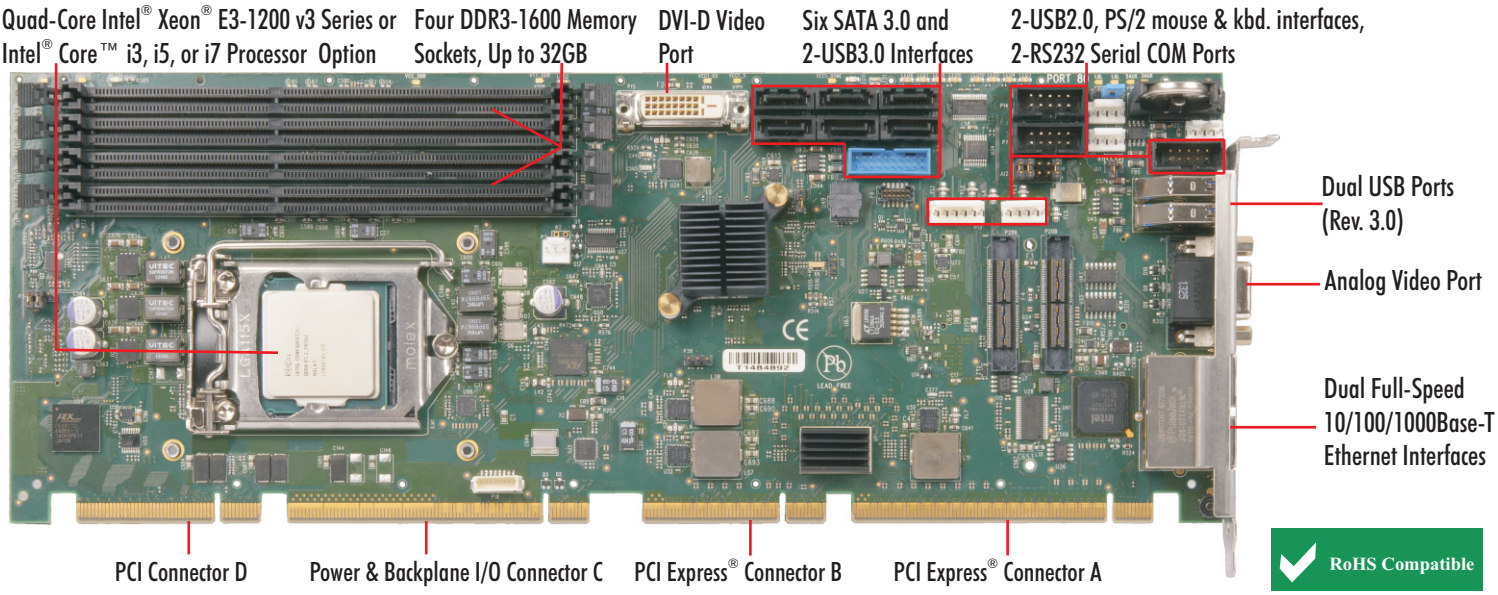
THD8141

SYSTEM HOST BOARD PRODUCT DATA SHEET

PCI EXPRESS Gen3 SHB DRIVES FLEXIBLE SYSTEM DESIGNS



RoHS Compatible

Trenton's THD8141single board computer delivers high-performance processing, card interface and expanded video capabilities to enable engineers to design industrial computer system solutions that support a wide range of applications. Here's a brief list of the SBC highlights:

- System performance boost with Haswell micro-architecture
- Multiple video & PCIe 3.0 interfaces enhance system flexibility
- PCIe 3.0, USB 3.0 and SATA 3.0 improves system performance
- 5-year product warranty maximizes system ROI
- On-board RAID supports a 6-drive SATA/600 storage array
- Deployment risks lowered with extended-life board design

LONG-LIFE EMBEDDED PROCESSOR OPTIONS:

Quad-Core Intel® Xeon® E3-1200 v3 Series, 2.3GHz - 3.5GHz*
Intel® Core™ i7 - 4790S quad-core 3.2GHz processor without ECC*
Intel® Core™ i5 - 4590S quad-core 3.0GHz processor without ECC*
Intel® Core™ i3 - 4330TE dual-core 2.4GHz processor with ECC*
Processor Package: LGA1155

*Higher speed processors as available

The validated processor options on the THD8141 feature the 22nm Intel® Micro-Architecture formally known as Haswell-WS/DT. These validated processors offer improved application performance, enhanced platform and system memory security. Here's a compelling list of additional CPU features supported:

- Intel® AVX 2.0 support for 256-bit integer operations*
- Full Intel® AMT 9.0 support for remote platform access and control functions including remote KVM redirection*

*Functionality is processor option dependent

PLATFORM CONTROLLER HUB (PCH):

The Intel® C226 is a Platform Controller Hub or PCH that takes the place of the traditional multi-component chipset. The PCH design approach saves power while providing enhanced system host board I/O, PCI Express and Ethernet interface capabilities.

THREE ETHERNET INTERFACES - 10/100/1000BASE-T:

Two Gigabit Ethernet ports are located on the board's I/O bracket and a third LAN is routed for use on cable header P35 or as a PICMG 1.3 backplane interface via SHB edge connector C. Trenton has a 24" (610mm) Ethernet LAN cable available (part no. 193-500001150-00) for use with header P35 that connects P35 to an Ethernet LAN connector mounted into an I/O plate. This third LAN will be useful in systems requiring Intel® AMT 9.0 support.

PCI EXPRESS® 3.0 INTERFACES:

Trenton's THD8141 SHB supports PICMG® 1.3 compatible backplanes. SHB backplane edge connectors A & B includes either a x16 or two x8 or a combination of x8, x4 and x1 PCI Express® links. An additional x4 PCIe link and eight PCIe reference clocks are also supplied on these edge connectors. An optional IOB33 expansion board can be used on the SHB to provide an additional x1 PCIe link to a Trenton backplane. SHB-to-backplane links are automatically configured to operate as either PCIe 3.0, 2.0 or PCIe 1.1 link interfaces based on the type of PCI Express endpoints such as option cards, PCIe switches and bridge chips. The SHB features PCI Express auto-negotiation for x1, x4, x8 and x16 PCIe cards, and PCIe 3.0 link retimers enable maximum signal integrity.

PCI EXPRESS INTERFACE CONFIGURATIONS:

PCI Express - Edge Connectors A & B - One x16 or two x8 links, plus one x4 link
- Eight reference clocks

PCI - Edge Connector D - 32-bit/33MHz

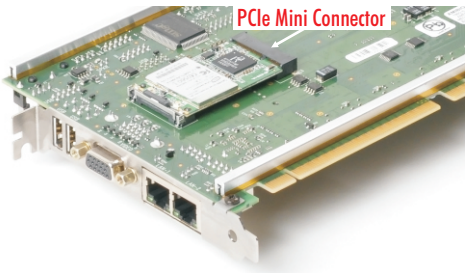
PCI Express - (IOB33 or MPE40 expansion board)- One x1 link

The number, type and combination of PCI Express and PCI interfaces available on the THD8141 enable system designers to develop solutions that meet a variety of application requirements in many diverse embedded computing markets.

DDR3-1600 MEMORY INTERFACE:

The DDR3-1600 memory interface is made up of two, dual-channel interfaces with a peak memory interface bandwidth per channel of 25.6GB/s when using the PC3-12800 DIMMs. The SHB is optimized for use with DDR3, ECC registered, PC3-10600 or PC3-12800 DIMMs. Max memory capacity is 32GB is when using standard 8GB DDR3 DIMMs and 16GB with 4GB DDR3 DIMMs.

PCI EXPRESS® Mini-CARD SUPPORT & BACKER PLATE:



The rear of the THD8141 SHB features a PCIe mini-connector that supports industry standard PCI Express Mini Cards.

The THD8141's full-length backer plate maximizes system integrity by ensuring proper SHB alignment within the card guides of the computer chassis, while assisting in the safe insertion and removal of the SHB from the system. The backer plate also protects sensitive board components from mechanical damage in hostile application environments.

SERIAL ATA/600 PORTS:

An integrated Serial ATA (SATA) controller in the Intel® C226 features six SATA ports with data transfer rates up to 600MB/s. The THD8141 supports independent SATA drive operation and RAID storage array configurations.

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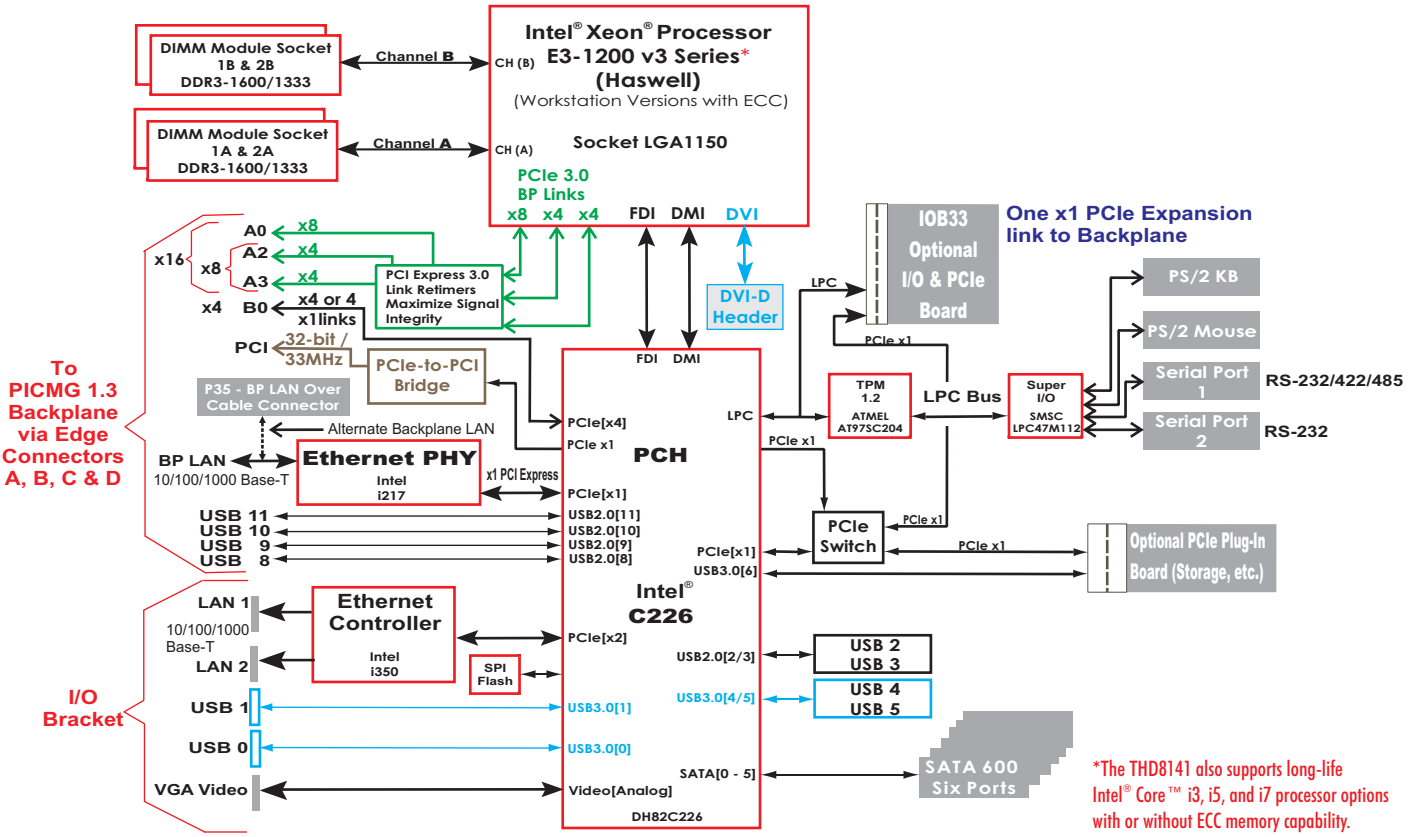

UNIVERSAL SERIAL BUS INTERFACES (USB 3.0 & 2.0):

There are ten USB interfaces available on the THD8141 SHB. USB ports 0 and 1 are located on the I/O bracket and support USB 3.0 & 2.0 devices as does on-board header P6 which supports USB ports 4 & 5. On-board header ports 2 and 3, and backplane interface ports 8, 9, 10 and 11; routed to the SHB's edge connector C, support USB 2.0 devices.

VIDEO INTERFACES:

The processor's integrated graphics controller dynamically utilizes a portion of the system memory based on the OS and the amount of memory installed. The Intel® Xeon® E3-1200 v3 series features Intel® HD Graphics P4600 while the Intel® Core™ processors offer Intel® HD Graphics 4600. Both processor types support max. video resolutions of 2560 x 1600. Independent VGA and DVI interfaces are available directly on the board with the VGA port on the SHB's I/O bracket and the on-board DVI-D connector.

BIOS (FLASH):

The board uses Aptio® 4.x BIOS from AMI and the BIOS resides in a SPI Flash device to simplify field upgrades and BIOS customization.

ADDITIONAL PRODUCT FEATURES:

I/O Features:

- Two on-board RS232 & RS232/422/485 headers plus headers for PS/2 mouse and PS/2 keyboard interface connections
- Optional IOB33 I/O and PCIe expansion board provides:
  - x1 PCIe link routing to a backplane's PCIe Expansion Slot
  - Two additional RS232 serial communication headers plus a PS/2 mouse, PS/2 keyboard, parallel printer & floppy header
- The THD8141 provides a programmable watchdog timer with programmable timeout periods of 100 msec to three minutes via board component U11. When enabled the WDT generates a system reset at the selected tomepout period. WDT control is supplied via the General Purpose IO pins from the Intel® C226 Platform Controller Hub (PCH).

APPLICATION CONSIDERATIONS:

Power Requirements:

Typical Values* - Static Desktop (Idle) with 16GB of system memory

CPU	Intel® No.	+5V	+12V	+3.3V
3.5GHz	E3-1275 v3	0.55A	1.15A	2.63A
3.2GHz	E3-1225 v3	0.48A	1.11A	2.62A
2.3GHz	E3-1268L v3	0.47A	1.16A	2.61A
3.2GHz	Core i7-4790S	0.47A	1.11A	2.64A
3.0GHz	Core i5-4590S	0.48A	1.13A	2.66A
2.4GHz	Core i3-4330TE[D]	0.47A	1.37A	2.66A

Typical Values - 100% Stress State with 16GB of system memory

CPU	Intel® No.	+5V	+12V	+3.3V
3.5GHz	E3-1275 v3	0.66A	7.39A	3.07A
3.2GHz	E3-1225 v3	0.62A	6.13A	3.10A
2.3GHz	E3-1268L v3	0.59A	4.57A	3.08A
3.2GHz	Core i7-4790S	0.57A	6.37A	3.11A
3.0GHz	Core i5-4590S	0.59A	4.84A	3.11A
2.4GHz	Core i5-4330TE[D]	0.58A	2.76A	3.09A

D = Dual-core CPU, all other processors are quad-core. NOTE: All SHB processor options support Intel® Hyper-Threading except the Intel® Xeon® E3-1225 v3 & Intel® Core™ i5-4590S
*Actual power numbers will vary as a function of the system application.

Temperature/Environment:

Operating Temperature: 0° to 50° C. all CPUs except E3-1275 v3*
Air Flow Requirement: 350LFM continuous airflow
Storage Temperature: - 40° to 70° C.
Humidity: 5% to 90% non-condensing
*THD8141 maximum operating temp. is 45° C. with the Intel® Xeon® E3-1275 v3 processor.

Mechanical:

The standard active cooling solution used on the THD8141 enables placement of option cards approximately 2.15" (54.61mm) away from the top component side of the SHB. Contact Trenton for a system engineering consultation if your application needs a lower profile cooling solution. The overall board dimensions are 13.330" (33.858cm) L x 4.976" (12.639cm) H.

ORDERING INFORMATION:

Part Number	CPU Speed	MaxTDP	Intel® No.*
92814100600000	3.5GHz	84W	E3-1275 v3
92814101300000	3.2GHz	84W	E3-1225 v3[N]
92814100200000	2.3GHz	45W	E3-1268L v3
92814102600000	3.2GHz	65W	Core i7-4790S[C]
92814104500000	3.0GHz	65W	Core i5-4590S[C,N]
92814107300000	2.4GHz	35W	Core i3-4330TE[D]

* = All CPU options are embedded CPUs, D = Dual-Core CPU, C = Processor does not support ECC Memory, N = Processor does not support Intel® Hyper-Threading, TDP = Thermal Design Power rating

STANDARDS:

- PCI Express® Base Specifications 3.0, 2.0 and 1.1
- SHB Express®System Host Board PCI Express Specification - PCI Industrial Computer Manufacturers Group (PICMG®) 1.3

AGENCY APPROVALS:

Designed for UI60950, CAN/CSA C22.2 No. 60950-00, EN55022:1998 Class B, EN61000-4-2:1995, EN61000-4-3:1997, EN61000-4-4:1995, EN61000-4-5:1995, EN61000-4-6:1996,EN61000-4-11:1994

The stated processing, memory and communication interface speeds and bandwidths are component maximums; actual system performance may vary.

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