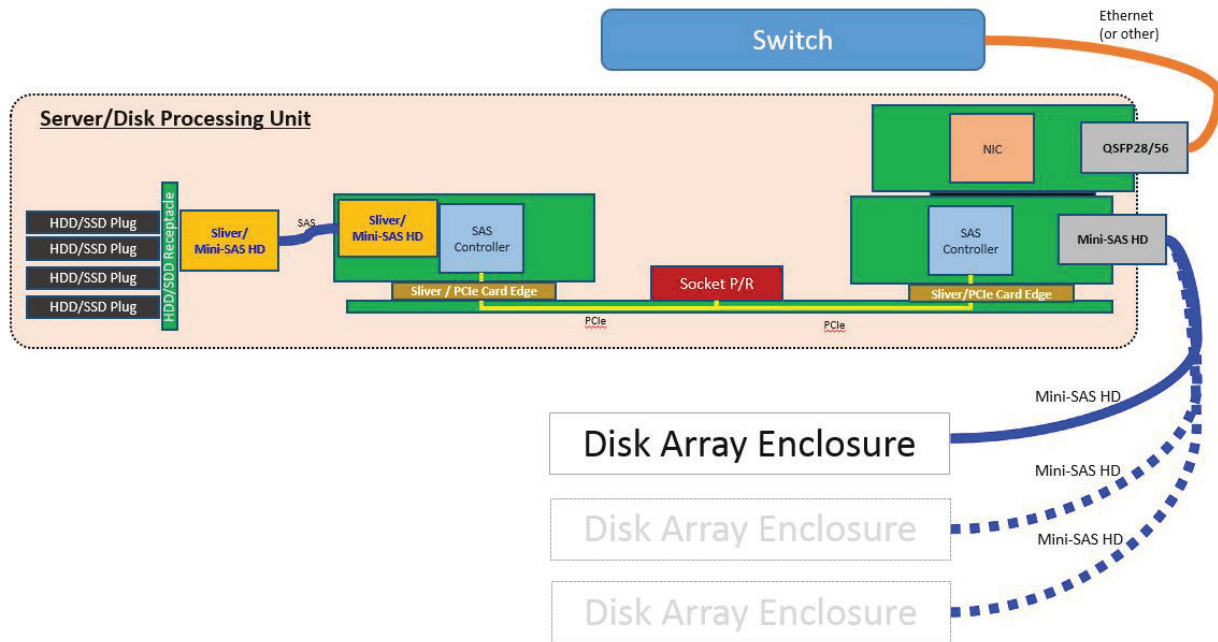# SERVER AND STORAGE SOLUTIONS

QUICK REFERENCE GUIDE

Today's market trends are pushing to integrate storage into a unified system, expanding the traditional idea of a storage solution to include switches with storage, data transfer, application and service resources. TE Connectivity (TE) has always been at the forefront of development and market innovation, offering not only storage connectivity products, but a broad range of storage solutions.

TE continues to be engaged in the latest storage interface standards to support the ever evolving market and its continual need for higher bandwidth. With the technical expertise required to deliver superior designs and customer support, TE offers solutions to virtually any storage challenge.
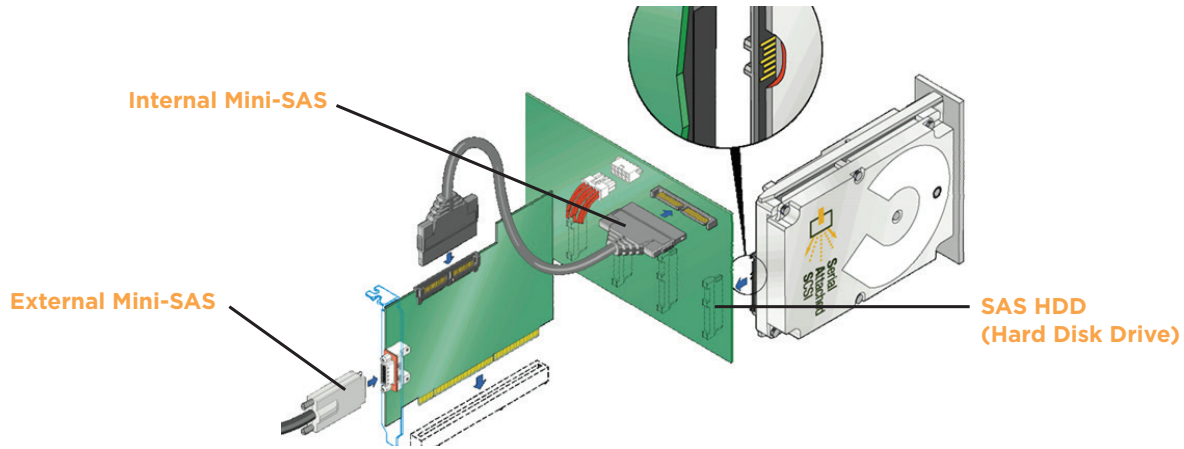
Product Applications

- Servers
- External storage systems
- HDDs/HDD carriers
- Processor blades
- Mezzanine cards
- Storage racks
- SAS/SATA Host Board Adapter (HBA) interfaces
- Direct-attach storage (DAS)
- JBOD
- RAID

Server and Storage Product Applications

Meeting Standards with TE Products
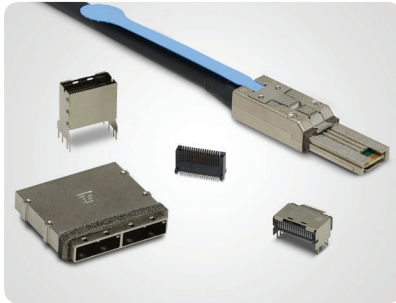

	Standards													
TE Products	SFF-9073	SFF-8086	SFF-8088	SFF-8482	SFF-8639	SFF-8643	SFF-8644	SFF-8680	PCIe Gen 3	PCIe Gen 4	USB 3.0	SATA 3.0	SAS 3	SAS 4
Internal Mini-SAS	•	•												
External Mini-SAS		•	•											
SAS 2 Drive Connector				•										
SAS 3 Drive Connector					•			•	•					
SAS 4 Drive Connector					•					•				•
Internal Mini-SAS HD						•								
External Mini-SAS HD							•							
M.2 NGFF									•	•	•	•		
Sliver									•	•		•	•	•

Server and Storage Connectors

Mini-SAS

- Rated up to 6 Gbps
- 26 position external or 36 position internal receptacles
- High density 0.8mm contact pitch
- Standard and universal key slots available
- Designed to meet SFF-8086 requirements

Reference Part Numbers:
Internal: 1888019-8
External: 2040551-2

Mini-SAS HD

- Meets SAS 2.0 (6 Gbps) and 3.0 (12 Gbps) standard
- Vertical and right angle 1x1, 1x2, 1x4 configurations available
- Higher density 0.75mm contact pitch
- Internal and external connectors meet SFF-8643 and SFF-8644 requirements

Reference Part Numbers:
Internal: 2227595-1
External: 2149027-1

SAS Drive

- Breadth of product that meets SFF-8482, SFF-8680, and SFF-8639 standards
- Offers 29 and 68 pin configurations in vertical receptacles and plugs; and also SFF-8639 (U.2) right angle receptacles
- *Being designed now* – EDSFF, a next generation drive connector

Reference Part Numbers:

Receptacle:	Plug:
1735870-1	1735610-1
2170506-1	1735183-1
2309567-1	
2357099-2	

Sliver Internal Cabled Interconnects

- Supports a choice of protocols (PCIe, SAS, SATA) for data rates up to 32 Gbps per channel
- 0.6mm pitch SMT connector design
- Flexible mounting and mating arrangements
- Supports present and future bandwidth needs without requiring requalification and redesign

Reference Part Numbers:

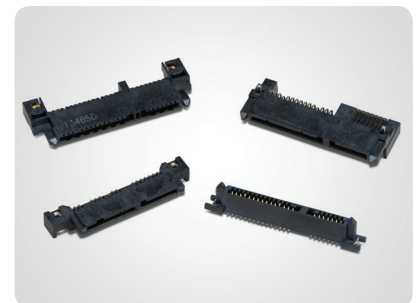| Vertical:	Right Angle:
2292096-1	2292055-1
2291316-1	2292069-1

M.2 NGFF

- Available in various heights
- 0.5mm pitch with 67 positions
- Designed for both single and double-sided modules
- Available in various keying options for module cards
- Support PCI Express 4.0, USB 3.0 & SATA 3.0

Reference Part Numbers:
2199119-X
2199230-X

SATA

- Compliant to Serial ATA 3.0 specification with high speed data transfer rate
- Point-to-point link with hot-plugging capability
- Wide selection of heights and orientation
- Alignment-free and slant Insertion SATA solution for easy application

Reference Part Numbers:
1735284-X
2129574-1
1735574-2

Storage Cable Assemblies

Mini-SAS

- SFF-8088 and SAS 2.0 and SAS 2.1 compliant
- Supports trained and untrained systems
- Up to 6 Gbps data rate
- Universal key and standard key slots
- 24, 26, 28 and 30AWG MADISON CABLE brand bulk cable

Reference Part Numbers:
Internal: 1888019-8
External: 1-2127833-8
Hybrid: 2202508-2

Mini-SAS HD
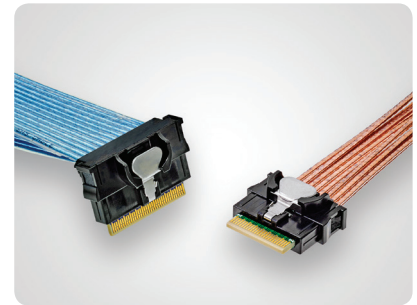

- SFF-8644 and SAS 2.1 compliant
- Broad band design for both 6 Gbps (SAS 2.1) and 12 Gbps (SAS 3.0)
- Improved cable latch design
- Scalable 4x and 8x cable plug configurations
- 24, 26, 28 and 30AWG MADISON CABLE brand bulk cable
- Available in 85 or 100 ohm options

Reference Part Numbers:
Internal: 2820335-X, 2820330-X
External: 4-2337815-X, 2-2337815-X, 2337815-X, 2820306-X

Sliver Internal Cabled Interconnects

- Supports a choice of protocols (PCIe, SAS, SATA) for data rates up to 32 Gbps per channel
- Available in discrete pair or ribbon laminated 33 AWG cable
- 4x and 8x standard configurations available
- Robust latching for secure connections

Reference Part Numbers:

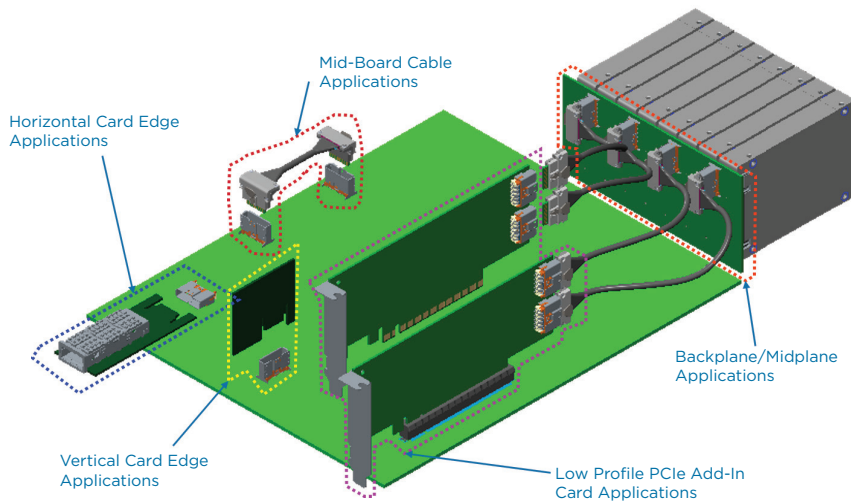| Straight:	Right Angle:
2820397-1	2820399-1
2820396-1	2821385-1

Sliver Application Design Flexibility

Mid-Board Cable Applications

Horizontal Card Edge Applications

Vertical Card Edge Applications

Low Profile PCIe Add-In Card Applications

Backplane/Midplane Applications
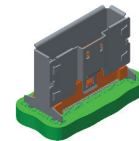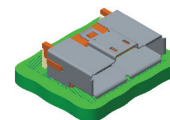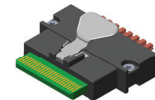
Sliver Interconnect Options

Vertical Board Mount Connector

Right Angle Cable Plug Connector

Straight Cable Plug Connector

Right Angle Board Mount Connector

Card Edge Connector

Related Products

zQSFP+/QSFP+ and QSFP28/56

- Support data rates from 10 Gbps to 56 Gbps per channel. Meets PCIe, Ethernet, Fibre Channel and InfiniBand protocols
- Industry standard interface; drop in replacement for competitive products
- Uses MADISON CABLE brand TURBOTWIN copper cable or InfiniTwist cable
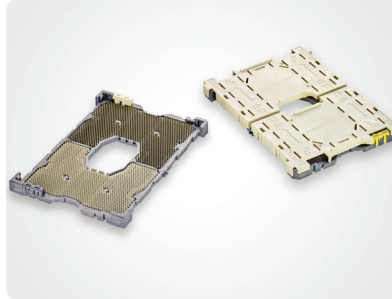
Reference Part Numbers:
Cages:
1x1: 2-2170705-1, 2198709-1
1x2: 2-2170808-1, 2198720-1
Connector: 1551920-2
Cable assembly: 2053638-1, 2333393-3, 4-2333393-3

LGA 3647 Sockets

- Currently rated at 0.5 Amps with insulation resistance of 500 megohms min. @ 500 VDC
- Two piece design for increased reliability by improving issues with warpage and offering better coplanarity
- Durability rating of up to 30 cycles

Reference Part Numbers:
P0: 2-2129710-5, 2-2129710-6
P1: 2-2129710-7, 2-2129710-8
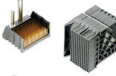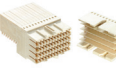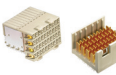**Bolster assemly:** 2299804-1
Back plate assembly: 2299805-1
Carrier: 2299806-1
LGA 2011 Sockets Also Available:
R3: 2201838-x
R3 Back plate: 2134440

Board-to-Board Connector Options for Server and Storage

	Connector Family	Data Rate	Signal Pin Count	Ground Pin Count	Configuration	Receptacle Part Number	Header Part Number	Additional Configurations
	STRADA Whisper	56G	48	24	4 pair, 6 column	2187509-1	2187510-1	Available in 4, 6, 8 and 12 pair configurations
	Z-PACK HM-eZd+	25G	80	40	4 pair, 10 column	2170901-1	2170902-1	-
	Impact	20G	64	32	4 pair, 8 column	2057414-1	2057442-2	Available in 2, 3, 4, 5 and 6 pair configurations
	Z-PACK TinMan	16G	64	32	4 pair, 8 column	1934222-1	1934305-1	Available in 3, 4, 5 and 6 pair configurations
	Z-PACK Slim UHD	16G	48	48	2 pair, 12 column	1982738-1	2042088-1	-
	Z-PACK HM-Zd+	16G	80	40	4 pair, 10 column	2065657-1	2170330-1	Available in 2, 3 and 4 pair configurations
	Z-PACK HM-Zd	10G	80	40	4 pair, 10 column	6469001-1	6469002-1	Available in 2, 3 and 4 pair configurations

Frequently Asked Questions

What standard and data rate is being used for this design?

Reference table on page 2 that gives the TE product name for each of the SFF documents under the SAS standards.

Storage products are commonly referred to as the supporting SFF document number. How do TE products align to those SFF documents?

The diagram on page 2 shows a storage application image and details the TE products used and the SFF documents that govern those products.

What is the advantage of using M.2 NGFF connectors over PCIe Mini Card connectors?

The M.2 NGFF connector saves more than 20% printed circuit board (PCB) space when compared to PCIe Mini Card.

Does TE offer an internal cabling system?

Yes, Sliver (detailed on pages 4-5) is TE's internal cabling product offering. Sliver is a robust solution that offers multiple options in configuration.

Where can I find more information on storage products that TE offers?

Information on the products offered in this Quick Reference Guide is available on TE.com at www.te.com/storagesolutions.

For More Information

TE Technical Support Center

USA:	+1 (800) 522-6752
Canada:	+1 (905) 475-6222
Mexico:	+52 (0) 55-1106-0800
Latin/S. America:	+54 (0) 11-4733-2200
Germany:	+49 (0) 6251-133-1999
UK:	+44 (0) 800-267666
France:	+33 (0) 1-3420-8686
Netherlands:	+31 (0) 73-6246-999
China:	+86 (0) 400-820-6015

te.com

1-1773898-3   09/19   DND

≡TE
connectivity