SMPTE Standards Administrative Guideline
AG-24 SMPTE MXF UL Style Guidelines

Effective July 02, 2019

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This Standards Administrative Guideline forms an adjunct to the use and interpretation of the SMPTE Standards Operations Manual. In the event of a conflict, the Operations Manual shall prevail.

Purpose:

This Administrative Guideline is a collection of guidelines and policies that are intended to help SMPTE Engineering Document authors and editors when defining Universal Labels.

This Administrative Guideline augments the ISO Directives with information and recommendations to be used when writing SMPTE Engineering Documents.

AG-02 (Engineering Documents) describes file names, dates and file packages for documents in development. AG16 describes the Styles that are recommended for authoring Engineering Documents.

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1   Normative References

SMPTE Standards Operation Manual (2015 v3.01)

SMPTE AG-02:201x Engineering Documents

SMPTE AG-03:2014 Normative References

SMPTE AG-04:2016 SMPTE Document Templates.

SMPTE AG-05:2016 XML Schema

SMPTE AG-16:2017 Document Style Guidelines

SMPTE AG-18:2017 SMPTE Metadata Registers Maintenance and Publication

SMPTE ST 2029:2009 Uniform Resource Names for SMPTE Resources

SMPTE ST 336:2017 Data Encoding Protocol Using Key-Length-Value

2   Universal Labels

2.1   Style Guidelines

Universal Labels are used in MXF documents in several contexts. Each of these has particular requirements in terms of layout and presentation of the label. The list below is expanded in the following sections

- Defining individual ULs

- Referring to ULs

- Summarizing ULs in a document

This document recommends UL styles that minimize errors for implementers copying ULs from MXF documents. The trend toward software processes for implementation and validation make this a priority over the original MXF style of using Word tables and long prose.

In the current Engineering Document templates, using Arial Bold 9 point for table headings and Arial undecorated 8 point for table cells reduces the chance of unwanted line breaks without the text being unnecessarily small.

2.2   Defining individual ULs

The example below shows the preferred way for defining ULs in MXF documents. It is a modified version of Table 2 in ST 2094-2.

Example Preferred Table 2 updated from ST 2094-2 – Group Node and Set Key for DMCVT Sets

Item Name	Symbol	Kind	Item UL
Color Transform Sets	ColorTransformSets	NODE	urn:smpte:ul:060e2b34.027F0101.05310000.00000000
DMCVT Generic Sets	DMCVTGenericSets	NODE	urn:smpte:ul:060e2b34.027F0101.05310100.00000000
DMCVT Generic Set 1	DMCVTGenericSet1	LEAF	urn:smpte:ul:060e2b34.027F0101.05310101.00000000
DMCVT Application Sets	DMCVTApplicationSets	NODE	urn:smpte:ul:060e2b34.027F0101.05310200.00000000

Table AG24-2.2.1

Item Name [optional in MXF documents] value of the `<Name>` element in the corresponding register for the UL. The case of the characters, whitespace and spellings shall be identical to the register.

Symbol [required in MXF documents] value of the `<Symbol>` element in the corresponding register for the UL. The case of the characters and spellings shall be identical to the register.

Kind value of the `<Kind>` element in the corresponding register for the UL

Item UL value of the `<UL>` element in the corresponding register for the UL using the correct encoding style for the label

Table title use of the word **Label** or **Element** or **Type** or **Group** is encouraged to help novice readers locate the register in which the UL can be found

Extra explanatory free-form text outside the summary table is encouraged to clearly define the semantics of the UL.

The following example shows a UL description from SMPTE ST 382-4 followed by the preferred alternative representation. Note that in the preferred representation, the second table is no longer part of the UL description and only serves to provide the common names of the AAC profiles. In most cases a second table is not required.

Example – Original Table 5 – Sound Essence Coding Label Value for AAC

Byte No.	Description	Value (hex)	Meaning
1	Object Identifier	06h	
2	Label size	0eh	
3	Designator	2bh	ISO, ORG
4	Designator	34h	SMPTE
5	Registry Category Designator	04h	Labels
6	Registry Designator	01h	Labels Registry
7	Structure Designator	01h	Labels Structure
8	Version Number	0dh	Version of the Registry
9	Parametric	04h	Node used to define parametric data
10	Sound Essence	02h	Identifies Sound Essence
11	Sound Coding Characteristics	02h	Identifies Sound Coding Characteristics
12	Compressed Sound Coding	02h	Identifies Compressed Sound Coding
13	MPEG Audio Compression	04h	Identifies MPEG Audio Compression
14	MPEG Audio Coding Details 1	xxh	See Table 6
15	MPEG Audio Coding Details 2	yyh	See Table 6
16	MPEG Audio Coding Details 3	00h	Reserved

The values for bytes 14 and 15 of the Label identify the usage of AAC and shall be as enumerated in Example – Original Table :

Example – Original Table 6 –Values of Bytes 14 and 15 for Sound Essence Coding Label for AAC Audio

MPEG Standard	AAC General Name	Value of Byte 14 (hex)	Value of Byte 15 (hex)	AAC Profile
MPEG-2 AAC	LC	03h	01h	Low Complexity profile MPEG-2 AAC
MPEG-2 AAC	LC + SBR	03h	02h	Low Complexity profile MPEG-2 AAC+SBR
MPEG-4 AAC	AAC LC	04h	01h	MPEG-4 AAC Profile
MPEG-4 AAC	AAC LC + SBR	04h	02h	MPEG-4 High Efficiency AAC Profile
MPEG-4 AAC	AAC + SBR + PS	04h	03h	MPEG-4 High Efficiency AAC v2 Profile

Note: AAC "General Name" is the commonly used terminology.

Example – Preferred Table 5 – SoundCompression Label Values for AAC

Item Name	Symbol	Kind	Item UL
MPEG 2 Advanced Audio Coding	`MPEG_2_Advanced_Audio_Coding`	NODE	urn:smpte:ul:060e2b34.0401010d.04020202.04030000
MPEG 2 LC AAC	`MPEG_2_LC_AAC`	LEAF	urn:smpte:ul:060e2b34.0401010d.04020202.04030100
MPEG 2 AAC SBR	`MPEG_2_AAC_SBR`	LEAF	urn:smpte:ul:060e2b34.0401010d.04020202.04030200
MPEG 4 Advanced Audio Coding	`MPEG_4_Advanced_Audio_Coding`	NODE	urn:smpte:ul:060e2b34.0401010d.04020202.04040000
MPEG 4 AAC Profile	`MPEG_4_AAC_Profile`	LEAF	urn:smpte:ul:060e2b34.0401010d.04020202.04040100
MPEG 4 High Efficiency AAC Profile	`MPEG_4_High_Efficiency_AAC_Profile`	LEAF	urn:smpte:ul:060e2b34.0401010d.04020202.04040200
MPEG 4 High Efficiency AAC v2 Profile	`MPEG_4_High_Efficiency_AAC_v2_Profile`	LEAF	urn:smpte:ul:060e2b34.0401010d.04020202.04040300

Notes

1. All labels are Leaves of urn:smpte:ul:060e2b34.0401010d.04020202.04xxyyzz MPEG Audio Compression

Example – Preferred Table 6 – General Names for AAC Audio Profiles

Symbol	AAC General Name	AAC Profile
`MPEG_2_LC_AAC`	LC	Low Complexity profile MPEG-2 AAC
`MPEG_2_AAC_SBR`	LC + SBR	Low Complexity profile MPEG-2 AAC+SBR
`MPEG_4_AAC_Profile`	AAC LC	MPEG-4 AAC Profile
`MPEG_4_High_Efficiency_AAC_Profile`	AAC LC + SBR	MPEG-4 High Efficiency AAC Profile
`MPEG_4_High_Efficiency_AAC_v2_Profile`	AAC + SBR + PS	MPEG-4 High Efficiency AAC v2 Profile

Notes

1. AAC "General Name" is the commonly used terminology.

2.3 Defining groups and sets

There is more information to be conveyed when defining groups and sets. For this reason, a two-table approach is recommended for readability.

The first table shall be identical in style to the table AG24-2.2.1 above. The purpose of this table is to enumerate the full UL for each property in the group.

The second table shall be indexed by the Item Name from the first table (identical in spelling, case and whitespace). The purpose of the second table is to define the syntax and semantics of properties in the group.

Two worked examples are shown below. The example marked 'preferred' is preferred since it is facilitating text search and checking:

Example – Original Table 1 – AAC SubDescriptor

Item Name	Type	Len	Item UL	Req ?	Meaning	Default
AAC SubDescriptor	Set UL	16	See Table 2	Req	Advanced Audio Coding SubDescriptor	
Length	BER Length	4		Req	Set length	
All items from the abstract SubDescriptor as specified in SMPTE ST 377-1 annex B.3 „SubDescriptor						
AAC Sampling Frequency	UInt8	1	060e2b34 0101010e 04020403 01040000	Opt	Low order 4 bits of Sampling Frequency Index. Upper 4 bits are zeros *1	
AAC Channel Configuration	UInt8	1	060e2b34 0101010e 04020403 01030000	Opt	Low order 4 bits of Channel Configuration. Upper 4 bits are zeros *2	

*1 ISO/IEC 13818-7 (MPEG-2 AAC) and ISO/IEC 14496-3 (MPEG-4 AAC).

*2 ISO/IEC 13818-7 (MPEG-2 AAC) and ISO/IEC 14496-3 (MPEG-4 AAC) ISO/IEC 14496-3:2009/Amd 4 defines the extended code points up to 14.

6.2 Key for the AAC SubDescriptor

The key (UL) for the AAC SubDescriptor shall be as defined in Table 2.

Example – Original Table 2 – Key for the AAC SubDescriptor

Byte No.	Description	Value (hex)	Meaning
1-7	Defined in the Structural Header Metadata Implementation section of SMPTE ST 377-1		
8	Register Version	01h	Version of the Registry
9-13	Defined in the Structural Header Metadata Implementation section of SMPTE ST 377-1		
14	Set Kind (1)	01h	AAC SubDescriptor
15	Set Kind (2)	78h	
16	Reserved	00h	Reserved

<div align="center">**Example – Preferred Table 1 – AACSubDescriptor ULs**</div>

Item Name	Symbol	Kind	Item UL
AAC SubDescriptor [1,2,3]	AACSubDescriptor	LEAF	urn:smpte:ul:060e2b34.027f0101.0d010101.01017800
AAC Sampling Frequency	AACSamplingFrequency	LEAF	urn:smpte:ul:060e2b34.0101010e.04020403.01040000
AAC Channel Configuration	AACChannelConfiguration	LEAF	urn:smpte:ul:060e2b34.0101010e.04020403.01030000

Notes:

1. SMPTE ST 377-1 defines the byte structure of Sets and Groups

2. AACSubDescriptor version byte is set to 1 according to SMPTE policy

6.2 Elements in the AAC SubDescriptor

<div align="center">**Example – Preferred Table 2 – Elements of AACSubDescriptor Set**</div>

Symbol	Type	Len	Req ?	Meaning	Default
AACSubDescriptor	Set UL	16	Req	Advanced Audio Coding SubDescriptor	
Length	BER Length	4	Req	Set length	
All items from the abstract SubDescriptor as specified in SMPTE ST 377-1 annex B.3					
AACSamplingFrequency	UInt8	1	Opt	Low order 4 bits of Sampling Frequency Index. Upper 4 bits are zeros	
AACChannelConfiguration	UInt8	1	Opt	Low order 4 bits of Channel Configuration. Upper 4 bits are zeros	

Symbol value of the <Symbol> element to be listed in the corresponding register for the UL. The case of the characters and spellings shall be identical to the register submission. If the row entry has no Symbol (e.g. Length) then the value in that row should be in italics. Constraints for symbol names can be found in the defining document of a register.

Type value of the <Name> element to be listed in the Types register when the value of the element's <Type> property is resolved. The case of the characters, whitespace and spellings shall be identical to those in the Types register submission.

Len [optional] the length in Bytes of the value field of the KLV representation of the element provided as helper information to the reader. If this optional column is present, then the value shall match the value in the register submission for that data type – it is duplicate information in an MXF document.

When defining data types, the length of the new data type shall be provided.

Notes The notes should be numbered and a superscript index should be added to the Item Name column or the Meaning column to indicate which note applies to which element.

Table title use of the word **Label** or **Element** or **Type** or **Group** is encouraged to help novice readers locate the register in which the UL can be found

Extra explanatory free-form text outside the summary table is encouraged to clearly

define additional semantics of the group.

2.4   Referring to ULs

In an MXF document is it often necessary to refer to existing SMPTE ULs. Many legacy documents are inconsistent in the way that this is done. Specifically, some legacy documents have been inconsistent in the case of characters and whitespace making document searches unreliable.

The **Symbol** of an element has consistent character case, has no whitespace and is not subject to line-break formatting issue. This makes it easy for implementers to search for in document. Document authors should verify that the publication version of documents have not had the character case or whitespace of symbols altered by non-technical editors.

Visually identifying symbols can be made easier for readers by creating a word style with the following properties only:

- Style name: S keyword (this is already defined in the SMPTE templates)
- Style type: character
- Font: Consolas (or Lucida Console or Ubuntu mono or Courier New or monospace)

This style can then be applied to all Symbols and other formatting such as Bold, Size, Color will be inherited accordingly. MXF document should use the element Symbol in body text to refer to an element. If clarity is required, the following phrasing may be used:

> The element with symbol `AACSubDescriptor` should …

2.5   Summarizing ULs in a document

It may be helpful to the implementation community to know which ULs are defined in any given document. An optional **informative** Annex may be provided that includes informative sections for each of the register submissions made in the document. Each section should clearly indicate which register the XML applies to and should contain the mature submission that was entered into the register. An example from ST 382-4 is given below.

All XML should be presented in a monospaced font and indented with spaces. Color highlighting to assist readability is optional.

Text indicating that in case of conflict with the body text of the main document, then the body text is considered the definitive reference.

Annex B – ULs Registered in this Document (Informative)

B.1 Elements registered in this document

The XML document below is the mature submission for the Elements Register. In case of conflict with the body text of this document, the body text should be considered the normative reference.

```xml
<!-- Metadata tags to support XML file editing -->
<!--  -->
<!-- Please fill these in if you edit this XML file -->
<!-- author=Oliver Morgan and Patrick Waddell -->
<!-- edit_date= 20161201-->
<!-- summary_of_edit= add elements for AAC SubDescriptor-->
<!-- author=Patrick Waddell -->
<!-- edit_date= 20170210-->
<!-- summary_of_edit= minor edits for Registrar-->
<!--  -->
<!-- DO NOT EDIT THIS TAG -->
<!-- master_commit_tag=v000000075 -->
<!-- DO NOT EDIT THIS TAG -->

<ElementsRegister xmlns="http://www.smpte-ra.org/schemas/335/2012">
  <Entries>
    <Entry>
      <Register>Elements</Register>
      <NamespaceName>http://www.smpte-ra.org/reg/335/2012</NamespaceName>
      <Symbol>AACChannelConfiguration</Symbol>
      <UL>urn:smpte:ul:060e2b34.0101010e.04020403.01030000</UL>
      <Kind>LEAF</Kind>
      <Name>AAC Channel Configuration</Name>
      <Definition>Low order 4 bits of Channel Configuration.  Upper 4 bits are zeros</Definition>
      <DefiningDocument>SMPTE ST 381-4</DefiningDocument>
      <IsDeprecated>false</IsDeprecated>
      <ContextScope>DefinedContext</ContextScope>
      <Type>urn:smpte:ul:060e2b34.01040101.01010100.00000000</Type>
    </Entry>
    <Entry>
      <Register>Elements</Register>
      <NamespaceName>http://www.smpte-ra.org/reg/335/2012</NamespaceName>
      <Symbol>AACSamplingFrequency</Symbol>
      <UL>urn:smpte:ul:060e2b34.0101010e.04020403.01040000</UL>
      <Kind>LEAF</Kind>
      <Name>AAC Sampling Frequency</Name>
      <Definition>Low order 4 bits of Sampling Frequency Index.  Upper 4 bits are zeros</Definition>
      <DefiningDocument>SMPTE ST 381-4</DefiningDocument>
      <IsDeprecated>false</IsDeprecated>
      <ContextScope>DefinedContext</ContextScope>
      <Type>urn:smpte:ul:060e2b34.01040101.01010100.00000000</Type>
    </Entry>
  </Entries>
</ElementsRegister>
```