

BRING IT TO THE BOARD (PCB)

The device under test (DUT) board is sometimes overlooked as a critical element in test-and burn-in strategies. This session brings PCBs into the limelight. The first presentation will cover some of the challenges that various DUT layouts present, demonstrating to semiconductor and ASICS design engineers the importance of considering final test hardware when designing device layouts. Another important consideration, covered in the second presentation, is the importance of performing RF characterization and simulation in-house to accurately measure the materials' electrical performance.

Building Optimized Test PCB's Starts at the DUT

Joe Birtola—CMR Summit Technologies

High Frequency PCB Material Characterization and Simulation

Ryan Satrom—Multitest

MARKET REPORT

As a bonus in this session, you'll get a look at the marketplace for test equipment and test consumables



This Paper

Market Trends in Test Equipment and Test Consumables

John West—VLSI Research

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Market Trends in Test Equipment and Test Consumables

John West
VLSI Research Inc.

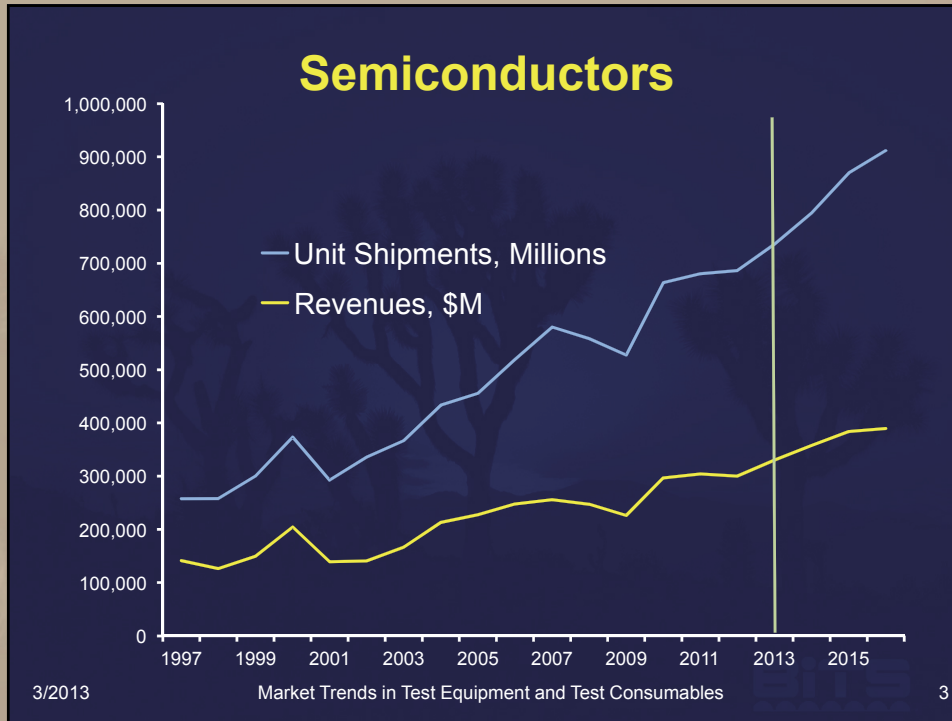


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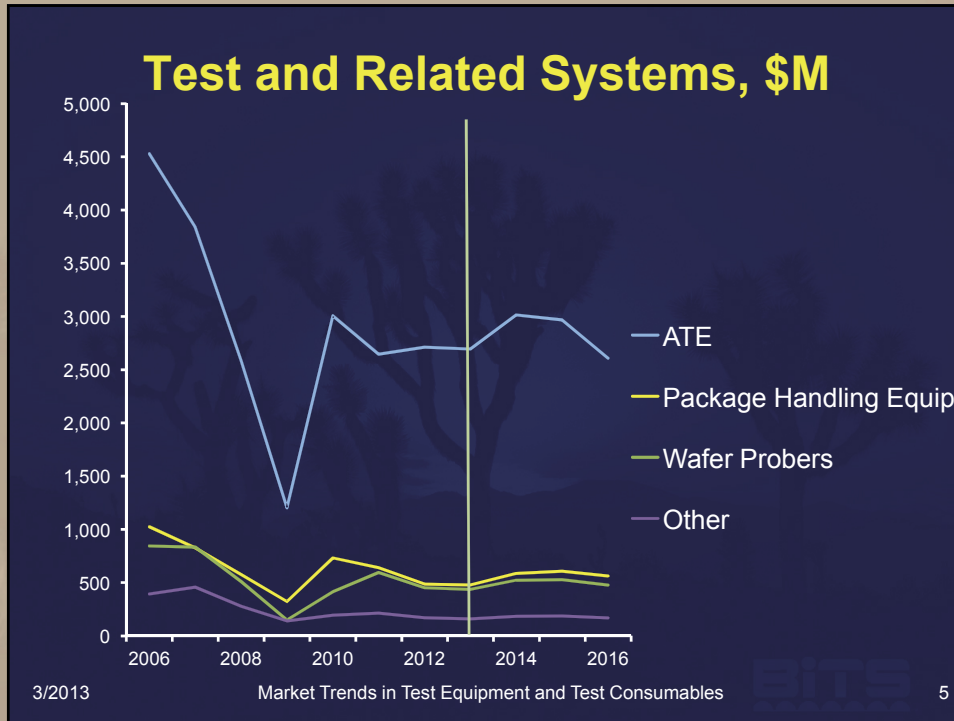
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Overview

- **Market Environment**
 - Semiconductors
- **Test Equipment**
 - Buy Rate
- **Test Consumables**
 - Sockets
 - Probe Cards
 - Interface Boards
- **Summary**

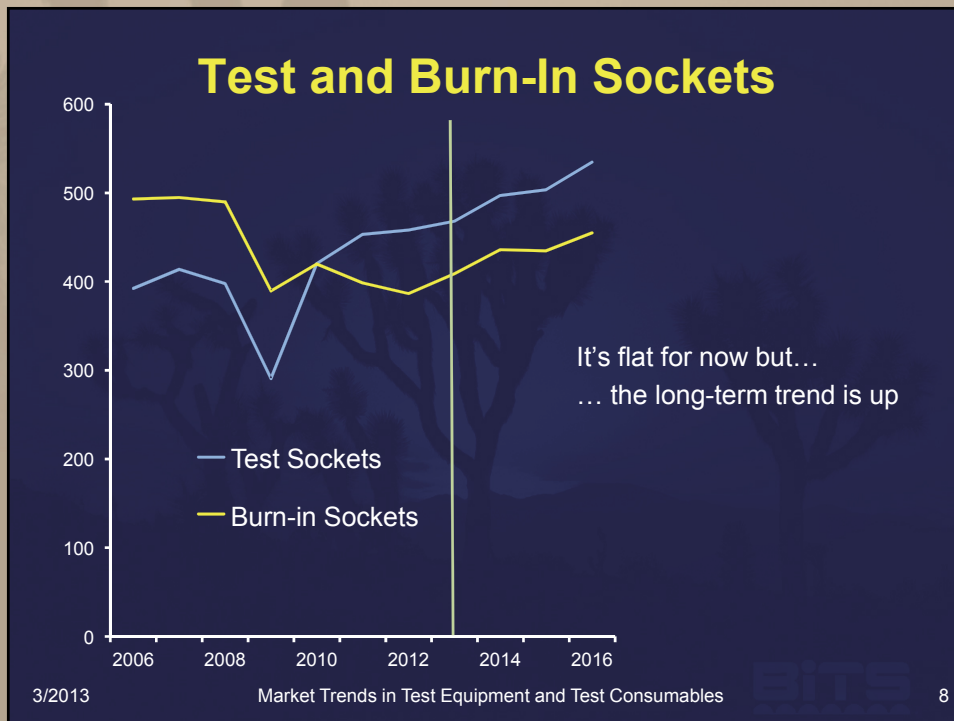
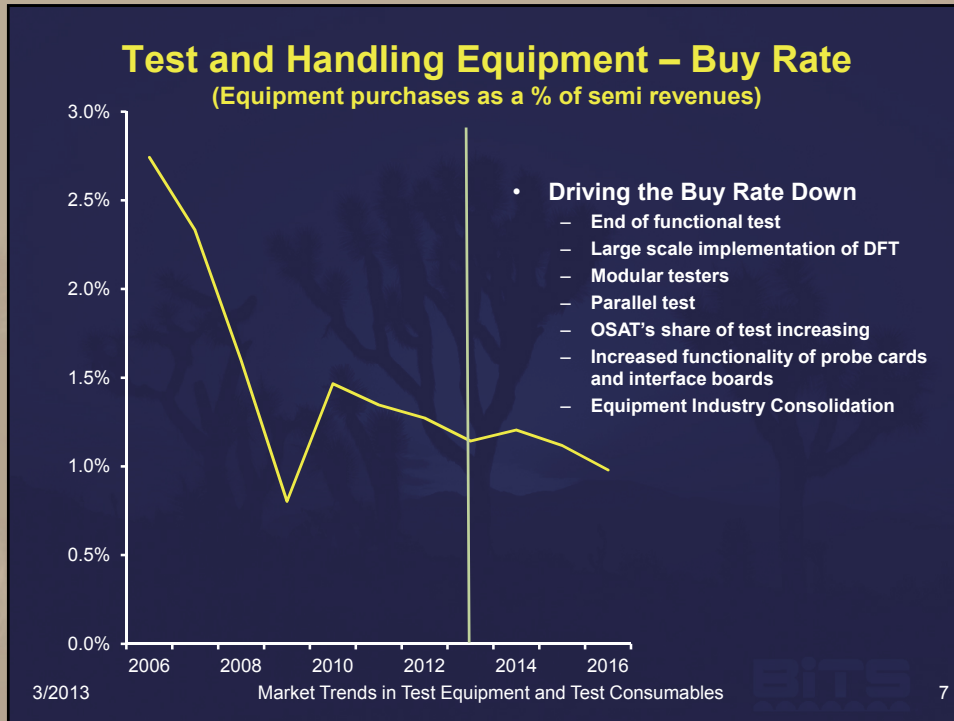


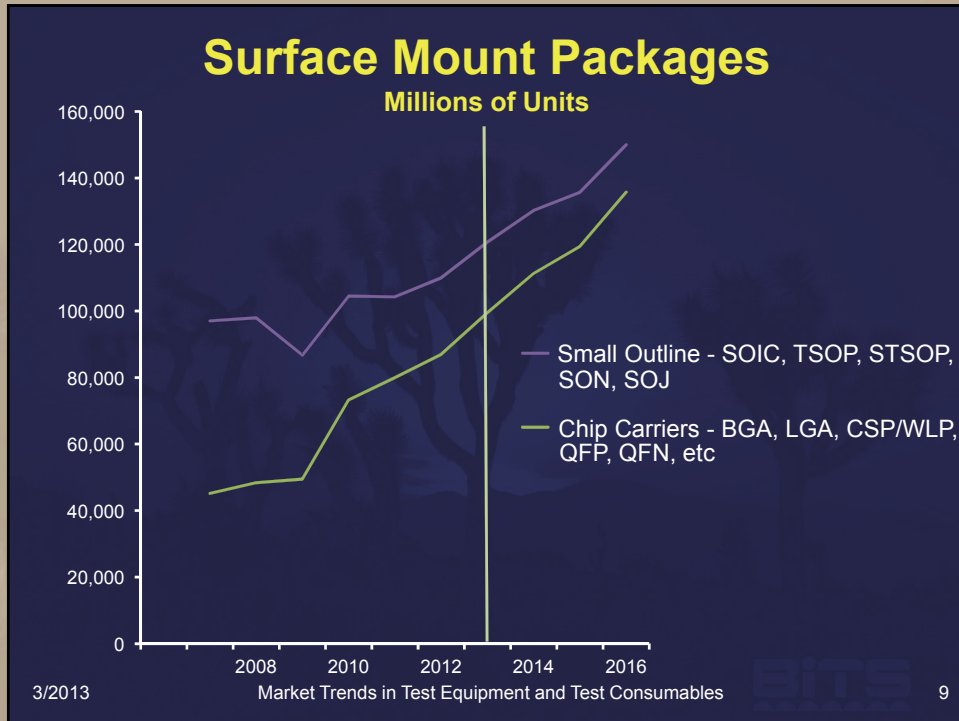
- ## Market Drivers
- **Semiconductor Units**
 - Solid growth of 7.2%
 - Highest Growth in Flash Memory driven by Mobile Devices
 - DRAM and other Logic with above average gains
 - **Semiconductor Revenues**
 - ASP driven upturn
 - **Winners in 2013 will be:**
 - Foundries serving mobile segments
 - Flash Memory Suppliers
 - DRAM Suppliers
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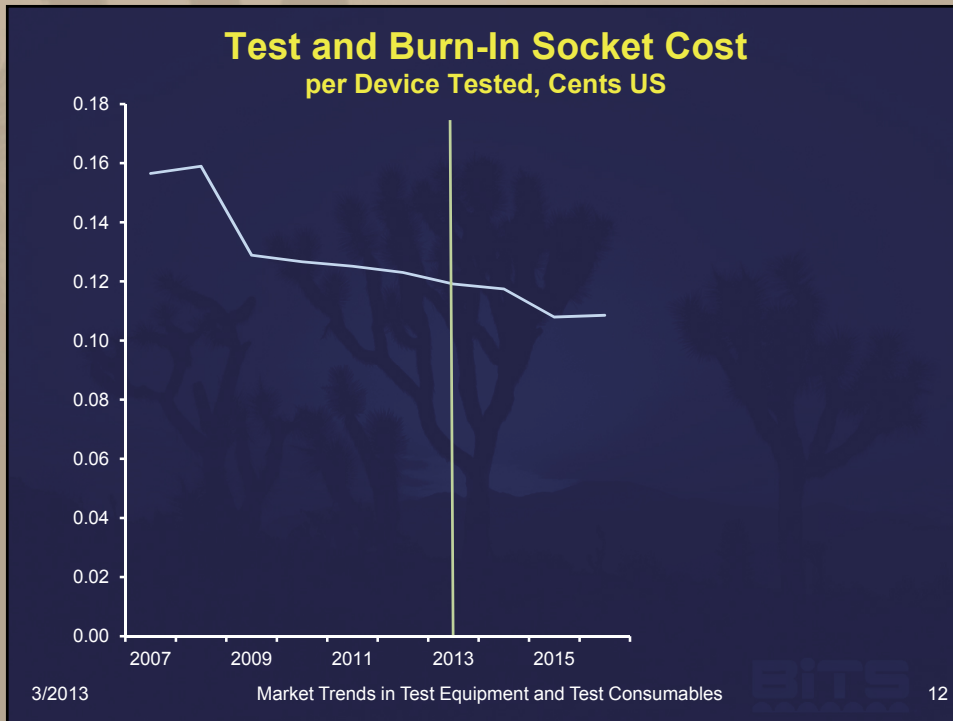
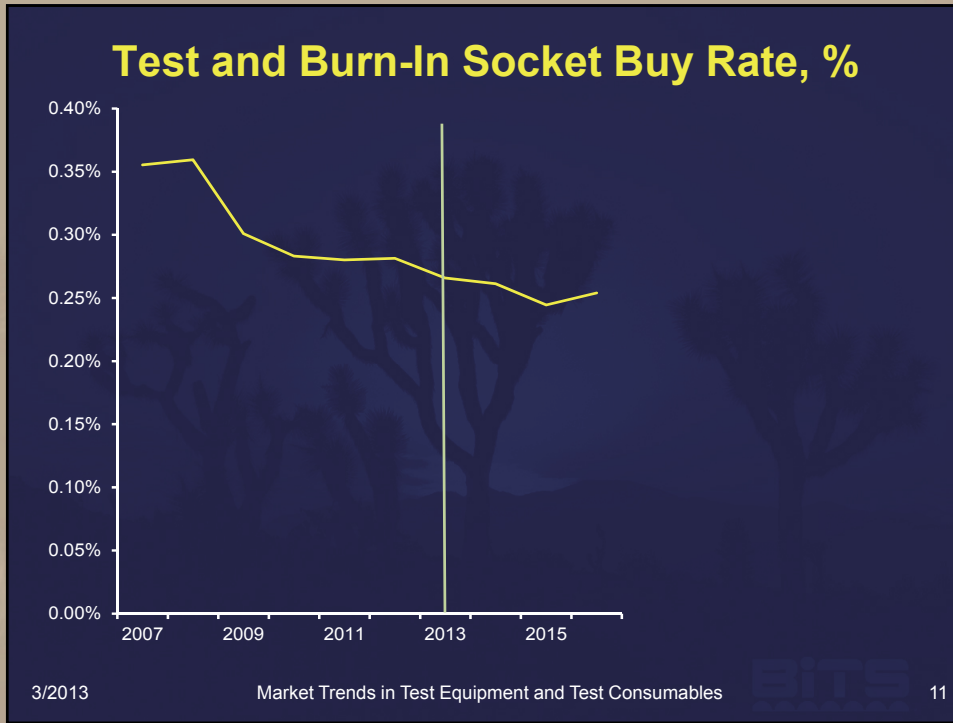
Market Trends in Test Equipment

- Mobile devices are the key driver for SOC
- Memory test continues to be depressed - challenged to reach \$0.5Bn in sales within next five years
- Handler spending continues to be weak - OSAT share gains drive productivity leading to lower handler demand
- Multi-site testing drives higher ASPs





- ## Drivers by Package Type - 2011 to 2016
- High Growth > 10% CAGR
 - BGA
 - LGA
 - CSP/WLP
 - QFN
 - SON
 - Mid Growth < 10% CAGR
 - Transistor Outline
 - SOIC, TSOP, STSOP
 - Flat to Decline
 - Through Hole Mount
 - PLCC
 - QFP
 - SOJ
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The Cost of Test is a Growing Concern

- In addition to the cost of Test and Burn-In Sockets...
 - ...there's Service, Support and Spares for Test Related Equipment and Test Consumables adding \$600M to \$800M to the bill...
 - ... and another \$400M for Load Boards...
 - ... and \$1,100M - \$1,300M for Probe Cards!
- Total cost of test per device tested over past few years has been flat!

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Summary

	2012	2013	2016	CAGR 11-16
Test Sockets, \$M	510	560	670	5.4%
<i>Annual Growth %</i>	-2%	10%		
Burn-In Sockets, \$M	480	515	590	3.7%
<i>Annual Growth, %</i>	-2%	7%		
Semiconductors, \$Bn	300	330	390	5.1%
<i>Annual Growth,%</i>	-3%	10%		

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