

A New Volume

Starting from the easiest and building to the more complex “pro moves” by layering the technologies. First, a quick review. Ultrasound is an *artful* science that balances beauty and diagnostic integrity. Your SC2000 allows you direct control over all of the physics involved in producing a desired image. All of them. Let’s focus (har har) on only the line density for now. Simply put, the amount of scan lines dictate the level of detail (aka spatial resolution) an image has. (This is not necessarily synonymous with “quality”. The term “quality” is a subjective term.) The fewer scan lines we ask the system to use, the faster the image production will be. It simply has less data to process before rendering the image. The result is an image with a high *temporal* resolution (aka high FPS or VPS since this is true with 2D imaging as well as Volume imaging). Sometimes, this is great! It displays valves, mobile structures, and color Doppler flow all in real time.

Alternatively, sometimes we need details. Further delineation would require more scan lines to assess any given area. (There’s a couple of ways to go about this such as (RES), (RES) in 2D to rewrite zoom an area or (RES), (4D) to “3D zoom” an area. More on this later..) Using your scan line controls, increasing the number of lines on the US image will indeed increase the special resolution, yet it will be at the cost of frame rate. Zooming, decreasing depth, or decreasing sector size will rebalance this demand for high special *and* high temporal resolution.

On the SC2000, the scan line controls are known as “SpaceTime” controls and they are found on the left most LCD knob in 2D and in 4D. (Note: during live TEE cases, you may need to press down on the knob to access it in 2D. It shares the same control knob as the “Quick Rotate” feature. Press down the knob to toggle it back and forth.)

T2 – (Available at 5.0 or higher leveled systems. Only available for volume color flow Doppler (VCFD). Intended for the fastest VPS for future hemodynamic analysis of VCFD.)

T1 – A setting used to create high frame rates or a smoother looking image. Spatial resolution is good.

S1 – A great “set it and forget” option as a balance between the resolutions.

S2 and S3 – Highest special settings. Mostly used to detail specific areas of the heart. High resolution MV leaflets, for example. RES or further volume manipulation is recommended to maintain real-time VPS.

On to the practical bits.

Mitral valve viewing (steps start from 2D imaging):

- ✓ Basic user: Activate 4D imaging. Use the U2 button (or clicking on the MV View icon in the left sided, on screen icon tray). Boom. Done and done. You’ve got a top-down view of a full volume clip. It most likely includes the MV, the AoV, and maybe even the LV for an EF.
- ✓ Advanced user: (RES) the MV annulus. Take care to be a bit generous with the widest portion of the box to include all of the on-screen annulus. Bring the top of the section down out of the extreme near-field to avoid any unsightly gain artifact. (Use the “Next” button near the track ball to alternate between position and size of the ROI.) Press (4D) to activate volume imaging. Then press U2/mitral valve icon to orient the image. Gain, salt, and pepper to season to your liking.
 - This is a good time to try your SpaceTime setting!
- ✓ Pro user: Activate (BiPlane+). Use the trackball or the tilt knob (left LCD, middle slot) to place the new plane through the Mitral Valve. (Note the Red and Green dots and the views they represent.) Press the (RES) button. Same as above – use the “Next” button to position/size the ROI. *Use the “Update” button to switch control priority between the planes.* Update is located around the trackball at about 11 o’clock. You now have precise control of the ROI box over the anatomical target. Now, go into 4D and press U2.
 - Another great chance to play with your ST settings!

Next time, on *VI with MB* we’ll cover Dynamic Range and 5 Things Your Doctor Doesn’t Want You To Know About The Fourth Dimension!