ARRI Metadata
Unreal Engine Plug-in with the UMC-4 and Alexa35

Plug In User Manual

Date: 06.09.2023

Version: 1.04

Version History

Version	Author	Change Note
V1.04 (2023-09-06)	Kristin Wloka	Bug fixes for Alexa35 and additional metadata in Live Link Camera Frame Data
V1.03 (2022-09-02)	Oestreich Andreas / Kristin Wloka	Updated for Alexa35
V1.02 (2021-12-06)	Oestreich Andreas	Adding new features form Changelog (V1.02)
V1.01 (2021-07-08)	Oestreich Andreas	Formatted and structured
V1.0 (2021-06-23)	Oestreich Andreas	Initial Version

Table of Contents

1.0 UMC-4 / Alexa35 Configuration

1.1 UMC-4 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 UMC-4 Setup

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-4 will now continuously send (and record on SD card, if enabled) the Lens Metadata to the designated multicast Address.

1.3 Alexa35 Configuration

For the detailed Configuration of the Alexa35, please refer to its user manual.

https://www.arri.com/resource/blob/284044/2c3e40c90b7faae31f794dc40a5f9c58/alexa-35-user-manual-data.pdf

The camera supports to stream real time metadata via Ethernet, to be used in virtual studios (aka volumes with an LED wall, aka mixed reality production systems). For more information please refer to

Streaming Addressing
► Select MENU > System > Network / WiFi > Streaming Metadata > Streaming Addressing to set the type of addressing.
Following options are available:

Unicast	The metadata is transmitted from the camera to an endpoint via any nodes.
Multicast	The metadata is transmitted to multiple recipients or to a closed group of recipients.

Streaming Address
► Select MENU > System > Network / WiFi > Streaming Metadata > Streaming Address to set the destination IP address.

Info: When streaming addressing is set to Multicast, the allowed address range is within IP subnet 239.192.0.0/16.

Streaming Port
► Select MENU > System > Network / WiFi > Streaming Metadata > Streaming Port to set the destination port between 1024 and 65535.

Enable Streaming
► Select MENU > System > Network / WiFi > Streaming Metadata > Enable Streaming to enable metadata streaming.

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

EXT to CAM, K2.0001604

Metadata Stream

Lens control via WCU-4

LBUS K2.0006752

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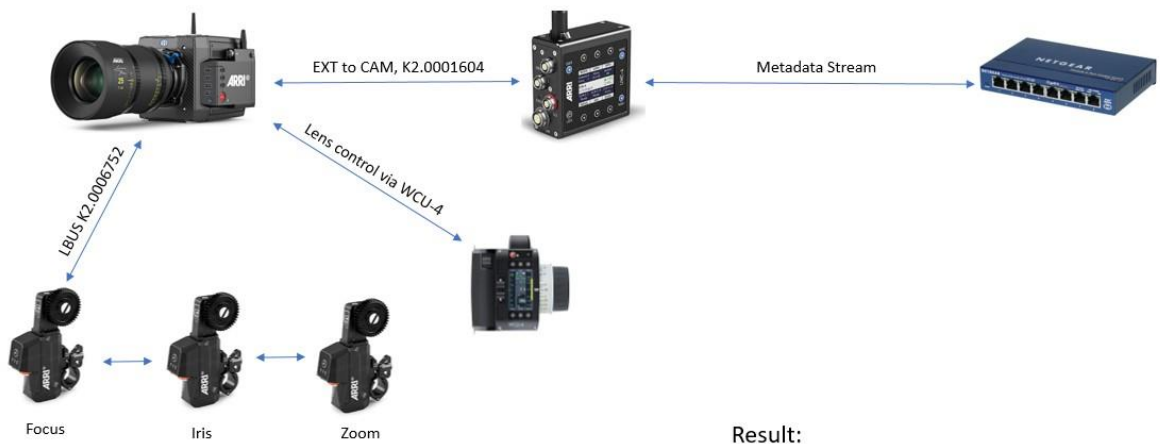
Result:
- Metadata in file header and camera
- Metadata as Network stream

2.1.2 LDA/LDM - CForce

Alexa Mini LF with
LDM and LDA lenses

Focus   Iris   Zoom

LCS to LBUS, K2.0007318

LBUS K2.0006752

EXT to CAM, K2.0001604

Metadata Stream

Lens control via WCU-4
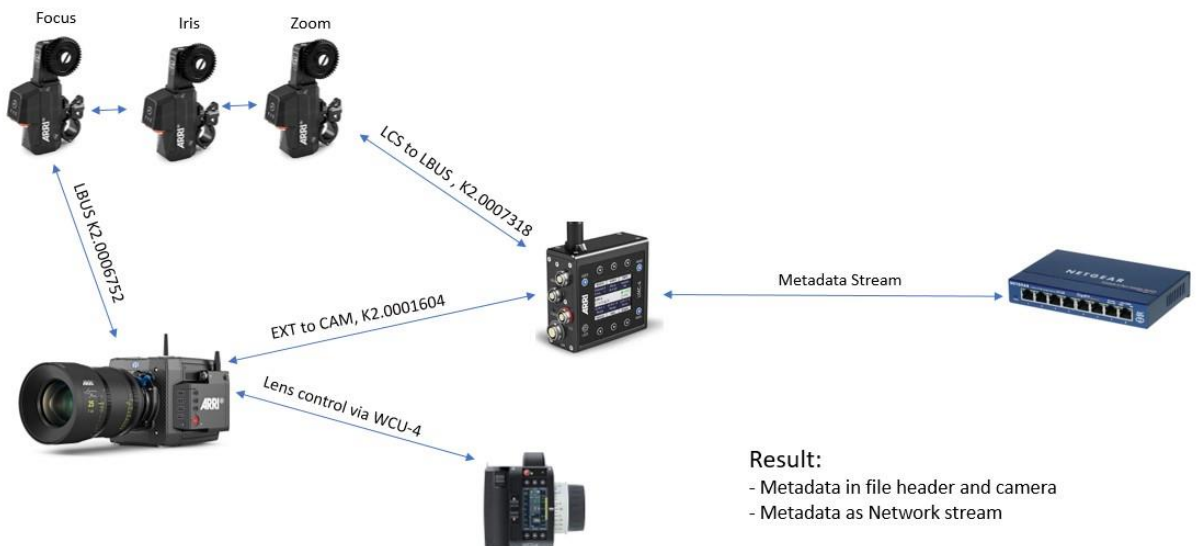
Result:
- Metadata in file header and camera
- Metadata as Network stream

2.2 ALEXA SXT / XT / 65 / LF

2.2.1 LDS - CLM

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

Focus   Iris   Zoom

EXT to CAM, K2.0005951

Metadata Stream

Lens control via WCU-4

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
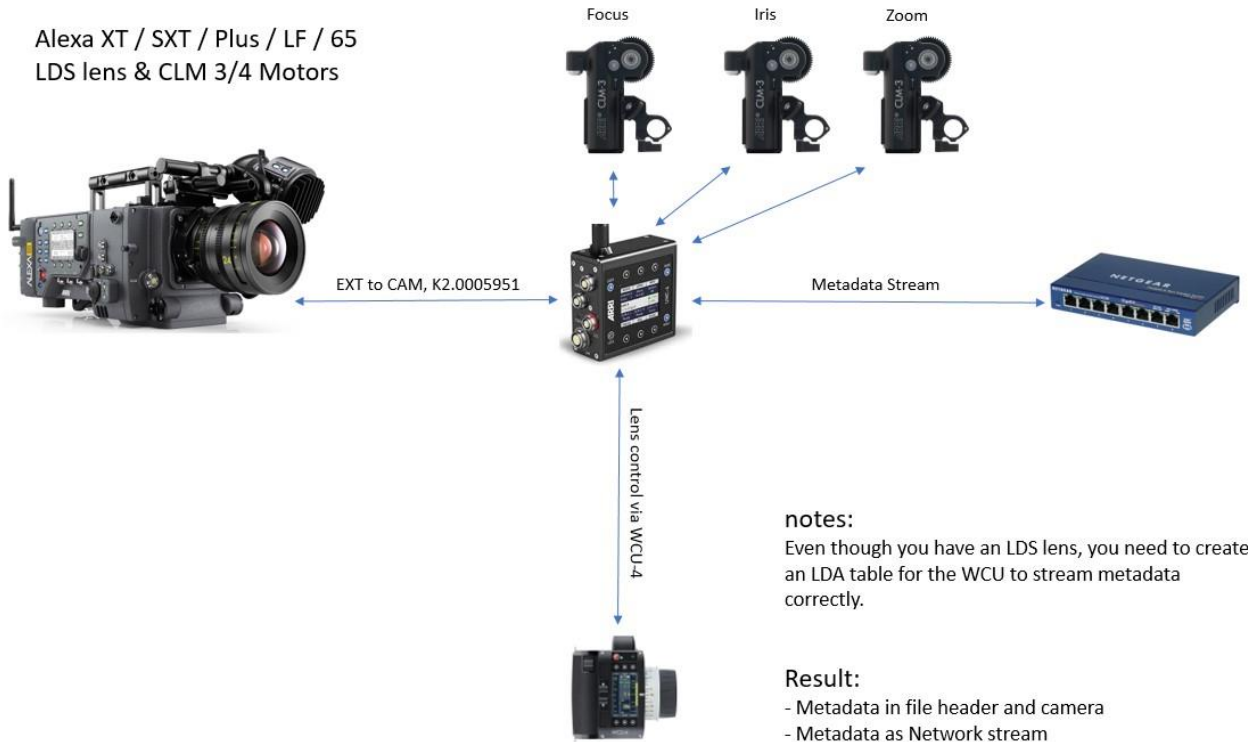
2.2.2 LDA / LDM – CLM

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

Focus   Iris   Zoom

EXT to CAM, K2.0005951

Metadata Stream

Lens control via WCU-4

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
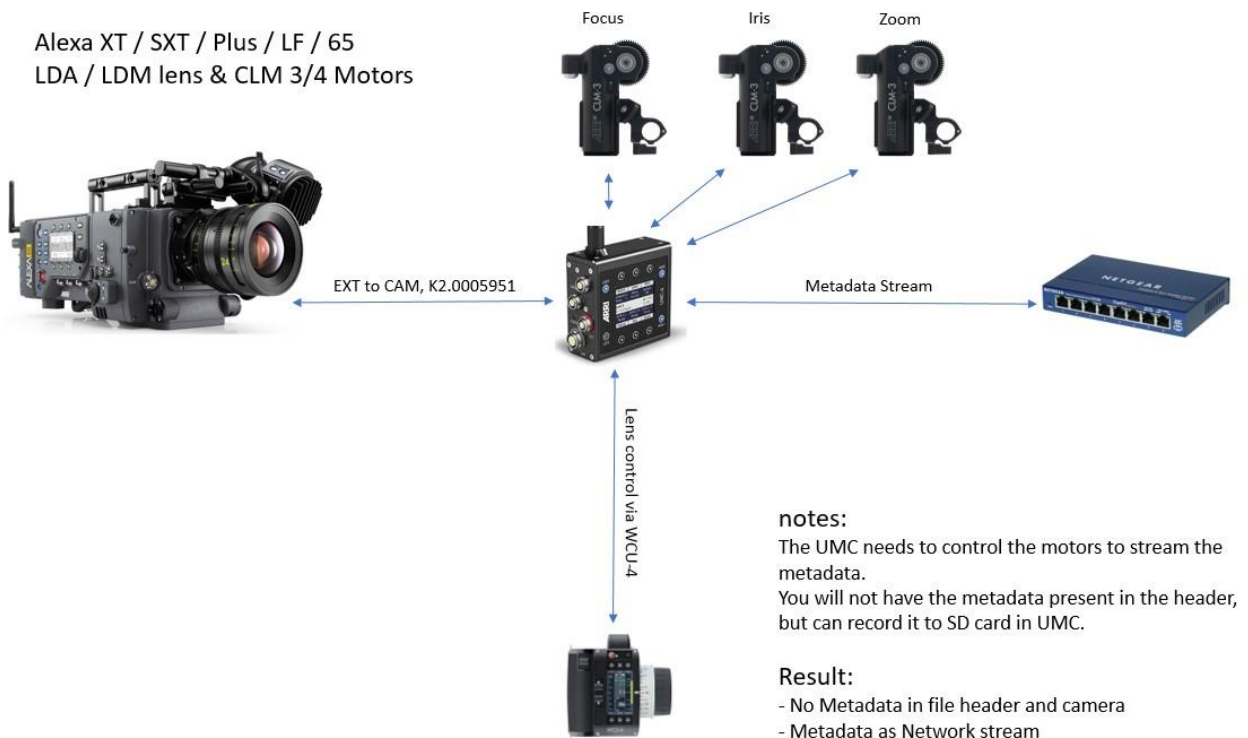
2.2.3 LDS – CForce

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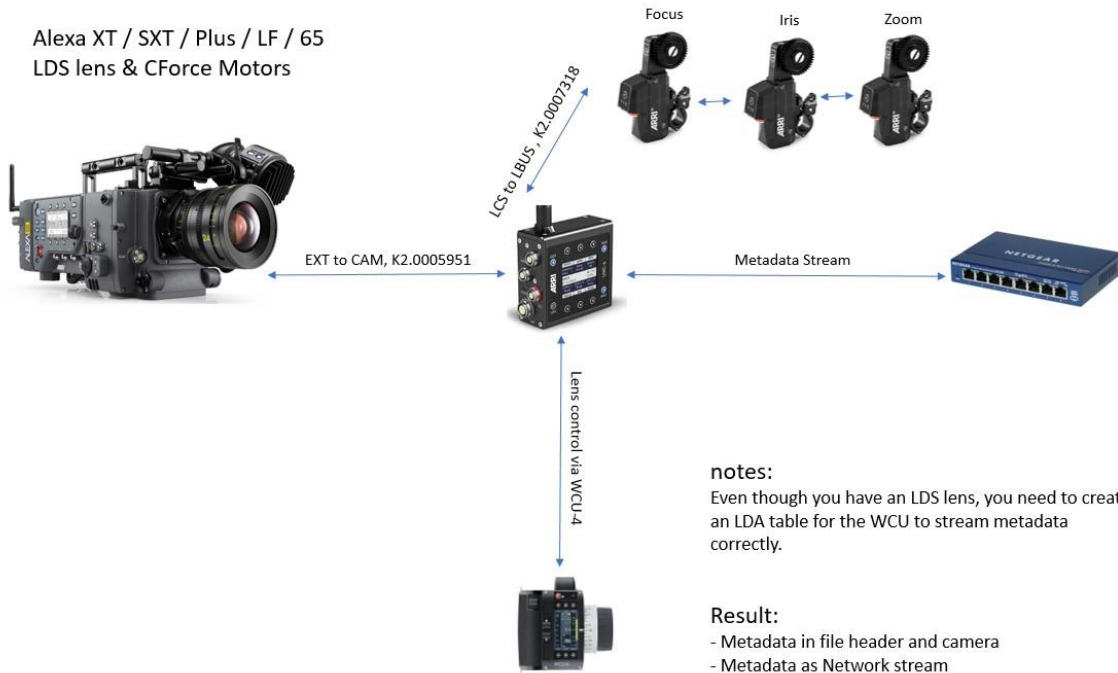
Focus Iris Zoom

LCS to LBUS, K2.0007318

EXT to CAM, K2.0005951

Metadata Stream

Lens control via WCU-4

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
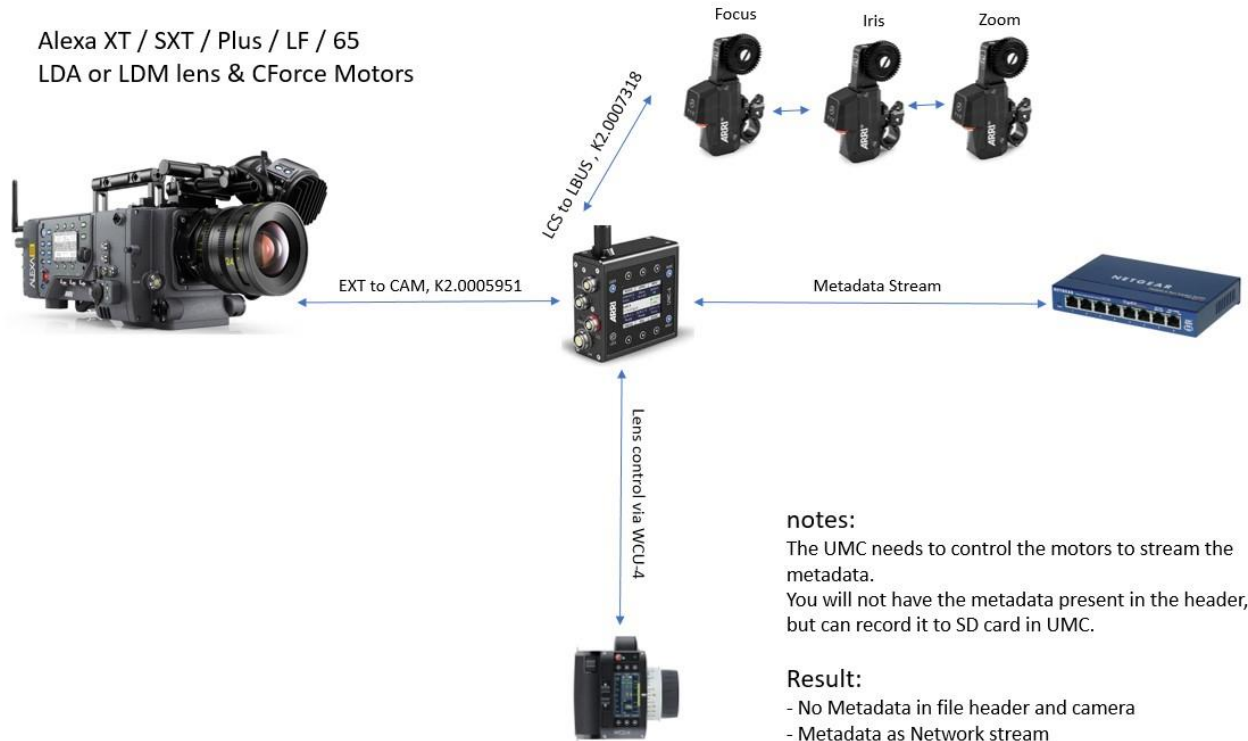
Focus Iris Zoom

LCS to LBUS, K2.0007318

EXT to CAM, K2.0005951

Metadata Stream

Lens control via WCU-4

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 Version Compatibility

3.1.1 Unreal Engine

The Arri Unreal Engine PlugIn (1.04) is now compatible with Unreal Engine Version 4.27.2 and newer. Due to changes to the way the Live Link camera works, 4.26.x and older is no longer supported.

3.1.2 UMC-4

This PlugIn Version (1.04) is compatible with UMC Firmware:

umc4-2.3.2645

3.2 Setup

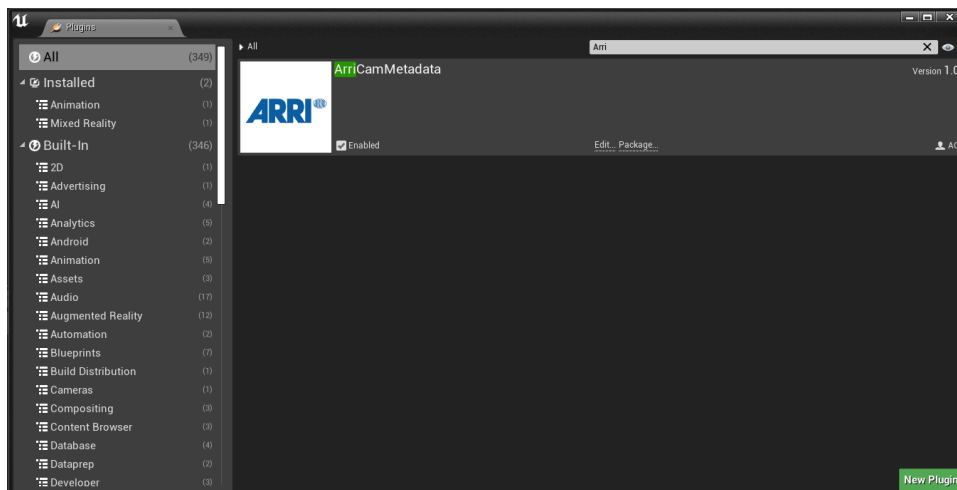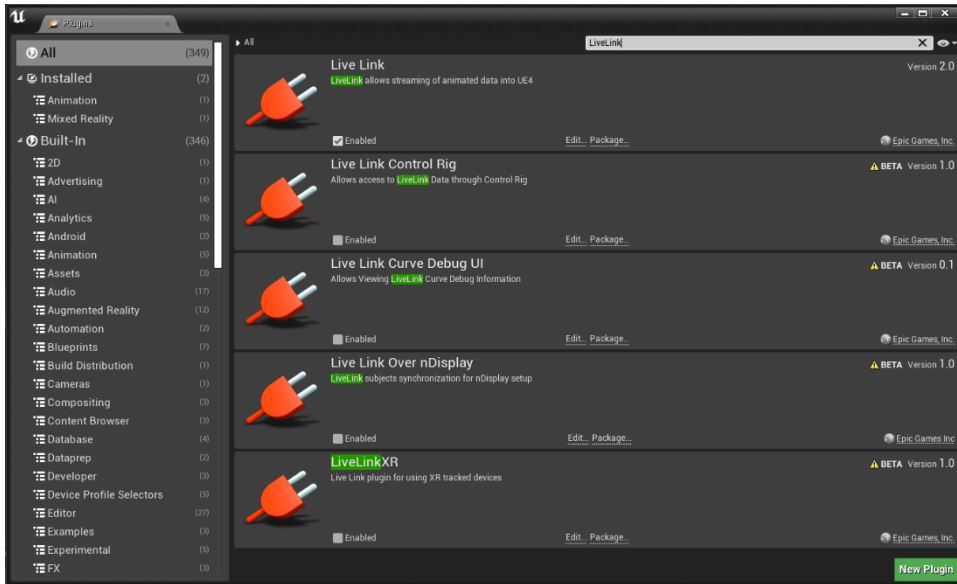Copy the Plug-in to either your project or engine folder and make sure it is activated in Unreal Engine.

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

3.3 Live Link

3.3.1 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)
Subject Name	Name for your Live Link subject
IPAddress	Your network card's IP address, that is receiving the metadata from the streaming device. You can configure the IP Address with a wildcard (*), should you have multiple devices receiving the data. The devices must be in an identical subnet, e.g. 192.168.0.* This will ensure the creation of the subject on the correct IP-Address Endpoint over multiple machines from a live link preset.
UDP Port Number	The port number configured in the UMC-4 (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.
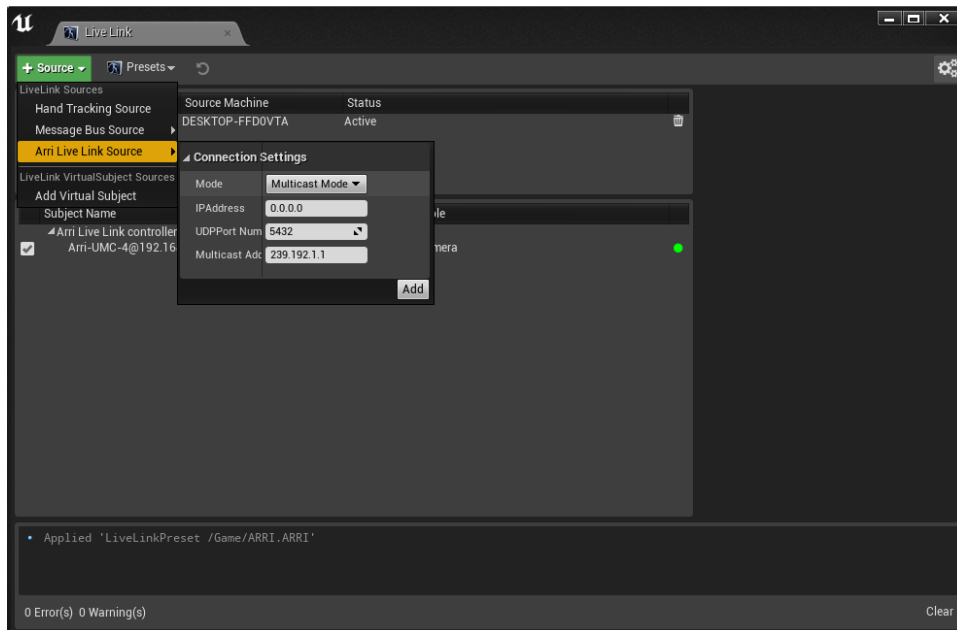
If everything is setup correctly, your Live Link subject will be automatically created.

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.

3.3.2 Workflow

3.3.2.1 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 or set the Transform Role to "None"
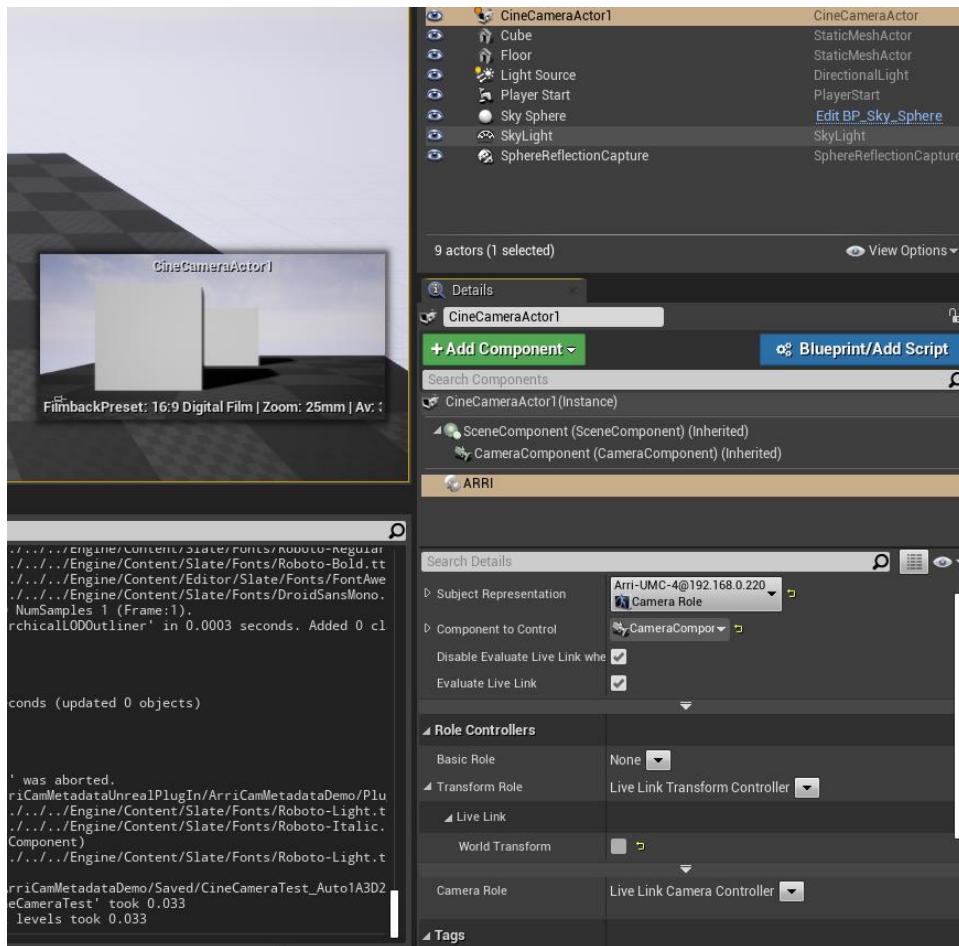
3.3.2.2 Arri Live Link Camera Controller

For additional features you can enable the ArriLiveLinkCameraController from the Live Link Comnponent Controller Menu. (LiveLinkComponentController->Role Controller->Camera Role)
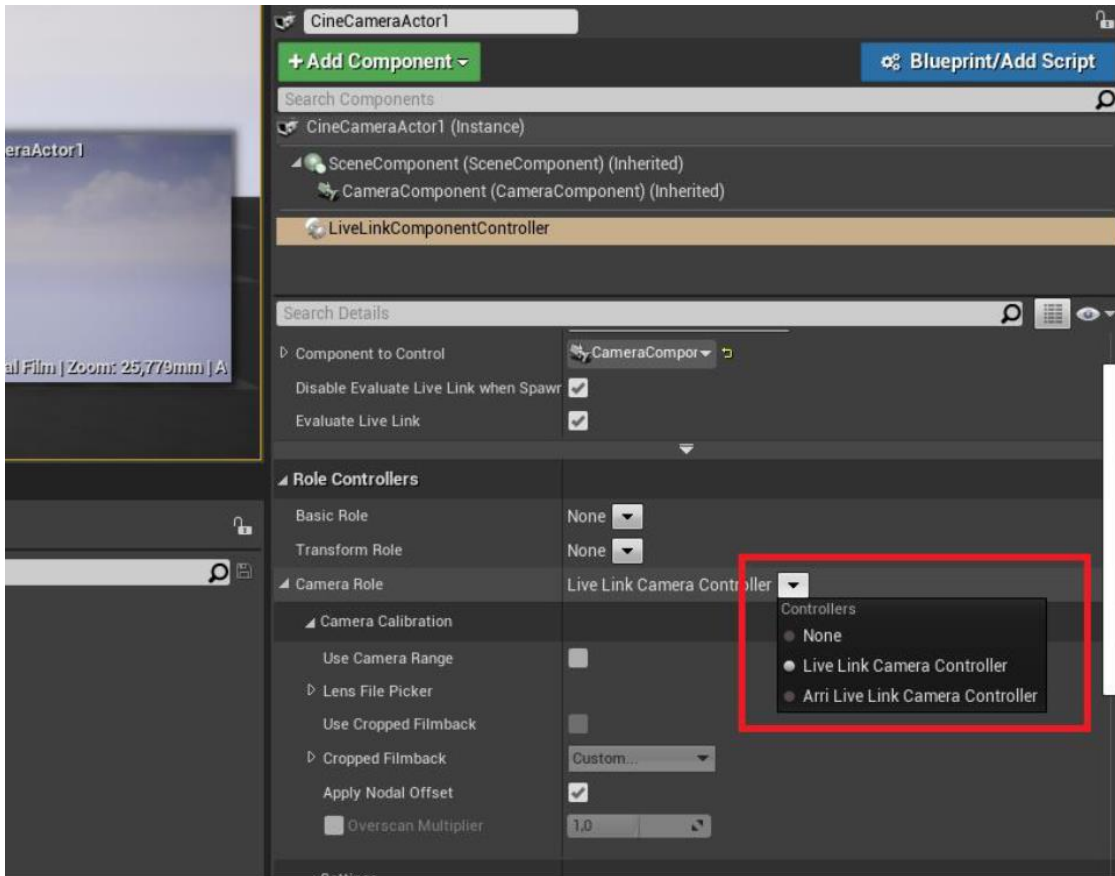
3.3.2.3 Timecode

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.

Inputs

Media Sources	2 Array elements
0	None
1	None

Outputs

Media Outputs	1 Array elements
0	None

Timecode Provider

Override Project Settings	☑
Timecode Provider	◉ Live Link Timecode Provider
Timecode	
Subject Key	Arri Live Link controller / Arri-UMC-4@192.168.0.220
Evaluation	Lerp
Override Frame Rate	24 fps (film)
Buffer Size	4
▷ Settings	

Timecode Provider

LiveLinkTimecodeProvider_0   25 fps

00:45:52:20

---

9 actors (1 selected)

Details ×

CineCameraActor1

+ Add Component ▾

Search Components

CineCameraActor1 (Instance)
  SceneComponent (SceneComponent) (Inherited)
    CameraComponent (CameraComponent) (Inherited)
  LiveLinkComponentController1

Search Details

Referenced Actor	None
Component Name	CameraComponent
Disable Evaluate Live Link when Spawnable	☑
Evaluate Live Link	☑
Update in Editor	☑

Role Controllers

|	
Basic Role	None
Transform Role	None
Camera Role	Arri Live Link Camera Controller
Arri	
Depth Of Field Multiplier	1,0
Override Iris	☐
New Iris	2,8
Set Filmback	☑
Arri Camera	Alexa LF
Alexa Mini LFPreset	None
Alexa Mini Preset	None
Alexa LFPreset	ARRIRAW LF 16:9 4K UHD
Amira Preset	None
Alexa 65Preset	None
▷ Camera Calibration	
▷ Settings	
▷ Debug	

3.3.2.4 Sensor Size & Metadata manipulation

The sensor size is not streamed from the UMC4. You can choose the correct sensor size from the Arri Live Link
Camera Controller:
Simply check "set Filmback" and choose your Arri camera and its sensor setting. This will automatically apply the correct sensor width and height to your CineCameraComponent. You can also
manipulate the Depth of field with a multiplier or override the Iris of the virtual camera.
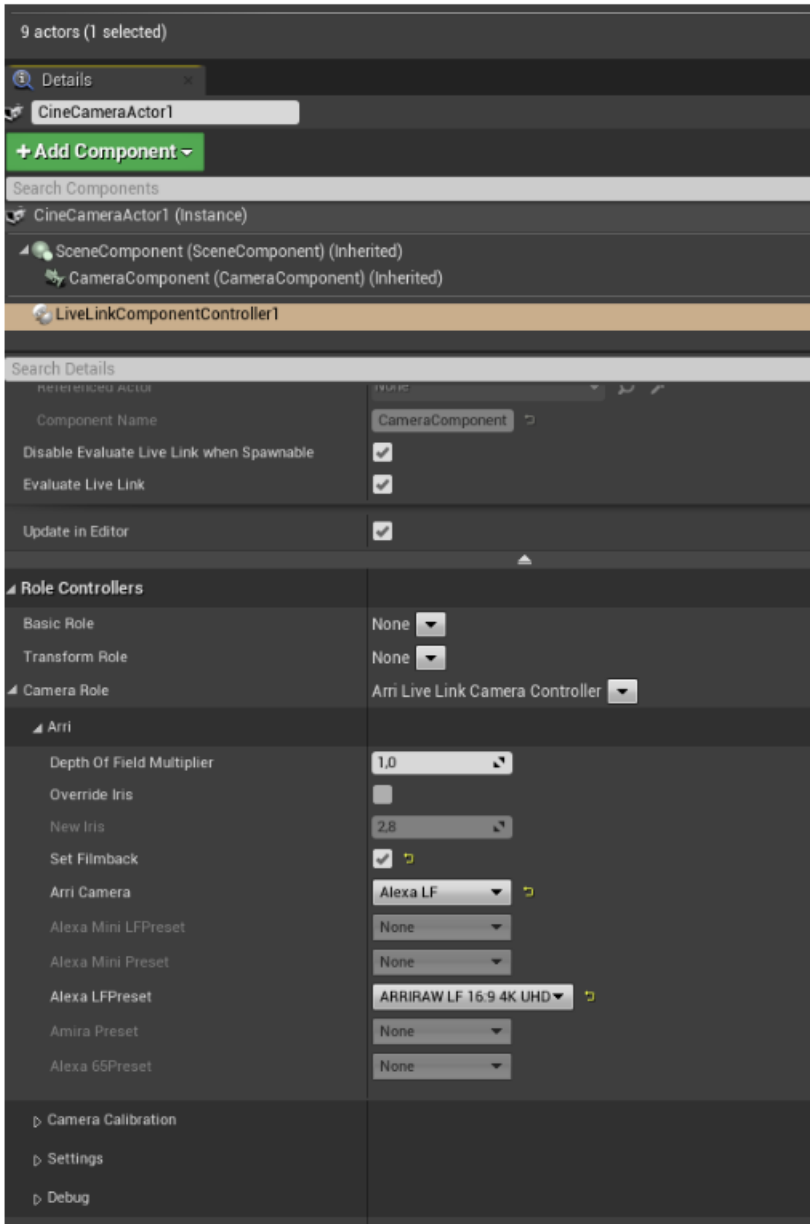
3.3.2.5 Additional Metadata from Live Link

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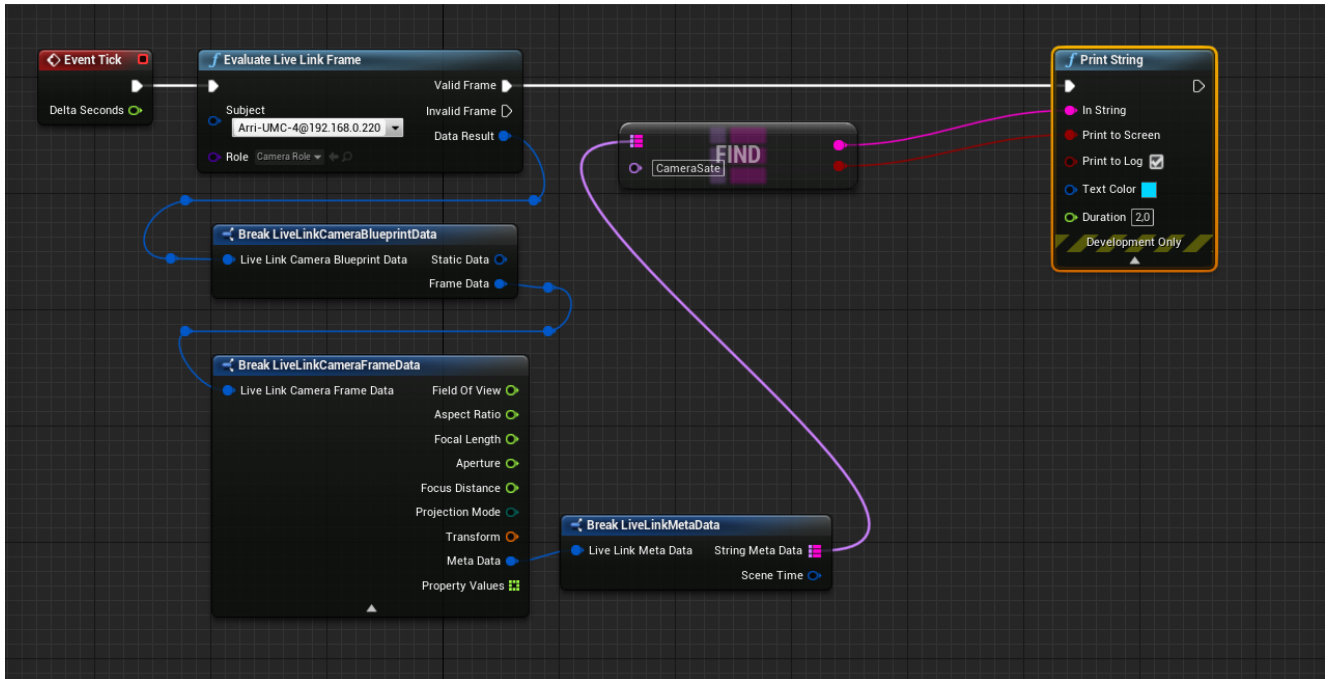
You can access all the camera metadata from the Live Link camera, including the timecode.

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 present in String
CameraHealth	**ENUM** **Always presented by the ENUM Name and then the current value, e.g:** FArriCameraHealthState::GOOD GOOD ERROR WARNING UNKNOWN
CameraMajorState	**ENUM** **Always presented by the ENUM Name and then the current value, e.g:** FArriCameraMajorState::CS_RECORDING CS_IDLE CS_STANDBY CS_REC_START CS_RECORDING CS_REC_STOP CS_PREREC_START CS_PRE_RECORDING CS_PREREC_STOP CS_PLAYBACK CS_ERASE CS_DELETE CS_INITIALIZE CS_SHUTDOWN

	CS_UPDATE
ExposureIndex	integer
ExposureTime	float
ShutterAngle	float
NDDensity	float
CCT	integer
tint	float
Roll	float
Tilt	float
Clipname	String

3.4 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-4 or Alexa35.
- 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.
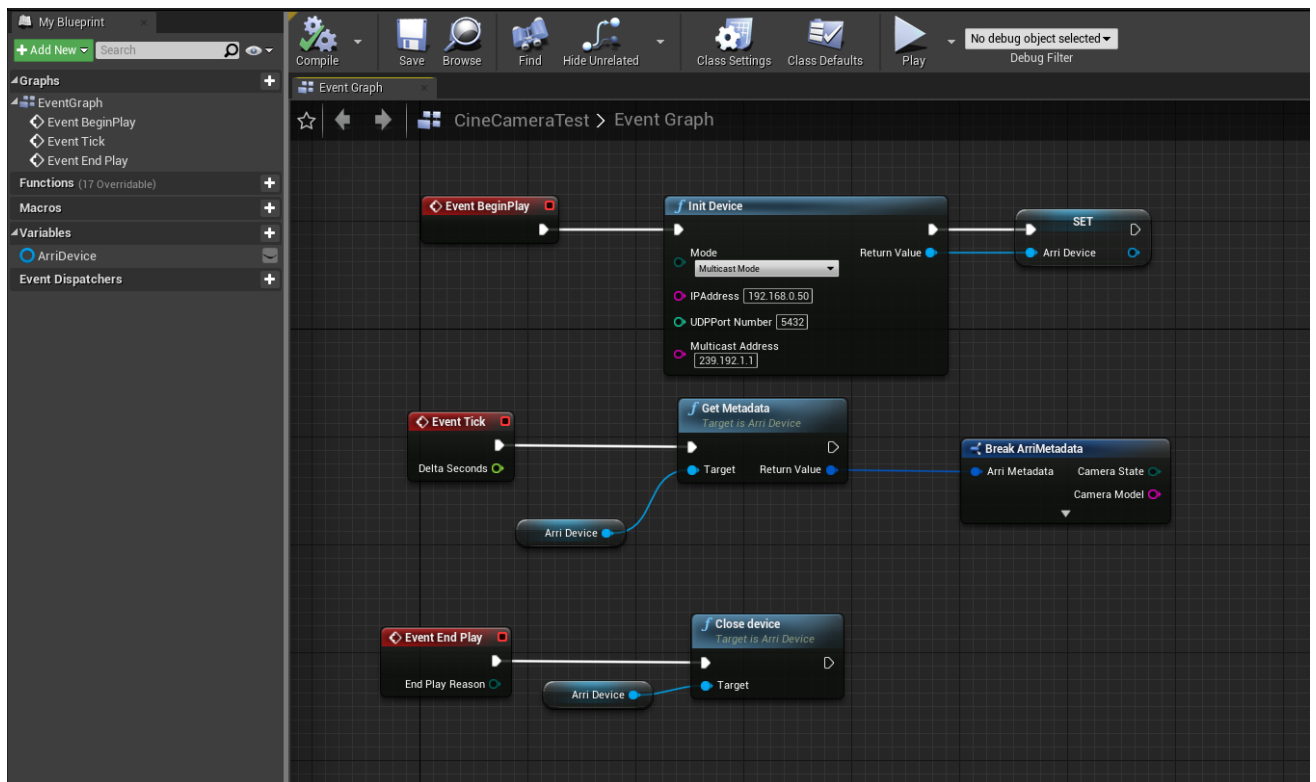
3.4.1 Metadata types and availability based on camera system

Metadate	Alexa MiniLF AMIRA Alexa Mini	ALEXA XT SXT 65 LF	Alexa 35	LiveLink	Blueprint	comment	datatype
camera health	x	x	x	x	x	Current health state of the camera	**ENUM** GOOD ERROR WARNING UNKNOWN
camera major state	x	x	x	x	x	Current state of the camera as displayed e.g. on the Home Screen	**ENUM** CS_IDLE CS_STANDBY CS_REC_START CS_RECORDING CS_REC_STOP CS_PREREC_START CS_PRE_RECORDING CS_PREREC_STOP CS_PLAYBACK CS_DELETE CS_INITIALIZE CS_SHUTDOWN CS_UPDATE
camera model	x		x		x	For UMC-4 workflow this metadate 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		x	The camera's serial number	String
camera software version	x		x		x	The camera's software version	String
nd filter density	x		x	x	x	ND filter density (e.g 0.6 or 1.2)	float
lens model	x		x		x	name of the lens in use	String
lens serial number	x		x		x	serial number of the lens	String
Lens scale raw encoder source			x		x	This item indicates if focus, iris, focal length values are provided by cine lens or ENG lens encoders "LDS" or "ENG"	String
Motor Raw Encoder Limits	x	x	x		x	the encoder limits of the attached lens motors: motorRawEncoderLimitsFocusMin motorRawEncoderLimitsFocusMax motorRawEncoderLimitsIrisMin motorRawEncoderLimitsIrisMax motorRawEncoderLimitsFLMin motorRawEncoderLimitsFLMax	Integer
Lens Limits Focus Imperial			x		x	Focus distance limits of the lens in imperial form	Integer > 0 value in 1/1000" -1 infinity 0 not available
Lens Limits Focus Metric			x		x	Focus distance limits of the lens in metric form	Integer > 0 value in mm -1 infinity 0 not available
Lens limits Iris			x		x	Linear iris limits of the lens	Integer ≥ 0 1/1000 of a stop with T1 ≅ 1000 -1 not available -2 closed -3 near close
Lens limits zoom			x		x	Focal length limits of the lens	Integer > 0 value in µm 0 not available
focus distance metric	x	x	x	x	x	Lens focus distance in metric form in cm	float

Focus distance imperial	x	x	x		x	Lens focus distance in imperial form	
iris / aperture	x	x	x	x	x	presented as aperture in Unreal Engine	float
focal length	x	x	x	x	x	focal length in mm	float
Lens squeeze factor			x		x	Anamorphic squeeze factor of the lens	float
Entrance Pupil Offset			x		x	Distance between the center of the entrance pupil of the lens and sensor plane	integer
Circle of confusion			x		x	The CoC is a perceptual parameter representing the diameter in mm, at which a point of light on the sensor starts to appear as a small blurred disc in the delivery format. The value is typically selected as a combination of acquisition format and delivery format or simply if more or less critical focus will be necessary.	float
lens raw encoder values	x		x		x	lens encoder values for lenses with LDS (lens data system)	integer
motor raw encoder values	x	x	x		x	motor encoder values of the external lens motors	integer
Lens scale raw encoder values			x		x	This item describes the current raw position of the lens ring as measured by the encoder built into lens. Its value is in the range from Lens Scale Raw Encoder Min to Lens Scale Raw Encoder Max.	Integer ≥ 0 raw value -1 not available
Lens converter focal length multiplier	x		x		x	Focal length multipler of the converter	integer
Lens converter light loss factor	x		x		x	Light loss factor of the converter	integer
Lens converter model	X		X		X	Name of the lens converter	
Lens converter physical length	X		X		X	Physical length of the converter in µm	integer
Lens converter serial number	X		X		X	Serial number of the lens converter	String
shutter angle	x		x		x	the shutter angle set in the camera in degrees	float
exposure time	x		x		x	the sensor's exposure time in milliseconds	integer
exposure index	x		x		x	the exposure index (ASA)	integer
recording media capacity	x		x		x	leftover capacity of the recording media in seconds	integer
timecode	x	x	x	x	x	Timecode in unreal format:	Unreal Engine timecode in HH:MM:SS:FF
framerate	x	x	x	x	x	the framerate of the timecode	Unreal Engine Framerate
dropframe	x	x	x	x	x	dropframe flag for timecode	boolean
framenumber	x	x	x	x	x	"the framenumber, describing timecode in combination with framerate and dropframe"	Unreal Engine Frametime
Clip name					x		
clip number	x		x		x	number of recorded clips on the recording media -> check known issues	integer

camera index	x		x		x	camera index, e.g "AA" or "B"	String
color temperature	x		x		x	the color temperature setting of the camera, e.g 5600	integer
tint	x		x		x	the green or magenta tint in range -16 to 16 ->	float
tilt	x		x	x	x	tilt value of UMC-4's IMU	float
roll	x		x	x	x	roll value of UMC-4's IMU	float

4.0 Troubleshooting

Contact

If you are having issues with the UMC-4, Alexa35 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 command line:

Log LogArri Verbose

You can now easily monitor all metadata streamed from the UMC-4, 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-4's Firmware, make sure you activate the Streaming after the update is complete and restart the UMC-4. Otherwise, it can happen, that you won't have an active ethernet stream. A reboot will solve this, when the UMC-4 comes up with streaming enabled.

5.2 Metadata

1. There is an issue with the "clip number" metadate. 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 conversed correctly between camera and UMC-4 unit, making its resolution narrower. It will only contain full numbers, without the decimal point.