Wentworth Laboratories

www.wentworthlabs.com

PEGASUS

ANALYTICAL PROBER

FA SERIES

200mm & 300mm SEMI-AUTOMATIC PROBE STATION

The Pegasus™ S200/S300FA Semi-Automatic Probe Stations are versatile probers specifically designed for failure analysis applications, device characterization, parametric, high power and ultra-fine geometries.

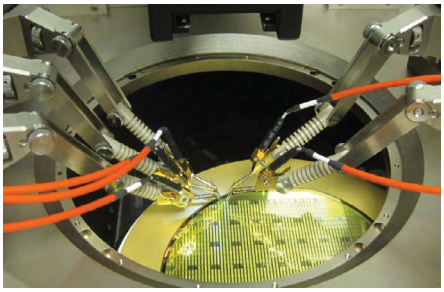
Utilizing our LabMaster™ windows based software package provides local and remote automation for today's analytical probing challenges.

PEGASUS™ S200/S300FA FEATURES

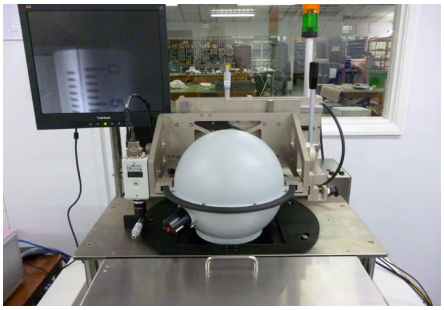
- Flexible for a wide range of applications, DC Parametric, Low Current, High Power plus many more.
- Precision engineering for reliable and repeatable sub-micron probing.
- Adaptable for industry standard testers.
- Temperature probing from –65°C to +400°C utilizing Wentworth's GuardMaster™
- Wide range of product enhancing accessories.
- Customizable product enhancing hardware and software options.
- LabMaster™ control and monitoring software, control of external devices and wafer mapping tools.
- Robust mechanical design.
- Cost effective test solutions.

Leader In ProbeAbility

Analytical DC Test



High Power Test



Opto Electronics Test

LEADING EDGE APPLICATIONS

DC PARAMETRIC

Utilizing either Wentworth replaceable Pegasus™ probes or DC cantilever probe cards , the Pegasus™ S200/S300FA probers are an ideal platform for parametric testing. Tunable stage speeds and product enhancing accessories allow for fast probing and increased through-put.

SPECIFICATION	
Features	
Frequency	dc > 100Mhz
Breakdown Voltage	500V
Leakage	+/-10fA -65°C > +200°C +/-20fA +200°C > +400°C

OPTO ELECTRONICS

Wentworth's Pegasus™ S200/S300FA can be specifically designed for production and analytical probing of semiconductor light-emitting diode (LED's) , laser diodes and optical micro-electromechanical devices.

Chuck solutions allow handling of full wafers, shards, single chips and packaged parts.

Ability to handle spectrometer probes, fibre optics, integrating spheres , glass chucks, thermal imaging cameras and more.

SPECIFICATION	
Features	
Speed	Up to 20 dies/sec (70,000 / hr)
Reverse Emission	Glass Chuck, DSP, Back Side
Controllable Contact Force.	Pegasus™ Probe (Open loop to prober Z -Stage)

HIGH POWER

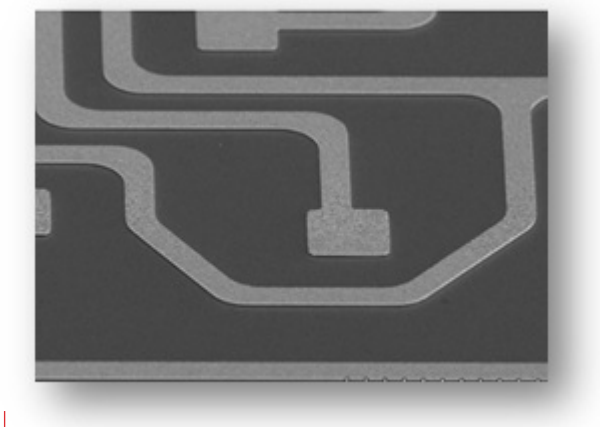
The Pegasus™ S200/S300FA High Power configuration addresses today's power semiconductor test challenges with Low Contact Resistance Measurements requiring accurate measurements at high voltages. Kelvin Chucks & Backside probing solutions allow Contact Resistance measurements in the milli ohm range.

High Current probes & probe cards (up to 100A) handle and distribute excessive current loads. Dedicated HV & HC probes reduce probe and device destruction at high voltages/currents to prevent device heating and arcing at the tip.

SPECIFICATION	
Features	
Voltage	3KV (Triax), 10KV (Coax)
Current	200 Amps (Pulsed)
Leakage	<1pA (3KV)

....VERSATILE SOLUTIONS

A typical 200mm Analytical prober/tester set up



Laser Cutting

EASE OF USE

Wentworth's Pegasus™ S200/S300FA is designed with the operator in mind. Ergonomic design and controls make the S200/S300FA platform one of the easiest prober platforms on the market to use. Quick start up and simple menu's allow users to be probing in minutes.

The Wentworth Pegasus™ S200/S300FA can be used in 'local' mode or 'remote' mode. This flexibility allows the prober to be easily integrated with industry standard testers and data acquisition software.

Using either the stand alone joystick (with menu driven controls) or our windows based graphical interface LabMaster™ this platform is an ideal choice for universities and commercial users.

CONFIGURABLE DESIGN

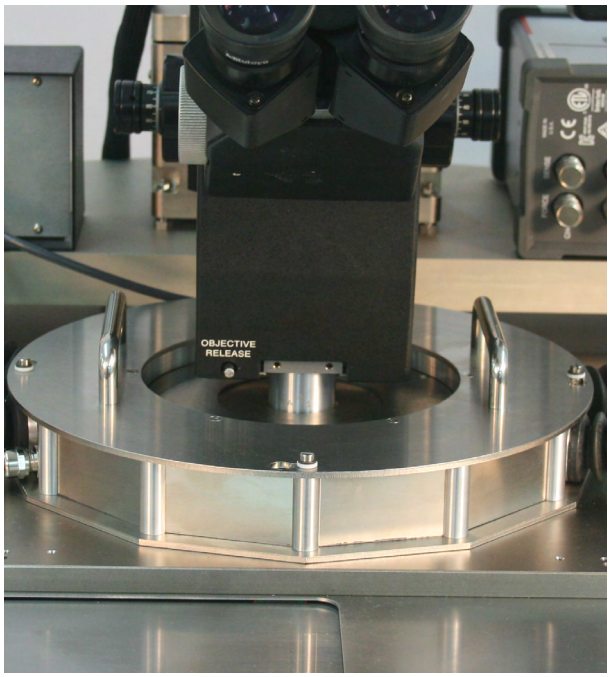
The Wentworth Pegasus™ S200/S300FA can be configured for a variety of applications at affordable cost. Wentworth's many years of experience serving the electronics industry allows even the most challenging application to be managed within standard lead times and budget's

ROBUST MECHANICS

Combining stainless steel and aluminium in it's construction the Pegasus™ S200/S300FA prober is extremely stable platform for sub micron probing and precision applications such as Laser cutting.

Lightweight chucks and drive mechanics allow extremely fast probing with no loss of

ANALYTICAL FLEXIBILITY



Pegasus™ S200FA with GuardMaster™ for low signal and low temperature probing

Analytical flexibility is at the core of our products, as well as mechanical stability and accuracy. Different measurements require different test methods and cabling solutions. Wentworth offer bespoke and standard tester solution packages implemented in an easy to use 'plug and play' configuration. Our LabMaster™ software has the ability to communicate with both the tester and the probers associated accessories, offering real time data analysis and data acquisition.

DYNAMIC TESTING

The Pegasus™ S200/S300FA probers advanced utilities permit the experienced user to design sophisticated test routines. These test routines may then
be re-used for automated testing, a significant productivity advantage. Our Quiet Mode option removes power to all motors to reduce the

FAILURE ANALYSIS

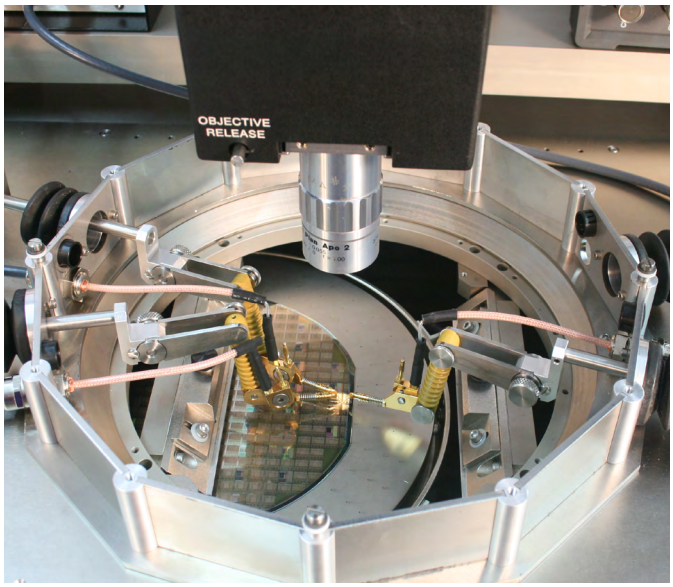
Failure analysis applications require mechanical versatility and ease to make multiple measurements. The Pegasus™ S200/S300FA has been designed with these aspects in mind. Offering Multiple FA tools/options Wentworth offer easy upgrade paths for a wide range of manipulator probe heads/needles, laser ready optics and control/monitoring analysis software.

THERMAL CHARACTERIZATION

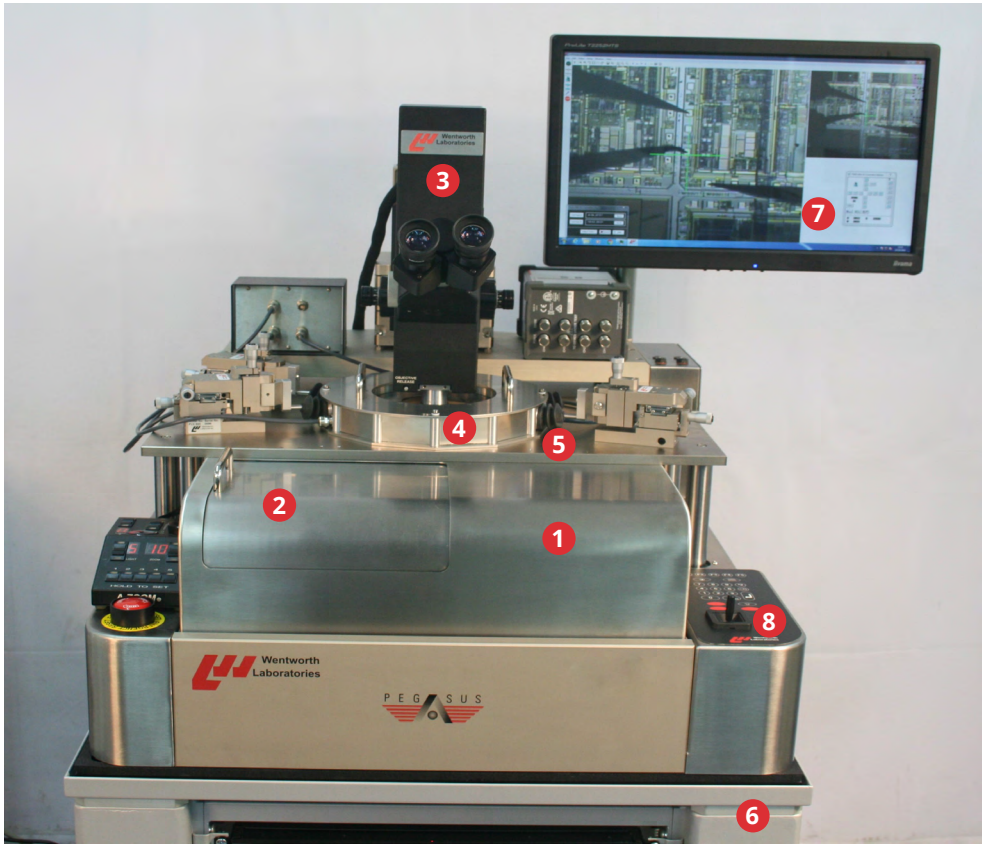
Wentworth offer performance thermal chuck solutions for device testing from -65oC to +400oC. Wentworth's propriety Heating and Cooling management system is an integral part of GuardMaster™, utilizing CDA or Nitrogen to reduce thermal effects and keeping the probing environment controlled.

OPTIONS

Temperature	Control
- 30°C to +400°C	Active air cooled chuck system
- 60°C to +300°C	Air cooled high end system combining very low and high temperatures within one chuck system
-65°C to +300°C	Liquid cooled for high power applications.



Pegasus™ S200FA with lower GuardMaster™ chamber



Pegasus™ S300FA Semi-automatic Probe Station

1. **GuardMaster™**
2. **Chuck Load/ Unload Access**
3. **Microscope with CCD Camera**
4. **MicroAccess**
5. **Large Area Platen**
6. **Anti Vibration Table (AVT)**
7. **Pegasus™ Control Software**
8. **Joystick/Keypad**

THE DESIGN

All Wentworth probers use a robust and strong chassis for mounting the probers stage.

The **X-Y stage** uses high precision 400 step motors with micro-stepping for greater accuracy. 2mm pitch ultra-high precision ball-screws reduce back lash and improve accuracy and repeatability

The **Z stage** uses 1mm pitch ultra-high precision multi point lift ball-screws for superior linear rigidity with additional multi point linear bearings for increased torsional stiffness.

STAGE SPECIFICATION	
Backlash	+/- 1.5 um
Repeatability	5 um
Accuracy	+/- 5um

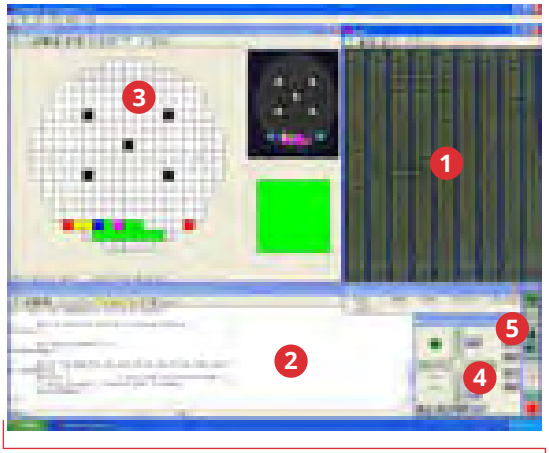
Controller

All stages are controlled by the **Pegasus™ Controller** consisting of the drive electronics, joystick, keypad and optional Windows user interface.

Interfacing is made easy with TTL, GPIB (IEEE488.2) and RS232 ports located on the back panel.

The **Microscope Bridge** is designed for strength and vibration isolation. The bridge can also be upgraded with a multi Z axis PMM (Programmable Microscope Mount), which allows test equipment such as thermal camera's, spectrometers, integrating spheres and light sources to be independently controlled via the prober joystick functions. This feature allows the optics to be repositioned to allow direct device access from the top side.

FUNCTION & CONTROL



LabMaster™ Control & Monitoring Software

USER INTERFACE

LabMaster™ allows real-time, fully integrated monitoring and control via a simple-to-use windows based graphical interface. LabMaster™ controls the Pegasus™ prober via either an RS232 interface or a GPIB (IEEE488.2) interface using the National Instruments PCI-GPIB board

The LabMaster™ **Video Window** 1 displays real-time video from the camera attached to the microscope by using an overlay video board. Any image shown in the LabMaster™ Video window can be saved to disk in a variety of image formats, or copied to the Windows clipboard for pasting into other Windows applications.

The LabMaster™ **Text Editor Window** 2 can be used to create, edit and run REXX programs. Multiple Edit windows can be open at any one time, allowing you to cut and paste text from one window to another. The Edit window toolbar contains buttons for frequently used functions such as Open, Save, Run, Stop and Syntax Check.

The graphical **WaferMap Window** 3 is a powerful failure analysis tool that can be used for device navigation and positioning, and for displaying and storing die-binning information. By using the Wafer Map window for device navigation and movement, the user can quickly position the chuck to any die on the wafer. Wafer maps can be stored locally at the prober and saved as a simple text file (SINF - comma separated value), for easy transfer import/ export.

Pegasus™ Motion Control Window 4 can be used to control the motion of the prober's chuck. The arrow buttons are used to index the prober the distance specified by the index step values entered using the probers setup dialogue box. Slow, Medium & Fast velocity function buttons allow easy navigation between different area's on the wafer.

LabMaster™ **Device Toolbar** 5 contains the device buttons for controlling external devices such as the Probe Platform, PMM, SAM's, Thermal Chucks, Lasers and Microscope Auto Zoom functions. The Hardware Setup dialogue box is used to add or remove devices from the Toolbar. It can also be used to modify a device's hardware setup parameters.

OFFLINE TOOLS

The Wentworth Labs Wafer Map editor is an off line editor / viewer for LabMaster™ compatible wafer map files and wafer map file templates. It allows for wafer map templates to be created and modified prior to being used for wafer testing. Wafer results files can also be viewed in this application and used to generate further template files.

THE PEGASUS™ S200FA & S300FA PROBE STATION

MICROSCOPE MOUNTS

Type	Travel X/Y	Resolution	Drive	Recommended Microscope	Application
Manual Stereozoom (MMM)	50x50mm	0.9 µm	High Precision Lead Screws	Binocular or Trinocular Stereozoom Microscope	General Probing, pad sizes down to 50um x 50um
Manual High Powered (MMM)	50x50mm	0.9 µm	High Precision Lead Screws	Compound High Mag Objective Microscope	Small geometry pad or line probing down to 1-2um
Programmable (PMM)	50x50mm	0.1 µm	Stepper motors	Compound High Mag Objective Microscope	Small geometry pad or line probing down to 1-2um

MICROSCOPES

Microscope Type	Models Available	Application
Stereo view	GMX, Leica.	Pad probing and internal features down to 5 µm
High magnification	Mitutoyo FS-70 Series, A-Zoom	Offers the most flexibility and options for features down to 0.5 µm
Without eyepieces	A-Zoom, Mono-Zoom	Use with CCD or Video Systems.

MANIPULATORS

Type	TPI / Resolution / Travel
PVX400 (Vacuum or Magnetic)	50 TPI / 1.2 µm/° / X = +/- 5 mm, y= +/- 5 mm, z = >5 mm
PVX500-100 (Vacuum or Magnetic)	100 TPI / 0.7 µm/° / X = +/-5 mm, y= +/-5 mm, z = >5 mm
PVX500-200 (Vacuum or Magnetic)	200 TPI / 0.4 µm/° / X = +/-5 mm, y= +/-5 mm, z = >5 mm
SAM (Programmable)	0.1 µm/° / X = 30 mm, y= 30 mm, z = 30 mm

COMMUNICATION INTERFACES

Type	Vendors
TTL	(2) 15-way D plugs each providing (4) TTL signal outputs & (8) TTL inputs
RS232	Serial 9-pin D connector
GPIB (IEEE488.2)	8-bit parallel multi-master interface bus
Ethernet	48-bit MAC address

ACCESSORIES

Probes: Triaxial, Coaxial, Low Impedance, Kelvin, High Power	**Thermal chucks:** Heating, Cooling, Fast Ramp/Cool Times
Probe Tips: Tungsten, Tungsten-Carbide, Be Cu, Gold Plated	**Probecards:** Ceramic Blade, Epoxy Cantilever, Custom solutions
GuardMaster™: Combined Light-tight and EMC shielded enclosure for low level measurements and frost-free low temperature probing	**Automatic 2-Point Align:** Provides system automation and fast device set-up routine
Manual Manipulator (PVX): Magnetic and Vacuum options	**Pattern Recognition:** Automatic die detection and probe to pad alignment
Programmable Computer Controlled Manipulators: For sub-micron and in die probing	**Packaged device holders:** Held down by vacuum on the chuck's surface
Pin Hole chucks: Designed for thin wafers <150um thick. Definable vacuum patterns and single device holders	**Probe Card Holders:** 4.5" and 6" low profile probe card holder (PCH)
Laser cutter: Laser Ablation, Depassivating, Cutting and Trimming	**Chuck Solutions:** Standard, Gold Plated, Waffle Tray, Single Devices, Interchangeable, Glass, Ceramic, Double Sided, Kelvin
Dark Boxes : External open dark boxes with cable patch panels	**Supplies:** Vacuum Pumps and Air Compressors
Camera and Monitors: Facilitates contacting bond pads or taking images	**LabMaster™** Control & Monitoring Graphical User Interface
Anti Vibration Tables: Robust anti vibration design for dampening external vibrations	**Quiet Mode:** Removes power to all motors to reduce the noise floor.
Interface Panels: Coax BNC, Triax BNC, SHV, HV Traix, D-SUB, SSMA, SMB, Banana	**Triaxial chucks:** For reduced leakage and capacitance measurements

PEGASUS™ S200/S300FA SEMI-AUTOMATIC PROBE STATION

Chuck Stage		
X-Y Stage	**Pegasus S200FA**	**Pegasus S300FA**
Precision ball-screws & stepper motors		
Travel	210mmx314mm	310mmx400mm
Resolution	0.312 µm	0.312 µm
Repeatability	± 4.0 µm	± 4.0 µm
Accuracy	± 5.0 µm	± 5.0 µm
Planarity	8 µm	8 µm
Maximum speed	100mm/sec	100mm/sec
Z Stage		
Precision ball-screws & stepper motors		
Travel	11mm	11mm
Resolution	0.156 µm	0.156 µm
Repeatability	± 1.0 µm	± 1.0 µm
Theta Stage		
Travel	± 8.0°	± 8.0°
Resolution	0.0001°	0.0001°
Programmable Microscope Mount		
Stepper Motors		
Travel	50mm x 50mm x 100mm	50mm x 50mm x 100mm
Resolution	0.15 µm	0.15 µm
Repeatability	± 1.0 µm	± 1.0 µm
Accuracy	± 2.5 µm	± 2.5 µm
Probe Platform		
Drive type	Stepper Motors	Stepper Motors
Z Travel	18mm	18mm
Material	Nickel Plated Steel	Nickel PlatedSteel
Graphical User Interface		
		Windows 7, 8.1 and 10
Communication Interfaces		
PC		TTL, RS232, GPIB (IEEE488.2), ETHERNET
Utilities		
Power		100-240 VAC 50/60 Hz select 600VA
Vacuum		0.5cfm @20" Hg (min)
Compressed air		4 bar min
Dimensions (WxDxH)		
Prober (excludes optics)	840x842x610mm	880x875x610mm
Controller		450x480x180mm 17.5x19.5x7"
Shielding		
Light		> 120 db
EMI		> 20 db 0.05-0.5 Ghz, 30 d0.5-3Ghz
Weight		
Prober		131 kg

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