VPX778

Intel® Ice Lake-D Xeon® D-1746TER with Integrated FPGA and GPGPU 6U VPX

VPX778

Key Features

- Intel® Ice Lake-D Xeon® D-1746TER (Ice Lake-D) in 6U VPX
- From CPU
  - Quad 1/10/25GbE and single 1000BASE-KX to P1
  - 40/100GbE (Quad 1/10GbE) and Dual 1000BASE-T to P5
- PCIe x16 Gen 4 to GPGPU (MXM module)
- Front panel 10GbE, 2x USB 3.0, Display Port (DP), RS-232 to USB (CPU/FPGA/IPMI) and GbE from FPGA
- FPGA AMD Zynq® UltraScale+ XCZU19EG
- Clock / Sync Generator for management of synchronization across multiple boards in the chassis
- Serial Over LAN (SOL)
- 48GB of DDR4 memory with ECC to CPU
- 8GB of DDR4 memory with ECC to FPGA
- 128GB of SSD to CPU
- 64GB of SSD to FPGA
- Platform Firmware Resilience (PFR) via on-board FPGA for security
- Trusted Platform Management (TPM)

Benefits

- Ice Lake-D embedded hardware security features, AI capability, enhanced connectivity and fast boot
- Balanced performance and low power
- Ideal upgrade for Broadwell-DE (such as VPX754)
- Electrical, mechanical, software, and system-level expertise in house
- Full system supply from industry leader
- AS9100 and ISO9001 certified company

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VPX778

The VPX778 is a Processor VPX (PrVPX) in a 6U VPX form factor based on the Intel® Processor Xeon® D-1746TER (Ice Lake-D) for general-purpose processing in demanding embedded applications. The D-1746TER has 10 cores with three channels of DDR4 memory.

The VPX778 CPU comes with 48 GB of DDR4 memory with ECC, 128 GB of SSD and an MXM socket for a GPGPU. The BIOS allows booting from on-board SSD, PXE, and/or USB. Further, the VPX778 has an AMD Zynq UltraScale+ FPGA (ZU19EG) which interfaces to the CPU via PCIe x4 Gen 3 with 8GB of DDR4 Memory with ECC.

The module routes quad 1/10/25GbE from the CPU to the P1 as well as a 40/100GbE (or quad 1/10GbE) and PCIe x4 Gen3 for expansion to P5.

On the front panel the VPX778 has 2x USB 3.0 connectors for expanded storage, peripherals, and more, native Display Port (DP), 10GbE as well as USB 2.0 for RS-232 to USB.

Figure 1: VPX778

The FPGA provides LVDS/M-LVDS/RS-422 to the P2/P3 and P4. The VPX778 provides a Clock / Sync Generator for management of synchronization across multiple boards in the chassis and provides this via VITA 67.2 to the rear for backplane distribution.

The module utilizes the Intel Bootguard PFR via on-board FPGA and Trusted Platform Management (TPM). The FPGA can be reprogrammed by the customer to meet their security requirements beyond what is provided by the PFR.

Linux OS is standard on the VPX778, consult VadaTech for other options.

Figure 2: VPX778 Top View

Block Diagram

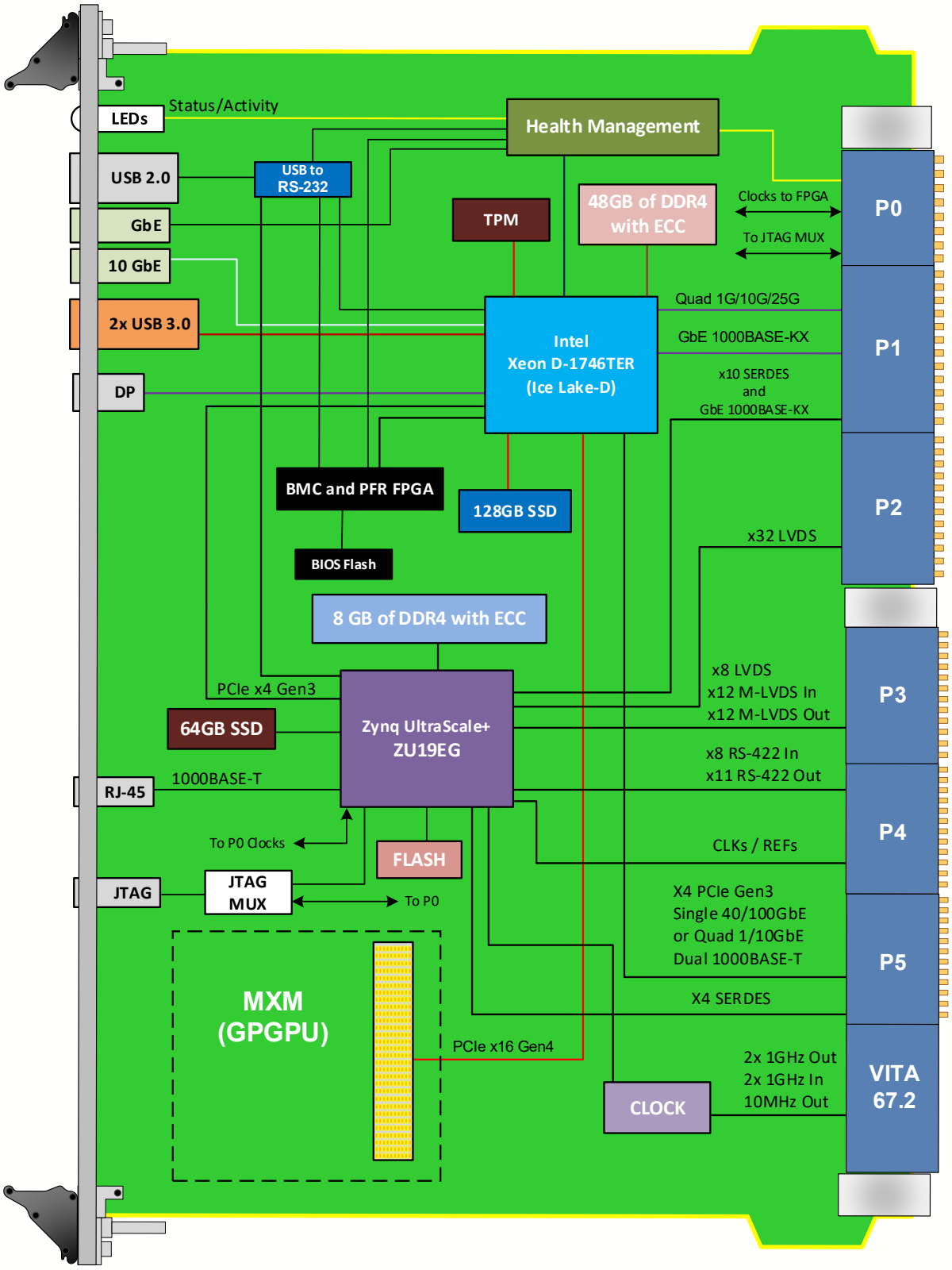

Figure 4: VPX778 Functional Block Diagram

Pinout Block Diagram

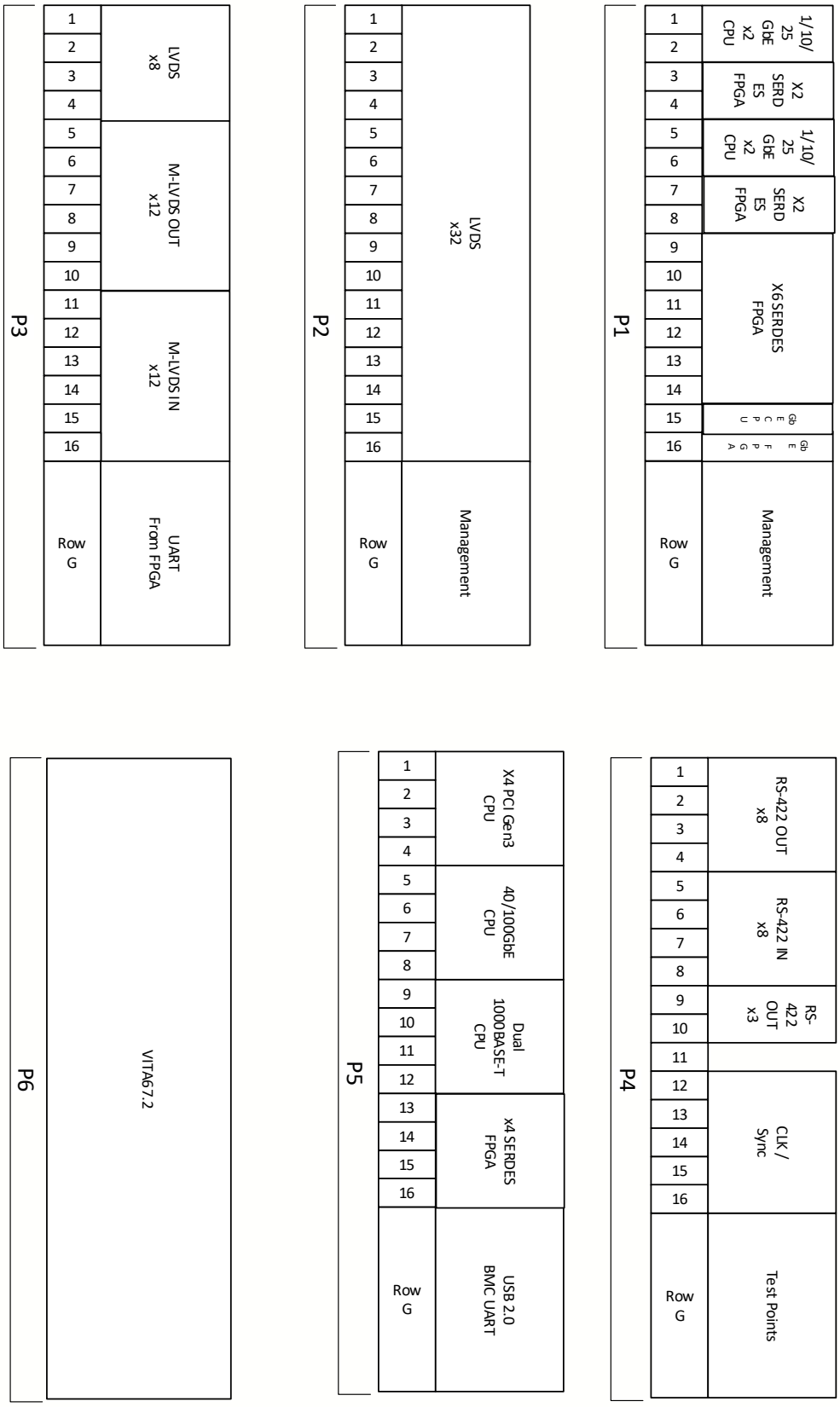

Figure 5: VPX778 Pinout Block Diagram

Specifications

Architecture		
Physical	**Dimensions**	6U, 1” Pitch
Configuration		
Power	**VPX778**	~85W CPU/FPGA utilization dependent without the GPGPU
Processor	**CPU**	Intel® Ice Lake-D Processor Xeon® D-1746TER
	Memory	DDR4 48/8 GB with ECC to CPU/FPGA
	Storage	128/64 GB SSD to CPU/FPGA
	Lanes	From CPU Quad 1/10/25GbE to P1; Single 40/100GbE and PCIe x4 Gen3 to P5
		From CPU single 1000BASE-KX to P1 and dual 1000BASE-T to P5
		From FPGA x10 SERDES and 1000BASE-KX to P1
		From FPGA x32 LVDS to P2 and x8 LVDS and 12 M-LVDS on P3
		From FPGA x11 RS-422 TX, x8 RS-422 RX and CLK/SYNC on P4
VPX Interfaces	**Slot Profiles**	See Ordering Options
	Payload Profile	See Figure 5
	Power Supplies	On P0: +12V and +3.3V_AUX
Front Panel	**Interface Connectors**	10GBASE-T and dual GbE via RJ45
		2x USB 3.0 connector and Display Port (DP)
		USB 2.0 to RS-232 for each subsystem
	LEDs	IPMI, activity and user defined
	Mechanical	6U VPX
Software Support	**Operating System**	Linux (consult VadaTech for other options)
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

VPX778 – 000-DEF-GHJ

	D = CPU	G = Applicable Slot Profile
	0 = D-1746TER 1 = Reserved 2 = Reserved	0 = 5HP VITA 48.1 (option H = 0/1) VITA 48.2 (option H = 2/3/4) 1 = Reserved
	E = Storage	**H = Environmental**
	0 = None 1 = 128 GB SSD (CPU) + 64 GB SSD (FPGA)	See Environmental Specification
	F = GPGPU	**J = Conformal Coating**
	0 = None 1 = NVIDIA RTX A2000 with 8 GB (60W) 2 = NVIDIA RTX4500 with 16 GB (80W) 3 = NVIDIA M3A500 with 4 GB (45W) 4 = Reserved 5 = Reserved 6 = Reserved	0 = No coating 1 = Humiseal 1A33 Polyurethane 2= Humiseal 1B31 Acrylic 3 = Parylene

Environmental Specification

	Air Cooled		Conduction Cooled		
Option H	**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

VPX516

- 3U FPGA carrier for FPGA Mezzanine Card (FMC) per VITA 46 and VITA 57
- Xilinx Virtex-7 690T FPGA in FFG-1761 package
- High-performance clock jitter cleaner

VPX592

- 3U FPGA carrier for FMC per VITA 46 and VITA 57
- Xilinx Kintex UltraScale™ XCKU115 FPGA
- High-performance clock jitter cleaner

VPX599

- Xilinx Kintex UltraScale™ XCKU115 FPGA
- Dual ADC 12-bit @ 6.4 GSPS
- Dual DAC 16-bit @ 12 GSPS (AD9162 or AD9164)

Contact

VadaTech Corporate Office
198 N. Gibson Road, Henderson, NV 89014, United States
Phone: +1 702 896-3337

VadaTech European Sales Office
VadaTech House, Bulls Copse Road, Southampton, SO40 9LR,
United Kingdom | Phone: +44 2380 016403

Asia Pacific Sales Office - India
#72, 15th cross, 3rd phase, JP Nagar, Bangalore 560078
Karnataka, India | Phone: +91 80 4666 9300

Asia Pacific Sales Office - Taiwan
7F-3, No16, Jihu Rd Lane 35, Neihu 114, Taipei City, Taiwan
Phone: +886 226 277 655

info@vadatech.com | www.vadatech.com

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