

# Butterfly<sup>TM</sup> Network

## PXIe-S5090 Brings Improved Production Testing Performance to Ultrasound

It can be a challenge to find affordable test equipment capable of operating in the low frequency range required for Butterfly Network's ultrasound probe. Copper Mountain Technologies' PXIe-S5090 2-Port 9 GHz Analyzer has provided improved speed and performance to match their unique application needs. Comprehensive support from CMT's expert applications engineers has helped optimize VNA performance and gave Butterfly Network the results they were looking for.

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*Andrew Betts, Butterfly Network*

Butterfly Network is at the forefront of a new era of medical imaging. Butterfly iQ's probe delivers a 2D array of 9000 micro-machined sensors emulating any type of transducer - linear, curved, or phased. Butterfly's Ultrasound-on-Chip<sup>TM</sup> technology replaces the traditional piezoelectric transducer array with a silicon transducer array. The Butterfly iQ features 19 presets to enable whole body imaging, and familiar touch interactions on mobile devices for unprecedented ease-of-use.

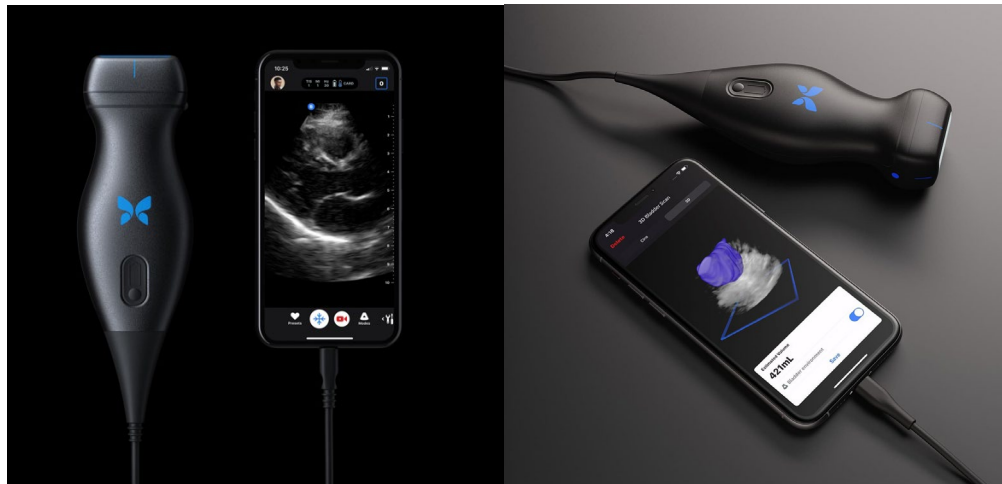


Figure 1 iQ Probe and iPhone showing captured images of heart (left) and 3d bladder volume (right)



Ultrasound applications typically require measurements covering a very low frequency range (1-10 MHz). Andrew Betts, a Test Engineer for Butterfly, was struggling to find an effective 10 MHz VNA solution in his desired price range. Other VNA units he had used did not cover these frequencies or were very expensive and left him underwhelmed by the user experience and difficulty of programming. This prompted Andrew to pursue a PXI based solution with fast test times to be used with his PXI based ATE semiconductor tester. "We're taking hundreds and hundreds of S parameter frequency sweeps per device to measure performance characteristics of capacitor-like components," explained Betts. "Test time is crucial in the production environment, especially when it can be coupled with good application support. 1 second sweep times have been reduced to 300  $\mu$ s using the PXIe-S5090."

Andrew had experience with National Instruments' (NI) PXI based offerings and decided to begin his search by reaching out to them. NI recommended CMT's PXIe-S5090 Analyzer, which at the time was in its final stage of production. He was quickly persuaded, as the PXIe-S5090 was able to cover his desired frequency range and he was comforted by the fact it had been referred to him by a reputable source. Betts knowledge of NI's PXI system for production/semiconductor testing meant he was no stranger to their equipment and made the PXIe-S5090 a convenient solution for him to implement, installing it directly into his NI STS tester system.



Figure 2 NI STS ATE tester, side panel removed to show CMT S5090 installed inside, SMA cables to loadboard bottom side

The installation process was pain free due to the straightforward software and programming examples that were provided. The PXIe-S5090 provided more speed with a slightly lowered noise floor. Betts noted that, "the PXI triggering that CMT supports allows us to synchronize multiple instruments via hardware triggering as opposed to software triggering, which greatly reduces test time." The ease of use and improved performance have been obvious benefits, but the impact goes beyond the instrument's performance. "I'd say the technical support has been the separator," said Betts. "I had a few simple startup questions, and a few complex capacitance measurement questions. CMT's support team was very patient and helpful as they walked me through all my questions. They also provided custom Python scripts that resolved my issues and made automation trivial." All in all, Betts and Butterfly Network found the new S5090 to be an affordable, high-performance VNA, that easily integrated into and upgraded the capabilities of their PXI production tester.