

Jim Handy

Jim.Handy@Objective-Analysis.com

105 Bacigalupi Drive, Los Gatos, CA 95032-5102, USA

+1 (408) 356-2549

Experience

- Experienced in Trial & Deposition Testimony, Expert Reports, etc.
- Highly published and widely quoted as a key semiconductor industry analyst.
- 44-year semiconductor industry veteran.
- Honorary Member: Storage Networking Industry Association (SNIA)
- Deep technical understanding and design background.
- Highly analytical.
- Excellent communications skills: oral, written, and presentation.
- Author of key reference design work: “The Cache Memory Book” Harcourt Brace, 1993
- Patent holder in cache memory design

Expert Experience

Trial Testimony

In Re: Spansion et al Federal Bankruptcy Court of Delaware Docket No: 09-10690, (Hon. Kenneth Carey). 11/30/09

Netlist, Inc. (Plaintiff) vs. Diablo Technologies, Inc. (Defendant), US District Court, Northern District of CA, Case No. 13-CV-05962 YGR, (Hon. Yvonne Gonzalez Rogers), 3/13/15

Deposition Testimony

In Re: Spansion et al Federal Bankruptcy Court of Delaware Docket No: 09-10690, (Hon. Kenneth Carey). 11/24/09

In Re: SRAM, 07-CV-1819-CW (N.D. Cal.), 3/25/10

Expert Reports

Expert Rebuttal Report - In Re: Spansion et al Federal Bankruptcy Court of Delaware Docket No: 09-10690, (Hon. Kenneth Carey). 11/20/09 (8 pages)

Expert Report - In Re: SRAM, 07-CV-1819-CW (N.D. Cal.), 1/25/10 (13 pages)

Expert Report - In Re: Qimonda Richmond, LLC, et al., Case No. 09-10589 (MFW) 2/6/12 (30 pages)

Expert Report - Netlist, Inc. (Plaintiff) vs. Diablo Technologies, Inc. (Defendant), US District Court, Northern District of CA, Case No. 13-CV-05962 YGR, (Hon. Yvonne Gonzalez Rogers), 1/16/15 (30 pages)

Other

- Assisted in a search for prior art in three confidential patent actions
- Unification Technologies LLC v. Micron Technology Inc., et al., W.D. Texas Case No. 6:20-cv-501, confidential consulting re: patent infringement dispute.
- Retained for a confidential suit to opine on losses suffered from an inadvertent fab shut-down that was settled before trial.
- Discussed industry norms in semiconductor pricing with an attorney in a confidential collusion action.
- Estimated past and projected factory shipments for ongoing royalty negotiations.
- Registered as a foreign agent and assisted attorneys with arguments in Fujian Jinhua’s appeal of the Commerce Department’s listing the company on the Entities List.

Job History

Present

President, Objective Analysis, Semiconductor Market Research

Founded successful consulting and market analysis firm well reputed in this business.

Leading analyst for semiconductor memory marketplace (DRAM, SRAM, NAND and NOR flash, flash cards, EPROM, EEPROM, mask ROM and other technologies.)

Consultant to industry leaders and publisher of subscription market research.

Frequent presenter at industry events and client visits.

2002 – 2006

Director of Nonvolatile Memory Research, Semico Research Corp.

Developed key analysis of memory markets.

Orchestrated other analysts' research efforts in both chips and application markets.

2000 – 2002

Senior Director of Corporate Marketing, Silicon Storage Technology, Inc.

Led team that defined and implemented marketing programs to sell SST's flash memories.

Responsible for annual sales of \$270 million. Grew market share during market downturn.

1991 – 2000

Director and Chief Analyst, Dataquest.

Responsible for all memory forecasts, models, and analysis. Managed worldwide team.

Extensive written work, published in periodicals and Dataquest documents for customers.

1986-1991

Strategic Marketing Manager, Integrated Device Technology.

Defined and architected introduction of company's fastest-ever ramping products.

Earlier Employment

Intel Corporation – Software Product Marketing

National Semiconductor – Microprocessor Product Marketing and System Design

SCI Systems, Inc. – Minicomputer & Microprocessor-Based System Design

Education

Bachelor of Electrical Engineering, Georgia Tech, 1974

Master's in Business Administration, University of Phoenix, 1983

Publications:

Objective Analysis Reports

Emerging Memories Find Their Direction (2020)

The Micron/Intel 3D XPoint Memory, 2019 Update (2019)

Emerging Memories Ramp Up (2019)

China's Memory Ambitions (September, 2018)

Emerging Memories Poised to Explode (October, 2018)

Profiting from the NVDIMM Market (October, 2017)

Solid State Drives in the Enterprise (July 2017)

How Many IOPS Do You Really Need – 2016 update (August 2016)

A Close Look at the Micron/Intel 3D XPoint Memory (October 2015)

The Enterprise SSD: Technologies & Markets (April 2014)
How Many IOPS Do You Really Need – 2014 update (July 2014)
The Enterprise SSD: Technologies & Markets (April 2014)
How Many IOPS Do You Really Need? (January 2013)
How PC NAND Will Undermine DRAM (July 2011)
Are Hybrid Drives Finally Coming of Age? (October 2010)
Putting SSDs to the Test (October 2010)
Solid State Disk Market Outlook 2010 (August 2010)
Intel's Braidwood: Death to SSDs? (August 2009)
Digital Storage in Consumer Electronics 2009 (January 2009)
Solid State Drives in the Enterprise (August 2008)
Digital Storage in Consumer Electronics 2008 (January 2008)
Flash Packaging: What Phone Makers Want and Why (January 2008)
Hybrid Drives: How, Why, and When (December 2007)
Understanding the NAND Market (November 2007)
The Solid-State Disk Market: a Rigorous Look (September 2007)

Objective Analysis Briefs

Why DRAM Vendors Must Consolidate
2008: Tough Year Ahead

Objective Analysis Alerts

Japan Suffers Serious Earthquake (15 April, 2016)
Earthquake in Taiwan (9 February, 2016)
Western Digital To Acquire SanDisk (20 October, 2015)
Micron a Takeover Target (13 July, 2015)
Four New Players Join 3D NAND Market (26 March, 2015)
NXP and Freescale Become One (2 March, 2015)
Cypress and Spansion to Merge (1 December, 2014)
Samsung Acquires Proximal Data (3 November, 2014)
Samsung Samples 3D NAND SSD (1 July, 2014)
SanDisk to Acquire Fusion-io (16 June, 2014)
Avago to Acquire LSI Corporation (19 December, 2013)
Rambus and Micron Sign License Agreement (12 December, 2013)
OCZ to File for Bankruptcy (27 November, 2013)
Cisco to Acquire Whiptail (10 September, 2013)
Western Digital Acquires Virident (9 September, 2013)
Fire at SK hynix Wuxi Plant (4 September, 2013)
SanDisk to Acquire SMART Storage (2 July, 2013)
Western Digital to Acquire sTec (24 June, 2013)
Fusion-io Founders Resign (9 May, 2013)
Seagate Jumps Into PCIe SSD Market (29 January, 2013)
Significant Earthquake off Japan Coast (14 December, 2012)
New Report Analyzes IOPS Needs for Enterprise Applications (27 November, 2012)
Intel's Otellini to Step Down in May (19 November, 2012)
IBM Announces Intention to Acquire Texas Memory Systems (16 August, 2012)
Micron to Acquire Elpida, Majority of Rexchip (2 July, 2012)
SK Hynix Acquires Link_A_Media (20 June, 2012)
Intel Sells IMFT Assets to Micron (28 February, 2012)

Elpida Files for Bankruptcy (27 February, 2012)
Micron's Appleton Killed in Plane Wreck (3 February, 2012)
Micron and Hynix Prevail in Rambus Suit (16 November, 2011)
LSI Acquires SandForce (27 October, 2011)
SanDisk Acquires Pliant Technology (17 May, 2011)
Italy Proposes PV FIT Reductions (21 April, 2011)
Seagate and Samsung "Combine" HDD Businesses (19 April, 2011)
Texas Instruments to Acquire National Semiconductor (6 April, 2011)
Japan Earthquake Update (23 March, 2011)
Major Earthquake Hits Japan (11 March, 2011)
Western Digital to Acquire Hitachi Global Storage Tech for \$4.3 Billion (7 March, 2011)
Powerchip to Become PC DRAM Foundry for Elpida (31 December, 2010)
Toshiba NAND Fab Suffers Power Outage (8 December, 2010)
Micron to Acquire Numonyx (10 February, 2010)
Microchip to Acquire SST (3 February, 2010)
Intel and Micron Introduce 25nm NAND (1 February, 2010)
Samsung and Rambus Settle Patent Litigation (21 January, 2010)
Micron & Intel's 32nm 3-bit NAND Arrives (11 August, 2009)
Spansion Settles with Samsung (8 April, 2009)
Italy Earthquake Threatens Micron Fab (8 April, 2009)
Spansion Files for Chapter 11 Protection (2 March, 2009)
Spansion President Resigns (3 February, 2009)
Qimonda Petitions for Insolvency Proceedings (23 January, 2009)
Intel & Hitachi Co-Develop Enterprise SSDs (2 December, 2008)
Spansion Sues Samsung (17 November, 2008)
Samsung Withdraws SanDisk Bid (21 October, 2008)
Toshiba to Acquire 30% of SanDisk's Share of JV Production (20 October, 2008)
Micron to Buy Out Qimonda's Share of Inotera (13 October, 2008)
Samsung Goes Public with SanDisk Offer (19 September, 2008)
Intel & Micron Skip 40nm Process - Jump to 34nm (29 May, 2008)
Hynix China Fab Suffers Power Outage (20 May, 2008)
Seagate Fires First Volley at SSD Maker STEC (14 April, 2008)
Numonyx Makes its Debut (31 March, 2008)
Micron/Nanya MOU - Qimonda's Bane or Boon? (4 March, 2008)
Power Outage in Korea: Six Samsung Fabs Closed (3 August, 2007)
Earthquake in Japan - Little Fab Impact Expected (17 July, 2007)
Intel & ST Create New Flash Company (22 May, 2007)
Apple Story Portends NAND & DRAM Shortage (27 April, 2007)
Earthquake in Japan - No Fabs Reporting Losses (24 March, 2007)
Hynix & SanDisk Cross-License NAND & Form JV (21 March, 2007)

Objective Analysis & SNIA White Papers

New Memories for Efficient Computing (June, 2018)
Survey Update: Users Share Their 2017 Storage Performance Needs (April, 2017)
Politics Pushes Business, Semiconductors (February, 2017)
Why Wait for Storage Class Memory? A white paper on Netlist's HybriDIMM (August, 2016)
2015 Reflections and 2016 Forecast (February, 2016)
Survey: Users Share Their Storage Performance Needs (December 2014)
Matching Flash to the Processor (March 2014)
Using Flash as Memory - A More Straightforward Way to Boost Performance (July 2013)

Making the Most of Flash Storage (June 2012)
Enterprise Reliability, Solid State Speed (February 2012)
NoC Interconnect Improves SoC Economics (April 2011)
Two May be Better Than One: Why Hard Disk Drives and Flash Belong Together (February 2011)
Choosing the Right Solid State Storage Device: A Case Study of the SNIA SSSI Performance Test Specification (November 2010)
NVELO's Dataplex, NAND Cache is Back! (June 2010)
Flash and HDD: Symbiosis or Survival of the Fittest? (Sept 2009)
Phase-Change Memory Becomes a Reality (August 2009)
NAND Flash Storage for the Enterprise - an In-Depth Look at Reliability (April 2009)
Solid State Storage 101 (January 2009)
Why we Need a New Memory Technology (January 2008)

Semico Reports (2002-2006)

Quarterly forecasts for the nonvolatile memory markets
Annual market share rankings for the nonvolatile memory market
Annual reports analyzing and forecasting the markets for USB flash drives and flash cards.

Special Analyst Reports

Occasional reports analyzing and forecasting the markets for flash in cell phone handsets and flash in hard disk drives, and the solid state drive market.

Semico Newsletter Articles

Weekly analyst "Spins" May 2002 – November 2006

Periodical Articles

Three Possible 2021 Outcomes: Pick Only One
Electronic Design, 1/19/21

Flash und DRAM ausgereizt: Diese Speicher werden in Zukunft wichtig
Elektronikpraxis, 7/10/20

Emerging Memory Market is Finding its Direction
Electronic Design, 6/25/20

COVID-19's Impact on the Semiconductor Market
Electronic Design, 4/13/20

A history of flash memory and its rise in the enterprise
TechTarget, 3/25/20

Emerging Memories: Why Now?
Linley Newsletter, 11/12/19

New Report: China's Memory Ambitions
Electronic Design, 1/23/20

2019 Was Down! Will 2020 See a Chip Recovery?
Electronic Design, 12/16/19

New Memories Create New Ways to Compute
PIRL Blog, 11/7/19

The Digital World Faces Uncharted Waters, Too
Electronic Design, 1/7/19

New memory technologies challenge NAND flash dominance
TechTarget, 10/3/18

Optane DIMMs Are Worth the Wait
EE Times, 6/7/18

Why are NVDIMMs Suddenly Hot?
Electronic Design, 2/14/18

What's the Difference Between All Those Emerging Memory Technologies?
Electronic Design, 1/24/18

HDD vs. SSD: Is there room for disk in a solid-state world?
TechTarget, August 2017

How Will Politics Impact the Semiconductor Industry and Overall Business Climate?
Electronic Design, 2/23/17

Intel Optane a Poor Fit for PCs
EE Times, 1/6/17

Memory Market Holds Key to Semiconductor Forecast
Electronic Design, 2/12/16

An Objective Analysis of the Industry Outlook for 2016
Electronic Design, 2/8/16

3D XPoint: A New Revolution in Memory?
Electronic Design, 12/3/15

Tomorrow's Memories: A Cost Game
The NVM Insider, August 2015

Forecast for Semiconductors and Things in 2014
Electronic Design, 12/18/13

Ancient Aliens Fail: Electronics Industry Looks to 2013
Electronic Design, 12/17/12

Who wants Elpida and why? Analysts weigh in
EE Times, 4/11/12

ISSCC from a memory analyst's view
ElectroIQ, 3/2/12

DRAM And NAND Prices Will Collapse Later In 2011
Electronic Design, 12/14/10

Solid State Drives for Energy Savings
SNIA Europe Newsletter, 5/10/10

Solid State Drives for Energy Savings
SNIA Europe: Storage Networking Times, 4/15/10

Phase Change Memory will Change Memory System Design
RTC Magazine, 3/22/10

Does MLC flash belong in enterprise SSDs?
InfoStor, February 2010

Pund-IT Weekly Review

3/17/21 Micron Bows Out of 3D XPoint Business
1/20/21 Intel Discontinues Optane Consumer SSDs
1/13/21 Microchip's Answer to Emerging Memories
11/18/20 Why Did Intel Sell its SSD Business?
11/11/20 How Many Optane SSDs has Intel Sold?
10/21/20 SK hynix Acquires Intel's NAND Business
10/7/20 Micron Earnings: Not So Bad After All
8/19/20 Did 3D XPoint Costs Reach Break-Even?
7/15/20 FRAM Turns 68
6/17/20 What Is "Software-Enabled Flash"?
5/20/20 Can YMTC Really Win 8% of 2021's NAND Flash Market?
3/25/20 COVID-19's Impact on the Semiconductor Market
3/4/20 SPIE Advanced Litho Conference: Artificial Intelligence and a lot of
Chemistry
2/19/20 UPMEM Releases Processor-In-Memory Benchmark Results
2/12/20 Does Persistent Memory Improve Performance? Ask Oracle
2/5/20 University of Lancaster Invents Yet An-other Memory
1/22/20 Micron Debuts 16Gb 1Znm DDR5 DRAM Chip
1/15/20 Kioxia Fire. Not Again!
10/23/19 Hprobe's Vote for MRAM
9/18/19 The Memory/Storage Hierarchy
9/11/19 UPMEM Processor-in-Memory at HotChips Conference
8/15/19 3D XPoint 2019 Update from Flash Memory Summit
7/17/19 Intel's Optane: Two Confusing Modes. Part 2
7/10/19 Intel's Optane: Untangling Two Confusing Modes (Part 1)
6/19/19 Failure Is Not an Option — It's a Requirement!
6/12/19 Intel's Optane DIMM Price Model
4/17/19 What's Inside an Optane DIMM?
11/18/20 Why Did Intel Sell its SSD Business?
11/11/20 How Many Optane SSDs has Intel Sold?
10/21/20 SK hynix Acquires Intel's NAND Business
10/7/20 Micron Earnings: Not So Bad After All
8/19/20 Did 3D XPoint Costs Reach Break-Even?
7/15/20 FRAM Turns 68

6/17/20 What Is “Software-Enabled Flash”?

5/20/20 Can YMTC Really Win 8% of 2021’s NAND Flash Market?

3/25/20 COVID-19’s Impact on the Semiconductor Market

3/4/20 SPIE Advanced Litho Conference: Artificial Intelligence and a lot of Chemistry

2/19/20 UPMEM Releases Processor-In-Memory Benchmark Results

2/12/20 Does Persistent Memory Improve Performance? Ask Oracle

2/5/20 University of Lancaster Invents Yet An-other Memory

1/22/20 Micron Debuts 16Gb 1Znm DDR5 DRAM Chip

1/15/20 Kioxia Fire. Not Again!

10/23/19 Hprobe’s Vote for MRAM

9/18/19 The Memory/Storage Hierarchy

9/11/19 UPMEM Processor-in-Memory at HotChips Conference

8/15/19 3D XPoint 2019 Update from Flash Memory Summit

7/17/19 Intel’s Optane: Two Confusing Modes. Part 2

7/10/19 Intel’s Optane: Untangling Two Confusing Modes (Part 1)

6/19/19 Failure Is Not an Option — It’s a Requirement!

6/12/19 Intel’s Optane DIMM Price Model

4/17/19 What’s Inside an Optane DIMM?

3/27/19 What Is SNIA’s Persistent Memory Programming Model?

2/27/19 Memory Sightings at ISSCC

2/13/19 Are SSDs Approaching Price Parity with HDDs?

2/6/19 Where Is Micron’s QuantX?

1/30/19 Emerging Memories Today: Forecasting Emerging Memories

1/23/19 Intel’s NAND Flash Losses Amid Others’ Gains

1/16/19 Emerging Memories Today: Emerging Memory Companies

1/9/19 Emerging Memories Today: Process Equipment Requirements

12/19/18 Emerging Memories Today: MRAM, ReRAM, PCM/XPoint, FRAM, etc

12/5/18 Emerging Memories Today: Understanding Bit Selectors

11/28/18 Emerging Memories Today: Why Emerging Memories Are Necessary

9/12/18 Why Are NAND Flash Fabs so Huge?

8/1/18 Making Sense of Intel & Micron’s 3D XPoint Breakup

7/18/18 Why DRAM Is Threatened by SSDs

6/27/18 New Memory for Efficient Computing

6/13/18 Intel’s Latest Optane DIMM Spin

6/6/18 The Micron QLC SSD – No Surprises Here

5/30/18 Quantum Computing: “Sooner than You Think!”

11/29/17 Micron’s Super-Fast New 32GB NVDIMM

11/8/17 What Are NVDIMMs?

10/25/17 IBM Upgrades Entire Range of Flash Offerings

9/13/17 How Samsung Will Improve 3D NAND Costs

8/2/17 An NVDIMM Primer

5/10/17 IBM Aligns Itself with High Speed NVMe-based Storage

3/22/17 Intel Announces Optane SSDs for the Enterprise

1/18/17 IBM Upgrades DS8000: All Models Are Now All-Flash

8/24/16 Intel Developer Forum – Not Much 3D XPoint Progress

5/18/16 IBM Jumps on the “New Memory” Bandwagon

4/20/16 Semiconductor Plants Paused, but no Significant Damage Reported

2/10/16 Earthquake in Taiwan: Little Information on Fab Impact

2/3/16 2016 Semiconductors – Another “Up” Year

9/23/15 NVM Is Big at the Storage Developer Conference
8/26/15 Flash Memory Summit: Limitless Layers of 3D NAND
7/15/15 Micron: The Hunter Becomes the Hunted
4/1/15 Intel, Micron, SanDisk & Toshiba Join 3D NAND Market
3/11/15 SanDisk Rolls Out InfiniFlash
2/25/15 IBM Launches All-New FlashSystem Family & Peace of Mind
12/3/14 \$1.6 Billion Price for NOR Flash Maker
11/12/14 IBM Storage Labs Briefing
7/2/14 Samsung Samples 3D NAND SSD
5/7/14 Where Are Enterprise SSDs Headed?
4/2/14 Is Microsoft Mismanaging XP?
1/22/14 IBM “Gets” Flash
12/18/13 Rambus and Micron End 13-Year Dispute
12/4/13 EMC Rolls Out XtremIO All-Flash Array
11/20/13 Is Micron Gunning for Intel's Business?
11/7/12 Intel Intros Fast Datacenter SATA SSD
11/7/12 Apple’s Fusion Drive – An SSD Cache for the Macintosh
8/22/12 IBM to Acquire Texas Memory Systems
2/29/12 Elpida, Japan’s Only DRAM Firm, Files for Bankruptcy
11/2/11 LSI Acquires SandForce—Strong Synergies in Combined Company
10/12/11 SSDs Open Eyes at Oracle OpenWorld 201
9/21/11 Intel’s Long View of Processors
6/22/11 AMD Fires Off Llano Salvo
5/11/11 Intel’s Tri-Gate: How 3D 22nm Transistors Redefine “Innovation”
5/11/11 Intel vs. NVIDIA: Contrasting Strategies
3/16/11 NVIDIA: Poised for a Mobile Future on the Brink of Amazing
3/9/11 Intel Launches New Core vPro Business Client Processors
2/2/11 Taiwan DRAM Consolidation Takes an Unusual Twist
1/5/11 Get Visual—Intel Introduces 2nd Gen Core Processors
9/1/10 Intel’s Goal for Infineon WLS? Making Atom an Explosive Commodity
6/23/10 Solid State Storage Doesn’t Have to be Tiny!
5/26/10 Intel Launches Core Processors for Ultra-Thin Notebooks
3/31/10 Intel Launches Xeon 7500 (Nehalem EX) Processors
2/3/10 Intel and Micron Intro Most-Advanced NAND Flash
10/14/09 Sun’s F5100 – A New Direction in Storage Architecture
9/30/09 Impressions of IDF
8/19/09 IBM Research and CIT Announce “DNA” Chip Breakthrough
8/12/09 Micron and Intel’s 34nm 3-bit NAND Arrives
8/5/09 WhipTail’s New SSD Storage Appliance
7/15/09 Fusion-io Makes SSDs More Affordable
5/6/09 STEC SSDs Introduced in Multiple IBM Systems
4/29/09 Virident Introduces MySQL and memcached Accelerators
4/15/09 Schooner Pursues a Unique Path in the Data Center
3/25/09 The Web Turns 20
3/18/09 What a Week for SSD Announcements!
3/4/09 Spansion Files for Chapter 11 Protection
1/14/09 Managing Wear in SSDs
12/23/08 Flashing Forward – IBM Updates Project Quicksilver
12/3/08 Intel and Hitachi to Co-Develop Enterprise Flash SSDs
11/19/08 Spansion Sues Samsung

11/12/09 Violin Memory: Getting Ready to Play Some Beautiful Flash Memory Music
 10/22/08 You Can't Hide From Solid State Drives, Even at SNW
 10/15/08 Micron to Buy Out Qimonda's Share of Inotera
 10/1/08 SSDs: A Tale of (Another) Two Conferences
 9/24/08 Enterprise SSDs All the Rage at Multiple Conferences
 9/17/08 Samsung Goes Public with SanDisk Offer
 7/30/08 SSDs Key at Simultaneous Conferences
 6/18/08 Fusion-io — Turbocharging I/O Performance
 6/11/08 Sun Introduces Fast, Green SSD Product Line
 6/4/08 Intel & Micron Skip 40NM NAND Process – Jump to 34nm
 5/28/08 A Rugged Test for Drives
 4/23/08 Seagate Fires First Volley at STEC
 3/26/08 Managing Size, Heat, and Noise
 3/5/08 BiTMICRO's New 1TB+ E-Disk Altima Ultra320
 2/20/08 Solid State Drives in Notebooks – Still Hard to Justify, but Advantages are
 Improving
 12/5/07 WSTS Reports October Chip Sales Up 5%
 12/5/07 EMC: Why Flash? Why Now?
 11/28/07 SanDisk Vaulted Disk and Spansion's Server Flash Portend Long Term DRAM
 Trouble

Blog Posts

Forbes Chip Talk Blog

7/31/14 Why I Attend the Flash Memory Summit
 7/21/14 When Soccer Trumps Solar
 7/8/14 SIA: May Semiconductor Revenues Reached \$26.9 Billion
 7/8/14 Will Samsung's V-NAND SSD Change The Flash Game?
 6/16/14 SanDisk to Acquire Fusion-io
 6/10/14 Samsung Announces 2nd-Generation 3D NAND
 6/9/14 SIA: April Chip Sales \$26.3 Billion
 5/30/14 Can A DRAM Oligopoly Really Work?
 5/28/14 The 3 Reasons Semiconductors Experience Revenue Cycles
 5/26/14 How many transistors have ever shipped?
 5/22/14 How Hard Can It Be To Make 3D NAND Flash Chips?
 5/5/14 Semiconductors Post Biggest Q1 in History
 4/30/14 Why Are Computer Chips So Expensive?
 4/30/14 The Semiconductor Cycle Is Dead...Again!
 4/30/14 The Biggest Problem Facing Semiconductors
 4/22/14 Growth Market: Enterprise SSDs
 4/4/14 February Semiconductors Hit Record High
 3/31/14 Micron, Italy, & Strikes
 3/29/14 Did Intel's SSDs Undermine Its Processor Sales?
 3/28/14 Is Microsoft Mismanaging XP?
 3/27/14 How Memory Growth Can Predict Semiconductor Growth
 3/3/14 January Semiconductors Break Sales Record
 2/28/14 SanDisk Card Reflects Incredible Growth
 2/21/14 Is Samsung Losing at Economies of Scale?
 2/11/14 Semiconductors – A Crazy Industry
 2/10/14 Rambus Founder Opines on Semiconductor Industry's Future

2/3/14 SIA: Semiconductors Finally Break \$300 Billion Barrier
1/31/14 NPR @ CES
1/30/14 Geek Antiques
1/30/14 Replacing Mechanisms with Microchips
1/15/14 SIA: Record World Semiconductor Revenues in November
1/15/14 SEMI: Forecasts are Positive at Annual ISS Conference
12/31/13 7 Reasons Semiconductor Stocks Will Shine in 2014
12/31/13 Is it Time to Put Chips in Guns?
12/16/13 Avago to Acquire LSI: Strong Synergies Plus Diversification
12/12/13 Rambus vs. Micron: Who Really Won?
12/5/13 October Semiconductor Sales Surge 7% - On Track to Break \$300 Billion
Bogey
11/30/13 Can a Belgian Company Save Semiconductors?
11/26/13 Maxim: Wear This Shirt or Die Young
11/18/13 Is Micron Gunning for Intel's Processor Business?
11/11/13 3 Guidelines for Success From An Award-Winning Executive
11/5/13 SIA: Record-Breaking Semiconductor Sales
10/23/13 How Healthcare will Drive Semiconductors
10/4/13 SIA; Greatest Semiconductor Growth Since March 2011
9/27/13 SIA: Helium Reserve Open For Business
9/6/13 Why the SK hynix Fire Matters
9/4/13 SIA: July up 5.1% from a year ago
8/30/13 Chips and the Tragedy of the Commons
8 /20/13 Intel's History and Outlook: Otellini's Viewpoint
8/10/13 Avoid Cross-Cultural Traps
8/6/13 One Way to Beat Robocallers
8/5/13 SIA: First Half Semiconductors Look Good
7/29/13 Silicon Valley Envy
7/15/13 imec: Semiconductor Solutions are a Team Effort
7/12/13 Applied Materials: Business is Coming Our Way
7/2/13 SanDisk Announces Construction Right on Time
7/1/13 SIA Reports Global Semi Sales Jump
6/26/13 Father of Immersion Litho Receives Award
6/19/13 Video on the Birth of Silicon Valley
6/12/13 Rambus and SK Hynix Settle
6/7/13 WSTS Releases Cautious Spring Semiconductor Forecast
6/6/13 SIA: April Semiconductor Revenues Slightly Up
5/25/13 Book: The Valley of Heart's Delight
5/17/13 Some Insight into CEO Departures
5/14/13 Did Toshiba Really Cut NAND Flash Production?
5/13/13 Fusion-io Loses Founders
5/10/13 March Semiconductor Sales Up Again
4/22/13 The Cold War is Really Over!
4/16/13 Semiconductors Start to Turn Around
4/2/13 SIA: February Shows Mild Growth
4/2/13 FTC Awards "Robocall Challenge" Winners
4/1/13 Arrest Worries Valley Execs
3/31/13 When Silicon Won't Do
3/25/13 Moore's Law vs. Wright's Law
3/22/13 Is the Semiconductor Cycle Dead?

3/21/13 What Makes Samsung Tick?
3/6/13 Semiconductors Positive in January
2/28/13 Why do Semiconductors Constantly Shrink?
2/27/13 Does the "Do Not Call" List Even Work?
2/19/13 Looking into the Far Future of Chips
2/5/13 How the Yen's Slide Helps Renesas
2/4/13 SIA: 2012 Semiconductor Revenues Just Miss \$300 Billion
1/18/13 Will Crowdfunding Change the Face of Consumer Electronics?
1/17/13 CES: No Kodak, No SanDisk
1/16/13 SEMI: Semiconductor Industry to Massively Transform
1/13/13 New Cars: Semiconductors and an Engine
12/31/12 2013: A Turning Point for Semiconductors
12/28/12 A Review of Semiconductor Forecasts
12/14/12 IEDM and the Future of Semiconductors
12/7/12 Japan – Big Earthquake In Semiconductor Country
12/6/12 SIA: October Up, Above Seasonal Rate
11/29/12 WSTS Reduces 2012 Semiconductor Forecast
11/28/12 The Role of Demand in Semiconductor Forecasts
11/19/12 Intel's Otellini to Step Down in May
11/6/12 SIA: Semiconductors Sequentially Up, Annually Down
11/1/12 Court OKs Micron/Elpida Deal
10/31/12 Semiconductor Earnings Season: Mixed Messages
10/10/12 OCZ Shares Good News and Bad News
10/5/12 Maxim: Growth in a Shrinking Market
10/2/12 Semiconductor Basics: Two Excellent Videos
10/2/12 SIA: Semiconductor Sales Flat in August
9/30/12 Why are Semiconductor Companies Suffering?
9/28/12 Where did Silicon Valley's Fabs Go?
9/21/12 Intel Developer Forum Recap
9 /20/12 Tech CEOs Move On
9/5/12 SIA: July Semiconductor Revenues Slightly Up
8/27/12 Why's Everyone Investing in ASML?
8 /20/12 Why Does Intel Make NAND Flash?
8/16/12 Think Yelp is Unbiased? Think Again!!
8/13/12 Testing the DRAM Profit Myth
8/5/12 SIA: Semiconductor Sales Flat, Rather than Down
7/31/12 SSD Growth is Demand, not Supply, Limited as CEOs Claim
7/30/12 Exchange Rates Rattle Semiconductor Makers
7/24/12 Toshiba Cuts NAND Production 30%: Will it Help?
7/6/12 SIA: Everything's Still Rosy
7/3/12 Micron Unveils Elpida Acquisition
6/30/12 Evangelist Marketing: Some Lessons for All of Us
6/28/12 Learning Leadership from a New Perspective
6/21/12 SK Hynix Acquires Link_A_Media
6/7/12 Why Use Silicon?
6/6/12 SIA April Semiconductor Sales: Down Y/Y but Up M/M
5/30/12 What is it Like to Live in Silicon Valley?
5/22/12 Semiconductors and the Mafia
5/18/12 Storage Valley or Silicon Valley?
5/15/12 IMFT - Intel's Billion Dollar Sandbox

5/1/12 SIA: Sequential Growth, But YoY Collapse
 4 /20/12 Semiconductor CapEx Continues to Grow
 4/19/12 DRAM Consolidation and the McKinsey Steel Model
 4/11/12 SanDisk Demurs, Market Loses \$106 Billion
 4/7/12 SSD Start-Up Valued at \$800 Million
 4/3/12 Feb WSTS, Down Again!
 3/31/12 Geeks and April Fool's Day
 3/17/12 Why Semiconductors are Like Airlines & Shipping
 3/11/12 Elpida's Bankrupt: Who's Next?
 3/5/12 SIA Announces January Semiconductor Sales, Down 8.8%
 3/5/12 Why Did AMD and Intel Withdraw from WSTS?
 2/28/12 Intel Sells Flash Assets
 2/27/12 Elpida Files for Bankruptcy
 2/14/12 Elpida Confronts Potential Bankruptcy
 2/13/12 A \$300 Billion Semiconductor Market? Not Yet!
 2/12/12 How Thai Floods will Soften Semiconductor Prices
 2/3/12 Appleton Death
 1/19/12 2012 Semiconductor Forecasts – Take Your Pick
 1/3/12 SIA: November Was Best Semiconductor Month of 2012
 12/29/11 What Causes Semiconductor Cycles?
 12/28/11 What it's like in a semiconductor fab
 12/14/11 What is a Nanometer?
 12/7/11 SIA: Optimism Amid a Downturn
 11 /20/11 How Does Process Relate to Cost?
 11/13/11 The End of Semiconductor Scaling
 11/6/11 What Does "Solid State": Mean?
 11/1/11 Semiconductor Sales Up in September - Or Maybe Not!
 10/31/11 Why Read a Semiconductor Blog?

The SSD Guy Blog

4/1/21 Failures Plague SSDs
 1/18/21 Intel Discontinues Optane Consumer SSDs. Is This Important?
 11/9/20 Why Did Intel Sell its SSD Business?
 10/28/20 How Many Optane SSDs has Intel Sold?
 6/11/20 Emerging Memory Market to Hit \$36 Billion by 2030
 6/9/20 What's Software-Enabled Flash?
 4/1/20 High Availability in an m.2 Format
 2/10/20 New Book Explains Persistent Memory Programming
 2/4/20 Does Persistent Memory Improve Performance? Ask Oracle!
 1/10/20 SNIA Webcast: Emerging Memories
 10/30/19 Micron's New XPoint SSD Finally Arrives
 9/10/19 The Memory/Storage Hierarchy
 9/3/19 Podcast: Flash Memory Summit 2019
 8/28/19 Start-Up Fadu Launches New SSD Controller
 6/26/19 Intel's Optane: Two Confusing Modes. Part 4) Comparing the Modes
 5/28/19 Failure is Not an Option — It's a Requirement!
 4/24/19 Intel's Optane: Two Confusing Modes. Part 3) App Direct Mode
 4/1/19 HDD & SSD Combined Into One
 3/30/19 Intel's Optane: Two Confusing Modes. Part 2) Memory Mode
 3/29/19 What is an SSD Trim Command?

3/27/19 Intel's Optane: Two Confusing Modes. Part 1) Overview
3/19/19 What is SNIA's Persistent Memory Programming Model?
1/30/19 Are SSDs Approaching Price Parity with HDDs?
1/18/19 A New Spin on Memcache
10/30/18 SSDs Need Controllers with More, NO! Less Power
10/4/18 Storage Visions Conference Coming Oct 22
9/28/18 Podcast: Flash Memory Summit
5/27/18 The Micron QLC SSD - No Surprises Here
4/1/18 New Approach to Portable Storage
1/29/18 Kaminario Adopts Software-Only Business Model
11/2/17 NVDIMM Report Now Available
10/17/17 WDC: No SSD/HDD Crossover
10/5/17 Comparing SSDs to Tomatoes
9/19/17 Getting the Most from Data Center SSDs
7/31/17 An NVDIMM Primer (Part 2 of 2)
7/25/17 An NVDIMM Primer (Part 1 of 2)
7/25/17 NGD's New "In-Situ Processing" SSD
5/9/17 IBM Aligns Itself with High Speed NVMe-based Storage
4/20/17 Comparing Wear Figures on SSDs
4/1/17 Extreme ECC Enables Big SSD Advances
3/30/17 Intel Pits Optane SSDs Against NAND SSDs
3/29/17 NGD's 24TB SSD Is Just The First Step
3/21/17 Intel Announces Optane SSDs for the Enterprise
1/26/17 Managing SSDs Using Machine Learning
1/19/17 IBM Upgrades DS8000 Series: All Models are now All-Flash
1/19/17 Latency, IOPS, and NVDIMMs
12/6/16 Micron Unveils New 5100 Enterprise SSDs
8/23/16 IBM Refreshes Broad Swath of Flash Offerings
6/17/16 IOPS Survey
6/16/16 Why 3D XPoint SSDs Will Be Slow
5/3/16 Flash vs. DRAM in PCs - Flash Wins
3/24/16 Why SSD and HDD Prices Move in Parallel
3/22/16 Toshiba Reveals Restructuring Plans
3/15/16 IBM Software + SanDisk Hardware
12/18/15 Is an HDD/SSD Price Crossover Coming Soon?
9/18/15 3D XPoint Memory at the Storage Developer's Conference
6/1/15 Comparing DWPD to TBW
5/29/15 Who's #1 in Flash Arrays? (Jay Kramer)
5/27/15 SanDisk: SSD at HDD Prices
5/22/15 MLC vs. eMLC - What's the Difference?
5/21/15 OCZ Comes Roaring Back with NVMe SSD Debut
4/28/15 Baidu Goes Beyond SSDs
4/1/15 The Impact of SSDs on Coffee Prices
3/31/15 SanDisk Rolls Out InfiniFlash
3/2/15 IBM Launches All-New
10/25/14 What's In My SSD? SLC, MLC, or TLC?
10/9/14 Comparing Samsung's Planar and V-NAND SSDs
10/6/14 SanDisk: We'll Upgrade Your PCs For You!
9/30/14 Why Aren't SSDs Popular in New PCs?
9/24/14 Video: A Brief History of SSDs
9/23/14 Big New HDDs Indefinitely Postpone SSD/HDD Price
9/19/14 How Big Can an SSD Get?

9/17/14 Hybrid Drives Not Catching On
8/22/14 SanDisk's 3-Bit SSD, the Ultra II
7/16/14 New Report Posts Results of IT Manager IOPS Survey
5/5/14 Making Data Destruction ABSOLUTE!
4/22/14 New Study Forecasts Huge Enterprise SSD Growth
4/16/14 White Paper: Matching Flash to the Processor
1 /20/14 IBM Launches Flash DIMMs
12/2/13 OCZ: Bankruptcy Certain, Outcome in Question
11/18/13 LSI SandForce SSD Controllers Move the Knee in the Curve
10/17/13 Kaminario Seizes SPC1 Title Again
10/15/13 Violin & Microsoft Take a New Approach to Scaling
8/28/13 Solving SSD Power Spike Issues
8/20/13 IBM Adds Server-Side Caching
8/16/13 A New Way to Use SSDs
8/13/13 Skyera Launches 500TB 1U Flash Box
8/12/13 Nimbus Launches 4th Generation Flash Appliance
8/12/13 Violin Ups Capacity, Performance, and Economics
8/9/13 White Paper: Using Flash as Memory
7/30/13 Diablo: Flash Belongs on the Bus
7/23/13 OCZ Launches Database Accelerator
7/19/13 Webinar: Flash Best Practices
7/3/13 SanDisk to Acquire SMART Storage
6/26/13 Kaminario's Performance and 7-Year Flash Life Warranties
6/24/13 Western Digital to Acquire sTec
6/19/13 IBM Makes Flash Even Faster
6/19/13 SanDisk Upgrades FlashSoft Cache
6/7/13 Webinar: Replacing DRAM with SSDs
5/30/13 SPDEcon Sneak Peek
5/30/13 Viking: Why Wait for Nonvolatile DRAM?
5/17/13 Seagate's Big Intro: Four New SSD Families in One Day
5/15/13 Webinar: How Many IOPS Do You Really Need?
5/13/13 CEO Change at Fusion-io
4/23/13 Kaminario Goes All-Flash
4/16/13 IBM to Invest \$1B in Flash Promotion
4/10/13 WDC's HGST Intros 12G SAS MLC SSDs
3/30/13 Seagate Upgrades Hybrids, Phases Out 7,200RPM HDDs
3/29/13 One-Hop vs Two-Hop PCIe SSDs
3/29/13 Are HDDs Vibration Sensitive?
3/28/13 Understanding Storage Delays
3/26/13 LSI's Take on Data Center Flash
3/26/13 Nimbus Upgrades both Software and Hardware
3/4/13 Violin Bets on Both Sides
3/1/13 "Noisy Neighbor" or Cuckoo?
2/26/13 Extreme SSD Error Correction
2/7/13 New Booklet: How Controllers Maximize SSD Life
2/1/13 SSDs and TCO
1/30/13 Seagate Virident
1/16/13 How Software can Hamper SSD Performance
12/7/12 Is Silicon Cheaper Than Iron?
12/3/12 SSDs that Don't Wear Out

12/3/12 How Many IOPS Do You Really Need?
11/19/12 Enterprise SSDs to Grow Over 10x by 2016
11/14/12 Why Don't HDDs Spin Faster than 15K RPM?
11/9/12 How Controllers Maximize SSD Life – Internal NAND Management
11/5/12 Intel Intros Fast Datacenter SATA SSD
11/2/12 How Controllers Maximize SSD Life – Feedback on Block Wear
11/2/12 Happy Birthday to The Memory Guy!
10/30/12 19nm & 20nm SSDs Arrive!
10/26/12 How Controllers Maximize SSD Life – Over Provisioning
10/25/12 Apple's Fusion Drive - An SSD Cache for the Macintosh
10/19/12 How Controllers Maximize SSD Life - Reduced Write Amplification
10/12/12 How Controllers Maximize SSD Life - Other Error Management
10/10/12 OCZ Drafts New CEO
10/5/12 How Controllers Maximize SSD Life - Improved ECC
10/2/12 IBM Completes Texas Memory Systems Acquisition
9/28/12 How Controllers Maximize SSD Life – External Data Buffering
9/27/12 Toshiba Announces its Hybrid Drive
9/27/12 Samsung Introduces TLC SSD
9/24/12 Storage Developer Conference Focuses on SSDs
9/21/12 How Controllers Maximize SSD Life – Better Wear Leveling
9/19/12 The Week of CEO Changes
9/14/12 How Controllers Maximize SSD Life
9/12/12 Seagate Updates Hybrid Drive
9/11/12 WD Introduces Hybrid HDD
9/7/12 IOPS Survey - Second Request
8/28/12 STEC SSD Survey Yields Surprising Results
7/31/12 For the Lack of a Fab...
7/31/12 PC Caching Software is Not All the Same
6/26/12 SanDisk Acquires Schooner
6/26/12 SMART Optimus Ultra+ SSD: SLC Performance Using MLC Flash
6/25/12 SK Hynix Jumps into the SSD Market
6/25/12 Seagate Invests in DensBits
6 /20/12 Link_A_Media Acquired by SK Hynix
6/7/12 Link_A_Media's Roaring SSD Debut
6/4/12 IOPS Survey
5/30/12 The "Real" SSD Guy
5/25/12 Toshiba Reveals Hybrid HDD Research
5/7/12 Big Data? Move the App to the Data
5/2/12 SSDs and Fast Erase
4/30/12 DensBits Debuts with eMMC Controller
4/28/12 Western Digital CEO: Hybrid Drives "Strategic"
4/27/12 The SSD Pricing Maven
4/26/12 The SSD You Can't Fly With
4/19/12 Another Look at SSD Performance
4/12/12 Intel Jumps Into the PCIe SSD Market
4/3/12 Violin D-Round Values Company at \$800M
3/26/12 Avnet's SSD Virtual Summit
3/23/12 Micron: SSD Over-Inventory at OEMs & Channel
3/12/12 SSDs and Server Consolidation
3/1/12 OCZ: Three Solid State Storage Products in Three Weeks

2/29/12 Kaminario white paper
 2/20/12 UCSD - Future SSDs Will Lack Performance
 2/8/12 Hitachi's New 2nd Generation SAS SSDs
 2/6/12 Fast New Intel SSD: The 520
 2/1/12 Standards for SSD Endurance
 1/29/12 The NAND Band!
 1/28/12 Video: How SSDs are Made
 1/20/12 How Will Thai Floods Impact the SSD Market?
 1/18/12 Victorinox' Terabyte-in-Your-Pocket
 1/6/12 Fusion-io's Billion IOPS Monster
 12/19/11 SandForce: The Cloud needs Different SSDs
 12/13/11 Apple to Acquire Anobit?
 11/28/11 Momentus XT
 11/23/11 DRAM vs SLC \$/GB
 11/22/11 Caching
 11/21/11 Fast Erase
 11/18/11 What Happens when SSDs Fail?
 11/17/11 SSDs and RAID
 11/15/11 SSD Garbage Collection
 11/14/11 Sometimes SSDs Don't Improve System Speed
 11/11/11 Are HDDs Obsolete?
 11/10/11 Not all SSDs are Created Equal
 11/9/11 When will SSD Prices Drop Below HDD Prices?
 11/8/11 Oracle Openworld
 11/7/11 The First SSD
 11/4/11 Seagate's Barracuda to Add Hybrids
 11/3/11 An HDD Cache for an SSD?
 11/2/11 What's the SNIA PTS?
 11/1/11 Thai Flooding & SSDs
 10/31/11 LSI Acquires SandForce

The Memory Guy Blog

4/1/21 Putting the Brakes on Added Memory Layers
 3/16/21 Micron Bows Out of 3D XPoint Business
 12/17/20 Microchip's Answer to Emerging Memories
 11/2/20 Why 3D NAND is Stuck at 40nm
 10/21/20 The Invention of Charge Trap Memory - John Szedon
 10/19/20 SK hynix Acquires Intel's NAND Business
 9/30/20 Micron Earnings: Not So Bad After All
 8/14/20 Did 3D XPoint Costs Reach Break-Even?
 7/22/20 Applied Materials Video Dramatizes 3D NAND Manufacture
 7/10/20 FRAM Turns 68
 6/11/20 SIA CEO's Priceless Comment
 6/9/20 Emerging Memory Market to Hit \$36 Billion by 2030
 6/5/20 New Report: Emerging Memories Find Their Direction
 5/12/20 Can YMTC Really Win 8% of 2021's NAND Flash Market?
 4/1/20 Forecasting with Smith Charts
 3/26/20 Samsung Admits to Needing EUV for Sub-20nm Nodes
 3/16/2020 COVID-19's Impact on the Semiconductor Market
 2/26/20 SPIE Advanced Litho Conference: Artificial Intelligence and a Lot of Chemistry

2/7/20 UPMEM Releases Processor-In-Memory Benchmark Results
 1/31/20 University of Lancaster Invents Yet Another Memory
 1/13/20 Micron Debuts 16Gb 1Znm DDR5 DRAM Chip
 1/8/20 Kioxia Fire. Not Again!
 11/20/19 DRAM Prices Hit Historic Low
 10/18/19 Hprobe's Vote for MRAM
 9/10/19 Podcast: Storage Developer Conference 2018 - Emerging Memories
 8/30/19 UPMEM Processor-in-Memory at HotChips Conference
 7/30/19 My Flash Memory Summit Schedule
 7/9/19 Emerging Memory Report Updated
 6/28/19 SEMICON West: See Me There
 6/5/19 Gordon Moore's Original 1965 Article
 5/30/19 Intel's Optane DIMM Price Model
 4/19/19 96-Layer NAND in Perspective: WDC Video
 4/2/19 What's Inside an Optane DIMM?
 4/1/19 MRAMs to Power Cell Phones
 3/22/19 Video: What's Driving Tomorrow's Semiconductors?
 3/4/19 Forecast Videos Prove A History of Accuracy
 2/27/19 NV Stacked Memory: Selectors and Forming (Part 1)
 2/22/19 Memory Sightings at ISSCC
 1/22/19 Emerging Memories Today: Forecasting Emerging Memories
 1/21/19 Where is Micron's Quantx?
 1/8/19 Emerging Memories Today: Emerging Memory Companies
 12/14/18 The Objective Analysis 2019 Chip Forecast
 12/11/18 Intel's Losses Amid Others' Gains
 12/11/18 Emerging Memories Today: Process Equipment Requirements
 12/4/18 Emerging Memories Today: The Technologies: MRAM, ReRAM, PCM/XPoint, FRAM, etc.
 11/30/18 Accelerating New Memory Materials Research
 11/27/18 Emerging Memories Today: Understanding Bit Selectors
 11/24/18 Videos Demystify MLC NAND Programming
 11/21/18 Emerging Memories Today: Why Emerging Memories are Necessary
 11/16/18 Valuable Memory Technical Resources
 11/14/18 Emerging Memories Today: New Blog Series
 11/2/18 Memory Market Falling, as Predicted
 9/5/18 Monatomic PCMs: A New Direction
 9/4/18 Why are NAND Flash Fabs so Huge?
 7/20/18 Extending the Write/Erase Lifetime of Phase Change Memory: Part 4 – The Possible Implications for 3D XPoint and Optane
 7/19/18 Making Sense of Intel & Micron's XPoint Breakup
 7/13/18 Extending the Write/Erase Lifetime of Phase Change Memory: Part 3 – Failure Modes for the Threshold Switch
 7/12/18 Why DRAM is Threatened by SSDs
 7/5/18 How to Worsen a DRAM Shortage
 7/5/18 Extending the Write/Erase Lifetime of Phase Change Memory: Part 2 - A More Complete View of Element Separation
 7/1/18 NAND Flash's Layers of Layers of Layers
 7/1/18 Extending the Write/Erase Lifetime of Phase Change Memory: Part 1- PCM Element Separation and Endurance
 6/28/18 Ron Neale To Share Posts
 6/18/18 Latest White Paper: New Memories for Efficient Computing
 4/6/18 Storage/Memory Hierarchy 40 Years Ago

4/1/18 Solving 3D NAND's Staircase Problem
3/12/18 Wafer Shortages and DRAM/NAND
1/24/18 Amazing 3D NAND Video
1/17/18 Original PCM Article from 1970
1/10/2018 Micron and Intel to End NAND Flash JV
1/9/2018 How 3D NAND Shrinks ECC Requirements
11/13/17 Micron's Super-Fast New 32GB NVDIMM
11/2/17 New Report Details NVDIMM Market
10/17/17 Did Toshiba REALLY Lose 3-6 Weeks' Production?
8/22/17 How Samsung Will Improve 3D NAND Costs
6/28/17 Super-Cooled DRAM for Big Power Savings
6/28/17 3D NAND: "I Have More Layers than You Do!"
4/20/17 Examining 3D XPoint's 1,000 Times Endurance Benefit
4/1/17 Why Satellites Are Programmed Differently
2/16/17 Using ECC to Reduce Power
2/13/17 Is Intel Adding Yet Another Memory Layer?
2/10/17 64-Layer 3D NAND Chips Revealed at ISSCC
1/27/17 Toshiba Decides to Split Off Memory Business
1/16/17 US Plans Response to China's Chip Plan
10/10/16 Memsys: A New Memory Conference
8/24/16 Intel Developer Forum – Not Much 3D XPoint Progress
7/8/16 When a Shortage Looms
6/23/16 Understanding Samsung's DRAM CapEx Cut
6/21/16 Samsung Power Glitch – Is It Important?
5/18/16 IBM Jumps on the "New Memory" Bandwagon
5/6/16 Putting DRAM Prices in Perspective
4/4/16 What is DRAM "Row Hammer"?
3/30/16 XMC Breaks Ground for 3D NAND Fab
3/22/16 Toshiba Restructuring: New 3D Fab Coming
3/21/16 Goodbye, Andy Grove
3/14/16 Early Computer Memories
1/18/16 A 1T SRAM? Sounds Too Good to be True!
1/9/16 Crossbar or Crosspoint?
12/21/15 Samsung's Colossal 128GB DIMM
12/17/15 New Materials Solve Key 3D NAND Issue
9/18/15 New Report: 3D XPoint Memory
8/25/15 Flash Memory Summit: Limitless Layers of 3D NAND
8/24/15 How Many Kinds of Memory Are There?
7/30/15 Micron/Intel 3D XPoint Raises More Questions than Answers
7/15/15 Is Micron Being Acquired?
7/1/15 Avalanche Samples MRAM
6/24/15 How NAND Flash Can Reduce DRAM Requirements
5/27/15 What Memory Will Intel's Purley Platform Use?
5/22/15 DRAM Prices Down, But Not So Bad
4/1/15 New Algorithm Dramatically Reduces Storage & Power Requirements
3/31/15 Four New Players Join 3D NAND Market
2/26/15 NAND Sourcing Changes as Supplies Tighten
2/12/15 What's This Nano-Imprint Litho that Toshiba and SK hynix are Co-Developing?
2/9/15 Why ST-MRAMs Need Specialized DDR3 Controllers
2/4/15 Backing Out DRAM Process Rules
12/2/14 Cypress to Merge with Spansion
11/26/14 Memory Issues in Space & Medical Applications

11/25/14 Obama Honors SanDisk Co-Founder
11/5/14 Is Apple Losing Dollars to Save a Few Cents?
10/9/14 Finally! Samsung's 3-Bit V-NAND Arrives
9/30/14 New Book: Vertical 3D Memory Technologies
9/19/14 Fundamentals of Memory - Free Online Course
9/17/14 SanDisk's Amazing 512GB SD Card
8/15/14 Cheesecake and Floating Gates
6/24/14 Intel to Use Micron Hybrid Memory Cube
5/22/14 Making 3D NAND Flash – Animated Video
5/8/14 Samsung Begins Operations at its Xi'an Fab
4/1/14 Researchers Devise 4-D Memory
3/4/14 Spansion's Super-Fast HyperFlash NOR
2/25/14 Comparing Samsung V-NAND to Micron 16nm Planar NAND
2/4/14 Why NAND is So Difficult to Scale
1/10/14 Did SK hynix Beat Samsung to the 8Gb LPDDR4?
12/13/13 3D NAND: Who Will Make it and When?
12/12/13 Rambus-Micron
12/6/13 3D NAND's Impact on the Equipment Market
12/5/13 What is a "Multilayer Cell?"
11/29/13 How Do You Erase and Program 3D NAND?
11/25/13 The Father of Flash Memory
11/22/13 3D NAND: Benefits of Charge Traps over Floating Gates
11/18/13 Micron Announces Processor-In-Memory
11/15/13 3D NAND: How do You Access the Control Gates?
11/12/13 DRAM Inventor Wins Kyoto Prize
11/8/13 An Alternative Kind of Vertical 3D NAND String
11/5/13 SIA: Memories Drive Record Semi Revenues
11/1/13 3D NAND: Making a Vertical String
10/30/13 Hynix Recovery - Not so Soon?
10/25/13 What is a 3D NAND?
10/23/13 Why Facebook Can't Get its Dream Memory Chip
10/18/13 Why Do We Need 3D NAND?
10/13/13 Hynix Squeaks Out Another Update
10/11/13 What is 3D NAND? Why do we need it? How do they make it?
9/25/13 Micron Samples Hybrid Memory Cube
8/5/13 Crossbar's Radical New Memory Technology
8/5/13 Samsung Announces 3D NAND Production
7/17/13 Micron NAND Reaches 16nm
7/12/13 Applied's Take on 3D NAND
7/2/13 SanDisk & Toshiba to Add NAND Capacity
5/21/13 SanDisk & Toshiba Move to Next Process Node
5/14/13 A Retrospect of Toshiba's NAND Production Cut
4/4/13 Hybrid Memory Cube Making Progress
4/1/13 New Memory Bonding Technique Shows Promise
3/12/13 DRAM Prices on the Rise
1/31/13 Why Do Memories Have Those Odd Names?
12/3/12 Macronix Solves Flash Wear Problem
12/2/12 History of Memory Slideshow in EE Times
12/1/12 Why Most NAND Rankings Ignore SanDisk
11/12/12 Everspin Samples First STT MRAM
11/12/12 Spansion Introduces 8Gb NOR Flash
11/2/12 Is there a NAND Shortage? Not quite.

11/1/12 Top Ten Trends for NAND Flash
10/31/12 Happy Birthday to The SSD Guy!
10/10/12 Does the 'Windows Bump' Really Exist?
10/9/12 Samsung Revenues Reflect NAND Price Increase
10/3/12 Adesto Acquires Atmel's Serial NOR Business
10/2/12 Kingston's 'Windows To Go' Thumb Drive
9/27/12 Is NAND Headed for Lower Bit Growth?
9/26/12 Alternative Memory Technologies Patiently Wait For Market to Explode
8/13/12 Is DRAM Really a Profitless Business?
7/24/12 Toshiba to Cut NAND Production by 30%
7/24/12 Samsung DRAMs in Massive Leibniz SuperMUC
7/18/12 Micron PCM Enters Mass Production
7/2/12 A New Way to Build Phase-Change Memory (PCM)
6/25/12 The End of Flash Scaling
6/8/12 NAND Flash at 35 Cents per Gigabyte
5/30/12 What is cMLC Flash?
5/30/12 Why DRAM Bit Growth will Suffer
4/30/12 DensBits - Making TLC Act Like MLC
4/19/12 Why DRAMs are Like Steel
4/13/12 Figuring Out Who Shipped What
4/10/12 Invensas' DIMM-in-a-Package
4/9/12 How Cheap is Flash?
4/4/12 MOSAID Samples 333GB/s HLNAND
4/3/12 NAND Flash Turns 25!
4/2/12 Hynix and Spansion Join Forces
3/9/12 Remembering Core Memory
2/29/12 IEEE Spectrum: Did Bad Memory Chips Down Russia's Mars Probe?
2/28/12 Intel Sells NAND Assets
2/27/12 Inside SanDisk's & Toshiba's New 128Gb NAND Chip
2/24/12 How Do You Make an ReRAM Work?
2/23/12 Harari Delivers Inspiring Keynote at ISSCC
2/20/12 NAND SSD Performance to Decline over Time
2/16/12 Micron Suffers Another Loss
2/15/12 Elpida Finally Makes Statement
2/14/12 Hynix is now SK-Hynix
2/13/12 New NAND Player: Macronix
2/6/12 Rambus Acquires Unity Semiconductor
2/3/12 Micron CEO Killed in Plane Crash
1/25/12 Elpida ReRAM Prototype
1/16/12 Cypress vs. GSI Battle Following Rambus Lead
12/26/11 DRAM Consolidation in 2012?
12/14/11 WIOMING: Another Spin on the Hybrid Memory Cube
12/13/11 What is a Content-Addressable Memory (CAM)?
12/8/11 A Change to Computing Architecture?
12/6/11 Micron, Intel, Introduce 128Gb NAND Chip
12/2/11 IBM to Build Micron Hybrid Memory Cube
12/1/11 Mission Statement

Smartkarma Blog

(Membership Required)

4/8/21 February Semiconductor Revenues Remain Impressively Above Trend

4/1/21 Micron 2QF21: Everything's Good and Getting Even Better
3/23/21 Intel Reveals Plan to Restore Process Leadership
3/16/21 Micron Kills 3D XPoint - Is Intel in Trouble?
3/4/21 January Semiconductors Up 13.2% Y/Y
3/3/21 Micron Ups Guidance: Revenues +10%, EPS +17%
2/24/21 Texas Weather Deals Second Blow to Automotive Chip Supply Chain
2/16/21 Japan Quake and Chip Shortages, Tough on Auto?
2/10/21 Samsung Surprisingly Cautious in 4Q Earnings Call
2/9/21 2020 Semiconductor Revenues Up 6.5%
1/29/21 One-Hour Power Outage, 9 Weeks of DRAM Price Hikes
1/13/21 Intel CEO Change Brings Focus Back to Technology
1/7/21 Micron Reports Solid 1QFY21, Adds New Twist to Strategy
1/4/21 November Semiconductor Sales Continue Upward Trend
12/14/20 2021 High Conviction: Semiconductor Growth with COVID Risk
12/7/20 Details of SK Hynix Acquisition of Intel Flash Business
12/5/20 WSTS Forecast Update All Positive
12/4/20 October Semiconductor Revenues Continue Upward Trend
12/1/20 Micron Updates Current Quarter Guidance
11/29/20 2021 Memory Market Hinges on Pandemic Response
11/24/20 SK Hynix Nears Reaching Its NAND Goals
11/21/20 SK Hynix: Big Plans for The Future
11/7/20 September Semiconductor Stats In: 2020 Growth Despite Pandemic
10/30/20 Western Digital: COVID & Trade War Impacts Manageable
10/29/20 Is YMTC Really a Threat to the NAND Flash Memory Business?
10/19/20 Intel's Memory Business Sale. Does It Make Sense?
10/5/20 August Semiconductor Sales Increase
9/29/20 US Government Puts the Squeeze on SMIC
9/17/20 SIA July Stats Still Show Strength
9/16/20 DRAM & NAND Spot Prices Indicate Impending Fall
9/10/20 The COVID-19 Pandemic and Semiconductors
8/28/20 Semis Moving from Inventory Build to Inventory Digestion
8/27/20 Kioxia as a Business
8/6/20 WSTS Reports June Semis: Lessens M/M Decline by Restating May
8/5/20 Western Digital Revenues Rise on SSD Growth
7/23/20 Intel Earnings Call - Solid Revenues Partly Thanks to COVID-19
7/22/20 WOW! SK Hynix Revenues Jump 20% Q/Q
7/8/20 May Chip Shipments Up, but Outlook Is Confused
7/2/20 Micron Earnings Surprisingly Strong
6/29/20 Moore's Law Has Ended... Again!
6/29/20 The Samsung Approach to Growth
6/10/20 Spring WSTS Semiconductor Forecast Gives Mixed Outlook
6/1/20 Semiconductors in April: COVID Impact Still Small
5/29/20 What's Intel Doing in Memory Chips?
5/19/20 US-Huawei Battle Likely to Harm US Business
5/16/20 How Economics Will Undermine Intel's Processor Dominance
5/14/20 Q1 Semis Up 6.9% Y/Y, but COVID Not Yet Factored In
4/30/20 Samsung Earnings: Mixed Q1 Results and a Mixed Outlook
4/30/20 Western Digital Shines Despite Pandemic
4/22/20 SK Hynix Earnings Call: Respectable Q1, but Unsettling Outlook
4/14/20 February Semiconductors Show Onset of COVID-19 Decline

3/31/20 Windows' Impact on Chip Sales
 3/25/20 Micron: Great Quarter, but Outlook Is Confusing
 3/23/20 Upcoming Micron Earnings Call: What to Expect
 3/9/20 Cypress/Infineon Versus Bloomberg: A Case for Mindful Understanding of the Press
 3/3/20 WSTS Reports Slowing Chip Decline
 3/3/20 Is ASML's Steady Rise About To End? (Rapid Response)
 2/27/20 Applied Materials Shines at SPIE Conference
 2/26/20 Does COVID-19 Imply A Bonanza for Micron?
 2/10/20 Chips Vs. Coronavirus: Best-Case & Worst-Case Scenarios
 2/3/20 Semiconductor Market Year-End Tally: -12.5%
 1/29/20 How Far Behind Is Intel's Process Migration?
 1/14/20 Composing the 2020 Semiconductor Forecast
 1/8/20 Kioxia Fire: Small Impact Anticipated
 1/6/20 China Semiconductor Progress & Opportunities Review 2020
 1/2/20 November Semiconductor Stats Good, But China Inventory Build May Be Misleading
 12/23/19 2020 High Conviction: Memory Chip Makers
 12/18/19 Micron Expresses Hopes for Better Quarters Ahead
 12/10/19 What a 5% DRAM Wafer Cut Really Means
 12/3/19 WSTS: Semiconductor Sales Grow Month/Month
 11/21/19 Memory Market Revenue Overview 3Q19
 11/6/19 Is a Quantum Computing Revolution Imminent?
 10/23/19 SK Hynix Earnings Call Reveals Little but Bad News
 10/19/19 Everspin's Dreams of MRAM Glory
 10/15/19 Semiconductor Revenues On-Trend for August
 10/5/19 After the Collapse: Semiconductors Enter the Next Phase
 9/27/19 Micron: Plan Is Good. Market? Not So Much!
 9/20/19 WDC – Using the Toshiba JV to Improve Profits
 9/11/19 The Danger of Over-Applying Trade Sanctions
 9/4/19 July Semiconductor Revenues Reported: Down 15.5% YoY
 8/26/19 Where Are We in the Semiconductor Memory Price Collapse?
 8/16/19 Have We Hit the NAND Flash Trough?
 8/5/19 Semiconductor Memory Prices Still Falling
 7/12/19 WDC Impact from Toshiba Power Outage
 6/26/19 Micron Technology's Tough Call
 6/12/19 April Semiconductors Down Again, 14.6% Year/Year
 6/4/19 WSTS Forecast Shows Rare Understanding of Downturn
 6/3/19 Cypress and Infineon? Think of NXP!
 5/29/19 Why Commodities Drive the Semiconductor Cycle
 5/15/19 Exploring Memory Companies' Inventory Write-Downs
 5/14/19 Memory Makers' Earnings Calls - Down Again
 4/22/19 Semiconductor Revenues Collapsing, As Anticipated
 4/14/19 China's New Semiconductor Thrust - Part 3: Market Size and Impact to Competition
 4/8/19 China's New Semiconductor Thrust - Part 2: Commodities as a Quick Path to Success
 3/31/19 China's New Semiconductor Thrust - Part 1: Why and How?
 3/21/19 Micron: Things Are Bad, and Getting Worse!
 3/14/19 Moore's Law May Not Be Dead, After All

3/5/19 January Chip Revenues Down 15.6% Year-On-Year
2/26/19 Memory Chips and the Elasticity Myth
1/31/19 Semiconductor Memory Business Shrinking Fast
1/30/19 2019 Semiconductors: 5%+ Decline
1/22/19 Inventory Clearance and the Semiconductor Cycle
1/9/19 Are Chip Oligopolies Real?
1/3/19 Forecasting the Semiconductor Market
11/16/18 Semiconductor Memory Prices Continue to Fall
11/2/18 Samsung Earnings Call Leaves Cause to Worry
10/16/18 Will NAND Flash and DRAM Be Displaced by Something New?
10/1/18 How NAND's Fall Leads to a DRAM Collapse
9/11/18 NAND Flash Prices Continue to Drop
8/28/18 Does YMTC's "Xtacking" 3D NAND Make Sense?
8/15/18 2019: A Zero-Margin Year for Memory Chips
7/24/18 3D XPoint: The End of the Beginning or the Beginning of the End?
7/2/18 A Semiconductor Downturn's Coming, But How Bad Will It Be?
6/12/18 Why is Intel Subsidizing 3D XPoint Memory?
5/22/18 Micron's Views vs. Semiconductor History