A25

Embedded Single Board Computer with Intel Xeon D
6U VMEbus for Industrial Applications

» *Intel Xeon D-1500 (Broadwell DE)*

» *Up to 16 cores and 32 threads*

» *64-bit VMEbus master and slave interfaces*

» *Up to 32 GB DDR4 DRAM soldered, ECC*

» *Front I/O: 3 Gb Ethernet, 2 USB 3.0, 2 COM*

» *Rear I/O: 2 Gb Ethernet*

» *1 PMC/XMC slot*

» *Trusted Platform Module (TPM)*

Latest Intel Xeon Technology
The A25 is a high-performance multicore VMEbus CPU board based on Intel's Xeon D-1500 server CPU. The VMEbus interface is implemented as an open-source, FPGA-based solution. This makes it both future-proof and cost-efficient with comprehensive functionality. The A25 supports a reduction of system size, a reliable long-term operation without forced air cooling, and manifold computing functions with just one computer board.

Versatile Front I/O and Mass Storage
With two USB ports, three Gigabit Ethernet ports and two RS232 COMs at the front, the board offers the crucial basics of a multi-purpose industrial computer. Being equipped with DDR4 SDRAM with ECC and Flash, the need for flexible mass storage extensions is covered by slots for microSD and mSATA.

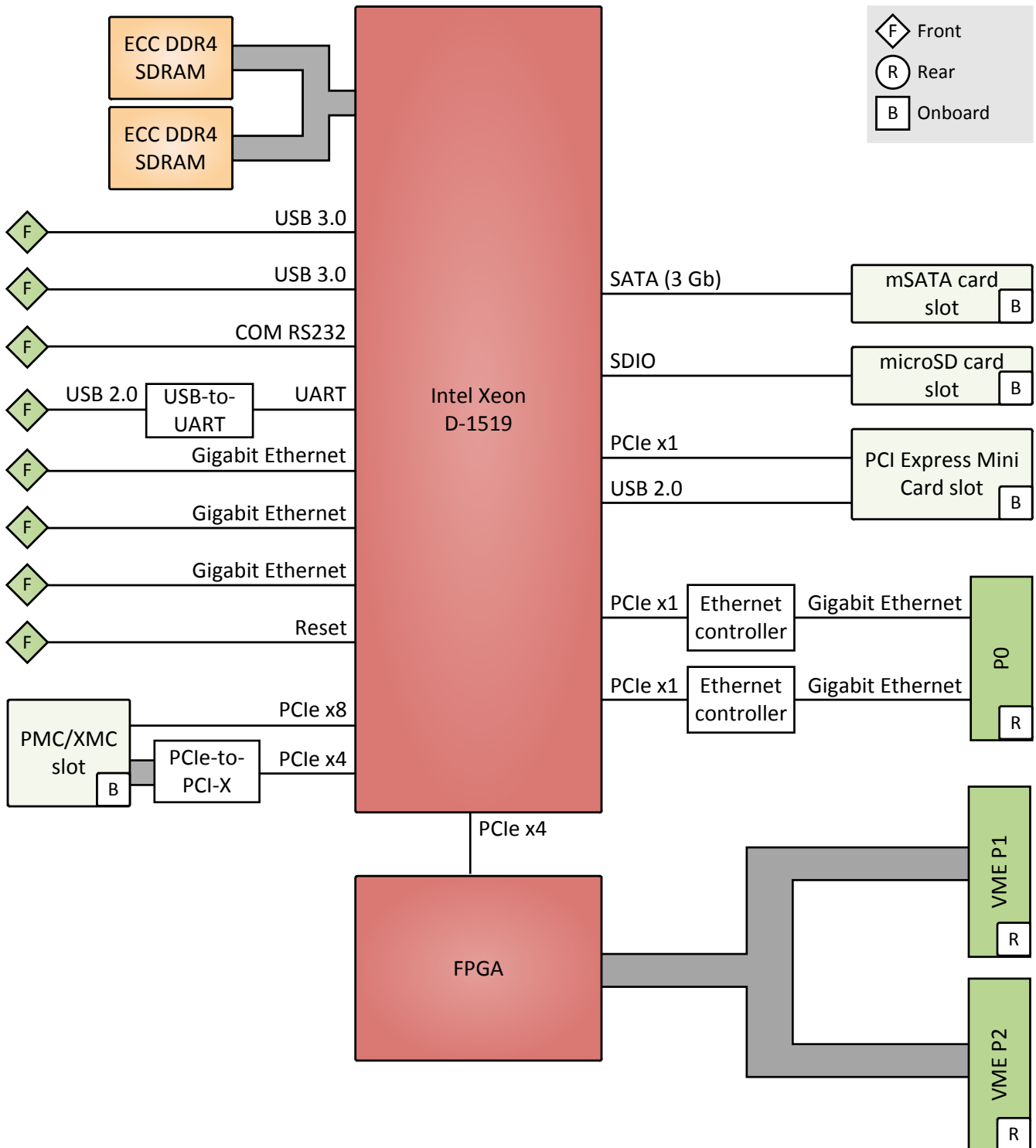### Flexible Interfaces via PMC/XMC
In addition, the A25 can be equipped with one XMC/PMC mezzanine card and one PCI Express Mini Card, providing additional front I/O (XMC/PMC) for functions such as graphics, mass storage, or further Ethernet. The PMC slot supports modules up to 64-bit/133-MHz PCI-X, while the XMC slot is controlled by one PCI Express x8 link. The modular extension with I/O mezzanines on a single-board computer allows to configure tailored systems from open standard components, reducing integration time and cost.

Designed for Harsh Environments
The A25 supports operation in a -40 °C to +60 °C temperature range. The rugged board withstands shock and vibration as all components on the board are soldered, which is a prerequisite for reliable operation and a longer product life-time.

Demanding Markets
The A25 is a computer board well suited for critical embedded applications, especially in the industrial automation and power & energy markets, for example as the central safety platform for power plants.

Data Sheet

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F	Front	
R	Rear	
B	Onboard	

ECC DDR4 SDRAM

ECC DDR4 SDRAM

Intel Xeon D-1519

F — USB 3.0

F — USB 3.0

F — COM RS232

F — USB 2.0 — USB-to-UART — UART

F — Gigabit Ethernet

F — Gigabit Ethernet

F — Gigabit Ethernet

F — Reset

PMC/XMC slot [B] — PCIe-to-PCI-X — PCIe x8

PCIe x4

SATA (3 Gb) — mSATA card slot [B]

SDIO — microSD card slot [B]

PCIe x1 — PCI Express Mini Card slot [B]
USB 2.0

PCIe x1 — Ethernet controller — Gigabit Ethernet — P0 [R]

PCIe x1 — Ethernet controller — Gigabit Ethernet

PCIe x4

FPGA

VME P1 [R]

VME P2 [R]

Diagram

CPU
- The following CPU types are supported:
  - Intel Xeon D-1519, 4 cores
  - Intel Xeon D-1539, 8 cores (on request)
  - Intel Xeon D-1577, 16 cores (on request)
- Intel Virtualization Technology (Intel VT)
  - VT-d
  - VT-x
- Intel Turbo Boost Technology
- Intel Hyper-Threading Technology

Security
- Trusted Platform Module (TPM 2.0)

Memory
- System RAM
  - Soldered DDR4, ECC support
  - 4 GB, 8 GB, 16 GB or 32 GB
- Boot Flash
  - 16 MB

Mass Storage
- The following mass storage devices can be assembled:
  - microSD card
  - mSATA disk

Front Interfaces
- USB
  - Two Type A connectors, host, USB 3.0
  - One Type A connector, USB-to-UART, for UART functionality using a USB 2.0 connection
- Ethernet
  - Three RJ45 connectors, 1000BASE-T, or
  - Six link and activity LEDs (two per channel)
- UART
  - One physical interfaces RS232 on RJ45 connector
- PMC/XMC front I/O if populated
- Status LED
- Reset button

Onboard Interfaces
- The board supports either one PMC module or one XMC module.
- XMC
  - One slot
  - Compliant with XMC standard VITA 42.3-2006
  - One x8 PCI Express link, PCIe 3.0
  - 5 V / 3.3 V V(I/O)
- PMC
  - One slot
  - Compliant with PMC standard IEEE 1386.1
  - Up to 64-bit/133-MHz, 3.3 V V(I/O)
- PCI Express Mini Card slot
  - One x1 PCI Express link
  - One USB 2.0 interface

Rear Interfaces
- Ethernet
  - Two channels, 1000BASE-T on P0 connector

Technical Data

Supervision and Control	■ Board management controller
	■ Watchdog timer
	■ Temperature measurement
	■ Real-time clock
	□ with supercapacitor, or
	□ with battery backup (optional)

Backplane Standard

- ■ VME64 and VME64x Specification
- ■ The following features are supported:
  - □ Master: D08(EO):D16:D32:D64(DMA only):A16:A24:A32:BLT:MBLT, non-privileged program/ data, supervisory
  - □ Slave: D08(EO):D16:D32:D64:A16:A25:A32:BLT:MBLT
  - □ Slave access routing to SRAM or other bus via Wishbone bus (e.g. PCI)
  - □ Slot-1 function with auto-detection
  - □ Interrupter D08(O):I(7-1):ROAK
  - □ Interrupt handler D08(O):IH(7-1)
  - □ Bus requester: ROR (release on request), RWD (release when done), SGL (single level 3 fair/ non-fair requester)
  - □ Multi-level 0-3 bus arbiter (RRS Round-Robin-Select)
  - □ BTO VMEbus timeout
  - □ ADO address only cycles
  - □ Mailbox functionality
  - □ Location Monitor A16, A24, A32
  - □ DMA controller with scatter gather capabilites (A24/A32/D32/D64, non-privileged, supervisory)
  - □ DMA access capabilities VMEbus, SRAM and other buses via Wishbone bus (e.g. PCI)
  - □ Utility functions
  - □ 1 MB local SRAM accessible via Wishbone bus
  - □ Geographical addressing

Electrical Specifications

- ■ Supply voltage
  - □ +5 V (-3%/+5%)
- ■ Power consumption
  - □ 60 W typ.

Mechanical Specifications

- ■ Dimensions
  - □ 6U, 4 HP
- ■ Weight
  - □ 540 g

Environmental Specifications

- ■ Temperature range (operation)
  - □ -40 °C to +60 °C
- ■ Temperature range (storage): -40 °C to +85 °C
- ■ Cooling concept
  - □ Air-cooled, airflow 1.5 m/s
- ■ Relative humidity (operation): max. 95% non-condensing
- ■ Relative humidity (storage): max. 95% non-condensing
- ■ Altitude: -300 m to +3000 m

Reliability

- ■ MTBF: 267 000 h @ 40°C according to IEC/TR 62380 (RDF 2000)

Safety

- ■ Electrical Safety
  - □ EN 62368-1 (former EN 60950-1)
- ■ Flammability (PCBs)
  - □ UL 94 V-0

Technical Data

EMC	■ EN 55022 (radio disturbance)
	■ IEC 61000-4-2 (ESD)
	■ IEC 61000-4-3 (electromagnetic field immunity)
	■ IEC 61000-4-4 (burst)
	■ IEC 61000-4-5 (surge)
	■ IEC 61000-4-6 (conducted disturbances)

| **BIOS/Boot Loader** | ■ AMI Aptio |

Software Support	■ Linux (on request)
	■ VxWorks (on request)
	■ QNX (on request)
	■ See also Application Note Recommendations for a Robust Software Setup
	■ For more information on supported operating system versions and drivers see Software.

Technical Data

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