SSD Innovations

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Contents

CONTENTS III
LIST OF FIGURES IV
LIST OF TABLES V
INTRODUCTION 6
SSD ARCHITECTURE 7
Evolution of Application Requirements 7
Interface Level Challenges 11
NAND Level Challenges 12
System Level Challenges 13
SSD INNOVATIONS 23
FusionIO 24
SandForce 29
SanDisk 34
Pliant Technology 37
STEC 40
Intel 43
ALTERNATIVE SSD ARCHITECTURES 47
Mosaid HyperLink NAND 47
Multi-Technology SSD architectures 51
External Power Supply For Flash Component 55
Appendix A: SSD Metrics 61
Appendix B: Acronyms 69
REFERENCES 71
ABOUT THE AUTHORS 72
ABOUT FORWARD INSIGHTS 73
Services 73
Contact 73
REPORT OFFERINGS 75

List of Figures

Figure 1. Factors Influencing SSD Development 9
Figure 2. SSD Past, Present and Future 10
Figure 3. SSD Segmentation by Requirements 11
Figure 4. SSD and Interface Performance Trends 12
Figure 5. Vertical Integration of Upcoming SSDs 14
Figure 6. NAND Introduction and Future in Storage Systems 15
Figure 7. Performance vs. Endurance 20
Figure 8. Endurance vs. Technology Node 20
Figure 9. BER trends 21
Figure 10. Access Delay in Time 24
Figure 11. Row based multilevel cell algorithm 28
Figure 12. SandForce "Phoenix" microcontroller architecture overview 29
Figure 13. Block usage representation following a traditional approach to Wear Leveling 31
Figure 14. Block Usage Representation 32
Figure 15. Transaction Percentage vs. Transaction Size, 3 hours of Mobile Mark 07 under Windows Vista for all Traffic 34
Figure 16. Write Traces under Microsoft Windows XP 36
Figure 17. Comparison HDD vs Pliant Solutions 37
Figure 18. Pliant IOPS Behavior vs Read/Write Workload 38
Figure 19. Flash Controller with Independent Flash Channels 40
Figure 20. ECC Data Coverage 41
Figure 21. Relation Between Endurance and Over-provisioning 43
Figure 22. SLC and MLC Performance Scaling vs. Over-provisioning 44
Figure 23. Incremental Usage of SLC/MLC Flash Architectures 45
Figure 24. HLNAND Topology 47
Figure 25. HLNAND Bank Driven Architecture 48
Figure 26. Mosaid HLNAND Roadmap 49
Figure 27. Mosaid HLNAND in MCP 50
Figure 28. Mosaid HLNAND DIMM Solution 50
Figure 29. HLNAND DIMM System Level Configurations 51
Figure 30. DC/DC Converter 55
Figure 31. Generic Charge Pump Scheme 57
Figure 32. Generic Charge Pump Scheme 57
Figure 33. Comparison of Different Approaches 59
Figure 34. Minimum SSD Capacity for 5 Year Product Life 63
Figure 35. Program Disturb 64
Figure 36. Read Disturb 65
Figure 37. Flash Error Rate Surface 66
Figure 38. SSD vs. HDD Bit Error Rates 67
Figure 39. ECC Selection 67
Figure 40. vRPM Formula for Client PCs 68

List of Tables

Table 1. Applications Requirements by Market Segment 8
Table 2. Maximum Device Level Throughput with Different System Architectures 13
Table 3. Reference SLC NAND parameters 14
Table 4. Memory Technologies Comparison 52
Table 5. SSD Capacity as a Function of Writes / Day 63

Introduction

The unprecedented cost reductions of NAND flash memories in the last few years have driven 35mm film and 1.4" floppy disk to extinction. These first generation storage systems such as SD cards and USB flash drives are primarily removable, low capacity, low cost storage for consumer media.

The next frontier for NAND flash memory is as a hard disk drive replacement or an additional tier in the storage hierarchy. The traditional focus on performance in computing and storage farms now encompasses power savings and green technologies. The main reason is not only due to environmental concerns but also to reduce the Total Cost of Ownership that is heavily impacted by electricity and cooling costs.

The priorities for solid state storage in the computing environment are dramatically different from those for consumer applications resulting in a new approach in the design of the system architecture. These varying requirements are driven by the different workload and environmental conditions. To satisfy these conditions, the type of memory used – SLC versus MLC – and system level management of wear leveling, garbage collection, FTL, ECC and security are key design considerations.

SSD Innovations focuses on innovative solutions from major industry players such as FusionIO, Intel, Pliant, Sandforce, SanDisk and STEC for improving the performance, endurance and reliability of SSDs. An exploration of the evolution of application requirements in computing applications, performance limitations of flash-based storage systems, trends and industry innovations is provided.

In addition, innovative SSD architectures incorporating new memory technologies, external power supply and linked chain architectures are investigated as future SSD development directions.

About the Authors

Luca De Ambroggi is Senior Technical Analyst for Solid State Storage architectures.

Luca Deambroggi has over 15 years of experience in semiconductor memories. At STMicroelectronics, he led a team of 15 engineers to design and test (BIST) NOR flash memories. At Infineon/Qimonda, Luca was responsible for concept engineering for *SSDs, USB flash drives, flash memory cards* and *MCPs* and analyzed the market and applications for *advanced phase change memory technology*. As Senior Manager for Technical Marketing, Luca had worldwide responsibility for DRAM customer-enabling activities.

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Francesco's expertise lies in the area of **software and firmware development for embedded flash memory systems and solid state storage systems.** He previously oversaw a firmware development team of 5 engineers for solid state storage systems at Qimonda AG and was responsible for software development of flash memory management including SW drivers, data management tools and file systems embedded systems at STMicroelectronics. In his most recent position as Senior Applications Engineer for Memory Systems, he was involved in the development and review of the low level software layers for proprietary and commercial operating systems for mobile applications at Spansion, Inc.

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About Forward Insights

Forward Insights provides independent, insightful market research, consulting and information services focusing on semiconductor memories and solid state storage. The company offers unparalleled depth and understanding of the strategic, market and technical complexities of the semiconductor memory landscape.

Services

Forward Insights offers a unique and comprehensive strategic, financial, market and technical perspective on the semiconductor memory industry. The professional services offered include:

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- Custom projects

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