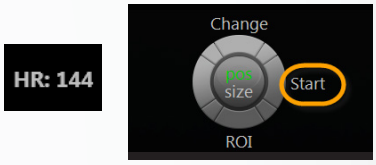
Voluson™ e4D Education

Expanding your knowledge in electronic 4D technology

*e*STIC

***e*STIC** (Electronic Spatio-Temporal Image Correlation) enhances fetal cardiac exams by acquiring a *volume* of the fetal heart, with up to 75% reduction in acquisition time over traditional STIC.

1. Optimize the 2D image in a Fetal Cardiac Preset
2. Select 4D hard key
3. Select *e*STIC on top of touch panel
4. Select desired preset
5. Adjust ROI[1] to include entire fetal thorax
6. Select desired Quality setting
7. Set volume angle (5-10° greater than gestational age)
8. Wait for estimated heart rate to appear on monitor
9. Select trackball Start key
10. Once acquisition is complete, choose Accept message on touch panel
11. Store as a volume to prevent accidental image loss

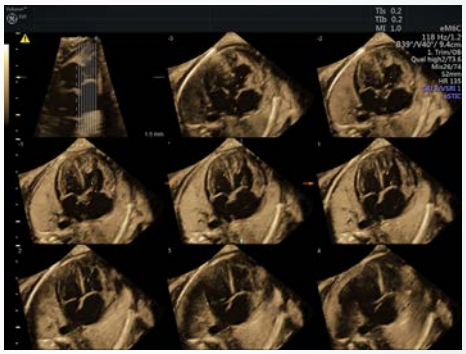


Additional tips

- *e*STIC volumes can also be acquired using color Doppler or HD-Flow™ to help provide additional clinical information. Adjust color and HD-Flow ROI box to include only the region of the heart to optimize frame rates. After adding color Doppler to the 2D image, follow acquisition steps above
- Add additional tools after acquisition such as VCI[2] (1-2 mm) or TUI[3] to help enhance contrast and visualization

*e*STIC

*e*STIC w/ VCI



*e*STIC w/VCI and TUI

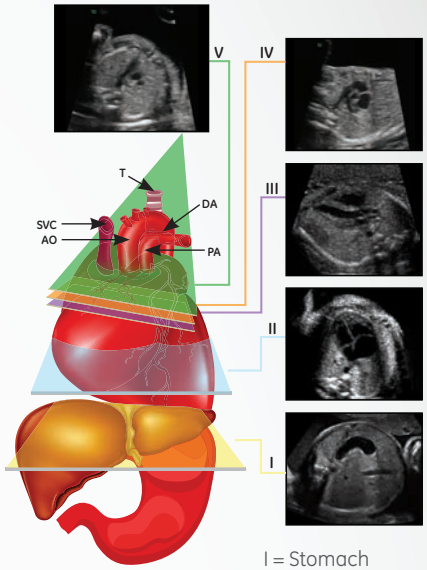
Manipulation *e*STIC volume – Regardless of fetal position, it is best to follow a methodical approach when learning to manipulate a fetal heart volume. For example, display the Apical 4 Chamber View in the A-plane with the apex of the heart pointing towards 10:00 and the spine at 6:00. Volume should be in the Quad display; utilize the touch panel to indicate which plane (A, B or C) is to be manipulated.

Example:

1. **Plane A** – Move axis dot to descending aorta or spine
2. Rotate the Z-axis to place the spine at 6 o'clock position (crux of heart and transverse aorta aligned vertically). Ensure apex of heart is pointing toward left side of display (if breech, rotate A-plane on the Y-axis 180°)
3. **Plane C** – Align descending aorta (or spine) vertically using Z-axis
4. **Plane B** – Align descending aorta (or spine) horizontal using Z-axis
5. **Plane A** – Rotate transverse spine toward 6 o'clock until you see aortic arch in the **B-plane**. Continue to rotate to visualize the ductal arch in the **B-plane**

Plane A anatomy manipulations

- Rotate apex toward 9 o'clock until you see the **aortic arch** in **B-plane**
- Rotate apex toward 12 o'clock until you see the **ductal arch** in **B-plane**
- **Parallel shift** down to **stomach** to confirm situs
- **Parallel shift** up to visualize **4 chamber view**
- **Parallel shift** up to visualize **3 vessel view**
- Move axis dot to Superior Vena Cava in 3 Vessel View to display in **venous connections** in the **B-plane**
- Move axis dot to the **Aorta**; rotate Y-axis to elongate the aorta, then move axis dot up to the aortic valve to visualize **RVOT** in **B-plane**



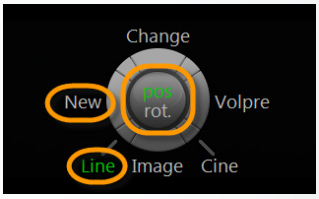
I = Stomach
II = 4-Chamber View
III = LVOT
IV = RVOT
V = 3 Vessel View

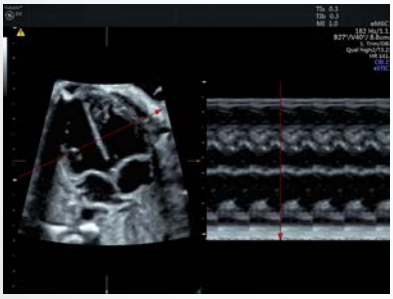
STIC M-Mode

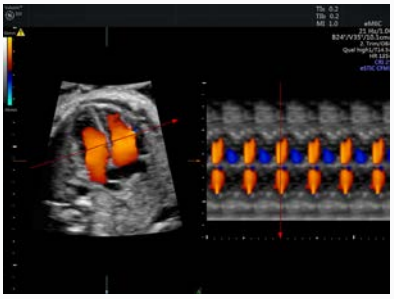
STIC M-Mode enables freely-rotatable M-Mode tracing through the fetal heart to facilitate measurements that are perpendicular to the cardiac structures.

*Note: STIC M-Mode is one virtual cardiac cycle repeated over time and thus cannot be used to assess arrhythmia's.

1. Acquire *e*STIC volume
2. Confirm Multiplanar display mode on right side of the touch panel
3. Select STIC-M on touch panel
4. Using the trackball, position cursor at the starting point of the desired M-Mode line and select trackball Set key
5. Move trackball and position second cursor at the end-point of the desired M-Mode line and press trackball Set key
6. Use appropriate trackball keys to adjust line rotation and position. Rotation may also be adjusted from the AMM[4] rotary knob
7. To create a new line, select the trackball New key







[1] ROI – Region of Interest
[2] VCI – Volume Contrast Imaging
[3] TUI – Tomographic Ultrasound Imaging
[4] AMM – Anatomic M-Mode

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