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RAPTORLINK ETHERNET SWITCHES

NEXT GENERATION 64 CHANNEL 50G 3U VITA-91 AND LEGACY VPX

DESCRIPTION

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 one on-board quad-core ARM processor, 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

Jared Sibrava | +1 (607) 643-1845 | jsibrava@amphenol-aao.com | amphenol-aerospace.com

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DESCRIPTION CONT.

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 10G NRZ speeds and lightweight management software. These options include:

- Dual 64x10G switch – SOSA aligned VITA-91 double density and speed connectors
- Single 32x10G switch – SOSA aligned VITA-91 double density and speed connectors
- Single 32x10G switch (with legacy RVPX SOSA-aligned connectors)

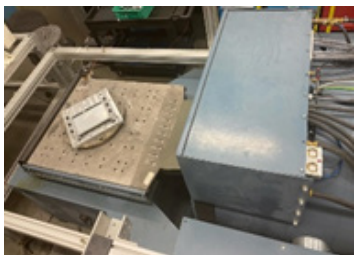
Along with the switch and processing infrastructure available in many different configurations, the RaptorLink 64X60 has a VITA46.11 Tier 1 compliant IPMI solution for sensor, link state, health, BIT, and other reporting to chassis managers. It also supports redundant IPMB interfaces and IPMB fast modes.

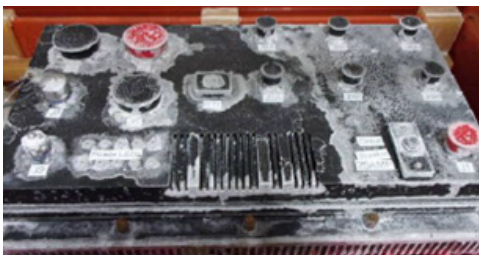
FEATURES & BENEFITS:

- 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 RS-232 and 1GBase-T
- SOSA-aligned 12V power input with a full IPMI controller for chassis management
- Powered by a quad-core ARM CPU with DDR4-SDRAM, flash memory, and EEPROM
- Linux OS with comprehensive network management software

RUGGEDIZATION:

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





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ORDERING INFORMATION:

PART NUMBER TABLE – VITA91 SOSA VARIANTS

CF-02W300-12X	Dual Switch – 64 channels @ 50G	Managed	125 Watts	~60 second boot	PTP
CF-02W300-13X	Single Switch – 32 channels @ 50G	Managed	81 Watts	~60 second boot	PTP
CF-02W300-14X	Signal Meshed Switch – 40 channels @ 50G	Managed	125 Watts	~60 second boot	PTP
CF-02W300-15X	Dual Switch – 64 channels @ 10G	Light Mgmt	36 Watts	~10 second boot	NO PTP
CF-02W300-16X	Single Switch – 32 channels @ 10G	Light Mgmt	18 Watts	~10 second boot	NO PTP

- 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’

REAR TRANSITION MODULE

CF-02W300-12R	SOSA V91 Variant	Breakout Test Board with up to 64 channels 25G fiber optics on MTPs

PART NUMBER TABLE – LEGACY RVPX SOSA VARIANTS

CF-02W300-17X	Single Switch – 32 channels @ 25G	Managed	81 Watts	~60 second boot	PTP
CF-02W300-18X	Single Switch – 32 channels @ 10G	Light Mgmt	18 Watts	~10 second boot	NO PTP

- 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'

REAR TRANSITION MODULE

CF-020400-603R	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

Jared Sibrava | +1 (607) 643-1845 | jsibrava@amphenol-aao.com | amphenol-aerospace.com

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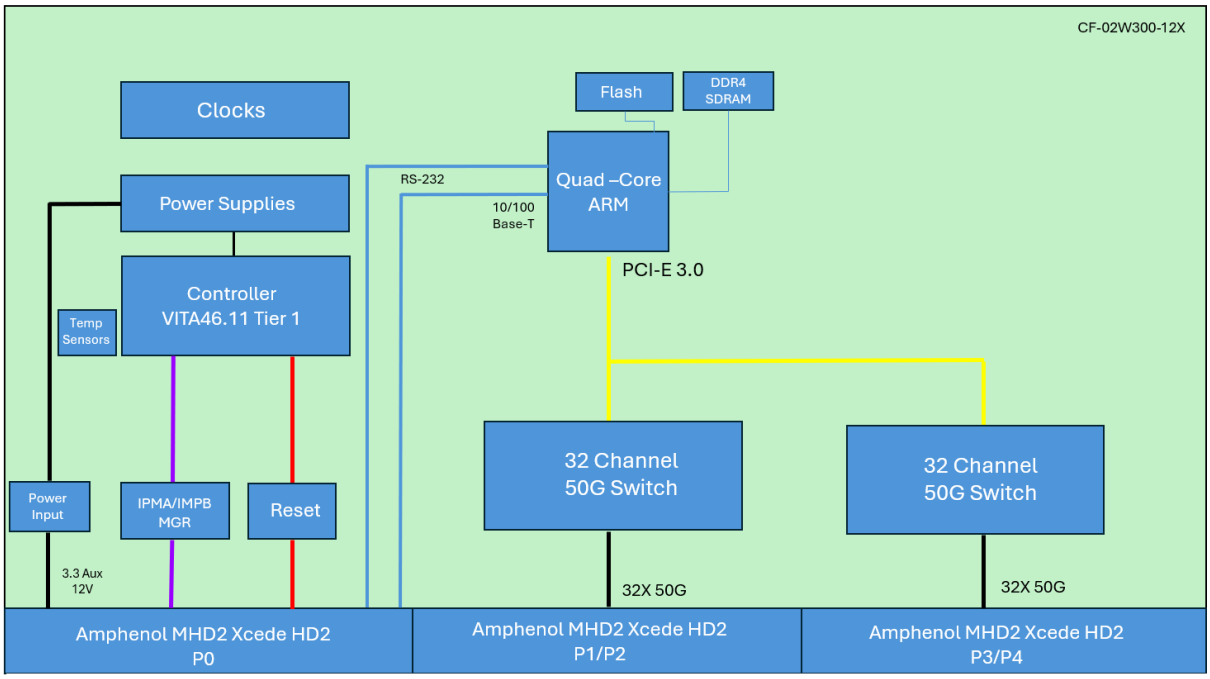
BLOCK DIAGRAMS | VITA91 SOSA VARIANTS

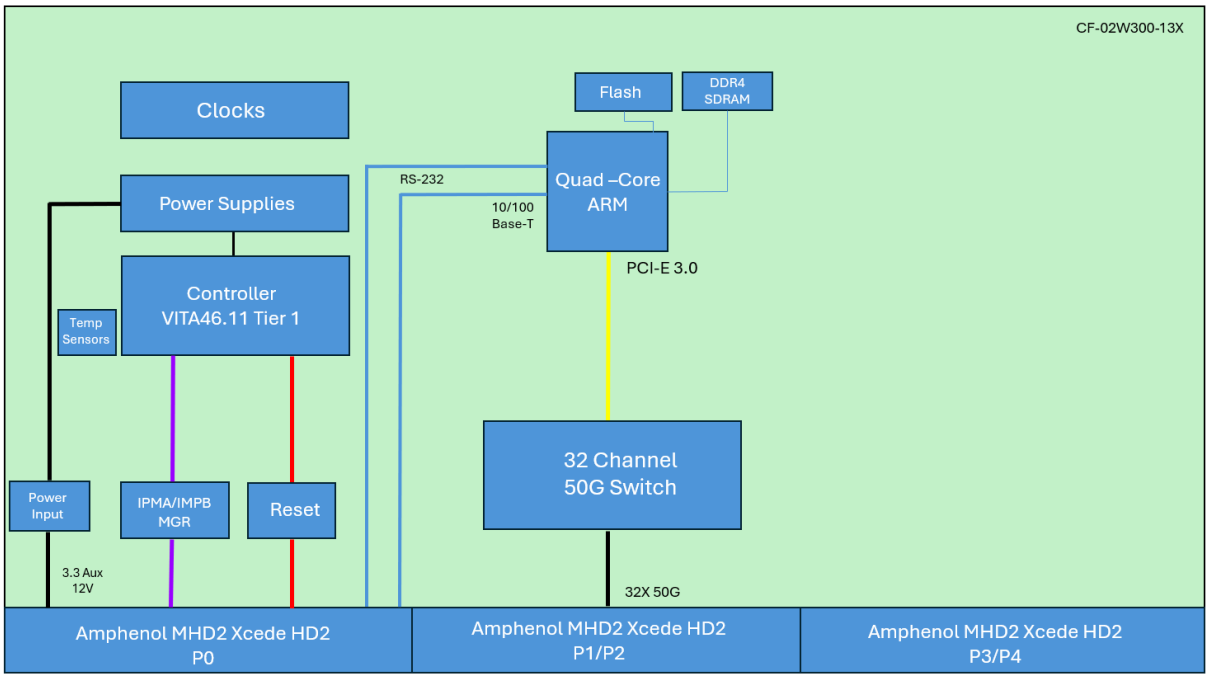
CF-02W300-12X

Dual Switch - 64 Channels @ 50G | 125 Watts | ~60 Second Boot | PTP



CF-02W300-13X

Single Switch - 32 Channels @ 50G | 81 Watts | ~60 Second Boot | PTP



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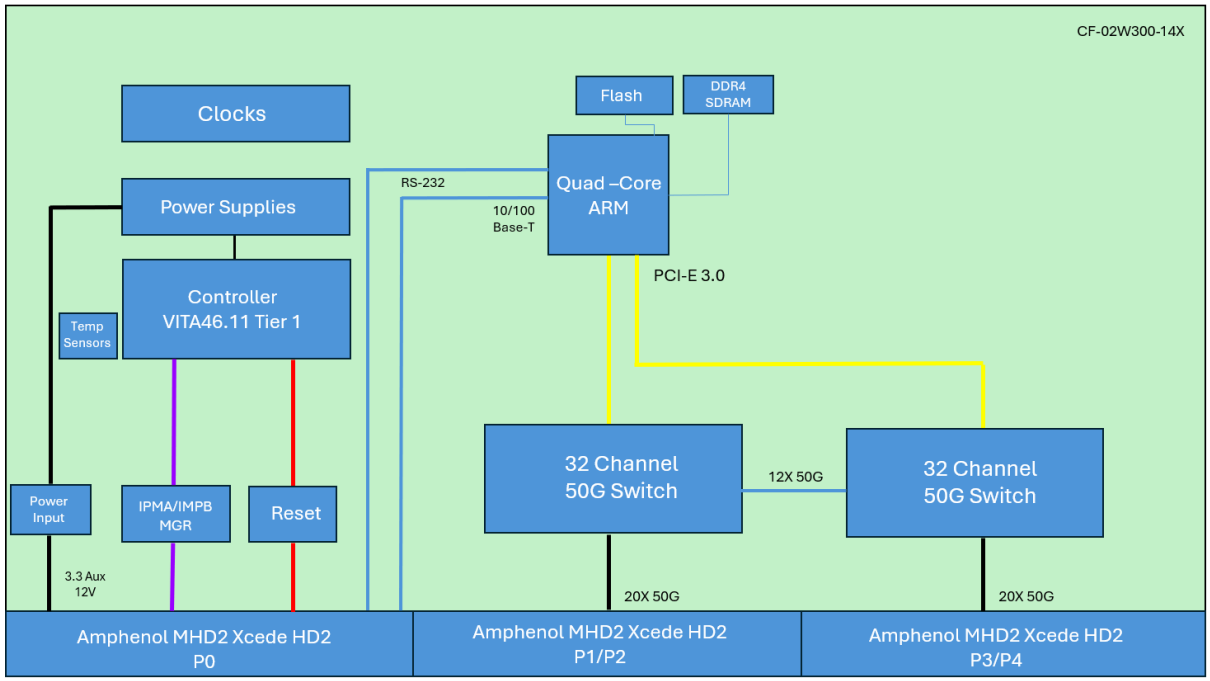
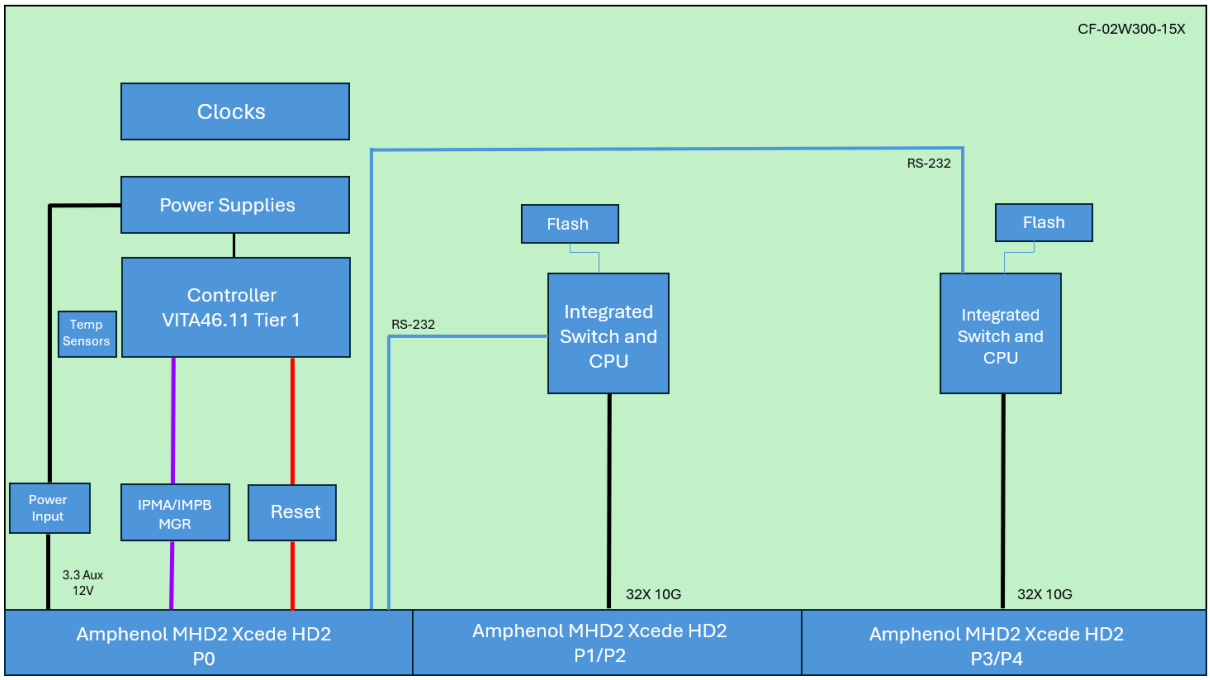
CF-02W300-14X

Single Meshed Switch - 40 Channels @ 50G | 125 Watts | ~60 Second Boot | PTP



CF-02W300-15X

Dual Switch - 64 Channels @ 10G | 36 Watts | ~10 Second Boot | No PTP



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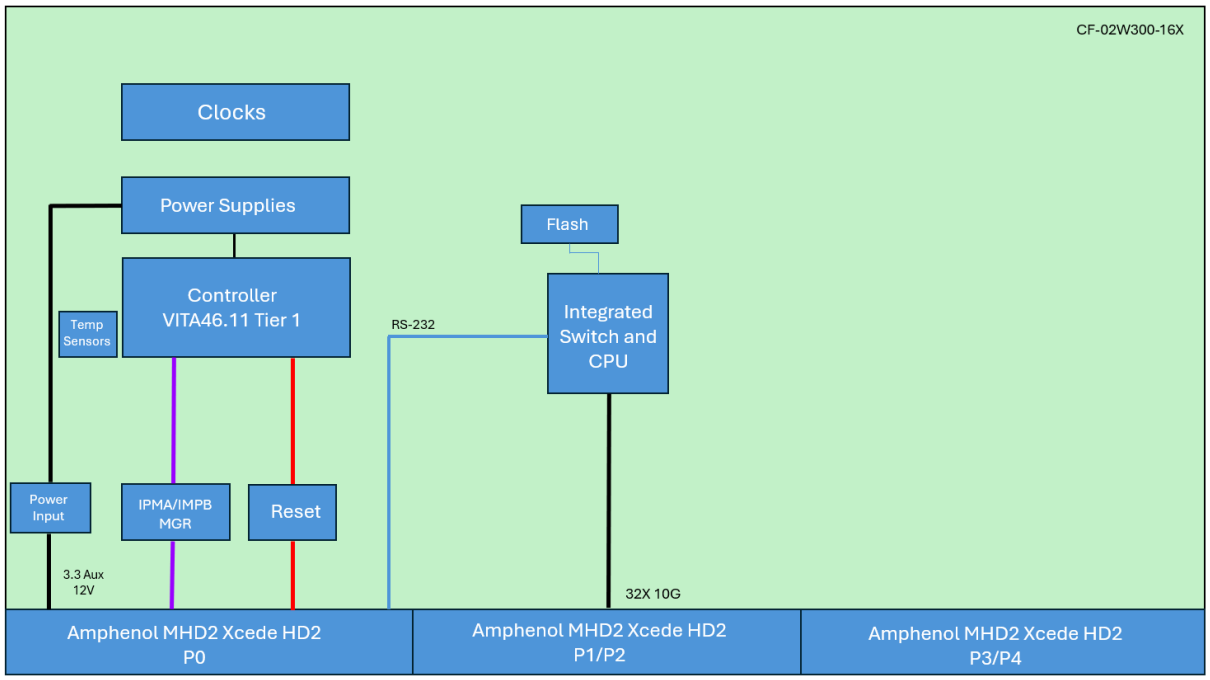
CF-02W300-16X

Dual Switch - 32 Channels @ 10G | 18 Watts | ~10 Second Boot | No PTP

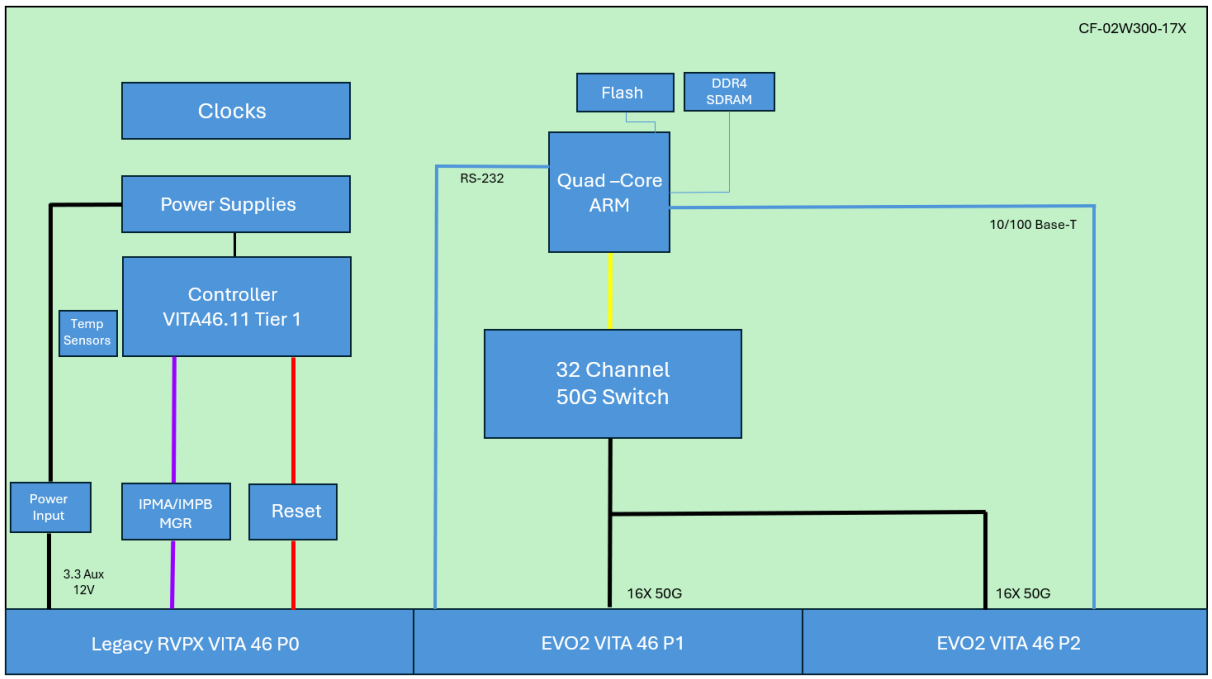


Jared Sibrava | +1 (607) 643-1845 | jsibrava@amphenol-aao.com | amphenol-aerospace.com

BLOCK DIAGRAMS | LEGACY RVPX SOSA VARIANTS

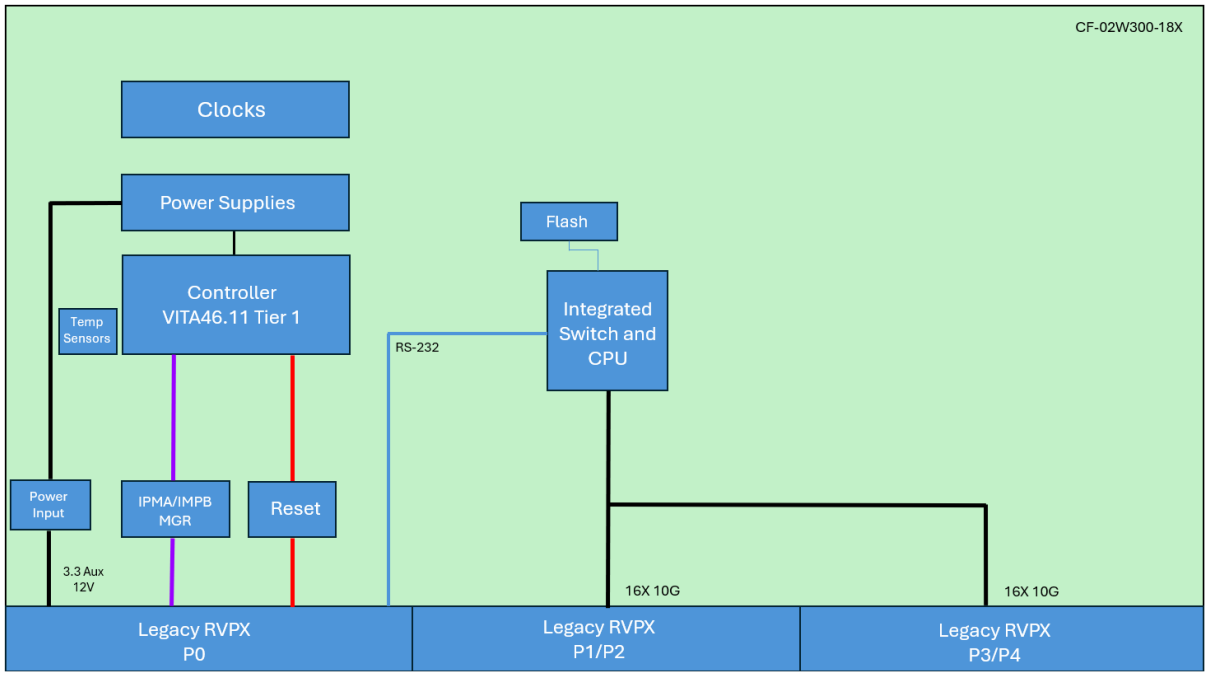
CF-02W300-17X

Single Switch - 32 Channels @ 25G | 81 Watts | ~60 Second Boot | PTP



CF-02W300-18X

Single Switch - 32 Channels @ 10G | 18 Watts | ~10 Second Boot | No PTP



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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.

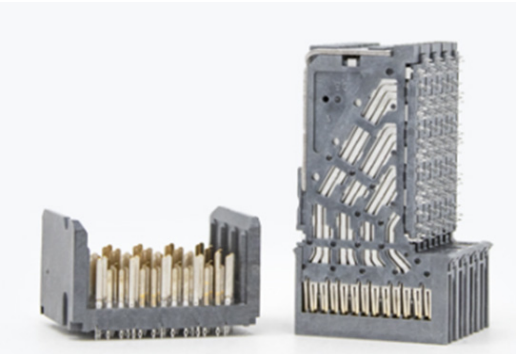
LABELING

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

BOARD VARIENTS 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



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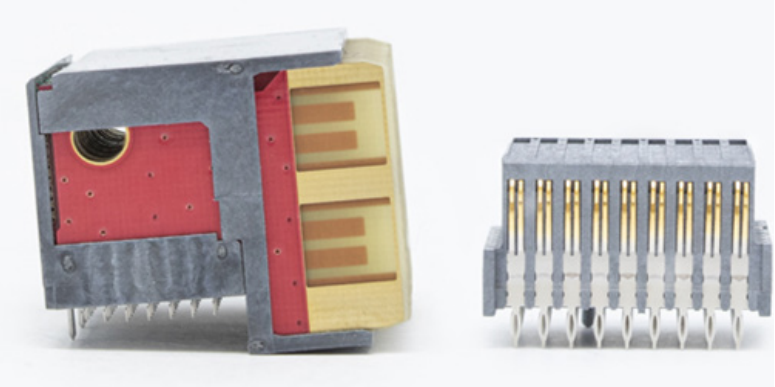
BOARD VARIANTS WITH LEGACY RVPX 25G SOSA CONNECTORS

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.



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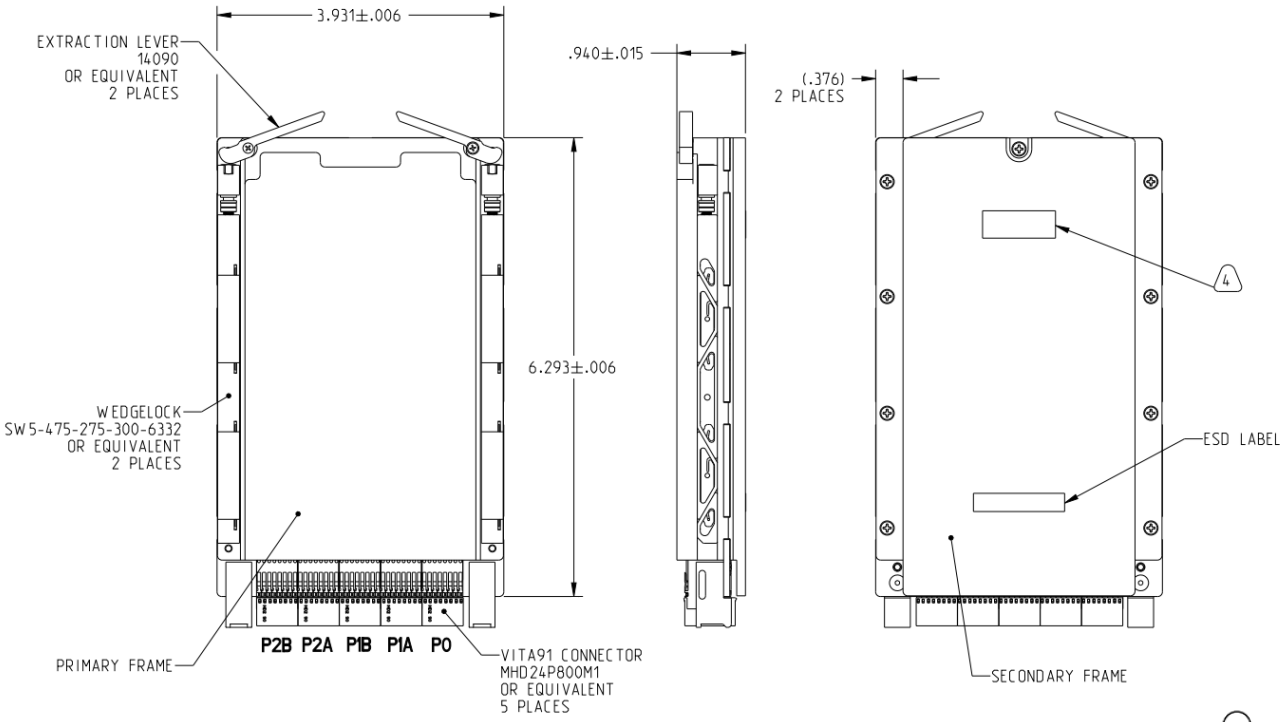
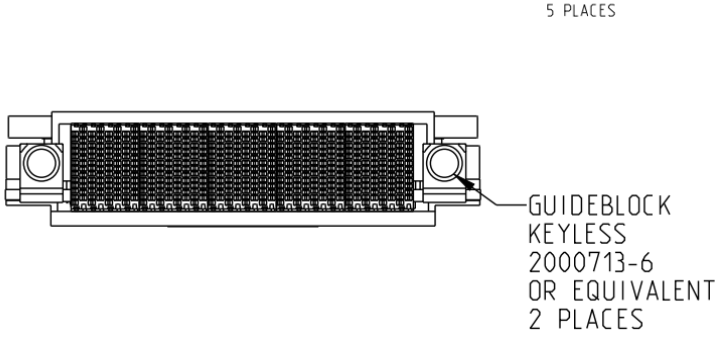
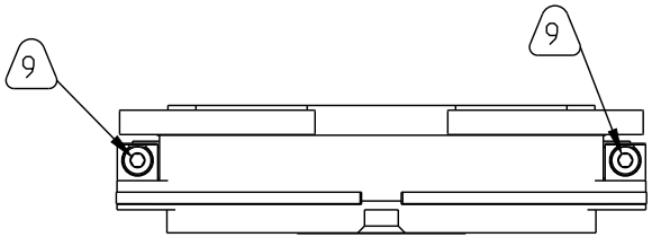
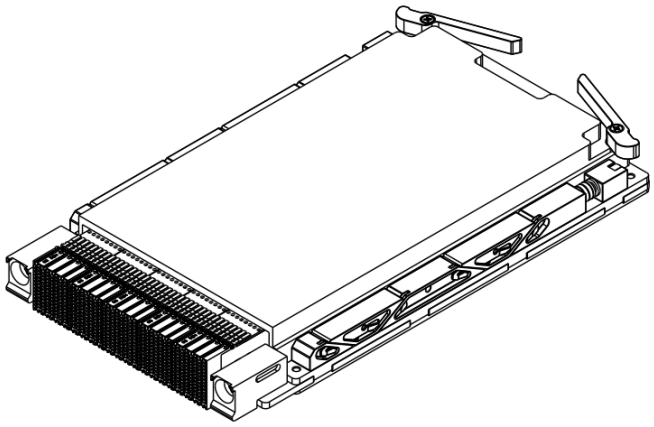
DIMENSIONAL INFORMATION

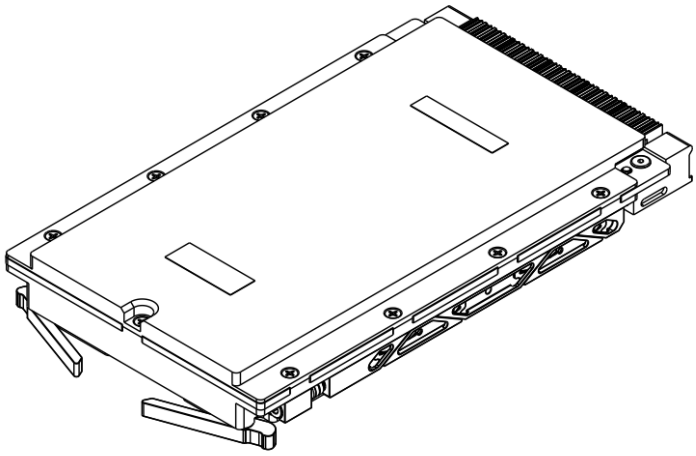
VITA91 SOSA VARIANT - MECHANICAL PRINTS, PINOUTS, AND STEP FILES AVAILABLE UPON REQUEST











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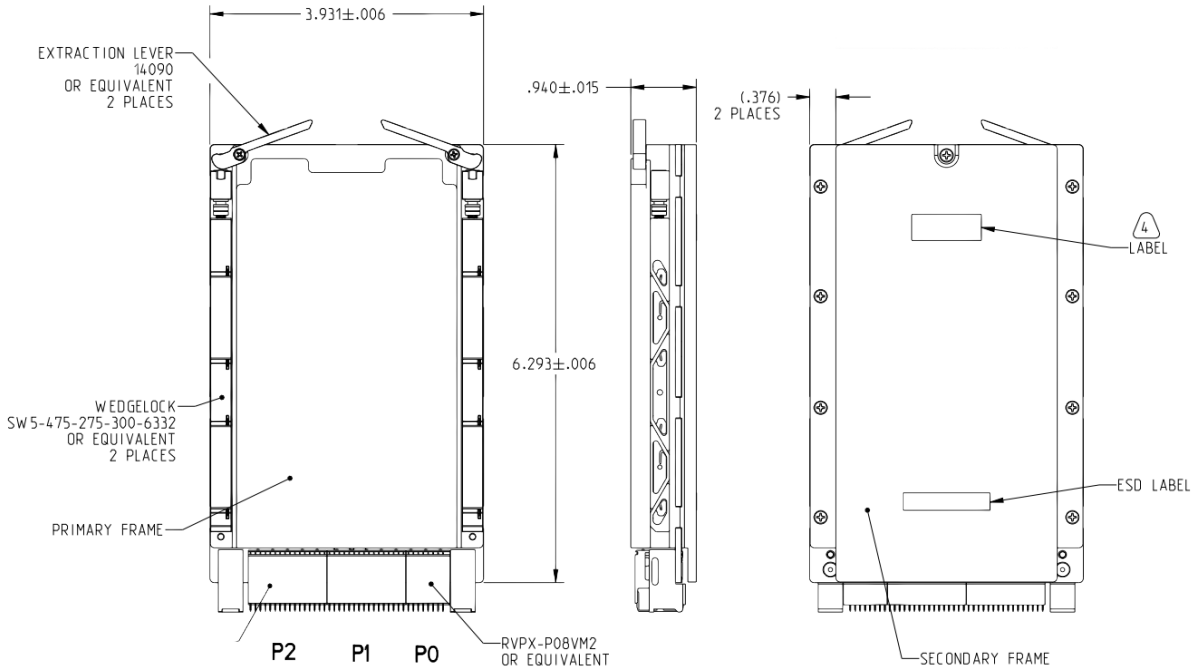
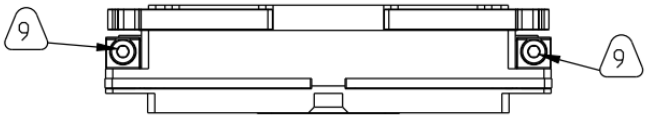
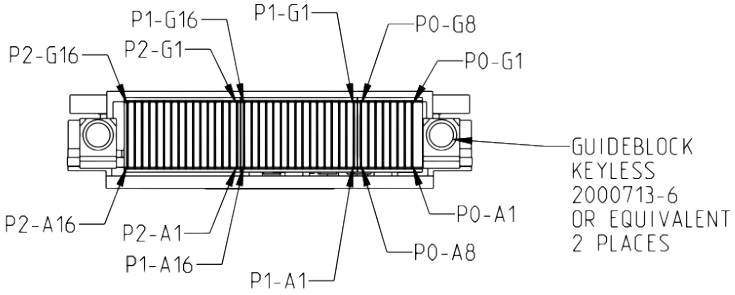
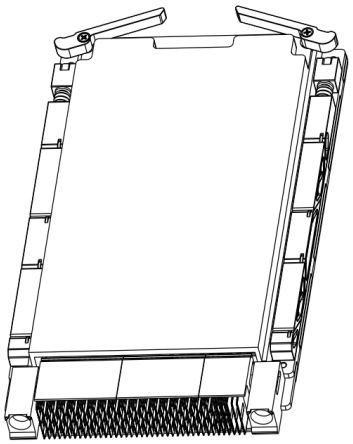
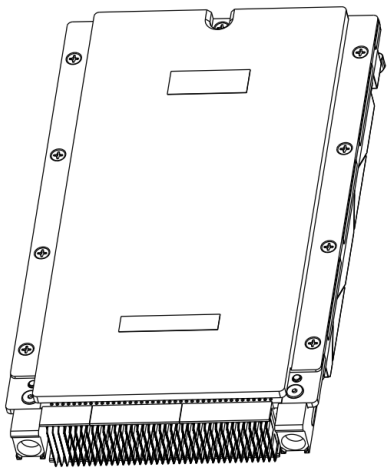
LEGACY RVPX SOSA VARIANT - MECHANICAL PRINTS, PINOUTS, AND STEP FILES AVAILABLE UPON REQUEST











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SOFTWARE

FULLY MANAGED | 60 SECOND BOOT | MANUALS AVAILABLE UPON REQUEST

STACKING
Stacking Ring Topology
Stacking Chain Topology
Removing and Replacing Stacking Members
Exchanging Stacking Members
Switching the Stacking Master

CONFIGURING SYSTEM TIME
Configuring of Daylight Savings Time
Configuring SNTP
Polling for Unicast Time Informaiton
Polling for Anycast Time Information
Broadcast Time Information
Defining SNTP Settings

CONFIGURING DEVICE SECURITY
Configuring Management Security
Configuring Authentication Methods
Defining Access Profiles
Defining Profile Rules
Defining Authenticaion Profiles
Defining RADIOUS Settings
Defining TACACS+ Authentication
Configuring Passwords
Defining Local Users
Defining Line Passwords
Defining Enable Passwords
Configuring Network Security
Network Security Overview
Port-Based Authentication
Advanced Port-Based Authentication
Defining Port Authentication Properties
Defining Port Authentication
Configuring Multiple Hosts
Defining Authentication Hosts
Viewing EAP Statistics
Defining Access Control Lists
Defining IP Based Access Control Lists
Defining MAC Based Access Control Lists
Binding Device Security ACL's
Managing Port Security
Enabling Storm Control

CONFIGURING SYSTEM LOGS
Defining General Log Properties
Viewing Memory Logs
Viewing Flash Logs
Defining System Log Servers

CONFIGURING INTERFACES
Configuring Ports
Aggregating Ports
Configuring LACP
Configuring VLAN's
Defining VLAN Properties
Defining VLAN Membership
Defiing VLAN Interface Settings
Configuring GARP
Defining GARP
Defining GVRP
Viewing GVRP Statistics

DEFINING IP ADDRESSES
Configuring IP Addressing
Defining IP Addressing
Defining ARP
Defining Domain Name Servers
Defining DNS Servers
Defining DNS Host Mapping

DEFINING THE FORWARDING DATABASE
Defining Static Forwarding Database Entries
Defining Dynamic Forwarding Database Entries
CONFIGURING SPANNING TREE
Defining Classic Spanning Tree
Defining STP on Interfaces
Defining Rapid Spanning Tree
Defining Multiple Spanning Tree
Defining MSTP Instances Settings

CONFIGURING SNMP
SNMP v1 and v2c
SNMP v3
Configuring SNMP Security
Defining SNMP View
Defining SNMP Group Profiles
Defining SNMP Group Members
Defining SNMP Communities
SNMP Communities Basic Table
SNMP Communities Advanced Table
Configuring SNMP Notifications
Defining SNMP Notification Global Parameters
Defining SNMP Notificaiton Filters
Defining SNMP Notification Recipients
SNMP v3 Notification Recipients

CONFIGURING MULTICAST FORWARDING
Multicast Forwarding
Typical Multicast Setup
Multicast Operation
Multicast Registration
Multicast Address Properties
Defining Multicast Properties
Adding MAC Group Address
Adding IP Multicast Groups
Configuring IGMP Snooping
Configuring MLD Snooping
Viewing IGMP/MLD IP Multicast Groups
Defining Multicast Router Ports
Defining Forward All Multicast

MANAGING SYSTEM FILES
Downloading System Files
Firmware Download
Configuration Download
Uploading System Files
Upload Type
Software Image Upload
Configuration Upload
Copying Files
Restoring the Defult Configuration File

CONFIGURING QUALITY OF SERVICE
Quality of Service Overview
VPT Classification Information
CoS Services
Defining General QoS Settings
Configuring QoS Settings
Restoring Factory Defult QoS Interface Settings
Defining Queues
Defining Bandwidth Settings
Mapping CoS Values to Queues
Mapping DSCP Values to Queues
Defining QoS Basic Mode
Defiing Basic Mode Settings
Rewritting Basic Mode DSCP Values
Defining QoS Advanced Mode
Setting Policy Binding

MANAGING DEVICE DIAGNOSTICS
Configuring Port Mirroiring

VIEWING STATISTICS
Viewing Interface Statistics
Recieve Statistics
Transmit Statstics
Viewing Etherlike Statistics
Managing RMON Statistics
Viewing RMON Statistics
Configuring RMON History
Defining RMON History Control
Viewing the RMON History Table
Configuring RMON Events
Defining RMON Events Control
Viewing the RMON Events Logs
Defining RMON Alarms

Jared Sibrava | +1 (607) 643-1845 | jsibrava@amphenol-aao.com | amphenol-aerospace.com

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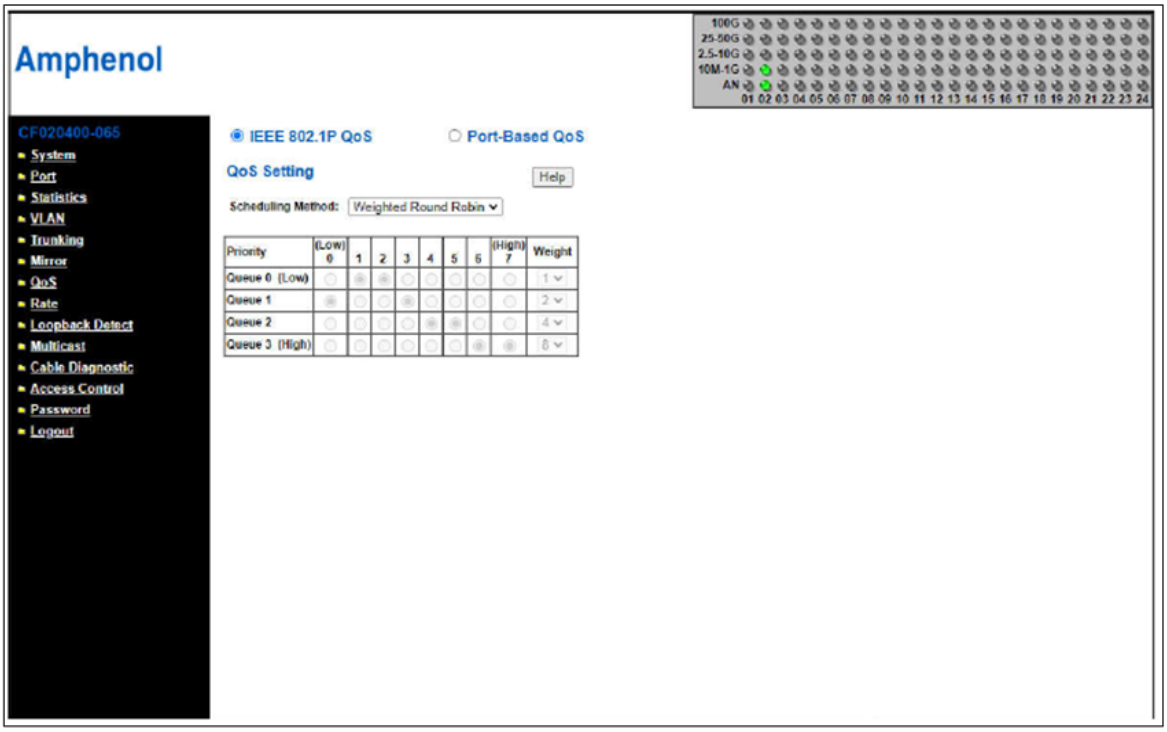
LIGHTLY MANAGED | 10 SECOND BOOT | MANUALS AVAILABLE UPON REQUEST

Configuring Authentication Methods
CLI and Web Interface
IPV4 / IPV6 Routing
Information on Links and Routing
Tagged and Untagged VLAN Configurtations
Trunk Link Aggregation
Port Mirroring Port Based QoS
802.1P QoS
Rate Limitations
Loop Detection
Multicast IGMP Snooping



Jared Sibrava | +1 (607) 643-1845 | jsibrava@amphenol-aao.com | amphenol-aerospace.com

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.

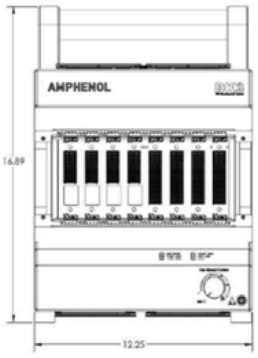
The platform is equipped with a balanced 12V/5V power supply for mixed power payloads, with an optional 12V-centric power supply available upon request. Both configurations are optimized to meet current and future VPX and SOSA-aligned module power requirements.

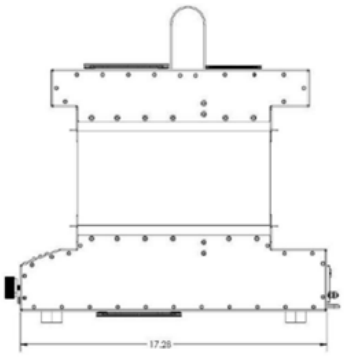
DATASHEET:

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





Jared Sibrava | +1 (607) 643-1845 | jsibrava@amphenol-aao.com | amphenol-aerospace.com

Amphenol
MILITARY HIGH SPEED

ACCESSORIES

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.

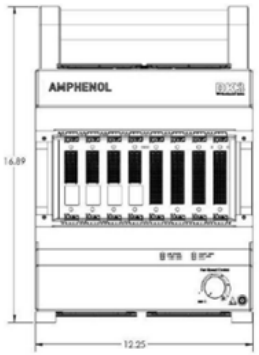
The open-frame chassis includes an integrated backplane, power supply, fan cooling, and rear transition slots, all supporting various test functions. Nessie comes standard with a 6-slot, 1.2" pitch, 50Gb backplane, ensuring robust support for your development needs. It also features a balanced 12V/5V 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.

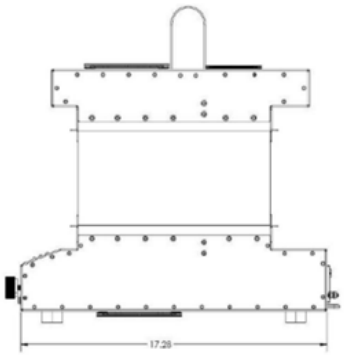
DATASHEET:

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





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AMPHENOL RUGGEDIZATION DESIGN

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

Opperating Temperature - thermal cycles between -40ºC and 85ºC while device is operating.

Temperature is measured at chassis housing or card edge

Storage temperature - thermal cycles between -55ºC and 125ºC

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
- o 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
- o 60 minutes per axis, in each of three mutually perpendicular axes.

40 G Peak Shock Cycle
- o Three hits in each axis, both directions, 1/2 sine and terminal-leak saw tooth, total 36 hits

FLUID SUSCEPTABILITY

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

ALTITUDE

Up to 60,000 ft Altitude Testing w/ Rapid Depressurization

ELECTROMAGNETIC COMPATIBILITY

Designed to comply with MIL-STL-461E

PRINTED CIRCUIT BOARD ASSEMBLIES

Conformal Coat

Amphenol performs Conformal Coting 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 method

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