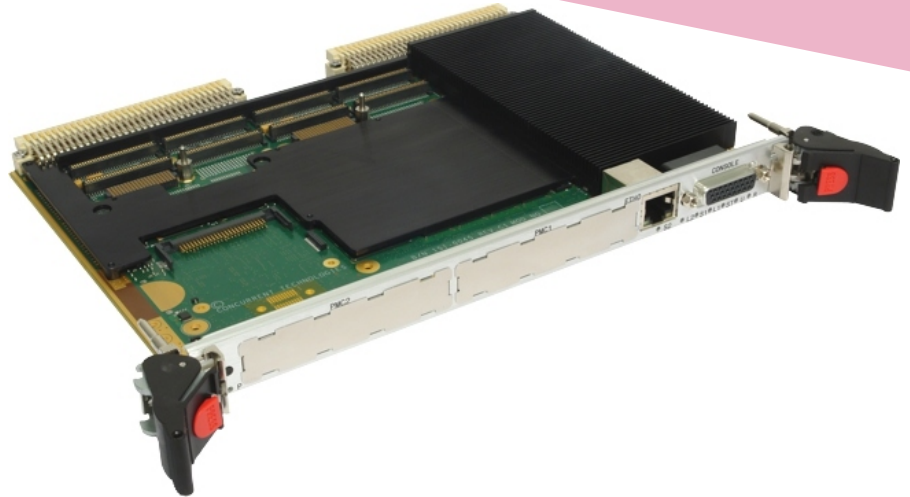


## 3rd Generation Intel® Core™ Processor Embedded Controller Rugged Air-Cooled



### APPLICATIONS

The VP 91x/x1x-RA is a PC-compatible high performance, high functionality, ruggedized VME processor board supporting the 3rd generation Intel® Core™ processors and the Mobile Intel® QM77 Express Chipset with up to 16 Gbytes of DDR3-1600 ECC DRAM. This single slot board features 2 PMC/XMC sites and a variety of interfaces including an option for an on-board mass storage drive and CompactFlash® site. The

VP 91x/x1x-RA is suitable for a range of demanding applications within the defense, industrial control, telecoms, telemetry, scientific and aerospace markets. For commercial applications air-cooled versions are available. To simplify the board's integration many popular industry standard operating systems are supported.

### HIGHLIGHTS

- Ruggedized dual PMC/XMC controller for VME systems:
  - air cooled
  - -40°C to +75°C, conformally coated
- 3rd generation Intel® Core™ processor:
  - 2-core 2.5 GHz Intel Core i7-3555LE processor
  - 2-core 1.7 GHz Intel Core i7-3517UE processor
- Up to 16 Gbytes of DDR3-1600 DRAM with ECC
- Up to 3 x external SATA interfaces plus optional on-board 2.5-inch SATA600 solid-state Flash disk
- Onboard CompactFlash® site
- 2 x PMC/XMC module interfaces:
  - 32/64-bit, 33/66/100 MHz PCI/PCI-X™
  - 2 x XMC module interfaces (x8 PCI Express®)
- 3 x 10/100/1000 Mbps Ethernet interfaces, with optional Gigabit Ethernet for VME64x backplane (VITA 31.1)
- 3 x serial channels, and up to 3 x USB interfaces
- VGA graphics, DVI-D and optional DVI-I graphics interfaces
- Keyboard and mouse interfaces
- 8 Mbytes of BIOS Flash EPROM, dual devices
- 64 Mbytes of Application Flash EPROM
- VME-64 Interface (factory build option):
  - A32/A24/A16/D64/D32/D16/D8(E0), MBLT64 modes
  - support for fast hardware byte-swapping
- Watchdog timer; Long Duration Timer
- Commercial air-cooled versions (N, E, K-Series):
  - N: 0°C to +55°C
  - E: -25°C to +70°C
  - K: -40°C to +85°C (includes humidity sealant)
- Ruggedized versions (RC-Series):
  - RC: -40°C to +85°C, conformally coated, conduction-cooled (at card edge) to ANSI/VITA 30.1-2002
- Optional support for:
  - Built-In Test (BIT) firmware and software
  - Board-level security package
  - Trusted Platform Module (TPM)
- Support for Linux®, Windows®, VxWorks®, QNX®, Solaris™ and LynxOS®
- Front and rear plug compatibility with the popular VP 717/08x-RA and VP 417/03x-RA families

## Ruggedized dual PMC/XMC controller

- utilizing 3rd generation Intel® Core™ i7 processor:
  - ruggedized air-cooled
  - conformally coated
- ruggedized conduction cooled version:
  - see VP 91x/x1x-RC datasheet
- commercial air-cooled version:
  - see VP 91x/x1x datasheet

## Central Processor

- 3<sup>rd</sup> generation Intel® Core™ processors:
  - 2-core 2.5 GHz Intel Core i7-3555LE processor
  - 2-core 1.7 GHz Intel Core i7-3517UE processor
  - up to 4 Mbytes of shared Last-Level cache
- utilizes Mobile Intel® QM77 Express Chipset

## DRAM

- up to 16 Gbytes soldered DDR3-1600 ECC DRAM:
  - single bit error correction
  - peak bandwidth of 25 Gbytes/s
  - dual channel architecture
- accessible from processor or VME bus

## Mass Storage Interfaces

- up to 3 x external SATA interfaces:
  - optionally 2 x SATA via P2
  - optionally 1 x SATA via P0 (see Note 1)
- 1 x EIDE interface supports on-board CompactFlash® socket via SATA converter
- optional on-board 2.5-inch SATA600 solid-state Flash disk

## Ethernet Interfaces

- two Gigabit Ethernet interfaces via rear panel:
  - accessed via optional P0 (see Note 1)
  - implemented by Intel® 82580DB LAN Controller via x2 PCI Express® Gen 2 port
- support for VITA 31.1:
  - Gigabit Ethernet for VME64x backplanes
- one Gigabit Ethernet interface via front panel:
  - accessed via RJ45 connector
  - implemented by Intel® 82579 Ethernet PHY

## PMC/XMC Interfaces

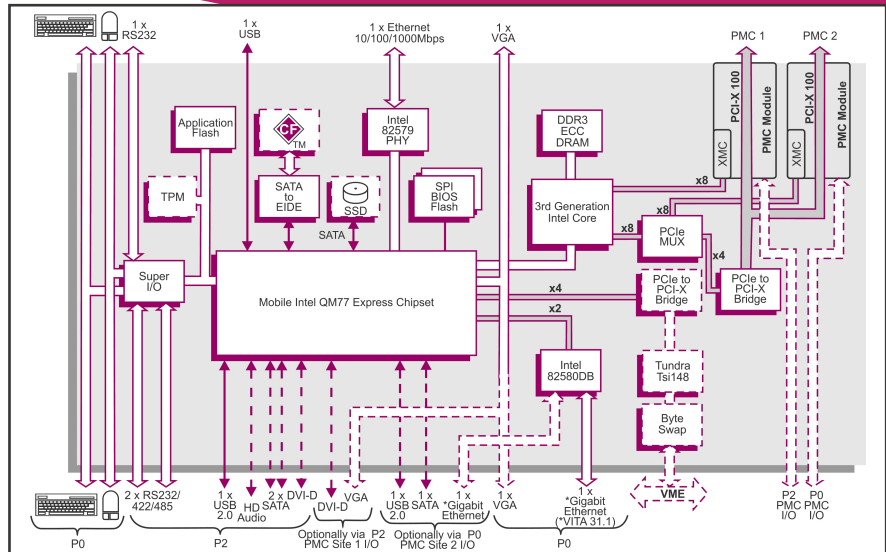
- 2 x PMC shared sites supporting:
  - 32/64-bit, 33/66/100 MHz PCI/PCI-X
  - 3.3V or 5V PCI signaling
- 2 x XMC (Switched Mezzanine Card) sites supporting:
  - up to x8 PCI Express port
  - XMC sites powered from 5V supply
- PMC/XMC Site 1 I/O via front panel and via P2:
  - P14 rear I/O via P2 or factory build option for reduced P14 I/O plus DVI-I graphics via P2
- PMC/XMC Site 2 I/O via front panel and via optional P0:
  - rear I/O via P24 to optional P0 includes factory build I/O options with P0 (see Note 1)
- XMC Pn6 rear I/O (P16 and P26) not connected

## Serial Interfaces

- 3 x serial channel interfaces:
  - 1 x RS232 accessed via 26-way high density connector on front panel
  - 2 x RS232/422/485 accessed via P2
- 16550 compatible UARTs

### Note 1:

The optional P0 connector supports VGA, PS/2 mouse and keyboard interfaces, and either 1) PMC Site 2 P24 I/O x64 and 1 x Ethernet or 2) PMC Site 2 P24 I/O x32, SATA, USB and 2 x Ethernet



## Graphics Interfaces

- implemented by the integrated chipset graphics controller
- optional DVI-D interface via P2:
  - digital, up to 1920 x 1080
- analog VGA interface via front panel, P2 or P0:
  - analog, up to 1920 x 1200
  - front panel access via 26-way high-density connector
- optional DVI-I interface via P2:
  - digital, up to 1920 x 1080
  - analog, using VGA, up to 1920 x 1200
  - this option uses I/O pins from PMC Site 1
- all interfaces support 32-bit color depth
- support for Microsoft® DirectX 10, OpenGL 2.0, Windows® and Linux®

## Other Peripheral Interfaces

- PC-compatible Real Time Clock
- up to 3 x USB 2.0 interfaces:
  - 1 x USB via 26-way front panel connector
  - 1 x USB via P2 connector
  - option for USB via P0 (see Note 1)
- keyboard and mouse interfaces accessed via a 26-way high-density connector on front panel or optionally via P0 connector
- watchdog timer
- 1 x 32-bit Long Duration Timer with processor interrupt capability

## Flash EPROM

- dual 8 Mbytes of BIOS SPI Flash EPROM
- 64 Mbytes of Application Flash EPROM

## Software Support

- support for Linux®, Windows®, VxWorks®, QNX®, Solaris™ and LynxOS®

## 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

## Firmware Support

- Insyde® Software InsydeH20™ BIOS:
  - includes Compatibility Support Module
- based upon Intel® Platform Innovation Framework for EFI
- comprehensive Power-On Self-Test (POST)
- LAN boot firmware included

## VME Interface

- P1 and P2 connectors compatible with VME64x
- with IDT® TSi148™ VME Bridge (build option):
  - 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
- or without VME Bridge (build option):
  - consult Technical Reference Manual

## Electrical Specification

- +5V @ 6.5A (typical with 2.5 GHz Intel Core i7-3555LE processor and 8 Gbytes DRAM)
- +12V @ 0.0A; -12V @ 0.0A; 3.3V not required
- +12V and -12V routed to both PMC/XMC sites

## Environmental Specification

- operating temperatures:
  - -40°C to +75°C
  - +75°C exceeds VITA 47 AC3
- storage temperatures (VITA 47 Class C3)
  - -50°C to +100°C
- 5% to 95% Relative Humidity, non condensing (operating and storage)
- operating altitude:
  - -1,000 to 33,000 feet (-305 to 10,058 meters)

## Mechanical Specification

- 6U form-factor
- single VME slot - front panel width 0.8inch (20.3mm)
- utilizes 160-way DIN connectors for P1 and P2
- optional P0
- IEEE 1101.10 handles
- operating mechanical:
  - shock - exceeds VITA 47 Class OS1, 40g
  - random vibration - VITA 47 Class V2, 0.04g<sup>2</sup>/Hz
- front and rear plug compatibility with the popular VP 717/08x-RA and VP 417/03x-RA families:
  - only applies to VME Bridge build option

## ORDERING INFORMATION

Order Number    Product Description (Hardware)

For the order number suffix (yz) options please contact your local sales office:  
Where y = P2 and P0 I/O configurations    Where z = DRAM size

VP 91x/x1x-yzRA    3rd generation Intel Core i7 SBC (RA-Series)

y - P2 and P0 I/O configurations

z - up to 16 Gbytes DRAM

For accessories, commercial air-cooled N, E and K-Series or ruggedized conduction cooled RC-Series, please contact your local sales office.

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Specification subject to change; E and OE.

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