

Enabling Gen-Z in Today's Form Factors

July 2017

This presentation covers how Gen-Z can be deployed using existing mechanical form factors.

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Deploying Gen-Z Attached Media

Multiple phases to balance Time-to-Market pressures and Performance

- Phase 1: Enable Legacy Form Factors
 - Storage: SFF-8201/8639 based modules – 2.5" and Compact 2.5"
 - I/O: QSFP, QSFP-DD, OSFP etc.
 - PCIe® cards with Gen-Z Bridges
 - Specifications to be published Q3 2017
- Phase 2: Augmented Form Factors
 - New Gen-Z high speed connector (Specification published July 2017) deployed on:
 - PCIe Cards
 - DIMMs
 - Storage Drives
- Phase 3: High Performance Modules
 - New Gen-Z Scalable Connector
 - New Gen-Z-optimized form factors – Specification to be published Q1 2018
 - Currently under development in Gen-Z Consortium Mechanical Workgroup

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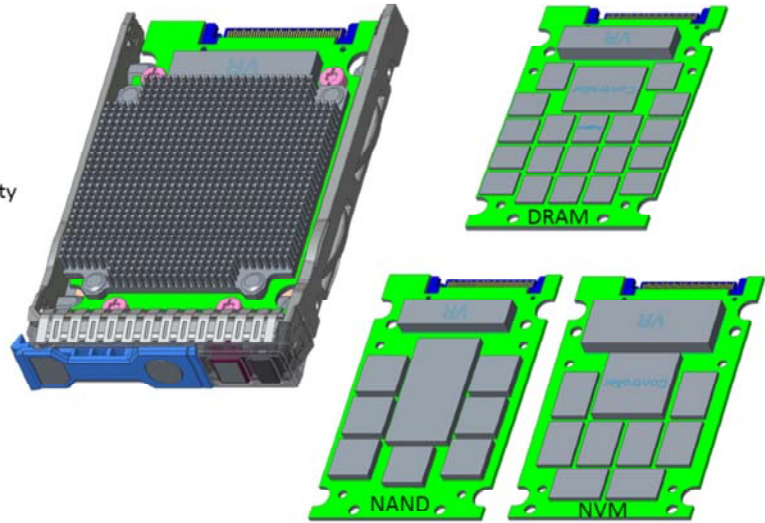
GEN Z

To balance time-to-market pressure and performance, the Gen-Z consortium is focused on deploying media in multiple phases.

1. Phase 1 as discussed in this presentation enables Gen-Z in existing industry standard form factors.
2. Phase two augments form factors such as PCIe cards, DIMMs, and storage drives to use the new Gen-Z Scalable Connector. This specification for which has been published by the Gen-Z Consortium.
3. Phase three creates new, optimized form factors with the Gen-Z Scalable Connector that take full advantage of the system benefits afforded by Gen-Z.

Gen-Z Phase 1 2.5" Form Factor

- SFF-8201, 2.5" Media Drive Form Factor
 - U.3, SFF-8639 Connector
 - Managed DRAM, NVM, NAND
- Other Possibilities
 - GPU Accelerators
 - FPGAs
 - Any other media, memory or functionality
 - HDD's



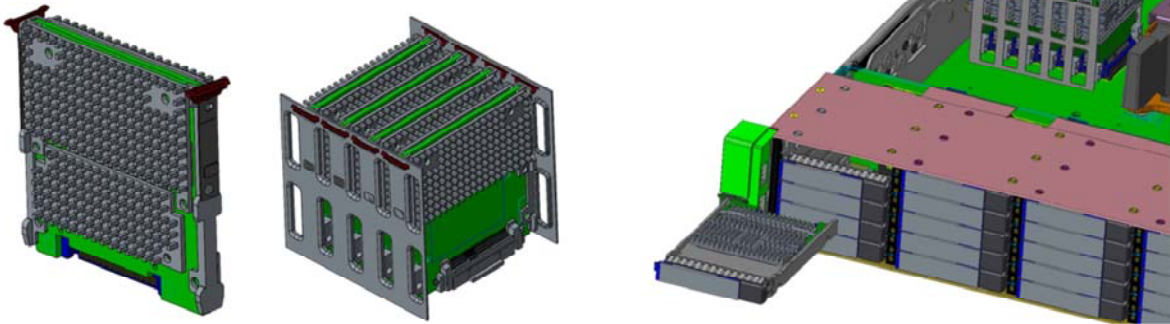
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The Gen-Z Consortium has published specifications that enable Gen-Z in 2.5" SSD form factors with the U.3 SFF-8639 connector. The layouts shown here are conceptual to show the different media support capabilities. In addition, the form factor could support accelerators, FPGAs or Gen-Z bridges and gateways.

Gen-Z Phase 1 2.5" Compact Form Factor

- Front Pluggable Modules
 - Mounts to standard 2.5" Drive mounting points
- Vertical (2U) Installations
 - Module with guide rails and latching mechanism vs 2.5" mounting
 - Same PCA with Heat sinks as Front Pluggable implementation
 - Bank of 4 with Side Walls (for visualization only)



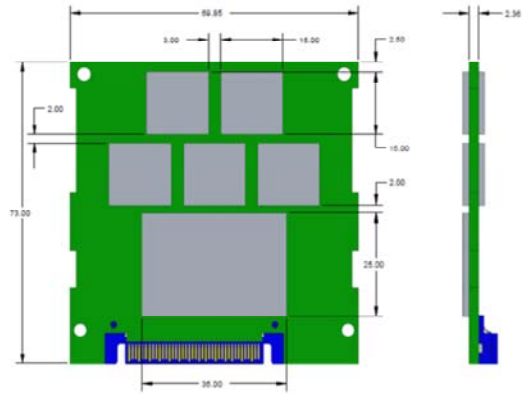
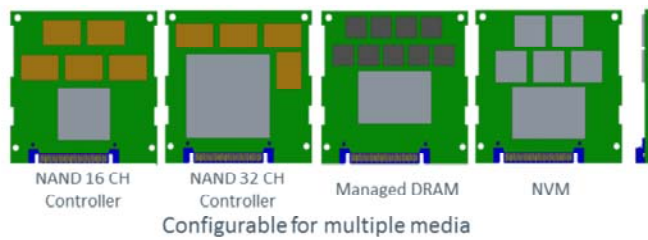
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The 2.5" compact form factor shown here, is a truncated 2.5" form factor that can be deployed in both internal and front pluggable implementations. The same PCA can be mounted in a carrier for front pluggable applications or placed internally to a 2U server.

Gen-Z Phase 1 2.5" Compact Form Factor

- Supports Multiple Media
 - DRAM, Managed DRAM, NVM, NAND, SCM (Storage Class Memory)
- Additional Details
 - PCB 69.85mm x 73mm
 - U.3, SFF-8639 Connector
 - 25W power envelope



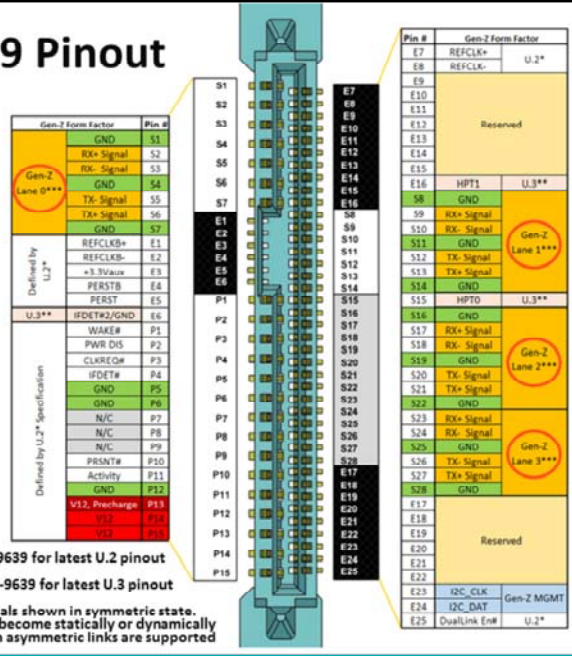
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The compact form factor can support multiple media, just as the 2.5" form factor, and also leverages the SFF-8639 U.3 connector. Additional mechanical details are shown here.

Gen-Z Enabled U.3 SFF-8639 Pinout

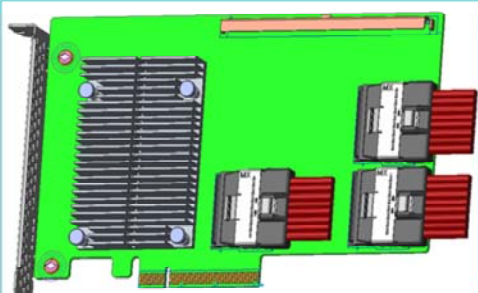
- Leverages U.2 and U.3 Pinouts
- Enables Gen-Z support for U.3 infrastructure



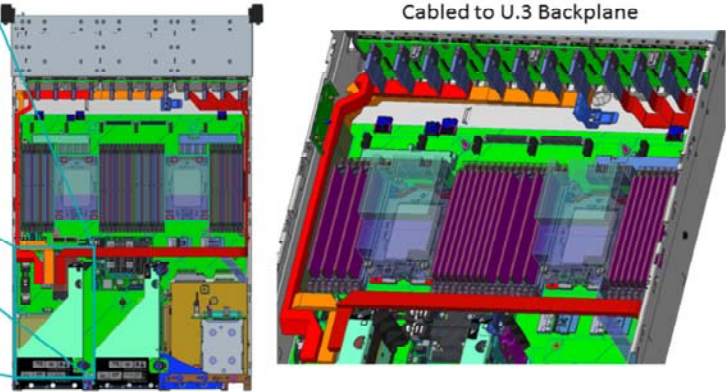
Shown here, is the U.3 SFF-8639 with a modified pinout to support 8 differential pairs of Gen-Z. Pins S1 through S14 and S16 through S28 support the Gen-Z data signals, while E23 and 24 support the management signals. Please refer to the SFF-9639 specification for the latest definitions of the remaining pins.

Gen-Z I/O Components

Gen-Z I/O Component in PCI FHHL Card Form Factor



Gen-Z I/O Component Cabled to U.3 Backplane



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To enable Gen-Z connectivity, a Gen-Z I/O component can be deployed in a PCIe card form factor. The I/O component supports one or more Logical PCI Devices (LPDs) which surface PCI or PCIe functions. Shown here is an example of the Gen-Z I/O component in a PCIe card form factor. In this example, the Gen-Z signals are cabled to a U.3 enabled backplane from the PCIe card.

Gen-Z Connector Additional Details and Next Steps

- For full specifications, visit: <http://genzconsortium.org/specifications/>
 - Gen-Z SFF-8639, 2.5" Form Factor Specification
 - Gen-Z SFF-8639, 2.5" Compact Form Factor Specification
- For additional specifications and news - Keep up with the Gen-Z Consortium @ <http://genzconsortium.org/>

For the full SFF-8639 based Gen-Z specifications, please refer to the Gen-Z consortium's specification page. For news and the latest updates, please refer to the consortium's website where new papers, educational materials, draft and final specifications, and much more is published on a regular basis.

Thank you

This concludes this presentation. Thank you.