



# **K2 Edge Smart Playout Center Cross Conversion and Service Extraction Manual**

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# 1 Grass Valley Product Support

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## 2 Compatibility

The functionality described in this document requires K2 Edge version 4.0.2.

## 3 Introduction

From release 4.0.2 K2 Edge supports cross conversion between different broadcast signals. This means that the system is capable of transforming a broadcast signal from one type towards another. For example, a playout system renders and broadcasts a 720@59.94p signal. When using a live-input of type NTSC the K2 Edge will detect that the input and output formats are not compatible (but related) and will automatically insert a cross conversion filter. This cross conversion filter will deinterlace/interlace the frames and correct the frame rate.

Cross conversion is automatically applied to clips, SDI-feeds and animations as indicated in the tables in chapter 4.

A number of services embedded in clips and in the VBI-data in SDI-streams, such as AFD, ATC and CDP, are extracted from the input source and made available in the output, possibly converted to a suitable alternative format (for example ATC and VITC).

## 4 Supported broadcast formats

The following tables define the K2 Edge supported broadcast formats with their related supported input media formats.

<b>PAL</b>		<b>SD, 720x576, interlaced, 25 frames/sec, AR 4:3</b>		
<b>Accepted input media formats</b>	<b>Frame rate<sup>1</sup></b>	<b>Auto Cross Conv<sup>2</sup></b>	<b>Needs ARC in template<sup>3</sup></b>	<b>Comments</b>
<b>PAL</b>	25	No	No	Native format.
<b>1080@50i</b>	25	No	Yes	Close to native format in terms of video and audio, just more pixels. Video is scaled down via a Channel Composer template.
<b>720@50p</b>	50	Yes	Yes	Different (but related) frame rate, automatically cross converted from a progressive to an interlaced format. This includes conversion of a selected set of services. Video is scaled down via a Channel Composer template.

<sup>1</sup> Frame rate for all tables is in frames per second.

<sup>2</sup> Cross conversion will automatically be applied to clips, SDI-feeds and animations as indicated in all tables.

<sup>3</sup> Aspect Ratio Conversion (ARC) must be realized by design of dedicated templates in Channel Composer, as indicated in all tables.

<b>NTSC</b>		<b>SD, 720x480, interlaced, 29.97 frames/sec, AR 4:3</b>		
<b>Accepted input media formats</b>	<b>Frame rate</b>	<b>Auto Cross Conv</b>	<b>Needs ARC in template</b>	<b>Comments</b>
<b>NTSC</b>	29.97	No	No	Native format.
<b>1080@5994i</b>	29.97	No	Yes	Close to native format in terms of video and audio, just more pixels. Video is scaled down via a Channel Composer template.
<b>720@5994p</b>	59.94	Yes	Yes	Different (but related) frame rate, automatically cross converted from a progressive to an interlaced format. This includes conversion of a selected set of services. Video is scaled down via a Channel Composer template.

<b>720@50p</b> HD, 1280x720, progressive, 50 frames/sec, AR 16:9				
Accepted input media formats	Frame rate	Auto Cross Conv	Needs ARC in template	Comments
720@50p	50	No	No	Native format.
PAL	25	Yes	Yes	Different (but related) frame rate, and automatically cross converted from an interlaced to a progressive format. This includes conversion of a selected set of services. Video is scaled up via a Channel Composer template.

<b>720@5994p</b> HD, 1280x720, progressive, 59.94 frames/sec, AR 16:9				
Accepted input media formats	Frame rate	Auto Cross Conv	Needs ARC in template	Comments
720@5994p	59.94	No	No	Native format.
NTSC	29.97	Yes	Yes	Different (but related) frame rate, and automatically cross converted from an interlaced to a progressive format. This includes conversion of a selected set of services. Video is scaled up via a Channel Composer template.

<b>1080@50i</b> HD, 1920x1080, interlaced, 25 frames/sec, AR 16:9				
Accepted input media formats	Frame rate	Auto Cross Conv	Needs ARC in template	Comments
1080@50i	25	No	No	Native format.
PAL	25	No	Yes	Close to native format in terms of video and audio, just less pixels. Video is scaled up via a Channel Composer template.

<b>1080@5994i</b> HD, 1920x1080, interlaced, 29.97 frames/sec, AR 16:9				
Accepted input media formats	Frame rate	Auto Cross Conv	Needs ARC in template	Comments
1080@5994i	29.97	No	No	Native format.
NTSC	29.97	No	Yes	Close to native format in terms of video and audio, just less pixels. Video is scaled up via a Channel Composer template.

## 5 Service extraction

A number of services embedded in clips and in the VBI-data in SDI-streams are extracted from the input source and made available in the output, possibly converted to a suitable alternative format. These extracted services will survive cross conversion, although some of the conversions are lossy.

The following sections describe each of the services recognized by the extraction process, with a list of the recognized sources.

### 5.1 AFD

The following input sources are supported for extraction of the Active Format Description (AFD) service, in given order of priority:

	Input source	Condition
1	AFD-objects defined on the timeline of a Channel Composer template.	
2	AFD ANC packets found in an MXF file, embedded in accordance with the SMPTE 436M-2006 specification, section 6: <i>MXF Ancillary Data Packet wrapping specifications</i> .	Main Player (*)
3	AFD-objects found embedded in the VBI-section of an SDI-stream of all supported broadcast formats.	Main Player

(\*) Input sources with the main Player condition are only recognized when the associated Channel Composer Player object was assigned the main player role. At any given time, only one Player can have this role.

### 5.2 CDP

The following input sources are supported for extraction of the Caption Distribution Packet (CDP) service, in given order of priority:

	Input source	Condition
1	A STL subtitle rendered in CEA-608 format. The 608 subtitle data will end up in the CDP's embedded 608 section. This input source can co-exist with the next #2 source. This input can also co-exist with #3 and #5. If present, 608 subtitle data from #3 and #5 will be overwritten.	
2	CEA-608 XDS commands placed on the timeline of a Channel Composer template. The XDS data will end up in the CDP's embedded 608 section. This input source can co-exist with the previous #1 source. This input can also co-exist with #3 and #5. If present, 608 XDS data from #3 and #5 will be overwritten.	
3	CDP objects found embedded in VBI section of an incoming SDI stream.	Main Player
4	CDP objects created from CEA-608 metadata as a result of cross conversion from SD to HD format. See the CEA-608 section below on how the 608 metadata came into existence in the first place.	Main Player
5	CDP ANC packets found in an MXF file, embedded conform the SMPTE 436M-2006 specification, section 6: <i>MXF Ancillary Data Packet wrapping specifications</i> .	Main Player

### 5.3 ATC / VITC

The following input sources are supported for extraction of the Ancillary Time Code (ATC) and Vertical Interval Time Code (VITC) services, in given order of priority:

	<b>Input source</b>	<b>Condition</b>
<b>1</b>	Any clip. The time code represents clip time.	Main Player
<b>2</b>	ATC objects found embedded in VBI section of HD SDI stream.	Main Player

That is, the ATC/VITC output reflects the time code of either the currently playing clip (if playing with main player role) or the currently playing SDI stream (again, only if playing as main player).

The extracted time code is emitted as VITC for SD-channels and ATC for HD channels.

### 5.4 CEA-608

The following input sources are supported for extraction of the CEA-608 closed caption service, in given order of priority:

	<b>Input source</b>	<b>Condition</b>
<b>1</b>	An STL subtitle rendered in CEA-608 format. This input source can co-exist with the next #2 source.	
<b>2</b>	CEA-608 XDS commands placed on the timeline of a Channel Composer template. This input source can co-exist with the previous #1 source.	
<b>3</b>	CEA-608 objects found embedded in VBI section of an incoming SDI stream in NTSC broadcast format.	Main Player
<b>4</b>	CEA-608 objects created from CDP metadata as a result of cross conversion from HD to SD format.	Main Player

## 6 The main Player

### 6.1 Introduction

In Channel Composer, Objects such as 'Clip', 'Audio' and 'Still' use a Player to play out content. Players can be used to control playout. Different actions can be defined. The default is: Play. Players can be modified in the **Object** and **Objects** window.



One main Player can be active per Channel.

The main Player role has following properties:

- The main Player has priority over other Players when resources are assigned.
- If the main Player contains an embedded Closed Caption subtitle stream, this stream will be played out. If other Clips contain subtitle streams, these streams will not be played out. In other words, only the main Player's subtitle stream will be played out.
- The main Player is the source for the ATC (HD) or VITC (SD) timecode signal in the SDI-output. Only one signal can be sent out, i.e. from the main Player.
- If the main Player is a Live Player and this Player transfers VBI-data from the SDI-input, this VBI-data will be transferred to SDI-out instead of any VBI-data generated by the K2 Edge server. This means that VBI-data from the input such as subtitles and teletext is passed to the output 'as is'.
- The main Player role can be assigned at any point in time, but is only active if between an In and Out Point.



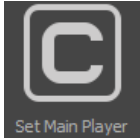
## 6.2 How to



In Channel Composer, the main Player command is automatically added for the first Clip or Live Object that is added to a Template.

To manually set the main Player:

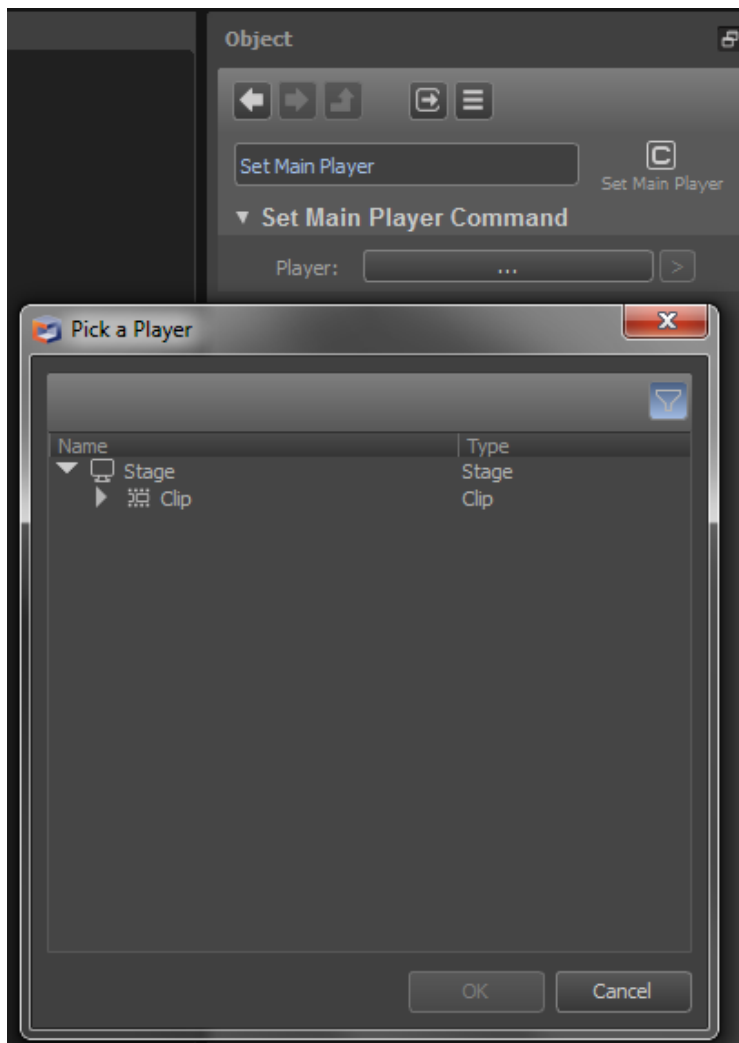
- In Channel Composer, go to **Library > Command** and select the **Set Main Player** icon.



- Drag on the **Template Timeline**, on the appropriate template and time. The Set Main Player icon is added to the timeline.



- Double-click the Set Main Player icon and in its **Object** window, select the appropriate Player.



*Example Pick a Player window in Channel Composer.*