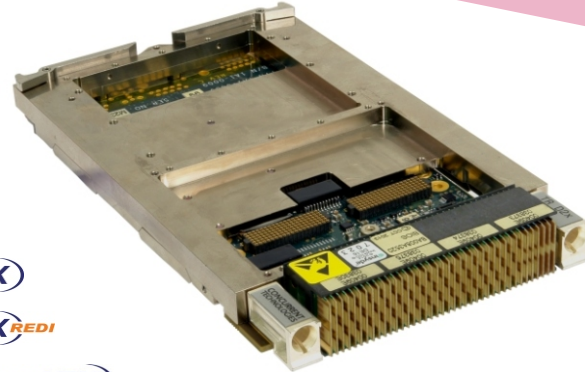


Intel® Atom™ Processor Single Board Computer, Rugged Conduction-Cooled



APPLICATIONS

TR D2x/msd-RCx is a rugged conduction-cooled 3U VPX board based on the Intel® Atom™ processor E3800 product family. TR D2x/msd-RCx is offered with two processor options: single-core for lowest power consumption and quad-core for enhanced performance. Irrespective of processor the product offers favorable Size, Weight and Power (SWAP) metrics and is designed for deployment in a variety of

applications within the aerospace, security, transportation, defense and other critical embedded markets. A number of optional software packages are offered including Fast Boot, Built-in Test (BIT) and a board level security package to prevent access to sensitive data. System management is compatible with the draft VITA 46.11 standard for uniform management functionality within VPX equipment.

HIGHLIGHTS

- 3U VPX-REDI (VITA 48.0) RCx-Series processor board:
 - conduction-cooled to VITA 48.2, conformally coated
 - -40°C to +85°C operating temperature (at card edge)
 - RCS-Series supports VPX-REDI Type 1 Two Level Maintenance in 3U VPX-REDI 0.85-inch slot
 - RCT-Series supports VPX-REDI Type 2 in 3U VPX-REDI 0.8-inch slot
- I/O interfaces compatible with several OpenVPX profiles
- Rear plug compatible with the popular TR A40/x0x-RCx or TR 90x/x1x-RCx families
- Intel® Atom™ processor E3800 product family:
 - 4-core 1.91 GHz (10W) Intel Atom processor E3845
 - 1-core 1.46 GHz (5W) Intel Atom processor E3815
- The 1-core board variant consumes less than 10W
- 4 Gbytes DDR3L DRAM with ECC
- Optional Fast Boot solution using the Intel® Firmware Support Package (Intel® FSP)
- Configurable PCI Express® (PCIe) VITA 46.4 data plane fabric interface:
 - 8 x1 PCIe ports, 2 x4 PCIe ports, 1 x4 + 4 x1 PCIe ports (Gen 1 and Gen 2)
 - compatible with OpenVPX module profiles
 - supports one Non-Transparent Bridge (NTB) port
- Compatible with the FR 331/x06-RCx Fabric Switch
- Configurable VITA 46.6 control plane fabric interface:
 - 2 x SerDes (1000BASE-BX) ports or 1 x SerDes plus 1 x Gigabit Ethernet ports or 2 x Gigabit Ethernet ports
- option for 10/100/1000 Ethernet port
- 2 x SATA300 mass storage interface plus support for optional on-board SATA Flash Drive Module
- Up to 2 x serial ports
- Up to 3 x USB 2.0 ports plus option for USB 3.0 port
- Watchdog and long duration timers
- Tier 1 Chassis Manager and IPMC functionality as per draft VITA 46.11 specification
- XMC module interface (x4 PCI Express Gen 2) with rear I/O
- Optional support for:
 - graphics (DVI-D, VGA) and stereo audio
 - High Speed CANbus controller interface
 - Built-In Test (BIT) firmware and software
 - board-level security package
 - Trusted Platform Module (TPM)
 - software tools for the PCIe fabric interface
- Non-rugged air-cooled versions (N-Series):
 - rear plug compatible with the rugged versions
- Support for Linux®, Windows® and VxWorks®

VPX-REDI Single Board Computer

- conduction-cooled 3U VPX SBC (RCx-Series) utilizing the Intel® Atom™ processor E3800 product family
- compatible with several OpenVPX module profiles
- factory build options for compatible rear I/O with TR A40/x0x-RCx or TR 90x/x1x-RCx

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

- 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 P2w-X20d or P2w-X20d+X24s rear I/O

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

Optional Built-In Test (BIT) Support

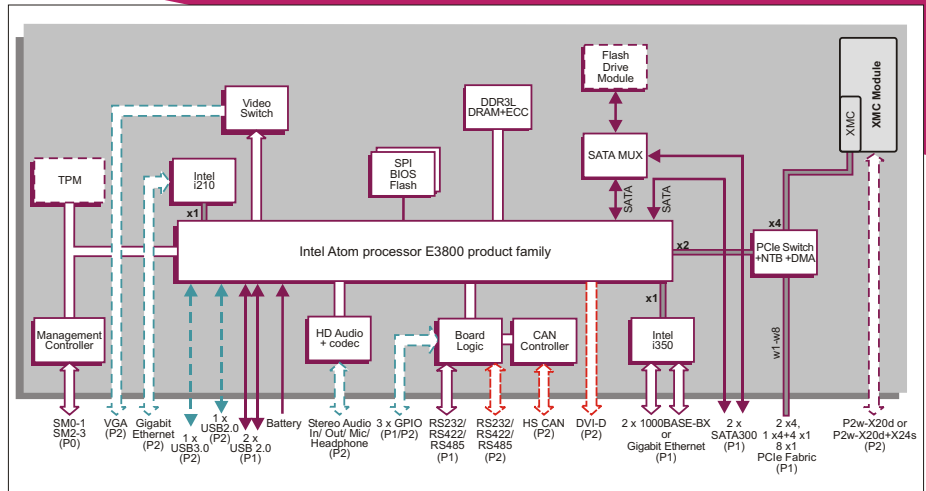
- Power-on BIT (PBIT), Initiated BIT (IBIT), Continuous BIT (CBIT)

Optional Board Security Packages

- Trusted Platform Module (TPM)
- 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 SW FNS/nnn datasheet

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

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

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 VPX-REDI Fabric Switch

ORDERING INFORMATION

Order Number	Product Description (Hardware)	For the order number suffix (d-yz) options please contact your local sales office:	
TR D2x/msd-yzRCx	Intel Atom processor E3800 family, RCx-Series where x = processor core selection where m = front panel width style where s = processor speed variant where RCx = RCS or RCT (VPX-REDI Type 1 or Type 2)	d = DRAM size	yz = rear I/O configuration

For further information on the VPX (N-Series) and VPX-REDI (RCx-Series) boards please contact your local sales office.