OpenDVD™

The Standard for Dynamic DVD Content

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Introduction

From the moment of DVD-Video's first launch, consumers have responded enthusiastically to the format's vivid picture quality, crystal-clear sound, and random-access convenience. Already thriving as a carrier for home video, DVD is also taking off as a medium for the capture, storage, and exchange of home movies. Aided by the popularity of video camcorders, the growing availability of affordable recordable/rewritable drives, DVD has emerged as the definitive solution for digital video delivery.

Until now, however, DVD has been a static medium. Once the DVD content on a disc was finalized, making minor modifications was a major job that required reconstruction of the entire disc from the original source files. But the OpenDVD specification changes all that, transforming the DVD format and ushering in the era of dynamic DVD.

The OpenDVD specification defines an open, fully-compatible standard that enhances the DVD experience for the end-user, offering the following added capabilities:

- An OpenDVD disc may be "opened," and its contents changed, turning DVD from a static medium into a living archive.
- An OpenDVD disc may be edited without reference to any original source materials; everything needed to create a revised project is resident on the disc itself.
- An OpenDVD disc maintains the full feature-set of the DVD-Video format, and is completely compatible with recordable/rewritable DVD and CD media.
- An OpenDVD disc may be output from a wide range of video editing or DVD software applications. In addition, the AuthorScript® DVD authoring/writing API from Sonic Solutions® allows this capability to be incorporated into third-party applications via a ready-made solution.
- An OpenDVD disc may be edited using an OpenDVD-compatible authoring application.

In the following pages, we'll look at the market context that makes the OpenDVD specification an important enhancement to the DVD-Video format, examine how the technology behind the specification works, discover the unique benefits of the OpenDVD standard, and explore how consumers will likely take advantage of the capabilities of OpenDVD discs.

Market Context: Digital Media, DVD, and Convergence

Launched in 1997, DVD-Video has since become the most rapidly adopted consumer electronics format ever. In part, this success is due to DVD's own great features. But DVD is also part of a larger context shaped both by the advent of digital entertainment media and the convergence of computing and consumer electronics.

Digital media have had a presence in consumers' lives since the Compact Disc took off in the mid-1980s. Offering high audio fidelity and random-access convenience, the CD proved the value of digital media in the home entertainment market.

Once the CD was well established in the marketplace, many consumers were generally content with the available selection of prerecorded (pressed) CDs. But others missed the flexibility offered by analog recording media such as the Compact Cassette; they wanted to be able to create compilations and also to take material that is available in other formats and play it back from CD.

When recordable (and subsequently rewritable) CD drives and media became affordable in the late 1990s, consumers were finally able to make the CD a more personal, customized medium, resulting in a boom in CD-R/RW recording. Significantly, it was the personal computer — rather than traditional "hi-fi components" — that provided the underlying platform that enabled this advance.

DVD recordability

A similar market evolution is underway today with DVD. While prerecorded DVDs, set-top players, and DVD-ROM drives have all been relatively affordable since soon after the DVD launch, the ability to record on DVD-Video compatible media was a rare and expensive feature only available for professional applications. But that began to change in 2001 with the introduction of "General Purpose" DVD-R, as well as rewritable alternatives DVD-RW and DVD+RW.

Suddenly, DVD recordability — enabled via the personal computer — is within reach of the average consumer. By the end of 2002, prices for aftermarket DVD recorders will drop below $400. According to estimates, roughly 4 million DVD recorders will ship in 2002 and between 12 and 18 million will ship in 2003 – spurred on as more and more PC manufactures make DVD recorders a standard component of their higher-end desktop and notebook computers.

Camcorders and PC-based editing

Paralleling the advent of affordable recordable DVD formats has been the growing popularity of camcorders, particularly those using new digital video formats. Nearly 16 million camcorders have been sold in the US in the last three years alone (1999-2001), bringing household penetration (according to the trade group Consumer Electronics Association) up into the range of 40%. Digital camcorders represent an increasing share of this total, rising from 20% of those sold in Q1 2000 to 30% just a year later.

Today's camcorders make it easy for consumers to capture many aspects of their lives, preserving special moments for later enjoyment. But they can also create a vast supply of raw video footage with lots of not-so-special moments. The solution, of course, is to edit the raw footage into presentable form. Personal computers offer an ideal platform for this capability, and both video input cards and video editing software have become important features in the home computer market.

Once edited, a home movie should be as easy to share with family and friends as any other home video program. Instead of viewing on the computer, consumers want to be able to play their video back on television in the comfort of the living room or family room. Until recently, that has meant the time-consuming transfer of their edited material back to tape. Unfortunately, a tape-based player does not offer a particularly convenient user-experience as a playback device for anyone who is used to the menu-driven, random-access capabilities of DVD.

What consumers want, then, is the convenience of a camcorder for capturing raw footage, the ability to edit that footage into a more polished presentation, and the convenience and portability of DVD for playing it back. Once again, it's the personal computer — equipped with video input, a recordable DVD drive and a consumer-oriented DVD creation application — that most effectively supports the required capabilities and puts them in reach of the average consumer. Ideally, the home user should find it as easy to use their computer for home movies as it is to rip and burn audio compilations onto CD.

Making Recordability Work for Consumers

Recording capability adds customization to the already-impressive feature-set of DVD. But to actually enhance the appeal of a given hardware or software product, a feature must offer tangible benefits for end-users. Thus to know how to translate recordability into competitive advantage, we first need to understand how consumers are likely to want to use it.

The Living Video Album

A big portion of the events that people tend to capture on videotape are not totally isolated, but rather can be seen as part of an ongoing story woven into their lives over time. A baby's first smile is followed by rolling over, then sitting up, then crawling, standing, walking, etc., all of which together makes up the evolving story of that baby's development. A child's first soccer game of the year is followed by a series of games over several months, all of which together make up the story of that season. And one year's wedding is followed by the next year's anniversary, with many more to come in the story of that marriage.

With still photography, it's common for people to organize their prints into albums that reflect these stories in their lives. Organizing content around a story tends to make an album more interesting and compelling. And as the story continues, the album grows with it, becoming a living reflection of the events recorded.

Recordable DVD offers the potential to achieve the same updateable, story-driven utility with video that we take for granted with a photo album. And the fact that a disc may be made playable on more than 30 million set-top players and tens of millions of computer-hosted DVD drives makes it very appealing as a medium for a video album.

If a capability isn't easy to use, however, it's unlikely that many consumers will be able to take advantage of it. A case-in-point is the timer-recording capability of a VCR. In theory, it's great to be able to record a television show when you're not at home so that you can watch at a more convenient time. But many consumers have found it too daunting to master setting the VCR's clock. The familiar blinking "00:00" found on VCRs in many homes is a reminder that consumers don't always find it easy to take full advantage of the capabilities of the products they own.

In the case of recordable DVD, the ability to make updated versions of existing discs only has value to consumers if the process for doing so is simple and convenient. That's what makes OpenDVD so significant.

Creating a DVD

Without the OpenDVD specification, the updating of existing DVDs has presented consumers with several obstacles in terms of time, hard-disk space, and convenience. To understand these challenges fully, we'll briefly review how a DVD is made initially, and then look at what must be done to revise its contents.

Consumer-level DVD software applications are all different in terms of their specific steps, but the process generally involves three main stages:

- **Capture** — gathering project "assets" (video, audio and still pictures) on the computer hard-drive:
  - Video files are played from a VCR or camcorder tape and captured to the computer hard-drive either in an intermediate format (e.g. AVI or QuickTime) or directly as the fully-compressed MPEG-2 files called for by the DVD-Video specification. When imported into a project, these video files become movies.
  - Audio files may be captured from the soundtrack of the video source, or captured separately to be combined later with video or stills. Audio files may be stored as uncompressed linear PCM (e.g. .wav files), or compressed to the Dolby Digital format.
  - Still pictures are either created on the computer or scanned in. The pictures are stored in a bitmap graphics file format (e.g. .bmp or .tif). Once imported, they may be used individually as background images for menus, or in a series as a movie (a "Slideshow" or "Stillshow").
- **Authoring** — importing assets to the project and defining menus and button links:
  - Menus are created to allow navigation between the project's movies.
  - A background image is defined for each menu.
  - Buttons are created on each menu, and a link (destination) is defined for each button.
- **Output** — format project elements for DVD and record to disc:
  - Any program involving multiple source components — typically menus, which are made up of a background image and subpicture overlays — is composited from multiple files into a single element.
  - Assets that are not already in DVD-compliant formats for video (MPEG-1 or -2), audio (PCM or Dolby Digital), or stills (MPEG-2) are transcoded and compressed, resulting in "elemental streams."
  - Elemental streams are "muxed" (multiplexed) together into the Video Object (.vob) files required for playback by a DVD-Video player.
  - The navigational data defined in authoring is converted into logical data (.ifo) files that can be read and interpreted by a DVD player.
  - A "disc image" is generated that reflects the directory structure required for a disc to be used by a DVD player. The VOB and IFO files are located in the "DVD-Video zone" (VIDEO_TS directory) within this structure.
  - The disc image is written to a hard-drive or directly to a recordable or rewritable DVD disc.

Revising a “closed” DVD

In addition to any new content that is to be added, updating a DVD project requires access to all the program material on the original disc that will also appear on the revised project. It also requires a “project file” — used to recreate the state of the project at the time the original disc image was created — that can be opened by the authoring software.

In the process described above, the final steps involve creation of a disc image that represents the project as it will appear on disc, following the exact structure defined by the DVD-Video specification. While this disc image is derived from the project defined during authoring, authoring software applications that make closed (non-OpenDVD) discs are not capable of opening the component parts of a project once they have been muxed and formatted into a disc image. This means that a closed DVD-Video disc itself cannot serve as the source for the project file or any of the program materials needed when a project is revised.

Since the required ingredients cannot be taken from an existing closed DVD, where do they come from? That depends on the extent to which the elements originally used to create the project remain accessible to the computer used for authoring:

- If the asset files (created during the original capture stage) are no longer available, the video source tapes must be found (as well as source tapes or CDs for any separate audio tracks), and the material recaptured to the computer hard drive. The time involved for the capture depends on the length of the video segment or segments being transferred.
- If the project file (created by the authoring software during the authoring of the original disc) is no longer available, the navigation (menus and button links) of the project must be redefined in the authoring software application. The time involved depends on the complexity of the project.
- If neither the asset files nor the project file have been retained, the entire project must be recreated from scratch.

Ideally, consumers would be able to retain on their hard drives both the asset files and the project file for every project they author. In reality, however, the size of video files makes this very impractical. Even after MPEG compression, video files used for DVD take up 2-4GB of hard-drive space for every hour of program.

A closed DVD, then, actually leaves the end-user with a big dilemma: either tie up huge amounts of storage space to back up each project’s files, or discard the video files and face the time-consuming job of re-transferring from tape (and re-encoding) each time a project is revised. Because few consumers have the storage space to keep source files on hand indefinitely, the files are generally discarded, making it less convenient and more time consuming for a closed DVD to be revised.

OpenDVD: Beyond the Barriers

The OpenDVD specification removes the barriers to updating a DVD, allowing consumers to take full advantage of DVD recordability. It does so with a unique new approach to the creation of DVDs, yielding discs whose contents are not locked but rather remain accessible as project elements to any OpenDVD-compatible authoring solution. With an OpenDVD-compliant disc, there's no worry about whether or not the source materials originally used to create a disc are still available — the disc itself incorporates everything needed to re-open and revise a project.

Enabled by AuthorScript™

AuthorScript™ is a DVD authoring/writing solution for third-party applications, developed by Sonic Solutions, the industry leader in DVD creation applications. Authorscript is also the technology core of Sonic's own applications. Because DVDs output by AuthorScript are automatically OpenDVD-compliant, support for the standard is built not only into applications across Sonic-branded product lines, but also into third-party video editing or DVD packages incorporating AuthorScript. Licensees of AuthorScript include industry-leading companies such as Adobe, Avid, Sony, and Microsoft.

During authoring, AuthorScript keeps track of both "structure" information related to a project's "logical data" (menus, navigation, links, etc.), and information about the location and format of the project's asset files (video, audio, and stills). The structure asset information is stored in an OpenDVD project file (*ProjectName*.dvd).

At the end of the authoring process, when all decisions regarding structure and content are finalized, the project is output for delivery on DVD. The AuthorScript engine reads the project file, evaluates the information therein, and carries out a series of operations that convert the project's current state into a form that is playable from a DVD-Video playback device. The unique capabilities of an OpenDVD disc are built in at this time.

Making an OpenDVD disc

As described earlier, the output stage of the DVD creation process typically involves several steps:

- Any program involving multiple source components — typically menus, which are made up of a background image and subpicture overlays — is composited from multiple files into a single element.
- Assets that are not already in DVD-compliant formats for video (MPEG-1 or -2), audio (PCM or Dolby Digital), or stills (MPEG-2) are transcoded and compressed, resulting in "elemental streams."
- Elemental streams are "muxed" (multiplexed) together into the Video Object (.vob) files required for playback by a DVD-Video player.

- The navigational data defined in authoring is converted into logical data (.ifo) files that can be read and interpreted by a DVD player.
- A “disc image” is generated that reflects the directory structure required for a disc to be used by a DVD player. The VOB and IFO files are located in the “DVD-Video zone” (VIDEO_TS directory) within this structure.

To make an OpenDVD-compliant disc, this process is augmented with the following steps:

- AuthorScript determines which elemental streams (normally only menus) were created by compositing, and it copies the source files used to create those elements into a new directory in the “DVD others zone” (the ROM area outside the VIDEO_TS directory) of the disc image.
- The project (.dvd) file is copied to the DVD-Others zone of the disc image.
- Within the new project file, information relating to the location of assets used in the project is changed as follows:
  - For composited assets, the location references are changed to point to the corresponding source files copied to the DVD-Others zone of the disc image.
  - For non-composited assets, the location references are changed to point to the corresponding VOB files in the DVD-Video zone of the disc image.

The result of these operations is that the DVD-Others zone of any DVD made from this disc image will contain within it an OpenDVD project file that can be opened by an AuthorScript-based DVD authoring application, and the project file will reference assets on the DVD itself rather than on the hard-drive of the computer on which the DVD was authored.

Because the VOB files, which account for the vast majority of the data stored on a DVD, are referenced directly from the DVD-Video zone, they do not need to be stored twice on disc. The combined file size of composited elements, meanwhile, represents a very small portion of the overall content on a DVD, and thus has minimal impact on the capacity of an OpenDVD disc.

OpenDVD advantages

Made with the process described above, OpenDVD discs offer DVD consumers the best of all worlds:

- They can revise their “home movie” DVDs whenever they want.
- They avoid the hassle of recreating projects from scratch.
- Their hard-drive space isn’t taken over by DVD-related files.

Crucially, consumers don’t have to sacrifice compatibility to take advantage of the convenience offered by OpenDVD discs:

- The OpenDVD specification maintains the full feature-set of the DVD-Video format.
- The specification maintains complete compatibility with recordable/rewritable DVD and CD media.

- OpenDVD discs are viewable in all standard DVD playback settings, from set-top players to computer-hosted drives.

Revising an OpenDVD disc

Revising an OpenDVD disc is easy — simply open the disc as a project in any of Sonic's OpenDVD-compatible DVD authoring/writing solutions:

- The disc need not have been recorded on the same format of recordable media as that used by the recording drive in the computer on which the disc will be revised. For instance, a DVD-R or -RW disc may be opened on a computer equipped with a DVD+RW drive, and vice versa. (The revised project will be rewritten to media supported by the user's drive). Thus, the benefits of exchanging OpenDVD-compliant discs with others may be enjoyed without worrying about drive formats.
- If the disc is played on computer via an OpenDVD-aware software DVD player such as Sonic CinePlayer, the player will recognize that the disc is OpenDVD-compliant, and the user will automatically be offered the option of opening the disc in an OpenDVD-compatible authoring solution such as Sonic MyDVD.

Once the OpenDVD disc is opened, AuthorScript readies the project for editing:

- The OpenDVD project file's structure data is used to restore the project's logical state at the time the DVD's disc image was created.
- The asset information in the project file is used to automatically locate asset files on the DVD for all of the disc's existing contents. There's no need for users to track down or recreate any source files for assets.
- Users can immediately begin working on what they really want to accomplish: updating the program with new content, deleting outdated content, or changing the navigation or appearance of menus. The creative process picks up from exactly where it was left when the project was worked on last.

In addition to making DVDs easier to revise, the OpenDVD specification makes the revision of a disc less dependent on the availability of a specific DVD authoring system:

- An OpenDVD-compliant disc may be opened and revised in an OpenDVD-compatible authoring application.
- The authoring package used to revise an OpenDVD disc need not be the same as that used to make it originally.

Faster rewrites with Edit-on-DVD™

Once an OpenDVD project has been revised to the user's satisfaction, the project can be written to a recordable or rewritable DVD, or to CD-R/RW. How this is accomplished depends on the media type of the disc being revised:

- **Fixed media** — If the OpenDVD disc that is being revised is a replicated (pressed) DVD or a recordable (write-once) format such as DVD-R, the revised project cannot be written back to the same disc. The assets on the original disc that are retained in the revised project will be automatically transferred to the computer hard-drive by AuthorScript before the disc image is created for the revised project. After the disc image is created, the entire image is written to a fresh disc.
- **Rewritable media** — If the OpenDVD disc that is being revised is in a rewritable format such as DVD-RW or DVD+RW, the revised project may be written back to the same disc.

There are two possible approaches to writing back to the same disc. One is to treat the existing disc as blank media. The assets on the original disc that are also used in the revised project are first transferred over to the computer hard-drive. After the disc image is created for the revised project, the entire image is written back to the original disc, overwriting its prior contents.

A more efficient approach is implemented in Sonic's exclusive Edit-on-DVD technology, a licensable extension of AuthorScript that optimizes the updating of OpenDVD discs by minimizing the rewriting of content that has not been changed. With Edit-on-DVD, VOB files that are common to the original and revised project are maintained in place, while all other sectors on the disc are available to be overwritten with new or changed content. By copying only the minimum files needed to make the intended revisions, Edit-on-DVD offers huge time-savings over conventional approaches.

Comparison: OpenDVD vs. closed DVD

The following table recaps how revising a "closed" DVD compares to revising a disc authored with OpenDVD technology:

"Closed" DVD	OpenDVD™ disc
Static — A closed DVD is fixed; the material written to the "DVD-Video zone" on the disc cannot be directly opened and modified. Instead, to make any changes the user must first recreate the project as it was when the disc was made. If the required files are no longer available, the disc must be re-authored from scratch.	***Dynamic*** — An OpenDVD disc contains on it the ingredients necessary to recreate the disc without reference to any external source. To make changes (adding or deleting movies, changing menu items, etc.), the user simply opens the disc as a project in any OpenDVD-compatible application.
Complicated — At a minimum, recreating a project means tracking down the project file and all the source asset files, and making sure those files are all in the same relative locations that they were in whenever the disc was written. If the assets haven't been retained on hard-disk, they will all have to be transferred from source tapes and re-encoded to a DVD-ready format.	***Convenient*** — With an OpenDVD disc, users don't have to bother finding, transferring, or encoding any materials other than those that they wish to add. Everything else they need is already right there on the disc, ready to roll at a moment's notice.
Time-consuming — Re-transferring video from source tapes and encoding to a DVD-ready format can take several times the actual duration of the transferred clips. And it involves making decisions about issues such as compression and disc capacity that most users would rather not deal with more than once.	***Quick and easy*** — All existing material on an OpenDVD disc is instantly accessible in any OpenDVD-compliant application. When a disc is revised, only video clips that are to be added need be transferred and encoded.
Eats up hard-drive space — Video files are big — very big. So a closed DVD leaves the user with a big dilemma: either tie up huge amounts of hard-drive space to back up the project, or erase the video files and risk having to re-transfer from tape (and re-encode) if the disc needs to be revised.	***Less filling*** — Once a project has been successfully written to an OpenDVD disc, there's no reason to keep huge video files on the hard-drive. The OpenDVD disc itself becomes an archive for the video clips used on the disc.
Isolated — With a closed DVD, the ability to add to and revise a DVD is limited to the one computer that contains the source files from which the DVD was originally authored. For anyone else to contribute to the DVD, they would need not only the project file and the original source files, but also the same authoring application.	***Interchangeable*** — An OpenDVD disc may be added to and revised by anyone using Sonic's OpenDVD-compatible applications. That allows DVD to be a collaborative medium, with multiple users (family members, project team members, etc.) contributing to a DVD that grows over time.

Using OpenDVD: A More Versatile Disc

Now that we understand the advantages of the OpenDVD specification, it's evident that a dynamic, updateable disc will make the DVD format even more versatile, opening up a whole new range of attractive uses. Here are some hypothetical examples — described from the consumer point of view — that show how average users might take advantage of OpenDVD capabilities:

- **Make corrections to an existing disc.**
  Your son's getting married tomorrow and you've put together a DVD for the rehearsal dinner, featuring classic clips from all that camcorder footage you've been shooting since he was a toddler. Remote in hand, you're running through your presentation one last time when you realize that you misspelled the bride's last name on your main title screen. There are still a million things left to do before the festivities begin, but you don't panic. You just pop the disc back into your computer, retype the name, and click "Make Disc." The revised screen is written back to your rewritable DVD, and you're ready to face your future in-laws.
- **Keep a "video diary" of your growing family**.
  Your baby's changing so fast, it seems like every week she does something new. You've got each move captured on video, of course, and you want to be able to play the best moments when friends and family come calling. But it's a hassle to hook up the camcorder to the TV each time, and then to fumble through a bunch of tapes trying to find the shots that you remember as being priceless. Instead, whenever you get a chance you capture new shots to your computer and write an updated "Baby" DVD. Now your guests are impressed instead of impatient.
- **Collect episodes of favorite TV shows.**
  It's the funniest show on TV! Unfortunately, once it airs you can't be sure you'll ever be able to see it again (you can't count on syndicated re-runs or a home video release). Not to worry — each week you capture the broadcast through your computer's tuner card, then add it to a DVD so that you can watch it anytime you want from your regular spot on the living-room couch. You can fit a few week's worth of shows on each disc, and the coolest episodes are as close as the Menu button on your DVD remote control.
- **Send video letters back and forth with distant loved-ones.**
  Sure, you used to fight a lot, but then you and your big sister realized that you were actually pretty close. Not literally, of course — she moved to Alaska. But sometimes you feel like she's right there in the same room with you, because you've each got a camcorder and a DVD burner. You shoot some footage hanging out with your buddies (and maybe a moment or two of Mom and Dad), then burn a DVD and send it off. A couple weeks later, she's sent it back, adding her own slice of life (a sled dog race? building an Igloo?) from the winter wonderland.
- **Update your small business portfolio.**
  You've got your architecture practice off the ground, and you've even found the time to make "before and after" video walkthroughs of the remodels you've designed. With DVD you've found a handy way to show your work to prospective clients in the comfort of their own living rooms, using a set-top player if they've got one or your

laptop if they don't. Depending on their taste and the type of remodel, you can customize your presentation by navigating directly to clips from selected projects. As more of your constructions are completed, you can add new walkthroughs to your portfolio, and delete clips that no longer represent your best work.

Summary

The ability to revise existing content without access to original source materials gives OpenDVD discs a huge advantage over traditional "closed" DVDs. When it comes to making even the smallest changes to the content on a disc, this advantage translates into benefits that simply aren't available with any other DVD authoring technology:

- **Flexible instead of fixed** — A fixed medium may be fine for movie titles rented at the video store. But for everything else, consumers want to be able to make changes. The OpenDVD standard gives DVD the flexibility of a dynamic, updateable medium.
- **Do more with DVD** — The OpenDVD specification opens up a whole new range of attractive uses, such as keeping "video diaries" of a growing family, collecting episodes of ongoing TV shows, or sending video letters back and forth with distant loved-ones.
- **Convenient and easy to use** — An OpenDVD disc can be edited directly in OpenDVD-compatible applications such as Sonic MyDVD and DVD Producer. Just open the disc as a project, make the changes (add or delete content, or change menus), and write a revised disc. There's no need to worry about digging up the project file or source asset files (video, audio, still pictures) used when the disc was originally created.
- **Best of all worlds** — Recreating a DVD project that hasn't been retained on hard drive is a big, time-consuming job: find all the clips on the source tapes, retransfer them to the computer, reconvert the assets to a DVD-compliant format, reauthor the menus, etc. On the other hand, consumers can't afford to tie up their hard-drives with DVD files that eat up huge amounts of storage space. With OpenDVD, consumers get the best of all worlds: they can revise their DVDs whenever they want, they avoid the hassle of recreating projects from scratch, and their hard-drive space isn't taken over by DVD-related files.
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Incorporating OpenDVD via AuthorScript™

The OpenDVD specification defines an open technology that may be integrated into any C++ application to enable output of OpenDVD-compliant recordable/rewritable discs. Sonic's AuthorScript SDK is one solution, available now, that offers a ready-made implementation of the OpenDVD specification.

AuthorScript is Sonic's comprehensive engine for authoring and burning DVD-Video discs. Just as PostScript® handles the details of desktop publishing, AuthorScript handles the details of publishing on DVD. The AuthorScript SDK makes it easy for OEMs and third-party developers to quickly integrate selected AuthorScript functionalities into their own applications.

In addition to built-in support for the OpenDVD specification, the AuthorScript SDK offers the following advantages to developers of video editing and DVD-related software applications:

- **Broad feature support** — AuthorScript provides the ability to transform video, audio, and still-image content stored on a PC into DVD-Video content that takes full advantage of the capabilities that have made DVD the fastest-growing consumer electronics format in history.
- **Proven compatibility** — DVDs made with AuthorScript are compatible with over a hundred-million set-top DVD players and DVD-equipped PCs worldwide. AuthorScript compatibility has been field-proven through the creation of thousands of commercial DVD titles, including many best-selling Hollywood movies. That means application developers get the highest possible level of compatibility without any additional expenditure of development resources.
- **Trusted by industry leaders** — Leading software companies including Microsoft, Sony, Adobe, and Avid have already staked their reputations on AuthorScript. Sonic's dedicated AuthorScript engineers and support personnel are committed to ensuring that the AuthorScript API delivers the performance and reliability our licensees demand.
- **Multi-level extensibility —** The AuthorScript SDK is available as a multi-level set of license packages. Developers can choose the features that suit their specific application needs today, while preserving the opportunity to expand their use of AuthorScript as their need for functionality grows in the future.
- **Ease of implementation** — The AuthorScript SDK makes it as easy as possible for developers to integrate DVD authoring into their applications. Provided as a set of DLLs and C headers, the AuthorScript libraries are self-contained so that calls to the libraries are seamless. The libraries can typically be integrated into a third-party application, including testing, in about three engineer-weeks.

AuthorScript's unique combination of power, compatibility, and ease make it the ideal vehicle for bringing the benefits of OpenDVD to any video or DVD application. For more information on the capabilities of the AuthorScript API, or on licensing AuthorScript for integration into a third-party application, please contact [authorscript@sonic.com].