

# GNU VCDImager

---

\$Id: vcdimager.texi,v 1.45 2005/06/18 04:11:08 rocky Exp \$  
The GNU Video CD Authoring Tools.  
for version 0.7.23, 18 June 2005

Herbert Valerio Riedel et al.

pub 1024D/883F4142 2001-03-19 Herbert Valerio Riedel <hvr@kernel.org>  
Key fingerprint = 7BB9 2D6C D485 CE64 4748 5F65 4981 E064 883F 4142  
uid Herbert Valerio Riedel <hvr@gnu.org>

Copyright © 2001 Herbert Valerio Riedel <hvr@gnu.org>

Permission is granted to copy, distribute and/or modify this document under the terms of the GNU Free Documentation License, Version 1.1 or any later version published by the Free Software Foundation; with no Invariant Sections, one Front-Cover Text: “GNU VCDImager by Herbert Valerio Riedel et al.” and one Back-Cover Text: “GNU VCDImager can be obtained at <http://www.gnu.org/software/vcdimager/>. The author is reachable at [hvr@gnu.org](mailto:hvr@gnu.org)”. A copy of the license is included in the section entitled “GNU Free Documentation License”.

# Table of Contents

<b>Introduction .....</b>	<b>1</b>
Supplied Tools .....	1
Features .....	1
<b>1 Video CD Concepts .....</b>	<b>3</b>
1.1 Overview .....	3
1.2 Anatomy of Video CD's .....	3
1.3 Known Video CD Flavors .....	4
1.3.1 Video CD 1.1 .....	4
1.3.2 Video CD 2.0 .....	4
1.3.3 Extended Video CD .....	5
1.3.4 Super Video CD 1.0 .....	5
1.3.5 HQ Video CD 1.0 .....	5
1.3.6 Extended Super Video CD .....	6
1.4 The ISO-9660 Track .....	6
1.4.1 Primary Volume Descriptor .....	6
1.4.2 Directory Structure .....	6
1.4.2.1 '/VCD' & '/SVCD' Directory .....	6
1.4.2.2 '/MPEGAV' & '/MPEG2' Directory .....	6
1.4.2.3 '/CDDA' Directory .....	7
1.4.2.4 '/SEGMENT' Directory .....	7
1.4.2.5 '/EXT' Directory .....	7
1.4.2.6 '/CDI' Directory .....	7
1.5 Constraints on MPEG streams .....	7
1.5.1 Video CD .....	7
1.5.2 Super Video CD .....	7
1.5.2.1 Scan Information Data .....	8
1.5.2.2 SVCD Subtitles .....	8
1.5.3 Common Constraints .....	8
1.5.3.1 Alignment .....	8
1.5.3.2 Access Point Sectors .....	8
1.6 Play Items .....	9
1.6.1 Sequence Items .....	9
1.6.2 Segment Items .....	9
1.7 Playback Control .....	10
1.7.1 Function Keys for Interaction .....	10
1.7.2 Linear Playback .....	10
1.7.3 PBC Lists .....	10
1.7.3.1 Play List .....	10
1.7.3.2 Selection List .....	11
1.7.3.3 End List .....	11
1.7.3.4 Command List .....	11
1.7.4 Applications .....	11

<b>2</b>	<b>Reference .....</b>	<b>12</b>
2.1	Tools .....	12
2.1.1	vcdimager .....	12
2.1.2	vcd-info .....	12
2.1.3	vcdxgen .....	12
2.1.3.1	Adding Files to the Video CD .....	12
2.1.3.2	CD-i Support .....	13
2.1.4	vcdxbuild .....	13
2.1.5	vcdxrip .....	13
2.1.6	vcdxminfo .....	13
2.1.7	cdxa2mpeg .....	13
<b>3</b>	<b>Video CD XML Description .....</b>	<b>14</b>
3.1	XML Simplified Rules .....	14
3.2	DTD Notation Reference .....	14
3.3	Video CD XML Conventions .....	14
3.4	<videocd> Root .....	15
3.4.1	<option> Element .....	16
3.4.2	<info> Container .....	17
3.4.3	<pvd> Container .....	18
3.4.4	<filesystem> Container .....	19
3.4.4.1	<folder> Element/Container .....	20
3.4.4.2	<file> Element .....	20
3.4.5	<segment-items> Container .....	20
3.4.5.1	<segment-item> Element .....	21
3.4.6	<sequence-items> Container .....	21
3.4.6.1	<sequence-item> Element .....	21
3.4.7	<pbcd> Container .....	23
3.4.7.1	<selection> Element .....	24
3.4.7.2	<playlist> Element .....	26
3.4.7.3	<endlist> Element .....	28
<b>4</b>	<b>Examples .....</b>	<b>29</b>
4.1	Simple Multitrack Example .....	29
4.2	Video CD Disassembling .....	30
4.3	Video CD Low-level Information .....	30
<b>Appendix A</b>	<b>Tips and Hints .....</b>	<b>32</b>
A.1	SVCD Player Compatibility .....	32
A.2	Fast Forward & Fast Rewind with Super Video CD's .....	32
<b>Appendix B</b>	<b>ISO 9660 Character Sets .....</b>	<b>33</b>
B.1	ISO646 d-Characters .....	33
B.2	ISO646 a-Characters .....	33
<b>Appendix C</b>	<b>Glossary .....</b>	<b>34</b>
<b>Appendix D</b>	<b>GNU General Public License .....</b>	<b>37</b>
	Preamble .....	37
	Terms And Conditions For Copying, Distribution And Modification .....	37
	Appendix: How to Apply These Terms to Your New Programs .....	41

<b>Appendix E</b>	<b>GNU Free Documentation License.....</b>	<b>42</b>
	ADDENDUM: How to use this License for your documents.....	47
<b>XML Tag Index .....</b>		<b>48</b>
<b>Concept Index .....</b>		<b>49</b>

## Introduction

This manual describes the *GNU VCDImager*<sup>1</sup> package, a tool-set for authoring, disassembling and analyzing Video CD's and Super Video CD's.

## Supplied Tools

The following command-line tools are provided with this package:

### **vcdimager**

Simple front-end, allowing for easy command-line controlled generation of basic VCD and SVCD disc images without an intermediate XML description.

**vcd-info** Selectively shows detailed information about the structure a Video CD. See [section "Introduction" in \*The GNU Video CD Info Dump Program\*](#).

**vcdxgen** XML VCD-description generator, with a command-line interface similar to the classic **vcdimager** front-end. See [Section 2.1.3 \[vcdxgen\], page 12](#).

### **vcdxbuild**

Builds a VCD/SVCD according to a supplied XML description and files containing the MPEG program streams referred to in the XML description. See [Section 2.1.4 \[vcdxbuild\], page 13](#).

**vcdxrip** Disassembles a given VCD or SVCD disc into a XML description and the contained MPEG program streams. See [Section 2.1.5 \[vcdxrip\], page 13](#).

### **vcdxminfo**

This is a debugging tool for displaying some MPEG properties, as conceived by internal library **libvcd** and **libvcdinfo**. See [Section 2.1.6 \[vcdxminfo\], page 13](#).

### **cdxa2mpeg**

A program to strip the RIFF header on CD-XA-format tracks. See [Section 2.1.7 \[cdxa2mpeg\], page 13](#).

The generated CD images created are suitable for being burnt on to CD-R, by the use of a CD-recording program which recognizes the BIN/CUE-format, such as **cdrecord**<sup>2</sup>, for instance.

## Features

Features of the back-end library<sup>3</sup>, on which all front-ends rely, include:

- Support for Video CD 1.1 and 2.0 disc format.
- Support for Super Video CD 1.0 and HQ Video CD 1.0<sup>4</sup> disc format.
- Full PBC support, including fully customizable play lists, (multi default) selection lists and end lists.
- Support for segment (play) items (SPI).
- Support for up to 98 sequence items (MPEG tracks) per (Super) Video CD.
- Support for additional entry points into sequence items.
- Support for defining auto pause points in sequence items and segment items.

---

<sup>1</sup> see <http://www.gnu.org/software/vcdimager/>

<sup>2</sup> see <http://cdrecord.sourceforge.net>

<sup>3</sup> the core of the GNU VCDImager package consists of a private library named **libvcd** and public library named **libvcdinfo**, the front-ends are just user interfaces to the exported C-API

<sup>4</sup> based on the IEC-62107 specification with some extensions defined in the super-set SVCD System Specification 1.0. Some support for the *deprecated* Chinese SVCD format is available through option switches.

- General facility for adding files as mode 2 form 1 and mixed form XA sectors to the ISO-9660 file-system and setting some labels in the ISO-9660 PVD
- Supports 99 minute CD-R media<sup>5</sup>.
- Image input support for GNU/Linux `ioctl()`-based cdrom devices, BIN/CUE images and NRG images.

---

<sup>5</sup> ...though most devices will have problems with such an out-of-specification media. You may want use the ‘`--sector-2336`’ option for images longer than 80 minutes

# 1 Video CD Concepts

This chapter gives some background information regarding the underlying Video CD technology.

**Warning:** All information in this chapter is presented without any warranty of accuracy or correctness. You are encouraged to send corrections and improvements for this manual to [bug-vcdimager@gnu.org](mailto:bug-vcdimager@gnu.org).

## 1.1 Overview

The Video Compact Disc (*Video CD* or *VCD*) is a standardized digital video storage format. It is based on the commonly available Compact Disc technology, which allows for low cost video authoring. Video CD's can be played in most DVD standalone player, dedicated VCD players and finally, modern Personal Computers with multimedia support.

## 1.2 Anatomy of Video CD's

Basically a Video CD is made up of CD-ROM XA sectors, i.e. CD-ROM mode 2 form 1 & 2 sectors. Non-MPEG data is stored in mode 2 form 1 sectors with a user data area of 2048 byte, which have a similiar L2 error correction and detection (ECC/EDC) to CD-ROM mode 1 sectors. While realtime MPEG streams is stored in CD-ROM mode 2 form 2 sectors, which by have no L2 ECC, yield a ~14% greater user data area consisting of 2324 bytes<sup>1</sup>

**Warning:** Realtime MPEG streams on Video CD's are only protected by L2 error detection (but no correction!), EDC, and CIRC encoding. Thus Video CD's are more easily affected by scratches and alike on the CD-ROM media surface.

In general, a Video CD is made up of several mode 2 (and optionally CD-DA) tracks. The layout of a Video CD is as follows:

- lead-in area containing the TOC.
- Mandatory pre-gap consisting of 150 sectors (00:00:00 – 00:01:74).
- ISO-9660 data track. The beginning of this track is defined to have the LSN 0. See [Section 1.4 \[The ISO-9660 Track\]](#), page 6.
  - ISO-9660 structure at 00:02:00 consisting of 16 empty sectors, primary volume descriptor (*PVD*) and directory records with file pointers to information area structures (described below) and external pointers to MPEG/CD-DA tracks following the ISO-9660 data track.
  - Optional karaoke area at 00:03:00. (not supported yet by vcdimager)
  - Video CD information area at 00:04:00.
  - Optional segment play item area with MPEG items aligned in 150 sector segments. There can be up to 1980 segments on a disc.
  - Optional program and data file area, for additional files added to the ISO-9660 track.
- Up to 98 MPEG mode 2 form 2 tracks wrapped in front and rear margin<sup>2</sup> empty sectors and preceded by (at least) 150 empty sector pre-gaps.
- 150 sector post-gap after the last mpeg track, as required by the ECMA-130 standard.
- Up to 97<sup>3</sup> CD-DA tracks. (not supported yet by vcdimager)
- Lead-out area.

---

<sup>1</sup> actually raw mode 2 sectors have a 2336 byte user data area, but parts of it are used for error codes and headers when using the mode 2 form 1 or form 2 configurations.

<sup>2</sup> Margins seem to be used, in order to compensate for inaccurate sector addressing issues on CD-ROM media. Interestingly, they have been abandoned for the Super Video CD.

<sup>3</sup> the maximum number of tracks on a Video CD must not exceed 99 tracks



## 1.3 Known Video CD Flavors

There are different Video CD flavors commonly used. The following sections tries to explain the differences amongst them.

See also <http://www.dvdrhelp.com/vcd> and <http://www.dvdrhelp.com/svcd>.

### 1.3.1 Video CD 1.1

This is the most basic Video CD specification dating back to 1993<sup>4</sup>, which has the following characteristics:

- One mode 2 mixed form ISO-9660 track containing file pointers to the information areas.
- Up to 98 multiplex-ed MPEG-1 audio/video streams or CD-DA audio tracks.
- Up to 500 MPEG sequence entry points used as chapter divisions.

The Video CD specification requires the multiplex-ed MPEG-1 stream to have a CBR of less than 174300 bytes (1394400 bits) per second<sup>5</sup> in order to accommodate single speed CD-ROM drives. The specification allows for the following two resolutions<sup>6</sup>:

- 352 x 240 @ 29.97 fps (NTSC SIF).
- 352 x 240 @ 23.976 fps (FILM SIF).

The CBR MPEG-1, layer II audio stream is fixed at 224 kbps with 1 stereo or 2 mono channels. It is recommended to keep the video bit-rate under 1151929.1 bps<sup>7</sup>.

### 1.3.2 Video CD 2.0

About two years after the Video CD 1.1 specification came out, an improved Video CD 2.0 standard was published in 1995. This one added the following items to the features already available in the Video CD 1.1 specification:

- Support for MPEG segment play items (*SPI*), consisting of still pictures, motion pictures and/or audio (only) streams was added. See [Section 1.6.2 \[Segment Items\]](#), page 9.
- Support for interactive playback control (*PBC*) was added.
- Support for playing related access by providing a scan point index file was added. ('/EXT/SCANDATA.DAT')
- Support for closed captions.
- Support for mixing NTSC and PAL content.

By adding PAL support to the Video CD 1.1 specification, the following resolutions became available:

- 352 x 240 @ 29.97 fps (NTSC SIF).
- 352 x 240 @ 23.976 fps (FILM SIF).
- 352 x 288 @ 25 fps (PAL SIF).

For segment play items the following audio encodings became available:

- Joint stereo, stereo or dual channel audio streams at 128, 192, 224 or 384 kbit/sec bit-rate.
- Mono audio streams at 64, 96 or 192 kbit/sec bit-rate.

---

<sup>4</sup> actually this flavor was based on the Karaoke-CD, which was the first MPEG based CD-ROM format.

<sup>5</sup> 2324 bytes of payload per sector \* 75 sectors per second = 174300 bytes per second

<sup>6</sup> Actually even PAL resolution works depending on the playing device

<sup>7</sup> It should be noted, that in addition to the audio stream and the video stream, there are also bits consumed by the program stream encapsulation which have to be taken into account for bit-rate calculations

Also the possibility to have audio only streams and still pictures<sup>8</sup> was provided. The bit-rate of multiplex-ed streams should be kept under<sup>9</sup> 174300 bytes/sec (except for single still picture items) in order to accommodate single speed drives.

### 1.3.3 Extended Video CD

Also known as *XVCD*, this is not an official standard. It's actually just a name for VCD's which do not conform with the official standards in order to use the additional performance of the DVD decoders and thus achieve better image quality. Such an XVCD may be unsupported by many available stand-alone playing devices.

See also <http://www.dvdrhelp.com/xvcd.htm>

### 1.3.4 Super Video CD 1.0

With the upcoming of the DVD-V media, a new VCD standard had to be published in order to be able to keep up with technology, so the Super Video CD specification was called into life 1999.

In the midst of 2000 a full subset<sup>10</sup> of this Super Video CD specification was published as IEC-62107.

As the most notable change over Video CD 2.0 a switch from MPEG-1 CBR to MPEG-2 VBR encoding for the video stream was performed. The following new features—based on the Video CD 2.0 specification—are:

- Use of MPEG-2 encoding instead of MPEG-1 for the video stream.
- Allowed VBR encoding of MPEG-1 audio stream.
- Higher resolutions (see below) for video stream resolution.
- Up to 4 overlay graphics and text (*OGT*) sub-channels for user switchable subtitle displaying<sup>11</sup> in addition to the already existing closed caption facility.
- Command lists for controlling the SVCD virtual machine.

For the Super Video CD, only the following two resolutions are supported for motion video and (low resolution) still pictures<sup>12</sup>:

- 480 x 480 @ 29.97 fps (NTSC 2/3 D1).
- 480 x 576 @ 25 fps (PAL 2/3 D1).

See also <http://www.dvdrhelp.com/svcd> for another description of SVCD and <http://www.dvdrhelp.com/glossary> for a description of the acronyms used above.

### 1.3.5 HQ Video CD 1.0

This is actually just a minor variation defined in IEC-62107 on the Super Video CD 1.0 format for *compatibility with current products in the market*. It differs from the Super Video CD 1.0 format in the following items:

- The system profile tag field in '/SVCD/INFO.SVD' is set to '1' instead of '0'.

<sup>8</sup> in addition to the resolutions already defined for motion video, also high resolutions are available for still pictures, which are 704 x 480 (NTSC Full D1) and 704 x 576 (PAL Full D1)

<sup>9</sup> Alas it seems, that for *strict* Video CD 2.0 compliance, it's required to pad the stream exactly to 1x muxrate. The Super Video CD format does not have this flaw.

<sup>10</sup> The features left out in this subset are: subtitles, command lists, extended pbc (hotspots and disc changer support).

<sup>11</sup> There is also a non-compliant subtitle format widely used, having its origins in the forgotten *China Video Disc* or *Chaoji VCD* (*CVD*) specification, which is said to have been a competitor for the Video CD 2.0 successor. See <http://www.dvdrhelp.com/forum/userguides/98177.php>. Vcdimager recognizes both formats.

<sup>12</sup> the same high resolutions as defined for Video CD 2.0 apply for Super Video CD's

- The system identification field value in ‘/SVCD/INFO.SVD’ is set to ‘HQ-VCD’ instead of ‘SUPERVCD’.
- ‘/EXT/SCANDATA.DAT’ is mandatory instead of being optional.
- ‘/SVCD/SEARCH.DAT’ is optional instead of being mandatory.

### 1.3.6 Extended Super Video CD

Just like the XVCD, and thus also known as *XSVCD*, this is not an official standard and may not work with all playing devices supporting SVCD’s.

## 1.4 The ISO-9660 Track

### 1.4.1 Primary Volume Descriptor

This ISO-9660 sector located at sector LSN 16 contains general information about the ISO-9660 file-system, such as volume label, the application used to create the CD, the preparer, the publisher, file-system size, pointer to the root directory and so on. . .

### 1.4.2 Directory Structure

#### 1.4.2.1 ‘/VCD’ & ‘/SVCD’ Directory

This directories (‘/SVCD’ is used on Super Video CD’s) contain file entries to structures contained in the information area of a (Super) Video CD.

‘/VCD/INFO.VCD’

General video disc information (e.g. album id, size of volume set and number of MPEG items)

‘/VCD/ENTRIES.VCD’

Entry point table.

‘/VCD/LOT.VCD’

List ID Offset Table into ‘PSD.VCD’ (only allowed for Video CD 2.0 discs with PBC)

‘/VCD/PSD.VCD’

Play sequence descriptor file (only allowed for Video CD 2.0 discs with PBC). This file may contain so-called lists (selection lists, play lists and end lists) which represent the PBC.

‘/SVCD/INFO.SVD’

‘/SVCD/ENTRIES.SVD’

‘/SVCD/LOT.SVD’

‘/SVCD/PSD.SVD’

These are the corresponding file names on Super Video CD’s, and fulfill the same purpose as those defined for the Video CD 2.0 format.

‘/SVCD/SEARCH.DAT’

This file, mandatory for Super Video CD’s, contains access point sector addresses. See [Section 1.5.3.2 \[Access Point Sectors\]](#), page 8.

‘/SVCD/TRACKS.SVD’

In this file additional information (e.g. playing time and stream characteristics) about each sequence track is recorded.

#### 1.4.2.2 ‘/MPEGAV’ & ‘/MPEG2’ Directory

This file contains file entries pointing to the sequence items contained in the tracks after the ISO-9660 track.

### 1.4.2.3 ‘/CDDA’ Directory

This file contains file entries pointing to optional CDDA tracks after the ISO-9660 track. This feature is not available for Super Video CD’s.

### 1.4.2.4 ‘/SEGMENT’ Directory

This directory contains file entries to segment play items. See [Section 1.6.2 \[Segment Items\]](#), page 9.

### 1.4.2.5 ‘/EXT’ Directory

‘/EXT/LOT\_X.VCD’

‘/EXT/PSD\_X.VCD’

These are only defined for Video CD 2.0, and contain the extended PBC, which adds area definitions for pointer based selection and/or highlighting of selection areas. (On Super Video CD’s the extended PBC has been merged into the main ‘/SVCD/PSD.SVD’ file)

‘/EXT/SCANDATA.DAT’

This file is optional, and defined (but with a different format) for Video CD 2.0 and Super Video CD 1.0 formats. It contains playing time related access information very similar to the ‘/SVCD/SEARCH.DAT’ file.

‘/EXT/CAPTnn.DAT’

Closed caption data file entries.

### 1.4.2.6 ‘/CDI’ Directory

This directory is provided for CD-i player applications. (Only useful for Video CD’s)

## 1.5 Constraints on MPEG streams

GNU VCDImager expects MPEG streams in a format suitable for (Super) Video CD production. Only a few cases where the MPEG streams fail to adhere to this requirement are detected, thus it’s up to the user to ensure that the constraints are fulfilled. All MPEG streams are expected to be packetized program streams.

### 1.5.1 Video CD

The Video CD specification requires the multiplex-ed MPEG-1 stream to have a bit rate of about 174300 bytes per second. The video stream is required to have one of the following resolutions:

- 352 x 240 @ 29.97 fps (NTSC).
- 352 x 240 @ 23.976 fps (FILM).
- 352 x 288 @ 25 fps (PAL) (not supported on VCD 1.x!).

See also <http://www.dvdrhelp.com/forum/userguides/94382.php> and <http://www.dvdrhelp.com/glossary> for a description of the acronyms used above.

The audio stream must be MPEG-1 layer II, fixed to a 224 kbits/sec CBR with 1 joint stereo, stereo or dual channel audio stream, and a sampling rate of 44.1 kHz at 16 bit resolution.

### 1.5.2 Super Video CD

When creating Super Video CD images MPEG-2 VBR streams are expected with a maximum allowed bit-rate of approximately 2.6 mbits/sec. The following video resolutions are (officially) supported<sup>13</sup>:

<sup>13</sup> actually you can try other resolutions as well, but then you are leaving the SVCD specification behind you. . .

- 480 x 480 @ 29.97 fps (NTSC).
- 480 x 576 @ 25 fps (PAL).

The audio stream must be MPEG-1 layer II, with a bit-rate ranging from 32 to 384 kbits/sec bit-rate (i.e. the audio stream *is* allowed to be VBR!) with up to 2 stereo or 4 mono channels, or 1 extended MPEG-1/2 multichannel (5+1) surround sound stream.

### 1.5.2.1 Scan Information Data

According to the specification, it is mandatory for Super Video CD's<sup>14</sup> to encode scan information data into user data blocks in the picture layer of all intra coded picture. It can be used by playing devices for implementing fast forward & fast reverse scanning.

The already existing scan information data can be updated by enabling the `update scan offsets` option. See [Section 3.4.1 \[<option> Element\]](#), page 16.

### 1.5.2.2 SVCD Subtitles

There exist two major subtitle formats for SVCD's, of which only one—*Overlay Graphics Text* or OGT—is officially supported. The non-compliant one has its origin in the so-called CVD format, a competitor for the Video CD 2.0 successor. The *real* SVCD subtitle format is part of the Super Video Specification, whereas the CVD-style subtitle format is not. Alas the latter one is more widely used, due to older pre-SVCD aged software only supporting the non-compliant CVD subtitle format.

Compliant SVCD subtitles are transported in a `private_stream_1` stream with only the `private_data_id` 0x70<sup>15</sup>. The `sub_stream_id` is used to distinguish between the 4 available subtitle channels.

As of the time of writing, there is only a proof of concept implementation (read *hack*) for creating proper SVCD subtitles. The source code is available from the `contribs` download directory, but its use is not recommended for production use. If you are searching for a new free software project, you could take this as an idea. . .

## 1.5.3 Common Constraints

### 1.5.3.1 Alignment

The MPEG program streams should be aligned to 2324 byte MPEG packet boundaries<sup>16</sup>. If the pack headers should happen not be aligned on 2324 byte boundaries, GNU VCDImager will try<sup>17</sup> to align them on the fly while issuing a warning that padding was needed. **Warning:** Padding the MPEG streams causes the bit-rate at which the data is read to be increased, this may lead to undesirable effects.

If the image generation process should abort with an MPEG related error message, it maybe either due to a bug or due to a corrupted or non-compliant MPEG stream coding. In this case re-encoding or re-multiplexing may help.

### 1.5.3.2 Access Point Sectors

An *Access Point Sector*, APS, is an MPEG video sector on the VCD/SVCD which is suitable to be jumped to directly. APS are required for entry points and scantables.

<sup>14</sup> It seems to be optionally supported for the Video CD 2.0

<sup>15</sup> While AC3 tracks use the `private_data_id` 0x80+, DVD subtitles 0x20 onwards and CVD subtitles 0x00 and up.

<sup>16</sup> i.e. pack headers must be repeated every 2324 bytes, starting on byte 0

<sup>17</sup> aligning only works, if MPEG packets are *not* bigger than 2324 bytes.

APS have to fulfill the requirement to precede every I-frame by a GOP header which shall be preceded by a sequence header in its turn. The start codes of these 3 items are required to be contained all in the same mpeg pack/sector, thus forming a so-called *access point sector*.

This requirement can be relaxed by enabling the **relaxed aps** option, i.e. every sector containing an I-frame will be regarded as an APS. **Warning:** The sequence header is needed for a playing device to figure out display parameters, such as display resolution and frame rate, relaxing the aps requirement may lead to non-working entry points.

## 1.6 Play Items

*Play items* are the MPEG payload on (Super) Video CD's. Sequences are useful for seamless play of larger video sections. However they can't be used for playing still frames. Segments on the other hand, are better for smaller items in interactive applications and can be used for still frames which are often used in menus.

### 1.6.1 Sequence Items

Each *sequence* is put in its own CD track. Motion video stream is required, with optionally up to 2 audio streams.

#### Advantages

- Can be directly accessed without requiring PBC.
- Size of of sequence is not broken up into 150-sector units as it is with a segment.
- Entry points which allow access to “Chapters” or “Scenes” within the larger segment unit.

#### Disadvantages

- Pre-gap of 150 empty sectors.
- Limit of 98 sequences.
- Must contain motion video (and audio for Video CD 2.0) — no still frames!

### 1.6.2 Segment Items

Segment items are stored in the so-called SPI area, which consists of up to 1980 allocation units which are called *segments*. Each segment consists of 150 XA form 2 sectors. Thus the SPI area can contain up to 658 MB of real-time data<sup>18</sup>.

A segment (play) item is a MPEG stream stored in one or more consecutive segments. A segment item can be

- MPEG video with *optional* MPEG audio.
- MPEG encoded still pictures with *optional* MPEG audio.
- MPEG audio only.<sup>19</sup>

#### Advantages

- Up to 1980 segment items possible.
- Still pictures and audio only MPEG streams allowed.
- No pre-gaps.

<sup>18</sup>  $1980 * 150 * 2324 = 690228000$  bytes

<sup>19</sup> Which allows for several hours of audio only play back to fit on a CD-ROM.

## Disadvantages

- Only accessible through PBC.
- Segment item size limited by SPI area size.
- Segment item size is fixed to 150 sectors (the same as the gap between tracks) which may be wasteful of space. If you have a large number of small motion videos, it might be advantageous to combine them into a track and use entry points into the track. “Continued” segments allow for logical segments (something you refer to as a segment in authoring) to be larger than 150 segments. However breaking a logical segments up into many small physical segments is not as clean as having one physical unit for one logical unit. And there may be additional fragmentation in the form of internal sector padding.

## 1.7 Playback Control

*Playback control*, PBC, is available for Video CD 2.0 and Super Video CD 1.0 disc formats. PBC allows control of the playback of play items<sup>20</sup> and the possibility of interaction with the user through the remote control or some other input device available.

### 1.7.1 Function Keys for Interaction

The following keys are usually found on the remote control belonging to the playing device.

**⏮** May also look like **⏮** on the remote control.

**⏭** May also look like **⏭** on the remote control.

**⏪** This key is usually mapped to the **⏪** or **⏪** key.

**⏩** This key may be mapped to the **⏩** key.

**⏹** This is actually a pseudo key, representing the numeric keys **0**, **1**, ..., **9**.

### 1.7.2 Linear Playback

This playback mode is active, when the PSD is not interpreted. In this mode, the **⏹** key causes to start playback at the entry in ‘ENTRY.VCD’/‘ENTRY.SVD’ with the index number pressed. The **⏮** and **⏭** keys play the next or previous entry in that the entry file. This mode allows for compliant playing devices to honor the entry points defined as chapter division markers<sup>21</sup>. Alas, only a few playing devices are capable of honoring Video CD chapters.

### 1.7.3 PBC Lists

The control structures involved in PBC are called *lists* and are stored in the *play sequence descriptor* file.

#### 1.7.3.1 Play List

A *Play list* is basically a collection of play items which are to be played in the order specified. Play lists allow to define target lists for the **⏮**, **⏭** and **⏩** keys on the remote control. Navigation for **⏮**, **⏭** and **⏩** are associated with the entire play-list. Thus, navigation is not updated if an entry passes through to the next entry, but only when passing from one list id to another.

<sup>20</sup> sequence items and segment items

<sup>21</sup> in fact even when the play item is contained in a play-list it should allow to jump between the entry points with the **⏮**/**⏭** keys.



### 1.7.3.2 Selection List

*Selection lists* can be used to offer a user selection based on numeric (NUMERIC) input or—if available—pointer device based selection, while showing a play item.

All of the navigation units available in a play list (NEXT, PREVIOUS, RETURN) can be used in a selection list. But in contrast to a play list, there are additional features: menu selection (mentioned above), random selection, default target (DEFAULT), timeout target and looping.

As with play lists, the navigation is associated with the entire list id. Thus, navigation is not updated if an entry passes through to the next entry; only when passing from one list id to another.

### Hot-spots

The Video CD format allows for so-called hot-spots in selection lists, which are used to define areas on the screen for selection targets, which can be used for pointer device based selection in addition to the NUMERIC input, and/or for highlighting of areas on the screen on selection.

The coordinate system used in menu-selection areas divides the entire viewable part of the screen into coordinates along the x and y axes from (x1,y1)=(0,0) in the upper left to the lower right (x2,y2)=(255,255), regardless the screen resolution or aspect ratio.

Alas menu-selection areas and menu highlighting, however useful may not supported among playing devices.

### Multi Default Selection List

*Multi default selection lists* are a special variant of selection lists which allow for defining different DEFAULT key targets, depending on which section of the play item the playback is currently in. The various sections are defined by using entry points which mark the boundaries.

### 1.7.3.3 End List

An *end list* can be used to terminate the interpretation of the PBC information.

### 1.7.3.4 Command List

*Command lists* are an optional feature defined for Super Video CD's, allowing to execute opcodes in a virtual machine, allowing for enhanced interactivity.

## 1.7.4 Applications

...to be written...



## 2 Reference

### 2.1 Tools

#### 2.1.1 vcdimager

This is the classic front-end, which is maintained only for ease of use and because it does not relay on `libxml2` and thus may be the only built front-end. `vcdimager` does not create a dummy PBC anymore as in the past. It is recommended to familiarize with the XML front-ends, in order to be able to use the extended features offered by GNU VCDImager.

There are a few command-line options for `vcdimager` at the moment, please issue ‘`vcdimager --help`’ for an actual list of available options.

#### 2.1.2 vcd-info

Selectively shows detailed information about the structure a Video CD. This might be helpful in diagnosing problems. This program was originally called `vcddebug`. See [section “Introduction” in \*The GNU Video CD Dump Program\*](#).

#### 2.1.3 vcdxgen

This tool works almost like the `vcdimager` tool, except that it creates an intermediate XML description, instead of directly building the disc image. This XML can be used as a starting point for customization.

The XML file can then be fed to `vcdxbuild` for building the actual image file(s).

*FIXME: write more*

##### 2.1.3.1 Adding Files to the Video CD

Files can be added to the ISO file-system, that is the first track of the Video CD, by making use of the command-line options ‘`--add-file=FILE,ISO_FILENAME`’ and ‘`--add-file-2336=FILE,ISO_FILENAME`’. The latter option allows you to include files containing the complete user data of mode 2 CD-ROM sectors<sup>1</sup>.

The path name given as *ISO\_FILENAME* determines where to link the file in the file-system of the Video CD. The given path name must be a valid ISO-9660 file name with the following restrictions:

- The Character set is restricted to upper case letters, numbers, underscore ‘\_’, dot ‘.’ and slash ‘/’, See [Section B.1 \[ISO646 d-Characters\]](#), page 33.
- The maximum file name length is restricted to 31 characters, the directory nesting level is restricted to 8 and the maximum path length is limited to 255 characters.
- File names must contain exactly one dot.<sup>2</sup>
- ISO-9660 conformance level 1 restrictions apply, i.e. file names are restricted to 8.3 characters.
- The path-name must not begin or end with a slash nor should it contain slashes following directly each other.

If the parent directory for a file entry does not exist it will be created automatically on demand.

<sup>1</sup> 8 bytes for sub-header, 2324 bytes payload (which contains 276 bytes ECC for form 1) and finally 4 bytes for EDC

<sup>2</sup> if no file name extension is supposed to exist the dot must be placed as a trailing dot.

### 2.1.3.2 CD-i Support

There is no specific CD-i support in GNU VCDImager. But you can use the general facilities for adding a custom CD-i player application.

If you happen to have a CD-i application consisting of the files ‘cdi\_imag.rtf’, ‘cdi\_text.fnt’, ‘cdi\_vcd.app’ and ‘cdi\_vcd.cfg’, with ‘cdi\_vcd.app’ being the main application executable, you could add the following lines to your ‘~/popt’ popt<sup>3</sup> aliasing file<sup>4</sup>

```
vcdimager alias --cdi \
    --iso-application-id "CDI/CDI_VCD.APP;1" \
    --add-file-2336 /usr/share/cdi/cdi_imag.rtf,CDI/CDI_IMAG.RTF \
    --add-file      /usr/share/cdi/cdi_text.fnt,CDI/CDI_TEXT.FNT \
    --add-file      /usr/share/cdi/cdi_vcd.app,CDI/CDI_VCD.APP \
    --add-file      /usr/share/cdi/cdi_vcd.cfg,CDI/CDI_VCD.CFG
```

### 2.1.4 vcdxbuild

This program allows to actually build a disc image, based on a given XML description and the files referenced therein. It can be thought of a Video CD *compiler* for XML descriptions of Video CD's.

*FIXME: write more*

### 2.1.5 vcdxrip

See See [section “Introduction” in \*The GNU Video CD Ripping Program\*](#).

### 2.1.6 vcdxminfo

This tool allows to show basic properties of MPEG streams as seen by the back-end library. Dumping of all APS contained in the stream is supported as well.

*FIXME: write more*

### 2.1.7 cdx2mpeg

A program to strip the RIFF header on CD-XA format tracks containing a RIFF header.

On Microsoft Windows, people would extract the payload tracks of Video CD's (e.g the tracks other than the first one) by simply copying the .dat/.mpg files as seen in the filesystem of a (Video) CD.

Since many MPEG players will play tracks copied this way, people tend to think of these as an MPEG files, but they are not. Instead they have a RIFF container around the MPEG stream, including some mode2 sector headers prepended to each MPEG “sector”. Presumably the RIFF container is automatically inserted by the Operating System or filesystem; it isn't part of a Video CD.

In such a setting, `cdx2mpeg` will extract the MPEG portion by stripping off the (inserted) RIFF container and mode2 sector headers.

The name `cdx2meg` refers to the fact that the program reads the CD-XA format tracks and in such a circumstance where there is a RIFF header, strips that off “2” make an MPEG file.

The ability to see or copy the .dat/.mpg requires some sort of filesystem support to read or show the CD Mode2 XA tracks. Depending on the Operating System and filesystem support, seeing MPEG tracks or having the contained in a RIFF might not available or applicable.

A better, more universal way to extract MPEGs from a Video CD is to use the `--tracks` option of See [Section 2.1.5 \[vcdxrip\], page 13](#).

<sup>3</sup> see documentation for popt for more information about option aliasing

<sup>4</sup> add it to ‘/etc/popt’ if the setting should be available system-wide

## 3 Video CD XML Description

The DTD the XML description conforms to, can be downloaded from <http://www.gnu.org/software/vcdimager/videocd.dtd>.

This chapter is merely a reference. Pointers to examples and more practical information about the XML structure used in vcdimager are available at <http://www.vcdimager.org/>.

The use of `vcdxgen` is recommended as a starting point point, when creating an advanced XML description.<sup>1</sup>

### 3.1 XML Simplified Rules

- All attribute values must be quoted.
- White space within content, including line breaks, is significant.
- All start tags ('<pbcc>') must have corresponding end tags ('</pbcc>').
- Tags without content and those which are empty elements must use the '</>' notation, e.g.: '<next-volume-use-lid2 />'.
- Elements must not overlap; they may be nested, however.
- Element names are case sensitive: '<videocd>' and '<VideoCD>' are two different entities.

### 3.2 DTD Notation Reference

Each section of the description of the Video CD XML format begins with a fragment from the Video CD DTD. The following table gives a simplified (and incomplete) reference for the notational syntax.

#PCDATA	parsed character data, i.e. only text without sub-elements allowed
EMPTY	empty, i.e. no sub-element allowed
()	grouping
A?	A or nothing (A is optional, but at most one A)
A+	one or more A's (at least one)
A*	zero or more A's (A optional, but could be several A's)
(A   B   C)	either A or B or C (but only one)
(A, B, C)	first A, followed by B, then C (all, and in this order)
(A & B)	both A and B, in any order

### 3.3 Video CD XML Conventions

#### Time Values

All time related values—<wait>, <autowait>, <playtime>, <start-time-offset>, <entry> and <auto-pause>—are given in seconds.

For the <wait> and <autowait> time entries the values given are rounded to values of the following set:

'-1' meaning an *infinite* wait time. Negative values get rounded to '-1'.

---

<sup>1</sup> Graphical user interfaces to aid XML editing are in development, if you want to join the GUI development group, please get into contact with me at [hvr@gnu.org](mailto:hvr@gnu.org).

'0'	meaning no wait time.
'1'	ranging from '1' to '60' in steps of 1, representing the time to wait in whole seconds.
'60'	ranging from '60' to '2000' in steps of 10, representing the time to wait in whole seconds.
'2000'	maximum wait time of 2000 seconds (33 minutes 20 seconds). Values larger will be truncated to this maximum wait time.

For `<loop>` and `<playtime>` the value '0' means *repeat forever* and *play until end* accordingly.

## Item IDs

Items and their associated IDs fall into two categories, *play items* and *PSD items*. Every reference to an ID has to be of the right class, otherwise the reference can't be resolved, due to a failing look up. A *play item* can be any of the following:

- play nothing item, (omitted `ref` attribute, e.g.: `<play-item />`).
- sequence item, `<sequence-item>`.
- entry point into sequence item, `<entry>`.
- segment item segment play item, `<segment-item>`.

Whereas a *PSD item* is required to be one of:

- disabled, (omitted `ref` attribute, e.g.: `<select />`).
- selection list, `<selection>`.
- play list, `<playlist>`.
- end list, `<endlist>`.

## 3.4 <videocd> Root

```

<!ELEMENT videocd
                                (option*,
                                info,
                                pvd,
                                filesystem?,
                                segment-items?,
                                sequence-items,
                                pbc?)>

<!ATTLIST videocd
  class      CDATA  #REQUIRED
  version    CDATA  #REQUIRED
  xmlns      %URI;  #FIXED 'http://www.gnu.org/software/vcdimager/1.0/'
>

<!ENTITY % URI "CDATA">

```

class  
version

Supported combinations of *class* and *version* are listed below:

<i>class</i>	<i>version</i>	Description
'vcd'	'1.0'	Video CD 1.0/Karaoke CD <i>experimental</i>
'vcd'	'1.1'	Video CD 1.1
'vcd'	'2.0'	Video CD 2.0
'svcd'	'1.0'	Super Video CD 1.0 (IEC-62107)
'hqvcd'	'1.0'	HQ Video CD 1.0 (IEC-62107)

**xmlns**      The `xmlns` attribute defines the XML name-space.

```
<?xml version="1.0"?>
<!DOCTYPE videocd PUBLIC "-//GNU//DTD VideoCD//EN"
    "http://www.gnu.org/software/vcdimager/videocd.dtd">
<videocd xmlns="http://www.gnu.org/software/vcdimager/1.0/"
    class="svcd" version="1.0">
...
</videocd>
```

### 3.4.1 <option> Element

```
<!ELEMENT option                                EMPTY>
<!--ATTLIST option
    name          CDATA    #REQUIRED
    value         CDATA    #IMPLIED
-->
```

The following option *name* are recognized.

**‘svcd vcd30 mpegav’**

Rename ‘/MPEG2’ folder on SVCDs to (non-compliant) ‘/MPEGAV’.

Allowed **value** content: ‘true’, ‘false’. Default: ‘false’.

**‘svcd vcd30 entrysvd’**

Enables the use of the (deprecated) signature ‘ENTRYSVCD’ instead of ‘ENTRYVCD’ for the file ‘/SVCD/ENTRY.SVD’.

Allowed **value** content: ‘true’, ‘false’. Default: ‘false’.

**‘svcd vcd30 tracksvd’**

Enables the use of the (deprecated) chinese ‘/SVCD/TRACKS.SVD’ format which differs from the format defined in the IEC-62107 specification. The differences are most exposed on SVCDs containing more than one video track.

Allowed **value** content: ‘true’, ‘false’. Default: ‘false’.

**‘track pregap’**

Used to set the track pre-gap for all tracks<sup>2</sup> in sectors globally. The specification requires the pre-gaps to be at least 150 sectors long.

Allowed **value** content: [‘1’..‘300’]. Default: ‘150’.

**‘track front margin’**

Set’s the front margin for sequence items. For Video CD 1.0/1.1/2.0 this margin should be at least 15 sectors long.

Allowed **value** content: [‘0’..‘150’]. Default: ‘30’ for Video CD 1.0/1.1/2.0, otherwise (i.e. Super Video CD 1.0 and HQ-VCD 1.0) ‘0’.

**‘track rear margin’**

Set’s the rear margin for sequence items. For Video CD 1.0/1.1/2.0 this margin should be at least 15 sectors long.

Allowed **value** content: [‘0’..‘150’]. Default: ‘45’ for Video CD 1.0/1.1/2.0, otherwise ‘0’.

---

<sup>2</sup> except for the first one, which is hardwired to 150 sectors

**‘leadout pregap’**

This option<sup>3</sup> allows to set the amount of empty sectors added before the lead-out area begins, i.e. the amount of post-gap sectors. The ECMA-130 specification requires the last data track before the lead-out to carry a post-gap of at least 150 sectors, which is used as default for this parameter.

Some operating systems may encounter I/O errors due to read-ahead issues when reading the last mpeg track if this parameter is set to low.

Allowed value content: [‘0’..‘300’]. Default: ‘150’.

**‘leadout pause’**

*DEPRECATED*. Use ‘leadout pregap’ instead. This option is equivalent to setting the ‘leadout pregap’ option to the (default) value ‘150’.

Allowed value content: ‘true’, ‘false’. Default: ‘true’.

**‘relaxed aps’**

This controls whether APS constraints are strict or relaxed. See [Section 1.5.3.2 \[Access Point Sectors\]](#), page 8.

Allowed value content: ‘true’, ‘false’. Default: ‘false’.

**‘update scan offsets’**

This controls whether to update the scan data information contained in the MPEG-2 video streams<sup>4</sup>. See [Section 1.5.2.1 \[Scan Information Data\]](#), page 8.

Allowed value content: ‘true’, ‘false’. Default: ‘false’.

```
...
<videocd xmlns=...
  <option name="relaxed aps" value="true"/>
  <info>
  ...
```

**3.4.2 <info> Container**

<pre>&lt;!ELEMENT info</pre>	<pre>(album-id?,   volume-count?,   volume-number?,   next-volume-use-sequence2?,   next-volume-use-lid2?,   restriction?,   start-time-offset*)&gt;</pre>
<pre>&lt;!ELEMENT album-id</pre>	<pre>(#PCDATA)&gt;</pre>
<pre>&lt;!ELEMENT volume-count</pre>	<pre>(#PCDATA)&gt;</pre>
<pre>&lt;!ELEMENT volume-number</pre>	<pre>(#PCDATA)&gt;</pre>
<pre>&lt;!ELEMENT next-volume-use-sequence2</pre>	<pre>EMPTY&gt;</pre>
<pre>&lt;!ELEMENT next-volume-use-lid2</pre>	<pre>EMPTY&gt;</pre>
<pre>&lt;!ELEMENT restriction</pre>	<pre>(#PCDATA)&gt;</pre>
<pre>&lt;!ELEMENT start-time-offset</pre>	<pre>(#PCDATA)&gt;</pre>

The <info> section allows to customize the information contained in the ‘VCD/INFO.VCD’ or ‘VCD/INFO.SVD’.

<sup>3</sup> Should have been better named ‘data track post-gap’.

<sup>4</sup> It is required, that the stream has already user data groups with scan information data, in order for this feature to work

**<album-id>**

Name of the album<sup>5</sup> which the discs belongs to. This id is used in conjunction with the following elements to decide whether a disc is the next volume of the currently played one.

The Content restricted to upto 16 d-characters, See [Section B.1 \[ISO646 d-Characters\]](#), page 33.

**<volume-count>**

Total number of volumes (discs) in the album identified by <album-id>.

Allowed content: ['1'..'65535']. Default: '1'.

**<volume-number>**

Ordinal number of the volume (disc) in the album.

Allowed content: ['0'..'65535']. Default: '1'.

The following elements are only supported for Video CD 2.0, Super Video CD 1.0 and HQ Video CD 1.0.

**<next-volume-use-sequence2/>**

If PBC interpretation is disabled, start the next disc if it has the same <album-id> at the second sequence instead of the first.

**<next-volume-use-lid2/>**

If PBC is present and interpretation enabled, start the next disc if it has the same <album-id> at the second PBC list instead of the first one.

**<restriction>**

Restriction category. This element allows to set viewing restrictions which may be interpreted by the playing device. The allowed range goes from '0', i.e. unrestricted, to '3', i.e. restriction category 3.<sup>6</sup>

**<start-time-offset>**

Only supported for Super Video CD 1.0 and HQ Video CD 1.0. Up to 5 <start-time-offset> may be defined, which represent the start time offsets for the first 5 discs of an album. *not implemented yet*

```
...
<info>
  <album-id>GNU_WARS_EP9</album-id>
  <volume-count>2</volume-count>
  <volume-number>1</volume-number>
  <next-volume-use-sequence2/>
</info>
...
```

<sup>5</sup> An *album* is defined as a series of discs which contain related content

<sup>6</sup> The exact meaning of the restriction categories is depending on the interpreting playing device.

### 3.4.3 <pvd> Container

```

<!ELEMENT pvd                                     (volume-id?,
                                                system-id?,
                                                application-id?,
                                                preparer-id?,
                                                publisher-id?)>

<!ELEMENT volume-id                             (#PCDATA)>
<!ELEMENT system-id                             (#PCDATA)>
<!ELEMENT application-id                       (#PCDATA)>
<!ELEMENT preparer-id                         (#PCDATA)>
<!ELEMENT publisher-id                       (#PCDATA)>

```

This part of the XML structure describes the primary volume descriptor of the disc.

#### <volume-id>

Volume label of the CD-ROM. Content restricted to up to 32 d-characters, See [Section B.1 \[ISO646 d-Characters\]](#), page 33. This is label usually shows up on computer systems as volume label.

#### <system-id>

System id of the CD-ROM. Content restricted to up to 32 a-characters. Should be set to 'CD-RTOS CD-BRIDGE' for Video CD's for CD-i compatibility. This fields content is ignored by vcdimager and always set to 'CD-RTOS CD-BRIDGE'.

#### <application-id>

Defines the application pathname for CD-i playing devices.

#### <preparer-id>

This field is used by vcdimager to put a version string on the Video CD, regardless of the content given in the XML description which is ignored.

#### <publisher-id>

Data Preparer Identifier for the CD-ROM. Content restricted to up to 128 a-characters See [Section B.2 \[ISO646 a-Characters\]](#), page 33.

```

...
<pvd>
  <volume-id>GNU_WARS_EP9_1_OF_2</volume-id>
  <system-id>CD-RTOS CD-BRIDGE</system-id>
  <publisher-id>John Doe</publisher-id>
</pvd>
...

```

### 3.4.4 <filesystem> Container

```

<!ELEMENT filesystem                             (folder*,
                                                file*)>

```

This section of the XML description allows for the creation of additional folders and files into the ISO-9660 filesystem on the Video CD. See [Section 2.1.3.1 \[Adding Files to the Video CD\]](#), page 12.



### 3.4.4.1 <folder> Element/Container

```

<!ELEMENT folder                                (name,
                                                folder*,
                                                file*)>

<!ELEMENT name                                  (#PCDATA)>

```

**<name>** Directory name in the ISO-9660 domain.

```

...
<filesystem>
  <folder>
    <name>CDI</name>
    <file src=...>
  ...
  </folder>
</filesystem>
...

```

### 3.4.4.2 <file> Element

```

<!ELEMENT file                                (name)>
<!ATTLIST file
  src          %URI; #REQUIRED
  format       (form1|mixed) "form1"
>
<!ELEMENT name                                  (#PCDATA)>

```

**<name>** Filename in the ISO-9660 domain.

**src** Source location of the file.

**format** Whether file is an ordinary **form1** file, or a **mixed** form real-time file containing the sector information in 2336 byte blocks.

```

...
<folder>
  <name>CDI</name>
  <file src="/usr/share/cdi/cdi_imag.rtf" format="mixed">
    <name>CDI_IMAG.RTF</name>
  </file>
  <file src="/usr/share/cdi/cdi_text.fnt">
    <name>CDI_TEXT.FNT</name>
  </file>
...

```

### 3.4.5 <segment-items> Container

```

<!ELEMENT segment-items                      (segment-item)+>

```

Only supported for Video CD 2.0, Super Video CD 1.0 and HQ Video CD 1.0.

### 3.4.5.1 <segment-item> Element

```

<!ELEMENT segment-item                                (auto-pause)*>
<!--ATTLIST segment-item
      id          ID          #REQUIRED
      src         %URI;      #REQUIRED
-->

<!ELEMENT auto-pause                                (#PCDATA)>

```

#### <segment-item>

Element representing a segment item. Segment play items need to be referenced from the <pbcs> section in order to be accessible at all.

**id**            Id string to be referenced in **ref** attributes.

**src**            This attribute specifies the external file name of the item, i.e. the location of the file containing the MPEG stream to be included.

#### <auto-pause>

See description in <sequence-item>.

```

...
<segment-items>
...
  <segment-item src="stills/splash.mpg" id="seg-still-splash" />

  <segment-item src="animations/intro.mpg" id="seg-animation-intro" />

  <segment-item src="animations/intra.mpg" id="seg-animation-intra" />

  <segment-item src="animations/extro.mpg" id="seg-animation-extro" />
...
</segment-items>
...

```

### 3.4.6 <sequence-items> Container

```

<!ELEMENT sequence-items                            (sequence-item)+>

```

### 3.4.6.1 <sequence-item> Element

```

<!ELEMENT sequence-item                                (default-entry?,
                                                         entry*,
                                                         auto-pause*)>

<!ATTLIST sequence-item
  id          ID          #IMPLIED
  src         %URI;      #REQUIRED
>

<!ELEMENT auto-pause                                (#PCDATA)>

<!ELEMENT default-entry EMPTY>
<!ATTLIST default-entry
  id          ID          #REQUIRED
>

<!ELEMENT entry                                    (#PCDATA)>
<!ATTLIST entry
  id          ID          #IMPLIED
>

```

#### <sequence-item>

Element representing a sequence item. Each sequence item corresponds to a single track in the resulting disc.

**id** ID value referenced in **ref** attributes.

**src** This attribute specifies the external file name of the item, i.e. MPEG stream, to be included.

#### <auto-pause>

This element specifies where to insert auto pause points, whose wait time is controlled by play lists' <await>. The time is given in seconds from the beginning of the sequence.

#### <default-entry>

Represents the mandatory default entry point pointing to the start of the sequence<sup>7</sup>.

**<entry>** Defines an additional entry point into the sequence item. Up to 99 entry points (including the default entry point) can be defined per sequence, while only a maximum of 500 entry points<sup>8</sup> can be present in the whole disc. The entry point time is given in seconds from the beginning of the sequence. If referenced from PBC the sequence which contains the entry point is played from the entry point to the end of the sequence, *not* to the next entry point! Similarly navigation values do not change if the next entry point is passed. See [Section 1.5.3.2 \[Access Point Sectors\]](#), page 8.

**id** Play item ID value referenced in **ref** attributes.

<sup>7</sup> Referencing the default entry point id should be equivalent to referencing the sequence id. Depending on the firmware of the playing device, the sequence id may reflect the start of the sequence as defined by the TOC, while the default entry id gets defined by the address defined in the 'ENTRY.VCD' or 'ENTRY.SVD'

<sup>8</sup> every sequence point has automatically an entry point defined, which must be subtracted from the maximum of 500 entry points

```

...
<sequence-items>
...
  <sequence-item src="videos/movie.mpg" id="seq-movie">
    <default-entry id="ent-movie-0" />
    <entry id="ent-movie-1">90.32</entry>
    <entry id="ent-movie-2">710</entry>
    <entry id="ent-movie-3">1760.5</entry>
    <entry id="ent-movie-4">3050</entry>
  </sequence-item>

  <sequence-item src="videos/trailer1.mpg" id="seq-trailer-1" />

  <sequence-item src="videos/trailer2.mpg" id="seq-trailer-2">
    <auto-pause>15.300</auto-pause>
    <auto-pause>260.7</auto-pause>
  </sequence-item>
...
</sequence-items>
...

```

### 3.4.7 <pbcc> Container

```

<!ELEMENT pbcc (selection|
                playlist|
                endlst)+>

<!ENTITY % pbccatts
" id ID #REQUIRED
  rejected (true|false) 'false'"
>

<!ENTITY % XY "CDATA">

<!ENTITY % ofsatts
" ref IDREF #REQUIRED
  x1 %XY; #IMPLIED
  y1 %XY; #IMPLIED
  x2 %XY; #IMPLIED
  y2 %XY; #IMPLIED"
>

<!ELEMENT play-item EMPTY>
<!ATTLIST play-item
  ref IDREF #IMPLIED
>

```

<pbcc> container and sub-elements only supported for Video CD 2.0, Super Video CD 1.0 and HQ Video CD 1.0.

**id** ID value referenced in **ref** attributes.

**rejected** Attribute controlling, whether item is not listed, i.e. *rejected*, in the LOT. Lists which are not rejected may be—if supported by the playing device—select-able by user input of the automatically assigned *List ID Number*. It is recommended to enable the rejected property for but the very first PBC list, in order to make the *unreferenced item check* work better. The first PBC Item must not be rejected.

`x1 y1 x2 y2`

Screen coordinates for selection-hotspot areas. This is only supported for `<selection>` members; '0,0' is the upper left left screen coordinate and '255,255' is the lower-right screen coordinate. `x1` and `y1` are required to be less than `x2` and `y2` respectively. This coordinate system is independent and does not vary due to actual screen resolution or aspect ratio that may be use in display.

See [Section 1.7.3.2 \[Selection List\]](#), page 11.

`play-item`

This empty element is used to reference play item ids. If the `ref` attribute is ommitted (e.g. `<play-item />`, the *play nothing item* is implicitly referenced.

## 3.4.7.1 &lt;selection&gt; Element

```

<!ELEMENT selection                                     (bsn?,
                                                         prev?,
                                                         next?,
                                                         return?,
                                                         (multi-default|default)?,
                                                         timeout?,
                                                         wait?,
                                                         loop?,
                                                         play-item?,
                                                         select*)>

<!ATTLIST selection
  %pbcattrs;
>

<!ENTITY % ofsattrs
  ref          IDREF          #IMPLIED
  x1           %XY;           #IMPLIED
  y1           %XY;           #IMPLIED
  x2           %XY;           #IMPLIED
  y2           %XY;           #IMPLIED
>

<!ELEMENT      bsn                (#PCDATA)>
<!ELEMENT      prev               EMPTY>
<!ELEMENT      next               EMPTY>
<!ELEMENT      return             EMPTY>

<!ELEMENT      default            EMPTY>
<!ELEMENT      multi-default      EMPTY>
<!ATTLIST multi-default
  numeric      (enabled|disabled) 'enabled'
>

<!ELEMENT      timeout            EMPTY>
<!ELEMENT      wait               (#PCDATA)>

<!ELEMENT      loop               (#PCDATA)>
<!ATTLIST loop
  jump-timing  (immediate|delayed) 'immediate'
>

<!ATTLIST prev      %ofsattrs>
<!ATTLIST next      %ofsattrs>
<!ATTLIST return    %ofsattrs>
<!ATTLIST default   %ofsattrs>
<!ATTLIST select    %ofsattrs>
<!ATTLIST timeout   ref          IDREF    #IMPLIED>
<!ATTLIST play-item ref          IDREF    #IMPLIED>

<!ELEMENT      play-item          EMPTY>
<!ELEMENT      select             EMPTY>

```

- <bsn>** Base selection number, the numeric value which is taken as the first selection number. The default is '1' and the allowed range goes from 1 upto 99.
- <prev>** Target list id jumped to on PREVIOUS key press.
- <next>** Target list id jumped to on NEXT key press.
- <return>** Target list id jumped to on RETURN key press.
- <default>**  
Target list id jumped to on DEFAULT key press. May not be present at the same time with the following element.  
If a **<default>** target is defined, **<loop>** should not be set to loop forever ('0') nor shall **<wait>** indicate an infinite time-out wait time, otherwise the target will be unreachable.
- <multi-default>**  
When present, causes the selection list to be a multi-default selection list, i.e. that the target list id of the DEFAULT depends on which part of the sequence item is playing. The **numeric** attributes, if *disabled*, allows to disable the NUMERIC keys. When using multi-default selections, the **<bsn>** must be set to 1 and the number of selection must match the number of all entry points of the sequence referenced by **<play-item>**.
- <timeout>**  
Target list id to be jumped on time-out of **<wait>**. If omitted (and **<wait>** is not set to an infinite time) one of the **<select>** targets is selected at random!
- <wait>** Time in seconds to wait after playback of **<play-item>** before triggering the **<timeout>** action (unless the user triggers some action before time ran up). Default: '0'.
- <loop>** Times to repeat the playback of **<play-item>**. the **jump-timing** attribute controls whether the playback of **<play-item>** is finished, thus *delayed*, before executing user triggered action or an *immediate* jump is performed. After the specified amount of repetitions are completed, the **<wait>** time begins to count down, unless set to an infinite wait time by setting it to the value '0'. If this element is omitted, a default of '1' is used, i.e. the **<play-item>** will be displayed once. The default for the **jump-timing** is *immediate*.  
When the **jump-timing** is set to *delayed*, it is recommended that the length of the referenced **<play-item>** is not more than 5 seconds. The recommended setting for a play item consisting of one still picture and no audio is to loop once and have a *delayed jump-timing*.  
If **<play-time>** refers to an entry, the unit of looping is complete when the sequence that the entry is contained in is complete. The point to start again on repetition is still however the entry point, not the beginning of the sequence.
- <play-item>**  
The *play item* to be played while waiting for user intervention.
- <select>** Target list id(s) jumped to on NUMERIC key presses. There may be up to 99 select choices. The sum of **<bsn>** and the number of **<select>** elements per **<selection>** must not be greater than 100.

### 3.4.7.2 <playlist> Element

```

<!ELEMENT playlist                                (prev?,
                                                    next?,
                                                    return?,
                                                    playtime?,
                                                    wait?,
                                                    autowait?,
                                                    play-item+)>

<!-- ATTLIST playlist
    %pbcattrs;
-->

<!ELEMENT      prev                                EMPTY>
<!ELEMENT      next                                EMPTY>
<!ELEMENT      return                              EMPTY>
<!ELEMENT      playtime                            (#PCDATA)>
<!ELEMENT      wait                                (#PCDATA)>
<!ELEMENT      autowait                            (#PCDATA)>
<!ELEMENT      play-item                           EMPTY>

```

<prev> Target list id jumped to on PREVIOUS key press.

<next> Target list id jumped to on NEXT key press.

<return> Target list id jumped to on RETURN key press.

<playtime>

The amount of seconds to play of every <play-item>. The given time value is rounded to 1/15 second units. The allowed range has a maximum value of '4369.0' seconds, values equal or less than '0' cause each <play-item> to be played to its end. Default: '0'

<wait> Time in seconds to wait after each playback of <play-item> before proceeding. Default: '0'.

<autowait>

Time in seconds to wait at each defined <auto-pause> point for sequence items referenced in this play list. Default: '0'.

<play-item>

The *play item(s)* to play in order. Up to 255 <play-item> elements may be defined per <playlist>.



```
...
<pbcb>
...
<playlist id="play-trailers">
  <prev ref="select-specialfeaturemenu"/>
  <next ref="select-specialfeaturemenu"/>
  <return ref="select-specialfeaturemenu"/>
  <wait>0</wait>
  <autowait>0</autowait>
  <play-item ref="seg-animation-intro"/>
  <play-item ref="seq-trailer-1"/>
  <play-item ref="seg-animation-intra"/>
  <play-item ref="seq-trailer-2"/>
  <play-item ref="seg-animation-intra"/>
  <play-item ref="seq-trailer-3"/>
  <play-item ref="seg-animation-extro"/>
</playlist>
...
</pbcb>
</videocd>
...
```

### 3.4.7.3 <endlist> Element

```
<!ELEMENT endlist                                     (next-volume?,
                                                         play-item?)>

<!ATTLIST endlist
    %pbcattrs;
>

<!ELEMENT next-volume                                (#PCDATA)>
```

The following elements are only supported for Super Video CD 1.0 and HQ Video CD 1.0.

## &lt;next-volume&gt;

Only supported for Super Video CD's. If set to 0 stop PBC interpretation, otherwise switch to the selected volume number.

<play-item>

Only supported for Super Video CD's. Displays the referenced image while waiting for a volume change. Referenced play item shall be a still picture.

```
...
  <endlist id="end-lid">
    <next-volume>2</next-volume>
    <play-item ref="change-disc-segitem"/>
  </endlist>
...
</pbcc>
</videocd>
...
```

## 4 Examples

The general procedure for creating a (Super) Video CD involves the following steps:

1. Get an idea for a Video CD.
2. Collecting, creating or encoding the required MPEG items for inclusion on the Video CD.
3. Design some sophisticated PBC flow and create a XML description reflecting that or use `vcdxgen` to generate a very simple Video CD structure.
4. Let `vcdxbuild` process the XML description created in the previous step. If required fix warnings and errors displayed by `vcdxbuild`.
5. Write the created disc image to a CD-R.

The steps of encoding compliant MPEG program streams are not covered in this manual.<sup>1</sup>

The last step, writing to a CD-R, can be accomplished by `cdrdao`<sup>2</sup> as simple as:

```
$ cdrdao write --device 0,5,0 --speed 8 videocd.cue
Cdrdao version 1.1.5 - (C) Andreas Mueller <andreas@daneb.de>
  SCSI interface library - (C) Joerg Schilling
  L-EC encoding library - (C) Heiko Eissfeldt
  Paranoia DAE library - (C) Monty

Check http://cdrdao.sourceforge.net/drives.html#dt for current driver
tables.

Using libscg version 'schily-0.5'

0,5,0: YAMAHA CRW8424S Rev: 1.0j
Using driver: Generic SCSI-3/MMC - Version 1.2 (options 0x0000)

Starting write at speed 8...
Pausing 10 seconds - hit CTRL-C to abort.
Process can be aborted with QUIT signal (usually CTRL-\\).
Executing power calibration...
Power calibration successful.
Writing track 01 (mode MODE2_RAW/MODE2_RAW)...
Writing track 02 (mode MODE2_RAW/MODE2_RAW)...
Wrote 750 of 750 MB (Buffer 100%).
Wrote 334544 blocks. Buffer fill min 96%/max 100%.
Flushing cache...
Writing finished successfully.
$
```

### 4.1 Simple Multitrack Example

In the following example session, the files 'track1.mpg', 'track2.mpg' and 'track3.mpg' are mastered into the default output files 'videocd.cue' and 'videocd.bin'. The volume label is set to 'My Test VCD'.

<sup>1</sup> see <http://mjpeg.sourceforge.net/>

<sup>2</sup> see <http://cdrdao.sourceforge.net/>

```
$ vcdimager --iso-volume-label="MY_TEST_VCD" track1.mpg track2 track3.mpg
INFO: scanning mpeg sequence item #0 for scanpoints...
INFO: scanning mpeg sequence item #1 for scanpoints...
INFO: scanning mpeg sequence item #2 for scanpoints...
INFO: writing track 1 (ISO-9660)...
INFO: writing track 2, MPEG1, NTSC SIF (352x240/29.97fps), 1 audio stream...
INFO: writing track 3, MPEG1, PAL SIF (352x288/25fps), 1 audio stream...
INFO: writing track 4, MPEG1, NTSC SIF (352x240/29.97fps), 1 audio stream...
finished ok, image created with 13626 sectors [03:01.51]
$
```

The same with XML based tools:

```
$ vcdxgen --iso-volume-label="MY_TEST_VCD" track1.mpg track2 track3.mpg
(Super) VideoCD xml description created successfully as 'videocd.xml'
$ vcdxbuild videocd.xml
INFO: scanning mpeg sequence item #0 for scanpoints...
INFO: scanning mpeg sequence item #1 for scanpoints...
INFO: scanning mpeg sequence item #2 for scanpoints...
INFO: writing track 1 (ISO-9660)...
INFO: writing track 2, MPEG1, NTSC SIF (352x240/29.97fps), 1 audio stream...
INFO: writing track 3, MPEG1, PAL SIF (352x288/25fps), 1 audio stream...
INFO: writing track 4, MPEG1, MPEG1, NTSC SIF (352x240/29.97fps), 1 audio stream...
finished ok, image created with 13626 sectors [03:01.51]
$
```

## 4.2 Video CD Disassembling

The next example show how to extract the PBC information and the MPEG streams contained in the image file 'videocd.bin' (the resulting streams are stored in files named 'avseq##.mpg' with '##' being the track number, starting with 0).

```
$ vcdxrip -c videocd.cue
INFO: detected extended VCD2.0 PBC files
INFO: extracting avseq00.mpg... (start lsn 450 (+4739))
INFO: extracting avseq01.mpg... (start lsn 5189 (+4160))
INFO: extracting avseq02.mpg... (start lsn 9349 (+4277))
INFO: writing xml description to 'videocd.xml'...
INFO: done
$
```

## 4.3 Video CD Low-level Information

The last example shows how to get lower-level layout information about a VCD using `vcd-info`. For more information see [section "Introduction" in \*The GNU Video CD Info Dump Program\*](#).

```

$ vcd-info -c videocd.cue
vcd-info - GNU VCDImager - (Super) Video CD Report
$Id: vcdimager.texi,v 1.45 2005/06/18 04:11:08 rocky Exp $

Source: image file 'svcd_ogt_test_ntsc.cue'
Image size: 4106 sectors
SVCD detected
-----

ISO9660 primary volume descriptor
ID: 'CD001'
version: 1
system id: 'CD-RTOS CD-BRIDGE'
volume id: 'SVCD_OGT_TEST_NTSC'
volumeset id: ''
publisher id: ''
preparer id: 'GNU VCDIMAGER 0.7.12 LINUX-GNU/I386'
application id: ''
ISO size: 376 blocks (logical blocksize: 2048 bytes)
XA marker present: yes
-----

ISO9660 filesystem dump
root directory in PVD set to LSN 18

/:
d d---1xrxxrxr 0 0 [fn 00] [LSN      18]      2048 .
d d---1xrxxrxr 0 0 [fn 00] [LSN      18]      2048 ..
d d---1xrxxrxr 0 0 [fn 00] [LSN      19]      2048 EXT
d d---1xrxxrxr 0 0 [fn 00] [LSN      20]      2048 MPEG2
d d---1xrxxrxr 0 0 [fn 00] [LSN      21]      2048 SEGMENT
d d---1xrxxrxr 0 0 [fn 00] [LSN      22]      2048 SVCD

/EXT/:
d d---1xrxxrxr 0 0 [fn 00] [LSN      19]      2048 .
d d---1xrxxrxr 0 0 [fn 00] [LSN      18]      2048 ..
- ----1xrxxrxr 0 0 [fn 00] [LSN     375]        201 SCANDATA.DAT;1

/MPEG2/:
d d---1xrxxrxr 0 0 [fn 00] [LSN      20]      2048 .
d d---1xrxxrxr 0 0 [fn 00] [LSN      18]      2048 ..
- ---2-xrxxrxr 0 0 [fn 00] [LSN     526]    7971320 ( 7024640) AVSEQ01.MPG;1

/SEGMENT/:
d d---1xrxxrxr 0 0 [fn 00] [LSN      21]      2048 .
d d---1xrxxrxr 0 0 [fn 00] [LSN      18]      2048 ..
- ---2-xrxxrxr 0 0 [fn 00] [LSN     225]    183596 ( 161792) ITEM0001.MPG;1

/SVCD/:
d d---1xrxxrxr 0 0 [fn 00] [LSN      22]      2048 .
d d---1xrxxrxr 0 0 [fn 00] [LSN      18]      2048 ..
- ----1xrxxrxr 0 0 [fn 00] [LSN     151]      2048 ENTRIES.SVD;1
- ----1xrxxrxr 0 0 [fn 00] [LSN     150]      2048 INFO.SVD;1
- ----1xrxxrxr 0 0 [fn 00] [LSN     152]    65536 LOT.SVD;1
- ----1xrxxrxr 0 0 [fn 00] [LSN     184]        40 PSD.SVD;1
- ----1xrxxrxr 0 0 [fn 00] [LSN     186]       190 SEARCH.DAT;1
- ----1xrxxrxr 0 0 [fn 00] [LSN     185]      2048 TRACKS.SVD;1
-----

SVCD/INFO.SVD

```

## Appendix A Tips and Hints

### A.1 SVCD Player Compatibility

If you have problems with your playing device failing to *detect* a created SVCD, you can may the following things (some of the advices below apply to VCDs as well):

1. Take warnings serious! If there were warnings issued during the image building process, chances are the problems are related to them.
2. Make sure the SVCD is physically OK (e.g., analyze the disc with `vcddebug` or try it on some other playing device).
3. Try creating the SVCD by enabling the `'svcd vcd30 mpegav'` and `'svcd vcd30 entrysvd'` options.
4. Add an empty `'/SEGMENT'` directory, if it isn't created due to inclusion of SPIs.
5. If you have confusing time readings for discs with more than one video track, you might need to use the `'svcd vcd30 tracksvd'` option.

### A.2 Fast Forward & Fast Rewind with Super Video CD's

Because of the VBR encoding of the MPEG-2 streams on SVCDs, there's no fixed relation between sector index and playing time. If scanning doesn't work with your playing device it can be caused by:

- The playing device does not support FF/RW with SVCDs.<sup>1</sup>
- The MPEG-2 streams playing time longer that can be handled by the playing device.<sup>2</sup>
- The MPEG-2 stream does not include the mandatory scan information data or when included, it doesn't follow the specification<sup>3</sup>. See [Section 1.5.2.1 \[Scan Information Data\]](#), page 8.
- Some playing devices require a sequence header before each GOP header. See [Section 1.5.3.2 \[Access Point Sectors\]](#), page 8.

---

<sup>1</sup> Sometimes upgrading the player firmware may help.

<sup>2</sup> Some devices don't support programs with a playing time of over about 40 minutes. This is to be seen as bug or limitation of the firmware, as SVCD's can have programs with up to 100 minute playing times.

<sup>3</sup> `libvcd` warns if scan information is missing or syntactically wrong.

## Appendix B ISO 9660 Character Sets

### B.1 ISO646 d-Characters

		0	1	2	3	4	5	6	7
	----	+	-----						
0					0		P		
1					1	A	Q		
2					2	B	R		
3					3	C	S		
4					4	D	T		
5					5	E	U		
6					6	F	V		
7					7	G	W		
8					8	H	X		
9					9	I	Y		
a						J	Z		
b						K			
c						L			
d						M			
e						N			
f						O	_		

### B.2 ISO646 a-Characters

		0	1	2	3	4	5	6	7
	----	+	-----						
0					0		P		
1			!	1	A	Q			
2			"	2	B	R			
3				3	C	S			
4				4	D	T			
5			%	5	E	U			
6			&	6	F	V			
7			'	7	G	W			
8			(	8	H	X			
9			)	9	I	Y			
a			*	:	J	Z			
b			+	;	K				
c			,	<	L				
d			-	=	M				
e			.	>	N				
f			/	?	O	_			

## Appendix C Glossary

See also <http://www.dvdrhelp.com/glossary>.

APS	Access Point Sector
CBR	Constant Bit Rate. Used in MPEG-1's.
CD	Compact Disc
CD-DA	Compact Disc Digital Audio, described in the "Red Book" or ICE 908. This commonly referred to as an audio CD and what most people think of when you play a CD as it was the first to use the CD medium.
CD-ROM	Compact Disc Read Only Memory or "Yellow Book" describe in Standards ISO/IEC 10149. The data stored on it can be either in the form of audio, computer or video files.
CD-ROM Mode 1 and Mode2	The Yellow Book specifies two types of tracks, Mode 1 and Mode 2. Mode 1 is used for computer data and text and has an extra error correction layer. Mode 2 is for audio and video data and has no extra correction layer. CD-ROM/XA An expansion of the CD-ROM Mode 2 format that allows both computer and audio/video to be mixed in the same track.
CD XA	<p>CD-ROM EXtended Architecture. A modification to the CD-ROM specification that defines two new types of sectors. CD-ROM XA was developed jointly by Sony, Philips, and Microsoft, and announced in August 1988. Its specifications were published in an extension to the Yellow Book. CD-i, Photo CD, Video CD and CD-EXTRA have all subsequently been based on CD-ROM XA.</p> <p>CD-XA defines another way of formatting sectors on a CD-ROM, including headers in the sectors that describe the type (audio, video, data) and some additional info (markers, resolution in case of a video or audio sector, file numbers, etc).</p> <p>The data written on a CD-XA is consistent with and can be in ISO-9660 file system format and therefore be readable by ISO-9660 file system translators. But also a CD-I player can also read CD-XA discs even if its own 'Green Book' file system only resembles ISO 9660 and isn't fully compatible.</p>
CVD	Chaoji VCD or China Video Disc <a href="http://www.dvdrhelp.com/forum/userguides/98177.php">http://www.dvdrhelp.com/forum/userguides/98177.php</a>
DVD	Digital Versatile Disc <a href="http://www.dvddemystified.com/dvdfaq.html">http://www.dvddemystified.com/dvdfaq.html</a>
DVD-V	DVD for Video.
DVD-A	DVD for Audio.
Entry Point	<p>A starting point within an MPEG track including the beginning of the track. Video CD's can have multiple entry points inside a track. Logically this corresponds to a "Chapter" or "Scene" of a larger uninterruptable unit.</p> <p>One might think a CD MPEG "track" could serve this purpose with a collection of tracks making up a work or movie. Alas, the CD specification requires a "track pregap" space of 150 sectors before a track. These often appear as a time gaps when hardware players go between tracks; this doesn't happen switching between entries in a track because there in fact is no gap.</p> <p>Physically on the CD an entry is stored as an INDEX inside a track.</p>

## FourCC

A four character code that uniquely identifies a data stream format. Software will look up the FourCC code then look for the codec associated to the code for that code. This idea was used in the IFF multimedia format developed by Electronic Arts for the Amiga in the early 1980s. This file format was copied by Apple (who called it AIFF) and Microsoft (RIFF). <http://www.fourcc.org/fcccodecs.htm>

FSF Free Software Foundation, <http://www.fsf.org/>

GNU GNU is not UNIX, <http://www.gnu.org/>

LOT List ID Offset Table.

MPEG Movie Picture Experts Group <http://mpeg.telecomitalialab.com>. Two sub formats used by Video CD's are MPEG-1 for VCD 1.0, 1.1 and 2.0 and MPEG-2. For SVCD, and HQVCD.

NTSC National Television Standards Committee. The NTSC is responsible for setting television and video standards in the United States.

OGT Overlay Graphics & Text. A subtitle format devised by Philips. The format has subtitle meta-information before an interleaved bitmap of 4 palette entries. Palette color 0 entries can be run-length encoded.

A more detailed description of this format can be found in the documentation directory of VCDImager.

## LBA

Logical Block Addressing. Mapped integer numbers from CD Red Book Addressing MSF. The starting sector is -150 and ending sector is 449849, which correlates directly to MSF: 00:00:00 to 99:59:74. Because an LBA is a single number it is often easier to work with in programming than an MSF.

LID List ID. A unit of playback control navigation inside a PSD. Numbering starts from 1.

## LSN

Logical Sector Number. Mapped integer numbers from CD Red Book Addressing MSF. The starting sector is 0 and ending sector is 449699, which correlates to MSF: 00:00:00 to 99:59:74. Because an LSN is a single number it is often easier to work with in programming than an MSF. Because it starts at 0 rather than -150 as is the case of an LBA it can be represented as an unsigned value.

PAL Phase Alternating Line, the dominant television standard in Europe.

PEM Program End Marker.

PBC Play-back Control.

PSD Play Sequence Descriptor. A section of a Video CD related to playback control. Also the individual units inside that section. We start numbering from 0. See also LID.

PVD Primary Volume Descriptor. A section of a Video CD.

RIFF Resource Interchange File Format. A way to tag multimedia files developed by Microsoft. Inside a RIFF is a 4-letter character code (which fits nicely in a 32-bit word) for each type of object called FOURCC. This idea was taken Electronic Arts which used in Amiga's IFF (Interchange File Format) and copied by Apple in their AIFF.



SIF	Source Interchange Format. A video resolution standard.
SPI	Segment Play Items.
SVCD	Super VCD <a href="http://www.dvdrhelp.com/svcd">http://www.dvdrhelp.com/svcd</a>
VBR	Variable Bit Rate. Used in MPEG-2's
Track	A unit of data of a CD. The size of a track can vary; it can occupy the entire contents of the CD. Most CD standards however require that tracks have a 150 frame (or "2 second") lead-in gap.
VCD	Video CD <a href="http://www.dvdrhelp.com/vcd">http://www.dvdrhelp.com/vcd</a>
XA	See CD XA
XML	eXtensible Markup Language, <a href="http://www.w3.org/XML/">http://www.w3.org/XML/</a> .
XSVCD	eXtended SVCD, <a href="http://www.dvdrhelp.com/xvcd.htm">http://www.dvdrhelp.com/xvcd.htm</a> .
XVCD	eXtended VCD, <a href="http://www.dvdrhelp.com/xvcd.htm">http://www.dvdrhelp.com/xvcd.htm</a> .

## Appendix D GNU General Public License

Version 2, June 1991

Copyright © 1989, 1991 Free Software Foundation, Inc.  
59 Temple Place - Suite 330, Boston, MA 02111-1307, USA

Everyone is permitted to copy and distribute verbatim copies of this license document, but changing it is not allowed.

### Preamble

The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public License is intended to guarantee your freedom to share and change free software—to make sure the software is free for all its users. This General Public License applies to most of the Free Software Foundation’s software and to any other program whose authors commit to using it. (Some other Free Software Foundation software is covered by the GNU Library General Public License instead.) You can apply it to your programs, too.

When we speak of free software, we are referring to freedom, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for this service if you wish), that you receive source code or can get it if you want it, that you can change the software or use pieces of it in new free programs; and that you know you can do these things.

To protect your rights, we need to make restrictions that forbid anyone to deny you these rights or to ask you to surrender the rights. These restrictions translate to certain responsibilities for you if you distribute copies of the software, or if you modify it.

For example, if you distribute copies of such a program, whether gratis or for a fee, you must give the recipients all the rights that you have. You must make sure that they, too, receive or can get the source code. And you must show them these terms so they know their rights.

We protect your rights with two steps: (1) copyright the software, and (2) offer you this license which gives you legal permission to copy, distribute and/or modify the software.

Also, for each author’s protection and ours, we want to make certain that everyone understands that there is no warranty for this free software. If the software is modified by someone else and passed on, we want its recipients to know that what they have is not the original, so that any problems introduced by others will not reflect on the original authors’ reputations.

Finally, any free program is threatened constantly by software patents. We wish to avoid the danger that redistributors of a free program will individually obtain patent licenses, in effect making the program proprietary. To prevent this, we have made it clear that any patent must be licensed for everyone’s free use or not licensed at all.

The precise terms and conditions for copying, distribution and modification follow.

### Terms And Conditions For Copying, Distribution And Modification

0. This License applies to any program or other work which contains a notice placed by the copyright holder saying it may be distributed under the terms of this General Public License. The “Program”, below, refers to any such program or work, and a “work based on the Program” means either the Program or any derivative work under copyright law: that is to say, a work containing the Program or a portion of it, either verbatim or with modifications and/or translated into another language. (Hereinafter, translation is included without limitation in the term “modification”.) Each licensee is addressed as “you”.

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running the Program is not restricted, and the output from the Program is covered only if its contents constitute a work based on the Program (independent of having been made by running the Program). Whether that is true depends on what the Program does.

1. You may copy and distribute verbatim copies of the Program's source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to the absence of any warranty; and give any other recipients of the Program a copy of this License along with the Program.

You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee.

2. You may modify your copy or copies of the Program or any portion of it, thus forming a work based on the Program, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:
  - a. You must cause the modified files to carry prominent notices stating that you changed the files and the date of any change.
  - b. You must cause any work that you distribute or publish, that in whole or in part contains or is derived from the Program or any part thereof, to be licensed as a whole at no charge to all third parties under the terms of this License.
  - c. If the modified program normally reads commands interactively when run, you must cause it, when started running for such interactive use in the most ordinary way, to print or display an announcement including an appropriate copyright notice and a notice that there is no warranty (or else, saying that you provide a warranty) and that users may redistribute the program under these conditions, and telling the user how to view a copy of this License. (Exception: if the Program itself is interactive but does not normally print such an announcement, your work based on the Program is not required to print an announcement.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Program, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Program, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Program.

In addition, mere aggregation of another work not based on the Program with the Program (or with a work based on the Program) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

3. You may copy and distribute the Program (or a work based on it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you also do one of the following:
  - a. Accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,
  - b. Accompany it with a written offer, valid for at least three years, to give any third party, for a charge no more than your cost of physically performing source distribution,

a complete machine-readable copy of the corresponding source code, to be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,

- c. Accompany it with the information you received as to the offer to distribute corresponding source code. (This alternative is allowed only for noncommercial distribution and only if you received the program in object code or executable form with such an offer, in accord with Subsection b above.)

The source code for a work means the preferred form of the work for making modifications to it. For an executable work, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the executable. However, as a special exception, the source code distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

If distribution of executable or object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place counts as distribution of the source code, even though third parties are not compelled to copy the source along with the object code.

4. You may not copy, modify, sublicense, or distribute the Program except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense or distribute the Program is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.
5. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Program or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Program (or any work based on the Program), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Program or works based on it.
6. Each time you redistribute the Program (or any work based on the Program), the recipient automatically receives a license from the original licensor to copy, distribute or modify the Program subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein. You are not responsible for enforcing compliance by third parties to this License.
7. If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Program at all. For example, if a patent license would not permit royalty-free redistribution of the Program by all those who receive copies directly or indirectly through you, then the only way you could satisfy both it and this License would be to refrain entirely from distribution of the Program.

If any portion of this section is held invalid or unenforceable under any particular circumstance, the balance of the section is intended to apply and the section as a whole is intended to apply in other circumstances.

It is not the purpose of this section to induce you to infringe any patents or other property right claims or to contest validity of any such claims; this section has the sole purpose of protecting the integrity of the free software distribution system, which is implemented by

public license practices. Many people have made generous contributions to the wide range of software distributed through that system in reliance on consistent application of that system; it is up to the author/donor to decide if he or she is willing to distribute software through any other system and a licensee cannot impose that choice.

This section is intended to make thoroughly clear what is believed to be a consequence of the rest of this License.

8. If the distribution and/or use of the Program is restricted in certain countries either by patents or by copyrighted interfaces, the original copyright holder who places the Program under this License may add an explicit geographical distribution limitation excluding those countries, so that distribution is permitted only in or among countries not thus excluded. In such case, this License incorporates the limitation as if written in the body of this License.
9. The Free Software Foundation may publish revised and/or new versions of the General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Program specifies a version number of this License which applies to it and “any later version”, you have the option of following the terms and conditions either of that version or of any later version published by the Free Software Foundation. If the Program does not specify a version number of this License, you may choose any version ever published by the Free Software Foundation.

10. If you wish to incorporate parts of the Program into other free programs whose distribution conditions are different, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally.

## **NO WARRANTY**

11. BECAUSE THE PROGRAM IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE PROGRAM, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE PROGRAM “AS IS” WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE PROGRAM IS WITH YOU. SHOULD THE PROGRAM PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.
12. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE PROGRAM AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE PROGRAM (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE PROGRAM TO OPERATE WITH ANY OTHER PROGRAMS), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

## **END OF TERMS AND CONDITIONS**

## Appendix: How to Apply These Terms to Your New Programs

If you develop a new program, and you want it to be of the greatest possible use to the public, the best way to achieve this is to make it free software which everyone can redistribute and change under these terms.

To do so, attach the following notices to the program. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the “copyright” line and a pointer to where the full notice is found.

```
one line to give the program's name and a brief idea of what it does.
Copyright (C) yyyy  name of author
```

```
This program is free software; you can redistribute it and/or modify
it under the terms of the GNU General Public License as published by
the Free Software Foundation; either version 2 of the License, or
(at your option) any later version.
```

```
This program is distributed in the hope that it will be useful,
but WITHOUT ANY WARRANTY; without even the implied warranty of
MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
GNU General Public License for more details.
```

```
You should have received a copy of the GNU General Public License
along with this program; if not, write to the Free Software
Foundation, Inc., 59 Temple Place - Suite 330, Boston, MA 02111-1307, USA.
```

Also add information on how to contact you by electronic and paper mail.

If the program is interactive, make it output a short notice like this when it starts in an interactive mode:

```
Gnomovision version 69, Copyright (C) 19yy name of author
Gnomovision comes with ABSOLUTELY NO WARRANTY; for details type 'show w'.
This is free software, and you are welcome to redistribute it
under certain conditions; type 'show c' for details.
```

The hypothetical commands ‘show w’ and ‘show c’ should show the appropriate parts of the General Public License. Of course, the commands you use may be called something other than ‘show w’ and ‘show c’; they could even be mouse-clicks or menu items—whatever suits your program.

You should also get your employer (if you work as a programmer) or your school, if any, to sign a “copyright disclaimer” for the program, if necessary. Here is a sample; alter the names:

```
Yoyodyne, Inc., hereby disclaims all copyright interest in the program
‘Gnomovision’ (which makes passes at compilers) written by James Hacker.
```

```
signature of Ty Coon, 1 April 1989
Ty Coon, President of Vice
```

This General Public License does not permit incorporating your program into proprietary programs. If your program is a subroutine library, you may consider it more useful to permit linking proprietary applications with the library. If this is what you want to do, use the GNU Library General Public License instead of this License.



## Appendix E GNU Free Documentation License

Version 1.1, March 2000

Copyright © 2000 Free Software Foundation, Inc.  
59 Temple Place, Suite 330, Boston, MA 02111-1307, USA

Everyone is permitted to copy and distribute verbatim copies of this license document, but changing it is not allowed.

### 0. PREAMBLE

The purpose of this License is to make a manual, textbook, or other written document *free* in the sense of freedom: to assure everyone the effective freedom to copy and redistribute it, with or without modifying it, either commercially or noncommercially. Secondly, this License preserves for the author and publisher a way to get credit for their work, while not being considered responsible for modifications made by others.

This License is a kind of “copyleft”, which means that derivative works of the document must themselves be free in the same sense. It complements the GNU General Public License, which is a copyleft license designed for free software.

We have designed this License in order to use it for manuals for free software, because free software needs free documentation: a free program should come with manuals providing the same freedoms that the software does. But this License is not limited to software manuals; it can be used for any textual work, regardless of subject matter or whether it is published as a printed book. We recommend this License principally for works whose purpose is instruction or reference.

### 1. APPLICABILITY AND DEFINITIONS

This License applies to any manual or other work that contains a notice placed by the copyright holder saying it can be distributed under the terms of this License. The “Document”, below, refers to any such manual or work. Any member of the public is a licensee, and is addressed as “you”.

A “Modified Version” of the Document means any work containing the Document or a portion of it, either copied verbatim, or with modifications and/or translated into another language.

A “Secondary Section” is a named appendix or a front-matter section of the Document that deals exclusively with the relationship of the publishers or authors of the Document to the Document’s overall subject (or to related matters) and contains nothing that could fall directly within that overall subject. (For example, if the Document is in part a textbook of mathematics, a Secondary Section may not explain any mathematics.) The relationship could be a matter of historical connection with the subject or with related matters, or of legal, commercial, philosophical, ethical or political position regarding them.

The “Invariant Sections” are certain Secondary Sections whose titles are designated, as being those of Invariant Sections, in the notice that says that the Document is released under this License.

The “Cover Texts” are certain short passages of text that are listed, as Front-Cover Texts or Back-Cover Texts, in the notice that says that the Document is released under this License.

A “Transparent” copy of the Document means a machine-readable copy, represented in a format whose specification is available to the general public, whose contents can be viewed and edited directly and straightforwardly with generic text editors or (for images composed of pixels) generic paint programs or (for drawings) some widely available drawing editor, and that is suitable for input to text formatters or for automatic translation to a variety of formats suitable for input to text formatters. A copy made in an otherwise Transparent file

format whose markup has been designed to thwart or discourage subsequent modification by readers is not Transparent. A copy that is not “Transparent” is called “Opaque”.

Examples of suitable formats for Transparent copies include plain ASCII without markup, Texinfo input format, LaTeX input format, SGML or XML using a publicly available DTD, and standard-conforming simple HTML designed for human modification. Opaque formats include PostScript, PDF, proprietary formats that can be read and edited only by proprietary word processors, SGML or XML for which the DTD and/or processing tools are not generally available, and the machine-generated HTML produced by some word processors for output purposes only.

The “Title Page” means, for a printed book, the title page itself, plus such following pages as are needed to hold, legibly, the material this License requires to appear in the title page. For works in formats which do not have any title page as such, “Title Page” means the text near the most prominent appearance of the work’s title, preceding the beginning of the body of the text.

## 2. VERBATIM COPYING

You may copy and distribute the Document in any medium, either commercially or noncommercially, provided that this License, the copyright notices, and the license notice saying this License applies to the Document are reproduced in all copies, and that you add no other conditions whatsoever to those of this License. You may not use technical measures to obstruct or control the reading or further copying of the copies you make or distribute. However, you may accept compensation in exchange for copies. If you distribute a large enough number of copies you must also follow the conditions in section 3.

You may also lend copies, under the same conditions stated above, and you may publicly display copies.

## 3. COPYING IN QUANTITY

If you publish printed copies of the Document numbering more than 100, and the Document’s license notice requires Cover Texts, you must enclose the copies in covers that carry, clearly and legibly, all these Cover Texts: Front-Cover Texts on the front cover, and Back-Cover Texts on the back cover. Both covers must also clearly and legibly identify you as the publisher of these copies. The front cover must present the full title with all words of the title equally prominent and visible. You may add other material on the covers in addition. Copying with changes limited to the covers, as long as they preserve the title of the Document and satisfy these conditions, can be treated as verbatim copying in other respects.

If the required texts for either cover are too voluminous to fit legibly, you should put the first ones listed (as many as fit reasonably) on the actual cover, and continue the rest onto adjacent pages.

If you publish or distribute Opaque copies of the Document numbering more than 100, you must either include a machine-readable Transparent copy along with each Opaque copy, or state in or with each Opaque copy a publicly-accessible computer-network location containing a complete Transparent copy of the Document, free of added material, which the general network-using public has access to download anonymously at no charge using public-standard network protocols. If you use the latter option, you must take reasonably prudent steps, when you begin distribution of Opaque copies in quantity, to ensure that this Transparent copy will remain thus accessible at the stated location until at least one year after the last time you distribute an Opaque copy (directly or through your agents or retailers) of that edition to the public.

It is requested, but not required, that you contact the authors of the Document well before redistributing any large number of copies, to give them a chance to provide you with an updated version of the Document.



#### 4. MODIFICATIONS

You may copy and distribute a Modified Version of the Document under the conditions of sections 2 and 3 above, provided that you release the Modified Version under precisely this License, with the Modified Version filling the role of the Document, thus licensing distribution and modification of the Modified Version to whoever possesses a copy of it. In addition, you must do these things in the Modified Version:

- A. Use in the Title Page (and on the covers, if any) a title distinct from that of the Document, and from those of previous versions (which should, if there were any, be listed in the History section of the Document). You may use the same title as a previous version if the original publisher of that version gives permission.
- B. List on the Title Page, as authors, one or more persons or entities responsible for authorship of the modifications in the Modified Version, together with at least five of the principal authors of the Document (all of its principal authors, if it has less than five).
- C. State on the Title page the name of the publisher of the Modified Version, as the publisher.
- D. Preserve all the copyright notices of the Document.
- E. Add an appropriate copyright notice for your modifications adjacent to the other copyright notices.
- F. Include, immediately after the copyright notices, a license notice giving the public permission to use the Modified Version under the terms of this License, in the form shown in the Addendum below.
- G. Preserve in that license notice the full lists of Invariant Sections and required Cover Texts given in the Document's license notice.
- H. Include an unaltered copy of this License.
- I. Preserve the section entitled "History", and its title, and add to it an item stating at least the title, year, new authors, and publisher of the Modified Version as given on the Title Page. If there is no section entitled "History" in the Document, create one stating the title, year, authors, and publisher of the Document as given on its Title Page, then add an item describing the Modified Version as stated in the previous sentence.
- J. Preserve the network location, if any, given in the Document for public access to a Transparent copy of the Document, and likewise the network locations given in the Document for previous versions it was based on. These may be placed in the "History" section. You may omit a network location for a work that was published at least four years before the Document itself, or if the original publisher of the version it refers to gives permission.
- K. In any section entitled "Acknowledgments" or "Dedications", preserve the section's title, and preserve in the section all the substance and tone of each of the contributor acknowledgments and/or dedications given therein.
- L. Preserve all the Invariant Sections of the Document, unaltered in their text and in their titles. Section numbers or the equivalent are not considered part of the section titles.
- M. Delete any section entitled "Endorsements". Such a section may not be included in the Modified Version.
- N. Do not retitle any existing section as "Endorsements" or to conflict in title with any Invariant Section.

If the Modified Version includes new front-matter sections or appendices that qualify as Secondary Sections and contain no material copied from the Document, you may at your option designate some or all of these sections as invariant. To do this, add their titles to

the list of Invariant Sections in the Modified Version’s license notice. These titles must be distinct from any other section titles.

You may add a section entitled “Endorsements”, provided it contains nothing but endorsements of your Modified Version by various parties—for example, statements of peer review or that the text has been approved by an organization as the authoritative definition of a standard.

You may add a passage of up to five words as a Front-Cover Text, and a passage of up to 25 words as a Back-Cover Text, to the end of the list of Cover Texts in the Modified Version. Only one passage of Front-Cover Text and one of Back-Cover Text may be added by (or through arrangements made by) any one entity. If the Document already includes a cover text for the same cover, previously added by you or by arrangement made by the same entity you are acting on behalf of, you may not add another; but you may replace the old one, on explicit permission from the previous publisher that added the old one.

The author(s) and publisher(s) of the Document do not by this License give permission to use their names for publicity for or to assert or imply endorsement of any Modified Version.

## 5. COMBINING DOCUMENTS

You may combine the Document with other documents released under this License, under the terms defined in section 4 above for modified versions, provided that you include in the combination all of the Invariant Sections of all of the original documents, unmodified, and list them all as Invariant Sections of your combined work in its license notice.

The combined work need only contain one copy of this License, and multiple identical Invariant Sections may be replaced with a single copy. If there are multiple Invariant Sections with the same name but different contents, make the title of each such section unique by adding at the end of it, in parentheses, the name of the original author or publisher of that section if known, or else a unique number. Make the same adjustment to the section titles in the list of Invariant Sections in the license notice of the combined work.

In the combination, you must combine any sections entitled “History” in the various original documents, forming one section entitled “History”; likewise combine any sections entitled “Acknowledgments”, and any sections entitled “Dedications”. You must delete all sections entitled “Endorsements.”

## 6. COLLECTIONS OF DOCUMENTS

You may make a collection consisting of the Document and other documents released under this License, and replace the individual copies of this License in the various documents with a single copy that is included in the collection, provided that you follow the rules of this License for verbatim copying of each of the documents in all other respects.

You may extract a single document from such a collection, and distribute it individually under this License, provided you insert a copy of this License into the extracted document, and follow this License in all other respects regarding verbatim copying of that document.

## 7. AGGREGATION WITH INDEPENDENT WORKS

A compilation of the Document or its derivatives with other separate and independent documents or works, in or on a volume of a storage or distribution medium, does not as a whole count as a Modified Version of the Document, provided no compilation copyright is claimed for the compilation. Such a compilation is called an “aggregate”, and this License does not apply to the other self-contained works thus compiled with the Document, on account of their being thus compiled, if they are not themselves derivative works of the Document.

If the Cover Text requirement of section 3 is applicable to these copies of the Document, then if the Document is less than one quarter of the entire aggregate, the Document’s Cover Texts may be placed on covers that surround only the Document within the aggregate. Otherwise they must appear on covers around the whole aggregate.

## 8. TRANSLATION

Translation is considered a kind of modification, so you may distribute translations of the Document under the terms of section 4. Replacing Invariant Sections with translations requires special permission from their copyright holders, but you may include translations of some or all Invariant Sections in addition to the original versions of these Invariant Sections. You may include a translation of this License provided that you also include the original English version of this License. In case of a disagreement between the translation and the original English version of this License, the original English version will prevail.

## 9. TERMINATION

You may not copy, modify, sublicense, or distribute the Document except as expressly provided for under this License. Any other attempt to copy, modify, sublicense or distribute the Document is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

## 10. FUTURE REVISIONS OF THIS LICENSE

The Free Software Foundation may publish new, revised versions of the GNU Free Documentation License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns. See <http://www.gnu.org/copyleft/>.

Each version of the License is given a distinguishing version number. If the Document specifies that a particular numbered version of this License “or any later version” applies to it, you have the option of following the terms and conditions either of that specified version or of any later version that has been published (not as a draft) by the Free Software Foundation. If the Document does not specify a version number of this License, you may choose any version ever published (not as a draft) by the Free Software Foundation.

## ADDENDUM: How to use this License for your documents

To use this License in a document you have written, include a copy of the License in the document and put the following copyright and license notices just after the title page:

```
Copyright (C)  year  your name.  
Permission is granted to copy, distribute and/or modify this document  
under the terms of the GNU Free Documentation License, Version 1.1  
or any later version published by the Free Software Foundation;  
with the Invariant Sections being  list their titles, with the  
Front-Cover Texts being  list, and with the Back-Cover Texts being  list.  
A copy of the license is included in the section entitled ‘‘GNU  
Free Documentation License’’.
```

If you have no Invariant Sections, write “with no Invariant Sections” instead of saying which ones are invariant. If you have no Front-Cover Texts, write “no Front-Cover Texts” instead of “Front-Cover Texts being *list*”; likewise for Back-Cover Texts.

If your document contains nontrivial examples of program code, we recommend releasing these examples in parallel under your choice of free software license, such as the GNU General Public License, to permit their use in free software.

## XML Tag Index

### A

album-id .....	17
application-id .....	19
auto-pause .....	22
await .....	27

### B

bsn .....	25
-----------	----

### D

default .....	25
default-entry .....	22

### E

endlist .....	28
entry .....	22

### F

file .....	20
filesystem .....	19
folder .....	20
format .....	20

### I

info .....	17
------------	----

### J

jump-timing .....	26
-------------------	----

### L

loop .....	25
------------	----

### M

multi-default .....	25
---------------------	----

### N

name .....	20
next .....	25, 27
next-volume .....	28
next-volume-use-lid2 .....	17
next-volume-use-sequence2 .....	17
numeric .....	26

### O

option .....	16
--------------	----

### P

pbcc .....	23
play-item .....	23, 24, 25, 27, 28
playlist .....	27
playtime .....	27
preparer-id .....	19
prev .....	25, 27
publisher-id .....	19
pvd .....	19

### R

rejected .....	23
restriction .....	17
return .....	25, 27

### S

segment-item .....	21
segment-items .....	20
select .....	25
selection .....	25
sequence-item .....	22
sequence-items .....	21
src .....	20
start-time-offset .....	17
system-id .....	19

### T

timeout .....	25
---------------	----

### V

videocd .....	15
volume-count .....	17
volume-id .....	19
volume-number .....	17

### W

wait .....	25, 27
------------	--------

### X

x1 .....	24
x2 .....	24

### Y

y1 .....	24
y2 .....	24

# Concept Index

## C

<code>cdrdao</code> , How to use .....	29
Chapters .....	10

## D

DTD of Video CD XML .....	14
---------------------------	----

## E

Entry points .....	22
--------------------	----

## F

FDL, GNU Free Documentation License .....	42
---	----

## G

GPL, GNU General Public License .....	37
---------------------------------------	----

## H

Hot-spot area coordinates .....	24
HQ Video CD 1.0 .....	5
HQ-VCD .....	5

## I

Interactivity, Video CD support for .....	10
ISO-9660 filename constraints .....	12

## K

Keys, on the remote control .....	10
-----------------------------------	----

## L

LOT area .....	6
----------------	---

## M

Menu highlighting .....	11
Menu selection areas .....	11
Menus .....	11, 25

MPEG Access point sector .....	8
MPEG input streams .....	7
MPEG padding .....	8
MPEG scan information user data .....	8

## O

OGT .....	8
-----------	---

## P

PBC (Playback control) .....	10
Play nothing item .....	15, 24
PSD area .....	6
PVD area .....	3

## R

Random selection on timeout .....	25
Rejected list .....	23
Relaxed APS constraints .....	17
RIFF CD-XA files .....	1

## S

SPI area .....	3, 9
Subtitles .....	8
SVCD .....	6

## U

<code>update scan offsets</code> .....	17
--	----

## V

VCD .....	4
Video CD file-system .....	6
Video CD layout .....	3
Video CD variants .....	4

## X

XML Identifiers .....	15
XML, time values in .....	14
XSVCD .....	6
XVCD .....	4