

SPECIAL ISSUE

SOLID-STATE DRIVES (SSDs)

Edited by R. Micheloni and P. Olivo

1589 Solid-State Drives: Memory-Driven Design Methodologies for Optimal Performance

By L. Zuolo, C. Zambelli, R. Micheloni, and P. Olivo

|INVITED PAPER| This paper describes design methodologies to optimize the performances of solid-state drives based on the underlying Flash technology.

1609 Reviewing the Evolution of the NAND Flash Technology

By C. Monzio Compagnoni, A. Goda, A. S. Spinelli, P. Feeley, A. L. Lacaita, and A. Visconti

|INVITED PAPER| This paper reviews historical trends of NAND Flash technologies, explaining why scaling of planar arrays below 1x nm is less favorable than vertical integration.

1634 Array Architectures for 3-D NAND Flash Memories

By R. Micheloni, S. Aritome, and L. Crippa

|INVITED PAPER| This paper is about 3-D NAND Flash memories and related integration challenges, covering charge trap and floating gate options.

1650 Software Support Inside and Outside Solid-State Devices for High Performance and High Efficiency

By F. Chen, T. Zhang, and X. Zhang

|INVITED PAPER| This paper is focused on the software aspects of the solid-state drives, from the Flash translation layer (FTL) to the operating system.

1666 Error Characterization, Mitigation, and Recovery in Flash-Memory-Based Solid-State Drives

By Y. Cai, S. Ghose, E. F. Haratsch, Y. Luo, and O. Mutlu

|INVITED PAPER| This paper reviews the most recent advances in solid-state drive (SSD) error characterization, mitigation, and data recovery techniques to improve both SSD's reliability and lifetime.

1705 Channel Coding for Nonvolatile Memory Technologies: Theoretical Advances and Practical Considerations

By L. Dolecek and Y. Cassuto

|INVITED PAPER| This paper provides an overview of most popular error-correction codes (ECCs) used in conjunction with nonvolatile memories.

1725 Reliability of Solid-State Drives Based on NAND Flash Memory

By N. R. Mielke, R. E. Frickey, I. Kalastirsky, M. Quan, D. Ustinov, and V. J. Vasudevan

|INVITED PAPER| This paper reviews SSD's reliability from the perspective of failure mechanisms and design mitigation techniques, with particular emphasis on the JEDEC qualification methods.

1751 Reliability of NAND-based SSDs: What Field Studies Tell Us

By B. Schroeder, A. Merchant, and R. Lagisetty

|INVITED PAPER| This paper presents reliability studies of NAND-based SSDs in production environments, subjected to real workloads and operating conditions.

1770 Resistive Random Access Memory for Future Information Processing System

By H. Wu, X. H. Wang, B. Gao, N. Deng, Z. Lu, B. Haukness, G. Bronner, and H. Qian

|INVITED PAPER| This paper reviews the fundamental materials and process integration needed for high volume manufacturing of resistive RAMs.

DEPARTMENTS

1583 POINT OF VIEW

Spatial Technology and Social Media in Remote Sensing: Challenges and Opportunities

By J. Li, J. A. Benediktsson, B. Zhang, T. Yang, and A. Plaza

1586 SCANNING THE ISSUE
Solid-State Drives (SSDs)

By R. Micheloni and P. Olivo

1834 SCANNING OUR PAST
Setting the Standards for Engineering Education: A History

By A. Akeru

1844 FUTURE SPECIAL ISSUE/ SPECIAL SECTIONS



On the Cover: Solid-state drives (SSDs) can dramatically improve the lifetime and performance of your laptop or personal computer. Our cover image this month captures how SSDs are becoming commonplace in consumer computer products.

[Continued on page 1582 ▶]

CONTENTS

CONTINUED FROM PAGE 1581

SPECIAL ISSUE: Solid-State Drives (SSDs)

1790 Phase Change and Magnetic Memories for Solid-State Drive Applications

By C. Zambelli, G. Navarro, V. Sousa, I. L. Prejbeanu, and L. Perniola

|INVITED PAPER| This paper reviews phase change memories and magnetic memories technologies from the perspective of their possible application in future SSDs.

1812 Design of Hybrid SSDs With Storage Class Memory and NAND Flash Memory

By C. Matsui, C. Sun, and K. Takeuchi

|INVITED PAPER| This paper presents the advantages of hybrid SSDs integrating both storage class memories and NAND Flash memories with respect to standard NAND-Flash-based SSDs.

1822 Platform Storage Performance With 3D XPoint Technology

By F. T. Hady, A. Foong, B. Veal, and D. Williams

|INVITED PAPER| This paper reviews the potentialities on computing introduced by the 3-D XPoint technology in changing the memory-storage hierarchy.

Proceedings OF THE IEEE

On the Web

www.ieee.org/proceedings

Find the following information on our website.

[Preview Current Issue](#)

[Browse Future Issues](#)

[Subscribe](#)

[Submit an Article](#)

[Email the Editor](#)

[Browse/Purchase Articles](#)

[Look Back in History](#)

[Centennial Celebration News and Events](#)

[Classic Papers](#)



On the Web

www.ieee.org

MEMBERSHIP

Check out the many features available through the IEEE Membership Portal.

PUBLICATIONS

Find IEEE articles by using the search features of IEEE Xplore

SERVICES

The IEEE offers many services to Members, as well as other groups.

STANDARDS

The IEEE is the leader in the development of many industry standards.

CONFERENCES

Search for the ideal IEEE Conference, on the subject of your choice

CAREERS/JOB

Find your next job through this IEEE service.