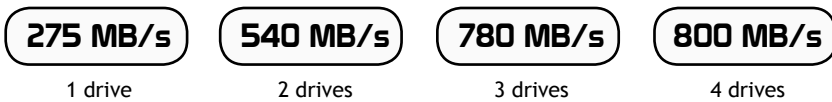# Wings

Exceptional power for everyone

What is Wings, and more importantly, why did we create it? SSD based cards were, until now, unbelievably expensive and not very compatible with all platforms. We made Wings in order to change this. At a much more affordable price, Wings comes in three different models: with a 32GB or 16GB onboard drive or the Lite version, all bootable and expandable the way you want. Designed with RAID in mind, it will completely redefine the concept of mass storage speeds.

Incremental Awesomeness

Max sustained Read Speed:*

275 MB/s	540 MB/s	780 MB/s	800 MB/s
1 drive	2 drives	3 drives	4 drives

Average real world Transfer Rate:

265 MB/s	525 MB/s	740 MB/s	750 MB/s
1 drive	2 drives	3 drives	4 drives

*   Results obtained with four Angelbird Crest 120 GB SSD Expansion Modules on a single 32 GB Wings card, using ATTO Benchmark tool
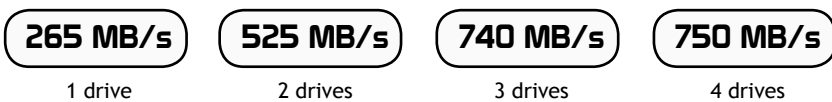
UPGRADABLE

Up to four Expansion Cartridges can be connected per card. We know you might need more speed, therefore it is possible to add more than one Wings to your computer, as long as you have free PCIe x4 slots. Adding cartridges is a matter of a few minutes and can be done by anyone. Connecting your existing 2.5" SATA HDD or SSD is also possible through our universal clip & couplers.

COMPATIBLE

Operating Systems are a personal choice. Wings is supported with Apple® OSX, Microsoft® Windows™. Although unsupported, Wings also works out of the box with Linux and FreeBSD. You will have the power of choice to boot any of the supported operating systems, or to use Wings to manage your cross-platform documents and files with great ease.
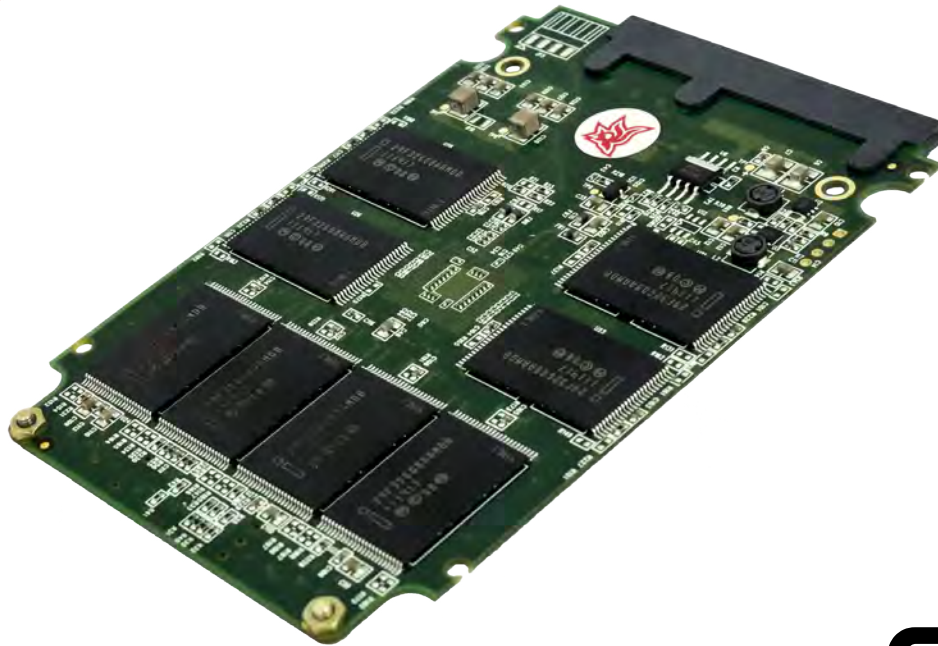
[1] OS X cannot be installed on Wings or Wings attached devices using the default installation method

Boots on PC / Mac / Linux

Apple® Mac OS X logo is a trademark of Apple®, Inc.

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Crest

Transformable Solid State Drives

Our Crest SSD drives lead the Consumer SSD scene. The popular Sandforce® SF-1222 controller keeps roaring high performance levels steady even with plenty of applications, files and video streams open, with the outstanding responsiveness that constantly amazes whoever takes the big step from conventional hard disk drives to solid state drives.

Benchmark results

INTERNAL STORAGE

The powerful Crest SSD drives can be used as internal drives for your computer, whether it is a desktop or a laptop. A fast and reliable SATA 3.0 Gbits interface is used to ensure an optimal flow of data.

EXPANSION MODULES

This is where our Crest SSD drives shine. You can quickly and safely remove the outer shell and attach the drives to our Wings PCIe RAID card, and benefit from the combined speed and access time of up to four drives at once.

SPECIFICATIONS

Capacity: 60GB, 115GB, 240GB
Controller: Sandforce® SF-1200 series
Cache: Built-In
Interface: SATA 2.6 3Gb/s
Form factor: 2.5inch
Operating humidity: 8 to 95% non condensing
RoHS compilant: 6/6
Access Time: 0.2ms
Interface burst speed: 3Gb/s
Random 4K / QD32 IOPS: up to 50000
Sustained read speed: up to 285MB/s
Sustained write speed: up to 275MB/s
Features: Auto-TRIM, ECC, RAISE,
one extra EMS protection layer
MTBF: 2,000,000 hours
DC input voltage: 5V ± 5%
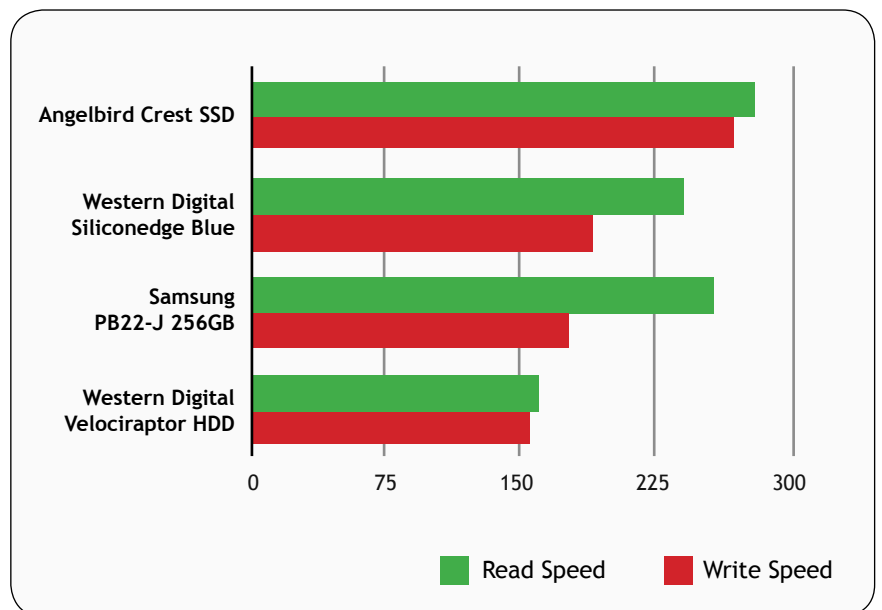Power consumption: <3.0W
Idle power consumption: <1.0W

Sandforce® logo is a trademark of Sandforce®, Inc.

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Angelbird Wings

x4 PCIe SSD RAID Card Specifications

Technical Specifications

Controller	Angelbird W1
Board Size[1]	183*125 mm
Interface Type	PCI Express x4
Onboard SATA Interface	SATA-2
Available Expansion Ports	4
Onboard SSD Storage	0, 16GB, 32GB

Performance Specifications

	Onboard Storage		Attached Storage[2]			
Size/Qty	16 GB	32 GB	1	2	3	4
Read Speed	50MB/s	100MB/s	275MB/s	540MB/s	780MB/s	800MB/s
Write Speed	30MB/s	50MB/s	265MB/s	525MB/s	740MB/s	750MB/s

Compatibility Specifications

Microsoft® Windows™	Windows 7, Windows Server 2008, Windows Vista
Apple® OS X[3]	Lion, Snow Leopard
Other Operating Systems[4]	Linux®, FreeBSD®

Reliability Specifications

Onboard SSD Storage MTBF	>2,000,000 hours
Certifications	RoHS, FCC and CE compliant

[1] Board size could change without prior notice
[2] Measured with Angelbird Crest SSD Expansion Cartridges. Attached storage performance could be further improved by using multiple Wings cards in a single computer
[3] OS X cannot be installed on Wings or Wings attached devices using the default installation method
[4] Windows XP, Linux and FreeBSD are not officially supported

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Angelbird Wings PCIe SSD RAID Card board dimensions
Side view with Expansion Cartridges

9mm

23mm

116mm

max w = 183mm

1 : 1 close approximation of Wings PCIe board size

22mm

max h = 125mm

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Angelbird Crest

2.5" SATA II Series SSD Specifications

Technical Specifications

Controller	SandForce SF-1200 Series
Form Factor	2.5 inches
Capacity	60, 115, 240 GB
DRAM Cache	n/a
Interface Type	SATA 2

Performance Specifications[1]

Read Speed (max)	285MB/s
Write Speed (max)	275MB/s
IOPS[2]	Up to 50,000
Access Time	< 0.2ms

Environmental Specifications

Shock resistance (operating)	1500G
Vibration resistance (operating)	15G
Maximum Altitude (operating)	60,000 ft
Operating Temperature	0°C to 70°C

Reliability and Electrical Specifications

MTBF	> 2,000,000 hours
Data Reliability	Built-in EDC / ECC function
Certifications	RoHS, FCC and CE compliant
DC input voltage	5V ± 5%
Power Consumption	< 3.0W
Idle Power Consumption	< 1.0W

[1] Measured with ATTO 2.43 Benchmark Tool
[2] Disk aligned / 4KB random write / QD=32

Wings

It's awesome! Times four.

Frees the bandwidth of the southbridge and guarantees stable and error-free data traffic.

Provides up to 50.000 IOPS over Crest SSD Expansion Cartridges. Useful in Audio and Video processing, where plenty of file fragments have to be read and written in real time.

The more you add, the more you get.

Adding more SSD units to Wings and setting a Striped RAID up increases IOPS as well as raw speed exponentially.

Open minded, OS-wise.

Overcomes Mac Pro physical limitations.
There are only four drive slots.
With Wings you can add more drives, leveraging the advantage of the free PCIe slots.

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Angelbird
Wings FAQ
Frequently Asked Questions

Q: What is Wings

A: *Wings is a storage controller. It allows you to access your files very very fast.*

Q: What can be used for?

A: *It can be used by anyone who works with big files, or very many big files.*
For example Audio and Video professionals can work with their projects much faster. Also gamers will benefit from wings. It greatly reduce the loading times of games. Wings also has great benefit for servers.

Q: What are the advantages for Audio professionals?

A: *When you have your sample library on Wings, loading times become very short. There will be no to very little latency. Also, when you have a project with many tracks then you can still play it in real time. This is a big difference with normal hard disks, where you will have to wait. When you use wings, you also do not have any noise from the drives which you normally have with traditional hard drives.*

Q: What are the advantages for Video professionals?

A: *Video professionals work with very big files. When using wings loading these files will be a matter of seconds in stead of minutes. For example if you load a file of 4.3 Gigabytes (a DVD) it will take little more than 5 seconds.*

Q: What are the advantages for Servers?

A: *You can speed up your server using wings. For example you can put your database files on wings and get many more IOPs. For a file server or webserver you could use wings to store the caches and swapfiles to greatly increase responsiveness.*

Q: What is the maximum storage space?

A: *When you use 4 Angelbird Crest drives of 480 GB per drive, then you can get a maximum size of almost 2TB. At this moment the biggest 2.5" hard disk drives have 1 TB of storage. This means that if you use 4 of them on wings, you get a maximum size of 4TB. Of course this is not as fast as using SSD drives.*

Q: How many Wings can be used together?

A: *Only limitation is available number of x4 PCIe slots on your motherboard.*

Q: Why you should choose Wings?

A: *Wings is the only storage controller of its kind. It is the only controller where you can attach the 2.5" ssd and hard disk drives of your choice. This means that when you need more speed, you can add an extra drive to make it even more fast. For example, if you have 2 drives attached to wings, and you add another 2 drives (which have to be the same size), you not only double your storage capacity but also your speed. It is the only storage controller on the market which can boot on the mac. This means you can install Mac OSX on a drive attached to Wings (or on the onboard drive), you can boot from it.*

Q: What is that USB port on Wings used for?

A: *When you have files stored on the onboard drive, and the computer with Wings in it is broken, then you can use the USB port to connect the wings to another computer and still access the files on the onboard drive of wings.*

Q: Is it possible to connect standard 2.5" HDD?

A: *Yes. Traditional harddisk support requires an external power cable. On PCs a mini molex cable is available in most cases. To provide Wings with extra power on a Mac, you need our special Mac Pro power cable (sold separately by Angelbird). You may need such cable also with some old SSD which draw more power than what Wings is designed to provide.*

Q: Which hardware Wings does require and on which does run best?

A: *Wings will run on any motherboard with a free a PCIe x4 slot; your motherboard can be equipped with any regular BIOS, UEFI or EFI, either 32 or 64 bit. One PCIe slot is required per card when using our Crest SSD cartridges, two slots might be occupied if using third party drives, as thickness may vary depending from the vendor and brand.*

Q: Which Operating Systems are supported?

A: *Microsoft Windows 7 and Windows Vista, both 32 and 64 bit. Apple OS X version 10.4 and up, 32 and 64 bit. Although unsupported, Angelbird also provides drivers compatible with Windows XP. Although not officially supported, Wings will also work in Linux and FreeBSD out of the box.*

Q: What is the difference between Expansion Cartridges and Crest SSD?

A: *Crest Internal storage drives are compatible with any 2.5" drive bay. This means that you can use it in almost any computer and laptop. For computers which only have 3.5" drive bays, you can use an adapter plate. Unfortunately, you cannot use Crest Internal Storage drives with all laptops. Some laptop need a slim 2.5" drive. This means you cannot use Crest Internal Storage. Crest Expansion Cartridges are specifically designed for use with wings. They are much smaller and this means you can two wings in PCIe slots next to eachother and there is still enough room to have 4 drives on each wings. When using Crest Internal Storage instead there will not be enough room. Another advantages of Crest Expansion Cartridges is that they get less hot.*