

VPX Processor Board

- air-cooled 3U VPX™ board utilizing processors based on Intel® processor Coffee Lake Refresh
- optional Rear Transition Module (RTM) available
- 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
- rugged conduction-cooled variants available

Central Processor

- 6-core Intel® Xeon® processor E-2276ME:
 - 12 Mbytes SmartCache, up to 2.8 GHz
- 4-core Intel® Xeon® processor E-2254ME:
 - 8 Mbytes SmartCache, up to 2.6 GHz
- 4-core 9th Generation Intel® Core™ i3-9100HL:
 - 6 Mbytes SmartCache, up to 1.6 GHz
- Intel® UHD Graphics
- range of performance/power factory build options
- utilizes the Intel® CM246 Platform Controller Hub

DRAM

- up to 32 Gbytes soldered DDR4 ECC DRAM:
 - single bit error correction
 - dual channel architecture
- accessible from processor or VPX™ fabric

Optional XMC Site

- 1 x XMC site, in a single VPX slot (VITA 42.0):
 - front I/O aperture, options for P2 rear I/O
 - 1 x8 or 2 x4 PCI Express® (PCIe®)
 - PCIe Gen 1, Gen 2 and Gen 3
- XMC connector type (build option):
 - up to Gen 2, VITA 42 XMC (black color)
 - up to Gen 3, VITA 61 XMC 2.0 (white color)
- XMC VPWR +5V or +12V (build option)

VPX 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)
- VPX P2 build option 1 supports the following:
 - full rear XMC I/O, providing X24s+X8d+X12d
 - DisplayPort® is not available (board is headless)
- VPX P2 build option 2 supports the following:
 - reduced rear XMC I/O, providing X8d+X12d
 - 1 x USB 2.0 port and 1 x USB 3.1 (Gen 1) port
 - 1 x SATA600 interface
 - 1 x DisplayPort with audio interface
- VITA 46.9 compliant XMC I/O pin-out

Optional Front I/O Module

- the optional Front I/O Module supports:
 - 10/100/1000 Mbps Ethernet port via RJ45, implemented by Intel® Ethernet Controller I210
 - 1 x USB 3.1(Gen 1)/2.0 port via Type A USB
 - up to 3 x RS232 (Tx/Rx) ports via an RJ45 or 1 x RS232 full modem via RJ45, user selectable
 - 1 x DisplayPort with audio interface
- module is only available for use with TR E8x/msd air-cooled boards (N-Series and E-Series)

Serial Ports

- 1 x RS232/422/485 port accessed via P1 (replaces VPX Expansion Plane PCI Express interface)
- option for 1 x RS232/422/485 port accessed via P2:
- up to 3 x RS232 (Tx/Rx) ports via Front I/O Module
- 16550 compatible UARTs

Graphics/Audio Interfaces

- up to 2 x independent graphics/audio interfaces:
 - DisplayPort v1.2 interface, supporting audio and video, via the optional Front I/O Module
 - DisplayPort v1.2 interface, supporting audio and video, via P2 (XMC build option 2)
 - up to 3840 x 2160 @ 60Hz, driver dependent
- support for Microsoft® DirectX 12
- support for OpenGL 4.x under Windows® and Linux® and support for OpenCL 2.0

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 and 1 x USB 3.1 (Gen 1) ports via P2 (XMC build option 2)
- 1 x USB port via the optional Front I/O Module
- 2 x GPIO signals via P1
- option for up to 4 x GPIO signals via P2 (1 or 4)

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
- optional XMC module, 2 x M.2 SSD sites supports:
 - 2242, 2260 and 2280 format modules
 - x4 PCIe interface (M-key) per site
 - NVMe Express® (NVMe™) logical device interface

VPX Control Plane, Ethernet

- configurable Control Plane (VITA 46.6)
- P1 factory build option for 2 x 1000 Mbps IEEE802.3z SerDes (1000BASE-BX) ports:
 - with software switchable option for 1 x 10/100/1000 Mbps Ethernet port (with magnetics) plus 1 x 1000BASE-BX port
- alternative factory build options for 2 x 10/100/1000 Mbps Ethernet ports:
 - one port with and one port without magnetics or
 - both ports with magnetics
- supports IEEE 1588 Precision Time Protocol
- implemented by Intel® Ethernet Controller I350-AM2 via x2 PCI Express Gen 2 port

VPX Data/Expansion Plane, PCI Express

- software configurable PCI Express (PCIe) VPX Data Plane fabric interface (VITA 46.4):
 - a) 1 x8, 2 x4, 4 x2 or b) 1 x4, 2 x2 PCIe ports
- P1 build options for either:
 - PCIe Expansion Plane interface (VITA 65) supporting a) 1 x4, 2 x2 or b) 2 x4, 4 x2 PCIe
 - or 1 x Serial, 1 x SATA600, 1 x SATA300 and 2 x USB 2.0 ports
- PCIe interfaces support 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
- 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

Optional Built-In Test (BIT) Support

- Power-on BIT, Initiated BIT, Continuous BIT

System Management

- IPMI via SM0-3, accessing:
 - voltages monitors, CPU temperature monitor and board temperature monitor
- Baseboard Management Controller (BMC)
- support for Serial Over LAN
- option for VITA 46.11 compatible Tier 1 Chassis Manager

Board Security Packages

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

Software Support

- supports Linux® and Windows®
- for other operating systems contact Concurrent Technologies for further information, e.g. VxWorks®
- options available for enhanced PCIe drivers

Firmware Support

- UEFI boot firmware (BIOS):
 - dual BIOS SPI Flash EPROMs
 - implements Secure Boot
- implements Intel® Boot Guard
- optional Fast Boot solution using the Intel® Firmware Support Package (FSP)
- LAN boot firmware included

Safety

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

Electrical Specification

- typical current figure for E-2276ME (45W) processor with 16 Gbytes DRAM:
 - +5V@4.8A; +3.3V@3.2A; +3.3V AUX @0.3A
- +12V AUX and -12V AUX routed to XMC site

Environmental Specification

- standard operating temperature:
 - VITA 47 Class AC1, 0°C to +55°C (N-Series)
- extended operating temperature (with restricted processor options):
 - -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

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

Legacy Board Compatibility

- TR E8x/msd is front and rear plug compatible with the popular TR E5x/msd family

Optional VPX Fabric Switch

- board is compatible with FR 341/x06 VPX Switch