



ARRI ALEXA 35 ARRIRAW HDE Transcoder

Quickguide

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1 Version History

Version	Author	Change Note
2022-04-14	O.Temmler	First version
2022-05-06	O. Temmler	Added reference to Workflow & Post Guide
2022-06-29	O. Temmler	Document update
2022-07-27	O. Temmler	Document updated to reflect changes in latest version of ARRIRAW HDE Transcoder
2022-08-07	O. Temmler	Information about the timeout option
2022-08-09	O. Temmler	Known issues and command line options
2022-08-18	O. Temmler	All sections rewritten. Added new checksum feature and known issues.

2 Introduction

CODEX High Density Encoding (HDE) is a lossless, variable bitrate encoding scheme, optimized for Bayer pattern images, such as ARRIRAW. The file size of a high density encoded ARRIRAW clip, on the average, is 50 to 60% of its original size, depending on the image content. Once decoded, the images deliver a bit-exact match to the original uncompressed ARRIRAW images.

CODEX originally introduced HDE to support ALEXA 65 productions, as the handling of the camera data created per day became a real challenge. Today, HDE is used in all sorts of ARRIRAW productions, no matter if the ARRI camera is an ALEXA 65, LF, Mini LF, Mini or SXT.

So far, the tool to apply on-the-fly HDE to ARRIRAW data was the CODEX Device Manager. Due to changes in the file format that is recorded by ALEXA 35, this workflow is currently unavailable. This document describes how HDE can be applied to ARRIRAW data from an ALEXA 35.

3 Changes for ALEXA 35

The ARRI ALEXA 35 introduced a new CMOS sensor, new image pipeline, new color science, and new features like the ARRI Textures. All that translates to more dynamic range, more sensitivity, more colors, and more creative control at the hands of the cinematographer. Most of it is achieved by the new sensor, but behind the scenes, a whole set of added metadata is an important enabling factor.

To reduce the overhead per frame, to increase performance and to add flexibility for possible extensions, we completely restructured the metadata in the ALEXA 35 MXF container. REVEAL Color Science – the suite of new image processing steps dedicated to ALEXA 35 – was designed to fully utilize this new MXF format.

As a consequence, single-frame sequence processing of ARRIRAW (.ari) or HDE-encoded ARRIRAW (.arx) is only supported for earlier camera models. Therefore, the current CODEX Device Manager (6.1) cannot present ALEXA 35 ARRIRAW as .arx file sequences. The structural improvements, however, will enable the upcoming release of Device Manager to provide on-the-fly transcoding of ALEXA 35 ARRIRAW data to MXF/HDE files.

4 The ARRIRAW HDE Transcoder

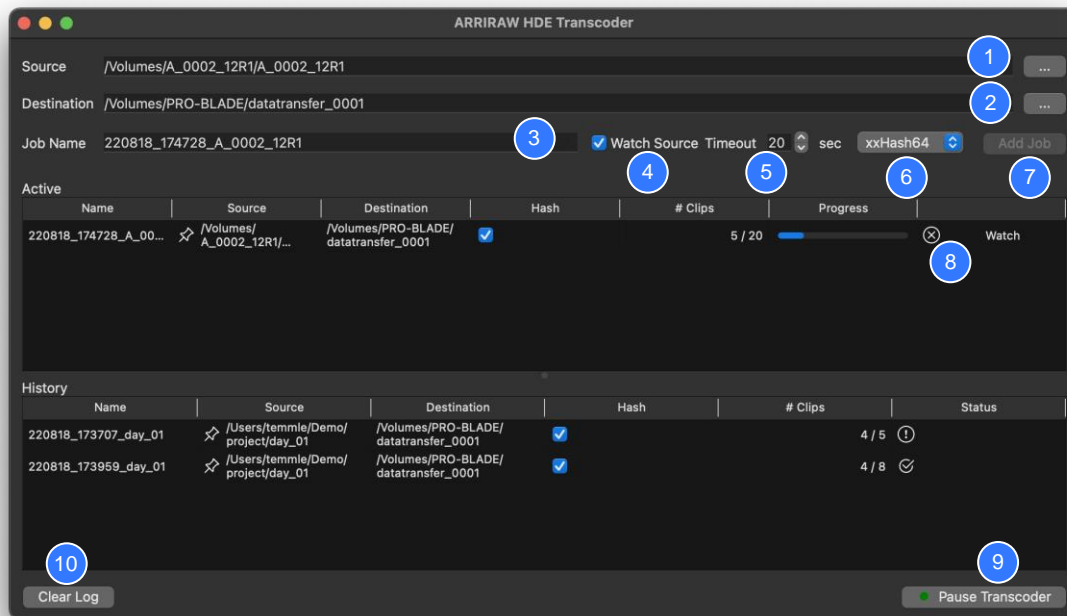
As it became clear that an MXF-ready Device Manager HDE workflow will not be in place when the first ALEXA 35 productions go into prep, CODEX agreed to license the HDE encoder component to ARRI. This allowed us to create the ARRIRAW HDE Transcoder, a simple software tool that provides an MXF/HDE output from an ALEXA 35 MXF/ARRIRAW input*.

The Transcoder is available with a simple user interface for macOS and Windows or as a command line tool for macOS, Windows, and CentOS 6. The UI version can be pointed to a source folder, which can either contain clips or further folders containing clips. The command line version can also encode individual MXF files.

At the output, the Transcoder mirrors the file structure from the source folder. With a checksum option, the Transcoder generates an ASC Media Hash List containing xxHash64be or MD5 checksums for each MXF/HDE file. These can be used to detect modifications or file corruption down the line.

*Note: ARRIRAW data from other ARRI cameras can only be encoded with the CODEX Device Manager.

4.1 User Interface Operation



1. Select a 'Source' folder which may contain clips or a folder containing more than one reel of clips. Non-camera files will be ignored. The .ale and .bin file will be copied over.
2. Select a 'Destination' folder where the encoded output will be written. The software will recreate the directory structure it finds in the source folder.
3. The 'Job Name' is automatically created based on the source folder name, but can be changed.
4. Activate 'Watch Source' and the software will encode any clips already present in the source folder and then wait for new files to show up. 'Watch Source' jobs are shown with a pin in the 'Active' job list.
Click on the X icon (8) to cancel the job and proceed to the next job, if present.
5. Some file systems may cause problems for the 'Watch Source' option, so the Transcoder may show an error message like 'not enough data' and fail to encode a clip. If that happens, increasing the Timeout (up to 120 secs) may resolve the issue.
6. Use the selection box next to the Timeout to choose if the Transcoder will create an xxHash64be checksum, an MD5 checksum, or no checksum for each file it creates.
7. When everything is set, clicking on 'Add Job' will start the Transcoder or add the job to the list of pending jobs.
8. Click the 'X' icon in the 'Active' job list to abort a running job or cancel a 'Watch Source' job.
9. If you want to temporarily stop the Transcoder, e.g. to free up CPU resources, click 'Pause Transcoder'. The encoder will finish to process the current clip and then wait until you click the button again to 'Resume' the job.
10. Click on 'Clear Log' to clear the jobs shown in the job 'History' list. Restarting the Transcoder also will clear this window. 'Clear Log' has no effect on the Transcoder's log file.
11. In the application menu, 'File > Show Log File...' will present a verbose log output which is rotated once a day.

4.2 Command Line Operation

```
arrirawhde [options] -i <input.mxf | input_folder | job.json> -o <output.mxf | output_folder>
```

options:

- a activate watch folder
- c force checksum creation into -c <type> md5 or xxhash64
- r <path/file> create a json report with specified file name at the specified path
- t <value > demux timeout in seconds
- v verbose mode
- eula print end user license agreement
- version print version

Example:

```
arrirawhde -c md5 -i /source/I_0003_12R1/I_0003_12R1/I_0003C001_220705_093843_a12R1.mxf -o /destination/
```

This will create an HDE-encoded clip named I_0003C001_220705_093843_a12R1_hde.mxf and an ascmhl folder containing an MHL file with an MD5 source checksum at the destination path.

Please note that the command line version will not copy the .ale or .bin file from a source folder!

4.3 Output File Names

Files processed by the ARRIRAW HDE Transcoder get “_hde” appended before the file extension.

4.4 Checksums

The Transcoder can generate an ASC Media Hash List containing a list of xxHash64 (big endian) or MD5 checksums for each file that is created in an active job. This MHL will be placed in an ascmhl folder at the selected destination directory.

Please note that the ARRIRAW HDE Transcoder does not perform a copy checksum verification. Encoding ARRIRAW files results in new files, not a copy. The checksums provided in the ASC MHL therefore are new source checksums that can be used to verify the downstream file integrity.

5 Known Issues

Apple command line version does not start

When the command line tool is installed on the mac, you first will need to open the Security panel in System Preferences to allow the execution of the software.

.ale and .bin files

These are only copied from the source by the UI versions. When the command line is used, these files must be transferred separately.

Checksum varies every time a file is encoded

The MXF specification requires that an MXF file contains a creation and modification time stamp, as well as unique identifier. Each of these values are different every time the file is created, so the same applies to the resulting checksum.

Processing order

Especially for jobs using the ‘Watch Source’ option, it is possible that the files are not processed in the expected order or any comprehensible order at all.

Unsupported non-RAW stream type: 48

This error message will be shown if the source folder contains mixed data i.e., non-ALEXA 35 MXF/ARRIRAW files, like MXF/Apple ProRes or other.

6 References

ASC Media Hash List: <https://theasc.com/asc/asc-media-hash-list> and <https://github.com/ascmih/mhl>

SMPTE Registered Disclosure Documents: <https://www.smpte.org/standards/document-index/rdd>

RDD 54 - Mapping ARRIRAW Bitstreams into the MXF Generic Container

RDD 55 - MXF Carriage of ARRI Camera System Metadata

RDD 51 - High Density Image Encoding for ARRIRAW Files

For a list of tools supporting ALEXA 35 recording formats, HDE, and look files, please go to [ARRI.com > Learn & Help > Camera & Workflow > ALEXA 35 Workflows](#)

To learn more about HDE or to register for the new Device Manager public beta please contact support@codex.online.