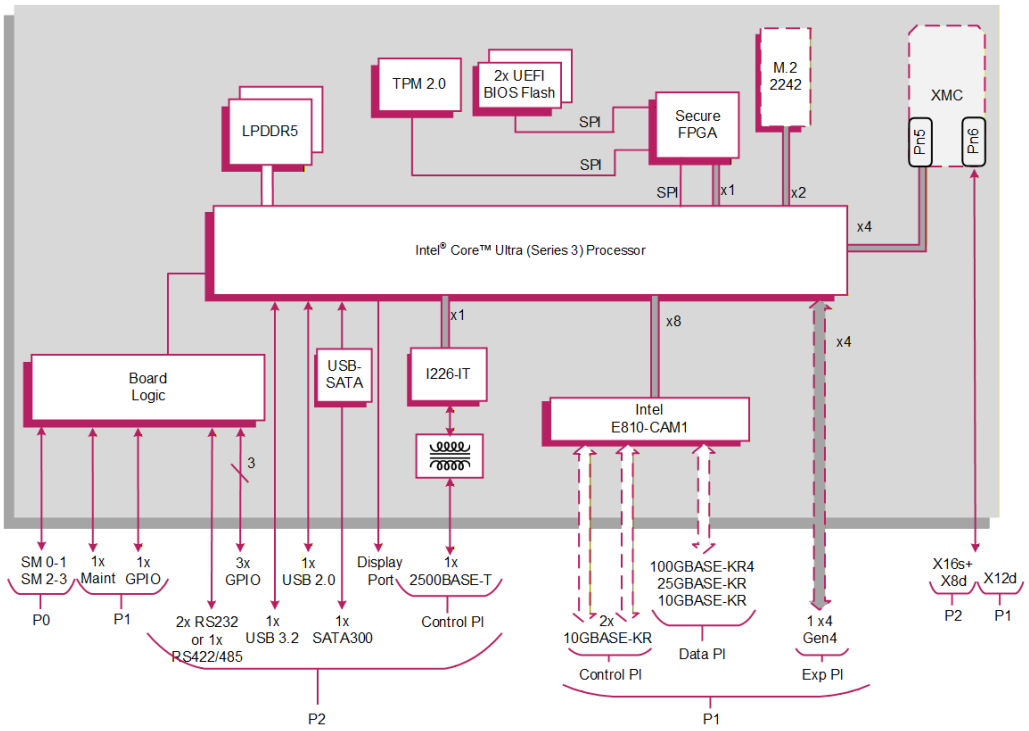
Hermes II
(TR LFx/msd)

Rugged 3U VPX I/O Intensive Plug In Card (PIC) based on 16-core Intel® Core™ Ultra (Series 3) Processor

Key Features

Hermes II is a rugged 3U VPX Plug In Card (PIC) based on the 16-core Intel® Core™ Ultra (Series 3) Processor. It is designed in alignment with the SOSA® Technical Standard for I/O intensive processor PICs.

- 16-core Intel® Core™ Ultra (Series 3) Processor
- Secure Enclave using security FPGA
- Intel® Iris Xe3 Graphics with Intel NPU for acceleration and AI Inferencing
- 100GBASE-KR4 Ethernet Data plane
- Control Plane: 2 x 10GBASE-KR + 1 x 2500BASE-T with Time Sensitive Network (TSN) support
- XMC Site for additional I/O resources
- Expansion Plane: x4 Gen4 PCI Express
- Up to 3.84TB storage with option for FIPS 140-3 compliant security



Specification

VPX Processor PIC

- rugged conduction-cooled 3U VPX PIC based on 16-core Intel® Core™ Ultra (Series 3) Processor
- compliant the following OpenVPX™ module and slot profiles:
  - SLT3-PAY-1F1F2U1TU1T1U1T-14.2.16
  - MOD3-PAY-1F1F2U1TU1T1U1T-16.2.15-4

Central Processor

- 16-core Intel® Core™ Ultra (Series 3) Processor
- Intel® Iris Xe3 Graphics with Intel NPU for acceleration and AI Inferencing

DRAM

- 64 Gbytes soldered LPDDR5 IBECC DRAM:
  - in-band ECC
  - single bit error correction
  - multi key total memory encryption

XMC Site

- 1x XMC site, in a single VPX slot (VITA 42.0):
  - XMC rear I/O, providing X16s+x8d+X12d
  - 1 x4 Gen4 PCI Express® Lane
- XMC connector type:
  - VITA 42 XMC (black)
- XMC VPWR +12 V
- VITA 46.9 XMC I/O pin-out

Serial Ports

- 1x RS232/422/485 port accessed via P2
- 1x maintenance port accessed via P1
- Maintenance port on P1 supports LVCMOS levels
- 16550 compatible UARTs

Graphics/Audio Interfaces

- 1x graphics/audio interface:
  - DisplayPort™ v1.2 interface, supporting audio and video, via P2
  - up to 3840 x 2160 @ 60 Hz, driver dependent

Other Peripheral Interfaces

- PC RTC, watchdog timer
- 1x USB 2.0 and 1x USB 3.2 (Gen 1) ports via P2
- 3x GPIO signals via P2
- 1x GPIO signal via P1

Mass Storage Interfaces

- 1x M.2 SSD site supports:
  - 2242 format module
  - x2 PCIe interface (M-key)
  - Opal 2.0 security encryption
  - Write Protect
  - NVM Express® (NVMe®) logical device interface
  - Up to 3.84TB storage with option for FIPS 140-3 compliant security
- 1x SATA 300 via P2

VPX Data Plane, 100 Gigabit Ethernet

- Configurable Ethernet VPX Data Plane fabric interface (VITA 46.7)
- 1x 100 Gigabit Ethernet port via P1 (VITA 46.7):
  - Supports 1x 100GBASE-KR4 or 1x 25GBASE-KR or 4x 10GBASE-KR
  - Implemented by Intel® Ethernet Controller E810 via x8 PCIe®
  - Factory build option available to disable Data Plane
- Supports IEEE 1588 Precision Time Protocol
- Supports ROCE v2 RDMA support

VPX Control Plane, Ethernet

- configurable Control Plane (VITA 46.6)
- 1x 2.5GBASE-T Ethernet port via P2:
  - supports 10/100/1000/2.5GBASE-T
  - implemented by Intel Ethernet Controller I226-IT
  - Time Sensitive Network (TSN) support
- up to 2x 10GBASE-KR Ethernet ports via P1 (VITA 46.7):
  - supports up to 2x 10GBASE-KR
  - implemented by Intel® Ethernet Controller E810 via x8 PCIe
  - factory build option available to disable Control Plane
- supports IEEE 1588 Precision Time Protocol

VPX Expansion Plane, PCI express

- configurable PCI Express (PCIe) VPX Expansion Plane fabric interface (VITA 46.4):
  - 1 x4 Gen 4
  - factory build option available to disable Expansion Plane
- PCIe interfaces support Gen 1, Gen 2, Gen 3 and Gen 4

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

System Management
- On board controller:
  - SM0-1 and SM2-3
- VITA 46.11-2022 type 3 IPMC
- option for VITA 46.11-2022 compatible Tier 1 Chassis Manager

Software Support
- supports Linux® and Windows®

Board Security Packages
- Trusted Platform Module (TPM 2.0)
- supports Total Memory Encryption, ROP Attack Prevention and Advanced Crypto-Key Protection
- option for Sanitization Utility Software Package
- option for proprietary board-level security features

Firmware Support
- dual 64 Mbyte BIOS SPI Flash EPROMs
- UEFI boot firmware (BIOS):
  - UEFI 2.7 support
  - 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 (Estimated)
- typical current figure for 16-core Intel® Core™ Ultra Processor (Series 3) with 64 Gbytes DRAM:
  - +12 V VS1 @ TBD
  - +3.3 V AUX @ TBD
- +12 V AUX and -12 V AUX routed to XMC site
- +5 V and +3.3 V are not connected

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:
  - -1,500 to 60,000 feet (-460 to 18,300 meters)
- rapid decompression:
  - from 8,000 to 60,000 feet (from 2440 to 18,300 meters)
- relative humidity: 5% to 95%, non-condensing

Mechanical Specification
- VPX form-factor (VITA 46.0, VITA 48.0)
- 3.9-inches x 6.3-inches (100 mm x 160 mm)
- slot width (VITA 48.0):
  - 1.0-inch VPX-REDI Type 1, RCR-Series, Type 1 Extended Covers Two Level Maintenance (VITA 48.2)
  - 1.0-inch VPX-REDI Type 1, RCR-Series, Type 1 Standard Covers Two Level Maintenance (VITA 48.2)
- connectors to VITA 46.0 for P0, P1 and P2
- operating mechanical:
  - shock - VITA 47 Class OS2, 40 g
  - random vibration - VITA 47 Class V3, 0.1 g^2/Hz

FPGA for Boot Security
- FPGA adds an additional level of security in addition to the standard Boot Guard and Secure Boot

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