SMPTE STANDARD

for Television — Extended Content Control Information (ExCCI) Data Packet

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SMPTE engineering documents are drafted in accordance with the rules given in Part XIII of its Administrative practices.

SMPTE 401M was prepared by the Committee on Wrappers and Metadata Technology (W25).

Introduction

The extended content control information (ExCCI) packet is intended for use in professional applications in the production and distribution chains for content. It provides a signaling mechanism that allows devices used to prepare content for consumer release to apply conditional access or other controls to that content as it is prepared for release. Thus, the area of intended application of the ExCCI packet is the professional space, with a subset of its elements used at the point of release from the professional space into the consumer space by the device that prepares for release the content with which the ExCCI packet is associated.

This definition of the ExCCI packet is intended to support the initial applications of content control in North America and other regions that decide to use it. Annex A provides details with respect to one such application of Version 1. The intention of SMPTE is to develop revisions of this standard that are expected more completely to address a wide range of requirements for content control and that takes into account the worldwide delivery requirements of the systems developed by relevant organizations such as the DVB, TVA, and ARIB.

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The ExCCI packet requires the addition of some form of identification for its practical implementation, depending upon the specific application. For example, the ExCCI packet may serve as the value in a KLV construct when associated with an appropriate key and length as defined in SMPTE 336M, or it may serve as the value inside an ANC packet as defined in SMPTE 291M. (The key assigned to the ExCCI packet is <06 0E 2B 34 01 01 01 06 02 07 02 00 00 00 00 00> in SMPTE RP 210 V6 and later versions.) Other methods of transport of the ExCCI packet are possible, and the data carried within a version 1 ExCCI packet also could be delivered by other methods — for example, those in RP 207.

1 Scope

This document defines content protection and content management (CPCM) information in the form of an extended content control information (ExCCI) data packet, including the packet's syntax, semantics, and structure. The packet is intended to convey redistribution control information for use as content is exported into the consumer space. Not all consumer distribution channels are expected to utilize all of the ExCCI information. (See annex B.)

2 Structure, carriage, and definition of the ExCCI packet

The ExCCI Packet comprises a minimum of 8 bytes, divided functionally into two fields of 4 bytes each, and followed by up to 225 additional bytes. The maximum size of an ExCCI packet carrying all optional bytes is 233 bytes.

The information contained in ExCCI packets shall be passed unaltered to the point of consumption and use of the ExCCI data, except where the specific purpose is to alter the ExCCI data.

The ExCCI packet structure is depicted in table 1. The two mandatory fields are designated introductory information and primary information. The optional field provides optional bytes for future applications.

The designations used in table 1 and the meanings of the bits and groups of bits identified by those designations are defined in sections 2.1 through 2.3. Bits marked as 'X' are reserved and shall carry the binary value 1 until further defined.

In this standard, hexadecimal numbers are denoted by a "0x" prefix: for example, the value 0x0e is equal to 14.

Operational requirements and characteristics with respect to the processing and transport of the ExCCI packet will be treated in other SMPTE documents.

Table 1 – Extended content control information (ExCCI) data packet structure

Byte Name	b7	b6	b5	b4	b3	b2	b1	b0
Introductory Information Field								
Length	B7	B6	B5	B4	B3	B2	B1	B0
Version	V7	V6	V5	V4	V3	V2	V1	V0
intro_1	X	X	X	X	X	X	X	X
intro_2	X	X	X	X	X	X	X	X
Primary Information Field								
content_control0	X	X	X	X	X	X	X	X
content_control1	X	R	X	X	X	X	X	X
content_control2	X	X	X	X	X	X	X	X
content_control3	X	X	X	X	X	X	X	X
Optional Bytes Field								
Optional Byte 0	X	X	X	X	X	X	X	X
	–	–	–	–	–	–	–	–
Optional Byte 224	X	X	X	X	X	X	X	X

NOTE – Bits marked as 'X' are reserved and shall carry the binary value 1 until further defined.

2.1 Introductory information

The first four bytes (32 bits) of the ExCCI data packet constitute the introductory information field and carry information about the length of the packet, the version of this standard.

2.1.1 Length field (8 bits)

The first byte of the ExCCI packet (length) is a binary number representing the length of the packet in bytes starting from the byte following the length byte and continuing through the last byte of optional bytes field. B7 is the most significant bit (MSB) and B0 is the least significant bit (LSB) of the length value. It shall have a minimum value of 0x07 and a maximum value of 0xE8.

2.1.2 ExCCI version (8 bits)

The second byte of the ExCCI packet (version) is a binary number representing the version of the ExCCI packet table. V7 is the most significant bit (MSB) and V0 is the least significant bit (LSB) of the version value. The version number shall be used to indicate the version of this standard that specifies the form and meaning of the information contained within the packet. This standard defines version one of the packet syntax, and the version field shall be set to 0x01 when carrying data structured according to this version. An ExCCI processing device receiving multiple EXCCI packets associated with a specific content item and having different version numbers shall process the packet having the highest Version number that it understands and silently ignore all other ExCCI packets.

2.1.3 Reserved bytes (16 bits)

The final two bytes of the Introductory Information field are reserved.

2.2 Primary information

The second four bytes (32 bits) of the ExCCI data packet constitute the primary information field and carry the primary content protection and copy management information.

2.2.1 Content control (32 bits)

The first content control byte (content_control0) is reserved.

The second content control byte (content_control1) contains the following content protection and copy management information. All other bits within the content_control1 byte are reserved.

The 'R' bit is the redistribution control bit.

The 'R' bit shall have the following meaning:

R	
0	Technological control of consumer redistribution is signaled
1	Technological control of consumer redistribution is not signaled

(See annex A.)

2.3 Optional bytes

The optional bytes are intended to contain additional data for future applications and are reserved. There may be up to 225 such optional bytes in the optional bytes field. They shall be carried if present. Their presence shall be indicated by the length byte.

Annex A (informative)
Use of the R bit in ATSC applications

The R bit can be used in conjunction with ATSC transmission systems to signal the insertion of the redistribution control (RC) descriptor, as defined in ATSC A/65B — section 6.9.13 , redistribution control (RC) descriptor.

Annex B (informative)
Area of intended application and usage of the ExCCI packet

The ExCCI packet provides a mechanism by which to send signals through the professional production and distribution chains to devices preparing content for consumer release. The signals are intended to allow those devices to apply conditional access or other controls to the content as it is prepared for release. The area of intended application of the ExCCI packet is thus the professional space, with a subset of the packet's elements used by the device preparing content for release into the consumer space. This is shown in figure B.1.

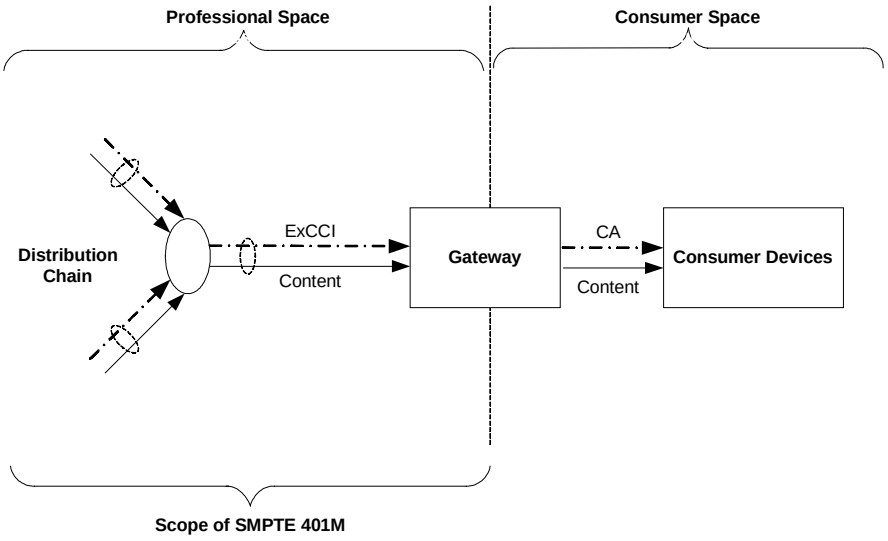

Figure B.1 – Area of application of ExCCI packet

As shown in figure B.1, the ExCCI packet travels through the production and distribution processes in the professional space with the content with which it is associated. It may be carried in the same medium and time-synchronized with its associated content, or it may be separated in various ways during parts of the production and distribution processes. At the point of release, it will be restored to an appropriate time relationship to the content as needed by the device preparing the content for release. In the figure, that device is termed a "gateway." On its input, the gateway receives the content along with the ExCCI packet. On its output, it produces the content in the form to be used for a particular consumer release channel along with any access control information or control functionality needed for that release channel. The data carrying the control information into the consumer space is shown as "CA" in the figure. The definition of the CA is outside the scope of this ExCCI document and will depend upon private agreements, public documents, government regulations, and other sources that have responsibility for such matters.

This first version of the ExCCI packet defines only a single control bit — the 'R' bit. The application of the 'R' bit in a source device and behavior of receiving devices are out of scope of this standard. Conditions for applying the 'R' bit in source devices and behavior of consumer sink devices may be bound by private agreements or government regulations. Implementers are cautioned to read and understand all applicable agreements and regulations. Examples of possible application of the 'R' bit are for control of the insertion of the 'redistribution control' descriptor in ATSC systems and similar functions in other applications for broadcast, cable, and satellite television release into consumer distribution.

Annex C (informative)
Bibliography

ATSC A/65B, Program and System Information Protocol for Terrestrial Broadcast and Cable (Revision B) 2003