

## Intel® Core™ i7 Processor (32nm) 3U Single Board Computer



### APPLICATIONS

The TP 702/38x is a PC-compatible high performance, high functionality 3U CompactPCI® board supporting the Intel® Core™ i7 processor up to 2.53 GHz (32nm process technology), the Mobile Intel® QM57 Express chipset and up to 8 Gbytes of DDR3-1066 ECC SDRAM. This single slot board features a variety of interfaces including dual Serial ATA150, dual Gigabit Ethernet, RS-232/422 and USB. The TP 702/38x is capable of operating in temperatures ranging from -40°C to +85°C

where it is suitable for a range of demanding applications within the defense, industrial control, telecomms, telemetry, scientific and aerospace markets. For harsher environments, extended temperature, ruggedized air-cooled and ruggedized conduction-cooled versions are supported. The board is plug compatible with the popular TP 402/35x family. To simplify the board's integration many popular industry standard operating systems are supported.

### HIGHLIGHTS

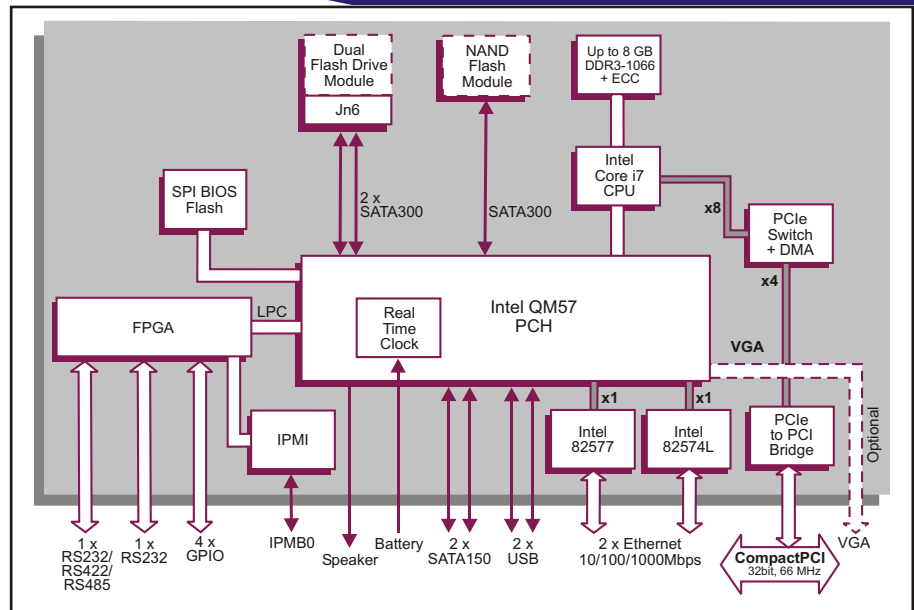
- 2.53 GHz, 2.0 GHz or 1.33 GHz Intel® Core™ i7 processor:
  - dual-core processor
  - 1066MHz DRAM Bus (800 MHz for 1.33 GHz processor)
  - 4 Mbytes shared last level cache
  - Intel® Hyper-Threading Technology
  - Intel® Turbo Boost technology
  - Intel® 64 Technology (64-bit computing support)
- Up to 8 Gbytes of dual channel DDR3-1066 ECC SDRAM
- 2 x 10/100/1000Mbps Ethernet interfaces accessed via J2
- 5 x Serial ATA channels:
  - 2 x SATA150 channels accessed via J2
  - 1 x SATA300 channel for optional on-board Flash disk
  - 2 x SATA300 channels routed to optional Dual Flash Drive Module
- 2 serial channel interfaces accessed via J2
- 2 x USB 2.0 interfaces accessed via J2
- Option for analog graphics via J2
- 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
- Option to bypass CompactPCI bus (Satellite Mode)
- Optional Built-In Test (BIT) support:
  - Power-on BIT, Initiated BIT, Continuous BIT
- Extended temperature versions (E-Series, K-Series):
  - E: -25°C to +70°C, air-cooled
  - K: -40°C to +85°C, humidity sealant, air-cooled
- Ruggedized versions (RA-Series, RC-Series):
  - RA: -40°C to +75°C, conformally coated, air-cooled
  - RC: -40°C to +85°C, conformally coated, conduction-cooled (at card edge) to ANSI/VITA 30.1-2002
- Support for Linux®, Windows® 7, Windows® Embedded Standard 7, Windows® XP, Windows® XP Embedded, Windows® Server 2003, Windows® Server 2008, QNX®, Solaris® and VxWorks®

## CompactPCI Single Board Computer

- 3U CompactPCI® SBC utilizing Intel® Core™ i7 processor
- for ruggedized versions, see separate datasheets:-
  - rear plug compatible
  - conduction-cooled: TP 702/38x-RC
  - air-cooled: TP 702/38x-RA

## Central Processor

- 2.53 GHz Intel® Core™ i7-610E processor, 2.0 GHz Intel® Core™ i7-620LE processor or 1.33 GHz Intel® Core™ i7-660UE processor
- common processor features are:-
  - dual-core processor
  - 4 Mbytes shared last level cache
  - Intel® Hyper-Threading Technology
  - Intel® 64 Technology (64-bit computing)
  - Intel® Turbo Boost technology
- processor to DRAM memory, bus speed:-
  - 610E - 1066MHz; 620LE - 1066MHz; 660UE - 800MHz
- Intel Turbo Boost technology allows faster graphics engine speed depending on the CPU loading
- utilizes Intel® Platform Controller Hub (PCH):-
  - Mobile Intel® QM57 Express chipset



## DRAM

- up to 8 Gbytes DDR3-1066 ECC SDRAM:-
  - up to 8 Gbytes soldered on-board
  - single bit error correction
  - dual channel architecture
- accessible from processor or CompactPCI® bus

## Mass Storage Interfaces

- 2 x SATA150 channels accessible via J2
- 1 x SATA300 channel routed to an optional 4 Gbytes NAND Flash Drive Module:-
  - Flash drive write protect signal from backplane
- 2 x SATA300 channels to optional Dual Flash Drive Module:-
  - one or two Flash Drives
  - uses XMC connectors (see Note 1)
  - Flash drive write protect switch on module

## Ethernet Interfaces

- 2 x channels supporting:-
  - 10 Base-T, 100 Base-TX, 1000 Base-T
  - implemented by an Intel® 82577 and an Intel® 82574L, via 2 x1 PCI Express® ports
  - both channels accessed via J2

## Graphics Interface

- optional analog graphics accessed via J2:-
  - integrated chipset graphics controller
- resolutions up to 1920 x 1200 @ 16M colors
- support for OpenGL 2.0, Windows® and Linux®

## Serial Interfaces

- 2 serial interfaces accessible via J2
- 1 x RS-232 interface supporting Tx and Rx
- 1 x RS-232 interface supporting Tx, Rx, RI, CTS, RTS, DSR, DTR and DCD
- or 1 x RS-422/RS-485 supporting Tx and Rx
- 16550 compatible UARTs

## Flash EPROM

- 8 Mbytes of BIOS Flash EPROM

## Firmware Support

- UEFI-compliant BIOS with legacy mode support
- comprehensive Power-On Self-Test (POST)
- LAN boot firmware included

## Software Support

- support for Linux®, Windows® 7, Windows® Embedded Standard 7, Windows® XP, Windows® XP Embedded, Windows® Server 2003, Windows® Server 2008, QNX®, Solaris® and VxWorks®

## Optional Built-In Test (BIT) Support

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

## Other Peripheral Interfaces

- PC-compatible Real Time Clock
- long duration timer and watchdog timer
- option for legacy speaker interface via J2
- 2 x USB 2.0 interfaces, both accessed via J2
- external battery supply for RTC and BIOS data
- 4 x GPIO signals via J2
- CPU temperature monitor; voltages monitor; all accessible via IPMI

## 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
- 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

## 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

## Safety

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

## Electrical Specification

- +5V @ 3.1A (typical 2.0 GHz with 4 Gbytes DRAM)
- +3.3V @ 5.1A
- 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: 2.0 GHz or 1.33 GHz)
  - -40°C to +85°C (K-Series: 1.33 GHz)
- storage temperature: -40°C to +85°C
- 5% to 95% Relative Humidity, non condensing (operating or storage):-
  - K-Series includes humidity sealant

## 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

## I/O Compatible with the TP 402/35x

- rear I/O compatible with the popular TP 402/35x

**Note 1:** The XMC connectors are provided for the Dual Flash Drive Module only. The CPU heatsink for air-cooled boards can not support an XMC module. The conduction-cooled board (RC-Series) can support an optional XMC module (see TP 702/38x-RC datasheet)

## ORDERING INFORMATION

### Order Number Product Description (Hardware)

TP 702/380-xy	1.33 GHz Intel® Core™ i7-660UE processor
TP 702/382-xy	2.0 GHz Intel® Core™ i7-620LE processor
TP 702/383-xy	2.53 GHz Intel® Core™ i7-610E processor

For the order number suffix (xy) options please contact your local sales office:  
 where x = I/O  
 x - rear I/O configurations

where y = SDRAM size  
 y - up to 8 Gbytes SDRAM

For accessories 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.

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