3rd Generation Intel® Core™ Processor Embedded Controller (Bridgeless VMEbus)

APPLICATIONS

VP 91x/11x is a high functionality processor board based on a 3rd generation Intel® Core™ processor and Mobile Intel® QM77 Express Chipset with up to 16 Gbytes of DDR3-1600 ECC DRAM. This single slot board is designed to be VMEbus compatible without implementing the capability to communicate across the VMEbus interface. It features 2 PMC/XMC sites, a variety of interfaces and has options for on-board mass storage

drive and CompactFlash®. VP 91x/11x is suitable for a range of demanding applications within the defense, industrial control, telecomms, telemetry, scientific and aerospace markets. For harsher environments, extended operating temperature range and ruggedized versions are supported.

HIGHLIGHTS

- 3rd generation Intel® Core™ processor:
  - 4-core 2.3 GHz Intel Core i7-3615QE processor
  - 4-core 2.1 GHz Intel Core i7-3612QE 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 mass storage drive
- 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®)
  - Expansion carrier for 2 more PMC sites
- 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

- VMEbus Bridgeless Interface supports:
  - SYSRESET, SYSFAIL, ACFAIL, GAx
  - VMEbus daisy chain
- Watchdog timer; Long Duration Timer
- Air-cooled versions (N, E, K-Series):
  - N: 0°C to 55°C,
  - E: -25°C to +75°C
  - K: -40°C to +85°C (includes humidity sealant)
- Ruggedized air-cooled versions (RA-Series):
  - -40°C to +75°C, conformally coated
- Ruggedized conduction-cooled versions (RC-Series):
  - -40°C to +85°C (at card edge), conformally coated
  - conduction-cooled to IEEE 1101.2
- 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®

Central Processor

- 3rd generation Intel® Core™processors:
  - → 4-core 2.3 GHz Intel Core i7-3615QE processor
  - → 4-core 2.1 GHz Intel Core i7-3612QE processor
  - → 2-core 2.5 GHz Intel Core i7-3555LE processor
  - → 2-core 1.7 GHz Intel Core i7-3517UE processor
  - → up to 6 Mbytes of shared Last-Level cache
- utilizes Mobile Intel® QM77 Express Chipset
- ruggedized versions, see separate datasheets:
  - → conduction-cooled: VP 91x/11x-RC
  - → air-cooled: VP 91x/11x-RA

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 mass storage

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
- expansion to optional dual PMC carrier board:
  - → via expansion connector (32-bit/33 MHz)
  - → or via PMC/XMC site 2 (64-bit/66 MHz)

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 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
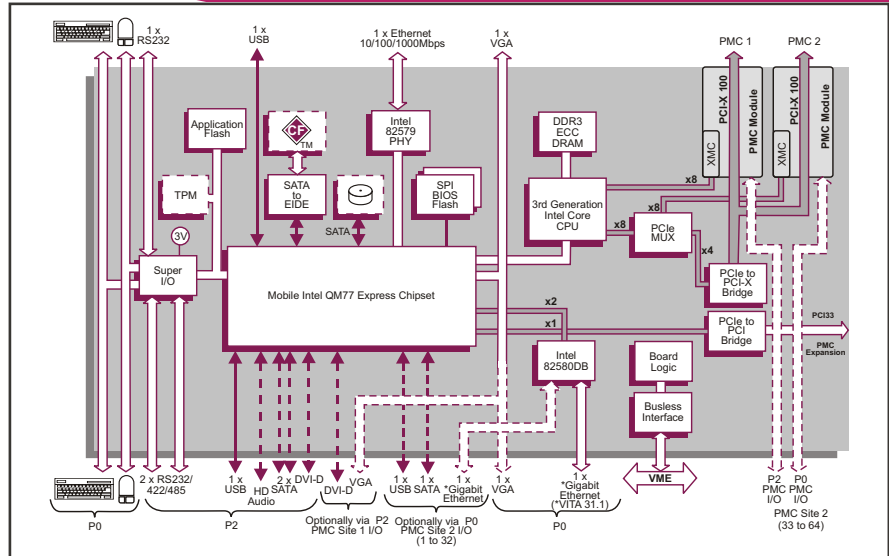
Graphics Interfaces

- implemented by the integrated chipset graphics controller
- optional DVI-D interface via P2:
  - → digital, up to 1920 x 1080
- analog VGA interface via front or via 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

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

Safety

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

VMEbus Bridgeless Interface

- P1 and P2 connectors compatible with VME64x
- busless VME interface supports:
  - → SYSRESET, SYSFAIL, ACFAIL, GAx
  - → VMEbus daisy chain

Electrical Specification

- +5V @ 9.4A (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 and PMC expansion connector

Environmental Specification

- operating temperatures:
  - → 0°C to +55°C (N-Series)
  - → -25°C to +70°C (E-Series: 1.7, 2.1 or 2.5 GHz)
  - → -40°C to +70°C (K-Series: 2.1 or 2.5 GHz)
  - → -40°C to +85°C (K-Series: 1.7 GHz)
- storage temperature: -40°C to +85°C
- 5% to 95% Relative Humidity, non condensing (operating or storage):
  - → K-Series includes humidity sealant

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
- IEEE 1101.10 handles
- operating mechanical:
  - → shock - 20g, 11ms, ½ sine
  - → vibration - 5Hz-2000Hz at 2g, 0.38mm peak displacement
- front and rear plug compatibility with the popular VP 717/18x 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/11x-yz   3rd generation Intel Core i7 SBC

y - P2 and P0 I/O configurations

z - up to 16 Gbytes DRAM

For accessories, extended temperature E and K-Series, or ruggedized RA and RC-Series, please contact your local sales office.