

ARRI Metadata

Live Link Metadata Plug-in for Unreal Engine

USER MANUAL

Date: 8. July 2021

Version: 1

Version History

Version	Author	Change Note
2021-07-08	Oestreich Andreas	Formatted and structured
2021-06-23	Oestreich Andreas	Initial version

Table of Contents

Version History	2
1.0 UMC-4 Configuration	4
1.1 Update Firmware.....	4
1.2 Setup UMC-4.....	4
2.0 Camera Setups	5
2.1 Alexa Mini LF / Alexa Mini / Amira	5
2.1.1 LDS - CForce.....	5
2.1.2 LDA/LDM - CForce	5
2.2 ALEXA SXT / XT / 65 / LF.....	6
2.2.1 LDS - CLM.....	6
2.2.2 LDA / LDM – CLM	6
2.2.3 LDS – CForce.....	7
2.2.4 LDA / LDM – CForce	7
3.0 Unreal Engine	8
3.1 Setup	8
3.2 Live Link	9
3.2.1 Setup	9
3.2.2 Workflow	10
3.2.2.1 Adding your subject to the cine camera	10
3.2.2.2 Timecode	10
3.2.2.3 Additional Metadata from Live Link	11
3.3 Blueprint	13
3.3.1 Metadata types and availability based on camera system	14
4.0 Troubleshooting	16
Contact	16
Debugging	16
5.0 Known issues	16
5.1 UMC Firmware update	16
5.2 Metadata	16

1.0 UMC-4 Configuration

1.1 Update Firmware

To update the device, proceed as follows:

1. Copy the firmware update package onto an SD card.
2. Insert the SD card in the SD card slot of the UMC-4.
3. Select Menu>System>Firmware Update and navigate to the update package on the SD card.
4. Select the package. A list of modules will be shown on the screen.
5. Press UPDATE. A new warning screen will be displayed. Proceed by simultaneously pressing the two UPDATE buttons. The screen will blackout and the status LED starts blinking red and green. The unit is being updated. This can take up to 30 seconds.
6. The UMC-4 will reboot after the update is completed. Depending on the update package content, additional modules might need to be updated after reboot; this is done automatically and is clearly indicated on the screen of the device. The second phase of the update procedure may take several minutes.

NOTE:

You may also update the Firmware via a Web browser if your device is accessible via Network. Navigate to the UMC's IP Address and follow the steps for the Firmware update in the Tab "Firmware".

1.2 Setup UMC-4

NOTE:

Before using the UMC for Metadata streaming, make sure your UMC unit has a valid MAC address. To check this, navigate to: **MENU->SYSTEM->NETWORK->SHOW PARAMETERS**
In the bottom line you will see the MAC address. If this is set to: 123456789AB, your UMC device needs to be sent to ARRI Service for repair.

1. Choose whether you want to stream the data via Unicast or Multicast and set the parameter in the Network settings of the UMC device (**MENU->SYSTEM->NETWORK**)
2. Configure the UMCs IP Address. Navigate to: MENU->SYSTEM->NETWORK. Either use DHCP or configure a manual IP Address. (Ask your IT admin what settings to use)
3. Configure the streaming Address: Navigate to **MENU->SYSTEM->NETWORK->Streaming Address**.
For Multicast: Set in range 239.192.x.x
For Unicast: Set to the IP Address of the receiving device (e.g., 192.168.0.50)
4. For Alexa Mini, Mini LF and AMIRA cameras:
Set the device to get its metadata from the camera: Navigate to: MENU->LENS->Set "Lens data source" to "CAM"
For ALEXA XT, SXT, LF and 65 or Thirdparty cameras:
Set the device to generate the metadata from the motor values: Navigate to: **MENU->LENS->Set "Lens data source" to "UMC"**
5. To activate the streaming navigate to:
MENU -> METADATA -> STREAM->"ON"

The UMC will now continuously send (and record) the Lens Metadata to the designated multicast Address.

2.0 Camera Setups

2.1 Alexa Mini LF / Alexa Mini / Amira

2.1.1 LDS - CForce

Alexa Mini LF / Alexa Mini / AMIRA
LDS lens

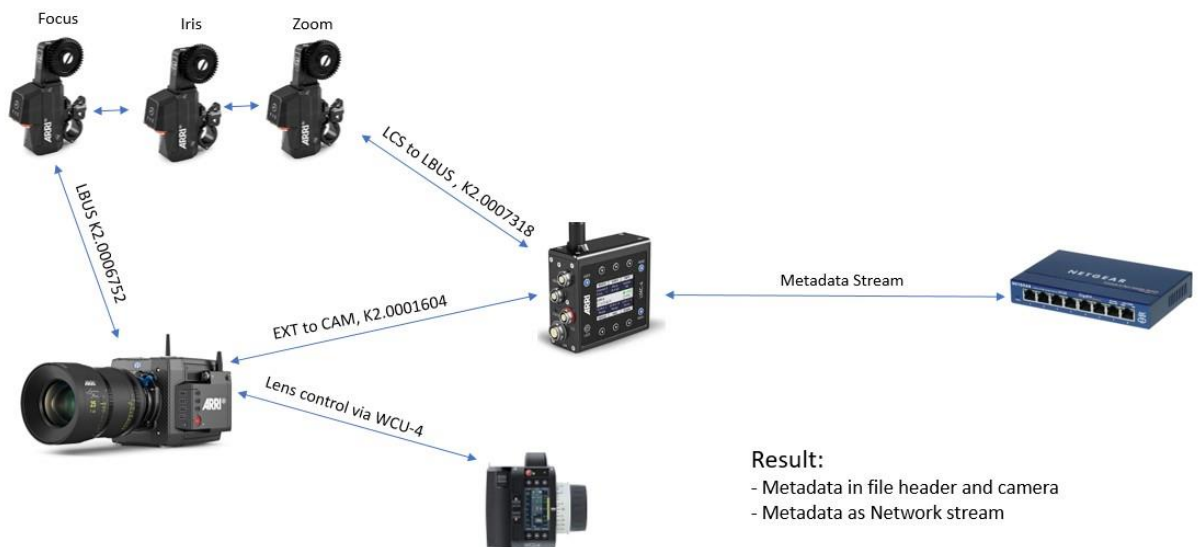


Result:

- Metadata in file header and camera
- Metadata as Network stream

2.1.2 LDA/LDM - CForce

Alexa Mini LF with
LDM and LDA lenses



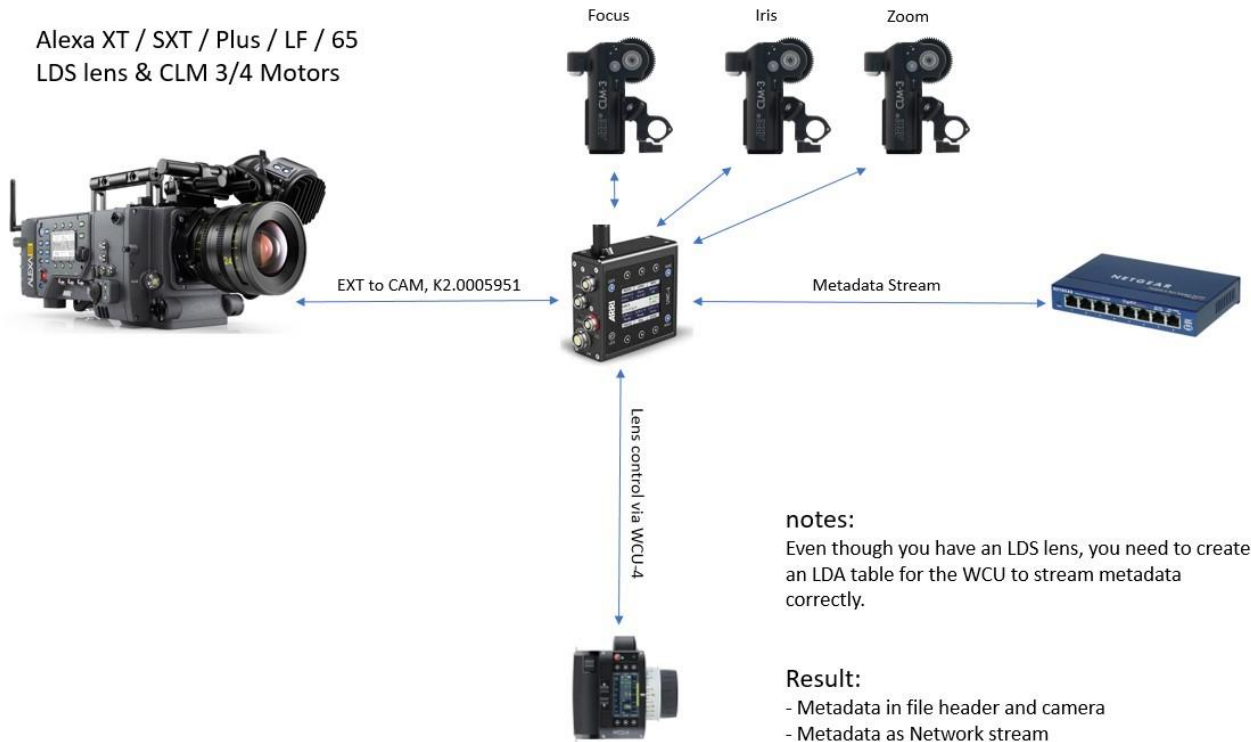
Result:

- Metadata in file header and camera
- Metadata as Network stream

2.2 ALEXA SXT / XT / 65 / LF

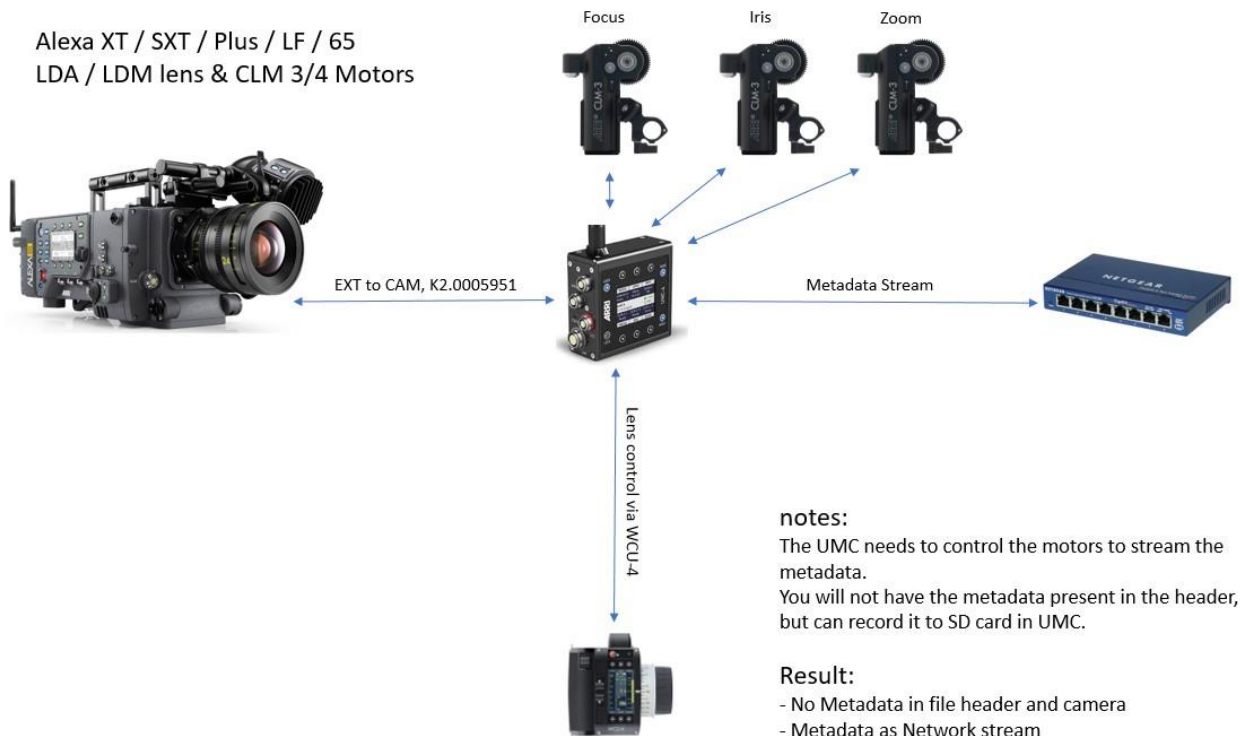
2.2.1 LDS - CLM

Alexa XT / SXT / Plus / LF / 65
LDS lens & CLM 3/4 Motors



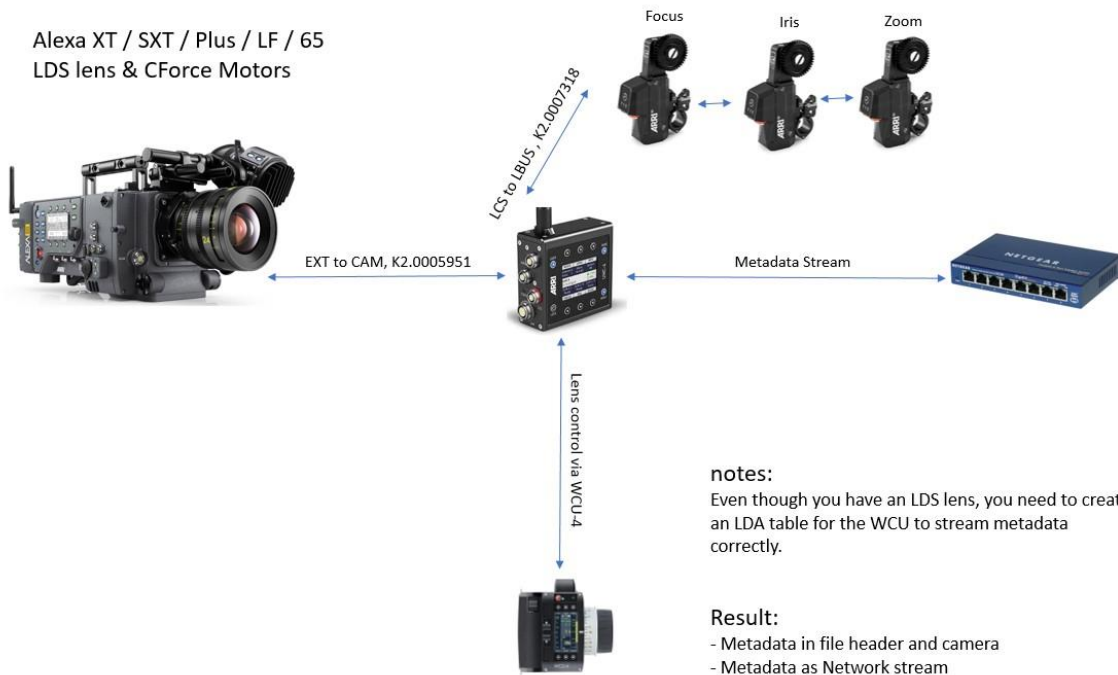
2.2.2 LDA / LDM – CLM

Alexa XT / SXT / Plus / LF / 65
LDA / LDM lens & CLM 3/4 Motors



2.2.3 LDS – CForce

Alexa XT / SXT / Plus / LF / 65
LDS lens & CForce Motors

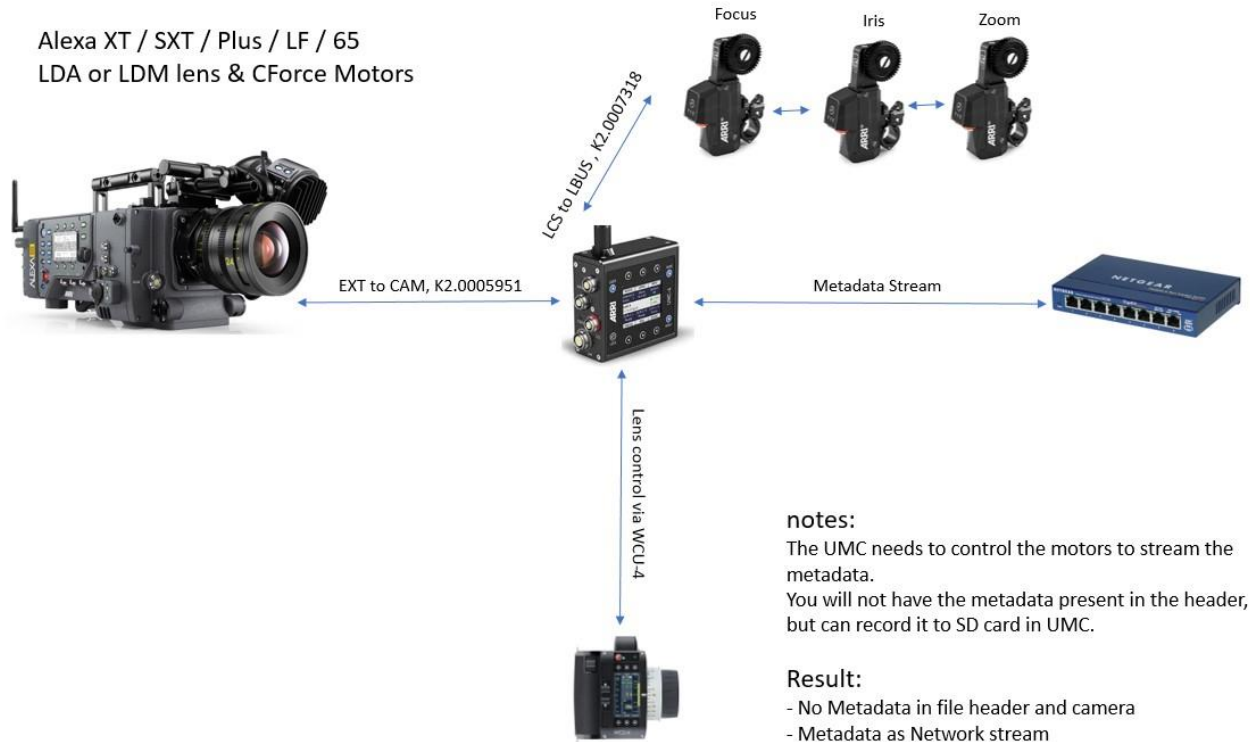


notes:
Even though you have an LDS lens, you need to create an LDA table for the WCU to stream metadata correctly.

Result:
- Metadata in file header and camera
- Metadata as Network stream

2.2.4 LDA / LDM – CForce

Alexa XT / SXT / Plus / LF / 65
LDA or LDM lens & CForce Motors



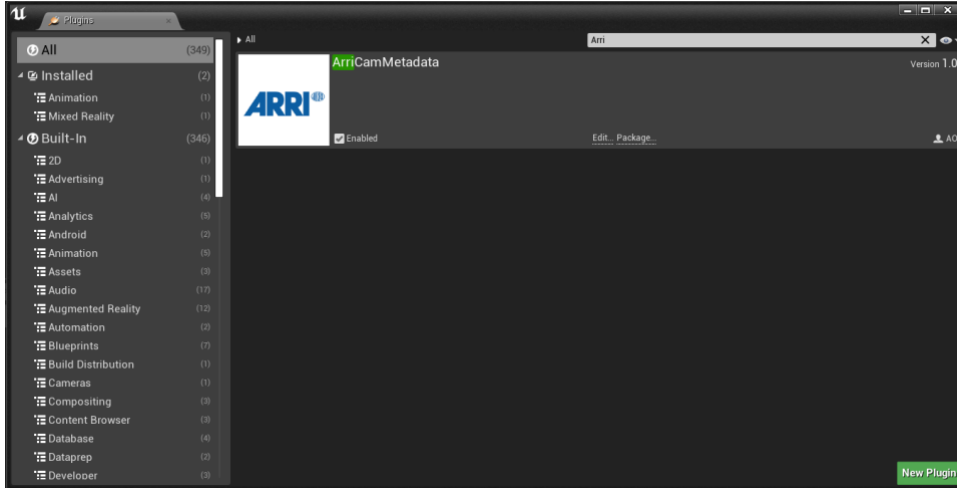
notes:
The UMC needs to control the motors to stream the metadata.
You will not have the metadata present in the header, but can record it to SD card in UMC.

Result:
- No Metadata in file header and camera
- Metadata as Network stream

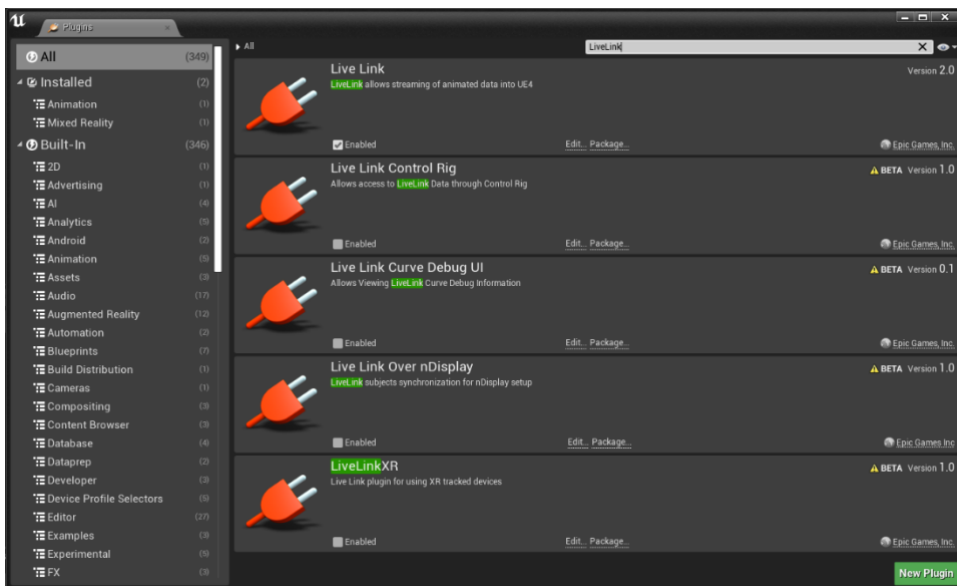
3.0 Unreal Engine

3.1 Setup

Copy the Plug-in to either your project or engine folder and make sure it is activated in Unreal Engine.



Make sure you have activated the LiveLink Plug-in and, if necessary the Live Link over nDisplay Plug-in.



For UE 4.27 you also have to activate the Live Link camera Plug-in



3.2 Live Link

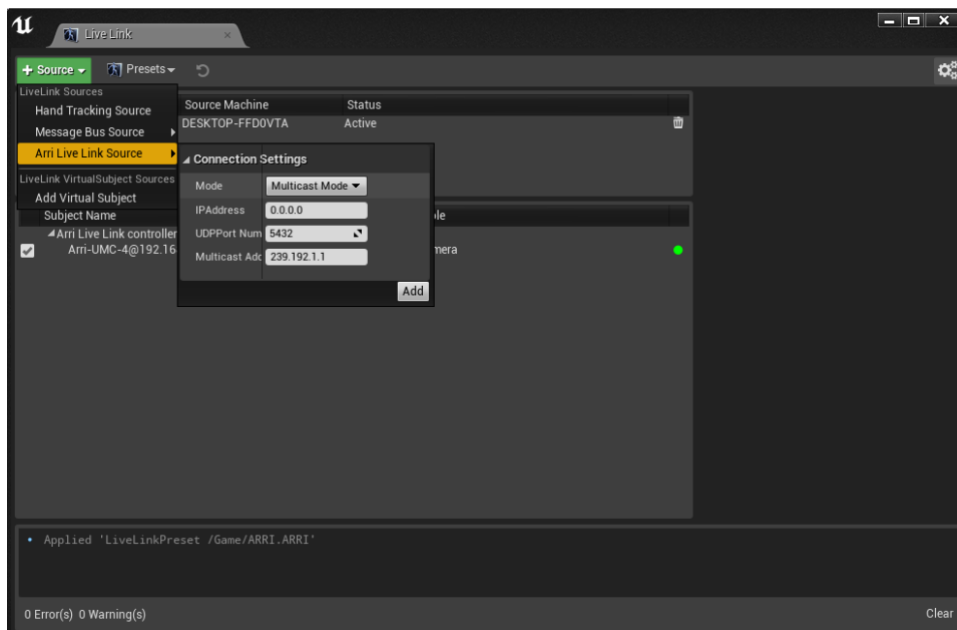
3.2.1 Setup

Before Setting up your Live Link make sure your UMC-4 unit is configured to your needs, either streaming as Multicast or Unicast via UDP.

- Go To Window -> Live Link and hit the “+Source” button.
- Select Arri Live Link Source and configure the settings:

Mode	Multicast or Unicast (from UMC-4 configuration)
IPAddress	Your network cards IP address that is receiving the network data
UDP Port Number	The port number configured in the UMC (Default is 5432)
Multicast Address	Multicast address in local scope 239.192.x.x (Default is: 239.192.1.1)

NOTE: If your machine has multiple network cards you need to make sure you set the IP address to your preferred network card, otherwise Unreal Engine might default to the wrong network interface (0.0.0.0) and you will not be able to receive the data.



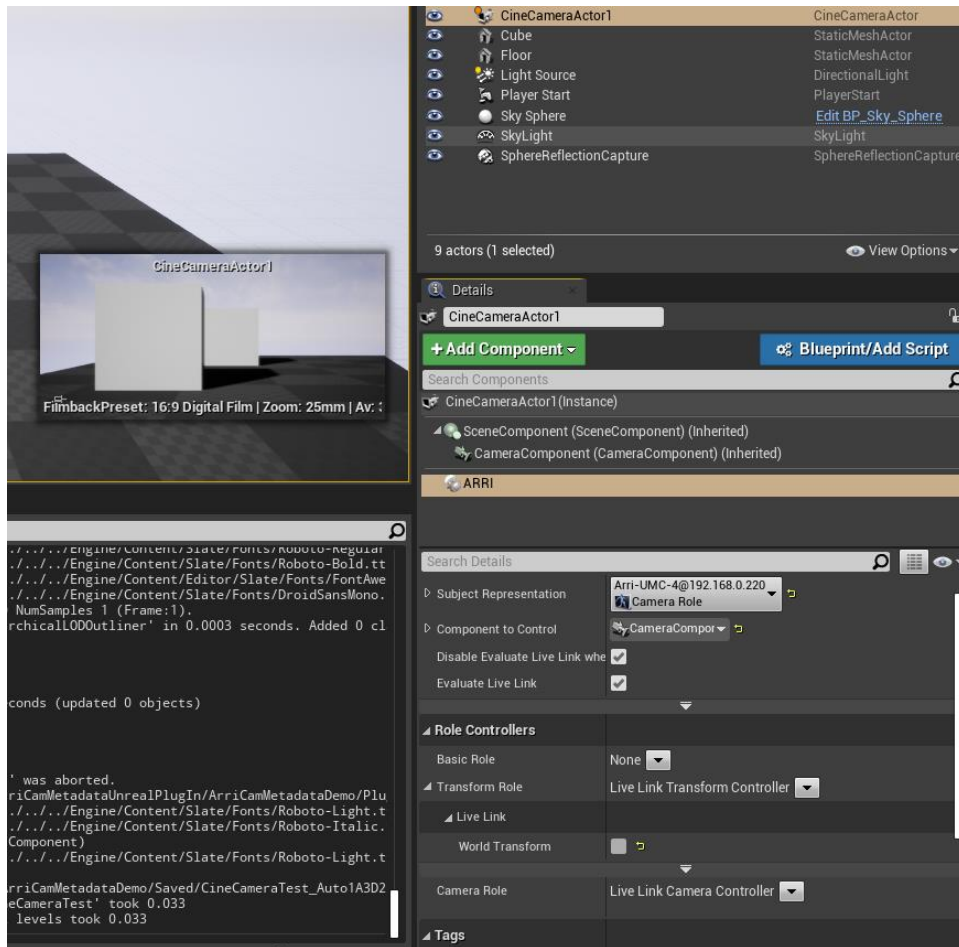
If everything is setup correctly, your Live Link subject will be automatically created.

For troubleshooting you can always view the Output Log and monitor “LogArri” to see whether your sockets are being created or whether any Warnings or Errors are thrown.

3.2.2 Workflow

3.2.2.1 Adding your subject to the cine camera

- Create a new Cine Camera Actor and place it in your scene.
- Add a Live Link Component to it. In the Live Link component select your Live Link subject.
- Once you have selected the Arri-UMC subject the camera data is applied to the cine camera.
- Lastly make sure you untick “World transform” in Role Controllers-> Transform Role -> Live Link

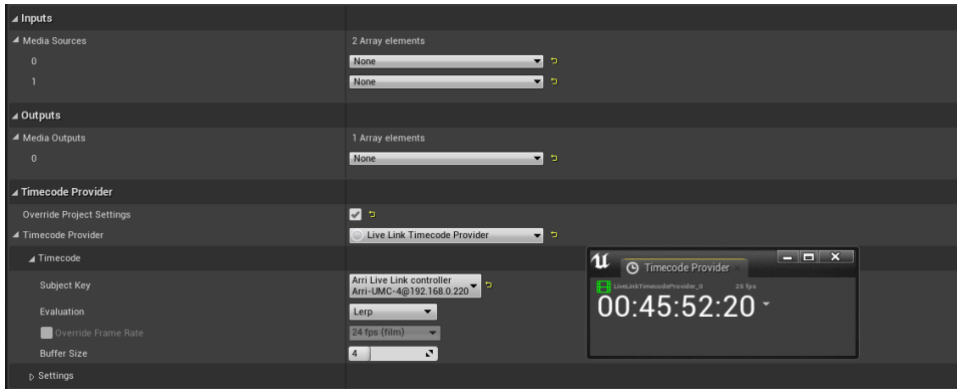


3.2.2.2 Timecode

You can stream the timecode from the UMC-4 from your Live Link subject to the Unreal Engine's Timecode Provider.

To do this, create a new Media Profile:

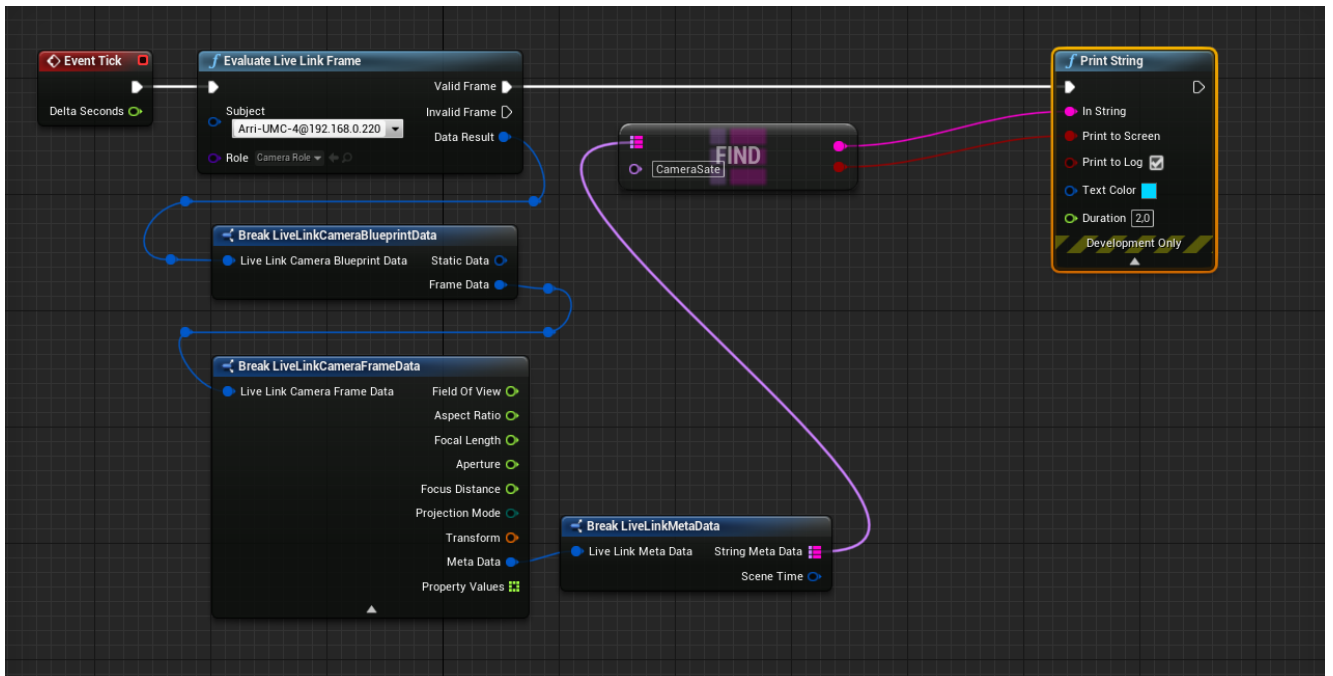
- Right click in Content browser->Media->New Media Profile
- Open the Media Profile and go to: Timecode Provider
- Tick the “Override Project Settings”
- As Timecode Provider select the Live Link Timecode Provider and as subject the ARRI Live Link subject.
- Hit save and open the Timecode Provider Window. Your engine timecode is now streamed from the UMC-4.



3.2.2.3 Additional Metadata from Live Link

You can access additional metadata from the Live Link subject in Blueprints.

Open your Blueprint class or your level blueprint and create the following Nodes.



You can access all the camera metadata from the Live Link camera, including the timecode.

Additionally embedded in the Meta Data field of the Live Link Frame data you will find the following properties. These can only be stored as Strings. If you want to use them, you need to take care of the conversion from String to designated datatype in Blueprints.

Key	Data type in String
CameraState	Datatype ENUM as String <ul style="list-style-type: none"> - CameraSystem Unknown state - CameraSystem Ready - CameraSystem Recording - CameraSystem Recording start - CameraSystem Recording stop - CameraSystem Warning - CameraSystem Error - CameraSystem Not Ready - CameraSystem Booting - CameraSystem Updating - CameraSystem Update Finished - CameraSystem Prerecording - CameraSystem Starting Prerecording - CameraSystem Playback - CameraSystem Formatting Medium
ExposureIndex	integer
ExposureTime	float
ShutterAngle	float
CCT	integer
tint	float

3.3 Blueprint

You can access all the metadata without using Live Link.

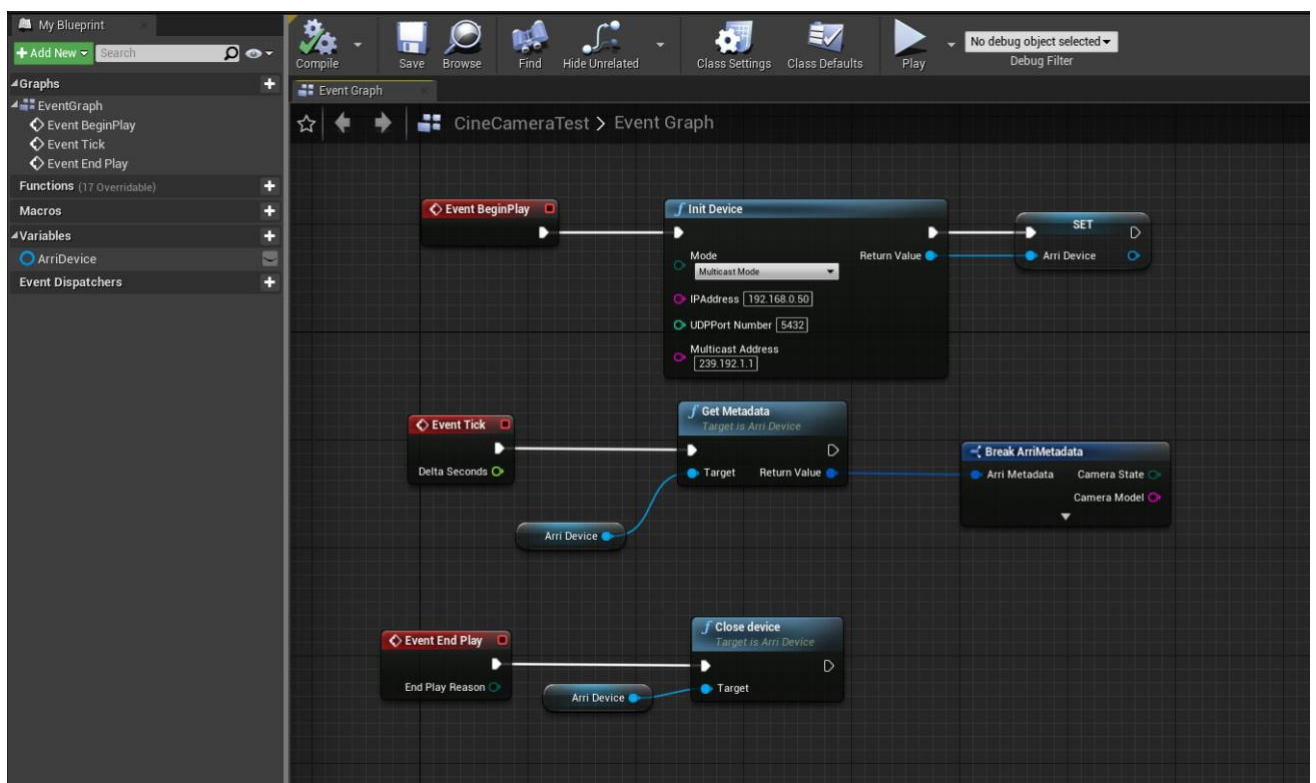
NOTE: If you do this, make sure you are not using Live Link at the same time. You must use one or the other, or you will have a conflict in the created socket, resulting in undefined behaviour.

Exception:

Should you be streaming the data via Multicast to two different network cards, you can setup a Live Link and Blueprint workflow simultaneously, since you can create a socket per network card. Just make sure you are using the correct IP address.

- Begin by creating an ArriDevice Variable:
- +Variable -> Variable Type -> Object Types -> ArriDevice -> Object Reference
- On Event Begin Play initialize the ArriDevice with your desired settings.
- Drag the ArriDevice Variable in the blueprint and set it from the Init Device output.
- Drag the Arri Device into your Blueprint again and use “get”. Drag out from its output and use the function “get Metadata”. Connect it to the Event Tick.
- The return value can now be broken (break ArriMetadata) and you will have access to all the metadata streamed from the UMC.
- Lastly close the device on Event End Play with the function “close device”.

You can now build your own logic with all the provided metadata.



3.3.1 Metadata types and availability based on camera system

Metadata	ALEXA Mini LF AMIRA ALEXA Mini	ALEXA XT SXT 65 LF	LiveLink	Blueprint	Comment	Datatype
camera state	x	x	x	x	The state the camera currently is in. Useful for recording automation.	ENUM HMI_CS_READY HMI_CS_RECORDING HMI_CS_REC_STARTING HMI_CS_REC_STOPPING HMI_CS_WARNING_ACTIVE HMI_CS_ERROR_ACTIVE HMI_CS_NOT_READY HMI_CS_BOOTING HMI_CS_UPDATING HMI_CS_UPDATE_FINISHED HMI_CS_PRE_RECORDING HMI_CS_PREREC_STARTING HMI_CS_PLAYBACK HMI_CS_MEDIUM_FORMAT
camera model	x			x	For UMC-4 workflow this metadata will be set to "UMC-4"	String
umc4 serial	x			x	The serial number of the UMC-4 device	String
umc4 software version	x			x	The UMC-4's software version	String
camera serial number	x			x	The camera's serial number	String
camera software version	x			x	The camera's software version	String
nd filter density	x			x	ND filter density (e.g 0.6 or 1.2)	float
nd filter type	x			x	set to "none" or "active"	ENUM ND_OFF ND_ON ND_UNKNOWN
lens name	x		x	x	name of the lens in use	String
lens serial number	x			x	serial number of the lens	String
motor encoder limits	x	x	x	x	the encoder limits of the attached lens motors: motorRawEncoderLimitsFocusMin motorRawEncoderLimitsFocusMax motorRawEncoderLimitsIrisMin motorRawEncoderLimitsIrisMax motorRawEncoderLimitsFLMin motorRawEncoderLimitsFLMax	integer
focus unit	x	x		x	metric or imperial	
focus distance	x	x	x	x	is always converted to metric in cm	float
iris / aperture	x	x	x	x	presented as aperture in Unreal Engine	float
focal length	x	x	x	x	focal length	float
lens raw encoder values	x			x	lens encoder values for lenses with LDS (lens data system)	integer
motor raw encoder values	x	x		x	motor encoder values of the external lens motors	integer

shutter angle	x			x	the shutter angle set in the camera in degrees	float
exposure time	x			x	the sensor's exposure time in milliseconds	integer
exposure index	x			x	the exposure index (ASA)	integer
recording media capacity	x			x	leftover capacity of the recording media in seconds	integer
framerate	x	x	x	x	the framerate of the timecode	Unreal Engine Framerate
dropframe	x	x	x	x	dropframe flag for timecode	boolean
framenummer	x	x	x	x	"the framenummer, describing timecode in combination with framerate and dropframe"	Unreal Engine Frametime
clip number	x			x	number of recorded clips on the recording media -> check known issues	integer
camera index	x			x	camera index, e.g "AA" or "B"	String
color temperature	x			x	the color temperature setting of the camera, e.g 5600	integer
tint	x			x	the green or magenta tint in range -16 to 16 -> check known issues	float
tilt	x		x	x	tilt value of UMC's IMU	float
roll	x		x	x	roll value of UMC's IMU	float

4.0 Troubleshooting

Contact

If you are having issues with the UMC-4 or the Unreal Plug-In please contact:

mrplugins@arri.de

For convenience, please include the Output Logs from Unreal Engine.

Debugging

If you would like to monitor the metadata you can access the verbose Logs by typing the following command in the Output Log's commandline:

Log LogArri Verbose

You can now easily monitor all metadata streamed from the UMC, without needing to access it via Blueprints.

Make sure to set this back to normal by typing:

Log LogArri Log

This sets the log back to its default state.

5.0 Known issues

5.1 UMC Firmware update

1. When updating the UMC's Firmware, make sure you activate the Streaming after the update is complete and restart the UMC. Otherwise it can happen, that you won't have an active ethernet stream. A reboot will solve this, when the UMC comes up with streaming enabled.

5.2 Metadata

1. There is an issue with the "clip number" metadata. This is currently always set to 1. Please refrain from using it for take automation until this issue is fixed.
2. The tint value is currently not converted correctly between camera and UMC unit, making its resolution narrower. It will only contain full numbers, without the decimal point.