



HIGH-SPEED BOARD-TO-BOARD & BACKPLANE

INTERCONNECT SOLUTIONS GUIDE

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-SPEED PERFORMANCE

Speeds to 112 Gbps PAM4

More than 4.0 Tbps of
aggregate bandwidth

Extremely low crosstalk
to 40 GHz

APPLICATION FLEXIBILITY

10 – 3,000 positions

0.33 mm – 40 mm
stack heights

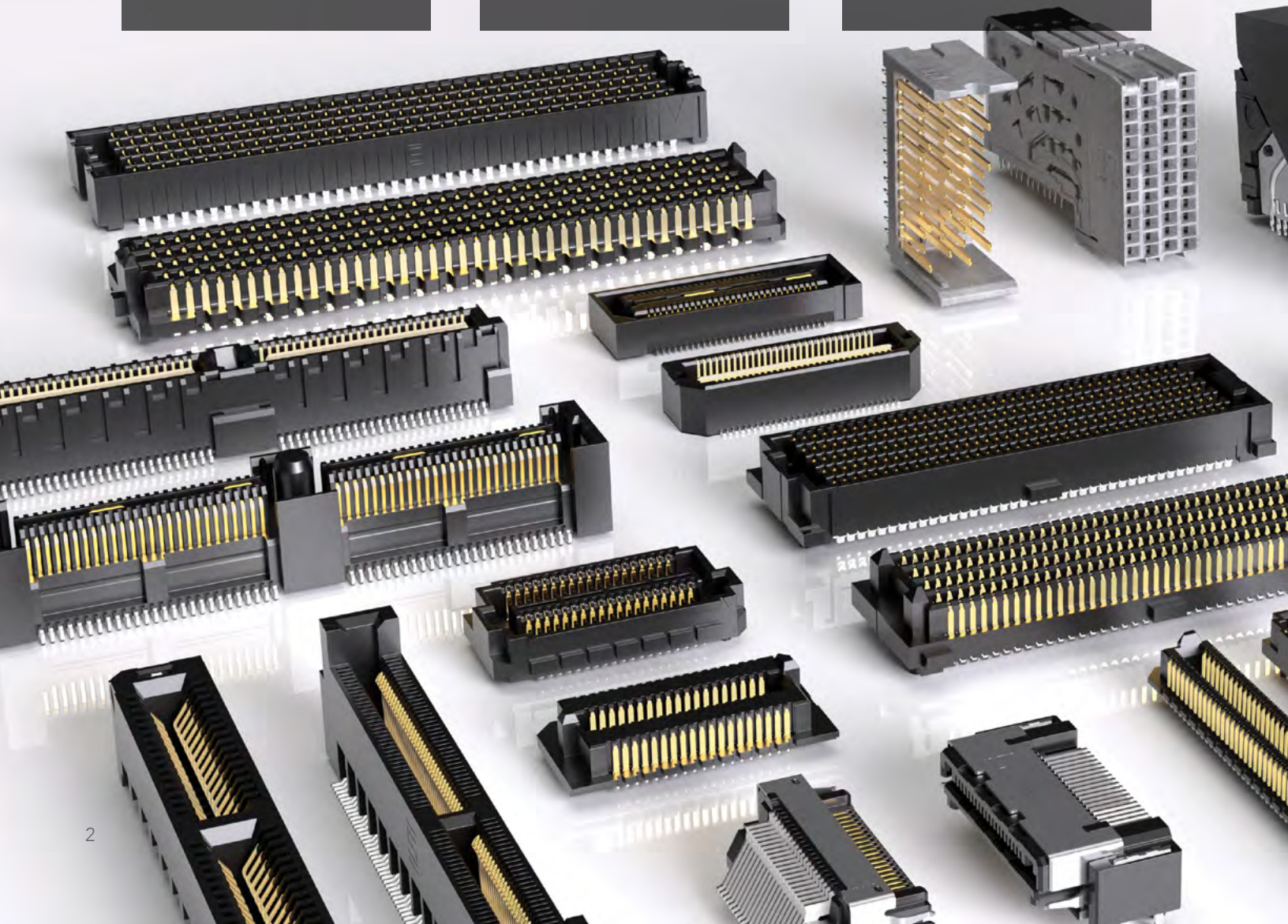
Vertical, right-angle,
edge mount

SIGNAL INTEGRITY SUPPORT

Free test reports, models,
app notes, Break Out Region

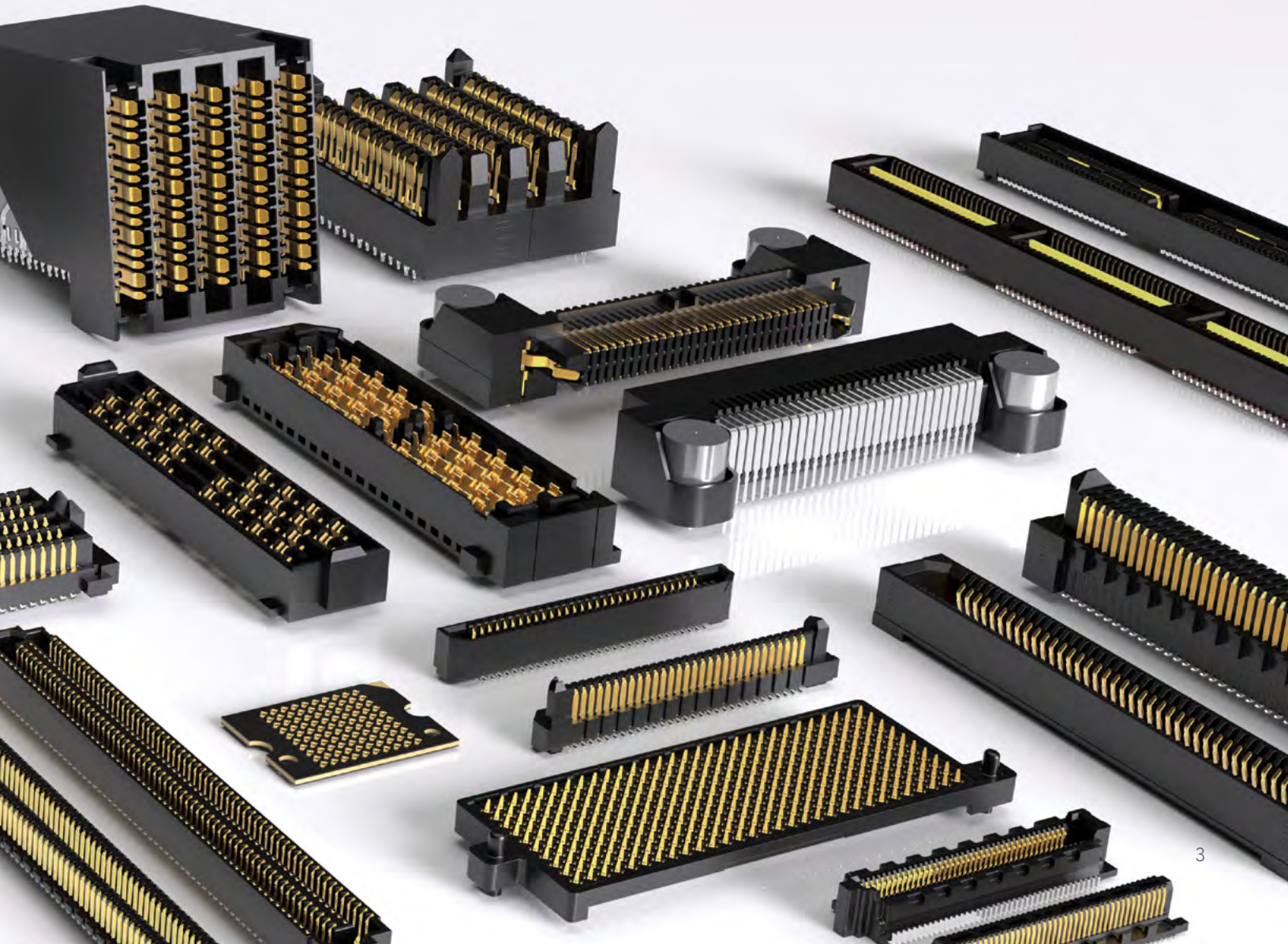
Easy access to
live EE support

Online tools: Simulator™
and Channelyzer®



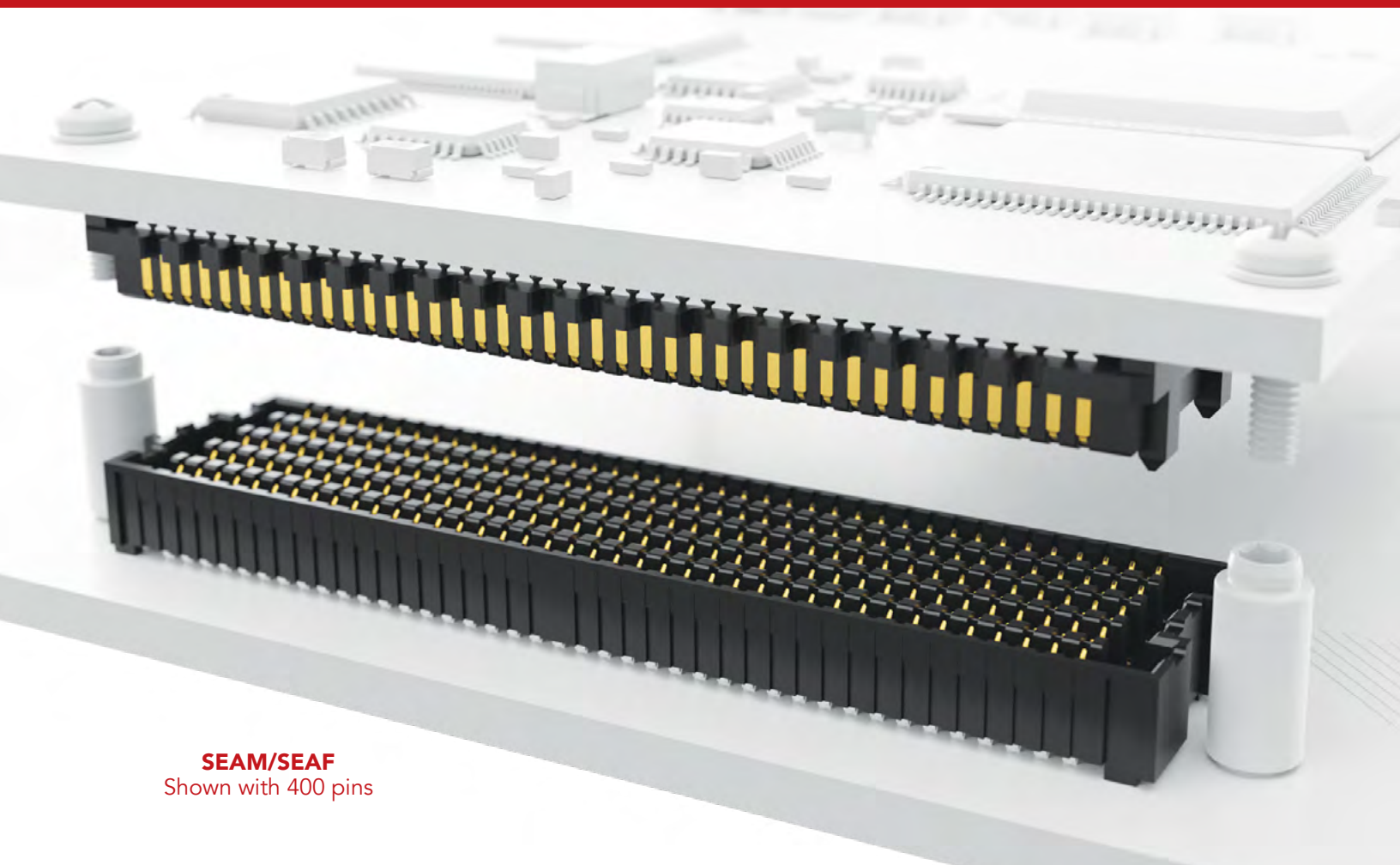
Learn more at
samtec.com

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HIGH-DENSITY ARRAYS

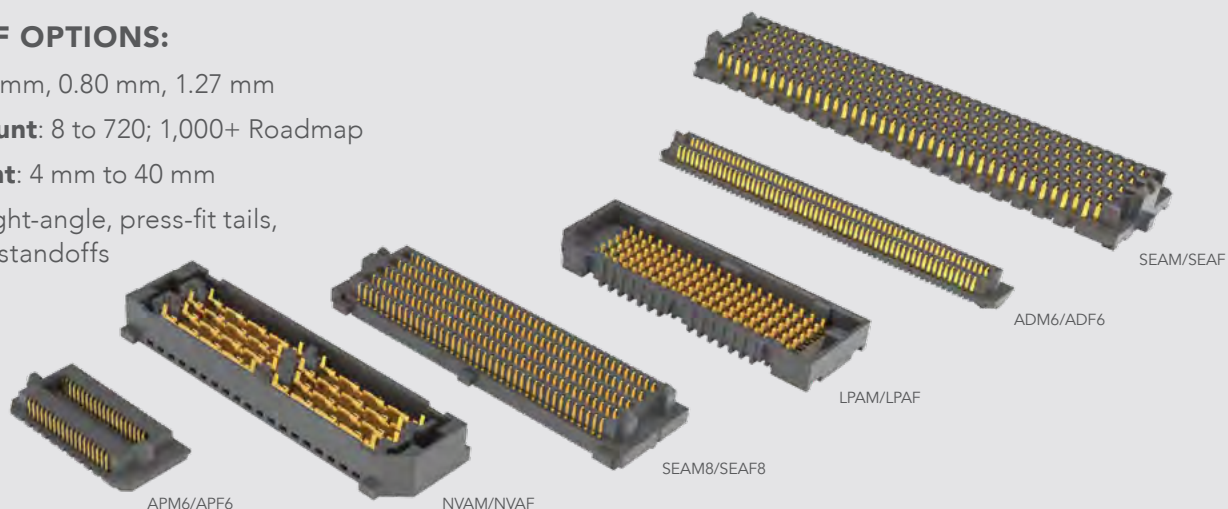
EXTREME PERFORMANCE • OPEN-PIN-FIELD • LOW-PROFILE



SEAM/SEAF
Shown with 400 pins

VARIETY OF OPTIONS:

- **Pitch:** 0.635 mm, 0.80 mm, 1.27 mm
- **Pin/Pair Count:** 8 to 720; 1,000+ Roadmap
- **Stack Height:** 4 mm to 40 mm
- **Options:** Right-angle, press-fit tails, 85 Ω tuned, standoffs

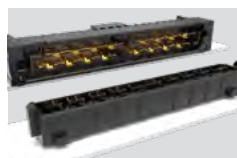


EXTREME PERFORMANCE ARRAYS

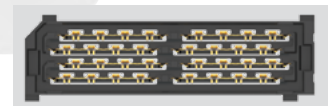
- 4.0 Tbps aggregate data rate - 9 IEEE 400G channels
- Two points of contact ensure a more reliable connection
- Fully shielded differential pair design
- Extremely low crosstalk (to 40 GHz) and incredibly tight impedance control
- Minimal variance in data rate as stack height increases
- Utilizes 40% less space with the same data throughput as compared to traditional arrays
- Terminal with latching available to mate with NovaRay® cable (NVAM-C)

NOVARAY®

NRZ	PAM4
56 Gbps	112 Gbps



Right-angle
in development
(NVAM-RA)



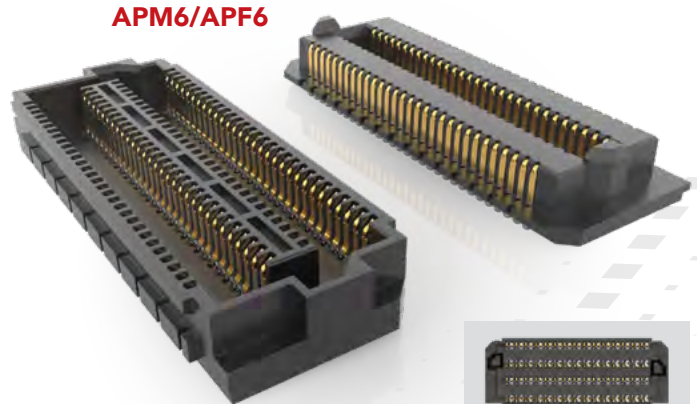
NVAM Series; 32 pairs
(actual size shown)

HIGH-PERFORMANCE ARRAYS

- Flexible open-pin-field and cost optimized, extreme performance solution
- Low-profile 5 mm stack height and up to 10 mm
- 0.635 mm pitch
- Four row design with up to 400 total pins; roadmap to 1,000+ pins
- Data rate compatible with PCIe® Gen 5 and 100 GbE
- Cable assembly in development

ACCELERATE®HP

NRZ	PAM4
56 Gbps	112 Gbps



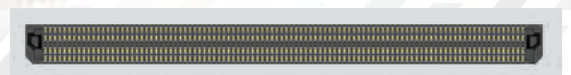
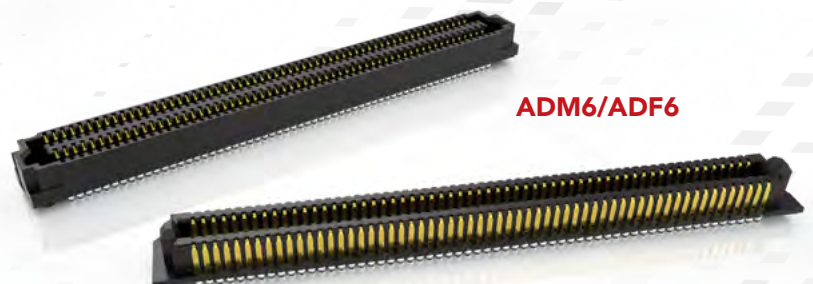
APF6 Series; 120 pins
(actual size shown)

HIGH-DENSITY MULTI-ROW STRIPS

- Up to 400 I/Os in a 4-row design
- Open-pin-field design for grounding and routing flexibility
- 0.635 mm pitch Edge Rate® contacts
- Low profile 5 mm stack height and slim 5 mm width
- Right-angle and other stack heights in development (ADF6-RA)

ACCELERATE®HD

PAM4
56 Gbps



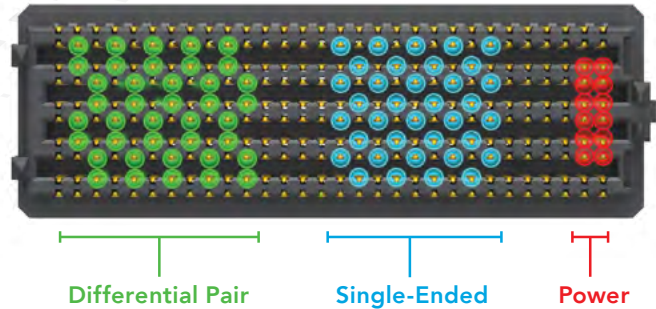
ADF6 Series; 400 pins
(actual size shown)

HIGH-DENSITY ARRAYS

1.27 mm PITCH ARRAYS

- Maximum grounding and routing flexibility
- Up to 560 Edge Rate® contacts optimized for signal integrity performance
- 7 mm to 40 mm stack heights; right-angle available
- Supports high-speed protocols such as Ethernet, PCI Express®, Fibre Channel and InfiniBand™
- Compatible with mPOWER™ (UMPT/UMPS) for power/signal flexibility

OPEN-PIN-FIELD FLEXIBILITY



SEARRAY™

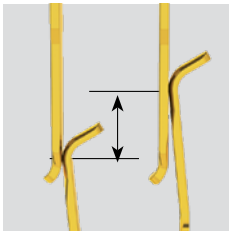
NRZ	PAM4
28 Gbps	56 Gbps



SEAM/SEAF



SEAM-RA



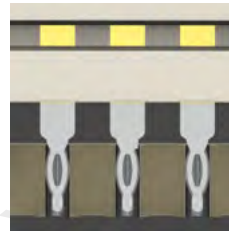
1.15 mm (.045")
contact wipe



Solder charge terminations
(IPC-A-610F & IPC J-STD-001F Class 3)



Elevated stack heights
available (SEAR)



Press-fit tails available
(SEAMP/SEAFP)

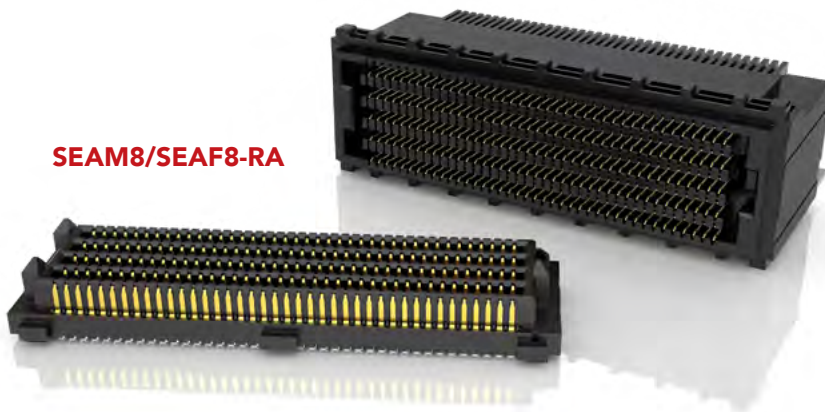


Jack screw
standoffs (JSO)

HIGH-DENSITY 0.80 mm PITCH ARRAYS

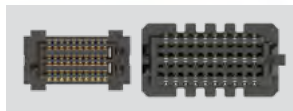
- 2x the density of 1.27 mm pitch arrays
- Up to 720 Edge Rate® contacts; higher pin counts in development
- 7 mm and 10 mm stack heights
- 2 mm extended wipe in development
- Compatible with mPOWER™ (UMPT/UMPS) for power/signal flexibility

SEAM8/SEAF8-RA



SEARRAY.8mm

NRZ	PAM4
28 Gbps	56 Gbps

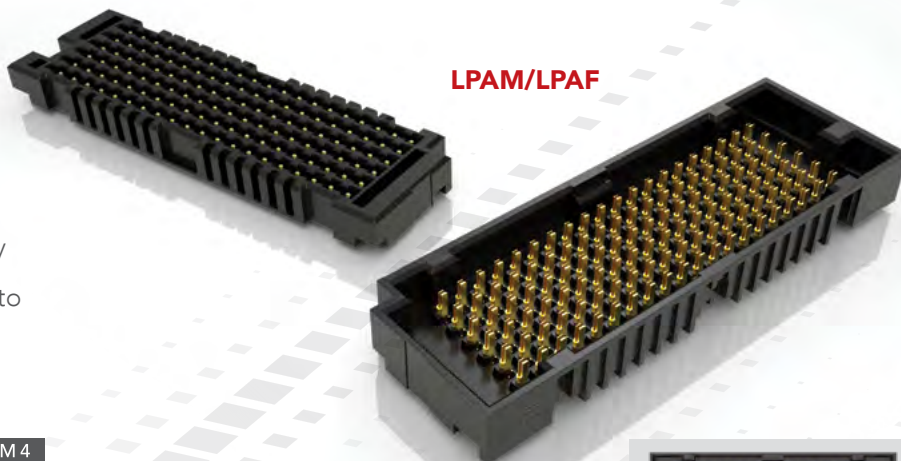


0.80 mm pitch vs. 1.27 mm pitch
(actual size shown; 60 pins)

LOW PROFILE ARRAYS

- Up to 400 total pins in 4, 6 or 8 rows
- 4 mm, 4.5 mm and 5 mm stack heights
- 1.27 mm pitch dual beam contacts
- Solder crimped termination for ease of processing
- Compatible with mPOWER™ (UMPT/UMPS) for power/signal flexibility
- Press-in or threaded standoffs available to assist with unmating (JSO)

LPAM/LPAF



LPARRAY

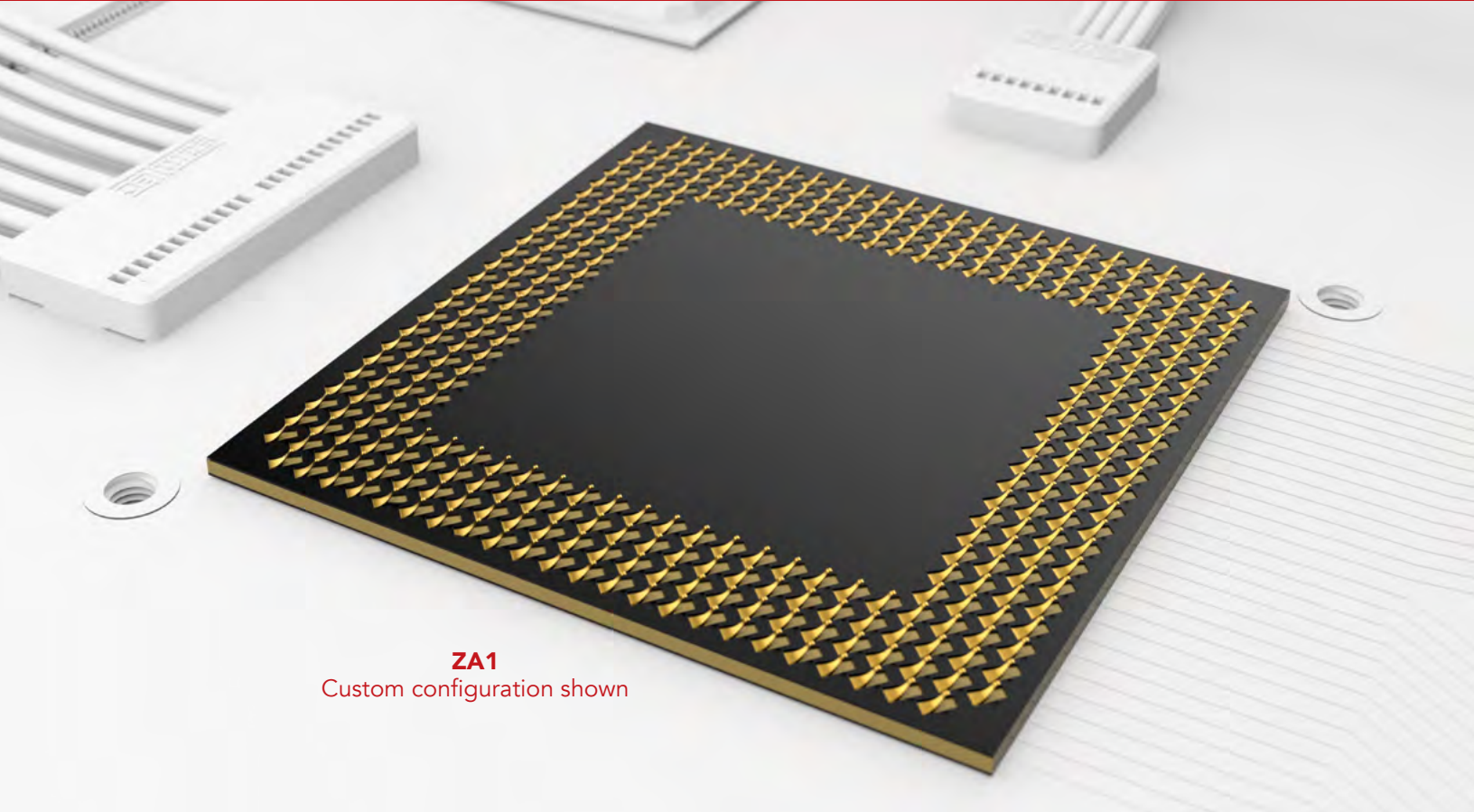
NRZ	PAM4
28 Gbps	56 Gbps



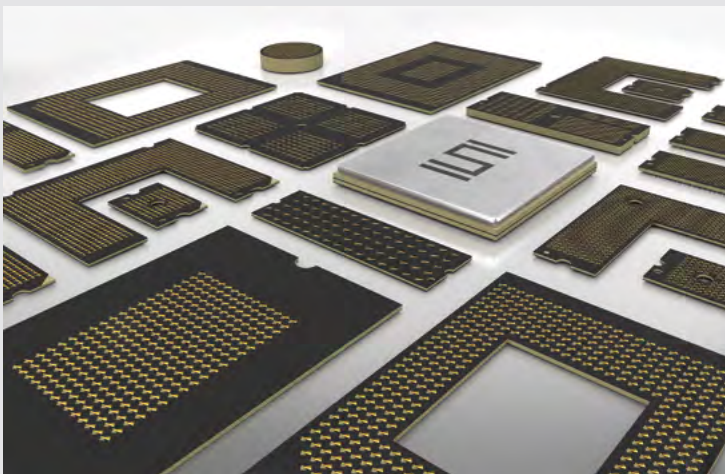
LPAM Series; 120 pins
(actual size shown)

HIGH-SPEED COMPRESSION INTERPOSERS

ULTRA-LOW PROFILE • HIGH-DENSITY • EXTREME FLEXIBILITY



ZA1
Custom configuration shown

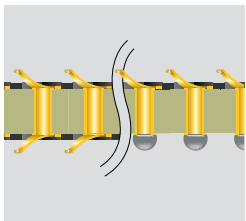


Z-Ray® ULTIMATE DESIGN FLEXIBILITY

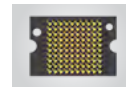
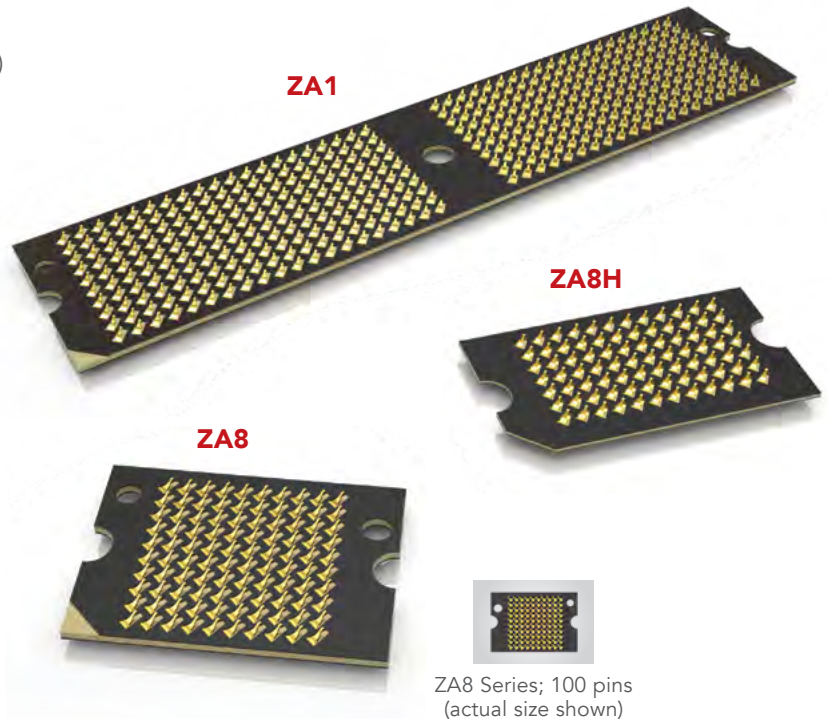
- Configurations for any application, complete with detailed footprints
- Dual compression or single compression with solder balls
- Customer-specific stack heights, pin counts, insulator shapes, and plating thicknesses
- Customizable in the X, Y, and Z axes
- Wide variety of custom geometries
- Quick-turn customization with minimal NRE and tooling charges
- Variety of compression and alignment hardware available

ULTRA-LOW PROFILE COMPRESSION INTERPOSERS

- 0.80 mm or 1.00 mm pitch
- 1 mm body height (ZA8/ZA1); 0.33 mm body height provides the shortest signal path (ZA8H)
- Up to 400 pins standard; 3,000+ pins with custom capabilities
- Customizable in X, Y, and Z axes, stack height, pin count, shape, plating thickness, etc.
- High-speed performance to 14 Gbps (ZA8/ZA1) and 56 Gbps NRZ (ZA8H)
- Alignment/compression hardware available (ZHSL, ZSO, ZD)



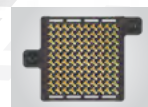
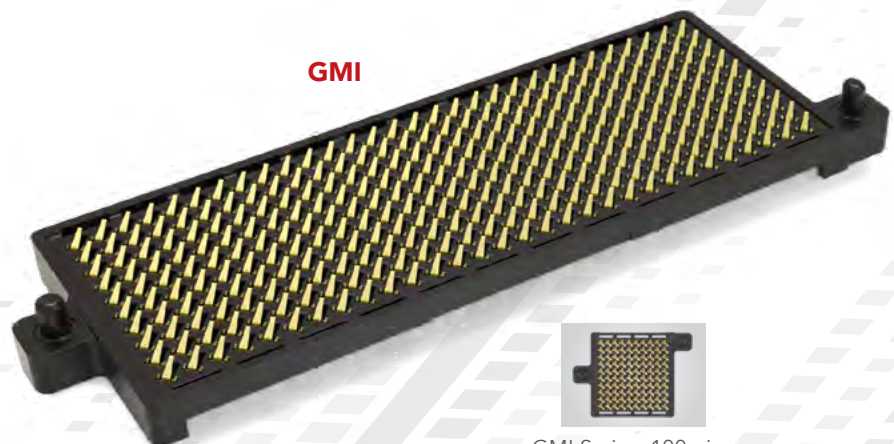
Dual compression,
or single compression
with solder balls



ZA8 Series; 100 pins
(actual size shown)

LOW PROFILE COMPRESSION INTERPOSERS

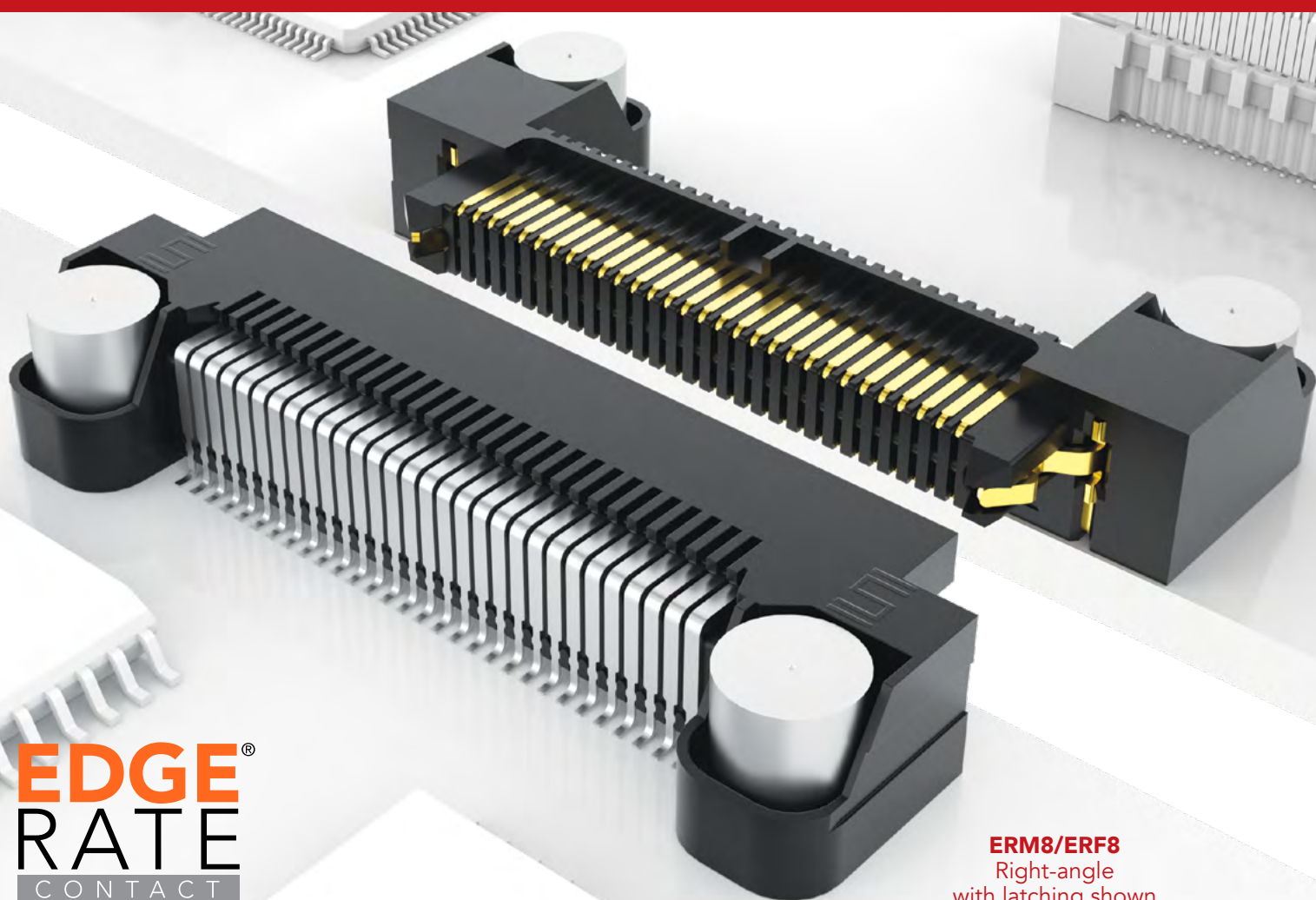
- 1.00 mm pitch
- 1.27 mm body height
- 100, 200 or 300 pins
- Dual compression
- Ideal for low cost board stacking, module-to-board and LGA interfaces
- Minimizes thermal expansion issues



GMI Series; 100 pins
(actual size shown)

EDGE RATE[®] CONNECTOR STRIPS

OPTIMIZED FOR SPEED • HIGH CYCLES • INCREASED CONTACT WIPE



**EDGE
RATE[®]**
CONTACT

ERM8/ERF8
Right-angle
with latching shown

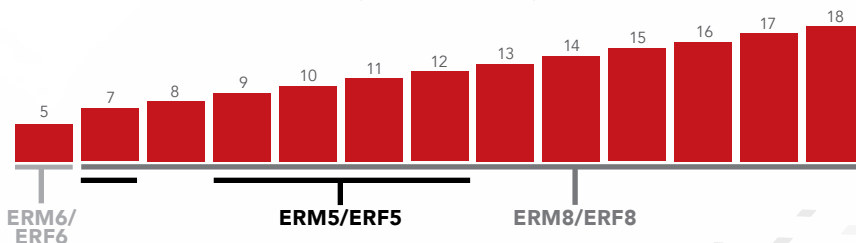
EDGE RATE[®] CONTACT SYSTEM:

- 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



STACK HEIGHT FLEXIBILITY

(Actual size in mm)

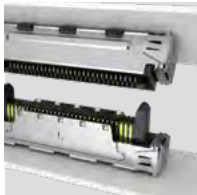


0.80 mm PITCH SYSTEM

- 1.5 mm contact wipe for a reliable connection
- Differential pair and hot swap options
- Stack heights from 7 mm to 18 mm
- Supports high-speed protocols including Ethernet and PCI Express®
- Right-angle and edge mount available

PAM 4
56
Gbps

ERM8/ERF8



Rugged 360° shielding
and metal latching options



Compatible with
mPOWER™ (UMPT/UMPS)
for power/signal flexibility

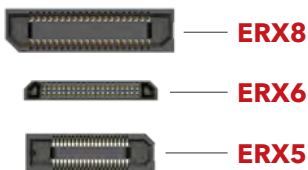
0.635 mm PITCH SYSTEM

- Extremely slim 2.5 mm body width
- Up to 120 positions in a 2-row design
- 5 mm stack height (others in development)

PAM 4
56
Gbps

ERM6/ERF6

Sockets shown actual size
at 40 total positions



Compatible with
mPOWER™ (UMPT/UMPS)
for power/signal flexibility

0.50 mm PITCH SYSTEM

- 1.00 mm contact wipe
- Up to 40% PCB space savings with 0.50 mm pitch vs. 0.80 mm pitch
- Stack heights from 7 mm to 12 mm
- 20 to 150 total positions

28
Gbps

ERM5/ERF5-RA



Compatible with
mPOWER™ (UMPT/UMPS)
for power/signal flexibility

GROUND PLANE CONNECTORS

RELIABLE SI PERFORMANCE • LOW-PROFILE • SLIM FOOTPRINT

QTH/QSH
5 mm stack height shown

QSERIES®

INTEGRAL GROUND/POWER PLANE

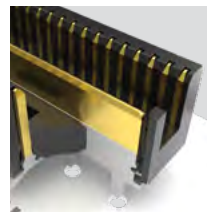
- Surface mount ground plane between two signal rows improves electrical performance
- Significantly reduces row-to-row crosstalk
- Integral metal plane for power to 25 Amps



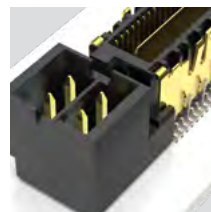
FEATURES



Differential pairs
reduce noise



Mixed technology
(MIT/MIS)



Options for power,
retention & RF

LOW PROFILE GROUND PLANE CONNECTORS

- 0.50 mm, 0.635 mm and 0.80 mm pitch
- 5 mm to 25 mm stack heights
- Integral ground/power plane
- Compatible with mPOWER™ (UMPT/UMPS) for power/signal flexibility
- Differential pairs and edge mount options available

QSTRIP®

28
Gbps

25 A
per plane

QTE/QSE

SLIM GROUND PLANE CONNECTORS

- 0.80 mm pitch and 1.20 mm contact wipe
- Edge Rate® contacts optimized for superior signal integrity performance
- Right-angle available for coplanar and perpendicular mating
- Compatible with mPOWER™ (UMPT/UMPS) for power/signal flexibility

QRATE®

28
Gbps

8.6 A
per plane

QRM8/QRF8



Slim 4.60 mm
body width saves
board space

RUGGED GROUND PLANE CONNECTORS

- 0.635 mm pitch
- Increased insertion depth for rugged applications
- Up to 156 signal pins/48 signal pairs standard
- Vertical, right-angle and edge mount
- Shielded systems available (QMSS/QFSS)
- Compatible with mPOWER™ (UMPT/UMPS) for power/signal flexibility

Q2™

25
Gbps

15.7 A
per plane

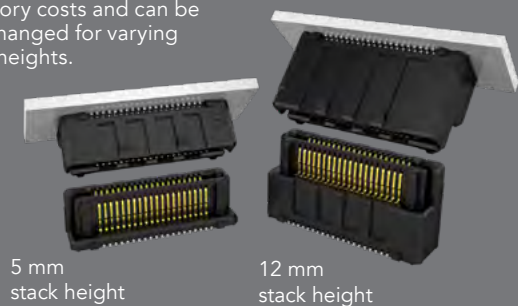
QMS/QFS

ULTRA MICRO INTERCONNECTS

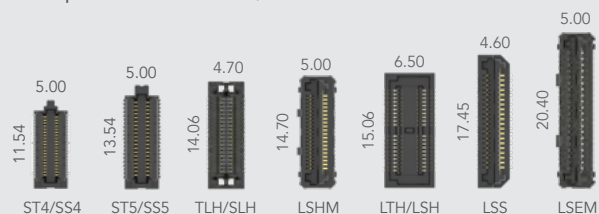
SPACE SAVING DESIGNS • HERMAPHRODITIC • HIGH-DENSITY

LSHM
80 total
positions shown

Self-mating connectors reduce inventory costs and can be interchanged for varying stack heights.



SLIM BODY DESIGNS - ACTUAL SIZE SHOWN (40 total positions each)

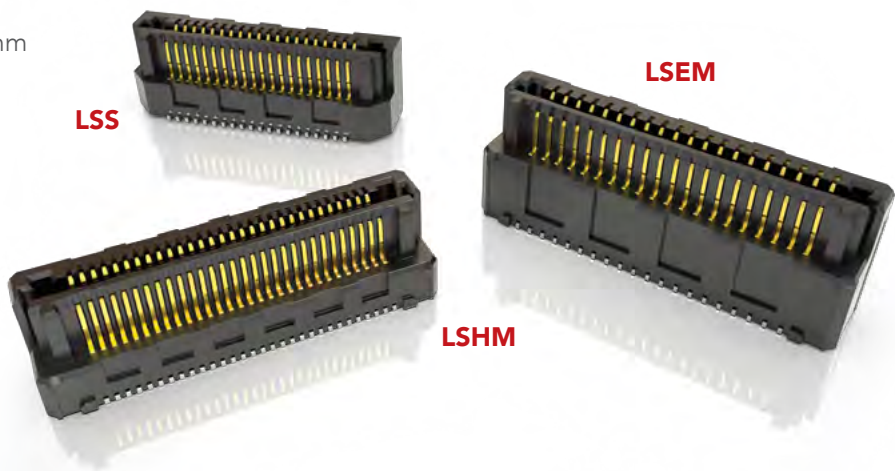


RUGGED HERMAPHRODITIC CONNECTORS

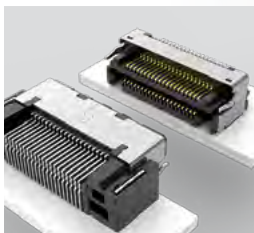
- Razor Beam™ contacts for high-speed and fine-pitch systems
- 0.50 mm, 0.635 mm and 0.80 mm pitch
- Ten stack height options from 5 mm to 12 mm
- 10 - 100 positions
- Right-angle available for perpendicular and coplanar applications

**RAZOR
BEAM**
SYSTEM

25
Gbps



Razor Beam™ contacts for ultra low profile designs



Optional shielding for EMI protection (LSHM)



Jack screw standoffs (JSO) assist with unmating

MICRO BLADE & BEAM STRIPS

- Ultra-fine 0.40 mm and 0.50 mm pitch
- Low profile stack heights from 2 to 6 mm
- Slim body designs for increased PCB space savings
- 20 - 160 positions



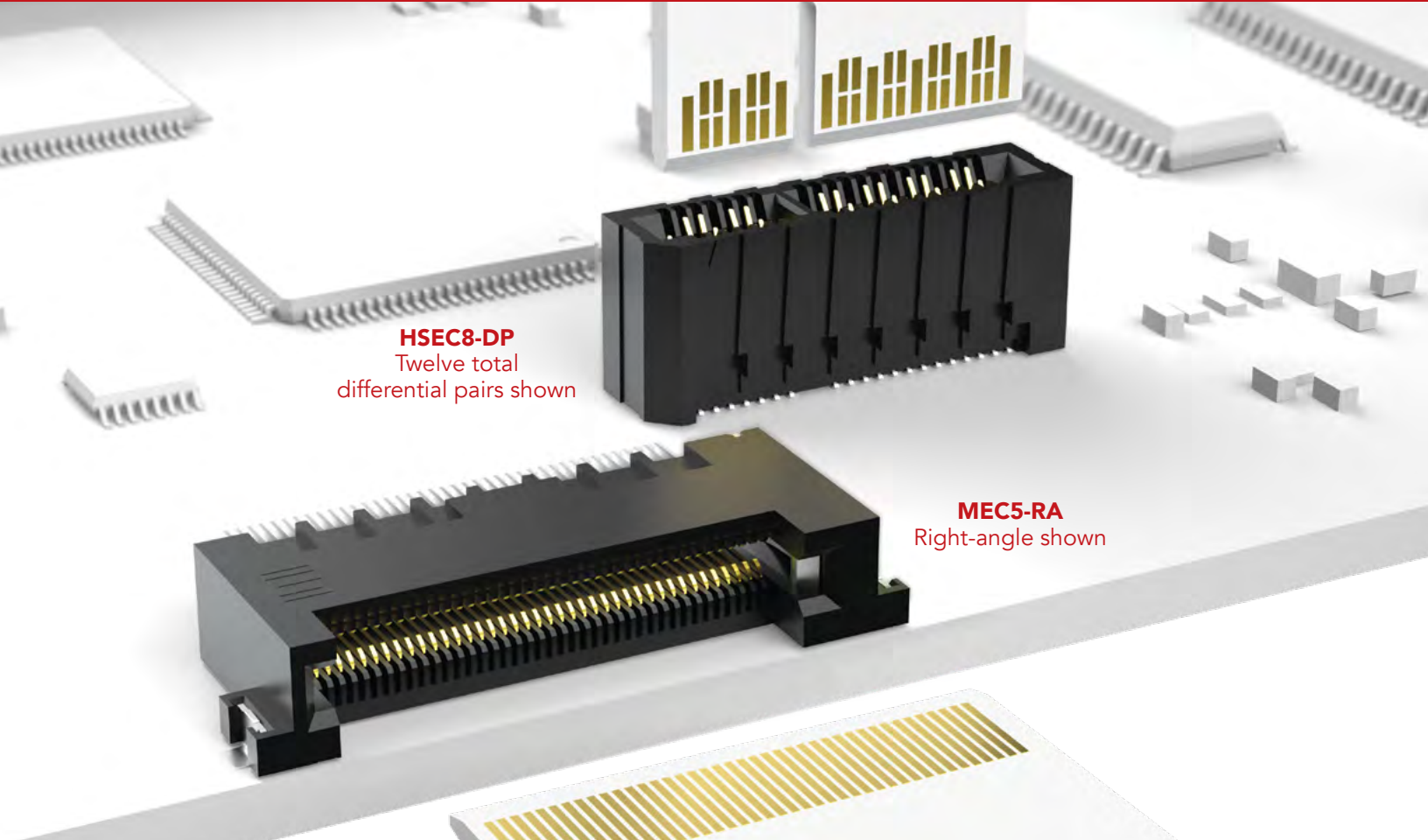
PAM4
56
Gbps

Compatible with mPOWER™ (UMPT/UMPS) for power/signal flexibility



EDGE CARD SYSTEMS

SPEEDS TO 56 Gbps • EDGE RATE® CONTACTS • VARIETY OF OPTIONS



HSEC8-DP

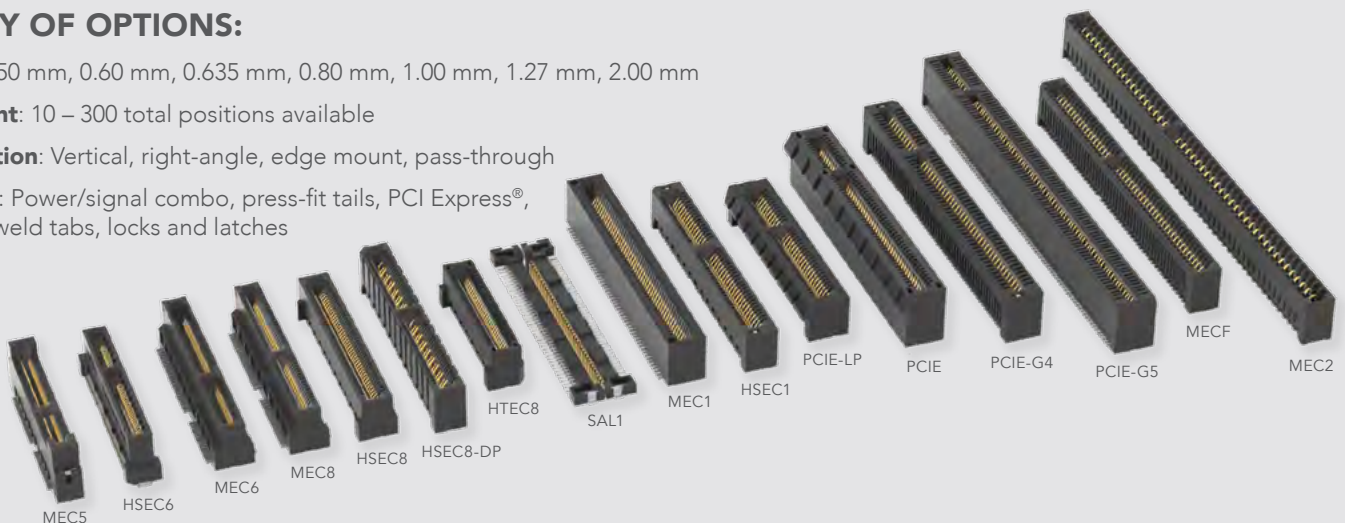
Twelve total
differential pairs shown

MEC5-RA

Right-angle shown

VARIETY OF OPTIONS:

- **Pitch:** 0.50 mm, 0.60 mm, 0.635 mm, 0.80 mm, 1.00 mm, 1.27 mm, 2.00 mm
- **Pin Count:** 10 – 300 total positions available
- **Orientation:** Vertical, right-angle, edge mount, pass-through
- **Options:** Power/signal combo, press-fit tails, PCI Express®, rugged weld tabs, locks and latches

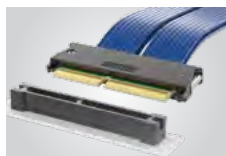


0.60 mm PITCH SOCKETS

- Differential pair Edge Rate® contacts
- Compliant to SFF-TA-1002: x4 (IC), x8 (2C), x16 (4C and 4C+)
- Mates with .062" (1.60 mm) thick cards
- PCI Express® Gen 4, Gen 5 and Gen-Z™ compliant

**EDGE
RATE**
CONTACT

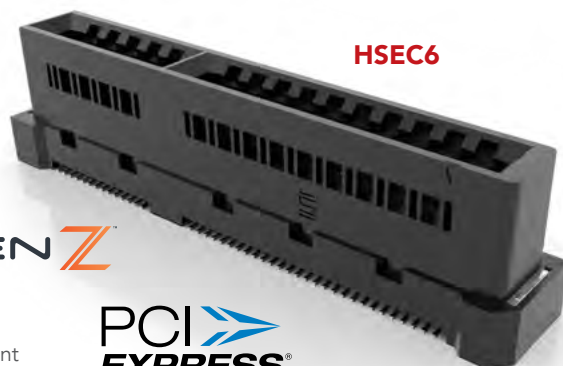
PAM4
56
Gbps



0.60 mm pitch mating
high-speed cable
assembly in development

GEN Z™

**PCI
EXPRESS**
GEN 4/5 COMPLIANT



HSEC6

0.80 mm PITCH SOCKETS

- Up to 200 high-speed Edge Rate® contacts
- Mates with .062" (1.60 mm) and .093" (2.36 mm) thick cards
- Power/signal combo (HSEC8-PV)
- PCI Express® Gen 3/4 compatible; Gen 4/5 compatible differential pair socket (HSEC8-DP)

**EDGE
RATE**
CONTACT

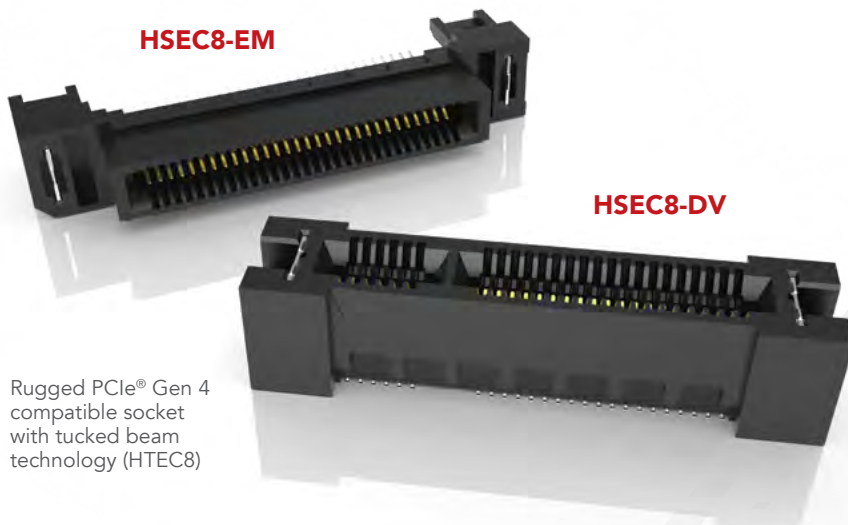
PAM4
56
Gbps



Rugged PCIe® Gen 4
compatible socket
with tucked beam
technology (HTEC8)

HSEC8-EM

HSEC8-DV

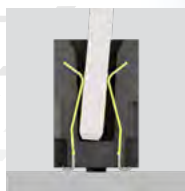


1.00 mm PITCH SOCKETS

- Edge Rate® contact system for decreased crosstalk
- 20 – 140 positions
- Mates with .062" (1.60 mm) thick cards
- PCI Express® Gen 3/4 compatible; Gen 5 compatible differential pair socket in development (HSEC1-DP)

**EDGE
RATE**
CONTACT

PAM4
56
Gbps



Custom designs can
aid with misalignment
in the X-Y axes

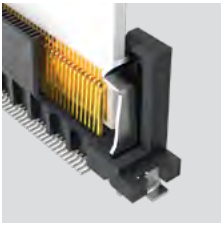
HSEC1-DV



EDGE CARD SYSTEMS

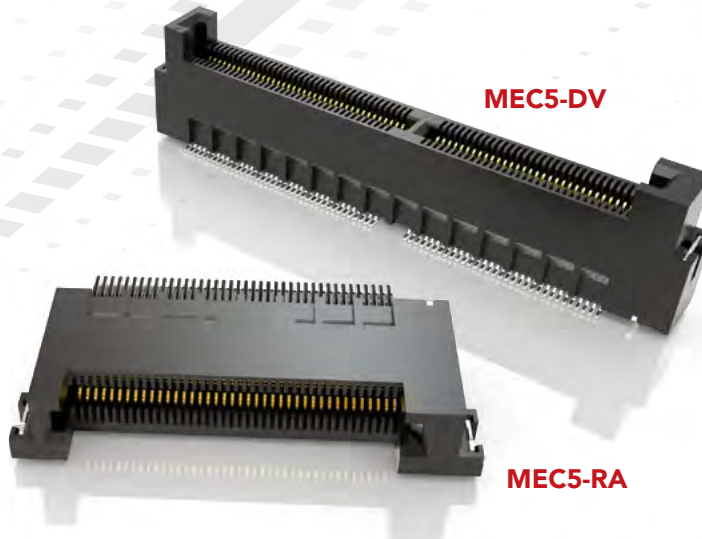
0.50 mm PITCH HIGH-SPEED, LOW-COST SOCKETS

- Justification beam enables use of standard PCB tolerance
- Up to 300 total I/Os
- PCIe® Gen 4 compatible
- Mates with .062" (1.60 mm) thick cards



Beam ensures card and body are flush

PAM4
56
Gbps



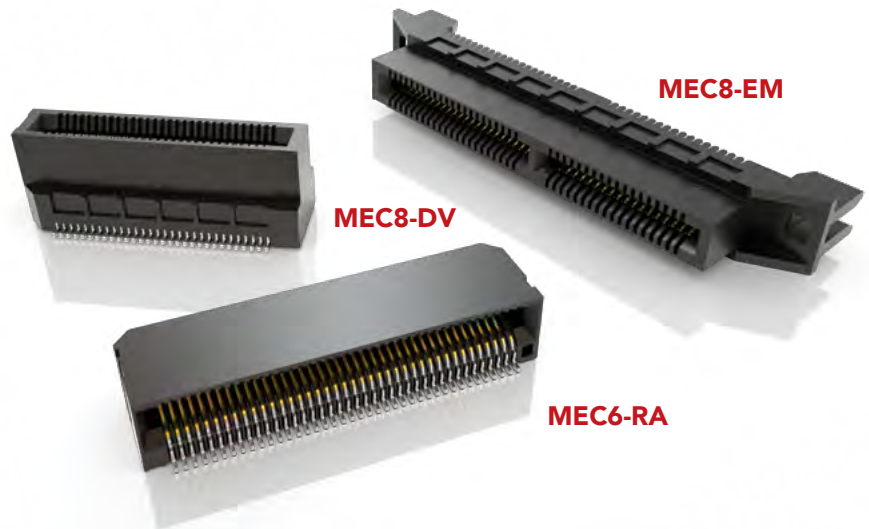
0.635 mm & 0.80 mm PITCH MICRO SOCKETS

- Up to 140 total I/Os
- Vertical and right-angle; edge mount (MEC8)
- Press-fit tails available (MEC8 -VP)
- Mates with .062" (1.60 mm) thick cards



Staggered press-fit tails

25
Gbps



1.00 mm, 1.27 mm & 2.00 mm PITCH SOCKETS

- Up to 140 total I/Os
- Right-angle and edge mount available (MEC1)
- Optional weld tabs, alignment pins and polarization
- Mates with .062" (1.60 mm) and .093" (2.36 mm) thick cards

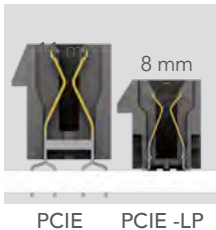
25
Gbps



samtec.com/edgecard

GEN 3 & 4 PCI EXPRESS® SOCKETS

- 1.00 mm pitch in x1, x4, x8 or x16
- Gen 3 compliant (PCIe) and Gen 4 compatible (PCIe-LP)
- Low profile version for space savings; through-hole tails in development
- PCI-Express® Jumpers available
- Mates with .062" (1.60 mm) thick cards



Gen 4 slim body socket with Edge Rate® contacts (PCIe-G4)



PCIe-LP



PCIe

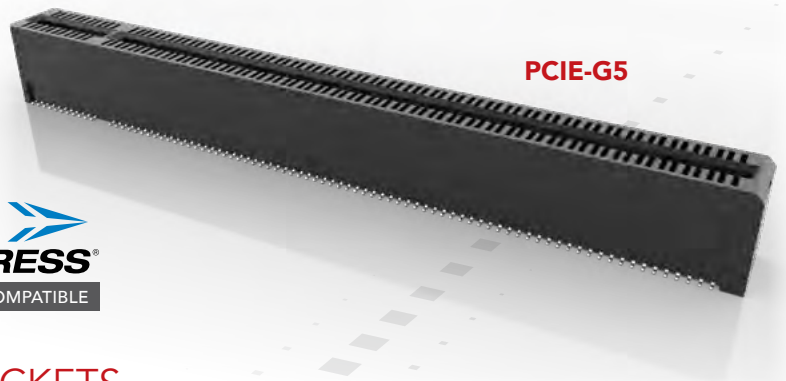


GEN 5 PCI EXPRESS® SOCKETS

- Differential pair system
- 1.00 mm pitch
- Design-in today for future-proof data rates
- Mates with standard PCIe® expansion cards
- 1, 4, 8 and 16 PCI Express® Gen 5 link options
- Currently in development



PCIe-G5



1.00 mm PITCH MICRO PLANE SOCKETS

- 40 to 80 I/Os per pair
- Mounts in pairs on same or opposite sides for easy signal routing
- BeCu contacts with large deflection
- PCI Express® Gen 3 compatible
- Mounting flexibility for variable mating card thickness and pass-through applications



SAL1

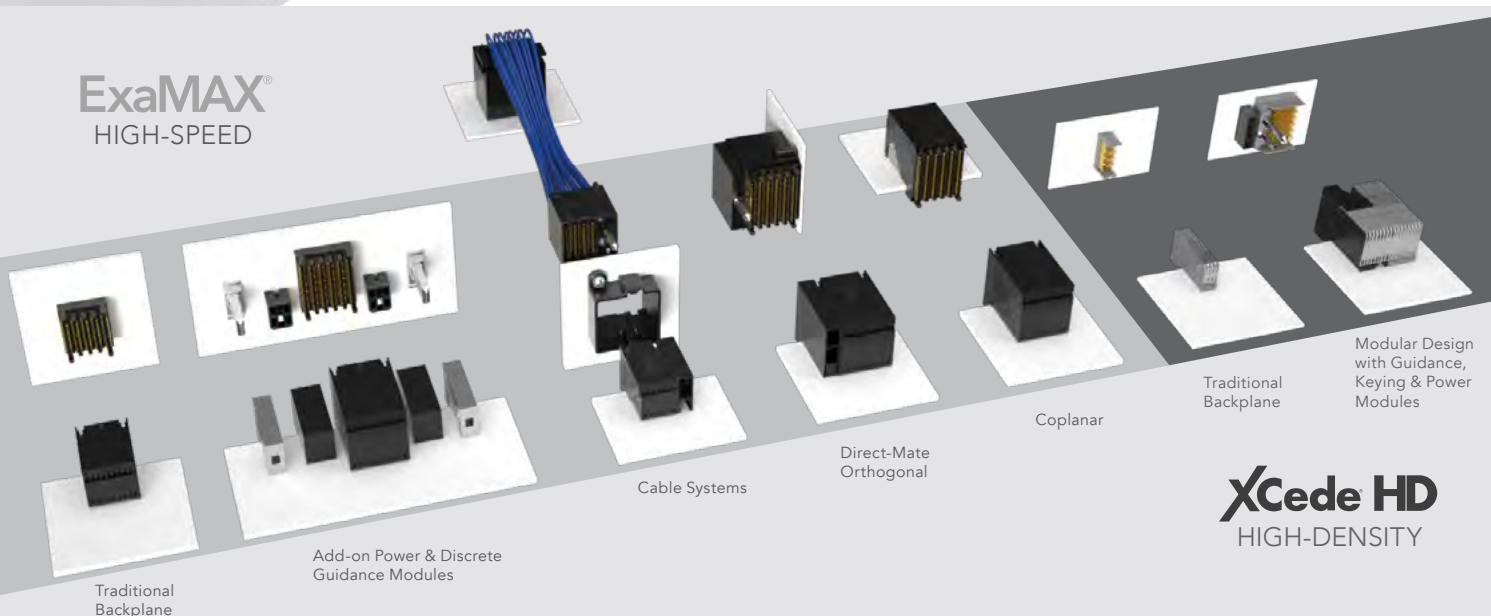
HIGH-SPEED BACKPLANE SYSTEMS

HIGH-DENSITY • DESIGN FLEXIBILITY • HIGH RELIABILITY



EBTM/EBTF-RA
Shown with power
and guidance modules

ExaMAX®
HIGH-SPEED



Modular Design
with Guidance,
Keying & Power
Modules

Traditional
Backplane

Coplanar

Direct-Mate
Orthogonal

Cable Systems

Add-on Power & Discrete
Guidance Modules

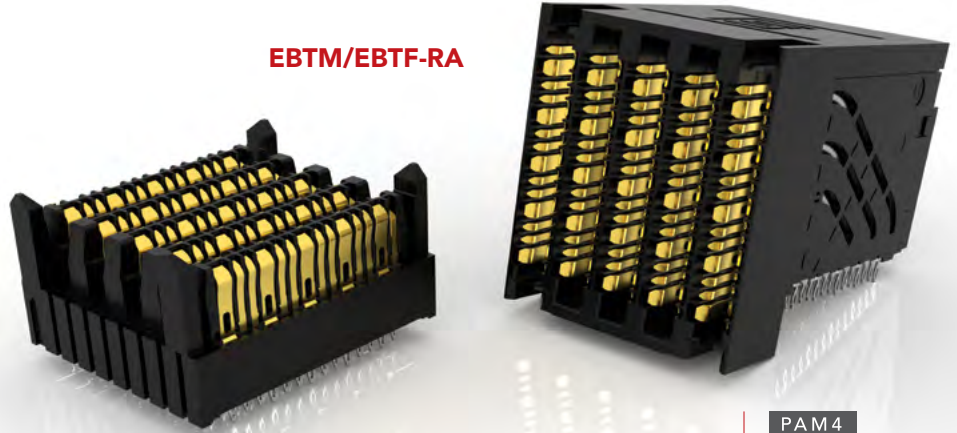
Traditional
Backplane

XCede HD
HIGH-DENSITY

EXAMAX® HIGH-SPEED BACKPLANE

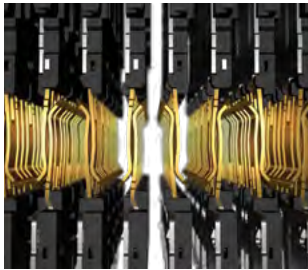
- Meets industry specifications such as PCI Express®, Intel OPI and VPI, SAS, SATA, Fibre Channel, InfiniBand™ and Ethernet
- Exceeds OIF CEI-28G-LR specification for 28 Gbps standards
- 24 - 72 pair designs (4 and 6 pairs; 6, 8, 10 and 12 columns)
- Wafer design increases isolation for reduced crosstalk
- Press-fit tails provide a reliable electrical connection
- Cable assemblies available (see pages 24 - 25)

EBTM/EBTF-RA



ExaMAX®

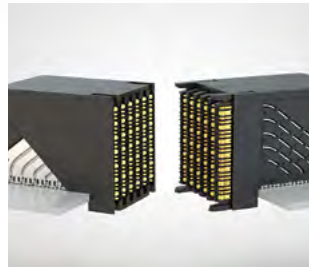
PAM 4
56
Gbps



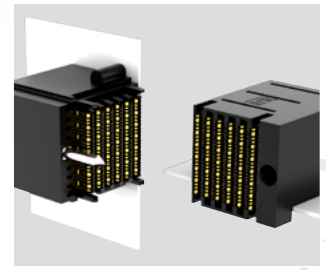
Two reliable points of contact



Staggered differential pair design with an embossed ground plane



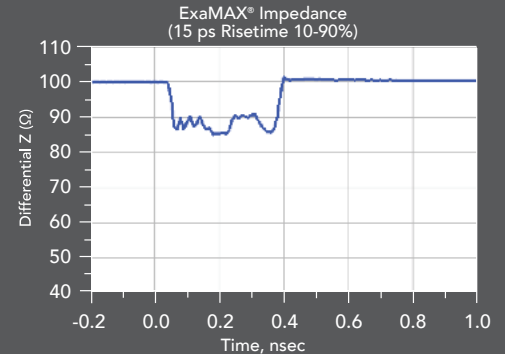
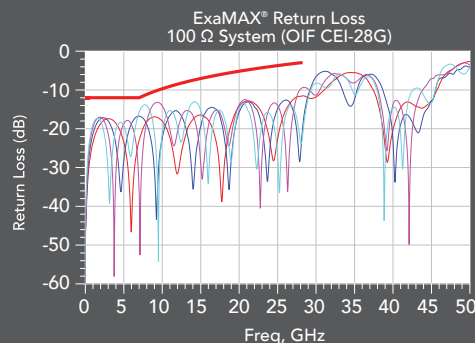
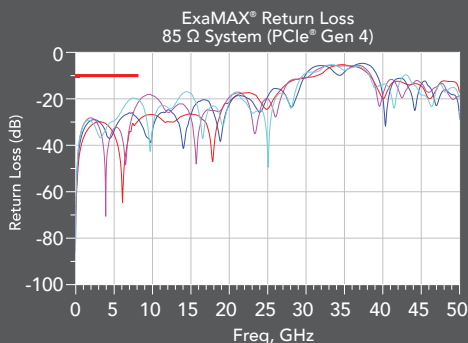
Coplanar available to bypass the midplane (EBTM-RA)



Direct-mate orthogonal (EBDM-RA) eliminates the midplane for a shorter signal path

PERFORMANCE CHARTS

ExaMAX® is engineered for 92 Ω impedance to address both 85 Ω and 100 Ω applications

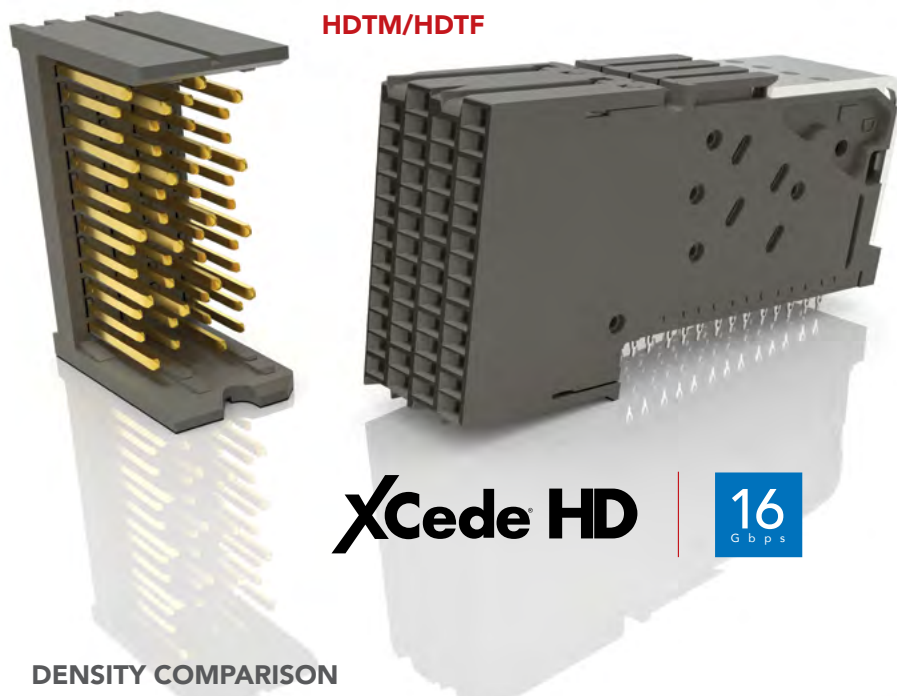


ExaMAX® is a trademark of AFCI

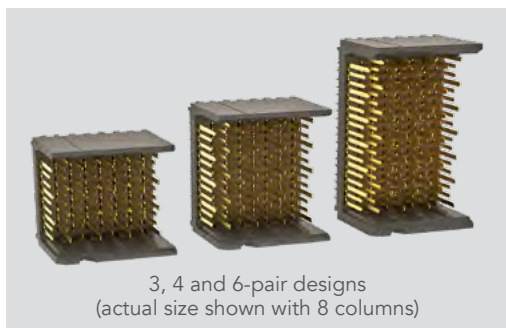
HIGH-SPEED BACKPLANE SYSTEMS

XCEDE® HD HIGH-DENSITY BACKPLANE

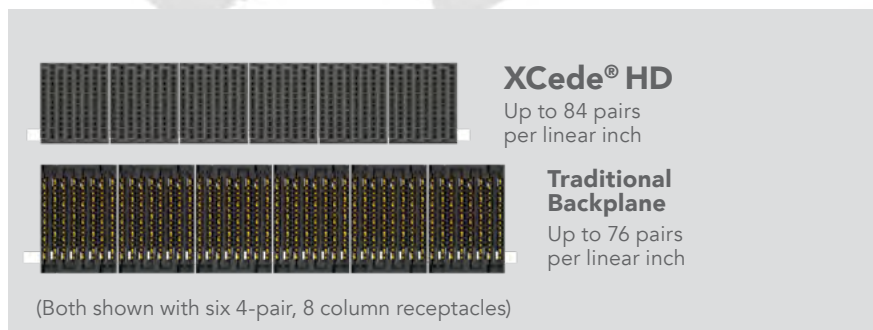
- Small form factor and modular design provides significant space-savings and flexibility
- High-performance system
- Up to 84 differential pairs per linear inch
- 3, 4 and 6-pair designs on 4, 6 and 8 columns
- Integrated power, guidance, keying and end walls available
- 85 Ω and 100 Ω options
- Combine any configuration of modules to create one integrated receptacle (BSP Series); corresponding terminal modules are individually mounted to the backplane



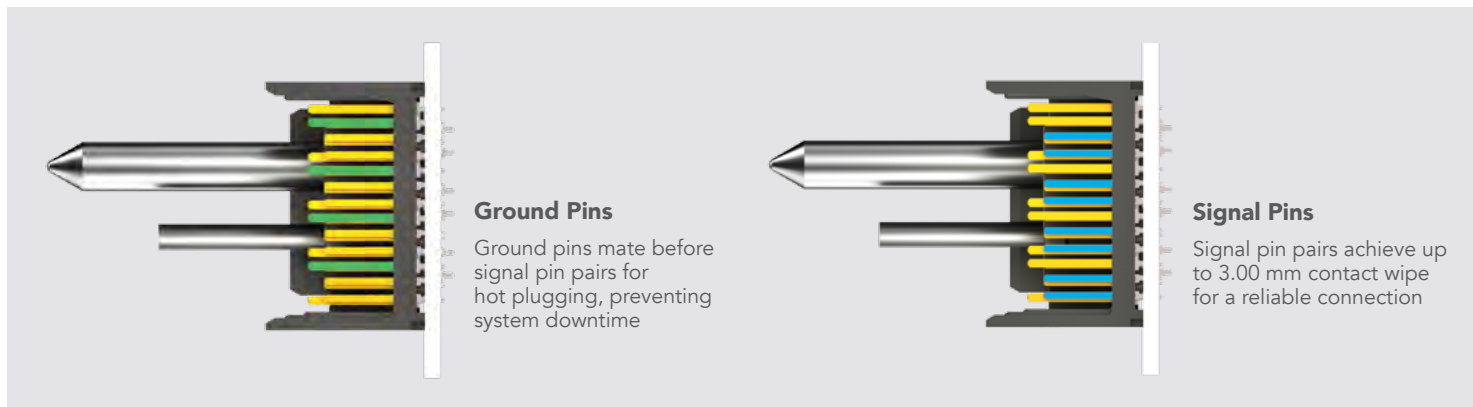
SMALL FORM FACTOR



DENSITY COMPARISON



SIGNAL/GROUND PIN STAGING



MODULAR DESIGN

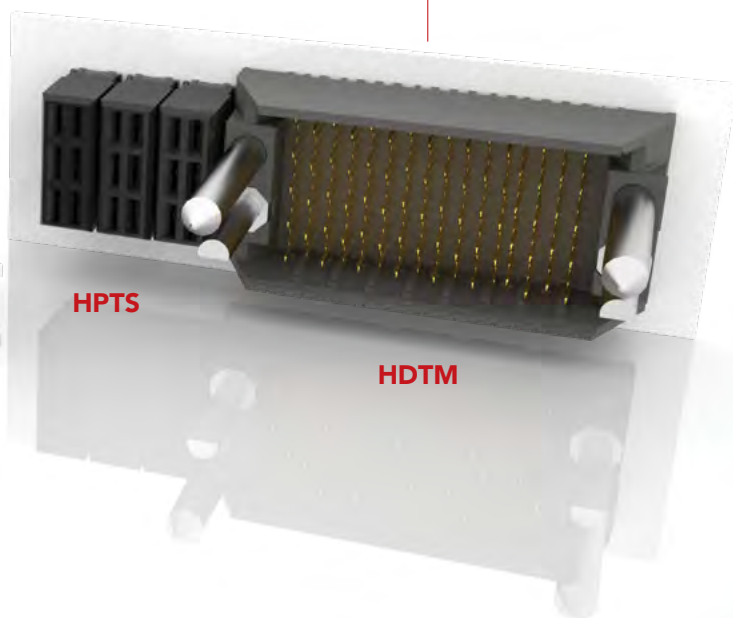
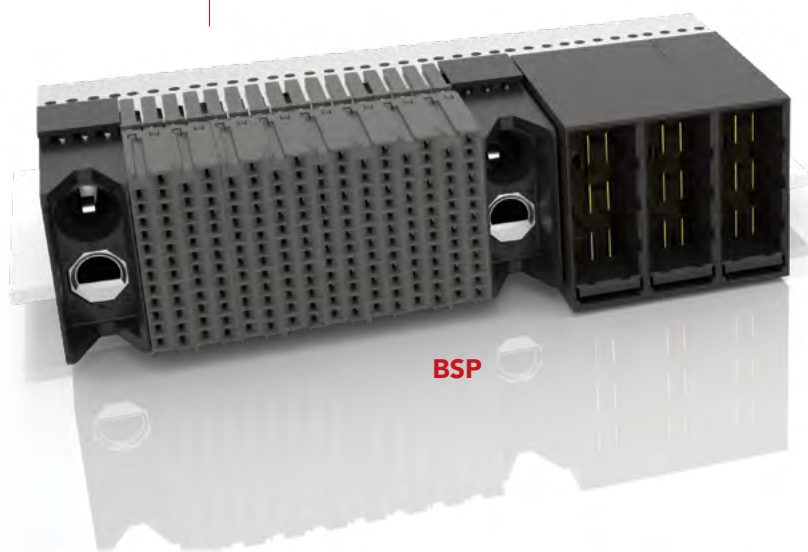
XCede® HD consists of signal, power and keying/guidance modules for incredible design flexibility. The modules can be customized in any configuration to meet specific application requirements. Contact HSBP@samtec.com for more information about building a full XCede® HD solution.

How to build a full solution:

- ① Right-angle modules can be built into a single customizable BSP

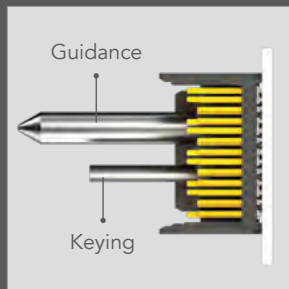
- ② Build a BSP part by combining any number, in any configuration, of HDTFs, power and keying/guidance modules to create one receptacle

- ③ Header modules mount to the backplane individually, in any configuration of HDTM and HPTS Series

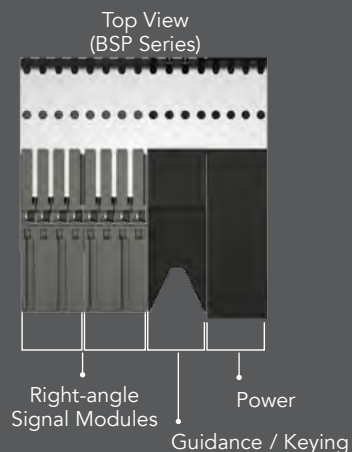
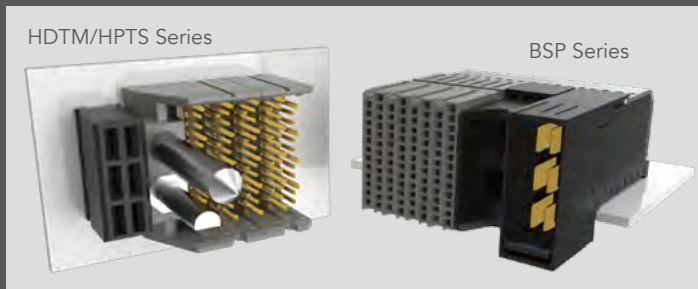


XCede® is a registered trademark of Amphenol Corporation.

PRODUCT BREAKDOWN (BSP Custom Configuration Shown)



Side View
(HDTM/HPTS Series)



HIGH-SPEED BACKPLANE SYSTEMS

EXAMAX® BACKPLANE CABLE ASSEMBLIES

- Utilizes Samtec's Eye Speed® ultra low skew twinax cable technology for improved signal integrity, increased flexibility and routability
- Highly customizable with modular flexibility
- Reduce costs due to lower layer counts
- 30 and 34 AWG
- Multiple end options available

ExaMAX®

PAM4
112
Gbps



EBCF

**EBTM/
EBCL**

DESIGN FLEXIBILITY



4 and 6 pairs;
4-16 columns



Intermateable with all
ExaMAX® connectors



Integrated guidance and
keying options

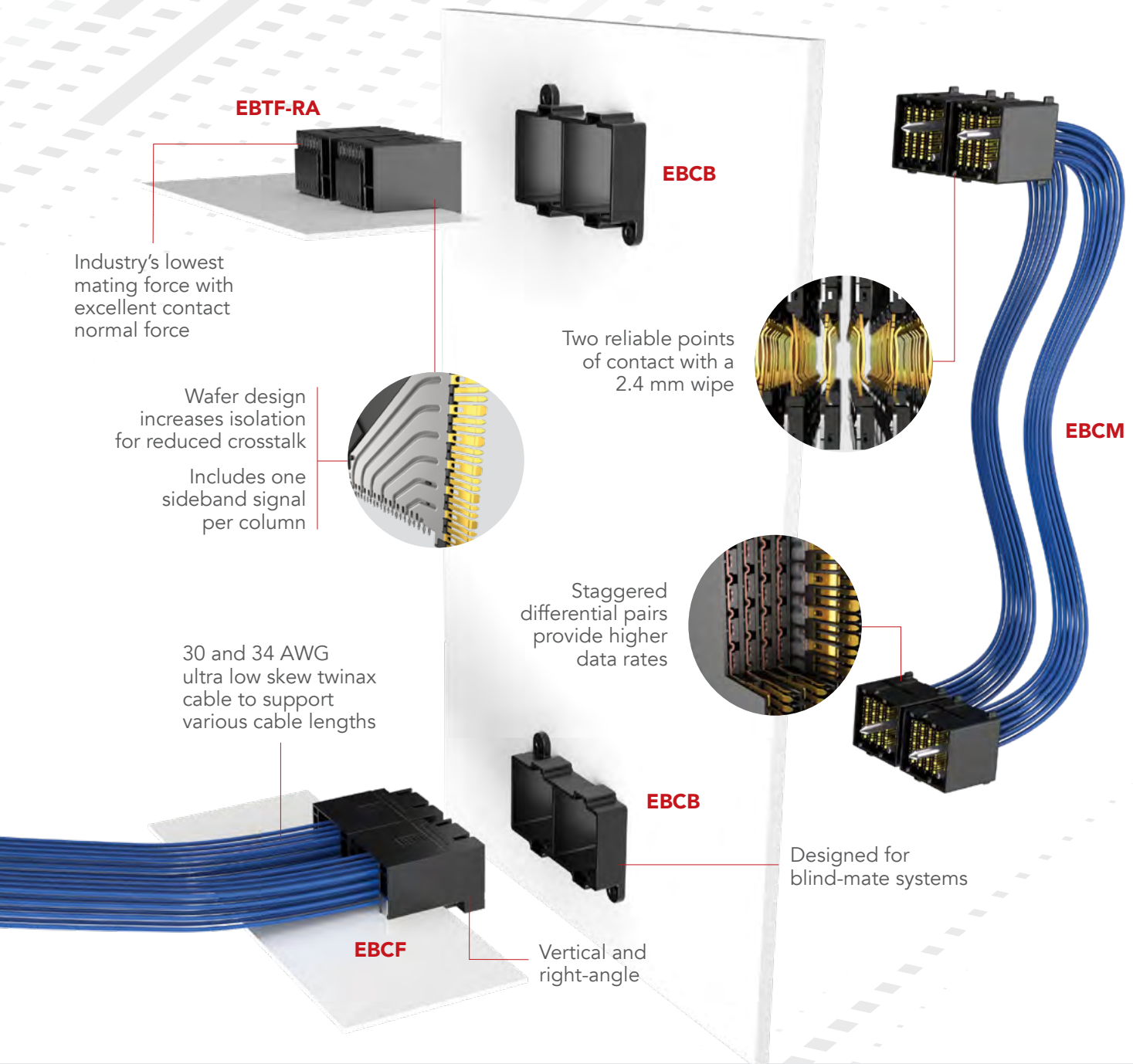


Cable-to-DMO
(Direct Mate Orthogonal)

HIGH-DENSITY APPLICATION



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

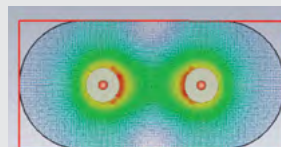


ULTRA LOW SKEW TWINAX CABLE

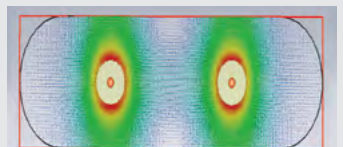
Samtec's Eye Speed® co-extruded twinax cable technology eliminates the performance limitations and inconsistencies of individually extruded dielectric twinax cabling, improving signal integrity, bandwidth and reach for high-performance system architectures.

- Tight coupling between signal conductors
- Improved bandwidth and reach
- Improved signal integrity and eye pattern opening

**EYE
SPEED
CABLE**



✓ **Good** design coupling with co-extruded low skew twinax



✗ **Bad** design coupling with paralleled pair twinax

HIGH-SPEED CABLE ASSEMBLIES

EYE SPEED® COAX & TWINAX CABLE • MIX & MATCH

Samtec offers both sides of the system – high-speed connectors and mating cable assemblies. This vertical integration allows for the ultimate combination of design flexibility and customer service.

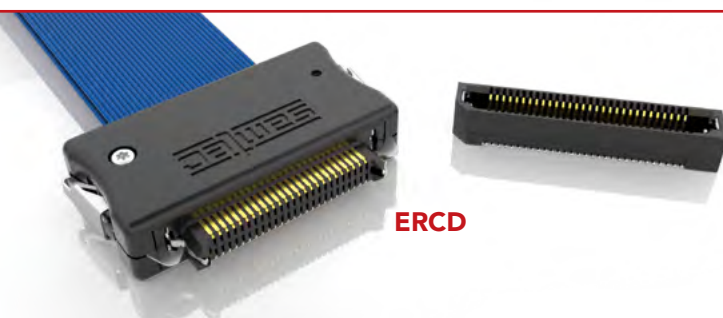
HIGH-DENSITY ASSEMBLIES

- NovaRay® up to 112 Gbps PAM4; 34 AWG ultra low skew twinax (NVAC/NVAM-C)
- SEARAY™ up to 14 Gbps; 34 AWG coax (ESCA), and 36 AWG coax or 34 AWG twinax (SEAC)
- Mates with NovaRay®, SEARAY™ and SEARAY™ 0.80 mm (pages 4-7)



EDGE RATE® ASSEMBLIES

- Up to 14 Gbps
- 34 AWG coax (ERCD); 30 AWG twinax (ERDP)
- Mates with 0.80 mm Edge Rate® connectors (pages 10 - 11)



Q SERIES® ASSEMBLIES

- Up to 14 Gbps
- 34 and 38 AWG coax; 30 AWG twinax
- 0.50 mm (HQCD/HQDP) and 0.80 mm pitch (EQCD/EQDP/EQRD)
- Mates with Q Series® connectors (pages 12 - 13)



ULTRA MICRO & EDGE CARD ASSEMBLIES

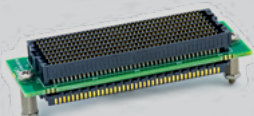
- Up to 14 Gbps
- 38 AWG coax mates with 0.50 mm pitch Razor Beam™ (HLCD; pages 14 - 15)
- 30 AWG twinax mates with 0.80 mm pitch edge card sockets (ECDP; pages 16 - 17)
- Mating assembly for PCI Express® edge cards (PCIEC; page 19)



EVALUATION AND DEVELOPMENT KITS

SIMPLIFY THE DESIGN PROCESS • REDUCE TIME TO MARKET

SI Evaluation Kits	Name	Kit Number	Description
	AcceleRate® HD SI Evaluation Kit	REF-212056-X.XX-XXX	The AcceleRate® HD SI Evaluation Kit routes eight high-precision differential pairs in an ADM6/ADF6 Series mated connector pair with user-selected stack heights and RF connector options.
	ExaMAX® Backplane SI Evaluation Kit	REF-205463-01	This SI test platform routes eight, high-precision differential pairs over a backplane using ExaMAX® connectors in a 4x10 configuration. It supports configurable backplane trace lengths via user-selected paddleboard placement.
	HSEC6-DV SI Evaluation Kit	REF-213543-X.XX-XX	SI test platform for evaluating 0.60 mm Edge Rate® vertical high-speed edge card connectors.
	HSEC8-DP SI Evaluation Kit	REF-210637-X.XX-XX	SI test platform for evaluating 0.80 mm pitch Edge Rate® differential pair high-speed edge card connectors.
	NovaRay® SI Evaluation Kit	REF-212761-X.XX-XX	The NovaRay® SI Evaluation Kit routes sixteen high-precision differential pairs in an NVAM/NVAF Series mated connector pair with user-selected stack heights and RF connector options.

FPGA Kits	Name	Kit Number	Description
	FMC+ HSPC Loopback Card	REF-197618-01	Samtec's VITA 57.4 FMC+ HSPC Loopback Card provides FPGA designers an easy to use loopback option for testing low-speed and high-speed multi-gigabit transceivers on any FPGA development board or FPGA carrier card.
	FMC+ HSPC/HSPCe Loopback Card	REF-197693-01	Samtec's VITA 57.4 FMC+ HSPC/HSPCe Loopback Card provides an easy to use loopback option for testing low and high-speed multi-gigabit transceivers on any FPGA development board or carrier card and, is an ideal substitute for 28 Gbps test equipment.
	FMC+ Extender Card	REF-212564-01	Samtec's VITA 57.4 FMC+ Extender Card increases board-to-board spacing on any FPGA development board or carrier card.

ONLINE TOOLS

DESIGN • PERFORMANCE • SIMULATION

QUICKLY BUILD MATED CONNECTOR SETS ONLINE

- Wide variety of search parameters and filters: pitch, signaling, stack height, pin count, etc.
- Easily sort search results to find the right mated set
- Live chat with engineers for custom options
- Immediately download models and open Specs Kit
- samtec.com/solutionator



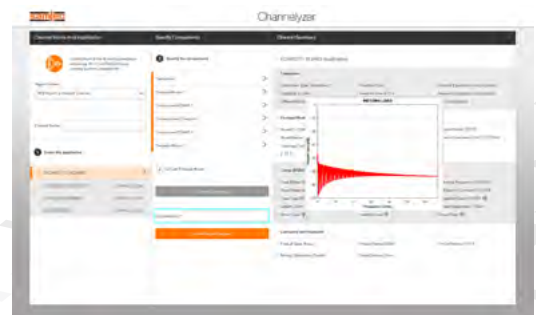
REAL-TIME HIGH-SPEED PERFORMANCE SIMULATIONS

- Integrates and blends data from models to project performance in the user-defined system
- Outputs include:
 - Insertion and return loss
 - Crosstalk (NEXT and FEXT)
 - Eye diagrams
- samtec.com/simulator



ONLINE FULL CHANNEL SIMULATION & ANALYSIS

- Channel modeling based on inputs provided by the user
- Results for standards and transceivers at varying equalization levels and data rates
- Individual receiver performance data per Tx/Rx assignments
- Channel overview and strategies for improved performance
- samtec.com/channelizer



MODIFIED & CUSTOM SOLUTIONS

WILLINGNESS, SUPPORT & EXPERTISE

Customs and Modifications make up about 28% of Samtec's total sales

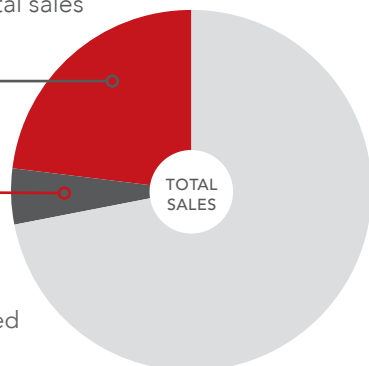
23%

Express Modifications

92% do not require engineering or tooling charges

5%

Engineered Customs



A substantial percentage of Samtec's high-speed board-to-board product segments are custom

27%

ARRAYS

11%

MEZZANINE

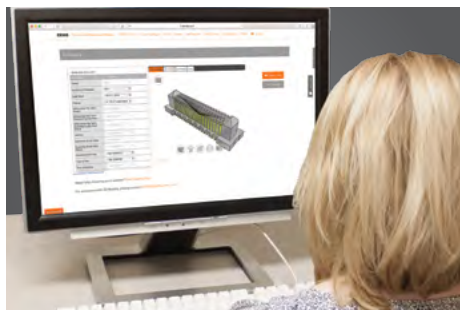
21%

ULTRA MICRO

34%

EDGE CARDS

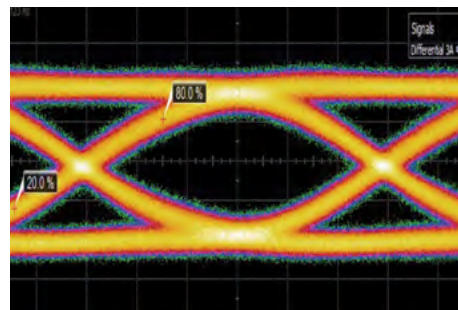
INDUSTRY LEADING CUSTOMER SERVICE



FLEXIBLE IN-HOUSE MANUFACTURING

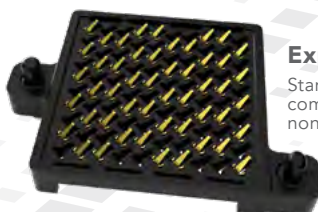


SIGNAL INTEGRITY EXPERTISE



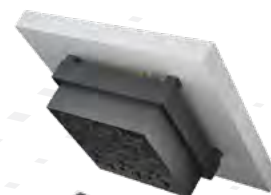
FLEXIBLE CAPABILITIES

- Full engineering, design and prototype support
- Design, simulation and processing assistance
- Quotes and samples turned around in 24 hours
- Flexible, quick-turn manufacturing
- Dedicated Application Specific Product engineers and technicians
- Modified or custom options for board level connectors and cable assemblies including: contacts, bodies, stamping, plating, wiring, molding, ruggedizing features and much more



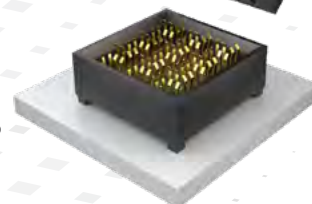
Express Modification

Standard low-profile compression array (GMI) with non-standard pin-out



Engineered Custom

Custom body and pin layout with rotated pairs to cancel magnetic coupling



Contact the Application Specific Products Group at asp@samtec.com for express modifications or engineered customs.

SEVERE ENVIRONMENT TESTING

INDUSTRIAL, MILITARY, AUTOMOTIVE & OTHER EXTREME APPLICATIONS

Severe Environment Testing (SET) is a new Samtec initiative to test our products beyond typical industry standards and specifications, many set forth by common requirements for rugged industries.

Several of our products undergo additional testing to ensure they are more than suitable for industrial, military, automotive and other extreme applications. Please visit samtec.com/set or contact set@samtec.com for more information and test results when available.



SET QUALIFIED PRODUCTS:

- Tiger Eye™ 1.27 mm Pitch Micro Rugged System (TFM/SFM)
- SEARAY™ 1.27 mm Pitch High-Density Arrays (SEAM/SEAF)
- SEARAY™ 0.80 mm Pitch Ultra-High Density Arrays (SEAM8/SEAF8)
- Razor Beam™ 0.50 mm Pitch Hermaphroditic Strips (LSHM)
- .100" Pitch Square Post Header and Socket (TSM/SSM)
- .050" Pitch Header and Socket (FTSH/CLP)
- Edge Rate® 0.80 mm Pitch Rugged High-Speed Strips (ERM8/ERF8)



PRODUCTS TO BE TESTED:

- Q Strip® 0.50 mm Pitch Low Profile Ground Plane Connectors (QTH/QSH)
- Q Rate® 0.50 mm Pitch Slim Body Ground Plane Connectors (QRM8/QRF8)
- Edge Rate® 0.80 mm Pitch Edge Card Socket (HSEC8)



TESTING INCLUDES:

MATING/UNMATING/DURABILITY: Measures the change in LLCR and mating/unmating after products have been cycled and exposed to various environmental conditions (100% relative humidity, 250 cycles).

MECHANICAL SHOCK/RANDOM VIBRATION/LLCR: Measures the product's ability to withstand a series of mechanical shocks and random vibration. LLCR is a before and after check for damage (40G Peak, 11 ms, Half Sine & 12gRMS, 5 - 2,000 Hz, 1 Hour/Axis).

MECHANICAL SHOCK/RANDOM VIBRATION/NANOSECOND EVENT DETECTION: Measures the product's ability to withstand a series of mechanical shocks and vibrations. Event detection monitors continuity during testing (40G Peak, 11 ms, Half Sine & 12gRMS, 5 - 2,000 Hz, 1 Hour/Axis).

TEMPERATURE CYCLING: Evaluates the product's reliability through thermal fatigue by cycling through two temperature extremes (-65 °C to 125 °C, 30 minute dwell time at each extreme; 500 cycles).

NON-OPERATING CLASS TEMPERATURE: Determines the temperature range at which the product operates at peak level (-55 °C to 125 °C at 100 cycles and -65 °C to 125 °C at 100 cycles; 200 total cycles).

DWV AT ALTITUDE: Measures the peak voltage that a product can withstand before dielectric breakdown at high altitudes (70,000 feet).

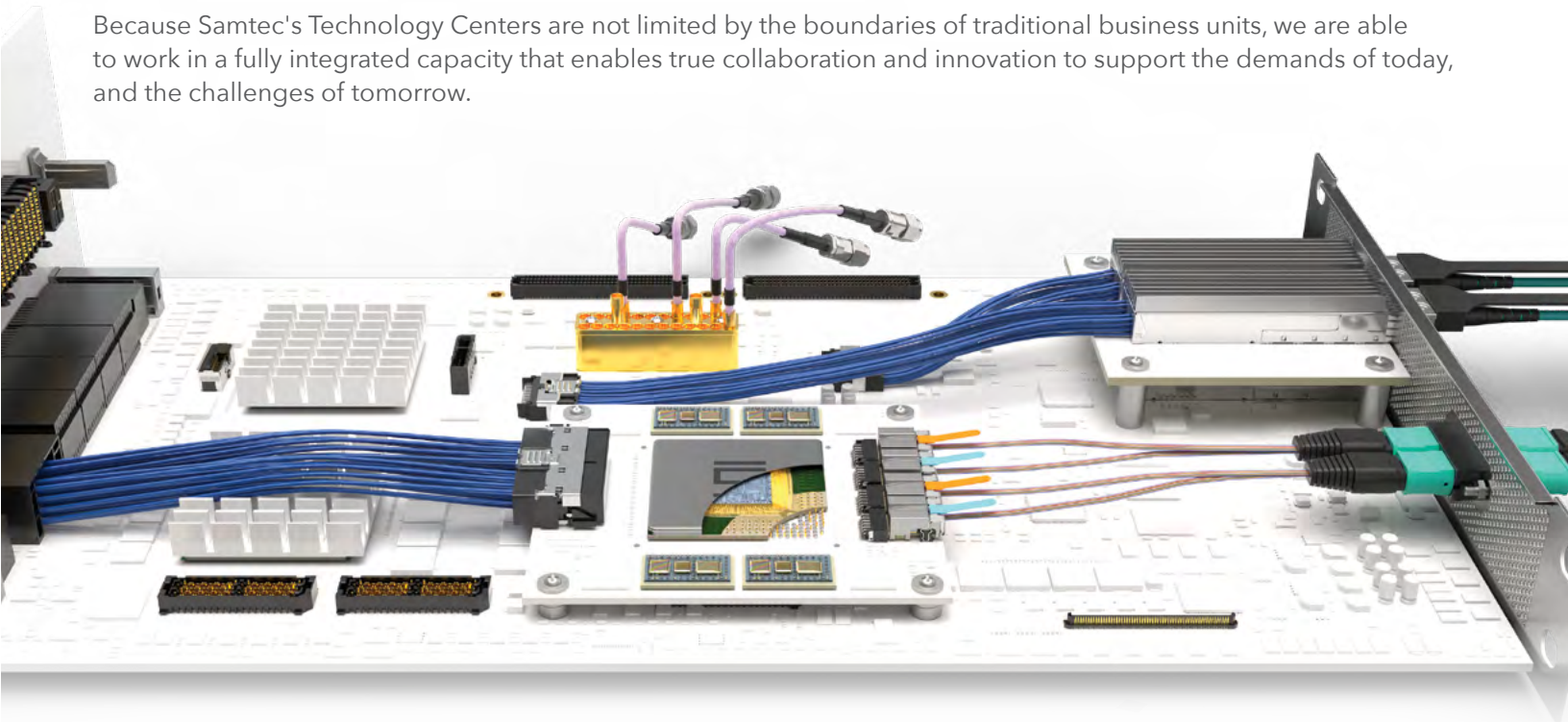
ELECTROSTATIC DISCHARGE (ESD): Measures the level of electrostatic voltage the product can withstand (exposure to 5k, 10k and 15k Volts, repeated 10 times).

TECHNOLOGY CENTERS

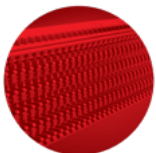
COMPLETE SYSTEM OPTIMIZATION FROM SILICON-TO-SILICON™

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.



INTEGRATION LEADS TO INNOVATION



ADVANCED INTERCONNECTS

High precision stamping, plating, molding and automated assembly



HIGH-SPEED CABLE

In-house R&D and manufacturing of precision extruded cable and assemblies



OPTICS

R&D, design, development and support of micro optical engines and assemblies



SYSTEM SIGNAL INTEGRITY

Full channel signal and power integrity analysis, testing and validation services



PRECISION RF

RF interconnect design and development expertise, with testing to 70 GHz



MICROELECTRONICS

Advanced glass substrate and IC packaging design, support and manufacturing capabilities



samtec
SUDDEN SERVICE®

UNITED STATES • NORTHERN CALIFORNIA • SOUTHERN CALIFORNIA • SOUTH AMERICA • UNITED KINGDOM
GERMANY • FRANCE • ITALY • NORDIC/BALTIC • BENELUX • ISRAEL • INDIA • AUSTRALIA / NEW ZEALAND
SINGAPORE • JAPAN • CHINA • TAIWAN • HONG KONG • KOREA

APRIL 2020