

## VIPER® Interconnect Platform

**Amphenol's VIPER® connector** is a shielded, high-density, high-speed press-fit, modular interconnect system. Optimized for differential pair architectures on a 1.8mm x 1.35mm grid, the waferized daughtercard assembly also provides single-ended and power wafer options integrated onto a stainless steel stiffener with stainless steel guidance and keying blocks. The backplane modules are available in 8 and 16 row increments on a 1.8mm x 1.8mm grid, with or without keying location blocks and integrated stainless steel guidepin/keys. The new backplane signal contacts incorporate a highly reliable 4-points-of-contact beam design and the ground contacts leverage Amphenol's 40 year experience with robust compliant pin and contact fork designs.

### Key Features

- Designed for 10+ Gbps data rate performance
  - 100 ohm impedance for differential pair configuration
- Separable interface offering 70 single-ended signals/ 25.4mm and 63 differential signals/ 25.4mm
- Reliable, redundant opposing cantilever contact beam design
- Greater than  $\pm 0.52\text{mm}$  X and Y translation in fully mated condition
- ESD protection supports 2-level maintenance designs
- Ruggedized vibration performance greater than  $0.6 \text{ G}^2/\text{Hz}$  (29.28 G<sup>2</sup> rms)
- Eye-of-the-needle compliant pins designed to pierce most conformal coatings
- Flexible modular design ideal for standard 3U and 6U applications as well as unique custom configurations incorporating RF microwave and optical MT solutions
- Fully footprint-compatible with VITA 46 and VITA 48 standards

ABS developed the VIPER interconnect platform after extensive voice of the customer (VOC) interviews. These interviews drove us to meet or exceed future avionic high-level vibration, mechanical shock and condensing moisture test requirements. Customers emphasized the need for ruggedization in the next generation of military packaging solutions that can scale to higher bandwidths without costly and time-consuming chassis redesigns. The VIPER connector platform offers the ability to scale from 80 Mbps to over 10 Gbps while retaining the same 20.3mm to 25.4mm backplane slot pitch.

### ELECTRICAL ATTRIBUTES

- **Data Rate:** 6.5 Gbps scalable 10 Gbps
  - **Differential Impedance:** 100 ohms
- **Differential Insertion Loss:** -5 dB up to 5 GHz (10 Gbps)
- **Differential Return Loss:** -5 dB up to 5 GHz (10Gbps)
  - **Far End Crosstalk:** -35 dB up to 8 GHz
  - **Near End Crosstalk:** -33 dB up to 8 GHz
    - **Signal Contacts:** 1 amp
- **Power Wafer:** 8 amps per wafer at 10° C T-Rise
- **Compliant Pin to Plated Thru Hole Resistance:** 1 milliohm max
- **Dielectric Withstanding Voltage:** 500 volts RMS
  - **Insulation Resistance:** 1000 megohms



## *VIPER MATERIALS AND FINISHES*

### **Backplane Signal and Ground Contacts:**

C7025 copper alloy, 0.23mm. Finish is 0.00127mm nickel minimum all over per SAE-AMS-QQ-N-290, Class I. Selective 0.00127mm gold minimum per ASTM-B488, Type II, Grade C, Class 1.27 in the mating area. 0.0076mm 60/40 reflowed tin/lead minimum selectively plated in the compliant pin area.

### **Differential, Power and Single-Ended**

#### **Daughtercard Wafer Leadframes:**

C7025 copper alloy, 0.38mm. Finish is 0.00127mm nickel minimum all over per SAE-AMS-QQ-N-290, Class I. Selective 0.00127 gold minimum per ASTM-B488, Type II, Grade C, Class 1.27 in the mating area. 0.0076mm 60/40 reflowed tin/lead minimum selectively plated in the compliant pin area.

### **Backplane Insulators and Daughtercard**

#### **Wafer Insert Mold Material:**

Glass reinforced polyester (Liquid Crystal Polymer), UL 94VO, Color Black.

**Front and Rear Stiffeners:** Stainless Steel, 0.6mm, Type 301, 1/2 Hard. Finish per Mill 2B.

**Backplane Guide Pin:** Stainless Steel, Type 303, Passivated.

### **Daughtercard Connector Guidance and Keying**

**Blocks:** Stainless Steel, Type 440, Passivated.

## *MECHANICAL ATTRIBUTES*

### **Signal and Ground Contact Normal Force:**

85 grams per beam

### **Signal and Ground Contact Engagement Force:**

45 grams max, 35 grams typical

### **Signal and Ground Contact Separation Force:** 30

grams max, 25 grams typical

**Signal and Ground Contact Durability:** 500 cycles minimum

**Contact Wipe Length:** 2.5mm minimum for ground contacts; 2.0mm minimum for power and signal contacts

### **Backplane Signal and Ground Compliant Pin**

**Insertion Force:** 4.9 kilograms maximum; 2.27 kilograms to 4.9 kilograms depending on the surface finish of PCB.

### **Backplane Signal and Ground Compliant Pin**

**Retention Force:** 2.27 kilograms minimum

### **Daughtercard Wafer Compliant Pin Insertion Force:**

1.8 kilograms to 3.6 kilograms depending on the surface finish of PCB.

### **Daughtercard Wafer Compliant Pin Retention**

**Force:** 1.6 kilograms minimum

**Translation:** ± 0.52mm in both X and Y direction fully mated

**Slot Pitch:** 20.30mm

## *ENVIRONMENTAL ATTRIBUTES*

**Temperature:** -55° C to 125° C

**Random Vibration:** 90 minutes per X, Y and Z axis at 0.6 G<sup>2</sup>/ Hz.

**Mechanical Shock:** 50 G'rms in Y axis, 80 G' rms in X and Z axis, 11 milliseconds, half sine.

**Temperature Life:** 1000 hours at 125° C

## *PRINTED CIRCUIT BOARD*

### **Minimum Backplane and Daughtercard Thickness:**

2.28mm

### **Daughtercard Pattern Primary Drilled Hole Size:**

0.55mm

### **Daughtercard Pattern Finished Hole Size:**

0.46 ± 0.05mm

### **Backplane Pattern Primary Drilled Hole Size:**

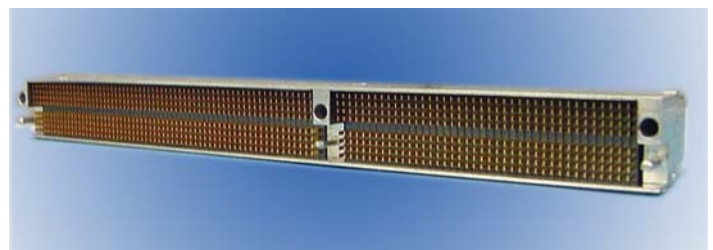
0.65mm

### **Backplane Pattern Finished Hole Size:**

0.56 ± 0.05mm

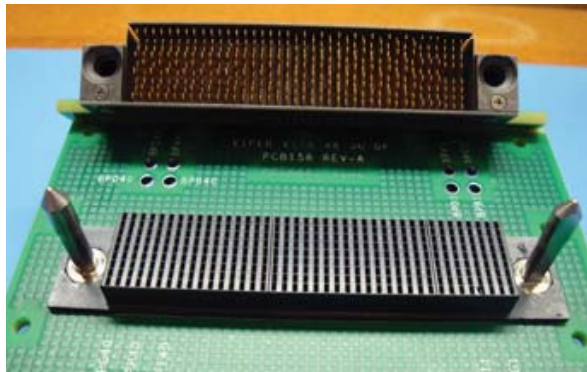
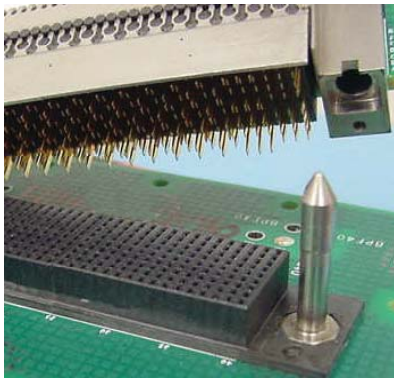
**Radial Hole Wall Deformation:** 0.04mm per side as measured from drilled hole.

**Axial Hole Wall Deformation:** 0.03mm as measured in the vertical plane.



*VIPER 6U VITA 64 Custom Power Configuration*

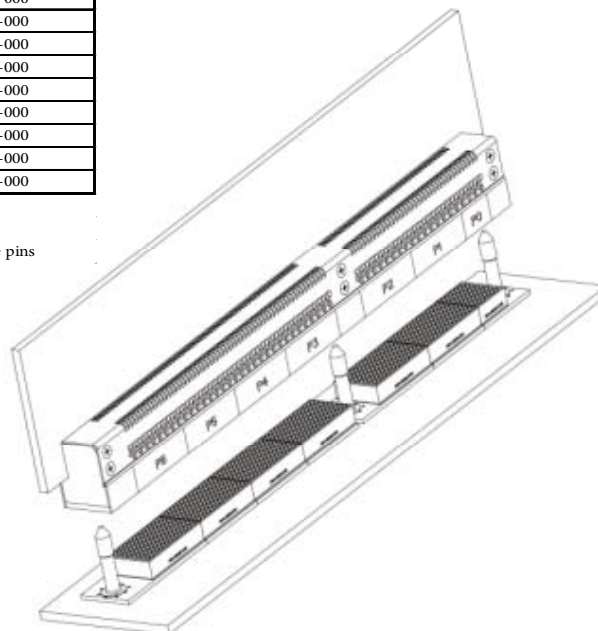
# VIPER® Interconnect Configuration Chart



<u>VPX Variant</u>	<u>Daughtercard Module*</u>	<u>Backplane Kit**</u>
Variant A [ 3U ]	VP773-00001	556-0005-000
Variant B [ 3U ]	VP773-00002	556-0011-000
Variant C [ 6U ]	VP776-00001	556-0004-000
Variant D [ 6U ]	VP776-00002	556-0008-000
Variant E [ 6U ]	VP776-00003	556-0025-000
Variant F [ 6U ]	VP776-00004	556-0026-000
Variant G [ 6U ]	VP776-00005	556-0027-000
Variant H [ 6U ]	VP776-00006	556-0019-000
Variant J [ 6U ]	VP776-00007	556-0006-000
Variant K [ 6U ]	VP776-00008	556-0028-000
Variant L [ 6U ]	VP776-00009	556-0029-000
Variant M [ 6U ]	VP776-00010	556-0030-000
Variant N [ 6U ]	VP776-00011	556-0031-000
Variant O [ 6U ]	VP776-00012	556-0032-000
Variant P [ 6U ]	VP776-00013	556-0033-000
Variant Q [ 6U ]	VP776-00014	556-0034-000
Variant R [ 6U ]	VP776-00015	556-0035-000
Variant S [ 6U ]	VP776-00016	556-0036-000
Variant T [ 6U ]	VP776-00017	556-0037-000
Variant U [ 6U ]	VP776-00018	556-0038-000
Variant V [ 6U ]	VP776-00019	556-0039-000
Variant W [ 6U ]	VP776-00020	556-0040-000
Variant X [ 6U ]	VP776-00021	556-0041-000
Variant Y [ 6U ]	VP776-00022	556-0042-000
Variant Z [ 6U ]	VP776-00023	556-0043-000
Variant AA [ 6U ]	VP776-00024	556-0044-000
Variant AB [ 6U ]	VP776-00025	556-0045-000
Variant AC [ 6U ]	VP776-00026	556-0046-000
Variant AD [ 6U ]	VP776-00027	556-0047-000
Variant AE [ 6U ]	VP776-00028	556-0048-000
Variant AF [ 6U ]	VP776-00029	556-0049-000
Variant AG [ 6U ]	VP776-00030	556-0050-000
Variant AH [ 6U ]	VP776-00031	556-0051-000
Variant AI [ 6U ]	VP776-00032	556-0052-000

\*Daughtercard Connectors are supplied complete with configurable keying

\*\*Backplane Kits include 8 and 16 position modules with configurable keyed guide pins





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