

## What are Port Multipliers (PM)?

Port Multipliers allow the connection of multiple Serial ATA devices to systems through a single Serial ATA port. Port Multipliers can be used for connecting any Serial ATA device, including SATA hard drives, SSD (solid state drive), other types of flash memory with SATA interface or SATA optical drives. The Port Multiplier offers unprecedented scalability, breaking the traditional Serial ATA connection topology of a single SATA device per port.

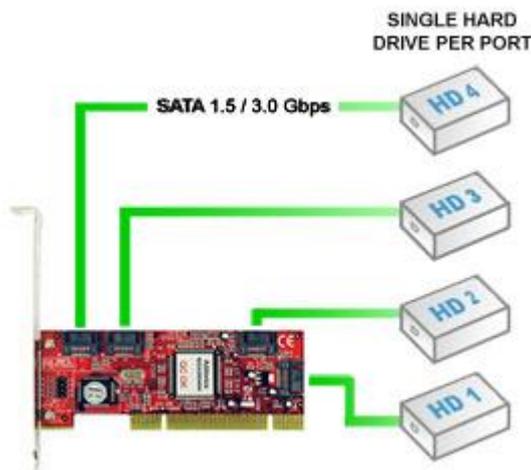
All the key advantages of Serial ATA technology over comparable interface solutions are preserved in the Port Multiplier. Both Serial ATA 1.5Gbps and Serial ATA 3.0Gbps devices are compatible, and the PM retains the 3.0Gbps SATA channel for connection to the SATA controller installed inside the host machine. With a supported 3.0Gbps SATA device and SATA controller, the Port Multiplier is able to take advantage of NCQ (Native Command Queuing). Similar to its lower speed competitors USB 2.0/1.1 and Firewire 400/800, devices connecting to the PM hot swapped without system reset.

## What are the benefits of using a Port Multiplier?

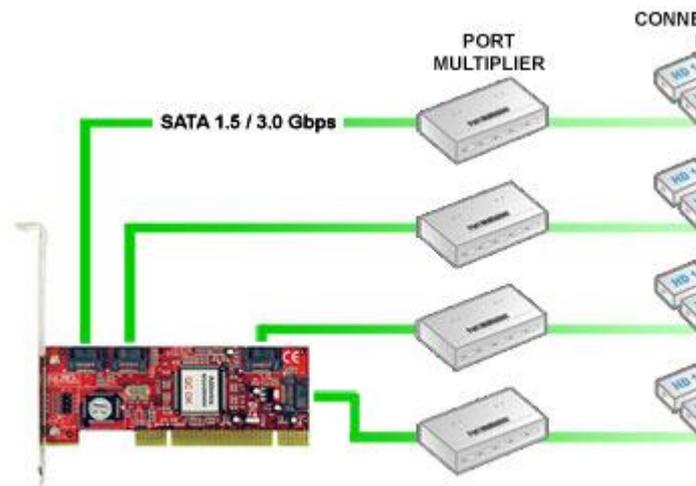
1. **Port Multipliers increase the number of SATA devices which can be connected onto a single controller.**

Prior to the Port Multiplier, SATA controllers with 4 Serial ATA ports are limited to 4 SATA devices, one per port. To increase the amount of drives on the system, additional SATA controllers must be installed. With a Port Multiplier supporting up to 5 hard drives attached onto each of the SATA ports, a controller previously limited to 4 SATA devices is now able to simultaneously connect up to 20 SATA devices. This is beneficial to users who own a motherboard with very few or no bus slots available for adding SATA controllers.

**Example of a system configuration without Port Multipliers**



**Example of a system configuration with Port Multipliers**



- 2.
3. **Port Multipliers reduce the amount of cabling required to connect an array of SATA devices.**

The SATA Port Multiplier combines several SATA devices into a single high speed 3.0Gbps SATA connection. In particular, this is an improvement for eSATA external storage units by allowing the convenience of only needing to connect one eSATA cable instead of requiring one cable per each device, with no substantial decrease in data transfer speed.

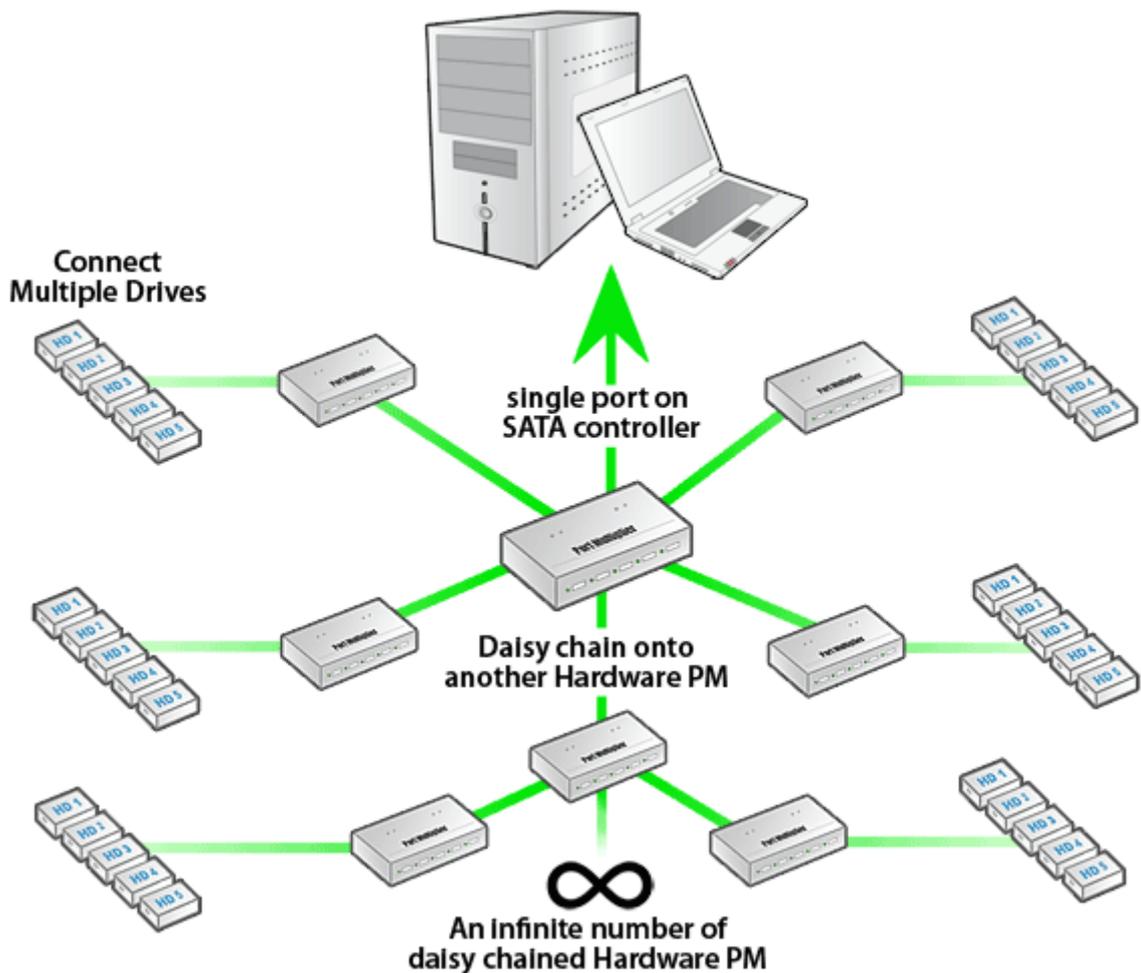
4. **Port Multipliers are available with built-in Hardware RAID controllers for combining drives.**

Hardware RAID Port Multipliers are a great option when considering the creation of a redundant data storage solution. RAID capability is attributed to the built-in RISC chips which assume the load of handling RAID parity calculations, resulting in superior performance over software RAID sets which direct the processing load to the system CPU. At the same time, implementation of Hardware Port Multipliers avoid the cost of expensive Hardware RAID SATA controllers. The Silicon Image 4726 chip

is able to create RAID 0, 1, JBOD, SAFE FAST, and SAFE BIG. The Oxford OXUFS936QSE chip is able to create FAST2 (2 drive RAID0 Striping), FAST4 (4 drive RAID0 Striping), SAFE2 (RAID1 Mirroring), SAFE FAST (Mirrored Striped), BIG 2 (2 drive Concatenation), BIG 4(4 drive Concatenation), RAID 3+S, or RAID 5+S using built-in hardware RAID.

**5. A potentially unlimited number of hard drives can be daisy chained to a single SATA port using Hardware Port Multipliers.**

With a Hardware RAID Port Multiplier, drives connected configured as a single RAID volume (for example, a blazing fast 5 drive Striped set) can be attached onto any SATA port whether or not it is port multiplier compatible. This allows for a potentially unlimited amount of storage capacity by daisy chaining up to 5 Hardware Port Multipliers each fully populated with 5 hard drives onto one Hardware Port Multiplier for a total capacity of 25 hard drives through a single SATA or eSATA port. To the operating system all the drives appear as a single volume, yet a redundant RAID set still retains the ability to rebuild the RAID under the situation of data loss.

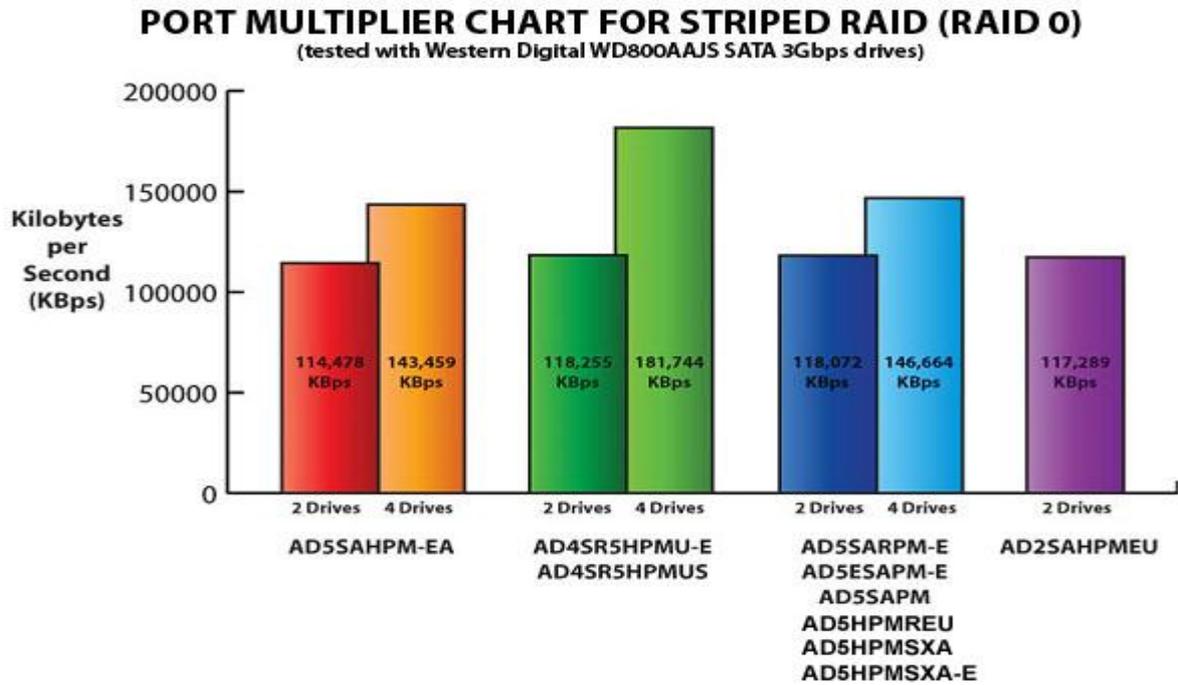


**6. Port Multipliers are not only limited to SATA or eSATA interface.**

Newer Port Multipliers or storage enclosures utilizing Port Multiplier ASIC may now include other common interfaces such as USB 2.0, Firewire 400, or Firewire 800. For systems which do not have an available SATA or eSATA port to attach a Port Multiplier, these alternative interfaces can be used instead for better compatibility. eSATA to USB 2.0 Adapters (AAU3ESA) can be attached onto Port Multipliers based on the 3726 which have no built-in USB support, allowing the connected drives to be seen as separate devices or as a single RAID volume on any computer with a USB 2.0/1.1 port. With hard drives set up as a single RAID volume using a hardware RAID port multiplier, the RAID volume can be connected to the computer through USB 3.0 using the Addonics USB 3.0 to eSATAp Adapter.

## Port Multiplier chipsets

1. [Silicon Image 3726](#)
2. [Silicon Image 4726](#)
3. [Silicon Image 5744](#)
4. [Oxford OXUFS936QSE](#)
5. [JMicron JMB393](#)



# PORT MULTIPLIER CHART FOR 4 DRIVE PARITY RAID (RAID 5)

(tested with Western Digital WD800AAJS SATA 3Gbps drives)

