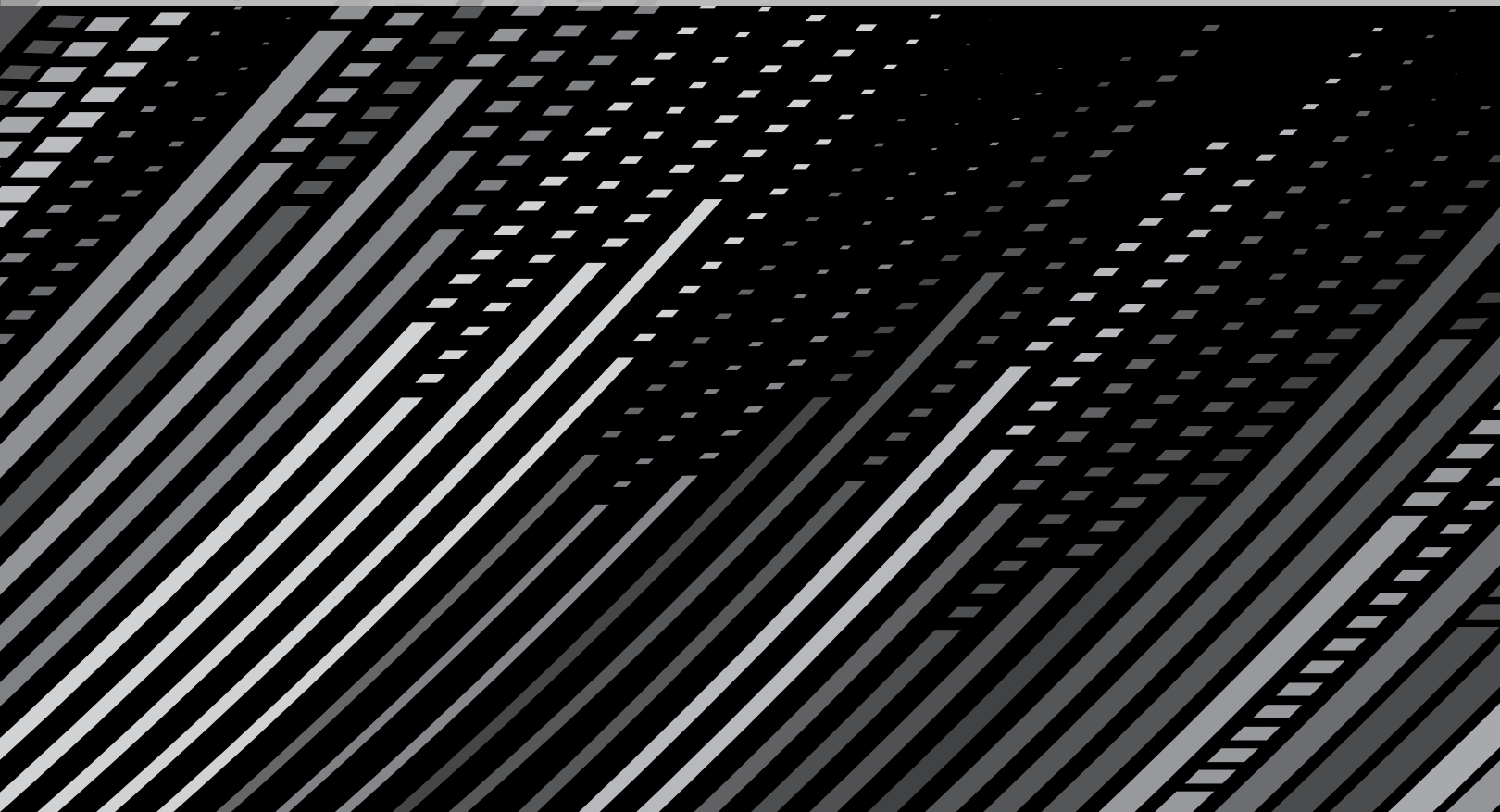


TECHNOLOGY OVERVIEW



INTEGRATION LEADS TO INNOVATION

Samtec Technology Centers Enable Complete System Optimization from Silicon-to-Silicon™

Samtec's Technology Centers offer **high-level design and development** of advanced interconnect systems and technologies, along with **industry-leading signal integrity expertise** which allows us to provide effective **strategies and technical support for optimizing the entire serial channel of high-performance systems.**

Because Samtec's Technology Centers are not limited by the boundaries of traditional business units, **we are able to work in a fully integrated capacity that enables true collaboration and innovation** to support the **demands of today, and the challenges of tomorrow.**



HIGH-SPEED
CABLE

A circular image showing a close-up of several purple high-speed cables with connectors, arranged in a row.

ADVANCED
INTERCONNECTS

A circular image showing a dense array of red interconnect pins or connectors, viewed from a slightly angled perspective.

SYSTEM SIGNAL
INTEGRITY

A circular image with an orange background, featuring a pattern of interconnected nodes and lines, representing signal integrity.

MICROELECTRONICS

A circular image showing a blue microelectronic circuit board with various components and traces.

OPTICS

A circular image showing green optical components, possibly fiber optic connectors or lenses, arranged in a row.

PRECISION RF

A circular image with a teal background, showing a pattern of concentric circles and lines, representing radio frequency (RF) signals.

samtec.com/tech-centers

Increasingly complex systems with escalating bandwidths and shrinking footprints drive Samtec to continually develop and expand our technical expertise and capabilities. High-level support for **high-speed interconnect system design**, **full channel signal integrity optimization**, and the **development of next generation technologies**, allows Samtec to provide innovative solutions and strategies for real-world challenges.

FULL CHANNEL CHALLENGES • SILICON-TO-SILICON SOLUTIONS

Full Channel Signal Integrity Optimization



Industry-Leading System Level SI Expertise

Reducing Expensive Layers & Exotic Materials



High-Speed Backplane & Materials Expertise

FPGA-Based Applications System Evaluation



Resources for Verification & Faster Time-to-Market

Increasing Bandwidths & Less Board Space



Extreme Density Products for 56+ Gbps Demands

Longer Trace Lengths & Increased Layer Counts



SI-Optimized Technologies Bypass Lossy Materials

Extreme Miniaturization & Integration Demands

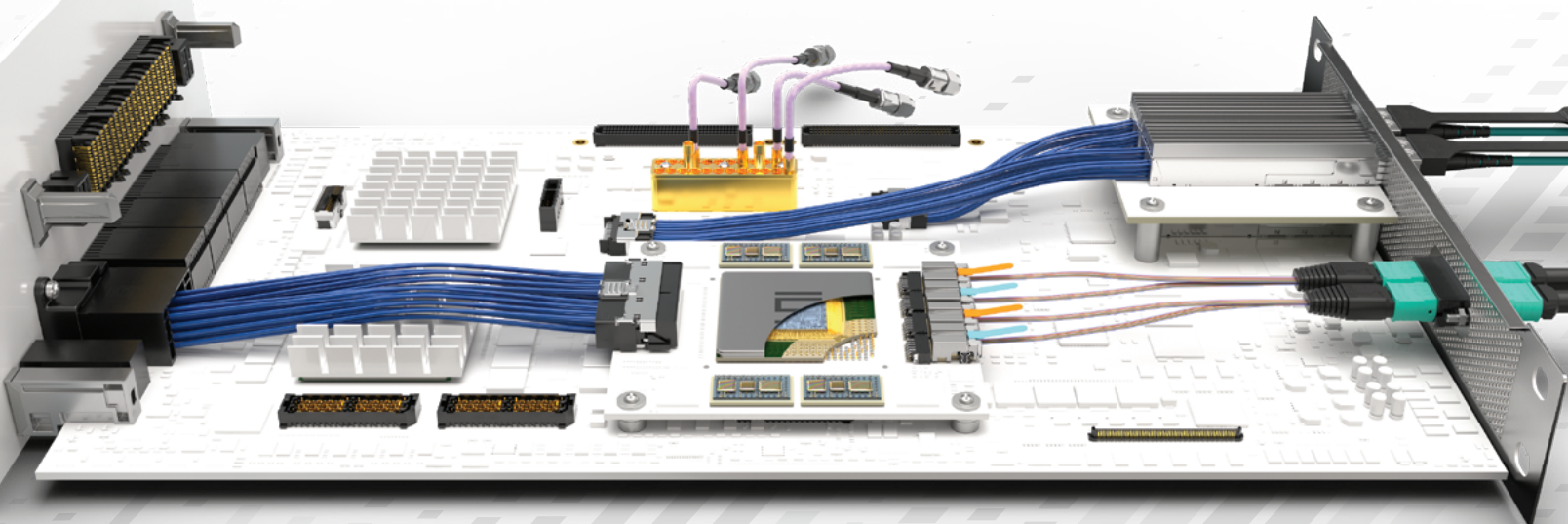


Next Generation Microelectronics Technologies

56 / 112 Gbps PAM4 System Architectures



Signal / Power Integrity & Thermal Strategies





FULL SYSTEM OPTIMIZATION...

HIGH-SPEED CABLE

ADVANCED INTERCONNECTS

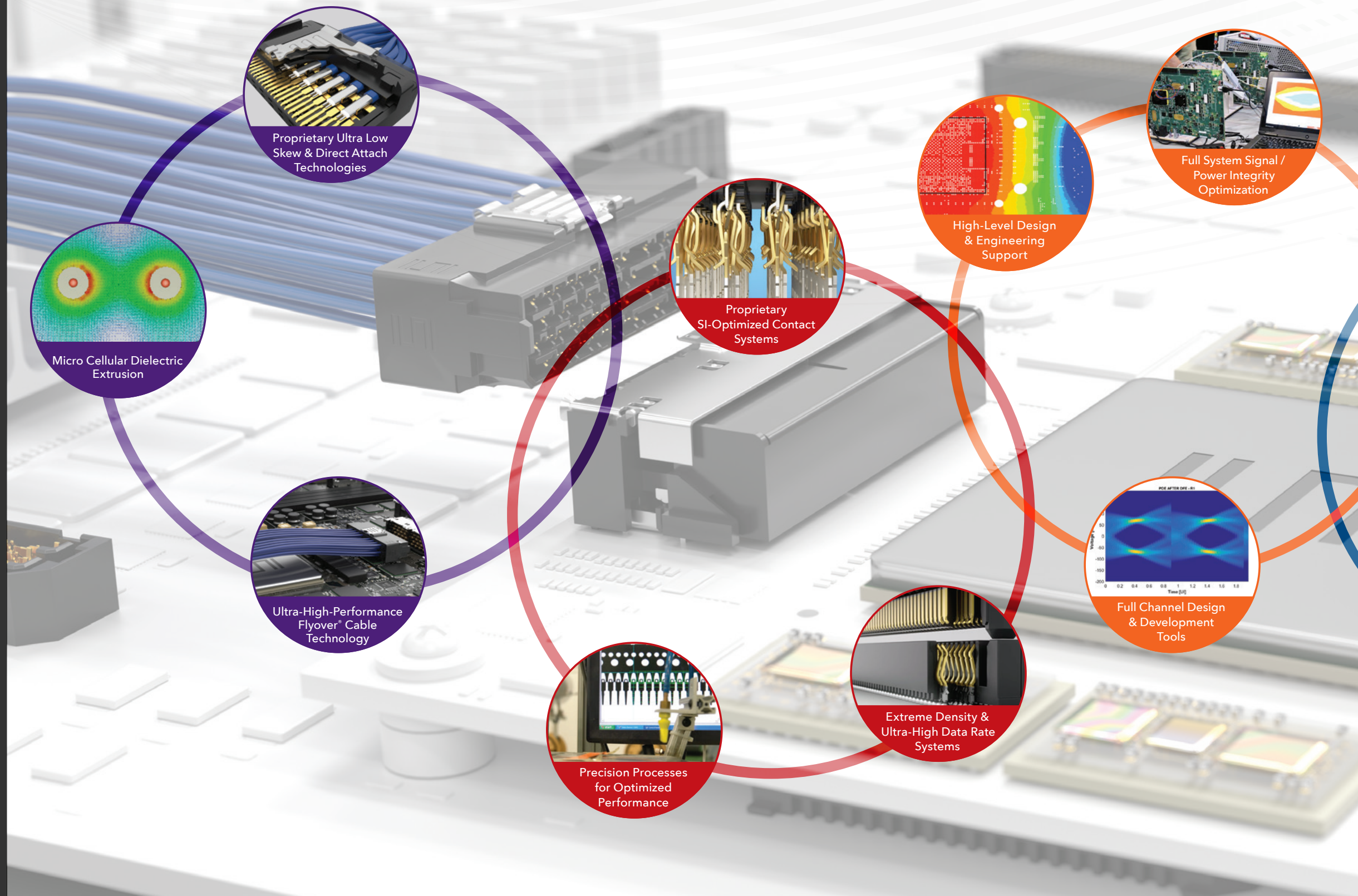
SYSTEM SIGNAL INTEGRITY

SUPPORTING THE DEMANDS OF TODAY

Samtec is recognized as the Service Leader in the interconnect industry, offering a broad line of proven interconnect solutions, from standard and high-speed connectors and cables, to ultra-micro, ultra-high-performance systems, including high-speed backplane, optics and microelectronics.

Samtec Technology Centers provide technical expertise and strategies, along with specialized support and product solutions for optimizing the entire signal path of a system.

Our global manufacturing facilities employ world-class processes and equipment to ensure the highest quality products with the shortest lead-times in the industry.



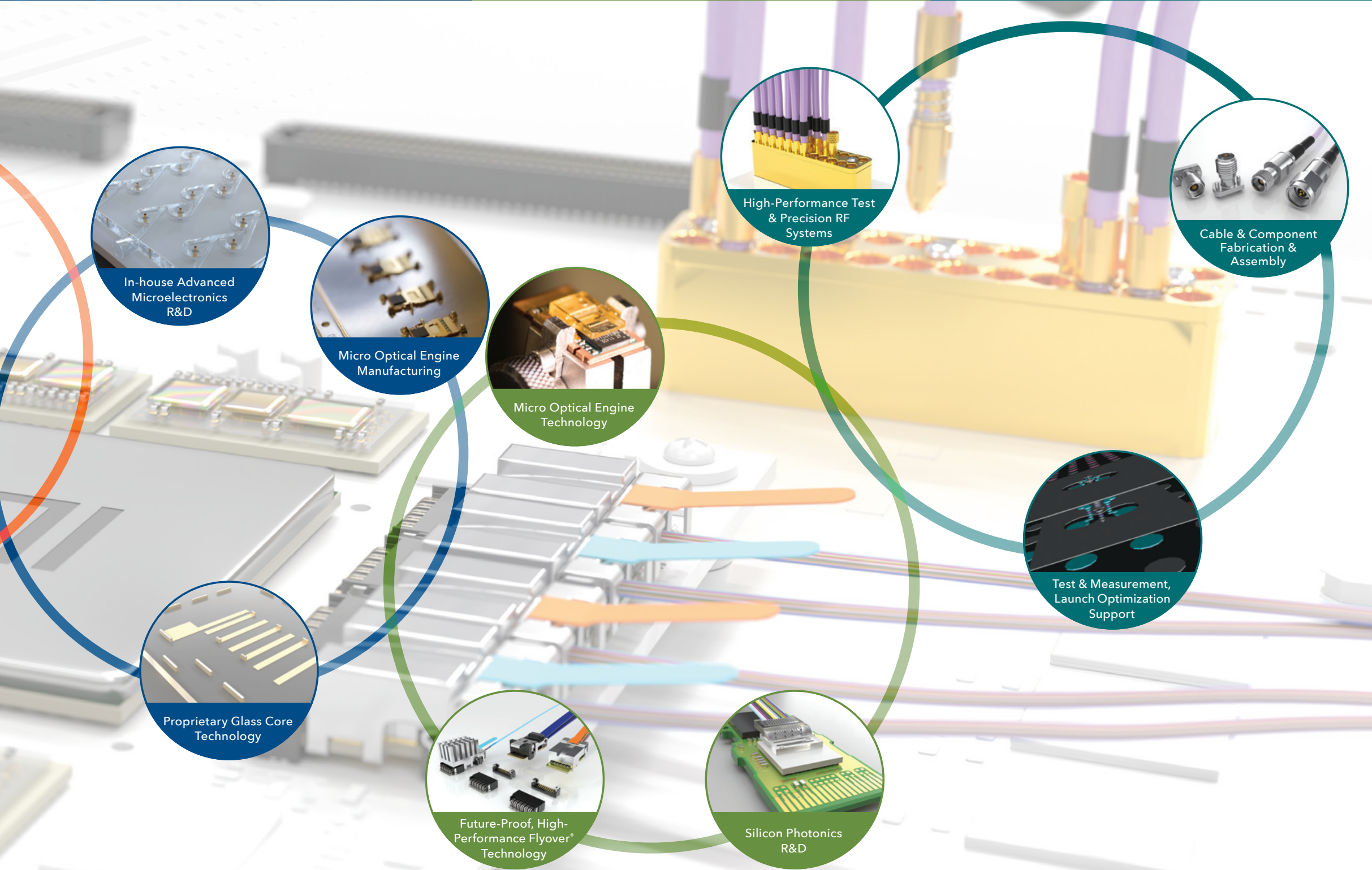
FROM SILICON-TO-SILICON™



MICROELECTRONICS

OPTICS

PRECISION RF



PREPARING FOR THE CHALLENGES OF TOMORROW

Continuous investment in new technologies, processes and expertise positions Samtec to support complex and challenging system demands as requirements quickly approach speeds of 112 Gbps and beyond.

Our R&D efforts are directed at meeting next generation challenges including increasing throughput, scalability, power and thermal management concerns, with innovative, yet cost-effective solutions.

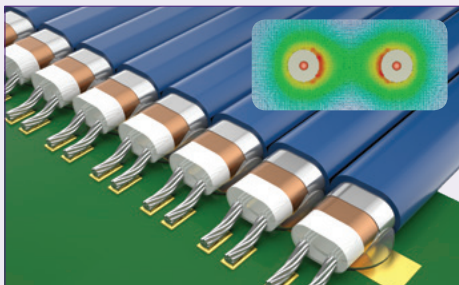
Samtec is also continuing to expand our "SI Toolbox" to provide customers with even more tools to help streamline the design and development process, and our expertise to think smaller, faster and more dense than ever before.

SAMTEC TECHNOLOGY CENTERS

INTEGRATION LEADS TO INNOVATION

HIGH-SPEED CABLE

New Albany, IN • Wilsonville, OR



- Optimized Process Controls
- Micro Cellular Dielectric Extrusion
- High-Speed Cable Automation
- In-house Micro Coax & Twinax Cable Design & Fabrication
- Proprietary Ultra Low Skew Twinax Cable Technology
- Proprietary Direct Attach Cable Technology
- Custom Cable Assembly Design & Development

ADVANCED INTERCONNECTS

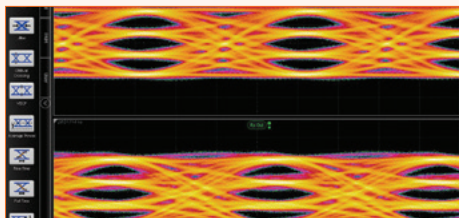
New Albany, IN • Columbia, SC
Guangdong Province, CN • Tempe, AZ



- High-Performance Interconnect Design
- Test & Evaluation Support
- Materials Science / R&D
- High-Speed Automation, Insert Molding and Precision Stamping
- Signal Integrity-Optimized Systems
- Extreme Density Designs
- Industry Leading Data Rates

SYSTEM SIGNAL INTEGRITY

New Albany, IN • Harrisburg, PA
Columbia, SC • Taipei, TW • Boston, MA



- Component & System Level Optimization
- Materials Science / R&D
- PCB Layout / Design Assistance
- Power / Thermal Management Strategies
- Application Specific Design Assistance
- Advanced Hardware / Software for Full System Evaluation
- Breakout Region Design Tools & Recommendations
- Evaluation Boards, Characterization & Test Kits



Our Technology Centers are comprised of industry-leading experts who provide effective strategies, technical support and advanced product solutions for optimizing the entire signal path of a system. Each Center has specific areas of expertise, but the fact that they are not divided into separate business units allows us to work in a fully integrated capacity that enables true collaboration and innovation.

Advanced Microelectronics R&D

High-Density Via Formation / Fill

Redistribution Layer Metalization

Glass Core Technology

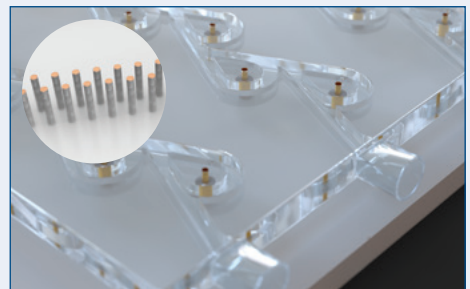
Micro Optical Engine / Microelectronics Manufacturing

Microfluidics, Waveguides & RF

High-Speed Interposers, 3D Packaging & Structures

MICROELECTRONICS

Colorado Springs, CO



850 nm VCSEL Technology

High-Performance Optics Expertise

Advanced SiPho R&D

Micro Optical Engine Design
and Application Support

Future Proof Systems Designed for Easy
Upgrades from Copper to Optical

PCIe® Protocol-Supported Systems

OPTICS

Santa Clara, CA



In-house Cable & Component Manufacturing

Custom & Original Solutions

Test & Measurement Support

Launch Optimizations and Simulations

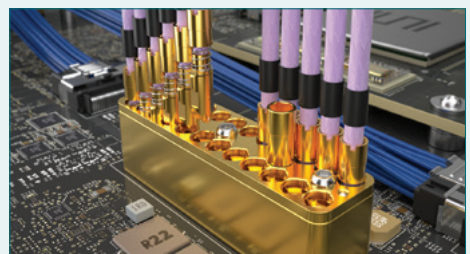
In-house Cable Assembly

12G-SDI Broadcast Video & 5G Network Solutions

High-Performance Test & Precision RF Solutions

PRECISION RF

New Albany, IN • Taipei, TW
Wilsonville, OR • Tempe, AZ



INTEGRATION LEADS TO INNOVATION

Innovation: NovaRay® Extreme Density High-Performance 112 Gbps PAM4 Arrays

CHALLENGE

- Increasing demand for extremely small form factors and ultra-high data rates
- Significant design, engineering and testing resources needed to develop innovative solutions to meet 112+ Gbps PAM4 performance demands

METHOD

- Ongoing investment in expertise enables quick development cycles
- Industry-leading expertise in **Advanced Interconnects**, **High-Speed Cables** & **System Signal Integrity** enables extreme performance product design

RESULTS

- Accelerated time-to-market of a ground-breaking technology
- Innovative interconnect system provides industry-leading data rates and extreme density for next generation system demands



Innovation: Custom Solutions Engineered to Meet Stringent Performance Demands

CHALLENGE

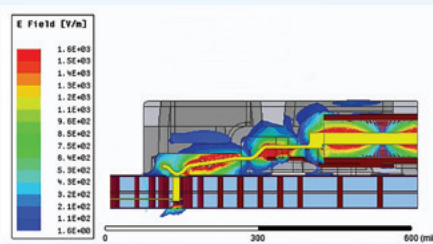
- Bleeding edge applications of new system platforms require innovative form factors to fit high-speed connectivity into small envelopes
- Technical expertise across multiple disciplines required to achieve a cost-effective solution that meets stringent electrical and mechanical requirements

METHOD

- **Advanced Interconnect**, **System Signal Integrity**, **Precision RF** & **High-Speed Cable** collaboration to design, simulate and produce a fully custom solution
- Samtec coaxial cable and direct attach technologies were leveraged to achieve improved system performance and cost-efficient automated processing

RESULTS

- A cost-competitive, ultra-low profile, separable interface eliminates the need for a board-mounted connector
- Custom system offers reduced signal loss, high operating frequency, crosstalk isolation, and industry-leading data rates in a small-form factor



HIGH-SPEED CABLE

ADVANCED INTERCONNECTS

SYSTEM SIGNAL INTEGRITY



Global integration across Samtec's Technology Centers allows us the ability to produce solutions quickly, with higher densities, faster speeds and smaller footprints. And without the rigid boundaries of traditional business units, innovations and developments that happen in one Tech Center are easily shared or transferred to the others, enabling exponential possibilities.

Innovation: Flyover® Technology Extends Reach & Improves Signal Integrity

CHALLENGE

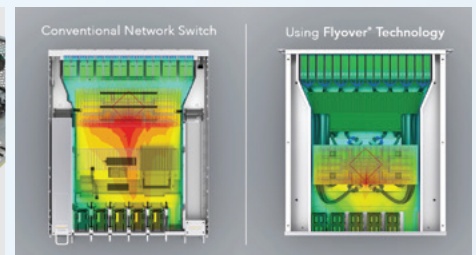
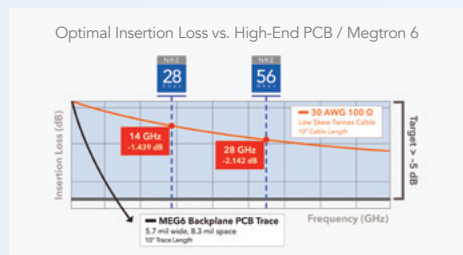
- Increasing demands to maintain and optimize signal reach and integrity at next gen 56 Gbps & 112 Gbps PAM4 speeds, while mitigating costs
- Traditional substrates, hardware and cabling face performance limitations

METHOD

- Advanced Interconnect, System Signal Integrity, High-Speed Cable & Optics** system experts worked together to identify alternative routing strategies
- Leveraging of Samtec's proprietary high-performance interconnect technologies

RESULTS

- Samtec's "Flyover®" technology routes signals through ultra low skew twinax cable, minimizing signal degradation
- Systems offer extended signal reach, simplified board layouts, less expensive materials, and thermal efficiencies



Innovation: Future-Proof Technologies Enable an Easy Path from Copper to Optics

CHALLENGE

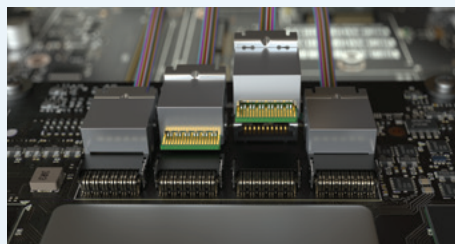
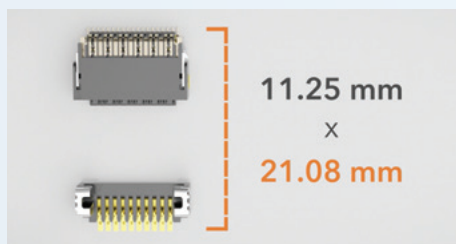
- Increasing challenges of routing signals through PCBs and other lossy materials over longer distances, at higher speeds
- System designers face potentially costly upgrades as bandwidth and signal integrity requirements rapidly increase
- Growing demand for smaller footprints, greater density and design flexibility

METHOD

- Advanced Interconnect, System Signal Integrity, High-Speed Cable & Optics** system experts collaborated to develop an innovative high-performance, ultra-micro mid-board connectivity solution
- Microelectronics** Center utilizes its packaging expertise to produce the high-performance micro optical engine

RESULTS

- FireFly™ is the first interconnect system that gives designers the flexibility to use micro footprint high-performance optical and low-cost copper interchangeably with the same high-performance connector system
- FireFly™ offers industry-leading density and bandwidths, and increased lengths



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