Product Brief

Intel® IOC340 I/O Controller
Storage Processing

Intel® IOC340 I/O Controller featuring Intel XScale® technology

Discrete SAS/SATA I/O controller with embedded RAID

The Next Generation of High Performance, Flexibility, Power Efficiency, and Data Protection

Combining enterprise-class SAS with the power and performance of RAID, the Intel® IOC340 I/O Controller delivers a new level of flexibility and interoperability for storage solutions. As part of the larger IOP34x product family, the Intel® IOC340 I/O Controller shares a common SAS/SATA control unit with the IOP348 and is pin compatible for design scalability. The IOC340 also supports usage models that maximize its resources as a discrete controller. For use in both direct attached storage and external storage systems, the high-performance SAS/SATA functionality integrated with embedded RAID results in a power-efficient, high-performance I/O controller. In addition, it offers excellent price-for-performance, enabling businesses of all sizes to benefit from the protection, performance, and power of SAS.

SAS Enters the Mainstream

As parallel interfaces are replaced with higher performance serial interfaces, SAS and SATA are fast becoming leading technologies. SAS technology delivers the powerful combination of SCSI reliability with the speed and ease-of-use of serial communication, resulting in 3 Gb/s maximum throughput for enterprise storage systems. As part of a larger family of storage processors, the Intel® IOC340 I/O Controller delivers enterprise-class SAS at a low solution cost and small footprint. The IOC340 is at home in a wide range of solution topologies because of its extensive support for SAS and SATA drives, both direct-attached and through expanders. Businesses can now realize the potential of SAS drives while consolidating existing SATA equipment, dramatically improving the flexibility and extensibility of their storage solutions, whether integrated into larger designs or smaller discrete form factors.

Maximum Design Flexibility

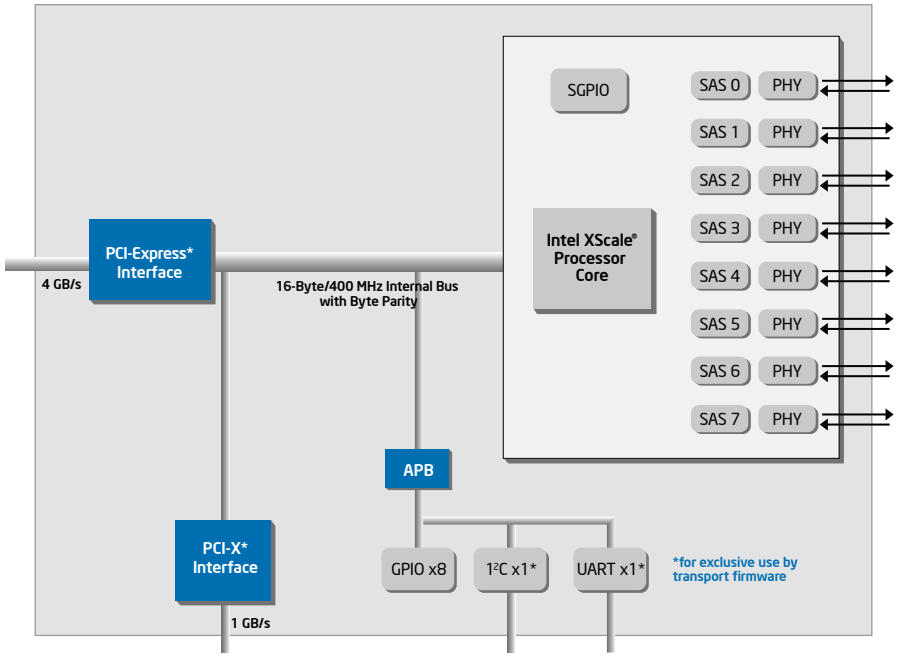
The open architecture of the Intel® IOC340 I/O Controller supports an array of layout options, allowing designers to customize and maximize the value of their products. Pin compatibility with the Intel® IOP348, IOP341 and IOP342 I/O Processor enables a single board design to be customized during the manufacturing process, greatly enhancing product flexibility. The IOC340 can also be combined with the IOP342 I/O Processor to deliver the highest performing, power-efficient storage solution. Alternatively, for designers who wish to use their own I/O processor, the open architecture of the IOC340 can be combined with any PCI-X* or PCI-Express* I/O processor to enable a wide variety of product solutions. The unique combination of features means designers can offer a full spectrum of disk control with a single design.

With support for multiple layout options, the Intel® IOC340 I/O Controller is easily integrated with a variety of solutions, supporting customizations for maximum performance and value. For direct-attached storage products, the IOC340 is well-suited for inclusion on uni-processor (UP), dual-processor (DP), multi-processor (MP) motherboards, or host adapter cards. For external products, the IOC340 can connect to a SAN or NAS host processor, SAS host, or RAID off-load processor, using either PCI-Express* or PCI-X* interfaces.

Pin compatibility, driver compatibility, and product characteristics extend beyond Intel products to the Emulex Fibre Channel I/O controllers.* Product designs based on the IOC340 can be easily modified to support the Fibre Channel-based Emulex IOC 504.* Engineers can focus on the signaling characteristics of 4 Gb/s Fibre Channel while knowing that other aspects of the design such as their software stacks, device drivers (based on Emulex's SLI* technology), peripherals, and host bus interfaces will all be equivalent. These product commonalities make possible a broad product line with minimal engineering work—a truly multi-protocol solution.

Product Highlights

- High-performance, discrete SAS/SATA I/O controller
- Pin compatibility with Intel® IOP341 I/O Processor, Intel® IOP342 I/O Processor, Intel® IOP348 I/O Processor, Emulex IOP 504 I/O Processor,* Emulex IOP 502M I/O Processor,* and Emulex IOP 504 I/O Controller*
- Emulex's Service Level Interface (SLI*) technology providing a driver compatible API
- Intel XScale® processor running highly optimized Intel disk controller firmware
- Either PCI-X* or PCI-Express*interface support
- Dual 128-bit/400 MHz internal buses, providing over 12 GB/s internal bandwidth
- 8 port, SAS/SATA II engine supporting industry standard SSP, SMP, STP, and direct attached SATA



Customer Reference Boards (CRBs)

A PCI-Express Host Bus Adapter (HBA) Customer Reference Board (CRB) is available for software and hardware evaluation. The card has on-board GbE, Dual UARTs, and JTAG connections to enable flash programming and debug access. The board is shipped with a 1200 MHz IOC340, 256 MB DDR2-533 DIMM, and SAS cables to support eight SAS drives.

For more information about the board, supported operating systems and device drivers, or software utilities please reference the following product code:

IQ413812SC.Kit: PCI-Express Form Factor CRB

Features	Benefits
Intel XScale® Controller	High-performance, individually configurable ports (8) offering flexible drive connection with support for both SAS and SATA devices.
PCI-X* and PCI-Express* Options	Flexibility and performance for additional integration of systems.
Dual Internal Buses	Dual 128-bit/400 MHz internal buses, providing over 12 GB/s internal bandwidth.

Intel® I/O Processor Comparison

	Intel® IOP348 I/O Processor	Intel® IOP341/342 I/O Processor	Intel® IOC340 I/O Controller	Intel® IOP333 I/O Processor
Intel XScale® Technology Application Cores	1	1/2	0	1
Core Speed	667/800/1200 MHz	800/1200 MHz	800/1200 MHz	500/667/800 MHz
RAID 5/6 offload solution Chip Count	1	2	2	2
SAS/SATA II Ports	8	0	8	0
Package Size	37.5 mm x 37.5 mm FCBGA5	37.5 mm x 37.5 mm FCBGA5	37.5 mm x 37.5 mm FCBGA5	37.5 mm x 37.5 mm FCBGA3
Integrated Host Bus Interfaces	PCI-Express*, PCI-X* or both concurrently	Concurrent PCI-Express and PCI-X	PCI-Express or PCI-X	PCI-Express to PCI-X Bridge
Memory Controller	Multi-ported DDR2 400/533 MHz with ECC	Multi-ported DDR2 400/533 MHz with ECC	n/a	Dual-ported DDR 333 MHz/DDR2 400 MHz
Internal Memory	n/a	1 MB SRAM	n/a	n/a
Max Memory	4 GB	4 GB	n/a	2 GB (DDR 333) 1 GB (DDR2 400)
Internal Bus	128-bit, 400 MHz (up to 6.4 GB/s) Dual Bus. Byte parity on data bus	128-bit, 400 MHz (up to 6.4 GB/s) Dual Bus. Byte parity on data bus	128-bit, 400 MHz (up to 6.4 GB/s) Dual Bus. Byte parity on data bus	333 MHz (up to 2.7 GB/s) Bus
Local Bus Width	16 Bits (66 MHz)	16 Bits (66 MHz)	16 Bits (66 MHz)	8/16 Bits (66 MHz)
DMA Buffer Size	4096 Bytes	4096 Bytes	4096 Bytes	1024 Bytes
ATU Buffer Size	4096 Bytes	4096 Bytes	4096 Bytes	4096 Bytes
I²C Bus Interface Unit	3	3	0	2 Serial Units
Hardware-based Application Accelerators	XOR, P+Q, CRC32C	XOR, P+Q, CRC32C	n/a	XOR, P+Q, CRC32C
UART	2 (1 Available for the IOP)	2	0	(2) 4-Pin (16550)
GPIO	16 GPIO 2 SGPIO units capable of up to 8 devices on the target end	16 GPIO	8 GPIO 2 SGPIO units capable of up to 8 devices on the target end	8 GPIO
External Interrupt Pins	16 + 1 HPI	16 + 1 HPI	n/a	16 + 1 HPI

Conclusion

The Intel® IOC340 I/O Controller delivers the next generation of storage power efficiency, performance, flexibility, and protection. The open, flexible architecture of the IOC340 facilitates a multitude of potential product designs to create customizable, enterprise-class storage solutions. As part of a flexible family of products, the IOC340 enables businesses of all sizes to benefit from the next evolution of storage technology.

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