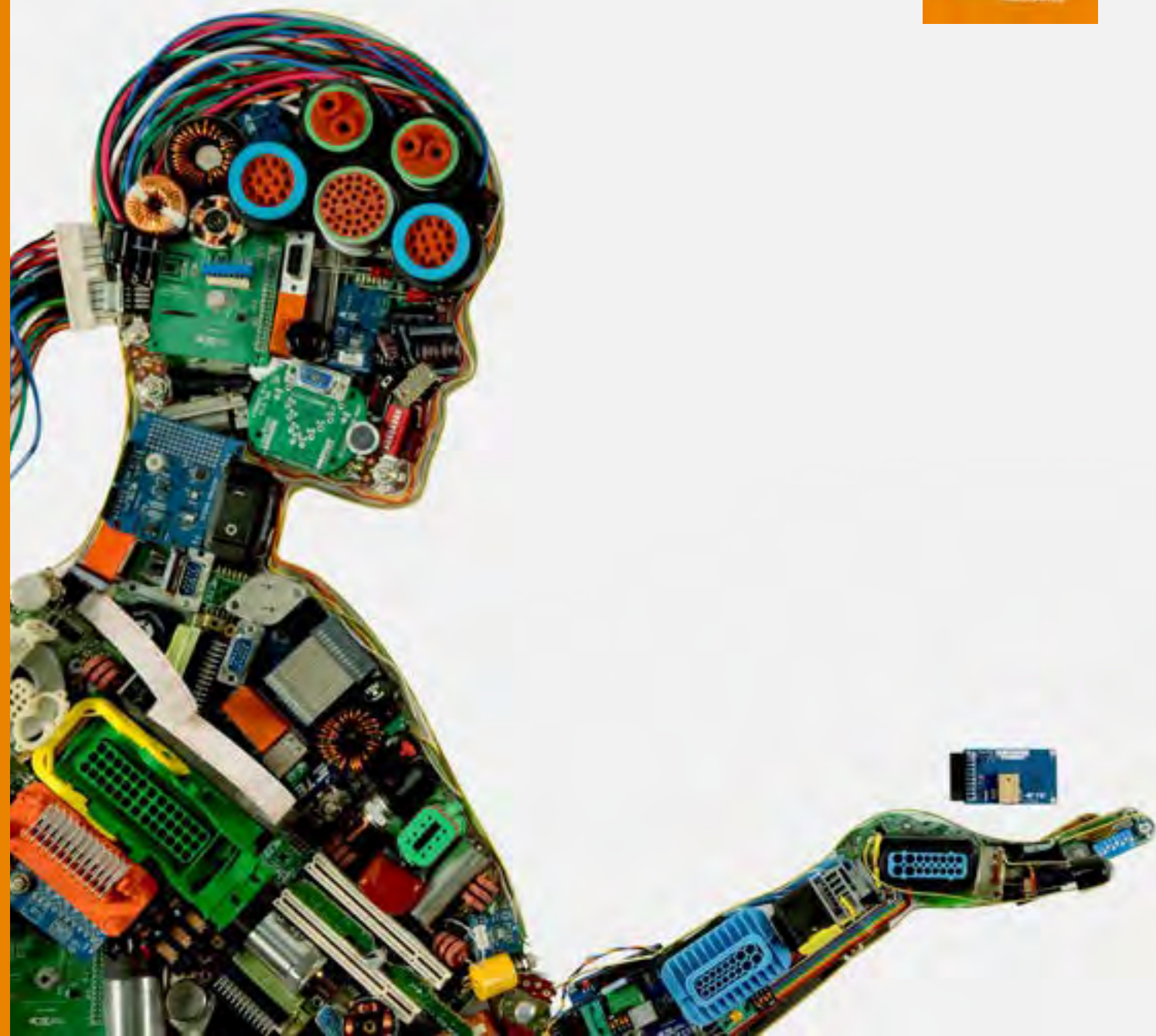


**WHEN
TECHNOLOGY
CONNECTS, SO
DOES HUMANITY.**

EVERY CONNECTION COUNTS



OUR PURPOSE

**WE CREATE
A SAFER,
SUSTAINABLE,
PRODUCTIVE
AND CONNECTED
FUTURE.**



**ADVANCING THE FUTURE
OF TRANSPORTATION**



**REVOLUTIONIZING
MEDICAL TECHNOLOGY**

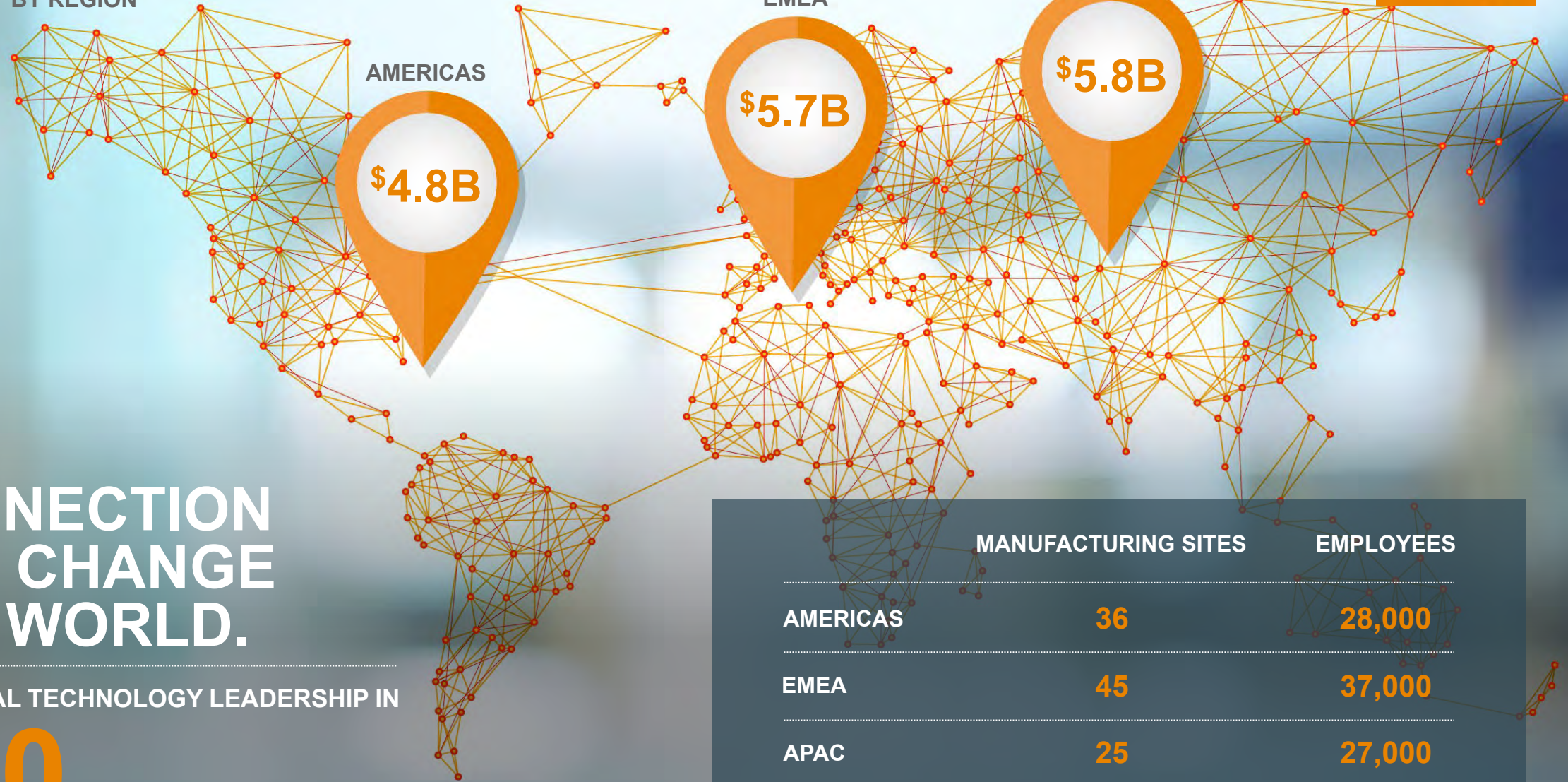


**ENABLING GLOBAL
COMMUNICATION
NETWORKS**



**MAKING FACTORIES &
HOMES SMARTER**

FY22 SALES
BY REGION



ANY
CONNECTION
CAN CHANGE
THE WORLD.

INDUSTRIAL TECHNOLOGY LEADERSHIP IN

140

COUNTRIES

	MANUFACTURING SITES	EMPLOYEES
AMERICAS	36	28,000
EMEA	45	37,000
APAC	25	27,000

Sales figures have been rounded for presentation purposes



INDUSTRIAL TECHNOLOGY LEADERSHIP



15K+

PATENTS
granted or pending

\$715M+

INVESTED in engineering,
research & development

8000+

ENGINEERS
globally

Approximately

20%

of sales from
new products

With Great Power Comes Great Sustainability



GREENHOUSE GAS ABSOLUTE
FY21 VS FY10



ENERGY USE INTENSITY
FY21 VS FY10



WATER USAGE
FY21 VS FY10



\$5.57M **1.5M**

GLOBAL CHARITABLE GIVING FY21

PEOPLE IMPACTED IN NEXT-GENERATION TECHNOLOGY EDUCATION FY20-21

\$2.9B

LOCAL ECONOMIC IMPACT FROM SUPPLY CHAIN FY21



Member of **Dow Jones Sustainability Indices**

Powered by the S&P Global CSA

Sustainability Yearbook
Member 2022

S&P Global

TE Connectivity (TE) Data and Devices

Focused Portfolio
for a Dynamic Market

EVERY CONNECTION COUNTS



Market Trends

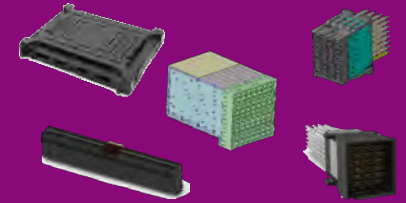


High Speed and Density

- 28G →56G →112G →224G
- Cables everywhere
- Finer Pitch: 1mm →0.8mm →0.6mm

TE Response

- 112G wide-ranging product portfolio
 - I/O connectors and cable assemblies
 - Cabled backplane and connectors
 - OTB solutions
- Next-generation server hardware (Next Gen LGA, DDR5 and PCIe 5.0)
- 224G new product introductions
- Power and thermal management (MULTIBEAM, Busbar, Cable Assemblies)

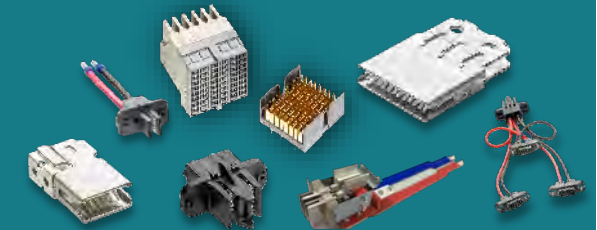


Cloud

- Deepening purpose-built solutions
- Rising complexity
- Growth at scale
- Edge computing

TE Response

- Total solutions partnership
- Product / technology innovation
 - Embracing artificial intelligence and machine learning
- Global supply chain and manufacturing base



IoT / Emerging Edge

- Mushrooming application
- Requirement diversification
- Low volume customers

TE Response

- Rich product portfolio
 - Antennas (LDS, metal stamping / PCB / FPC / ceramic / external antennas)
 - RF connectors & RF cable assemblies
 - Interconnect solutions (I/O, FPC, Wire-to-Board)
- Acquisition of Linx Technologies and Laird Connectivity's External Antennas business
- Ecosystem and channel engagement



Why TE Connectivity (TE) Data and Devices?

A Diverse and Comprehensive Portfolio to Support Your Connectivity Needs

Partnerships that Enhance Innovation:

TE helps shape the connector future through collaborating with customers and peers while pioneering new technologies.

Solutions for High Performance:

Our products can support the market trends of high-speed, energy-efficiency, and miniaturization in cloud, IoT end point and edge markets.

Faster, Flexible Support:

TE's manufacturing, value-added support and investments are focused on delivering top quality, highly-efficient products to address dynamic design cycles.

End-to-End Connectivity:

TE offers a broad range of products which can be used across data communications and IoT applications, providing extensive options for customers and the opportunity to consolidate their supplier base.

Sustainable Partnership:

TE's engineering and manufacturing expertise, combined with our global footprint spanning multiple industries, allow us to deliver one of the largest connectivity and sensor product portfolios.

Industries & Solutions

INNOVATIVE CONNECTIVITY SOLUTIONS THAT HELP CUSTOMERS DELIVER PERFORMANCE BEYOND DATA CENTER AND IOT END DEVICES



AEROSPACE & DEFENSE

Faster data to address the most stringent quality and performance standards

AUTOMATION & CONTROL

Focus on production equipment utilization and uptime with integrated diagnostic capabilities

POWER DISTRIBUTION

Drive for smarter power and increased efficiency in most harsh conditions

SAFETY & SECURITY

Achieve real-time, mobile monitoring capability across multiple locations and facilities

INTELLIGENT BUILDINGS

Monitor and deliver resource efficiency of various building systems and location-based services.

TEST & MEASUREMENT

Speed and accuracy of data collection for research, development, test and evaluation

LIGHTING

Meet the demand for increased energy efficiency and provide dimming and color control

AUTOMOTIVE

Focus on high-quality consumer port applications, vehicle-to-vehicle communication, and EV charging.

HVAC

Expectation of cloud-based systems to help drive Ethernet and wireless connectivity at the equipment level

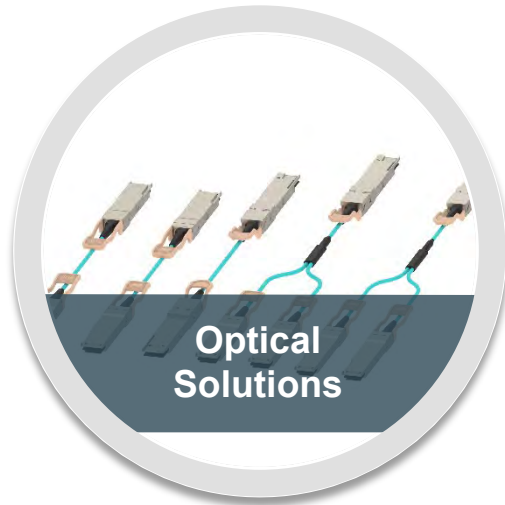
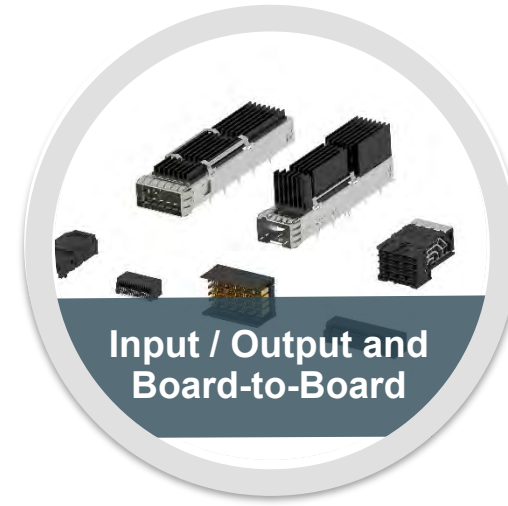
MEDICAL

Provide seamless connectivity for smart health monitoring devices and equipment with connector, antenna, and sensor solutions.

MATERIAL HANDLING

Conservation of both space and power, while sharing large amounts of information

Data and Devices Product Portfolio



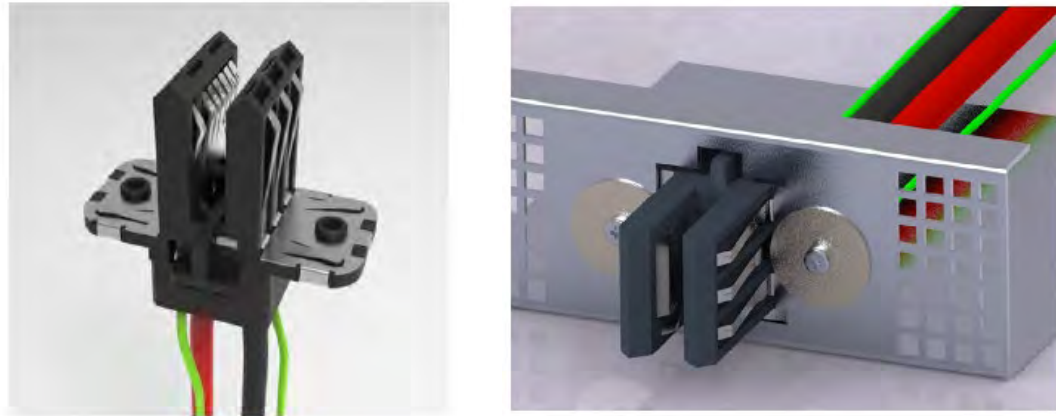
TE is Leading Innovation in Interconnect Solutions



- Sliver connector chosen for performance, density, flexibility, and robustness.
- Rated up to 56G PAM-4 (112G).
- Meets all current protocol performance requirements for PCIe Gen3/4 (8G & 16G), SAS3/4 (6G, 12G, & 24G), Ethernet protocols (10G & 25G per lane), Infiniband (28G), and expected to meet performance for IEEE & OIF 56 Gbps, PCIe Gen5, and SAS5.

TE is Leading Innovation in Power Solutions

OCP Open Rack V3 Busbar



- Increased current capacity (75A --> 100A).
- Dedicated chassis ground contacts.
- Sense contact(s) in the IT gear connector.
- Improved lead-in.
- Conductive surface on the busbar cage interior.

Power Solutions for OCP



- TE's OCP power solutions provide a wide variety of power delivery options to energize your data center infrastructure. Meeting standard form factors, and with an eye on innovation, TE is your partner for power delivery.

TE is Leading Innovation in I/O & Board-to-Board Solutions

Enabling 800G with OSFP



- TE's octal small form factor pluggable (OSFP) connectors and cable assemblies address next-generation data center needs by supporting aggregate data rates of 200 Gbps and up to 400 Gbps. These products are designed for both 28G NRZ and 56G PAM-4 protocols, with a roadmap to 112G PAM-4 for future system upgrades.

112G Per Lane with QSFP-DD



- Faceplate density equal to current 1xN QSFP28.
- 1x1, 1x2, 1x3, 1x4, 1x5 and 1x6 cages available.
- Cages are belly-to-belly compatible.
- Connector is traditional SMT with 4 rows.
- 56G QSFP-DD cages are drop-in compatible to QSFP-DD 112G connectors.

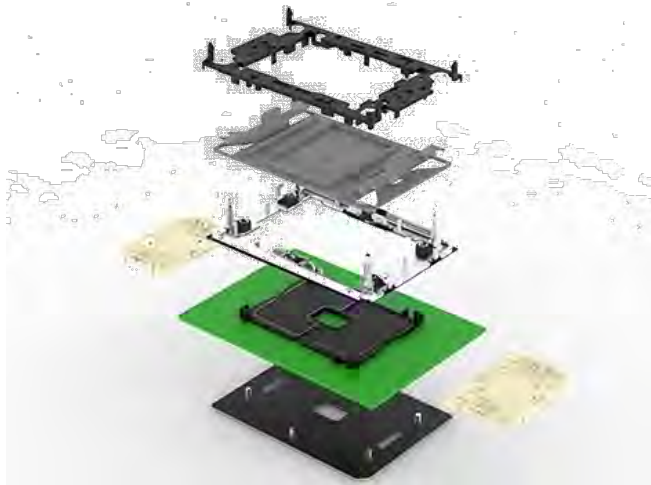
STRADA Whisper Absolute Connectors



- STRADA Whisper Absolute high-speed backplane connectors are engineered for 112G PAM4, enabling next generation data centers with outstanding cross-talk control and helping to reduce insertion loss. The connectors allow seamless transition from 56G and 112G as mating interface is backward compatible to 56G STRADA Whisper and STRADA Whisper R connectors. The signal pairs can be quad-routable, achieving cost-effective 112G architecture design.

TE is Leading Innovation in Sockets and Optics Solutions

LGA 4189 Sockets



- LGA 4189 sockets support next-generation central processing units (CPUs) for higher performance and better system scaling.
- LGA 4189 sockets are designed for next-generation processors, which can support PCIe Gen 4 and four or eight-multi-processor system architectures.

Active Optical Cabling



- Our active optical cable assembly portfolio provides improved cable flexibility and longer reach, as compared to both traditional passive copper solutions and emerging active copper and active electrical (ACC/AEC) cable solutions, supporting high performance computing, data center and networking interconnect applications.

TE is Leading Innovation in Portfolio Solutions

112G Portfolio Solutions



- TE's 112G industry-leading product portfolio provides a robust and flexible array of solutions to enable next generation architectures.

Products:

- 112G and 224G support for OSFP, QSFP, SFP, SFP-DD, OSFP-XD, QSFP-DD, CDFP Connectors, Cages, and Cable Assemblies
 - Direct Attached Copper Cables (DAC), Active Copper Cables (ACC), Active Electrical Cables (AEC), Active Optical Cables (AOC)
 - Leading (Switch, Server, and High Availability)
 - Stacked and Ganged
- Backplane (Standard, DPO, and Cabled Backplane Solutions)
 - AdrenaLINE SlingShot Interconnects
 - STRADA Whisper / Absolute
- Over the Board (OTB) I/O Solutions
 - OTB Connectors, Sockets and Assemblies
 - OSFP, OSFP XD, and QSFP DD I/O
- Enabling 112G and 224G Through PCIe
 - Sliver Receptacles, Plugs, and Cable Assemblies
 - CEM Connectors
 - Sliver Product Family (SFF-TA-1002/SFF-TA-1020)
 - MCIO Product Family (SFF-TA-1016)
- Powering 224G Operations
 - ORv3, IT Gear, 48V, CROWN CLIP, ELCON, MULTI-BEAM PSU, DTC Cable, Busbar, ICCON, and RAPID LOCK Interconnects
- Socket and Hardware
 - Co-Packaged, uLGA, CPU, Switch ASIC, AI ASIC
- Wire-to-Board and Accessories
 - AMP CT Family and HPI Family
 - Modular Jacks
 - USB Serial I/O

224G Portfolio Solutions



- With TE's 224G portfolio solutions, a full array of customized options for compute and rack datacenter infrastructure is at your fingertips.



TE portfolio solutions are a holistic product offering leveraging the entirety of the product portfolio, with interconnectivity and compatibility in mind, while reducing time to market and overall product uncertainty. TE's robust end-to-end product portfolio touches each part of the datacenter from server to infrastructure – and all devices in between.

TE is Leading Innovation in Micro Markets

External Antenna



- TE acquired Laird Connectivity's External Antennas business and together offers a combined 7 decades of RF and antenna design and manufacture experience. The wide portfolio of antenna solutions includes options for IoT, public safety, vehicular/transportation, infrastructure, fixed wireless access and many more. In addition, custom antenna developments are regularly undertaken for OEMs and other customers.

Linx Technologies IoT Portfolio



- The Linx Technologies portfolio strives to minimize the risk, delays, and technical challenges for design engineers to make their products wireless and connect to the Internet of Things (IoT).
- The Linx Technologies IoT portfolio is made up of an array of wireless components including antennas, modules, remote controls and RF connectors.

LEMBAS USB/LTE Modem

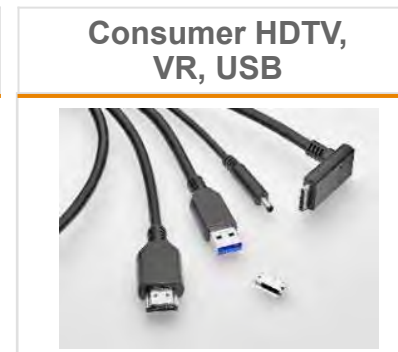
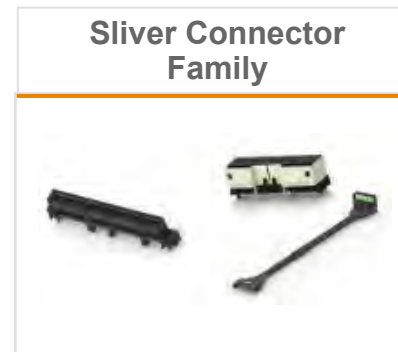
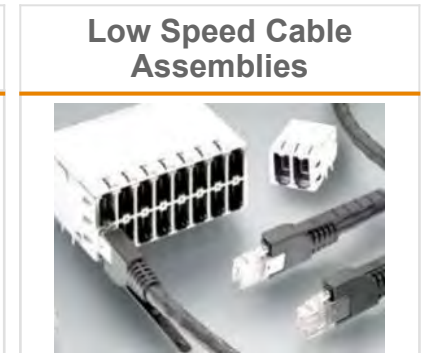


- Our LEMBAS LTE/GNSS USB modem for LTE CAT4 network and GPS tracking is designed for use on a wide array of single board computers (SBCs) utilizing ARM chip-sets. Plug-and-play features and 1-command initial set-up enables instant access to cellular connectivity and GPS tracking in an easy-to-use package.

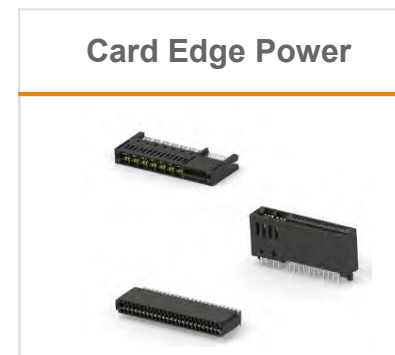
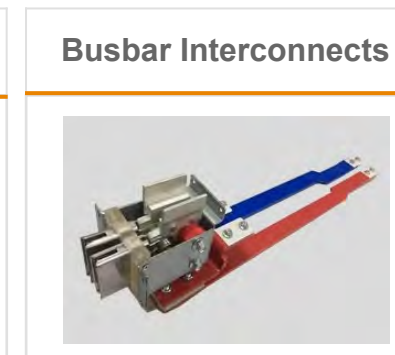
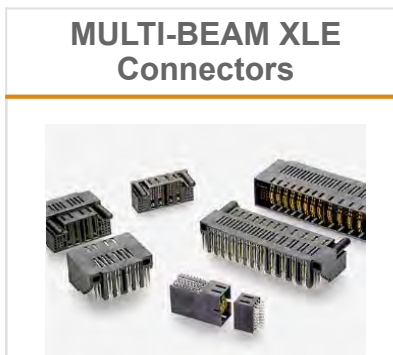
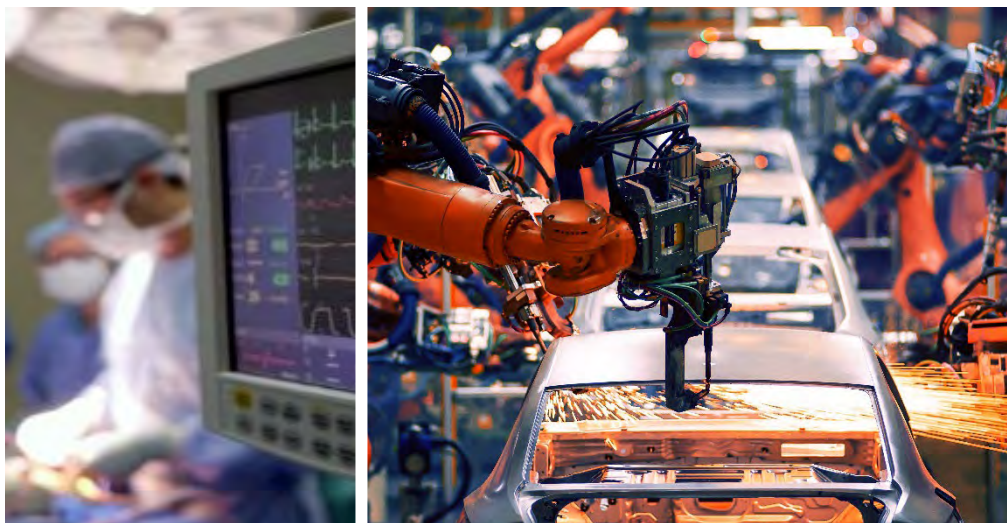
Data and Devices | Cable Assemblies and Compute ICC



Data Center Infrastructure
 Networking and Telecommunication
 High Speed Compute
 Multimedia
 Smartphone
 Internet of Things
 Industrial and Automation



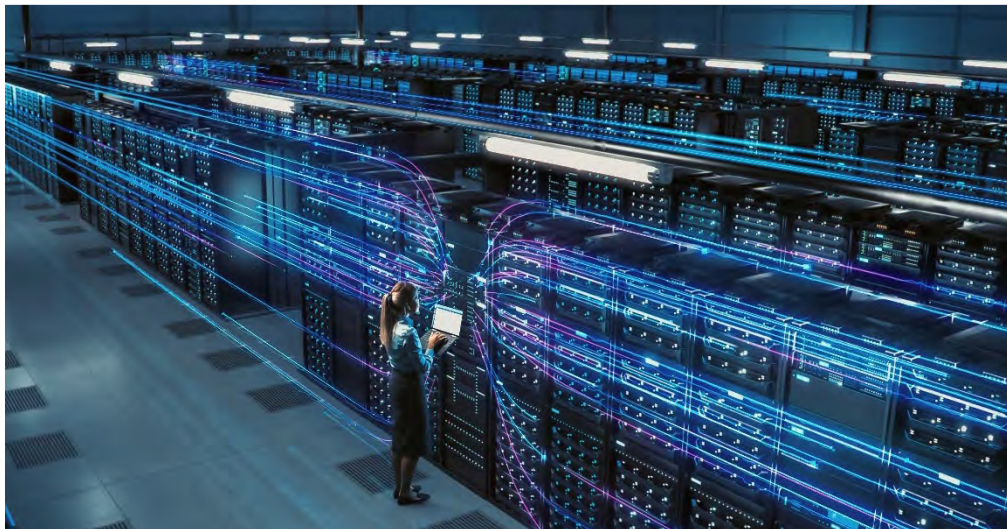
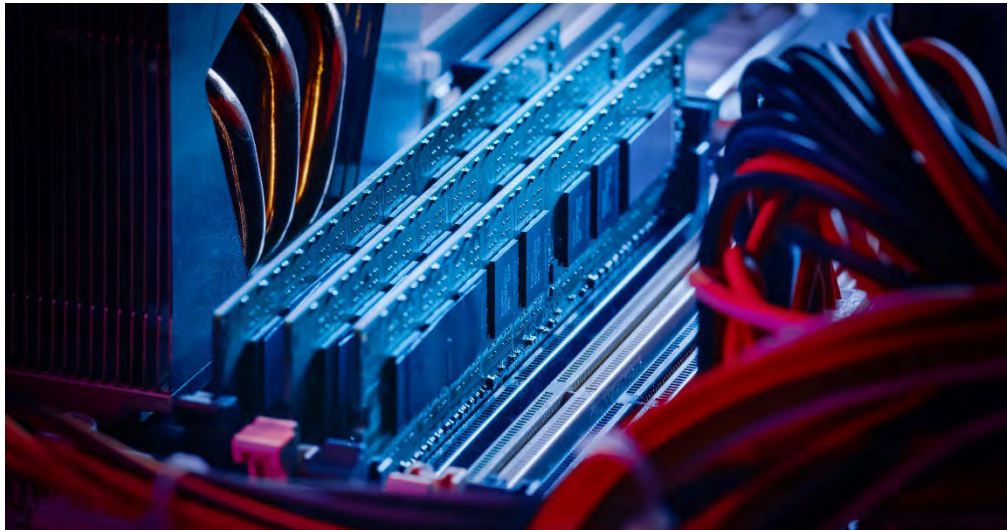
Data and Devices | Power Solutions



Switch | Server
Storage | Shelf Power
Rack Power
Network Card
Wireless BTS

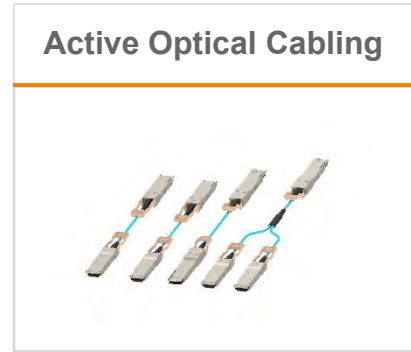
Industrial & Robotics
Medical
EV Charging & Solar
Instrument
Automation

Data and Devices | Input/Output (I/O) and Board-to-Board

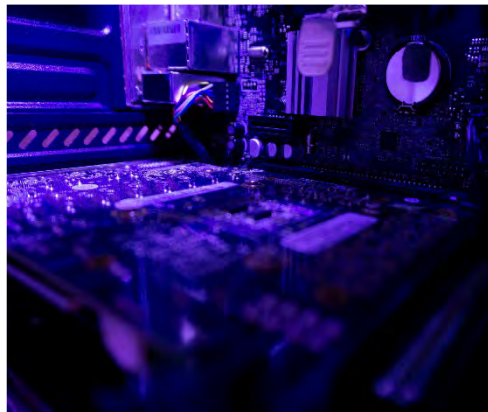
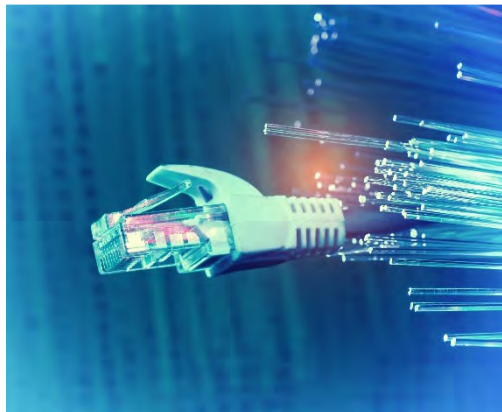


<p>External High Speed I/O</p>	<p>HDD / SSD</p>	<p>Card Edge</p>
<p>STRADA Whisper Connectors</p>	<p>High Speed</p>	<p>Mezzanine</p>
<p>Internal High Speed I/O</p>	<p>Telecommunications and Networking Switch Server Storage Hyperscale Datacenters Wireless BTS High Speed Compute</p>	

Data and Devices | Optical Solutions



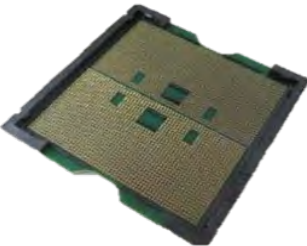


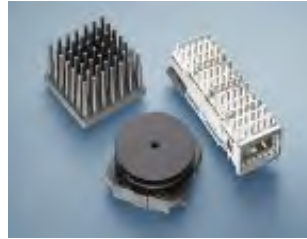


Telecommunications and Networking
Switch | Server | Storage
Hyperscale Datacenters
Wireless BTS
High Speed Compute



Data and Devices | Sockets



<p>DIP/SIP Socket</p> 	<p>x86 Sockets & Hardware</p> 	<p>Non-x86 Sockets & Hardware</p> 
<p>Memory Sockets</p> 	<p>DMD Sockets</p> 	<p>Heat Sinks</p> 
<p>Edge Computing Servers and Data Center Artificial Intelligence Machine Learning</p>		<p>Internet of Things Wearable Devices Handheld Devices</p>

Data and Devices | Portfolio Solutions



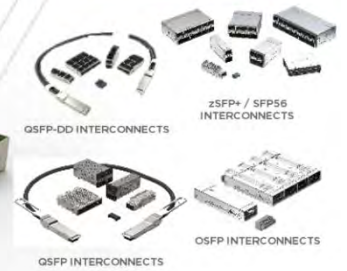
POWER CONNECTORS & CABLE ASSEMBLIES



HYBRID CABLE ASSEMBLIES



HIGH SPEED I/O INTERCONNECTS



INTERNAL CARD EDGE CABLES & CONNECTORS



INTERNAL CARD EDGE CABLES & CONNECTORS



POWER CONNECTORS & CABLE ASSEMBLIES



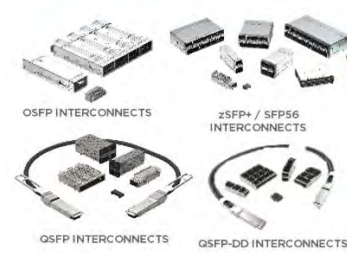
HIGH SPEED BACKPLANE CONNECTORS



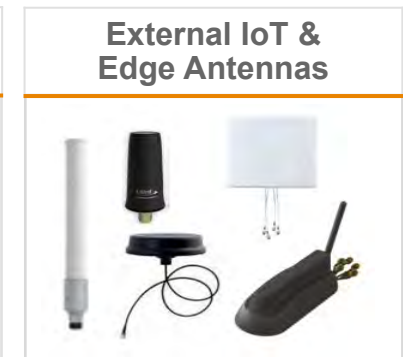
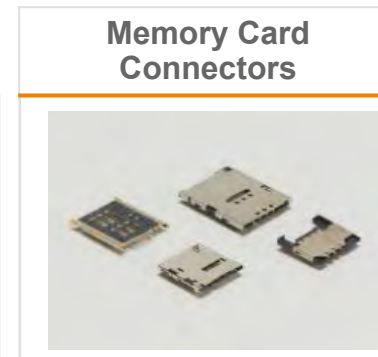
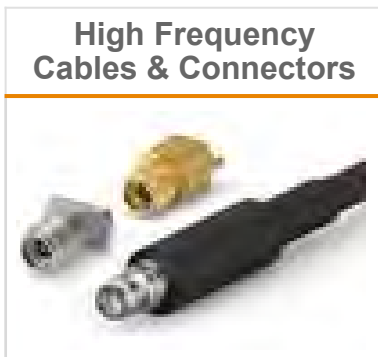
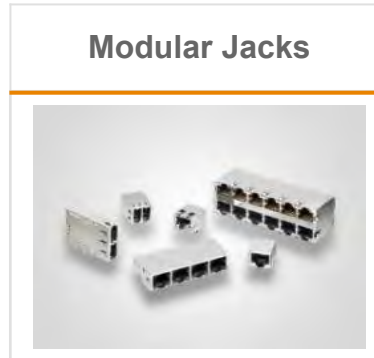
HYBRID CABLE ASSEMBLIES



HIGH SPEED I/O INTERCONNECTS



Data and Devices | Micro-Markets and IoT



Internet of Things
 Test and Measurement
 Industrial
 Consumer Products
 Automotive
 Public Safety

EDGE COMPUTING SOLUTIONS

Quick Reference Guide

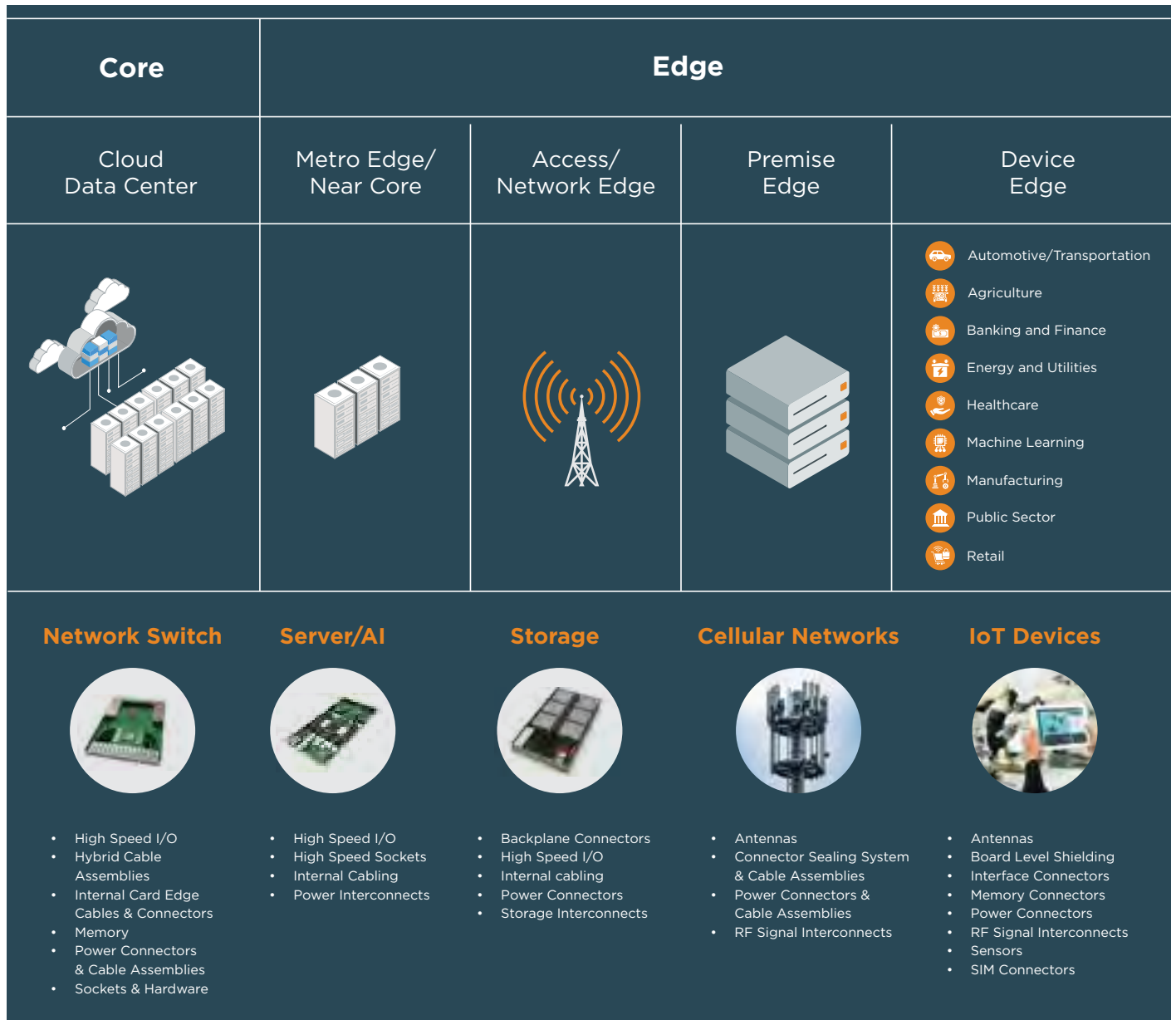
Bringing performance and reliability to edge computing with solutions that address ruggedization, cooling, EMI and physical security



RELIABILITY AND PERFORMANCE AT THE EDGE

As the expectation for consuming massive amounts of data at faster speeds with low latency is ever increasing, the need for edge computing has become paramount. Across a growing range of applications, from autonomous vehicles and smart power grids to industrial manufacturing and healthcare, the ability to compute data close to the source is critical for faster transfer and response times. Metro and premise edge data centers, servers and end devices must perform seamlessly to meet these demands. That's why TE Connectivity (TE) offers products and expertise to help meet challenging and varied requirements.

HOW TE SUPPORTS THE EDGE ECOSYSTEM

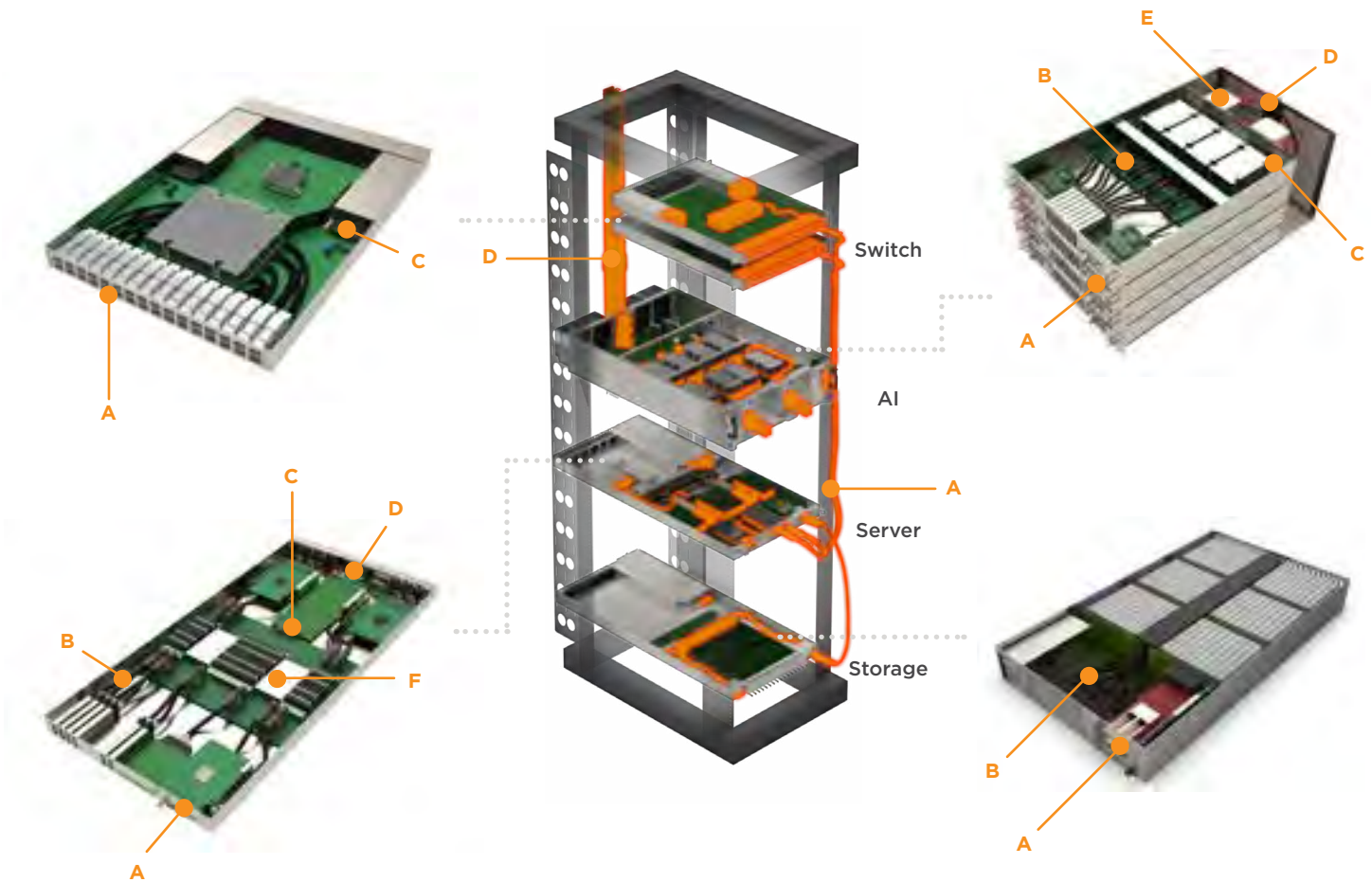




KEY REQUIREMENTS FOR EDGE DATA CENTERS

High Speed/Low Latency	Low latency should ideally be 5 milliseconds (Ms) or less.
Extreme Temperature Tolerance	Components must be able to operate in environments ranging from 40°C (-40°F) up to +125°C (257°F).
Power Supply Utilization	Server configuration, component selection and choice of thermal cooling technology can impact power usage.
Small Footprint	Server configuration design optimization and smaller format component selection play a critical role in maximizing floor space.
Silent Operation	Noise levels can reach up to 92 dB(A). Liquid cooling technologies, such as immersion or cold plate, can significantly reduce noise.
Minimize Electromagnetic Interference (EMI)	Antennas, components, shielding selection and positioning must be considered early in the design phase.

TE COMPONENTS SUPPORTING EDGE DATA CENTERS



A - High Speed I/O

- QSFP Connectors and Cages
- QSFP-DD Connectors and Cable Assemblies
- SFP Connectors
- RJ point five Connectors
- OSFP Connectors and Cages
- CDFP Connectors, Cages & Cable Assemblies
- CDFP PCIe Gen 5 and 6 Connectors
- Active and Passive Copper Cable Assemblies
- Active Optical Cable Assemblies

B - Internal Connectors and Cable Assemblies

- ICC Internal Cable Connectors
- Sliver Cabled Interconnects
- Mini Cool Edge IO (MCIO) Interconnects
- PCIe Gen 5 CEM Connectors

C - Power Connectors & Cable Assemblies

- MINIPAK HDL Connectors
- ORv3 (Open Rack Version 3) IT Gear Power Input Solution
- MULTI-BEAM Plus Connectors
- Thermal Bridge I/O Connectors
- ICCON Block and ICCON Insert High Power Pins and Sockets
- Card Edge Power Connectors
- ELCON Mini Connectors and Cable Assemblies
- RAPID LOCK Power Connector

D - Busbar Solutions

- Power Busbar Connectors
- ELCON Drawer Connectors
- 48V Vertical Busbar
- Liquid Busbars

E - Backplane Connectors

- STRADA Whisper Connectors
- STRADA Whisper Absolute Connectors
- AdrenaLINE Catapult, AdrenaLINE Slingshot, and AdrenaLINE Fastlane Connectors

F- Sockets & Hardware

- LGA 4677 Socket
- LGA 3647 Socket
- PCIe GEN 5 CEM Connectors
- DDR5 DIMM Sockets

Accessories

- Performance Materials for EMI Protection
- Antennas
- Sensors

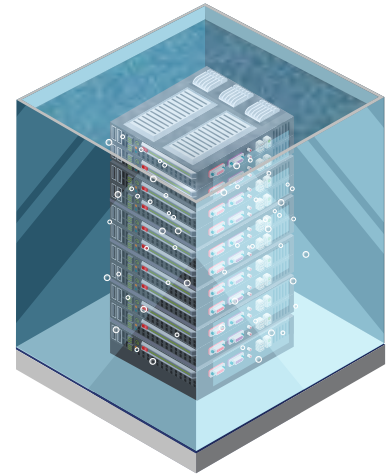
TE SOLUTIONS FOR THERMAL PERFORMANCE

As the demand to process more data increases every year, so too does the need for higher-power data racks and more efficient edge data centers. A forced air data rack can consume as much as 30 to 50 kilowatts of energy. Higher temperatures that occur due to higher power levels can directly affect the longevity of components in the data rack if the thermal design is not optimized. TE offers products for air and cold plate cooling solutions, but is also focused on developing a robust portfolio of products to support state-of-the-art immersion cooling technology.

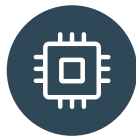
IMMERSION COOLING

When comparing traditional air cooling, cold plate cooling and immersion cooling technologies, one can think of them as “good, better and best” choices.

- **Air Cooling (Good)** - Long-term operational costs add up from power consumption associated with running air conditioners and server fans.
- **Cold Plate Cooling (Better)** - Offers a more enhanced method with closed loop water cooling, but comes at a high cost with added system complexity and other required cooling equipment.
- **Immersion Cooling (Best)** - Removes the need for fans and air conditioning, introducing a host of benefits, including:



Energy Savings



Increased Compute Density



Superior Thermal Management



Noise Reduction



Reduced Footprint

MEETING THE COMPONENT REQUIREMENTS OF IMMERSION COOLING

Immersion cooling offers distinct advantages for edge data centers; however, the performance of the system is only as good as its components. As TE evolves existing products and develops new ones to support immersion cooling, we consider:

Impact on performance

Through simulations and testing, we evaluate how submersion impacts impedance in our existing products and identify required modifications.

Material compatibility

Engineering products with materials that can be submerged for long periods of time without degradation.

Component protection

Sealing of components that will be submerged is critical for long-term performance.



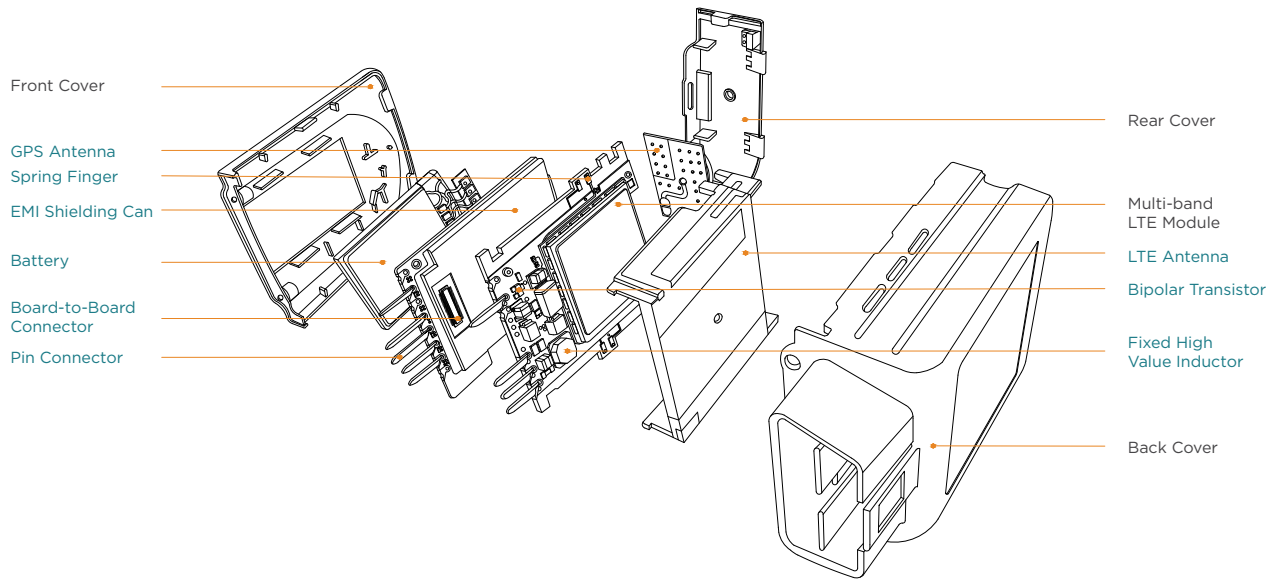
KEY REQUIREMENTS FOR EDGE COMPUTING DEVICES

Robust I/O and Wireless Connectivity	Provide secure data transmission with low latency, failure detection and automatic fail-safe functionality.
Extreme Temperature Tolerance	-40°C (-40°F) up to +70°C (158°F).
Ingress Protection	Devices must be designed with components that can help minimize or prevent the ingress of dust and liquids per standards.
Shock and Vibration Resistance	Edge PCs and components should withstand up to 50 g of shock force.
Small Footprint	Given the space constraints of rugged edge PCs, smaller format components can be critical.
Low Power Consumption	Proper antenna and component selection and positioning within the device are key considerations in improving power efficiency.
Electromagnetic Interference (EMI)	Antennas, components, shielding selection and positioning must be considered early in the design phase to avoid degraded signal performance.
Physical Security	Helping to prevent unauthorized physical access, such as tampering, is an important consideration in remote, unattended applications.

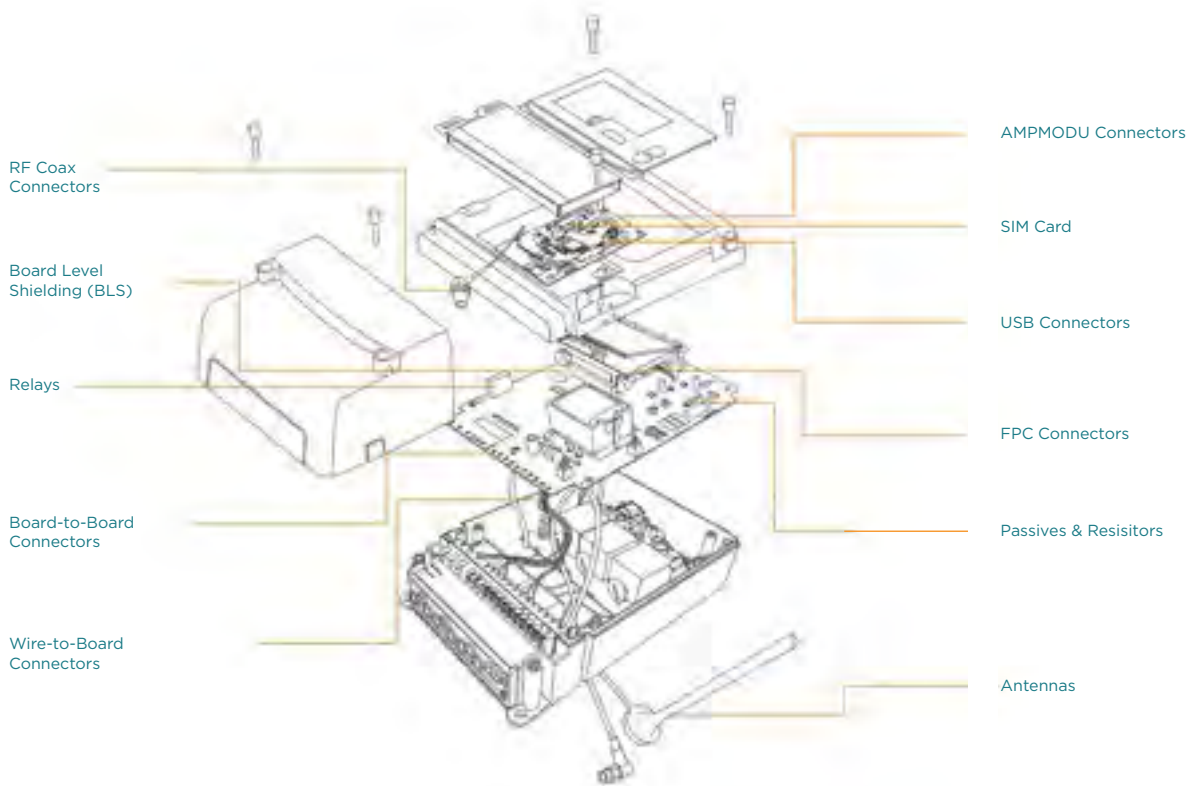
TE COMPONENTS SUPPORTING EDGE DEVICES

Across a range of applications from fleet telematics and smart metering to smart buildings and medical devices, TE connectors, antennas and components help deliver performance, reliability and long operational lifetimes in harsh environments. Below are just a couple examples of how our products are incorporated into device designs.

FLEET TELEMATICS



SMART METERS



WHY PARTNER WITH TE?



Our history in design engineering, global manufacturing prowess, materials science expertise and signal integrity analysis are benefits that contribute to the value of partnering with us. At TE, we view our role of consultant as a trusted advisor, who helps to bring value to our customers through innovative and customized solutions.



Partnerships that Enhance Innovation

We collaborate closely with customers and peers in the development of new technologies.



Solutions for High Performance

Our products can support high-speed, energy-efficiency, and miniaturization in cloud, IoT end point and edge markets.



Faster, Flexible Service

TE's manufacturing and value-added services deliver top quality, highly efficient products to meet dynamic design cycles.



End-to-End Connectivity

TE offers a broad range of product options across data communications and IoT applications, giving customers the opportunity to consolidate their supplier base.



Sustainable Partnership

TE's engineering and manufacturing expertise, combined with our global footprint provides one of the largest connectivity and sensor portfolios.

te.com

TE Connectivity, TE Connectivity (logo) AMPMODU, RJ *point five*, Sliver, MINIPAK, MULTI-BEAM Plus, ICON, ELCON Mini, ELCON, RAPID LOCK, STRADA Whisper, AdrenaLINE Catapult, AdrenaLINE Slingshot, AdrenaLINE Fastlane are trademarks owned or licensed by the TE Connectivity Ltd. family of companies. All other logos, products and/or company names referred to herein might be trademarks of their respective owners.

The information given herein, including drawings, illustrations and schematics which are intended for illustration purposes only, is believed to be reliable. However, TE Connectivity makes no warranties as to its accuracy or completeness and disclaims any liability in connection with its use. TE Connectivity's obligations shall only be as set forth in TE Connectivity's Standard Terms and Conditions of Sale for this product and in no case will TE Connectivity be liable for any incidental, indirect or consequential damages arising out of the sale, resale, use or misuse of the product. Users of TE Connectivity products should make their own evaluation to determine the suitability of each such product for the specific application.

©2023 TE Connectivity. All Rights Reserved.

02/23 Original

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

STRADA WHISPER ABSOLUTE BACKPLANE SOLUTIONS GUIDE

In today's rapidly evolving digital landscape, the need for 112G datacenter architectures has become more pressing than ever before. As data continues to grow exponentially, traditional datacenter infrastructures are struggling to keep up with the increasing demands for faster data transfer and processing.

112G datacenter architectures offer a compelling solution to address this challenge, providing a quantum leap in data transmission speeds and overall performance. With its capability to transmit data at 112 gigabits per second (Gbps), this technology empowers datacenters to handle massive workloads, real-time analytics, and high-performance computing tasks seamlessly.

By adopting 112G datacenter architectures, organizations can unlock the full potential of emerging technologies such as artificial intelligence (AI), machine learning, and 5G networks, while providing enhanced reliability, reduced latency, and improved scalability.

In an era where data is the lifeblood of businesses, 112G datacenter architectures have become an indispensable foundation for maintaining competitiveness and meeting the ever-increasing demands of the digital age.



CABLED BACKPLANE APPLICATIONS

The advent of 112G server backplane infrastructure marks a significant milestone in the realm of high-speed data transfer and server performance. With its capability to transmit data at a blazing speed of 112 gigabits per second (Gbps), this cutting-edge technology opens up a wide array of applications across various industries and computing environments.

- 1** **Data Centers and Cloud Computing:** In today's data-driven world, data centers and cloud computing platforms are crucial for storing, processing, and managing vast amounts of information. The 112G server backplane allows for lightning-fast communication between servers and networking devices, enabling data centers to handle the increasing demands of real-time data analytics, artificial intelligence, and other high-performance workloads.
- 2** **High-Performance Computing (HPC):** In the realm of scientific research, simulations, and complex modeling, HPC clusters rely heavily on fast and efficient data transfer. The 112G server backplane ensures that large-scale computations can be executed swiftly, reducing processing times and enhancing overall computational performance.
- 3** **Telecommunications and 5G Networks:** With the rapid deployment of 5G networks, there is an unprecedented need for high-speed data communication between network elements. The 112G backplane facilitates seamless connectivity between networking equipment, improving the efficiency and reliability of 5G infrastructure.
- 4** **AI and Machine Learning:** AI and machine learning algorithms demand immense computational power and data throughput. The 112G server backplane accelerates data access and transfer within AI hardware accelerators, enabling real-time inferencing and training for AI applications.
- 5** **Video Streaming and Content Delivery:** As video streaming services continue to gain popularity, the 112G backplane ensures smooth and uninterrupted data transmission, reducing buffering times and providing a seamless viewing experience to users worldwide.
- 6** **Financial Services and High-Frequency Trading:** In the realm of financial markets, where split-second decisions can make a significant difference, the ultra-fast data transfer enabled by the 112G server backplane can be important for high-frequency trading and real-time market analysis.
- 7** **Aerospace and Defense:** In critical aerospace and defense applications, reliability and data integrity are paramount. The 112G backplane provides the necessary speed and robustness to support advanced communication systems, radar processing, and defense networking infrastructures.
- 8** **Automotive and Autonomous Vehicles:** The automotive industry is embracing the era of connected and autonomous vehicles. The 112G server backplane contributes to the efficient exchange of data between in-vehicle systems, enhancing safety, and enabling advanced driver assistance systems (ADAS) and autonomous driving functionalities.

WHY TE FOR CABLED BACKPLANE SOLUTIONS?

SI Performance in De-mate Conditions

- TE's STRADA Whisper connector ensures reliable signal integrity (SI) performance in 1.2mm de-mate conditions which occurs in larger modular systems
- SI performance is maintained in worst case or corner case conditions providing margin for channel performance

Automated Manufacturing Processes

- Consistent quality
- Proven scalability

Mechanically Robust

- Removes quality concerns
- Fantastic quality record

Industry Diversification

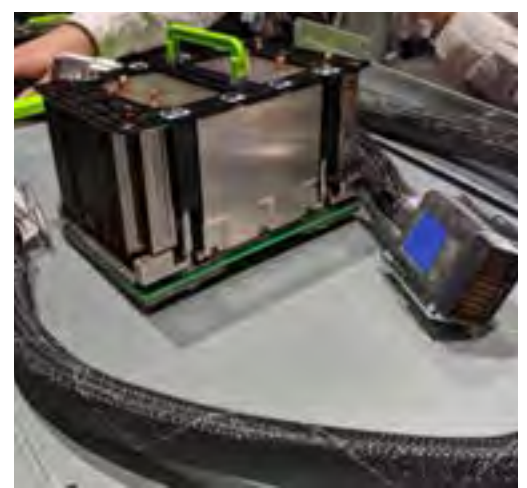
- STRADA Whisper Absolute connector is the default standard interface for LEO satellites demonstrating robustness
- Robust and high performance

Electrically Superior & Best TCO

- Provides maximum amount of design margin in IL, RL, and XTLK. Applied cost savings.
- Allows for other system tradeoffs like board materials, retimers, etc
- Applied cost savings: optimized footprint has 2 less routing layers saving hundreds/thousands per system in PCB costs

Proven Supply Chain




- Successful track record of executing steep ramps
- Does not use any "exotic" or proprietary materials enabling a reduced supply chain risk



STRADA WHISPER ABSOLUTE PORTFOLIO OVERVIEW

TE is a leader in cabled backplane assemblies with deep experience and application knowledge. Backplane cable assemblies are used across a broad industry and customer base. TE is highly focused on the AI market segment.

- Winning in AI at major GPU Player, and most cloud service providers. Diverse wins in other industry segments.
- Best in class signal integrity as echoed by numerous customers. 20% better z-axis unmate performance.
- STRADA Whisper Absolute cable assemblies are part of a high growth product family for TE.
- Large installed capacity base - 60M+ dps for cables and 294M dps for connectors and currently scaling higher.
- Execution: TE has successfully ramped multiple AI projects to high volume levels and met customer schedules.
- Mature automated manufacturing processes that are very high yield which allows for resiliency of manufacturing footprint.
- Vertically integrated factory in Dongguan, China for cables - bulk cable made in same facility as cable assemblies
- Vertically integrated connector factory in Qingdao, China - stamp, mold, plate assembly all in-house. No exotic materials used in mating interface like competition reducing supply chain risk.
- Proven robust interface which is now becoming default standard in several satellite deployments. Long cycle life segment.

56G	112G	224G
STRADA WHISPER CONNECTOR	STRADA WHISPER ABSOLUTE CONNECTOR	ADRENALINE SLINGSHOT CONNECTOR
Available	Available	Available
		
<ul style="list-style-type: none"> • Proven 56G connector • High signal integrity margin with 360-grounding design • Maintain the electrical performance at 1.5mm unmating condition • Internal system versatility is enabled through over the board solutions • Available in 4 to 12-pair for traditional backplane applications 	<ul style="list-style-type: none"> • Backward compatible as connectors have same mating interface as STRADA Whisper connector/cables • Reduce insertion loss and lower cross talk noise with new connector design and improved mating structure • Mate-able with existing STRADA Whisper connectors and cabled headers • Available in 4-pair and 8-pair for traditional backplane applications 	<ul style="list-style-type: none"> • New hermaphroditic mating interface for 224G SI performance • Modular construction - cablets and housings can be easily scaled up or down from 4x4 to 12x16 • 13% more dense than STRADA Whisper Absolute connector • Design optimized for 25 to 32 AWG cabled backplane architecture

Enables 112G network architectures

- New footprint design provides improved performance without sacrificing and simplifying routing capabilities
- Provides excellent cross talk, return loss, insertion loss performance to address 112G channel requirements
- Provides quad-routability for signal traces
- Mating interface is backward-compatible to existing 56G STRADA Whisper connector portfolio

Designed for 112G PAM-4 backplane applications

- Best in class crosstalk and insertion loss performance
- 92 Ohm impedance supporting both 85 Ohm and 100 Ohm applications
- Minimize skew with noise isolation, 360-degree grounding design
- 1.75 mm wipe length, ensuring good electrical performance with 1.0mm of un-mate condition

Cost effective upgrade solution

- Backward-compatible mating interface reduces engineering design effort when upgrading from 56G to 112G system
- Manufactured with fully automated assembly process helping reduce operating cycle times, operating cost and enhance machine productivity

STRADA WHISPER ABSOLUTE PORTFOLIO SOLUTIONS

We offer 4 solutions:

1. Point-to-point Cables
2. Backshell
3. Bricked Cable Assembly
4. Full Backplane/Midplane Solution
5. Interoperability and Interconnectivity Options
6. Multiple Customization Options Available

1 Point-to-point Cables

4x8



6x3



6x4



8x8



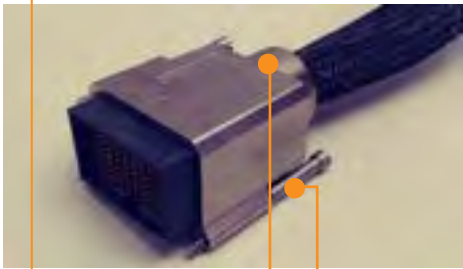
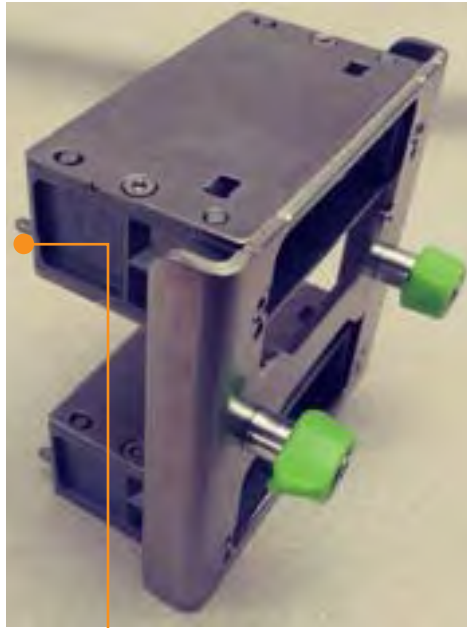
9x5



12x6



- Panel mount, floating, guided hardware solution keying / error proofing features
- Connector floats within brick assemblies



Guide Pins

Jackscrews

Keying Feature

EMI Shielding

Connector Float Controlled via Housing Lug / Sheet Metal Window

STRADA Whisper Cabled Receptacle

2 Backshell



- Typically used in I/O applications or “rack to rack” interconnect
- Cable is fixed into position by an installer
- Field installation / deployment of cables
- Can be oriented in many angles to aid in installation
- Can provide EMI protection when used in conjunction with a metal braid

3 Bricked Cable Assembly



- Allow for the brick to be integrated into a midplane / backplane
- Minimizes assembly for the customer

4 Backplane / Midplane



- Complete solution provided
- No further midplane / backplane assembly required by the customer

5 Interoperability and Interconnectivity Options



STRADA Whisper Header to IO Cables



STRADA Whisper Receptacle to Midboard

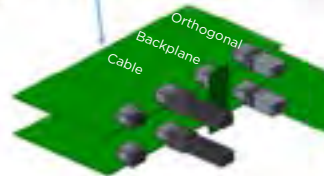


STRADA Whisper Header to STRADA Whisper Receptacle



Near Chip Socket

Cable Backplane Header or Receptacle



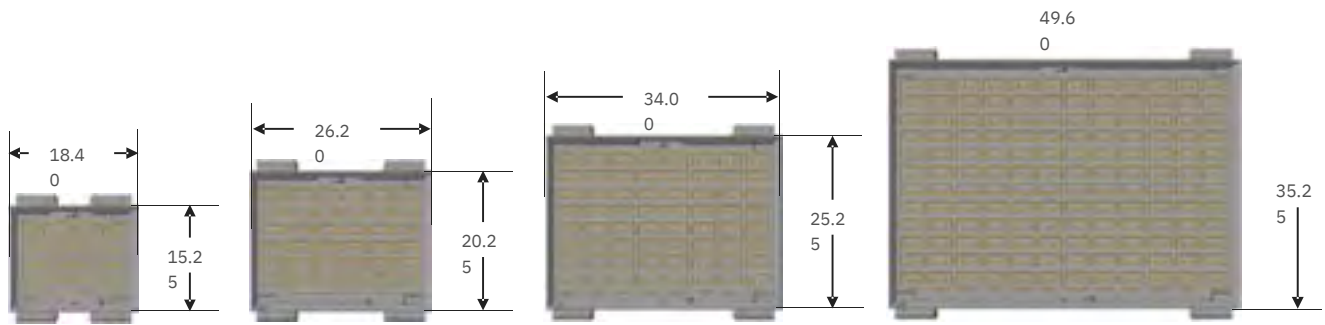
6 Cartridge Systems Available



STRADA WHISPER ABSOLUTE PORTFOLIO ENABLES:

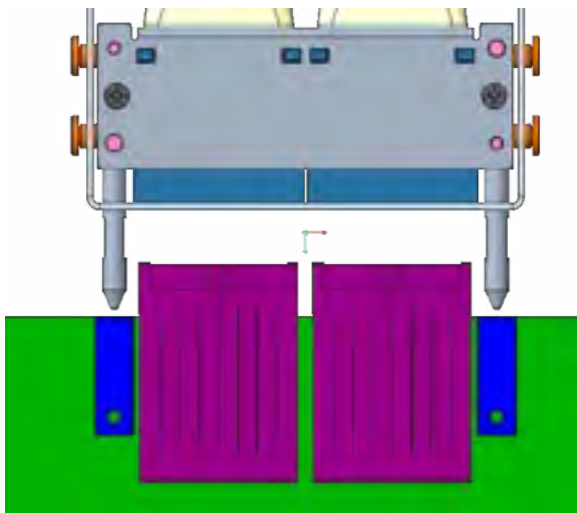
- Blind mate connections (float & gatherability) enable eased serviceability
- Breakout cabling allows for complex network switching, accelerator pooling, and storage array topologies
- Compatibility with other standard interfaces fosters ecosystem development

STRADA WHISPER ABSOLUTE CONNECTORS SIZING

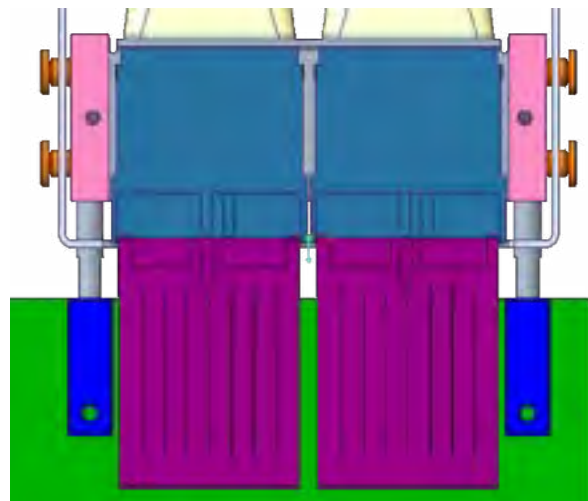


- 3.90mm column to column pitch
- 2.50mm row to row pitch
- 4pr, 6pr, 8pr, and 12pr are most popular pair count sizes
- Even number column counts more typical
- Many configurations tooled and others are easily added with flexible tooling family

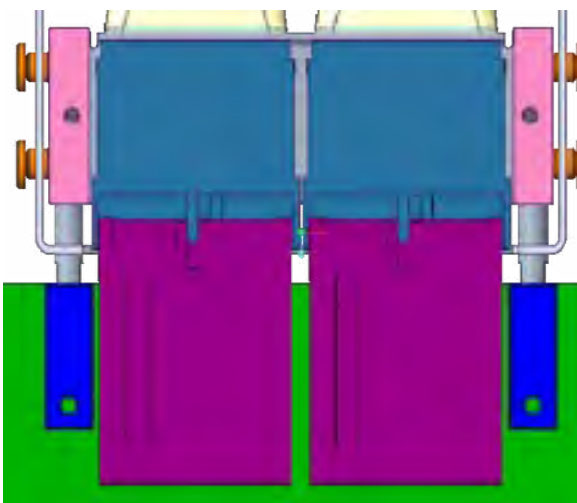
STRADA WHISPER ABSOLUTE CONNECTORS MATING SEQUENCE



Step 1 - Guide Pins



Step 2 - Housing Shroud

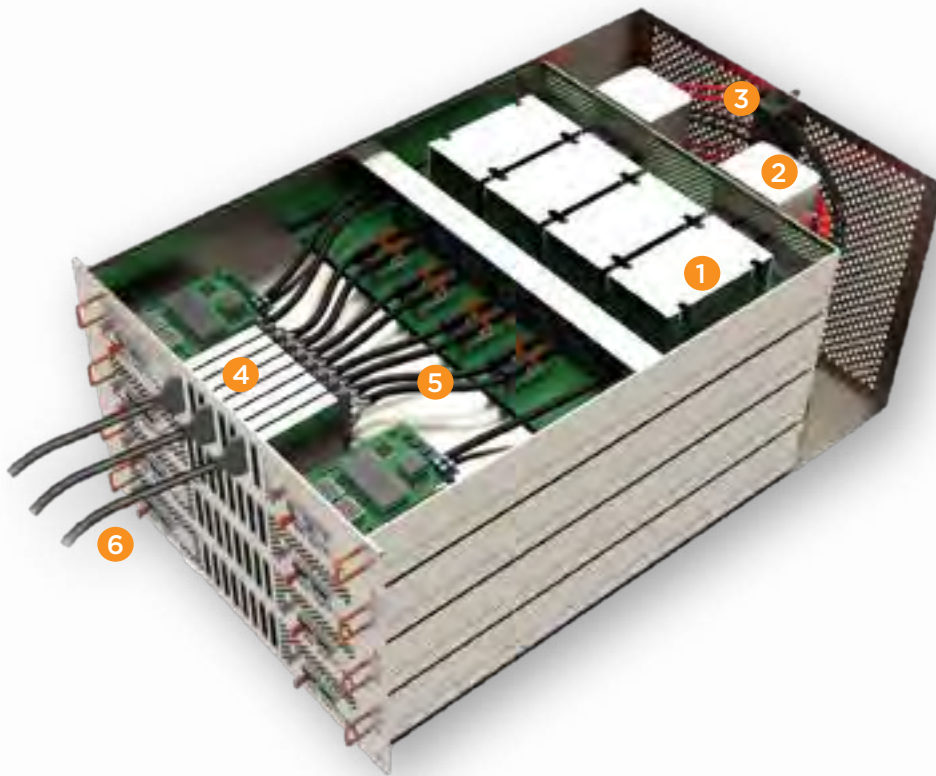


Step 3 - Housing Guides

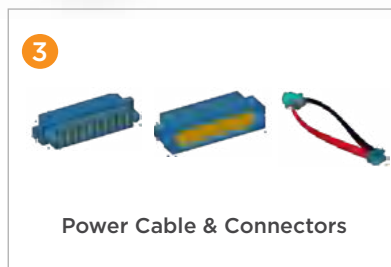
TE IS YOUR PARTNER FOR 112G INFRASTRUCTURE

The 112G product portfolio supports standard form-factors and performance requirements, and is designed with reliability and upgradability in mind, enabling applications including compute/storage, high-speed networking and artificial intelligence/machine learning.

- Due to the demands on next generation high-speed designs, TE Connectivity (TE) has developed one of the most comprehensive, flexible and high performing internal and external connector and cable assembly portfolios in the market.
- Standard external I/O form factors enable ecosystem connectivity for intra-rack and inter-rack applications.
- Next generation products aligned with the industry's 112G channel performance needs, delivering high marks in cross talk, return loss, insertion loss performance.
- Copper cable solutions provide cost-effective system design and connectivity options to achieve the performance demands of 112G architectures.



1
Compute Module &
Mezzanine Connectors



3
Power Cable & Connectors



5
Internal Twinax
Cable & Connectors





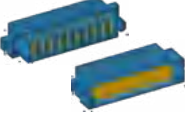
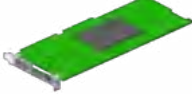










2
STRADA Whisper
Cable Backplane



4
NIC Card/ Front IO



6
DAC Cables

1. Compute Module	2. STRADA Whisper Cabled Backplane & Cartridge	3. Power Cable & Connectors	4. NIC Card Front IO	5. Internal Twinax Cable & Connectors	6. DAC
 <p>Sidestack Mezzanine Connectors</p>	 <p>STRADA Whisper Receptacle</p>	 <p>MULTI-BEAM Plus Power Connector</p>	 <p>QSFP-DD Cage & Connector STRADA Whisper Receptacle</p>	 <p>Mid Board Copper Cables</p>	 <p>QSFP-DD Cables</p>
 <p>CPU socket</p>	 <p>STRADA Whisper Cables</p>	 <p>MULTI-BEAM Plus</p>	 <p>CDFP Cage & Connector</p>	 <p>Mid Board Copper Receptacle</p>	 <p>CDFP Cables</p>
	 <p>Cable Cartridge</p>		 <p>OSFP Cage & Connector</p>		 <p>OSFP Cables</p>

te.com

TE Connectivity, TE Connectivity (logo), TE, STRADA Whisper, MULTI-BEAM Plus and AdrenaLINE Slingshot are trademarks owned or licensed by the TE Connectivity Ltd. family of companies All other logos, products and/or company names referred to herein might be trademarks of their respective owners.

The information given herein, including drawings, illustrations and schematics which are intended for illustration purposes only, is believed to be reliable. However, TE Connectivity makes no warranties as to its accuracy or completeness and disclaims any liability in connection with its use. TE Connectivity's obligations shall only be as set forth in TE Connectivity's Standard Terms and Conditions of Sale for this product and in no case will TE Connectivity be liable for any incidental, indirect or consequential damages arising out of the sale, resale, use or misuse of the product. Users of TE Connectivity products should make their own evaluation to determine the suitability of each such product for the specific application.

©2024 TE Connectivity. All Rights Reserved.

01/24