



INTEL TECHNOLOGY BRIEFING

INDEO™ TECHNOLOGY
REAL-TIME VIDEO COMPRESSION



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DESKTOP VIDEO— NOW PLAYING ON YOUR PC



Indeo™ video is a digital video recording format. It turns your PC into a video player, so you can view training tapes, recorded interviews and other digital “movies.” It will also turn your PC into a video recorder with the appropriate hardware. In this brief, you’ll learn about the technology behind the motion.



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INTEL INDEO™ VIDEO TECHNOLOGY

The following features make
Indeo Technology “smart.”

VIDEO
PLAYBACK

VIDEO
RECORDING

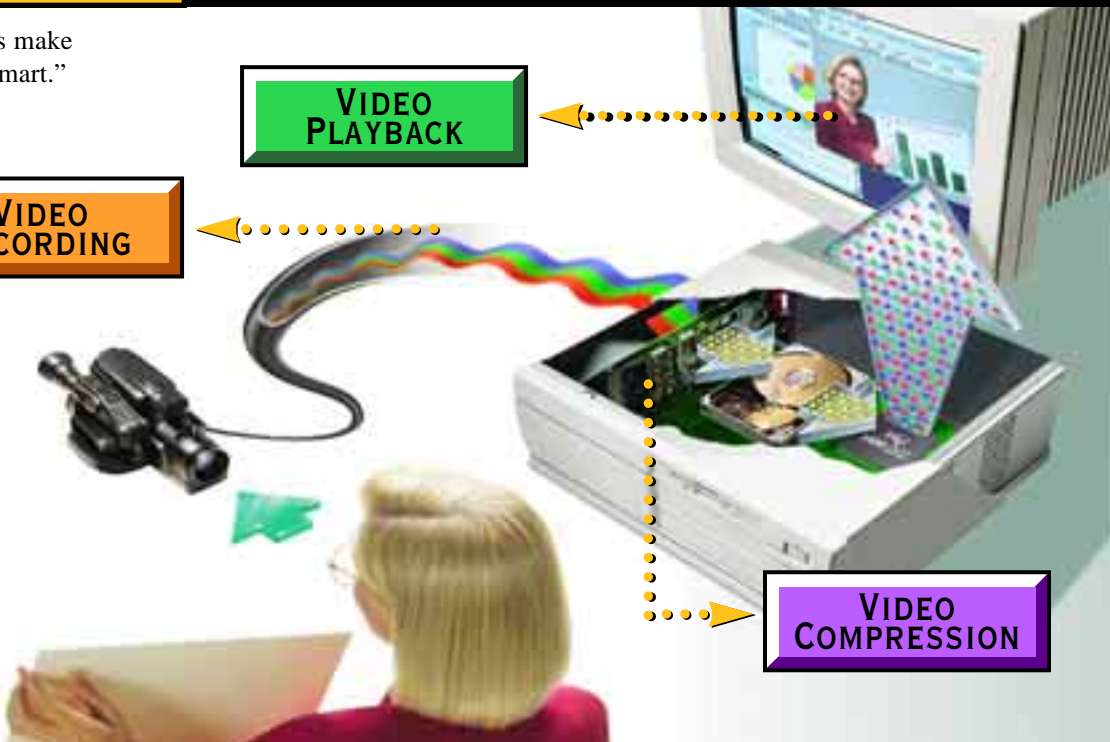
INDEO
DEFINED

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VIDEO
COMPRESSION



INDEO TECHNOLOGY DEFINED

Due to its versatility, digital video has several advantages over analog video. You can edit it, store it, and transmit it easily. However, the process of digitizing video generates massive amounts of data, creating a storage problem. That's why you need Indeo video.

Developed by the Intel Architecture Labs, Indeo video reduces the size of uncompressed digital video files from 5 to more than 10 times. This is important, because a one-minute small-screen video file is typically 50MB, but it can reach hundreds of megabytes. On average, Indeo video will reduce this 50MB file to about 9MB. Not only do compressed files take up less hard disk space, they also process faster, giving you better quality playback.>



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INTEL VIDEO ADVANCEMENTS

There are three ways in which Intel is continuing to improve desktop video. First, faster video starts with faster computers, so we're developing faster CPU technology. Second, we're working with leading graphics card vendors to optimize their software drivers for Indeo video. And finally, we're developing more efficient compression and decompression (codec) techniques to give video higher quality. All of which will help you understand why Intel and Indeo Technology mean higher-quality video.>




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A unique feature of Indeo Technology is that it compresses video in real time, as it's being recorded through a video capture board. So the file doesn't have to be saved to the hard disk then later compressed—a process which can take up to 15 to 30 minutes per minute of video and requires massive storage capacity.



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VIDEO RECORDING

INPUT AND CONVERSION.

Analog video is received from a video camera, VCR or laserdisc in any standard format such as NTSC (broadcast TV). A video capture board—such as the Intel Smart Video Recorder—converts this analog video signal into digital information.



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SMART PLAYBACK

Indeo Technology is scalable. That is, it automatically determines what hardware is available and optimizes playback for that configuration.

Indeo video lets you play back a video file regardless of whether or not you recorded it. Before the file can be viewed, it must first be decompressed. Indeo video reverses the compression process, reassembling the video information on the Pentium microprocessor—again in real time.>



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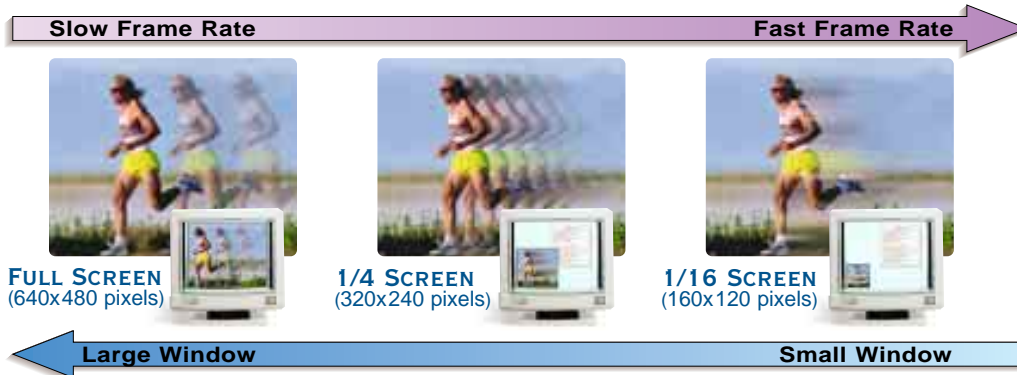
WINDOW SIZE VS. FRAME RATE

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These are the three factors that affect video playback:

- Microprocessor speed
- Playback window size
- Frame rate

Smaller playback windows result in smoother, more natural video images. A faster microprocessor, like the Pentium processor, supports bigger playback windows and higher frame rates.



Frame rate based on playing an Indeo video file captured at 30 fps. These are typical numbers only. The frame rate may vary based on system configuration and the video clip being used.



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SMART COMPRESSION

Only Indeo video uses multiple types of “lossy” and “lossless” compression techniques. With lossless compression, no information is lost. It is instead encoded into a format that occupies less space. Lossy compression carefully removes from video images “excess” data which won’t be noticed by the human eye. This affords greater compression ratios, and hence better playback performance.>



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COMPRESSION TECHNIQUES

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fter the video is digitized, Indeo video, running on the i750 video processor, compresses it in real time, utilizing the following:

- YUV Subsampling reduces a pixel area to an average color value
- Pixel Differencing and Temporal Compression shrink data by storing only the information which changes between pixels or frames, like a moving image
- Run Length Encoding notes a “run” of identical pixels and records how many occur
- Variable Content Encoding reduces a variable amount of information into a fixed number of bits.



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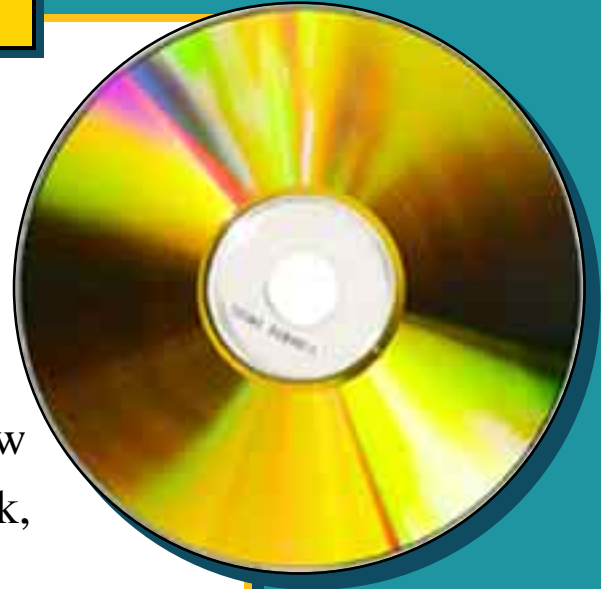
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STORAGE

Once compressed, the digitized video file is then combined with the audio information into a standard file format, such as Microsoft's Audio Video Interleave (AVI), and stored to a hard disk. Now the file is ready for use, i.e. playback, editing, distribution or storage on disk or CD-ROM.



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HOW DO I GET INDEO VIDEO?



Indeo video is included in most operating systems, so you get it free. Additionally, most leading software developers are using Indeo Technology to add video capabilities to their applications, because of its high quality and interoperability between different platforms. So you can interchange video files between operating systems—even between PCs and Macs. Look for the Indeo video logo whenever you buy multimedia hardware and software.



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