

## Intel® Core™ 2 Duo Processor, Dual PMC/XMC



### APPLICATIONS

The PP 531/06x is a PC-compatible, high performance, dual PMC/XMC, CompactPCI® board supporting the Intel® Core™ 2 processor up to 2.26 GHz (45nm process technology), and the Intel® GS45 mobile chipset with up to 8 Gbytes of DDR3-1066 SDRAM. The PP 531/06x features a variety of I/O interfaces including an option for an on-board SATA300 drive and a CompactFlash® socket. The board will operate in a system slot, a peripheral slot or independently from the CompactPCI

bus. Supporting two Gigabit Ethernet ports, the board is compliant to the PICMG® 2.16 specification. Full system monitoring is provided by the PICMG 2.9 compliant IPMI interface. The PP 531/06x is suitable for demanding applications within the defense, industrial control, telemetry, transportation, and aerospace markets. Ruggedized conduction-cooled and air-cooled versions are planned. To simplify the board's integration many popular standard operating systems are supported.

### HIGHLIGHTS

- 2.26GHz or 1.86GHz Intel® Core™ 2 Duo processor:
  - 45nm process technology, dual-core processor
  - 1066MHz Front Side Bus
  - 6 Mbytes last-level cache shared between cores
  - Intel® 64 Technology (64-bit computing)
- Up to 8 Gbytes DDR3-1066 SDRAM
- 2 x PMC/XMC sites with front and rear user I/O:
  - 32/64-bit; 33/66MHz PCI
  - 64-bit; up to 100MHz PCI-X
  - XMC interfaces (x8 and x4 PCI Express™)
- High-performance mass storage interfaces:
  - 2 external SATA 300 ports
  - optional on-board Hard Disk Drive
- On-board CompactFlash® socket
- 4 x Universal Serial Bus (USB 2.0) interfaces
- 4 x 10/100/1000Mbps Ethernet interfaces:
  - Dual Gigabit Packet Switching Backplane (PICMG 2.16)
- 1 x RS232/RS422/RS485 serial channel interface
- Graphics, keyboard and mouse interfaces
- Watchdog timer and Long Duration Timer
- 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)
- Extended temperature versions planned:
  - -25°C to +70°C (E-Series)
  - -40°C to +85°C (K-Series, includes humidity sealant)
- Ruggedized conduction-cooled version (RC-Series) planned:
  - conduction-cooled to ANSI/VITA 30.1-2002
  - -40°C to +85°C, conformally coated
  - see separate PP 531/06x-RC datasheet
- Ruggedized air-cooled version (RA-Series) planned:
  - -40°C to +75°C, conformally coated
  - see separate PP 531/06x-RA datasheet
- Support for Linux®, Windows® XP, Windows® XP Embedded, Windows® Server 2003, Windows® Server 2008, QNX®, Solaris™ and VxWorks®

## Central Processor

- 2.26 GHz Intel® Core™ 2 Duo SP9300 or 1.86 GHz Intel® Core™ 2 Duo SL9400
- common processor features:-
  - 45nm process technology
  - soldered to board
  - 1066 MHz Front Side Bus
  - 6 Mbytes of shared last-level on-die cache
  - Intel 64 technology (64-bit computing)
  - no CPU fan
- utilizes Intel® GS45 mobile class chipset with Intel ICH9M-E I/O Controller Hub
- provision for XDP debug port

## SDRAM

- supports up to 8 Gbytes DDR3-1066 SDRAM:-
  - up to 8 Gbyte soldered
  - peak bandwidth of 16 Gbytes/s
  - dual channel architecture
- accessible by CPU and from CompactPCI® bus

## Mass Storage Interfaces

- 2 SATA interfaces via J5
- 1 x SATA 300 interface for on-board hard disk or solid state drive (uses a PMC/XMC site)
- 1 x SATA 300 interface for on-board CompactFlash socket via EIDE converter

## Ethernet Interfaces

- 2 x front interfaces implemented by Intel® 82574L controllers via x1 PCI Express™ links
- 1 x rear interface via J3 implemented by Intel 82574L controller via x1 PCI Express link
- 1 x rear interface via J3 implemented by an Intel® 82567 Gigabit Ethernet controller
- support for PICMG 2.16 R1.0 - Packet Switching Backplane (PSB)
- supports 10 Base-T, 100 Base-TX, 1000 Base-T

## PMC/XMC Interfaces

- 2 x PMC/XMC sites
- common features for both PMC sites:-
  - 32/64-bit, 33/66MHz PCI bus
  - 64-bit PCI-X bus up to 100MHz
  - 5V and 3.3V signaling levels
  - front panel I/O and Pn4 connectors used for rear I/O
- XMC (PCI Express™ Mezzanine Card) features:-
  - XMC site 2 interface supported via x4 PCI Express link
  - XMC site 1 interface supported via x8 PCI Express link

## Graphics Interface

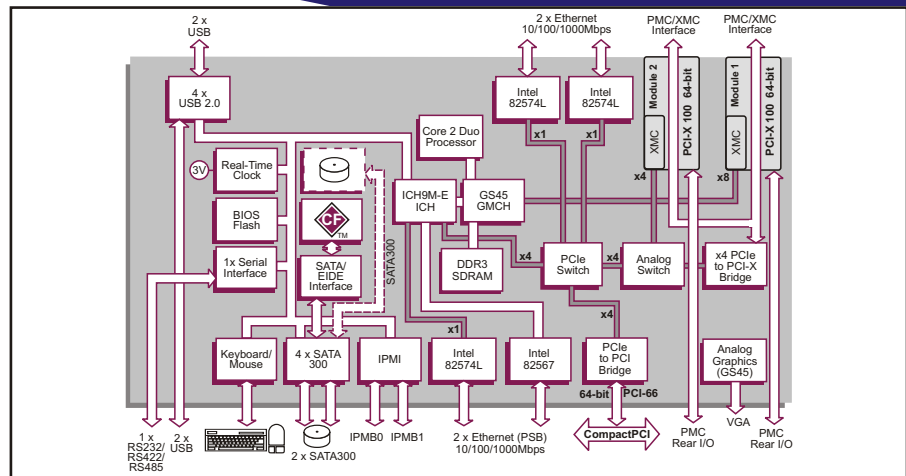
- implemented by Intel GS45 chipset
- analog VGA accessed via J5 rear I/O
  - resolutions up to 2048 x 1536 @ 16M colors

## Serial Interface

- 1 x RS232/RS422/RS485 serial channel:-
  - Tx, Rx, CTS and RTS signals via J5
- 16550 compatible UART

## Flash EPROM

- 4 Mbytes of BIOS Flash EPROM - 8-bits wide



## Firmware Support

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

## Software Support

- support for Linux®, Windows® XP, Windows® XP Embedded, Windows® Server 2003, Windows® Server 2008, QNX®, Solaris™ and VxWorks®

## Other Peripheral Interfaces

- PC Real Time Clock (Year 2000 compliant)
- watchdog timer
- 1 x 32-bit Long Duration Timer with processor interrupt capability
- CPU temperature monitor; voltages monitor; optional system fan monitor:-
  - accessible via IPMI
- serialised GPIO via J5:-
  - 4 x GPO signals via AD PP5/006 RTM
  - 8 x GPI signals via AD PP5/006 RTM
- 4 x USB 2.0 interfaces:-
  - 2 accessed via J5
  - 2 accessed via front panel
- independent legacy speaker output via J3
- keyboard and mouse

## 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
- PCI Express to PCI bridge for off-board accesses
- J4 connector not fitted
- PICMG 2.1 R2.0 Hot Swap compliant
- 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

## IPMI

- PICMG 2.9 R1.5 (System Management Spec.):-
  - implements the IPMB0 interface
  - implements an IPMB1 interface
- on-board Baseboard Management Controller
- supports 8 Kbytes of non-volatile memory

## Electrical Specification

- +5V@TBDA (typical at 2.26 GHz with 4 Gbytes SDRAM); +5% / -3%
- +3.3V@TBDA; +5% / -3%
- +12V@0.01A; -12V@0.001A
- +12V and -12V routed to PMC slots

## Safety

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

## Environmental Specification

- operating temperatures:-
  - 0°C to +55°C (N-Series)
  - -25°C to +70°C (E-Series)
  - -40°C to +85°C (K-Series)
- storage temperature: -40°C to +85°C
- 5% to 95% Relative Humidity, non condensing (operating or storage):-
  - K-Series includes humidity sealant
- ruggedized versions available, see separate datasheets:-
  - rear plug compatible
  - conduction-cooled: PP 531/06x-RC
  - air-cooled: PP 531/06x-RA

## Mechanical Specification

- 6U form-factor: 9.2inches x 6.3inches (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 531/061-xy	1.86 GHz Core 2 Duo processor SL9400 SBC
PP 531/062-xy	2.26 GHz Core 2 Duo processor SP9300 SBC

AD PP5/006-zz	Rear Transition Module
AD 110/002-z1	2.5 inch SATA300 Hard Disk Drive assembly

Replace the order number suffix (xy) with selections from the following:  
**where x =**  
 1 - Ethernet via rear panel  
 2 - Ethernet via PICMG 2.16  
**where y = memory size**  
 1 - reserved  
 2 - 4 Gbytes  
 3 - 8 Gbytes

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