



Storage

SATA Port Multipliers
SATA Port Selectors
SATA PS/PM Combo
SATA Host Controllers



2009
EXAR CORPORATION

Product Overview

The EXStor family includes Port Multipliers (PMP), Port Selectors (PS), Combo devices with integrated PMP and PS, and SATA Host Controllers. All EXStor family devices are certified for SATA 2.6 analog PHY compliance by the University of New Hampshire's Interoperability Laboratory (UNH-IOL). An example feature set of the Combo XRS10L240 device is found on the next page. All devices are pin compatible, in a 100 pin LQFP package, enabling feature expansion using the initial PCB design. The XRS10L120 and XRS10L210 devices are also offered in the industry's lowest power, 64 pin QFN package. All SATA Host Controllers support multiple SATA & IDE ports and are AHCI compliant.

The Exar / EXStor Family

Exar's EXStor family of storage products provides the combined advantages of the Serial ATA II Active/Passive Port Selector (PS) and Port Multiplier (PMP) implementations for Serial ATA II systems at 3.0 Gbps and 1.5 Gbps. The EXStor family offers lower power and higher reliability devices that support SATA Gen. 2 enhanced features compliant with the latest SATA standards. Device settings have been tailored to achieve full support of Gen-2i and Gen-2m using the default register values. The 2-wire MDIO interface provides access to internal registers enabling advanced features such as spread spectrum clocking, transmit pre-emphasis, and receive equalization.

All EXStor PMP/PS devices have been successfully tested for interoperability with all leading host bus adaptor and SATA hard disk drive manufacturers. The EXStor family includes the only combo PS/PMP devices in the industry and the only devices qualified over the full industrial temperature range (-40°C to +85°C).

The XRS10L620 is a 32-bit PCI-X/PCI to 2-SATA/1-PATA Host Controller. The XRS10L640 is a PCI-X to 4-SATA Host controller. They allow an embedded CPU with a PCI-X bus to communicate with two/four SATA Devices directly or with up to eight/sixteen additional devices through two/four 1:4 SATA Port Multipliers (PMP). It uses 3.3V and 1.8V supplies and operates over a wide temperature range of -10°C to +70°C.

EXStor Storage Product Matrix				
Part Number	Description	Package	Production Status	Evaluation Board
XRS10L210IV	2:1 Port Selector	100-LQFP	Now	XRS10L210ES
XRS10L210IL	2:1 Port Selector	64-QFN	Now	XRS10L210ILES
XRS10L120IV	1:2 Port Multiplier	100-LQFP	Now	XRS10L120ES
XRS10L120IL	1:2 Port Multiplier	64-QFN	Now	XRS10L120ILES
XRS10L140IV	1:4 Port Multiplier	100-LQFP	Now	XRS10L140ES
XRS10L220IV	Combo 2:2 PS / PMP	100-LQFP	Now	XRS10L220ES
XRS10L240IV	Combo 2:4 PS / PMP	100-LQFP	Now	XRS10L240ES
XRS10L620CV	PCI-X - 2xSATA/1 IDE	128-LQFP	Now	XRS10L620ES
XRS10L640CV	PCI-X - 4xSATA	128-LQFP	Q2 09	XRS10L640ES

Target Applications

Enhance SATA connectivity in the consumer market

- HD DVR
- IP-Set-Top Box
- Home NAS, DAS
- High-end PC Desktops
- Drive Enclosures
- Plug-in Cards
 - HBA & PCMCIA
- Home Gateway



Storage array needs for Industrial markets

- Video Surveillance
- Video Editing
- POS Systems

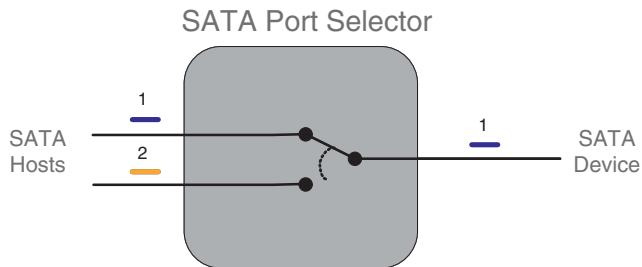


Mid-plane needs for SMB Enterprise markets

- Blade Servers
- NAS Appliance
- External RAID



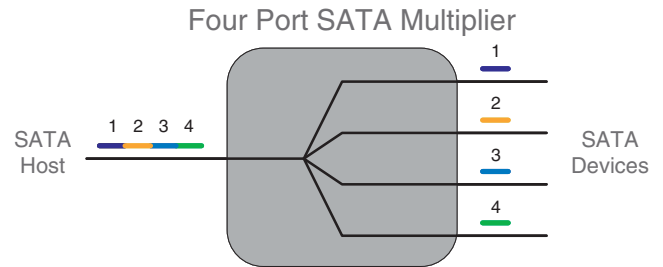
Port Selector Overview



Why a Port Selector?

- Allows two hosts to communicate with single ported SATA drives
- Reconditions the signals and extends the link distance

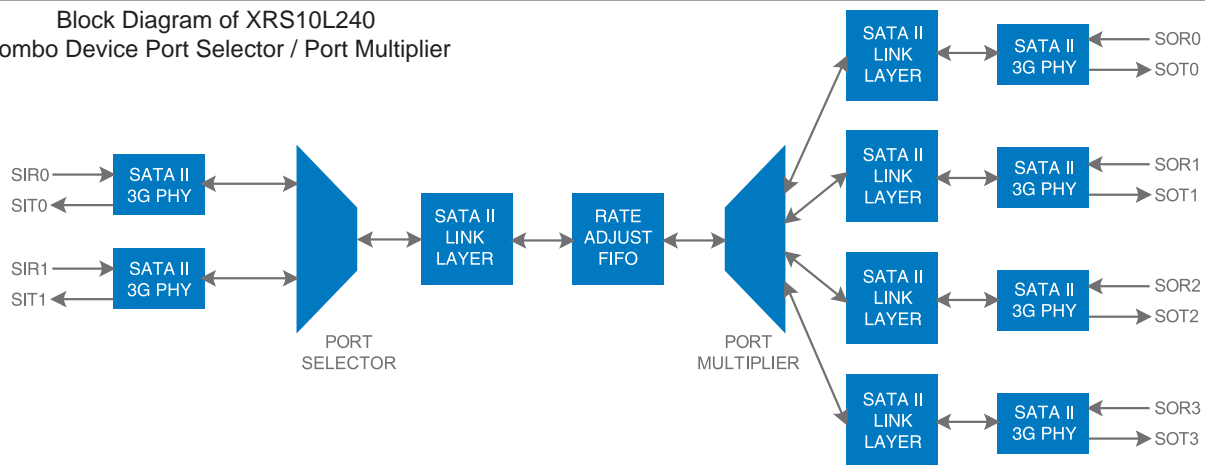
Port Multiplier Overview



Why a Port Multiplier?

- Expands SATA ports
- Reconditions the signals and extends the link distance

Block Diagram of XRS10L240
Combo Device Port Selector / Port Multiplier



XRS10L240 Feature Set

General Features

- Six independent 3/1.5Gbps SATA ports
- Connects 2 host ports to 4 device ports
- Supports 3/1.5Gbps rate detection/speed negotiation
- Supports power down modes - active, partial, slumber and power down
- Advanced features configurable through MDIO bus

Physical Features

- CMOS 0.13 Micron Technology
- Single 1.2 V Power Supply
- -40°C to 85°C Industrial Temperature Range
- No heatsink or airflow required
- 100-Pin LQFP Package

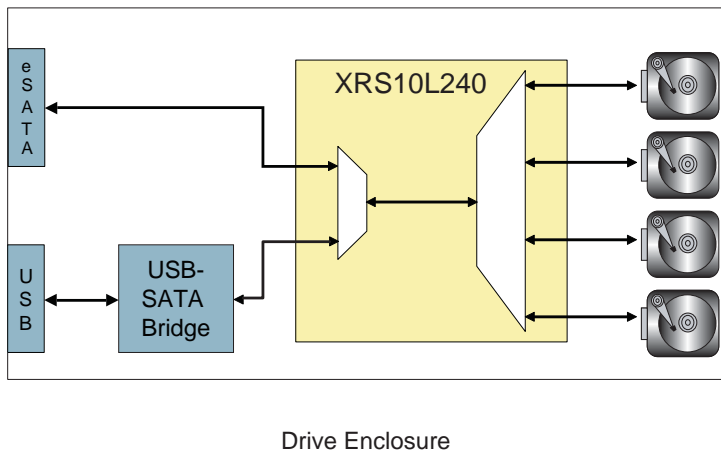
I/O Features

- High speed outputs with programmable pre-emphasis to drive long interconnects
- Selectable high speed input equalization for optimum reception
- Compliant with SATA Gen-2i & Gen-2m specification
- Enables reliable data transmission over 1 meter or more of FR-4 and 4 meters or more of unequalized copper cable
- Selectable spread spectrum clocking (SSC) for EMI reduction

Port Multiplier/Selector Logic Features

- Low latency architecture
- Supports OOB signaling for SATA applications
- Internal OOB detectors for COMRESET/COMINIT and COMWAKE

Application Example



Drive Enclosure

Feature	EXAR Advantage
Jitter Performance	Low, Retimed to local clock
TX amplitude	Programmable 300-900 mV
TX output Pre-emphasis	8 levels
RX Input Equalization	4 levels
Supply Voltages	Single 1.2V
Power Consumption	Industry lowest
Temperature Range	Industrial (-40°C to 85°C)

Exar Technology Advantages

Standards Compliance

Meets or exceeds SATA Gen-2i and Gen-2m specification allowing for seamless interoperability with all SATA and eSATA-compliant hosts and target devices "out of the box".

Highest Levels of Integration

On-chip functionality includes internal PLL multipliers allowing for use of inexpensive external crystals to generate the required high-frequency clocks. Single-supply operation reduces board real estate and Bill of Materials cost. Default register settings are sufficient for most

applications eliminating the need for programming from on board micro-controllers.

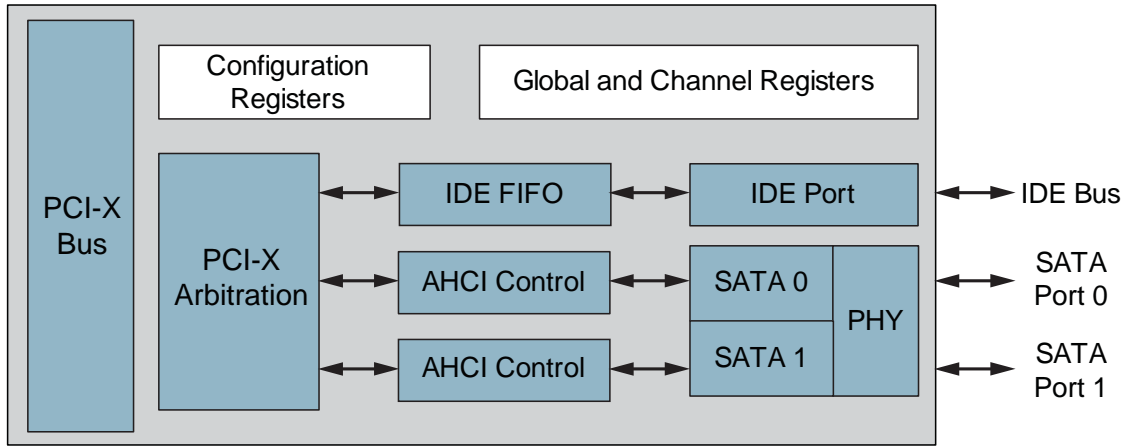
"Best-in-Class" Analog Performance

Low jitter outputs produce symmetrical, clean output waveforms with improved signal integrity. In addition, programmable transmit pre-emphasis, output amplitude and receive equalization allow the designer to optimize the parameters for a particular interconnect. This tunability affords the system designer the ability to drive long cables and backplanes as well as short runs on a compact PCB with optimum BER performance. Also, spread spectrum programmability reduces the peak energy of the fundamental frequency thereby reducing electromagnetic emissions for easier FCC compliance.

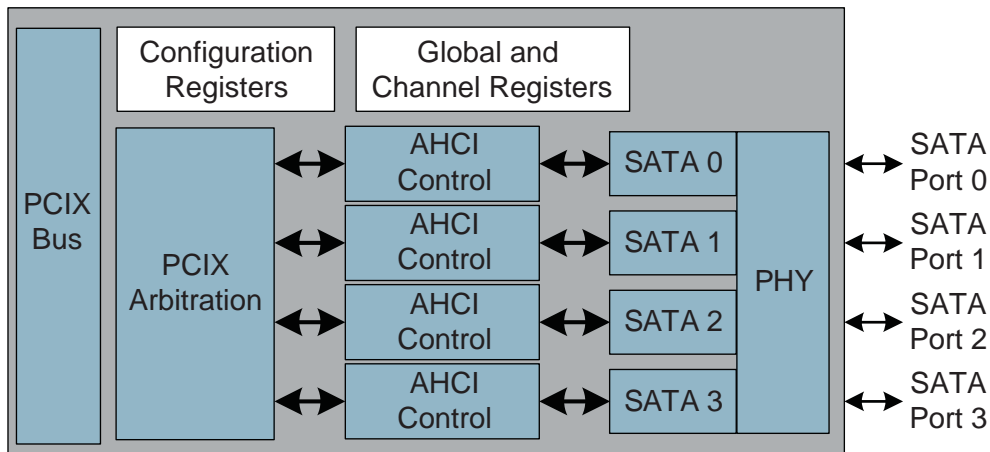
XRS10L620/640 PCI-X to SATA Host Controllers

The XRS10L620 is a 32-bit PCI-X/PCI to 2-SATA/1-PATA Host Controller. The XRS10L640 is a 32-bit PCI-X/PCI to 4-SATA Host Controller. Both allow an embedded CPU with a PCI-X bus to communicate with two/four SATA Devices directly or through two/four 1:4 SATA Port Multiplier (PMP) an additional eight/sixteen devices can be connected. They also enable RAID functionality via software RAID on the Host CPU.

XRS10L620 Block Diagram



XRS10L640 Block Diagram



General Features

- 2 SATA ports and 1 IDE port (XRS10L620 only)
- 4 SATA ports (XRS10L640 only)
- Supports enhanced AHCI to reduce CPU overhead
- Advanced Host Controller Interface (AHCI) allows advanced features of SATA such as hot plug and Native Command Queuing (NCQ)
- Compliant to SATA Port Multiplier ver 1.1

SATA Interface

- Conforms to Gen1i and Gen1m(eSATA)
- Asynchronous Notification & Hot plug capable
- Programmable output swings
- Tolerant to Spread Spectrum Clocking
- Internal termination for AC coupling

IDE Interface (XRS10L620 only)

- Conforms to ATA-7 specification
- PIO mode 0, 1, 2, 3, 4 with 16.6 MB/s data rate
- Multi-word DMA mode 0, 1, 2 with 16.6 MB/s data rate
- Ultra DMA mode 0, 1, 2, 3, 4, 5, 6 with up to 133MB/s data rate

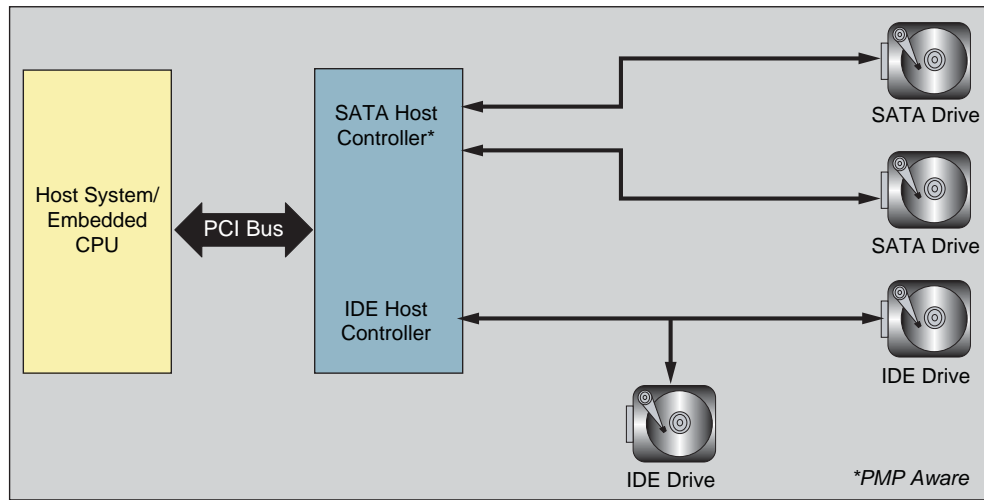
PCI-X Interface

- 32-bit PCI-X with burst data rate 400 MB/s @ 100 Mhz
- Compliant with PCI Bus Power Management I/F 1.1
- Supports Dual Address Cycle (DAC)

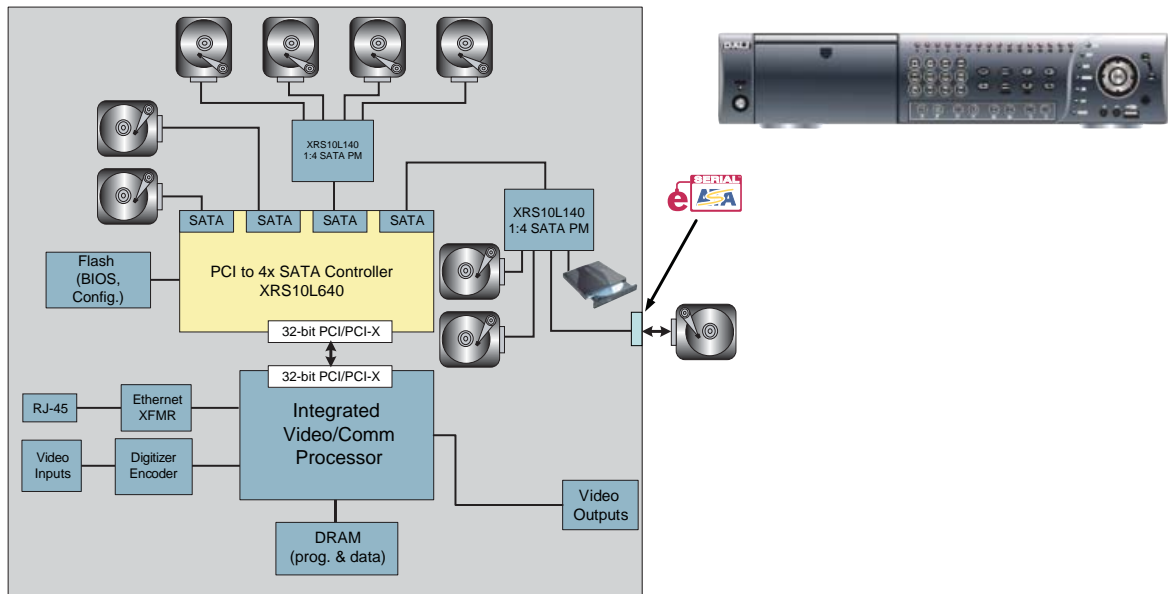
Physical Features

- 128 Pin LQFP package
- 1.8/3.3V power supply

XRS10L620 Application Diagram



XRS10L640 in a DVR/Video Surveillance Application (>4 drives)



Advantages of Using the EXAR XRS10L620/640 Solution

Distinguishing Feature	Competitive Advantage	System Benefit
Lowest active power consumption – 500 milliwatts	No heat-sink or airflow required	Reduces system cost and complexity
Support for IDE port on same chip	Needed for legacy ODD DVR applications + duplication and backup boxes	Significantly smaller footprint; Lower BOM cost
Higher performance PCI-X bus @ 100MHz	400 Mbytes/sec throughput	34% faster file transfers
Native Command Queing (NCQ)	Higher throughput	Higher throughput plus longer MTBF/reliability
Support Port Multiplier	Allow more SATA connections	Expandable and higher capacity system



NORTH AMERICA

Exar Corporation, Fremont, CA, USA
Exar Corporation, Palatine, IL, USA
Exar Corporation, Billerica, MA, USA
Exar Corporation, Raleigh, NC, USA
Exar Corporation, Center Valley, PA, USA
Exar Corporation, Dallas, TX, USA
Exar Corporation, Atlanta, GA, USA
Exar IC Canada Corporation, Montreal, Quebec, Canada

EUROPE

Exar SARL, Paris, France
Exar GmbH, Munich, Germany
Exar Ltd, London, United Kingdom
Exar SRL, Milano, Italy

JAPAN

Exar Japan Corporation, Tokyo, Japan

ASIA PACIFIC

Exar Corporation Beijing Representative Office, Beijing, China
Exar Corporation Shanghai Representative Office, Shanghai, China
Exar Corporation Shenzhen Representative Office, Shenzhen, China
Exar Korea Co. Ltd., Seoul, Korea
Exar Pte Ltd., Singapore
Exar Corporation Taiwan Branch Office, Taipei, Taiwan

www.exar.com