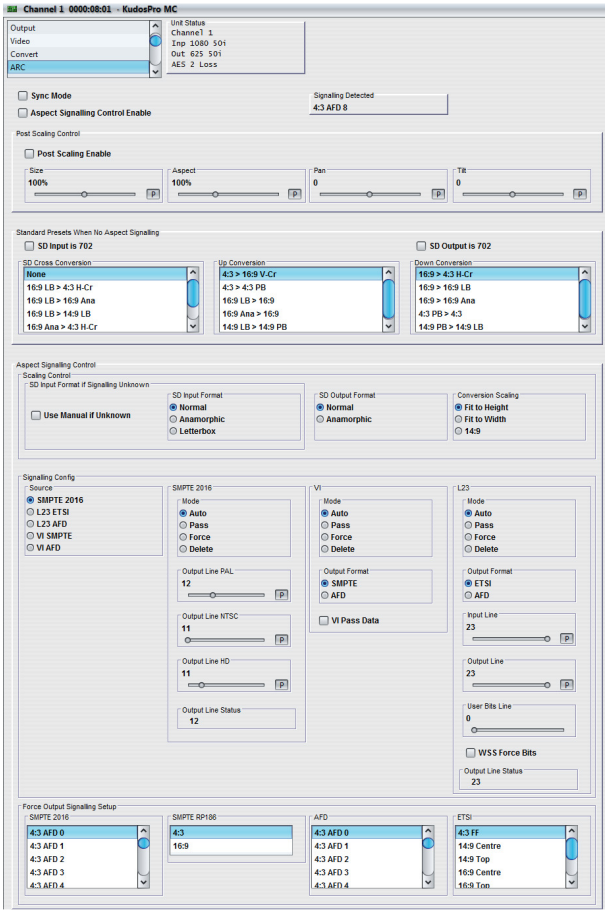
KudosPro - Application Note no 8.

ARC & Signalling

APPLICATION NOTE



Contents

Introduction

The KudosPro range of products offers full integration with various forms of ARC signalling. KudosPro can react to signalling in the input and where appropriate either pass or modify the signalling according to the current video process.

KudosPro is compatible with various signalling formats including:

- AFD conforming to SMPTE 2016
- Video Indexing conforming to SMPTE RP186 (1995)
- Video Indexing conforming to SMPTE RP186 (2008)
- Line 23 Wide Screen Signalling (ETSI)
- Line 23 Wide Screen Signalling (Modified ETSI - AFD)

Today, the most common method of signalling used is that which conforms to SMPTE 2016. This is the only specification that can be applied to both SD and HD. WSS and VI specifications only apply to SD transmissions, WSS only applies to 625 formats.

L23 WSS signalling is virtually unused in today's broadcast systems.

Video indexing is not very common today, but is still used by some broadcasters, most notably by the BBC.

Where sources are encountered that have no signalling, KudosPro can generate signalling. Also KudosPro can be used to convert input signalling to a different signalling format on the output.

With regard to multi-channel KudosPro products, each video channel will operate independently, with respect to signalling.

Note 1 – KudosPro is not compatible with signalling associated with the Composite or Component YC inputs. Any signalling information present in the input will be stripped.

VANC Priority

It is possible VANC information, other than signalling information, to be configured on certain output lines. This maybe timecode, closed captions, teletext, or Dolby metadata. It possible that more than one VANC data packet could be configured to be output on a particular line. In many cases only one VANC packet can be carried on any one line.

In such circumstances, to avoid conflicts, a priority table dictates which VANC packet type is actually placed on the chosen line. The table is shown below:

		525	625	HD	
1	Timecode VITC	11-17	7-20		SD only
2	Signalling WSS ("Line 23")		10-23		625 only
3	Signalling SMPTE2016	11-19	7-22	9-20	
4	Dolby Metadata SMPTE2020	8-20	8-20	8-20	
5	Closed Captions CEA 708			8-20	59 Hz, 29p, 23p HD only
6	Teletext RDD08			8-20	50 Hz, HD only
7	Teletext WST		7-22		Line no. control only active when down converting from a source with RDD08

The table lists the highest priority at the top and the lowest at the bottom. In circumstances where two or more VANC packets are configured to be on the same line, the lower priority VANC packet is bumped to the nearest available line. In the event that there are two 'nearest' available lines, the VANC packet will be bumped to the lower line number.

Note – VI information is not placed in VANC data, so is irrelevant with respect to 'VANC Priority'.

KudosPro ARC Signalling Menu

KudosPro is available as a multi-channel video processor. Each video channel has its own ARC menu, which can be independently configured.

The ARC menu may be easily accessed using the ARC shortcut button on the front panel.

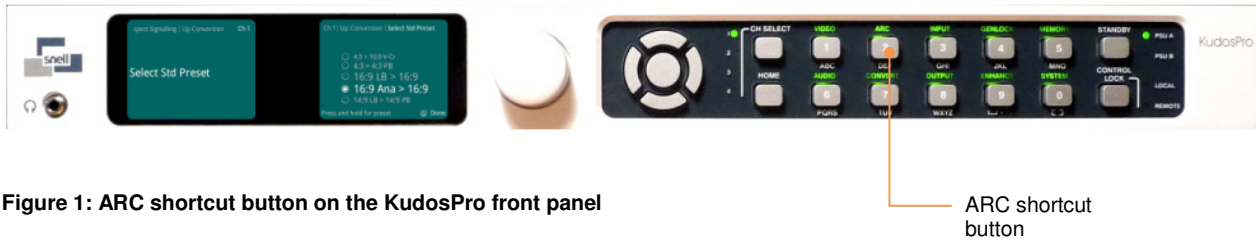


Figure 1: ARC shortcut button on the KudosPro front panel

All ARC features can be controlled via the Front Panel. However, the Rollcall template or Embedded Java Applet, offers an easier control interface:

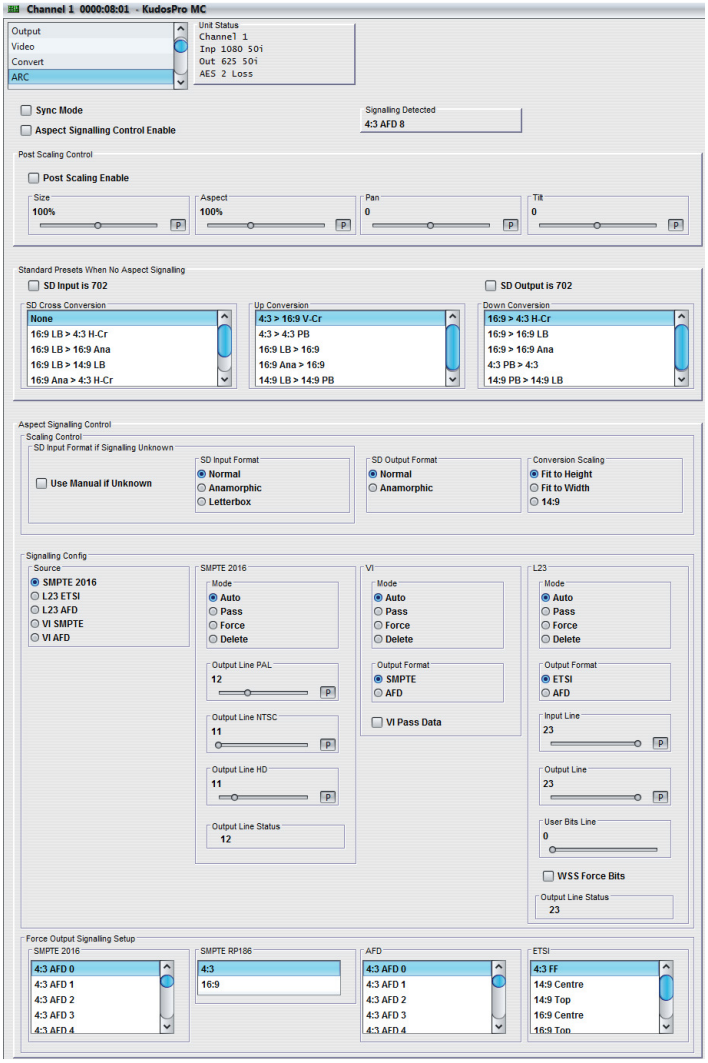


Figure 2: RollCall Template - ARC

Note 2 – the Embedded Java Applet appears identical to the Rollcall Template.

ARC menu controls

Sync Mode

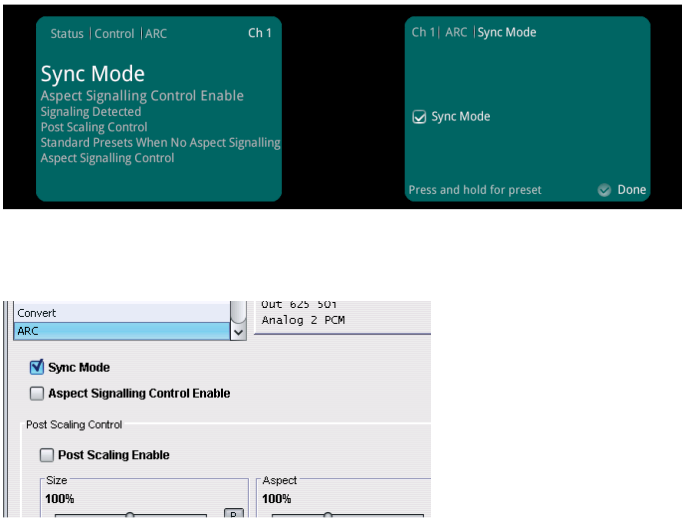


Figure 3: Enabling 'Sync Mode'.

When 'Sync Mode' is enabled, if the input and output video formats are the same, then the ARC feature is disabled. Signalling is unaffected.

Aspect Signalling Control Enable

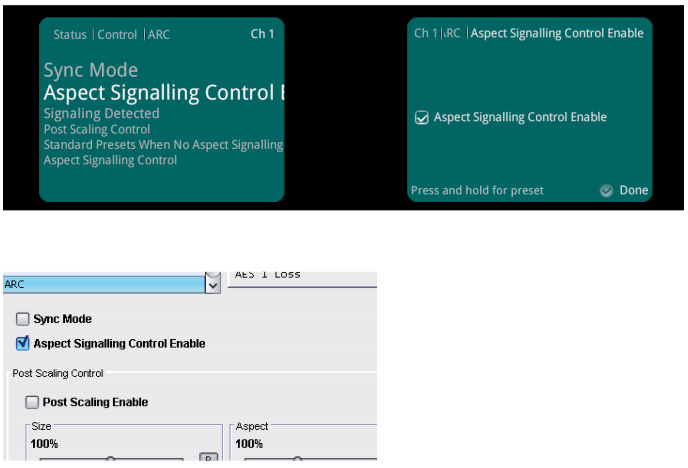


Figure 4: Enabling aspect signalling control

When enabled, the KudosPro will react to input signalling if present.

Signalling Detected

Figure 5: Input signalling detection confirmation

The ‘Signalling Detected’ feature indicates the status of the selected signalling source, as set in the ‘Signalling Config / Source’ menu.

Post Scaling Control

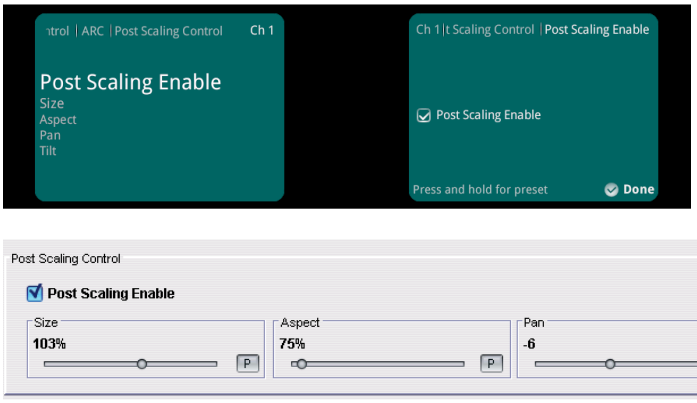


Figure 6: 'Post Scaling Enable' control

This menu allows an operator to manually resize the picture. The 'resize' does not affect signalling. This process is not part of the ARC and occurs later in the signal processing path.

Size: This may be used to scale the original picture between 80% and 120%.

Figure 7: demonstration of a 16:9 image subjected to a rescale by 80%

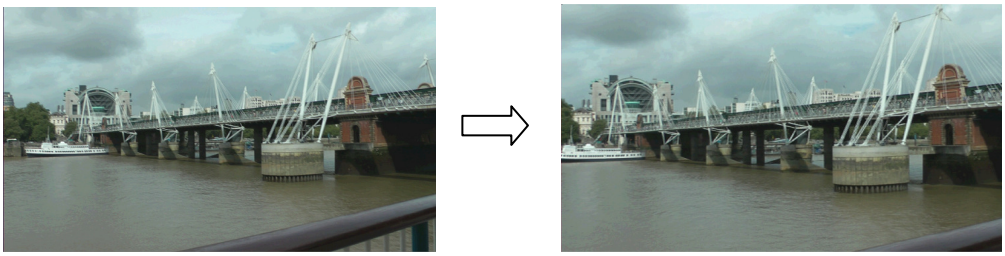


Figure 8: demonstration of a 16:9 image subjected to a rescale by 120%

Any increase in size will result in cropping.

Aspect: This control may be used to adjust the scale of the horizontal, while maintaining the vertical scaling, so effectively adjusting the aspect ratio. A setting of 100% effectively means that the aspect ratio is unaltered.

This control maybe set anywhere between 70% and 150%, in 1% increments.

As this setting is moved towards 70%, the picture will be proportionally squeezed horizontally.

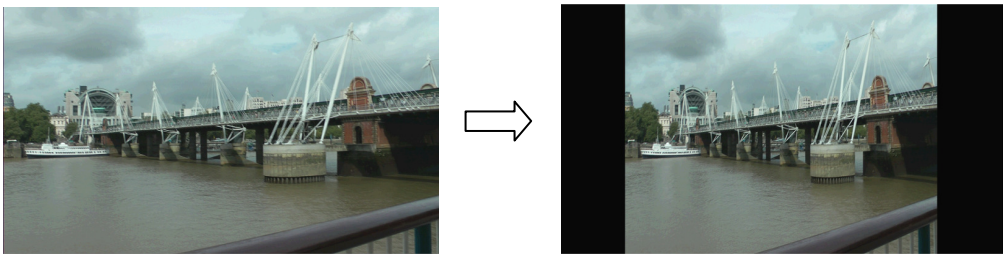


Figure 9: demonstration of a 16:9 image subjected to an aspect of 70%

As this setting is moved towards 150%, the picture will be proportionally stretched horizontally:

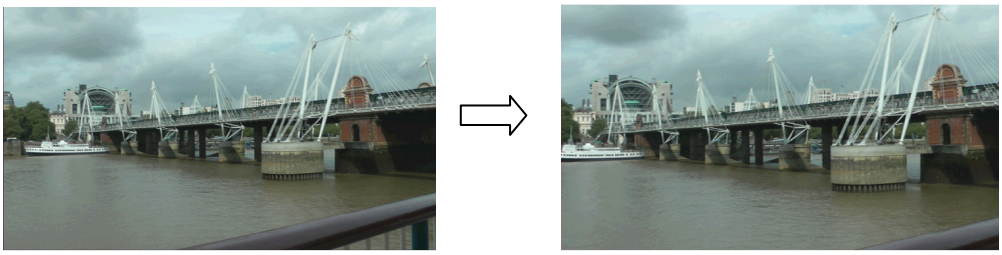


Figure 10: demonstration of a 16:9 image subjected to an aspect of 150%

Any ‘stretch’ will result in side-cropping.

Pan: This control may be used to change the horizontal position of the picture. The control range is -50 to +50. This represents horizontal adjustment of 50 pixels, left or right. A setting of ‘0’ represents no position change of the picture. Negative values move the picture to the left:

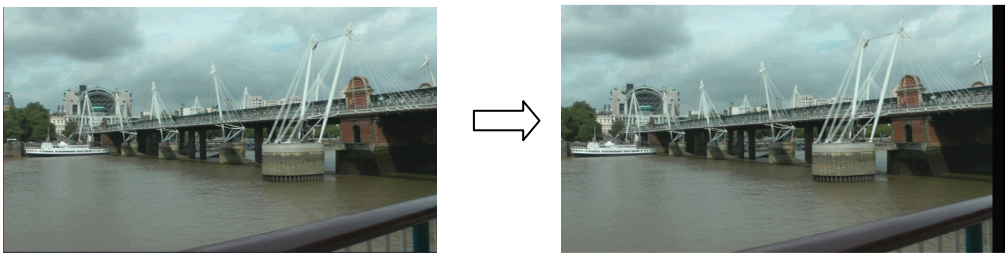


Figure 11: demonstration of a 16:9 image subjected to a Pan setting of -50

A ‘Pan’ to the left will result in cropping on the left side of the picture.

Positive values move the picture to the right. A ‘Pan’ to the right will result in cropping on the right side of the picture.

Tilt: This control may be used to change the vertical position of the picture. The control range is -50 to +50, in integer increments. A setting of ’50’ represents a vertical shift of 50 lines. A setting of ‘0’ represents no position change of the picture.

Negative values move the picture up.

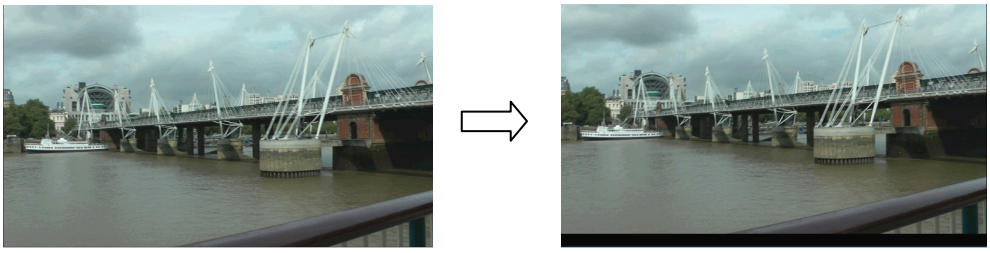


Figure 12: demonstration of a 16:9 image subjected to a Tilt setting of -50

An upward ‘Tilt’ will result in cropping at the top of the picture.

Positive values move the picture down. A downward ‘Tilt’ will result in cropping at the bottom of the picture.

Standard Presets When No Aspect Signalling

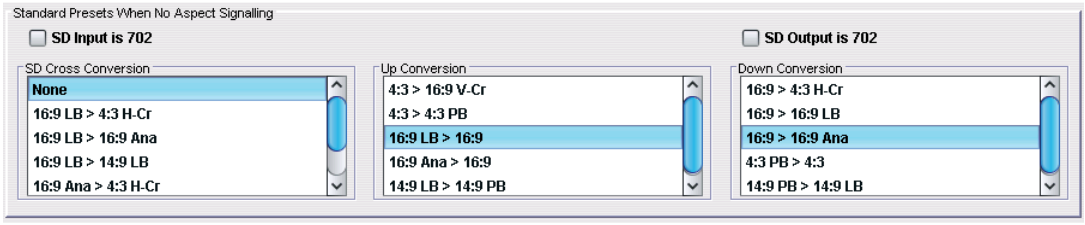


Figure 13: 'Standard Presets When No Aspect Signalling' menu

Abbreviation key:

H-Cr …. Horizontal Crop
V-Cr …. Vertical Crop
PB …… Pillar box
LB …… Letterbox
Ana …. Anamorphic

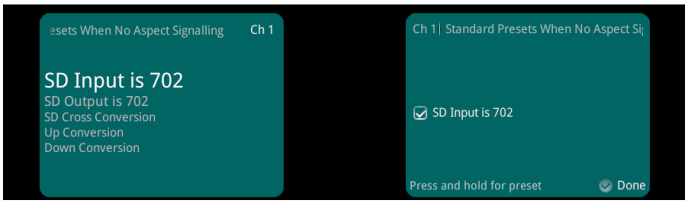
When an SDI source is applied to the KudosPro, that does not contain compatible signalling information, this menu offers a manual method of controlling the aspect ratio via defined presets.

This menu is only active when the control 'Aspect Signalling Control Enable' is un-ticked (disabled) and 'Sync Mode' is un-ticked (disabled).

Figure 14: Disabling 'Aspect Signalling Control Enable' & 'Sync Mode'

This menu has no effect on output signalling. If valid signalling data is required at the output, either the 'Scaling Control' within the 'Aspect Signalling control' menu can be used (page 14), or the 'Forced Output Signalling' feature can be used (page 28).

SD Input is 702



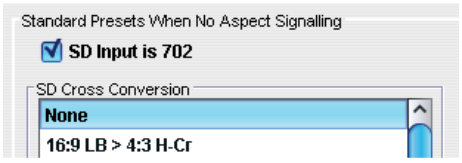
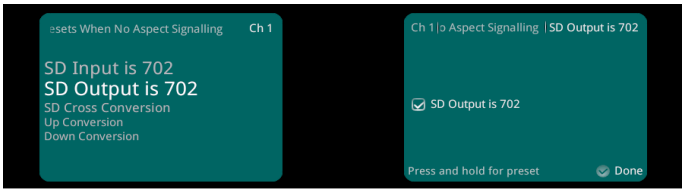


Figure 15: 'SD Input is 702' select box.

A full width SD SDI video frame is 720 pixels wide. However, source material derived from the analog domain is seldom full width. Typical horizontal resolution is 702 pixels. If such a source is applied to the input, enabling the control 'SD Input is 702' will ensure that the output picture is suitable scaled, taking into account the slightly narrower source. This is achieved by applying a further 720/702 horizontal scaling factor.

SD Output is 702



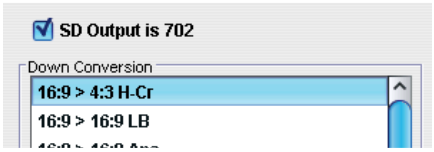


Figure 16: 'SD Output is 702' select box.

When selected, an SD SDI output will be slightly rescaled to be only 702 pixels wide. This is achieved by applying a further 702/720 horizontal scaling which is seen as a slight horizontal squeeze.

SD cross Conversion

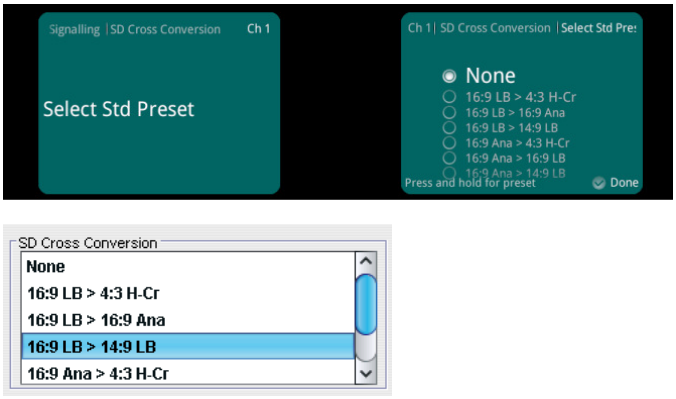
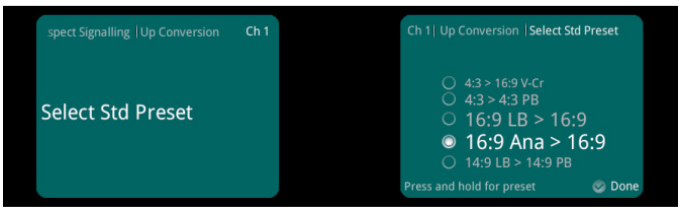


Figure 17: 'SD Cross Conversion' presets

This menu offers several scaling presets. When selected, these will only be applied when both the input and the output formats are SD.

Up Conversion



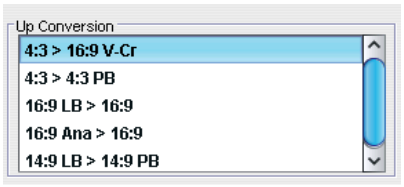
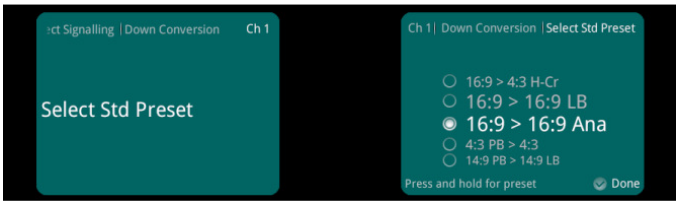


Figure 18: 'Up conversion' presets

This menu offers several scaling presets. When selected, these will only be applied when up-converting.

Down Conversion



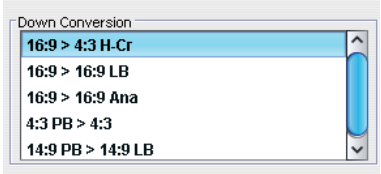


Figure 19: 'Down conversion' presets

This menu offers several scaling presets. When selected, these will only be applied when down-converting.

Aspect Signalling Control

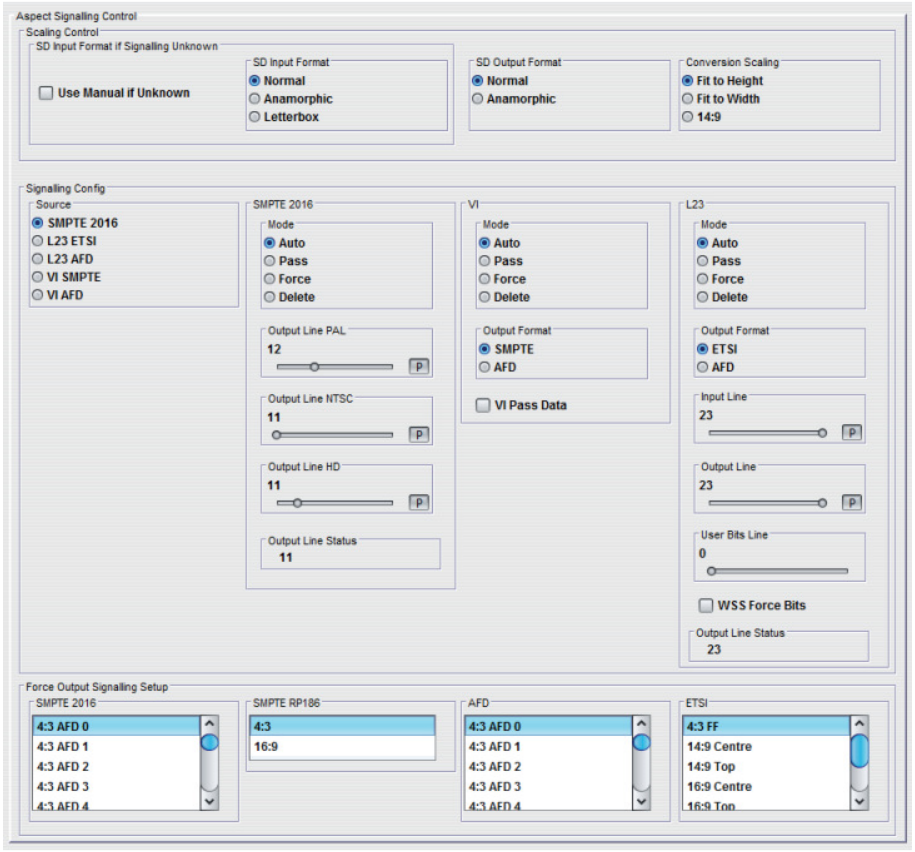


Figure 20: 'Aspect Signalling Control' menu

When sources are encountered that do not contain signalling information, KudosPro is able to generate appropriate signalling in the output. Since no signalling is present in the input, the detail of the incoming aspect ratio is unknown. Therefore, a certain amount of manual configuration is required to ensure that meaningful signalling is inserted into the output.

For sources that do include signalling data, there may also be some manual configuration required to ensure that the correct signalling format is detected on the input and how this signalling is processed to the output.

Scaling Control

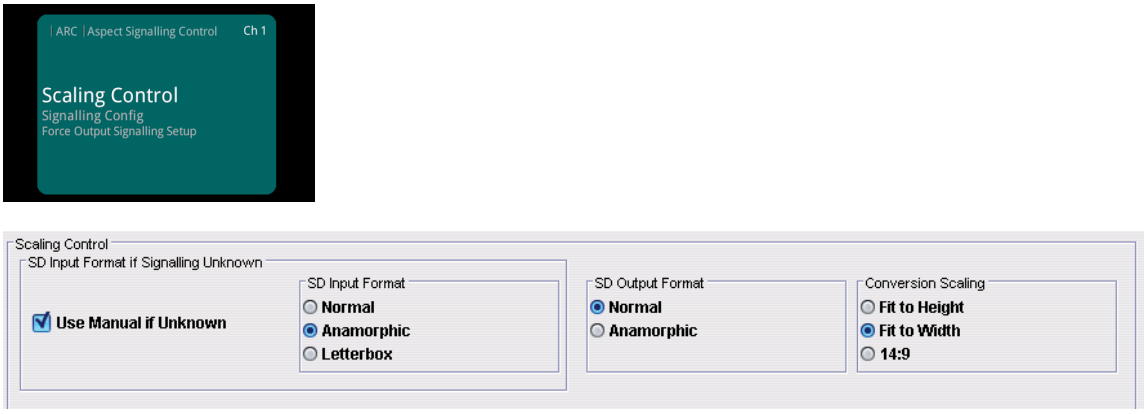


Figure 21: 'Scaling Control' menu

This control is only active when the 'Aspect Signalling Control Enable' checkbox is ticked. These controls allow output manual configuration of the ARC when using input aspect signalling to drive the input to the ARC. The input side of the ARC should be defined by input signalling, but a default input format for SD images can be configured when input signalling is not detected.

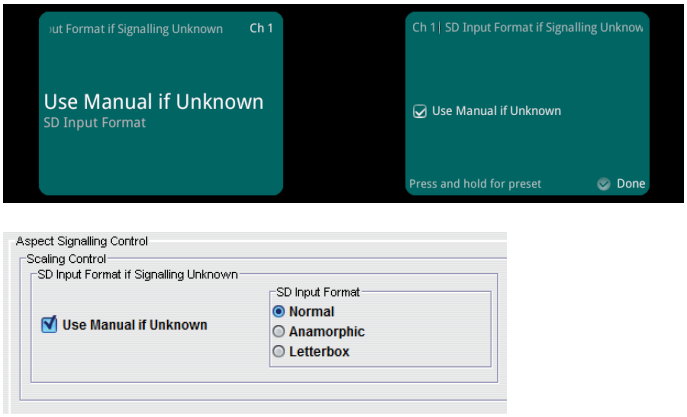


Figure 22: ARC Input Manual Configuration Controls

In order to use input signalling to drive the input side of the ARC, the Operator must first select the desired input signalling type from the 'Source' menu, from the 'Signalling Config' controls. If present, the detected input signalling will drive the input to the ARC.

However, if no valid signalling is detected within an SD source then the ARC input can be manually setup using the 'SD Input Format' menu. To enable this, the 'Use Manual if Unknown' checkbox should be ticked.

SD Input format: This is a default setting that the unit will use to drive the input to the ARC, when the selected input signalling is not detected within the source.

Note the settings in this menu will only have an effect when:

- Input source is SD,
- Selected input signalling is not detected
- Control 'Use Manual if Unknown' is ticked.

This allows the Operator to describe an incoming SD picture with regard to its aspect ratio.

Normal: this setting should be selected when the SD input has a full frame 4:3 image (most probably shot in 4:3).

Figure 23: A 4:3 Full frame SD image

Anamorphic: this setting should be selected when the SD input has anamorphic 4:3 image (most probably shot in 16:9).

Figure 24: A native16:9 image, displayed as an SD anamorphic image.

Letterbox: this setting should be selected when the SD input has a 16:9 letterboxed image, within the 4:3 raster.

Figure 25: A 16:9 image, letterboxed into a 4:3 display

ARC Output Manual Configuration Controls

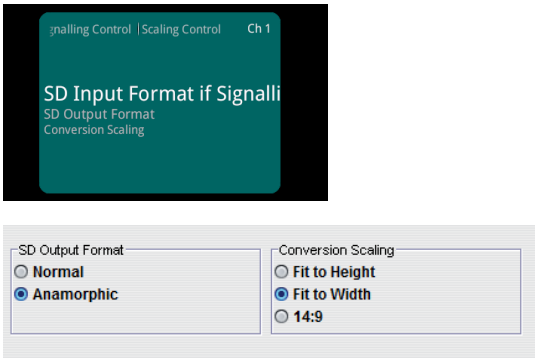


Figure 26: ARC Output Manual Configuration Controls

A combination of 'SD Output Format' and 'Conversion Scaling' can be used to manually set up the output side of the ARC. The resultant aspect ratio of the output image is also dependent upon the input video's aspect ratio.

SD Output Format

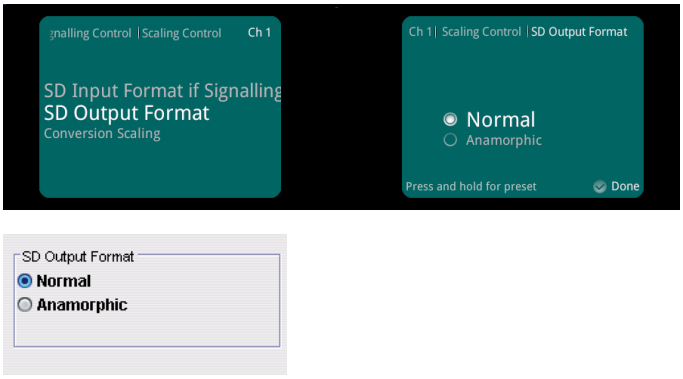


Figure 27: 'SD Output Format' control

This control allows the Operator to define whether the SD output is 'Normal' or 'Anamorphic'.

This control has no effect when the output is HD.

When output signalling mode is set to 'Auto' in the 'Signalling Config' menu, the 'SD Output Format' settings will cause output signalling to be modified accordingly.

Conversion Scaling

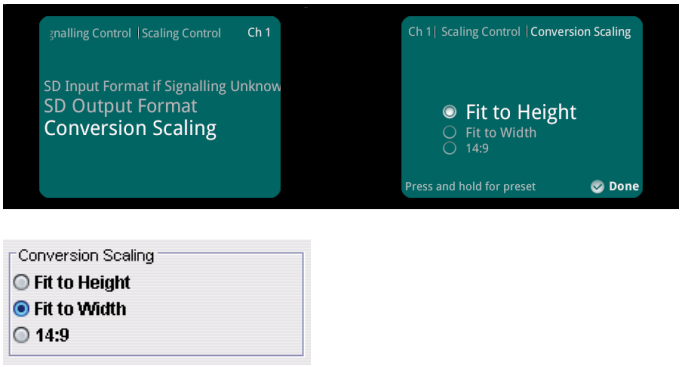


Figure 28: 'Conversion Scaling' control

This control allows an Operator to adjust the 'Conversion Scaling' and is dependent upon the conversion process being performed.

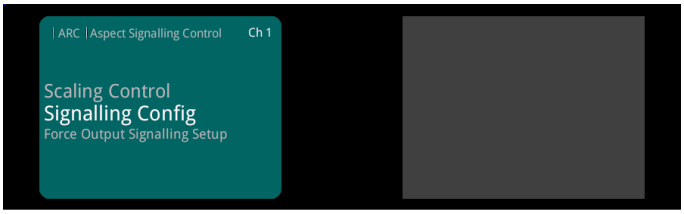
Settings may cause cropping of the processed picture, or may result in side bars, or top and bottom bars appearing in the output picture.

This control can be used effectively when input and output aspect ratios are different. This would normally be when a process of up-conversion or down-conversion is being performed. The control enables the Operator to dictate how the output picture is to appear at the output.

When SD cross-converting, the Operator can set a suitable SD aspect ratio setting for the output, by using the 'Conversion Scaling' control.

When the output signalling mode is set to 'Auto' in the 'Signalling Config' menu, the 'Conversion Scaling' settings will cause output signalling to be modified accordingly.

Signalling Config



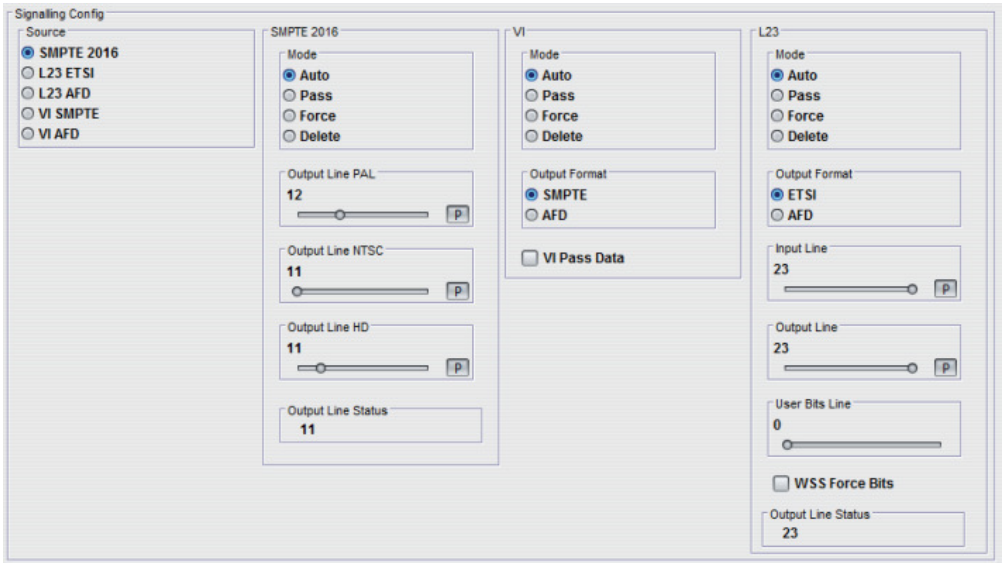


Figure 29: 'Signalling Config' menu

This menu is used to configure how signalling is detected in the input and how signalling is handed over to the output.

Source

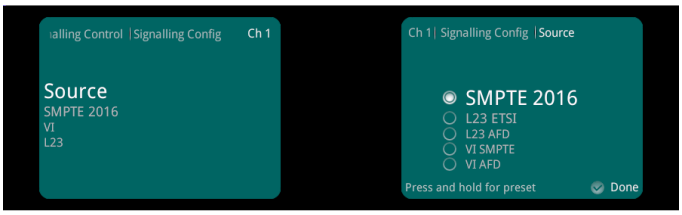


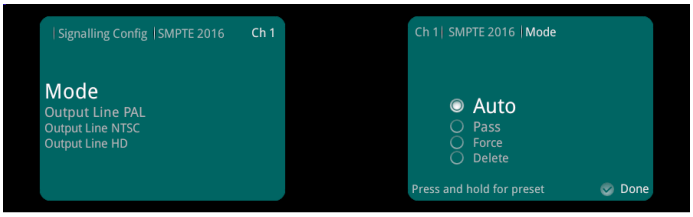
Figure 30: Signalling Config 'Source' selection control

This menu allows the Operator to select the desired input signalling type to be detected from the input video. If detected and the control 'Aspect Signalling Control Enable' is ticked, the ARC input will be defined by the input signal. The status of the selected source is displayed in the 'Signalling Detected' status box (Figure 5, page 7).

The supported input signalling formats are:

- **SMPTE 2016:** SMPTE ST 2016-1. Format for Active Format Description and Bar Data
- **L23 ETSI:** ETSI EN 300 294 v1.4.1. Television systems; 625-line television Wide Screen Signalling (WSS)
- **L23 AFD:** West Country TV/HTV/Central TV L23_SPEC.doc 1997.
- **VI SMPTE:** SMPTE RP186-1995. Video Index Information Coding for 525- and 625-Line Television Systems
- **VI AFD:** SMPTE RP186-2008. Video Index Information Coding for 525- and 625-Line Television Systems

SMPTE 2016



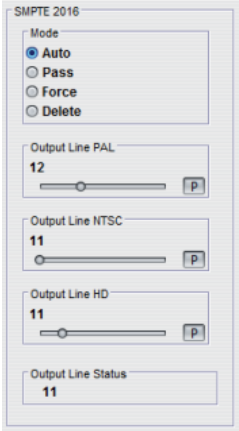


Figure 31: 'SMPTE 2016' signalling configuration menu

This menu allows the Operator to configure how signalling, conforming to SMPTE 2016, is embedded into the video output.

Mode:

Auto: Automatically generates an output SMPTE 2016 signal with AFD data that matches the output aspect of the ARC.

Pass: If SMPTE 2016 is selected as the input signalling source, any valid SMPTE 2016 input signal is passed through to the output unchanged. The output signal may not represent the actual aspect of the output image. If a SMPTE 2016 signal is not present at the input, then no SMPTE 2016 signal will be output.

Force: Generates an output SMPTE 2016 signal with AFD data that matches that which is selected in the 'Force Output Signalling Setup' – SMPTE 2016 list box (see page 29). This list contains 16 AFD codes for coded frame aspect ratio of 4:3 and the same AFD codes for a coded frame aspect ratio of 16:9.

Delete: Disables embedding of SMPTE 2016 output signalling in the output video.

Output Line PAL: Allows the Operator to select the output line where SMPTE 2016 signalling will be placed when the output standard is SDI 625i.

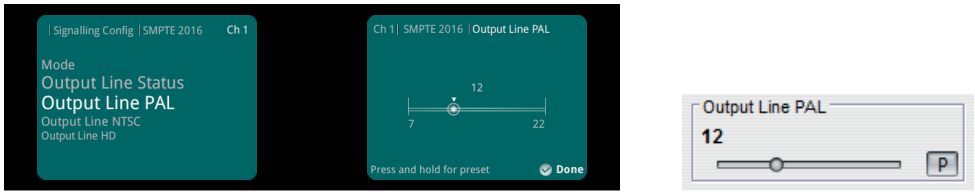


Figure 32: SMPTE-2016 output line configuration for PAL

When the output is 625i, SMPTE 2016 signalling may be placed anywhere between line 7 and line 22. The default is line 12.

Output Line NTSC: Allows the Operator to select the output line where SMPTE 2016 signalling will be placed when the output standard is SD 525i.

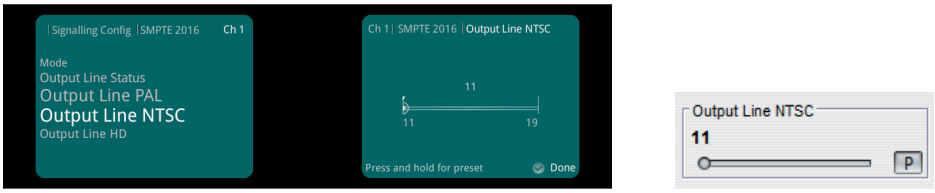


Figure 33: SMPTE-2016 output line configuration for NTSC

When the output is 525i, SMPTE 2016 signalling may be placed anywhere between line 11 and line 19. The default is line 11.

Output Line HD: Allows the Operator to select the output line where SMPTE 2016 signalling will be placed when the output is HD.

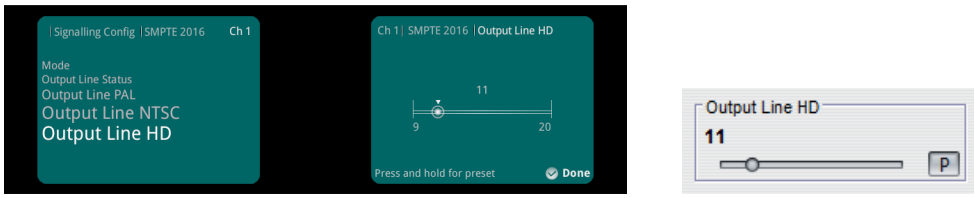


Figure 34: SMPTE-2016 output line configuration for PAL

When the output is HD, SMPTE 2016 signalling may be placed anywhere between line 9 and line 20. The default is line 11.

Output Line Status: Displays confirmation of the actual line where SMPTE 2016 information is placed. In the circumstance of a VANC conflict event (see note on page 4 – VANC Conflict) this may differ from the output line selected by the Operator

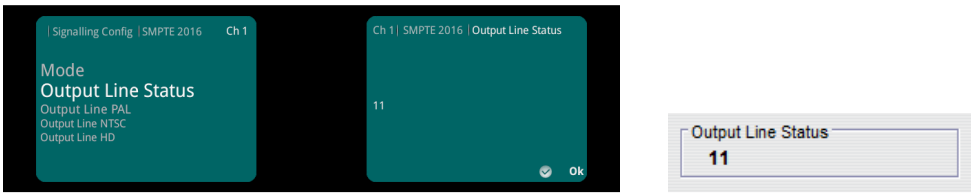


Figure 35: SMPTE-2016 Output Line HD - status

VI (Video Indexing)

VI conforming to SMPTE RP186 is supported by KudosPro.

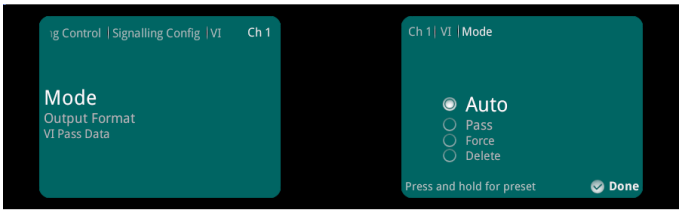
KudosPro is compatible with the early 1995 revision of SMPTE RP186 and the later 2008 revision.

VI signalling is only applicable to the SD domain. VI is supported in both 625 and 525 formats.

Note – VI data is carried in the least significant data bits of the Chrominance Channels, in the vertical blanking period. As such, there is no concept of VI data residing on a particular line, as with WSS, or SMPTE2016. VI is not implicated in VANC Priority issues.

'VI' submenu

The VI submenu is used to configure how VI signalling emerges from the output.



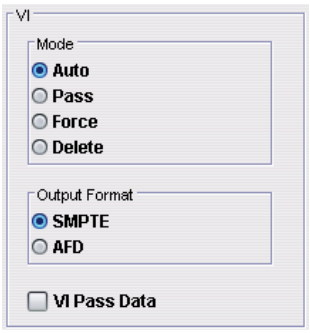


Figure 36: VI configuration menu

Mode

Auto: If Output Format is set to SMPTE, this automatically generates an output VI signal conforming to SMPTE RP 186-95 (1995) with scanning system information that matches the output aspect of the ARC.

If Output Format is set to AFD, this automatically generates an output VI signal conforming to SMPTE RP 186-08 (2008) with scanning system information and AFD that match the output aspect of the ARC.

Pass: If either VI SMPTE or VI AFD is selected as the input signalling source, any valid SMPTE RP 186-95/08 input signal is passed through to the output unchanged irrespective of what output format is set. For both output formats, the output signalling may not represent the actual aspect of the output image. If a VI signal is not present at the input, then no VI signalling will be output.

Force: If 'Output Format' is set to SMPTE, this generates an output SMPTE RP 186-95 signal with scanning system information that matches that which is selected in the 'Force Output Signalling Setup' SMPTE RP 186 list box (see page 27). The Operator can specify 4:3 or 16:9; the actual code used will be determined by whether the output video standard is 625 or 525.

If Output Format is set to AFD, this generates an output SMPTE RP 186-08 signal with scanning system information and AFD codes that match what is selected in the Force Output Signalling Setup – AFD list box (see page 31). This list contains eight AFD codes for scanning system information of 4:3 and the same AFD codes for scanning system information of 16:9. The actual scanning system information used will be determined by whether the output video standard is 625 or 525.

Delete: Disables embedding of any form of SMPTE RP 186-95/08 output signalling in the output video.

Output format: This control allows an Operator to configure the output VI version (SMPTE or AFD).

Selecting 'SMPTE' will result in VI conforming to the 1995 specification of SMPTE RP186 to be inserted in the SD output.

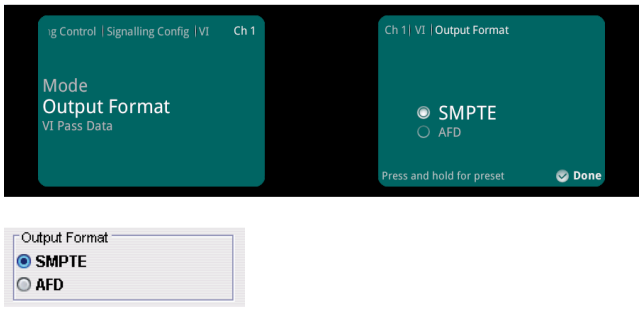


Figure 37: Select VI output format to be 'SMPTE'

Selecting 'AFD' will result in VI conforming to the 2008 specification of SMPTE RP186 to be inserted in the SD output.

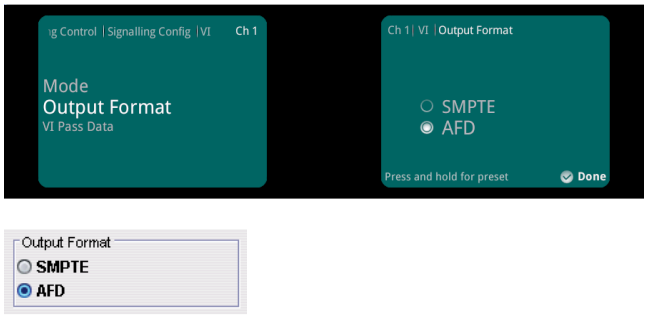


Figure 38: Select VI output format to be 'AFD'

VI Pass Data: VI signalling has the capacity to carry User Bits. If User Bits are present in the input VI data and are required to be retained in the VI output data, then this control should be enabled.

Figure 39: Selecting 'VI Pass Data' mode

L23 Signalling

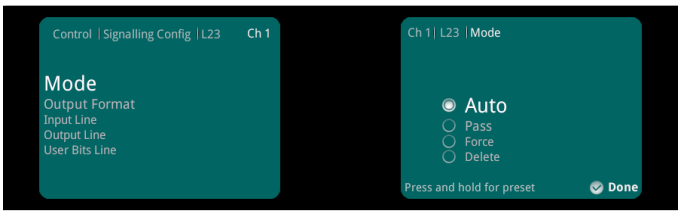
WSS (Wide Screen Signalling) is only supported by KudosPro in the 625i domain.

Note 3:

The original L23 specification is defined by ETSI (ETSI EN 300 294 V1.4.1) and is supported by KudosPro. However, in the late 1990's a group of companies including Westcountry TV, HTV and Central TV found the ETSI spec didn't meet their requirements. These companies collaborated with Snell to produce a modified version of the ETSI spec, based on the BBC ARD specification. This is not an official spec, but is also supported by KudosPro.

'L23' menu

The L23 Menu is used to configure how L23 signalling emerges from the output.



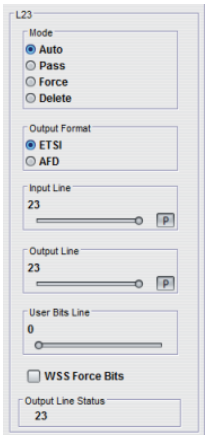


Figure 40: Selecting L23 'Auto' mode

Mode:

Auto: If Output Format is set to ETSI, this automatically generates an output WSS signal conforming to ETSI EN 300 294 with AFD codes that match the output aspect of the ARC.

If Output Format is set to AFD, this automatically generates an output WSS signal conforming to L23 spec with scanning system information and AFD codes that match the output aspect of the ARC.

Pass: If either L23 ETSI or L23 AFD are selected as the input signalling source, any valid ETSI EN 300 294 input signal is passed through to the output unchanged irrespective of what output format is set. For both output formats, the output signal may not represent the actual aspect of the output image. If a WSS signal is not present at the input, then no WSS signal will be output.

Force: If Output Format is set to ETSI, this generates an output ETSI EN 300 294 signal with AFD codes that match that which is selected in the Force Output Signalling Setup – ETSI list box (see page 32). This list contains eight AFD codes.

If Output Format is set to AFD, this generates an output ETSI EN 300 294 signal that is modified to carry VI scanning system information and AFD codes that match what is selected in the Force Output Signalling Setup – AFD list box (see page 32). This list contains eight AFD codes for scanning system information of 4:3 and the same AFD codes for scanning system information of 16:9.

The actual scanning system information used will always be the 625 variant as WSS is only supported in 625 video output.

Delete: Disables embedding of any form of ETSI EN 300 294 output signalling in the output video.

Output Format: This control allows the Operator to choose whether output L23 signalling is compliant with either the ETSI specification, or 'modified ETSI' as explained in Note 3 above.

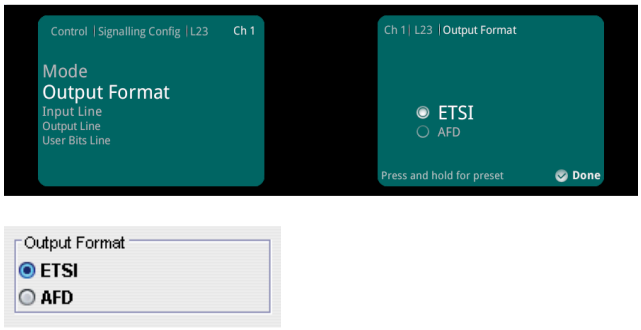


Figure 41: Configuring L23 signalling output format

Input Line: Although L23 signalling, as the name suggests, is normally carried on line 23 of a 625i video signal, it is acceptable to carry L23 signalling on alternative lines. KudosPro can accept L23 signalling carried on an input line anywhere between line 10 and line 23.

The 'Input Line' control is used to manually identify which input line L23 signalling is received on.

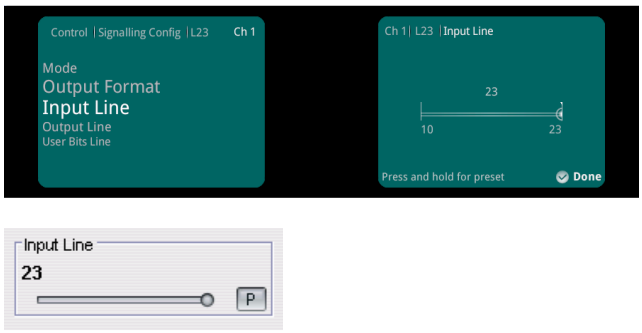


Figure 42: Selecting L23 input line

Output Line: This control allows an Operator to select the output line where output L23 signalling will be inserted. Any line between line 10 and line 23 may be selected.

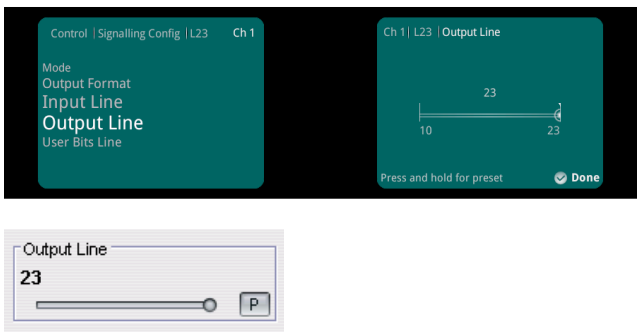
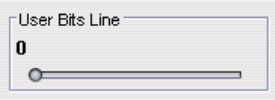
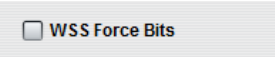


Figure 43: configuring L23 output line

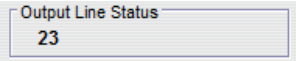
User Bit Line: This menu is currently inactive and will be added at a later date.



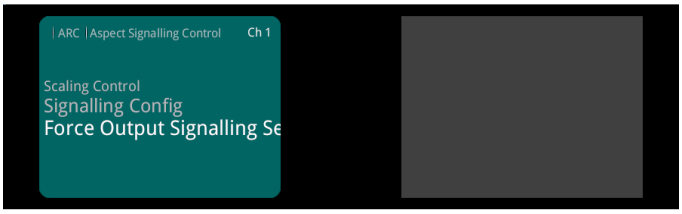
WSS Force Data: Currently not working.



Output Line Status: Displays confirmation of the actual line where L23 information is placed. In circumstances of a VANC conflict event (see note on page 4 – VANC Conflict) this may differ from the output line selected by the Operator



Forced Output Signalling Setup



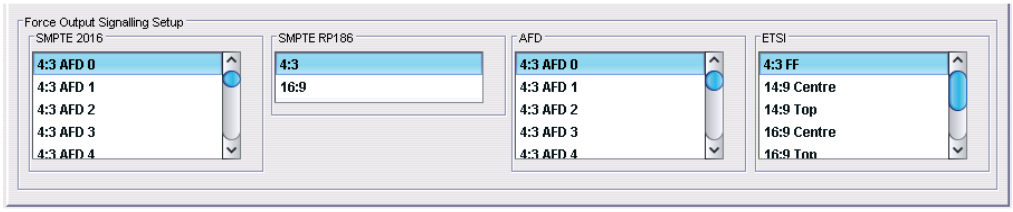


Figure 40: 'Forced Output Signalling Setup' menu

The sub-menus within the 'Forced Output Signalling Setup' menu only become active when the relevant 'Force' mode is set in the Signalling 'Mode' submenu, within the 'Signalling Config' menu.

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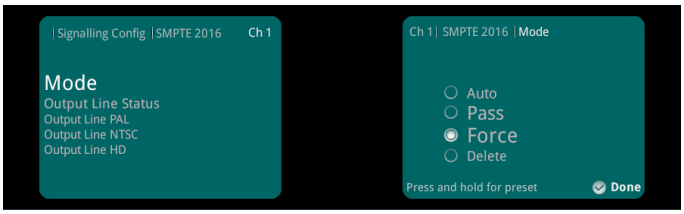


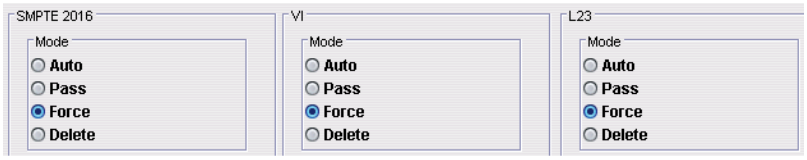


Figure 41: Signalling 'Mode' set to 'Force'

SMPTE 2016

When SMPTE 2016 'mode' is set to 'Force', SMPTE 2016 signalling data is inserted into the output.

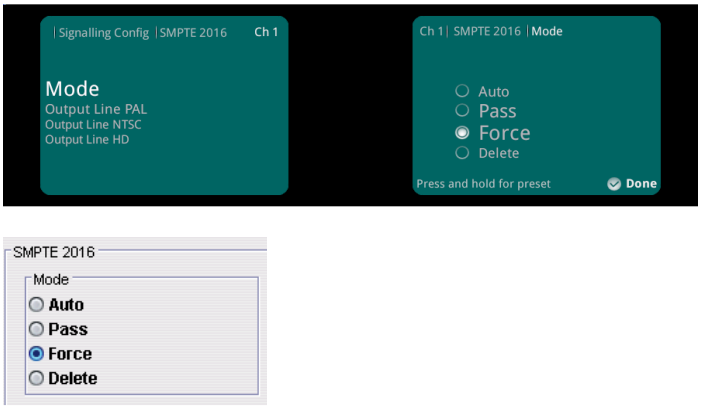
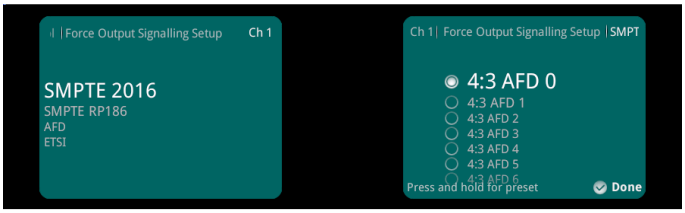


Figure 42: SMPTE 2016 mode set to 'Force'

The specific AFD code, inserted into the output, is dependent on the configuration of the 'SMPTE 2016' submenu, within the 'Forced Output Signalling Setup' menu.



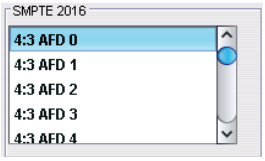


Figure 43: Selecting SMPTE 2016 code to be inserted

The list has 16 AFD codes for coded frame AR of 4:3 and the same AFD codes for a coded frame AR of 16:9. Consult SMPTE 2016 specification for a detailed description of each AFD code.

VI

When the output is SD and VI 'mode' is set to 'Force', VI signalling data is inserted into the output**.**

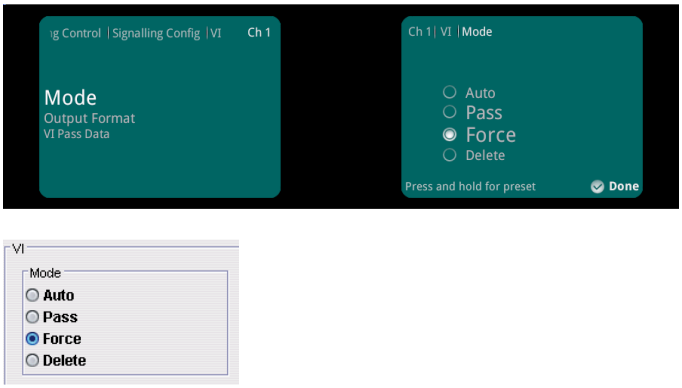


Figure 44: VI mode set to 'Force'

The inserted VI data format is dependent on the setting of the 'Output Format' submenu.

When SMPTE is selected, the submenu SMPTE RP186 defines the signalling code inserted into the output.

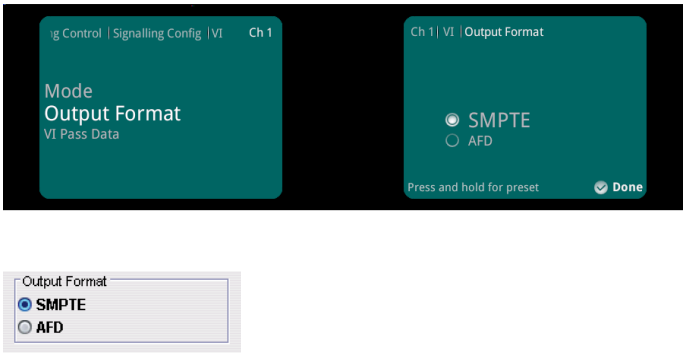


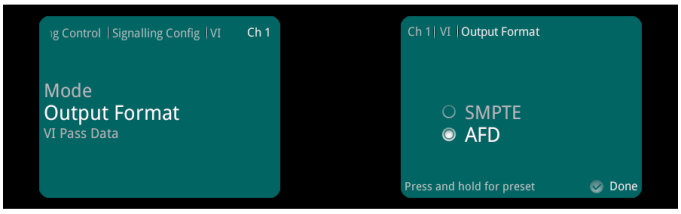
Figure 45: setting VI output format to SMPTE

Figure 46: SMPTE RP186 forced setting

This submenu controls the actual SMPTE RP186-95 code inserted into the SD output.

The list has 2 scanning system information codes, 4:3 or 16:9. The actual code used will be determined by whether the output video standard is 625 or 525. Consult SMPTE RP 186-95 spec for a detailed description of each scanning system information codes.

When AFD is selected, the submenu AFD within the 'Forced Output Signalling Setup' defines the actual signalling code inserted into the output.



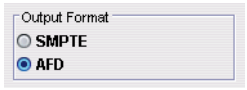
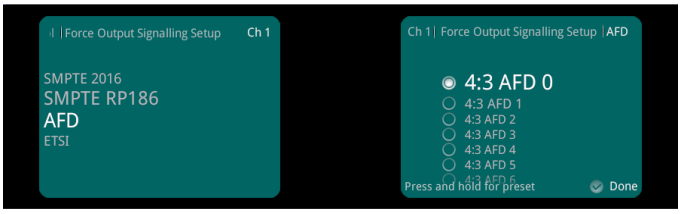


Figure 47: Setting VI output format to 'AFD'



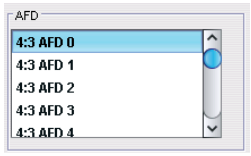


Figure 48: VI AFD forced setting

This submenu controls the actual AFD code inserted into the SD output.

The list has 8 AFD codes for scanning system information of 4:3 and the same AFD codes for scanning system information of 16:9. The actual scanning system information used will be determined by whether the output video standard is 625 or 525. Consult SMPTE RP 186-08 specification for a detailed description of each scanning system information and AFD codes.

L23

When the output is 625i and L23 'mode' is set to 'Force', L23 signalling data is inserted into the output**.**

Figure 49: L23 mode set to 'Force'

The inserted L23 data format is dependent on the setting of the Output Format submenu.

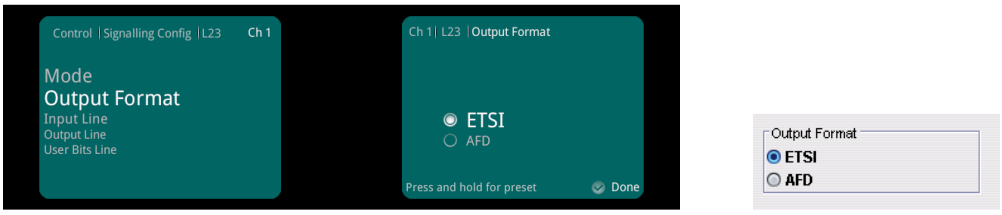


Figure 50: Setting L23 Output format to 'ETSI'

When the output format is set to 'ETSI', the submenu 'ETSI' within the 'Forced Output Signalling Setup' defines the actual signalling code inserted into the output.

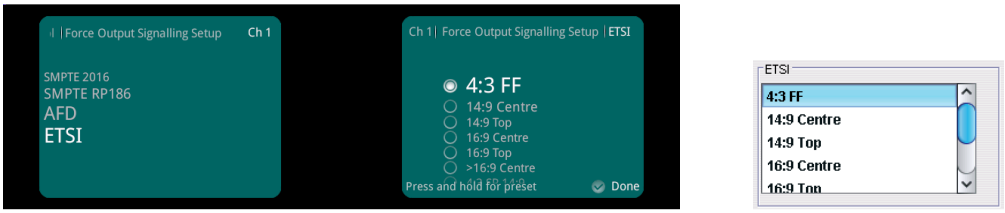


Figure 51: L23 ETSI forced setting

This submenu controls the actual ETSI code inserted into the SD output. The list has 8 AFD codes. Consult codes ETSI EN 300 294 v1.4.1 spec for a detailed description of each AFD code.

When the output format is set to 'AFD', the submenu AFD within the 'Forced Output Signalling Setup' defines the actual Signalling code inserted into the output.

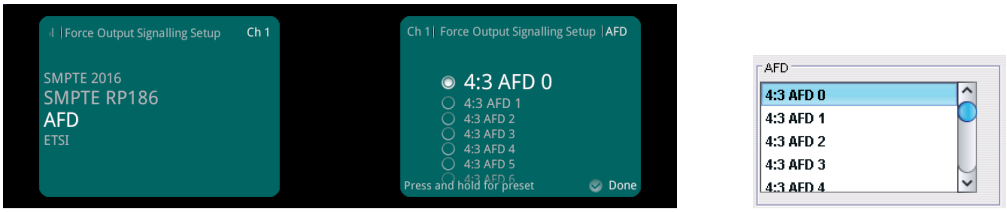


Figure 52: L23 AFD forced setting

This submenu controls the actual AFD code inserted into the SD output. The list has eight AFD codes for scanning system information of 4:3 and the same AFD codes for scanning system information of 16:9.

The actual scanning system information used will always be 625 as WSS is only supported in 625 output video. Consult SMPTE RP 186-08 spec for a detailed description of each scanning system information and AFD codes.

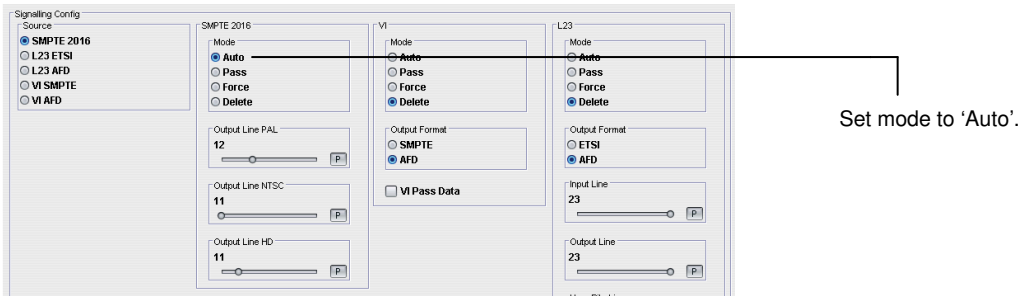
Working Examples

Example 1

- **Input**: 1080 50i, 4:3 image, pillar boxed into a 16:9 frame.
- **Input signalling:** None
- **Output:** 625i, full frame 4:3 image.
- **Output signalling requirement:** conforming to SMPTE 2016

For this requirement, because the input video has no signalling associated with it, some manual configuration will be required.

1. In the Signalling Config menu, set the SMPTE2016 mode to 'Auto'

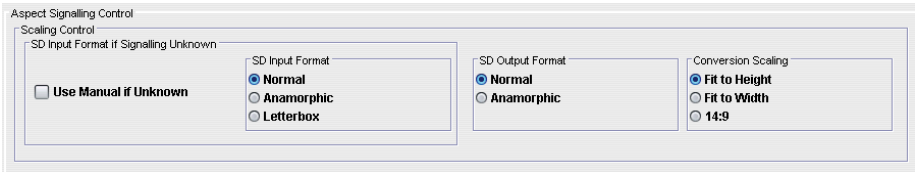


Note 1: In this example, both L23 and VI submenus have 'Mode' set to 'Delete'. This ensures that only SMPTE 2016 signalling is inserted to the output. However, it is acceptable to set these respective 'Modes' also to 'Auto' in which case L23 and VI signalling will also be inserted into the SD output. This will not affect the SMPTE 2016 signalling, and is for the Operator to decide which signalling should be inserted into the output.

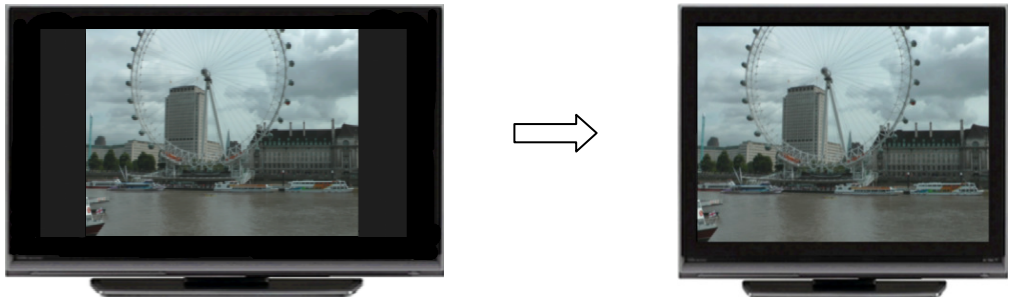
Note 2: Output SMPTE 2016 signalling will be placed on line 12 (default) of the 625i SDI output.

2. In the Scaling Control menu, set

   - SD output Format to 'Normal'
   - Conversion Scaling to 'Fit to Height'



This configuration will effectively crop off the black side-bars present in the HD source image. When viewed on a 4:3 television, the picture will fill the display and will be presented with the correct aspect ratio.



SMPTE 2016 AFD code: 4x3 AFD 8 (Code 1000), will be inserted into the 625i SDI output.

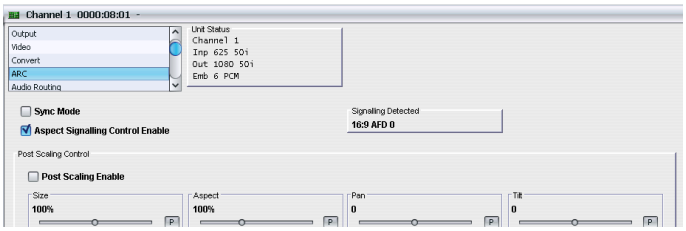
Example 2

Requirements

- **Input**: 625i, with 16:9 anamorphic image carried in a 4:3 frame.
- **Input signalling**: Signalling conforming to SMPTE RP186 (rev 2008) carrying code of 16:9 AFD-8 (Code 1000)
- **Output:** 1080 50i Full Frame 16:9 image.
- **Output signalling:** Conforming to SMPTE 2016 to be inserted into the HD output on Line 12.

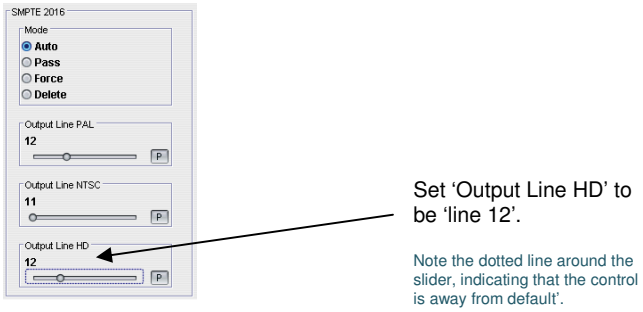
For this requirement the ARC process will be automatically controlled. Some manual configuration will be required.

1. In the ARC menu, enable the control 'Aspect Signalling Control Enable'.



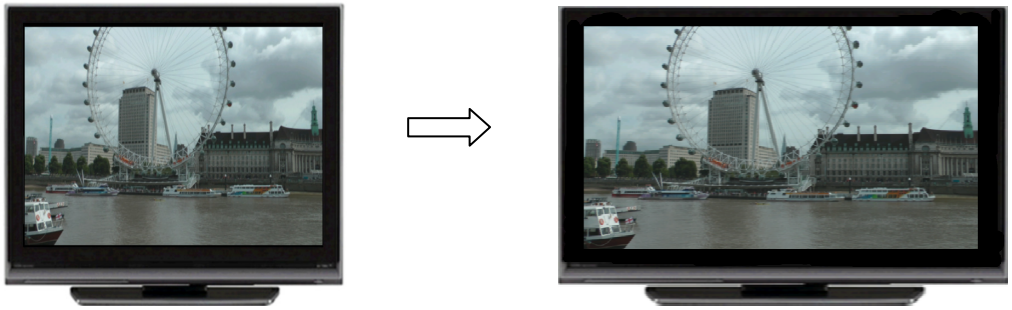
2. In the 'Signalling Config' menu, select the signalling source to be VI AFD.

3. In the 'Signalling Config' menu, set the control 'Output Line HD' to be '12'.



Note: The Mode button must be set to 'Auto'. This is the default setting for this control.

This configuration will effectively un-squeeze the anamorphic source image so that it is correctly displayed in the HD domain.



SMPTE 2016 AFD code: 16x9 AFD 8 (Code 1000), will be inserted into the HD output.

Example 3

Requirements

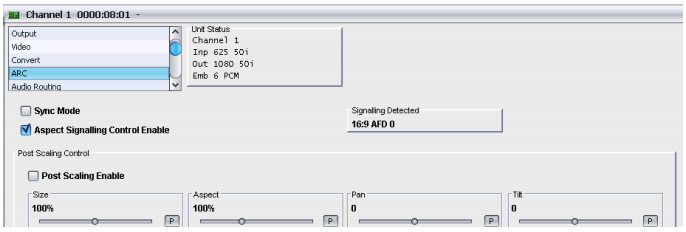
- **Input:** 525i, with 16:9 image letterboxed into a 4:3 frame.
- **Input signalling:** Signalling conforming to SMPTE 2016 carrying a code of: 4:3 AFD 10 (code 1010).
- **Output:** 1080 59i to be shown as a full frame 16:9 image.
- **Output Signalling:** Signalling to conform to SMPTE 2016, carrying a code of: 16:9 AFD 10 (code 1010).

For this particular requirement, the input AFD code describes the input as a 4:3 frame carrying a 16:9 letterboxed image. 4:3 AFD 10 describes the 16:9 center as fully protected.

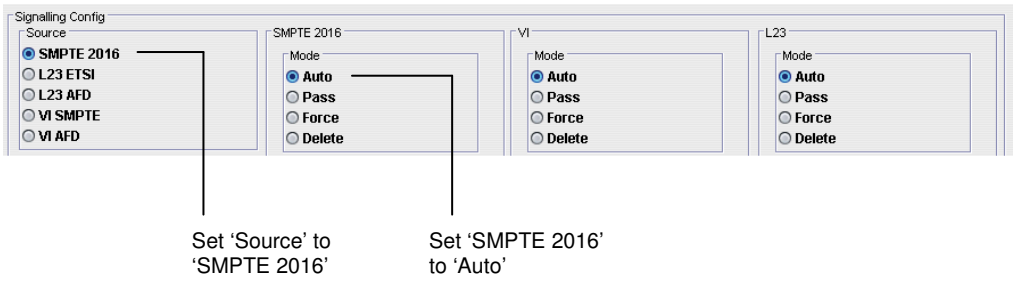
For the requirements of this conversion process, the output SMPTE 2016 code needs to be 16:9 AFD 10. This describes the 16:9 output image as full frame and fully protected.

This signalling requirement can be fulfilled by KudosPro automatically and configuration is minimal.

1. The ‘Aspect Signalling Control Enable’ is set to enable.



2. The ‘Signalling config’ menu is configured with the ‘Source’ set to ‘SMPTE 2016’ and ‘SMPTE 2016 Mode’ to ‘Auto’.



Note: in this example both VI & L23 modes are set to 'Auto'. However because the output is HD, no VI or L23 signalling will be inserted into the output.

This configuration will result in the output HD image being displayed as a full frame 16:9 image. The output will carry a suitable AFD code (16:9 AFD 10), that describes the output as 16:9 with all areas of the picture protected.

Note that for this example, all picture scaling has been controlled by signalling. The Scaling Control, within the 'Aspect Signalling Control' menu, has no effect on the converted image.

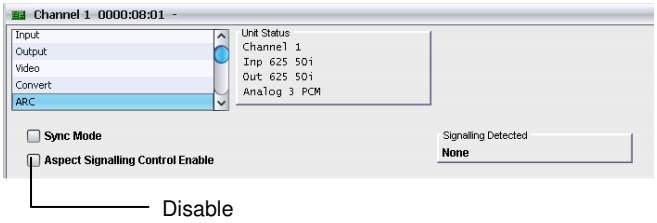
Example 4

Requirements

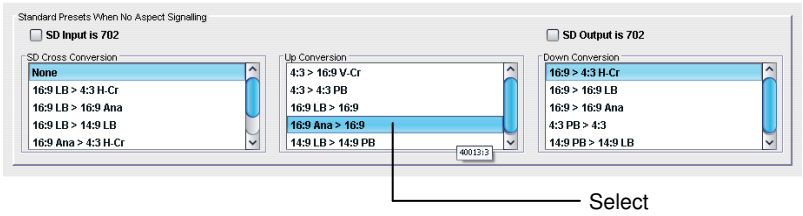
Input: 625i anamorphic 4:3 image.
Input signalling: None
Output: 1080 50i with a displayed full frame image of 16:9.
Output signalling: conforming to SMPTE 2016, with an AFD code of: 16:9 AFD 10.

In this example, the menu 'Standard Presets When No Aspect Signalling' is used to rescale the image. The desired signalling data is inserted into the output using the 'Force Output Signalling Setup' menu.

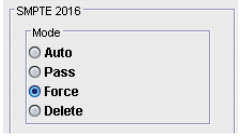
1. Ensure that the control 'Aspect Signalling Control Enable' is disabled.



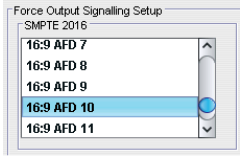
2. In the 'Up Conversion' sub-menu, within the 'Standard Presets When No Aspect Signalling' menu, select the preset '16:9 Ana > 16:9'.



3. In the 'Signalling Config' menu, set the SMPTE 2016 'Mode' to 'Force':



4. In the SMPTE 2016 sub-menu, in the 'Forced Output Signalling Setup' menu, set the preset '16:9 AFD 10':



This configuration will effectively rescale the anamorphic source image to be displayed as a full frame 16:9 output picture. An AFD code of '16:9 AFD 10' will be inserted into the output.