

# Advanced Access Content System (AACCS)

## *Blu-ray Disc Prepared Video Book*

*Intel Corporation*

*International Business Machines Corporation*

*Microsoft Corporation*

*Panasonic Corporation*

*Sony Corporation*

*Toshiba Corporation*

*The Walt Disney Company*

*Warner Bros.*

*Revision 0.953*

*Final*

*October 26, 2012*

This page is intentionally left blank.

# Preface

## Notice

THIS DOCUMENT IS PROVIDED "AS IS" WITH NO WARRANTIES WHATSOEVER, INCLUDING ANY WARRANTY OF MERCHANTABILITY, NONINFRINGEMENT, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY WARRANTY OTHERWISE ARISING OUT OF ANY PROPOSAL, SPECIFICATION OR SAMPLE. Intel Corporation, International Business Machines Corporation, Microsoft Corporation, Panasonic Corporation, Sony Corporation, Toshiba Corporation, The Walt Disney Company and Warner Bros. disclaim all liability, including liability for infringement of any proprietary rights, relating to use of information in this specification. No license, express or implied, by estoppel or otherwise, to any intellectual property rights are granted herein.

This document is subject to change under applicable license provisions.

Copyright © 2006-2012 by Intel Corporation, International Business Machines Corporation, Microsoft Corporation, Panasonic Corporation, Sony Corporation, Toshiba Corporation, The Walt Disney Company and Warner Bros. Third-party brands and names are the property of their respective owners.

## Intellectual Property

Implementation of this specification requires a license from AACSLA LLC.

## Contact Information

Please address inquiries, feedback, and licensing requests to AACSLA LLC:

- Licensing inquiries and requests should be addressed to [licensing@aacsla.com](mailto:licensing@aacsla.com).
- Feedback on this specification should be addressed to [comment@aacsla.com](mailto:comment@aacsla.com).

The URL for the AACSLA LLC web site is <http://www.aacsla.com>.

This page is intentionally left blank.

# Table of Contents

Notice .....	iii
Intellectual Property.....	iii
Contact Information.....	iii
<b>CHAPTER 1 INTRODUCTION .....</b>	<b>1</b>
<b>1.1 Purpose and Scope .....</b>	<b>1</b>
<b>1.2 Overview.....</b>	<b>1</b>
<b>1.3 Organization of this Document.....</b>	<b>1</b>
<b>1.4 Reference .....</b>	<b>2</b>
<b>1.5 Document History .....</b>	<b>2</b>
<b>1.6 Notation .....</b>	<b>2</b>
<b>1.7 Terminology .....</b>	<b>3</b>
<b>1.8 Abbreviation and Acronyms .....</b>	<b>3</b>
<b>CHAPTER 2 DETAILS FOR CONTENT REVOCATION .....</b>	<b>5</b>
<b>2. INTRODUCTION .....</b>	<b>5</b>
<b>2.1 Prepared Video Content Certificate.....</b>	<b>5</b>
<b>2.2 Prepared Video Token.....</b>	<b>8</b>
2.2.1 Binding Nonce File .....	9
2.2.2 Storing the PVT on the media.....	10
<b>2.3 Content Revocation List.....</b>	<b>10</b>
<b>2.4 Content Hash Table .....</b>	<b>10</b>
2.4.1 Data Structure for Content Hash Table .....	10
2.4.2 Hash Calculation.....	13
2.4.2.1 Clip AV stream .....	13
2.4.2.2 Usage Rule.....	13
2.4.2.3 Managed Copy Manifest File.....	13
2.4.2.4 BD-J Root Certificate .....	13
2.4.3 Verifying Content Certificate.....	14
2.4.3.1 Clip AV stream .....	14
2.4.3.2 Usage Rule.....	14
2.4.3.3 Managed Copy Manifest File.....	14

2.4.3.4 BD-J Root Certificate .....14

**CHAPTER 3 DETAILS FOR CONTENT ENCRYPTION AND DECRYPTION ...15**

**3. INTRODUCTION .....15**

3.1 Media Key Block.....15

3.2 Media ID.....15

3.3 Binding Nonce .....15

3.4 Partial Media Key Block for Host Revocation List.....16

3.5 Bus Encryption Flag .....16

3.5.1 Encryption Scheme .....17

3.6 CPS Unit Key File and CPS Usage File.....17

3.6.1 Application Format Structure.....17

3.6.1.1 Clip .....17

3.6.1.2 PlayList .....17

3.6.1.3 Movie Object .....17

3.6.1.4 BD-J Object .....17

3.6.1.5 Index Table .....17

3.6.1.6 First Playback .....18

3.6.1.7 Top Menu.....18

3.6.1.8 Title.....18

3.6.2 CPS Unit .....18

3.6.3 CPS Unit Key File (Unit\_Key\_RW.inf) .....21

3.6.4 CPS Unit Usage File (CPSUnitXXXXXX.cci) .....21

3.6.4.1 CCI\_and\_other\_info( ).....21

3.6.4.2 Basic CCI for AACs.....21

3.6.4.3 Enhanced Title Usage for AACs .....21

3.6.4.4 Key Management Information for On-line Function .....21

3.6.4.5 Content Owner Authorized Outputs Information.....21

3.7 Encrypted Packs .....21

3.7.1 Encryption Scheme .....21

3.7.2 Copy Permission Indicator.....22

3.8 Embedded CCI in AV Content .....22

3.8.1 private\_data\_byte.....22

**CHAPTER 4 DETAILS FOR USES OF ON-LINE CONNECTIONS .....23**

**4. INTRODUCTION .....23**

4.1 Virtual File System .....23

4.1.1 AACs Files for VFS .....23

4.2 System Model .....24

<b>4.3</b>	<b>Connection Protocol between Remote Server and BD-J Application .....</b>	<b>24</b>
<b>4.4</b>	<b>APIs between AACSLayer and BD-J Application .....</b>	<b>24</b>
4.4.1	Package com.aacsla.bluray.online .....	24
4.4.1.1	Class Summary .....	24
4.4.1.2	Class MediaAttribute .....	24
4.4.1.2.1	Constructors.....	24
4.4.1.2.2	Methods .....	24
4.4.1.3	Class DeviceAttribute .....	25
4.4.1.3.1	Constructors.....	25
4.4.1.3.2	Methods .....	25
4.4.1.4	Class ContentAttribute.....	25
4.4.1.4.1	Constructors.....	25
4.4.1.4.2	Methods .....	25
4.4.1.5	Class EnablePermission .....	26
4.4.1.5.1	Constructors.....	26
4.4.1.5.2	Methods .....	26
<b>4.5</b>	<b>AACS Media Binding .....</b>	<b>26</b>
<b>4.6</b>	<b>Example for the content use with network transaction .....</b>	<b>26</b>
4.6.1	Download additional Content .....	26
4.6.2	Download updated Usage Rule.....	27
4.6.3	Download Title Key.....	27
4.6.4	Download Permission .....	27
 <b>CHAPTER 5 MANAGED COPY AND PREPARED VIDEO CONTENT .....</b>		<b>29</b>
<b>5.</b>	<b>INTRODUCTION .....</b>	<b>29</b>
<b>5.1</b>	<b>System Model .....</b>	<b>29</b>
<b>5.2</b>	<b>APIs between Managed Copy Machine and BD-J Application .....</b>	<b>29</b>
5.2.1	Package com.aacsla.bluray.mc.....	29
5.2.1.1	Interface Summary.....	29
5.2.1.2	Interface MCEventListener .....	29
5.2.1.2.1	Methods .....	29
5.2.1.3	Interface MCOT.....	30
5.2.1.3.1	Methods .....	30
5.2.1.4	Interface MCProgress .....	30
5.2.1.4.1	Fields .....	30
5.2.1.4.2	Methods .....	30
5.2.1.5	Class Summary .....	31
5.2.1.6	Class ManagedCopy .....	31
5.2.1.6.1	Fields .....	31
5.2.1.6.2	Constructors.....	31
5.2.1.6.3	Methods .....	31
5.2.1.7	Class MCCancelEvent .....	34
5.2.1.7.1	Constructors.....	34
5.2.1.8	Class CompleteTransactionEvent .....	34
5.2.1.8.1	Constructors.....	35
5.2.1.9	Class MCCompleteEvent.....	35
5.2.1.9.1	Constructors.....	35
5.2.1.10	Class MCErrrorEvent.....	35

5.2.1.10.1 Constructors.....	35
5.2.1.11 Class MCEvent .....	35
5.2.1.11.1 Constructors.....	35
5.2.1.12 Class MCMAvailableEvent .....	35
5.2.1.12.1 Constructors.....	35
5.2.1.13 Class MCStartEvent.....	36
5.2.1.13.1 Constructors.....	36
5.2.1.14 Class MCStopEvent .....	36
5.2.1.14.1 Constructors.....	36
5.2.1.15 Exception Summary .....	36
5.2.1.16 Class MCException .....	36
5.2.1.16.1 Constructors.....	36
<b>5.3 Managed Copy Manifest File.....</b>	<b>36</b>
5.3.1 Rules to use Managed Copy Manifest File .....	37
5.3.2 XML schema of Managed Copy Manifest File.....	37
<b>5.4 Managed Copy Web Service .....</b>	<b>37</b>
5.4.1 Web Service Description .....	37
5.4.2 Offer Response Message.....	37
5.4.3 Permission Response Message.....	37
<b>5.5 Requirement for Managed Copy Machine .....</b>	<b>38</b>
5.5.1 Recovery process .....	38
5.5.2 Making a Managed Copy.....	38
<b>5.6 Application/HTML for financial/accounting transaction.....</b>	<b>38</b>
<b>5.7 Managed Copy Messages .....</b>	<b>38</b>
5.7.1 Request Permission.....	38
<b>CHAPTER 6 DETAILS FOR SEQUENCE KEYS AND UNIFIED MKB .....</b>	<b>39</b>
<b>6. INTRODUCTION .....</b>	<b>39</b>
<b>CHAPTER 7 CLARIFICATIONS FOR UNENCRYPTED CONTENT .....</b>	<b>41</b>
<b>7. INTRODUCTION .....</b>	<b>41</b>
<b>CHAPTER 8 ADDITIONAL REQUIRMENTS FOR THE 3D FREATURE.....</b>	<b>43</b>
<b>8. INTRODUCTION .....</b>	<b>43</b>
<b>ANNEX A. CARRIAGE OF SYSTEM RENEWABILITY MESSAGE.....</b>	<b>45</b>
<b>ANNEX B. REQUIREMENTS FOR ON-LINE AND MANAGED COPY API ....</b>	<b>47</b>



## List of Figures

Figure 2-1	Example of the relation between Content Hash Table Digest and Hash Value .....	12
Figure 2-2	Example of the Content Hash Table syntax .....	13
Figure 3-1	Directory structure for AACV directory .....	20
Figure 3-2	Directory structure for BDMV directory .....	20

This page is intentionally left blank.

## List of Tables

Table 2-1	Data Format for Prepared Video Content Certificate .....	5
Table 2-2	Prepared Video Token.....	8
Table 2-3	Data Format for Prepared Video Volume ID .....	9
Table 2-4	Data Format for Prepared Video Serial Number .....	9
Table 2-5	Data Format for Binding Nonce File.....	10
Table 2-6	Data Format for Content Hash Table .....	11
Table 3-1	Data Format for Binding Nonce in User Control Data .....	16
Table 3-2	Data Format for Bus Encryption Flag in User Control Data .....	17

This page is intentionally left blank

# Chapter 1

## Introduction

### 1.1 Purpose and Scope

The Advanced Access Content System (AACS) specification defines an advanced, robust and renewable method for protecting audiovisual entertainment content, including high-definition content. The specification is organized into several “books”. The AACS *Introduction and Common Cryptographic Elements* book of this specification defines cryptographic procedures that are common among the various defined uses of the protection system. The AACS *Pre-recorded Video Book* defines common details for using the system to protect audiovisual content distributed on any kind of pre-recorded (read-only) storage media. This AACS *Prepared Video Book* specifies additional details for using the system to protect audiovisual content on recordable storage media in a manner functionally equivalent to the AACS pre-recorded (read-only) format. This document (the AACS *Blu-ray Disc Prepared Video Book*) specifies additional details for using the system to protect audiovisual content distributed as Prepared Video Content for Blu-ray Disc Rewritable Media (BD-RE) and Blu-ray Disc Recordable Media (BD-R). Specifications covering other storage types, transmission media and formats are expected to be available in the future (see Section 1.7 of AACS *Prepared Video Book* of this specification).

When there is a discrepancy between a format-independent book and this book, then this book takes precedence.

The use of this specification and access to the intellectual property and cryptographic materials required to implement it will be the subject of a license. A license authority referred to as AACS LA is responsible for establishing and administering the content protection system based in part on this specification.

(Note) In this specification the words “BD Recordable Disc” includes both Blu-ray Disc Rewritable Media (BD-RE) and Blu-ray Disc Recordable Media (BD-R).

### 1.2 Overview

In the Blu-ray Disc Prepared Video Book, the following described procedures are required to protect AACS Prepared Video Content.

- Content Revocation
- Content Encryption and Decryption
- Uses of On-line Connections
- Managed Copy
- Sequence Keys
- Unencrypted content

This document is provided as a detailed description of procedures and data structures that are specific for the use of the AACS technology on BD Recordable Disc.

### 1.3 Organization of this Document

This document is organized as follows:

- Chapter 1 provides an introduction and overview.

- Chapter 2 describes Blu-ray Disc specific procedures related to the revocation of Prepared Video Content.
- Chapter 3 describes Blu-ray Disc specific procedures for the production (encryption) and off-line playback (decryption) of AACS Content on Blu-ray Disc Recordable Disc.
- Chapter 4 describes Blu-ray Disc specific procedures for the use of AACS Content with network transactions.
- Chapter 5 describes Blu-ray Disc specific procedure for the Managed Copy of Prepared Video Content.
- Chapter 6 describes Blu-ray Disc specific procedure for Sequence Keys.
- Chapter 7 describes clarifications for unencrypted content.
- Chapter 8 describes Blu-ray Disc specific 3D feature.

## 1.4 Reference

This specification shall be used in conjunction with the following publications. When the publications are superseded by an approved revision, the revision shall apply.

AACS LA, Introduction and Common Cryptographic Elements

AACS LA, Pre-recorded Video Book

AACS LA, Prepared Video Book

Blu-ray Disc Association, System Description Blu-ray Disc Recordable Format, part 1: Basic Format Specifications, version 1.3

Blu-ray Disc Association, System Description Blu-ray Disc Recordable Format, part 2: File System Specifications, version 1.1

Blu-ray Disc Association, System Description Blu-ray Disc Rewritable Format, part 1: Basic Format Specifications, version 2.1

Blu-ray Disc Association, System Description Blu-ray Disc Rewritable Format, part 2: File System Specifications, version 2.1

Blu-ray Disc Association, System Description Blu-ray Disc Rewritable Format, part 3: Audio Visual Basic Specifications, version 3.0

Digital Transmission Licensing Administrator, Digital Transmission Content Protection Specification Volume 1 Revision 1.4

## 1.5 Document History

This document version 0.953 supersedes version 0.952 dated July 14, 2011 and contains NO SPECIFICATION CHANGES. Version 0.952 superseded version 0.951 dated September 28, 2009 and contained NO SPECIFICATION CHANGES. Version 0.951 superseded version 0.95 dated May 21, 2009 and contained the following change.

- Blu-ray 3D is defined.

## 1.6 Notation

Except where specifically noted otherwise, this document uses the same notations and conventions for numerical values, operations, and bit/byte ordering as described in the *AACS Introduction and Common Cryptographic Elements* book of this specification.

## 1.7 Terminology

**Aligned Unit:** An Aligned unit consists of a series of 32 Source Packets.

**Block Key:** A Block Key is a key to encrypt and decrypt each Aligned unit.

**CPS Unit:** A CPS Unit is a group of titles, to which the same title key has been assigned.

**CPS Unit Key:** A CPS Unit Key is a Blu-ray Disc synonym for the Title Key.

**CPS Unit Usage file:** A CPS Unit Usage file is a Blu-ray Disc synonym for the Title Usage file.

**ECC Cluster:** An ECC Cluster consists of a series of 32 Physical Sectors.

**Hash Unit:** A Hash Unit consists of a series of 96 Logical Sectors.

**Hash Value:** A Hash Value is data, which has been calculated from a byte sequence in a Hash Unit.

**Logical Sector:** A Logical Sector is a data field in a logical volume. All Logical Sectors in a logical volume shall have the same size.

**Reserved:** The term “Reserved”, when used to define the syntax of the data structure, indicates that the field may be used for future extensions. Unless otherwise specified, all the bits of reserved field in the syntax of data structure shall be set to 0<sub>2</sub>. The term “Reserved”, when used to define the meaning of values, indicates that the reserved values may be used for future extensions. The reserved values shall never be used in this version.

**Segment Key:** A Segment Key is a Blu-ray Disc synonym for the Title Key for Sequence Key (SK) segment portion.

**Source Packet:** A Source Packet consists of a Source Packet header and a subsequent MPEG-2 transport packet.

## 1.8 Abbreviation and Acronyms

BD	Blu-ray Disc
BDMV	Blu-ray Disc Movie
BD-R	Blu-ray Disc Recordable Media
BD-RE	Blu-ray Disc Rewritable Media
CCI	Copy Control Information
CHT	Content Hash Table
CPS	Content Protection System
ECC	Error Correction Code
MPEG	Moving Picture Experts Group
VFS	Virtual File System

This page is intentionally left blank.



# Chapter 2

## Details for Content Revocation

### 2. Introduction

Content revocation requires the Content Certificate that is specified in Chapter 2 of the *AACS Prepared Video Book* of this specification. This chapter describes additional details of content revocation that are specific to the BDMV format.

As described in the *AACS Prepared Video Book*, every hash units of the AV content in the BDMV format on the disc is hashed, and this hashed value is included in the Content Hash Table. Every part of the Content Hash Table, that corresponds to an AV content file, is then hashed, and this hashed value is included in the unsigned Prepared Video Content Certificate as a Content Hash Table Digest. This unsigned Prepared Video Content Certificate is finally signed by the AACS LA, and this becomes the Prepared Video Content Certificate.

A disc may contain both encrypted content and unencrypted content. The Prepared Video Content Certificate, however, shall cover all the AV contents in the BDMV format on the disc, whether they are encrypted or not.

### 2.1 Prepared Video Content Certificate

In parallel with the “\BDMV” directory, a single Prepared Video Content Certificate shall be stored in the “\AACS\_pv” directory and in the “\AACS\_pv\DUPLICATE” directory. Note that the Prepared Video Content shall have one Prepared Video Content Certificate file named “Content000.cer”, regardless of single-layer or dual-layer.

The data format of the Prepared Video Content Certificate is defined in Table 2-1.

**Table 2-1 Data Format for Prepared Video Content Certificate**

Byte	Bit	7	6	5	4	3	2	1	0
0		Certificate Type: 07 <sub>16</sub>							
1		(reserved)							
2		Total_Number_of_HashUnits							
...									
5									
6		Total_Number_of_Layers							
7		Layer_Number							
8		Number_of_HashUnits							
...									
11									
12		Number_of_Digests							
13									
14		Applicant ID							
15									

16	(msb)	CCSS ID	(lsb)	Sequence Number 1
17	Sequence Number 1		(msb)	
18	Timestamp			
19	(lsb)	Sequence Number 2		
20	Minimum CRL Version			
21				
22	Number of Prepared Video Authorizing Servers Entries			
23				
24	Length_Format_Specific_Section			
25				
26	Hash_Value_of_MC_Manifest_File			
:				
45				
46	Hash_Value_of_BDJ_Root_Cert			
:				
65				
66	Num_of_CPS_Unit			
67				
68	Hash_Value_of_CPS_Unit_Usage_File#1			
...				
87				
	...			
68+(J-1)*20	Hash_Value_of_CPS_Unit_Usage_File#J			
..				
87+(J-1)*20				
K (see note below)	Content Hash Table Digest #1			
:				
K+7				
...	...			
K+(N-1)*8	Content Hash Table Digest #N			
...				
K+7+(N-1)*8				
L (see note below)	Public Key of Authorizing Server #1			
...				
L+39				
...	...			
L+(M-1)*40	Public Key of Authorizing Server #M			
...				
L+39+(M-1)*40				

$L+40+(M-1)*40$ : $L+79+(M-1)*40$	Signature Data
---	----------------

Note:  $K = 88+(J-1)*20$ ,  $L = K+8+(N-1)*8$

Details of each field are defined in the AACS *Prepared Video Book* of this specification with the following exceptions:

- A 4-byte Total\_Number\_of\_HashUnits field indicates the total number of Hash Unites on the disc.
- A 1-byte Total\_Number\_of\_Layers field shall be 01<sub>16</sub> for AACS Prepared Video Content. The Licensed Player shall ignore this field.
- A 1-byte Layer\_Number field shall be 00<sub>16</sub> for AACS Prepared Video Content. The Licensed Player shall ignore this field.
- A 4-byte Number\_of\_HashUnits field indicates the number of Hash Units on the disc. Note that for AACS Prepared Video Content, the same value is set in this field as the value in Total\_Number\_of\_HashUnits field.
- A 2-byte Number\_of\_Digests field indicates the number of Clip AV stream files that have a file size equal to or more than 96 Logical Sectors on the disc.
- A 2-byte Applicant ID assigned by AACS LA.
- A 4-byte Content Sequence Number consists of 6-bit Content Certificate Signing Server ID (CCSS ID), 15-bit Timestamp, and 11-bit Sequence Number that is a concatenation of a 4-bit Sequence Number 1 and 7-bit Sequence Number 2, and is assigned by AACS LA to uniquely identify the Certified Content amongst that Content Provider's content. The combination of the Applicant ID and the Content Sequence Number is referred to as the *Content Certificate ID*. In other words, the Content Certificate ID is a 6-byte number. Timestamp indicates the date (referenced to UTC) when a Content Certificate is signed, and contains a value for the elapsed days from 1st January 2008 with the value 0 representing 1st January 2008. Timestamp values predating 2 February 2008 are reserved, and shall not be used as a timestamp.
- A 2-byte Minimum CRL Version value, assigned by the AACS LA to indicate the minimum Content Revocation List Version number that shall accompany the Certified Content.
- A 2-byte Number of Prepared Video Authorizing Servers Entries contains the number of Authorizing Servers whose Public Key values are included in this Content Certificate. Only the least significant 7 bits in this field are used, because the number of Authorizing Servers referenced in this Content Certificate shall be no more than 128.
- A 2-byte Length\_Format\_Specific\_Section that specifies the length of the subsequent Format\_Specific\_Section. The Format Specific Section for BD includes the subsequent Hash\_Value\_of\_MC\_Manifest\_File, Hash\_Value\_of\_BDJ\_Root\_Cert, Num\_of\_CPS\_Unit, and a sequence of Hash\_Value\_of\_CPS\_Unit\_Usage\_Files.
- A 20-byte Hash\_Value\_of\_MC\_Manifest\_File contains the hash value for the Managed Copy Manifest File as defined in Section 5.3.
- A 20-byte Hash\_Value\_of\_BDJ\_Root\_Cert contains the hash value for the BD-J Root Certificate as defined in Section 2.4.2.4.
- A 2-byte Num\_of\_CPS\_Unit fields indicates the number of CPS Units on the disc.
- A series of 20-byte Hash\_Value\_of\_CPS\_Unit\_Usage\_Files contains the hash value for the CPS Unit Usage File as defined in Section 2.4.2.2.

The Prepared Video Content Certificate shall be no more than 57,248 bytes and the Number of Prepared Video Authorizing Servers Entries shall be no more than 128.

## 2.2 Prepared Video Token

Each BD Recordable Disc that contains AACCS Prepared Video Content includes the Prepared Video Token. The Prepared Video Token contains the public key of an authorizing server. The Licensed Player shall verify this token before playback of the AACCS Content.

The Prepared Video Token “PV.tkn” shall be stored in the “\AACCS\_pv” directory and in the “\AACCS\_pv\DUPLICATE” directory.

The data format of the Prepared Video Token is defined in Table 2-2.

**Table 2-2 Prepared Video Token**

Byte	Bit	7	6	5	4	3	2	1	0
0		PVAS Public Key							
...									
39									
40		Prepared Video Volume ID							
...									
55									
56		PVSN Status	Move Allowed	BEE	Reserved				
57		Reserved							
...									
59									
60		Media Key Delta							
...									
75									
76		Prepared Video Serial Number (PVSN)							
...									
91									
92		Prepared Video Token Signature Data							
...									
131									

Details and the usage of the Prepared Video Token are defined in Section 2.8 of AACCS *Prepared Video Book* of this specification. Here is the additional clarification for some syntax:

- A 16-byte Prepared Video Volume ID field contains the Volume ID used for calculating the Volume Unique Key or Volume Variant Unique Key. The data format of the Prepared Video Volume ID is defined in Table 2-3.
- A 16-byte Prepared Video Serial Number (PVSN) field contains the PVSN used for AACCS On-line defined in Chapter 4 of this book or Managed Copy defined in Chapter 5 of this book. This Prepared Video Serial Number is optional for BD Recordable Disc. The data format of the PVSN is defined in Table 2-4.

Media ID is used to calculate Prepared Video Token Signature Data, as described in the section 2.8 of AACS *Prepared Video Book* of this specification. In case of a PC-based system, this Media ID for AACS use shall be retrieved from the disc by use of the procedure as defined in the section 4.6 of *Introduction and Common Cryptographic Elements* book of this specification.

**Table 2-3 Data Format for Prepared Video Volume ID**

Byte	Bit	7	6	5	4	3	2	1	0
0		Prepared Video Volume ID							
:									
15									

(msb) (lsb)

**Table 2-4 Data Format for Prepared Video Serial Number**

Byte	Bit	7	6	5	4	3	2	1	0
0		Prepared Video Serial Number (PVSN)							
:									
15									

(msb) (lsb)

### 2.2.1 Binding Nonce File

Each BD Recordable Disc that contains AACS Prepared Video Content includes the Binding Nonce File. The Binding Nonce File contains all-zero value. Note that the Binding Nonce (16 bytes) itself is stored in User Control Data associated with the first logical Sector of the Binding Nonce File.

The Binding Nonce File “BN.dat” shall be stored in the “\AACS\_pv” directory. Note that there is no backup of the Binding Nonce File.

The following requirements are applied to the Binding Nonce File to reserve enough size of continuous area for the Binding Nonce File, and to avoid unexpected Read Modify Write operation to the ECC Cluster that contains the Binding Nonce File.

- The size of Binding Nonce File shall be 65536 bytes.
- The Binding Nonce File shall be allocated on an ECC Cluster basis.

The data format of the Binding Nonce File is defined in Table 2-5.

**Table 2-5 Data Format for Binding Nonce File**

Syntax	No. of bits	Mnemonics
Binding Nonce File {		
(all-zero)	65536	bslbf
}		

## 2.2.2 Storing the PVT on the media

The Download Client creates the Binding Nonce and ensures that it is successfully committed to the Binding Nonce File before sending the Binding Nonce to the PVAS. The Download Client stores the PVT data in the PVT File when it is received from the PVAS. During playback, the Licensed Player retrieves the PVT data from the PVT File and uses the Binding Nonce value from the Binding Nonce File during the signature verification process of that PVT.

## 2.3 Content Revocation List

In parallel with the “\BDMV” directory, the Content Revocation List (CRL) “ContentRevocation.lst” shall be stored in the “\AACS\_pv” directory and in the “\AACS\_pv\DUPLICATE” directory.

The data format for the Content Revocation List is defined in Section 2.7 of the *AACS Prepared Video Book* of this specification.

CRL data shall be recorded from the first byte of the file, and the null (00<sub>16</sub>) padding may be attached after the CRL data in the file for the authoring and the mastering purpose.

## 2.4 Content Hash Table

### 2.4.1 Data Structure for Content Hash Table

For BD Recordable Disc, the Content Hash Table (CHT) shall be stored in the “\AACS\_pv” directory and in the “\AACS\_pv\DUPLICATE” directory. Note that the Prepared Video Content shall have one Content Hash Table file named “ContentHash000.tbl”, regardless of single-layer or dual-layer.

The Content Hash Table shall contain an 8-bytes hash value for each hash unit of the Clip AV stream file under “\BDMV\STREAM” directory on BD Recordable Disc. Details of the hash calculations are defined in Section 2.4.2 of this book. Each Clip AV stream file is sequentially divided into hash units from head to tail, and the size of each hash unit is 96 Logical Sectors. Note that the tail portion of each Clip AV stream file, which size is less than 96 Logical Sectors, is omitted from storing of its hash value. If the file size of Clip AV stream file is exactly the multiple of 96 Logical Sectors, there is no tail portion to be omitted from storing. Note that the size of CHT is zero bytes if there is no Clip AV stream that has a file greater than or equal to 96 Logical Sectors on the disc.

Table 2-6 shows the data structure for Content Hash Table.

**Table 2-6 Data Format for Content Hash Table**

Syntax	No. of bits	Mnemonics
Content Hash Table {		
for(I=0 ; I < Number_of_Digests ; I++) {		
Starting_HU_Num#I	32	Uimsbf
Clip_Num#I	32	Uimsbf
HU_Offset_in_Clip#I	32	Uimsbf
}		
for(I=0 ; I < Number_of_HashUnits ; I++){		
Hash_Value#I	64	Bslbf
}		
}		

Starting\_HU\_Num#I (4 bytes) indicates the position in hash units of the first hash value of Clip AV Stream file #I that have a file size greater than or equal to 96 Logical Sectors in the hash value part in this table. This number starts from zero.

Clip\_Num#I (4 bytes) indicates a 5-digit number included in the file name of Clip AV stream file #I that has a file size greater than or equal to 96 Logical Sectors. This value is stored in the ascending order of the 5-digit number included in the file name of the corresponding Clip AV stream file.

HU\_Offset\_in\_Clip#I (4 bytes) indicates the offset in hash units from the top of the Clip AV stream file #I that have a file size greater than or equal to 96 Logical Sectors. This offset shall be 00000000<sub>16</sub> for AACs Prepared Video Content.

Hash\_Value#I (8 bytes) contains the hash value calculated from the hash unit #I on BD Recordable Disc. These Hash\_Value#I shall be listed in the ascending order of the 5-digit number included in the file name of the corresponding Clip AV stream file, and in the ascending order of the logical position in the Clip AV stream file.

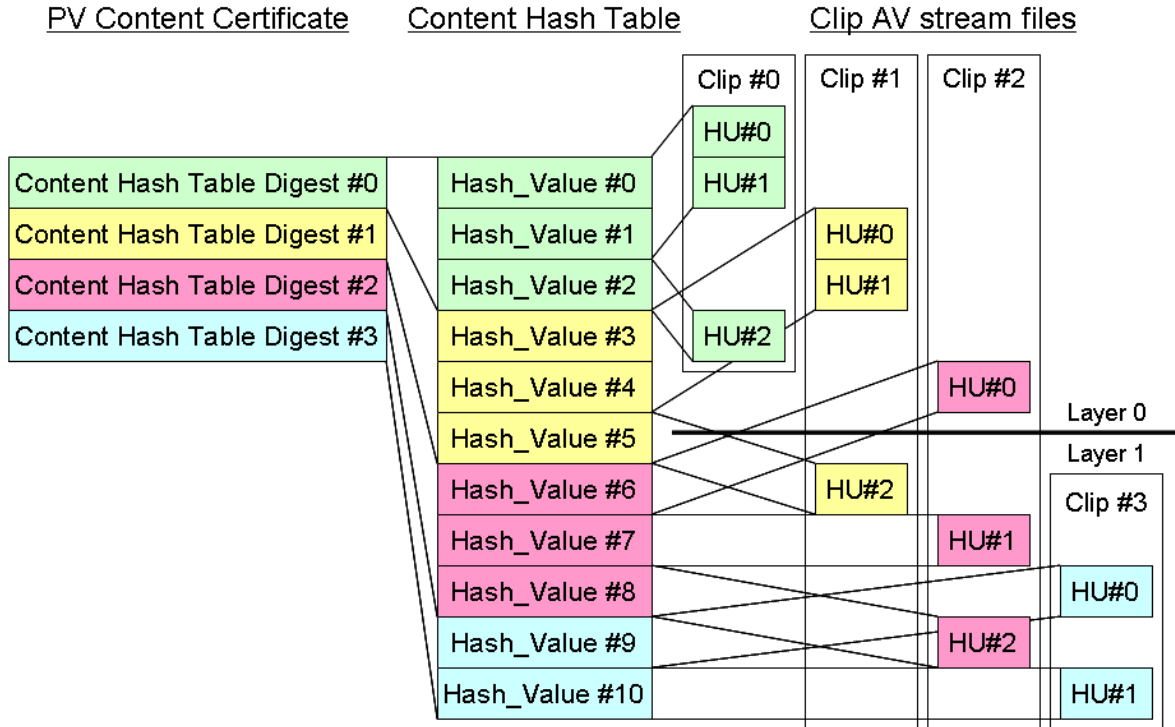
Number\_of\_Digests is defined in Table 2-1, and indicates the number of Clip AV Stream files on BD Recordable Disc.

Number\_of\_HashUnits is defined in Table 2-1, and indicates the number of hash units on BD Recordable Disc.

Content Hash Table Digest #J defined in Table 2-1 is the digest of the concatenation of the hash values from the Starting\_HU\_Num#I to Starting\_HU\_Num#(I+1) - 1.

(Note) In case that BD Recordable Disc is composed of only Clip AV stream file(s) that have a file size less than 96 Logical Sectors, both Number\_of\_Digests and Number\_of\_HashUnits shall be set to zero. In other words, empty (i.e. file size is zero) ContentHash000.tbl shall be stored on BD Recordable Disc.

Figure 2-1 shows the example of the relation between Prepared Video Content Certificate and Content Hash Table.



**Figure 2-1 Example of the relation between Content Hash Table Digest and Hash Value**

In this example, there is one Prepared Video Content Certificate, one Content Hash Table and four Clip AV stream files that have a file size greater than or equal to 96 Logical Sectors. The whole part of Clip AV stream file #0 is recorded on Layer 0, and the whole part of Clip AV stream file #3 is recorded on Layer 1. Each Clip AV stream file #1 and #2 are recorded separately on both Layer 0 and 1. From a physical allocation point of view, each Clip AV stream file is fragmented and the file extents of different Clip AV stream files are recorded alternately.

In this example, all Hash Units of Clip AV stream files is included in one Content Hash Table.

Figure 2-2 shows the example of the Content Hash Table syntax defined in Table 2-6.



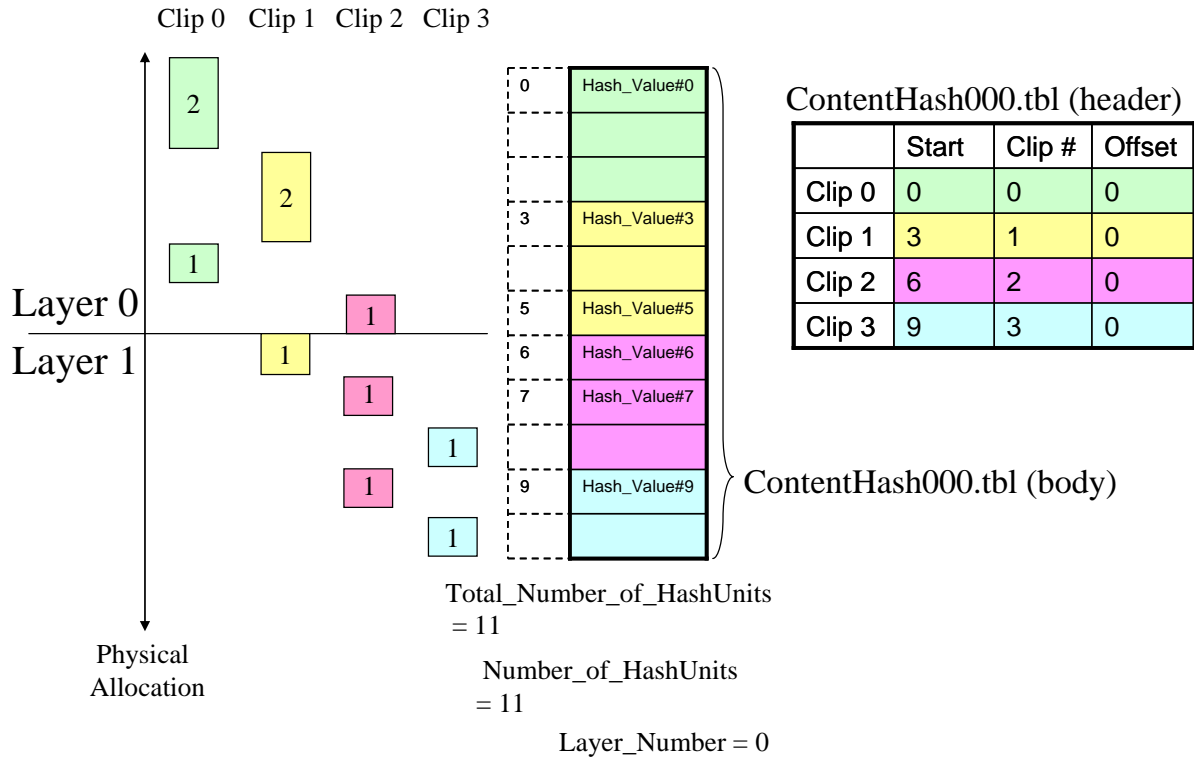


Figure 2-2 Example of the Content Hash Table syntax

## 2.4.2 Hash Calculation

### 2.4.2.1 Clip AV stream

Refer to Section 2.3.2.1 of the AACS *Blu-ray Disc Pre-recorded Book*.

### 2.4.2.2 Usage Rule

Refer to Section 2.3.2.2 of the AACS *Blu-ray Disc Pre-recorded Book*.

### 2.4.2.3 Managed Copy Manifest File

Refer to Section 2.3.2.3 of the AACS *Blu-ray Disc Pre-recorded Book*.

### 2.4.2.4 BD-J Root Certificate

Refer to Section 2.3.2.4 of the AACS *Blu-ray Disc Pre-recorded Book*.

### **2.4.3 Verifying Content Certificate**

Refer to Section 2.3.3 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### **2.4.3.1 Clip AV stream**

Refer to Section 2.3.3.1 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### **2.4.3.2 Usage Rule**

Refer to Section 2.3.3.2 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### **2.4.3.3 Managed Copy Manifest File**

Refer to Section 2.3.3.3 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### **2.4.3.4 BD-J Root Certificate**

Refer to Section 2.3.3.4 of the AACS *Blu-ray Disc Pre-recorded Book*.

# Chapter 3

## Details for Content Encryption and Decryption

### 3. Introduction

The general approach for encryption and decryption of Prepared Video Content protected by AACS is specified in Chapter 3 of the AACS *Prepared Video Book* of this specification. This chapter describes additional details of that approach that are specific to the use of AACS encryption with BD Recordable Disc and its Application Format.

#### 3.1 Media Key Block

Each BD Recordable Disc that contains content encrypted by AACS (using a CPS Unit Key that is provided in the “AACS\_pv” directory and in the “\AACS\_pv\DUPLICATE” directory) shall include two Read/Write Media Key Blocks (MKB). The MKB “MKB\_RW.inf” shall be stored in the “\AACS\_pv” directory and in the “\AACS\_pv\DUPLICATE” directory.

MKB data shall be recorded from the first byte of the file, and null (00<sub>16</sub>) padding may be attached after the MKB data in the file for authoring and mastering purposes.

#### 3.2 Media ID

Refer to Section 2.1 of the AACS *Blu-ray Disc Recordable Book*.

#### 3.3 Binding Nonce

The Binding Nonce is stored in the Protected Area of the BD Recordable Disc, and is used to calculate Prepared Video Token Signature Data in the Prepared Video Token as described in Section 2.2 of this book. For BD Recordable Disc, the Binding Nonce shall be stored in the User Control Data associated with the first logical Sector of the Binding Nonce File and shall be non-zero value. The details of the Protocol for Reading / Writing the Binding Nonce is described in Section 4.7 of the AACS *Introduction and Common Cryptographic Elements* book of this specification.

Table 3-1 shows the data format for Binding Nonce (128 bits) which is recorded in User Control Data of BD Recordable Disc.

**Table 3-1 Data Format for Binding Nonce in User Control Data**

Byte	Bit	7	6	5	4	3	2	1	0
0	BEF	Reserved							
1		Reserved							
2	(msb)	Binding Nonce							
:									
17									
	(lsb)								

### 3.4 Partial Media Key Block for Host Revocation List

The Partial Media Key Block for Host Revocation List mechanism for BD Prepared Video Content is identical to that for BD Recordable Video Content. Refer to Section 2.5 of the AACS *Blu-ray Disc Recordable Book*.

### 3.5 Bus Encryption Flag

The Bus Encryption Flag (BEF) is used to indicate whether the sector data shall be encrypted or not in the interface bus between the Licensed Drive and the PC Host. If the BEF is set to 1<sub>2</sub>, the corresponding sector data shall be encrypted in the interface bus in the manner that is specified in Section 3.5.1. Otherwise, the Licensed Drive shall not encrypt sector data across the interface bus.

If the Bus Encryption Enabled (BEE) flag in the Prepared Video Token is set to 1<sub>2</sub>, the BEF shall be set to 1<sub>2</sub> for all the sectors that correspond to the Aligned Unit with Copy\_permission\_indicator set to 11<sub>2</sub> of the Clip AV stream files under “\BDMV\STREAM” directory. Otherwise, the BEF shall be set to 0<sub>2</sub>. Note that the BEF shall be set to 0<sub>2</sub> for the sectors that do not correspond to Clip AV stream files under “\BDMV\STREAM” directory. For the details of Copy\_permission\_indicator, refer to Section 3.7.2.

(Note) If an application handles Clip AV stream files (e.g. the BD-J Application copies a Clip AV stream file on a BD-ROM Disc to the Local Storage), such a stream should be handled by the application without bus-encrypted form. In other words, the PC Host shall decrypt the bus-encrypted Clip AV stream and hand it over to the application. For the Local Storage, refer to Chapter 4 of this book.

For BD Recordable Disc, the Bus Encryption Flag shall be stored in the User Control Data associated with the corresponding sector.

Table 3-2 shows the data format for the Bus Encryption Flag (1 bit) which is recorded in User Control Data of BD Recordable Disc.

**Table 3-2 Data Format for Bus Encryption Flag in User Control Data**

Byte	Bit	7	6	5	4	3	2	1	0
0	BEF	Reserved							
1	Reserved								
2	Binding Nonce								
:									
17									

### 3.5.1 Encryption Scheme

Refer to Section 3.7.1 of the AACCS *Blu-ray Disc Pre-recorded Book*.

## 3.6 CPS Unit Key File and CPS Usage File

### 3.6.1 Application Format Structure

Refer to Section 3.9.1 of the AACCS *Blu-ray Disc Pre-recorded Book*.

#### 3.6.1.1 Clip

Refer to Section 3.9.1.1 of the AACCS *Blu-ray Disc Pre-recorded Book*.

#### 3.6.1.2 PlayList

Refer to Section 3.9.1.2 of the AACCS *Blu-ray Disc Pre-recorded Book*.

#### 3.6.1.3 Movie Object

Refer to Section 3.9.1.3 of the AACCS *Blu-ray Disc Pre-recorded Book*.

#### 3.6.1.4 BD-J Object

Refer to Section 3.9.1.4 of the AACCS *Blu-ray Disc Pre-recorded Book*.

#### 3.6.1.5 Index Table

Refer to Section 3.9.1.5 of the AACCS *Blu-ray Disc Pre-recorded Book*.

### **3.6.1.6 First Playback**

Refer to Section 3.9.1.6 of the AACS *Blu-ray Disc Pre-recorded Book*.

### **3.6.1.7 Top Menu**

Refer to Section 3.9.1.7 of the AACS *Blu-ray Disc Pre-recorded Book*.

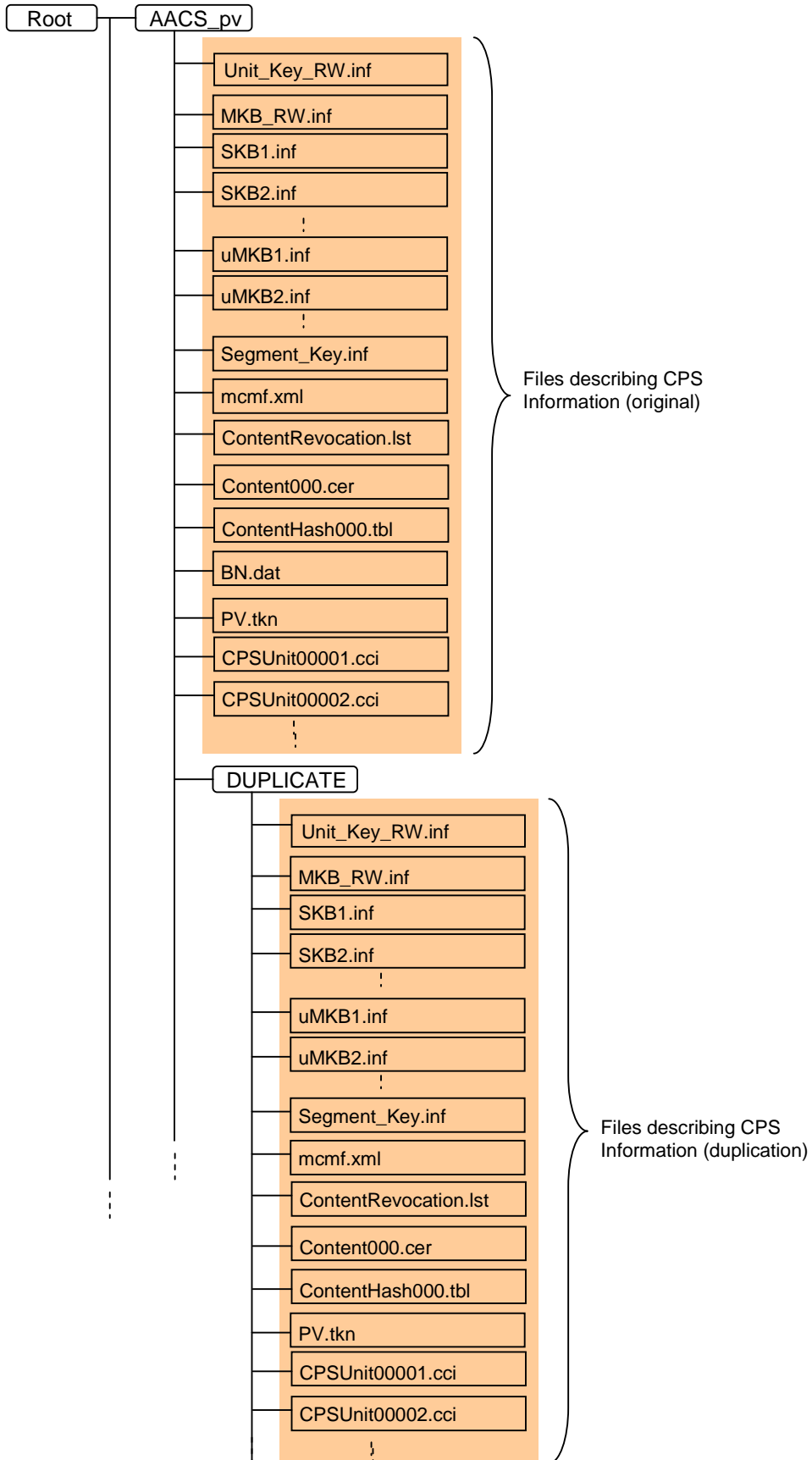
### **3.6.1.8 Title**

Refer to Section 3.9.1.8 of the AACS *Blu-ray Disc Pre-recorded Book*.

## **3.6.2 CPS Unit**

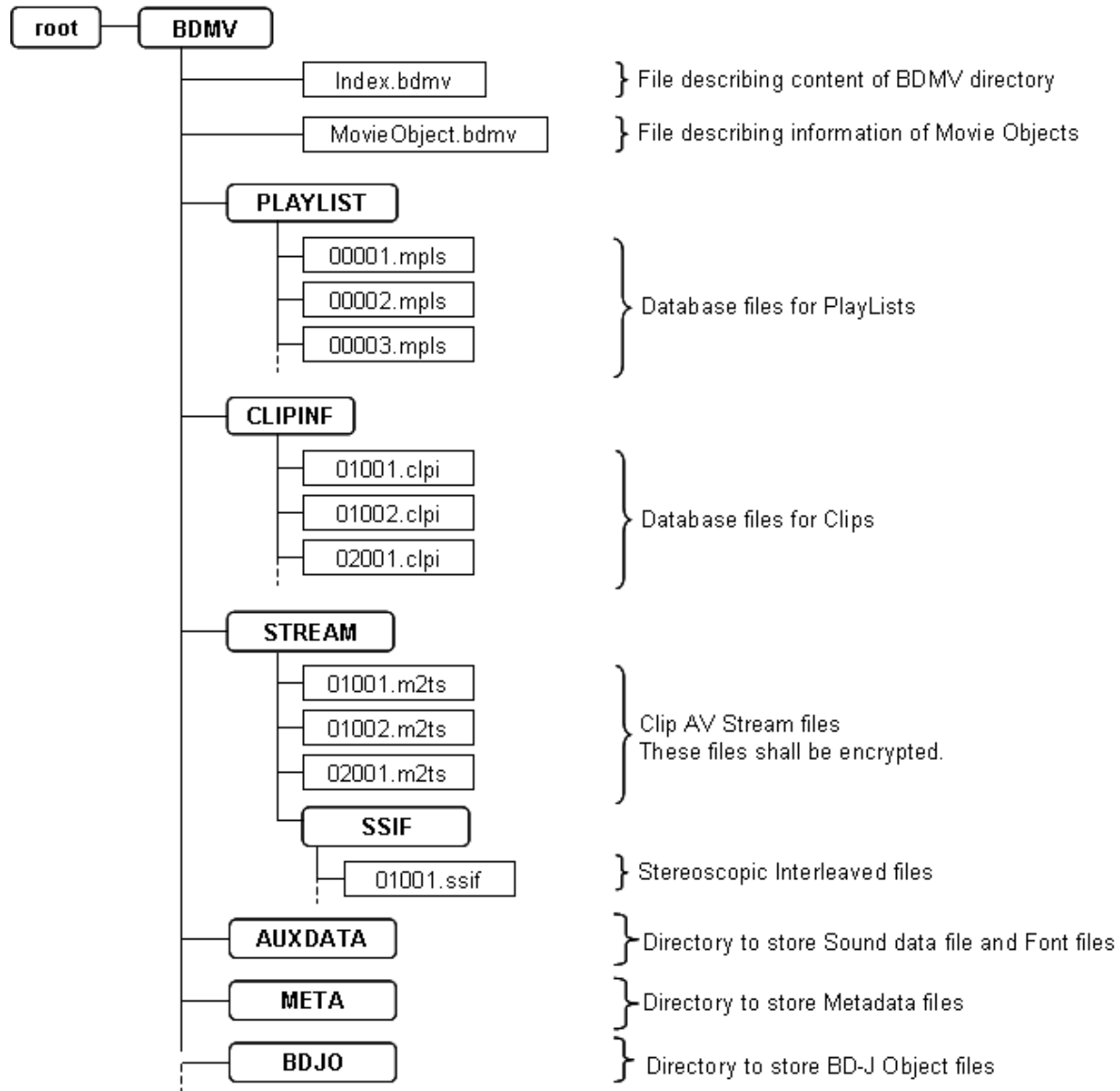
Refer to Section 3.9.2 of the AACS *Blu-ray Disc Pre-recorded Book*.

Figure 3-1 and Figure 3-2 show the directory structure of the AACS Prepared Video Content application format. Detailed information is described in the chapter “Directories and Files” in *Blu-ray Disc Association, System Description Blu-ray Disc Rewritable Format, part 3: Audio Visual Basic Format Specification*.



**Figure 3-1 Directory structure for AACV\_pV directory**

DUPLICATE directory contains the duplication of CPS information files except for the Binding Nonce File and is used when these files in AACV\_pV directory cannot be read. File name and the file data of the duplicated CPS files shall be the same as original CPS files. The location of the file data of duplicated CPS files should be physically far from the location of the file data of original CPS files.



**Figure 3-2 Directory structure for BDMV directory**

Clip AV stream files under “\BDMV\STREAM” directory may be encrypted using the scheme described in Section 3.7.1. No other files under “\AACV\_pV” directory or “\BDMV” directory shall be encrypted using the scheme described in Section 3.7.1.



### 3.6.3 CPS Unit Key File (Unit\_Key\_RW.inf)

Each CPS Unit on the BD Recordable Disc that is encrypted by AACS has a unique CPS Unit Key. All CPS Unit Keys on one disc shall be stored in the CPS Unit Key File “Unit\_Key\_RW.inf” in the “\AACS\_pv” directory and in the “\AACS\_pv\DUPLICATE” directory.

For details of CPS Unit Key File, refer to Section 3.9.3 of the AACS *Blu-ray Disc Pre-recorded Book*.

The MAC of the PMSN field in the Unit\_Key\_Block() contains the 16-byte MAC of the Prepared Video Serial Number calculated by using the CPS Unit Key for each CPS Unit. The MAC of the PMSN is generated as follows:

$$\text{CMAC}(K_{cu}, \text{Prepared Video Serial Number})$$

### 3.6.4 CPS Unit Usage File (CPSUnitXXXXX.cci)

Each CPS\_Unit on the BD Recordable Disc that is encrypted by AACS has an associated CPS Unit Usage file. CPS Unit Usage file is the Usage Rules for AACS Prepared Video Content and describes the CCI and related information of each CPS\_Unit. Each CPS Unit Usage file associated to a CPS\_Unit shall be stored in the “CPSUnitXXXXX.cci” file in the “\AACS\_pv” directory and in the “\AACS\_pv\DUPLICATE” directory. Here, XXXXX shall be the 5-digit number. XXXXX shall be equal to the CPS Unit number to which the CCI file is associated. The extension shall be “cci”.

For details of CPS Unit Usage File, refer to Section 3.9.4 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### 3.6.4.1 CCI\_and\_other\_info()

Refer to Section 3.9.4.1 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### 3.6.4.2 Basic CCI for AACS

Refer to Section 3.9.4.2 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### 3.6.4.3 Enhanced Title Usage for AACS

Refer to Section 3.9.4.3 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### 3.6.4.4 Key Management Information for On-line Function

The Key Management Information for the On-line Function mechanism for BD Prepared Video Content is identical to that for BD Pre-recorded Video Content. Refer to Section 3.9.4.4 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### 3.6.4.5 Content Owner Authorized Outputs Information

Refer to Section 3.9.4.5 of the AACS *Blu-ray Disc Pre-recorded Book*.

### 3.7 Encrypted Packs

#### 3.7.1 Encryption Scheme

Refer to Section 3.10.1 of the AACS *Blu-ray Disc Pre-recorded Book*.

### **3.7.2 Copy Permission Indicator**

Refer to Section 3.10.2 of the AACS *Blu-ray Disc Pre-recorded Book*.

## **3.8 Embedded CCI in AV Content**

Refer to Section 3.11 of the AACS *Blu-ray Disc Pre-recorded Book*.

### **3.8.1 private\_data\_byte**

Refer to Section 3.11.1 of the AACS *Blu-ray Disc Pre-recorded Book*.

# Chapter 4

## Details for Uses of On-line Connections

### 4. Introduction

The information related to the AACS Content use with network transaction is specified in Chapter 5 of AACS *Introduction and Common Cryptographic Elements* book of this specification. This chapter describes additional details of on-line functions that are specific to the use of AACS encryption with BD Recordable Disc and Application Format.

The On-line Connection mechanism for BD Prepared Video Content is identical to that for BD Pre-recorded Video Content.

If the AACS *Blu-ray Disc Pre-recorded Book* is referenced in this chapter, sentences in the AACS *Blu-ray Disc Pre-recorded Book* need to be replaced with Prepared Video Volume ID instead of Volume ID, Prepared Video Serial Number (PVSN) instead of Pre-recorded Media Serial Number (PMSN), BD Recordable Disc instead of BD-ROM, and “AACS\_pv” directory instead of “AACS” directory.

### 4.1 Virtual File System

Refer to Section 4.1 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### 4.1.1 AACS Files for VFS

Refer to Section 4.1.1 of the AACS *Blu-ray Disc Pre-recorded Book*.

## 4.2 System Model

Refer to Section 4.2 of the AACS *Blu-ray Disc Pre-recorded Book*.

## 4.3 Connection Protocol between Remote Server and BD-J Application

Refer to Section 4.3 of the AACS *Blu-ray Disc Pre-recorded Book*.

## 4.4 APIs between AACS Layer and BD-J Application

Refer to Section 4.4 of the AACS *Blu-ray Disc Pre-recorded Book*.

### 4.4.1 Package com.aacsla.bluray.online

#### 4.4.1.1 Class Summary

Refer to Section 4.4.1.1 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### 4.4.1.2 Class MediaAttribute

Refer to Section 4.4.1.2 of the AACS *Blu-ray Disc Pre-recorded Book*.

##### 4.4.1.2.1 Constructors

###### 4.4.1.2.1.1 MediaAttribute

Refer to Section 4.4.1.2.1.1 of the AACS *Blu-ray Disc Pre-recorded Book*.

##### 4.4.1.2.2 Methods

###### 4.4.1.2.2.1 getVolumeID

```
public byte[] getVolumeID( )
```

Provide the Prepared Video Volume ID in the Prepared Video Token of the currently inserted media. Note that Volume ID is 16 bytes.

**Returns:**

the Prepared Video Volume ID. If there is no currently inserted media or any other error, returns null.

###### 4.4.1.2.2.2 getPMSN

```
public byte[] getPMSN( )
```

Provide the Prepared Video Serial Number in the Prepared Video Token of the currently inserted media. Note that Prepared Video Serial Number is 16 bytes. The integrity of Prepared Video Serial Number need not be maintained outside of AACS Layer.

**Returns:**

the Prepared Video Serial Number. If Prepared Video Serial Number is undefined in the currently inserted media, returns null. If there is no currently inserted media or any other error, returns null also.

### **4.4.1.3 Class DeviceAttribute**

Refer to Section 4.4.1.3 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### **4.4.1.3.1 Constructors**

##### **4.4.1.3.1.1 DeviceAttribute**

Refer to Section 4.4.1.3.1.1 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### **4.4.1.3.2 Methods**

##### **4.4.1.3.2.1 getDeviceBindingID**

Refer to Section 4.4.1.3.2.1 of the AACS *Blu-ray Disc Pre-recorded Book*.

### **4.4.1.4 Class ContentAttribute**

Refer to Section 4.4.1.4 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### **4.4.1.4.1 Constructors**

##### **4.4.1.4.1.1 ContentAttribute**

Refer to Section 4.4.1.4.1.1 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### **4.4.1.4.2 Methods**

##### **4.4.1.4.2.1 getContentCertID**

```
public byte[ ] getContentCertID( )
```

Provide the Content Certificate ID associated with the currently inserted media from the BD Recordable Disc or Local Storage. Note that the Content Certificate ID is 6 bytes, and defined in Section 2.1 of this book.

**Returns:**

the Content Certificate ID. If there is no currently inserted media or any other error, returns null. When the Prepared Video Content Certificate was replaced by VFS, the Content Certificate ID returned by this method shall be retrieved from the Prepared Video Content Certificate on the Binding Unit Data Area of Local Storage.

#### **4.4.1.5 Class EnablePermission**

Refer to Section 4.4.1.5 of the AACS *Blu-ray Disc Pre-recorded Book*.

##### **4.4.1.5.1 Constructors**

###### **4.4.1.5.1.1 EnablePermission**

Refer to Section 4.4.1.5.1.1 of the AACS *Blu-ray Disc Pre-recorded Book*.

##### **4.4.1.5.2 Methods**

###### **4.4.1.5.2.1 getNonce**

Refer to Section 4.4.1.5.2.1 of the AACS *Blu-ray Disc Pre-recorded Book*.

###### **4.4.1.5.2.2 setPermission**

Refer to Section 4.4.1.5.2.2 of the AACS *Blu-ray Disc Pre-recorded Book*.

###### **4.4.1.5.2.3 checkPermission**

Refer to Section 4.4.1.5.2.3 of the AACS *Blu-ray Disc Pre-recorded Book*.

###### **4.4.1.5.2.4 isCacheable**

Refer to Section 4.4.1.5.2.4 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### **4.5 AACS Media Binding**

Refer to Section 4.5 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### **4.6 Example for the content use with network transaction**

##### **4.6.1 Download additional Content**

Refer to Section 4.6.1 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### **4.6.2 Download updated Usage Rule**

Refer to Section 4.6.2 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### **4.6.3 Download Title Key**

Refer to Section 4.6.3 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### **4.6.4 Download Permission**

Refer to Section 4.6.4 of the AACS *Blu-ray Disc Pre-recorded Book*.

This page is intentionally left blank.



# Chapter 5

## Managed Copy and Prepared Video Content

### 5. Introduction

The information related to the Managed Copy functionality specified in Chapter 5 of *AACS Prepared Video Book* of this specification. This chapter describes additional definition of interface and structure related to Managed Copy for the use with BD Recordable Disc and Application Format for BD Prepared Video Content.

The Managed Copy for Prepared Video Content is identical to that for BD Pre-recorded Video Content.

If the *AACS Blu-ray Disc Pre-recorded Book* is referenced in this chapter, sentences in the *AACS Blu-ray Disc Pre-recorded Book* need to be replaced with Prepared Video Volume ID instead of Volume ID, Prepared Video Serial Number (PVSN) instead of Pre-recorded Media Serial Number (PMSN), BD Recordable Disc instead of BD-ROM, Prepared Video Content Certificate instead of Content Certificate, and “AACS\_pv” directory instead of “AACS” directory.

### 5.1 System Model

Refer to Section 5.1 of the *AACS Blu-ray Disc Pre-recorded Book*.

### 5.2 APIs between Managed Copy Machine and BD-J Application

Refer to Section 5.2 of the *AACS Blu-ray Disc Pre-recorded Book*.

#### 5.2.1 Package `com.aacsla.bluray.mc`

##### 5.2.1.1 Interface Summary

Refer to Section 5.2.1.1 of the *AACS Blu-ray Disc Pre-recorded Book*.

##### 5.2.1.2 Interface `MCEventListener`

Refer to Section 5.2.1.2 of the *AACS Blu-ray Disc Pre-recorded Book*.

##### 5.2.1.2.1 Methods

###### 5.2.1.2.1.1 `MCMStatusChanged`

Refer to Section 5.2.1.2.1.1 of the *AACS Blu-ray Disc Pre-recorded Book*.

### **5.2.1.3 Interface MCOT**

Refer to Section 5.2.1.3 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### **5.2.1.3.1 Methods**

##### **5.2.1.3.1.1 getFreeSpace**

Refer to Section 5.2.1.3.1.1 of the AACS *Blu-ray Disc Pre-recorded Book*.

##### **5.2.1.3.1.2 getMCMCOTInfo**

Refer to Section 5.2.1.3.1.2 of the AACS *Blu-ray Disc Pre-recorded Book*.

##### **5.2.1.3.1.3 getMajorMCOTId**

Refer to Section 5.2.1.3.1.3 of the AACS *Blu-ray Disc Pre-recorded Book*.

##### **5.2.1.3.1.4 getMinorMCOTId**

Refer to Section 5.2.1.3.1.4 of the AACS *Blu-ray Disc Pre-recorded Book*.

### **5.2.1.4 Interface MCProgress**

Refer to Section 5.2.1.4 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### **5.2.1.4.1 Fields**

##### **5.2.1.4.1.1 COPYING**

Refer to Section 5.2.1.4.1.1 of the AACS *Blu-ray Disc Pre-recorded Book*.

##### **5.2.1.4.1.2 STOPPED**

Refer to Section 5.2.1.4.1.2 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### **5.2.1.4.2 Methods**

##### **5.2.1.4.2.1 copied**

Refer to Section 5.2.1.4.2.1 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### **5.2.1.4.2.2 getState**

Refer to Section 5.2.1.4.2.2 of the AACCS *Blu-ray Disc Pre-recorded Book*.

#### **5.2.1.4.2.3 remaining**

Refer to Section 5.2.1.4.2.3 of the AACCS *Blu-ray Disc Pre-recorded Book*.

### **5.2.1.5 Class Summary**

Refer to Section 5.2.1.5 of the AACCS *Blu-ray Disc Pre-recorded Book*.

### **5.2.1.6 Class ManagedCopy**

Refer to Section 5.2.1.6 of the AACCS *Blu-ray Disc Pre-recorded Book*.

#### **5.2.1.6.1 Fields**

##### **5.2.1.6.1.1 BDJKEEP\_FULL**

Refer to Section 5.2.1.6.1.1 of the AACCS *Blu-ray Disc Pre-recorded Book*.

##### **5.2.1.6.1.2 BDJKEEP\_LIMITED**

Refer to Section 5.2.1.6.1.2 of the AACCS *Blu-ray Disc Pre-recorded Book*.

##### **5.2.1.6.1.3 BDJKEEP\_TERMINATE**

Refer to Section 5.2.1.6.1.3 of the AACCS *Blu-ray Disc Pre-recorded Book*.

#### **5.2.1.6.2 Constructors**

##### **5.2.1.6.2.1 Managed Copy**

Refer to Section 5.2.1.6.2.1 of the AACCS *Blu-ray Disc Pre-recorded Book*.

#### **5.2.1.6.3 Methods**

##### **5.2.1.6.3.1 IsMCMSupported**

Refer to Section 5.2.1.6.3.1 of the AACCS *Blu-ray Disc Pre-recorded Book*.

#### **5.2.1.6.3.2 InvokeMCM**

Refer to Section 5.2.1.6.3.2 of the AACCS *Blu-ray Disc Pre-recorded Book*.

(Note) BD-ROM Application Environment is also used for Prepared Video Content on BD Recordable Disc.

#### **5.2.1.6.3.3 getInstance**

Refer to Section 5.2.1.6.3.3 of the AACCS *Blu-ray Disc Pre-recorded Book*.

#### **5.2.1.6.3.4 completeTransaction**

Refer to Section 5.2.1.6.3.4 of the AACCS *Blu-ray Disc Pre-recorded Book*.

#### **5.2.1.6.3.5 getDefaultURL**

Refer to Section 5.2.1.6.3.5 of the AACCS *Blu-ray Disc Pre-recorded Book*.

#### **5.2.1.6.3.6 getMCOTList**

Refer to Section 5.2.1.6.3.6 of the AACCS *Blu-ray Disc Pre-recorded Book*.

#### **5.2.1.6.3.7 getMCMNonce**

Refer to Section 5.2.1.6.3.7 of the AACCS *Blu-ray Disc Pre-recorded Book*.

#### **5.2.1.6.3.8 getDealManifest**

Refer to Section 5.2.1.6.3.8 of the AACCS *Blu-ray Disc Pre-recorded Book*.

#### **5.2.1.6.3.9 getSessionId**

Refer to Section 5.2.1.6.3.9 of the AACCS *Blu-ray Disc Pre-recorded Book*.

#### **5.2.1.6.3.10 getCoupon**

Refer to Section 5.2.1.6.3.10 of the AACCS *Blu-ray Disc Pre-recorded Book*.

#### **5.2.1.6.3.11 getMajorMcotId**

Refer to Section 5.2.1.6.3.11 of the AACCS *Blu-ray Disc Pre-recorded Book*.

#### **5.2.1.6.3.12 getMinorMcotId**

Refer to Section 5.2.1.6.3.12 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### **5.2.1.6.3.13 getMcotOfferInfo**

Refer to Section 5.2.1.6.3.13 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### **5.2.1.6.3.14 getMCUi**

Refer to Section 5.2.1.6.3.14 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### **5.2.1.6.3.15 getStatus**

Refer to Section 5.2.1.6.3.15 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### **5.2.1.6.3.16 getMCOTParams**

Refer to Section 5.2.1.6.3.16 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### **5.2.1.6.3.17 getContentCertID**

public byte[] **getContentCertID()**

throws

MCEException

This method returns the ID of the Prepared Video Content Certificate, which is stored in the Recovery Cache. If there is no Content Certificate ID in the Recovery Cache, it returns null

##### **Returns:**

Content Certificate ID in the Recovery Cache.

##### **Throws:**

MCEException - Thrown if InvokeMCM() was not called.

#### **5.2.1.6.3.18 getContentID**

Refer to Section 5.2.1.6.3.18 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### **5.2.1.6.3.19 verifyOffers**

Refer to Section 5.2.1.6.3.19 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### **5.2.1.6.3.20 verifyPermission**

Refer to Section 5.2.1.6.3.20 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### **5.2.1.6.3.21 addMCEventListener**

Refer to Section 5.2.1.6.3.21 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### **5.2.1.6.3.22 removeMCEventListener**

Refer to Section 5.2.1.6.3.22 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### **5.2.1.6.3.23 makeCopy**

Refer to Section 5.2.1.6.3.23 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### **5.2.1.6.3.24 getOffer**

Refer to Section 5.2.1.6.3.24 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### **5.2.1.6.3.25 cancelCopy**

Refer to Section 5.2.1.6.3.25 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### **5.2.1.6.3.26 getBDJKeepMode**

Refer to Section 5.2.1.6.3.26 of the AACS *Blu-ray Disc Pre-recorded Book*.

(Note) The BD-ROM Application Environment is also used for Prepared Video Content on BD Recordable Discs.

### **5.2.1.7 Class MCCancelEvent**

Refer to Section 5.2.1.7 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### **5.2.1.7.1 Constructors**

##### **5.2.1.7.1.1 MCCancelEvent**

Refer to Section 5.2.1.7.1.1 of the AACS *Blu-ray Disc Pre-recorded Book*.

### **5.2.1.8 Class CompleteTransactionEvent**

Refer to Section 5.2.1.8 of the AACS *Blu-ray Disc Pre-recorded Book*.

### **5.2.1.8.1 Constructors**

#### **5.2.1.8.1.1 CompleteTransactionEvent**

Refer to Section 5.2.1.8.1.1 of the AACS *Blu-ray Disc Pre-recorded Book*.

### **5.2.1.9 Class MCTransactionEvent**

Refer to Section 5.2.1.9 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### **5.2.1.9.1 Constructors**

##### **5.2.1.9.1.1 MCTransactionEvent**

Refer to Section 5.2.1.9.1.1 of the AACS *Blu-ray Disc Pre-recorded Book*.

### **5.2.1.10 Class MCTransactionErrorEvent**

Refer to Section 5.2.1.10 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### **5.2.1.10.1 Constructors**

##### **5.2.1.10.1.1 MCTransactionErrorEvent**

Refer to Section 5.2.1.10.1.1 of the AACS *Blu-ray Disc Pre-recorded Book*.

### **5.2.1.11 Class MCTransactionEvent**

Refer to Section 5.2.1.11 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### **5.2.1.11.1 Constructors**

##### **5.2.1.11.1.1 MCTransactionEvent**

Refer to Section 5.2.1.11.1.1 of the AACS *Blu-ray Disc Pre-recorded Book*.

### **5.2.1.12 Class MCTransactionAvailableEvent**

Refer to Section 5.2.1.12 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### **5.2.1.12.1 Constructors**

##### **5.2.1.12.1.1 MCTransactionAvailableEvent**

Refer to Section 5.2.1.12.1.1 of the AACS *Blu-ray Disc Pre-recorded Book*.

### **5.2.1.13 Class MCStartEvent**

Refer to Section 5.2.1.13 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### **5.2.1.13.1 Constructors**

##### **5.2.1.13.1.1 MCStartEvent**

Refer to Section 5.2.1.13.1.1 of the AACS *Blu-ray Disc Pre-recorded Book*.

### **5.2.1.14 Class MCStopEvent**

Refer to Section 5.2.1.14 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### **5.2.1.14.1 Constructors**

##### **5.2.1.14.1.1 MCStopEvent**

Refer to Section 5.2.1.14.1.1 of the AACS *Blu-ray Disc Pre-recorded Book*.

### **5.2.1.15 Exception Summary**

Refer to Section 5.2.1.15 of the AACS *Blu-ray Disc Pre-recorded Book*.

### **5.2.1.16 Class MCException**

Refer to Section 5.2.1.16 of the AACS *Blu-ray Disc Pre-recorded Book*.

#### **5.2.1.16.1 Constructors**

##### **5.2.1.16.1.1 MCException**

Refer to Section 5.2.1.16.1.1 of the AACS *Blu-ray Disc Pre-recorded Book*.

##### **5.2.1.16.1.2 MCException**

Refer to Section 5.2.1.16.1.2 of the AACS *Blu-ray Disc Pre-recorded Book*.

## **5.3 Managed Copy Manifest File**

The Managed Copy Manifest File “mcmf.xml” shall be stored in the “\AACS\_pv” directory and in the



“\AACS\_pv\DUPLICATE” directory if a BD Recordable Disc is made ready for Managed Copy or for the on-line transaction. The Managed Copy Manifest File defines the list of files which enables the Managed Copy Machine to identify the necessary files to process Managed Copy of each Managed Copy Unit (MCU).

For details of Managed Copy Manifest File, refer to Section 5.3 of the AACS *Blu-ray Disc Pre-recorded Book*.

### **5.3.1 Rules to use Managed Copy Manifest File**

Refer to Section 5.3.1 of the AACS *Blu-ray Disc Pre-recorded Book*.

### **5.3.2 XML schema of Managed Copy Manifest File**

Refer to Section 5.3.2 of the AACS *Blu-ray Disc Pre-recorded Book*.

(Note) FileName and DirectoryName shall indicate only the files and Directories that are actually recorded in the BD Recordable Disc.

## **5.4 Managed Copy Web Service**

Managed Copy web service and the message used in this service that are specific to Prepared Video Content on BD Recordable Discs are defined in this section.

### **5.4.1 Web Service Description**

Managed Copy web service description is used for communication between the MCM and the MCS. Managed Copy web service description for Prepared Video Content is defined in this section based on the Managed Copy web service description defined in Appendix C of AACS *Pre-recorded Video Book* of this specification.

For details of the Web Service Description, refer to Section 5.4.1 of the AACS *Blu-ray Disc Pre-recorded Book*.

### **5.4.2 Offer Response Message**

The Offer Response Message is a Web service message as defined in the Appendix A of AACS *Pre-recorded Video Book* of this specification, using the Managed Copy Offer Schema. This chapter defines a Managed Copy Offer Schema specific to Prepared Video Content.

For details of Offer Response Message, refer to Section 5.4.2 of the AACS *Blu-ray Disc Pre-recorded Book*.

### **5.4.3 Permission Response Message**

Permission Response Message is a web service message as defined in the Appendix B of AACS *Pre-recorded Video Book* of this specification, using the Managed Copy Permission Schema. This chapter defines a Managed Copy Permission Schema specific to Prepared Video Content.

For details of Permission Response Message, refer to Section 5.4.3 of the AACS *Blu-ray Disc Pre-recorded Book*.

## **5.5 Requirement for Managed Copy Machine**

Basic requirements for the MCM are defined in Chapter 5 of AACS *Prepared Video Book* of this specification and Chapter 5 of AACS *Pre-recorded Video Book* of this specification. This section specifies additional details specific to Prepared Video Content Managed Copy.

### **5.5.1 Recovery process**

Refer to Section 5.5.1 of the AACS *Blu-ray Disc Pre-recorded Book*.

### **5.5.2 Making a Managed Copy**

Refer to Section 5.5.2 of the AACS *Blu-ray Disc Pre-recorded Book*.

## **5.6 Application/HTML for financial/accounting transaction**

Refer to Section 5.6 of the AACS *Blu-ray Disc Pre-recorded Book*.

## **5.7 Managed Copy Messages**

### **5.7.1 Request Permission**

For details of Request Permission, refer to Section 5.5.8 of AACS *Prepared Video Book*.

Note that SHA1 Hash of the Title Key File defined in Table 5-1 of AACS *Prepared Video Book* is calculated using the SHA-1 hashing function as defined in the below equation.

$$\text{SHA1 Hash of the Title Key File} = \text{SHA-1 (CPS Unit Key File)}$$

Even if the CPS Unit Key File was replaced by VFS, CPS Unit Key File on BD Recordable Disc shall be used for hash calculation.

# Chapter 6

## Details for Sequence Keys and Unified MKB

### 6. Introduction

The Sequence Key and the Unified MKB mechanism for BD Prepared Video Content is identical to that for BD Pre-recorded Video Content. Refer to Chapter 6 of the AACCS *Blu-ray Disc Pre-recorded Book*.

This page is intentionally left blank.

# Chapter 7

## Clarifications for Unencrypted Content

### 7. Introduction

Disc structure for the BD Recordable Disc containing unencrypted content is identical to that for BD Pre-recorded Video Content. Refer to Chapter 7 of the *AACS Blu-ray Disc Pre-recorded Book*.

This page is intentionally left blank.

# Chapter 8

## Additional Requirements for The 3D Feature

### 8. Introduction

3D feature for the BD Recordable Disc is identical to that for BD Pre-recorded Video Content. Refer to Chapter 8 of the AACS *Blu-ray Disc Pre-recorded Book*.

This page is intentionally left blank.



## **Annex A. Carriage of System Renewability Message**

Carriage of System Renewability Message is identical to that for BD Pre-recorded content. Refer to Annex B of the *AACS Blu-ray Disc Pre-recorded Book*.

This page is intentionally left blank.

## **Annex B. Requirements for On-line and Managed Copy API**

This annex defines requirements and recommendations for On-line and Managed Copy APIs and their BD-J specific aspects, in addition to Chapter 4 and Chapter 5 of this book. Refer to Annex C of the AACS *Blu-ray Disc Pre-recorded Book* of this specification.