

# Video Clarity



Tools for Video Analysis

## ClearView File Importer - An Overview

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## General Information and Overview

Video Clarity File Importer is powerful video and audio decoding software. The program was designed and developed as an integral part of Video Clarity ClearView systems.

ClearView File Importer provides a fast, high quality video and audio import tool supporting various input media file types and flexible functionality for output selection and adjustment.

Video may be decoded for standard television resolutions and frame rates as well as user-defined selections.

Video quality improvements can be made by de-interlacing the source file and by truncating to legal broadcast values for specific files.

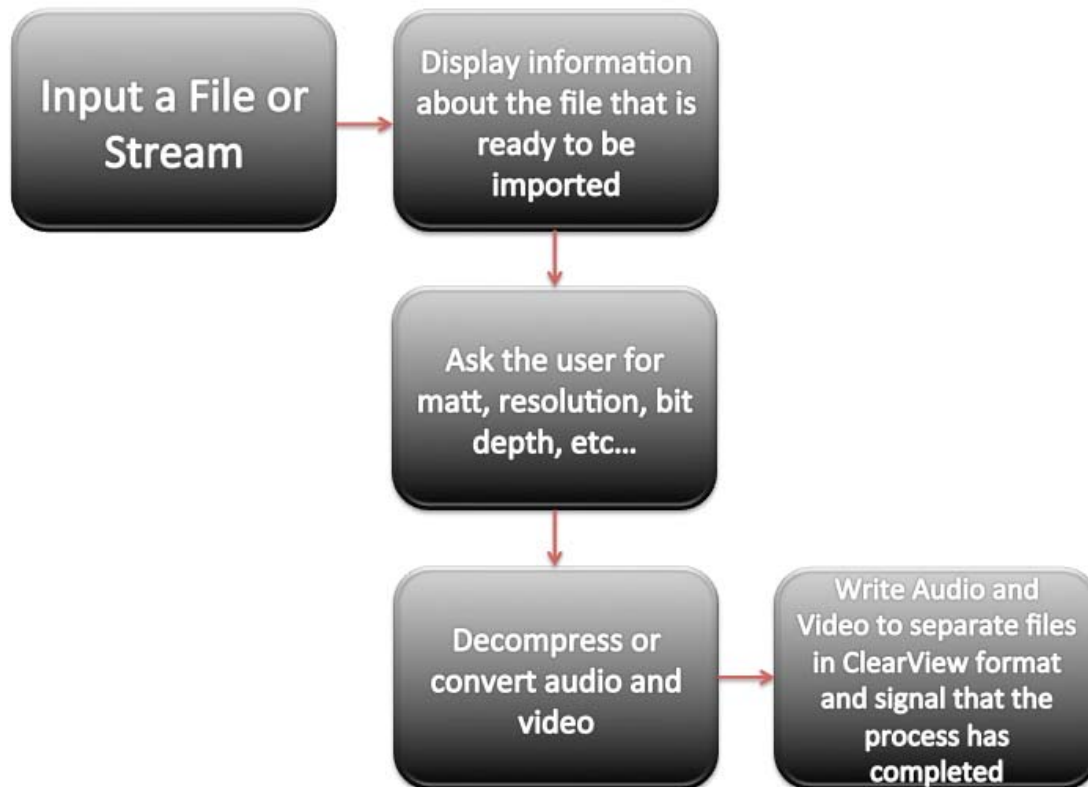
Certain CS Coefficients' may be applied for the imported video file and by defining the image format for the decoded output.

### **Key benefits of the ClearView File Importer are:**

- End-user oriented GUI interface
- Wide range of supported video formats
- MPTS demux/decode
- Flexible source modification
- Detailed per-pixel source cropping
- Variety of Video and Image formats for output media
- Image quality, size and positioning adjustment for output files
- Up to 8 channel audio decoding
- Fast, real-time decoding speed
- Both Graphical and Command Line user interfaces

**Please note that throughout this overview if a feature is described as “video”, it will generally apply to both audio and video.**

## ClearView File Importer Workflow



*Figure 2 – File Importer Workflow.*

Once the video file is imported, File Importer will reflect source information, which is the following:

- Compression/file type (H.264, MPEG-2, BMP, MOV, etc);
- Video height & width;
- Video Bit-depth;
- Frame rate;
- Number of frames in the file;
- Video bit-rate;
- Audio bit rate;
- Number of audio channels;
- Audio sampling frequency;
- Audio bit depth;
- Show info for a selected SPTS in the MPTS (when applicable)

In case the MPTS file contains several SPTSs, source information will be updated with corresponding input, according to the selected SPTS.

The user is then able to configure output options and start the decoding process.

Following output adjustments are available:

- Output frame size
- Output frame rate
- First/last frames to import
- De-interlace or not
- 3:2 pull-down insertion or removal
- Bit depth – converting 8 to 10 or 10 to 8 bits
- Crop source (x, y, width, height) with values or interactive graphical box
- Scale up or down to x,y / w,h
- Color Space – convert from YUV to RGB by using either SD or HD color space
- Import audio Yes/No
- Output image resolution
- Output canvas resolution
- Truncate to legal broadcast values (Yes/No)

Two screens in the top of the File Importer window reflect the input (original) and output (maintained) preview of the source video. Output preview screen will dynamically adjust according to the settings defined in the Output Sequence section.

In order to start the decoding process, a ClearView Library, which is the target destination of the output file, should be selected. A Library is defined in the ClearView main GUI or command set and is being used as output folder of the File Importer.

Having all options configured, decoding process may be started by clicking on 'Import' button.

Progress bar indicates current progress of the video-decoding process. Once the process is finished, status bar message will indicate that the Video Import has succeeded.

Decoded video and audio are stored in Library folder in separate files (Audio file's location may be different, according to the settings in ClearView).

Upon decoding process completion, process information is stored in the sequence index file called "sequences". It contains the following information for each sequence in the library (folder).

- Frame-rate
- Resolution
- Bit-Depth
- Number of frames
- Audio present (or video only)

Further, decoded video may be used in ClearView application for definite maintenance purposes.

### Supported File Types

The ClearView File Importer application input recognition is a unified flow, divided into the following techniques:

- DirectShow to decode MPEG-2, MPEG4, AVC, mJPEG, VC-1
- Drastic Technologies' DTMediaRead SDK to decode everything else

Technique	Supported Format
DirectShow	MainConcept MPEG-2
	MPEG-4 Part 2
	H.264Pro
	VC-1 Pro
	JPEG2000,
	MJPEG Decoders and SDKs
	Network Streaming SDK
Drastic's DTMediaRead	Converter and Scaler Pack ver. 8.5
	Avid AVR, DS HD/SD, DV (*.gen)
	Avid Meridian & Y'CbCr
	Avid OMFI (*.omf, *.omfi)
	AVR, JFIF, JPED, Meridian, RGB, Y'CbCr
	CineWave
	DV Movies (*.dv, *.dif)
	DVS Direct File Format (*.dvs)
	DVSD, DV25, DV50, MPEG-I, mJPEG, DigiSuite
	Headerless/Raw (*.hdr, *.yuv, *.rgb, *.raw)
	HiCon SLB32 RFB format (*.slb)
	Jaleo Direct Format (*.js)
	Media 100 MJPEG
	Newtek Video Toaster (*.rtv)
	PhotoShop FilmStrip (*.flm)
	Cineon (CIN)
	DPIX (DPX)
	JPEG
	Microsoft BMP, DIB
	Photo CD PCD
	Photoshop PSD
	Portable anymap PNM
	Portable Bitmap Fomat PBM DPS Velocity Files (*.dps)
	Microsoft AVI (*.avi)
	MPEG 1 4:2:0 (*.mpg, *.mpeg)
	MPEG 2 Elem. Stream, (4:2:0/4:2:2)
	MPEG 2 Program Stream, (4:2:0/4:2:2)
MPEG 2 Transport Stream, (4:2:0/4:2:2)	
MPEG 4 /AVC Elementary Stream 4:2:0/4:2:2, (*.h264)	

MXF Format (DV, DVCPro50, MPEG, IMX)
Profile GXF Format/SMPTE-360 (*.gxf)
QuickTime Movies (*.mov)
RealVideo (*.ra, *.rm, *.ram)
SGI Movie Format (*.mv)
Windows Media (*.asf, *.wmf, *.wmv)
Y'CbCr 8/10
Y'CbCr, RGB
YCrCb 8/RGBA
Accom YUV CCIR 601 8 Bit
Portable graymap PGM
Portable pixmap PPM
Sun Raster (.ras)
SGI RGB
Targa TGA, ICB, VDA, VST
Targa 3000, Pinnacle
TIFF, TIF
v210 Y'CbCr 10 Bit

## Graphical User Interface

File Importer is the single-window application with no additional settings and screens in the background. All adjustments, settings and maintenance of the Input and Output sources are done on the single screen.

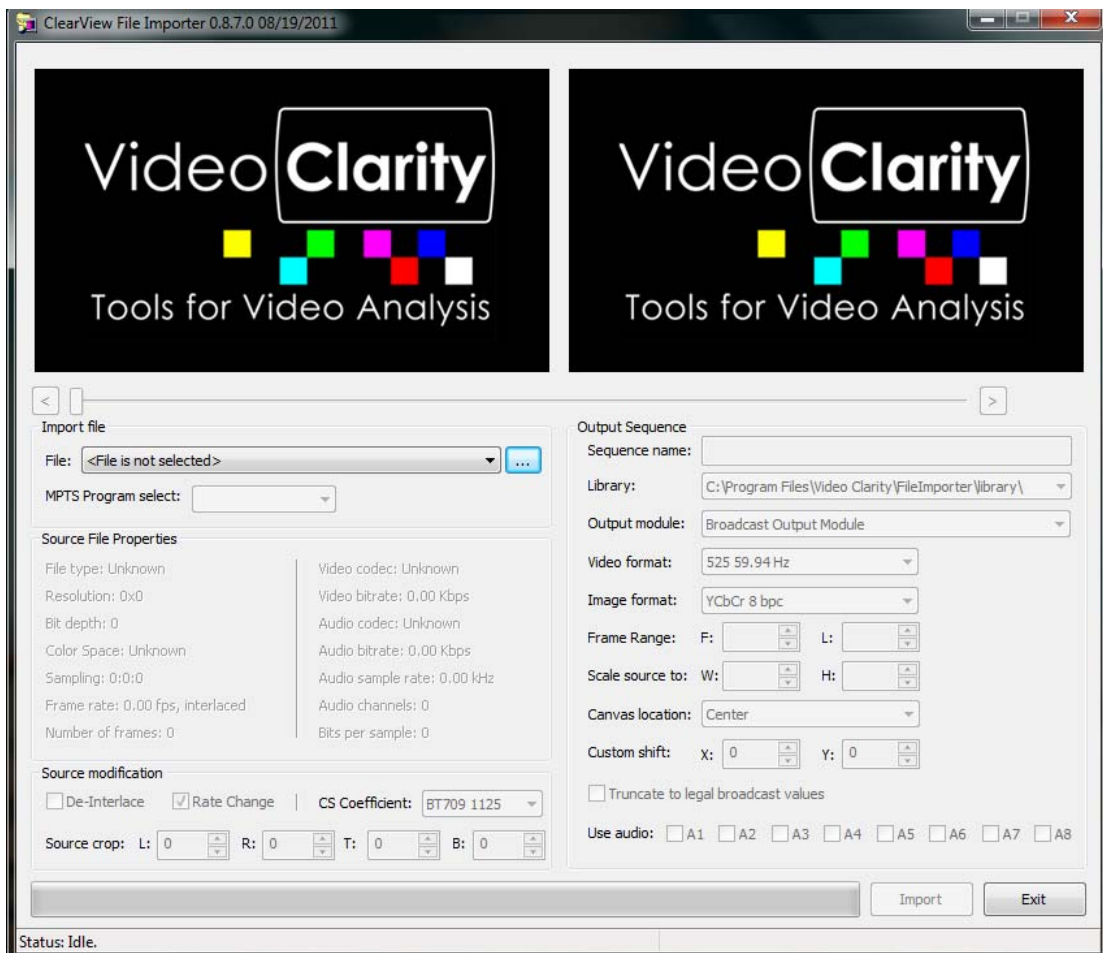


Figure 8 - First Launch.

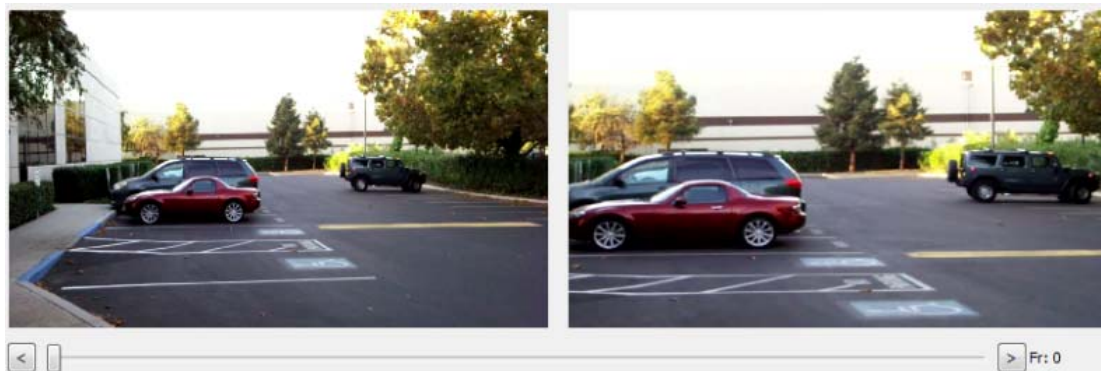
It is possible to divide File Importer's screen to certain logical components that reflect different parts of the application but are tied in with logical connections upon certain functionality-based reasons.

**Following are the logical parts of File Importer:**

- Video Preview section:
  - Input Video Preview screen
  - Output Video Preview screen
  - Per-frame slider
- Import File section:
  - File selection drop-down list
  - 'Browse' button
  - MPTS Program select drop-down list
- Source File Properties:
  - File Type
  - Resolution
  - Bit Depth
  - Color Space
  - Sampling
  - Frame Rate
  - Number of Frames
  - Video Codec
  - Video Bitrate
  - Audio Codec
  - Audio Bitrate
  - Audio Sample Rate
  - Audio Channels
  - Bits per Sample
- Source modification:
  - 'De-Interlace' checkbox
  - 'Rate Change' checkbox
  - 'CS Coefficient' drop-down list
- Source Crop adjustable fields:
  - L (Left)
  - R (Right)
  - T (Top)
  - B (Bottom)
- Output Sequence:
  - 'Sequence Name' field
  - 'Library' drop-down list
  - 'Output Module' drop-down list
  - 'Video Format' drop-down list
  - 'Image Format' drop-down list
- 'Frame Range' adjustable fields:
  - F (First)
  - L (Last)
- 'Scale Source to' adjustable fields:

- W (Width)
- H (Height)
- 'Canvas Location' drop-down list
- 'Custom Shift' adjustable fields:
  - X (X-axis)
  - Y (Y-axis)
- 'Truncate to legal broadcast values' checkbox
- 'Use Audio' checkboxes:
  - A1-A8 (channels)
- Progress bar
- Application functional buttons:
  - 'Import' button
  - 'Exit' button
- 'Status' bar
- 'Preview Position' informational bar

## Video Preview Section



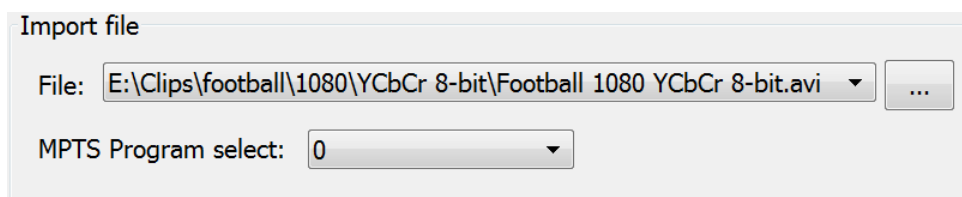
*Figure 9 - Video Preview section.*

**'Input Video Preview'** screen – displays selected frame of the imported video file in the native format. Once the decoding is performed, input video preview reflects the frame that is currently being decoded.

**'Output Video Preview'** screen – displays the adjusted video according to the Output Sequence options defined. Screen reflects current frame of the video file during the decoding process.

**'Per-frame Slider'** – provides ability to slide through each frame within the imported video file. 'Fr' value reflects the number of current frame.

## Import File section



*Figure 10 - Import File section*

**'File Selection'** drop-down list – reflects currently imported video file. In case it is expanded – the list of recently imported files is displayed.

**'Browse'** button – provides ability to locate desired input file.

**'MPTS Program select'** drop-down list – In case transport stream offers more than one program service, expanded drop-down list will reflect all program services that imported video file contains.

In case loaded file offers single program transport stream – the list will contain only default '0' value.

## Source File Properties

Source File Properties	
File type: AVI	Video codec: Uncompressed
Resolution: 1920x1080	Video bitrate: 132.34 Mbps
Bit depth: 16	Audio codec: Uncompressed
Color Space: YUV	Audio bitrate: 1.46 Mbps
Sampling: 4:2:2	Audio sample rate: 48.00 kHz
Frame rate: 29.97 fps, interlaced	Audio channels: 2
Number of frames: 150	Bits per sample: 16

*Figure 11 - Source File Properties.*

**'File Type'**: The Video Files category includes a wide range of video formats that use different codecs to encode and compress video data. 'File Type' indicates the name of the imported File Format.

**'Resolution'**: Indicates the number of pixels that imported video contains. Displayed as 'amount of horizontal pixels' x 'number of vertical pixels'

**'Bit Depth'**: Indicates the number of bits allocated to represent each primary value (red, green and blue) in each frame of the imported video file.

**'Color Space'**: Indicates the color space, being used by the imported video file.

**'Sampling'**: Defines the number of samples per unit of time taken from a continuous signal to make a discrete signal.

**'Frame Rate'**: Indicates the frequency, amount of frames that may be displayed per each second of the imported video file's playback.

**'Number of Frames'**: Identifies total number of frames for the imported video file.

**'Video Codec'**: Indicates whether the video compression/decompression has been applied to the imported video file.

**'Video Bitrate'**: Indicates the amount of bits that are processed per second during the video playback.

**'Audio Codec'**: Identifies the algorithm that compresses and decompresses digital audio data according to a given audio file format or streaming media audio format.

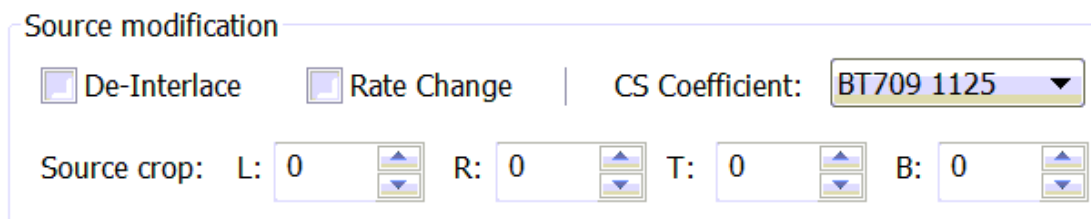
**'Audio Bitrate'**: Indicates the amount of bits that are processed per second during the audio playback.

**'Audio Sample Rate'**: Refers to the number of samples per second that are used to digitize a particular sound.

**'Audio Channels'**: Identifies the number of audio channels, which imported video holds.

**'Bits per Sample'**: Indicates the audio Bit Depth that directly corresponds to the resolution of each sample in a set of digital audio data.

## Source Modification



*Figure 12 - Source Modification.*

**'De-Interlace'** checkbox – Identifies the process of converting interlaced video, such as common analog television signals or 1080i format HDTV signals, into a non-interlaced form.

**'Rate Change'** checkbox – Indicates whether the rate has been changed for the Video Format of the Output Sequence, comparing to the source video file.

**'CS Coefficient'** drop-down list – Indicates Color Space Coefficient that may be applied to the source file. Available CS Coefficients are:

- BT709 1125;
- SMPTE 240M

Source modification

De-Interlace     Rate Change    |    CS Coefficient: BT709 1125

Source crop:    L: 0    R: 0    T: 0

BT709 1125  
SMPTE 240M

Figure 13 - CS Coefficient options.

## Output Sequence

Output Sequence

Sequence name: Football 1080 YCbCr 8-bit

Library: G:\AV\_Samples\

Output module: Broadcast Output Module

Video format: 525 59.94 Hz

Image format: YCbCr 8 bpc

Frame Range:    F: 0    L: 149

Scale source to:    W: 1440    H: 972

Canvas location: Center

Custom shift:    X: -360    Y: -243

Truncate to legal broadcast values

Use audio:     A1     A2     A3     A4     A5     A6     A7     A8

Figure 14 - Output Sequence

**'Sequence Name'** field: The field holds the name that will be used for decoded Video, Audio and CVO files.

**'Library'** drop-down list: Refers to the Library selection as destination folder for the decoded files to be stored. Expanded list displays all available Library folders.

**Note:** Library is defined in ClearView application.

**'Output Module'** drop-down list – Determines whether the video file should be decoded in any of standard video resolutions (Broadcast Output), or may have specific resolution, offered in 'No Video Output Module'.

Possible selections are:

- **No Video Output Module** – The module has no restrictions and is configurable in ClearView application.
- **Broadcast Output Module** – The set of standard resolutions for video devices.

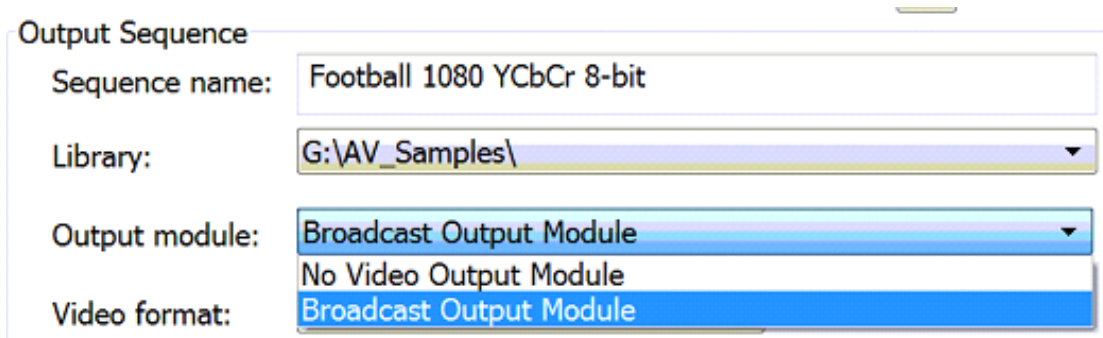


Figure 15 - Output Module options.

**'Video Format'** drop-down list – Identifies possible output video format selection (resolution and refresh rate).

Depending on the Output Module specified, Video Format drop-down list contains different available selections, which are:

Output Format	
No Video Output Module	Broadcast Output Module
720 x 486 30 Hz;	525 59.94 Hz;
720 x 526 25 Hz;	625 50.00 Hz;
1280 x 720 25 Hz;	720p 50.00 Hz;
1280 x 720 30 Hz;	720p 59.94 Hz;
1280 x 720 50 Hz;	720p 60.00 Hz;
1280 x 720 60 Hz;	1080i 50.00 Hz;
1920 x 1080 25 Hz;	1080i 59.94 Hz;
1920 x 1080 30 Hz;	1080i 60.00 Hz;
1920 x 1080 50 Hz;	1080p 23.98 Hz;
1920 x 1080 60 Hz	1080p 24.00 Hz;
	1080p 25.00 Hz;
	1080p 29.97 Hz;
	1080p 30.00 Hz;
	1080p 50.00a Hz;
	1080p 59.94a Hz;
	1080p 60.00a Hz;
	1080p 50.00b Hz;
	1080p 58.94b Hz

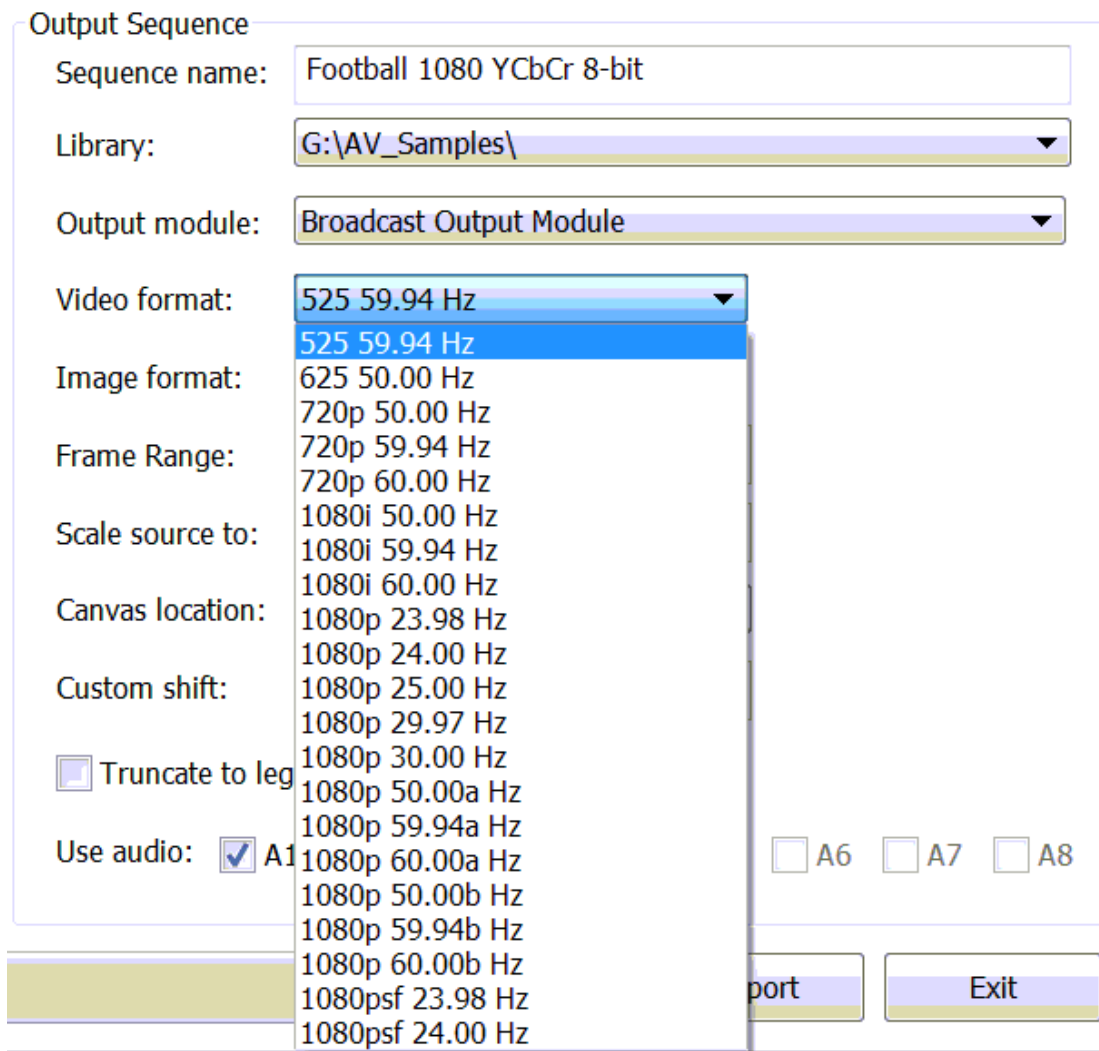


Figure 16 - Video Format options for Broadcast Output Module.

**'Image Format'** drop-down list – Refers to the Image format to be used in output sequence. Possible selections are:

- **Y'CbCr 8 bpc** – Broadcast I/O format
- **Y'CbCr 10 bpc** – Broadcast I/O format
- **RGB 8 bpc** – DVI I/O format

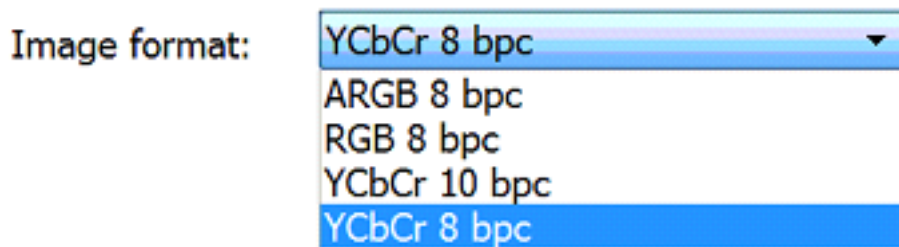


Figure 17 - Image Format options.

**'Frame range'** adjustable fields – Reflect the frame range to be used for video output. By default, 'F' holds the first frame of the input video, which value is '0' and 'L' holds the last frame. 'L' value will always be 'Number of Frames' (information from the Source File Properties section) -1.

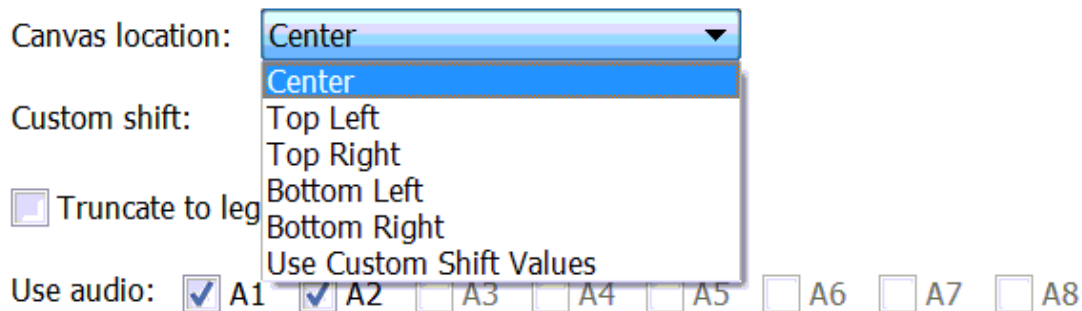
**'Scale Source to'** adjustable fields – Identify resolution in which the input video file will be scaled, within selected 'Video Format'

*Note: Resolution, defined in 'Scale Source to' adjustable fields may not be more than two times greater than the resolution selected in 'Video Format'.*

**'Canvas Location'** drop-down list – Defines the video location in case output file has black padding, or exceeds resolution range.

Available options are:

- Center;
- Top Left;
- Top Right;
- Bottom Left;
- Bottom Right;
- Use Custom Shift Values.



*Figure 18 - Canvas Location options.*

**'Custom Shift'** adjustable fields – Provide the ability to define custom Canvas Location in pixels according to X (horizontal) and Y (vertical) axis.

**'Truncate to legal broadcast values'** checkbox – Functionality is used in YUV Luma only. Pixel intensity values for the Y Component that is above or below the following values should be truncated to only values within this range.

- YUV 8 bit 16-235
- YUV 10 bit 64-940

**'Use Audio'** checkboxes – The option allows an increase the number of audio channels in the output audio.

**Progress bar** – Reflects the current progress of the decoding process. The bar turns to solid green when the decoding is finished.



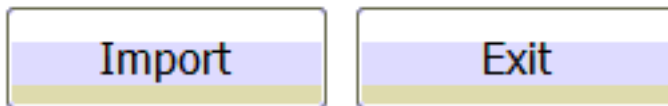
*Figure 19 - Progress bar for no decoding has yet taken place.*



*Figure 20 - Progress bar for 'Complete' import status.*

### Application functional buttons:

- **'Import'** button – Being clicked, starts the decoding process with the settings defined in Source Modification and Output Sequence sections.
- **'Exit'** button – Being clicked, closes the File Importer.



*Figure 21 - 'Import' and 'Exit' functional buttons.*

**'Status'** bar – Represents status messages based on the changes made by the user during the use of application.

**Status: Building of preview graph complete**

*Figure 22 - 'Status' bar (displays the message for just imported video)*

**Status: Import file complete.**

*Figure 23 - 'Status' bar (displays the message for complete import process)*

**'Preview Position'** information bar – Displays the number of the frame, on which the focus is currently put, or estimation time for the decoding process to be completed.

**Preview position: 0 frame.**

*Figure 24 - 'Preview position' status bar (displays the first frame in focus)*

**For further operational details of the ClearView File Importer please see the ClearView System Guide @ <http://www.videoclarity.com/PDF/ClearViewSystemGuide.pdf>**