SMPTE STANDARD

for Television — Material Exchange Format (MXF) — Mapping Type D-11 Essence Data to the MXF Generic Container

Table of contents

1 Scope

This standard defines the mapping of compressed picture data according to the type D-11 data stream and up to 8 channels of AES3 data into the material exchange format generic container (MXF-GC). This mapping is given the acronym: MXF-GC(D-11).

The MXF specification is written in several parts. This is one of a set of documents that define the contents of the MXF file body.

The MXF file format specification includes operation pattern specifications that may define restrictions to be placed on the way in which this essence container type can be implemented. The reader is advised to carefully study the appropriate operational pattern document for compliance to the defined implementation.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

SMPTE 331M-2004, Television — Element and Metadata Definitions for SDTI-CP

SMPTE 367M-2002, Television — Type D-11 Picture Compression and Data Stream Format

SMPTE 369M-2002, Television — Type D-11 Data Stream and AES3 Data Mapping over SDTI

SMPTE 377M-2004, Television — Material Exchange Format (MXF) — File Format Specification

SMPTE 379M-2004, Television — Material Exchange Format (MXF) — MXF Generic Container.

Approved
September 22, 2004

SMPTE 385M-2004, Television — Material Exchange Format (MXF) — Mapping SDTI-CP Essence and Metadata into the MXF Generic Container

3 Glossary of acronyms, terms and data types

The general glossary of acronyms, terms and data types used in the MXF specification is given in SMPTE 377M. Supplementary glossaries of acronyms and terms are defined in SMPTE 379M and SMPTE 385M. They are not repeated here to avoid any divergence of meaning.

3.1 Acronyms and terms used in this standard

ECC: Error Correction Code

H-ANC: Horizontal ANCillary data (per SMPTE 291M)

VITC: Vertical Interval Time Code

PsF: Progressive segmented Frame

4 Introduction (informative)

This standard specifies the mapping of type D-11 data from an SDTI data port specified by SMPTE 369M to the MXF generic container (SMPTE 379M). The type D-11 data comprises packets of type D-11 basic blocks containing compressed picture data and auxiliary picture data as specified in SMPTE 367M (type D-11 picture compression and data stream format).

Four channels of 24-bit AES3 data are optionally mapped into the H-ANC space of the SDTI according to SMPTE 272M. In addition, VITC may also be mapped into the H-ANC space according to SMPTE 369M. This specification also covers the mapping of the audio and VITC data from the SDTI into the MXF generic container.

Figure 1 also includes the optional four channels of 24-bit AES3 data mapped into the H-ANC space. VITC data (shown as auxiliary data in figure 1) may also be mapped into the H-ANC space.

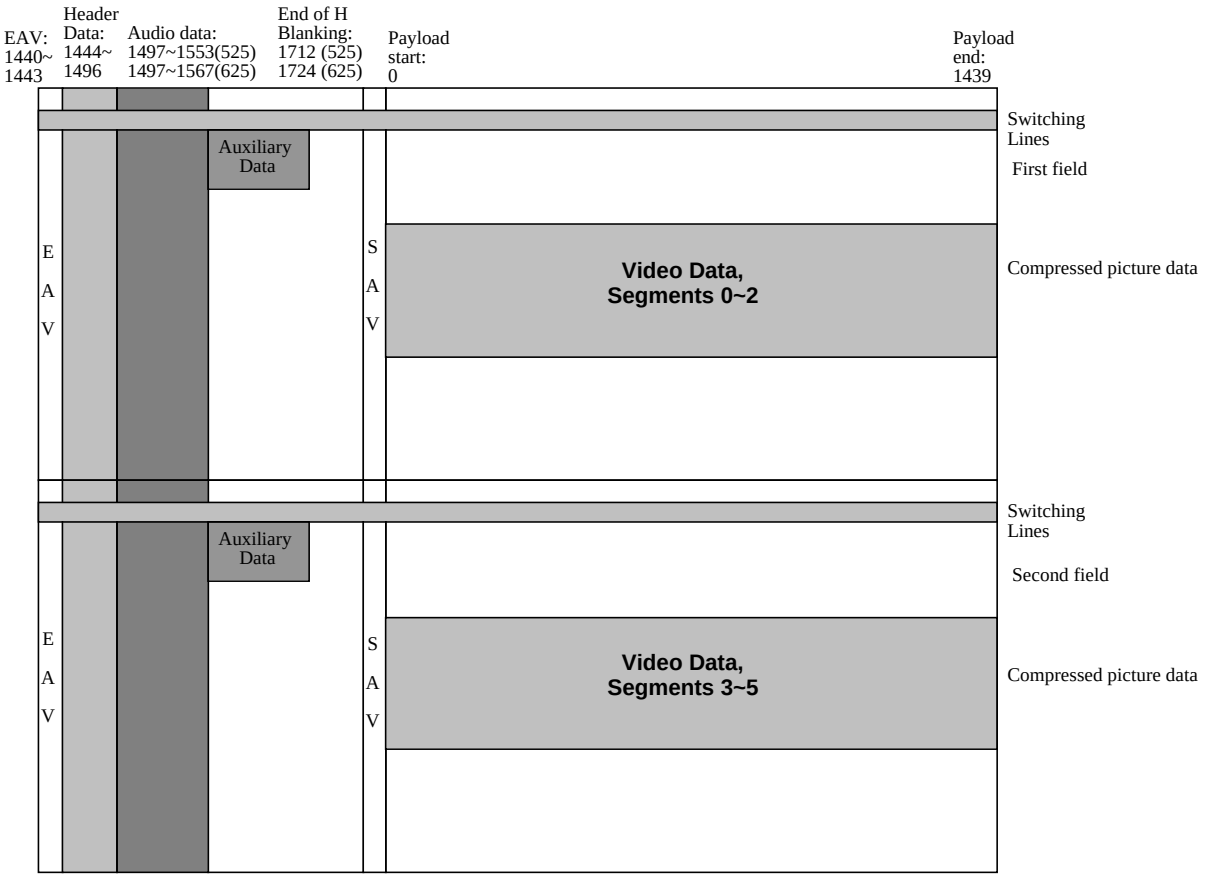

Figure 1 – SDTI mapping

The type D-11 data stream packets are grouped into six equal data segments of which the first three data segments are mapped onto the first field of the SDTI and the last three data segments are mapped onto the second field of the SDTI, as shown in figure 1.

Note that because the type D-11 format operates at 24-Hz and 24÷1.001-Hz frame rates as well as the conventional television rates of 25-Hz and 30÷1.001-Hz, the SDTI must operate at all frame rates to support synchronous stream transfers based on one frame of compressed HD picture data together with the associated audio data and VITC data packed into one frame of the SDTI.

Table 1 shows the core parameters of the SDTI at all the frame rates used by SMPTE 367M.

Table 1 – Total number of lines and samples per line for each frame rate of the interface

Frame rate of the Interface	24÷1.001Hz	24Hz	25Hz	30÷1.001Hz
Total number of Lines	525	625	625	525
Total number of samples per Line	2145	1800	1728	1716

This standard defines the mapping of type D-11 data into the generic container as an MXF-compliant body. In effect, this standard defines the generic container with a system item, a type D-11 compressed picture data element, a 4-channel AES3 data element and optional auxiliary data elements in the auxiliary item.

The MXF-GC (D-11) mapping conforming to this standard complies with the requirements for MXF body files defined in the MXF format document.

5 Type D-11 data structure and mapping to the generic container

For each frame of the type D-11 SDTI payload, the data shall be divided into four components as follows:

1. A metadata pack element followed by optional metadata elements whose values are extracted from ancillary data packets. These ancillary data packets are extracted from the H-ANC space as specified in SMPTE 369M.

2. A mandatory picture element whose value comprises all six concatenated segments of the type D-11 compressed picture information (see SMPTE 367M). This component is mapped into a type D-11 element in the generic container picture item.

3. An optional AES3 sound element whose value comprises all the AES3 data packets extracted from the H-ANC space of the SDTI as defined in SMPTE 369M. This AES3 data is mapped into an 8-channel AES3 Element as defined in SMPTE 331M. Only 4 channels of the 8-channel element are used.

4. Optional H-ANC data packet elements for the carriage of ANC data packets not carried by the system item.

This specification shall use frame-based mapping as defined by SMPTE 379M. The order of items in this mapping shall be system, picture, sound and data (if present).

5.1 KLV coding

The resulting KLV coded packets for each frame are represented in sequence as shown in figure 2.

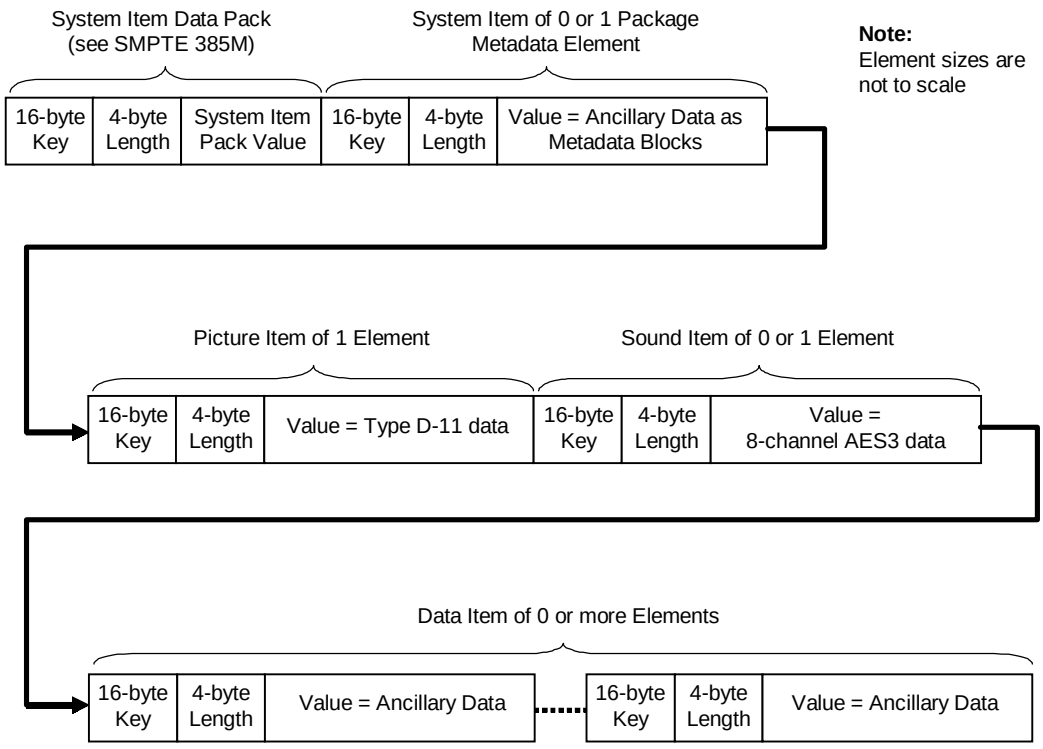

Figure 2 – Sequence of KLV coded GC elements in the type D-11 mapping

5.1.1 Ancillary data packet mapping

The SDTI payload as defined by SMPTE 369M may include “auxiliary data” coded as H-ANC packets according to SMPTE 291M.

These H-ANC packets contain data that can be mapped into either the GC system item or the GC data item depending on the value of the H-ANC data ID word and the secondary data ID word (where applicable). Only those auxiliary data H-ANC packets carrying 8-bit data are supported in this mapping. Any auxiliary data H-ANC packets which contain data ID and secondary data ID values identifying user data words of 9-bits per word are not supported.

Figure 3 illustrates the “auxiliary data” H-ANC packet structure.

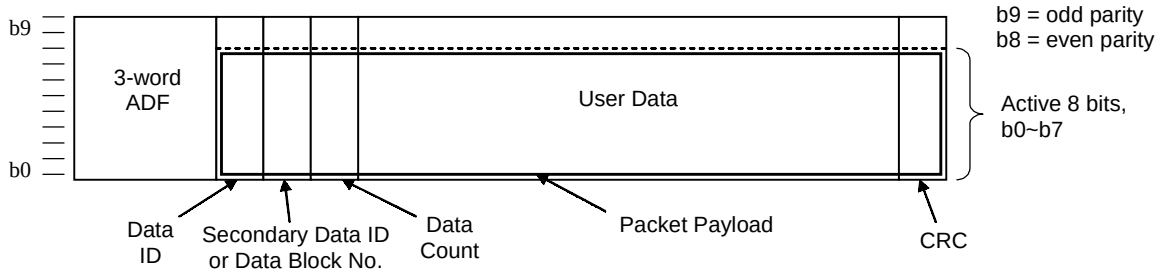

Figure 3 – Ancillary data packet structure

If the H-ANC packet data ID word identifies a user data type which is metadata, then the packet payload shall be mapped into the system item as one or more package metadata sets. Package metadata sets contain metadata items which describe the whole content package of which they are a part.

The H-ANC packet mapped to any GC (D-11) element shall remove the 3-word ancillary data flag (ADF) as this is specifically related to synchronization of the H-ANC packet in the SDTI. The GC (D-11) element mapping shall include the CRC word to provide some level of error protection.

Each element value shall be defined as the least significant 8 bits of each word from the following parts of an H-ANC data packet:

- the data ID word;
- the secondary data ID (or data block number) word;
- the data count word;
- the user data words; and
- the CRC word.

On reconstruction of an H-ANC packet from the GC (D-11) element value, the 3-word ADF shall be added. Since bits b8 and b9 of all 10-bit input words are discarded at the point of mapping the SDTI input into the file, these bit values shall be re-calculated to reconstruct the complete H-ANC packet.

NOTES

1 The mapping of an ANC data packet payload into the value field of a system or essence element is identical to the mapping into a CP auxiliary element (defined in SMPTE 331M). The data type value for the metadata block is '21_H' as per SMPTE 331M.

2 Users are cautioned that any change to the user data words will require a re-calculation of the CRC check word according to SMPTE 291M.

5.2 System item mapping

The contents of the system item shall comply with that defined in SMPTE 385M. The system metadata pack and the package metadata set are required. The presence of the picture item, sound item, data item and control element depends on the setting of the system metadata bitmap as defined in SMPTE 385M.

5.2.1 SMPTE universal label

The universal label used in the MXF GC(D-11) system item and in the MXF header metadata shall have the following value:

Table 2 – Specification of the MXF-GC(D-11) essence container UL

Byte No.	Description	Value (hex)	Meaning
1~13	See SMPTE 379M	—	Defined in Table 3 of the MXF generic container specification
14	Mapping Kind	03h	Type D-11: SMPTE 367M compression and SMPTE 369M SDTI transport
15	Type D-11 Source Coding (1920*1080 picture size)	01h ~06h	01h = 23.98 PsF 02h = 24 PsF 03h = 25 PsF 04h = 29.97 PsF 05h = 50 I 06h = 59.94 I
16	Type: Template Extension	01h or 02h	01h = template defined in this document 02h = extended template

The label value as described above shall be used as the essence container label in the preface set and the appropriate file descriptor set of the header metadata and in the partition pack.

5.2.2 Package metadata set

5.2.2.1 Metadata element key

The package metadata element key value shall be as follows:

Table 3 – Key value for the type D-11 package metadata element

Byte No.	Description	Value (hex)	Meaning
1~12	See SMPTE 385M	—	Defined in Table 2 of SMPTE 385M
13	Item Type Identifier	04h	CP-compatible system item
14	System Scheme Identifier	01h	SDTI-CP, version 1
15	Metadata Element Identifier	02h	Package metadata set
16	Metadata Block Count	xxh	Number of H-ANC packets

5.2.2.2 Metadata element length

The length field of the KLV coded element shall be 4 bytes BER long-form encoded (i.e., 83h.xx.yy.zz). The value of the length field shall correctly define the length of the element value.

5.2.2.3 Metadata element value

Where present this shall contain the 8-bit payloads of all auxiliary data H-ANC packets present on the SDTI that are identified as carrying metadata.

The 8-bit payload of each auxiliary data H-ANC packet shall be mapped into a sequence of metadata items as defined in figure 4 of SMPTE 385M. Each metadata item shall comprise a local tag with a value of ‘21h’ as

defined in SMPTE 331M, a 2-byte length as defined in SMPTE 385M, followed by the 8-bit payload of the H-ANC data packet (as defined by 5.1.1) mapped into the value field.

Where more than one auxiliary data H-ANC packet is present in the frame period, they shall be mapped to the metadata items in the sequence as they appear in the frame. Metadata items mapped from field 1 of the SDTI shall be followed immediately by metadata items mapped from field 2 of the SDTI.

Because the package metadata set applies to the whole content package, there is no requirement for the metadata link item described in SMPTE 385M.

NOTE – The package metadata set will typically comprise two metadata items mapped from the payloads of two auxiliary data H-ANC packets, one in the first field of the SDTI and one in the second field. These typically contain only VITC data.

5.3 Picture item mapping

The picture item value shall comprise a single element which contains the compressed picture and embedded auxiliary data as defined by SMPTE 367M. The mapping of the compressed picture and embedded auxiliary data onto the SDTI is defined by SMPTE 369M.

5.3.1 Essence element key

The essence element key value shall be as follows:

Table 4 – Key value for the type D-11 picture element

Byte No.	Description	Value (hex)	Meaning
1~12	See SMPTE 379M	—	Defined in Table 2 of SMPTE 379M
13	Item Type Identifier	15h	GC picture item
14	Essence Element Count	01h	One essence element present
15	Essence Element Type	01h	Type D-11 video as defined by SMPTE 367M
16	Essence Element Number	01h	Normative value

5.3.2 Essence element length

The length field of the KLV coded element shall be 4 bytes BER long-form encoded (i.e., 83h.xx.yy.zz). The value of the length field shall correctly define the length of the element value.

5.3.3 Essence element value

5.3.3.1 Segment mapping

Each compressed picture data stream is divided into six equal segments, numbered 0 to 5, as defined in SMPTE 367M. Each segment has an even channel and an odd channel as defined in SMPTE 367M.

All the packets from both channels of segments 0 to 2 are mapped into 212 lines of the first field of the SDTI and all the packets from both channels of segments 3 to 5 are mapped into 212 lines of the second field of the SDTI, as defined in SMPTE 369M and illustrated in figure 1.

NOTE – The last of the 212 lines in each field is not fully occupied.

5.3.3.2 SDTI payload line mapping

The transfer of the data from SDTI to the type D-11 element value in the picture item shall include all the basic block data (see details below), but shall specifically exclude the first two words and the last two words of each SDTI payload line.

The first two words of each SDTI payload line contain the SDTI data type identifier word followed by a data valid word. In this latter case, a value of 1FEh identifies the first line of the payload and a value of 1FDh identifies all other payload lines. These words are discarded at the point of mapping from the SDTI to the type D-11 picture item value, but shall be accurately recreated when mapping from a type D-11 picture item value to the SDTI.

The last two words of each SDTI payload line contain the payload CRC values. These words are discarded at the point of transferring from the SDTI to the type D-11 picture item value, but shall be faithfully recreated when transferring from a type D-11 picture item value to the SDTI.

SDTI basic blocks from the even and odd channels are interleaved on a byte by byte basis for the SDTI Mapping with the first byte from the even channel preceding the first byte from the odd channel. In the mapping to the MXF generic container, the basic blocks shall be maintained as individual blocks so that each basic block from the even channel shall precede the equivalent basic block from the odd channel. The mapping from SDTI to MXF thus involves a re-mapping of each pair of basic blocks from byte interleaving to block interleaving.

5.3.3.3 Basic block mapping

Each segment comprises a first auxiliary basic block followed by 225 compressed picture basic blocks.

The compressed picture and auxiliary basic block format of the type D-11 compressed data shall conform to SMPTE 367M.

Four bytes of Reed Solomon ECC are added to each basic block as defined by SMPTE 367M. Between the end of each basic block and the start of the ECC a 1-byte reserved word shall be added.

The default value of the reserved word shall be zero.

Figure 4 illustrates the addition of the reserved word and the 4-byte RS ECC to an auxiliary basic block.

Figure 5 illustrates the addition of the reserved word and the 4-byte RS ECC to a compressed picture basic block.

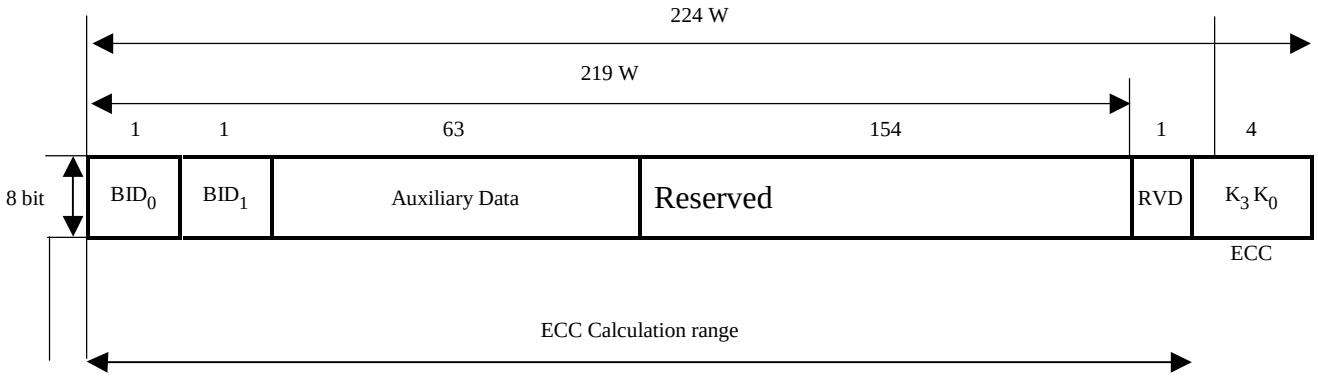

Figure 4 – Addition of reserved word and ECC to an auxiliary basic block

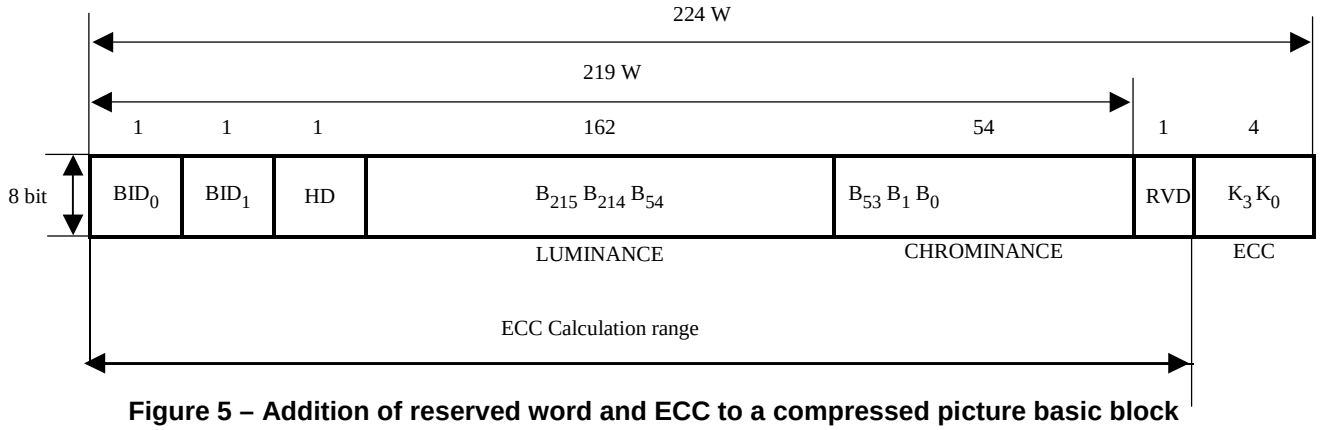

Figure 5 – Addition of reserved word and ECC to a compressed picture basic block

The basic blocks are mapped into the 8 LSBs of the SDTI. Bits 9 and 8 of the SDTI are defined as parity check bits and these shall be discarded during the transfer from the SDTI to the type D-11 picture item value.

The Reed-Solomon ECC words, which are at the end of all basic blocks, shall be discarded and the space removed during the transfer from the SDTI to the type D-11 picture element value.

At the point of transferring basic blocks from the picture element value to the SDTI, the 4 Reed-Solomon EEC words shall be recalculated according to SMPTE 367M and re-inserted at the end of each basic block. Further, each byte shall be mapped to the least significant 8 bits of the SDTI and bits 8 and 9 recalculated as parity bits as defined in SMPTE 305M.

The picture item value comprises the basic blocks from all six segments of the two channels in a contiguous byte-stream. With the removal of the Reed-Solomon EEC words, the basic block size is reduced to 220 bytes.

The length of the concatenated basic blocks shall be calculated and entered into the picture item length field.

NOTE – The length of the element value is defined by 2 fields per frame, 2*3*226 basic blocks per field and 220 bytes per basic block giving a value of 596,640 bytes.

5.4 Sound item mapping

The sound item shall comprise one 8-channel AES element as defined by SMPTE 331M. For the GC (D-11) mapping, only the first four channels are used.

The source data is encapsulated on the SDTI as an ancillary (H-ANC) data packet according to SMPTE 369M and shown in figure 1. The H-ANC packets are located on SDTI lines as defined in SMPTE 369M. This AES3 data is mapped into the H-ANC packets according to SMPTE 272M.

5.4.1 Essence element key

The essence element key value shall be as follows:

Table 5 – Key value for the 8-channel AES-3 sound element

Byte No.	Description	Value (hex)	Meaning
1~12	See SMPTE 379M	--	Defined in Table 2 of SMPTE 379M
13	Item Type Identifier	06_h	SDTI-CP compatible sound item
14	Essence Element Count	01_h	One essence element present
15	Essence Element Type	10_h	8-channel AES3
16	Essence Element Number	02_h	Normative value

5.4.2 Essence element length

The length field of the KLV coded element shall be 4 bytes BER long-form encoded (i.e., 83h.xx.yy.zz). The value of the length field shall correctly define the length of the element value.

5.4.3 Essence element value

The AES3 element is as per the definition in SMPTE 331M. Active channels are filled with AES3 data according to the stream valid flag defined in SMPTE 331M. The active data length varies according the frame rate. Note that for frame rates with a 1.001 divisor, the active data length varies over a 5-frame sequence.

5.5 Data item mapping

The SDTI may contain H-ANC data packets that have non-metadata payloads. Each such H-ANC data packet may optionally be mapped to a data essence element in the MXF GC (D-11).

The data item value may contain zero or more essence elements mapped from those H-ANC data packets in the horizontal blanking area of the SDTI that have not already been mapped to the package metadata element in the system item.

Where required, non-metadata H-ANC data payloads shall be mapped to data essence elements as defined in SMPTE 331M. For each frame, each non-metadata payload shall be mapped in the order in which they appear on the SDTI. H-ANC data payloads from field 1 shall be followed immediately by H-ANC data payloads from field 2.

If no non-system item H-ANC data packets are present on the SDTI, the data item shall not be included in the MXF generic container.

If the data item has a variable length in each content package, then the end of the data item should be padded with the KLV fill item to ensure that the content package size is constant.

NOTE – The KLV fill item ensures that a simple index table can be used.

5.5.1 Essence element key

The data essence element key value shall be as follows:

Table 6 – Key value for an ANC packet data essence element

Byte No.	Description	Value (hex)	Meaning
1~12	See SMPTE 379M	—	Defined in Table 2 of SMPTE 379M
13	Item Type Identifier	07h	SDTI-CP compatible data item
14	Essence Element Count	nnh	Defined as required
15	Essence Element Type	21h	ANC packet payload
16	Essence Element Number	03h ~7Fh	As defined by SMPTE 379M section 7.1, but different from the picture and sound essence element numbers

5.5.2 Essence element length

The length field of the essence element shall be 4 bytes BER long-form encoded (i.e., 83h.xx.yy.zz). The value of the length field shall correctly define the length of the element value.

5.5.3 Essence element value

Each essence element value shall comprise the 8-bit payload of an H-ANC packet (as defined by 5.1.1).

6 Application issues

6.1 Application of the KLV fill item

Within any MXF partition containing an essence container with this mapping specification, the KAG value defined in the partition pack shall have the value of 512 (02.00h) and the first byte of the key of the first element of each item shall be aligned to the KLV alignment grid of that partition.

For each item in a content package, the length of the KLV fill item should be the minimum required to align to a KAG boundary and be consistent with maintaining a constant content package size.

Where possible, any immediately preceding partition should align the start of each MXF partition containing an essence container with this mapping specification to a byte offset that is an integer multiple of the defined KLV alignment grid relative to the start of the header partition pack.

The length field of the essence element shall be 4 bytes BER long-form encoded (i.e., 83h.xx.yy.zz).

NOTE – The application of the KAG shall comply with SMPTE 377M, section 5.4.1.

6.2 Application of index tables for constant GC item sizes

One index table segment should be present in the MXF header partition. Repetition of this index table segment in subsequent partitions is optional.

The definition of the index table format is given in the MXF file format specification (SMPTE 377M). This section describes the application of Index tables to an MXF-GC(D-11) essence container.

Any KLV fill items are treated as a part of the element that they follow and are not indexed in their own right.

Note that the index entry array is not used for GC(D-11) types with fixed item lengths. Note also that an “edit unit” is the duration of one content package (i.e., video frame).

The index table segment is constructed as follows:

Table 7 – Index table segment set

Item Name	Meaning	Value
Index Table Segment	A segment of an Index Table	
Length	Set Length	
Instance ID	Unique ID of this instance	
Index Edit Rate	Frame rate of the Type D-11 video	{24000, 1001}, {24,1}, {25,1} or {30000, 1001}
Index Start Position	Byte address of first edit unit indexed by this table segment	0
Index Duration	Number of edit units indexed by this table segment (NSA)	0
Edit Unit Byte Count	Defines the length of a fixed size edit unit	>0
IndexSID	Identifier of the index table segment	
BodySID	Identifier of the essence container	
Slice Count	Number of slices minus 1 (NSL)	0
Delta Entry Array	Map of elements in each content package (optional) (see table 6)	
IndexEntry Array	Index from sample number to stream offset	Not encoded

This mapping specification may use the optional delta entry array table as defined in SMPTE 377M. An example delta entry array table for system, picture, sound and data elements is given below:

Table 8 – Structure of example delta entry array

Field Name	Meaning	Typical Values	Comment
NDE	Number of delta entries	4	
Length	Length of each delta entry	6	
PosTableIndex	No temporal reordering	0	Element 0 e.g. system data pack element
Slice	Slice number in index entry	0	
Element Delta	(Fixed) Delta from start of slice to this element	0	
PosTableIndex	No temporal reordering	0	Element 1 e.g. picture item
Slice	Slice number in index entry	0	
Element Delta	(Fixed) Delta from start of slice to this element	Len(system item + fill))	
PosTableIndex	No temporal reordering	0	Element 2 e.g. sound item
Slice	Slice number in index entry	0	
Element Delta	(Fixed) Delta from start of slice to this element	Len(system item + fill + element 1 + fill)	
PosTableIndex	No temporal reordering	0	Element 3 e.g. data item
Slice	Slice number in index entry	0	
Element Delta	(Fixed) Delta from start of slice to this element	Len(system item + fill + element 1 + element 2 + fill)	

6.3 File descriptor sets

The file descriptor sets are those structural metadata sets in the header metadata that describe the essence and metadata elements defined in this document. The structure of these sets is defined in the MXF file format specification (SMPTE 377M).

The definition of the property values in the file descriptor sets appropriate to this specification are given in annex A of this standard.

File descriptor sets should be present in the header metadata for each essence element and for the system metadata pack element.

6.4 Mapping track numbers to generic container elements

The number of essence tracks in the associated header metadata package shall be the same as the number of essence elements used in this mapping application. The track number value shall be derived as described in the MXF generic container specification (SMPTE 379M).

The associated header metadata package should define one metadata track to describe the contents of the system metadata pack of the CP-compatible system item. The track number value shall be derived as described in SMPTE 385M. This track can be used to describe the date/time components in the CP-compatible system item.

6.5 Essence container partitions

The type D-11 mapping maintains each content package of the generic container as a separate editable unit with the contents of the system, picture, sound and data items in synchronism. As a consequence, if the essence container using this mapping is partitioned, then each partition must contain an integer number of content packages where each content package contains all the items required.

Annex A (informative)
Descriptor set values for the essence elements defined in this standard

The file essence descriptors in this annex are defined in SMPTE 377M. These descriptors are replicated here with the aim to define property values, where appropriate. Where more than one file descriptor is referenced by a package, it will need to first reference the multiple descriptor as described in SMPTE 377M

In all tables describing sets in this annex, the columns are defined as follows:

- Item name: the name of the property;
- Type: the defined type of the property;
- Len: the length of the value in bytes where known;
- Meaning: a description of the property;
- Default value(s): appropriate values for type D-11 mapping.

Note that the key, length, instance UID and generation UID rows are not included in these tables.

NOTE – For the case of properties in this annex that are SMPTE labels (ULs), a list of appropriate values is provided in SMPTE RP 224.

A.1 CDCI (picture) essence descriptor

Item Name	Type	Len	Default Value(s)
Linked Track ID	UInt32	4	
Sample Rate	Rational	8	{24000,1001}, {24,1} {25,1}, {30000,1001}
Container Duration	Length	8	
Codec	UL	16	See SMPTE RP 224
Essence Container	UL	16	See SMPTE RP 224
Picture Essence Coding	UL	16	See SMPTE RP 224
Signal Standard	Enum	1	4 (SMPTE 374M)
Frame layout	UInt8	1	1 (I) or 4 (PsF) (see SMPTE 377M E2.2)
Stored Width	UInt32	4	1920
Stored Height	UInt32	4	540
StoredF2Offset	Int32	4	0
Sampled Width	UInt32	4	1920
Sampled Height	UInt32	4	540
Sampled X-Offset	Int32	4	0
Sampled Y-Offset	Int32	4	0
Display Height	UInt32	4	540
Display Width	UInt32	4	1920
Display X-Offset	Int32	4	0
Display Y-Offset	Int32	4	0
DisplayF2Offset	Int32	4	0
Aspect Ratio	Rational	8	{16,9}
Active Format Descriptor (AFD)	UInt8	1	0
Video Line Map	Array of Int32	8+(2*4)	{21,584}

Item Name	Type	Len	Default Value(s)
Alpha Transparency	UInt8	1	0 (False)
Gamma	UL	16	See SMPTE RP 224
Image Alignment Offset	Uint32	4	0
Field Dominance	UInt8	1	1
Image Start Offset	UInt32	4	0
Image End Offset	UInt32	4	0
Component Depth	UInt32	4	10
Horizontal Sub-sampling	UInt32	4	2
Vertical Sub-sampling	UInt32	4	1
Color Siting	UInt8	1	4
Reversed Byte Order	Boolean	1	False (0)
Padding Bits	UInt16	2	0
Alpha Sample Depth	UInt32	4	0
Black Ref Level	UInt32	4	64
White Ref level	UInt32	4	940
Colour Range	UInt32	4	897
Locators	StrongRefArray (Locators)	8+16n	Present only if essence container is external to the file

A.2 Generic sound essence descriptor

Item Name	Type	Len	Default Value(s)
Linked Track ID	UInt32	4	
Sample Rate	Rational	8	{24000,1001}, {24,1} {25,1}, {30000,1001}
Container Duration	Length	8	
Codec	UL	16	See SMPTE RP224
Essence Container	UL	16	See SMPTE RP224
Sound Essence Coding	UL	16	See SMPTE RP224
Audio sampling rate	Rational	8	{48000,1}
Locked/Unlocked	Boolean	1	01h (locked)
Audio Ref Level	Int8	1	0 (default)
Electro-Spatial Formulation	Uint8 (Enum)	1	Not encoded
Channel Count	UInt32	4	4
Quantization bits	UInt32	4	16 or 24
Dial Norm	Int8	1	Not encoded
Locators	StrongRefArray (Locators)	8+16n	Present only if essence container is external to the file

A.3 Generic data essence descriptor

Item Name	Type	Len	Default Value(s)
Linked Track ID	UInt32	4	
Sample Rate	Rational	8	{24000,1001}, {24,1} {25,1}, {30000,1001}
Container Duration	Length	8	
Codec	UL	16	See SMPTE RP224
Essence Container	UL	16	See SMPTE RP224
Data Essence Coding	UL	16	See SMPTE RP224
Locators	StrongRefArray (Locators)	8+16n	Present only if essence container is external to the file

Annex B (informative)
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