

A photograph of a server room with rows of server racks. The racks are illuminated with blue and red lights, creating a futuristic and high-tech atmosphere. The perspective is from a low angle, looking down the length of the server aisle.

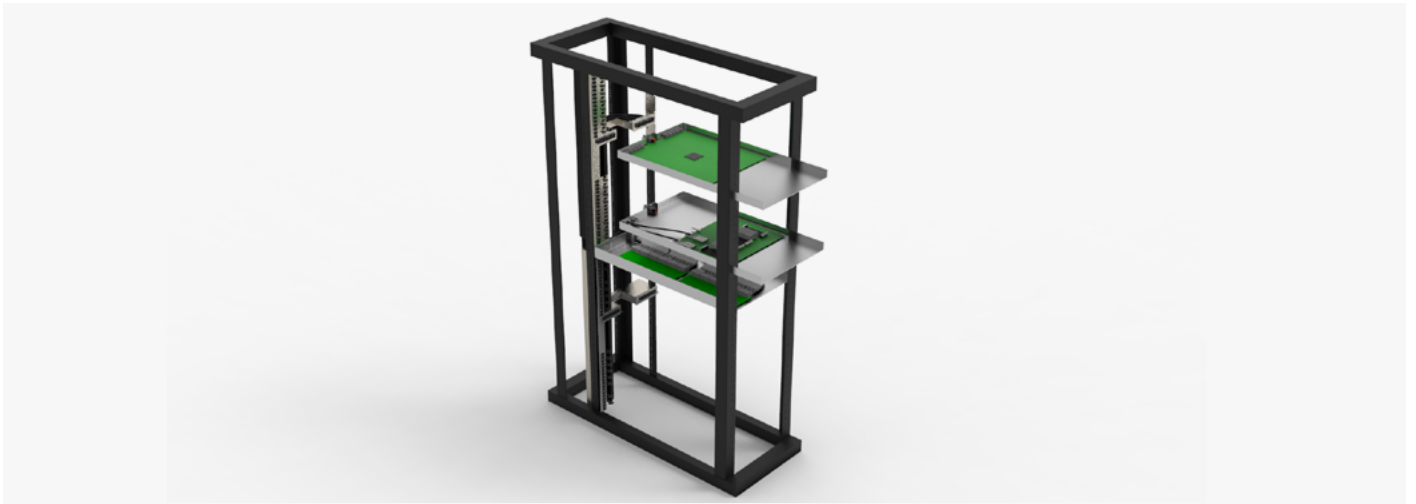
STRADA WHISPER ABSOLUTE BACKPLANE SOLUTIONS GUIDE

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

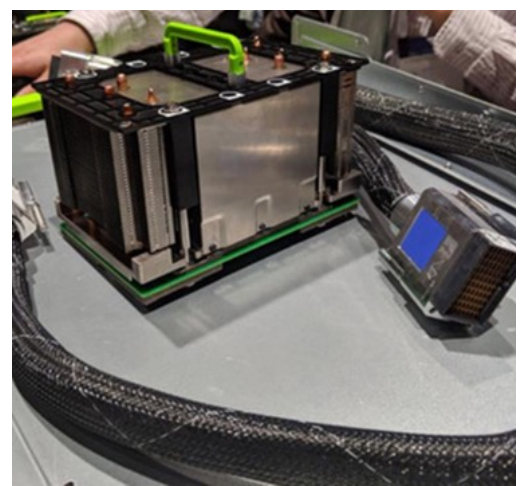
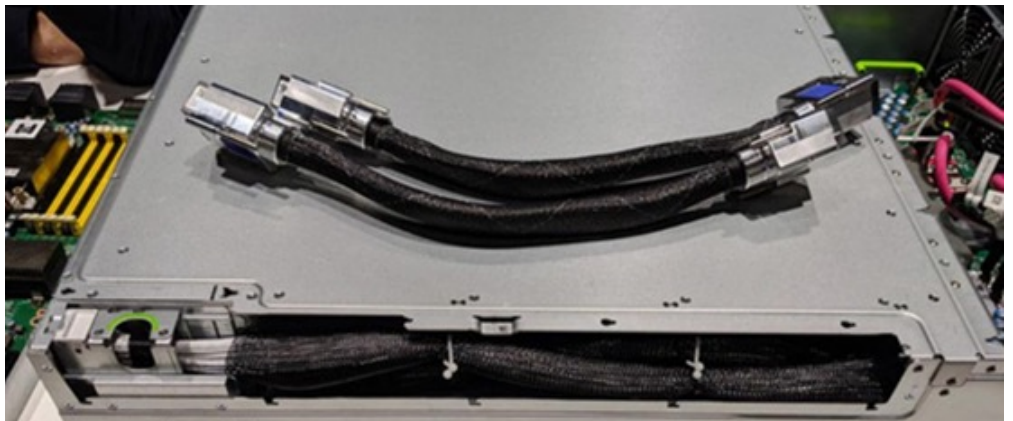
- STRADA Whisper Absolute connector is the default standard interface for LEO satellites demonstrating robustness
- Robust and high performance

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



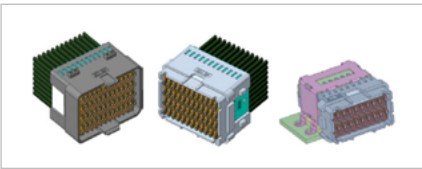
- Successful track record of executing steep ramps
- Does not use any "exotic" or proprietary materials enabling a reduced supply chain risk



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

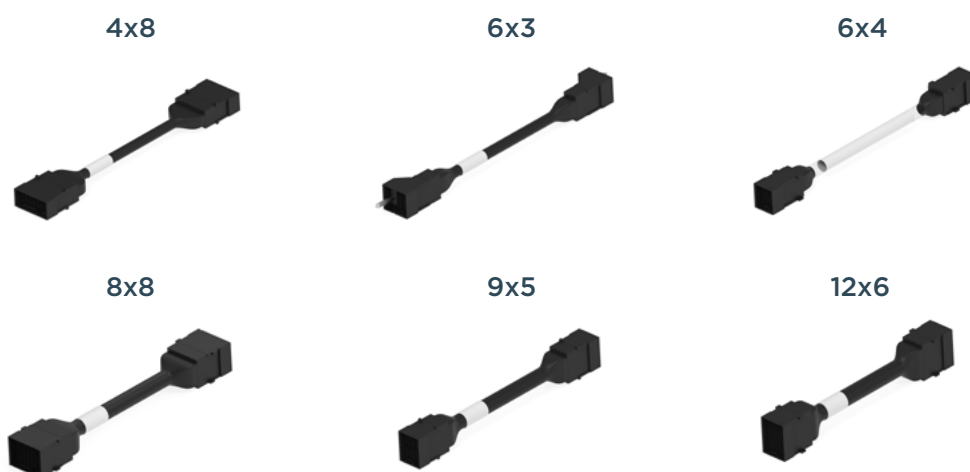
- Backward-compatible mating interface reduces engineering design effort when upgrading from 56G to 112G system
- Manufactured with fully automated assembly process helping reduce operating cycle times, operating cost and enhance machine productivity

STRADA WHISPER ABSOLUTE PORTFOLIO SOLUTIONS

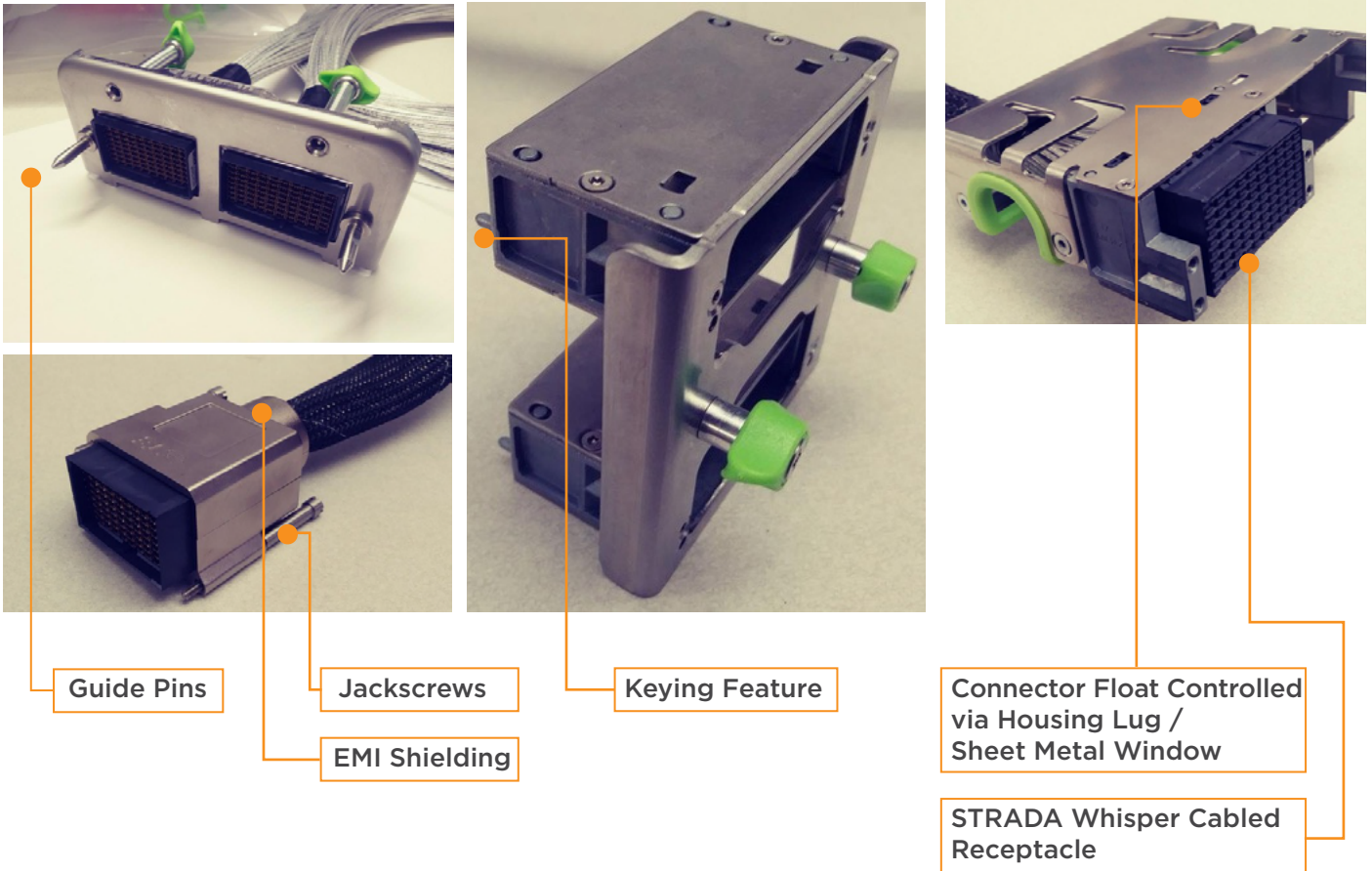
We offer 4 solutions:

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



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



Guide Pins

Jackscrews

EMI Shielding

Keying Feature

Connector Float Controlled via Housing Lug / Sheet Metal Window

STRADA Whisper Cabled Receptacle

2 Backshell



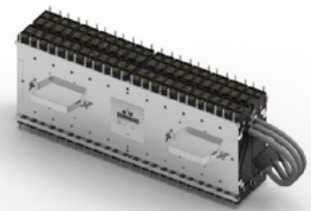
- Typically used in I/O applications or “rack to rack” interconnect
- Cable is fixed into position by an installer
- Field installation / deployment of cables
- Can be oriented in many angles to aid in installation
- Can provide EMI protection when used in conjunction with a metal braid

3 Bricked Cable Assembly



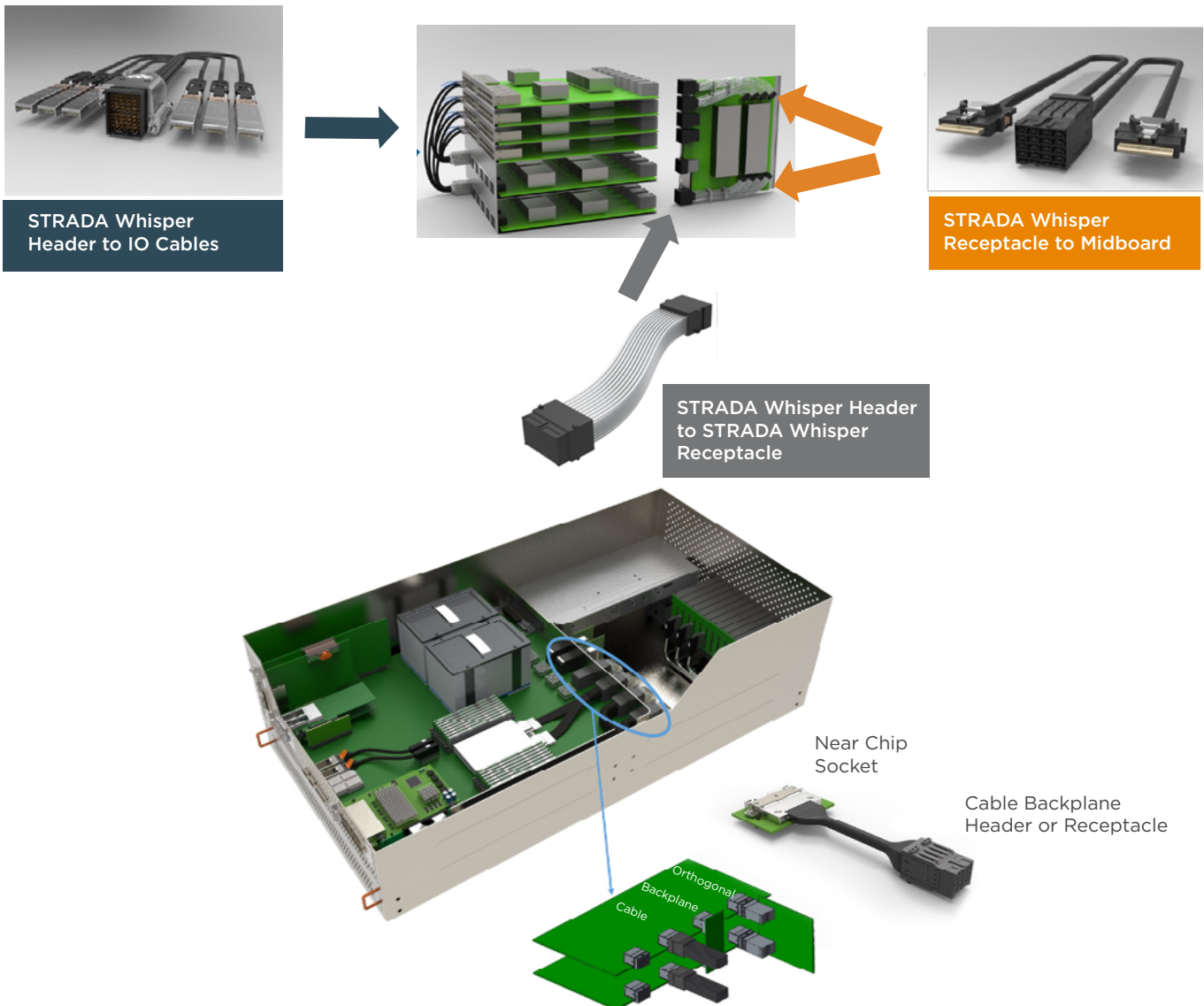
- Allow for the brick to be integrated into a midplane / backplane
- Minimizes assembly for the customer

4 Backplane / Midplane



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

5 Interoperability and Interconnectivity Options



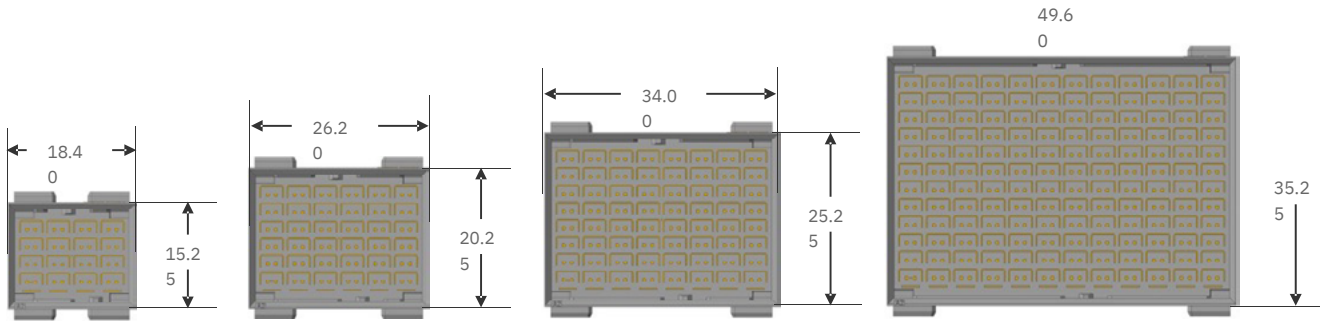
6 Cartridge Systems Available



STRADA WHISPER ABSOLUTE PORTFOLIO ENABLES:

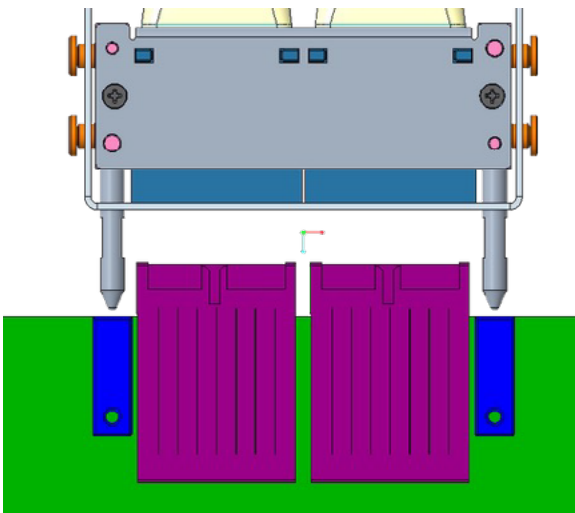
- Blind mate connections (float & gatherability) enable eased serviceability
- Breakout cabling allows for complex network switching, accelerator pooling, and storage array topologies
- Compatibility with other standard interfaces fosters ecosystem development

STRADA WHISPER ABSOLUTE CONNECTORS SIZING

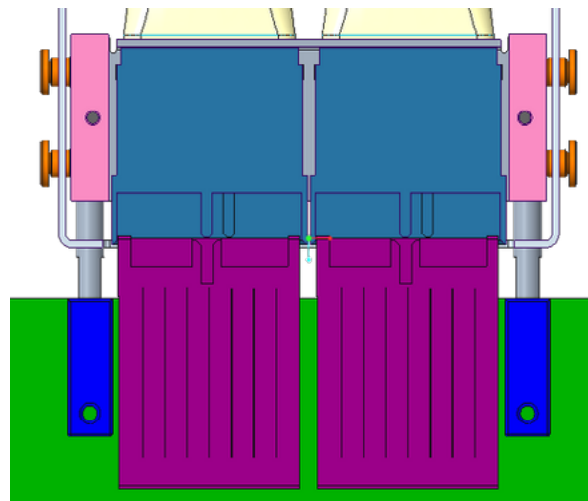


- 3.90mm column to column pitch
- 2.50mm row to row pitch
- 4pr, 6pr, 8pr, and 12pr are most popular pair count sizes
- Even number column counts more typical
- Many configurations tooled and others are easily added with flexible tooling family

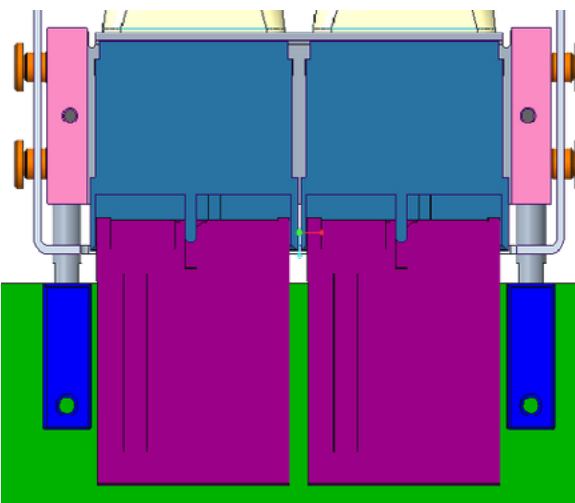
STRADA WHISPER ABSOLUTE CONNECTORS MATING SEQUENCE



Step 1 - Guide Pins



Step 2 - Housing Shroud

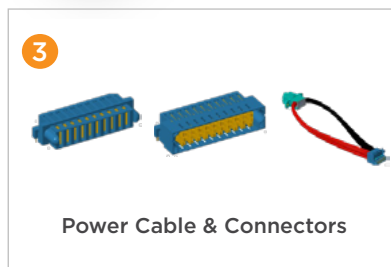
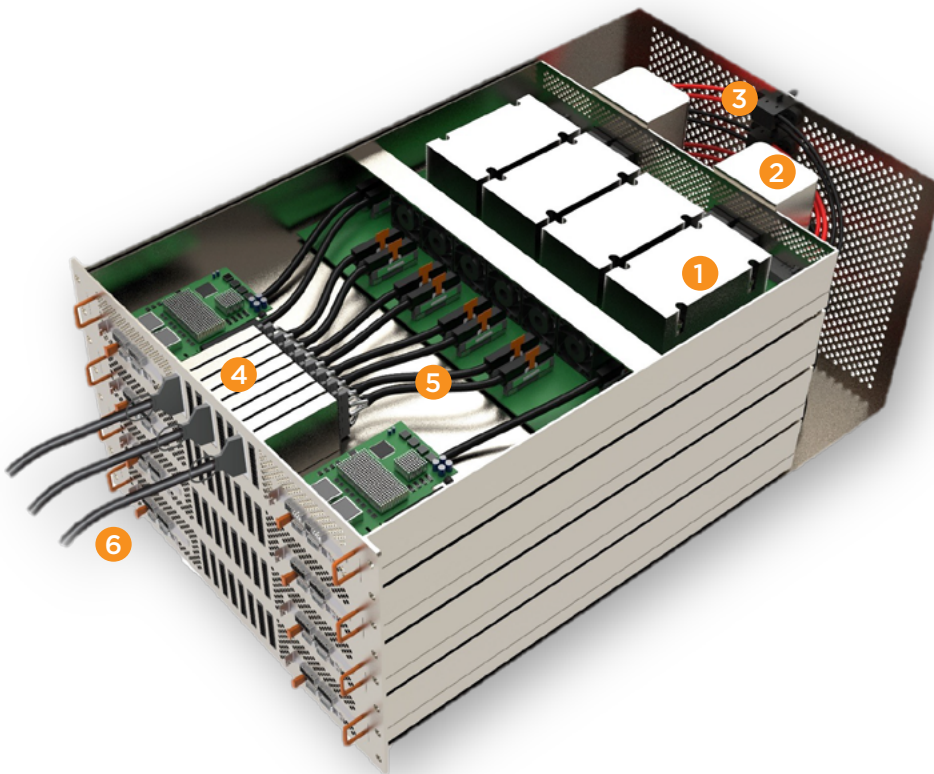



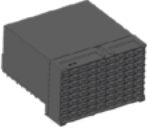
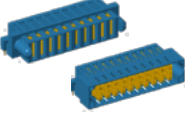
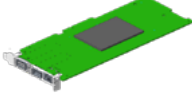











Step 3 - Housing Guides

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	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>

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01/24