Embedded Computing

Board-Level Interconnects

Rugged High-Speed Solutions
That Save Weight and Space

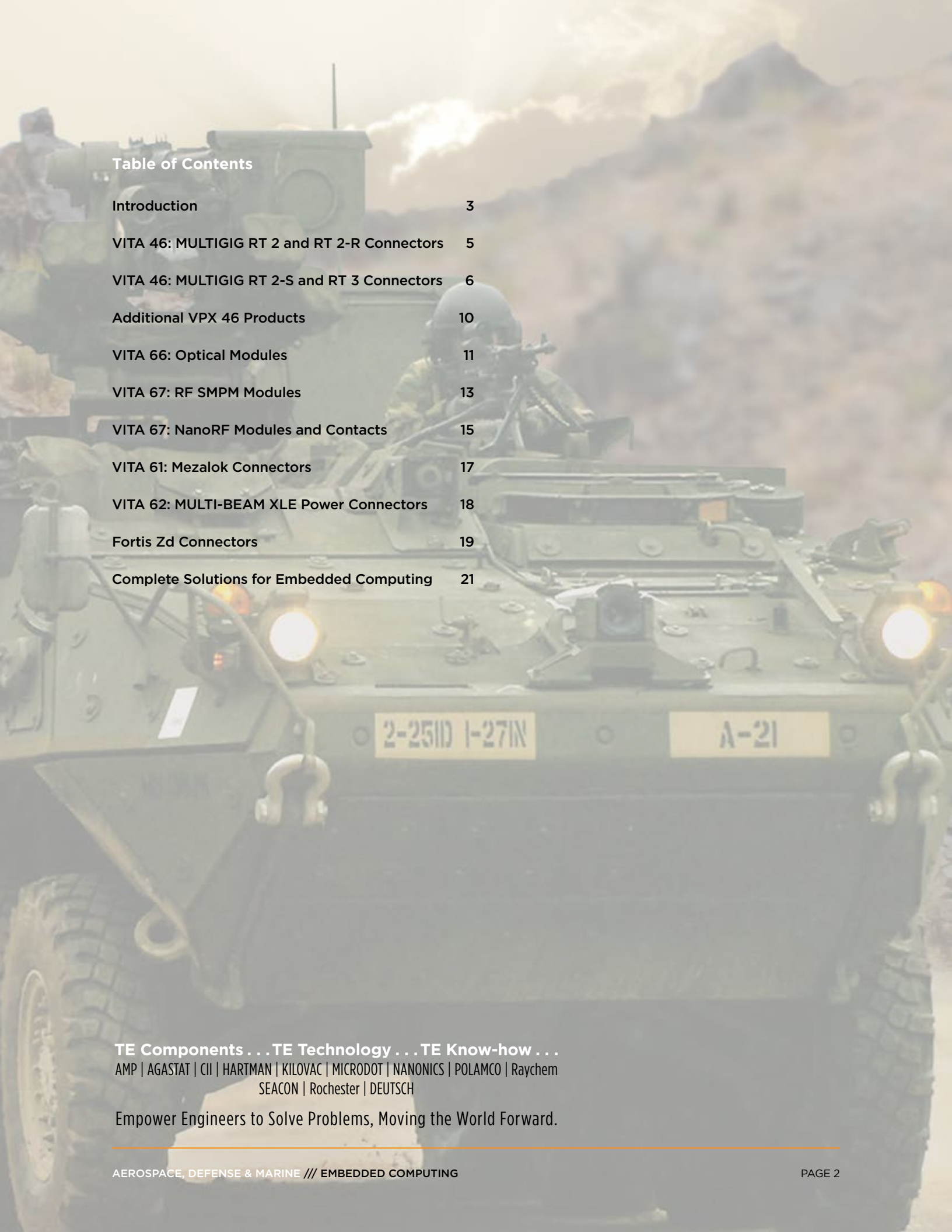


Table of Contents

TE Components . . . TE Technology . . . TE Know-how . . .

AMP | AGASTAT | CII | HARTMAN | KILOVAC | MICRODOT | NANONICS | POLAMCO | Raychem SEACON | Rochester | DEUTSCH

Empower Engineers to Solve Problems, Moving the World Forward.

Embedded Computing

Rugged, Weight- and Space-Saving High-Speed Solutions

SWaP: Reduce Size and Weight

Increase Power, Data and Bandwidth Speed Design with Open Architecture Solutions

Next-generation processors need next-generation connectivity to keep pace with the growing demand for bandwidth even as space, weight, and power savings become critical.

TE Connectivity (TE) has been pushing the bandwidth envelope by adapting high-speed commercial technology and combining it with our expertise in rugged packaging. The results are board-level interconnects that give you more performance in harsh military and aerospace applications.

Beyond Speed

TE is also reducing size through higher contact densities and supporting RF and optical interconnects at the board level allowing contact, high-speed box-to-box connectivity. TE has a full range of I/O connectors supporting rates up to 25+ Gb/s.

Meeting the Needs of Battlespaces

We are meeting the demanding needs of battlespaces with ruggedized copper and fiber interconnect and cable assemblies. And we are helping to protect systems with lightweight shielding and EMI-immune datapaths.

TE is focusing our technology to minimize size, weight and power consumption, to increase bandwidth, and to enable open architecture systems.

More Performance for Land, Sea, Air, and Space

- **Avionics and Vetronics**
- **Communications Hubs and Processing**
- **Electronic Warfare and Countermeasure Management**
- **Two-Level Maintenance and ESD Sensitive Applications**
- **Mobile and Fixed Satellite Terminals and Ground Base Stations**
- **Power Supply and Distribution**
- **Radar Interface and Processing – RF and Digital**
- **Sensor Array Hubs and Data Processing**
- **Vehicle Mission Computers and Navigation**
- **Weapons Control and Targeting**
- **Space**

VPX Compliant Solutions

As the latest standard architecture evolving from VMEbus, the VPX standard meets the needs for data-intensive processing in the aerospace and defense industries, where both ruggedness and high-speed performance are crucial. Supporting switched fabric architecture, VPX systems are designed for flexible application of demanding high-speed protocols, such as 10G and 100G Ethernet, PCIe Gen4, RapidIO, InfiniBand, and HyperTransport, in ground, aerospace, and marine applications.

Scalable

VPX systems are highly scalable and flexible, supporting both 3U and 6U formats to meet the widest range of needs. The VPX backplane interconnect uses the TE 7-row MULTIGIG RT 2 connector system to support both single-ended and differential signals.

Open Architecture

As a widely used standard, VPX promotes interoperability, a healthy choice of suppliers, and economies of scale that result from higher board volumes. TE Connectivity is an active participant and standards driver for organizations like VITA and SOSA and has a portfolio of products aligned to their standards.

Ruggedness

MULTIGIG RT connectors are built for extreme environments on and beyond the earth's atmosphere. TE knows that system critical connections in aerospace and defense systems can often mean life or death, for this reason TE has tested and proven the MULTIGIG RT connector system for shock, vibration, humidity, corrosion, durability, and all in extreme temperatures. This extreme ruggedness is designed into MULTIGIG RT to ensure successful missions and to extended life spans in critical environments where repair is impossible, or overly expensive.

Flexible

Not only does VPX accommodate new technologies, it has expanded beyond backplane/daughterboard signaling to embrace mezzanine application, power modules, and optical and RF connectivity—all with the goal of providing unmatched flexibility and capabilities for embedded computing.

VPX™

High Speeds, Multimedia, Maximum Flexibility

TE's portfolio of VPX systems gives you a complete array for high-speed data, optical, RF, power, and mezzanine connectivity. More choice means more flexibility in achieving specific system architectures with standards-based solutions. Get the high-speed signal integrity advanced applications require in rugged, reliable connectors.

MULTIGIG RT 2
RUGGED

- The standard for VITA 46 applications
- Modular connector system features a protected backplane connector

FAST

- Supports speeds up to 10+ Gb/s, providing a comfortable performance margin in VPX applications

FLEXIBLE

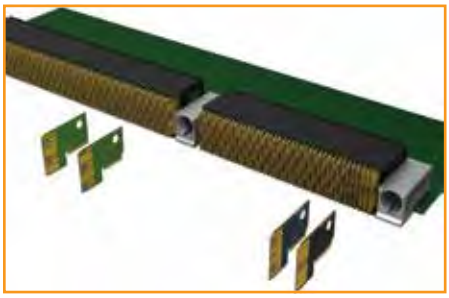
- Wafers are easily modified to support the need for propagation delay, characteristic impedance, and other electrical parameters
- Lightweight connector offers built-in ESD features enabling field serviceability

MULTIGIG RT 2-R
EXTREME RUGGEDNESS

- Passes extreme requirements of VITA 72 study group
- Features a quad-redundant contact system for greater reliability in a high vibration environment
- Specified for VITA 78 SpaceVPX applications

ULTRA FLEXIBLE

- Compatible with standard MULTIGIG RT-2 connectors for VITA 46
- Optimized footprints for signal integrity and ease of board design
- Low outgassing



MULTIGIG RT 2

VITA 46 MULTIGIG RT 2 and MULTIGIG RT 2-R Connectors

Modular MULTIGIG RT 2 Connector System with Data Rates to 10+ Gb/s

The MULTIGIG RT 2 connector, the standard for VITA 46, represents a huge step forward in the world of rugged computing and C4ISR enabling technology. The connectors support speeds to 10+ Gb/s, providing a comfortable performance margin in VPX applications.

This modular connector system features a protected pinless backplane connector and wafer-based design in place of pin contacts. Wafers, available for differential, single-ended, and power needs, can be easily modified to support specific customer needs for characteristic impedance, propagation delay, and other electrical parameters. This lightweight connector system also offers built in ESD features, enabling field serviceability, and is fully qualifies for VITA 47 environments.

Ultra-Rugged MULTIGIG RT 2-R Connectors

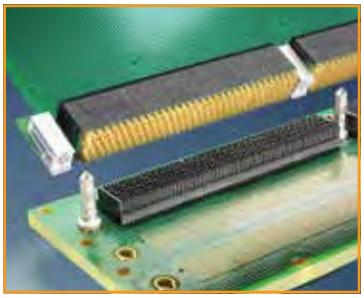
MULTIGIG RT 2-R connectors are an evolution of MULTIGIG RT 2 connectors, designed to offer even more ruggedness and reliability in demanding high-vibration environments. They go beyond VITA 47 environmental performance to meet the demanding requirements of VITA 72.

The connectors are specified for VITA 78 SpaceVPX fault-tolerant interoperable backplanes and modules. The lightweight connectors offer low outgassing and resist the growth of tin whiskers to high reliability in the challenging environment of space.

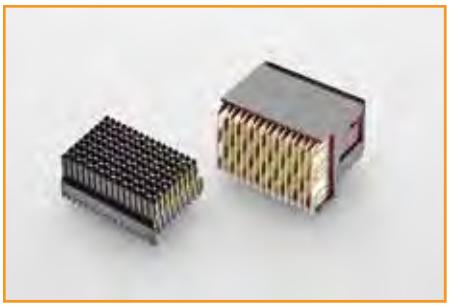
Backward compatible to all existing VITA 46 daughtercards, rugged MULTIGIG RT 2-R connectors have a pinless interface tested to 10,000 mating/unmating cycles. The connector has been torture tested by exposing a 6U VPX test unit to random vibration levels of 0.2 g^2/Hz for 12 hours.

STANDARDS AND SPECIFICATIONS

- **Application Specification:** 114-163004
- **Product Specification:**
  108-2072 (RT 2 and 2-R)
  108-2072-3 (RT 3)
- **Qualification Test Report:**
  501-544 (RT 2 and 2-R)
  501-134091 (RT 3)
- **Electrical Performance Report:**
  505-2 (RT 2 and 2-R)
  505-163005 (RT 3)
- **Backplane Connector Removal:**
  408-10127 (all series)
- **Daughtercard Connector Removal:**
  408-10454 (all series)
- **Standards and Test Reports:** #204690 (VITA 72 VPX Connector Report)



MULTIGIG RT 2-R



FAST

- Enhanced PCB wafer and contact design supports increased bandwidth up to 25+ Gb/s

FLEXIBLE

- Meets interface requirements for VITA 46 connectors allowing backward compatibility with legacy VPX products
- Customizable to meet unique application requirements

MODULAR

- Modular design enables numerous configurations by interchanging higher-speed MULTIGIG RT 3 connectors with the legacy MULTIGIG RT 2 and MULTIGIG RT 2-R connectors.

RUGGED

- Contact design utilizes quad redundant contacts for optimum performance in shock and vibration

VITA 46 MULTIGIG RT 2-S and RT 3 Connectors

TE Connectivity's (TE) MULTIGIG RT 2-S and MULTIGIG RT 3 next generation lightweight, rugged, high speed backplane connectors meet the interface dimensions for VITA 46 VPX connectors.

They are backward compatible with legacy MULTIGIG RT products and offer the same reliable interface.

The new contact and wafer designs optimize signal integrity, extending data rates to 16-25+ Gb/s.

STANDARDS AND SPECIFICATIONS

- **Application Specification:** 114-163004
- **Product Specification:**
  108-2072 (RT 2 and 2-R)
  108-2072-3 (RT 3)
- **Qualification Test Report:**
  501-544 (RT 2 and 2-R)
  501-134091 (RT 3)
- **Electrical Performance Report:**
  505-2 (RT 2 and 2-R)
  505-163005 (RT 3)
- **Backplane Connector Removal:** 408-10127 (all series)
- **Daughtercard Connector Removal:** 408-10454 (all series)
- **Standards and Test Reports:**
  #204690 (VITA 72 VPX Connector Report)

				
	MULTIGIG RT 2 Connector	**MULTIGIG RT 2-R Connector**	**MULTIGIG RT 2-S Connector**	**MULTIGIG RT 3 Connector**
SPEEDS	10+ Gb/s	10+ Gb/s	16+ Gb/s	25+ Gb/s
RUGGEDIZED	–	✓	✓	✓
MATING CYCLES	200	500	500	500
QUAD-REDUNDANT CONTACT SYSTEM	–	✓	✓	✓
FLEXIBILITY WITH WAFER CONFIGURATION	✓	✓	✓	✓
VITA 46 INTERMATEABLE	✓	✓	✓	✓
PCB HOLE DIMENSION BACKPLANE (in mm)	0.56 (ref)	0.56 (ref)	0.56 (ref)	0.37 (ref)
PCB HOLE DIMENSION DAUGHTERCARD (in mm)	0.46 (ref)	0.46 (ref)	0.46 (ref)	0.32 (ref)
RELEASE DATE	2003	2013	2019	2019
OPEN VPX STANDARD	VITA 46.0	VITA 46.0	VITA 46.0	VITA 46.30

VITA 46 VPX PART NUMBERS

Plug-In Module (Daughtercard)	RT 2 (10Gb/s)		RT 2-R (Rugged 10Gb/s)		RT 2-S (16+Gb/s)	RT 3 (25+Gb/s)	RT 3 Highspeed with Power
Position	**Differential**	**Single Ended**	**Differential**	**Single Ended**	**Differential**	**Differential**	**Differential**
P0	1410189-3		2102772-1		2102772-1 (RT 2-R)	2102772-1 (RT 2-R)	2332816-1
P1, 2, 3, 4, 5, 6	1410187-3	1410190-3	2102771-1	2102847-1	2302317-1	2302785-1	
Plug-In Guide Module	**1-1469492-X**		**2000713-X**		**2000713-X**	**2000713-X**	

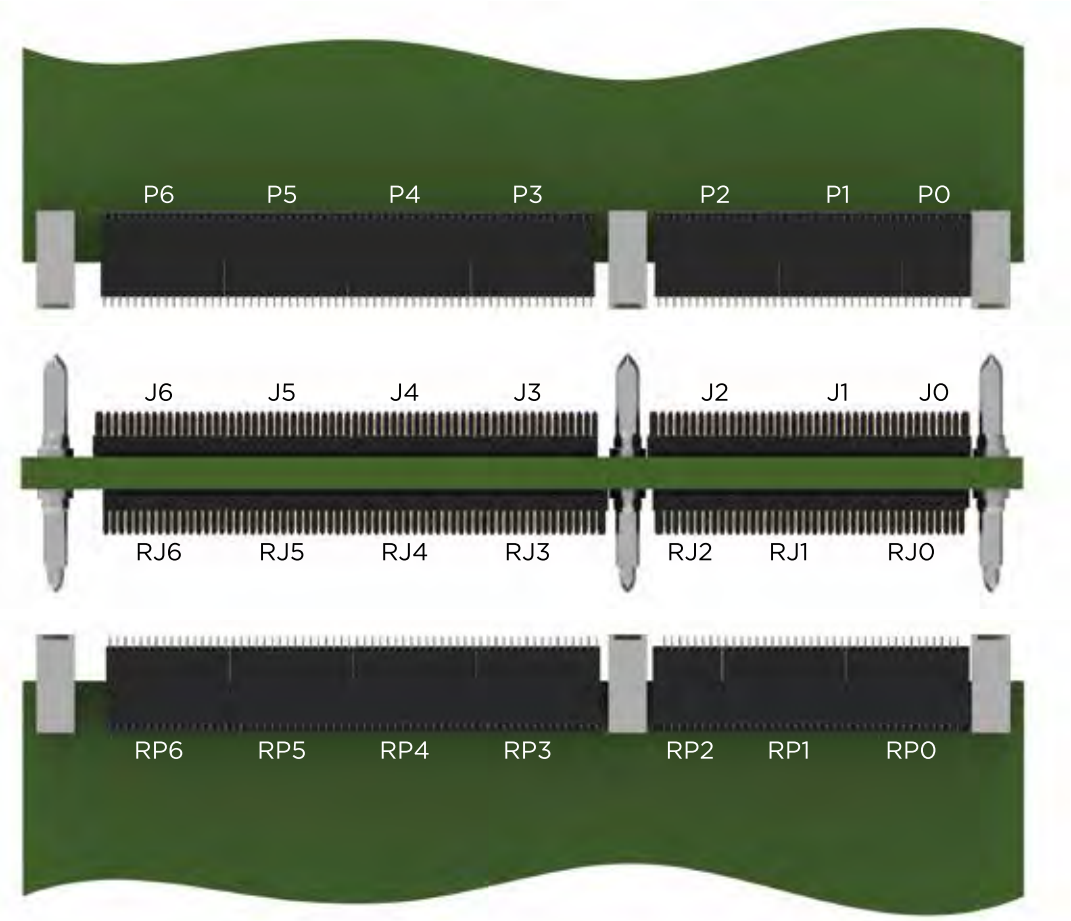
Backplane	RT 2 (10Gb/s)	RT 2-R (Rugged 10Gb/s)	RT 2-S (16+Gb/s)	RT 3 (25+Gb/s)	RT 3 Highspeed with Power
J0	1410186-1	2102735-1	2102735-1 (RT 2-R)	2102735-1 (RT 2-R)	2332817-1
J1, 3, 4, 5	1410140-1	2102736-1	2102736-1 (RT 2-R)	2302789-1	
J2, 6	1410142-1	2102737-1	2102737-1 (RT 2-R)	2302790-1	
Backplane Guide Pin	**1-1469491-X**	**2000676-X**	**2000676-X**	**2000676-X**	

VITA 46.10 REAR TRANSITION MODULE (RTM) PART NUMBERS

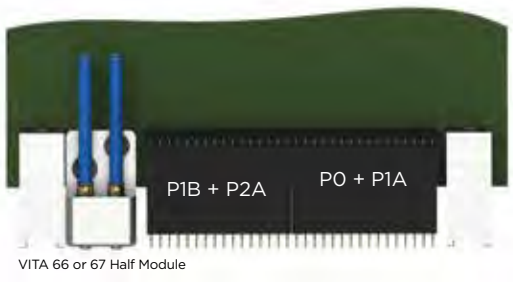
Plug-In Module (Daughtercard)	RT 2 (10Gb/s)		RT 2-R (Rugged 10Gb/s)		RT 2-S (16+Gb/s)		RT 3 (25+Gb/s)	
Position	**Differential**	**Single Ended**	**Differential**	**Single Ended**	**Differential**	**Single Ended**	**Differential**	**Single Ended**
RP0	1410968-3		2102773-1		2302319-1		2302794-1	
RP1, 3, 4, 5, 6	1410975-3	1410970-3	2102774-1	2102849-1	2302320-1	2102849-1	2302795-1	2102849-1
RP2	1410971-3	1410972-3	2102775-1	2102848-1	2302321-1	2102848-1	2302796-1	2102848-1
RTM Daughtercard	**1-1469492-X**		**2000713-X**		**2000713-X**		**2000713-X**	

Backplane	RT 2 (10Gb/s)		RT 2-R (Rugged 10Gb/s)		RT 2-S (16+Gb/s)		RT 3 (25+Gb/s)	
Position	**Full Load**	**Select Load**	**Full Load**	**Select Load**	**Full Load**	**Select Load**	**Full Load**	**Select Load**
RJ0	1410964-1	1410965-1	2102768-1	2102850-1	2102768-1 (RT 2-R)	2102850-1 (RT 2-R)	2302791-1	2302792-1
RJ1	1410140-1	1410966-1	2102736-1	2102851-1	2102736-1 (RT 2-R)	2102851-1 (RT 2-R)	2302789-1	2302793-1
RJ2	1410186-1		2102735-1		2102735-1 (RT 2-R)		2302788-1	
RJ3	1410142-1		2102737-1		2102737-1 (RT 2-R)		2302790-1	
RJ4, 5, 6	1410140-1		2102736-1		2102736-1 (RT 2-R)		2302789-1	
RTM Backplane Pin	**1410956-1**		**2226127-1**		**2226127-1**		**2226127-1**	

These connectors have smaller compliant pins in columns 7 and 8 and RT 2 compliant pins in columns 1-6 (mixed hole pattern)
***RT 3 P0 and J0 (2332816-1 and 2332817-1) have smaller compliant pins in col 7 and 8



MODULES FOR VITA 66 AND 67 HALF MODULE 3U APPLICATIONS



VITA 66 or 67 Half Module

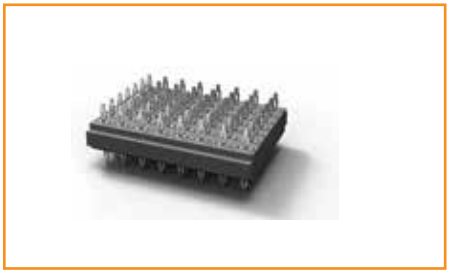
Position	RT 2 (10Gb/s)	RT 2-R (Rugged 10Gb/s)	RT 2-S (16+Gb/s)	RT 3 (25+Gb/s)
P0 + P1A	1410326-3	2286250-1	2345723-1	2313237-1
J0 + J1A	1410140-1	2102736-1	2102736-1 (RT 2-R)	2313238-1
P1B + P2A	1410187-3	2102771-1	2302317-1	2302785-1
J1B + J2A	1410142-1	2102737-1	2102737-1 (RT 2-R)	2302790-1

SPACE VPX VITA 78 AND 78.1

Position	VITA 78 SpaceUM 3U	VITA 78 SpaceUM 6U	VITA78.1 PowerSX	VITA 78.1 Power Supply
P0	2286123-3	2286123-3	2305983-3	2102772-3
P1	2286121-3	2286117-3	2305984-3	2305986-3
P2	2286118-3	2286118-3	2305985-3	2305986-3
P3		2286119-3		
P4		2286120-3		
P5		2286117-3		
P6		2286118-3		

* Space VPX PN's listed have 60/40 tin-lead plating. For 93/7 tin-lead use -1
** RT 2 or 2-R P0 connector can be used assuming wafers 7 and 8 (diff pairs) do not require higher data rates

Additional VPX-Compatible Products



Stacking Compliant Pin Connector

Permanent Stacking

- Compliant pin termination on both sides
- Well suited for rigid flex or board-to-board stacking where a separable interface is not required

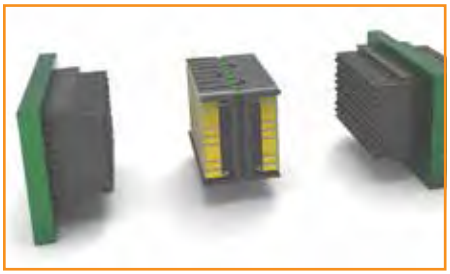
Convenient

- Simple press-fit application
- Connector footprint matches the MULTIGIG RT 2 and 2-R connector pattern for low noise and low loss
- Fits VITA 46 half module spaces, end-to-end stackable to build the pin count required with standard components

Low Profile

- 4 mm stack height

Fits VITA 46.0 Footprint	Position Size	Stack Height	Tin-lead Plated Tails	Tin Plated Tails (RoHS)
Plug-In Board	56 pos (8x7)	4.0 mm	2102785-1	2102785-2
Backplane	72 pos (8x9)	4.4 mm	2352497-1	2352497-2



VITA 46 Interposer

Part No. 2226027-1

Parallel Backplanes

- Stacking connector to enable parallel backplanes in a VPX chassis.
- Mates to backplane VITA 46 connectors, maintaining VITA 46 pinout
- 25 mm stack height

VPX Daughtercard (Plug-In Module) Covers

Part No. 2226808-1 6U
Part No. 2226808-2 3U

Rugged Protection

- Durable polycarbonate protective cover applied to a plug-in card
- Prevents connector damage in handling

EASY TO USE

- Common mounting interface requirements for the various fiber-optic interconnects within 3U and 6U VPX applications
- Quickly and confidently implement the best solution for specific applications

RUGGED

- The three module varieties are based upon proven optical termini for military and aerospace applications

VERSATILE

- Full-size VITA 66.1 or half-size VITA 66.4 and derivative connectors
- Plug (daughtercard) connector housing contains a slot feature to facilitate cleaning the MT interfaces
- Locating post features help ensure proper position on the backplane and daughtercard

HIGH PERFORMANCE

- Connectors designed to maximize optical performance, accommodating up to two MT ferrules
- Receptacle connector insert floats relative to the shell, providing ±0.25 mm planar floating alignment capability

APPLICATIONS

- Embedded Computing
- Avionics and Vetronics
- Secure Communications
- Processing
- Radar
- Imaging and Targeting

VITA 66 Optical Modules

TE Connectivity's (TE) Ruggedized Optical Backplane interconnect system provides a high-density, blind-mate optical interconnect in a backplane/daughtercard configuration. The fiber optic ribbon cable interconnect feeds through the backplane to removable system modules using MT ferrules.

The fiber optic connectors are available in two sizes:

- **Full-width: VITA 66.1 for two MT ferrules.**
- **Half-width: VITA 66.4 for a single MT ferrule.**
  Two modules can be fit into the same space as a VITA 66.1 modules.
- **VITA 66.4 High-Density Derivative: for two MT ferrules.**

Designed for rugged embedded computing applications, the fiber optic connectors are compatible with VPX and other high-performance standards.

MECHANICAL/ENVIRONMENTAL

- **Mating Force**

Per 12-fiber MT ferrule:	**Per 24-fiber MT ferrule:**
Min: 7.8 N (1.75 lb)	Min: 18.0 N (4.05 lb)
Max: 11.8 N (2.65 lb)	Max: 22.0 N (4.95 lb)

- **Durability:** 100 cycles, tested per EIA-455-21
- **Shock:** 50 g, sawtooth, 11 ms pulse duration, tested per TIA/EIA-455-14, condition E
- **Random Vibration:** 11.95 g_{rms}, 50 to 2000 Hz, 15 minutes per plane. Tested per TIA/EIA-455-11, test condition VI-D
- **Storage Temperature:** -55˚C to +85˚C
- **Operating Temperature:** -40˚C to +85˚C
- **Thermal Aging:** 168 hrs at +85˚C
- **Humidity, Steady-State:** 168 hours at 95% RH, 60˚C
- **Temperature Cycling:** 21 cycles between -40˚C to +85˚C

MATERIALS

- **Connector Shell and Housing:** Aluminum alloy 6061, clear-chromate conversion-coated (RoHS compliant)
- **Alignment Posts and Screws:** Stainless steel, 300 series, passivated (RoHS-compliant)

STANDARDS AND SPECIFICATIONS

- **Application Specification:** 114-32050 (VITA 66.1)
  114-32144 (VITA 66.4)
  114-163005 (HD VITA 66.4 Derivative)
- **Product Specification:** 108-2467 (VITA 66.1)
  108-2467-1 (VITA 66.4)
  108-163007 (HD VITA 66.4 Derivative)
- **Qualification Test Report:** 501-134012 (VITA 66.1)
  501-134012-1 (VITA 66.4)
  501-163003 (HD VITA 66.4 Derivative)

Interface	Part No.	
	Backplane	Daughtercard
High-Density, Half-Size, VITA 66.4 Derivative	2828383-1	2828384-1
VITA 66.1	2000973-1	2000974-1
VITA 66.4	2226880-1	2226881-1

Contact TE about availability and additional fiber assemblies.

MT Ferrule Kits

VITA 66.1 & VITA 66.4 Connectors	Backplane	Daughtercard
12 Fiber, multi-mode, standard-grade	2102866-1	2101866-2
12 Fiber, multi-mode, low-loss-grade	2313212-1	2313212-2
HD VITA 66.4 Derivative Connectors	**Backplane**	**Daughtercard**
12 Fiber, multi-mode, low-loss-grade	2828413-1	2828412-1
24 Fiber, multi-mode, low-loss-grade	2828413-2	2828412-2

OPERATING TEMPERATURE RANGE

- Standard-grade MT ferrule kits: -20°C to +85°C
- Low-loss-grade MT ferrule kits: -40°C to +85°C

VITA 67 RF SMPM Modules

VITA 67 RF modules from TE are modular systems designed specifically to allow backplane/daughtercard multi-contact mating within a robust platform to withstand the mechanical rigors of military and aerospace applications. They are also fully compatible with VPX packaging to make it easy and convenient to achieve RF connectivity within a well-established architecture.

The contacts tolerate generous misalignment to allow blind mating and be configured to eliminate the possibility of stubbing. The contacts are housed in robust stainless steel or aluminum modules that hold four or eight contacts. The modules are configured to provide RFI/EMI shielding between the RF contacts and provide a high level of adjacent channel isolation of at least 100 dBc up through 40 GHz.

MORE CHOICE

- Modular design for application-specific configuration
- Modules available in stainless steel and aluminum
- Float-mounted jack maintains positive RF connection

VERSATILE

- Will support 0.80” card pitch
- .240” center-to-center contact spacing
- RF contacts are available for a variety of cables

ROBUST

- SMPM-based contact performance to 40 GHz
- Excellent channel-to-channel isolation
- Higher packaging density saves space and weight

STANDARDS AND SPECIFICATIONS

- **Application Specification:** 114-32004
- **Instruction Sheet:** 408-10373 (float mt jack contacts)
- **Instruction Sheet:** 408-10364 (direct attach plug contacts)
- **Product Specification:** 108-2443
- **Qualification Test Report:** 501-748

VITA 67.1 AND 67.2 MODULES

Interface Side	Part No.			
	4-position (67.1)	8-position (67.2)	Mounting flange	Module material
Plug-In Module	1996883-4	1996705-4	c'sink thru-holes to accept 2-56 UNC	stainless steel
	2157338-4	2157350-4	c'sink thru-holes to accept 2-56 UNC	aluminum
	2101925-3	2101924-3	2-56 UNC Mtg holes	stainless steel
	2157339-4	2157340-4	2-56 UNC Mtg holes	aluminum

Interface Side	Part No.			
	4-position (67.1)	8-position (67.2)	Contact interface to rear of backplane	Module material
Backplane	1996884-1	1996706-1	SMPM plug	stainless steel
	2101510-2	1996777-2	OSMM jack	stainless steel
		2157553-1	Direct attach cable	aluminum

VITA 67.3 MODULES

Interface Side	Part No.				
	9-position	10-position	14-position	Module material	Notes
Plug-In Module	2332834-1	2323863-1	2332829-1	Stainless steel	
	2332834-2	2323863-2	2332829-2	Stainless steel	alignment pin seated by customer
	2332834-3	2323863-3	2332829-3	Aluminum	
	2332834-4	2323863-4	2332829-4	Aluminum	alignment pin seated by customer
Backplane	2332832-1	2323763-1	2332827-1	Stainless steel	
	2332832-2	2323763-2	2332827-2	Aluminum	

RF CONTACTS

	Cable type*	Part No.	Module side for 67.1, 67.2	Module side for 67.3
Jack Contacts	.047" dia	1996771-1	Plug-in Module	Backplane
	.086" dia	1996390-1	Plug-in Module	Backplane
	.086" low loss cable	2101814-1	Plug-in Module	Backplane
Plug Contacts	.047" dia (for direct attach cable)	2157248-1	Backplane	Plug-in Module
	.086" dia (for direct attach cable)	2101012-1	Backplane	Plug-in Module
	.086" low loss cable (for direct attach cable)	2157022-1	Backplane	Plug-in Module
	NA – pressfit directly into backplane	1996318-1	Backplane	N/A

*Semirigid cable or flex equivalent.

TOOLING

Part No.	Use
2119704-1	OSMM low profile wrench (use for OSMM connectors mating to backplane modules)
2101595-1	SMPM jack insertion/extraction tool (use on 1996390-1, 1996771-1)
2161640-1	SMPM plug extraction tool (use on 2101012-1, 2157248-1)

LIGHTER WEIGHT

- Small contact size with higher RF contact density enables smaller packaging
- Aluminum modules available for weight reduction

MODULAR

- Blind-mateable float-mounted backplane contacts for module-to-module or box-to-box architecture
- Multiple cable types to fit application requirements – .047" coaxial cable and .086" option for backplane cabling

RELIABLE

- Low loss and excellent isolation – optimized design for signal integrity
- TE tested to vibration requirements per VITA 72

INDUSTRIES

- Military Electronics
- C4ISR
- Electronic Warfare (EW)

APPLICATIONS

- Embedded Computing – VPX modules and Radar processing

VITA 67.3 NanoRF Modules and Contacts

A higher density RF coax module, twice the density of VITA 67 SMPM RF modules used in VPX embedded computing applications. Half and full size module sizes can retain up to 12 or 18+ RF contacts, with options for customizing contact count and position. The daughtercard modules are mounted to the card in the VPX Plug-In module, and the backplane module into the chassis backplane.

The interface features a floating insert to pre-align RF contacts before engagement. Radial and axial contact float assures final alignment of the contacts and keeps the contacts fully engaged for excellent RF performance under harsh environments.

The contact design supports frequencies up to 70 GHz, and is designed to terminate to standard .047" and .086" semi-rigid and flexible cables.

STANDARDS AND SPECIFICATIONS

- **Instruction Sheet:** 408-163016
- **Product Specification:** 108-163016
- **Qualification Test Report:** 501-134076

MATERIALS

- Aluminum and stainless steel options for modules
- Copper alloy, 50 µin gold plating, PTFE dielectrics

ELECTRICAL

- Excellent RF performance through 60 GHz
- Isolation minimum 100 dB up through 27 GHz

MECHANICAL

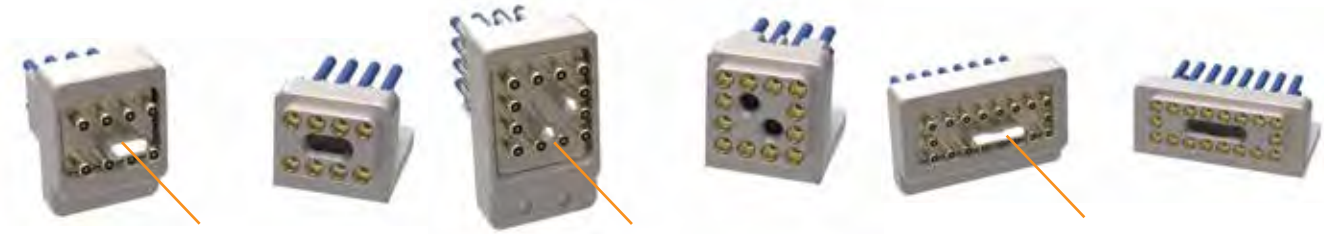
- Supports as low as 0.110 inch contact pitch
- Fits in VPX systems packaging requirements
- 500 mating cycles durability
- Meets high vibration requirements of VITA 72

APPLICATION TOOLING

- No special tooling required

PRODUCT INFORMATION

Module Size	# Positions (Total)	# Positions Supporting .047" Cable (Backplane Side)	# Positions Supporting .086" Cable (Backplane Side)	Plug-in Card Module PN (St Steel)	Plug-in Card Module PN (Aluminum)	Backplane Module PN (St Steel)	Backplane Module PN (Aluminum)	Backplane Cutout
Half Module	8	8	—	2828431-1	2828431-2	2828434-1	2828434-2	Non-Standard 0.8" Slot Pitch
						2332627-1	2332627-2	VITA 67.3D
	9	1	8		2357976-1		2357971-1	VITA 67.3D
	10	6	4		2332769-1		2332764-1	Non-Standard 0.8" Slot Pitch
	12	12	—	2313225-1	2313225-2	2313228-1	2313228-2	Non-Standard 0.8" Slot Pitch
						2313376-1	2313376-2	VITA 67.3D
Full Module	16	16	—	2828392-1	2828392-2	2828395-1	2828395-2	Non-Standard 0.8" Slot Pitch
						2341106-1	2341106-2	VITA 67.3C
	18	18	—	2322335-1	2322335-2	2322337-1	2322337-2	Non-Standard 0.8" Slot Pitch
						2343040-1	2343040-2	VITA 67.3C
	19	—	19		2357159-1		2357154-1	VITA 67.3C
	21	6	15		2355542-1		2355536-1	VITA 67.3C
	26	26	—		2313381-1		2313373-1	VITA 67.3C



Guide Blade Guide Pins Guide Blade

VERSATILE

- 114-position module is VITA 61 compliant
- 60, 114, and 320 positions
- 10, 12, 15, 17 and 18 mm stack heights

ROBUST

- Rugged surface-mount mezzanine connector with 500 mating cycle durability
- Improved thermal cycling stability compared to VITA 42 connectors—2000 thermal shock cycles -55°C to +125°C
- Supports data rates up to 16+ Gb/s
- Anti-stubbing design during mating

HIGH PERFORMANCE

- Mini-Box contact system provides four points of contact for ultra-reliability
- LCP plastic housings offer superior thermal stability and low outgassing
- Compliant BGA board-attach supports standard surface mount processing and excellent thermal stability

VITA 61 Mezalok (XMC 2.0) Connectors

TE's Mezalok mezzanine connectors are designed for stacking or mezzanine applications for rugged embedded computing. The connectors incorporate a quad-redundant Mini-Box contact system for a separable interface, and are available in 60, 114, and 320 positions with stack height options of 10, 12, 15, 17 and 18 mm.

Mezalok connectors are shock and vibration resistant per VITA 47 and 72 HALT test requirements. The 114-position connector is compliant to VITA 61. Featuring a wide operating temperature range, excellent thermal stability, and data rates to 16+ Gb/s, these rugged and highly versatile connectors are ideal for high-speed embedded computing applications. Installation of Mezalok connectors is easily accomplished using standard BGA surface mount processes.

STANDARDS AND SPECIFICATIONS

- **Application Specification:** 114-13279
- **Product Specification:** 108-2411
- **Qualification Test Report:** 501-736
- **Electrical Performance Report:** 505-4

Position Size	Connector and Stack Height (mm)		50 Microinch Gold Mating		30 Microinch Gold Mating	
			Tin-Lead BGA	Lead Free BGA	Tin-Lead BGA	Lead Free BGA
114 (XMC 2.0 per VITA 61)	Pin Connector		2102060-1	2102060-2	2102060-3	2102060-4
	Socket Connector	10	2102061-1	2102061-2	2102061-5	2102061-6
		12	2102061-3	2102061-4	2102061-7	2102061-8
		15	1-2102061-3	1-2102061-4	1-2102061-5	1-2102061-6
		17	1-2102061-7	1-2102061-8		
		18	2102061-9	1-2102061-0	1-2102061-1	1-2102061-2
320	Pin Connector		2102429-1			2102429-4
	Socket Connector	10	2102430-1			2102430-6
		18	2102430-9			1-2102430-2
60	Pin Connector		2102079-1	2102079-2		
	Socket Connector	10	2102080-1	2102080-2		
		12	2102080-3	2102080-4		

HIGH PERFORMANCE

- 20 A and 50 A power contacts, plus signal contacts
- 3-beam high-conductivity-copper contact design allows for a greater angular misalignment between mating connectors and offers a lower mating force
- Hot-plug capable

VITA 62 MULTI-BEAM XLE Power Connectors

The MULTI-BEAM XLE power connector, specified for the VPX VITA 62 power supply standard, offers 50 A and 20 A contacts.

The design is hot pluggable, tolerates mating misalignment, and supports VPX architecture.

Higher input voltage of 270V DC is required for select applications, including altitudes of 60-70k ft for military avionics. New VITA 62.1 and 62.2 variations meet creep/clearance distance requirements, slots are required in the boards between contacts. “Fins” are inserted between power contacts and penetrate through the board slots to increase breakdown voltage.

STANDARDS AND SPECIFICATIONS

- **Application Specification:** 114-13251
- **Instruction Sheet:** 408-163017 (270V connectors)
- **Product Specification:** 108-2292
- **Qualification Test Report:** 501-115016

	Slot Size	Position	Part Type	PCB Termination	Part No (50 Au Interface, Au Flash Tails)	Part No (30 Au Interface, Tin Pl Tails)	Notes
VITA 62.0	3U	P0	RA Header	solder tail	2317477-1	6450839-7	
	3U	P0	RA Header	compliant pin	2314578-2	6450849-7	
	3U	J0	Vert Recpt	compliant pin	2309390-1	1-6450869-4	
	6U	P0	RA Header	solder tail	2314579-1	6450833-7	
	6U	P1	RA Header	solder tail	2314580-1	6450839-6	
	6U	P0	RA Header	compliant pin	2314577-1	6450843-6	
	6U	P1	RA Header	compliant pin	2314578-1	6450849-6	
	6U	J0	Vert Recpt	compliant pin	2314581-1	6450863-5	
	6U	J1	Vert Recpt	compliant pin	2309390-2	1-6450869-0	
VITA 62.2 270VDC	3U	P0	RA Header	solder tail	2313443-1		use fins 2313445-1 (2 per)
	3U	P0	RA Header	compliant pin	2313442-1		use fins 2313445-1 (2 per)
	3U	J0	Vert Recpt	compliant pin	2313441-1		use fins 2313444-1 (2 per)
VITA 62.1 3-Phase	3U	P0	RA Header	solder tail	2332791-1		use fins 2313445-1 (6 per)
	3U	P0	RA Header	compliant pin	2332793-1		use fins 2313445-1 (6 per)
	3U	J0	Vert Recpt	compliant pin	2332795-1		use fins 2313444-1 (6 per)

FAST

- Allows 12+ Gb/s data rates in a design that saves weight and space

RUGGED

- Extreme mechanical and electrical performance for the most demanding applications
- Space-compatible materials
- Proven compliant pin board attach facilitates manufacturing efficiency, repairability, and superior electrical performance
- Protected pin field on backplane for reliability and durability

FLEXIBLE

- Modular design allows for user configurability and modular evolution
- M55302-heritage Mini-Box separable interface provides four points of contact on all sides of the pin
- Staggered daughtercard pin field supports two-level maintenance

HIGH PERFORMANCE

- 3-pair (9-row) and 2-pair (6-row) versions available to accommodate multiple slot pitches
- Shielded versions for EMI protection

Fortis Zd Connectors

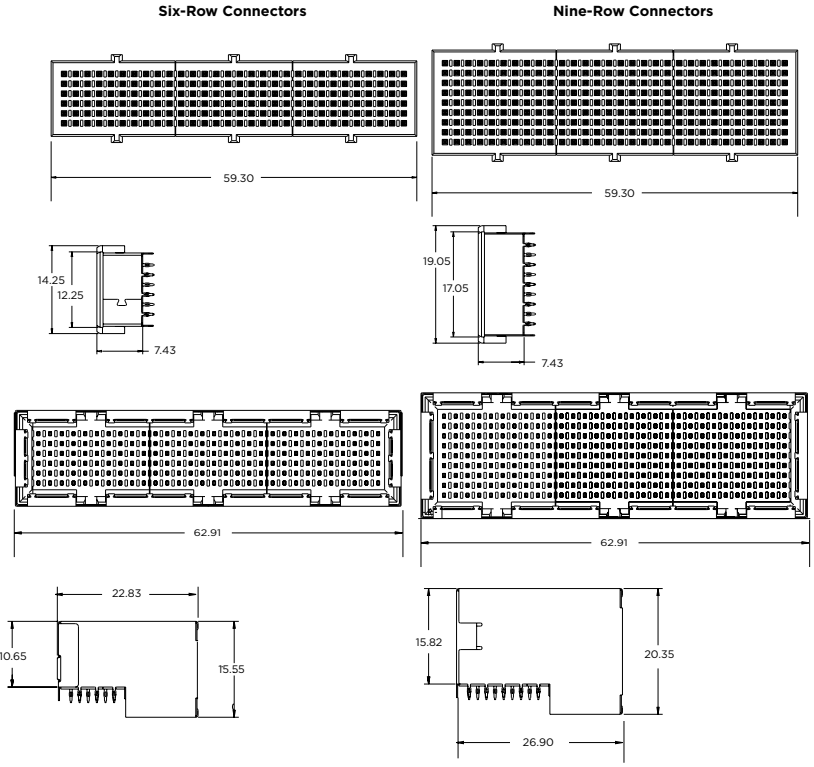
Extreme Mechanical and Electrical Performance for the Most Demanding Bandwidth Applications

With high speeds and high reliability in demanding applications, the Fortis Zd connector family is designed to meet processing-intensive applications. The connectors support speeds of 12+ Gb/s in a design that saves weight and space.

STANDARDS AND SPECIFICATIONS

- **Application Specification:** 114-13267
- **Product Specification:** 108-2409
- **Qualification Test Report:** 501-752
- **Electrical Performance Report:** 505-1

The Mini-Box contact, with spring contact on all four of the mating posts, has years of proven reliability in rugged applications.



STANDARD FORTIS Zd MODULES

		Part No.					
		Left	Center		Right	Full Shroud	
		10 Col.	10 Col.	20 Col.	10 Col.	10 Col.	20 Col.
6-Row (2-Pair) Connector Modules							
Right-Angle	Differential	2102086-1	2102087-1	2102096-1	2102088-1	2102081-1	2102232-1
Vertical	—	2102092-1	2102093-1	2102098-1	2102092-1	2102094-1	2102234-1
9-Row (3-Pair) Connector Modules							
Right-Angle	Differential	2000890-1	2000891-1	2000903-1	2000892-1	2102155-1	2102159-1
	Single Ended	2102314-1	2102315-1	2102316-1	2102317-1	2102318-1	2102319-1
Vertical	—	2000895-1	2000896-1	2000905-1	2000895-1	2102157-1	2102161-1

-1 parts have tin-lead plated contact tails; for lead-free tin order -2.

SHIELDED FORTIS Zd MODULES

		Part No.					
		10 Col.	20 Col.	30 Col.	40 Col.	50 Col.	60 Col.
6-Row (2-Pair) Connector Modules							
Right-Angle	Differential	2102515-1	2102515-2	—	—	—	—
Vertical	—	2102516-1	2102516-2	—	—	—	—
9-Row (3-Pair) Connector Modules							
Right-Angle	Differential	2102247-1	2102247-2	2102247-3	2102247-4	2102247-5	2102247-6
	Single Ended	2102320-1	2102320-2	2102320-3	2102320-4	2102320-5	2102320-6
Vertical	—	2102248-1	2102248-2	2102248-3	2102248-4	2102248-5	2102248-6

GUIDE HARDWARE

	Part No.		
	Universal Guide Hardware	VITA 46	Rugged VITA 46 Machined
Guide Pin	223969-X	1-1469491-X	2000676-X
Guide Module	223979-X	1-1469492-X	2000713-X (with ESD contact)

See TE drawings for guide module and pin options.

Complete Solutions for Embedded Computing

Count on TE for complete end-to-end solutions to enable high-performance computing. Our I/O solutions give you one of the widest ranges of choices for helping to increase speeds speeds, going longer distances, and eliminating bandwidth bottlenecks.

CeeLok FAS-T Connectors

- Small, field terminable, 10 Gigabit Ethernet, rugged I/O connector
- Compact size 8 shell saves weight and space
- Ruggedized for excellent shock, vibration, temperature, and sealing performance, with integral backshell that provides low cost, low-weight strain relief, and EMI protection

CeeLok FAS-X Connectors

- One of the highest speed I/O connectors available
- Single-channel size 11 or four-channel size 25 38999 shells or ARINC 809
- Fast, easy assembly
- Composite or metal shell
- Lanyard-release option

DEUTSCH Wildcat Connectors

- Full range of sizes and configurations, with wide choice of materials and finishes
- 38999 and micro sizes
- Close to double density compared to standard 38999

Unmanned Power Connectors

- 8 AWG to 14 AWG Power / 22 AWG to 24 AWG Signal
- 2 and 3 position wire-to-wire and wire-to-board configurations in power only
- Mixed signal and power available in 3 positions (2 power, 1 bank of 8 signal contacts)
- Pigtails available in 1 foot lengths use high grade flexible silicone wire rated at 200˚C and 600 V (other wire options available)

RF Connectors

- I/O for LRUs and LRMs
- Blindmate, rugged, high pin count
- Signal, Quadrax, RF, power, and optical (ARINC 801 and mini expanded beam)

High-Speed Cable

- Gigabit/10G Ethernet
- Fibre Channel
- DVI/HDMI
- IEEE 1394
- USB 3.0
- CANbus

Optical Connectors

- Expanded beam, ceramic ferrule, and MT termini
- Single mode and multimode for any reach
- Compatibility with an extensive line of standard and optics-only connectors

Harnessing Components

- Families matched to application extremes
- Heat-shrink tubing
- Molded parts
- Adhesives
- Backshells
- Identification
- Solder sleeves and termination devices

Notes

Notes

LET'S CONNECT

We make it easy to connect with our experts and are ready to provide all the support you need. Just call your local support number or visit www.te.com/industrial to chat with a Product Information Specialist.

Technical Support

te.com/support-center

North America	+1 800 522 6752	Asia Pacific	+86 400 820 6015
North America (Toll)	+1 717 986 7777	Japan	+81 044 844 8180
EMEA/South Africa	+800 0440 5100	Australia	+61 2 9554 2695
EMEA (Toll)	+31 73 624 6999	New Zealand	+64 (0) 9 634 4580
India (Toll-Free)	+800 440 5100		

Rugged High-Speed Solutions That Save Weight and Space

te.com/embeddedcomputing

4-1773700-7 09/19