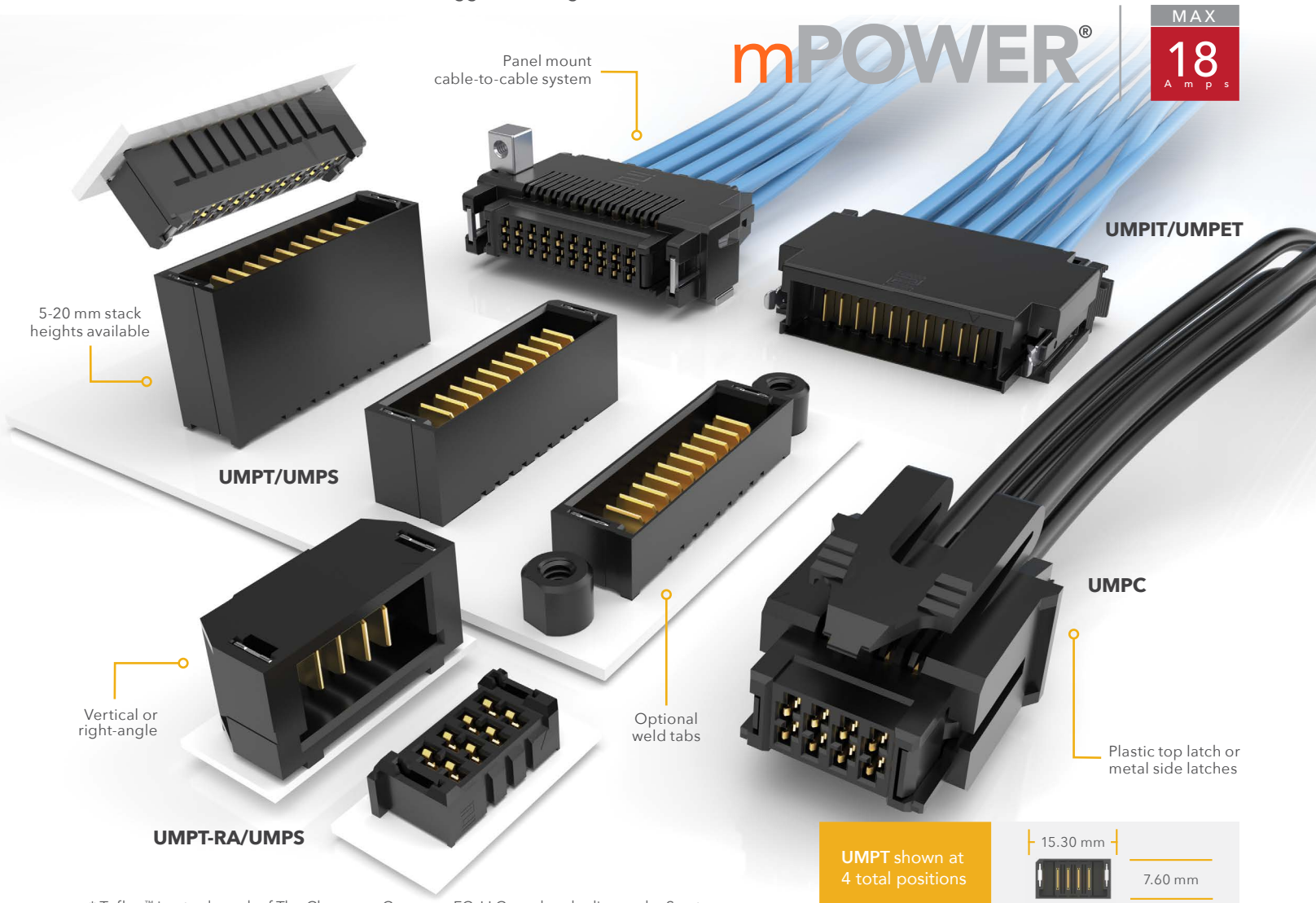




FLEXIBLE POWER

mPOWER® 2.00 mm PITCH ULTRA MICRO POWER SYSTEM

- Design flexibility in one product family for board-to-board, cable-to-board and cable-to-cable applications
- 2 to 10 total positions
- Tin or 10 μ " gold plated power blades; 30 μ " gold plating available to meet specific regulations
- Discrete wire cable assemblies with rugged latching
- Standard creepage (2.20 mm) and clearance (1.65 mm)
- Cable components (IMPC/IMPCC/CC489; IMPE/IMPEC/TC146) and tooling available
- Selectively loading contacts achieves customer specific creepage and clearance requirements; contact asp@samtec.com



* Teflon™ is a trademark of The Chemours Company FC, LLC used under license by Samtec

System

- **UMPT/UMPT-RA** – Power Terminal, Vertical and Right-Angle
- **UMPS** – Power Socket
- **GPST** – SureWare™ Guide Post Standoff
- **UMPC/UMPCCT** – Cable-to-Board Assembly, Socket
- **UMPI/UMPIT** – Cable-to-Cable Assembly, Socket
- **IMPC/IMPCC/CC489** – Socket Cable Components
- **UMPE/UMPET** – Cable-to-Cable Assembly, Terminal
- **IMPE/IMPEC/TC146** – Terminal Cable Components

For more information on Samtec's high-power systems, please visit [samtec.com/mpower](https://www.samtec.com/mpower)

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CONNECTOR SPECIFICATIONS

CURRENT SPECIFICATIONS

CURRENT RATING (PER CONTACT)		
PINS	-T	-G
1	17.8 A	17.5 A
2	15.5 A	16.3 A
3	13.5 A	13.9 A
4	12.9 A	13.2 A
10	9.8 A	8.9 A

Ratings are derated 20% with 30 °C rise to the maximum allowable temperature

CREEPAGE & CLEARANCE

	CREEPAGE	CLEARANCE
UMPT/UMPS	2.20 mm	1.65 mm

Selectively loading contacts achieves customer specific creepage and clearance requirements. Contact asp@samtec.com

POWER SIMULATION

Samtec now offers power simulation that can calculate temperature increase in the connector area. Contact RuggedPower@samtec.com for more details.

MPOWER® SOLUTIONS



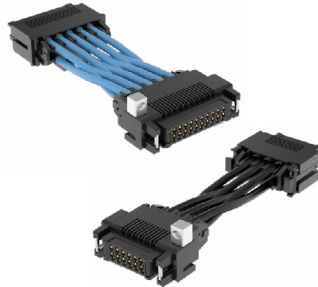
UMPS/UMPT

Power Socket and Terminal Vertical with Optional Weld Tabs Right-Angle with Latching (Cable Mate)



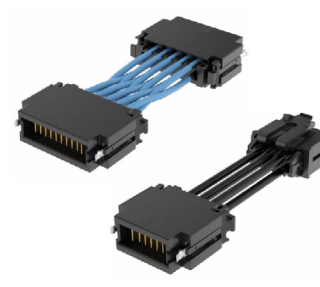
UMPC/UMPCT

Cable-to-Board Assembly, Socket PVC or Teflon™ Fluoropolymer Metal Side Latching or Plastic Top Latch



UMPI/UMPIT

Cable-to-Cable Assembly, Socket PVC or Teflon™ Fluoropolymer Panel Mount with Metal Side Latching



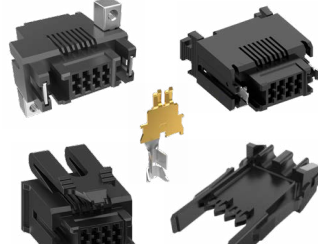
UMPE/UMPET

Cable-to-Cable Assembly, Terminal PVC or Teflon™ Fluoropolymer Metal Side Latching



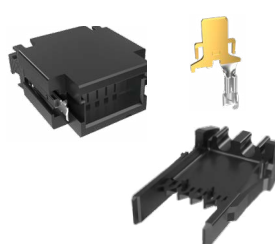
GPSO

SureWare™ Guide Post Standoff 5 – 30 mm Stack Heights



IMPC/IMPCC/CC489

Socket Cable Components Body, Cable Holder, Contact



IMPE/IMPEC/TC146

Terminal Cable Components Body, Cable Holder, Contact

Tooling Mini Applicator

CAT-MC-489-1618-XX-01
(16-18 AWG)

CAT-MC-489-1818-XX-01
(18 AWG)

Visit samtec.com/tooling for more information.

For the latest information about product availability, or to discuss your high-power system application needs, please contact RuggedPower@samtec.com.



PRODUCT OVERVIEW



Full Channel Interconnect Solutions

A DIFFERENT BREED OF CAT

INNOVATIVE TECHNOLOGIES • SUDDEN SERVICE®

Founded in 1976, Samtec is much more than just another connector company. We put people first, along with a commitment to **exceptional service**, **quality products** and **innovative technologies** that take the industry further faster. This is enabled by our unique, **fully integrated business model**, which allows for true **collaboration and innovation** without the limits of traditional business models.

We believe that taking care of our customers and our employees is paramount in how we approach our business, and this belief is deeply ingrained throughout Samtec worldwide.

INNOVATIVE TECHNOLOGIES

At Samtec, integration leads to innovation. We are leading the way in high-performance system design and support for complete system optimization from **SILICON-TO-SILICON™**. Samtec is positioned to produce solutions quickly, with higher densities, faster speeds and smaller footprints to meet the demands of next generation systems.

From standard cataloged products to unique high-performance design, Samtec's **SOLUTION BLOCKS** are designed to support any interconnectivity need, regardless of application, performance requirements or environment.

Silicon-to-Silicon™ Solutions



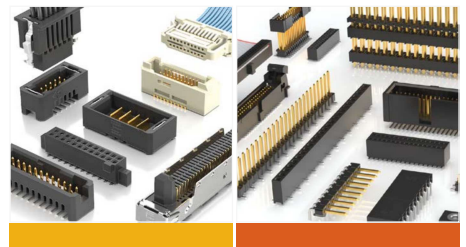
**HIGH-SPEED
BOARD-TO-BOARD**

**HIGH-SPEED
CABLE**

OPTICS

RF

Core Board-to-Board



RUGGED/POWER

**FLEXIBLE
STACKING**

SUDDEN SERVICE®

Samtec is the service leader in the industry, offering unmatched technical support, free product samples and access to online resources, and innovative online tools to help streamline the design process.



#1 in Bishop's Customer Survey of
the Electronic Connector Industry

HIGH-SPEED BOARD-TO-BOARD

10-15

High-Density Arrays • Dual Row Strips • Ultra Micro Interconnects
Edge Card Systems • Backplane Systems

HIGH-SPEED CABLE

16-23

Flyover® Technology & Cable Systems: Panel, Mid-Board & Backplane • Micro Coax & Twinax Assemblies

OPTICS

24-25

Mid-Board Optical Transceivers • Passive Optical System

RF SOLUTIONS

26-31

RF Connectors & Adaptors • RF Cable Assemblies • RF Original Solutions

RUGGED/POWER

32-37

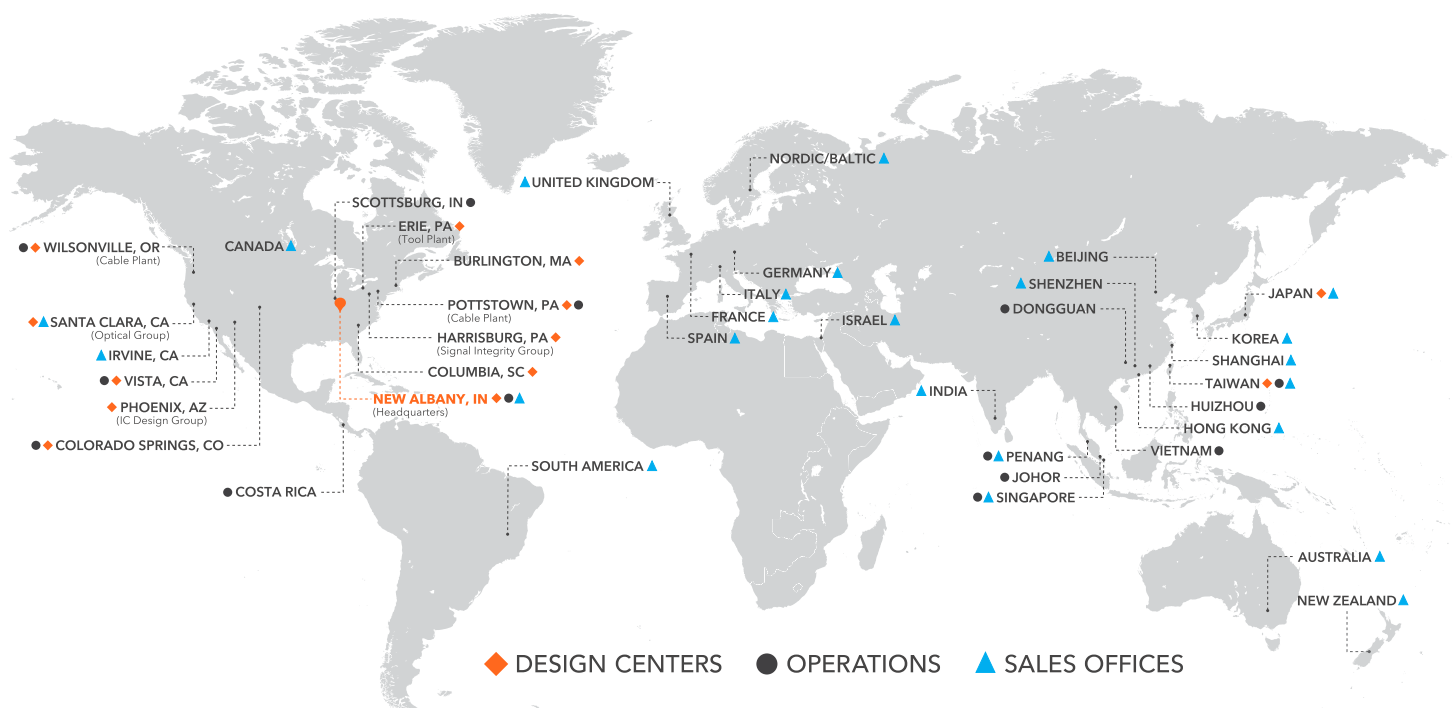
Power Systems • Rugged I/O Systems • Rugged Board-to-Board Systems
Rugged High-Speed Systems • Discrete Wire Assemblies • Ultra Rugged Solutions & Testing

FLEXIBLE STACKING

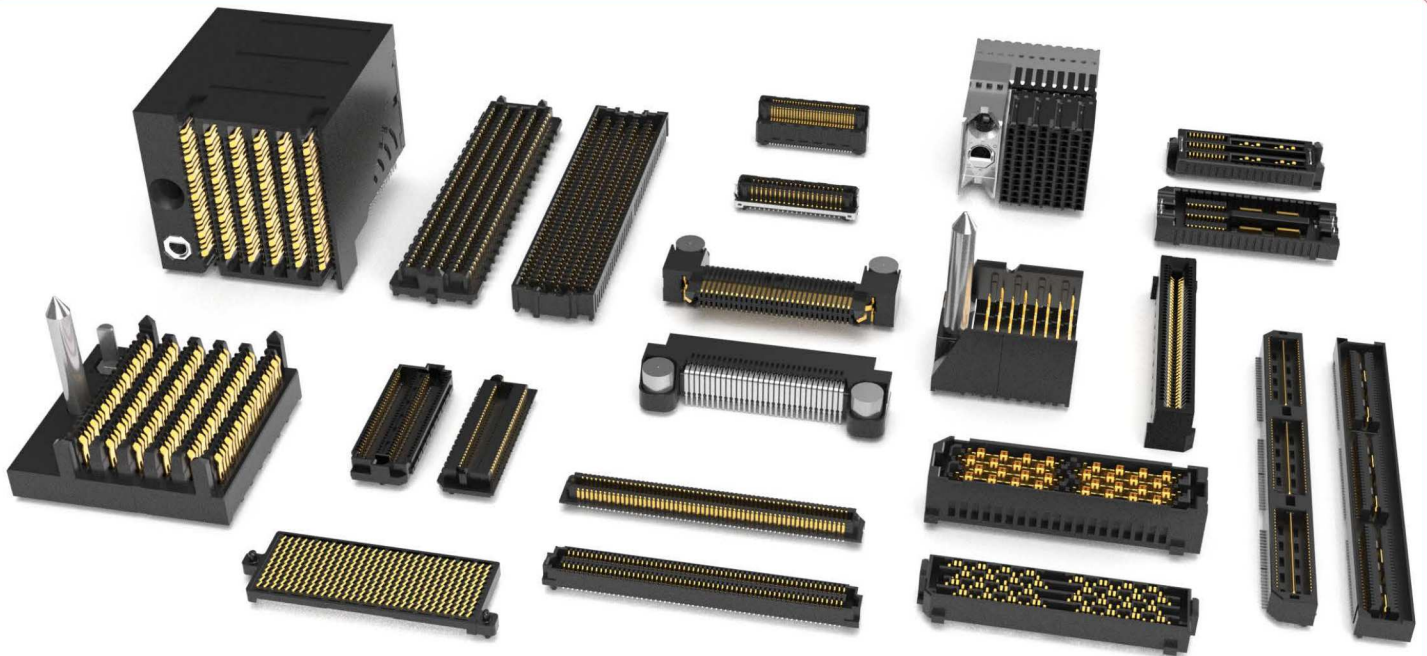
38-41

Flexible Board Stackers • Contact Flexibility • IDC Cable Systems • Modified & Custom Solutions

GLOBAL SUPPORT NETWORK



SOLUTION BLOCKS



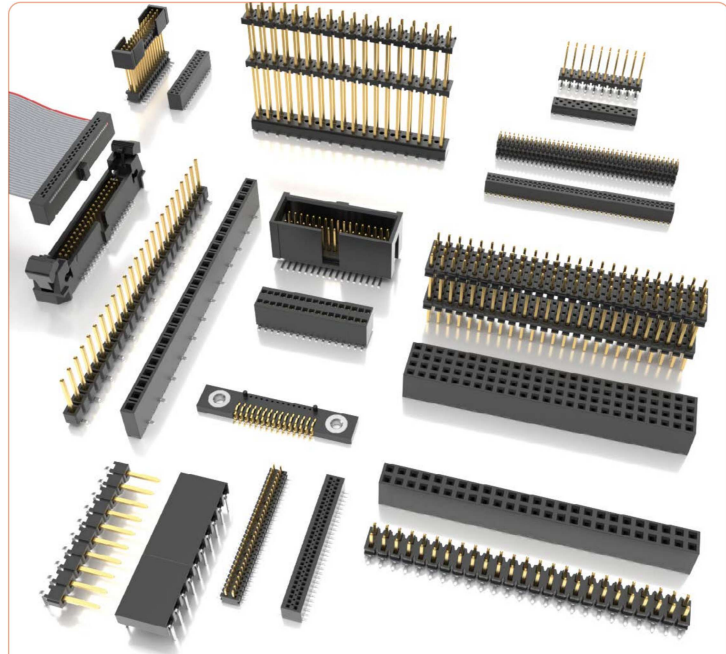
HIGH-SPEED BOARD-TO-BOARD

OPEN-PIN-FIELD ARRAYS | GROUND PLANE & EDGE RATE® STRIPS | EDGE CARDS | ULTRA-MICRO | BACKPLANE



RUGGED/POWER

ULTRA RUGGED | BLADE POWER
RUGGED I/O | BOARD-TO-BOARD | DISCRETE WIRE



FLEXIBLE STACKING

LOW PROFILE | PASS-THROUGH | ONE-PIECE
SKYSCRAPERS | SHROUDED HEADERS | IDC SYSTEMS



HIGH-SPEED CABLES

FLYOVER® & EYE SPEED® CABLE TECHNOLOGY | PANEL, MID-BOARD & BACKPLANE | MICRO COAX & TWINAX



OPTICS

MID-BOARD TRANSCEIVERS | EXTENDED TEMP/RAD HARD
PCI EXPRESS®-OVER-FIBER | NEXT GEN



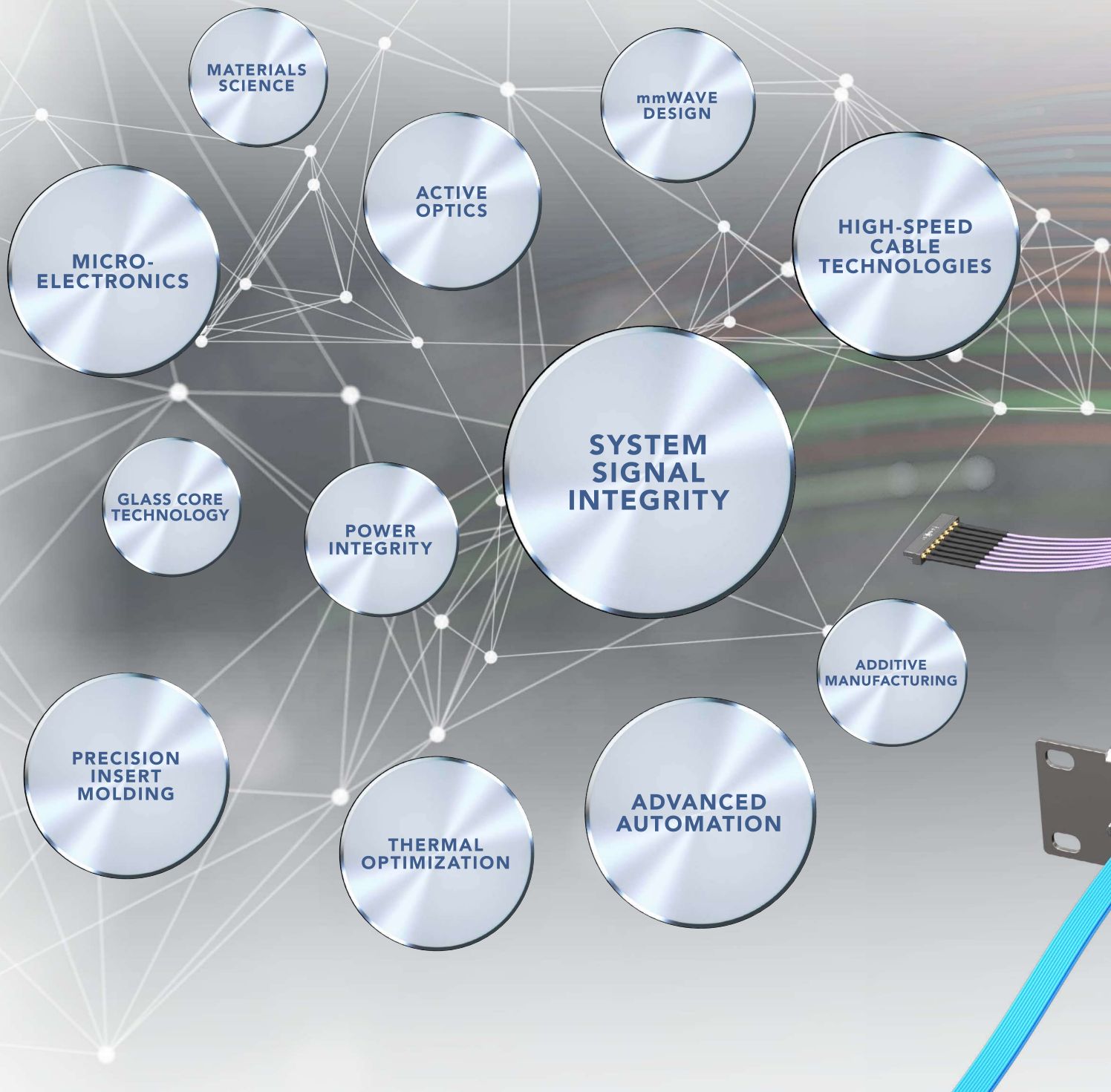
RF

CONNECTORS, CABLES & ORIGINAL SOLUTIONS
PRECISION RF | LOW FREQUENCY

INTEGRATION LEADS TO INNOVATION

Samtec's integrated business model facilitates high-level design and development of advanced interconnect systems and **TECHNOLOGIES**. Along with industry-leading expertise, this allows us to offer effective strategies and support for **optimizing the entire signal channel of high-performance systems.**

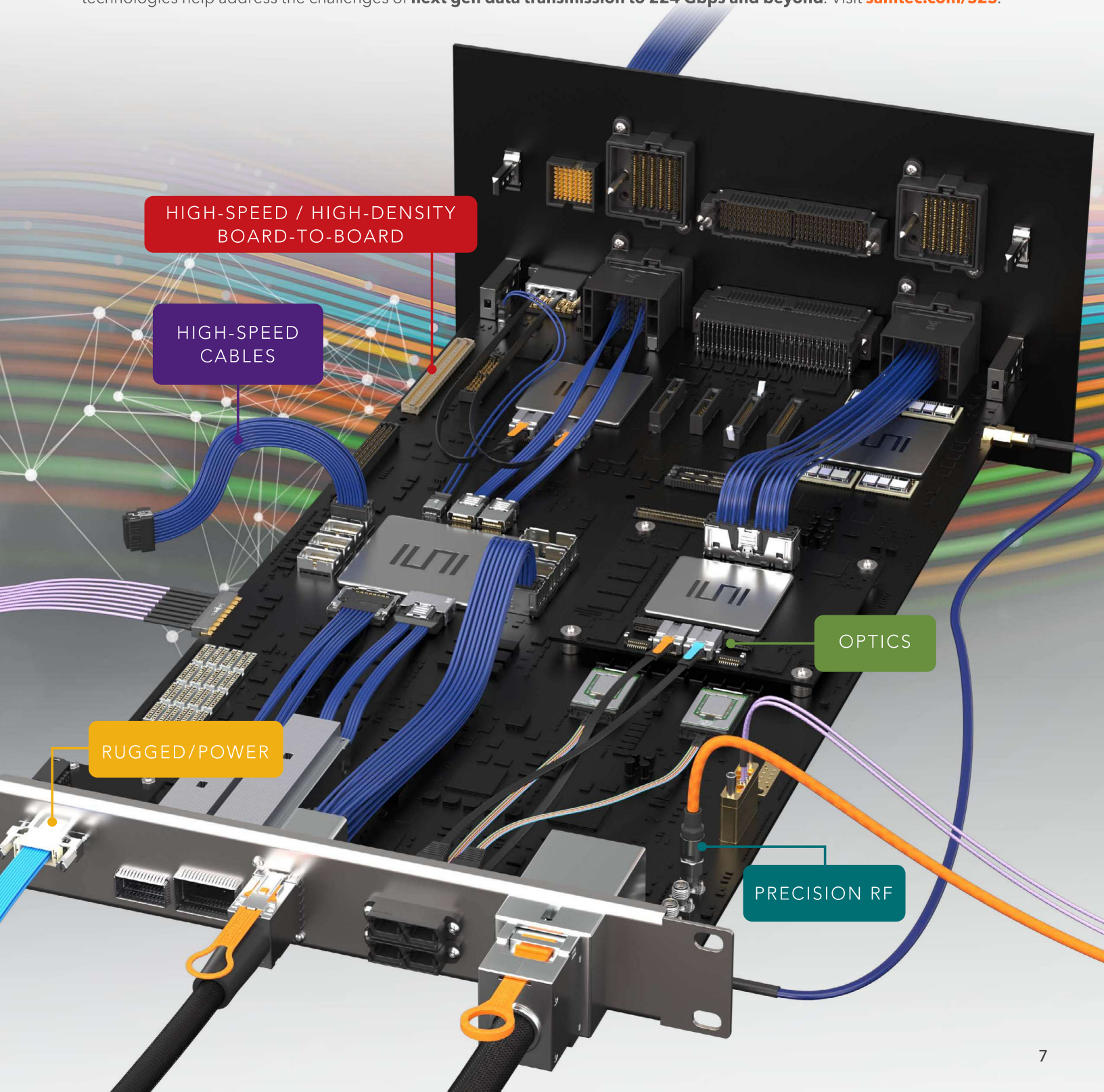
Samtec is structured like no other company in the interconnect industry. We work in a fully integrated capacity that enables true collaboration and results in uniquely innovative **PRODUCTS** because **our technology teams are not limited by the boundaries of traditional business units.**



SILICON-TO-SILICONTM SOLUTIONS

As bandwidth, scale and power requirements continue to challenge conventional engineering methods, Samtec strives to help **optimize the landscape of your entire system** - and develop solutions, together.

Samtec's industry-leading signal integrity expertise, full system optimization strategies, and innovative products and technologies help address the challenges of **next gen data transmission to 224 Gbps and beyond**. Visit samtec.com/S2S.



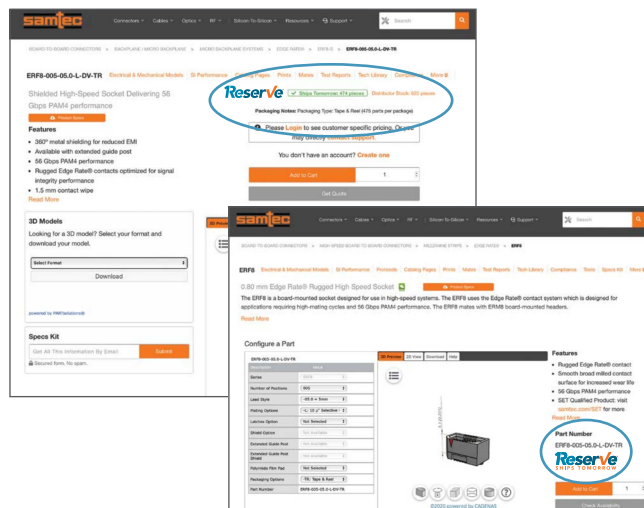
SUDDEN SERVICE®

UNMATCHED LEAD-TIMES Innovative Programs & Systems Enable Deliveries in Days, Not Weeks.



This designation allows customers to **quickly and easily identify availability of over 200,000 of Samtec's most popular connectors and cables** - guaranteed to ship in 1-day.

Look for the **Reserve®** badge throughout **samtec.com** to quickly determine if your part number is eligible, along with current availability, quantity breaks and pricing. Hundreds of part numbers are being added daily!



Free product samples, shipped in 24-hours or less have been a cornerstone of Samtec Sudden Service® since the company was founded. Visit **samtec.com** to quickly request your sample.



An innovative shipping program that **bridges the gap between manufacturing facilities and customers**, allowing for manufacturing flexibility without increased costs, and with even faster lead-times. Contact **ecustomerservice@samtec.com** to learn more.

24/7 WORLDWIDE ACCESS Samtec is the Electronics Industry's Service & Technology Leader.

Technical Support

Signal Integrity Group: **sig@samtec.com**

Application Support Group: **asg@samtec.com**

Interconnect Processing Group: **ipg@samtec.com**

Supply Chain Support

MySamtec™ Real-Time Account Access: **account.samtec.com**

Personal Account Managers & CSRs: **ecustomerservice@samtec.com**

Upfront, Aggressive 24-Hour Quotes: **pricing@samtec.com**

MYSAMTEC™ A Personalized Web Experience for Easy Ordering.

Samtec's user-friendly eCommerce platform allows you to quickly and easily check product availability and pricing, as well as place and manage your orders online.

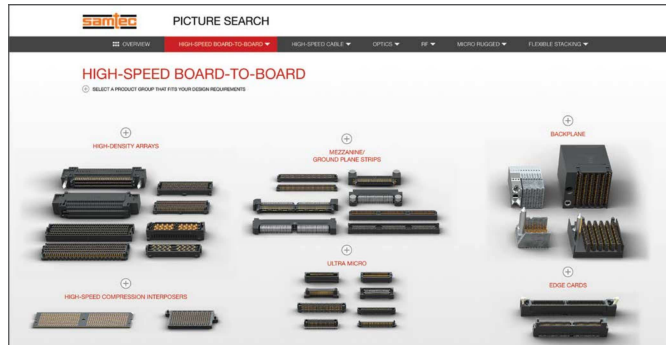
mySamtec™
account.samtec.com

ONLINE TOOLS Find, Design & Validate Your Solution

Quickly and easily find the right solution, whether you prefer to search by product name or characteristics, browse through pictures, or build an assembly by entering physical specifications. Visit samtec.com/digital-tools.

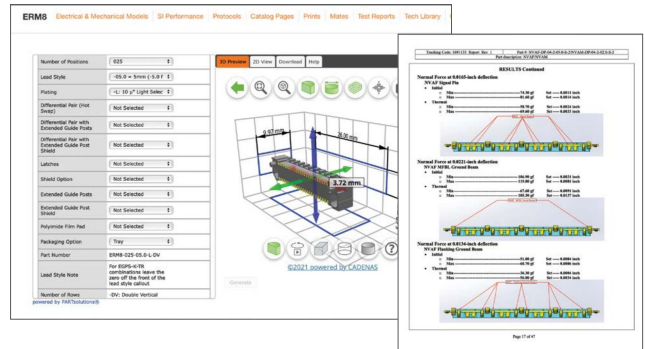
PICTURE SEARCH

Browse through a highlight reel of Samtec's most popular products to find the ideal solution for your application, view specifications, check availability, order samples and more. To find your solution, visit samtec.com/picturesearch.



DOWNLOADS

Samtec offers immediate and unlimited access to all the documentation you need to select the right solution for your application from 3D models, prints and footprints to test reports, white papers and so much more. Visit samtec.com to start exploring.



SOLUTIONATOR®

Quickly build mated connector sets or design full cable assemblies using a wide variety of user-defined search parameters and filters, view specs and order samples in Samtec's online design tools.

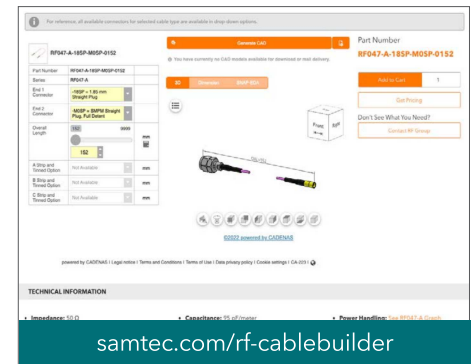
Solutionator^{HS} TO BOARD



Solutionator^{HS} CABLE



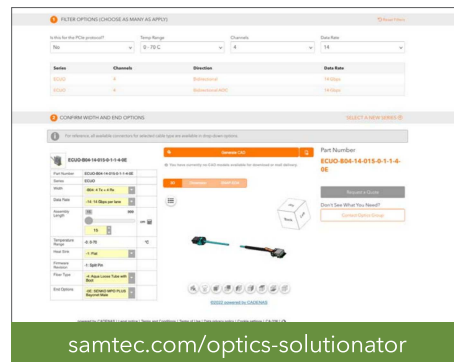
Solutionator^{RF} CABLE



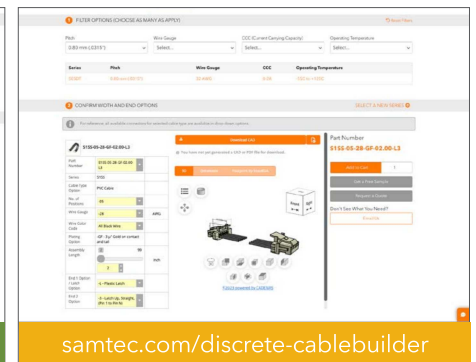
Solutionator^{FLEX} STACKING



Solutionator^{ACTIVE OPTICS}



Solutionator^{DISCRETE WIRE}





HIGH-SPEED BOARD-TO-BOARD & BACKPLANE

Samtec offers the largest variety of high-speed board-to-board and backplane interconnects in the industry with full engineering support, online tools and an unmatched service attitude.

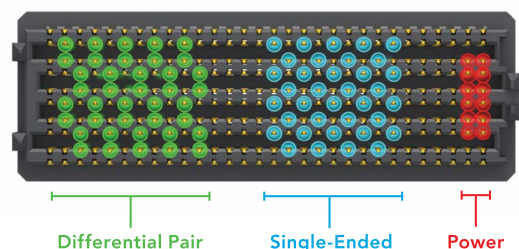
HIGH-DENSITY ARRAYS

samtec.com/arrays

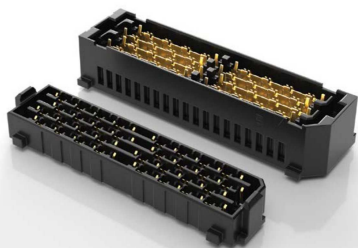
- Up to 800 pins; roadmap to 1,000+
- Open-pin-field arrays for maximum grounding and routing flexibility
- 0.635 mm, 0.80 mm and 1.27 mm pitch; 4 to 40 mm stack heights
- Supports high-speed protocols such as Ethernet, PCI Express® (6.0 capable), CXL® (3.1 capable), Fibre Channel and InfiniBand™
- NovaRay® extreme density arrays support 128 Gbps PAM4 applications; PCIe® 7.0 capable
- Vertical and right-angle, press-fit tails, power/signal combo, standoffs and mating cable assemblies available for increased design flexibility
- Up to 5,000 cycles with SureCoat™ palladium nickel with gold flash plating for high-temp (150 °C), high-cycle applications (SEAM/SEAF; additional products in development)
- Severe Environment Testing qualified (SEAM/SEAF, SEAM8/SEAF8), see pages 36-37

NRZ	PAM4	PAM4
56	112	128
Gbps	Gbps	Gbps

(NovaRay®)



NOVARAY®



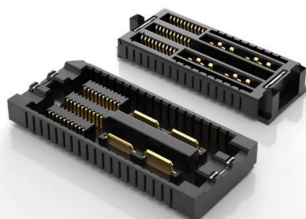
ACCELERATE®HP



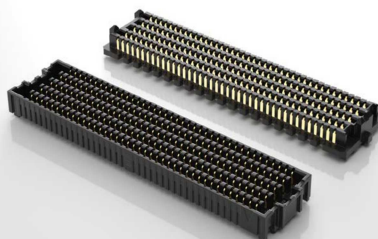
ACCELERATE®HD



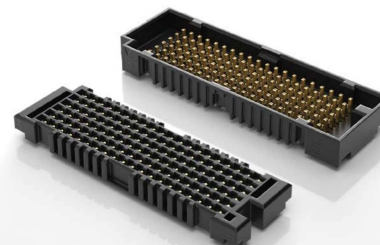
ACCELERATE®mP



SEARRAY™



LPARRAY™



PCI-SIG®, PCI Express® and the PCIe® design marks are registered trademarks and/or service marks of PCI-SIG.

BUILD IT YOURSELF

Check out the High-Speed Board-to-Board Solutionator® to quickly build a mated set for your specific application. Visit samtec.com/hsb2b-solutionator

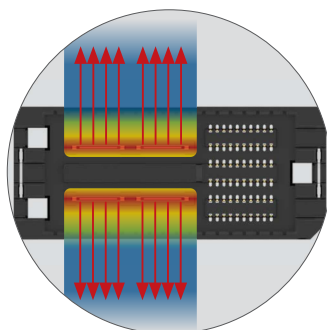
VARIETY OF OPTIONS

Brand/Series	Pitch	Stack Height	Pin Count
NovaRay® (NVAM/NVAF)	0.80 mm	7, 9, 10 & 12 mm	8, 12, 16, 24, 32, 36, 48 pairs
AcceleRate® HP (APM6/APF6)	0.635 mm	5 & 10 mm	80, 160, 240, 400, 800
AcceleRate® HD (ADM6/ADF6)	0.635 mm	5, 7, 9, 10, 11, 12, 14 & 16 mm	40-400
AcceleRate® mP (UDM6/UDF6)	0.635 mm (sig) & 6.00 mm (pwr)	5 & 10 mm	Up to 10 Power & 240 Signal
SEARAY™ (SEAM/SEAF)	1.27 mm	7-18.5 mm	40-560
SEARAY™ 0.80 mm (SEAM8/SEAF8)	0.80 mm	7 & 10 mm	40-500
LP Array™ (LPAM/LPAF)	1.27 mm	4, 4.5 & 5 mm	40-400

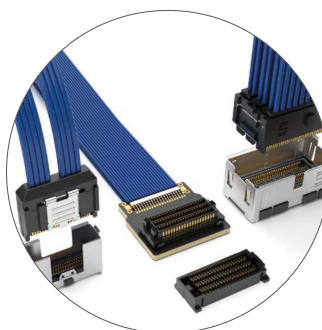
Not all stack height and pin count combinations are available; visit samtec.com/arrays for details



NovaRay® offers two points of contact for a reliable connection



AcceleRate® mP 90° rotated power blades improve performance & simplify breakout region (BOR)



Mating high-speed cable assemblies with micro coax & ultra low skew twinax

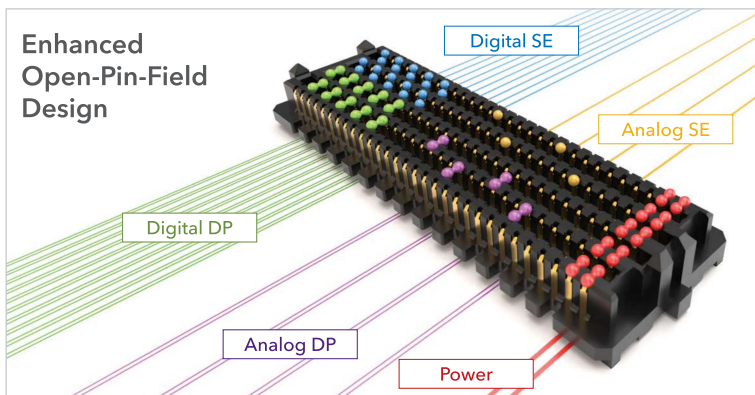


SureWare™ guide post & jack screw standoffs for mating/unmating assistance

ANALOG OVER ARRAY™

DC TO
15
GHz

Samtec Analog Over Array™ connectors can replace dozens of precision RF connectors offering a smaller footprint, less weight and cost optimization. Reference Designs achieve industry-leading differential crosstalk and return loss performance beyond 8 GHz. Visit samtec.com/kits or contact SIG@samtec.com



ALSO AVAILABLE

COMPRESSION INTERPOSERS

SuperNova™ dual compression one-piece interposers with performance to 56 Gbps PAM4 in a low 1.27 mm body height (GMI); 100, 200 and 300 total positions



PROTOTYPE CAPABILITIES

Non-standard profiles and position counts available via Samtec's Additive Manufacturing. Contact hsb2b@samtec.com for details.

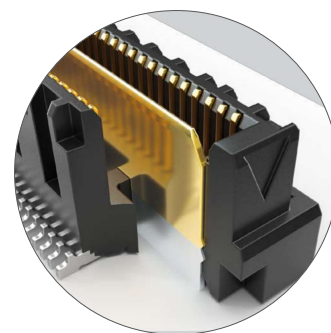
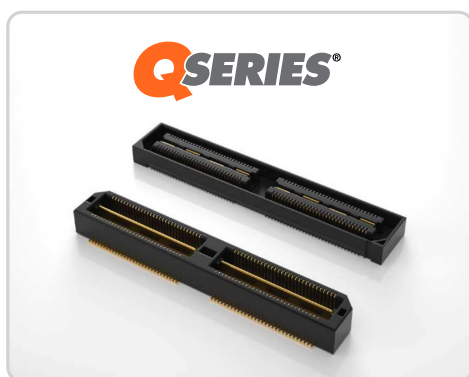
HIGH-SPEED BOARD-TO-BOARD & BACKPLANE

samtec.com/mezzanine

HIGH-SPEED DUAL ROW STRIPS

- Edge Rate® contacts optimized for speed and high cycles; designed at 85 Ω for PCIe® data rates
- Integral ground plane for power to 25 Amps
- 0.50 mm, 0.635 mm and 0.80 mm pitch; 5 to 30 mm stack heights
- Space-saving designs, ruggedizing features and SureWare™ standoff options
- Vertical, right-angle and edge mount
- Extended Life Product™ and Severe Environment Testing qualified (ERM8/ERF8), see pages 36-37

PAM 4	MAX
56 Gbps	25 Amps



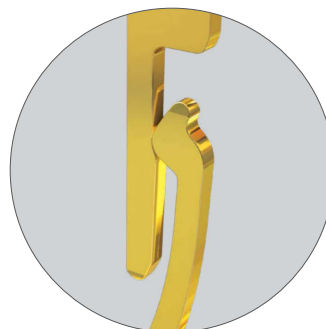
Integral ground plane improves electrical performance and reduces crosstalk

ULTRA MICRO INTERCONNECTS

samtec.com/ultra-micro

- Slim body designs for increased PCB savings; low profile 2 to 12 mm stack heights
- Up to 160 total pins on a choice of pitch from ultra fine 0.40 mm to 0.80 mm
- Hermaphroditic connectors reduce inventory costs
- EMI shielding with rugged latching for higher retention forces
- Right-angle and SureWare™ standoff options
- Floating contact system provides 0.50 mm of float in X & Y directions
- Extended Life Product™ and Severe Environment Testing qualified (LSHM), see pages 36-37

PAM 4
56 Gbps



Razor Beam™ contacts for high-speed and fine pitch systems



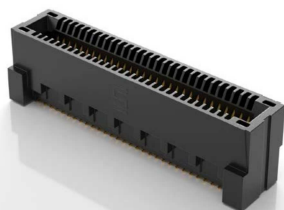
HIGH-SPEED EDGE CARDS

samtec.com/edgecard

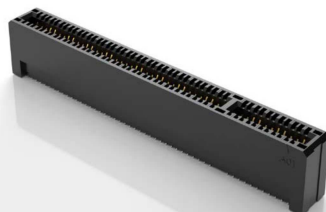
PAM4
64
Gbps

- Generate® high-speed edge card sockets with Edge Rate® contacts for decreased crosstalk
- PCI Express® 3.0/4.0/5.0/6.0 solutions; CXL® capable connectors
- Choice of pitch, 0.50 mm to 2.00 mm, with up to 300 total positions
- Vertical, right-angle, edge mount and pass-through
- Power/signal combo, press-fit tails, rugged tucked beam technology, weld tabs, locks, latches and mating cable assemblies
- Designs for misalignment mitigation

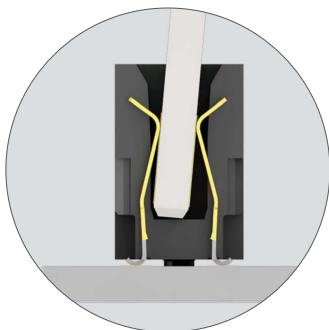
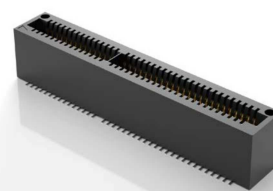
GENERATE™



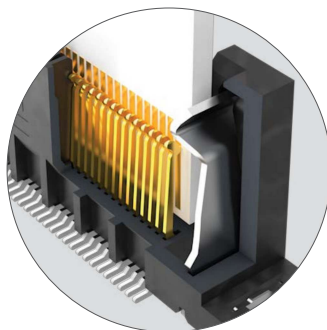
PCI EXPRESS®



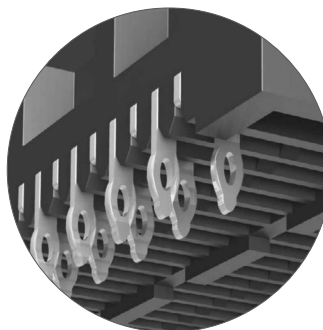
MICRO EDGE CARD



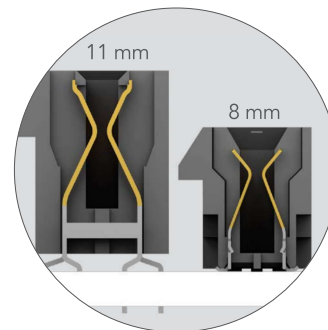
Custom designs aid with misalignment (HSEC1-DV)



Justification beam enables use of standard PCB tolerance (MEC5)



Staggered press-fit tails (MEC8-VP)



PCI Express® low profile versions for space savings (PCIE-LP)

EDGE RATE® CONTACT SYSTEM

- Smooth milled mating surface reduces wear and increases durability
- Lower insertion and withdrawal forces
- Robust when “zippered” during unmating
- Minimized parallel surface area reduces broadside coupling and crosstalk
- Designed, simulated and optimized for 50 Ω and 100 Ω systems

EDGE RATE®
SYSTEM

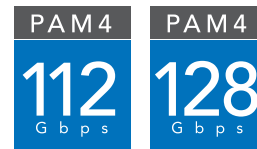


HIGH-SPEED BOARD-TO-BOARD & BACKPLANE

samtec.com/backplane

HIGH-SPEED BACKPLANE

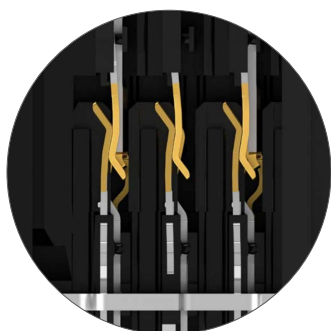
- Variety of configurations: traditional backplane, direct-mate orthogonal, coplanar, Flyover® cable systems
- Up to 128 differential pairs total
- NovaRay® micro rugged backplane features an offset footprint for optimal SI performance to 128 Gbps PAM4; PCIe® 7.0 capable
- ExaMAX® and NovaRay® provide two points of contact for a reliable electrical connection
- XCede® HD features a small form factor and modular design for space savings and flexibility
- Guidance, keying and power modules



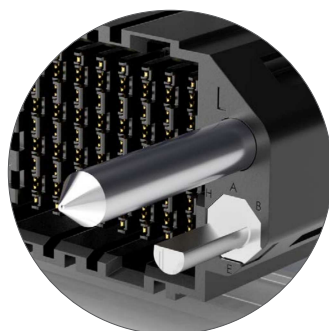
(NovaRay®)



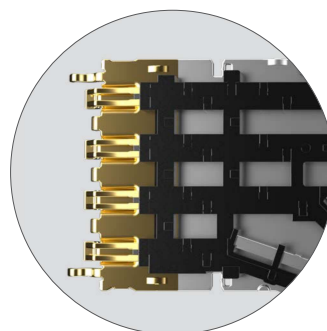
NOVARAY®



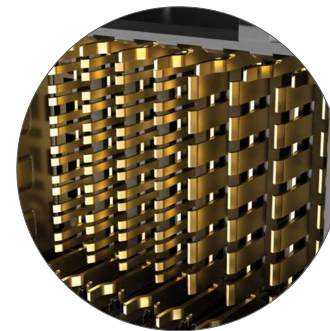
Two points of contact guaranteed



Supports blind mate applications

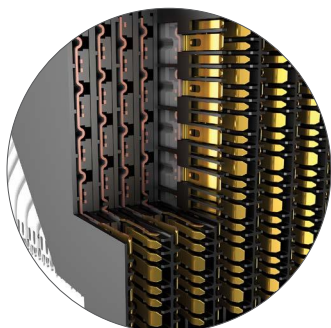


Differential pair wafer design eliminates intrapair skew

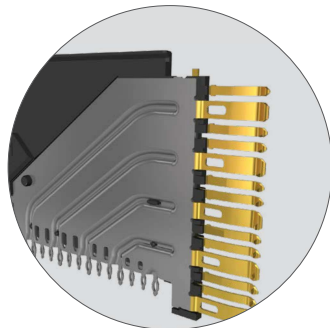


Open-Pin-Field and Power wafer signaling flexibility

EXAMAX®

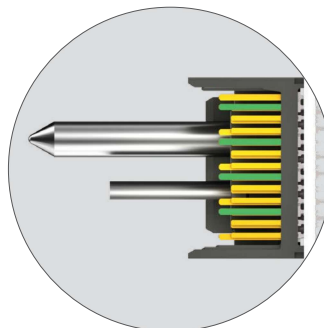


Staggered differential pair design with embossed ground structure for higher data rates

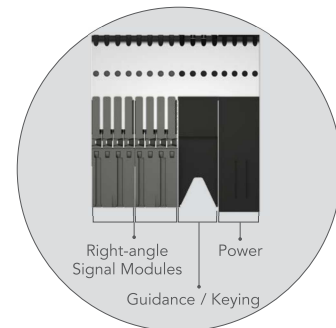


Wafer design increases isolation for reduced crosstalk; one sideband signal per column

XCEDE® HD



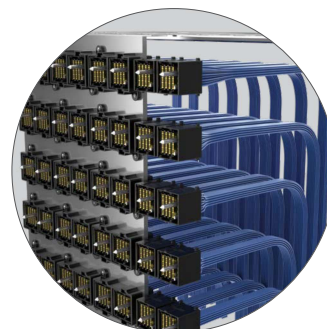
Signal/ground pin staging for hot plugging



Modular design for flexibility and customizable to meet specific requirements

BACKPLANE CABLE ASSEMBLIES

- Eye Speed® ultra low skew twinax cable technology for improved signal integrity; see page 21 for specifications
- Improved signal integrity and increased signal path length at higher data rates
- Reliable mating with guaranteed two points of contact
- 16 - 96 differential pairs (ExaMAX®); up to 128 pairs (NovaRay®)
- Multiple end 2 options available



HIGH-DENSITY APPLICATION
Increases architectural flexibility by overcoming the limitations of traditional connector-to-connector backplane

ROADMAP: HIGH-SPEED BOARD-TO-BOARD & BACKPLANE



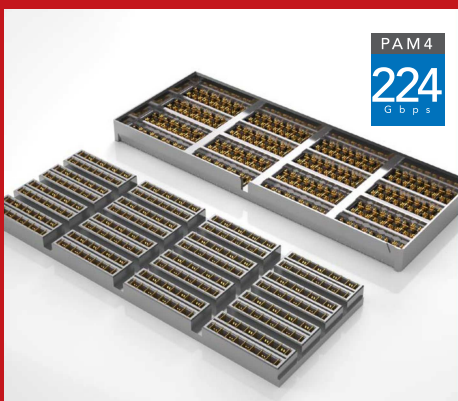
AcceleRate® mP Slim Body Arrays



AcceleRate® HP 800 Pin Arrays



AcceleRate® HP Right-Angle Array



Si-Fly® HD Mezzanine Arrays



Si-Fly® HD Backplane Cable-to-Board



ExaMAX® 2-Pair Backplane Connectors



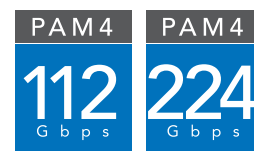
HIGH-SPEED CABLE SYSTEMS

Samtec's high-speed board-to-cable and Flyover® cable systems provide innovation for next generation architectures with industry leading support, in-house manufacturing and customization capabilities to create a solution for any application.

FLYOVER® CABLE SYSTEMS




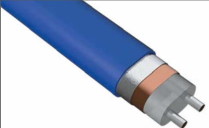
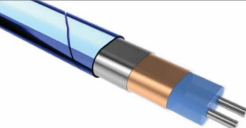
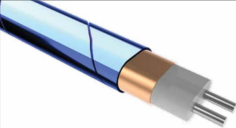
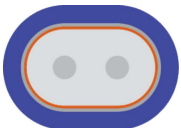
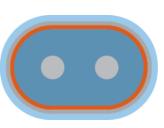
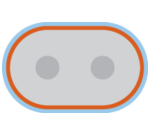
samtec.com/flyover

- Breaks the constraints of traditional signaling substrate and hardware offerings by routing signals via ultra low skew twinax cable versus lossy PCB
- Cost-effective, high-performance and heat efficient solution to the challenges of 224 Gbps bandwidths and beyond



Eye Speed® Cable Technology

- Ideal for all high-performance applications up to 224+ Gbps PAM4 data rates
- Tight coupling between signal conductors
- Ultra low skew twinax <3.5 ps/meter (intrapair): Eye Speed® twinax and Eye Speed Thinax™
- Hyper low skew twinax 1.75 ps/meter (intrapair): Eye Speed AIR™
- Improved signal integrity and eye pattern opening
- Increased bandwidth and reach
- Differential pair, single-ended (Eye Speed ThinSE™) and mixed signaling available
- Taped jacket miniaturizes the cable for easier routing, overall weight reduction and increased air flow (Eye Speed Thinax™ and Eye Speed AIR™)

112 Gbps PAM4		224 Gbps PAM4
		
		
		
Industry leading twinax cable	40% smaller cross sectional area	Lowest dK for best SI performance

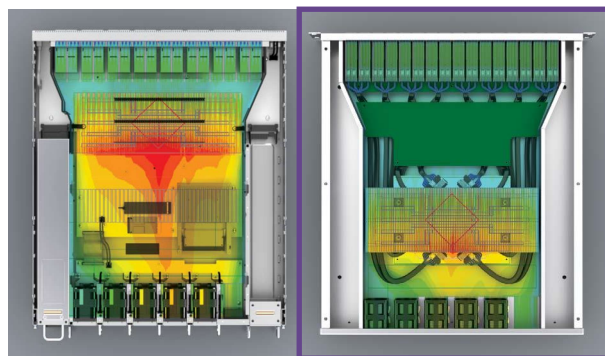
Performance & Cost Advantages

- Up to 224 Gbps PAM4 and beyond
- Simplified board layout
- Less expensive PCB materials, fewer PCB layers
- Eliminates expensive re-timers

Support

Fully integrated technology teams for full system optimization from Silicon-to-Silicon™, including Samtec's High-Speed Cable Plants.

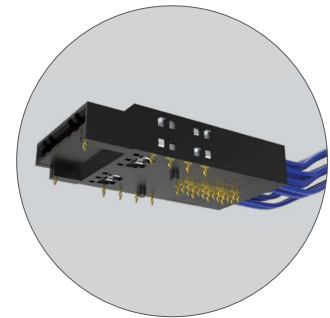
Thermal Improvement



Standard Network Switch vs. Samtec Flyover® Technology

PANEL ASSEMBLIES

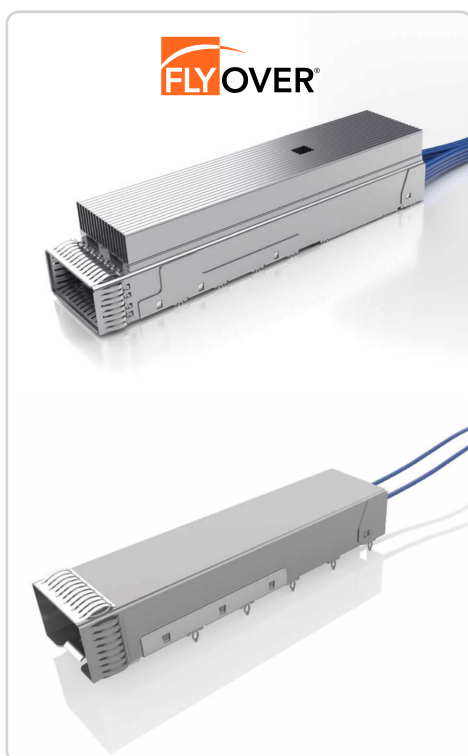
- Flyover® QSFP and QSFP-DD with up to 800 Gbps PAM4 aggregate data rate (112 Gbps PAM4 per channel; 4 or 8 channels); double density versions feature belly-to-belly mating for maximum flexibility; heat sink options for optimal dissipation
- NovaRay® I/O provides the highest aggregate data rate on the market - up to 4,096 Gbps PAM4 (128 Gbps PAM4, 32 differential pairs) from the IC package to the panel and beyond; no heat sinks required for panel space savings; PCIe® 7.0 capable
- ExaMAX® I/O EMI shielded external cable and cage supports 64 Gbps PAM4 performance; high-density, staggered differential pairs on individual signal wafers for reduced crosstalk (112 Gbps PAM4 cable-to-cable solution in development)
- Flyover® SFP and OSFP with up to 112 Gbps PAM4 per channel performance and belly-to-belly capability; optimized cage and heatsink design for excellent thermal performance (224 Gbps PAM4 Flyover® OSFP solution in development)
- PCIe® 6.0/CXL® 3.1 and PCIe® 7.0 capable
- Eye Speed® cable technology; see page 21 for specifications
- Variety of end options including AcceleRate®, NovaRay®, Si-Fly®, Halo™, ExaMAX® and Generate®
- SI Evaluation Kit available (Flyover® QSFP and NovaRay® I/O); see pages 42-43



Sideband signals are routed through press-fit contacts for increased airflow

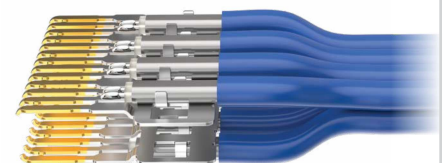


NovaRay® I/O with rugged 38999 shell available for salt fog resistance to 48 hours



FLYOVER® DIRECT ATTACH TECHNOLOGY

- High-density contacts directly soldered to the Eye Speed® ultra/hyper low skew twinax cable
- Improved signal integrity by eliminating the transition board and its variability
- Achieves tighter tolerances



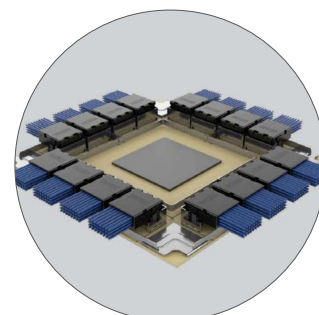
HIGH-SPEED CABLE

MID-BOARD ASSEMBLIES

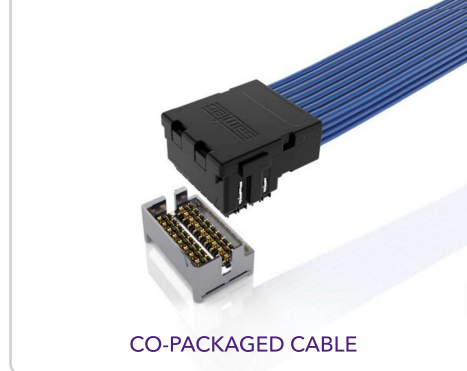
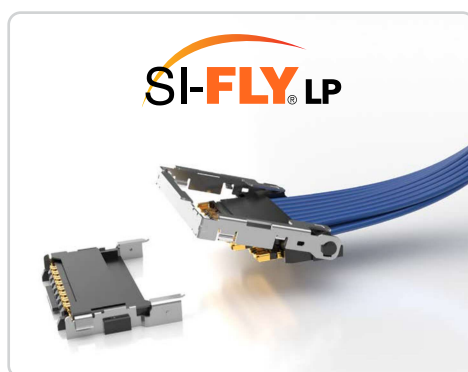
- NovaRay® cable system with industry leading 4.0 Tbps aggregate data rate density (128 Gbps PAM4, PCIe® 7.0 capable); proprietary pin to ground configuration enables very low crosstalk (beyond 40 GHz) and very tight impedance control
- Si-Fly® LP provides 112 Gbps PAM4 performance in an extremely low 4 mm profile for placement adjacent to the IC package, under heat sinks or other cooling hardware
- Si-Fly® HD co-packaged and near-chip systems provide the highest density 224 Gbps PAM4 solution in today's market, with both vertical and right-angle cable launches in development
- Halo™ copper features up to 16 differential pairs in a low 6.5 mm profile for 112 Gbps PAM4 performance; interchangeable with Halo™ optical using the same rugged surface mount connector
- Generate® high-speed 64 Gbps PAM4 edge card assemblies are compatible with SFF-TA-1002 (1C, 2C, 4C & 4C+); high-speed test cable available (see page 23)
- Direct Attach: high-density contacts soldered directly to the Eye Speed® cable for improved signal integrity and tighter tolerances
- PCIe® 6.0/CXL® 3.1 and PCIe® 7.0 capable
- Eye Speed® cable technology; see page 21 for specifications
- SI Evaluation Kits available (NovaRay® and Si-Fly® LP); see pages 42-43



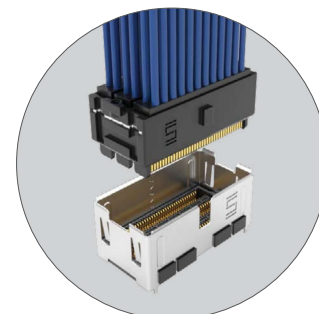
NovaRay® provides two reliable points of contact guaranteed



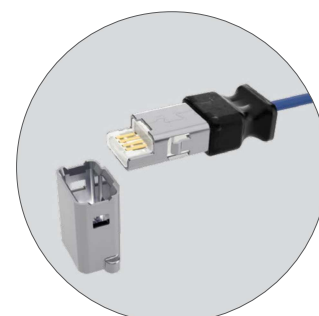
Si-Fly® HD ultra high-density co-packaged solution



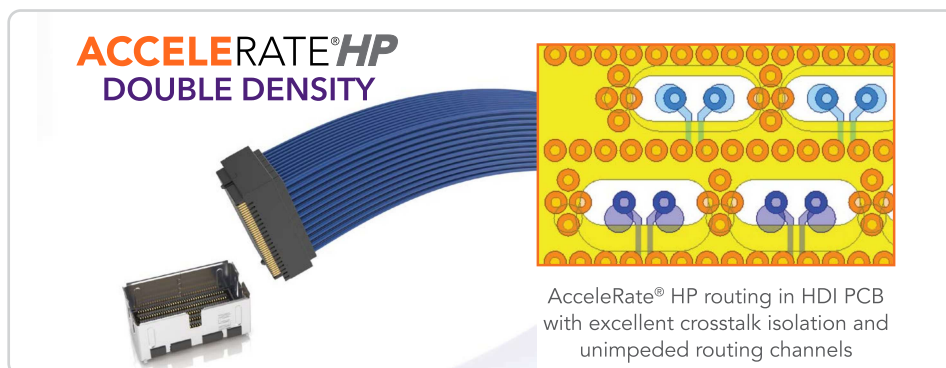
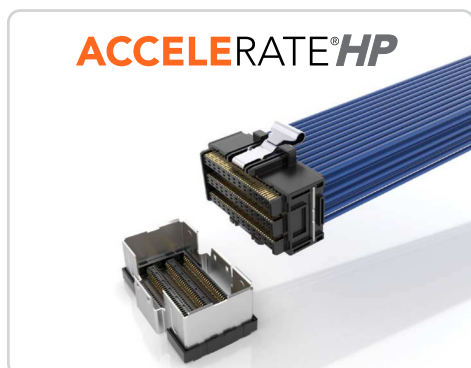
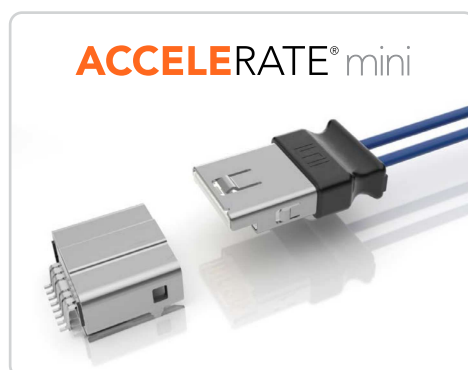
- AcceleRate® is the industry's slimmest cable assembly – 7.6 mm width; up to 24 differential pairs in a high-density 2-row design and 64 Gbps PAM4 performance (PCIe® 6.0/CXL® 3.1 capable)
- AcceleRate® HP provides 112 Gbps PAM4 performance with staggered row-to-row spacing for optimized traces; up to 96 differential pairs, up to 144 single-ended signals, or a mixed signaling option
- AcceleRate® HP Double Density is a direct-to-chip package solution with the industry's highest density 112 Gbps PAM4 interconnect; double the density in the same Gen 1 footprint, up to 144 differential pairs
- AcceleRate® Mini delivers 112 Gbps PAM4 performance in an extremely small form factor with one or two differential pairs; design flexibility as an end 2 option for other Flyover® assemblies
- Eye Speed® cable technology; see page 21 for specifications
- Direct Attach: high-density contacts soldered directly to the Eye Speed® cable for improved signal integrity and tighter tolerances
- SI Evaluation Kits available; see pages 42-43



AcceleRate® HP locking option for maximum density



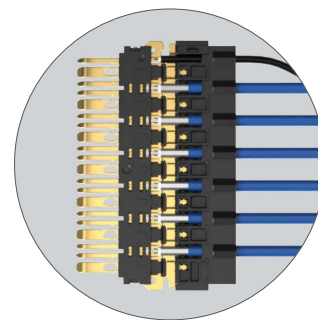
AcceleRate® Mini features a slim 4 mm width



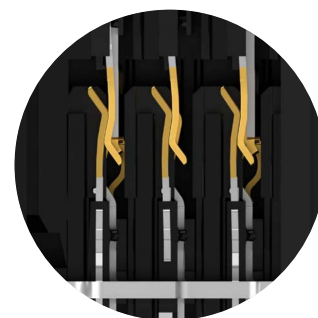
HIGH-SPEED CABLE

BACKPLANE ASSEMBLIES

- NovaRay® micro rugged backplane assemblies are ultra high density with up to 128 differential pairs and two reliable points of contact; large continuous ground blades between and surrounding the pairs eliminates resonances; 128 Gbps PAM4 performance and PCIe® 7.0 capable
- ExaMAX® backplane assemblies offer design flexibility for a variety of applications; high-reliability with two points of contact and up to 96 staggered differential pairs on individual signal wafers
- Highly customizable and configurable; guidance, keying and power options
- Eye Speed® cable technology; see page 21 for specifications
- SI Evaluation Kit available (ExaMAX®); see pages 42-43



ExaMAX® wafer design increases isolation for reduced crosstalk; includes one sideband signal per column



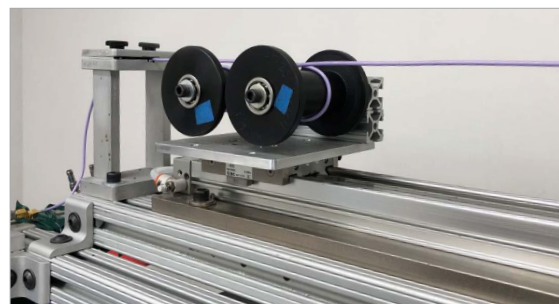
NovaRay® features a precision molded contact system with a 2.0 mm wiper

Eye Speed® Dynamic Testing

Samtec Eye Speed® ultra low skew twinax cable underwent dynamic insertion and return loss testing, proving the cable to be rugged with stable electrical performance after 250 flex/bend cycles.

This arduous flex and bend test determined that the performance of Samtec Eye Speed® ultra low skew twinax is essentially indistinguishable from the original raw, unbent cable.

Ultra low skew twinax provides the lowest insertion loss in the industry, controlled performance across temperature, and robust insertion loss in any assembly and operation environment. Contact HDR@samtec.com for higher cycle results.



Six feet of ultra low skew twinax cable on mandrels was coiled/uncoiled moving back and forth on a slide at a rate of 20-25 cycles per minute.

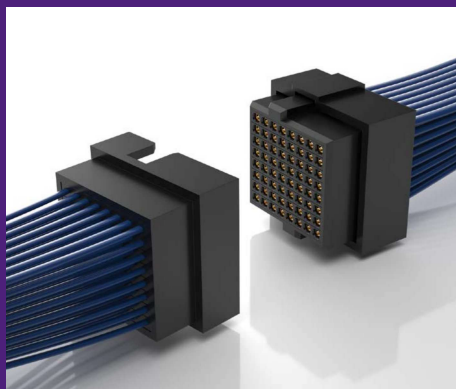
Flyover® Cable Management

- Samtec works with system architects in the early stages to optimize the architecture for cable management while keeping signal integrity and thermals in mind
- Complimentary service using mockups with accurate cable lengths
- Minimize number of SKUs within one system
- Minimize pressure drop



Eye Speed® Cable Specifications				
	Ultra Low Skew Twinax (28-36 AWG)	Thinax™ (34 AWG)	AIR™ (33 AWG)	ThinSE™ (32/34 AWG)
Flyover® QSFP	X	X		
NovaRay® I/O	X	X		In Development
ExaMAX® I/O	X			
Flyover® SFP/OSFP		X		
NovaRay®	X	X	In Development	
Si-Fly® LP	X			
Si-Fly® HD			X	
Halo™		X		
Generate®	X			
AcceleRate®	X	X		In Development
AcceleRate® HP		X		X
AcceleRate® HP Double Density		X		
AcceleRate® Mini		X	In Development	
ExaMAX® Backplane	X	X		In Development
NovaRay® Backplane		X		

ROADMAP: FLYOVER® CABLE SYSTEMS



Si-Fly® HD Backplane Cable-to-Cable



AcceleRate® Mini with Positive Latching



AcceleRate® Slim Cable-to-Cable



AcceleRate® HP Cable-to-Cable



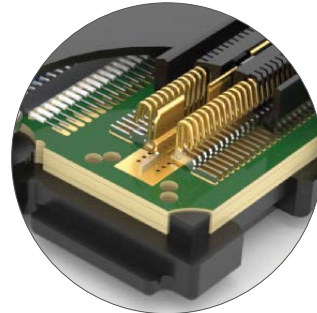
Flyover® CDFP Assembly



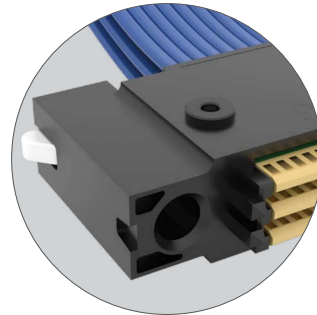
0.80 mm LGA Cables

MICRO COAX & TWINAX ASSEMBLIES

- High-density SEARAY™ 1.27 mm pitch with up to 240 I/Os; supports PCIe® 2.0/3.0 protocols; vertical, right-angle and press-fit board level mates
- Ultra-high density SEARAY™ 0.80 mm pitch with up to 300 I/Os; supports PCIe® 3.0 and SAS3 protocols
- Q Series® 0.50 mm and 0.80 mm pitch ground plane assemblies with up to 180 I/Os; surface mount, edge mount and panel mount terminations
- Q Rate® 0.80 mm pitch ground plane assemblies with up to 156 I/Os; Edge Rate® contacts optimized for signal integrity performance
- 14 Gbps PAM4 performance
- 34 and 38 AWG Eye Speed® micro coax; 30 and 32 AWG Eye Speed® twinax
- Single-ended 50 Ω and differential 100 Ω standards
- Mix-and-match end options for application-specific requirements with extensive customizing capabilities
- All micro coax cable assemblies can be made available with Samtec's new Eye Speed ThinSE™ coax for smaller mechanical form factors; contact HDR@samtec.com



Integral ground/power plane reduces crosstalk



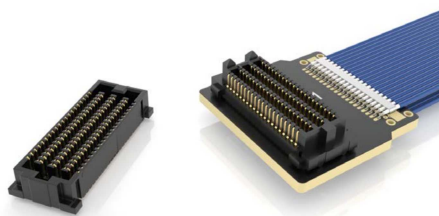
Rugged options include screw downs/mounts, retention pins, guide posts and latching

14
G b p s

SEARAY™



SEARAY™.8mm



QSERIES®



QRATE®



EYE SPEED® CABLE TECHNOLOGY

- Excellent signal integrity performance with individual copper serve or copper tape shielding
- Stranded conductor for small bend radii and dynamic high flexing cycle applications
- 26-38 AWG coax and twinax construction

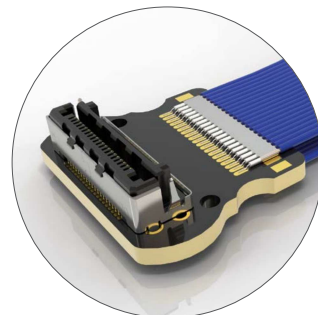
**EYE®
SPEED
CABLE**



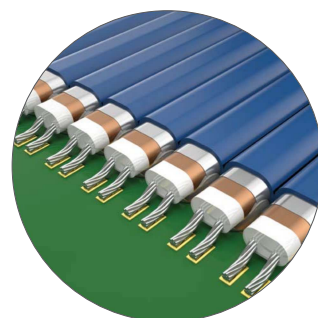
BUILD IT YOURSELF

Check out the High-Speed Cable Solutionator[®] to quickly design a full assembly for your specific application. Visit samtec.com/cablebuilder

- 0.50 mm pitch (16 Gbps) and 0.80 mm pitch (14 Gbps) edge card assemblies; mates with Samtec's high-speed edge card sockets
- PCI Express[®] assemblies support 3.0/4.0/5.0/6.0 data transfer rates with standard 36, 64, 98 and 164 positions; power cable option available
- FireFly[™] copper assemblies available for 28 Gbps performance and PCIe[®] 3.0/4.0/5.0 data transfer rates; interchangeable with FireFly[™] optical
- Razor Beam[™] 0.50 mm pitch hermaphroditic assemblies with vertical or right-angle options; 14 Gbps performance
- Edge Rate[®] 0.80 mm pitch assemblies feature a smooth milled contact surface for increased durability and life; 14 Gbps performance
- 34, 36 and 38 AWG Eye Speed[®] micro coax; 30, 34 and 36 AWG Eye Speed[®] twinax; 34 AWG Eye Speed[®] ultra low skew twinax
- Rugged latching, board locks and screw down options
- Mix-and-match end options for application-specific requirements with extensive customizing capabilities
- High-speed Generate[®] and PCIe[®] test assemblies with DC to 110 GHz frequency range; 29 AWG low loss microwave cable with RF connector end options

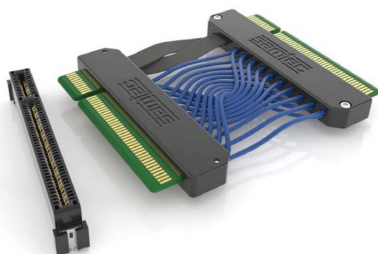


Razor Beam[™] shielding and optional rugged screw downs



Eye Speed[®] cost-effective ribboning eliminates discrete wires

PCI EXPRESS



EDGE CARD



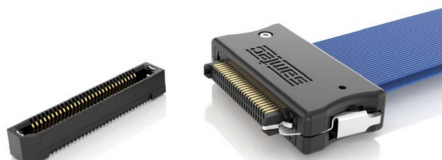
FIREFLY



RAZOR BEAM
SYSTEM



EDGE RATE
SYSTEM



TEST ASSEMBLIES





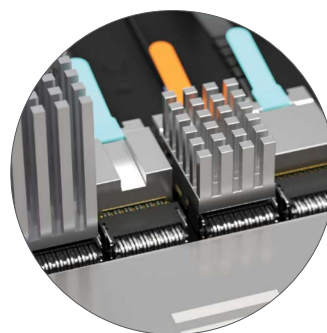
OPTICS

Samtec is the industry leading provider of mid-board optical transceiver solutions. This growing and comprehensive family of products provides reliable signal integrity over an extended distance in chip-to-chip, board-to-board, on-board and system-to-system connectivity. Optical products are offered with Samtec's Sudden Service® - full engineering support, online tools and a service attitude that is unmatched.

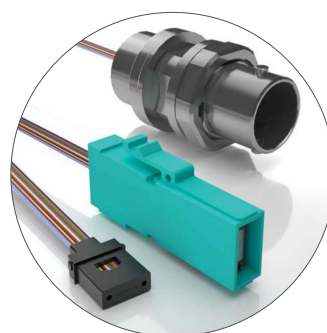
MID-BOARD OPTICAL TRANSCEIVERS

samtec.com/optics

- Data connection is taken "off board," simplifying board layout and enhancing signal integrity from IC to faceplate
- FireFly™ features an industry leading miniature footprint and simple assembly process for performance to 28 Gbps; additional versions include PCIe®-Over-Fiber for 3.0/4.0/5.0 data rates, industrial temp with a range of -40 °C to +85 °C and extreme environment with a parylene conformal coating
- PCIe®-Over-FireFly™ adaptor card supports 3.0/4.0/5.0 data rates with scalable configurations for cost optimized performance
- Halo™ next gen optics designed for embedded applications demanding 56/112 Gbps PAM4 performance; the 2-piece contact system in a low profile withstands high shock and vibration
- FireHawk® provides the smallest footprint, lowest profile and lowest mass optics in the industry (10 x 7.7 x 4.4, less than 0.4 grams); designed for extreme performance to 40 Gbps aggregate and extreme applications including Rad Hard for space/satellites
- Protocol agnostic
- Supports data center, HPC and FPGA Protocols, including 10/40/100 Gb Ethernet, InfiniBand™, Fibre Channel, PCIe®, CXL® and Aurora
- FireFly™ and Halo™ offer copper assemblies that are interchangeable with the equivalent optics using the same connector system; see pages 18 and 23
- Evaluation and development kits available, see pages 42-43
- Industry standard passive MPO-to-MPO panel adaptor and optical patch cable available



Variety of heat sinks for optimal cooling



Variety of end options including MTP®, MT, MXC® and U-SDI Interface



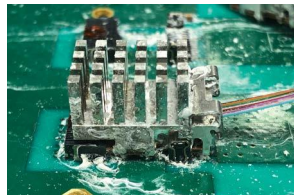
BUILD IT YOURSELF

Check out the Optics Solutionator® to quickly design a full assembly for your specific application. Visit samtec.com/optics-solutionator

FireFly™ Embedded		PCIe®-Over-Fiber		FireFly™ Rugged		Halo™ Next Gen	
14 Gbps	x4 x12	8 GTps	PCIe® 3.0 x4 PCIe® 3.0 x8 PCIe® 3.0 x16	10 Gbps	x4 x12	PAM4 56 Gbps	x8
16 Gbps	x12	16 GTps	PCIe® 4.0 x4 PCIe® 4.0 x8 PCIe® 4.0 x16	12.5 Gbps	x12	PAM4 112 Gbps	x8
32 Gbps	x4 x12 (in development)	32 GTps	PCIe® 5.0 x4 PCIe® 5.0 x8 PCIe® 5.0 x16 (in development)	25 Gbps	x4	(in development)	
						FireHawk® Space	
						10 Gbps	x4

RUGGED ENVIRONMENT CAPABILITIES

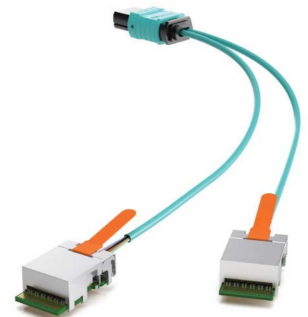
- Tin whisker mitigation
- Optional parlylene conformal coating for exposed mil/aero applications
- Fungal resistant
- Multiple end options including MT38999, MTP®, MXC®, Glenair® Series 79, VITA™ 66.X and other common rugged interfaces



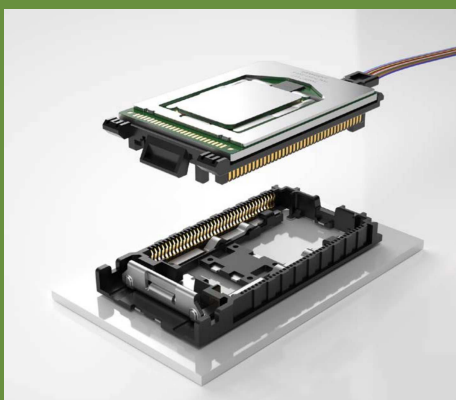
VITA/VNX/VNX+/FMC/FMC+/XMC/XMC+ are all respective trademarks of VITA
MTP® and MXC® are registered trademarks of US Conec Ltd.

APPLICATION SPECIFIC CUSTOMIZATIONS

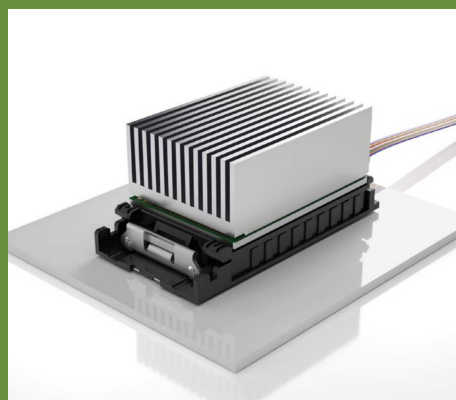
- Custom firmware
- Secure firmware
- Custom optical link budget
- Custom fiber mappings
- Custom optical connectors
- Custom assemblies with multiple FireFly™/optical connectors
- Contact OpticsOTP@samtec.com for assistance with your application needs



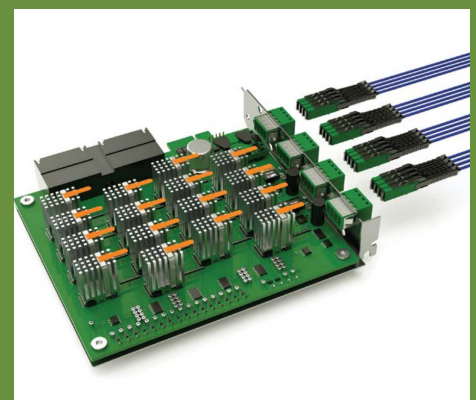
ROADMAP: OPTICS



Halo™ 112G Direct Drive



Halo™ PCIe® 6.0 Capable



OCP and PCIe® Add-In Cards



RF SOLUTIONS

Full RF solution capabilities, including cable assemblies, board connectors, cable connectors and adaptors are backed by industry-leading service. Samtec is vertically integrated, designing and manufacturing our own high frequency cables and connectors to ensure the highest quality products with full system support. Samtec's RF technical support includes launch optimization, simulation and testing.

RF CONNECTORS

samtec.com/rf-boardconnectors

- Precision RF board connectors for frequencies from 18 GHz to 110 GHz; solderless compression mount vertical and edge launch solutions; stripline or microstrip/CPW (see chart)
- Magnum RF® ganged SMPM to 65 GHz features a push-on interface with varying retention forces (board-to-board and cable-to-board)
- SMP/SMPM assists with misalignment when paired with bullet adaptors
- In-series and between-series adaptors support applications to 110 GHz; plug-to-plug, jack-to-jack or plug-to-jack
- Precision RF cable connectors from 1.00 mm (110 GHz) to TNCA (18 GHz) terminate to common microwave/mmWave cables; solder clamp and direct solder connectors
- Blind Mate RF backplane supports 110 GHz with high-density size 16 and 20 contacts; ideal solution for VITA™ 90 VNX+™
- Low frequency sub-6 GHz and 12G-SDI, 50 Ω and 75 Ω solutions: BNC, DIN 1.0/2.3, High-Density BNC, MCX, MMCX, SMB, SMA, TNC

DC TO

110
GHz



Precision alignment grooves for easy visual matching and peak connector performance

PRECISION RF



MAGNUMRF® GANGED RF ASSEMBLIES



ADAPTORS & BULLETS



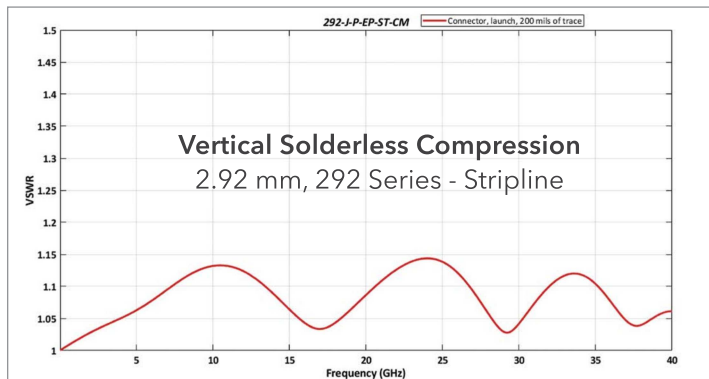
BLIND MATE BACKPLANE



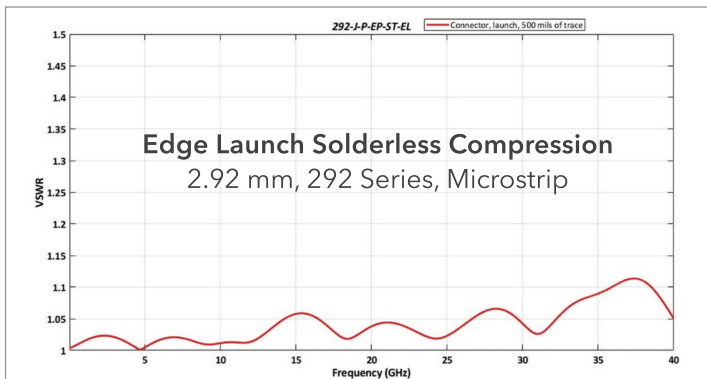
LOW FREQUENCY



COMPRESSION MOUNT CONNECTORS - VSWR

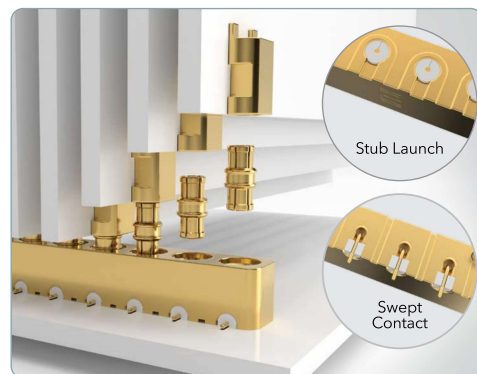
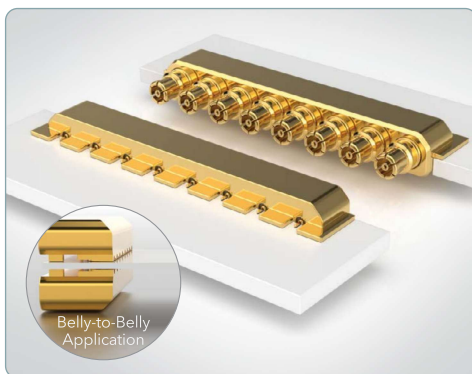
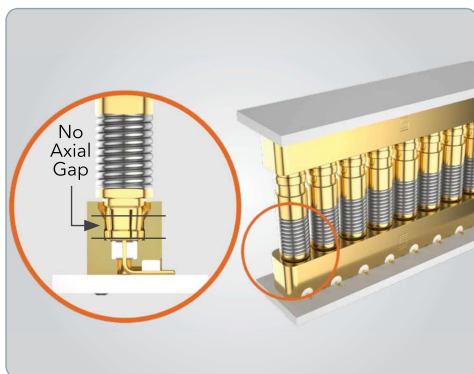


The VSWR used AFR on the measurement from the reference plane of the connector into 0.2" of board trace. Board construction was a straight stripline trace on a 6-layer Tachyon 100G board.



The VSWR used AFR on the measurement from the reference plane of the connector into 0.5" of board trace. Board construction was a straight microstrip trace on a 4 layer stackup with an outer 10 mil core of I-Tera MT40.

MAGNUM RF® MULTI CHANNEL CONNECTORS



Mezzanine, coplanar and perpendicular solution: swept contact or stub launch terminations

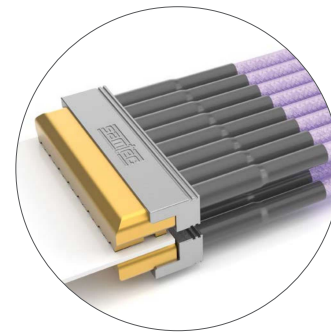
PRECISION RF SOLUTIONS

Type	Frequency	Board Connector	Cable Connector	Cable Assemblies	Adaptor
1.00 mm	to 110 GHz	100-EL	PRF10	LL110, LL095, RF047-A	PRFBA
1.35 mm	to 90 GHz	135 (-CM, -CMM)	PRF13	RF047-A	
1.85 mm	to 65 GHz	185 (-CM, -CMM, -EL)	PRF18	LL071, RF047-A, RF086	PRFIA, PRFBA
SMPPM	to 65 GHz	SMPPM (-SM, -MT, -ST-TH, -RA-TH, -EM)	PRFM0	LL110, LL095, RF047-A, RF086, RF23C	PRFIA, PRFBA
Ganged SMPPM	to 65 GHz	GPPC (-SL, -CMM, -EM, -RA-SM)	N/A	GC47, GC86	PRFIA
		GPPB (-SM)	N/A	N/A	PRFIA
2.40 mm	to 50 GHz	240 (-CM, -CMM, -EL)	PRF24	LL043, RF047-A, RF085, RF086, RF23C	PRFIA
SMP	to 40 GHz	SMP (-SM, -TH, -MT, -EM)	PRF00	RF047-A, RF086, RF23C, RF25S, RF405	SMP-B (Bullet)
2.92 mm	to 40 GHz	292 (-CM, -CMM, -EL)	PRF92	LL043, LL032, RF047-A, RF085, RF086, RF23C	PRFIA, PRFBA
3.50 mm	to 34 GHz	N/A	PRF35	RF23S	
SSMA	to 34 GHz	N/A	PRF51	Available as a Quick-turn Custom	
SMA	to 18/26.5 GHz	SMA (-TH, -SM, -MT, -EM)	PRF01	LL071, LL043, LL018, RF047-A, RF086, RF23C, RF402, RF405, RF25S, RF180, RF280	
N Type	to 18 GHz	N/A	PRF06	RF180, RF280	
TNCA	to 18 GHz	N/A	PRF04	RF180, RF280	

RF CABLE ASSEMBLIES

- Nitrowave™ high-performance microwave cable assemblies to 110 GHz are phase and amplitude stable with flexure; state-of-the-art shielding techniques and interlayer with lower density dielectric that minimizes loss
- Precision RF, high frequency assemblies for 18 to 110 GHz microwave/mmWave frequencies; low loss and semi-flexible cable types from .047" to .277" (see chart on page 27)
- Cable lengths standard up to 10 meters (>10 meters as custom RSP) and phase matching in pairs down to 1 ps; cable management available
- Variety of interfaces from 1.00 mm (110 GHz) to TNCA (18 GHz)
- Push-on, threaded and Magnum RF® ganged solutions (cable-to-board and board-to-board)
- Bulls Eye® high performance test and measurement assemblies to 90 GHz
- Flexible micro waveguide technology supports the demands of next gen mmWave systems (E-band and V-band)
- Traditional sub-6 GHz frequency assemblies with RG type cables, and .081 mm and 1.13 mm Micro High Frequency; variety of 50 Ω and 75 Ω end options; 75 Ω , 12G-SDI optimized assemblies available
- Non-magnetic options available for medical and quantum computing applications

samtec.com/rf-cableassemblies



DC TO
110
GHz

Magnum RF® belly-to-belly
application for maximum density



Application tooling available for
assembly, installation/extraction;
visit samtec.com/tooling



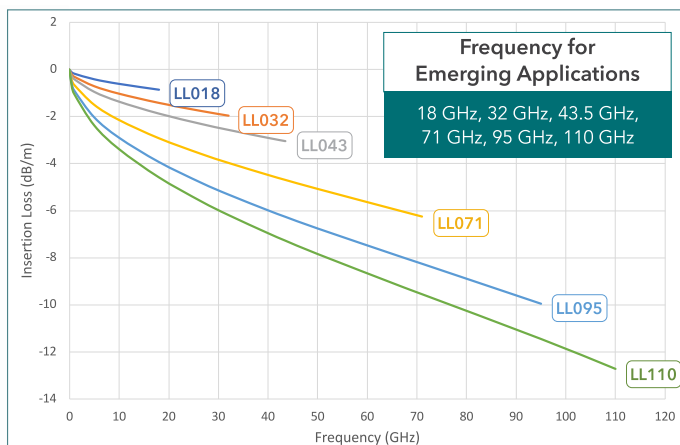
BUILD IT YOURSELF

Check out the RF Cable Solutionator® to quickly design a full assembly for your specific application. Visit samtec.com/rf-cablebuilder

LOW-LOSS CABLE CONSTRUCTION WITH INTERLAYER



NITROWAVE™ MAXIMUM INSERTION LOSS (dB/m)



MIX & MATCH RF CABLE ASSEMBLY FLEXIBILITY

Samtec offers a variety of end options for each product series. This blends application-specific customization with the simplicity and lead-time efficiencies of an off-the-shelf assembly.



ANY
RF Connector

ANY
Microwave Cable

ANY
Application



TESTING & TECHNICAL SUPPORT

High-level design and development of advanced interconnect systems along with industry leading expertise allow us to offer effective strategies and support for optimizing the entire signal channel. RF technical support includes launch optimization, simulation, and testing.

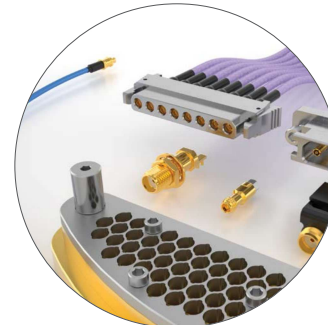
Contact RFGroup@samtec.com to discuss your application and testing requirements.



RF ORIGINAL SOLUTIONS

samtec.com/originalrf

- Bulls Eye® high performance test and measurement assemblies to 90 GHz with a high-density, space saving design that enables smaller evaluation boards and shorter trace lengths
- Flexible micro waveguide technology is an alternative to rigid metallic waveguides; supports 60 GHz to 90 GHz (E-band) and 50 GHz to 75 GHz (V-band); low-loss performance, ultra small form factor, ease of use and lower cost
- Magnum RF® push-on, ganged SMPM enables 40% greater density and better alignment for multiple channels; mode free operation to 65 GHz supports low- or mid-band system requirements; bullet adaptors for misalignment and blind mate
- Low frequency 100 Ω shielded twisted pair system with a ¼-turn bayonet lock
- 50 Ω and 75 Ω ganged micro scale systems with rugged contacts; full ganged system or ganged with industry standard end 2 options
- IsoRate® 50 Ω high isolation systems; half the cost of traditional RF with virtually the same performance
- 75 Ω mini and micro-mini interconnects; high vibration version for higher extraction forces
- Analog Over Array™ connectors simultaneously run analog, digital and power signals; replaces dozens of Precision RF connectors with a smaller footprint, less weight and cost optimization (see page 11 or visit samtec.com/kits)



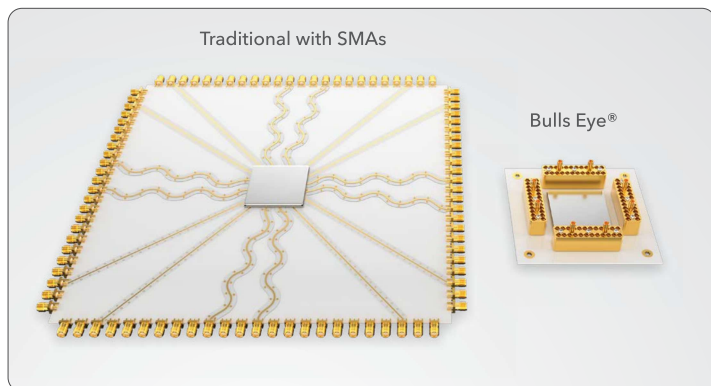
Custom and quick-turn modifications available to meet the demands of digital/analog systems

DC TO

90
GHz

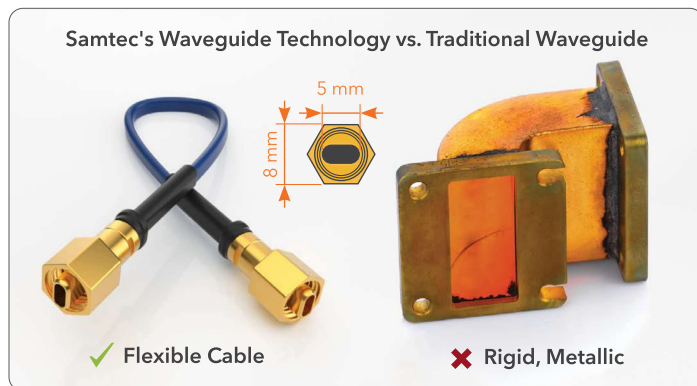


BULLS EYE® TEST SOLUTIONS



High-density test and measurement solution that compression mounts to the board for placement directly adjacent to the SerDes being characterized

FLEXIBLE WAVEGUIDE

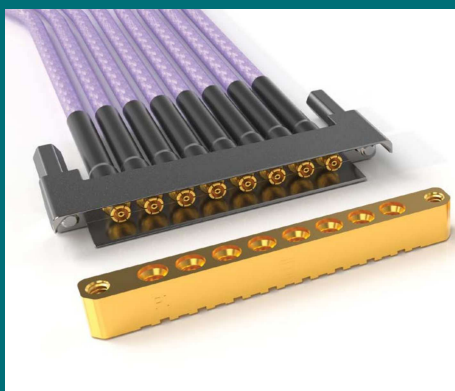


Supports the demands of next gen mmWave systems with dynamic flexibility during flexure (E-band and V-band)

ROADMAP: RF SOLUTIONS



URSA® I/O with RF Contacts



Magnum RF® with Rugged Screw Downs



Threaded SMPM Connectors & Cable Assemblies



SMP3/SMPS 30% Smaller SMPM Design



38999 Contacts: Size 12 SMPM, 16 & 20



Bulls Eye® Non-Magnetic Designs



RUGGED/POWER SOLUTIONS

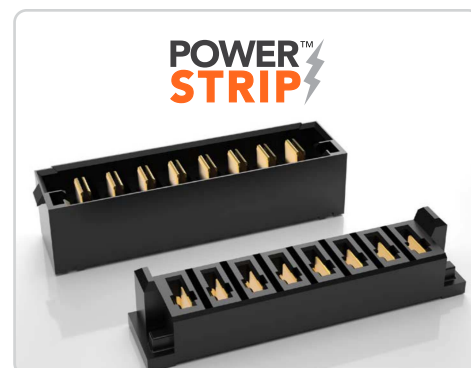
Rugged contact systems, flexible power interconnects and rugged signal integrity combined with ultra-rugged offerings create the foundation of Samtec's rugged/power solutions for high cycle, high speed and high power applications. Additional testing for severe environments ensures products are more than suitable for military, space, automotive, industrial and other extreme applications.

POWER SYSTEMS

samtec.com/power-systems

- mPOWER® ultra micro power up to 18 A/blade (460 VAC)
- AcceleRate® mP power/signal arrays for up to 15 A/blade (200 VAC)
- Mini Mate® and Power Mate® systems with individually shrouded contacts; up to 9.3 A/contact (400 VAC)
- Extreme power systems up to 60 A/blade (300 VAC)
- 23 A/blade (438 VAC) to 58.7 A/blade (450 VAC) PowerStrip™ systems
- Severe Environment Testing qualified (UMPS/UMPT), see pages 36-37

MAX
60
A m p s



RUGGED I/O SYSTEMS

samtec.com/rugged-io

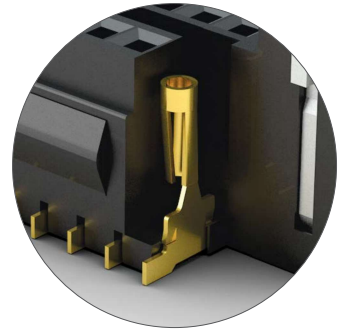
- URSA® I/O features hyperboloid contacts for high-reliability
- AccliMate™ flexible IP67/IP68 sealed systems: circular and rectangular
- NovaRay® I/O 128 Gbps PAM4 system with a rugged 38999 shell
- FireFly™ mid-board optical transceivers with extended temperature range



RUGGED BOARD-TO-BOARD SYSTEMS

samtec.com/rugged-b2b

- Tiger Eye™ is Samtec's most rugged contact system rated to 1,000+ mating cycles on 0.80, 1.27 or 2.00 mm pitch; up to 3.8 A/pin (250 VAC) and 8 Gbps performance; vertical and right-angle, stack heights to 12 mm and a variety of ruggedizing options
- Razor Beam™ 25 Gbps hermaphroditic connectors with slim body designs, EMI shielding and optional lubricated contacts; 4-6x greater mating/unmating forces vs. typical micro pitch connectors
- Floating connectors are ideal for multiple connectors on a board; provides 0.50 mm contact float in the X and Y axes to compensate for misalignment
- Severe Environment Testing qualified (SFM/TFM, S2M/T2M), see pages 36-37



Tiger Eye™ multi-finger contact with several points of contact for high reliability

TIGER EYE
SYSTEM



RAZOR BEAM
SYSTEM



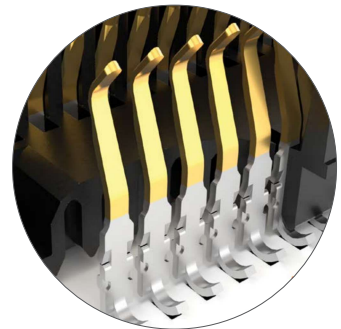
FLOATING SYSTEM



RUGGED HIGH-SPEED SYSTEMS

samtec.com/rugged-hs

- 0.50, 0.635 and 0.80 mm pitch Edge Rate® strips in 5 to 18 mm stack heights; performance to 56 Gbps PAM4; extended contact wipe, 360° EMI shielding, extended guide post and rugged metal latching options
- Generate® 0.60, 0.80 and 1.00 mm pitch edge cards with performance to 64 Gbps PAM4; vertical, right-angle, edge mount and pass-through
- 0.50 mm to 2.00 mm pitch micro edge card sockets with rugged weld tabs; vertical, right-angle and edge mount
- Severe Environment Testing qualified (ERM8/ERF8), see pages 36-37



Edge Rate® contacts feature a smooth milled mating surface that reduces wear and increases durability

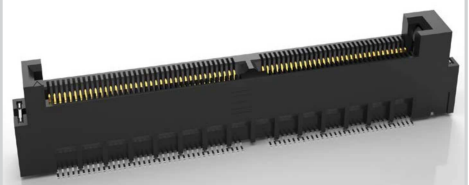
EDGE RATE
SYSTEM



GENERATE



MICRO EDGE CARDS



DISCRETE WIRE SYSTEMS

samtec.com/discrete-wire

- Micro Mate™ 1.00 mm pitch cable-to-board, cable-to-cable and cable-to-panel with positive latching; up to 40 total dual leaf contacts and 2.7 A/pin (250 VAC)
- Tiger Eye™ 0.80, 1.27 and 2.00 mm pitch with up to 100 positions and 3.8 A/pin (250 VAC)
- Mini Mate® and Power Mate® with up to 50 positions and 10.4 A/pin (300 VAC)
- mPOWER® 2.00 mm pitch cable-to-board/cable/panel; up to 16.8 A/blade (435 VAC)
- PowerStrip™ 5.00 and 6.35 mm pitch with up to 34.5 A/blade (450 VAC); power-only or signal/power
- Components and tooling available; visit samtec.com/tooling



ROADMAP: RUGGED/POWER



mPOWER® High-Density Arrays



AcceleRate® mP Slim Body Arrays



URSA® I/O with Contact Flexibility



URSA® I/O with AcceleRate® Mini Cable



URSA® I/O with Precision RF Contacts

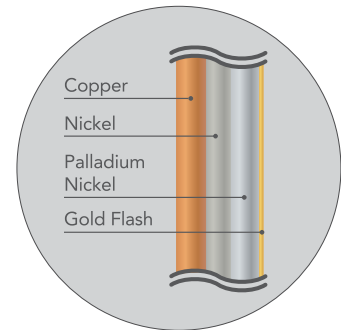


URSA® I/O with Power Contacts

ULTRA RUGGED SOLUTIONS

- Reliability and flexibility in small form factors for extreme applications and industries, including military, aerospace and submersible
- URSA® I/O 1.00 mm pitch system with up to 80 micro hyperboloid contacts for extreme reliability; rated to 5,000 mating cycles; rugged EMI shielding, captive panel screws and strain relief (slim latching option available)
- NovaRay® I/O with rugged 38999 shell is salt fog resistant to 48 hours; threaded cable-to-panel design using Flyover® technology; 128 Gbps PAM4 performance and PCIe® 7.0 capable
- FireHawk® CSSO mid-board optical transceivers feature the industry's smallest footprint - 10 x 7.7 x 4.4; Rad Hard design withstands the vibrations and radiation in space applications
- FireFly™ rugged mid-board optical transceivers with extended temperature range of -40 °C to +85 °C; optional parylene conformal coating for exposed military and aerospace applications
- SureWare™ ultra rugged hardware (standoffs, alignment and guidance) assists with "blind mate" and reduces the risk of component damage
- VITA™ 90 VNX+™ solution configured with RF backplane, SEARAY™ right-angle array and rugged optics (visit samtec.com/VITA for details)
- Severe Environment Testing (SET) qualified products are Commercial-Off-the-Shelf (COTS) and modified COTS to get solutions to market faster; see pages 36-37

samtec.com/ultra-rugged



SURECOAT™

High-reliability palladium nickel plating with gold flash for high-temp (150 °C), high-cycle (5,000) applications.



Micro hyperboloid contact with 4 points of contact for extreme mating cycles



SEVERE ENVIRONMENT TESTING (SET)

samtec.com/set

Severe Environment Testing (SET) is a Samtec initiative to test products beyond typical industry standards and specifications for performance confidence in rugged/harsh environment industries. These products undergo additional testing, inspired by military standards, to ensure they are more than suitable for military, space, automotive, industrial and other extreme applications.

SET qualified products are Commercial Off-the-Shelf (COTS) and modified COTS for incredible design flexibility to get solutions to market faster. Visit samtec.com/SET or contact SET@samtec.com for additional information and current available test results.



MEETS OR EXCEEDS:

- VITA™ 47.1 Module Insertions
- VITA™ 47.3 Humidity
- VITA™ 47.1 Operating Shock Class OS2
- VITA™ 47.1 Vibration Class VS3
- Exceeds VITA™ 47.1 Temperature Cycling Class C4
- Exceeds VITA™ 47.1 Non-Operating Temperature Class C4
- VITA™ 47.1 Electrostatic Discharge Resistance
- Exceeds VITA™ 47.1 Altitude for DWV

SET QUALIFIED PRODUCTS

SFM / TFM / SFSMT Tiger Eye™ 1.27 mm Pitch Rugged System

SEAF / SEAM SEARAY™ High-Density Arrays

LSHM Razor Beam™ Hermaphroditic Strips

SSM / TSM .100" Pitch Square Post Header & Socket

FTSH / CLP .050" Pitch Header & Socket

ERF8 / ERM8 Edge Rate® Rugged High-Speed Strips

S2M / T2M Tiger Eye™ 2.00 mm Pitch Micro Rugged System

UMPS / UMPT mPOWER® Ultra Micro Power Connectors

SEAF8 / SEAM8 SEARAY™ 0.80 mm Ultra-High Density Arrays

B1SDT / P1M URSA® I/O Ultra Rugged Power System

NASA

Samtec's SET products are approved for NASA Class D missions that require high-reliability, quick-turn and cost-effective solutions for LEO satellites, SmallSats, CubeSats and other space exploration applications.

Samtec also utilizes NASA outgassing data to determine if certain products meet NASA's ASTM E595-77/84/90 test requirements. Visit outgassing.nasa.gov for data.

LOT SCREEN TESTING

Samtec's Lot Screen Testing program provides added assurance for upsampling board-to-board interconnects for mission critical applications such as military and aerospace. This program includes Lot Screen Testing and Qualification Conformance Inspection (QCI), both modeled after MIL-DTL-55302 and parallel EIA-364 standards. Both include a complete test plan as well as reports on each specific build, ensuring compliance with stringent standards and specifications. Contact map@samtec.com or visit samtec.com/mil-aero for more information.

Testing Options	Lot Screen Testing	QCI
Visual & Mechanical Inspection	X	X
Mating/Unmating Forces	X	X
Low Level Contact Resistance	X	X
Insulation Resistance	X (Pin-to-Pin & Row-to-Row)	X (Pin-to-Pin, Row-to-Row & Closest Metallic Hardware)
Dielectric Withstanding Voltage	X (Sea Level)	X (Sea Level & High Altitude)
Solderability	X	X
Current Carrying Capacity		X
Mechanical Shock		X
Random Vibration		X
Extended Life		X (Plating Thickness Verification, Mating Cycle, Thermal Shock & Humidity)
Workmanship		X

EXTENDED LIFE PRODUCT™

E.L.P.™ products are tested to rigorous standards, which evaluate contact resistance in simulated storage and field conditions.

- 10 year Mixed Flowing Gas (MFG)
- High Mating Cycles (250 to 2,500)
- Certain plating and/or contact options will apply

For complete details about Samtec's E.L.P.™ program, a list of qualifying products and test results, please visit samtec.com/ELP or email the Customer Engineering Support Group at ASG@samtec.com



DESIGN QUALIFICATION TESTING

All Samtec series undergo Design Qualification Testing (DQT), which includes:

- Gas Tight
- Normal Force
- Thermal Aging
- Mating/Unmating/Durability
- IR/DWV
- Current Carrying Capacity (CCC)
- Mechanical Shock/Random Vibration/LLCR
- Mechanical Shock/Random Vibration/Event Detection



TESTING REFERENCE CHART

TEST	SET	E.L.P.™	DQT
Gas Tight	X*	X*	X
Normal Force	X*	X*	X
Thermal Aging	X*	X*	X
Mating / Unmating / Durability (240 Hrs)	X (100% RH, 250 Cycles)	X* (90-98% RH, 100 Cycles)	X (90-98% RH, 100 Cycles)
IR / DWV	X (At Altitude of 70,000 Feet)	X*	X
CCC	X*	X*	X
Mechanical Shock / Random Vibration / LLCR & Nanosecond Event Detection	X (40 G Peak, 11 ms, Half Sine & 12gRMS, 5 - 2,000 Hz, 1 Hr / Axis)	X* (100 G Peak, 6 ms, Half Sine & 7.56gRMS Avg, 2 Hr / Axis)	X (100 G Peak, 6 ms, Half Sine & 7.56gRMS Avg, 2 Hr / Axis)
Temperature Cycling (500 Cycles)	X	N/A	N/A
Non-Operating Class Temperature	X	N/A	N/A
Electrostatic Discharge (ESD)	X	N/A	N/A
10 Year MFG (Mixed Flowing Gas)	N/A	X	N/A
Mating Cycles (250 to 2,500)	N/A	X	N/A

* Completed as part of initial Design Qualification Testing (DQT). E.L.P.™ and SET testing are performed in addition to DQT.



FLEXIBLE STACKING

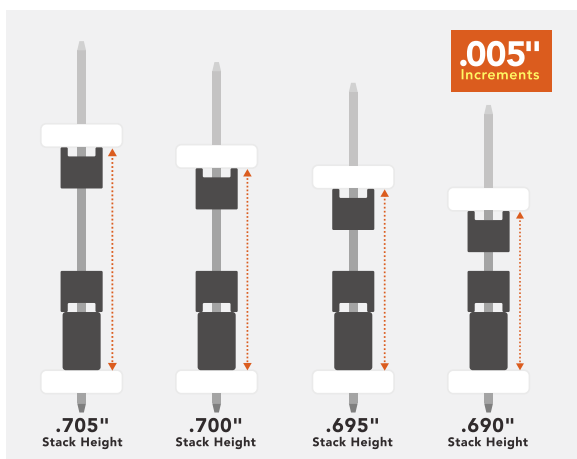
With the largest variety of board-to-board interconnects, Samtec makes it easy to find board stackers for any application. Header and socket systems are available in a variety of pitch, density, stack height, orientation and many more standard or custom options.

samtec.com/flex-stacking

FLEXIBLE STACKING SOLUTIONS

INCREDIBLE FLEXIBILITY

- Post height: Adjustable in .005" (0.13 mm) increments
- Body positions: Adjustable in .005" (0.13 mm) increments
- Board stacking distance: 1.65 mm (.065") – 48.51 mm (1.910")
- Number of pins: 2-300
- Number of rows: 1-6



VARIETY OF PITCHES

- 0.80 mm (.0315")
- 1.00 mm (.0394")
- .050" (1.27 mm)
- .050" x .050" (1.27 x 1.27 mm)
- .050" x .100" (1.27 x 2.54 mm)
- 2.00 mm (.0787")
- .100" (2.54 mm)
- .156" (3.96 mm)
- .200" (5.08 mm)

CUSTOMIZABLE

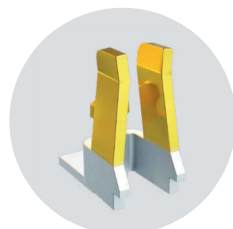
- Mix-and-match headers and sockets to find the right solution
- Quick and easy custom parts are available. Contact asp@samtec.com

VARIETY OF CONTACTS



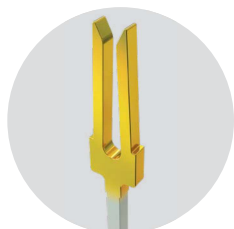
Tiger Eye™ Contact

- High-reliability
- High mating cycles
- Multi-finger contact



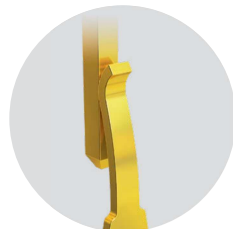
Tiger Claw™ Contact

- Pass-through
- Ultra-low profile
- Dual wipe contact



Tiger Buy™ Contact

- High-retention
- Cost-effective
- Tuning fork contact



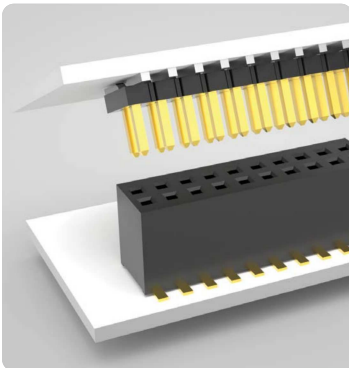
Tiger Beam™ Contact

- Best cost
- Reliable performance
- Post & beam contact

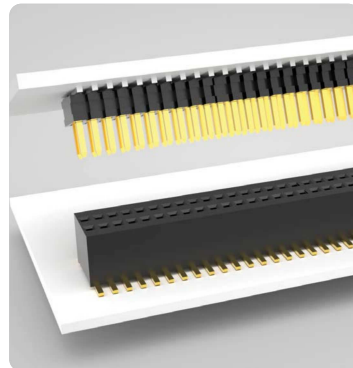


VARIETY OF ORIENTATIONS/APPLICATIONS

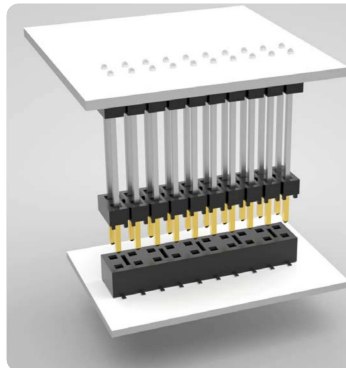
- For a list of popular series and specifications, see page 40
- Standard profile offers the largest variety, low profile saves space and elevated profile provides clearance for improved air flow
- Right-angle connectors increase design flexibility
- Space saving, bottom entry connectors provide access to components when mated
- Pass-through solutions connect three or more boards
- Self-nesting sockets with square post tails for PC/104[™] and PC/104-Plus[™] applications
- Ruggedizing features: locking clips, board locks, guide posts, alignment pins, shrouded, polarized and keyed
- Tail options: surface mount, through-hole, mixed technology, press-fit
- SI Lite rugged solutions rated for up to 8 Gbps high-speed signals; visit samtec.com/si-lite
- Severe Environment Testing (SET) and Extended Life Product[™] (E.L.P.[™]) qualified solutions; see pages 36-37 for details
- Tiger Eye[™], Flexible Flat Ribbon, Molded-to-Position and Flat Flexible Cable (FFC) IDC cable assemblies with space saving designs; choice of socket or plug, single or double ended, twisted pair or flat cable



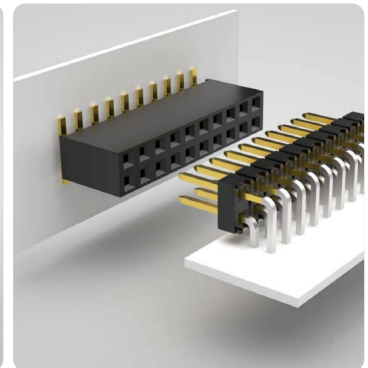
Standard



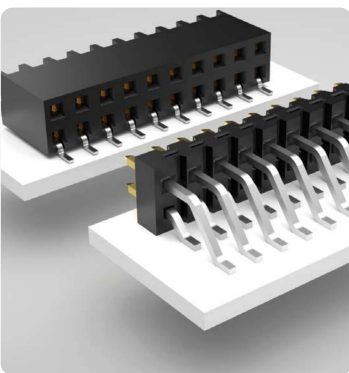
Low Profile



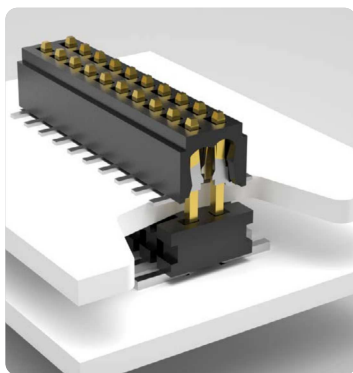
Elevated



Right-Angle



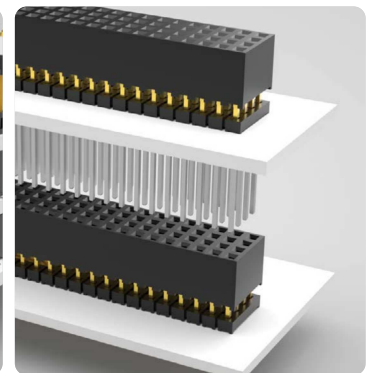
Coplanar



Bottom Entry



Pass-Through



Self-Nesting

FLEXIBLE STACKING

REFERENCE CHART OF POPULAR SERIES

SERIES		FSI	SEI	SIB	CLE	FTE	CLM	FTMH/FTM	MLE	MW
PITCH		1.00 mm (.0394")		.100" (2.54 mm)	0.80 mm (.0315")		1.00 mm (.0394")			
ORIENTATION		V				V & RA	V	V & RA	V	
BOARD STACKING (mm)	MIN	3	1.65	3.8	5	5	3.48		4.57	4.62
	MAX	10			9.14		8.43	5.11	9.27	
CONTACT SYSTEM					Tiger Beam™		Tiger Claw™		Tiger Beam™	
MATES		One-Piece			FTE, AW	CLE	FTM, FTMH, MW	CLM, MLE	FTM, FTMH, MW	CLM, MLE

SERIES		CLP	FLE	FTS	FTSH	FW	SOLC	TOLC	DWM/ HDWM	FTR	RSM	SLM	
PITCH		.050" x .050" (1.27 mm x 1.27 mm)							.050" x .100" (1.27 mm x 2.54 mm)				
ORIENTATION		V & RA	V		V & RA		V						
BOARD STACKING (mm)	MIN	3.53	5.82	3.53	5.18	7.72	6.35		9.65	9.78		7.11	
	MAX	17.75	19.15	5.82	7.49	19.15	12.00		22.99	14.73	19.69	19.43	
CONTACT SYSTEM		Tiger Claw™	Tiger Beam™				Tiger Buy™						Tiger Buy™
MATES		FTSH, FTS, FW		CLP, FLE			TOLC	SOLC	SMS, SLM, RSM		FTR, (H)DWM, TML, ZML, (H)TMS	(H)TMS, (H)MTMS, (H)DWM, FTR	

SERIES		MMT	TMM/ MTMM	TMMH	TW	ZLTMM	CLT	ESQT/ -368	MMS	SMM	SQT	SQW	TLE
PITCH		2.00 mm (.0787")											
ORIENTATION		RA	V & RA		V				V & RA	V	V & RA	V	
TERMINATION		SMT & MT	T/H & SMT			T/H	T/H & SMT	T/H	T/H & SMT	SMT	T/H	T/H & SMT	SMT
BOARD STACKING (mm)	MIN	2	3.63	4.14	7.49	7.62	3.63	9.37	5.94	6.07	7.85		6.99
	MAX	4	18.87	22.07	43.31	13.34	4.98	43.31	19.81	17.78	29.59		17.53
CONTACT SYSTEM							Tiger Claw™	Tiger Buy™	Tiger Claw™	Tiger Eye™	Tiger Buy™		Tiger Beam™
MATES		CLT, SQT, SQW, ESQT, TLE, SMM, MMS				SQT, SQW, ESQT, SMM	(M)TMM, TMMH, MMT, TW, TSH	TMMH, (M)TMM, MMT, TW, (Z)LTMM, ESQT, PTT, TSH, TMMs, PTHF	TMMH, (M)TMM, MMT, TW, (Z)LTMM, TSH	(M)TMM, TMMH, MMT, TW, (Z)LTMM, TW, PTT	TMMH, (M)TMM, MMT, TW, (Z)LTMM, PTT, ESQT, TSH	TMMH, (M)TMM, MMT, TW, TSH, (Z)LTMM, PTT	TMMH, (M)TMM, MMT, TW, (Z)LTMM, TSH

SERIES		DW, EW, ZW	HW	MTSW/HMTSW	TLW/MTLW	TSM	TSW/HTSW	BCS	ESW, ESQ	HLE	SSM	SSQ	SSW	
PITCH		.100" (2.54 mm)												
ORIENTATION		V		V & RA					V		V & RA			
TERMINATION		T/H	T/H & SMT	T/H		SMT & MT	T/H			T/H & SMT	SMT	T/H	T/H & SMT	
BOARD STACKING (mm)	MIN	13.59	10.03	7.24	6.1	7.47	7.87	9.02	13.59	7.47	11.18	10.03		
	MAX	48.51	30.73	46.36	20.96	14.48	35.69	18.92	48.51	26.16	30.1	38.35		
CONTACT SYSTEM									Tiger Claw™	Tiger Buy™	Tiger Beam™	Tiger Claw™	Tiger Buy™	
MATES		SSW, SSQ, ESW, ESQ, CES, SLW, BSW, BCS, SSM, HLE, PHF		SSW, SSQ, ESW, ESQ, BCS, BSW, CES, SLW, HLE, SSM	BSW, CES, SLW, HLE	SSW, SSQ, SSM, BSW, ESW, ESQ, BCS, SLW, CES, HLE	SSW, SSQ, SSM, ESW, ESQ, BCS, BSW, CES, SLW	(H)TSW, (H)MTSW, TSS, ZSS, DW, EW, ZW, HW, TSM, MTLW, PHT	(M)TSW, EW, MTLW, (H)TSS, ZSS, TSM, DW, ZW, HW, TSSH	(M)TSW, DW, EW, ZW, (M)TLW, TSM, HW	(M)TSW, TST, TSS, ZST, ZSS, DW, EW, ZW, TSM, HMTSW, HTSW, TSSH, BST, HTSS, (M)TLW	TSW, MTSW, MTLW, EW, ZW, TSS, ZSS, TSM, TSSH, HTSS	(H)TSW, (H)MTSW, MTLW, EW, ZW, TSS, HTSS, ZSS, TSM, TSSH, DW, HW	



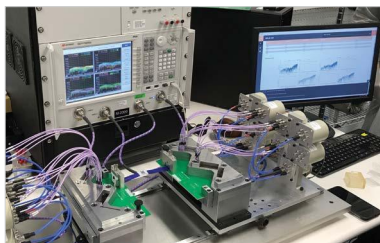
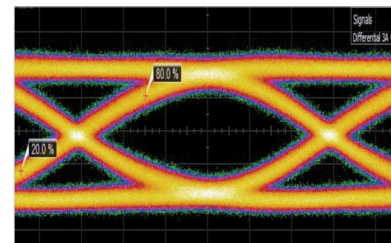
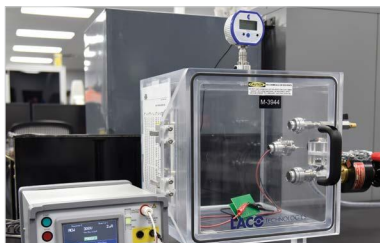
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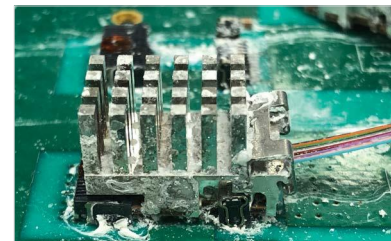
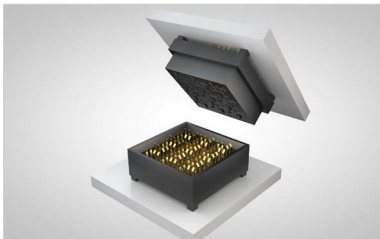
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- Modified stack heights, latching and screw downs
- Modified contacts, bodies, stamping, plating, wiring, molding and much more
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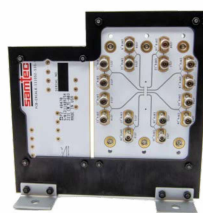
SI EVALUATION KITS: BOARD-TO-BOARD



Generate® 0.60 mm Pitch
High-Speed Edge Card (HSEC6-DV)



Generate® Differential Pair
Edge Card (HSEC8-DP)



Edge Rate® 0.635 mm Pitch
High-Speed Strips (ERM6/ERF6)



AcceleRate® mP Signal/
Power Arrays (UDM6/UDF6)



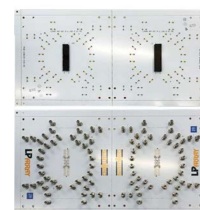
AcceleRate® HP High-Performance
Arrays (APM6/APF6)



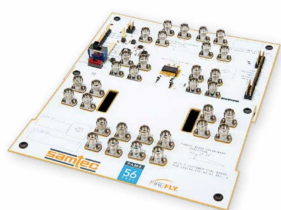
AcceleRate® HD High-Density
Arrays (ADM6/ADF6)



NovaRay® Extreme Density Arrays
(NVAM/NVAF)



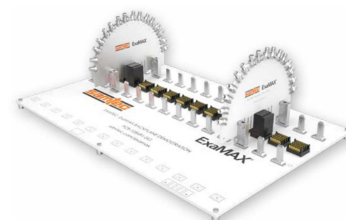
LP Array™ Low Profile Arrays
(LPAM/LPAF)



FireFly™ 20+ Gbps Edge Card
Socket (UEC5-2)



SEARAY™ High-Density Arrays
(SEAM/SEAM-RA & SEAF/SEAF-RA)



ExaMAX® High-Speed Backplane
Traditional Connectors (EBTF/EBTM)

PRECISION RF/ANALOG OVER ARRAY™ EVALUATION KITS



Bulls Eye® 50 GHz
High-Performance Test
System (BE40A)



Bulls Eye® 70 GHz
High-Performance Test
System (BE70A)



SEARAY™ Analog Over Array™
Digital/Analog/Power
Connectors (SEAM/SEAF)



Vertical Compression Mount
Precision RF Connectors
(1.35/1.85/2.40/2.92 mm)

SI EVALUATION KITS: CABLE



Flyover® QSFP Cable System
(FQSFP to ARC6 and other
End 2 options)



Flyover® QSFP
Double Density Cable System
(FQSFP-DD to NVAC/ARC6)



Flyover® QSFP 800G
Double Density Cable System
(FQSFP-D8 to NVAC/CPC)



NovaRay® I/O Flyover® Panel
Mount Cable Systems (NVACE/
NVAC & NVA3P/NVA3E)



NovaRay® Flyover® Extreme
Performance Cable System
(NVAC/NVAM-CT)



Si-Fly™ LP Low Profile
Cable System (CPC/CPI)



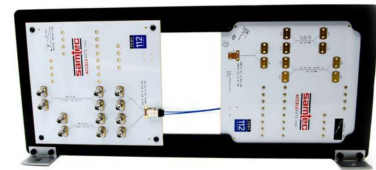
ExaMAX® Backplane Cable System
(EBCM/EBTF-RA)



AcceleRate® Flyover® Slim
Cable System (ARC6/ARF6)



AcceleRate® HP Flyover®
High-Performance Cable System
(ARP6/APF6-L)

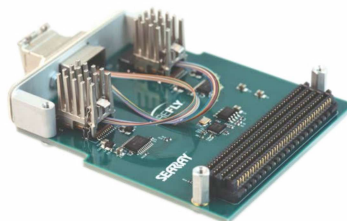


AcceleRate® Mini Flyover®
Small Form Factor Cable
System (ARM6/AMF6)

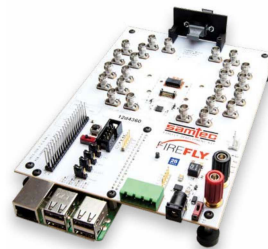
OPTICS/FPGA DEVELOPMENT KITS



25/28 Gbps FireFly™ FMC+™ Kit



14 Gbps FireFly™ FMC™ Kit



28 Gbps FireFly™ Kit



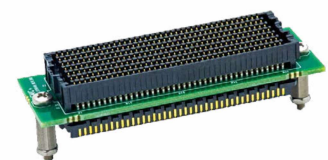
10/25 Gbps FireHawk® Kits



PCIe®-Over-Fiber
Adaptor Card (PCUO/PCOA)



VITA™ 57.4 FMC+™
HSPC & HSPC/HSPCe Loopback Cards



VITA™ 57.1 FMC™ &
VITA™ 57.4 FMC+™ Extender Cards



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