AuthorScript® DVD and CD Authoring/Recording/Playback Engines

Product Guide, Autumn 2003

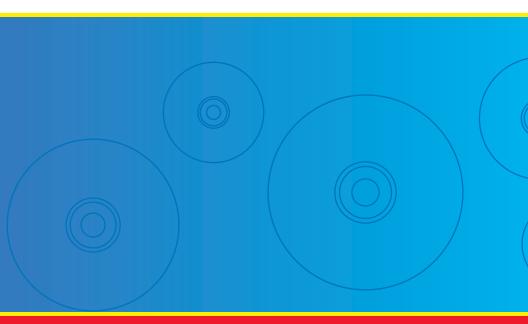




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About Sonic Solutions

Based in Marin County, California, Sonic (http://www.sonic.com) is the world's leading supplier of DVD and CD creation software. Sonic's professional DVD authoring software is used to produce the majority of major film releases on DVD. Sonic's desktop DVD creation software powers most of the world's DVD burners, and Sonic's CD and DVD mastering software is the leading OEM solution for transferring and backing up data to CD and DVD media.

In 1996, Sonic Solutions introduced the first commercial DVD production system: DVD Creator. This was followed by Sonic DVD Fusion, allowing direct DVD publishing from nonlinear video editors, and by Sonic DVDit! and MyDVD, fifth generation consumer-level DVD authoring applications for Windows. Millions of Sonic DVD authoring applications have been shipped, and the majority of the world's DVD title production is accomplished with solutions from Sonic.

Sonic's core strengths include in-depth knowledge of the DVD and CD digital media formats and the video and audio data types they require, and the design of friendly, yet powerful, authoring and editing applications for the consumer, desktop and professional CD and DVD markets.

Sonic has development, sales and support offices in Marin County CA; San Jose, CA; San Luis Obispo CA; Malvern, PA; Shanghai, China; Taipei, Taiwan; Tokyo, Japan; London, England; and Kiev, Ukraine.

AuthorScript Overview

Sonic AuthorScript is the world's leading engine for the creation and burning of DVDs and CDs on PCs and CE devices. Available as a software development kit (SDK) with extensive APIs, AuthorScript makes it easy for application developers to add a broad range of CD and DVD technologies into their applications and to support the widest array of CD and DVD burners. A flexible solution, AuthorScript contains modules for converting video and audio data into DVD- and VCD-compliant streams, formatting and burning DVD-Video and VCD projects, data mastering on recordable CDs and DVDs, music CD ripping and burning, DVR recording and timeshifting, and DVD-Video and VCD playback. AuthorScript also includes comprehensive support for recording and editing in the DVD-VR and DVD+RW (+VR) formats.

Sonic AuthorScript creates fully-compatible DVDs that play back on the widest number of set-top and PC-based DVD players. In addition, AuthorScript's integrated OpenDVD™ technology makes it easy for consumers to revise recorded discs at any time, customizing menus, adding or deleting video, audio, and photos, and editing video on a PC equipped with an OpenDVD-enabled application such as MyDVD®.

AuthorScript has been licensed by industry-leading companies including Adobe, AOL/Time Warner, Avid, Microsoft, and Sony. It underlies Sonic's DVD applications including MyDVD®, DVDit!®, and RecordNow!™, which are bundled by major OEMs such as Adaptec, Compaq, Dell, Fujitsu, Hewlett-Packard, Hitachi, Matrox, Memorex, Nova, Panasonic, Philips, Pioneer, Sony, ViewSonic, and many others.

AuthorScript is analogous to PostScript® for interactive media. Just as PostScript handles font formatting details and makes them transparent to application developers, AuthorScript handles the details of the DVD format so that in-depth knowledge of the DVD specification is not required to create DVD titles. AuthorScript takes in simple DVD navigation commands along with the source locations of video and audio files and performs all of the tasks required to format those files for DVD playback. Available as a set of C++ libraries, AuthorScript can be compiled into virtually any application.

The Benefits of AuthorScript

Start-to-finish support for DVD creation is just part of what makes AuthorScript an ideal solution for developers seeking to add DVD support to their applications. AuthorScript also offers many other valuable benefits and advantages.

Automated DVD and CD Creation

AuthorScript is a family of automatic and easy-to-integrate DVD and CD authoring, burning and playback engines appropriate for applications in a 2-foot (PC) or 10-foot (living room set top box) viewing environment.

Powerful DVD specification support

The AuthorScript engine implements almost every feature of the entire DVD specification, features that have made DVD-Video the fastest-growing consumer electronics format of all time. The engine supports all video and audio formats allowed by the specification, plus anamorphic widescreen video, motion menus, multiple audio streams, multiple video angles, subpicture overlays, DVD command language, UOP control, and much more.

Proven compatibility

With AuthorScript you get the highest possible level of compatibility, provided with no additional effort on the part of the application developer. The AuthorScript engine is mature and proven, having been used in the creation of tens of thousands of DVD titles, including many best-selling Hollywood movies.

To ensure compatibility - from the oldest DVD players to the newest, and from PC software players to DVD-based game consoles - Sonic performs extensive quality assurance both on AuthorScript and on the discs it produces. Sonic also works with all major DVD player manufacturers to ensure playback compatibility, including tuning the AuthorScript engine to work around problematic player behavior.

OpenDVD™ specification support

Applications using AuthorScript support the new OpenDVD™ specification. Open DVD™ is the easiest way to create DVD titles that can be re-edited, revised, and changed over time. With rewritable formats, the changes can even be written back to the same disc. This groundbreaking capability opens a whole new realm of possibilities for the DVD-Video format, giving consumers a versatile way to preserve, update, and share their video and audio

Flexible Encoding

Sonic's plug-in encoder architecture gives developers the freedom to choose from various software and hardware encoding solutions. Developers without an encoder may use Sonic's real time encoding module, or they may separately license a compatible third-party encoder. Developers with their own encoder can easily modify it to plug into AuthorScript.

Trusted by industry leaders

Dozens of leading software companies, including Microsoft, Adobe, and Avid, have already staked their reputations on the AuthorScript API. Sonic's dedicated AuthorScript engineers and support personnel are committed to ensuring that the AuthorScript API delivers the performance and reliability these licensees demand, and to making it as easy as possible for additional developers to integrate DVD authoring into their applications.

The AuthorScript Product Family

AuthorScript is a fully featured family of optical media creation engines addressing any customer's DVD or CD output needs.

Whether you are creating your own full DVD authoring software application, photo slideshow creation application, data back up service, music download service, or DVD-recordable set top box, there is an AuthorScript SDK designed to fit your needs.

AuthorScript is available in several versions to address various needs:

AuthorScript Product Family

AuthorScript Video	DVD Video authoring/recording for PC applications & STBs (Video CD also available)
AuthorScript Photo Slideshow	DVD Video compatible photo slideshows with available motion transitions
AuthorScript Audio Mastering	Time-tested CD audio mastering engine for music download and burn services
AuthorScript Data Backup	Easy-to-integrate CD and DVD data mastering engine for data backup applications
AuthorScript DVR	Self-enclosed DVR module for application integration (Linux version coming soon)
AuthorScript DVD Navigator	Complete DVD playback engine for PCs and STBs
Additional Modules	Encoding and decoding of: MPEG video, AC-3, MP3, and MPEG audio

Engines are available for Windows and Linux operating systems except as noted.

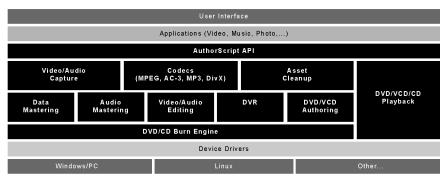
The Markets for AuthorScript

AuthorScript addresses the media engine needs of several key markets. Whether you are a software developer or a services provider needing to work with digital media, there is likely an AuthorScript engine to meet your needs.

Market	AuthorScript SDK
Digital Music services	AuthorScript Audio Mastering; Video
DVD Creation applications and systems	AuthorScript Video
Digital Cameras / Photo applications	AuthorScript Photo Slideshow
Video on Demand / Video download services	AuthorScript Video; Data Backup
Set Top Boxes / Digital Media Servers	AuthorScript Video; DVR; Photo Slideshow
Data backup/archiving applications	AuthorScript Data Backup

AuthorScript Software Stack

AuthorScript is a family of media creation and playback engines that can be used individually for particular digital and physical media types, or together to offer a full suite of media handling services. The diagram below shows the full hierarchy of the complete AuthorScript software stack.



< Represents AuthorScript Software Stack

AuthorScript Video





AuthorScript Video SDK

The Sonic AuthorScript™ Video engine is the technology underlying all of Sonic's DVD authoring applications, and the engine that makes it possible to format content for DVDs and VCDs. The AuthorScript API (Application Programmer's Interface) is a collection of C++ libraries -- and associated calls that can be made from within applications -- that handle all of the low-level processes for converting video, audio, graphics and interactivity into a DVD-Video disc. These libraries are available to third-party developers who would like to add direct DVD-Video publishing to their multimedia, video and audio applications.

MEDIA

· DVD-R/+R/+RW/-RW/RAM and CD-R/RW

FORMAT SUPPORT

· DVD-V-VR; +VR; Video CD (VCD); Super Video CD (SVCD)

VIDEO/AUDIO/GRAPHICS FILE SUPPORT

Video:

- · TV formats supported: NTSC & PAL
- · Video aspect ratio supported: 4:3 & 16:9
- MPEG decoding support (optional)¹⁷
- · MPEG-1, MPEG-2, video import¹
- · MPEG-1/MPEG-2 program stream, WMV, AVI, Quicktime import¹ (optional)²
- · Video (VOBs) import from pre-recorded DVDs³
- · DVD+RW (+VR) VOBs Import3

VIDEO/AUDIO/GRAPHICS FILE SUPPORT (continued)

Audio:

- · WAV (PCM) sample-rate conversion to 48kHz for DVD, 44.1kHz for VCD/SVCD1
- · WAV (PCM), MPEG-1 Layer 2, WMV, MP3 Audio Import
- Dolby Digital Audio import¹⁰
- · Dolby Digital Encoding support (optional)4

Stills:

- · BMP, TIF, TGA, PNG, PICT, JPG import for menus and slideshows⁵
- · Resize still images if necessary

AUTHORING FEATURES

Basic Features:

- · Menus supported (number of menus) = 99
- · Number of buttons (play items) per menu = 32
- · Load style-based templates 12
- · Add button Drop Shadow
- · Specify still image file for menus
- Bit Budget™ reporting

Slideshow:

- · Specify number of pictures
- · Set display interval
- · Simple slide show (Auto Play, No Navigation)
- · Audio under slide show
- · Still show (navigation without audio)
- · Manual advance using chapter points
- · MPEG2 Transitions between slides

Navigation:

- · Assign first play
- · Add chapter points to video stream
- · Legalize chapter point locations to GOP intervals
- · End play options (play all, return to menu)

OUTPUT FEATURES

Basic Features:

- WriteDirect[™] for direct formatting to DVD/CD recorders⁶
- · Build Volume to Hard disk
- · Specify device
- · Check media capacity before burning to disc
- Open-DVD™ Writing®

SYSTEM REQUIREMENTS

Operating System: Windows 98 SE, Millennium Edition, 2000 or XP Linux Red Hat 7.2, 7.3 8.0, 9.0; Monta Vista Hard Hat Linux 2.0, 2.1

Processor: Pentium II 400 MHz or higher RAM: 128MB Minimum (256MB Recommended)

AuthorScript Disk Space: ~30MB disk space for the SDK libraries

AVAILABLE PLATFORMS

Windows: Linux

OPTIONS

Encoders, Transcoding (for Windows)

AuthorScript Slideshow





AuthorScript Photo Slideshow SDK

The AuthorScript Photo Slideshow SDK is for application developers or device makers looking to add a photo slideshow creation module to their application or device that is capable of being played back on a standard DVD player. This SDK offers the DVD player compatibility that Sonic is famous for, along with advanced photo slideshow features such as motion menus, automatic playback, audio enabled slideshows, manual or automatic slide advancement, video-based transition between slides, and much more.

MEDIA

· DVD-R/+R/+RW/-RW/RAM and CD-R/RW

FORMAT SUPPORT

DVD-V-VR; +VR; Video CD (VCD); Super Video CD (SVCD)

VIDEO/AUDIO/GRAPHICS FILE SUPPORT

Video:

- TV formats supported: NTSC & PAL
- · Video aspect ratio supported: 4:3 & 16:9
- MPEG decoding support (optional)¹⁷

Audio:

- WAV (PCM) sample-rate conversion to 48kHz for DVD,44.1kHz for VCD/SVCD1
- · WAV (PCM), MPEG-1 Layer 2, WMV, MP3 Audio Import
- Dolby Digital Audio import¹⁰
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VIDEO/AUDIO/GRAPHICS FILE SUPPORT (continued)

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AuthorScript Disk Space: ~30MB disk space for the SDK libraries

AVAILABLE PLATFORMS

Windows; Linux

OPTIONS

Encoders, Transcoding

AuthorScript Audio Mastering





AuthorScript Audio Mastering SDK

The AuthorScript Audio Mastering SDK is a full-featured audio "rip and burn" engine and toolkit with an API to enable applications running under the Microsoft 32-bit Operating Systems (Windows 9X, NT, 2000, ME XP, and XP MCE).

The chief advantages of using the AuthorScript Audio Mastering SDK for digital music burning are:

Small Footprint - At 1MB, the AuthorScript Audio Mastering SDK is smaller than competing solutions. It is written very tightly and it allows for quick downloading.

Efficiency/Speed - The AuthorScript Audio Mastering SDK will never be a performance bottleneck. The SDK can support 64 separate drives simultaneously.

Simplicity - AuthorScript's clear API makes it very easy for third parties to integrate audio and music burning support in their applications.

Best drive support - Sonic's SilentSelect [™] technology enables support of new drives automatically by reading and understanding their key attributes dynamically. This eliminates the need to update supported drive tables in the field as new drives enter the market.

Broad compatibility, proven solution - The AuthorScript Audio Mastering SDK is used by leading applications developers as well as PC OEMs including AOL,/MusicNet, HP, IBM, Sony, NEC, Fujitsu, Philips and many others. It has an installed base of over 40 million to date.

GENERAL COMPONENTS

- · Music CDs: write red book audio CDs
- · Data CDs; write data CDs
- · Copy Function for CDs
- · MP3 CDs; Create CDs that can be played in MP3 players

SYSTEM SUPPORT

Windows 98SE, Me, NT4, 2000, XP, and XP/MCE

GENERAL BURNING FEATURES

- · High-Speed Media Support
- · Selectable Burn Speed
- · Supports ability to burn multiple copies
- · Support for 74 and 80 minute CDs
- Supports raw mode copying
- · Buffer Underrun Protection JustLink Ricoh's technology
- · Buffer Underrun Protection BurnProof Sanyo's technology
- · ISO 9660 Mode 1 and Mode 2 XA
- · Joliet supports file names up to 64 characters in length including double-byte characters
- · UDF Support
- · Session-At-Once allows users to write multiple DAO sessions on a CD
- · Disc-at-Once (DAO) writes multiple tracks in a single operation and closes the disc
- · Track-At-Once (TAO) writes data one track at a time
- Test mode
- · Display CD Properties (sessions, tracks, etc.)
- · Close disc completely option (not just session) (automatic)
- · Accurate display of project size
- · Accurate display of space remaining on disc
- · Accurate display of time remaining on disc
- · Erase option to erase RW media
- · Power Management Aware (rejects sleep, hibernation)
- System diagnostics utility allows tech support reps to quickly and easily collect users system and device information (debug utilities built into products)
- · Seamless burn from network support

AUDIO FEATURES

- · CDDA Support create audio CDs playable in any CD player
- · Extraction of Multiple audio tracks at once
- · Adjust silence/gap between tracks
- Audio from MP3 files (SDK does not convert to/from MP3)
- Audio from WAV files
- · Audio from WMA files (SDK does not convert to/from WMA)
- · Audio from CD Audio disc
- · Audio from multiple CD audio discs

AUDIO FEATURES (continued)

- · Mixing all of the above on one CD
- · Audio track preview (will play tracks from CD)
- · Edit audio tracks (can add/remove tracks)
- · Supports MP3 and WMA as source for audio tracks (SDK does not convert WMA or MP3 files)
- · MP3 decoder (Yahoo must license MP3 decoder with Fraunhofer/Thomson Multi Media)
- · MS Audio Support
- · Alterable layout
- · CD Text Support
- SRC Support writes the International Standard Recording Code information of each track's author, country of origin and year of production
- UPC Support writes a Unique Product Code for identifying each song, necessary for commercial CDs

AuthorScript Data Backup





AuthorScript Data Backup SDK

The AuthorScript Data Backup SDK is the most device-friendly engine on the market. We recently introduced our SilentSelect™ technology that enables support of new drives automatically by understanding their key attributes dynamically. This eliminates the need to update supported drive tables in the field as new drives enter the market. This engine supports over 1800 drives and counting. The AuthorScript Data Backup SDK has gone through one of the most rigorous qualification processes known for both CD and DVD drives.

This engine has been around longer than any other, is small, efficient, extensively tested in the lab and by the market, well documented and easy to integrate.

GENERAL COMPONENTS

- · Write data to CDs; DVDs
- · Copy Function for CDs; DVDs

SYSTEM SUPPORT

Windows 98SE, Me, NT4, 2000, XP, and XP/MCE

GENERAL BURNING FEATURES

- · High-Speed Media Support
- · Selectable Burn Speed
- · Supports ability to burn multiple copies
- · Support for 74 and 80 minute CDs
- · Support for DVD +R/+RW and -R/-RW
- · Supports raw mode copying
- · Buffer Underrun Protection JustLink Ricoh's technology
- · Buffer Underrun Protection BurnProof Sanyo's technology
- · ISO 9660 Mode 1 and Mode 2 XA

GENERAL BURNING FEATURES (continued)

- Joliet supports file names up to 10664 characters in length including double-byte characters
- · UDF 1.02 Support
- · Session-At-Once allows users to write multiple sessions on a CD
- · Border-At-Once allows users to write multiple borders on a DVD
- · Test mode
- · Close disc completely option (not just session) (Automatic)
- · Accurate display of project size
- · Accurate display of space remaining on disc
- · Accurate display of time remaining on disc
- · Erase option to erase RW media
- System diagnostics utility allows tech support reps to quickly and easily collect users system and device information (debug utilities built into products)
- · Seamless burn from network support

AuthorScript DVR





AuthorScript DVR SDK

AuthorScript DVR works with your computer's TV tuner and video input circuitry to provide real-time encoding of video and audio to hard disk.

FEATURES

- Real-time encoding of Analog TV Tuner, S-Video, and Composite sources to MPEG1 and MPEG 2
- · User selectable recording quality level
- · Time-shift for instant replay or whole-program review

SPECIFICATIONS

- · Accepts NTSC or PAL video source
- · Film (24 fps) and Video (30 fps) frame rates
- · Field/Frame decoding and deinterlacing (Bob & Weave)
- · MPEG2 video
- · MPEG1 Layer 2 audio
- · Compatible with YUY2 and UYVY color-space input
- · Video noise filtering
- · 800kbps 20Mbps video bitrate encoding
- · Configurable motion search parameters
- · Configurable bitrate MPEG-1 Layer audio encoding

PRIMARY CAPABILITIES

DVR Recording Modes

The DirectShow components supplied with the AuthorScript DVR SDK (Windows version) can be used in a number of different ways to provide television and analog video viewing, recording and time-shifting experiences for your end-users. Each mode will have different system requirements for optimum performance and/or require you to make trade-offs in the length of program being recorded, or its quality.

Live Viewing Mode

In live viewing mode, all your computer's resources can be devoted to the relatively simple task of decoding and presenting video on your monitor. Understandably, this produces the best quality picture.

PRIMARY CAPABILITIES (continued)

Real Time Recording Mode

When Recording video to disk (for later editing), the video must be received from the tuner or camera input, then encoded into AuthorScript DVR's MPEG1 or MPEG2 format. These two operations require more computer resources than simple viewing. To ensure the best possible recording quality, your application may suspend playback or "Preview."

DVR Playback Mode

While not specifically a "recording" mode, DVR Playback does involve using the files created during Recording Mode. Since they already exist on disk, the impact on system resources is no greater than playing back any other type of media files.

Time Shift Mode

Time shifting is the most resource intensive set of operations. First, the video must be received from tuner or camera input, encoded to MPEG1 or MPEG2 format and stored in the Time Shift buffer. In order to be available for playback (in either near-real time or shifted time), the buffered video must be decoded again, processed through the computer's VGA display circuitry, and finally delivered to the monitor.

AuthorScript DVD Navigator





AuthorScript DVD Navigator

The AuthorScript DVD Navigator is a software-based DVD playback engine available on a variety of platforms. This Navigator has an installed base of over 20 million users and has matured and stabilized over 7 years of development.

FEATURES

- · Software-based DVD Playback Engine Plays DVDs and VCDs
- · Displays exceptional picture quality
- · Various Play modes including trick modes
- · VGA Accelerated delivers superior performance on specific VGAS platforms
- · Auto-detection provides optimal configuration every time
- · Any resolution or color depth video display (depending on VGA memory)

SPECIFICATIONS

- · Available in 16 languages
- · Navigates button controls in any direction
- · Provides VideoCD 1.1 and 2.0 Navigation and MPEG-1 Decoding
- Set language, audio stream, subpicture stream, camera angle, parental controls
- Supports Dolby Digital (AC-3); 5.1 channel S/PDIF; MPEG2, 2 channel, LPCM, MPEG1 Layer 2 audio formats
- · Supports CSS: Macrovision
- · Requires 256KB RAM (on Windows)

PRIMARY CAPABILITIES

· Available on Windows or Linux

Additional AuthorScript Modules

The AuthorScript product family also includes a series of Encoders and Decoders of that can be licensed from Sonic separately:

VIDEO ENCODER / DECODER

- · MPEG1
- · MPEG2
- · DivX

AUDIO ENCODER / DECODER

- · AC-3
- MP3
- · MPEG1 layer II

Integrating AuthorScript into an Application

The AuthorScript libraries are self-contained so that calls to the libraries can be seamless within an application. Our partners have found that the AuthorScript libraries can be integrated into their application in about two engineer-weeks, including testing time.

The easiest way to implement AuthorScript within an application is by providing a "Publish as DVD" feature. This is a menu option directly within the application that translates an Edit List or Video Timeline into a DVD title without any menus, chapters, or other elaborate DVD navigation features. While this requires very little development effort, the end result may be as basic as a linear DVD title that plays like a laserdisc or videotape from start to end.

For developers seeking more control over the interactive features of DVD, the application needs to support some DVD related UI development, which could include menu design, chapter point definition, navigation control, multi-angle video, multiple audio stream support, and subtitle support.

The AuthorScript Licensing Program

Sonic Licenses the AuthorScript SDKs to customers looking to incorporate a DVD and/or CD engine within their application or system.

Licensing terms typically include the following components:

- Set up Fee
- · NRE fee (if customized work is required)
- · Per-Unit licensing fee

The per-unit licensing fee is based on licensee shipment volume, and the number of AuthorScript modules needed

How to Buy

To determine which version of AuthorScript is right for you and test drive an evaluation copy, contact your nearest Sonic sales representative by contacting:

Phone: (415) 893-8000

Email: authorscript@sonic.com

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