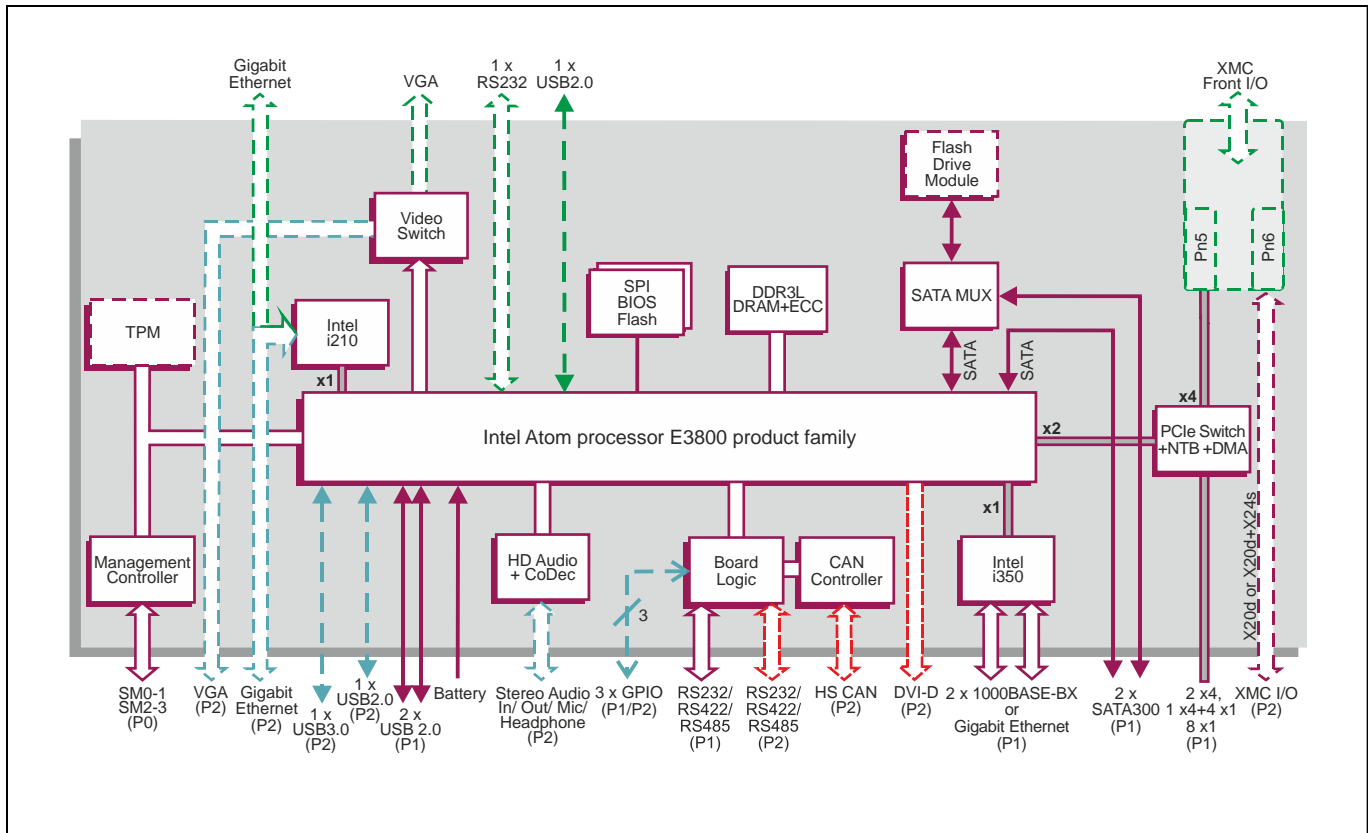
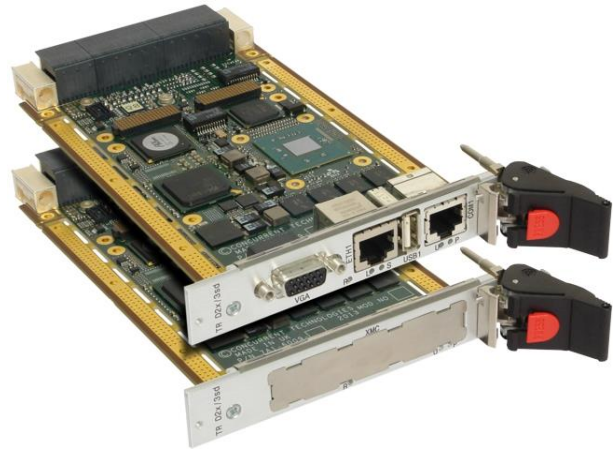


# Intel® Atom™ Processor Board

## Key Features

TR D2x/msd is a 3U VPX board based on the Intel® Atom™ processor E3800 product family.

- Optimized for Size, Weight and Power (SWaP) as a result of high performance relative to the module's power consumption:
  - quad-core processing available for enhanced performance
  - single core processing available for lowest power consumption
- Designed for deployment in a variety of applications within aerospace, security, transportation, defense and other critical embedded markets:
  - optional Fast Boot and Built-in-Test packages ensures the module is equipped to handle critical applications
  - optional board level security package ensures sensitive data remains secure
- XMC option for user I/O
- On board Flash Drive option for reliable storage



## VPX Embedded Computer Board

- air-cooled 3U VPX computing board utilizing the Intel® Atom™ processor E3800 product family:
  - optional rear transition module
- compatible with several OpenVPX™ module profiles
- factory build options for rear I/O compatibility with TR A40/x0x or TR 90x/x1x

## 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 soldered 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 (build option)

- 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)
  - front panel I/O aperture
  - option for +5V or +12V VPWR
  - option for X20d or X20d+X24s rear I/O
- front panel build option does not support XMC site

## Front Panel I/O (build option)

- front panel I/O build option (no XMC site) supports:
  - 1 x 10/100/1000Mbps Ethernet (specific variants)
  - 1 x RS232 channel accessed via RJ45, full modem support (16550 compatible)
  - 1 x USB2.0 interface
  - 1 x VGA, user switchable via front panel or via P2
- only available with the air-cooled boards (N-Series)

## Graphics Interface

- DVI-D interface (build option) via P2:
  - resolutions up to 1920 x 1080 @ 60 Hz
- VGA interface, user switchable via front or P2:
  - resolutions up to 2048 x 1536 @ 75 Hz
  - factory build option via P2
- 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

## 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

## 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

## 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
- supported by Fabric Interconnect Networking software (FIN-S), see separate datasheet

## Additional Ethernet Port

- option for 1 x 10/100/1000 Mbps Ethernet port via front panel or 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

## 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

## Software Support

- support for Linux®, Windows® and VxWorks®

## Non-Volatile Memory

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

## Electrical Specification

- typical power consumption is 9.4 W 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

- operating temperature (all variants):
  - 0°C to +70°C (N-Series), exceeds VITA 47 Class AC1
- extended operating temperature:
  - -25°C to +70°C (E-Series)
- for airflow requirements and fanless operation refer to the Technical Reference Manual
- 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 (operating or non-operating):
  - 5% to 95%, non condensing
- option for rugged conduction-cooled (VITA 48.2) VPX-REDI (RCx-Series) version:
  - see TR D2x/msd-RCx datasheet

## Mechanical Specification

- 3U VPX form-factor (VITA 46.0, VITA 48.0)
- 3.9 inches x 6.3 inches (100mm x 160mm)
- optional slot widths:
  - 0.8-inch (VITA 46.0)
  - 1.0-inch (IEEE 1101.10 as per VITA 46.0)
  - 1.0-inch (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 - 0.002g<sup>2</sup>/Hz

## Optional VPX Fabric Switch

- board is compatible with FR 331/306 VPX Fabric Switch

