

## Advanced SCSI Architecture (ASA)

ASA incorporates a Seagate-designed onboard SCSI controller and associated firmware and is the common architecture across the Hawk, Barracuda and Elite 9 families of disc drives. Special demands are placed on SCSI drives that operate in high-end applications. These applications are typically centered around a multitasking, multiprocessing environment, requiring high-level operating systems that transfer data in large blocks. Seagate recognizes that, to create a truly high-performance SCSI drive, its internal architecture must be optimized for maximum performance in the demanding environments where SCSI excels. These environments include LAN/WAN, RAID, digital A/V and technical workstations. Seagate designed, developed and manufactured ASA to meet the needs of these environments.

## Why ASA II?

Seagate enhanced its Advanced SCSI Architecture to optimize performance in the single-task, small block environment by reducing the amount of code required for the onboard SCSI controller while adding significant features. ASA II, the second generation of the original ASA, provides significant performance increases in both sequential and random situations. Sequential read-performance increases of 50 percent are common with write-performance increases up to 250 percent. A new hardware feature, *rotational-position seek/sort*, increases random performance by more than 20 percent. ASA II is fully compatible with initial ASA implementations. The following table shows Seagate products that feature ASA and ASA II.

Model	Capacity (Mbytes)	Spindle (RPM)	Form-Factor	Avg. Seek Time (Read/Write)
<b>Hawk 2 (ASA)</b>				
ST11900N	1,700	5,400	3.5", half-height	9/10.5
ST12400N	2,148	5,400	3.5", half-height	9/10.5
<b>Hawk 1LP (ASA)</b>				
ST31200N	1,052	5,400	3.5", low-profile	9/10.5
<b>Hawk 2LP (ASA II)</b>				
ST31230N	1,050	5,400	3.5", low-profile	9/10.5
ST32430N	2,147	5,400	3.5", low-profile	9/10.5
<b>Hawk 4 (ASA II)</b>				
ST15320N	4,294	5,400	3.5", half-height	9/10.5
<b>Barracuda 2 (ASA)</b>				
ST12550N	2,139	7,200	3.5", half-height	8/9
<b>Barracuda 2LP (ASA II)</b>				
ST31250N	1,022	7,200	3.5", low-profile	8/9
ST32550N	2,147	7,200	3.5", low-profile	8/9
<b>Barracuda 2, 2-head parallel (Fast Wide SCSI-2) (ASA)</b>				
ST12450W	2,134	7,200	3.5", half-height	8/9
<b>Barracuda 4 (ASA II)</b>				
ST15150N	4,294	7,200	3.5", half-height	8/9
<b>Elite 9 (ASA)</b>				
ST410800N	9,090	5,400	5.25", full-height	11/12

## RAID

RAID (redundant arrays of independent discs) systems integrate two or more SCSI disc drives together, improving data-transfer rates and ensuring data integrity. Drive features required for RAID applications include:

- *Optimized value/performance*
- *Hot-plugability*
- *Synchronized/interruptible thermal calibration (T-Cal)*

Seagate Hawk and Barracuda drives meet all of the needs listed above and feature ASA II for greater data-transfer rates.

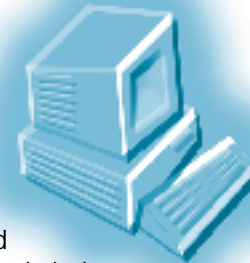
**The Bottom Line**—Seagate drives ensure less time to transfer data and greater overall data throughput, increasing the power of RAID systems.



## Technical Workstations

Technical workstations are most commonly used in applications that require complex mathematical computations and for the production of three-dimensional technical drawings and blueprints. The hard disc drive in a technical workstation must be able to work quickly, reading and writing back and forth to the processor to produce drawings in a timely manner. With Seagate's Hawk and Barracuda families of drives, a technical workstation can choose either a very high-performance 7,200 RPM or a cost-optimized 5,400-RPM solution. Additionally, ASA II benefits the technical workstation by reducing controller overhead and implementing rotational-position seek/sort to process random data quickly.

**The Bottom Line**—Seagate drives designed with ASA II provide the performance required for calculation-intensive technical-workstation applications while offering both a value class of products and a high-performance class.



## Digital A/V

In digital audio-visual applications, speed is everything. A disc drive in an A/V application must be able to provide:

- Uninterrupted data streaming
- High data rates

All Seagate high-end drives prevent pauses in the data stream through interruptible T-Cal. Because the drive controller command overhead is reduced in Seagate products that feature ASA II, data throughput is greatly increased, and Seagate's rotational-position seek/sort provides the increased performance required when audio and video are on separate areas of the drive.

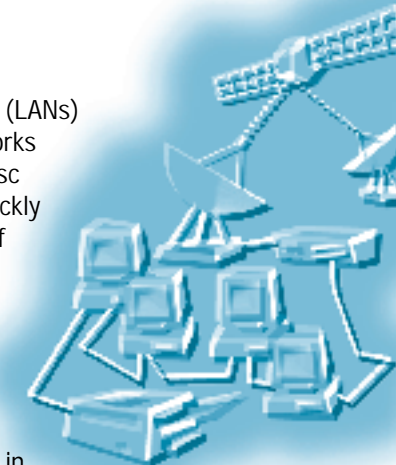
**The Bottom Line**—ASA II, featuring rotational-position seek/sort and Seagate's streamlined firmware implementation, ensures optimum performance in the most demanding audio-visual environment.



## LAN/WAN

Local area networks (LANs) and wide area networks (WANs) require a disc drive to respond quickly in an environment of multiple users and multiple tasks all making requests and writing data to a common server. This is the type of environment in which ASA II excels. By reducing the command overhead, time-to-data is greatly reduced. In random, read situations, which are likely to exist when multiple users access the same system, rotational-position seek/sort can maximize the drive's work in each rotation of the disc, reducing the rotations necessary for obtaining data.

**The Bottom Line**—All applications of LAN/WAN benefit from Seagate ASA II design by increasing data transfers both in and out of the server.



## Technical Overview

ASA and ASA II tailor and streamline the *internal* architecture of the disc drive to maximize performance of Seagate's Hawk, Barracuda and Elite 9 SCSI disc drives in multitasking and single-user applications.

Key technical features and benefits of ASA II:

- **Reduced controller overhead**

The total time to transfer data after a command has been issued consists of command or controller overhead, drive seek time, drive latency and the drive data-transfer rate. These elements help provide a measure of overall drive performance. ASA II reduces the controller overhead component by 40 percent. This reduction significantly increases drive performance in short data-block situations.

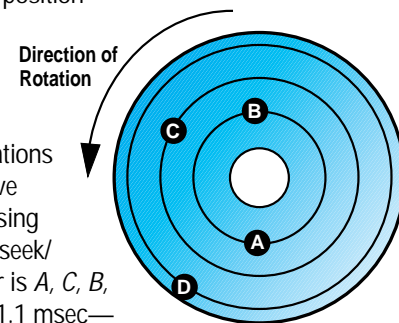
- **Common firmware across all ASA and ASA II drive families**

All Hawk, Barracuda and Elite 9 drives feature Advanced SCSI Architecture. This common SCSI implementation provides easy product migration when changes in capacity or performance platforms are required. A common SCSI architecture reduces the hard disc drive evaluation time, speeding the time-to-market for your products.

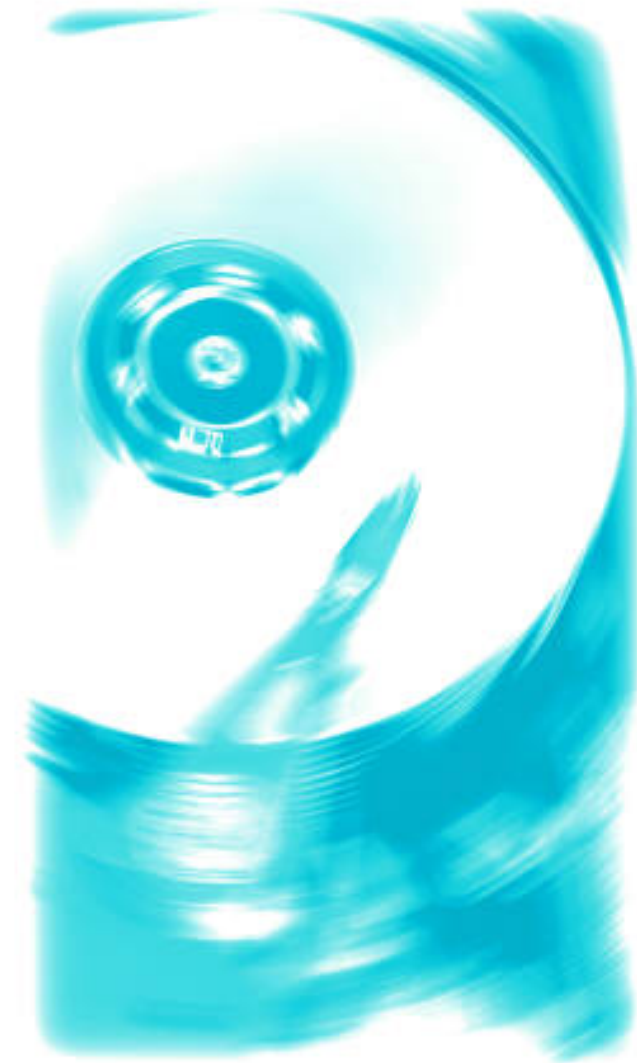
- **Rotational-position seek/sort**

Rotational-position seek/sort, a new hardware feature of ASA II, improves overall performance in a random environment by an average of 20%. The figure below illustrates a typical series of seek requests a drive may be required to process. A standard drive reads the data blocks in order—*A, B, C, D*—in an *elevator-seek* fashion that takes the diagrammed seeks 22.2 msec to complete.

With the rotational-position seek/sort feature, the drive seeks back and forth between tracks, minimizing the rotations necessary to retrieve the needed data. Using rotational-position seek/sort, the seek order is *A, C, B, D* and takes only 11.1 msec—a 50 percent decrease in overall read time.



## ASA and ASA II



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Seagate Technology is a leading independent designer, manufacturer and marketer of data-storage products and components for the computer systems and data-technology industries.

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