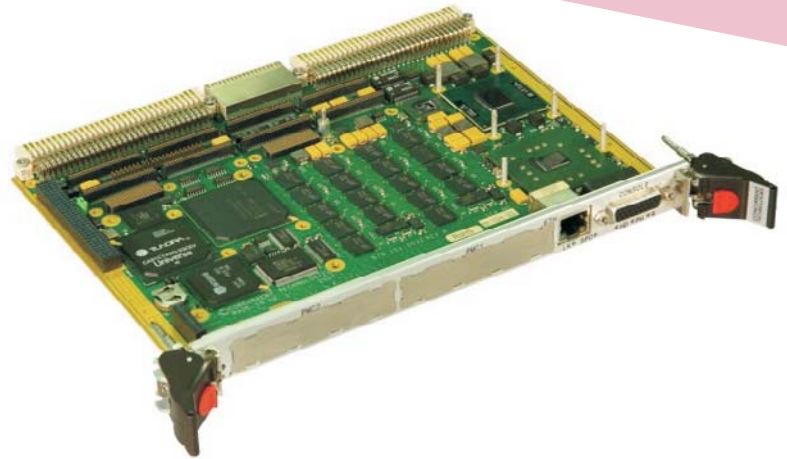


## Intel® Core™ 2 Duo Processor Dual PMC Embedded Controller



### APPLICATIONS

The VP 417/03x is a PC-compatible high performance, high functionality VME processor board supporting the 2.16 GHz Intel® Core™ 2 Duo processor T7400 and the 1.5 GHz Intel® Core™ 2 Duo processor L7400. This single slot board features 2 PMC sites, up to 4 Gbytes of soldered DDR2 SDRAM and a variety of interfaces including an option for an on-board Hard Disk Drive, CompactFlash™ or Hitachi GST MicroDrive™. The



VP 417/03x is suitable for a range of demanding applications within the defense, industrial control, telecomms, telemetry, scientific and aerospace markets. To simplify the board's integration many popular industry standard operating systems are supported. The board is plug compatible with the popular VP 315/02x and VP 317/02x families (5-row backplane variants).

### HIGHLIGHTS

- 2.16 GHz or 1.5 GHz Intel® Core™ 2 Duo processor:
  - 667 MHz Front Side Bus
  - 64 Kbytes L1 cache
  - 4 Mbytes L2 cache
  - Intel® 64 Technology (64-bit computing support)
  - no CPU fan needed
- Up to 4 Gbytes of dual channel DDR2-400 ECC SDRAM
- High performance SATA and EIDE disk interfaces with optional on-board disk drive
- CompactFlash™ or Hitachi GST MicroDrive™ on a carrier
- 2 x PMC/XMC module interfaces:
  - 32/64-bit, 33/66 MHz PCI/PCI-X™
  - 2 x XMC module interfaces (x8 PCI Express®)
  - Expansion carrier for 2 more PMC sites
- 2 x 10/100/1000 Mbps Ethernet interfaces:
  - Gigabit Ethernet for VME64x backplane (VITA 31.1)
- 1 Mbyte of BIOS Flash EPROM
- 64 Mbytes of Application Flash EPROM
- Graphics interface
- Keyboard and mouse interfaces
- 3 x serial channel interfaces
- 3 x Universal Serial Bus (USB 2.0) interfaces
- Watchdog timer; Long Duration Timer
- VME-64 Interface supporting A32/A24/A16/D64/D32/D16/D8(E0), MBLT64 and with support for fast hardware byte-swapping
- Single slot
- Extended temperature versions planned:
  - -25°C to +70°C (E-Series)
  - -40°C to +85°C (K-Series, includes humidity sealant)
  - supporting 1.5 GHz processor
- Ruggedized versions planned:
  - conduction cooled and air cooled
- Support for Linux®, Windows® 2000, Windows® XP, Windows® XP Embedded, RTX®, VxWorks®, QNX®, Solaris™ and LynxOS®

## Central Processor

- 2.16 GHz Intel® Core™ 2 Duo processor T7400:-
  - uses µFC-PGA 478 (micro Flip-Chip Pin Grid Array) package
- 1.5 GHz Intel® Core™ 2 Duo processor L7400:-
  - uses µFC-BGA 478 (micro Flip-Chip Ball Grid Array) package
- common processor features are:-
  - dual-core CPU
  - 667 MHz Front Side Bus
  - 4 Mbytes of secondary (L2) on-die cache
  - 64 Kbytes of primary (L1) on-die cache
  - Intel® 64 Technology (64-bit computing support)
  - no CPU fan
- utilizes Intel® E7520 server class chipset:-
  - uses Intel® 6300ESB I/O Controller Hub
- provision for XDP debug port

## DRAM

- supports up to 4 Gbytes DDR2-400 ECC SDRAM:-
  - up to 4 Gbytes soldered on-board
  - up to four bit error correction
  - peak bandwidth of 6.4 Gbytes/s
  - dual channel architecture
- accessible from processor or VME bus

## Hard Disk Interfaces

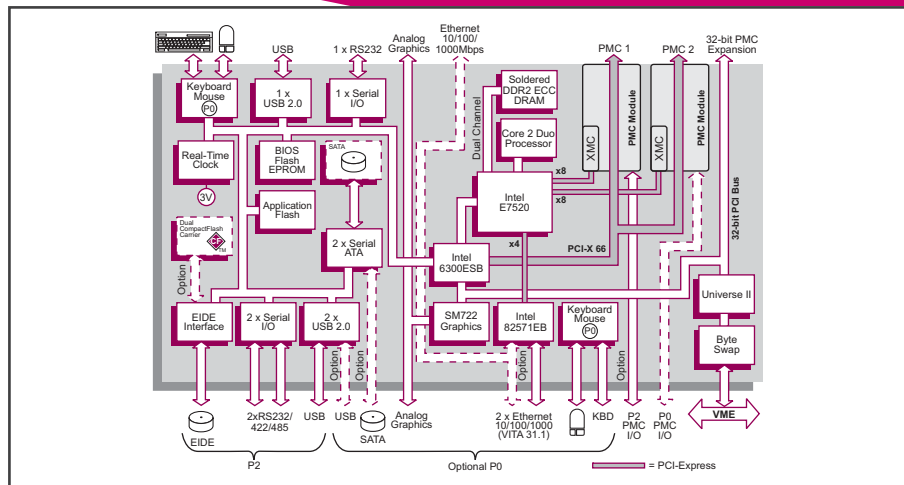
- 2 x EIDE interfaces:-
  - supports up to Ultra-DMA 100
  - second EIDE interface supports CompactFlash™ carrier with 2 sites (within a single slot)
  - primary channel supports off-board EIDE drives via P2 connector
- 2 x Serial ATA150 interfaces:-
  - transfer rate up to 150 Mbytes/s
  - 1 channel can be used for on-board 2.5 inch SATA disk drive
  - option for 1 channel via P0 (see Note 1)

## PMC Interfaces

- 2 x PMC sites; for both sites:-
  - 32/64-bit, 33/66 MHz PCI/PCI-X
  - XMC (PCI Express® Mezzanine Card) interface supported via x8 PCI Express Link
  - 3.3V or 5V PCI signaling levels
- PMC Site 1 I/O via front panel and P2
- PMC Site 2 I/O via front panel and optional P0 (see Note 1)
- expansion to an optional dual PMC carrier board:-
  - via expansion connector (32-bit/33 MHz)
  - or via baseboard PMC site (64-bit/66 MHz)

## Ethernet Interfaces

- two interfaces supporting 10 Base-T, 100 Base-TX, 1000Base-T:-
  - implemented by Intel® 82571EB LAN Controller via x4 PCI Express® link
  - both interfaces accessed via optional P0 (see Note 1)
  - 1 channel switchable to front panel RJ45
- support for VITA 31.1:-
  - Gigabit Ethernet for VME64x backplanes



## Graphics Interface

- implemented by a Silicon Motion SM722:-
  - 8 Mbytes video memory
  - resolutions up to 1280 x 1024 @ 16M colors
- analog graphics accessed via a 26-way high-density connector on front panel and via optional P0

## 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 UART

## Other Peripheral Interfaces

- PC-compatible Real Time Clock (Year 2000 compliant)
- 3 x USB 2.0 interfaces:-
  - 1 via a 26-way high-density connector on front panel
  - 1 via P2 connector
  - option for 1 via P0 connector (see Note 1)
- keyboard and mouse interfaces accessed via a 26-way high-density connector on front panel and optionally via P0 connector
- watchdog timer
- 1 x 32-bit Long Duration Timer with processor interrupt capability

## Flash EPROM

- 1 Mbyte of BIOS Flash EPROM
- 64 Mbytes of Application Flash EPROM

## Software Support

- support for Linux®, Windows® XP, Windows® XP Embedded, Windows® 2000, RTX®, VxWorks®, QNX®, Solaris™ and LynxOS®

## Firmware Support

- Phoenix® TrustedCore® Server BIOS
- comprehensive Power-On Self-Test (POST)
- LAN boot firmware included

## Safety

- PCB (PWB) manufactured with flammability rating of 94V-0

## VME Interface

- P1 and P2 connectors compatible with VME64x
- implemented using Tundra® 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

## Electrical Specification

- +5V@9.8A (typical at 2.16 GHz with 4 Gbytes SDRAM)
- +12V@0.0A; -12V@0.0A; 3.3V not required
- +12V and -12V routed to both PMC sites and PMC expansion connector

## Environmental Specification

- operating temperatures:-
  - 0°C to +55°C (N-Series: up to 2.16 GHz)
  - -25°C to +70°C (E-Series: 1.5 GHz)
  - -40°C to +85°C (K-Series: 1.5 GHz)
- storage temperature: -40°C to +85°C
- 10% to 90% Relative Humidity, non condensing (operating or storage):-
  - K-Series includes humidity sealant
- ruggedized versions planned:-
  - conduction cooled (RC-Series: 1.5 GHz)
  - air cooled (RA-Series: 1.5 GHz)

## Mechanical Specification

- 6U form-factor
- single VME64x slot - front panel width 0.8 inch (20.3mm)
- utilizes 160-way connectors for P1 and P2
- optional P0
- IEEE 1101.10 handles
- shock: 20g, 11ms, ½ sine (operating); 30g, 11ms, ½ sine (non-operating)
- vibration: 5Hz-2000Hz at 2g, 0.38mm peak displacement (operating); 5Hz-2000Hz at 5g, 0.76mm peak displacement (non-operating)

**Note 1:** The optional P0 connector supports either PMC Site 2 I/O x64 and 1 x Ethernet or PMC Site 2 I/O x32, SATA, USB and 2 x Ethernet

## ORDERING INFORMATION

### Order Number Product Description (Hardware)

VP 417/031-xy 1.5 GHz Core 2 Duo Processor L7400  
 VP 417/032-xy 2.16 GHz Core 2 Duo Processor T7400

AD 110/001-z1 2.5 inch SATA Hard Disk Drive assembly  
 AD 200/001-01 Dual CompactFlash/MicroDrive Carrier  
 AD CRz/PMC-zz PMC Carrier boards for 2 PMC modules  
 CB 26D/125-00 VGA, Keyboard, Mouse, RS232, USB connector cable  
 DS MSS/001-zzU Board with HDD, CD-RW/DVD, CompactFlash

### Replace the order number suffix (-xy) with selections from the following:

#### Where x = P2/P0 Breakout combinations

1- 3-row I/O, P2= PMC1 I/O x32, EIDE, USB (1.5 Ghz only)  
 2- 5-row I/O, P2= PMC1 I/O x64, EIDE, USB, 2xRS232/422/485  
 3- 5-row I/O, P2 as x=2; P0= PMC2 I/O x64, 1xGigE, see ++  
 4- 5-row I/O, P2 as x=2; P0= PMC2 I/O x32, VITA 31.1, USB, 1xSATA see ++

#### Where y = memory size

1 - reserved  
 2 - 2 Gbytes  
 3 - 4 Gbytes

++ when x=3 or 4 then Keyboard, Mouse, VGA available

For z options please contact your local sales office

For extended temperature, 1.5 GHz 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. RoHS 2002/95/EC compliant.

Datasheet Code 1553/0607  
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