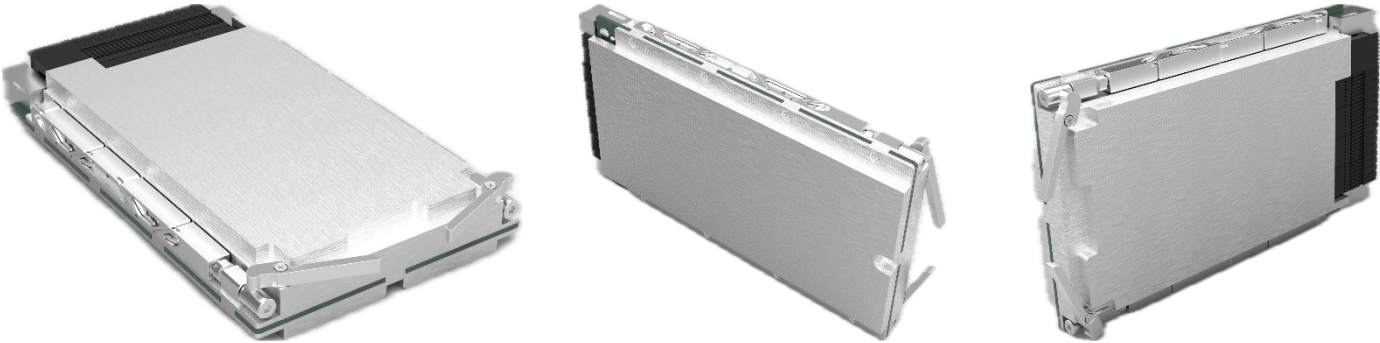


RaptorLink 64X50 SOSA Ethernet Switch

Next Generation 64-Channel 50G 3U VITA-91 and Legacy VPX SOSA Aligned Ethernet Switch Modules

PDS - 370



DESCRIPTION

SUMMARY

Amphenol's next-generation 3U VPX Ethernet switch, the RaptorLink 64X50, is SOSA-aligned and features VITA-91 connectivity, offering double density with support for speeds of up to 50G per lane on the backplane. The switch operates with 64 individual channels, supporting speeds of 1G, 10G, and 25G in NRZ mode, and 50G in PAM-4 mode. Additionally, it supports multiple ganged protocols, including 40Gx4, 50Gx2, and 100Gx4 in NRZ mode, and up to 400Gx8 in PAM-4 mode. This makes the Ethernet switch highly adaptable for future backplane architectures. All boards are built with Amphenol MIL-HD2 SOSA/VITA 91 and/or R-VPX Evolution series connectors which have datasheets available readily.

Management is handled by two on-board quad-core ARM processors, each with ample memory for complex networking applications. The switch includes a full suite of SOSA-aligned IPMI status functions for various chassis manager requirements. In summary, the RaptorLink 64X50 integrates two managed 32-channel, 50G Ethernet switches into a single, 3U SOSA-aligned, VITA-91 VPX board.

Several versions of the RaptorLink switch are available with 50G PAM-4 and NRZ connectivity configurations. Each model includes a comprehensive management software suite with features such as MACsec, Time-Sensitive Networking (TSN), and a 60-second boot time. The switches are offered in the following configurations:

- Dual 64x50G switch – SOSA aligned VITA-91 double density and speed connectors
- Single 32x50G switch – SOSA aligned VITA-91 double density and speed connectors
- Single 40x50G switch – SOSA aligned VITA-91 double density and speed connectors
- Additionally, a single 32x50G switch is available with legacy RVPX SOSA-aligned connectors.

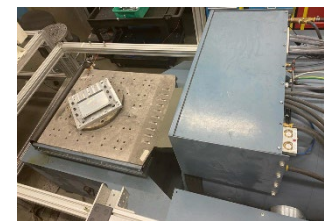
To meet the demands of applications requiring low power consumption and fast boot times (under 10 seconds), several configurations of the switch are available with up to 25G NRZ speeds and lightweight management software. These options include:

- Dual 64x25G switch – SOSA aligned VITA-91 double density and speed connectors
- Single 32x25G switch – SOSA aligned VITA-91 double density and speed connectors
- Single 32x25G switch (with legacy RVPX SOSA-aligned connectors)

Along with the switch and processing infrastructure available in many different configurations, the RaptorLink 64X60 has a VITA46.11 Tier 1 compliant IPMI solution for sensor, link state, health, BIT, and other reporting to chassis managers. It also supports redundant IPMB interfaces and IPMB fast modes.

FEATURES

- Dual 32-channel Ethernet switch chips, capable of speeds up to 50G PAM-4 and NRZ speeds up to 25G.
- Support for multiple speeds: 1G, 10G, 25G, 40G, 50G, 100G, and 400G (PAM-4 and NRZ formats).
- Layer 2 and Layer 3 network management capabilities, including support for time-sensitive networking (TSN), MACsec, and advanced routing applications.
- Dedicated management interfaces via dual RS-232 and 1GBase-T.
- SOSA-aligned 12V power input with a full IPMI controller for chassis management.
- Powered by dual quad-core ARM CPUs with DDR4-SDRAM, flash memory, and EEPROM.
- Linux OS with comprehensive network management software.



RUGGEDIZATION

- Fully ruggedized to withstand extreme environmental and EMI/EMP conditions.
- Interfaces for power diagnostics and more.
- Meets the following environmental specifications:
 - Operating Temperature: -40°C to 85°C while operating.
 - Storage Temperature: -55°C to 125°C.
 - Humidity: 0-100% non-condensing humidity during operation.
 - Vibration: 10g peak, 5-2,000 Hz sine vibration, and 40 G peak shock cycles.
 - Altitude: -1,500 to 60,000 ft with rapid depressurization.
 - EMC: Designed to comply with MIL-STD-461E.

ORDERING INFORMATION

PART NUMBER TABLE – VITA91 SOSA VARIANTS

| | | | | |
|---------------|--|------------|-----------|-----------------|
| CF-02W300-12X | Dual Switch – 64 channels @ 50G | Managed | 150 Watts | ~60 second boot |
| CF-02W300-13X | Single Switch – 32 channels @ 50G | Managed | 75 Watts | ~60 second boot |
| CF-02W300-14X | Signal Meshed Switch – 40 channels @ 50G | Managed | 150 Watts | ~60 second boot |
| CF-02W300-15X | Dual Switch – 64 channels @ 25G | Light Mgmt | 50 Watts | ~10 second boot |
| CF-02W300-16X | Single Switch – 32 channels @ 25G | Light Mgmt | 25 Watts | ~10 second boot |

- Channel as defined as AC coupled CML SERDES Tx+/- and Rx+/- pair meant for backplane operation
- Media converters and other protocol variants are available upon request
- 'X' variants are conduction-cooled; For air-cooled variants, replace the 'X' with a 'V'

PART NUMBER TABLE – LEGACY RVPX SOSA VARIANTS

| | | | | |
|---------------|-----------------------------------|------------|----------|-----------------|
| CF-02W300-17X | Single Switch – 32 channels @ 50G | Managed | 75 Watts | ~60 second boot |
| CF-02W300-18X | Single Switch – 32 channels @ 25G | Light Mgmt | 25 Watts | ~10 second boot |

- Channel as defined as AC coupled CML SERDES Tx+/- and Rx+/- pair meant for backplane operation
- Media converters and other protocol variants are available upon request
- 'X' variants are conduction-cooled; For air-cooled variants, replace the 'X' with a 'V'

PART NUMBER TABLE – REAR TRANSITION MODULES

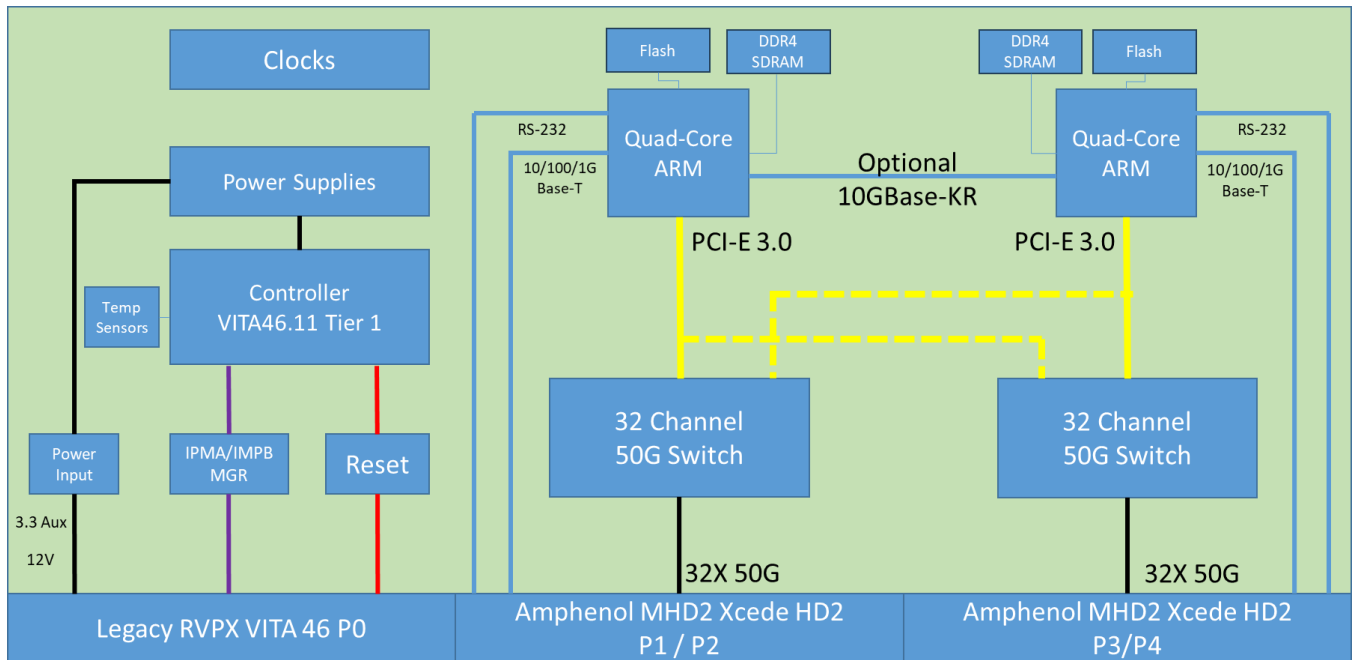
| | | |
|---------------|--------------------------|--|
| CF-02W300-12R | SOSA V91 Variant | Breakout RTM with up to 64 channels 25G fiber optics on MTPs |
| CF-02W300-18R | Legacy RVPX SOSA Variant | Breakout RTM with up to 32 channels 25G fiber optics on MTPs |

- Other variants are available upon request and these are meant to be utilized with commercial chassis components sold by Amphenol and listed in the accessories section of this datasheet

BLOCK DIAGRAMS

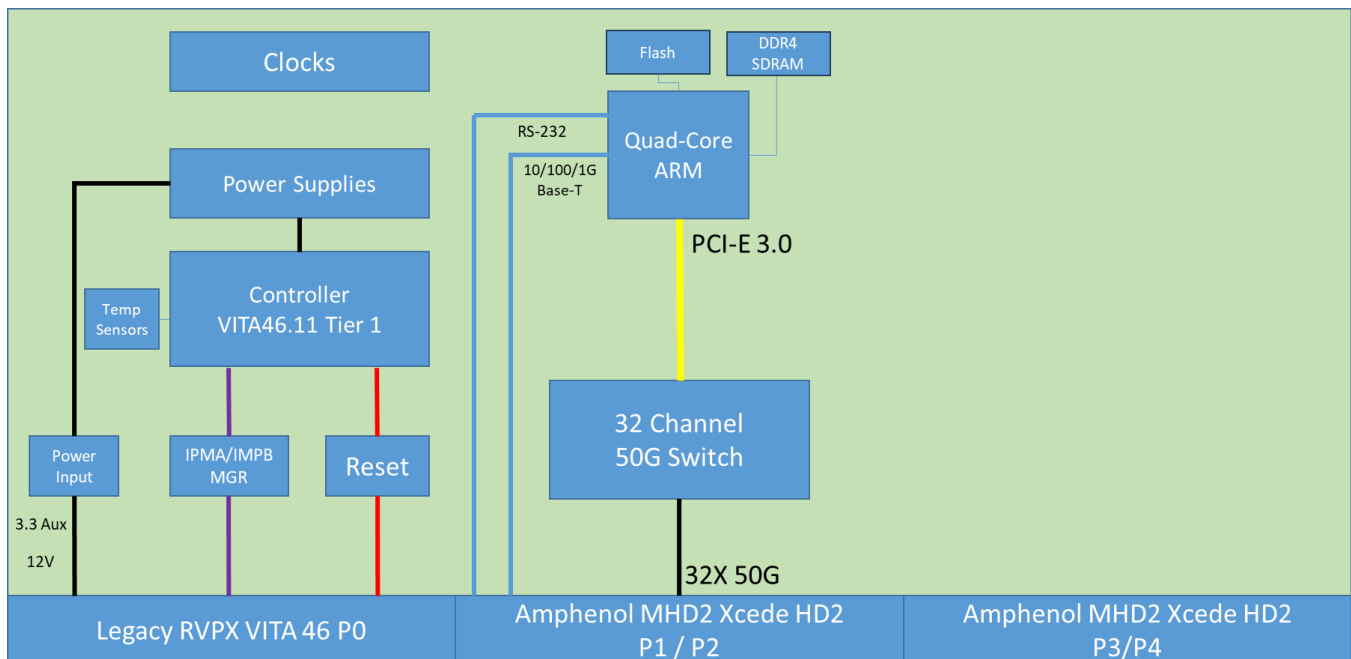
CF-02W300-12X – Dual Switch – 64 channels @ 50G; Managed; 150 Watts; ~60 second boot

VITA91 SOSA VARIANT

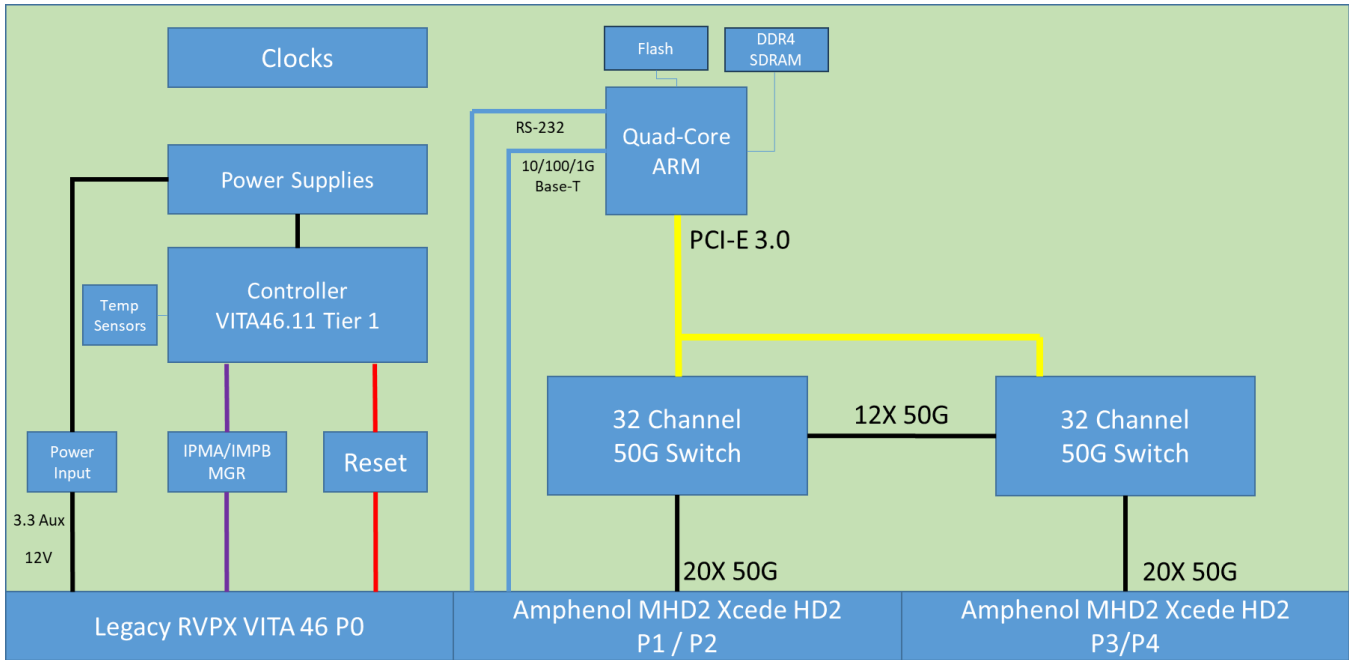


CF-02W300-13X – Dual Switch – 64 channels @ 50G; Managed; 150 Watts; ~60 second boot

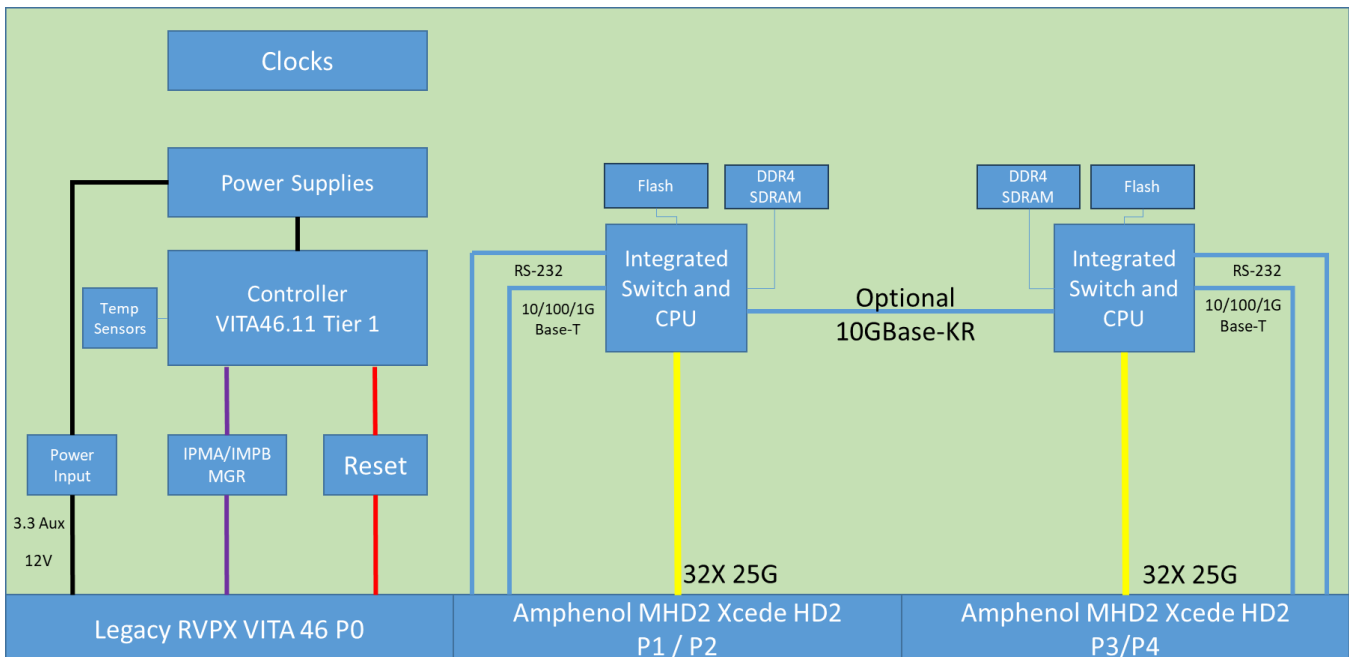
VITA91 SOSA VARIANT



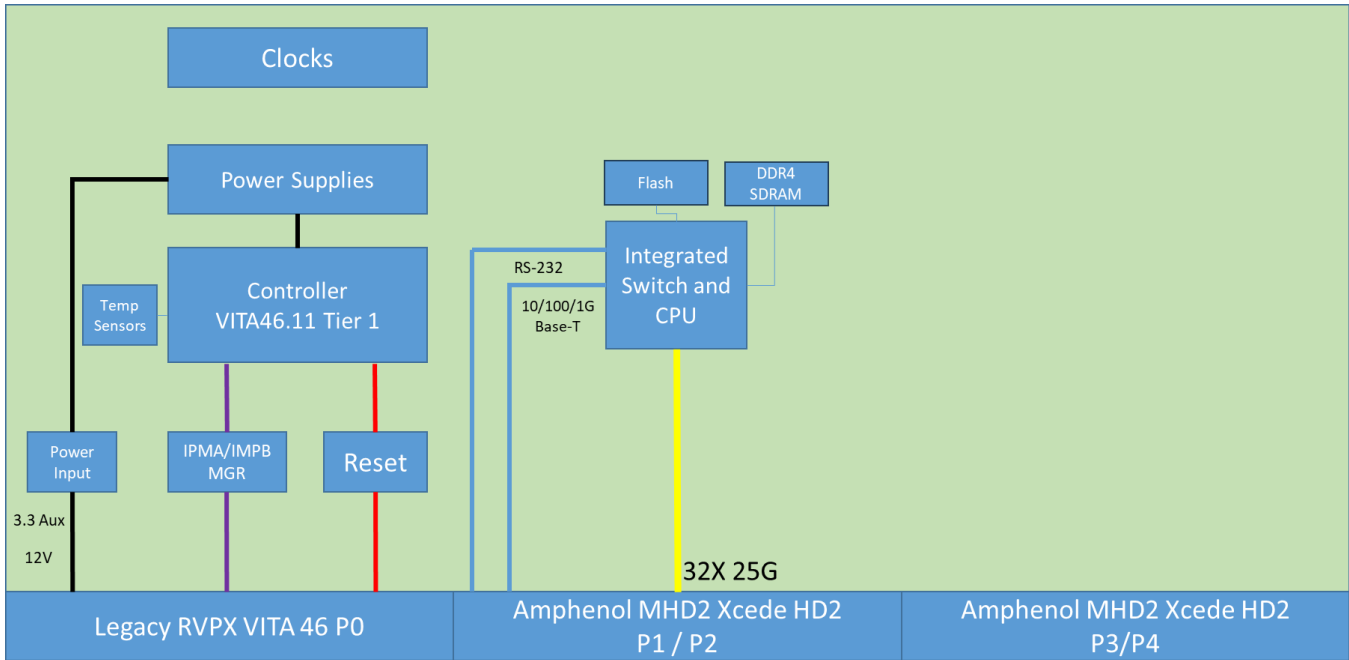
CF-02W300-14X – Single Meshed Switch – 40 Channels @ 50G
 VITA91 SOSA VARIANT



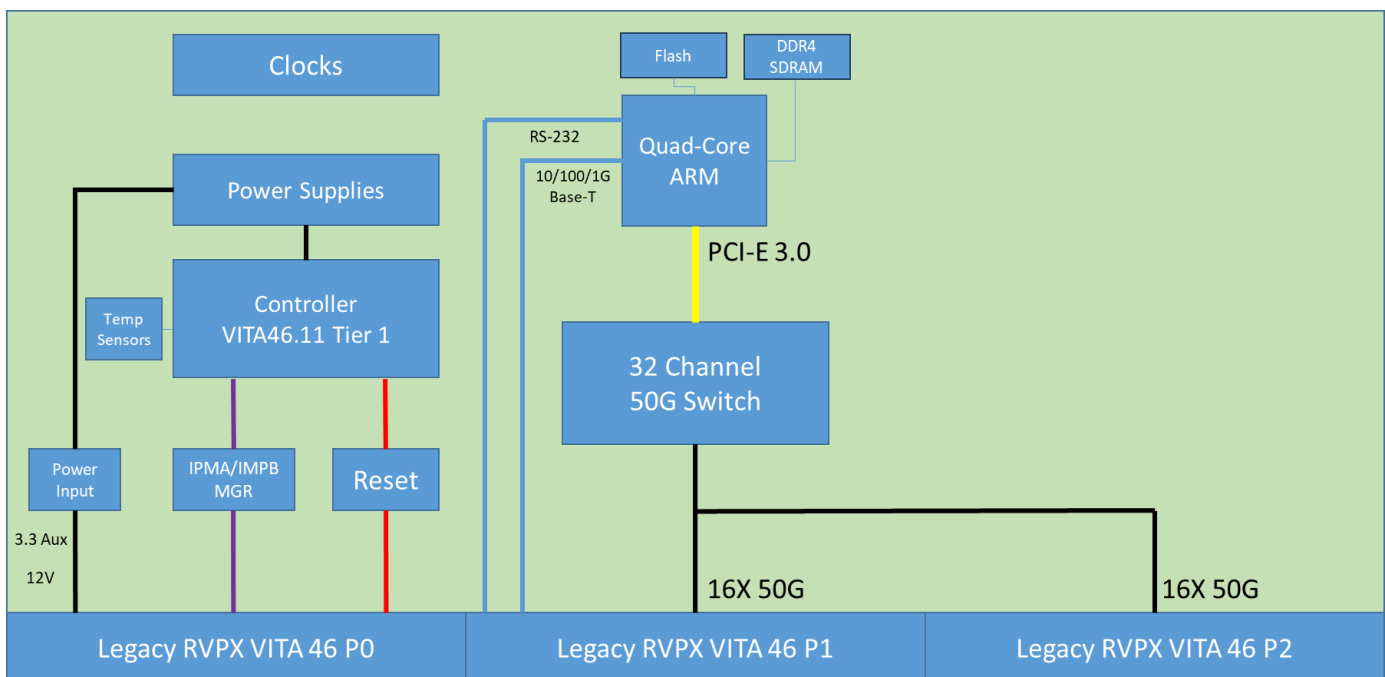
CF-02W300-15X – Dual Switch – 64 channels @ 25G; Light Management; 50 Watts; ~10 second boot
 VITA91 SOSA VARIANT



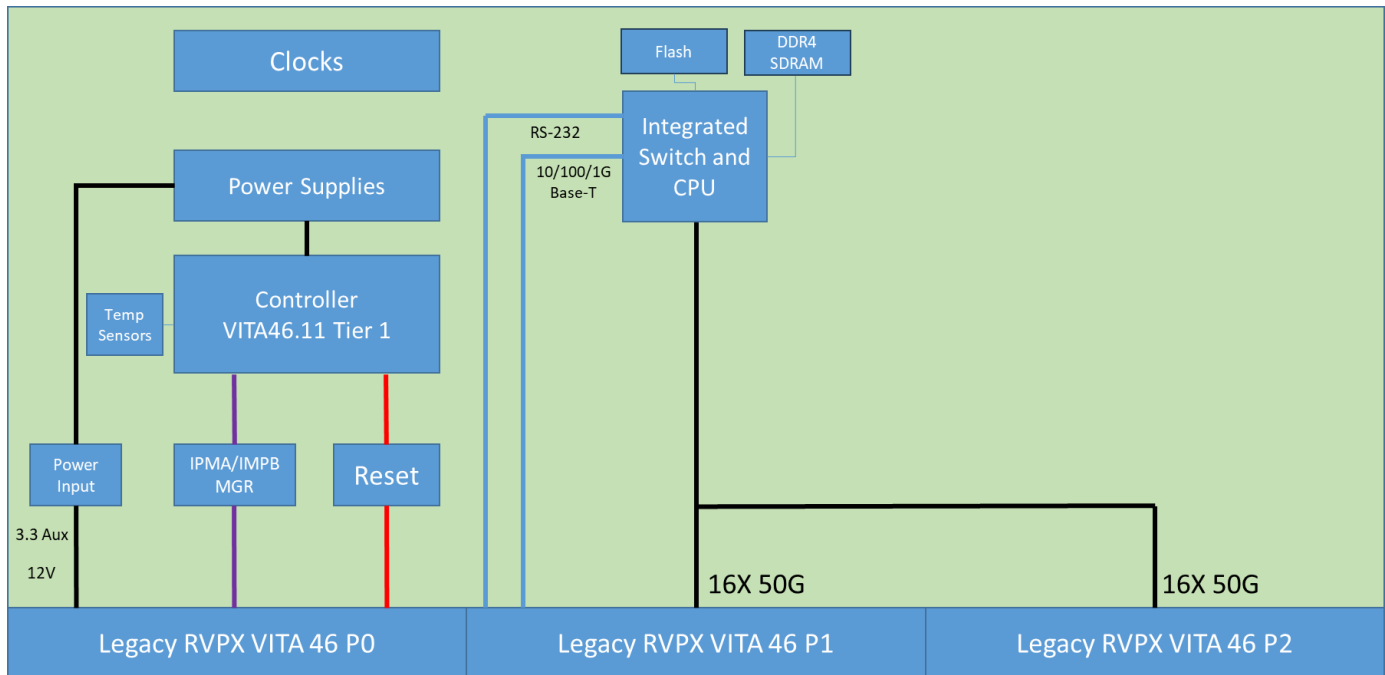
CF-02W300-16X – Single Switch – 32 channels @ 25G; Light Management; 25 Watts; ~10 second boot
VITA91 SOSA VARIANT



CF-02W300-17X – Single Switch – 32 channels @ 50G; Managed; 75 Watts; ~60 second boot
LEGACY RVPX SOSA VARIANT



CF-02W300-18X – Single Switch – 32 channels @ 25G; Light Management; 25 Watts; ~10 second boot
LEGACY RVPX SOSA VARIANT



OTHER MECHANICAL CONSIDERATIONS

Frame Components

The primary and secondary frame components are finished in accordance with MIL-DTL-5541 Type II, Class 3 on aluminum alloy. Additional materials and finishes are available upon request.

Extraction Levers

The extraction lever is crafted from 7075-T7351 aluminum alloy and treated with a black anodized finish per MIL-A-8625 Type II, Class 2 specifications.

Wedgelocks

We utilize a variety of wedgelocks per customer requirements, with our standard being the SW5T-475 series from WaveTherm. These wedgelocks are constructed from 6061-T6511 aluminum alloy and black anodized in compliance with MIL-A-8625 Type II, Class 2. They feature 300-series stainless steel fasteners, passivated per AMS2700.

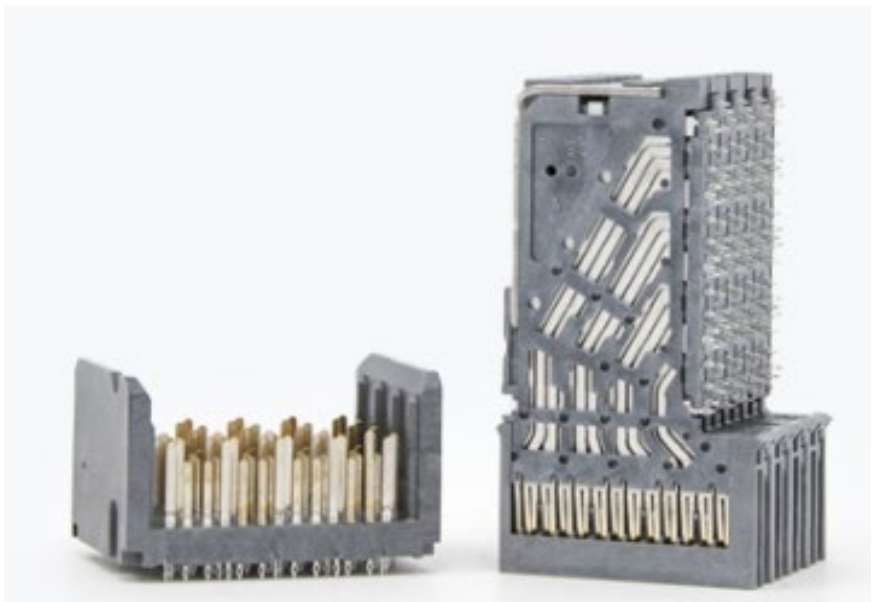
Labeling

Each board is equipped with an identification label, an ESD label, and is protected by a clear overlay.

Board Variants with SOSA VITA91 Connectors

Amphenol has designed these connectors in alignment with The Open Group Sensor Open Systems Architecture™ (SOSA) technical standard, MIL-HD2 provides developers with a readily available, robust open architecture solution for tighter card pitches and chassis designs where space requirements and density are critical. These connectors are available in 3-, 4-, and 6-pair configurations, providing the MIL-embedded market with the highest count of differential pairs available today in a 3U configuration at 56Gb/s PAM 4 speeds. This series was selected by the SOSA Consortium and provides a SOSA aligned solution for nextgen switch and payload card requirements enabling the MIL-embedded market to meet next-gen performance levels while still meeting COTS requirements.

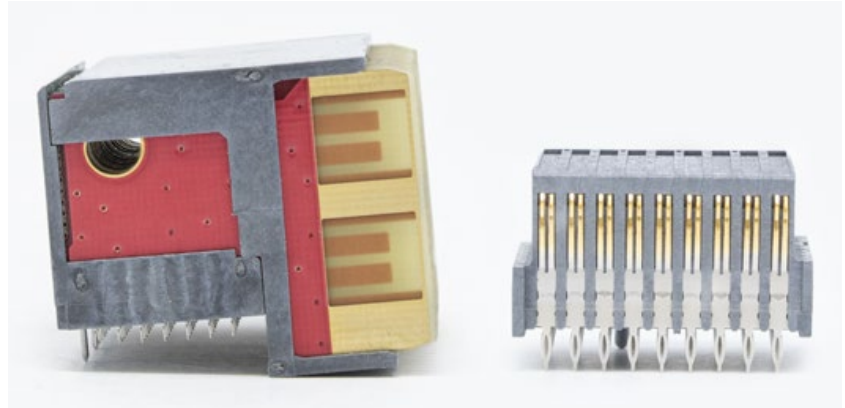
- Highest density with 1.80mm pitch
- 4 diff, 8 column - SOSA aligned configuration
- Data rates scalable to 56Gb/s PAM4 to support system upgrades without costly redesigns
- Proprietary crosstalk reducing technologies
- 15.7mil drill compliant pin allows deeper backdrilling
- Optimized footprints
- Shielded contacts mate before signal contacts, providing up to a 4mm minimum wipe
- Embedded capacitor available
- Differential pairs 28-84 per inch (11-33 differential pairs per centimeter)
- Proven EMI and signal integrity advantages
- Improved impedance matching
- Complete solution for unique customer requirements
- Enables hot plugging
- Meets high density application requirements



Board Variants with Legacy R-VPX 25G SOSA Connectors

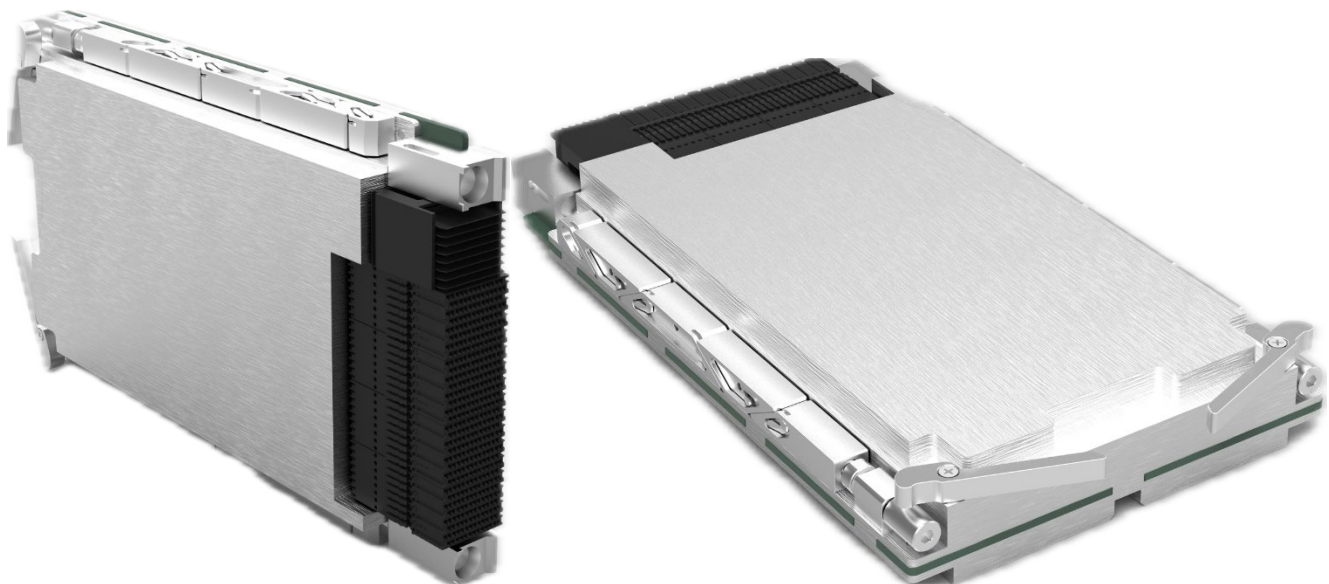
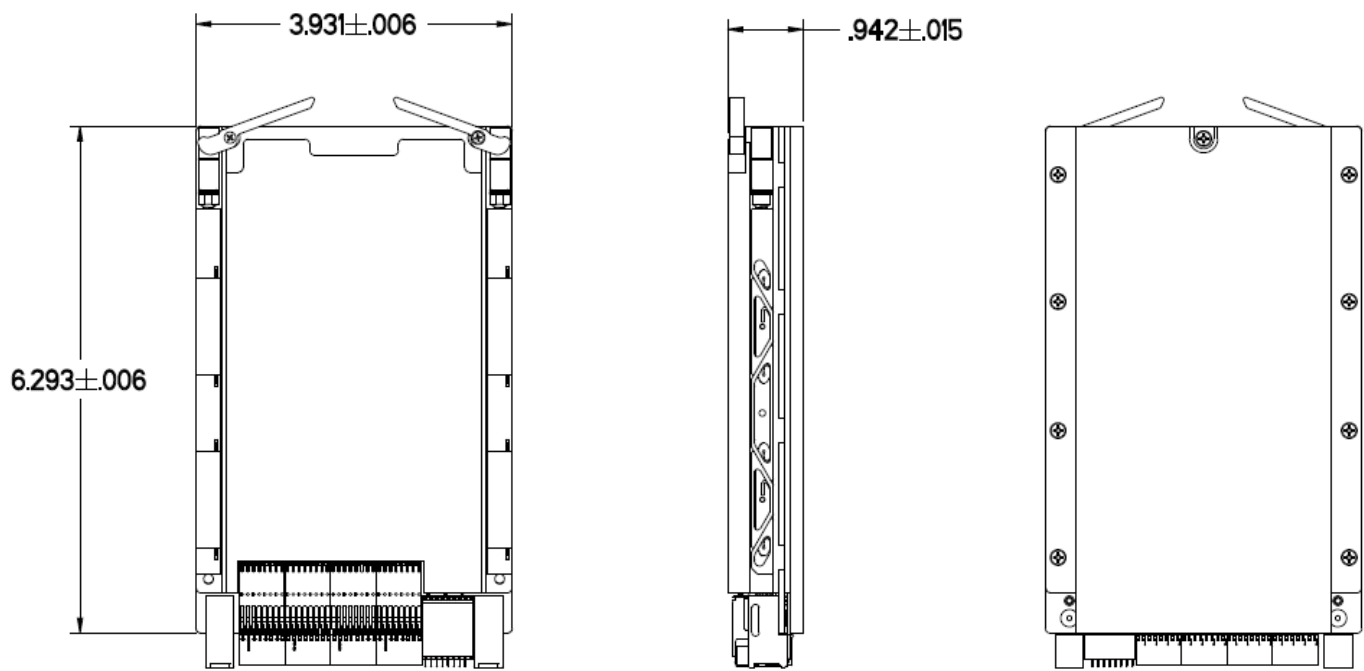
Improving off original Vita 46 standards, Amphenol's R-VPX Evolution 2.0 is the next generation of high-speed ruggedized backplane connectors. R-VPX Evolution 2.0 series connectors are designed and optimized to achieve data rates in excess of 25 Gb/s, meeting VITA 46.30 requirements. This makes the Evolution 2.0 Series connectors among the fastest VITA 46.30 connectors in the world. These connectors are tested to VITA 46 levels and are backward intermateable with R-VPX, R-VPX EVO 1 and VITA 46 qualified connectors.

- 25+ Gb/s performance
- Module and backplane connectors utilize smaller compliant contacts for increase Si performance
- Intermateable with existing/legacy VITA 46 connectors
- Qualified to VITA 46 spec
- Ruggedized 4-point contact system
- Passed VITA 72 vibration level testing with BER monitoring.

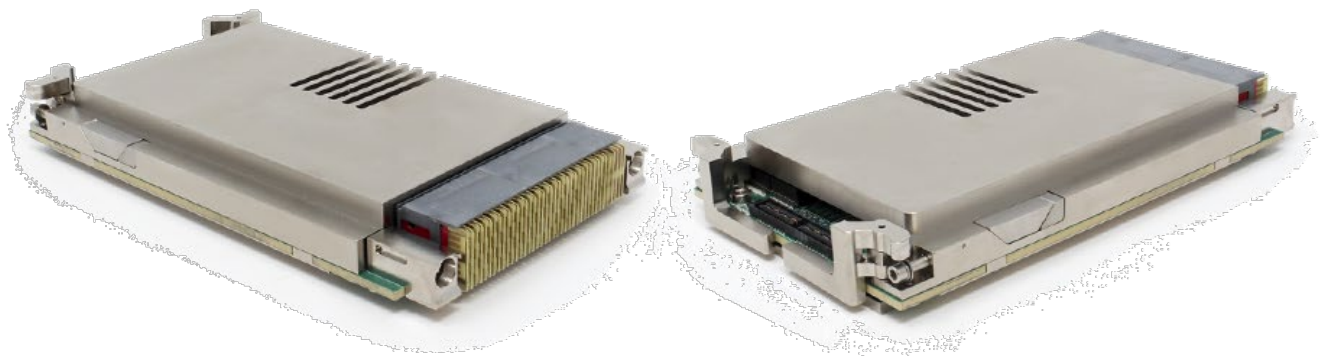
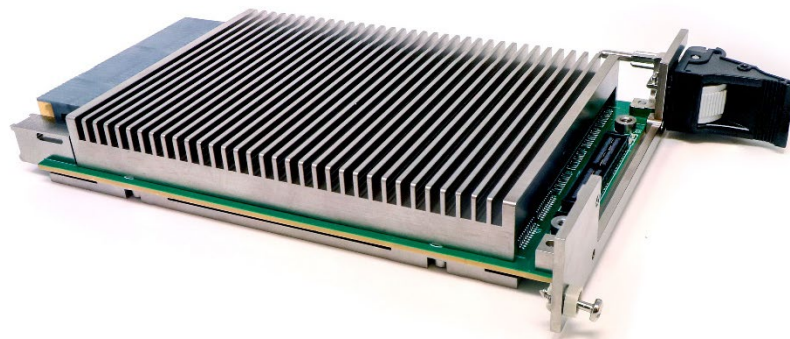
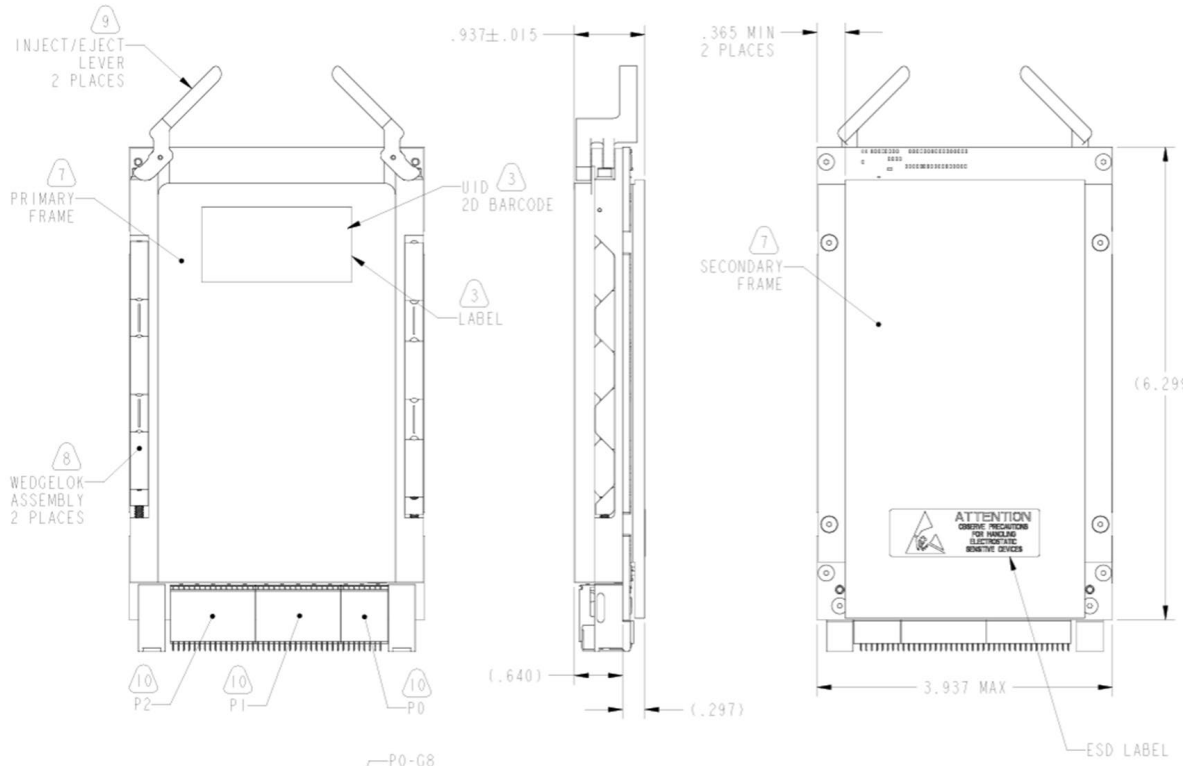


DIMENSIONAL INFORMATION

VITA91 SOSA Variant - Mechanical prints, pinouts, and step files available upon request



LEGACY RVPX SOSA Variant - Mechanical prints, pinouts, and step files available upon request



SOFTWARE

Fully Managed – 60 second boot - Manuals available upon request

| | | |
|---|--|--|
| Stacking | Configuring VLANs | Configuring IGMP Snooping |
| Stacking Ring Topology | Defining VLAN Properties | Configuring MLD Snooping |
| Stacking Chain Topology | Defining VLAN Membership | Viewing IGMP/MLD IP Multicast Groups |
| Stacking Members and Unit ID | Defining VLAN Interface Settings | Defining Multicast Router Ports |
| Removing and Replacing Stacking Member | Configuring GARP | Defining Forward All Multicast |
| Exchanging Stacking Members | Defining GARP | Defining Unregistered Multicast Settings |
| Switching the Stacking Master | Defining GVRP | Managing System Files |
| Configuring System Time | Viewing GVRP Statistics | Downloading System Files |
| Configuring Daylight Savings Time | Defining IP Addresses | Firmware Download |
| Configuring SNTP | Configuring IP Addressing | Configuration Download |
| Polling for Unicast Time Information | Defining IP Addresses | Uploading System Files |
| Polling for Anycast Time Information | Defining ARP | Upload Type |
| Broadcast Time Information | Defining Domain Name Servers | Software Image Upload |
| Defining SNTP Settings | Defining DNS Servers | Configuration Upload |
| Configuring Device Security | Defining DNS Host Mapping | Copying Files |
| Configuring Management Security | Defining the Forwarding Database | Restoring the Default Configuration File |
| Configuring Authentication Methods | Defining Static Forwarding Database Entries | Configuring Quality of Service |
| Defining Access Profiles | Defining Dynamic Forwarding Database Entries | Quality of Service Overview |
| Defining Profile Rules | Configuring Spanning Tree | VPT Classification Information |
| Defining Authentication Profiles | Defining Classic Spanning Tree | CoS Services |
| Mapping Authentication Methods | Defining STP on Interfaces | Defining General QoS Settings |
| Defining RADIUS Settings | Defining Rapid Spanning Tree | Configuring QoS General Settings |
| Defining TACACS+ Authentication | Defining Multiple Spanning Tree | Restoring Factory Default QoS Interface Settings |
| Configuring Passwords | Defining MSTP Instance Settings | Defining Queues |
| Defining Local Users | Defining MSTP Interface Settings | Defining Bandwidth Settings |
| Defining Line Passwords | Configuring SNMP | Mapping CoS Values to Queues |
| Defining Enable Passwords | SNMP v1 and v2c | Mapping DSCP Values to Queues |
| Configuring Network Security | SNMP v3 | Defining QoS Basic Mode |
| Network Security Overview | Configuring SNMP Security | Defining Basic Mode Settings |
| Port-Based Authentication | Defining SNMP Security | Rewriting Basic Mode DSCP Values |
| Advanced Port-Based Authentication | Defining SNMP View | Defining QoS Advanced Mode |
| Defining Port Authentication Properties | Defining SNMP Group Profiles | Setting Policy Binding |
| Defining Port Authentication | Defining SNMP Group Members | Managing Device Diagnostics |
| Configuring Multiple Hosts | Defining SNMP Communities | Configuring Port Mirroring |
| Defining Authentication Hosts | SNMP Communities Basic Table | Viewing Statistics |
| Viewing EAP Statistics | SNMP Communities Advanced Table | Viewing Interface Statistics |
| Defining Access Control Lists | Configuring SNMP Notifications | Viewing Interface Statistics |
| Defining IP Based Access Control Lists | Defining SNMP Notification Global Parameters | Receive Statistics |
| Defining MAC Based Access Control Lists | Defining SNMP Notification Filters | Transmit Statistics |
| Binding Device Security ACLs | Defining SNMP Notification Recipients | Viewing Etherlike Statistics |
| Managing Port Security | SNMPv1,2c Notification Recipients | Managing RMON Statistics |
| Enabling Storm Control | SNMPv3 Notification Recipients | Viewing RMON Statistics |
| Configuring System Logs | Configuring Multicast Forwarding | Configuring RMON History |
| Defining General Log Properties | Multicast Forwarding | Defining RMON History Control |
| Viewing Memory Logs | Typical Multicast Setup | Viewing the RMON History Table |
| Viewing Flash Logs | Multicast Operation | Configuring RMON Events |
| Defining System Log Servers | Multicast Registration | Defining RMON Events Control |
| Configuring Interfaces | Multicast Address Properties | Viewing the RMON Events Logs |
| Configuring Ports | Defining Multicast Properties | Defining RMON Alarms |
| Aggregating Ports | Adding MAC Group Address | |
| Configuring LACP | Adding IP Multicast Groups | |

Lightly Managed – 10 second boot - Manuals available upon request

CLI and Web Interface

IPV4 / IPV6 routing

Information on links and routing

Tagged and untagged VLAN configurations

Trunk Link Aggregation

Port Mirroring

Port Based QoS

802.1P QoS

Rate Limitations

Loop Detection

Multicast IGMP Snooping

Cable Diagnostics

Amphenol

CF020400-065

- System
- Port
- Statistics
- VLAN
- Trunking
- Mirror
- QoS
- Rate
- Loopback Detect
- Multicast
- Cable Diagnostic
- Access Control
- Password
- Logout

100G 25.50G 2.5-10G 10M-1G AN 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

IEEE 802.1P QoS Port-Based QoS

QoS Setting Help

Scheduling Method: Weighted Round Robin

| Priority | (Low) | 0 | 1 | 2 | 3 | 4 | 5 | 6 | (High) | 7 | Weight |
|----------------|-----------------------|-----------------------|----------------------------------|-----------------------|----------------------------------|-----------------------|-----------------------|----------------------------------|----------------------------------|-----------------------|--------|
| Queue 0 (Low) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | 1 |
| Queue 1 | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | 2 |
| Queue 2 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | 4 |
| Queue 3 (High) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | 8 |

ACCESSORIES

El Sharko - 3U VPX Development Chassis

Supporting Legacy RVPX and SOSA Aligned Payload Integration

The El Sharko is a versatile bench-top platform designed to provide the scalability needed for rapid development, demonstration, and evaluation of 3U VPX and SOSA-aligned systems. By streamlining design cycles, El Sharko helps accelerate deployment timelines. Its design allows for quick backplane replacements and seamless transitions between air-cooled and conduction-cooled slot inserts.

Featuring an open-frame design, El Sharko includes a backplane, power supply, fan cooling, and rear transition slots, supporting a wide range of test functions. It comes standard with an 8-slot, 1.2" pitch, 40Gb power and ground backplane to enhance your development capabilities.

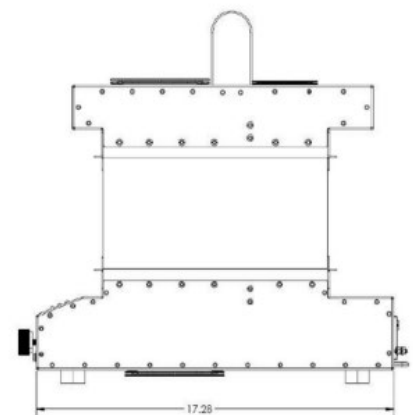
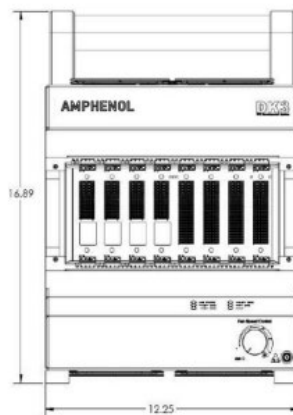
The platform is equipped with a balanced 12V/5V power supply for mixed power payloads, with an optional 12V-centric power supply available upon request. Both configurations are optimized to meet current and future VPX and SOSA-aligned module power requirements.

Datasheet:

<https://www.amphenol-aerospace.com/resources/literature/view/el-sharko-3u-vpx-dev-chassis-datasheet>

PART NUMBER TABLE

| | |
|---------------|--|
| CF-020400-604 | The El Sharko development chassis, 8 x 1.2" pitch air-cooled slots, power, and ground pass-thru 40Gb backplane with 4 x VITA67 full width apertures and balanced 12V/5V PSU. Consult Amphenol for 12V centric PSU and fully populated backplane availability |
| CF-020400-605 | Conduction cooled guide accessory kit. Includes top and bottom guides plus mounting hardware |



Nessie - 3U VPX 50G Development Chassis

Supporting new VITA-91 and SOSA Aligned Payload Integration

Nessie is the premier development chassis featuring high-density SOSA V91 connectors, specifically designed for next-generation VPX systems operating at 50Gbps. It offers unmatched scalability, making it ideal for rapid development, demonstration, and evaluation of MIL-HD2 Next-Gen SOSA/VITA 91-aligned connectors, perfectly suited for advanced switch and payload card requirements.

By accelerating design cycles, Nessie enables faster time to deployment. Its flexible design allows for quick backplane replacements and seamless transitions between air-cooled and conduction-cooled slot inserts, making it a versatile solution for a range of applications.

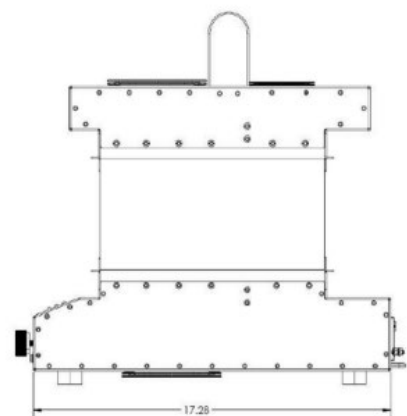
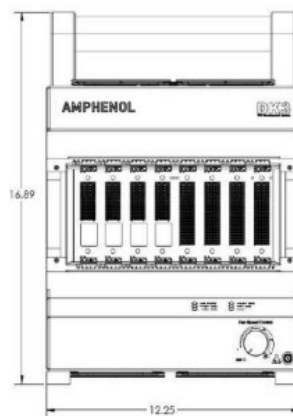
The open-frame chassis includes an integrated backplane, power supply, fan cooling, and rear transition slots, all supporting various test functions. Nessie comes standard with a 6-slot, 1.2" pitch, 50Gb backplane, ensuring robust support for your development needs. It also features a balanced 12V/5V power supply for mixed power payloads, with an optional 12V-centric power supply available on request, meeting the power requirements for both current and future VPX and SOSA-aligned modules.

Datasheet:

<https://www.amphenol-aerospace.com/resources/literature/view/3u-vpx-50g-development-chassis-nessie>

PART NUMBER TABLE

| | |
|---------------|---|
| CF-020400-612 | The Nessie development chassis, 6 x 1.2" pitch air-cooled slots, power, and ground pass-thru 50Gb backplane with 3 x VITA67 full width apertures and balanced 12V/5V PSU. Consult Amphenol for 12V centric PSU and fully populated backplane availability |
| CF-020400-605 | Conduction cooled guide accessory kit. Includes top and bottom guides plus mounting hardware |



Amphenol Ruggedization Pedigree

OVERVIEW:

Amphenol integrated electronic products are designed and manufactured to our Ruggedization guidelines listed below. These guidelines ensure years of reliable operation in harsh environment applications where extreme operating temperatures, shock, vibration, and corrosive atmospheres are regularly experienced. Unless otherwise noted, the parts conform to the below specifications

TEMPERATURE:

- Operating Temperature- Thermal Cycles between -40°C and 85°C while device is operating
- Temperature is measured at chassis housing or card edge
- Storage Temperature- Thermal Cycles between -55°C and 125°C

HUMIDITY:

- Operating Humidity- Humidity cycle between 0-100% non-condensing humidity while device operating
- Storage Humidity- Humidity cycle between 0-100% condensing humidity

SEALING:

- Sealing can be optionally provided at the MIL-DTL-38999 interface with up to 10-5 cc/sec performance

SHOCK AND VIBRATION:

- Sine Vibration - 10g Peak, 5-2,000Hz
 - Based on a sine sweep duration of 10 minutes per axis in each of three mutually perpendicular axes. May be displacement limited from 5 to 44 Hz, depending on specific test.
- Random Vibration - 0.0005 @ 5Hz, 0.1 @ 15 Hz, 0.1 @ 2,000 Hz
 - 60 minutes per axis, in each of three mutually perpendicular axes.
- 40 G Peak Shock Cycle
 - Three hits in each axis, both directions, ½ sine and terminal-peak saw tooth, Total 36 hits.

LUIDS SUSCEPTABILITY:

- MIL-DTL-38999 receptacle interface per EIA-364-10E

ALTITUDE:

- -1,500 to 60,000 ft Altitude Testing w/ Rapid Depressurization

ELECTROMAGNETIC COMPATIBILITY:

- Designed to comply with MIL-STD-461E

PRINTED CIRCUIT BOARD ASSEMBLIES:

- Conformal Coat
- Amphenol performs Conformal Coating to both sides of printed circuit board assemblies using HUSMISEAL IB31 in accordance with IPC-610, Class 3.
- Printed Circuit Board Rigidity
- Amphenol printed circuit boards are fabricated in accordance with IPC-6012, Class 3.
- Printed Circuit Board Fabrication
- Amphenol printed circuit boards acceptance criteria is in accordance with IPC-610, Class 3.

RELIABILITY PREDICTIONS (MTBF):

Amphenol can perform Mean Time Between Failure (MTBF) reliability analysis in full compliance with MIL-HDBK-217F-1 Parts Count Prediction and MIL-HDBK-217F-1 Parts Stress Analysis Prediction. We can also perform reliability analyses in full compliance of ANSI/VITA 51.1 if it is required or preferred over the later met

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