

## Intel® Atom™ Processor 3U Single Board Computer



### APPLICATIONS

The TP A40/30x is a PC-compatible low power, high functionality, 3U CompactPCI® board supporting the 1.6 GHz Intel® Atom™ processor Z530. It utilizes the Intel® System Controller Hub US15W to support 1 Gbyte of DDR2 SDRAM. This board can support a PMC/XMC site and features a variety of interfaces including four Serial ATA300 channels, dual Gigabit Ethernet, RS232/422, USB, CANbus and HD audio. The TP A40/30x is a

commercial air-cooled board, suitable for a range of environments within industrial control, transportation, security, telemetry, scientific and medical applications. Options to operate in temperatures ranging from -40°C to +85°C are available. Ruggedized conduction-cooled and ruggedized air-cooled versions are planned. To simplify the board's integration many industry standard operating systems are supported.

### HIGHLIGHTS

- 1.6 GHz Intel® Atom™ processor:
  - 512 Kbytes L2 cache
  - Intel® Hyper-Threading Technology supports 2 execution threads
  - Intel® Virtualization Technology
- Combined thermal design power of processor and chipset is less than 5 Watts
- 1 Gbyte of DDR2-533 SDRAM
- Single/dual 3U CompactPCI slot configurations available
- PMC/XMC module interface, on optional second slot board with front and rear user I/O:
  - 32 bit, 33/66MHz PCI/PCI-X operation
  - XMC module interface (x1 PCI Express®)
- 2 x 10/100/1000Mbps Ethernet interfaces
- 4 x Serial ATA300 channels:
  - 2 channels accessed via J2
  - 1 channel used for SATA300 hard drive on optional second slot boards
  - 1 channel used for CompactFlash® on optional second slot boards (including front loading CompactFlash)
- CompactFlash® site(s) on single and/or dual slot board
- High definition stereo audio
- Analog graphics interface, front or rear
- 1 or 2 x serial channel interfaces
- 5 x USB 2.0 interfaces
- High speed CANbus controller
- CompactPCI controller:
  - operates in the system slot or in a peripheral slot
  - PICMG 2.1 R2.0 (Hot-Swap Specification)
  - 32-bit, 33/66 MHz CompactPCI interface
  - option to bypass CompactPCI bus (Satellite Mode)
- IPMI (Intelligent Platform Management Interface):
  - PICMG 2.9 (System Management Specification)
- Watchdog and long duration timer
- Extended temperature versions available:
  - -25°C to +70°C (E-Series)
  - -40°C to +85°C (K-Series, includes humidity sealant)
- Ruggedized versions planned:
  - conduction cooled and air cooled
- Support for Linux®, Windows® XP, Windows® XP Embedded, QNX® and VxWorks®

## Central Processor

- 1.6 GHz Intel® Atom™ processor Z530:-
  - 512 Kbytes of secondary (L2) on-die cache
  - 533 MHz Front Side Bus
  - Intel Hyper-Threading Technology supporting 2 execution threads
  - Intel® Virtualization Technology
- uses Small Form Factor packaging (micro Flip-Chip Ball Grid Array) package
- utilizes Intel® System Controller Hub US15W (SCH)
- combined thermal design power of processor and chipset is less than 5 Watts

## DRAM

- 1 Gbyte soldered DDR2-533 SDRAM
- accessible from processor or CompactPCI® bus

## Optional Second Slot Boards

- second slot board, two options (see diagram)
- option 1 supports onboard:-
  - PMC/XMC site or 2.5" SATA300 disk drive
  - CompactFlash site
- option 2 supports onboard:-
  - SATA300 disk drive (or external disk drive)
  - CompactFlash site, accessible via front panel

## PMC/XMC Interface

- single PMC/XMC site available on an optional second slot board (option 1 in diagram):-
  - 32-bit, 33/66 MHz PCI operation
  - 3.3V and 5V PCI signaling levels
  - XMC (Switched Mezzanine Card) interface supported via x1 PCI Express® port
  - I/O via front panel and 64 bits via J2 on optional second slot board

## Mass Storage Interfaces

- 4 x Serial ATA300 interfaces:-
  - transfer rate up to 300 Mbytes/s
  - 2 x channels accessible via J2
  - 1 x channel routed to 2.5" SATA300 disk drive on both types of optional second slot board (uses PMC/XMC site on option 1)
  - 1 x channel routed to a CompactFlash® site (type 1) on both second slot board options
- 1 x EIDE interface:-
  - supports an on-board CompactFlash® site (type 1) on the single slot base board

## Ethernet Interfaces

- up to 2 x channels supporting:-
  - 10 Base-T, 100 Base-TX, 1000 Base-T
  - implemented by Intel® 82546GB via PCI-X 66 bus
- 1 x channel accessed via front panel RJ45
- option for one channel accessed via J2

## Stereo Audio

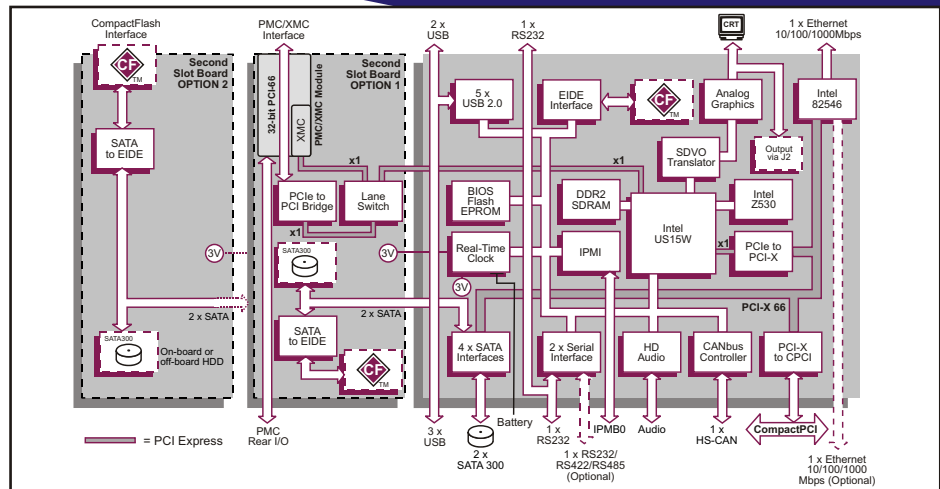
- Intel® High Definition Audio interface via J2 supports Stereo Audio Codec on optional Rear Transition Module (RTM)

## Flash EPROM

- 1 Mbyte of BIOS Flash EPROM

## Graphics Interface

- implemented by the Intel® US15W SCH
- analog VGA accessed via a 15-way high density connector on front panel or optionally via J2:-
  - resolutions up to 2048 x 1536 @ 16M colors



## Serial Interfaces

- 1 x RS232 serial channel accessed via front panel RJ45 connector or J2:-
  - supporting CTS, RTS, DSR, DTR and DCD
- option for 1 x RS232/422/485 serial channel accessed via J2:-
  - supporting RI, CTS, RTS, DSR, DTR and DCD
- 16550 compatible UARTs

## Other Peripheral Interfaces

- PC Real Time Clock (Year 2000 compliant)
- long duration timer; watchdog timer
- legacy speaker interface
- 5 x USB 2.0 interfaces:-
  - 3 channels accessed via J2
  - 2 channels accessed via front panel
- 2 x GPIO signals via J2
- High Speed CANbus controller:-
  - up to 1 Mbps

## CompactPCI Interface

- universal signaling support, compliant with PICMG 2.0 R3.0; 3.3V or 5V signaling levels
- 33/66 MHz; 32-bit interface accessed via J1
- operates as a System Slot controller (supporting up to 7 peripheral slots) or operates in a Peripheral Slot
- PICMG 2.1 R2.0 Hot Swap Compliant
- option to disable CompactPCI interface (Satellite Mode):-
  - receives power from CompactPCI bus
  - board can be hot swapped

## IPMI

- PICMG 2.9 R1.0 (System Management Specification):-
  - implements the IPMB0 interface
- on-board Baseboard Management Controller
- monitors CPU temperature, voltages and fan
- supports 8 Kbytes of non-volatile memory

## Software Support

- supports Linux®, Windows® XP, Windows® XP Embedded, QNX®, and VxWorks®

## Firmware Support

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

## Electrical Specification

- the target power consumption for this board is under 10 watts
- +5V@TBD A
- +3.3V@TBD A
- +12V@ 0.01 A
- 12V not required
- all voltages are tolerant to +5% / -3%

## 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)
- 5% to 95% Relative Humidity, non condensing (operating):-
  - K-Series includes humidity sealant
- 40°C to +85°C (storage)
- 5% to 95% Relative Humidity, non condensing (storage)
- ruggedized versions planned

## Mechanical Specification

- 3U form-factor: 3.9 inches x 6.3 inches (100mm x 160mm)
- single or dual slot
- connectors: IEC-1076-4-101 for J1-J2
- 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)

TP A40/303-xy 1.6 GHz Atom processor Z530

CB 232/121-01 RJ45 plug to 9-way 'D' Plug adaptor cable (for SBC front panel)  
 AD TP1/004-10 I/O RTM plus 9-way D-type Serial (when x=0, 1 or 4)  
 AD TP1/004-20 I/O RTM plus RJ45 Serial and RJ45 Ethernet (when x=2, 3 or 5)  
 AD 110/002-zz 2.5 inch SATA Hard Disk Drive assembly

For z options please contact your local sales office

### where x = width and rear I/O options

0 - 1-slot with TTL Serial via J2  
 1 - 2-slot with TTL Serial via J2; type 1  
 2 - 1-slot with Gigabit Ethernet via J2  
 3 - 2-slot with Gigabit Ethernet via J2; type 1  
 4 - 2-slot with TTL Serial via J2; type 2  
 5 - 2-slot with Gigabit Ethernet via J2; type 2

### where y = SDRAM; VGA out

1 - reserved  
 2 - 1 Gbyte; VGA front  
 3 - reserved  
 4 - 1 Gbyte; VGA rear

note: type 1 and 2 refer to the 2nd slot options in the block diagram

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