VPX
(OpenVPX)

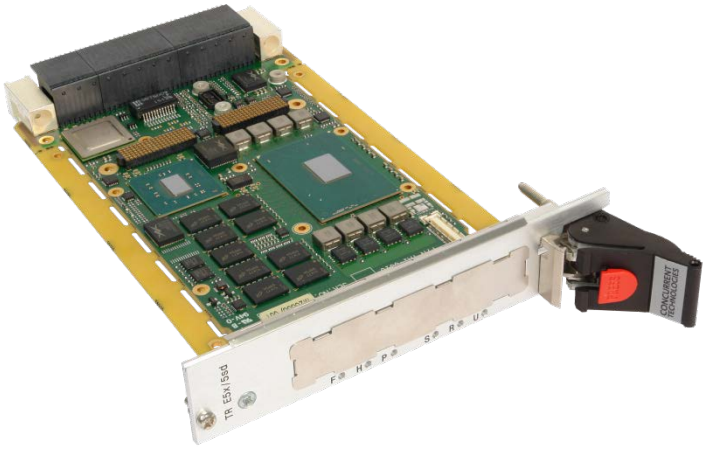
TR E5x/msd
N, E - Series

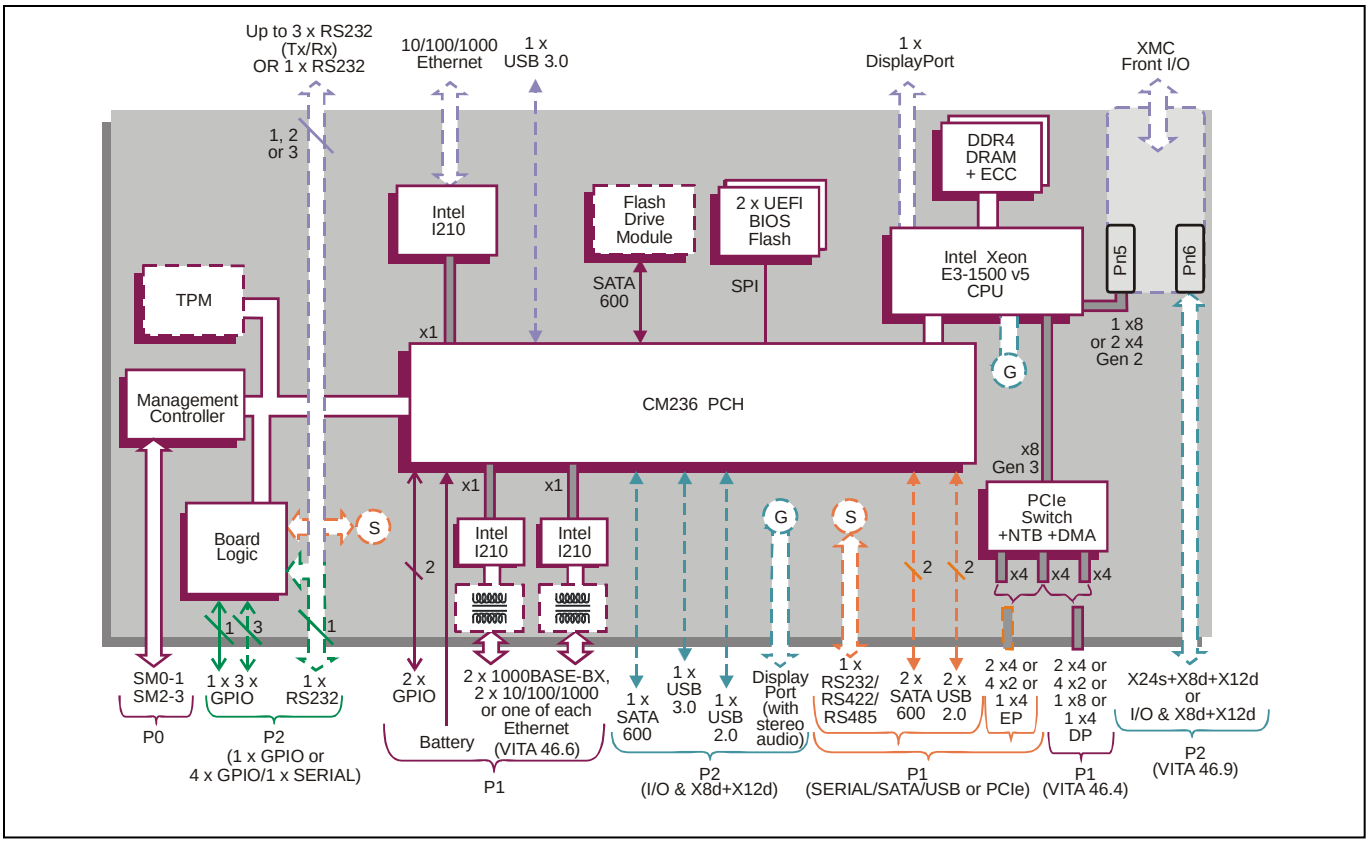
3U VPX™ board based on Intel® Xeon™ E3-1500 v5 processor family

Key Features

TR E5x/msd is a 3U VPX™ module based on the Intel® Xeon® processor E3-1500 v5 family to **provide enhanced processing performance with optimised Size, Weight and Power characteristics.**

- Mobile workstation processor performance with enterprise-class graphics capabilities
- Error Correction Code (ECC) memory for high operational reliability
- XMC module site for local I/O expansion or front panel I/O
- Local solid state disk module site for rugged storage
- Compatible with popular OpenVPX™ module profiles enabling widespread use in VPX™ solutions
- Designed for use in air and rugged conduction-cooled environments





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Specification

VPX Processor Board
- air-cooled 3U VPX SBC utilizing Intel® Xeon® processor E3-1500 v5 family
  - → optional Rear Transition Module (RTM)
- compatible with several OpenVPX™ module profiles:
  - → MOD3-PAY-2F2U-16.2.3-3
  - → MOD3-PAY-2F1F2U-16.2.1-4
  - → MOD3-PAY-1F2F2U-16.2.2-4

Central Processor
- Intel Xeon processors supported:
  - → 4-core Intel® Xeon® E3-1515M v5 (45W)
  - → 4-core Intel® Xeon® E3-1505M v5 (45W)
  - → 4-core Intel® Xeon® E3-1505L v5 (25W)
- utilizes the Intel® CM236 Platform Controller Hub

DRAM
- up to 16 Gbytes soldered DDR4 ECC DRAM:
  - → single bit error correction
  - → dual channel architecture
  - → accessible from processor or VPX™ fabric

XMC Interface (Build Option)
- 1 x XMC site, in a single VPX slot (VITA 42.0):
  - → front panel I/O and build options for P2 rear I/O
  - → 1 x8 or 2 x4 PCI Express® Gen 2 (VITA 42.3) XMC (Switched Mezzanine Card) interface
  - → +5V or +12V powered (factory build option)
- no XMC site with the optional front panel I/O

XMC P2 I/O plus Additional P2 I/O Option
- P2 factory build options, option 1 (full rear XMC I/O) or option 2 (reduced XMC I/O plus additional P2 I/O)
- XMC build option 1 supports the following:
  - → full rear XMC I/O, P2w1-X24s+X8d+X12d
  - → DisplayPort is not available (board is headless)
- XMC build option 2 supports the following:
  - → reduced rear XMC I/O, P2w7-X8d+X12d
  - → 1 x USB 2.0 port and 1 x USB 3.0 port
  - → 1 x SATA600 interface
  - → 1 x DisplayPort™ interface
- XMC rear I/O supports VITA 46.9 pin-mapping

Graphics Interfaces
- up to 2 x independent graphics interfaces:
  - → DisplayPort interface, supporting audio and video, via the optional front panel I/O
  - → DisplayPort interface, supporting audio and video, via P2 (XMC build option 2)
  - → resolution is dependent on the device driver
- support for Microsoft® DirectX 12 and 11.x
- support for OpenGL 4.x and 5.x under Windows® and Linux®
- support for OpenCL 2.1

Serial Ports
- 1 x RS232/422/485 port accessed via P1 (replaces VPX Expansion Plane PCI Express interface):
  - → supporting Tx, Rx, RTS and CTS in RS232 only
- option for 1 x RS232 port accessed via P2:
  - → supporting Tx, Rx, RTS and CTS
- 1 x RS232 (full modem) or 3 x RS232 (Tx/Rx) ports via the optional front panel I/O:
  - → the RS232 configuration is user selectable
- 16550 compatible UARTs

Other Peripheral Interfaces
- PC RTC, long duration timer, watchdog timer
- up to 4 x USB ports via the rear:
  - → option for 2 x USB 2.0 ports via P1 (replaces VPX Expansion Plane PCI Express interface)
  - → option for 1 x USB 2.0 port and 1 x USB 3.0 port via P2 (XMC build option 2)
- 1 x USB 3.0 port via the optional front panel I/O
- 2 x GPIO signals via P1
- option for up to 4 x GPIO signals via P2 (1 or 4)

Front Panel I/O (Build Option)
- front panel I/O build option (no XMC site) supports:
  - → 10/100/1000 Mbps Ethernet port via RJ45
  - → 1 x USB 3.0 port
  - → up to 3 x RS232 (Tx/Rx) ports via an RJ45 or 1 x RS232 full modem via RJ45, user selectable
  - → 1 x DisplayPort interface (resolution dependent on device drivers)
- only available with air-cooled boards

Mass Storage Interfaces
- 2 x SATA600 interfaces via P1 (replaces VPX Expansion Plane PCI Express interface)
- 1 x SATA600 interface via P2 (XMC build option 2)
- 1 x SATA600 interface for an optional on-board Flash Drive Module

VPX Control Plane, Ethernet
- configurable Control Plane (VITA 46.6)
- P1 factory build option for 2 x 1000BASE-BX ports (IEEE802.3z)
- alternative P1 factory build options for 2 x 10/100/1000 Mbps Ethernet ports or 1 x 1000BASE-BX and 1 x 10/100/1000 Mbps Ethernet ports:
  - → with or without magnetics
  - → optional Rear Transition Module available

VPX Data/Expansion Planes, PCI Express
- P0, P1 and P2 support OpenVPX configuration
- configurable PCI Express (PCIe®) VPX Data Plane fabric interface (VITA 46.4) supports:
  - → 2 x4 or 4 x2 or 1 x8 or 1 x4 PCIe ports
- configurable PCIe VPX Expansion Plane interface (VITA 65) supports:
  - → 2 x4 or 4 x2 or 1 x4 PCIe ports
  - → P1 configured as a build option (replaces 1 x RS232/422/485, 2 x SATA600 and 2 x USB 2.0 interfaces)
- PCIe interface supports Gen 1, Gen 2 and Gen 3
- PCIe switch supports two non-transparent ports for multi-processing configurations
- 4 channel DMA engine for fast data block moves
- switch ports can be configured by the VPX Switch Configuration tool, see separate datasheet
- switch supported by Fabric Interconnect Networking software (FIN-S), see separate datasheet
- support for PCIe backplane common clock options REFCLK (VITA 65-R2012)

System Management
- IPMI via SM0-3, accessing:
  - → voltages monitor, CPU temperature monitor and board temperature monitor
- Baseboard Management Controller (BMC)

Optional Built-In Test (BIT) Support
- Power-on BIT, Initiated BIT, Continuous BIT

Optional Board Security Packages
- Trusted Platform Module (TPM):
  - → compliant to TCG v1.2
- proprietary hardware/software board security

Software Support
- supports Linux®, Windows® and VxWorks®

Firmware Support
- UEFI boot firmware (BIOS):
  - → UEFI 2.4 support
  - → EDK II support
  - → includes Compatibility Support Module
- LAN boot firmware included

Non-Volatile Memory
- 8 Mbytes of BIOS Flash EPROM, dual devices

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

Electrical Specification
- typical current consumption for 4-core Intel Xeon processor (45W) with 16 Gbytes DRAM:
  - → +5V @ 6.4A
  - → +3.3V @ 2.9A; +3.3V AUX @ 0.4A
- +12V AUX and -12V AUX routed to XMC site

Environmental Specification
- operating temperature, all processors (CPU):
  - → VITA 47 Class AC1, 0°C to +55°C (N-Series)
- extended operating temperature (selected CPU):
  - → -25°C to +70°C (E-Series)
- non-operating temperature:
  - → VITA 47 Class C1, -40°C to +85°C
- operating altitude:
  - → 0 to 15,000 feet (0 to 4,572 meters)
- relative humidity:
  - → 5% to 95%, non condensing
- rugged conduction-cooled (VITA 48.2) VPX-REDI™ (RCx-Series) version

Mechanical Specification
- 3U VPX form-factor (VITA 46.0, VITA 48.0)
- 3.9 inches x 6.3 inches (100mm x 160mm)
- slot width 1.0-inch air cooled:
  - → IEEE 1101.10 as per VITA 46.0
  - → or VITA 48.0 as per VITA 65
- connectors to VITA 46.0 for P0, P1 and P2
- operating mechanical:
  - → shock - VITA 47 Class OS1, 20g
  - → random vibration - 0.002g²/Hz

Optional VPX Fabric Switch
- board is compatible with FR 331/x06 VPX Switch or FR 341/x06 VPX Switch

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

Datasheet Code 1750/0117