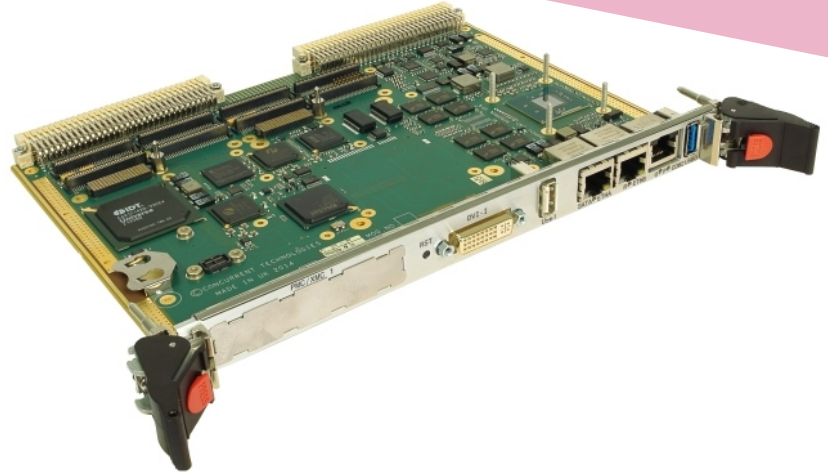


## Intel® Atom™ Processor, Single or Dual Site PMC/XMC Controller



### APPLICATIONS

VP E2x/msd is a 6U VME board based on the Intel® Atom™ E3800 processor family that has been designed to provide the processing and graphics performance required for many VMEbus applications. Within a single slot format VP E2x/msd offers expansion capabilities, on-board storage options and an array of standard PC I/O features. Variants of VP E2x/msd are available for a range of environments from laboratory, industrial

through to highly rugged situations (conduction-cooled). Target markets include: industrial control, transportation, security, telemetry, scientific and defense. Many industry standard operating systems are offered and the Concurrent Technologies Fast Boot software package is available to reduce the time delay between power-on and application start-up.

### HIGHLIGHTS

- 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
- Low power, e.g. the 1-core board variant is typically less than 18W
- The board supports forced air-cooled or fanless versions
- 8 Gbytes DRAM without ECC (4-core processor only) or 4 Gbytes DRAM with ECC
- Up to 2 x PMC/XMC module interfaces:
  - 32/64-bit, 33/66 MHz PCI, 100 MHz PCI-X (for both sites)
  - XMC module interface (x1 PCI Express® for each site)
- Up to 3 x SATA drive interfaces via the rear
- Option for an on-board SATA 2.5-inch mass storage drive
- Options for an on-board CFast™ site and SATA Flash Module
- DVI-D graphics interface via P2 and an optional DVI-I graphics interface via the front panel
- Up to 3 x serial interfaces
- Up to 4 x USB 2.0 interfaces and 1 x USB 3.0 interface
- Option for High Definition stereo audio
- Up to 4 x 10/100/1000 Mbps Ethernet interfaces
- Watchdog and long duration timer
- VME64 interface supporting A32/A24/A16/D64/D32/D16/D8(E0), MBLT64
- Optional Fast Boot solution based on the Intel® Firmware Support Package (Intel® FSP)
- Optional support for:
  - Built-In Test (BIT) firmware and software
  - board-level security package
  - Trusted Platform Module (TPM)
  - front and rear plug compatibility with the popular VP A45/01x family
  - rear I/O via Rear Transition Module (RTM)
- Commercial versions (N, E, K-Series):
  - N: 0°C to +70°C
  - E: -25°C to +70°C
  - K: -40°C to +85°C, includes humidity sealant
- Rugged conduction-cooled versions (RC-Series):
  - conduction-cooled to ANSI/VITA 30.1-2002
  - -40°C to +85°C (at card edge), conformally coated
- Supports Linux®, Windows® and VxWorks®

## 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

- either 4 Gbytes soldered DDR3L DRAM, ECC:
  - build option for 1-core or 4-core processor
  - peak bandwidth of 10.6 Gbytes/s (4-core)
  - peak bandwidth of 8.52 Gbytes/s (1-core)
  - single channel architecture
- or 8 Gbytes soldered DDR3L DRAM, no ECC:
  - build option for 4-core processor only
  - peak bandwidth of 21.3 Gbytes/s
  - dual channel architecture
- accessible from processor or VME bus

## Mass Storage Interfaces

- up to 3 x external SATA300 interfaces:
  - 2 x SATA via P2
  - 1 x SATA via optional P0
- On-board SATA300 support for optional:
  - CFast™ Card
  - SATA Flash Drive Module
  - 2.5-inch mass storage drive (voids PMC/XMC site 2)

## Ethernet Interfaces

- up to 4 x Gigabit Ethernet interfaces implemented by an Intel® i350 AM4 Ethernet controller via a x1 PCI Express® Gen 2 port
- 2 x Gigabit Ethernet interfaces via front panel RJ45 connectors
- 2 x Gigabit Ethernet interfaces via rear:
  - accessed via optional P0
  - on-board magnetics (50V isolation via P0)

## PMC/XMC Interfaces

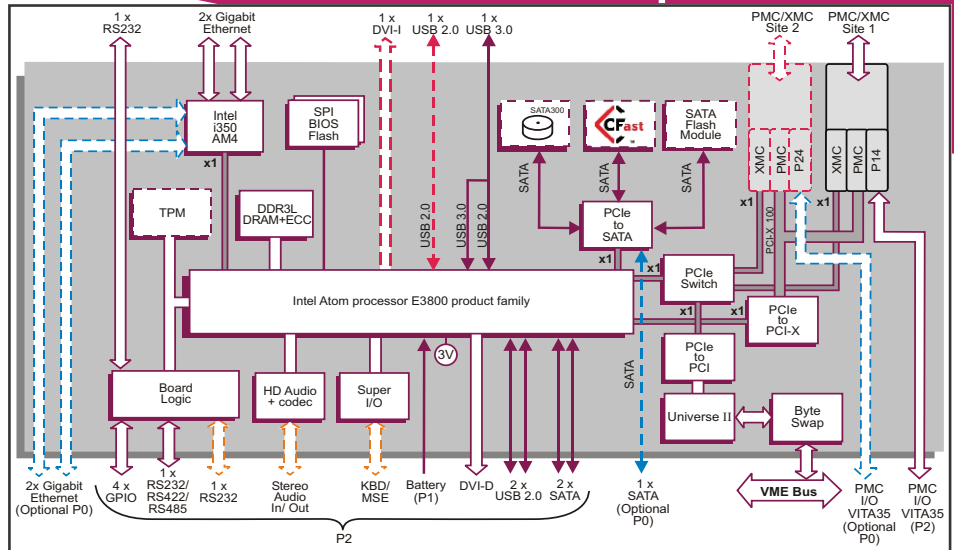
- single or dual PMC/XMC interfaces
- PMC/XMC site 1:
  - front panel I/O
  - P14 rear I/O via P2 (VITA 35)
- PMC/XMC site 2 (build option):
  - front panel I/O: option for PMC/XMC site or extra front panel I/O connectors (USB 2.0 and DVI-I interfaces)
  - P24 rear I/O via optional P0 (VITA 35)
- PMC interface(s) support shared:
  - 32/64-bit, 33/66MHz PCI bus
  - 64-bit PCI-X bus up to 100MHz
  - 5V and 3.3V signaling
- XMC (Switched Mezzanine Card) site(s):
  - support x1 PCI Express® (Gen 1, Gen 2)
  - both powered from 5V supply
- expansion to optional dual PMC/XMC carrier board via x1 PCI Express XMC site

## Serial Interfaces

- 1 x RS232 accessed via RJ45 on front panel:
  - Tx, Rx, CTS, RTS, DSR, DTR and DCD
- 1 x RS232/422/485 accessed via P2:
  - RS232 supports Tx, Rx, CTS, RTS, DSR, DTR, DCD and RI
- build option for 1 x RS232 accessed via P2:
  - Tx and Rx
- 16550 compatible UARTs

## Stereo Audio

- build option for Intel® High Definition Audio interface (on-board CoDec) via P2:
  - stereo audio input and output



## Graphics Interfaces

- DVI-I interface via front panel (single site build option, uses PMC/XMC site 2):
  - DVI-D up to 1600 x 1200 @ 16M colors
  - DVI-A up to 2048 x 1536 @ 16M colors
- additional DVI-D via P2:
  - up to 1600 x 1200 @ 16M colors
- 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®

## Other Peripheral Interfaces

- PC-compatible Real Time Clock
- keyboard and mouse PS/2 interfaces via P2 (build option for VP A45/01x legacy compatibility only)
- up to 3 x USB 2.0 interfaces:
  - 1 via a USB connector on the front panel (single site option, voids PMC/XMC site 2)
  - 2 via P2 connector
- 1 x USB 3.0/2.0 via front panel connector
- watchdog timer; 1 x 32-bit Long Duration Timer with processor interrupt capability
- 4 x GPIO signals via P2 with processor interrupt capability

## Flash EPROM

- dual 8 Mbytes of BIOS SPI Flash EPROM

## Software Support

- supports Linux®, Windows® and VxWorks®

## Firmware Support

- Insyde Software InsydeH20™ BIOS:
  - Intel® Platform Innovation Framework for EFI
- optional Fast Boot solution based on the Intel® Firmware Support Package (Intel® 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

## VME Interface

- P1 and P2 connectors compatible with VME64x
- implemented using IDT® Universe II™ device
- VME Master/Slave
- A32/A24/A16/D64/D32/D16/D8(E0)/MBLT64
- fast hardware byte swapping
- auto system controller detect
- full interrupter / interrupt handler support
- bus error interrupt hardware

## Safety

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

## Electrical Specification

- typical power consumption is less than 18W for the 1-core Intel Atom processor E3815 board
- +5V is required and +3.3V is not required
- +12V @ 0.0A; -12V @ 0.0A
- +12V and -12V routed to both PMC/XMC sites

## Environmental Specification

- commercial operating temperature:
  - 0°C to +70°C (N-Series)
- extended operating temperatures:
  - -25°C to +70°C (E-Series)
  - -40°C to +85°C (K-Series)
- for airflow requirements and fanless operation refer to the Technical Reference Manual
- non-operating temperature: -40°C to +85°C
- operating altitude: 0 to 15,000 feet (0 to 4,572 meters)
- 5% to 95% Relative Humidity, non condensing (operating or non-operating):
  - K-Series includes humidity sealant
- rugged versions, see separate datasheet:
  - conduction-cooled: VP E2x/msd-RC

## Mechanical Specification

- 6U form-factor
- single slot, front panel width 0.8 inch (20.3mm)
- utilizes 160-way connectors for P1 and P2
- optional P0 connector
- IEEE 1101.10 handles
- operating shock: 20g, 11ms, ½ sine
- operating vibration:
  - 5Hz-2000Hz at 2g, 0.38mm peak displacement

## ORDERING INFORMATION

Order Number      Product Description (Hardware)

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

VP E2x/msd-zy      Intel Atom processor E3800 family where x = number of processor cores where m = single or dual PMC/XMC sites where s = processor speed variant

d = DRAM size      zy = P2/P0 rear I/O option

For accessories, extended temperature E and K-Series, or rugged conduction-cooled RC-Series, please contact your local sales office.