

## **ARCHIVE 2009**

### SOCKETS 101: A BROAD AND DEEP SURVEY OF TEST INTERCONNECT SOLUTIONS

by

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#### ABSTRACT

**This tutorial offers** a comprehensive study of test sockets. With an emphasis on socket technology, the role of the socket in the test interface will be defined from electrical and mechanical perspectives. Plus, commercial aspects, some history and a future roadmap will be discussed.

The many options for electrical contacts, which are perhaps the most critical factor in the success of a socket as a transparent interconnect, will be described and compared in detail. Their anatomies, advantages, and vulnerabilities will be made plain to attendees regardless of their background and experience.

Likewise, various socket materials and their limitations will be reviewed. The features which integrate the test socket with its compression mechanism (be it manual lid or robotic test handler) will be covered to provide an understanding of how they shape the socket platform.

This leads naturally into how devices can be aligned within sockets, which in turn will carry the discussion into a comparison of various techniques for alignment such as floating nests and strip test.

High-frequency behavior will be touched upon briefly, to the extent necessary for typical engineers to select contacts and specify socket constructions.

Finally, maintenance and life-tracking will be reviewed with an eye toward better and more economical test strategies. Engineers who attend this session, regardless of their experience with test sockets, should leave with a fundamental and comprehensive understanding of test sockets in terms of application, specification, and selection.

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#### Who should have attended this tutorial?

Test engineers who are relatively new to the socket 'world' will accelerate their knowledge of sockets, while veteran engineers will gain new insights by having the opportunity to think outside of the boundaries of their direct experience. Others, such as executives, journalists, and academics, whose work takes them close to the socket industry and are seeking a deeper understanding of the socketing field and all its vagaries, will find this tutorial just what they need.

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# **Compression Mechanisms**

- 'Lids' hinged, open-top, compression plates
- Can add thermal functions

















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# Burn-in Sockets

- Hard mounted
- Lidded (open or hinged)
- Standardized or tooled
- Iteratively inexpensive
- Less durable



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### Types of Test, Types of Sockets Functional Test - AKA 'Sort' or 'Final' or 'Production' test Automated – high throughput Moderately to significantly parallel - 'At speed' interconnect must be Photo courtesy of solder-like Advantest GmbH 3/2009 BiTS 2009 Tutorial: Sockets 101 - A Broad and Deep Survey of Semiconductor Test Interconnect Solutions 16





- Made to suit equipment, device customized
- Cost of use significant
- Often share roles







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- Wear
- Sticking
- Tolerance stacks
- Hygroscopic growth
- Contact patch







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- Hard stop
- Contact damage
  - Force
  - Energy
- Contact compliance
- Required contact force
- Thermal requirements













































