

Keysight Technologies

L4411A Makes It Easy for ATTI to Transition Test System from VXI to LXI

System integrator Advanced Testing Technologies, Inc. (ATTI) served as a beta test site for the Keysight Technologies, Inc. 1U, half-rack L4411A LXI class C DMM. ATTI engineers were able to replace the E1412A VXI DMM with the L4411A LXI DMM in their test system without changing any test code. They tested it extensively and confirmed that the new LXI DMM implements all the modes and functionality of their E1412A VXI DMM over all the different measurement ranges. They also discovered that the LXI DMM improved throughput by 30%.

ATTI builds avionics test stations and writes the associated test programs for military and commercial clients like the U.S. Air Force, NATO, KLM Airlines, Boeing and others. The company's VXI-based test stations, called Benchtop Reconfigurable Automatic Testers (BRATs), can be configured for a wide variety of avionics test applications. The various tester models in the BRAT family are tailored to fit the specific avionics application.

Protecting customers' software investment

Many of ATTI's BRAT testers have been in use for between 6 and 12 years, and some of the testers' VXI components have become obsolete. ATTI engineers have been seeking drop-in replacements – hardware they can use without having to make any changes to the existing test program code – for the obsolete test equipment in the BRAT systems.

“Our customers don't have the budget to change their software,” said Rob Spinner, ATTI director of technical operations. “They are using classic platforms that have been around for a while, like the B1 bomber platform. The cost of the test stations is nothing compared to the cost of the software they've sunk into that platform. That could cost 20 or 30 times more to replace. That's why it is important to have drop-in replacements.”

When ATTI engineers learned about Keysight's LXI instruments, they were impressed with the benefits. They ultimately decided to begin converting their GPIB and VXI instruments to the LXI format. They had already evaluated and adopted the N8211A LXI microwave source when Field Engineer Joe Langone approached them with the idea of being a beta test site for Keysight's new 1U, half-rack L4411A LXI class C DMM. They jumped at the opportunity.



Testing the LXI replacement

ATTI engineers evaluated the L4411A as a replacement for a Keysight E1412A VXI DMM. The design of the E1412A VXI DMM is based on the Keysight 34401A DMM, and the L4411A has 34401A emulation mode built into it, so the replacement was straightforward. The ATTI engineers changed the communication port from VXI to LAN. They hooked up the I/O from the VXI multimeter to the L4411A DMM and ran a self-test program to validate it.

The self-test program routes each test instrument in the system to the DMM through a switch and measures small and large signals. It checks frequency, amplitudes, and resistances in multiple modes as well as period and temperature.

“We made sure all the different modes and different ranges worked to preset accuracies of the self-test program,” said Rob. “That gave us a performance confidence level on the tester. We ran the test with the old (VXI) DMM and with the new (LXI) DMM and we could tell how long each functional test took. We looked at the test throughput times and we had a throughput improvement of about 30% with the LXI DMM – with the potential for more if you look at the switching.”

“We didn’t have to change the self-test program or the instrument driver,” said Bill Leippe, ATTI software engineer. “Due to the design of our system software all we had to change was the resource string so that the SCPI Commands would be directed to the LXI-Based DMM instead of the VXI-Based DMM.”

Driving forces behind moving to LXI

ATTI engineers were delighted with the Web-based GUI, the size and cost reductions, and the throughput improvement provided by LXI technology.

ATTI’s customers typically require a GUI, so ATTI builds custom GUIs for each of its testers. Having LAN-based equipment with the capability to serve Web pages eliminates the need for custom GUIs.

The ATTI team also uses the GUI, initially to make sure the equipment is live, then as an aid in software development, and also in troubleshooting and performing maintenance. “The GUIs help tremendously,” said Rob. “They give us a good reason to move forward to LXI rather than just waiting for things to become obsolete.”

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