Supply Chain Planning in the Global Electronics Industry
• Ask questions during the webinar by using the Questions window

• Questions will be addressed at the end of the webinar

• Any question we do not get to will be answered individually by email

• The presentation will be sent to you after the webinar

• Please respond to the survey questions at the end of the webinar
Agenda

• SiliconExpert Introduction               5 minutes
• Walt Custer - Custer Consulting          40 minutes
• Tierney Powers - SiliconExpert           10 minutes
• Questions & Answers                    5 minutes
Tierney Powers
Sales Associate
(415) 990-7256
tierney@siliconexpert.com
• Serving Electronic OEMs, Distributors, Manufacturers & Contract Manufacturers

• Our Electronic Component Database of over 250 million components powers our:
  o Comprehensive software tools
  o Integrated solutions
  o Professional services
Reactive vs. Proactive Approaches to Obsolescence Management

Our Database

- 250 Million+ Orderable Part Numbers
- Up to 42 Parametric values/product line
- Risk Analysis & Obsolescence Forecasting Algorithms developed with CALCE
- Environmental Data tracked: EU & China RoHS, REACH, WEEE compliance & Material Declarations
- Parametrically-derived cross-references for millions of parts
Walt Custer
President at Custer Consulting Group
707 785-1777
walt@custerconsulting.com

www.custerconsulting.com
Business Outlook

Global Electronics Industry

Custer Consulting Group
www.custerconsulting.com
September 2013
Topics of this Presentation

• Business Cycles & Global Economy
• World & Regional Electronic Supply Chain Growth
  - Electronic Equipment
  - Active & Passive Components
  - EMS/ODM Companies
  - Materials and Process Equipment
• Summary & Forecasts

• Forecasting tools and how to use this information to predict your companies sales
Global Economy
<table>
<thead>
<tr>
<th>Country</th>
<th>% Change</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Britain</td>
<td>-1.5</td>
<td>Jul</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>+2.0</td>
<td>Jul</td>
</tr>
<tr>
<td>France</td>
<td>-1.8</td>
<td>Jul</td>
</tr>
<tr>
<td>Germany</td>
<td>-2.3</td>
<td>Jul</td>
</tr>
<tr>
<td>Italy</td>
<td>-4.4</td>
<td>Jul</td>
</tr>
<tr>
<td>Netherlands</td>
<td>-0.4</td>
<td>Jul</td>
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<tr>
<td>Russia</td>
<td>-0.8</td>
<td>Jul</td>
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<tr>
<td>Spain</td>
<td>+0.4</td>
<td>Jul</td>
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<tr>
<td>Euro Area</td>
<td>-2.2</td>
<td>Jul</td>
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<tr>
<td>Canada</td>
<td>-0.6</td>
<td>Jun</td>
</tr>
<tr>
<td>USA</td>
<td>+1.4</td>
<td>Jul</td>
</tr>
<tr>
<td>China</td>
<td>+10.4</td>
<td>Aug</td>
</tr>
<tr>
<td>India</td>
<td>-2.2</td>
<td>Jun</td>
</tr>
<tr>
<td>Malaysia</td>
<td>+7.6</td>
<td>Jul</td>
</tr>
<tr>
<td>Singapore</td>
<td>+2.7</td>
<td>Jul</td>
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<tr>
<td>S Korea</td>
<td>+0.9</td>
<td>Jul</td>
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<tr>
<td>Taiwan</td>
<td>+2.1</td>
<td>Jul</td>
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<tr>
<td>Thailand</td>
<td>-4.5</td>
<td>Jul</td>
</tr>
<tr>
<td>Japan</td>
<td>+1.6</td>
<td>Jul</td>
</tr>
</tbody>
</table>

Source: www.economist.com + Eurostat
Purchasing Managers' Indices
July vs. August 2013

Above 50 = Growth
Below 50 = Contraction

- World: 50.8 - 51.7
- USA: 55.4 - 55.7
- Europe: 50.3 - 51.4
- China: 47.7 - 50.1
- S Korea: 47.2 - 47.5
- Taiwan: 48.6 - 50
- Japan: 50.7 - 52.2

Markit Economics, JPMorgan and ISM
Global "Purchasing Managers" Index

Diffusion Index, >50 = Growth

Markit Economics
World Purchasing Managers Index

3/12 Rate of Change

ISM, JPMorgan, Markit Economics

ISM, JPMorgan, Markit Economics
Electronic Equipment
World Electronic Equipment Production by Type

2012 TOTAL: $2.15 Trillion
Methods to Measure Growth

Sector composites based upon financial reports of similar companies
- Typically quarterly, semiannually or monthly

Government and trade organization statistics
- Typically monthly

- TIMELY DATA REPORTED ON A CONSISTENT BASIS IS KEY
Sector Analyses based on Company Financial Reports
Electronic Equipment Suppliers
Composite of 115 Public Companies
Quarterly Revenue Growth

Media tablets included

Computer 13, Internet 9, Storage 10, Communication 20, SEMI 20, Medical 23, Instruments 11, Military 6, Business & Office 3
+ Media tablets from all vendors
Inventory/Sales Ratios
Large Component Distributors, Semiconductor, EMS & OEM Companies

Ratio: Inventories/Sales

Custer Consulting Group based upon company financials
Global Electronic Supply Chain Growth
2Q'13 vs. 2Q'12

Electronic Equipment
- Military
- Business & Office
- Instruments & Controls
- Medical
- Communication
- Internet
- Computer
- Data Storage
- SEMI Equip

Semiconductors (SIA)
- Passive components
- PCBs
- Component Distrib
- EMS (excl Foxconn)
- ODM

PCB Process Equipment
- PCB Laminate
- Materials

% Change

US$ equivalent at fluctuating exchange; based upon industry composites including acquisitions
Regional Data from Government, Industry & Trade Organization Statistics

Europe
Japan
Taiwan/China
USA
Eurostat Data (NACE Rev 2)
Electronic Equipment Production by Country

- C26  computer, electronic & optical products
- C261  electronic components & boards
- C2611  electronic components
- C2612  loaded electronic boards
- C264  consumer electronics
- C2651  instruments & appliances for measuring, testing and navigation
- C266  irradiation, electromedical & electrotherapeutic equipment
- C2733  wiring devices
- C2751  electric domestic appliances
- C2823  office machinery & equipment (except computers & peripherals)
- C291  motor vehicles
- C303  air & spacecraft and related machinery

Monthly indices where average month in CY2005=100
European Computer, Electronic & Optical Products Production

Index (2010=100), Seasonally Adjusted

Eurostat, C26 category, EU 27 countries
Japan Electronic Equipment Production by Month 2000 to Present

Yen Billion

 JEITA www.jeita.or.jp/
Taiwan/China Electronic Equipment Producers
Composite of 101 Manufacturers
Consolidated Revenue

Aug 2013 down 2.1% compared to Aug 2012

Taiwan listed companies, often with significant manufacturing in China
U.S. Electronic Equipment Orders & Shipments
Computer, Communications, Measurement & Control and Military

$ Billions (monthly, seasonally adjusted)

www.census.gov/indicator/www/m3/
Global Electronic Equipment

Europe
Japan
Taiwan/China
USA
World Electronic Equipment Production by Region (Final Assembly)

2012 TOTAL: $2.15 Trillion

N America: 52.0%
W Europe: 19.0%
Japan: 6.0%
Rest of Asia: 8.0%
Rest of World: 15.0%

Electronic Outlook 11/2012
Global Electronic Equipment Shipment Growth

3/12 Rate of Change

IU.S. Dept of Commerce, Eurostat, JEITA, Taiwan/China Composite
World Electronic Equipment Monthly Shipments
Converted @ Constant 2010 Exchange Rates

Source: Custer Consulting Group
World Electronic Equipment Monthly Shipments
Converted @ Constant 2010 Exchange Rates

Source: Custer Consulting Group
Market Segments

Volume (Shifted to Low Cost Areas)
- Computers & Mobile Communication Devices
- Other Consumer Electronics
- Datacom/Telecom
- Automotive

"Protected"
- Military
- Medical
- Instruments & Controls
- High IP Content

Prototype, Quick Response, Short Run, Need for Local Support
Military Equipment
Composite of 6 Public Companies
Revenue, Net Income & Inventory

General Dynamics, Harris, Lockheed, Northrop Grumman, Raytheon, Rockwell Collins
U.S. Military Electronics Orders & Shipments
Defense Communication & Search & Navigation Equipment

$ Billions (monthly, seasonally adjusted)

Military electronics have been a key "protected" market for domestic PCB manufactures following the post-2000 downturn

www.census.gov/indicator/www/m3/
Instruments & Control Equipment Composite of 12 Public Companies

Revenue, Net Income & Inventory

Agilent, Ametek, Emerson, Itron, Keithly, LeCroy, PerkinElmer, Rockwell Automation, Teledyne, ThermoFisher, Varian, Woodward Governor

+0.2%
U.S. Electromedical, Measurement & Control Equipment Orders & Shipments

$ Billions (monthly, seasonally adjusted)

Orders
Shipments

www.census.gov/indicator/www/m3/
Medical Equipment
Composite of 23 Public Companies
Revenue, Net Income & Inventory

Mobile Phone Unit Shipments
World
Units

Units (Millions)

Gartner Dataquest 8/13 & prior reports
World Mobile Phone Sales to End Users
2Q’13

Units

TOTAL: 435.2 Million Units
Gartner Dataquest 8/13 & prior reports,

Smartphone Unit Shipments to Endusers

World

Units (Millions)

Thousands

0  50  100  150  200  250

Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4 Q1 Q2

2007 2008 2009 2010 2011 2012 2013

Gartner Dataquest 8/13 & prior reports,
"Internet" Equipment Suppliers
Composite of 9 Public Companies
Revenue, Net Income & Inventory

ADTRAN, Cisco Systems, Extreme Networks, Juniper Networks, Mattson Technology, Netgear, Sierra Wireless, Sonus Networks, Sycamore

+5.5%
Cisco Systems
Revenue, Net Income & Inventory

$ Billions

Revenue
Income
Inventory

$639 M due to Scientific Atlanta acquisition

+ 6%

CSCO
Juniper Networks
Revenue & Net Income

$ Millions

Revenue
Income

2Q/06 Net Loss: $1.2 Billion

"Inventory" not listed on Balance Sheet
## Smart Connected Device Market by Type

<table>
<thead>
<tr>
<th>Year</th>
<th>Smartphone</th>
<th>Tablet</th>
<th>Portable PC</th>
<th>Desktop</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>53.2</td>
<td>7.7</td>
<td>22.4</td>
<td>16.6</td>
</tr>
<tr>
<td>2012</td>
<td>59.5</td>
<td>11.8</td>
<td>16.5</td>
<td>12.2</td>
</tr>
<tr>
<td>2013</td>
<td>65.2</td>
<td>14.6</td>
<td>11.6</td>
<td>8.6</td>
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<tr>
<td>2014</td>
<td>68.0</td>
<td>15.3</td>
<td>9.7</td>
<td>7.0</td>
</tr>
<tr>
<td>2015</td>
<td>69.0</td>
<td>15.9</td>
<td>8.9</td>
<td>6.2</td>
</tr>
<tr>
<td>2016</td>
<td>69.8</td>
<td>16.3</td>
<td>8.4</td>
<td>5.5</td>
</tr>
<tr>
<td>2017</td>
<td>70.5</td>
<td>16.5</td>
<td>8.0</td>
<td>5.0</td>
</tr>
</tbody>
</table>
Personal Computer Unit Shipments

World

Units

Thousands

Units (Millions)

Gartner Dataquest 7/13 & prior reports
Server & Media Tablets not included
World Personal Computer Market
2Q’13

TOTAL: 76.0 Million Units

Includes desk-based PCs, mobile PCs, mini-notebooks but not Media Tablets
Taiwan/China Motherboard Vendor Sales
Composite of 22 Manufacturers

Taiwan listed companies, often with significant manufacturing in China
Data Storage Equipment Suppliers
Composite of 10 Public Companies
Revenue, Net Income & Inventory

Brocade, EMC, Iomega, Maxtor, Network Appliance, Qlogic, Quantum, Seagate, Western Digital, SanDisk
(Iomega & Maxtor historical data retained as both were purchased by other members of this group)
“We are excited about our pending acquisition of SMART Storage Systems, as it accelerates our growth in enterprise storage. The growth drivers of our business are vibrant and SanDisk is poised for further gains.” 7/17/13

4Q08 net loss: -$1.76 billion
Components

- Semiconductors
- Passive Components
- Solar/Photovoltaic Industry
- Component Distributors
### Monthly Semiconductor Shipments

**$ Billions (3-month average)**

<table>
<thead>
<tr>
<th>Region</th>
<th>7/12</th>
<th>7/13</th>
<th>% CH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Americas</td>
<td>4.13</td>
<td>5.02</td>
<td>+21.5%</td>
</tr>
<tr>
<td>Europe</td>
<td>2.82</td>
<td>2.85</td>
<td>+1.1%</td>
</tr>
<tr>
<td>Japan</td>
<td>3.61</td>
<td>2.93</td>
<td>-18.6%</td>
</tr>
<tr>
<td>Asia Pacific</td>
<td>13.74</td>
<td>14.73</td>
<td>+7.2%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>24.29</td>
<td>25.53</td>
<td>+5.1%</td>
</tr>
</tbody>
</table>

SIA [www.sia-online.org/](http://www.sia-online.org/)
Global Semiconductor Shipments
Monthly US$

US$ Billions (3-month average)

Record high

2009 recession much sharper but shorter than 2001

SIA
Global Semiconductor Shipments
3-Month Growth Rates on $ Basis

Total $ Shipments from All Countries to an Area
SIA website: www.sia-online.org/
Total Semiconductor Shipments to an Area
Monthly Shipments - Reporting Firms

$ Billions

Japan
N America
Europe
Asia-Pac

SE Asia

SIA website: www.sia-online.org/
Asia grows from 20% to 56.1% market share.
Semiconductor Shipments to N. America vs. U.S Electronic Equipment Production

3/12 Rate of Change (US$)

Total $ Semiconductor Shipments from All Countries to N. America  www.sia-online.org/
U.S. Electronic Equipment Shipments  www.census.gov/indicator/www/m3/
Semiconductor Fab, Assembly, Packaging, Test & Measurement Equipment
Semiconductor Fab, Test & Measurement
Composite of 20 Public Companies
Revenue, Net Income & Inventory

US$ Billions @ fluctuating exchange

+8.4%

Q3 Q1 Q3 Q1 Q3 Q1 Q3 Q1 Q3 Q1 Q3 Q1 Q3 Q1 Q3 Q1 Q3 Q1 Q3 Q1 Q3 Q1 Q3 Q1 Q3 Q1 Q3

Applied Materials, ASM Intl, ASML, Advantest, KLA Tencor, Novellus, Hitachi Hi Tech, Lam Research, BTU, LTX-Credence, FEI, FSI, Intervac, Kulicke & Soffa, MKS Instruments, Rudolph, Teradyne, Ultratech Stepper, Varian semiconductor, Veeco
Global Semiconductor & Semiconductor Capital Equipment
3-Month Shipment Growth Rates on $ Basis

3/12 Rate of Change

- Semiconductors
- SEMI Capital Equip
- Zero Growth

Sources: SIA; Semiconductor Equipment Association of Japan, www.semi.org, Custer Consulting Group SEMI equipment sector composite 2012 growth
Passive Components
Passive Components
Composite of 10 Companies
Revenue, Net Income & Inventory

AVX, Bel Fuse, Diodes, Littlefuse, Murata, RF Micro, Rohm, Vishay, TDK, Yageo;
Euros, Yen & NT$ converted to US$ at fluctuating exchange rates
U.S. Passive Components Shipments vs. Semiconductor Shipments to N America

3/12 Rate of Change

Semiconductors lead passive components by 1-3 months and are more volatile
Taiwan Solar/Photovoltaic Panel Companies
Composite of 17 Manufacturers

Big Sun Energy Technology, Daxon, DelSolar, e_TON Solar Tec, Eversol, Gintech, Green Energy Technology (GET), Ligitek, Motech, Neo Solar Power, Phoenixtec Power Co (PPC), Precision Silicon, Sino-American Silicon Products, Sonartech, Sysgration, Tyntek, Wafer Works
Global "Purchasing Managers" Index vs. Global Passive Component & Semiconductor Shipments

Global PMI = JPMorgan
Global Passive Components = Custer Consulting Group Industry Composite
Global semiconductors = SIA
Component Distributors
Electronic Component Distributors
Composite of 4 US Public Companies
Revenue, Net Income & Inventory

Q3’13/Q3’12 Guidance +6%

+4%

Arrow, Avnet, Nu Horizons, Richardson
Arrow Electronics
Revenue, Net Income & Inventory

$ Billions

Revenue
Income
Inventory

+3%

4.9-5.3
7/24/13

ARW
Georg Steinberger, chairman of DMASS, commented on the results: “As expected, the improvement on the booking side since Q4/CY12 materializes now in the form of higher revenues, so that the market has slightly turned towards a positive trend. However, we should be careful to over-interpret the market conditions, as bookings are just slightly higher than billings. With China as one key economy softening, the trend could turn easily. Nevertheless, I am cautiously optimistic that 2013 will remain positive.”
EMS & ODM Companies
Large EMS Providers
Composite of 9 Public Companies
Revenue, Net Income & Inventory

Benchmark+Pemstar, Celestica, Flextronics+Solectron, Foxconn, Jabil, Plexus, Sanmina-SCI, Sypris, Venture Mfg

US$ Billions @ fluctuating exchange

Q3’13/Q3’12 Guidance

-8%

-1%
Large EMS Providers
Composite of 8 Public Companies
Quarterly Revenue Growth

Excludes Foxconn

Benchmark+Pemstar, Celestica, Flextronics+Solectron, Jabil, Plexus, Sanmina-SCI, Sypris, Venture Mfg
# Large Taiwan ODM Providers

## 2012 vs. 2011 Sales ($M)

<table>
<thead>
<tr>
<th></th>
<th>2011</th>
<th>2012</th>
<th>2012/2011 Growth %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foxconn (Hon Hai)</td>
<td>93,837</td>
<td>108,937</td>
<td>16%</td>
</tr>
<tr>
<td>Quanta Computer</td>
<td>35,884</td>
<td>32,659</td>
<td>-9%</td>
</tr>
<tr>
<td>Compal Electronics</td>
<td>21,976</td>
<td>20,562</td>
<td>-6%</td>
</tr>
<tr>
<td>Wistron</td>
<td>19,827</td>
<td>20,260</td>
<td>2%</td>
</tr>
<tr>
<td>Chimei Innolux</td>
<td>16,424</td>
<td>15,955</td>
<td>-3%</td>
</tr>
<tr>
<td>Asustek Computer</td>
<td>10,749</td>
<td>12,693</td>
<td>18%</td>
</tr>
<tr>
<td>Inventec</td>
<td>11,451</td>
<td>10,843</td>
<td>-5%</td>
</tr>
<tr>
<td>Lite On Technology</td>
<td>3,201</td>
<td>2,597</td>
<td>-19%</td>
</tr>
<tr>
<td>Mitac International</td>
<td>1,138</td>
<td>962</td>
<td>-15%</td>
</tr>
<tr>
<td>Inventec Appliance</td>
<td>837</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>215,324</td>
<td>225,468</td>
<td>+5%</td>
</tr>
</tbody>
</table>

Source: Company data, NT$ converted at constant avg 2012 exchange (29.554 NT$ = 1US$)

Unconsolidated company sales *(to be updated soon to consolidated sales)*
Taiwan ODM Companies
Composite Sales of 10 Large Manufacturers

Aug 2013 was 1.5% below Aug 2012 and 1% sequentially below July 2013

Asustek Computer, Chei Mei, Compal Electronics, Foxconn, Chimei Innolux, Inventec, Inventec Appliance, Lite On Technology, Mitac International, Quanta Computer, Wistron, Chei Mei Display replacing Chei Mei & Innolux Display 3/10 & later
Apple Inc.
Revenue, Net Income & Inventory

$ Billions

+ 1%
34-37
7/23/13

FY ends September

AAPL
Foxconn Electronics (Hon Hai), Taiwan
Revenue, Net Income & Inventory

NT$ (Billions)

Q1 Q3 Q1 Q3 Q1 Q3 Q1 Q3 Q1 Q3 Q1 Q3 Q1 Q3 Q1 Q3 Q1 Q3 Q1 Q3 Q1 Q3 Q1 Q3 Q1 Q3 Q1

+ 1%
Large ODM Companies
Composite of 10 Public Manufacturers
Quarterly Revenue Growth

Asustek Computer, Compal Electronics, Foxconn, Chimei Innolux, Inventec, Inventec Appliance, Lite On Technology, Mitac International, Quanta Computer, Wistron
PCB Fabrication
2012 World PCB Production by Region

(US$ M @ Average 2012 Exchange)

Total: $60.0 Billion

- 42.8% N America
- 14.7% Europe
- 13.4% Japan
- 12.6% China/HK
- 6.6% Taiwan
- 5.0% S Korea
- 4.5% Rest of Asia
- 0.4% ROW

Total: $60.0 Billion

IPC 8/13
Japan PCB Shipments

Yen (Billions)

Calendar Year

2012/2011
-6%

www.jpca.org/kikaitoukei/kikai2012.xls
Taiwan Rigid & Flex PCB Shipments
Broad Composite of 46 Taiwan-listed Manufacturers

Consolidated sales of TSE-listed companies

Includes significant production by Taiwan-owned companies in China

Company Financial Releases

Calendar Year

NT$ (Billions)
European PCB Production

Russia & FSR not included

Euros (Billions)

Thousands

M Gasch 8/13
N American Rigid & Flexible PCB Shipments & Orders

$M (statistical sample of about 50% of producers)

2012/2011 Rigid & Flex PCB Shipment Growth: -3.2%

Note: IPC survey captures "market" not domestic production. About 15% of the above represents imported boards resold by N American PCB producers in survey.
Process Equipment Related Suppliers
Composite of 9 Companies

Revenue

$ Millions

PCB
Flat Panel Displays
Touch Screens
Photovoltaic

+6%

Q1 Q3 Q1 Q3 Q1 Q3 Q1 Q3 Q1 Q3 Q1 Q3 Q1 Q3 Q1 Q3 Q1 Q3 Q1 Q3 Q1

C-Sun, Tailing Technology, Camtek, ESI, GSI Group, Orbotect, Mentor Graphics, Nordson, Coherent
World PCB Model
Regional PCB Shipment Growth

3/12 Rate of Growth (in local currency)

Sources: IPC, JPCA, Taiwan/China composite; Eurostat "wiring devices" for Europe
World PCB Monthly Shipments
Converted @ Constant 2011 Exchange Rates

$ Billions

Calendar Year

Source: Custer Consulting Group
World PCB Monthly Shipments
Converted @ Constant 2011 Exchange Rates

Source: Custer Consulting Group
World PCB Shipments (with forecast)
Converted @ Constant 2011 Exchange Rates

$ Billions

Growth calculations:
- Europe = composite European SIA & local PCB assoc data
- Japan & N. America from JPCA & IPC data
- Taiwan/China: 46 rigid & flex company composite
- Rest of Asia growth = Taiwan/China 44 company composite

Actual
Forecast

Aug 2013 1.6% below Aug 2012

Source: Custer Consulting Group - 2010 base year expanded by monthly growth of N. American, European, Japanese & Taiwan/China monthly PCB shipments
Forecasts
<table>
<thead>
<tr>
<th>Region</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
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<tbody>
<tr>
<td>World</td>
<td>4.2</td>
<td>0.1</td>
<td>1.9</td>
<td>5.5</td>
<td>6.4</td>
</tr>
<tr>
<td>USA</td>
<td>1.5</td>
<td>-0.8</td>
<td>-3.0</td>
<td>3.1</td>
<td>5.4</td>
</tr>
<tr>
<td>EU</td>
<td>1.8</td>
<td>-2.7</td>
<td>-2.3</td>
<td>2.0</td>
<td>2.7</td>
</tr>
<tr>
<td>Japan</td>
<td>-13.5</td>
<td>-8.8</td>
<td>-12.3</td>
<td>3.6</td>
<td>4.4</td>
</tr>
<tr>
<td>Four Tigers</td>
<td>5.9</td>
<td>0.8</td>
<td>3.6</td>
<td>5.4</td>
<td>6.2</td>
</tr>
<tr>
<td>China</td>
<td>10.8</td>
<td>1.7</td>
<td>4.3</td>
<td>6.9</td>
<td>7.5</td>
</tr>
</tbody>
</table>

Constant $ Growth Rates Converted @ Constant Exchange Rates

Henderson Ventures 9/2013
www.hendersonventures.com
Global PMI, Electronic Equipment, PCB & Semiconductor Shipments

3/12 Rate of Change

Source: Custer Consulting Group
## Worldwide Semiconductor Capital Equipment Market by Geography (with forecast)

### 2002-2014

<table>
<thead>
<tr>
<th>Year</th>
<th>ROW</th>
<th>China</th>
<th>S Korea</th>
<th>Europe</th>
<th>Taiwan</th>
<th>Japan</th>
<th>N America</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
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### Annual Growth Rate

- ROW: 3.16%
- China: 7.08%
- S Korea: 8.74%
- Europe: 4.32%
- Taiwan: 7.97%
- Japan: 4.61%
- N America: 6.28%
Global Electronic Supply Chain Forecast

2013 vs. 2012

- Combined GDP
- Electronic Equipment
- PCBs
- Semiconductors
- SEMI Equipment

% Change

- Henderson Ventures
- Custer Consulting Group
- HV
- SEMI
Global Electronic Supply Chain Forecast

2014 vs. 2013

Combined GDP
Electronic Equipment
PCBs
Semiconductors
SEMI Equipment

Henderson Ventures
Custer Consulting Group
HV
SEMI

% Change

0 5 10 15 20 25

20130808
Conclusions

Weak global business conditions in 1H’13; signs of improvement in 2H’13

SE Asia dominates world electronics production.

Some increased talk of “re-shoring” due to rising costs in China

Company financial “guidance” is a helpful forecasting tool

August PMI leading indicator data says global manufacturing growth has resumed.

Leading indicators are useful for tracking the recovery regionally and can be applied to products throughout electronic supply chain.
Using This Information to Forecast Your Company’s Sales
Data Sources

- Trade Organizations
  - SIA, SEMI, JEITA, IPC, JPCA, DMASS, ZVEI
- Government Statistics
  - US DOC, Eurostat
- Published Market Research Studies
- Company Financial Reports & Consolidated Sector Data
- Leading Indicators
  - Purchasing Managers Indices, Conference Board CLI
  - Consumer Confidence, Chip Foundry sales, etc.
- Your Own Company’s Sales
Forecasting Your Company Sales

• Organize monthly or quarterly sales in spreadsheet
• Obtain related industry time series for same time period
• Compare industry data and/or leading indicators to your sales using 3/12 growth rates
• Determine lead times vs. your data
• Forecast your sales based upon lead times
• Estimate your market share gains/losses by comparing your company growth to a related industry sector

• Custer Consulting Group can assist by providing:
  • Historical industry data
  • Help with analysis
Custer Consulting Group Products

Daily News Services (6 days/week)
- Global electronics supply chain
- Solar/Photovoltaic supply chain

Business Outlook
- Market charts & data
  Global market
  OEMs
  Components, EMS, ODM, materials & process equip
  Solar/Photovoltaic
- Weekly Market Comments with latest charts
Much More Information Exists (both charts and actual chart data)

Due to time constraints only a Limited Sample was Provided

E-mail walt@custerconsulting.com

to receive a much more complete set of charts
Tierney Powers
Sales Associate
(415) 990-7256
tierney@siliconexpert.com
Supply Chain Risk

- Inventory & Pricing
- Counterfeit Risk
- Lead Time
- Lifecycle - obsolescence, Y-to-EOL
- Acquisitions
- Natural Disasters
- Environmental & Regulation Compliance – RoHS, REACH, Conflict Minerals
Sept. 4, 2013 SK Hynix China Computer-Memory Chip Factory Fire

“A fire at a giant Chinese factory making almost one sixth of the world's supply of a key high-tech component shows how vulnerable global manufacturing chains can be to an unexpected event, analysts say.”

- Channel News Asia
**Counterfeit Trends**

**Counterfeit Incidents per Year**

- **2004:** 10
- **2005:** 16
- **2006:** 18
- **2007:** 30
- **2008:** 15
- **2009:** 19
- **2010:** 247
- **2011:** 68
- **2012:** 107
- **2013:** 22

**through June 1st**

**Product Line Percentage for the Counterfeit Parts**

Based on GiDEP & SiliconExpert Technologies
Products Obsoleted with PCNs in the past 2 Years

- 58% of parts were obsoleted with PCN's
- 42% of parts were obsoleted without PCN's

Not all parts are obsoleted with PCNs!
Parts Search is a powerful search tool with proprietary search technology that produces the fastest and most accurate search in the industry.

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BOM Manager

4 Pillars of BOM: Best Practices

1. Scrub and Validate
2. Manage Lifecycle
3. Create Custom Reports
4. Set up PCN Alerts
New Module: Supply Chain
Live Demo Portion
If we do not get to your question in this 1 hour allotted time period, we will respond personally via email following this broadcast.

Contact Information:

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tierney@siliconexpert.com

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