

INSIDE THIS ISSUE:

Z-ADJUSTABLE PROBE 2

POPULATED SUBSTRATES 2

PARTNER PROFILE 2

PROBE TIP 3

LINEAR ARRAY TECHNOLOGY 3

CHIP RESISTOR EVOLUTION 3

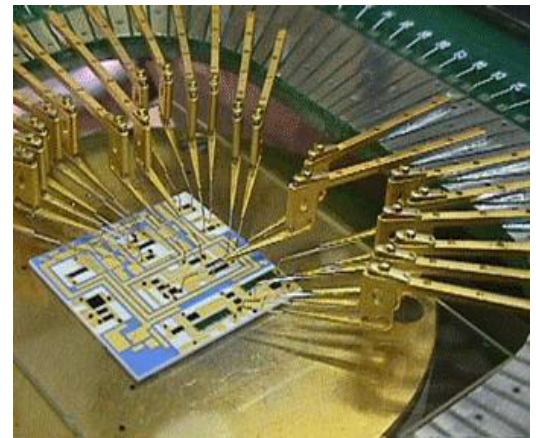
TRADE SHOW SCHEDULE 4

PROBE APPLICATIONS

- Wafer sort
- Device test
- Laser trim
- Process control
- Parametric test
- Reliability studies
- Signal integrity

WELCOME TO THE FIRST ISSUE OF PROBITY

This is the first issue of Probity, Accuprobe's newsletter to inform the test community about events, issues, products and challenges in this dynamic segment of the semiconductor market. With so many industry changes taking place from both the technical and economic perspective, it is important that we communicate and foster a dialog for the benefit of our thousands of customers throughout the world. Accuprobe too is undergoing substantial change, with the entry of Jeff Wake into the business alongside company founder and respected industry probing expert, Tom Murphy. We look forward to being of continued service to you and your companies, your feedback and suggestions, and to meeting you at one of the many industry events scheduled for 2002.



Hybrid circuit being tested with z-adjustable probes

PROBING CHALLENGES IN THE YEARS AHEAD

In the recently released International Technology Roadmap for Semiconductors (ITRS), where the technological challenges and needs facing the semiconductor industry over the next 15 years are described, a number of probe card difficult challenges were identified.

These were grouped under the categories:

- High Frequency Probing
- Geometry
- Parallel Test
- Probing at Temperature
- Product
- Probe Cleaning
- Cost & Delivery

• Probe Metrology

Clearly increased product densities, the move to 300mm wafers, and products operating up to 40Ghz presents serious challenges to currently available probing technology.

Accuprobe continues to monitor industry requirements and has an active product development program underway to address a number of these issues.

The report is sponsored by the Semiconductor Industry Association (SIA), as well as associated organizations in Europe, Japan, Taiwan, and Korea .

The full report is publicly available at the web site <http://public.itrs.net/Home.htm>

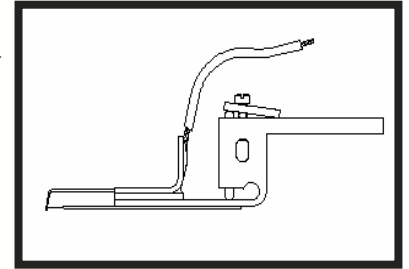
## NEW INLINE Z-ADJUSTABLE KELVIN PROBE

Accuprobe pioneered the K Type Z-adjustable Kelvin probe 25 years ago. These probes are robust, long lasting and provide significant flexibility by allowing the probe card user to precisely adjust the z-axis of the probes for optimum probe co-planarity. K-Type Z-adjustable probes have a ceramic substrate attached to the probe body so that force and sense probe tips can be mounted allowing true Kelvin measurements to be made. The current design mounts the two tips side by side with a selectable separation between the probe contact centers from between .002" to .060".

While useful in many applications, the side-by-side configuration of the probe tips can limit the density of connections in some cir-

cumstances, due to the width of the probes and the potential for probe interference. Accuprobe is pleased to make available a new Z-adjustable in-line Kelvin configuration as an alternative to the current K-Type probe.

The In-line Kelvin (IK) Z-adjustable probe provides a slim alternative to the long proven K Type probe. The IK probe is available with Gold or Tin plating (TIK) on the probe body and is also available in a Flexible version (FIK). The model number matrix is essentially the same as the original K Type probe and is available with the same selection of materials, dimensions and other variables. Contact Accuprobe or your sales agent for additional information and ordering information for the IK Type Z-adjustable probe.



New inline Z-adjustable probe

## PROBING POPULATED SUBSTRATES

Probing populated devices requires a measure of creativity when trying to make contact down through a group of passive or active devices on a thin film or thick film substrate. In the ideal world the device designer would place all probe contacts around the perimeter of the device. However, more often than not, Murphy's law creeps in and we find ourselves with the equivalent of an aerial shot of Manhattan trying to reach down through the tall buildings to make contact with a manhole cover in the street. We sometimes find a requirement to place probes at different levels in the Z axis making contact with the conductive surfaces of some components and the need to then address the variation in

Z position as a function of the pick and place and attachment process. No one probe technology may be sufficient to satisfy all of the requirements so the creative probe card assembly will draw from a full range of probe products to accomplish a working probe card assembly. It will be necessary to use cantilever beam probes with elongated tip lengths to clear the component heights which may exceed 0.150 inch in height. Spring compression probes can be used where Z height variation will frustrate the use of fixed Z position probes. As always, planarization of the entire probe card assembly is critical to measurement success and the longevity of the test fixture.

It's like trying to reach a manhole in the street from the rooftops of Manhattan.

## PARTNER PROFILE

**Par-Tek**

Phoenix, Arizona

Par-Tek is based in Phoenix, Arizona and provides technical representation for suppliers of quality semiconductor test interface hardware, including products from Accuprobe.

The principal, Lee Bemis, has many years of

experience in the semiconductor test industry and is well known throughout the west.

Accuprobe is pleased to have Lee and Par-Tek supporting our probing efforts.

Phone: 480-496-8799 Fax: 480-496-9193  
Cell: 602-620-9302 e:mail: [lee@par-tek.com](mailto:lee@par-tek.com)



Lee Bemis of Par-Tek

## MINIMIZING PROBE SCRUB

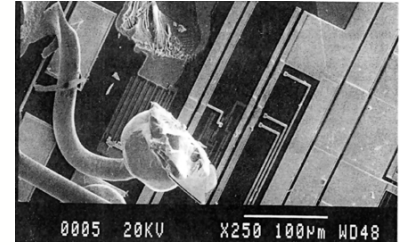
Accuprobe has recently published Probe Tip #20 entitled "Minimizing Probe Scrub." The technical bulletin is in response to a number of enquires from customers seeking to understand best practices in probing.

Scrub is the movement of the

probe tip against the pad of the device under test (DUT) when overdrive is applied to the system. An optimum level of scrub is required to ensure maximum yield and minimal damage to the pads of the DUT. Minimal scrub can lead to a failure to break through surface contaminants, while

an excessive level of scrub can damage passivation areas surrounding the bond pad.

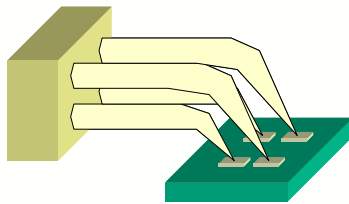
Full details of the technical bulletin can be found on our informative web site located at [www.accuprobe.com](http://www.accuprobe.com).



Lifted ball bond due to pad damage

## LINEAR ARRAY TECHNOLOGY

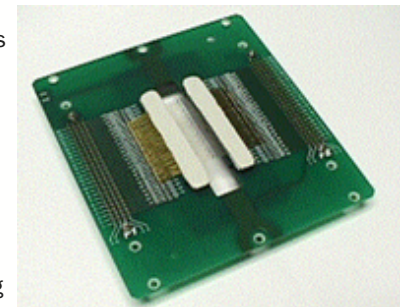
Accuprobe's Linear Array Technology probe cards form the basis of complex multi-die chip resistor solutions and are also finding application in the test of optical, MEMS, and sensor devices. The cards incorporate dual epoxy bar arrays that can each accommodate up to 256 probe needles at 100 microns pitch. A unique under/over placement of the probe needles allow four rows



Under/Over Probe Configuration

of pads to be reached, or alternatively allows for tighter pad spacing without needle interference. In chip resistor laser trim, full Kelvin measurement of multi-die standard form factor resistors are able to be trimmed in a single pass as a result of the complex geometries that are able to be supported. Accuprobe is able to support a number of standard cards and wire harnesses for industry leading laser trimmers. A newly designed general purpose 4 1/2"

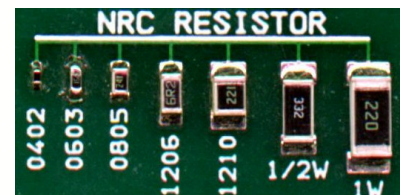
probe card is suitable for use with the Linear Array Technology for probing optical, MEMS, and sensor devices. Accuprobe has designed a number of custom cards for unique applications using this flexible, quality, and long life technology.



Linear Array Technology Card

## CHIP RESISTOR EVOLUTION

The humble resistor continues to be evolved with the volume 0603 and 0402 form factor products now being supplemented by the 0201 very small geometry device. Moore's Law has generally been attributed to apply to processor and memory devices, however passive components have undergone a similar evolution, some would say revolution. The new 0201 devices are 0.6mm in length and have 0.15mm terminations. This is a 40% reduction in size from the volume 0402 product and is more than a 5x reduction in size from the 1210 device shown at right. Multi-chip arrays fabricated on a single substrate lead to complex probing challenges, particularly when full Kelvin measurements need to be made to meet acute tolerances. The incredible shrinking size of the resistor has pushed the laser trim industry to evolve faster and more accurate trim systems to satisfy the expanding requirements for the surface mount segment of the industry. Accuprobe supports both the GSI Lumonics and the ESI (Electro Scientific Industries) family of laser trim systems. Accuprobe has recently produced a 228 pin, 1 pass, full Kelvin 0603 probe card assembly for the GSI 724/770 laser trim system for a leading industry customer. Accuprobe is fully capable of satisfying the ChipR industry needs for similar 0402 and 0201 applications.



Chip Resistor Size Reduction

**Celebrating our 26th Year**

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

**ACCUPROBE, INC.**

1 Harrison Ave  
PO Box 1044  
Salem, MA 01970  
USA  
Phone: +1-978-745-7878  
Fax: +1-978-745-7922  
Email: [accuprobe@aol.com](mailto:accuprobe@aol.com)



**Probing the World of Microelectronics**

Accuprobe manufactures fixed pattern probe card assemblies for use by semiconductor producers. Probe cards are used for semiconductor wafer sort and Hybrid circuit laser trim applications. Accuprobe also manufactures probe card assembly and repair equipment which allows customers to assemble their own probe card assemblies using Accuprobe needles, tips, blank probe cards, edge sensors and other related components. Accuprobe offers Epoxy Ring, Z Adjustable, Metal Blade, Ceramic Blade and Blade Spring probes.

For further information or subscription changes contact: the Editor at [accuprobe@aol.com](mailto:accuprobe@aol.com)

**SEE US AT THESE TRADE SHOWS AND EVENTS**



April 15-20 - Munich, Germany  
EPP Stand A1.151



April 24 - Schaumburg, IL  
April 26 - Orlando, FL  
May 1 - Boxborough, MA  
June 6 - Bethlehem, PA  
September 4-6 - Denver, CO



**SOUTHWEST TEST WORKSHOP**

June 9 - 12 - Long Beach, CA



City of Long Beach, CA