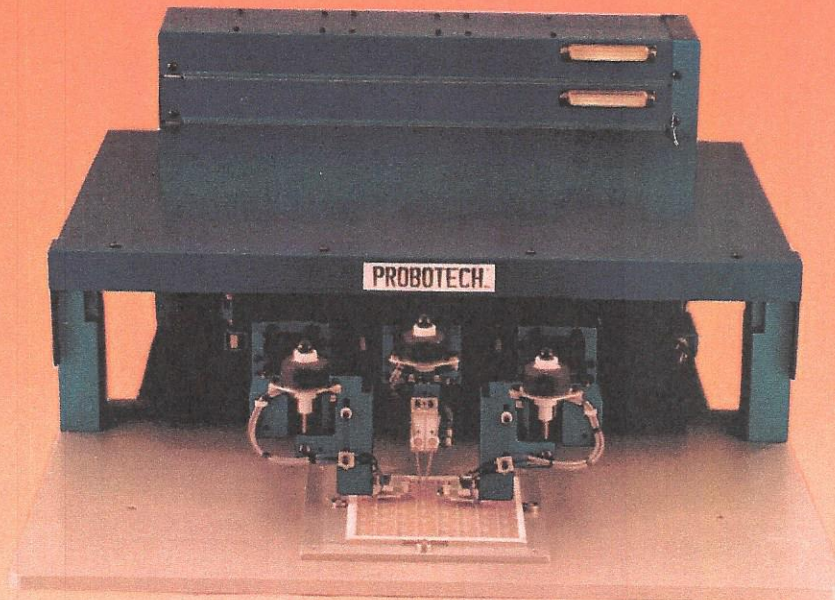


# PROBOTECH<sup>®</sup> INC.

*PROBING INTO THE FUTURE WITH<sup>™</sup>  
SYSTEMS FOR THE MICROCIRCUIT INDUSTRY*

## **MICROCIRCUIT PROBERS**



**TURN KEY TEST SYSTEMS  
FLYING PROBES MAGNETICALLY PROPELLED  
X/Y MOTION WITHOUT LEAD SCREWS, CABLES, OR GEARS  
EASILY CONTROLLED INSTRUMENT BUS FOR CUSTOM TEST FLEXIBILITY**

- \* OPENS / SHORTS, AND MDA
- \* AUTO-ALIGNMENT
- \* SHRINKAGE COMPENSATION
- \* TEACH, OR CAD DATA
- \* 3 PROBE SYSTEM (Pictured)
- \* 12 PROBES / 2 SIDED AVAILABLE
- \* BENCH TOP SIZE

- \* PROBES 3 MIL PADS
- \* .2 MIL REPEATABILITY
- \* SOFT-TOUCH NON-WIPE
- \* SURFACE SENSING PROBES
- \* PROGRAMMABLE Z-AXIS
- \* COLOR CAMERA OPTICS
- \* FAST & VERY LOW COST

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PROBOTECH (R) PROBER INSTRUCTION MANUAL  
Release 2000.13 2/26/98 (last update 06/17/97)  
PROBOTECH 2000  
Bench top Microcircuit Probers

## 1. SYSTEM OVERVIEW

### 1.1 APPLICATIONS and CAPABILITIES:

The **ability** to learn or import CAD probing patterns, makes the PROBOTECH robotic probers ideal as **universal test systems** for thick/thin film circuits, MCM's, SMD placement verification, PC boards, board inner layers, and other microcircuit technologies.

The prober systems have independently movable ROBOTIC probes. You can teach the PROBOTECH probers new circuits in just minutes. Test sequences can be keyboard entered or digitized into a spread sheet style data entry program, or loaded from CAD data bases. You also can use large scale drawings of the circuits to digitize the x/y locations.

The **unique** menu driven spread sheet style test software simplifies the setup of instrumentation. Many instruments may be connected and controlled selectively to provide universal testing of numerous different components. Different tests can be uniquely performed on each component. Reference measurements can be included to compensate for process variations by scaling other measurements. Both process control and engineering limits are tested. Limits can be entered as percentages or as absolute values. Failures can be re-tested. Operators can interact during tests to answer conditional questions, such as verifying device codes or examining defects before continuing tests. The measurements can be checked against limits, printed, stored, and custom user routines can be called for special data analysis.

The PROBOTECH 2000 prober also works well with substrates that contain arrays of identical circuits where each circuit contains many components. Once the system has been taught to probe the components of one circuit, the system can step and repeat the probing of other identical circuits.

## 1.2 SYSTEM DESCRIPTION:

The PROBOTECH 2000 series Bench top probers have two teachable robotic arms that position two probes. The Modular series probers can have from one to twelve probes, double sided. The probers are constructed of sturdy anodized aluminum, making them light weight for their size. The fixture plate on the P2000 can be changed by users to accommodate different substrate sizes. Automatic substrate alignment can be provided, using a three point edge alignment system, and universal vacuum chucks are available. The probers are controlled by an IBM PC/AT compatible computer (buyer supplied). The licensed prober software sends user defined commands over the IEEE 488 interface bus to control buyer provided instrumentation.

### POSITIONING METHOD and CAPABILITY of ROBOTIC ARM:

The basic drive system uses low force linear positioners that are propelled along monorails. Each positioner rides on precision ball bearing wheels (air bearings are optional). The propelling forces are electromagnetic fields between the ribs of the monorail and two electromagnets mounted in the positioner. The positioners move in microsteps along the rails by precisely controlling the strength and phase of currents in the electromagnets. The positional accuracy of the positioning system is mainly determined by the width and spacing of the ribs, and the accurate control of the electromagnetic field currents. There is no mechanical contact to the ribs. There are no lead screws, rotary motors, slides, cables, gears, or other mechanical linkages to wear out and affect the accuracy of the basic X/Y drive system. Under normal operating conditions, the basic drive system will require very little maintenance.

## 1.3 SYSTEM CONFIGURATION REQUIREMENTS

The PROBOTECH prober includes prober software for IBM PC/AT compatible computers. The customer supplies the computer, DOS, instruments, IEEE 488 controller card, and instrument cables.



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1.4 SYSTEM SPECIFICATION:

The following is typical, but will vary between models. See individual data sheets for each prober for actual specifications.

Minimum step size	.001 inch (.0001 step optional software)
Repeatability	.0002 inch
Straightness of travel	.0004/inch (.00015/in and .00005 optional)
Positional accuracy/axis	+-.002 (.0005 and .0002 are map options)
Probing area approx.	P2000 series 24in x 20in, Modular 10in x 50in
Speed y-axis	up to 40 ips (user set, depends on model)
Speed x-axis	up to 40 ips (user set, depends on model)
Probing rate	approx. 6.3 points/sec. (No measurement, see

Programmable z-axis with .5 (2 inch optional on Modular series), at 3 ips.

NOTE: Probing rate depends on many factors. System speed performance is greatly dependent on the speed of the user supplied computer, instruments, and distance between test pads. All above values should be used only as an estimate.

**MECHANICAL SAFETY:**

The systems use low force positioning devices. When the robotic arm is in motion, it has the least force, and can be stopped with minimal effort, and will not clamp down as would lead screw driven systems. When the arm is at rest, the arm can be moved by applying about four pounds of force. Once in motion the arm can be pushed with minimal force. The system will automatically recover from such action by performing an auto-alignment at the beginning of the next probing sequence. Because of the many uses and applications for its products, PROBOTECH INC makes no warranty, either expressed or implied, that its product(s) is suitable or safe for any particular purpose, and because buyer controls the uses and applications, buyer shall indemnify PROBOTECH for any loss resulting from the use of the product(s).

**TYPE OF PROBES:**

The non-wipe Kelvin probes are available in .001, to .015 inch diameter tips, and .002 separation. Surface sensing probes are available, and the probes can withstand large variations in z-axis height while maintaining position on warped substrates or while probing three dimensional circuits.

**DIMENSIONS:**

**PROBOTECH 2000-24X36:**

Fixture Base: (width 36in.)x(depth 28in.)x(height 8.5in.)  
Distance from test surface to top: 3.75in. (will fit under microscope)  
Probe tip to test surface with probe in up position: .32 to .75 inch.  
Controller drive unit is 20.25in width x 18.5in depth x 14in height.

**PROBOTECH 2000-15X22:**

The PROBOTECH 2000 series includes a smaller unit with base dimensions of 24 x 18 inches, fixture plate 13.5 x 22 inches, and probing area of 11 x 10 inches. Controller unit 24 x 18 x 6.375 inches can fit under fixture.