GROUND SYSTEMS

NAVAL SYSTEMS

AIRBORNE SYSTEMS

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COMPUTING ENGINES

GENERAL MICRO SYSTEMS, INC.
POWERING THE EMBEDDED MARKET SINCE 1979

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OIL AND GAS EXPLORATION

MEDICAL SYSTEMS & RESEARCH

MINING EXPLORATION

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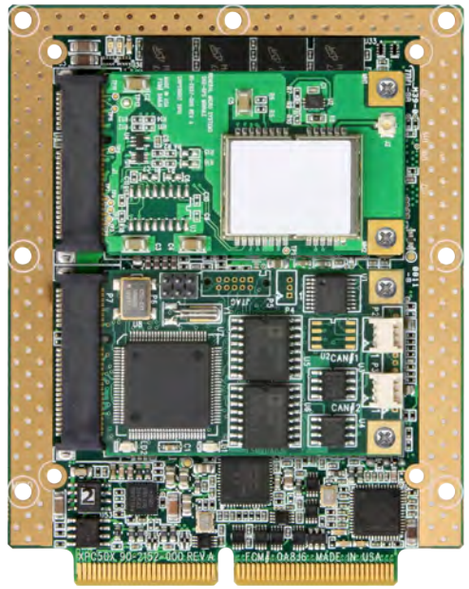

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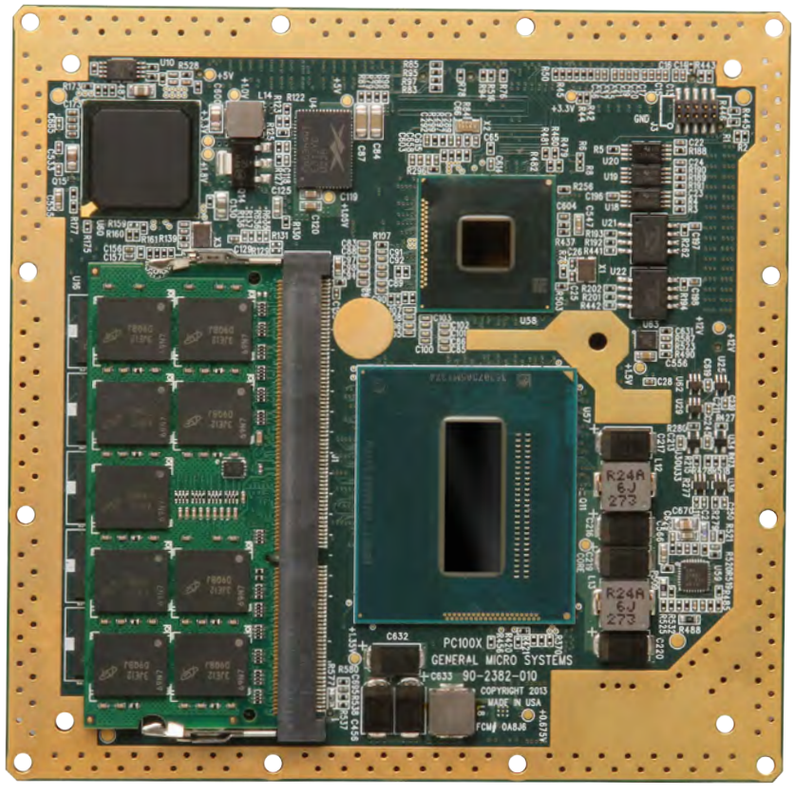


"POSEIDON" PG50X

Rugged, Ultra-Small, Ultra-Low-Power Intel ® Atom™ Quad Core SBC

- 2.0 GHz Intel® Atom™ Quad Core processor with 2MB of L2 Cache
- Up to 4GB of 133MHz DDR3 SDRAM with ECC
- One Gigabit Ethernet port with TCP/IP offloading engine
- Support for two SAM™ sites for custom I/O (MIL-STD-1553, Wi-Fi/BT, GPS, etc...)
- Up to 1TB of onboard SSD (Lose one SAM™ Site)
- One SATA (3Gb/sec) port for external storage devices
- High performance dual head graphics with 2D and 3D acceleration
- Supports DVI-D/HDMI video with resolutions up to 1280x1024 @ 85Hz
- Display Port or Embedded Display Port (eDP) for direct connection to LCD displays
- Three USB 2.0 and one USB 3.0 ports
- Full HD-Audio support with headset support
- One Serial port with RS-232/422/485 support
- Two x1 PCI Express lanes for user I/O expansion
- Five buffered General Purpose I/O lines
- Dual 8MB BIOS boot device with write-protect
- Full power management control for Sleep/Hibernate operation
- CPU temperature and voltage monitoring with status LED indicators
- Reset and power On/Off switch with suspend support
- Support for Windows®, Linux® and VMware®

"CHRONOS" PB100X

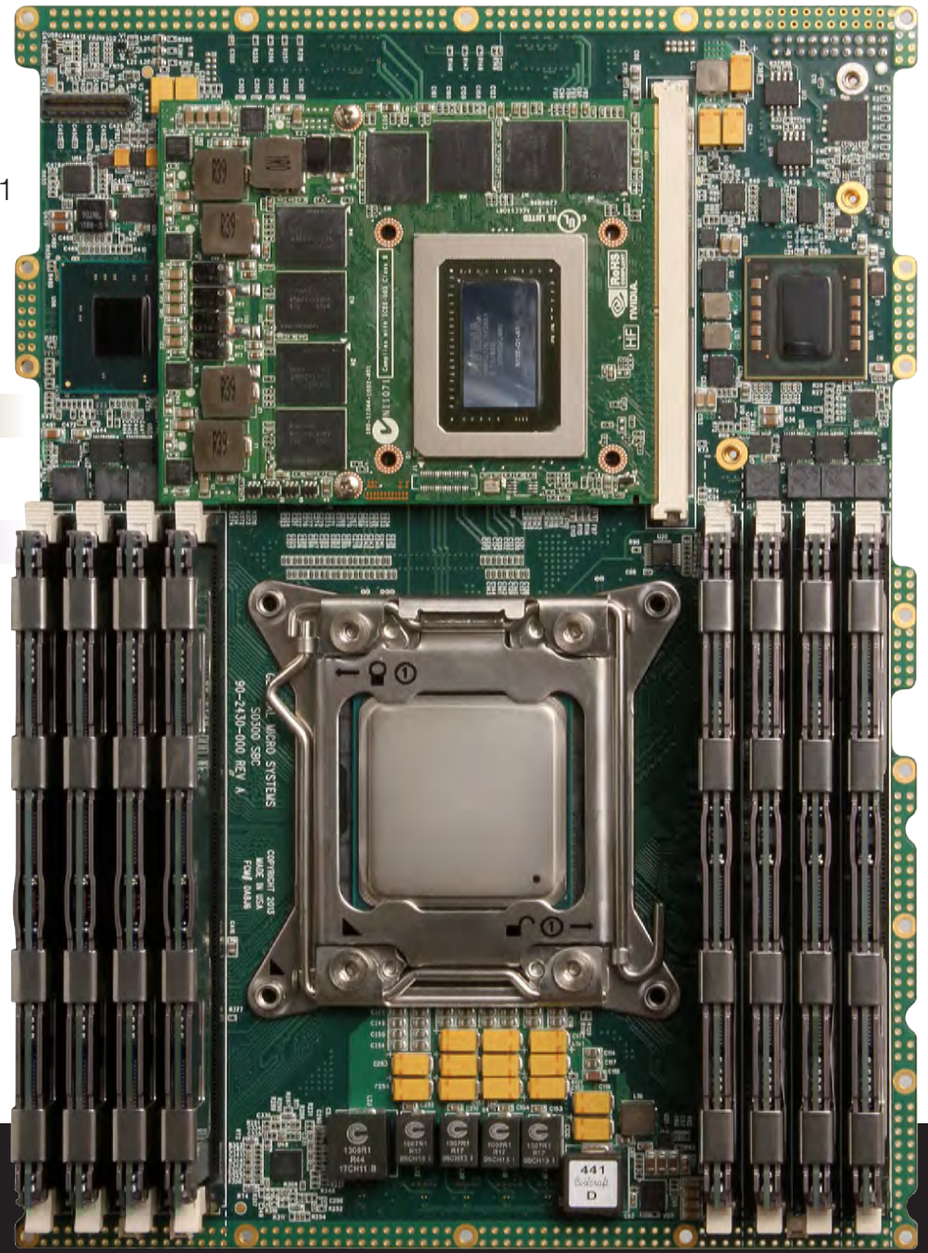
Ultra-Small, High Performance, Intel ® Quad Core™ i7 SBC

- Drop-in replacement for PC80x (Penryn) and PC90x (Dual/Quad Core™ i7) SBC
- Up to 2.4GHz Intel® Quad Core™ i7 Haswell processor with 6MB of L2 Cache
- Up to 32GB of 1600MHz DDR3 memory with ECC
- Three Gigabit Ethernet ports with TCP/IP Offloading Engine
- Four USB 3.0 and ten USB 2.0 ports
- Three Display Port and one VGA port
- Six SATA 6Gb/sec ports and full HD-Audio support
- Six x1 PCI Express lanes and three x4 PCI Express lanes
- Dual 8MB BIOS boot devices with write-protect
- Support for Active Management Technology (AMT) for remote KVM functions
- Supports Intel Virtualization Technology (VT-x/VT-d2) for best performance
- Full power-management control for sleep/hibernate operation
- CPU temperature and voltage monitoring for safe operation
- Extensive Built-In-Test (BIT) and Extended BIT (EBIT) for diagnostics
- Support for Windows®, Linux® and VMware®
- Ultra-low power requirements - as low as 25W total

ORANGE SERIES SYSTEMS *175W MAX*

SMART DISPLAYS

ACCESSORIES



70% of actual size. ▶

“ZEUS” PO300X

Rugged, High Performance, 10-Core Intel® Xeon® Ivy Bridge-EP SBC

- Utilizes Intel® Xeon® Ivy Bridge-EP CPU with 10 cores, each operating up to 2.4GHz
- Support for Hyper-Threading on each core for total of 20 logical cores
- Supports up to 128GB of DDR3 memory with ECC, up to 1600 MT/s
- 25MB unified instruction/data cache, shared between cores (2.5MB/Core)
- One mSATA SSD with write-protect and secure-erase for OS boot up to 1TB
- Highest performance, full size, embedded GPU module from Nvidia® (Optional)
- Supports dual Display Port/HDMI ports and one RGB Video
- Dual 10Gigabit Ethernet ports with TCP/IP Offloading Engine (TOE)
- Quad USB 3.0 ports for high-speed I/O devices with power
- Full HD-Audio support with 1W mono amplifier
- Two USB 2.0 ports, two Serial ports with RS-232/422/485 and eight buffered GPIO
- One Gigabit Ethernet port or one COM port for system Health Monitoring
- Intel® Virtualization Technology (VT-x/VT-d2) and Trusted Execution Technology (TXT)
- Trusted Platform Module (TPM) for secure operation (Optional)
- Support for Active Management Technology (AMT) for remote KVM functions
- Converged Platform Power Management (CPPM) for power saving
- Baseboard Management Controller (BMC) for health monitoring/reporting (IPMI 2.0)
- Dual 8MB BIOS boot devices with write protect
- Real Time Clock (RTC) with field replaceable battery
- Tamper-proof hardware with secure-erase

ABOUT GMS

Since its inception in 1979, General Micro Systems, Inc. (GMS) has been true to its Mission Statement:
"To Become the World's Leading *Technology Independent* Supplier of Computing Engines, while Providing the Best *Price/Performance*, Quality and Customer Support, Demanded by Our Current and Our Future Customers."

But what does "Technology Independent" mean? And how do you measure "Price /Performance"?
These are two of the questions often asked by our customers.

To be Technology Independent, GMS has an operational model that requires utilization of the best CPU technology available from ANY supplier in the market. Unlike most other computer manufactures, GMS does not make commitments to a given processor company. Since 1979, GMS has deployed over 40 different CPU technologies, from the very first Intel® 4004/8008 microprocessor, to the Rockwell® PPS-4/8, Rockwell/MOS Technology® 6502, Zilog® Z80, Motorola® 6800/6810/6820/6830/6840/6860, Sun Microsystems SPARC®, Motorola Power PC® and currently the Atom™, Core™ i7 and Xeon® processors from Intel®. The criteria used to select the CPU are based on a simple formula: The "Bang"-per-Watt. The "Bang"-per-Watt is defined as the processor's aggregate performance divided by product of the "real estate" and power it requires. Using this metric allows GMS' system engineers to optimize our Computing Engine designs to be the most "efficient" processing sub-systems in the embedded computing market. For some systems, this approach results in the lowest power-consuming product, and for others the highest performance. However, the primary objective is not necessarily to be the lowest power or the highest performance, but rather to be the most "efficient" engine that can be produced with the current technology.

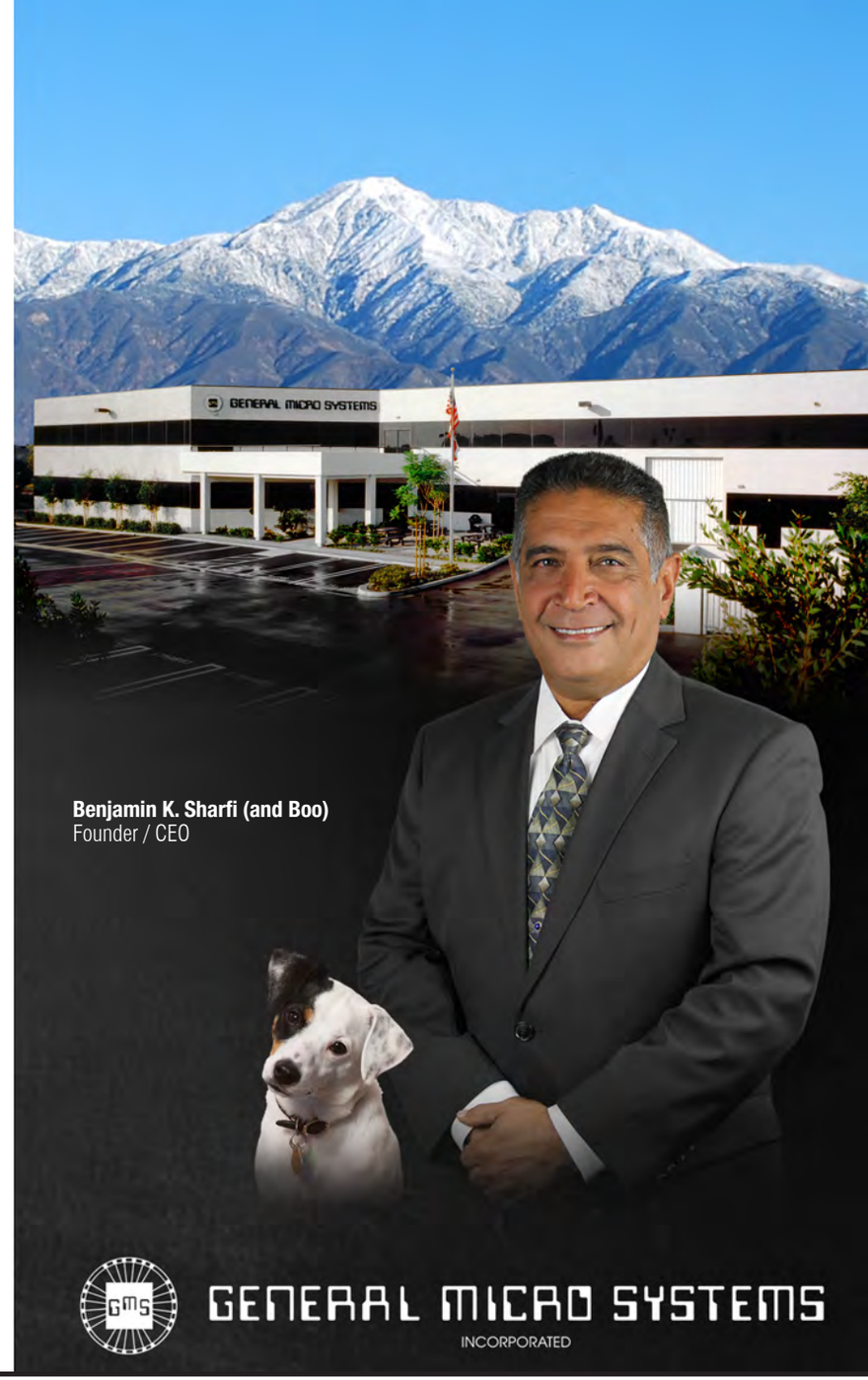
Once the processor technology is selected, the challenge is to maximize the Computing Engine's performance while achieving the lowest cost available in the market. For over 30 years GMS has been the Price/Performance champions of the market. GMS has broken nearly every price barrier established by the "Big Boys" and has demonstrated that a quality product can be produced in the USA at an affordable price without cutting corners, and with outstanding customer support. Furthermore, GMS does not compete with its customers, because GMS provides only the Engine to power the final solution.

This unparalleled commitment to technology and innovation has earned GMS the highest level of respect from our customers, the media, and even the competition. GMS has been recognized by the media for its innovations and has been awarded more 'Product of the Year' awards than all competitors COMBINED. A few noteworthy GMS innovations are: The Mezzanine concepts of the Special Application Module (SAM™) I/O, CPU Carriers, VME Interface silicon, Intel® processors on VME, MicroSparc, and Multiple CPUs on an SBC, as well as the latest product offering - the SB1002-MD "Golden-Eyes", where two independent domains are housed in one system to allow Multiple Independent Levels of Security (MILS) and compliance to High Assurance Platform (HAP).

Not only has GMS demonstrated superiority in hardware design, but also in software support. GMS software engineers are experts in a wide variety of languages and operating systems, as well as experts in software development for embedded microprocessors and microcontrollers and system BIOS development. Over the past three and a half decades, GMS systems have included support for over 30 operating systems and associated custom drivers, including the unique VME/IP, which provides TCP/IP over VME to eliminate the "Endian Issue" and Real-time Asynchronous Multi Processing (RAMP), which allows several processors in a VME card cage to work simultaneously on a single task. Today, GMS products supports all the major OSs, such as Windows®, Linux® and VMware®. In addition, the system BIOS for all GMS products is generated and maintained in-house, as are all Linux®, Windows® and VMware® Board Support Packages (BSP), thus providing consistency and uniformity across all platforms. This level of control over BIOS, boot loaders and operating system drivers allows GMS to provide our customers with the option of customizing software and firmware elements of our products to meet their specific needs, with minimal cost and minimum time to market.

With this level of knowledge and expertise, GMS is able to own its own technology from the hardware to the software, which is what truly distinguishes GMS from the competition.

General Micro Systems is in its 35th year in the embedded computing market and is the oldest supplier of embedded computers in the world. GMS is proud to be able to continue to outpace the market with innovations and products that have left their mark on the industry, and will for years to come. Furthermore, GMS will always strive to provide customers with the solutions they need to stay ahead of their competition - at the lowest possible price without compromising on quality or customer service!



QUALITY STATEMENT

General Micro Systems, Inc. promises innovative, quality products and excellent customer service, as reflected in our Quality Policy:

"We at GMS are fully committed to providing products that conform to our customers' requirements the first time, every time, all the time by continuously maintaining a quality improvement process that achieves total customer satisfaction."

In order to do this we have embedded an awareness of quality in our organizational processes at all levels, per Total Quality Management (TQM). Through management review of our Quality Management Systems, we continually improve our processes, products and services to satisfy our customers' changing needs.

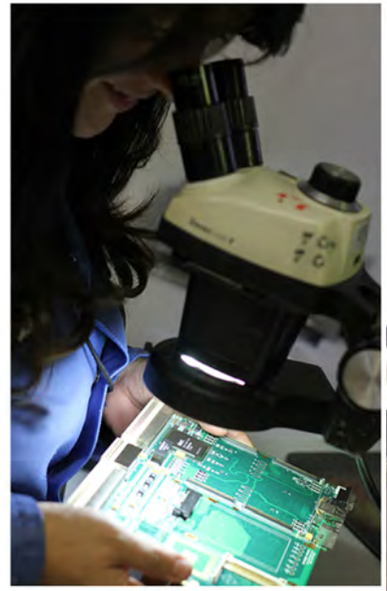
To conform to our customers' requirements for product longevity, both availability and support, GMS designs our computing engines using Mobile and Low Power processor technologies from Intel ISG (Intelligent Systems Group) , and Server processor technologies from Intel DCG (Data Center Group). These processors technologies come with guaranteed availability of a minimum of seven years.

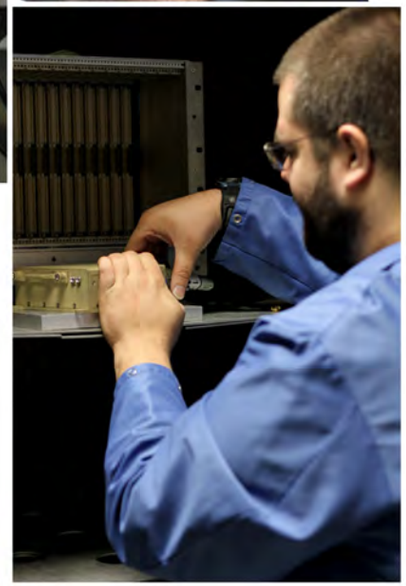
GMS is registered and certified to internationally recognized ISO 9001:2008 since 1999. With our growing involvement in military and aerospace programs, our quality system exemplifies the highest standard of AS-9100C, assuring that we maintain consistently high standards that allow General Micro Systems' products to meet and exceed the growing quality requirements of the aerospace, medical and military markets. For example, we provide separate product lines for RoHS and non-RoHS to support different customers' requirements. Because our ultimate goal is customer satisfaction, their requirements come first. We believe that quality starts and ends with our customers and we strive to always satisfy their needs. This is reflected in our business flexibility as individuals and as a company.

To engage the TQM philosophy, quality originates with our staff commitment to the best products and best customer service – always. Through an active mentoring and training system, we make sure the staff has the knowledge and skills necessary to be effective. Our employees are empowered to take responsibility for their actions, which contributes to better total quality and success of the company. The built-in quality in our products allows GMS' products to be more competitive and our fast growing company is the best proof.

In fact, we build special relationships every day with our customers, as well as, our suppliers. GMS customers, suppliers and employees work together as a team, and the combined effort ultimately benefits everyone.

Udi Levin
President





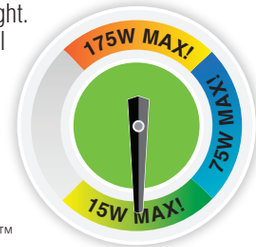
Walt Otto
VP of Engineering

SYSTEMS THAT MATCH PERFORMANCE TO YOUR PROGRAM'S PACKAGING REQUIREMENTS

As rugged systems requirements become more demanding, it is critical to have the ability to select different packaging options in order to achieve the optimal result. GMS, which continues to define the industry's direction in the design and manufacture of board and system-level products, has taken the lead on this concept with three series of system offerings that comprise the very latest in embedded computing technology.

GMS systems are targeted for applications where traditional VPX/VME/cPCI ATR packaging (card cage, power supply, fan trays, etc.) can not be considered due to size, weight, cost or other limiting factors. GMS systems pack the most performance with the lowest power consumption in the smallest package possible. All of our systems use only embedded devices to provide long life cycles, and to withstand harsh environmental conditions for MIL/Aero applications - meeting MIL-STD-810G, MIL-STD-1275D, MIL-STD-901D, MIL-STD-461E, DO-160D and IP67, to name a few.

Our products are broken down into the following performance categories:



GREEN SERIES SYSTEMS are designed to be the smallest, lowest-power, and lightest weight. These computers utilize ultra-low-power consuming CPUs and support devices to achieve total system power usage of 15 watts or less. The latest GREEN systems incorporate the Intel® Atom™ Bay Trail quad core processor for the best performance to power ratio of any CPU on the market - with up to 8GB of RAM, high-speed I/O and limited expansion for custom I/O functions. These systems support a wide range of functionality from Power over Ethernet (PoE), Gigabit Ethernet, USB 3.0, Display Port/embedded Display Port, fully sealed removable nDrives™ and more. GREEN SERIES systems are ideal for UAV and hand-held applications, where weight and heat are the primary considerations. The GREEN SERIES Engines are also available in the RuggedView™ display series for applications that require low-power and low-cost smart display solutions.

BLUE SERIES SYSTEMS are designed to meet more demanding applications where powerful multi-core processors with up to 32GB of RAM, vast standard and custom high-speed I/O, and a high degree of modularity are required from a system designed for maximum power dissipation of 75 watts or less. These systems offer standard I/O interfaces such as PMC/XMC, and Special Application Modules (SAM™) for highest efficiency I/O, as well as high-speed I/O such as 10Gigabit Ethernet, SATA 3 at 6 Gigabits/sec, USB 3.0, Display Port/embedded Display Port, and much more. The BLUE series also provides the widest selection of storage configurations, from fully sealed removable nDrive™, mSATA for on-board storage, 2.5" fixed/removable SSDs to a removable canister storage with up to 8TB! The BLUE SERIES engines are also available in the RuggedView™ display series for applications that require powerful smart displays with modularity and extensive functionality. This series contains the widest product offering, and can provide solutions for applications that require functionality beyond the typical embedded computer, such as multi-channel HD-DVR, FPGA integration, high-end graphics processing, and secure virtualization, among many others. BLUE systems are ideal for embedded computing applications with moderate-to-high CPU needs but limited cooling options for long-term defense and industrial programs which require extended roadmaps for technology upgrades. BLUE systems are based on a foundation of sixteen years of development and production of small, rugged computing systems for this industry, and have roadmaps out to 2022.

ORANGE SERIES SYSTEMS represent a brand new concept in system engineering that GMS is pioneering. These systems in this series are designed with server class Intel® Xeon® chipsets that support 10-Core server class processors, and include up to 128GB of ultra-high-performance memory. With a power envelope of 175 watts, ORANGE systems provide extensive I/O capabilities, such as PMC/XMC, Special Application Modules (SAM™) for highest efficiency I/O, SamVideo™ for ultra-high-performance graphics, as well as high-speed I/O like 10Gigabit Ethernet, SATA 3 at 6 gigabits/sec, USB 3.0, PCIe Gen3, and many more. ORANGE systems are ideal for headless network servers or virtual machine systems hosting six to eight independent operating systems "images", each with a specific mission. Each "image" may have its own bootable drive or share one drive array, RAID or NAS. These systems are designed to save a significant amount of power/heat, weight, and complexity, and significantly reduce costs of installation, daily operation and technology upgrades!

PACKAGING OPTIONS

In conjunction with GMS's ruggedization levels R1 to R5, there are three types of packaging options for each of the GMS products. The Green, Blue and Orange series are defined by the computing engine used, as the same computing engines is utilized throughout a given series. The difference between the various COTS products of a series is the tailoring of the packaging for different applications and industries. The packaging of a system is identified in that product's model number – by the last two digits.

The **'-01'** packaging is designed to provide the lowest possible cost and lightest weight. This packaging utilizes standard computer industry I/O interconnects such as DB-9, RJ-45 and Type A USB connectors. This packaging is the most economical and provides the most cost effective way to realize off-the-shelf I/O without compromising performance. This packaging is intended for use in environments that require ruggedization levels up to GMS level R3.

The **'-05'** packaging is designed with a single, sealed MIL-grade connector that is used to "fan-out" all I/O signals from the system. This approach saves significant cost relative to interconnects, while reducing the volume and weight of the system. However, '-05' packaging is not submersible, and the connectors do not support high mate/de-mated cycles. This level of ruggedization does provide protection against harsh environmental condition such as rain and sand, and is intended for use in environments that require ruggedization levels up to GMS level R4.

The **'-02'** packaging is designed to be fully sealed, submersible, and to meet the harshest of environments. This level of packaging utilizes sealed circular MIL connectors and heavy gaskets to assure a full environmental seal. All systems with '-02' packaging are intended for use in environments that require ruggedization levels up to GMS level R5.

RUGGEDIZATION LEVELS

In an effort to optimize customer satisfaction and the COTS availability of our products, GMS has defined five levels of ruggedization (R1-R5). These ruggedization levels are based on four characteristics: Shock rating, vibration rating, temperature range, and ingress protection (IP). These ruggedization levels are distinct from our packaging options. In other words, these R1-R5 levels can be used in conjunction with various levels of packaging that range from fully sealed for submersion to commercial interconnects for less expensive solutions.

Rugged Level I (R1) represents the commercial level of ruggedization. R1 systems are designed for applications that require a rugged computer, but cannot do with just any off-the-shelf ruggedized PC. This rugged level offers the lowest levels of shock, vibration, temperature, IP and cost.

Rugged Level II (R2) represents the next level up from the commercial level of ruggedization. R2 systems are designed for applications that require a little more shock, vibe, and IP, and also an extension of the low temperature specification. The deployment of these systems is often implemented such that they are located inside another more rugged enclosure.

Rugged Level III (R3) represents the "middle-of-the-road" option for ruggedness. R3 systems are designed for applications that require a rugged computer, but the full ruggedization is either unnecessary or cost prohibitive. R3 offers an optimized price-point for system ruggedization.

Rugged Level IV (R4) represents one level down from a fully ruggedized system. R4 systems are designed for applications that essentially need maximum ruggedization, but for which the cost of full ruggedization is prohibitive. The only differences between R4 and R5 are vibration and IP levels.

Rugged Level V (R5) represents the highest level of ruggedization that GMS has to offer. R5 provides the highest levels of shock, vibration, and temperature range, in a fully sealed submersible package.

Rugged Levels	R1	R2	R3	R4	R5
Shock	20g	20g	52g	100g	100g
*** Vibrations**	.0001g2/Hz	.0008g2/Hz	.03g2/Hz	.03g2/Hz	.1125g2/Hz
Temperature	0°C to +55°C	-20°C to +55°C	-20°C to +75°C	-40°C to +85°C	-40°C to +85°C
IP Levels	54	64	64	66	67

*** Vibration frequency for systems not including drives are tested between 5Hz and 2000Hz**

RUGGEDCOOL™ TECHNOLOGY

All General Micro Systems' products are equipped with GMS' patent pending RuggedCool™ technology, which is the most unique cooling system in the industry. This one-of-a-kind cooling technology is the only method that allows systems using Intel-based CPUs with a TjMax of 105°C to operate in an industrial temperature environment (-40°C to +85°C) at full operational load - without throttling the CPU!

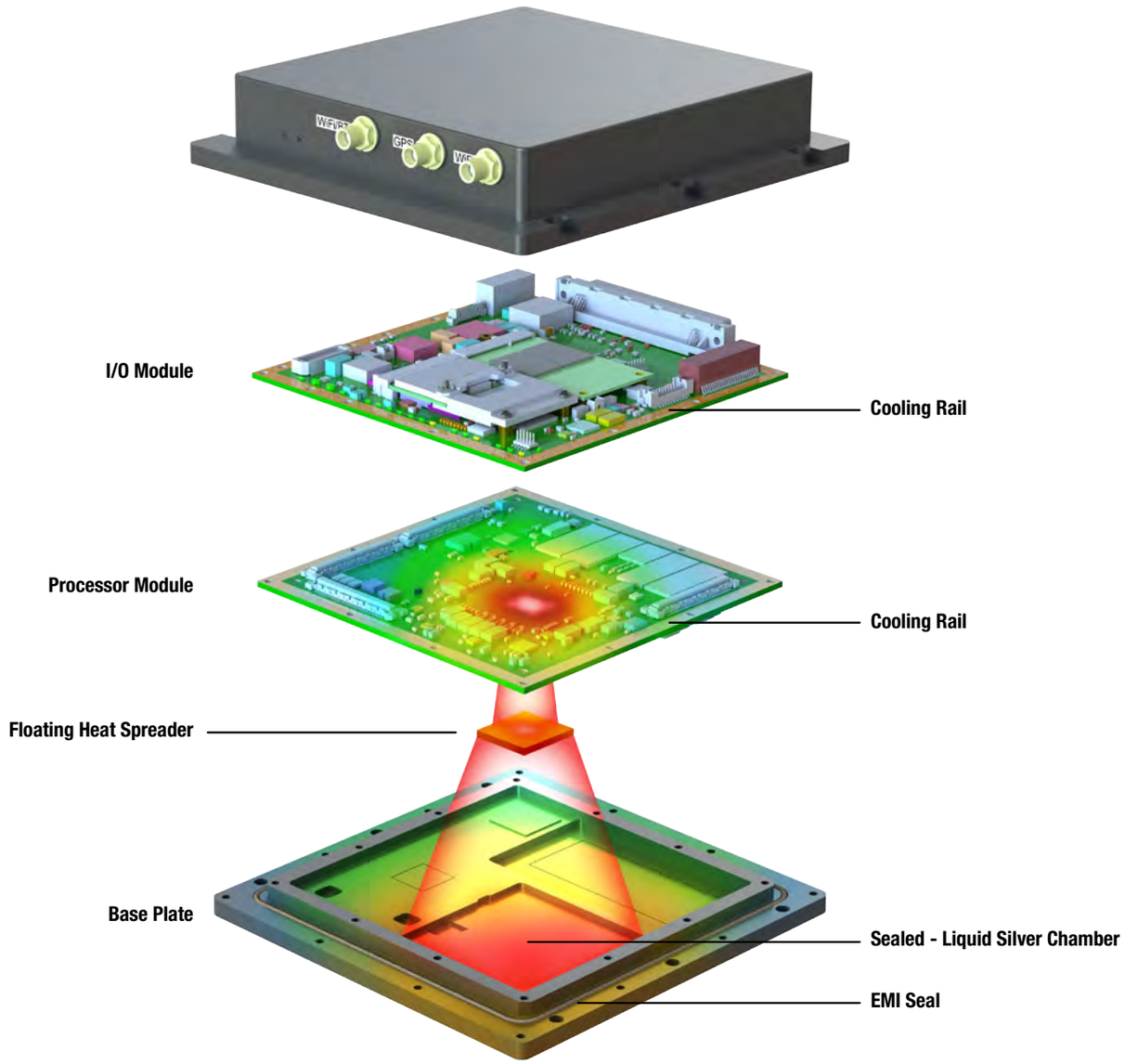
Instead of using thermal gap pads to conduct heat from the CPU to the system's interface to the cold plate, as is done by all other rugged computer system manufacturers, GMS uses an exclusive technology that employs a corrugated alloy slug with an extremely low thermal resistance to act as a heat spreader at the processor die. Once the heat is spread over a much larger area, a liquid silver compound in a sealed chamber is used to transfer the heat from the spreader to the system's enclosure. This approach yields a temperature delta of less than 10°C from the CPU core to the cold plate, compared with more than 25°C for other manufacturers' systems.

Shock and Vibration

Another advantage of RuggedCool™ technology is its effect on shock and vibration. With this technology, the CPU die does not make direct contact with the system enclosure, but rather connects via a liquid silver chamber which acts as a shock absorber. This shock absorber prevents shock from being transferred from the enclosure to the FCBGA (Flip Chip Ball Grid Array), thus saving the CPU from micro-fractures, which in time cause the CPU to fail. This added thermal valve for GMS cooling allows any GMS system to operate at higher shock and vibration specifications than any other system manufacturer. This unique cooling system results in the best thermal and shock/vibration specification in the industry. The US Army has deployed thousands of units of the Golden-Eye III in vehicles for the Army's Warfighter Information Network – Tactical (WIN-T).

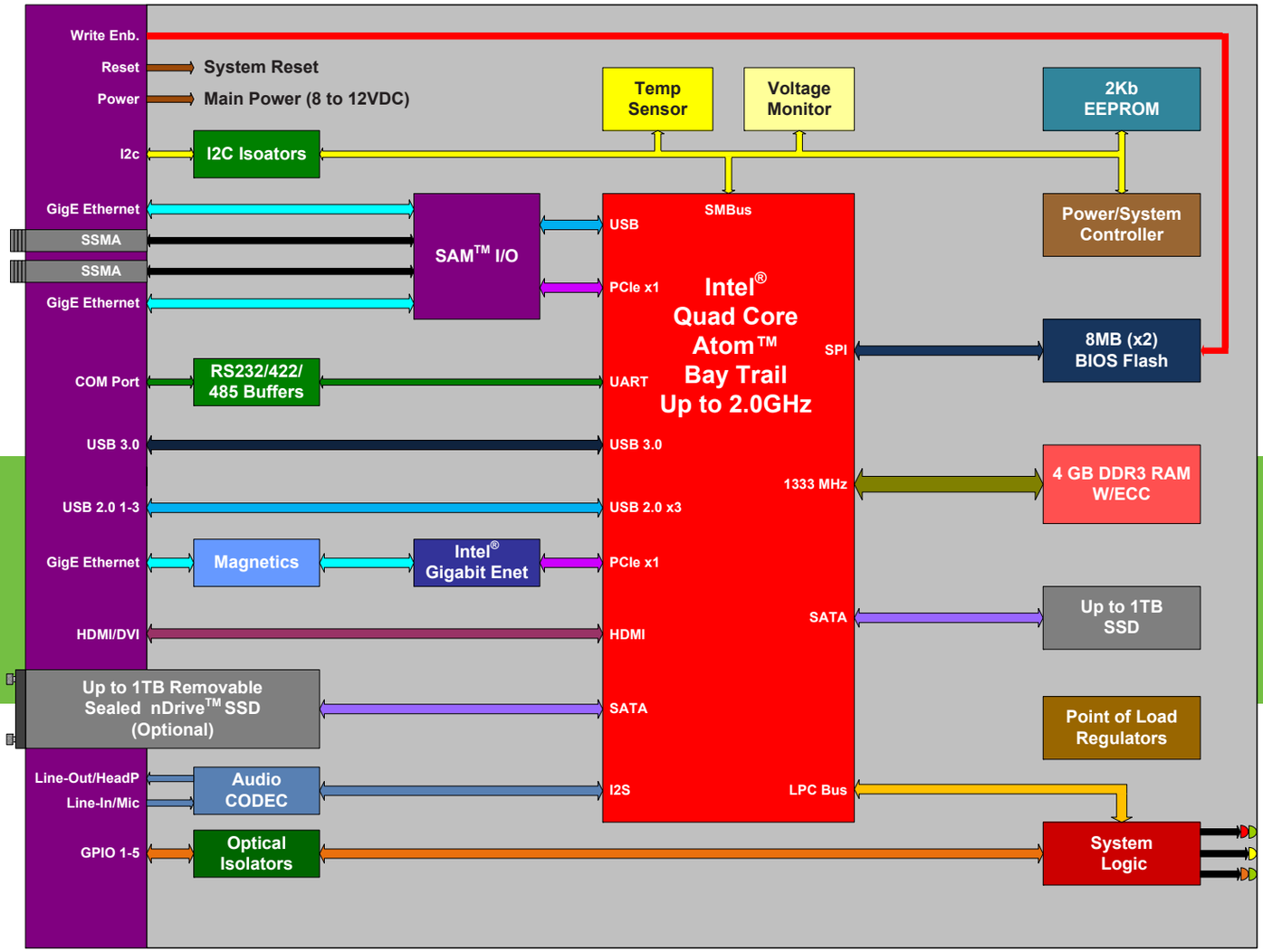
Conduction Cooled From the Ground Up

Another distinct element of GMS' cooling approach is that each electronics module in the system is designed from the ground up to be conduction cooled and to meet rugged MIL standards, such as MIL-STD-810G, MIL-S-901D, MIL-STD-1275E, MIL-STD-461F and DO-160D, to mention a few. All other manufacturers take commercial hardware, such as PC-104® and COM Express®, and add cooling plates in order to produce conduction-cooled systems. This results in poor cooling and poor ruggedness performance. In this approach, heat-producing devices other than the CPU are cooled by the CPU's thermal conduction path. This is in direct opposition to the desired goal of drawing heat away from the CPU! Also, all GMS products include printed circuit boards that utilize multiple power and ground planes, with specific design techniques for optimizing the heat flow from the CPU and other high-power dissipation devices to the system's enclosure. For more information about how this technology works, contact a GMS representative and request a demonstration.



"MAKO" SG501

Low-Cost, Rugged, Ultra-Low-Power System



- Ultra small, low cost, fan-less system
- Standard off-the-shelf PC connectors
- Up to 2.0GHz Intel® Quad Core Atom™ processor with 2MB of L2 Cache
- Up to 4GB of 1333MHz DDR-3 SDRAM with ECC
- Up to 1TB high speed SSD for OS Boot
- Up to 1TB of sealed, removable nDrive™ for user storage (Optional)
- One Gigabit Ethernet port with onboard Magnetics
- One HDMI port for high-performance graphics with 2D/3D acceleration
- One USB 3.0 port with power for high speed I/O
- Three USB 2.0 ports with power
- One Serial Port with RS-232/422/485 support and five optically isolated GPIO lines
- One SAM™ site for custom I/O (Dual GigE, Wi-Fi, CANBus or user I/O)
- Full HD-Audio support with onboard 1W mono amplifier
- One isolated I2c bus for additional sensors and low cost user I/O
- Real Time Clock (RTC) and 3 timers
- Extensive Built-In Test (BIT) and Extended BIT (EBIT) for diagnostics
- Pass/Fail, Power Good, and user LED indicators
- 8MB of BIOS/user Flash and 256B of FRU EEPROM
- CPU temperature and voltage monitoring for safe operation
- Onboard Power Supplies for single 8-12VDC input power
- External Power Conditioning Module (ePCM) for dirty power 16-36VDC (Optional)
- Available in solar-powered version for true stand-alone operations
- Support for Windows®, Linux® and VMware®
- Ultra-low SWaP only 5.5" x 3.5" x 1.7" @ 2 lbs. and under 10W average
- CE Mark and FCC compliant
- Operates at standard temp. 0°C to +55°C or extended temp. -20°C to +75°C
- Available in GMS ruggedization levels R1-R3

General Description

The SG501 "Mako" is a low-cost, rugged, ultra-low-power, lightweight, Intel® Quad Core Atom™-based computer system utilizing standard PC I/O connectors for ease of use and lower cost. It is designed to provide the lowest power consumption possible in a fully ruggedized conduction-cooled module, operating from -20°C to +75°C (0°C to +55°C standard). The Mako is targeted for applications where an ultra-low-power, low-cost rugged computer is needed to provide the best possible performance per dollar and per watt, utilizing standard PC interconnects to provide easy interconnect to system I/O and user I/O.

The Mako utilizes the Intel® Quad Core Atom™ processor with 2MB of L2 cache operating at 2.0 GHz and deep sleep capabilities for ultra-low power consumption when not active. To harvest this incredible CPU performance, the CPU is coupled with up to 4GB of 1333MHz DDR3 RAM with Error Correcting Code (ECC). The entire Mako system consumes less than 10W in normal operation. This makes the Mako the highest performance per watt system in a fully rugged enclosure on the market.

The I/O subsystem for the Mako is designed to support a wide array of standard and custom I/O functions. The SG501 standard configuration supports one Gigabit Ethernet, three USB 2.0 ports and one USB 3.0 port with power, up to 1TB of SSD storage for local OS boot and one additional sealed, removable nDrive™ up to 1TB (Optional), five optically isolated digital general purpose I/O lines, HDMI/DVI-D port, one isolated I2c bus for additional sensors and low cost I/O devices, and one COM port with RS-232/422/485 options. Optional additional I/O functions such as, dual Gigabit Ethernet, CANbus, ProfiBus, Wi-Fi/Bluetooth, GPS, and many other I/O functions are provided via one SAM™ site.

Applications

The Mako is designed to provide a low-cost, rugged computer for commercial and industrial applications. The Mako is best deployed in commercial vehicles, industrial controls, medical systems, and oil/gas exploration where the computer is exposed to the harshest possible environments and size/weight/power and cost are the main considerations. The Mako is ideal for applications where it is connected to a variety of I/O such as engines, motors, sensors, and cameras that require high performance, high speed I/O such as, USB 3.0 and Gigabit Ethernet without compromising ruggedness and reliability. The Mako may be ordered with an optional solar power supply for commercial and industrial applications where the computer system is placed out in the field where there is no power available. Using Wi-Fi or cellphone technology, the SG501 can be connected to cameras, sensors, or other data sources to record/monitor and transmit the data collected from sensors to a base station. The SG501 is CE Mark and FCC compliant with an optional support for MIL-STD-1275 via an external PCM.

Technology Used

The SG501 utilizes the most efficient Quad Core Atom™ processor from Intel®. The BayTrail CPU is a third-generation Atom™ processor with a fully integrated memory controller for the best memory performance possible. This CPU is considered to have the best performance per watt in the market. The graphics engine of the BayTrail has the best performance of any Atom™-based integrated video in the market with outstanding performance in 2D and 3D with DirectX™ 11 and OpenGLES 3.0 support.

Cooling

The Mako is equipped with GMS's patent pending RuggedCool™ technology, which is the most unique cooling system in the industry and is the only system that operates up to -20°C to +75°C at full load! This cooling approach provides the lowest thermal resistance to the case while providing the highest shock specifications known in the industry. The SG501 is a fan-less system that can be mounted directly to a metal surface or used as a stand-alone system.

Full Environmental Specs

The Mako is available in ruggedization levels R1-R3. Additional information regarding the ruggedization levels and full environmental specifications for this product can be found on our website at www.gms4sbc.com.

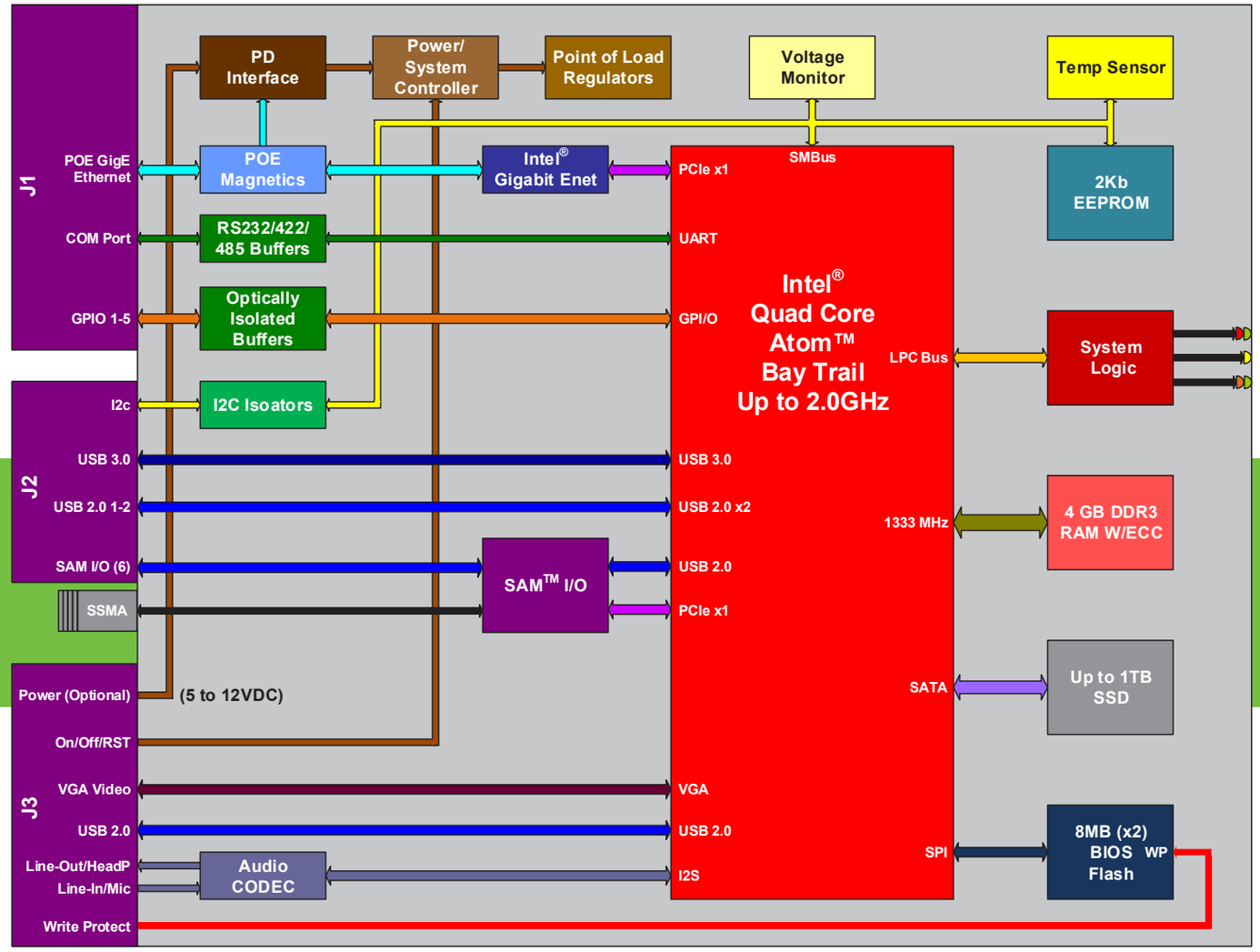
Additional Views and Variations

SG501 (Showing standard connector configuration)

SG501 (Showing removable nDrive)

"MARLIN" SG502-LP

Fully Sealed, Rugged, Ultra-Low-Power System



- Unit may operate up to 100 meters away from base station with remote I/O functions
- 2.0 GHz Intel® Quad Core Atom™ processor with 2MB of L2 Cache
- Up to 4GB of 1333MHz DDR3 SDRAM with ECC
- Up to 1TB fixed high speed SSD
- One Gigabit Ethernet port with Power over Ethernet (PoE) (Optional)
- One USB 3.0 port and three USB 2.0 ports with power
- One Serial Port with RS-232/422/485 support
- High-performance VGA port with 2D and 3D acceleration
- Five optically isolated General Purpose I/O lines
- One SAM™ site for custom I/O (CANBus, ProfiBus, Wi-Fi/BT or user I/O)
- Full HD-Audio support with onboard 1W mono amplifier
- Extensive Built-In Test (BIT) and Extended BIT (EBIT) for diagnostics
- Isolated I2c bus for additional sensors and control functions
- Real Time Clock (RTC) and 3 timers
- Pass/Fail, Power Good, and user LED indicators
- 8MB of BIOS/user Flash and 256B of FRU EEPROM
- CPU temperature and voltage monitoring for safe operation
- Onboard power supplies for a single 8-16VDC input power (No PoE)
- External On/Off/Reset input with suspend mode
- Available in solar-powered version for true stand-alone operations
- Support for Windows®, Linux® and VMware®
- External Power Conditioning Module (ePCM) for dirty power operation (Optional)
- Fully compliant to MIL-STD 810F, MIL-S-901D, DO-160D and IP67 (MIL-STD 1275 Optional via PCM).
- Ultra-low SWaP only 6.0" x 3.75" x 1.0" @ 1.5 lbs. and under 15W average
- Operates at standard temp -20°C to +75°C or extended temp -40°C to +85°C
- Available in GMS ruggedization levels R3-R5

General Description

The SG502-LP "Marlin" is a fully-sealed, rugged, ultra-low-power, lightweight, Intel® Quad Core Atom™-based computer system. It is designed to provide the lowest power consumption possible in a fully ruggedized conduction cooled module, operating up to -40°C to +85°C (-20°C to +75°C Standard). The Marlin is targeted for applications where an ultra-low-power, fully sealed, submersible rugged computer is needed to operate up to 100 meters away from the base station utilizing Power over Ethernet (PoE) (IEEE 802.3AT type 2) technology with ultra-fast I/O and processing capabilities. The Marlin provides the best possible performance per dollar and per watt, utilizing hi-density rugged interconnects to provide easy interconnect to system I/O and user I/O.

The Marlin utilizes the Intel® Quad Core Atom™ processor with 2MB of L2 cache operating at 2.0 GHz and deep sleep capabilities for ultra-low power consumption when not active. To harvest this incredible CPU performance, the CPU is coupled with up to 4GB of 1333MHz DDR3 RAM with Error Correcting Code (ECC). The entire Marlin system consumes less than 15W in normal operation. This makes the Marlin the highest performance per watt system in a fully rugged, sealed enclosure on the market.

The I/O subsystem for the Marlin is designed to support a wide array of standard and custom I/O functions. The SG502-LP supports one Gigabit Ethernet port with Power over Ethernet (PoE) per IEEE 802.3AT type 2. This version of PoE supports up to 25W, which may be used to power the entire system as well as the external I/O connected to the USB ports. Additionally, the Marlin supports one USB 3.0 and three USB 2.0 ports, up to 1TB of fixed SSD storage, five optically isolated digital General Purpose I/O lines, one VGA port, one COM port with RS-232/422/485 options and isolated I2c bus for additional low cost sensors and I/O. Additional I/O functions such as dual Gigabit Ethernet, CANbus, ProfiBus, Wi-Fi/Bluetooth, GPS, and many other I/O functions are provided via one SAM™ Site with I/O via the J2 connector.

Applications

The Marlin is designed to provide a low-cost, rugged computer for well/deep drilling applications where the computer needs to be up to 100 meters away or longer with additional In-Line repeaters. The Marlin interconnect is designed so that the I/O subsystems that are connected to its ultra-high-speed I/O may operate in a remote location while collecting images and other data and then send it all up to the base station via the Gigabit Ethernet port, which also powers the entire system and I/O devices. The Atom's astounding performance is ideal for remote control of I/O functions in defense and UAV applications, as well as commercial and industrial applications. The Marlin is widely deployed in oil/gas exploration and unmanned robots for hazardous applications in which the computer is exposed to the harshest possible environments and where power, weight, and size are the main considerations. The Marlin may be ordered with PoE or optional solar power supply for commercial and industrial applications in which the computer system is placed out in the field where there is no power available. The SG502-LP is fully compliant to MIL-STD 810F, MIL-S-901D, DO-160D and IP67 (MIL-STD 1275 Optional via PCM).

Technology Used

The SG502-LP utilizes the most efficient Quad Core Atom™ processor from Intel®. The BayTrail CPU is a third-generation Atom™ processor with a fully integrated memory controller for the best memory performance possible. This CPU is considered to have the best performance per watt in the market. The graphics engine of the BayTrail has the best performance of any Atom™-based integrated video in the market with outstanding performance in 2D and 3D with DirectX™ 11 and OpenGLES 3.0 support.

Cooling

The Marlin is equipped with GMS' patent pending RuggedCool™ technology, which is the most unique cooling system in the industry and is the only system that operates up to -40°C to +85°C at full load! This cooling approach provides the lowest thermal resistance to the case while providing the highest shock specifications known in the industry. The SG502-LP is a fan-less system that can be mounted directly to a metal surface or used as a stand-alone system.

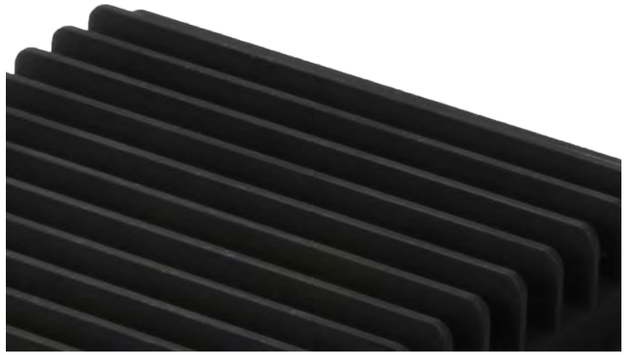
Full Environmental Specs

The Marlin is available in ruggedization levels R3-R5. Additional information regarding the ruggedization levels and full environmental specifications for this product can be found on our website at www.gms4sbc.com.

Additional Views and Variations

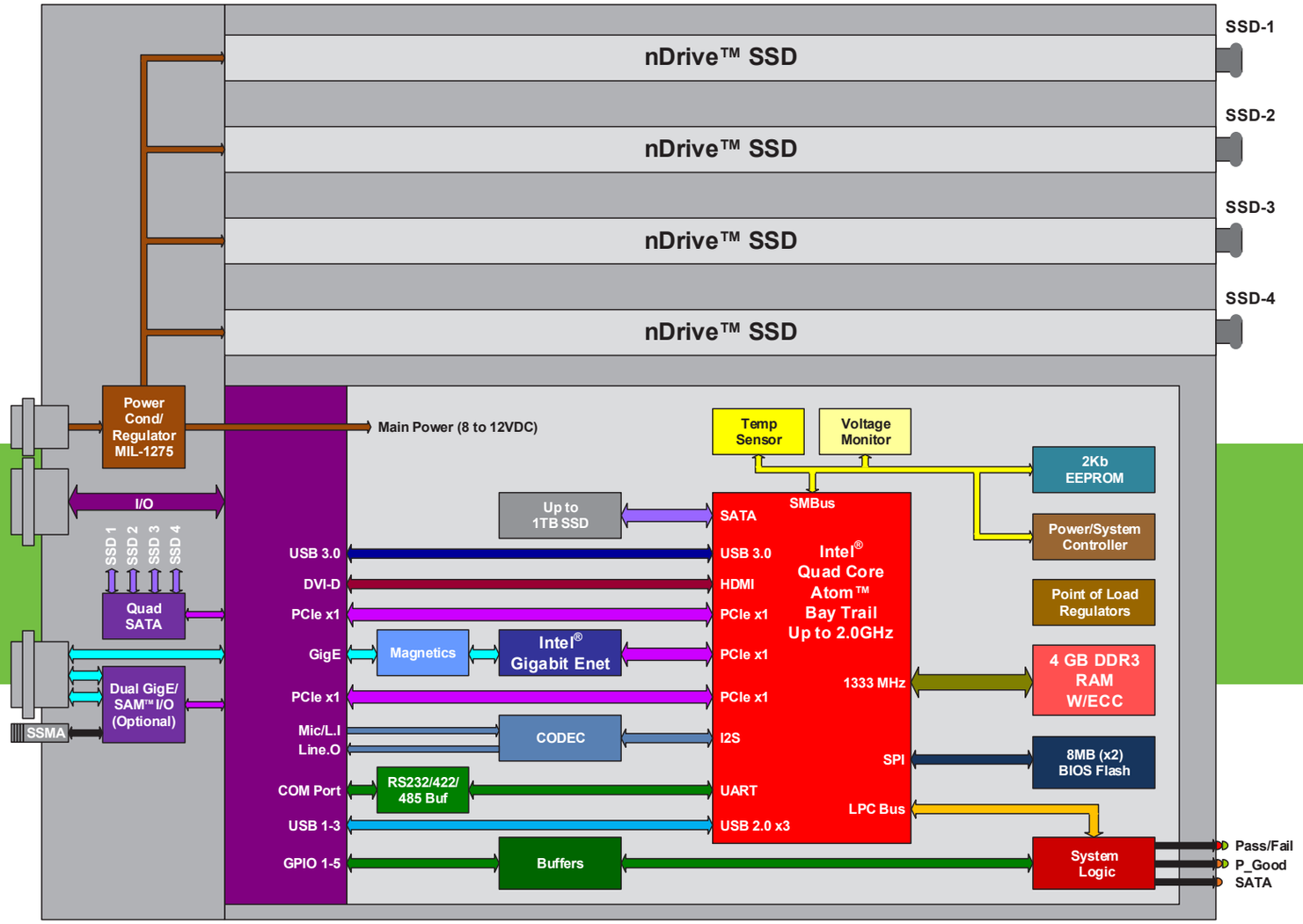
SG502-LP (Showing fully-sealed rugged connectors)

SG502-LP (Showing extended temperature cooling fins)



"NAUTILUS" SG502-NAS

Rugged, Ultra-Small, Low Power System with Quad Removable Sealed SSD



- Up to 2.0GHz Intel® Quad Core Atom™ processor with 2MB of L2 Cache
- Up to 4GB of 1333MHz DDR3 SDRAM with ECC
- Up to 1TB of mSATA SSD for OS boot with write protect
- Supports up to four removable, sealed nDrive™ SSDs
- Optional external docking station for nDrive™ SSDs, with USB interface
- Up to three Gigabit Ethernet ports with TCP/IP Offloading Engine (TOE)
- Support for Network Attached Storage (NAS) software
- DVI/HDMI and Display Port video ports for dual head video
- One USB 3.0 port with power
- Three USB 2.0 ports with power
- One Serial Port with RS-232/422/485 support
- Five buffered General Purpose I/O lines (Optional)
- Support for one SAM™ I/O site for dual Gigabit Ethernet or User I/O
- Line-In/Mic-In and Line Out
- Extensive Built-In Test (BIT) and Extended BIT (EBIT) for diagnostics
- Full power-management control for sleep/hibernate operation
- Up to 8MB of BIOS flash and 2Kb of EEPROM for FRU storage
- Real Time Clock (RTC) with external/internal or no battery operation
- CPU temperature and voltage monitoring for safe operation
- Reset and Power On/Off signal with suspend support
- Pass/Fail, Power Good, and user LED indicators
- Available in solar-powered version for true stand-alone operations
- Support for Windows®, Linux® and VMware®
- Fully compliant to MIL-STD 810F, MIL-STD-1275D, MIL-S-901D, DO-160D and IP66
- Ultra-low SWaP only 6.8" x 3.5" x 2.9" @ 3.5 lbs. and as low as 15W (Less SSDs)
- Operates at standard temp -20°C to +75°C or extended temp -40°C to +85°C
- Available in GMS ruggedization levels R3-R5

General Description

The SG502-NAS "Nautilus" is a rugged, low-cost, ultra-low-power, lightweight, Intel® Quad Core Atom™-based computer system. It is designed to provide the lowest power consumption possible in a fully ruggedized, conduction-cooled module, operating up to -40°C to +85°C (-20°C to +75°C Standard). The Nautilus is targeted for applications where an ultra-low-power, low-cost, rugged computer is needed with as much as 4TB of storage to provide the best possible NAS performance per dollar and per watt, utilizing hi-density, low-cost, rugged interconnects to provide easy interconnect to system I/O and user I/O.

The Nautilus utilizes the Quad Core Intel® Atom™ processor with 2MB of L2 cache operating up to 2.0GHz and deep sleep capabilities for ultra-low power consumption when not active. To harvest this incredible CPU performance, the CPU is coupled with up to 4GB of 1333MHz DDR3 SDRAM with Error Correcting Code (ECC). The entire Nautilus system consumes as little as 15W total (Less SSD). This makes the Nautilus the lowest power-consuming and highest-performing, fully rugged NAS/data logger on the market.

The I/O subsystem for the Nautilus is designed to support a wide array of standard and custom I/O functions. The SG502-NAS standard configuration supports one standard Gigabit Ethernet port with TCP/IP Offloading Engine (TOE), one USB 3.0 port and three USB 2.0 ports with power, up to 1TB of internal SSD for NAS software or other Operating Systems, five buffered digital I/O lines, DVI/HDMI and Display Port/eDP for flat screen displays and one COM port with RS-232/422/485 options. The Nautilus supports up to four nDrive™ SSD drives each with capacity of up to 1TB each. Optional additional I/O functions such as dual Gigabit Ethernet ports, Quad Video capture, CANbus, MIL-STD-1553, Wi-Fi/Bluetooth, FireWire, GPS for data time stamping, and many other I/O functions utilizing the one SAM™ site provided.

Applications

The Nautilus is designed to provide a low-cost, rugged computer system with as much as 4TB of rugged, ultra-small, sealed SSD storage. It is ideal for network attached storage or data logging applications where an ultra-low power system is required with a very fast network and storage subsystem for recording and serving data to other systems. The Nautilus is widely deployed in unmanned robots for hazardous applications, where the computer is exposed to the harshest possible environments, and UAVs, where power, weight, and size are the main considerations. The Nautilus is ideal for applications where it is connected to a variety of I/O such as motors, sensors, and cameras that are all enclosed within another enclosure that protects all the system functions to reduce the system cost significantly without compromising ruggedness and performance. The Nautilus may be ordered from the factory with operating systems such as Windows 7®, Linux® or VMware® pre-installed. The SG502-NAS is fully compliant to MIL-STD 810F, MIL-STD-1275D, MIL-S-901D, DO-160D and IP66.

Technology Used

The SG502-NAS utilizes the most efficient Quad Core Atom™ processor from Intel®. The BayTrail CPU is a third-generation Atom™ processor with a fully integrated memory controller for the best memory performance possible. This CPU is considered to have the best performance per watt in the market. The graphics engine of the BayTrail has the best performance of any Atom™-based integrated video in the market with outstanding performance in 2D and 3D with DirectX™ 11 and OpenGLES 3.0 support.

Cooling

The Nautilus is equipped with GMS' patent pending RuggedCool™ technology, which is the most unique cooling system in the industry and is the only system that operates up to -40°C to +85°C at full load! This cooling approach provides the lowest thermal resistance to the case while providing the highest shock specifications known in the industry. The SG502-NAS is a fan-less system for reliable operation and can be mounted directly to a metal surface or used as a stand-alone system.

Full Environmental Specs

The Nautilus is available in ruggedization levels R3-R5. Additional information regarding the ruggedization levels and full environmental specifications for this product can be found on our website at www.gms4sbc.com.

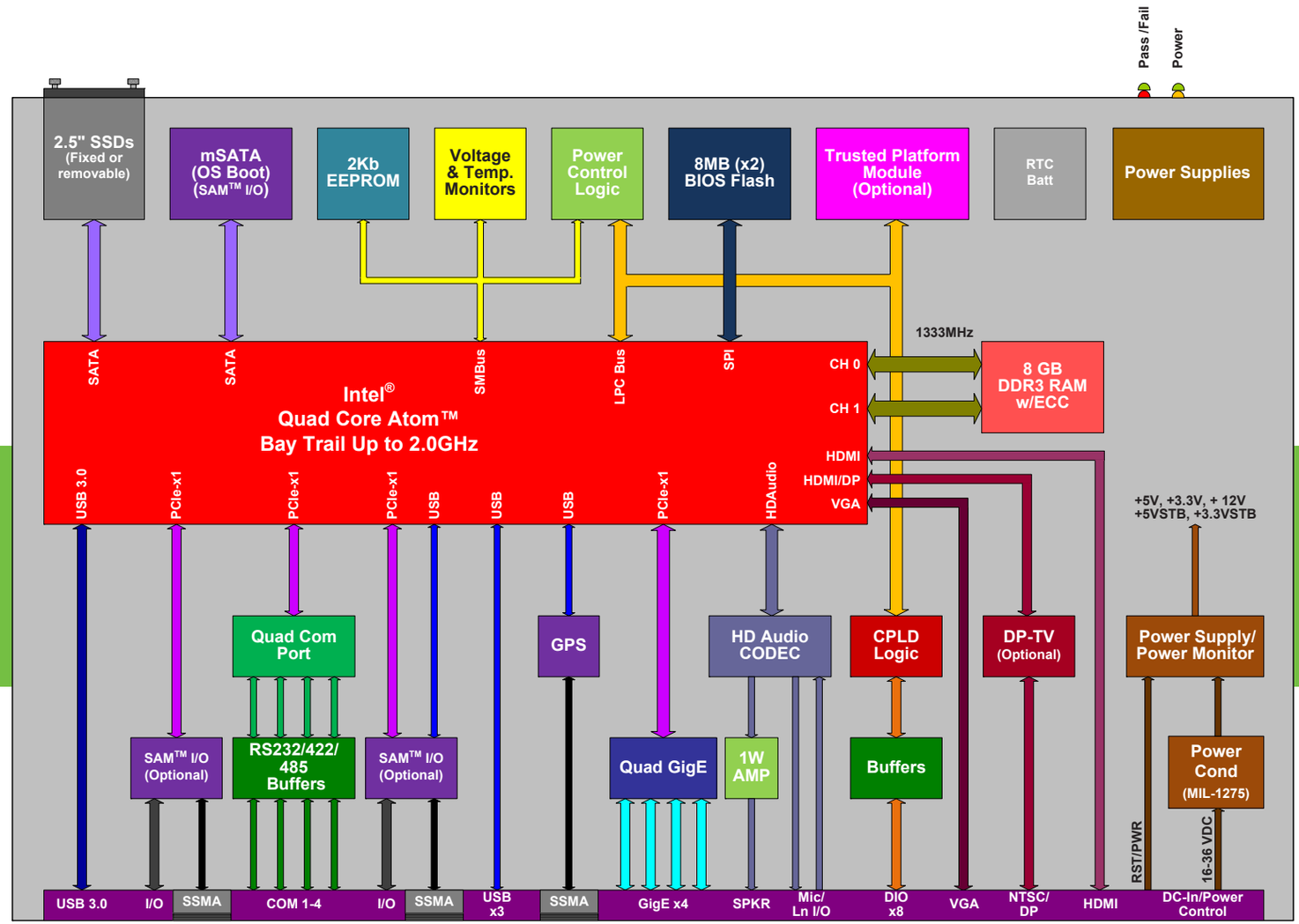
Additional Views and Variations

SG502-NAS (Sealed door open to expose drive cartridges)

SG502-NAS (Showing standard connector configuration)

"BARRACUDA" SG505

Low-Cost, Rugged, Lightweight, Low-Power System



- Up to 2.0GHz Intel® Atom™ Quad Core processor with 2MB of L2 Cache
- Up to 8GB of 1333MHz DDR3 SDRAM
- Support for one fixed or removable 2.5" SATA SSD up to 2TB
- mSATA Flash for OS Boot with secure-erase and write-protect up to 1TB
- Up to four Gigabit ports with TCP/IP Offloading Engine (TOE)
- One USB 3.0 port with power
- Three USB 2.0 ports with power
- VGA, HDMI, and Display Port video (NTSC/PAL optional, lose DP)
- Four Serial Ports with RS-232/422/485 options
- Eight buffered General Purpose I/O lines
- Support for GPS for position and/or time stamping of data
- Two SAM™ sites for custom I/O (Wi-Fi, Bluetooth, Quad Video Capture, etc.)
- Full HD-Audio support with onboard 1W mono amplifier
- Trusted Platform Module (TPM) for secure operation (Optional)
- Extensive Built-in Test (BIT) and Extended BIT (EBIT) for diagnostics
- Full power-management control for sleep/hibernate operation
- Real Time Clock (RTC) with field replaceable battery
- CPU temperature and voltage monitoring for safe operation
- Reset and power On/Off signal with suspend support
- Pass/Fail, Power Good, and user LED indicators
- Available in solar-powered version for true stand-alone operations
- Support for Windows®, Linux® and VMware®
- Power Conditioning Module (PCM) for dirty power operation (Optional)
- Ultra-low SWaP only 5.4" x 6.5" x 2.0", @ 2 lbs. and as low as 15W total
- Fully compliant to MIL-STD 810F, MIL-S-901D, DO-160D, MIL-STD 1275D and IP65.
- Operates at standard temp 0°C to +55°C or extended temp -40°C to +85°C
- Available in GMS ruggedization levels R1-R4

General Description

The SG505 "Barracuda" is a third-generation rugged, low-cost, low-power, lightweight Intel® Quad Core Atom™ computer system. It is designed to provide the lowest power consumption possible in a fully ruggedized, conduction-cooled system, operating up to -40°C to +85°C (0°C to +55°C Standard). The Barracuda is targeted for applications where an ultra-low-power, low-cost, rugged computer is needed to provide the best possible performance per dollar and per watt, utilizing hi-density, low-cost, rugged interconnects to provide easy interconnect to system I/O and user I/O.

The Barracuda utilizes the latest Intel® Atom™ BayTrail Quad Core processor with 2MB of L2 cache up to 2.0GHz and deep sleep capabilities for ultra-low power consumption when not active. To harvest this incredible CPU performance, the CPU is coupled with up to 8GB of 1333 MHz DDR3 SDRAM. The entire Barracuda system consumes less than 15W total with average of 10W in normal operation. This makes the Barracuda the lowest power-consuming and highest-performing, fully rugged system on the market.

The I/O subsystem for the Barracuda is designed to support a wide array of standard and custom I/O functions. The SG505 standard configuration supports up to four Gigabit Ethernet channels with TCP/IP Offloading Engine (TOE), one USB 3.0 port and three USB 2.0 ports with power, one removable or fixed 2.5" SSD up to 2TB, eight buffered digital I/O lines, one RGB port, one each HDMI/DVI and Display Port with optional NTSC/PAL video (lose Display Port), four COM ports with RS-232/422/485 options, and a full HD-Audio headset jack and 1-watt audio amplifier to drive an 8-ohm speaker directly. Optional additional I/O functions such as mSATA with write-protect and secure-erase as a boot device, Quad Video capture, CANbus, MIL-STD-1553, Wi-Fi/Bluetooth, FireWire, and many other I/O functions utilizing the two SAM™ sites are provided.

Applications

The Barracuda is primarily designed to provide a low-cost, rugged computer for defense and UAV applications but can be deployed in commercial and industrial applications, as well. The Barracuda is widely deployed in unmanned robots for hazardous applications, where the computer is exposed to the harshest possible environments, and UAVs, where power, weight, and size are the main considerations. The Barracuda is ideal for applications where it is connected to a variety of I/O such as motors, sensors, and cameras, which are all housed within another enclosure to significantly reduce the overall system cost without compromising ruggedness and performance. The SG505 may be ordered from the factory with operating systems such as Windows 7®, Linux® or VMware® pre-installed. The SG505 is fully compliant to MIL-STD-810F, MIL-STD-901D, DO-160D, MIL-STD-1275D and IP65.

Technology Used

The Barracuda utilizes the most powerful Intel® Atom™ Quad Core processor. The BayTrail CPU is a third-generation Atom™ processor with a fully integrated memory controller for the best memory performance possible. This CPU is considered to have the best performance per watt in the market with protection assured by the Trusted Platform Module (TPM) for secure operation. The graphics engine of the BayTrail has the best performance of any Atom™-based integrated video in the market with outstanding performance in 2D and 3D with DirectX™ 11 and OpenGLES 3.0 support.

Cooling

The Barracuda is equipped with GMS's patent pending RuggedCool™ technology, which is the most unique cooling system in the industry and is the only system that operates up to -40°C to +85°C at full load! This cooling approach provides the lowest thermal resistance to the case while providing the highest shock specifications known in the industry. The SG505 is a fan-less system and can be mounted directly to a metal surface or used as a stand-alone system.

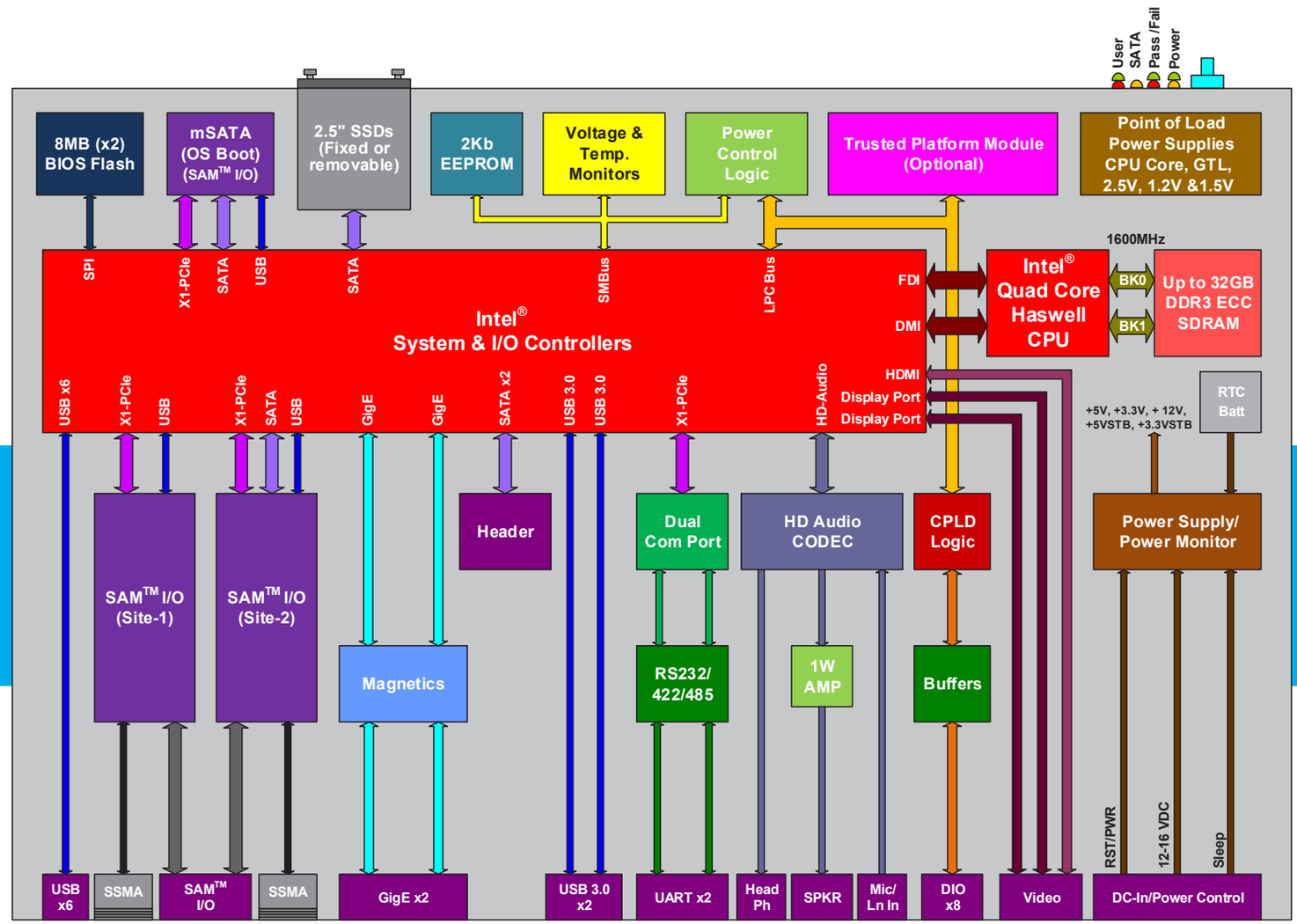
Full Environmental Specs

The Barracuda is available in ruggedization levels R1-R4. Additional information regarding the ruggedization levels and full environmental specifications for this product can be found on our website at www.gms4sbc.com.

Additional Views and Variations

SG505 (Showning front connector configuration)

SG505 (Showing optional removable drive)



"FALCON" SB1001

Rugged, Low-Cost, Small, Lightweight System

- Utilizes standard off-the-shelf I/O interconnects for low system cost
- Up to 2.4GHz Intel® Quad Core™ i7 Haswell processor with 6MB of L2 Cache
- Up to 32GB of 1600MHz DDR3 memory with ECC
- One removable or fixed 2.5" SATA SSD drive up to 2TB
- Up to 1TB mSATA for OS boot with write-protect
- Two USB 3.0 ports with power
- Six USB 2.0 with power
- Two Gigabit Ethernet ports with TCP/IP Offloading Engine (TOE)
- Dual Display Port and one HDMI port
- Dual Serial ports with RS-232/422/485 options
- Eight buffered General Purpose I/O lines
- Three SAM™ sites for custom I/O (Profibus, CANbus, Wi-Fi/BT, GPS, etc.)
- Full HD-Audio support with onboard 1W mono amplifier
- Dual BIOS boot devices with write-protect
- Support for Active Management Technology (AMT) for remote KVM functions
- Intel® Virtualization Technology (VT-x/VT-d2) and Trusted Execution Technology (TXT)
- Trusted Platform Module (TPM) for secure operation (Optional)
- Full power management control for sleep/hibernate operation
- Pass/Fail, Drive Active, Power Good and user LED indicators
- CPU temperature and voltage monitoring for safe operation
- Reset and power On/Off signal with suspend support
- Support for Windows®, Linux® and VMware®
- External Power Conditioning Module (ePCM) for dirty power 16-36VDC (Optional)
- Ultra-low SWaP only 6.0" x 6.3" x 2.0", @ 4 lbs., as low as 35W total
- CE Mark and FCC compliant (MIL-STD-1275 via external PCM Optional)
- Operates at standard temp 0°C to +55°C or extended temp -40°C to +85°C (Optional)
- Available in ruggedization levels R1-R4

General Description

The SB1001 “Falcon” is a second-generation, low-cost, small, lightweight, and rugged computer system with commercial interconnects. It is designed to provide the highest level of workstation performance possible utilizing standard PC interconnects for a low-cost, fully-ruggedized, conduction-cooled system capable of operating from -40°C to +85°C (0°C to +55°C Standard). The Falcon is targeted for applications where a low-cost, rugged computer is needed to provide the best possible performance per dollar, utilizing standard off-the-shelf I/O interconnect to reduce system cost while providing comparable MIL-STD ruggedness found in products like the SB1002 series.

The Falcon supports the latest, most power-efficient Intel® Quad Core™ i7 Haswell processor with Hyper-Threading for a total of 8 logical cores, each operating at up to 2.4GHz with the ability to TurboBoost up to 3.4GHz. To harvest this incredible CPU performance, the CPU is coupled with up to 32GB of RAM organized in two banks that supports Error Correcting Code (ECC). The ECC RAM provides 2-bit error detection and 1-bit error correction and supports up to 1600 Mega Transfers per Second (MTS) between CPU and memory.

The I/O subsystem for the Falcon is designed to support a wide array of standard and custom I/O functions. The SB1001 configuration supports two Gigabit Ethernet channels with TCP/IP Offloading Engine (TOE), six USB 2.0 and two USB 3.0 ports, a removable or fixed 2.5” SSD up to 2TB, eight buffered digital I/O lines, dual Display Port and one HDMI port for a triple display support. Additionally the Falcon offers two COM ports with RS-232/422/485 options, and a full HD-Audio headset jack and a 1-watt audio amplifier to drive an 8-ohm speaker directly. Additional I/O functions include up to 1TB of onboard mSATA SSD for OS boot with write-protect and three SAM™ I/O sites for custom I/O such as Profibus, CANbus, Wi-Fi/Bluetooth, GPS, Quad Video capture, FireWire, etc. An external Power Conditioning Module (PCM) for dirty power operation is an available option and can provide 16-36VDC of regulated power.

Applications

The Falcon is designed to replace bulky air-cooled industrial rack-mount or stand-alone computers in a much smaller space without requiring fans. Up to six Falcons may be placed in a single 1U short rack, thus providing up to 24 cores in a single 1U space for an astounding performance per weight, size, and cost ratio. The SB1001 is ideal for oil rig platforms, medical/police/fire vehicles, and industrial automation where a low-cost, ultra-small, high-performance rugged system is required to meet harsh environmental specifications. The Falcon may be ordered from factory with operating systems such as Windows 7®, Linux® or VMware® pre-installed. The SB1001 is CE Mark and FCC compliant with an optional support for MIL-STD-1275 via an external PCM.

Technology Used

The Falcon utilizes the Intel® Core™ i7 Haswell CPU, which is the newest and most powerful, efficient processor from Intel® with advanced thermal management and graphics. The Haswell Core™ i7 processor supports Hyper-Threading for a total of eight logical cores and supports 6MB of L2 cache shared among the cores. Haswell supports up to 32GB of DDR3 RAM with Error Correcting Code (ECC) and 1600 Mega Transfers per Second (MTS) between the CPU and RAM. Another major improvement of the Haswell processor over the Ivy Bridge Core™ i7 is the graphics performance. The Haswell processor provides three independent video outputs and better-than 40% improvement in 3D acceleration. Haswell is also coupled with Lynx Point™ and is a 4th-generation Core™ i7 with a fully integrated memory controller for the best memory performance possible. This CPU is considered the workhorse of the workstation market with many added power-saving features and peak performance with controlled thermals, as well as security functions, such as Intel’s 2nd-generation Virtualization Technology VT-x, Trusted Execution Technology (TXT) and Active Management Technology (AMT) for remote KVM functions. The Haswell platform also supports PCIExpress Gen3, USB 3.0 and SATA 3 for the highest performance possible on a workstation platform.

Cooling

The Falcon system is equipped with GMS’ patent pending RuggedCool™ technology, which is the most unique cooling system in the industry and is the only system that operates up to -40°C to +85°C at full load! This cooling approach provides the lowest thermal resistance to the case while providing the highest shock specifications known in the industry. The SB1001 is a fan-less system for reliable operation and can be mounted directly to a metal surface or used as a stand-alone system.

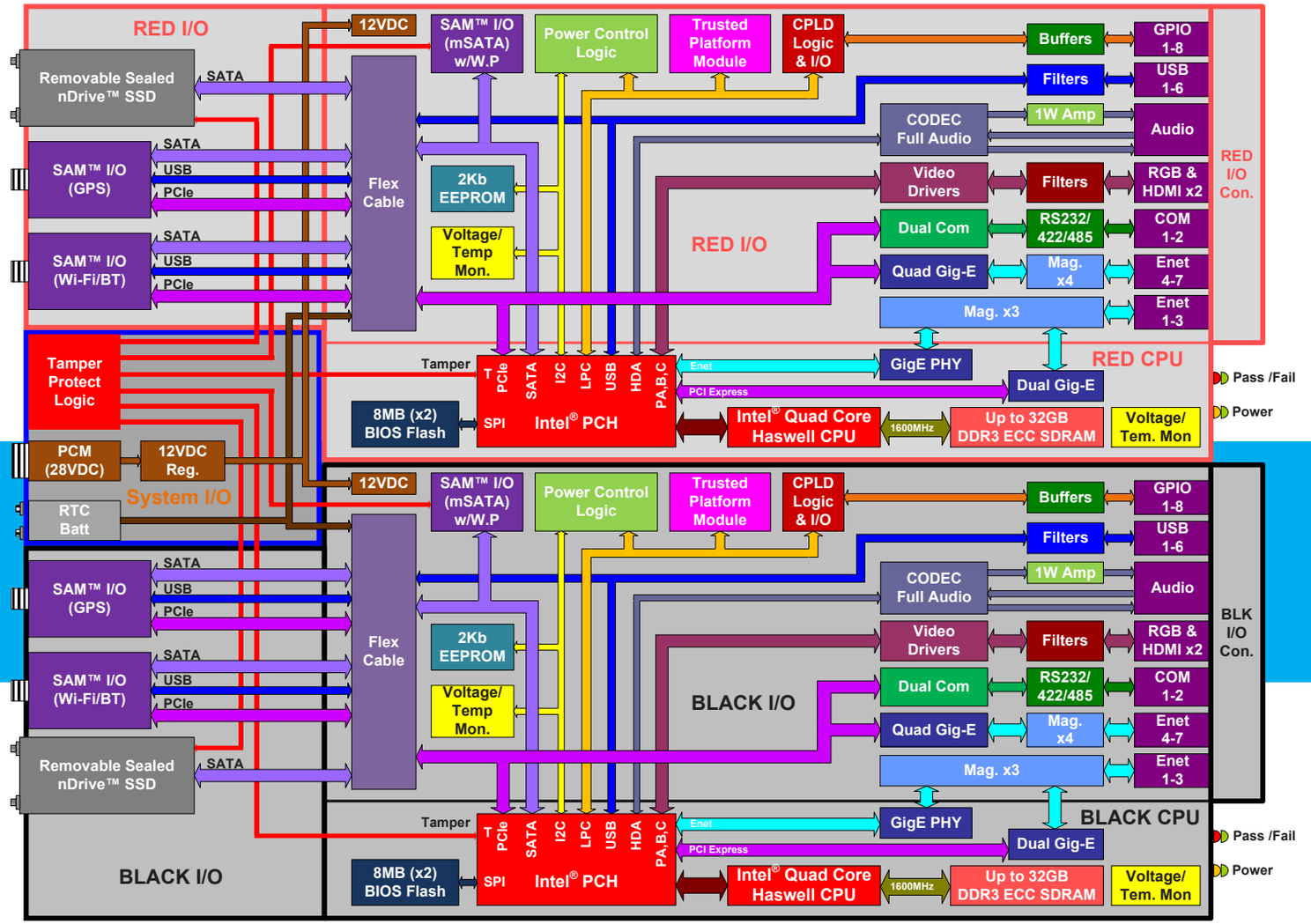
Full Environmental Specs

The Falcon is available in ruggedization levels R1-R4. Additional information regarding the ruggedization levels and full environmental specifications for this product can be found on our website at www.gms4sbc.com.

Additional Views and Variations

SB1001 (Showing rear connector configuration)

SB1001 (Showing removable drive option)



"GOLDEN-EYES" SB1002-MD

Rugged, Small, Dual, Fully Isolated Systems with Removable Drives

- Fully supports Multi-Domain, NSA-secure architecture
- Two fully independent systems (Red/Black) **Each with:**
- Up to 2.4GHz Intel® Quad Core™ i7 Haswell processor with 6MB of L2 Cache
- Up to 32GB of 1600MHz DDR3 memory with ECC
- Up to 1TB of sealed removable nDrive™ SSD drives
- Up to 1TB of fixed SSD for OS boot
- Seven Gigabit Ethernet ports with TCP/IP Offloading Engine (TOE)
- Six USB 2.0 ports with power
- Two Serial ports with RS-232/422/485 options
- Dual DVI/HDMI ports and one RGB video port
- Eight buffered General Purpose I/O lines
- Two SAM™ sites for custom I/O (MIL-STD-1553, Wi-Fi/BT, GPS, etc.)
- Full HD-Audio support with onboard 1W mono amplifier
- Real Time Clock (RTC) with field-replaceable battery
- Dual BIOS boot devices with write-protect
- Support for Active Management Technology (AMT) for remote KVM functions
- Intel® Virtualization Technology (VT-x/VT-d2) and Trusted Execution Technology (TXT)
- Trusted Platform Module (TPM) for secure operation (Optional)
- Tamper-proof hardware with optional secure-erase
- Full power-management control for sleep/hibernate operation
- CPU temperature and voltage monitoring with status LED indicators
- Reset and power On/Off signal with suspend support
- Ultra-low SWaP only 5.4" x 6.5" x 2.75" @ 6 lbs. and as low as 60W total
- Fully compliant to MIL-STD 810G, MIL-STD 1275D, MIL-S-901D, DO-160D, MIL-STD 461E and IP66
- Operates at standard temp -20°C to +75°C or extended temp -40°C to +85°C (Optional)
- Available in ruggedization levels R3-R5

General Description

The SB1002-MD "Golden-Eyes" is a fifth-generation, ultra-rugged, small, lightweight computer system. It is designed to allow two different Domains (Red and Black) to operate independently in the same system, while providing the highest level of workstation performance possible in a fully ruggedized, conduction-cooled, sealed system, operating up to -40°C to +85°C (-20°C to +75°C Standard). The Golden-Eyes system is targeted for applications where Classified and Unclassified software need to operate simultaneously with an NSA-approved architecture for Multi-Domain applications in a small, ultra-rugged enclosure with the highest possible performance per dollar and per watt while utilizing rugged interconnects to provide a fully sealed system and sharing only DC power.

The Golden-Eyes supports the latest, most power-efficient Intel® Core™ i7 Haswell processor with Hyper-Threading for a total of 8 logical cores, each operating at up to 2.4GHz and the ability to TurboBoost up to 3.4GHz. To harvest this incredible CPU performance, the CPU is coupled with up to 32GB of RAM organized in two banks that support Error Correcting Code (ECC). The ECC RAM provides 2-bit error detection and 1-bit error correction and supports up to 1600 Mega Transfers per Second (MTS) between CPU and memory.

The I/O subsystem for the Golden-Eyes is designed to support a wide array of standard and custom I/O functions. **Each Domain** (Red and Black) of the SB1002-MD configuration supports seven Gigabit Ethernet ports with TCP/IP Offloading Engine (TOE), six USB 2.0 ports, a removable sealed nDrive™ SSD up to 1TB, eight buffered digital I/O lines, three video ports, two COM ports with RS-232/422/485 options, and full HD-Audio headset jack and a 1-watt audio amplifier to drive an 8-ohm speaker directly. Additional I/O functions included on both Domains include up to 1TB of onboard SSD with write-protect and secure-erase as a Boot device, two SAM™ sites for custom I/O such as Wi-Fi/Bluetooth, GPS, Quad Video capture, CANbus, MIL-STD-1553, FireWire, and many more.

The Golden-Eyes supports the most secure storage subsystem possible. The Red and Black Domains each support mSATA as a boot device as well as a dual redundant BIOS Flash with hardware write-protect and tamper-proof functions. In addition, the Red and Black Domains support a sealed removable nDrive™ SSD drive with tamper-proof security functions. A hardware tamper-proof circuit is also provided which enables the security functions of the system to prevent access to any of the stored data on the system. These data security functions, along with the Trusted Platform Module (TPM) and the Trusted Execution Technology (TXT), make the Golden-Eyes the most secure Multi-Domain system on the market.

Applications

The Golden-Eyes is designed to provide the ultimate multi-domain, rugged computer for defense and UAV applications. The Golden-Eyes is the next generation of the Golden-Eye III, which is widely deployed in Army WIN-T vehicles, robots for hazardous applications where the computer is exposed to harsh environments, and UAVs, where power, weight, and size are the main considerations. The SB1002-MD is ideal for outdoor applications where it may be fully exposed to rain, sun, dirt, and radiation. This system may be ordered from the factory with operating systems such as Windows 7®, Linux® or VMware® pre-installed. The SB1002-MD is fully compliant to MIL-STD 810G, MIL-STD 1275D, MIL-S-901D, DO-160D, MIL-STD 461E and IP66.

Technology Used

The Golden-Eyes utilizes the Intel® Core™ i7 Haswell CPU, which is the most powerful, efficient processor from Intel® with advanced thermal management and graphics. The Haswell Quad Core™ i7 processor supports Hyper-Threading for a total of eight logical cores and supports 6MB of L2 cache shared among the cores. Haswell supports 32GB of DDR3 with ECC and 1600 Mega Transfers per Second (MTS) between the CPU and RAM. The other major improvement of the Haswell over the Ivy Bridge Core™ i7 is the graphics performance. The Haswell processor provides three independent video outputs and better-than 40% improvement in 3D acceleration. Haswell is also coupled with Lynx Point™ and is a fourth-generation Core™ i7 with a fully integrated memory controller for the best memory performance possible. This CPU is considered the workhorse of the workstation market with many added power saving features and peak performance with controlled thermals, as well as security functions such as Intel's second-generation Virtualization Technology VT-x and Trusted Execution Technology (TXT). The Haswell platform also supports PCIExpress Gen3, USB 3.0 and SATA 3 for the highest performance possible on a workstation platform.

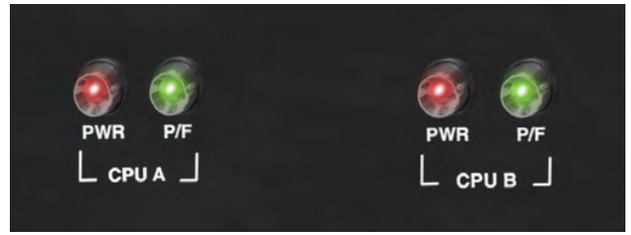
Cooling

The Golden-Eyes system is equipped with GMS' patent pending RuggedCool™ technology, which is the most unique cooling system in the industry and is the only system that operates up to -40°C to +85°C at full load without throttling the CPU! This cooling approach provides the lowest thermal resistance to the case while providing the highest shock specifications known in the industry. The SB1002-MD is a fan-less system for reliable operation and can be mounted directly to a metal surface or used as a stand-alone system.

Additional Views and Variations

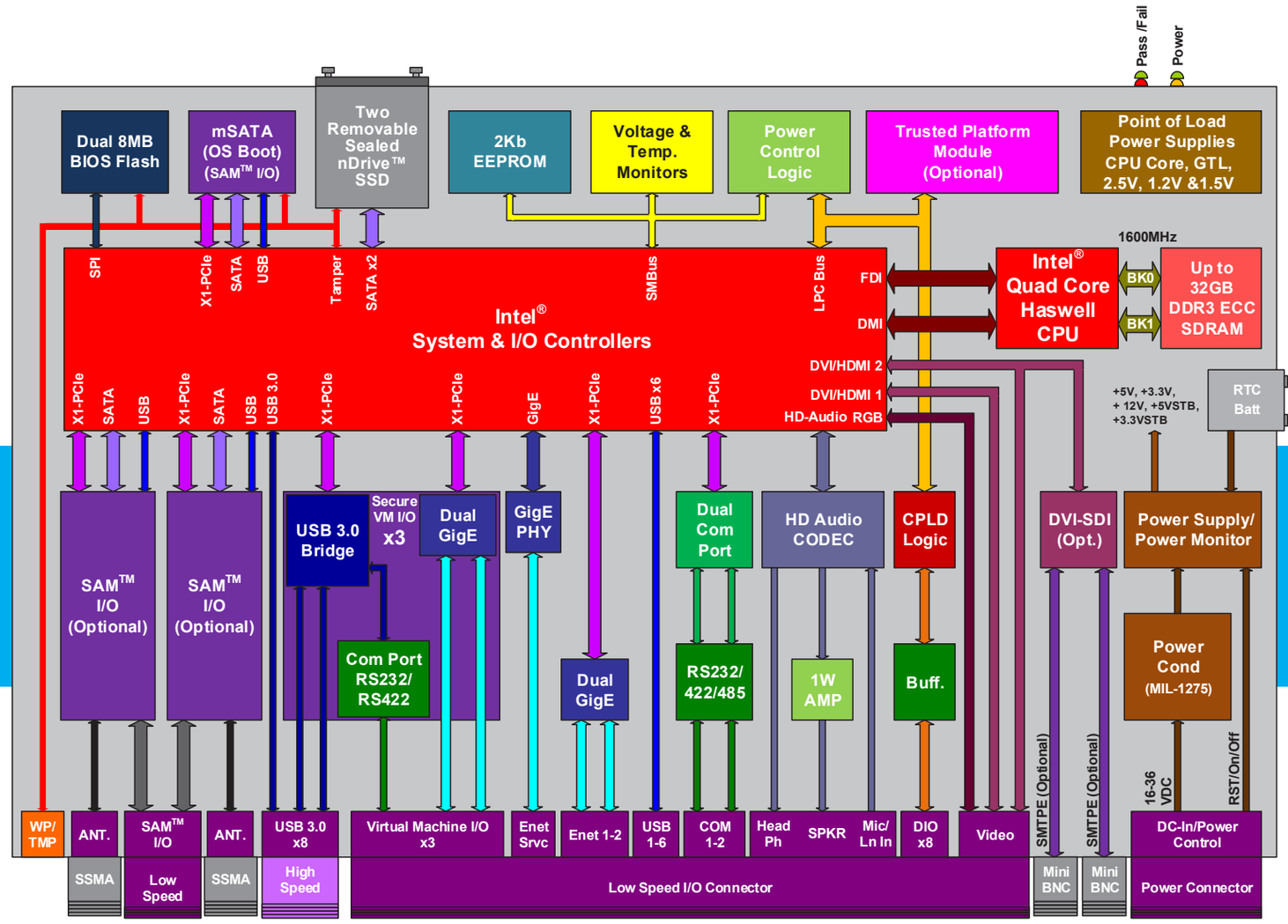
SB1002-MD (Showing rear connector configuration)

SB1002-MD (Showing two separate domains)



Full Environmental Specs

The Golden-Eyes is available in ruggedization levels R3-R5. Additional information regarding the ruggedization levels and full environmental specifications for this product can be found on our website at www.gms4sbc.com.



"GOLDEN-EYE" SB1002-SVM

Rugged, Small, Secure Virtual Machine System with Removable Drive(s)

- Supports up to three "Secure Virtual Machine" (SVM™) I/O architecture
- Each I/O site is fully isolated from other sites for secure safe operation
- Up to 2.4GHz Intel® Quad Core™ i7 Haswell processor with 6MB of L2 Cache
- Up to 32GB of 1600MHz DDR3 memory with ECC
- Up to two removable fully sealed drives (nDrive™), up to 1TB each
- Up to 1TB of fixed SSD for OS boot
- Eight USB 3.0 and six USB 2.0 ports with power
- Nine Gigabit Ethernet ports with TCP/IP Offloading Engine (TOE)
- Dual DVI/HDMI ports and one RGB video port
- Five Serial ports with RS-232/422/485 options and eight buffered GPI/O lines
- Support for dual redundant SDI video outputs (Opt., lose one DVI/HDMI)
- Two SAM™ sites for custom I/O (MIL-STD-1553, Wi-Fi/BT, GPS, etc.)
- Full HD-Audio support with onboard 1W mono amplifier
- Real Time Clock (RTC) with field-replaceable battery
- Dual BIOS boot devices with write-protect
- Support for Active Management Technology (AMT) for remote KVM functions
- Intel® Virtualization Technology (VT-x/VT-d2) and Trusted Execution Technology (TXT)
- Trusted Platform Module (TPM) for secure operation (Optional)
- Tamper-proof hardware with optional secure-erase
- Full power-management control for sleep/hibernate operation
- CPU temperature and voltage monitoring with status LED indicators
- Reset and power On/Off signal with suspend support
- Ultra-low SWaP only 5.4" x 6.5" x 2.75", @ 5 lbs. and as low as 50W total
- Fully compliant to MIL-STD 810G, MIL-STD 1275D, MIL-S-901D, MIL-STD 461E, DO-160D and IP66
- Operates at standard temp -20°C to +75°C or extended temp -40°C to +85°C (Optional)
- Available in ruggedization levels R3-R5

General Description

The SB1002-SVM "Golden-Eye" is a fifth-generation, ultra-rugged, small, lightweight video computer system. It is designed to support three "Secure Virtual Machine" SVMI/O™ architectures so that each site is fully isolated from other sites for secure safe operation, while providing the highest level of workstation performance possible in a fully ruggedized, conduction-cooled, sealed system operating up to -40°C to +85°C (-20°C to +75°C Standard). This system is designed to replace multiple workstations with added partitioning between virtual machines for hardware and software security, and also for applications that require a small, ultra-rugged enclosure with the highest possible performance per dollar and per watt while utilizing rugged interconnects to provide a fully sealed system.

The Golden-Eye supports the latest, most power-efficient Intel® Core™ i7 Haswell processor with Hyper-Threading for a total of 8 logical cores, each operating at up to 2.4GHz with the ability to TurboBoost up to 3.4GHz. To harvest this incredible CPU performance, the CPU is coupled with up to 32GB of RAM organized in two banks that support Error Correcting Code (ECC). The ECC RAM provides 2-bit error detection and 1-bit error correction and supports up to 1600 Mega Transfers per Second (MTS) between CPU and memory.

The I/O subsystem for the Golden-Eye is designed to support a wide array of standard and custom I/O functions, including three independent SVMI/O™ modules. The SB1002-SVM configuration supports a total of nine Gigabit Ethernet channels with TCP/IP Offloading Engine (TOE), eight USB 3.0 and six USB 2.0 ports with power, and up to two removable fully sealed nDrives™ drives of up to 1TB each which can be put in RAID 0 or 1 for performance increase or redundancy. Additional standard I/O functions included are eight buffered digital I/O lines, dual DVI/HDMI or one DVI/HDMI and dual redundant SDI (SMTPE-259/292/424/425) (Optional, Lose one DVI/HDMI) outputs and one RGB video port, five COM ports with RS-232/422/485 options, and an HD-Audio headset jack and a 1-watt audio amplifier to drive an 8-ohm speaker directly. Additional I/O functions include up to 1TB of onboard SSD for OS boot with write-protect and secure-erase, as well as two SAM™ I/O sites for custom I/O, such as Wi-Fi/Bluetooth, GPS, quad video capture, CANbus, MIL-STD-1553, FireWire, etc.

The Golden-Eye also supports the most secure storage subsystem possible. The system supports mSATA as a boot device as well as a dual redundant BIOS Flash with hardware write-protect and tamper-proof functions. In addition, the SB1002-SVM supports up to two removable or fixed drives with tamper-proof security functions. A hardware tamper-proof circuit enables the security functions of the system to prevent access to any of the stored data on the system. These data security functions, along with the Trusted Platform Module (TPM) and the Trusted Execution Technology (TXT), make the Golden-Eye the most secure virtual machine system on the market.

Applications

The Golden-Eye is designed to provide the ultimate secure computer system for defense and UAV applications as well as industrial and commercial applications. The Golden-Eye is the next generation of the Golden-Eye III, which is widely deployed in Army WIN-T vehicles, robots for hazardous applications where the computer is exposed to harsh environments, and UAVs, where power, weight, and size are the main considerations. The SB1002-SVM is ideal for outdoor applications where it may be fully exposed to rain, sun, dirt, and radiation. This system may be ordered from the factory with operating systems such as Windows 7®, Linux® or VMware® pre-installed. The SB1002-SVM is fully compliant MIL-STD 810G, MIL-STD 1275D, MIL-S-901D, DO-160D, MIL-STD 461E and IP66.

Technology Used

The Golden-Eye utilizes the Intel® Core™ i7 Haswell CPU, which is the newest and most powerful, efficient processor from Intel® with advanced thermal management and graphics. The Haswell Core™ i7 processor supports Hyper-Threading for a total of eight logical cores and supports 6MB of L2 cache shared among the cores. Haswell supports up to 32GB of DDR3 RAM with Error Correcting Code (ECC) and 1600 Mega Transfers per Second (MTS) between the CPU and RAM. Another major improvement of the Haswell processor over the Ivy Bridge Core™ i7 is the graphics performance. The Haswell processor provides three independent video outputs and better-than 40% improvement in 3D acceleration. Haswell is also coupled with Lynx Point™ and is a fourth-generation Core™ i7 with a fully integrated memory controller for the best memory performance possible. This CPU is considered the workhorse of the workstation market with many added power-saving features and peak performance with controlled thermals, as well as security functions such as Intel's second-generation Virtualization Technology VT-x, Trusted Execution Technology (TXT), and Active Management Technology (AMT) for remote KVM functionality. The Haswell platform also supports PCIExpress Gen3, USB 3.0 and SATA 3 for the highest performance possible on a workstation platform.

Additional Views and Variations

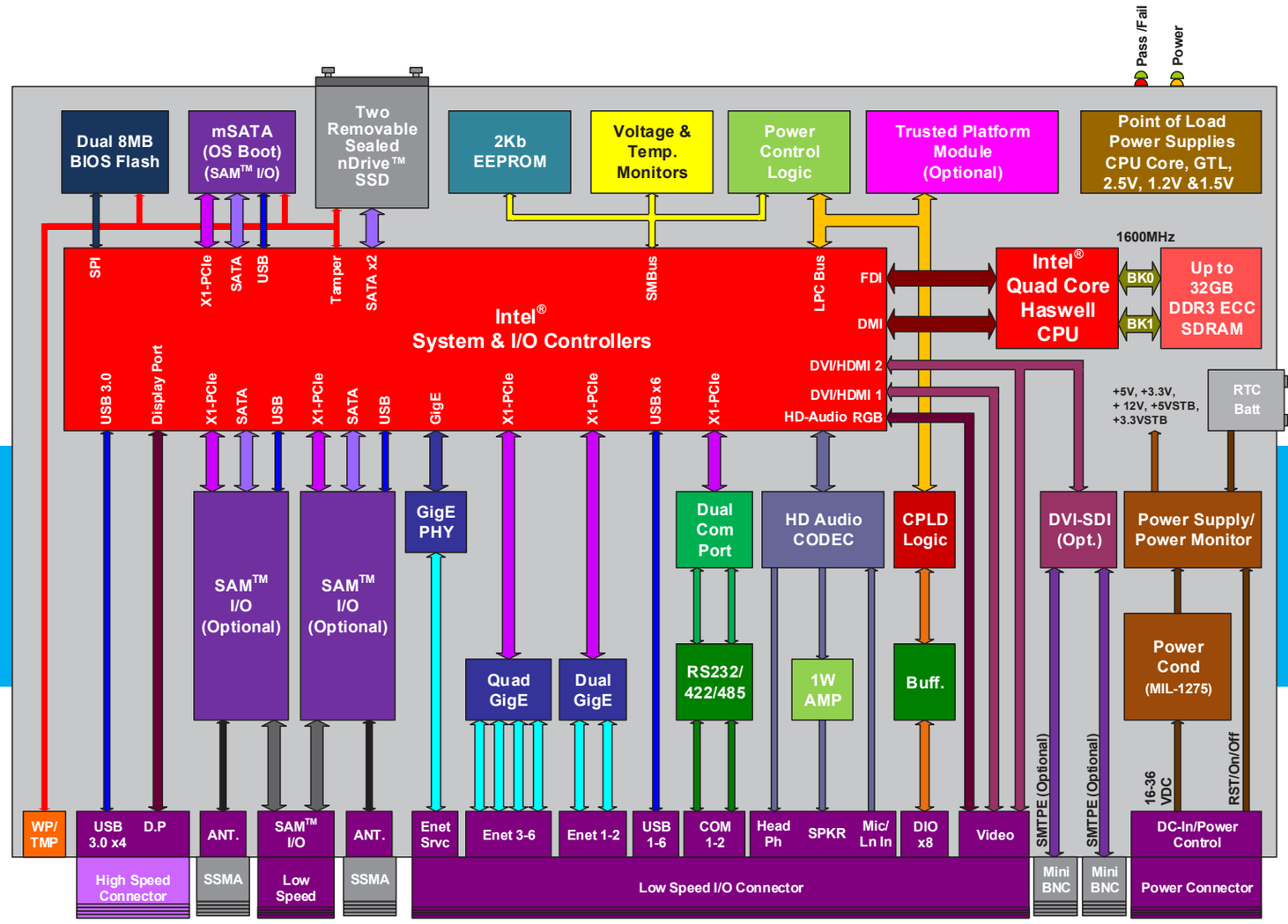
SB1002-SVM (Showing rear connector configuration)

Cooling

The Golden-Eye system is equipped with GMS' patent pending RuggedCool™ technology, which is the most unique cooling system in the industry and is the only system that operates up to -40°C to +85°C at full load without throttling the CPU! This cooling approach provides the lowest thermal resistance to the case while providing the highest shock specifications known in the industry. The SB1002-SVM is a fan-less system for reliable operation and can be mounted directly to a metal surface or used as a stand-alone system.

Full Environmental Specs

The Golden-Eye is available in ruggedization levels R3-R5. Additional information regarding the ruggedization levels and full environmental specifications for this product can be found on our website at www.gms4sbc.com.



"OSPREY" SB1002-HS

Rugged, Small, High-Speed I/O System with Removable Drive(s)

- High-Speed I/O interconnect with USB 3.0 and Display Port
- Up to 2.4GHz Intel® Quad Core i7™ Haswell processor with 6MB of L2 Cache
- Up to 32GB of 1600MHz DDR3 memory with ECC
- Up to two removable fully sealed drives (nDrive™) up to 1TB each
- Up to 1TB of fixed SSD for OS boot
- Four USB 3.0 and six USB 2.0 ports with power
- Display Port for ultra-high resolution video
- Seven Gigabit Ethernet ports with TCP/IP Offloading Engine (TOE)
- Dual DVI/HDMI ports and one RGB video port
- Two Serial ports with RS-232/422/485 options and eight buffered GPIO lines
- Support for dual redundant SDI video outputs (Opt., lose one DVI/HDMI)
- Two SAM™ sites for custom I/O (MIL-STD-1553, Wi-Fi/BT, GPS, etc.)
- Full HD-Audio support with onboard 1W mono amplifier
- Real Time Clock (RTC) with field-replaceable battery
- Dual BIOS boot devices with write protect
- Support for Active Management Technology (AMT) for remote KVM functions
- Intel® Virtualization Technology (VT-x/VT-d2) and Trusted Execution Technology (TXT)
- Trusted Platform Module (TPM) for secure operation (Optional)
- Tamper-proof hardware with optional secure-erase
- Full power-management control for sleep/hibernate operation
- CPU temperature and voltage monitoring with status LED indicators
- Reset and power On/Off signal with suspend support
- Ultra-low SWaP only 5.4" x 6.5" x 2.75", @ 5 lbs. and as low as 40W total
- Fully compliant to MIL-STD 810G, MIL-STD 1275D, MIL-S-901D, DO-160D, MIL-STD 461E and IP66
- Operates at standard temp -20°C to +75°C or extended temp -40°C to +85°C (Optional)
- Available in ruggedization levels R3-R5

General Description

The SB1002-HS "Osprey" is a fifth-generation, ultra-rugged, small, lightweight computer system. It is designed to provide a high-speed I/O system with USB 3.0, Display Port, and removable drives, while providing the highest level of workstation performance possible in a fully ruggedized, conduction-cooled, sealed system, operating from -40°C to +85°C (-20°C to +75°C Standard). This system is designed for applications that require a small, ultra-rugged enclosure with the highest possible performance per dollar and per watt while utilizing rugged interconnects to provide a fully sealed system.

The Osprey supports the latest, most power-efficient Intel® Quad Core™ i7 Haswell processor with Hyper-Threading for a total of 8 logical cores, each operating at up to 2.4GHz with the ability to TurboBoost up to 3.4GHz. To harvest this incredible CPU performance, the CPU is coupled with up to 32GB of RAM organized in two banks that support Error Correcting Code (ECC). The ECC RAM provides 2-bit error detection and 1-bit error correction and supports up to 1600 Mega Transfers per Second (MTS) between CPU and memory. The high-speed I/O is made possible via a new interconnect technology which utilizes differential blades housed in a rugged MIL connector. This advanced interconnect maintains the signal integrity of the high speed I/O over both interconnects for reliable high-speed I/O.

The I/O subsystem for the Osprey is designed to support a wide array of standard and custom I/O functions. The SB1002-HS configuration supports four USB 3.0 ports, and one Display port for ultra-high video resolution up to 3840 x 2160 via a high-speed, rugged MIL blade connector. The SB1002-HS standard configuration supports a total of seven Gigabit Ethernet channels with TCP/IP Offloading Engine (TOE), six USB 2.0 ports, and up to two removable fully sealed nDrives™ of up to 1TB each which can be put in RAID 0 or 1 for performance increase or redundancy. Additional standard I/O functions included are eight buffered digital I/O lines, dual DVI/HDMI or one DVI/HDMI and dual redundant SDI (SMTPE-259/292/424/425) (Optional, Lose one DVI/HDMI) outputs and one RGB video port, two COM ports with RS-232/422/485 options, and an HD-Audio headset jack and a 1-watt audio amplifier to drive an 8-ohm speaker directly. Additional I/O functions include up to 1TB of onboard SSD for OS boot with write protect and secure erase, as well as two SAM™ sites for custom I/O such as Wi-Fi/Bluetooth, GPS, Quad Video capture, CANbus, MIL-STD-1553, FireWire, etc.

The Osprey also supports the most secure storage subsystem possible. The system supports mSATA as a boot device, as well as a dual redundant BIOS Flash with hardware write protect and tamper-proof functions. In addition, the SB1002-HS supports up to two removable or fixed drives with tamper-proof security functions. A hardware tamper-proof circuit enables the security functions of the system to prevent access to any of the stored data on the system. These data security functions, along with the Trusted Platform Module (TPM) and the Trusted Execution Technology (TXT), make the Osprey the most secure high-speed system on the market.

Applications

The Osprey is designed to provide the ultimate rugged computer system for defense and UAV applications, as well as industrial and commercial applications. The Osprey is the next generation of the Golden-Eye III, which is widely deployed in Army WIN-T vehicles, robots for hazardous applications where the computer is exposed to harsh environments, and UAVs, where power, weight, and size are the main considerations. The SB1002-HS is ideal for outdoor applications where it may be fully exposed to rain, sun, dirt, and radiation. This system may be ordered from the factory with operating systems such as Windows 7®, Linux® or VMware® pre-installed. The SB1002-HS is fully compliant to MIL-STD 810G, MIL-STD-1275D, MIL-S-901D, DO-160D, MIL-STD-461E and IP66.

Technology Used

The Osprey utilizes the Intel® Core™ i7 Haswell CPU, which is the newest and most powerful, efficient processor from Intel® with advanced thermal management and graphics. The Haswell Core™ i7 processor supports Hyper-Threading for a total of eight logical cores and supports 6MB of L2 cache shared among the cores. Haswell supports up to 32GB of DDR3 RAM with Error Correcting Code (ECC) and 1600 Mega Transfers per Second (MTS) between the CPU and RAM. Another major improvement of the Haswell processor over the Ivy Bridge Core™ i7 is the graphics performance. The Haswell processor provides three independent video outputs and better-than 40% improvement in 3D acceleration. Haswell is also coupled with Lynx Point™ and is a fourth-generation Core™ i7 with a fully integrated memory controller for the best memory performance possible. This CPU is considered the workhorse of the workstation market with many added power-saving features and peak performance with controlled thermals, as well as security functions such as Intel's second-generation Virtualization Technology VT-x, Trusted Execution Technology (TXT), and Active Management Technology (AMT) for remote KVM functions. The Haswell platform also supports PCIExpress Gen3, USB 3.0 and SATA 3 for the highest performance possible on a workstation platform.

Additional Views and Variations

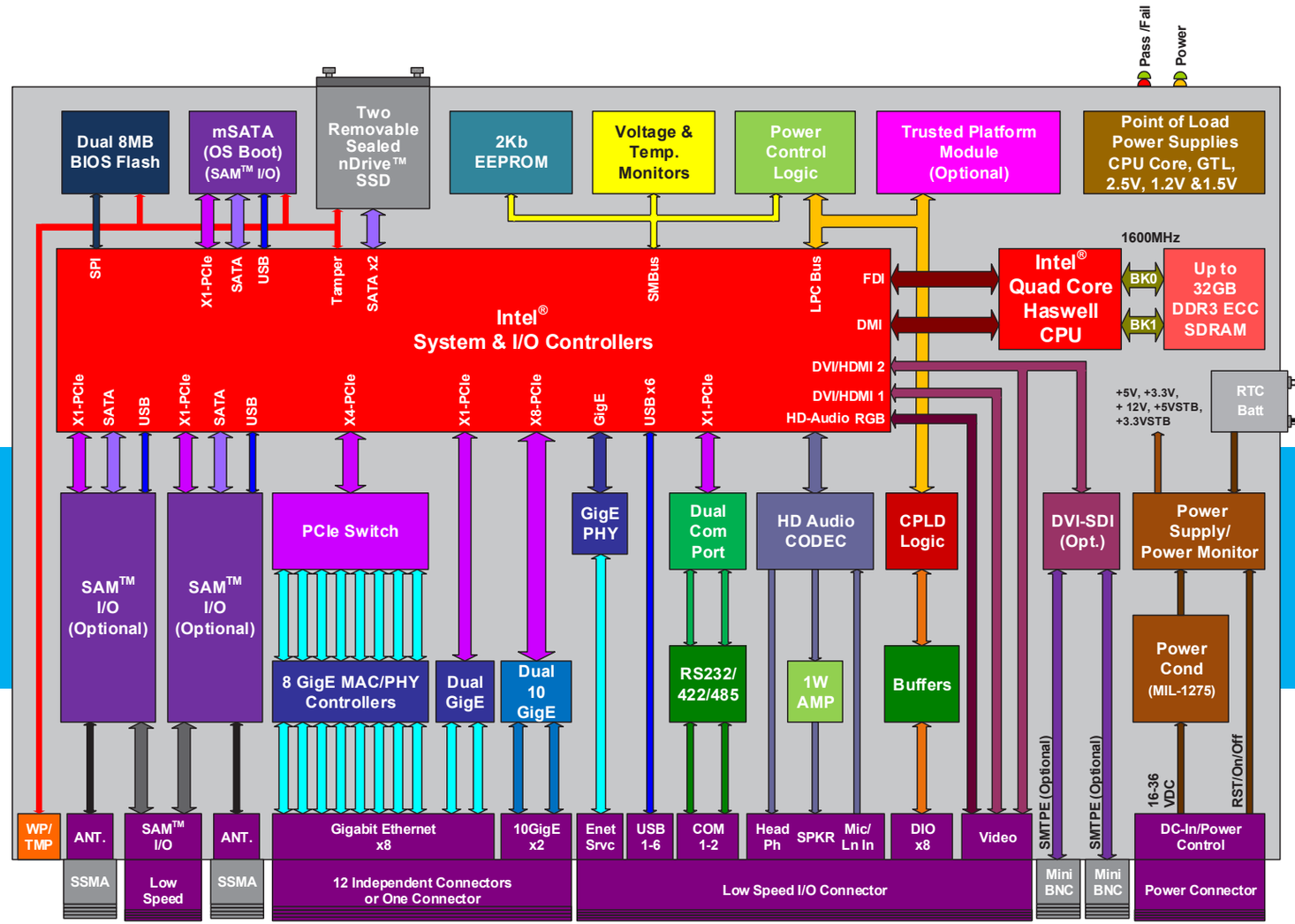
SB1002-HS (Showing rear connector configuration)

Cooling

The Osprey system is equipped with GMS' patent pending RuggedCool™ technology, which is the most unique cooling system in the industry and is the only system that operates up to -40°C to +85°C at full load without throttling the CPU! This cooling approach provides the lowest thermal resistance to the case while providing the highest shock specifications known in the industry. The SB1002-HS is a fan-less system for reliable operation and can be mounted directly to a metal surface or used as a stand-alone system.

Full Environmental Specs

The Osprey is available in ruggedization levels R3-R5. Additional information regarding the ruggedization levels and full environmental specifications for this product can be found on our website at www.gms4sbc.com.



"RAVEN" SB1002-RT

Rugged, Small, 12-Port Intelligent Router System with Removable Drives(s)

- Two 10Gigabit Ethernet Ports with TCP/IP Offloading Engine (TOE)
- Ten Gigabit Ethernet ports with TCP/IP Offloading Engine (TOE)
- One Gigabit Ethernet port for router configuration
- Supports Layer III software routing functions with customizable rules
- Ethernet ports connect to 12 individual or one large MIL circular connectors
- Up to 2.4GHz Intel® Quad Core™ i7 Haswell processor with 6MB of L2 Cache
- Up to 32GB of 1600MHz DDR3 memory with ECC
- Up to two removable fully sealed drives (nDrive™) up to 1TB each
- Up to 1TB of fixed SSD for OS boot
- Support for six USB 2.0 ports with power and two Serial ports with RS-232/422/485 options
- Supports dual DVI/HDMI ports and one RGB video port
- Support for dual redundant SDI video outputs (Opt., lose one DVI/HDMI)
- Two SAM™ sites for custom I/O (MIL-STD-1553, Wi-Fi/BT, GPS, etc.)
- Full HD-Audio support with onboard 1W mono amplifier and eight buffered GPI/O lines
- Dual BIOS boot devices with write-protect and RTC with field-replaceable battery
- Intel® Virtualization Technology (VT-x/VT-d2) and Trusted Execution Technology (TXT)
- Trusted Platform Module (TPM) for secure operation (Optional)
- Support for Active Management Technology (AMT) for remote KVM functions
- Tamper-proof hardware with optional secure-erase
- Full power-management control for sleep/hibernate operation
- CPU temperature and voltage monitoring with status LED indicators
- Reset and power On/Off signal with suspend support
- Ultra-low SWaP at 5.4" x 6.5" x 2.75", @ 5 lbs. and as low as 50W
- Fully compliant to MIL-STD 810G, MIL-STD 1275D, MIL-S-901D, DO-160D, MIL-STD 461E and IP66
- Operates at standard temp -20°C to +75°C and extended temp -40°C to +85°C (Optional)
- Available in ruggedization levels R3-R5

General Description

The SB1002-RT "Raven" is a fifth-generation, ultra-rugged, small, lightweight computer system. It is designed to provide a 12-port intelligent software router system with two removable drives supporting Layer III routing functions with customizable rules while providing the highest level of workstation performance possible in a fully ruggedized, conduction-cooled, sealed system, operating from -40°C to +85°C (-20°C to +75°C Standard). This system is designed for applications that require a very high performance, low-cost router in a small, ultra-rugged enclosure with the highest possible performance per dollar and per watt while utilizing rugged interconnects to provide a fully sealed system.

The Raven supports the latest, most power-efficient Intel® Core™ i7 Haswell processor with Hyper-Threading for a total of 8 logical cores, each operating at up to 2.4GHz with the ability to TurboBoost up to 3.4GHz. To harvest this incredible CPU performance, the CPU is coupled with up to 32GB of RAM organized in two banks that support Error Correcting Code (ECC). The ECC RAM provides 2-bit error detection and 1-bit error correction and supports up to 1600 Mega Transfers per Second (MTS) between CPU and memory.

The I/O subsystem for the Raven is designed to support a wide array of standard and custom I/O functions. The SB1002-RT configuration supports ten Gigabit Ethernet ports with TCP/IP offloading engine, two 10Gigabit Ethernet ports with TCP/IP Offloading Engine (TOE), one additional Gigabit Ethernet for system configuration and remote control, six USB 2.0 ports, and up to two removable fully sealed nDrives™ of up to 1TB each which can be put in RAID 0 or 1 for performance increase or redundancy. Additional standard I/O functions include eight buffered digital I/O lines, dual DVI/HDMI or one DVI/HDMI and dual redundant SDI (SMTPE-259/292/424/425) (Optional, Lose one DVI/HDMI) outputs and one RGB video port, two COM ports with RS-232/422/485 options, and a full HD-Audio headset jack and a 1-watt audio amplifier to drive an 8-ohm speaker directly. Additional I/O functions include up to 1TB of onboard SSD for OS boot with write-protect, as well as two SAM™ I/O sites for custom I/O such as Wi-Fi/Bluetooth, GPS, Quad Video capture, CANbus, MIL-STD-1553, FireWire, etc.

The Raven also supports the most secure storage subsystem possible. The system supports mSATA as a boot device, as well as a dual redundant BIOS Flash with hardware write-protect and tamper-proof functions. In addition, the SB1002-RT supports up to two removable sealed drives with tamper-proof security functions. A hardware tamper-proof circuit enables the security functions of the system to prevent access to any of the stored data on the system. These data security functions, along with the Trusted Platform Module (TPM) and the Trusted Execution Technology (TXT), make the Raven the most secure router system on the market.

Applications

The Raven is designed to provide the ultimate multi-port, rugged, low-cost router computer system for defense and UAV applications, as well as industrial and commercial applications. The Raven is the next generation of the Golden-Eye III, which is widely deployed in Army WIN-T vehicles, robots for hazardous applications where the computer is exposed to harsh environments, and UAVs, where power, weight, and size are the main considerations. The SB1002-RT is ideal for outdoor applications where it may be fully exposed to rain, sun, dirt, and radiation. This system may be ordered from the factory with operating systems such as Windows 7®, Linux® or VMware® pre-installed. The SB1002-RT is fully compliant to MIL-STD 810G, MIL-STD 1275D, MIL-S-901D, DO-160D, MIL-STD 461E and IP66.

Technology Used

The Raven utilizes the Intel® Core™ i7 Haswell CPU, which is the newest and most powerful, efficient processor from Intel® with advanced thermal management and graphics. The Haswell Core™ i7 processor supports Hyper-Threading for a total of eight logical cores and supports 6MB of L2 cache shared among the cores. Haswell supports up to 32GB of DDR3 RAM with Error Correcting Code (ECC) and 1600 Mega Transfers per Second (MTS) between the CPU and RAM. Another major improvement of the Haswell processor over the Ivy Bridge Core™ i7 is the graphics performance. The Haswell processor provides three independent video outputs and better-than 40% improvement in 3D acceleration. Haswell is also coupled with Lynx Point™ and is a fourth-generation Core™ i7 with a fully integrated memory controller for the best memory performance possible. This CPU is considered the workhorse of the workstation market with many added power saving features and peak performance with controlled thermals, as well as security functions such as Intel's second-generation Virtualization Technology VT-x, Trusted Execution Technology (TXT), and Active Management Technology (AMT) for remote KVM functions. The Haswell platform also supports PCIExpress Gen3, USB 3.0 and SATA 3 for the highest performance possible on a workstation platform.

Cooling

The Raven system is equipped with GMS' patent pending RuggedCool™ technology, which is the most unique cooling system in the industry and is the only system that operates up to -40°C to +85°C at full load without throttling the CPU! This cooling approach provides the lowest thermal resistance to the case while providing the highest shock specifications known in the industry. The SB1002-RT is a fan-less system for reliable operation and can be mounted directly to a metal surface or used as a stand-alone system.

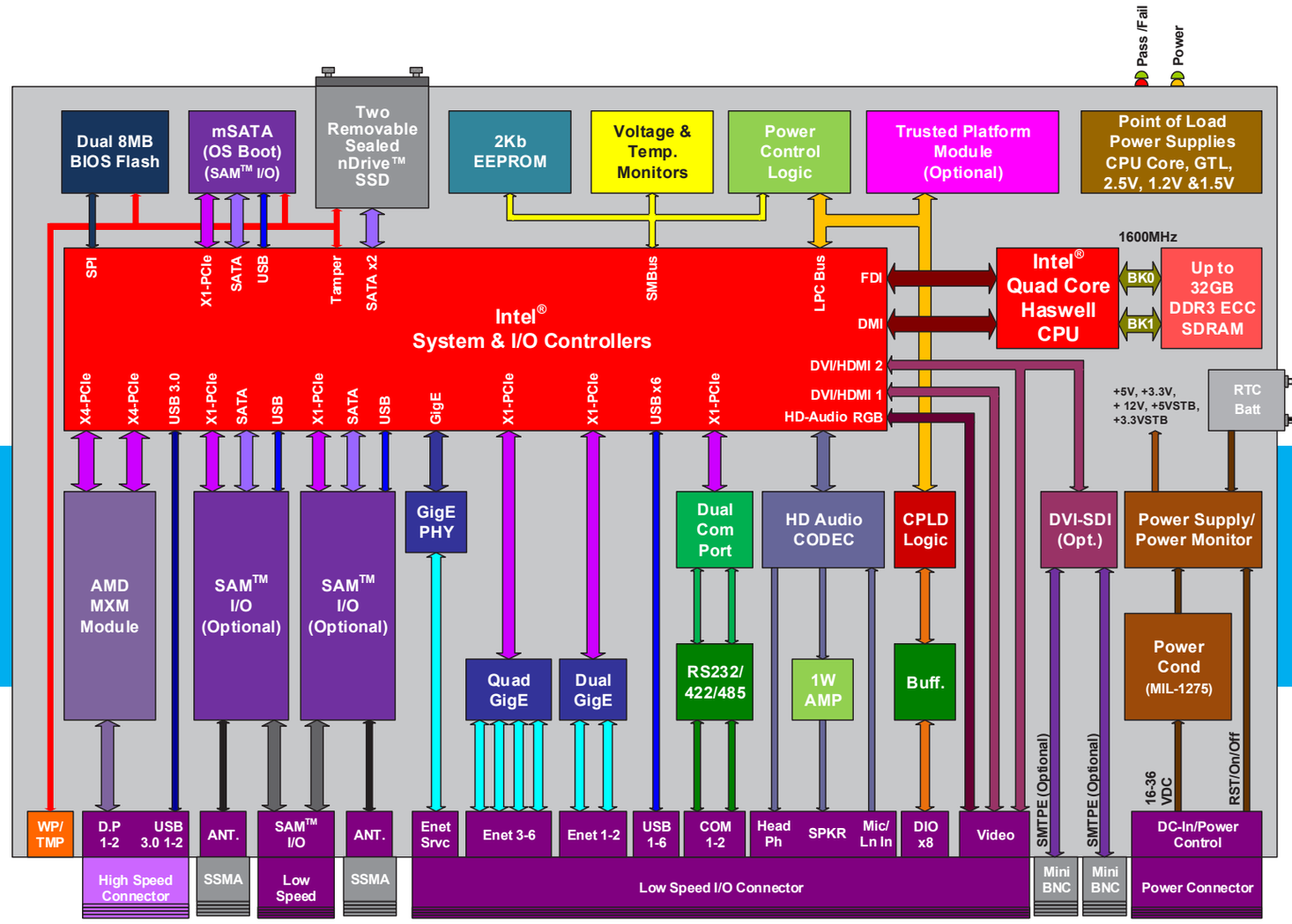
Additional Views and Variations

SB1002-RT (Showing rear connector configuration)

SB1002-RT (Showing rear connector configuration)

Full Environmental Specs

The Raven is available in ruggedization levels R3-R5. Additional information regarding the ruggedization levels and full environmental specifications for this product can be found on our website at www.gms4sbc.com.



"PEACOCK" SB1002-XV

Rugged, Small, Extreme Video System with Removable Drive(s)

- Supports AMD Radeon™ GPU with 2GB GDDR5 SDRAM
- GPU includes a Unified Video Decoder (UVD) for H.264, VC-1, MPEG-2 and MPEG-4
- Supports OpenCL™ 1.2 and DirectCompute 11.1 technology
- Dual DisplayPort and dual DVI/HDMI ports and one VGA video port
- Up to 2.4GHz Intel® Quad Core™ i7 Haswell processor with 6MB of L2 Cache
- Up to 32GB of 1600MHz DDR3 memory with ECC
- Up to two removable fully sealed drives (nDrive™) up to 1TB each
- Up to 1TB of fixed SSD for OS boot
- Two USB 3.0 and six USB 2.0 ports with power
- Up to seven Gigabit Ethernet ports with TCP/IP Offloading Engine (TOE)
- Two Serial ports with RS-232/422/485 options and eight GPI/O lines
- Support for dual redundant SDI video outputs (opt., lose one DVI/HDMI)
- Two SAM™ sites for custom I/O (Mil-STD-1553, Wi-Fi/BT, GPS, etc.)
- Full HD-Audio support with onboard 1W mono amplifier
- Dual BIOS boot devices with write-protect and RTC with field-replaceable battery
- Support for Active Management Technology (AMT) for remote KVM functions
- Intel® Virtualization Technology (VT-x/VT-d2) and Trusted Execution Technology (TXT)
- Trusted Platform Module (TPM) for secure operation (optional)
- Tamper-proof hardware with optional secure-erase
- Full power-management control for sleep/hibernate operation
- CPU temperature and voltage monitoring with status LED indicators
- Reset and power On/Off signal with suspend support
- Ultra-low SWaP only 5.4" x 6.5" x 2.75", @ 5 lbs. and as low as 60W total
- Fully compliant to MIL-STD 810G, MIL-STD 1275D, MIL-S-901D, DO-160D, MIL-STD 461E and IP66
- Operates at standard temp -20°C to +75°C or extended temp -40°C to +85°C (optional)
- Available in ruggedization levels R3-R5

General Description

The SB1002-XV "Peacock" is a fifth-generation, ultra-rugged, small, lightweight video computer system with an emphasis on video processing. It is designed to support AMD's Radeon™ GPU with up to 2GB of GDDR5 SDRAM a Unified Video Decoder (UVD) 4 for H.264, VC-1, MPEG-4, and MPEG-2, and OpenCL™1.2 and DirectCompute 11.1 technology, while providing the highest level of workstation performance possible in a fully ruggedized, conduction-cooled, sealed system, operating from -40°C to +85°C (-20°C to +75°C standard). This system is designed for applications that require graphics engine performance above what is supported in the embedded graphics with the Intel® Chipset, in a small ultra-rugged enclosure with the highest possible graphic performance per dollar and per watt while utilizing rugged interconnects to provide a fully sealed system.

The Peacock supports the latest, most power-efficient, Intel® Core™ i7 Haswell processor with Hyper-Threading for a total of 8 logical cores, each operating at up to 2.4GHz with the ability to TurboBoost up to 3.4GHz. To harvest this incredible CPU performance, the CPU is coupled with up to 32GB of RAM organized in two banks that support Error Correcting Code (ECC). The ECC RAM provides 2-bit error detection and 1-bit error correction and supports up to 1600 Mega Transfers per Second (MTS) between CPU and memory. The video is generated via an AMD Radeon™ MXM module with dual independent DisplayPort with up to 2GB of GDDR5 SDRAM for astounding graphic performance. Other MXM modules may be deployed based on specific applications and power requirements. Additionally, two HDMI/DVI ports and one VGA port are provided via the Intel® Embedded Graphics chipset.

The I/O subsystem for the Peacock is designed to support a wide array of standard and custom I/O functions. The SB1002-XV configuration supports up to seven Gigabit Ethernet ports with TCP/IP Offloading Engine (TOE), two USB 3.0 and six USB 2.0 ports with power, up to two removable fully sealed nDrives™ of up to 1TB each which can be put in RAID 0 or 1 for performance increase or redundancy, eight buffered digital I/O lines, and up to five simultaneous video ports. Additional I/O includes dual DVI/HDMI or one DVI/HDMI and dual redundant SDI (SMPTE-259/292/424/425) (optional, lose one DVI/HDMI) outputs and one VGA video port, two COM ports with RS-232/422/485 options and a full HD-Audio headset jack and a 1-watt audio amplifier to drive an 8-ohm speaker directly. Additional I/O functions include up to 1TB of onboard SSD for OS boot with write-protect, as well as two SAM™ I/O sites for custom I/O such as Wi-Fi/Bluetooth, GPS, Quad Video capture, CANbus, MIL-STD-1553, FireWire, etc.

The Peacock also supports the most secure storage subsystem possible. The system supports mSATA as a boot device, as well as a dual redundant BIOS Flash with hardware write-protect and tamper-proof functions. In addition, the SB1002-XV supports two removable drives with tamper-proof security functions. A hardware tamper-proof circuit enables the security functions of the system to prevent access to any of the stored data on the system. These data security functions, along with the Trusted Platform Module (TPM) and the Trusted Execution Technology (TXT), make the Peacock the most secure video system on the market.

Applications

The Peacock is designed to provide the ultimate video processing computer system for defense and UAV applications, as well as industrial and commercial applications. The Peacock is the next generation of the Golden-Eye III, which is widely deployed in Army WIN-T vehicles, robots for hazardous applications where the computer is exposed to harsh environments, and UAVs, where power, weight, and size are the main considerations. The SB1002-XV is ideal for outdoor applications where it may be fully exposed to rain, sun, dirt and radiation. This system may be ordered from the factory with operating systems such as Windows 7®, Linux® or VMware® pre-installed. The SB1002-XV is fully compliant to MIL-STD 810G, MIL-STD 1275D, MIL-S-901D, DO-160D, MIL-STD 461E and IP66.

Technology Used

The Peacock utilizes the Intel® Core™ i7 Haswell CPU, which is the newest and most powerful, efficient processor from Intel® with advanced thermal management and graphics. The Haswell Core™ i7 processor supports Hyper-Threading for a total of eight logical cores and supports 6MB of L2 cache shared among the cores. Haswell supports up to 32GB of DDR3 RAM with Error Correcting Code (ECC) and 1600 Mega Transfers per Second (MTS) between the CPU and RAM. Another major improvement of the Haswell processor over the Ivy Bridge Core™ i7 is the graphics performance. The Haswell processor provides three independent video outputs and better-than-40% improvement in 3D acceleration. Haswell is also coupled with Lynx Point™ and is a fourth-generation Core™ i7 with a fully integrated memory controller for the best memory performance possible. This CPU is considered the workhorse of the workstation market with many added power-saving features and peak performance with controlled thermals, as well as security functions such as Intel's second-generation Virtualization Technology VT-x, Trusted Execution Technology (TXT) and Active Management Technology (AMT) for remote KVM functions. The Haswell platform also supports PCIExpress Gen3, USB 3.0 and SATA 3 for the highest performance possible on a workstation platform.

Additional Views and Variations

SB1002-XV (Showing rear connector configuration)

Cooling

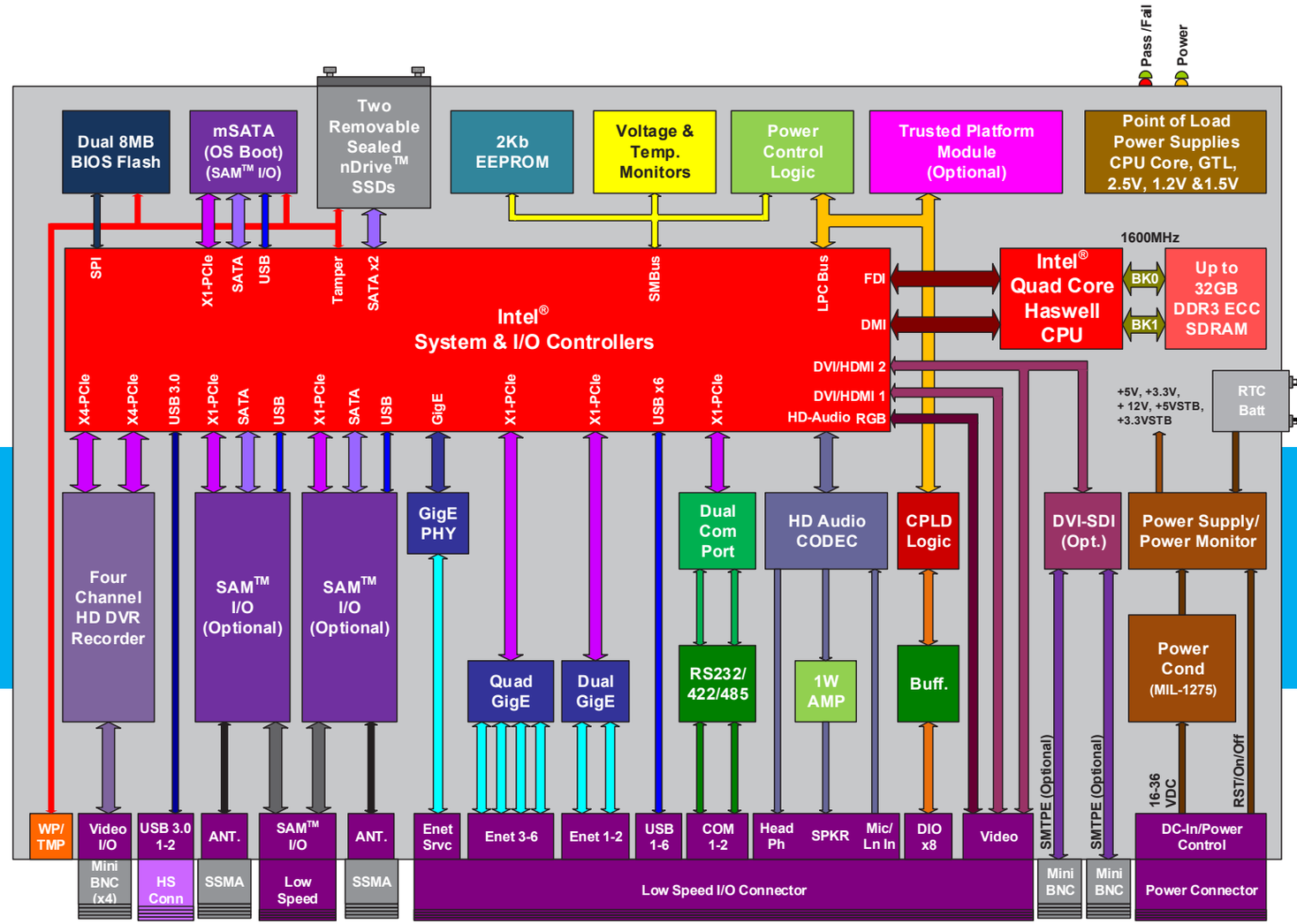
The Peacock system is equipped with GMS' patent pending RuggedCool™ technology, which is the most unique cooling system in the industry and is the only system that operates up to -40°C to +85°C at full load without throttling the CPU! This cooling approach provides the lowest thermal resistance to the case while providing the highest shock specifications known in the industry. The SB1002-XV is a fan-less system for reliable operation and can be mounted directly to a metal surface or used as a stand-alone system.

Full Environmental Specs

The Peacock is available in ruggedization levels R3-R5. Additional information regarding the ruggedization levels and full environmental specifications for this product can be found on our website at www.gms4sbc.com.

"EAGLE" SB1002-HDVR

Rugged, 4-Channel HD-DVR Recorder with Removable Drive(s)



- Records up to four HD video ports (SDI) simultaneously at 1080p/30Hz with audio
- Utilizes the latest TI DaVinci DSP for real time encoding and decoding
- Simultaneous Record and Monitor/Playback over LAN
- Supports H.264 compression on all four channels simultaneously
- Up to 2.4GHz Intel® Quad Core™ i7 Haswell processor with 6MB of L2 Cache
- Up to 32GB of 1600MHz DDR3 memory with ECC
- Up to two removable fully sealed drives (nDrive™) up to 1TB each
- Up to 1TB of fixed SSD for OS boot
- Two USB 3.0 and six USB 2.0 ports with power
- Seven Gigabit Ethernet ports with TCP/IP Offloading Engine (TOE)
- Supports dual DVI/HDMI ports and one RGB video port
- Two Serial ports with RS-232/422/485 options and eight buffered GPI/O lines
- Support for dual redundant SDI video outputs (Opt., lose one DVI/HDMI)
- Two SAM™ sites for custom I/O (Mil-STD-1553, Wi-Fi/BT, GPS, etc.)
- Full HD-Audio support with onboard 1W mono amplifier
- Dual BIOS boot devices with write-protect and RTC with field-replaceable battery
- Support for Active Management Technology (AMT) for remote KVM functions
- Intel® Virtualization Technology (VT-x/VT-d2) and Trusted Execution Technology (TXT)
- Trusted Platform Module (TPM) for secure operation (Optional)
- Tamper-proof hardware with optional secure-erase
- CPU temperature and voltage monitoring with status LED indicators
- Reset and power On/Off signal with suspend support
- Ultra-low SWaP only 5.4" x 6.5" x 2.75" @ 5 lbs. and as low as 40W total
- Fully compliant to MIL-STD 810G, MIL-STD 1275D, MIL-S 901D, DO-160D, MIL-STD 461E and IP66
- Operates at standard temp -20°C to +75°C or extended temp -40°C to +85°C (Optional)
- Available in ruggedization levels R3-R5

General Description

The SB1002-HDVR "Eagle" is a fifth-generation, ultra-rugged, small, lightweight HD-DVR computer system. It is designed to record up to four HD video ports simultaneously at 1080P/30Hz with audio, simultaneously record and monitor/playback over LAN, and support H.264 compression on all four channels and metadata processing through Texas Instruments' DaVinci DSP, offering real time encoding and decoding capabilities. The "Eagle" provides the highest level of workstation performance possible in a fully ruggedized, conduction-cooled, sealed system, operating up to -40°C to +85°C (-20°C to +75°C standard). This system is designed for applications that require a small, ultra-rugged enclosure with the highest possible performance per dollar and per watt while utilizing rugged interconnects to provide a fully sealed system.

The Eagle supports the latest, most power-efficient Intel® Quad Core™ i7 Haswell processor with Hyper-Threading for a total of 8 logical cores, each operating at up to 2.4GHz with the ability to TurboBoost up to 3.4GHz. To harvest this incredible CPU performance, the CPU is coupled with up to 32GB of RAM organized in two banks that support Error Correcting Code (ECC). The ECC RAM provides 2-bit error detection and 1-bit error correction and supports up to 1600 Mega Transfers per Second (MTS) between CPU and memory.

The I/O subsystem for the Eagle is designed to support a wide array of standard and custom I/O functions. The SB1002-HDVR configuration supports six Gigabit Ethernet channels with TCP/IP Offloading Engine (TOE), one additional Gigabit Ethernet for system configuration and remote control, two USB 3.0 and six USB 2.0 ports, and up to two removable fully sealed nDrives™ of up to 1TB each which can be put in RAID 0 or 1. Additional standard I/O functions include eight buffered digital I/O lines, dual DVI/HDMI or one DVI/HDMI and dual redundant SDI (SMTPE-259/292/424/425) (Optional, Lose one DVI/HDMI) outputs and one RGB video port, two COM ports with RS-232/422/485 options, and a full HD-Audio headset jack and a 1-watt audio amplifier to drive an 8-ohm speaker directly. Additional I/O functions include up to 1TB of onboard SSD for OS boot with write-protect, as well as two SAM™ I/O sites for custom I/O such as Wi-Fi/Bluetooth, GPS, Quad Video capture, CANbus, MIL-STD-1553, FireWire, etc.

The Eagle also supports the most secure storage subsystem possible. The system supports mSATA as a boot device, as well as a dual redundant BIOS Flash with hardware write-protect and tamper-proof functions. In addition, the SB1002-HDVR supports up to two removable or fixed sealed drives with tamper-proof security functions. A hardware tamper-proof circuit enables the security functions of the system to prevent access to any of the stored data on the system. These data security functions, along with the Trusted Platform Module (TPM) and the Trusted Execution Technology (TXT), make the Eagle the most secure HD-DVR system on the market.

Applications

The Eagle is designed to provide the ultimate quad-channel HD-DVR computer system for defense and UAV applications, as well as industrial and commercial applications. The Eagle is the next generation of the Golden-Eye III, which is widely, deployed in WIN-T Army vehicles, robots for hazardous applications where the computer is exposed to harsh environments, and UAVs, where power, weight, and size are the main considerations. The SB1002-HDVR is ideal for outdoor applications where it may be fully exposed to rain, sun, dirt, and radiation. This system may be ordered from the factory with operating systems such as Windows 7®, Linux® or VMware® pre-installed. The SB1002-HDVR is fully compliant to MIL-STD 810G, MIL-STD-1275D, MIL-S-901D, MIL-STD-461E, DO-160D and IP66.

Technology Used

The Eagle utilizes the Intel® Core™ i7 Haswell CPU, which is the newest and most powerful, efficient processor from Intel® with advanced thermal management and graphics. The Haswell Core™ i7 processor supports Hyper-Threading for a total of eight logical cores and supports 6MB of L2 cache shared among the cores. Haswell supports up to 32GB of DDR3 RAM with Error Correcting Code (ECC) and 1600 Mega Transfers per Second (MTS) between the CPU and RAM. Another major improvement of the Haswell processor over the Ivy Bridge Core™ i7 is the graphics performance. The Haswell processor provides three independent video outputs and better-than 40% improvement in 3D acceleration. Haswell is also coupled with Lynx Point™ and is a fourth-generation Core™ i7 with a fully integrated memory controller for the best memory performance possible. This CPU is considered the workhorse of the workstation market with many added power saving features and peak performance with controlled thermals, as well as security functions such as Intel's second-generation Virtualization Technology VT-x, Trusted Execution Technology (TXT), and Active Management Technology (AMT) for remote KVM functions. The Haswell platform also supports PCIExpress Gen3, USB 3.0 and SATA 3 for the highest performance possible on a workstation platform.

Additional Views and Variations

SB1002-HDVR (Showing removable canister)

Cooling

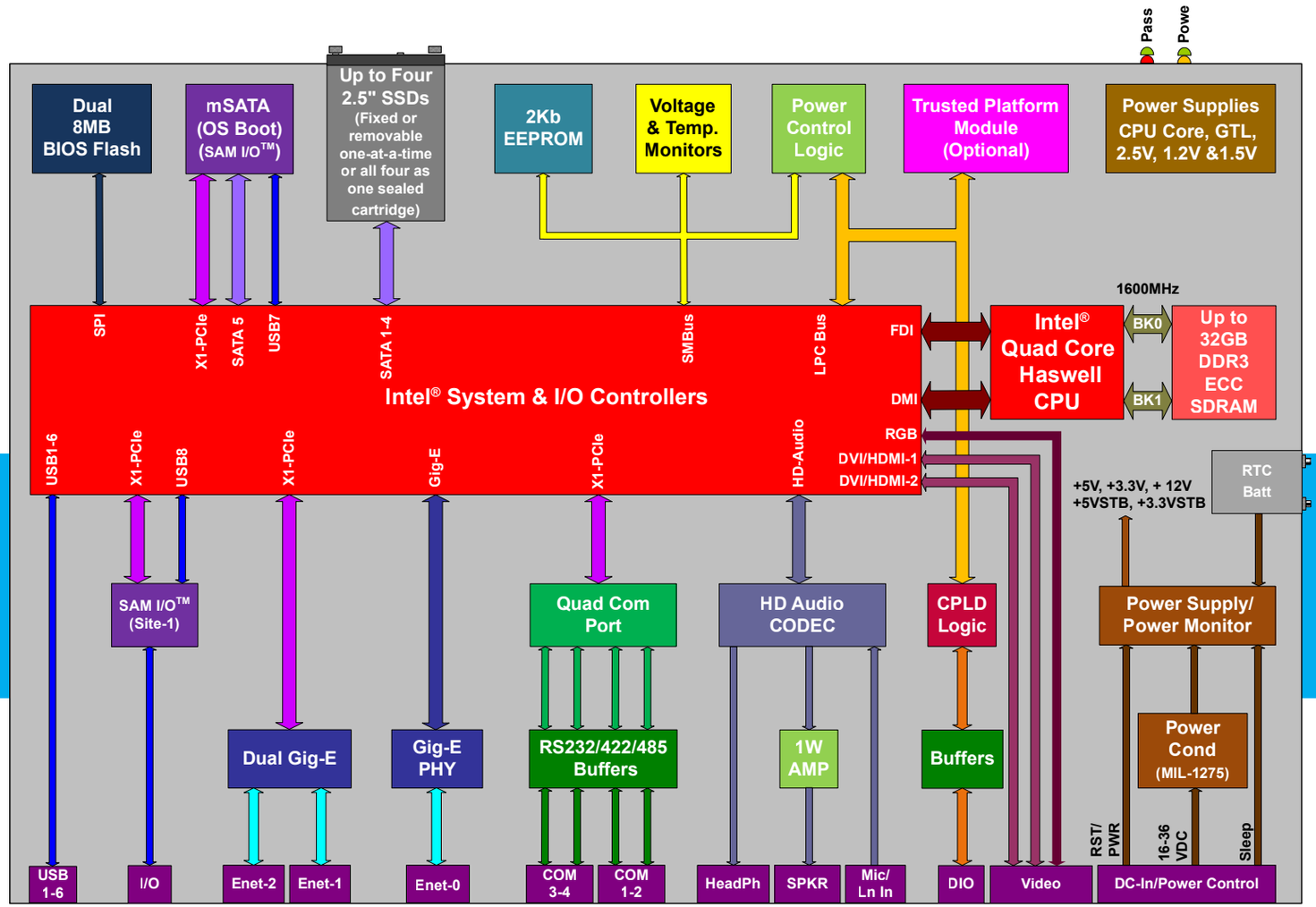
The Eagle system is equipped with GMS' patent pending RuggedCool™ technology, which is the most unique cooling system in the industry and is the only system that operates up to -40°C to +85°C at full load without throttling the CPU! This cooling approach provides the lowest thermal resistance to the case while providing the highest shock specifications known in the industry. The SB1002-HDVR is a fan-less system for reliable operation and can be mounted directly to a metal surface or used as a stand-alone system.

Full Environmental Specs

The Eagle is available in ruggedization levels R3-R5. Additional information regarding the ruggedization levels and full environmental specifications for this product can be found on our website at www.gms4sbc.com.

"SEAHAWK" SB1002-FSS

Rugged, Lightweight NAS with Removable Storage, Ultra-High Insertion Cycles



- Up to 2.4GHz Intel® Quad Core™ i7 Haswell processor with 6MB of L2 Cache
- Up to 32GB of 1600MHz DDR3 memory with ECC
- Up to 8TB removable storage canister, withstands ~10,000 insertion cycles (optional)
- Fully sealed drive bay when canister is removed
- Up to 1TB of fixed SSD for OS boot
- Up to three GigE ports with TCP/IP Offloading Engine (TOE)
- Up to six USB 2.0 ports and four Serial ports with RS-232/422/485 options
- Dual DVI/HDMI ports and one RGB video port
- Eight buffered General Purpose I/O lines
- Support for one SAM™ site for custom I/O
- Full HD-Audio support with onboard 1W mono amplifier
- Real Time Clock (RTC)
- Dual BIOS boot devices with write protect
- Intel Virtualization Technology (VT-x/VT-D2)
- Trusted Execution Technology
- Trusted Platform Module (TPM) for secure operation (optional)
- Support for Active Management Technology (AMT) for remote KVM functions
- Full power management control for Sleep/Hibernate operation
- CPU temperature and voltage monitoring with status LED indicators
- Reset and power On/Off signal with suspend support
- Support for Windows®, Linux® and VMware®
- Fully operates from -40°C to +85°C at full load with no throttling
- Ultra-low SWaP only 5.02" x 9.11" x 4.21" @ 5 lbs. and as low as 40W total
- Fully compliant to MIL-STD 810G, MIL-STD 1275D, MIL-S 901D, DO-160D, MIL-STD 461E and IP66
- Operates at standard temp -20°C to +75°C or extended temp -40°C to +85°C (optional)
- Available in ruggedization levels R3-R5

General Description

The SB1002-FSS "Seahawk" is a fifth-generation, ultra-rugged, small, lightweight computer system. It is designed to provide up to 8TB of removable SSD storage as a single canister with ultra-high insertion capabilities for an extended product life cycle, while providing the highest level of workstation performance possible in a fully ruggedized, conduction-cooled, sealed system operating from -40°C to +85°C (-20°C to +75°C standard).

The Seahawk supports the latest, most power-efficient Intel® Quad Core™ i7 Haswell processor with Hyper-Threading for a total of 8 logical cores, each operating at up to 2.4GHz with the ability to TurboBoost up to 3.4GHz. To harvest this incredible CPU performance, the CPU is coupled with up to 32GB of RAM organized in two banks that support error correcting code (ECC). The ECC RAM provides 2-bit error detection and 1-bit error correction and supports up to 1600 mega-transfers per second (MTS) between CPU and memory.

The I/O subsystem for the Seahawk is designed to support a wide array of standard and custom I/O functions. The SB1002-FSS supports three Gigabit Ethernet channels with TCP/IP offloading engine, six USB 2.0 ports, up to 8TB of removable SSD storage, eight buffered digital I/O lines, four COM ports with RS-232/422/485 options, dual DVI/HDMI ports, one RGB video port, and an HD audio headset with a one-watt audio amplifier to drive an 8-ohm speaker directly. Additional I/O functions include up to 1TB of onboard SSD for OS boot with write-protect, as well as one SAM™ I/O sites for custom I/O such as Wi-Fi/Bluetooth, GPS, Quad Video capture, CANbus, MIL-STD-1553, FireWire, etc.

The Seahawk also supports the most secure storage subsystem possible. The system supports mSATA as a boot device, as well as a dual redundant BIOS Flash with hardware write-protect. These data security functions, along with the Trusted Platform Module (TPM) and the Trusted Execution Technology (TXT), make the Seahawk the most secure NAS system on the market.

Applications

The Seahawk is designed to provide the ultimate Network Attached Storage (NAS) or data-logging rugged computer system for defense and UAV applications, as well as industrial and commercial applications, specifically for those that require frequent insertion and desertion of removable data drives. The Seahawk is the next generation of the Golden-Eye III, which is widely deployed in Army WIN-T vehicles, robots for hazardous applications where the computer is exposed to harsh environments, and UAVs, where power, weight, and size are the main considerations. The SB1002-FSS is ideal for outdoor applications where it may be fully exposed to rain, sun, dirt, and radiation. This system may be ordered from the factory with operating systems such as Windows®, Linux®, or VMware® pre-installed. The SB1002-FSS is fully compliant to MIL-STD 810G, MIL-STD-1275D, MIL-S-901D, DO-160D, MIL-STD-461E and IP66.

Technology Used

The Seahawk utilizes the Intel® Core™ i7 Haswell CPU, which is the newest and most powerful, efficient processor from Intel® with advanced thermal management and graphics. The Haswell Core™ i7 processor supports Hyper-Threading for a total of eight logical cores and supports 6MB of L2 cache shared among the cores. Haswell supports up to 32GB of DDR3 RAM with error correcting code (ECC) and 1600 mega-transfers per second (MTS) between the CPU and RAM. Another major improvement of the Haswell processor over the Ivy Bridge Core™ i7 is the graphics performance. The Haswell processor provides three independent video outputs and better-than 40% improvement in 3D acceleration. Haswell is also coupled with Lynx Point™ and is a fourth-generation Core™ i7 with a fully integrated memory controller for the best memory performance possible. This CPU is considered the workhorse of the workstation market with many added power saving features and peak performance with controlled thermals, as well as security functions such as Intel's second-generation Virtualization Technology VT-x, Trusted Execution Technology (TXT), and Active Management Technology (AMT) for remote KVM functions. The Haswell platform also supports PCIExpress Gen3, USB 3.0 and SATA 3 for the highest performance possible on a workstation platform.

Additional Views and Variations

SB1002-FSS (Showing removable canister)

Cooling

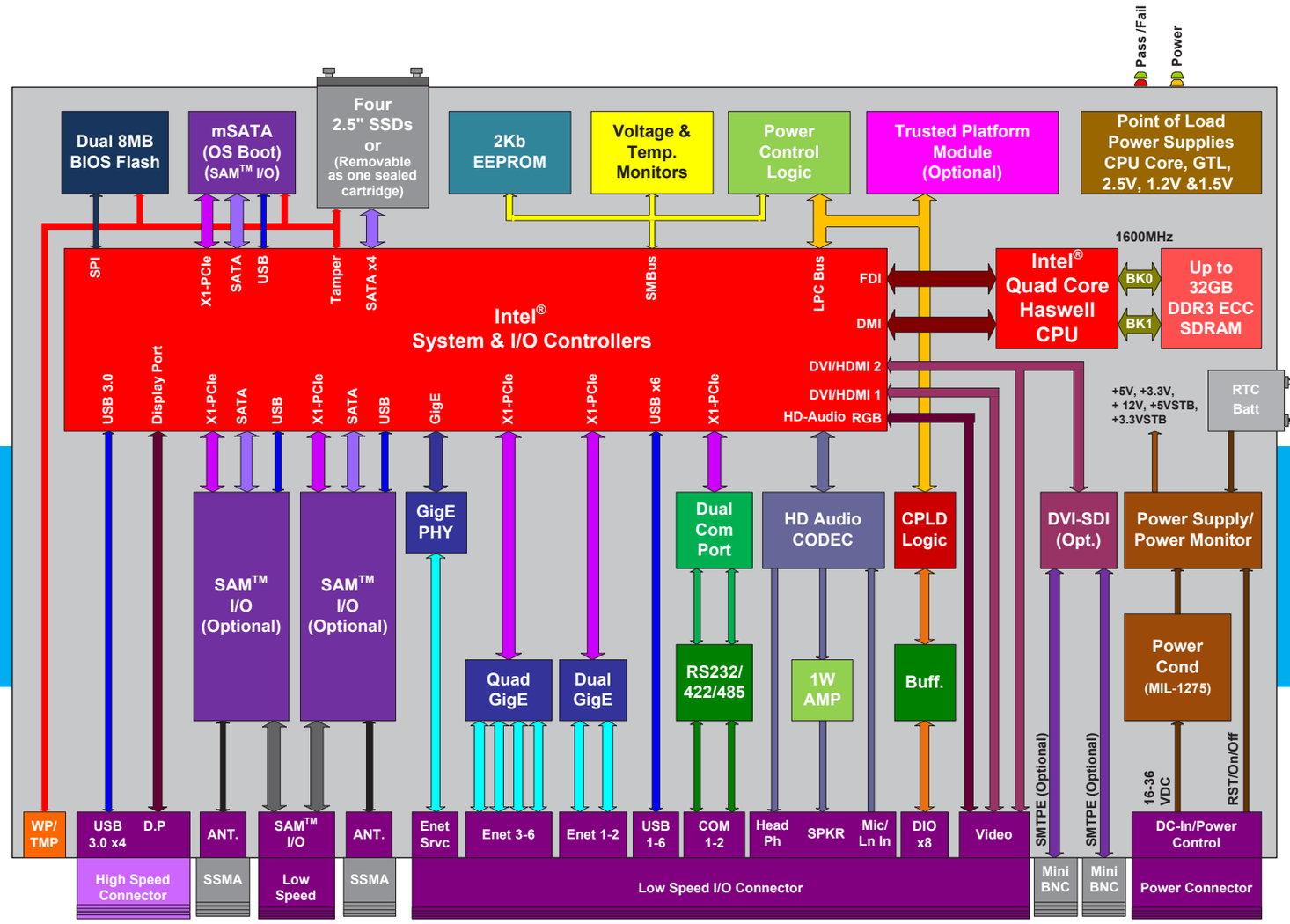
The Seahawk system is equipped with GMS' patent pending RuggedCool™ technology, which is the most unique cooling system in the industry and is the only system that operates up to -40°C to +85°C at full load without throttling the CPU! This cooling approach provides the lowest thermal resistance to the case while providing the highest shock specifications known in the industry. The SB1002-FSS is a fan-less system for reliable operation and can be mounted directly to a metal surface or used as a stand-alone system.

Full Environmental Specs

The Seahawk is available in ruggedization levels R3-R5. Additional information regarding the ruggedization levels and full environmental specifications for this product can be found on our website at www.gms4sbc.com.

"CONDOR" SB1002-R4

Rugged, Small, High-Speed I/O System with Quad Removable Drive(s)



- Up to 8TB of removable SSDs as four individual drives or as single canister (Optional)
- High-Speed I/O interconnect with USB 3.0 and Display Port
- Up to 2.4GHz Intel® Quad Core i7™ Haswell processor with 6MB of L2 Cache
- Up to 32GB of 1600MHz DDR3 memory with ECC
- Up to 1TB of fixed SSD for OS boot
- Four USB 3.0 and six USB 2.0 ports with power
- Display Port for ultra-high resolution video
- Seven Gigabit Ethernet ports with TCP/IP Offloading Engine (TOE)
- Dual DVI/HDMI ports and one RGB video port
- Two Serial ports with RS-232/422/485 options and Eight buffered GPIO lines
- Support for dual redundant SDI video outputs (Opt., lose one DVI/HDMI)
- Two SAM™ sites for custom I/O (MIL-STD-1553, Wi-Fi/BT, GPS, etc.)
- Full HD-Audio support with onboard 1W mono amplifier
- Real Time Clock (RTC) with field-replaceable battery
- Dual BIOS boot devices with write-protect
- Support for Active Management Technology (AMT) for remote KVM functions
- Intel® Virtualization Technology (VT-x/VT-d2) and Trusted Execution Technology (TXT)
- Trusted Platform Module (TPM) for secure operation (Optional)
- Tamper-proof hardware with optional secure-erase
- Full power-management control for sleep/hibernate operation
- CPU temperature and voltage monitoring with status LED indicators
- Reset and power On/Off signal with suspend support
- Ultra-low SWaP only 5.4" x 6.5" x 4.0", @ 5 lbs. and as low as 40W total
- Fully compliant to MIL-STD 810G, MIL-STD 1275D, MIL-S-901D, DO-160D, MIL-STD 461E and IP66
- Operates at standard temp -20°C to +75°C or extended temp -40°C to +85°C (Optional)
- Available in ruggedization levels R3-R5

General Description

The SB1002-R4 “Condor” is a fifth-generation, ultra-rugged, small, lightweight computer system. It is designed to provide up to 8TB of storage along with high-speed I/O such as USB 3.0, Display Port, and removable drives, while providing the highest level of workstation performance possible in a fully ruggedized, conduction-cooled, sealed system, operating from -40°C to +85°C (-20°C to +75°C Standard). This system is designed for applications that require a small, ultra-rugged enclosure with the highest possible performance per dollar and per watt while utilizing rugged interconnects to provide a fully sealed system.

The Condor supports the latest, most power-efficient Intel® Quad Core™ i7 Haswell processor with Hyper-Threading for a total of 8 logical cores, each operating at up to 2.4GHz with the ability to TurboBoost up to 3.4GHz. To harvest this incredible CPU performance, the CPU is coupled with up to 32GB of RAM organized in two banks that support Error Correcting Code (ECC). The ECC RAM provides 2-bit error detection and 1-bit error correction and supports up to 1600 Mega Transfers per Second (MTS) between CPU and memory. The high-speed I/O is made possible via a new interconnect technology which utilizes differential blades housed in a rugged Mil connector. This advanced interconnect maintains the signal integrity of the high speed I/O over both interconnects for reliable high-speed I/O.

The I/O subsystem for the Condor is designed to support a wide array of standard and custom I/O functions. The SB1002-R4 configuration supports four USB 3.0 ports and one Display Port for ultra-high video resolution up to 3840 x 2160 via a high-speed, rugged Mil blade connector. The SB1002-R4 standard configuration supports a total of seven Gigabit Ethernet channels with TCP/IP Offloading Engine (TOE), six USB 2.0 ports, up to 8TB of removable SSDs as four individual drives or as single canister (Optional). Additional standard I/O functions included are eight buffered digital I/O lines, dual DVI/HDMI or one DVI/HDMI and dual redundant SDI (SMTPE-259/292/424/425) (Optional, Lose one DVI/HDMI) outputs and one RGB video port, two COM ports with RS-232/422/485 options, and an HD-Audio headset jack and a 1-watt audio amplifier to drive an 8-ohm speaker directly. Additional I/O functions include up to 1TB of onboard SSD for OS boot with write-protect and secure-erase, as well as two SAM™ sites for custom I/O such as Wi-Fi/Bluetooth, GPS, Quad Video capture, CANbus, MIL-STD-1553, FireWire, etc.

The Condor also supports the most secure storage subsystem possible. The system supports mSATA as a boot device, as well as a dual redundant BIOS Flash with hardware write-protect and tamper-proof functions. In addition, the SB1002-R4 supports up to two removable or fixed drives with tamper-proof security functions. A hardware tamper-proof circuit enables the security functions of the system to prevent access to any of the stored data on the system. These data security functions, along with the Trusted Platform Module (TPM) and the Trusted Execution Technology (TXT), make the Condor the most secure high-speed system on the market.

Applications

The Condor is designed to provide the ultimate Network Attached Storage (NAS) or data-logging rugged computer system for defense and UAV applications, as well as industrial and commercial applications. The Condor is the next generation of the Golden-Eye III, which is widely deployed in Army WIN-T vehicles, robots for hazardous applications where the computer is exposed to harsh environments, and UAVs, where power, weight, and size are the main considerations. The SB1002-R4 is ideal for outdoor applications where it may be fully exposed to rain, sun, dirt, and radiation. This system may be ordered from the factory with operating systems such as Windows 7®, Linux® or VMware® pre-installed. The SB1002-R4 is fully compliant to MIL-STD 810G, MIL-STD-1275D, MIL-S-901D, DO-160D, MIL-STD-461E and IP66.

Technology Used

The Condor utilizes the Intel® Core™ i7 Haswell CPU, which is the newest and most powerful, efficient processor from Intel® with advanced thermal management and graphics. The Haswell Core™ i7 processor supports Hyper-Threading for a total of eight logical cores and supports 6MB of L2 cache shared among the cores. Haswell supports up to 32GB of DDR3 RAM with Error Correcting Code (ECC) and 1600 Mega Transfers per Second (MTS) between the CPU and RAM. Another major improvement of the Haswell processor over the Ivy Bridge Core™ i7 is the graphics performance. The Haswell processor provides three independent video outputs and better-than 40% improvement in 3D acceleration. Haswell is also coupled with Lynx Point™ and is a fourth-generation Core™ i7 with a fully integrated memory controller for the best memory performance possible. This CPU is considered the workhorse of the workstation market with many added power-saving features and peak performance with controlled thermals, as well as security functions such as Intel’s second-generation Virtualization Technology VT-x, Trusted Execution Technology (TXT), and Active Management Technology (AMT) for remote KVM functions. The Haswell platform also supports PCIExpress Gen3, USB 3.0 and SATA 3 for the highest performance possible on a workstation platform.

Additional Views and Variations

SB1002-R4 (Showing rear connector configuration)

Cooling

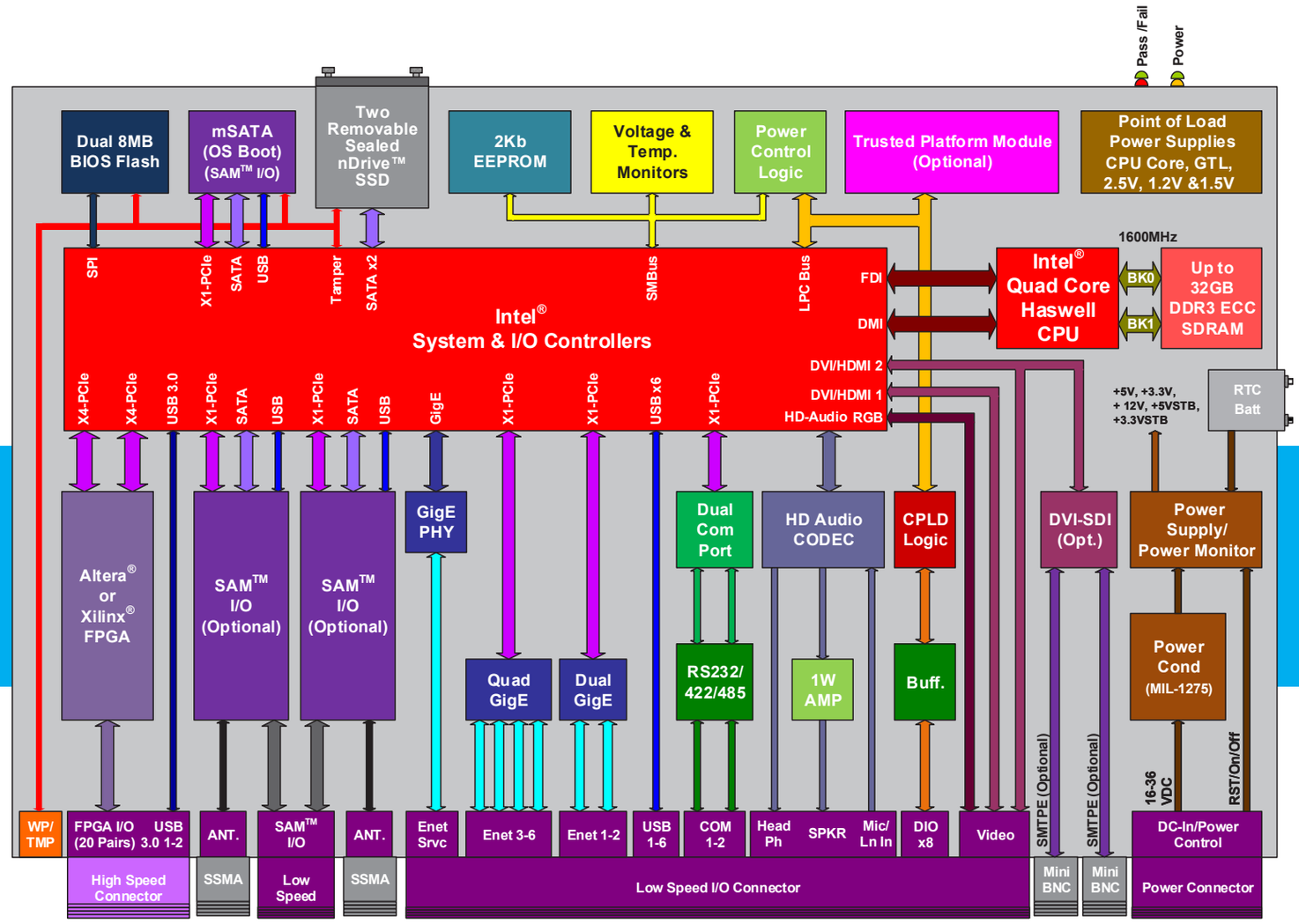
The Condor system is equipped with GMS’ patent pending RuggedCool™ technology, which is the most unique cooling system in the industry and is the only system that operates up to -40°C to +85°C at full load without throttling the CPU! This cooling approach provides the lowest thermal resistance to the case while providing the highest shock specifications known in the industry. The SB1002-R4 is a fan-less system for reliable operation and can be mounted directly to a metal surface or used as a stand-alone system.

Full Environmental Specs

The Condor is available in ruggedization levels R3-R5. Additional information regarding the ruggedization levels and full environmental specifications for this product can be found on our website at www.gms4sbc.com.

"HAWK" SB1002-FPGA

Rugged, Small, FPGA System with Removable Drive(s)



- Supports Xilinx® or Altera® FPGA devices for custom computing functions
- Up to 20 pairs of differential signaling to high-speed MIL connector
- Specialized or custom solutions firmware, such as FPDP and DSP
- Up to 2.4GHz Intel® Quad Core™ i7 Haswell processor with 6MB of L2 Cache
- Up to 32GB of 1600MHz DDR3 memory with ECC
- Up to two removable fully sealed drives (nDrive™) up to 1TB each
- Up to 1TB of fixed SSD for OS boot
- Two USB 3.0 and six USB 2.0 ports with power
- Seven Gigabit Ethernet ports with TCP/IP Offloading Engine (TOE)
- Dual DVI/HDMI ports and one RGB video port
- Two Serial Ports with RS-232/422/485 options and eight buffered GPIO lines
- Support for dual redundant SDI video outputs (Opt., lose one DVI/HDMI)
- Two SAM™ sites for custom I/O (MIL-STD-1553, Wi-Fi/BT, GPS, etc.)
- HD-Audio support with onboard 1W mono amplifier and RTC with field-replaceable battery
- Dual BIOS boot devices with write-protect
- Support for Active Management Technology (AMT) for remote KVM functions
- Intel® Virtualization Technology (VT-x/VT-d2) and Trusted Execution Technology (TXT)
- Trusted Platform Module (TPM) for secure operation (Optional)
- Tamper-proof hardware with optional secure-erase
- Full power management control for sleep/hibernate operation
- CPU temperature and voltage monitoring with status LED indicators
- Reset and power On/Off signal with suspend support
- Ultra-low SWaP only 5.4" x 6.5" x 2.75", @ 4.25 lbs. and as low as 40W total
- Fully compliant to MIL-STD 810G, MIL-STD-1275D, MIL-S-901D, DO-160D, MIL-STD-461E and IP66
- Operates at standard temp -20°C to +75°C or extended temp -40°C to +85°C (Optional)
- Available in ruggedization levels R3-R5

General Description

The SB1002-FPGA "Hawk" is a fifth-generation, ultra-rugged, small, lightweight FPGA computer system. It is designed to support high gate-count Xilinix® or Altera® Field Programmable Gate Array (FPGA) devices for custom ultra-high-speed computing functions, while providing the highest level of workstation performance possible in a fully ruggedized, conduction-cooled, sealed system, operating from -40°C to +85°C (-20°C to +75°C standard). This system is designed for applications requiring ultra-high-speed data processing and I/O, such as FPDP, DSP, and many other custom functions that require a small, ultra-rugged enclosure with the highest possible performance per dollar and per watt while utilizing rugged interconnects to provide a fully sealed system.

The Hawk supports the latest, most power efficient, Intel® Quad Core™ i7 Haswell processor with Hyper-Threading for a total of 8 logical cores, each operating at up to 2.4GHz with the ability to TurboBoost up to 3.4GHz. To harvest this incredible CPU performance, the CPU is coupled with up to 32GB of RAM organized in two banks that support Error Correcting Code (ECC). The ECC RAM provides 2-bit error detection and 1-bit error correction and supports up to 1600 Mega Transfers/second (MTS) between CPU and memory. The FPGA function supports the most popular FPGA devices from Xilinix® or Altera® with standard or custom libraries.

The I/O subsystem for the Hawk is designed to support a wide array of standard and custom I/O functions. The SB1002-FPGA configuration supports six Gigabit Ethernet channels with TCP/IP Offloading Engine (TOE), one additional Gigabit Ethernet for system configuration and remote control, six USB 2.0 and two USB 3.0 ports, and up to two removable fully sealed nDrives™ of up to 1TB each which can be put in RAID 0 or 1 for performance increase or redundancy. Additional standard I/O functions include eight buffered digital I/O lines, dual DVI/HDMI or one DVI/HDMI and dual redundant SDI (SMTPE-259/292/424/425) (Optional, Lose one DVI/HDMI) outputs and one RGB video port, two COM ports with RS-232/422/485 options, a full HD-Audio headset jack, and a one-watt audio amplifier to drive an 8-ohm speaker directly. Additional I/O functions include up to 1TB of onboard SSD for OS boot with secure-erase and write-protect, as well as two SAM™ I/O sites for custom I/O such as Wi-Fi/Bluetooth, GPS, Quad Video capture, CANbus, MIL-STD-1553, FireWire, etc.

The Hawk also supports the most secure storage subsystem possible. The system supports mSATA as a boot device, as well as a dual redundant BIOS flash with hardware write-protect and tamper-proof functions. In addition, the SB1002-FPGA supports up to two removable drives with tamper-proof security functions. A hardware tamper-proof circuit enables the security functions of the system to prevent access to any of the stored data on the system. These data security functions, along with the Trusted Platform Module (TPM) and the Trusted Execution Technology (TXT), make the Hawk the most secure FPGA system on the market.

Applications

The Hawk is designed to provide the ultimate custom FPGA system for defense and UAV applications, as well as industrial and commercial applications. The Hawk is the next generation of the Golden-Eye III, which is widely deployed in Army WIN-T vehicles, robots for hazardous applications where the computer is exposed to harsh environments, and UAVs, where power, weight, and size are the main considerations. The SB1002-FPGA is ideal for outdoor applications where it may be fully exposed to rain, sun, dirt, and radiation. This system may be ordered from the factory with operating systems such as Windows 7®, Linux® or VMware® pre-installed. The SB1002-FPGA is also compliant to MIL-STD 810G, MIL-STD-1275D, MIL-S-901D, MIL-STD-461E, DO-160D and IP66.

Technology Used

The Hawk utilizes the Intel® Core™ i7 Haswell CPU, which is the newest and most powerful, efficient processor from Intel® with advanced thermal management and graphics. The Haswell Core™ i7 processor supports Hyper-Threading for a total of eight logical cores and supports 6MB of L2 cache shared among the cores. Haswell supports up to 32GB of DDR3 RAM with Error Correcting Code (ECC) and 1600 Mega Transfers per Second (MTS) between the CPU and RAM. Another major improvement of the Haswell processor over the Ivy Bridge Core™ i7 is the graphics performance. The Haswell processor provides three independent video outputs and better-than 40% improvement in 3D acceleration. Haswell is also coupled with Lynx Point™ and is a fourth-generation Core™ i7 with a fully integrated memory controller for the best memory performance possible. This CPU is considered the workhorse of the workstation market with many added power saving features and peak performance with controlled thermals, as well as security functions such as Intel's second generation Virtualization Technology VT-x, Trusted Execution Technology (TXT) and Active Management Technology (AMT) for remote KVM functions. The Haswell platform also supports PCIExpress Gen3, USB 3.0 and SATA 3 for the highest performance possible on a workstation platform.

Additional Views and Variations

SB1002-FPGA (Showing rear connector configuration)

Cooling

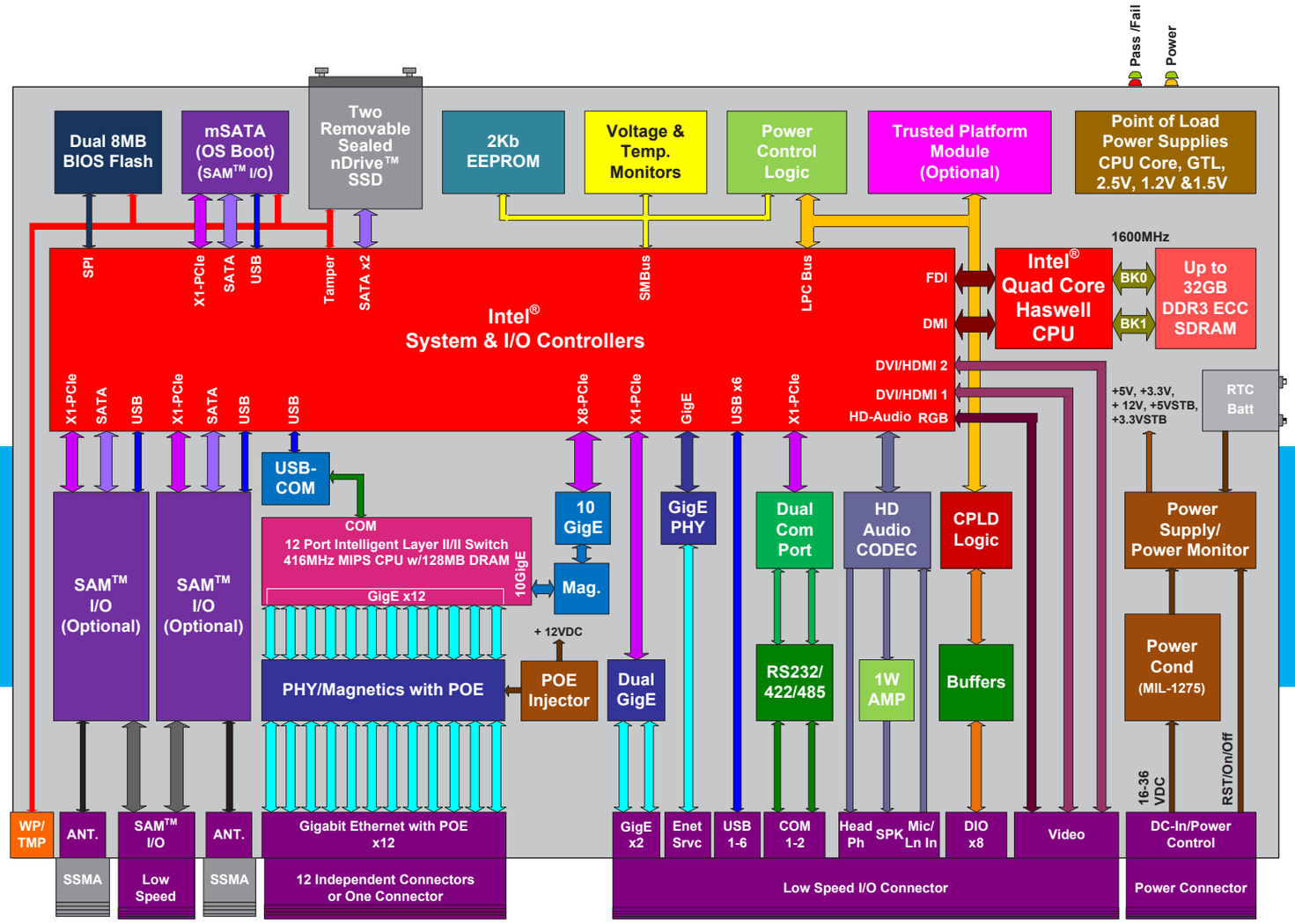
The Hawk system is equipped with GMS' patent pending RuggedCool™ technology, which is the most unique cooling system in the industry and is the only system that operates up to -40°C to +85°C at full load without throttling the CPU! This cooling approach provides the lowest thermal resistance to the case while providing the highest shock specifications known in the industry. The SB1002-FPGA is a fan-less system for reliable operation and can be mounted directly to a metal surface or used as a stand-alone system.

Full Environmental Specs

The Hawk is available in ruggedization levels R3-R5. Additional information regarding the ruggedization levels and full environmental specifications for this product can be found on our website at www.gms4sbc.com.

"MALLARD" SB1002-SW

Rugged, Small, 12-Port Intelligent Switch with Removable Drive(s)



- Twelve Gigabit Ethernet ports with Power Over Ethernet and TCP/IP Offloading Engine
- Three Gigabit Ethernet ports with TCP/IP Offloading Engine (TOE)
- Supports Layer III software routing functions with customizable security rules
- Very low latency, VLAN support, QoS/differentiated services
- DHCP client, server support, SNMP and multicast/spanning tree capabilities
- Support for IEEE-1588 for packet time stamping (Optional)
- Internal shared memory with jumbo frame support
- Web GUI and SNMP management interfaces provided for ease of configuration
- Support for Multicast IPv4, IPv6 with IGMPv2/3 snooping and MLD
- Up to 2.4GHz Intel® Quad Core™ i7 Haswell processor with 6MB of L2 Cache
- Up to 32GB of 1600MHz DDR3 memory with ECC
- Up to two removable fully sealed drives (nDrive™) up to 1TB each
- Up to 1TB of fixed SSD for OS boot
- Support for six USB 2.0 ports with power and two Serial ports with RS-232/422/485
- Supports dual DVI/HDMI ports and one RGB video port
- Two SAM™ sites for custom I/O (MIL-STD-1553, Wi-Fi/BT, GPS, etc.)
- Full HD-Audio support with onboard 1W mono amplifier and eight buffered GPI/O lines
- Dual BIOS boot devices with write-protect and RTC with field-replaceable battery
- Intel® Virtualization Technology (VT-x/VT-d2) and Trusted Execution Technology (TXT)
- Trusted Platform Module (TPM) for secure operation (Optional)
- Support for Active Management Technology (AMT) for remote KVM functions
- Tamper-proof hardware with optional secure-erase
- Ultra-low SWaP at 5.4" x 6.5" x 2.75", @ 5 lbs. and as low as 50W
- Fully compliant to MIL-STD 810G, MIL-STD 1275D, MIL-S-901D, DO-160D, MIL-STD 461E and IP66
- Operates at standard temp -20°C to +75°C and ext. temp -40°C to +85°C (Optional)
- Available in ruggedization levels R3-R5

General Description

The SB1002-SW "Mallard" is a fifth-generation, ultra-rugged, small, lightweight computer system. It is designed to provide a 12-port intelligent hardware switch/ router system with two removable drives supporting Layer II/III routing functions with customizable rules while providing the highest level of workstation performance possible in a fully ruggedized, conduction-cooled, sealed system, operating from -40°C to +85°C (-20°C to +75°C Standard). This system is designed for applications that require a very high performance, low-cost router in a small, ultra-rugged enclosure with the highest possible performance per dollar and per watt while utilizing rugged interconnects to provide a fully sealed system.

The Mallard supports the latest, most power-efficient Intel® Core™ i7 Haswell processor with Hyper-Threading for a total of 8 logical cores, each operating at up to 2.4GHz with the ability to TurboBoost up to 3.4GHz. To harvest this incredible CPU performance, the CPU is coupled with up to 32GB of RAM organized in two banks that support Error Correcting Code (ECC). The ECC RAM provides 2-bit error detection and 1-bit error correction and supports up to 1600 Mega Transfers per Second (MTS) between CPU and memory.

The I/O subsystem for the Mallard is designed to support a wide array of standard and custom I/O functions. The SB1002-SW configuration supports three Gigabit Ethernet ports with TCP/IP offloading engine, six USB 2.0 ports, and up to two removable fully sealed nDrives™ of up to 1TB each which can be put in RAID 0 or 1 for performance increase or redundancy. Additional standard I/O functions include eight buffered digital I/O lines, dual DVI/HDMI or one RGB video port, two COM ports with RS-232/422/485 options, and a full HD-Audio headset jack and a 1-watt audio amplifier to drive an 8-ohm speaker directly. Additional I/O functions include up to 1TB of onboard SSD for OS boot with write-protect, as well as two SAM™ I/O sites for custom I/O such as Wi-Fi/Bluetooth, GPS, Quad Video capture, CANbus, MIL-STD-1553, FireWire, etc.

The switch functions are controlled via a 416MHz MIPS CPU with 128MB of DRAM. The MIPS processor controls up to 12 Gigabit Ethernet ports and one10Gigabit Ethernet port connected directly to the host CPU. The Mallard supports fully managed Layer II and Layer III functions, such as VLAN and QoS processing, enabling the delivery of differentiated services, security through intelligent frame processing, and egress frame manipulation. The Mallard switch may be configured via the host CPU USB/COM port which is connected internally or via a Gigabit Ethernet port on the rear panel.

The Mallard also supports the most secure storage subsystem possible. The system supports mSATA as a boot device, as well as a dual redundant BIOS Flash with hardware write-protect and tamper-proof functions. In addition, the SB1002-SW supports up to two removable sealed drives with tamper-proof security functions. A hardware tamper-proof circuit enables the security functions of the system to prevent access to any of the stored data on the system. These data security functions, along with the Trusted Platform Module (TPM) and the Trusted Execution Technology (TXT), make the Mallard the most secure router system on the market.

Applications

The Mallard is designed to provide the ultimate multi-port, rugged, low-cost switch/router computer system for defense and UAV applications, as well as industrial and commercial applications. The Mallard is the next generation of the Golden-Eye III, which is widely deployed in Army WIN-T vehicles, robots for hazardous applications where the computer is exposed to harsh environments, and UAVs, where power, weight, and size are the main considerations. The SB1002-SW is ideal for outdoor applications where it may be fully exposed to rain, sun, dirt, and radiation. This system may be ordered from the factory with operating systems such as Windows 7®, Linux® or VMware® pre-installed. The SB1002-SW is fully compliant to MIL-STD 810G, MIL-STD 1275D, MIL-S-901D, DO-160D, MIL-STD 461E and IP66.

Technology Used

The Mallard utilizes the Intel® Core™ i7 Haswell CPU, which is the newest and most powerful, efficient processor from Intel® with advanced thermal management and graphics. The Haswell Core™ i7 processor supports Hyper-Threading for a total of eight logical cores and supports 6MB of L2 cache shared among the cores. Haswell supports up to 32GB of DDR3 RAM with Error Correcting Code (ECC) and 1600 Mega Transfers per Second (MTS) between the CPU and RAM. Another major improvement of the Haswell processor over the Ivy Bridge Core™ i7 is the graphics performance. The Haswell processor provides three independent video outputs and better-than 40% improvement in 3D acceleration. Haswell is also coupled with Lynx Point™ and is a fourth-generation Core™ i7 with a fully integrated memory controller for the best memory performance possible. This CPU is considered the workhorse of the workstation market with many added power saving features and peak performance with controlled thermals, as well as security functions such as Intel's second-generation Virtualization Technology VT-x, Trusted Execution Technology (TXT), and Active Management Technology (AMT) for remote KVM functions. The Haswell platform also supports PCIExpress Gen3, USB 3.0 and SATA 3 for the highest performance possible on a workstation platform.

Additional Views and Variations

SB1002-SW (Showing rear connector configuration)

Cooling

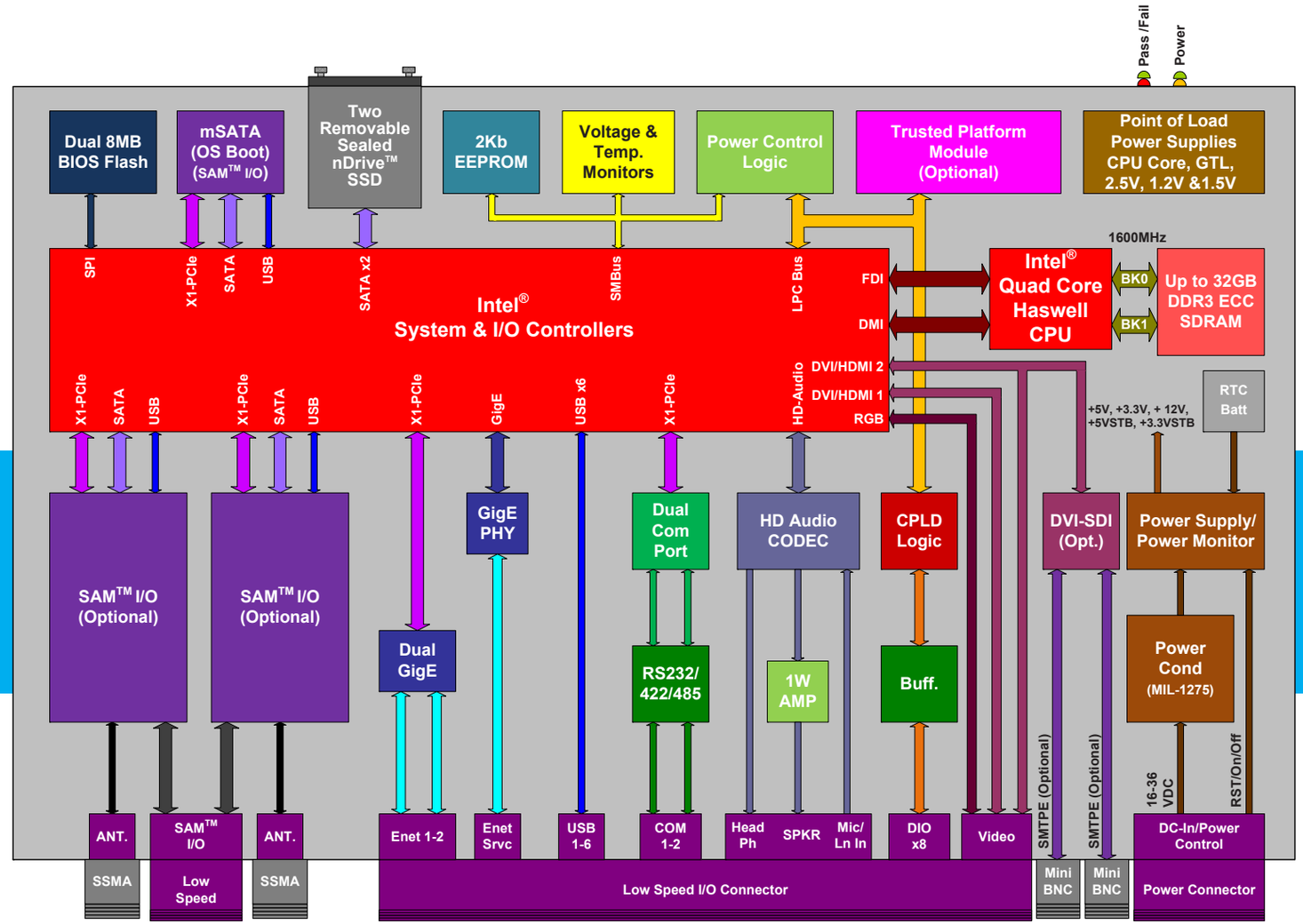
The Mallard system is equipped with GMS' patent pending RuggedCool™ technology, which is the most unique cooling system in the industry and is the only system that operates up to -40°C to +85°C at full load without throttling the CPU! This cooling approach provides the lowest thermal resistance to the case while providing the highest shock specifications known in the industry. The SB1002-SW is a fan-less system for reliable operation and can be mounted directly to a metal surface or used as a stand-alone system.

Full Environmental Specs

The Mallard is available in ruggedization levels R3-R5. Additional information regarding the ruggedization levels and full environmental specifications for this product can be found on our website at www.gms4sbc.com.

"CROW" SB1002-LC

Rugged, Low-Cost, Small, Lightweight, High-Performance System



- Rugged system optimized for the lowest cost and weight in a fully sealed system
- Up to 2.4GHz Intel® Quad Core™ i7 Haswell processor with 6MB of L2 Cache
- Up to 32GB of 1600MHz DDR3 memory with ECC
- Up to 1TB of fixed SSD
- Up to 2TB of removable 2.5" SSD (Optional)
- Three Gigabit Ethernet ports with TCP/IP Offloading Engine (TOE)
- Six USB 2.0 ports with power
- Dual DVI/HDMI ports and one RGB video port
- Two Serial ports with RS-232/422/485 options and 8 buffered GPIO lines
- Support for dual redundant SDI video outputs (Opt., lose one DVI/HDMI)
- Two SAM™ sites for custom I/O (MIL-STD-1553, Wi-Fi/BT, GPS, etc.)
- Full HD-Audio support with onboard 1W mono amplifier
- Dual BIOS boot devices with write-protect and Real Time Clock (RTC)
- Support for Active Management Technology (AMT) for remote KVM functions
- Intel® Virtualization Technology (VT-x/VT-d2) and Trusted Execution Technology (TXT)
- Trusted Platform Module (TPM) for secure operation (Optional)
- Full power-management control for sleep/hibernate operation
- CPU temperature and voltage monitoring with status LED indicators
- Up to 16MB of BIOS Flash for system parameters and user data
- 2Kb of EEPROM for FRU parameters
- Reset and power On/Off signal with suspend support
- Power Conditioning Module (PCM) for "dirty power" regulation from 16-36VDC (Optional)
- Ultra-low SWaP only 5.4" x 6.5" x 2.75", @ 4.0 lbs. and as low as 40W total
- Fully compliant to MIL-STD 810G, MIL-STD 1275D, MIL-S-901D, DO-160D, MIL-STD 461E and IP66
- Operates at standard temp 0°C to +55°C or extended temp -40°C to +85°C (Optional)
- Available in ruggedization levels R1-R4

General Description

The SB1002-LC "Crow" is a fifth-generation, ultra-rugged, small, lightweight computer system. It is designed to provide a rugged system optimized for the lowest cost and weight in a fully sealed case, while providing the highest level of workstation performance possible in a fully ruggedized, conduction-cooled, sealed system, operating up to -40°C to +85°C (0°C to +55°C Standard). This system is designed for applications that require a small, ultra-rugged enclosure with the highest possible performance per dollar and per watt while utilizing rugged interconnects to provide a fully sealed system.

The Crow supports the latest, most power-efficient Intel® Core™ i7 Haswell processor with Hyper-Threading for a total of 8 logical cores, each operating at up to 2.4GHz with the ability to TurboBoost up to 3.4GHz. To harvest this incredible CPU performance, the CPU is coupled with up to 32GB of RAM organized in two banks that support Error Correcting Code (ECC). The ECC RAM provides 2-bit error detection and 1-bit error correction and supports up to 1600 Mega Transfers per Second (MTS) between CPU and memory.

The I/O subsystem for the Crow is designed to support a wide array of standard and custom I/O functions. The SB1002-LC standard configuration supports three Gigabit Ethernet channels with TCP/IP Offloading Engine (TOE), six USB 2.0 ports with power, eight buffered digital I/O lines, dual DVI/HDMI or one DVI/HDMI and dual redundant SDI (SMTPE-259/292/424/425) (Optional, Lose one DVI/HDMI) outputs and one RGB video port, and a full HD-Audio headset jack and a 1-watt audio amplifier to drive an 8-ohm speaker directly. Additional I/O functions include up to 1TB of onboard SSD for OS boot and an optional 2.5" removable SSD up to 2TB, as well as two SAM™ I/O sites for custom I/O such as Wi-Fi/Bluetooth, GPS, Quad Video capture, CANbus, MIL-STD-1553, FireWire, etc.

The Crow also supports the most secure storage subsystem possible. The system supports mSATA as a boot device, as well as a dual redundant BIOS Flash with the Trusted Platform Module (TPM) (Optional) and the Trusted Execution Technology (TXT), which make the Crow the most secure low cost and fully rugged system on the market.

Applications

The Crow is designed to provide a low-cost, rugged computer system for defense and UAV applications, as well as industrial and commercial applications. The Crow is the next generation of the Golden-Eye III, which is widely deployed in WIN-T Army vehicles, robots for hazardous applications where the computer is exposed to harsh environments, and UAVs, where power, weight, and size are the main considerations. The SB1002-LC is ideal for outdoor applications where it may be fully exposed to rain, sun, dirt, and radiation. This system may be ordered from the factory with operating systems such as Windows 7®, Linux® or VMware® pre-installed. The SB1002-LC is fully compliant to MIL-STD 810G, MIL-STD 1275D, MIL-S-901D, DO-160D, MIL-STD 461E and IP66.

Technology Used

The Crow utilizes the Intel® Core™ i7 Haswell CPU, which is the newest and most powerful, efficient processor from Intel® with advanced thermal management and graphics. The Haswell Core™ i7 processor supports Hyper-Threading for a total of eight logical cores and supports 6MB of L2 cache shared among the cores. Haswell supports up to 32GB of DDR3 RAM with Error Correcting Code (ECC) and 1600 Mega Transfers per Second (MTS) between the CPU and RAM. Another major improvement of the Haswell processor over the Ivy Bridge Core™ i7 is the graphics performance. The Haswell processor provides three independent video outputs and better-than 40% improvement in 3D acceleration. Haswell is also coupled with Lynx Point™ and is a fourth-generation Core™ i7 with a fully integrated memory controller for the best memory performance possible. This CPU is considered the workhorse of the workstation market with many added power saving feature and peak performance with controlled thermals, as well as security functions such as Intel's second-generation Virtualization Technology VT-x, Trusted Execution Technology (TXT), and Active Management Technology (AMT) for remote KVM functions. The Haswell platform also supports PCIExpress Gen3, USB 3.0 and SATA 3 for the highest performance possible on a workstation platform.

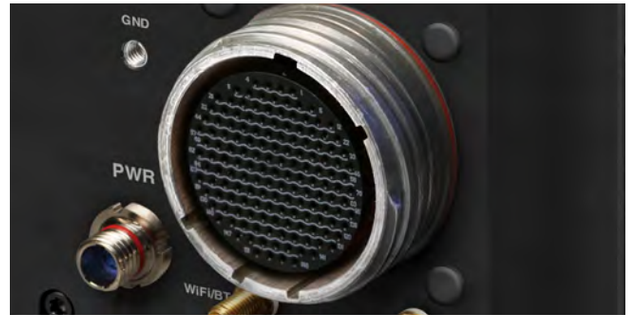
Cooling

The Crow is equipped with GMS' patent pending RuggedCool™ technology, which is the most unique cooling system in the industry and is the only system that operates up to -40°C to +85°C at full load without throttling the CPU! This patent pending cooling approach provides the lowest thermal resistance to the case while providing the highest shock specifications known in the industry. The SB1002-LC is a fan-less system for reliable operation and can be mounted directly to a metal surface or used as a stand-alone system.

Additional Views and Variations

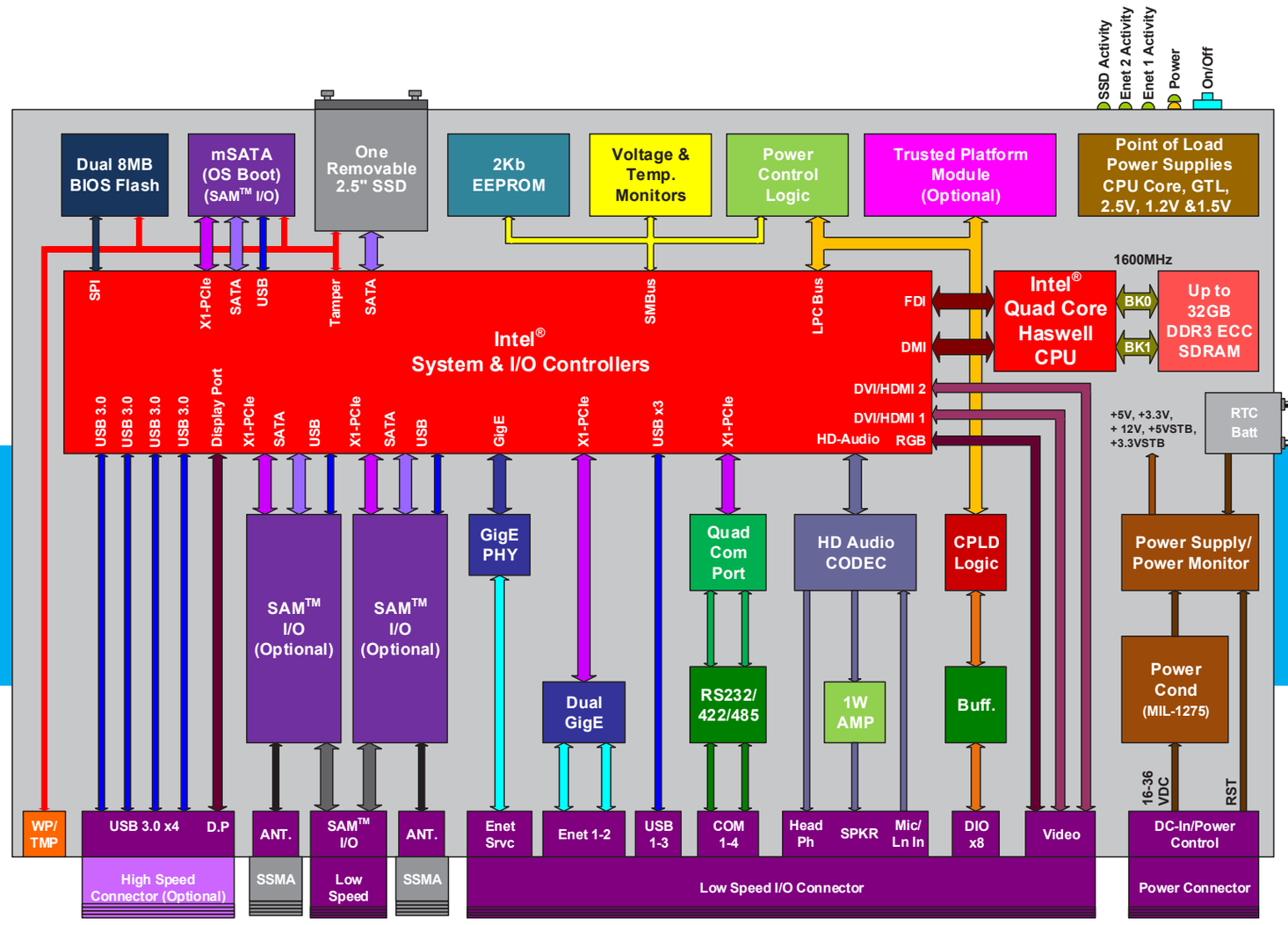
SB1002-LC (Showing rear connector configuration)

SB1002-LC (Showing rugged 38999 connector)



Full Environmental Specs

The Crow is available in ruggedization levels R1-R4. Additional information regarding the ruggedization levels and full environmental specifications for this product can be found on our website at www.gms4sbc.com.



"HUMMINGBIRD" SB1002-LP

Rugged, Small, Low Profile, High-Speed I/O System with Removable Drive

- Low Profile, High-Speed I/O system with DZUS™ rail mounts
- High-Speed I/O interconnect with four USB 3.0 ports and one Display Port (Optional)
- Up to 2.4GHz Intel® Quad Core i7™ Haswell processor with 6MB of L2 Cache
- Up to 32GB of 1600MHz DDR3 memory with ECC
- One removable 2.5" SSD drive up to 2TB
- Up to 1TB of fixed SSD for OS boot
- Three USB 2.0 ports and four Serial ports with RS-232/422/485 options
- Three Gigabit Ethernet ports with TCP/IP Offloading Engine (TOE)
- Dual DVI/HDMI ports and one RGB video port
- Eight buffered General Purpose I/O lines
- Two SAM™ sites for custom I/O (Mil-STD-1553, Wi-Fi/BT, GPS, etc.)
- Full HD-Audio support with onboard 1W mono amplifier
- Dual BIOS boot devices with write-protect and Real Time Clock (RTC)
- Support for Active Management Technology (AMT) for remote KVM functions
- Intel® Virtualization Technology (VT-x/VT-d2) and Trusted Execution Technology (TXT)
- Trusted Platform Module (TPM) for secure operation (Optional)
- Tamper-proof hardware with optional secure-erase
- Full power-management control for sleep/hibernate operation
- CPU temperature and voltage monitoring for safe operation
- Optional cooling radiator for DZUS™ rack mount applications
- Network activities, SSD activities and Power status LED indicator
- Power On/Off switch on front panel with suspend support
- Ultra-low SWaP only 5.4" x 6.0" x 2.0", @ 5 lbs. and as low as 40W total
- Fully compliant to MIL-STD 810G, MIL-STD 1275D, MIL-S-901D, DO-160D, MIL-STD 461E and IP66
- Operates at standard temp -20°C to +75°C and ext. temp -40°C to +85°C (Optional)
- Available in ruggedization levels R3-R5

General Description

The SB1002-LP "Hummingbird" is a fifth-generation, ultra-rugged, small, lightweight computer system. It is designed to provide a DZUS™ rail mounts, low profile, with optional high speed I/O, and with removable drive, while providing the highest level of workstation performance possible in a fully ruggedized, conduction-cooled, sealed system, operating from -40°C to +85°C (-20°C to +75°C Standard). This system is designed for applications that require a small, ultra-rugged enclosure with the highest possible performance per dollar and per watt while utilizing rugged interconnects to provide a fully sealed system.

The Hummingbird supports the latest, most power-efficient Intel® Quad Core™ i7 Haswell processor with Hyper-Threading for a total of 8 logical cores, each operating at up to 2.4GHz with the ability to TurboBoost up to 3.4GHz. To harvest this incredible CPU performance, the CPU is coupled with up to 32GB of RAM organized in two banks that support Error Correcting Code (ECC). The ECC RAM provides 2-bit error detection and 1-bit error correction and supports up to 1600 Mega Transfers per Second (MTS) between CPU and memory. The high-speed I/O is made possible via a new interconnect technology which utilizes differential blades housed in a rugged Mil connector. This advanced interconnect maintains the signal integrity of the high speed I/O over both interconnects for reliable high-speed I/O.

The I/O subsystem for the Hummingbird is designed to support a wide array of standard and custom I/O functions. The SB1002-LP with the high speed I/O option supports four USB 3.0 ports and one Display Port for ultra-high video resolution up to 3840 x 2160 via a high-speed, rugged Mil blade connector. The SB1002-LP standard configuration supports a total of three Gigabit Ethernet channels with TCP/IP Offloading Engine (TOE), three USB 2.0 ports, and one removable 2.5 inch SSD up to 2TB. Additional standard I/O functions included are eight buffered digital I/O lines, dual DVI/HDMI and one RGB video port, four COM ports with RS-232/422/485 options, and an HD-Audio headset jack and a 1-watt audio amplifier to drive an 8-ohm speaker directly. Additional I/O functions include up to 1TB of onboard SSD for OS boot with write-protect and secure-erase, as well as two SAM™ sites for custom I/O such as Wi-Fi/Bluetooth, GPS, Quad Video capture, CANbus, MIL-STD-1553, FireWire, etc.

The Hummingbird also supports the most secure storage subsystem possible. The system supports mSATA as a boot device, as well as a dual redundant BIOS Flash with hardware write-protect and tamper-proof functions. In addition, the SB1002-LP supports one removable or fixed drive with tamper-proof security functions. A hardware tamper-proof circuit enables the security functions of the system to prevent access to any of the stored data on the system. These data security functions, along with the Trusted Platform Module (TPM) and the Trusted Execution Technology (TXT), make the Hummingbird the most secure high-speed system on the market.

Applications

The Hummingbird is designed to provide the ultimate rugged computer system for defense and UAV applications, as well as industrial and commercial applications. The Hummingbird is the next generation of the Golden-Eye III, which is widely deployed in Army WIN-T vehicles, robots for hazardous applications where the computer is exposed to harsh environments, and UAVs, where power, weight, and size are the main considerations. The SB1002-LP is ideal for outdoor applications where it may be fully exposed to rain, sun, dirt, and radiation. This system may be ordered from the factory with operating systems such as Windows 7®, Linux® or VMware® pre-installed. The SB1002-LP is fully compliant to MIL-STD 810G, MIL-STD-1275D, MIL-S-901D, DO-160D, MIL-STD-461E and IP66.

Technology Used

The Hummingbird utilizes the Intel® Core™ i7 Haswell CPU, which is the newest and most powerful, efficient processor from Intel® with advanced thermal management and graphics. The Haswell Core™ i7 processor supports Hyper-Threading for a total of eight logical cores and supports 6MB of L2 cache shared among the cores. Haswell supports up to 32GB of DDR3 RAM with Error Correcting Code (ECC) and 1600 Mega Transfers per Second (MTS) between the CPU and RAM. Another major improvement of the Haswell processor over the Ivy Bridge Core™ i7 is the graphics performance. The Haswell processor provides three independent video outputs and better-than-40% improvement in 3D acceleration. Haswell is also coupled with Lynx Point™ and is a fourth-generation Core™ i7 with a fully integrated memory controller for the best memory performance possible. This CPU is considered the workhorse of the workstation market with many added power-saving features and peak performance with controlled thermals, as well as security functions such as Intel's second-generation Virtualization Technology VT-x, Trusted Execution Technology (TXT), and Active Management Technology (AMT) for remote KVM functions. The Haswell platform also supports PCIExpress Gen3, USB 3.0 and SATA 3 for the highest performance possible on a workstation platform.

Additional Views and Variations

SB1002-LP (Showing rear view with optional vacuum radiator)

Cooling

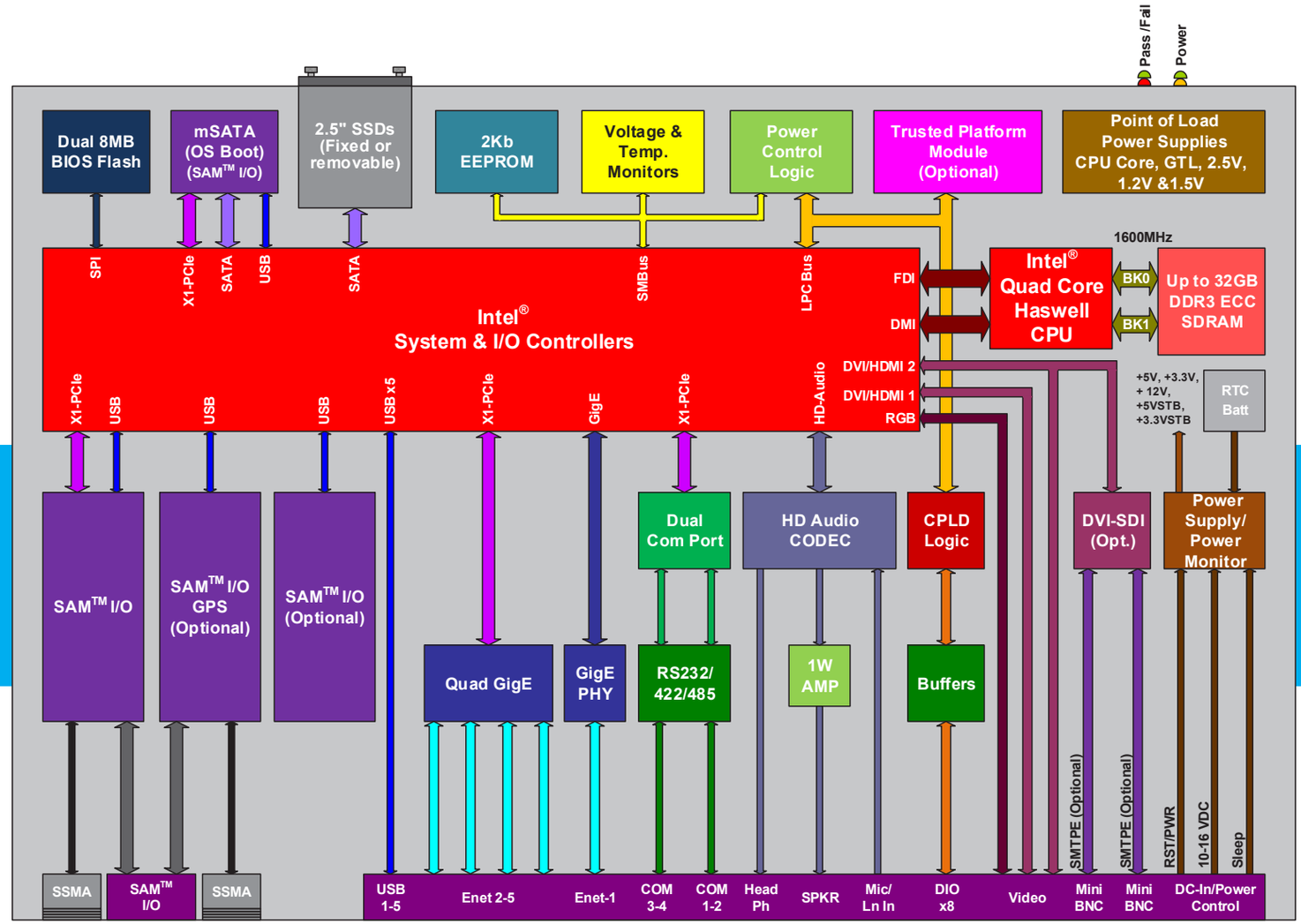
The Hummingbird system is equipped with GMS' patent pending RuggedCool™ technology, which is the most unique cooling system in the industry and is the only system that operates up to -40°C to +85°C at full load without throttling the CPU! This cooling approach provides the lowest thermal resistance to the case while providing the highest shock specifications known in the industry. The SB1002-LP is a fan-less system for reliable operation and can be mounted directly to a metal surface or used as a stand-alone system. For DZUS™ mount applications, the SB1002-LP may be ordered with a DZUS™ front panel and a cooling radiator with vacuum hose connection for rail mount applications.

Full Environmental Specs

The Hummingbird is available in ruggedization levels R3-R5. Additional information regarding the ruggedization levels and full environmental specifications for this product can be found on our website at www.gms4sbc.com.

"HARRIER" SB1005

Rugged, Low Cost, Small System with Removable Drive



- Up to 2.4GHz Intel® Quad Core™ i7 Haswell processor with 6MB of L2 Cache
- Up to 32GB of 1600MHz DDR3 memory with ECC
- Up to 2TB of removable or fixed 2.5" SSD for user storage
- Up to 1TB fixed SSD for OS boot with write-protect (Optional)
- Optional docking station for SSD drive with USB support
- Up to five Gigabit Ethernet ports with TCP/IP Offloading Engine (TOE)
- Up to five USB 2.0 ports with power
- Up to four Serial ports with RS-232/422/485 options
- Dual DVI/HDMI ports and one RGB video port
- Eight buffered General Purpose I/O lines
- Support for dual redundant SDI video outputs (Opt., lose one DVI/HDMI)
- Up to three SAM™ sites for custom I/O (MIL-STD-1553, Wi-Fi/BT, GPS, etc.)
- Full HD-Audio support with onboard 1W mono amplifier
- Dual BIOS boot devices with write-protect
- Support for Active Management Technology (AMT) for remote KVM functions
- Intel® Virtualization Technology (VT-x/VT-d2) and Trusted Execution Technology (TXT)
- Trusted Platform Module (TPM) for secure operation (Optional)
- Full power management control for sleep/hibernate operation
- CPU temperature and voltage monitoring with status LED indicators
- Up to 16MB of BIOS Flash for system parameters and user data
- 2Kb of EEPROM for FRU parameters
- Reset and power On/Off signal with suspend support
- Ultra-low SWaP only 5.5" x 5.5" x 1.24", @ 3.0 lbs. and low as 40W total
- Fully compliant to MIL-STD-810F, MIL-S-901D, DO-160, and IP65
- External Power Conditioning Module (ePCM) for dirty power 16-36VDC (Optional)
- Operates at standard temp 0°C to +55°C or extended temp -40°C to +85°C (Optional)
- Available in ruggedization levels R1-R4

General Description

The SB1005 “Harrier” is a fifth-generation, rugged, small, lightweight computer system. It is designed to provide the highest level of workstation performance possible in a fully ruggedized, conduction cooled, sealed system, operating up to -40°C to +85°C (0°C to +55°C Standard). The Harrier is targeted for applications where a rugged computer is needed to provide the best possible performance per dollar per watt, utilizing hi-density, low cost rugged interconnects to provide an easy interconnect to system I/O and user I/O.

The Harrier supports the latest, most power efficient, Intel® Core™ i7 Haswell processor with Hyper-Threading for a total of 8 logical cores, each operating at up to 2.4GHz and the ability to TurboBoost up to 3.4GHz. To harvest this incredible CPU performance, the CPU is coupled with up to 32GB of RAM organized in two banks that supports Error Correcting Code (ECC). The ECC RAM provides two bit error detection and one bit error correction and supports up to 1600 Mega Transfers / Second (MTS) between CPU and memory.

The I/O subsystem for the Harrier is designed to support a wide array of standard and custom I/O functions. The SB1005 standard configuration supports up to five Gigabit Ethernet channels with TCP/IP Offloading Engine (TOE), five USB 2.0 ports, one removable or fixed 2.5” SSD drive up to 2TB, eight buffered digital I/O lines, dual DVI/HDMI or one DVI/HDMI and dual redundant SDI (SMTPE-259/292/424/425) (Optional, Lose one DVI/HDMI) outputs and one RGB video port, four COM ports with RS-232/422/485 options, and a full HD-Audio headset jack with a one watt audio amplifier to drive an 8-ohm speaker directly. Optional additional I/O functions such as, mSATA for OS Boot with write-protect up to 1TB, quad video capture, CANbus, MIL-STD-1553, Wi-Fi, Bluetooth, FireWire, GPS for data time stamping, and many other I/O functions utilizing the three SAM™ sites provided.

Applications

The Harrier is designed to provide a low cost rugged computer for defense and UAV applications, as well as industrial and commercial applications. The Harrier is widely deployed in vehicles, robots for hazardous applications where the computer is exposed to harsh environments, and UAVs, where power, weight, and size are the main considerations. The Harrier is ideal for applications, where it is connected to a variety of I/O such as motors, sensors and cameras that are all enclosed within another enclosure that protects all system functions to reduce the system cost significantly without compromising ruggedness and performance. The Harrier may be ordered from the factory with operating systems such as Windows 7®, Linux® or VMware® pre-installed. The SB1005 is fully compliant to MIL-STD 810F, MIL-STD 1275D, MIL-S-901D, DO-160D and IP65.

Technology Used

The Harrier utilizes the Intel® Core™ i7 Haswell CPU, which is the newest and most powerful, efficient processor from Intel® with advanced thermal management and graphics. The Haswell Core™ i7 processor supports Hyper-Threading for a total of eight logical cores and supports 6MB of L2 cache shared among the cores. Haswell supports up to 32GB of DDR3 RAM with Error Correcting Code (ECC) and 1600 Mega Transfers per Second (MTS) between the CPU and RAM. Another major improvement of the Haswell processor over the Bridge Core™ i7 is the graphics performance. The Haswell processor provides three independent video outputs and better than 40% improvement in 3D acceleration. Haswell is also coupled with Lynx Point™ and is a fourth-generation Core™ i7 with a fully integrated memory controller for the best memory performance possible. This CPU is considered the workhorse of the workstation market with many added power saving features, peak performance with controlled thermals as well as security functions, such as Intel’s second-generation Virtualization Technology VT-x, Trusted Execution Technology (TXT) and Active Management Technology (AMT) for remote KVM functions.

Cooling

The Harrier system is equipped with GMS’ patent pending RuggedCool™ technology, which is the most unique cooling system in the industry and is the only system that operates up to -40°C to +85°C at full load without throttling the CPU! This cooling approach provides the lowest thermal resistance to the case while providing the highest shock specifications known in the industry. The SB1005 is a fan-less system for reliable operation and can be mounted directly to a metal surface or be used as a stand-alone system.

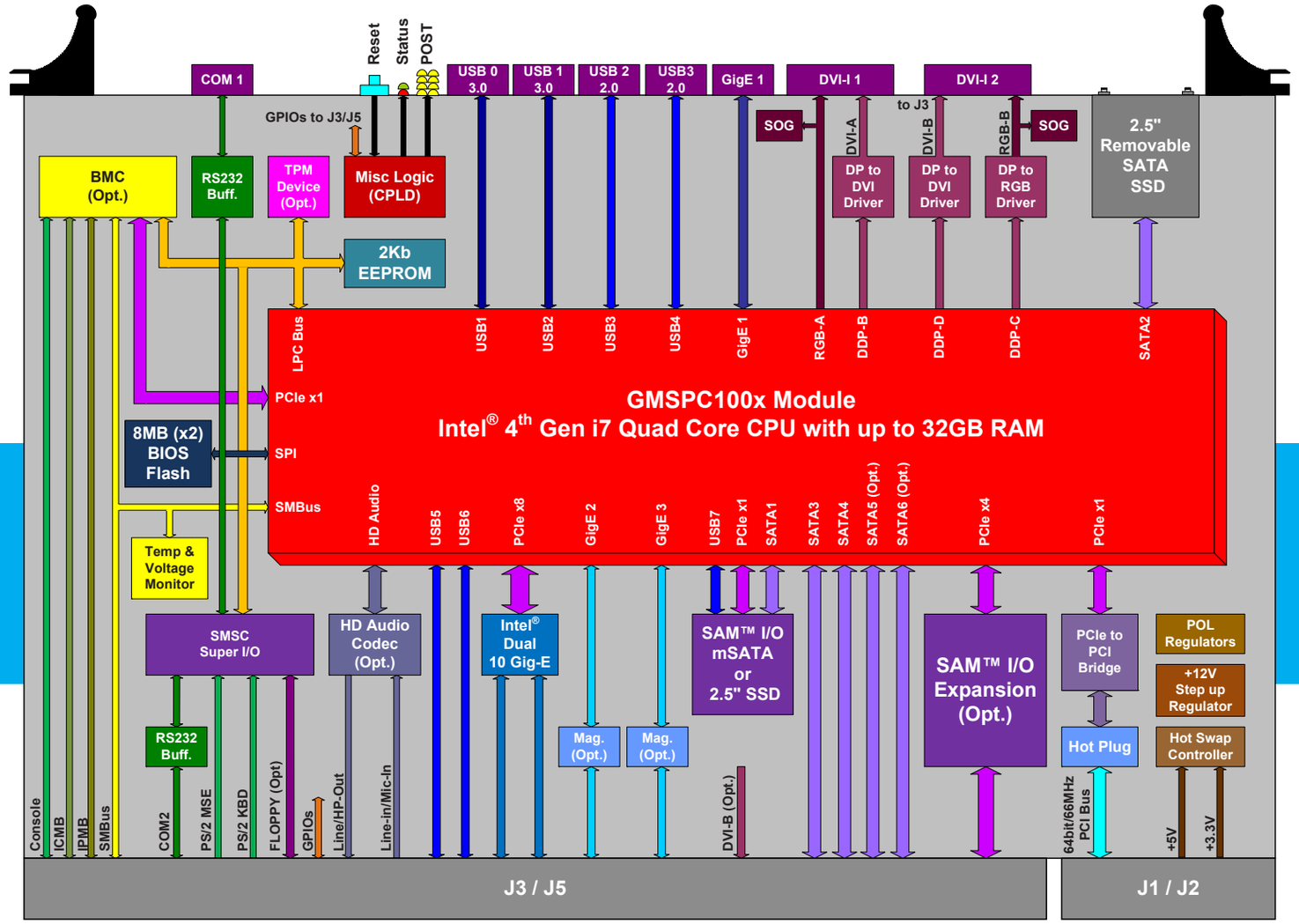
Full Environmental Specs

The Harrier is available in Ruggedization Levels R1-R4. Additional information regarding the Ruggedization Levels and full environmental specifications for this product can be found on our website at www.gms4sbc.com.

Additional Views and Variations

SB1005 (Showing front connector configuration)

SB1005 (Showing optional removable drive)



"HERON" CB2109

High-Performance, Upgradeable CPU, Front I/O cPCI SBC

- Up to 2.4GHz Intel® Quad Core™ i7 processor with 6MB of L2 Cache
- Up to 32GB of 1600MHz DDR3 memory with ECC
- One 2.5" removable or fixed SSD from front panel up to 2TB
- Docking station for SSD with USB interface (Optional)
- Up to 1TB mSATA flash or 2.5" SSD for OS boot (Optional)
- Four SATA ports with RAID support to rear panel
- Two 10Gigabit Ethernet ports with TCP/IP Offloading Engine (TOE)
- Three Gigabit Ethernet ports with TCP/IP Offloading Engine (TOE)
- Two DVI-I ports with Sync-On-Green on RGB Video
- Two USB 3.0 with power to front panel
- Two USB 2.0 ports to front panel and two USB 2.0 ports to rear panel
- Two Serial ports with RS-232 drivers
- One SAM™ site for custom I/O (MIL-STD-1553, WiFi/BT, GPS, etc.)
- Line-In, Headphone-Out, and Mic for Voice Recognition/VoIP
- Super I/O for legacy I/O such as PS2 KB/MS and Floppy (Optional)
- Intel® Virtualization Technology (VT-x/VT-d2) and Trusted Execution Technology (TXT)
- Trusted Platform Module (TPM) for secure operation (Optional)
- Real Time Clock (RTC) with internal or no battery operation
- Baseboard Management Controller (BMC) for system health monitoring (Optional)
- Dual BIOS with 8MB Flash storage
- 256Kb of FRU EEPROM
- CPU temperature and voltage monitoring for safe operation
- Full diagnostics and health reporting with Pass/Fail indicators
- Auto Detect System Master/Peripheral Master cPCI operations
- Fully Hot Swappable 64bit/66MHz cPCI Bus
- Operates at standard temp 0°C to +55°C or extended temp -20°C to +75°C
- Available in ruggedization levels R1-R3

General Description

The CB2109 "Heron" is fourth-generation, 6U cPCI SBC module based on GMS's upgradable CPU technology. It is designed to provide the highest level of workstation performance possible in a fully ruggedized, single-slot cPCI. The Heron is targeted for applications where ultra-high-speed processing power is required with outstanding graphics for upgrading legacy hardware, such as the C269, or for new applications where ultra-high performance, lower-power cPCI is needed. The Heron is the highest performance cPCI SBC in the market with vast I/O and upgradable CPU for extended life cycle.

The Heron supports the Haswell Intel® Core™ i7 processor with up to four physical CPU cores with Hyper-Threading for total of 8 logical cores, each operating at up to 2.4GHz with the ability to TurboBoost. To harvest this incredible CPU performance, the CPU is coupled with up to 32GB of RAM organized in two banks and supporting Error Correcting Code (ECC). The ECC RAM provides 2-bit error detection and 1-bit error correction and supports up to 1600 Mega Transfers per Second (MTS) between CPU and memory.

The I/O subsystem for the Heron is designed to support a wide array of standard and custom I/O functions. The CB2109 standard configuration supports two 10Gigabit Ethernet ports and two Gigabit Ethernet ports with TCP/IP Offloading Engine (TOE) to the rear panel and one Gigabit Ethernet to the front panel, two USB 3.0 and two USB 2.0 ports to front panel, two USB 2.0 to the rear, up to 1TB of mSATA with write-protect for OS boot or one 2.5" SSD/HDD, two DVI-I ports with Sync-On-Green on the RGB ports with one optional DVI port to rear panel, two COM ports with RS-232 drivers (one to front panel and one to rear), and Line In/Out Audio. The Heron also supports Super I/O for legacy COM ports and PS2 Mouse/KB on rear I/O, and two SAM™ sites for custom I/O expansion. The first one is shared with the mSATA device, while the second, much larger site can support a variety of expansion I/O such as, MIL-STD-1553, ARINC-429, CANBus, GPS or any custom I/O via 4-Lane PCIExpress with I/O to rear Panel. The I/O connectors in the front and rear panel are placed on the same locations as the C269 for seamless upgradability.

Applications

The Heron is designed to provide the ultimate cPCI SBC to replace multiple legacy cPCI SBCs (x86 or PPC) with a single SBC utilizing Intel's Virtualization Technology (VT-x/VT-d2). Furthermore, with the Trusted Execution Technology (TXT) the SBC is secure from unauthorized boot devices and unauthorized replications of the system. It is ideal for factory automation, and medial and defense applications, where big investments have been made on cPCI platform. The Heron may be ordered from the factory with operating systems such as Windows 7®, Linux® or VMware® pre-installed.

Technology Used

The Heron utilizes the most powerful Intel® Core™ i7 Haswell CPU, which is the newest and most powerful, efficient processor from Intel® with advanced thermal management and graphics. The Haswell Core™ i7 processor supports Hyper-Threading for a total of eight logical cores and supports 6MB of L2 cache shared among the cores. Haswell supports up to 32GB of DDR3 RAM with Error Correcting Code (ECC) and 1600 Mega Transfers per Second (MTS) between the CPU and RAM. Another major improvement of the Haswell processor over the Ivy Bridge Core™ i7 is the graphics performance. The Haswell processor provides three independent video outputs and better-than 40% improvement in 3D acceleration. Haswell is also coupled with Lynx Point™ and is a fourth-generation Core™ i7 with a fully integrated memory controller for the best memory performance possible. This CPU is considered the workhorse of the workstation market with many added power-saving features and peak performance with controlled thermals, as well as security functions such as Intel's second-generation Virtualization Technology VT-x, Trusted Execution Technology (TXT), and Active Management Technology (AMT) for remote KVM functionality. The Haswell platform also supports PCIExpress Gen3, USB 3.0 and SATA 3 for the highest performance possible on a workstation platform.

Cooling

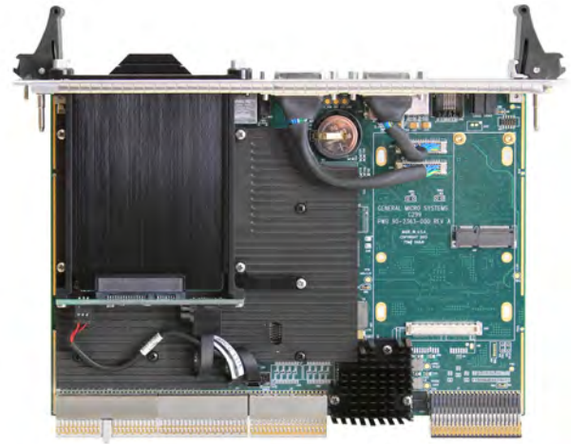
The Heron is equipped with GMS' patent pending RuggedCool™ technology, which is the most unique cooling system in the industry operating up to -20°C to +75°C at full load (0°C to +55°C Standard). This cooling approach provides the lowest thermal resistance to the case while providing the highest shock specifications known in the industry. The CB2109 is a fan-less SBC for reliable operation.

Full Environmental Specs

The Heron is available in ruggedization levels R1-R3. Additional information regarding the ruggedization levels and full environmental specifications for this product can be found on our website at www.gms4sbc.com.

Additional Views and Variations

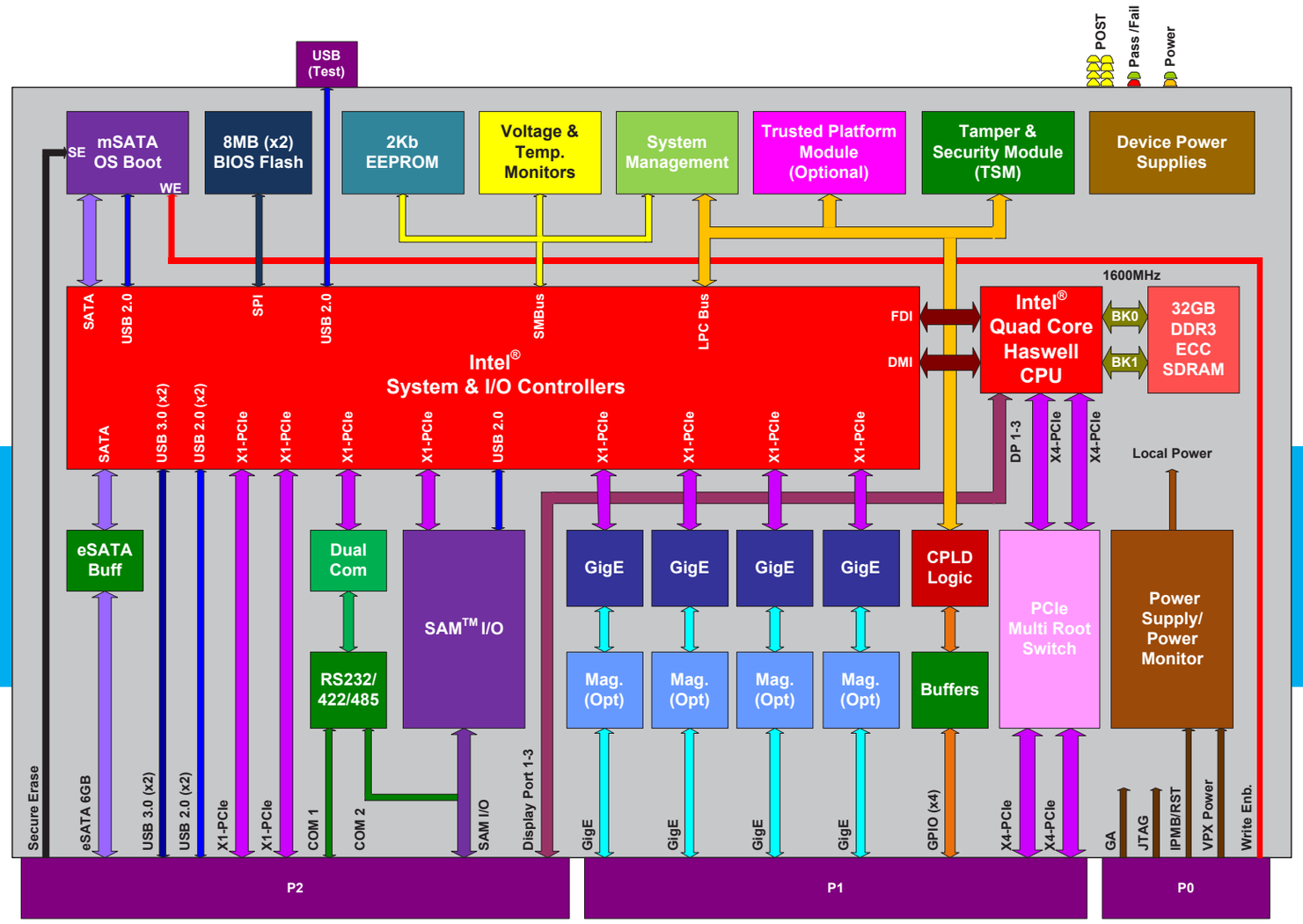
CB2109 (Shown from top view)



CB2109 (Showing removable drive)

"SPARROW" VPXCB1002

Rugged, Ultra-Secure, Open VPX 3U Module



- Up to 2.4GHz Intel® Core™ i7 Haswell processor with 6MB of L2 Cache
- Up to 32GB of 1600MHz DDR3 memory with ECC
- Up to 1TB mSATA for OS boot with write-protect (Optional)
- Four independent Gigabit Ethernet ports with TCP/IP Offloading Engine (TOE)
- Up to three Display Ports
- Two USB 3.0 ports with power
- Two USB 2.0 ports with power
- Up to two COM ports with CTS/RTS
- One eSATA ports at 6Gb/s and two x1 lane PCI Express
- One SAM™ site for custom I/O (MIL-STD-1553, Wi-Fi/BT, GPS, etc.)
- Tamper & Security Module (TSM)
- Intel® Virtualization Technology (VT-x/VT-d2) and Trusted Execution Technology (TXT)
- Trusted Platform Module (TPM) for secure operation (Optional)
- Tamper-proof logic to prevent unauthorized access to NVRAM and hardware
- Four buffered General Purpose I/O lines with interrupt capabilities
- System Health Management Controller for health monitoring/reporting
- Front panel Pass/Fail, Power, and POST LEDs,
- Up to 16MB of BIOS Flash for system parameters and user data
- 2Kb of EEPROM for FRU parameters
- One USB port to front for diagnostics and configuration
- Two x4 PCIe lanes to VPX-P1, configurable as transparent or blocking
- Two x1 PCIe lanes to VPX-P2 for additional system I/O
- Fully compliant to OpenVPX™ 3U, VITA 46/47/48 standards
- Support for Windows®, VMware® and Linux®
- Fully compliant to MIL-STD-810G, MIL-S-901D and DO-160D
- Operates at standard temp 0°C to +55°C or extended temp -40°C to +85°C
- Available in ruggedization levels R1-R5

General Description

The VPXCB1002 "Sparrow" is an Intel® fourth-generation Core™ i7 OpenVPX™ SBC module from GMS. It is designed to provide the highest security and performance possible in a fully ruggedized and conduction-cooled VPX module, operating up to -40°C to +85°C (0°C to +55°C Standard). The Sparrow is targeted for applications where data security and an ultra-rugged computer is needed to provide the highest possible performance per dollar and per watt, utilizing OpenVPX™ 3U specifications, and fully compliant to VITA 46/47/48.

The Sparrow supports the latest Intel® Core™ i7 processor with up to four physical CPU cores with Hyper-Threading for total of 8 logical cores, each operating at up to 2.4GHz with the ability to TurboBoost up to 3.4GHz. To harvest this incredible CPU performance, the CPU is coupled with up to 32GB of RAM organized in two banks, supporting Error Correcting Code (ECC). The ECC RAM provides 2-bit error detection and 1-bit error correction and supports up to 1600 Mega Transfers per Second (MTS) between CPU and memory.

The I/O subsystem for the Sparrow is designed to support a wide array of standard and custom I/O functions. The VPXCB1002 standard configuration supports four independent Gigabit Ethernet channels with MAC/PHY/Magnetics with TCP/IP Offloading Engine (TOE) to VPX-P1, two USB 3.0 and two USB 2.0 with power, up to two COM ports with Handshaking, one 6Gb/s eSATA port, two x1 lane PCI Express, four buffered digital I/O lines with interrupt capabilities, and three Display Port for video. The Sparrow provides up to 1TB of ultra-fast NVRAM (100MB/s write and 200MB/s read) with write-protect and secure-erase capabilities and can be used as a boot device. Additional I/O, such as Quad Video capture, CANbus, MIL-STD-1553, Wi-Fi, Bluetooth, FireWire, GPS for data time stamping, and many other I/O functions, may be added via the one SAM™ site onboard with I/O to VPX-P2.

Applications

The Sparrow is designed to provide the ultimate rugged computer for defense and UAV applications. The Sparrow is widely deployed in Army vehicles, robots for hazardous applications where the computer is exposed to harsh environments, and UAVs, where power, weight, and size are the main considerations. The VPXCB1002 supports the most popular Hypervisors offered by VMware®, WindRiver® and Microsoft® and may be ordered from the factory with operating systems such as Windows 7®, Linux® or VMware® pre-installed. The VPXCB1002 is fully compliant to MIL-STD 810G, MIL-S-901D and DO-160D.

Technology Used

The Sparrow utilizes the most powerful Intel® Core™ i7 Haswell CPU, which is the newest and most powerful, efficient processor from Intel® with advanced thermal management and graphics. The Haswell Core™ i7 processor supports Hyper-Threading for a total of eight logical cores and supports 6MB of L2 cache shared among the cores. Haswell supports up to 32GB of DDR3 RAM with Error Correcting Code (ECC) and 1600 Mega Transfers per Second (MTS) between the CPU and RAM. Another major improvement of the Haswell processor over the Ivy Bridge Core™ i7 is the graphics performance. The Haswell processor provides three independent video outputs and better-than 40% improvement in 3D acceleration. Haswell is also coupled with Lynx Point™ and is a fourth-generation Core™ i7 with a fully integrated memory controller for the best memory performance possible. This CPU is considered the workhorse of the workstation market with many added power-saving features and peak performance with controlled thermals, as well as security functions such as Intel's second-generation Virtualization Technology VT-x, Trusted Execution Technology (TXT), and Active Management Technology (AMT) for remote KVM functionality. The Haswell platform also supports PCIExpress Gen3, USB 3.0 and SATA 3 for the highest performance possible on a workstation platform.

Cooling

The Sparrow is equipped with GMS' patent pending RuggedCool™ technology, which is the most unique cooling system in the industry and is the only VPX board with a Quad Core™ i7 processor with 32GB of RAM that operates up to -40°C to +85°C at full load (0°C to +55°C Standard) This cooling approach provides the lowest thermal resistance to the rail while providing the highest shock specifications known in the industry. In addition, the VPXC1002 is furnished with a GMS designed wedge lock that gives over 8x surface area for increased heat transfer compared to standard wedge lock designs.

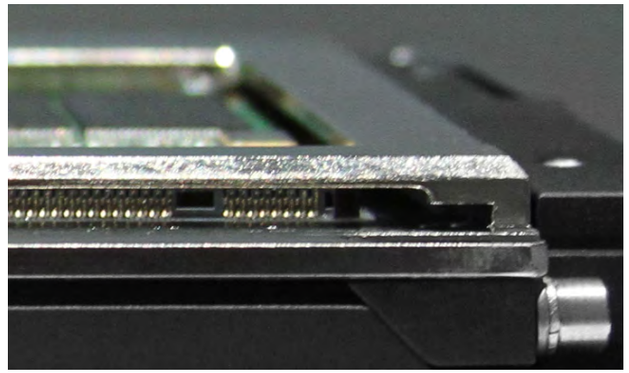
Full Environmental Specs

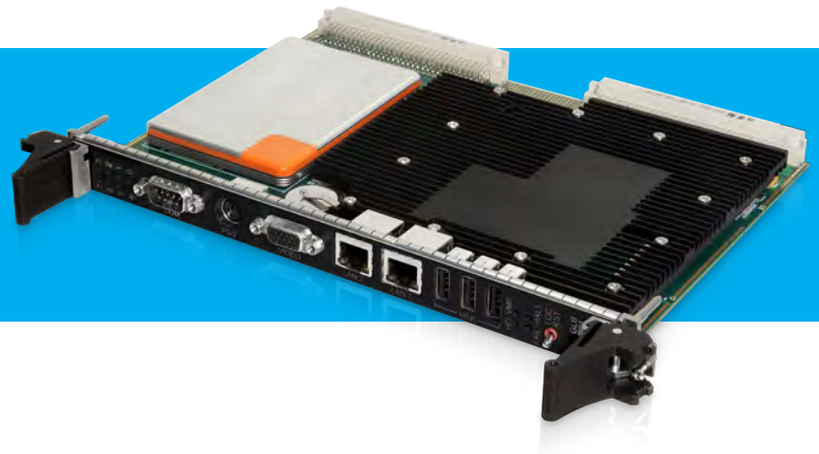
The Sparrow is available in ruggedization levels R1-R5. Additional information regarding the ruggedization levels and full environmental specifications for this product can be found on our website at www.gms4sbc.com.

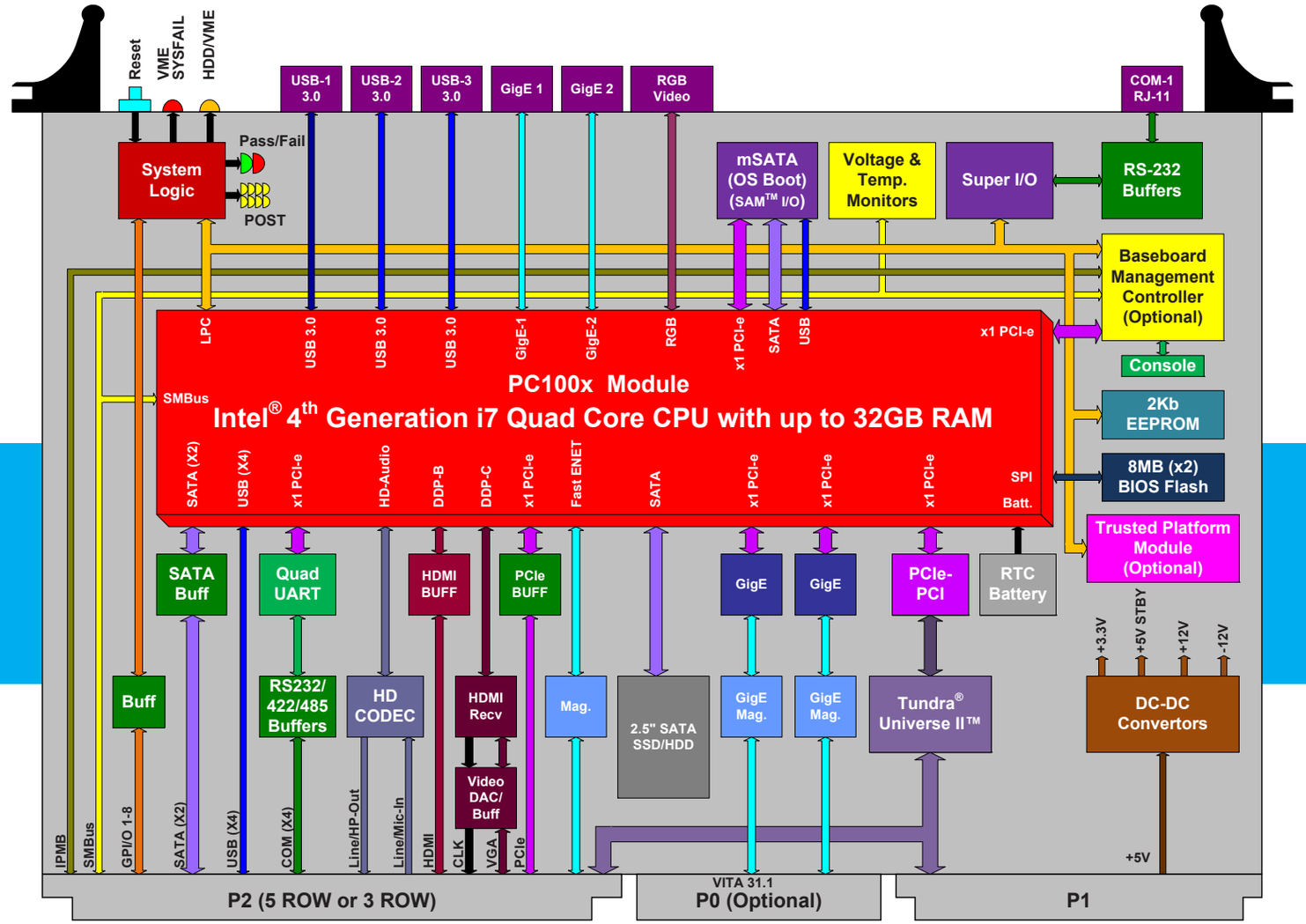
Additional Views and Variations

VPXCB1002 (Shown with conduction plate)

VPXCB1002 (Detail of proprietary wedge lock design)







"EGRET" VB2105

High-Performance, Upgradeable CPU, Front I/O, VME SBC

- Up to 2.4GHz Intel® Quad Core i7™ processor with 6MB of L2 Cache
- Up to 32GB of 1600MHz DDR3 memory with ECC
- Supports one 2.5" SATA HDD or one SSD up to 2TB
- Up to 1TB mSATA flash for OS boot (Optional)
- Two buffered SATA ports with RAID support
- Up to five Gigabit Ethernet ports with TCP/IP Offloading Engine (TOE)
- Dual RGB video to front and rear panel and one HDMI port to rear panel
- One PCIE x1 lane for custom high speed I/O on P2
- Line-In, Headphone-Out, and Mic for Voice Recognition/VoIP
- Three USB 3.0 ports to front panel
- Four USB 2.0 ports to rear panel
- Four Serial ports with RS-232/422/485 options
- Super I/O with COM port to front panel
- Intel® Virtualization Technology (VT-x/VT-d2) and Trusted Execution Technology (TXT)
- Trusted Platform Module (TPM) for secure operation (Optional)
- Up to 16MB of BIOS Flash for system parameters and user data
- 2Kb of EEPROM for FRU parameters
- Real Time Clock (RTC) with internal or no battery operation
- Baseboard Management Controller (BMC) for system health monitoring (Optional)
- CPU temperature and voltage monitoring for safe operation
- Full diagnostics and health reporting with Pass/Fail indicators
- VME-64 support via Tundra® Universe™ II
- Support for 3-row or 5-row VME interface
- Single +5V operation
- Support for Windows®, Linux® and VMware®
- Operates at standard temp 0°C to +55°C or extended temp -20°C to +75°C
- Available in ruggedization levels R1-R3

General Description

The VB2105 “Egret” is a fifth-generation, VME SBC module based on GMS’s upgradable CPU technology. It is designed to provide the highest level of workstation performance possible in a fully ruggedized, single-slot VME slot. It may be operated in all VME backplanes with 3-row or 5-row VME connectors with or without VME P0. The Egret is targeted for applications where ultra-high-speed processing power is required with outstanding graphics for upgrading legacy hardware or for new applications where hard Real Time is required. The Egret is the highest performance VME SBC in the market with vast I/O and upgradable CPU for extended life cycle.

The Egret supports the latest Intel® fourth-generation Core™ i7 processors with up to four physical CPU cores with Hyper-Threading for a total of 8 logical cores, each operating at up to 2.4GHz with the ability to run in TurboBoost mode up to 3.3GHz. To harvest this incredible CPU performance, the CPU is coupled with up to 32GB of RAM organized in two banks supporting Error Correcting Code (ECC). The ECC RAM provides 2-bit error detection and 1-bit error correction and supports up to 1600 Mega Transfers per Second (MTS) between CPU and memory.

The I/O subsystem for Egret is designed to support a wide array of standard and custom I/O functions. The VB2105 standard configuration supports up to five Gigabit Ethernet channels with TCP/IP offloading engine, three USB 3.0 ports to the front panel and four USB 2.0 to the rear, mSATA with write-protect and secure erase for OS boot up to 1TB, two VGA ports (one to the front panel and one to the rear), one HDMI port, four COM ports with RS-232/422/485 options, super I/O with COM port to front panel, one buffered PCIe port for user I/O, and audio headset jack. Optional additional I/O functions such as Quad Video capture, CANbus, MIL-STD-1553, Wi-Fi, Bluetooth, FireWire, GPS for data time stamping, and many other I/O functions utilizing the SAM™ site are provided (lose mSATA).

Applications

The Egret is designed to provide the ultimate VME SBC to replace multiple legacy VME SBCs (x86 or PPC) with a single SBC utilizing Intel’s Virtualization Technology (VT-x/VT-d2). Furthermore, with the Trusted Execution Technology (TXT) the SBC is secure from unauthorized boot devices and unauthorized replications of the system. It is ideal for factory automation, medical, and defense applications, where big investments have been made on a VME platform and where true hard “Real Time” is required. No other bus architecture can provide this hard “Real Time” performance like VME. The Egret may be ordered from the factory with operating systems such as Windows 7®, Linux® or VMware® pre-installed.

Technology Used

The Egret utilizes the most powerful Intel® Core™ i7 Haswell CPU, which is the newest and most powerful, efficient processor from Intel® with advanced thermal management and graphics. The Haswell Core™ i7 processor supports Hyper-Threading for a total of eight logical cores and supports 6MB of L2 cache shared among the cores. Haswell supports up to 32GB of DDR3 RAM with Error Correcting Code (ECC) and 1600 Mega Transfers per Second (MTS) between the CPU and RAM. Another major improvement of the Haswell processor over the Ivy Bridge Core™ i7 is the graphics performance. The Haswell processor provides three independent video outputs and better-than 40% improvement in 3D acceleration. Haswell is also coupled with Lynx Point™ and is a fourth-generation Core™ i7 with a fully integrated memory controller for the best memory performance possible. This CPU is considered the workhorse of the workstation market with many added power-saving features and peak performance with controlled thermals, as well as security functions such as Intel’s second-generation Virtualization Technology VT-x, Trusted Execution Technology (TXT), and Active Management Technology (AMT) for remote KVM functionality. The Haswell platform also supports PCIExpress Gen3, USB 3.0 and SATA 3 for the highest performance possible on a workstation platform.

Cooling

The Egret is equipped with GMS’s patent pending RuggedCool™ technology, which is the most unique cooling system in the industry operating up to -20°C to +75°C at full load (0°C to +55°C Standard). This cooling approach provides the lowest thermal resistance to the case while providing the highest shock specifications known in the industry. The VB2105 is a fan-less SBC for reliable operation.

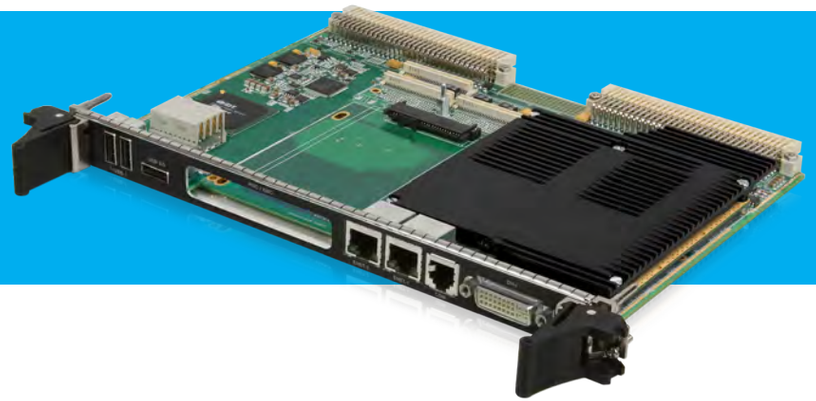
Full Environmental Specs

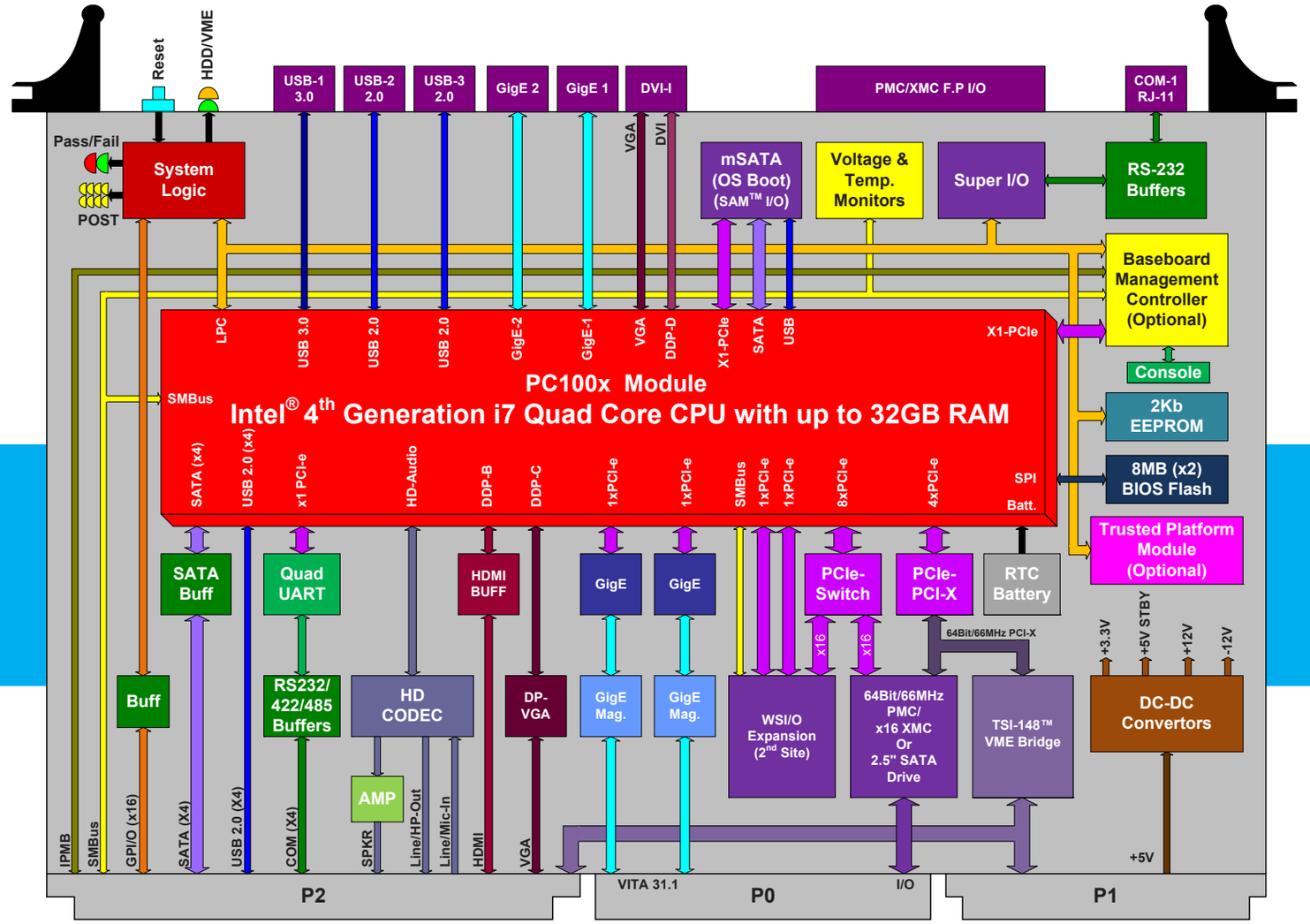
The Egret is available in ruggedization levels R1-R3. Additional information regarding the ruggedization levels and full environmental specifications for this product can be found on our website at www.gms4sbc.com.

Additional Views and Variations

VB2105 (Ultra-efficient heatsink for low air flow chassis)

VB2105-BO (Optional break out board for expanded I/O)





"ALBATROSS" VSB2105

High-Performance, Upgradeable CPU, VME SBC

- Up to 2.4GHz Intel® Quad Core™ i7 processor with 6MB of L2 Cache
- Up to 32GB of 1600MHz DDR3 memory with ECC
- Up to 1TB mSATA flash for OS boot (Optional)
- Four Gigabit Ethernet ports with TCP/IP Offloading Engine (TOE)
- One PMC-X/16-Lane XMC compliant site with rear I/O or 2.5" SATA drive
- Four buffered SATA ports with RAID support
- Line-In, Headphone-Out, and Mic for Voice Recognition/VoIP
- One DVI-I (DVI/HDMI and VGA) to front panel and one VGA and one HDMI to rear panel
- One USB 3.0 and two USB 2.0 ports to front
- Four USB 2.0 to rear with power
- Four Serial Ports with RS-232/422/485 options
- Super I/O with COM port to front panel
- Sixteen buffered user I/O with interrupt capabilities
- Work Station I/O (WSI/O) for additional custom I/O (2nd VME Slot)
- Intel® Virtualization Technology (VT-x/VT-d2) and Trusted Execution Technology (TXT)
- Trusted Platform Module (TPM) for secure operation (Optional)
- Up to 16MB of BIOS Flash for system parameters and user data
- 2Kb of EEPROM for FRU parameters
- Real Time Clock (RTC) with internal or no battery operation
- Baseboard Management Controller (BMC) for system health monitoring (Optional)
- CPU temperature and voltage monitoring for safe operation
- Full diagnostics and health reporting with Pass/Fail indicators
- VME-64/2eSST support via TSI-148
- Single +5V operation
- Support for Windows®, Linux® and VMware®
- Operates at standard temp 0°C to +55°C or extended temp -20°C to +75°C
- Available in ruggedization levels R1-R3

General Description

The VSB2105 "Albatross" is a sixth-generation VME SBC module based on GMS's upgradable CPU technology. It is designed to provide the highest level of workstation performance possible in a fully ruggedized, single-slot VME slot. It may be operated in all VME backplanes with 3-row or 5-row VME connectors with or without VME P0. The Albatross is targeted for applications where ultra-high-speed processing power is required with outstanding graphics for upgrading legacy hardware or for new applications where hard Real Time is required. The Albatross is the highest performance VME SBC in the market with vast I/O and upgradable CPU for extended life cycle.

The Albatross supports the latest Intel® fourth-generation Core™ i7 processor with up to four physical CPU cores with Hyper-Threading for a total of 8 logical cores, each operating at up to 2.4GHz with the ability to TurboBoost. To harvest this incredible CPU performance, the CPU is coupled with up to 32GB of RAM organized in two banks supporting Error Correcting Code (ECC). The ECC RAM provides 2-bit error detection and 1-bit error correction and supports up to 1600 Mega Transfers per Second (MTS) between CPU and memory.

The I/O subsystem for Albatross is designed to support a wide array of standard and custom I/O functions. The VSB2105 standard configuration supports four Gigabit Ethernet channels with TCP/IP offloading engine (TOE), one USB 3.0 and two USB 2.0 to front panel, four USB 2.0 to rear, mSATA with write-protect and secure-erase for OS boot up to 1TB, one 2.5" SATA drive (lose PMC/XMC), one VGA port and one HDMI port to rear, one DVI-I (DVI/HDMI and VGA) to front panel, four COM ports with RS-232/422/485 options, Super I/O with COM port to front panel, audio headset jack, and sixteen buffered GPI/O lines. Optional additional I/O functions are provided via the 64Bit, 66MHz PMC site or x16 lanes PCI Express XMC site. For additional high-speed I/O, the VSB2105 provides two x1 and one x16 PCI Express lanes to a 2nd-slot VME board mounted directly to the Albatross for an 8HP configuration. This Workstation I/O module supports additional PMC sites and HDD/SDD or maybe a custom user I/O module.

Applications

The Albatross is designed to provide the ultimate VME SBC replacement of multiple legacy VME SBCs (x86 or PPC) with a single SBC utilizing Intel's Virtualization Technology (VT-x/VT-d2). Furthermore, with the Trusted Execution Technology (TXT), the SBC is secure from unauthorized boot devices and unauthorized replications of the system. It is ideal for factory automation, medical, and defense applications, where big investments have been made on a VME platform and where true hard "Real Time" is required. No other bus architecture can provide this hard "Real Time" performance like the VME. The Albatross may be ordered from the factory with operating systems such as Windows 7®, Linux® or VMware® pre-installed.

Technology Used

The Albatross utilizes the most powerful Intel® Core™ i7 Haswell CPU, which is the newest and most powerful, efficient processor from Intel® with advanced thermal management and graphics. The Haswell Core™ i7 processor supports Hyper-Threading for a total of eight logical cores and supports 6MB of L2 cache shared among the cores. Haswell supports up to 32GB of DDR3 RAM with Error Correcting Code (ECC) and 1600 Mega Transfers per Second (MTS) between the CPU and RAM. Another major improvement of the Haswell processor over the Ivy Bridge Core™ i7 is the graphics performance. The Haswell processor provides three independent video outputs and better-than-40% improvement in 3D acceleration. Haswell is also coupled with Lynx Point™ and is a fourth-generation Core™ i7 with a fully integrated memory controller for the best memory performance possible. This CPU is considered the workhorse of the workstation market with many added power-saving features and peak performance with controlled thermals, as well as security functions such as Intel's second-generation Virtualization Technology VT-x, Trusted Execution Technology (TXT), and Active Management Technology (AMT) for remote KVM functionality. The Haswell platform also supports PCIExpress Gen3, USB 3.0 and SATA 3 for the highest performance possible on a workstation platform.

Cooling

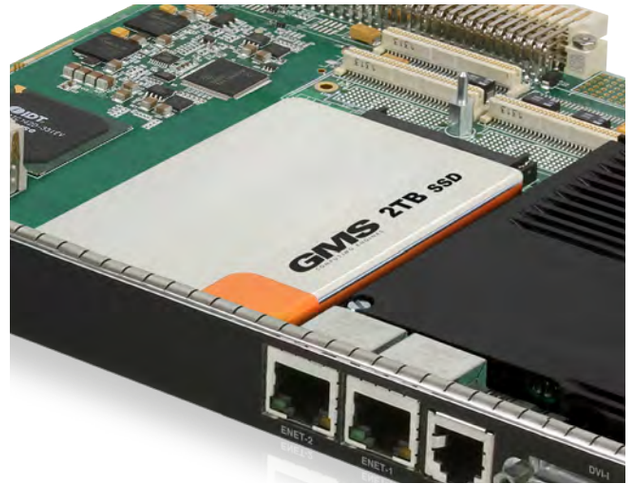
The Albatross is equipped with GMS's patent pending RuggedCool™ technology, which is the most unique cooling system in the industry and operating up to -20°C to +75°C at full load (0°C to +55°C Standard). This cooling approach provides the lowest thermal resistance to the case while providing the highest shock specifications known in the industry.

Full Environmental Specs

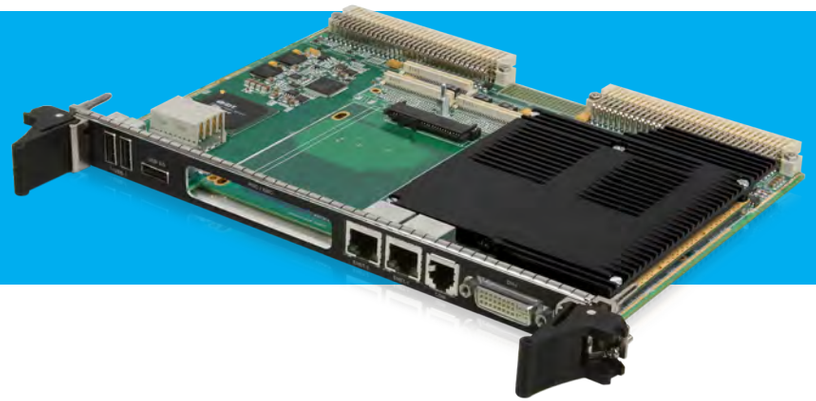
The Albatross is available in ruggedization levels R1-R3. Additional information regarding the ruggedization levels and full environmental specifications for this product can be found on our website at www.gms4sbc.com.

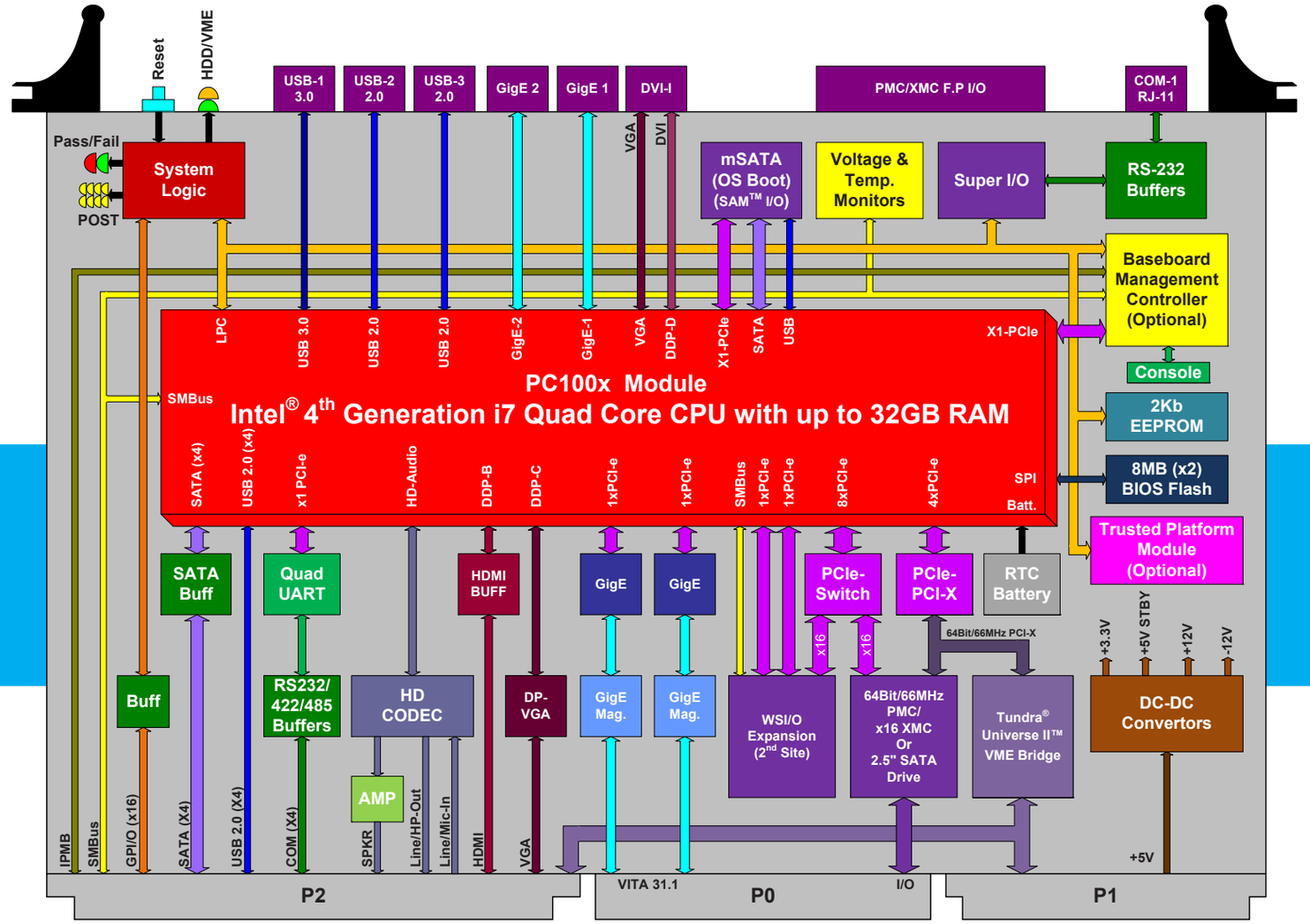
Additional Views and Variations

VSB2105 (Showing fixed drive option)



VSB2105 (Ultra-efficient heatsink for low air flow chassis)





"ROYAL ALBATROSS" VSB2102

High-Performance, Upgradeable CPU, VME SBC

- Up to 2.4GHz Intel® Quad Core™ i7 processor with 6MB of L2 Cache
- Up to 32GB of 1600MHz DDR3 memory with ECC
- Up to 1TB mSATA flash for OS boot (Optional)
- Four Gigabit Ethernet ports with TCP/IP Offloading Engine (TOE)
- One PMC-X/16-Lane XMC compliant site with rear I/O or 2.5" SATA drive
- Four buffered SATA ports with RAID support
- Line-In, Headphone-Out, and Mic for Voice Recognition/VoIP
- One DVI-I (DVI/HDMI and VGA) to front panel and one VGA and one HDMI to rear panel
- One USB 3.0 and two USB 2.0 ports to front
- Four USB 2.0 to rear with power
- Four Serial Ports with RS-232/422/485 options
- Super I/O with COM port to front panel
- Sixteen buffered user I/O with interrupt capabilities
- Work Station I/O (WSI/O) for additional custom I/O (2nd VME Slot)
- Intel® Virtualization Technology (VT-x/VT-d2) and Trusted Execution Technology (TXT)
- Trusted Platform Module (TPM) for secure operation (Optional)
- Up to 16MB of BIOS Flash for system parameters and user data
- 2Kb of EEPROM for FRU parameters
- Real Time Clock (RTC) with internal or no battery operation
- Baseboard Management Controller (BMC) for system health monitoring (Optional)
- CPU temperature and voltage monitoring for safe operation
- Full diagnostics and health reporting with Pass/Fail indicators
- VME-64/2eSST support via Tundra® Universe II™
- Single +5V operation
- Support for Windows®, Linux® and VMware®
- Operates at standard temp 0°C to +55°C or extended temp -20°C to +75°C
- Available in ruggedization levels R1-R3

General Description

The VSB2102 “Royal Albatross” is a sixth-generation VME SBC module based on GMS’s upgradable CPU technology. It is designed to provide the highest level of workstation performance possible in a fully ruggedized, single-slot VME slot. It may be operated in all VME backplanes with 3-row or 5-row VME connectors with or without VME P0. The Royal Albatross is targeted for applications where ultra-high-speed processing power is required with outstanding graphics for upgrading legacy hardware or for new applications where hard Real Time is required. The Royal Albatross is the highest performance VME SBC in the market with vast I/O and upgradable CPU for extended life cycle.

The Royal Albatross supports the latest Intel® fourth-generation Core™ i7 processor with up to four physical CPU cores with Hyper-Threading for a total of 8 logical cores, each operating at up to 2.4GHz with the ability to TurboBoost. To harvest this incredible CPU performance, the CPU is coupled with up to 32GB of RAM organized in two banks supporting Error Correcting Code (ECC). The ECC RAM provides 2-bit error detection and 1-bit error correction and supports up to 1600 Mega Transfers per Second (MTS) between CPU and memory.

The I/O subsystem for the Royal Albatross is designed to support a wide array of standard and custom I/O functions. The VSB2102 standard configuration supports four Gigabit Ethernet channels with TCP/IP offloading engine (TOE), one USB 3.0 and two USB 2.0 to front panel, four USB 2.0 to rear, mSATA with write-protect and secure-erase for OS boot up to 1TB, one 2.5” SATA drive (lose PMC/XMC), one VGA port and one HDMI port to rear, one DVI-I (DVI/HDMI and VGA) to front panel, four COM ports with RS-232/422/485 options, Super I/O with COM port to front panel, audio headset jack, and sixteen buffered GPI/O lines. Optional additional I/O functions are provided via the 64Bit, 66MHz PMC site or x16 lanes PCI Express XMC site. For additional high-speed I/O, the VSB2102 provides two x1 and one x16 PCI Express lanes to a 2nd-slot VME board mounted directly to the Royal Albatross for an 8HP configuration. This Workstation I/O module supports additional PMC sites and HDD/SDD or maybe a custom user I/O module.

Applications

The Royal Albatross is designed to provide the ultimate VME SBC replacement of multiple legacy VME SBCs (x86 or PPC) with a single SBC utilizing Intel’s Virtualization Technology (VT-x/VT-d2). Furthermore, with the Trusted Execution Technology (TXT), the SBC is secure from unauthorized boot devices and unauthorized replications of the system. It is ideal for factory automation, medical, and defense applications, where big investments have been made on a VME platform and where true hard “Real Time” is required. No other bus architecture can provide this hard “Real Time” performance like the VME. The Royal Albatross may be ordered from the factory with operating systems such as Windows 7®, Linux® or VMware® pre-installed.

Technology Used

The Royal Albatross utilizes the most powerful Intel® Core™ i7 Haswell CPU, which is the newest and most powerful, efficient processor from Intel® with advanced thermal management and graphics. The Haswell Core™ i7 processor supports Hyper-Threading for a total of eight logical cores and supports 6MB of L2 cache shared among the cores. Haswell supports up to 32GB of DDR3 RAM with Error Correcting Code (ECC) and 1600 Mega Transfers per Second (MTS) between the CPU and RAM. Another major improvement of the Haswell processor over the Ivy Bridge Core™ i7 is the graphics performance. The Haswell processor provides three independent video outputs and better-than 40% improvement in 3D acceleration. Haswell is also coupled with Lynx Point™ and is a fourth-generation Core™ i7 with a fully integrated memory controller for the best memory performance possible. This CPU is considered the workhorse of the workstation market with many added power-saving features and peak performance with controlled thermals, as well as security functions such as Intel’s second-generation Virtualization Technology VT-x, Trusted Execution Technology (TXT), and Active Management Technology (AMT) for remote KVM functionality. The Haswell platform also supports PCIExpress Gen3, USB 3.0 and SATA 3 for the highest performance possible on a workstation platform.

Cooling

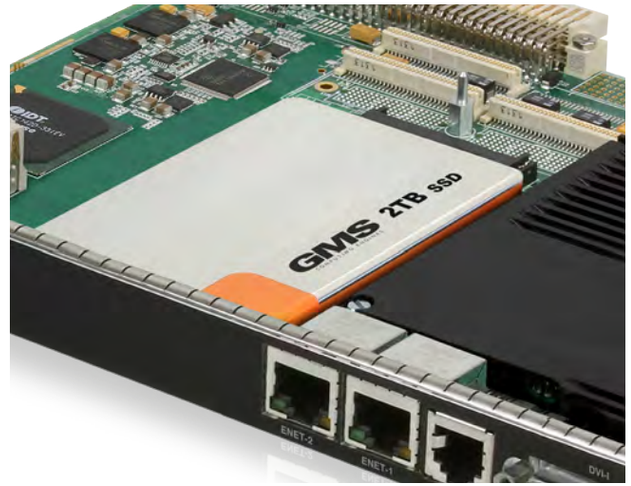
The Royal Albatross is equipped with GMS’s patent pending RuggedCool™ technology, which is the most unique cooling system in the industry and operating up to -20°C to +75°C at full load (0°C to +55°C Standard). This cooling approach provides the lowest thermal resistance to the case while providing the highest shock specifications known in the industry.

Full Environmental Specs

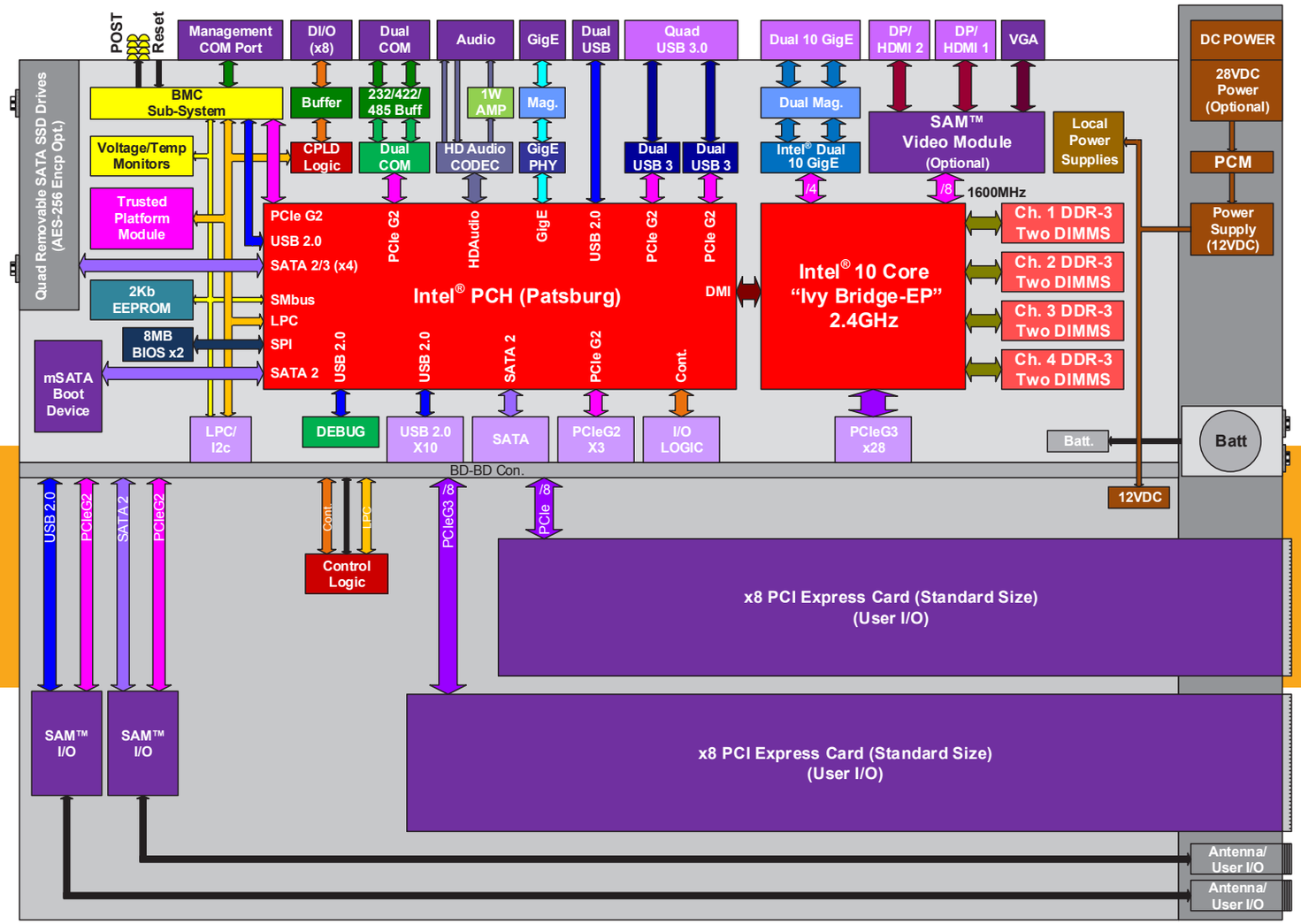
The Royal Albatross is available in ruggedization levels R1-R3. Additional information regarding the ruggedization levels and full environmental specifications for this product can be found on our website at www.gms4sbc.com.

Additional Views and Variations

VSB2102 (Showing fixed drive option)



VSB2102 (Ultra-efficient heatsink for low air flow chassis)



"PYTHON" SO301

Rugged, High-Performance Server with Commercial PCI Express I/O Expansion

- Standard I/O interconnect for low cost, high performance server
- Supports two half-size commercial PCI Express boards for low-cost custom I/O
- Designed with Intel's highest performance, server-class embedded chipset
- Utilizes Intel® Xeon® Ivy Bridge-EP CPU with 10 cores, each operating up to 2.4GHz
- Support for Hyper-Threading on each core for total of 20 logical cores
- Supports up to 128GB of DDR3 memory with ECC up to 1600 MT/s
- 25MB unified instruction/data cache shared between cores (2.5MB/Core)
- Quad removable 2.5" SATA SSDs with optional AES-256 encryption and secure erase
- One SAM™ I/O site mSATA with write-protect and secure-erase for OS boot up to 1TB
- Highest performance, full-size, embedded GPU module from AMD (Optional)
- Supports dual DisplayPort/HDMI ports and one RGB video (Optional)
- Dual 10-Gigabit Ethernet ports with TCP/IP Offloading Engine (TOE)
- Quad USB 3.0 and two USB 2.0 ports with power
- Two Serial ports, eight buffered GPIO and HD-Audio with 1W mono amplifier
- Two SAM™ sites for custom I/O (mSATA, Mil-STD-1553, Wi-Fi/BT, GPS, etc.)
- Dual BIOS boot devices with write-protect and RTC with field replaceable battery
- Baseboard Management Controller for health monitoring/reporting (IPMI 2.0) (Optional)
- One Gigabit Ethernet port and one COM port for system health monitoring
- Intel® Virtualization Technology (VT-x/VT-d2) and Trusted Execution Technology (TXT)
- Trusted Platform Module (TPM) for secure operation (Optional)
- Support for Active Management Technology (AMT) for remote KVM functions
- Converged Platform Power Management (CPPM) for power saving
- Internal battery to allow orderly shutdown upon power interruption
- Ultra-low SWaP only 11.75" x 7.75" x 3" @ 14 lb. and as low as 150W
- CE Mark and FCC compliant (MIL-STD-1275 Optional)
- Operates at standard temp 0°C to +55°C or extended temp -20°C to +75°C (Optional)
- Available in ruggedization levels R1-R3

General Description

The SO301 "Python" is a second-generation fully rugged server utilizing commercial PC interconnects with two standard PCI Express expansion sites. It is designed to provide the highest level of server class performance possible in a fully ruggedized, conduction-cooled system operating over a full -20°C to +75°C temperature (0°C to +55°C Standard). The Python is targeted for applications where an ultra-fast, multi-core CPU is needed with vast amounts of high-speed, ECC-protected RAM to support commercial off-the-shelf I/O modules in half-size PCI Express formats. The SO301 supports 10 physical CPU cores with Hyper-Threading for a total of 20 logical cores, each operating up to 2.4GHz with the ability to TurboBoost up to 3.0GHz. To harvest this incredible CPU performance, the CPU is coupled with up to 128GB of DDR3 RAM organized in four banks. Each RAM bank consists of two DDR3 DIMM arrays with Error Correcting Code (ECC). The ECC RAM provides 2-bit error detection with 1-bit correction and supports up to 1600 Mega Transfers per Second (MTS) between CPU and memory.

The I/O subsystem for the Python is designed to support a wide array of high-speed I/O devices with modularity and security. The I/O consists of a host CPU I/O and two 8-lane commercial, half-size PCIe I/O expansion sites. The host CPU supports dual 10Gigabit Ethernet ports, four USB 3.0 and two USB 2.0 ports with power, two Serial ports with RS-232/422/485 buffers, full HD-Audio and eight General Purpose I/O lines. There is also 8-lane PCIe to support a powerful GPU from AMD with two DisplayPort/HDMI ports and one VGA port (optional). The SO301 also provides a very flexible set of storage devices with highly secure options. The Python supports up to four removable 2.5" SATA SSD drives with an optional AES-256 Encryption, and secure erase functions up to 2TB. Additionally, the host supports one mSATA drive with write-protect for use as a local boot device up to 1TB. Other optional I/O devices included for the host CPU are two SAM™ sites for GPS for accurate positioning and time stamping of data packets, Wi-Fi/ Bluetooth, and many other I/O functions. The SO301 also features an optional Baseboard Management Controller (BMC) for detailed system health monitoring and reporting using industry standard IPMI 2.0 via a dedicated Ethernet port or Serial Port. The two PCIe expansion sites support all commercial half-size PCIe cards with standard I/O interconnects to the rear panel. All the I/O ports utilize commercial connectors for easy, economical cabling. In addition, the SO301 is capable of providing power holdup in the event of unexpected power outage so the system can perform an orderly shutdown to protect running applications.

Applications

The Python is designed to be a fully ruggedized server with standard commercial interconnects on the rear panel and expansion for up to two half-size, 8-lane PCIe I/O cards. It is ideal for server racks where a sealed fan-less server is needed for data collection, targeting/mapping, and data acquisition. The SO301 supports the most popular Hypervisors offered by VMware®, WindRiver® and Microsoft® and may be shipped from the factory with operating systems such as Windows 7® and Linux® pre-installed. The SO301 is CE Mark and FCC compliant with an optional support for MIL-STD-1275.

Technology Used

The Python utilizes the most powerful Xeon® processor from Intel®. The Ivy Bridge-EP CPU is a second-generation, 10-core Sandy Bridge microarchitecture processor with a fully integrated memory controller for the best possible memory performance. This CPU is the highest performance server-class CPU from Intel® with many added security functions, such as Intel's second-generation Virtualization Technology VT-x, Trusted Execution Technology (TXT), and Converged Platform Power Management (CPPM) for thermal management and power saving. The graphics engine is based around the most powerful AMD full-size embedded MXM GPU module for outstanding performance in 2D and 3D accelerations and is fully virtualized. The I/O is provided via 40 lanes of PCIe 3.0 which are monitored via the Trusted Platform Module (TPM) to assure full security and safe operation.

Cooling

The Python is equipped with GMS' patent pending RuggedCool™ technology, which is the most unique cooling system in the industry and is the only rugged server that operates up to -20°C to +75°C at full load! This cooling approach provides the lowest thermal resistance to the case while providing the highest shock specifications known in the industry. The SO301 is a fan-less system for reliable operation and can be mounted directly to a metal surface or used as a stand-alone system.

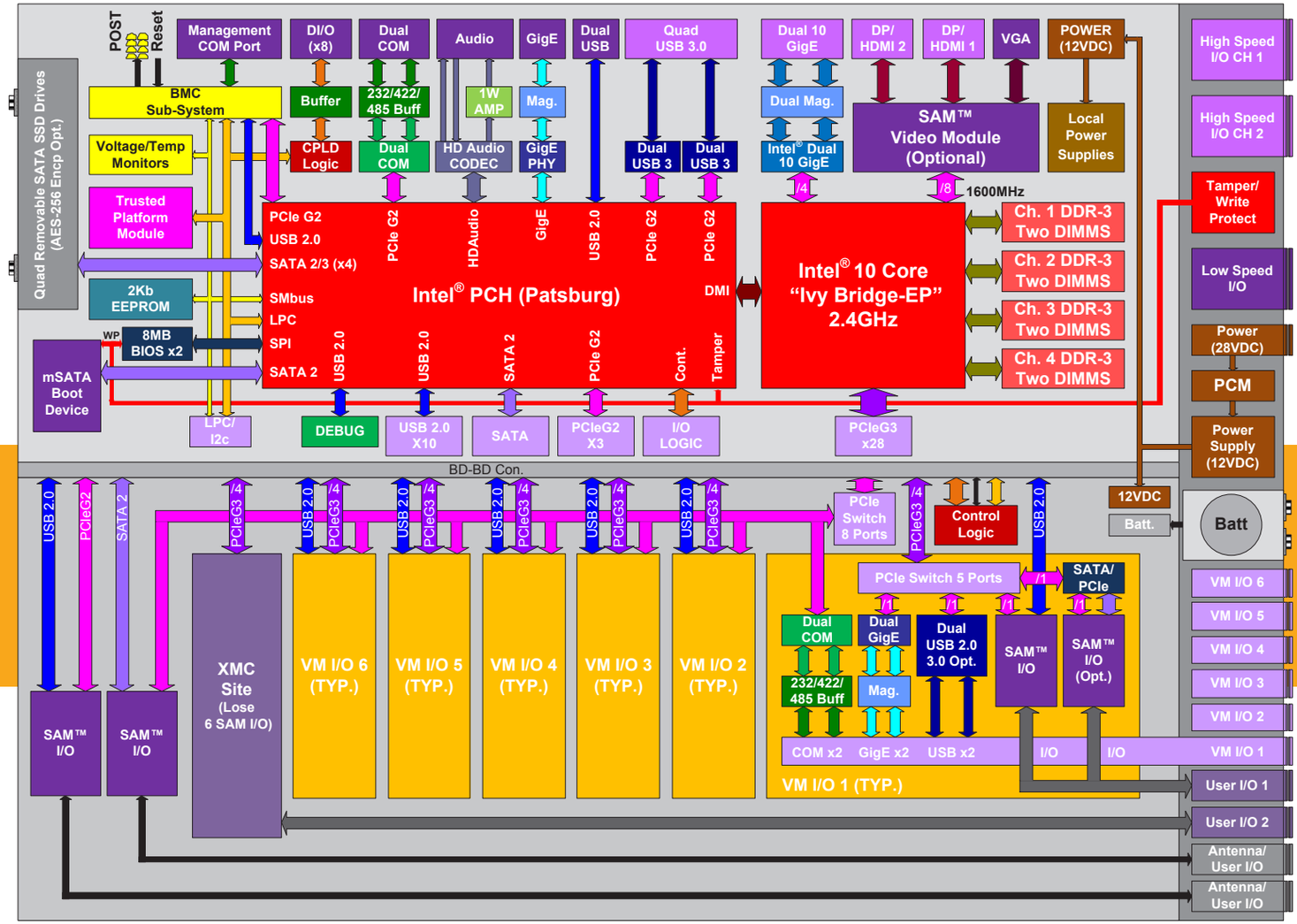
Full Environmental Specs

The Python is available in ruggedization Levels R1-R3. Additional information regarding the ruggedization levels and full environmental specifications for this product can be found on our website at www.gms4sbc.com.

Additional Views and Variations

SO301 (Showing rear connector configuration)

SO301 (Showing PCIe expansion slots)



"SPIDER" SO302-SVM

Rugged, Six-Way, Secure Virtual Machine Server

- Designed from the ground up for a Secure Virtual Machine (SVM) system
- Up to six independent VM I/O sites for the highest performance and security
- Utilizes Intel® Xeon® Ivy Bridge-EP CPU with 10 Cores, each operating up to 2.4 GHz
- Support for Hyper-Threading on each core for a total of 20 logical cores
- Supports up to 128GB of DDR3 memory with ECC up to 1600 MT/s
- 25MB unified instruction/data cache, shared between cores (2.5MB/Core)
- Quad removable 2.5" SATA SSDs with optional AES-256 encryption and secure erase
- Intel® Virtualization Technology (VT-x/VT-d2) and Trusted Execution Technology (TXT)
- Trusted Platform Module (TPM) for secure operation (Optional)
- Support for Active Management Technology (AMT) for remote KVM functions
- Converged Platform Power Management (CPPM) for power saving
- Internal battery to allow orderly shutdown upon power interruption
- Ultra-low SWaP only 11.75" x 7.75" x 3.0" @ 14 lb. and as low as 150W
- Fully compliant MIL-STD 810G, MIL-STD-1275D, MIL-S-901D, DO-160D, MIL-STD-461E and IP66
- Operates at standard temp -20°C to +75°C or extended temp -40°C to +85°C (Optional)
- Available in ruggedization levels R3-R5

Host System I/O provides:

- Highest performance, full-size, embedded GPU module from AMD (Optional)
- Supports dual Display Port/HDMI ports and one RGB Video (Optional)
- One mSATA with write-protect and secure-erase for OS boot up to 1TB
- Dual 10Gigabit Ethernet ports with TCP/IP Offloading Engine (TOE)
- Configurable for one XMC site enabling high performance I/O such as FPGA or Video
- Quad USB 3.0, two USB 2.0 ports, HD-Audio support with 1W mono amplifier
- Two Serial Ports with RS-232/422/485 options, and eight buffered GPIO lines
- One Gigabit Ethernet port and one COM port for system Health Monitoring
- Baseboard Management Controller (BMC) for health monitoring/reporting (IPMI 2.0) (Opt.)
- Two SAM™ sites for custom I/O (Mil-Std-1553, Wi-Fi/BT, GPS, etc.)
- Tamper-proof hardware with secure-erase
- Dual BIOS boot devices with write protect and RTC with field-removable battery

General Description

The SO302-SVM "Spider" is a second-generation, fully rugged server. It is designed to provide the highest level of server-class performance possible in a fully ruggedized, conduction-cooled system, operating up to -40°C to +85°C (-20°C to +75°C Standard). The Spider is targeted for applications where an ultra-fast, multi-core CPU is needed with vast amounts of high-speed, ECC-protected RAM with six independent I/O modules to replace multiple workstations utilizing virtual machine technology. The SO302-SVM supports 10 physical CPU cores with Hyper-Threading for a total of 20 logical cores, each operating at up to 2.4GHz with ability to TurboBoost up to 3.0 GHz. To harvest this incredible CPU performance, the CPU is coupled with up to 128GB of DDR3 RAM organized in four banks. Each RAM bank consists of two DDR3 DIMM arrays with Error Correcting Code (ECC). The ECC RAM provides 2-bit error detection with 1-bit of correction and supports up to 1600 Mega Transfers per Second (MTS) between CPU and memory.

The I/O subsystem for the Spider is designed to support the widest array of high-speed I/O devices with modularity and security. The I/O consists of a host CPU I/O and six Virtual Machine I/Os (VMIO). The host CPU also supports one 4-lane XMC site (lose six SAM™ I/O sites on VMIO), dual 10-Gigabit Ethernet ports, four USB 3.0 and two USB2.0 ports with power, two Serial ports with RS-232/422/485 buffers, full HD-Audio, and eight General Purpose I/O lines. The SO302-SVM also provides a very flexible set of storage devices with highly secure options. The Spider supports up to four removable 2.5" SATA SSD drives up to 2TB each, with optional AES-256, and secure erase functions with tamper proof. Additionally, the host supports one mSATA drive with write-protect for use as a local boot device up to 1TB. Other optional I/O devices included for the host CPU are two SAM™ Sites, which can be used to add I/O such as GPS for accurate positioning and time stamping of data packets, Wi-Fi/ Bluetooth and many other user I/O options. The Spider also supports an optional Baseboard Management Controller (BMC) for detailed system health monitoring and reporting using industry-standard IPMI 2.0 via a dedicated Ethernet port or Serial port. For applications requiring high-performance video output, the SO302-SVM provides an optional SAM™ Video module, utilizing the most powerful AMD GPU with dual DisplayPort or HDMI ports and one VGA port. In addition, the SO302-SVM is capable of providing power holdup in the event of unexpected power outage so the system can perform an orderly shutdown to protect running applications.

The Spider secure virtual machine architecture allows up to six VM I/O sites. Each VM I/O site is fully independent and is configured as a "Share Nothing Architecture". In addition, each VM I/O site is connected to the host CPU via PCI-Express lanes only; thus all I/O transactions are fully monitored and supervised with the TPM/TXT/VT-x security engines to assure the host CPU authorizes all accesses. Each VMIO site provides dual Gigabit Ethernet ports, two USB 2.0 ports (USB 3.0 Optional) with power, two Serial ports with RS-232/422/485 buffers, and two SAM™ I/O sites. Each SAM™ I/O supports a variety of different I/O modules, such as mSATA for a dedicated boot device for the VM sites, a separate Video output or capture, CANbus, MIL-STD 1553, or custom user I/O.

Applications

The SO302-SVM is designed to replace up to six different rugged workstations into a much smaller, lighter package using far less power. The Spider is the next generation of the SZC91x "Zeus" which is widely deployed in Army WIN-T vehicles, unmanned vehicles, and hazardous applications where the computer is exposed to the harshest possible environments and also where size, weight, and power are the main considerations. It is ideal for combat and surveillance vehicles where several computers are used for data collection, targeting/ mapping, and data acquisition. The SO302-SVM supports the most popular Hypervisors offered by VMware®, WindRiver® and Microsoft® and may be shipped from the factory with operating systems such as Windows 7® and Linux® pre-installed. The Spider is fully compliant to MIL-STD 810G, MIL-STD-1275D, MIL-S-901D, DO-160D, MIL-STD-461E and IP66.

Technology Used

The Spider utilizes the most powerful Xeon® processor from Intel®. The Ivy Bridge-EP CPU is a second-generation ten core Sandy-Bridge microarchitecture processor with a fully integrated memory controller for the best possible memory performance. This CPU is the highest performance server-class CPU from Intel® with many added security functions, such as Intel's second-generation Virtualization Technology VT-x and Trusted Execution Technology (TXT), Active Management Technology (AMT) for remote KVM functions, and Converged Platform Power Management (CPPM) for thermal management and power saving. The graphics engine is based around the most powerful AMD full-size, embedded MXM GPU module for outstanding performance in 2D and 3D accelerations and is fully virtualized. The I/O is provided via 40 lanes of PCIe 3.0.

Each Virtual Machine I/O provides (up to six):

Dual Gigabit Ethernet ports
Two USB 2.0 ports (USB 3.0 Optional) with power
Two COM ports with RS-232/422/485 buffers
Two SAM™ sites for custom I/O such as mSATA and video

Additional Views and Variations

SO302-SVM (Showing rear connector configuration)

Cooling

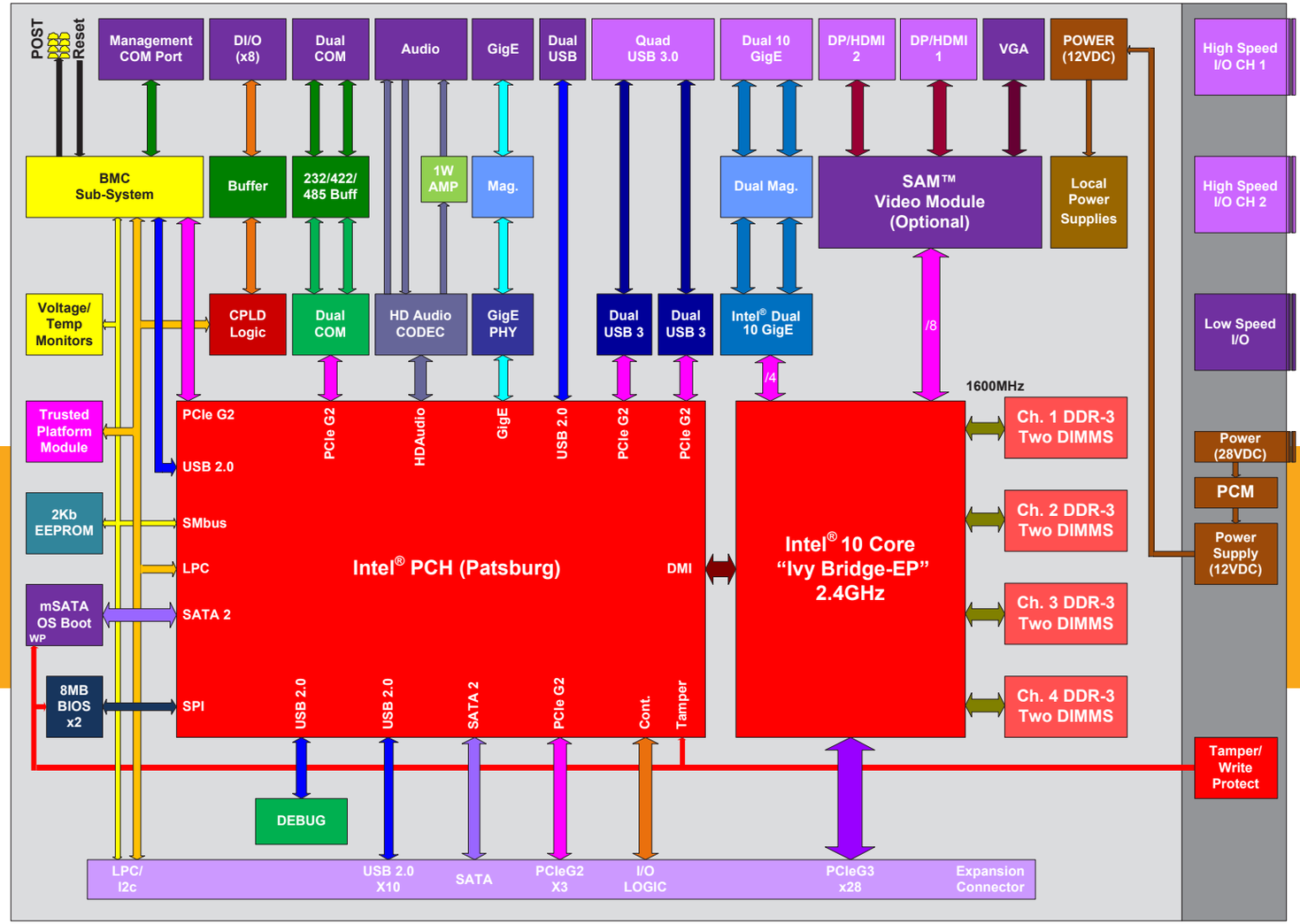
The Spider is equipped with GMS' patent pending RuggedCool™ technology, which is the most unique cooling system in the industry and is the only server that operates up to -40°C to +85°C at full load without throttling the CPU! This cooling approach provides the lowest thermal resistance to the case while providing the highest shock specifications known in the industry. The SO302-SVM is a fan-less system for reliable operation and can be mounted directly to a metal surface or used as a stand-alone system.

Full Environmental Specs

The Spider is available in ruggedization levels R3-R5. Additional information regarding the ruggedization levels and full environmental specifications for this product can be found on our website at www.gms4sbc.com.

"SCORPION" SO302-LP

Rugged, High-Performance, Low-Profile Server



- Utilizes Intel® Xeon® Ivy Bridge-EP CPU with 10 cores, each operating up to 2.4GHz
- Support for Hyper-Threading on each core for total of 20 logical cores
- Supports up to 128GB of DDR3 memory with ECC, up to 1600 MT/s
- 25MB unified instruction/data cache shared between cores (2.5MB/Core)
- One mSATA SSD with write protect and secure erase for OS boot up to 1TB
- Highest performance, full-size, embedded GPU module from AMD (Optional)
- Supports dual DisplayPort/HDMI ports and one RGB Video (Optional)
- Dual 10Gigabit Ethernet ports with TCP/IP Offloading Engine (TOE)
- Quad USB 3.0 ports with power
- Two USB 2.0 ports with power
- Full HD-Audio support with 1W mono amplifier
- Two Serial ports with RS-232/422/485
- Eight buffered General Purpose I/O lines
- One Gigabit Ethernet port and one COM port for system Health Monitoring
- Intel® Virtualization Technology (VT-x/VT-d2) and Trusted Execution Technology (TXT)
- Trusted Platform Module (TPM) for secure operation (Optional)
- Support for Active Management Technology (AMT) for remote KVM functions
- Converged Platform Power Management (CPPM) for power saving
- Baseboard Management Controller (BMC) for health monitoring/reporting (IPMI 2.0)
- Dual BIOS boot devices with write-protect
- Real Time Clock (RTC) with field-replaceable battery
- Tamper-proof hardware with secure-erase
- Internal battery to allow orderly shutdown upon power interruption
- Ultra-low SWaP only 11.75" x 7.75" x 1.75" @ 14 lb. and as low as 100W
- Fully compliant to MIL-STD 1275D, MIL-S-901D, DO-160D, MIL-STD 461E and IP66
- Operates at standard temp -20°C to 75°C or extended temp -40°C to +85°C (Optional)
- Available in ruggedization levels R3-R5

General Description

The SO302-LP "Scorpion" is a second-generation, fully rugged, low-profile server. It is designed to provide the highest level of server-class performance possible in the lowest-profile, fully ruggedized, conduction-cooled, operating from -40°C to +85°C temperature (-20°C to +75°C Standard). The Scorpion is targeted for applications where an ultra-fast, multi-core CPU is needed with vast amounts of ultra-high-speed, ECC-protected RAM for data processing in a very small package with dual redundant systems and an optional video configuration. The SO302-LP supports 10 physical CPU cores with Hyper-Threading for a total of 20 logical cores, each operating at up to 2.4GHz with the ability to TurboBoost up to 3.0GHz. To harvest this incredible CPU performance, the CPU is coupled with up to 128GB of DDR3 RAM organized in four banks. Each RAM bank consists of two DDR3 DIMM arrays with Error Correcting Code (ECC). The ECC RAM provides 2-bit error detection with 1-bit correction and supports up to 1600 Mega Transfers per Second (MTS) between CPU and memory.

The I/O subsystem for the Scorpion is designed to support the widest array of ultra-high-speed I/O devices with modularity and security. The host CPU supports dual 10Gigabit Ethernet ports, four USB 3.0 and two USB 2.0 ports with power, two Serial ports with RS-232/422/485 buffers, full HD-Audio, and eight General Purpose I/O lines. The SO302-LP provides one mSATA drive with write-protect for use as a local boot device up to 1TB. The Scorpion also supports a Baseboard Management Controller (BMC) for detailed system health monitoring and reporting using industry standard IPMI 2.0 via a dedicated Ethernet port or serial port. For applications requiring high-performance video output, the SO302-LP provides an optional SAM™ Video module, utilizing the most powerful AMD GPU with dual DisplayPort or HDMI ports and one VGA port. In addition, the SO302-LP is capable of providing power holdup in the event of unexpected power outage so the system can perform an orderly shutdown to protect running applications.

Applications

The Scorpion is designed to operate as a stand-alone server with or without video input. It is ideal for heavy number-crunching applications where data is transmitted via ultra-high-speed I/O ports, such as 10Gigabit Ethernet and USB 3.0 devices. The Scorpion is a low-profile server at only 2 inches in height, thus offering the best SWaP on the market. It is ideal for combat and surveillance vehicles where several computers are used for data collection, targeting/mapping, and data acquisition. The SO302-LP supports the most popular Hypervisors offered by VMware®, WindRiver® and Microsoft® and may be shipped from the factory with operating systems such as Windows 7® and Linux® pre-installed. The SO302-LP is fully compliant to MIL-STD 810G, MIL-STD 1275D, MIL-S-901D, DO-160D, MIL-STD 461E and IP66.

Technology Used

The Scorpion utilizes the most powerful Xeon® processor from Intel®. The Ivy Bridge-EP CPU is a second-generation Sandy-Bridge microarchitecture processor with a fully integrated memory controller for the best possible memory performance. This CPU is the highest performance server class CPU from Intel® with many added security functions, such as Intel's second-generation Virtualization Technology VT-x, Trusted Execution Technology (TXT), Active Management Technology (AMT) for remote KVM functions, and Converged Platform Power Management (CPPM) for thermal management and power saving. The graphics engine is based around the most powerful AMD full-size, embedded MXM GPU module for outstanding performance in 2D and 3D accelerations and is fully virtualized.

Cooling

The Scorpion is equipped with GMS' patent pending RuggedCool™ technology, which is the most unique cooling system in the industry and is the only server that can operate up to -40°C to +85°C at full load! This cooling approach provides the lowest thermal resistance to the case while providing the highest shock specifications known in the industry. The SO302-LP is a fan-less system for reliable operation and can be mounted directly to a metal surface or used as a stand-alone system.

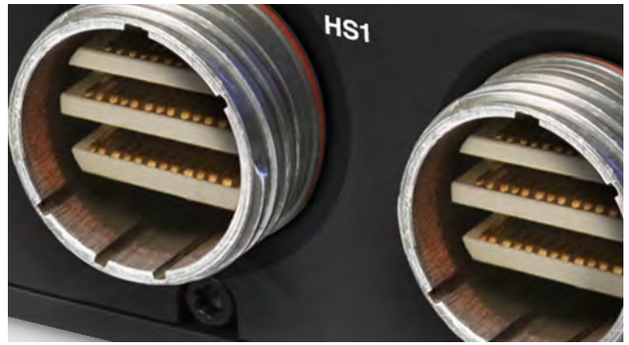
Full Environmental Specs

The Scorpion is available in ruggedization levels R3-R5. Additional, information regarding the ruggedization levels and full environmental specifications for this product can be found on our website at www.gms4sbc.com.

Additional Views and Variations

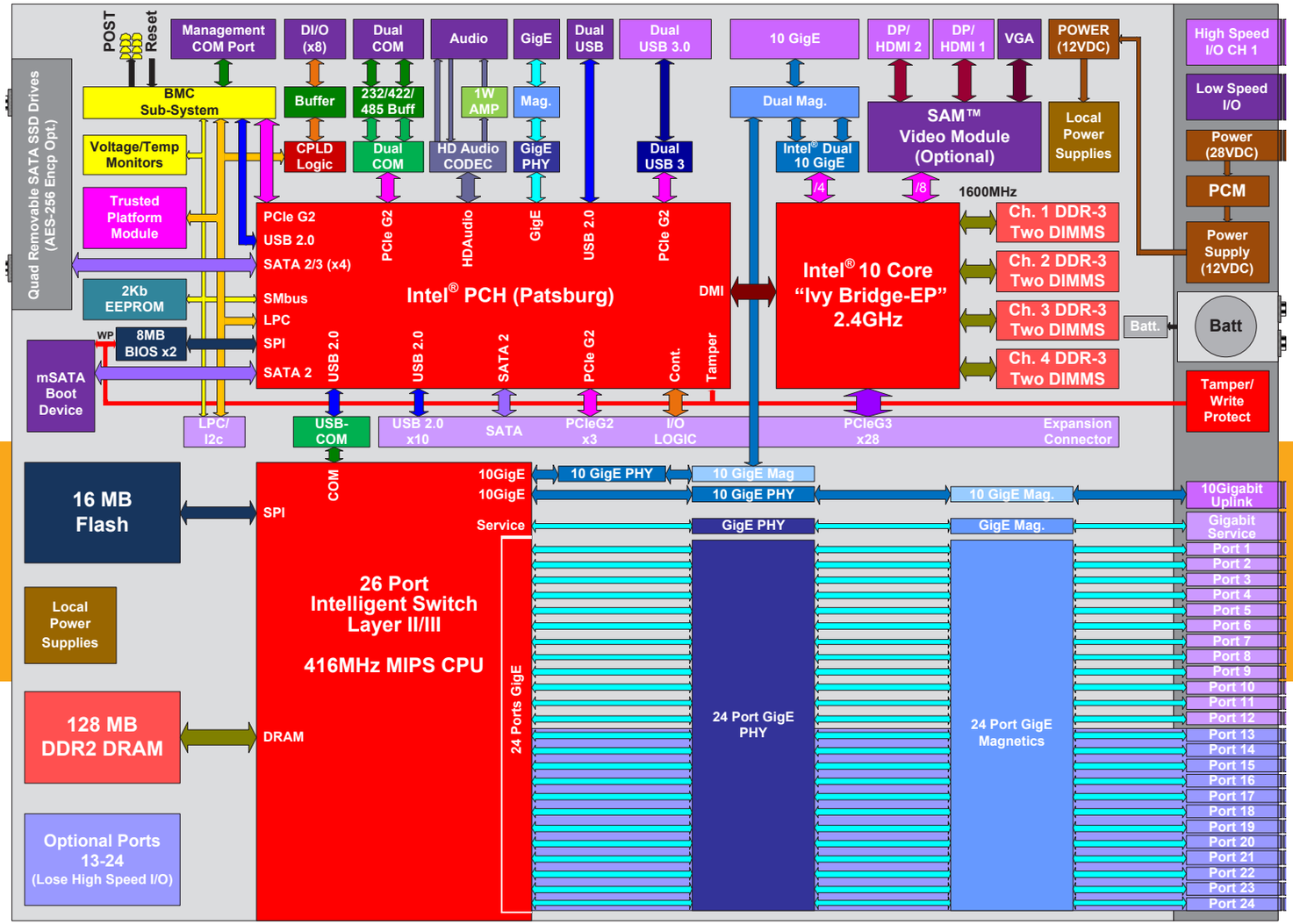
SO302-LP (Showing rear connector configuration)

SO302-LP (Showing USB 3.0 high speed connectors)



"TIGER" SO302-SW

Rugged, Fully Sealed Server with 14-Port Intelligent Switch



- Fully managed Layer II switch with Layer III features enterprise level Ethernet Switch
- 12Gigabit Ethernet ports (1000Base-T) and two 10Gigabit Ethernet ports (10GBase-T)
- Utilizes individual MIL circular locking connectors for each Ethernet port
- Very low latency, VLAN support, QoS/differentiated services
- Multicast and spanning tree capabilities
- Security features for authentication and authorization
- DHCP client and server support, and SNMP
- Support for IEEE-1588 for packet time stamping (Optional)
- Internal shared memory with jumbo frame support
- Web GUI and SNMP management interfaces provided for ease of configuration
- Support for Multicast IPv4, IPv6 with IGMPv2/3 snooping and MLD
- Designed with Intel's highest performance, server-class, embedded chipset
- Utilizes Intel® Xeon® Ivy Bridge-EP CPU with 10 cores, each operating up to 2.4GHz
- Support for Hyper-Threading on each core for total of 20 logical cores
- Supports up to 128GB of DDR3 memory with ECC, up to 1600 MT/s
- Quad removable 2.5" SATA SSDs with optional AES-256 Encryption and secure erase
- One mSATA with write protect and secure erase for OS boot up to 1TB
- Highest performance, full-size, embedded GPU module from AMD (Optional)
- One 10GigE, Dual USB 3.0 ports, dual DisplayPort/HDMI ports (Optional) for high-speed I/O
- Supports two USB 2.0 ports and one RGB Video for low speed I/O
- Two Serial ports with RS-232/422/485 and eight buffered GPIO lines
- HD-Audio support, onboard 1W mono amplifier, dual BIOS boot devices with write-protect
- Intel® Virtualization Technology (VT-x/VT-d2) and Trusted Execution Technology (TXT)
- Trusted Platform Module (TPM) for secure operation (Optional)
- Converged Platform Power Management (CPPM) for power saving
- Support for Active Management Technology (AMT) for remote KVM functions
- Baseboard Management Controller (BMC) for health monitoring/reporting (IPMI 2.0)

General Description

The SO302-SW "Tiger" is a second-generation, fully rugged server with an integrated 14 port intelligent Layer II or III switch. It is designed to provide an Enterprise level of Layer II and Layer III switch functions with the highest level of server-class performance possible in a fully ruggedized, conduction-cooled system, operating up to -40°C to +85°C (-20°C to +75°C Standard) temperature range. The Tiger utilizes individual MIL circular locking connectors for each Ethernet port thus providing the ultimate rugged interconnect with maximum flexibility. The Tiger is targeted for applications where an ultra-fast, multi-core CPU is needed with vast amounts of high-speed, ECC-protected RAM controlling 12 Gigabit Ethernet devices (24 optional, lose High-Speed I/O and locking connectors) with packet snooping and switching functions with customizable rules. The SO302-SW supports 10 physical CPU cores with Hyper-Threading for a total of 20 logical cores, each operating up to 2.4GHz with ability to TurboBoost up to 3.0GHz. To harvest this incredible CPU performance, the CPU is coupled with up to 128GB of DDR3 RAM organized in four banks. Each RAM bank consists of two DDR3 DIMM arrays with Error Correcting Code (ECC). The ECC RAM provides 2-bit error detection with 1-bit correction and up to 1600 Mega Transfers per Second (MTS) between CPU and memory.

The I/O subsystem for the Tiger is designed to support the widest array of high-speed I/O devices with modularity and security. The Tiger consists of a host CPU module and the Switch module. The Host CPU supports two 10-Gigabit Ethernet ports where one is connected to the Switch, while the second port is available to the user on the high-speed connector. Additional I/O included are two USB 3.0 and two USB 2.0 ports with power, two Serial ports with RS-232/422/485 buffers, full HD-Audio, and eight General Purpose I/O lines. The SO302-SW also provides a very flexible set of storage devices with highly secure options. The Tiger supports up to four removable 2.5" SATA SSD drives with an optional AES-256 Encryption up to 2TB, each with optional secure-erase functions and tamper-proof. Additionally, the host supports one mSATA drive with write-protect for use as a local boot device up to 1TB. The Tiger supports an optional Baseboard Management Controller (BMC) for detailed system health monitoring and reporting using industry standard IPMI 2.0 via a dedicated Ethernet port or Serial port. For applications requiring high-performance video output, the SO302-SW provides an optional SAM™ Video module, utilizing the most powerful AMD GPU with dual DisplayPort or HDMI ports and one VGA port. In addition, the SO302-SW is capable of providing power holdup in the event of unexpected power outage so the system can perform an orderly shutdown to protect running applications.

The switch functions are controlled via a 416MHz MIPS CPU with 128MB of DRAM. The MIPS processor controls up to 24 Gigabit Ethernet ports and two 10Gigabit Ethernet ports. One of the 10Gigabit Ethernet ports is connected directly to the host CPU while the other port is accessible on the external connector, along with one additional 10Gigabit Ethernet port from the host CPU. The Tiger supports fully managed Layer II and Layer III functions, such as VLAN and QoS processing, enabling the delivery of differentiated services, security through intelligent frame processing, and egress frame manipulation. The Tiger may be configured via the host CPU USB/COM port which is connected internally or via a Gigabit Ethernet port on the rear panel.

Applications

The SO302-SW is designed to provide the highest-performance, rugged server with a built-in managed Layer II and III switch that can support 12 Gigabit Ethernet ports (24 optional, lose High-Speed I/O and locking connectors) and two 10Gigabit Ethernet ports. It is ideal for combat and surveillance vehicles where several computers are used for data collection, targeting/mapping, and data acquisition. The SO302-SW supports the most popular Hypervisors offered by VMware®, WindRiver® and Microsoft® and may be shipped from the factory with operating systems such as Windows 7® and Linux® pre-installed. The Tiger is fully compliant to MIL-STD 810G, MIL-STD-1275D, MIL-S-901D, DO-160D, MIL-STD-461E and IP66.

Technology Used

The Tiger utilizes the most powerful Xeon® processor from Intel®. The Ivy Bridge-EP CPU is a second-generation, 10-core Sandy-Bridge microarchitecture processor with a fully integrated memory controller for the best possible memory performance. This CPU is the highest performance server-class CPU from Intel® with many added security functions, such as Intel's second-generation Virtualization Technology VT-x and Trusted Execution Technology (TXT), Active Management Technology (AMT) for remote KVM functions, and Converged Platform Power Management (CPPM) for thermal management and power saving. The graphics engine is based around the most powerful AMD full size embedded MXM GPU module for outstanding performance in 2D and 3D accelerations.

- Internal battery to allow orderly shutdown upon power interruption
- Ultra-low SWaP only 11.75" x 7.75" x 3.0" @ 15 lb. and as low as 175W
- Fully compliant to MIL-STD 810G, MIL-STD-1275D, MIL-S-901D, DO-160D, MIL-STD-461E and IP66
- Operates at standard temp -20°C to +75°C or extended temp -40°C to +85°C (Optional)
- Available in ruggedization levels R3-R5

Additional Views and Variations

SO302-SW (Showing rear connector configuration)

Cooling

The Tiger is equipped with GMS's patent pending RuggedCool™ technology, which is the most unique cooling system in the industry and is the only server that operates up to -40°C to +85°C at full load without throttling the CPU! This cooling approach provides the lowest thermal resistance to the case while providing the highest shock specifications known in the industry. The SO302-SW is a fan-less system for reliable operation and can be mounted directly to a metal surface or used as a stand-alone system.

Full Environmental Specs

The Tiger is available in ruggedization levels R3-R5. Additional information regarding the ruggedization levels and full environmental specifications for this product can be found on our website at www.gms4sbc.com.

"TARANTULA" SO302-4in1

Rugged, Six-Way, Secure Virtual Machine With 18 port Switch, RAID and APU

- Supports six independent workstations, 18-port switch, 16TB RAID and Aux Power Unit
- Replaces bulky, heavy, rack mount hardware into one single unit smaller than a shoe box
- Utilizes Intel® Xeon® Ivy Bridge-EP CPU with 10 Cores, each operating up to 2.4 GHz
- Support for Hyper-Threading on each core for a total of 20 logical cores
- Supports up to 128GB of DDR3 memory with ECC up to 1600 MT/s
- 25MB unified instruction/data cache, shared between cores (2.5MB/core)
- Intel® Virtualization Technology (VT-x/VT-d2) and Trusted Execution Technology (TXT)
- Trusted Platform Module (TPM) for secure operation (optional)
- Support for Active Management Technology (AMT) for remote KVM functions
- Converged Platform Power Management (CPPM) for power saving
- Ultra-low SWaP only 11.75" x 7.75" x 4.5" @ 18 lb. and as low as 180W
- Fully compliant MIL-STD 810G, MIL-STD-1275D, MIL-S-901D, DO-160D, MIL-STD-461E and IP66
- Operates at standard temp -20°C to +75°C or extended temp -40°C to +85°C (optional)
- Available in ruggedization levels R3-R5

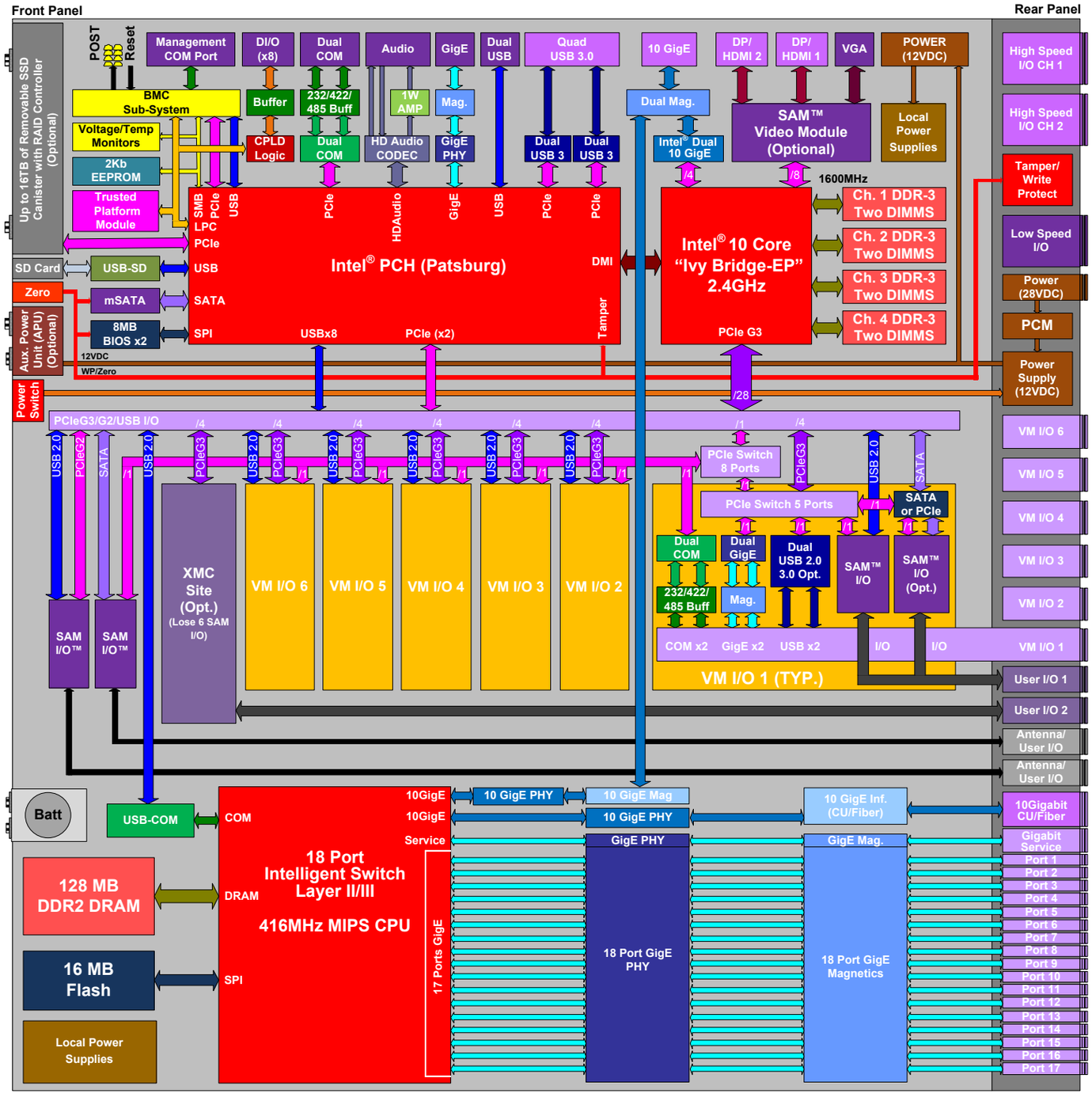
Host System I/O provides:
- Highest performance, full-size, embedded GPU module from AMD (optional)
- Supports dual DisplayPort/HDMI ports and one VGA port (optional)
- One mSATA with write-protect and secure-erase for OS boot, up to 1TB
- One10Gigabit Ethernet port with TCP/IP Offloading Engine (TOE)
- Configurable for one XMC site enabling high performance I/O such as FPGA or video
- Quad USB 3.0, two USB 2.0 ports, HD-audio support with 1W mono amplifier
- Two serial ports with RS-232/422/485 options, and eight buffered GPIO lines
- One Gigabit Ethernet port and one COM port for system health monitoring
- Baseboard management controller (BMC) for health monitoring/reporting (IPMI 2.0) (opt.)
- Two SAM™ sites for custom I/O (MIL-STD-1553, Wi-Fi/BT, GPS, etc.)
- Tamper-proof hardware with secure-erase
- Dual BIOS boot devices with write protect and RTC with field-removable battery

Virtual Machines:
- Designed from the ground up for a Secure Virtual Machine (SVM) system
- Up to six independent VM I/O sites for the highest performance and security
- Dual Gigabit Ethernet ports
- Two USB 2.0 ports (USB 3.0 optional) with power
- Two COM ports with RS-232/422/485 buffers
- Two SAM™ sites for custom I/O such as mSATA and video

SSD Storage:
- Up to 16TB of SSD storage with hardware RAID controller
- Single canister allows for quick removal/replacement of the SSD storage
- Supports up to 8, 2TB SSD devices with secure erase and write-protect (optional)
- Supports hardware RAID 0,1,5,10, 50 and other custom configurations
- The entire storage canister can easily be removed without the use of special tools
- Sealed canister (IP66) can be transported and read by host server
- Unique keying allows canister to only be operated in delineated sites

Switch Functions:
- Fully managed Layer II switch with Layer III features enterprise level Ethernet switch
- 18 Gigabit Ethernet ports and one 10Gigabit Ethernet port (fiber optional)
- Utilizes individual MIL circular locking connectors for each Ethernet port
- Very low latency, VLAN support, QoS/differentiated services
- Multicast and spanning tree capabilities
- Security features for authentication and authorization
- DHCP client and server support, and SNMP
- Support for IEEE-1588 for packet time stamping (optional)
- Internal shared memory with jumbo frame support
- Web GUI and SNMP management interfaces provided for ease of configuration
- Support for Multicast IPv4, IPv6 with IGMPv2/3 snooping and MLD

Auxiliary Power Unit (APU)
- APU to allow for orderly shutdown upon power interruption (optional)
- Super Caps technology for ground/airborne applications
- Power monitor directly sends CPU to suspend to disk (S5) or shutdown
- Fully meets MIL-STD-1275, 50ms holdup time
- Fully sealed canister, for easy removal/replacement



General Description

The SO302-4in1 "Tarantula" is a third-generation, fully rugged server. It is designed to replace a rack full of workstations, switches/routers, mass storage with a RAID controller and an auxiliary power unit (APU) by combining all four functions into one sealed system that is smaller than a shoe box. The Tarantula supports the highest level of server-class performance possible in a fully ruggedized, conduction-cooled system, operating up to -40°C to +85°C (-20°C to +75°C standard). The Tarantula is targeted for applications where an ultra-fast, multi-core CPU is needed with vast amounts of high-speed RAM that is protected by error correcting code (ECC). It houses six independent I/O modules (replacing up to six workstations) utilizing virtual machine technology with an 18 port Layer II/III intelligent switch/router and up to 16TB of SSD storage with a hardware RAID controller. The SO302-4in1 supports 10 physical CPU cores with Hyper-Threading for a total of 20 logical cores, each operating at up to 2.4GHz with ability to TurboBoost up to 3.0 GHz. To harvest this incredible CPU performance, the CPU is coupled with up to 128GB of DDR3 RAM organized in four banks. Each RAM bank consists of two DDR3 DIMM arrays with ECC. The ECC RAM provides 2-bit error detection with 1-bit of correction and supports up to 1600 Mega Transfers per Second (MTS) between CPU and memory which results in an incredible peak memory transfers of 60GB/s.

The I/O subsystem for the Tarantula is designed to offer the widest array of high-speed I/O devices with modularity and security. The I/O consists of a host CPU I/O and six Virtual Machine I/Os (VMIO). The host CPU also supports one 4-lane XMC site (lose six SAM™ I/O sites on VMIO), one 10-Gigabit Ethernet port with support for copper or fiber cabling, four USB 3.0 and two USB 2.0 ports with power, two serial ports with RS-232/422/485 buffers, full HD-Audio, and eight general purpose I/O lines. The SO302-4In1 also provides a very flexible set of storage devices with highly secure options. The Tarantula supports up to eight, 2TB SSD devices (16TB total), housed in a single, sealed, removable canister for easy removal and archiving. This removable mass-storage includes a hardware RAID controller that supports all major RAID configurations such as RAID 0, 1, 5, 10, 50, as well as custom configurations with optional AES-256, and secure erase functions with tamper proof protection. Additionally, the host includes one mSATA drive (up to 1TB) with write-protect for use as a local boot device and a removable Secure Digital (SD) card that is housed on the front panel behind a sealed door. Two SAM™ sites are also included with the host CPU that can be used to add I/O such as GPS for accurate positioning and time stamping of data packets, Wi-Fi/ Bluetooth and many other user configurable options. The Tarantula also offers an optional baseboard management controller (BMC) for detailed system health monitoring and reporting using industry-standard IPMI 2.0 via a dedicated Ethernet or serial port. For applications requiring high-performance video output, the SO302-4in1 provides an optional SAM™ Video module, utilizing the most powerful AMD GPU with dual DisplayPort or HDMI ports and one VGA video. In addition, the SO302-4in1 supports an optional removable auxiliary power unit (APU) that is capable of providing holdup power in the event of unexpected power drop-offs up to 10 seconds, allowing the system to perform an orderly shutdown to protect running applications. The APU supports an array of Super-Caps in place of traditional batteries, which eliminates the need for replacements and the hazardous issues related to batteries.

The Tarantula's secure virtual machine (SVM) architecture allows up to six VM I/O sites. Each VM I/O site is fully independent and is configured as "share nothing architecture." In addition, each VM I/O site is connected to the host CPU via PCI-Express lanes only, thus all I/O transactions are fully monitored and supervised with the TPM/TXT/VT-x security engines to ensure that the host CPU authorizes all accesses. Each VM I/O site provides dual Gigabit Ethernet ports, two USB 2.0 ports (USB 3.0 optional) with power, two serial ports with RS-232/422/485 buffers, and two SAM™ I/O sites. Each SAM™ I/O supports a variety of different I/O modules, including an mSATA as a dedicated boot device for the VM sites, a separate video output or capture, CANbus, MIL-STD 1553, or custom user I/O.

The switch functions are controlled via a 416MHz MIPS CPU with 128MB of DRAM. The MIPS processor controls up to 18 Gigabit Ethernet ports and two 10Gigabit Ethernet ports. One of the 10Gigabit Ethernet ports is connected directly to the host CPU while the other port is accessible on the external connector, along with one additional 10Gigabit Ethernet port from the host CPU. The 10Gigabit Ethernet ports support a copper interface or a fiber interface with multiple fiber options. The Tarantula supports fully managed Layer II and Layer III functions, such as VLAN and QoS processing, enabling the delivery of differentiated services, security through intelligent frame processing, and egress frame manipulation. The Tarantula may be configured via the host CPU USB/COM port which is connected internally or via a Gigabit Ethernet port on the rear panel.

Applications

The SO302-4in1 is designed to replace up to six different, rugged workstations; eighteen rugged, inelegant switch/router ports; a mass storage system with ultra-fast transfer rates with RAID support; and an auxiliary power unit for orderly power shutdown with 50ms hold time power per MIL-STD 1275D into a much smaller, lighter package using far less power. The Tarantula is the third generation of the SZC91x "Zeus" which is widely deployed in Army WIN-T vehicles, unmanned vehicles, and hazardous applications where the computer is exposed to the harshest possible environments and also where size, weight, and power are the main considerations. It is ideal for combat and surveillance vehicles where several computers are used for data collection, targeting/mapping, and data acquisition. The SO302-4in1 supports the most popular Hypervisors offered by VMware®, WindRiver® and Microsoft® and may be shipped from the factory with operating systems such as Windows 7® and Linux® pre-installed. The Tarantula is fully compliant to MIL-STD 810G, MIL-STD-1275D, MIL-S-901D, DO-160D, MIL-STD-461E and IP66.

Additional Views and Variations

SO302-4IN1 (Showing rear connector configuration)

Technology Used

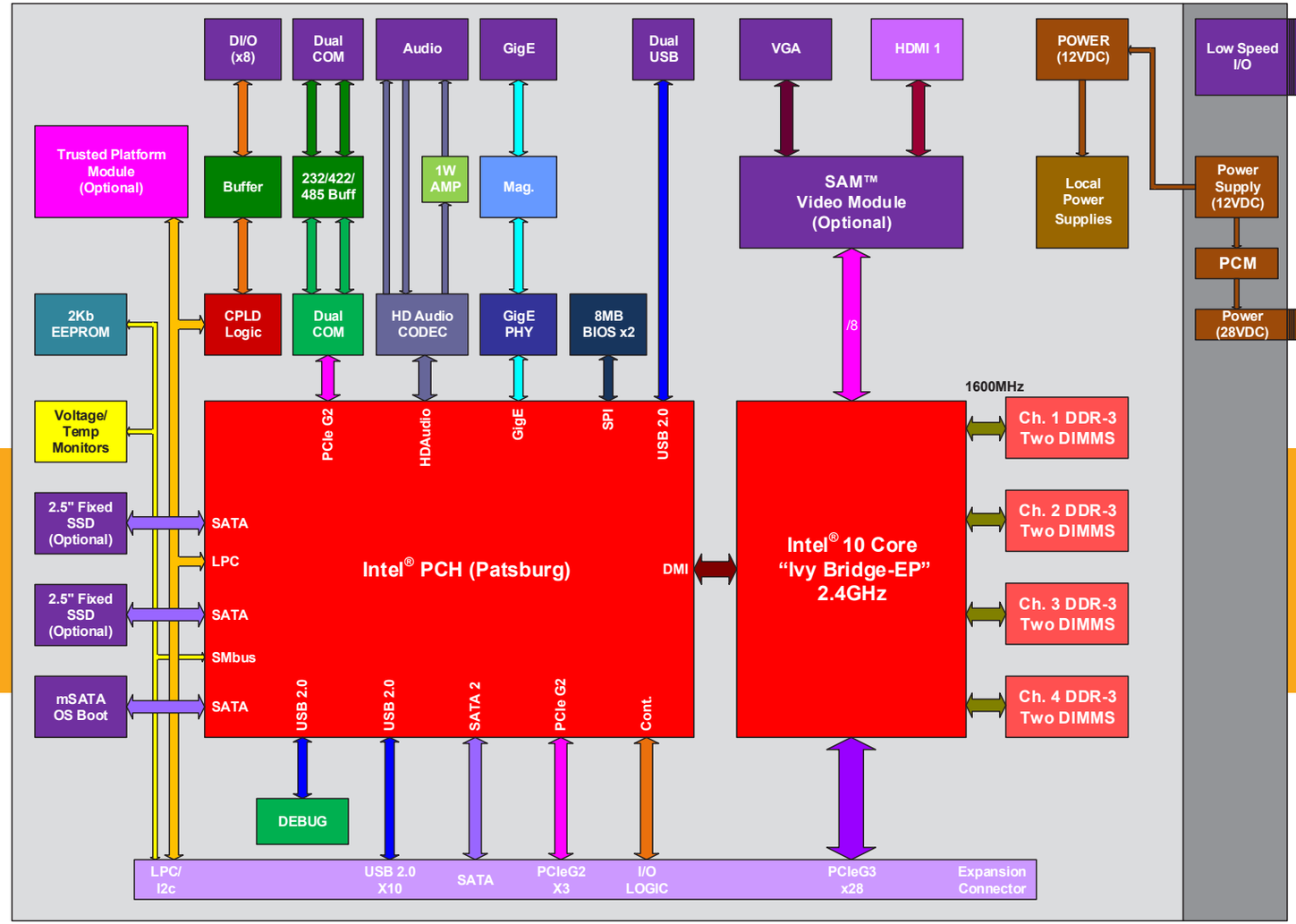
The Tarantula utilizes the most powerful Xeon™ processor from Intel®. The Ivy Bridge-EP CPU is a second-generation ten core Sandy-Bridge microarchitecture processor with a fully integrated memory controller for the best possible memory performance. This CPU is the highest performance server-class CPU from Intel® with many added security functions, such as Intel's second-generation Virtualization Technology VT-x and Trusted Execution Technology (TXT), Active Management Technology (AMT) for remote KVM functions, and Converged Platform Power Management (CPPM) for thermal management and power saving. The graphics engine is based around the most powerful AMD full-size, embedded MXM GPU module for outstanding performance in 2D and 3D accelerations and is fully virtualized. The I/O is provided via 40 lanes of PCIe 3.0.

Cooling

The Tarantula is equipped with GMS' patent pending RuggedCool™ technology, which is the most unique cooling system in the industry and is the only server that operates up to -40°C to +85°C. This cooling approach provides the lowest thermal resistance to the case while providing the highest shock specifications known in the industry. The SO302-4in1 is a fan-less system for reliable operation and can be mounted directly to a metal surface or used as a stand-alone system.

Full Environmental Specs

The Tarantula is available in ruggedization levels R3-R5. Additional information regarding the ruggedization levels and full environmental specifications for this product can be found on our website at www.gms4sbc.com.



"MUSTANG" SO302-LC

Rugged, High-Performance, Low-Cost Server

- Fully sealed, conduction-cooled, low-maintenance server for data centers
- Utilizes Intel® Xeon® Ivy Bridge-EP CPU with 10 cores, each operating up to 2.4GHz
- Support for Hyper-Threading on each core for total of 20 logical cores
- Supports up to 128GB of DDR3 memory with ECC, up to 1600 MT/s
- 25MB unified instruction/data cache shared between cores (2.5MB/Core)
- One mSATA SSD for OS boot up to 1TB
- Two 2.5" fixed SSD drives, each up to 2TB with RAID support (Optional)
- Optional docking station for SSD with USB support
- Highest performance, full-size, embedded GPU module from AMD (Optional)
- Supports one HDMI port and one RGB video port (Optional)
- One Gigabit Ethernet port with TCP/IP Offloading Engine (TOE)
- Two USB 2.0 ports with power
- Two Serial ports with RS-232/422/485
- Eight buffered General Purpose I/O lines
- Full HD-Audio support with 1W mono amplifier
- Intel® Virtualization Technology (VT-x/VT-d2) and Trusted Execution Technology (TXT)
- Trusted Platform Module (TPM) for secure operation (Optional)
- Support for Active Management Technology (AMT) for remote KVM functions
- Converged Platform Power Management (CPPM) for power saving
- Dual BIOS boot devices with write-protect
- Real Time Clock (RTC) with field-replaceable battery
- Internal battery to allow orderly shutdown upon power interruption
- Ultra-low SWaP only 11.75" x 7.75" x 1.75" @ 14 lb. and as low as 100W
- Fully compliant to MIL-STD 810G, MIL-STD 1275D, MIL-S-901D, DO-160D, MIL-STD-461E and IP66
- Operates at standard temp 0°C to +55°C or extended temp -40°C to +85°C (Optional)
- Available in ruggedization levels R1-R4

General Description

The SO302-LC "Mustang" is a second-generation fully rugged server. It is designed to provide the highest level of server-class performance possible in a low-cost, fully ruggedized, conduction-cooled system, operating over the full -40°C to +85°C temperature (0°C to +55°C Standard). The Mustang is targeted for applications where an ultra-fast, multi-core CPU is needed with low I/O requirements for data/image processing in a very small, low-cost package. The SO302-LC supports 10 physical CPU cores with Hyper-Threading for a total of 20 logical cores, each operating up to 2.4GHz with the ability to TurboBoost to 3.0GHz. To harvest this incredible CPU performance, the CPU is coupled with up to 128GB of DDR3 RAM organized in four banks. Each RAM bank consists of two DDR3 DIMM arrays with Error Correcting Code (ECC). The ECC RAM provides 2-bit error detection with 1-bit correction and supports up to 1600 Mega Transfers per Second (MTS) between CPU and memory.

The I/O subsystem for the Mustang is designed to provide basic, low-cost I/O ports. The host CPU supports one Gigabit Ethernet port, two USB 2.0 ports, two Serial ports with RS-232/422/485 buffers, full HD-Audio, and eight General Purpose I/O lines. The SO302-LC also provides one mSATA drive with write protect for use as a local boot device up to 1TB and an optional additional up to two 2.5" SATA drives, each with up to 2TB capacity which support RAID 0 and RAID 1. For applications requiring high-performance video output, the SO302-LC provides an optional SAM™ Video module utilizing a low cost AMD GPU with one HDMI port and one VGA port. In addition, the SO302-LC is capable of providing power holdup in the event of unexpected power outage so the system can perform an orderly shutdown to protect running applications.

Applications

The Mustang is designed to operate as a stand-alone, low-cost, rugged server with or without video output. It is ideal for heavy number-crunching applications, where data is brought via standard I/O ports such as Gigabit Ethernet, and then is processed and put on local storage devices. The Mustang is a low-cost, rugged server with vast storage offering the best SWaP on the market. It is ideal for data centers, combat and surveillance vehicles where several computers are used for data collection, targeting/mapping/DVR, and data acquisition. The SO302-LC supports the most popular Hypervisors offered by VMware®, WindRiver® and Microsoft® and may be shipped from the factory with operating systems such as Windows 7® and Linux® pre-installed. The SO302-LC is fully compliant to MIL-STD 810G, MIL-STD 1275D, MIL-S-901D, DO-160D, MIL-STD-461E and IP66.

Technology Used

The Mustang utilizes the most powerful Xeon® processor from Intel®. The Ivy Bridge-EP CPU is a second-generation Sandy-Bridge microarchitecture processor with a fully integrated memory controller for the best possible memory performance. This CPU is the highest performance server-class CPU from Intel® with many added security functions, such as Intel's second-generation Virtualization Technology VT-x, Trusted Execution Technology (TXT), Active Management Technology (AMT) for remote KVM functions, and Converged Platform Power Management (CPPM) for thermal management and power saving. The graphics engine is based around the most powerful AMD full-size embedded MXM GPU module for outstanding performance in 2D and 3D accelerations and is fully virtualized. Lower performance MXM modules are also available for lower cost and power consumption.

Cooling

The Mustang is equipped with GMS' patent pending RuggedCool™ technology, which is the most unique cooling system in the industry and is the only server that operates up to -40°C to +85°C at full load! This cooling approach provides the lowest thermal resistance to the case while providing the highest shock specifications known in the industry. The SO302-LC is a fan-less system for reliable operation and can be mounted directly to a metal surface or used as a stand-alone system.

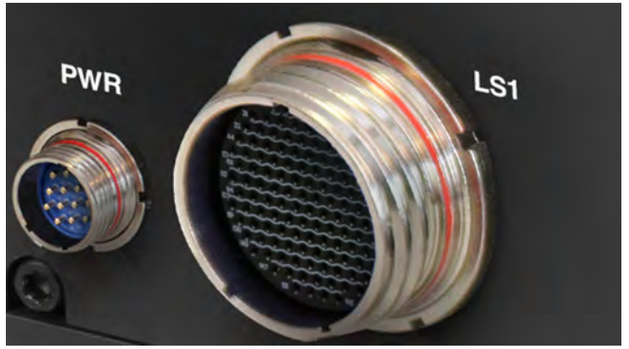
Full Environmental Specs

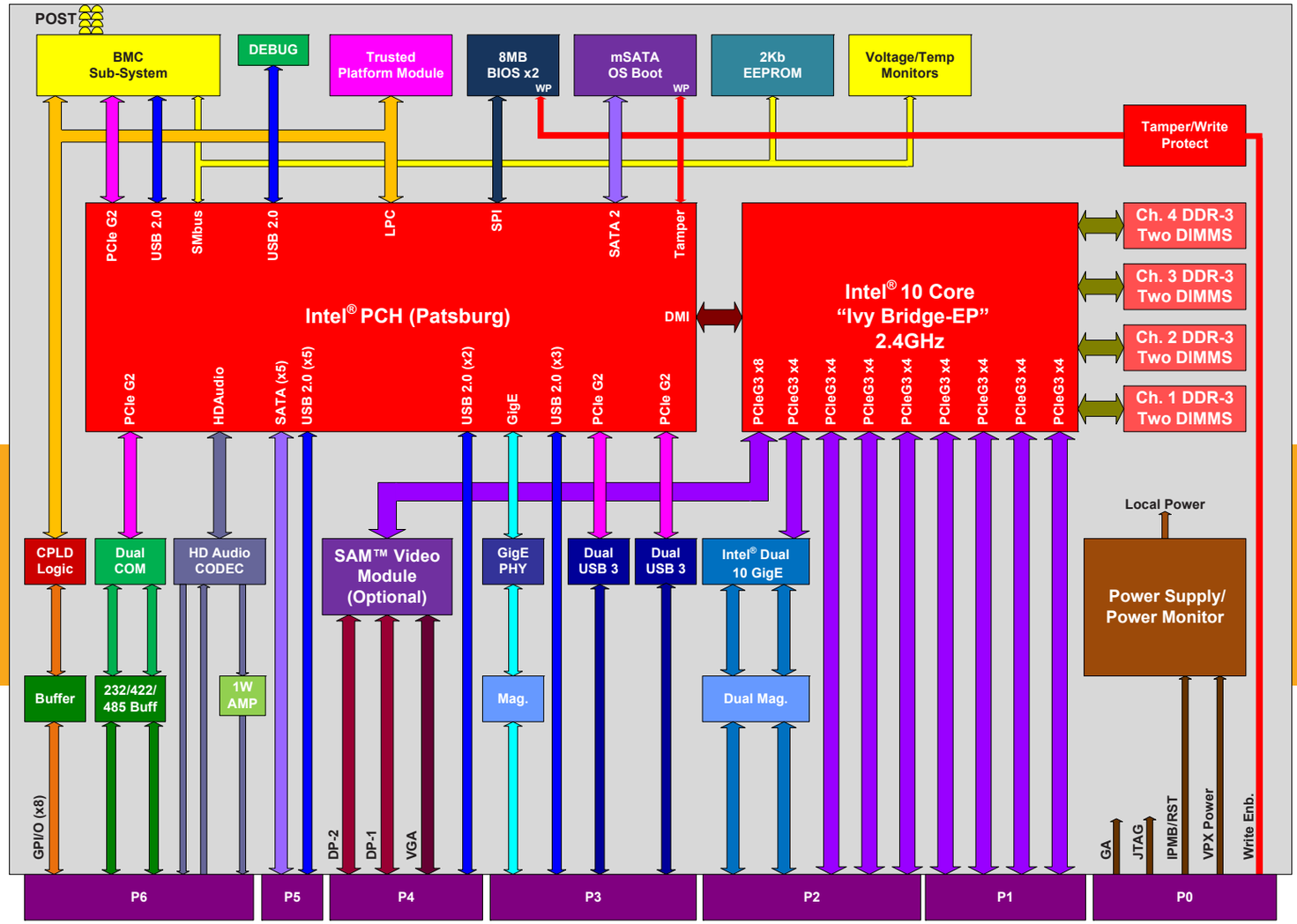
The Mustang is available in ruggedization levels R1-R4. Additional information regarding the ruggedization levels and full environmental specifications for this product can be found on our website at www.gms4sbc.com.

Additional Views and Variations

SO302-LC (Showing rear connector configuration)

SO302-LC (Showing rugged 38999 connector)





"MONGOOSE" VPXCO300

Rugged, Ultra-High-Performance, Ten Core Xeon® Open VPX 6U Module

- Utilizes Intel® Xeon® Ivy Bridge-EP CPU with 10 cores, each operating up to 2.4GHz
- Support for Hyper-Threading on each core for total of 20 logical cores
- Supports up to 128GB of DDR3 memory with ECC, up to 1600 MT/s
- 25MB unified instruction/data cache, shared between cores (2.5MB/Core)
- One mSATA SSD with write-protect and secure-erase for OS boot up to 1TB
- Highest performance, full-size, embedded GPU module from AMD (Optional)
- Supports dual Display Port/HDMI ports and one RGB Video (Optional)
- Dual 10Gigabit Ethernet ports with TCP/IP Offloading Engine (TOE)
- Quad USB 3.0 and Ten USB 2.0 ports with power
- Five SATA ports with RAID support
- Full HD-Audio support with 1W mono amplifier
- Two Serial ports with RS-232/422/485 and eight buffered GPIO lines
- One Gigabit Ethernet port and one COM port for system Health Monitoring
- Intel® Virtualization Technology (VT-x/VT-d2) and Trusted Execution Technology (TXT)
- Trusted Platform Module (TPM) for secure operation (Optional)
- Support for Active Management Technology (AMT) for remote KVM functions
- Converged Platform Power Management (CPPM) for power saving
- Baseboard Management Controller (BMC) for health monitoring/reporting (IPMI 2.0)
- Dual BIOS boot devices with write-protect and Real Time Clock with field-replaceable battery
- Tamper-proof hardware with secure-erase
- Four x4PCIe lanes to VPX-P1, configurable as transparent or blocking
- Three x4 PCIe lanes to VPX-P2 for additional system I/O
- Fully compliant to OpenVPX™ 6U, VITA 46/47/48 standards
- Support for Windows®, VMware® and Linux®
- Fully compliant to MIL-STD-810G, MIL-S-901D and DO-160D
- Operates at standard temp 0°C to +55°C or extended temp -40°C to +85°C
- Available in ruggedization levels R1-R5

General Description

The VPXCO300 “Mongoose” is the first fully rugged 6U VPX Server in the market. It is designed to provide the highest level of server-class performance possible in a fully ruggedized, conduction-cooled, 6U-8HP Open VPX module operating up to -40°C to +85°C (0°C to +55°C Standard). The Mongoose is targeted for applications where an ultra-fast, multi-core CPU is needed with vast amounts of ultra-high-speed, ECC-protected RAM for data processing. The VPXCO300 supports 10 physical CPU cores with Hyper-Threading for a total of 20 logical cores, each operating at up to 2.4GHz with the ability to TurboBoost up to 3.0GHz. To harvest this incredible CPU performance, the CPU is coupled with up to 128GB of DDR3 RAM organized in four banks. Each RAM bank consists of two DDR3 DIMM arrays with Error Correcting Code (ECC). The ECC RAM provides 2-bit error detection with 1-bit correction and supports up to 1600 Mega Transfers per Second (MTS) between CPU and memory.

The I/O subsystem for the Mongoose is designed to support the widest array of ultra-high-speed I/O devices with modularity and security. The Mongoose supports an incredible 40 lanes of Gen3 PCI Express lanes organized in 8 ports of x4 lanes for astounding performance and expansion. The onboard I/O included are dual 10Gigabit Ethernet ports, four USB 3.0 and ten USB 2.0 ports, five SATA 6Gb/s ports with RAID support, two Serial ports with RS-232/422/485 buffers, full HD-Audio, and eight General Purpose I/O lines. The VPXCO300 provides one mSATA drive with write-protect for use as a local boot device up to 1TB. The Mongoose also supports a Baseboard Management Controller (BMC) for detailed system health monitoring and reporting using industry standard IPMI 2.0 via a dedicated Ethernet port or Serial port. For applications requiring high performance video output, the VPXCO300 provides an optional SAM™ Video module, utilizing the most powerful AMD GPU with dual Display Port or HDMI ports and one VGA port.

Applications

The Mongoose is designed to operate as a stand-alone server with or without video. It is ideal for heavy number-crunching applications, where data is brought via ultra-high-speed I/O ports such as 28 lanes of Gen3 PCI Express or dual 10Gigabit Ethernet or USB 3.0 for processing. It is ideal for combat and surveillance vehicles where several computers are used for data collection, targeting/mapping, and data acquisition. The VPXCO300 supports the most popular Hypervisors offered by VMware®, WindRiver® and Microsoft® and may be shipped from the factory with operating systems such as Windows 7®, Linux® and/or VMware® pre-installed. The VPXCO300 is fully compliant to MIL-STD 810G, MIL-S-901D and DO-160D.

Technology Used

The Mongoose utilizes the most powerful Xeon® processor from Intel®. The Ivy Bridge-EP CPU is a third-generation Nehalem processor with a fully integrated memory controller for the best possible memory performance. This CPU is the highest performance, server-class CPU from Intel® with many added security functions, such as Intel’s second-generation Virtualization Technology VT-x, Trusted Execution Technology (TXT), Active Management Technology (AMT) for remote KVM functions, and Converged Platform Power Management (CPPM) for thermal management and power saving. The graphics engine is based around the most powerful AMD full-size, embedded MXM GPU module for outstanding performance in 2D and 3D accelerations and is fully virtualized.

Cooling

The Mongoose is equipped with GMS’ patent pending RuggedCool™ technology, which is the most unique cooling system in the industry and is the only server that can operate up to -40°C to +85°C at full load! This cooling approach provides the lowest thermal resistance to the case while providing the highest shock specifications known in the industry. In addition, the VPXCO300 is furnished with a GMS designed wedge lock that gives over 8x surface area for increased heat transfer compared to standard wedge lock designs.

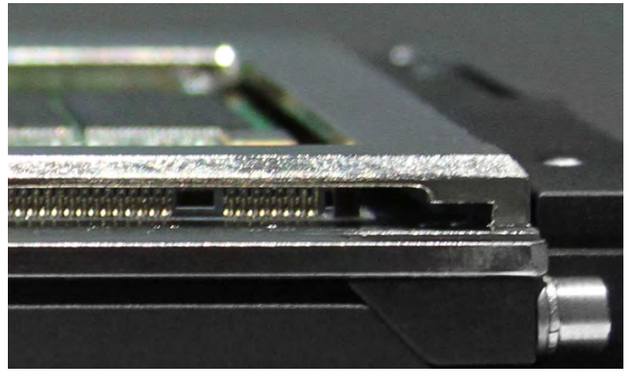
Full Environmental Specs

The Mongoose is available in ruggedization levels R1-R5. Additional information regarding the ruggedization levels and full environmental specifications for this product can be found on our website at www.gms4sbc.com.

Additional Views and Variations

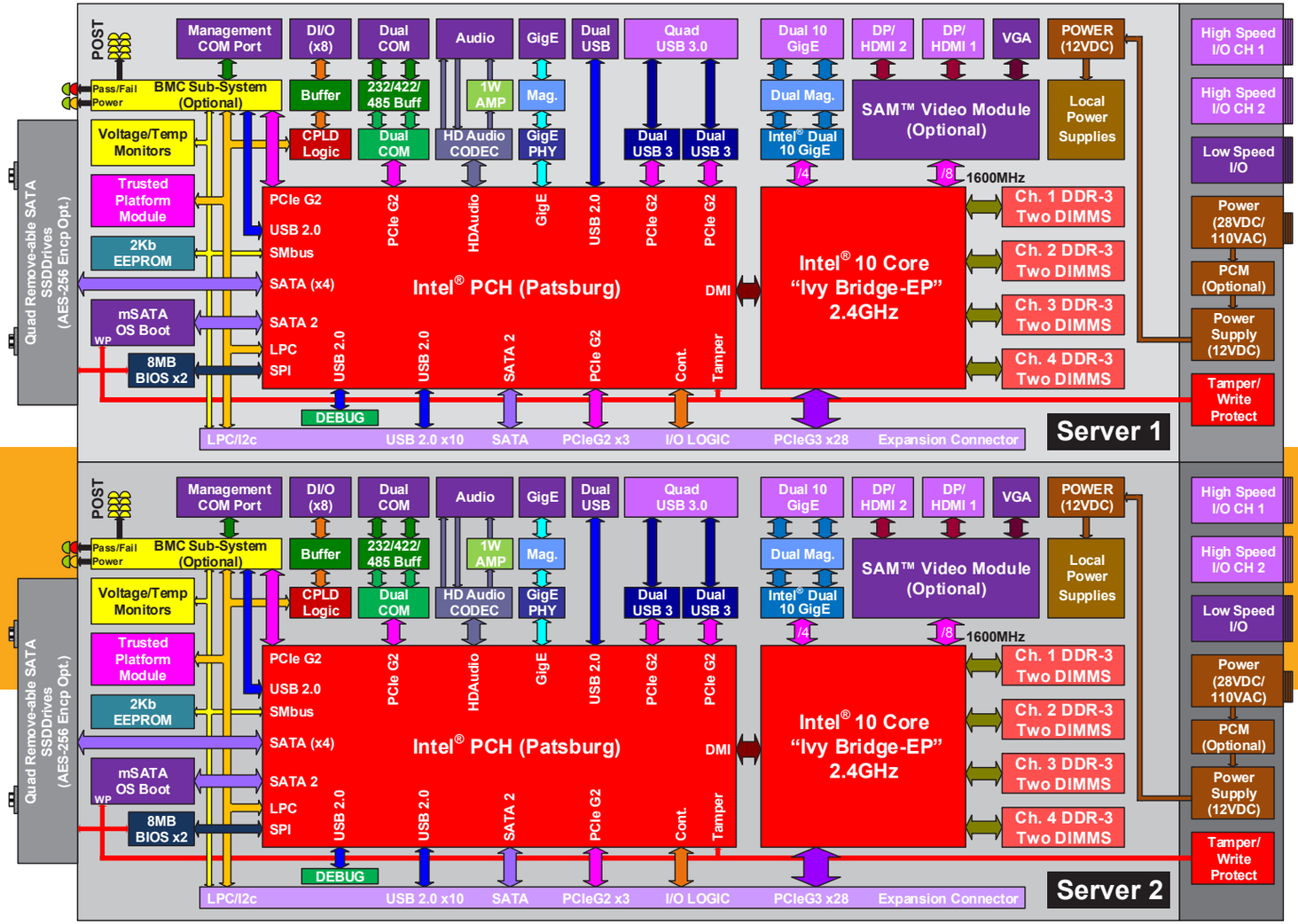
VPXCO300 (Showing close-up of CPU/RAM)

VPXCO300 (Detail of proprietary wedge lock design)



"YETI" SO302-1U

Rugged, High-Performance, 1U Single/Dual Redundant Server



- High-density, sealed, fan-less single or dual system in a 1U 19" standard rack mount
- Rugged, Mil circular connectors for I/O and Power
- DC power (Mil-Std-1275) or A/C power (Optional)
- Two fully independent, redundant servers **each with:**
- Intel® Xeon® Ivy Bridge-EP CPU with 10 cores, each operating up to 2.4GHz
- Support for Hyper-Threading on each core for total of 20 logical cores
- Supports up to 128GB of DDR3 memory with ECC, up to 1600 MT/s
- Four removable or fixed 2.5" SSD up to 2TB each with AES-256 Encryption (Optional)
- One mSATA SSD with write protect and secure erase for OS boot up to 1TB
- Dual 10-Gigabit Ethernet ports with TCP/IP Offloading Engine (TOE)
- Highest performance, full-size, embedded GPU module from AMD (Optional)
- Supports dual DisplayPort/HDMI ports and one RGB video (Optional)
- Quad USB 3.0, two USB 2.0 ports and HD-Audio support with 1W mono amplifier
- Two Serial Ports with RS-232/422/485 and eight buffered GPI/O lines
- Baseboard Management Controller (BMC) for health monitoring/reporting (IPMI 2.0)
- One Gigabit Ethernet port and one COM port for system Health Monitoring
- Support for Active Management Technology (AMT) for remote KVM functions
- Intel® Virtualization Technology (VT-x/VT-d2) and Trusted Execution Technology (TXT)
- Trusted Platform Module (TPM) for secure operation (Optional)
- Converged Platform Power Management (CPPM) for power saving (Optional)
- Dual BIOS boot devices with write-protect and RTC with field replaceable battery
- Internal battery to allow orderly shutdown upon power interruption
- Ultra-low SWaP only 19" x 17.6" x 1.75" @ 30 lbs. and as low as 300W
- Fully compliant to MIL-STD 810G, MIL-STD 1275D, MIL-S-901D, DO-160D, MIL-STD 461E and IP64
- Operates at standard temp 0°C to +55°C or extended temp -40°C to +85°C (Optional)
- Available in GMS ruggedization levels R1-R4

General Description

The SO302-1U "Yeti" is a second-generation fully rugged 1U server with the ability to support two independent servers. It is designed to provide the highest level of server-class performance possible in a 1U 19" standard-depth rack-mount, fully ruggedized, conduction-cooled system, operating from a standard temperature from 0°C to +55°C or from -40°C to +85°C extended temperature. The Yeti is targeted for applications where an ultra-fast, multi-core CPU is needed with vast amounts of ultra-high-speed, ECC-protected RAM for data processing in a very small package with optional video configuration and dual redundant systems. The Yeti utilizes the embedded server chipset for a minimum 7-year life cycle and is also conduction-cooled so that it does not require fans to cool the CPU/internal devices. What also makes the Yeti truly unique is that it can operate from either an AC or DC input with full Mil-Std-1275 power to support vehicle or generator power. **Each system** within the SO302-1U supports 10 physical CPU cores with Hyper-Threading for a total of 20 logical cores, each operating up to 2.4GHz with the ability to TurboBoost up to 3.0GHz. To harvest this incredible CPU performance, the CPU is coupled with up to 128GB of DDR3 RAM organized in four banks. Each RAM bank consists of two DDR3 DIMM arrays with Error Correcting Code (ECC). The ECC RAM provides 2-bit error detection with 1-bit correction and supports up to 1600 Mega Transfers per Second (MTS) between CPU and memory.

Each I/O subsystem for the Yeti is designed to support the widest array of storage and ultra-high-speed I/O devices with modularity and security. The SO302-1U offers up to 8TB of total storage utilizing four 2.5" SSDs with AES-256 encryption for increased RAID functionality and exceptional security. The host CPU supports dual 10-Gigabit Ethernet ports, four USB 3.0 and two USB 2.0 ports, two Serial ports with RS-232/422/485 buffers, full HD-Audio and eight General Purpose I/O lines. The SO302-1U provides one mSATA drive with write-protect for use as a local boot device up to 1TB. The Yeti also supports an optional Baseboard Management Controller (BMC) for detailed system health monitoring and reporting using industry standard IPMI 2.0 via a dedicated Ethernet port or Serial port. For applications requiring high-performance video output, the SO302-1U provides an optional SAM™ Video module, utilizing the most powerful AMD GPU with dual DisplayPort or HDMI ports and one VGA port. In addition, the SO302-1U is capable of providing power holdup in the event of unexpected power outage so the system can perform an orderly shutdown to protect running applications.

Applications

The Yeti is designed to operate as a low-maintenance, stand-alone, dual redundant server to fit in a 1U 19" standard-depth rack. It is ideal for heavy number-crunching applications where data is brought via ultra-high-speed I/O ports, such as 10Gigabit Ethernet and USB 3.0 devices. The Yeti offers the highest density computing on the market with over 40 Hyper-Threaded cores and 256GB of DDR3 RAM and up to 16TB of SSD storage in a 19" x 17.6" x 1.75" space! It is ideal for field data centers where the server is deployed in harsh environments making the CPU fans and filters not easily usable due to sand, dirt, debris, etc. The SO302-1U is designed to operate where several computers are used for data collection, targeting/mapping, and data acquisition. The SO302-1U supports the most popular Hypervisors offered by VMware®, WindRiver® and Microsoft® and may be shipped from the factory with operating systems such as Windows 7® and Linux® pre-installed. The SO302-1U is fully compliant to MIL-STD 810G, MIL-STD 1275D, MIL-S-901D, DO-160D, MIL-STD 461E and IP64.

Technology Used

The Yeti utilizes the most powerful Xeon® processor from Intel®. The Ivy Bridge-EP CPU is a second-generation Sandy-Bridge microarchitecture processor with a fully integrated memory controller for the best possible memory performance. This CPU is the highest performance server-class CPU from Intel® with many added security functions, such as Intel's second-generation Virtualization Technology VT-x, Trusted Execution Technology (TXT), Active Management Technology (AMT) for remote KVM functions, and Converged Platform Power Management (CPPM) for thermal management and power saving. The graphics engine is based around the most powerful AMD full-size, embedded MXM GPU module for outstanding performance in 2D and 3D accelerations and is fully virtualized.

Additional Views and Variations

SO302-1U (Showing rear connector configuration)

Cooling

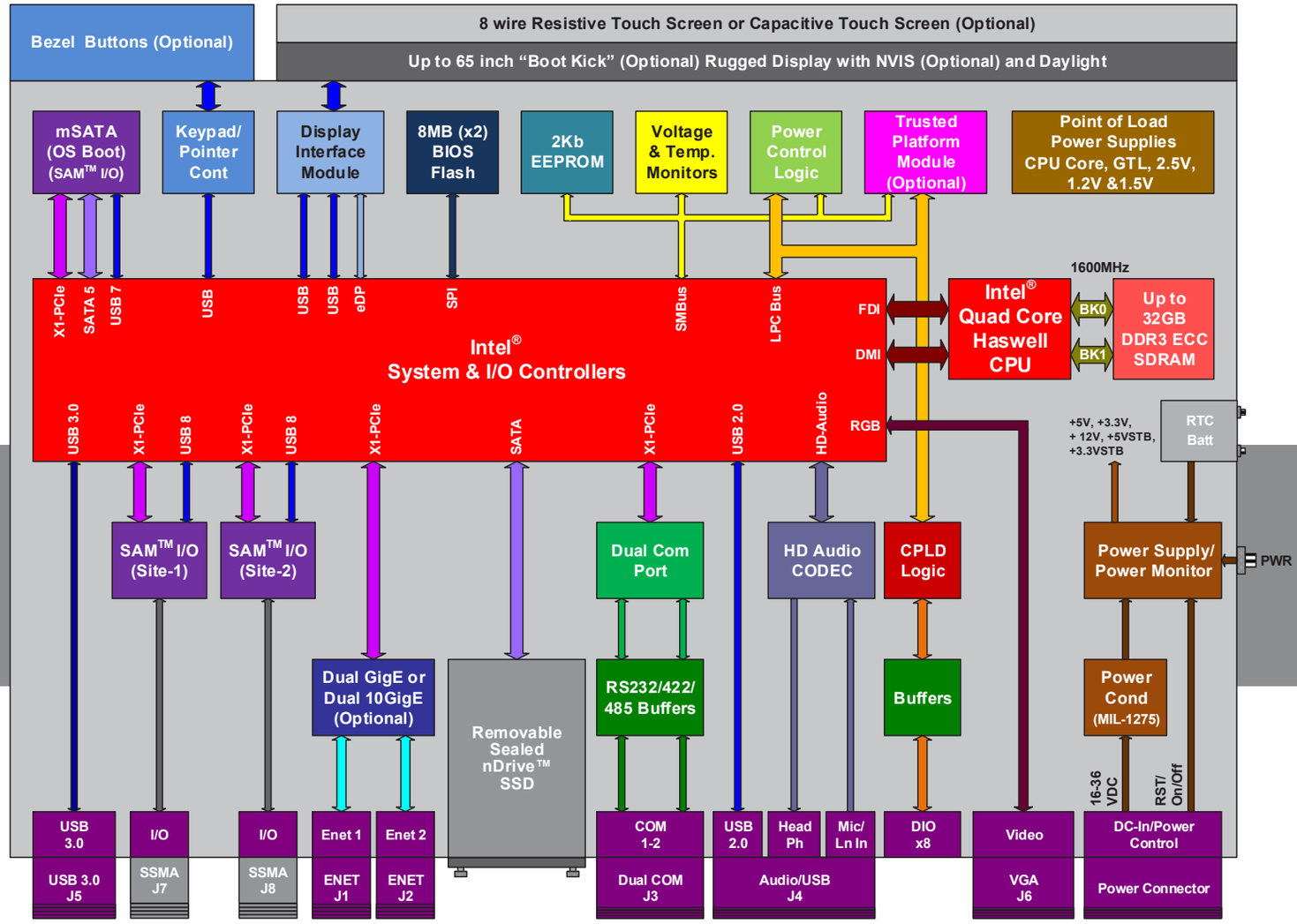
The Yeti is equipped with GMS's patent pending RuggedCool™ technology, which is the most unique cooling system in the industry and operates up to -20°C to +75°C extended temp (0°C to +55°C Standard) at full load! This cooling approach provides the lowest thermal resistance to the case while providing the highest shock specifications known in the industry. The SO302-1U is a fan-less system for reliable operation and can be mounted directly to a metal surface or used as a stand-alone system.

Full Environmental Specs

The Yeti is available in ruggedization levels R1-R4. Additional information regarding the ruggedization levels and full environmental specifications for this product can be found on our website at www.gms4sbc.com.

RUGGEDVIEW™

Rugged, Smart Display with Removable Drive



- Available in 6.5", 10.4", 12.2", 15" and 19" diagonal in 4:3 formats
- Available in 15.6", 17.3", 24", 32", 46", 55" and 65" in 16:9 format
- Full daylight viewable screen with optional Night Vision Imaging System (NVIS)
- Ultra-rugged "Boot-Kick" glass for virtually unbreakable screen
- Ultra-small frame and lightweight, less than 2 inches thick!
- Anti-Glare (AG) and Anti-Reflective (AR) coating for crisp display in any light
- Resistive touch screen with glove and/or stylus operation with EMI shielding
- Up to 32 bezel keys for screen control and special functions (Customizable and Optional)
- Up to 2.4GHz Intel® Quad Core™ i7 Haswell processor with 6MB of L2 Cache
- Up to 32GB of 1600MHz DDR3 memory with ECC
- Up to 1TB of fixed SSD for OS boot
- One fully sealed drive nDrive™ up to 1TB (Optional)
- Two Gigabit or two 10Gigabit (Optional) Ethernet ports with TCP/IP Offloading Engine (TOE)
- One USB 3.0, one USB 2.0 port and two COM ports with RS-232/422/485 options
- Two SAM™ sites for custom I/O (MIL-STD-1553, Wi-Fi/BT, GPS, CANBus, etc.)
- Full HD-Audio support with onboard 1W mono amplifier
- One ultra-high performance Display Port or VGA output for a triple displays support
- Optional passive display (no CPU) for dual or triple displays
- Intel® Virtualization Technology (VT-x/VT-d2) and Trusted Execution Technology (TXT)
- Trusted Platform Module (TPM) for secure operation (Optional)
- CPU temperature and voltage monitoring for safe operation
- Pass/Fail, Power, and user LED indicators and Power On/Off switch
- Fully compliant to MIL-STD 810G, MIL-STD-1275D, MIL-S-901D, DO-160D, MIL-STD-461E and IP66
- Optional Atom™-based CPU for lower power and cost
- Operates up to -30°C to +80°C (no heater) or up to -40°C to +80°C (with heater)
- Available in ruggedization levels R1-R5

General Description

The RuggedView™ displays integrate the most rugged, reliable, and crisp displays with the fourth-generation Core™ i7, ultra-rugged, small, lightweight computer system, resulting in the thinnest, most powerful smart display on the market today. It is designed to provide the highest level of workstation performance possible in a fully ruggedized, conduction-cooled, fully sealed system with an ultra-bright, rugged display with Night Vision Imaging System (NVIS). The RuggedView™ is targeted for applications where an ultra-rugged computer with a rugged display is needed to provide the best possible stand-alone-system per dollar and per watt while utilizing rugged interconnects to provide a fully sealed smart display system in less than 2 inches of thickness!

The RuggedView™ supports the latest, most power-efficient, Intel® Haswell Quad Core™ i7 processor with Hyper-Threading for a total of 8 logical cores, each operating up to 2.4GHz with the ability to TurboBoost up to 3.4GHz. To harvest this incredible CPU performance, the CPU is coupled with up to 32GB of RAM organized in two banks that support Error Correcting Code (ECC). The ECC RAM provides 2-bit error detection and 1-bit error correction and supports up to 1600 Mega Transfers per Second (MTS) between CPU and memory. The RuggedView™ is offered with several screen options and formats from a 6.5 inch diagonal to 65 inch diagonal with or without touchscreen and bezel keys. The display for the RuggedView™ integrates of the most rugged glass available in the market. The displays can withstand a direct "Boot Kick" without damaging the display or the touch screen. It is viewable in direct sun with up to 1300 nits of brightness and supports Anti-Reflective (AR) and Anti-Glare (AG) coating for crisp graphics even in direct sunlight. The display also supports NVIS for applications where night vision glasses are used to reduce stress on the viewer. The RuggedView™ may optionally be purchased with less rugged glass to meet specific requirements and price points. Additionally, the RuggedView™ may be ordered from the factory with many other I/O functions, as well as Intel® Atom™ based CPU (Green Engines). For systems requiring multi-displays, the RuggedView™ may be ordered as a passive display (No CPU) to extend the desktop or repeat the display in two other displays.

The I/O subsystem for the RuggedView™ is designed to support a wide array of standard and custom I/O functions. The standard configuration supports up to two Gigabit Ethernet ports or an optional two 10Gigabit Ethernet ports with TCP/IP Offloading Engine (TOE), one USB 3.0 and one USB 2.0 port, two COM ports with RS-232/422/485 options, one removable sealed nDrive™ SSD up to 1TB (Optional), and one internal fixed SSD, each with capacities of up to 1TB each with secure-erase and write-protect options. The RuggedView™ may be highly customized via Flex I/O™ to bring additional I/O out to connectors easily and cost effectively. Optional additional I/O functions, such as quad video capture, CANbus, MIL-STD-1553, Wi-Fi, Bluetooth, FireWire, GPS and many other I/O functions utilizing the two SAM™ sites, are provided.

Applications

The RuggedView™ is designed to provide the ultimate rugged computer with an ultra-rugged display for defense and industrial applications. The RuggedView™ is ideal for outdoor applications where it may be fully exposed to rain, sun, dirt, and radiation. The RuggedView™ may be ordered from the factory with operating systems such as Windows 7®, Linux® or VMware® pre-installed. The SD series is fully compliant MIL-STD 810G, MIL-STD-1275D, MIL-S-901D, DO-160D, MIL-STD-461E and IP66.

Technology Used

The RuggedView™ utilizes the Intel® Core™ i7 Haswell CPU, which is the newest and most powerful, efficient processor from Intel® with advanced thermal management and graphics. The Haswell Core™ i7 processor supports Hyper-Threading for a total of eight logical cores and supports 6MB of L2 cache shared among the cores. Haswell supports up to 32GB of DDR3 RAM with Error Correcting Code (ECC) and 1600 Mega Transfers per Second (MTS) between the CPU and RAM. Another major improvement of the Haswell processor over the Ivy Bridge Core™ i7 is the graphics performance. The Haswell processor provides three independent video outputs and better-than 40% improvement in 3D acceleration. Haswell is also coupled with Lynx Point™ and is a fourth-generation Core™ i7 with a fully integrated memory controller for the best memory performance possible. This CPU is considered the workhorse of the workstation market with many added power-saving features and peak performance with controlled thermals, as well as security functions such as Intel's second-generation Virtualization Technology VT-x, Trusted Execution Technology (TXT), and Active Management Technology (AMT) for remote KVM functions. The Haswell platform also supports PCIExpress Gen3, USB 3.0 and SATA 3 for the highest performance possible on a workstation platform. The glass used for the display portion is highly customizable in performance and ruggedness, based on application. The computing engine of the RuggedView is upgradeable and is field serviceable. For lower CPU performance needs, the RuggedView may be ordered with an Atom™ CPU or as a Slave Display without the CPU.

Additional Views and Variations

SD17 (Showing 16:9 aspect with no buttons)

Cooling

The RuggedView™ is equipped with GMS' patent pending RuggedCool™ technology, which is the most unique cooling system in the industry and is the only system that operates up to -40°C to +80°C at full load (0°C to +55°C Standard)! This cooling approach provides the lowest thermal resistance to the case while providing the highest shock specifications known in the industry. The RuggedView™ is a fan-less system for reliable operation and can be mounted directly to a metal surface or used as a stand-alone system.

Full Environmental Specs

The RuggedView™ is available in ruggedization levels R1-R5. Additional information regarding the ruggedization levels and full environmental specifications for this product can be found on our website at www.gms4sbc.com. The SD series is also available with less rugged glass and packaging.

SAM™ I/O ADC

8 Channel 16-bit Analog to Digital Converter

- 8 Channels 16-bit A/D converter Simultaneously Sampled
- Fast throughput rate: 200 KSPS for all 8 channels
- Programmable 2nd Order Anti-Alias Analog Filter
- Over-sampling capability with digital filter
- 8 Channels SE or 4 PSEUDO Differentials
- Analog Input Clamp Protection
- 1MΩ Analog Input Impedance
- 8Kx16 SRAM

SAM™ I/O ProfiBus

Real-Time Ethernet and Fieldbus

- Configurable Card that runs Master and up to 125 Slave Protocols
- SYCON.net FDT/DTM Configuration Tool Included
- Data Exchange via Dual-Port Memory (DPM)
- Cyclic Data max 7168; 244 Byte per Slave
- PCI-E Interface for PROFIBUS (netX based)
- Configuration Data 244 Bytes per Slave
- Toolkit C Source Files Included
- DPV1 Class 1 and 2 Support
- Acyclic R/W 240 Bytes

SAM™ I/O FG

Frame Grabber

- Arbitrary video window sizing, cropping and scaling
- Drivers for Windows 7™, WinXP-E™, Linux®
- Windows™ DirectShow/DirectDraw support
- 8x D1 size capture at full frame rate
- Efficient PCI DMA cycle operation
- 8 Live NTSC/PAL video inputs
- Linux® Video4Linux support
- Low Power Operation

SAM™ I/O MIL-STD-1553

One Channel Dual Redundant 1553 Controller

- Programmable bus controller, remote terminal, or monitor terminal modes
- Multiprotocol Support of MIL-STD-1553A/B Notice 2 and STANAG 3838
- Controller of dual redundant (A/B channel) 1553 communications
- Linux® drivers, Window® XP™ drivers, VMware® drivers
- Selectable 10,12,16 or 20 MHz Systems Clocks
- DDC 1553 E Silicon

SAM™ I/O CBC

CANBus Controller

- Supports 11-bit (CAN 2.0A) and 29-bit (CAN 2.0B active) identifiers
- High Speed CAN interface according to ISO 11898-2
- Time-stamped CAN messages
- Bit rates 10 to 1000 kbps
- Reliable error handling
- Low Power consumption
- NEMA Compliance
- Isolated CAN Channels

SAM™ I/O ARINC-429

6 ARINC Channel 429 Controller

- Eight Single-Ended Bi-Directional Avionics Discretes
- A/D Signal Capture on First RX Channel
- External Input and Output LVTTL Clock
- One LVTTL Input and Output Trigger
- IRIG-B Receiver (DC or AM)
- 1 Mbytes of ZBT Memory
- Up to 6 ARINC Channels
- ARINC-717 RX/TX
- RoHS Compliant

SAM™ I/O Wi-Fi/BT

Wireless Internet Solution

- Microsoft® Windows 7™, Windows 8™, Windows XP™ and Linux®
- Wi-Fi certified for 802.11a, 802.11b, 802.11g, 802.11n, WMM, WPA, WPA2
- Authentication Protocols - PAP, CHAP, TLS, GTC, MS-CHAP, MS-CHAPv2
- Supports seamless roaming between respective access points
- Dual Mode Bluetooth 2.1, 2.1+EDR, 3.0, 3.0+HS, 4.0 (BLE)
- IEEE 802.11a/b/g/n, 802.11d, 802.11e, 802.11i, 802.11h
- Dual Stream, Dual Band 802.11a/g/n 2x2 and 2.4/5 GHz
- WPS Wi-Fi Direct for-peer-to peer device connections
- IEEE WLAN Standard

SAM™ I/O DGE

Dual Gigabit Ethernet

- ACPI register set and power down functionality supporting D0 and D3 states
- IPv6 support for IP/TCP and IP/UDP receive checksum offload
- Utilizes Intel 82580DB dual Gigabit Ethernet device
- Support for Virtual Machines Device queues
- TCP/IP Offloading Engine (TOE)
- Onboard dual magnetics
- Wake up on data packet

SAM™ I/O GPS

Global Positioning System

- 50-channel u-blox- 5 engine with over 1 Million effective correlators
- -160dBm SuperSense® Indoor GPS acquisition and tracking sensitivity
- A-GPS: AssistNow Online and AssistNow Offline; OMA SUPL compliant
- Accelerated startup at weak signals with KickStart feature
- Less than 1 second TTFF for Hot and Aided Starts
- One PPS output for timing and time stamping
- SBAS (WAAS, EGNOS, MSAS, GAGAN)
- Receives GPS and GALILEO signals
- High immunity to jamming

SAM™ VIDEO ATI MXM

High Definition Video GPU ATI Radeon E4690

- Supports dual displays simultaneously
- Supports single/dual-link DVI, DisplayPort, HDMI or VGA ports
- 320 shader processors
- 3DMark06 HDR/SM3.0 2,669
- 128-bit, 512MB GDDR3
- Avivo™ HD Video and Display
- Next generation video decode
- H.264, VC-1, MPEG-2
- Picture-in-Picture
- Support for DirectX 10.1, OpenGL 3.1
- Support for Windows® and Linux® drivers

EPCM

External Power Conditioning Module

- Converts "dirty" 28V input and produces "clean" 12V out
- Designed to work all GMS industrial and rugged systems
- Extended temp -40°C to 85°C
- Fully rugged, sealed enclosure
- Meets MIL-STD-1275E
- 4.8" X 3.0" X 1.2"

SAM™ VIDEO ATI MXM

Superior Graphics for Embedded Systems

- Supports Single/Dual-Link DVI, Display Port, HDMI or VGA ports
- Support for DirectXTM10.1, OpenGLTM3.1
- Support dual displays simultaneously
- 3DMark06 HDR/SM3.0 2,669
- 128-bit, 512MB GDDR3
- Avivo™ HD Video and Display
- Next generation video decode
- H.264, VC-1, MPEG-2
- 320 shader processors
- Picture-in-Picture

DDS

nDrive™ or 2.5" SATA Drive External Docking Station

- Single drive bay docking station for 2.5" SATA drive
- Supports GMS nDrive™ fully sealed drive
- USB 3.0 port interface
- Universal compatibility

OCTOPUS

Rugged, Fully Sealed, Low-Cost, 26-Port Enterprise Level Ethernet Switch

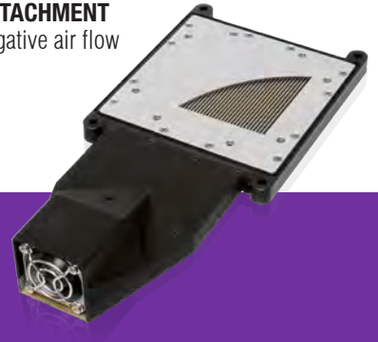
- Fully managed Layer II switch with Layer III features
- 24 Gigabit Ethernet ports and two 10Gigabit Ethernet ports
- Optional MIL circular fiber Optic connectors for 10Gigabit Ethernet ports
- Very low latency, VLAN support, QoS/differentiated services
- Multicast and spanning tree capabilities
- Security features for authentication and authorization
- DHCP client and server support, and SNMP
- Support for Multicast IPv4, IPv6 with IGMPv2/3 snooping and MLD
- Support for IEEE-1588 for packet time stamping (Optional)
- One Gigabit Ethernet port for configuration control or one COM port for Debugging
- Versatile DC power, 12VDC or full MIL-STD 1275 (up to 36VDC)
- Ultra-low SWaP only 12" x 7.25" x 1.7" @ 6 lb. and as low as 40W
- Fully compliant to MIL-STD 810G, MIL-STD 1275D, MIL-S 901D, DO-160D, MIL-STD 461E and IP66
- Operates from standard temp 0°C to +55°C or extended temp -40°C to +85°C
- Available in ruggedization levels R1-R5

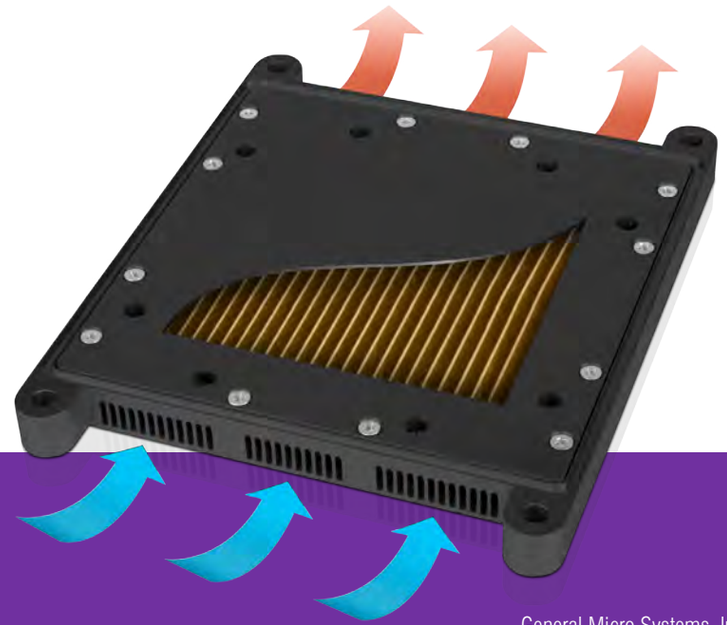
GMS RADIATORS

Once the heat is transferred to the system enclosure's conduction cooling interface, it has to be removed to effectively cool the system. GMS offers several solutions to remove heat from the system. For most applications, such as vehicle or airborne applications, the system is mounted directly to a thermally conductive, usually metal, bulkhead for conduction cooling. In these applications, the mechanical structure of the vehicle acts as the cold plate/heat sink, so there is no need for additional cooling. For applications where there is no method for mounting the system to a thermally conductive structure, such as in helicopters and other DZUS® mount applications, GMS offers several radiator solutions to provide cooling. These radiators may be forced-air cooled, where the forced air can be supplied by air-pressure/vacuum or by using military-grade fans. GMS also offers water-based radiators for extremely harsh environments where airflow is not an option. For additional information, talk to a GMS representative about solutions to meet your exact needs.

RADIATOR WITH HOSE ATTACHMENT
Available in positive or negative air flow or water cooling options

RADIATOR WITH FAN ATTACHMENT
Available in positive or negative air flow





SECURITY FEATURES

Over the last several years computer security has become a major concern for all users and manufacturers around the world. Sophisticated software has been written to penetrate corporate, government and military networks and servers in order to access proprietary and sensitive information, and to perform malicious and criminal attacks that compromise the integrity of the information and deny legitimate access to the information. Both internal and external attacks on data security are becoming more and more frequent, with the damage often being irreversible, and, in general, the traditional methods of protection such as firewalls and anti-virus/anti-malware software are no longer adequate. A "holistic" approach to security that ranges from user education / operational policies to containment after a breech is required to address the rapidly evolving computer security environment. For embedded computing, a "holistic" approach requires that security features at the hardware and firmware level are also present. In addition, for some defense and government agency customers, the required security features go beyond what is found in many embedded computing systems currently on the market. For these applications, additional measures have been, and are being, developed to address situations in which computers with sensitive information may fall into the hands of the enemy. These additional measures help to ensure that sensitive information is not obtained by the enemy.

As a result of these increased computer security threats, General Micro Systems has taken the lead in implementing improved security features - from the architectural level down to the hardware level. All GMS systems are designed from the ground up to provide for the most advanced security features possible. GMS's systems include security functions that protect against threats such as software attacks at system initialization, threats against the integrity of the system BIOS and related firmware, escalation of privilege attacks against the operating system, rootkits, physical tampering and unauthorized configuration changes, and compromise of data and mass storage devices. In addition, GMS provides architectural variants of the typical embedded computer system that provide for government approved compartmentalization of I/O resources for operation of virtual machines in computing environments with multiple security domains, and with multiple processing sub-systems in total isolation.

The security functions included in GMS systems are summarized in the paragraphs below.

Trusted Platform Module (TPM) and Trusted Execution Technology (TXT)

The primary purpose of the TPM is to provide a hardware mechanism for maintaining the integrity of a computer platform. It is a key element in protecting against stealthy malware such as rootkits and bootkits by providing hardware cryptographic capabilities that support authentication processes for low level elements of the system, including the BIOS, the boot sector and master-boot-record (MBR). Systems with TPM are capable of meeting NIST guidelines for trusted computing, which include "measurement" of firmware, software and configuration information before they are executed, then encrypted storage of the "measurements" in hardware, and then validation the "measurements" against a predefined expectation. The TPM is involved in all three of these steps, including the storage of the expected and current measurements. In addition to providing for "platform integrity", the TPM can be used for key protection for hard disk encryption, and for password authentication support, and therefore, has potential uses for operating systems and application software.

TXT is a computer hardware technology based in the processor and associated chipset that provides key elements for establishing a verifiable description of the system per the methodologies prescribed by the Trusted Computing Group (TCG). Key elements of TXT include extensions to the instruction set specifically for security operations, Authentication Code Modules (ACM), and features for supporting Launch Control Policies (LCP).

In summary, TXT and TPM together can be used to establish the "root of trust" and the "chain of trust" by providing hardware based encrypted identifiers for all software components involved in system initialization, and hardware based mechanisms for blocking the execution of software components that do not match approved versions. In addition, hardware mechanisms are provided for protecting residual secret data from memory snooping and reset attacks, and features are included to support local and remote attestation of the trustworthiness of the system.

Of course, usage of TXT and TPM implies system software (BIOS) and operating system involvement, and, indeed, support at both levels is required for the realization of a trusted computing system.

BIOS

GMS develops all system BIOS in-house. Although this approach increases development costs, it provides for superior software quality control and maximum flexibility to meet the unique needs of our customers, such as enhanced password protection, ultra-fast boot, and custom plasma screens. For consistency across GMS's product lines, American Megatrends, Inc. (AMI) BIOS cores are exclusively used. Also, the AMI BIOS cores provide key security related capabilities required for GMS products, most notably UEFI 2.3.1 compliance, and support for UEFI Secure Boot, NIST 800-147 BIOS Protection Guidelines, TPM 1.2 and 2.0, Intel V-Pro (including TXT), Intel VT-d, Intel Ant-Theft Technology, and password protection for BIOS setup and boot.

Other important features of the GMS system BIOS include:

- Storage of system parameters and configuration settings in the BIOS Flash instead of the standard battery-backed CMOS. This results in systems that can operate fully without the need of battery in a system.

- Hardware write protect (WP) for the BIOS flash. This feature, which includes a write protect signal at the system interconnect, can be used to eliminate inadvertent and unauthorized changes to the system BIOS and system configuration settings.

GMS welcomes custom BIOS needs which, in most cases, are provided for free to OEM customers.

Data Security

GMS products include functionality to provide for the security of data stored on internal and removable mass storage devices. These functions include support for software based full-disk encryption, and support for "in-line" hardware based disk encryption, as well as media with internal encryption capability (Self-Encrypting Drive). Also, GMS products may be configured with mass storage that has hardware based write protection, and with mass storage that has hardware based "secure erase" capability.

Software Based Full-Disk and File-System Encryption

The processors used in GMS products includes instruction set enhancements for AES FIPS Publication 197 data encryption and decryption. Key lengths of 128, 192, and 256 bits are supported. The Trusted Platform Module (TPM) included in GMS products can be used in conjunction with the disk encryption mechanism to provide encryption key storage. Various off-the-shelf software products that provide full-disk and file-system encryption make use of the processor's AES instructions, including BitLocker, McAfee Endpoint Encryption, Symantec PGP Whole Disk Encryption and TruCrypt.

Hardware Full-Disk Encryption

Some GMS systems include the option for in-line hardware based full-disk encryption. This approach provides cryptographic processor between the root system's SATA ports and the mass storage devices. The cryptographic processor performs AES FIPS 140-2 certified encryption at a key length of 256 bits. The encryption and decryption are performed at "wire-speed" on the SATA interface, eliminating the processing overhead and performance considerations of software based disk encryption. This method is also operating system independent and allows for encryption of any mass storage device. Key token, password and TPM based key management are supported.

Self-Encrypting Drive (SED)
All GMS products with 2.5" internal or removable mass storage support self-encrypting drives (SED). SED are nominally compliant to the Trusted Computing Group's Opal SSC specification and use AES encryption with 256 bit key length. Encryption keys are stored internal to the drive, providing a security advantage over software based encryption. SEDs are readily available in the rotating media market, and are gaining support in the SSD market.

Secure-Erase (SE)
The specific meaning of Secure Erase in the context of disk drives is an ATA command defined by NIST Special Publication 800-88 (Guidelines for Media Sanitization) for a firmware based process for overwriting a hard drive. Virtually all hard disk drives and SSDs support in some fashion the Secure Erase ATA command. Because there may be some circumstances in which execution of the command via software is not possible, GMS offers, as an option on some products with internal or removable mass storage, a hardware mechanism for initiating the secure erase operation. This option allows the Secure Erase to be initiated when power is applied to the mass storage device, regardless of the operational state of the system - the system does not have to be functional, nor does any software need to be running. Specialized mass storage media is required for this feature.

GMS also offers, as an option, mass storage with specialized secure erase methods for defense and governmental agency related customers. These methods include DoD 5220.22-M, NSA 9-12, NSA 130-2, as well as Army, Air Force and Navy secure erase specifications. Secure erase for these methods is also triggered by ATA commands and, optionally, by a hardware mechanism. The secure erase, when triggered, cannot be stopped. If power is disconnected from the drive before the secure erase is complete, the secure erase will resume when power is re-applied. Some of the secure erase methods are destructive, such that the drive is not reusable after the erase is complete.

Write-Protect (WP)
GMS also offers, as an option on some products with internal or removable mass storage, a hardware mechanism for preventing any data writes to the mass storage device. This feature, which includes a write protect signal at the system interconnect, can be used to eliminate unauthorized or inadvertent changes to the content of the mass storage device, and is of interest to customers requiring that the operating system be "tamper proof". Specialized mass storage media is required for this feature.

Tamper-Proof (TAMP)
One possible security risk with computer systems that process confidential information is that unauthorized personnel may attempt to physically open the system in order to access data storage devices, including mass storage, non-volatile memory or even RAM, or to modify the system configuration such that the integrity of the system is compromised.

To prevent tampering such as this from being successful, some GMS products include a tamper sensor. This sensor, when activated, sends a signal to the internal and removable drives, as well as the PCH (Platform Controller Hub), which can be used to initiate various responses, such as halting operation, turning off power, disabling subsequent initialization, triggering secure erase of the drives, and triggering erasure of the system BIOS.

Secure Virtual Machine (SVM)
In a standard virtual machine (VM) environment, all of the root system's I/O resources, such as USB, Ethernet, Serial ports, etc., are effectively organized as a generic pool, and are assigned to a given virtual machine on a "as-needed" basis for a given application. In the GMS Secure Virtual Machine architecture, the system's I/O resources are predefined by the hardware topology to be in specific groupings. These groupings are the designated I/O for a set of virtual machines and for the supervisory portion of the system. The hardware topology of the GMS Secure Virtual Machine is the key to providing the necessary isolation, resulting in dedicated I/O resources at the hardware level for each virtual machine, and a dedicated hardware path to the processor/memory sub-system for every virtual machine. The GMS Secure Virtual Machine architecture, in conjunction with Intel VT-x and VT-d technologies, which provide for isolation at the memory, DMA, and interrupt levels, and along with an appropriate virtual-machine monitor (VMM), provides the highest level of security possible for virtualized operating systems.

The GMS Secure Virtual Machine architecture uses none of the system's centralized I/O resources for virtual machine I/O, while providing dedicated (un-shared) connections from the system's root complex to the discrete hardware elements designated for each virtual machine's I/O. This approach addresses security risks by allowing the native I/O device drivers to be resident in the protected virtual machine partitions rather than being emulated by the VMM, and by eliminating any hardware or software coupling between the I/O functions of the virtual machine instances. Thus, the I/O functions of one virtual machine cannot be monitored or interfered with by software running on another virtual machine or by software running on the VMM itself. An added benefit of this architecture is the inherent fault tolerance of dedicated I/O resources: Damage or malfunction of the hardware elements designated for one virtual machine does not affect the operation of any of the other virtual machines. For example, a typical embedded computer system has multi-port USB hubs connected to an EHCI USB host controller as part of its central resources. The assignment of these ports by the VMM may span, or even be shared by, more than one virtual machine. A failure or error on one of the ports may affect the hub or the host controller in such a way that communications on the other ports are degraded or compromised. For the GMS Secure Virtual Machine architecture, USB ports assigned to a given virtual machine are provided by host controllers that are dedicated to that specific virtual machine. While damage, malfunction or error at that host controller will affect the operation of the associated virtual machine, there should be no effect on any of the other virtual machines in the system.

Another important aspect of the GMS Secure Virtual Machine architecture is its inherent support for trusted computing. In addition to the Trusted Platform Module (TPM) and the TXT capabilities provided by the processor and chipset, VT-x and VT-d are integral elements of a trusted computing system that hosts virtual machine partitions. VT-d is utilized during both system initialization, and by the VMM during normal operation. During initialization, VT-d provides for protected memory regions (PMR) from which the "launch environment" itself, as well as elements of the VMM, may operate. VT-d is used in the creation and management of the trusted partitions for the virtual machine instantiations, protecting the virtual machine partitions and the VMM from each other, and during normal operation, the VMM may use VT-d to define protected regions for use by integrity monitoring functions.

Multi Domain Platform (MDP)
GMS's Multi-Domain Platform systems are targeted for applications where two different Security Domains need to co-exist in the same enclosure. For this situation, the GMS MDP architecture is "Share Nothing": ALL hardware for one domain is physically and electrically separated from ALL hardware for the other domain. It is basically two separate systems enclosed in the same box, with only the common element being the input power. All internal functions, including regulators, processor and memory, and I/O functions are fully isolated from each other such that the electrical coupling and RFI between the two domains is negligible. This is achieved via shielding one domain from another and filtering all I/O interconnects.

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