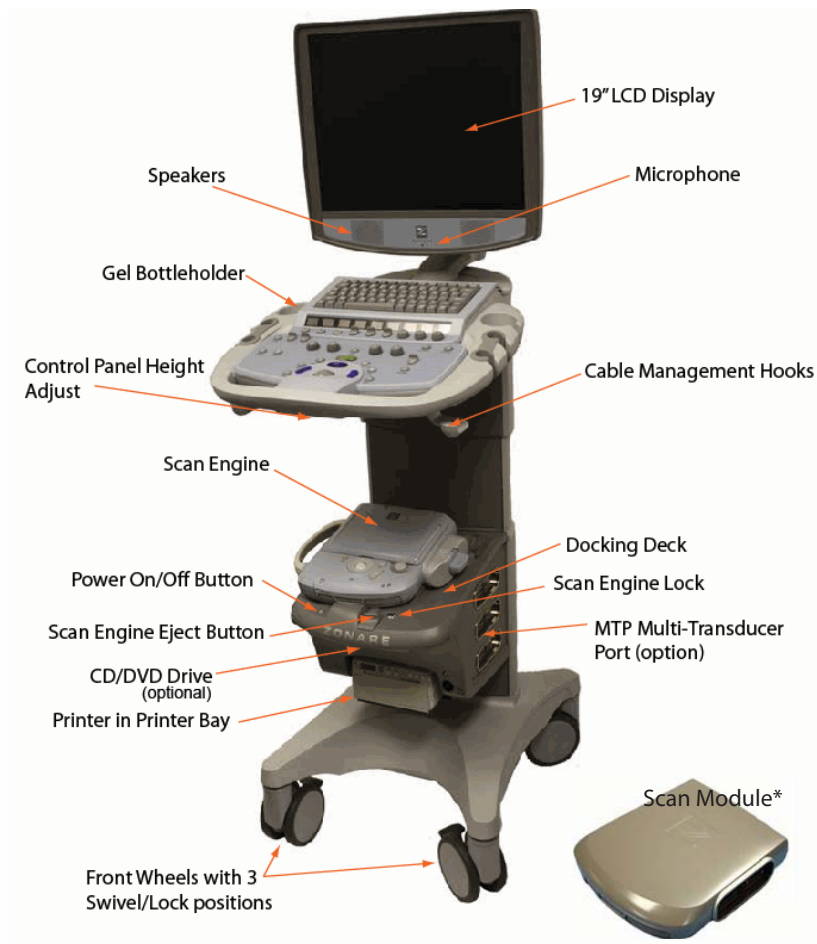
CAUTION: "United States law restricts this device for sale or use by or on the order of a physician"

z.one ultra sp Components

z.one ultra

See the **z.one ultra** Ultrasound System Operator Manual for operational details and safety instructions.











z.one ultra sp Convertible Ultrasound System*



* The ZONARE Scan Module can be used instead of the Scan Engine on the **z.one ultra sp** Ultrasound System. The Scan Module, which is not convertible, displays images on the SmartCart *sp*'s LCD display and is operated and powered by the SmartCart *sp*'s user interface and power options.



Image Screen Layout

- ① **Status Icons**
 -  SmartCart/Scan Engine battery charge status (if cart battery not present second icon will not appear)
 - i. Green: Battery has >25% capacity remaining
 - ii. Yellow: Battery has >10%-25% capacity remaining
 - iii. Red: Battery has <10% capacity remaining
 -  Scan Engine Disk Status
 - i. Green: >20% Dicom storage capacity available
 - ii. Yellow: >5% - <20% Dicom storage capacity available
 - iii. Red: <5% Dicom storage capacity available
 -  Smart Cart Hard Disk
 - i. Green: >20% storage capacity available
 - ii. Yellow: >5% - <20% storage capacity available
 - iii. Red: <5% storage capacity available
 -  Removable Media (USB)
 - i. Green: >20% storage capacity available
 - ii. Yellow: >5% - <20% storage capacity available
 - iii. Red: <5% storage capacity available
-  **② USB Printer**
 - i. Green: Printer has completed all jobs
 - ii. Yellow: Job (or jobs) have been queued but not printed
 - iii. Red: Printer has an error
-  **③ USB Serial Port is recognized and supported**
-  **④ Removable Media (CD/DVD)**
-  **⑤ Wireless Connection**
-  **⑥ Wireless Connectivity Status**
 - i. 1 bar: 1 - 20% wireless signal strength
 - ii. 2 bars: 21 - 40% wireless signal strength
 - iii. 3 bars: 41 - 60% wireless signal strength
 - iv. 4 bars: 61 - 80% wireless signal strength
 - v. 5 bars: 81 - 100% wireless signal strength
-  **⑦ Networking Status**
 - i. Grey: Network communication established
 - ii. Grey with X: Network communication has not been established
 - iii. Red: Error with Network transfer
- ⑧ Non-Imaging Status**
 - Analog Exam Clock
 - Drive Capacity
- ⑨ Current Exam**
- ⑩ Recent Measurements**
- ⑪ Patient Schedule**
- ⑫ Department Schedule**
- ⑬ Function Keys (programmable)**
- ⑭ Reference Images**

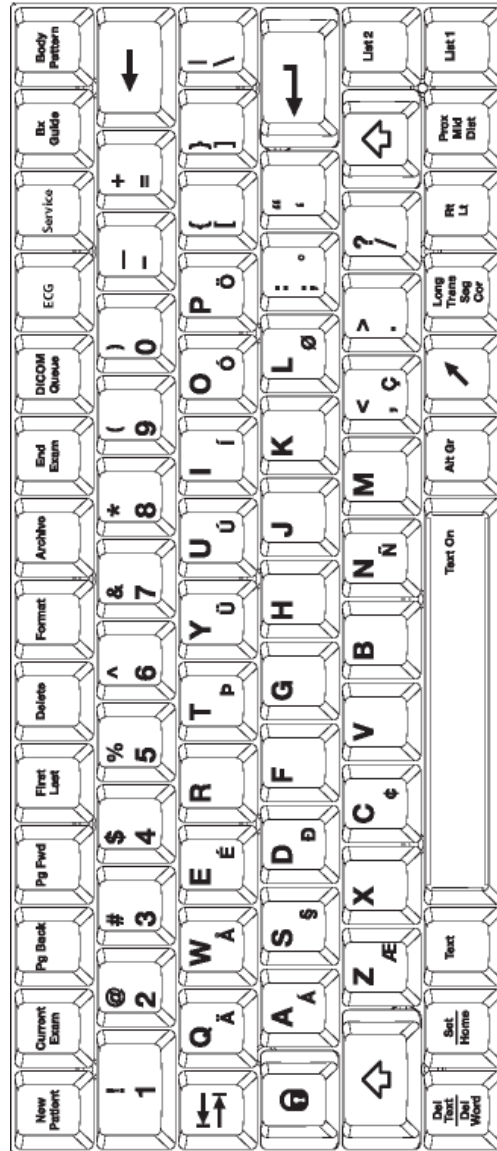
- 1 Set-up Button
- 2 F1, F2 (programmable buttons)
- 3 M-Mode Major Mode Button*
- 4 PW Doppler Major Mode Button*
- 5 Zoom Button
- 6 Color/Power Doppler Major Mode Button*
- 7 2D (B-Mode) Major Mode Button*
- 8 Exam Type Button
- 9 Transducer/MTP Display Button
- 10 Depth Button
- 11 Frequency Button
- 12 Menu Button
- 13 Print Button
- 14 Store Button
- 15 Set Buttons (2)
- 16 Freeze Button
- 17 Optimize Button (Auto-opt with ZST)
- 18 Measure Button
- 19 Calc Button (displays Calculation Package, if available)
- 20 Enter/Select
- 21 Back/Delete
- 22 Report Button (displays Calcs Worksheet/Report, if available)
- 23 Trackball
- 24 Softkeys
- * Rotate button to adjust Gain



SmartCart sp Control Panel

z.one ultra sp Components (cont'd)

SmartCart sp QWERTY Keyboard



Getting Started

Operate the z.one *ultra* SmartCart *sp* Using AC Power

Connect the AC power cord to the back of the SmartCart *sp*, then plug into a hospital-grade electrical outlet. Flip the power supply rocker switch to the ON position.

Turn the System On/Off

1. Locate the green **Power** button on the front of the docking deck.
2. Press the **Power** button once to turn ON and once to turn OFF.

Proper Insertion/Removal (Docking) of the Scan Engine/Scan Module

To Dock

1. Place the Scan Engine/Scan Module in the molded area on the docking plate so that it will align itself in the cradle.
2. Gently slide the Scan Engine/Scan Module towards you until you hear it "click" into place.

To Undock*

1. Push and hold the Scan Engine/Scan Module release lever away from you.
2. Then slide the Scan Engine/Scan Module away from you to undock it from the SmartCart *sp*.

* If the SmartCart *sp* includes the optional Multi-Transducer Port (MTP), you must first disconnect the Multi-Transducer Connector from the Scan Engine/Scan Module before you can undock it from the SmartCart *sp*. See the Operator Manual.

Connect Transducer(s)

WARNING: Bent, broken, or missing pins on the transducer connector may cause poor image quality, including possible mirror image artifact. Check pins before connecting transducer. If pins are bent, broken, or missing, do not use the transducer and call ZONARE Technical Support.



1. Locate the transducer connection port on the side of the Scan Engine/Scan Module.
2. Position the transducer connection board against the port with cable facing towards you.
3. Rotate the locking knob clockwise.

Systems with Optional Multi-Transducer Port

Note: The Multi-Transducer Port (MTP) enables simultaneous connection of up to 3 separate transducers.

1. Locate the MTP on the side of the SmartCart *sp*.
2. Connect each transducer to available transducer port as described above.

Display Transducer Softkeys

1. Press the **Transducer** button. Softkeys for the connected transducer(s) will display.



Proper SmartCart *sp* Usage




When Moving

1. Lower the adjustable height to MINIMUM using the height adjustment lever.
2. Fold the Monitor Display down to a horizontal position and lock in place.
3. Ensure that the transducer cables are wrapped over the cable hooks.
4. Place the front wheels in the non-swivel position (number 1).
5. Ensure that the back (pivoting) wheels always lead (push cart from the front when transferring from location to location).
6. When moving the SmartCart *sp* over obstacles, always pull and/or lift from the rear.



When Scanning

1. Before scanning a patient, apply the brake by fully depressing the brake pedal on each front wheel.
2. To disengage the brakes, flip up the pedals.

Enter New Patient Information

- 
- 
- 
1. Press the **New Patient** key on the QWERTY keyboard.
 2. Use the **Trackball** to point the cursor to the **Exam** drop-down menu and press **Set**. Demographics information displayed may change depending on the **Exam Type** selected.
 3. Input the patient information using the keyboard and **Tab** key to move between data fields.
 4. Select **Exit** to exit the **Patient Information** page and begin imaging.
 5. Or press **Freeze** to exit the **Patient Information** page.

Select Exam Type and Preset

- 
- 
1. Press the **Exam Type** button.
 2. Press the softkey for the **Exam Type/Preset** you want.
OR
 - Use **Trackball**: Highlight and select **Exam Type**.
 - a. On next menu, highlight and select the exam you want.
 - b. On next menu, highlight and select the **Preset** you want.
 3. The selected exam automatically opens in B-Mode (2D).

View Full-Screen Display (SmartCart *sp* only)

1. During imaging, press the SmartCart *sp* function key programmed for **Full Image Display (F1, F2)** to view a full-screen display of the imaging area.
2. To return to normal view, press the function key again.
(See the Operator Manual for how to program function keys for **Full Image Display**.)





B-Mode for SmartCart sp



Note: The **Optimize** key can be configured to activate both **AutoGain/DGC** and/or **Sound Speed Correction**. Refer to the Operator Manual.

Adjust the Gain/DGC


Automatic Gain/DGC Adjustments – Optimize Key

-  1. Press the **Optimize** button. The system will automatically adjust the overall gain/DGC.
-  2. If a different gain level is desired, rotate the **2-D Gain** knob to adjust the brightness level. The new gain/brightness level will be remembered the next time you press the **Optimize** key.

Manual Gain Adjustments

-  • To adjust the overall gain, rotate the **2-D Gain** knob clockwise to increase gain and counter-clockwise to decrease gain.
-  • To adjust specific area(s) of the image:
 1. Press the **Menu** button. Use the **Trackball** to select **TGC**.
 2. Select desired slide with **Trackball**. Move **Trackball** left/right to set each slide to desired position.
 3. To move several consecutive slides at once, press **Enter/Select**, then select and set slides with **Trackball**.
 4. Press **Enter/Select** to deselect consecutive slides.

Auto-Opt with ZST Feature - Sound Speed Correction

-  1. Press the **Optimize** key. (The default is an “extended” press. Refer to the Operator Manual.)
2. The image will freeze momentarily.
3. The image becomes live with the correct sound speed, displayed as a ZSI unit (Zone Speed Index unit of “0” is based upon 1540 meters/sec. Values that are above or below 1540 will be displayed as a + or – value).

Adjust the Depth




-  Use the **Depth** button to increase (down) or decrease depth (up).

Compound Imaging

Turn On/Off

1. Press the **Compound On** softkey to turn compounding off. Press again to turn on.

Compounding

-  1. Press the **Menu** button. Use the **Trackball** to select **Compounding**.
 -  2. Depending on the active transducer, move the **Trackball** right/left to cycle through the different compound choices.
- OR
-  1. When doing **Compound** imaging, press the **Frequency** button to cycle through the available **Frequency** and **Compounding** choices for that transducer.

Zoom

Acoustic Zoom



1. During live scanning, press the **Zoom** button. An ROI will appear.
2. Use the **Set** button and the **Trackball** to adjust the ROI position and size.
3. Press **Zoom** again when ready to invoke the feature. Press **Zoom** again to exit.

Display Zoom



1. With a frozen image, press the **Zoom** button. The current image displays as a magnified image.
2. Use the **Depth** button to decrease or increase the magnification factor. The magnification factor is displayed on the screen. Use the **Trackball** to pan the image, Up, Down, Right, Left, or Diagonally.
3. Press **Set** to toggle between **Pan** and **Cine** review.

Freeze the Image

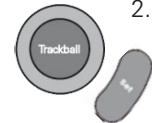


- Press **Freeze** to freeze the image; press **Freeze** again to unfreeze the image.

Toggle Between Linear and Virtual Array Formats

Press the softkey to switch between **LIN** and **VA**.


Retrospective Processing




1. After freezing the image, press the **Menu** button to select the **B-Processing** mode controls.
2. Use the **Trackball** and **Set** buttons to highlight and adjust the various parameters. (See Operator Manual for more information)

M-Mode for SmartCart sp



Turn On/Off M-Mode

- 
1. Press **M** to enter **M-Mode** display.
 2. Press **M** again to exit **M-Mode** display.



Adjust Gain

- 
- Use the rotary **Gain** on the **M-Mode** button to adjust strip gain.
Clockwise = increases Gain; Counter-clockwise = decreases Gain

Adjust Sweep Speed

- 
1. With **M-Mode** displayed, press the **Menu** button to display the menu.
- 
2. Use the **Trackball** to highlight **Sweep Speed**.
 3. Move **Trackball** left or right to cycle through the **Sweep Speeds** (Low, Medium, High).


Retrospective Processing

- 
1. After freezing the image, press **Menu** to select the **M-Processing** mode controls.
- 
2. Use the **Trackball** and **Set** button to highlight and adjust the various parameters.
(See Operator Manual for additional information)


Color Doppler/Power Doppler (CD/PD) for SmartCart sp

Note: The **z.one ultra** system does not require the user to adjust the transmit focus location. The Zone Sonography™ architecture dynamically controls focusing on transmit and receive. Please refer to the Operator Manual for more details.

Turn On/Off CD/PD

- 
1. Press the **C** button to enter **CD/PD** display.
 2. Press the **C** button again to exit **CD/PD** display.

Adjust/Move ROI

- 
1. Use **Set** button to toggle between positioning and sizing of ROI area.
 2. Use the **Trackball** to adjust the ROI position and size. Then press **Set** button.

Steer (Left/Right/Center) [linear array transducers only]

Press the **Steer** softkey to cycle through Left / Right / Center

Adjust Gain

- 
- Turn the outer rim of the **C** button to adjust **CD/PD** gain.

Adjust Scale

Press the **Scale** softkey to increase (up) or decrease (down) the velocity scale.

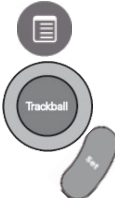
Adjust Baseline

Press the **Baseline** softkey (up/down) to raise or lower the baseline.

Switch Between CD (Color Doppler) and PD (Power Doppler)

1. Activate **Color Doppler** Mode.
2. Turn the right-most softkey to select **CDV** or **PDI**, then press the key to activate.

Retrospective Processing

- 
1. After freezing the image, press **Menu** to select **CD Processing** mode controls.
 2. Use the **Trackball** and **Set** button to highlight and adjust the various parameters.
(See Operator Manual for additional information)

Pulse Wave (PW) Doppler for SmartCart sp

Turn On/Off PW Doppler

1. Press **D** to begin **PW Doppler** display.
2. Press **D** again to exit **PW Doppler** display.*
3. Use the **Trackball** to position the **PW** cursor.
*Press **B-Update** softkey to active **PW** strip if entering **PW** for first time during the exam.

Steer the Cursor (linear array transducers only)

Press the **Steer** softkey to cycle through Left / Right / Center

Adjust Gain

1. Turn the outer rim of the **D** knob to adjust gain.

Adjust Scale

Use the **Scale** softkey to increase/decrease **PW** scale.

Adjust Baseline

Use the **Baseline** softkey to raise (up) or lower (down) the **PW** baseline.

Adjust Filter

Use the **Filter** softkey to increase/decrease filter settings (L, M, H).

Retrospective Processing

1. After freezing the image, press **Menu** to select the **PW Processing** mode controls.
2. Use the **Trackball** and **Set** button to highlight and adjust the various parameters.
(See Operator Manual for additional information.)

B-Mode

Depth (cm)

1. During live scanning, press the **Measure** button.
2. Use the **Trackball** to set the caliper at the appropriate place in the image.
3. The depth (from the transducer) will be displayed on the screen in the measurements area.

Distance (cm)

1. On a frozen B-Mode image, press **Measure** button.
2. Use **Trackball** to select **Distance** and press **Set** button.
3. Use **Trackball** to position the first caliper and press **Set**.
4. Use **Trackball** to position the second caliper and press **Set**.
5. The distance from the first caliper to the second caliper will be displayed on the screen in the measurements area.

Additional Distance Measurements

1. Press **Measure** again or double-click **Select/Enter** button.
2. Repeat Steps 2 - 4 (above) to measure up to four distances.

Volume (cm³)

1. Acquire the long axis image first.
2. **Freeze** the B-Mode image; then press the **Measure** button.
3. Use the **Trackball** and **Set** button to highlight and select **Volume**.
4. Use the **Trackball** to position the first caliper for caliper set 1. Press **Set**.
5. Use the **Trackball** to position the next caliper and press **Enter/Select**.
6. Repeat Steps 3 and 4 for caliper set 2. Press **Store** button.
7. Unfreeze image. Acquire the short axis view.
8. Repeat Steps 2 - 5 for caliper set 3. The volume calculation then displays.

Area (cm²)


Note: Default is set to **Ellipse**. If not, use **Set-up | Calcs | General |** to change method to **Ellipse**.

1. On a frozen image, press **Measure**.
2. Use the **Trackball** and **Set** button to highlight and select the **Circ/Area** option.
3. Position the first caliper and press **Set**.
4. Position the second caliper and press **Set**.
5. Use the **Trackball** to define the ellipse.
6. Use **Set** to toggle among the first and second calipers and ellipse for repositioning if necessary.
7. The area will be displayed on the screen in the measurements area.

Measurements & Annotations (cont'd)

Trace (cm²)

Note: Default is set to **Ellipse**. Go to **Set-up | Calcs | General |** to change method to **Trace**.

- 
1. On a frozen image, press **Measure**.
 2. Use the **Trackball** to highlight and select the **Circ/Area** option.
 3. Use the **Trackball** to position the active caliper at a point on the perimeter to be measured and press **Set**.
 4. Using the **Trackball**, drag the second caliper to enclose the area to be measured and press **Set**.
 5. The area will be displayed on screen in the measurements area.
 6. To backup or undo the trace, press the **Back/Delete** button.


Delete a Measurement

Press the **Back/Delete** button to delete the last cursor.




M-Mode

Distance (cm)

- 
1. Display the **M-Mode** strip.
 2. Press **Freeze**.
 3. Press **Measure**.
 4. Select **Distance** using the **Trackball**.
 5. Use the **Trackball** to position to the M-caliper.
 6. Press **Set** to lock the vertical axis and activate the second M-caliper.
 7. Use the **Trackball** to position the second caliper and press **Set**.
 8. The **M-distance** displays on the screen in the measurements area.

Heart Rate (bpm)

Note: Default is measuring one heart cycle. To increase the number of heart cycles for the default, go to **Set-up | Calcs | General**

- 
1. Display the **M-Mode** strip.
 2. Press **Freeze**.
 3. Press **Measure**.
 4. Select **HR** using the **Trackball**.
 5. Use the **Trackball** to position the first cursor and press **Set** to lock the cursor.
 6. Use the **Trackball** to position the second cursor and press **Set**.
 7. HR is displayed on the screen in the measurements area.

PW Doppler

Auto-Dop Trace

Note: Can be used during "live" or "frozen" PW strips.

To activate **Auto-Dop Trace** (first time after boot up):



1. Display the **PW** strip.
2. Double-click the **Measure** key (only need to do once per bootup)
 - a. Doppler waveform starts being traced with a green line outlining the maximum velocities.
 - b. Can be configured to outline the mean velocities, etc. (refer to Operator Manual).
 - c. Results are displayed (up to 4 items) in lower right screen and updated.



3. Choose a Measurement from the list (default is **RI** measurement).



To temporarily turn **Auto-Dop Trace** OFF/ON:

- Single-click the **Measure** key

To completely turn **Auto-Dop Trace** OFF/ON:

- Double-click the **Measure** key

Velocity (cm/s)

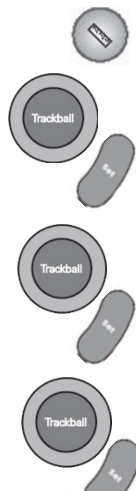
1. Display the **PW** strip.
2. Press **Freeze**.
3. Press **Measure**.
4. Select **Velocity** using the **Trackball**.
5. Use the **Trackball** to position the cursor.
6. Velocity will be displayed on the screen in the measurements area.
7. To measure additional velocities, press **Enter/Select** twice to activate another cursor. Up to four separate velocities can be measured and displayed.

Velocity Pairs, RI, PI, Accl, S/D, A/B, HR

1. Display the **PW** strip.
2. Press **Freeze**.
3. Press **Measure**.
4. Select the desired measurement using the **Trackball**.
5. Use the **Trackball** to place the first cursor and press **Set**.
6. Use **Trackball** to place the second cursor and press **Set**.
7. Measurement will be displayed on the screen in the measurements area.

Measurements & Annotations (cont'd)


Volume Flow*

- 
1. Acquire 2D/Color/PW Doppler spectrum (spectral strip can be "live" or "frozen").
 2. Double-click the **Measure** button. This will produce a generic auto trace measurement.
 3. Use the **Trackball** to scroll down to **Vol Flow** and press **Set**. On the next menu are two selections: **Vessel Diam** and **PW Gate Size**.
 4. Use the **Trackball** to highlight **Vessel Diam**. Then use the **Trackball** to position the horizontal lines on the inner diameter of the vessel. The vessel diameter represents the diameter of the flow area that blood passes through. Press **Set**.
 5. Next, use the **Trackball** to highlight **PW Gate Size**. Then use the **Trackball** to position the **PW Gate** within the vessel diameter, encompassing the entire flow. Press **Set**.
 6. The following generic numbers will be displayed at the bottom of the image.
 - Diameter
 - TAMN
 - PSV
 - Volume Flow (ml/min)

* You can activate **Auto-Dop Trace** while scan is "live" or "frozen." You can adjust **PW Gate Size** only during "live scanning." You can adjust **Vessel Diam** while "live" or "frozen."

Calc with Volume Flow* (only available when using the "Vasc/Arterial-UE" preset)

Currently, **Calc** is only for UE graft measurements.

- 
1. Press **Exam Type** button. Use the **Trackball** to select **Vascular Exam Type**, then select **Arterial-UE** preset.
 2. After setting up **Volume Flow** measurement described above, press the **Calc** button.
 3. Use the **Trackball** to highlight **Graft Vel** to obtain just a **PSV** (inflow, prox, mid, distal, outflow). Use the **Trackball** to select one of the **PSV** options. Press **Set**.
 4. Then scroll down and select **Graft Vol Flow**. **Graft Vol Flow** will give you three subtopics: **Location** (inflow, prox, mid, distal, outflow), **Vessel Diam**, **PW Gate Size**.
 5. Highlight **Location** and select one of the options.
 6. Next, use the **Trackball** to highlight and adjust the **Vessel Diam** and **PW Gate Size** to obtain your measurements (see the "To Measure Flow Volume" section above).
 7. The following measurements will be displayed:
 - Graft location and inflow diameter
 - TAMN
 - Graft Inflow PSV
 - Graft Vol Flow (ml/min)

* You can activate **Auto-Dop Trace** while scan is "live" or "frozen." You can adjust **PW Gate Size** only during "live scanning." You can adjust **Vessel Diam** while "live" or "frozen."

Annotations on SmartCart *sp*

Enter Text

1. Press the **Spacebar** or **Text** key.
2. A cursor will appear in the image area (position with the **Trackball** if desired).
3. Use the alphanumeric keyboard to type desired text. Overwrite mode is the default.
4. Press **Set** to change from overwrite mode to insert mode.

Move Text

1. Press the **Spacebar** or **Text** key.
2. Place cursor in word(s) you want to move. Then double-click the **Set** button. The selected text is now highlighted in yellow.
3. Use the **Trackball** to reposition the selected text. Then press **Set**.

Delete Text

1. To delete the last word you typed, press the **Del Text/Del Word** key.
2. To delete all text displayed, press **Shift + Del Text/Del Word**.

Use the Arrow

1. The arrows can be activated during live or frozen imaging.
2. Press the **Arrow** key. The arrow will be green.
3. Use the **Trackball** and **Set** key to toggle between **Position** and **Rotate**.
4. Press **Store** key. The arrow turns gray and is stored with the image.

To bring up additional arrows on the same image:

1. Double-click the **Set** key to set the arrow (turns gray). Another green arrow appears.
2. Move the **Trackball** to position and rotate the green arrow.
3. Repeat steps 3 & 4 above. You can bring up as many arrows as desired.

To delete a single arrow:

1. Press the **Del Text** key (QWERTY keyboard). The last arrow deletes.
2. Repeat to continue deleting the last arrow used. This will delete one arrow at a time.

To delete all arrows simultaneously:

1. Unfreeze the image. The arrow(s) will disappear. Text will remain on the screen.

Use Quick Annotation Keys*

The quick annotation keys are accessed via the SmartCart *sp*'s softkey menu:




- Rt Lt • Long Trans Sag Cor • Prox Mid Dist
- List 1 • List 2 • List 3 • Body Pattern Controls

1. On the QWERTY keyboard, press the **Spacebar** or **Text** key to display text. Text will appear at the current cursor position. Toggle the appropriate softkey to display the desired annotation. You can cycle through the lists forward or backward.

* You can store customized annotations to **Presets**. For details, see the Operator Manual.

Image Storage for SmartCart sp

The **Print** and **Store** keys can be configured to send images to a combination of internal CompactFlash, external peripherals, and networked DICOM devices. The factory default configuration is:

-  **Store** Key: Stores images to internal CompactFlash/network.
-  **Print** Key: Prints image simultaneously to attached/network printer and the internal CompactFlash.
-  See the Operator Manual for details on configuring these keys.

Archive Options



To avoid loss of data, always back up storage/archiving devices. Do not delete patient data and images from scanner until backup has been completed and the ability to read the transferred details verified.

Review



1. Press **Archive**.
2. Use the **Trackball** to point to the desired patient exam to review.
3. Double-click the **Set** key to open the exam.
4. Use **Pg/Forward, Pg/Back** keys (QWERTY) to navigate through the images.

Export Exams

1. Insert USB Memory Stick or other media (CompactFlash reader, CD, DVD) into the appropriate port/slot.
2. Press **Archive**.
3. Press **Export**. Click on exam(s) desired for exporting.
4. Under **Destination** choose the directory for exporting exams.
5. Click on **Export**.

Import Exams

1. Insert USB Memory Stick or other media (CompactFlash reader, CD, DVD) that has **z.one ultra** DICOM exams into the appropriate port/slot.
2. Press **Archive**.
3. Press **Import**. Choose **Source Device** by clicking on directory from the list.
4. Click on exam(s) desired for importing.
5. Click on **Import**.

Restart Exams



1. Press **New Patient** key.
2. Use the **Trackball** to click on **Restart**. Exams eligible for **Restart** will display.
3. Select desired exam to **Restart**.

Note: Exams can be restarted only during the same calendar day.

Delete Exams

1. Use the **Trackball** and **Set** to select exam(s) to delete.
2. Press **Delete**.

NOTE: The following instructions are for the Scan Engine only; they do not apply to the Scan Module.

Automatic Gain/DGC Adjustments – Optimize Key



1. Press the **Optimize** key. The system will automatically adjust the overall gain/DGC.



2. If a different gain level is desired, rotate the **Gain** knob to adjust the brightness level. The “new” gain/brightness level will be remembered the next time you press the **Optimize** key.

Manual Adjustments of Gain/DGC



1. To adjust the overall gain, rotate the **Gain** knob clockwise to increase gain and counter-clockwise to decrease gain.



2. To adjust DGC, press the **DGC** button.



a. The screen will show a DGC graphic. Use the **Depth** rocker button to highlight (green) the region of interest.

b. Use the **Gain** knob to adjust the gain accordingly.

c. Press the **DGC** button a second time to remove the DGC graphic.

Auto-Opt with ZST Feature - Sound Speed Correction



1. Press the **Optimize** key.

2. The image will freeze momentarily.

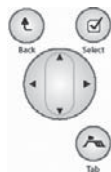
3. The image becomes live with the correct sound speed, displayed as a ZSI unit (Zone Speed Index unit of “0” is based upon 1540 meters/sec. Values that are above or below 1540 will be displayed as a + or – value).

Adjust the Depth



Use the **Depth** rocker key to increase (down) or decrease (up) depth.

Adjust the Frequency

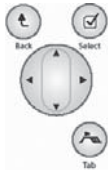


1. Use **Menu Control** to highlight **Frequency**.

2. Toggle wheel left or right to cycle through compound, harmonic, and fundamental frequencies.

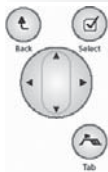
B-Mode for Scan Engine (cont'd)

Turn on Tissue Harmonic Imaging



1. Use **Menu Control** to highlight **Harmonics**.
2. Press **Select** to activate harmonic imaging.
3. Press **Select** again to deactivate harmonic imaging.

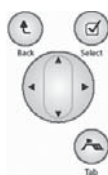
Turn On/Off Compound Imaging



Note: To cycle through compound, harmonic, and fundamental frequencies, use **Menu Control** to select **Frequency** and toggle wheel left and right.

1. Use **Menu Control** to select **Compounding**.
2. Press **Select** to deactivate compound imaging.
3. Press **Select** again to activate compound imaging.

Adjust Zoom



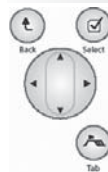
1. Use **Menu Control** to highlight **Zoom**.
2. Press the **Select** button. An ROI will appear.
3. Use the **Set** button to toggle between positioning and sizing of the ROI area.
4. Use the **Trackball** to adjust the ROI position and size.
5. With **Zoom** highlighted, press **Select** again to activate the feature.
6. With **Zoom** highlighted, press **Select** again to deactivate the feature.

Freeze the Image



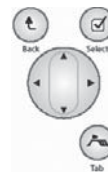
Press **Freeze** to freeze the image; press **Freeze** again to unfreeze the image.

Toggle Between Linear and Virtual Array Formats



Using **Menu Control**, select **B Format**. Then cycle left/right between **LIN** and **VA**.

Retrospective Processing



1. After freezing the image, press **Menu Control** to select the **B-Processing** mode controls.
2. Use **Menu Control** and **Select** to highlight and adjust the various parameters. (See Operator Manual for more information)

Turn On/Off M-Mode



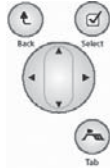
1. Press **M** to enter **M-Mode** display.
2. Press **M** again to exit **M-Mode** display.
3. Position the **M** cursor using the Trackball.

Adjust Gain



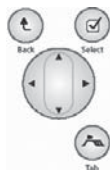
1. Use the **Gain** knob to adjust strip gain.

Adjust Sweep Speed



1. With **M-Mode** displayed, press **Menu Control** to display the menu.
2. Use **Menu Control** to highlight and toggle through the **Sweep Speeds** (Slow, Medium, High).

Adjust Zoom



1. Use the **Menu Control** to highlight **Zoom**.
2. Press the **Select** button. An ROI will appear.
3. Use the **Set** button to toggle between positioning and sizing of the ROI area.
4. Use the **Trackball** to adjust the ROI position and size.
5. With **Zoom** highlighted, press **Select** again to activate the feature; press **Select** again to deactivate the feature.

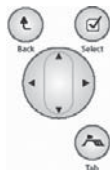


Freeze the Image



1. Press **Freeze** to freeze the image; press **Freeze** again to unfreeze the image.

Retrospective Processing




1. After freezing the image, press **Menu Control** to select the **M-Processing** mode controls.
2. Use **Menu Control** and the **Select** button to highlight and adjust the various parameters.

(See Operator Manual for additional information)

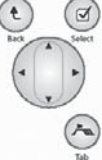
Color Doppler/Power Doppler (CD/PD) for Scan Engine

Note: The **z.one ultra** system does not require the user to adjust the transmit focus location. The Zone Sonography™ architecture dynamically controls focusing on transmit and receive. Please refer to the Operator Manual for more details.


Turn On/Off CD/PD

- 
1. Press the **C** to begin **CD/PD** display.
 2. Press the **C** again to exit **CD/PD** display.


Switch Between CD and PD

- 
1. Use the **Tab** key and **Menu Control** to highlight **Power Doppler**.
 2. Press **Select** to enter **PD**.
 3. With **Power Doppler** highlighted, press **Select** to exit **PD** and return to **CD**.


Adjust/Move ROI

- 
1. Use the **Set** button to toggle between positioning and sizing of ROI area.
 2. Use the **Trackball** to adjust the ROI position and size.

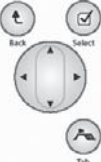
Adjust Gain

- 
- Turn **Gain** knob to adjust **CD/PD** gain.

Adjust Scale

- 
1. Use **Menu Control** to highlight **Scale**.
 2. Use **Menu Control** and toggle left or right to adjust scale.

Retrospective Processing

- 
1. After freezing the image, press **Menu Control** to select the **CD/PD Processing** mode controls.
 2. Use **Menu Control** and the **Select** button to highlight and adjust the various parameters.
(See Operator Manual for additional information)

Pulse Wave Doppler for Scan Engine/Annotations

Turn On/Off PW Doppler

1. Press **PW** to begin **PW Doppler** display.
2. Press **PW** again to exit **PW Doppler** display.
3. Use the **Trackball** to position the PW cursor.

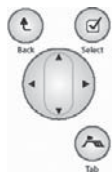
Position the Cursor

Use the **Trackball** to position the PW cursor.

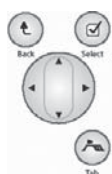
Adjust Gain

1. Adjust gain using the **Gain** knob.

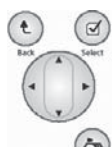
Increase/Decrease Scale

1. With PW active, use **Menu Control** to select and highlight **Scale**.
 2. Use **Menu Control** and toggle left or right to increase or decrease scale.
- 

Adjust Baseline

1. With PW active, use **Menu Control** to select and highlight **Baseline** from menu.
 2. Use **Menu Control** to raise (right toggle) or lower (left toggle) the PW baseline.
- 

Retrospective Processing

1. After freezing the image, press **Menu Control** to select the **PW Processing** mode controls.
 2. Use **Menu Control** and the **Select** button to highlight and adjust the various parameters.
(See Operator Manual for additional information.)
- 

Annotations

Please see the Operator Manual for how to make annotations while using the Scan Engine.

Image Storage for Scan Engine

The **Print** and **Store** keys can be configured to send images to a combination of internal CompactFlash, external peripherals, and networked DICOM devices. The factory default configuration is:



Store Key: Stores images to internal CompactFlash/network.



Print Key: Prints image simultaneously to attached/network printer and the internal CompactFlash.

Refer to the Operator Manual for details on configuring these keys.

Archive Options



To avoid loss of data, always back up storage/archiving devices. Do not delete patient data and images from scanner until backup has been completed and the ability to read the transferred details verified.

Review

1. Press the **Tab** key to select the **Tools** menu.
2. Use **Menu Control** to highlight **View Archive** and press **Select**.
3. Double-click the **Set** key to open the exam.

Export Exams

1. Insert USB Memory Stick or other media (CompactFlash reader, CD, DVD) into the appropriate port/slot.
2. Press the **Tab** key to select the **Tools** menu.
3. Use **Menu Control** to highlight **View Archive** and press **Select**.
4. Use **Menu Control** to highlight **Export** and press **Select**.
5. Click on exam(s) desired for exporting.
6. Under **Destination** choose the directory for exporting exams.
7. Use **Menu Control** to highlight **Export** and press **Select**.

Import Exams

1. Insert USB Memory Stick or other media (CompactFlash reader, CD, DVD) that has **z.one ultra** DICOM exams into the appropriate port/slot.
2. Use **Menu Control** to highlight **View Archive** and press **Select**.
3. Use **Menu Control** to highlight **Import** and press **Select**.
4. Choose **Source Device** by clicking on directory desired for importing exams.
5. Click on exam(s) desired for importing.
6. Use **Menu Control** to highlight **Import** and press **Select**.

Restart

1. Press **Tab** key to display the **Patient** tab.
2. Use **Menu Control** and **Set** to select **Restart Exam**.
3. Use the **Trackball** to highlight the patient to be restarted and double-click **Set** to reopen the desired exam from list.

Note: Exams can only be restarted during the same calendar day.

Delete

1. Press **Tab** key to display the **Tools** menu.
2. Use **Menu Control** to scroll down to **View Archive**.
3. Use **Trackball** to highlight exam to be deleted.
4. Use **Menu Control** to scroll down to **Delete Exam**.
5. Press **Select**.
6. Press **Select** again to confirm deletion.

Ensure appropriate **Exam** type and **Preset** have been selected for the current application

B-Mode

Increase Penetration

- Turn off Harmonics
- Decrease Frequency
- Adjust Gain with Optimize key, manually, or with DGC

Improve Resolution

- Turn on Harmonics
- Increase Frequency
- Use Zoom Function
- Turn on Compounding
- Auto-opt with ZST

Define Tissue Boundaries

- Change Gray Map
- Decrease Persistence
- Turn on Harmonics
- Adjust Edge Setting
- Auto-opt with ZST

Improve Contrast Resolution

- Change Gray Map
- Decrease Dynamic Range
- Turn on Compounding

CD/PD

Eliminate Aliasing

- Increase the PRF (Scale)
- Adjust the Color Baseline

Increase Sensitivity

- Decrease the PRF (Scale)
- Increase Color Gain
- Decrease Wall Filter
- Steer ROI (L10-5 and L8-3 only)

Imaging Tips (cont'd)

Decrease Flash Artifact

- Decrease the Color Gain
- Turn on Flash Suppress
- Increase the Wall Filter
- Increase the Velocity Scale
- Reposition/Resize the Color Box

Increase Color Smoothing

- Increase Color Gain
- Adjust Edge
- Increase Color Persistence

Increase Frame Rate

- Decrease the Color Box Size
- Decrease Depth
- Use Zoom Feature

PW

Increase Sensitivity

- Adjust Doppler angle to flow
- Decrease the sample volume size
- Decrease PRF (Scale)

Noise Reduction


- Change Doppler Map
- Adjust Dynamic Range
- Decrease Doppler Gain
- Increase Wall Filter
- Decrease the Sample Volume Size

Eliminate Aliasing

- Increase PRF (Scale)
- Adjust the Baseline
- Select Lower Frequency Doppler Probe
- Display Low-Velocity Spectrum
- Decrease PRF (Scale)
- Decrease Wall Filter

For the complete information on safety, warnings, regulatory and proper usage of **z.one ultra** and **z.one ultra sp** Ultrasound Systems, please refer to the Operator Manual. This section does not list all precautionary statements, and it is up to the user to read the entire Safety Manual prior to operating **z.one ultra** and **z.one ultra sp** systems.

Regulatory Information

 **z.one ultra** and **z.one ultra sp** systems meets the acoustic output emission guidelines established by the U.S. Food and Drug Administration (FDA). Acoustic output quantities have been measured, and are displayed, in accordance with the standards listed under "Guidance Documents." Additional regulatory information including conformance to applicable standards is listed in the Operator Manual.

Warnings and Cautions

It is not possible for ZONARE to anticipate every condition and situation in which a **z.one ultra sp** system will be used. The following warnings and cautions represent typical situations that require special attention. User knowledge and experience with a specific application and environment must also be taken into consideration in order to help ensure the safety of personnel and equipment.

To achieve proper grounding reliability, the **z.one ultra sp** power plug must be fully inserted into a receptacle marked "hospital grade." Do not remove the grounding wire. If there is any question of power outlet or power cord integrity, do not proceed. Obtain qualified assistance.

The **z.one ultra sp** system contains no operator-serviceable components within the enclosures.

To avoid electrical shock, do not remove covers. As with any other electrical equipment, always observe care when operating this instrument.

The **Scan Module** has no internal battery. Therefore, the **SmartCart sp** must be plugged into a wall outlet or running on the ZPak battery for the **Scan Module** to function.

For service issues, contact Tech Support. To reduce the risk of electric shock, DO NOT connect the **z.one ultra sp** input or output connections to equipment that is not properly connected to an Earth ground.

The **z.one ultra sp** system represents a potential explosion hazard if it is used in the presence of flammable anesthetics. Use only transducers that are specifically approved for the **z.one ultra sp** system. If the proper identification of a connected transducer is not displayed on screen, do not proceed with its use. Inspect the transducer and **Scan Engine/Scan Module** before each use. Inspect the transducer face, housing, cable, connectors, and cases. Do not use the unit if damage is detected.

Bent, broken, or missing pins on the transducer connector may cause poor image quality, including possible mirror image artifact. Check pins before connecting transducer. If pins are bent, broken, or missing, do not use the transducer and call ZONARE Technical Support.

Make sure that bare parts of the electrodes and the patient do not come in contact with conductive parts, such as metal examination beds, trolleys, and similar items.



Safety (cont'd)

Safety

To avoid electrical shock, always unplug the **SmartCart sp**'s AC power cord from the wall outlet before cleaning any part of the **z.one ultra sp** system. For additional information on the care and usage of transducers, see the transducer care chapter of the Operator Manual.

To avoid electrical shock, do not touch the battery contact. The transducer connector may reach temperatures that exceed IEC 60601-1 limits for patient contact; therefore, only the operator should handle the **z.one ultra sp** system. Patient contact with surfaces that exceed the IEC 60601-1 limit may result in discomfort or minor risk of patient injury.

Scan Engine Battery Warnings & Cautions

- The **Scan Engine** battery has a safe-smart device. Always inspect the battery for damage before using. Do not use if battery is leaking, emits odor, and/or is deformed/discolored in any way.
- Use only ZONARE supplied batteries.
- Do not disassemble or alter the battery.
- Charge the battery at room temperature. If not fully charged after 4 hours call tech support.
- Do not short-circuit the battery by directly connecting the positive and negative terminals with metal objects.
- Store the battery between 32° and 120° F and do not expose the battery to temperatures above 150° F. Do not discard into fire.
- Do not charge the battery near a heat source including direct sunlight.
- The battery should only be charged within the **Scan Engine** of the **z.one ultra sp** or with a ZONARE provided battery charger.
- Do not connect battery to an electrical power outlet. Remove the battery from the scan engine during shipping or extended transport.
- Do not immerse in water, microwave, and/or use in a pressurized container.

General Precautions

- If the **Scan Engine/Scan Module** has been moved between environments with extremes of temperature and/or humidity, allow the **Scan Engine/Scan Module** to rest for at least 30 minutes in a controlled environment before using.
- Do not use the **z.one ultra sp** if any error message displays on the screen.
- Do not block airflow to any ventilation holes in the **z.one ultra sp** system.
- Do not excessively twist or bend the cables; this may cause failure.
- Follow cleaning and disinfection instructions as improper cleaning or disinfection of any part of the **z.one ultra sp** system may cause permanent damage.
- Do not submerge the transducer past the indicated point.
- Do not use solvents or abrasives to clean any part of the **z.one ultra sp** system.
- Do not spill liquid on the **z.one ultra sp** system.





ZONARE

NEXT GENERATION OF
ULTRASOUND.

ZONARE Medical Systems
420 North Bernardo Avenue
Mountain View, CA 94043-1839
1-877-913-9663 or 1-650-316-3199
www.zonare.com

ZONARE Medical Systems designs, develops and manufactures a new breed of high-performance ultrasound solutions which combine revolutionary technology with an innovative physical design. Through Zone Sonography™ technology – our unique, patented approach to imaging – we're focused on enhancing diagnostic abilities, economic value, and patient care in clinical environments worldwide.

Part Number Q00196 Software Revision 4.2, June 2009

© 2009 ZONARE Medical Systems, Inc. All rights reserved.

