Philips Medical Systems

Galil Controller Helps Deliver Amazingly Clear, 3D Images Inside The Womb

Viewing ultrasound images of a developing child is a sight to behold—even if it is a bit hard to make out.

Now, those fuzzy images have been cleared up and are more revealing than ever due to the iU22 ultrasound system from Philips Medical Systems. It fully integrates 2D, 3D and real-time 4D imaging modes, as well as multiplanar reconstruction (MPR) resolution that rivals acquired 2D plane definition.

As a result, expectant parents can quickly identify the very distinct anatomic features of their child—including the fetal heart. And, clinicians and doctors can diagnose with greater depth and accuracy.

The iU22 delivers these detailed images using its mechanical probe or transducer, which incorporates a unique gimble mechanism that is powered by a single brushless motor. Prior probes used gears that provided slow frame rates, causing the image to "chunk" along as the clinician moved the probe over a patient.

The motor is controlled by a customized, single-axis motion controller and drive combination from Galil. The controller features a Proportional-Integral-Derivative (PID) filter with acceleration and velocity feed-forward functionality for accurate control and smooth motion. It also handles high bandwidths and compensates for high-frequency noise. These features help the iU22 3D probe perform with high accuracy and stability between frames, which eliminates any wobbly or bouncing images.

To help speed the iU22 to market, Philips went to Galil for the motion controller to keep costs down and knowing that Galil could handle the noise and accuracy specifications.

According to Lisa Wade, VP-Marketing and Sales at Galil, "Philips liked the fact that Galil was able to take our existing, proven, single axis DMC-1412 controller and integrate it with an amplifier on a small-sized board to save space and costs while not compromising on performance."

For example, the Galil controller already offered a contour mode and arrays that can buffer the position data that is sent on the fly from the Philips CPU. These include constant, linear speed generation of profiles that are coming from the scan head. By offloading this and other intensive motion tasks to the controller, the CPU is freed to focus on handling the image computations for the 3D renderings.

"We were also able to provide diagnostics for the amplifier, as well as programmable power limits and power monitoring, which is important to Philips for meeting FDA requirements," Wade added.

Reducing user fatigue was another critical consideration, as examiners had found the all-day, back-and-forth movement of the ultrasound probe to cause stress to their hands, wrists, back and shoulders. To prevent this, the iU22 features an ergonomic probe and a flat, articulating display/control panel that adjusts for each user. It also has a lightweight, portable chassis for scanning flexibility, foot-controlled swivel lock and brakes, and voice recognition software that lets users stay productive when their hands are full.

Such features have improved workflow and productivity to the point that doctors report savings of 3–5 minutes per exam. With a typical day running at 50 exams, that adds up to almost four hours of time saved for other tasks or additional patients.

In addition to 3D images inside the womb, the iU22 is used for gynecological imaging and scanning of the breast, prostate and muscular systems. ■

Custom Galil controller helped Philips speed its high performance iU22 ultrasound system to market while saving on cost and space.

Philips Medical Systems
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www.medical.philips.com/iU22