

PXI in Multiport Device Test Applications

Submitted by [Keysight Technologies](#)

Driving down the cost-of-test is a high priority in high-volume component manufacturing. Engineers continually look for ways to increase the number of components tested in a shorter amount of time. Furthermore, components have become more complex and have more connecting ports that require characterization. Test instruments and signal integrity software have evolved to address those needs and test instrument vendors continue to push for even more sophisticated improvement.

This article highlights the advantages and key capabilities of multiport PXIe vector network analyzers (VNA) and the advantages they provide in a PXI test systems to improve high-volume production measurement throughput.

Initially, network analysis was used specifically for 2-port S-parameter measurements. Since then, VNAs have evolved to provide much more capability, including the ability to test power splitters, mixers, differential devices and became more actively used in test systems for measurements. Another large application space for VNAs is signal integrity testing of high speed digital interconnects. Backplanes, PCB's, cable and connectors are transmitting gigabit data rates that create microwave transmission line effects. VNAs with enough dynamic range can measure very low levels of crosstalk within the very fast channels.

The devices being tested have also evolved. They now include several integrated functions on a single component. Expanded device functionality has resulted in components with more test complexity and more ports. Multi-port devices, or devices that require more than 4 ports for network analysis, are much more common. These devices can be tested through a series of 2-port measurements, using switches to switch between ports. However, switches have a few drawbacks. They are known source of signal loss, can limit dynamic range, due to attenuation, and affect measurement accuracy, due to temperature instability during test. Switching loss and the time required to switch and settle negatively impact test system accuracy and speed.

The newer 4-port PXI VNA addresses multiport device complexity, provides more thorough characterization. and does not require external switching or additional couplers for multiport measurements. It connects directly to the component and can make simultaneous measurements, achieving more accurate measurements faster. Multi-port VNAs provide high performance by eliminating the loss associated with switches and provide fast simultaneous measurements using multiple receivers. Time is also saved during measurement sweeps by reducing the number of sweeps required. PXI VNAs provide flexible, reconfigurable multi-site or parallel test configurations with up to 32-ports in one PXI chassis. Additionally, full crossbar calibrations can be used for near end and far end crosstalk measurements.

Multiport applications benefit from PXI 4- port VNAs, addressing the challenges of high-volume component manufacturing with an accurate and cost effective solution that is flexible and reconfigurable depending on the number of ports needed.

For more information read [Multiport and Multi-site Test Optimization Techniques](#)

<http://literature.cdn.keysight.com/litweb/pdf/5992-0681EN.pdf?id=2611867>