New Technologies and New Standards Enable New Mobile Applications

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Mobile Storage Performance

Sequential in MB/s

> 50X

emmc 4.41  emmc 4.5  emmc 5.0  emmc 5.1  UFS 2.1 G3x1L  UFS 2.1 G3x2L  PCIe Gen3x2L  UFS 3.0 G4x2L  PCIe Gen4x2L

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Next Generation Mobile Storage Controller

- MIPI HS-G4 x2 (23.2Gbps)
- PCIe Gen.3 x2/Gen. 4x2

- Advanced Process
- Package

- 1.2V NAND IF
- 3D NAND

- Soft Error
- Data integrity

Host Interface

Reliability

Power/Thermo

Throughput
Next Generation Mobile Storage Controller

- Host Memory Acceleration
- High Efficient

- MIPI HS-G4 x2 (23.2Gbps)
- PCIe Gen.3 x2 /Gen. 4x2
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- 1.2V NAND IF
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- Soft Error
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- Host Interface
- Reliability
- Power / Thermo
- Through-put

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Host Interface

- Utilize Host Memory to reduce the table update
- Advanced Line coding (128b/130b)
Next Generation Mobile Storage Controller

- Host Memory Acceleration
- High Efficient

Host Interface
- MIPI HS-G4 x2 (23.2Gbps)
- PCIe Gen.3 x2 /Gen. 4x2

Reliability
- Soft Error
- Data integrity

Power / Thermo
- Advanced Process
- Package

Through-put
- 1.2V NAND IF
- 3D NAND

Error correction
- Data protection
Reliability

- More Soft bit error due to large SRAM density
- Error correction to prevent potential stuck
- Data protection/encryption
Next Generation Mobile Storage Controller

- 1.2V NAND IF
- 3D NAND
- Advanced Process
- Package
- MIPI HS-G4 x2 (23.2Gbps)
- PCIe Gen.3 x2 /Gen. 4x2
- Soft Error
- Data integrity
- Error correction
- Data protection
- High throughput
- LDPC
- RAID

Host Interface

Reliability

Power/Thermo

Throughput

- Host Memory Acceleration
- High Efficient

- Advanced Process
- Package

- 1.2V NAND IF
- 3D NAND

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Performance/Throughput

- 1.2V 3D NAND can support 1200MT/s above
- 2KB/4KB LDPC is expected for high throughput and higher performance
- Multi-core CPU
Next Generation Mobile Storage Controller

- Host Memory Acceleration
- High Efficient

Low power optimization

- Advanced Process
- Package

- MIPI HS-G4 x2 (23.2Gbps)
- PCIe Gen.3 x2 /Gen. 4x2

- Soft Error
- Data integrity

Error correction
- Data protection

- 1.2V NAND IF
- 3D NAND

High throughput
- LDPC
- RAID

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Power Consumption/Thermo

- Advanced process with superior low leakage
- SRAM, Logic cell (SVT, HVT cell)
- Wire-bonding vs Flip-chip
Next Generation Mobile Storage Controller

- Host Memory Acceleration
- High Efficient

- Low power optimization

- MIPI HS-G4 x2 (23.2Gbps)
- PCIe Gen.3 x2 /Gen. 4x2

- Advanced Process
- Package

- 1.2V NAND IF
- 3D NAND

- Soft Error
- Data integrity

- Error correction
- Data protection

- High throughput LDPC
- RAID
Summary

- Optimize the design of PCIe PHY/NVMe
- Consider the design trade-off between performance and power consumption
- PCIe/UFS3.x aim for Mobile computing and Automotive applications
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Thank you

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