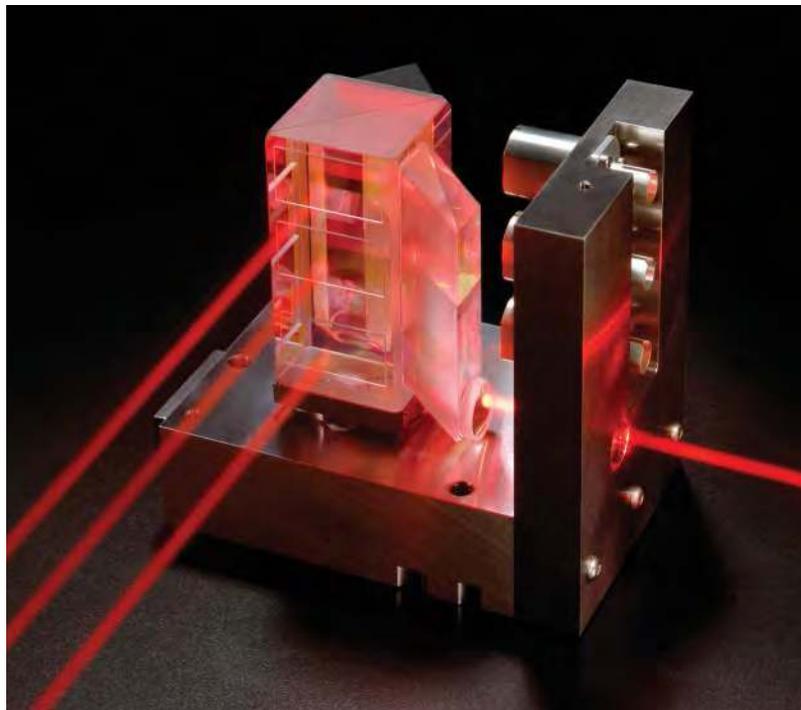


# Keysight Technologies Transducer Systems

Leading the Future for Extreme  
Accuracy Positioning Applications



## Keysight Laser Interferometry Systems

- Highest accuracy
- Flexible standard system design
- Custom design available

When nanometer accuracy matters – you can rely on Keysight.

Keysight Technologies, Inc. is a world leader in the design and manufacture of laser interferometry systems, advanced electronic measurement systems, high-precision optical components, complex monolithic optics (CMOs), and opto-electric systems design for the most demanding metrology applications. With more than 11,000 systems delivered, Keysight's modular interferometry solutions have set the standard for precision measurement for the most challenging applications in semiconductor lithography, aerospace/defense, metrology, and manufacturing. And, we continue to develop systems that will enable the future in each of these markets.

Our systems offer:

- High-precision in a wide dynamic range
- Simultaneously measure a position with multiple degrees of freedom
- The highest accuracy available in both air and vacuum

We deliver a selection of modular lasers, optics, electronics, and accessories that are designed to work together and give customers the flexibility they need in a precision laser measurement system for a variety of applications. A wide-range of standard systems and components is available and can be configured to meet your specific needs. In addition, our team of expert engineers will work with you to design custom system solutions.

A state-of-the-art optics design and fabrication facility in Santa Clara, CA allows our engineering and production teams to work together and tightly manage the design and production processes resulting in the high quality and dependability that our customers rely on. Deterministic manufacturing processes allow Keysight to maintain quality control that responds to the toughest optical challenges and deliver high-precision designs with cost-effective solutions for both standard applications and high-volume custom requirements.

### Typical Applications

- Semiconductor
- 3D packaging
- CMM
- Flat panel
- R&D investigations
- Manufacturing test



Figure 1. The Keysight N1212A Remote Optical Combiner offers extremely low heat loads for thermally sensitive applications and high velocity capability.



Figure 2. Keysight 5517 Lasers offer a wide range of specifications that can be selected to optimize system performance.

## Transducer Systems

Keysight laser measurement systems are both accurate and highly configurable. Multiple choices for each of the key system components are available enabling the creation of custom systems using standard products;

- Laser source
- Beam directing optics
- Measurement optics
- Optical receiver
- Axis electronics

Additional products are available for accurately measuring the air environment and creating a compensation factor to correct the measurement values due to variation in the air pressure, temperature, and humidity.

Most products can be mixed and matched as needed for the specific application, desired interface, and required performance level.

### USB electronics

The E1735A is a single axis solution for simple measurement-only applications.

### VME compatible electronics

Keysight offers three axis boards for VMEbus systems. All have the same flexible hardware interface along with similar software interfaces, enabling mixing boards as required within multi-axis systems.

- The 10897D provides a solution for single axis systems as well as multi-axis systems requiring continuous (versus sampled) feedback from all axes.
- The 10898D is a dual axis board with increased velocity range.
- The N1225A has four times the resolution of other solutions and handles three to four axes.

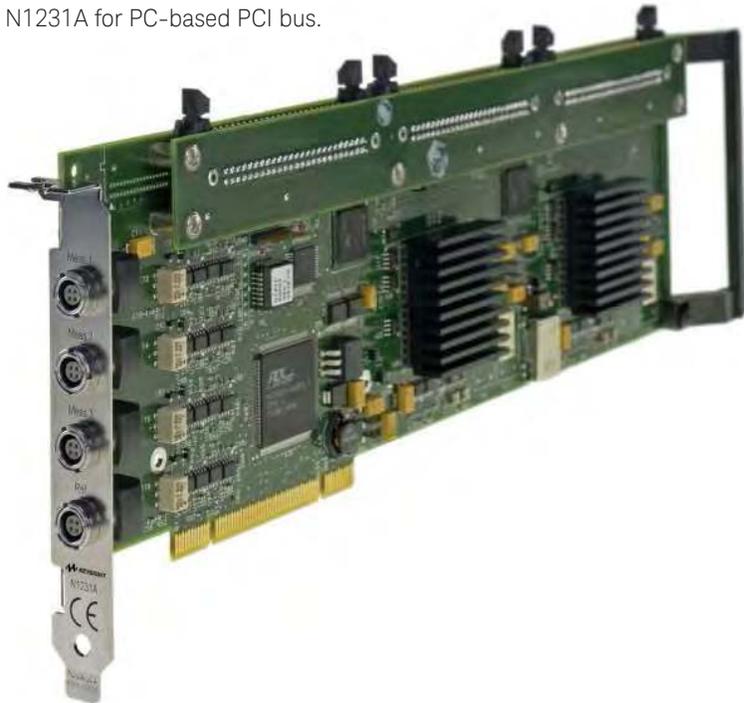
Keysight also offers an interface and control system enabling a set of VMEbus axis boards to send compensated data to a Delta Tau PMAC/UMAC motion control system. The N1226A, N1227A and N1228A/B products are used to make up this system.

### PC-based PCI electronics

Two solutions are available for PC-based PCI bus systems. The three-axis 1231A contains a plug compatible interface to the PMAC/UMAC series of motion controllers from Delta Tau. The three-axis N1231B offers two times the resolution of the N1231A and contains a flexible hardware interface similar to Keysight's VMEbus boards.



Figure 3. Keysight electronics solutions are available for multiple platforms and include the N1225A VMEbus and the N1231A for PC-based PCI bus.



## Standard Multi-Axis Optics

A wide variety of standard multi-axis optics are available that allow the measurement of pitch and or yaw with displacement in several measurement configurations. These include:

- The Z4399A enables measurement of distance, pitch, and yaw.
- The 10721A makes two differential measurements between two vertically offset mirrors to obtain distance and yaw.
- The E1827A is based on Keysight's proprietary CMO technology and enables distance and yaw measurements.
- The Z4420B enables distance and yaw measurement of two vertically offset stages while measuring pitch of the bottom stage.

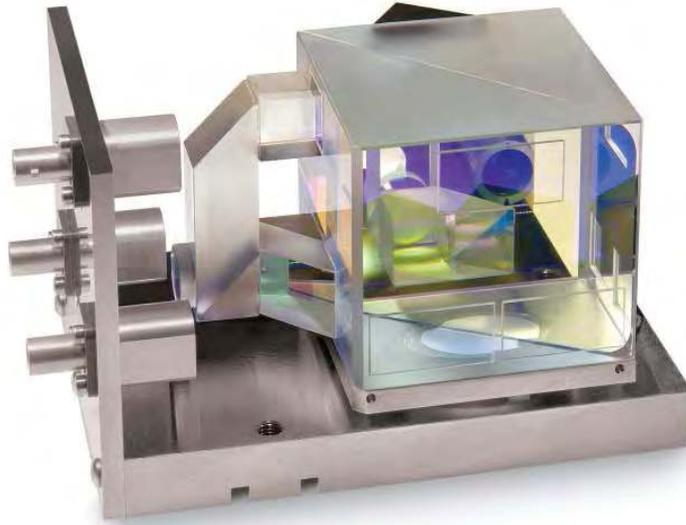


Figure 4. Keysight's multi-axis interferometers are designed and produced using our unique Complex Monolithic Optics (CMOs) technology and provide extreme precision and reliability in a compact form factor.

## Precision Designed Optical Components

Keysight is a world-leader in the design and fabrication of precision optics. The accuracy of your measurement depends upon the optical components used in your system. Keysight offers a number of beam delivery optics ranging from bare optics to beam translation components which are built to exacting wavefront specifications.



Figure 5. A broad selection of beam directing optics and mounts are available for integration into complex multi-axis measurement systems.

## Vacuum Compatibility

Keysight offers several standard interferometers that can be configured for vacuum environments. The housings of these components are made of stainless steel and the optical elements are attached to these housings using a low volatility UHV compatible adhesive.

The entire assembly is verified to be free of trapped air pockets and is manufactured in a class 100 clean room environment to prevent contamination of your vacuum system.

## Custom Interferometer Design

Keysight's staff of optical engineers is ready to apply their many years of leading-edge optical design experience to your project. Whether it's a coating design to exacting specifications, the design of a new optic, consultation on an optical configuration question, or help with a metrology or process control problem, we can provide specific state-of-the-art expertise to rapidly and efficiently address your needs.

### Services available

- Optical design
- Thin film coating design
- Optical fabrication consulting
- Monolithic opto-mechanical assembly design
- Optical metrology consulting and design
- Process control consulting
- Environmental test

And, unlike optical design labs that outsource manufacturing, Keysight offers comprehensive and proven services from initial concept through volume production, even for complex assemblies. The result: faster turnaround, clear accountability, and the benefits of decades of real world manufacturing experience.



Figure 6. Keysight's unique CMO technology allows us to design and manufacture standard and custom interferometers that are highly accurate, never need alignment and are light weight and space efficient.

**myKeysight**

**myKeysight**

[www.keysight.com/find/mykeysight](http://www.keysight.com/find/mykeysight)

A personalized view into the information most relevant to you.



**Three-Year Warranty**

[www.keysight.com/find/ThreeYearWarranty](http://www.keysight.com/find/ThreeYearWarranty)

Keysight's commitment to superior product quality and lower total cost of ownership. The only test and measurement company with three-year warranty standard on all instruments, worldwide.



**Keysight Assurance Plans**

[www.keysight.com/find/AssurancePlans](http://www.keysight.com/find/AssurancePlans)

Up to five years of protection and no budgetary surprises to ensure your instruments are operating to specification so you can rely on accurate measurements.



[www.keysight.com/quality](http://www.keysight.com/quality)

Keysight Technologies, Inc.  
DEKRA Certified ISO 9001:2008  
Quality Management System

**Keysight Channel Partners**

[www.keysight.com/find/channelpartners](http://www.keysight.com/find/channelpartners)

Get the best of both worlds: Keysight's measurement expertise and product breadth, combined with channel partner convenience.

[www.keysight.com/find/lasers](http://www.keysight.com/find/lasers)

For more information on Keysight Technologies' products, applications or services, please contact your local Keysight office. The complete list is available at: [www.keysight.com/find/contactus](http://www.keysight.com/find/contactus)

**Americas**

Canada	(877) 894 4414
Brazil	55 11 3351 7010
Mexico	001 800 254 2440
United States	(800) 829 4444

**Asia Pacific**

Australia	1 800 629 485
China	800 810 0189
Hong Kong	800 938 693
India	1 800 112 929
Japan	0120 (421) 345
Korea	080 769 0800
Malaysia	1 800 888 848
Singapore	1 800 375 8100
Taiwan	0800 047 866
Other AP Countries	(65) 6375 8100

**Europe & Middle East**

Austria	0800 001122
Belgium	0800 58580
Finland	0800 523252
France	0805 980333
Germany	0800 6270999
Ireland	1800 832700
Israel	1 809 343051
Italy	800 599100
Luxembourg	+32 800 58580
Netherlands	0800 0233200
Russia	8800 5009286
Spain	0800 000154
Sweden	0200 882255
Switzerland	0800 805353
	Opt. 1 (DE)
	Opt. 2 (FR)
	Opt. 3 (IT)
United Kingdom	0800 0260637

For other unlisted countries:  
[www.keysight.com/find/contactus](http://www.keysight.com/find/contactus)

(BP-07-10-14)