

Customer Presentation (Innovation)

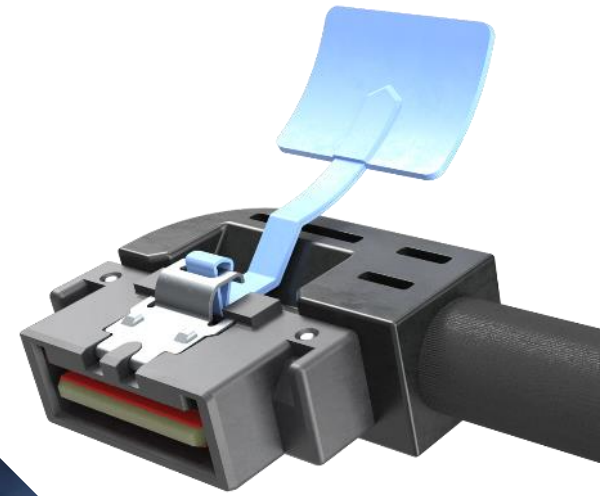
# NEXTSTREAM CONNECTOR SYSTEM

The NextStream Connector System offers next-generation data rates of up to 64 Gbps PAM-4, meeting the PCIe Generation 6 standard and enabling data centers to upgrade and meet the demands of data-intensive applications like AI, NVMe-EDSFF storage, CXL, UPI systems and high-performance computing.

PRESENTER'S NAME:

DATE:

*creating connections for life*



# NEXTSTREAM CONNECTOR SYSTEM

The next-generation NextStream Connector System delivers high-speed data transmission rates up to 64 Gbps PAM-4 and meets the PCI Express (PCIe) Generation 6 standard, enabling data centers to upgrade and meet the needs of data-intensive applications like AI, NVMe-EDSFF storage, CXL, UPI systems and high-performance computing.

## Key Product Information

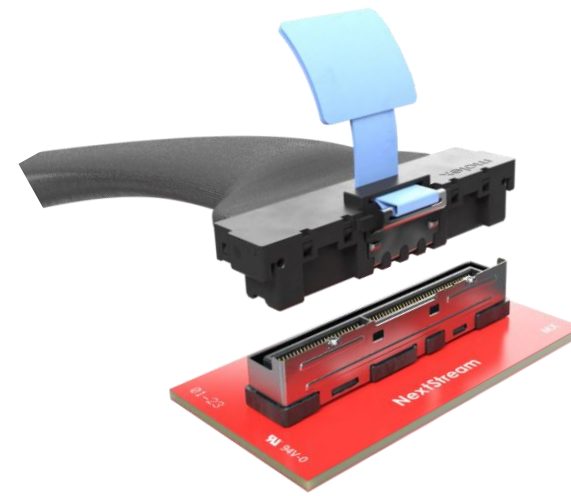
**Category:** High-Speed Internal I/O Connectors

**Circuits:** 38 to 154

**Data Rate:** 64 Gbps PAM-4

**Data Transmission Standard:** PCIe Generation 6  
(Upgradable to PCIe Generation 7)

**Small Form Factor:** SFF-TA-1035 Standard



[View Product  
Landing Page](#)

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### *New Series*

220385 **NextStream Vertical Receptacles**

220750, 225350, 225557

**NextStream Vertical-Exit Cable Assemblies**

225351, 220751

**NextStream Right-Angle Cable Assemblies**

224863, 225352, 300771

**NextStream Side-Exit Cable Assemblies**

### *In Development*

220749 **NextStream Right-Angle Receptacles**

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**molex**

# VITAL PRODUCT INFORMATION



## What makes this product different from the competition?

The NextStream Connector System and cable solution is the small form factor (SFF) TA-1035 standard. It supports the Open Compute Project (OCP) Data Center Modular Hardware System (DC-MHS) pin definition standard with an additional 6-pin series for customer-specific requirements in next-generation servers built to PCIe Generation 6 specifications.

## How does this solution create value for our customers?

The NextStream system has improved signal integrity (SI) to support the PCIe Generation 6 standard. A varied catalog of options enables customers to meet requirements for data-rich applications such as AI servers, NVMe-EDSFF solid-state drive (SSD) storage, Compute Express Link (CXL) memory and active copper cable (ACC) re-driver cable systems.

## What is the Molex Advantage?

Global manufacturing capability, robust engineering support, and an extensive portfolio of modular, standardized data center infrastructure and connectivity solutions make Molex a unique partner in improving capabilities.

# PRODUCT OVERVIEW

## Meet the Next-Generation Industry Standard

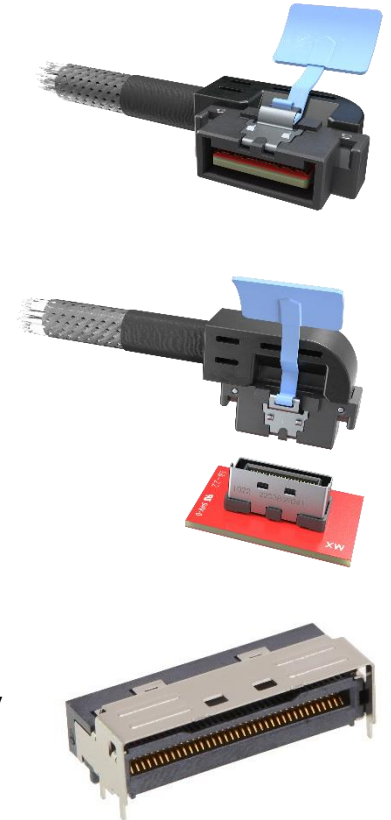
With market trends leading to higher data transmission rates, and the release of PCIe Generation 6, the NextStream Connector System meets the PCIe standard and provides up to a 64 Gbps data rate. The NextStream system has been defined by the SFF Committee as standard SFF-TA-1035 for next-generation high-speed cable connector systems. It is upgradable to PCIe Generation 7 and backward compatible with PCIe Generation 4 and 5 and the SAS-4 standard.

## Superior Signal Integrity (SI) Performance

The NextStream system's paddle card protection design ensures excellent SI quality, with reliable performance ensured by material selection, contact distance and a mechanical design optimized for high-volume production processes.

## Scalable for Supporting Varied Configurations

The NextStream system offers vertical, right-angle and side-exit cable designs that provide flexibility in PCB design, with multiple options including 4x, 8x, 16x, vertical and right-angle connectors. A varied catalog of options offers flexibility and scalability for multiple applications such as AI servers, AI GPU modules, NVMe-EDSFF SSD storage, CXL memory and ACC re-driver cable installations.



# MARKETS AND APPLICATIONS



*Hyperscale Data Centers*

## **Servers and Storage**

- Cloud computing
- Hyperscale data centers
- AI infrastructure
- Switches
- Servers
- Storage devices
- Just a bunch of memory (JBOM) systems



*Servers and Routers*

## **Networking**

- Chassis applications
- Interposer cards
- Routers
- Just a bunch of disks (JBOD) systems



*IoT Devices*

## **Consumer**

- Connected home systems
- Internet of things (IoT) devices

# FREQUENTLY ASKED QUESTIONS

## **What is the difference between the NextStream (SFF-TA-1035) and Mini Cool Edge/MCIO (SFF-TA-1016) connector systems?**

Molex's NextStream Connector System is designed as a PCIe Generation 6 solution to provide customers with better SI performance and more reliable connections in next-generation server, AI, NVMe, CXL and Ultra-Path Interconnect (UPI) link applications. The NextStream design has SI performance superior to that of Mini Cool Edge/MCIO and provides more options in high-speed channels and side-band requirements.

## **What is the internal active copper cable (ACC) re-driver cable, and how does the NextStream ACC re-driver cable help solve customer challenges?**

NextStream active re-driver cables can provide up to +10 dB gain for system dB budget. These cables utilize the NextStream Connector System's additional 6 pins in the design for the inter-integrated circuit (I2C) signals and the voltage circuit (VCC) required for tuning the re-driver circuit seamlessly. It is a great option for Gen 6 and Gen 7 high-speed solutions for internal cable use.

# SOLVING INDUSTRY CHALLENGES

Industry Need	Industry Challenge	Industry Solution	Anticipated Results
<b>Additional high-speed differential pairs</b>	Customers need to add more data transmission power.	NextStream 8x connectors provide 13 high-speed channel options for improved signal strength and data transmission speeds.	High-speed PCIe Gen 6 performance is available in a smaller space.
<b>Adding a re-driver circuit into I/O products</b>	Customers need faster data transmission speeds and better SI performance over longer distances.	The NextStream Connector System features an extra channel for the re-driver signal, providing a better SI dB budget and smaller cable bundles.	The built-in re-driver IC offers improved SI performance across a wider range of applications.
<b>PCIe Generation 6 support and future-proofing for Generation 7</b>	Increased speed requirements driven by data-rich AI and machine learning applications necessitate upgrading to the PCIe Generation 6 data transmission standard.	The NextStream Connector System implements support of PCIe Generation 6 and is upgradable to PCIe Generation 7, in addition to being backward compatible with PCIe Generation 4 and 5 and the SAS-4 standard.	Customers can meet today's needs for a multitude of applications and future-proof systems for anticipated upgrades to PCIe Generation 7.
<b>Operator control and efficiency</b>	Simplifying operation for new or inexperienced operators and reducing the failure rate are vital for end users.	NextStream connectors feature Poka-Yoke, for simpler and more reliable operation by new or inexperienced operators, as well as an anti-slant and anti-reverse design to help reduce the failure rate.	An increased yield rate, reduced failure rate and improved assembly time during production along with simplified training for new operators will save costs and speed production times.

# SOLVING INDUSTRY CHALLENGES (CONT'D)

Industry Need	Industry Challenge	Industry Solution	Anticipated Results
<b>High-quality SI performance</b>	Higher speeds require extremely high SI performance to meet current PCIe Gen 6 standards and Gen 7 standards in the near future.	The fully shrouded cable plug housing of the NextStream Connector System helps ensure excellent SI quality while reducing pressure on operators.	Customers will see dependably high SI quality, improving system installation speed and accuracy.
<b>Easy installation</b>	Customers need simple upgrade capability to meet rising demand for higher performance.	The NextStream system's user-friendly design, chamfer guide and audible locking help support easy and error-free system assembly.	Quick, easy and error-free upgrades are enabled with the NextStream system through robust mechanical design optimized for simple installation.
<b>Robust mechanical design to avoid defects</b>	Customers are looking to mitigate risks from mating or wrenching issues during assembly operations.	NextStream connectors pass a five-direction wrench test and incorporate a guiding/stopping mechanism in the connector housing design to make the design more robust and reduce the potential for damage.	By minimizing the potential risk of connector or contact damage in mating/un-mating, customers will reduce the defect rate.

# PRODUCT ADVANTAGES AND FEATURES

## Delivers upgradable high-speed performance to future-proof systems

with a 64 Gbps PAM-4 transmission rate for high-speed, low-latency data-intensive applications with ACC re-driver cable capability, and future upgradability to PCIe Generation 7 with 128 Gbps PAM-4 data rates.

## Fulfills system needs by supporting standardized applications and protocols

including PCIe Gen 6, NVMe-EDSFF, CXL, UPI 2.0 and OCP DC-MHS, plus customized interfaces as needed.

## Offers high performance in space-constrained applications

with an optimized mating height as low as 11.90mm for PCIe Gen 6 speeds in a miniaturized package.

## Simplifies installation for operators and helps eliminate mis-mating errors

using anti-slant, anti-reverse and guiding/stopping features as well as Poka-Yoke to make installation faster and easier.

## Improves signal loss performance and system gain over longer cable distances and thinner cable

using an industry-first internal active re-driver channel.

### Key Specifications

Number of Circuits	38 to 154
Data Rate (max.)	64 Gbps PAM-4 (Upgradable to 128 Gbps PAM-4)
Data Transmission Standard	PCIe Generation 6 (Upgradable to PCIe Gen 7)
Small Form Factor	SFF-TA-1035
Mating Height (min.)	11.90mm
Operating Temperatures	-40 to +80°C

# PRODUCT ADVANTAGES AND FEATURES (CONT'D)

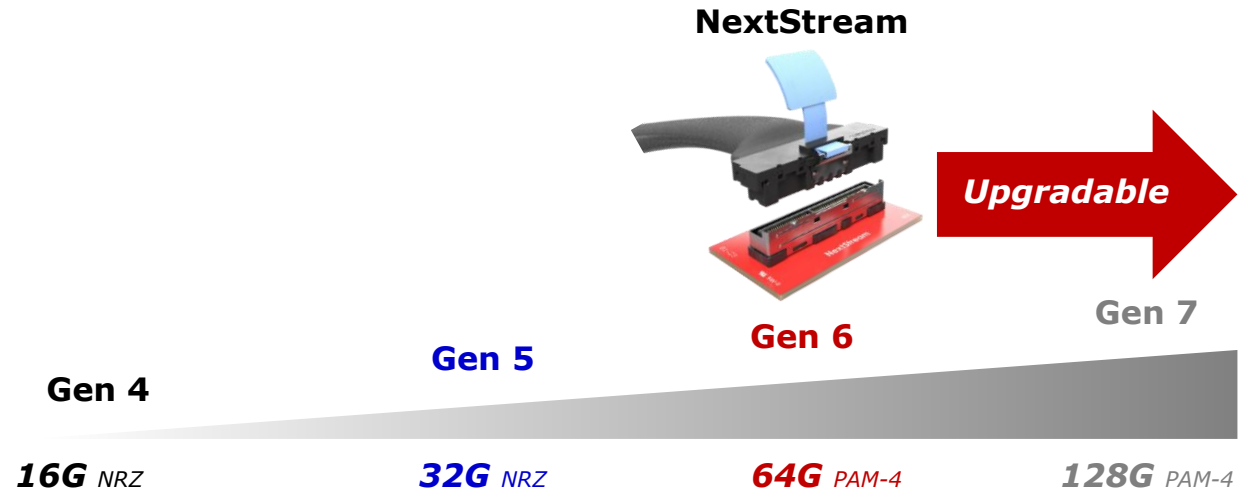
## Enhances design flexibility for a variety of applications, data rates and protocols

with a comprehensive suite of configurations and options including 4x, 8x, 16x, vertical, right-angle and side-exit connectors as well as a wide range of wire gauges.

## Helps ensure excellent signal integrity (SI) for high-speed applications

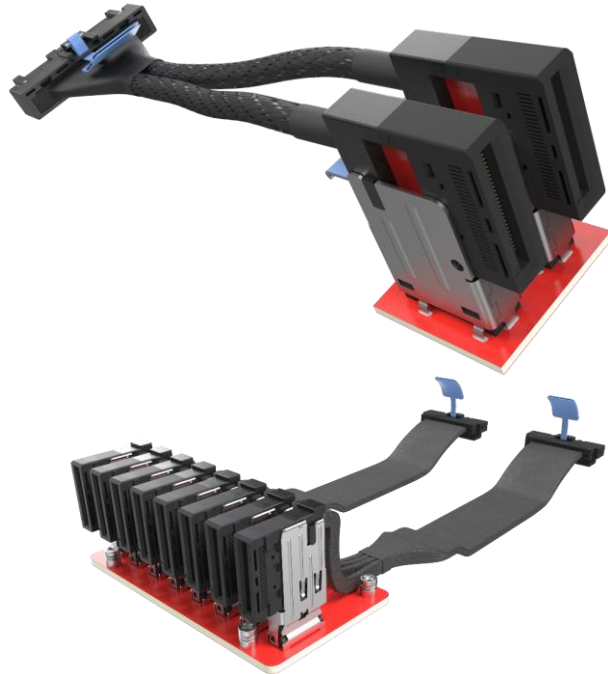
using a fully shrouded cable plug housing and enhanced paddle card/gold fingers protection that meets PCIe Gen 6 standards for insertion loss, return loss and crosstalk.

Offers standard and custom pin options to meet specific design requirements such as NVMe, EDSFF, CXL, UPI 2.0 or AI GPU switch servers including PCIe-Special Interest Group (SIG) standard pin maps for 38, 74, 124 or 148 pins, with additional pin options for 44, 80, 130 or 154 pins.

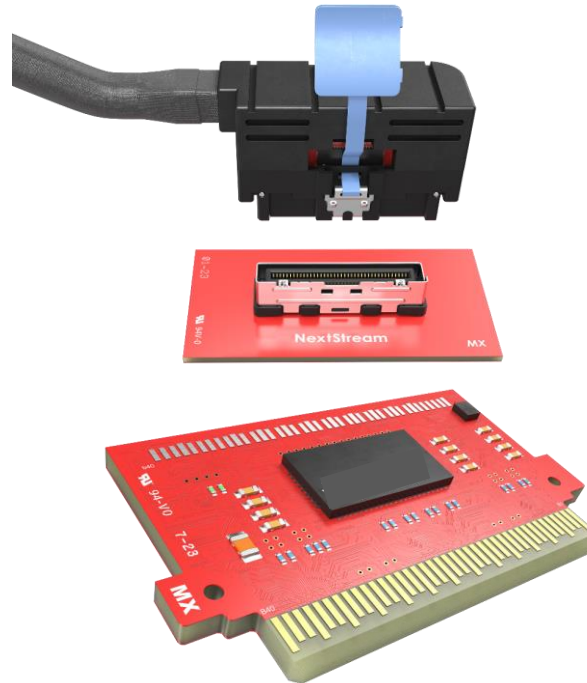


# PRODUCT ADVANTAGES AND FEATURES (CONT'D)

**4x, 38 pins/8x, 74 pins**  
to support NVMe-EDSFF SSD Storage



**8x, 80 pins**  
to support ACC Re-Driver Cable and UPI2.0/3.0 link



**16x, 124 pins/148 pins**  
to support AI GPU modules



# UNIQUE AND USEFUL DIFFERENTIATION VS. SIMILAR MOLEX PRODUCT

Sample Series Number	NextStream		Mini Cool Edge (MCIO)		Sliver	
	Receptacle	Cable Assembly	Receptacle	Cable Assembly	Receptacle	Cable Assembly
	220385	225351	216834	215071	206653	2312668
<b>Full High Speed</b>	X8, up to 13 high-speed channels		X8, 12 high-speed channels		2C, up to 13 high-speed channels	
<b>Connector Length</b>	30.40mm		25.80mm		35.75mm	
<b>Mating Height</b>	11.90mm		17.80mm		17.07mm	
<b>Paddle Card Protection</b>	Fully surrounded housing with anti-slant and lead-in features		Limited protection		Limited protection	

# SPECIFICATIONS AND SUPPORTING INFORMATION

## Reference Information

Packaging: Tape and Reel  
Designed in: Millimeters  
RoHS: Yes  
Halogen Free: Yes  
Glow Wire Capable: Yes  
Data Rate Standard: PCIe Generation 6  
Upgradable to PCIe Generation 7  
Small Form Factor Standard: SFF-TA-1035

## Electrical

Data Rate (max.): 64 Gbps PAM-4  
Upgradable to 128 Gbps PAM-4  
PCIe Channel: X4/X6 (42P), X8/X12 (80P),  
X16/X20 (130P), X20/X24 (160P)  
Impedance: 850 Ohms  
Voltage (max.): 12V AC per contact  
Current (max.): 1.1A per contact

## Mechanical

Mated Height: 11.9mm  
Connector Length: 30.40mm  
Fix/Lock: Latch fixed  
Mating Force (max.): 54N upon 80 pins  
Latch Retention Force (min.): 50N  
Wire Gauge: 28 to 32 AWG  
Wire Type: Discrete and ribbon twinax cable  
Pitch: 0.60mm  
Cable Plug Type: Straight; right-angle down; right  
exit; left exit  
Receptacle Type: Vertical, right-angle  
Receptacle Mounting: SMT soldering  
Circuit Size: 38, 44, 74, 80, 124, 130, 148 or 154  
circuits  
Durability (max.): 250 cycles

## Physical

Housing: LCP  
Contact: Copper Alloy  
Plating: Contact area—Gold  
Operating Temperatures: -40 to +80°C

## Additional Resources

Web Overview Page	<a href="http://www.molex.com/en-us/products/connectors/high-speed-internal-io/nextstream-connector-system">www.molex.com/en-us/products/connectors/high-speed-internal-io/nextstream-connector-system</a>
Datasheet	<a href="#">987652-5532.pdf (molex.com)</a>
Global Product Manager	Eric Chu, CSBU, DSS



THANK YOU

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**molex**