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EDSFF Overview

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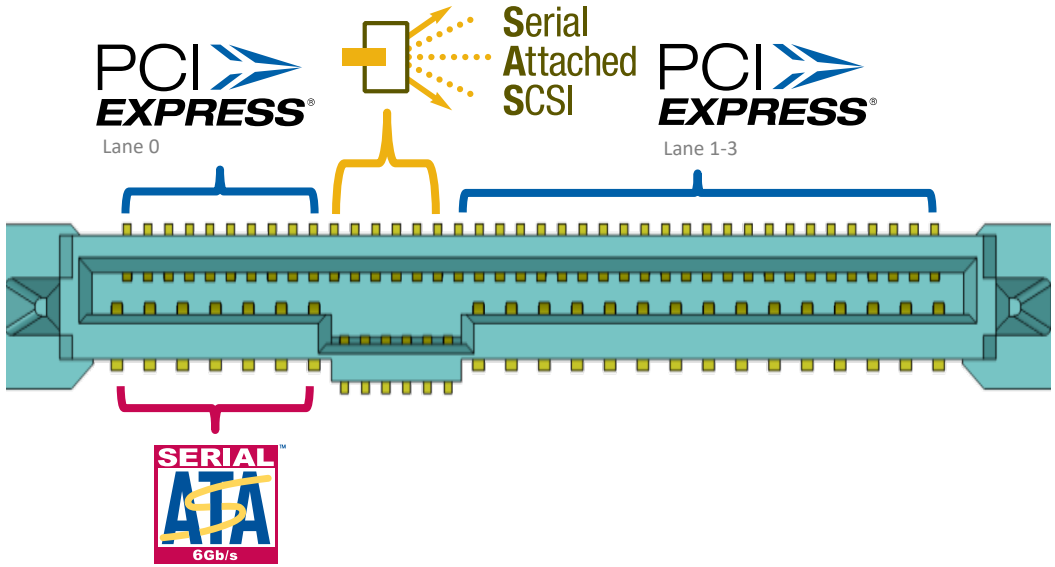
First:

Let’s Turn Back the Clock to 2014

U.2 SSDs are Introduced

U.2

(Formerly SFF-8639)



U.2 Brought PCIe Attached Storage into the Mainstream

Note: Always pronounced “U dot 2”

U.2 Design Priority

Compatibility with the Ubiquitous 2.5” HDD

Fast Forward to 2018

Question:

Do we really need, or even want, continued compatibility with HDDs?

EDSFF: Enterprise & Datacenter SSD Form Factor

- Industry Leaders work together to limit storage form factor proliferation

Promoters

Contributors

For more Information, visit: https://edsffspec.org/

EDSFF Overview

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E1.L (SFF-TA-1007)

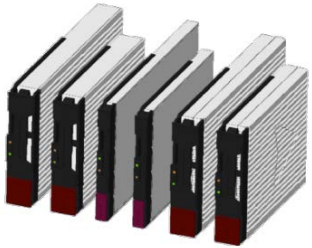
- Density Optimized
- 318.75 x 38.4 mm
- Supports > 40W
- Up to 48 Standard NAND sites

E1.S (SFF-TA-1006)

- 111.5 x 31.5 mm
- Up to 12 Standard NAND sites
- Supports >12W

E3 (SFF-TA-1008)

- Ultra high-performance applications
- (104.9/142.2) x 78mm
- Supports up to 70W
- Up to 48 Standard NAND sites



EDSFF Advantages

- Same Protocol: NVMe
- Same Interface: PCIe
- Same Connector: SFF-TA-1002
- Same Pinout and Functions

Different Usages
Same Expectations!

EDSFF Gains Industry Collaboration Advantages

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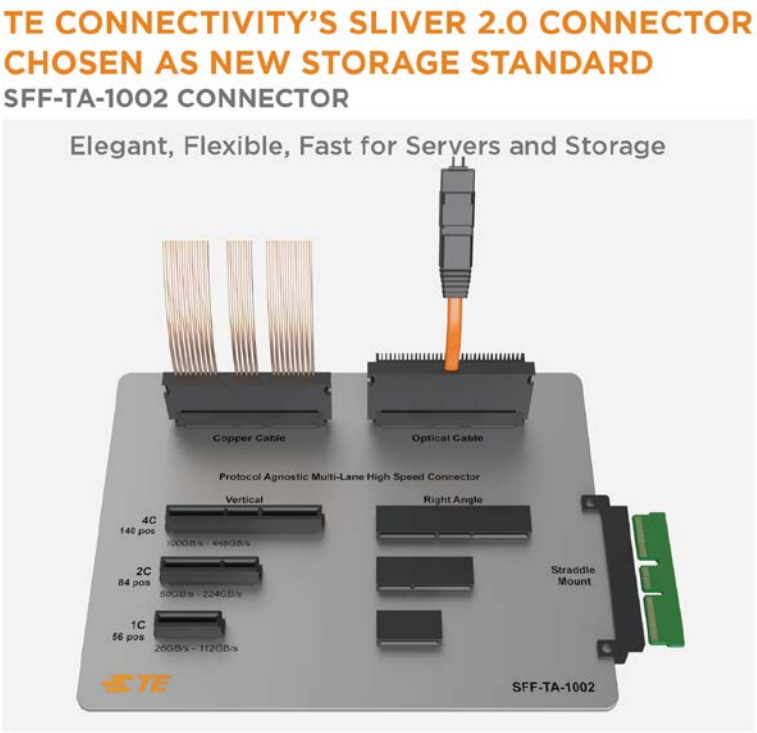
Capacity Scaling	➡	E1.L: Up to 3X more capacity per drive vs. U.2 E1.S: 2x more than M.2
Performance Scaling	➡	Support for x4, x8, x16
Thermally Efficient	➡	E1.L: Up to 2x less airflow required per drive vs. U.2 15mm[1] E1.L: Up to 3x less that U.2 7mm[2]
Future Proofing	➡	PCIe* 4.0 and 5.0 ready; enabling scalability & interoperability to be the innovation form factor for the next 20 years[3]
Solution Range	➡	E1.L, E1.S: case and caseless designs

[3]Source: Microsoft, FMS 8/8/2018

EDSFF Connector

SFF-TA-1002



Source: https://www.amphenol-icc.com/product-series/mini-cool-edge-0-60mm.html

- X4 Orthogonal connector configuration
- Allows airflow through the connector
- Connector tips card edge up for front mounting
- Connectors 'gang' together in a frame
- Frame attaches to PCB for integrity
- Improved cost, reliability

[3]Source: Microsoft, FMS 8/8/2018

EDSFF: Built from the ground up for SSDs

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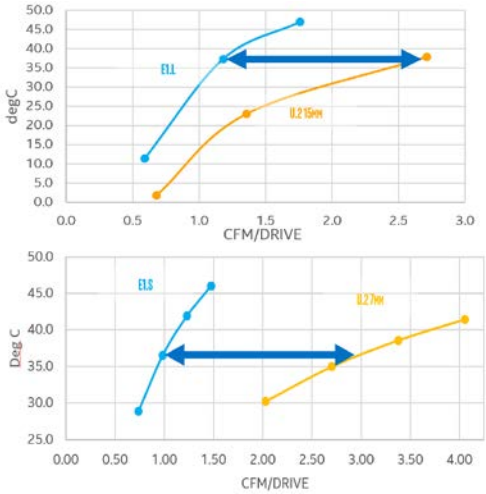
- General Purpose Scalable Connector
  - Flexible: multiple orientations, widths, PCIe5* support
  - Supports multiple interoperable specs (EDSFF, OCP Mezz, GenZ)

- Break from legacy to optimize for SSDs
  - 50% to 100% increase in media package sites

- Improved thermal efficiency
  - 2-3X less airflow needed
  - Or, support higher power devices



https://www.amphenol-icc.com/product-series/mini-cool-edge-0-60mm.html

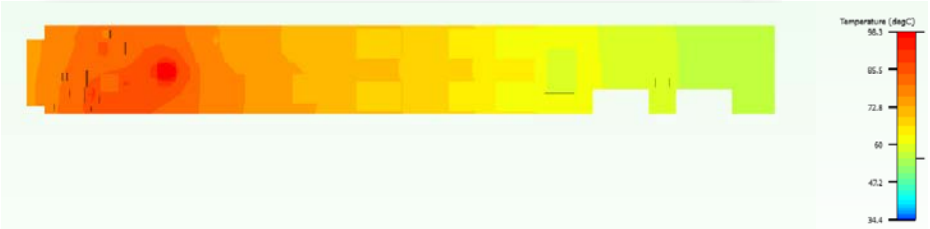
Source – Intel. Comparing airflow required to maintain equivalent temperature of a 4TB U.2 15mm Intel® SSD DC P4500 to a 4TB "1U.L" form factor for Intel® SSD DC P4500.

Source – Intel. Comparing airflow required to maintain equivalent temperature of an 8TB U.2 7mm Intel® SSD DC P4500 to a 8TB EDSFF 1U-Short form factor for Intel® SSD DC P4510.

Results have been estimated or simulated using internal analysis or architecture simulation or modeling, and provided for informational purposes. Simulation involves three drives for each form factor in a sheet metal representation of a server, 12.5mm pitch for E1.L form factor, 1000m elevation, limiting SSD on case temp of 70C or thermal throttling performance, whichever comes first. 5C guard band. Results used as a proxy for airflow anticipated on EDSFF spec compliant E1.L form factor, Intel® SSD P4510.

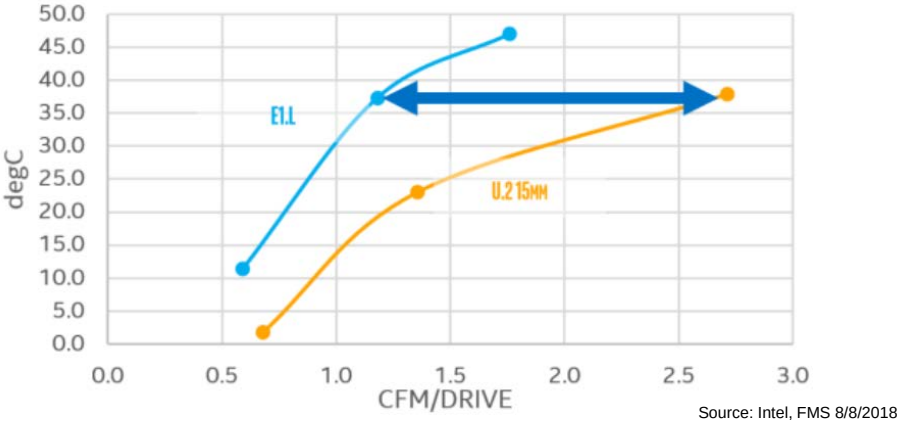
[3]Source: Microsoft, FMS 8/8/2018

EDSFF and SFF-TA-1002: Improved Thermals



Thermal efficiency

2x less airflow[3] vs U.2 15mm



Source: Intel, FMS 8/8/2018

Intel ‘pre-standard’ Example

Before EDSFF

1PB IN 42u
w/2 TB HDDs

With EDSFF

STORAGE CAPACITY
1PB IN 1U
INTEL® 3D NAND SSD, 32TB RULER

Opening up new use cases in warm storage with disruptive total cost of ownership

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Thank You

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