ImagePerfect™

Enabling a Smart, Safe and Secure Surveillance Storage Solution

The surveillance-optimized Seagate® SkyHawk™ HDD offers superior image integrity and is one of the best performers on the market. It is designed to keep surveillance systems in the field longer and reduce the need for post-deployment support. Backed by ImagePerfect firmware, the SkyHawk is truly a purpose-built surveillance storage solution with many features tailored to enhance the user experience.

SkyHawk ImagePerfect Firmware

SkyHawk ImagePerfect firmware is built on Multi-Tier Caching (MTC) Technology™ and allows for high image integrity and up to 64 HD video streams. The intelligent firmware algorithm reduces data errors, allows for perfect images to be stored without pixelization and prevents critical frame loss during multiple stream recordings.

Higher Streaming With Zero Frame Lost Performance

ATA-8 Streaming Command Set Support

ImagePerfect supports the ATA-8 Streaming command set (Figure 1) and allows a host to request delivery of data within an allotted time; it places a priority on a time to transfer the data, rather than the integrity of the data. In addition, the ATA-8 Streaming command set is optimized to handle large sequential block transfers, which are typically found in video files. Desktop HDDs can handle a limited number of streams because they are intended for a single PC.
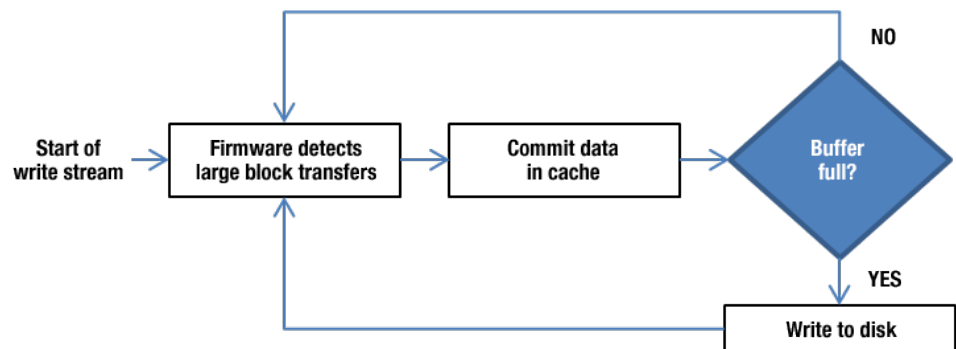

Figure 1. How command streaming works

Optimize for 24×7 Write Intensive Workload (up to 90% Write)

A surveillance system can be write intensive, writing data up to 90% of the time. To support such a workload, ImagePerfect is tuned for multiple seamless video recording environments with the highest throughput performance. Besides helping to ensure the highest level of video integrity during recording, ImagePerfect also enables real-time big data analytics.

ImagePerfect™

Supports Larger Cache Memory

ImagePerfect firmware supports larger cache memory that enables better caching and buffering for a higher number of video streams. A larger cache size will also help to optimize the Write performance by sequencing data written to the HDD media. As a result, there are fewer physical read/write head movements between data streams when writing or reading data to and from the HDD media. Together this means higher HDD reliability (Figure 2).
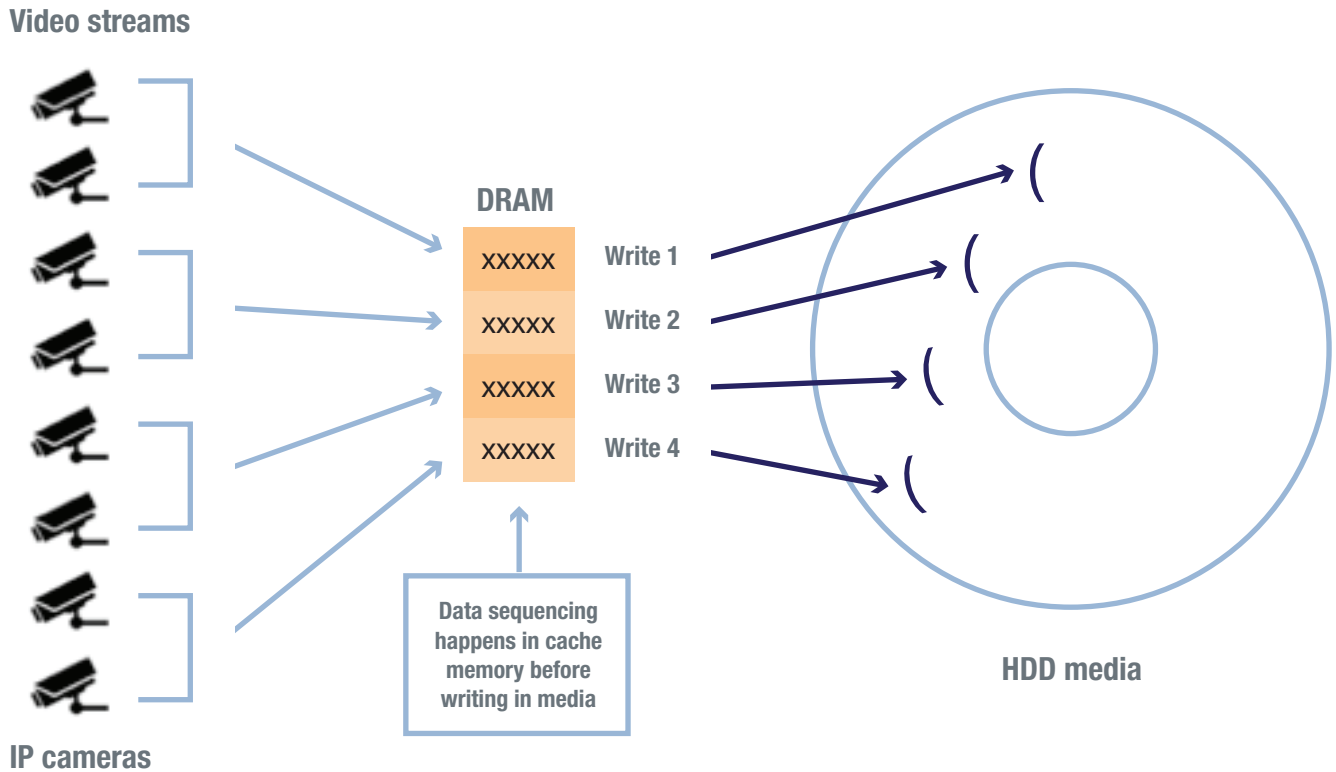

Figure 2. Larger cache memory

Built In Powerful Error Correction Code

Powerful error correction and data recovery algorithms are built in to ImagePerfect, providing the highest assurance against video frame losses while intensive multiple video streams are recording. Its high speed on-the-fly error correction coding[1] also helps to ensure no video freeze frames during live playback. These significantly reduce the chances of unrecoverable data error or video intermission in surveillance applications.

1 Higher data error (sector/ bits) correction on-the-fly will reduce the number of drive retries.

Predictable and Low Command Completion Time

Internal and background operations of SkyHawk HDDs with ImagePerfect are interruptible and scheduled such that they do not hold up any requests from the host. Command completion times (CCT) are kept low to minimize any host buffer overruns or underruns. This helps to ensure that no video frames are lost during recordings, and that video frames do not freeze during playback, respectively.

Robustness to External Disturbance
AcuTrac® Technology

Under extreme vibration conditions present in a multi-bay surveillance system, any drive in the system must be able to tolerate vibration caused by other drives and chassis fan(s). Vibration from a neighboring HDD or chassis fan can negatively impact individual drive performance, resulting in overall system performance degradation. In a mild vibration condition, an HDD drive may simply degrade in performance. However, in an extreme vibration condition, an HDD drive may stop functioning altogether as the servo system cannot lock on a data track.

AcuTrac allows the SkyHawk HDD to function even under an extreme vibration condition with minimal performance degradation. The HDD is designed for dual-stage actuation: a VCM and PZT microactuator. While the primary VCM actuator is responsible for fast track-to-track movement, the PZT microactuator is a secondary actuator responsible for inner-track movements in the servo system (Figure 3). Both VCM and PZT loops work together enabling the servo system to react quickly to any vibration to keep it performing optimally (Figure 4).
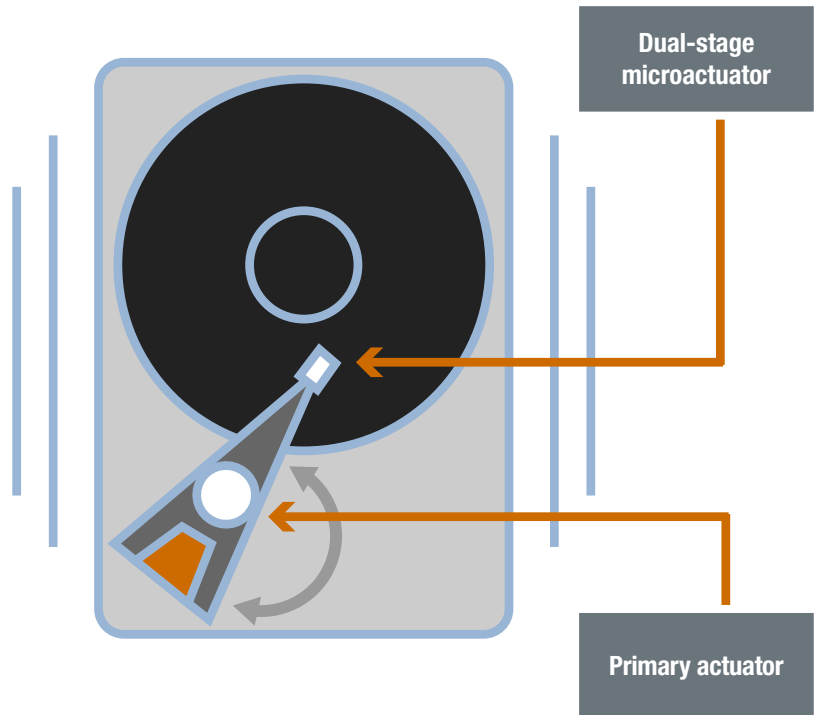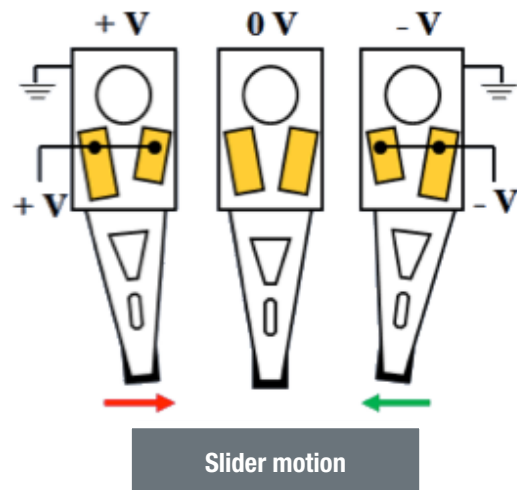

Figure 3. AcuTrac components

Figure 4. VCM and PZT loops work together

3

RV Sensors Detect Vibration

Rotational Vibration (RV) sensors are on board Seagate SkyHawk HDDs to detect vibration about an axis which can affect servo tracking capability and overall drive performance (Figure 5).

The signal will be processed by the advanced servo control system, which will construct two feed-forward control efforts to both VCM and PZT microactuator loops. This will then suppress the vibration-induced head off-track motion, sustaining good tracking capability while maintaining
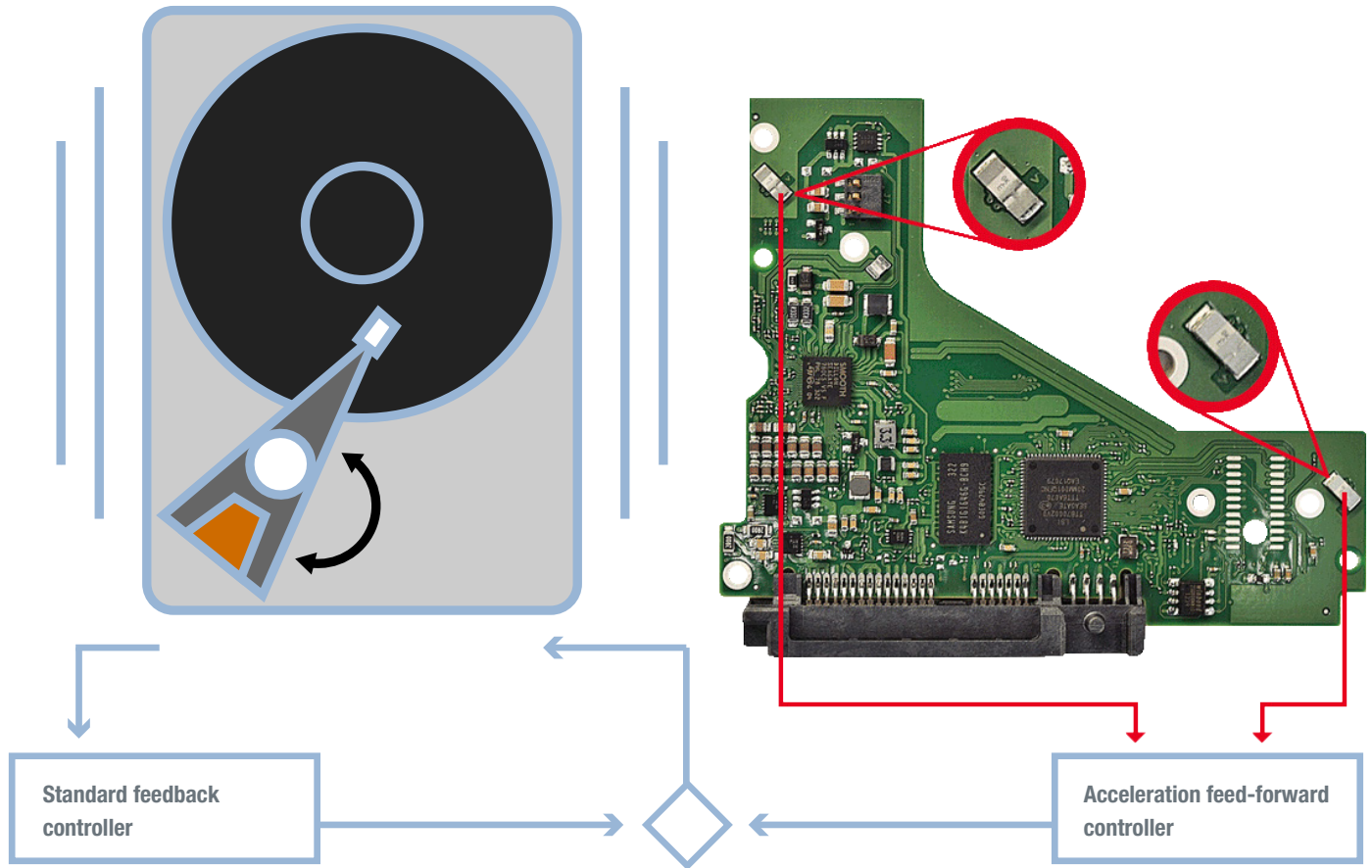

Standard feedback controller

Acceleration feed-forward controller

Figure 5. Rotational Vibration (RV) sensors

seagate.com

 SEAGATE