Market Trends in Test

John West
VLSI Research Europe

IEEE SW Test Workshop
Semiconductor Wafer Test Workshop
June 10 - 13, 2012 | San Diego, California
Presentation Overview

• Market Environment
  – capex, confidence, inventories, and utilization rates

• ATE Market
  – sales, buy rate, cost per device tested, & consolidation

• Test Consumables
  – probe cards, sockets and interface boards

• Probe Cards
  – cost per device tested, and why no consolidation

• Summary
## 2012 Top 10 Capex Spenders

Capital Expenditures by Company, $Bn

<table>
<thead>
<tr>
<th>Company</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012e</th>
</tr>
</thead>
<tbody>
<tr>
<td>Samsung</td>
<td>3.9</td>
<td>11.0</td>
<td>11.7</td>
<td>13.6</td>
</tr>
<tr>
<td>Intel</td>
<td>4.5</td>
<td>5.2</td>
<td>10.5</td>
<td>12.5</td>
</tr>
<tr>
<td>TSMC</td>
<td>2.7</td>
<td>5.9</td>
<td>7.4</td>
<td>8.3</td>
</tr>
<tr>
<td>Hynix</td>
<td>0.9</td>
<td>3.0</td>
<td>3.0</td>
<td>3.7</td>
</tr>
<tr>
<td>GLOBALFOUNDRIES</td>
<td>0.8</td>
<td>2.8</td>
<td>5.4</td>
<td>3.6</td>
</tr>
<tr>
<td>Micron Technology</td>
<td>0.5</td>
<td>1.8</td>
<td>2.8</td>
<td>2.0</td>
</tr>
<tr>
<td>UMC</td>
<td>0.5</td>
<td>1.8</td>
<td>1.6</td>
<td>2.0</td>
</tr>
<tr>
<td>Toshiba</td>
<td>1.0</td>
<td>2.1</td>
<td>1.6</td>
<td>1.8</td>
</tr>
<tr>
<td>SanDisk</td>
<td>0.5</td>
<td>1.1</td>
<td>1.4</td>
<td>1.4</td>
</tr>
<tr>
<td>Elpida</td>
<td>0.9</td>
<td>1.3</td>
<td>1.0</td>
<td>0.2</td>
</tr>
<tr>
<td>Others</td>
<td>6.9</td>
<td>12.1</td>
<td>10.0</td>
<td>7.6</td>
</tr>
<tr>
<td><strong>Total Top 10</strong></td>
<td>23.1</td>
<td>48.1</td>
<td>56.4</td>
<td>56.7</td>
</tr>
</tbody>
</table>

**Annual Growth**

- 108.2%
- 17.3%
- 0.5%

Up $6Bn on VLSI’s January update

Most of the upgrade is in foundry, the rest is capacity upgrades for memory.
Industry Confidence... it’s on the up

Confidence above the 75° growth line

Driven by foundries, subcons and SOC for computing
Inventories... under control

inventory, $Bn
inventory to billings ratio
Utilization rates at the subcons are rising fast.

Driven primarily by strong demand in the mobile space amid new product introductions.
Semiconductors, $M

Logic
Memory
Discrete & Other
Analog
ATE Buy Rate
ATE as a % of device sales

Memory IC Test Systems
Systems-on-a-Chip Test Systems

June 10 - 13, 2012  IEEE Workshop
Top 3 ATE Vendors’ Share of Market

- 2007: 65%
- 2008: 70%
- 2009: 75%
- 2010: 80%
- 2011: 85%
- 2012e: 90%
Probe Card Cost per Device Tested
cents per device
Why are costs per device not falling?

• Transition from Cantilever to Advanced
  – doesn’t drive down cost per device tested

• Average Selling Prices are Falling
  – but at the same rate as IC average selling prices

• Industry Consolidation
  – fewer suppliers, but no consolidation at the top
Probe Card Consolidation?

Top 10 Share

Top 5 Share

Top 3 Share

Summary

• **Semiconductors**
  – 2012: revenues up 4%, units up 7%

• **Semi Equipment**
  – at least as good as 2011

• **ATE Equipment**
  – 2012: down 6.5% to $2.5Bn

• **IC Probe Cards**
  – 2012: flat at $1.2Bn
Thank You

John West
VLSI Research Europe
Cambridge, UK
+44 1223 393633
johnwest@vlsiresearch.com