

**PRECISION
POWERHOUSE**

Guide to DVD

WELCOME TO A BETTER WORLD

DVD delivers.

**Full Screen Full Motion on Your
Computer.
Crystal Clear Surround Sound.
Interactive Capabilities.**

This Precision Powerhouse DVD and accompanying booklet presents the big picture that is the DVD advantage. DVD is a rapidly growing format because it is simply the best way to present interactive video and audio in an extremely convenient package. Precision Powerhouse is one of the very few production facilities in Midwest that offers complete DVD production from concept to package design to replication. On the following pages we'll try and answer some of the questions you may have. Feel free to call or e-mail us anytime for more information or to schedule a tour of our Facility.

**PRECISION
POWERHOUSE**

**911 Second Street South
Minneapolis, MN 55409
(612) 333-9111 www.precisionpowerhouse.com**

The Difference between a CD and DVD

DVD is a high capacity multimedia data storage medium. It can accommodate a complete movie on a single disc, content rich multimedia or very high quality multi-channel audio.

Can CDs play on a DVD player? Most DVD hardware will play audio CDs and CD-ROMs because of a second laser system. The physical dimensions are identical to compact discs. But you should check with your DVD brand's dealer to confirm compatibility with CDs.

Can DVDs play on a CD player? NO.

The Difference between CD and DVD Technology. Like CDs, DVDs store data in microscopic grooves running in a spiral around the disc. All DVD drive types use laser beams to scan these grooves: Minuscule reflective bumps (called lands) and non-reflective holes (called pits) aligned along the grooves represent the zeros and ones of digital information. But that's where the similarities end. DVDs use smaller tracks (0.74 microns wide, compared to 1.6 microns on CDs) as well as new modulation and error correction methods. These technologies allow them to store data seven times as large as that of a CD. The narrow tracks require special lasers--which can't read CD-ROMs, CD-Rs, CD-RWs, or audio CDs. DVD drive makers managed to solve the problem

FORMAT DIFFERENCES

DVD Video For viewing movies and other visual entertainment. The total capacity is 17 gigabytes if two layers on both sides of the disk are utilized.

DVD-ROM Its basic technology is the same as DVD Video, but it also includes computer-friendly file formats. It is used to store data. This product should supplant conventional CD-ROMs in the near future.

DVD-R First generation capacity is 3.95 gigabytes. Second Generation is 4.7 gigabytes. Originally designed for professional authoring, a version for general consumer use is now under development. As with CD-R, users can write to this disk only once.

DVD-RAM This makes DVD a virtual hard disk, with a random read-write access. Originally a 2.6-gigabyte drive, its capacity has increased to 4.7-gigabyte-per-side. It can be re-written more than 100,000 times.

DVD-RW Similar to DVD-RAM except that its technology features a sequential read-write access more like a phonograph than a hard disk. Its read-write capacity is 4.7 gigabytes per side. It can be re-written up to about 1,000 times.

DVD Audio The latest audio format more than doubles the fidelity of a standard CD. It is expected to become the most popular audio disk.

Why DVD video is superior to standard videotape

DVD video storage provides resolution, which is far greater than that offered by laser disc media and almost twice the resolution of standard VHS videotape.

This resolution is dependent on the capabilities of the television monitor used, but you need not have a new monitor to enjoy the benefits of DVD. DVD video also provides low noise.

One more advantage is that a DVD disc is not physically touched while it spins in the player, so there is no wear and tear or loss of fidelity over time. In contrast, videotapes do touch a playback mechanism and eventually break down, degrading the quality of picture.

DVD Video is designed to provide 133 minutes of high quality digital video, audio and graphic content on one disc side.

- MPEG-2 video quality meets CCIR-601 broadcast standards.
- 720x480 pixels/frame at 30 fps (NTSC).
- Better than both VHS and laser disc.
- Audio using 5.1 channel dolby digital surround sound.
- DVD Video provides a higher level of interactivity than the laser disc or video CD formats (chapters and menu pages)

DVD storage capacity

A DVD can store over two hours of video on one layer of the disc.

A CD can store just 74 minutes of audio -- just enough to hold Beethoven's Ninth Symphony.

The DVD format allows for a disc that can have information on two layers on one side of a disc as well as information on two layers on the other side of the disc. In its single sided, single layer format, a DVD disc can hold 4.7 Gigabytes of information which is over 7 times the amount of information that can be stored on today's CDs and CD-ROMs.

The storage capabilities of the various configurations of the DVD disc:

DVD 5 = 4.7 Gbytes (1 side / 1 layer)

DVD 9 = 8.5 Gbytes (1 side / 2 layers)

DVD 10 = 9.4 Gbytes (2 sides / 1 layer)

DVD 18 = 17.0 Gbytes (2 sides / 2 layers)

DVD R = 3.95 Gbytes per side (first generation) 4.7 Gbytes (second gen)

DVD RAM = 2.6 Gbytes per side

The WWW Of DVD.

WHY SHOULD I USE DVD?

When the video needs to be of the best quality and presented in a full screen as opposed to a small portion of the screen. **When menu selections will improve and shorten the viewing experience.** When crisp, clear, surround sound is important. **When portability is an issue.** When a great presentation is a vital part of the selling experience. **When the need arises for multiple looping presentations like at a trade show or in a kiosk.**

WHEN SHOULD I USE DVD?

When a great presentation must be delivered on a laptop computer. **With kiosk presentations to eliminate the risk of video wear & tear problems.** When CD-Rom presentations are too small, and too problematic. **When you need a non-linear presentation that allows for selection over fast forwarding or rewinding.**

WHERE SHOULD I USE DVD?

Trade Shows. **Sales Presentations.** Kiosks. **Training Sessions.** Big Events. **Direct Mail.**

TEN UNIQUE WAYS TO USE DVD

1. AS A COMPANY YEAR-END REVIEW.
2. AS AN HISTORICAL DOCUMENT OF YOUR COMPANY.
3. AS AN EMPLOYEE ORIENTATION TOOL.
4. AS A VISUAL, MENU-DRIVEN COMPANY HANDBOOK OR COMPANY BENEFITS GUIDE.
5. AS A PRESENTATION SALES TOOL FOR ONE-ON-ONE, LARGE GROUPS OR TRADE SHOWS.
6. AS A KIOSK
7. AS A FULL-MOTION, FULL SCREEN INTERACTIVE CATALOG.
8. AS AN INTERACTIVE MOTIVATIONAL OR SALES TRAINING TOOL.
9. AS A PREMIUM HANDOUT CONTAINING A PURCHASED FILM OR SOUNDTRACK, FEATURING YOUR LOGO/BRAND THROUGHOUT.
10. AS A CUSTOMIZED WORKSTATION TIPS & ADVICE TOOL.

DVD CHECKLIST

The following checklist raises issues that need to be considered in preparing a DVD title. Answers to these questions will help determine how much data a particular title comprises, and what impact this will have on the video and audio quality as well as how complex the “authoring” process to create the disc will be.

- How long is the title?
- What format is the Source Master?
- Will the disc contain additional material such as logos, trailers, interviews, etc.?
- How many audio tracks and in what configuration?
- Will the disc contain subtitles, closed captioning or other subpicture information?
- Will the disc be released in a 4x3 or 16x9 format?
- Will the disc be a PAL or NTSC?
- What will the on-screen menus look like?
- Will the disc contain Chapter Stops that allow a user to “jump” to a particular part of the content?
- Will the disc contain content that needs to be “branched” based on user interaction?
- How is DVD read by the players?

DVD ROM

A high capacity, high throughput read only digital storage medium.

- High Capacity: total capacity ranges from 4.7 to 17.0 Gbytes depending on the number of layers and sides used on the disc.
- High Throughput: 10.08Mbps transfer rate at 1x DVD (8x CD ROM)
- General Purpose: supports both Micro-UDF and ISO 9660 file formats.
- Compatibility: DVD players are backwards compatible with all CD-Rom and CD-Audio discs.

DVD ROM System Requirements

- OEM PC's with DVD ROM generally high-end Pentium 2 / mmx etc.
- DVD ROM upgrade kits require typically 133 MHz Pentium,m 16MB RAM, 2MB video RAM, full-length expansion slot.
- Software DVD-Video (MPEG2) decoding expect 266 MHz Pentium 2, 32MB RAM minimum.

DVD Title Authoring

- Creating a DVD disc image that can be transferred to DLT tape for glass mastering.
- Performed on new-for-DVD authoring systems.
- Similar in many ways to video-CD 2.0 authoring.
- Designs in interactivity for the DVD title.
- Presents the movie or video in a fashion that maximizes the entertainment value by using the interactive features of DVD players; e.g. menus, multiple camera angles, subtitles and languages.

The process involves multiplexing and integrating the following:

- video and audio data
- extra language soundtracks
- subtitles
- alternative camera angles
- branching to multiple points.

Involves manipulating the data assets rather than creating them.

File Formatting & Mastering

Precision Powerhouse offers the following services:

- file formatting to UDF file system
- creation of DLT master tape with DDP encoding “ready-to-master”
- porting CD-ROM titles directly to DVD

MPEG2 and compressed audio can also be incorporated into DVD ROM projects.

- DVD is mastered from a DLT (digital linear tape), a well-established SCSI tape medium.
- Precision Powerhouse creates a DLT compact tape type III/IV with DDP 2.0 encoding (disc description protocol). This has become the de facto mastering standard for DVD.

DLT master tapes are ready for manufacturing at the disc plant.

DVD POINTS OF CONCERN

The foremost issue revolves around compatibility — will the file run on the target computer(s)? Unfortunately, unlike the past thirty years of an unchanging VHS standard, the world of compressed video changes almost on a daily basis — thus the need for the multiple formats. As a result, each project will be different based on a user's specific operating environment.

Processor speed is a critical variable when determining the suitable image resolution. As we increase resolution, we use more data to define the image. With more data per second, the processor must be capable of decompressing it and maintaining a smooth playback.

Another common concern is the screen size of the compressed video. Standard size is half-screen (320x240). Just as indicated previously regarding image resolution, the same circumstance applies here. The more powerful the computer, the better the chance you can successfully run the video full screen. While it is technically possible to accomplish this, it's only practical under the right conditions — that being the necessary computer power to run the video full screen. For purposes of a guideline, it is recommended that a user have a minimum Pentium 200 mhz processor to effectively accomplish this function. And even when possible, the user must realize that we are still just expanding a quarter screen up to full screen, so the image will become softer as a result.

DVD PACKAGING

Packaging for the DVD disc is entirely driven by the market and content providers.

- There is no standard.
- Options are identical to CD.
- DVD-Video may adopt package similar in size to VHS package to differentiate from CD.
- Jewel box remains a cost-effective and durable solution.
- Precision Powerhouse is able to offer any configuration.

ADDITIONAL MANUFACTURING POINTS

- DVD is technically more difficult and more expensive to make than CD.
- Project development tools and manufacturing equipment are not as highly-developed and readily-available as they are for CD.
- However, DVD uses the same core manufacturing technologies as CD and at launch is an achievable, controllable process for the advanced CD manufacturer.

COMPRESSION

Compression is the process of converting digital audio and video masters to computer data files of greatly reduced size. This is a specialty of Precision Powerhouse. The compression process affects the final quality.

High-quality video compression is the single most enabling technology for DVD. To illustrate the level of compression required for two hours of high quality video, consider this: the raw data storage requirements for uncompressed CCIR-601 resolution 4:2:2 serial digital video are roughly 20 megabytes per second. For a 120-minute movie, this would require 144 Gigabytes of storage space, before accounting for audio. With DVD capable of storing 4.7 Gigabytes of data, compression ratios of roughly 40:1 are required in order to fit the video for a feature film along with the audio and subtitles on a single-sided disc.

MPEG2 was born out of a continuing desire and demand to achieve the best possible audio and video quality for digital storage applications. It follows on the heels of MPEG1 which took the first steps in bridging the gap between analog and digital technologies to achieve broadcast quality audio and video.

*NOTE: Not all MPEG compression is the same. Two encoder types will produce different picture quality.

Powered by



PRECISION POWERHOUSE

For More Information Contact:

Dan Piepho

Precision Powerhouse

911 Second Avenue South

Minneapolis, MN 55415

www.precisionpowerhouse.com

dan@power-house.com