Quick Card

3D/4D for Obstetrics

ACUSON Sequoia Ultrasound System
3.5 (VB30)

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SIEMENS Healthineers

Getting Started

The 3D volume data set is a series of 2D images gathered over a timed acquisition.

Step 1

- Press **3D/4D control**
- Select **3D** or **4D** from the touch screen

Step 2

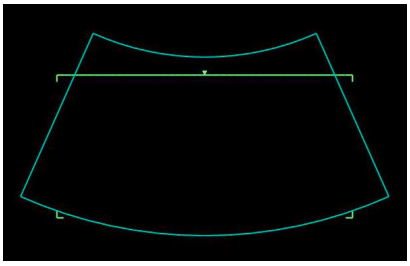
- Place the Volume of Interest (VOI) to include the anatomy desired. The VOI can be curved by selecting the Curve option on the trackball left Set key

3D

- Press the **Update** key, and the system will automatically acquire a sweep and display the volume

4D

- Press the **Update** key to start the acquisition; the system will enter live 4D imaging; select **Freeze** to stop the acquisition



Tips:

Face

- To obtain the frontal view of a fetal face in 3D/4D, ensure that your 2D acquisition plane displays the fetal profile.
- Use light pressure to increase the amount of fluid seen in front of the fetal face.
- If the fetus is highly mobile, 4D mode is helpful as several 3D acquisitions may be needed to prevent a blurred image.
- **Surface** or **LightSource** rendering modes are recommended.

Spine

- To obtain a 3D fetal spine, the 2D acquisition plane is preferably spine-up.
- Curve the VOI line to match the curvature of the spine while keeping this line in the amniotic fluid above the spine.
- The **Skeletal** (Max IP) rendering mode is recommended.

Step 3

3D

- Press **Image** to store a volume

4D

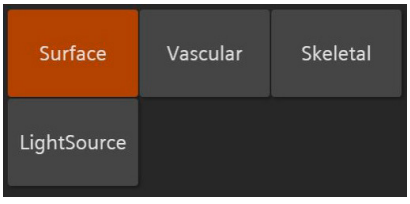
- During live acquisition, press the **Clip** key to store a 4D clip
- Press the **Image** key to store a single volume on a frozen image

Stored 3D volumes are marked with a cube graphic.

Stored 4D volume clips are marked with a cube containing a “play” icon.

Render Modes

There are four render modes available:



Surface

Smooths image contour, creates a soft sculptured appearance for highlighting surface features of soft tissue, such as the fetal face and limbs.

Light Source

Helps increase depth perception, reveal surface details, provides an element of texture, and can provide a deeper understanding of relational anatomy.

The adjustable Light Source direction is automatically activated in a 1:1 layout, but may be activated/deactivated in any layout by selecting the Light key on the touch screen.

Use the trackball to adjust the direction of the light.

Vascular (Minimum Intensity Projection)

This mode is best for visualizing hypo-echoic areas and vascular structures.

Skeletal (Maximum Intensity Projection)

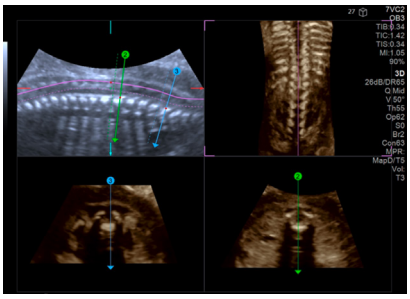
This mode is best for bony structures, such as the fetal spine.

FlexPlane

The FlexPlane tool allows the user to obtain and visualize anatomy of any shape along any plane. This is especially useful when imaging complex or irregularly shaped structures.

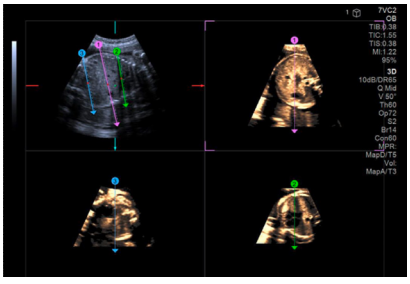
The user can choose from:

- **Line –** A straight line in any direction
- **Trace –** A freehand line traced in any direction
- **Spline –** An open spline controlled by selecting the set key along the path of the spline

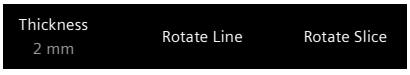


Once the desired option is chosen:

- Press either Set control to begin the line
- Press either Set key again to end the Line/Trace tools or to change the direction of the Spline tool (double-click either Set control to end the Spline)
- To redraw the slice, press the **Update** control



Use the rotary soft keys to adjust volume thickness as well as line or slice orientation.

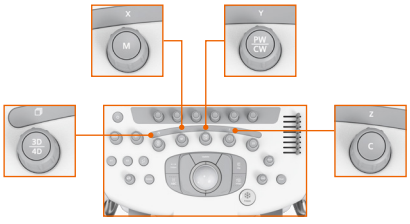


Note: *To enable measurements on the rendered image, set the thickness to Off.*

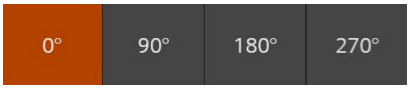
MPR & VR Orientation

Adjust the Multiplanar Renderings (MPR) and the volume using the rotation tools on the control panel. These controls can be used during 4D live acquisition.

- Select the desired quadrant from the touch screen
- The MPR slicing function is manipulated using the 3D/4D control
- The X axis is manipulated using the M-mode control
- The Y axis is manipulated using the PW Doppler control
- The Z axis is manipulated using the Color Doppler control

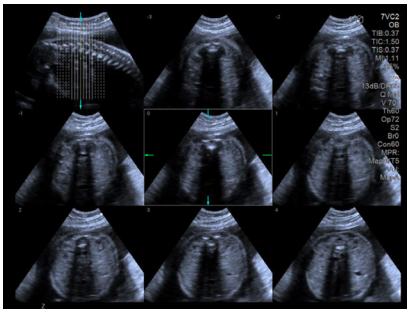


Use the rotation tools on the touch screen to quickly rotate the volume rendering by set degrees.



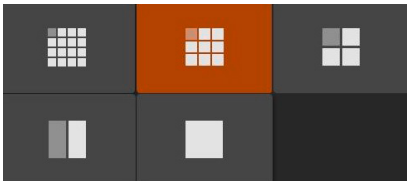
Multislice

The Multislice tab contains options for viewing multiple slices of the selected MPR plane at the same time. It is often referred to as a CT or MRI view.

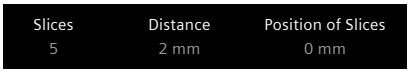


- Select the desired plane using the A, B, and C keys

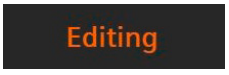
- Select the desired layout from the touch screen



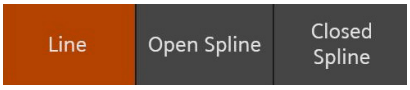
- Use the rotary soft keys to adjust the number of slices, distance between slices, and the position of the slices



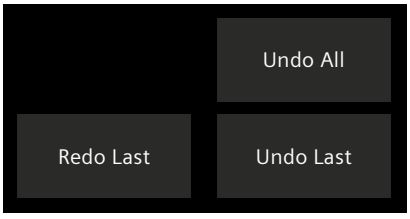
Editing



The editing tab contains options for removing unnecessary structures.



- Select the desired tool from the touch screen
- Using the trackball and **Set** keys delineates the area for removal
- Place the scissor icon in the area to be removed and press the **Set** key to finalize
- Edits may be reversed using the touch screen options



Additional Optimization – Acquisition

Angle

Determines the angle of the volume sweep.

Quality

Adjusts the resolution and sweep speed between Low, Mid, and High.

Additional Optimization – VR

Threshold

Decreasing the threshold removes low-level echoes, while increasing the threshold adds low-level echoes.

Opacity

Adjusts the transparency of the voxel.

Smooth

Averages the edges of the voxels with adjacent voxels to smooth the volume image appearance.

Brightness

Changes the voxel saturation.

Contrast

Raises or lowers the percentage of contrast to enhance differences in tissue. It can help enhance the fetal face structures when lowered.

Tint

Applies assigned color shades to the gray scale.

Additional Optimization – MPR

Dynamic Range

Decreasing the threshold removes low-level echoes, while increasing the threshold adds low-level echoes.

Map

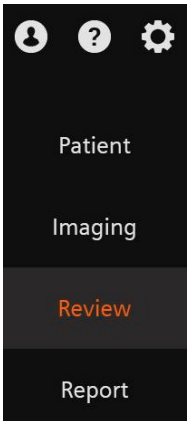
Adjusts the transparency of the voxel.

Tint

Applies assigned color shades to the gray scale.

Review

- Select **Review** from the touch screen with the pointer, select the image for review



- Select the **3D/4D** tab on the touch screen to activate the volume manipulation tools if desired
- Any additional images stored while the volume is active in the **3D/4D** tab will be stored as volumes or volume clips. Additional images stored while in the **Review** tab will be stored as still images.

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Our portfolio, spanning in vitro and in vivo diagnostics to image-guided therapy and cancer care, is crucial for clinical decision-making and treatment pathways. With the unique combination of our strengths in patient twinning[1], precision therapy, as well as digital, data, and artificial intelligence (AI), we are well positioned to take on the greatest challenges in healthcare. We will continue to build on these strengths to help overcome the world's most threatening diseases, enable efficient operations, and expand access to care.

We are a team of more than 71,000 Healthineers in over 70 countries passionately pushing the boundaries of what is possible in healthcare to help improve the lives of people around the world.

[1] *Personalization of diagnosis, therapy selection and monitoring, after care and managing health.*

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