



ZEISS eXtended Data workflow with Ambient MasterLockit*Plus*

Version 4

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Introduction

ZEISS eXtended Data technology provides frame accurate lens characteristics (distortion and vignetting) for use in VFX. Lens characteristics can be recorded in the video files and passed to the post-production – this replaces the standard grids and grey card workflow that are both time consuming and inaccurate.

In this guide, you will learn how to record ZEISS eXtended Data using Ambient MasterLockit*Plus*. This most universal way works with almost any camera as the only requirement is that the camera features a timecode socket to synchronize with the MasterLockit*Plus*.

Note

The following guide is not a user manual, but an optional support document from ZEISS to improve your user experience and to show you possible uses and combinations of our product and ZEISS eXtended Data technology.

Please always observe the separate specific user manual for equipment from Ambient Recording

(<http://ambient.de/downloads/>), from ARRI (<https://www.arri.com/en/>), RED (<https://www.red.com/>) or SONY

(<https://www.sony.de/>) and software from Pomfort (<https://pomfort.com/>).

ZEISS is not the manufacturer of the ARRI, RED or SONY cameras, Ambient MasterLockit*Plus* and Pomfort Silverstack. If you have any questions, please contact the manufacturer of your respective technical equipment, components and software.

We do not claim to declare the use of third party equipment (third party means all companies except ZEISS), nor do we accept any liability for damage resulting from misuse contrary to the instructions of the respective manufacturer.

Pre-requisites

In order to use this workflow following equipment is needed:

- A ZEISS cinema lens featuring ZEISS eXtended Data (Supreme Prime or CP.3 XD).
- A cinema camera with a timecode synchronization connector.
- An Ambient MasterLockit*Plus*.
- An Apple iMac, MacBook or MacBook Pro (is called Mac in the following pages) with Pomfort Silverstack.
- Optional: ZEISS eXtended Data injection software (`zeiss-xdcp`).

Overview of the workflow

Using Ambient MasterLockit*Plus*, the workflow is simple:

1. **Record** the ZEISS eXtended Data with MasterLockit*Plus* and video files on the camera.
2. **Prepare** video files and ZEISS eXtended Data for post-production.
3. **Use** ZEISS eXtended Data in post-production.



Record ZEISS eXtended Data using Ambient MasterLockitPlus

What does the MasterLockitPlus do?

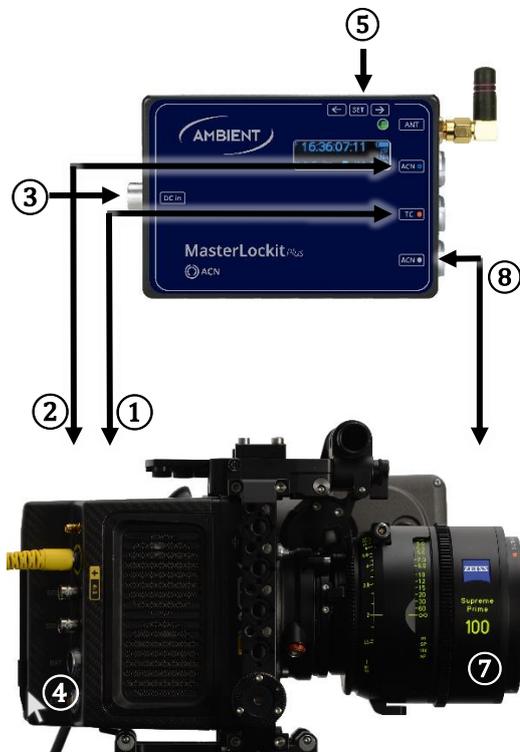
- MasterLockitPlus is a device that generates timecode and helps to synchronize time code of different set devices.
- MasterLockitPlus can also continuously read ZEISS eXtended Data through the external lens connector and tag each data set with the timecode: this allows to synchronize recorded lens data with video frames.
- MasterLockitPlus can also send ZEISS eXtended Data to other devices using its WIFI interface. This allows realtime usage of the ZEISS eXtended Data for on-set live image correction using Pomfort LiveGrade for example.

Detailed information about MasterLockitPlus features and user guide:

<https://ambient.de/product/mlp/>

Setup camera and Ambient MasterLockitPlus

Special adjustments are needed. See Appendix for detailed step-by-step setup description for ARRI cameras, RED cameras or SONY Venice. The MasterLockitPlus can also be used with another cameras. The only requirement is that the camera and MasterLockitPlus must be synced through timecode.



Prepare the camera and MasterLockitPlus setup

The general setup is simple:

- ① Connect the red TC port of the MasterLockitPlus to the camera timecode port.
- ② Optional: Connect the blue ACN port of the MasterLockitPlus to the camera with camera metadata cable.
- ③ Connect MasterLockitPlus DC in port to a power source.
- ④ Switch on the camera.
- ⑤ Switch on the MasterLockitPlus.
- ⑥ Ensure that camera and MasterLockitPlus are synchronized (see [Synchronize MasterLockitPlus with camera](#)).

Attach lens and verify that the lens is recognized

- ⑦ Attach the lens to the camera. Always attach the lens when the camera is switched on.
- ⑧ Connect the lens eXtended Data port to grey ACN port of the MasterLockitPlus.

Exchange the lens

- Do not switch off the camera or the MasterLockitPlus.
- Disconnect the lens from the MasterLockitPlus.
- Detach the lens from the camera and attach the new lens to the camera.
- Connect the new lens to the MasterLockitPlus.

Warning

If you do not proceed in the order described above (eg. connect the lens to MasterLockitPlus before attaching the lens), the lens might not be recognized by the MasterLockitPlus or by the camera.

In such case, unplug and then plug in again the lens cable from the MasterLockitPlus – this will “wake up” the MasterLockitPlus and recognize the lens.

Record ZEISS eXtended Data with Ambient MasterLockitPlus

ZEISS eXtended Data will be recorded whenever the lens is connected to the powered MasterLockitPlus.

Prepare recorded media for post-production

There are 2 ways to provide recorded ZEISS eXtended Data to VFX:

- Provide video files of any format with ZEISS eXtended Data side car files.
- Provide EXR file sequences with embedded ZEISS eXtended Data.

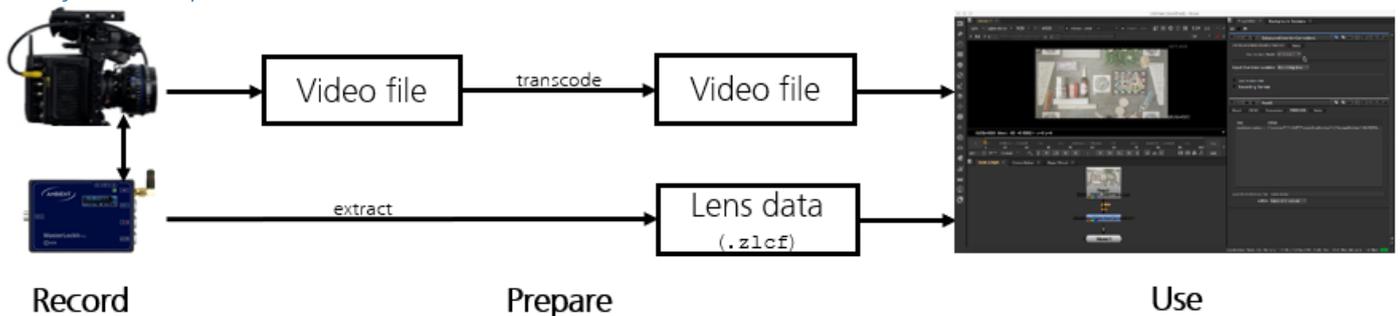
The choice of the video file format is made by VFX department.

Any video file format with ZEISS eXtended Data as side car files

In case the VFX department works with another file formats than EXR, they will need for each video clip one side car file with the recorded ZEISS eXtended Data.

Side car files with extension `.z1cf` (ZEISS Lens Correction File) will be generated using Pomfort Silverstack. These files contain recorded ZEISS eXtended Data and all information needed by VFX.

Workflow description



Following two steps are needed:

- Optional: **Transcode** video files into desired file format.
- **Extract** `.z1cf` files from the MasterLockitPlus and transfer them to the post-production.

Extract ZEISS eXtended Data from the Ambient MasterLockitPlus

What is Pomfort Silverstack?

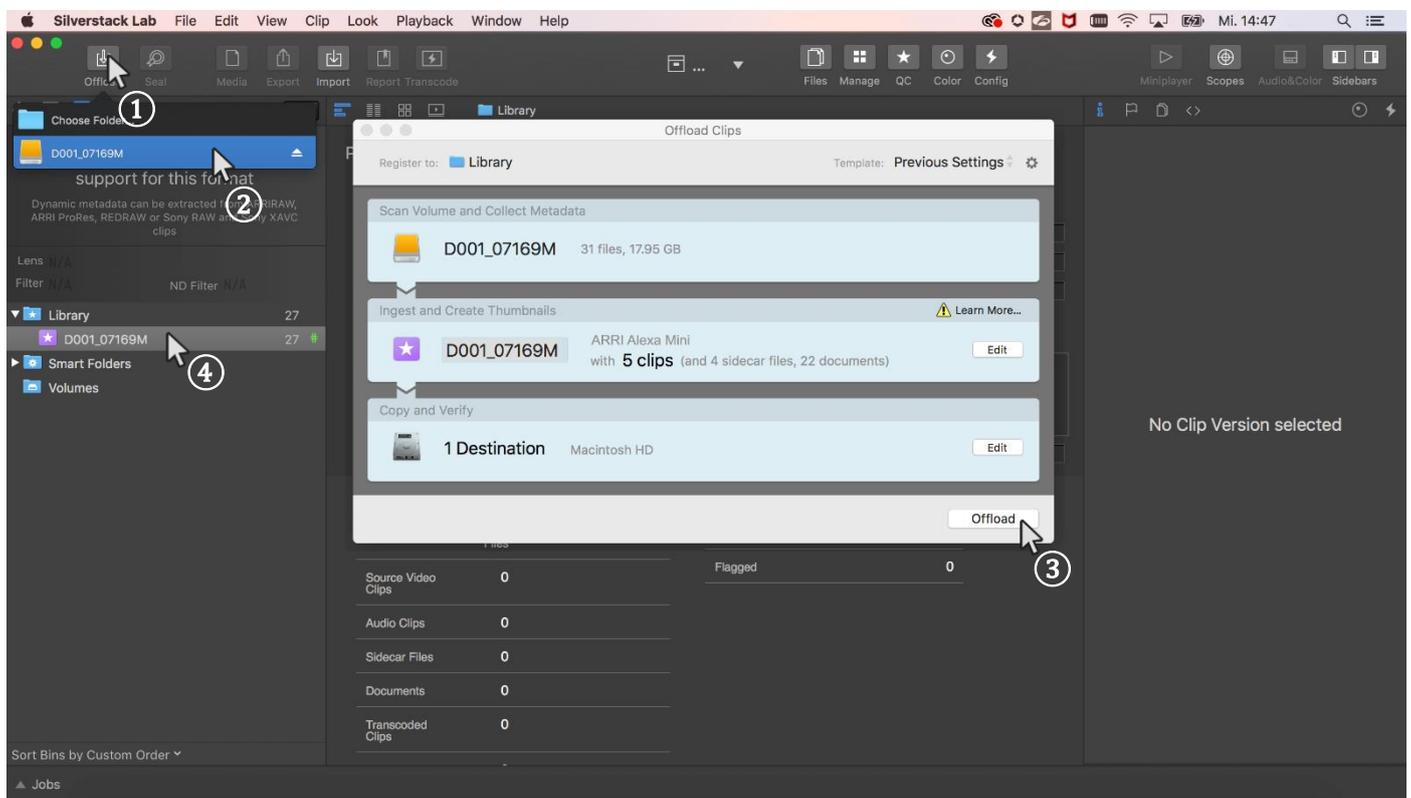
Silverstack is a Mac software, developed by Pomfort GmbH, for on-set data management in all kinds of professional film productions. A broad set of features including copying, playback and reporting enables the user to backup, preview and prepare movie data right on the film set.

Silverstack XT or Silverstack Lab allows to read the corresponding ZEISS eXtended Data from the MasterLockitPlus and generate ZEISS Lens Correction Files (.z1c.f) for each clip. Always use the latest version of Silverstack.

Prepare Pomfort Silverstack

- Download Silverstack from Pomfort website and follow installation instructions (<http://pomfort.com/silverstack/download/>).
- Choose a license and install it using instructions from Pomfort website.
- Connect your Mac to MasterLockitPlus via WIFI connection.

Load video files in the Silverstack Library



①+②

Select the media with the video files.

③

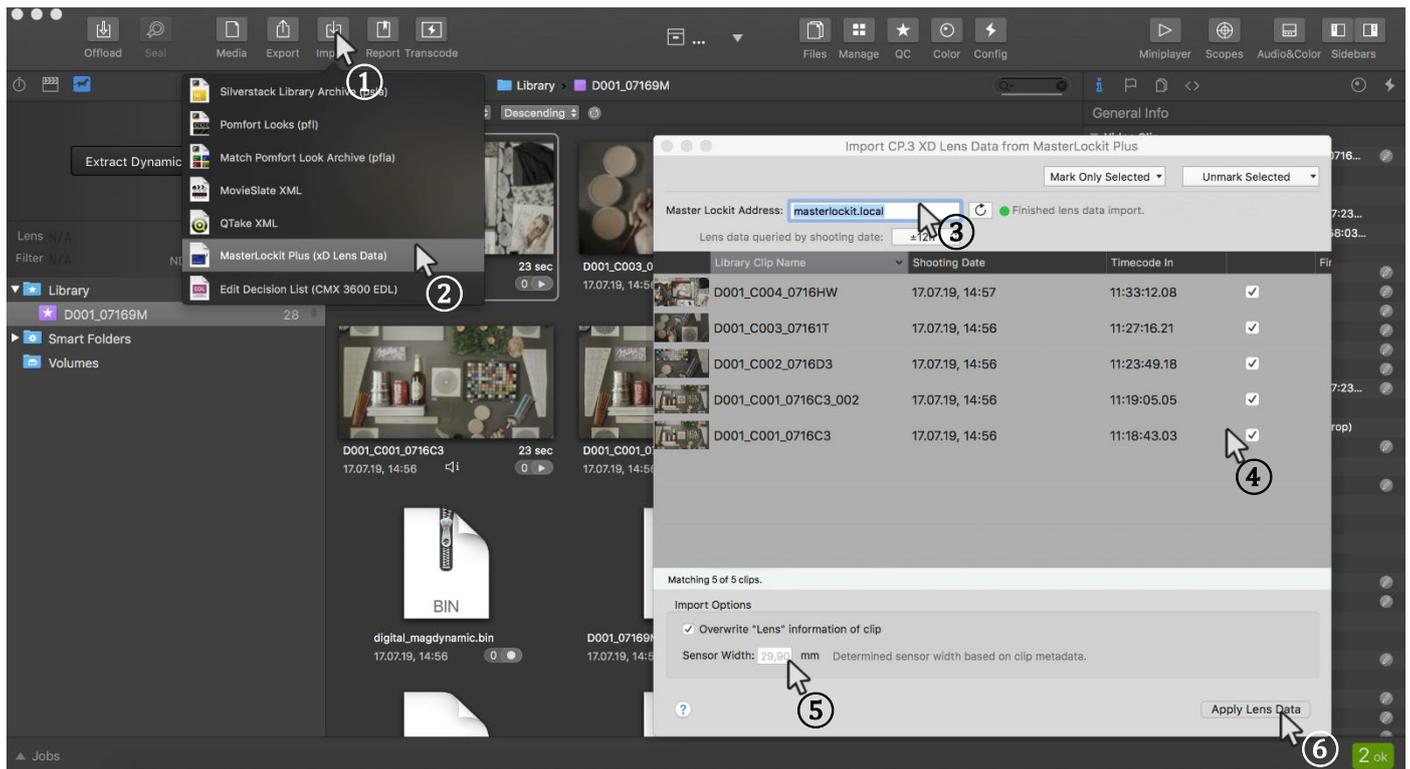
Choose a destination path where the video files will be saved, then **Offload**.

④

All clips will be listed in 'Library'.

Extract ZEISS eXtended Data from the Ambient MasterLockitPlus

ZEISS eXtended Data are recorded with the MasterLockitPlus as dynamic metadata. They must be extracted using Silverstack and saved into .z1cf files.



①+②

Import ZEISS eXtended Data from the MasterLockitPlus.

③

For importing, the WIFI connection to MasterLockitPlus is necessary.

④

All data sets corresponding to clips in the library are listed in 'black'. Data set that do not match with any clip are greyed out. Choose all data sets that need to transfer.

⑤

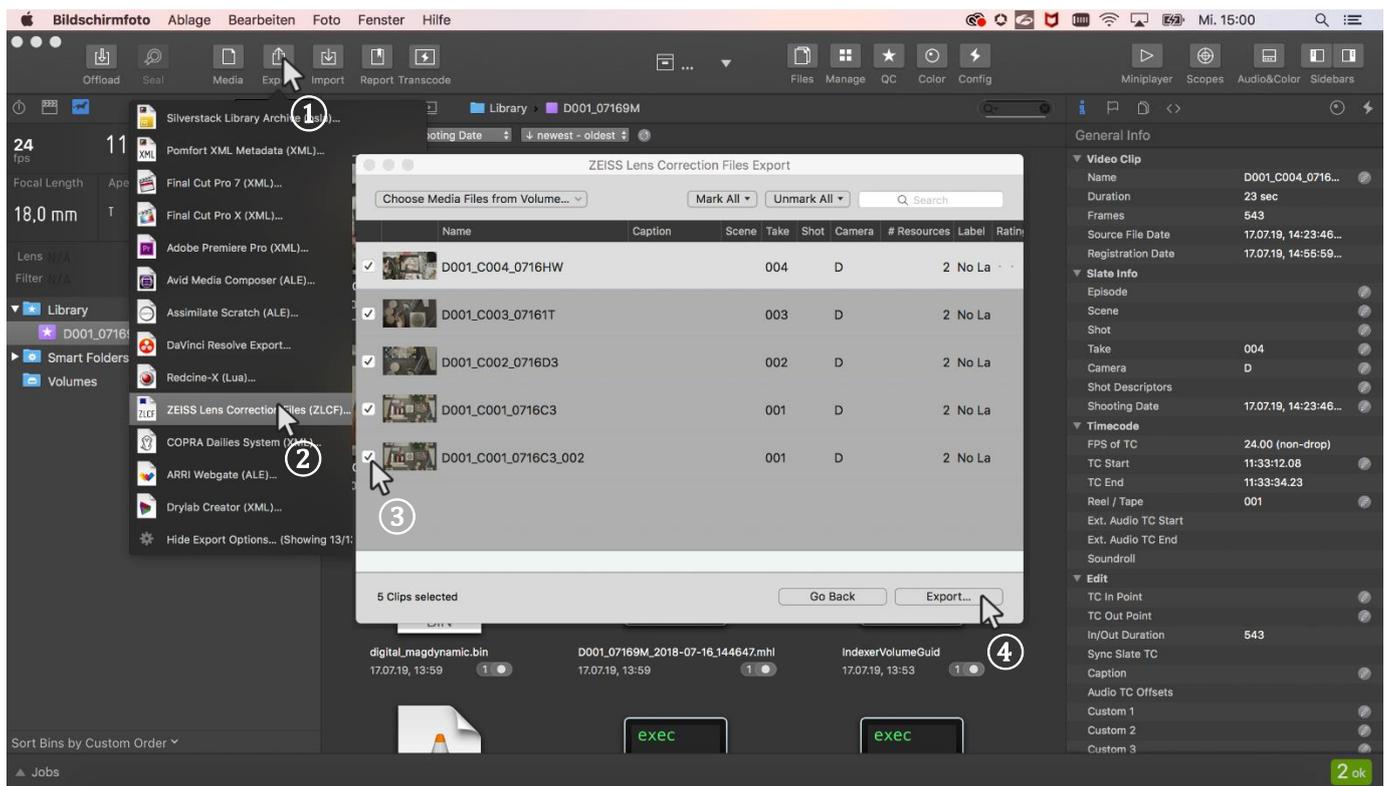
If the Sensor Width field is empty, fill in the information based on camera Info.

⑥

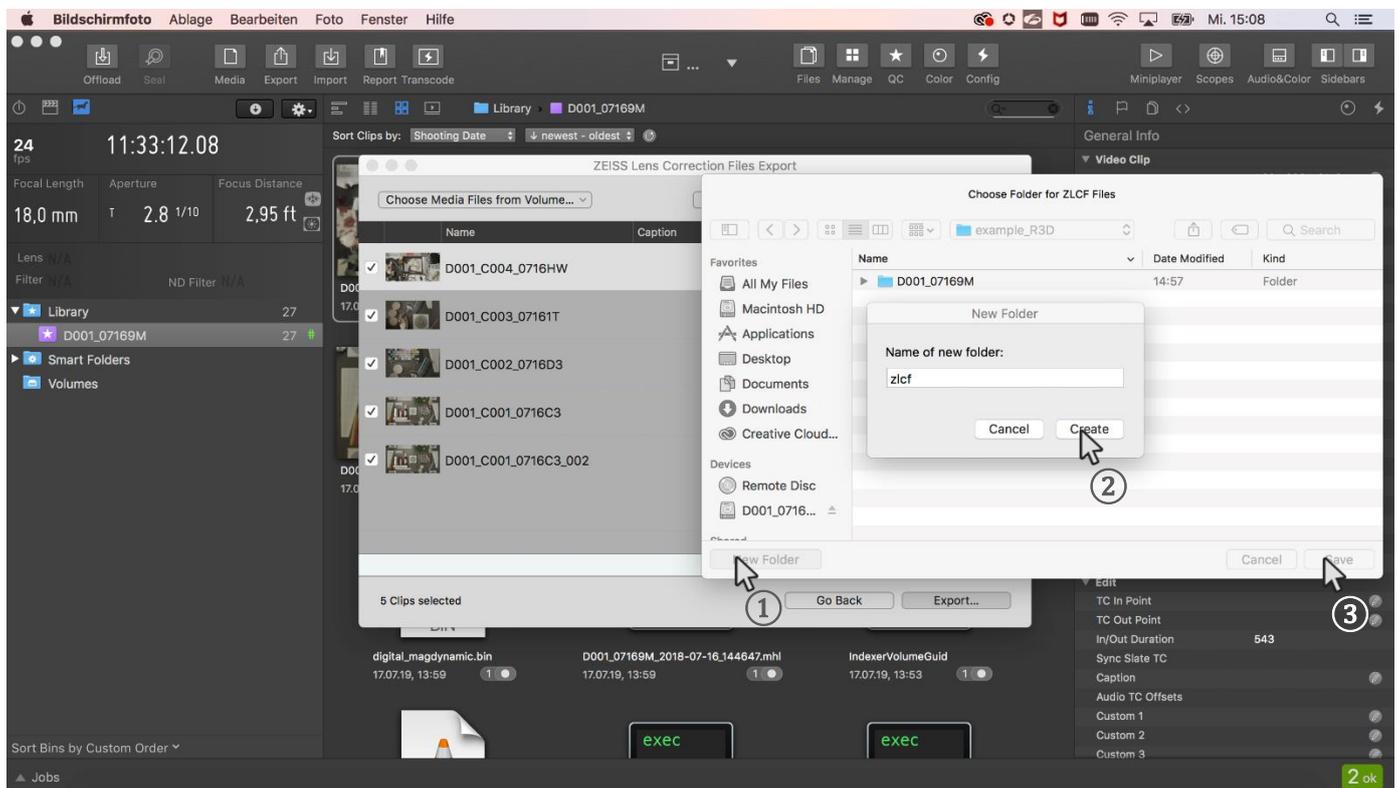
Finish import by choosing **Apply Lens Data**.

Generate ZEISS Lens Correction Files (.zlcf)

Now that ZEISS eXtended Data has been imported from MasterLockitPlus, ZEISS Lens Correction Files (.zlcf) can be generated.



- ①+② Open the Export function by selecting **Export + ZEISS Lens Correction Files (ZLCF)**.
- ③ Choose all video files for which you want to generate a **.zlcf** file.
- ④ Go to the next step by choosing **Export**.



- ①+②+③ Choose a folder in which the **.zlcf** files will be saved.

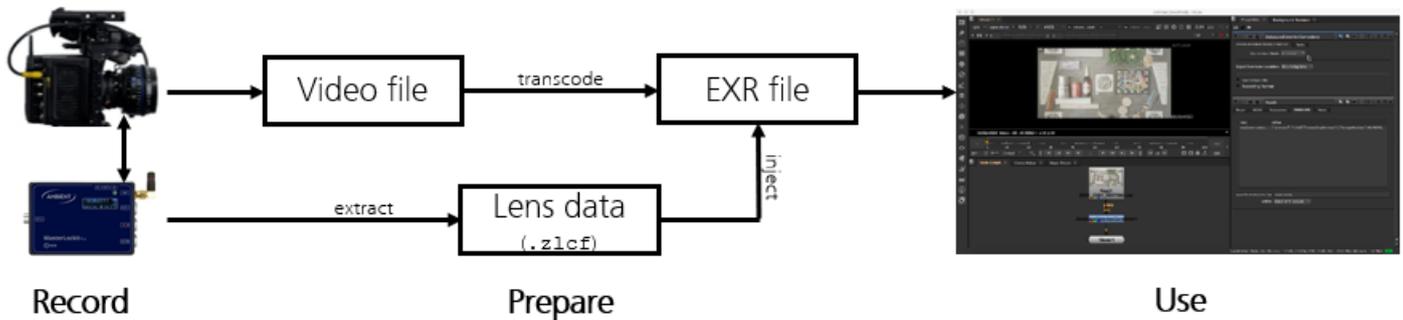
Send the ZEISS Lens Correction Files together with the video files to the post-production.

Save the .z1cf files in a folder within the same directory that contains the video files folder.

EXR file sequences with embedded ZEISS eXtended Data

In case the VFX department works with EXR file sequences, it is possible to read the ZEISS eXtended Data out of the .z1cf files and inject them into the EXR file sequences.

As of today, none of the EXR transcoders (BlackMagic DaVinci Resolve, Colorfront, etc ...) will automatically inject ZEISS eXtended Data into the EXR file sequences. This must be done manually using ZEISS provided injection software: zeiss-xdcp.



Following three steps are needed:

- **Transcode** recorded video files into EXR file sequences as usual.
- **Extract** .z1cf files from the MasterLockitPlus and copy them into the EXR directory.
- Use zeiss-xdcp software to **inject** ZEISS eXtended Data into the EXR file sequences.

Example

One MXF file has been transcoded into an EXR file sequence:

- MXF file is example_AMBIENT/example.mxf
- EXR file sequence is: example_EXR/example_001.exr example_EXR/example_002.exr ...
- ZLCF file is example_EXR/example.zlcf

Data extraction and injection happens using following command:

```
zeiss-xdcp -s example_EXR/example.zlcf -d example_EXR/example_*.exr
```

For more information about the different options of zeiss-xdcp software:

```
zeiss-xdcp --help
```

Use ZEISS eXtended Data in post-production

For introduction on how to use ZEISS eXtended Data in post-production, please read the ZEISS eXtended Data plug-in Quick Guide. It can be found on the ZEISS website <https://www.zeiss.com/cine/xd>.

Appendix A – Setup Ambient MasterLockit*Plus*

Connect Ambient MasterLockit*Plus* to a Mac

WIFI connection

The MasterLockit*Plus* has built-in WIFI router functionality. A supplied WIFI dongle must be plugged in to the USB port.

- Open your network settings and search for WIFI Access Points.
- Connect to the access point which name (SSID) begins with “mlp-”.
- Type in the password. The password is identical to the name of the access point (mlp-...).

Access the MasterLockit*Plus* web interface

- Open a web browser (we recommend Google Chrome).
- Type in 10.0.0.1 OR masterlockit.local in the address bar.

In case the web interface does not appear, verify that the MasterLockit*Plus* is properly connected to your Mac via WIFI.

Synchronize MasterLockit*Plus* with camera

While the MasterLockit*Plus* records ZEISS eXtended Data continuously, it is important to ensure that the Frame Rate and timecode are setup correctly and synchronized with the camera. Pre-requisite is that cable connections are correct.

Following setups are mandatory to ensure that ZEISS eXtended Data will match frames of video clips:

Verify system date and time of camera and Mac

- Setup right date, time and time zone on the camera.
- Setup right date, time and time zone on the Mac.

Choose the right timecode settings in your camera

Camera must be setup correctly to accept external timecode.

ARRI camera

- **TC → Options**
Source: Ext LTC
Mode: Free Run
Generator: Regen

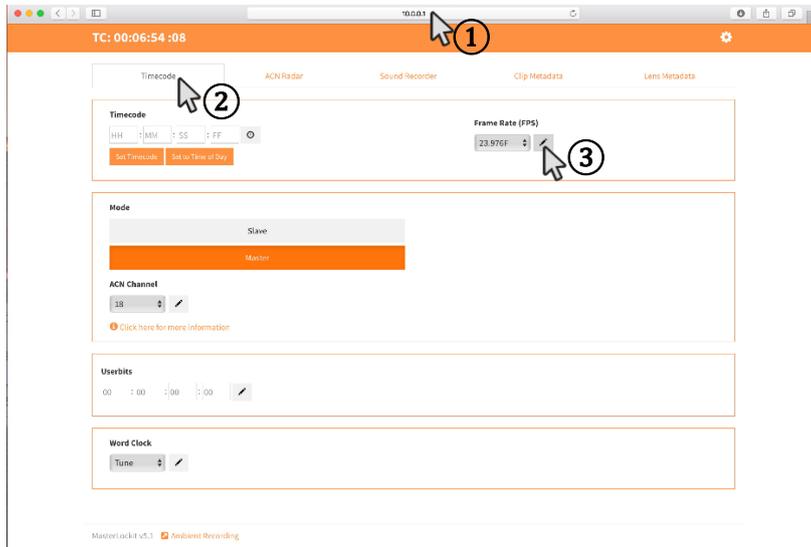
RED camera

- **Menu → Settings → Project → Timecode**
TC Display Mode: TOD
Source: External

SONY Venice camera

- **Menu → TC/Media-tap → TC Mode → Preset F-Run (Ext-Lk)**

Choose the same Frame Rate (FPS) value for the MasterLockit*Plus* as for the camera



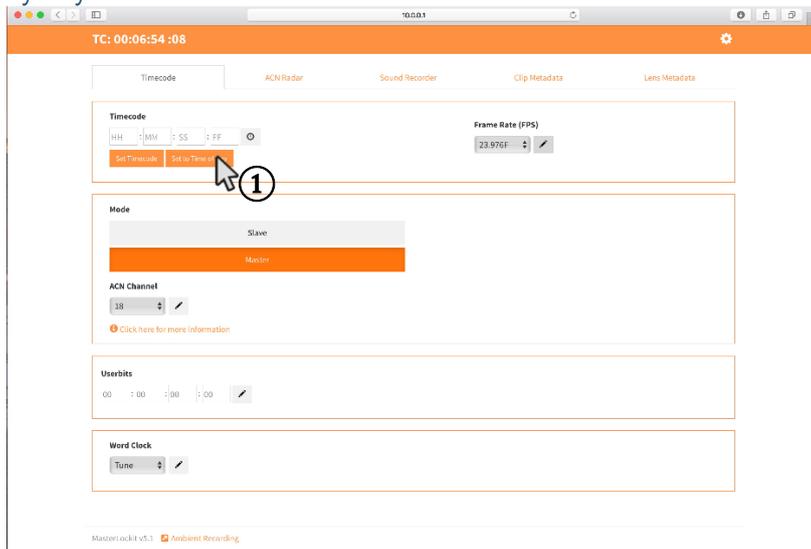
- ① Connect to web interface.
- ②+③ On the **Timecode** tab choose the right **Frame Rate (FPS)**.

Note

On RED DSMC2 cameras use the 'Project Frame Rate' value.

On SONY Venice camera use the 'Menu → Project-tap → Project Frame Rate' value.

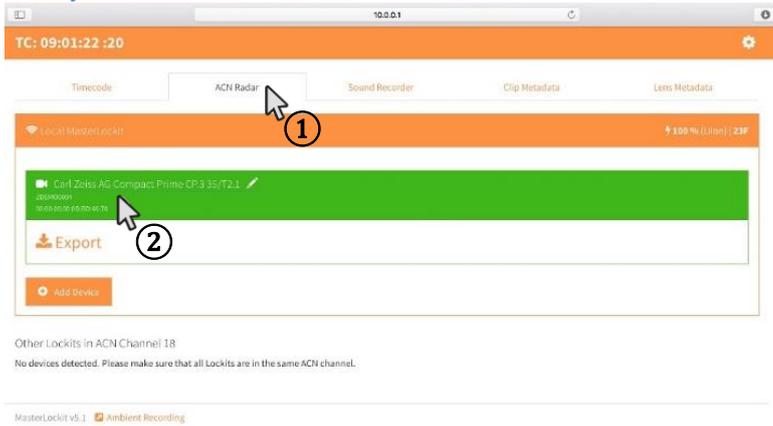
Sync your camera with the MasterLockit*Plus*



- ① On the **Timecode** tab press **Set Time of Day**.

Verify that the timecode value on the web browser (TC) corresponds to the timecode value on the camera. The camera gets the timecode from the MasterLockit*Plus* now.

Verify that the lens is connected to the Ambient MasterLockitPlus



①+②

Elements with green background are recognized by the MasterLockitPlus. The MasterLockitPlus will automatically detect Supreme Prime and CP.3 XD lenses.

Appendix B – Cables needed for different cameras

The following table shows which cables are needed for specific camera setup.

More information can be found on Ambient website http://ambient.de/product_custom_cat/timecode-kabel/.

Brand	Model	Lens data cable	Timecode cable	Camera metadata cable ¹	Power cable ²
ARRI	Amira	MLC-CP	LTC-OUT	-	AK-HS4
ARRI	ALEXA Classic	MLC-CP	TC-IO	MLC-L1B10P	included with camera metadata cable
ARRI	ALEXA Classic	MLC-CP	TC-IO	MLC-L1B10	AK-L0B2-HS4
ARRI	ALEXA LF	MLC-CP	TC-IO	-	AK-L0B2-HS4
ARRI	ALEXA Mini	MLC-CP	TC-IO (optional TC-IO-RA)	MLC-L1B10P	included with camera metadata cable
ARRI	ALEXA Mini LF	MLC-CP	TC-IO	-	AK-L0B2-HS4
ARRI	SXT	MLC-CP	TC-IO	-	AK-L0B2-HS4
Blackmagic Design	Ursa/Mini/Mini Pro	MLC-CP	LTC-Out	-	AK-XLR4M
Canon	C700	MLC-CP	LTC-Out	-	AK-HS4-PC2M (AK-L0B2-HS4 optional)
Canon	C500	MLC-CP	LTC-Out	-	-
Canon	C300 II	MLC-CP	LTC-Out	-	-
Canon	C100 II	MLC-CP	TC-OUT	-	-
Panasonic	Varicam LT/35/HS	MLC-CP	LTC-Out	-	AK-HS4 (AK-L0B2-HS4 optional for 35/HS)

¹ The camera metadata cable is not necessary to get the ZEISS eXtended Data but is part of a correct metadata setup with the MasterLockitPlus. Using this cable, the MasterLockitPlus receives metadata from the camera in addition to the ZEISS eXtended Data. The MasterLockitPlus does not support all cameras.

² Cameras with no or not supported power outlet require additional 6-28V power source to power the MasterLockitPlus / lens connection. Different solutions are possible.

Panasonic	Varicam Pure	MLC-CP	LTC-Out	-	AK-L0B2-HS4
Panavision	Milenium DXL	MLC-CP	over ACN	over ACN	AK-L0B2-HS4
RED	DSMC1	MLC-CP	LTC-Out / EPIC	ACN-RCP	-
RED	DSMC2 w Base Expander	MLC-CP	LTC-Out / EPIC	ACN-RCP	-
RED	DSMC2 w V-LOCK I/O Expander	MLC-CP	LTC-Out / EPIC	ACN-RCP	AK-HS4-PC2M
RED	DSMC2 w JETPACK Expander	MLC-CP	LTC-Out / EPIC	ACN-RCP	-
RED	DSMC2 w JETPACK- SDI Expander	MLC-CP	LTC-Out / EPIC	ACN-RCP	AK-L0B2-HS4
RED	DSMC2 with REDVOLT Expander	MLC-CP	TC-IO	ACN-RCP	AK-L0B2-HS4
RED	DSMC2 w OMOD	MLC-CP	over ACN	over ACN	AK-L0B2-HS4
Sony	F65	MLC-CP	LTC-Out	-	-
Sony	F5/F55	MLC-CP	LTC-Out	-	AK-HS4
Sony	FS7II (requires XDCA- FS7 for timecode and DC out)	MLC-CP	LTC-Out	-	AK-HS4
Sony	Venice	MLC-CP	LTC-OUT	-	AK-HS4

Appendix C - Cables

- Lens data cable
 - MLC-CP



- Power cables
 - AK-XLR4M



- AK-HS4-PC2M



- AK-L0B2-HS4



- AK-HS4



- Camera metadata cables

- MLC-L1B10P



- ACN-RCP



- Timecode cables
 - TC-I/O & TC-I/O RA (Right Angle)



- LTC-Out/EPIC



- LTC-OUT



- TC-OUT



Appendix D – Setup ARRI cameras

Equipment

- ARRI Alexa Classic, Alexa SXT / LF or Alexa Mini
- ZEISS cinema lens featuring ZEISS eXtended Data (Supreme Prime or CP.3 XD)
- Ambient MasterLockitPlus
- Lens data cable MLC-CP
- Timecode cable TC I/O
- Camera metadata & power cable MLC-L1B10P

Connection diagram

Camera / Lens		Cable		MasterLockitPlus
Timecode connector	←	TC-IO	→	TC (red)
Ethernet connector	←	MLC-L1B10P	→	Ethernet port + DC in
Lens eXtended Data socket	←	MLC-CP	→	ACN (grey)



cable connections with Alexa Classic / SXT or LF



cable connections with Alexa Mini

Verify that lens is recognized by camera

ARRI Alexa Classic / SXT or LF

- Lens information are displayed on camera display (①+②+③).



ARRI Alexa Mini

- Lens information are displayed on camera screen (①).



Appendix E – Setup RED DSMC2 cameras

Equipment

- RED DSMC2 camera (If you use a RED DSMC2 camera with firmware version 7.1 or higher and you are shooting in R3D, please read the White Paper “ZEISS eXtended Data workflow with RED DSMC2 cameras”.)
- ZEISS cinema lens featuring ZEISS eXtended Data (Supreme Prime or CP.3 XD)
- Ambient MasterLockitPlus
- Lens data cable MLC-CP
- Timecode cable LTC-Out/EPIC
- Optional: Camera metadata cable ACN-RCP
- Power cable AK-HS4-PC2M

Connection diagram

Camera / Lens		Cable		MasterLockitPlus
Power TAP	←	AK-HS4-PC2M	→	DC in
Sync	←	LTC-Out/EPIC	→	TC (red)
Ctrl	←	ACN-RCP (optional)	→	ACN (blue)
Lens eXtended Data socket	←	MLC-CP	→	ACN (grey)



cable connections with RED DSMC2 camera

Verify that the lens is recognized by the camera

- Lens information are displayed on camera screen (①).



Appendix F – Setup SONY cameras

Equipment

- SONY cinema camera (If you use a SONY Venice camera with firmware version 4.0 or higher and you are shooting in X-OCN, please read the White Paper “ZEISS eXtended Data workflow with SONY Venice camera”.)
- ZEISS cinema lens featuring ZEISS eXtended Data (Supreme Prime or CP.3 XD)
- Ambient MasterLockitPlus
- Lens data cable MLC-CP
- Timecode cable LTC-OUT
- Power cable AK-HS4

Connection diagram

Camera / Lens		Cable		MasterLockitPlus
12V Out	←	AK-HS4	→	DC in
Sync	←	LTC-OUT	→	TC (red)
Lens eXtended Data socket	←	MLC-CP	→	ACN (grey)



cable connections with SONY Venice camera

Verify that lens is recognized by the camera

- Lens information are displayed on “Lens” tap ((1)+(2)+(3)+(4)).



Appendix G – Troubleshooting

The camera does not detect the lens

In case the lens data is not shown on the screen, in the viewfinder or in the camera menu:

- Disconnect the lens from the MasterLockit*Plus*.
- Detach the lens from the camera.
- Attach the lens to the camera.
- Wait until the lens data is shown on the monitor of the camera.
- Connect the lens data cable to the MasterLockit*Plus*.

Check if the lens is powered through the camera

If your camera does not recognize your lens, please check if the lens getting power through the camera:

Alexa Mini

- Go to **SETTINGS** → **Enable lens mount** should be on.

ARRI Alexa SXT / Alexa Plus

- Go to **OPTIONS** → **LDS mount** should be on.

RED DSMC2 cameras

- Go to **MENU** → **Settings** → **Setup** → **Lens**
- Ensure that following options are selected:
 - **Enable Power to Lens**
 - **Auto-Detect PL Lens**

SONY Venice

- Hold the **MENU** button while turning the dial wheel. → Go to **Technical**. → **System Configuration** → **Lens Interface** should be **Type C**.

What to do if the MasterLockit*Plus* does not detect the lens

In case the lens is not recognized by the MasterLockit*Plus*:

- Verify that the MLP-CP cable is plugged in correctly.
- Un-plug and re-plug the MLP-CP cable.
- Verify that the whole connections have been done correctly.

Appendix H – Short presentation of zeiss-xdcp software

ZEISS eXtended Data injection software (`zeiss-xdcp`) is a command line tool used for injecting ZEISS eXtended Data into EXR files.

It can be downloaded from the ZEISS website <https://www.zeiss.com/cine/xd> and runs on Mac, Windows or Linux. You only need a terminal. For detailed list of options: `zeiss-xdcp --help`

Usage:

```
zeiss-xdcp [OPTION]... -s SOURCE... -d DESTINATION...
```

Options:

```
-h [ --help ]           Display help text and exit.
--version              Output version information and exit.
-s [ --source ] arg    Path to one or more files where the
                       metadata shall be copied from.
-d [ --destination ] arg Path to one or more files where the
                       metadata shall be copied to.
--ask-before-overwriting-metadata Prompt before overwriting existing
                       metadata.
--do-not-overwrite-metadata Do not overwrite existing metadata.
--abort-on-first-error  Abort copying on the first error occurred.
```

Description:

A command-line tool used for timecode-based copying of ZEISS eXtended Metadata from a given container into the metadata section of the given image file(s).

After copying the metadata, the image files (e.g. of type `exr`) can then be used directly by the ZEISS eXtended Data Plug-ins to perform different kinds of lens corrections just on the basis of the embedded metadata. An additional metadata description file (e.g. of type `zlcfc`) will no longer be needed and this will simplify the workflow with the ZEISS eXtended Data technology.

Supported File Formats:

```
zlcfc: Path to a single file of this format can be used as SOURCE.
r3d:   Path to a single file of this format can be used as SOURCE. If the
       footage is split into multiple files, please select only one of them
       because the other parts will be found and used automatically.
exr:   Path to one or more files of this format can be used as DESTINATION.
```

Examples:

```
Copy from "clip.zlcfc" to "clip-0000.exr".
$ zeiss-xdcp -s clip.zlcfc -d clip-0000.exr

Copy from "clip.zlcfc" to "clip-0000.exr", "clip-0001.exr" and "clip-0002.exr".
$ zeiss-xdcp -s clip.zlcfc -d clip-0000.exr clip-0001.exr clip-0002.exr

Copy from "clip.zlfc" to files which start with "clip-" and end with ".exr".
$ zeiss-xdcp -s clip.zlcfc -d clip-*.exr

Copy from "clip-001.r3d" and all the other r3d files contained in the same
directory which belong to the same footage to files which start with "clip-"
and end with ".exr".
$ zeiss-xdcp -s clip-001.r3d -d clip-*.exr
```

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