

# FRAMEFORMER III

Motion Compensated Standards Conversion



FrameFormer for Adobe Premiere Pro CC Standard Edition

User Manual for Windows & Mac Versions

Issue 1.1



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## Foreword

This manual contains information for the installation and operation of the FrameFormer plug-in for Adobe Premiere Pro.

## Versions covered by this manual

FrameFormer standard edition (Windows) version: 1.0.1 onwards

FrameFormer standard edition (Mac) version: 1.0.1 onwards

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# 1. Introduction to FrameFormer

## 1.1 What is FrameFormer?

FrameFormer is a plug-in for Adobe Premiere Pro CC which enables you to carry out motion compensated frame rate and format conversion of video material.

Typical applications include conversion of TV program material for example from 1080i 50 to 720p 59.94, SD to HD conversion with ARC, and integration of mixed frame rate content e.g. 23.976Hz and 29.97Hz into the same project.

FrameFormer Standard Edition converters are ideal for high volume standards conversion applications where a constrained set of repeatable conversions are needed on a regular basis. The FrameFormer Standard Edition is perfect for broadcast, post production and content distribution applications where the highest possible quality deliverables are essential, but a limited number of file formats and picture standards are in use.

- Simple and clean integration of mixed frame rate content in your project.
- High quality motion compensated conversion guaranteed.
- Preview your conversion results as you work (live thumbnails)

## 1.2 What is Motion Compensated Standards Conversion?

Motion compensated processing overcomes many of the drawbacks associated with linear standards converters. A motion compensated frame rate converter, such as FrameFormer for Adobe Premiere Pro CC calculates the motion between frames in the content, and works out where to move objects to when creating new frames in between. If we can calculate the change in an object's position between two frames of the input sequence, since we know the time interval between those frames, if we assume that the object moves at a constant speed, we can work out where the object should be at any other time interval. A motion compensated converter can thus reproduce the object within any interpolated or re-timed frames. In this way, all picture objects remain sharp and in focus, and their motion is smoothly portrayed without any judder or irregular movement.

## 1.3 FrameFormer Specification

The FrameFormer plug-in for Adobe Premiere Pro specification is shown in Table 1 below

| <b>Feature</b>                             | <b>Standard Edition</b>             |
|--|-------------------------------------|
| <b>Frame rate support</b>                  | 23.98,24,25,29.97,30,50,59.94,60 Hz |
| <b>Picture format support</b>              | SD, HD                              |
| <b>Input file support</b>                  | As Supported by Premiere Pro CC     |
| <b>Output file formats (Containers)</b>    | MPEG-2, MPEG-4, Raw Stream*         |
| <b>Output file encoding (Video Codecs)</b> | MPEG-2, H.264, AVC                  |
| <b>Aspect ratio conversion</b>             | Automatic & presets                 |
| <b>Cadence management</b>                  | Removal                             |
| <b>De-interlacer</b>                       | Included                            |
| <b>Audio (as supported by video codec)</b> | MPEG-1(Layers 1&2), AAC             |
| <b>OS Support (Mac version)</b>            | Mac OS X 10.10 & later              |
| <b>OS Support (Win version)</b>            | Win 7,8 & 10                        |
| <b>Licence</b>                             | Single Node Locked                  |

*Table 1: FrameFormer Plug-in specification*

\* Please note that only these formats are supported as output file extensions. These may not be the same as your input file extension. For example, a ProRes encoded .mov file can be converted but can only be output as an .mp2 or .mp4 file in the Standard Edition.

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## 2. FrameFormer Installation

FrameFormer is available to download as fully licensed software from the Toolfarm

[https://www.toolfarm.com/buy/insync\\_frameformer\\_for\\_premiere\\_standard\\_edition/](https://www.toolfarm.com/buy/insync_frameformer_for_premiere_standard_edition/)

Should you wish to trial the software first then a demo version can also be downloaded from the same location.

Please note that the demo version:

- is time limited for 30 days
- contains a visible watermark on output files
- the audio output will be periodically muted

### 2.1 Installation

Download the required FrameFormer installation file a convenient location. You will need to have enough free disk capacity for the installation – nominally **120MB**.

For information the files will be labelled as below:

#### Windows

- FrameFormer\_Std\_Demo.msi (demo installer)
- FrameFormer\_Std.msi (full licensed version installer)

#### Mac

- FrameFormer\_Std\_Demo\_X\_X\_X\_Mac.pkg (demo installer)
- FrameFormer\_Std\_X\_X\_X\_Mac.pkg (full licensed version installer)

Double click the downloaded file to start the installation process. FrameFormer will now be installed and available from within the Adobe Premiere Pro application.



## 2.2 Important

Before you open FrameFormer for the first time there are a few important points you should be aware of:

### Where can I find the FrameFormer plugin?

- The FrameFormer plugin is found under the File>Export menu. To run the plug-in the Premiere Pro timeline must be selected.

### Are there any specific project settings I should be aware of?

- Yes. As FrameFormer is designed for CPU only operation then if your version of Adobe Premiere Pro is earlier than Premiere Pro CC 2019 (13.1), you will need to disable the GPU for the conversion. In Premiere click File > Project Settings > General. In the Video Rendering and Playback dialogue box, select 'Mercury Playback Engine Software Only'

### What about the sequence settings?

- The FrameFormer plug-in must use the sequence settings to determine the input file format (height x width) and frame rate. When you drop the first clip on the timeline it will ask you if you want to "change the sequence settings" – but only if the current settings are different from the source clip. You should accept the change and the sequence settings will inherit the settings of the source clip. To access and check these settings this in Premiere click Sequence > Sequence Settings.

### When converting the timeline - can I mix clips with different resolutions and frame rates?

- No, or not without scaling clips on the Premiere timeline, which we would not recommend. So, you can add a single clip to the timeline and convert it to the required standard. You can also add multiple clips but these must be of the same input file format (height x width) and frame rate. These will be converted to a single file output. Note that converted clips are "exported" from Premiere but can be reimported if further work is required.

### When the FrameFormer plug-in is open can I still work in Premiere?

- No. Premiere will not respond whilst FrameFormer is opened. You must first close the FrameFormer plug-in to switch back and use Premiere.

## 2.3 Product Activation

Now you are ready to activate the software. When you open the plugin for the first time you will be asked to accept the EULA (Figure 1).

### Demo activation

The demo version of the software does not require license activation. Your 30-day demo license will start when you first use the FrameFormer demo application.

### Single node-locked licensing

If you have purchased FrameFormer then it must be activated with a node-locked single license. You will be prompted to enter a license key on first usage. The key will have been provided to you by the online retailer. License activation requires an internet connection.

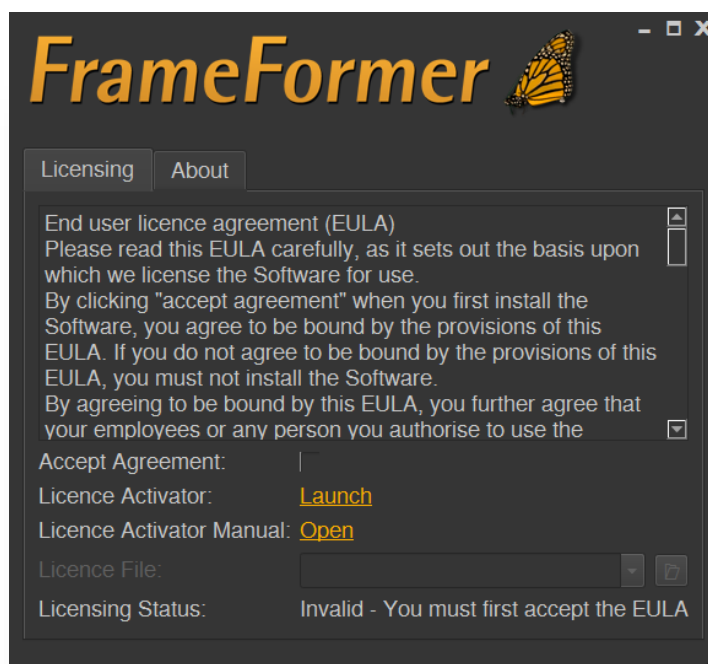


Figure 1: License activation screen



## 3. Getting Started

In order to get started, we recommend you begin with a simple test conversion from a standard file. This will prove that your setup is compatible with FrameFormer and all the internal systems required for conversion are functioning correctly. If you have any difficulties with this test conversion then please contact us at [support@insync.tv](mailto:support@insync.tv)

### 3.1 Test Conversion

Download the test file from here:

[https://s3-eu-west-1.amazonaws.com/insync.public/vOuo559u\\_insync\\_test.mxf](https://s3-eu-west-1.amazonaws.com/insync.public/vOuo559u_insync_test.mxf)

Once you have this or any other file (or sequence of files) you wish to convert:

- Open a project in Premiere
- Import the file to be converted.
- Drop the file into the Premiere timeline.
- With the timeline in focus click File > Export
- Select the FrameFormer Plug-in

You are now ready to run a conversion using FrameFormer. In the following sections we will step through the various application areas and the output conversion parameters available to users.

In order to provide maximum flexibility, FrameFormer provides a comprehensive range of user controls and settings. It is possible that in some cases the combination of settings will result in the output encoder rejecting the conversion - if the configuration is non-standard. This will result in an error message(s) and indicate that the conversion has not been executed.

**The HD & SD Conversion guides in the following sections will provide a list of valid settings which will allow conversions to be successfully completed.**

### 3.2 HD Output Conversion Guide

Table 2 contains a list of HD output conversions. We recommend to set the parameters in the order shown below.

| VIDEO SETTINGS               |   | OUTPUT SETTINGS |   |                     | ENCODER SETTINGS |           |   |   |
|------------------------------|---|-----------------|---|---------------------|------------------|-----------|---|---|
| HD output format             | → | Codec           | → | Profile             | →                | Level     | → | Max Target/<br>Max Variable bit<br>rate |
| <b>MPEG4 Part 14 Wrapper</b> |   |                 |   |                     |                  |           |   |   |
| 1440p/1440i                  |   | AVC             |   | AVC-Intra class 50  |                  | n/a       |   | 60mbps                                  |
| 1280p/1920p/1920i            |   | AVC             |   | AVC-Intra class 100 |                  | n/a       |   | 200mbps                                 |
| 1280p/1920p/1920i            |   | AVC             |   | AVC-Intra class 200 |                  | n/a       |   | 200mbps                                 |
| 1280p                        |   | H.264           |   | Baseline            |                  | 3.2       |   | 20mbps                                  |
| All HD Output Formats        |   | H.264           |   | Baseline            |                  | 4         |   | 20mbps                                  |
| All HD Output Formats        |   | H.264           |   | Baseline            |                  | 4.1/4.2   |   | 50mbps                                  |
| All HD Output Formats        |   | H.264           |   | Baseline            |                  | 5         |   | 135mbps                                 |
| All HD Output Formats        |   | H.264           |   | Baseline            |                  | 5.1/5.2   |   | 240mbps                                 |
| 1280p                        |   | H.264           |   | Main                |                  | 3.2       |   | 20mbps                                  |
| All HD Output Formats        |   | H.264           |   | Main                |                  | 4         |   | 20mbps                                  |
| All HD Output Formats        |   | H.264           |   | Main                |                  | 4.1/4.2   |   | 50mbps                                  |
| All HD Output Formats        |   | H.264           |   | Main                |                  | 5         |   | 135mbps                                 |
| All HD Output Formats        |   | H.264           |   | Main                |                  | 5.1/5.2   |   | 240mbps                                 |
| 1280p                        |   | H.264           |   | High                |                  | 3.2       |   | 25mbps                                  |
| All HD Output Formats        |   | H.264           |   | High                |                  | 4         |   | 25mbps                                  |
| All HD Output Formats        |   | H.264           |   | High                |                  | 4.1/4.2   |   | 62.5mbps                                |
| All HD Output Formats        |   | H.264           |   | High                |                  | 5         |   | 168.75mbps                              |
| All HD Output Formats        |   | H.264           |   | High                |                  | 5.1/5.2   |   | 300mbps                                 |
| 1280p                        |   | H.264           |   | High 10             |                  | 3.2       |   | 60mbps                                  |
| All HD Output Formats        |   | H.264           |   | High 10             |                  | 4         |   | 60mbps                                  |
| All HD Output Formats        |   | H.264           |   | High 10             |                  | 4.1/4.2   |   | 150mbps                                 |
| All HD Output Formats        |   | H.264           |   | High 10             |                  | 5/5.1/5.2 |   | 300mbps                                 |
| 1280p                        |   | H.264           |   | High 422            |                  | 3.2       |   | 80mbps                                  |
| All HD Output Formats        |   | H.264           |   | High 422            |                  | 4         |   | 80mbps                                  |
| All HD Output Formats        |   | H.264           |   | High 422            |                  | 4.1/4.2   |   | 200mbps                                 |
| All HD Output Formats        |   | H.264           |   | High 422            |                  | 5/5.1/5.2 |   | 300mbps                                 |
| <b>MPEG2 Part 1 Wrapper</b>  |   |                 |   |                     |                  |           |   |   |
| 1280p/1440p/1440i            |   | MPEG-2 Pt 2     |   | High                |                  | High 1440 |   | 80mbps                                  |
| All HD Output Formats        |   | MPEG-2 Pt 2     |   | High                |                  | High      |   | 100mbps                                 |
| <b>Raw Stream Wrapper</b>    |   |                 |   |                     |                  |           |   |   |
| 1280p/1440p/1440i            |   | MPEG-2 Pt 2     |   | High                |                  | High 1440 |   | 80mbps                                  |
| All HD Output Formats        |   | MPEG-2 Pt 2     |   | High                |                  | High      |   | 100mbps                                 |

Table 2: Valid conversion settings for HD outputs

### 3.3 SD Output Conversion Guide

Table 3 contains a list of SD output conversions. We recommend to set the parameters in the order shown below.

| VIDEO SETTINGS               | OUTPUT SETTINGS |          |           | ENCODER SETTINGS                     |
|------------------------------|-----------------|----------|-----------|--------------------------------------|
| SD output format             | Codec           | Profile  | Level     | Max Target/<br>Max Variable bit rate |
| <b>MPEG4 Part 14 Wrapper</b> |                 |          |           |                                      |
| All SD Output Formats        | H.264           | Baseline | 3         | 10mbps                               |
| All SD Output Formats        | H.264           | Baseline | 3.1       | 14mbps                               |
| All SD Output Formats        | H.264           | Baseline | 3.2/4     | 20mbps                               |
| All SD Output Formats        | H.264           | Baseline | 4.1/4.2   | 50mbps                               |
| All SD Output Formats        | H.264           | Baseline | 5         | 135mbps                              |
| All SD Output Formats        | H.264           | Baseline | 5.1/5.2   | 240mbps                              |
| All SD Output Formats        | H.264           | Main     | 3         | 10mbps                               |
| All SD Output Formats        | H.264           | Main     | 3.1       | 14mbps                               |
| All SD Output Formats        | H.264           | Main     | 3.2/4     | 20mbps                               |
| All SD Output Formats        | H.264           | Main     | 4.1/4.2   | 50mbps                               |
| All SD Output Formats        | H.264           | Main     | 5         | 135mbps                              |
| All SD Output Formats        | H.264           | Main     | 5.1/5.2   | 240mbps                              |
| All SD Output Formats        | H.264           | High     | 3         | 12.5mbps                             |
| All SD Output Formats        | H.264           | High     | 3.1       | 17.5mbps                             |
| All SD Output Formats        | H.264           | High     | 3.2/4     | 25mbps                               |
| All SD Output Formats        | H.264           | High     | 4.1/4.2   | 62.5mbps                             |
| All SD Output Formats        | H.264           | High     | 5         | 168.75mbps                           |
| All SD Output Formats        | H.264           | High     | 5.1/5.2   | 300mbps                              |
| All SD Output Formats        | H.264           | High 10  | 3         | 30mbps                               |
| All SD Output Formats        | H.264           | High 10  | 3.1       | 42mbps                               |
| All SD Output Formats        | H.264           | High 10  | 3.2/4     | 60mbps                               |
| All SD Output Formats        | H.264           | High 10  | 4.1/4.2   | 150mbps                              |
| All SD Output Formats        | H.264           | High 10  | 5/5.1/5.2 | 300mbps                              |
| All SD Output Formats        | H.264           | High 422 | 3         | 40mbps                               |
| All SD Output Formats        | H.264           | High 422 | 3.1       | 56mbps                               |
| All SD Output Formats        | H.264           | High 422 | 3.2/4     | 80mbps                               |
| All SD Output Formats        | H.264           | High 422 | 4.1/4.2   | 200mbps                              |
| All SD Output Formats        | H.264           | High 422 | 5/5.1/5.2 | 300mbps                              |
| <b>MPEG2 Part 1 Wrapper</b>  |                 |          |           |                                      |
| All SD Output Formats        | MPEG-2 Pt 2     | Main     | Main      | 15mbps                               |
| <b>Raw Stream Wrapper</b>    |                 |          |           |                                      |
| All SD Output Formats        | MPEG-2 Pt 2     | Main     | Main      | 15mbps                               |

Table 3: Valid conversion settings for SD outputs

## 4. Using the FrameFormer Plug-in

In this section, we will outline the use of FrameFormer based upon the licensed standard edition of the software. To do this we will step through the various FrameFormer screens or “tabs” and describe the functionality available to the user. We will assume the user is familiar with the operation of Adobe Premiere Pro.

### 4.1 FrameFormer – Input screen

On the **Input** tab (Figure 2), the user can see the attributes of the input file.

Although the standard plug-in supports conversion to SD/HD and up to a maximum frame rate of 60fps – the input is only restricted by the ability of Premiere to decode them. This means even UHD (i.e 3940 x 2160) or HFR (i.e 120 fps) source files can be used but will be down-converted as part of the conversion process.



Figure 2: Input tab settings

Please note that the input values are read by FrameFormer from the Premiere sequence settings. When users add a clip for conversion to the time-line they should accept to update the sequence settings - if they differ from the current settings.

The input tab displays:

- **Video frame size:** height & width in pixels of the source file
- **Video scan type:** progressive or interlaced
- **Video field order:** 1<sup>st</sup> or 2<sup>nd</sup> field dominance applicable only to interlaced content
- **Video frame-rate:** the frame rate of the source file
- **Video display aspect ratio:** the ratio of the width to the height of the displayed frame
- **Video colour space: the colour space standard**
- **Video duration:** length of video (hours:minutes:seconds:frames)
- **Audio channels:** number of audio channels
- **Audio sample rate:** sample rate in Khz
- **Audio duration:** length of audio (hours:minutes:seconds:samples)

## 4.2 FrameFormer – Video settings

We recommend that first you select the desired output format (frame size & aspect ratio) and frame rate. These are found in the **Video** tab (Figure 3).

The frame rate options will be dependent on the format selection.

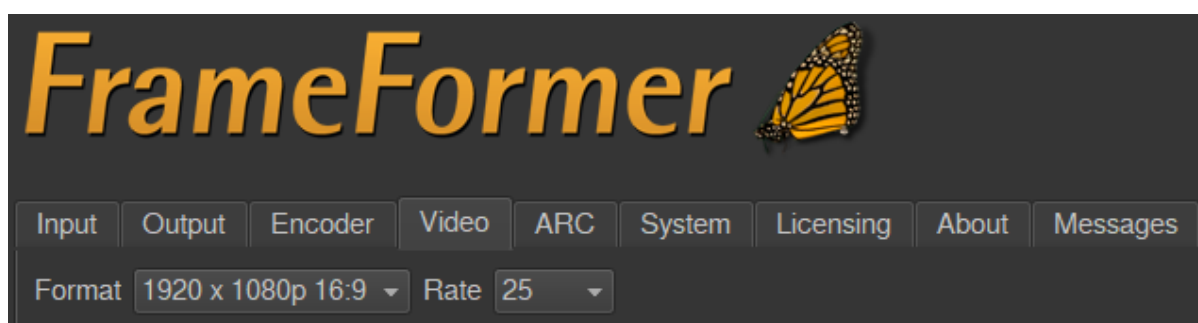


Figure 3: Video tab settings

A full list of available formats & frame rates is shown in Table 4.

| Format            | Frame Rate                       |
|-------------------|----------------------------------|
| 740 x 480i 4:3    | 29.97                            |
| 740 x 480i 16:9   | 29.97                            |
| 704 x 480i 4:3    | 29.97                            |
| 704 x 480i 16:9   | 29.97                            |
| 720 x 576i 4:3    | 25                               |
| 720 x 576i 16:9   | 25                               |
| 704 x 576i 4:3    | 25                               |
| 704 x 576i 16:9   | 25                               |
| 1280 x 720p 16:9  | 23.98,24,25,29.97,30,50,59.94,60 |
| 1920 x 1080i 16:9 | 25,29.97,30                      |
| 1440 x 1080i 16:9 | 25,29.97,30                      |
| 1920 x 1080p 16:9 | 23.98,24,25,29.97,30,50,59.94,60 |
| 1440 x 1080p 16:9 | 23.98,24,25,29.97,30,50,59.94,60 |

Table 4: Output formats & frame rates

## 4.3 FrameFormer – Output settings

The **Output** tab (Figure 4) enables selection of output file wrapper and codec. It is important to refer to the tables in sections 3.1/3.2 to understand how the combination of wrapper, codec, profile and level relate to the output format and maximum bit rate (encoder setting)

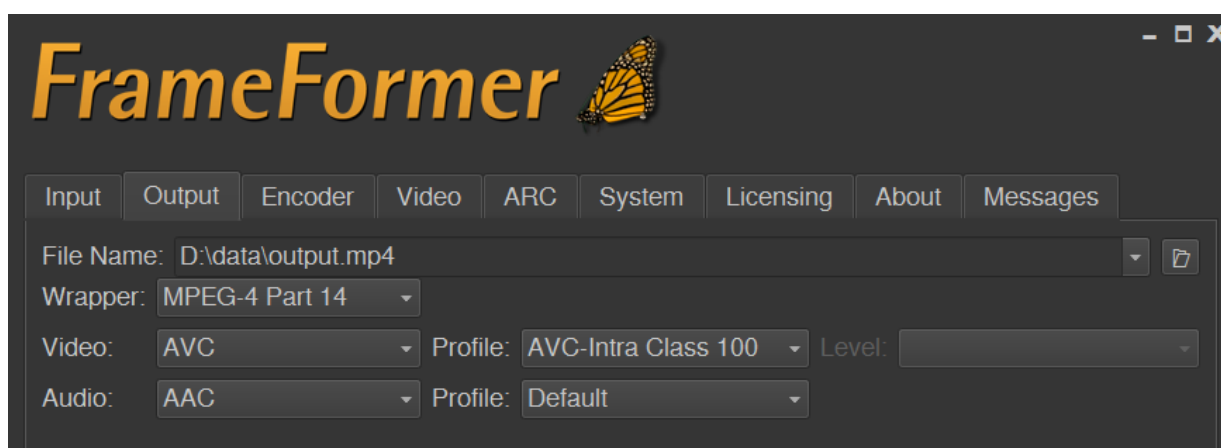


Figure 4: Output tab settings

Available parameters are:

- **File Name:** the user must enter the required file-name, a valid directory path with write permissions and the file-type suffix (.mp2,.mp4).
- **Wrapper:** the wrapper is the file container - which standardises how the AV content and metadata are packaged into a single file.
- **Video Codec:** the video encoding technique
- **Audio Codec:** the audio encoding technique (if audio output required)
- **Profile:** the profiles represent a sub-set of the encoding techniques available in the codec. This is useful to target decoders with very different decoding capabilities (memory and processing power)
- **Level:** levels address the problem of bandwidth, max resolution, and memory issues on the decoder side. Any given device supports a max profile depending on the memory and the max resolution available. Lower levels mean lower resolutions, lower allowed max bitrates and lower memory to store reference frames.



Available video output wrappers, codecs, profiles & levels are shown in Table 5.

| <b>Wrappers</b>     | <b>Codecs</b> | <b>Profiles</b>  | <b>Level</b>   |
|---------------------|---------------|--|--|
| <b>MPEG-4 Pt 14</b> | AVC           | AVC-Intra class 50<br>AVC-Intra class 100<br>AVC-Intra class 200 | N/A  |
|                     | H.264         | Baseline<br>Main<br>High<br>High 10<br>High 422                  | 1,1b/1.1/1.2/1.3<br>2/2.1/2.2<br>3/3.1/3.2<br>4/4.1/4.2<br>5/5.1/5.2 |
| <b>MPEG-2 Pt 1</b>  | MPEG-2 Pt 2   | Main<br>High   | Low<br>Main<br>High 1440<br>High                                     |
| <b>Raw Stream</b>   | MPEG-2 Pt 2   | Main<br>High   | Low<br>Main<br>High 1440<br>High                                     |

*Table 5: Output tab settings*

## 4.4 FrameFormer – Encoder settings

The **Encoder** tab (Figure 5) is used to set the required video bit rate and audio sample size. Refer to the tables in sections 3.1/3.2 for maximum bit rate settings.

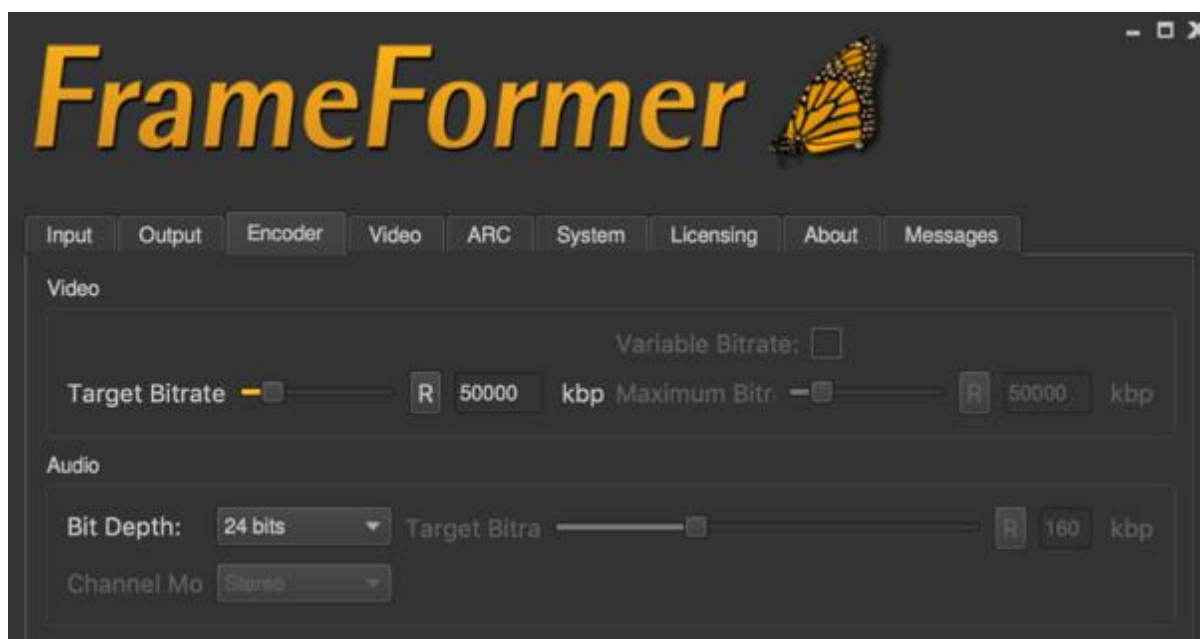


Figure 5: Encoder settings

- **Target Bitrate**: slider control/dialogue box entry for constant bit rate encoding target bit rate
- **Maximum Bitrate**: slider control/dialogue box entry for variable bit rate encoding for maximum bit rate. The “variable bitrate” box must also be selected
- **Audio Bit Depth**: options for audio bit depth - if audio output is required and enabled in the output settings
- **Audio Channel Mode**: options for audio channel mode - if audio output is required and enabled in the output settings

## 4.5 FrameFormer – ARC settings

If specific aspect ratio conversions are required, click on the ARC tab (Figure 6).

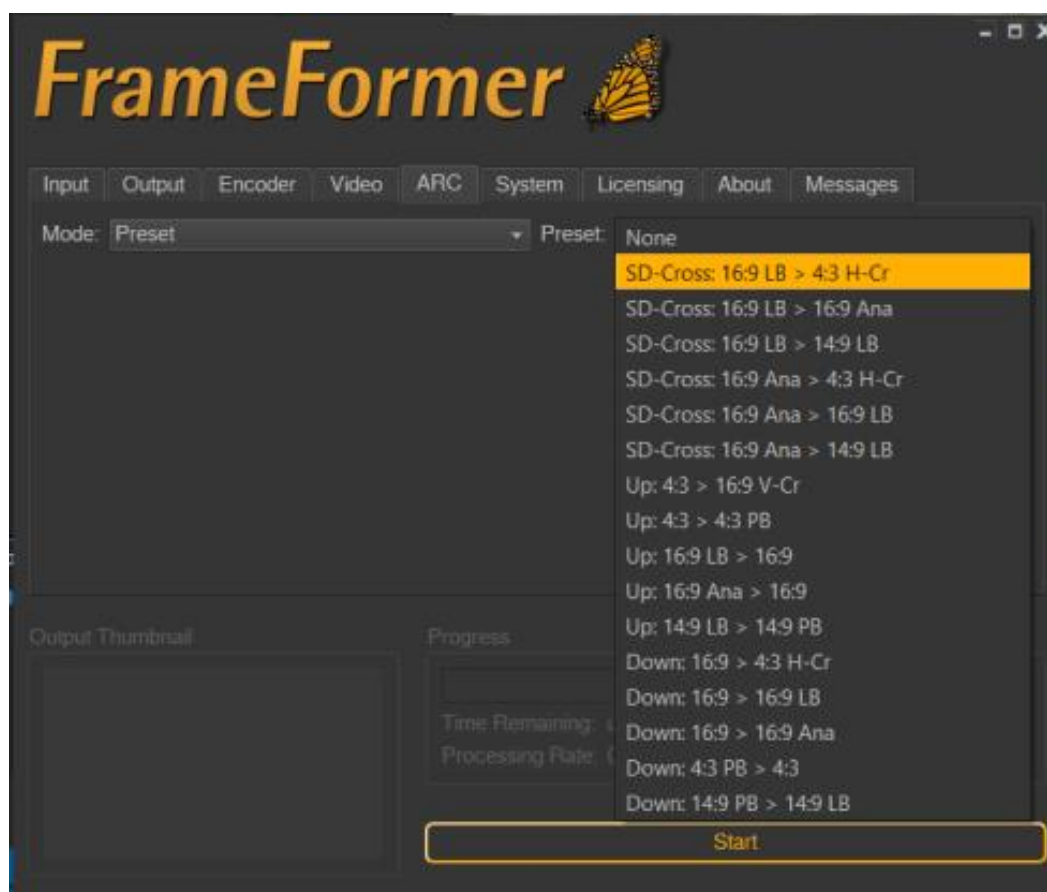
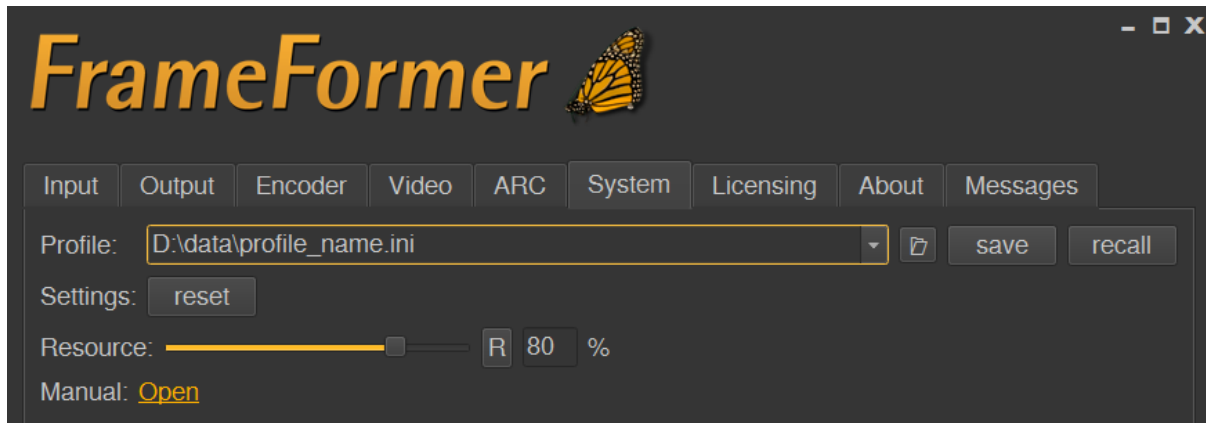


Figure 6: ARC settings

- **Automatic:** If set to automatic then the conversion will optimise the conversion based on the input aspect ratio and the selected output aspect ratio (video settings)
- **Preset:** A number of letterbox (LB), pillarbox (PB), vertical crop (V-Cr), horizontal crop (H-Cr) and anamorphic (Ana) presets are available. Select the required aspect ratio conversion from the drop-down list.

## 4.6 FrameFormer – System settings

The system settings allow users to manage conversion profiles and system resources (Figure 7).



*Figure 7: System settings*

- **Profile:** to save a conversion configuration save the current configuration as a profile. Profiles can be recalled to repeat a chosen conversion.
- **Resource usage:** to set the amount of hardware resources (CPU/memory) used by FrameFormer, adjust the resource slider, or enter a desired resource percentage in the dialogue box.

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## 4.7 FrameFormer – Other screens

For information FrameFormer presents three other screens

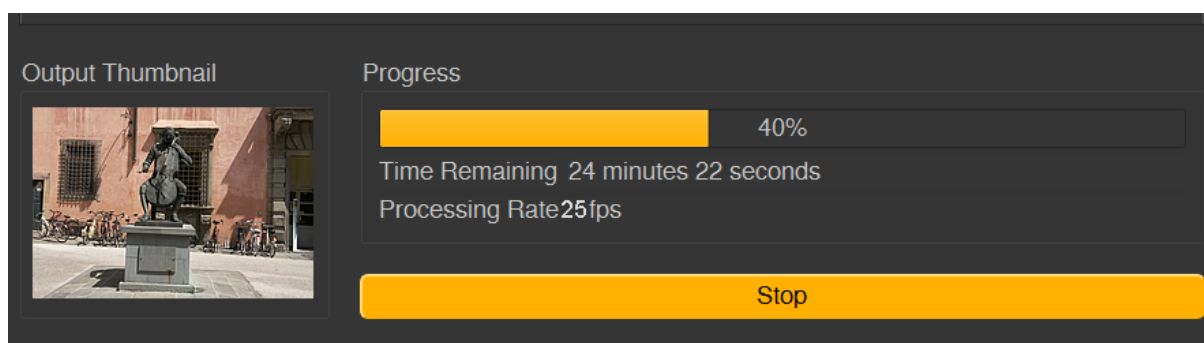
- **Licensing:** this displays the license agreement and the path to the license file
- **About:** this displays the version of the FrameFormer software
- **Messages:** this displays any messages. Typically, if there is a failure to convert then the software version and any error message will be needed for any support enquiry

## 4.8 Starting and monitoring the conversion

The progress bar (Figure 7) appears on all screens. When you start a conversion the output thumbnail and progress bar will display the status of the conversion. Time remaining and processing rate (fps) are also presented.

Before you start, if you do not want to convert the entire timeline, use the blade tool to trim the section of clip(s) you want to convert. When you export the clip, the conversion will only act on the sub-clip(s) you have made.

Click the start button to commence the conversion. You can abandon the conversion at any time by pressing the stop button.



*Figure 7: Thumbnail and progress bar*

Should a conversion fail for any reason then a message will appear. In most cases this will be a result one of the following:

- Insufficient disk space for the output file
- No permission for the user to write to the target file destination
- A non-valid conversion profile in which case refer to the tables contained in sections 3.1/3.2 to correct.

