

## ISDCF Doc4 - 16-Channel Audio Packaging Guide

20161029

### General

The audio channel ordering shown in the Table below is recommended for use in all Compositions, whether Interop or SMPTE. Since routing is not always available at playback, the channel ordering in the Composition commonly maps one-to-one to the audio outputs of a player, and hence the Table also identifies the recommended audio wiring in cinemas.

Channel in package	Configuration			Notes
	5.1	7.1 SDDS	7.1 DS	
1	L	L	L	Left
2	R	R	R	Right
3	C	C	C	Center
4	LFE	LFE	LFE	Screen low frequency effects
5	Ls	Ls	Lss	Left surround (or left side surround)
6	Rs	Rs	Rss	Right surround (or right side surround)
7	HI			Hearing impaired (with emphasis on dialog)
8	VI-N			Visually impaired narrative (audio description)
9	--	Lc	--	Left center
10	--	Rc	--	Right center
11	-- --	--	Lrs	Left rear surround
12	-- --	--	Rrs	Right rear surround
13	Motion Data			Synchronous signal (currently used by D-Box)
14	Sync Signal			Used for external sync (e.g. FSK Sync) - only used for SMPTE-DCP - NOT INTEROP-DCP
15	--			Unused at this time
16	--			Unused at this time

*Note 0. While the Table above is a recommendation meant to capture and encourage common practice, it is not guaranteed that all Compositions past, present or future follow this recommendation.*

*Note 1. Not all channels need to be present in a given DCP. For instance, only the first 8 channels should be used when delivering 5.1 + HI/VI content. In all cases, an even number of channels shall be used.*

*Note 2. While some labels are reused across all configurations for convenience, the corresponding channel may not carry the identical signal. For instance, the signal labeled "Lss" in a 7.1DS mix may not be identical to the signal labeled "Ls" in the 5.1 mix for the same title.*

*Note 3. The actual channel configuration may not always be inferred by channel count. The next Section specifies an unambiguous means of signaling the channel configuration.*

*Note 4. Theatre equipment is responsible for rendering the audio channels to the appropriate combination of auditorium speakers. In particular, theatre equipment may choose to render the left surround channel (Ls) of a 5.1 content to all left surround speakers, including back left surround speakers.*

*Note 5. Delivery of a 7.1DS Composition (without a matching 5.1 CPL in the same delivery) to a 5.1 theatre is not recommended since theatre playback equipment is not guaranteed to accurately render a 7.1DS to a 5.1 auditorium.*

*Note 6. Content using the 5.1 configuration may contain a back surround signal matrix-encoded in the Ls and Rs signals – see the 5.1 w/ Surround EX soundfield configuration below.*

*Note 7. A discrete 6.1 configuration is not defined.*

*Note 8. Audio channel labeling, as specified in Annex A of SMPTE ST 429-2 should not be used for Interop-DCPs. (With channel labeling some equipment may not be able to recognize the labels with Interop-DCP packages and may not even play.)*

## **SMPTE Compositions**

A Composition that conforms to SMPTE ST 429-2 should follow the recommendations of this section in addition to those of the previous ("General") section. ISDCF Test Content Bv2.1 conforms to this description.

*NOTE 1: These recommendations are intended to provide maximal compatibility with theatrical equipment while allowing such equipment to unambiguously identify the audio soundfields and channels contained in the Composition, e.g. differentiate between Compositions containing 5.1 and 7.1 material. They also allow mastering equipment to automatically create CPLs based on the information contained in Main Sound Track Files.*

Each Main Sound Track File should include Audio Channel Label and Soundfield Group Label Sub-Descriptors ("MCA Sub-Descriptors") as specified in Annex A.2 of SMPTE ST 429-2.

*NOTE 2: SMPTE ST 428-12 specifies MCA Sub-Descriptors parameters for common D-Cinema audio channels and soundfields.*

*NOTE 3: Section 4 at D-BOX Technical Note 124-915-0001 ([http://www.d-box.com/technical\\_notes/124-915-0001.pdf](http://www.d-box.com/technical_notes/124-915-0001.pdf)) specifies MCA Sub-Descriptors parameters for D-BOX Motion Data channels.*

The ChannelAssignment property of the WaveAudioEssence Descriptor of each Main Sound Track File should be set to the Channel Configuration 4 UL (as specified in Annex A.1 of SMPTE ST 429-2).

*NOTE 4: Using Channel Configuration 4 in combination with MCA Sub-Descriptors is not forbidden by Annex A.2 of SMPTE ST 429-2:2014, and provides compatibility with implementations that do not recognize other values of the ChannelAssignment property of the WaveAudioEssence Descriptor.*

The Composition Playlist should conform to SMPTE ST 429-16:2014, and the xs:any extension point at the top level of the CompositionMetadataAsset element (see Section 4.3 of SMPTE ST 429-16) should contain one MCASubDescriptors element conforming to the XML Schema definition below.

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" elementFormDefault="qualified"
  targetNamespace="http://isdcf.com/ns/cplmd/mca"
  xmlns:mxf="http://www.smpte-ra.org/reg/395/2014/13/1/aaf">

  <xs:import namespace="http://www.smpte-ra.org/reg/395/2014/13/1/aaf"/>

  <xs:element name="MCASubDescriptors">
    <xs:complexType>
      <xs:choice maxOccurs="unbounded" minOccurs="0">
        <xs:element ref="mxf:SoundfieldGroupLabelSubDescriptor"/>
        <xs:element ref="mxf:AudioChannelLabelSubDescriptor"/>
      </xs:choice>
    </xs:complexType>
  </xs:element>
</xs:schema>
```

The SoundfieldGroupLabelSubDescriptor and AudioChannelLabelSubDescriptor elements are the XML representation of all Audio Channel Label and Soundfield Group Label Sub-Descriptors, respectively, present in the Main Sound Track File. This XML representation is specified in specified in SMPTE ST 2001-1.

*NOTE 5: The following XML Schema Definition documents available at <https://github.com/sandflow/IMF/tree/master/xsd/regxml> define the SoundfieldGroupLabelSubDescriptor and AudioChannelLabelSubDescriptor elements:*

- *reg.xsd*
- *www-smpte-ra-org-reg-2003-2012.xsd*
- *www-smpte-ra-org-reg-395-2014-13-1-aaf.xsd*
- *www-smpte-ra-org-reg-335-2012.xsd*

<http://isdcf.com/papers/ISDCF-Doc4-Audio-channel-recommendations.pdf>

*NOTE 6: The `regxml` library at <https://github.com/sandflow/regxml> can be used to automatically convert MCA Sub-Descriptors to their RegXML representation.*

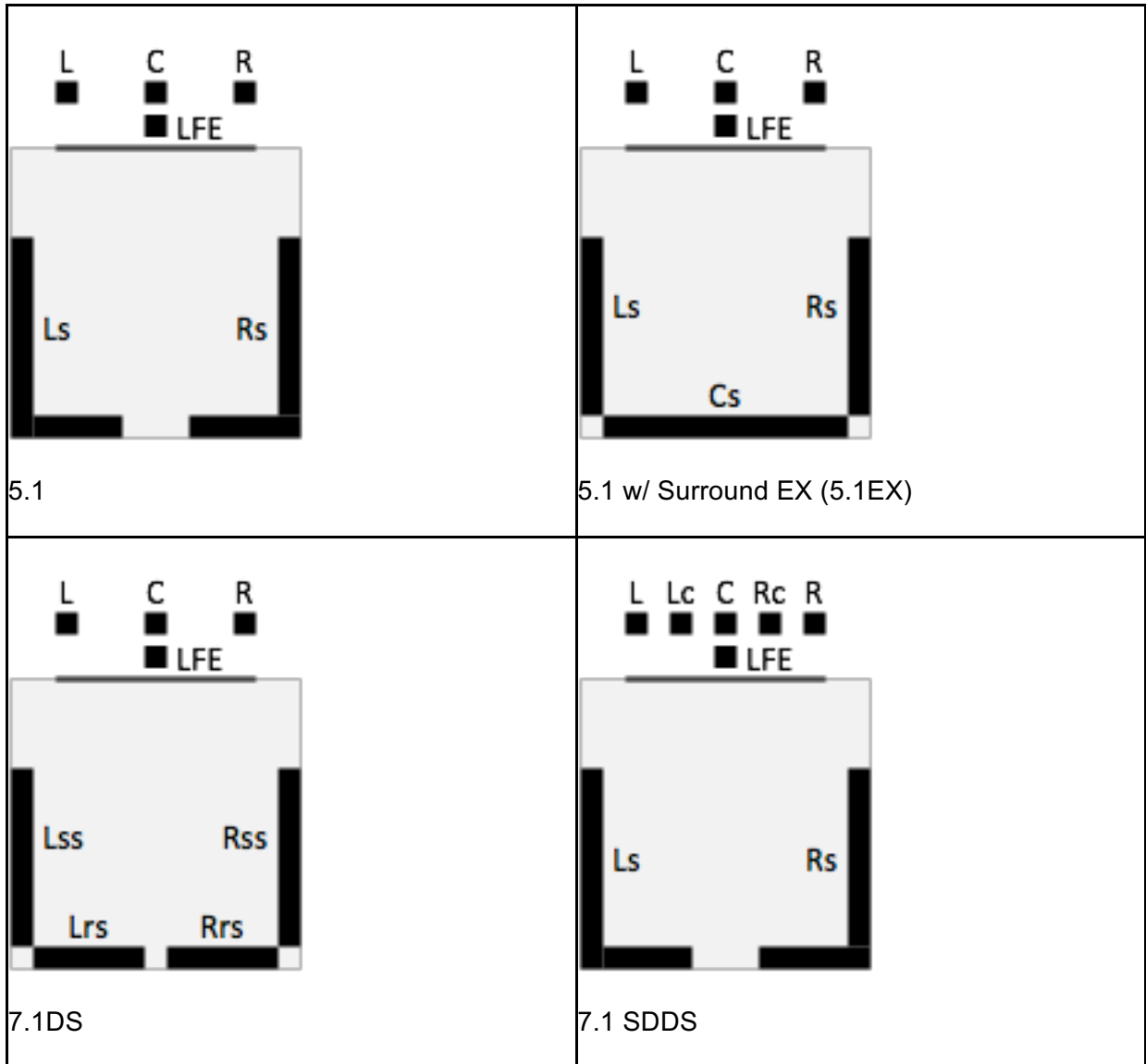
*NOTE 7: Providing an XML representation of the `SoundfieldGroupLabelSubDescriptor` and `AudioChannelLabelSubDescriptor` elements in the CPL allows the audio soundfield and channels contained in the Main Sound Track File to be identified without parsing the Track File.*

As specified in SMPTE ST 429-7, the properties of the MCA Sub-Descriptors contained in the Main Sound Track File take precedence over those in the Composition Playlist in case of conflict.

*EXAMPLE: The ISDCF B2 Test Content (<http://isdcf.com/t/b2>) conforms to the recommendations above.*

## Soundfield Configurations

The following depict the soundfield for the configuration described above.



*Note 1. The Ls and Rs components of the 5.1 soundfield may not extend to the back of the auditorium in all situations.*

*Note 2. The Ls and Rs components of the 7.1DS soundfield may extend to the back of the auditorium in some situations.*