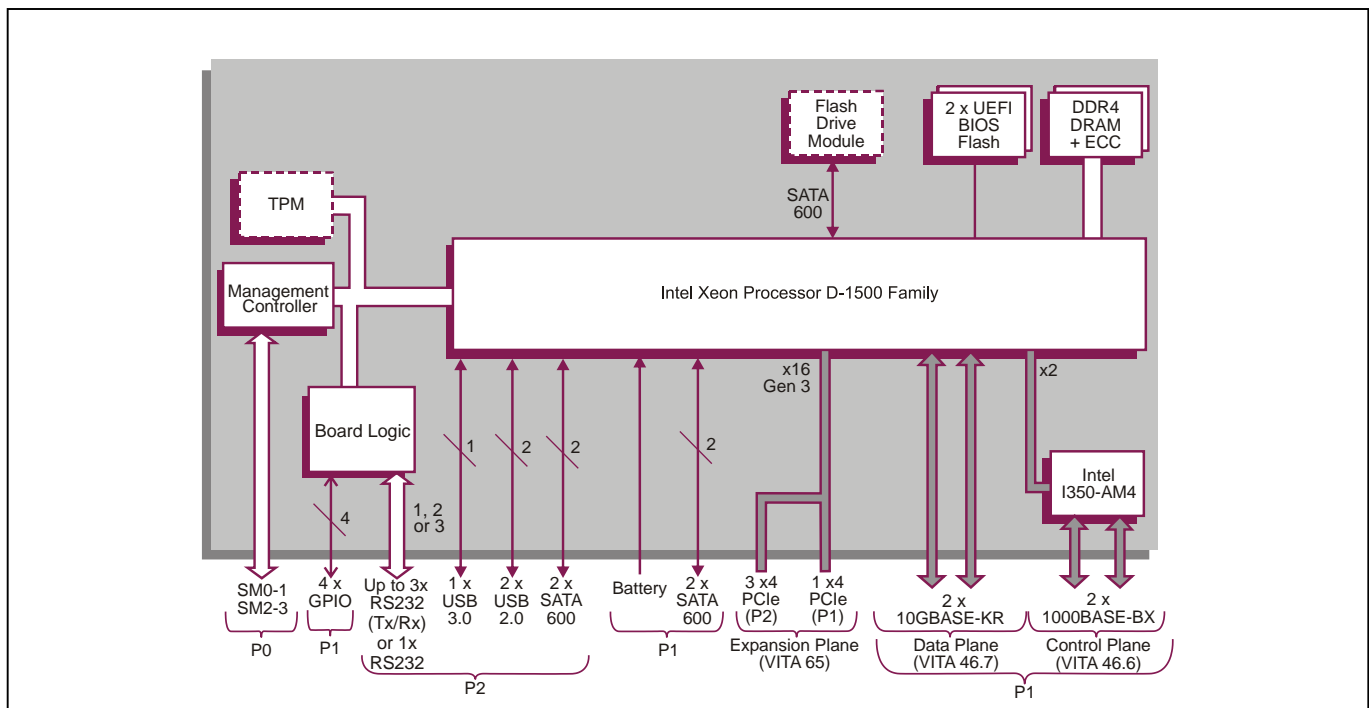# Rugged conduction-cooled 3U VPX™ board based on Intel® Xeon® Processor D-1500 Family

Key Features

TR C4x/3sd-RCx provides server grade virtualization support and connectivity to meet the needs of high performance embedded computer applications. Separate control and data planes allow secure multi-processor based solutions to be constructed for rugged and extended temperature operating environments.

- Intel® Xeon® Processor D-1500 Family:
  - → 8-core processing
  - → 12-core processing
- Up to 32 Gbytes of DDR4 DRAM
- On-board solid state drive (SSD) option:
  - → Flash Drive Module
- 10 Gigabit and Gigabit Ethernet connectivity
- PCI Express® connections for point to point expansion
- Support for Linux® and Windows®

CONCURRENT TECHNOLOGIES

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VPX-REDI Embedded Computer Board

- conduction-cooled 3U VPX-REDI™ board utilizing the Intel® Xeon® processor D-1500 family
- OpenVPX™ profile supporting 10GBASE-KR on Data Plane compatible with:
  - → SLT3-PAY-2F2U-14.2.3
- air-cooled VPX variants available:
  - → see separate TR C4x/msd datasheet

Central Processor

- 8-core Intel® Xeon® processor D-1539:
  - → 12 Mbytes Cache, 1.6 GHz
- 12-core Intel® Xeon® processor D-1559:
  - → 18 Mbytes Cache, 1.5 GHz
- Intel® Advanced Vector Extensions 2
- Intel® AES New Instructions
- server class processing cores in a System-on-a-Chip package

DRAM

- up to 32 Gbytes soldered DDR4 ECC DRAM:
  - → single bit error correction, dual bit error detection
  - → dual channel architecture
- accessible from processor or VPX Expansion Plane

Serial Ports

- up to three user selectable RS232 serial ports
- the first RS232 port via P2 supports either:
  - → Tx/Rx CTS/RTS, DTR/DSR
  - → or Tx/Rx
- when enabled, the second and third RS232 (Tx/Rx) port are switched to the P2 connector (losing the first port modem signals). 16550 compatible UARTs

Other Peripheral Interfaces

- PC RTC, long duration timer, watchdog timer
- up to three USB ports:
  - → 2 x USB 2.0 ports via P2
  - → 1 x USB 3.0 port via P2
- 4 x GPIO signals via P1

Mass Storage Interfaces

- 5 x SATA600 interfaces:
  - → 2 x SATA via P1
  - → 2 x SATA via P2
  - → 1 x SATA routed to an optional on-board Flash Drive Module

Graphics Interface

- an on-board graphics interface is not supported
- if graphics interface support is required, use an Expansion Plane PCI Express port via backplane to a graphics processor module

VPX Control Plane, One Gigabit Ethernet

- VPX Control Plane supports 2 x 1000 Mbps IEEE802.3z SerDes (1000BASE-BX) interfaces (VITA 46.6):
  - → compatible with OpenVPX module profiles
  - → supports IEEE 1588 "Deterministic Network Timing" (contact sales office for supported operating systems)

VPX Data Plane, Ten Gigabit Ethernet

- VPX Data Plane supports 2 x 10 Gigabit Ethernet (10GBASE-KR) interfaces (VITA 46.7):
  - → compatible with OpenVPX module profiles

VPX Expansion Plane, PCI Express

- configurable PCI Express® (PCIe®) VPX Expansion Plane interface (VITA 65) supports:
  - → 1 x4 PCIe port via P1 connector
  - → 3 x4 PCIe ports via P2 connector
  - → the 16 lanes can be configured as 4 x4 ports, 2 x8 ports or 1 x16 port
  - → compatible with OpenVPX module profiles
- PCIe interface supports Gen 1, Gen 2 and Gen 3
- 4 channel DMA engine for fast data block moves
- ports can be configured by the VPX Switch Configuration Tool, see separate datasheet

System Management

- IPMI via SM0-1 and SM2-3:
  - → CPU temperature and voltage monitor accessed via System Management interface
- Baseboard Management Controller (BMC)

Board Security Features

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

Optional Built-In Test (BIT) Support

- Power-on BIT, Initiated BIT, Continuous BIT

Software Support

- supports Linux® and Windows®

Firmware Support

- UEFI boot firmware (BIOS):
  - → UEFI 2.4 support
  - → EDK II support
  - → includes Compatibility Support Module
  - → implements Secure Boot
- implements Intel® Boot Guard
- LAN boot firmware included

Non-Volatile Memory

- 16 Mbytes of BIOS Flash EEPROM, dual devices

Safety

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

Electrical Specification

- typical current consumption for 8-core processor (1.6 GHz) with 32 Gbytes DRAM:
  - → +5V @ 5.6A
  - → +3.3V @ 1.2A; +3.3V AUX @ 0.3A

Environmental Specification

- conduction-cooled (VITA 48.2)
- operating temperature at card edge:
  - → VITA 47 Class CC4, -40°C to +85°C
- 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

- 3U VPX form-factor (VITA 46.0, VITA 48.0): 3.9 inches x 6.3 inches (100mm x 160mm)
- slot widths (VITA 48.0):
  - → 0.8 inches VPX-REDI Type 2, RCT-Series
  - → 0.85 inches VPX-REDI Type 1, RCS-Series, Type 1 Two Level Maintenance (VITA 48.2)
- connectors to VITA 46.0 for P0, P1 and P2
- operating mechanical:
  - → shock - VITA 47 Class OS2, 40g
  - → random vibration - VITA 47 Class V3, 0.1g²/Hz

Related Products

- Development systems, switches, carriers and rear transition modules are available. Contact Concurrent Technologies for more details