



# MILITARY & AEROSPACE CONNECTIVITY SOLUTIONS

RUGGED, HIGH-PERFORMANCE INTERCONNECTS FOR MIL/AERO APPLICATIONS



# MILITARY & AEROSPACE INTERCONNECT & DESIGN CAPABILITIES

Samtec delivers Sudden Service® solutions that are engineered to meet the stringent quality, production, and compliance requirements of many standard and application-specific military and aerospace designs. Our extensive MIL standard and Severe Environment Testing initiatives, along with an extremely flexible portfolio of high-performance interconnects, enable quick-turn and cost-effective solutions that provide the ultimate in performance and reliability.



Samtec testing initiatives include advanced tests that meet or exceed typical industry and MIL standards for performance confidence in rugged military and aerospace applications.

Samtec leads the industry in Rugged Signal Integrity solutions with performance from Gigabit Ethernet (GbE) to 224 Gbps PAM4, along with extreme design flexibility for durability and reliability in harsh environments.

COTS, ASP or MAP interconnect solutions are available with a wide variety of rugged features to ensure quality and durability in any application.

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## COTS & MODIFIED INTERCONNECT SOLUTIONS

Many of Samtec's extensive line of **rugged and high-speed interconnect products** are ideal for Mil Spec environments and systems, including MIL-STD-810, MIL-STD-810G, MIL-STD-1344, MIL-PRF-38534, MIL-DTL-55302 and NASA Class D missions.

In addition, Samtec offers **design and manufacturing support to modify products** to suit specific applications, as well as **extensive testing for performance confidence in rugged military and aerospace applications**. COTS materials allow Samtec to create modified options that are part of the Application Specific Product (ASP) or Military/Aerospace Product (MAP) series. Contact [mapsales@samtec.com](mailto:mapsales@samtec.com) for engineering support on Mil/Aero designs.



### Commercial Off-The-Shelf (COTS)

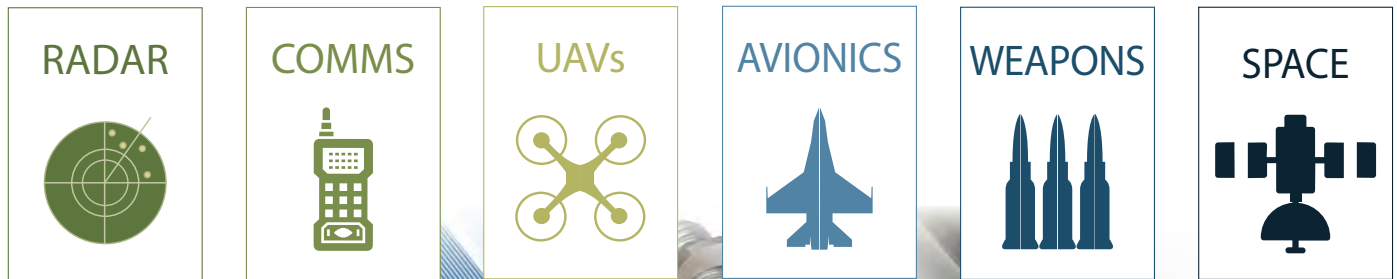
- Certified ISO-9001
- Cost-effective solutions
- Short lead-times and no MOQs
- Full Qualification Testing
- Up to 30 μ" Gold; Tin Lead
- -55 °C to +125 °C operating temp on most connectors; -40 °C to +125 °C on THV/FEP cables

### Application Specific Products (ASP)

- Modified COTS built to Samtec's print
- AS9102 FAI available
- Non-standard options available
- Similar part Qualification Testing
- Options to support up to 150 °C operating temperatures
- Customer specified plating (up to 50 μ" Gold; Tin Lead)

### Military/Aerospace Product (MAP)

- Modified COTS built to Samtec's print
- Manufacturing location and product specification control available
- Non-standard options available
- AS9102 FAI and ITAR control available
- Customer-specified lot screen sample size testing modeled after MIL-DTL-55302
- Customer-specified plating available (up to 50 μ" Gold, Tin Lead)



# MIL/AERO APPLICATIONS

## RADAR



Samtec's High-Speed Board-to-Board and Precision RF solutions enable speed and reliability in harsh radar environments, such as cockpit communications, missile defense, jamming equipment, 5G MIMO antennas, early warning radar systems, and land-based/in-flight/naval radar.

## COMMS



Samtec's RF Solutions enable integration of multi-band RF signal paths into rugged, small form factors, supporting tactical networks from manpack radios to ground control stations. Ruggedized High-Speed Cable and High-Density Arrays, including those pre-qualified to VITA standards, support a wide range of military and aerospace communications equipment.

## UAVs



Optimized for reduced size, weight, and power (SWaP), Samtec products enable Power, RF and Cable connections in the latest Drone and UAV designs. Multiple points of contact deliver reliable signal integrity, while mechanical latches or other rugged options create a secure connection.



*Samtec products are regularly deployed in a number of military and aerospace applications requiring reliability, durability and performance.*

## AVIONICS



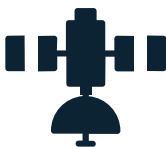
Samtec offers a range of rugged/power, RF, high-density arrays, and high-speed cable systems that support not only the electrical aspects of the aircraft, but also the reliability of those systems in rugged and harsh Avionics environments.

## WEAPONS



Samtec offers flexible solutions that have been tested to ensure quality and durability when quick responses, precision and reliability are critical, including Weapons and Munitions systems. Key test standards found in MIL shock and vibe profile (MIL-STD-810G) and 70,000 ft. qualification testing are included in Samtec's Severe Environment Testing (SET) program.

## SPACE



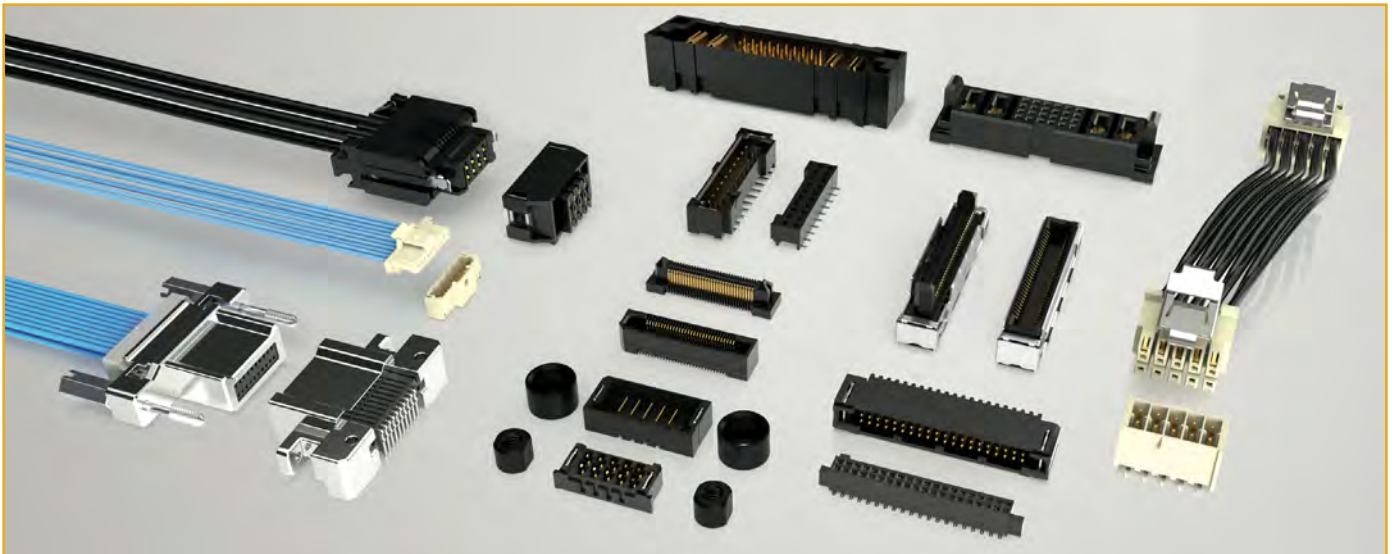
Samtec's SET-qualified products are approved for NASA Class D missions that require high-reliability, quick-turn and cost-effective solutions. In addition, Samtec offers market-leading expertise in High-Speed Connectors, Cable Systems, and Rad-Hard Rugged Optics for space applications, as well as a specialized range of Precision RF connectors ideal for Satcom applications.

# MIL/AERO ALIGNED PRODUCTS



## ULTRA RUGGED SOLUTIONS

Extreme High Mating Cycles • Rugged MIL-DTL Materials • Maximum Durability & Reliability  
High Data Rates & Densities • Hardware & High-Reliability Platings • Severe Environment Testing



## RUGGED / POWER SYSTEMS

High-Reliability Contact Systems • High Mating Cycles • High Power & Power/Signal  
Small Form Factors • Ruggedizing Features & Options



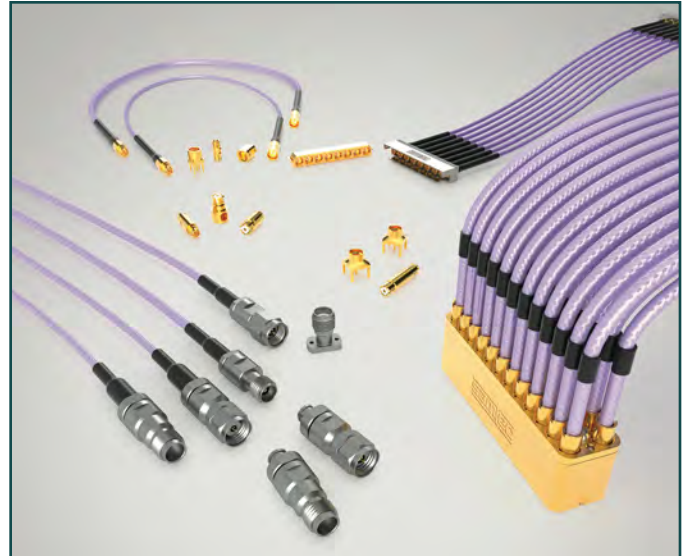


Samtec offers a robust line of interconnect solutions designed to withstand the extreme and harsh environments of Mil/Aero applications.



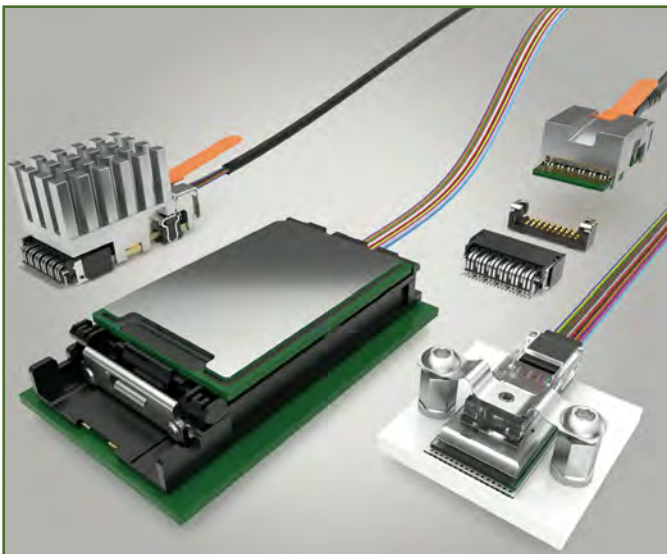
### HIGH-SPEED CABLE

Flyover® Technology • Extreme High-Density  
Industry-Leading Data Rates • High-Performance  
Mix-and-Match End Options



### PRECISION RF SOLUTIONS

18 to 110 GHz • High Isolation • High-Density  
Phase & Insertion Loss Stable Cable  
High Performance Test to 90 GHz



### RUGGED OPTICS

Extended Temp Range • Extreme Environments  
Rad-Hard Solutions • Ultra Micro Footprints  
Future Proof Design

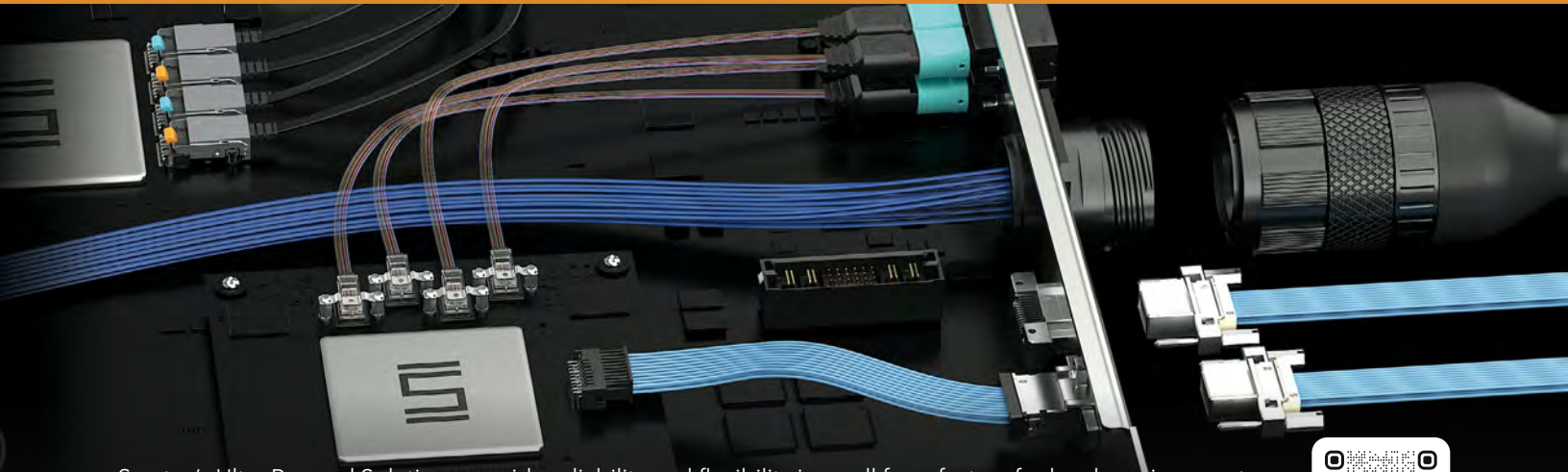


### HIGH-SPEED CONNECTORS

Signal Integrity Optimized • Ultra-High Density  
Design Flexibility • Rugged Contact Systems  
High-Reliability & Durability



# ULTRA RUGGED SOLUTIONS



Samtec's Ultra Rugged Solutions provide reliability and flexibility in small form factors for harsh environments, including military, aerospace, submersible and other applications. Samtec's Severe Environment Testing (SET) qualified products are COTS and modified COTS for cost-effective, quick-turn solutions.



MAX  
**2.9** RUGGED POWER I/O SYSTEMS  
A m p s

- Micro hyperboloid contact with four points of contact for a reliable connection and extreme mating cycles
- Cable-to-cable and cable-to-board solutions in a space-saving double row design on a micro 1.00 mm pitch
- Extreme Density / Small Form Factor with up to 1,450 I/Os in a 1RU panel
- EMI shielding limits signal degradation and optimizes performance; captive panel screws and strain relief
- PVC or Teflon™ fluoropolymer wire



GIGABIT ETHERNET PAM 4  
**GbE** → **112** 38999 RUGGED I/O SYSTEMS  
G b p s

- Samtec's NovaRay® I/O high data rate cable system in a rugged 38999 shell
- Salt fog resistant to 48 hours
- IP67 for dust and waterproof sealing option
- High-density 16 pair; 32 pair on roadmap
- Threaded cable-to-panel design using Flyover® technology
- 28 or 34 AWG (external) and 34 AWG (internal) Eye Speed® ultra low skew twinax

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

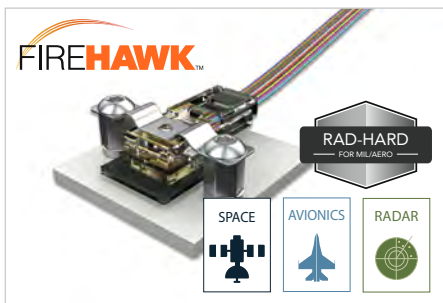


# HIGH MATING CYCLES • MIL-DTL MATERIALS • ULTRA DURABLE



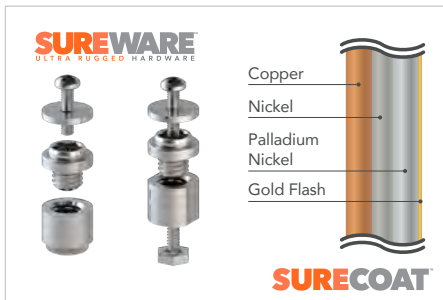
## 10 Gbps 28 Gbps FIREFLY™ EXTREME ENVIRONMENT & EXTENDED TEMP OPTICAL SYSTEMS

- Sealed & parylene-coated system (ETMO) for exposed military, aerospace and submersible applications; operates in salt fog, blowing sand and dust, jet fuel exposure, altitudes up to 65,000 ft
- Extended temp system (ETUO) with range of -40 °C to +85 °C and a micro footprint for increased density
- See page 16 for additional details



## 10 Gbps FIREHAWK™ ULTRA RUGGED/COMPACT OPTICS

- The smallest optical transceiver in the industry at 10 mm x 7.7 mm x 2.5 mm
- Meets Mil/Aero requirements, including MIL-PRF-38534
- Rugged BGA attach withstands high shock and vibration
- Extreme performance to 40 Gbps aggregate (10 Gbps x 4 channels) transfer rate
- **RAD-HARD** radiation tolerant design
- See page 17 for additional details



## ULTRA RUGGED HARDWARE & PLATING OPTIONS

- Guide post standoffs (GPSO) made of 303 stainless steel with MIL-C-13924 black oxide finish allow for .035" of initial misalignment and blind mating
- Standoffs (SO) with precision machined tolerances
- Jack screw precision standoffs (JSO) reduce the risk of damage
- Palladium nickel plating with gold flash for high-temp, high-cycle applications; qualified up to 150°C ambient

## TECHNOLOGY ROADMAP



High-cycle "super lube" for extreme mating cycles



URSA™ I/O with power, signal, RF coax & high-speed contacts for high-reliability in harsh environments

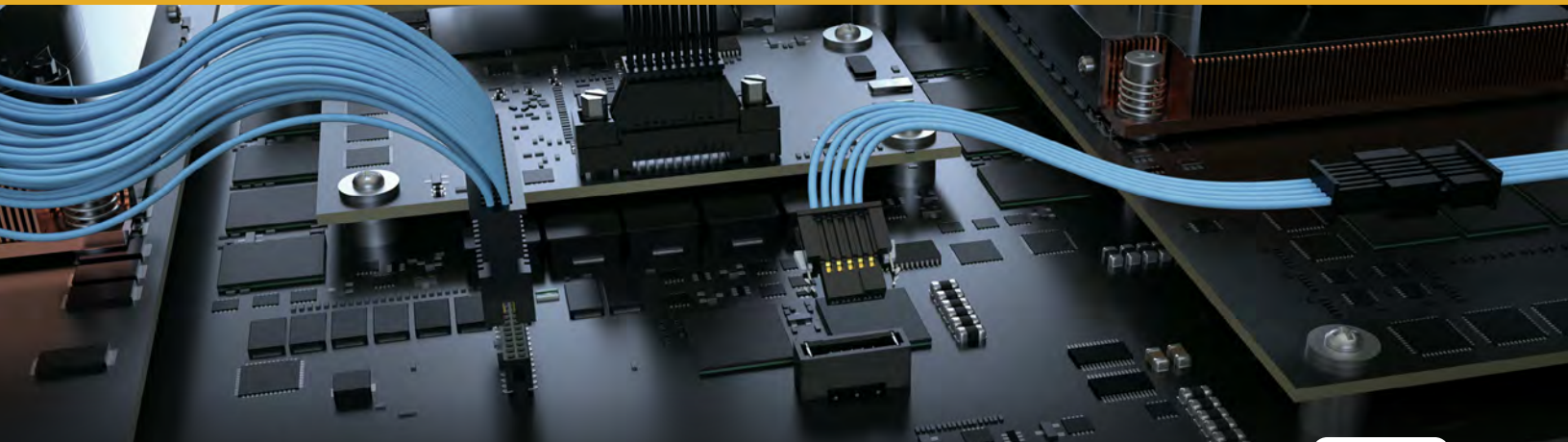


URSA™ I/O Cable with AccelRate™ Mini Extreme Performance System

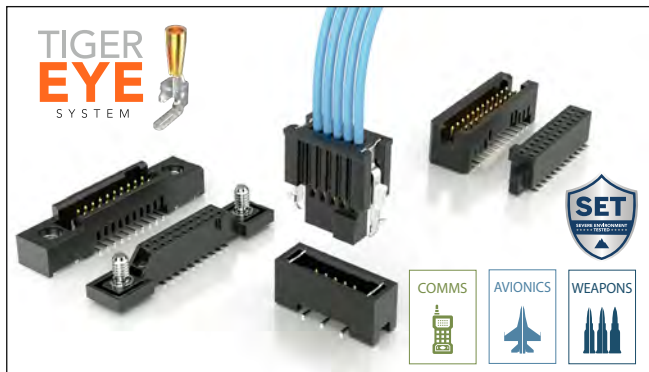


Expanded testing to MIL-DTL-55302 including salt spray & enhanced shock & vibration

# RUGGED/POWER SYSTEMS



Samtec offers the industry's most extensive line of rugged and high power interconnects. High-reliability contact systems are designed to support high mating cycles and high-shock/vibration applications. Standard and optional ruggedizing features are available on most products for added durability.



MAX  
**3.2**  
A m p s

**8**  
G b p s

## TIGER EYE™ HIGH-RELIABILITY CONTACT SYSTEMS

- Samtec's most rugged contact system: high reliability Tiger Eye™ three-finger BeCu system (1,000+ mating cycles) on a 0.80 mm, 1.27 mm or 2.00 mm pitch
- Shrouded, polarized and keyed
- Screw down, locking clip, friction latching and weld tab ruggedizing options
- Mating discrete wire assembly with PVC or Teflon™ fluoropolymer, and IDC cable assemblies with rugged strain relief
- **SET & E.L.P.™ qualified:** SFM/TFM Series
- **E.L.P.™ qualified:** SEM/TEM Series



NRZ

PAM 4

**28**  
G b p s

**56**  
G b p s

## EDGE RATE® RUGGED / HIGH-SPEED SYSTEMS

- Rugged, signal integrity-optimized Edge Rate® contact system, designed for high-speed, high cycle applications
- Contacts offer increased durability and an extended wipe for a reliable connection
- 360° shielding option reduces EMI
- Rugged friction locks, weld tabs, extended guide posts and rugged metal latching available
- Choice of 0.50 mm, 0.635 mm and 0.80 mm pitches, orientations and mating high-speed cable assemblies
- **SET qualified:** ERF8/ERM8 Series



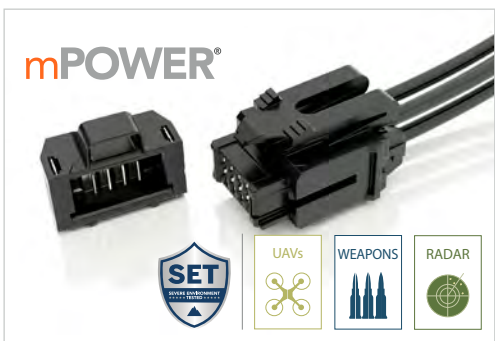
# HIGH-RELIABILITY • HIGH MATING CYCLES • HIGH POWER • SFF



NRZ  
25  
Gbps

## HIGH-SPEED, HIGH-DENSITY MICRO SYSTEMS

- Razor Beam™ contacts for high-speed and fine-pitch systems
- 4-6x greater mating/unmating forces vs. typical micro pitch connectors
- Choice of 0.50 mm, 0.635 mm and 0.80 mm pitches
- Optional lubricated contacts and shielding for EMI protection
- Self-mating design reduces inventory costs



## FLEXIBLE, RUGGED HIGH POWER CABLES & CONNECTORS

- mPOWER® Ultra Micro Power Systems
  - Board-to-board, cable-to-board and cable-to-cable applications
  - 2-10 total power blades with up to 18 A per blade on a 2.00 mm pitch
  - **SET qualified:** UMPS/UMPT Series
  - Visit [samtec.com/mpower](http://samtec.com/mpower)
- PowerStrip™ Power Systems & Power/Signal Combo Systems
  - 24.8 A/blade to 58.7 A/blade (1 blade powered)
  - Up to 10 dual blade contacts
  - 3.81, 5.00 and 6.35 mm pitches
  - Visit [samtec.com/powerstrip](http://samtec.com/powerstrip)

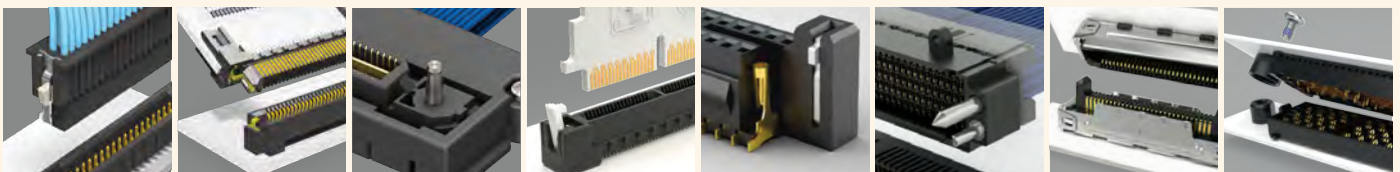


## RUGGED/POWER DISCRETE WIRE SYSTEMS

- Micro Mate™ system with up to 40 reliable crimp style dual leaf contacts on a 1.00 mm pitch
- Mini Mate® system with up to 50 individually shrouded contacts on a 2.54 mm pitch
- Rugged latching systems for increased retention
- PVC or Teflon™ fluoropolymer wire for high temp or halogen free applications

## RUGGEDIZING FEATURES & OPTIONS

Most Samtec interconnect systems are also available with a variety of standard and optional features to further ensure quality and durability in rugged and harsh environments.



Positive Latching

Friction Locks

Retention Pins

Board Locks

Weld Tabs

Guide Posts

Shielding

Screws/Standoffs

# HIGH-SPEED CABLE SYSTEMS



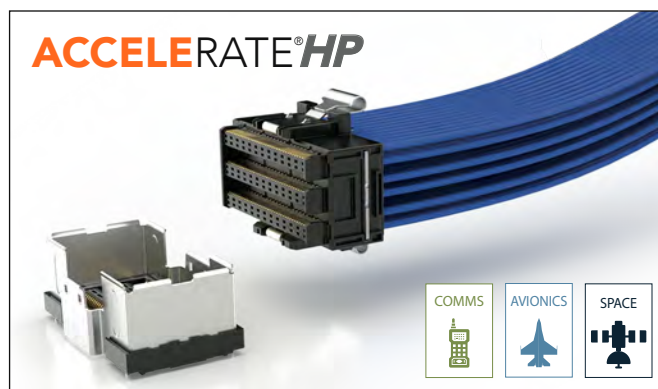
Samtec's high-speed cable assemblies utilize Flyover® technology to route data above lossy PCB, simplifying board layout, extending signal reach and improving thermal management. For superior signal integrity, small bend radii and dynamic high-flexing cycles, these assemblies feature Samtec's proprietary Eye Speed® ultra low skew twinax and micro coax cable. Mix-and-match end options are available for application specific requirements.



NRZ 56 Gbps | PAM4 112 Gbps

## NOVARAY® EXTREME SPEED & DENSITY CABLES

- Industry leading aggregate data rate density - 2x the data rate in 60% of the space
- 4.0 Tbps aggregate data rate - 9 IEEE 400G channels
- Innovative, fully shielded differential pair design enables extremely low crosstalk (beyond 40 GHz) and tight impedance control
- 48 differential pairs per square inch
- Two reliable points of contact guaranteed
- Eye Speed® 34 AWG ultra low skew twinax cable



NRZ 56 Gbps | PAM4 112 Gbps

## ACCELERATE® HP EXTREME DENSITY CABLES

- Industry's highest density 112 Gbps PAM4 cable-to-board system; supports today's 256-channel chip and tomorrow's 512-channel chip
- Staggered row-to-row spacing allows adequate routing lanes for optimized traces; 0.635 mm contact pitch
- 32 to 72 differential pairs; up to 96 pairs in development
- Eye Speed® 34 AWG ultra low skew twinax cable or ThinSE™ micro coax cable
- BGA solder ball attach for simplified processing
- Right-angle shielded mating connector in development



# FLYOVER® TECHNOLOGY • EXTREME-DENSITY • HIGH-RELIABILITY



## 14 Gbps EYE SPEED® MICRO COAX & TWINAX CABLES

- Mix-and-match end options for extensive customization
- Rugged shielding, latching, locking and screw down options available
- High-Density SEARAY™, Rugged Edge Rate®, Ultra Micro Razor Beam™, High-Speed Q Strip® & 0.80 mm pitch High-Speed Edge Card assemblies
- 30 - 38 AWG micro coax and twinax cable



## 56 Gbps NRZ 112 Gbps PAM4 EXAMAX® HIGH-SPEED BACKPLANE CABLE

- Cable-to-cable, cable-to-board, mid-board and panel applications
- Highly customizable with modular flexibility, and reduced costs due to lower PCB layer counts
- 4 and 6 pairs; 4-16 columns
- Multiple end 2 options and optional integrated guidance/keying
- Eye Speed® 30 and 34 AWG ultra low skew twinax cable
- Two reliable points of contact with a 2.4 mm wipe

## TECHNOLOGY ROADMAP

**112 Gbps PAM4**

**NOVARAY**

Micro Rugged Backplane System with true 112 Gbps PAM4 signal integrity and Flyover® support

**56 Gbps NRZ 112 Gbps PAM4**

**ACCELERATE HP**

Gen 2 Direct-to-Chip Package with Eye Speed® Thinax™ Ultra Performance Twinax Cable

**56 Gbps PAM4 112 Gbps PAM4**

**ExaMAX**

ExaMAX® I/O fully shielded cable-to-cable bulkhead panel connection with performance to 112 Gbps PAM4

**224 Gbps PAM4**

**SI-FLY HD**

Si-Fly™ HD on-package system with vertically launched Eye Speed® Thinax™ cables for the highest density package

ExaMAX® is a registered trademark of AFCL.

# PRECISION RF SOLUTIONS



Samtec offers complete RF interconnect solutions supporting traditional sub-6 GHz frequencies to 110 GHz microwave / mmWave frequencies (sub-Terahertz spectrum). Technical support includes launch optimization, simulation and testing, along with quick-turn modifications and new designs.



## MAGNUM RF™ GANGED SMPM SOLUTIONS

- High-density, space-saving, push-on design
- 65 GHz performance
- Ideal for Phased Array, Signal Intelligence & Electronic Warfare applications
- Cable-to-Board System: .047" or .086" low-loss flexible cable; 3.56 mm (.140") pitch edge launch or vertical launch
- Board-to-Board System: 3.56 mm (.140") pitch, single-row standard (multi-row also available); mezzanine, coplanar or perpendicular designs



## NEXT GEN RF: PHASE & INSERTION LOSS STABLE

- Optimized coaxial structure designed to meet the demands placed on Mil/Aero and Defense applications
- Engineered for high-performance, high-stability: phase and insertion loss stable over temperature, flexure and repeated use
- Supports extended frequency ranges for emerging technologies
- Conductors feature a silver plating, providing the highest electrical conductivity, while avoiding oxidation



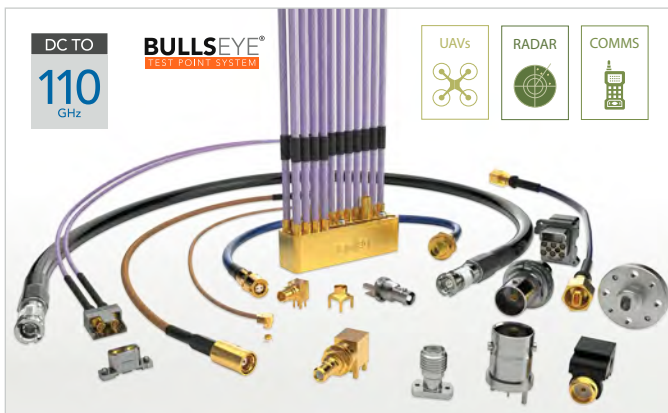


# HIGH FREQUENCY • INDUSTRY STANDARDS • ORIGINAL SOLUTIONS



## HIGH FREQUENCY, PRECISION RF (18 to 110 GHz)

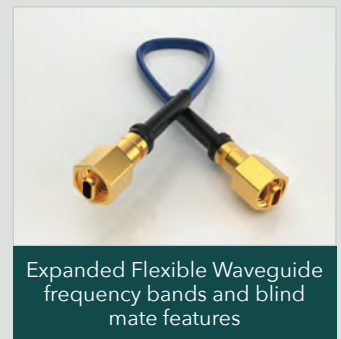
- **Push-on SMP & SMPM** connectors for cable-to-board, board-to-board applications
- RF047-A, RF085, RF086 & RF23C Series cable assemblies
- Large diameter cable assemblies available for even lower-loss over longer distances
- Small diameter cable assemblies for greater flexibility and millimeter wave frequency
- High-performance board connectors with air dielectric for low VSWR and insertion loss



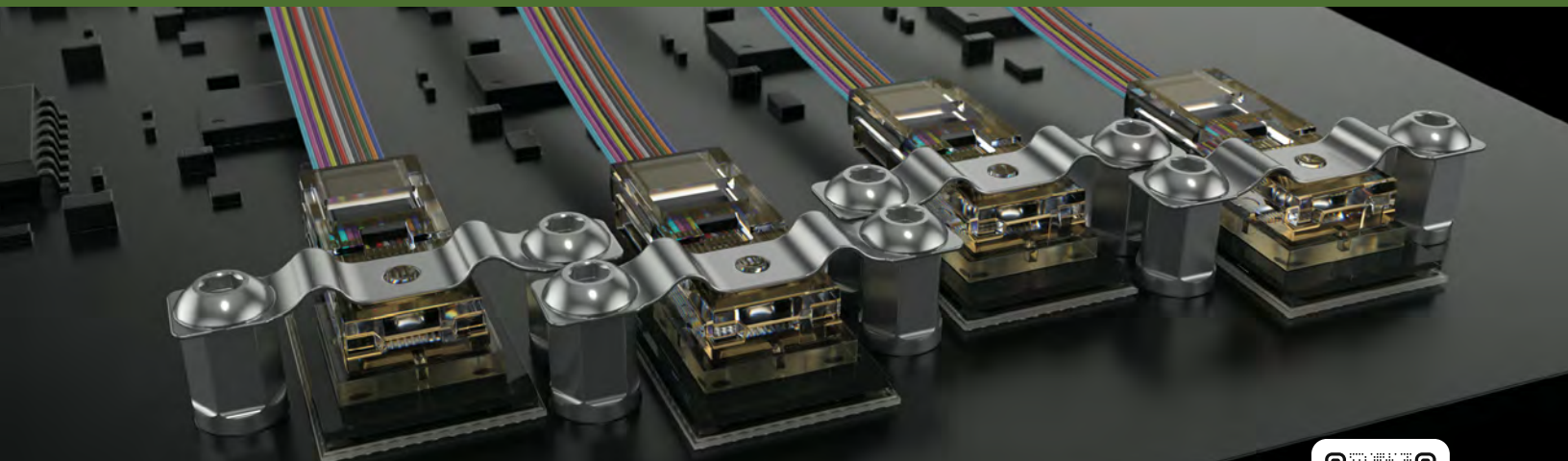
## INDUSTRY-STANDARD & ORIGINAL SOLUTIONS

- Sub-6 GHz to 110 GHz
- Bulls Eye® Test to 90 GHz
- High vibration tolerance
- E-band & V-band Flexible Waveguide Technology
- Ganged and high isolation cable systems
- 50 & 75  $\Omega$  RF solutions
- Micro High-Frequency U.FL and W.FL
- 100  $\Omega$  shielded twisted pair cable assemblies
- Micro-mini interconnects
- Non-magnetic RF solutions

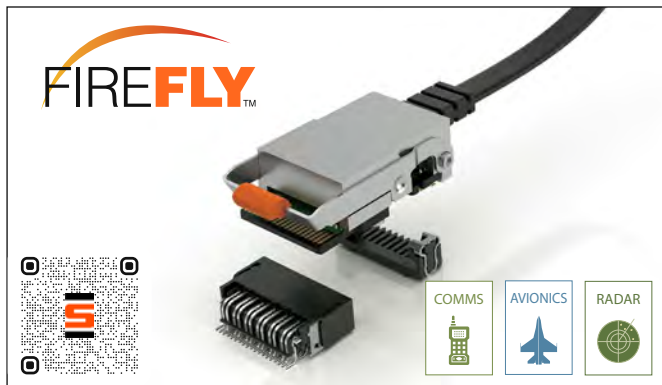
## TECHNOLOGY ROADMAP



# RUGGED OPTICS

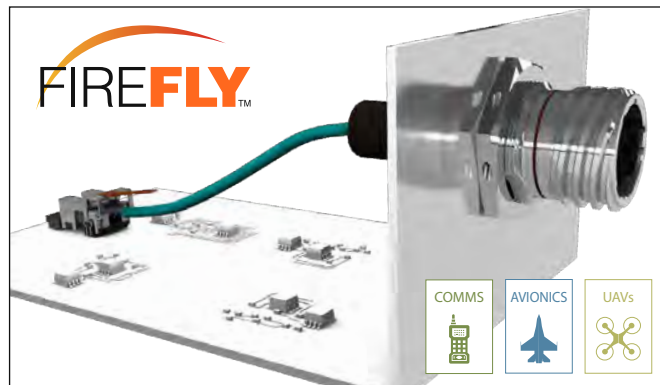


Samtec's rugged optical systems offer reliability, extreme density and high performance to 40 Gbps in harsh and extreme conditions. The innovative designs deliver fiber optic bandwidth to a new generation of radar, vision systems, communications networks, surveillance and reconnaissance sensors.



## 10 Gbps 28 Gbps FIREFLY™ EXTREME ENVIRONMENT OPTICAL SYSTEMS (ETMO Series)

- A range of optical engine configurations that can be optimized for specific applications
- Sealed and Parylene-coated for exposed 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
- Capable of passing MIL-STD-810, Method 509.7
- Extended temp range of -40 °C to +85 °C



## 10 Gbps 28 Gbps FIREFLY™ EXTENDED TEMP OPTICAL SYSTEMS (ETUO Series)

- Ideal for military, aerospace and industrial applications, with a temperature range from -40 °C to +85 °C
- Error free transmission during applied external vibrations and shock test, to methods specified in MIL-STD-810G
- Micro rugged board level connector system with positive latching, weld tabs and loading guides for a secure connection
- Pigtailed cable for maximum link budget with customizable optical connectors
- Commercial FireFly™ Optical System (ECUO Series) and High-Performance Copper FireFly™ System (ECUE Series) also available; visit [samtec.com/firefly](http://samtec.com/firefly) for details



# RAD-HARD • EXTENDED TEMP • EXTREME ENVIRONMENTS

## 10 Gbps FIREHAWK™ ULTRA RUGGED/COMPACT OPTICS

- Chip Scale Package (CSP): industry's smallest footprint and lowest profile (< 0.4 grams)
- FireHawk™ for Mil/Aero (CSPO): integrated microcontroller to automate key functions
- FireHawk™ for Space (CSSO): withstands impacts of radiation without a microcontroller
- Meets Mil/Aero requirements, including MIL-PRF-38534
- **RAD-HARD** for Satellites: internal driver ASIC for VCSELs and PIN receivers designed using radiation hardened by design guidelines
- Extreme performance to 40 Gbps aggregate (10 Gbps x 4 channels) transfer rate
- Withstands shock, vibration, electrostatic discharge, temperature cycles, humidity, salt fog and radiation



### ROBUST PERFORMANCE IN HARSH ENVIRONMENTS

<b>HUMIDITY</b>	85 °C (85 °C RH) for 1,000 hours; > 95 °C RH for 600 hours (at 60 – 80 °C)
<b>SALT FOG</b>	24 Hours
<b>RADIATION</b>	Single Event: > 75 MeV; Heavy Ion: 3.77E11 n/cm <sup>2</sup> ; Ionizing Dose (ELDRS): > 63 krad
<b>VIBRATION</b>	20G <sub>rms</sub>
<b>SHOCK</b>	50G
<b>ESD</b> (Electrostatic discharge)	Class 1A 250 V HBM; Class 1C 1,000 V HBM
<b>TEMP CYCLES</b>	-40 °C to +85 °C (standard); -40 °C to +95 °C (also available)

### CSSO SERIES FOR SPACE | REFERENCE CHARTS (DATA AVAILABLE FOR UP TO 10G)

DESCRIPTION	CONDITIONS	COMMENTS
<b>ESD</b>	JS-001-20170. 250 V. Class 1	ESD circuits designed for Class 2A
<b>LATCH-UP</b>	JESD78E. Class A	ESD circuits designed for Class 2A

DESCRIPTION	CONDITIONS	EXPOSURE LEVEL	UNITS	
<b>SINGLE EVENT EFFECT</b> (Heavy Ion)	Single Event Latch-Up (SEL)	No single event Latch-up	77.8	MeV-cm <sup>2</sup> /mg
	Single Event Upset (SEU)	No reset events	< 46	MeV-cm <sup>2</sup> /mg
		No permanent damage	> 85.4	
<b>DISPLACEMENT DAMAGE</b> (Neutron)	1 MeV equiv. neutron fluence	Pre and post irradiation test for Δ in Tx eye and Rx sensitivity	3.70E+11	n/cm <sup>2</sup>
<b>TOTAL IONIZING DOSE</b> (ELDRS)	Ionizing dose of biased & unbiased parts	Pre and post irradiation test for Δ in Tx eye and Rx sensitivity	63.75	krad

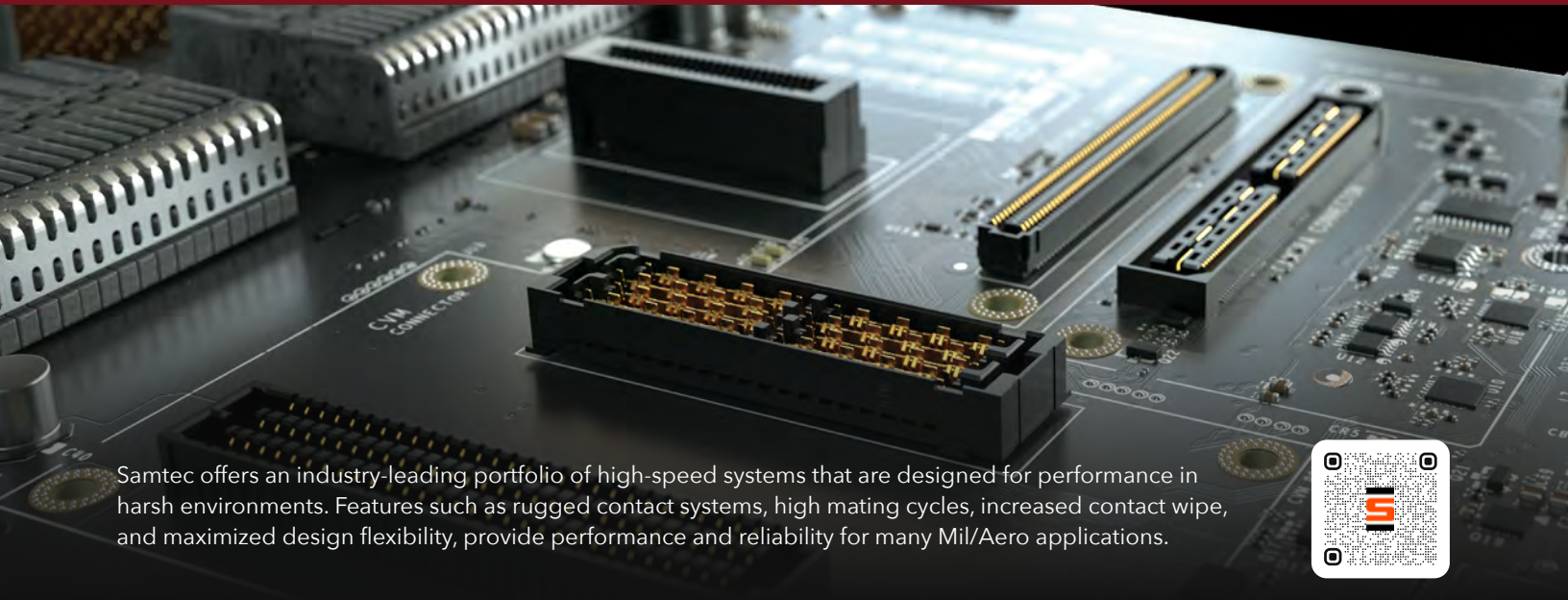
## TECHNOLOGY ROADMAP

**112 Gbps**  
HALO™ Next Gen Optics - up to 112 Gbps PAM4 per lane, up to 16 channels (8 channel bidirectional)

FireHawk™ CSP Series for Space with 28 Gbps / 32 Gbps performance

FireFly™ Extreme Environment support for PCIe® 4.0

# HIGH-SPEED CONNECTORS



Samtec offers an industry-leading portfolio of high-speed systems that are designed for performance in harsh environments. Features such as rugged contact systems, high mating cycles, increased contact wipe, and maximized design flexibility, provide performance and reliability for many Mil/Aero applications.



NRZ	PAM4
28 Gbps	56 Gbps

## SEARAY™ HIGH-DENSITY HIGH-SPEED ARRAYS

- Open-pin-field design for maximum grounding and routing flexibility
- Rugged Edge Rate® contacts optimized for signal integrity
- High-density 1.27 mm pitch system: up to 560 contacts and 1.15 mm (.045") contact wipe (SEAM/SEAF)
- Ultra high density 0.80 mm pitch system: up to 500 contacts and optional guide post for blind mating (SEAM8/SEAF8)
- Solder charge terminations meet IPC J-STD-001F and IPC-A-610F Class 3 criteria (SEAX Series)



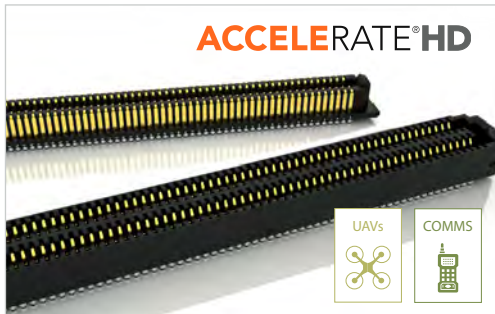
NRZ	PAM4
56 Gbps	112 Gbps

## NOVARAY® EXTREME PERFORMANCE ARRAYS

- 4.0 Tbps aggregate data rate - 9 IEEE 400G channels; 112 Gbps PAM4 per channel
- 0.80 mm pitch; 2, 3 or 4 rows
- 1 or 2 banks with up to 16 pairs/bank
- Two points of contact ensure a more reliable connection
- 7, 9, 10 & 12 mm stack heights, with minimal variance in data rate as height increases
- Analog Over Array™ capable



# EXTREME PERFORMANCE • HIGH-DENSITY • RUGGED CONTACTS

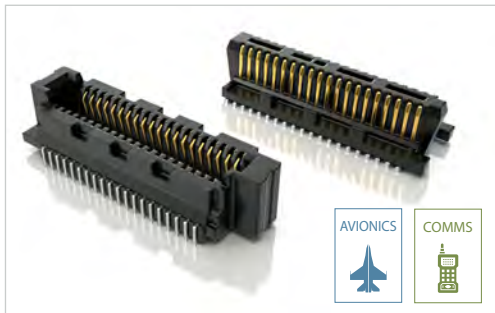


NRZ  
32  
Gbps

PAM4  
64  
Gbps

## ULTRA HIGH-DENSITY SLIM BODY ARRAYS

- Rugged Edge Rate<sup>®</sup> contacts optimized for signal integrity performance
- Open-pin-field design for grounding and routing flexibility
- Up to 400 I/Os in a 4-row design; 0.635 mm pitch
- Slim 5 mm width, low profile 5 mm to 16 mm stack heights



PAM4  
56  
Gbps

## MICRO BLADE & BEAM STRIPS

- Ultra fine 0.40 mm and 0.50 mm pitch; 20 - 160 positions
- Low profile 2 mm to 6 mm stack heights
- Slim body design for increased board space savings
- Shrouded polarization for blind mating



NRZ  
28  
Gbps

## HIGH-SPEED GROUND PLANE STRIPS

- Low profile designs on a 0.50 mm, 0.635 mm or 0.80 mm pitch
- Integral ground/power plane improves electrical performance
- Latching, weld tabs, guide posts
- Extended Life Product<sup>™</sup> testing available



NRZ  
32  
Gbps

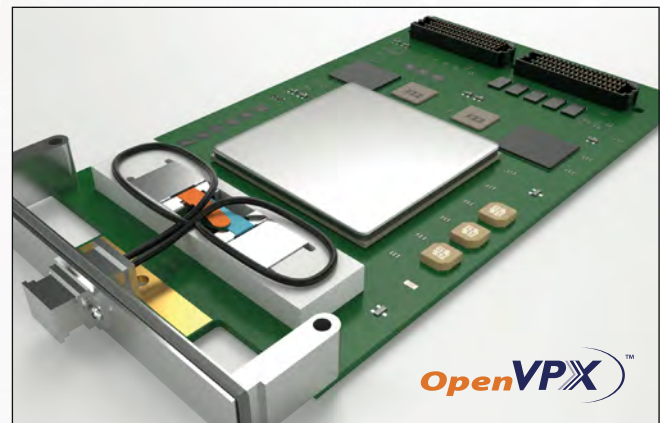
PAM4  
64  
Gbps

## HIGH-SPEED EDGE CARD CONNECTORS

- Rugged, high-speed Edge Rate<sup>®</sup> contacts on a 0.60, 0.80 or 1.00 mm pitch
- Single-Ended or Differential Pair; Vertical, right-angle, edge mount
- 0.60 mm pitch mating high-speed cable assembly (GC6)
- Optional board locks, cable latching and weld tabs for mechanical strength



Samtec offers a wide variety of industry standard solutions to help enable rapid, affordable, cross-platform connectivity for military/defense applications. Samtec's high-performance interconnects provide the flexibility, modularity and SWaP demands of current and future SOSA-based technologies.



## SOSA PLUG-IN CARDS USING VITA 90 VNX+

- Small form factor solutions for 12.5 mm & 19 mm cards
- Industry standard, ruggedized backplane supports blind mating, analog signals to 110 GHz (size 20 contacts, size 16 on roadmap), and digital signals to 56 Gbps PAM4
- SEARAY™ right-angle connectors with rugged, signal integrity-optimized Edge Rate® contact system, and open-pin-field design for maximum grounding and routing flexibility
- 200 LPC, 240, 320 and 400-pin HPC options
- Design supports internal rugged optics, ganged precision RF, or high-speed digital interconnects
- Visit [samtec.com/VITA](http://samtec.com/VITA) for additional information

## SOSA™ PLUG-IN CARDS USING OpenVPX™

- **VITA 42 XMC:** SamArray® high-density open-pin-field, solder ball-equipped arrays
- **VITA 57.1 FMC, 57.4 FMC+ and VITA 88 XMC+:** SEARAY™ high-speed, high-density open-pin-field arrays
- **VITA 42, VITA 57.1 and VITA 57.4:** Micro jack screw precision board stacking standoffs reduce risk of damage when unmating mezzanine cards
- **VITA 66:** SWaP-Optimized Optics Solutions
  - Extended Temp FireFly™ Micro Flyover System™ (p.16)
  - FireHawk™ Ruggedized Optical Transceivers for Mil/Aero and Space applications (p.17)
- Visit [samtec.com/VITA](http://samtec.com/VITA) for additional information



# SAMTEC INDUSTRY STANDARDS & SPACE HERITAGE

For 25+ years, Samtec has been engaged in developing products and supporting standards for systems that launch into space. The first stage of Samtec's space heritage began when one of Samtec's earliest products, the SamArray® High-Density Open-Pin-Field Array, was selected as part of the VITA 42 XMC standard in 2002.

Since then, Samtec engineers have continued to engage with numerous standards bodies to develop the standards and interconnects that make leading-edge space-qualified designs possible and continue to expand on Samtec's space heritage.



# PRODUCT TESTING



All Samtec series undergo typical industry standard **Design Qualification Testing (DQT)** procedures, which include:

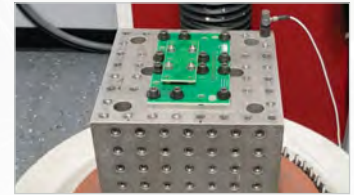
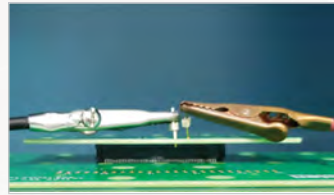
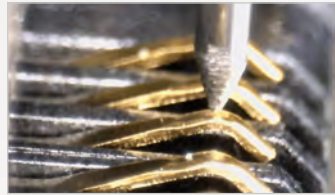
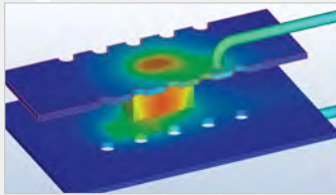
- Gas Tight
- Normal Force
- Thermal Aging
- Mating/ Unmating/ Durability
- IR/DWV
- Current Carrying Capacity (CCC)
- Mechanical Shock/Random Vibration/LLCR
- Mechanical Shock/Random Vibration/Event Detection



Samtec offers additional rigorous testing standards to evaluate contact resistance in simulated storage and field conditions. **Extended Life Product™ (E.L.P.™)** products are qualified to:

- 10 year Mixed Flowing Gas (MFG)
- High Mating Cycles (250 to 2,500)

Certain plating and/or contact options apply. For complete details, along with a list of qualifying products and test results, visit [samtec.com/ELP](http://samtec.com/ELP) or email the Customer Engineering Support Group: [asg@samtec.com](mailto:asg@samtec.com).



## SAMTEC PRODUCT TESTING REFERENCE CHART

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

\* Completed as part of initial Design Qualification Testing. E.L.P.™ & SET are performed in addition to DQT.

## CROSS REFERENCE OF EIA-364 PROCEDURES & MIL-STD-1344 METHODS

TEST	EIA-364 Procedure	MIL-STD-1344 Method
Mating / Unmating Forces	EIA-364-13	2013
Temperature Life with or without Electrical Load	EIA-364-17	1005
Withstanding Voltage	EIA-364-20	3001
Insulation Resistance	EIA-364-21	3003
Low Level Contact Resistance	EIA-364-23	3002
Salt Spray	EIA-364-26	1001
Mechanical Shock (Specified Pulse)	EIA-364-27	2004
Vibration	EIA-364-28	2005
Humidity	EIA-364-31	1002
Thermal Shock (Temperature Cycling)	EIA-364-32	1003
Contact Engagement / Separation Force	EIA-364-37	2014



# PERFORMANCE & RELIABILITY CONFIDENCE FOR EXTREME CONDITIONS



**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](http://samtec.com/SET) or contact [set@samtec.com](mailto:set@samtec.com) for additional information and current available test results.



## MEETS:

- VITA 47.1 Module Insertions
- VITA 47.3 Humidity
- VITA 47.1 Operating Shock Class OS2
- VITA 47.1 Vibration Class VS3
- VITA 47.1 Electrostatic Discharge Resistance

## EXCEEDS:

- VITA 47.1 Temperature Cycling Class C4
- VITA 47.1 Non-Operating Temperature Class C4
- VITA 47.1 Altitude for DWV

## 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™ 0.80 mm pitch Ultra-High Density Arrays

## LOT SCREEN TESTING

Lot screen sample-size testing to MIL-DTL-55302 is available to ensure product meets required specifications. Military/Aerospace Product (MAP) required; contact [mapsales@samtec.com](mailto:mapsales@samtec.com).

## NASA APPLICATIONS

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](http://outgassing.nasa.gov) for data.



# GLOBAL SUPPORT NETWORK



[www.samtec.com](http://www.samtec.com)

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