Rugged Intel® Atom™ Processor Board

Key Features

TR D2x/3sd-RCx is a rugged conduction-cooled 3U VPX board based on the Intel® Atom™ processor E3800 product family.

- Size, Weight and Power (SWaP) optimized

- Designed for deployment in applications within military, aerospace, security, transportation and other critical embedded markets

- XMC site for user specific I/O

- Optional SATA Flash Drive for reliable storage

- Fast Boot, Built-in-Test and Enhanced Security packages available to order

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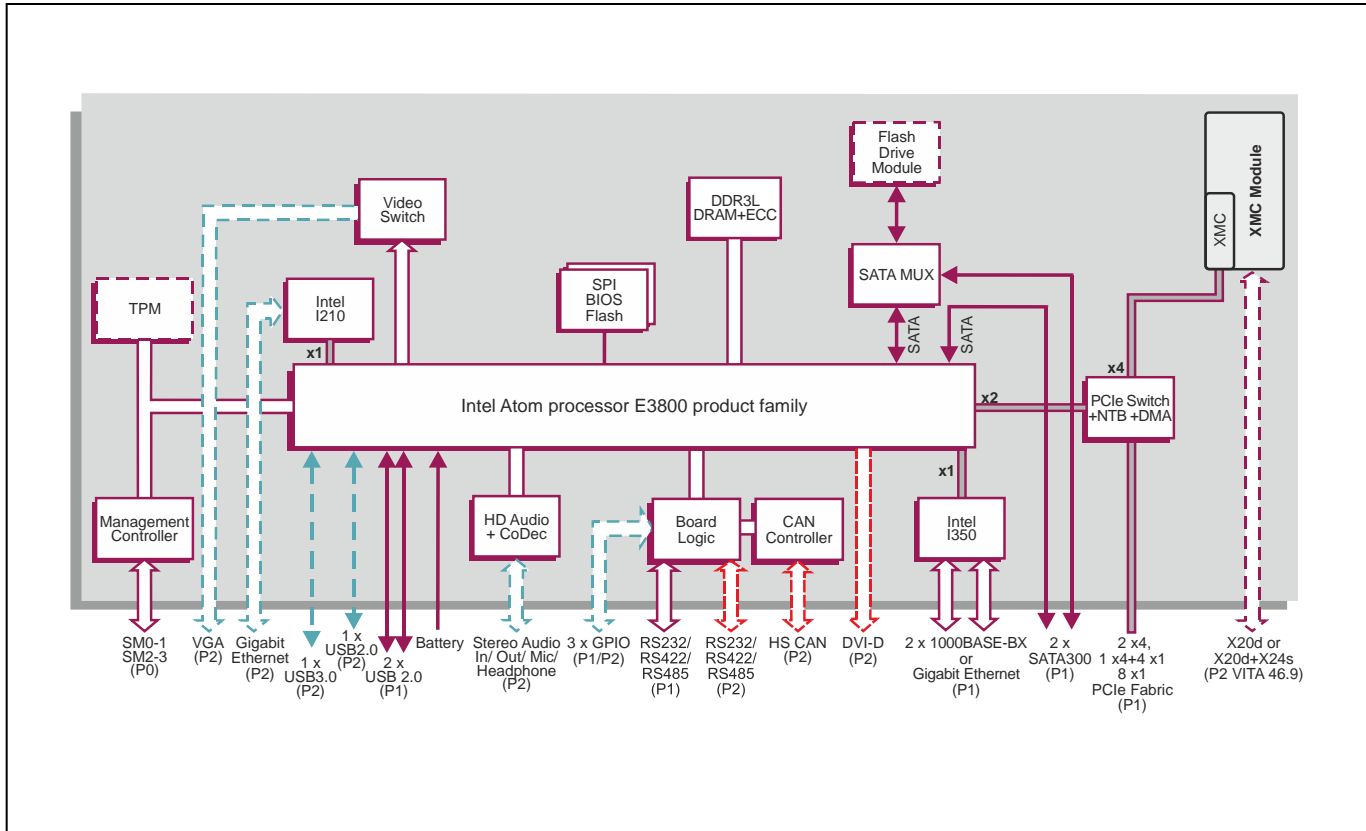
VPX-REDI Embedded Computer Board

- conduction-cooled 3U VPX-REDI™ computing board utilizing a CPU from the Intel® Atom™ processor E3800 product family
- compatible with several OpenVPX module profiles
- factory build options for compatible rear I/O with TR A4030x-RCx or TR 90x/31x-RCx
- air-cooled VPX variants available:
  → see TR D2x/msd datasheet

Central Processor

- Intel® Atom™ processor E3800 product family:
  → 4-core 1.91 GHz (10W) Intel® Atom™ processor E3845, 2M Last Level cache
  → 1-core 1.46 GHz (5W) Intel® Atom™ processor E3815, 512K Last Level cache

DRAM

- 4 Gbytes DDR3L ECC DRAM:
  → peak bandwidth of 10.6 Gbytes/s (4-core)
  → peak bandwidth of 8.52 Gbytes/s (1-core)
  → single channel architecture
- accessible from processor or VPX fabric

XMC Interface

- 1 x XMC site, in a single VPX slot (VITA 42.0):
  → XMC (Switched Mezzanine Card) interface supported by x4 PCI Express® Gen 2 (VITA 42.3)
  → option for +5V or +12V VPWR
  → option for X20d or X20d+X24s rear I/O
- XMC rear I/O supports VITA 46.9 pin-mapping

Graphics Interfaces

- optional DVI-D interface via P2:
  → resolutions up to 1920 x 1080 @ 60 Hz
- optional VGA interface via P2:
  → resolutions up to 2048 x 1536 @ 75 Hz
- 1-core processor:
  → graphics base frequency is 400 MHz
- 4-core processor:
  → graphics base frequency is 542 MHz
  → graphics burst frequency is 792 MHz
- support for Microsoft® DirectX 11.1 on Windows®
- support for OpenGL 3.0 on Linux®

Mass Storage Interfaces

- 2 x SATA300 interfaces via P1 connector
- optional SATA Flash Module, 8 Gbytes minimum

Serial Interfaces

- 1 x RS232/422/485 COM channel accessed via P1:
  → supporting Tx/Rx, CTS/RTS in RS232 only
  → supporting Transmit Control in RS485 mode
- 1 x RS232/422/485 COM channel accessed via P2:
  → supporting CTS, RTS, DSR, DTR, DCD and RI 16550 compatible UARTs

VPX Control Plane Ethernet Interfaces

- build option for 2 x 1000 Mbps IEEE802.3z SerDes (1000BASE-BX) ports via P1:
  → software switch option for 1 x SerDes port and 1 x 10/100/1000 Mbps Ethernet port
- alternative factory build options for 2 x 10/100/1000 Mbps Ethernet ports
- build options for on-board Ethernet magnetics

VPX Data Plane PCI Express Interface

- P0, P1 and P2 support OpenVPX configuration
- configurable PCI Express (PCIe®) fabric interface:
  → 8 x1 PCIe ports, 2 x4 PCIe ports, 1 x4 + 4 x1 PCIe ports
  → support for Gen 1 and Gen 2
  → supports one Non-Transparent Bridge (NTB) port for multi-processing configurations
- 4 channel DMA engine for fast data block moves
- PCIe ports can be configured by the VPX switch configuration tool
- switch supported by Fabric Interconnect Networking software (FIN-S), see separate datasheett

Additional Ethernet Port

- option for 1 x 10/100/1000 Mbps Ethernet port via P2

Other Peripheral Interfaces

- PC Real Time Clock
- long duration timer; watchdog timer
- 2 x USB2.0 ports via P1 plus an option for a USB3.0 port and a USB2.0 port via P2
- 3 x GPIO signals via P1/P2
- optional stereo audio including onboard codec
- optional High Speed CANbus controller interface
- CPU temperature monitor; voltages monitor; accessed via System Management interface

System Management

- Tier 1 Chassis Manager and IPMC functionality as per draft VITA 46.11 specification
- compatibility with standard off-the-shelf system management utilities based on IPMI Version 1.5

Optional Built-In Test (BIT) Support

- Power-on BIT (PBIT), Initiated BIT (IBIT), Continuous BIT (CBIT)

Optional Board Security Features

- Trusted Platform Module (TPM):
  → build option for either TPM 1.2 or TPM 2.0
- option for Sanitization Utility Software Package
- proprietary board-level security features

Software Support

- support for Linux®, Windows® and VxWorks®

Firmware Support

- Insyde Software InsydeH20™ BIOS
- optional Fast Boot solution using the Intel® Firmware Support Package (Intel® FSP)
- Intel® Platform Innovation Framework for EFI
- LAN boot firmware included

Non-Volatile Memory

- dual 8 Mbytes of BIOS SPI Flash EPROM
- 8 Kbytes user EEPROM

Electrical Specification

- typical power consumption is 9.4W for the 1-core Intel Atom processor E3815 board
- +5V, +3.3V and +3.3V AUX are required
- +12V is not required
- +12V AUX and -12V AUX routed to XMC site

Safety

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

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)
- 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 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
- for non-rugged VPX (N-Series) version:
  → commercial air-cooled
  → see TR D2x/msd datasheet

Optional VPX-REDI Fabric Switch

- board is compatible with FR 331/306-RCx or FR 341/306-RCx VPX-REDI Fabric Switches

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