Mini-Circuits Decreases Manufacturing Test Time by 80% with Keysight’s Multiport PXI Vector Network Analyzer

More than a few high-tech companies started in someone’s garage. Mini-Circuits, a global leader in RF and microwave components and integrated assemblies, started in the kitchen of Harvey Kaylie’s Brooklyn, New York, apartment.

Kaylie’s early efforts led to the development of a new line of mixers, transformers, and passive RF components. He helped transform a niche, low-volume cottage industry into one that provided volume and quality, at lower prices to support proliferation of wireless technology.

Celebrating its 50th anniversary, Mini-Circuits now designs and manufactures over 10,000 different products. The company achieved preferred supplier status with over 20,000 customers worldwide, including Keysight Technologies, by staying true to Kaylie’s simple formula for success. Manufacture quality products, sell them at a competitive price, and provide fast delivery with strong service and support.
Reduce Test Times to Meet a Customer’s Delivery Timeline

When a customer asked Mini-Circuits to deliver over 1,000 5 x 5 switch matrices within two months, they rose to the challenge. The existing test setup used proprietary software and robotics to automate most aspects of the manufacturing test process.

However, it was impossible to test 1,000 passive, 10-port devices in two months using a conventional benchtop solution. Their existing solution consisted of a Keysight PNA-X and RF switching to route the vector network analyzer (VNA) ports to the various ports of the DUT.

In addition to higher throughput, the test engineering team needed a solution that offered less measurement uncertainty. For example, measuring all of the signal paths simultaneously allowed them to observe how adjustments made to one path affected the other paths.

“I used to resist bringing on newer test technology,” said Ted Heil, president of Mini-Circuits. “I felt that what we had was good enough. But in this dynamic world, it’s a handicap to have that attitude because being efficient is how we’re going to survive in the future,”

Multiport PXI VNA Reduces Test Time by 80%

Keysight Technologies, one of Mini-Circuits’ key customers, is also a long-term supplier of their test equipment. The relationship began in the 1970s when founder Kaylie met Dave Packard of Hewlett Packard, predecessor to Keysight. Over the years, a reciprocal business partnership developed between the two companies.
Heil contacted a Keysight field engineer to explore alternatives to Mini-Circuits’ test approach. The field engineer suggested a PXIe multiport VNA that significantly improves throughput while offering more flexible test configurations than conventional benchtop solutions.

“Keysight helped us select and install the 10-port PXI VNA into our test setup, which reduced our overall test time by 80%. As a result, we were able to meet our customer’s timeline with time to spare,” said Heil.

The multiport PXI VNA also enabled Mini-Circuits to get more accurate measurement results by eliminating degradation in performance — dynamic range, trace noise, directivity, and stability. The elimination of external switches increases accuracy, minimizes the loading effect, and simplifies the calibration process.

Heil considers the multiport device market to be a growth opportunity for Mini-Circuits. In addition to providing significant time savings and improved measurement accuracy, the scalable PXI VNA solution will enable Mini-Circuits to add more measurement ports when needed in the future.

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