

## 4<sup>th</sup> Generation Intel® Core™ Processor 3U Single Board Computer



### APPLICATIONS

TP B1x/3sd is a 3U CompactPCI® board that is designed to be suitable for a range of defense, aerospace, industrial control, scientific and communications applications. It is available in a number of different operating temperature ranges, and rugged variants are also available for harsh environments. TP B1x/3sd is

plug compatible with the popular TP 702/38x family allowing users to transition to a higher performance board that can extend the life of existing deployments. A Fast Boot software package is available to improve start up times for critical embedded applications.

### HIGHLIGHTS

- 4<sup>th</sup> generation Intel® Core™ processor:
  - 2-core or 4-core processor
  - includes Intel® Advanced Vector Extensions 2 (AVX2)
  - includes Intel® AES New Instructions (AES-NI)
- Up to 16 Gbytes soldered DDR3L-1600 DRAM with ECC
- 2 x 10/100/1000Mbps Ethernet interfaces
- 2 x SATA300 interfaces via the rear
- Option for an on-board SATA Flash Module
- 2 serial channel interfaces
- 2 x USB2.0 interfaces
- Option for VGA graphics interface
- Watchdog and long duration timer
- CompactPCI controller:
  - operates in the system slot or in a peripheral slot
  - 32-bit at 33/66 MHz CompactPCI interface
  - PICMG® 2.1 R2.0 (Hot-Swap Specification)
  - Option to bypass CompactPCI bus (Satellite Mode)
- Optional Fast Boot software package, using the Intel® Firmware Support Package (Intel® FSP)
- Optional support for:
  - Built-In Test (BIT) firmware and software
  - board-level security package
  - Trusted Platform Module (TPM)
  - rear I/O via Rear Transition Module (RTM)
- Commercial versions (N, E, K-Series):
  - N: 0°C to +55°C
  - E: -25°C to +70°C
  - K: -40°C to +85°C, includes humidity sealant
- Rugged conduction-cooled versions (RC-Series):
  - conduction-cooled to ANSI/VITA 30.1-2002
  - -40°C to +85°C (at card edge), conformally coated
  - supports XMC module site
  - see separate datasheet, TP B1x/3sd-RC
- Support for Linux®, Windows® and VxWorks®
- Plug compatibility with the popular TP 702/38x family

## Central Processor

- 4<sup>th</sup> generation Intel® Core™ CPU:
  - 4-core Intel® Core™ i7-4700EQ CPU up to 3.4 GHz, 6M Last Level cache
  - 2-core Intel® Core™ i5-4410E CPU 2.9 GHz, 3M Last Level cache
  - 2-core Intel® Core™ i5-4422E CPU up to 2.9 GHz, 3M Last Level cache
  - Intel® Advanced Vector Extensions 2 (AVX2)
  - Intel® AES New Instructions (AES-NI)
- utilizes the Intel® QM87 Platform Controller Hub

## DRAM

- up to 16 Gbytes soldered DDR3L-1600 ECC DRAM:
  - single bit error correction
  - peak bandwidth of 25.6 Gbytes/s
  - dual channel architecture
- accessible from processor or CompactPCI® bus

## Mass Storage Interfaces

- 2 x SATA300 interfaces accessible via J2
- 1 x optional Flash Drive Module:
  - write protect signal from backplane

## Ethernet Interfaces

- 2 x Ethernet interfaces via J2 supporting:
  - 10BASE-T, 100BASE-TX, 1000BASE-T
- implemented by an Intel® i350-AM2 Ethernet controller via a 1 x2 PCI Express® port

## Graphics Interface

- option for VGA graphics interface via J2:
  - resolutions up to 1920 x 1200
- support for Microsoft® DirectX 11.1 on Windows® and OpenGL 3.0 on Linux®
- implemented by the Intel® HD Graphics 4600

## Serial Interfaces

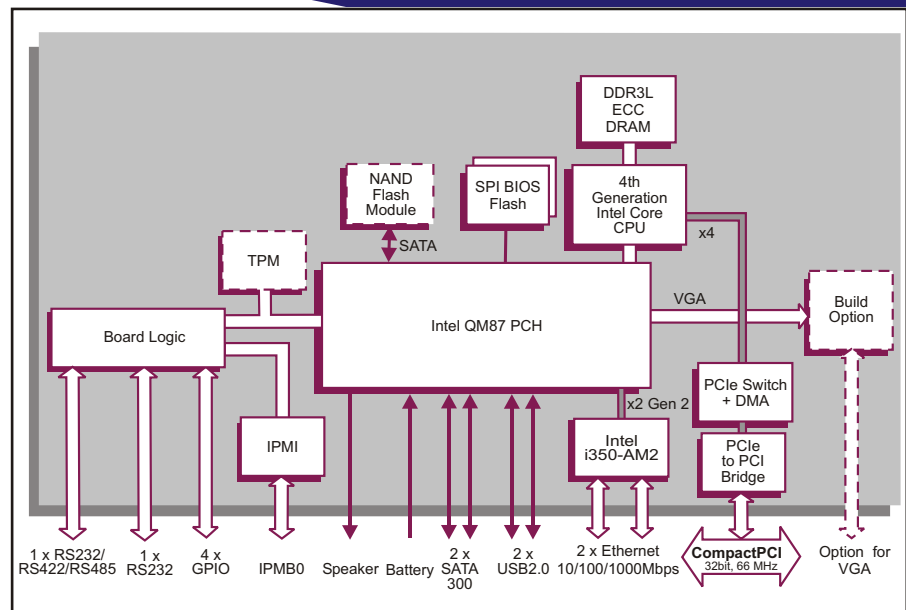
- 2 serial interfaces accessible via J2
- 1 x RS232 interface supporting Tx and Rx
- 1 x RS232 interface supporting Tx, Rx, RI, CTS, RTS, DSR, DTR and DCD or 1 x RS422/RS485 supporting Tx and Rx
- 16550 compatible UARTs

## Other Peripheral Interfaces

- PC-compatible Real Time Clock
- watchdog timer; 32-bit Long Duration Timer with processor interrupt ability; chipset timer
- legacy speaker interface via J2
- 2 x USB 2.0 interfaces via J2
- 4 x GPIO signals via J2
- external battery supply for the RTC
- CPU temperature monitor; board temperature monitor; voltages monitor:
  - all accessible via IPMI

## IPMI

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



## CompactPCI Interface

- universal signaling support, compliant with PICMG 2.0 R3.0; 3.3V or 5V signaling levels
- 33/66 MHz; 32-bit interface via J1
- PCI Express link from processor via PCIe-PCI bridge for off-board accesses:
  - DMA hardware support included
- operates as a System Slot controller (supporting up to 7 peripheral slots) or operates in a Peripheral Slot:
  - supports hot-swapping peripheral boards
  - PICMG 2.1 R2.0 Hot Swap Specification
- option to disable CompactPCI interface (Satellite Mode):
  - receives power from CompactPCI bus
  - board can be hot swapped

## Flash EPROM

- 8 Mbytes of BIOS Flash EPROM, dual devices:
  - main/backup device enabled via switch

## Software Support

- support for Linux®, Windows® and VxWorks®

## Firmware Support

- Insyde® Software InsydeH20™ BIOS:
  - includes Compatibility Support Module
- optional Fast Boot software package using the Intel® Firmware Support Package (FSP):
  - based upon Intel® Platform Innovation Framework for EFI
- LAN boot firmware included

## Optional Built-In Test (BIT) Support

- Power-on BIT (PBIT), Initiated BIT (IBIT), Continuous BIT (CBIT)

## Optional Board Security Packages

- Trusted Platform Module (TPM)
- proprietary board-level security features

## Safety

- PCB (PWB) manufactured with flammability rating of UL94V-0

## Electrical Specification

- typical current consumption (4-core processor with 8 Gbytes DRAM):
  - +5V @ 7.6A
  - +3.3V @ 3.1A
- voltages +5%/-3%
- +12V and -12V not required

## Environmental Specification

- operating temperatures:
  - 0°C to +55°C (N-Series)
  - -25°C to +70°C (E-Series: selected CPU)
  - -40°C to +70°C (K-Series: selected CPU)
  - -40°C to +85°C (K-Series: selected CPU)
- non-operating temperature: -40°C to +85°C
- 5% to 95% Relative Humidity, non condensing (operating or non-operating):
  - K-Series includes humidity sealant
- for rugged versions, see separate datasheet:
  - conduction-cooled: TP B1x/3sd-RC
  - 2-core processor only
  - supports XMC module site

## Mechanical Specification

- 3U form-factor: 3.9-inches x 6.3-inches (100mm x 160mm)
- single slot
- connectors: IEC-1076-4-101 for J1-J2
- shock: 20g, 11ms, ½ sine
- vibration: 5Hz-2000Hz at 2g, 0.38mm peak displacement

## Legacy SBC Compatibility

- rear I/O compatible with the popular TP 702/38x

## ORDERING INFORMATION

Order Number Product Description (Hardware)

TP B1x/3sd-yz 4th generation Intel Core SBC  
where x = 2-core or 4-core processor  
where s = processor performance

For the order number suffix (d-yz) options please contact your local sales office:  
where d = DRAM size where yz = I/O Configuration

d = up to 16 Gbytes DRAM

yz = rear I/O configuration

For accessories, extended temperature E and K-Series, or rugged conduction-cooled RC-Series, please contact your local sales office.