



# SEMIPROBE®

Test • Inspect • Innovate



## Innovative Probing and Inspection Solutions

## INTRODUCING SEMIPROBE

SemiProbe designs and manufactures the most innovative and modular probing and inspection test solutions available today.

Our customers include Universities, Government Research Labs, and a broad range of semiconductor companies developing innovative technologies including MEMS, nanotechnology, optoelectronics, photovoltaics and more. With hundreds of installed systems across five continents, we provide cost-effective platforms and accessories to meet a wide variety of applications from R&D through production.



Success in today's rapidly evolving environment is defined by your ability to adapt to changing requirements, reduce your time to market and control your cost. Your market demands greater functionality within a single package, requiring electrical, mechanical, and/or optical multimodal integration. Packaging needs to decrease in size, increasing the complexity of design and production. And as the technology permeates virtually every aspect of daily life, extended testing to insure reliable performance in harsh environments is a necessity.

Traditional probe systems are not designed to address these critical issues. They are purpose built for a particular technology and wafer size with limited flexibility and field upgrade path.

We believe we have a better solution to help meet the challenges you face. The Probe System for Life (PS4L) is designed based on SemiProbe's patented adaptive architecture. Unlike traditional systems, all foundation modules are interchangeable, making the PS4L the consummate solution for many different applications and budgets. This unique modular design enables customers to acquire test capabilities that precisely match their requirements. More important, as the environment or test conditions change, the PS4L can easily be field-upgraded to meet these new demands. With this design philosophy, PS4L customers realize substantial time and cost savings over traditional probe systems because they do not need to invest in a new platform when wafer size, levels of automation, or test requirements change.

Our commitment to you is to empower you with the latest technology you need to help lower the cost of test and improve your time to market.

### **Platforms:**

- Manual & Semiautomatic Probers
- Wafer & Die Optical Inspection
- Specialty Probers
  - Vacuum/Cryogenic/High Temp
  - Double Sided
  - Magnetic Stimulation

### **Technologies:**

- Discrete Devices
- MEMS, NEMS & MOEMS
- Optoelectronics
- HF/Microwave (DC to >300 GHz)
- Photovoltaics
- Nanotechnology
- Materials Science

### **Applications:**

- Device Characterization
- Pin to Pad Alignments
- Known Good Die
- Package, PCB & Substrate Testing
- Wafer Level Reliability
- Failure Analysis, debug

## LAB ASSISTANT

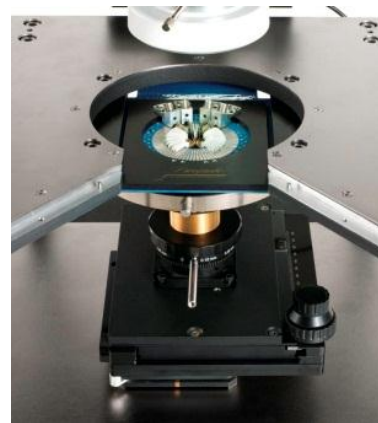
### Small footprint manual systems with probing capabilities ranging from individual die to 200 mm wafers/substrates

The SemiProbe Lab Assistant family of probe systems is specifically designed to address the requirements of Universities and research personnel - simplicity and ease of operation, portability, affordability and modularity. The Lab Assistant provides features and options for both DC and HF/Microwave testing that are typically only available in much more expensive systems – multiple stages, chucks, optics and manipulators. Numerous accessories can be added at a later date to enhance the system functionality.

The Lab Assistant is packaged as a complete system that can be unpacked and ready to use in as little as an hour. System pricing starts under \$10,000 with a choice of 50 mm, 100 mm, 150 mm or 200 mm for either DC or HF/Microwave applications.

A typical Lab Assistant configuration includes:

- Rigid aluminum base with rubber vibration isolation feet
- Rapid magnetic course stage adjustment with coaxial and linear fine adjustment
- Chuck Z lift adjustment with contact/separate lever
- 360 degree theta
- Chuck with isolation adapter and vacuum control system
- 4.5" probe card holder
- Precision micrometer platen planarity adjustment
- Aluminum with stainless steel plated platen with removable front wedge
- Two (2) HF or DC manipulators with magnetic base and probe arms
- Microscope post with coaxial and linear microscope movement
- 7x to 90x trinocular stereo zoom microscope with wide field 10x adjustable eyepieces and 100 mm (4") working distance
- CCTV system ready



## PROBE SYSTEM FOR LIFE

- **All key components are interchangeable which enables the system to easily be configured to meet applications and budgets – present and future**
- **Software and hardware modules provide a perpetual field upgrade path**

The Probe System for Life (PS4L) family of wafer probing systems is designed based on SemiProbe's patented adaptive architecture. Unlike traditional probe systems, all foundation modules – bases, stages, chucks, microscope mounts, microscope movements, optics, manipulators and more - are interchangeable, making the PS4L the consummate solution for many different applications and budgets. This unique modular design enables customers to acquire test capabilities that precisely match their requirements. More important, as the environment or test conditions change, the PS4L can easily be field-upgraded to meet these new demands. With this design philosophy, PS4L customers realize substantial time and cost savings over traditional probe systems because they do not need to invest in a new platform when wafer size, levels of automation, or test requirements change.



All SemiProbe semiautomatic and fully automatic systems operate on the powerful PILOT control software suite, designed employing the same adaptive architecture philosophy as the PS4L hardware. PILOT is modular, intuitive and easy to learn. This powerful DLL-based software enables users to quickly and easily communicate with the probe system and test instrumentation. Full driver libraries are available for LabView, C++, and Visual Basic with specific instrument drivers to support the most advanced instrumentation available. Communications may be made using RS-232, GPIB or TCP/IP, enabling the system to be either a controller or a slave in an integrated solution.

A complete line of accessories is available for the PS4L including probe card holders, manipulators, probe arms and bases, probe tips, laser cutters, optics, CCTV systems, material handling (robotics for auto load), pattern recognition, vibration isolation tables, dark boxes and much more.





## SPECIALTY PROBERS

### DOUBLE SIDED PROBING (DSP)

SemiProbe has unique DSP products to meet the needs of emission microscopy (failure analysis) and manual and semiautomatic systems to test devices with active regions on both sides. Systems allow contact on one side and observation on the other or the ability to contact both sides simultaneously. Our high speed semiautomatic system enables high speed probing of devices such as discrete power transistors, IGBTs, SCRs, diodes and photovoltaics.



### MAGNETIC STIMULATION

The Magnetic Stimulation System (MSS) provides testing solutions for memory devices – Fram, FeRam, MRAM and Spintronics. The operator manually controls the position of the device under test (DUT), the contact probes, the microscope and the magnetic source. In order to gain the minimum distance from the DUT to the magnetic source, an ultra-thin glass chuck is used. The wafer or fragment is held in position using two non-ferric clamps. The chuck system is open directly under the chuck for the magnetic source and magnetic source positioning system.



The MSS system is designed to use standard DC probes on individual manipulators or HF/Microwave probes. The magnetic source is held on a unique holder designed to provide a rigid mount that maintains multiple degrees of freedom for positioning in relationship to the DUT. All components and fasteners used in the system are non-ferric.

### RESEARCH ASSISTANT

Designed for research on small samples, the Research Assistant enables users to transform a single system into a multi-use platform for vacuum, cryogenic and ultra-high temperature test applications. It is ideal for small materials research, MEMS and more.

The basic Research Assistant includes a chamber, vacuum pump and control system. To convert the system for Cryogenic probing or Ultra-High Temperature applications, the flange is removed and exchanged for the desired application. This entire conversion process takes less than one hour, providing unsurpassed flexibility and significant capital equipment savings. Users may start with the basic vacuum module system and then field upgrade to add either or both additional modules as needs and budgets dictate.



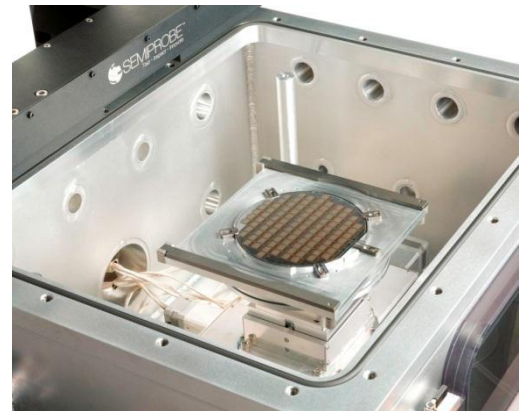
## SPECIALTY PROBERS

### VACUUM PROBERS

Sized for the user's wafer/substrate, our vacuum probers are used extensively in MEMS development and production. From sensors to gyros, any product that will be vacuum packaged in either a conventional package or via 3D packaging can be characterized earlier in the process. SemiProbe vacuum systems will test wafers or substrates up to 200 mm. Individual die and broken/partial wafers can also be tested. The system is built using our PS4L adaptive architecture. All key modules are interchangeable to provide unsurpassed flexibility. The interchangeable modules makes it easy to convert to provide testing solutions for a variety of applications - DC, HF, OPTO, MEMS, Nanotechnology and more.



Several thermal chuck options are available to provide temperature ranges from -60oC to 300oC. The probe system platen accommodates individual manipulators as well as probe cards. Up to 8 motorized/programmable manipulators can be placed inside the chamber and operated remotely from outside the chamber. Several different size viewing ports, windows and flanges are available in a variety of materials. High resolution stereo zoom or compound optics are available to view the device and are typically complimented with a CCTV camera system. The system accommodates other accessories including Laser Cutters, MEMS Motion Analyzers and IR Blackbodies. Several different types of vacuum pumps and controls are available to meet a variety of vacuum levels.



The SemiProbe Automatic Vacuum Prober (AVP) is built around a central robotic system that feeds any number of probing or secondary processing modules, providing unprecedented flexibility and process uptime. Modules can be reconfigured or new modules added without interruption of the other modules in the system. Because of the test overhead, wafers generally take a significant amount of time to test. Using the conventional single robot per prober concept, the expensive vacuum robot sits idle during this entire test time. By utilizing a central robot to feed many probers, the cost of automation is substantially reduced while throughput and uptime is significantly improved.



## INSPECTION SYSTEMS

SemiProbe WIS inspection systems inspect, locate and identify defects created during wafer manufacturing, probing, bumping, dicing or general handling, providing microelectronic device manufacturers with accurate, timely quality assurance and process information. The WIS inspection system has single sided and double sided wafer mapping capabilities and can improve efficiency, reduce manufacturing costs, increase yields and shorten time to market. The WIS wafer inspection system is a high speed optical inspection system capable of automatic inspection or high speed operator inspection and coding.

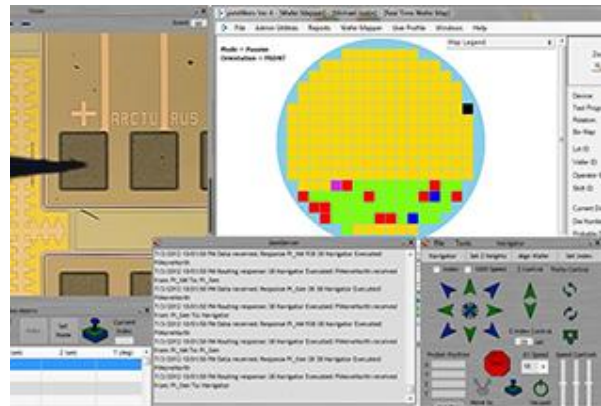
Full wafers or singulated die on stretch frame or in wafer pack may be inspected.



Defect Inspection for:	
Probe Mark	Saw
Inking Verification	Pattern
Residual Films	Incomplete Etch
Through Silicon VIA	Resist
Bump	Large Scale Contamination
Passivation	Scratches, Cracks, Chips

## SOFTWARE

The SemiProbe PILOT Control software Suite for SemiProbe semi and fully automated probe systems employs the SemiProbe patented adaptive architecture. Software modules can be added to the base system as needed. PILOT Control Software consists of a Microsoft Windows-based user interface relying on the SemiServer for communicating to and from the probe system. Individual customer applications can be integrated with PILOT Control Software for a more customized system to meet individual needs.



The PILOT software comes with standard modules including Navigator and Position Matrix, with more sophisticated options like the Vision module available. Modules interfacing to the SemiServer have a set of remote commands that can be accessed by any other module providing the capability to perform its own specific function, yet access all other features of the suite seamlessly.

## ACCESSORIES

We offer a comprehensive line of accessories to complement your investment including:

- ✓ Manipulators
- ✓ Probe Arms and Probe Tips
- ✓ Optical
- ✓ Environmental
  - High and Low Temperature Chucks and Chambers
  - Dark Boxes
  - Electrical and Acoustic
- ✓ Cables
- ✓ Inkers and other Inspection accessories

## SUMMARY

With over 70 years of experience, we deliver application specific probing solutions to help you solve your most difficult test challenges quickly and cost effectively. We would like the opportunity to work with you and become your probe and inspection system vendor. Of course, if you have a particular need or challenge now or in the future, we'd love to hear from you. Here is what some of our current customers have said:

*"For our application we were interested in a flexible and upgradeable system. SemiProbe's Probe System for Life met those needs perfectly, employing interchangeable standard products alongside custom SemiProbe components."*

**-Semiconductor Company**

*"We are very impressed by what this station can do in terms of flexibility"*

**-University Research Facility**

*"Brilliant Design. Finally a probing company that provides an affordable multipurpose system with a myriad of upgrade options."*

**-University Research Facility**

*"It's refreshing to hear a probing system vendor say yes to providing customized solutions for newly developed products"*

**-Semiconductor Company**

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