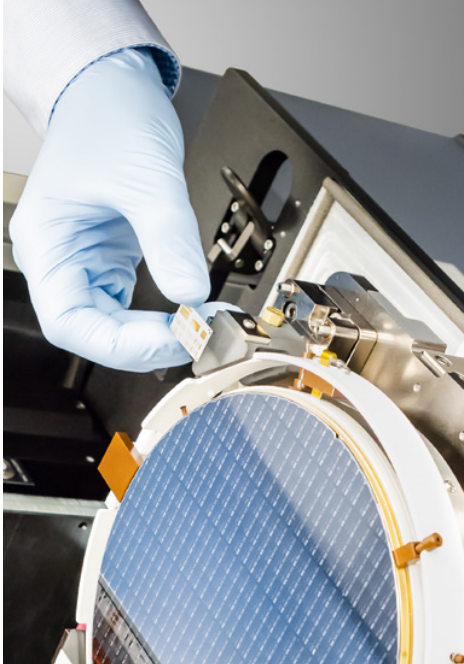
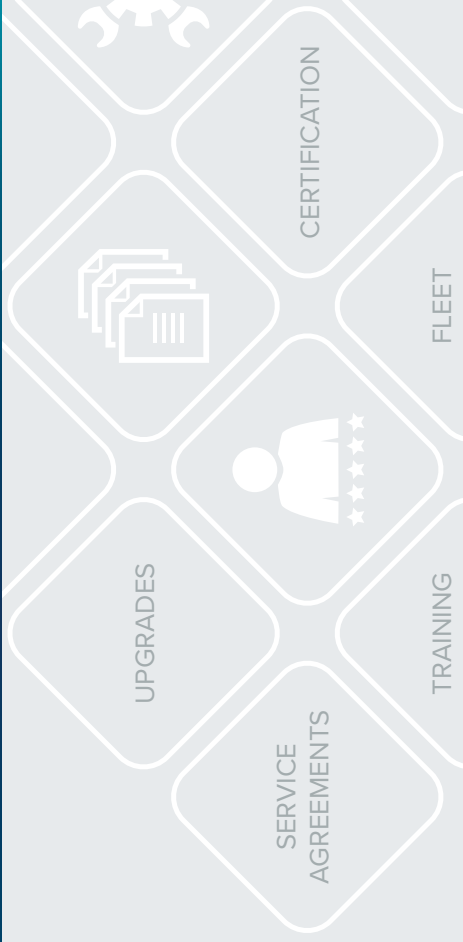


# Global Services

For Cascade Probe Systems



## FormFactor, Inc. - Company Profile

FormFactor, Inc. (NASDAQ:FORM) is a leading provider of essential test and measurement technologies along the full IC life cycle – from characterization, modeling, reliability, and design de-bug, to qualification and production test.



### Vision & Mission

Our heritage is innovation.

- / We constantly strive to help our customers solve the advanced test challenges of the broader semiconductor industry.
- / Our focus on customer partnership, innovation, agility and operational excellence allows us to earn sustainable business every day.



### Key Facts

FormFactor at a glance

- / Founded in 1993, IPO 2003
- / #1 Advanced Probe Card Supplier
- / #1 Engineering Probe Systems Supplier
- / Named as a BEST Supplier in customer satisfaction surveys, year-after-year
- / Ship >50 million MEMS probes annually
- / Over 10,000 probe systems installed



### Customer Collaboration

Global and local.

- / Enable customer success through technology, partnerships, "First Time Right" product quality, global customer support
- / 1,700 employees, with >500 directly supporting customers
- / 22 service and repair centers
- / 13 sales offices
- / 9 design centers

## Cascade Probe Systems

### Technology leadership

Cascade Probe Systems are an essential part of FormFactor, Inc. We offer a complete line of premium performance analytical probe solutions for on-wafer probing, board test and package test that help increase process performance while reducing cost of ownership. Our probe systems are available with a complete set of accessories such as microscopes, thermal control systems, software and industry-leading probes.

### Worldwide expertise, service and support

We have an extensive patent portfolio and are ISO 9001:2015 and ISO 14001:2015 certified. With facilities in Dresden/Germany and Beaverton OR/USA, and worldwide sales and support offices we serve customers in all major sectors (fabless, integrated device manufacturers, foundries, governments, institutes, universities, subcontractors).



## Further FormFactor Products



### Probes

- / More than 50 analytical probe models for wafer, package, and board level characterization.
- / Our families of RF, mixed-signal and DC probes are designed to meet the challenges of a wide range of probing environments.



### Probe Cards

- / Extensive portfolio of high-performance probe cards for memory, RF, foundry and logic devices that help lower overall production costs, improve yields and enable "more-than-Moore" advanced packaging technologies.



### Metrology

- / FRT - a FormFactor company - manufactures powerful surface metrology tools for various sectors such as development production and quality control.
- / Due to the design and construction of these multi-sensor devices, FRT tools can be used for multiple applications.

## Worldwide Application Support and Customer Service

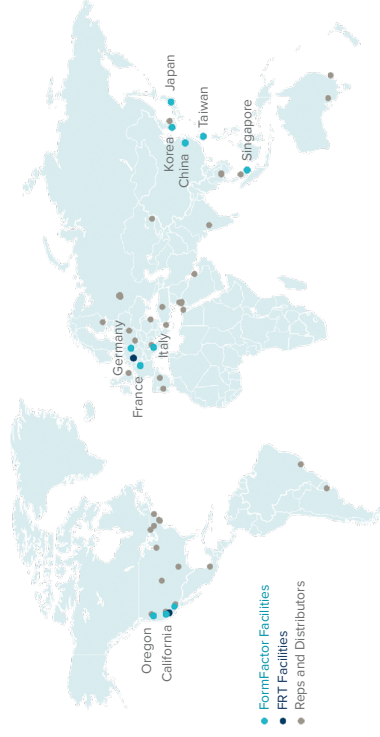
### Global Presence

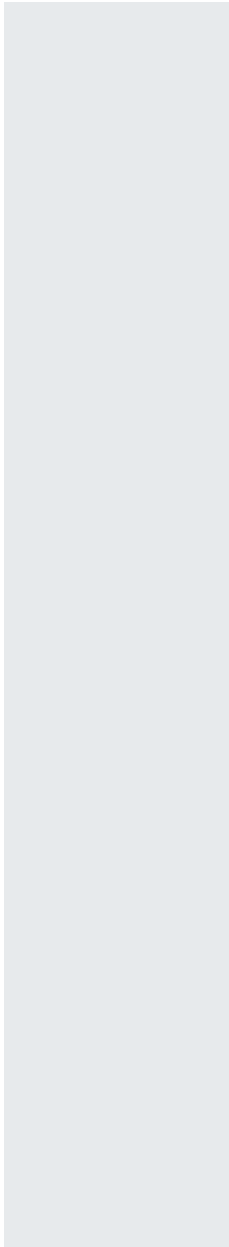
- / Over 10,000 Probe Systems
- / 1,700 Global Employees
- / 9 Design Centers
- / 7 Manufacturing Locations
- / 13 Sales Offices
- / 22 Service centers
- / Over 50 certified field service engineers
- / Continued training/certification

### Application Support

- / Worldwide Customer Application and Product Solutions team
- / Dedicated experts for state-of-the-art solutions
- / Over 20 certified field application engineers
- / Over 20 application experts at our partners

## Global Strength for Local Results





**Commitment**  
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Agreements  
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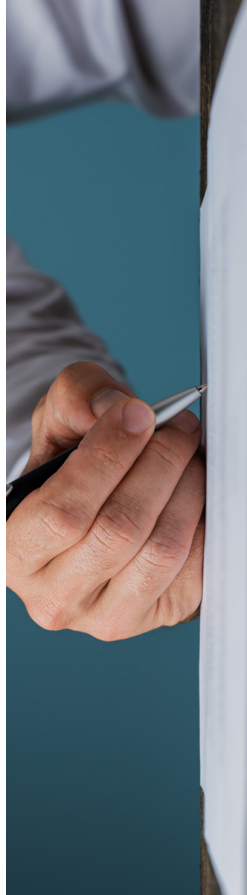
Upgrades  
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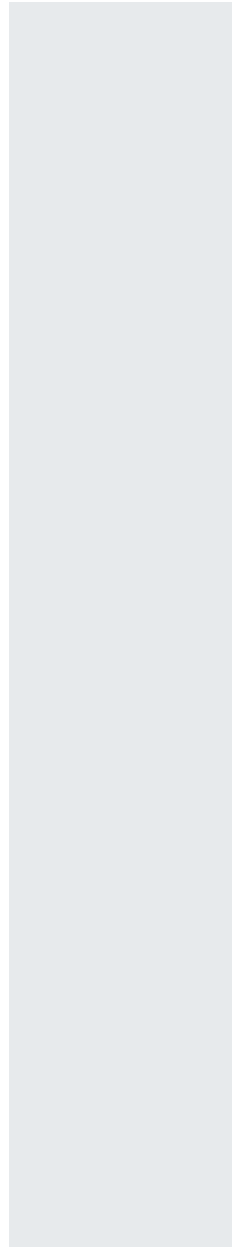
## Our Commitment

Customer Service is our passion at FormFactor. We are committed to being intimately connected to our customers and their needs to **optimize performance, increase yields and maximize product output.**

FormFactor's worldwide Service and customer support team is uniquely positioned to do just that. We have the facilities and resources in place to allow customers to focus on driving continuous **innovation** with fewer economic risks. By collaborating with FormFactor to protect and enhance System performance, customers accelerate their **time-to-market** and their **profitability.**

FormFactor offers a wide range of value-added service options — from comprehensive maintenance plans to technical training, certification and consulting for your engineering teams. Whatever service option you choose, rest assured that FormFactor's service organization will configure that service option to provide what's best for your needs.

As a company with a reputation for delivering technical excellence, we commit to provide you the **greatest possible value every day.**



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## Service Agreements

FormFactor has designed our Service Agreements to bring our customers simplicity and peace of mind when it comes to keeping equipment operating at optimum performance.

We take the guesswork out of maintenance budgeting by providing parts and labor coverage at a single, low cost. We eliminate time wasted waiting for maintenance or repair parts by providing priority service and part delivery.

Comprehensive, scheduled preventive maintenance, including FormFactor's full performance guarantee where applicable, maximize uptime and assure equipment is operating at the peak of performance.



## Service Agreements Guide

	Platinum	Priority Gold	Silver	Calibration
<b>System coverage (parts and labor included)</b>				
/ Full coverage for all station components	✓	✓		
/ Coverage for all station components except thermal			✓	
<b>Priority service for maximum uptime</b>				
/ Typical one-hour response on first notification	✓	✓	✓	
/ First priority delivery of replacement parts and availability of service engineer	✓	✓		
/ High priority delivery of replacement parts and availability of service engineer	✓	✓	✓	✓
<b>Preventive maintenance</b>				
/ Annual on-site visit to clean, planarize stage, lubricate and calibrate thermal chuck	✓	✓	✓	✓
/ Advance replacement of stage control hardware based on calculated wear estimates	✓	✓	✓	✓
<b>Software updates (including Velex® annual subscription renewal)</b>				
/ Major (additional functionality) and minor (defect repair) probe station control software updates	✓	✓		
/ Minor (defect repair) probe station control software updates			✓	✓
<b>Full performance guarantee</b>				
/ Guaranteed thermal chuck noise and leakage current, thermal transit time and system noise and shielding equal to date of manufacture	✓	✓		
<b>Application training</b>				
/ Two days of application training on your probe station at your site	✓			



## Service Agreements

### Repeatable, Reliable Results Are Critical to Your Success

We focus on your Probe System equipment so you don't have to. Our **Priority Gold** and **Silver Service Agreements** are designed to provide you with the best performing equipment with maximum uptime and throughout all while eliminating variable maintenance costs.

Combining all the benefits of the three-year **Priority Gold** Agreement and two days of application training, our **Platinum Service Agreement** offers four years of worry-free usage of your probe station.

### Budgeted Cost of Ownership

Service Agreements from FormFactor take the guess work out of budgeting for optimum Probe System performance. **Priority Platinum, Gold** and **Silver** contracts cover the costs of all parts and labor required to keep your Probe System performing at its best.

A realistic assessment of total cost of ownership takes into account the maintenance costs associated with a piece of equipment over its useful life. Service agreements allow you to budget for these costs.

### Annual Maintenance for Peak Performance

FormFactor's **annual maintenance** is included with applicable Service Agreements. We design our annual maintenance to keep your equipment operating at peak performance and with minimal test result variability.

High-wear parts are replaced on scheduled intervals; moving parts are lubricated and electrical and mechanical performance is verified.

### Predictable Uptime and Productivity

Your probe system performs a vital function and should be ready and functional when needed. The data extracted during measurements provides critical insight into semiconductor development and manufacturing processes.

Annual maintenance, plus **priority parts** and **service** scheduling, included with FormFactor Service Agreements ensure that you can meet your R&D commitments.

If a maintenance issue arises, there is no need to waste time issuing a purchase order. **Priority replacement parts** delivery and **labor** are included with applicable Service Agreements. Simply make a single call and FormFactor does the rest.

### Performance Guarantee (Priority Platinum and Gold Level)

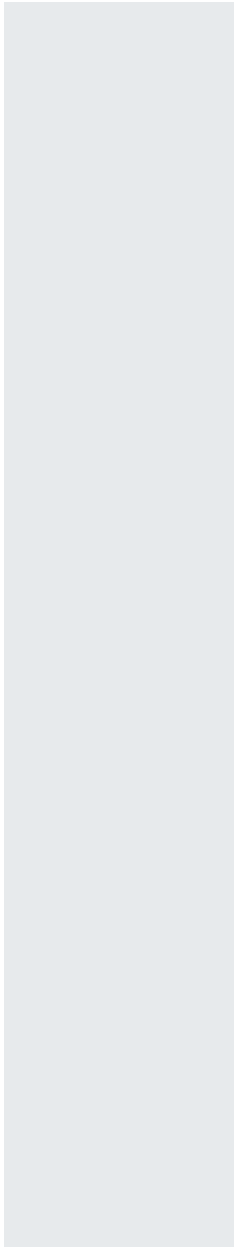
Low-leakage current and noise are critical to many measurements. The performance guarantee included in **Priority Platinum** and **Gold Service Agreements** offers you the peace of mind that your probe station meets **"as new" specifications** for these electrical parameters.

Electrical and mechanical performance are verified and demonstrated during each annual maintenance visit.

### Run the Most Recent Software

Running the **latest software** improves the functionality and productivity offered by your probe station and provides the benefit of FormFactor's ongoing development of new software capabilities.

Priority Platinum and Gold Service Agreement customers receive major and minor updates while Silver Service Agreement customers receive minor software updates.



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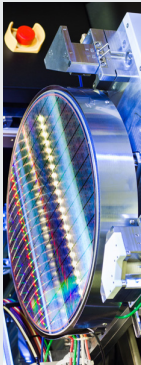
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## Performance and Productivity Upgrades



FormFactor is committed to continually innovating solutions to solve our customers' most difficult problems. If there is a component of your existing Probe System that is limiting your test capabilities, look no further than FormFactor performance and productivity upgrades.

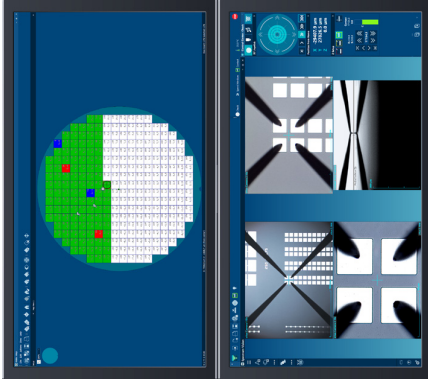
We have expertly engineered upgrade packages for all of our Probe System platforms to keep your existing Probe System fleet providing you with the performance and increased throughput you require.



## Velox™ Probe Station Control Software

Velox™ is FormFactor's unique software suite for 200 mm and 300 mm wafer probe stations. It is the universal standard for semi- and fully-automated systems, enabling seamless communication between the user and more than 15 different platforms. Velox reduces total cost of ownership by minimizing training efforts and providing faster time to robust and reliable data.

As a key element of FormFactor's exclusive Contact Intelligence™ technology for autonomous operation, it allows the user to perform measurement tasks faster, safer and more accurately. Velox enables safe and fast wafer loading, easy test automation and measurement system integration, while preventing costly damage of probes and probe cards throughout the entire measurement cycle.



**User-Centered Design**  
Minimized training costs and enhanced efficiency.


**Windows 10 Compatible**  
Highest performance and safe operation with state-of-the-art hardware.

**Smart Automation Features**  
Faster time to data due to reduced test cycle times.


**Simplified Operation for Inexperienced Users**  
Reduced training costs with Workflow Guide and condensed graphical user interface.

**Loader Integration**  
No need for any additional software. Easy creation of workflows and receipts.

**Hundreds of Tuneable Options**  
High flexibility for a large variety of applications.

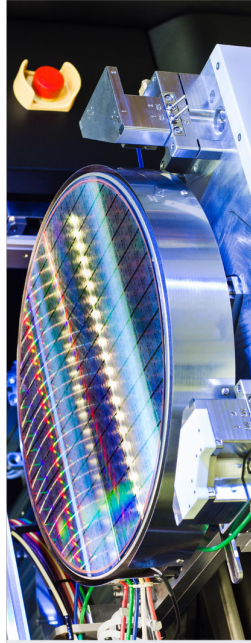


Velox  
Probe Station Control Software



## Thermal Systems

FormFactor offers thermal chuck upgrades on all of our probe system platforms. Our modular thermal chucks paired with either an air-cooled or liquid-cooled thermal system provide world class performance. Faster thermal transitions between test temperatures provide the benefit of less wait time and increased throughput. Best-in-class temperature accuracy and thermal uniformity minimize test result variability. Thermal chuck upgrades are a key step in meeting the increasingly demanding test scenarios of today and into the future.



- / Enhanced thermal range
- / Reduced thermal transition times
- / Best-in-Class wafer temperature accuracy and thermal uniformity
- / Optimized noise and leakage current performance

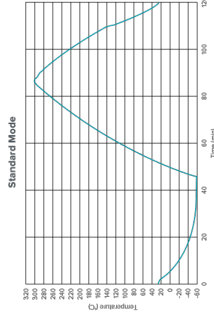
### ATT Transition Time (Typical)\*

	Standard Mode	ECO Mode
Cooling	25°C to -40°C	17 min
	25°C to -60°C	53 min
	200°C to 25°C	N/A
Heating	300°C to 25°C	18 min
	300°C to 25°C	33 min
	-60°C to 25°C	7 min
	-40°C to 25°C	5 min
	25°C to 200°C	19 min
	25°C to 300°C	35 min

\* Performance valid within fulfilled facility/media requirements as stated in the Facility Planning Guide.  
 \*\* Eco mode limits the CDA consumption of the chuck to max. 355 l/min

### ATT Thermal Transition Time (60°C to 300°C)

Typical times using CH300xi with FermoGuard Chuck



## eVue Digital Imaging System

### Experience the future of digital imaging

The eVue IV digital imaging system combines extraordinary optical performance with increased productivity.

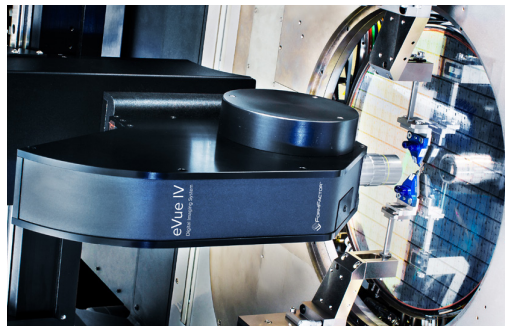
Its revolutionary multi-lens design provides the perfect balance between optical resolution, digital zoom and live motion video. The system enables the user to navigate, observe and measure devices faster and smarter than ever before, supporting FormFactor's unique Contact Intelligence™.

The new high-speed focus system allows faster operation, providing highly accurate measurement data in the shortest time. The advanced intelligent lens mount detects involuntary mechanical contact and enhances automation safety.

The eVue IV digital microscope is the perfect addition to your Cascade Probe Station.



eVue IV  
Digital Imaging System



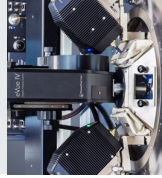
### Multi Lens Design

- / Quick and easy probe tip navigation
- / Maximizes field of view
- / High magnification



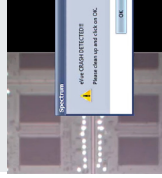
### Extended Lifetime

- / 24/7 operating
- / Increased MTBF
- / No internal maintenance required



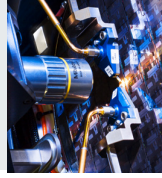
### Intelligent Collision Detection

- / Protects the measurement setup
- / Prevents involuntary mechanical contact between lens and probes
- / Enhances automation safety



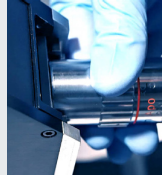
### Longer Focus Range

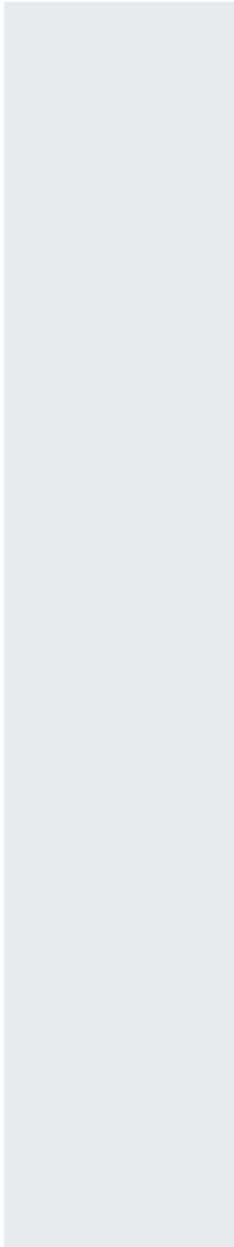
- / Z drive can work in the same range as the chuck
- / Enables higher separation gap while the DUT stays in focus
- / Makes the unique ScopeFollowMode even more powerful
- / Enables a faster and more accurate probe tip placement



### Intelligent Objective Lens Mount

- / Automatically configure and optimize performance
- / Easy lens exchange
- / eVue identifies objective parameters automatically and communicates them to Veilox-Probe Station Control Software





Commitment 8 - 11
<b>Certification 28 - 31</b>

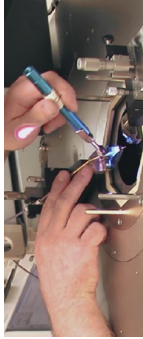
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## Maintenance Training and Service Certification

FormFactor recognizes that each of our customers has unique requirements. Some customers have their own maintenance and service teams that are responsible for the front-line support of all equipment.

FormFactor offers training for our customer's service teams that can be tailored to the service model that meets your needs.



### Maintenance Training

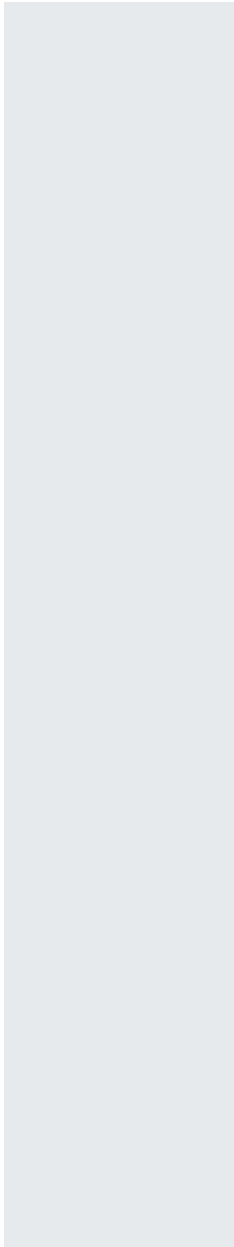
- / On-site or FormFactor facility
- / Routine maintenance
- / Basic troubleshooting



### Service Certification

- / FormFactor facility
- / Advance Troubleshooting
- / Module and component replacement
- / Specification verification
- / Service tools and test fixtures available

*Annual recertification required*



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## Applications Training

Applications Engineers are specialists in FormFactor probers, probes and measurement applications. They are available to provide advanced software and hardware training to optimize your probing process for usability, throughput and accuracy. They can also assist in the remote interfacing between the prober and the user's test executive software.

Training can be performed at the user's location or at specific FormFactor sites. Standard training agendas are available, but agendas can also be customized for the user's maximum benefit. Training is typically one to three days with a recommended audience of up to six people.



### Example training agenda: Advanced training on a prober for an RF application that uses WinCal RF calibration software



#### Probe Station Essentials

- ✓ Overview
- ✓ Controls
- ✓ Vision Components: Microscope, Chuck-Camera, Contact View
- ✓ Platen
- ✓ Chuck
- ✓ Thermal
- ✓ Loading wafers
- ✓ Probing fundamentals: Positioner based or Probe Card
- ✓ Best Practices



#### Velox Software

- ✓ Overview
- ✓ Navigation
- ✓ Communication
- ✓ Software interfaces: Toolbar, Wafer Map, Spectrum Vision, Control Center
- ✓ Software Advanced: Table View, Remote Communicator, Error Report Tool, Special Tools
- ✓ Hands on

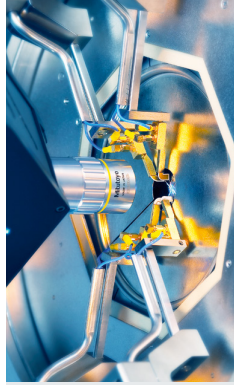


#### RF Probing

- ✓ RF Probe families and characteristics
- ✓ Handling and mounting considerations
- ✓ Planarizing probes
- ✓ Overtravel and skate
- ✓ Connecting probes to an instrument
- ✓ RF measurement and calibration
- ✓ S-Parameters



### Application Expertise



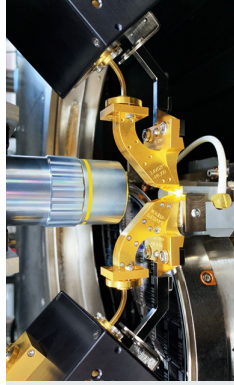
“Succeed by making the best decisions with the best data.”

/ IV/CV



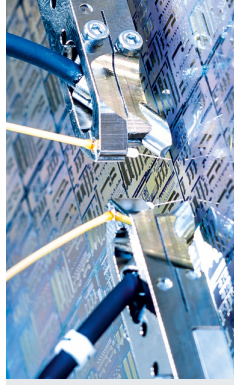
“Investigate sensitive device measurements.”

/ Ultra-low Noise (If)



“Make the most of your RF expertise and take the shortest path to highest accuracy.”

/ RF / mmW / THz



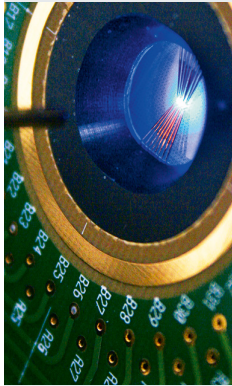
“Providing solutions in wafer-level photonics probing.”

/ Silicon Photonics



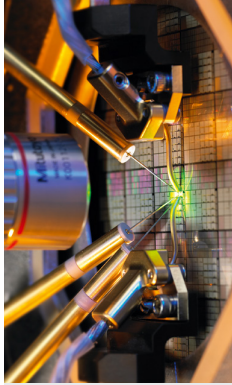


### Application Expertise



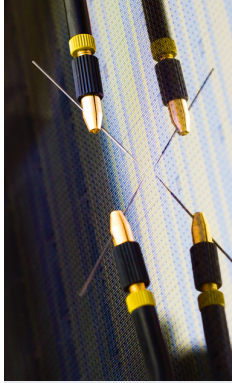
**"Highly-accurate high-throughput functional testing of optoelectronics."**

/ Opto /  $\mu$ LED



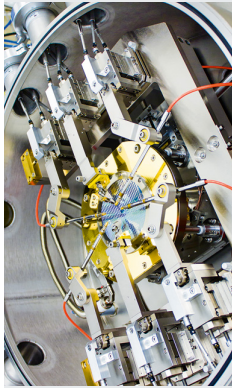
**"Energize your power measurements."**

/ High Power Test



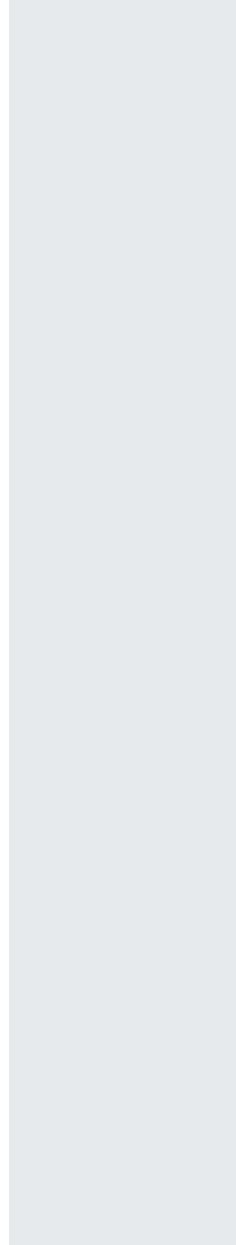
**"Fast and accurate solutions for identifying the cause of a failure."**

/ Failure Analysis



**"Modern and innovative solutions for the special requirements in MEMS testing."**

/ MEMS Test



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# Fleet Management

Let FormFactor put our 30+ years of experience in wafer probe applications and knowledge gained from supporting over 10,000 Probe Systems installed worldwide to work for you. We partner with you to develop efficient maintenance and replacement plans to keep critical equipment up and running as you execute on your long-term asset strategies.

**1. Asset Inventory Assessment** 

Excellent planning leads to excellent results. FormFactor will provide technical experts to evaluate the status of each probe system in the fleet as well as understand the criticality of the tests being performed on each probe system.

**2. Asset Management Solution Proposal** 

Knowing exactly where to act. With the Asset Assessment completed, FormFactor will deliver a comprehensive, long-term proposal. The proposal will be specifically tailored to each customer's technical road map. FormFactor will leverage hardware/software upgrades, probe system replacement via our SourceOne refurbished equipment program and new capacity additions to the fleet to deliver the most economical benefit.

“FormFactor Fleet Management plans put your most capable assets at the right place at the right time.”

**3. Service and Support** 

Professional tools for professional work. Executing the asset management solution plan is FormFactor's specialty. We put our worldwide footprint and outstanding customer-centric support infrastructure to work. Regular plan reviews keep FormFactor and the customer closely linked through long-term success.



- Investment cost savings** through customer-oriented approach to uptime, reliability and Cost of Ownership.
- Operational cost savings** through optimized service configuration and intelligent refurbishment and replacement strategy.
- Maintenance cost savings** through age and critically weighted programs.

## Total Cost Savings Through Expert and Economical System and Service Optimization

## Product Safety and Ergonomy

Cascade probe systems and systems-related services conform to the highest international standards and regulatory requirements.



### Quality

/ ISO 9001 : 2015

- / Products and services meet all customer and regulatory requirements
- / Continual improvement of products and processes

### Safety

/ SEMI S2, cNRTLus, CE, UL

- / Compliance with safety, health and environmental requirements to prevent or reduce the risk of injury



### Ergonomics

/ SEMI S8

- / Straightforward design
- / Easy and ergonomic operation



### Environment

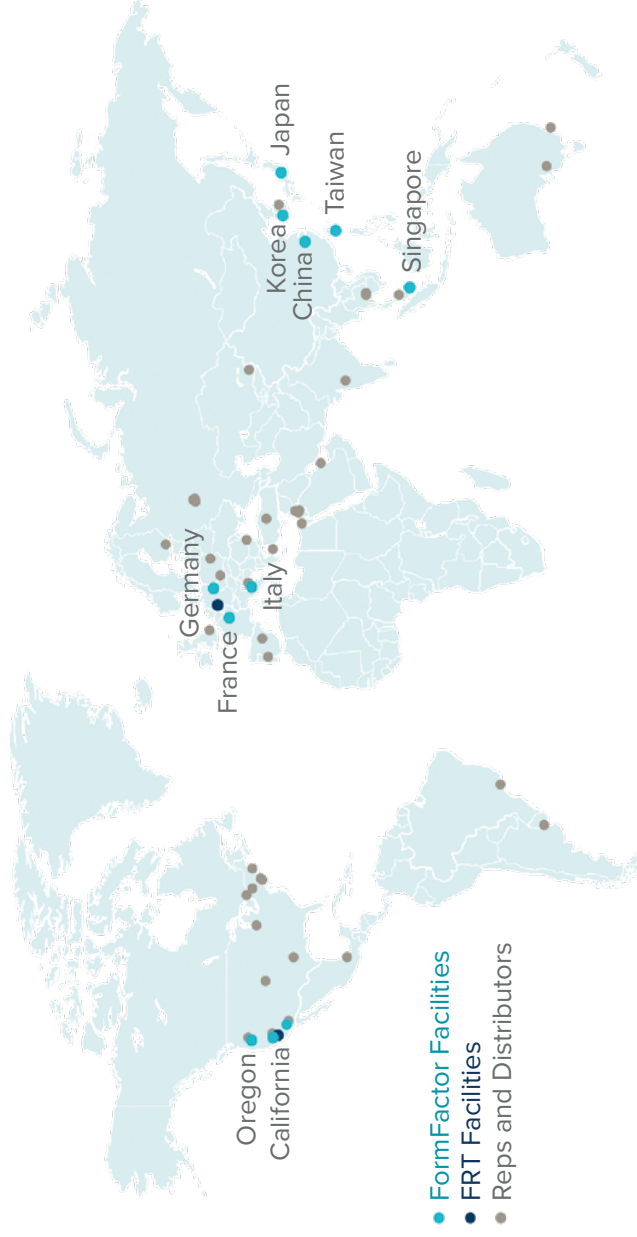
/ ISO 14001 : 2015, RoHS

- / Prevention of pollution
- / Reduced consumption of natural resources
- / Minimization of waste
- / No use of hazardous materials

Certifications in collaboration with TÜV SÜD and TÜV Rheinland.



## Global Strength for Local Results



- / 2,000 Global Employees
- / 10 Design Centers
- / 8 Manufacturing Locations
- / 13 Sales Offices
- / 22 Service Centers



[www.formfactor.com](http://www.formfactor.com)



@formfactor



FormFactor Inc.