

# **Positronic**<sup>®</sup> - The Leader in Power Connector Solutions for PICMG Applications

For nearly two decades, Positronic has been a leading edge power connector manufacturer for PICMG technology-based applications such as AdvancedTCA<sup>®</sup>, CompactPCI<sup>®</sup>, MicroTCA<sup>®</sup>, and PICMG 3.8. Despite copy cat products, Positronic continues to offer the broadest selection of power connectors for these applications. Visit <u>www.connectpositronic.com</u> for more details.



## AdvancedTCA<sup>®</sup>

- Dedicated Zone 1 power interface for plug-in cards
- Closed entry female contacts for ruggedized applications
- Heavy gold contact options
- Available from stock at <u>www.posishop.com</u>

## Compact PCI<sup>®</sup>

- P47 version for CompactPCI applications •
- Features include AC/DC power input, power output at various voltages and signal controls
  - Five package sizes available •
  - Closed entry female contacts for ruggged applications
    - Heavy gold plated contact options •
  - Widest variety of gender / termination combinations in the marketplace •



## MicroTCA (µTCA)<sup>®</sup>

- Compliant to MTCA.0, MTCA.1 & MTCA.3 specifications
- High reliability, precision machined contacts
- Low contact resistance
- Minimized height above printed circuit board
- Single and dual port configurations
- Power contacts carry 50 amps minimum at a 30°C temperature rise (prior to derating)

## PICMG 3.8

- Compliant to PICMG 3.8 requirements •
- Intended for power and system management use  ${\scriptstyle \bullet}$ 
  - Blind mating capability
    - 19.8 mm wide •





Plug-in boards used in today's computing platforms must provide higher reliability, greater functionality and require more power than ever before. Many next generation platforms deliver bulk voltage to boards. DC to DC converters are used to supply the various voltage requirements on the board. This allows systems to adapt as semiconductor voltages change.

The **VPB Series** was developed as a **dedicated interface** between backplanes and boards. The connector is capable of providing dual redundant power, system management and high voltage auxiliary circuits to each slot within the platform. The connector's outstanding blind mating capability can be used to align the board during insertion. The **VPB Series** is **compliant to PICMG 3.0, AdvancedTCA®, Zone 1 connector requirements**.



Advanced TCA®

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Visit our web site for the latest catalog updates and supplements at http://www.connectpositronic.com/design-tools/catalogs/

Positronic Industries' **FEDERAL SUPPLY CODE** (Cage Code) FOR MANUFACTURERS is **28198** 

#### POSITRONIC<sup>®</sup> IS AN ITAR REGISTERED COMPANY

Products described within this catalog may be

protected by one or more of the following US patents:

#4,900,261<sup>†</sup> #5,255,580 #5,329,697

#6.260.268 #6.835.079 #7.115.002

<sup>†</sup>Patented in Canada, 1992 Other Patents Pending



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#### About the cover:

For more information about the products shown on the front cover, visit the following web sites:

- Rittal backplane (top left) http://www.rittal-corp.com
- Diversified Technology, Inc ATS1160 (middle left) http://www.dtims.com
- F9 Systems, Inc. AdvancedTCA Thermal Blade™ (bottom left) http://www.f9-systems.com
- GE Fanuc Embedded Systems AT4-AMC-1 carrier blade (bottom left) http://www.gefanucembedded.com

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# "SIZZLE FAULT"

A high resistance short between a front board's overcurrent protection and the backplane's overcurrent protection could allow high currents to be drawn through the Zone 1 Power Connector indefinitely. These currents could reach a value that is slightly less than the overcurrent protection for the entire backplane.



# Zone 1 backplane connectors must survive sizzle fault conditions when tested per PICMG 3.0, R3.0, Section B.4.2.4.

- Conditions: IEC 60512-3, Test 10d
- The mated set of connectors (specimens) shall be comprised of a Front Board connector with right angle (90°) press-in terminations and a backplane connector having press-in terminations
- Standard atmospheric conditions
- Ambient temperature shall be 55 degrees C
- Contact positions 28 and 33 shall be energized at 10 amperes through a circuit path sized to simulate a standard PICMG 3.0 frontboard/backplane
- Contact positions 29 and 34 shall be energized at 50 amperes through a circuit path sized to simulate a standard PICMG 3.0 frontboard/backplane
- There shall be a one hour stabilization time after test set up
- · Test time shall be four hours after one hour stabilization period
- After completion of test, connectors shall be immediately uncoupled
- Requirements after test conditioning:
- Visual inspection of backplane connector shall show no defect that would impair normal operation
- After backplane connectors are allowed to cool to room ambient temperature the connectors shall be mated to fresh Front Board connectors that have right angle (90°) press-in terminations. The mated connector sets shall pass the test requirements of B.4.2.2; B.4.2.3; B.4.2.4; B.4.2.5; and B.4.3.2.

## Positronic's VPB series meets the requirements of this test!

# Positronic's Blue Connectors are Green

Energy is essential to everyone. Often we do not give thought to where energy comes from or how much we consume until energy is not readily available.

Energy has become an area of focus for governments, private industry, and citizens. Enhanced methods of producing energy from traditional sources, development

of new energy sources and conservation of energy from all sources have become more crucial than ever before.

Across the world, the electronic equipment that we all rely upon in our daily lives consumes a vast amount of energy. An unavoidable waste of energy occurs when power is distributed throughout electronic equipment. As electrical current flows through conductors and connectors, unwanted heat is generated in proportion to the amount of electrical resistance encountered.

Lowering resistance in connector contacts and conductors will reduce the amount of heat generated, and result in less wasted energy. Additional energy will be saved, as cooling systems will have less heat to draw out of the equipment.

In the past, the primary metric for power connectors has been contact current ratings. In the future, contact resistance may become equally important. While it is true that contact resistance and contact current ratings are closely associated, contact current ratings cannot be used to quantify the energy consumed by contacts.

Current ratings are based on the temperature rise of a connector or contact at a specific current level. A connector design or test method allowing relatively rapid heat dissipation may yield a reasonable temperature rise, while a relatively high amount of energy is still being wasted.

Within the connector industry, there are a variety of test methods used to quantify a particular performance metric. Different test methods can yield different values for the same metric. This lack of uniformity can be confusing to connector users who are trying to compare connectors offered by various manufacturers. Third party assessment can give connector users a common point of reference when making connector choices.

Assessors use contact resistance as the metric to determine the relative efficiency of connector contacts. These assessments verify the claims made by manufacturers.

Once the assessment is made, the assessor issues a statement that will aid power connector users in evaluating contact efficiency as it relates to energy consumption. As an example, the Positronic VPB series size 16-power contacts recently underwent evaluation. The contact resistance was found to be less than one milliohm each. This low contact resistance is achieved by use

connectors.

of high conductivity contact materials.

In addition, Positronic's Large Surface

Area (LSA) contact system is utilized

as the interface between male and

female power contacts in VPB series

The VPB series was designed

for use as the Zone 1 power

connector in AdvancedTCA (ATCA)

telecommunication computing systems.

Zone 1 connectors provide power from

backplanes to front boards in ATCA

chassis. The low contact resistance



- ✓ Average power contact resistance is less than 0.001 ohms
- ✓ Average signal contact resistance is less than 0.005 ohms
- ✓ RoHS compliant

of Positronic's VPB series provides energy savings opportunities in any application using this connector.

The following formula verifies the energy savings of a lower resistance contact at a given current: *Power Consumption (Watts) = Current Flow<sup>2</sup> (Amperes<sup>2</sup>) X Contact Resistance (Ohms).* Contact resistance has a one-to-one effect on power consumption. If, the contact resistance is reduced by half, the power consumption is reduced by half.

Low resistance power contacts also provide benefits in systems sensitive to voltage drop. This is demonstrated in the following formula: *Voltage drop across contact pairs = Current Flow (Amperes) X Contact Resistance (Ohms).* Once again, contact resistance has a one-to-one effect. Reducing the contact resistance by half reduces voltage drop by half.

Higher energy costs and government legislation will cause energy conservation efforts to continue to intensify. If we consider the vast numbers of power contacts in electronic equipment around the world, it is clear how lower contact resistance can play a role in meeting energy conservation goals. Positronic utilizes high conductivity contact materials and unique contact interfaces to provide low contact resistance in our power connector products. To learn more about these products, visit connectpositronic.com.

## **VPB SERIES TECHNICAL CHARACTERISTICS**

#### **MATERIALS AND FINISHES:**

Connector Insert:	Glass-filled polyester, UL 94V-0, blue color.
Contacts:	Precision-machined copper alloy with gold flash over nickel plate. Other finishes available upon request.
	Size 22 female precision-stamped and formed press-fit contacts are available, contact Technical Sales.

#### **MECHANICAL CHARACTERISTICS:**

Blind Mating System:	Male and female connector bodies provide "lead-in" for 2.0 mm [0.078 inch] diametral misalignment.
Polarization:	Provided by connector body design.
Fixed Contacts:	Printed board mount terminations, both straight and right angle (90°). Size 16 female contacts feature "Closed Entry" design. Size 22 female contacts feature rugged open entry design. "PosiBand" closed entry contacts are optional.
Fixed Contact Retention in Connector Body: Size 16 Contacts: Size 22 Contacts:	31 N [7 lbs.] 25 N [5 lbs.]
Sequential Contact Mating System:	First mate contacts 25, 26, 28 29, 30 and 31. Second mate contact 33. Third mate contact 34. Contacts 1-24 mate before 27 and 32. Last mate contacts 27 and 32.

Power to be enabled through a last mate contact within VPB Series or another connector.

Consult Technical Sales for customer specified sequential mating.

Printed Board Mounting:	Mounting holes provided in connector body for printed board. Self-tapping screws are available, see ordering information page.

**Mechanical Operations:** 

250 couplings, minimum.

#### **ELECTRICAL CHARACTERISTICS:**

Contact Current Ratings, per UL 1977: Size 16 Power Contacts:	See temperature rise curve on page 9 for details. 30 amperes continuous, all contacts under load.				
Size 22 Signal Contacts:	2 amperes nominal rating.				
Current Overload Test	Tested per PICMG 3.0, R3.0 Section B.4.2.4, see page 4 for more information.				
Initial Contact Resistance: Termination to termination: Size 16 Contacts:	Average resistance is less than 0.001 ohms. Tested per IEC 60512- 2, Test 2a. Compliant to PICMG 3.0, R3.0 requirements of 0.0022 ohms maximum. Tested per IEC 60512- 2, Test 2b.				
Size 22 Contacts:	Average resistance is less than 0.005 ohms. Tested per IEC 60512-2, Test 2a. Compliant to PICMG 3.0, R3.0 requirements of 0.0085 ohms maximum. Tested per IEC 60512- 2, Test 2a.				
Insulation Resistance:	5 G ohms per IEC 60512-2, Test 3a.				
Voltage Proof:					
Contacts 1-16: Contacts 17-34:	1,000 V r.m.s. 2,000 V r.m.s.				
Creepage and Clearance Dista	nce: minimum:				
Contact positions 1-16 to an					
other contact within this g					
Contact positions17-24 to a					
other contact within this gr					
Contact positions 25-34 to a	iny				
other contact within this gr					
Contact positions 13-16 to					
Contact positions 21-24 to 2					
Contact positions 25, 26 to 2	27-29: 2.0mm [0.079 inch]				

#### **CLIMATIC CHARACTERISTICS:**

Working Temperature:

-55°C to +125°C.

UL and C.N.R. Recognized File #E49351

## MATING DIMENSIONS

Right Angle (90°) Board Mount Male to Straight Board Mount Female (FULLY MATED)



1 mm [0.039 inch] separation allowed

#### MALE CONNECTOR WITH RIGHT ANGLE (90°) COMPLIANT PRESS-FIT PRINTED BOARD MOUNT TERMINATIONS CODE 62

### **Typical Part Numbers**

#### VPB30W8M6200\*1/AA



VPB30W8M6200A1/AA shown for reference. Positions 1-4 are not populated with contacts.

#### **CONTACT HOLE PATTERN**

NOTE: See page 9 for suggested printed board hole sizes.

#### FEMALE CONNECTOR WITH STRAIGHT COMPLIANT PRESS-FIT PRINTED BOARD MOUNT TERMINATIONS CODE 93



#### MALE CONNECTOR WITH RIGHT ANGLE (90°) SOLDER PRINTED BOARD MOUNT TERMINATIONS CODE 4

#### **Typical Part Numbers** VPB30W8M400\*1/AA



#### FEMALE CONNECTOR WITH RIGHT ANGLE (90°) SOLDER PRINTED BOARD MOUNT TERMINATIONS CODE 4 WITH -394.0 MOS



VPB30W8F400A1/AA-394.0 shown for reference. Positions 1-4 are not populated with contacts.

> This connector option is offered to support extender cards. Consult Technical Sales for higher volume requirements.



### 40 30 20 10-0 Λ 5 10 15 20 25 30 SIZE 16 CONTACT CURRENT LOAD

Above curve developed using VPB30W8M6200A1 and VPB30W8F9300A1 connectors.

CURVE A - ALL SIZE 16 POWER CONTACT UNDER LOAD, SIGNAL CONTACTS 1-24 UNDER 1 AMP LOAD CURVE B - SIZE 16 POWER CONTACT POSITIONS 28, 33 UNDER LOAD, SIGNAL CONTACTS 1-24 UNDER 1 AMP LOAD

## **EXAMPLES OF POSSIBLE** CONTACT ASSIGNMENTS

CONTACT POSITION	FUNCTION			
1-16	Low Speed Hardware Management			
17-24	High Voltage Metallic Test and Ringing Generator Signals			
25	Shelf Ground			
26	Logic Ground			
27/32	Enables for A and B power			
28	A Return			
29	B Return			
30	A Early			
31	B Early			
33	A Voltage			
34	B Voltage			

### SUGGESTED PRINTED BOARD HOLE SIZES FOR COMPLIANT PRESS-FIT CONNECTORS

Traditionally, tin-lead has been a popular plating for printed circuit board (PCB) holes. However, many PCB hole platings must now be RoHS compliant. Positronic is pleased to offer PCB HOLE SIZES FOR **RoHS** PCB platings as shown below.

OMEGA & BI-SPRING COMPLIANT PRESS-FIT CONTACT HOLE							
BOARD TYPE	CONTACT SIZE	RECOMMENDED DRILL HOLE SIZE	RECOMMENDED PLATING	FINISHED HOLE SIZES			
TIN-LEAD	22 OMEGA	<u>ø1.150±0.025</u> [ø0.0453±0.0010]	15µ [0.0006] minimum solder	<u>ø1.000+0.090-0.060</u> [ø0.0394+0.0035-0.0024]			
SOLDER PCB	16 BI-SPRING	<u>ø1.750±0.025</u> [ø0.069±0.001]	over 25µ [0.0010] min. copper	<u>ø1.600+0.090-0.060</u> [ø0.0630+0.0035-0.0024]			
RoHS PRINTED CIRCUIT BOARD (PCB) PLATING OPTIONS							
COPPER PCB	22 OMEGA	<u>ø1.19±0.025</u> [ø0.047±0.001]	25µ (0.0010) min. copper	<u>ø1.09±0.05</u> [ø0.043±0.002]			
COPPER POB	16 BI-SPRING	<u>ø1.750±0.025</u> [ø0.069±0.001]	25µ [0.0010] min. copper	<u>ø1.600+0.090-0.060</u> [ø0.0630+0.0035-0.0024]			
IMMERSION	22 OMEGA	<u>ø1.19±0.025</u> [ø0.047±0.001]	0.85±0.15µ [0.000033±0.000006] immersion tin over	<u>ø1.09±0.05</u> [ø0.043±0.002]			
TIN PCB 16 BI-SPRING		<u>ø1.750±0.025</u> [ø0.069±0.001]	25µ [0.0010] min. copper	<u>ø1.600+0.090-0.060</u> [ø0.0630+0.0035-0.0024]			
IMMERSION	22 OMEGA	<u>ø1.19±0.025</u> [ø0.047±0.001]	0.34±0.17µ [0.000013±0.000007] immersion silver over	<u>ø1.09±0.05</u> [ø0.043±0.002]			
SILVER PCB 16 BI-SPRIM		<u>ø1.750±0.025</u> [ø0.069±0.001]	25μ [0.0010] min. copper	<u>ø1.600+0.090-0.060</u> [ø0.0630+0.0035-0.0024]			
ELECTROLESS NICKEL/	22 OMEGA	<u>ø1.19±0.025</u> [ø0.047±0.001]	0.05µ [0.000002] min. immersion gold over 4.5±1.5µ [0.000177±0.000059]	<u>ø1.09±0.05</u> [ø0.043±0.002]			
IMMERSION GOLD PCB	IMMERSION 16		electroless nickel per IPC-4552 over 25μ [0.0010] min. copper	<u>ø1.600+0.090-0.060</u> [ø0.0630+0.0035-0.0024]			

"Omega" Termination utilized on signal contacts



"Bi-Spring" Termination utilized on power contacts





#### COMPLIANT **PRESS-FIT CONTACT HOLE**

NOTE: For PCB plating compositions not shown, consult Technical Sales.

## **ORDERING INFORMATION – CODE NUMBERING SYSTEM**

Specify Complete Connector By Selecting an Option From Steps 1 Through 8

STEP	1	2	3	4	5	6	7	8	9
EXAMPLE	VPB	30W8	F	93	0	0	A1	/AA	-394.0
STEP 1 - BASIC 3 VPB - VP Series STEP 2 - CONNECT *1 30W8 - Contact p not popula variant for backplan option for *1 22W8 - Contact p 17-24 are Standard option for frontboar	OR VAR ositions <sup>-</sup> ated. Sta Advance es. Stance frontboa ositions <sup>-</sup> not popu cost sav	1-4 are ndard edTCA® dard ards. 1-4 and ulated. <i>i</i> ing						/AA - Note: create	<ul> <li>STEP 9 - SPECIAL OPTIONS</li> <li>394.0- Allows for female contact right angle (90°) solder mount.</li> <li>CONTACT TECHNICAL SALES FOR SPECIAL OPTIONS</li> <li>8 - ENVIRONMENTAL COMPLIANCE OPTIONS</li> <li>RoHS compliant</li> <li>This step should be included to a standard part number. ple: VPB30W8F9300A1/AA</li> </ul>
STEP 3 - CONNECT M - Male *2 F - Female - Profe *2 S - Female - Indu	essional L	_evel					A1 -	base Gold flas terminati	TACT PLATING (choose plating ad on end use requirements) sh over nickel on mating end and on end. sh over nickel on mating end and
<ul> <li>STEP 4 - CONTACT</li> <li>4 - Right Angle (90) length 2.68 [0.1 394.0, contact</li> <li>MOS part numb</li> <li>42- Right Angle (90°) length 4.09 [0.1</li> <li>62 - Right Angle (90°)</li> <li>93 - Straight Board I</li> <li>99 - Straight Board I</li> <li>and formed corr (Step 3). Contact</li> </ul>	°) Board   06] (30W Fechnical ber) °) Board I 61]. 9 Board M Mount, P Mount, P Mount, P	Mount, So 8 female I Sales for Mount, So Iount, Pre- ress-fit. I ress-fit, S emale "F"	older, ter requires r 22W8 fe older, ter ss-fit. Ma Female o ize 22 st variant o	MOS emale mination ale only nly. amped			C1 - ( C2 - ( D1 - D2 -	5.00µ [0. terminati or 93 in s 0.76µ [0.0 mating er solder co with code 1.27µ [0.0 mating er 1.27µ [0.0 mating er	00020 inch] tin-lead solder coat on on end. Not available with code 62
STEP 5 0 - None						STEI		with code	e 62 or 93 in step 4.
Notes *1 VPB series can be sup Use part number VPB		contacts p	opulated ir	n all 34 po	sitions.	0 - N			
* <sup>2</sup> Female signal contact Closed entry contacts ing of the contact. Thi environments experier	s are offere are desigr s closed er ncing highe	ned with an ntry feature er levels of s	unbroken provides h shock and	ring at the nigher relia	bility in Closed	U	1) ±0.13	3 mm [0.00	<b>ecified, dimensional tolerances are:</b> D5 inches] for all diameters. 15 inches] for all other dimensions.

Telecordia GR1217 shows a preference that	MO
press-fit connectors use auxiliary mounting hardware. Also, the AdvancedTCA <sup>®</sup> Zone 1 connector serves as the lower alignment	STEEL SCRE PART NUMB
feature for front boards. Therefore, the use of mounting hardware is recommended.	A4546-7-1-16
mounting hardware is recommended.	A4546-7-2-16

entry contacts are also more abuse resistant than open entry designs.

However, VPB connectors have been tested to PICMG 3.0. B.5.1.3 requirements, which may guide connector users to omit use of screws. Contact Positronic for test details.

VPB Power contacts are always closed entry design.

• Female compliant press-fit connectors require a press-fit tool, part number 9513-308-1-41, for installation.

### **DUNTING SCREWS**

STEEL SCREW PART NUMBER	STAINLESS STEEL SCREW PART NUMBER	THREAD LENGTH
A4546-7-1-16	A4546-7-6-4	<u>6.35+0.00-0.76</u> [0.250+0.000-0.030]
A4546-7-2-16	A4546-7-7-4	<u>7.93+0.00-0.76</u> [0.312+0.000-0.030]
A4546-7-3-16	A4546-7-8-4	<u>9.53+0.00-0.76</u> [0.375+0.000-0.030]
A4546-7-4-16	A4546-7-9-4	<u>11.11+0.00-0.76</u> [0.438+0.000-0.030]

#### Install Screw to a Depth of: 3.50 [0.138] Minimum

5.00 [0.197] Maximum

**Contact technical sales** for RoHS compliant mounting screw information.

• The use of a support tool when installing press-fit connectors is recommended. For female connectors use 9513-400-6-41, for male connectors use 9513-400-8-41.

# **Other Power Connector Products**

To view all products visit

## www.connectpositronic.com

Positronic Industries has a wide variety of power connector products. Let us provide solutions for Power Entry Modules (PEM) and other power distribution needs.



## Scorpion Modular Connector

Build Your Own Connector Modular tooling produces a one-piece insulator with almost infinite configurations using twenty-one different module types. Power, signal, and shielded contacts are offered. Options include: cooling vents, blind mate, sequential mate, integral locking and connector keying.



## **Power Connection Systems**

Available with 3 to 30 contacts and utilizes an integral locking system. Offers a wide variety of termination styles and accessories for board to board, cable to board, and panel to cable applications.



## Infinity/Mini-Infinity

For low, medium and high power applications requiring outstanding blind mating capability. Offers mixed contact density, sequential mate contacts, and a wide variety of termination styles.



### **Compact Power Connector**

The power interface for platforms that utilize IEEE1101.10 form factors including CompactPCI®. Offers a wide variety of sizes and contact variants. Provides for input, output, and system management in a single connector as well as three-level sequential mating.



## Goldfish

For low to mid range power applications that require excellent blind mating. Additional options include float mounts, selective loading and sequential mating.



## DragonFly

High density connectors having power and/or signal contacts. Multiple package sizes with integral locking system.



## **Regional Headquarters**

Positronic | Americas 423 N Campbell Ave Springfield MO 65806 USA

Positronic | Europe Z.I. d'Engachies 46, route d'Engachies F-32020 Auch Cedex 9 France

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Positronic | Asia 3014A Ubi RD 1 #07-01 Singapore 408703 +1 800 641 4054 info@connectpositronic.com For most current sales office information, please visit www.connectpositronic.com/locations

+33 5 6263 4491 contact@connectpositronic.com

+65 6842 1419 singapore@connectpositronic.com

#### **Sales Offices**

Positronic has local sales representation all over the world. To find the nearest sales office, please visit www.connectpositronic.com/locations