

# $\Psi$ Probing Solutions Inc.

*choose from these*

**COMPLETE SYSTEMS**

*or*

**CUSTOMIZE**

*your own.*

**482 PMI Semi-Automatic Photo Mask  
Inspection Work Station**



**2020HV Work Station-Vertical/Horizontal**

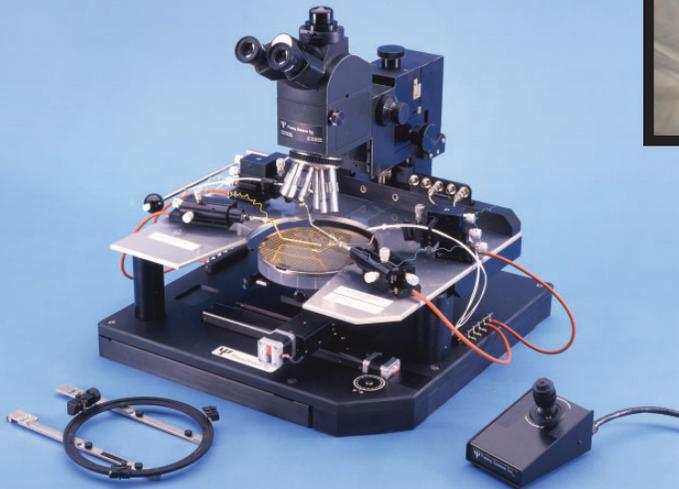


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## **S500 SEMI-AUTOMATIC PROBE STATION**



# $\Psi$ Probing Solutions Inc.

9 Enterprise Way, Ste. 100  
Dayton, NV 89403

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Fax: 775-246-0480

[sales@probingolutions.com](mailto:sales@probingolutions.com)



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## **About Probing Solutions Inc.**

Probing Solutions Inc., has been providing high quality analytical Semiconductor wafer probing equipment and photo mask inspection stations since 1995. Our wafer probing equipment, complemented by a full line of accessories, is designed for failure analysis, wafer-level reliability, and/or tests on packaged parts to suit your needs.

Mask Inspection and defect review product lines, purchased from The Micro-manipulator Co., Inc. have continued to expand in capability including semi-automatic, scanning, go-to-XY location or “Point and Shoot” mouse command. Map auto-navigation process, visual defect detection and classification using 8 Transmitted Bright field and Dark field light sources independently or in combination with color contrast filters is highly effective. The combination of lighting modes, used simultaneously enables the detection of more defects including a selection of microscopes and mask handling paddles are available for safe mask handling while loading and unloading the photomasks.

Our latest development is a semiautomatic class-1 clean room Stainless Steel Mask Inspection/Review Work Station that features optional KLA-Tencor™ defect file import for Off-Line rapid defect review, verification or reclassification for repair. Allows Up-Load of any additions or changes as necessary.

For more information on our extensive and expanding line of products, call or send us an email. We are here to assist you with the selection of the correct System configuration to satisfy your specific application needs with your probing or photomask inspection solutions.

***Ph (775) 246-0999 • Fax (775) 246-0480***

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# *Wafer Probing*

**Ψ Probing Solutions Inc.**

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The PSI 600LS / 610LS™ Manual 300mm Wafer Probe Station is a powerful, yet economical analytical wafer probe station. This probe station is ideally suited for a wide range of engineering applications. These include Design Analysis, Failure Analysis, Production Process Analysis, ESD effect, Electromigration, High Voltage, Low current / Low Noise, Microwave, CV / IV. A truly versatile “Shouldn’t be without” Manual Analytical Lab Tool for small feature probing.

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## MANUAL 300mm



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### *Features Include*

The **Precision Lead Screw X-Y** manual stage controls are easily operated with one or both hands while positioning the Wafer, Manipulators and looking through the Microscopes. The manual 600LS Station has a Probing Target Capability of 5 mil pads to Submicron lines and Design features.

The Vacuum Wafer Chuck is selectable as Ambient, Hot and Cold Temperature, Coaxial, Triaxial and Low Current / Low Noise versions with Gold Plated or Stainless Steel Wafer surfaces.

**Microscope Lift Delay** adjustment which allows the Probes to be raised from the wafer independent of the microscope, without changing their individual positioning and avoiding any possible collision with microscope objectives. When returned to the *platen down* position, the Probes return to their original positions and the microscope to its “*In Focus*” position and analysis can resume undisturbed.

The **PSI 600LS PLATEN “Z” LIFT** has vertical Locking Position.

High magnification **US MICROSCOPE CO.** Scientific, Analytical, 2X Zoom, Trinocular Microscopes with 10X Eyepieces, 2X, 10X, 20X plan apochromatic Objectives offer the highest visual acuity optically available today. Microscope accessories also available are 50X SLWD (22.5mm), 100X SLWD (13mm), Wide Field CCD Camera adapters, Higher Magnification, Eyepieces, Polarizers, Tiltheads and much more.

**MODULAR DESIGN:** the 600 Series 300mm Wafer Probe Stations are designed as a platform on which to build on as the Engineering Analytical Analysis task expands with design discipline as feature size shrinks. A wide variety of system accessories and upgrades are readily available to fit changing needs.

## STANDARD FEATURES

### CHUCK THETA CONTROL

- $\pm 7.5$  degrees (manual)
- 100 T.P.I. resolution

### PLATEN

- Resolution 1.0  $\mu\text{m}$
- Platen Quick Lift with three (3) locking height positions

### MICROSCOPE (MANUAL)

- 2" X, 2" Y, 2" Z standard
- 3 Z platen position locations to accommodate test fixturing

### FACILITIES

- Power: 110V/60Hz 2 amps standard, 220V/50Hz optional 1.5 amps standard
- Vacuum Source: 20" Hg of mercury for vacuum wafer chuck and manipulators
- Magnetic manipulators optional

### DIMENSIONS, FINISH AND WEIGHT

- 36" ( cm) D x 36" ( cm) W x 36" ( cm) H, with pallet
- Shipping weight 274 lbs. ( kg) approximate
- Grained black anodized aluminum stainless-steel for long life and clean room compatibility

## OPTIONS AVAILABLE

### 400-FPC-FRX-8 OR 400-FPC-FRX-ADJ

- Fixed probed card adapter available in 4" standard or 6"

### 400-LTE

- Light Tight/RFI-EMI Environmental Enclosure

### VIBRATION ISOLATION TABLES

- Multiple options

### H1000 SERIES HOT/COLD CHUCK SYSTEMS

- Temperature range from  $-65^{\circ}$  to  $400^{\circ}$  C, self-contained systems
- Ambient to  $400^{\circ}$  C or  $0^{\circ}$  C to  $400^{\circ}$  C

### CHUCKS

- Ambient gold plated, stainless steel and thermal chucks available.

### THERMAL CHUCK INTEGRAL PLUMBING ACCESSORY

- Provides services for Hot Chuck usage within the probe station

### LASER CUTTER

- Single and multi-wavelength laser cutting systems available operating from single-shot to 40Hz continuously for excellent control during material removal or thin metal cutting.

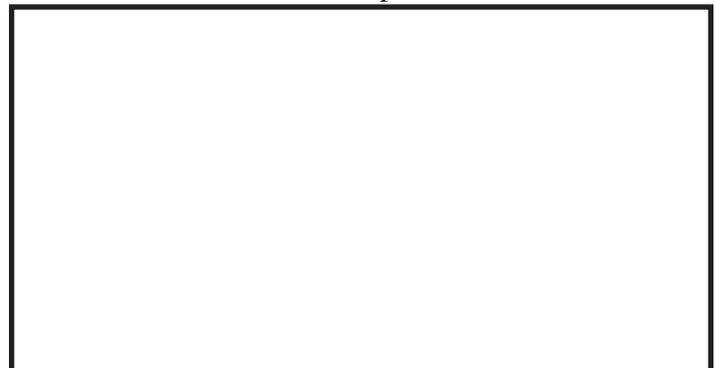
### MICROSCOPES

- USMCO 3X standard zoom with up to 3000X magnification
- USMCO 2X standard zoom with up to 2000X magnification (10X eyepieces x 2X Zoom x 100X objective, 2000x magnification)
- Meiji zoom stereo with 2.1X to 270X magnification (20X eyepieces x 7X objective, plus 2X doubler lens)
- Mitutoyo available
- Motic available

### OTHER ACCESSORIES

- Manipulators
- Probe Holders
- Probe Tips
- Thermal Chuck Systems

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**MOTORIZED 300mm  
X-Y JOYSTICK CONTROL**

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**STANDARD FEATURES**

**Control method, "Local" to prober \_\_\_\_\_**

- Dedicated controller.
- Joystick control for interactive positioning.

**Microscopes \_\_\_\_\_**

- USMCO 3X standard zoom with up to 3000X magnification
- USMCO 2X standard zoom with up to 2000X magnification  
(10X eyepieces x 2X Zoom x 100X objective, 2000x magnification)
- Meiji zoom stereo with 2.1X to 270X magnification  
(20X eyepieces x 7X objective, plus 2X doubler lens)
- Mitutoyo available
- Motic available

**Other Accessories \_\_\_\_\_**

- Manipulators
- Probe Tips
- Card Holders
- Probe Holders
- Thermal Chuck Systems

## STANDARD FEATURES

### CHUCK THETA CONTROL

- $\pm 7.5$  degrees (manual)
- 100 T.P.I. resolution

### PLATEN

- Resolution 1.0  $\mu\text{m}$
- Platen Quick Lift with three (3) locking height positions

### MICROSCOPE (MANUAL)

- 2" X, 2" Y, 2" Z standard
- 3 Z platen position locations to accommodate test fixturing

### DIMENSIONS, FINISH AND WEIGHT

- Controller: 16" (41cm) D x 19" (48cm) W x 5.5" (14cm) H, 24 lbs. (11kg)
- Grained black anodized aluminum stainless-steel for long life and clean room compatibility

### FACILITIES

- Power: 110V/60Hz 2 amps standard, 220V/50Hz optional 1.5 amps standard
- Vacuum Source: 20" Hg of mercury for vacuum wafer chuck and manipulators
- Magnetic manipulators optional

### DIMENSIONS, FINISH AND WEIGHT

- 36" ( cm) D x 36" ( cm) W x 48" ( cm) H, with pallet
- Shipping weight 314 lbs. ( kg) approximate

## OPTIONS AVAILABLE

### 400-FPC-FRX-8 OR 400-FPC-FRX-ADJ

- Fixed probed card adapter available in 4" standard or 6"

### 400-LTE

- Light Tight/RFI-EMI Environmental Enclosure

### VIBRATION ISOLATION TABLES

- Multiple options

### H1000 SERIES HOT/COLD CHUCK SYSTEMS

- Temperature range from  $-65^{\circ}$  to  $400^{\circ}$  C, self-contained systems
- Ambient to  $400^{\circ}$  C or  $0^{\circ}$  C to  $400^{\circ}$  C

### CHUCKS

- Ambient gold plated, stainless steel and thermal chucks available.

### THERMAL CHUCK INTEGRAL PLUMBING ACCESSORY

- Provides services for Hot Chuck usage within the probe station

### LASER CUTTER

- Single and multi-wavelength laser cutting systems available operating from single-shot to 40Hz continuously for excellent control during material removal or thin metal cutting.

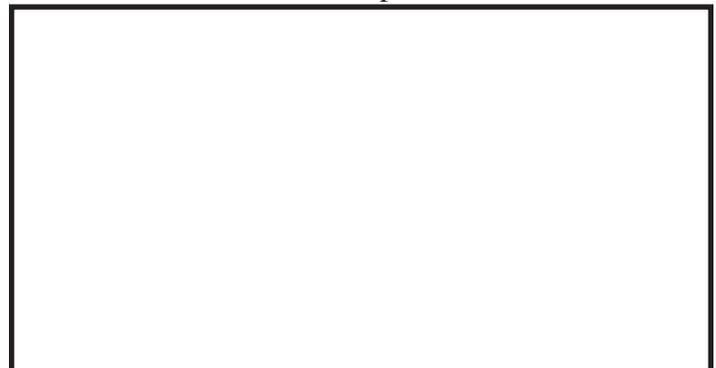
### MICROSCOPES

- USMCO 3X standard zoom with up to 3000X magnification
- USMCO 2X standard zoom with up to 2000X magnification (10X eyepieces x 2X Zoom x 100X objective, 2000x magnification)
- Meiji zoom stereo with 2.1X to 270X magnification (20X eyepieces x 7X objective, plus 2X doubler lens)
- Mitutoyo available
- Motic available

### OTHER ACCESSORIES

- Manipulators
- Probe Holders
- Probe Tips
- Thermal Chuck Systems

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**SEMI-AUTOMATIC PROBE STATION**

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**STANDARD FEATURES**

**Control method, "Local" to prober \_\_\_\_\_**

- Dedicated controller with user Pendant (keypad).
- Additional Joystick control for interactive positioning.

**Microscopes \_\_\_\_\_**

- USMCO with up to 2000X magnification. (10X eyepieces x 2X Zoom x 100X objective)
- Meiji stereozoom with 2.1X to 270X magnification. (20X eyepieces x 7X objective, plus 2X double lens)

**Software Compatibility \_\_\_\_\_**

- Labview™ from National Instruments
- Metrics ICS™ from Alliance Technology
- GPIB optional

**Other Accessories \_\_\_\_\_**

- Manipulators
- Probe Holders
- Probe Tips
- Thermal Chuck Systems

**Local Control functions include \_\_\_\_\_**

- Load, Align, Set Reference
- Set and drive platen to up or down position
- Enter index (die) size
- Go to X,Y location
- Go to Column, Row location
- Store and recall up to 18 locations
- Illuminator on/off
- Speed high/low with indicator
- Set units
- Touchdown, illuminator, high speed, index mode indicators
- Program mode, external trigger input and time delay function
- Step and repeat probing of whole wafer or a percentage specified



**Control method from external computer \_\_\_\_\_**

- RS-232 standard, prober control command set

## **PLATEN**

Accepts 10 or more manipulators Magnetic stainless-steel with ground-grained surface 3 point belt driven support/lift provides excellent stability. Optional strain relief manifolds: BNC, TRIAX, TRIAX/BNC for manipulator interconnect.

### **Fine“Z” Lift Control**

True planar vertical motion with micron precision  
Relative “Z” position indicator (selectable)  
Resolution: 2 microns per degree of revolution  
Range: 1” (25.4mm)

### **Fast “Z” Lift Control**

Platen lift with three lock Z up positions  
Platen range: 1” (25.4mm)  
Adjustable microscope delay: 0” to 1” travel  
Raises microscope from 1.25” to 3.0”

## **VACUUM CHUCK OPTIONS**

6” (152mm) for 4” to 6” wafers or 8” (200mm) for 6” to 8” wafers  
Stainless-steel for low contamination, or gold plated brass  
Flatness  $\pm 0.0005$ ” ( $\pm 12$  microns)  
Electrical isolation exceeds 5 Teraohms  
Electrically wired to BNC connector on platen  
Thermal chucks also available.

## **FACILITY REQUIREMENTS**

Power: 110VAC/60Hz standard, 2 amps, 220VAC/50Hz, 1.5 amps optional  
Vacuum: 20” of mercury for vacuum chuck, magnetic manipulators optional

## **DIMENSIONS, FINISH AND WEIGHT**

23.5” (60cm) D x 37” (94cm) W x 48” (87cm) H  
Grained black anodized aluminum, stainless-steel for long life  
162 lbs. (74kg)

## **SHIPPING INFORMATION**

39” (99cm) D x 37” (94cm) W x 48” (81cm) H, with pallet  
Shipping weight 220 lbs. (100kg) approximate

## **MICROSCOPE POST AND**

### **MICROSCOPE OPTIONS**

X-Y translation: 2” x 2” (50.8mm x 50.8mm)  
Focus (Z) motion 2” (50.8mm) standard; up to 4” (100mm) option  
Coaxial coarse/fine focus control knobs  
USMC-STD-2X or 3X zoom microscope recommended  
3 long working distance objectives (2X, 10X and 20X)  
Adjustable 4-Port nosepiece  
Optional 50X and 100X objectives  
Trinocular head with camera port  
Auto voltage switching, 110/210 VAC fiber optic illuminator (150W) CE certified  
Optional Tilthead, ergonomic 30° tilt  
Other microscopes available as options  
Optem A-Zoom available  
Meiji EMZ-TR-5 Step zoom Stereo Microscope available

## **X-Y STAGE OPTIONS**

Precision X-Y screw drive / STG-MIC  
Stage and chuck planarized at factory  
Theta rotation control:  $\pm 7.5$  degrees

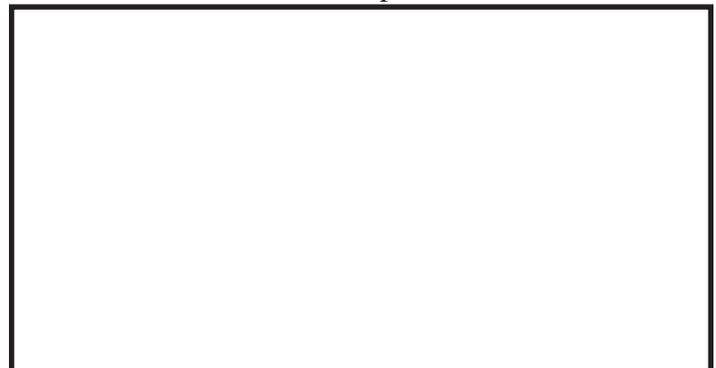
## **SOCKET STAGE ADAPTER OPTIONS**

Hold PCB zero insertion socket cards for probing packaged part devices  
Adapters: 4.5” x 4.5” to 6” wide cards

## **PROBE CARD HOLDER - PCH OPTION**

Holds probe cards for 200mm wafer probing  
PCH: 4.5” or 4.5” to 6” wide/adjustable as well as celedon probe tiles

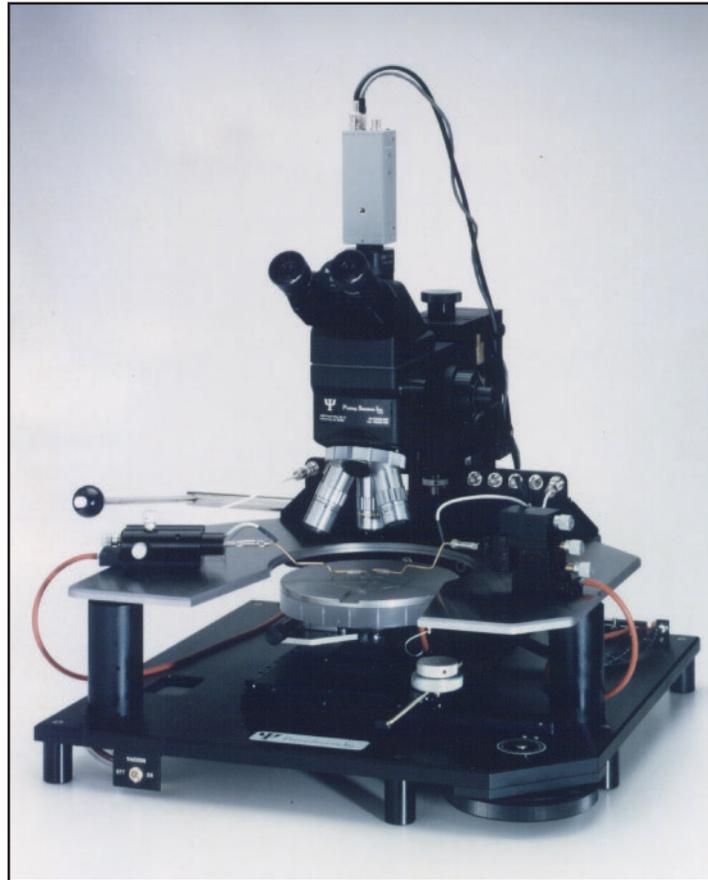
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[www.probingolutions.com](http://www.probingolutions.com)

The PSI 400 / 410™ Manual Wafer Probe Station is a powerful, yet economical 6" / 8" easy to use analytical wafer probe station. The PSI 400 / 410™ is ideally suited for a wide range of engineering applications. These include Design Analysis, Failure Analysis, Production Process Analysis, ESD effect, Electromigration, High Voltage, Low current / Low Noise, Microwave, CV / IV. A truly versatile "Shouldn't be without" Manual Analytical Lab Tool for small feature probing.

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## Features Include

The **PUSH/PULL** and coaxial X-Y manual stage controls are easily operated with one hand, while positioning the Wafer and Manipulators looking through the Microscope. Has a General Purpose Probing Target Capability 3µm and larger.

The Vacuum Wafer Chuck is selectable as 6" or 8" diameter either of which is capable of accepting smaller 5", 4", 3" Wafers. Wafer Slices, individual Die or Hybrid Substrates are accommodated on 6" or 8" Chucks using an accessory VAC-PUC vacuum concentrator on the chuck surface. Vacuum Wafer Chucks are available for Ambient, Hot and Cold Temperature, Coaxial, Triaxial and Low Current / Low Noise versions with Gold Plated or Stainless Steel Wafer surfaces.

**Microscope Lift Delay** adjustment which allows the Probes to be raised from the wafer independent of the microscope, without changing their individual positioning and avoiding any possible collision with microscope objectives. When returned to the *platen down* position, the Probes return to their original positions and the microscope to its "In Focus" position and analysis can resume undisturbed.

The **PSI 400 Series PLATEN "Z" LIFT** has three vertical Locking Positions.

The **PSI 410 Series Microscope "Z" LIFT** has 12 selectable vertical Ratchet Positions: 3 inches (76mm)

High magnification **US MICROSCOPE CO.** Scientific, Analytical, 2X Zoom, Trinocular Microscopes with 10X Eyepieces, 2X, 10X, 20X plan apochromatic Objectives offer the highest visual acuity optically available today. Microscope accessories also available are 50X SLWD (22.5mm), 100X SLWD (13mm), Wide Field CCD Camera adapters, Higher Magnification, Eyepieces, Polarizers, Tiltheads and much more.

**MODULAR DESIGN:** the 400 Series Wafer Probe Stations are designed as a platform on which to build on as the Engineering Analytical Analysis task expands with design discipline as feature size shrinks. A wide variety of system accessories and upgrades are readily available to fit changing needs.

## **PLATEN**

243 square inches accepts 10 or more manipulators Magnetic stainless-steel with ground-grained surface 3 point belt driven support/lift provides excellent stability. Optional manifolds: BNC, TRIAX, TRIAX/BNC and HP/KELVIN.

### **Fine“Z” Lift Control**

True planar vertical motion with micron precision  
Relative “Z” position indicator (selectable)  
Large 6” (152mm) diameter “Z” control dial  
Resolution: 2 microns per degree of revolution  
Range: 1” (25.4mm)

### **Fast “Z” Lift Control**

Platen lift with three lock up positions  
Platen range: 1” (25.4mm)  
Adjustable microscope delay: 0” to 1” travel  
Raises microscope from 1.25” to 3.0”

## **VACUUM CHUCK OPTIONS**

6” (152mm) for 4” to 6” wafers or 8” (200mm)  
for 6” to 8” wafers  
Stainless-steel for low contamination, or gold plated brass  
Flatness  $\pm 0.0005$ ” ( $\pm 12$  microns)  
Electrical isolation exceeds 5 Teraohms  
Electrically wired to BNC connector on platen  
Thermal chucks also available

## **FACILITY REQUIREMENTS**

Power: 110V/60Hz standard, 220V/50Hz optional (2 amps)  
Vacuum: 20” of mercury vacuum stage,  
vacuum based manipulators

## **DIMENSIONS, FINISH AND WEIGHT**

23.5” (60cm) D x 37” (94cm) W x 32” (87cm) H  
Grained black anodized aluminum, stainless-steel  
for long life  
162 lbs. (74kg)

## **SHIPPING INFORMATION**

39” (99cm) D x 37” (94cm) W x 32” (81cm) H, with pallet  
Shipping weight 220 lbs. (100kg) approximate

## **MICROSCOPE POST AND**

### **MICROSCOPE OPTIONS**

X-Y translation: 2” x 2” (50.8mm x 50.8mm)  
PSI 400LS: Hinged Dependent Vertical lift; 1.25” to 3.0”  
PSI 410LS: Independent Vertical Lift/Lock 12 selectable  
positions; 3” range  
Focus (Z) motion 2” (50.8mm) standard; up to 4”  
(100mm) option  
Coaxial coarse/fine focus control knobs  
USMC-STD-2Z-V1/V2 with 2:1 zoom in body recommended  
3 long working distance objectives (2X, 10X and 20X)  
Adjustable 4-Port nosepiece  
Optional 50X and 100X objectives  
Trinocular head with camera port, 10X objectives  
Coaxial fiber optic illuminator (150W)  
Optional Tilthead; your choice of flip mirror or prism  
Optem A-Zoom available  
Meiji EMZ-TR Stereo Microscope available

## **X-Y STAGE OPTIONS**

Precision X-Y screw drive / STG-MIC  
6” x 6” (152mm x 152mm) or 8” x 8” (200mm x 200mm)  
Stage and chuck planarized at factory  
Theta rotation control:  $\pm 7.5$  microns (100 T.P.I. leadscrew)  
Proven ball and rail construction

## **SOCKET STAGE ADAPTER OPTIONS**

Hold PCB zero insertion socket cards for probing packaged  
part devices  
Adapters: 4.5” x 4.5” to 6” wide cards

## **PROBE CARD HOLDER - PCH OPTION**

Holds probe cards for wafer probing  
400-FPC-FRX-8, 4.5” x 4.5” card  
400-FPC-FRX-ADJ, 4.5” adjustable to 6” with long rails

Local Sales Representative



*Visit our website at:*  
***[www.probingolutions.com](http://www.probingolutions.com)***

# Ψ Probing Solutions Inc. PSI 400LS / 410LS™

The PSI 404LS / 414LS™ Manual Wafer Probe Station is a powerful, yet economical 6" / 8" easy to use analytical wafer probe station. This probe station is ideally suited for a wide range of engineering applications. These include Design Analysis, Failure Analysis, Production Process Analysis, ESD effect, Electromigration, High Voltage, Low current / Low Noise, Microwave, CV / IV. A truly versatile "Shouldn't be without" Manual Analytical Lab Tool for small feature probing.

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## Features Include

The **Precision Lead Screw X-Y** manual stage controls are easily operated with one or both hands while positioning the Wafer, Manipulators and looking through the Microscopes. The manual 400LS Station has a Probing Target Capability of 5 mill pads to Submicron lines and Design features.

The Vacuum Wafer Chuck is selectable as 6" or 8" diameter either of which is capable of accepting smaller 5", 4", 3" Wafers. Wafer Slices, individual Die or Hybrid Substrates are accommodated on 6" or 8" Chucks using an accessory VAC-PUC vacuum concentrator on the chuck surface. Vacuum Wafer Chucks are available for Ambient, Hot and Cold Temperature, Coaxial, Triaxial and Low Current / Low Noise versions with Gold Plated or Stainless Steel Wafer surfaces.

**Microscope Lift Delay** adjustment which allows the Probes to be raised from the wafer independent of the microscope, without changing their individual positioning and avoiding any possible collision with microscope objectives. When returned to the *platen down* position, the Probes return to their original positions and the microscope to its "In Focus" position and analysis can resume undisturbed.

The **PSI 400LS Series PLATEN "Z" LIFT** has vertical Locking Position.

The **PSI 410LS Series Microscope "Z" LIFT** has 12 selectable vertical Ratchet Positions: 3 inches (76mm)

High magnification **US MICROSCOPE CO.** Scientific, Analytical, 2X Zoom, Trinocular Microscopes with 10X Eyepieces, 2X, 10X, 20X plan apochromatic Objectives offer the highest visual acuity optically available today. Microscope accessories also available are 50X SLWD (22.5mm), 100X SLWD (13mm), Wide Field CCD Camera adapters, Higher Magnification, Eyepieces, Polarizers, Tiltheads and much more.

**MODULAR DESIGN:** the 400 Series Wafer Probe Stations are designed as a platform on which to build on as the Engineering Analytical analysis task expands with design discipline as feature size shrinks. A wide variety of system accessories and upgrades are readily available to fit changing needs.

**PLATEN**

243 square inches accepts 10 or more manipulators. Magnetic stainless-steel with ground-grained surface 3 point belt driven support/lift provides excellent stability. Optional manifolds: BNC, TRIAX, TRIAX/BNC and KELVIN.

**Fine“Z” Lift Control**

True planar vertical motion with micron precision  
Relative “Z” position indicator (selectable)  
Large 6” (152mm) diameter “Z” control dial  
Resolution: 2 microns per degree of revolution  
Range: 1” (25.4mm)

**Fast “Z” Lift Control**

Platen lift with three lock up positions  
Platen range: 1” (25.4mm)  
Adjustable microscope delay: 0” to 1” travel  
Raises microscope from 1.25” to 3.0”

**VACUUM CHUCK OPTIONS**

6” (152mm) for 4” to 6” wafers or 8” (200mm)  
for 6” to 8” wafers  
Stainless-steel for low contamination, or gold plated brass  
Flatness  $\pm 0.0005$ ” ( $\pm 12$  microns)  
Electrical isolation exceeds 5 Teraohms  
Electrically wired to BNC connector on platen  
Thermal chucks also available

**FACILITY REQUIREMENTS**

Power: 110V/60Hz standard, 220V/50Hz optional (2 amps)  
Vacuum: 20” of mercury vacuum stage,  
vacuum based manipulators

**DIMENSIONS, FINISH AND WEIGHT**

23.5” (60cm) D x 37” (94cm) W x 32” (87cm) H  
Grained black anodized aluminum, stainless-steel  
for long life  
162 lbs. (74kg)

**SHIPPING INFORMATION**

39” (99cm) D x 37” (94cm) W x 32” (81cm) H, with pallet  
Shipping weight 220 lbs. (100kg) approximate

**MICROSCOPE POST AND****MICROSCOPE OPTIONS**

X-Y translation: 2” x 2” (50.8mm x 50.8mm)  
Optional model 404: 4” x 4” (101.6mm x 101.6mm)  
PSI 400LS: Hinged Dependent Vertical lift; 1.25” to 3.0”  
PSI 410LS: Independent Vertical Lift/Lock 12 selectable  
positions; 3” range  
Focus (Z) motion 2” (50.8mm) standard; up to 4”  
(100mm) option  
Coaxial coarse/fine focus control knobs  
USMC-STD-2Z-V1/V2 with 2:1 zoom in body recommended  
3 long working distance objectives (2X, 10X and 20X)  
Adjustable 4-Port nosepiece  
Optional 50X and 100X objectives  
Trinocular head with camera port, 10X objectives  
Coaxial fiber optic illuminator (150W)  
Optional Tilthead; your choice of flip mirror or prism  
Optem A-Zoom available  
Meiji EMZ-TR Stereo Microscope available

**X-Y STAGE OPTIONS**

Precision X-Y screw drive / STG-MIC  
6” x 6” (152mm x 152mm) or 8” x 8” (200mm x 200mm)  
Stage and chuck planarized at factory  
Theta rotation control:  $\pm 7.5$  microns (100 T.P.I. leadscrew)  
Proven ball and rail construction

**SOCKET STAGE ADAPTER OPTIONS**

Hold PCB zero insertion socket cards for probing packaged  
part devices  
Adapters: 4.5” x 4.5” to 6” wide cards

**PROBE CARD HOLDER - PCH OPTION**

Holds probe cards for wafer probing  
PCH: 4.5” or 4.5” to 6” wide/adjustable

Local Sales Representative



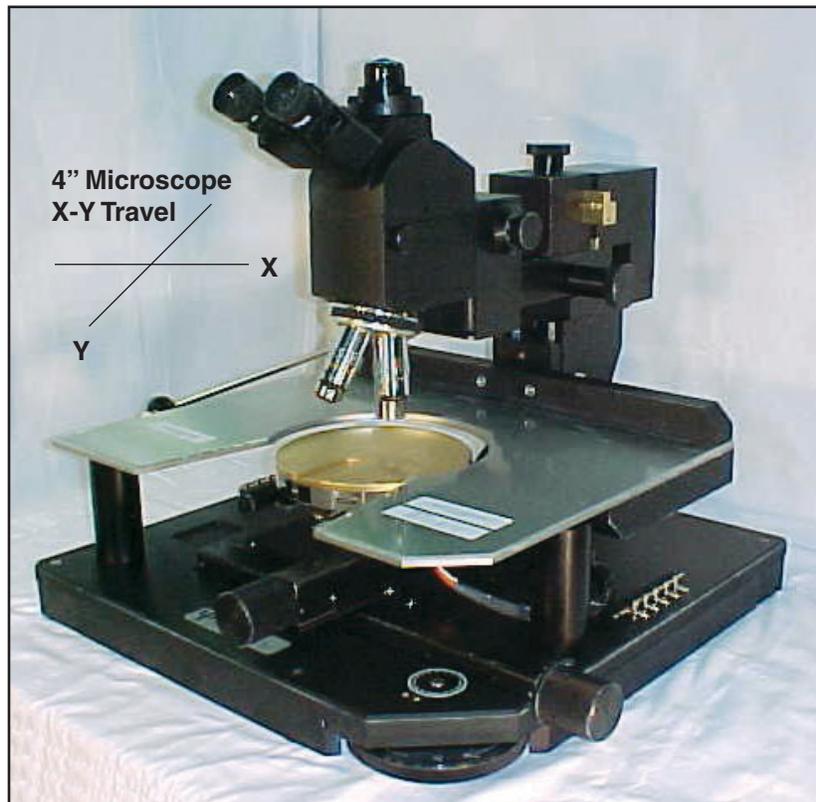
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***[www.probingolutions.com](http://www.probingolutions.com)***

# Ψ Probing Solutions Inc. PSI 404LS / 414LS™

## 4" x 4" X-Y Focus Precision Lead Screw Probe Station

The PSI 400LS / 410LS™ Manual Wafer Probe Station is a powerful, yet economical 6" / 8" easy to use analytical wafer probe station. This probe station is ideally suited for a wide range of engineering applications. These include Design Analysis, Failure Analysis, Production Process Analysis, ESD effect, Electromigration, High Voltage, Low current / Low Noise, Microwave, CV / IV. A truly versatile "Shouldn't be without" Manual Analytical Lab Tool for small feature probing.

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### Features Include

The **Precision Lead Screw X-Y** manual stage controls are easily operated with one or both hands while positioning the Wafer, Manipulators and looking through the Microscope. The manual 404LS Station has a Probing Target Capability of 5 mil pads to micron lines and Design features.

The Vacuum Wafer Chuck is selectable as 6" or 8" diameter either of which is capable of accepting smaller 5", 4", 3" Wafers. Wafer Slices, individual Die or Hybrid Substrates are accommodated on 6" or 8" Chucks using an accessory VAC-PUC vacuum concentrator on the chuck surface. Vacuum Wafer Chucks are available for Ambient, Hot and Cold Temperature, Coaxial, Triaxial and Low Current / Low Noise versions with Platinum surfaces.

The **PSI 404LS Series PLATEN "Z" LIFT** has 3 vertical Locking Positions.

The **PSI 414LS Series Microscope "Z" LIFT** has 12 selectable vertical Ratchet Positions: 3 inches (76mm)

High magnification **US MICROSCOPE CO.** Scientific, Analytical, 2X Zoom, Trinocular Microscopes with 10X Eyepieces, 2X, 10X, 20X plan apochromatic Objectives offer the highest visual acuity optically available today. Microscope accessories also available are 50X SLWD (22.5mm), 100X SLWD (13mm), Wide Field CCD Camera adapters, Higher Magnification, Eyepieces, Polarizers, Tiltheads and much more.

**MODULAR DESIGN:** the 400 Series Wafer Probe Stations are designed as a platform on which to build on as the Engineering Analytical analysis task expands with design discipline as feature size shrinks. A wide variety of system accessories and upgrades are readily available to fit changing needs.

**PLATEN**

243 square inches accepts 10 or more vacuum or magnetic manipulators. Magnetic stainless-steel with ground-grained surface 3 point belt driven support/lift provides excellent stability. Optional manifolds: BNC, TRIAX, TRIAX/BNC.

**Fine“Z” Platen Lift Control**

True planar vertical motion with micron precision  
Relative “Z” position indicator (selectable)  
Large 6” (152mm) diameter “Z” control dial  
Resolution: 2 microns per degree of revolution  
Range: 1” (25.4mm)

**Fast “Z” Lift Control**

Platen lift with three lock up positions  
Platen range: 1” (25.4mm)  
Adjustable microscope delay: 0” to 1” travel  
Raises microscope from 1.25” to 3.0”

**VACUUM CHUCK OPTIONS**

6” (152mm) for 4” to 6” wafers or 8” (200mm)  
for 6” to 8” wafers  
Stainless-steel for low contamination, or gold plated brass  
Flatness  $\pm 0.0005$ ” ( $\pm 12$  microns)  
Electrical isolation exceeds 5 Teraohms  
Electrically wired to BNC connector on platen  
Thermal chucks also available

**FACILITY REQUIREMENTS**

Power: 110V/60Hz standard, 220V/50Hz optional (2 amps)  
Vacuum: 20” of mercury vacuum stage,  
vacuum based manipulators

**DIMENSIONS, FINISH AND WEIGHT**

23.5” (60cm) D x 37” (94cm) W x 32” (87cm) H  
Grained black anodized aluminum, stainless-steel  
for long life  
162 lbs. (74kg)

**SHIPPING INFORMATION**

39” (99cm) D x 37” (94cm) W x 32” (81cm) H, with pallet  
Shipping weight 220 lbs. (100kg) approximate

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**MICROSCOPE POST AND****MICROSCOPE OPTIONS**

X-Y translation: 4” x 4” (101.6mm x 101.6mm)  
PSI 404LS: Hinged Dependent Vertical lift; 1.25” to 3.0”  
PSI 414LS: Independent Vertical Lift/Lock 12 selectable  
positions; 3” range  
Focus (Z) motion 2” (50.8mm) standard; up to 4”  
(100mm) option  
Coaxial coarse/fine focus control knobs  
USMC-STD-2XZ-V1/V2 with 2:1 zoom in body recommended  
3 long working distance objectives (2X, 10X and 20X)  
included  
4-Port nosepiece  
Optional 50X and 100X objectives  
Trinocular head with camera port, 10X eye pieces  
Coaxial fiber optic illuminator (150W)  
Optional Tilthead; your choice of flip mirror or prism  
Optem A-Zoom available  
Meiji EMZ-TR-5 step zoom, Stereo Microscope available

**X-Y STAGE OPTIONS**

Precision X-Y screw drive  
6” x 6” (152mm x 152mm) or 8” x 8” (200mm x 200mm)  
Stage and chuck planarized at factory  
Theta rotation control:  $\pm 7.5$  degrees (100 T.P.I. leadscrew)

**PROBE CARD HOLDER - CELADON PROBE  
TILES**

Holds probe cards for wafer probing



*Celadon-Probe Tile Adapter Kit*

## ULTIMATE VALUE MANUAL 6" TO 8" Wafer Probe Station

### *DESCRIPTION*

The PSI 100™ and PSI 200™ Vacuum Accessory Probe Stations are economical and easy to use manual probe stations. They are ideally suited for Microwave, Hybrids, Packaged parts, chip-on-board, PC Board and Hot Wafer Probing Applications. The PSI 100™ and PSI 200™ can probe geometrics as small as 8 microns on wafers and packaged devices. The baseplate can accommodate up to 8 standard vacuum base manipulators. A microscope boom mount is offered with a choice of Stereoscopes with magnifications up to 270X. These stations feature manual positioned pedestal bases secured by vacuum. Many of Probing Solutions' accessories may be used including 6" and 8" ambient vacuum chucks, 2" x 2", 4" x 4" and 6" x 6" Hybrid substrate Holders, Packaged Device Adapters, Probes, Manipulators, Low Noise and Hot/Cold Chucks, Light Tight Enclosures, Vibration Isolation Tables, Stereoscope Optics, etc.



### *Features Include*

The ability of the user to quickly and efficiently change the accessories and the test configuration.

Vacuum/356VM Pedestal Mounted accessories as shown above can be easily moved or replaced simply by breaking the vacuum with the switch at the base of each accessory.

Probing Solutions Inc. offers a wide variety of vacuum pedestal mounted chucks. They are available in 6" to 8" ambient chucks, hot chucks, low noise chucks, (SSA) coaxial and triaxial chucks.

Socket Card Adapter, with zero insertion, sockets on PC Cards for probing packaged parts.

Hybrid Substrate Holders (HSH) are a spring loaded design to exert gentle positive pressure on the ceramic substrate or MW stripline package while being probed.

Microwave applications: Use a PSI 100™ or PSI 200™ inside a light tight enclosure (LTE) with a coaxial or triaxial chuck and high frequency or microwave probe accessories and the PSI 100™ or PSI 200™ Probe Station becomes a versatile microwave test station.

## **STATION BASE**

PSI 100™ : 231 square inches (1490 square cm) for 6" wafers  
PSI 200™ : 522 square inches (3561 square cm) for 8" wafers  
BNC Manifold: 5 BNC connector strain reliefs  
Pedestal Base vacuum port and one 5 port vacuum manifold

## **HYBRID SUBSTRATE HOLDER OPTIONS (\*)**

Holder sizes: 2" x 2", 4" x 4" and 6" x 6"  
Spring loaded DUT holding  
Stainless steel surface  
All holders will accommodate any shape substrate as small as 0.5" x 0.5"

## **SOCKET STAGE ADAPTER OPTIONS (\*)**

Holds PCB socket cards for probing live packaged devices  
Adapters: 2" x 2" to 6" wide cards

## **MICROSCOPE POST AND**

## **MICROSCOPE OPTIONS**

Microscope Boom Mount  
Consult factory for Stereoscope options  
Magnification range is 4X to 270X, scope dependent

## **DIMENSIONS, FINISH AND WEIGHT**

PSI 100™ : 14" (36cm) W x 16.5" (42cm) D x 18.5" (47cm) H  
PSI 200™ : 23.5" (60cm) W x 23.5" (60cm) D x 18.5" (47cm) H  
Note: 15.5" (39cm) of "behind station space" needed for microscope "E" Extension Arm  
Grained black anodized aluminum for long life  
50 lbs. (23kg) approximate

## **VACUUM CHUCK OPTIONS (\*)**

Stainless steel for low contamination (STD), or gold plated brass 6" (152mm) for 4" to 6" wafers or 8" (200mm) for 6" to 8" wafers with concentric vacuum grooves and tweezer slot  
Flatness + 0.0005" ( $\pm 12$  microns)  
Electrical isolation exceeds 5 Teraohms  
Hot/Cold and Low Noise Chucks available

## **VACUUM PEDESTAL BASE OPTIONS**

Vacuum Pedestal Base is needed for (\*) options  
Optional fine 0.5" x 0.5" micrometer (100 T.P.I. leadscrew) 5 with the Theta rotation control:  $\pm 12^\circ$  (100 T.P.I. leadscrew)  
Pedestal Bases and Chucks are planarized at factory

## **FACILITY REQUIREMENTS**

Power: 110V/60Hz standard, 220V/50Hz optional  
Vacuum: 20 Hg mercury for vacuum chuck and vacuum-based manipulators

## **SHIPPING INFORMATION**

32" (81cm) D x 20" (74cm) W x 23" (58cm) H  
Shipping weight 65 lbs. (30kg) approximate

**NOTE: (\*) options require a 356VM vacuum pedestal base.**

PSI 100™ and PSI 200™ stations are not suited for laser applications. PSI recommends the PSI-400-LAS-V0 which has been designed to support USMCO USMC-STD-1X Trinocular, Laser-Ready Microscope and the 45.6 lbs. laser weight with stability. Refer to: PSI-400-LAS-V0 Laser Station or PSI-400LS-V0 Wafer Probe Station.

Local Sales Representative

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## DEDICATED LASER CUTTER WORKSTATION

The PSI 400LAS Manual Laser cutting Workstation works without a platen and is designed to be a dedicated FA Lab Station for Semiconductor oxide, nitride or layer removal as well as sub-layer removal for probing, edge trimming or bridge removal.



### *Features Include*

Rigid microscope post for stability.

Will accommodate 6" (152mm) or 8" (200mm) wafers, Hybrid packages, Ceramic substrate holder, Zero insertion Socket Card Adapters SSA's for packaged parts or delided circuits.

With a PVAC-PUC vacuum concentrator on a 6" (152mm) or 8" (200mm) vacuum wafer chuck, wafer pieces, slices or individual die can be held in place to have passivation or metal layers removed for probing and failure analysis.

A major advantage to having a dedicated Laser Cutter work station is that it frees up FA Lab equipment use schedules on Wafer Probe Stations that otherwise would be tied up with Lasers mounted on them as a dual use mode tool.

The largest advantage of all is the low cost of ownership for such a precision special application FA Lab tool.

The PSI 400 LAS is equipped with a highly rated US Microscope Co. STD Laser Ready Microscope designed for Green, UV, IR or TRI-LITE combination (all three Wave Length capabilities in one Laser). Consult USMCO for Microscope Specifications, special NUV and NIR Laser Objectives and accessories.

# LASER CUTTER WAVELENGTH GENERAL APPLICATION GUIDE



Application	355 nm (UV) Laser	532 nm (Green) Laser	1064 nm (IR) Laser
Passivation removal, Nitrides and Polyimides	Excellent with good control	Control limited but operational	NA
Passivation and dielectric removal, Oxides	Little Effect	Good	NA
Metal line cutting with passivation	Little Effect	Good, however depth control limited	Inconsistent
Metal line cutting after passivation removal	Little Effect	Good, however depth control limited	Good with little damage to underlying materials

## X-Y STAGE OPTIONS

Precision X-Y leadscrew drive positioning or rack and pinion (shown)  
 6"x6" (152mm x 152mm) or 8"x8" (200mm x 200mm)  
 Stage and chuck planarized at factory  
 Theta rotation control:  $\pm 7.5$  degrees rotation

## VACUUM CHUCK OPTIONS

6" (152mm) for 4" to 6" wafers or 8" (200mm) for 6" to 8" wafers  
 Stainless Steel for low contamination or gold plated brass  
 Flatness  $\pm 0.0005$ " ( $\pm 12$ microns)  
 Electrical isolation exceeds 5 Teraohms

## MICROSCOPE POST & MICROSCOPE OPTIONS

X-Y translation: 2"x2" (50.8mm x 50.8mm)  
 Optional model 404: 4"x4" (101.6mm x 101.6mm) X-Y translation  
 Focus (Z) motion 2" (50.8mm) standard; 4" (100mm) optional  
 Leadscrew/Fine focus control adjustment  
 USMC-STD-V1/V2: 1:1 Microscope  
 10X eyepieces, pair  
 3 long working distance objectives (2X, 10X and 20X)  
 Adjustable 4-Port nosepiece  
 Optional 50X and 100X objectives  
 Trinocular head with laser port  
 Coaxial Fiber Optic Illuminator (150W)  
 Optional: NIR and NUV objectives  
**NOTE:** 2X Zoom or Tilthead microscopes may not be used with lasers

## STAGE ADAPTER OPTIONS

SSK: Holds zero insertion socket cards for probing packaged part devices  
 HCH: Holds hybrid circuit packages or ceramic substrates  
 PVAC-PUC: Vacuum concentrator holds die, slices or wafer pieces on standard 6" or 8" vacuum chuck

## DIMENSIONS, FINISH AND WEIGHT

23.5" (60cm) D x 37" (94cm) W x 32" (87cm) H, with pallet  
 Grained black anodized aluminum, stainless steel for long life  
 62 lbs. (28kg)

## FACILITY REQUIREMENTS

Power: 110V/60Hz standard, 220V/50Hz (2 amps) optional  
 Vacuum: 20" of mercury for vacuum stage and vacuum wafer chuck

## SHIPPING INFORMATION

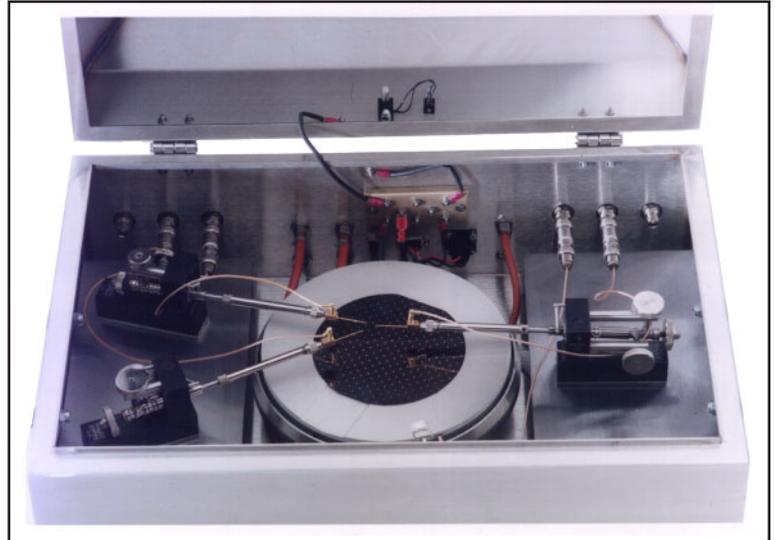
System Size: 23.5" (60cm) x 37" (94cm) x 32" (87cm)  
 System Weight: 62 lbs. (28kg)  
 Shipping Size: 1 crate - 39" (99cm) D x 37" (94cm) W x 32" (81cm) H, with pallet  
 Shipping Weight: 1 crate - 102 lbs. (46kg) approximate

Local Sales Representative

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

*The ideal prober where lab space may be limited because of its compact footprint. The Model S8 is a low cost 8" analytical test station designed for probing targets 100 microns and above.*

*For all the capability of the S8 with a 6" chuck, choose the Model S6.*



With the "Mini" Light Tight Enclosure as standard, this stainless steel prober is excellent for applications that require dark and electrically 'quiet' environments such as low current measurements, CV measurements, and parametric testing of MOS and CCD elements. The desktop prober is perfect for use at the lab, office, school or training sites because it is portable, reliable and easy to use at a fraction of the cost of a traditional probe station.

This station can be configured in either a 6" or 8" chuck size with an ambient Coaxial or Triaxial chuck for general purpose

probing. For at temperature probing, the Micromanipulator Co. H-1000 thermal chuck series (Coaxial or Triaxial) is available with a temperature range from -65° C to +400° C.

All styles of magnetic based manipulators work with this station's fixed platens and either BNC or Triax 6000 style probe holders are accepted. Order an optional StereoZoom microscope with boom stand to provide the optics for this unit which is designed for probing target sizes 100 microns and above.

### ***Features Include***

- "Mini" light tight enclosure
- Stainless steel construction
- Two fixed platens
- Uses optional Zoom Stereo microscope with boom stand which is external to enclosure
- Ten feed-through connections for BNC or Triax probe types
- One feed-through connection for the chuck
- Vacuum connection for chuck

- Includes integral incandescent lamp
- Accepts any Probing Solutions (4", 6" or 8") style chuck (coaxial or triaxial with ambient or thermal characteristics)
- All versions available with H-1000 -65° C to 400° C thermal chucks include ambient cooling option with heat exchanger

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# SPECIFICATIONS

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## PSI S6 and S8 Desktop Prober

### CHUCK SIZE

6 = 150mm or 6 inches  
8 = 200mm or 8 inches

### CHUCK TYPE, AMBIENT AND THERMAL

LN = Low noise triaxial ambient chuck  
EVS = Stainless steel coaxial ambient chuck  
EVG = Gold Plated coaxial ambient chuck  
C = Coaxial thermal chuck  
T = Triaxial thermal chuck

### CHILLER OPTIONS

C = 0 degree C chiller to +400 degree C  
HC = -65 degree chiller to +400 degree C

Note: all HC systems require 230VAC, (208v minimum, 230v maximum) single phase, 30 amp power supply and HT-70-15 low temperature fluid 5.5 L (1.5 gal)

### SHIPPING

System shipping weight 40 lbs (ambient), see H1000 for thermal system components

### POWER TYPE FOR THERMAL CHUCKS ONLY

AC1 = AC Controller, power to chuck  
DC1 = DC Controller, power to chuck

### LINE VOLTAGE

V1 = 110 VAC, 50/60 Hz, 2.0 amps  
V2 = 230 VAC, 50 Hz, 1.5 amps

### CE CERTIFICATION

CE certification for -65 degree chiller option

### OPTIONAL MICROSCOPE WITH STAND AND E-ARM

EMZ-STR Meiji Zoom Stereo  
2.1X to 270X Magnification with fiber optic illuminator.  
Specify 110 VAC, 50/60 Hz or 220 VAC, 50 Hz CE

### FOOTPRINT

21" (53cm) x 14" (36cm) x 10" (25cm)

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# CONFIGURATION

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The Model PS8 (or S6) station configuration is build on the following part number key:

PS (6 or 8 for **chuck size**) - (**chuck type**) - (**chiller option**) - (hot chuck **power type** if applicable) - (**line voltage**) - (**CE**)

### Example Part Numbers:

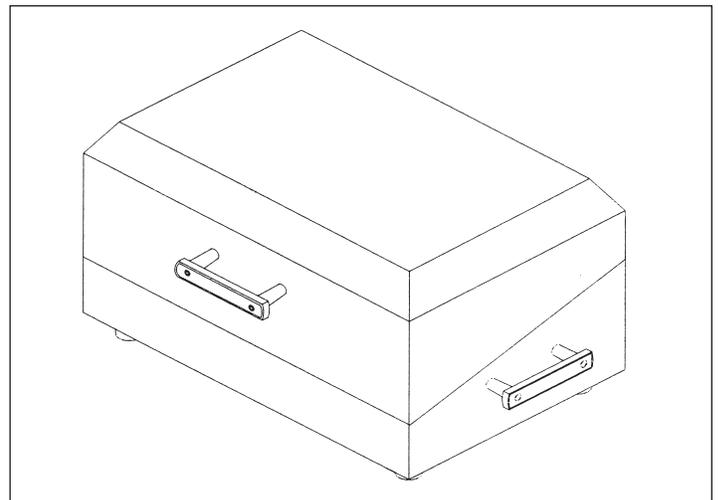
**PS8-LN:** 8" (200mm) low noise triaxial ambient chuck

**PS8-EVS:** 8" (200mm) stainless steel or gold plated coaxial ambient chuck

**PS6-EVS:** 6" (150mm) stainless steel or gold plated coaxial ambient chuck

**PS6-C-AC1-V1:** 6" (150mm) coaxial thermal chuck ambient to +400° C with AC heat controller designed for use with 115VAC power

**PS8-T-DC1-V2-CE:** 8" (200mm) triaxial thermal chuck ambient to +400° C with DC heat controller designed for use with 230VAC power with CE marking



# *Signal Integrity Test Stations*

 **Probing Solutions Inc.**

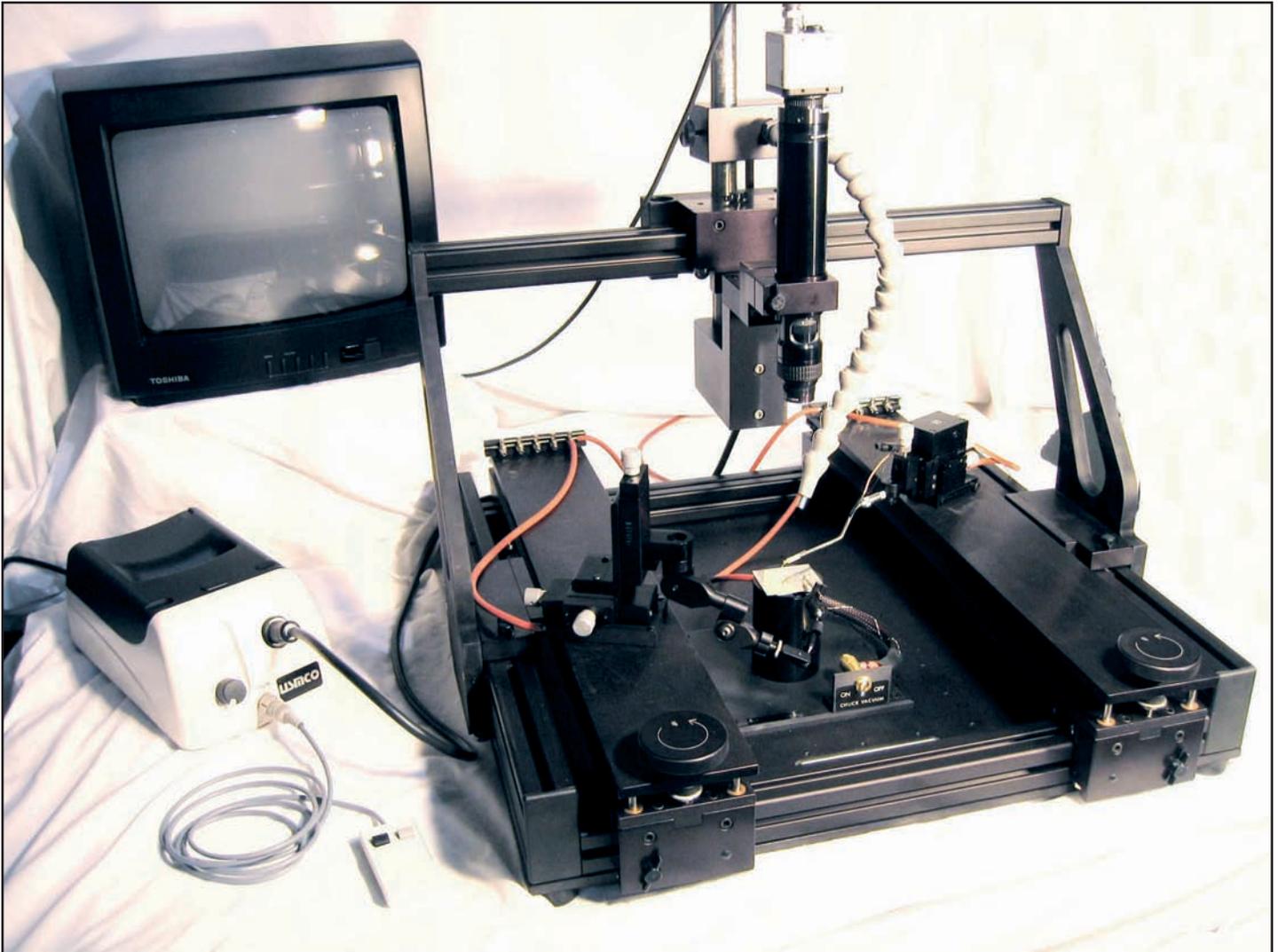
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# **Ψ Probing Solutions Inc.      PSI 1120™ BGA**

## **COMPACT GENERAL PURPOSE PROBE STATION**

*Great for Circuit Boards and LCD Displays!*



### ***Features Include***

- Open design allows a variety of fixtures and device types to be probed, ranging from flat panel displays to high density PCBs.
- Useful DUT area is 11½” x 20½” (29.21cm x 52cm), which can be easily expanded in ‘X’ with a simple rail and baseplate change.
- The large platens (1 pair) may be positioned as needed and locked. Each has individual ‘Z’ control.
- Accepts standard pedestals, BGA vacuum wafer chucks, packaged device fixtures and universal mounts. User fixturing is easily attached by threaded holes in baseplate.
- May be used with a variety of manipulators and probes/probe holders.
- Economical solution to a variety of probe needs. Including signal integrity applications, BGA and small PCB’s up to 11” x 20” square (22.9cm x 50.8cm).

## **PLATEN**

Comes standard with two 4" (10cm) x 26" (66cm) platens positionable in the 'X' axis providing a useful test area of 11" (22.9cm) x 20" (50.8cm). Each platen has 2" (5cm) of 'Z' travel.

## **STATION BASE**

24" (60.96cm) x 24" (60.96cm) grained, black anodized aluminum. 10-32 threaded holes on a 2" (5cm) x 2" (5cm) grid pattern provides facility for fixture mounting.

## **MICROSCOPE POST AND**

### **MICROSCOPE OPTIONS**

X, Y translation is 19" (48.26cm) x 17" (43.1cm). The Z microscope gross positioning ranges from the surface of the baseplate to 8" above.

Accepts stereo microscope with typical 2.1X to 270X magnification range and 10X eyepieces. Illuminator and camera port are standard or optional ultra zoom 6.5X, W3mm ff & coaxial with 1X adaptor and mount coupler.

## **FINISH DIMENSIONS AND WEIGHT**

24" (60.96cm) x 24" (60.96cm) x 16" (40.64cm)  
Weight: 74.75 lbs. (33.9kg)

## **DESCRIPTION**

The PSI 1120™ is the essence of simplicity and affordability yet includes functions normally found on machines priced significantly higher. It was created to satisfy the probing requirements of DUTs whose geometries are too small for hand guided probes yet capable of contacting structures viewed with stereo microscopes.

The 24" (60.96cm) x 24" (60.96cm) baseplate provides the structure which accepts two large platens positionable in the 'X' axis, and containing individual 'Z' controls. Further, the microscope glides over the fixture mounting area and then locks into position.

The platens will each support up to 8 manipulators depending upon type and travel characteristics. Manipulators and probe holders are available to accomplish a variety of goals. Probes from those commonly found with oscilloscopes to small geometry needles may be used.

## **OPTIONAL ACCESSORIES**

15" CCD Video Monitor  
PWAVE VM Manipulator with Articulating Arms,  
compatible with 1,2,4 Point Probes and Picoprobes  
Zoom stereo Meiji EMZ-5R Conventional Microscope

Optional Manual Zoom Lens



PWave VM R&L Manipulator with articulating holder adapters

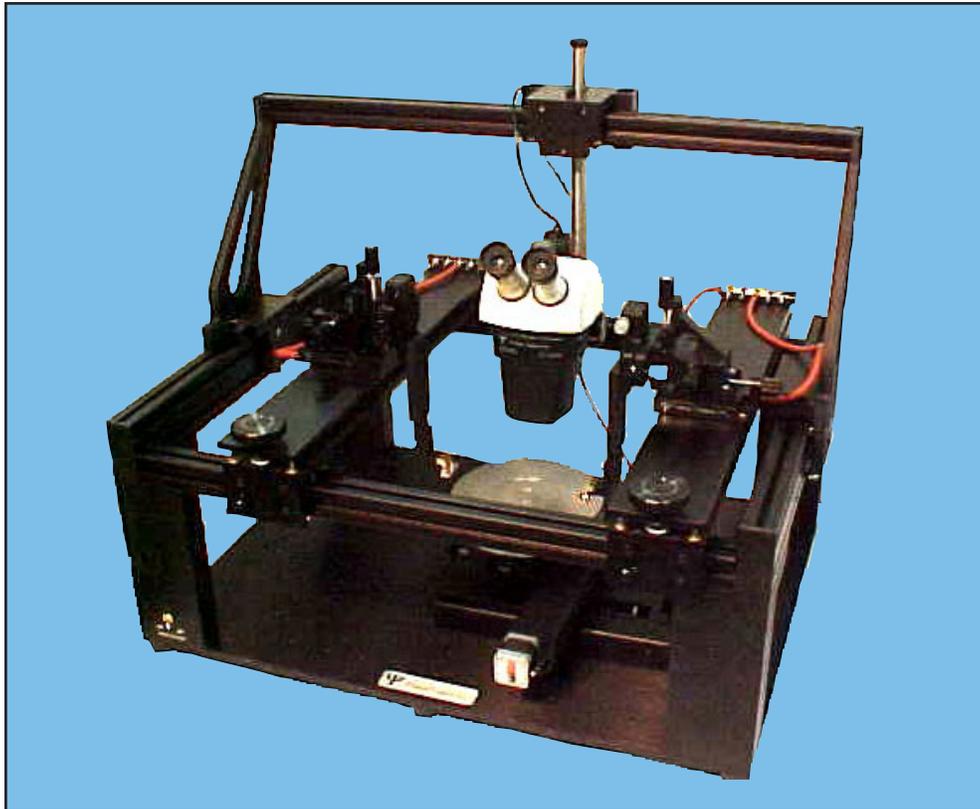
Local Sales Representative



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***[www.probingolutions.com](http://www.probingolutions.com)***

**HORIZONTAL SIGNAL  
INTEGRITY TDR PROBE STATION**

**MULTIPLE CIRCUIT BOARD CONFIGURATIONS**



**MANUAL STATION**

*Features Include*

- Open design allows a variety of fixtures and device types to be probed, ranging from flat panel displays to high density populated PCB's for Time Domain Testing.
- With standard Hard Fixture capability or X-Y lead screw controlled stage with Vacuum chuck for flat-based fixtures, allowing precision controlled targeting of probes.
- The large platens (2 each) may be positioned horizontally and locked. Each has individual height control.
- Accepts standard PSI X-Y stages, wafer chucks, packaged device fixtures and fixed universal board mounts. User fixturing is easily accomplished with stand-off's attached to the grid of threaded holes in the base plate.
- May be used with a variety of manipulators, probes and probe holders. Including: Probing Solutions, PICO Probes and TDR Probes and others.
- Economical solution to a variety of probing needs. Populated Boards, Displays, Hybrid packages and Back Side Solder Ball, just to name a few.

## PLATEN

Comes standard with two 4" (10cm) x 26" (66cm) platens positionable in the 'X' axis providing a useful test area of 19" (48cm) x 20" (51cm). Each platen has 2" (5cm) of height positioning.

## STATION BASE (FOOTPRINT)

32" (81cm) x 26" (66cm) grained, black anodized aluminum. 10-32 threaded holes on a 2" (5cm) x 2" (5cm) grid pattern providing facility for fixture mounting.

## MICROSCOPE POST AND

## MICROSCOPE OPTIONS

X, Y translation is 32" (81cm) x 24" (61cm). The Z microscope positioning ranges from the surface of the DUT to 8" (20.3cm) above.

System accepts stereo microscope with a typical zoom magnification range and 10X eyepieces (for total zoom magnification of 2.1x to 270x). Illuminator and camera ports are standard. Optional Navitar zoom lens with Articulating Mounting System

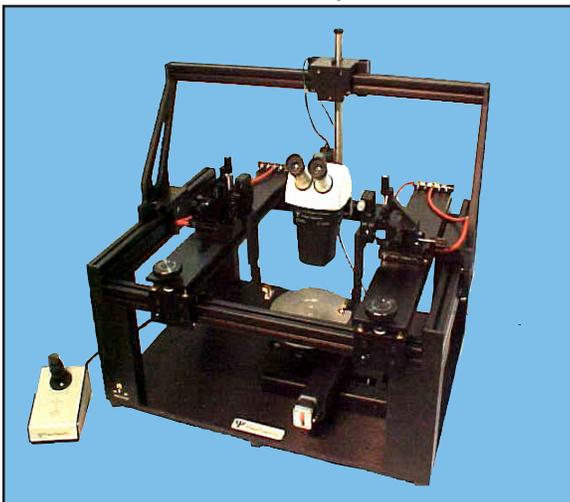
## FINISH DIMENSIONS AND WEIGHT

34" (81cm) W x 26" (61cm) D x 24.4" (71cm) H  
Weight: 170 lbs. (77kg)  
12" (30cm) Work Height

## FACILITIES

Auto Switching CE Illuminator. 110/220 VAC, 2.5A, 50/60 Hz

## PSI 1920H with Motorized Joystick X-Y Controller



Visit our website at:  
[www.probingolutions.com](http://www.probingolutions.com)

## DESCRIPTION

The PSI 1920™ is the essence of simplicity and affordability yet includes functions normally found on machines priced significantly higher. This probe station was created to satisfy the versatility requirements for populated *Time Domain Reflection* testing, and *DUTs* whose geometries are too small for hand guided probes yet capable of contacting structures viewed with microscopes.

The 32" (81cm) x 24" (71cm) baseplate provides the structure which supports two large platens positionable in the 'X' axis, and containing individual 'Z' controls. Further, the microscope glides over the fixture mounting area and then locks into position.

A lead screw driven stage option provides the additional versatility for work height accuracy and precision required by populated PCBs and difficult areas to be tested on both front side and back side board locations

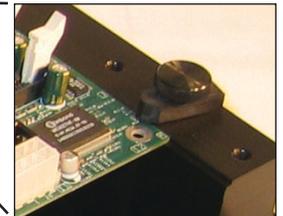
The platens will each support up to 8 manipulators depending on model selected. Manipulators and probe holders are available to accomplish a variety of probing tasks.

1920-BS-FRX  
Face-down Fixture



Face-up or Face-down  
Board Test Fixtures

1920-FS-FRX  
Face-up Fixture



Local Sales Representative



**HORIZONTAL/VERTICAL SIGNAL INTEGRITY  
TDR PROBING**

**MULTIPLE SIZE CIRCUIT BOARD CONFIGURATIONS**

**H  
O  
R  
I  
Z  
O  
N  
T  
A  
L**



**V  
E  
R  
T  
I  
C  
A  
L**

**MANUAL WORK STATION**

*Features Include*

- Open design allows a variety of fixtures and device types to be probed, essential for vertical high density populated PCB's for Time Domain Reflectometry and Four Point Differential Modeling.
- Fixture capability for controlled probe target, large and small.
- Large circuit boards may be positioned vertically or horizontally, specify "H" or "H/V" accessory fixtures at time of order.
- Optional 1 each or 2 each (shown), CCD Video Monitors and stands.
- Front and back side video viewing optional.
- May be used with a variety of manipulators, probes and probe holders from Probing Solutions, PICO Probes™ and TDR Probes and others.
- Please discuss the manipulator and probe holder options with the factory or your local PSI sales representative.
- Compatible with Tektronix® 11800 with SDZOTDR, TDS 8000 and 80E04TDR.
- Compatible with Agilent® 54750 or 83480.

## **PLATEN**

Comes standard with 5" Z travel, two 4" (10cm) x 26" (66cm) platens positionable in "X" axis providing horizontal positioning for probing areas 19" (48cm) x 20" (51cm) or vertical 19" (48cm) x 30" (76cm).

## **STATION BASE (FOOTPRINT)**

32" (81cm) x 26" (66cm) grained, black anodized aluminum. 10-32 threaded holes on a 2" (5cm) x 2" (5cm) grid pattern providing facility for fixture mounting.

## **FACILITIES**

Auto Switching CE Illuminator. 110/210 VAC, 2.5A, 50/60 Hz

## **FINISH DIMENSIONS AND WEIGHT**

32" (81cm) W x 26" (66cm) D x 14.5" (37cm) H  
30" (76cm) board work height - vertical  
Weight: 150 lbs. (68kg)  
VIB ISO Table 116lbs. (53kg), 36" (91cm) W x 30" (76cm) D x 30" (75cm) H  
Facilities Required: 90 PSIG Air, Vacuum - 25in Hg,  
Power - 110/220 VAC, 60/50 Hz

## **Accessories**

2020HV Accessory Options

Horizontal/Vertical Zoom Lens CCD Video



Manual Zoom Lens



**Visit our website at:**  
**[www.probingolutions.com](http://www.probingolutions.com)**

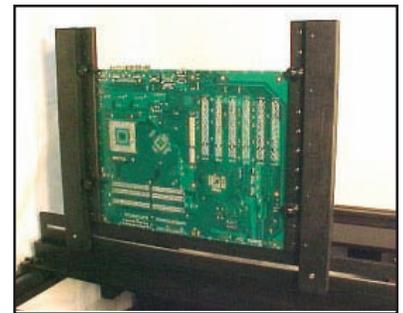
## **DESCRIPTION**

The PSI 2020HV™ is the essence of simplicity and affordability yet includes functions not normally found on machines priced significantly higher. It was created to satisfy the versatility requirements for populated Time Domain Reflection testing, and DUTs whose geometrics are too small for hand guided probes yet capable of contacting structures viewed with zoom lens video.



Mother and Daughter Board may be probed simultaneously

Vertical Board Holder



PWave VM R&L Manipulator with articulating holder adapters

Local Sales Representative



*Wafer Probe  
System Accessories*

 **Probing Solutions Inc.**

*Copyright © 1995 Probing Solutions Inc.*



## SYSTEM ACCESSORIES

**PRODUCT NAME: 4300-LTE**

Light Tight Enclosure Clam Shell Top, 22" D, 20" W x 18" H (For PSI 100).

**PRODUCT NAME: 400-LTE**

Light Tight Enclosure Roll-Top, 36" D, 35" W x 30.25" H.

**PRODUCT NAME: 400-LTE-BNC**

BNC Feedthrough panel for 400/440-LTE.

**PRODUCT NAME: 400-LTE-ILOC**

Interlock Switch.

**PRODUCT NAME: 400-LTE-S**

Inner platform for 400 LTE or TMC Isolation tables, with grids front and back.

**PRODUCT NAME: 400-LTE-SOCK**

Universal Feedthrough panel.

**PRODUCT NAME: 400-LTE-TP3000**

TP3000 Feedthrough panel for 400/440-LTE.

**PRODUCT NAME: 400-LTE-TRI**

Triax Feedthrough panel for 400/440-LTE.

**PRODUCT NAME: 400-LTE-TRI/BNC**

Triax (4) and BNC (4) Feedthrough panel for 400/440-LTE.

**PRODUCT NAME: SUB-TABLE-1201**

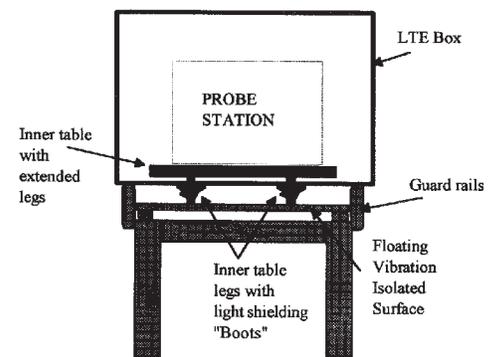
Inner platform for 400-LTE on 1201 isolation table with grids front and back.

**PRODUCT NAME: SUB-TABLE-9100**

Inner platform for 400-LTE on 9100 isolation table with grids front and back.



SIDE VIEW OF LTE



## SYSTEM ACCESSORIES

### LOW NOISE AMBIENT WAFER CHUCKS

Low Noise / Low Current measurements require special chuck construction to provide the DUT with greater noise immunity while under test. These chucks can perform double duty at general purpose testing as well. LN Chucks are not intended to be used exclusively for Low Noise applications, general-purpose use will not diminish their Low Noise performance unless surface damage or rough handling abuse occurs.

#### PRODUCT NAME: 400-EVS-LN6

6" (152mm) Low Noise Vacuum Chuck with Stainless Steel vacuum wafer surface.

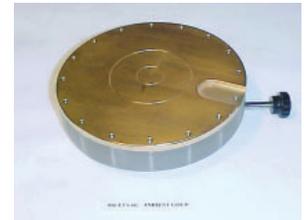


#### PRODUCT NAME: 400-EVS-LN8

8" (200mm) Low Noise Vacuum Chuck with Stainless Steel vacuum wafer surface.

#### PRODUCT NAME: 400-EVS-6G

6" (152mm) Vacuum Wafer Chuck for General Purpose Ambient Temperature testing with a Gold Plated vacuum wafer mounting surface.



#### PRODUCT NAME: 400-EVS-6SS

6" (152mm) Vacuum Wafer Chuck with Stainless Steel vacuum wafer surface.

#### PRODUCT NAME: 400-EVS-8G

8" (200mm) Ambient Vacuum Wafer Chuck with a Gold Plated vacuum wafer surface.

#### PRODUCT NAME: 400-EVS-8SS

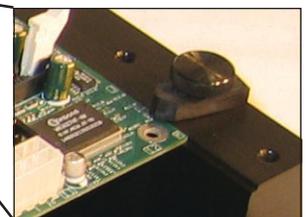
8" (200mm) Ambient Vacuum Wafer Chuck with a Stainless Steel vacuum wafer surface.

#### PRODUCT NAME: 1920-BS-FRX

Printed Circuit Board Holding Fixture for Probing PCB Back side interconnects and solder joints. For Vacuum Chuck or base plate stand-off hard mounting, Electronically isolated.

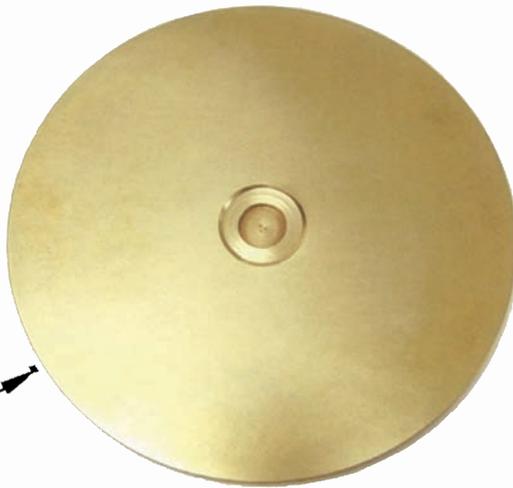
#### PRODUCT NAME: 1920-FS-FRX

Printed Circuit Board Holding Fixture for Probing PCB Front side component leads and circuit traces. For Vacuum Chuck or base plate stand-off hard mounting, Electronically isolated.

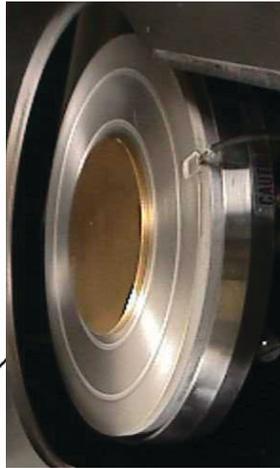


REVISIONS		
REV.	DESCRIPTION	DATE

Ø3.980 X .150 THICK



Ø.014 THRU 3 PLCS  
ON A Ø.050 B.C.



ISOMETRIC VIEW  
SCALE: 1:2

**PVAC-PUC Vacuum Concentrator** for Vacuum Wafer  
Chucks to concentrate vacuum to hold small items:  
Die, Hybrid Packages and wafer slices.

NOTES

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ± 1/16" .XX ± .010 ± 0° 30' .XXX ± .005	CAD GENERATED DRAWING, DO NOT MANUALLY UPDATE DO NOT SCALE DRAWING	DATE	 <b>Probing Solutions Inc. U.S.A.</b> 9 Enterprise Way Dayton, NY 89403 Tel: (773) 246-0999 Fax: (773) 246-0480
	APPROVALS	DATE	
MATERIAL BRASS	DRAWN JMC/GUFFEY	11-10-03	<b>PUC, VACUUM CONCENTRATOR</b>
FINISH FLAT GOLD	CHECKED		
	RESP ENG		STATE DWG. NO. <b>A</b>
	MFG ENG		SCALE: 1:1.5 CAD FILE:
	CATEGORY CODE: <b>DA050</b>		<b>PVAC-PUC</b>
			SHEET 1 OF 1

## X-Y 6"-8" STAGE ACCESSORIES

### PRODUCT NAME: 400-STG-6

Stage X, Y Drive, 6" x 6" with micron level resolution. Features include unique stage lock with shortened Y rack, fast push/pull-out loading for quick DUT changes, 6" x 6" stage X-Y motion, precision coaxial stage controls.

### PRODUCT NAME: 400-STG-6-MIC

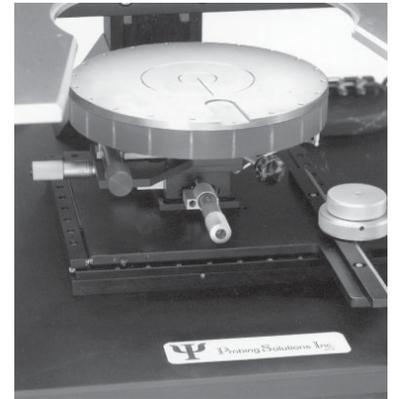
Stage X, Y Drive, 6" x 6" with 0.5" x 0.5" at 100 TPI Micro Stage for micron resolution. Features include unique stage lock with shortened Y rack, fast push/pull-out loading for quick DUT changes, precision coaxial stage controls.

### PRODUCT NAME: 400-STG-8

Stage X, Y Drive, 8" x 8" with micron level resolution. Features include unique stage lock with shortened Y rack, fast push/pull-out loading for quick DUT changes, precision coaxial stage controls.

### PRODUCT NAME: 400-STG-8-MIC

Stage X, Y Drive, 8" x 8" with 0.5" x 0.5" at 100 TPI Micro Stage for micron resolution. Features include unique stage lock with shortened Y rack, fast push/pull-out loading for quick DUT changes, precision coaxial stage controls.



### PRODUCT NAME: STG-MIC

Fixed Mount, features include 0.5" x 0.5" XY micro stage (100 TPI).

### PRODUCT NAME: STG-VP

Stage vacuum pedestal base, manual positioning. Features include the ability to use this pedestal base instead of an X-Y stage and hand positioning with vacuum lock-down.

### PRODUCT NAME: STG-VP-MIC

Stage vacuum pedestal base with 0.5" x 0.5" at 100 TPI Micro Stage for micron resolution. Features include the ability to use this pedestal base instead of an XY stage and hand positioning with vacuum lock-down.

### PRODUCT NAME: PROBE CARD HOLDER

#### Adjustable:

4.5" to 6" Probe Card with Long Rails and Load Board Mount  
400-FPC-FRX-ADJ



#### Standard:

4.5" x 4.5" Probe Card, short rails  
400-FPC-FRX-8



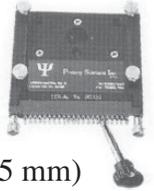
## SYSTEM ACCESSORIES

### SOCKET STAGE ADAPTERS

Socket stage adapters hold socket stage printed circuit cards. These adapters are used with PSI Stages or Vacuum Pedestal Bases.

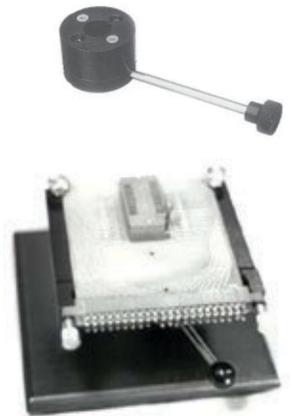
The **400-SSA** socket stage adapter accepts socket stage cards with dimension of 3.56 in. (90.5 mm) wide by 4.3 in. (109.5 mm) long and 0.062 in. (1.6 mm) thick. The **400VAR-SSA** socket stage adapter will accept cards up to 5 in. (127 mm) wide.

Adapters are supplied with a 44 pin edge connector (PSSD-022) suitable for use with socket stage cards which have up to 40 pins. Larger cards require a 70 pin edge connector (PSSD-072) with a 0.10 in. centers. The 400-SSA adapter height can be reduced by 1" for high devices by removing midsection.



### STAGE MOUNT ADAPTERS

The 400-SSM provides a standard mounting block with threaded bolt holes for mounting custom device holders on the PSI stages or vacuum pedestal bases.

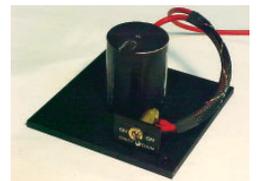


### PRODUCT NAME: 400-SSA

3.5" x 3.5" Card Socket Stage Adapters for Probing Solutions PSI-400/410 Probe Station.

### PRODUCT NAME: BGA VACUUM HOLDER

For PSI 1120-BGA Probing/packaged parts, 2"x2" boards or wafer slices/die.

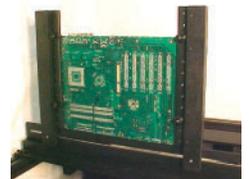


### ZOOM LENS SYSTEM: ZL-KIT

10X zoom with fine focus, lens system providing up to 7" of working distance

### PRODUCT NAME: V-PCB-REC-19

Vertical Board Receiver for PSI 2020HV Work Station.



### PRODUCT NAME: CMK-BSA

Horizontal/Vertical zoom lens CCD video Boom fixture for PSI 2020HV. CMK-BSA-HM includes X and Z lead screw driven positioning.



### Horizontal/Vertical Zoom Lens CCD Video

## CABLE ADAPTER ACCESSORIES

**PRODUCT NAME: P45-2F**

Probe Tee, Coaxial for Model 44 A.

**PRODUCT NAME: P45-3F**

Probe Tee, Coaxial.

**PRODUCT NAME: P46**

Probe Coaxial Cable, UMC-UMC, 30.

**PRODUCT NAME: P46-4**

Probe Coaxial Cable, 4”.

**PRODUCT NAME: P47**

Probe Coaxial Adapter, UMC to BNC.

**PRODUCT NAME: P47-M**

Adaptor, UMC Male to BNC Male.

**PRODUCT NAME: P48**

Probe Adapter BNC - Pin Jack.

**PRODUCT NAME: P49-14**

Probe Coaxial Cable, UMC to BNC, 14”

**PRODUCT NAME: P49-30**

Probe Coaxial Cable, UNC to BNC, 30”.

**PRODUCT NAME: P51-30**

Cable, SMA-BNC, 30”.

**PRODUCT NAME: 101**

Adapter, Male Triax/BNC Jack, Guard to Shield.

**PRODUCT NAME: 102**

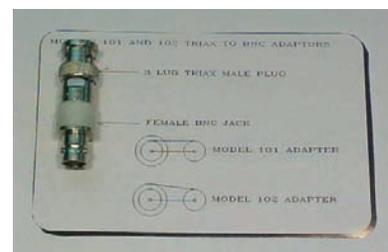
Adapter, Male Triax/BNC Jack, Shield to Shield.

**PRODUCT NAME: 201**

Adapter, Triax Jack/Male BNC, Guard to Shield.

**PRODUCT NAME: 202**

Adapter, Triax Jack/Male BNC, Shield to Shield.



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## CABLE ACCESSORIES

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**PRODUCT NAME: A1003511**

Adapter, Male Triax 3 Lug to Female Triax 2 Lug.

**PRODUCT NAME: A1003512**

Adapter, Female BMC/Male Triax/BNC/3 Lug, Isolated Ground.

**PRODUCT NAME: A1003515**

Adapter, Male Tri/BNC Jack, 3 Lug, Shields Shunted.

**PRODUCT NAME: A1003516**

Feedthrough, Female to Female Triax, 3 Lug, Bulkhead.

**PRODUCT NAME: TRI-CAB-1**

Tribo-Electric Cable, Triaxial, 1 meter long.

**PRODUCT NAME: TRI-CAB-2**

Tribo-Electric Cable, Triaxial, 2 meters long.

**PRODUCT NAME: TRI-CAB-3**

Tribo-Electric Cable, Triaxial, 3 meters long.

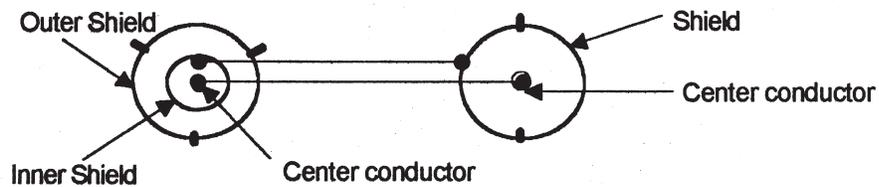


## TRIAX TO BNC ADAPTER GUIDE

The following illustrates the connection scheme for the TRIAX to BNC adapters currently available. Notice how the shielding connections are handled for each part number defined.

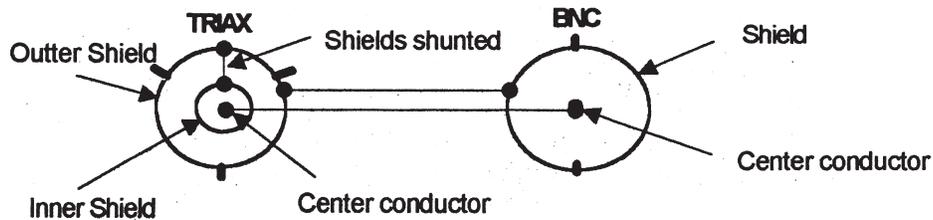
### A1003512

*Isolated ground with Triax inner shield tied to BNC shield*



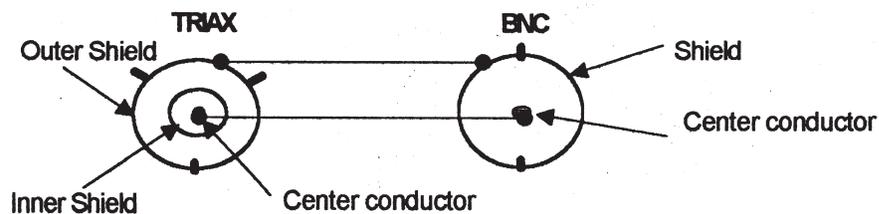
### A1003515

*Triax shields shunted and tied to BNC shield*



### A1008551

*Triax inner shield floating and Triax outer shield tied to BNC shield*



## VIBRATION TABLE ACCESSORIES

### KINETICS VIBRATION ISOLATION TABLES

**PRODUCT NAME: 9101-01-21GRCR4**

30" x 36" VIB-150 table with white plastic top, guard rails, casters.

**PRODUCT NAME: 910121-22-GR2**

30" x 36" VIB-150 table with stainless steel top and guard rails.

**PRODUCT NAME: 83-014-01**

4 casters for 9100 series tables.

**PRODUCT NAME: 96-101-21**

Kinetic Systems 9600 Series LabMate III stainless steel vibration isolation workstation, designed from the ground up to meet full compliance with class one or class ten cleanroom standards.

**PRODUCT NAME: 2001-21-22**

Kinetic Systems Variable Height Vibration Isolation Workstation.



**9101-01-21GRCR4**



**96-101-21**



**2001-21-22**

### TMC VIBRATION TABLES

**PRODUCT NAME: 63-24052-01**

30" x 36" table, TMC 63 series.

**PRODUCT NAME: 63-26102-01**

30" x 48" table, TMC 63 series.

**PRODUCT NAME: 63-24053-02**

30" x 48" table.



## SYSTEM ACCESSORIES

**PRODUCT NAME: 81-312-02**

10" wide Sliding Shelf.

**PRODUCT NAME: 83-014-01**

Retractable casters (Set of 4).

**PRODUCT NAME: 81-301-01**

30" x 35" table with front support rails, cleanroom compatible.

**PRODUCT NAME: 81-302-05**

Rear arm rest support bar for 30" x 35" table.

**PRODUCT NAME: 81-303-01**

Arm rest pads. Not clean room compatible

**PRODUCT NAME: 81-301-02**

Front arm rest bar for 48" tables.

**PRODUCT NAME: 81-301-03**

Front arm rest bar for 60" tables.

**PRODUCT NAME: 81-302-01**

Rear arm rest bar for 36" tables.

**PRODUCT NAME: 81-302-02**

Rear arm rest bar for 48" tables.

**PRODUCT NAME: 81-302-03**

Rear arm rest bar for 60" tables.

**PRODUCT NAME: 83-015-01**

4 casters for 63 series tables.



**81-301-01**

Detail showing padded armrest/  
front support bar



**TMC81-301-01**

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## LASER CUTTER SYSTEMS

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### VARIABLE FREQUENCY

#### **QuikLaze II Model 50 - Includes 50 Hz Variable Frequency from 1Hz to 50Hz Maximum Repetition Rate, fluid cooled with Video Marker**

**PRODUCT NAME: QUICKLAZE II IR**

Laser Machining System, IR single wavelength for US Microscope NIR objectives, 1064 nm, infrared (IR). Requires NIR objectives.

**PRODUCT NAME: QUICKLAZE II GREEN**

Laser Machining System, green single wavelength for US Microscope 532 nm, green. USMCO laser ready microscope.

**PRODUCT NAME: QUICKLAZE II IR-GREEN**

Laser Machining System, dual wavelength 1064 nm and 532 nm, IR/Green. Requires NIR objective for cutting.

**PRODUCT NAME: QUICKLAZE II GREEN/UV3**

Laser Cutter System, dual wavelength 532 nm and 355 nm, Green/UV. Requires NUV objective for cutting.

**PRODUCT NAME: QUICKLAZE II GREEN/UV4**

Laser Cutter System, dual wavelength 532 nm and 266 nm, Green/UV. Requires NUV objective for cutting.

**PRODUCT NAME: QUICKLAZE TRILITE**

Laser Cutter System, triple wavelength 1064 nm, 532 nm and 355 nm, IR/Green/UV. Requires NUV and NIR objectives

**PRODUCT NAME: QUICKLAZE II TRILITE SELECTABLE CUTTING FREQUENCY**

Laser Cutter System, triple wavelength 1064 nm, 532 nm and 355 nm, IR/Green/UV. Requires NUV and NIR objectives for cutting.

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## LASER CUTTER SYSTEMS

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### SINGLE FREQUENCY

#### **EzLaze, Air Cooled Laser Cutter System**

Frequency 1 Hz, continuous repetition rate for 5 cycles, temp shuts down to cool moderately.

#### **PRODUCT NAME: EZLAZE GREEN**

Laser Cutter System, green single wavelength 532 nm, green for USMCO laser ready microscope.

#### **PRODUCT NAME: EZLAZE IR**

Laser Cutter System, IR single wavelength 1064 nm, infrared (IR). Requires NIR objectives for cutting.

#### **PRODUCT NAME: EZLAZE IR/GREEN**

Laser Cutter System, dual wavelength 1064 nm and 532 nm, IR/Green. Requires NIR objectives for cutting.

#### **PRODUCT NAME: EZLAZE GREEN/UV3**

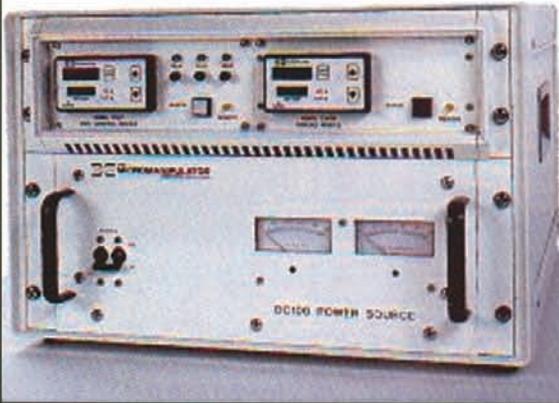
Laser Cutter System, dual wavelength 532 nm and 355 nm, Green/UV. Includes UV tube lens. Requires NIR objectives for cutting.

#### **PRODUCT NAME: EZLAZE GREEN/UV4**

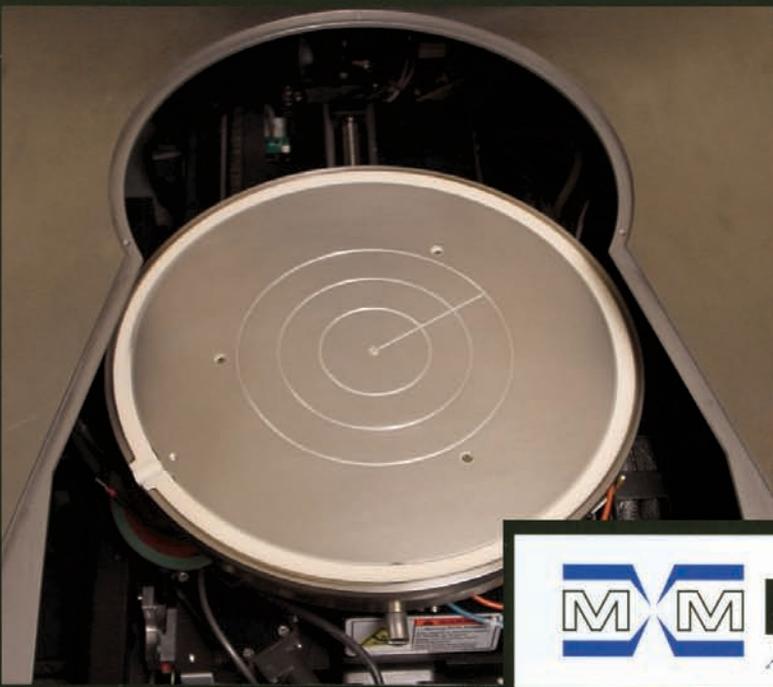
Laser Cutter System, dual wavelength 532 nm and 355 nm, Green/UV. Includes UV tube lens. Requires NIR objectives for cutting.

#### **PRODUCT NAME: EZLAZE TRILITE SELECTABLE CUTTING FREQUENCY**

Laser Cutter System, triple wavelength 1064 nm, 532 nm and 355 nm, IR/Green/UV. Includes UV tube lens. Requires NUV and NIR objectives for cutting.



# H1000 Series High Performance Thermal Chuck System



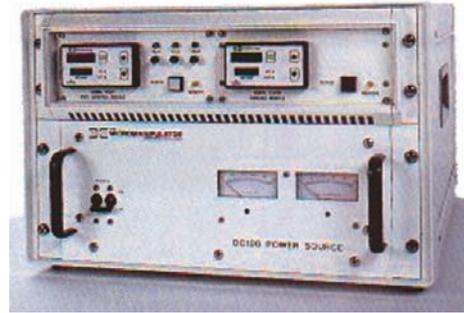
**Micromanipulator**

*Analytical Probing for Professionals*

## The H1000 Thermal System

has been specifically designed for use with probing stations and features

- Super Low Noise Performance
- Low Capacitance
- High Isolation
- Fast Cycling Times
- Superior Temperature Uniformity
- Modular Configurations

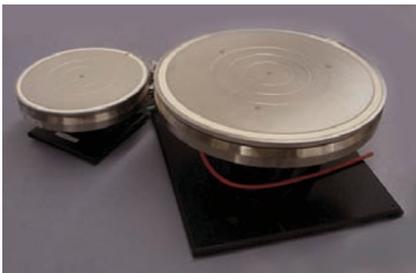


DC controller for superior ramp speed & accuracy.

### Design Concept, a System of Components

The H1000 series of thermal chucks was designed from over 45 years of probing experience. The result is a thermal chuck SYSTEM that integrates into the probing environment to provide not only sample thermal control, but one that maintains the accuracy and functionality of the probing station itself. This approach is evident in features such as:

- **External Cooling Shield.** Presents a cool surface around and under the chuck to minimize personnel burns and prevent transfer of the chuck heat to the probe station stage drive thus maintaining positioning accuracy, repeatability and enhancing the reality of the stage drive itself in both manual and programmable systems.
- **Plumbing Service Module.** External to the thermal chuck controller, this module routes the flow of coolant outside of the main controller rack removing the danger of coolant leaks on sensitive equipment in a rack mounted controller.
- **Quick Disconnects.** Hoses carrying cooling fluid feature self sealing quick disconnects to prevent fluid leakage and its associated inconvenience when disconnecting the chuck.
- **Kinematic Mounting** which places the hot chuck thermal surface on a dynamic mount that actually minimizes vertical expansion into the probes or probe card.
- **Cast-in Heating and Cooling Elements** provide for rapid temperature cycling as well as the best temperature uniformity in the industry.



152mm to 300mm Thermal Chucks to the system.

### Patented High Performance Chucks

The Micromanipulator's low leakage (triaxial) chucks feature a patented surface/guard design. With this unique design, the electrical "guard" of the chuck surface is integrated into the surface itself. There are no multiple layers to cause thermal conductivity and internally generated noise; no separate, raised guard to make loading a wafer more difficult; but most importantly, this "break through" design gives the lowest leakage and noise levels of any chuck in the industry while actually reducing chuck capacitance!

300mm Thermal Chucks are available in Coaxial or Triaxial Chucks. Triaxial Chucks feature our patented guarded surface.

### Configurations to Match Your Application

Configure the thermal chuck system to fit your needs including choices of:

- Hot only
- Hot and Cold
- DC driven (low noise)
- AC driven (economical)
- Coaxial chucks (4", 6", 8", 12")
- Triaxial chucks (4", 6", 8", 12")



## Product Configurator

Configure your H1000 series thermal chuck system from the following choices:



*AC controller is designed to minimize noise spikes, shown with Thermal Chuck.*

### 1. Start with a Heating Controller and Power Supply type

*For 8000, 6000, and 4000 Series (200mm) Test Stations, 400° C temperature controllers*

H1000-DC1-V1 (V2)

DC - PID power supply

*Note: V2 = 208 minimum, 230 maximum*

H1000-AC1-V1 (V2)

AC (zero crossing or burst firing) PID power supply

*For 9000 Series (300mm) Test Stations, 300° C temperature controllers*

H1000-DC-V1-12 (V2)

DC - PID power supply

*Note: V2 = 208 minimum, 230 maximum*

H1000-AC-V1-12 (V2)

AC (zero crossing or burst firing) PID power supply

### 2. Choose a Computer Interface

The native RS-422 interface to both the heat and cooling modules can be used with either RS-232 or IEEE-488 interfaces (not required for manual operation).

H1000-RS-232

H1000-RS-422

H1000-IEEE

### 3. Choose a Cooling Option

(options include SRV1 service module)

*Cooling option is required to protect chuck mounting components and maintain warranty.*

**C1000-V0-H**

Ambient to 400° C

(water supply and drain must be user supplied)

**C1000-V1(V2)-HE**

Ambient to 400° C

(includes self-contained heat exchanger)

**C1000-V1(V2)-C-0**

0° C to 400° C

(includes refrigeration system)

For 300mm stations add "-12" to part numbers listed above.

*Note: For cooling to -65° C, see integrated -65° C to + 400° C system on page 8.*

### 4. Choose a Chuck Configuration

**CHK6000-6C** (or 4C)

4" or 6" coaxial chuck for 6000 series stations

**CHK6000-6A** (or 4A)

4" or 6" triaxial chuck for 6000 series stations

**CHK8800-8C** (or 4C or 6C)

4", 6" or 8" coaxial chuck

**CHK8800-8A** (or 4A or 6A)

4", 6" or 8" triaxial chuck

**CHK9000-12C**

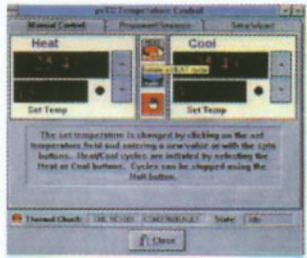
12" coaxial chuck

**CHK9000-12A**

12" triaxial chuck

## pcTC™ Thermal Chuck Control Software

Micromanipulator's pcTC™ Thermal Chuck Control program is a Microsoft Windows™ based, user friendly, graphically based interface program which will allow the control of a variety of thermal chuck systems including those produced by Micromanipulator. The program features common function icons and set point adjust windows for easy set up of heat, soak and cool programs as well as event notification to other concurrently running programs.



Manual Set Up screen.

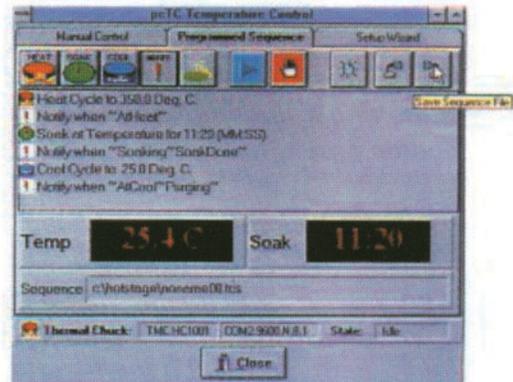
### Manual Set Up

Manual Set Up mode allows easy control of temperature set points in heat or cool modes. Dial in the temperature desired, then activate the heat or cool cycle. Cycles may be stopped at any time.

### Programming a Sequence

Programming a sequence is as easy as selecting the function icon, setting the parameters and clicking OK.

Heat, Soak and Cool events may be programmed with external program event notification. Sequence files may be saved and recalled for later use.



Programming a sequence is easy with function icons.



Notification dialogue box makes interfacing easy.

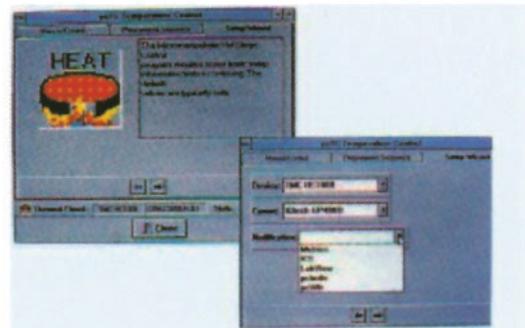
### Notification

Notifications to other programs is easy using either common event notification check boxes or the flexible script editor.

Notification may be made via DDE, RS-232 or IEEE-488 (requires National Instruments GPIB Interface in pcTC computer for IEEE-488 operation).

### Set Up Wizard

pcTC also provides a Set Up Wizard for configuring your system. Select the device (Thermal Chuck type, Micromanipulator or other manufacturer) to be controlled, the communications interface to be used, or Windows programs to be notified from the easy wizard-led routine.



Controlling the device and communications interfaces are easy to set up with the wizard-led routine.

## The H1000 Controllers

All H1000 controllers feature *Proportional, Integral, Derivative (PID)* control. This method of control has three operational modes operating in conjunction with each other to provide optimum performance in dampening of system response (**P**), correction for droop between set point and actual process temperature (**I**), and anticipation of set point approach to minimize over and under shoot (**D**). The PID algorithms have been tuned to provide maximum efficiency, cycle speed and control accuracy over the thermal chuck system range of temperature.



### Heating Systems:

The **H1000-DC\*** Controller features a LINEAR DC power system. PID control maximizes ramp speed and accuracy while the DC operation coupled with the high electrical isolation of a H1000 series hot chuck provides a thermal chuck system with noise levels as low as 1 fA in the guarded, triaxial mode.

### The H1000-AC\*

Controller features a PID drive which uses AC power (sine wave). The AC power is applied at the “Zero Crossing” point to minimize noise spikes due to abrupt changes in the drive signal. The result is a very electrically quiet and efficient drive signal to the chuck. For applications where the chuck may be grounded, the AC drive is electrically quiet enough for the most demanding applications.

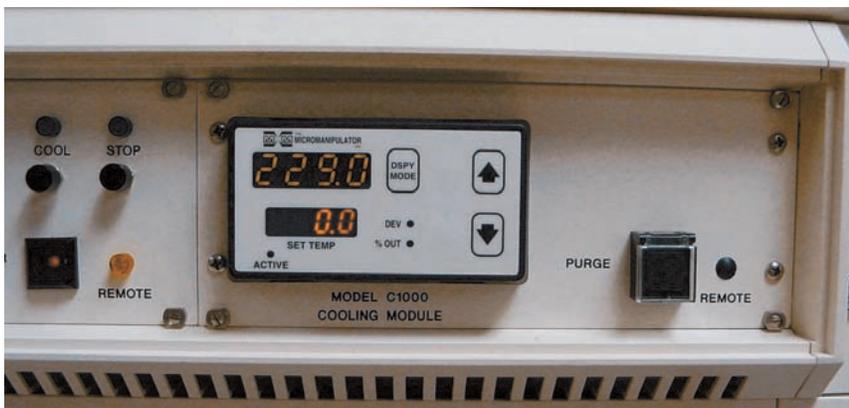
### Isolation Relays

Both H1000 controllers feature Isolation Relays. The Isolation Relays in the H1000-AC ensure that all AC voltage is removed when the controller is not in heat mode.

### Cooling Modules:

The **C1000-H\*** and **C1000-HE\*** cooling options provide fast cool down of the thermal chuck. Temperature control is provided by the heat controller when in heat mode. The **C1000-C-0\*** provides fast cool down of the thermal chuck as well as temperature control to 0°C.

Cooling modules receive power from the H1000 heat modules and operate in conjunction with those controllers to provide operation over the full system temperature range. Automatic purging after cool down is provided with the ambient cooling options. The zero degree cooling option provides automatic purging when the chuck temperature rises 1.5° C above the cool set point temperature. Manual purging is available with all cooling options.



\* See page 3 for part numbers

## Controller Safety Features

All H1000 controllers feature state-of-the-art safety features including:

- Over-temperature protection.
- Thermocouple failure runaway protection, including a secondary controller with its own temperature sensor.
- In addition, a service module and self-sealing quick hose disconnects are provided with cooling modules for routing and control of coolant remotely from controller system minimizing the chance of fluid leakage into the system electronics.

## Controller Specifications

### Heating Controllers

Function	H1000-DC*	H1000-AC*
Control Method	PID, DC Power	PID, Zero Crossing, AC Power
Temperature Range	Ambient to 400°**	Ambient to 400°**
Temperature Resolution	0.1° C	0.1° C
Temperature Stability	0.1° C	0.1° C
Over-temperature Protection	Max +25° C	Max +25° C
Status Indicators	Heating	Heating
Fault	Fault	
% Deviation	% Deviation	
% Power Applied	% Power Applied	
Computer Control (Optional)	RS-232, RS-422, IEEE-488	RS-232, RS-422, IEEE-488
Operational Modes	Manual or Computer Control	Manual or Computer Control

For more information, see Heat Controller specification sheet A1011205.

### Cooling Modules

Function	C1000-H*	C1000-HE*	C1000-C-0*
Control Method	On/Off	On/Off	PID
Cooling Medium	Water <sup>(1)</sup>	Glycol/Water <sup>(2)</sup>	Glycol/Water <sup>(4)</sup>
Temperature Range	Ambient to +400° C	Ambient to +400° C	0° C to +400° C
Temperature Resolution	1.0° C <sup>(3)</sup>	1.0° C <sup>(3)</sup>	0.1° C <sup>(3)</sup>

- Notes:
- (1) Source must be supplied by user (not self-contained).
  - (2) Self-contained heat exchanger has a 2.5 gallon reservoir.
  - (3) Temperature control above ambient performed by heat controller with 0.1° C resolution.
  - (4) Chiller has 2 liter reservoir.

\* See page 3 for part numbers

\*\* 12" (300mm) systems to 300°

## H1000 System Cooling Options



### **C1000-V0-H**

The C1000-V0-H cooling option is a economical way to quickly cool the thermal chuck using water supplied by the user. Cooling water is automatically purged after the cooling set point temperature is reached.

The Service Module (shown right) is designed to be located external to the electronic control equipment to eliminate the danger of fluid leaks causing equipment damage. For more information, see C1000-V0-H Cooling Option specification sheet A1011206.

### **C1000-HE**

The C1000-HE is operationally equivalent to the C1000-V0-H cooling option. The heat exchanger (shown left) however, is fully self-contained and eliminates the need for the user to supply cold water and drain to cool the thermal chuck. The heat exchanger incorporates all functions of the Service Module and can be used as a direct replacement for the Service Module in upgrade applications. For more information, see C1000-HE Cooling Option specification sheet A1011207.



### **C1000-C-0**

The zero degree cooling option provides chuck cooling capability down to zero degrees Celsius. The zero degree chiller (shown left) is used in conjunction with the Cooling Control Module and Service Module (shown above, top left) to control the thermal chuck temperature. The fluid from the chiller is used to cool the external cooling shield and thus also permits stable temperature control with the heat module at temperatures from near ambient to zero degrees Celsius. For more information, see C1000-C-0 Cooling Option specification sheet A1011208.

## HC1000 -65° Temperature Control System

The HC1000 System (shown right) is an integrated temperature control product which has the capability of controlling the temperature of the thermal chuck through the range of -65° C to +400° C\*. The HC1000 system incorporates the same heating technology that is used in H1000 System and is available in either AC and DC configurations. A two-stage refrigeration system is used to provide a source of cooling fluid to control the thermal chuck temperature to -65° C\*. For more information, see HC1000 System specification sheet A1011209.



\*300mm = -65° to 300° C standard.

<b>Control Method</b>	<b>PID</b>
Cooling Media	Galden type fluid or Methanol for thermal chucks (1.32 gallons). Glycol/water mixture for cooling shield (2.5 gallons).
Temperature Range	-65° C to +400° C up to 8" (200mm) chucks -65° C to +300° C for 12" (300mm) chucks
Temperature Resolution	0.1° C

## Dryer System



### Gas Drying System

Dryer System for 8800-TEMPSEAL and 8800-DRYSHIELD

- Dryer system for supplying clean, dry air to 8800-TEMPSEAL, 8800-DRYSHIELD or other closed systems.
- Compressed air input must be maintained from 80-100 PSIG (551K to 689K pascal) at up to 15 SCFM (7.08 l/sec).
- Regulated flow output adjustable from 1-14 SCFM.
- 0.3 micron particle filter at output to protect probe station and device under test (DUT).
- Filtering system traps liquids at air input.
- Output air dew point to -73° C at 100 PSIG input.



1555 Forrest Way Tel: 775-882-2400  
 Carson City, NV 89706 Tel: 800-654-5659  
 info@micromanipulator.com Fax: 775-882-7694  
 www.micromanipulator.com Made in the USA

**H1000 Series  
Thermal Chuck System  
HC1000 -65 to +400 Degree C Controller**

# **S**pecifications

The HC1000 Temperature Control System is an integrated system which incorporates either an AC or DC Heat Controller which provides precise control for temperatures from ambient to +400° C. The system also incorporates an Ultra Low Temperature Chiller to control the temperature of the chuck from ambient to -65° C.

### **Features and Benefits**

- The HC1000 Temperature Control system provides temperature control over the entire range of -65° C to +400° C.
  - Both heating and cooling controllers employ *Proportional, Integral, Derivative (PID)* control which has been optimized to provide precise temperature control.
  - The Ultra Low Temperature Chiller uses a two stage refrigeration system providing the capability to maintain a reservoir of cooling fluid at -80° C to ensure rapid cooling of the chuck to -65° C.
  - The HC1000 is available with either an AC or DC power option for heating the thermal chuck.
  - The AC Heat Controller commands power with a zero-crossing detector in conjunction with burst firing to virtually eliminate 60Hz harmonic noise while accurately controlling power output to the thermal chuck.
  - The DC Heat Controller includes a linear DC power supply capable of more than 1000W with less than 25mV ripple at 100 volts output.
  - Internal safety circuitry in both the AC and DC heat controllers provides for over and under-temperature protection.
  - The HC1000 includes a separate cooling system providing fluid to the H1000 thermal chuck safety cooling shield.
  - The HC1000 system is compatible with all H1000 Thermal Chuck system configurations
- The HC1000 system includes a built-in RS-422 interface. RS-232 and IEEE-488 interfaces are available options.
  - Optional temperature control software enables programmable sequencing of heat, cool, and soak cycles.
  - The AC and DC Heat Controllers allow entry of up to 10 temperature calibration data offsets to cause the H1000 display to match the measured temperature of the chuck surface.

## **Specifications**

### **Performance**

*Temperature control:* PID

*Typical ramp rates:* <sup>[1]</sup>

*6" coaxial chuck*

-65° C to +400° C: 32 min

+400° C to -65° C: 44 min

*8" coaxial chuck*

-65° C to +400° C: 45 min

+400° C to -65° C: 56 min

*Stability (Resolution of 0.1° C):*

±0.3° C at temperatures above 50° C

±1.0° C at temperatures within 0.5° C of ambient or below ambient

### **Physical data:**

*HC1000 Systems*

31.5" wide x 48" high x 27" deep

AC Version - 505 lbs.

DC Version - 585 lbs.

*Hoses/Cables:* 6 feet long

<sup>[1]</sup> to within 0.5° C of setpoint



# *Probe Manipulators*

 **Probing Solutions Inc.**

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## MANIPULATORS

### PRODUCT NAME: P110/360VM, RIGHT HAND

For probing 10 micron geometries, .4" (10.0mm) maximum travel per axis, 32 TPI lead screw, mini-arc manipulator, standard vacuum base for use with PSI 400 and 410 stations.

### PRODUCT NAME: P210/360VM, LEFT HAND

For probing 10 micron geometries, 0.4" (10.0mm) maximum travel per axis, 32 TPI lead screw, mini-arc manipulator, standard vacuum base for use with PSI 400 and 410 stations.



**P210/360VM  
LEFT HAND**

### PRODUCT NAME: P110/360MT, RIGHT HAND

For probing 10 micron geometries, 0.4" (10.0mm) maximum travel per axis, 32 TPI lead screw, mini-arc manipulator, magnetic base for use with PSI 400 and 410 stations.

### PRODUCT NAME: P210/360MT, LEFT HAND

For probing 10 micron geometries, 0.4" (10.0mm) maximum travel per axis, 32 TPI lead screw, mini-arc manipulator, magnetic base for use with PSI 400 and 410 stations.

### PRODUCT NAME: P110/360MT, RIGHT HAND

For probing 10 micron geometries, 0.4" (10.0mm) maximum travel per axis, 32 TPI lead screw, mini-arc manipulator, magnetic base for use with PSI 400 and 410 stations.

### PRODUCT NAME: P350/660VM90, RIGHT HAND

For probing 2-6 micron geometries, 0.25" (6.4mm) maximum travel per axis, 50 TPI, 90 degree mount with vacuum base.



**250/660VM  
MANIPULATOR  
LEFT HAND  
50 TPI**

### PRODUCT NAME: P250/660VM90, LEFT HAND

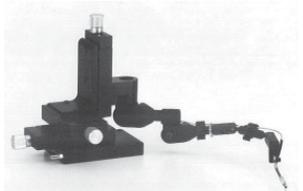
For probing 2-6 micron geometries, 0.25" (6.4mm) maximum travel per axis, 50 TPI, 90 degree mount with vacuum base.

### PRODUCT NAME: P350/660MT90, RIGHT HAND

For probing 2-6 micron geometries, 0.25" (6.4mm) maximum travel per axis, 50 TPI, 90 degree mount with magnetic base.

### PRODUCT NAME: P35, RIGHT HAND

Right Hand Articulating Arm, 24 TPI (threads per inch), for probing non linear axis 5-10 micron geometries vacuum base.



**P45 ARTICULAT-  
ING ARM  
LEFT HAND  
MANIPULATOR  
24 TPI**

### PRODUCT NAME: P45, LEFT HAND

Left Hand Articulating Arm, 24 TPI (threads per inch), for probing non linear axis 5-10 micron geometries vacuum base.

## MANIPULATORS

**PRODUCT NAME: P550/660VM90, RIGHT HAND VACUUM MOUNT**

For probing 1 micron geometries, 0.25" (6.4mm) maximum travel per axis, 100 TP, 90 degree vacuum mount.

**PRODUCT NAME: P350/660MT90, LEFT HAND VACUUM MOUNT**

For probing 2-6 micron geometries, 0.25" (6.4mm) maximum travel per axis, 50 TPI, 90 degree vacuum mount.

**PRODUCT NAME: P450/660VM90, LEFT HAND VACUUM MOUNT**

For probing 1 micron geometries, 0.25" (6.4mm) maximum travel per axis, 100 TPI, 90 degree vacuum mount.

**PRODUCT NAME: P550/660MT90, RIGHT HAND MAGNETIC MOUNT**

For probing 1 micron geometries, 0.25" (6.4mm) maximum travel per axis, 100 TPI.

**PRODUCT NAME: P450/660MT90, LEFT HAND MAGNETIC MOUNT**

For probing 1 micron geometries, 0.25" (6.4mm) maximum travel per axis, 100 TPI.

**PRODUCT NAME: P2550/660VM90, HIGH RESOLUTION RIGHT HAND VACUUM MOUNT**

For probing sub-micron geometries, 0.25" (6.4mm) maximum travel per axis, 200 TPI, 90 degree mount, mini-arc manipulator.

**PRODUCT NAME: P2450/560VM90, HIGH RESOLUTION LEFT HAND VACUUM MOUNT**

For probing sub-micron geometries, 0.25" (6.4mm) maximum travel per axis, 200 TPI, 90 degree mount, mini-arc manipulator.

**PRODUCT NAME: P2550/560MT90, HIGH RESOLUTION RIGHT HAND VACUUM MOUNT**

For probing sub-micron geometries, 0.25" (6.4mm) maximum travel per axis, 200 TPI, 90 degree mount, mini-arc manipulator.

**PRODUCT NAME: P2450/560MT90, HIGH RESOLUTION LEFT HAND VACUUM MOUNT**

For probing sub-micron geometries, 0.25" (6.4mm) maximum travel per axis, 200 TPI, 90 degree mount, mini-arc manipulator.

**PRODUCT NAME: P400-VM, CLOSE POSITIONING, BACK SIDE CONTROLS, VACUUM BASE**

For probing 1 micron geometries, 0.5" (12.7mm) travel per axis, 100 TPI, standard base for use with PSI 400/410 stations and S500, universal left or right side of platen, features fast Z lift. Nose piece.



**450/660VM 90  
MANIPULATOR  
LEFT HAND  
100 TPI**



**P400-VM**

## MANIPULATORS

### PRODUCT NAME: P400-MT

For probing 1 micron geometries, 0.5" (12.7mm) travel per axis, 100 TPI, standard base for use with PSI 400 and 410 stations, either left or right side of station, features fast Z lift. Magnetic.

### PRODUCT NAME: P2525M-VM

For probing sub-micron geometries, 0.5" (12.7mm) travel per axis, 200 TPI, standard base for use with PSI 400 and 410 stations, either left or right side of station, features fast Z lift. Vacuum.



**P2525M-VM**

### PRODUCT NAME: P2525M-MT

For probing 1 micron geometries, 0.5" (12.7mm) travel per axis, 100 TPI, standard base for use with PSI 400 and 410 stations, either left or right side of station, features fast Z lift. Magnetic.

### PRODUCT NAME: P35-VM

Manipulator with Articulating Arm assembly, Oscilloscope probe holder kit, 3-axis, 24 TPI, 2.9 micron per degree sensitivity, nose adapter and 1" collet shaft, right vacuum.

### PRODUCT NAME: P45-VM

Manipulator with Articulating Arm assembly, Oscilloscope probe holder kit, 3-axis, 24 TPI, 2.9 micron per degree sensitivity, nose adapter and 1" collet shaft, left vacuum.

### PRODUCT NAME: P35-MT

Manipulator with Articulating Arm assembly, Oscilloscope probe holder kit, 3-axis, 24 TPI, 2.9 micron per degree sensitivity, nose adapter and 1" collet shaft, right hand with magnetic base.



**P35/45**

### PRODUCT NAME: P45-MT

Manipulator with Articulating Arm assembly, Oscilloscope probe holder kit, 3-axis, 24 TPI, 2.9 micron per degree sensitivity, nose adapter and 1" collet shaft, left magnetic.

### PRODUCT NAME: PWAVE-200

RF/Microwave Base manipulator, 40 TPI, 1/2" (12.7mm) standard base for use with PSI 400 or 410, right hand vacuum.

### PRODUCT NAME: PWAVE-100

RF/Microwave Base manipulator, 40 TPI, 1/2" (12.7mm) standard base for use with PSI 400 or 410, left hand vacuum.



**PWAVE 1 & 2**

## MANIPULATOR ACCESSORIES

**PRODUCT NAME: PLF-400/PWAVE ARM-ANGLE APPROACH**

Adapter Link for 400 Series stations, required for P-Wave 100 and P-Wave 200 manipulators, right-angle. Probing to target.



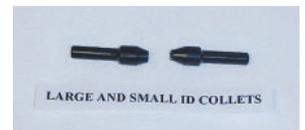
**PLS/PLF 400**

**PRODUCT NAME: PLS-400/PWAVE ARM-STRAIGHT APPROACH**

Adapter Link for 400 Series stations, required for P-Wave 100 and P-Wave 200 manipulators, straight-angle. Probing to target.

**PRODUCT NAME: PORM-6**

Kit of O-Rings for 360 VM vacuum bases.



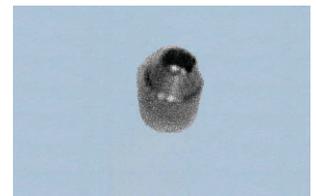
**P2/P5**

**PRODUCT NAME: P1**

1" Collet Shaft.

**PRODUCT NAME: P2**

Collet, replacement delrin, 0.040" (1mm) hole.



**COLLET CLOSURE**

**PRODUCT NAME: P3**

3" Collet Shaft.

**PRODUCT NAME: P5**

Collet, replacement delrin, 0.120" (3mm) hole.

**PRODUCT NAME: P6**

6" Collet Shaft.



**P1/P3/P6**

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## MANIPULATOR ACCESSORIES

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**PRODUCT NAME: PWAVE200-5AR-VM, MANIPULATOR RIGHT HAND**

1/2" Travel, 40 TPI, Vacuum Base Manipulator, left handed with articulating arms. Accommodating a 10" reach and 5 axis articulation. Used on all horizontal and vertical applications.



**PRODUCT NAME: PWAVE100-5AR-VM MANIPULATOR LEFT HAND**

1/2" Travel, 40 TPI, Vacuum Base Manipulator, left handed with articulating arms. Accommodating a 10" reach and 5 axis articulation. Used on all horizontal and vertical applications.



*Probe Tips  
and  
Probe Holders  
Reference Manual*

 **Probing Solutions Inc.**

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# Elements of a Probe

## 1 Manipulator

Stabilized by either a vacuum base or a magnetic base, the manipulator sits on the probe station platen and supports the probe holder; available in manual, motorized or programmable versions. Guaranteed for 5-years, our manipulators are a proven solution!

## 2 Collet and Collet Shaft

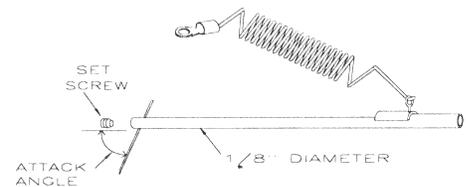
The black plastic collet allows different probe holder shank widths to be attached firmly to the manipulator. Collet shafts are included with the manipulator, applicable collets are included with the probe holder.

## 3 Probe Holder

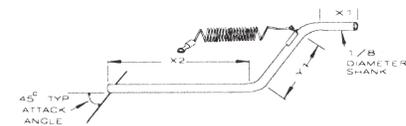
A metal shaft, either straight or bent, holds the probe tip on one end and is held by the manipulator collet shaft on the other. Most probe holders secure the probe tip with either a *pin jack* or *set screw* probe mount. Some probe holders feature a *shaft lock* that secures the probe tip by sliding the closure handle toward the probe point. Depending upon the test requirements, single wire, coaxial, triaxial, certified triax or Kelvin configurations are available.

## 4 Probe Tip

The Probe Tip (or needle) is the part of the unit that actually touches the device under test (DUT). Some probe holders have built-in tips, others use changeable or disposable tips. Many standard configurations are available and special tips may be made for a nominal setup charge (ask for our *Custom Probe Request Chart*, A1009253).



**Set Screw; Straight (X1 dimension) Probe Holder**



**Pin Jack Closure; Bent Probe**

# Commonly Asked Questions

**Q** *I'd like to order another prober holder to match the one in the lab. I think I have a Model 79 probe holder but the illustration shows a straight shank, the one I have is bent. What should I order?*

**A** Probing Solutions, Inc. offers both straight and bent style probe holders. If the chuck on your probe station is even with the platen, order the probe holder with a suffix '100.' On the other hand, if your probe station's chuck is below the platen surface, order the probe holder with an '400' suffix. Contact your local technical representative or the factory for complete part numbers.

**Q** *I prefer a probe holder with the probe tip built-in. Is this style available?*

**A** Yes! While disposable point probes remain very popular because probe tips (or needles) can be quickly replaced (there is no 'down time' due to re-sharpening), many prefer or require the probe holder and tip in a single unit. This style is ideal for high frequency, low level signal testing or cutting. Our Model 44, 0 or 00 are examples of this type of probe.

**Q** *I have a complicated arrangement on my test station. I need uniquely shaped probe holders. The standard probe holders you offer won't work, what other options do you offer?*

**A** Choose your solution! Probing Solutions, Inc. Company offers malleable (bendable) probe holders like our Model 72s that can be shaped and reshaped as desired. If a more exact configuration is required, custom designed probe holders are available. Request a "Custom Probe Holder Request Chart" form.

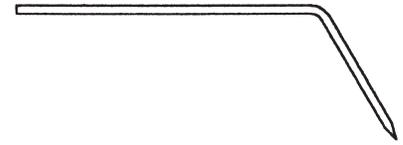
**Q** *Are the model numbers listed in this catalog complete part numbers? How do I place an order?*

**A** Complete part numbers are not listed. There are too many configuration options to detail here. Please contact your local representative or the factory direct at 775-246-0999, for information and to place your order.

# Probe Holders

## Model 0 and 00

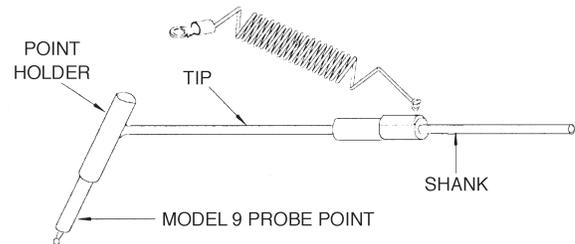
Designed for cutting and other heavy duty applications, the 0 and 00 probe holders are fixed point construction. Unlike our probe holders with replaceable points, these fixed point probes must be returned to be re-sharpened or entirely replaced once the point is damaged. Call the factory for more information.



Model 0

## Model 11 probe holder, Model 9 and 13 tips

Designed for hybrid and thin film devices, the Model 11 probe holder accepts only the large radius gold and platinum ball points like the Model 9 or 13. The shank is .040 inch diameter and is approximately 5/8 inch in length. The tip is .040 inch diameter and can be obtained in various lengths (standard length is 3/8 inch). The point holder is made of a stainless steel tube which is split to provide spring action for point gripping which accommodate two probe points. The Model 9 probe point consists of a gold plated brass shank .060 inch in diameter and 3/4 inch long, for use with either a gold or platinum ball point (choose 5, 10 or 15 mil radius). The Model 13 probe tip is a one-piece polished steel point, approximately 3/4 of an inch in length with a 2.5 mil radius point.

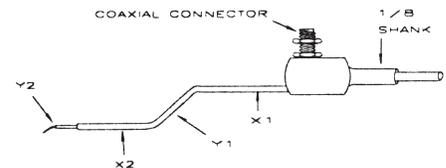


Model 11

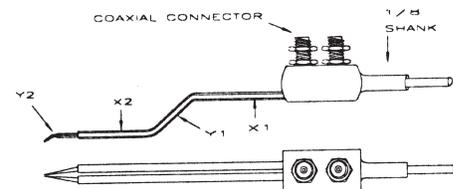
## Model 44

Engineered for high frequency or low level signal testing, the Model 44 is precise enough to use when testing large scale integrated circuits. Gold-plated brass body, the coaxial probe point and inner conductor are made of pure tungsten. The dielectric is Teflon with an outside sheath of copper. Electrical connection is made through an ultraminiature 50 ohm coaxial connector on top of the body. A small access hole is provided in the bottom of the body for connecting a small chip resistor which may be installed in series or parallel, attenuating or terminating. A typical application is a 50 ohm terminating resistor and most common resistance values are available, but consult the factory before ordering. The Model 44 probe, coaxial receptacle, connectors, coaxial cable and BNC adapter have a characteristic impedance of 50 ohms. The isolation resistance is greater than 10,000 megohms @ 500 VDC. Frequency response 3 GHz. Capacitance is 2.5pf per inch with a normal capacitance range for probes of 3 to 6pf. Check with the factory regarding the refurbishing program for your existing Model 44s. Order cables separately. The following configurations are available:

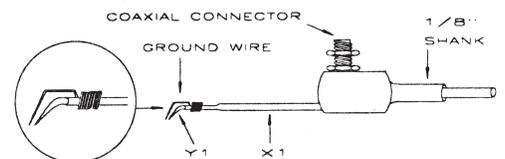
- Model 44 probe with resistor standard UMC DC to 1 GHz, 950 ohm series, 50 ohm termination or special
- Model 44-D Kelvin probe
- Model 44-SMA Ultra High Frequency 3 GHz Probe
- Model 44-X-GP Ground Plane tip is an auxiliary point that is attached to the shielding near the point (50 mils standard separation, 100 mils maximum to 10 mils minimum)



Model 44

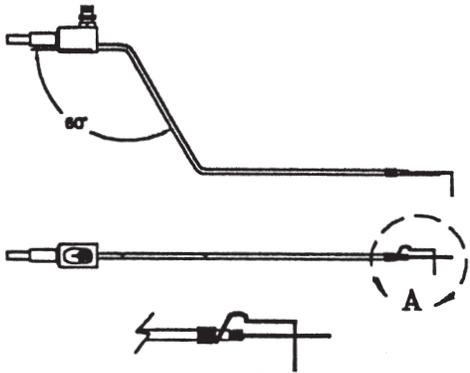


Model 44-D



Model 44-GP

# Probe Holders



Model 44-CS

DETAIL A  
SCALE 2X1

## Model 44-CS contact Sense Probe

This low cost alternative to traditional contact sensing systems compensates for variations in wafer flatness due to temperature and/or repeat touchdowns. Designed to allow automatic Z position compensation with Probing Solutions. The Model 44-CS is most effective when it's positioned close to the active probe. It will not interfere with low noise or low current testing because it does not carry any electrical signals. An individual manipulator, such as a 110/210, is required for this probe holder (this is a separate manipulator/probe holder from the active manipulator/probe holder). Order cables separately.

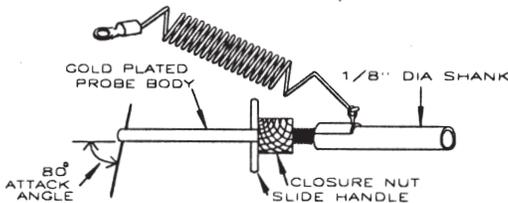
# Special Attack Angle Probe Holders

Most probe holders feature a probe tip attack angle of 45 or 60 degrees, however, the following holders are available with on-axis or 80 degree probe tip attack angles.

## High Attack Angle Probe Holders

### Model 74-80, 75-80 and 79-80

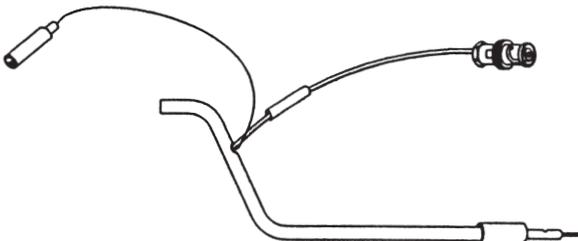
Designed for hot stage probing and other applications where thermal expansion or vibration may make probing difficult. These holders will accept any Model 7 point but are intended to be used with high compliance points such as are the Model 7F, 7F-10, 7F-C10 and 7S. Note, because of the high angle of attack, the probe point must be about 3/8" below the holder to be visible. Therefore compound microscope objectives with a working distance of less than 1/2 inch (12.5 mm) may not be able to be used.



Model 74-80

## On-Axis Probe Holders Model 74-0 and 79-0

Allowing the probe tip to exit the probe holder straight from the end, the on-axis probe holder is ideal for *very low* profile probing. The tip can then be bent to the probing attack angle by hand or pre-bent probe tips (available in 45 or 60 degree attack angles—see page 11) may be used. For hand-bending, malleable probe tips such as the 7A-M, 7F-M or 7X-M are recommended.



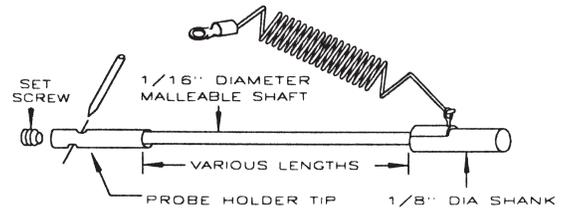
Model 79-0

- The Model 74 probe holder features a straight shaft with a shaft lock for the tip. The probe is locked in place by sliding the closure toward the point.
- The Model 79 probe holders in the on-axis configuration feature a set screw closure. This on-axis configuration is available for all Model 79 holders; coaxial, triaxial, Kelvin and high temperature versions.

# Standard Probe Holders

## Model 72

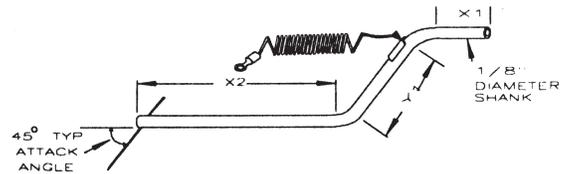
This malleable (bendable) probe holder with a low resistance probe assembly can be formed and reformed to any shape desired. Nominal contact resistance between point and leadwire is .1 to .2 ohms. The probe shaft is available from 1.5" to 4.0" in quarter inch increments. This probe is available with either a pin jack or set screw probe mount. The pin jack version is available at a 45 degree angle only. The Model 72 accepts all series 7 disposable probe tips.



Model 72

## MODEL 75

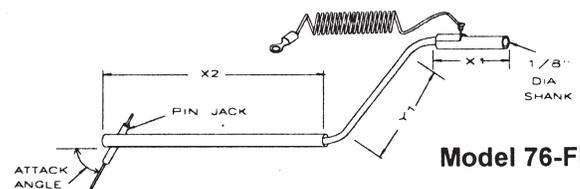
This general purpose probe holder is the "holder of choice" for long reach applications. A 2-56 set screw secures the probe point in gold-plated contacts to provide a low resistance connection (0.1 to 0.2 ohms). This holder is also available with a pin jack probe mount to quickly change probe tips. The Model 75 accepts all series 7 disposable probe tips. Because of this probe holder's strength, it may be used to scribe and cut when used with rugged points such as the Model 7B, 7D or 7G.



Model 75

## Model 76 and 76-FPC

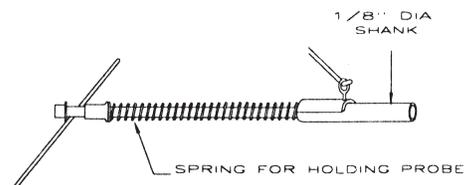
On 6000 series probe stations, the 76-FPC may be used with fixed position probe cards and the 76 is used without. The pin jack probe mount is set at a 45 degree angle to allow for quick point replacement and will accept all Model 7 disposable probe points. Order 75-8000-F-02 .



Model 76-FPC

## Model 77A

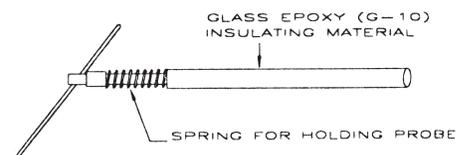
Ideal for general applications, this probe holder is available with 30° or 60° from horizontal probe tip attack angles. Quick probe tip replacement is enhanced by the spring load mechanism in the Model 77A. This holder will accept all Model 7 probe points.



Model 77A

## Model 78

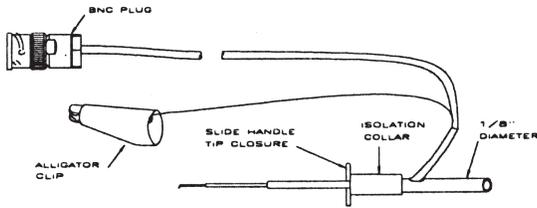
Constructed of glass epoxy (G-10) insulating material to isolate the Model 7 probe point, the point is held in place by a spring and insulating slide ring. For low capacitance and high frequency measurements on 400/500/600 series probe stations, all active probes should be attached directly to the probe point. The probe point shank may be cut to remove any unused portion thereby reducing capacitance. Nominal inherent capacitance of the Model 7 series points is 0.25 pico farad. Recommended probe points are 7A, 7F, 7H and 7X.



Model 78

# Standard Probe Holders

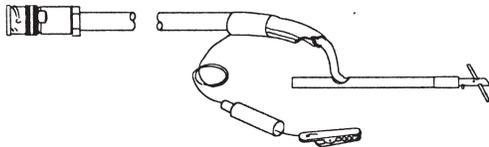
## MODEL 79 COAXIAL PROBE HOLDER



For measurement of high frequency or low level signals, the Model 79 is a coaxially shielded probe holder. The outer conductor of the coax runs down to within 0.2 inch (5mm) of the pin jack which holds the probe point. High frequency signals in excess of 1.36 GHz can be probed.

A connection wire is provided for grounding the outer conductor close to the probe tip. The coaxial cable is 30" in length and terminates in a BNC connector. This is a RG 178B/U 50 ohm cable with a capacitance of 29pf per foot (75pf total) and attenuation of 0.29 db/foot at 400 MHz. Any Model 7 probe points may be used.

## MODEL 79-T TRIAXIAL PROBE HOLDER

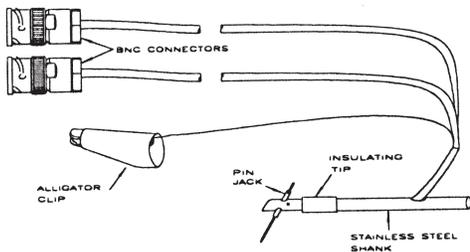


This triaxially shielded probe holder is ideal for low current and low noise testing. The center conductor is connected to the point. The inner shield floats (not connected at the probe end). The outer shield is attached to a 6 inch ground wire at the probe holder for connection at DUT. Isolation is  $>5 \times 10^{12}$  ohms between the center conductor and inner shield. Higher isolation *certified* probes are available to  $>1 \times 10^{14}$  ohms. Between the inner and outer shield is  $>5 \times 10^{12}$  ohms.

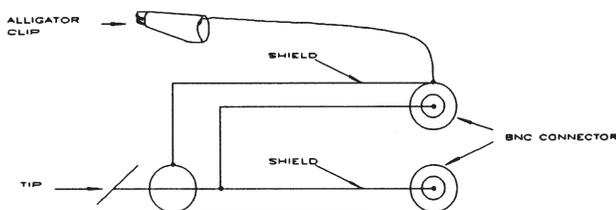
The standard cable length is 30 inches which terminates in a TRB (triaxial bayonet 3 lug) connector. The cable has an impedance of 50 ohms and capacitance of 29.4pf per foot inner and 100pf per foot outer. Choose pin jack or set screw probe mounts, either accept all Model 7 probe points.

Certified versions of the 79-T are available. These probe holders feature  $>10$  Teraohms isolation @ 500 VDC. For certified performance in low current (below 10fA) measurements.

## MODEL 79-D KELVIN PROBE HOLDER



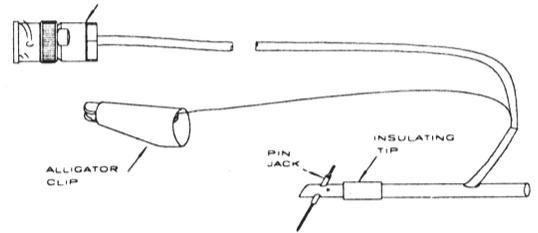
For the benefits of a probe holder with two cable output (Kelvin probe) with the convenience of a single tip, choose the Model 79-D (coaxial) or 79-TD (triaxial). The wiring configuration joins the center conductors of the two cables at the point holder. Kelvin probing, with a single point Model 79 rather than dual points (per probe), eliminates the problem of planarization and contact uniformity. With set screw or pin jack probe mounting, the Model 79-D and 79-TD probe holders will accept all Model 7 probe tips.



# Standard Probe Holders

## Model 79-H

These ceramic insulated probe holders are designed to be used in applications where the probe holder is positioned above a high temperature chuck and sample. The Model 79-Hs are available with coax or triax connections and conform to the same specifications as the regular Model 79 probe holders. The Model 79-H probes provide enhanced low leakage characteristics. Standard isolation characteristics @ 500 VDC is >5 Teraohms. The *certified* versions feature >10 Teraohms isolation @ 500 VDC. The Model 79-Hs are available in all typical configurations including Kelvin and work with standard manipulators and probing systems. Choose between set screw or pin jack probe mounts, either version accepts all Model 7 probe tips.



Model 79-H

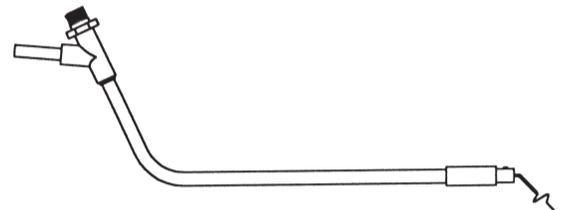
# Triaxial Probe Holders

## Model Triaxial Probe Holder

Featuring an integrated, proprietary triaxial connector and balanced body for superior vibration attenuation, the Model 82 provides not only extremely low leakage and low noise performance, but actually helps stabilize the probe and removes residual vibration. The Model 82 features a full triaxial cable to a disposable probe tip that accommodates all straight or pre-bent 7-series disposable probe tips, or to within 0.25" of an integrated tip. The integrated triaxial connector provides a straight and smooth connection path to the probe cable minimizing the potential for wear induced leakage paths and balancing the body for stability and vibration attenuation.

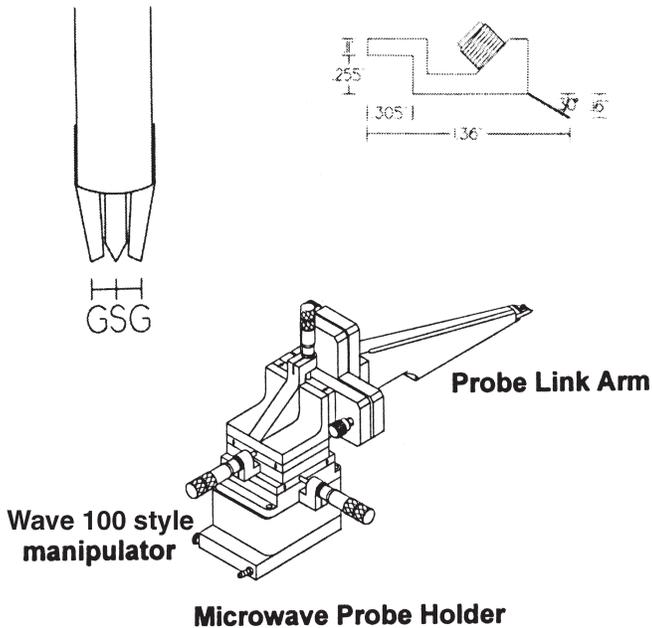
A high temperature, high isolation ceramic insulator at the tip provides low leakage, high isolation performance at temperatures up to 400 degrees C.

See Model 79-T, 79-HT, and 79-TD for other triax options.



Model 82

# Microwave and Active Probes



For high frequency (1-120 GHz), low capacitive loading, or high input impedance probing, Probing Solutions distributes the PicoProbe series of probes. Popular models include.

**Model PP12C**

High input impedance with 0.1pf loading.

**Model PP18B and 19**

High input impedance with 0.02pf capacitive loading.

**Model PP40**

Microwave probe available in multiple ground-single configurations for frequencies to 40 GHz.

**Model PP67**

Microwave probe available in multiple ground-single configurations for frequencies to 67 GHz.

**Model PP120**

Microwave probe available in multiple ground-single configurations for frequencies to 120 GHz.

Microwave probes (PP40, PP67, and PP120) require the wave 100 style manipulator with appropriate probe link arms (PLS or PLF).

See pages 89 and 90 for applications and configurations.

# High Performance Probe Head Holders and Probe Heads

The Model 80 series of coaxial probe holders, together with our coaxial cables, are designed to support the Model 81 probe heads.

With its large, rigid construction, the Model 80 holder is designed to be less susceptible to vibration, attenuating common lab vibration frequencies while maintaining excellent electrical characteristics.

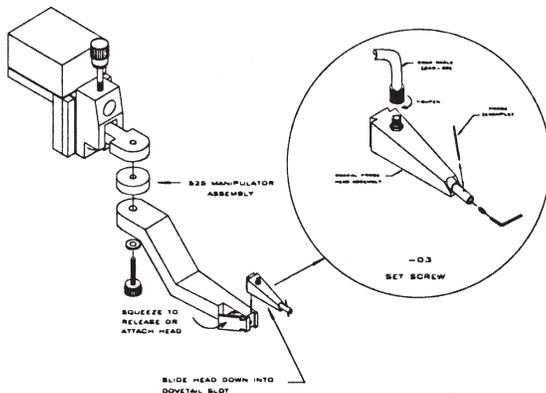
The Model 80 probe head holder is adapted to a Model P400VM or Model 2525VM manipulator.

The Model 80 grips the Model 81 probe head with a spring-lock. The probe head can be replaced without tools, making probe tip changes fast and easy.

**Model 80 Probe Head Holder Part Numbering:**

P400VM-RECT

The Model 81 probe heads are constructed of Teflon and provide for a cable connection directly to the probe tip. The Teflon probe head is available in a straight, 30° left, or a 30° right orientation. The probe tip may be attached to the probe head using a pin jack or a set screw closure.



**Model 80 for Test Station w/ 81 Probe Head**

# High Performance Holders and Probe Heads

## Specifications:

Compatible probe tips for pin jack Model:

- Accepts tips with shank diameters 15 to 30 mils.
- Accepts all Model 7 probe tips (20 mil shank).

Compatible probe tips for set screw Model:

- Accepts tips with shank diameters 15 to 22 mils.
- Accepts all Model 7 probe tips (20 mil shank).

Isolation: >10 teraohms between the center conductor and the shield.

Temperature Range: -65° to + 400°C at DUT.

Frequency Range:

- DC to 1 GHz for UMC connector.
- DC to 2 GHz for SMA connector.

Wiring: The center conductor is connected to the probe tip. The shield floats, not connected.

## Model 81 Probe Head Part Numbering:

Part number consists of type, tip attachment and alignment as follows:

<i>Type</i>	<i>Alignment</i>
XXXX	XX - XXX
<i>Tip Attachment</i>	

<b>Type:</b>	81      Coaxial, single wire, UMC 81D    Coaxial, Kelvin, UMC
<b>Tip Attachment:</b>	81S    Coaxial, single wire, SMA 81SD   Coaxial, Kelvin, SMA
<b>Alignment:</b>	02      Pin Jack 03      Set Screw
<b>Alignment:</b>	S       Straight 30L    30° left handed 30R    30° right handed

## Cables:

- \* For *single wire*, order one cable per probe head.
- \* For *dual (Kelvin)* applications, order two cables per probe head. Kelvin probes feature dual cables with a single tip.

## Coaxial; UMC type:

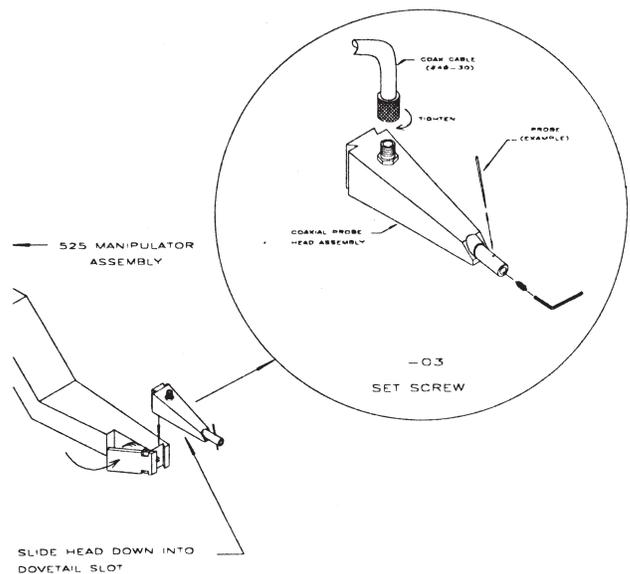
- \* UMC to BNC: 49-14 (14" long) or 49-30 (30" long)
- \* UMC to UMC: 46 (30" long)

## Coaxial; SMA type:

- \* SMA standard to BNC: 51-30 (30" long)
- \* SMA right angle to BNC: 52-30 (30" long)

## Coaxial to Triaxial:

Adapter systems can be ordered which are connected in-line with the UMC coaxial cable. Networks can be ordered with resistors installed and configured as series, voltage dividers, or terminated in parallel.



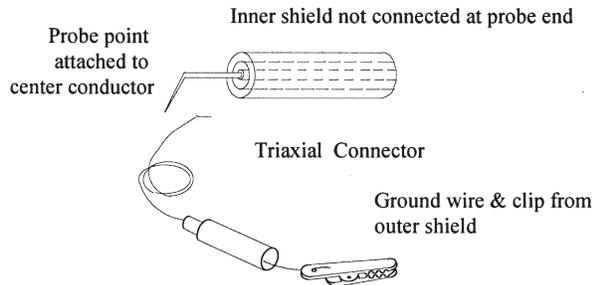
Model 79-Triaxial Probe Holder specifications and dimensions:

Probe Holder	Method of securing probe points	Choice of spring loaded pin jack or set screw.
	Compatible Probe Points: Pin Jack Model	Accepts points with shank diameters 15 to 30 mils. Accepts all model 7 probe points (20 mil shank).
	Compatible Probe Points: Set Screw Model	Accepts probe points with shank diameters 15 to 22 mils. Accepts all model 7 probe points (20 mil shank).
	Isolation	> $5 \times 10^{12}$ ohms between the center conductor and inner shield. Higher isolation "certified" probes available to > $1 \times 10^{14}$ ohms. > $5 \times 10^{12}$ ohms between the inner and outer shields.
	Wiring (see Wiring Detail below)	The center conductor is connected to the point. The inner shield floats, not connected at the probe end. The outer shield is attached at a 6 inch ground wire at the probe holder, for connection at DUT.

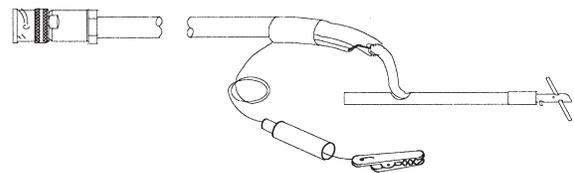
Cable	Length	30 inches standard. Special lengths are available from a few inches to any length required.
	Impedance	50 ohms.
	Capacitance	Per foot: 29.4 pf inner, 100 pf outer.
	Inner conductor material and conductance	Silver plated, copper coated steel. Conductivity is 160 milliohms per foot (4% of copper).
	Dielectric	Teflon to minimize crazing, cracking and hyroscopic effects.
	Shield material and coverage	Tinned copper braid. 95% coverage for inner shield. 91% for outer shield.
	Special features	Low triboelectric effect, low noise. 50 db lower than standard cable.

Connector	TRB	Triaxial bayonet 3 lug.
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**Wiring Detail**



**Triaxial Probe Holder**



# PROBE HOLDER LETTER DESIGNATIONS

Code Format:	_ _ - _ - - - - - - - (1)                    (2)                    (3)                    (4)
(1) Probe Model:	0, 00, 11, 44, 72, 74, 75, 76, 77, 78, 79.
Dimensional configuration. Test Station or use designed for: All Probing Solutions Wafer Probe Stations.	
(2) Point style, connector type, use designation:	<p>V: convex point, straight conical shape, standard for all probes.</p> <p>C: concave point, thin shape, on model 00 only.</p> <p>N: nipple point, diameter reduced to 10 mil tip on model 00 only.</p> <p>R: replaceable point probe holder.</p> <p>S: SMA coaxial connector.</p> <p>D: two point Kelvin probe with two UMC connectors.</p> <p>H: two point Kelvin probe with two SMA connectors.</p> <p>J: single point Kelvin probe with two UMC connectors.</p> <p>F: FPC probing applications.</p> <p>DF: Two point Kelvin probe, UMC, for FPC probing.</p> <p>SF: SMA connector, FPC probing.</p> <p>VF1: FPC probing on 600VM Test Stations with 450/550 manipulators.</p> <p>VR1: regular probing on 6000VM Test Stations with 450/550 manipulators.</p> <p>K: used with R &amp; K probecard.</p> <p>1: dimension change on model 0.</p> <p>0: 0 degree, on-axle probe holder.</p> <p>80: 80 degree probe holder.</p>
(3) Lead wire color, resistor designation, misc.:	<p>BX: black</p> <p>BR: brown</p> <p>RD: red</p> <p>OR: orange</p> <p>YL: yellow</p> <p>GN: green</p> <p>BU: blue</p> <p>PR: purple</p> <p>GY: gray</p> <p>WT: white</p> <p>XX: lead wire color not specified.</p> <p>NA: wired with coaxial cable, or no lead wire at all.</p> <p>RT: termination resistor, 50 ohm.</p> <p>RS: series resistor, 950 ohm.</p> <p>GP: ground plane auxiliary point.</p> <p>GT: ground plane point, and termination resistor.</p> <p>GS: ground plane point, and series resistor.</p> <p>DL: standard point on model 00-MUC, 1.5 micron radius.</p> <p>SP: sharp point on model 00-MUC, 0.5 micron radius.</p> <p>02: improved pin jack on model 79 probe holder.</p> <p>03: set screw closure on model 79 probe holder.</p> <p>02: dimension change on model 44.</p> <p>0: 0 degree, on-axis probe holder.</p>

# Probe Tip Maintenance

Through years of probing experience, Probing Solutions, Inc. has developed many different probe tips and probe tip holders designed to meet a wide variety of probing applications. Engineers often ask the question: "How should I care for my probe tips and holders for maximum return on my investment?"

## Probe Tip Construction

To properly clean and care for probe tips, it is important to know what material is used in the construction of the probe tip.

**Probing Solutions, Inc.** uses different materials to meet the specific probing application. Probe tips are typically constructed using either single material such as Tungsten or two different materials such as Nickel and Tungsten, one for the shank and the other material for the tip. Probe tips 7B, 7D, 7G, and 7H are single material construction. The 7A, 7C, 7F, and 7X are examples of using two materials for the construction. Additionally, Probing Solutions offers custom designed probe tips and probe tip holders if a standard probe does not meet your specific probing requirement.

## Cleaning Probe Tips

### **Tungsten, Tungsten Carbide and Nickel Tips**

To remove deposits from the probe tip, simply rinse in de-ionized water using compressed air to dry excess water from the tip. To remove oxide deposits, dip probe tips into a 1.0 Normal sodium hydroxide (NaOH) solution for a few seconds. Then rinse with de-ionized water and dry with compressed air.

### **Beryllium Copper Tips**

Like the probe tips above, to remove deposits from the probe tip, rinse with de-ionized water using compressed air to dry excess water from the tip. To remove oxide deposits from the tip, wash the tip in a 10% sodium

carbonate solution ( $\text{Na}_2\text{CO}_3$ ) and rinse in de-ionized water. Do not dry the tips. Next dip the tip into a 10% v/v nitric acid solution ( $\text{HNO}_3$ ) until a reaction occurs. Rinse the tip in de-ionized water *immediately* after the acid reaction starts. Do not let the reaction continue for more than one second. After rinsing, dry excess water with compressed air.

## Cleaning Probe Holders

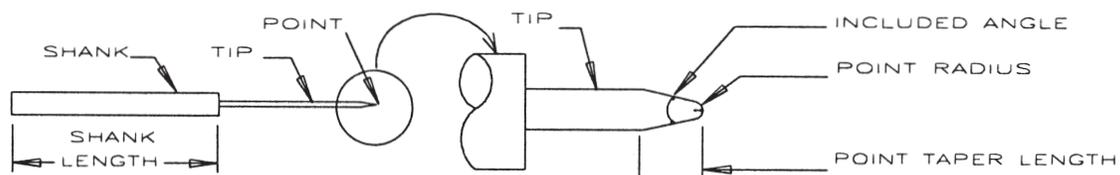
To clean the probe holders, use a methanol solution (either 190 or 200 proof) and apply to the holder tip using a swab or some other suitable applicator. Do not soak the holder body in the methanol solution. After applying the methanol, proceed with baking the shank at a temperature of 200°F-300°F for a minimum time of 6 hours.

## Controlling Corrosion

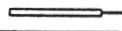
In order to eliminate the effects of corrosion for both the tips and holders, it is recommended that the original shipping box of the probe tips/probe holders remain sealed and kept in a dry place until ready to use. After opening, use of a desiccator is recommended. If a desiccator is not available, it is recommended that a small desiccator package be used in the bottom of the product box.

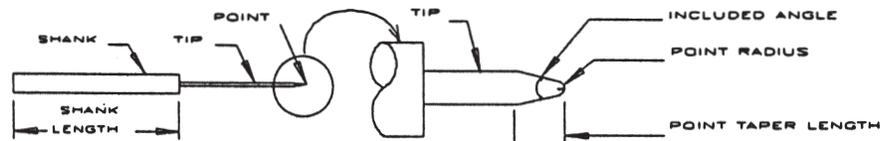
## Summary

Use these suggestions for the proper care of probe tips and shanks to extend the life of your probe tips. Probe tip construction, protection against corrosion, and cleaning procedures are different depending upon the material associated with probe tips. Protection against corrosion and proper cleaning procedures are paramount to maintaining the integrity of test probes and probe holders.



# DISPOSABLE PROBE TIP POINTS

POINT STYLE	MODLE #	POINT RADIUS (MICRONS)	POINT TAPER LENGTH	INCLUDED ANGLGE (DEGREES)	TOTAL LENGTH	SHANK DIAMETER	MATERIAL
FINE-TIP CAT-WHISKER FLEXIBLE TIP SHAFT (TIP DIAMETER .005") 	407A	0.35	.020"	14°	1.4"	.020"	NICKEL (Bendable)
HEAVYDUTY NEEDLE FOR LARGER TARGETS 	407B 407B-1 407B-2 407B-5* 407B-10* 407B-25* 407B-50* 407B-100* 407B-200*	0.50 1.00 2.00 5.00 10.00 25.00 50.00 100.00 200.00	.060" .070" .090" .090" .075" .080" .080" .080" .080"	19° 16° 13° 13° 15° 14° 11° 9° 3°	1.4" 1.4" 1.4" 1.4" 1.4" 1.4" 1.4" 1.4" 1.4"	.020" .020" .020" .020" .020" .020" .020" .020" .020"	TUNGSTEN TUNGSTEN TUNGSTEN TUNGSTEN TUNGSTEN TUNGSTEN TUNGSTEN TUNGSTEN TUNGSTEN
*MAY BE GOLD PLATED, ADD 'G' TO PART NUMBER							
CAT-WHISKER (TIP .005") FOR SMALL TARGETS 	407C	0.35	.025"	14°	1.3"	.020"	DUMET (Cu/Fe) (Bendable)
TUNGSTEN CARBIDE TIP FOR CUTTING 	407D	5.00	.075"	15°	1.4"	.020"	TUNGSTEN CARBIDE
CAT-WHISKER (TIP .001") FOR SMALL TARGETS 	407F	0.50	.0027"	21°	1.4"	.020"	NICKEL (Bendable)
HEAVY DUTY NEEDLE SAME SHAPE AS 7B, BUT A SHORTER LENGTH 	407G 407G-1 407G-2 407G-5 407G-10 407G-25 407G-50 407G-100 407G-200	0.50 1.00 2.00 5.00 10.00 25.00 50.00 100.00 200.00	.060" .070" .090" .090" .075" .080" .080" .080" .080"	19° 16° 13° 13° 15° 14° 11° 9° 3°	0.5" 0.5" 0.5" 0.5" 0.5" 0.5" 0.5" 0.5" 0.5"	.020" .020" .020" .020" .020" .020" .020" .020" .020"	TUNGSTEN TUNGSTEN TUNGSTEN TUNGSTEN TUNGSTEN TUNGSTEN TUNGSTEN TUNGSTEN TUNGSTEN
BERYLLIUM-COPPER NEEDLE FOR SMALL TARGETS 	407H	1.00	.135"	8°	1.4"	.020"	BERYLLIUM COPPER
SHARPEST PROBE NEEDLE AVAILABLE FLEXIBLE CAT-WHISKER (TIP .003") 	407X 407X-SHORT	0.10 0.10	.013" .008"	13° 21°	1.4" 1.4"	.020" .020"	NICKEL NICKEL (Bendable)



MODE 407 CONFIGURATION ENLAGEMENT OF TIP

## Recommended Applications for Probe Holders

Application	Recommended Probe Models
General Purpose	0, 00, 72, 75, 76, or 77 with 7 series probe tips
Thin Film	11 probe holder with 9 or 13 probe tips or 72, 75, 77 with 7F series probe tips
Low Capacitance	78, PicoProbes
High Frequency	44, 44-SMA, 79, PicoProbes
Cutting	00-MUC-DL, 00-MUC-SP, 75 with 7B, 7D or 7G probe tips
Hot Stage	On-Axis, High Attack Angle, 79-H with 7F or 7S probe tips
High Impedance (Active Probes)	PicoProbes
Low Profile Probing	74-0, 79-0 with 7A-M, 7X-M or pre-bent probe tips
Triaxial	82, 79-T, 79-HT, 79-T-O, single Triax cable
Kelvin	44-D, 79-D, 79-TD, 79-HTD, 80 with 81SD probe tips
Microwave	PicoProbes available DC to 120 GHz

## Recommended Applications for Probe Tips

MODEL #	DESCRIPTION	APPLICATION
7A	Fine-tip (.005") flexible shank	<1 micron targets
B series	Heavy Duty needle for larger targets	General Purpose
7B-G suffix	General Purpose, gold-plated (exceptions: 7B, 7B-1, 7B-2)	Low Resistance Probing, high current probing
7C	Cat-whisker (.005") for small targets, very strong probe	Not much compliance, for lightly passivated or oxidized surfaces
7D	Tungsten Carbide point for cutting	Cutting
7F	Specialized probe point (.001"), nickel shank for small targets	Thermal (hot chuck) and CV application, probe tip is compliant; will follow expansion and contraction of target
7G series	Heavy Duty needle same shape as Model 7B, shorter length	General Purpose
7H	Beryllium-Copper probe point	Delicate target or surface, soft tip with low resistance
7X and 7X-Short	Sharpest probe needle available, flexible cat-whisker (.003")	Sub-micron targets
7S	Tungsten, very sharp, most flexible probe tip	Very compliant, ideal for thermal applications

## Angled Disposable Probe Tip Reference Chart

45 = 45 degree attack angle 60 = 60 degree attack angle		Tip Diameter	Point Radius in Microns	Point Taper Length	Included Angle (degrees)	Overall Shank Length	Shank Diameter	Material	Attributes
Style	Model Number								
Fine-tip	7A-45 or 7A-60 short	.005"	0.35	.020"	14	5/8"	.020"	Shank: Nickel Tip: Tungsten	bendable shanks flexible tip shaft
	7A-45 or 7A-60 long	.005"	0.35	.020"	14	1 1/8"	.020"		
Heavy Duty Needle	7B-45 or 7B-60 short	.020"	0.5	.060"	19	5/8"	.020"	Tungsten	larger targets general purpose
	7B-45 or 7B-60 long	.020"	0.5	.060"	19	1 1/8"	.020"		
Small Targets Hot Stage	7F-45 or 7F-60 short	.001"	0.5	.0027"	21	5/8"	.020"	Shank: Nickel Tip: Tungsten	bendable shanks & tips, super flexible
	7F-45 or 7F-60 long	.001"	0.5	.0027"	21	1 1/8"	.020"		
Very Small Targets	7X-45 or 7X-60 short	.003"	0.1	.013"	13	5/8"	.020"	Shank: Nickel Tip: Tungsten	bendable shanks sharpest probe
	7X-45 or 7X-60 long	.003"	0.1	.013"	13	1 1/8"	.020"		

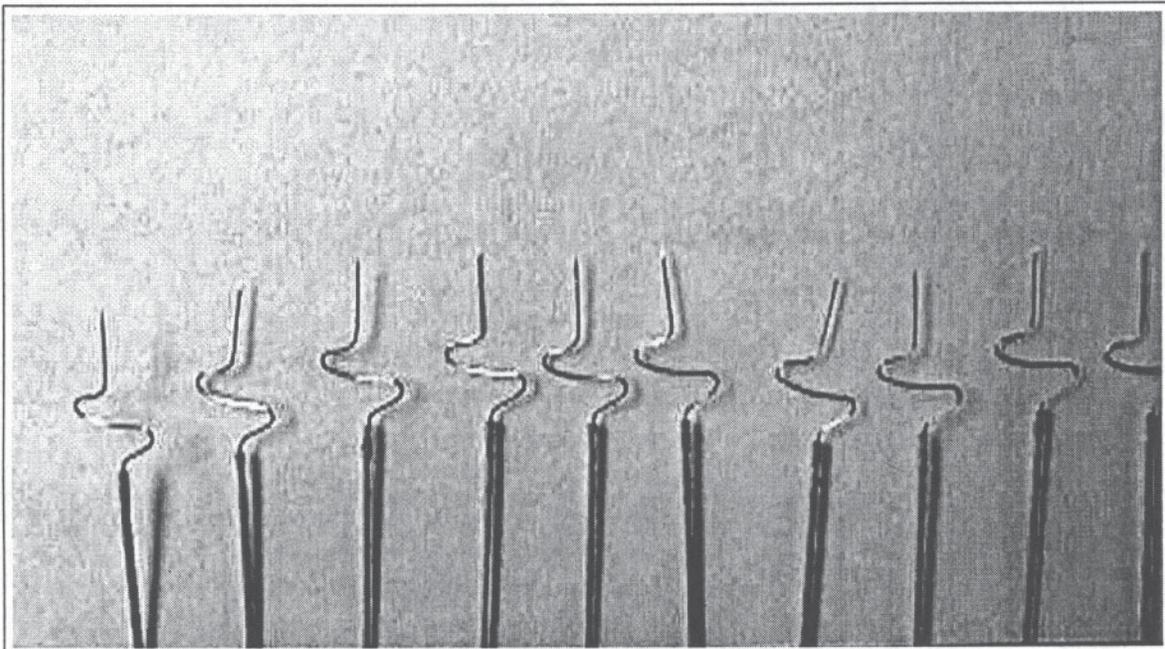
# Model High - Compliance Probes

# Product Guide

## The Model 7S Probe

The model 7S probe is a new, state-of-the art high-compliance probe. The probe wire diameter, tip "S" bend design, tip taper, and

tip point radius have all been maximized to produce a high compliance probe tip that provides two key benefits:



- The tip is extremely resistant to contact damage ("fishhooking"). The tip may be used at a high attack angle, scrubbed on the sample surface and repeatedly raised and lowered without damage occurring as the tip and "spring" design provides force for a very good ohmic contact yet flexes before tip damage occurs.
- The model 7S compliant tip will stay with a sample and maintain good probe contact even when the sample moves (during thermal expansion for example). Tests have shown that the model 7S probe will maintain its position at a probing site with over 100 microns of sample movement underneath the probe.

## Model 7S Specifications:

**Point Radius:** 0.7 micron

**Tip Wire Diameter:** 0.005"

**Point Taper:** 0.02"

**Overall Length:** 1 5/8 "

# CUSTOM FIXED TIP PROBE WORK SHEET

PROBING SOLUTIONS INC.'S PROBE MAKING DEPARTMENT REQUIRES THE FOLLOWING INFORMATION IN ORDER TO PRODUCE A CUSTOM FIXED TIP PROBE:

A. FIXED PROBE TIP MODEL (Circle One): 44 44-D 44-GP

B. TYPE OF WIRE/CABLE NEEDED:

(Circle One): Single - Coax - Triax (Circle One): Standard - Triboelectric (for Coax/Triax only)

C. TYPE OF PROBE CONNECTOR (Circle One):

SMA

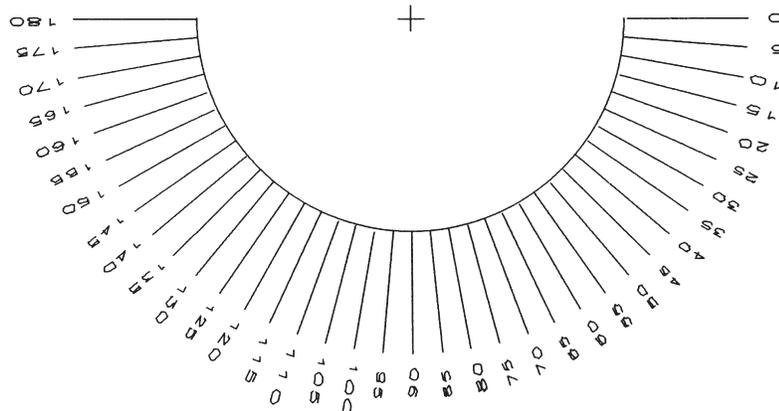
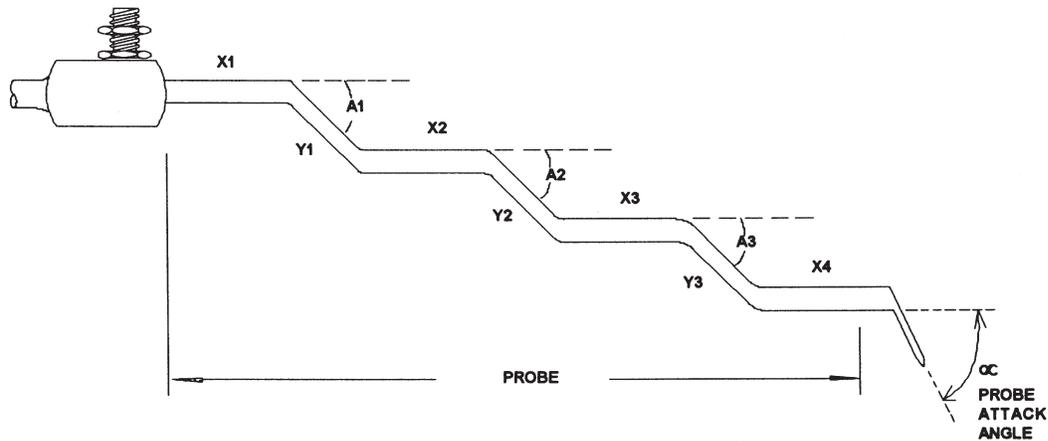
SMC

UMC



D. DETERMINE PROBE ATTACK ANGLE AND BENDS FOR APPROPRIATE X'S AND Y'S USING THE CHART, MODEL AND PROTRACTOR BELOW. ENTER ALL DATA IN THE APPROPRIATE BOXES:

PROBE MODEL	WIRE TYPE			DIMENSIONS AND ANGLES										PROBE ATTACK ANGLE $\alpha$	SPACE BETWEEN GP TIPS	
	WIRE	STD	KELVIN	X1	A1	Y1	X2	A2	Y2	X3	A3	Y3	X4			





*High Performance  
Microwave Probes*

**Ψ Probing Solutions Inc.**

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## Picoprobe High Performance Microwave Probes: DC to 120 GHz

*Picoprobes* are the industries premier Microwave Probing standard for Probe Tips. Ranging from 1GHz to Telecommunications and Phased Array Radar frequencies at 70 -120 GHz. All Picoprobes offer a large variety of probe tips, sizes and form factors to select from. Consult Probing Solutions Applications Engineering or request a Spec Sheet on the specific probe selected for detailed Probe Tip selection.

- **MODEL PP7: 1C SIGNAL DRIVER** Designed as a IC Circuit line driver to inject signals. To be used in conjunction with PPMoels, PP12C or PP18B to measure frequency response in adjacent circuit nodes. Supplied with a 6 foot (1.8 Meters) Coaxial cable with 50 Ohm termination to avoid undesirable frequency reflections. Using Tungsten Probe Tips can minimize capacitive coupling between circuits
- **MODEL PP7A:** Is an unterminated 7 version that may be used for capacitive and resistive measurements in low to medium speed signal applications where a 50 Ohm termination is not required. Comes with a 6 foot (1.8 Meter) Coaxial cable. When used for low capacitance Applications the cable should be reduced to a 3 foot (1 Meter). If a shorter cable is desired the product must be specified as PP7A-3 at the time of order,
- **MODEL PP10: DC to 10 GHz** High Speed Multipurpose Passive Probe that can be used for driving as well as receiving signals, have replaceable Coaxial Probe Tips and a 50 Ohm Coaxial cable with a BNC connector. A 250 Ohm Probe Tip should be used with 0.180 inch long dual probe points to achieve DC to 10 GHz response. The signal will be attenuated by 5:1.
- **MODEL PP12C:** Is an ACTIVE High Speed, High Impedance probe used for measuring internal voltage nodes of Integrated Circuits. The input is 1 megohm shunted by 0.1pf, the Rise/Fall times are 0.8 ns. When used with High Impedance Oscilloscopes signal attenuation is 10:1 and with a 50 Ohm input signal attenuation is 20:1. Good for High Speed Bipolar, NMOS or CMOS, -10V to +20V Probing and will withstand large input over voltages.  
**NOTE: Requires a PPS-V1 Power Supply, Each PS supports two (2) Probes.**
- **MODEL PP18T and PP19: DC to 350 MHz** Low input Capacitance (0.02pf) and Low Input Current (10 /-14A), allows probing and characterization of the most sensitive High Speed MOS dynamic circuits nodes. The difference in these two probes is  
**MODEL PP18B** operating Voltage is 0V to 15VDC  
**MODEL PP19** operating Voltage is -7V to +8V  
Both have  $\pm 5\%$  Gain Accuracy and Signal attenuation Oscilloscope 10:1 or 50 Ohm input 20:1.  
Both utilize the PP10 Disposable Probe Tips with a Target Size range selectable from 3um to 50 urn.  
**NOTE: Requires a PPS-V1 Power Supply. Each PS supports two (2) Probes.**
- **MODEL PP28 and PP29: DC to 1GHz.** For high speed sub micron MOS circuits. Extremely Low Input Capacitance (0,04pf) Low DC Current drain  
**MODEL PP2S** operating voltage -3V to +10V DC  
**MODEL PP29** operating voltage -7V to +6V DC  
Both models have  $\pm 3\%$  Gain Accuracy and Signal attenuation of 20:1  
**NOTE: Requires a PPS-V1 Power Supply, Each PS supports two (2) Probes.**
- **MODEL PP34A: DC to 3 GHz.** Combines full DC capability, rise and fall times of 120 ps, 10 Megohm Input Impedance shunted by 0.1 pf and 20 to 1 Signal Attenuation with a 50 Ohm Oscilloscope input  
**NOTE: Requires a PPS-V1 Power Supply. Each PS supports two (2) Probes**

- MODEL PP40A: DC to 40GHz.** Uses low loss Coaxial Techniques with a 50 Ohm cable. The 40A achieves an insertion loss of less than 0.8 db and a return loss of greater than 18 db through 40 GHz. The 40A has individually spring loaded Probe Tips allowing the precise positioning necessary for good LRM calibration The flexible tips even allow probing on non-planar surfaces such as Ceramic Substrates and Laser Diode structures Multiple 40A Probes, up to 11 can also be mounted on standard 4.5" (114.3mm) probe cards with minimum issues with planarization on either Manual or Semiautomatic Probe Stations. The Model PP40A is also available in a dual Probe configuration **Probe tip foot-print must be specified (GSG), (GS), (SG) as well as pitch at the time of placing the order.**
- MODEL PP67: DC to 67 GHz.** Also a low loss Coaxial Probe achieves 1.1 db insertion loss and a return loss of greater than 14 db through 67 GHz. This probe also has spring loaded tips that maximize contact on non-planar surfaces. Measurements with this series of probes and tips provides reliable and repeatable measurements. Any pitch is available from 50 to 1250 microns. **Probe tip foot-print must be specified (GSG), (GS), (SG) as well as pitch at the time of placing the order.**
- MODEL PP120BT: 75 GHz to 120 GHz.** With a Bias T sets new standards for the top end of Microwave Probing Applications. With an insertion loss of less than 1.75 db and a return loss greater than 15 db max (75 to 110 GHz) Any pitch (tip spacing) is available from 50 to 450 microns. **Probe tip pitch and foot-print must be specified at the time of placing the order.**
- MODEL PP120NB: 75 GHz to 120 GHz.** This probe tip has the same specs as the PP120BT. **Except it does not have the Bias T option.**
- POWER SUPPLY PPS-VI:** The Pico Probe is required for all active Pico Probes, this Power Supply will support two (2ea) active probes at the same time. Required for 12C, 18B, 19, 28, 29 and 34A Probe Models.
- PP50A (DC to 50GHz), PP75 (50GHz to 75 GHz), PP90 (60GHz to 90GHz), PP110H (BC to 110 GHz)** Are available on special request for Price and availability directly from Probing Solutions Sales.
- PP-CAL-STD.** Calibration substrates for probing Applications are available. Please select the Calibration Substrate best suited to your application from the selector chart.
- WHEN ORDERING.** Customer/User must specify:

**CONFIGURATION:** Specify GSG, GS or SG for tip placement where S is the signal tip and G is the ground tip. Use the following diagram to determine the appropriate configuration.

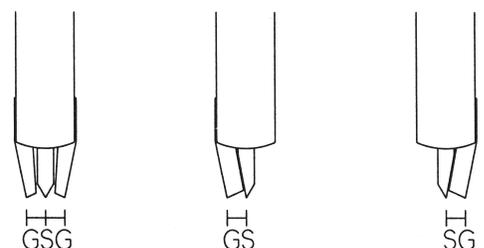
**PITCH:** Specify ground (G) to signal (S) tip spacing in Microns from 50 to 1250 microns. For standard GSG probes, the two spacings are equal. Contact the factory for spacings larger than 1250 microns or unusual tip placement and spacings.

**MOUNTING STYLE:** Specify T, C, GR, P, DP, EDP or LP.

Choose the appropriate mounting style for your application. the P, DP, EDP and LP styles have the connector pointing back at a 45° angle to give more working area above the probe. the DP and EDP styles are used where extra clearance beneath the probe is needed. However, probe positioning is more difficult. Due to the increased probing angle, the probe points slide further forward for a given change in the Z axis than our other style probes. Custom mounting styles are available.

**EXAMPLE:** PP 40A-GSG-150-P is a Model 40A with Ground, Signal, Ground configuration with 150 microns between each contact mounted in a P style adaptor.

**TOP VIEW**



# *Photomask Inspection*

**Ψ Probing Solutions Inc.**

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## 9" SEMI-AUTOMATIC PHOTOMASK INSPECTION/REVIEW STATION

The 482-PMI Semi-Automatic fully integrated cleanroom inspection/review work station is designed to even tighter X-Y positioning accuracy and repeatability specifications and will accept operator designed Defect X-Y position coordinates manually or downloaded from inspection reports when in review mode. Use this product for Visual Defect Review, Analysis, Verification, Classification, Reclassification, Corrective Action or Rejection. The operator monitored process utilizes four (4) independent or eight (8) combined Top and Backside Bright and Dark Field illumination modes simultaneously. Using color contrast filters and fully color corrected Microscope Objectives. This procedure is highly effective using both Bright and Dark Field illumination in combination to detect defects otherwise not distinguishable using single mode surface illumination methods.



### *Features Include*

- Ultra compact fully integrated clean room work station constructed from anodized aluminum and stainless steel components.
- $\pm 2\mu\text{m}$  Accuracy and Repeatability combined capable of scanning, viewing and reviewing submicron defects.
- Stage mask capacity for 4" to 9" mask reticles. Accept high pellicles of either or both sides of the mask.
- Facilitates rapid mask and paddle interchangeability with maximum safety and minimum inspection time delay.
- Semi-automatic operation that accepts X-Y position coordinates from production inspection files and navigates to those inspection locations for visual defect review and classification.
- Operator settable and infinitely adjustable 0-0 mask reference coordinates.
- Eight combinations of Bright / Dark Field illumination standard on all 300 and 400 PMI series Photomask Inspection / Review Stations.
- Keyboard, mouse or variable speed joystick, stage X-Y and microscope Z focus control.
- 482-PMI Semi-Automatic Photo Mask Inspection / Review Station provides high efficiency for powerful primary or secondary "off-line" defect inspection or review by defect X-Y location coordinates, automatic scanning, verification, classification, measuring and X-Y defect mapping by symbol and location.
- Total vertical system integration for economy of space in a cleanroom or lab environment.
- Sub micron defect detection, location mapping, classifying and measuring.
- Review or inspect reticles for all defect classifications, pinhole, edge effect, bridging, non-connect, scratching, thin metal and contamination.
- Review multi-die reticles for repeated defects, die to die or die to database with **PSI maskWork™** test file import. Optional KLA-TENCOR™ file import compatibility. Contact the factory or an authorized Sales Representative for other compatible production inspection test system file import.
- Automatic mask scan control including settable overlap, Pause, Resume, Symbol Mark, Classify, Go-To X-Y Location, Photo Capture, Store, Print and Network.

## GENERAL

10" x 9" stage with vari-rails that accept from 4" to 9" mask reticles / paddles  
Accuracy / Repeatability combined  $\pm 2\mu\text{m}$  laser calibrated  
Eight combinations of incident and transmitted bright and dark field lighting modes on all 300 and 400 series Photomask Inspection Stations  
Fully integrated all stainless steel clean room, 36" W x 30" D x 30" H Vibration Isolation Table  
Keyboard, mouse, joystick and 17" color monitor. PSI maskWorks™ Navigation / Inspection Software

## maskWork™ SOFTWARE

Mask scanning / mapping with four spline pattern by four directions  
Save and run reticle defect maps with marking X-Y coordinates  
Zero-Zero Home (0-0) reference, program variable to match mask reticle reference  
Move to user defined X-Y locations  
Fast X-Y two point alignment  
Load Mask command selection Center, Left, Right  
Program definable Field Of View (FOV) for scanning  
User defined defect report, type, X-Y location, size, symbol, color code and disposition  
Program selectable units of measure in mils or microns  
Defect measurement in selected units of measure

## FACILITY REQUIREMENTS

Voltage / Frequency: 110VAC/60Hz standard or 220VAC/50Hz optional  
Current: 3 Amps @ 110VAC standard or 1.5 Amps @ 220VAC optional

## SHIPPING DIMENSIONS

Station Accessories, 1 Crate:  
1 - 40" (106.7cm) x 42" (106.7cm) x 59" (150cm)  
946 lbs. (429kg)

## MICROSCOPES

USMCO microscopes with variable 2X Zoom, standard Trinocular head, standard  
Adjustable 4-Port Turret, standard  
10X ultra-wide eyepieces with one crossline alignment reticle, standard  
2XL, 10XL and 20XL objectives, standard

## MICROSCOPE OPTIONS

Tilthead available, reduces neck strain and adapts to operator height differences. May be ordered with flip mirror or prism  
Measuring Eyepiece Reticle available  
15X or 20X eyepieces available  
50X objectives available  
Polarizer Kit

## OPTIONAL ACCESSORIES

CCD Cameras and wide field adapters  
KLA™ Interface Software  
Digital Video Image Enhancement  
Network Cards, customer specified

## MASK PADDLES/MASK HANDLING SAFETY

WP4040 4" x 4" square (133mm 3" & 4" Wafer)  
WP5050 5" x 5" square (152mm 6" Wafer)  
WP6060 6" x 6" square (200mm 8" Wafer)  
WP7070 7" x 7" square or semi-round (200mm 8" Wafer)  
WP9090 9" x 9" square (300mm 12" Wafer)

Local Sales Representative



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## PHOTOMASK INSPECTION/REVIEW STATION w/DIGITAL READOUT

The 362-PMI Photomask Inspection/Review Station introduces digital location identification of X-Y mask defect locations. This is detected by the operator during manual visual inspection. Digitally Displaying the X-Y defect locations on the Digital Readout facilitates easy relocation and repair. Defect detection is further enhanced through the utilization of four (4) independent or eight (8) combined illumination modes with color contrast filters; Top and Backside Bright and Dark field illumination simultaneously. This method of multi Bright and Dark Field illumination combinations enables detection of all defects in a single manual scan not found in common Bright Field mode inspection microscopes.



### *Features Include*

- Stage capacity for 4" to 7" Mask Reticles. Accepts Pellicles on both sides. Facilitates rapid Mask and Paddle interchangeability with maximum safety and minimum inspection time delay.
- Digital Readout (DRO) enables location of defect coordinates, or rapid relocation of X-Y location for reinspection and classification or repair decisions.
- Digital Readout comes with front panel function control.
- Easy one touch switches allow for zero reference settings and conversion between millimeters/inches.
- Eight combinations of Bright/Dark field illumination standard on all 300 Photo Mask Inspection and Review Stations.
- Cleanroom compatibility, constructed from anodize aluminum and stainless steel components.
- Mask Paddles can be co-planar to stage travel.
- 362PMI Digital Readout (DRO) Photomask Inspection Station provides a powerful hands on manual primary defect location and classification inspection station.
- The Digital Readout allows primary defect location information and instant relocation or reinspection, re-classification and rapid decisions on repair.
- Makes handling safe while utilizing 4" to 7" mask paddles. These have a large pick handling access opening and is a secure handling device for transporting individual mask reticles to and from the 362PMI Inspection Station.
- Sub-micron defect visual detection, location, classification.
- Accurately locate all defect classifications, pinholes, edge defects, bridging, non-connects, scratches, thin metal and contamination.
- Greater advantage and probability of defect detection with eight (8) Bright/Dark field lighting combinations afford visual light shading and intensity for clarity.

## **GENERAL**

6" x 6" manual stage controlled by convenient coaxial X-Y knobs  
Provides precise positioning X-Y for each axis. Laser calibrated to the Digital Readout  
Eight combined incident and transmitted bright and dark field lighting modes on all 300 and 400 series Photomask Inspection Stations  
Vari-rails accommodate mask or paddle reticle handling  
Digital X-Y scales and Digital X-Y positioning Readout (DRO)  
Stage accepts 4" to 7" Photomask reticles with pellicles on one or both sides  
Theta rail alignment of reticle edge with stage X axis

## **FACILITY REQUIREMENTS**

Voltage / Frequency: 110VAC/60Hz standard or 220VAC/50Hz optional  
Current: 3 Amps @ 110VAC standard or 1.5 Amps @ 220VAC optional

## **SHIPPING DIMENSIONS**

Station, Digital Readout and Accessories, 1 Crate:  
42" (106.7cm) x 42" (106.7cm) x 53" (135cm)  
285 lbs. (129kg)

## **MICROSCOPES**

USMCO microscopes with variable 2X Zoom  
Trinocular head, standard  
Adjustable 4-Port Turret, standard  
10X ultra-wide eyepieces with one crossline alignment reticle, standard  
2XL, 10XL and 20XL objectives, standard

## **MICROSCOPE OPTIONS**

Tilthead available, reduces neck strain and adapts to operator height differences. May be ordered with flip mirror or prism  
Measuring Eyepiece Reticle available  
15X or 20X eyepieces available  
50X, SL50X and SL100X objectives available  
Polarizer Kit

## **OPTIONAL ACCESSORIES**

CCD Cameras and wide field adapters  
Digital Video Image Enhancement  
Digital Video Camera with High Resolution Monitor

## **MASK PADDLES/MASK HANDLING SAFETY**

WP4040 4" x 4" square (133mm 3" & 4" Wafer)  
WP5050 5" x 5" square (152mm 6" Wafer)  
WP6060 6" x 6" square (200mm 8" Wafer)  
WP7070 7" x 7" square or semi-round (200mm 8" Wafer)  
*Contact factory for special configurations*

Local Sales Representative



*Visit our website at:*  
***[www.probingolutions.com](http://www.probingolutions.com)***

## PHOTOMASK INSPECTION/REVIEW STATION

The 342-PMI Photomask Inspection/Review Station allows hands-on operator manual visual inspection. Defect detection is further enhanced through the utilization of four (4) independent or eight (8) combined illumination modes with color contrast filters; Top and Backside Bright and Dark field illumination modes simultaneously. This method of multiple Bright and Dark illumination combinations enable detection of all defects in a single manual scan not found in a single Bright Field mode of illumination.



### *Features Include*

- Stage capacity for 4" to 7" Mask Reticles. Accepts Pellicles on both sides. Facilitates rapid Mask and Paddle interchangeability with maximum safety and minimum inspection time delay.
- Mask Paddles can be co-planar to stage travel.
- Easy manual location of mask defects.
- Eight combinations of Bright/Dark field illumination standard on all 300PMI Photo Mask Inspection and Review Stations.
- Cleanroom compatibility, constructed from anodize aluminum and stainless steel components.
- 342PMI Photomask Inspection Station provides a powerful hands on manual primary defect location and classification inspection station. For 4" x 4" to 7" x 7" mask reticles.
- Makes handling safe while utilizing 4" to 7" mask paddles. These have a large pick handling access opening and is a secure handling device for transporting individual mask reticles to and from the Inspection Station.
- Visual sub-micron defect detection and review.
- Visual review of all defect classifications, pinholes, edge defects, bridging, non-connects, scratches, thin metal and contamination.
- Greater advantage and probability of defect detection with eight (8) Bright/Dark field lighting combinations afford visual light shading and intensity for clarity.

## GENERAL

6" x 6" manual stage control by convenient coaxial X-Y knobs.  
Provides precise positioning X-Y for each axis.  
Eight combined incident and transmitted bright and dark field lighting modes on all 300 series Photomask Inspection Stations.  
Vari-rails accommodate mask or paddle size flexibility.  
CE / SEMI Certified PMI Stations available.  
Stage accepts 4" to 7" Photomask reticles with pellicles on one or both sides.  
Theta rail alignment of reticle edge with stage X axis.

## FACILITY REQUIREMENTS

Voltage / Frequency: 110VAC/60Hz standard or 220VAC/50Hz optional  
Current: 3 Amps @ 110VAC standard or 1.5 Amps @ 220VAC optional

## SHIPPING DIMENSIONS

Station Accessories, 1 Crate:  
1 - 36" (91.4cm) x 36" (91.4cm) x 36" (91.4cm)  
225 lbs. (102kg)

## MICROSCOPES

USMCO microscopes with variable 2X Zoom, standard Trinocular head, standard Adjustable 4-Port Turret, standard 10X ultra-wide eyepieces with one crossline alignment reticle, standard 2XL, 10XL and 20XL objectives, standard

## MICROSCOPE OPTIONS

Tilthead available, reduces neck strain and adapts to operator height differences. May be ordered with flip mirror or prism  
Measuring Eyepiece Reticle available  
15X or 20X eyepieces available  
50X, SL50X and SL100X objectives available  
Polarizer Kit

## OPTIONAL ACCESSORIES

CCD Cameras and wide field adapters  
KLA™ Interface Software  
Digital Video Image Enhancement  
Network Cards, customer specified

## MASK PADDLES/MASK HANDLING SAFETY

WP4040 4" x 4" square (133mm 3" & 4" Wafer)  
WP5050 5" x 5" square (152mm 6" Wafer)  
WP6060 6" x 6" square (200mm 8" Wafer)  
WP7070 7" x 7" square or semi-round (200mm 8" Wafer)  
*Contact factory for special configurations*

Local Sales Representative



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## 9" PHOTOMASK INSPECTION/REVIEW STATION w/DIGITAL READOUT

The 462-PMI Photomask Inspection/Review Station introduces digital location identification of X-Y mask defect, detected by the operator during manual visual inspection. Digitally Displaying the X-Y defect locations on the Digital Readout facilitates easy relocation and repair. Defect detection is further enhanced through the utilization of four (4) independent or eight (8) combined illumination modes with color contrast filters; Top and Backside Bright and Dark field illumination simultaneously. This method of multi Bright and Dark Field illumination combinations enables detection of all defects in a single manual scan not found in common single Bright Field mode illumination inspection microscopes.



### *Features Include*

- Stage capacity for 4" to 9" Mask Reticles. Accepts Pellicles on both sides. Facilitates rapid Mask and Paddle interchangeability with maximum safety and minimum inspection time delay.
- Digital Readout (DRO) enables location of defect coordinates, or rapid relocation of X-Y.
- Digital Readout comes with front panel function control.
- Easy one touch switches allow for zero reference settings and conversion between millimeters/inches.
- Eight combinations of Bright/Dark field illumination standard on all 300 and 400PMI series Photo Mask Inspection and Review Stations.
- Cleanroom compatibility, constructed from anodize aluminum and stainless steel components.
- Mask Paddles can be co-planar to stage travel.
- 462PMI Digital Readout (DRO) Photomask Inspection/Review Station provides a powerful hands on manual primary defect location and classification inspection station.
- The Digital Readout allows primary defect location information and instant relocation or reinspection, re-classification and rapid decisions on repair.
- Makes handling safe while utilizing 4" to 9" mask paddles. These have a large pick handling access opening and is a secure handling device for transporting individual mask reticles to and from the Inspection Station.
- Visual sub-micron defect detection and review.
- Visual review of all defect classifications, pinholes, edge defects, bridging, non-connects, scratches, thin metal and contamination.
- Greater advantage and probability of defect detection with eight (8) Bright/Dark field lighting combinations afford visual light shading and intensity for clarity.

## **GENERAL**

9" x 9" manual stage controlled by convenient coaxial X-Y knobs  
Provides precise positioning X-Y for each axis. Laser calibrated to the Digital Readout  
Eight combined incident and transmitted bright and dark field lighting modes on all 300 and 400 series Photomask Inspection Stations  
Vari-rails accommodate mask or paddle reticle handling  
Digital X-Y scales and Digital X-Y positioning Readout (DRO)  
Stage accepts 4" to 9" Photomask reticles with pellicles on one or both sides  
Theta rail alignment of reticle edge with stage X axis

## **FACILITY REQUIREMENTS**

Voltage / Frequency: 110VAC/60Hz standard or 220VAC/50Hz optional  
Current: 3 Amps @ 110VAC standard or 1.5 Amps @ 220VAC optional

## **SHIPPING DIMENSIONS**

Station, Digital Readout and Accessories, 1 Crate:  
42" (106.7cm) x 42" (106.7cm) x 53" (135cm)  
285 lbs. (129kg)

## **MICROSCOPES**

USMCO microscopes with variable 2X Zoom  
Trinocular head, standard  
10X ultra-wide eyepieces with one crossline alignment reticle, standard  
2XL, 10XL and 20XL objectives, standard

## **MICROSCOPE OPTIONS**

Tilthead available, reduces neck strain and adapts to operator height differences. May be ordered with flip mirror or prism  
Measuring Eyepiece Reticle available  
15X or 20X eyepieces available  
50X, SL50X and SL100X objectives available  
Polarizer Kit

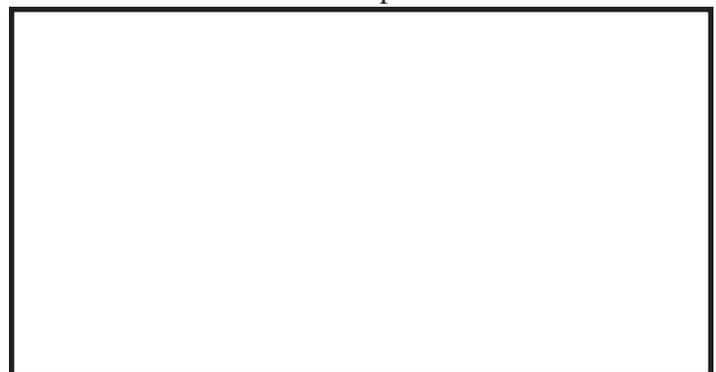
## **OPTIONAL ACCESSORIES**

CCD Cameras and wide field adapters  
Digital Video Image Enhancement  
Digital Video Camera with High Resolution Monitor

## **MASK PADDLES/MASK HANDLING SAFETY**

WP4040 4" x 4" square (133mm 3" & 4" Wafer)  
WP5050 5" x 5" square (152mm 6" Wafer)  
WP6060 6" x 6" square (200mm 8" Wafer)  
WP7070 7" x 7" square or semi-round (200mm 8" Wafer)  
WP9090 9" x 9" square (300mm 12" Wafer)  
*Contact factory for special configurations*

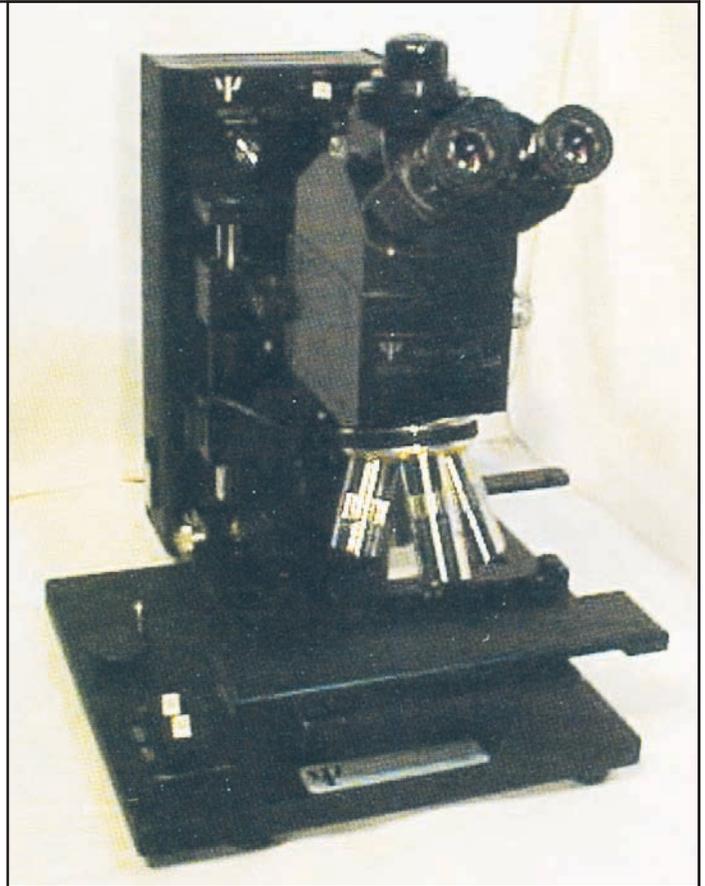
Local Sales Representative



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## 9" MANUAL PHOTOMASK INSPECTION/REVIEW STATION

The 442-PMI Photomask Inspection/Review Station allows hands-on operator manual visual inspection. Defect detection is further enhanced through the utilization of four (4) independent or eight (8) combined illumination modes with color contrast filters; Top and Backside Bright and Dark field illumination modes simultaneously. This method of multiple Bright and Dark illumination combinations enable detection of all defects in a single manual scan not found in a single Bright Field mode of illumination. Adding the 9" x 9" mask allows for handling capabilities for 300mm wafers.



### *Features Include*

- Stage capacity for 4" to 9" Mask Reticles. Accepts Pellicles on both sides. Facilitates rapid Mask and Paddle interchangeability with maximum safety and minimum inspection time delay.
- Mask Paddles can be co-planar to stage travel.
- Easy manual location of mask defects.
- Eight combinations of Bright/Dark field illumination standard on all 300 and 400PMI Photo Mask Inspection and Review Stations.
- Cleanroom compatibility, constructed from anodize aluminum and stainless steel components.
- 442PMI Photomask Inspection Station provides a powerful hands on manual primary defect location and classification inspection station. For 4" x 4" to 9" x 9" mask reticles.
- Makes handling safe while utilizing 4" to 9" mask paddles. These have a large pick handling access opening and is a secure handling device for transporting individual mask reticles to and from the Inspection Station.
- Visual sub-micron defect detection and review.
- Visual review of all defect classifications, pinholes, edge defects, bridging, non-connects, scratches, thin metal and contamination.
- Greater advantage and probability of defect detection with eight (8) Bright/Dark field lighting combinations afford visual light shading and intensity for clarity.

## **GENERAL**

9" x 9" manual stage controlled by convenient coaxial X-Y knobs  
Provides precise positioning X-Y for each axis.  
Eight combined incident and transmitted bright and dark field lighting modes on all 300 and 400 series Photomask Inspection Stations  
Vari-rails accommodate mask or paddle size flexibility  
Stage accepts 4" to 9" Photomask reticles with pellicles on one or both sides  
Theta rail alignment of reticle edge with stage X axis

## **FACILITY REQUIREMENTS**

Voltage / Frequency: 110VAC/60Hz standard or 220VAC/50Hz optional  
Current: 3 Amps @ 110VAC standard or 1.5 Amps @ 220VAC optional

## **SHIPPING DIMENSIONS**

Station and Accessories, 1 Crate:  
36" (91.4cm) x 36" (91.4cm) x 36" (91.4cm)  
225 lbs. (101kg)

## **MICROSCOPES**

USMCO microscopes with variable 2X Zoom, standard  
Trinocular head, standard  
Adjustable 4-Port Turret, standard  
10X ultra-wide eyepieces with one crossline alignment reticle, standard  
2XL, 10XL and 20XL objectives, standard

## **MICROSCOPE OPTIONS**

Tilthead available, reduces neck strain and adapts to operator height differences. May be ordered with flip mirror or prism  
Measuring Eyepiece Reticle available  
15X or 20X eyepieces available  
50X , SL50X and SL100X objectives available  
Polarizer Kit

## **OPTIONAL ACCESSORIES**

CCD Cameras and wide field adapters  
Digital Video Image Enhancement  
Digital Video Camera with High Resolution Monitor

## **MASK PADDLES/MASK HANDLING SAFETY**

WP4040 4" x 4" square (133mm 3" & 4" Wafer)  
WP5050 5" x 5" square (152mm 6" Wafer)  
WP6060 6" x 6" square (200mm 8" Wafer)  
WP7070 7" x 7" square or semi-round (200mm 8" Wafer)  
WP9090 9" x 9" square (300mm 12" Wafer)  
*Contact factory for special configurations*

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*PMI 300/400 Series  
Application  
Notes*

 **Probing Solutions Inc.**

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# Model 300/400-PMI Series Photomask Inspection Stations

# Application Note

The **300/400-PMI Photomask Inspection Station** series provides visual inspection capabilities to efficiently and reliably detect defects in photomasks and pellicles utilized in photolithography processes. By combining the correct optics and procedures, surprising benefits in yields and process control often result because defects that have previously gone undetected are now easily revealed.

## Benefits of Visual Inspection

With the appropriate instrument and training, an inspector can detect:

- Submicron pinholes, chrome spots, and particles in high density patterns.
- Edge defects even on 45° lines.
- Butting errors.
- Thin chrome.
- Particles on top of chrome.
- Transparent particles trapped beneath high standoff pellicles.
- Repeated defects.
- Glass side defects.
- Pellicle membrane defects.

There are also miscellaneous benefits:

- Particles on top of a pellicle membrane can be detected while inspecting the reticle surface. This amounts to simultaneous inspection of two surfaces. On clear field masks, glass side defects can also be detected simultaneously.
- Set up time is less than one minute. If a major problem is identified, inspection can be terminated without spending resources inspecting the entire reticle.
- When an automatic system is out of service, a photomask inspection station can keep production moving.
- A single instrument for both reticle preparation and post pellicle inspection.
- No false defects.

## Essential Instrument Features

Without a photomask inspection station, inspectors will miss defects because they are invisible. The spectacular improvement in the **300/400-PMI** series performance is the result of double dark-field illumination. Double dark-field eliminates the need to optically resolve defects in order to detect them. This is because it causes the size and contrast of the defect to be exaggerated. The result is higher throughput and greater reliability.

Incident dark-field enables the detection of particles on top of chrome. Transmitted dark-field is used to detect particles, chemical residue, pinholes, excess chrome, edge defects and butting errors. Double dark-field enables all of these defects to look like stars in the night sky.

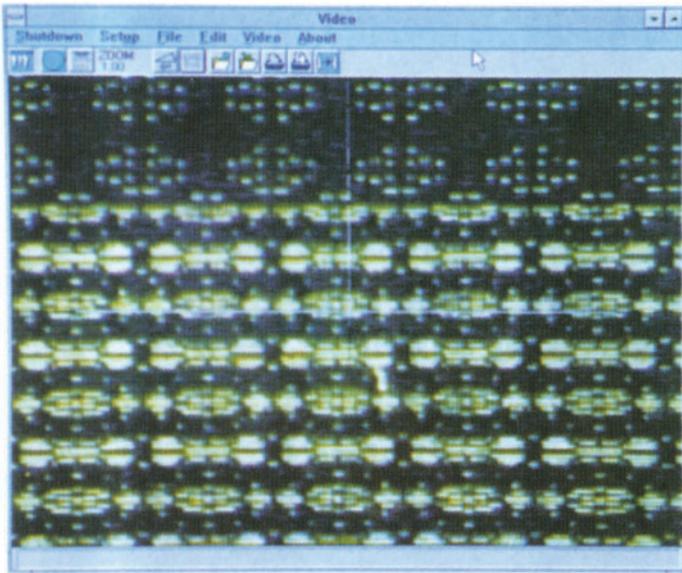
Once a defect is detected, the inspector can go to higher magnification and bright-field illumination to classify it. Classification consists of identifying the defect (particle, chrome dot, pinhole etc.) sizing it and sometimes defining its location. Bright-field illumination is required for this task since dark-field image sizes are greatly exaggerated.

A photomask inspection station is characterized by the following features:

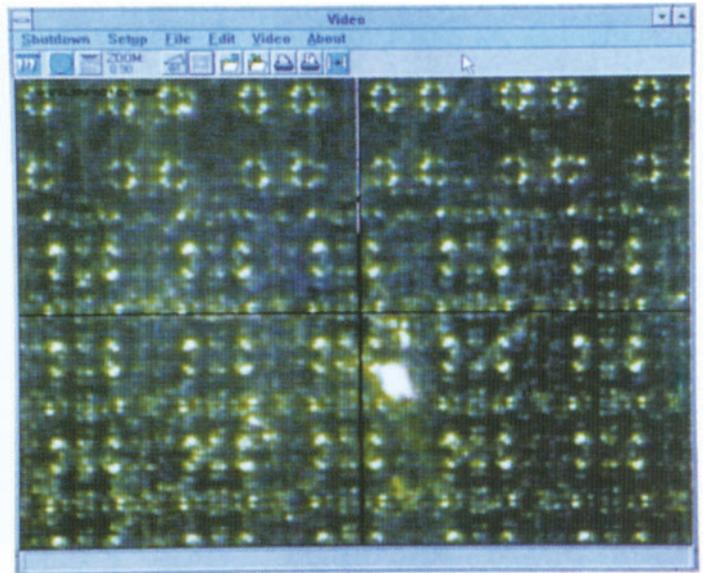
- Long working distance objectives (>12mm).
- Highest magnification objective of at least 100X (200X available).
- Incident and transmitted dark-field illuminators.
- Incident and transmitted bright-field illuminations with color contrast filters.
- Instant switching between illumination modes.
- Erect image for normal hand-eye coordination.
- Low controls (focusing, stage position, illumination).
- Stage and fixtures for handling masks with high standoff pellicles.

An instrument having the above features will enable the procedures discussed in the following sections to be fully utilized.

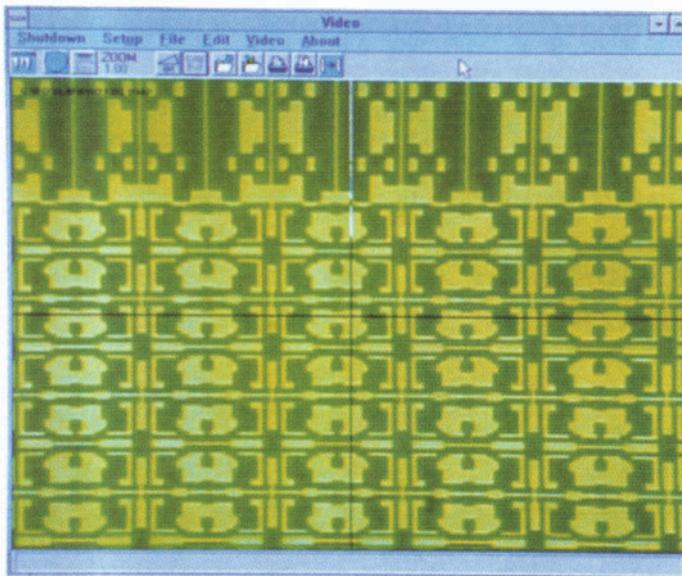
The same area of an IC Photomask is shown with four modes of illumination. Defect was detected utilizing Incident & Transmitted Dark-Field illumination and the procedures outlined in Table 2.



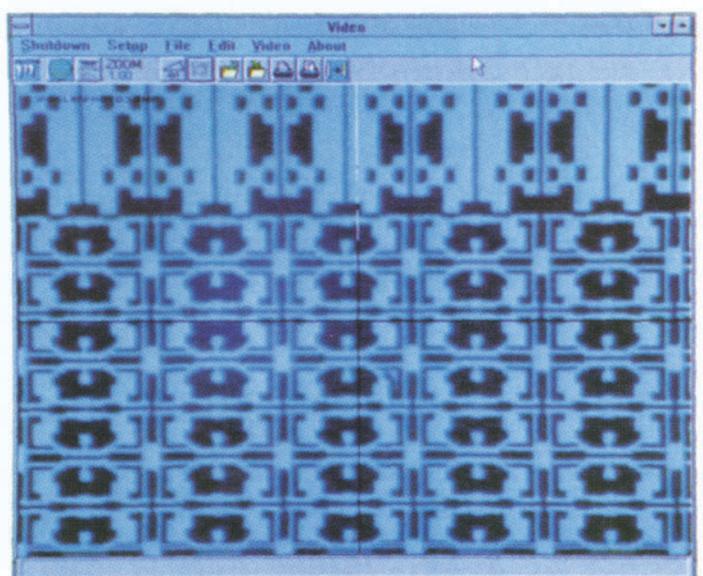
1. The area is illuminated with Incident Bright-Field. The defect is invisible.



2. The area is illuminated with Transmitted Bright-Field. The defect is visible, but indistinguishable from other features of the photomask.



3. The area is illuminated with Incident Dark-Field. The defect is visible, but indistinguishable from other features of the photomask.



4. The area is illuminated with Transmitted Dark-Field. The defect is highly visible and shows up as a bright star in contrast to the surrounding features of the photomask.

The defect in this example was determined to be a submicron particle on the back of the glass, and would have gone undetected utilizing normal Bright-Field illumination of most microscopes.

## Objective Selection

Choice of the optimum objective depends upon the size of the defect which causes rejection. Submicron defects are dimmer than 1 micron defects and are usually surrounded by a higher pattern density. The problems facing the inspector are, therefore:

1. If too low a magnification is selected, submicron defects will be very dim. Also, the field of view will be cluttered with the bright edges of chrome lines.
2. If too high a magnification is selected, the defects will be brighter and the clutter will be reduced. However, inspection times will increase.

## Identification

Techniques for identifying defects depend upon the size. Defects greater than 1 micron can be identified using color contrast bright-field (CCBF). Smaller defects require "probing" with different illumination modes. Even then, an unresolved chrome spot can not be distinguished from a particle. A defect identification procedure is presented in Table 3. It calls for a series of actions and observations. The defect is identified by correlation of the observations with items in Tables 4 and 5.

## Defect Sizing

Sizing defects with a photomask inspection station is an approximate function. For defects larger than 1 micron, one significant figure accuracy is obtained. Defects less than 1 micron may be classified either as between 1/4 micron and 1 micron or less than 1/2 micron. (There is an uncertainty of about a quarter of a micron as to the size of the defect that can be observed in incident bright-field.) A procedure for sizing defects is presented in Table 6.

## Defect Location

The coordinates of defects may be determined by their proximity to some known features utilizing the 342-PMI. This, of course, is a slow and tedious process. By utilizing the coordinate location functions of the 362-PMI, 382-PMI, and 482-PMI exact locations of defects can be logged or recalled for further analysis. Provided that the photomask has been correctly indexed and aligned, these coordinates can easily be recalled for future analysis and relocated utilizing the field of view of the 10x objective. This accuracy is sufficient to enable a defect to be relocated from specified coordinates or to specify the coordinates of a detected defect.

### Table I Reticle Scan Procedure

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1. Determine if the reticle contains a series of parallel line segments
2. Load it on the stage with the line segments running parallel to the Y-axis (to and away from the operator)
3. Start in the left hand corner and traverse the stage away and parallel to the Y-axis.
4. At the end of the scan segment, increment the stage to the left a distance of about 80% of the field of view.
5. Scan the entire field in a similar pattern until the inspection is complete.

## Inspection Procedures

Many inspectors are in a disadvantaged position to adequately inspect reticles. The reason results from the fact that the combined knowledge of reticle defects and microscopy has not been generally available. For this reason, we have developed a means by which the inspection of reticles can be accomplished quickly and reliably.

In order to help alleviate this problem, a series of tables was developed for use with the 300/400-PMI series Photomask Inspection Stations. These tables each contain a procedure for a part of the inspection process. The procedures are presented in Tables 1 through 6.

## Definitions

The tables contain some abbreviations. The definitions are as follows:

- IBF** Incident Bright-Field Illumination. This is the classic semiconductor industry illumination where the light shines down through the microscope objective and reflects off the specimen and back through the objective to the inspectors eyes.
- TBF** Transmitted Bright-Field Illumination. The light from an illumination system shine through the specimen from directly below the objective.
- CCBF** Color Contrast Bright-Field. Using different color filters on IBF and TBF enables both illumination systems to be used simultaneously to simplify defect identification. In this Note, IBF is assumed to be yellow, and TBF green.
- IOFI** Incident Dark-Field Illumination. In this illumination mode, light from above the specimen illuminates the field of view at such an angle that it does not reflect directly back into the objective lens. Consequently, the surface of a perfect mirror would appear pitch black to an operator. However, a piece of dust on the mirror would scatter light into the objective and would look like a star against the night sky.
- TDF** Transmitted Dark-Field Illumination. In this illumination mode, light from below the specimen illuminates the field of view from such an angle that it misses the objective lens. A perfect glass substrate would appear invisible to an operator. However, a defect (bubble, seed) in the substrate, chrome dot or particle on the surfaces, and pinhole in chrome will scatter light into the objective lens and enable these defects to be observed.

## Scanning

We recommend a vertical scan with horizontal increments as opposed to a left to right reading type scan when performing a manual inspection. Our justification is that a person's field of view is wider than it is high. Thus, when the image moves vertically through the wide visual field, usage of the visual system is thought to be more efficient. The benefits of a vertical scan are indicated to be higher detection reliability, less work in eyemotion within the microscope field of view, and accommodation of faster scan rates.

Related to scanning efficiency is plate orientation. Some dark-field illumination makes chrome edges visible. We recommend orienting the plate such that any parallel features such as chrome lines be parallel to the direction of scan. Our experience shows that faster scan rates can be used for such favorable orientations. This follows also from the fact that inspectors are looking for a difference in the expected image. When the lines are parallel to the direction of scan, there will be no difference in the image of a defect free photomask. Any visible defect can be easily detected using fast scan rates and a minimum of visual effort. Consequently, we suggest that each photomask be oriented with due regard to a favorable scan direction.

## Defect Detection

Dark-field is superior to bright-field for defect detection. For example, some submicron defects are completely invisible at the highest magnification in bright-field, but are easily observed at relatively low power in dark-field. Conversely, defects can not be adequately sized or identified in dark-field.

As a consequence of the above, we recommend a two part, detect/classify procedure: scan for defects using simultaneous top and bottom dark-field illumination (double dark-field) at wide viewing fields and classify them at high magnification using bright-field. A procedure for detecting defects is presented in Table 2.

## Magnification

Not only is magnification important to maximize detection/classification reliability and throughput, but also the combination of optical elements that yields the magnification can affect inspection efficiency. We recommend the following rules be used to obtain desired magnification:

1. Use 10X eyepieces whenever possible because they have the widest field of view.
2. Use the highest power objective and the lowest zoom setting in order to have the highest possible resolution and light gathering capability.

For example, to obtain a 100X inspection magnification, use 10X eyepieces, 1X zoom setting, and a 10X objective. This will give better results than either 10X eyepieces, 2X zoom and 5X objective or 20X eyepieces, 1X zoom and 5X objective.

## Table 2 Defect Detection Procedure

1. Load the reticle.
2. Switch the instrument and both bright-field illuminators on.
3. Remove eyeglasses and focus.\*
4. Traverse to the scan starting point.
5. Rotate the scanning objective into the duty position. To help narrow the choices of objectives, the following values can be used to obtain a starting point:

Defect Min. Rejection Size (microns)	Objective Magnification
5	2
2	5-10
0.5	10-20
<0.5	50-100

6. Switch on both dark-field illuminators.
7. Begin the scan pattern.
8. Observe for an incongruous point or burst of light.

\* Inspectors with astigmatism may need to wear glasses.

NOTE: Tables 3-5 assume yellow IBF and green TBF.

## Table 3 Defect Identification Procedure

1. Center the defect in the field of view.
2. Rotate the 50X objective into the duty position.
3. Turn on both bright-field illuminators.
4. Observe the color and brightness of the defect. If the defect cannot be observed, proceed to step 5. Otherwise, identify the defect from the description presented in Table 4.
5. Switch off TBF. Increase brightness of IBF, if necessary.
6. Note the background surrounding the defect (chrome or glass).
7. If defect is invisible, go to step 8. If visible, refer to Item 1 in Table 5 for chrome background. For glass background, refer to Items 6 and 7.
8. Switch IBF off and TDF on. If defect is visible, refer to Items 2 and 4 of Table 5. If invisible, proceed to Step 9.
9. Switch TDF off and IDF on. Refer to Items 3 and 5 of Table 5.

**Table 4**  
**CCBF Identification Guide for Defects**  
**Larger than 1 micron**

<b>COLOR</b>		
<b>Defect</b>	<b>Background</b>	<b>Identity</b>
Green	Yellow	Pinhole
Yellow	Green	Chrome Dot
Black	Green	Particle on Glass
Black	Yellow	Particle on Chrome

**Table 5**  
**Submicron Defect Identification Guide**

<b>Item</b>	<b>Background</b>	<b>Illumination</b>	<b>Appearance</b>	<b>Identity</b>
1	Chrome	IBF <sup>1</sup>	Black Point	Particle
2	Chrome	TDF	Star	Pinhole
3	Chrome	IDF	Star	Particle
4	Glass	TDF	Star	2
5	Glass	IDF	Star	2
6	Glass	IBF <sup>1</sup>	Black Point	Particle
7	Glass	IBF <sup>1</sup>	Yellow Point	Chrome Dot

**NOTES:**

1. Defects less than about 1/2 micron will not be observed
2. Not identifiable. A particle is visually indistinguishable from a chrome dot.

**Table 6**  
**Defect Sizing Procedure**

1. Go to high magnification
2. Switch to IBF illumination. Fully open the aperture diaphragm.
3. Install a measuring eyepiece in one of the viewing tubes.
4. Rotate the eyepieces so that the scale is parallel to the longest dimension of the defect
5. Move the stage so that the left or lower edge of the defect touches a division marker. Count the number of lines subtended by the defect. If the defect subtends less than one division, proceed to Step 6. Otherwise record the size.
6. If the defect is less than one micron and visible, the size is between 1/4 and 1 micron. If it is invisible in IBF illumination, the size is less than 1/2 micron.



*Warranty,  
Terms of Sale,  
International Letter  
of Credit*

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## **PROBING SOLUTIONS LIMITED PRODUCT WARRANTY**

Warranty: All products manufactured by Probing Solutions Inc. are warranted to be free of defects in materials and workmanship for a period of two years from the date of shipment except for:

- Manual manipulators, which carry a 5-year warranty.
- Purchased systems accommodation items such as microscopes, lasers, thermal systems, illuminators (with the exception of light bulbs) are all covered by their respective manufacturer's warranties.

The Warranty is limited to repair or replacement at the factory. This warranty does not cover damage to the product incurred, through negligence, misuse, dropping/impact, tampering, exposure to corrosive substances, fire, explosion, water, wind, rain, hurricane, typhoon, earthquake, mud slides, building collapse or other natural disasters or other acts of nature, normal wear and tear or lack of normal preventative maintenance. Extended Service Warranty and Support are also available for our products, as is on-site or preventative maintenance warranty service.

## TERMS OF SALE

**Quote Valid:** 30 days from date of issue.

**Delivery (estimated ship date):** 6-10 weeks ARO (After Receipt of Order)

**Payment Terms:** Payment may be made via check drawn on a US bank, wire transfer or credit card (VISA and MasterCard accepted). Payment terms are Net 30 days from shipment upon approved credit. If applying for credit terms an application for credit with company, bank and credit references should be sent to the Finance Department of Probing Solutions. A finance charge of 1.5% (annual percentage rate 18%) is applied monthly to balances unpaid after terms have expired. After 90 days, a delinquency charge of \$10 USD plus 10% will be added each month or any portion thereof. The Buyer agrees to pay reasonable cost and/or attorney's fees incurred in the collection of such accounts. All federal, State or local taxes, duties and import fees are paid by the buyer; taxes may be added to invoice as required by law. Open Account Billing on approval of credit application.

**International Terms:** prepay (bank wire transfer, check, credit card: VISA or MasterCard) or Irrevocable Letter of Credit confirmed by a US bank.

**Education Discount:** Probing Solutions offers a 10% 30 days, net 31 days prompt pay discount on all orders for new equipment placed by qualifying universities and colleges.

**Minimum Order:** Minimum order amount is \$50 USD.

**Order Acceptance:** All orders subject to final acceptance by The Probing Solutions Company, Inc., Dayton, Nevada.

**Shipping:** FOB factory Dayton, Nevada U.S.A. All Test Stations will be shipped via air freight or padded/ "air ride" van, insured, freight collect or specify prepaid and add charges to invoice. Experience has shown that long distance common carrier motor freight subjects the equipment to repetitive shocks that can damage the precision alignment of the system and make it impossible for the Company to warrant equipment performance.

**Restocking Fee:** Parts returned for credit will be subject to a minimum of 20% restocking charge. Higher charges, up to full value, may apply for special orders or cosmetic damage or physically damaged parts.

**Order delay:** In the event the Buyer issues a change order causing a delivery delay from the confirmed delivery date, the Buyer shall be charged interest upon the Purchase Order price of the affected items at the rate of 1.5% per month (annual percentage rate 18%). Interest shall be calculated from the initial confirmed delivery date to the actual date of shipment.

**Order Cancellation of "Standard Products":** In the event the Buyer cancels the order for a standard produce the Buyer will be subject to a cancellation charge of twenty five percent (25%) based upon the Purchase Order price of the affected products. In the event of cancellation, the Buyer will have no rights to partially completed goods.

**Custom Orders:** All orders for custom products shall be prepaid unless otherwise specifically agreed in writing. In event of cancellation the Buyer will forfeit the entire prepayment (see order cancellation below). In the case of custom orders where items or parts are specified by the Buyer Probing Solutions does not guarantee that these items or parts will be suitable for the Buyer's application.

**Order Cancellation of Custom or "Non-Standard" Products:** In the event the Buyer cancels the order for a custom or (non-standard) product; the Buyer will be subject to a cancellation charge of one hundred percent (100%) based upon the Purchase Order price of the affected products. In the event of cancellation of a custom (non-standard) product the Buyer will have the option to accept partially completed goods "as-is" at the time of cancellation.

**Guarantee:** All products manufactured by The Probing Solutions Co., Inc. are guaranteed to be free of defects in materials and workmanship for a period of one year from date of shipment except for:

- Manual manipulators, which carry a 5-year guarantee.
- Lasers, for which mechanical/electrical and optical assemblies are warranted for one year, flash lamps and nonlinear crystals for 90-days. The laser warranty does not include illumination or indicator lamps.

This guarantee is limited to the repair or replacement of equipment at the factory. This warranty does not cover damage incurred through negligence, misuse, dropping/impact, tampering, exposure to corrosive substances, normal wear and tear, or lack of normal preventative maintenance. No other warranty is expressed or implied.

**International Warranty Shipments:** Unless otherwise contracted, this guarantee is limited to replacement or repair of equipment at the factory. Products must be returned to the factory prepaid by Probing Solutions with standard (nonexpedited) shipping arranged by Probing Solutions Charges for expedited shipping for warranty work shall be charged to the customer. Repaired or replaced products will be returned to the customer via customer arranged prepaid shipping charges. The customer shall be responsible for all customs related charges (duty. Value Added Tax-VAT) associated with the shipments of the equipment for warranty work.

Extended warranty service and support are also available for our products, as is on-site or accelerated response warranty service. Please contact Probing Solutions, Service and Quality Assurance Department for information on these programs at 775-246-0999.

**Factory/Field Service:**

- For immediate Equipment and/or Application assistance email [sales@probingsolutions.com](mailto:sales@probingsolutions.com)
- Factory field service may be scheduled with a minimum of 30 to 45 days notice in advance of travel. With a full description of the problem in writing including photos where applicable or desirable to communicate problem.
- Domestic USA and Canada - \$2,500 plus part costs required to make repairs.
- International • \$5,500 plus part costs required to make repairs (In some cases it proves to be less costly to ship the test station to the factory for repair and often is a shorter turn around lead time return to Lab Up-Time for the customer).

**Sales and Service:** Probing Solutions Inc. has a world wide network of local Sales Representatives with factory trained Service Engineers available for immediate short term repair response to help with equipment repairs and applications assistance. Please contact the Probing Solutions Customer Service Department.

## **LETTER OF CREDIT INSTRUCTIONS**

Listed below are the terms and conditions REQUIRED by Probing Solutions Inc. to accept a Letter of Credit issued by your bank. Unless these terms and conditions are followed for the Letter of Credit, your order cannot be shipped. Delay penalties for shipment shall not apply or be honored for any delay due to Letter of Credit errors or discrepancies from this criterion. If your bank is unable to issue the Letter of Credit with the following guidelines, please contact us providing specific and detailed information on those areas that must be altered BEFORE issuing the Letter of Credit. This will eliminate needless costs involved in amendments and delay after the credit has been opened which will be charged to you.

### **PRIOR TO ISSUANCE OF LETTER OF CREDIT**

A draft of the proposed Letter of Credit is to be faxed to The Probing Solutions Inc. before opening the Letter of Credit. Fax the draft to the attention of the Accounts Receivable Department at 01-775-246-0480. Probing Solutions Inc. will review the draft and promptly communicate any required changes to be incorporated into the Letter of Credit. After the Letter of Credit is opened any amendments that are required because our L/C instructions were not complied with shall be at the expense of the applicant.

### **LETTER OF CREDIT REQUIREMENTS**

- 1. THE LETTER OF CREDIT IS TO BE DRAWN IN IRREVOCABLE FORM**, must be in the ENGLISH language, and be subject to the Uniform Customs and Practice for Documentary Credits, International Chamber of Commerce Publication No. 500.
- 2. The LETTER OF CREDIT IS TO BE CONFIRMED BY ANY U.S. BANK.** The confirmation charge shall be to the account of the applicant.
- 3. The beneficiary is to be shown as:**  
Probing Solutions Inc.  
9 Enterprise Way  
Dayton, Nevada 89403 USA
- 4. Drafts payable at sight of documents.**
- 5. The expiration date shall be at least 90 days after the scheduled shipment date of the equipment.**
- 6. The credit is to be freely negotiable and payable in the USA.**

7. The letter of credit shall be payable in U.S. currency.
8. TRANSSHIPMENTS must be allowed.
9. PRICE BASIS: EX-WORKS, EX-FACTORY or F.O.B. FACTORY. No other price basis shall be accepted.
10. The airport of export shall be specified as any USA West Coast airport.
11. The Air Waybill is to be consigned to the ISSUING BANK, marked freight collect and notify applicant.
12. Presentation of documents must be no less than 10 days and no later than 21 days after the date of the Air Waybill.
13. If the Letter of Credit allows for an acceptance period, where a certain percent of the dollar value will be paid upon presentation of the documents and the balance is to be paid after acceptance, a limit of no more than 45 days from the date of shipment must be placed as the acceptance period.

The certificate of approval, or a notice of non-conformance, with a specific listing of non-conformance issues with the equipment, must be issued to the confirming bank and the beneficiary within 45 days of date of shipment, or else the equipment will be deemed to be accepted without notification and the remaining 10% payment will be released to the beneficiary. If notification of non-conformance is received prior to the 45-day limit, the 10% shall continue to be withheld until receipt of notification from the user that the non-conformance issues have been resolved.

Please use the following wording in the L/C for such an issue:

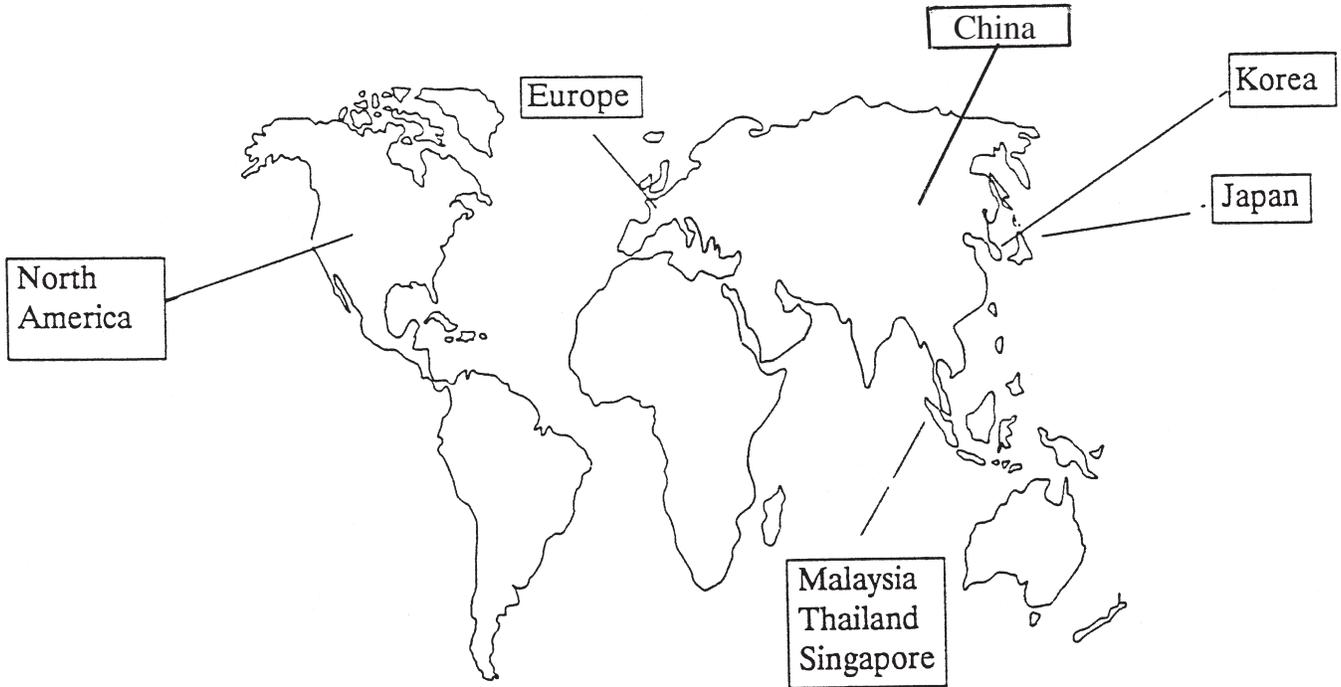
**Ninety percent (90%) of the total value is to be released to the beneficiary upon receipt of documents. The remaining ten percent (10%) is to be released in 45 days from date of shipment, or upon presentation of a Certificate of Approval from the applicant, which ever occurs first.**

14. SPECIAL TERMS: The Letter of Credit shall state that charges for amendments, including related communications charges, issued at the request of the beneficiary because of noncompliance with our L/C instructions, are for the account of the applicant.

NOTE: The bank may require that the customer provide a copy of the Probing Solutions Inc. letter of credit instructions so they may follow this instruction.

# Ψ Probing Solutions Inc.

9 Enterprise Way, Ste. 100 • Dayton, NV 89403 U.S.A



Ψ **Probing Solutions Inc.** representatives and trading companies from around the world stand ready to serve you in technical sales assistance and service. Telephone, Fax or Email Probing Solutions sales for contact information of our sales/service representative or dealer/distributor located nearest to you.

## Local Sales Representative



Visit Our Website At:  
[www.probingolutions.com](http://www.probingolutions.com)



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Specifications subject to change without notice

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