

## IBM TrueTrack™ Servo Technology

**TrueTrack™ is a significant IBM servo technology that eases system integration, enhances hard disk drive reliability, and adds robustness against vibration and disk shift.**

One of the HDD design limits at high track density is dynamic head-track misalignment error due to spindle vibrations and from small shifts in the disk position. These self-induced vibrations and disk shifts can cause write errors by keeping the read/write heads away from the true track position.

High track density design is made even more challenging with increasing rotational speed. A 7200 RPM drive exhibits larger vibration than a similar 5400 RPM drive, and the higher excitation frequency (120 Hz) of the 7200 RPM drive makes vibration servo error compensation more difficult.

IBM has found a new way to address the problem of HDD errors caused by self-induced vibrations and disk shift with this patented servo technology. (U.S. patent 5,608,586, ....issued March 4, 1997).

Because of TrueTrack™ servo technology, customers can expect:

1. **Easier qualification.**  
These hard disk drives are very robust against errors due to persistent self-vibration and disk shift. This improved environment leads to easier qualification.
2. **Easier system integration.**  
Helping to eliminate the effects of vibration allows more flexibility in computer chassis selection. Last-minute design changes are no longer required.
3. **Improved reliability.**  
The TrueTrack servo's adaptive re-calibration compensates for changes in vibration or disk shift over time. This dramatically increases robustness over the life of the hard disk drive.

TrueTrack servo technology is available on several IBM [desktop](#) and [server](#) HDDs, specifically:

- IBM [Deskstar 16GP](#) and IBM [Deskstar 14GXP](#) series
- IBM [Deskstar 25GP](#) and IBM [Deskstar 22GXP](#) series
- IBM Ultrastar 9ES and IBM [Ultrastar 18ES\\*](#)

\* New Servo Architecture features offered on IBM Ultrastar 18ES

- New servo architecture in silicon with custom LSI chip. Competitors use off-the-shelf DSP (Digital Signal Processors). IBM Ultrastar implements its custom optimized solution in silicon, which is more cost-effective and more performance intensive, offering minimum time delay in computation and other servo benefits.
- Reduced head-track misalignment error due to cross vibration (used in error recovery functions as part of the algorithm), self-vibration, and structural resonance effects.