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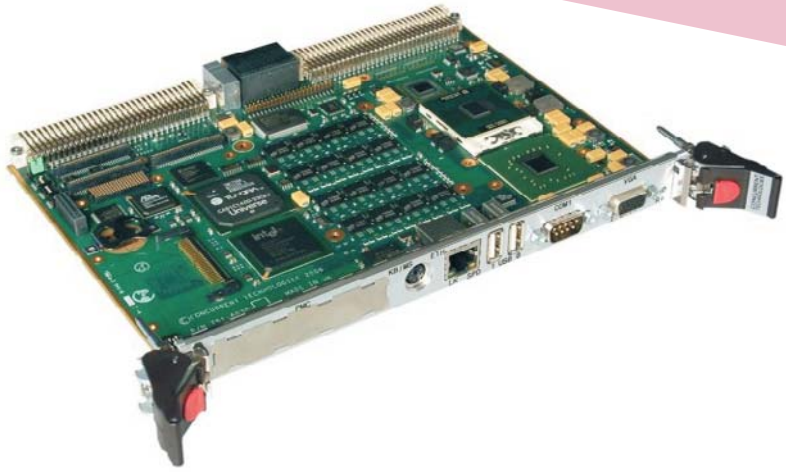
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VME/VXS

VX 407/04x

N, E, K - Series

Intel® Core™ 2 Duo Processor Single Board Computer



RoHS 2002/95/EC

APPLICATIONS

The VX 407/04x is a PC-compatible high performance VXS single board computer supporting the 2.16 GHz and 1.5 GHz Intel® Core™ 2 Duo processors which contain two CPU cores and shared L2 cache. The board features up to 4 Gbytes DDR2 synchronous DRAM and a variety of interfaces including an option for an on-board Hard Disk Drive, CompactFlash™ or Hitachi GST MicroDrive™. The VX 407/04x supports VITA 41.3 on VXS backplanes, or when the P0 connector is not fitted it will support dual Gigabit Ethernet on either VXS or VME64x backplanes.

The VX 407/04x is suitable for a range of demanding applications within the industrial control, defense, telecomms, telemetry, scientific and aerospace markets. Its functionality can be further increased through the use of PMC modules. To simplify the board's integration many popular industry standard operating systems are supported. The board is fully plug compatible with the VX 405/04x family. For backwards compatibility, the board is P2 plug compatible with the VP 305/01x and VP 307/01x families (without P0 connector).

HIGHLIGHTS

- 2.16 GHz or 1.5 GHz Intel Core 2 Duo processor:
  - dual-core processor
  - 667 MHz Front Side Bus
  - 64 Kbytes L1 cache
  - 4 Mbytes shared L2 cache
  - Intel® 64 Technology (64-bit computing)
  - passive heatsink
- 2.0 GHz and 1.66 GHz Intel® Core™ Duo processor versions available; see VX 405/04x datasheet
- Up to 4 Gbytes of 667MHz DDR2 SDRAM
- High performance SATA interface
- EIDE interfaces with support for on-board CompactFlash, MicroDrive or optional on-board disk drive (in a single slot)
- Options for networking via rear I/O; either:
  - 2 x 10/100/1000Mbps Ethernet channels via P2

  or:
  - 2 x 1000Mbps baseband IEEE 802.3 backplane ports via P0 for VITA 41.3 on VXS backplanes
- 1 x 10/100/1000Mbps front panel Ethernet interface
- 1 Mbyte of BIOS Flash EPROM
- 32/64-bit PMC module interface, operating at 33/66 MHz:
  - 1 x XMC module interface (x1 PCI Express™)
- Front panel and P2 I/O combinations available:
  - analog and digital graphics interfaces
  - keyboard and mouse interfaces
  - 2 x RS232/RS422/RS485 serial channels
  - 5 x Universal Serial Bus (USB) ports
- Floppy disk interface
- Watchdog timer and Long Duration Timer
- VME64 Interface supporting A32/A24/A16/D64/D32/D16/D8(EO), 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
- Support for Linux®, Windows® 2000, Windows® XP, Windows® XP Embedded, VxWorks® and QNX®

CONCURRENT TECHNOLOGIES

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Specification

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 dual-core processor features are:-
  - → 667 MHz Front Side Bus
  - → 64 Kbytes of primary (L1) on-die cache
  - → 4 Mbytes of shared secondary (L2) on-die cache
  - → Intel® 64 Technology (64-bit computing)
  - → no CPU fan; low power processor
- 2.0 GHz and 1.66 GHz Intel® Core™ Duo processor versions available; see VX 405/04x datasheet
- utilizes mobile Intel® 945GME chipset
- provision for XDP debug port

DRAM

- supporting up to 4 Gbytes of 667MHz DDR2 SDRAM soldered on-board:-
  - → peak bandwidth of 10.6 Gbytes/s
  - → dual channel architecture
- accessible from processor and VME bus

Hard Disk Interfaces

- 2 x EIDE interfaces:-
  - → supports up to Ultra-DMA 100 for high performance drives
  - → second EIDE interface can be used for on-board 2.5 inch disk drive or CompactFlash™ or Microdrive™ Type II drive (all within a single slot)
  - → primary channel supports up to two off-board EIDE drives via P2 connector
- one Serial ATA150 interface:-
  - → accessible via VXS P0
  - → transfer rate up to 150 Mbytes/s

Ethernet Interfaces

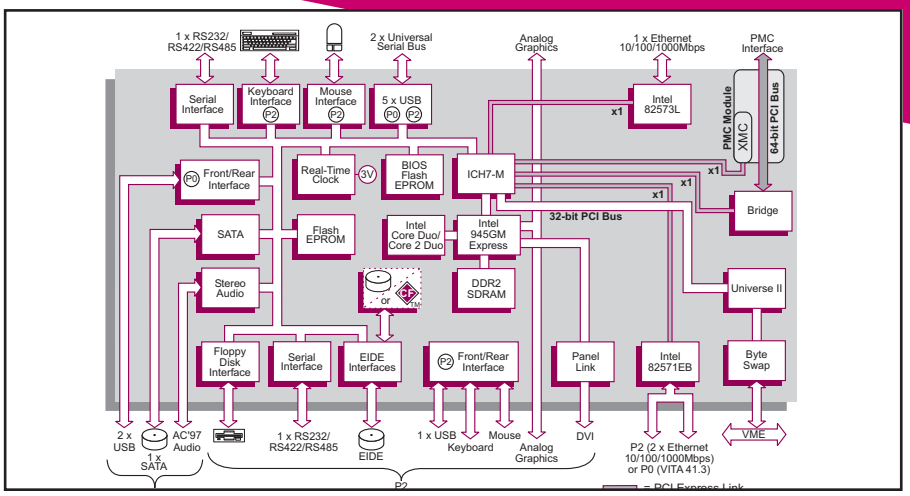
- 2 x rear I/O interfaces:-
  - → implemented by Intel® 82571EB Controller
  - → 2 x 10/100/1000Mbps Ethernet channels when P0 not fitted, accessed via P2 for either VME64x or VXS backplanes; or
  - → 2 x 1000Mbps baseband IEEE 802.3 backplane ports, accessed via VXS P0 connector for VITA 41.3 on a VXS backplane
- 1 x Ethernet channel accessed via front panel RJ45 connector:-
  - → implemented by Intel® 82573L Controller
  - → supports 10/100/1000Mbps

Graphics Interface

- implemented by Intel 945GM Express chipset
- analog VGA accessed via a 15-way high density connector on front panel or P2:-
  - → resolutions up to 2048 x 1536 @ 16M colors
- flat panel supported by a Panel Link interface via P2 connector:-
  - → resolutions up to 1600 x 1200
  - → supporting up to 16M colors

Stereo Audio

- AC'97 interface on P0 supports High Definition Audio (HDA) Codec on breakout
- independent legacy speaker output via P2



PMC Interface

- 1 x PMC slot supporting:-
  - → I/O via front panel
  - → 32/64-bit, 33/66 MHz PCI operation
  - → 3.3V or 5V PCI signaling
  - → XMC (PCI-Express Mezzanine Card) interface supported via x1 PCI Express® Link
- option for dual PMC carrier board using baseboard XMC connector (uses PMC site)

Serial Interfaces

- 2 x asynchronous RS232/RS422/RS485 serial channels:-
  - → 1 x channel accessed via a 9-way D-type connector on the front panel
  - → 1 x channel via P2 connector
- 16550 compatible UARTs
- both channels can be user configured for RS232, RS422 or RS485

Other Peripheral Interfaces

- keyboard and mouse interfaces via a single PS/2™ type connector on front panel and via P2 connector
- floppy disk interface via P2 connector
- 5 x USB 2.0 (Universal Serial Bus) interfaces:-
  - → 2 x USB interface accessed via USB connectors on front panel
  - → 1 x USB interface via P2 connector
  - → 2 x USB interface via P0 connector
- 3 x General Purpose I/O bits via P2 connector
- PC Real Time Clock (Year 2000 compliant)
- 1 x 32-bit Long Duration Timer with processor interrupt capability; watchdog timer

Firmware Support

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

Software Support

- support for Linux®, Windows® 2000, Windows® XP, Windows® XP Embedded, VxWorks® and QNX®

Flash EPROM

- 1 Mbyte of BIOS Flash EPROM
- 1 Mbyte of Flash EPROM
- application storage available on CompactFlash

Safety

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

VME Interface

- compatible with VME64x and VXS:-
  - → P1 and P2 connectors compatible with VME64x and VXS systems; backplane must support 5-row (160-way) connectors
  - → P0 connector compatible with VXS systems
- uses the Tundra® Universe IID™ device
- VME Master/Slave
- A32/A24/A16/D64/D32/D16/D8(EO)/MBLT64
- fast hardware byte swapping
- auto system controller detect
- full interrupter / interrupt handler support
- bus error interrupt hardware

Electrical Specification

- +5V@7.5A (typical at 2.16 GHz with 2 Gbytes SDRAM)
- +3.3V, +12V and -12V not utilized
- +12V and -12V routed to PMC expansion slot

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

Mechanical Specification

- 6U form-factor 9.2 inches x 6.3 inches (233mm x 160mm)
- single slot: 0.8 inches (20.3mm)
- utilizes 160-way connectors for P1 and P2
- optional P0 (for VXS backplanes only)
- 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)

ORDERING INFORMATION

Order Number	Product Description (Hardware)
VX 407/041-xy	1.5 GHz Core 2 Duo Processor L7400
VX 407/042-xy	2.16 GHz Core 2 Duo Processor T7400
AD VP2/015-10	RTM for VME64x or VXS backplane: use when x=2
AD VP2/015-30	RTM (with HDA Codec) for VXS backplane: use when x=5
AD CR3/PMC-zz	PMC Carrier Board for 2 PMC modules (front/rear I/O)
AD CP1/DR1-z0	2.5 inch Hard Disk Drive (HDD) assembly
DS MSS/00x-zzU	Board with HDD, CD-RW/DVD, CompactFlash, FDD

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

Where x = P2/P0 Breakout combinations	Where y = memory size
1 - Same as x = 2. Also includes AD VP2/009-10 RTM	1 - reserved
2 - 5-row only: P2 I/O = 2 x 10/100/1000 Ethernet ++	2 - 2 Gbytes
5 - 5 row only: VXS P0 I/O = VITA 41.3, 2 x USB, 1 x SerialATA, AC'97 audio. P2 I/O ++	3 - reserved
	4 - 4 Gbytes

++ when x = 1, 2 or 5 then P2 I/O = EIDE, floppy, keyboard, mouse, 1xUSB DVI-D, VGA, speaker,3xGPIO and 1xRS232

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

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Specification subject to change; E and OE. RoHS 2002/95/EC compliant.

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