



Retail Channel Dynamics of Flash Memory Products

PriceG2, Inc.
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- Introduction
- Channel Pricing: Mechanics, Erosion, Premiums
- High Capacity Introductions
- SSDs in Retail
- \$/GB Charts
- Conclusion

- PriceG2, Inc. is a **technology leveraged** market research firm
 - Products: Research Reports, Analysis Software

- Product Categories
 - Flash Memory
 - SSD, USB Flash Drives, Secure Digital, Memory Stick, CompactFlash, MMC, xD
 - Hard Drives
 - 1.0"/1.8"/2.5"/3.5", Internal/External, SATA/PATA/SAS/FC, RPM, etc.
 - *(more to follow)*

Data Transformed into Information

- PriceG2 tracks retailers products over the internet
 - Standard metric: s/w runs the same way every week
- Thousands of data points transformed into reports & s/w

Retailers

- Best Buy
- CDW
- Circuit City¹
- CompUSA
- Frys
- Office Depot
- OfficeMax
- Staples
- Target
- Walmart

Internet



01001000
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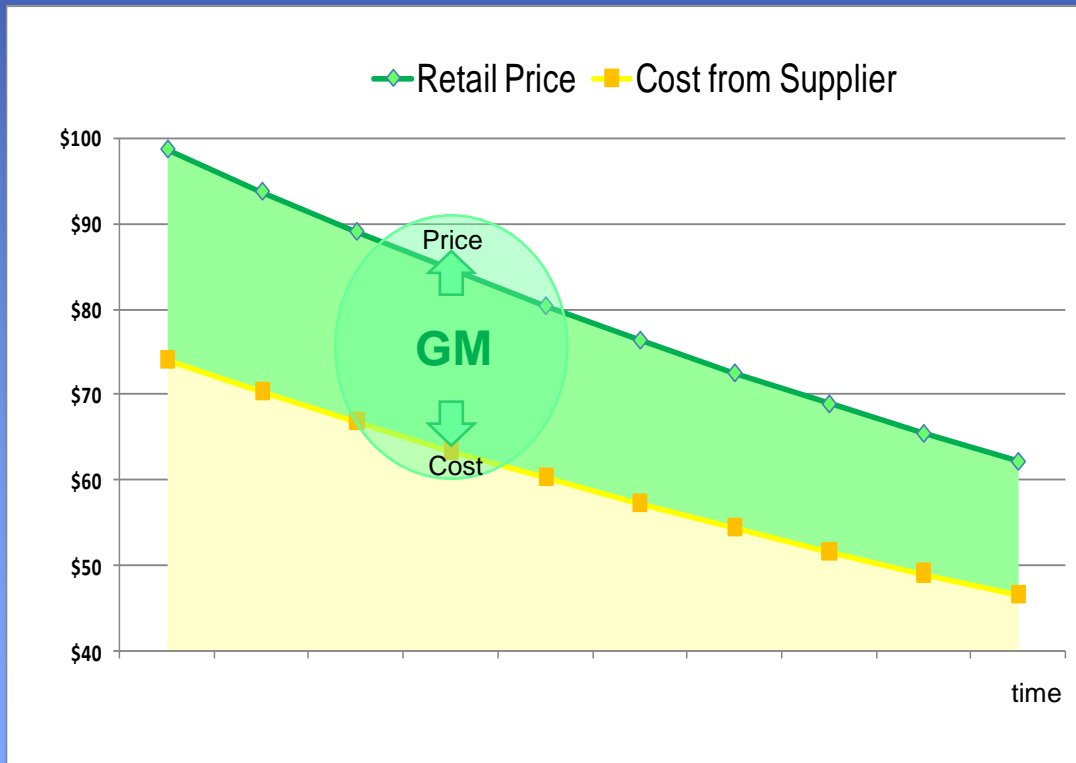
Reports



Analysis Software

Channel Pricing Mechanics

- Retail Price\$ is fn(cost, GM requirements, retailer goals, etc.)



“On-Line” Retailer

- Small or no inventory
- No retail buildings
- No store employees
- = Smaller GM needed

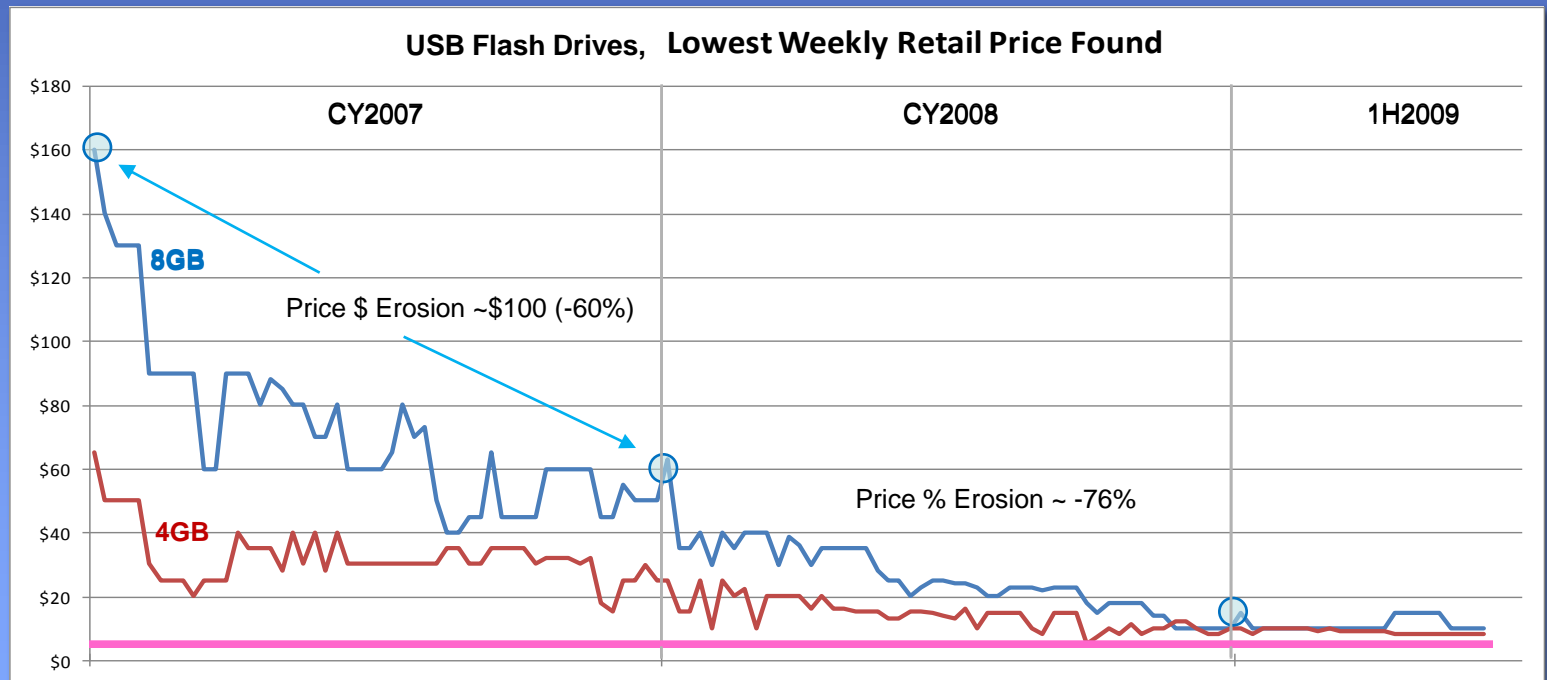
“Bricks and Mortar” Retailer

- Physical Inventory
- Retail Buildings
- Store Employees
- = Larger GM needed

Retail Pricing of USB Flash Drives

Trends

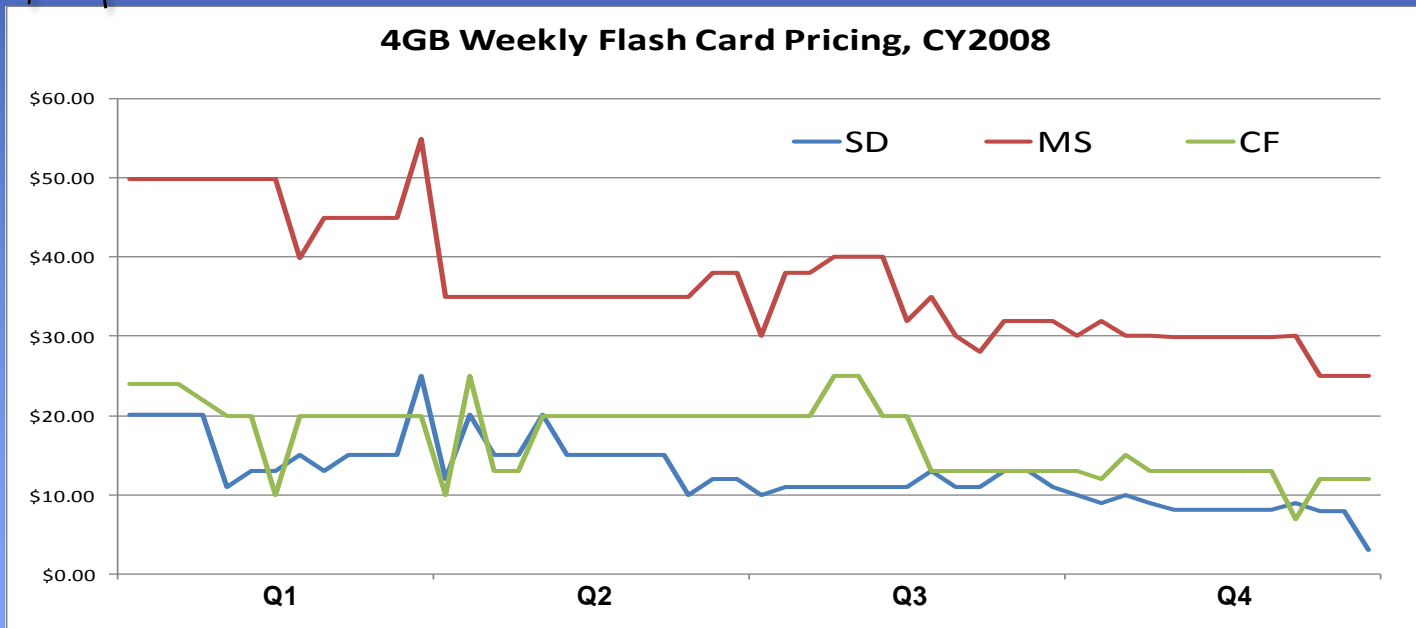
- Price \$ Erosion followed by Price % Erosion
- Technological maturity + multiple sources of supply (competition) = pricing falls towards an asymptote



Pricing Premium: "A Rose By Any Other Name"



"4GB memory card = 4GB memory card, right? Why should pricing be different?"



- ➔ SD had lowest average pricing over 52 weeks
- ➔ CF, MS were priced 1.4X, 3.1X AVG. higher, respectively

Velocity of High Capacity Introductions

- How fast is the industry increasing capacity, really?
- Volumetric Storage: fixed mm^3 = demand on technology to increase capacity
 - Flash Cards – must fit a slot bounded by x-y-z coordinates



- Retail Price Limited Storage
 - Price \$, not volume (mm^3) is #1 constraint
 - USB Flash Drives
 - SSD – “sort of”
 - = Demand on technology to reduce \$



It costs what
???

➔ Underlying advances of flash memory cell density

Detection of New High Capacities

- PriceG2 software monitors weekly product listings at major retailers
 - Description, Price, Model #, Availability* (number of days wait to ship)
- Alarms go off when a new capacity model appears, clients notified

MarketVision - Q3CY07

4.0 Secure Digital: Summary

Lowest Prices Tracked

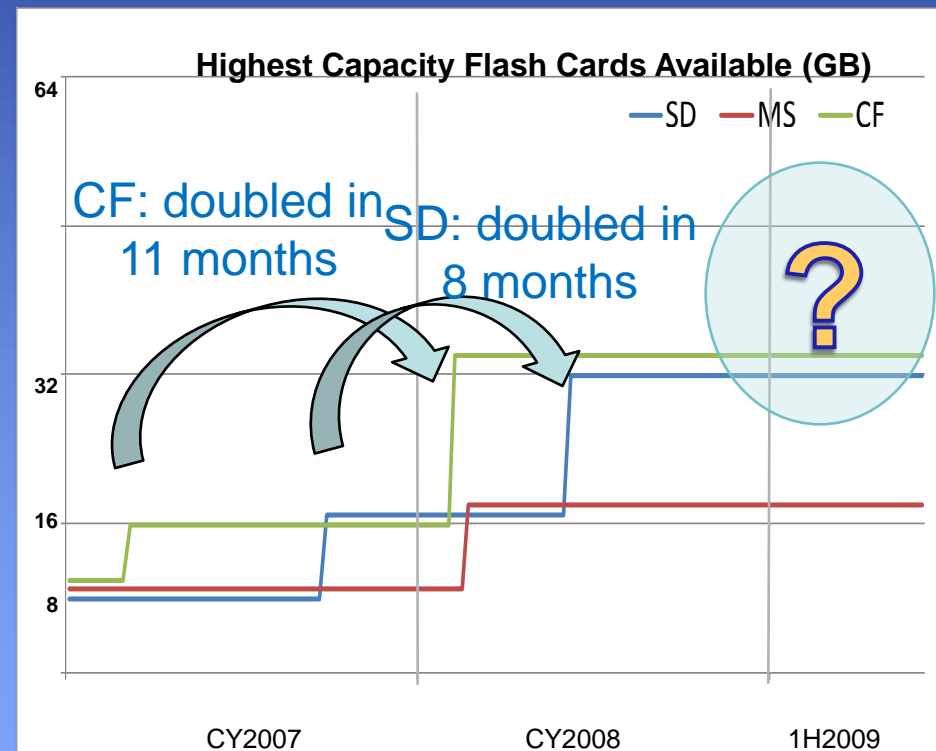
GB	WK27	WK28	WK29	WK30	WK31	WK32	WK33	WK34	WK35	WK36	WK37	WK38	WK39	QTD%Δ
0.128	\$9.99	\$9.99	\$9.99	\$9.99	\$9.99	\$9.99	\$9.99	\$9.99	\$9.99	\$9.99	\$9.99	\$9.99	\$9.99	
0.256	\$4.99	\$4.99	\$6.99	\$4.99	\$4.90	\$4.90	\$4.90	\$4.90	\$7.00	\$7.00	\$7.00	\$7.00	\$7.00	40%
0.512	\$4.99	\$4.99	\$9.90	\$4.99	\$4.99	\$4.99	\$4.90	\$4.90	\$4.90	\$4.90	\$4.99	\$4.99	\$4.99	
1	\$6.99	\$6.99	\$6.99	\$6.99	\$6.99	\$6.99	\$9.90	\$9.90	\$9.90	\$9.90	\$9.90	\$9.90	\$9.90	42%
2	\$15.99	\$15.99	\$15.99	\$15.00	\$15.99	\$15.99	\$15.99	\$15.99	\$14.90	\$14.90	\$17.99	\$17.99	\$15.99	
4	\$29.99	\$29.99	\$29.99	\$39.99	\$39.99	\$39.99	\$39.99	\$39.99	\$29.90	\$29.90	\$29.90	\$29.90	\$29.90	
8	\$69.99	\$69.99	\$79.99	\$79.99	\$79.99	\$79.99	\$79.99	\$79.99	\$69.99	\$69.99	\$84.99	\$84.99	\$80.87	16%
16													\$230	
32														
64														
128														
256														
512														

Patriot; FRY#5381518

New High Capacities in CY2007 - 2009

■ “Volumetric” Flash Card GB Increases

- 2007 – 2008: Doubling
 - CF : 16 to 32GB in 11 months
 - SD : 16 to 32GB in 8 months
- 2008 – 1H2009: Flat!
 - SD: 12 months, no increase yet
 - CF: 16 months, “ “
 - MS: 16 months, “ “



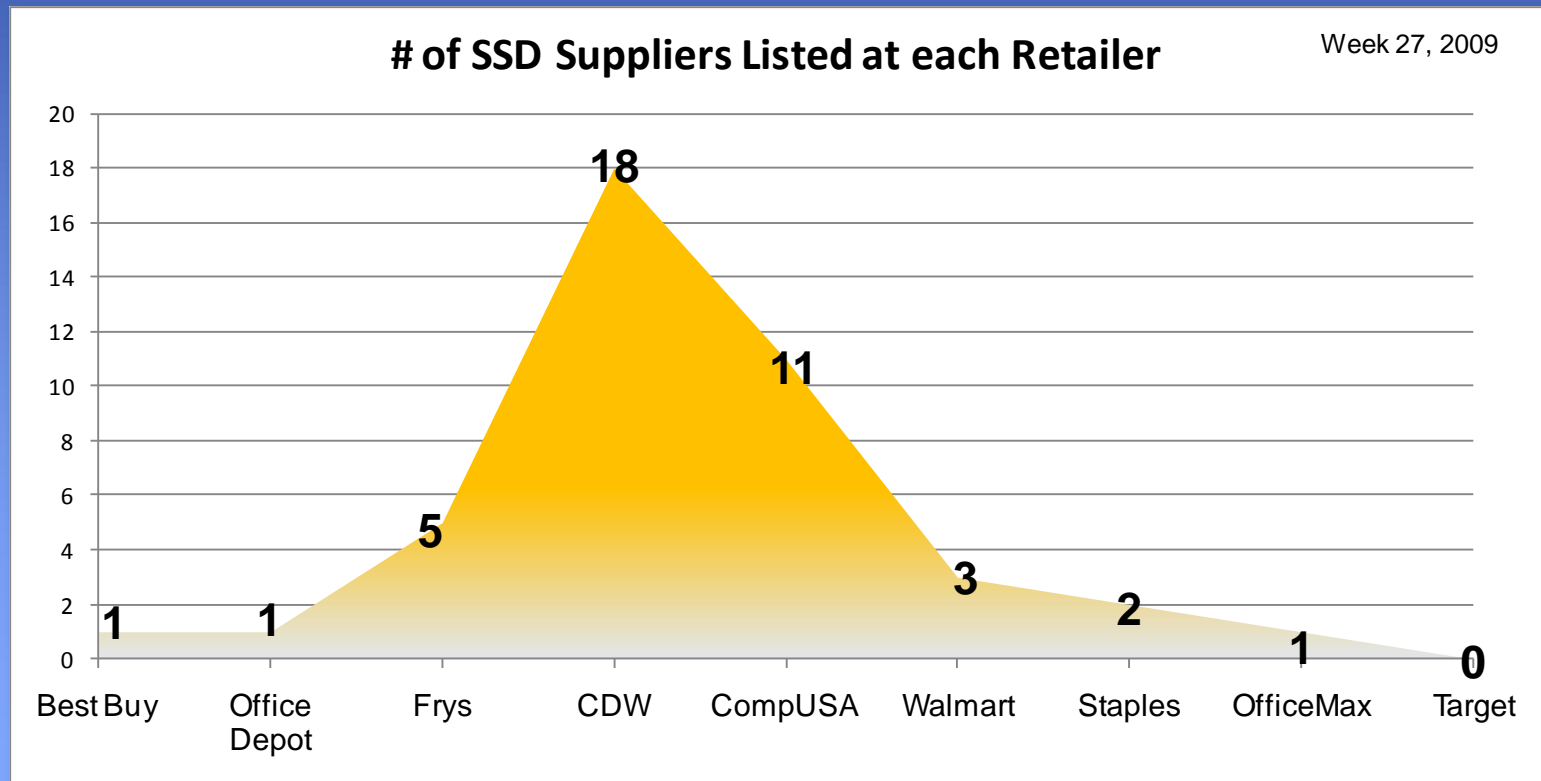
Retail SSDs: What is out there?

Week 27, 2009



27 SSD Suppliers: Where are They Found?

- “Center of Gravity” - technical retailers CDW, CompUSA, Frys
- Surprises: Best Buy (more?), Walmart (early adopter)





Retail SSD Distribution Map, WK27

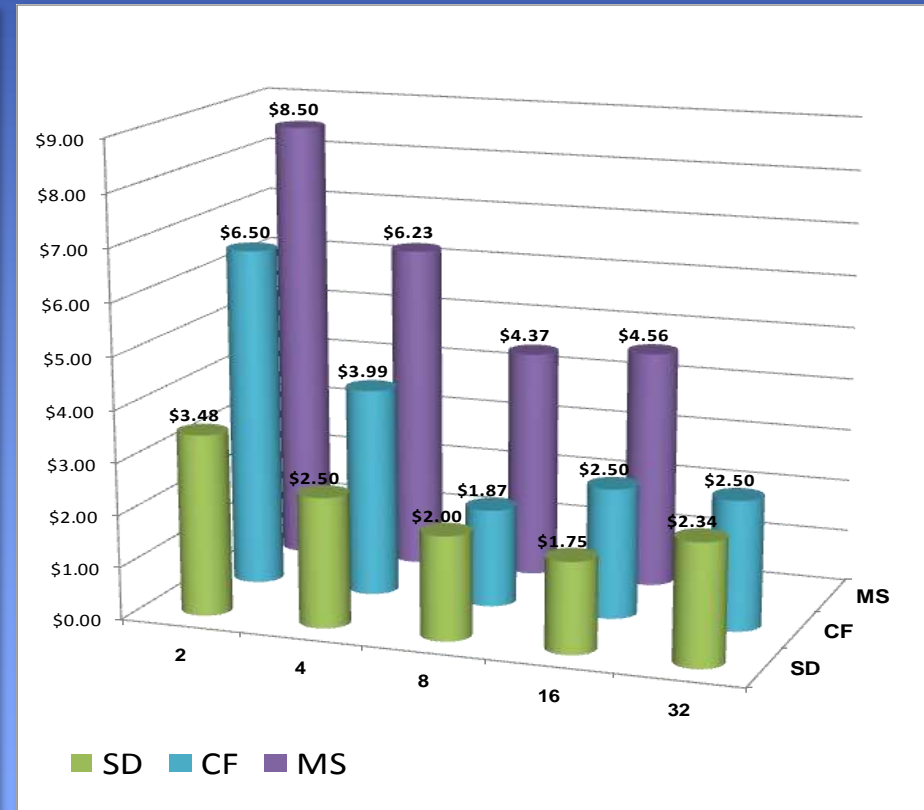
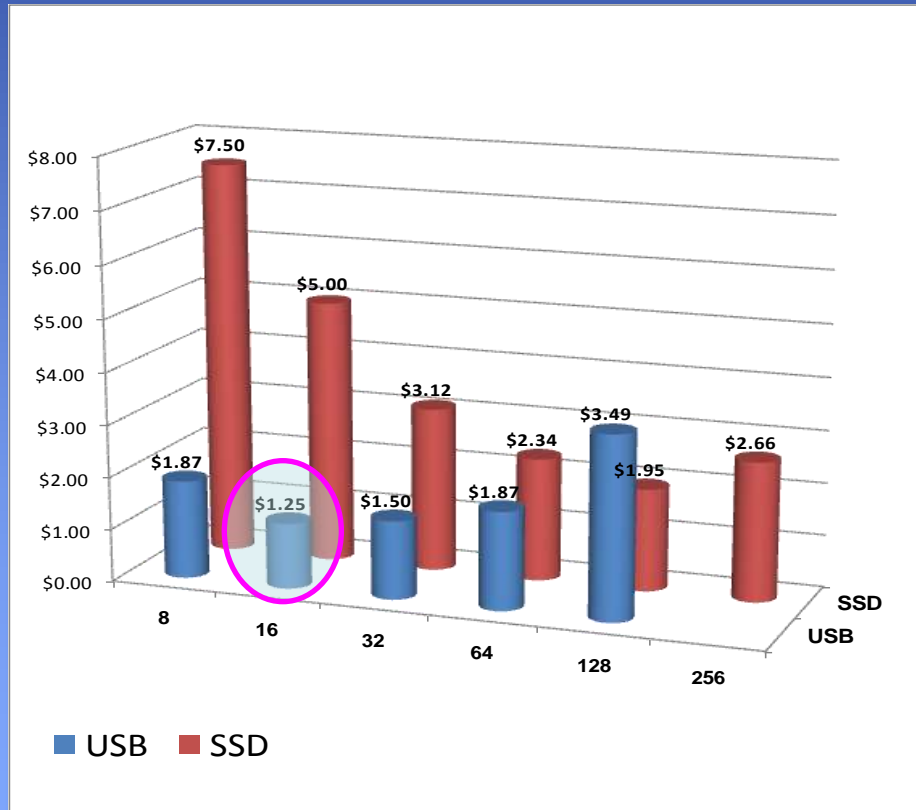
Legend: Low GB - High GB

Supplier/Retailer	Best Buy	CDW	CompUSA	Frys	Office Depot	OfficeMax	Staples	Target	Walmart
ACTIVE MEDIA			16						
ALURATEK		32-64							
CAVALRY			64-128						
CENTON			32-192						
CORSAIR			64-256						
CRUCIAL		32-64	32-64	64					
FUSION-IO		80-640							
HP		32-64							
IBM		15.8-31.4							
IMATION		16-128				32-128	16-64		
INTEL		4-160	32-160	80					
ITRONIX		32-64							
KINGSTON		32-160	80	64-160					
LENOVO		128-256							
LEXAR		4-8		8-16	16				
OCZ			16-250						30
PANASONIC		32							
PATRIOT			32-256	32-256					
PNY	64-128								
RIDATA									16-128
SAMSUNG		256							
SANDISK		8-32							
SUN		18-100							
TEXAS MEM		450							
TOTAL MICRO		32							
TRANSCEND		128-192	2-64				8-192		8-128
WINTEC			24-48						
27									
# of Suppliers	1	18	11	5	1	1	2	0	3

- Empty Cells → Opportunity
- 15 of 27 suppliers with 128GB+
- 7 of 27 suppliers with 250GB+

\$/GB Charts for Week 26, 2009

- \$1.25/GB is the low found in 16GB USB Flash Drives
 - 1 year ago price was \$3.75/GB for 16GB USB Flash Drives



Conclusions

- Pricing
 - Erosion – up to 60~70% per year from 2007 – 1H2009
 - Some flash cards get a premium of up to 3X more for same GB
- High Capacity Introductions
 - Doubled in 2007 – 2008. Where are they in 2009?
- SSD
 - Retail U.S. category emerged in 2007, now has 27 suppliers
 - Trend to watch: make lower cost xxGB vs. make highest capacity
- \$/GB
 - \$1.25/GB is the lowest retail price detected for WK26-2009 for 16GB USB
 - = Approx. 2/3 price erosion from the same week a year ago



Thank You

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