



DVD Survival Guide

by Jim Baker

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This Survival Guide is intended as an introduction to Digital Versatile Disc technology for multimedia developers; it provides an overview of the DVD format, authoring concerns, and guidance to further sources of information. With DVD still in its infancy, this (short) Guide will not answer all your questions about DVD; it is designed to stimulate thought on the subject. However, an extensive list of web links in Appendix A of this document provides access to third parties who can provide more information on DVD products, services and technology.

Of particular usefulness is the [Sonic Solutions](http://www.sonic.com/html/collateral/pdf/dvd_primer.pdf) excellent DVD Primer *'Premastering in the Age of DVD'* by Mark Ely and Dave Block. This primer will tell you everything you need to know about the technical specifications of DVD, which this Guide does not attempt to cover. The primer can be downloaded from the Sonic Solutions site at http://www.sonic.com/html/collateral/pdf/dvd_primer.pdf.

What is DVD ?

DVD, as proposed by the DVD Consortium of consumer electronics manufacturers, is a standard which will deliver high resolution video and audio content on a high capacity disc, in types or 'books' (like the color books of traditional CD formats) aimed at a variety of target markets. These 'books', with generalizations, are:

A Book	DVD-ROM	a successor to CD-ROM and CD-i
B Book	DVD-Video	a successor to laserdisc, and CD-i
C Book	DVD-Audio	a higher resolution competitor to audio compact discs
D Book	DVD-Recordable	providing for DVD-R machines for desktop disc creation
E Book	DVD-Writeable	eraseable DVD disc

All flavors of DVD use a file system format called UDF (Universal Disc Format); what this means to the developer is that all types of DVD disc can be played in consumer DVD players and DVD-ROM drives, with common specifications. Data intended for DVD-ROM players (such as Macintosh or Windows applications and datafiles) is ignored by a domestic DVD player as it resides in a different portion of the CD. This is akin to how Enhanced CDs in Blue Book format operate on domestic CD players. Furthermore, video and audio is encoded in a common format, avoiding compatibility and performance issues that have plagued multimedia on variable MacOS and Windows platforms.

DVD offers four different capacities although most discs currently manufactured can store up to 4.7GB (the equivalent of more than seven CD-ROMs or two hours of high quality MPEG2 video). Capacity depends on the method used in the manufacture of the disc; data can be recorded on each of a disc's two sides, and in up to two layers on each. A double-sided, double-layered DVD disc can store 17GB (26 CD-ROMs worth, or seven hours of MPEG2 video).

Movie fans, audiophiles and games fanatics all agree that the superior video image quality, option for surround sound, and interactivity make DVD a format to die for. Corporate multimedia developers will find DVD offers considerably more than CD-i ever could. Sonic Solution's [DVD Primer](#) provides a detailed technical explanation of video and audio formats and DVD Video functionality.

DVD-Video was the first format out of the gate and onto the shelves. With DVD players now available, an increasing number movie titles are being released by major studios on DVD. Consumer DVD-ROM titles are still few and far between, and information on corporate DVD-ROM applications is difficult to find. DVD is very much a technology in its infancy, although its future is very bright. The last twelve months has seen CD manufacturers investing in DVD premastering and replication facilities, and technology developers preparing authoring systems for market. After all, without tools for title creation and the means for mass production,

title developers are not going to get very far. So while 1997 might not have seen the rush of DVD discs some were expecting, 1998 may well be the first year of significant DVD sales.

Authoring for DVD

For most multimedia professionals, it is DVD-ROM that offers the most appealing side of DVD. Imagine a disc that packs the contents of seven CD-ROMs onto one CD. Imagine the confines of 320x240 Cinepak video shattered by full-screen, full-motion MPEG video. Imagine stereo, CD-quality audio throughout, and surround sound where you want it. Now imagine one multimedia format for all platforms; no problems with video and audio compression rates between Macs and PCs, no concerns about the speed of the user's CD-ROM drive and the 'lowest common denominator' scenario. As a DVD title, your game, corporate product catalog, reference work, training program, will perform exactly the same way on every DVD-equipped computer. Now there's innovation.

But while the attractions of a finished DVD title are great, the road to creating one is longer and tougher than one might imagine. For experienced multimedia producers, creating a CD-ROM title is more a creative challenge than a technical or budgetary one. After all, you've got your Macintosh, **Macromedia Director** or similar authoring tool, and your trusty **Toast**-equipped CD writer; all you need is time to do your stuff. However, the tools you are using are the result of ten or more years of hardware and software development time, and millions of dollars in profitable sales to support the companies developing them for you. DVD is very new, and very different. Until recently, there has been no clear path for a developer to migrate from traditional CD-ROM development into DVD, mainly because of the lack of tools, and the lack of knowledge multimedia tool vendors have of DVD. Macromedia, purveyors of the ubiquitous Director, trumpet on their packaging that it can "produce high-performance content for CD-ROM, DVD, and the Web faster than ever before". In the case of Director's DVD support, 'never before' would be more accurate. Integration between traditional desktop multimedia tools like **PhotoShop**, **Infini-D**, **SoundDesigner** and **Illustrator**, and DVD-Video authoring systems has been limited to DVD's support for TIFF files.

If you had wanted to get into DVD authoring within the last twelve months or so, you would have needed a cool \$250,000 to set up a DVD-Video suite. Early versions of **Sonic Solutions** DVD Creator were over \$150,000, and that was before the Macintosh and **Silicon Graphics** platforms, **Sony** digital video equipment and the rest. The majority of systems sold went to early adoptors such as service bureaus and CD manufacturers, eager to carve out a niche in this potentially lucrative market; Sonic Solutions beta partners included IBM Interactive Media, Intel, The Post Group, Kao Infosystems and Warner Advanced Media Operations. After all, without someone to manufacture your disc, what's the point of developing for



DVD ? Replicators have not been slow to recognize that they have an advantage while DVD authoring tools are still costly; numerous replication companies including Kao and Cineram have set up DVD studios, offering a wide range of development services from graphic design to video compression. In the CD-ROM business, these services have been traditionally those of the multimedia title developer. DVD and its complexities have so far taken these tasks out of the hands of the small business.

But not for long. As DVD gradually matures, signs of increased marketing are becoming visible; DVD titles in your corner video store, players under the \$500 mark, and DVD-ROM drives available for Christmas. History to some extent is repeating itself. When CD recorders first appeared, they were very much the domain of large-scale media manufacturers and priced accordingly. But within five years, a CD-R drive with software is \$499 and media a couple of dollars each. Already, authoring tool developers are readying the next generation of DVD tools. Sonic Solutions announced at the Interational Broadcasting Convention in September 1997 their **DVD Creator Workstation** for under \$100,000 which runs on a single MacOS computer. Furthermore, Sonic have broken out their suite of tools into distinct products that can operate in a workgroup environment; DVD Producer for authoring interactive content; DVD Studio for video and audio encoding; and DVD PrePlay for proofing a project before mastering. Add to this their recently-announced support for Pioneer's DVD-R drive, and you are as close to a turnkey desktop DVD authoring solution as you can get.

Not to be outdone, **Pioneer** themselves announced in September a DVD authoring program, **DVDesigner**, intended for use with premastering systems from Pioneer and others. The Java-based tool is priced at a modest \$495, which will certainly stimulate multimedia developers of more modest means to investigate either developing new titles for DVD, or porting existing CD-ROM titles to DVD.

Can I Repurpose My CD-ROM ?

A year or so ago, the CD-ROM community was busy thinking how to port existing CD-ROM titles with video content over to the MPEG standard. Hardware manufacturers readying MPEG decompression cards for PCs wanted sample CDs to bundle with their product; this caused quite a frenzy among multimedia developers as the royalties offered were attractive, and sales of CD-ROMs had slumped. Companies like Minerva did brisk business in either selling MPEG systems to the title developers themselves, or to service bureaus. For the first time, title developers got a taste for how much MPEG compression actually costs; between \$100 and \$200 per minute, or \$80,000+ for the hardware itself (for a good quality system). Up until then, lesser quality video compression could be achieved in-house for considerably less money. The **Sony** UVW1800 Betacam and a **Media100xs**, for Cinepak or similar encoding, was about the most expensive piece of kit the average multimedia house possessed.

As it happened, MPEG CD-ROM titles did not take the world by storm as many PC vendors had imagined; the average PC did not ship with MPEG decoding hardware on-board, and Apple's own software MPEG was platform-dependent. DVD was already looming on the horizon, and this may have contributed to the lack of interest in porting CD-ROM titles to MPEG. But the point was, it wasn't too difficult to port. All that really had to happen was re-compressing the edited master video as MPEG; Director and QuickTime supported MPEG data streams, so it was just like playing a full-screen QuickTime movie. At worst, the interface had to be redesigned to accommodate full screen video rather than 320x240, but most developers out to repurpose a CD-ROM allowed the user to toggle between the two sizes.



Repurposing for DVD is somewhat different. The question is: 'Is this title going to be for DVD-Video (playable on DVD-ROM and domestic DVD players) or is it going to be aimed at DVD-ROM only?' While the process for encoding the video and audio is similar, authoring the interactivity is not at all the same. Whereas DVD-ROM discs can contain MacOS and Windows applications that access video in the DVD-Video portion of the CD, domestic DVD-Video players cannot play Director applications. Creating an interactive menu system, readable in a domestic player, must be done in a turnkey environment such as Sonic's DVD Producer software. Only rudimentary CD-ROM titles will port acceptably to DVD-Video, while the more sophisticated CD-ROM titles, that rely on complex scripting and functionality, would be suitable only for DVD-ROM repurposing.

Life may be getting easier; at IBC, Sonic Solutions announced that DVD Producer will be equipped with technology which allows Macromedia Director files to be automatically converted to DVD-Video and DVD-ROM format. This allows for the creation of interactive projects within Director, which can then be seamlessly imported into DVD Producer. Additional interactivity can be added during DVD authoring, as well as multiplexing, proffing and formatting the final DVD disc image.

Working with a Service Bureau

Given the current cost of building one's own DVD development suite, and with DVD authoring being a considerably more sophisticated process than most CD-ROM developers are used to, working with a service bureau certainly has its attractions. Not only have they made a substantial investment in the equipment, but they should have the experience to make the production process streamlined. Producing a DVD disc requires a technical background far in advance of CD-ROM specifications. Mixing audio for surround sound, understanding the subtleties of MPEG video and audio encoding; these are tasks more suited to high-end post-production facilities than to home-spun Director programmers working with 8-bit mono audio, 256-color graphics, and QuickTime video.

As a result, companies are appearing that combine post-production facilities and multimedia shops. These are not marginal enterprises; most represent millions of dollars of investment. **d-house** of Novato, CA is a good example of this new breed, offering a wide range of DVD-specific services. Started by former employees of Sonic Solutions and Daikin, in-house expertise covers every aspect of professional audio, video and graphical production. d-house will consult on porting CD-ROM titles to DVD-ROM, encode video and audio, and broker replication of the final product. For many content developers it is companies like d-house who, hand-holding at every stage of the process, will help make the production of a DVD title a reality.

Nevertheless, with the advent of second generation authoring tools such as Sonic's \$25,000 DVD Producer and Pioneer's \$495 DVDesigner, the more confident multimedia developers will bring authoring in-house. The software will output a datafile similar to an edit decision list, which can then be taken to a mastering house for building. The encoding of audio and video is still likely to be done at a service bureau, perhaps one that also offers mastering and replication such as **Kao Infosystems**, who charge between \$50 and \$125 per minute for MPEG1 and MPEG2 encoding respectively.

The Road Ahead

DVD offers the first substantial advance in disc-based interactive communications since the introduction of the CD-ROM. Either way you look at, if you are a multimedia content developer, DVD is in your future. The question is, when will you jump in. With service bureaus offering a full range of production services, and new desktop software in a realistic price range, that time may well be now.

APPENDIX A - 3rd Party Tools & Services

DVD Production Houses & Service Bureaus

AIX Entertainment

(213) 655 4116

www.aixentertainment.com

Cineram

(800) 865 2200

Crest National

(800) 309 3472

www.crestnational.com

Crush Digital

(212) 965 1501

www.crushdv.com

dHouse

(415) 898 4123

www.d-house.com

Digital Video Compression Center

(818) 777 5199

www.dvcc.com

IDC Digital

(212) 581 3940

www.idcdigital.com

Kao Infosystems

(800) 525 6575

www.kaoinfo.com

LaserPacific

(213) 462 6266

NB Digital Solutions

(410) 721 5725

www.nbdig.com

Pacific Coast Sound Works

(213) 655 4771

www.pcsw.com



Sunset Post
(800) GO SUNSET
www.sunsetpost.com

Technicolor
(800) 903 3211

The Post Group
(213) 462 2300
www.postgroup.com

DVD Authoring Tools (MacOS compatible)

Pioneer New Media
(310) 952 2111
www.pioneerusa.com

Sonic Solutions
(888) SONIC 4U
www.sonic.com

About the Author

Jim Baker (jim@studiosource.com) is Managing Director of 21st Century Media and studiosource in Novato, California. Recently, he has produced titles including Apple's *QuickTime VR Showcase* CD-ROM, the *Twentieth Anniversary Macintosh QuickTime Showcase* CD-ROM, *Disability Matters Interactive*, and the *Recording Industry Sourcebook* CD-ROM. He is a regular contributor to European multimedia publications, and has written Apple Survival Guides for QuickTime VR and Enhanced CD.

He is married, with two Labraborers who recently ate his software library CD-R.

