

DVD RECORDING INFORMATION

DVD stands for Digital Versatile/Video Disc, **DVDR** stands for DVD Recordable and **DVDRW** for DVD ReWriteable. If you're familiar with regular audio/music CDs or regular DVD-Video discs, then you will know what a recordable DVDR/W looks like. A recordable DVDR/W stores up to 2 hours of very good quality DVD-Video, including several audio tracks in formats like stereo, Dolby Digital or DTS and also advanced menu systems, subtitles and still pictures that can be played by many standalone DVD Players and most computer DVD-ROMs. If you choose to lower the video quality it is possible to store several hours video on a recordable DVDR/W using low bitrates and low resolution with video quality more like VHS, SVHS, [SVCD](#), [CVD](#) or [VCD](#). It is also possible to have up to 4.37* GB ordinary data or mix DVD-Video and data on a recordable DVD that can be played by most computer DVD-ROMs.

There are three competing DVD Recording standards, **DVD-R/W** and **DVD+R/W** have pretty similar features and are compatible with many standalone DVD Players and most DVD-ROMs while **DVD-RAM** has less DVD Player and DVD-ROM compatibility but better recording features.

DVD-R and DVD-RW

DVD-R/W was the first DVD recording format released that was compatible with standalone DVD Players.

DVD-R is a non-rewriteable format and it is compatible with about [93%](#) of all DVD Players and most DVD-ROMs.

DVD-RW is a rewriteable format and it is compatible with about [80%](#) of all DVD Players and most DVD-ROMs.

DVD-R/W supports single side 4.37 computer GB* DVDs(called [DVD-5](#)) and double sided 8.75 computer GB* DVDs(called [DVD-10](#)).

These formats are supported by [DVDForum](#).

DVD+R and DVD+RW

DVD+R/W has some "better" features than DVD-R/W such as lossless linking and both CAV and CLV writing.

DVD+R is a non-rewritable format and it is compatible with about [89%](#) of all DVD Players and most DVD-ROMs.

DVD+RW is a rewritable format and is compatible with about [79%](#) of all DVD Players and most DVD-ROMs.

DVD+R/W supports single side 4.37 computer GB* DVDs(called [DVD-5](#)) and double side 8.75 computer GB* DVDs(called [DVD-10](#)).

These formats are supported by the [DVD+RW Alliance](#).

DVD+R DL

DVD+R DL or called DVD+R9 is a Dual Layer writeable [DVD+R](#). The dual layered discs can hold 7.95 computer GB* (called [DVD-9](#)) and dual layered double sides 15.9* computer GB (called [dvd-18](#)).

DVD-RAM

DVD-RAM has the best recording features but it is **not** compatible with most DVD-ROM drives and DVD-Video players. Think more of it as a removable hard disk. DVD-RAM is usually used in some [DVD Recorders](#).

This format is supported by [DVDForum](#).

Read our [DVD Writers and Recorders list](#) and read also our [DVD Players Compatibility list](#) to see what types your standalone DVD Player supports. You find more detailed comparisons between the formats in the [more info section here](#).

The DVD sizes can be a bit confusing. There are basically 4 different DVD+-R/W Sizes.

DVD-5, holds around 4 700 000 000 bytes and that is 4.37 computer GB where 1 kbyte is 1024 bytes* . DVD+R/W and DVD-R/W supports this format. Also called Single Sided Single Layered. **This is the most common DVD Media, often called 4.7 GB Media.**

DVD-10, holds around 9 400 000 000 bytes and that is 8.75 computer GB. DVD+R/W and DVD-R/W supports this format. Also called Double Sided Single Layered.

DVD-9, holds around 8 540 000 000 bytes and that is 7.95 computer GB. DVD+R supports this format. Also called Single Sided Dual Layered. **This media is called DVD+R9, DVD+R DL or 8.5 GB Media.**

DVD-18, holds around 17 080 000 000 bytes and that is 15.9 computer GB. DVD+R supports this format. Also called Double Sided Dual Layered.

** In the computer world is 1 KB data = 1024 bytes so 4 700 000 000 bytes / 1024 = 4 589 843KB / 1024 = 4482MB / 1024 = 4.37GB. See section 3.3 in the DVDDemystified FAQ [here](#).*

DVD+R/W/DL and DVD-R/W exact sizes

DVD-R/W = 4 706 074 624 bytes (4488 MB)

DVD+R/W = 4 700 372 992 bytes (4482 MB)

DVD+R DL = 8 547 993 600 bytes (8152 MB)

DVD Write and read speeds

Single Layer(4.7GB) write speeds

1x (CLV) = about 58 minutes

2x (CLV) = about 29 minutes

2.4x (CLV) = about 24 minutes

4x (CLV) = about 14.5 minutes

6x (CLV/ZCLV) = about 10-12 minutes
8x (PCAV/ZCLV) = about 8-10 minutes
12x (PCAV/ZCLV) = about 6.5-7.5 minutes
16x (CAV/ZCLV) = about 6-7 minutes

Dual/Double Layer(8.5GB) write speeds

1x CLV = about 105 minutes
2.4x CLV = about 44 minutes
4x CLV = about 27 minutes

Single Layer (4.7GB) read speeds

6x CAV (avg. ~4x) read speed is max 7.93MB/s = ~14 minutes
8x CAV (avg. ~6x) read speed is max 10.57MB/s = ~10 minutes
12x CAV (avg. ~8x) read speed is max 15.85MB/s = ~7 minutes
16x CAV (avg. ~12x) read speed is max 21.13MB/s = ~5 minutes

** write speed time and read speed time is not the same because writing requires some extra steps and also does the faster writing above 6x usually use lower write speeds for some parts of the dvd. 4x DVD speed = 36x CD speed. See section 4.2 in the DVDDemystified FAQ [here](#).*

Other non-standard special DVD formats:

DVD-VCD

is basically a VCD authored on a DVDR/W. DVD supports the VCD resolution but the audio has to be resampled to 48 khz. If the audio is resampled to 48 khz it is standard DVD-Video. Read more [here](#) how to make a such.

DVD-SVCD

is basically a SVCD authored on a DVDR/W. DVD do not supports the SVCD resolution but it may anyway work and the audio has to be resampled to 48 khz like the DVD-VCD. Read more [here](#) how to make a such and download a DVD Sample including a DVD-SVCD [here](#).

DVD-MP3

is MP3s burned on a DVDR/W but very few MP3 capable standalone DVD Players supports it because most Players verify DVDR/W as DVD-Video only. Check our [DVD Players list](#) for compatibility.

DVD-ISO

is MPEG,MPG,VOB files burned on a DVDR/W without any DVD Authoring(making the vob,ifo files) but very few standalone DVD Players supports it because most Players verify DVDR/W as DVD-Video only. Check our [DVD Players list](#) for compatibility.

What is **miniDVD** / **cDVD** then?

Read here on the [miniDVD/cDVD page](#).

DVD Samples, DVD-SVCD Samples

[DVD Trailers](#), Dolby Digital, DTS, THX Trailers and some other DVD VOB Trailers

To play the DVD Trailers on your computer use [WinDVD](#) and just open the VOB file.

If you would like to burn the VOB Trailers on a DVD±R/W you can use [Ifoedit to author trailers on a DVD](#) or [demultiplex](#) the VOB and then author with for example [Spruceup](#) or any author tool that support Dolby Digital(AC3) or DTS.

[DVD-SVCD Samples](#), NTSC and PAL DVD-SVCD samples.

Technical Info for DVD-Video

PAL

Video:

Up to 9.8 Mbps* (9800 kbps*) MPEG2 video

Up to 1.856 Mbps (1856 kbps) MPEG1 video

720 x 576 pixels MPEG2 (Called Full-D1)

704 x 576 pixels MPEG2

352 x 576 pixels MPEG2 (Called Half-D1, same as the CVD Standard)

352 x 288 pixels MPEG2

352 x 288 pixels MPEG1 (Same as the VCD Standard)

25 fps*

16:9 Anamorphic (only supported by 720x576)

Audio:

48000 Hz

32 - 1536 kbps

Up to 8 audio tracks containing Dolby Digital, DTS, PCM(uncompressed audio), MPEG-1 Layer2. One audio track must have MPEG-1, DD or PCM Audio.

Extras:

Motion menus, still pictures, up to 32 selectable subtitles, seamless branching for multiple storylines, 9 camera angles. And also additional DVD-ROM / data files that only can be read by computer DVD drives.

Total:

Total bitrate including video, audio and subs can be max 10.08 Mbps (10080 kbps)

* *Mbps = million bits per second*

* *kbps = thousand bits per second*

* *fps = frames per second*

For more technical DVD-Video details read [the DVDDemystified DVD FAQ section 3.4](#) or the [mpeg.org DVD Technical Notes](#).

NTSC (NTSC Film)**Video:**

Up to 9.8 Mbps* (9800 kbps*) MPEG2 video

Up to 1.856 Mbps (1856 kbps) MPEG1 video

720 x 480 pixels MPEG2 (Called Full-D1)

704 x 480 pixels MPEG2

352 x 480 pixels MPEG2 (Called Half-D1, same as the CVD Standard)

352 x 240 pixels MPEG2

352 x 240 pixels MPEG1 (Same as the VCD Standard)

29,97 fps*

23,976 fps with [3:2 pulldown](#) = 29,97 playback fps (NTSC Film, this is only supported by MPEG2 video)

16:9 Anamorphic (only supported by 720x480)

Audio:

48000 Hz

32 - 1536 kbps

Up to 8 audio tracks containing DD (Dolby Digital/AC3), DTS, PCM(uncompressed audio), MPEG-1 Layer2. One audio track must have DD or PCM Audio.

Extras:

Motion menus, still pictures, up to 32 selectable subtitles, seamless branching for multiple storylines, 9 camera angles. And also additional DVD-ROM / data files that only can be read by computer DVD drives.

Total:

Total bitrate including video, audio and subs can be max 10.08 Mbps (10080 kbps)

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For more technical DVD-Video details read [the DVDDemystified DVD FAQ section 3.4](#) or the [mpeg.org DVD Technical Notes](#).

DVD File/Folder Structure

Explanation:

- . BUP = Backup files of the IFO files.
- . IFO = The IFO files includes information such as chapters, subtitle tracks and audio tracks.
- . VOB = The VOB files contains the actual video, audio, subtitles and menus.

Folder	Files	Explanation
AUDIO_TS	(undefined)	DVD Audio
VIDEO_TS	VIDEO_TS.BUP	
	VIDEO_TS.IFO	The first video play item, IFO , usually a copyright notice or a menu
	VIDEO_TS.VOB	The first video play item, VOB
	VTS_01_0.BUP	
	VTS_01_0.IFO	Title 01, IFO , usually the main movie
	VTS_01_0.VOB	Title 01, VOB 0, the menu for this title
	VTS_01_1.VOB	Title 01, VOB 1, the video for this title
	VTS_01_2.VOB	Title 01, VOB 2 , if larger than 1 GB it will be splitted into several vobs
	VTS_01_3.VOB	Title 01, VOB 3
	VTS_01_4.VOB	Title 01, VOB 4 , up to 10(0-9) VOB files if necessary
	VTS_02_0.BUP	
	VTS_02_0.IFO	Title 02, IFO , usually movie extras
	VTS_02_0.VOB	Title 02, VOB 0, the menu for this title

VTS_02_1.VOB **Title 02, VOB 1, the video for this title**
 B
 VTS_xx_x.BU
 P
 VTS_xx_x.IFO And so on
 VTS_xx_x.VOB
 B
 VTS_xx_x.VOB
 B
 VTS_99_9.VOB Up to 99(1-99) titles with max 10(0-9) VOB files each
 B

Video File Comparison

Format	VCD	SVCD	DVD	HDDVD HDTV (WMV HD)	DivX XviD WMV	MOV Quick- Time	RM Real- Media	DV
Resolution	352x240	480x480	720x480 ²	1440x1080 ²	640x480 ²	640x480 ²	320x240 ²	720x480 ²
NTSC/PAL	352x288	480x576	720x576 ²	1280x720 ²				720x576
Video Compression	MPEG1	MPEG2	MPEG2, MPEG1	MPEG2 (WMV-MPEG4)	MPEG4	Sorenson, Cinepak, MPEG4	RM	DV
Video bitrate	1150kbp/s	~2000kbp/s	~5000kbp/s	~20Mbps (~8Mbps)	~1000kbp/s	~1000kbp/s	~350kbp/s	25Mbps
Audio Compression	MP1	MP1	MP1, MP2, AC3, DTS, PCM	MP1, MP2, AC3, DTS, PCM	MP3, WMA, OGG, AAC, AC3	Sorenson, Cinepak, MP3	RM	DV
Audio bitrate	224kbp/s	~224kbp/s	~448kbp/s	~448kbp/s	~128kbp/s	~128kbp/s	~64kbp/s	~1500kbp/s
Size/min	10MB/min	10-20MB/min	30-70MB/min	~150MB/min (~60MB/min)	4-10MB/min	4-20MB/min	2-5MB/min	216MB/min
Min/74min CD	74min	35-60min	10-20min	~4min (~10min)	60-180min	30-180min	120-300min	3min

Hours/D VD	N/A	N/A	1-2hrs (2-5hrs ^a)	~30min (~1hrs)	7-18hrs	3-18hrs	14-35hrs	20min
Hours/ DualLaye rDVD DVD	N/A	N/A	2-4hrs (5-9hrs ^a)	~55min (~2hrs)	13-30hrs	6-30hrs	25-65hrs	37min
Player Compati bility	Great	Good	Excellent	None	Few	None	None	None
Compute r CPU Usage	Low	High	Very High	Super high	Very High	High	Low	High
Quality	Good	Great*	Excellent *	Superb*	Great*	Great*	Decent*	Excellent

kbps = thousand bits per second

Mbps = million bits per second

² *approximately resolution, it can be higher or lower*

~ approximately bitrate, it can be higher or lower

^a *DVD with lower video quality, similiar to VCD/SVCD video quality*

** the video quality depends on the bitrate and the video resolution, higher bitrate and higher resolution generally means better video quality but bigger file size*

More Info

General DVD Info

[The DVDDemystified DVD FAQ](#)
[mpeg.org DVD Technical Notes](#)

Comparisons between the difference formats, DVD-R vs DVD+R, DVD+RW vs DVD-RW vs DVD-RAM

[What's the difference between the various DVD recordable formats, and what should I buy?](#)

[DVDDemystified DVD FAQ comparison](#)