CompactPCI

PP 402/04x

Intel® Core™ 2 Duo Processor Single Board Computer

RoHS 2002/95/EC

APPLICATIONS

The PP 402/04x is a PC-compatible high performance, high functionality one-slot CompactPCI® single board computer supporting either the 2.16 GHz Intel® Core™ 2 Duo processor T7400 or the 1.5 GHz Intel® Core™ 2 Duo processor L7400. The board supports up to 4 Gbytes DDR2 SDRAM and a variety of interfaces, including an on-board CompactFlash™ drive and an optional on-board SATA hard disk drive. Its functionality can be further increased through the use of a PMC module. Additionally, very high-performance networking is provided by four Gigabit Ethernet links and it is fully compliant with PICMG® 2.16 (Packet Switching Backplane) specification. Full system monitoring is provided by the PICMG 2.9 compliant IPMI interface. The PP 402/04x is suitable for a range of high-performance applications in industrial control, telecomms, telemetry, scientific and aerospace markets. To simplify the board's integration many popular industry standard operating systems are supported.

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 support)
  - passive heat sink
- Single slot (for all option combinations)
- Up to 4 Gbytes of 667 MHz DDR2 DRAM
- On-board CompactFlash™/Microdrive™ interface
- Two high performance Serial ATA150 (SATA) channels:
  - optional on-board SATA disk drive (in a single slot)
- Four 10/100/1000Mbps Ethernet interfaces
- Dual Gigabit Packet Switching Backplane (PICMG 2.16)
- PMC module interface (32/64-bit at 33/66 MHz)
- 1 Mbyte of BIOS Flash EPROM
- 1 Mbyte Application Flash EPROM
- Analog and digital graphics interfaces
- CompactPCI controller:
  - operates in system slot or peripheral slot
  - 32/64-bit at 33/66 MHz CompactPCI interface
- Option to bypass CompactPCI bus (Satellite Mode)
- IPMI (Intelligent Platform Management Interface):
  - PICMG 2.9 (System Management Specification)
- PS/2 keyboard and mouse port
- 4 x USB 2.0 interfaces and 2 x RS232 serial channels
- Watchdog timer; long duration timer
- Extended temperature versions available:
  - -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, Windows® Server 2003, Solaris™, LynxOS®, QNX® and VxWorks®
- Optional Transition Module for rear panel I/O

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 processor features are:-
  - ➔ dual-core processor
  - ➔ 667 MHz Front Side Bus
  - ➔ 64 Kbytes of primary (L1) on-die cache
  - ➔ 4 Mbytes of secondary (L2) on-die cache
  - ➔ Intel® 64 Technology (64-bit computing) support
  - ➔ no CPU fan; low power processor
- utilizes 64-bit Intel® 945GME Express chipset:-
  - ➔ uses Intel® ICH7-M DH Controller Hub

DRAM

- supporting up to 4 Gbytes 667 MHz DDR2 SDRAM:-
  - ➔ single channel or dual channel operation
  - ➔ 2 Gbytes soldered onboard giving peak bandwidth of up to 5.3 Gbytes/s
  - ➔ 4 Gbytes (SODIMM + soldered) giving peak bandwidth of up to 10.6 Gbytes/s
- accessible from processor or CompactPCI bus

Hard Disk Interfaces

- 1 x EIDE interface:-
  - ➔ supports 1x CompactFlash™ or Microdrive™ Type II drive using on-board socket
- 2 x Serial ATA150 interfaces:-
  - ➔ both channels accessible via J5 to the Rear Transition Module (RTM)
  - ➔ one channel switchable to on-board SATA disk drive (in a single slot)
  - ➔ transfer rate up to 150 Mbytes/s

Ethernet Interfaces

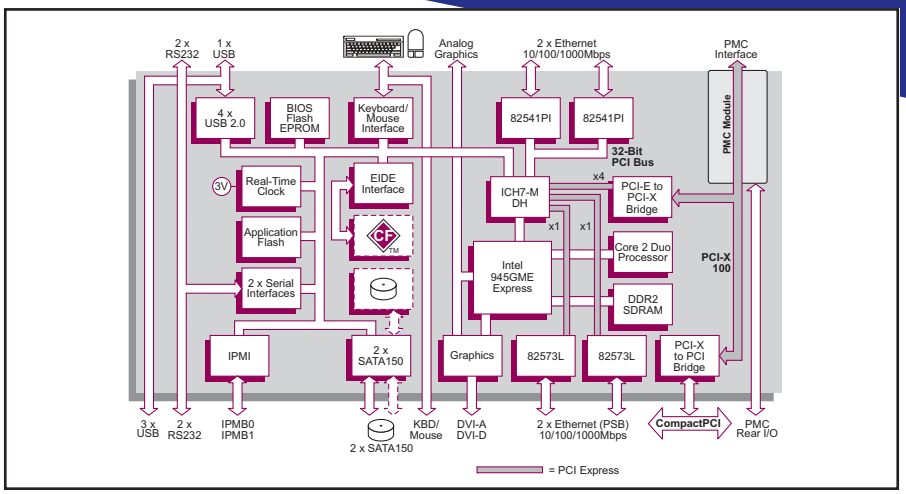
- four channels supporting 10 Base-T, 100 Base-TX, 1000Base-T
- 2 x front panel interfaces accessed via RJ45 connectors:-
  - ➔ implemented by 2 x Intel® 82541PI LAN controllers via 32-bit, 33 MHz PCI Bus
- 2 x rear interfaces accessed via J3:-
  - ➔ implemented by 2 x Intel® 82573L LAN controllers via x1 PCI Express® links
- support for PICMG 2.16 R1.0 - Packet Switched Backplane (PSB)

PMC Interface

- single PMC site:-
  - ➔ I/O via front panel and J5
  - ➔ 32/64-bit, 33/66/100 MHz PCI/PCI-X operation
  - ➔ 3.3V PCI signaling levels

Graphics Interface

- implemented by the Intel® 945GME:-
  - ➔ resolutions up to 2048 x 1536 @ 75Hz
  - ➔ up to 16M colors
- accessed via a 15-way high density connector on front panel or via J3 (DVI-A)
- DVI-D interface supported via J3
- DVI-I connector available on Transition Module



Serial Interfaces

- 2 x RS232 serial channels:-
  - ➔ accessed by 2 x RJ45 connectors on front panel or via J3/J5
- each channel supports CTS, RTS, DSR, DTR and DCD via front panel and Transition Module; RI supported via Transition Module
- 16550 compatible UART

Other Peripheral Interfaces

- keyboard and mouse interfaces via a single PS/2™ type connector on front panel or via J3
- PC-compatible RTC (Year 2000 compliant)
- 4 x USB (Universal Serial Bus 2.0) interfaces:-
  - ➔ one via front panel
  - ➔ three via J5
- watchdog timer; long duration timer
- system fan monitor; CPU temperature monitor; voltages monitor:-
  - ➔ all accessible via IPMI
- legacy speaker interface

Software Support

- support for Linux®, Windows® XP Embedded, Windows® 2000, Windows® XP, Windows® Server 2003, Solaris™, LynxOS®, QNX® and VxWorks®

Flash EPROM

- 1 Mbyte of BIOS Flash EPROM - 8-bits wide
- 1 Mbyte of Flash EPROM
- application storage available in CompactFlash

Firmware Support

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

IPMI Interface

- PICMG 2.9 R1.0 (System Management Specification):-
  - ➔ implements the IPMB0 interface
  - ➔ implements an IPMB1 interface
- on-board Baseboard Management Controller
- supports 8 Kbytes of non-volatile memory

CompactPCI Interface

- compliant with PICMG 2.0 R3.0; 3.3V or 5V signaling levels (universal signaling support)
- 33/66 MHz; 32/64-bit interface accessed via J1/J2 connectors
- utilizes a PCI-X to PCI bridge for off-board accesses
- PICMG 2.1 R2.0 Hot Swap Specification
- operates as a System Slot controller or in a Peripheral Slot
- option to disable CompactPCI interface (Satellite Mode):-
  - ➔ receives power from CompactPCI bus
  - ➔ board can be hot swapped in this mode
- J4 connector not fitted

Electrical Specification

- typical at 2.16 GHz with 2 Gbytes DRAM:-
  - ➔ +5V@4.9A; +5% / -3%
  - ➔ +3.3V@2.7A; +5% / -3%
  - ➔ +12V@0.05A; -12V@0.05A
- +12V and -12V routed to PMC expansion slot

Safety

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

Environmental Specification

- operating temperatures:-
  - ➔ 0°C to +55°C (N-Series: 2.16 GHz, 1.5 GHz)
  - ➔ -25°C to +70°C (E-Series: 1.5 GHz)
  - ➔ -40°C to +85°C (K-Series: 1.5 GHz)
- 10% to 90% Relative Humidity, non condensing (operating)
- -40°C to +85°C (storage)
- 10% to 90% Relative Humidity, non condensing (storage)

Mechanical Specification

- 6U form-factor: 9.2 inches x 6.3 inches (233mm x 160mm)
- single-slot: 0.8inches (20.3mm)
- connectors: IEC-1076-4-101 for J1-J5
- 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)
PP 402/041-xy	1.5 GHz Core Duo processor L7400
PP 402/042-xy	2.16 GHz Core Duo processor T7400
AD PP4/003-20	RTM I/O: PMC, Ethernet, SATA, USB, RS232, DVI-I, KBD, MSE
AD 110/001-z1	2.5 inch SATA Hard Disk Drive assembly

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

where x =	where y = memory size
1 - Ethernet via rear panel	1 - reserved
2 - Ethernet via PICMG 2.16	2 - reserved
	3 - 2 Gbytes, single channel
	4 - reserved
	5 - 4 Gbytes, dual channel

For z options please contact your local sales office

For extended temperature, 1.5 GHz E or K-Series, please contact your local sales office

Datasheet Code 1551/0408