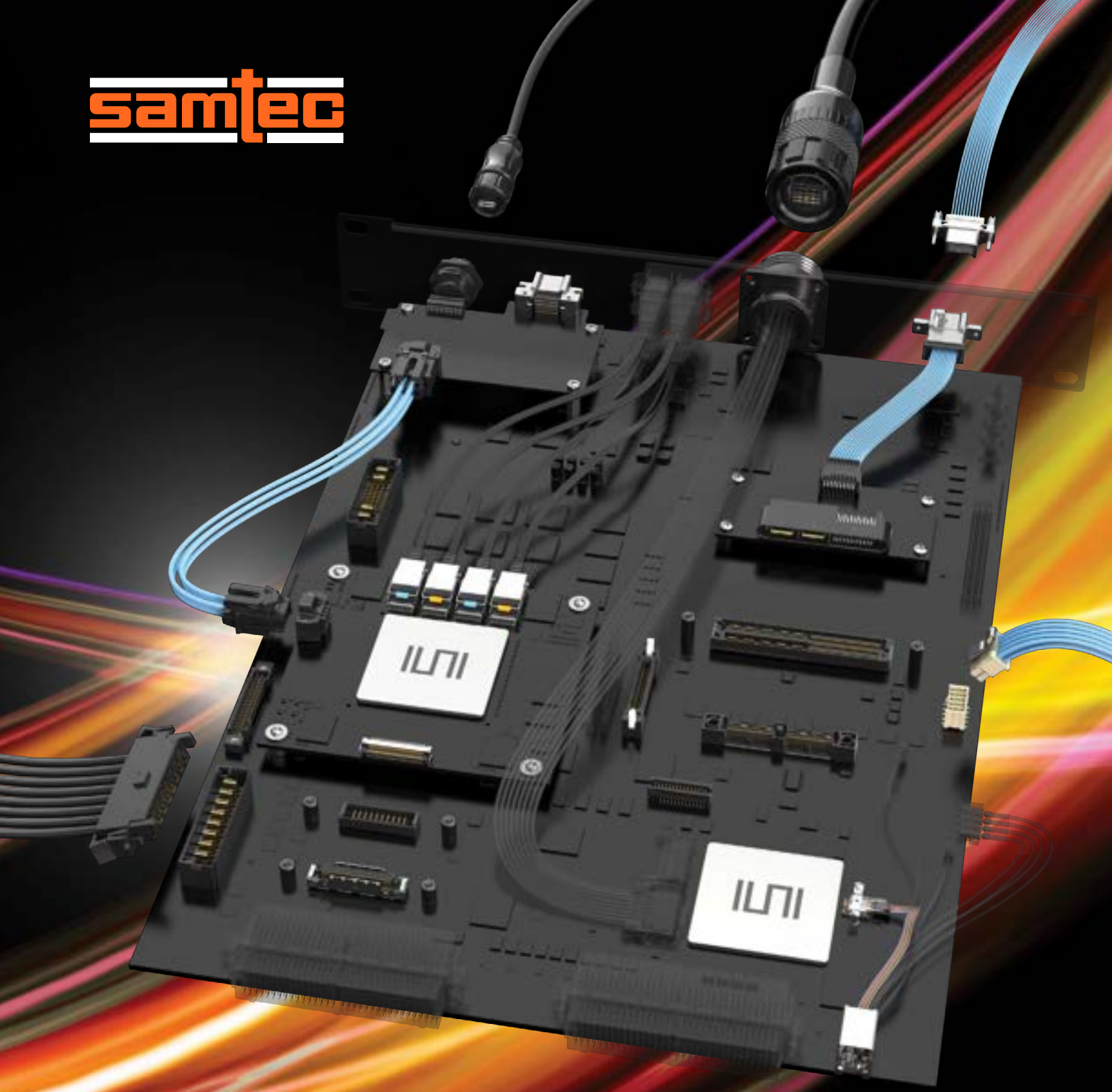


RUGGED/POWER

INTERCONNECT SOLUTIONS GUIDE

RUGGED/POWER INTERCONNECT SOLUTIONS

Ultra rugged systems, flexible power interconnects and rugged contact systems combined with rugged signal integrity offerings, create the foundation of Samtec's rugged/power solutions for high cycle, high power and high speed applications.

Additional testing for severe environments ensures products are more than suitable for military, space, automotive, industrial and other extreme applications. Samtec's rugged/power products are offered in conjunction with full engineering support, online tools and a service attitude that is unmatched in the connector industry.

ULTRA RUGGED

Extreme High Mating Cycles

Rugged MIL-DTL Materials

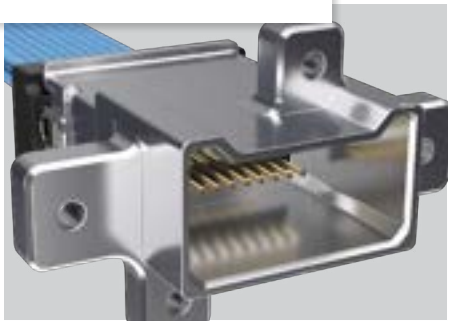
Testing for Extreme/Harsh Applications

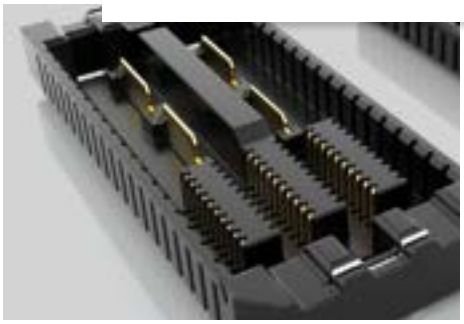
FLEX POWER

3 to 60 Amps

Configurability of Power & Signal

Space-saving Form Factor









RUGGED CONTACT SYSTEM

1,000+ Mating Cycles

Tiger Eye™ Heat-treated BeCu Contacts

Multiple Points of Contact
for High-reliability

RUGGED SIGNAL INTEGRITY

High Speeds to 56 Gbps PAM4

Edge Rate® Contact Design
Increases Wear Life

Expertise in Signal Integrity
Design & Analysis

ULTRA RUGGED SOLUTIONS 6-11

Rugged I/O Systems
Rugged Optics
VITA 90 VNX+ Solutions
Hardware & Plating
Ultra Rugged Testing (SET, E.L.P.™ & DQT)

POWER SYSTEMS, TOOLS & SERVICE 12-17

mPOWER® Ultra Micro Power Systems
AcceleRate® mP Power/Signal Combination
Mini Mate® & Power Mate® Isolated Power
PowerStrip™ Extreme Power
Power Integrity Services & Simulation Tool

RUGGED I/O SYSTEMS 18-21

URSA™ I/O Rugged Power
38999 NovaRay® I/O Systems
FireFly™ Extreme Environment Optics
FireFly™ Extended Temp Optics
AccliMate™ Flexible Sealed Systems

RUGGED BOARD-TO-BOARD SYSTEMS 22-25

Tiger Eye™ Rugged Contact System
Mini Mate® & Power Mate® Individually Shrouded Power
mPOWER® Ultra Micro Power Systems
Razor Beam™ Hermaphroditic
Floating and One-Piece Interfaces

RUGGED HIGH-SPEED SYSTEMS 26-29

Edge Rate® Rugged, High-Speed Contact System
High-Speed, High-Density & Micro Edge Cards
AcceleRate® mP Signal/Power Arrays
Q Series® Integral Ground Plane Connectors
Razor Beam™ Hermaphroditic Interfaces

DISCRETE WIRE CABLE ASSEMBLIES 30-33

Micro Mate™ 1.00 mm Pitch Systems
Rugged Tiger Eye™ Systems
Mini Mate® & Power Mate® Isolated Power
mPOWER® Ultra Micro Power
PowerStrip™ Extreme Power

Rugged Features & Custom Solutions 34-35
Sudden Service® & Online Tools 36-37
Integration Leads to Innovation & Silicon-to-Silicon™ Solutions 38-39

RUGGED/POWER
PRODUCT OVERVIEW



6-11

ULTRA RUGGED SOLUTIONS

RUGGED & 38999 I/O | VITA 90 VNX+ | EXTREME ENVIRONMENT OPTICS | RUGGED HARDWARE
HIGH-RELIABILITY PLATING | SEVERE ENVIRONMENT TESTING



22-25

RUGGED BOARD-TO-BOARD

HIGH CYCLE CONTACTS | ISOLATED POWER
ULTRA MICRO POWER | HERMAPHRODITIC | ONE-PIECE



26-29

RUGGED HIGH-SPEED

RUGGED SIGNAL INTEGRITY CONTACTS | EDGE CARDS
SIGNAL/POWER COMBOS | GROUND/POWER PLANE | SELF-MATING

12-17



POWER SYSTEMS

ULTRA MICRO POWER | POWER/SIGNAL COMBINATIONS | INDIVIDUALLY SHROUDED POWER
60 AMP EXTREME POWER | FLEXIBLE POWER STACKING | INTEGRAL GROUND/POWER PLANE

30-33



DISCRETE WIRE CABLE

MICRO PITCH | HIGH CYCLE CONTACTS
ISOLATED POWER | ULTRA MICRO POWER | HIGH POWER

18-21



RUGGED I/O SYSTEMS

POWER I/O | 38999 | EXTREME ENVIRONMENT OPTICS
EXTENDED TEMP OPTICS | FLEXIBLE SEALED

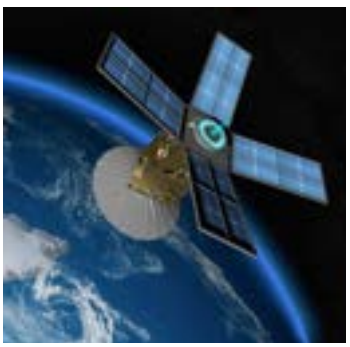
ULTRA RUGGED SOLUTIONS



Samtec's ultra rugged solutions provide reliability and flexibility in small form factors for extreme/harsh environments. From rugged I/O cable assemblies, sealed & compact optics, and VITA 90 VNX+ modules to ultra rugged hardware and high-temp coatings, these solutions are ideal for military, aerospace, submersible and other harsh environment applications. Many Ultra Rugged offerings are available now with a robust roadmap to meet or exceed requirements for harsh environment applications and industries.

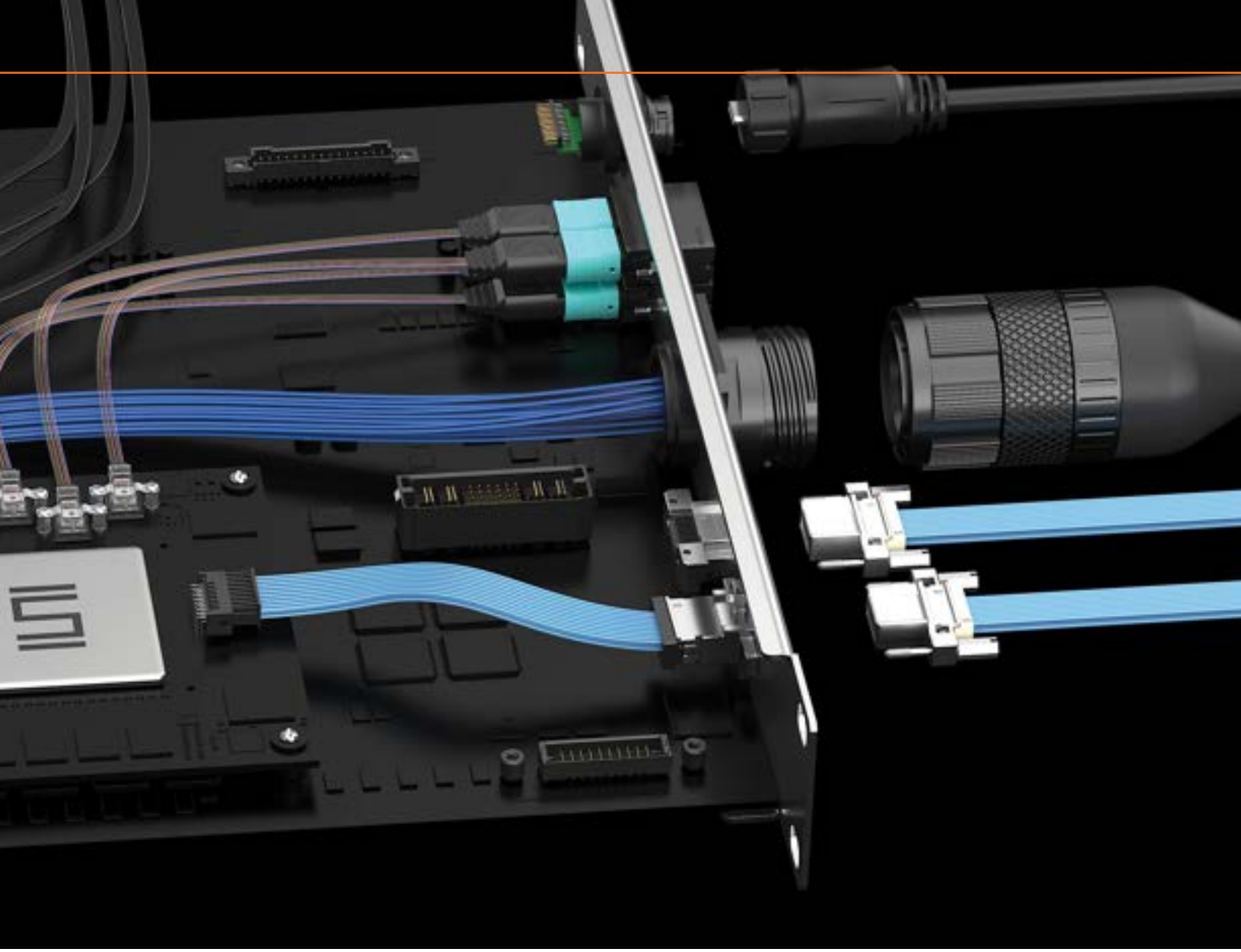
For design flexibility and cost optimization, Samtec's Severe Environment Testing (SET) qualified products are Commercial-Off-the-Shelf (COTS) and modified COTS to get solutions to market faster. See page 10-11 or visit **samtec.com/set** for more information.













RUGGED POWER I/O SYSTEMS

MIL AERO SPACE

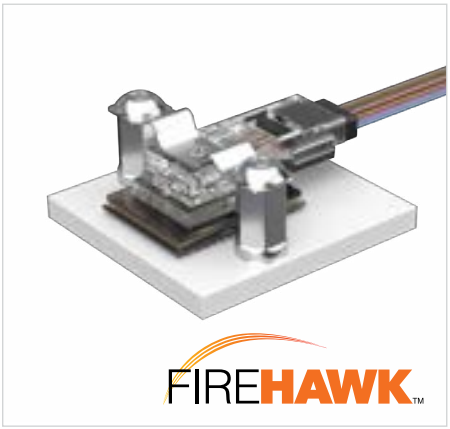
- Four points of contact for a reliable connection and high mating cycles
- Extreme density with up to 1,450 I/Os in a 1RU panel
- EMI shielding limits signal degradation and optimizes performance
- Series: B1SD(T)/P1PD(T)/P1M
- See page 18-19 for more information
- samtec.com/ursa



38999 RUGGED I/O SYSTEMS

MIL AERO

- High data rate cable system in a rugged 38999 shell
- Salt fog resistant to 48 hours
- IP67 for dust and waterproof sealing
- Threaded cable-to-panel design
- High-density 16 pair; 32 on roadmap
- Series: NVA3E/NVA3P
- samtec.com/novaray-io



ULTRA RUGGED/COMPACT OPTICS

MIL AERO SPACE

- FireHawk™ is the smallest optical transceiver in the industry – 10 x 7.7 x 2.5 mm
- Extreme performance up to 40 Gbps transfer rates
- Rugged BGA attach withstands high shock and vibration
- Radiation tolerant design
- Series: CSPO, CSSO
- **samtec.com/firehawk**



VITA 90 VNX+ SOLUTIONS

MIL AERO SPACE

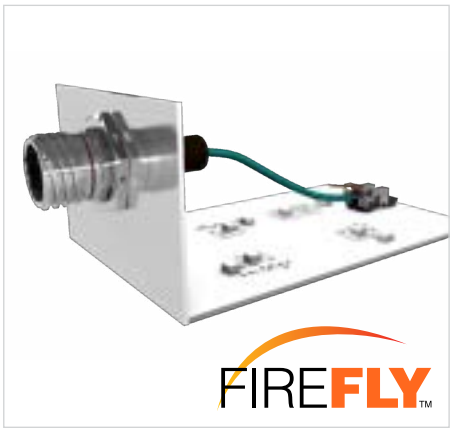
- RF backplane system to support 110 GHz with high-density size 20 cable; size 16 on roadmap
- Rugged blind mate solution
- Configured with SEARAY™ right-angle array and rugged optics
- SWaP-C reductions make this ideal for military and aerospace applications
- COTS or modified COTS solution for cost and time flexibility
- **samtec.com/vnx**



EXTREME ENVIRONMENT OPTICAL SYSTEM

MIL AERO SUB

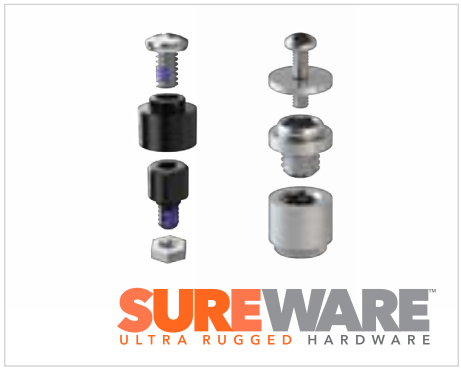
- Sealed and parylene-coated for exposed military, aerospace and submersible applications
- Ruggedized for tin whisker mitigation and fungal resistance; operates in harsh environments including salt fog, blowing sand and dust, jet fuel exposure, altitudes up to 65,000 feet
- Extended temp range of -40 °C to +85 °C
- Series: ETMO/UEC5/UCC8
- **samtec.com/firefly**



EXTENDED TEMP OPTICAL SYSTEMS

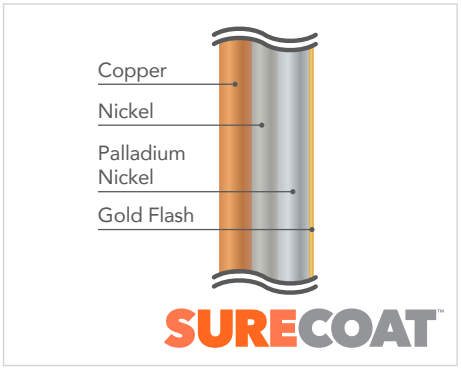
MIL AERO

- Extended temperature range from -40 °C to +85 °C
- x4 and x12 designs to 25 Gbps per lane performance
- Samtec's Extended Temp FireFly™ optical with Amphenol® Aerospace bulkhead interconnects
- Micro footprint allows for increased density
- Series: ETUO/UEC5/UCC8
- **samtec.com/firefly**



ULTRA RUGGED HARDWARE

- Guide post standoffs (GPSO) allow for .035" of initial misalignment
- Assists with “blind mate” for ultra micro, fine pitch mezzanine connectors
- 5 to 30 mm stack heights
- 303 stainless steel with MIL-C-13924 black oxide finish
- Jack screw precision standoffs (JSO) reduce the risk of component damage
- Standoffs (SO) with precision machined tolerances (+/- .002" (0.05 mm))
- **samtec.com/hardware**



HIGH RELIABILITY PLATING

- Palladium nickel with gold flash plating
- Qualified up to 150 ˚C ambient
- Available on SEARAY™ 1.27 mm pitch high-density arrays to 5,000 cycles (SEAF/SEAM)
- Product Roadmap includes SEARAY™ 0.80 mm, AcceleRate® HP, LP Array™ and Generate™ 0.80 mm
- Ideal for high-temp, high-cycle applications such as ATE, military, aerospace and automotive

ROADMAP



High-cycle "super lube" for extreme mating cycles



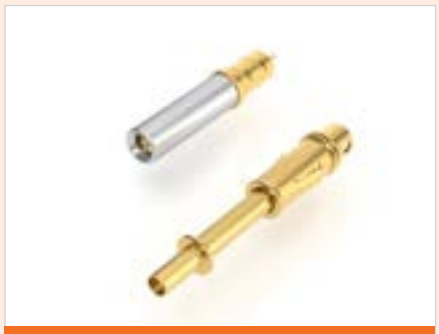
Expanded testing to MIL-DTL-55302 including salt spray and enhanced shock & vibration



URSA™ I/O configurations of power, signal, RF coax and high-speed contacts for high-reliability in harsh environments



Rugged blind mate solution with RF and optical connectivity for backplane applications



Size 16 and 20 high-frequency coax 38999 contacts for high-density, multi-position housings



Phase & insertion loss stable microwave/ millimeter wave cable assemblies - Orange is the new cable!

ULTRA RUGGED TESTING

SEVERE ENVIRONMENT TESTING (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.

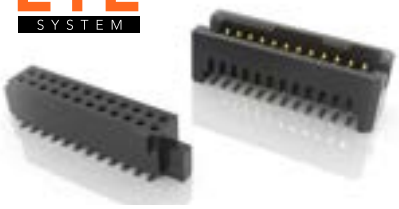
MEETS OR EXCEEDS:

- 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

LOT SCREEN SAMPLE TESTING

Lot screen sample testing available to ensure product meets required specifications. Military/Aerospace Product (MAP) required; contact map@samtec.com

TIGER™ EYE SYSTEM



SEARAY™



mPOWER®



SET QUALIFIED PRODUCTS

SFM / TFM Tiger Eye™ 1.27 mm Pitch Micro 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™ Ultra-High Density Arrays

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.

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

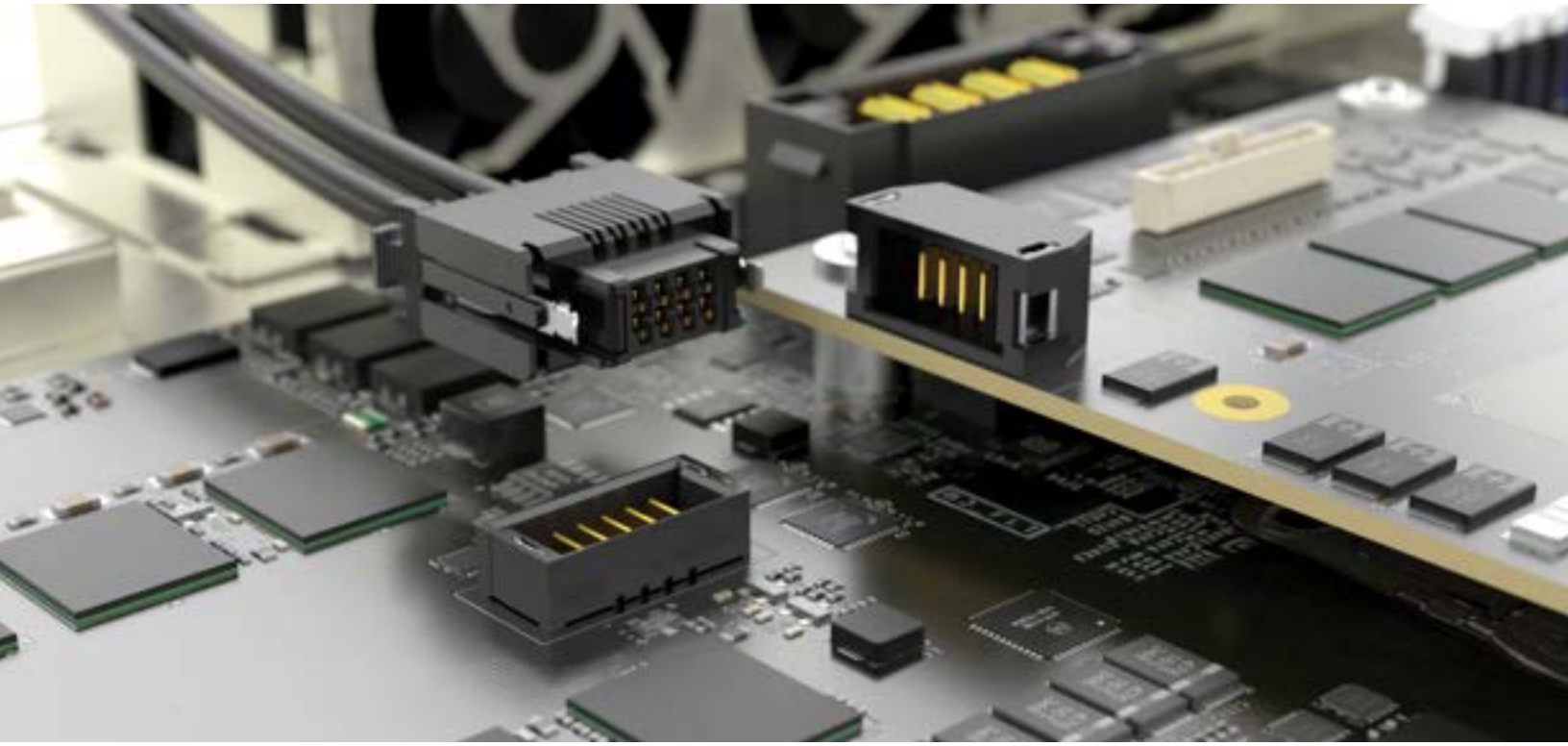


TESTING REFERENCE CHART

TEST	SET	E.L.P.™	DQT
Gas Tight	X*	X*	N/A
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.

POWER SYSTEMS



2.00 mm PITCH ULTRA MICRO POWER

mPOWER®

MAX 18 Amps

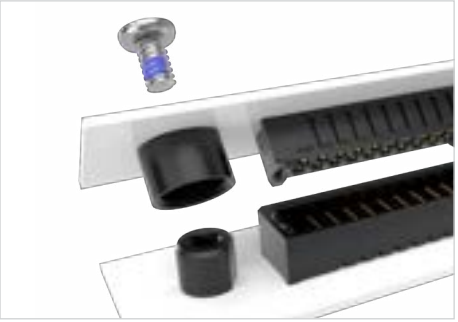
- Board-to-board, cable-to-board and cable-to-cable
- Tin or 10 µ" Gold plated power blades; 30 µ" Gold plating available to meet specific regulations
- 2-10 total power blades
- 5-20 mm stack heights; vertical and right-angle
- Optional weld tabs
- Mating cable assemblies with plastic top or metal side latching
- Components (IMPC/IMPCC/CC489, IMPE/TC146) and tooling also available (see page 33)



40% space savings compared to traditional power interconnects



ULTRA MICRO POWER (continued)



SureWare™ guide post standoffs available for misalignment and "blind mate"



Cable-to-cable solutions available with rugged side latching (see page 33)



Severe Environment Testing (SET) qualified (UMPS/UMPT); visit samtec.com/set

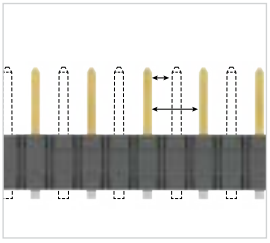
CURRENT SPECIFICATIONS

CURRENT RATING (PER CONTACT)		
PINS	Tin	Gold
1	17.8 A	17.5A
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@samtc.com

ACCELERATE® mP POWER/SIGNAL ARRAYS

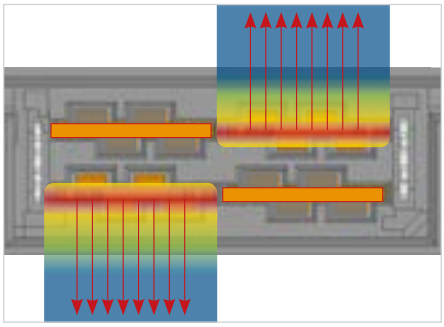
- Best in class density for power and signal
- Rotated power blades for improved performance and simplified breakout region (BOR)
- Open-pin-field design for routing and grounding flexibility
- Low profile 5 mm stack height; up to 16 mm in development
- 4 power and 60 signal positions; up to 10 power and 240 signal positions in development

ACCELERATE® mP

MAX 22 Amps | PAM4 56 Gbps



UDF6/UDM6



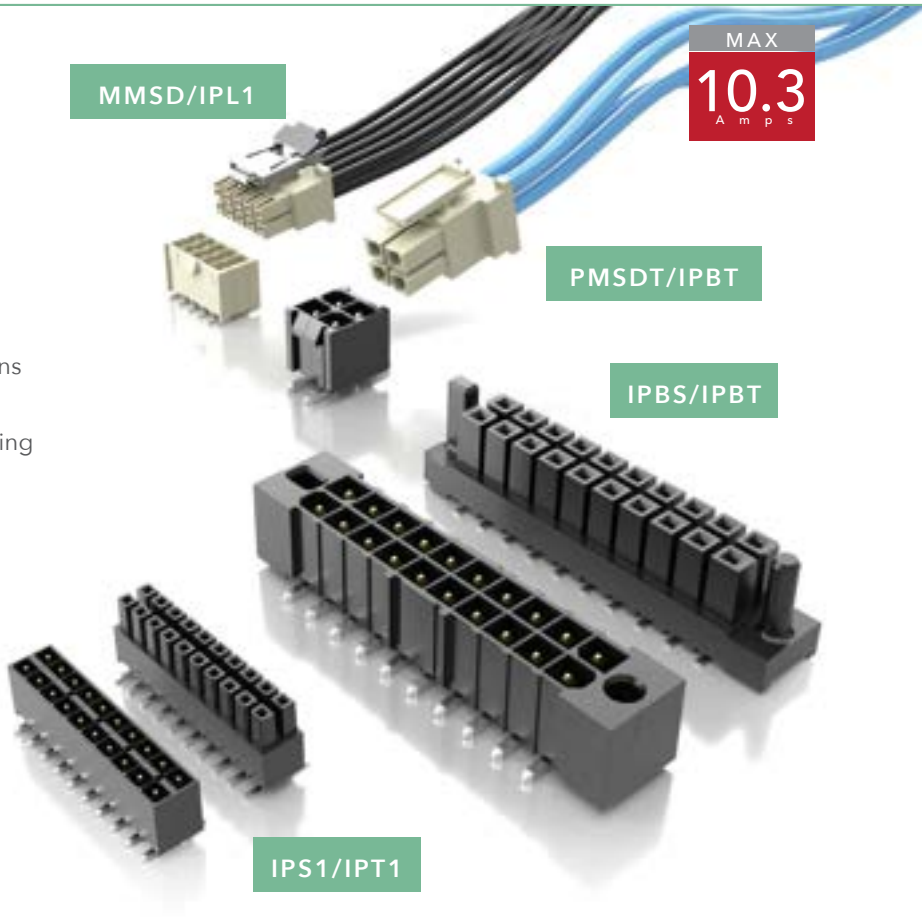
Blades rotated 90° have equal access to heat escape for uniform cooling, increased current capacity and reduced crowding

MINI MATE® & POWER MATE®

- Individually shrouded contacts for electrical and mechanical protection
- .100" (2.54 mm) and .165" (4.19 mm) pitch
- Surface mount or through-hole
- Vertical and right-angle for parallel, perpendicular and coplanar applications
- Locking clip, key polarization and guide post options
- Discrete wire assemblies with 16-30 AWG PVC or Teflon™ fluoropolymer wire; components and tooling available (see page 32)
- Metal or plastic rugged latching system

	CREEPAGE	CLEARANCE
IPT1/IPS1 MMSS(T)/MMSD(T)	2.54 mm	1.91 mm
IPBT/IPBS PMSS(T)/PMSD(T)	4.27 mm	3.05 mm

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



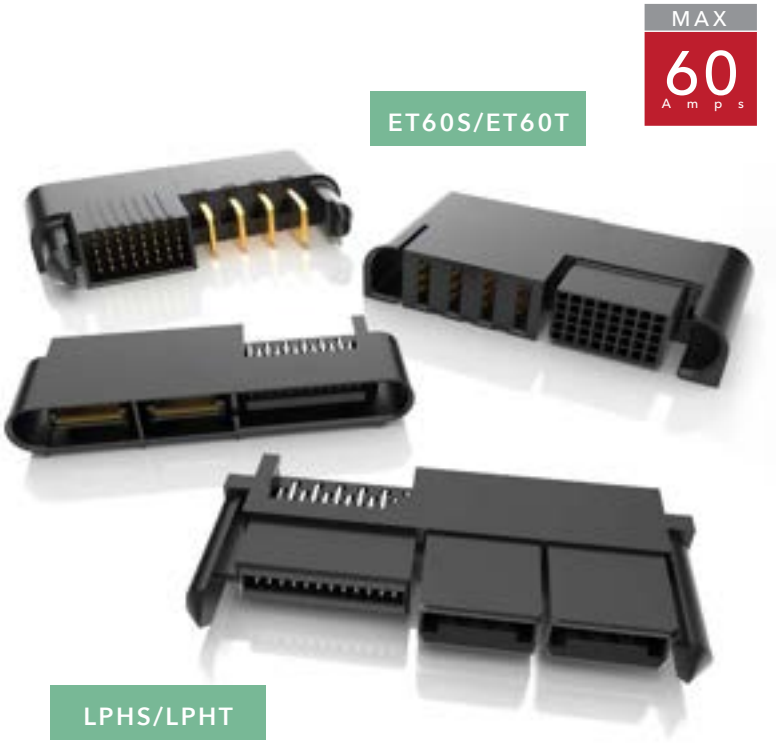
*Teflon™ is a trademark of The Chemours Company FC, LLC used under license by Samtec

EXTREME POWER

- AC or DC power, AC-DC combos, split power and hotswap options (ET60S/ET60T)
- 3 or 5 signal rows in the same form factor
- Top guide post option for board space savings
- High-density, double stacked power blades in a low 7.5 mm profile (LPHS/LPHT)
- Rugged guide posts for blind mating assistance
- Vertical or right-angle socket mates with terminal or .062" (1.60 mm) PCB card

	CREEPAGE	CLEARANCE
LPHT/LPHS	5.63 mm	2.69 mm
ET60T/ET60S	3.02 mm	1.87 mm

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

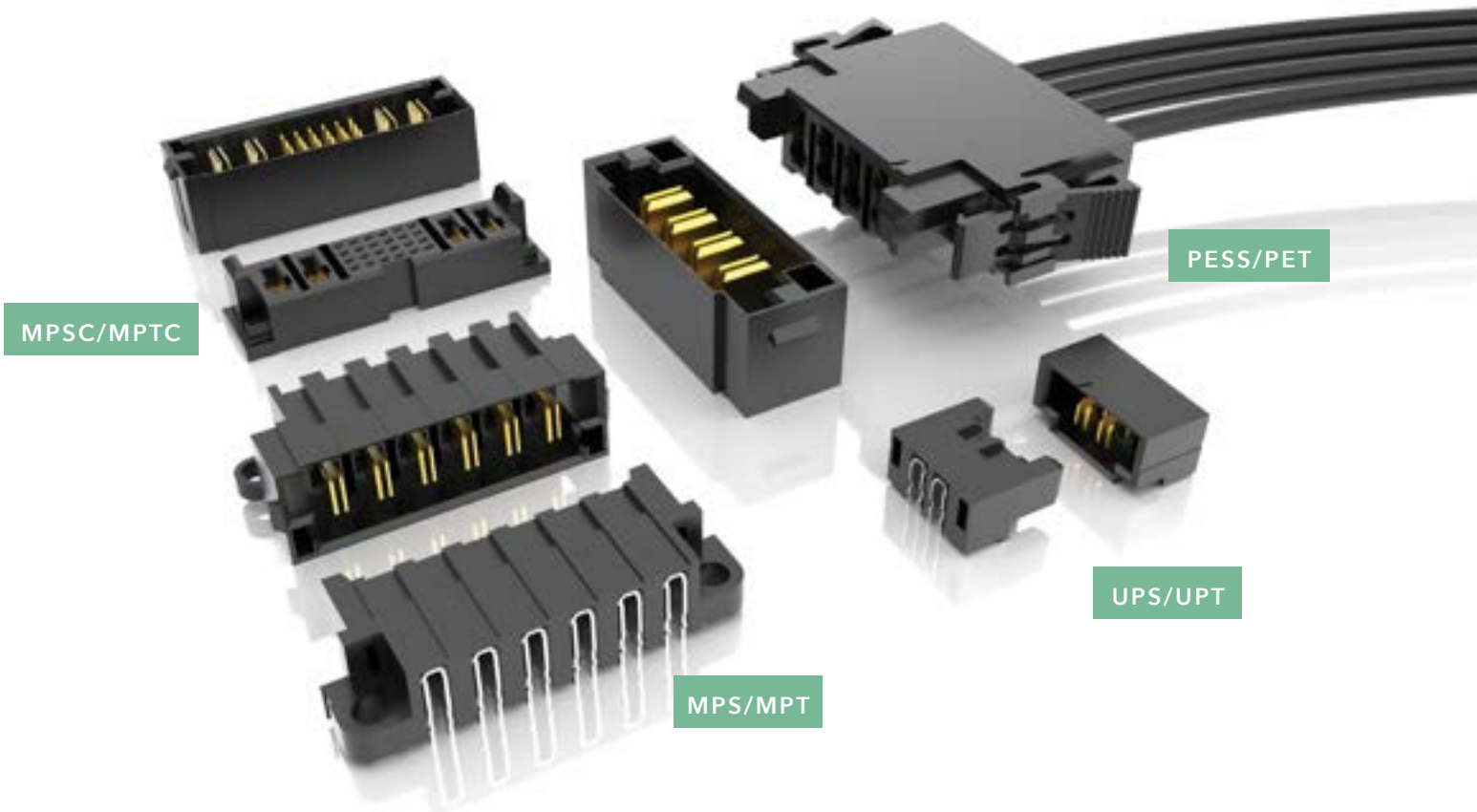


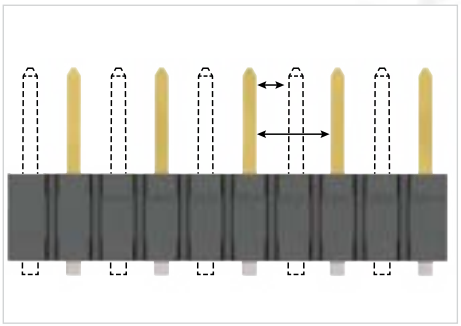
POWERSTRIP™ SYSTEM

- 24.8 A/blade to 58.7 A/blade (1 blade powered)
- 3.81 mm, 5.00 mm and 6.35 mm pitch
- Up to 10 dual blade contacts
- Power only or power/signal combinations available
- Vertical and right-angle orientations
- Rugged latching, guide posts, locking clips and screw downs
- Discrete wire assemblies with 10-16 AWG wire; components and tooling available (see page 33)

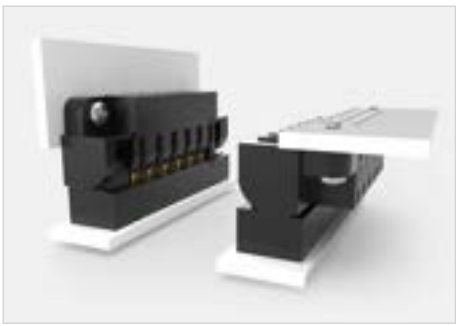
MAX 60 Amps

	CREEPAGE	CLEARANCE
PET/PES/PETC/ PESC/PESS	3.66 mm	3.31 mm
MPT/MPS/MPTC/ MPSC/MPSS/MPPT	2.95 mm	2.71 mm
UPT/UPS/UPPT	5.50 mm	1.51 mm





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



"Hinging" for 90° mating radius, ideal for blind mating (FMPT/FMPS)



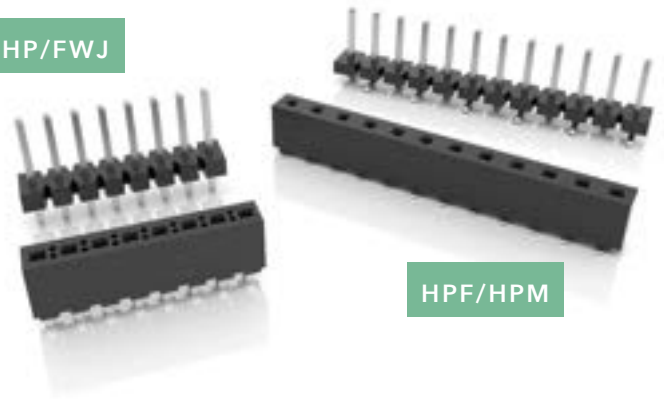
Hermaphroditic power system with rugged screw downs (MPPT, UPPT)

FLEXIBLE POWER STACKING SYSTEMS

MAX 16.1 Amps

- Standard and high-power connector strips
- Power Eye three-finger BeCu contacts for a reliable connection
- .156" (3.96 mm) and .200" (5.08 mm) pitch
- 1 to 24 total positions
- Flexible stack heights from .350" (8.89 mm) to 1.02" (25.91 mm)
- Surface mount and through-hole
- Vertical and right-angle for parallel and perpendicular applications
- Rugged locking clip option

FHP/FWJ



HPF/HPM

HIGH-SPEED GROUND PLANE SYSTEMS

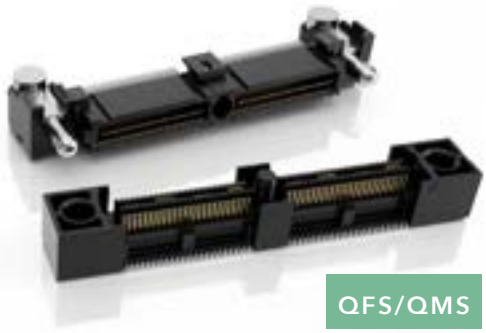
QSERIES®

MAX 25 Amps

- Integral ground/power plane improves electrical performance
- Q2™ rugged connectors rated to 15.7 Amps
- Q Strip® low profile connectors rated to 25 Amps
- Q Rate® slim connectors rated to 8.5 Amps
- 0.50 mm, 0.635 mm and 0.80 mm pitch
- 5 mm to 25 mm stack heights

QSE/QTE





QFS/QMS

HIGH-SPEED BACKPLANE SYSTEMS

XCede HD

MAX 17.3 Amps

- Backplane power modules for design flexibility
- ExaMAX® modules rated to 17.3 Amps
- XCede® HD modules rated to 12.3 Amps; integrated power in development
- 12 to 72 pair designs
- Integrated guidance and keying



BSP, HDTM/HPTS

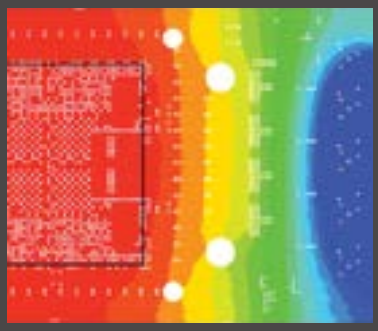
POWER SERVICES

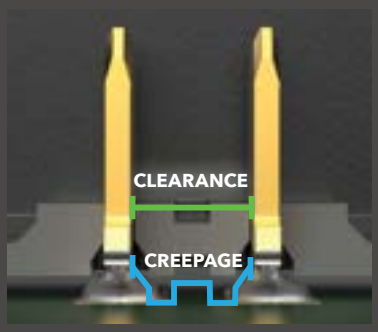
POWER INTEGRITY SERVICES

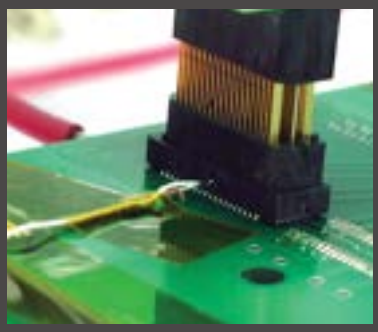
- Standard power test data, including current carrying capacity, working voltage, voltage drop and resistance, creepage and clearance, is available for select power systems
- Current Cycling Test Data, which demonstrates connector performance in realistic and common applications, is available for select series
- Power Integrity Guidelines are based on test data and proven design parameters, designed to help in connector selection and PCB design maximization
- Power Integrity Certified products undergo testing and additional requirements unique to Samtec. Products must pass Current Cycling Test EIA 365-55, have current carrying capacity, resistance vs. number of contacts data available and Power Integrity Guidelines developed

Visit **samtec.com/powerintegrity** to learn more





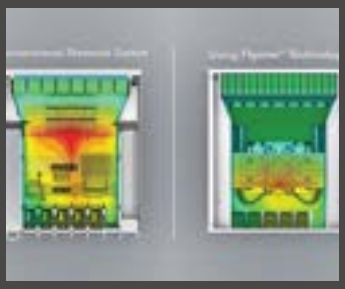




POWER ARCHITECTURE, SYSTEM DESIGN & ROUTING SERVICES

Samtec provides complete support and strategies for the optimization of system power architectures.

Visit **samtec.com/sig** for more information.



System Power Architectures & Design Solutions



Reference Routing Development for Application-Specific Solutions



Safety and Reliability Design Assurance



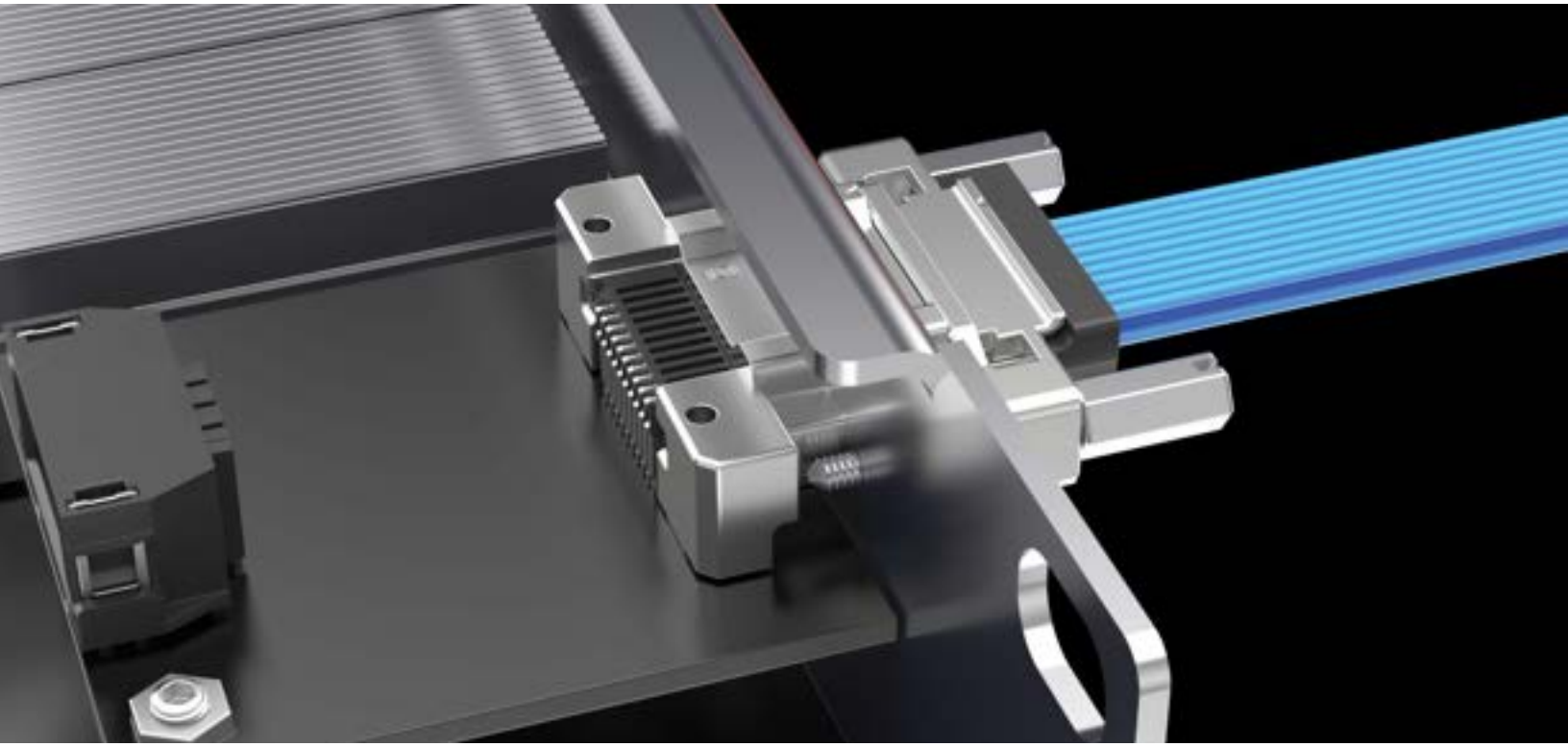
Recommendations for Customer-Specific Requirements

POWER SIMULATION TOOL

Samtec offers power simulation that can calculate temperature increase in the connector area, in real time. Find this tool on samtec.com when searching a product for your specific application. Contact **MicroRuggedGroup@samtec.com** for assistance.



RUGGED I/O SYSTEMS



RUGGED POWER I/O SYSTEMS

URSA™ I/O
ULTRA RUGGED CONTACT SYSTEM

MAX 2.9 Amps

- Four points of contact for an extremely reliable connection
- Micro 1.00 mm pitch
- Up to 40 positions per row
- Cable-to-cable and cable-to-board solutions
- Rugged captive panel screws and strain relief
- EMI shielding to limit signal degradation and optimize performance
- Through-hole or surface mount
- 28 and 30 AWG PVC or Teflon™ fluoropolymer wire; color coded available
- Components available (B1SDS/IBT1/CC508, P1PDS/IPP1/TC145)



Extreme density with up to 1,450 total I/Os in a 1RU panel (29 cables at 50 total I/Os each)



B1SDT/P1PDT/P1M

MICRO-HYPERBOLOID CONTACT SYSTEM

- High-reliability
- Four points of contact
- Extreme mating cycles
- Designed for rugged power I/O systems



ROADMAP



AcceleRate® Mini combo assembly for extreme performance to 112 Gbps PAM4



SMPM combo assembly for high frequency to 65 GHz



Magnum RF™ micro-miniature SMPM combo assembly for greater density to 65 GHz



Shielded vertical mating header for design flexibility



Rugged cable shielding for EMI protection



Slim, rugged latching for a secure connection



Size 20 high-frequency coax 38999 contacts

38999 RUGGED I/O SYSTEMS

- Samtec's NovaRay® I/O high data rate cable system in a rugged 38999 shell
- Salt fog resistant to 48 hours
- IP67 sealed option
- High-density 16 pair; 32 pair on roadmap
- Threaded cable-to-panel design using Flyover® cable technology
- 28, 30 or 34 AWG (external); 34 AWG (internal) ultra low skew twinax
- Up to 3,548 Gbps PAM4 aggregate data rate from the IC package to the panel and beyond

NOVARAY® I/O | PAM4 112 Gbps



NVA3E/NVA3P

EXTREME ENVIRONMENT OPTICAL SYSTEM

- Sealed and parylene-coated for exposed military, aerospace and submersible applications
- Ruggedized for tin whisker mitigation and fungal resistance; operates in harsh environments including salt fog, blowing sand and dust, jet fuel exposure, altitudes up to 65,000 feet
- Extended temp range of -40 °C to +85 °C
- x4 bidirectional design to 25 Gbps per lane performance
- Dual power mode for interoperability with legacy optical modules
- Customizable optical end 2 connectors including MT Elite®, MTP Elite® and low loss MXC®

*MT Elite®, MTP Elite® and MXC® are registered trademarks of US Conec Ltd.

FIREFLY™ | 25 Gbps

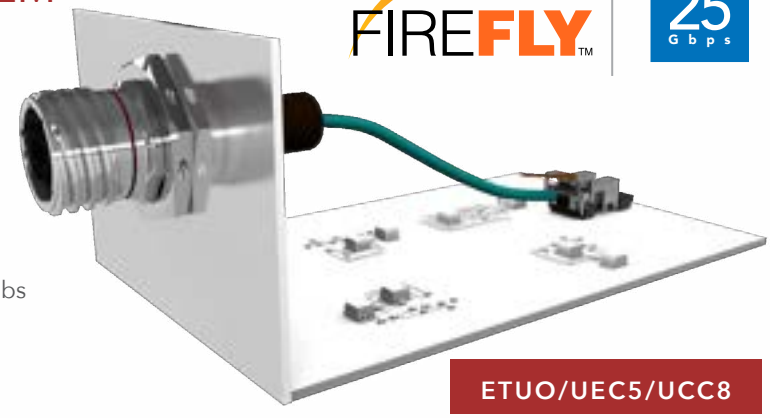


ETMO/UEC5/UCC8

EXTENDED TEMP OPTICAL SYSTEM

- Extended temperature range from -40 °C to +85 °C
- x4 and x12 designs to 25 Gbps per lane performance
- Extended Temperature FireFly™ with Amphenol® Aerospace bulkhead interconnects (MT38999)
- Developed for military, aerospace and industrial applications
- Micro rugged connector set with positive latching, weld tabs and loading guides for secure connection
- Variety of rugged end 2 options

FIREFLY™ | 25 Gbps



ETUO/UEC5/UCC8

ACCLIMATE™ FLEXIBLE SEALED SYSTEMS

ACCLIMATE™

- IP67 miniature push-pull latching system with lightweight plastic shell
- IP68 bayonet-style latching circulars with metal or plastic shells and flexible configurations
- 12 mm, 16 mm and 22 mm shell size options
- IP67 sealed USB type-C system capable of USB 3.1 speeds; metal shell on roadmap
- Rectangular design for maximum panel area savings
- IP68 threaded circulars with rugged overmold design
- USB & Ethernet options ideal for data uploads/downloads





Rectangular design for 25-45% panel area savings

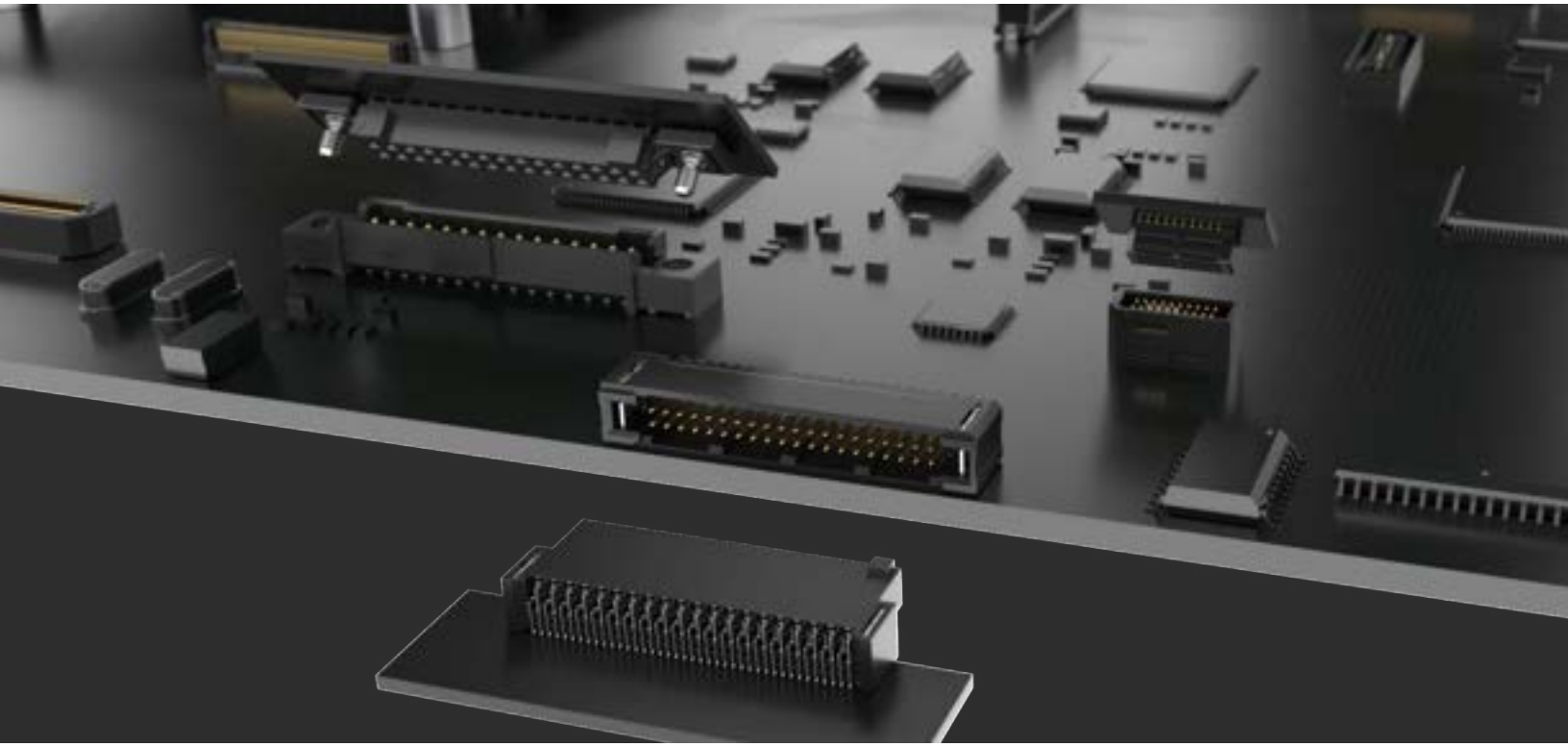


Kitted components for efficient field assembly (ACPK/ACRK)



Rugged dust caps available

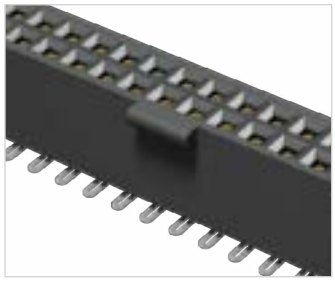
RUGGED
BOARD-TO-BOARD SYSTEMS



1.27 mm TIGER EYE™ SYSTEMS

MAX 3.2 Amps | 8 Gbps

- Tiger Eye™ is Samtec's most rugged contact system rated to 1,000+ mating cycles
- Screw down, locking clip, and weld tab ruggedizing options
- Shrouded, polarized and keyed
- Surface mount or through-hole tails
- 6 -12 mm stack heights; right-angle available
- Severe Environment Testing (SET) qualified (SFM/TFM); visit **samtec.com/set** for test reports
- Discrete wire and IDC cable assemblies available (see page 31)

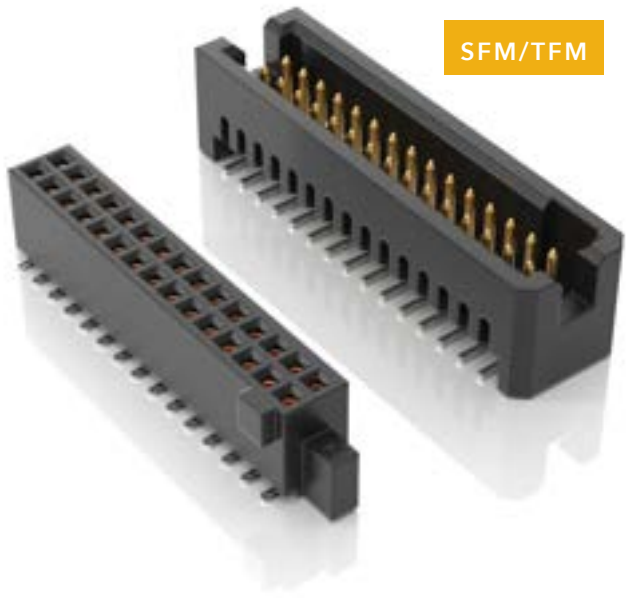


Locking for increased unmating force (SFML/TFML)



Four row design for higher density (MOLC/FOLC)

SFM/TFM



2.00 mm TIGER EYE™ SYSTEMS

MAX 3.8 Amps | 8 Gbps

- Optional metal latching, screw downs, weld tabs and locking clips
- Double row with up to 80 total pins
- Surface mount or through-hole tails
- Right-angle mating headers available
- Severe Environment Testing (SET) qualified (S2M/T2M); visit **samtec.com/set** for test reports
- Discrete wire cable assemblies available (see page 31)



S2M/T2M



Wide range of stack heights (SMM/TMM)

0.80 mm TIGER EYE™ SYSTEMS

MAX 2.9 Amps | 8 Gbps

- Micro 0.80 mm pitch and slim body for space savings
- Locking clip and weld tab ruggedizing features
- Double row with up to 100 total pins
- Locking for increased unmating force (SEML)
- Extended Life Product™ high mating cycle connectors (SEM/TEM); test reports available at **samtec.com/elp**
- Discrete wire cable assemblies available (see page 31)

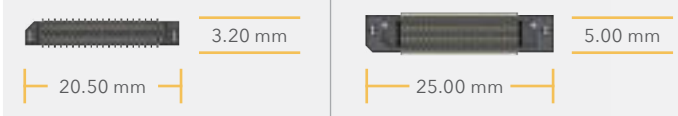


SEM/TEM



Slim version available for a smaller footprint (SEMS/TEMS)

SEM/TEM shown at 40 total positions



TIGER™ EYE CONTACT



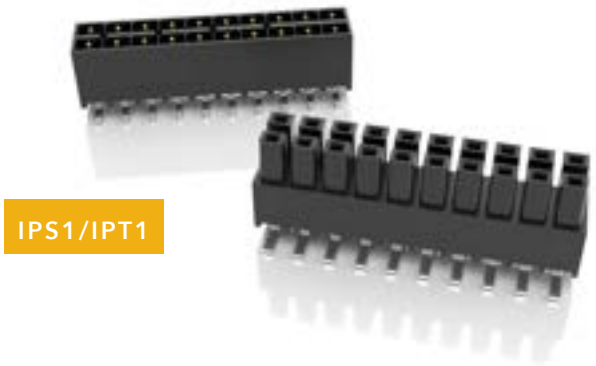
TIGER EYE™ CONTACT SYSTEM

- Multi-finger design with several points of contact for high-reliability
- Smooth, flat mating area increases mating cycles and lowers contact resistance
- Heat-treated BeCu for the best combination of mechanical and electrical properties
- Surface mount, micro slot tail increases solder surface area for higher joint strength

MINI MATE® SHROUDED POWER SYSTEMS

MAX 5.9 Amps

- High retention Tiger Buy™ contacts
- .100" (2.54 mm) pitch
- Up to 50 total individually shrouded contacts
- Elevated stack heights from 11 mm to 35 mm
- Optional polarization, alignment pin and locking clip
- Vertical and right-angle for parallel, perpendicular and coplanar applications
- Discrete wire cable assemblies available (see page 32)



IPS1/IPT1

POWER MATE® ISOLATED POWER SYSTEMS

MAX 10.3 Amps

- .165" (4.19 mm) pitch
- Up to 30 total individually shrouded contacts
- Single or double row option
- Keyed polarization and polarized guide post options
- Vertical and right-angle for parallel and perpendicular applications
- Discrete wire cable assemblies available (see page 32)



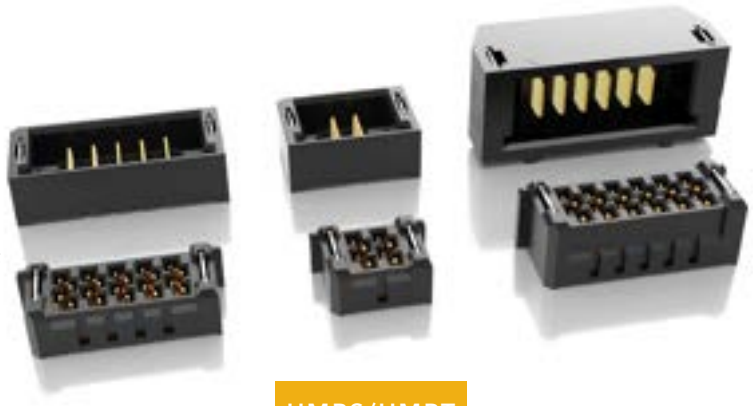
IPBS/IPBT

ULTRA MICRO POWER SYSTEMS

mPOWER®

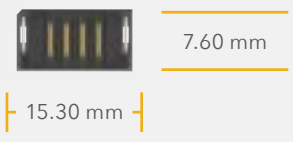
MAX 18 Amps

- Micro 2.00 mm (.0787") pitch
- Board-to-board, cable-to-board and cable-to-cable
- Choice of 2 to 10 positions
- 5 mm to 16 mm, 18 mm and 20 mm stack heights
- SureWare™ guide post standoffs (GPSO) assist with misalignment and "blind mate"
- Cable assemblies available (see page 33)
- Severe Environment Testing (SET) qualified (UMPS/UMPT); visit **samtec.com/set** for test reports



UMPS/UMPT

UMPT shown at 4 total positions



HERMAPHRODITIC CONNECTORS

RAZOR™ BEAM SYSTEM | 25 Gbps

- 0.50 mm, 0.635 mm and 0.80 mm pitch
- Razor Beam™ contacts for high-speed and fine-pitch systems
- Optional lubricated contacts and shielding for EMI protection
- 4-6x greater mating/unmating forces vs. typical micro pitch connectors
- Audible click when mated
- Severe Environment Testing (SET) qualified (LSHM); visit **samtec.com/set** for test reports

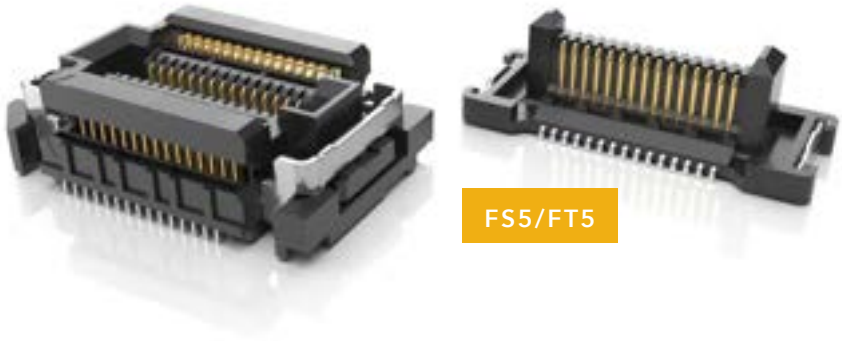
Slim Body Designs (40 total positions each)





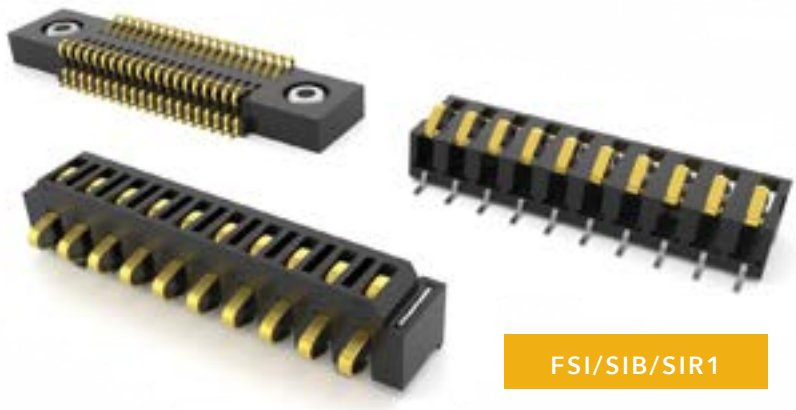
FLOATING CONNECTORS

- Provides 0.50 mm contact float in the X and Y axes to compensate for misalignment
- Ideal for multiple connectors on a board
- 5 mm and 7 mm stack heights
- Micro 0.50 mm pitch
- Up to 60 total positions
- Vertical and right-angle

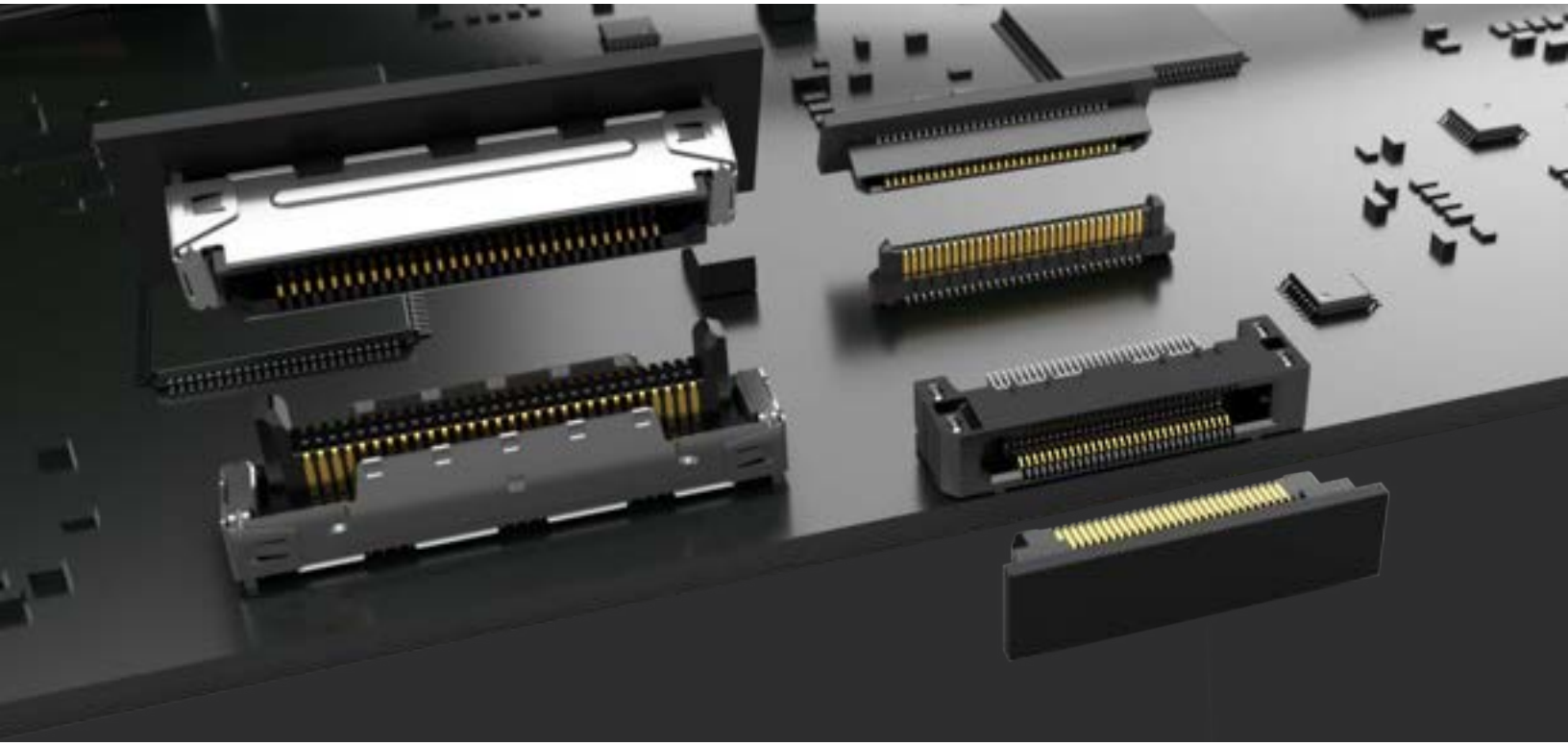


ONE-PIECE INTERFACES

- Robust design and mechanical hold-downs for high-shock and vibration applications
- Optional rugged weld tabs, screw downs and locking clips
- 1.00 mm, 1.27 mm and 2.54 mm pitch designs
- Up to 100 total positions



RUGGED
HIGH-SPEED SYSTEMS



0.80 mm PITCH EDGE RATE®

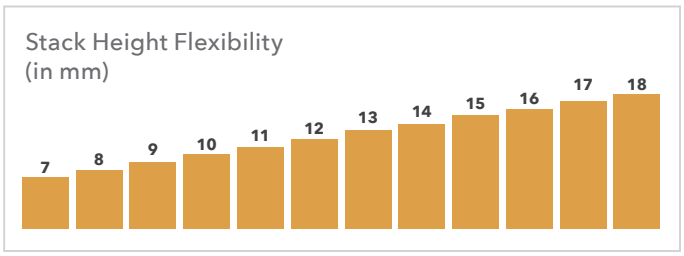
EDGE® RATE SYSTEM | PAM4 56 Gbps

- 1.50 mm extended contact wipe
- Optional extended guide post and rugged metal latching
- 360° shielding option reduces EMI
- Up to 200 total pins
- Single-ended or differential pair signaling
- Vertical, right-angle and edge mount available
- Severe Environment Testing (SET) qualified (ERF8/ERM8); visit **samtec.com/set** for test reports





ERF8/ERM8





Mating Cable Assemblies
(ERCD/ERDP Series)

0.50 mm PITCH EDGE RATE®

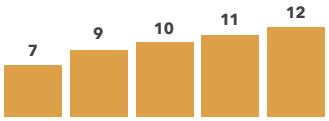
- 1.00 mm contact wipe for a reliable connection
- Rugged friction locks and weld tabs available
- Up to 40% PCB savings vs. 0.80 mm pitch
- Up to 150 total pins
- Vertical and right-angle available

EDGE® RATE SYSTEM | 28 Gbps

ERF5/ERM5



Stack Height Flexibility (in mm)



0.635 mm PITCH SLIM BODY EDGE RATE®

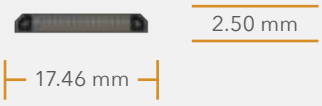
- Extremely slim 2.5 mm body width
- 1.00 mm contact wipe
- Up to 120 total positions in a 2-row design
- 5 mm stack height with others in development
- Optional weld tabs
- J lead for ease of processing

EDGE® RATE SYSTEM | PAM4 56 Gbps

ERF6/ERM6



ERF6 shown at 40 total positions



EDGE® RATE CONTACT



EDGE RATE® CONTACT SYSTEM

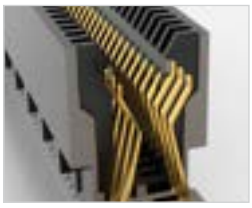
- Smooth milled mating surface reduces wear and increases durability
- Lower insertion and withdrawal forces
- Robust when "zippered" during unmating
- Minimized parallel surface area reduces broadside coupling and crosstalk
- Designed, simulated and optimized for 50 Ω and 100 Ω systems

0.60 mm, 0.80 mm & 1.00 mm PITCH SYSTEMS

GENERATE™

PAM4 56 Gbps

- High-speed Edge Rate® contact system
- Vertical, right-angle, edge mount and pass-through
- Power/signal combo to 60 A per power bank (HSEC8-PV)
- PCIe® 3.0, 4.0 and 5.0 capable
- Misalignment mitigation (HSEC1-DV)
- Press-fit tails, weld tabs, locks and latches



Rugged tucked beam technology (HTEC8)



Compliant to SFF-TA-1002 specifications (HSEC6)

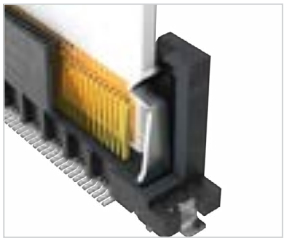


HSEC8-DV/HSEC8-PV/HSEC1

HIGH-DENSITY EDGE CARD

PAM4 56 Gbps

- Justification beam enables use of standard PCB tolerance
- 0.50 mm ultra-fine pitch with up to 300 total I/Os
- Surface mount or through-hole with rugged weld tabs
- PCIe® 4.0 capable



Beam ensures card and body are flush



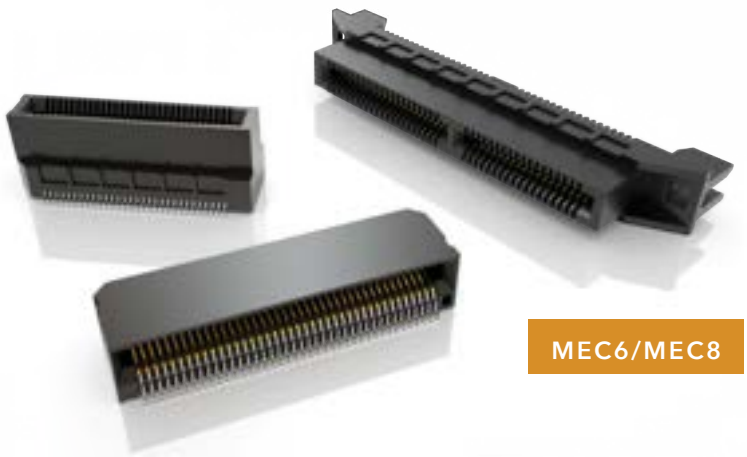
MEC5-DV/MEC5-RA

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

MICRO EDGE CARDS

25 Gbps

- 0.635 mm, 0.80 mm, 1.00 mm, 1.27 mm and 2.00 mm pitch
- Optional rugged weld tabs and polarization
- Solutions for 1.60 mm (.062") and 2.36 mm (.093") thick card
- Vertical, right-angle and edge mount



MEC6/MEC8

ACCELERATE® mP POWER/SIGNAL ARRAYS

MAX 22 Amps | PAM4 56 Gbps

- Best in class density for power and signal
- Rotated power blades for improved performance
- Open-pin-field design for routing and grounding flexibility
- Low profile 5 mm stack height; up to 16 mm in development
- 4 power and 60 signal positions; up to 10 power and 240 signal positions in development

ACCELERATE®mP



UDF6/UDM6

Q SERIES® GROUND PLANE CONNECTORS

MAX 25 Amps | PAM4 56 Gbps

QSERIES®

- Integral ground/power plane for reliable signal integrity and power to 25 Amps
- 0.50 mm, 0.635 mm and 0.80 mm pitch
- Low profile Q Strip® from 5 mm to 25 mm stack heights
- Q Rate® with signal integrity-optimized Edge Rate® contacts
- Q2™ with optional shielding and increased insertion depth

QSH/QTH



QRF8/QRM8



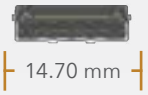
Surface mount ground plane improves electrical performance

HERMAPHRODITIC RAZOR BEAM™ INTERFACES

RAZOR™ BEAM SYSTEM | 25 Gbps

- High-retention, high-speed Razor Beam™ contacts
- 0.50 mm, 0.635 mm and 0.80 mm pitch
- Slim body design
- 4-6x greater mating/unmating forces vs. typical micro pitch connectors
- Self-mating system reduces inventory costs
- Shield option for EMI protection

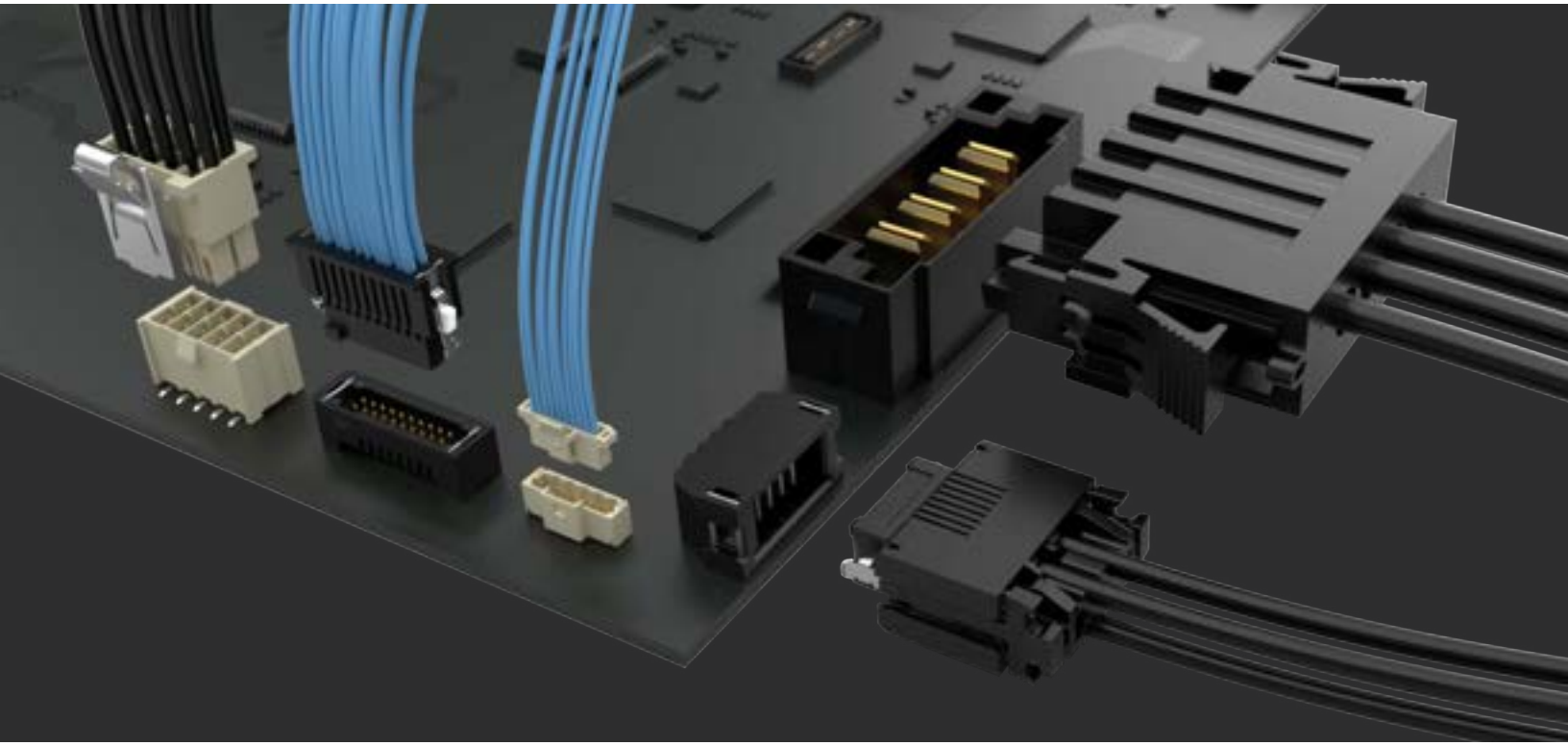
LSHM shown at 40 total positions





LSHM/LSS/LSEM

DISCRETE WIRE SYSTEMS



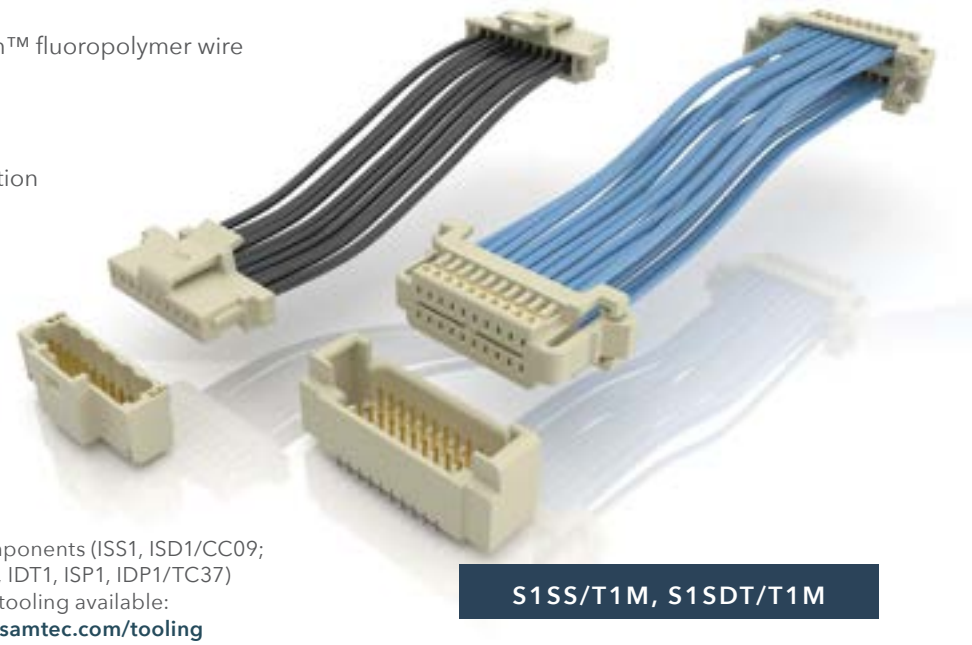
MICRO MATE™ 1.00 mm PITCH SYSTEMS

MICROMATE™

MAX 2.7 Amps

- Cable-to-board, cable-to-cable and cable-to-panel
- Low profile design down to 3.2 mm
- 28 and 30 AWG wire options in PVC or Teflon™ fluoropolymer wire
- Up to 40 total crimp-style dual leaf contacts
- Socket or terminal, single or double row
- Rugged positive latching for increased retention
- Vertical and right-angle mating headers





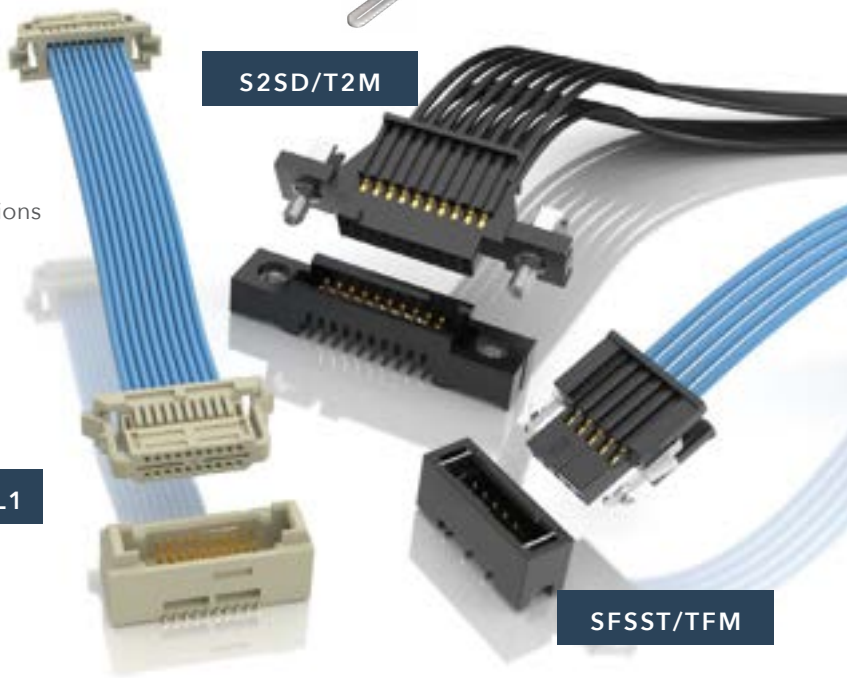
Components (ISS1, ISD1/CC09; IST1, IDT1, ISP1, IDP1/TC37) and tooling available: visit **samtec.com/tooling**

S1SS/T1M, S1SDT/T1M

TIGER EYE™
DISCRETE WIRE SYSTEMS

- 0.80 mm, 1.27 mm and 2.00 mm pitch
- 24 to 32 AWG in PVC or Teflon™ fluoropolymer wire; color coded wire available
- Single or double ended assemblies
- Up to 100 total positions
- Shrouded, polarized and keyed for more rugged applications
- Retention latching option for higher withdrawal forces
- Optional screw downs
- Crimp for automotive applications in development for 1.27 mm pitch (SFSD/FFSD) assemblies; contact **AutoSalesGroup@samtec.com**

TIGER™ EYE CONTACT | MAX 3.8 Amps



	0.80 mm Pitch	1.27 mm Pitch	2.00 mm Pitch
Series	SESDT	SFSS, SFSST, SFSD, SFSDT	S2SD, S2SDT
Cable AWG	32	28 and 30	24, 26, 28, 30
Cable Type	Teflon™ fluoropolymer	PVC or Teflon™ fluoropolymer; color coded available	PVC or Teflon™ fluoropolymer; color coded available
No. of Rows	2	1 or 2	2
Total No. of Positions	10, 20, 30, 40	3 - 100	10 - 60
Mates - Terminal Cables	--	TFSS, TFSST, TFSD, TFSDT	T2SD, T2SDT
Mates - Board Connectors	TEM-L1	TFM/SFM, TFC/SFC	T2M/S2M
Component - Body	ISDE	ISDF, TSDF	ISD2, ITD2
Component - Contact	CC396	CC03R, CC03M, T1M44-M, T1M44-R	CC81L, CC81R, T1M82-L, T1M82-R



Components available for build-it-yourself design and application flexibility; please see chart above



Hand tools available for low volume and semi-automatic mini applicators for self assembly; visit **samtec.com/tooling**



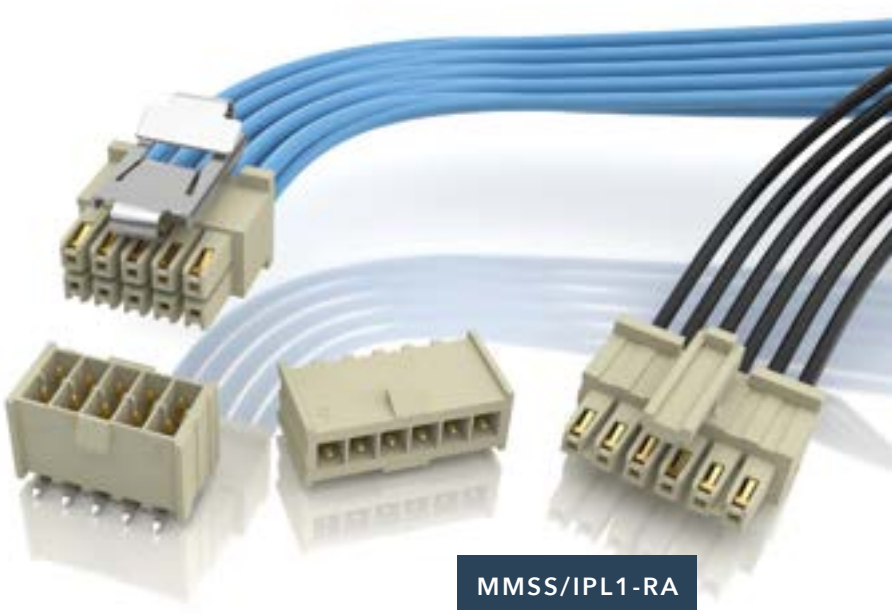
IDC cable assemblies with rugged strain relief and mating shrouded headers; visit **samtec.com/idc**

MINI MATE® DISCRETE WIRE SYSTEMS

MAX 4.8 Amps

- .100" (2.54 mm) pitch
- Individually shrouded contacts
- 2 to 50 total positions
- Single and double row
- 20 to 30 AWG PVC or Teflon™ fluoropolymer wire; color coded available
- Keyed polarization
- Rugged metal or plastic latching
- Vertical or right-angle mating header
- Sealed version on roadmap for harsh environments

MMSDT/IPL1



MMSS/IPL1-RA



Components (IPD1/CC79L/CC79R) and tooling available for application flexibility; visit **samtec.com/tooling**

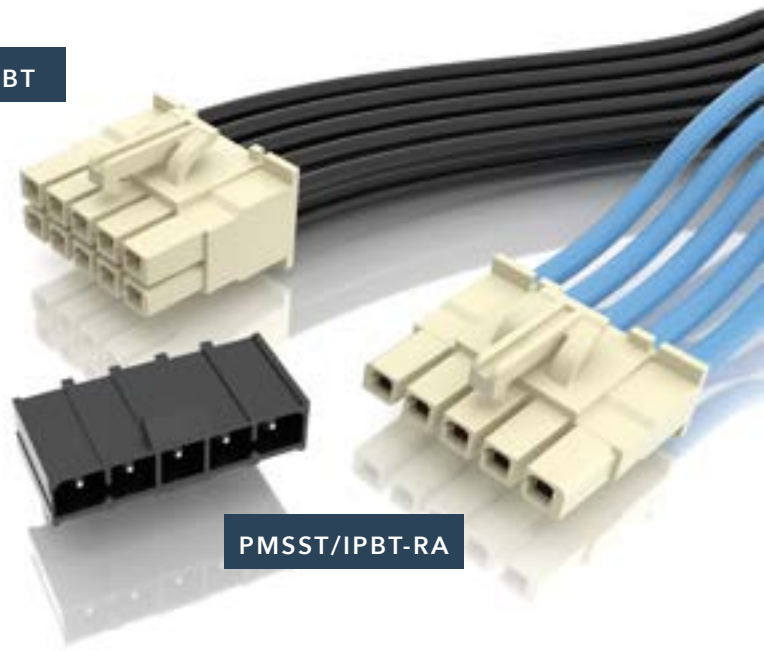
POWER MATE® DISCRETE WIRE SYSTEMS

MAX 10.4 Amps

- .165" (4.19 mm) pitch
- Individually shrouded contacts
- 2 to 30 total positions
- Single and double row
- 16 to 24 AWG PVC or Teflon™ fluoropolymer wire
- Keyed polarization
- Rugged plastic latching
- Single or double ended
- Vertical or right-angle mating header

PMSD/IPBT





PMSST/IPBT-RA



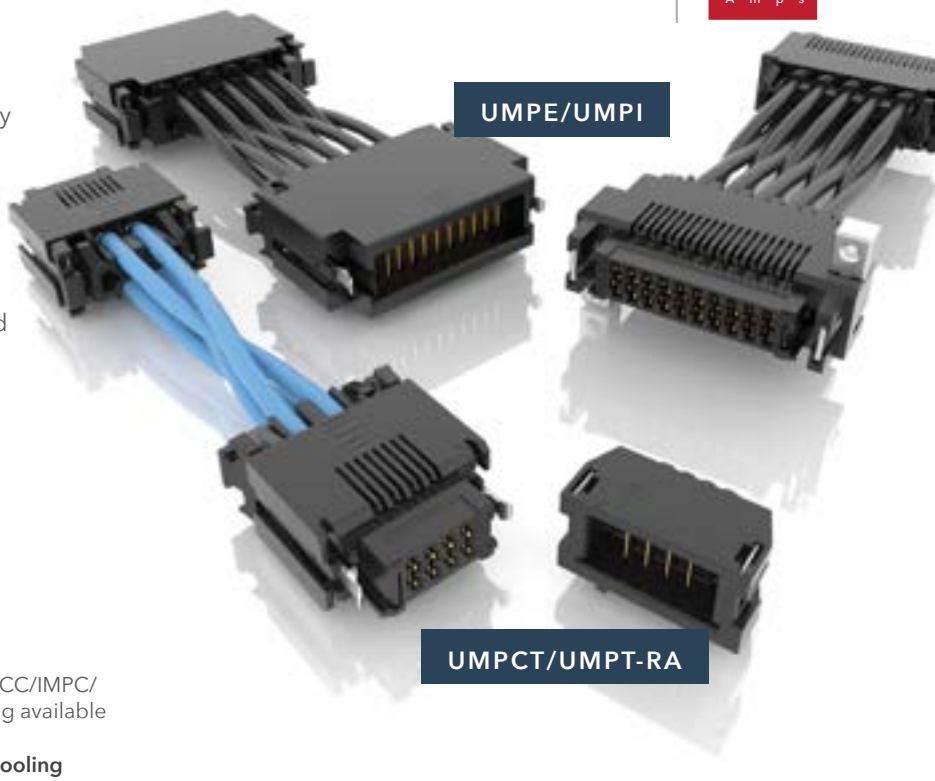
Components (IPBD/CC69L/CC69R) and tooling available; visit **samtec.com/tooling**

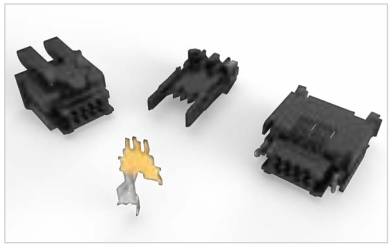
mPOWER® ULTRA MICRO POWER SYSTEMS

- Micro 2.00 mm pitch cable-to-board and cable-to-cable solutions
- Simplifies board layout and delivers power directly to active components
- 2 – 10 total power blades
- 16 and 18 AWG wire; color coded available
- Plastic top latching or metal side latching options
- Tin or 10 µ" Gold plated power blades; 30 µ" Gold plating available to meet specific regulations
- PVC or high-temp Teflon™ fluoropolymer wire
- Vertical and right-angle mating headers with optional weld tabs

mPOWER®

MAX 18 Amps





Components (IMPCC/IMPC/CC489) and tooling available for self assembly; visit **samtec.com/tooling**

POWERSTRIP™ HIGH-POWER SYSTEMS

- 5.00 mm and 6.35 mm pitch
- 2 to 8 total dual blade contacts
- 30 Amp signal/power combo with 4 total power, and 16 or 24 Tiger Eye™ signal positions
- 10 – 16 AWG wire
- Polarized with a rugged latching system
- Single or double ended
- Vertical and right-angle mating headers

MAX 40 Amps

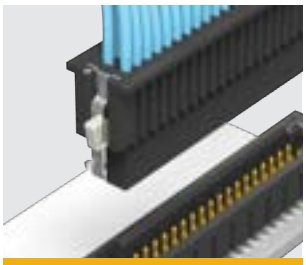




Components (IMS5/CC46L/CC46R, IMSC5/CC81L/CC81R, IPS6/CC10L/CC10R) and tooling available for flexible applications; visit **samtec.com/tooling**

RUGGED FEATURES & CUSTOM SOLUTIONS

RUGGEDIZING OPTIONS



POSITIVE LATCHING
Manually activated latches increase unmating force by up to 200%



FRICTION LOCKS
Metal or plastic friction locks increase retention/withdrawal force



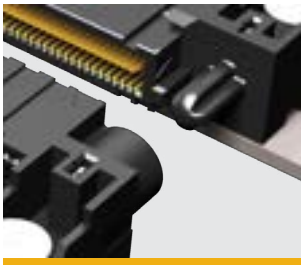
RETENTION PINS
Increase unmating force by up to 50%



BOARD LOCKS
Boards are mechanically locked together



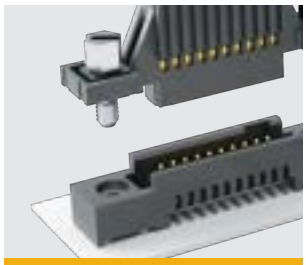
WELD TABS
Significantly increase sheer resistance of connector to PCB



GUIDE POSTS
Easy and secure mating



SHIELDING
360° shielding reduces EMI



SCREW DOWNS
Secure mechanical attachment to the board

CONTACT SYSTEMS

TIGER™ EYE CONTACT



- High-reliability
- High Mating Cycles
- Multi-finger Contact

TIGER™ CLAW CONTACT



- Dual Wipe Contact
- Pass-through Applications
- Ultra-low Profile

BLADE & BEAM CONTACT



- Mating/Alignment "Friendly"
- Cost-effective
- Micro Pitch

TIGER™ BEAM CONTACT



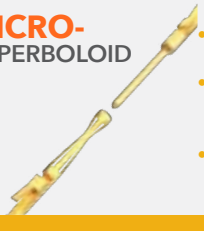
- Best Cost
- Reliable Performance
- Post & Beam Contact

EDGE® RATE CONTACT



- Designed for Signal Integrity
- Superior Impedance Control
- Reduced Broadside Coupling

MICRO-HYPERBOLOID



- High-reliability
- Four Points of Contact
- Extreme Mating Cycles

WILLINGNESS, SUPPORT AND EXPERTISE

Industry-Leading Customer Service

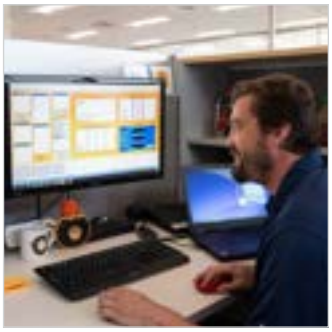
- Quotes and samples in 24 hours
- Prototype and processing assistance
- Dedicated Application Specific Product engineers and technicians

Flexible, In-House Manufacturing

- Global Operations, including multiple cable fabrication & assembly facilities
- Quick-turn samples and prototypes
- Custom & modified product support

Signal Integrity Expertise

- Industry-leading engineering support for high-performance system design
- Full system optimization assistance, including simulation, testing, analysis and evaluation

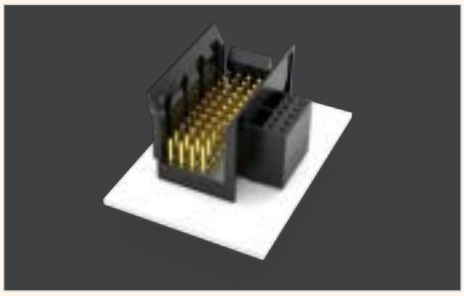





CUSTOMS & EXPRESS MODIFICATIONS

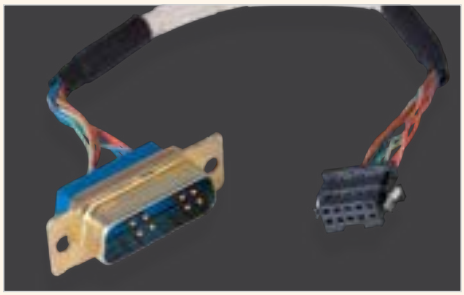
FLEXIBLE RUGGED SOLUTIONS

- Contacts and bodies
- Stamping, plating and molding
- Wiring
- Strain relief
- Screw downs
- Latches & locks
- Shielding modifications
- Polarization



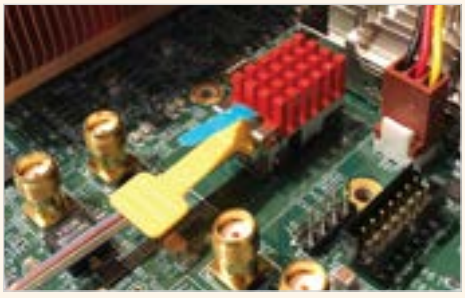
FLEXIBLE DISCRETE WIRE SOLUTIONS

- Variety of end 2 options
- Nylon woven sleeves
- Twisted pairs, color coding
- Heat shrink
- Selectively populated
- Barrel or harness crimp
- Ring/spade lug terminal
- Sealed



OPTICS FOR EXTREME ENVIRONMENTS

- Parylene coating
- Salt-fog inpenetrable
- Mitigation for tin whiskers
- Fungal resistant
- Extreme shock and vibration
- Full support for liquid immersion cooling



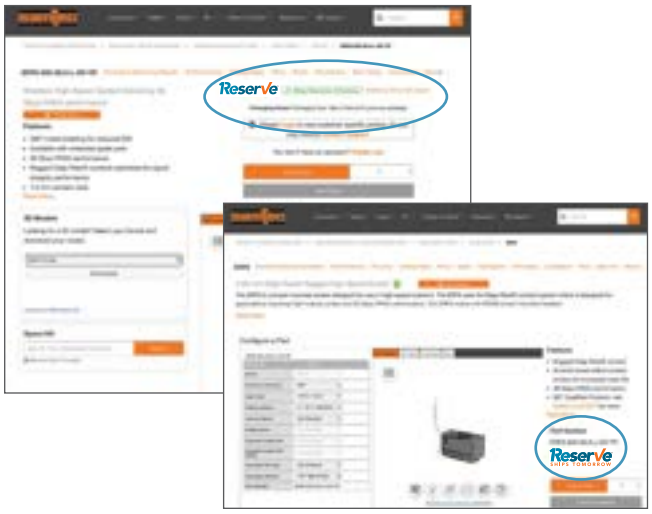
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This designation allows customers to **quickly and easily identify availability of over 200,000 of Samtec's most popular connectors and cables – guaranteed to ship in 1-day.**

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ONLINE TOOLS

FIND, DESIGN & VALIDATE YOUR SOLUTION

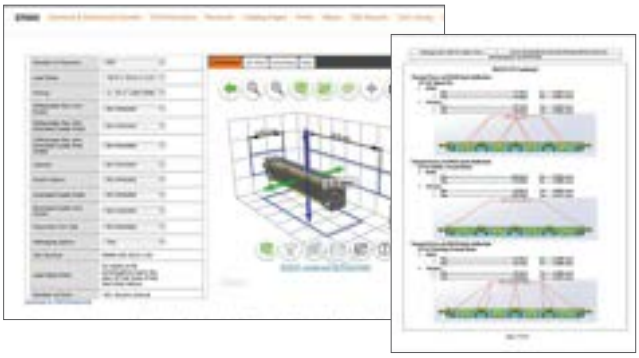
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SOLUTIONATOR®

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 GET A MATED SET IN SECONDS BOARD TO BOARD



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Solutionator RF DESIGN IN A MINUTE CABLE



samtec.com/rf-cablebuilder

Solutionator FLEX GET A MATED SET IN SECONDS STACKING



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Solutionator ACTIVE OPTICS DESIGN IN A MINUTE

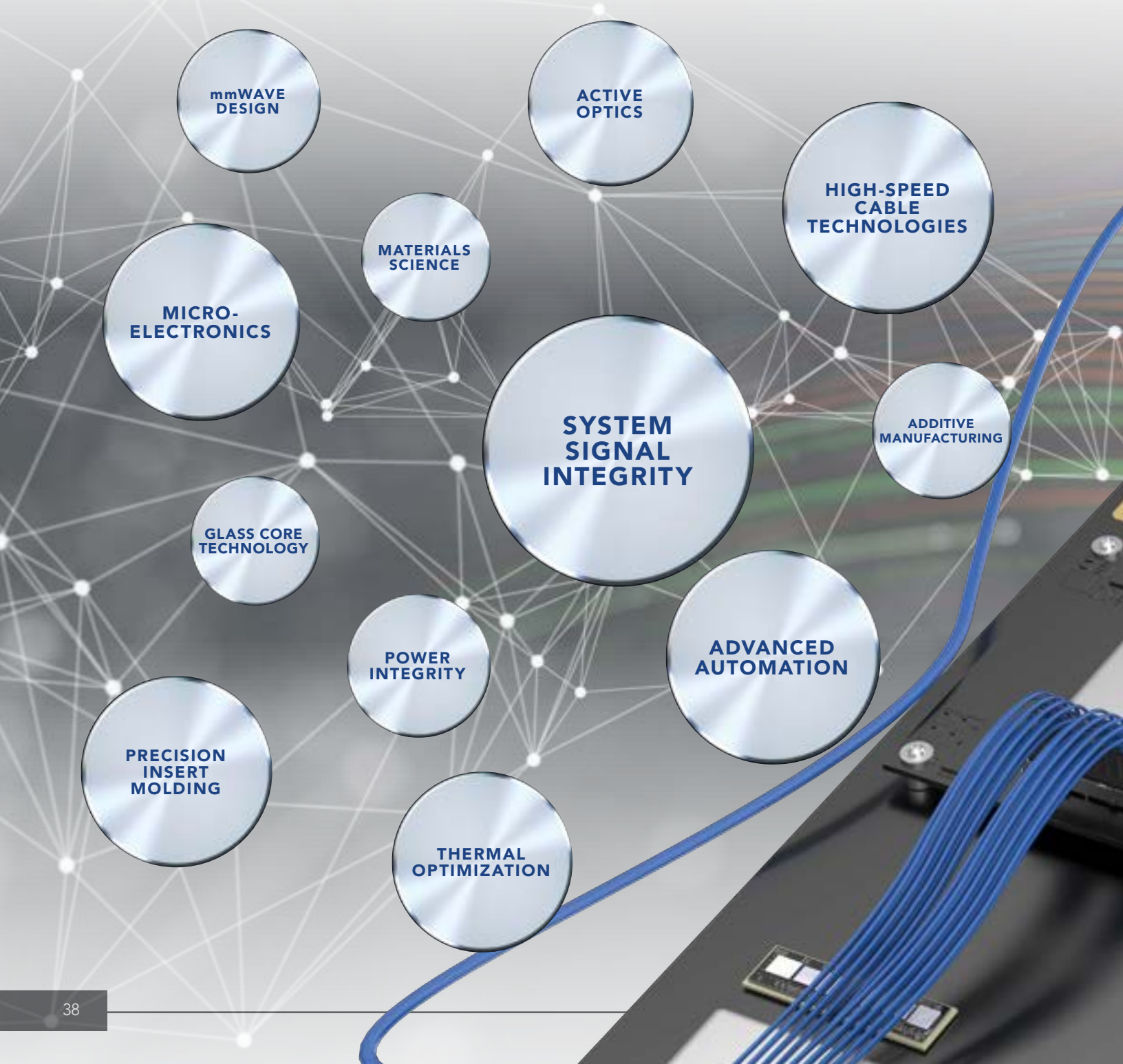


samtec.com/optics-solutionator

INTEGRATION LEADS TO INNOVATION

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

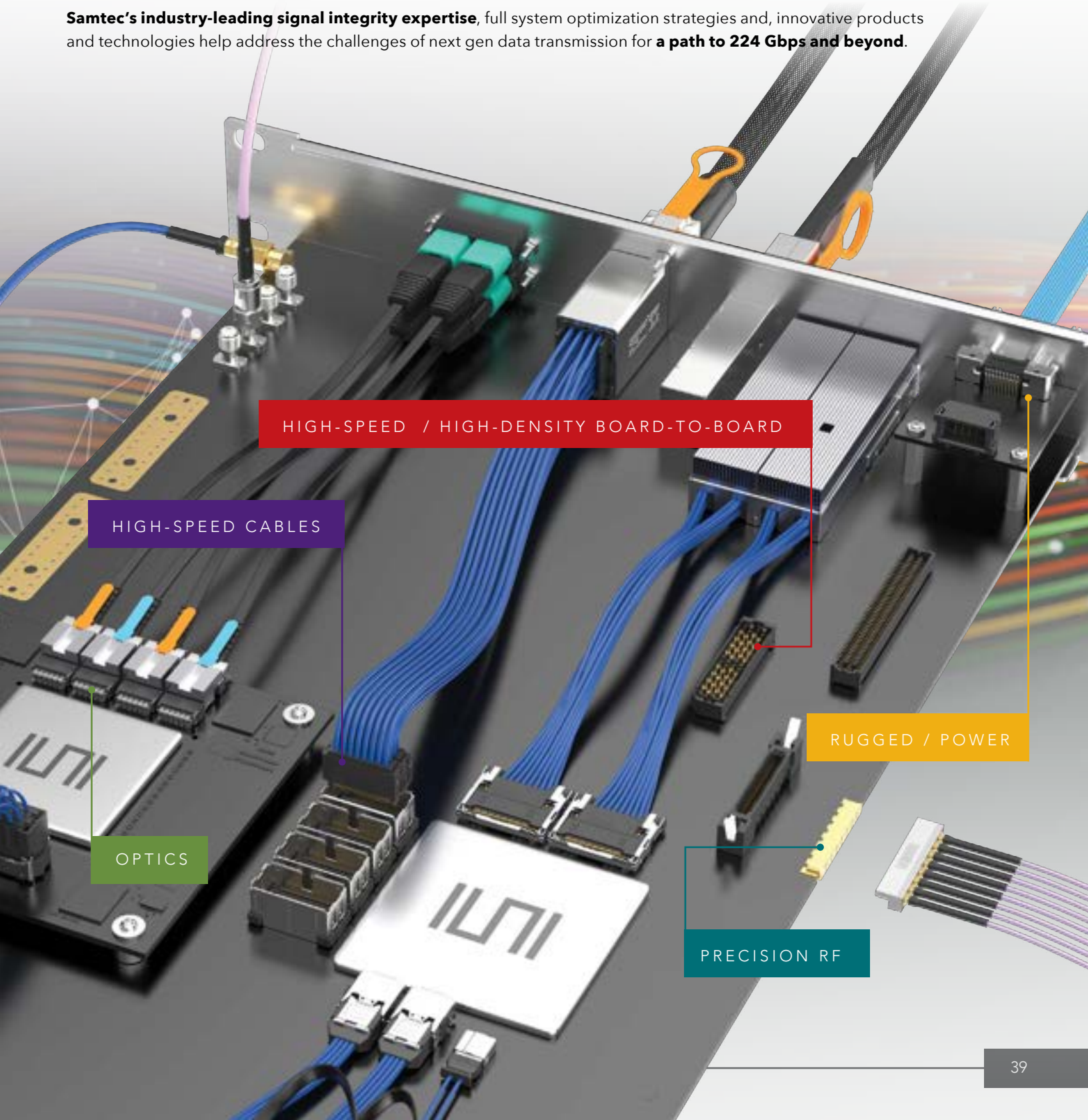
Samtec is structured like no other company in the interconnect industry. We work in a fully integrated capacity that enables true collaboration and results in uniquely innovative **PRODUCTS** because **our technology teams are not limited by the boundaries of traditional business units.**



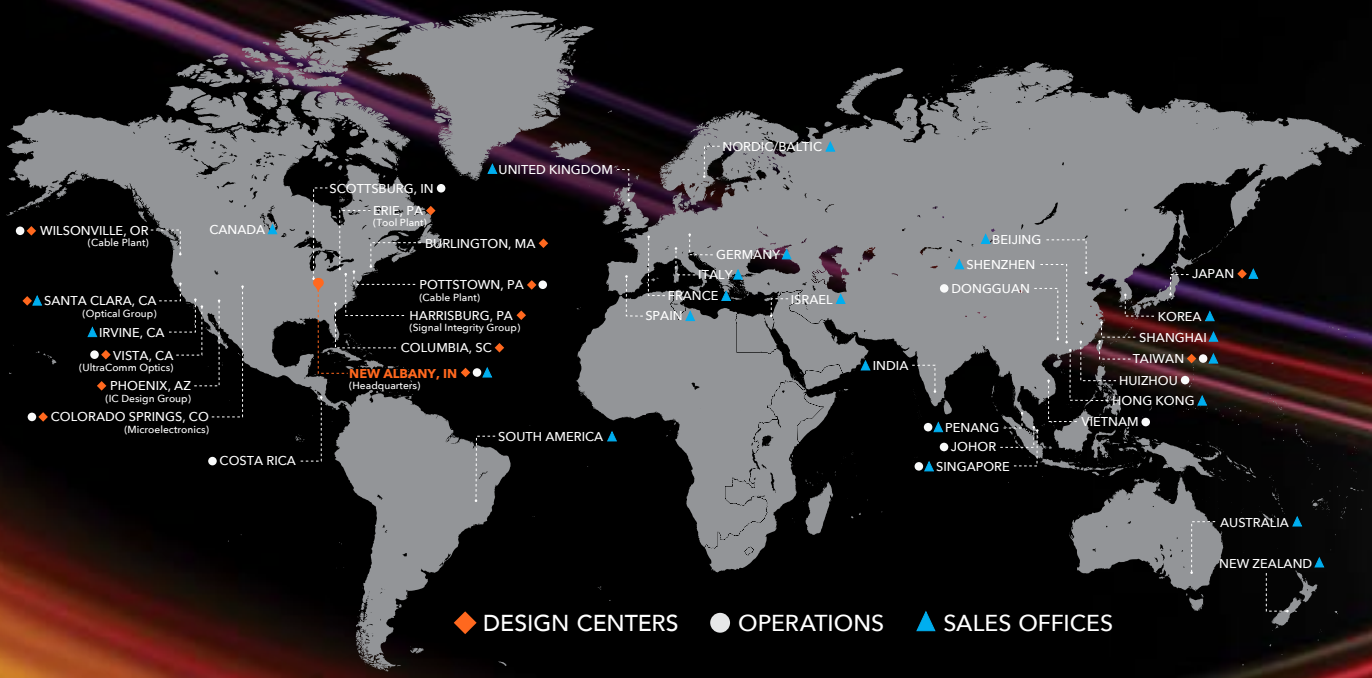
SILICON-TO-SILICON™ SOLUTIONS

As bandwidth, scale and power requirements continue to challenge conventional engineering methods, we want 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 for **a path to 224 Gbps and beyond**.



GLOBAL SUPPORT NETWORK



samtec

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