



HARMONIZED SYSTEM
COMMITTEE

-
26th Session

NC0302E1
(+ Annexes I and II)
O. Eng.

Brussels, 18 October 2000.

CLASSIFICATION OF DVD STORAGE UNITS

(Item VII.20 on Agenda)

Reference documents :

42.448 (HSC/22)
42.508 (HSC/22)
NC0160E2, Annex G/17, paragraph 7 (ii) (HSC/24 – Report)
NC0221E1 (HSC/25)
NC0250E2, Annex IJ/11 (HSC/25 – Report)

I. BACKGROUND

1. At its 25th Session, the Committee held a preliminary discussion on the classification of DVD drives.
2. According to one delegate, as noted in paragraph 2 of Doc. NC0221E1, there were two types of DVDs (i.e., Digital Video Discs and Digital Versatile Discs). This suggested that certain DVD drives could operate solely in conjunction with automatic data processing machines whereas others could be connected to apparatus other than automatic data processing machines (e.g., televisions or sound reproducers) which might also use a memory similar to those of automatic data processing machines. He felt, contrary to the view expressed by the Secretariat, that there was a difference between the CD-ROM drives classified in heading 84.71 and the DVD drives under consideration. Further, on the basis of the information available, he was not in a position to clearly distinguish between the three types of DVD drives listed in paragraph 5 of the working document. Therefore, he believed that more detailed information was needed about all types of DVD drives before classifying these products, in order to clearly indicate in the Explanatory Notes not only what was included in heading 84.71 but also what was excluded.
3. Another delegate pointed out that the scope of this study was limited to the classification of DVD drives solely used as storage units in conjunction with automatic data processing machines. He felt that the information provided in paragraphs 4 and 5 of Doc. NC0221E1 was suitable for drafting the relevant amendments to the Explanatory Note

File No. 2811

to heading 84.71. If more detailed information were obtained, this had to be relevant only to DVD drives solely operated in conjunction with automatic data processing machines, and not any other product, in order to avoid unduly complicating the study.

4. After discussion, the Committee instructed the Secretariat to endeavour to obtain more information on different types of DVD drives from interested administrations and the relevant industry and to prepare a new document on this basis for examination by the Committee at its next session.

II. INFORMATION PROVIDED BY THE ICC

5. On 18 May 2000, a team of technical experts provided by the ICC, following a demonstration of DVD-ROM Drives and DVD Video/Audio Players at the WCO Headquarters, submitted to the Secretariat a “DVD Definition”, a table concerning “DVD Characteristics”, additional information on DVD drives and DVD players and a glossary of the terms used.

6. **DVD Definition**

DVD-ROM/Recordable/Rewritable (e.g.: DVD-R, DVD-RAM, DVD+RW, and DVD-RW) drives operate exactly like CD-ROM/Recordable/Rewritable drives (e.g.: CD-R and CD-RW). In other words, they allow users to access (read and/or write) large quantities of data in the range from 4 to 28 times that of conventional CDs (650 MegaBytes). They cannot operate as a “stand alone” apparatus, and must be connected to an ADP machine. In conjunction with ADP machines, the drives allow for direct file system access such as file name structure and file attributes. They do not allow direct video output signals to a display via ports such as Composite, S-video, Component, and/or RGB. In principle, the drives cannot be directly controlled by external user interfaces such as electrical-mechanical switches other than to open and/or close the loading mechanism. Finally, the drives do not have integrated components such as the MPEG-2 decoder, specific disc format support, and/or dedicated memory that are necessary for DVD Video/Audio/Game playback.

7. **Table**

DVD CHARACTERISTICS	
DVD-ROM/DVD-Recordable	DVD/Video/Audio/Game Player
Requires ADP machine	No ADP machine is required
Does not have dedicated memory for MPEG decoding	Has dedicated memory for MPEG decoding
No video output ports	Has video output ports. Example(s) : <ul style="list-style-type: none"> • RGB/YUV/YUV Progressive • S-Video • Composite • SCART
No integrated components to support “Standalone” capabilities to play DVD video and/or audio and/or game discs <ul style="list-style-type: none"> • No MPEG-2 decoding, software or hardware 	Has integrated components to support “Standalone” capabilities to play DVD video and/or audio and/or game discs <ul style="list-style-type: none"> • Has MPEG-2 decoder (hardware)
No direct control of unit function (Play, Stop, Record, etc.)	Has direct control of unit function (Play, Stop, Record, etc.)
Direct access to file system (data file name structure)	No direct access to file system (data file name structure)

8. The additional information on DVD drives and DVD players and a glossary of the terms used are reproduced in Annexes I and II to this document.

III. NOTE FROM CANADA

9. On 22 August 2000, the Secretariat received the following note from Canada, accompanied by four appendices containing extensive information on DVDs, DVD drives and DVD players :

Analysis

- 9.1 DVDs were first used commercially to distribute recorded video material and as such became commonly known as Digital Video Discs. However, the evolution of the technology has led to much broader usage. Therefore, Canada agrees with the Secretariat's statement in Doc. NC00221E1 that the acronym DVD is best expressed as "Digital Versatile Disc".
- 9.2 The distinguishing feature between computer DVD drives and DVD units (i.e., audio and video players) is that computer DVD drives have interfaces (typically IDE or SCSI) to provide data compatible with an ADP machine.
- 9.3 Computer DVD drives can perform the functions described by headings 85.19 and 85.21 (recording/reproducing audio or video). This can be done either through the ADP machine itself or when connected to peripheral audio/video systems. However, the signal is converted to the necessary format by other elements of the ADP machine, not the DVD drive. The DVD drive merely delivers data in the format necessary for the ADP machine.
- 9.4 Canada agrees with the Secretariat's position that Computer DVD drives are properly classified under heading 84.71, specifically subheading 8471.70, by virtue of their being specifically designed to be used solely with ADP machines.
- 9.5 Similarly, any of the other DVD drives can be classified according to their designed function by application of the General Rules for the Interpretation of the Harmonized System.

Concerns

- 9.6 The mechanism for reading the data is common to all types of DVD drives. Thus, while it is possible to easily differentiate between the finished products, the internal assemblies (without an interface or other additional components) are indistinguishable. This could lead to difficulties in classifying components of the various DVD drives.
- 9.7 As the distinction between the various types of DVD drives rests principally on the interface through which the data is delivered (i.e., ADP format, audio format or video format), the usefulness of any classification decision may be short lived if the market were to adopt a single DVD drive concept by moving the interfaces away from the drives and into the related devices (i.e., ADP machines, video displays, speakers/earphones/audio systems).

Suggestions

- 9.8 In the immediate term, the classification of Computer DVD drives should be confirmed under subheading 8471.70.
- 9.9 Given the minimal differences in the various distinct DVD drive systems, consideration should be given to making provision for all such systems under one heading, with subheading breakouts as appropriate.

10. The following information was excerpted from the appendices provided by Canada (the full texts of the appendices will be made available to delegates during the session – English only):

DVDs

- 10.1 The abbreviation “DVD” initially stood for “Digital Video Disc” but today is more appropriately taken to stand for “Digital Versatile Disc” to reflect the fact that these discs are capable of storing all types of digital data (and not just digital data representing movies).
- 10.2 There are five variations, or books, of DVD :
- DVD-ROM is a high-capacity data storage medium
 - DVD-Video is a digital storage medium for feature-length motion pictures
 - DVD-Audio is an audio-only storage format similar to CD-Audio
 - DVD-R offers a write-once, read-many storage format akin to CD-R
 - DVD-RAM will be a rewritable (erasable) flavour of DVD.
- 10.3 With the same overall size as a standard 120 mm diameter, 1.2mm thick CD, DVD discs provide up to 17GB of storage with higher than CD-ROM transfer rates and similar to CD-ROM access times and come in four versions :
- DVD-5 is a single-sided single-layered disc boosting capacity seven-fold to 4.7GB
 - DVD-9 is a single-sided double-layered disc offering 8.5GB
 - DVD-10 will be a 9.4GB dual-sided single-layered disc
 - DVD-18 will increase capacity to a huge 17GB on a dual-sided dual-layered disc.

DVD-Video/Audio Players

- 10.4 DVD-Video titles use MPEG-2 compression to store video. MPEG-2 offers greater overall compression than MPEG-1 and yields much sharper, cleaner pictures. MPEG-2 encoded video commonly uses 480 horizontal lines per frame (720 x 480 pixels), versus 425 lines for laser disc and 250 to 270 lines for VHS video.
- 10.5 DVD Audio includes the option of PCM (pulse code modulation) digital audio with sampling sizes and rates higher than audio CD. Alternatively, audio for most movies is stored as discrete, multi-channel surround sound using Dolby Digital or Digital Theatre Systems Digital Surround (DTS) audio compression similar to the digital surround sound formats used in theatres. DTS is an audio encoding format similar to Dolby Digital, requiring a decoder, either in the player or in an external receiver.
- 10.6 DVD Players consist of the following major components :
- Disc Reader Mechanism : consists of the motor which spins the disc and the laser which reads the information from it.
 - The DVD-DSP (digital signal processor) : an integrated circuit that translates the laser pulses back into electrical form that other parts of the decoder can use.
 - The Digital Audio/Video Decoder : This complex integrated circuit reconstitutes the compressed data on the disc, converting it into studio-quality video and CD-quality audio for output to TVs and stereo systems.
 - Microcontroller : This device controls the operation of the player, translating user inputs from the remote control or front panel into commands for the audio/video decoder and the disc reader mechanism.

10.7 With its 1 million logic transistors, the audio/video decoder is by far the most complex component of a DVD Player. This devices has three essential functions :

- Separate and synchronize audio and video data
- Decode the video data and format it for display on a television monitor
- Decode the audio data and format it for amplification by a home audio system.

DVD-ROM

10.8 Like DVD discs, there is little to distinguish a DVD-ROM drive from an ordinary CD-ROM drive as the only giveaway is the DVD logo on the front. Even inside the drive there are more similarities than differences : the interface is ATAPI or SCSI for the more upmarket drives, and the transport is much like any other CD-ROM Drive. CD-ROM data is recorded near the top surface of a disc. DVD's data layer is right in the middle so that the disc can be double-sided. The laser is different, having a pair of lenses on a swivel : one to focus the beam onto the DVD data layers and the other for reading ordinary CDs.

10.9 DVD-ROM drives spin the disk a lot slower than their CD-ROM counterparts. However, since the data is packed much closer together on DVD discs, the throughput is substantially better than a CD-ROM drive at equivalent spin speed. While 1x CD-ROM drive has a maximum data rate of only 150KBps, a 1x DVD-ROM drive can transfer data a 1,250KBps, which is just over the speed of an 8x CD-ROM drive.

10.10 Can I play DVD movies on my computer? If your computer has the right stuff. The computer operating system or playback software must support regional codes and be licensed to descramble copy-protected movies. If the computer has TV video out, it must support Macrovision in order to play copy-protected movies. You may also need software that can read the MicroUDF file system format used by DVDs. In addition to a DVD-ROM drive, you must have extra hardware to decode MPEG-2 video and Dolby Digital or MPEG-2 audio, or your computer must be fast enough to handle software decoding.

10.11 DVD player applications (using either software or hardware decoding) are virtual DVD players. They support most DVD-Video features (menus, subpictures, etc.) and emulate the functionality of a DVD player remote control.

10.12 Personal computer makers are looking forward to putting DVD-ROM drives into PCs, and when they do so, adding a DVD video decoder is all that is necessary to bring DVD's excellent video and audio to the PC for entertainment, games, education, training and promotional applications.

IV. SECRETARIAT COMMENTS

11. The information provided by the ICC and the Canadian Administration are mutually supportive. More detailed information is also available (see paragraph 10 above).
12. The Secretariat would like to remind the Committee that the original purpose of this study was to update the Explanatory Note to heading 84.71. At its 24th Session, the Committee requested the Secretariat to prepare separate documents for the classification of 12 products one of which was "DVD storage units". Therefore, this study should be limited to the classification of DVD Drives solely used as storage units in conjunction with automatic data processing machines.
13. In the understanding of the Secretariat, such drives are presently referred to by the relevant industry and trade as "DVD-ROM/RAM/Recordable/Rewritable Drives".

14. The abbreviation "DVD" now stands for "Digital Versatile Disc". Such discs are similar to CDs.
15. The Secretariat would also like to remind the Committee that, at its 17th Session (see H/12 to Doc. 40.260, HSC/17 – Report), it classified CD-ROM drives, being storage units for automatic data processing machines which, consist of drive-units designed for retrieving signals from CD-ROMs, audio CDs and photo-CDs, in heading 84.71 (see also Classification Opinion 8471.70/1).
16. "DVD drives" are distinguishable from standalone "DVD players" in many features (see paragraph 7 above).
17. To retrieve data from DVDs, "DVD-ROM/R/RW drives" function on the same principle as CD-ROM drives. Due to the absence of (i) an additional hardware or software decoder for images and audio, (2) necessary video and audio connections and (3) necessary control function keys (e.g., play, stop, etc.), they are unable to play a movie or music (i.e., record or reproduce sound or image). They operate solely in conjunction with automatic data processing machines in accordance with commands from the CPU of such machines.
18. Since the Committee has classified CD-ROM drives in heading 84.71, on the basis of the foregoing, and for consistency in Committee decisions, the Secretariat is still of the view that "DVD-ROM/R/RW drives" should fall in the same heading as storage units, by application of Notes 5 (B), 5 (C) and 5(D) to Chapter 84 (subheading 8471.70).
19. The Secretariat agrees with the Canadian Administration that standalone DVD players designed to be connected to apparatus other than automatic data processing machines (e.g., televisions) can be classified in their appropriate heading according to their designed function by application of the General Rules for the Interpretation of the Harmonized System.
20. Since the subject of this study was the classification of "DVD drives designed to operate solely in conjunction with automatic data processing machines" as finished products, the Secretariat requests the Committee to give its views in respect of the concerns expressed by Canada in its note (see paragraphs 9.6, 9.7 and 9.9 above).

V. CONCLUSION

21. Taking into account the comments provided by the ICC, Canada and the Secretariat, the Committee is invited to rule on the classification of DVD drives (see paragraph 6 above) and to decide what further action should be taken in this regard.
22. The Committee is also invited to give its views in respects of the concerns expressed by Canada (see paragraph 20 above).

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DVDROM/DVD-Recordable

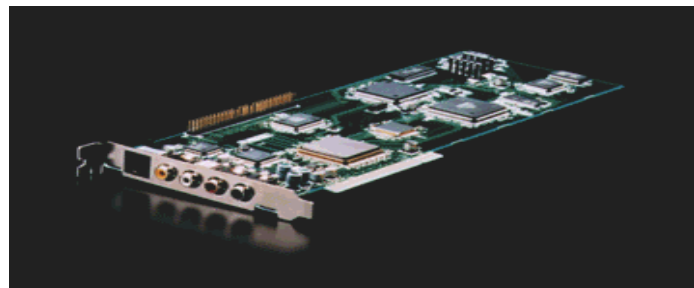
DVDROM drives require PC connection in order to function. Operating system drivers are required to use the drive.

Internal (to the PC) units require either a IDE, SCSI-2 narrow, SCSI-3, or SCART interface. Power for the unit must come for the PC or Laptop. No other interface for Video is available.

External units require either SCSI-2, SCSI-3, USB2, or IEEE 1394 interface. In some cases, there are proprietary interfaces, but they are not usually popular due to compatibility issues. Power must be supplied by an external supply. Very rarely is there a video/S-video port available.

For a DVDROM/Recordable drive to be able to play a DVD Video, hardware or software MPEG-2 decoder must be installed. A software interface to play the video is also required.

DVDROM drives are intended for mass storage devices.



DVDROM/DVD-Recordable

- Primary Uses for DVDROM/Recordable:
 - Mass Storage Device for PC/Laptop.
 - 4.7 GB to 17 GB per disc.
 - Fast access and transfer rates.
 - Offload and Archive data files to free up Hard disk space.
 - Completely compatible with all CDROM/audio formats.
 - Software Application distribution.
 - Microsoft's Windows 2000 operating system barely fits onto the 650 MB CDROM. Next OS release is expected to be placed onto a DVDROM.
 - Interactive Encyclopedias of the future will require significant space to include rich multimedia files.
 - Training
 - Seminars
 - Installation instructions
 - Maintenance Procedures and instructions.

DVDROM/DVD-Recordable

0% of DVDROM customers admit to purchasing a DVDROM for use with consumer DVD video.

However, fewer than 10% continue to use it to view DVD video after the first experience.

– Why?

- PC and Laptop monitors are not ideal for this type of viewing.
- DVD player prices have dropped to an average of \$299.00.

DVD Video Players

Intended for consumer entertainment.

- Offers full and rich "movie theatre" experience at home.
- Little to no degradation of image quality with age.
- Does not easily connect to PC/Laptop environment.
- Allows consumer to proceed immediately to any frame of the movie.

Mpeg-2 decoder installed.

Offers only video connect ports, not PC/Laptop.

Average selling price is about \$299.00.



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Component video

Video signal format that separates chrominance and luminance into two waveforms.

Composite video

Video signal format that includes all the visual information in one waveform, including chrominance, luminance, blanking pedestal, field, line, color sync pulses and field equalizing pulses.

Decode

The process of decompressing a video clip and then converting its color space of from YUV to RGB.

Digital Versatile Disc

A generic name for a family of related disc formats encompassing Video, Audio, and computer file storage on an optical disc format. They share common physical format and logical/file structures. They differ only in content. Physical differences between erasable (Book E), write-once read many times (Book D), and Read-Only Memory (Book A) may emerge.

File system

Means of identifying files and their sector number on disc.

Moving Pictures Experts Group (MPEG)

An international standard for compressing motion pictures and video with high quality. In addition to compressing single images-frames-frames are compressed relative to each other as well.

A subcomponent of a DVD decoder system which executes the Navigation system and performs all decoding up to the channel layer at least up to the track buffer layer. In future, external MPEG decoders may perform the actual video and audio reconstruction, but copyright issues currently prevent this.

A color model used chiefly for computer displays in which colors are specified according to their red, green, and blue components.

A color model used chiefly for video signals in which colors are specified according to their luminance-the Y component-and their hue and saturation-the U and V components.
