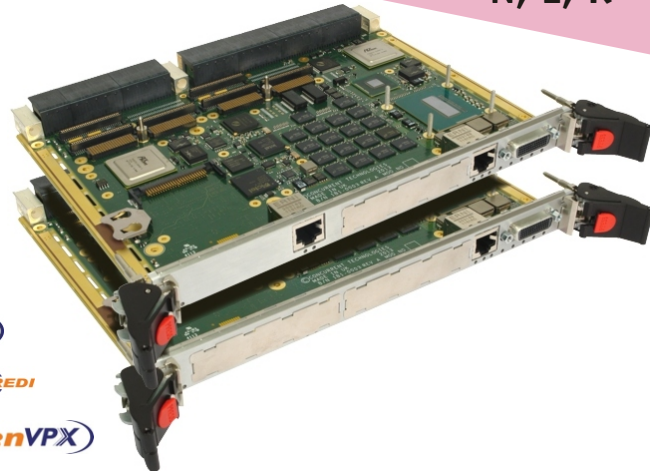


4th Generation Intel® Core™ Processor Single or Dual PMC/XMC Carrier



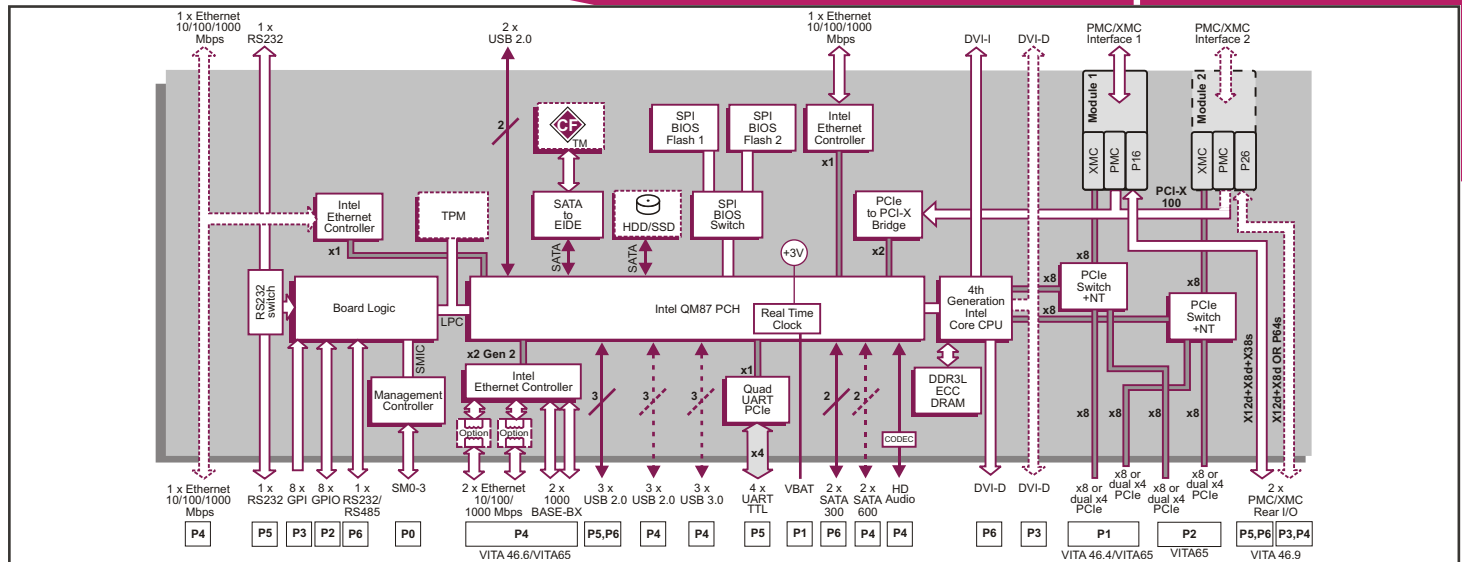
APPLICATIONS

VR E1x/msd is a 6U VPX air-cooled processor board based on a 4th generation Intel® Core™ processor (2-core or 4-core) with up to 32 Gbytes of memory for high performance compute capability. This single slot board features a comprehensive selection of I/O including one or two PMC/XMC sites plus local storage

options with 2.5-inch drive and CompactFlash® options. VR E1x/msd is suitable for a range of defense, aerospace, security, transport and industrial control. For harsh environments, extended temperature and rugged versions are supported.

HIGHLIGHTS

- 6U VPX (VITA 46.0) single board computer:
 - air-cooled, use in commercial (non-rugged) applications
 - 6U VPX 0.8-inch slot or 1.0-inch slot
- Compatible with several OpenVPX™ profiles
- 4th generation Intel® Core™ processor:
 - option for 2-core or 4-core processor
 - includes Intel® Advanced Vector Extensions 2 (AVX2)
 - includes Intel® AES New Instructions (AES-NI)
- 16 or 32 Gbytes soldered DDR3L-1600 DRAM with ECC
- Optional Fast Boot software package, using the Intel® Firmware Support Package (Intel® FSP)
- Configurable PCI Express® data plane (VITA 46.4, VITA 65) and expansion plane (VITA 65) fabric interface each supporting:
 - two x8 or four x4 PCI Express ports with DMA
 - Gen 1, Gen 2 and Gen 3
 - up to two non-transparent ports
- Control plane interface (VITA 46.6, VITA 65) supports:
 - 2 x Gigabit Ethernet and 2 x 1000BASE-BX interfaces
- Up to 2 x Gigabit Ethernet ports via front panel:
 - alternatively one port via front and one via rear
- Up to 4 x SATA interfaces and an optional on-board SATA 2.5-inch mass storage drive
- Onboard CompactFlash® socket
- Up to 2 x PMC/XMC module interfaces:
 - XMC: each 1 x8 or 2 x4 PCI Express®
 - PMC: each 32/64-bit, 33/66/100 MHz PCI/PCI-X™
 - front and rear I/O options
- 8 x GPIO, 8 x GPI, 6 x serial interfaces
- Up to 8 x USB 2.0 and 3 x USB 3.0 ports
- 3 x independent graphics display interfaces
- High Definition stereo audio
- Optional support for:
 - Built-In Test (BIT) firmware and software
 - board-level security package
 - Trusted Platform Module (TPM)
 - rear transition module
- Extended temperature versions (E-Series, K-Series)
- Rugged conduction-cooled versions (RCx-Series):
 - conduction-cooled to VITA 48.2
 - -40°C to +85°C (at card edge), conformally coated
 - rear plug compatible with the air-cooled versions
- Rear plug compatible with the popular VR 737/x8x SBC
- Watchdog and long duration timers



VPX Single Board Computer

- 6U VPX air-cooled SBC
- three front/rear I/O factory build options:
 - option 1 - legacy VR 737/x8x compatible I/O
 - option 2 - dual PMC/XMC sites plus extra I/O
 - option 3 - single PMC/XMC site plus extra I/O

Central Processor

- 4th generation Intel® Core™ processor:
 - 4-core Intel® Core™ i7-4700EQ CPU up to 3.4 GHz, 6M Last Level cache
 - 2-core Intel® Core™ i5-4400E CPU up to 3.3 GHz, 3M Last Level cache
 - Intel® Advanced Vector Extensions 2 (AVX2)
 - Intel® AES New Instructions (AES-NI)
- utilizes the Intel® QM87 Platform Controller Hub
- 16 or 32 Gbytes soldered DDR3L-1600 ECC DRAM:
 - single bit error correction, dual channel memory
 - accessible from processor or VPX fabric
 - 2-core supports 16 Gbytes
 - 4-core supports 16 or 32 Gbytes

PMC/XMC Interfaces (build options)

- both PMC/XMC sites commonly support:
 - front panel I/O aperture
 - PMC - 32/64-bit, shared 33/66/100MHz PCI/PCI-X bus (3.3V PCI signaling, 5V tolerant)
 - PMC VIO from 3.3V or 5V (user selectable switch)
 - XMC - 1 x8, 2 x4 PCI Express® (PCIe) Gen 2
 - XMC VPWR from 5V or 12V (factory build option)
 - VITA 46.9 compliant pin-out
- build option 1 - dual sites, VR 737/x8x compatible:
 - site 1 XMC P16, 20 differential-pairs plus 38 single-ended, P6w1-X12d+X8d+P5w3-X38s
 - site 2 XMC P26 or P24, 20 differential-pairs or 64 single-ended, P4w1-X12d+X8d or P3w1-P64s
- build option 2 - dual sites, site 1 has rear I/O:
 - XMC P16, 20 differential-pairs plus 38 single-ended, P6w1-X12d+X8d+P5w3-X38s
- build option 3 - single site, site 1 has rear I/O:
 - XMC P16, 20 differential-pairs plus 38 single-ended, P6w1-X12d+X8d+P5w3-X38s

Graphics Interfaces

- build options 1, 2 and 3 - DVI-I interface via a front panel 60-way High Density (HD) connector and DVI-D interface via VPX P6 connector:
 - DVI-D up to 1920 x 1200 @ 16M colors
 - DVI-A up to 1920 x 1200 @ 16M colors
- build option 1 - additional DVI-D interface via a front panel 60-way HD connector
- build options 2 and 3 - additional DVI-D via P3:
 - up to 1920 x 1200 @ 16M colors

Stereo Audio

- Intel® High Definition stereo audio interface via P4 supported by on board Codec

Mass Storage Interfaces

- for all build options (unless otherwise stated)
- support for on-board CompactFlash® socket
- optional on-board 2.5-inch SATA600 drive
- 2 x SATA300 interfaces via P6
- build options 2 and 3 additionally include 2 x SATA600 interfaces via P4

Serial Interfaces

- for all build options
- 1 x RS232 channel via a front panel 60-way HD connector, can be switched by user via P5
- 1 x RS232/422/485 channel via P6:
 - supporting full modem in RS232 only
 - supporting Transmit Control in RS485 mode
- 4 x UART serial TTL interfaces via P5
- 16550 compatible UARTs

Other Peripheral Devices

- for all build options (unless otherwise stated)
- long duration timer and watchdog timer
- PC Real Time Clock
- CPU temperature, board temperature and voltage sensors accessed via System Management interface
- 8 x GPIO signals via P2, 8 x GPI signals via P3
- 3 x USB 2.0 ports, two via P6 and one via P5
- 2 x USB 2.0 ports via 60-way HD connector
- build options 2 and 3 additionally include 3 x USB 2.0 and 3 x USB 3.0 interfaces via P4

VPX Data/Expansion Plane PCIe Interface

- configurable PCIe fabric interface (VITA 46.4, VITA 65) each supporting:
 - 2 x8 or 4 x4 PCIe (Gen 1, Gen 2, and Gen 3)
 - compatible with OpenVPX™ module profiles
- supports up to two non-transparent ports with DMA for multi-processing applications
- PCIe ports can be configured by the VPX switch configuration tool
- supported by Fabric Interconnect Networking software (FIN-S), see SW FNS/nnn datasheet

VPX Control Plane Ethernet Interfaces

- 2 x 10/100/1000 Mbps Ethernet interfaces via P4:
 - with or without magnetics (build option)
- 2 x 1000BASE-BX interfaces via P4
- VITA 46.6, VITA 65 compliant

Additional Ethernet Port (build option)

- build option 2 - additional 1 x 10/100/1000 Mbps Ethernet port via P4 (with magnetics)
- build option 3 - additional 1 x 10/100/1000 Mbps Ethernet port via a front panel RJ45 connector

Software Support

- support for Linux®, Windows® and VxWorks®

Non-Volatile Memory

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

Firmware Support

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

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

Safety

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

System Management

- System Management interface:
 - implements SMO-1 and SM2-3 hardware
- on-board System Management Controller

Electrical Specification

- typical current figure (4-core, 2.4 GHz, 16 Gbytes):
 - V53, +5V @ 9A, voltage +5%/-2.5%
- 3V3_AUX @ 600mA maximum, voltage +5%/-2%

Environmental Specification

- operating temperatures:
 - 0°C to +55°C (N-Series)
 - -25°C to +70°C (E-Series: selected CPU)
 - -40°C to +70°C (K-Series: selected CPU)
- non-operating temperature:
 - VITA 47 Class C1, -40°C to +85°C
- operating altitude:
 - 0 to 15,000 feet (0 to 4,572 meters)
- 5% to 95% Relative Humidity, non-condensing:
 - K-Series includes humidity sealant
- rugged conduction-cooled (VITA 48.2) VPX-REDI (RCx-Series) versions:
 - see VR E1x/msd-RCx datasheet

Mechanical Specification

- 6U VPX form-factor (VITA 46.0)
- 9.2 inches x 6.3 inches (233mm x 160mm)
- optional slot widths:
 - 0.8-inch (VITA 46.0)
 - 1.0-inch (VITA 48.0 as per VITA 65)
- connectors to VITA 46.0, P0 through to P6
- operating mechanical:
 - shock - VITA 47 Class OS1, 20g
 - vibration - 0.002g²/Hz

ORDERING INFORMATION

Order Number Product Description (Hardware)

VR E1x/msd-yz 4th generation Intel Core processor, N, E and K-Series

where x = 2-core or 4-core processor, m = front panel width style and rear I/O options, s = processor speed

For ordering information and accessories, extended temperature E and K-Series, please contact your local sales office.

All companies and product names are trademarks of their respective organizations. Specification subject to change; E and OE.

For the order number suffix (d-zy) options, please contact your local sales office:

where d = DRAM size

d = up to 32 Gbytes DRAM

options, s = processor speed

where yz = I/O Configuration

yz = I/O interface