

SEP8253

User Manual



Revision 0.2

May 16, 2019

PREFACE

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INTRODUCTION

Warranty

The following is an abbreviated version of Trenton Systems' warranty policy for High Density Embedded Computing (HDEC®) products. For a complete warranty statement, contact Trenton Systems or visit our website at www.trentonsystems.com.

HDEC® Series board-level products manufactured by Trenton Systems are warranted against material and manufacturing defects for five years from date of delivery to the original purchaser. Buyer agrees that if this product proves defective Trenton Systems, Inc. is only obligated to repair, replace or refund the purchase price of this product at Trenton Systems' discretion. The warranty is void if the product has been subjected to alteration, neglect, misuse or abuse; if any repairs have been attempted by anyone other than Trenton Systems, Inc.; or if failure is caused by accident, acts of God, or other causes beyond the control of Trenton Systems, Inc. Trenton Systems, Inc. reserves the right to make changes or improvements in any product without incurring any obligation to similarly alter products previously purchased.

In no event shall Trenton Systems, Inc. be liable for any defect in hardware or software or loss or inadequacy of data of any kind, or for any direct, indirect, incidental or consequential damages arising out of or in connection with the performance or use of the product or information provided. Trenton Systems, Inc.'s liability shall in no event exceed the purchase price of the product

Return Policy

A Return Material Authorization (RMA) number, obtained from Trenton Systems prior to return, must accompany products returned for repair. The customer must prepay freight on all returned items, and the customer is responsible for any loss or damage caused by common carrier in transit. Items will be returned from Trenton Systems via Ground, unless prior arrangements are made by the customer for an alternative shipping method.

To obtain an RMA number, call us at (800) 875-6031 or (770) 287-3100. We will need the following information:

Return company address and contact

Model name and model # from the label on the back of the product

Serial number from the label on the back of the product

Description of the failure

An RMA number will be issued. Mark the RMA number clearly on the outside of each box, include a failure report for each board and return the product(s) to our Lawrenceville, GA facility:

Trenton Systems, Inc.

1725 MacLeod Drive

Lawrenceville, GA 30043

Attn: Repair Department

INTRODUCTION (CONT.)

Trademarks

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HANDLING PRECAUTIONS

WARNING: This product has components that may be damaged by electrostatic discharge.

To protect your system host board (SHB) from electrostatic damage, be sure to observe the following precautions when handling or storing the board:

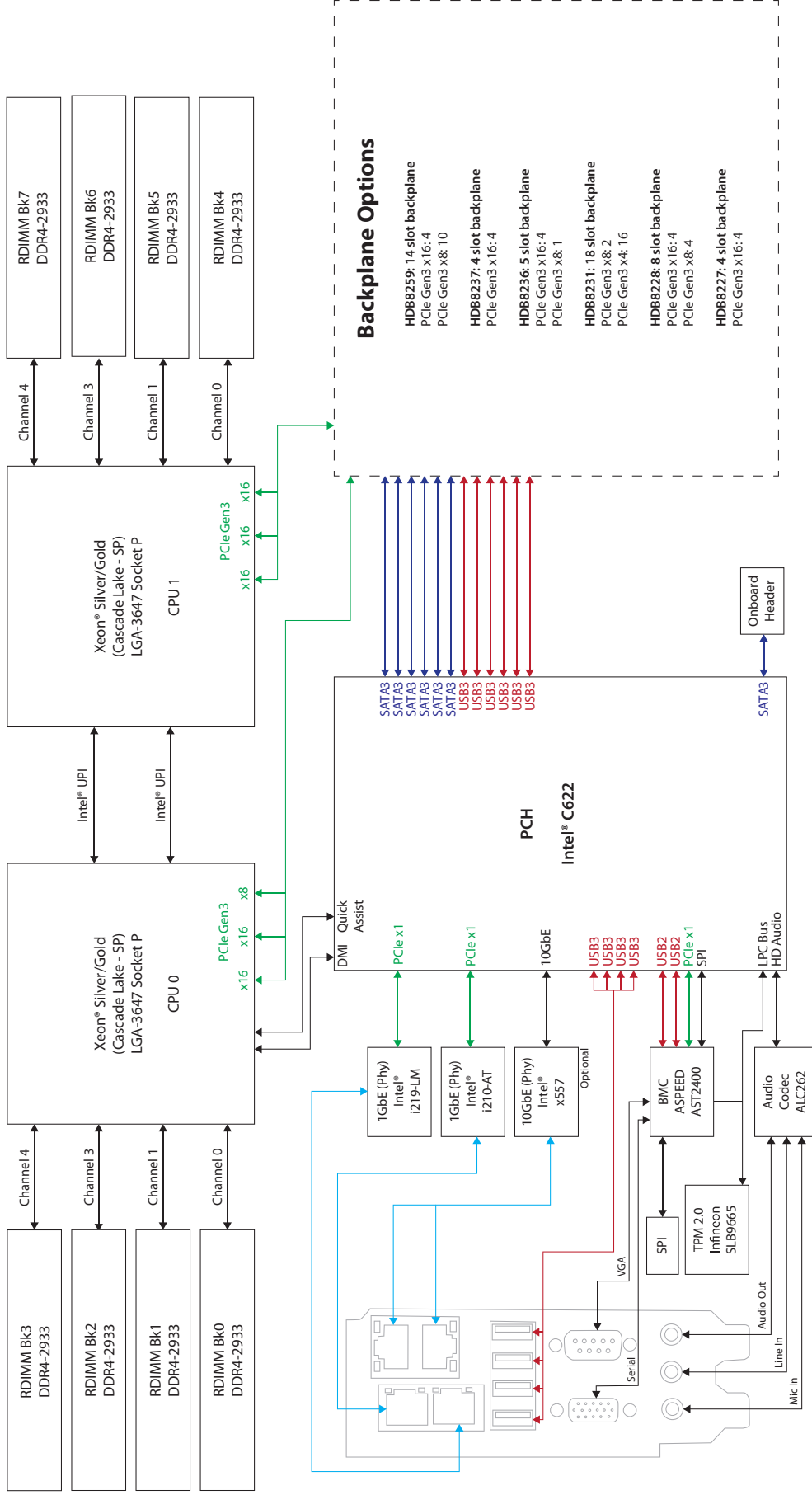
- Keep the SHB in its static-shielded bag until you are ready to perform your installation.
- Handle the SHB by its edges.
- Do not touch the I/O connector pins.
- Do not apply pressure or attach labels to the SHB.
- Use a grounded wrist strap at your workstation or ground yourself frequently by touching the metal chassis of the system before handling any components. The system must be plugged into an outlet that is connected to an earth ground.
- Use antistatic padding on all work surfaces.
- Avoid static-inducing carpeted areas.

RECOMMENDED BOARD HANDLING PRECAUTIONS

This SHB has components on both sides of the PCB. Some of these components are extremely small and subject to damage if the board is not handled properly. It is important for you to observe the following precautions when handling or storing the board to prevent components from being damaged or broken off:

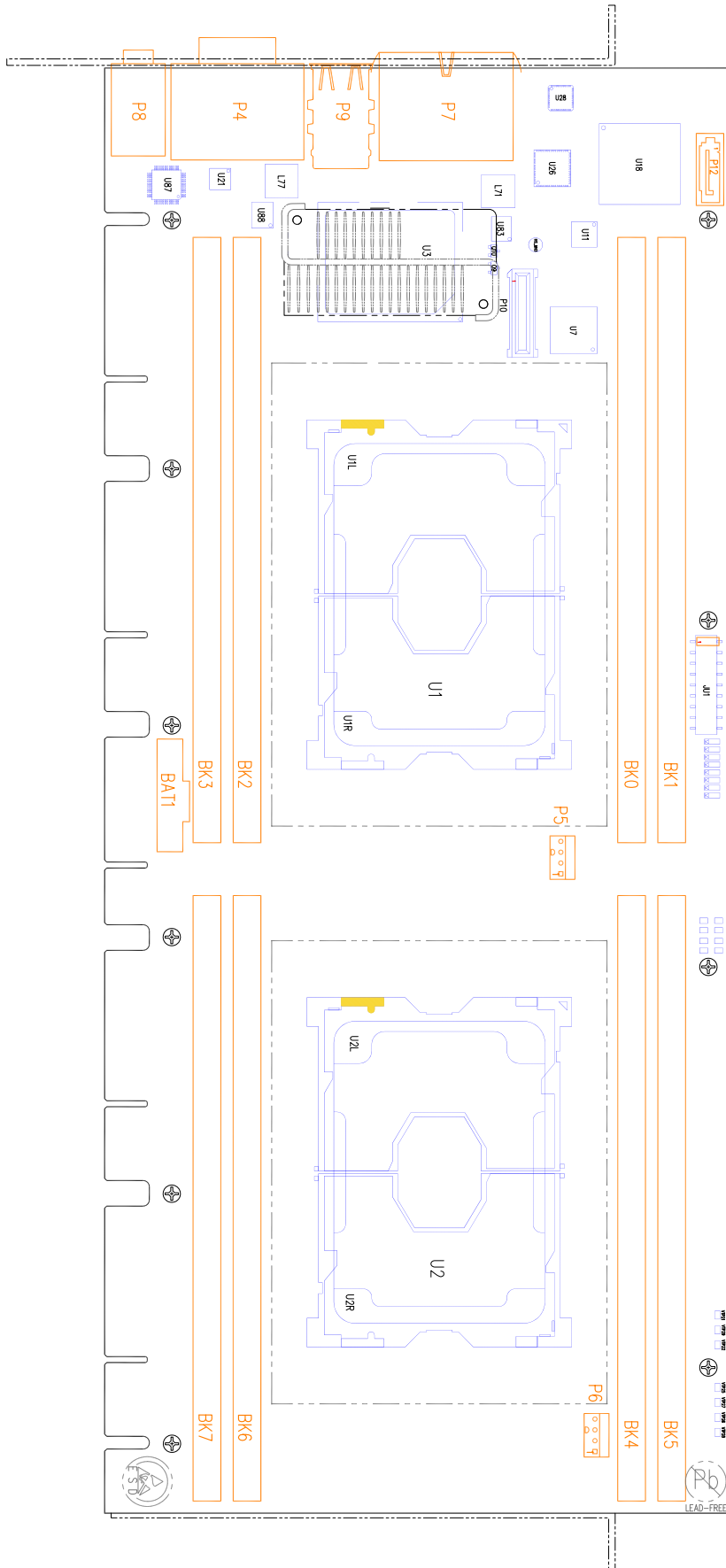
- Handle the board only by its edges.
- Store the board in padded shipping material or in an anti-static board rack.
- Do not place an unprotected board on a flat surface.

BLOCK DIAGRAM



The SHB's overall dimensions are 13.345" (33.858cm) L x 5.750" (14.605cm) H. The standard cooling solution used on the SEP8253 SHBs enables placement of option cards approximately 2.975" (75.57mm) away from the top component side of the SHB. Some system integration applications using chassis such as 2U rackmount computers require lower profile cooling solutions. A low profile heat sink option is available for the SEP8253 board that allows option card placements of 1.550" (39.37mm) from the topside of the board. A low profile cooling solution usually results in a 25-30% reduction in a system's maximum operating temperature rating. Contact Trenton Systems for more information on cooling solution options for the SEP8253 system host board.

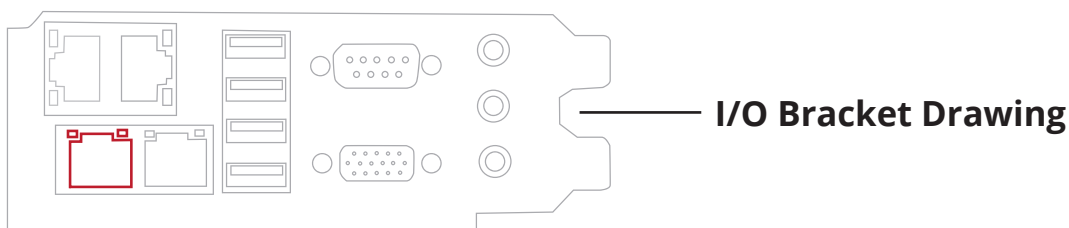
LAYOUT DRAWING (TOP)



CONNECTIONS

I/O Bracket

- **Video**
Support for up to 1920 x 1200 (WUXGA) with 8MB of video memory through the onboard ASPEED AST2400 with a DB15 connector (reference designator P4).
- **Serial Port**
Support for serial port with DB9 connector (reference designator P4).
- **Dual 1GbE**
 1. Support for two 1GbE ethernet ports through Intel i219-LM PHY using RJ-45 connectors (reference designator P7)
 - a. IPMI support is through the upper P7 connector (outlined in red below)



- **Optional Dual 10GbE**
Optional support for two 10GbE ethernet ports through Intel x557 controller using RJ-45 connectors. This optional 92-508258 board can be plugged into connector P10 on the SEP8253 processor board.
- **Audio Port**
 1. Audio codec Realtek ALC262-VD2
 2. Light blue = line in, lime = line out, pink = mic
 - a. (reference designator P8)
- **USB 3.0**
Support for four USB 3.0 connections from the Intel C622 chipset using Type A connectors (reference designator P9).

Onboard

- CPU fan power connectors (reference designators P5 and P6)
 1. 4 pin single row headers to supply +12V, ground, fan tach, and PWM control signals for the CPU fans
- Optional support for 92-8258 board that provides two 10GbE (reference designator P10)
- SATA 3
 1. Support for a single SATA III 600 port (reference designator P12)

CONNECTIONS (CONT.)

- Battery
 1. A lithium battery is provided for ten years of data retention for CMOS memory (reference designator BAT1).
 2. Caution: there is a danger of explosion if the battery is incorrectly replaced. Replace it only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.
- Debug Connector (internal use only) is reference designator P2 located on the bottom side of the board.

Backplane

- **PCIe**

The SEP8253 processor board provides 88 lanes of PCI Express gen 3 to the backplane. For a complete list of supported HDEC backplanes please contact Trenton or reference the Trenton Systems website.
- **USB 3**

Support for up to six USB 3.0 connections are provided from the Intel C622 PCH to the HDEC backplane.
- **SATA 3**

Support for up to six SATA III 600 connections are provided from the Intel C622 PCH to the HDEC backplane

JUMPERS

Onboard

- Jumper JU1 (Molex, Part #: 0015911182) is a dual-row, 18-pin jumper. Each position controls the operation of specific features.
 - CMOS Clear
 - a. Install on pins 1 and 2 to operate. Install on pins 3 and 4 to clear
 - b. Note: to clear the CMOS, power down the system and install the JU1 jumper on pins 3 and 4. Wait for at least two seconds, move the jumper back to pins 1 and 2 and turn the power on. Clearing CMOS on the SEP8253 will not result in a checksum error on the following boot. If you want to change a BIOS setting, you must press DEL or the F2 key during POST to enter BIOS setup after clearing CMOS.
 - Management Engine (ME) Recovery
 - a. No jumper install on pins 5 and 6 is the normal SHB operating mode.
 - b. Install jumper on pins 5 and 6 for one power-up cycle to force a management engine update.
 - Clear Password
 - a. No jumper installed on pins 7 and 8 is the normal operating mode.
 - b. Install jumper on pins 7 and 8 for one power-up cycle to reset the password to default (null password).
 - BIOS Recovery
 - a. No jumper installed on pins 9 and 10 is the normal operating mode.
 - b. Install jumper on pins 9 and 10 to force a Top Block Swap (Alternate Boot Block).
 - Flash Descriptor Security
 - a. No jumper installed on pins 11 and 12 enables the Flash Descriptor Security.
 - b. Install jumper on pins 11 and 12 to disable Flash Descriptor Security.
 - SPI Voltage Enable (Factory Use Only)
 - a. No jumper installed on pins 13 and 14 is the normal operating mode.
 - b. Caution: installing this jumper is required for certain factory operations. Field installation of a jumper in JU1 pin locations 13 and 14 may result in unintended system operation.
 - Pins 15 & 16 : FORCE_VRON#. No jumper installed for normal operating mode. For internal use only.
 - Pins 17 & 18: BMC Disable. No jumper installed for normal operating mode which enables BMC. Jumper installed to disable BMC.

PROCESSOR OPTIONS

The SEP8253 HDEC board supports dual socket LGA-3647 socket P 1st or 2nd generation Intel Xeon Scalable processors (code name Skylake-SP and Cascade Lake-SP) up to 125W per CPU.

Below is a list of suggested, long-life (10+ year availability) processors. To see a full list of supported Skylake-SP and Cascade Lake-SP CPUs please reference the Intel website.

Processor	Max DDR4 Speed	Base Clock Speed	Cores / Threads	Cache	Long-life availability	Max thermal design power (TDP)
Gold 6238T	2933MHz	1.9GHz	22C/44T	30MB	Yes	125W
Gold 6230	2933MHz	2.1GHz	20C/40T	28MB	Yes	125W
Gold 6226	2933MHz	2.7GHz	12C/24T	19MB	Yes	125W
Gold 5218T	2666MHz	2.1GHz	16C/32T	22MB	Yes	105W
Gold 5215	2666MHz	2.5GHz	10C/20T	13.75MB	Yes	85W
Silver 4216	2400MHz	2.1GHz	16C/32T	22MB	Yes	100W
Silver 4215	2400MHz	2.5GHz	8C/16T	11MB	Yes	85W
Silver 4214	2400MHz	2.2GHz	12C/24T	17MB	Yes	85W
Silver 4210	2400MHz	2.2GHz	10C/20T	14MB	Yes	85W
Silver 4209T	2400MHz	2.2GHz	8C/16T	11MB	Yes	70W
Gold 6138	2666MHz	2.0GHz	20C/40T	27.5MB	Yes	125W
Gold 6130	2666MHz	2.1GHz	16C/32T	22MB	Yes	125W
Gold 5120T	2400MHz	2.2GHz	14C/28T	19.25MB	Yes	105W
Gold 6126T	2666MHz	2.6GHz	12C/24T	19.25MB	Yes	125W
Silver 4109T	2400MHz	2.0GHz	8C/16T	11MB	Yes	70W
Gold 6128	2666MHz	3.4GHz	6C/12T	19.25MB	Yes	115W

Note that certain CPU SKU's support Optane persistent memory. Please contact Trenton or reference the Intel website for further details.

MEMORY OPTIONS

The SEP8253 HDEC board supports eight channels of DDR4 up to 1024GB max. Each CPU has 4 standard DIMM sockets (8 sockets total) directly connected (see block diagram for details). Trenton recommends ECC registered DDR4 memory modules for use on the SEP8253.

Memory Population Sequence

Number of DIMMs	CPU0	CPU1
1	BK0	
2	BK0	BK4
3	BK0, BK1	BK4
4	BK0, BK1	BK4, BK5
5	BK0, BK1, BK2	BK4, BK5
6	BK1, BK1, BK2	BK4, BK5, BK6
7	BK0, BK1, BK2, BK3	BK4, BK5, BK6
8	BK0, BK1, BK2, BK3	BK4, BK5, BK6, BK7

Note that certain Intel CPU's support Optane DC persistent memory. Please contact Trenton or visit Intel's website for further information.

CHIPSET

The SEP8253 HDEC board has the Intel C622 (Lewisburg) chipset. To see a full description of the C622 chipset please reference the Intel website.

BIOS

AMI Aptio™ V supports a UEFI BIOS firmware on the SEP8253. For more information please contact Trenton.

IPMI MANAGEMENT & SECURITY

ASPEED AST2400 BMC supporting for IPMI 2.0, TPM 2.0 support via Infineon SLB9665. Please contact Trenton for more information on IPMI support.

WATCHDOG TIMER

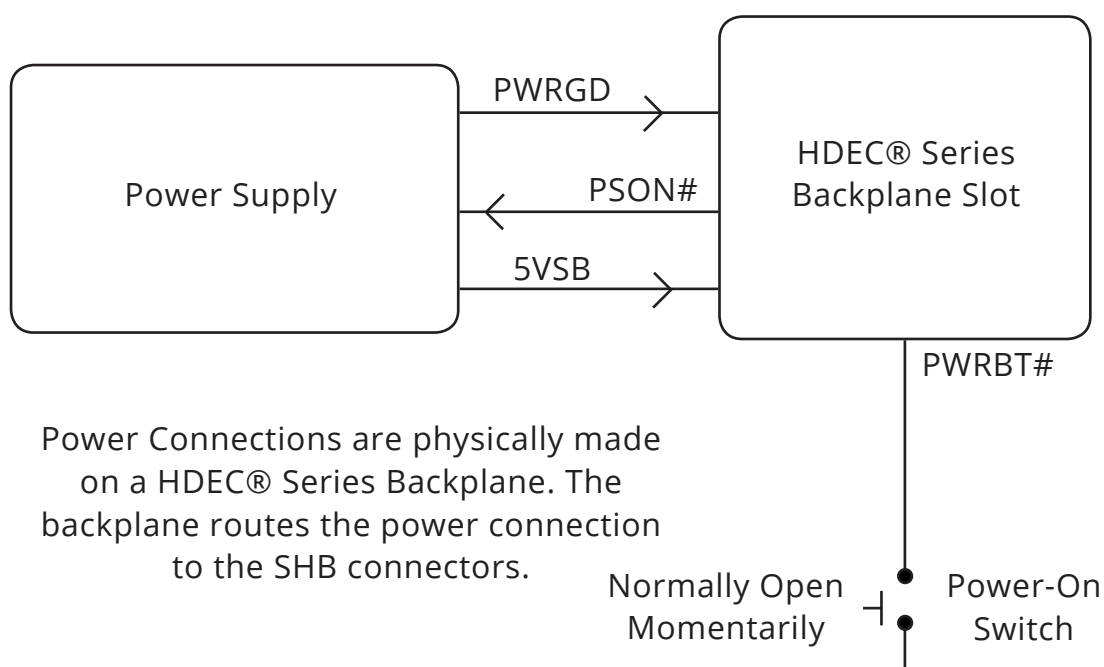
The SEP8253 provides a programmable Watchdog Timer with 7 programmable timeout periods ranging from 32 msec to 32 seconds. Please contact Trenton for more information on Watchdog Timer.

POWER REQUIREMENTS

Processor	Typical Values (static desktop)			Typical Values (100% stress state)			Memory Used
	5V	12V	3V	5V	12V	3V	
Gold 6230	3.54A	1.75A	7.46A	3.77A	2.05A	32.3A	8x16GB DDR4-2933
Silver 4216	3.92A	1.76A	8.94A	3.66A	2.08A	25.55A	8x16GB DDR4-2400
Gold 6130	2.53A	1.59A	6.05A	2.81A	1.96A	28.63A	8x16GB DDR4-2666
Gold 6126T	2.50A	2.23A	5.84A	2.85A	2.63A	28.44A	8x16GB DDR4-2666
Gold 6128	2.60A	2.20A	4.58A	2.56A	2.48A	25.16A	8x16GB DDR4-2666

Power Supply and SHB Interaction

The following diagram illustrates the interaction between the power supply and the processor. The signals shown are PWRGD (Power Good), PSON# (Power Supply On), 5VSB (5 Volt Standby) and PWRBT# (Power Button). The +/- 12V, +/-5V, +3.3V and Ground signals are not shown.



PWRGD, PSON# and 5VSB are usually connected directly from an ATX or EPS power supply to the backplane. The PWRBT# is a normally open momentary switch that can be wired directly to a power button on the chassis.

POWER REQUIREMENTS (CONT.)

CAUTION: In some EPS systems, the power may appear to be off while the 5VSB signal is still present and supplying power to the SHB, option cards and other system components. The +5VAUX LED on a Trenton HDEC® backplane monitors the 5VSB power signal; “green” indicates that the 5VSB signal is present. Trenton backplane LEDs monitor all DC power signals, and all of the LEDs should be off before adding or removing components. Removing boards under power may result in system damage.

ACPI Connection

The diagram on the previous page shows how to connect an ACPI compliant power supply to the SEP8253. The following table shows the required connections that must be made for soft power control to work.

Signal	Description	Source
+12	DC voltage for those systems that require it	Power Supply
+5V	DC voltage for those systems that require it	Power Supply
+3.3V	DC voltage for those systems that require it	Power Supply
+5VSB	5 Volt Standby. This DC voltage is always on when an ATX or EPS type power supply has AC voltage connected. 5VSB is used to keep the necessary circuitry functioning for software power control and wake up.	Power Supply
PWRGD	Power Good. This signal indicates that the power supply's voltages are stable and within tolerance.	Power Supply
PSON#	Power Supply On. This signal is used to turn on an ATX or EPS type power supply.	SHB/Backplane
PWRBT#	Power Button. A momentary normally open switch is connected to this signal. When pressed and released, this signals the SHB to turn on a power supply that is in an off state. If the system is on, holding this button for four seconds will cause the SHB's chipset to shut down power supply. The operating system is not involved and therefore this is not considered a clean shutdown. Data can be lost if this situation occurs.	Power Button

TEMPERATURE / ENVIRONMENT

- Operating Temperature: 0-50°C with standard cooling solution and 350LFM of continuous airflow.
- Storage Temperature: -40°C to 70°C
- Humidity: 5% to 90% non-condensing



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