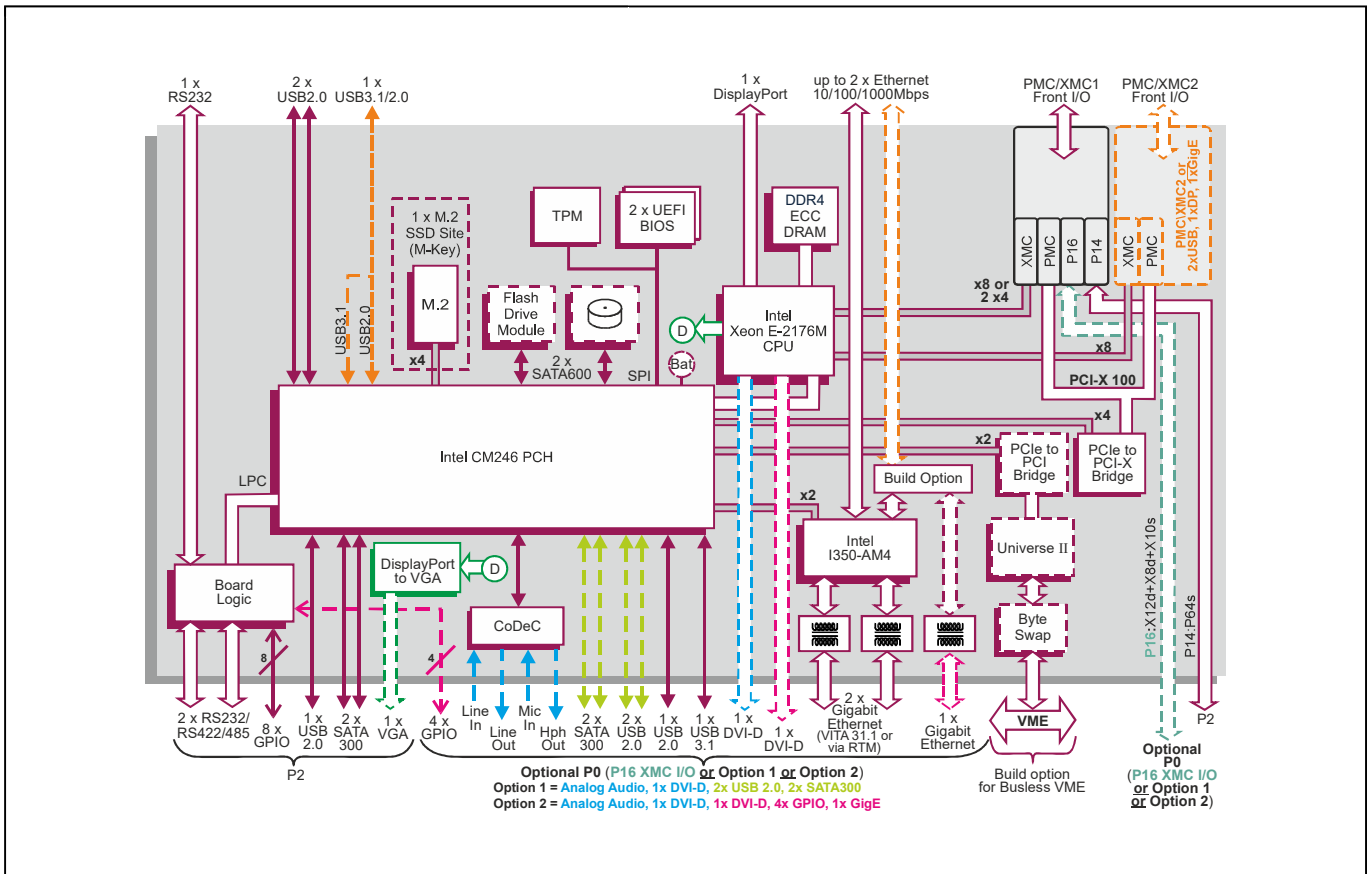# VME board based on Intel® Xeon® processor

Key Features

VP B7x/msd is a high performance, flexible VMEbus board based on a 6-core Intel® Xeon® processor E-2176M (formerly known as Coffee Lake-H). It is designed for long life-cycle applications in the defense, industrial, scientific and aerospace markets.

- Six-core processor and up to 32 Gbytes DDR4 DRAM for high performance applications
- Dual or single PMC/XMC sites for local expansion
- Wide variety of I/O interfaces including SATA, USB, Ethernet, graphics and serial
- Direct attached storage options suitable for operating system, application and data use
- Board support packages for Linux®, Windows® and VxWorks®
- Option to exclude VMEbus interface is available

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VME Embedded Computer Board

- air-cooled 6U VME computing board utilizing an Intel Xeon processor (coded Coffee Lake)
- single or dual XMC sites (build options)
- optional Rear Transition Module (RTM)
- rugged conduction-cooled (RCx-Series) versions:
  - see VP B7x/msd-RC datasheet

Central Processor

- 6-core Intel Xeon processor E-2176M:
  - 12 Mbytes Smart Cache, 2.7 GHz
  - Intel UHD Graphics 630
- range of performance/power factory build options
- utilizes the Intel CM246 Platform Controller Hub

DRAM

- 16 or 32 Gbytes soldered DDR4 ECC DRAM:
  - single bit error correction
  - dual channel architecture
- accessible from processor or VME bus

PMC/XMC Interfaces

- single or dual PMC/XMC interfaces
- PMC/XMC I/O site 1:
  - front panel I/O
  - PMC P14 rear I/O (P64s) via P2
  - XMC P16 rear I/O (X12d+X8d+X10s) (this build option replaces build option 1 & 2) via optional P0
- PMC/XMC I/O site 2 (or additional front I/O):
  - front panel I/O: option for PMC/XMC site or extra front panel I/O connectors (USB 3.1/2.0 and Gigabit Ethernet interfaces)
  - rear I/O: none
- PMC PCI/PCI-X interfaces:
  - 32/64-bit, 33/66 MHz PCI bus
  - 64-bit PCI-X bus up to 100 MHz
  - 5V and 3.3V signaling
- XMC PCI Express interfaces:
  - both support x8 PCI Express (Gen 1, Gen 2)
  - XMC site 1 can also support 2 x4 PCI Express
  - both powered from 5V supply

Ethernet Interfaces

- up to 4 x Gigabit Ethernet interfaces:
  - implemented by an Intel I350-AM4 LAN controller via a x2 PCI Express port (Gen 2)
- 1 x Gigabit Ethernet interface via front panel RJ45
- 2 x Gigabit Ethernet interfaces via optional P0:
  - via P0 to optional RTM or utilize VITA 31.1 (Gigabit Ethernet for VME64x backplanes)
- 1 x GigE via P0 (build option 2) or as a builld option via front panel RJ45 (disables PMC/XMC site 2):
  - on-board magnetics (50V isolation via P0)

Mass Storage Interfaces

- up to 4 x external SATA300 interfaces:
  - 2 x SATA via P2
  - 2 x SATA (build option 1) via optional P0
- 1 x M.2 SSD site on-board supporting:
  - Type 2242, 2260 and 2280 device
  - x4 PCIe interface (M-key)
  - NVM Express (NVMe™) logical device interface
  - resides within PMC/XMC Sites 1 and 2 areas
- 2 x SATA600 interfaces for optional on-board:
  - SATA Flash Drive Module
  - 2.5-inch SATA drive (disables PMC/XMC Site 2)

Serial Interfaces

- 3 x serial channel interfaces:
  - 1 x RS232 accessed via 60-way high density connector on front panel
  - 2 x RS232/422/485 accessed via P2
- 16550 compatible UARTs

Stereo Audio

- Intel High Definition Audio interface with CoDeC (build options 1 & 2) via optional P0:
  - line level stereo input and output
  - line level microphone input
  - headphone output

Graphics Interfaces

- 1 x DVI-D interface (build option 1) or 2 DVI-D interfaces (build option 2) via optional P0:
  - up to 1920 x 1200 @ 16M colors
- 1 x DisplayPort interface via 60-way high density connector on front panel:
  - up to 1920 x 1200 @ 60Hz
  - resolution is dependent on the device driver
- 1 x VGA interface (build option) via P2:
  - up to 1920 x 1200 @ 16M colors
  - implemented by DisplayPort to VGA converter
- support for Microsoft DirectX 12, OpenGL 4.5 under Windows and Linux and OpenCL 2.1

Other Peripheral Interfaces

- PC Real Time Clock
- watchdog timer; 32-bit Long Duration Timer with processor interrupt ability; chipset timer
- 3 x USB 2.0 ports:
  - 2 x USB 2.0 via 60-way connector on front panel
  - 1 x USB 2.0 via P2
- up to 4 x USB ports accessed via optional P0:
  - 1 x USB 2.0 port and 1 x USB 3.1 (Gen 1) port
  - 2 x USB 2.0 ports (build option 1)
- option for 1 x USB 3.1 (Gen 1) and USB 2.0 ports accessed via USB connector (disables PMC/XMC site 2)
- 8 x GPIO signals via P2 plus 4 x GPIO signals (build option 2) via optional P0:
  - supports processor interrupt capability
- Write Protect (build option 2) and External Reset (build option 2) via optional P0

Flash EPROM

- 32 Mbytes of BIOS Flash EPROM, dual devices:
  - main/backup device enabled via switch

Software Support

- support for Linux, Windows and VxWorks

Board Security Packages

- Trusted Platform Module (TPM 2.0)
- option for Sanitization Utility Software Package
- option for proprietary board-level security features

Firmware Support

- UEFI boot firmware (BIOS):
  - based on EDK II
  - includes Compatibility Support Module
  - implements Secure Boot
- implements Intel Boot Guard
- optional Fast Boot solution using the Intel Firmware Support Package (FSP)
- LAN boot firmware included

Optional Built-In Test (BIT) Support

- Power-on BIT (PBIT), Initiated BIT (IBIT), Continuous BIT (CBIT)

Safety

- PCB (PWB) manufactured with flammability rating of UL94V-0

VME Interface

- P1 and P2 connectors compatible with VME64x
- implemented using IDT Universe™ II device
- VME Master/Slave
- A32/A24/A16/D64/D32/D16/D8(EO)/MBLT
- fast hardware byte swapping
- auto system controller detect
- full interrupter / interrupt handler support
- bus error interrupt support
- build option for busless VME interface:
  - SYSRESET, SYSFAIL, ACFAIL, GAx
  - VMEbus daisy chain

Electrical Specification

- typical current figure for 6-core processor (45W TDP) with 16 Gbytes DRAM:
- +5V @ 8.0A
- +12V @ 0.0A; -12V @ 0.0A; 3.3V not required
- +12V and -12V routed to both PMC/XMC sites

Environmental Specification

- operating temperature:
  - 0 C to +55 C (N-Series)
  - extended operating temperatures (based upon selected processor performance/power option):
  - -25 C to +70 C (E-Series)
  - -40 C to +70 C (K-Series)
  - -40 C to +85 C (K-Series)
- non-operating temperature: -40 C to +85 C
- 5% to 95% Relative Humidity, non-condensing:
  - K-Series includes humidity sealant

Mechanical Specification

- 6U form-factor
- single slot, width 0.8-inch (20.3mm)
- utilizes 160-way connectors for P1 and P2
- optional P0 connector
- IEEE 1101.10 VME64x handles, alternatively with option for VME32 handles
- shock: 20g, 11ms, sine
- vibration: 5Hz-2000Hz at 2g, 0.38mm peak displacement

Legacy Board Compatibility

- VP B7x/msd rear plug compatibility with the popular VP B1x/msd and VP 92x/x1x families

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Please contact your local Concurrent Technologies sales office for further details on board build options and accessories.