

Tools for Video Analysis

# **ClearView**

## **Importer Manual**

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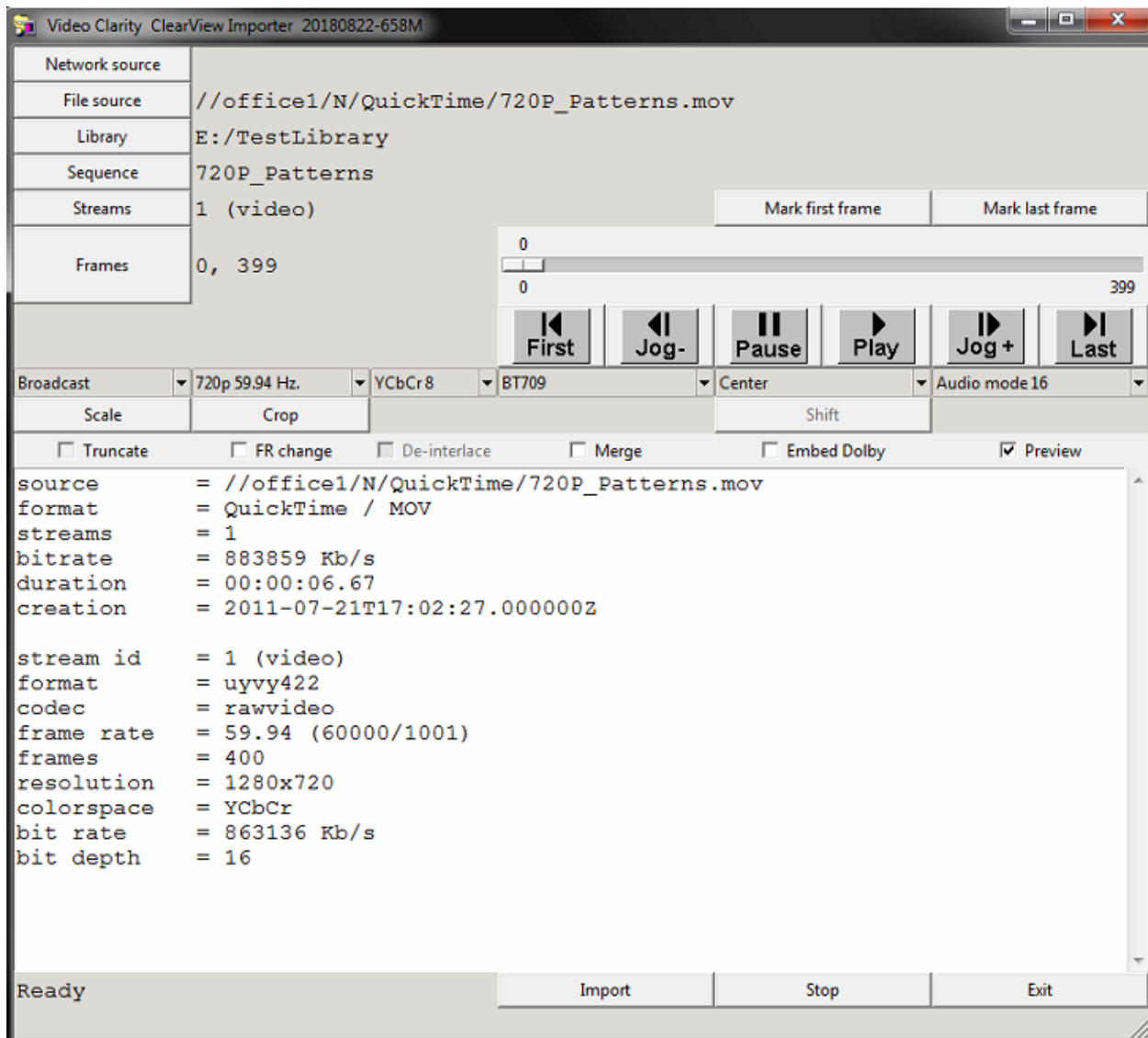
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# ClearView Importer

The ClearView Importer is a comprehensive decode application. All media files must be converted to the ClearView native uncompressed file format before they can be used for playback, or analysis. The application has a graphical user interface, and a command line interface. Both can be used for file importation.

## Graphical User Interface

Figure: ClearView Importer Graphical User Interface



## Import From File

In order to start working with the File Importer application it is required to import a video file, which can be decoded according to the output options specified. Supported file types are listed at the end of the ClearView Importer manual.

In order to browse for a file, please follow the steps below:

1. Within opened File Importer application, click on the button 'Source'
2. Navigate to the desired file using Windows Explorer.

After the file is imported in to the application, File Importer populates all the required information and sets default adjustment configuration for Source Modification and Output Sequence sections.

## Record Compressed IP Stream

ClearView Importer also has the ability to record, and decode compressed IP streams. You can designate the multicast address by pressing the "Network Source" button. You must use the following syntax:

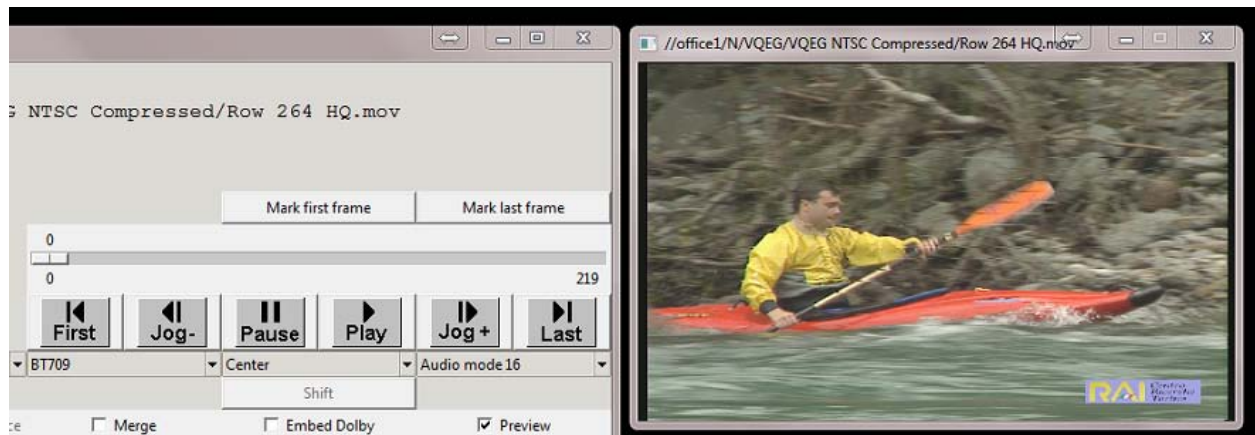
```
udp://239.3.3.3:3333  
udp://239.3.3.3:3333?localaddr=10.0.0.34  
udp://239.3.3.3:3333?localaddr=10.0.0.34&sources=10.0.0.32
```

localaddr is the physical IP address of the local interface you would like to record from

sources is the physical IP address of the network interface sending out the unicast/multicast stream

## Preview

A preview window can be enabled by selecting the preview checkbox.



The following preview options will be enabled after preview has been selected

Selection	Definition
Mark first frame	Sets the first frame for import
Mark last frame	Sets the last frame for import
Shuttle Bar	Allows the user to quickly scrub through entire clip
First	Jumps to first frame
Jog Back	Moves back one frame
Pause	Pauses the preview
Play	Begins playback of the preview
Jog Forward	Moves forward one frame
Last	Jumps to last frame

## MPTS Program Selection

ClearView Importer allows video files with more than one stream to be imported and used for decoding purposes. In case transport streams offer more than one program service, all stream ID's will be listed in the main UI after loading the source clip.

The user can then select which video and audio stream to import by selecting the 'streams' button. By default the application will import the first video stream, and first audio stream if available.

## De-Interlace Imported Video

File Importer provides ability to De-Interlace video files and decode them according to the Output Sequence options specified.

The De-Interlace checkbox will not be automatically unchecked for converting from interlaced to progressive video, so the user must check the box manually if they wish to De-Interlace the sequence.

When ClearView Importer de-interlaces a video it combines the lines of field one and the lines of field two into single progressive frame. No interpolation or content modification takes place whatsoever.

## Rate Change

Similar to De-Interlacing, the ClearView Importer application dynamically adjusts to the imported video file's properties and output video format specified. In case the imported video source properties differ from the specified Video Format, 'Rate Change' checkbox will need to be manually checked by the user in order for frame change to occur.

Also, selecting Video Format, which has no rate change comparing to the source file's properties will cause 'Rate Change' to remain unchecked (if previously not checked), or unchecked (if previously checked).

When File Importer performs a frame-rate conversion frames are either dropped or repeated. There is no inter-frame prediction or content manipulation.

## CS Coefficient

It is possible to change the Color Space Coefficient that will be applied for the RGB source file during the decoding process when importing to a YCbCr image format.

File Importer offers the following CS Coefficients in the Source Modification selection:

- BT. 601
- BT. 709
- BT. 2020
- ICtCp
- HLG

## Source Crop

File Importer source cropping functionality provides the ability to define the area of the imported video to be used in decoding process.

Source cropping is defined in the 'Crop' adjustable field.

The upper right corner, width, and height are required entries:

<x>,<y>,<width>,<height>

Source cropping definition is done in pixels.

Values entered in the 'Crop' adjustable field means the amount of pixels to be cropped from the original imported video.

## Sequence Name

The 'Sequence' button identifies the file name that will be used for the decoded output. The field allows alphanumerical input with special characters.

After the decoding process is completed with certain 'Sequence Name' value specified, the following files will be created with provided input:

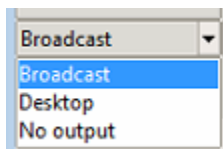
- **<Sequence Name> (with no extension)** – Decoded Video raw data;
- **<SequenceName>.aud** – Decoded Audio raw data;
- **<SequenceName>.cvo** - The file contains the name of the sequence.

## Library

'Library' identifies the location of the output files after the decoding process is completed. If there is no library at the selected location then the Importer will automatically create a new library for you.

## Output Module

Figure: Ouptut Module Drop Down



The Output Module drop down allows the user to select what type of video format they will import their clip to. The importer supports broadcast resolutions, desktop resolutions, and custom resolutions.

## Video Format

Video Format selection identifies resolution and frame rate in which the video will be decoded according to the “Output Module” selected.

## Image Format

File Importer allows applying certain Image Format to be used in output video sequence. Offered ‘Image Formats’ are:

- **Y’CbCr 8 bpc**
- **Y’CbCr 10 bpc**
- **ARGB 8 bpc**
- **RGB 8 bpc**
- **RGB 10 bpc**

In order to select the desired Image Format, please expand corresponding drop-down list and click on the value you would like to be applied for the decoded video.

## Frame Range

‘Frames’ adjustable field identifies the range of the imported video file to be used for the decoding process. The following inputs are required:

- **F (First)** – Number of the first frame to be used;
- **L (Last)** – Number of the last frame to be used in video decoding process.

**Note:** *The first frame of the video sequence after import always starts with ‘0’ value.*

‘Frames’ adjustable field allow only numeric values to be inputted. Number of the last frame cannot be greater than it is defined for the first one.

## Scale

File Importer scaling functionality provides the ability to scale source video file upon per-pixel width and height adjustment within selected output Video Format.

The ‘Scale’ adjustable field requires the following:

- **W (Width)** – per-pixel width scaling of the source file;
- **H (Height)** – per-pixel height scaling of the source file.

In order to configure source scaling, it is required to provide numerical input.

**Note:** *Scaling does modify the video content.*



## Canvas Location

Canvas Location identifies the location of the video to be placed on the screen, in case black padding is displayed, or the video resolution exceeds 'Video Format' specified.

Following selections are available for 'Canvas Location' configuration:

- **Center** (Video will be displayed in the center);
- **Top Left** (Video will be displayed in the top left corner);
- **Top Right** (Video will be displayed in the top right corner);
- **Bottom Left** (Video will be displayed in the bottom left corner);
- **Bottom Right** (Video will be displayed in the bottom right corner);
- **Use Custom Shift Values** (if selected, user will be able to specify custom shift)

In order to define 'Canvas Location', please expand corresponding drop-down list and select desired output video location.

## Custom Shift

By default, 'Custom Shift' adjustable fields are disabled for editing and display the values of current video positioning on the screen according to output Video Format specified.

In order to enable 'Custom Shift' it is required to select 'Custom Shift' in the 'Canvas Location' drop-down list.

Custom shifting provides the ability to define user-input positioning for the output video in case the black padding appears on the screen, or the video exceeds configured resolution.

Following adjustable fields are available for video shifting configuration:

- **X** (X-axis shifting);
- **Y** (Y-axis shifting)

Adjustable fields accept numeric input (both positive and negative).

## Truncate to Legal Broadcast Values

'Truncate to Legal Broadcast Values' functionality is used in YUV Luma only.

Pixel intensity values for the Y Component that are above or below the following values should be truncated to only values within this range.

In order to apply truncating, please check the corresponding checkbox before decoding the video.

## **Use Audio**

File Importer provides the ability of video decoding with up-to 16 audio channels.

Once the video file is imported, application loads and automatically selects all available audio channels. Unavailable audio channels will be displayed as grayed out checkboxes.

In order to select/deselect audio channels that will be available in the output video sequence, simply check/uncheck corresponding checkboxes in the 'Use Audio' section.

## **Merge**

If a HEVC encoder has taken interlaced fields and encoded them as separate progressive half height frames then this checkbox should be selected. On import it will merge the HEVC progressive half height fields into full interlaced frames.

## **Embed Dolby**

Enable or disable (default) encapsulation of an AC3 audio stream (IEC 61937-3). ClearView Importer will leave the AC3 audio compressed for playback over SDI or SMPTE 2022/2110 uncompressed IP.

## **Importing Video**

After all the desired adjustments made to the source input, it is possible to 'Import' (decode) the video file. In order to do that, simply click on 'Import' button in the bottom right corner of the File Importer screen. Once 'Import' action is initiated the current progress of the decoding process will be displayed on the bottom of the GUI.

# Command Line Interface

ClearView File Importer provides the ability for the video to be decoded using a Command Line input. CVI.exe can be invoked from the command line for batch processing. Multiple instances of CVI.exe can run in parallel.

All settings, available in Graphical User Interface mode are also configurable with specific input commands using the Command Line Interface.

Command Line supports batch video maintenance of the source files located both on the local workstation and on a network location.

**Table: Command Line Input Commands**

Option	Definition
-audio_mode n	Set the number of audio channels supported in the aud file. Accepted values are 0, 8 (default), and 16.
-audio_root path	Specify the directory for decoded audio. The default is the library path.
-bitbucket enable [[disable]]1 0	Enable or disable (default) import file write. Used for troubleshooting when little disk space is available.
-buffer_duration <seconds>	Specify the number of seconds to pre-record. Used in conjunction with "-record*" options to control a recording.
-canvas name	Specify the canvas location. Accepted values are "center" (default), "topleft", "topright", "bottomleft", and "bottomright".
-clip enable disable 1 0	Enable or disable (default) truncation of invalid SDI broadcast values.
-colospace name	Apply this colospace matriix during YUV/RGB conversion. Accepted values are "BT601", "BT709", "BT2020", and "ICtCp".
-control <port>	Specify an optional control port. Used by other tools to send control messages, such as stop.
-crop x1,y1,x2,y2	Set the pixel crop rectangle, where (x1,y1) and (x2,y2) define the top left and bottom right pixel coordinates, respectively.
-debug level	Set the logging level. Accepted values are "t" for trace detail, "d" for debug detail, "v" for verbose, "i" for general information (default), "W" for warnings and errors only, and "E" for errors only"
-deinterlace enable disable 1 0	Enable or disable (default) conversion of interlaced input to non interlaced.
-frames <first>,<last>	Set the start and last frames of the import. When last is set to -1, it means to import starting at the start frame until the last detected frame. The default is 0,-1.
-help	Display usage and exit.
-formats	Display available image and broadcast formats and exit.
-ids <stream_id1>,<stream_id2>,...	Specify the ids of the streams to import. The ids of a multiprogram transport stream are displayed using the probe option. The default is -1,-1 which means to import the first video and first audio streams found. Multiple audio streams may be specified. Exactly one video stream can be specified.
-image format	Specify the target image format.
-library path	Specify the full path of the ClearView library. This is required.
-logdir path	Specify the full path of the directory containing log files.
-log_rotate enable [[disable]]1 0	Enable or disable (default) log file rotation. Creates a sequence of log files of manageable size.
-loop enable [[disable]]0 1	Used with -bitbucket for import troubleshooting.

-merge enable [disable] 0 1	HECV progressive to interlace.
-output module	Specify the output module. Acceptable values are "none" (default), "broadcast", "desktop".
-preview <module>	Specify an optional preview port. Used by other tools to coordinate preview during import.
-probe enable disable 1 0	Enable or disable (default) probing the source for detail information.
-rate_change enable disable 1 0	Enable or disable (default) performing frame rate conversion.
-record <path>	Specify the path where the input is recorded to. Used as a separate recorder, or in conjunction with an import.
-record_sessions <number>	Used for troubleshooting record.
-record_duration <seconds>	Specify the number of seconds to record.
-record_overlap enable disable 1 0	Enable or disable (default) simultaneous record and import.
-ring_size n	Set the number of buffers per stream.
-scale <width>x<height>	Set the target scale resolution. For example "1080x720".
-scale_algo name	Set the scale algorithm. Default is "bicubic".
-sequence name	Set the name of the ClearView sequence. This must be unique within the library.
-shift x,y	Set the top left coordinates for a pixel shift. Default is 0,0.
-source file/uri	Set the path of a source file or a multicast address, e.g., <a href="http://233.3.3.3:3333">udp://233.3.3.3:3333</a> .
-separate enable [disable] 1 0	Enable or disable (default) field splitting. Separate frame-based video input into its fields, producing a new half height clip with twice the frame rate and twice the frame count.
-stack enable [disable] 1 0	Enable or disable (default) field stacking.
-tc enable [disable] 1 0	Enable or disable (default) timecode generation. A file with a ".tc" suffix is generated along side the video import file.
-tcstart	Time code start time
-test <number>	Used for troubleshooting
-threads n	Set the number of decoder threads.
-timeout_data n	Set the timeout in seconds for a buffer to drain.
-timeout_conn n	Set the timeout in seconds to connect to a stream source. Default is 5.
-version	Display the version and exit.
-video format	Set the video format. For example "1920x1080 60.00 Hz.", or for broadcast "1080p 23.98 Hz."

## Command Line Examples

Import a file with minimal options:

```
cvi \  
-source test.mpg \  
-library testlib \  
-sequence test1
```

Import the first 100 frames of a file:

```
cvi \  
-source test.mpg \  
-library testlib \  
-sequence test2 \  
-frames 0,99
```

Import a file starting at frame 100 and specify a target image format:

```
cvi \  
-source test.mpg \  
-library testlib \  
-sequence test2 \  
-frames 100,-1 \  
-image "YCbCr 10 bpc"
```

Import a file and specify a broadcast video format:

```
cvi \  
-source test.mpg \  
-library testlib \  
-sequence test3 \  
-output broadcast \  
-video "1080p 23.98 Hz."
```

Import video stream 73 and audio streams 91 and 92:

```
cvi \  
-source test.mpg \  
-library testlib \  
-sequence test4 \  
-ids 73,91,92
```

Import 1000 frames from an ongoing udp multicast:

```
cvi \  
-source udp://233.3.3.3:1234 \  
-library test_lib \  
-sequence test5 \  
-frames 0,999
```

# Supported File Types

## Video Format Import Types

Accom YUV CCIR 601 8 Bit  
ARI Raw Bayer Pattern  
Avid AVR, DS HD/SD, DV (\*.gen)  
Avid \_DNxHD  
Avid Meridian &Y'CbCr  
Avid OMFI (\*.omf, \*.omfi)  
AVR, JFIF, JPED, Meridian, RGB, Y'CbCr  
Cineon (CIN)  
CineWave  
Digital Negative (.dng)  
DPX RGB 8, RGB 10, Y'CbCr 4:2:2  
DV Movies (\*.dv, \*.dif)  
DVS Direct File Format (\*.dvs)  
DVSD, DV25, DV50, MPEG-I, MJPEG DigiSuite  
H.261, H.263, H.264, H.265  
HDV  
Headerless/Raw (\*.hdr, \*.yuv, \*.rgb, \*.raw)  
HiCon SLB32 RFB format (\*.slb)  
Image (gif, jpg, png)  
Jaleo Direct Format (\*.js)  
JPEG  
JPEG2000  
Media 100 MJPEG  
Microsoft BMP, DIB Files (\*.dps)  
Microsoft AVI (\*.avi)  
MJPEG  
MPEG-1 4:2:0 (\*.mpg, \*.mpeg)  
MPEG-2 Elem. Stream, (4:2:0/4:2:2)  
MPEG-2 (\*.m2v)  
MPEG-2 Program Stream, (4:2:0/4:2:2)  
MPEG 2/4 in Transport Stream (4:2:0/4:2:2)  
MPEG-2 in TS, MPTS (4:2:0/4:2:2)  
MPEG-4 Part 2  
MPEG-4 /AVC Elementary Stream  
(4:2:0/4:2:2), (\*.h264)  
MPEG-4 /AVC in TS, MPTS (4:2:0/4:2:2), (H.264)4:2:0/4:2:2, (\*.h264)  
MPEG-4 (\*.m4v)  
MPEG-H HEVC/H.265 4:2:0 Main Profile (\*.h.265) MPEG-H in TS, MPTS  
MXF Format (DV, DVCPro50, MPEG, IMX)  
Newtek Video Toaster (\*.rtv)  
Phantom Support (cine)  
Photo CD PCD  
PhotoShopFilmStrip (\*.flm)  
Photoshop PSD

Portable anymap PNM  
Portable Bitmap Format PBM DPS  
Velocity Portable graymap PGM  
Portable pixmap PPM  
Profile GXF Format/SMPTE-360 (\*.gxf)  
QuickTime Movies (\*.mov)  
QuickTime Formats with proper codec, ProRes, etc.  
RealVideo (\*.ra, \*.rm, \*.ram)  
Red Camera Stream (r3d)  
Run-Length encoding (rle)  
SGI Movie Format (\*.mv)  
Silicon Image Bayer (siv)  
Sun Raster  
Sun Raster (\*.ras)  
SGI RGB  
Targa TGA, ICB, VDA, VST  
Targa 3000, Pinnacle  
TIFF, TIF  
Transport Stream (\*.ts)  
v210Y'CbCr 10 Bit product  
VC-1 Pro, Viewstore (vsr)  
vcap, vcap10  
Windows Media (\*.asf, \*.wmf, \*.wmv)  
Y'CbCr 8/10  
Y'CbCr, RGB  
YCrCb 8/RGBA

## **Audio Import Formats Exported File Formats**

Dolby Digital Plus Professional Decoder  
MPEG-2 Layer 1 (.mp1) QuickTime with up to 16 audio channels  
MPEG-2 Layer 3 (.mp3) Microsoft AVI (\*.avi), BMP  
Waveform Audio (.wav) Headerless/Raw (\*.yuv, \*rgb, \*.raw)  
Adaptive Multi-rate (.amr)  
Advanced Audio Coding (\*.aac)  
Audio Interchange File Format (.aiff)  
Windows Media Audio (.wma)