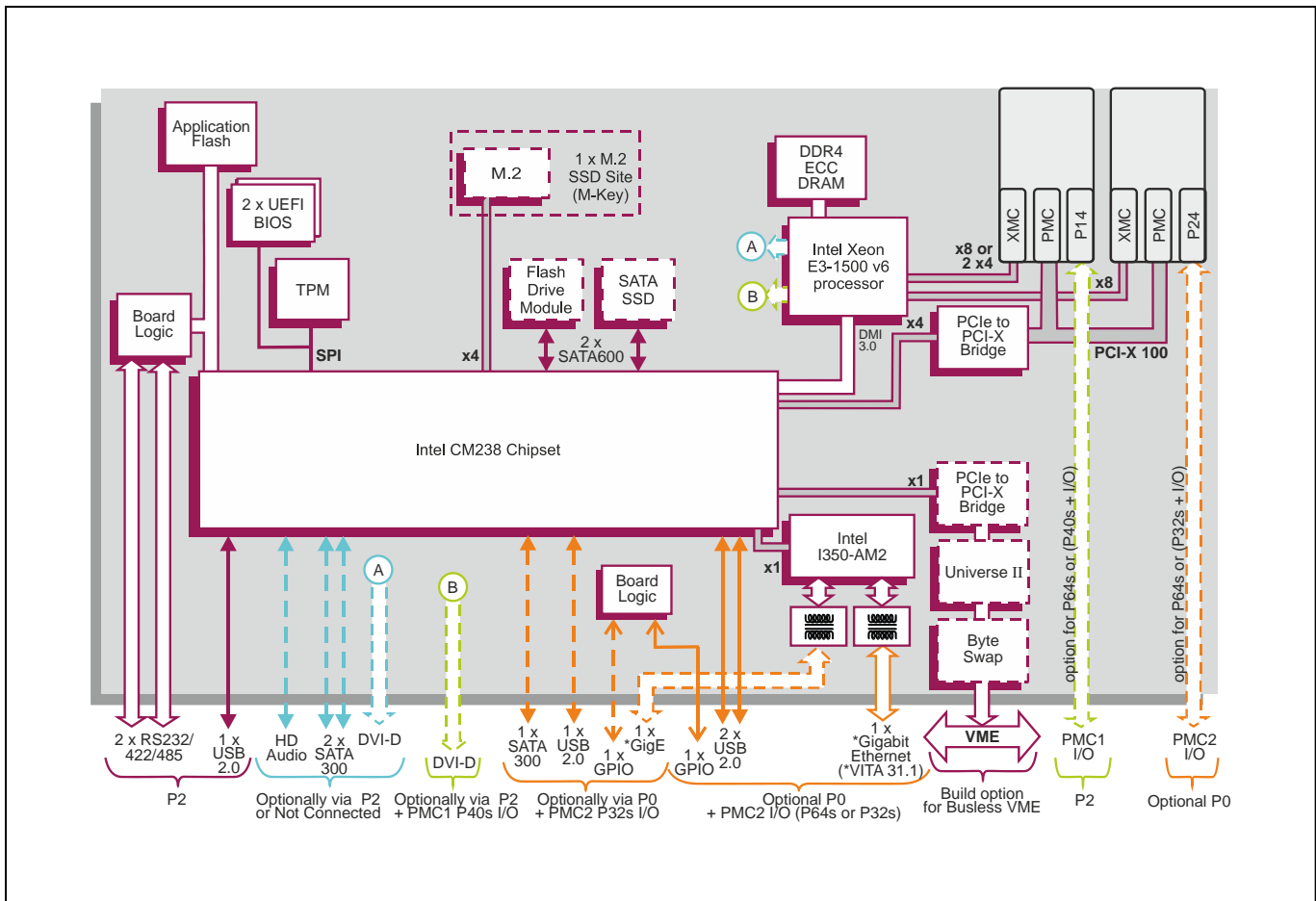## Rugged Conduction-Cooled VME board based on Intel® Xeon® Processor

Key Features

VP F6x/msd-RC is a rugged conduction-cooled 6U VMEbus processor board designed to extend the life of existing VMEbus deployments. It is capable of supporting legacy operating systems and offers a variety of local storage options.

- Utilizes 4-core Intel® Xeon® Processor E3-1505L v6

- Supports two on-board PMC/XMC sites

- Optional SATA Flash, M.2 and 2.5-inch storage drives

- Support for Linux®, Windows® and VxWorks®. For other Operating Systems contact your local Concurrent Technologies Sales Office

- Option to exclude VMEbus interface is available

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VME Embedded Computer Board

- rugged conduction-cooled 6U VME computing board utilizing an Intel® Xeon® processor
- air-cooled (N, E, K-Series) versions:
  → see VP F6x/msd datasheet

Central Processor

- 4-core Intel® Xeon® Processor E3-1505L v6:
  → 8 Mbytes Cache, 2.2 GHz
  → Intel® HD Graphics P630
- utilizes the Intel® CM238 Chipset

DRAM

- 16 Gbytes soldered DDR4-2400 ECC DRAM:
  → single bit error correction
  → dual channel architecture
- accessible from processor or VME bus

PMC/XMC Interfaces

- 2 x PMC shared sites supporting:
  → 32/64-bit, 33/66 MHz PCI bus
  → 64-bit PCI-X bus up to 100 MHz
  → 3.3V or 5V PCI signaling
- 2 x XMC (Switched Mezzanine Card) sites:
  → support x8 PCI Express (Gen 1, Gen 2)
  → XMC Site 1 can also support 2 x4 PCI Express
  → both sites provide 5V VPWR
- PMC Site 1 I/O (P14) via P2:
  → P64s via P2 or factory build option to provide P40s plus DVI-D via P2
- PMC Site 2 I/O (P24) via optional P0:
  → P64s via P0 or factory build option to provide P32s plus other I/O
  (see Note: Option 1 or Option 2)

Ethernet Interfaces

- 2 x Gigabit Ethernet interfaces via rear panel:
  → accessed via optional P0
  → on-board magnetics
  → implemented by Intel® Ethernet Controller I350-AM2 via x1 PCI Express® (PCIe®) Gen 2 port
- support for VITA 31.1:
  → Gigabit Ethernet for VME64x backplanes
- support Wake-On-LAN
- support Precision Time Protocol (IEEE 1588)

Serial Interfaces

- 2 x RS232/422/485 accessed via P2
- 16550 compatible UARTs

Mass Storage Interfaces

- build options for up to 3 x external SATA interfaces:
  → 2 x SATA300 via P2
  → 1 x SATA300 via P0
- 1 x M.2 SSD site for optional on-board supporting:
  → Type 2242 device only
  → x4 PCIe interface (M-key)
  → NVM Express® (NVMe™) logical device interface
  → NVMe 1.3 compatible
  → 2242 device can be fitted simultaneously with PMC/XMC module fitted to PMC/XMC site 2
- 2 x SATA600 interfaces for optional on-board:
  → SATA Flash Drive Module
  → 2.5-inch SATA drive (uses PMC/XMC Site 2)
- PMC/XMC site 2 supports only one on-board drive

Graphics Interfaces

- up to 2 x DVI-D interfaces (build options) via P2:
  → up to 1920 x 1200
  → 1 x interface uses I/O pins for PMC/XMC Site 1
- support for Microsoft® DirectX 12, OpenGL 4.4 under Windows® and Linux® and OpenCL 2.1

Stereo Audio

- build option for Intel® High Definition stereo audio interface via P2 (external CodeC required)

Other Peripheral Interfaces

- PC-compatible Real Time Clock
- up to 4 x USB 2.0 ports:
  → 1 x USB via P2
  → 2 x USB via P0
  → option for an additional USB via P0 (see Note: Option 2)
- 1 or 2 x GPIO signals via P0 (see Note: Option 2)
- watchdog timer
- 1 x 32-bit Long Duration Timer with processor interrupt capability

Optional Built-In Test (BIT) Support

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

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 2.6 boot firmware (BIOS):
  → includes Compatibility Support Module
  → implements Secure Boot (with TPM)
- implements Intel® Boot Guard
- optional Fast Boot solution based on the Intel® Firmware Support Package (Intel® FSP)
- LAN boot firmware included

Flash EPROM

- dual 16 Mbytes of BIOS SPI Flash EPROM
- 64 Mbytes of Application Flash memory for VxWorks applications

Software Support

- support for Linux®, Windows® and VxWorks®

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 hardware
- build option for busless VME interface:
  → SYSRESET, SYSFAIL, ACFAIL, GAx
  → VMEbus daisy chain

Electrical Specification

- +5V @ 7.4A (typical with 16 Gbytes DRAM)
- +12V, -12V and +3.3V not required
- +12V and -12V routed to both PMC/XMC sites

Safety

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

Environmental Specification

- operating temperature (at card edge):
  → VITA 47 Class CC4, -40°C to +85°C
  → conduction-cooled
- non-operating temperature:
  → VITA 47 Class C4, -55°C to +105°C
- operating altitude:
  → -1,000 to 50,000 feet (-305 to 15,240 meters)
- 5% to 95% Relative Humidity, non-condensing

Mechanical Specification

- 6U form-factor
- single slot, width 0.8 inch (20.3mm)
- utilizes 160-way connectors for P1 and P2
- optional P0 connector
- operating mechanical:
  → shock - VITA 47 Class OS2, 40g
  → random vibration - VITA 47 Class V3, 0.1g²/Hz displacement

Legacy Computing Board Compatibility

- upgrade path for the popular VP F1x/msd-RC, VP 91x/01x-RC and VP 91x/11x-RC board families

Note:
The optional P0 connector supports factory build options for one of two options:
Option 1)
    PMC/XMC Site 2 P64s I/O,
    1 x GPIO, 2 x USB 2.0 and
    1 x Ethernet (VITA 31.1) interfaces
or
Option 2)
    PMC/XMC Site 2 P32s I/O,
    1 x SATA, 2 x GPIO, 3 x USB 2.0 and
    2 x Ethernet (VITA 31.1) interfaces

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

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