A decorative graphic on the left side of the page features a large green circle partially overlapping a dashed black circle. Below these are several thin, concentric white circles. A small solid green circle is positioned above the dashed circle. Horizontal dashed lines are present above and below the graphic.

Marketing Bulletin

## SmartAlign™ Technology

### Frequently Asked Questions

#### What is SmartAlign™ technology?

Seagate® SmartAlign technology is hard drive firmware that manages read-modify-write conditions resulting from partition misalignment conditions which are associated with the use of 4K sector drives, known as Advanced Format. SmartAlign technology does not realign hard drive partitions; it manages read-modify-write conditions dynamically inside the drive without host computer intervention or *knowledge*.

Without SmartAlign technology, read-modify-write conditions negatively impact hard drive performance. Seagate testing has demonstrated that SmartAlign technology's functionality maintains consistent performance in our Advanced Format hard drives for the large majority of desktop workloads. The result for customers using SmartAlign technology is a hard drive that behaves just as legacy 512-byte sector hard drives without the use of additional software utilities.

#### Why doesn't Seagate use an alignment utility like other Advanced Format hard drives?

SmartAlign technology avoids the extra time and hard drive integration steps required by the use of an alignment utility. With SmartAlign technology, system builders, IT managers and anyone integrating a Seagate Advanced Format hard drive can use the drive in the same way they always have. No utilities, no hassles—just strong, consistent performance.

#### Does Seagate have data to demonstrate that SmartAlign technology works?

The following graph shows test results of Seagate prototype Barracuda® drives equipped with SmartAlign technology compared with competitive Advanced Format drives. Each drive measured was a 3-disk, 6-head, 2TB hard drive with Advanced Format 4K sectors.

# SmartAlign™ Technology

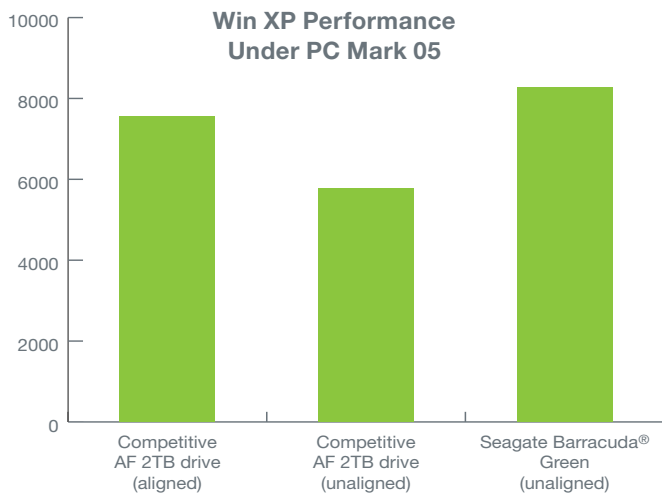
## Frequently Asked Questions



Testing was on Windows XP systems, where HDD partition alignment with Advanced Format drives is known to be a problem. Drive performance was measured using PC Mark 05 software to simulate standard desktop workloads.

Two tests were performed using the competitive Advanced Format drives: the first with the drive unaligned, the other after the drive was aligned using the manufacturer-provided software alignment utility. The Seagate drive was tested in the unaligned condition but equipped with SmartAlign technology to manage misalignment conditions dynamically.

The data demonstrates that SmartAlign technology's performance is not only competitive, but slightly faster than the competitive Advanced Format drives, even after running the alignment software utility.



### Is SmartAlign™ technology the only tool Seagate recommends to manage alignment issues in Advanced Format drives?

Seagate encourages our customers to use operating systems and configuration tools that create aligned hard drive partitions. Be sure to install 4K-aware operating systems, such as Windows 7 and Mac OS, or 4K-aware hard drive partitioning utilities or imaging tools that produce aligned partitions and ensure good baseline performance.

If this cannot be achieved, Seagate hard drives with SmartAlign technology can be relied on to produce consistent and expected performance, even on unaligned systems. Additionally, fully aligned systems can encounter some read-modify-write conditions, and Seagate drives with SmartAlign technology will easily manage those.

[www.seagate.com](http://www.seagate.com)

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