

SEMICO

Research Corporation

End-Use Market Drivers Create Opportunities

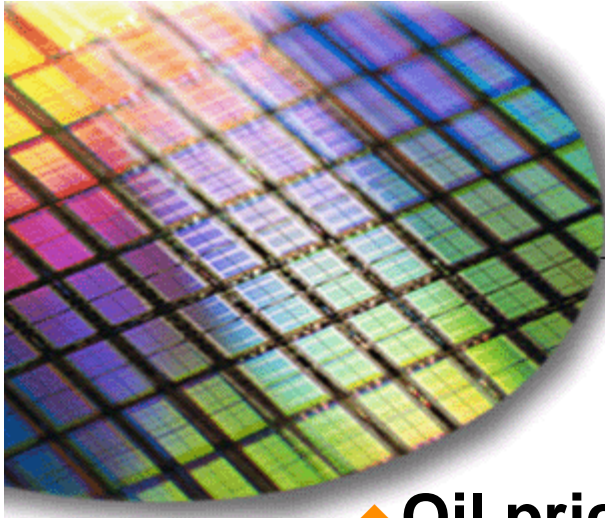
AngelouEconomics

January 2007

Bob Merritt

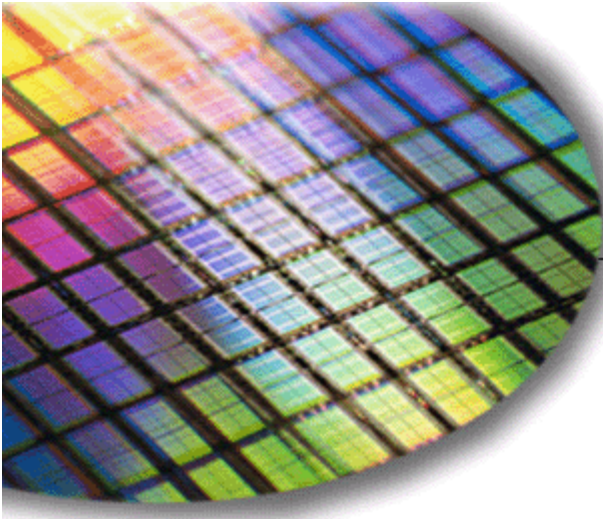
Semico Research



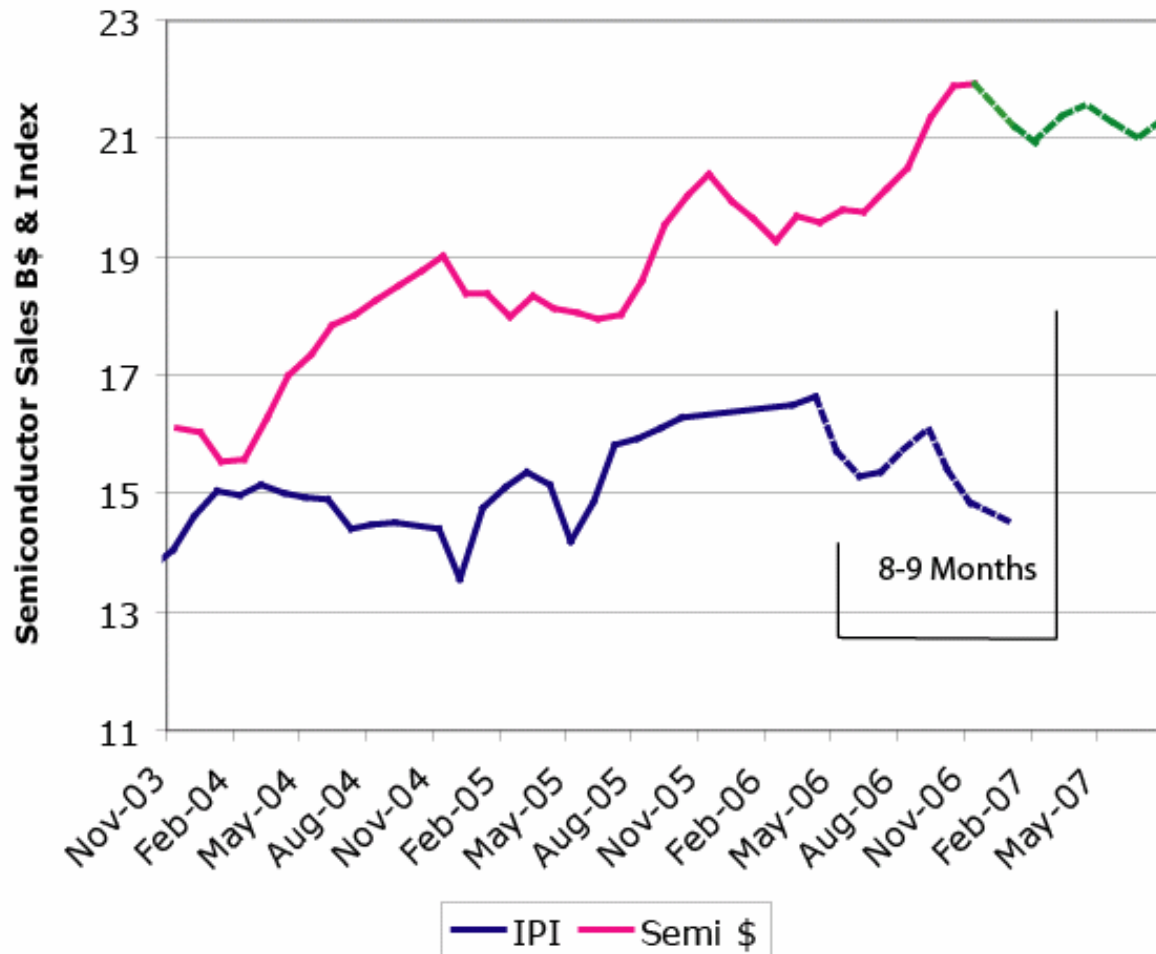


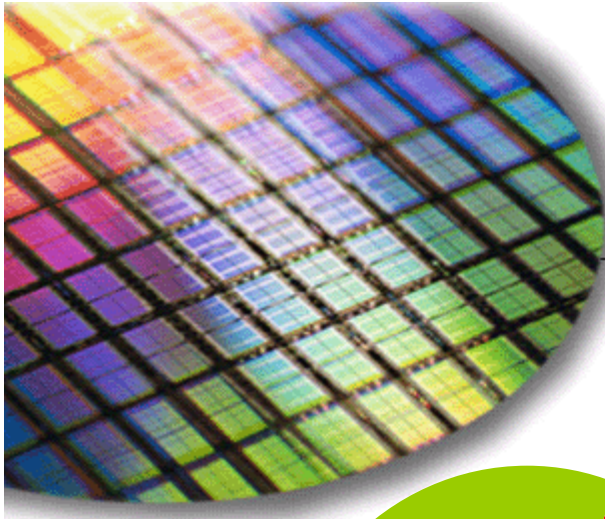
The Economy?

- ◆ **Oil prices – peaked 30% from 2005**
 - Currently 3% above 2005
 - Drag on consumer spending
- ◆ **Housing prices continue to decline**
 - Bad for consumer confidence
- ◆ **Global competition**
 - Holding down corporate profits
- ◆ **Deficit**
 - Inflation worries
- ◆ **Middle East conflict fuels uncertainty**
- ◆ **North Korea a wild card adding to fear**

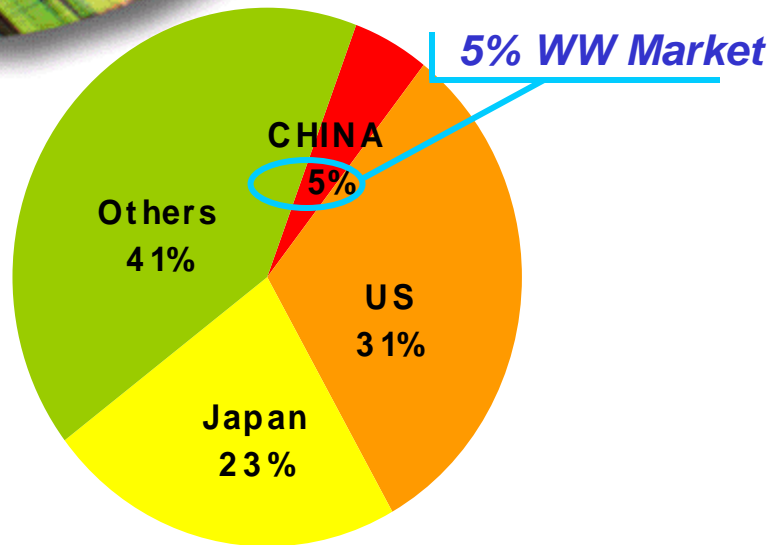


Semico Inflection Point Indicator (IPI)

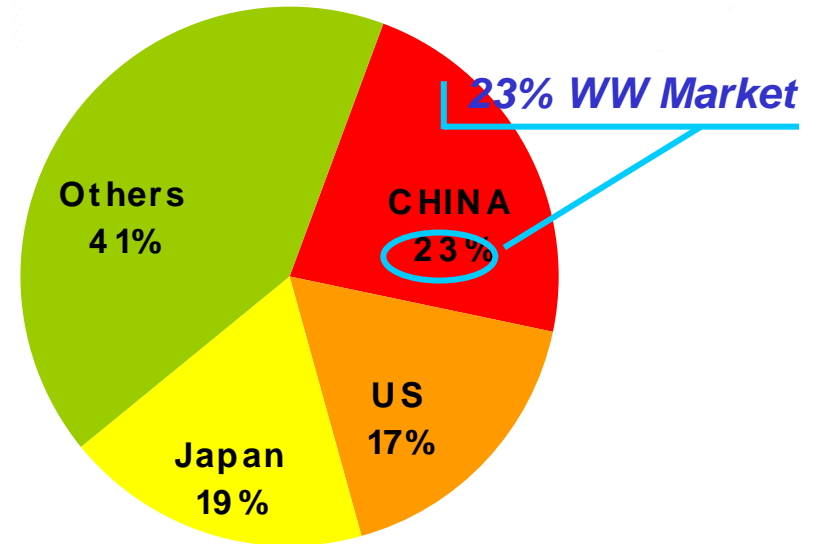




China - Emerging IC Powerhouse



2000 Global IC market
\$204.4B

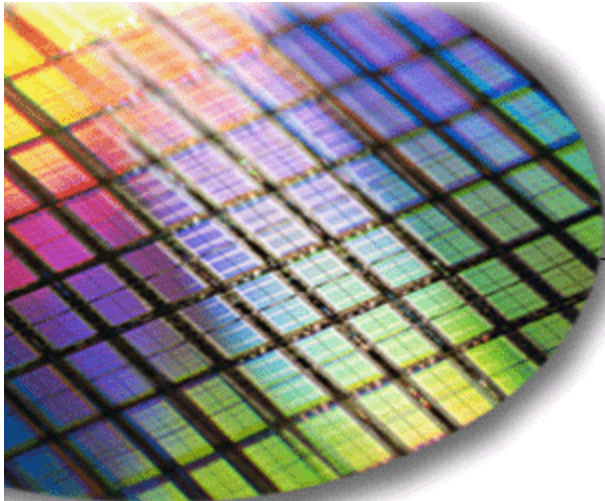


2006 Global IC market
\$253.8B

China has maintained 33% CAGR since 2000 (global CAGR = 4.0%)

China became the world's largest regional IC market in 2005

Source: SEMICO 2006



Capacity Utilization

Chg in
ASPs

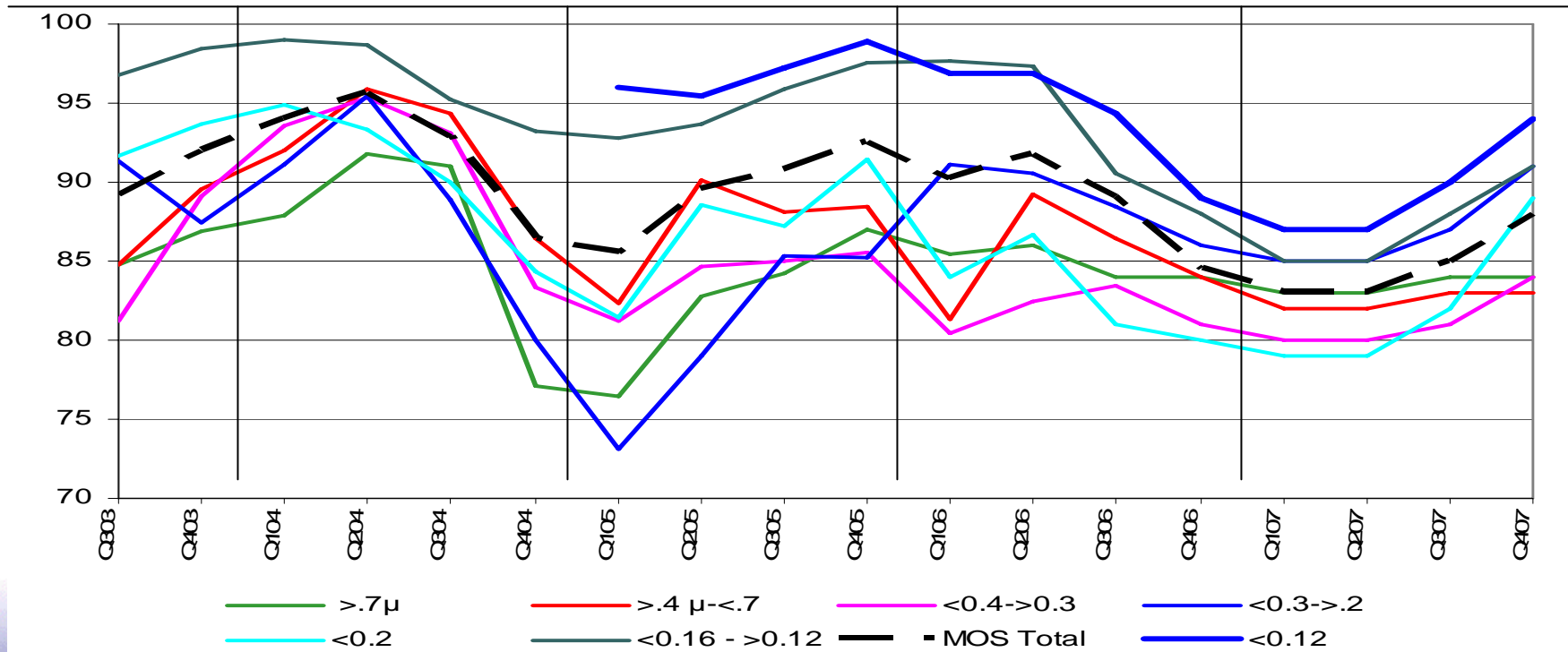
8.6%

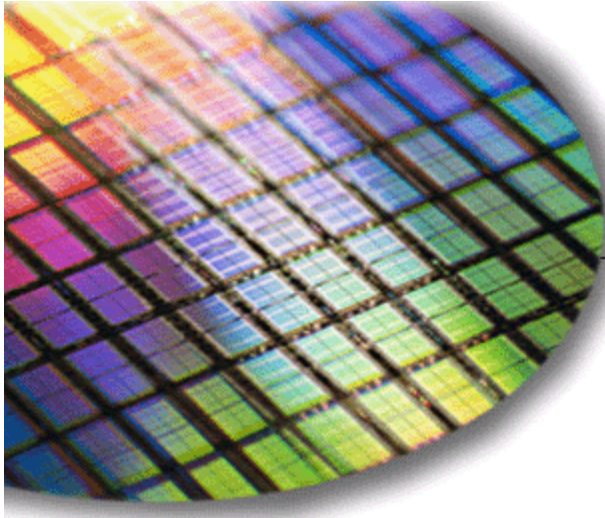
8.3%

1.7%

-5.4%

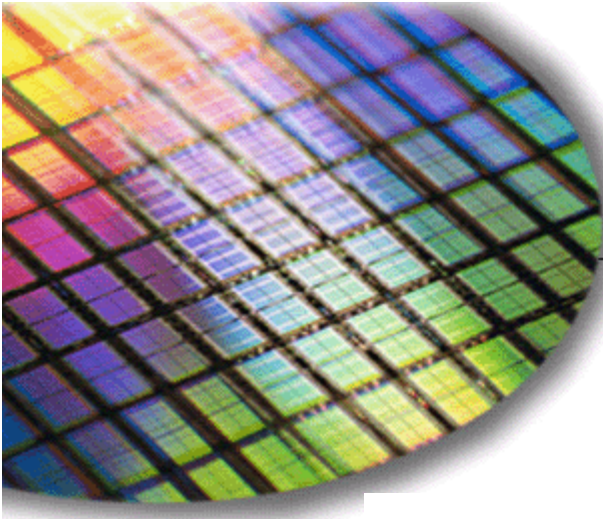
-1.0%



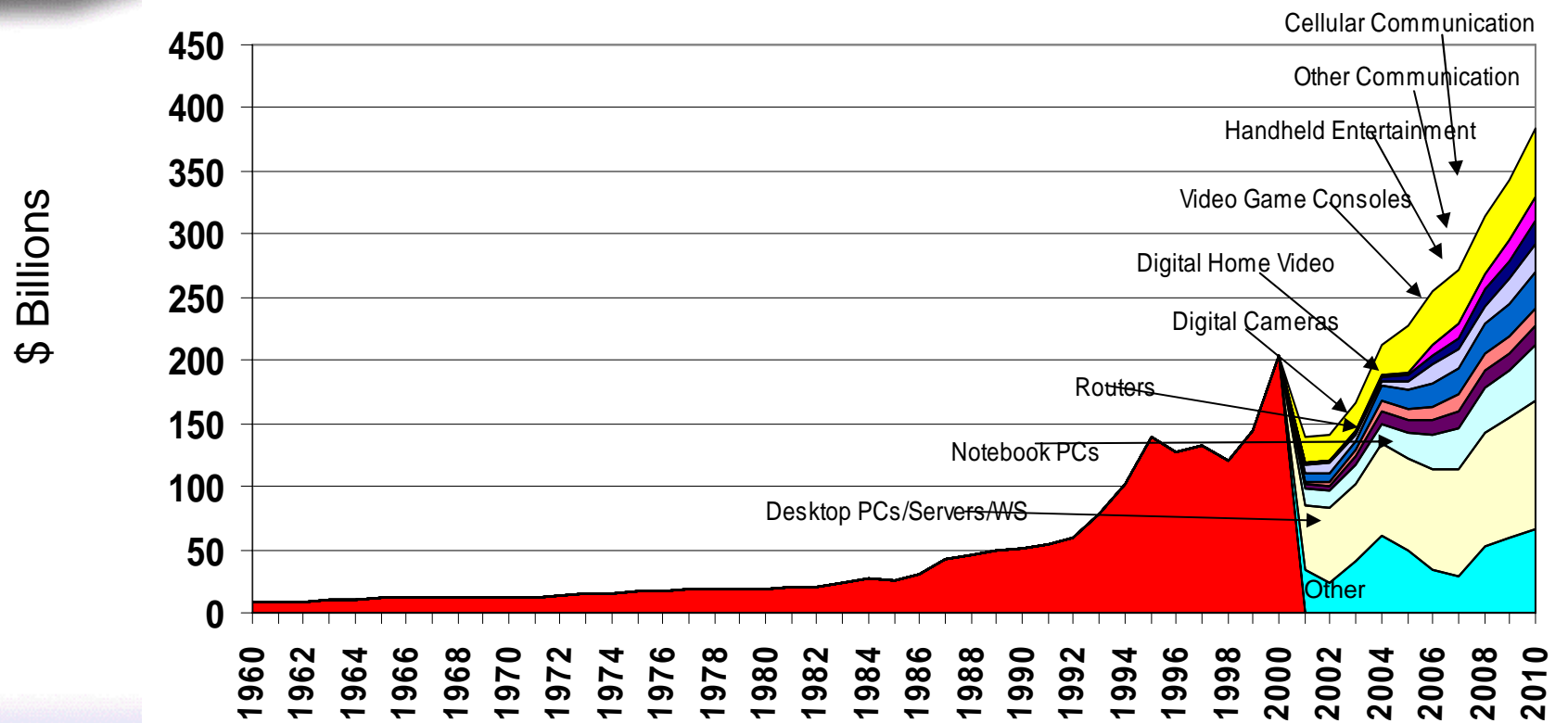


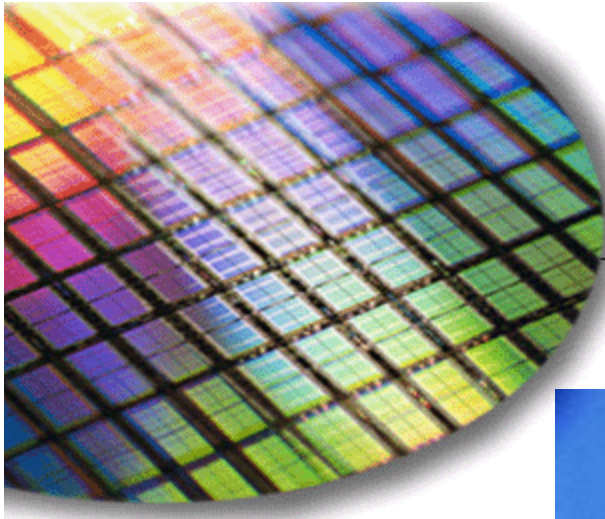
Semiconductor Investments

- ◆ **2006 Semiconductor Capex +15%**
 - **55% Memory investment**
- ◆ **2007 Semiconductor Capex - 4%**
 - **Market correction year**
 - **Utilization rate to increase at year end**
- ◆ **Foundries and shared technology development**



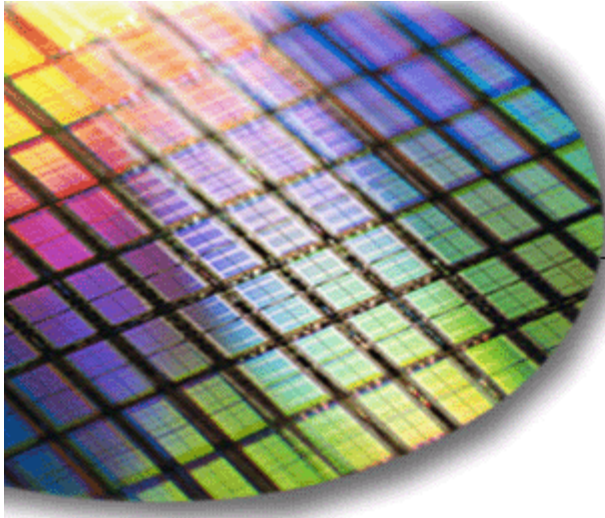
Driving End-Use Markets





Market Directions

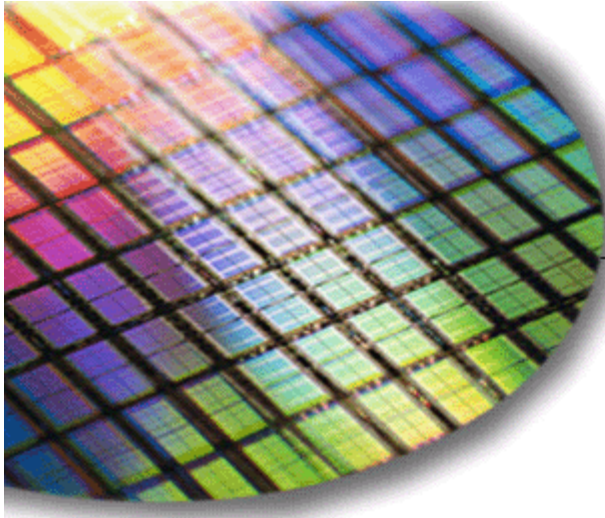




Major End Markets

5 Yr CAGR

◆ Desktop	3%
◆ Notebooks	17%
◆ Cell Phones	6%
● High-end phones	16%
◆ MP3 Players	
● Flash	11.3%
● HDD	27%
● Average Flash: 2006 2GB, 2010 6.7GB	
◆ Game Consoles	10%



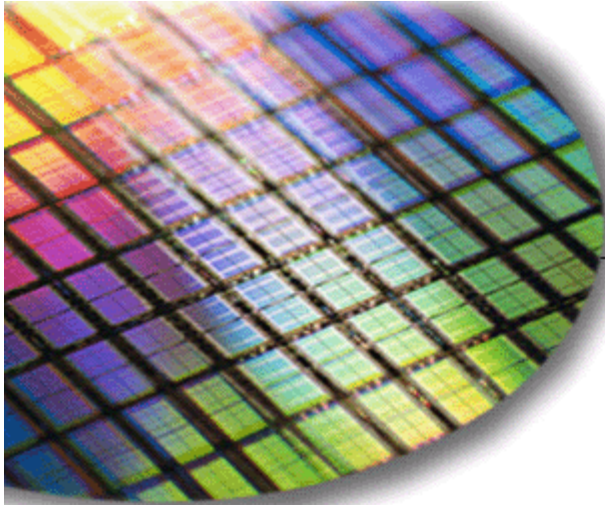
New Innovations

“Wee-mote” for the \$250 Wii game console.

With ambidextrous appeal for experienced gamers and novices alike, the wand and joystick (included in console) can be a steering wheel, racket, or pointing device for new dimensions of game play.



COURTESY: NINTENDO



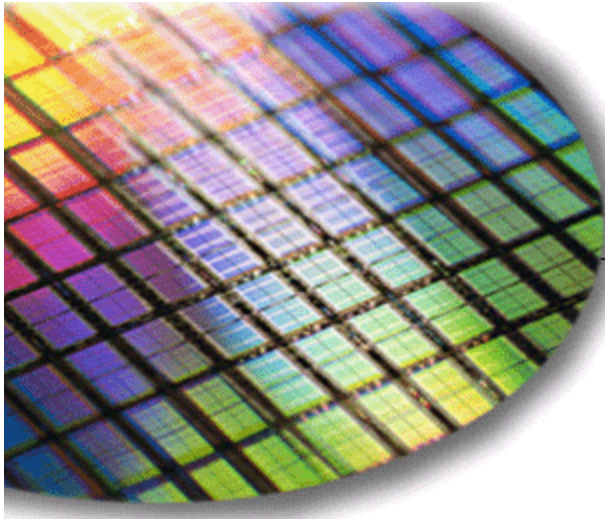
New Innovations

Sharp Vodafone 905SH

- With a clamshell lid that can flip up and rotate 90 degrees, this 3G phone has a high-resolution, 2.6-inch widescreen display
- Perfect for watching digital TV broadcasts and aimed at Japanese cell phone users.



COURTESY: SHARP



New Innovations

Sold out for 2006

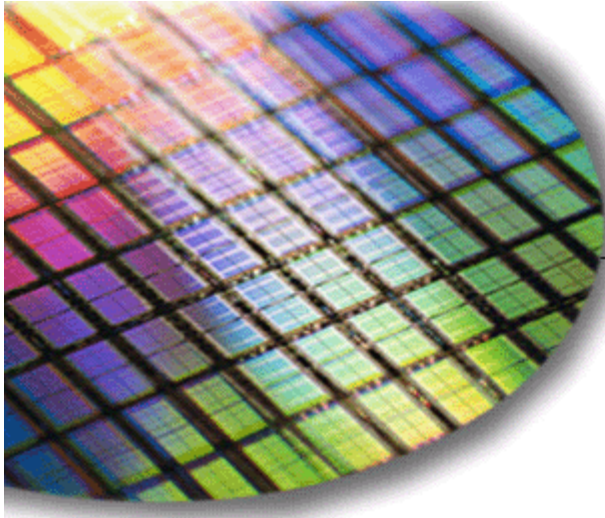
Of the nation's 66 million wildlife watchers,
45 million of them are bird-watchers

Successful new category products have been GPS, Fishfinder, and Digital Binoculars with built-in camera and Scouting and Trail cameras.

Technology

- DSP
- DRAM
- Flash
- Analog
- Directional microphones



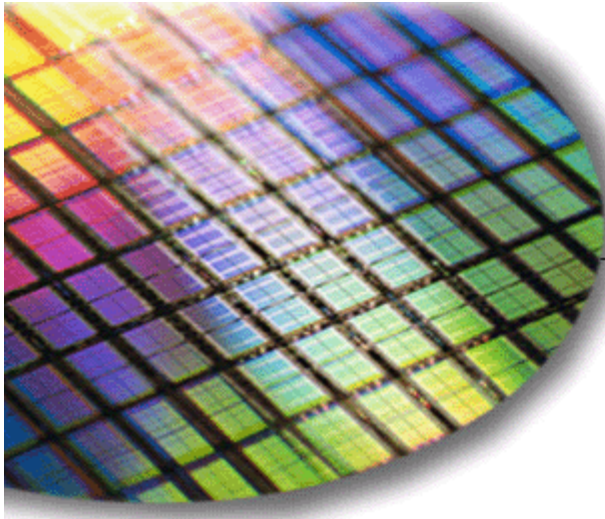


New Innovations

- The design goal: A full-featured mobile PC small enough to fit in a pocket.
- Weighing just over a pound, this PC has a 4.5-inch touch screen that slides up to reveal a keyboard.
- A U.S. version is available.

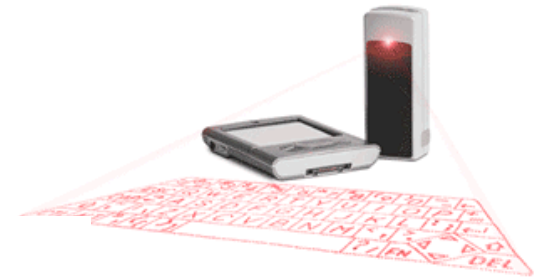


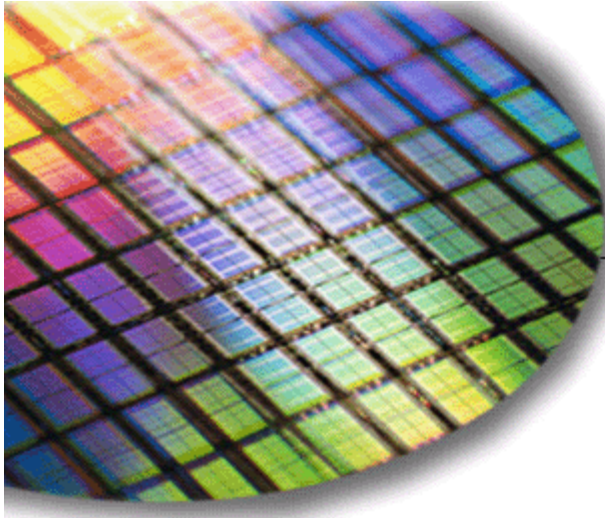
COURTESY: SONY



Disruptive Technologies that Will Drive the Market

- ◆ Virtual Keyboards
- ◆ Visor Displays
- ◆ Project Displays
- ◆ Fuel Cells
- ◆ Brain Fingers
- ◆ New Memory Technologies
- ◆ Low Leakage ICs





New Markets Offer Added Growth

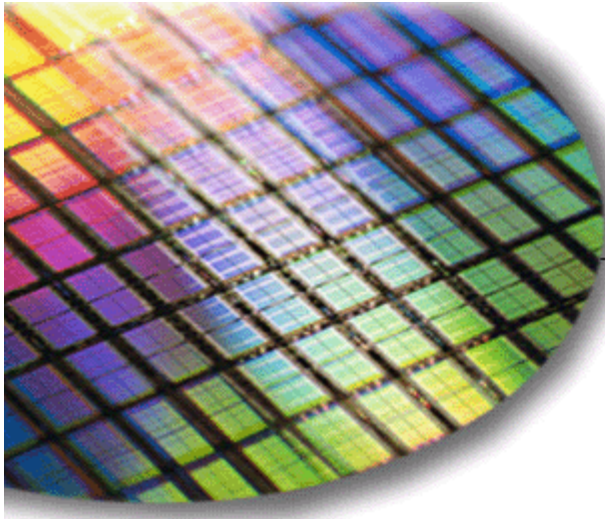
Automotive

- **Gas-saving electronics**

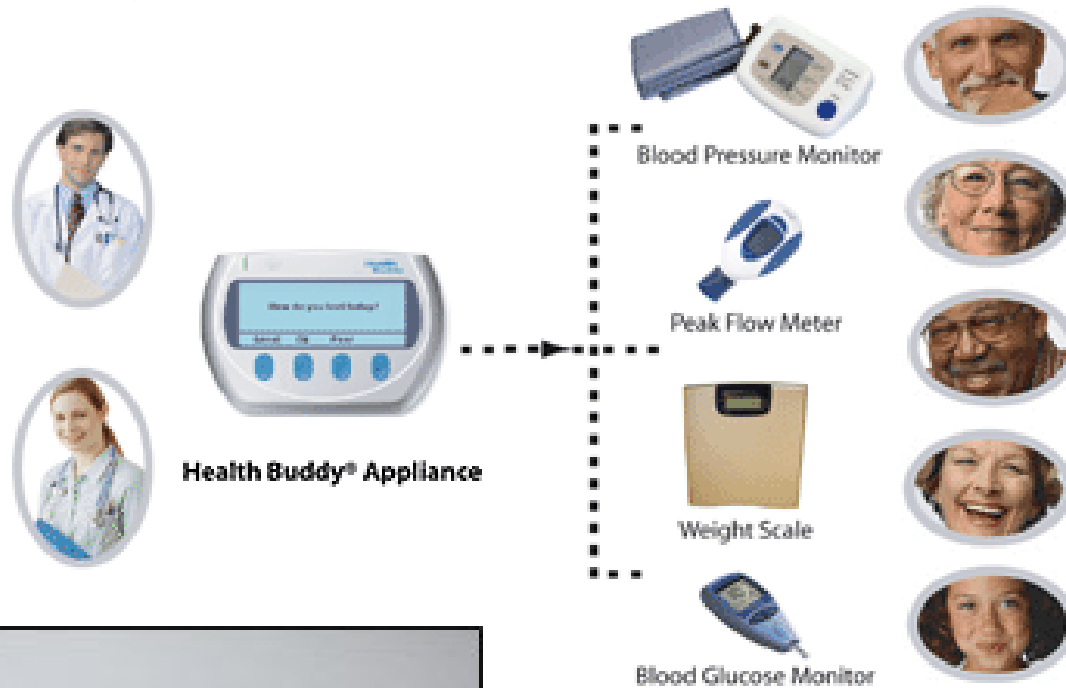
- ◆ Hybrid vehicles - multiple types
- ◆ Displacement on demand
- ◆ Flex fuel vehicles
- ◆ Tire pressure monitoring
- ◆ Electronic valves

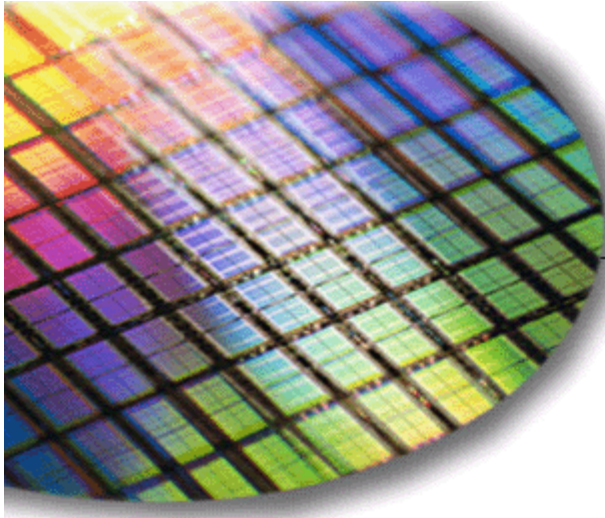
- **Entertainment**

- ◆ Mobile TV
- ◆ In-car DVD
- ◆ Satellite Radio
- ◆ Mobile Internet
- ◆ Noise cancellation
- ◆ Wireless technology



Home Healthcare



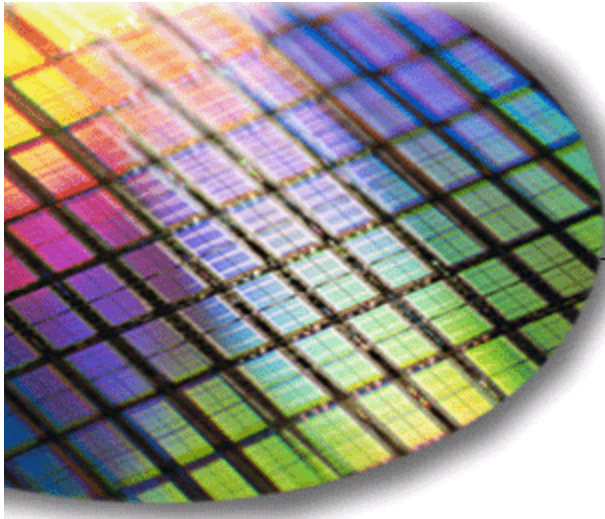


New Markets Offer Added Growth

Home Healthcare

- Home diagnostics
- Easy-to-use, patient-centric design
- Health Buddy System supports over 50 health management programs including NCQA certified
- Large, high-resolution color screen
- Multiple medical device ports
- Uses remote configuration for patient customization

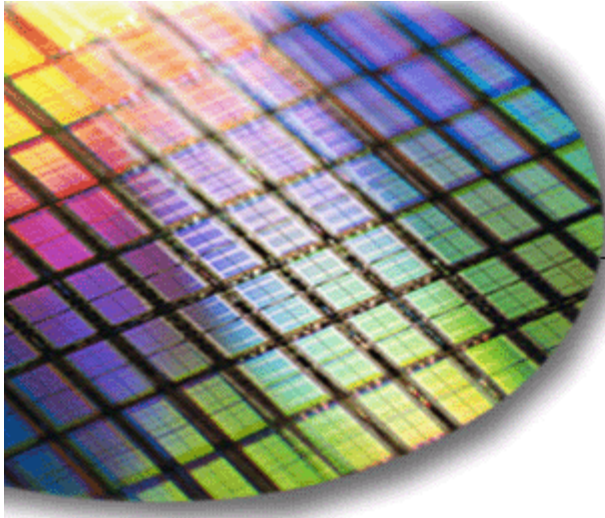




Consumer Electronics

- ◆ **HDTV**
 - Projection
 - Plasma
 - LCD
- ◆ **Satellite Radio & MP3 players**
- ◆ **Media Players**
- ◆ **Games**
 - Consoles
 - Handhelds

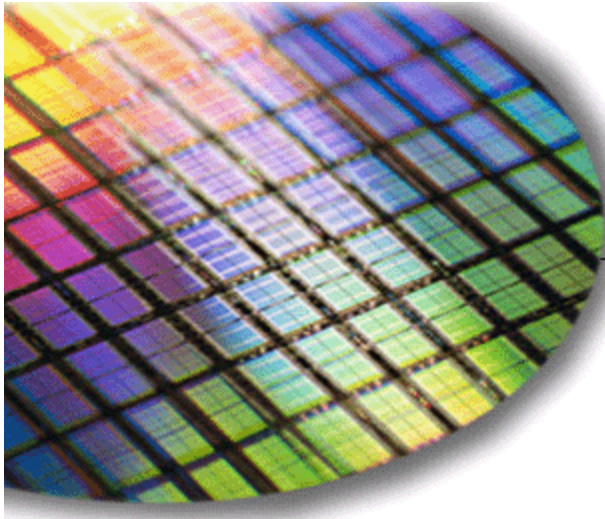




Bluetooth

- ◆ **Common with cell phones and headsets**
- ◆ **Expanding into other consumer applications: Keyboards, MP3 players, PMPs, stereo headphones**
- ◆ **Expanding into medical devices**
- ◆ **Automotive**





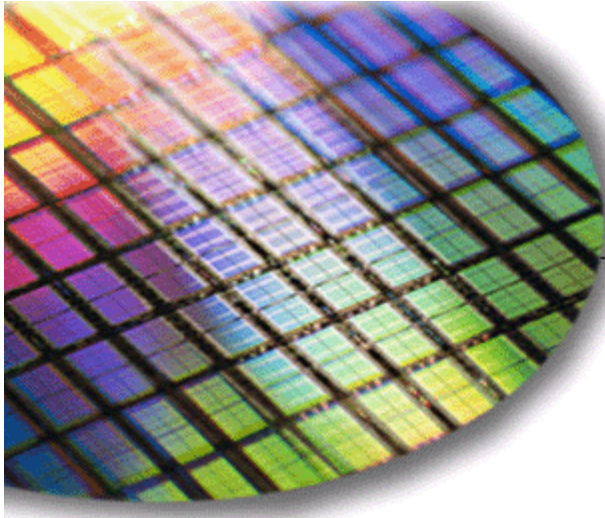
Ultra Wide Band (UWB)



◆ **Wireless hubs enable wireless connection of:**

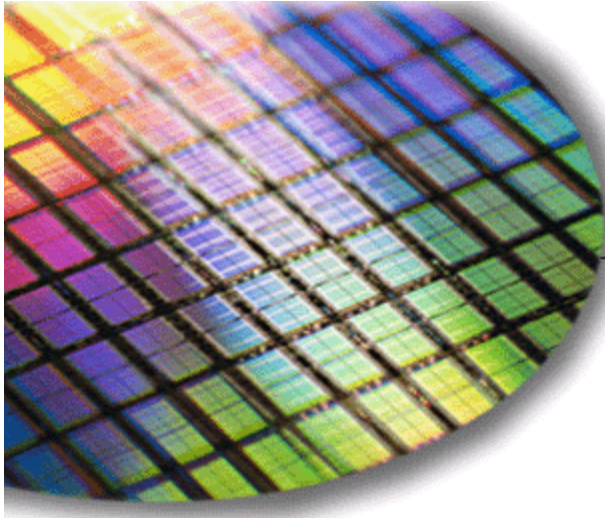
- **Printers**
- **Scanners**
- **Remote hard disks**
- **Digital cameras**





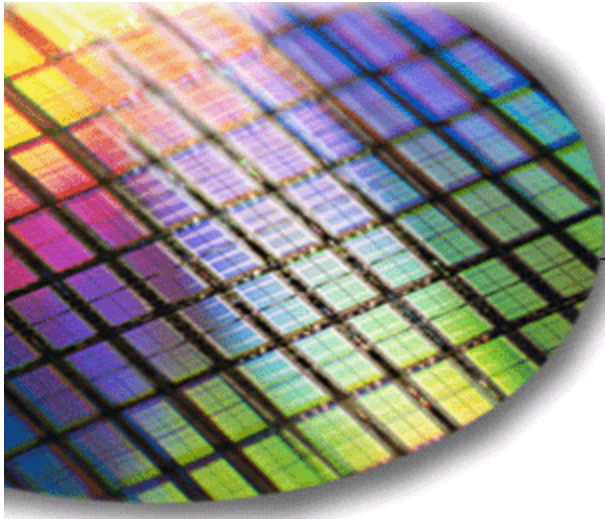
Zigbee

- ◆ **Ultra-low power, mesh capability**
- ◆ **Wireless sensors**
- ◆ **Checking and adjusting temperature and lighting systems, etc.**
- ◆ **Medical & industrial applications**
- ◆ **Residential automation**
- ◆ **Commercial building control will be a major application**



WiBree

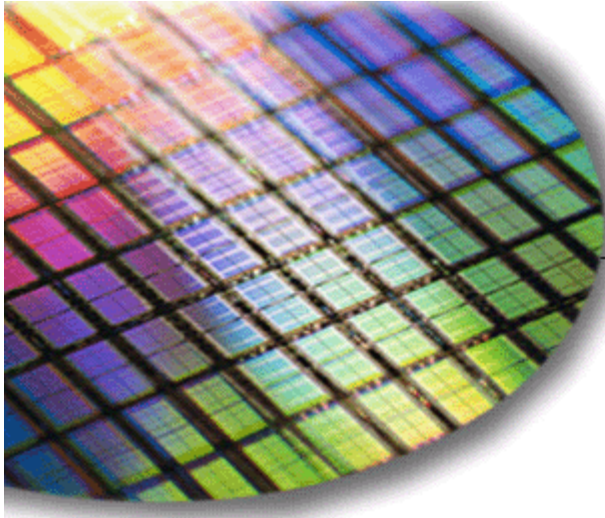
- ◆ **New industry initiative**
- ◆ **New radio technology for ultra-low power wireless connections**
- ◆ **Communicates with small "button" cell battery power devices such as watches & sports sensors**
- ◆ **Enables smaller and less costly implementations**
- ◆ **Easy to integrate with Bluetooth solutions**



WiMAX

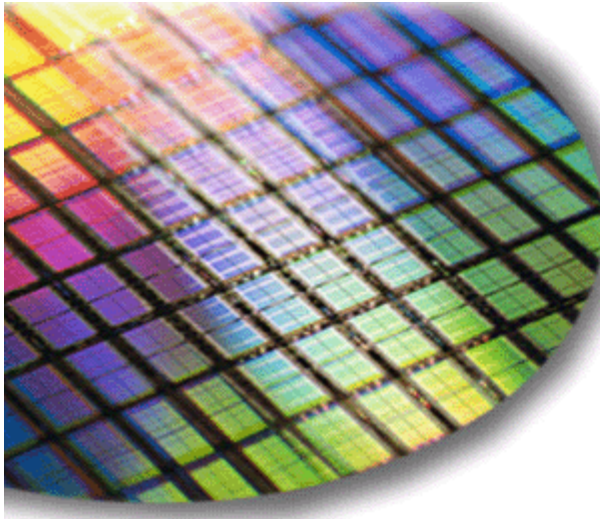
- ◆ **Wireless Broadband**
- ◆ **Intel driving WiMAX in notebooks**
- ◆ **Remote location for broadband access**





WiFi

- ◆ Latest version, 802.11n, now embedded into notebooks
- ◆ Enhanced throughput and range over 802.11a,b, g
- ◆ Support for bandwidth hungry applications



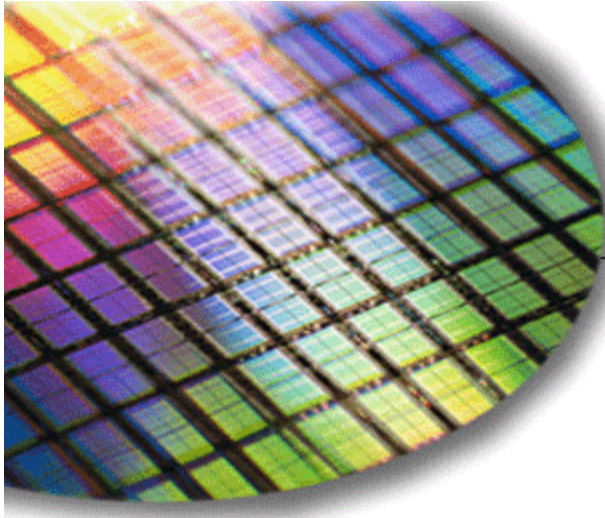
Communications and Portable Computing Replacing Desktop Personal Computers as Application Driver for New Technologies



- ◆ **Cell phones adding more computer-like functions:**
 - Graphics, photos, video, TV
 - Games, sounds, music
 - Email and text messaging
 - Web page viewing
 - Java apps

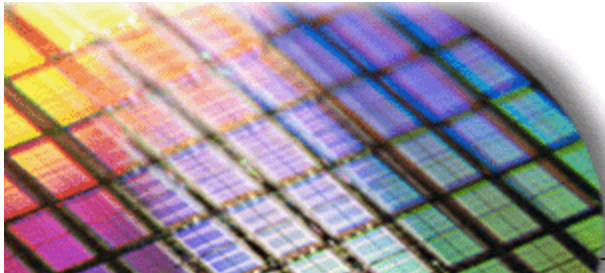
- ◆ **Handheld devices adding wireless connectivity:**
 - Bluetooth
 - WiFi & WiMax
 - TCP/IP

- ◆ **High-end cell phones & notebooks converging as both are driven by Moore's Law and supported by 3G wireless networks**



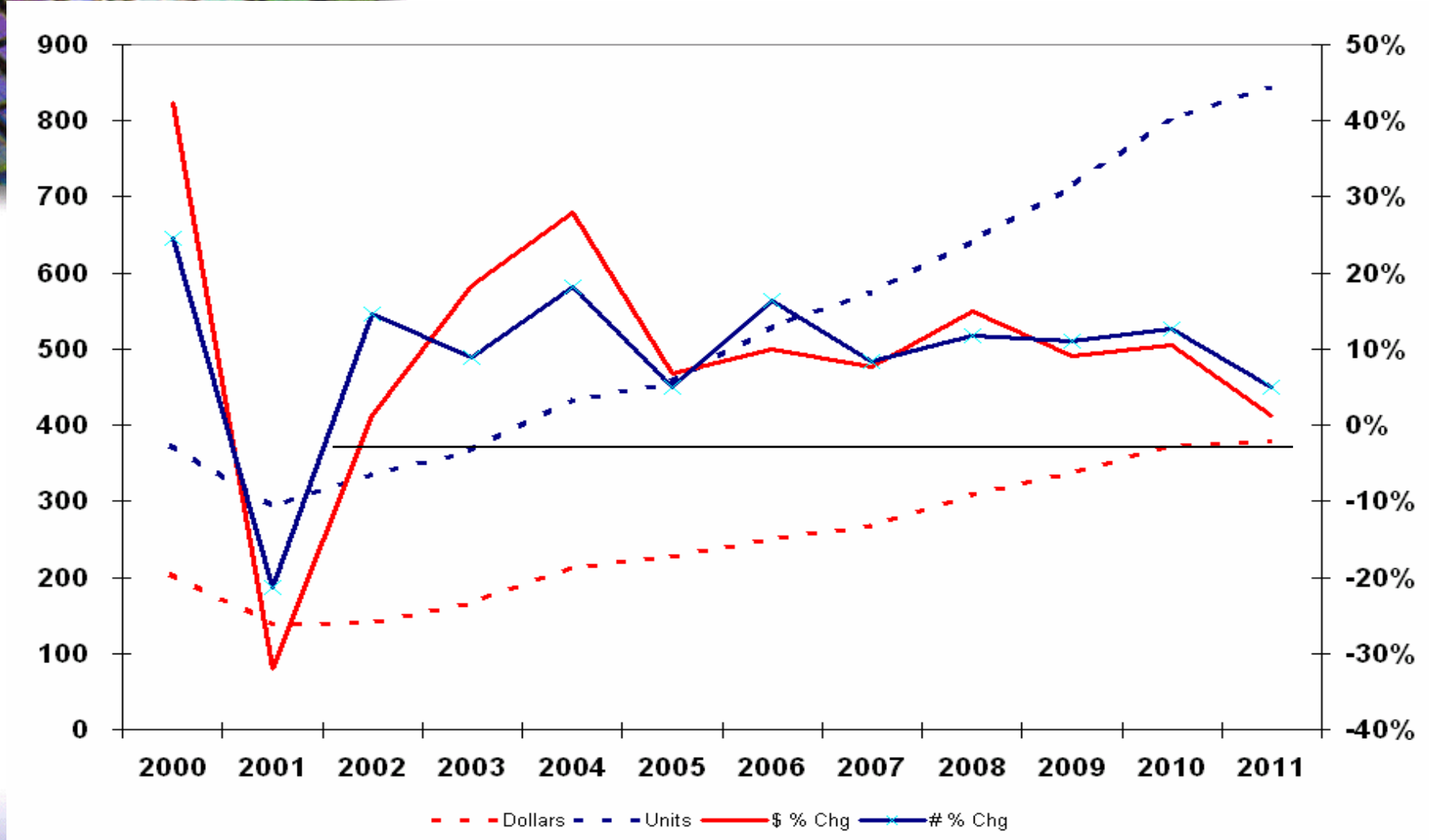
Forecast

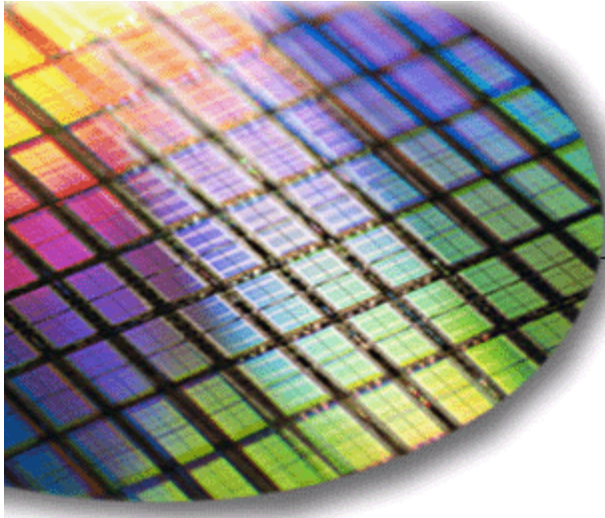
- ◆ **Q4 2006 market starting to slow**
- ◆ **2006 Total Semiconductor revenues up 9.8%**
- ◆ **2007 Total Semiconductors revenues up 7%**
- ◆ **Falling Capacity Utilization in First Half 2007 returning to high rates in 2008**
- ◆ **2008 Market rebound; up 15%**
- ◆ **Next downturn to start in second half 2010**



Semiconductor Forecast

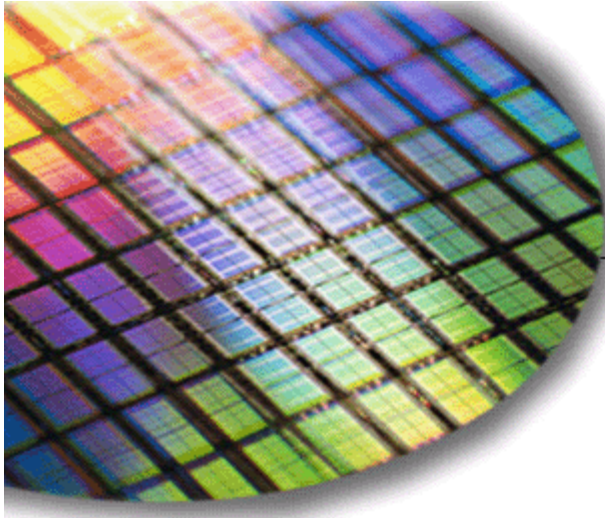
Dollars & Units in Billions





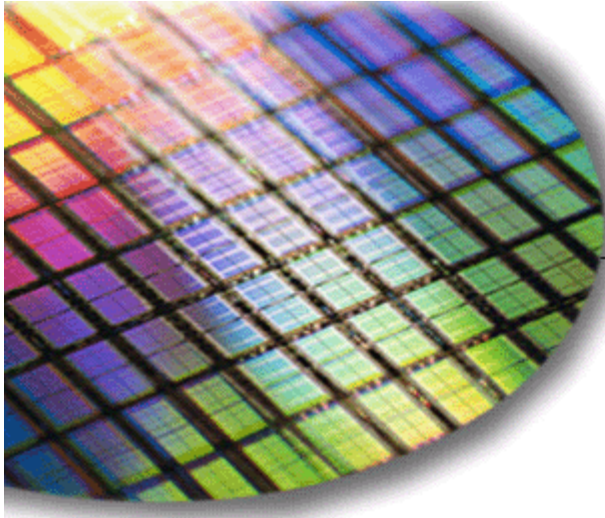
Prof. Clayton Christensen's "Innovator's Dilemma"

- ◆ **New markets develop around unfulfilled demand**
- ◆ **The initial market entrants cannot completely meet the requirements with their new innovative solutions, so they improve and evolve their technology over time in order to achieve the highest level of performance**
- ◆ **In some instances the capabilities of the market leaders eventually exceed the requirements of the majority of the users, thus creating new market dynamics**



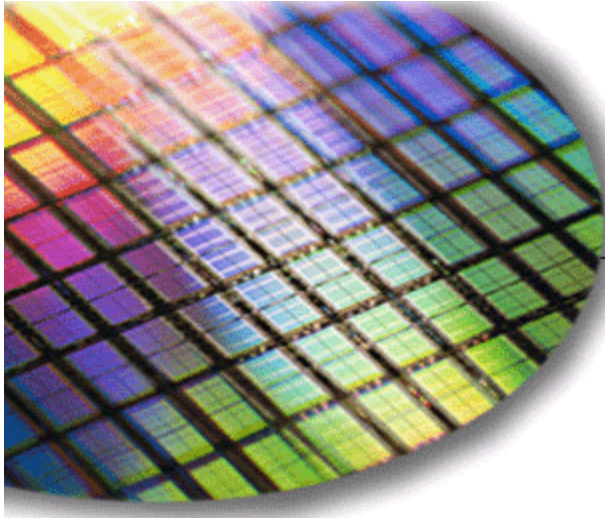
Moore's Law Meets "Innovator's Dilemma"

- ◆ **Moore's Law scales computing architecture toward smaller platforms**
- ◆ **Performance of desk top personal computers now exceeds the requirements of the majority of personal users**
- ◆ **Additional scaling depends on wireless data linkage and more convenient sources of power**



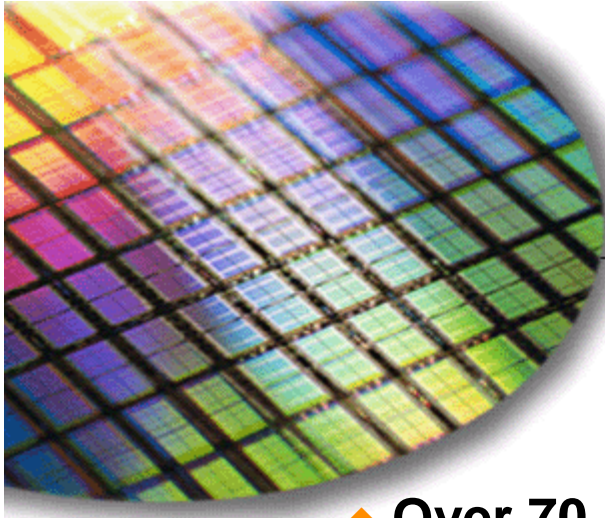
Value Proposition of the Technologies

- ◆ **Changing the target application also changes the value proposition of the technologies**
- ◆ **The rise of portable personal computing and communications devices and portable digital media display devices changes the value proposition of technologies developed in support of desktop “tethered” personal computing boxes**
- ◆ **The ability to extend Moore’s Law for personal computing depends on growth in wireless data and more convenient sources of power**



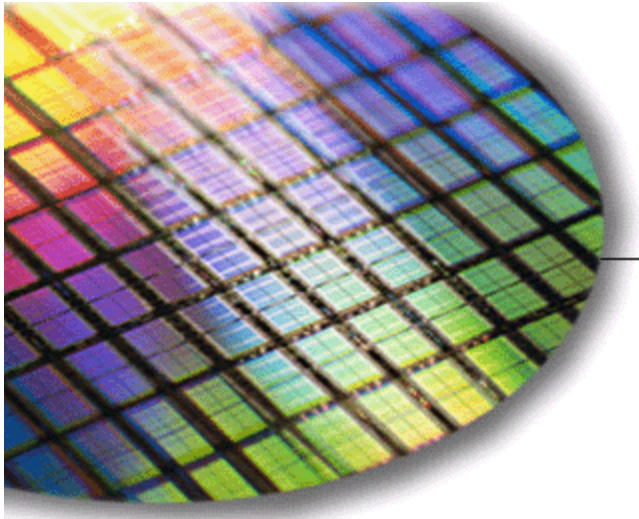
The Medici Effect

- ◆ **Florence, Italy was a crossroad of several disciplines and cultures**
- ◆ **Medici family banking and commerce dominated Florence for 250 years and guided the cultural Renaissance**
- ◆ **“Its assertion that breakthrough insights occur at novel intersections is an enduring principle of creativity...” C. Christensen**

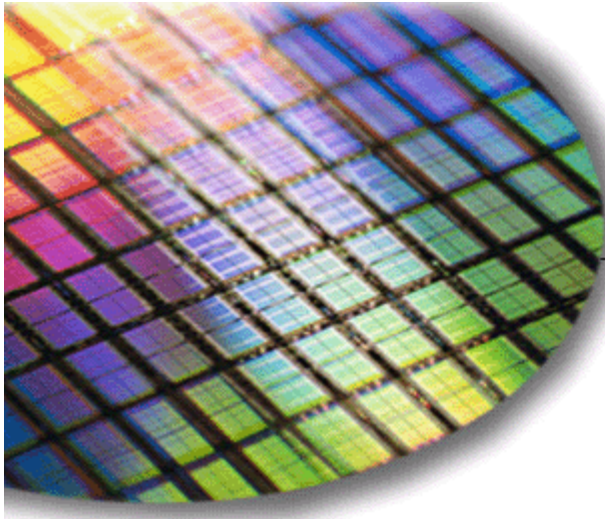


Austin Technology Companies At the Critical Crossroads of Technology

- ◆ **Over 70 highly visible companies, over 30% related to communications**
- ◆ **Strong base of computing expertise from commercial companies as well as the academic environment**
- ◆ **Proven high-volume efficient manufacturing expertise**
- ◆ **Not “burdened” by legacy product base**
- ◆ **Strong venture capital presence**
- ◆ **Additional support infrastructure**



The Austin Community Has the Opportunity to Define the Future Path of Semiconductor Development



Thank You!

“The Future Ain’t What it Use To Be”

Yogi Berra

Bob Merritt

Semico Research Corp.

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