

Keysight Technologies

PXI Vector Network Analyzer Series

Drive down the size of test



Full Two-Port VNA that Fits in Just One Slot

When you need to measure basic S-parameters, the right mix of speed, performance and footprint gives you an edge. Sharpen your edge with the Keysight PXIe M937XA vector network analyzer (VNA).

The Keysight PXI VNA is a full two-port VNA that fits in just one slot. The PXI VNA also performs fast, accurate measurements and reduces your cost-of-test by letting you simultaneously characterize many devices – two-port or multiport – using a single PXI chassis.

Get more VNA in less space

It offers the best PXI VNA performance on key specifications such as dynamic range, measurement speed, and trace noise. Each module is a completely independent two-port network analyzer and up to 16 modules can be added to a chassis for multi-site and multiport applications. All ports are fully synchronous so multiple ports can be measured simultaneously with multiport error correction applied.

Same Keysight VNA measurement science

The M937XA extends Keysight’s expertise in measurement and metrology into the modular PXI form factor. It provides the same quality results you have come to expect in our vector network analyzers.

Main features and benefits

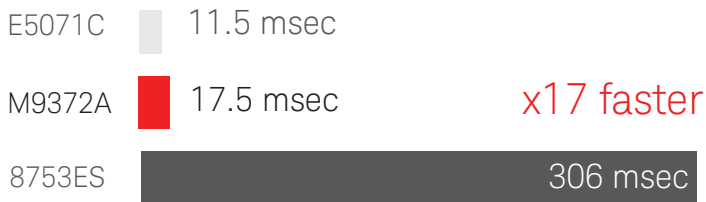
| Product features | Your benefit |
|---|--|
| Choice of six frequency ranges up to 26.5 GHz (widest currently available). | Pay for only the frequency range you need. |
| Best PXI VNA speed, dynamic range, trace noise and stability. | Improve accuracy, yield and margins. |
| Full 2-port S-parameters in a single-slot PXI. | Have more slots available in your PXI chassis. |
| Trusted Keysight measurement science and calibration. | Get measurements you can count on. |
| Electronic calibration (ECal) control via USB interface. | Perform fast, easy, and accurate calibrations. |
| Cascade multiple modules to address multiport applications. | Test with full N-port correction capability. |
| Simply add modules for multi-site applications. | Increase throughput, lower cost-of-test per device. |
| Cost-effective VNA capability. | Achieve lower pricing as compared to other PXI VNAs. |



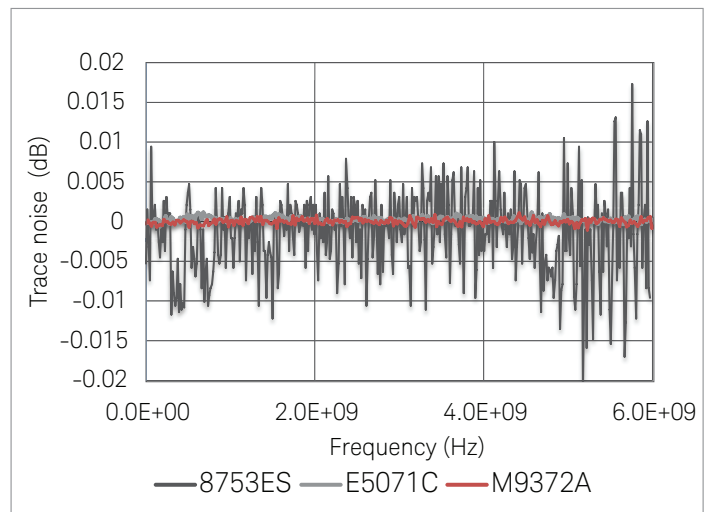
Figure 1. Pay for only the frequency range you need with the widest choice of frequency ranges from 300 kHz up to 26.5 GHz.

Measurements You Can Count On

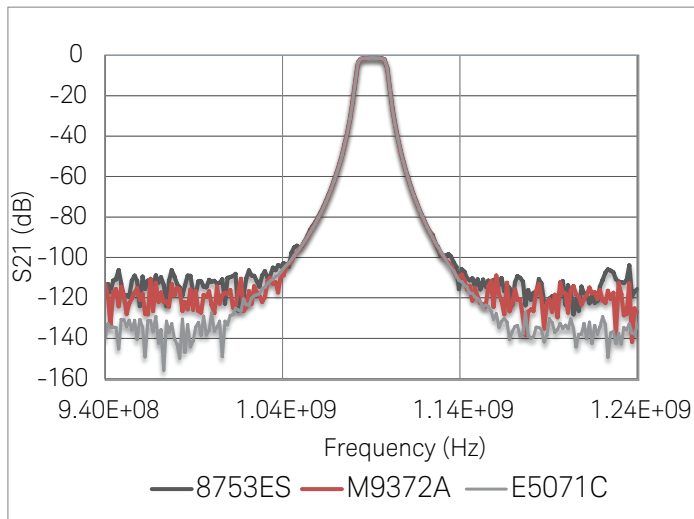
Fast measurement speed ¹



Low trace noise ³



Wide dynamic range ²



1. 401 pts, full 2-port cal, 800 M to 1.8 GHz.
IFBW = 6 kHz (8753ES), 500 kHz (E5071C), 600 kHz (M9372A).
2. IFBW = 10 Hz, max specified power.
3. Standard deviation of traces at 1 kHz IFBW: E5071C: 0.3 mdB, M9372A: 0.4 mdB, 8753ES: 5.2 mdB.

Multiport Testing with Full N-Port Correction Capability

The PXI VNA is an ideal solution for multiport measurements. It has a two-port (2- reference receivers and 2- test receivers) architecture in a one-slot module. It can be easily configured as a true multiport VNA by using additional modules installed in the same chassis. The full N-port correction capability allows for complete and accurate characterization of multiport devices.

A multiport PXI VNA provides higher throughput with much less sweeps required than a VNA with a switch matrix for the same multiport device. For example, a 12-port device requires just 12 sweeps with a 12-port multiport M937XA vs. 132-sweeps with a 2-port VNA and a switch matrix. The true multiport VNA has no degradation in performance (i.e. dynamic range, trace noise, directivity, stability) due to external switches.

Multiple PXI VNA modules may be installed in one chassis and identified by the M937XA firmware as one VNA under a single PXI controller. One or more modules in the set must have Option 551 (N-Port Calibrated Measurements). The frequency of the multiport array is determined by the lowest frequency module configured in the array. In a multiport configuration, only one module must have a valid license for software capabilities (i.e. Option 009 or 010) to function in multiport mode.

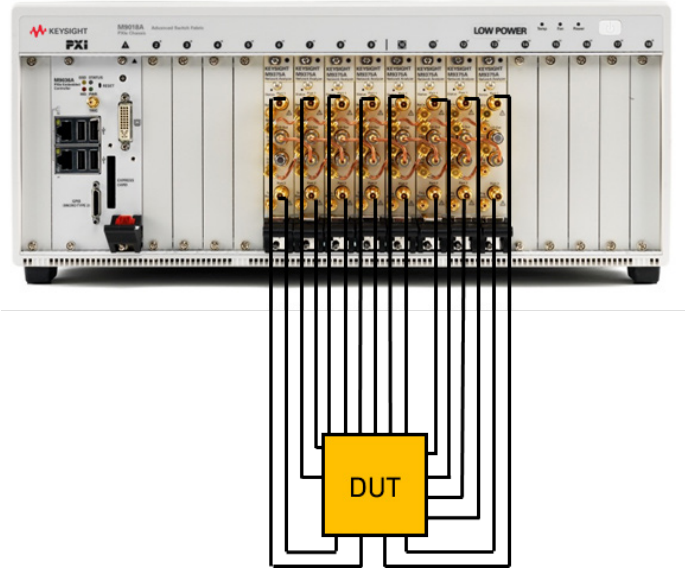


Figure 3. Easily add or subtract modules to meet all of your multiport measurement needs.

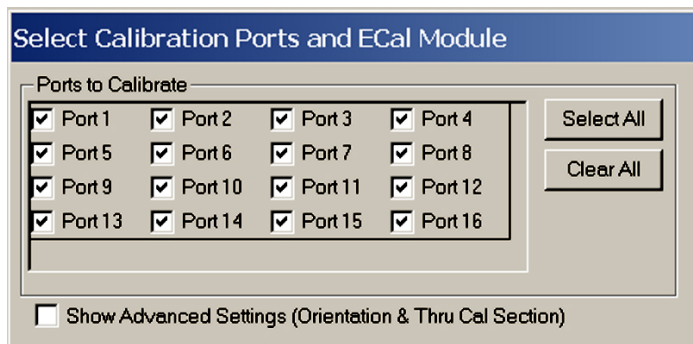


Figure 2. The full N-port correction capability allows for complete and accurate characterization of multiport devices.

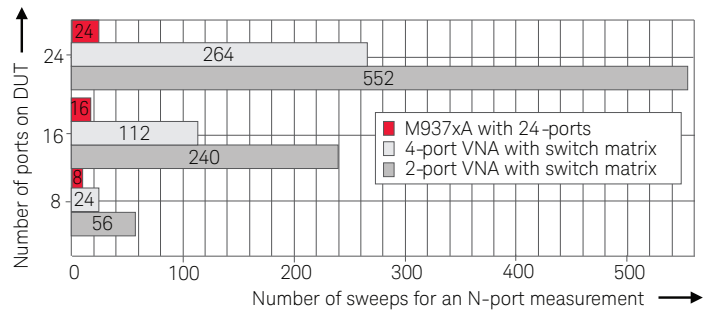


Figure 4. The multiport PXI VNA offers higher throughput with less sweeps required than a VNA with a switch matrix.

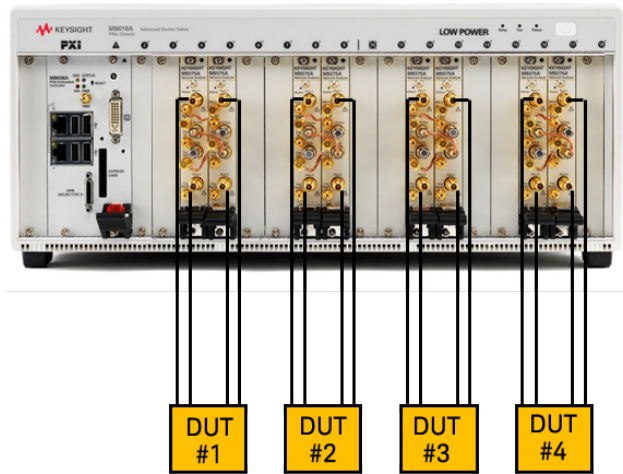
Increase Throughput with Multi-Site Capability

Unlike sequential measurements by a switch-based solution, the PXI VNA multi-site capability offers simultaneous measurements to improve overall throughput. Each PXI module or multiport array of modules is installed and identified under a single PXI controller. This makes it possible to run measurements of different devices at the same time or different measurement paths in a single component.

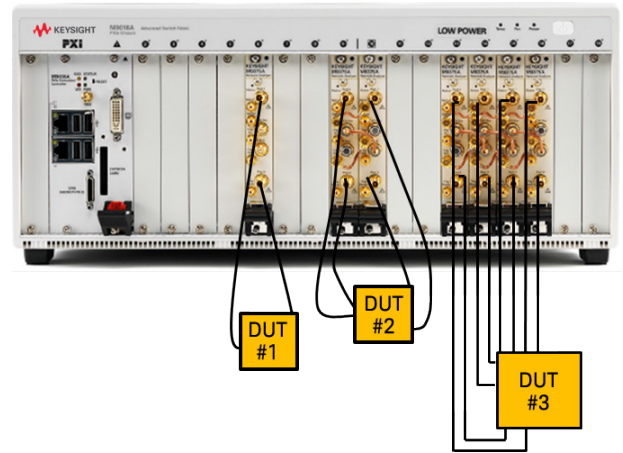
Multiple instances of the M937XA software are launched and each software instance is connected to either an individual M937XA, or a multiport array. Each instance behaves as an independent instrument to be used simultaneously. In addition, segment sweep enables you to optimize measurement conditions specifically for each device under test, so you can balance speed and accuracy. The PXI VNA multi-site capability gives you high throughput, so you can significantly lower the cost-of-test per device.



Figure 5. Multiple instances of the M937XA software are launched with each instance behaving as an independent instrument to be used simultaneously.



(a) Test multiple devices simultaneously.



(b) Test different devices simultaneously.

Figure 6. The PXI VNA multi-site capability increases throughput, resulting in a significantly lower cost-of-test per device.

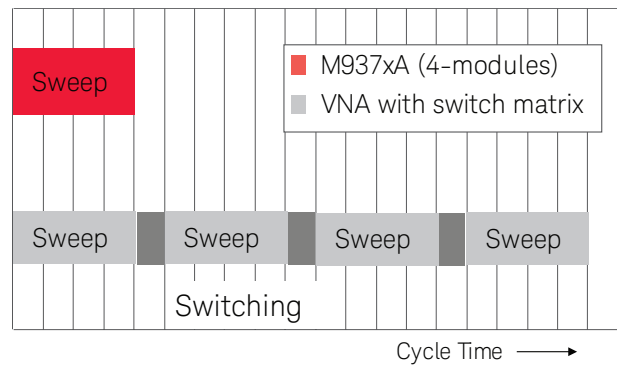


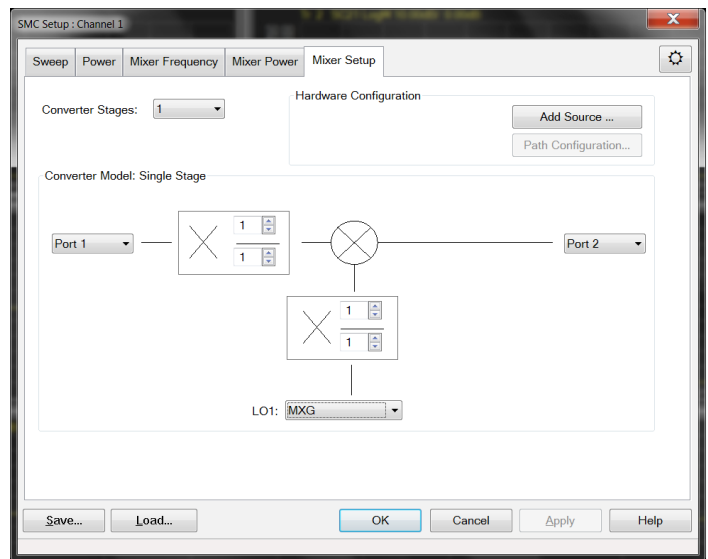
Figure 7. Unlike sequential measurements by switch-based solution, the PXI VNA offers simultaneous measurements to improve overall throughput.

Enhanced Measurement Capability

Accurate mixer/converter measurements

Frequency offset mode is available to set the PXI VNA's source frequency independently from where the receivers are tuned. Scalar mixer calibration (SMC) enables accurate conversion loss measurements of mixers or converters.

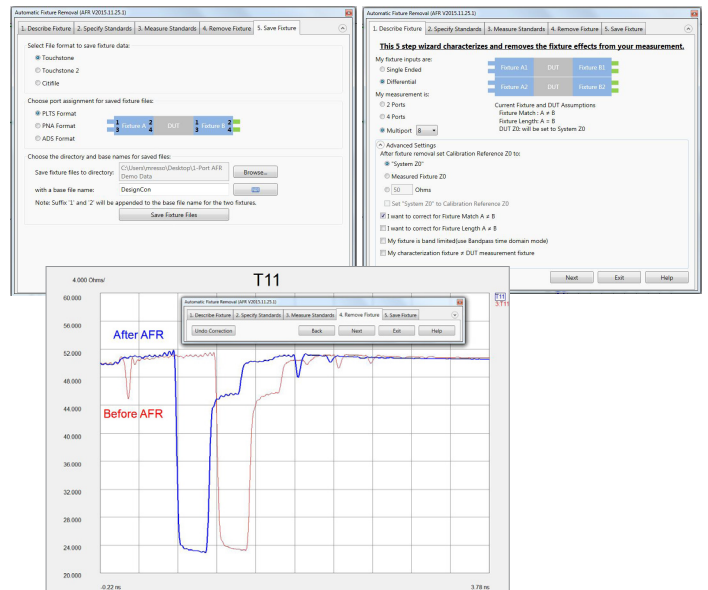
- Frequency-offset sweep
- Scalar mixer/converter measurements (SMC) for accurate conversion loss/gain measurements
- Intuitive GUI to control multiple PXI VNA modules
- External signal source control



Automatic fixture removal

Many devices do not have coaxial connectors and are put in fixtures in order to measure them in a coaxial environment. Accurately removing the effects of the fixture is required to get a good measurement of the device under test (DUT). Automatic fixture removal adds a powerful application wizard to guide you through characterizing a fixture and removing it from the measurement.

- Easiest way to remove fixture effects from non-coaxial device measurements
- Extract fixture S-parameters from 2x thru or one-port measurements
- Step-by-step wizard to characterize your fixture and remove it from your measurements



Advanced calibration tools

Calibrating network analyzers is critical for high accuracy measurements and can be particularly challenging in non-coaxial environments such as in-fixture, on-wafer, or waveguide. The PXI VNA supports a broad range of mechanical and electronic calibration kits, and offers advanced calibration methods to enhance ease-of-use while providing best-in-class accuracy.

Keysight calibration tools include:

- High-performance two-and four-port ECal modules, covering 300 kHz to 67 GHz, with nine connector types
- QSOLT and n-port calibration for multipoint test systems



Easy Integration into Test Environments

Software platform

Keysight soft front panels provide easy to use instrument communications. The graphical user interface guides developers through module setup using a similar look and feel as the popular Keysight network analyzers. Users can quickly configure the instrument parameters and perform calibrations.

IO libraries

Keysight IO Libraries Suite offers fast and easy connection to both traditional and modular instruments. The Keysight IO Libraries Suite helps you by displaying all of the modules in your system, whether they are PXI, PXIe, or AXIe. From here you can view information about the installed software or launch the modules' soft front panel directly from Keysight Connection Expert (KCE). KCE offers an easy way to find the correct driver for your instrument.

Drivers

The M973XA PXI VNA is supplied with a comprehensive portfolio of module drivers, documentation, examples, and software tools to help you quickly develop test systems with your software platform of choice. The module comes with IVICOM, IIVI-C, LabVIEW and MATLAB software drivers that work in the most popular T&M development environments including, LabVIEW and LabWindows/CVI from National Instruments, MATLAB from The MathWorks, Microsoft C/ C++, C#, and VB.NET.

Automated Measurement Expert

One of critical challenges for RF component manufacturers is to reduce the burden of developing and maintaining in-house test programs. The Automated Measurement Expert (AMX) addresses this challenge by providing ready-to-use automated multipoint test software supporting the M973XA PXI VNA. The AMX frontend Test Plan Builder (S94701A) generates test plan files that contain optimal VNA setups and test sequences from your DUT test plans. The AMX backend software (KS8400A/ S94702A) performs automated multipoint S-parameter tests according to the generated TAP plan files. This enables you to conduct complicated tests of multipoint RF components easily by just editing your DUT test plans with the Test Plan Builder. There is no need to do any programming for the core VNA setup and measurement sequences.

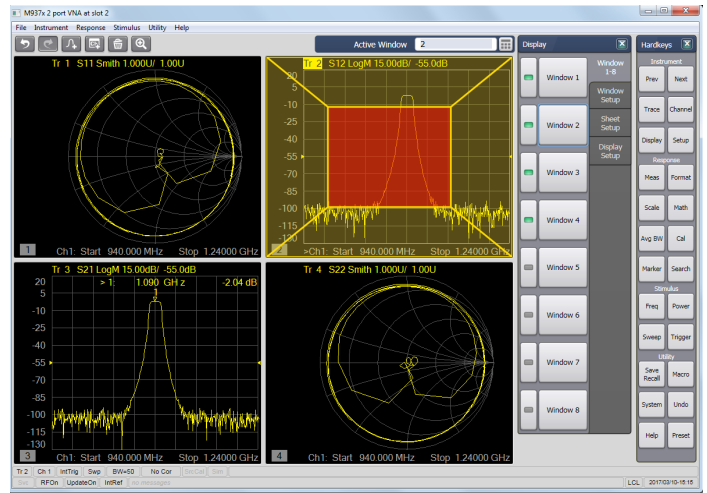


Figure 8. The graphical user interface guides test engineers using a similar look and feel as Keysight's popular network analyzers.

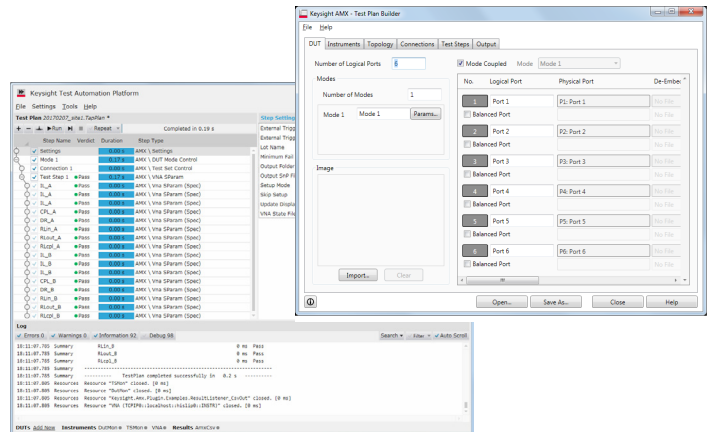


Figure 9. Automated Measurement Expert.

Ordering Information

| Model | Description |
|-----------------|--|
| M9370A | 300 kHz to 4 GHz |
| M9371A | 300 kHz to 6.5 GHz |
| M9372A | 300 kHz to 9 GHz |
| M9373A | 300 kHz to 14 GHz |
| M9374A | 300 kHz to 20 GHz |
| M9375A | 300 kHz to 26.5 GHz |
| Product options | |
| 007 | Automatic fixture removal |
| 009 | Frequency offset mode/scalar calibrated converter measurements |
| 010 | Time domain |
| 551 | N-port calibrated measurement |
| 897 | Built-in performance test software for inclusive calibration, perpetual license |
| 898 | Built-in performance test software for standards compliant calibration, perpetual license |
| Accessories | |
| Y1242A | Multiport cable kit |
| Y1281A | Accessory and tool kit: <ul style="list-style-type: none"> – Pull tool for SMB connectors – Custom socket for 3.5/SMA connector nuts |
| M9019A | PXIe 18-slot chassis |
| M9037A | PXIe high performance embedded controller |
| Calibration | Electronic and mechanical kits available |

Software Information

The PXI VNA includes instrument drivers, documentation, examples and software tools to help you quickly develop test systems in your application development environment of choice.

| | |
|---|--|
| Operating systems | Microsoft Windows Vista SP1 and SP2 (32/64-bit) Microsoft Windows 7 (32/64-bit) |
| Standard compliant drivers | IVI-COM, IVI-C, LabVIEW, MATLAB |
| Application development environments (ADE) | Visual Studio (C/C++, C#, VB.NET), LabVIEW, LabWindows/CVI, MATLAB, VEE |
| Keysight Command Expert | Instrument control for SCPI or IVI-COM drivers |
| Keysight IO libraries (version 16.3.16603.3 or newer) | Includes: VISA libraries, Keysight Connection Expert, IO Monitor |

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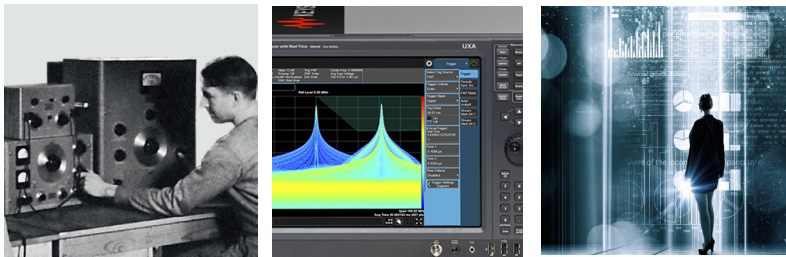


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