



SILICON SERIES LUNCHEON

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New Markets, New Economics

GSA Luncheon: FBR Capital Markets' View of Semiconductor Fundamentals in a Recovering Global Economy

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FBR Capital Markets

February 11, 2010

Slide Source: FBR Capital Markets

Disclosures

****Not to be used in lieu of full research report****

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Today's Agenda

- ▶ **Introductory Remarks**
- ▶ **Look Back at the Downturn and Subsequent Recovery**
- ▶ **Recap of Current Fundamental and Financial Trends within Semis**
- ▶ **Technology Trends to Focus on in 2010 and Beyond**
- ▶ **Other Topics of Interest**
- ▶ **Transition into Analyst Panel**

Note: Pop Quizzes will be Administered Throughout!!

Introductory Remarks

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Analyst Biographies

Craig Berger, CFA CPA – Craig Berger is a senior vice president in FBR’s technology, media & telecom equity research group, covering the semiconductor component sector. Craig has more than 10 years of experience working in the chip industry or analyzing chip stocks. Prior to joining FBR, Craig worked at Wedbush Morgan Securities from 2005 through 2007, actively following more than 15 stocks in the analog, communication, and consumer sub-sectors. From 2002 through 2005 he worked at Smith Barney Citigroup as an analyst and an associate. From 1999 through 2002 Mr. Berger worked at Intel Corporation where he held various positions of increasing responsibility in the CPU and capital spending operations finance groups. Mr. Berger was named Forbes’ #2 ranked “Blue Chip” semiconductor analyst for 2008 and was named Starmine’s #3 ranked semiconductor earnings forecaster for 2008. Craig has been a repeat guest on CNBC’s Fast Money and Squawk Box TV shows, and is often cited by press and media outlets including Barron’s, The Wall Street Journal, Bloomberg, Forbes, and others. Craig holds a Bachelor in Business Administration and a Masters in Professional Accounting from the University of Texas at Austin. He is a certified public accountant and a CFA charterholder.

Robert Pikover – Robert Pikover is an associate analyst in FBR’s technology, media & telecom equity research group. Previously Robert was a research associate at Thomas Weisel Partners covering the Wireless and Wireline Equipment space. Previous to that he was at KPMG in their Valuation Services Practice. Robert graduated from NYU with his BS in Finance in May 2005. Robert is also a CFA level 3 candidate.

FBR's Semi Research Is Differentiated

- ▶ **Analyst worked at Intel in Finance for 3 years (1999-2002)**
 - Worked as the CPU P&L Consolidator, and as a Capex Finance Project Specialist
 - Yields perspective about how Intel works from the inside, its close/forecasting processes
 - Interfaced with executive management members including newly appointed CFO Smith
- ▶ **Truly proprietary channel checks drive additional insight**
 - Build forecasts -- Desktop motherboard checks (4 different firms) and notebook ODM checks (6 firms)
 - Distributor channel checks with implications for PC-related chip firms
 - Foundry/production channel checks with implications for PC-related chip firms
 - Apple Build plan checks
- ▶ **We know the difference between being positive on the Stock versus positive on business trends**
- ▶ **Valuation analysis incorporates meaningful history and cyclical context**

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FBR Capital Markets Semiconductor Research Coverage

Source: FBR Research													
9-Feb-10	Rating	Price	Target	% Return to Target	Market Cap (\$m)	Current 2009 EV/S	Target 2009 EV/S	Current 2010 EV/S	Target 2010 EV/S	Current 2010 P/E	Target 2010 P/E	Current 2010 EV/EBITDA	Target 2010 EV/EBITDA
AMD**	OP	\$7.42	\$13	75%	5,869	1.19	2.00	0.98	1.65	8.8	14.9	6.6	11.2
ATHR#	MP	\$32.15	\$39	21%	2,130	3.18	4.02	2.02	2.55	13.4	16.9	9.9	12.5
ATML	OP	\$4.80	\$5.50	15%	2,288	1.56	1.84	1.34	1.57	NA	NA	12.8	15.0
BRCM	OP	\$28.80	\$37	28%	15,840	3.02	4.00	2.34	3.10	16.1	21.3	9.9	13.1
FCS**	OP	\$9.06	\$19	110%	1,156	1.00	2.07	0.78	1.61	7.0	14.5	3.8	8.0
IRF**	OP	\$18.97	\$26	37%	1,363	1.21	1.94	0.90	1.44	12.6	20.2	6.0	9.6
INTC	MP	\$19.35	\$27	40%	109,328	2.57	3.80	2.20	3.25	9.7	14.3	5.1	7.5
LLTC	UP	\$26.43	\$31	20%	6,036	7.06	8.21	5.69	6.63	15.3	17.8	11.2	13.0
LSI#**	OP	\$5.14	\$7.50	46%	3,543	1.29	2.02	1.10	1.72	10.1	15.9	6.8	10.6
MRVL	OP	\$18.07	\$24	33%	12,107	3.60	5.02	2.91	4.06	12.5	17.4	8.8	12.3
MXIM**	MP	\$17.63	\$22	29%	5,467	2.84	3.66	2.24	2.89	12.4	16.1	6.8	8.7
MSCC#	OP	\$14.98	\$23	54%	1,230	2.12	3.64	1.89	3.24	9.7	16.6	6.7	11.5
NSM**	MP	\$13.74	\$17	26%	3,311	2.97	3.60	2.49	3.03	13.3	16.2	7.9	9.6
NVDA#	MP	\$16.19	\$17	3%	9,392	2.30	2.39	1.91	1.98	17.5	18.2	10.7	11.1
ONNN**	OP	\$7.62	\$11.50	51%	3,375	2.05	3.08	1.70	2.54	9.6	14.1	6.9	10.3
QCOM#	OP	\$37.51	\$48	29%	63,429	4.17	5.85	3.96	5.56	12.3	17.3	8.4	11.8
SLAB#	OP	\$44.31	\$61	38%	2,119	3.79	5.60	3.12	4.61	14.1	20.8	9.8	14.4
TXN	OP	\$23.10	\$33	45%	29,037	2.44	3.64	2.06	3.06	10.0	14.8	5.6	8.3
Median		\$17.85	\$24	35%	4,505	2.51	3.64	2.04	2.96	12.4	16.6	7.4	11.1
Average		\$19.18	\$26	39%	15,390	2.69	3.69	2.20	3.03	12.0	16.9	8.0	11.0

Excludes stock-based compensation

**P/Es adjusted for 'phantom' depreciation charges above sustainable capital expenditures

Slide Source: FBR Capital Markets

Opportunities to Trade Chip Stocks

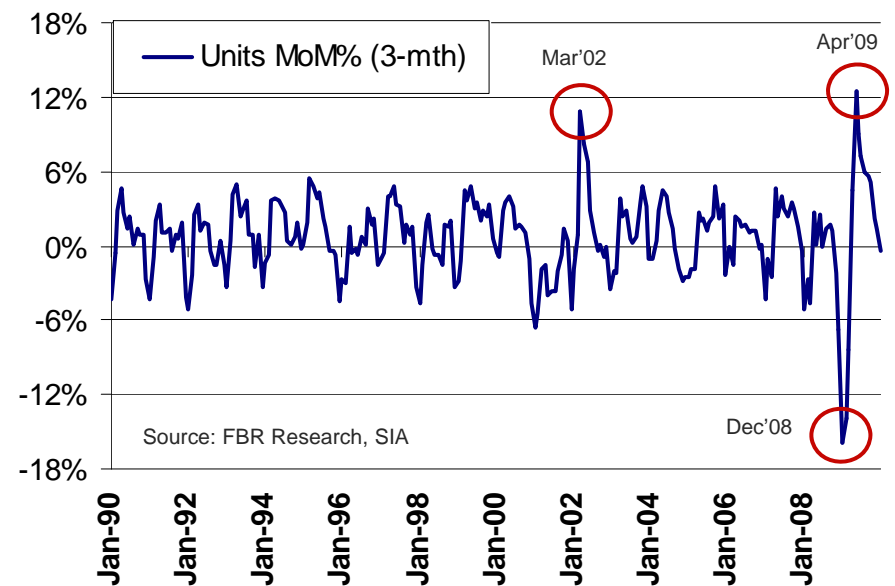
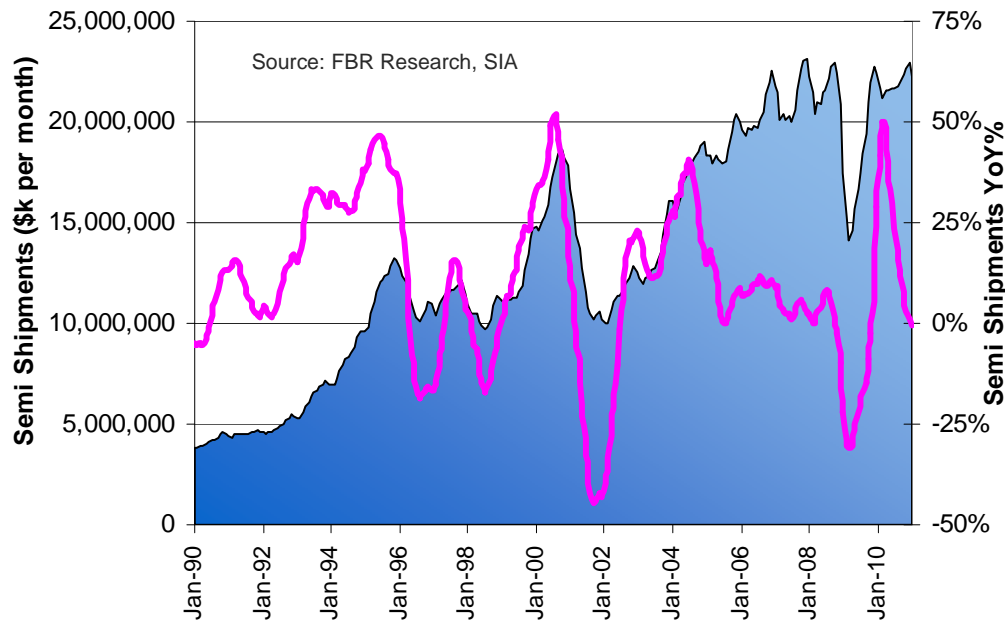
- ▶ **Product cycle plays** – Broadcom’s cellular, “combo” chip efforts
- ▶ **Secular growth/penetration plays** – Power management chips, 3G play (QCOM); WiFi play (ATHR), etc
- ▶ **Inventory boom/bust cycles** – All semis, extended leadtimes to drive this in 2010??
 - The “Semiconductor Cycle”
- ▶ **Seasonality** – Consumer chips and Wireless chips exiting 4Q holidays
- ▶ **Valuation misalignments** – INTC vs AMD, LLTC vs MXIM; FCS at 7x P/E
- ▶ **New management team stories** – (IRF)
- ▶ **Restructuring/business improvement stories** – (ATML, IRF)

Slide Source: FBR Capital Markets

A (Painful) Look Back at the 2008-2009 Downturn

Slide Source: FBR Capital Markets

4Q08 a Six-Sigma Event for Semi Firms



- ▶ **2008-2009 semiconductor downturn steeper than Dot Cum Bubble Burst, though not as severe on a peak-to-trough basis**
- ▶ **Recovery so far seems to be “V-Shaped”**
 - Macro Weakness could still drive Double-Dip or “W-Shaped” recovery

- ▶ **Unit momentum hit a brick wall in October and November 2008;**
- ▶ **Semiconductor industry experienced net negative orders in 4Q08, a never before seen phenomenon**
- ▶ **Semiconductor unit shipments began to rebound in 2Q09**

Slide Source: FBR Capital Markets

Pop Quiz #1 (Bonus Question)

▶ **What caused the previous spike up in month-over-month unit shipments in early 2002??**

1. Recovery from Dot-Com bubble burst
2. China decided to step in and buy low
3. Mostly something else, and if so what?

Answer: 3 and a little bit of 1.

HP's purchase of Compaq caused the firm to stop buying components and building product until all combined company inventories were flushed through. Once this process was completed HP started buying components again (en masse), which along with some recovery from the dot-com bubble burst drove the upside.

Slide Source: FBR Capital Markets

Drivers of Net Negative Chip Orders in 4Q08

- ▶ **Chip order cancellations exceeded new orders placed for all of 4Q08, something that has never happened before.**
- ▶ **Main drivers** of this global response include:
 - Massive credit and liquidity contraction that drove all businesses big and small to drain inventory and sell everything on hand, including old equipment
 - A desire to raise cash levels to weather global uncertainties
 - Falling customer demand forecasts as downstream customers did the same
 - Fears of a poor 4Q08 holiday selling season
 - Concerns swirling about smaller distributors going out of business
 - Concerns about major chip firms and/or their customers breaching debt covenants
 - ▶ Those covenants tied to profitability
 - Hugely falling stock markets impacting purchasing manager behavior as wealth destruction drove demand destruction (and fears of demand destruction)

Slide Source: FBR Capital Markets

2008-2009 Downturn Sharpest on Record

	4Q84 - 3Q85	3Q91 - 1Q92	3Q95 - 2Q96	4Q97 - 3Q98	3Q00 - 4Q01	2Q04 - 4Q04	3Q06 - 1Q07	3Q08 - 1Q09*
Peak to Trough Unit Decline	-25%	-9%	-6%	-8%	-30%	-7%	-3%	-37%*
Duration	3 Qtrs	2 Qtrs	2 Qtrs	3 Qtrs	5 Qtrs	2 Qtrs	2 Qtrs	2 Qtrs*

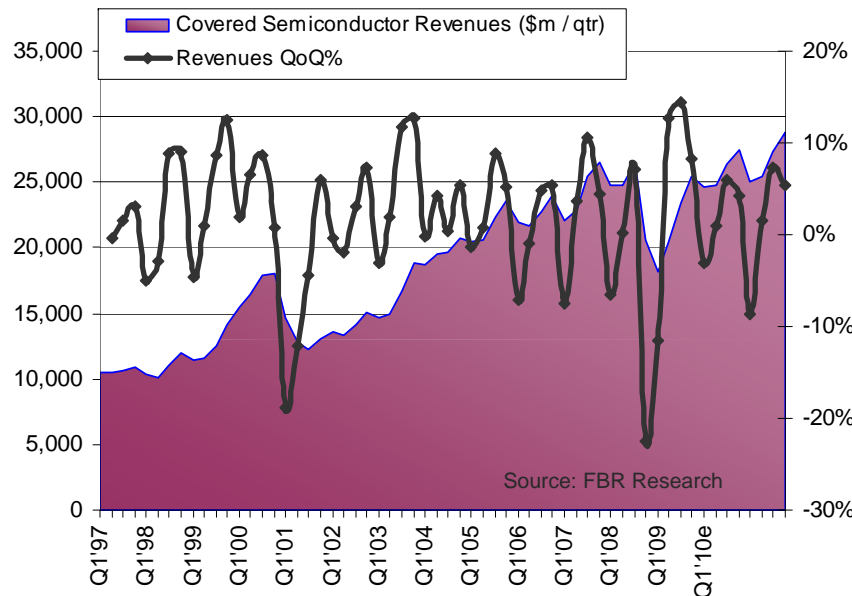
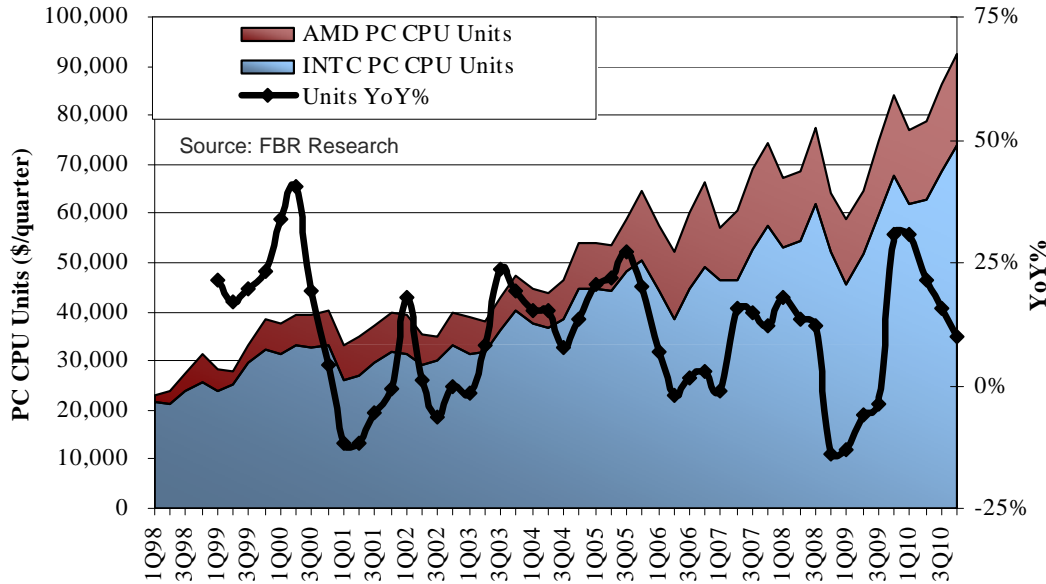
*We expect 1Q09 will be this downcycle's trough quarter with IC units falling by 20% QOQ in 1Q09 after declining 21% QOQ in 4Q08

Source: FBR Research, SIA

- ▶ **Chip firms responded with amazing speed and rapidity to global economic conditions by reducing headcount, slowing production, reducing fab capacity, and cutting inventories**
- ▶ **From our publications on 2/3/09:**
 - **2008–2009 downturn the sharpest on record.** We believe that 1Q09 shipments will mark the trough quarter for the chip industry overall as (1) the chip industry is shipping below end consumption levels for PCs, handsets, and other devices; and (2) this has been the fastest and most severe downturn in chip history. We expect IC units (excluding discretetes) to fall by 37% in two quarters, worse than the 30% unit decline spread over five quarters coming out of the dot-com bubble, and worse than the 25% unit decline spread out over three quarters following a massive inventory and memory correction cycle in late 1984 and early 1985.

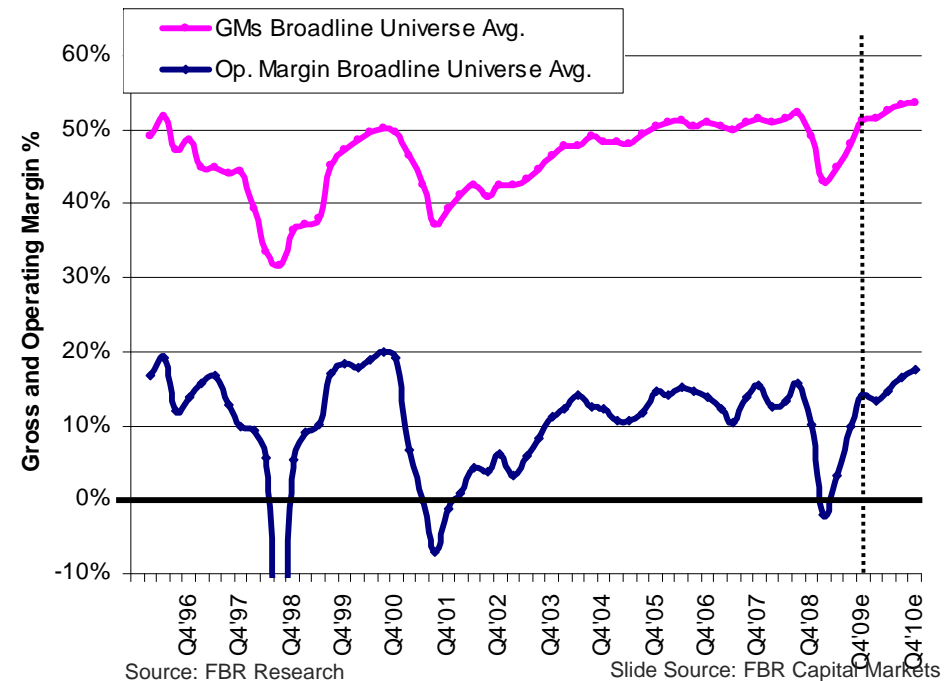
Slide Source: FBR Capital Markets

Even Intel's Business Sank; Industry Margins Too



Intel and AMD's CPU unit shipments hit an all time trough in 1Q09 on a year-over-year basis:

- PC units fell to -20% year-over-year in 4Q08 and 1Q09 even as chip and system price declines impacted revenues even more
- Netbooks and very low cost notebooks still impacting CPU and PC revenues as emerging market unit demand is a primary business driver



Chip Sales Fell Far Below Consumption in 4Q08

	2Q08	3Q08	4Q08	1Q09	2Q09	3Q09E	4Q09E	1Q10E	2Q08-1Q10 Sequential Growth Summation
Global Handset Sales Volumes (mu)	302	304	289	245	270	289	329	290	3%
QOQ%	4%	1%	-5%	-15%	10%	7%	14%	-12%	
Handset Chip Maker Revenue (\$m)									
TXN	902	915	646	551	601	675	732	695	
QCOM	1,762	1,761	1,334	1,316	1,786	1,699	1,608	1,497	
RFMD	241	272	202	172	213	255	250	231	
NSM	462	466	422	292	281	314	345	348	
Average	3,367	3,414	2,604	2,331	2,880	2,943	2,935	2,772	-8%
	5%	1%	-24%	-10%	24%	2%	0%	-6%	
Global PC Sales Volumes (mu)	70	78	76	65	68	80	93	88	33%
QOQ%	0%	11%	-3%	-15%	5%	17%	17%	-5%	
Global PC Device Build Volumes (mu)	53	61	53	46	52	64	66	60	31%
QOQ%	4%	15%	-14%	-13%	11%	24%	3%	-9%	
PC Chip Maker Revenues (\$m)									
AMD	1,349	1,606	1,162	1,177	1,184	1,396	1,646	1,518	
INTC	9,470	10,217	8,226	7,145	8,024	9,389	10,569	9,818	
MRVL	843	791	513	521	641	803	835	792	
NVDA	893	898	481	664	777	903	933	906	
Average	12,554	13,512	10,382	9,508	10,625	12,491	13,983	13,034	13%
QoQ%	-4%	8%	-23%	-8%	12%	18%	12%	-7%	

Source: Nokia for handset sales volumes, IDC for PC sales volumes, FBR Research

Chip shipments fell well below end device consumption levels in 4Q08 and 1Q09:

- Handset device (unit) sales likely fell by 15% from peak (3Q08) to trough (1Q09), while handset chip vendors experienced a 36% decline in peak to trough shipments
- PC shipments fell by 12% peak to trough, lower than PC device builds at a -24% decline, and lower than PC chip vendors at a -31% decline peak to trough.
- Analysis suggested at the time chip shipments were running 15% to 20% below end consumption levels in 1Q09

Slide Source: FBR Capital Markets

Pop Quiz #2

Chip firms responded so quickly and dramatically to the 2008-2009 recession because:

1. Chip management teams are experienced and battle-worn from so many previous Semiconductor Cycles
2. Chip management teams wished to fulfill their fiduciary duties of maximizing and/or protecting shareholder value
3. Chip firms thought they may be able to get TARP funds if they showed enough restructuring related losses
4. Chip management teams thought that global demand/consumption would fall by 20-30% and responded to that
5. Many firms reduced headcount and took this as an opportunity to “clean house”
6. The metaphorical Sky was Falling and the sector saw net negative orders
7. Hoarding cash seemed appropriate back then

Answer: All except number 3

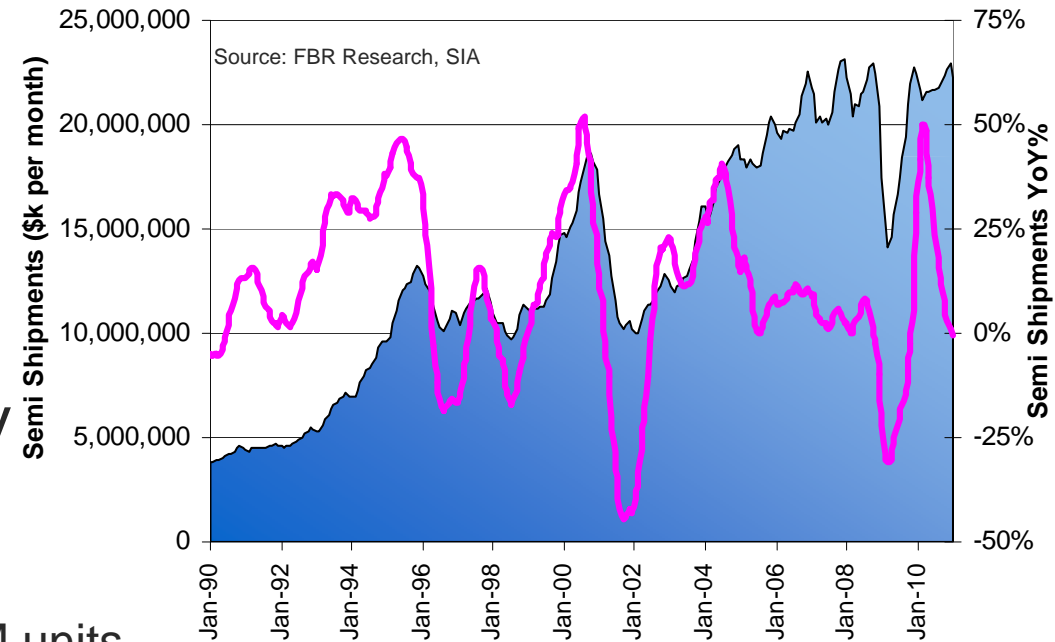
Slide Source: FBR Capital Markets

Recap of Current Semiconductor Fundamental and Financial Trends

Slide Source: FBR Capital Markets

2010 Chip Shipments Likely to Grow 20% YOY

► **20% Growth in 2010** – Chip fundamentals are vastly improved and we expect 2010 shipments to grow 20% year-over-year, partially due to easy 1H10 comparisons:



- **PC** unit growth likely +10-15% YOY to 350M units
- **Handset** unit growth likely +10-12% YOY to 1.4B units: (NOK and Samsung both at +10% YOY)
- **Consumer device** shipments like LCD TVs, Smartphones, and set top boxes likely to grow robustly, largely due to emerging market unit strength
- **Industrial and automotive** chip shipments recovering meaningfully as inventory reductions in those (later-cycle) sectors are now complete
- **Networking and comm** shipments likely to grow meaningfully as China and India ramp 3G spends, Capex budgets refresh, and iPhones / Smartphones stress cellular networks
- **DRAM and NAND memory chips** likely to grow robustly as pricing trends are (finally) better in these sectors following meaningful fab closures and some bankruptcies (QI)

Slide Source: FBR Capital Markets

Still Positive on Chips with “Super-Cycle” Thesis Intact

We remain constructive on chip stocks given beneficial demand, supply, inventory and stock valuation trends in the market; targeting SOX 400-425 within one year

- Absent global macro weakness, a China hard landing, or unwinding of the dollar carry trade

We recognize chip leadtimes have extended (analog, discretetes, memory, other broadbased) and there is some double ordering taking place (a function of higher leadtimes)

However, the question isn't whether double ordering is happening (it is) but whether it will lead to excess inventory in 1H10, that will then lead to future estimate cuts.

We believe 2010 EPS estimates are safe, and that the supply chain is more disciplined given:

1. **Demand Improving** – Chip demand continues to improve in 2010 with IT, enterprise, comm. equipment, networking, and industrial all growth areas (possible PC corporate refresh too)
2. **Inventories lean** – Inventories in the global supply chain are near bone dry which will drive some 1H10 replenishment (when things are seasonally slower); **2Q or 3Q could grow less than typical on a sequential basis**
3. **Customers less likely to hold inventory; credit remains tight** – The idea of holding excess inventory following the pain of 4Q08 is now vile to distributors and others; credit remains tight
4. **Less tolerance for games at distribution** – The rules at distribution have changed somewhat with much less tolerance for order cancellations and double booking by end customers now versus prior cycles (multiple long time distributors contacts are confirming this)
5. **Valuations discounting estimate cuts** – Many chip stocks reflect large estimate cuts to our forecasted 2010 earnings power: INTC, AMD, TXN, LSI FCS, MSCC, IRF, ONNN all trade at 10x P/E

Slide Source: FBR Capital Markets

SOX Cyclical Upside Still Attractive



Source: FBR Research

- ▶ **SOX made lows consistent with 2002 and 1999 troughs**
- ▶ **Still down -42% from SOX 550**
- ▶ **But +77% run-up from SOX 180**
 - Now at SOX 320
- ▶ **While we remain bullish on chip stocks and think the industry is in a "Super-Cycle," any excessive inventory build or replenishment could drive stocks to once again correct.**

▶ **Very Cyclical Industry** – Long capacity installation time and product manufacturing cycle times lead to inventory hoarding and chip price swings

- Industry now tracking to a 2-year cycle, plus or minus a couple quarters
- Amplitude/magnitude of semi cycle has diminished as firms get better at inventory management and as investors hound management about inventory levels

Slide Source: FBR Capital Markets

Summary: Where Fundamentals Stand Now

- ▶ **1Q10 PC builds forecasted to fall -9% QoQ, after upside strength in 4Q**
 - 1Q NBs forecast to fall -9% QOQ; HDD supply still very tight
 - 1Q DTs forecast to fall -9% QOQ; some Intel chipset shortages
- ▶ **Asian Distri Checks: 1Q sales to fall 8%-12% QOQ, inventory at trough levels**
- ▶ **US Distri Checks: 1Q sales to grow sequentially due to industrial, auto strength**
- ▶ **1Q foundry wafer starts to fall only 0%-5% QOQ after strong 4Q (-1% QOQ), 3Q (+15% QOQ), and 2Q (+65% QOQ)**
 - 1Q production trends were revised higher by +8% in aggregate over the past month
 - Positive revision driven by increased orders in PC, communications, and to a lesser extent consumer
- ▶ **Supply chain inventory DOIs at or near all time lows (3Q09 was all time low)**
 - Supply chain inventory dollars fell -25% through 2Q09, +1% QOQ in 3Q09, +2% QOQ in 4Q09
 - 3Q Forward DOIs vs. all time trough: US Electronics Retailers (at all-time lows); PC OEMs (new low in 3Q); Handset OEMs (new low in 3Q); chip distributors (new low in 3Q); chip firms (new post-bubble trough); Comm. Equipment OEMs (new low in 3Q); and EMS firms (inline with prior trough)
- ▶ **Other** – DRAM and NAND robust (supply); Industrial chip sector now mostly recovered as chip shipments ramp back towards consumption/production levels

Slide Source: FBR Capital Markets

1Q PC Builds to Seasonally Fall – 1/18/10

- ▶ Checks with proprietary contacts at top 5 notebook ODMs and top 4 desktop Motherboard makers (Quanta, Compal, Asustek, Wistron, Inventec, others)
- ▶ **1Q09 PC builds declined -13% QoQ with NBs -18% QOQ and DTs -6% QOQ**
- ▶ **2Q09 PC builds grew +11% QoQ with NBs +17% QOQ and DTs +4% QOQ**
- ▶ **3Q09 PC builds grew +24% QoQ with NBs +28% QOQ and DTs +19% QOQ**
- ▶ **4Q09 PC builds grew +3% QoQ with NBs +12.5% QOQ and DTs -11% QOQ**
- ▶ **1Q10 PC builds forecasted to fall -9% QoQ, inline with typical seasonality**
 - 1Q NBs forecast to fall -9% QOQ; HDD supply still very tight
 - 1Q DTs forecast to fall -8.5% QOQ; some Intel chipset shortages
- ▶ **2009 unit growth of several percent was MUCH better than -15% YOY expectations in January 2009**
- ▶ **Potential 2010 catalysts include corporate refresh benefits from Windows 7; more netbook, nettop, and CULV units; and increased touch-panel applications**

Slide Source: FBR Capital Markets

1Q Distributor Shipments Grow in US, Fall in Asia – 1/25/10

- ▶ **Asian Distri Checks: 1Q chip shipments should fall –8% to –12% QOQ**
 - DOIs fell MOM to 27-30 days, less than one month ago (~30 days), targeted levels (40-45 days) and January highs (60 days); inventory shortages still exist!
 - Seeing most upside from PC, followed by networking/comm, last from consumer
 - Chinese New Year could drive shutdowns and shipment choppiness/volatility
- ▶ **US Distri Checks: 1Q sales to grow QOQ due to industrial, auto strength**
- ▶ **Chip leadtimes largely stable** (in some cases rising and in other cases falling)
 - Peak seasonal build passed in November
 - Lower leadtimes are a positive since chip customers will not be motivated to double-order or build up inventories, both positive behavioral outcomes

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2002	22%	-23%	31%	-8%	-9%	1%	64%	-2%	2%	14%	-10%	-3%
2003	53%	-23%	20%	5%	-11%	3%	29%	6%	4%	9%	-9%	-4%
2004	0%	11%	13%	0%	-13%	-1%	9%	-5%	22%	0%	2%	-12%
2005	16%	-25%	36%	-1%	-4%	-4%	13%	12%	9%	-3%	0%	-15%
2006	5%	-13%	20%	-5%	-2%	3%	5%	11%	11%	-9%	-1%	-20%
2007	22%	-28%	39%	5%	-9%	0%	23%	8%	4%	-11%	1%	-17%
2008	20%	-27%	34%	11%	-8%	-2%	18%	-7%	1%	-13%	-27%	-3%
2009	-11%	35%	18%	3%	-9%	13%	13%	7%	8%	-13%	7%	3%
2010	13%											

Note: Jan 2010 is a projection, Source: FBR Research

Slide Source: FBR Capital Markets

Production Trends Improving for 1Q – 2/1/10

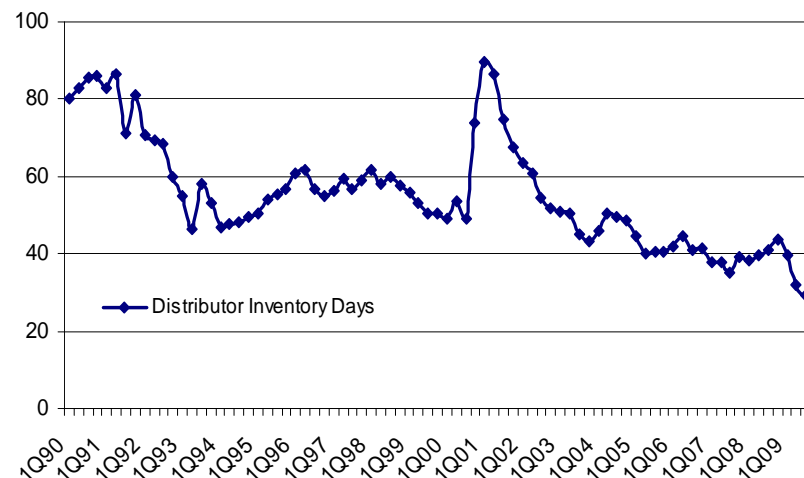
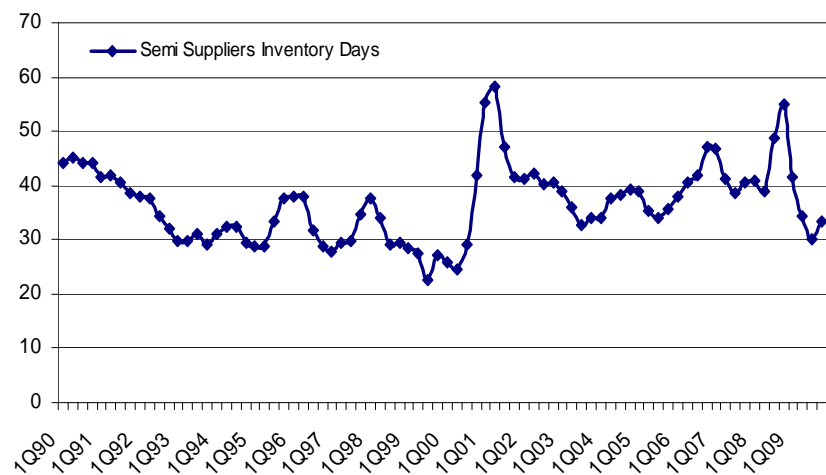
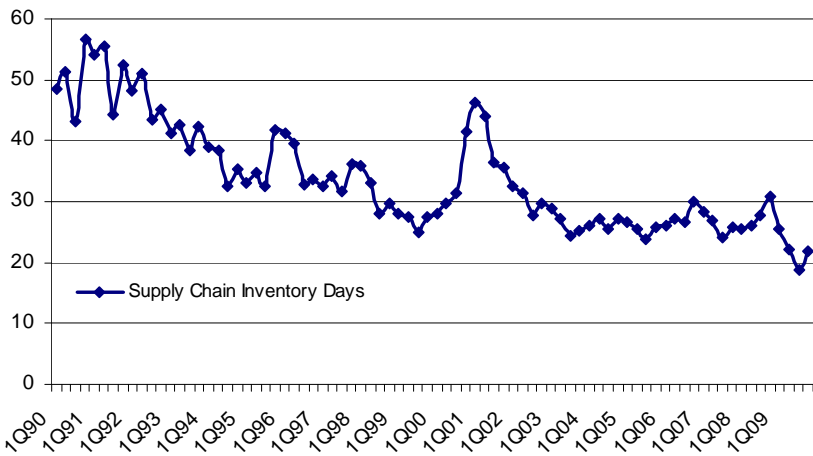
- ▶ **1Q wafer production checks continue to ramp higher**
 - 1Q production trends were revised higher by +5% over the past month
 - Positive revision driven by increased orders by PC (chipsets and graphic customers), communications (both wireless and wire-line, particularly IDM clients), and to a lesser extent consumer (display related)
 - Utilization in 1Q10 at the major foundries remain at +90%
 - Chip firms need more product with 2Q visibility improving noticeably

1Q09 indexed to 1.00	2Q (7/709)	3Q (9/16/09)	3Q QOQ%	4Q (1/4/10)	4Q QOQ %	1Q (10/18/09)	1Q (12/07/09)	1Q (1/4/10)	1Q New (2/1/10)	Change vs. Prior Check	1Q QOQ %
Qualcomm	1.42	1.59	12.5%	1.39	-12.5%	1.11	1.18	1.30	1.30	0.0%	-7.0%
Broadcom	1.55	1.77	14.1%	1.68	-5.1%	1.42	1.46	1.56	1.56	0.0%	-7.0%
Marvell	1.50	1.80	20.0%	1.70	-5.5%	1.42	1.53	1.56	1.56	0.0%	-8.5%
LSI	1.50	1.73	15.0%	1.66	-4.0%	1.16	1.32	1.39	1.39	0.0%	-16.0%
TI	1.60	1.82	14.0%	1.88	3.0%	1.60	1.69	1.69	1.91	12.8%	1.5%
Nvidia	1.80	2.02	12.0%	2.04	1.0%	1.51	1.81	1.84	1.89	2.7%	-7.4%
AMD	1.78	2.17	22.5%	2.19	0.5%	1.54	1.85	1.98	1.98	0.0%	-9.4%
Altera	1.30	1.37	5.0%	1.54	13.0%	1.35	1.47	1.51	1.51	0.0%	-2.0%
Xilinx	1.60	1.68	5.0%	1.85	10.0%	1.69	1.69	1.68	1.87	11.6%	1.2%
Silicon Labs	1.85	2.31	25.0%	1.97	-15.0%	1.47	1.47	1.57	1.57	0.0%	-20.0%
Atheros	1.60	2.00	25.0%	2.16	8.0%	1.37	1.58	2.00	2.00	0.0%	-7.6%
CSR	2.20	2.64	20.0%	2.59	-2.0%	1.86	2.07	2.07	2.07	0.0%	-20.0%
Mediatek	1.80	2.07	15.0%	2.01	-3.0%	1.50	1.71	1.79	1.93	7.9%	-4.0%
Average	1.65	1.92	15.8%	1.90	-0.9%	1.46	1.60	1.69	1.73	2.7%	-8.2%
Median	1.60	1.82	15.0%	1.88	-2.0%	1.47	1.58	1.68	1.87	0.0%	-7.4%

Source: FBR Research

Slide Source: FBR Capital Markets

Supply Chain DOIs Up Slightly from 3Q Trough Levels



Total supply chain inventories grew 4% sequentially in dollars in 4Q after falling 25% from 3Q08 through 3Q09; Forward days have increased modestly, mostly due to seasonally lower 1Q sales (70%), and some higher inventory dollars (30%)

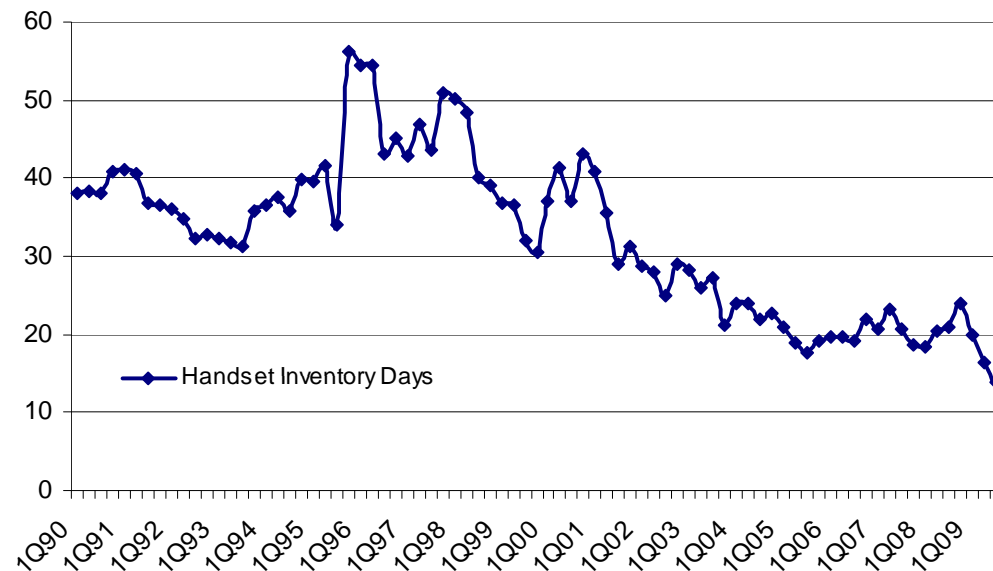
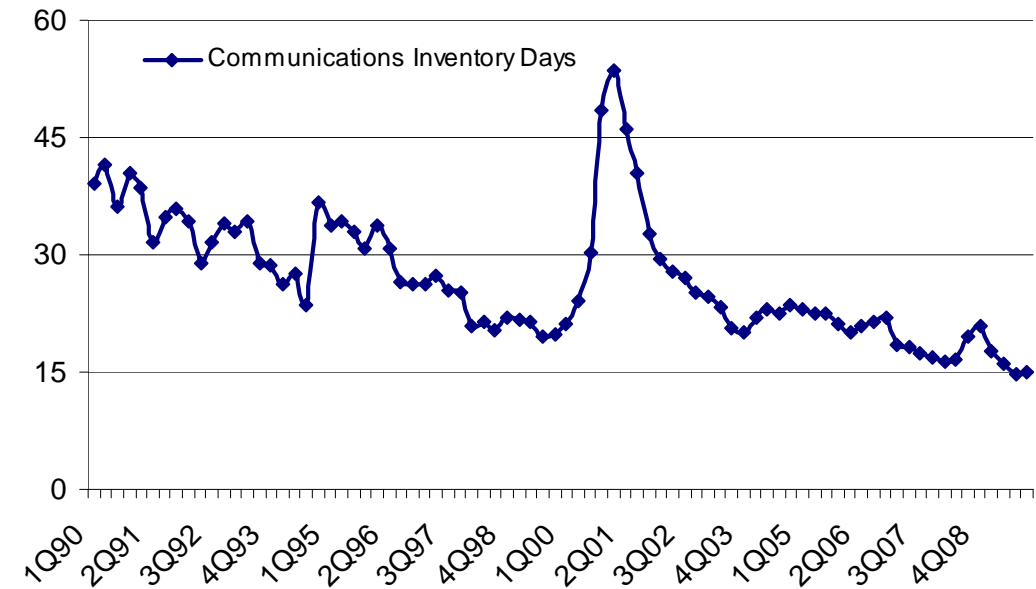
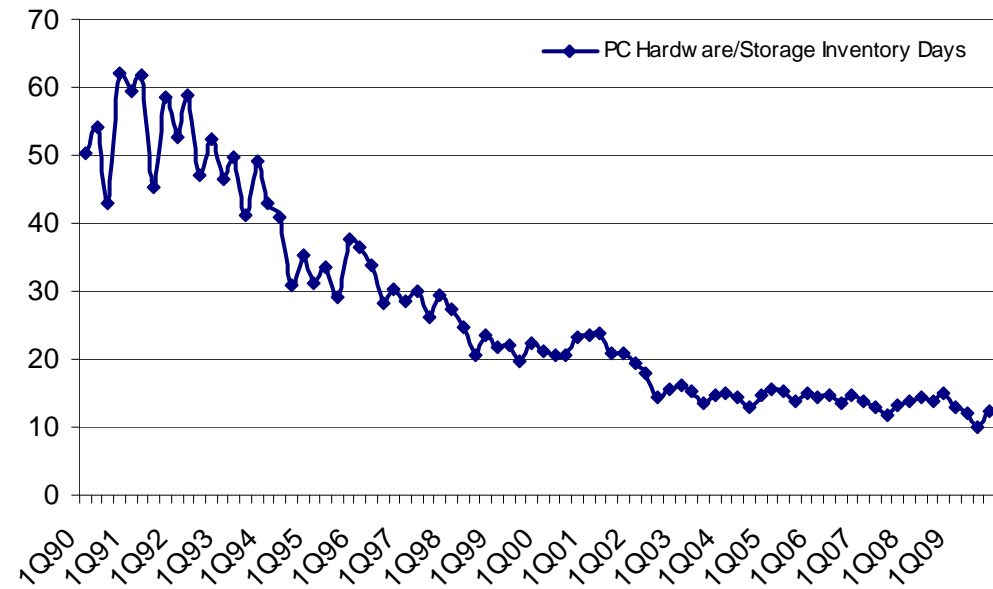
Chip firms' DOIs near trough levels and up just slightly to support higher sales

EMS and distributor DOIs up from all-time trough levels in 3Q due to seasonally lower 1Q sales

Source (All graphs): Factset, FBR Research

Slide Source: FBR Capital Markets

Supply Chain DOIs Up Slightly from 3Q Trough Levels



Handset, Comm Equipment, and PC Hardware Forward DOIs now sit just above all-time (3Q09) trough levels, largely due to seasonally lower 1Q sales in handset and PC, a positive

Source (All graphs): Factset, FBR Research

Slide Source: FBR Capital Markets

Given Robust Trends, Why are Chip Stocks Acting So Poorly?

Semiconductor specific reasons:

1. Chip firms are shipping above consumption levels in 1H10 as the supply chain needs to replenish unsustainably lean inventories
2. Expanded leadtimes and prior replenishment have ended badly: inventory stockpiles to work through, EPS estimate cuts, and 35% stock price sell-offs (peak-to-trough)
3. Lack of confidence that inventories will remain in check drive apathy and embed future estimate cuts into stock valuations

Global macroeconomic reasons:

1. Fears of new large bank regulations could drive banks to hoard cash and loan less; further banks are raising capital levels, also constraining lending
2. Greece debt defaults raise global credit concerns again (and Dubai)
3. Some European, Mid-Eastern countries are facing sovereign risk pressures
4. Stocks may have broken key technical support levels with many calling for a 50% retracement of gains since the market lows of March

Slide Source: FBR Capital Markets

Pop Quiz #3

Global electronics demand (and thus chip demand) recovered so meaningfully in 2009 due to:

1. Emerging market unit strength for PCs, handsets and TVs is real (China, India) and chips are global in various end markets!!
2. Consumers have little discipline and always seem to spend on the next cool gadget as technology leaps forward (iPhone, netbooks, Kindle, Wii)
3. China (and to a much lesser degree the US) have juiced their economy with so much stimulus that it could take decades to pay down
4. It was just an inventory build!!
5. You call that a recovery??

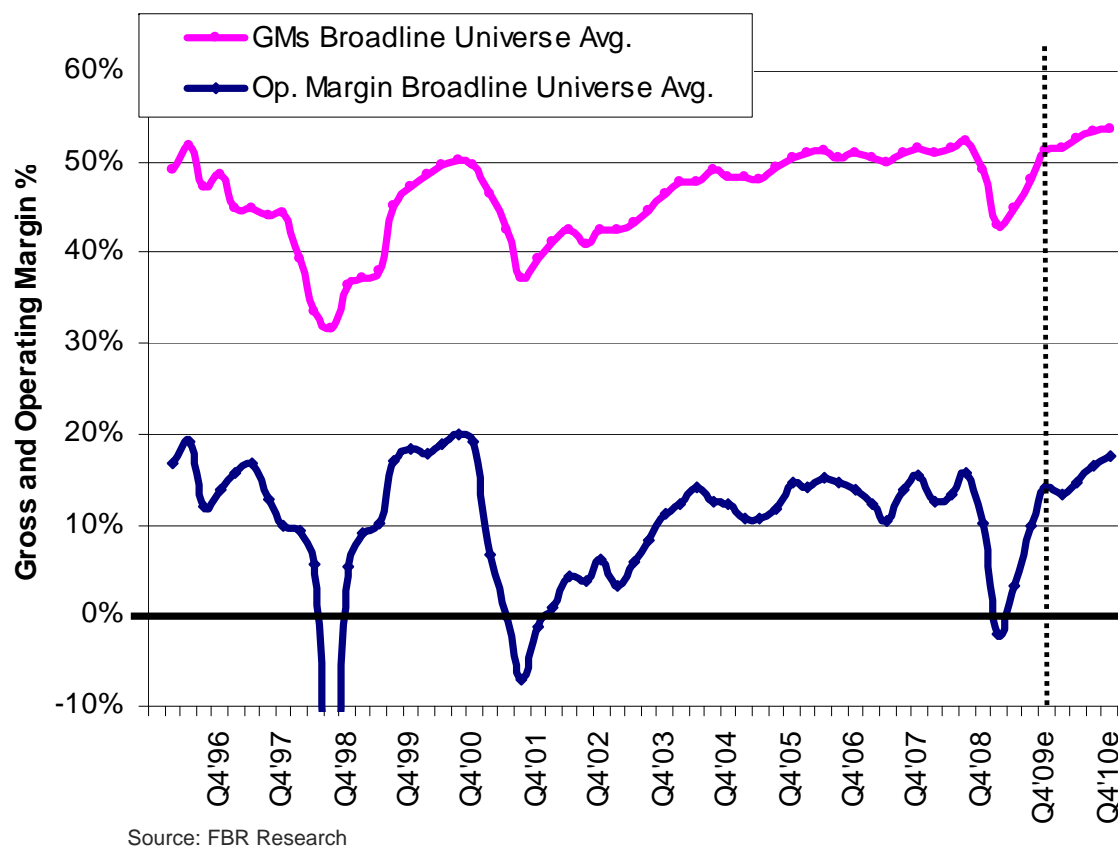
Answer: All except number 4

Slide Source: FBR Capital Markets

Other Interesting Topics

Slide Source: FBR Capital Markets

Chip Firms' Margins at All Time Highs



Chip firms' fast responses – fab closures, headcount cuts, salary/bonus reductions – all drove gross and operating margins back towards prior historical peaks!

Slide Source: FBR Capital Markets

Growth Drivers and Key Trends for 2010

1. **Enterprise/IT spending and corporate PC refresh** – Pent-up demand is building for enterprise, IT, data center, and storage related chips and systems. Thus we expect 2010 spending here to increase driven by Win 7 corporate PC refresh.
2. **China cellular infrastructure buildout** – Phase III of China's cellular infrastructure spending plan, one of the largest phases of spending, is picking up speed and should continue to do so through 2010
3. **Wireless everything: more proliferation of wireless technologies** – Wi-Fi, Bluetooth, and GPS proliferating more broadly into everyday devices that do not contain much electronics content now.
4. **CULV (consumer ultra low voltage), netbook, and smartbook PC shipments** – Acer plans to launch more competitive ultra-thin offerings by the spring time, which may lure competitors HP and DELL to do the same. Netbook/smartbook volumes will grow throughout 2010 given very low costs.
5. **Smartphones** – We see a continued proliferation of smartphones with +15% growth in 2009 and +25% expected in 2010. Handset chip content is actually increasing versus recent years.
6. **Tablets, eBook readers, and MIDs** – Chip suppliers that will benefit from this advanced wireless handheld trend are Qualcomm, Infineon, Broadcom, Marvell, Nvidia, Intel, and STMicro.
7. **Touchscreen devices** – Touchscreens will penetrate all sorts of devices, including more handsets, but also applications like TVs, monitors, industrial and white goods buttons, automobiles, and others.
8. **LED and 3D TVs and screens** – LED- TV shipments for 40-inch and larger models are expected to grow by 750%, reaching 19 million units in 2010 from 2.5 million in 2009. While some will point to success of Avatar , we believe 3-D is five to eight years away from being a widespread phenomenon.
9. **USB 3.0 (SuperSpeed)** – Still there is a need for more speed by ever-faster computing hardware and ever greater bandwidth demands.
10. **Distributed computing** – As broadband becomes faster and increasingly available, PCs do not need to have expensive operating systems and processors; they can be 'dumb terminals' that just interface with the Internet, where all of the computing takes place in servers.

Slide Source: FBR Capital Markets

Many (Many) Different Chip Firms Compete

<p>Diversified IDMs</p> <p>Advanced Micro Devices (AMD) Atmel (ATML) Cypress Semi (CY) IDT (IDTI) Infineon (IFX) Intel (INTC) LSI Logic (LSI) Microchip (MCHP) STMicroelectronics (STM) Texas Instruments (TXN)</p> <p>Standard Components</p> <p>CREE (CREE) Fairchild (FCS) IXYS Corp (SYXI) International Rectifier (IRF) Microsemi (MSCC) ON Semi (ONNN) Vishay Intertechnology (VSH)</p> <p>U.S. Listed Foundry Companies</p> <p>Chartered Semi (CHRT) Semi Manufacturing Intl (SM) Taiwan Semi (TSM) Tower Semi (TSEMF) UMC (UMC)</p>	<p>Analog</p> <p>Advanced Analogic Tech (AATI) AMIS Holdings (AMIS) Analog Devices (ADI) Austriamicrosystems AG (B01138) AuthenTec Inc. (AUTH) California Micro Devices (CAMD) Cirrus Logic (CRUS) ELMOS Semi (569542) Intersil (ISIL) Leadis (LDIS) Linear Technology (LLTC) Maxim (MXIM) Micrel (MCRL) Monolithic Power Systems (MPWR) National Semi (NSM) O2Micro (OIIM) Pericom (PSEM) Power Integrations (POWI) Semtech (SMTC) Silicon Image (SIMG) Silicon Laboratories (SLAB) Sipex (SIPX) Standard Microsystems (SMSC) Supertex (SUPX) Volterra Semi (VLTR) Wolfson Microelectronics (335631)</p>	<p>Consumer / Multimedia</p> <p>ESS Technology (ESST) Genesis (GNSS) Leadis (LDIS) MediaTek (637248) Micronas Semi Neomagic (NMGC) Nvidia (NVDA) Omnivision (OVTI) Pixelworks (PXLW) Sigma Designs (SIGM) Sigmatel (SGTL) Silicon Image (SIMG) Silicon Motion (SIMO) Techwell (TWLL) Trident (TRID) TVIA (TVIA) Vimicro International (VIMC) Wolfson Microelectronics (335631) Zoran (ZRAN)</p> <p>Communications - Wireless</p> <p>Atheros (ATHR) Anadigics (ANAD) CSR PLC (341473) DSP Group (DSPG) Hittite Microwave (HITT) Qualcomm (QCOM) RF Micro Devices (RFMD) RF Monolithics (RFMI) Sirenza (SMDI) SIRF Technology (SIRF) Skyworks (SWKS) Spreadtrum Comm. (SPRD) Triquint (TQNT) WJ Comm (WJCI)</p>	<p>Memory</p> <p>Hynix (645026) Elpida (6665) Integrated Silicon Solution (ISSI) Micron (MU) Nanya (628360) PowerChip (610899) ProMOS (615629) Qimonda AG (QI) Ramtron (RMTR) Saifun Semis (SFUN) Samsung Electronic (677172) Sandisk (SNDK) Silicon Storage Technology (SSTI) Smart Modular Technologies (SMOD) Spansion (SPSN) StakTek (STAK) Winbond Electronic (696651)</p> <p>Programmable Logic Devices</p> <p>Actel Corp (ACTL) Altera Corp (ALTR) Lattice (LSCC) Quicklogic (QUIK) Xilinx (XLNX)</p> <p>Intellectual Property</p> <p>ARM Holdings (ARMHY) CEVA (CEVA) MIPS Technologies (MIPS) Rambus (RMBUS) Tessera Technologies (TSRA) Transmeta (TMETA) Virage Logic (VIRL)</p>	<p>Communications - Wireline</p> <p>Applied Micro Circuits (AMCC) Broadcom (BRCM) Brocade Comm (BRCD) Centillum Comm (CTLM) Conexant Systems (CNXT) Emulex (ELX) Exar (EXAR) HiFn (HIFN) Ikanos (IKAN) Marvell Technology Group (MRVL) Mellanox (MLNX) Metalink (MTLK) Microtune (TUNE) Mindspeed (MSPD) Netlogic Microsystems (NETL) PLX Technology (PLXT) PMC-Sierra (PMCS) QLogic (QLGC) Transwitch (TXCC) Tundra Semi (*TUN) Zarlink Semi (ZL)</p> <p>U.S. Listed Assembly/Test Firms</p> <p>Advanced Semi Eng (ASX) Amkor (AMKR) ASE Test (ASTSF) ASAT Holdings (ASTT) ASM Pacific Technology (600245) STATS ChipPAC (STTS) Chipmos Technologies (IMOS) Siliconware Precision (SPIL)</p>
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Source: FBR Research
Slide Source: FBR Capital Markets

Pop Quiz #4

Why hasn't there been more chip firm consolidation in recent years??

- 1. Historically too much (almost unlimited) capital for chip firms**
- 2. Low barriers to entry in chips (fabless analog design as an example)**
- 3. Desire of many C-Level executives to remain employed**
- 4. Depressed stock prices driving an unwillingness to sell**
- 5. Large bonus and option packages reduce motivation to sell entirely**

Answers: All

Slide Source: FBR Capital Markets

M&A Activity Likely to Increase

We believe merger and acquisition (M&A) activity is likely to increase in coming quarters:

- 1. Economic recovery appears to have set in and confidence is up**
- 2. Stock valuations have increased, so firms are not “selling at the bottom” anymore**
- 3. Equity and debt markets have once again re-opened**
- 4. Large firms with big cash positions (the-Haves) will look to take advantage of weaker competitors (the-Have Nots) to accelerate growth, build scale and gain technology**

Slide Source: FBR Capital Markets

Thoughts on Innovation

"Everything that can be invented has been invented."

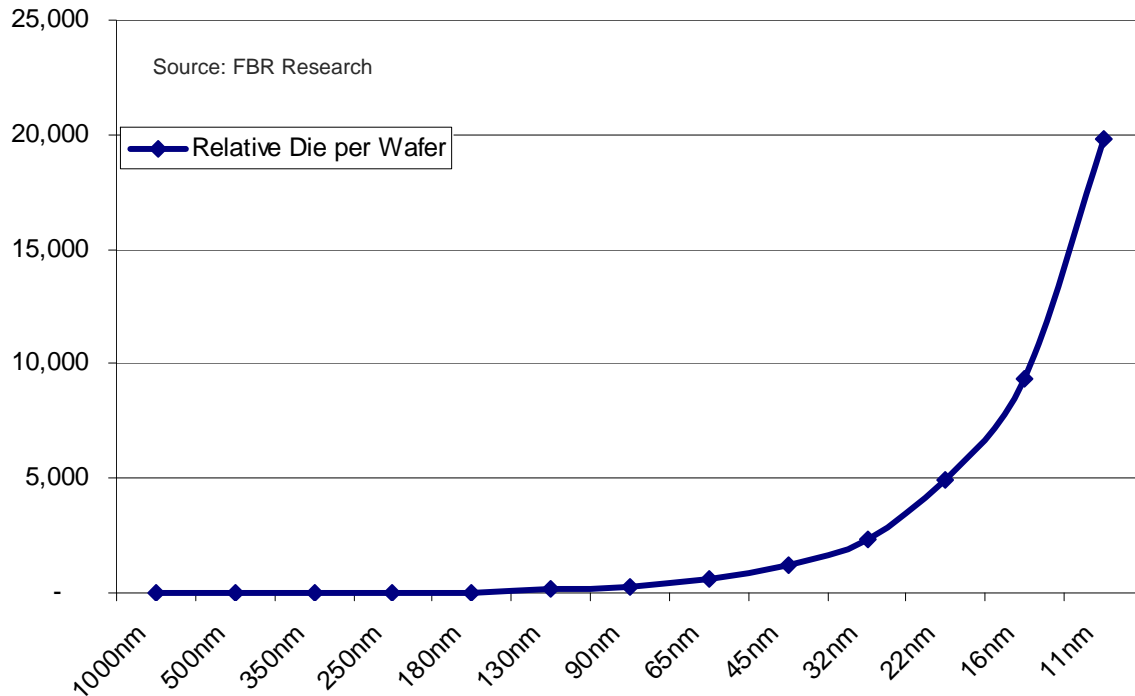
-- *Quote misattributed to Charles H. Duell, Commissioner of the Patent Office, 1899*

"The advancement of the arts, from year to year, taxes our credulity and seems to presage the arrival of that period when human improvement must end."

-- *Henry L. Ellsworth, Commissioner of the Patent Office, 1835-1845*

We think Innovation and Moore's Law will continue for some time to come

Moore's Law: More Juice Left Still



Process Node	Wafer Size	Relative Die per Wafer
1000nm	200mm	1
500nm	200mm	4
350nm	200mm	8
250nm	200mm	16
180nm	200mm	31
130nm	300mm	142
90nm	300mm	296
65nm	300mm	568
45nm	300mm	1185
32nm	300mm	2344
22nm	300mm	4959
16nm	300mm	9375
11nm	300mm	19835

Source: FBR Research

(Gordon) Moore's Law likely to continue for next 6-8 years, then advances in materials and compounds should continue technology advancements

Two methods of lowering cost per chip:

- ▶ Moore's Law: Shrink the area of the chip by "writing" circuits with a smaller pen (litho)
 - Moore's Law - # of chip transistors doubles every 18-24 months, price gets cut in half
 - Smaller size = less cost, as more die (chips) can be contained on a wafer
- ▶ Moving to bigger wafers (200mm to 300mm) -- 150% more die, only 30%-50% more cost

Slide Source: FBR Capital Markets

Broadcom's Bluetooth and Combo Offerings an Example of How to Win a Market

Combo Solutions – Blutionium® Bluetooth® Silicon

BCM2048 Bluetooth® EDR + FM Radio Single-Chip Solution
BCM2049 Single-Chip Bluetooth® 2.1 + EDR with Integrated FM Transceiver
BCM2075 Multifunction Monolithic IC with AGPS, Bluetooth® 2.1 + EDR, and Integrated FM Transceiver
BCM4325 Low-Power 802.11a/b/g with Bluetooth® 2.1 + EDR and FM
BCM4329 Low-Power 802.11n with Bluetooth® 2.1 + EDR and FM (Tx and Rx)
BCM94312HMGB 802.11g and Bluetooth 3.0 Half MiniCard Reference Design
BCM943224HMB Dual-Band 802.11n and Bluetooth 3.0 Half MiniCard Reference Design
BCM943225HMB Single-Band 802.11n and Bluetooth 3.0 Half MiniCard Reference Design

Bluetooth RF Silicon and Software Solutions – Blutionium® Bluetooth® Silicon

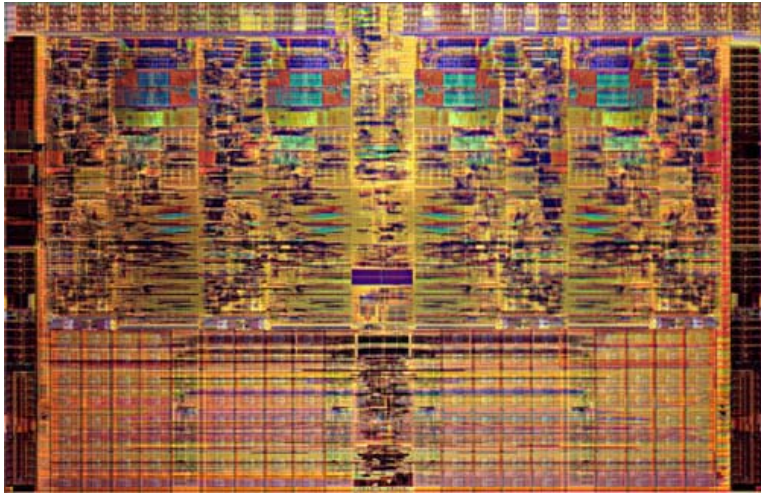
BCM2004 Bluetooth® Radio for QUALCOMM®-Based Handsets
BCM2042 Advanced Wireless Keyboard/Mouse Bluetooth® Solution
BCM2044 Single-Chip Bluetooth® Mono Headset IC
BCM2044S ROM-Based Noise and Echo Reduction Mono Headset IC
BCM2045 Advanced Single-Chip Bluetooth Solution
BCM2046 Single-Chip Bluetooth® EDR HCI Solution
BCM2047 Single-Chip Bluetooth® Wireless Audio Solution with DSP
BCM2048 Bluetooth® EDR + FM Radio Single-Chip Solution
BCM2049 Single-Chip Bluetooth® 2.1 + EDR with Integrated FM Transceiver
BCM2070 Single-Chip Bluetooth® 3.0 HCI Solution
BCM20740 Low-Cost ROM Based Single-Microphone Mono Headset Solution
BCM20741 ROM-Based, Single-Microphone, Mono Headset IC with Noise and Echo Reduction
BCM20742 ROM-Based, Dual-Microphone, Mono Headset IC with Noise and Echo Reduction
BCM2075 Multifunction Monolithic IC with AGPS, Bluetooth® 2.1 + EDR, and Integrated FM Transceiver
BCM4325 Low-Power 802.11a/b/g with Bluetooth® 2.1 + EDR and FM
BCM4329 Low-Power 802.11n with Bluetooth® 2.1 + EDR and FM (Tx and Rx)

Success is created when products are specifically designed to address a particular market niche. Bluetooth is really 20 different sub-markets, depending on application and usage models.

Slide Source: FBR Capital Markets

Cool and Innovative Products for 2010

Intel's Nehalem Quad-Core CPU on 32nm



Source: Intel

Qualcomm's Snapdragon on 45nm on a single chip includes:

- ▶ 1GHz ARM CPU
- ▶ 600MHz DSP
- ▶ 3G baseband modem
- ▶ GPS (7th Generation)
- ▶ 720p Video Decode
- ▶ 12 megapixel camera support
- ▶ Multiple audio codecs and MediaFLO TV support

Broadcom's Bluetooth/WiFi/FM (BCM4329) on 65nm

- ▶ 802.11n A/B/G
- ▶ Bluetooth 2.1 +EDR
- ▶ FM receiver and transmitter (transceiver)
- ▶ On chip power management unit (PMU)

Selling into iPhone, iPad (likely); iPod Touch, Motorola Droid phones, HTC phones (Google Nexus One), Others

Broadcom's Single Chip Integrated Access Device on 65nm combines multiple boxes (voice, video, and data) into one box:

- ▶ ADSL2+ DSL
- ▶ 802.11n WiFi (2x2)
- ▶ Gigabit Ethernet switch (4 PHYs)
- ▶ VoIP functionality (DECT)
- ▶ 400MHz dual core processor

Slide Source: FBR Capital Markets

Other Stuff

Slide Source: FBR Capital Markets

Coverage End Market Exposure

	PC	Handset	Consumer	Enterprise Comm. Equipment	Industrial / Auto	Aero & Defense	Medical	Other
AMD	93%		7%					
Atmel	5%	10%	30%	7%	42%			6%
Broadcom	20%	22%	33%	25%				
Fairchild Semi	25%	10%	20%	15%	20%			10%
Int'l Rectifier	35%		15%	13%	20%	17%		
Intel	87%	5%		5%				3%
Linear	12%	11%	5%	25%	41%	6%		
LSI	40%			60%				
Marvell	65%	15%	5%	10%				5%
Maxim	29%		27%	20%	24%			
Microsemi	8%		8%	12%	7%	50%	15%	
National Semi	12%	33%	13%	10%	32%			
Nvidia	75%	5%	20%					
ON Semi	23%	10%	15%	10%	26%	11%	5%	
Qualcomm	2%	90%	3%	5%				
Silicon Labs	10%	20%	10%	50%	10%			
Texas Instruments	10%	22%	15%	20%	28%	5%		
Mean	32%	21%	15%	19%	25%	18%	10%	6%
Median	23%	13%	15%	13%	25%	11%	10%	6%

Source: FBR Research

Slide Source: FBR Capital Markets

Semiconductor Industry Risks

- ▶ **Cyclical risks including excess inventory, excess supply, and capacity underutilization**
- ▶ **Demand and other macroeconomic risks often resulting in excess supply**
- ▶ **Chip price decline risks, particularly in digital and consumer chips**
- ▶ **Excess competitive risks in an industry not particularly prone toward consolidation**
- ▶ **Other design and execution risks associated with running complex manufacturing operations**

Slide Source: FBR Capital Markets

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New Markets, New Economics

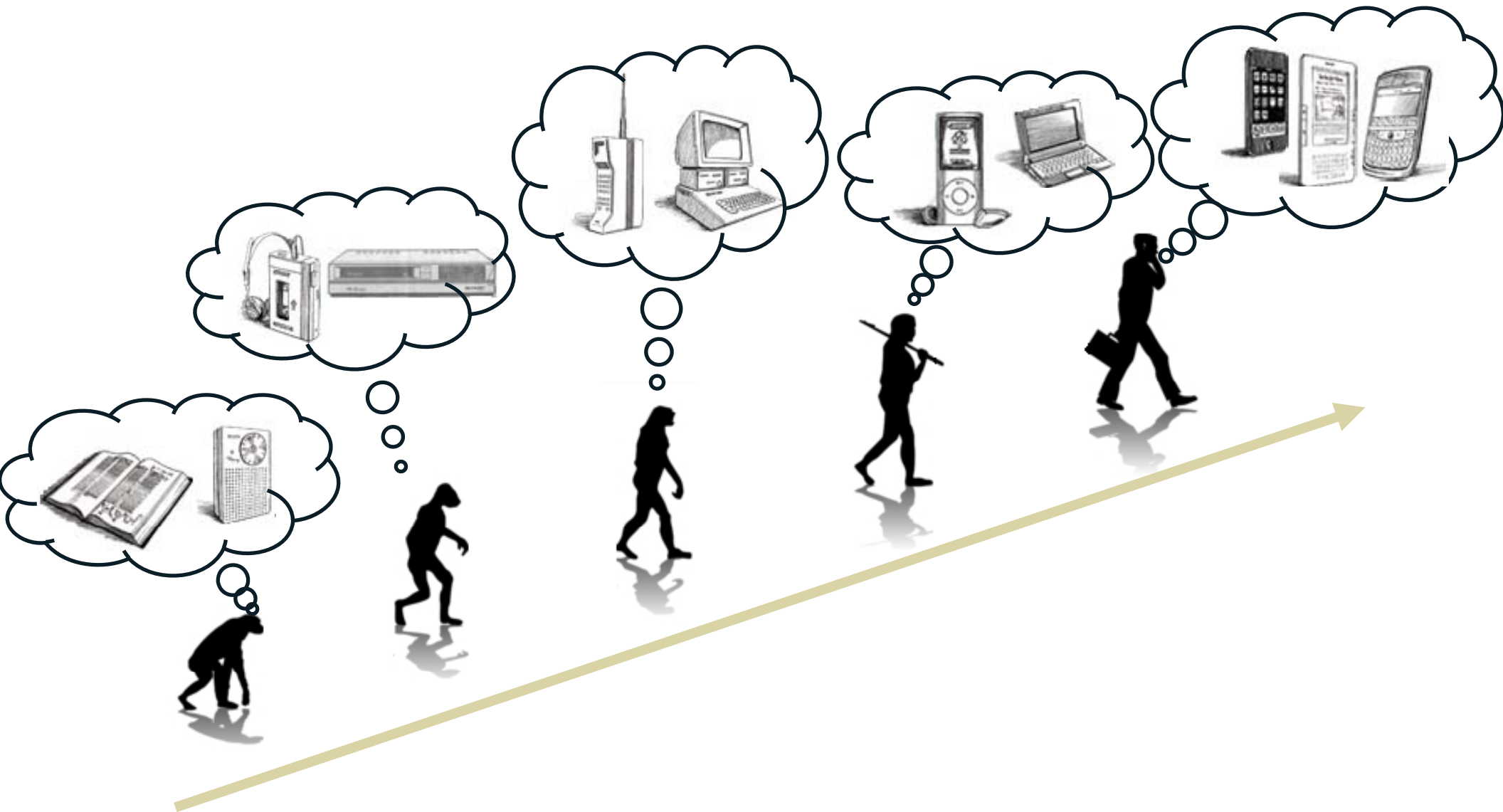
The Consumer Electronics Market

a.k.a. \$700B Gorilla

Susie Inouye
Research Director



The Evolution of the Consumer

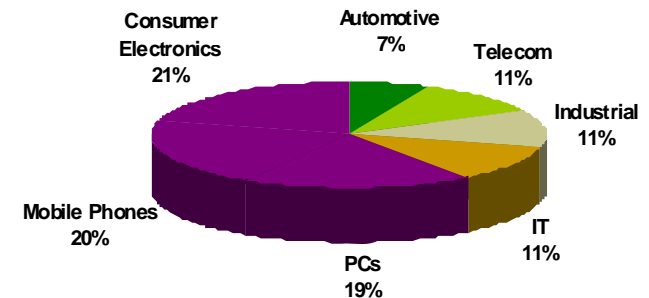
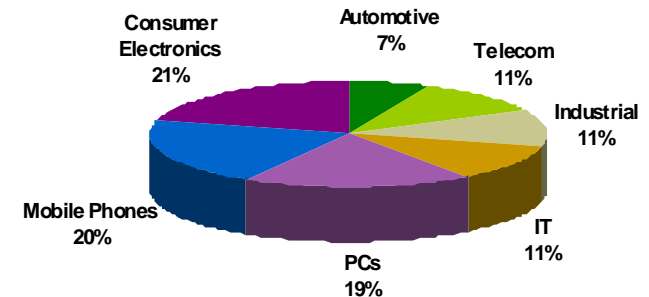




The Gorilla At-A-Glance

2010 Semiconductor Market = \$259B

- ▶ \$739B Equipment Market (+9%)
- ▶ Semi SAM is \$55B (+14%)
- ▶ Semi RSAM is 60% of TAM - \$156B (+17%)
- ▶ Hot Applications
 - Blackberry, iPhone, Droid
 - eReader
 - Televisions
 - Netbooks



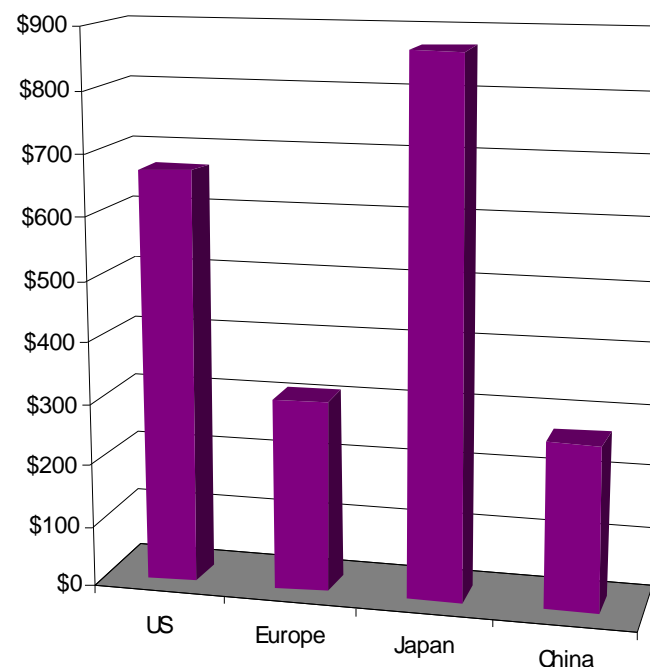
databeans Estimates, January 2010



The Gorilla At-A-Glance

Continued

2010 Average Spending on CE

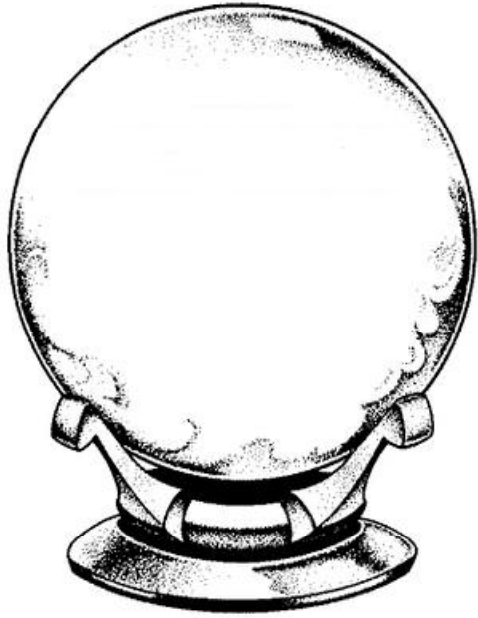


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▶ 4.2 Billion Consumers

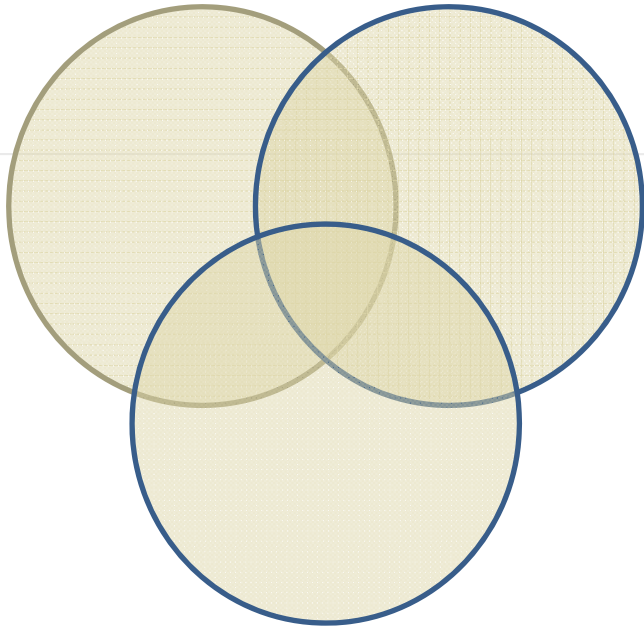
▶ Worldwide Average of \$170 per Year on CE

- Japan: \$869
- US: \$671
- Europe: \$312
- China \$270



Predictions

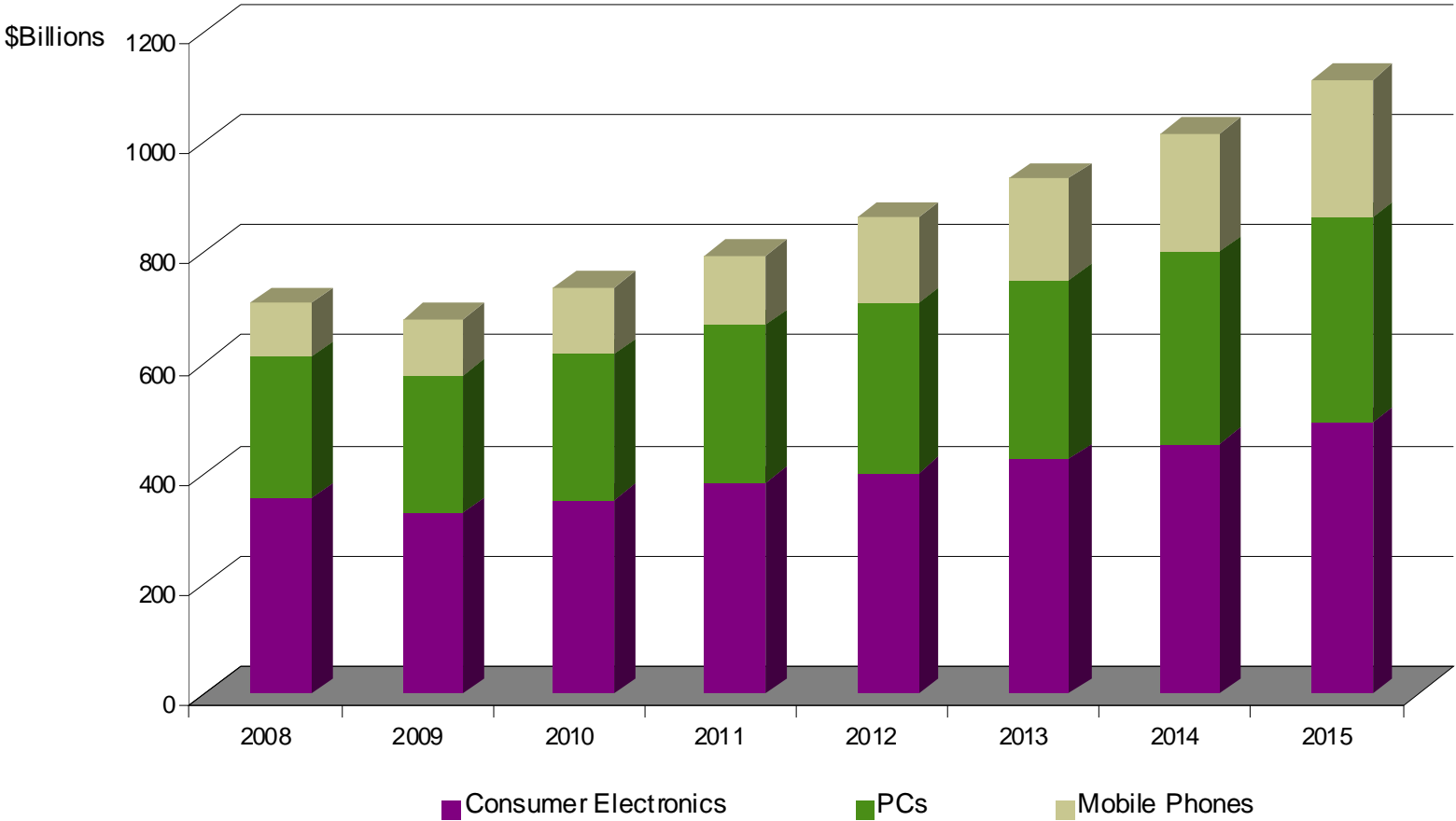
- Pads/Tablets Disruptive to eReader and Netbook Segments
 - iTunes to begin selling books
 - Book Rentals/"Borrowing"
- Lower Cost Notebooks Disruptive to Netbook Market
- Android OS Gains Share
- Volume Ramp for LCD/OLED Displays
- Volume Ramp for Capacitive Touch



Guidance

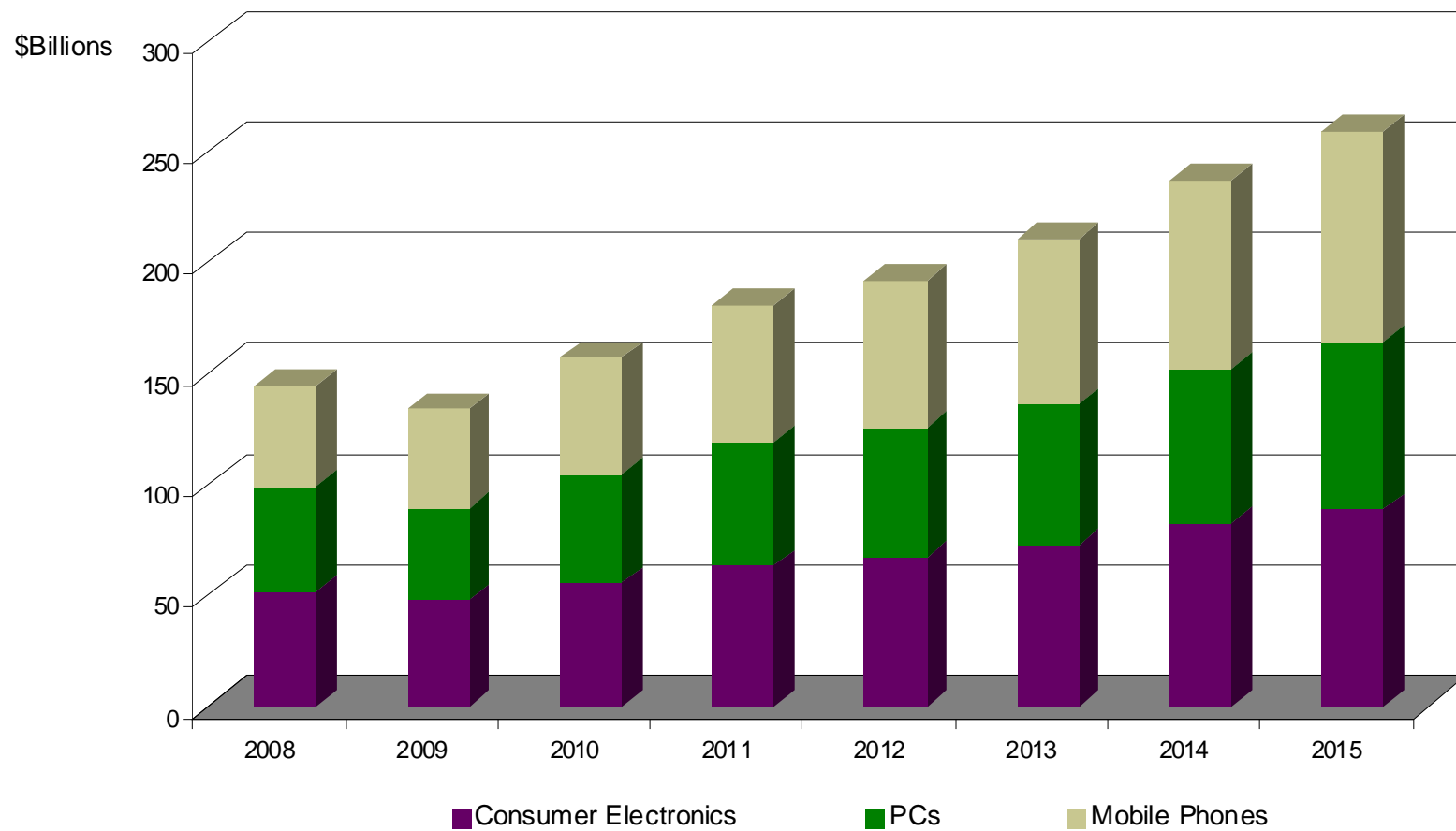
- Know Your Customer's Market
- "Consumerize" Your Technology
- Stay Ahead of the Curve
 - Consolidation
 - Stay Informed on Start-Ups
- Customer Support
 - Evaluation Kits
 - Development Tools
 - Software Libraries

Global Consumer Electronics Revenue



databeans Estimates, January 2010

Global Consumer Semiconductor Revenue



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New Markets, New Economics

Home Networking

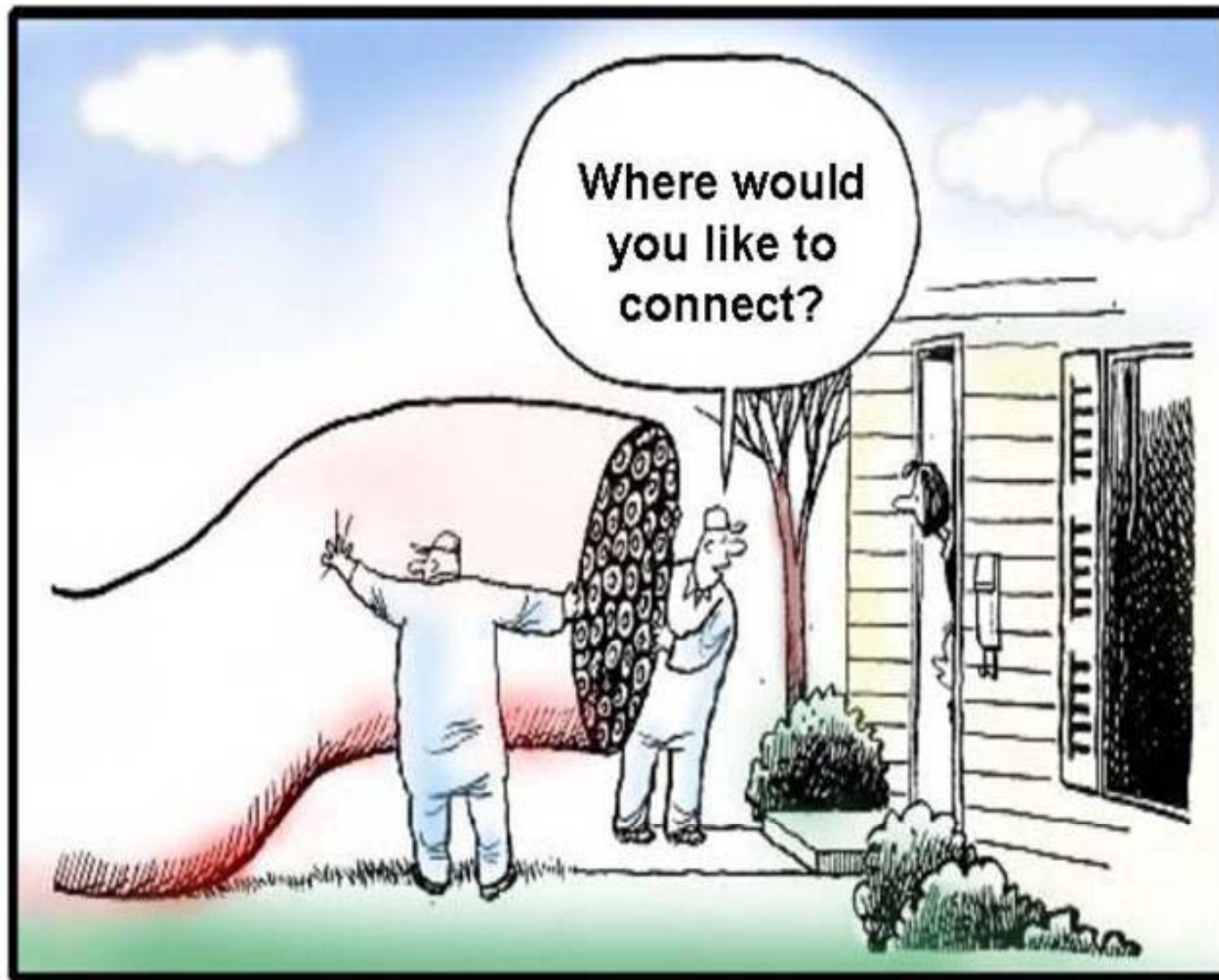
Uniting the Digital Home

Lee Ratliff

Senior Analyst,

Broadband Digital Home and IPTV

Now What?



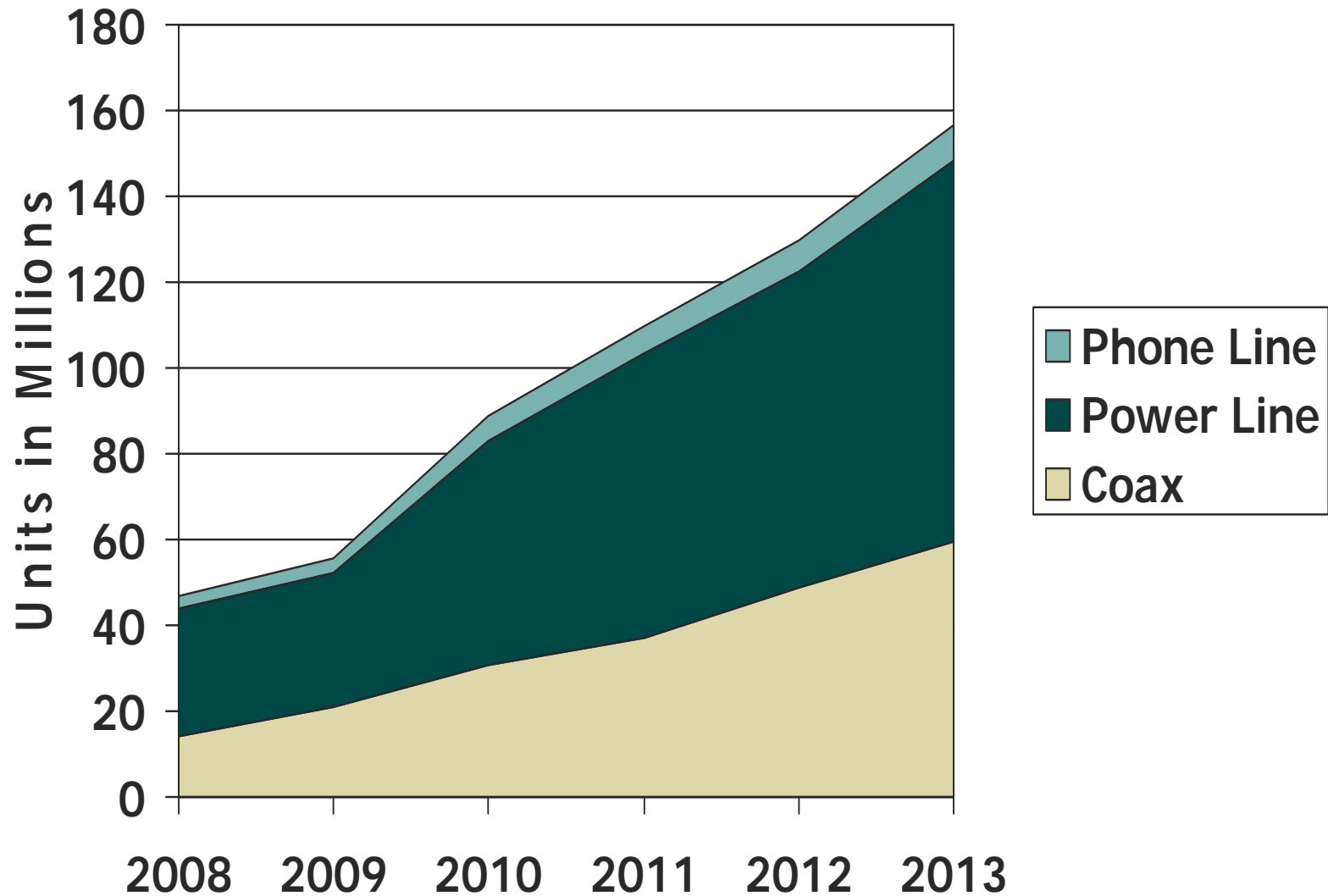
High-QoS Home Networks

- Wired, but no new wires
 - Power Line
 - Coax
 - Phone Line
- Market Drivers
 - IPTV
 - Multi-Room DVR
 - DBS single-wire distribution
 - CE: Media extenders, IETV, VOD

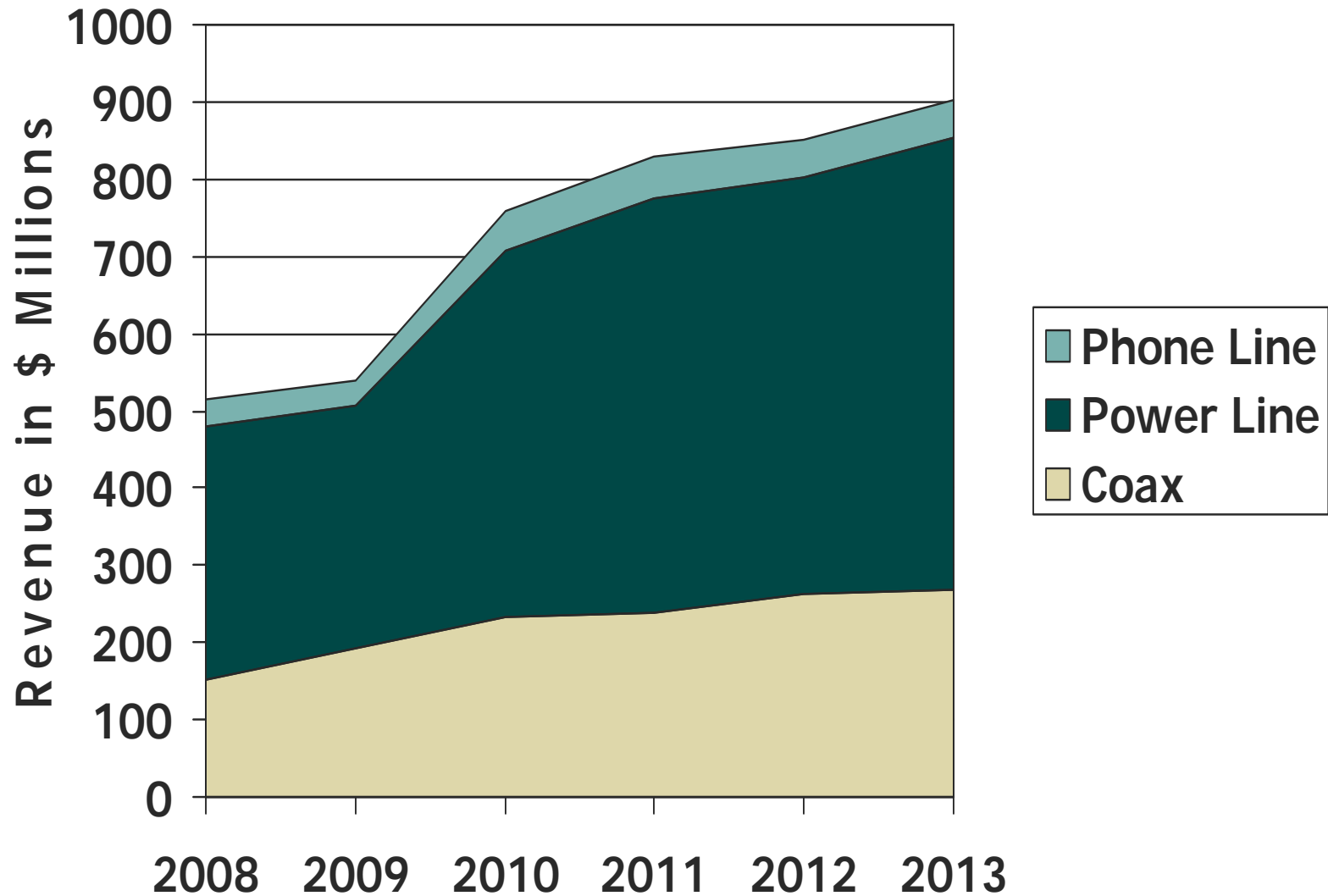
Market Dynamics

- New upcoming standards
 - ITU G.hn
 - IEEE 1901
- Consolidation & Acquisitions
 - Sigma Designs / CopperGate
 - Atheros / Intellon
 - Lantiq / Aware
 - Broadcom / ??????

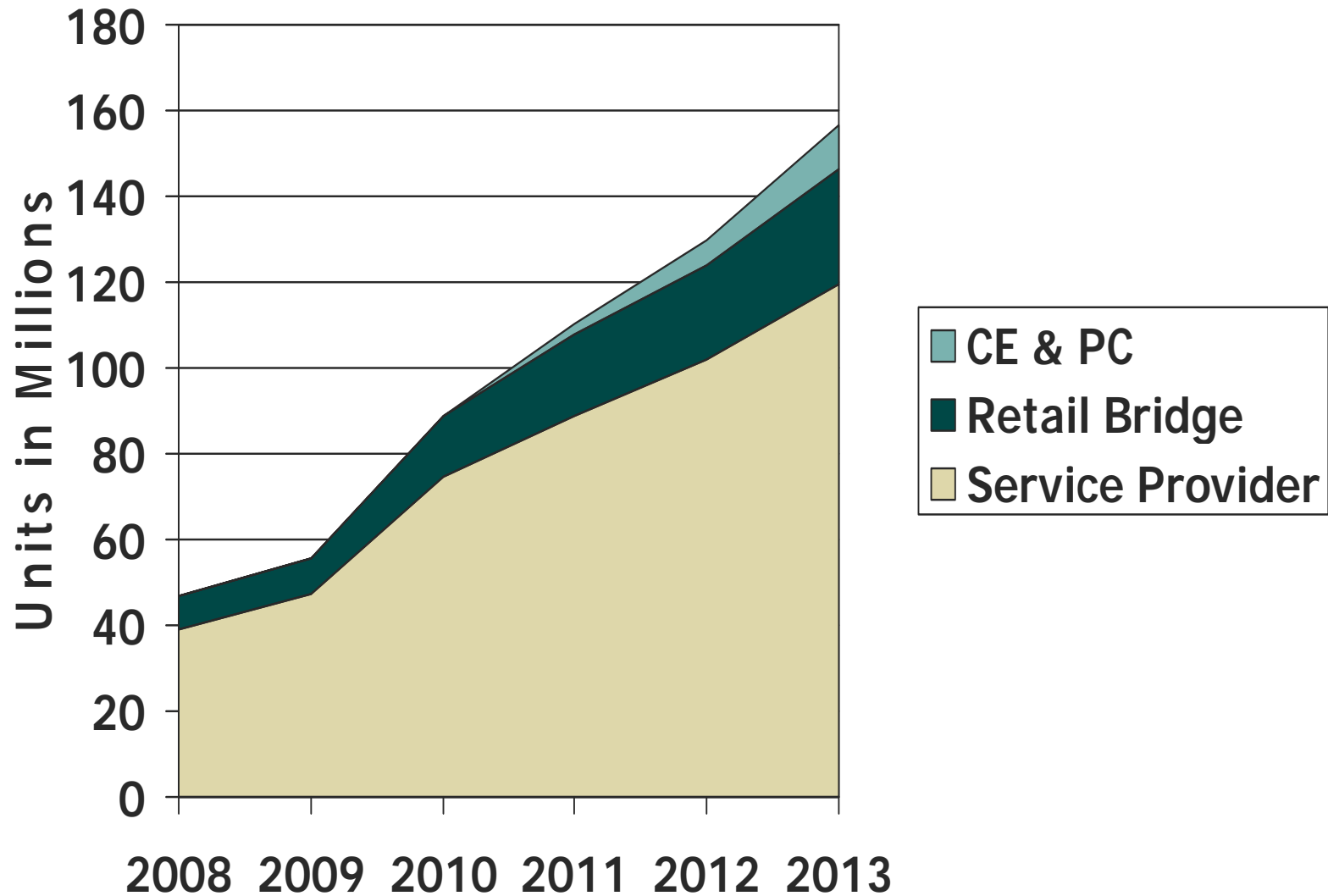
Unit Shipments by PHY Type



Semiconductor TAM



Unit Shipments by Channel



The Wild Card: Consumer Electronics

- Will CE adopt wireline networking natively?
 - Ethernet & WiFi are the presumed winners in CE. Look at IETV.
 - CE makers will not adopt wireline networking until standards consensus exists.
 - Standards confusion is giving 802.11n room to run.

The Two Networks

- Service providers opting for wireline
 - Reliable, stable, high performance
 - WiFi used in rare cases
- Consumers will continue with WiFi
 - Ubiquitous, easy, portable
 - Wireline bridge products used when WiFi fails

Thank You!!

Slide Source: FBR Capital Markets



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New Markets, New Economics

Cloud Computing: Creating New Opportunities for Semiconductor



Sergis Mushell
Principal Research Analyst
Gartner



**Due to legal constraints Gartner slides are not available. If you would like information pertaining to Mr. Mushell's presentation please contact him at:
Sergis.Mushell@gartner.com**

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