

Pioneer

HD-V9000 Content Creation Manual

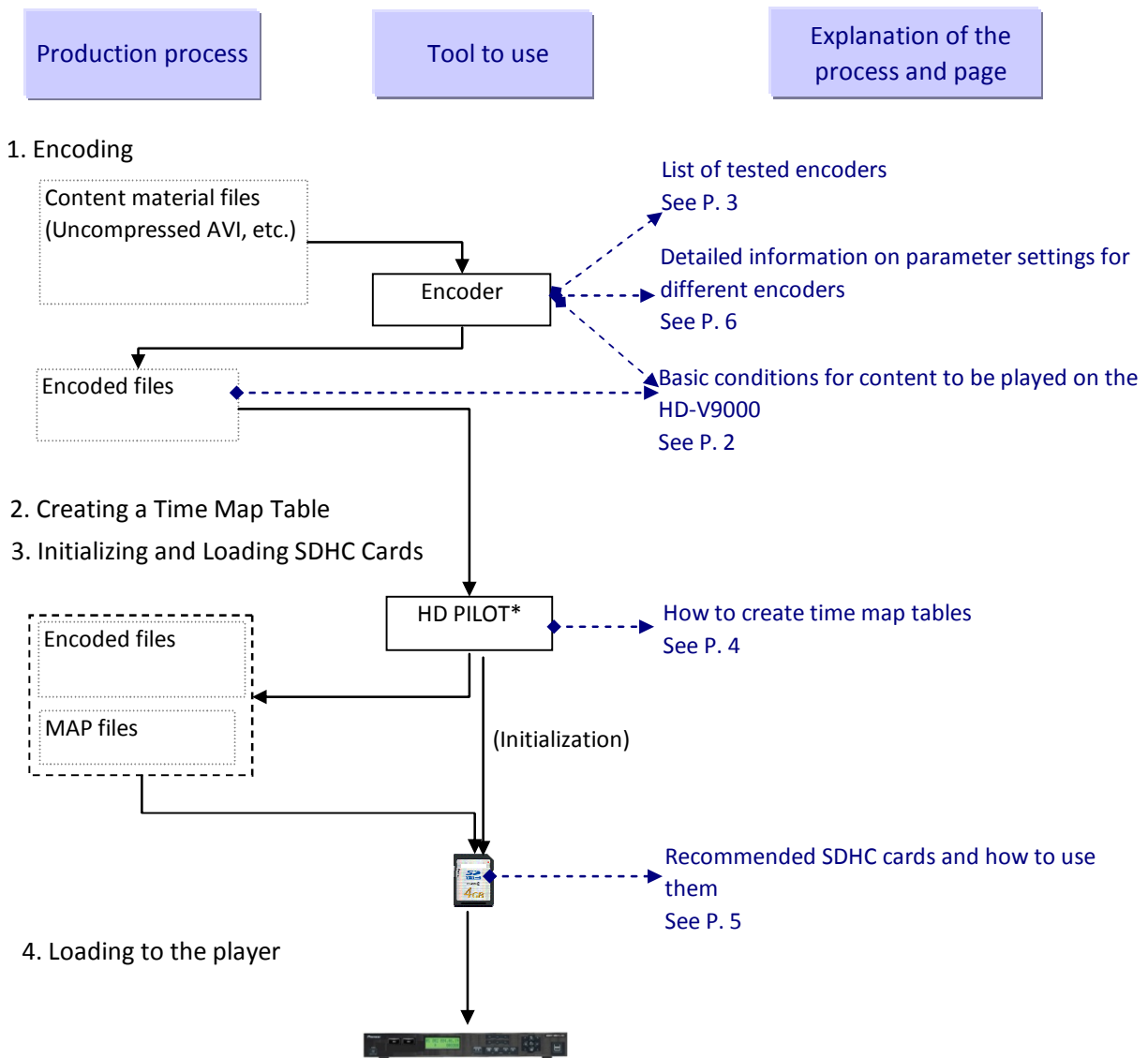
Pioneer Corporation
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Introduction

This manual explains the precautions to take when creating content for the HD-V9000 HD Video System Player.

The basic workflow in creating content is as follows.

For detailed information on each process, refer to the page indicated below.



After creating content, always be sure to check that it works on this unit.

HD PILOT is specialized support software for the HD-V9000, which you can download for free from the Pioneer website. In addition to supporting the creation of time map tables, HD PILOT sets the various parameters for the player, creates playlists, and can be easily loaded onto the player via RS-232C, ethernet, SDHC card or USB memory.

Basic Conditions for Content to be Played on the HD-V9000

1. The HD-V9000 can play MPEG2-TS (Transport Stream) movie file containers.
2. The MPEG2-TS container must be within the ranges shown in Table 1 and Table 2.
The maximum bit rates are indicated, so set the player within a range that does not exceed them.
3. Always enable audio streaming, even for movie files that do not need audio.
4. Select Top Field First for the field order of interlaced video.
5. To enable random access with MPEG2 and H.264, make the following settings for each respectively.
For MPEG2, add SH (Sequence Header) at the start of GOP (Group of Pictures).
For H.264, put IDR in GOV (Group of Video Object Plane) and add SPS (Sequence Parameter Set) and PPS (Picture Parameter Set).
6. Make I (IDR) and P picture at intervals of 3. (Ex.: I B B P B B P B B P)
7. The audio sampling frequency is 48 KHz.
8. Do not select LPCM audio for low bit-rate videos (10 Mbps or less). Doing so may result in problems with the audio while the video is playing.

Table 1 Video Format

Container	Video				Audio
	Codec	Profile@Level	Bit Rate (max)	Resolution	Codec
MPEG2-TS (ISO/IEC 13818-1)	MPEG-2 (ISO/IEC 13818-2)	MP@ML	15 Mbps	720×480/59.94i	LPCM MPEG-1 Audio Layer II (MP2) Dolby Digital
		422P@ML	50 Mbps	720×576/50i	
		MP@HL	60 Mbps	1280×720/50p, 59.94p	
		422P@HL	60 Mbps	1440×1080/50i, 59.94i 1920×1080/50i, 59.94i	
	H.264/AVC (ISO/IEC 14496-10)	MP@L3.1	14 Mbps	720×480/59.94i	LPCM MPEG-1 Audio Layer II (MP2) Dolby Digital AAC (MPEG-4 AAC LC)
		MP@L4.1	50 Mbps (CAVLC)	1280×720/50p, 59.94p 1440×1080/50i, 59.94i 1920×1080/50i, 59.94i	
			30 Mbps (CABAC)		
		HP@L4.1	50 Mbps (CAVLC)		
			30 Mbps (CABAC)		
		H422@L4.0	50 Mbps (CAVLC)		
20 Mbps (CABAC)					

- Dolby and the double-D symbol are trademarks of Dolby Laboratories.
- We recommend using the .m2t or .mpg file extensions.
- Only file names in ASCII can be recognized.
- Performing operations such as operating a menu, making network connections, etc., while a high bit-rate video file is playing may stop or disrupt the video and/or audio.
- Files in the 1440×1080 video file format are converted to 1920×1080 when the video is output by this player.

Table 2 Audio Format

Codec	No. of Channels	Sampling Frequency	No. of Quantized Bits /Bit Rate (max)	Notes
LPCM	2 CH	48 kHz	16 bit	Conforming to SMPTE 302M-2002
MPEG-1 Audio LayerII	2 CH	48 kHz	384 kbps	ISO/IEC 11172-3
Dolby Digital	2 CH	48 kHz	448 kbps	Dolby Digital Decoder Implementation Kit Version 3.0
AAC (MPEG-4 AAC LC)	2 CH	48 kHz	288 kbps	ISO/IEC 14496-3

List of Tested Encoders

The encoders and their versions that created the content Pioneer used in verifying operation on the player are as follows.

As of February 2010

MPEG2

Maker	Application	Version	Note
MainConcept	MPEGPro HD V3	3.1, 3.3	Adobe Premiere Pro Plug-in
MainConcept	MPEGPro HD 4	4.02	Adobe Premiere Pro Plug-in
MainConcept	Reference	1.6	
Canopus	ProCoder 3	3.03	

H.264/AVC

Maker	Application	Version	Note
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MainConcept	Reference	1.6	
Canopus	ProCoder 3	3.03	

Specs of the PC systems used for verifying operation of the encoder software.

Application	System Information
MPEGPro HD V3	Microsoft Windows XP Professional Version 2002 Service Pack 2 Intel® Core™2 CPU 6600 @ 2.40 GHz 2.00 GB RAM
MPEGPro HD 4	Microsoft Windows XP Professional Version 2002 Service Pack 2 Intel® Core™2 CPU 6600 @ 2.40 GHz 2.00 GB RAM
Reference	Microsoft Windows XP Professional Version 2002 Service Pack 2 Intel® Core™2 Duo CPU E6550 @ 2.33 GHz 1.97 GB RAM
ProCoder 3	Microsoft Windows XP Professional Version 2002 Service Pack 2 Intel® Core™2 Duo CPU E6550 @ 2.33 GHz 1.97 GB RAM

Note: For information on how to make the encoder settings for each software application, please contact the manufacturer of the respective software.

This table is subject to change without notice.

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Canopus and ProCoder are registered trademarks of Thomson Canopus Co., Ltd.
Adobe and Premiere are trademarks or registered trademarks of Adobe Systems Incorporated.
Microsoft and Windows are registered trademarks of the Microsoft Corporation in the United States and other countries.

Intel and Intel Core are registered trademarks of the Intel Corporation.

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What is a Time Map Table?

A time map table consists of information, such as frames, times, etc. extracted from an encoded video file. A time map table data file (hereafter, a MAP file) is needed to make frame searches of movie files on the HD-V9000. Although the player can play video files even without a MAP file, when the MAP file is not used, it may take a long time for the video to start, so Pioneer recommends using a MAP file.

How to Create a MAP File

You can create MAP files with HD PILOT* support software. Please refer to the HD PILOT user's manual (available on the Pioneer website) for information on how to use the HD PILOT software. When MAP files are created, they have the .map file extension (with the same name as the encoding file).

Note 1: Precautions after creating a MAP file

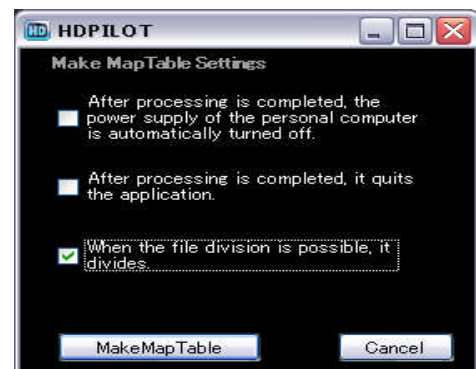
When a video file has been re-edited, re-encoded or re-named, always create a new MAP file.

Note 2: Splitting Files Over 4 GB

When an SDHC card is in the standard format (FAT32), file of 4 GB or greater cannot be handled. For that reason, it is necessary to split movie files that are 4 GB or larger. When the HD PILOT support software is used, it automatically splits files that are 4 GB or larger when the MAP file is created. Subsequently the split file is treated by HD PILOT and by the HD-V9000 as one file, so the video plays seamlessly. (For more detailed information, refer to the HD PILOT user's manual and/or HD PILOT Help screens).

When you wish to divide a file that is 4 GB or larger with HD PILOT, put a check next to "When the file division is possible, it divides." on the setting screen at right.

Note: When this checkbox is turned on, it requires an additional 1 MB of free disk space in addition to the file size on the HDD being used, even if the file is less than 4 GB.



When files are split, all files must be copied onto the SDHC Card. This includes the original video file, the split video files, the MAP file and a list file for managing the split files.

Recommended SDHC Cards and How to Use Them

We recommend using the following SDHC cards to ensure stability when playing video on the HD-V9000 as well as for playing high bit-rate videos.

Type of Card: SDHC 4 GB/8 GB/16 GB/32 GB CLASS 6 or CLASS 10

Card Maker: Panasonic, Toshiba, SanDisk

A CLASS 6 SDHC card is guaranteed to provide 48 Mbps or faster transfer rate, while a CLASS 10 guarantees at least 80 Mbps, so the actual transfer rate (during play) will be even higher. When playing a 50 or 60 Mbps high bit-rate video on the HD-V9000, measure the transfer rate of the actual SDHC card being used and confirm its real performance.

How to Measure Card Transfer Rates

The transfer speed of an SDHC card can be measured by the player or by the HD PILOT support software. For details, refer to the player's user's manual and/or the HD PILOT manual.

Other Usage Precautions

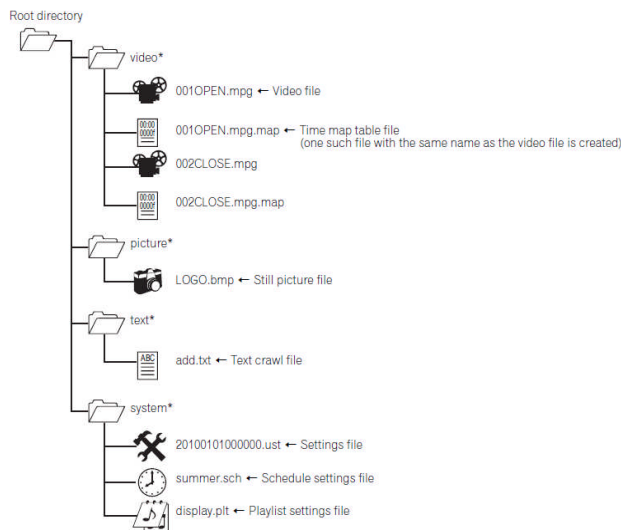
- When playing a 60 Mbps video file, try to use an SDHC card with an actual transfer rate of about 120 Mbps.
- Before using a SDHC card, first initialize it with HD PILOT. During the initialization process, Video, Picture, Text and System folders are created automatically.
- A MAP file is copied to the SDHC card's Video folder as a unit with its video file.
- By way of example, if a 4GB or larger video file is split when the MAP file is created, they take the following file structure. In this case, all the files are copied together into the Video folder.

Video Files: 000aaa.mpg.prt01, 000aaa.mpg.prt02, 000aaa.mpg.prt03
MAP File: 000aaa.mpg.map
List File: 000aaa.mpg.lst

Notes

The folder structure of SDHC cards when used with the HD-V9000 is as follows.

- video ... video file (.mpg .m2t), time map table file (.map)
- picture ... Still image file (.bmp)
- text ... text crawl file (.txt)
- system ... Settings file (.ust), Playlist settings file (.plt), Schedule settings file (.sch)



* For the NTFS format, only use small letters for the directory name.

Detailed Information on Parameter Settings for Different Encoders

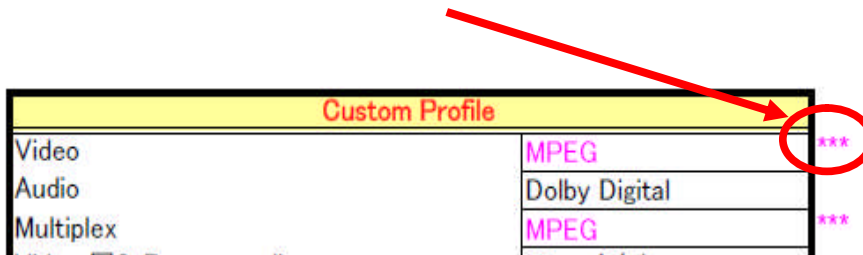
From the next section on, we are providing the actual setting parameter data that Pioneer used when conducting various tests. This information is categorized by the encoder used for content creation in different circumstances. When encoding or requesting assistance, please refer to this table.

In our verification of packaged content, we checked standard compatibility using a PC application and made a visual check of content actually playing on the HD-V9000.

TV SYSTEM	Codec	Usage
NTSC Frame Rate 29.97fps (for Japan and North America)	H.264/AVC	Normal HD
		High Quality HD
		Long Time HD
	MPEG2	Normal HD
		High Quality HD
		Long Time HD
PAL Frame Rate 25fps (for Europe)	H.264/AVC	Normal HD
		High Quality HD
		Long Time HD
	MPEG2	Normal HD
		High Quality HD
		Long Time HD
		SD (Standard Definition)

Pioneer testing concluded that if certain settings were not made for some parameters, the encoder would not meet the HD-V9000's specs and the content would not play properly.

When a parameter is marked in the document as shown below, do not make/change any settings for this parameter.



Custom Profile	
Video	MPEG ***
Audio	Dolby Digital
Multiplex	MPEG ***