

## Saving, Sharing Videos on CD

*"I think a lot of people really want to do this (capture and show personal videos)," said Andy Parsons, senior vice president of product development for Pioneer New Media Technologies, at a recent Consumer Electronics Show. "I wanted to do this two years ago and I was frustrated. I said I'm not going to pay \$5,000 for a recorder."*

While Parsons was talking about using his firm's DVD recorders to copy a video to 4.7GB DVD media, consumers have actually been able to cost-effectively record and playback videos for more than a year.

### The secret?

Most of today's computers have the power and capacity to support video production. Digital camcorders are available with FireWire connectivity that simplifies downloading video to personal computers. Economical and user-friendly personal video production tools have become widely available. When you record DVD-quality MPEG-1 or MPEG-2 video on a CD, it can be played on virtually any DVD-ROM drive or DVD player as well as computer-based CD-ROM drives. Products like NTT's CD & DVD Maker 7 Titanium, InterVideo DVD Copy 5, Ulead MovieMaker 5, Roxio Easy CD as well as a number of the video production tools, make it fast and easy to copy your videos onto CD-R and CD-RW media.

### Why Video on CD?

There are a number of compelling reasons for businesses, institutions and individuals to write video content onto CD media: CD-RW drives and CD-R/CD-RW media are inexpensive and widely available. Most of the 46 million DVD-ROM drives in use in computers around the world will play CD-based video.

Most of the 120 million DVD players in use around the globe will play CD-RW-based video.

A large percentage of the 250 million computer-based CD-ROM drives in use will play CD-R-based video. Economical and easy-to-use video production tools are available that will allow users to store the finished video on VHS tape, DVD, CD and send it across the Internet.

### Video Standards, Capacity

The Moving Picture Experts Group (MPEG) defined the standards for compressing motion video and audio signals using DCT (Discrete Cosine Transform) compression which provides a common world language for high-quality digital video.

MPEG-1 (White Book standard) was designed so VHS-quality video could play from a regular CD. The standard supports video coding with quality roughly equivalent to VHS videotape. Most graphics chips can scale the picture for full-screen playback; however, software-only half-screen playback is a useful trade-off. With MPEG-1, more than 70 minutes of good-quality video and audio can be stored on a single CD-ROM disc optimized for non-interlaced video.

MPEG-2, a related standard for coding video at higher data rates and in an interlaced format, was developed to deliver HDTV or theater-quality video. MPEG-2 is optimized for the higher demands of broadcast, HDTV and entertainment applications, including satellite broadcast and DVD-Video and is backward compatible with MPEG-1. MPEG-2 Resolution is about twice that of VHS videotape. In addition, the standard supports features

such as scalability and the ability to place pictures within pictures.

While many people look down on MPEG-1 quality, keep in mind that we have been viewing - and have been very satisfied with - VHS-based videos for years. More importantly, when the videos are stored on CD, they don't suffer from constant playback degradation and images don't deteriorate over time.

A standard 650MB CD will store about 30 minutes of DVD-quality video at 4Mbps. The higher-capacity 700MB CDs provide an additional 50MB of capacity. While this pales when compared to a DVD disc's 4.7GB 2-hour capacity, the cost of production and distribution is significantly less; and for many applications, 30 minutes is a very long video. Consider:

- sales training
- product, services, capabilities presentations
- HR, management presentations
- installation, maintenance, troubleshooting videos
- educational coursework
- sales presentations
- visual guided tours of real estate, vacation locations, business locations
- weddings, graduations and other family celebrations
- commercial and video news release distribution

### **System Requirements**

Apple computers have always had a multimedia focus. Some of the newer, more powerful computers from Gateway, Fujitsu, Dell and HP are also excellent, economical video production systems. In fact, almost any computer sold today is multimedia and video production-ready. Some enhancements may be required, but there is nothing standing in the way of using them to produce, view and share personal and professional video on CDs.

You do need to make certain that your system is equipped with a good-quality video card and a sound card. While you can get by with 64MB of memory, more is always better. With memory modules so inexpensive today, 128MB simplifies your job. 256MB of memory allows you to take advantage of advanced video editing you'll want to do once you become familiar with all of the things you can do in producing your video CDs.

Individuals with 20GB hard drives often feel they have massive storage capacity, but digital video consumes volumes of storage space, which doesn't leave much capacity for OS, application and working file storage or your video editing and authoring work. As a result, most video production solution manufacturers recommend that users add an external 80GB+ hard drive with a rotational speed of 7,200 - 10,000 rpm. Fortunately, these high-capacity drives have become remarkably inexpensive.

### **Video Input**

If you already have a digital camcorder, you can download video files directly to your system; and with today's low-cost video production tools, immediately begin the editing and authoring process. If you have an analog camcorder, your video must be converted to DV to simplify and speed the editing process. Video production products such as ADS Tech's DVD Xpress DX2 do the job automatically. In addition, you probably have a library of old VHS tapes that you want to edit and convert to DVD.

A number of bridge solutions are available which provide both analog and digital signals in and out. These economic products, such as ADS Tech's PYRO AV Link, are priced under \$300, work with OS-native video tools such as QuickTime, iMovie,

Final Cut Pro and MovieMaker and also include additional video editing and authoring products and tools.

These products allow you to accept input from digital and analog camcorders as well as standard analog VCRs. They also enable you to copy the finished video to VHS tape, DVD; and of course, very low-cost CD-R and CD-RW media.

### **Recorder**

The final piece of hardware you will need will be a DVD recorder. Because of the economy and versatility of today's DVD+/-R/RW/DL drives, very few CD-R recorders are sold today. The drive allows you to produce every flavor of DVD disc as well as write-once CD-R and rewritable CD-RW discs.

This is important in producing video CDs or CDs with DVD content because many older DVD players cannot play CD-Rs, but they can play CD-RW discs. If you produce your video on a CD-R disc and the recipient has a DVD-ROM drive, they should be able to play the video flawlessly. However, if you are using the video in a classroom environment or sending a copy to family and friends in other areas for playback on a DVD player, make certain they can view your masterpiece by producing it on quality, name brand CD-RW media.

Recorders are rated by recording and playback speeds. For example an 16x8x16x unit records CD media at 52x speed (copying a full 74-minute disc in less than 5 minutes) while 16x10x52x drives copy a complete disc in about 2 minutes. These drives will rewrite a CD-RW disc at 8x and 12x respectively and will read both CD-R and CD-RW discs as well as DVD media.

Depending upon your system configuration, you can choose a drive with USB, SCSI or FireWire connectivity. All will allow you to carry out the work satisfactorily.

### **CD-R vs. CD-RW**

With CD, you have two storage options; and, as long as you choose quality media (see addendum), you can use either:

- CD-R - write-once CD media can be played in any of the more than 160 million CD drives that are in use around the globe. If you are sending your business video or presentation to someone who will view it on their office or personal computer, you can be quite certain their system will play the video. The media is slightly less expensive but the price differences are insignificant. If you are sending the disc to a person who will play it in a DVD-ROM drive or DVD player, there is a good chance your video will be "invisible" to the player.
- CD-RW - rewritable CD media is readable by even first-generation DVD-ROM drives and DVD players. So if you're sending personal or family videos to mom, dad or the kids to be viewed on their TV set, it's probably safer to copy the video to CD-RW discs.

### **Post-production**

The beauty of today's video editing, authoring, titling and production solutions is that they are both very powerful and easy to use. After storing your raw video - analog or digital - on your hard drive, you can begin the editing/post-production process. In a very short period of study and experimentation, almost anyone can turn family outing video, corporate plant video tours, classroom sessions or other video documentary into a tight, professional-looking video complete with titles, special effects and enhanced sound track.

Using standard drag-and-drop methods, you can cut out the camera jitters and jumps as well as other undesirable portions of the video. You can add fades and dissolves to move from scene to scene, location to location, time period to time period.

In the same manner, you can dub in the sound track, lay down a voice over track or add music to your video (note - for personal videos it is legal to make a single copy and use music segments but for business/professional applications copyright protection does apply.)

When you are satisfied with your video, you are ready to encode it using MPEG-1 or MPEG-2 and copy the digital file to your CD-RW or CD-R disc. The result will be a video CD that is perfect for sharing with friends, family, business partners and students/trainees.

Andy Marken

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### ***Addendum***

#### **Choosing the Right Media Quality**

CD-R and CD-RW media are readily available and inexpensive. However, if you are going to all the trouble and effort to capture video, edit and author your creative work, prepare it for distribution and store it for years; obviously, buying the cheapest media isn't a wise choice.

If you're lucky, you only know the media is bad after you've produced your video and try to play it back on the recorder or another player. If you're unlucky, you find out that the media has gone bad 2-3 months later, when you attempt to play the video that is now stored only on the CD-R or CD-RW media.

To protect themselves, buyers need to know:

- Will media from manufacturer X record at the desired speed?
- Will it perform well at that speed?
- Will the disc, once recorded, be readable on the wide variety of players available?
- Will it retain the video data, over time, even under less than ideal conditions?
- What type of guarantee does the manufacturer provide with its product?

Let's begin by putting cost differences in perspective.

Despite the fact that CD-R and CD-RW disc quality and capabilities can differ widely, disc costs vary by only a few cents and all can store volumes of video. In making your selection keep in mind that the time you spend in creating the video is substantial and valuable.

The cost of a disc is really irrelevant. What really matters is the value of the video that will be recorded on it. How important is it? How long do you want to keep it? What would be the cost, in time and money, to replace it? The fact is, if your video is valuable enough to be put on a CD-R or CD-RW disc, the real issue is whether the disc can be trusted--not how much it costs.

Sunlight and temperature, as well as humidity can be a major factor in the degradation of CD-R and CD-RW discs. Unless precautions are taken during manufacturing, the more extreme the exposure, the faster the deterioration. Verbatim uses industry standard accelerated aging tests to obtain comparative data and to determine an estimated lifetime. Tests show that the media has a projected data life of at least 100 years.

To extend the data life of the media, the reflective layer must remain intact. Manu-

facturers put a protective layer over the reflective layer because when it is pierced, the reflectivity of the read/write laser is reduced, and this causes media errors. For added protection, Verbatim developed a dual-protective layer production technique, which is standard for all of the firm's DataLifePlus CD-R and CD-RW media.

Today, CD-R and CD-RW discs can be recorded at a variety of speeds. Depending upon the application and the drive, users can burn CD-R media at 1x to 52x speeds with higher-performance media and drives available. CD-RW media provides the added flexibility of enabling users to write, erase and rewrite a CD more than 1,000 times. And, with the new high-speed CDRW discs, users can rewrite at 1.5 MB/sec (10x speed).

While optimized for high write speeds, Verbatim suggests that for certain applications, users record in real time. Especially when producing video CDs, the lower write speed ensures higher video quality and fidelity. Another application where slower speeds are recommended is when the user has a slow or overburdened system. By slowing the recording speed, the demand on the system is decreased, and buffer under-runs, which can ruin discs, can be avoided.

Drive compatibility is another critical factor. Variations in recorders and CD, DVD players/readers can cause media compatibility problems. These difficulties can be as subtle as slow read times and as serious as the inability to read at all. To provide media that meets the broadest range of recording requirements, Verbatim continually works to advance storage media technologies. To ensure read and write performance with the widest range of CD-RW, CD-ROM/DVD-ROM drives/players; the company works closely

with hardware manufacturers on testing pre-production media compatibility and performance.

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**Andy Marken** is president of Marken Communications and has been involved in the marketing of storage technology for more than 15 years. His experience includes work with Panasonic, Verbatim, Matsushita, Plasmon, Nikon, Mitsubishi Chemical and a number of hard drive manufacturers. Andy can be reached at [andy@markencom.com](mailto:andy@markencom.com).