

VPX010

6U OpenVPX 100G Switch with Integrated Health Management

Key Features

- Unified 1.5 GHz quad-core CPU for, Shelf Manager, JSM, and Fabric management
- Six 100G egress Ports on the front panel (configurable as six 40GbE)
- Each 100G/40G Port could be bifurcated to four 10G/1G Ports
- Automatic fail-over with redundant VPX010
- Full Layer 3 managed Ethernet switches
- PLL synthesizer for generating any clock frequency disciplined to GPS/SyncE/IEEE1588
- Non-blocking 100/40/10G/1GbE
- VITA 46 and VITA 65 compliant

Benefits

- Sophisticated clocking features enabling GPS/SyncE/NTP Grand Master Clock
- Optional virtual JTAG capability for remote programming and debugging eases FPGA code development
- VadaTech's Scorpionware® Shelf Management Software included at no additional cost
- Electrical, mechanical, software, and system-level expertise in house
- Full system supply from industry leader
- AS9100 and ISO9001 certified company



vadatech
THE POWER OF VISION

OpenVPX

100G



VPX010

The VPX010 is part of the VadaTech family of 100G switches fully integrated with health management. This range are the most feature-rich VPX products on the market.

The management software is based on VadaTech's operationally proven robust Carrier Manager and Shelf Manager. The MCMC manages the Power Modules, Cooling Units, and up to 12 payload modules within the chassis. It also manages the 100GbE switch.

The Ethernet switch is managed with an enterprise grade Layer 2 or 3 switching/routing stack that supports IEEE1588 and Synchronous Ethernet. Each 100G port is configurable to run as 40GbE, as four 10GbE or four 1GbE. The switch has a throughput of 3.2 TB which allows each port to run at full 100G speed without any blocking.

The VPX010 runs Linux on its centralized quad-core CPU and is fully redundant when used in conjunction with a second instance of the module. The firmware is HPM.2 compliant which allows for easy upgrades.

The unit provides JTAG services to the payload modules via the JSM which eliminates a separate JTAG dongles per board in the system. The virtual JTAG option allows the boards in the system to have a JTAG interface via IP and programmed remotely without any JTAG dongle in the system.

The VPX010 has advanced clocking features including grand master clock and high-quality clock distribution/synthesis.

Block Diagram

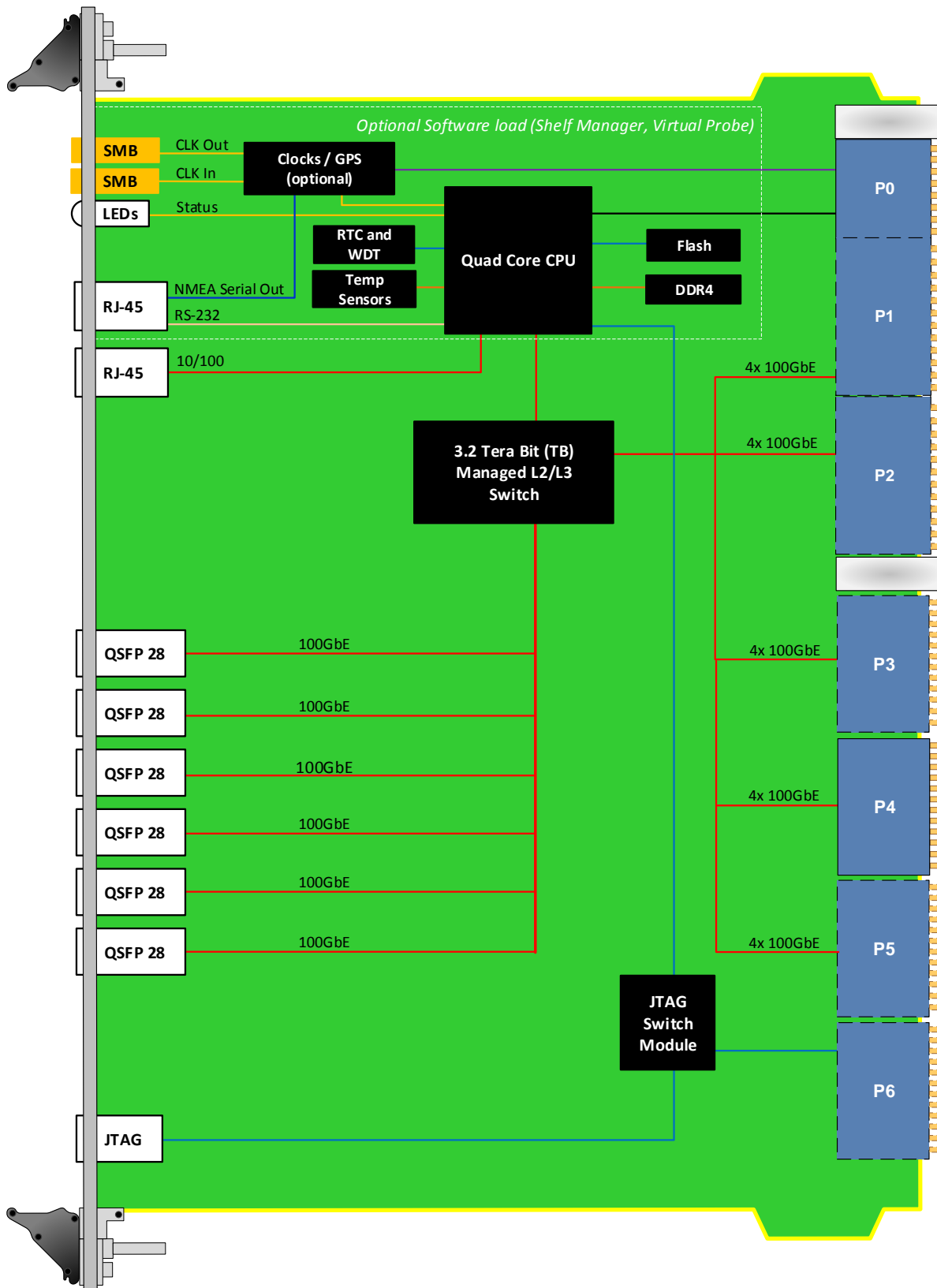


Figure 1: VPX010 Functional Block Diagram

Architecture

Optional IPMI Carrier Manager, Shelf Manager and Protocol Analyzer

The VPX010 utilizes the same proven standards-compliant IPMI management stack that has been utilized successfully in our previous generation products. It supports carrier manager, shelf manager, and protocol analyzer operations to help facilitate a seamless chassis integration experience. The IPMI stack enables a rich feature set including:

- IPMI v2.0 with IPMI v1.5 compatibility
- SDR, FRU, and SEL storage interfaces (SEL stored in MRAM for high-speed/non-volatile/no-wear-out access)
- Intelligent temperature, voltage, and current sensing
- Shelf cooling policy
- Shelf activation and power management/Automatic fail-over/redundancy management
- Alarm controls
- Event notification and flexible alerting policies
- CLI, SNMP, RMCP+, HTTP, and HPI
- IPMB Protocol Analyzer GUI for use on PC
- ScorpionWare GUI system manager integration tool on PC available separately

Fat Pipe Fabric

The VPX010 100GbE Switch provides:

- Layer 3 management
- Switch can be SyncE Grand Master based on GPS
- 3.2TB Gbps aggregate bandwidth

GPS and General-Purpose Clocks

The VadaTech VPX010 has the most sophisticated clocking distribution in the market to meet the most stringent requirements such as wireless infrastructure, high speed A/D, etc. The VPX010 supports the following GPS and general-purpose clocking features:

- Low-jitter/low-skew backplane routing
- Clock disciplining with arbitrary clock frequency output and holdover (Stratum-3 option) including 1PPS regeneration and holdover
- Flexible integration and synchronization between GPS, SyncE, and NTP clocking enabling Grand Master clock functionality
- 'Any Frequency' high-quality clock generation/jitter cleaning for up to two user clocks
- Supports hitless automatic clock failover for improved reliability
- Optional built-in GPS receiver enables direct time/clock synchronization to the GPS satellite constellation

The VPX010 supports flexible front panel clock port ordering options:

- Two DC-coupled LVCMOS Inputs/Outputs, or two AC-coupled Sine-wave Inputs, or one of each
- Built-in GPS receiver for time/location/clock synchronization plus a DC-coupled LVCMOS Input/Output

GPS Receiver Enabled Features

The VPX010 can be ordered with a GPS Receiver option. The receiver disciplines an onboard high-quality DPLL which is phase/frequency aligned to the atomic clocks in the GPS satellite constellation. The onboard clock synthesis/jitter cleaning capability can be utilized to convert this frequency into any frequency desired while still remaining locked to the GPS atomic clocks.

When the GPS Receiver option is purchased the VPX010 has the capability to re-transmit the incoming GPS data via Ethernet to other network nodes in the Trimble TSIP binary protocol format. This GPS data is also sent out the front panel GPS RS-232 serial port in the standard NMEA format for use by external equipment.

NTP Grand Master Clock

The VPX010 can provide Ethernet time services to the chassis networks on both the 100/40/10/1GbE ports. It can be subordinate to an external NTP master server or when the GPS receiver option is purchased can act as a Grand Master clock utilizing the precision timing information provided via the GPS receiver and on-board disciplined oscillator.

Synchronous Ethernet

The VPX010 provides a Synchronous Ethernet (SyncE) on each port. With this feature, ports on the Ethernet switch can be designated as master ports and the Ethernet fabrics within the chassis can be synchronized from end-to-end with external equipment. This feature utilizes advanced telecom-grade network synchronization PLLs to provide exceptional SyncE performance.

JTAG Master/JTAG via Ethernet Virtual Probe

The VPX010 provides optional JTAG Master Capability to send out configuration data streams via the chassis JTAG Switch Module (JSM) to configure arbitrary JTAG Slave devices on VPX cards. Virtual Probe services are also available to provide JTAG via Ethernet for Xilinx FPGAs. This allows for standard development tools such as Xilinx iMPACT/ChipScope to treat the switch/JSM combination as if it was a standard JTAG probe. This approach frees the developer from having to attach JTAG probes directly to the VPX or JSM which can be difficult when systems are already fully assembled. It also allows for remote debugging across long distances when required without the need to install additional JTAG equipment on-site.

Specifications

Architecture		
Physical	Dimensions	6U, 1" pitch
Type	Controller	OpenVPX Switch with integrated Health Management and JSM
Standards		
VPX	Type	VITA 46.x
VPX	Type	VITA 65 OpenVPX
Module Management	IPMI	IPMI v2.0 HPM v1.0
Configuration		
Power	VPX010	~100W (traffic dependent) Main power from +12V input
Front Panel	Interface Connectors	100G over QSFP 28 (40G/10G/1G per port configuration) CPU 10/100 (RJ-45) CPU RS-232 (RJ-45) Option for GPS NMEA serial data in/out (RJ-45) LEDs Status per port Two CLK IN/OUT (SMB); CLK IN becomes GPS ANT IN with GPS receiver option
VPX Interfaces	Slot Profiles Rear IO	See Ordering Options JTAG Clocks/GPS (Optional) 100GbE on P1/P2/P3/P4/P5 (ports can be configured as 40G, four 10G or four 1G) Clocks
Software Support	Operating System	Linux
Other		
MTBF	MIL Hand book 217-F@ TBD hrs	
Certifications	Designed to meet FCC, CE and UL certifications, where applicable	
Standards	VadaTech is certified to both the ISO9001:2015 and AS9100D standards	
Warranty	Two (2) years, see VadaTech Terms and Conditions	

INTEGRATION SERVICES AND APPLICATION-READY PLATFORMS

VadaTech has a full ecosystem of OpenVPX, ATCA and MTCA products including chassis platforms, shelf managers, AMC modules, Switch and Payload Boards, Rear Transition Modules (RTMs), Power Modules, and more. The company also offers integration services as well as pre-configured Application-Ready Platforms. Please contact VadaTech Sales for more information.

Ordering Options

VPX010 – ABC-DEF-GHJ-K00

A = Fabric routing (rear only)* 0 = P1/P2/P3/P4/P5/P6 loaded 1 = P1/P2/P3/P4/P5/P6 not loaded 2 = P1/P2/P6 loaded 3 = P1/P2 loaded 4 = P6 not loaded 5 = Reserved 6 = Reserved	D = Front Panel Clocking 0 = No FP clock 1 = Dual LVCMOS Clock In/Out 2 = Sine Wave In + LVCMOS In/Out 3 = Built-in GPS receiver + LVCMOS In/Out 4 = Dual Sine Wave In 5 = GPS receiver + Sine Wave In	G = Applicable Slot Profile 0 = 5 HP, VITA 46 1 = 5 HP, VITA 48.1	K = VPX Connector Type 0 = Standard 50u Gold Rugged 1 = KVPX Connectors
B = Health Management 0 = No Shelf manager 1 = Shelf manager	E = Clock Holdover Stability 0 = Standard (XO) 1 = Stratum-3 (TCXO)	H = Environmental See Environmental Specification	
C = QSFP28 TXCVRs (6 off) 0 = No TXCVRs 1 = 40GBASE-SR 2 = 40GBASE-LR (1 KM) 3 = 40GBASE-LR (10 KM) 4 = 100GBASE-SR 5 = 100GBASE-LR (1 KM) 6 = Reserved 7 = Reserved	F = JTAG and Virtual Probe 0 = No JTAG (P5/P6 not fitted) 1 = JSM only 2 = JSM and Virtual Probe	J = Conformal Coating 0 = No coating 1 = Humiseal 1A33 Polyurethane 2 = Humiseal 1B31 Acrylic	

Notes: *For redundancy the P2 must be loaded and combined with the correct backplane routing.

Environmental Specification

Option H	Air Cooled			Conduction Cooled	
	H = 0	H = 1	H = 2	H = 3	H = 4
Operating Temperature	AC1* (0°C to +55°C)	AC3* (-40°C to +70°C)	CC1* (0°C to +55°C)	CC3* (-40°C to +70°C)	CC4* (-40°C to +85°C)
Storage Temperature	C1* (-40°C to +85°C)	C3* (-50°C to +100°C)	C1* (-40°C to +85°C)	C3* (-50°C to +100°C)	C3* (-50°C to +100°C)
Operating Vibration	V2* (0.04 g2/Hz max)	V2* (0.04 g2/Hz max)	V3* (0.1 g2/Hz max)	V3* (0.1 g2/Hz max)	V3 (0.1 g2/Hz max)
Storage Vibration	OS1* (20g)	OS1* (20g)	OS2* (40g)	OS2* (40g)	OS2* (40g)
Humidity	95% non-condensing	95% non-condensing	95% non-condensing	95% non-condensing	95% non-condensing

Notes: *Nomenclature per ANSI/VITA 47. Contact local sales office for conduction cooled (H = 2, 3, 4).

Related Products

VPX550



- Xilinx Kintex UltraScale™ XCKU115 FPGA
- COM Express Module Type-6
- 8 GB of DDR4 Memory to FPGA

VPX551



- Dual Kintex UltraScale™ XCKU115
- 16 GB of 64-bit wide DDR4 Memory to each FPGA
- Rear fibre I/O via VITA 66.5

VPX580



- Xilinx UltraScale+ XCZU19EG FPGA
- 8 GB of 64-bit wide DDR4 Memory (single bank) with ECC
- Dual FMC+ sites (16 SERDES to each) on a 6U VPX

Contact

VadaTech Corporate Office

198 N. Gibson Road, Henderson, NV 89014

Phone: +1 702 896-3337 | Fax: +1 702 896-0332

Asia Pacific Sales Office

7 Floor, No. 2, Wenhua Street, Neihu District, Taipei 114, Taiwan

Phone: +886-2-2627-7655 | Fax: +886-2-2627-7792

VadaTech European Sales Office

VadaTech House, Bulls Copse Road, Southampton, SO40 9LR

Phone: +44 2380 016403

info@vadatech.com | www.vadatech.com

Choose VadaTech

We are technology leaders

- First-to-market silicon
- Constant innovation
- Open systems expertise

We commit to our customers

- Partnerships power innovation
- Collaborative approach
- Mutual success

We deliver complexity

- Complete signal chain
- System management
- Configurable solutions

We manufacture in-house

- Agile production
- Accelerated deployment
- AS9100 accredited



vadatech
THE POWER OF VISION

Trademarks and Disclaimer

The VadaTech logo is a registered trademark of VadaTech, Inc. Other registered trademarks are the property of their respective owners. AdvancedTCA™ and the AdvancedMC™ logo are trademarks of the PCI Industrial Computers Manufacturers Group. All rights reserved. Specification subject to change without notice.

© 2019 VadaTech Incorporated. All rights reserved.
DOC NO. 4FM737-12 REV 01 | VERSION 1.3 – NOV/19