
Data Center Capabilities & Solutions



CONNECTIVITY SOLUTIONS THAT EMPOWER PROGRESS

Connectivity is the foundation of many of today's technologies and is critical to enabling the applications of tomorrow — generative AI, autonomous vehicles and an even greater dependence on streaming. Behind it all are data centers acting as the body's circulatory system, ensuring information flows when and where it's needed. But the need for faster speeds, higher power throughputs and smaller components is forcing design engineers and system architects to overcome growing challenges from signal integrity (SI), thermal management and more.

When system failures mean mission-critical applications and processes are at risk, companies trust Molex. Our consultative approach is backed by our industry-leading portfolio of interconnect solutions, facilitating collaboration with our customers at the earliest stages of design and navigating complex performance requirements. From consumer electronics and transportation to telecommunications and data centers, Molex solutions are essential to building the systems, devices and infrastructure that people rely on every day.

Industry-leading Solutions Powered by World-class Engineering Expertise

Through customer collaboration, innovation, data-driven insights and a commitment to quality at every stage of production, our global engineering teams are building a more connected future.

- Enabling high-speed data connectivity
- Delivering more power in a smaller footprint
- Meeting shortened design cycle needs
- Ensuring highest level of SI performance
- Providing specialized best-in-class manufacturing

What can we create together?

CREATING THE CONNECTED WORLD

80+

Years of connectivity experience



A leader in open platform standards



Global footprint enabling supply chain optimization



50 customers ranked among the largest datacom providers



100,000+ products in our portfolio

A GLOBAL LEADER IN INTERCONNECT SOLUTIONS

Enabling Global Innovation Through Advanced Connectivity Solutions

Molex's global reach and distributor network help customers accelerate time-to-market through worldwide design, manufacturing, sales and supply chain capabilities. Our engineering expertise is locally available across languages and time zones to ensure design challenges are avoided and overcome. And strategically placed regional sourcing improves logistics efficiency, operational performance, deliverability and support across the product lifecycle.

SERVING CUSTOMERS WORLDWIDE
66 Manufacturing Locations



MOLEX DATA CENTER SOLUTIONS

POWERING THE DATA CENTERS OF TODAY AND TOMORROW

What if you were tasked to build a next-generation data center? At Molex, we know it takes more than just selling interconnect products to be a trusted provider — it requires delivering personalized experiences and the confidence that system requirements will be achieved. Our collaborative engineering approach delivers unparalleled expertise and industry-leading high-speed interconnect solutions to help datacom customers reach their speed, performance, scalability and reliability goals.

Industry Standards & Memberships

Molex is at the forefront of datacom technologies. As an active participant in standards bodies and industry associations, we're working alongside our customers to develop the next generation of system architectures.

- Open Compute Project
- 1394 Trade Association
- Telecommunications Industry Association
- IEEE 802
- Ethernet Alliance
- PIC Industrial Computer Manufacturers Group (PICMG)
- InfiniBand Trade Association
- Technical Committee T10 - SCSI / SAS
- SCSI Trade Association
- INCITS T11
- SNIA
- IPC
- JEDEC

APPLICATION SPOTLIGHT

COMPUTE SERVERS & HYPERSCALE DATA CENTERS

The number of hyperscale data centers is predicted to double by 2025, driven by bandwidth-intensive, high-speed applications like edge computing, 5G, AI and the ever-growing internet of things (IoT). The increasing prevalence of cloud computing along with emerging applications like autonomous vehicles and Industry 4.0 place both critical business functions and human safety on the line, leaving little room for system errors or downtime. Today's data centers must be built for scale as well as unquestioned reliability.



THE CHALLENGES

To ensure longevity and consistent uptime, data center transformation requires scalable, flexible architectures and a predictive engineering methodology that provides architects and facility operators with a channel-wide view. But designing for performance means more than expanding compute resources — it must also address challenges in cooling, power distribution and rack space utilization on a facility-wide scale.



THE SOLUTION

Through multi-disciplinary engineering expertise and close customer collaboration, Molex is anticipating future market requirements and consistently delivering reliable, scalable solutions. Our co-development philosophy provides customers with confidence and efficiency from the earliest stages of the design process.



NearStack PCIe Connectors

- Included in the next-generation OCP DC-MHS family (M-XIO and M-FLW)
- Meet the Small Form Factor SFF-TA-1026 standard
- Improve SI, lower insertion loss and reduce signal latency with direct connection near ASIC



KickStart Connector System

- Offers standardized server boot drive connectivity
- Provides power and signal circuits in one cable assembly
- Features low-profile, robust design



NextStream Connector System

- Features high-speed data transmission rates of up to 64 Gbps
- Meets latest PCIe Generation 6 and 7 standards
- Supports a wide range of data-intensive connector-to-connector and connector-to-module applications



Direct Attach (DA) CEM

- Offers direct attach twinax assembly for improved SI performance while enabling design flexibility
- Supports 32 Gbps NRZ data transfer rates



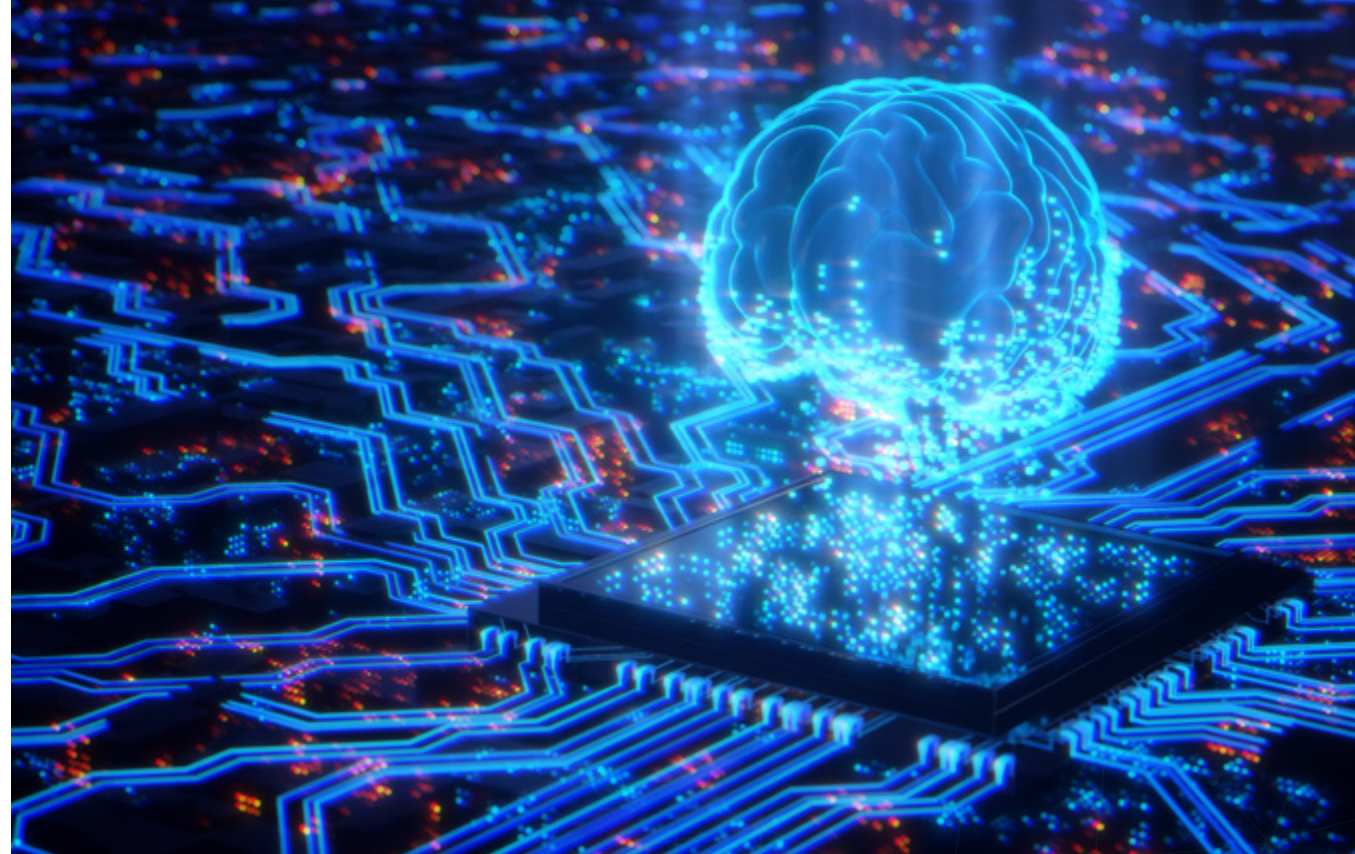
DESIGN CONSIDERATION

Scalability: Hyperscale data centers are faced with rapidly evolving business requirements. Emerging applications exist across every industry, but they all share a common need — reliable performance. Molex helps customers identify, develop and implement modular, flexible solutions that can cost effectively scale to meet increases and decreases in demand without sacrificing reliability.

APPLICATION SPOTLIGHT

GENERATIVE AI & MACHINE LEARNING

The increasing demand for high-speed connectivity has stretched the limits of signal integrity through interconnect solutions. Generative AI and machine learning (ML) now demand even faster speeds and higher bandwidths and are forcing engineers to build architectures that run at 224 Gbps-PAM4. But the tricks to extend channel bandwidths past a bitstream's Nyquist frequency are no longer enough — systems require 224G components. Molex has pushed the laws of physics and made the next generation of data centers possible by releasing its first-to-market comprehensive portfolio of 224G solutions.



THE CHALLENGES

Although only at the early stage of their emergence, generative AI and ML are already placing unprecedented demands on data centers. The need to move more data more quickly introduces challenges to signal integrity, reliability and thermal management. And these challenges are only amplified by the rate at which AI is being adopted across industries and applications. Bloomberg Intelligence predicts the generative AI market will grow from \$40 billion in 2022 to \$1.3 trillion in only 10 years — a compound annual growth rate (CAGR) of 42%. We now need a new era of data centers, architectures and solutions that can make this growth possible.



THE SOLUTION

Molex's R&D efforts are anticipating the evolving demands of AI and pioneering ground-breaking solutions, proven by our first-to-market comprehensive portfolio of 224 Gbps-PAM4 products. Combined with the latest PCIe technologies, our broad solution portfolio enables purpose-built data centers to support the most mission-critical applications. By focusing on a consultative approach early in the design process, our team of engineers can work with your company to create the best scalable solution for the needs of today and tomorrow.



Inception 224G Genderless Backplane and Cable

- Provide optimal flexibility
- Offer optimal signal integrity and simplified integration
- Form the backbone of the hardware communication architecture



Mirror Mezz Connectors

- Support data transmission rates up to 224 Gbps
- Simplify connector assembly and add protection from damage with electrically tuned contacts and BGA PCB attach
- Incorporate flex cable links to lengthen board-to-board distance without forfeiting performance



CX2-DS Near-ASIC Connector-to-Cable

- Supports data transmission rates up to 224 Gbps
- Offers isolated Tx/Rx with innovative shielding structure and high performance twinax for maximum system performance
- Reduces cross talk and improves SI performance



High-Speed Pluggable IO

- Features SMT, BiPass and external cable solutions built for 224 Gbps-PAM4
- Provides superior mechanical durability and excellent shielding to minimize crosstalk and deliver better SI performance at a higher Nyquist frequency
- Offers multiple Direct Attach (DAC) and Active Electrical Cables (AEC) configurations, optimized wire termination and CMIS support



DESIGN CONSIDERATION

Signal Integrity (SI): Poor signal integrity in AI and ML applications leads to data errors, reduced performance and inaccurate results. Molex collaborates with our customers to address these challenges through careful routing, component selection, proper shielding and simulation testing.

APPLICATION SPOTLIGHT

NETWORKING & SWITCHES

Enterprise data centers can vary significantly in size and performance requirements. But whether it's an on-premises server room or colocation facility, companies count on faster speeds, greater reliability and more redundancy to support mission-critical applications. Molex has developed a broad portfolio of interconnect solutions to ease integration, simplify deployment and improve performance.



THE CHALLENGES

Keeping up with business demands can be expensive and time consuming, especially if unexpected or not forecasted. Ensuring data center infrastructure is scalable and flexible enough to meet the changing requirements is critical for on-premises and colocation facilities.



THE SOLUTION

Although no one-size-fits-all data center solution exists, Molex's broad portfolio of copper and optical interconnect solutions ensures performance and cost effectiveness.



High-Speed Pluggable IO

- Features SMT, BiPass and external cable solutions built for 224 Gbps-PAM4
- Provides superior mechanical durability and excellent shielding to minimize crosstalk and deliver better SI performance at a higher Nyquist frequency
- Offers multiple Direct Attach (DAC) and Active Electrical Cables (AEC) configurations, optimized wire termination and CMIS support



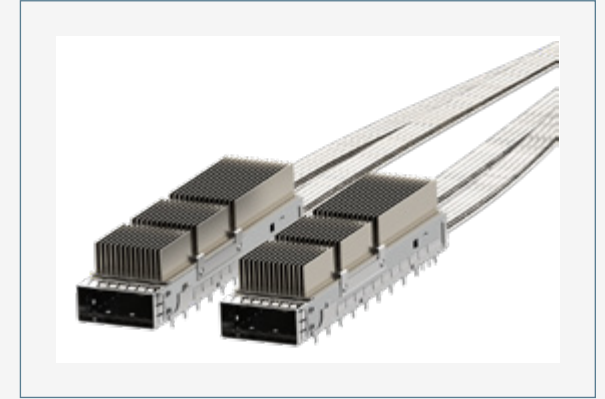
Mirror Mezz Connectors

- Support data transmission rates up to 224 Gbps
- Simplify connector assembly and add protection from damage with electrically tuned contacts and BGA PCB attach
- Incorporate flex cable links to lengthen board-to-board distance without forfeiting performance



Inception 224G Genderless Backplane and Cable

- Provide optimal flexibility
- Offer optimal signal integrity and simplified integration
- Form the backbone of the hardware communication architecture



BiPass I/O Connector System

- Uses lower insertion loss copper twinax as a PCB alternative
- Provides passive, superior signal integrity performance for increased channel margin
- Increases design flexibility for optimal implementation of 224Gbps PAM-4 protocols
- Offers QSFP-DD, OSFP, and OSFP-XD option



DESIGN CONSIDERATION

Reliability: Data centers are the heart of enterprise operations, storing and transmitting vital data that drives business forward. Unexpected downtime can have significant implications, impacting internal processes, performance quality, customer expectations and operational efficiencies. Molex supports enterprise facilities in identifying the necessary solutions and required architecture to meet the growing demand for bandwidth, maximize reliability and minimize maintenance.



Molex is a leader in data center solutions, proven by our first-to-market 224 Gbps products, next-gen PCIe solutions and broad portfolio of copper and optical cabling and components. Our focus on co-development with our customers and our consultative approach ensure we're constantly operating at the cutting-edge of data center technology and able to support hyperscale and enterprise facilities alike.

molex.com

molex

creating connections for life