

How to

Deployment of Axis-K410-V1

May 2024

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1. Introduction

Axis Communications launched the body worn solution in 2020. Axis manufactures numerous components which are used in this solution; however, a 3rd party server is used for the in-vehicle server appliance. The model chosen was the <u>Onlogic K410</u> for its size, capabilities, and functionality. Axis developed a custom Windows® image for this server which supports direct integration with the servers DIO and ignition sensing. Axis also developed wireless offload capabilities. All of these functionalities and software components come pre-installed on the Axis build from OnLogic, the **Axis-K410-V1** which can be ordered through OnLogic with the Axis image and pre-configured with the Axis chosen components.

The primary use case for this solution will be for law enforcement or security force type end customers who need both an in-vehicle camera system and a body worn system that work together. However, body worn cameras are NOT required for this solution to be used, meaning this solution can be used in a variety of segments and solutions with just the in-vehicle component.

This document will guide you through the deployment of this system. This document <u>will not</u> discuss how to acquire power from a battery and deploy a constant power and switched power distribution system or how to program and generate triggers from a lightbar controller. This document assumes these systems are already in place and the integrator has prior knowledge of these types of systems.

2. Prerequisites

Axis body worn camera deployment

AXIS Camera Station - central server

Robust wireless network

Bench configuration

Prior or during the deployment of the Axis in-vehicle solution, it is recommended to deploy the Axis body worn camera solution. In the camera profile section, ensure that Broadcast and Receive Wireless signal has been toggled too on. In the about section of the AXIS W800 System Controller you will find the system ID which will be deployed into the Event Bridge for OnLogic component further along in this guide.

This guide is primarily focused on the deployment of the in-vehicle solution, however there needs to be serious consideration of how the central server receives the invehicle video as well as the body worn camera video. The server needs to be licensed and sized accordingly. This will be covered in more detail later in this document.

- A typical officer will record around 3hrs of video per shift. That could potentially generate 32GB of data total which will then need to be replicated. With that in mind as a data point, if you have 10 officers per day with a retention time of 90 days: (10 officers) x (32GB) = 320GB per day (90days) = 29TB. This math is based off of the above information and 2 1080p cameras; one forward facing and one transportation area camera, recording at 30FPS.
- The amount of storage required for the body worn camera (BWC) will also need to be calculated. 1hr of 1080p BWC video will generate 5GB of data. An officer records rough 3hrs per shift. (5GB) (3hrs) = 15GB per shift per officer. Multiplied by the number of retention days will help size the system appropriately.

One of the most critical aspects of this entire solution is the network infrastructure. With the potential for multiple vehicles, needing to offload at one point:

- The network should be provisioned to be able to handle the load that is • about to be placed on it.
- The access points should support 1GB or above depending on the anticipated network load.
- Whatever access point are used, if more than one is required, ensure they do not overlap and are tuned to work together.
- Size out the number of access points depending upon how many vehicles will be allowed to connect to each AP at one time.

It is highly recommended to pre-configure as much of this system as possible prior to physical install. If the Axis-K410-V1 server is pre-programmed with the Axis F91 series and all of the wireless information, then the vehicle upfitter will just need to do the physical install, and the rest of the system should function upon leaving the upfitter.

3. Example parts list

		Example	Parts List Per Vehicle		
Make	Model	Part Number	Suggested QTY per Vehicle	Description	Additional Note
Axis	<u>F9114</u>	01991-001	1	Sensor Main Unit	Required
Axis	<u>TF9902</u>	02360-001	1	F91Mounting plate	Required
Axis	<u>F2115</u>	02639-001	1	Forward facing sensor	Required
Axis	<u>F4105</u>	02364-001	1	Mini-dome	Required
Axis	<u>T8355</u>	01561-001	1	Digital mic	Required/Swapable
Axis	TU6004-E	02250-001	2	Sensor cables	Required
Axis	<u>TW4100</u>	02978-001	1	Windshield mount	Required
Axis	Indication LED (4 pack)	01765-001	1	Red indication LED	Suggested/Swapable
Axis	ACS License	0879-010	1	ACS License	1 Required per F91
Axis	<u>S1296</u>	02543-001	1	Central server	Suggested/Swapable
OnLogic	Onlogic K410	Axis-K410-V1	1	In-vehicle server	Required
Taoglas	Stingray Antennas	WA.500W.301151	2	Wireless/BT Antennas	Suggested/Swapable
	Ν	lot included: Wireless r	etwork nor body worn ca	amera narts list	

4. Initial Server Configuration

Upon receiving all of the equipment, it is recommended to organize all equipment per vehicle. It is also recommended that each equipment's hardware be pre-programmed as much as possible prior to physical installation.

Once everything is laid out, connect the server to a screen, keyboard, and mouse. Ensure that a network connection is available for windows updates.

The Axis-K410-V1 should ship with a power supply and connector. Ensure that the middle ignition sensing pin is connected to the positive pin. This will simulate an ignition power source for when Ignition Sense is enabled. Having power supplied to the ignition sense pin prior to enabling ignition sense will not negatively impact the system.



boot the system on via the

Now that power is supplied, power button.

Follow the Windows boot prompts, name your system, and apply a password. Once the initial Windows setup is complete, the desktop will begin to load and install AXIS Camera Station.

Once the system has booted, rename the PC with the <u>car number</u> it will be installed in. This will ensure that when the recorded video is transferred to the central server, it will label each camera lens with the car number its associated to, making managing video easier.

Set up the date and time to match the region.

Go to Remote Desktop settings and Enable Remote Desktop. This will make trouble shooting and making any system changes easier once the system is installed.

Rer	note Desktop
devio Andro	te Desktop lets you connect to and control this PC from a remote by using a Remote Desktop client (available for Windows, aid. iOS and macOS), You'll be able to work from another device as were working directly on this PC.
Enabl	e Remote Desktop
	On

It is recommended to connect the server to a network with internet and perform all Windows system updates at this time as well.

Once the windows updates have completed, it is time to setup ignition sense.

5. Ignition sense configuration

The server supports ignition sense, which allows the server to be programmed to perform different actions based upon the state of the ignition. It is not enabled out of the box and has to be turned on and configured.

On the desktop there is a **<u>power shell script</u>** that assists in programming the ignition-sense.

- Right-click and Run as Administrator
- Follow the system prompts
 - Enter the number of minutes you want the server to stay on after the vehicle has been shut off.
 - At this time, it is recommended to let the server run for 2.5 3hrs after the vehicle has turned off to give the vehicle enough time to transfer recordings based upon a law enforcement shift. *Please adjust based upon your own network capabilities.*
 - Enter the number of seconds the server should be delayed for start-up once ignition has been turned on.
 - The recommended time is 10 secs and this is the default setting. This setting will ensure that the server boots on after the vehicles initial power surge when the vehicle is turned on. When ignition is applied a vehicle can see a short voltage drop which could result in the server not booting properly.
 - Activate ignition-sense.
 - Enter a Y for yes.
 - Activate low-power mode. This reduces idle power consumption.
 - Enter a Y for yes.
 - The hard-off-timer will be automatically set for 1hr after the ignition timer sequence has finished.
- Once you run this script, the ignition sense will be enabled, and the nonrequired components of AXIS Camera Station will be removed.
 - For example: AXIS Camera Station Cloud, Secure Entry, Smart Search, System Health Monitoring, and Vehicle Data will all be removed. This will make AXIS Camera Station boot up faster when the vehicle turns on.
- At this point you need to <u>**REMOVE POWER**</u> from the server and allow it to restart. Keep the power removed for at least 10secs. Re-apply power. This will allow ignition sense to take over and the Auto Ignition and Watchdog lights on the server will now be on.





6. Network configurations

The server comes with 2 network ports and a wireless network card.

It is recommended that the wireless card on the Axis-K410-V1 have a reserved IP address on the central network to ensure it always can connect to the central server.

For the two local ports, one should be set with a static IP address that would match the AXIS F91 series camera subnet. The other port should use DHCP or match the

network scheme of the MDT/Laptop can communicate with the Axis-K410-V1 via AXIS Camera Station Client.

It is recommended to pre-configure the server with the wireless network it will be connecting to. If the SSID will be hidden, enter the hidden network name, security type, password and check off **Connect Automatically**. This way the server will automatically connect to the wireless network when it is within range or when it returns to the station to begin the offload of video to the central server.

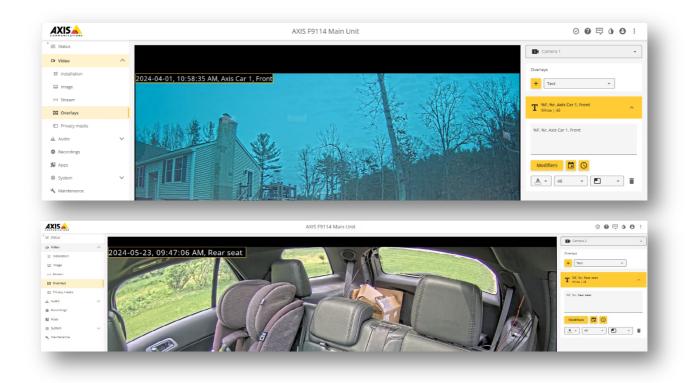
nage known networks	
Add a new network	
earch this list ρ	
t by: Preference $ \lor $ Filter by: All $ \lor $	Add a new network
Axis Incar	Network name
•	Axis Test
	Security type
	WPA2-Personal AES
	Security key
	••••••
	Connect automatically
	Connect even if this network is not broadcasting
	Save Cancel

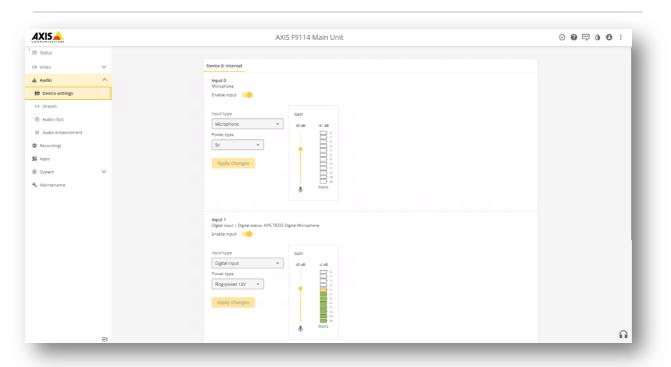
7. Camera configurations

The F91 series will be connected to one of the network ports of the server. The server will supply POE power to the F91 series. For initial programming, both lens should be connected to the F91 and the digital mic should be connected to one of the audio in ports.

- Username and password: Log into the F91 series and setup a username and password
- **Overlays:** Go to Video > Installation > Select the Lens on the right side that represents the forward-facing camera > click overlays on the left-hand side
 - It is recommended to add the date and time overlay, name of car and view type. Repeat for 2nd camera.
- Enable mic: Go to Audio > Device settings > Enable the Mic input that your using > Select Digital input > Power Type Ring-power 12V > Apply changes
 - Adjust dB threshold as needed
 - Apply changes
 - Assign the mic channel to the right sensor. For example, if the mic is installed in the rear seat area, ensure that the rear seat lens is associated with the mic.

- Video > Stream > Select the sensor > Audio > Include > Select the right input source. Input 0 = Mic 1 and Input 1 = Mic 2
- **Network:** Leave the F91 series as a DHCP network address or configured to work within the vehicles network IP scheme.







8. Server AXIS Camera Station Configuration

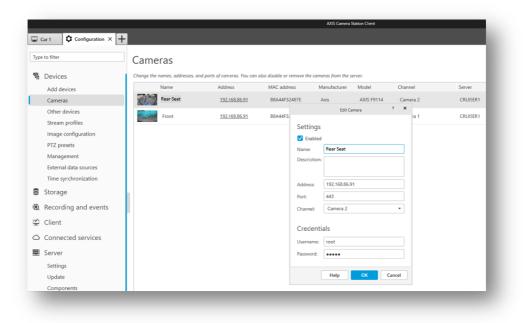
In this section we will add and configure the Axis F91 series to AXIS Camera Station running on the Axis-K410-V1.

- Ensure AXIS Camera Station (ACS) service controller is running in the bottom right-hand corner and then open ACS.
- Go to Configuration > Devices > Add Devices > Discover the F91 series lens and add the Active lens' > Choose Quick configuration > Retention time should be unlimited > Recording storage Automatic > Recording Method None

to filter	Add devices							
Devices	Select the devices in your network th	at you want to add to the server. You can fir	d the added devices under either Cameras	or Other devices.				
Add devices	Manual search Enter str	eam URLs Cancel Include prere	corded video 🕥 🤇			[F91	×
Cameras	Name	IP Address Hostname	MAC address Status	Manufacturer	Model			
Other devices	AXIS F9114 - Camera	3 192.168.86.91	88A44F32487E	Axis	AXIS F9114			
Stream profiles Image configuration	AXIS F9114 - Camera	4 192.168.86.91	88A44F32487E	Axis	AXIS F9114			
PTZ presets								
Management								
External data sources								
Time synchronization								

Once the cameras have been added, it is recommended to rename them with where they are placed.

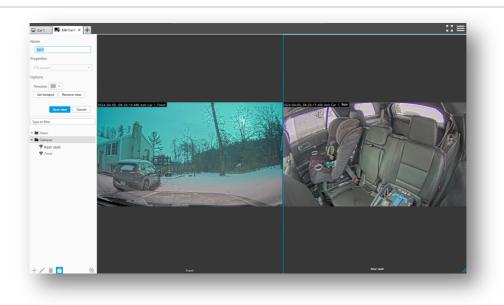
• Go to Devices > Cameras > Right click > Edit

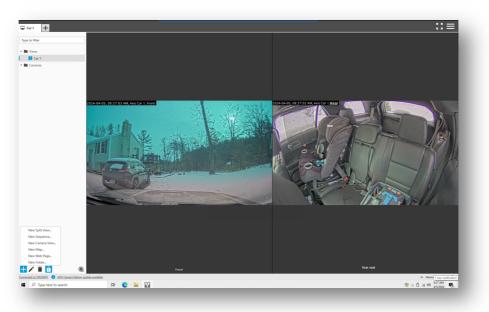


Now

create a view with these 2 cameras.

 Bottom left corner click the + sign > New Split View > Name the view > drag the 2 cameras in side by side > save the view





The microphone now needs to be added to the camera it belongs to.

• Devices > Stream profiles > Select the "rear seat" camera > In the microphone drop down menu select the Built-in or line in mic > Apply

	Stream profile	es				
B Devices	Create profiles for live streamin	ng and recording.				
Add devices	Name	High	Medium	Low	Server	
Cameras	Rear Seat	1920x1080 30 fps H.264	1280x720 15 fps H.264	640x360 8 fps H.264	CRUISER1	Ŷ
Other devices	Front	1920x1080 30 fps H.264	1280x720 15 fps H.264	640x360 8 fps H.264	CRUISER1	
Stream profiles	FIONC	1320x1060 30 lps 11204	12008/20 15 lps n.264	640/360 6 lps n.264	CROISERT	
Image configuration						
PTZ presets						
Management						
External data sources						
Time synchronization						
Storage						
Recording and events						
🖞 Client						
	Video profiles			Audio		
Connected convices		Medium	Low	Microphone:	Built-in microph	none or line in 💌
	High	Medium				
			▼ 640x360 (16:9)	 Speaker: 	None	
		080 (16:9) • 1280x720 (16:9)	 640x360 (16:9) H.264 	Speaker: Use microphone	Built-in micro	ophone or line in
Server	Resolution: 1920x10 Format: H.264	080 (16:9) • 1280x720 (16:9)		•	Duilt in minut	ophone or line in accordings
Server Settings	Resolution: 1920x10 Format: H.264 Frame rate: 30	→ 1280x720 (16:9) → H.264	▼ H.264	•	Built-in micro	ophone or line in coronings
Server Settings Update	Resolution: 1920x10 Format: H.264 Frame rate: 30	1280x720 (16:9) 1280x720 (16:9) H.264 Y 15	 H.264 8 ^ 	•	Built-in micro	ophone or line in coronings
Server Settings Update Components	Resolution: 1920x10 Format: H.264 Frame rate: 30 ^ Compression: 30 ^	1280x720 (16:9) I280x720 (16:9) H264 I5 30	 H.264 8 ^ 30 ^ 	Use microphon	Built-in micro	ophone or line in coroniga
Update Components Incident report	Resolution: 1920x10 Format: H.264 Frame rate: 30 Compression: 30	1280x720 (16:9) I280x720 (16:9) H264 I5 30	 H.264 8 ^ 30 ^ 	•	Built-in micro	ophone or line in coroungs

It is important for all of the systems to be <u>time sync'd</u> to ensure both the in-vehicle video syncs with the body worn camera video. The F9114 shall use the in-vehicle server ACS installation as the NTP server. The in-vehicle server shall use the same NTP time server as the central ACS server and the body worn solution server. This is why we will add the central server as the primary time sync server for both the body worn system and the in-vehicle system. To make the in-vehicle server sync with the central server:

- Go to > Devices > Time synchronization > click on the F91 series camera > Check off enable time synchronization > Set the primary NTP server to use Axis Camera station > Apply
- Now the in-vehicle server/cameras will retain the time sync with the same server as the body worn cameras.

ype to filter	Time synchr	onizatio	on				
Devices	Configure the time settings	on devices.					
Add devices	Name	Enabled	NTP source	Primary NTP server	Secondary NTP server	Alarm	Server time offset
Cameras	Rear , Front , AXIS	F91 🗸	Static	192.168.86.87	time.windows.com	~	-00:00:00.9600029
Other devices							
Stream profiles							
Image configuration							
PTZ presets							
Management							
External data sources							
Time synchronization							
Storage	Cable time control	nitation				14/5	ndours Timo sopiso
Storage	Enable time synchro NTP source: Static	nization	•			Sen	ndows Time service ver: CRUISE1 us: Running
 Storage Recording and events Client 			•	✓ Secondary N	TP server	Sen	ver: CRUISER1
 Storage Recording and events ✓ Client △ Connected services 	NTP source: Static	rver	•	Secondary N		Sen	ver: CRUISER1 tus: Running
 Storage Recording and events ✓ Client △ Connected services 	NTP source: Static Primary NTP se	rver 192.168.86.87		_ ,	time.windows.com •	Sen	ver: CRUISER1 tus: Running
 Storage Recording and events Client Connected services Server 	NTP source: Static Primary NTP se Server address Use AXIS Came	192.168.86.87 ra Station	•	O Server address	time.windows.com •	Sen	ver: CRUISER1 tus: Running
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The Axis Event Bridge uses the Manual Recording profile. The standard setting records the High profile setting which will be 30FPS and 1080p per stream. A prebuffer can be applied when the event trigger to start recording is activated.

To configure a pre-buffer:

- Go to Recording and Events > Recording Method > Click on both cameras > Under Manual change the pre-buffer to however many seconds is required. It is recommended to match the same pre-buffer settings as the body worn camera.
 - If the pre-buffer is enabled, audio will always be recorded in the prebuffer. There is no way to configure the audio to be muted in the prebuffer settings.

Car 1 Configuration ×					
ype to filter	Recording method				
B Devices	Select which stream profile to use for recording. To en	edit stream profiles, go to Stream profiles. To manage ev	ents, go to Action rules.		
Storage	Name Motion de	etection Continuous Motion profile	Continuous profile	Manual profile	Server
Recording and events	Rear Seat	High (1920x1080, 30 fps.	Medium (1280x720, 15 f	High (1920x1080, 30 fps	CRUISER1
Schedules	Front	High (1920x1080, 30 fps.	Medium (1280x720, 15 f	High (1920x1080, 30 fps,	CRUISER1
Recording method					
I/O ports					
Action rules					
A					
2 Client					
→ Connected services					
△ Connected services	This configuration will affect multiple cameras.	. Empty boxes mean settings differ between cameras. C		and will affect selected camera	as if applicable.
 Connected services Server Settings Update 			Only visible settings are applied		as if applicable.
Connected services Connected services Setvings Update Components	Motion detection	Continuous		Manual	as if applicable.
Connected services Server Settings Update Components Incident report	Motion detection () Video settings	Continuous O		Manual Video settings	
Connected services Server Settings Update Components Incident report Scheduled export	Motion detection	Continuous		Manual Video settings Profile: High	s if applicable.
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Connected services Server Settings Update Components Incident report Scheduled export IL Licenses	Motion detection Video settings Profile: High Prebutie: 5 ^ y seconds Patibulifie: 10 ^ y seconds Raise alarm ************************************	Continuous C Video settings • Profile: Medium		Manual Video settings Profile: High Prebuffer: 15	v seconds
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9. Recording Replicator

Recording Replicator uses the same JSON connection file as the Body worn system. When video is recorded on the in-vehicle server, and then connects back to the central server, the recorded video will be replicated onto the central server for long term storage. The recorded video on the in-vehicle server will get over written based up the storage retention time or storage available/allocated.

At this time, there is no check sum to ensure that video does not get over written before it has had time to transfer.

Based upon the normal working shift of an officer, the in-vehicle server should provide at least 30 days of storage/30 days to allow recordings to transfer based up 3hrs of recordings per officer per day.

Prior to generating the connection file and applying it to the in-vehicle server, it is recommended that the central server running ACS and receiving the video, be updating to the latest version of ACS 5, version 5.57.23929.

After ACS has been updated, it is recommended to renew the ACS certificate and generate a new connection file before applying it to the in-vehicle server.

- Go to the central server > configurations > Security > Certificates > click on Renew
- Close ACS > Restart the ACS service controller > Open ACS > Generate a JSON Connection file
- Go to the central server > open AXIS Camera Station (ACS) > go to the hamburger button in the top right corner > Other > Connection File > Export
 - Save this connection file to a thumb drive and transfer it to the invehicle server. This file can be used with all of the in-vehicle servers.
 - You will need to update the connection file in the body worn system as well with this new file.

		2	
	Connection file		
Connection	file		
	es an Axis body worn system to tra s one AXIS Camera Station system		
	e connection file, make sure that the enew the certificate, go to Configu		
Certificates.	enen ine eerintate, go to comiga	ation - security -	
		addin > Security >	
Certificates. System name: AXISNVR-	9HFRAC7	aton > secandy >	
System name: AXISNVR-	9HFRAC7		
System name: AXISNVR-	9HFRAC7		
System name: AXISNVR-	9HFRAC7		
System name: AXISNVR-	9HFRAC7	Help	
System name: AXISNVR-	9HFRAC7		0

Now that the connection file has been generated, it can be applied to the in-vehicle server. Ensure that the server is connected to the same network at the central server and connect the USB drive with the connection file on it.

- Go to the in-vehicle server > ACS > Recording Replicator > Under destination click browse > select the connection file > apply it
 - If applied correctly, a Destination server name should populate
- Enable Scheduled backup
 - Schedule should be set to ALWAYS. Recording Replicator will look for connectivity every 3 mins and then begin offloading once connection has been established.
- Select the cameras that have been installed in the vehicle
- Click Sync now to test the connection. If there is no recorded video, nothing will transfer.
 - It is recommended to create a manual recording on each camera inside of ACS and then stop recording and test the connection to ensure video transfers to the central server.
 - The in-vehicle server cameras will not appear in the central server until there is video to be transferred.

Image: control Image: control Add devices Add devices Back up recordings to another server specified in the connection file. Add devices Destination Cher devices Back up recordings to another server specified in the connection file. Add devices Destination Cher devices Boose Trape configuration Pointation Pic prests Scheduled backup Storage Scheduled backup Storage Cameras Client Cameras Client Cameras Client Mane Clients Rear Seat Storage Rear Seat Storage Rear Seat Clients Rear Seat Image: configuration Prot Image: configuration Prot Image: configuration Prot Cameras Cameras Cameras Cameras Cameras Prot Image: configuration Prot Image: configuration Prot Image: configuration Prot Image: configuration <td< th=""><th></th><th>AXIS Camera Station Client</th></td<>		AXIS Camera Station Client
Periods Bask up recording to another server specified in the connection file. Add devices Destination Cameras Upload the connection file generated from the destination server. Other devices Boxup Stream profiles Boxup Image configuration Destination set to AXISNR-9HFRAC7 PTZ prests Scheduled backup Management Scheduled backup External data sources Management Time synchronization Management Connected services Cameras Vertice Connected services Server Management Server Management Connected services Pront	⊊ Car 1 Configuration × +	
Add devices Destination Cameras Upload the connector file generated from the destination server. Browse Browse Image configuration Destination set to AXISNVR-9HFRAC7 PIZ prests Destination set to AXISNVR-9HFRAC7 Management Scheduled backup Stretral data sources Image configuration Time synchronization Image configuration Storage Add events Connected services Cameras Image configuration Image configuration Storage Cameras Client Cameras Client Name Client Name Storage Rear Seat Server Prot	Type to filter	Recording replicator
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• Recording and events • Cameras • Cameras • Cameras • Cameras • Name • Connected services • Rear Seat • Rear Seat • Front	Cameras Other devices Stream profiles Image configuration PTZ presets Management External data sources	Upload the connection file generated from the destination server. Browse Destination set to AXISNVR-9HFRAC7 Scheduled backup Schedule the backup of recordings. Select a schedule.
Image: Connected services Image: Connected services Image: Server Image: Connected services Image: Licenses Image: Connected services	Storage	Abrays schedule 🗸
Connected services Server Licenses Connected services Front Connected services Front	🏽 Recording and events	Cameras Type to search ×
Server Server Front Front	🖆 Client	Name
Licenses	 Connected services 	Rear Seat
Licenses	Server	Contract of the second s
Security Idle: Next run at 04/01/2024 12:16:00. Last synced: 03/29/2024 13:10:27 Front	E Licenses	
	Security	Sync rew Idle: Next run at 04/01/2024 12:16:00. Last syncad: 03/29/2024 13:10:27 Front

10. Event Bridge for OnLogic

The Event Bridge for OnLogic, is a component of ACS that establishes a direct integration between the DIO of the OnLogic server and the Bluetooth card, as well as the ACS recording engine. This component makes the integration of event triggers with camera recording and activation seamless. There are pre-defined Actions that can be used, but Actions are highly customizable depending on which cameras you want to activate and when.

The first thing that needs to be done is to enable the cameras to be used. Inside of ACS, go to the Configuration tab:

- Event Bridge for OnLogic > Cameras > Toggle the cameras ON
- This is also where you can create custom Action Group's which can be programmed to start specific cameras for specific events.
 - **For example**, if you wanted the rear seat camera to ONLY start recording when the rear door is open, you can create an Action Group and name it "Rear Seat Camera"; then add that camera to that Action Group.
 - An Action will then populate in the Action Tree "Start recording on group: Rear Seat Door Open".
 - Associate that event trigger with the right input on the DIO and wire the trigger wire to it.

			AXIS Camera Station Client		? _ 8 ×
⊊ Car1 Configuration × +					:3 ≡
Type to filter	ACTION GROUPS				
🗣 Devices	Camera Name	Enable	Action Groups	MAC address	Model
Storage	Rear Seat	-	0 group has been selected	B8A44F32487E	AXIS F9114
 Recording and events Client 	Front	-	0 group has been selected	B8A44F32487E	AXIS F9114
 Connected services 			- 3 P. 1.9 occ. sector		
E Server					
Licenses					
Security Access control					
 Recording replicator Settings^{PREVEW} 					
Event Bridge for OnLogic Cameras PROVEW Settings PROVEW					

ipe to filter	Action Groups ADD NEW
9 Devices Storage	Name
Recording and events	
Client	
Connected services	
Server	Action Group
Server	C Group ID
Connected services Server Licenses Security Access control	
Server Licenses Security	- Group ID

⊋ Car1 ♀ Configuration × +	-		AXIS Camera Station Client	
Type to filter	ACTION GROUPS			
Devices	Camera Name	Enable	Action Groups	MAC address
Storage Recording and events	Rear Seat		1 group has been selected	B8A44F32487E
Ź Client	Front	-	Rear Seat	88A44F32487E
Connected services				

Now that the cameras are enabled, go to the Setting Tab under Event Bridge for OnLogic. This is where we will begin to populate the Action event tree for inputs and outputs as well as associate the end users body worn camera system with the invehicle server.

- Log into the end users body worn system via the AXIS W800 System controller. Go to the 3 ellipses in the top right-hand corner and click on About. Copy the System ID into a notepad file and save it to the same thumb drive as the connection file.
- Copy and paste this System ID into the Event Bridge under Body Worn System ID. This will embed the AXIS W800's system ID into the Bluetooth Beacon when it's generated, only activating BWC's that belong to that end customers system.

About							
System name	י <mark>ן</mark>	Litchfield					
System ID		47ff31cd-08	b6-48	f5-9b(56-c97	f0e315	33a
	_ _		_	_	_	_	
Firmware version		11.9.55					
							ose
	_	_			AJ	(IS Carmera Startic	n Ciert
⊋ Car1 🚺 Configuration × 🕂					ka	(IS Carnera Static	n Client
	Machine Onlogic Karbon 410				KA.	OS Carnera Static	n Ciere
Type to filter	Machine				a)	CS Carnera Static	
Type to filter	Machine Onlogic Karbon 410	6-c97f0e31533a			ده.	KS Camera Static	
Type to filter 17 Devices Storage	Machine Onlogic Karbon 410 Body Work System ID	6-c97f0e31533a Po Duoro	Gon Pa	Description	۵ ا	KS Camera Statio	
Type to filter Type to filter Devices Storage Recording and events	Machine Onlogic Karbon 410 Body Work System ID	Pin Descrip	2	Description		KS Camera Statio	
Type to filter Type to filter Devices Storage Recording and events Client	Machine Onlogic Karbon 410 Bolg Well System ID 47ff31cd-08b6-48f5-9b66	Pin Duscrip 1 3 Ind	2	Ourt	60	KS Camera Static	
Type to filter	Machine Onlogic Karbon 410 Body Wark System 12 47ff31cd-08b6-48f5-9b6f	Pin Duscrip 1 3 In0 18 20 8 In1	2 4 6	Our0 Our1	60	KS Centra Static	
Type to filter Subscription Storage Recording and events Client Connected services	Machine Onlogic Karbon 410 Bolg Well System ID 47ff31cd-08b6-48f5-9b66	Pin Duscrip 1 3 In0 18 20 8 In1	2	Ourt	6	CS Camera Statio	
Type to filter Image: Type to filter	Machine Onlogic Karbon 410 Body Wark System 12 47ff31cd-08b6-48f5-9b6f	Pin Duscrip 1 3 3 100 5 1n1 7 1r2 9 1r8	2 4 6 8	Our0 Our1 Our2	66	CS Centere Statio	
yps to filter ¶ Devices ≣ Storage @ Recording and events ⊈ Client Connected services ≣ Server ⊠ Licenses	Machine Onlogic Karbon 410 505 Kort system to 47ff31cd-08b6-48f5-9b6f 2 4 6 8 10 12 14 16 0 0000 0 0000	Ph Description 1 - 3 100 5 - 7 - 9 106 11 - 12 - 13 - 14 - 15 - 16 - 17 19 10 - 17 19	2 4 6 8 10 12 14	Our0 Our1 Our2 Our3 Our4 Our5		KS Camera Statio	
Type to filter Image: Storage Storage Recording and events Image: Client Image: Connected services Server	Machine Chilogic Karbon 419 100 your system to 47/131cd -0866-48(5-9660 2 4 6 8 10 12 14 16 0 0 0 0 0 0 0 0	Pin Description 1	2 4 6 8 10 12	Our0 Our1 Our2 Our3 Our4	20	KS Camera Statio	

- The DIO supports 8 inputs and 8 outputs. When Pins 1 (Power) and 2 (Ground) are wired, the inputs if the DIO will show RED. When the DIO is not powered, or when a grounded input it triggered, they color will change to green. The isolated digital inputs/outputs are enabled by default and require an external power source (9 ~ 48 VDC) in order to operate. The outputs function as open-drains, and should not be used to source more than 150mA of current. The input of the DIO is pulled high when floating.
- Ensure that any event trigger applied to the input or output is a <u>grounded</u> <u>source</u>.
 - This may require the use of an automotive, 12v, SPST relay to convert the positive voltage trigger from the lightbar controller to a grounded voltage trigger.



- The Event Bridge supports drag and drop programming. It is important to plan out which Pins will perform which actions and document this, so the vehicle upfitter wires the correct triggers to the correct pins.
 - For example: In this demo, I have Pin 3 wired to "Start recording on all cameras" and Pin 5 set to "Stop recording on ACS cameras". Start recording on all cameras will trigger both the in-vehicle cameras to start recording and will create a Bluetooth beacon to automatically activate the BWC. Stop recording on ACS cameras will ONLY stop recording on the in-vehicle cameras. The officer will need to manually stop the BWC from recording.
 - The Bluetooth beacon will continue to transmit for as long as the PIN is in an active state. Meaning that if any other people arrive on scene wearing a body worn camera associated with that end user, and their camera is not active, it will automatically turn on until the trigger is deactivated.
 - If there is a desire to have the trigger be timed, the trigger source can be configured as a timed relay if possible or a physical timed relay could be put inline between the trigger source and the DIO on the in-vehicle server.

ype to filter	Machine											cording on	
	Onlogic Karbon 410							*			body w	orn cameras	
Devices	Body Worn System ID												
Storage	47ff31cd-08b6-48	f5-9b66-c97f0e	31533a										
Recording and events				Description		Description							
🖞 Client			1 3	InO	2 4	Out0							
→ Connected services	2 4 6 8 10 13	14 16 18 20	5	in1	6	Out1							
 Connected services 			7	in2	8	Out2							
Server			9	In3	10	Out3							
Licenses			11	in4	12	Out4							
	1 3 5 7 9 1	13 15 17 19	13	In5	14	Out5 Out6							
Security			15	Inti In7	16	Out6							
Access control			19	107	20	000							
Recording replicator													
Settings	Pin 3[In 0]	Start record	ding on a	II cameras	~		Actions				Pin 4 [Out 0]		
							Start record	ing on body worn c	ameras 🗲				
Event Bridge for OnLogic													
Cameras	Pin 5 [In 1]	Stop record	ding on A	CS camer	as←		Start record	ing on ACS cameras	₅←		Pin 6 [Out 1]	Recording LED \rightarrow	
Settings													
Q Smart search 2	Pin 7 [In 2]						Stop record	ing on ACS cameras	s when vehicle is shut d	iown 🔶	Pin 8 [Out 2]	Component Is Ready LED ->	
System Health Monitoring													
, system realth wonitoning							Turn off PC	4					_
	Pin 9 [In 3]							`			Pin 10 [Out 3]		

In the example above, there are also 2 output Actions which are pre-populated.

These are meant to support indication LED's which can be utilized to inform the officer that the system is up and running, and that there is an on-going recording and that the system is up and running.

- These LED Actions should be dragged to the corresponding output pins. The output pins are the even numbers on the DIO.
 - For example: When an officer starts their shift they need to know their system is up and running. This can be done by logging into the ACS client on their Mobile Data Terminal or by visually seeing an LED which signifies the system is up and running. Also, the most common method for starting a recording is to activate the lights and sirens. When this action is used the in-vehicle cameras will start recording and the recording LED (if supplied) will turn on. When the lights and sirens are turned off, it does not stop the recording. This recording indication LED will stay lit until the officer presses the stop recording button.
 - Axis LED's or any 3rd party 12v LED's can be used in this application.

11. Creating a client user

The local MDT/laptop in the vehicle can connect back to the in-vehicle server using ACS Client which should be loaded and installed onto the vehicle's MDT/laptop. This can be don't by setting up a guest user on the in-vehicle server for the person in the car to use as a login.

- Navigate to computer management on the server > Local users and groups > users > add a user as the Police Dept. name > add a password > uncheck user must change password at next login > checkoff password never expires.
- In ACS add the user you just created under User permissions
 - Configuration > Security > User permissions > Discover the windows user
 > add

e to filter	User settings	
B Devices	These settings apply to the current AXIS Camera Station user on the	his computer.
Storage	Navigation system	
Recording and events	Tree view navigation system	
🖆 Client	Show in navigation: Views Show navigation path when navigating in view	
Client settings		
User settings	Notifications	
Streaming	Show taskbar notification for alarms	
→ Connected services	Show taskbar notification for tasks Show notifications in Device management	
Server	Show intercom notification window	
E Licenses	Snapshot	
Security	When a snapshot is taken show a message	
Event Bridge for OnLogic	When a snapshot is taken open the snapshot folder	
Event bridge for OnLogic	Snapshot folder: C:\Users\axis\Pictures	Browse
Recording replicator		
	Startup	
	Start in full screen	
	Remember last used tabs	
	Remember last used monitors	
	Sound on alarm	
	O No sound	

e to hiter	User permis	ssions					
Devices	Make sure that users and y on individual and also as ;		local computer or he	ove an active directory user account before you a	ld them to AXIS Camera Station. V	When a user is part of a group, the user gets	the privileges granited as
Storage	Name	Donain	Role	Details	Server		
Recording and events	💼 Administrators	CAR1984	Administrator	Local Administrators (an server)	CAR1984		
Client				Add user/group	, — в х		
Connected services							
Server				Show Scope			
2 Licenses				 ✓ Usars (in Server: CAR1984) ✓ Groups (in Complex - 	_		
Security				Available domain users/groups			
User permissions				Type to filter			
Certificates				Name Details			
Event Bridge for OnLogic	1			A Administrator			
			_	🛓 suis			Remove
Recording replicator				AXISPD AXISPD			
	Role			Default/loccent			
) Operator () Viewer to view a description of th	di sala	A Guest			
	sener o une ur group i	to week a cestripuon of th	er rom	▲ wibaGuhityA			type to tilter

	🔿 🗖 🖬 🖬 🖬					
·	Computer Management (Local): System Tools): Bystem Tools): The Scheduler >): Event Wever): Shared Folders): Shared	Name Administrator # aris B GauthAccon. B GauthAccon. WDAGUNIty	User cannot o	inge password at next logon hange password er expires abled	×	Actions Users More Actions
Q #	,	YY	Help	Create		

- Assign the user permissions to ensure they only have access to view the video and have very limited access rights.
 - For example: assign the user to be an operator > under Role click on Cameras > check off access to video and audio > Click Views > check off Access to the View you create above > under System ensure that the only item checked off is Prevent access to recordings older than: X minutes > Save
 - In this example 1440 minutes is used as that represents 1 day
 - This is all highly customizable

Cameras Views I/O	System								
Name	Access	Video	Audio listen	Audio speak	Manual recording	Mechanical PTZ	PTZ priority		
Car 1 - Front		\checkmark							
Car 1 Rear Seat		✓							
tole									
n operator can access	selected functi		nd live and recor	rded video from se	elected cameras.				Т
n operator can access : Cameras Views I/C	selected functi		nd live and recor	rded video from se	elected cameras.				
n operator can access : Cameras Views I/C Name	selected functi		nd live and recor	rded video from se	elected cameras.			Access	Edit
Administrator Administrator Cameras Views VC Name Car 1	selected functi		nd live and recor	rded video from se	elected cameras.			Access V	
In operator can access : Cameras Views I/C Name	Operator	Viewer							Edit
n operator can access s Cameras Views 1/C Name III Car 1	Operator O	Viewer							Edit
n operator can access s Cameras Views V/C Name Car 1	Operator O elected function System	Viewer							Edit

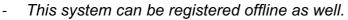
- Adjust the User Settings for when the officer logs in to the ACS client it appears the same way every time.
 - For example, copy the setting below:
 - Configuration > Client > User settings > copy settings in image below

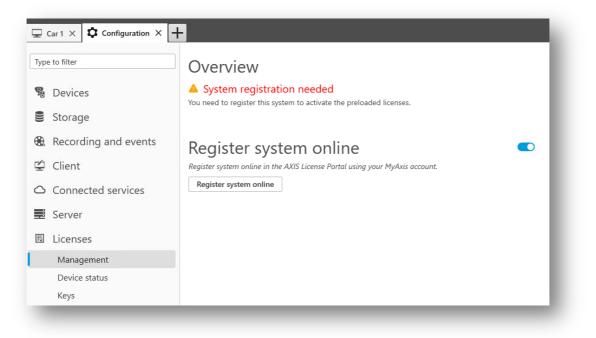
12. Licensing AXIS Camera Station

The in-vehicle server needs to have a license applied to AXIS Camera Station. This is the only license that needs to be applied to the in-vehicle server. The F91 series brought into ACS, requires 1 camera license.

- To apply the license you must have an <u>Axis Communications My Axis</u> <u>Account</u>.
- Once you have an account and have purchased the required licenses go to:

 Configuration > Licenses > Management > Register system online > Sign into your account and apply the license key to the server in the AXIS License Portal





♠ Systems			
AXISNVR-PM	14EUPJ		
License status	Add license key Ener Iones Hy * RMCN - CFUE	Ectit license Usere arms Steven Jussaur Add	ne Ø
License keys			Ownload license fi
Key Tota	Registration date	Content O Core O Universal	
		ltems per paj	ge <u>5 ▼</u> 0 of 0 < 3

The central server receiving the video will also have to be licensed and require 1 license per stream.

• For example: If every vehicle has 2 cameras, the central server will need 2 licenses per vehicle.



Ensure that when license are ordered, they are ordered per vehicle and not as 1 large batch. For the central server, the license can be order in 1 large batch. If the central server is an Axis Server, it will come pre-loaded with some licenses, so the math will just have to be done to ensure there is enough licenses to support all the vehicles.

13. AXIS Camera Station Client Install MDT

The officer may need to check the system status or want to view the video from within the vehicle. The best way to accomplish this would be to install <u>AXIS Camera</u> <u>Station Client</u> on the mobile data terminal and link it back to the server running in the back of the vehicle. The client software is only a client so it will not install the server application.

- Download AXIS Camera Station Client on a USB Thumb Drive
- Install the application on the vehicle MDT
- Open ACS client
- Under Remote server add the IP address of the Axis-K410-V1 in the back of the vehicle
- Point the client to the IP address of the server in the rear of the vehicle
- Now when the user logs in they will only see the View that was created and have access to:
 - See if the cameras are up and running
 - The current state if their recording or not
 - And have the ability to go back and see recordings from 1 day

XIS Camera Station 5.	AXIS Camera Station 5.
Connect to server(s)	Connect to 10.10.10.1
O Last used servers	O Current user
O This computer	O Other user
O Remote server: 10.10.10.1 ▼ 5	Username: AXISPD
Sign in to AXIS Secure Remote Access	Password:
Log in as current user	Remember me
Log in	Log in Change Server



14. Physical installation

In this section, we will cover the physical installation of the various components of the Axis in-vehicle solution. The two primary components of this solution will be the AXIS F91 main unit and the Axis-K410-V1 server. Both of these devices should be installed in a secure location in the vehicle, preferably close to one another.



Using the supplied mounting brackets, install the server to a secured surface. Ensure the server is close to the power distribution panels for access to power.

- Attach wall mounting brackets to the chassis using the provided screws. To assemble, locate the four holes in the chassis that line up to the two countersunk holes in each wall mount bracket.
 - Screw type: M3x0.5 FH 120 Degree Length: 4 mm
- Take care to ensure that the brackets are oriented correctly and that the part of the brackets in contact with the mounting surface is positioned away from the system to ensure a **small air gap is maintained between the mounting surface and the system.** Install the four supplied screws.
- Fasten system to the mounting surface (hardware not provided). The mounting bracket systems are required to secure 3x the hanging weight of the computer system. The mating substrate must be capable of maintaining the same rating.

•	KARBON 400	•
		THE

Use the supplied terminal block and wire the server to the power distribution panel supplying both positive, ground and ignition voltage.

- This server supports 9 48 V DC power.
- This server will draw at max power 34.2 watts, in addition the POE power available is 36watts, therefor a **7.5amp fuse** should be used in-line between the server and the power distribution panel.

The server has 2 network ports.

- Either port will supply connectivity and POE to the F91 main unit.
- The other port should connect into the vehicle network, allowing the mobile data terminal the ability to connect with the server.



Connect the DIO terminal block to the DIO port and supply 12v dc to pin 1 and ground to pin 2.

- The isolated digital inputs/outputs are enabled by default and require an external power source (9 ~ 48 VDC) in order to operate.
- The outputs function as open-**drains**, and should not be used to source more than 150mA of current. The input of the DIO is pulled **high when floating**.
- The inputs and outputs require a grounded signal to be able to trigger an event.
 - For example: When a lightbar is turned on, an additional pin can be activated on the lightbar controller sending voltage into the line. An

inline 12v, automative, SPST, relay can be used in-line and wired to convert that 12v signal into a ground which would then be wired to the associated pin on the DIO.



The server comes with a built-in wireless card and support for both 2.4GHz and 5GHz bands via an Intel wide-temp wireless-AC 9260 802.11ac Wi-Fi & BT 5.1 card. This card supports 2 RP-SMA Male connectors.

- Connect the wireless antennas directly to the supplied connectors and mount the antennas in an optimal location inside the vehicle or outside the vehicle.
 - For example: If using the <u>Taoglas Stingray antennas</u>, these antennas can be mounted inside the vehicle on an available window in an optimal location, not requiring a hole to be drilled through the vehicle.
- Various antenna types and connectivity solutions can be used to connect the system back to the end customers wireless access points on the building.



The Axis-K410-V1 uses the Intel_AC-9260NGW which is a wide temp wireless card and when used in conjunction with the Taoglas Stingray antenna, the coax cable needs to be at least 1m in length to comply with the FCC regulations. Anything less will violate the radio grant allowance for gain on 5GHz.





The F91 main unit should be installed using the AXIS TF9902 Surface Mount mounting bracket securing it to a fixed mounting location inside the vehicle. The F91 series should be connected to the server via a cat5/cat6 cable, as the server will power the F91 main unit via POE power.



Run the coax cable for the 2 sensors through the vehcile from their install location back to the F91 main unit.

- The primary cable runs for the sensor unit will be from the front windhshiled back to the F91 main unit and from the transportation area back to the F91 main unit.
- Once the coax cables are run and connected back to the main unit, the camera sensors can now be installed.

The 2 primary sensor install locations will be the forward facing camera and the rear seat area camera.

The forward-facing lens will use a combination of the AXIS F2115-R Varifocal Sensor varifocal sensor and the AXIS TW4100 Front Windshield Mount. The AXIS F2115-R has a 107-56 degree field of view.

- The AXIS TW4100 mount and the AXIS F2115-R both have alignment markers to assist with ensuring the sensor is mounted level. Align the sensor marker with the marker on the adjustment ring from the AXIS TW4100.
- Place the adjustment ring inside the mount and align the horizontal markers.
- Connect the coax cable to the sensor.
- Secure the coax cable using the supplied zip tie.
- Prep the windshield surface with an alcohol wipe and let it dry.
- Remove the 3M adhesive label.
- Secure the mount to the windshield firmly holding it there for 10 secs.
- Adjust the sensor unit as needed for the desired field of view.



The transportation area camera will use the AXIS F4105-LRE Dome Sensor unit. This unit is IP6K9K rated with an adjustable lens and integrated IR allowing the camera to see at night. It has a 110 degree field of view.

- The AXIS F4105-LRE should be securely mounted in an optimal location in the transportation area to achieve the best field of view.
- Once the location has been determined, connect the coax whip on the AXIS F4105-LRE to the other end of the coax cable that was previously run.
- Use the supplied lens adjustment tool to both adjust the field of view of the lens and adjust the focus of the lens if needed.

If the project requires a wider field of view to capture more of the transportation area, a <u>144 degree field of view lens</u> can be purchased separately



The AXIS T8355 Digital Microphone has a max spl of 130dB and is a hemispherical microphone. It is IP65 rated and needs 9-13 V DC power supplied by the F91 main unit.

- The mic has various mounting options allowing it to be surface mounted or recessed behind a surface.
- Once an optimal location is found, route the mic cable through the vehicle back to the F91 main unit and ensure the 3.5mm connector is plugged into the mic port that is associated with the current lens.
- It is recommended that the mic be installed somewhere in the transportation area to ensure important audio is captured from the person being transported.



15. Central server setup

Now that the cameras and the Axis-K410-V1 are programmed and installed, it is time to set up the central server and organize the in-vehicle cameras and body worn cameras as well as user access rights for an optimal end user experience. This

section will be a high-level overview of the best practices when configuring the central server.

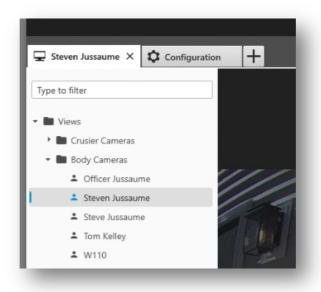
The topics that will be covered are:

- Video management
- How video transfers
- User access rights
- Folder and view creation
- Video playback and Exporting video

AXIS Camera Station is a video management software which allows for the unique organization and management of recorded video. In this case ACS is being used to manage in-vehicle and body worn camera video.

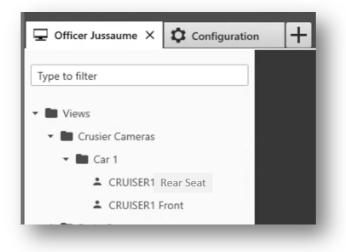
Axis body worn cameras can be assigned to a user. Once a user is added into AXIS Body Worn Manager, the username will populate inside of ACS. All these users will populate as a "camera" and as a "view". Once all the users have been populated, it is recommended to create a folder in VIEWS and add all the BWC users into one folder.

 Right click on Views > New Folder > Rename folder Body Worn Cameras > OK > Drag all the body worn camera users into that folder; *click on a user then click shift and down to multi-select users*



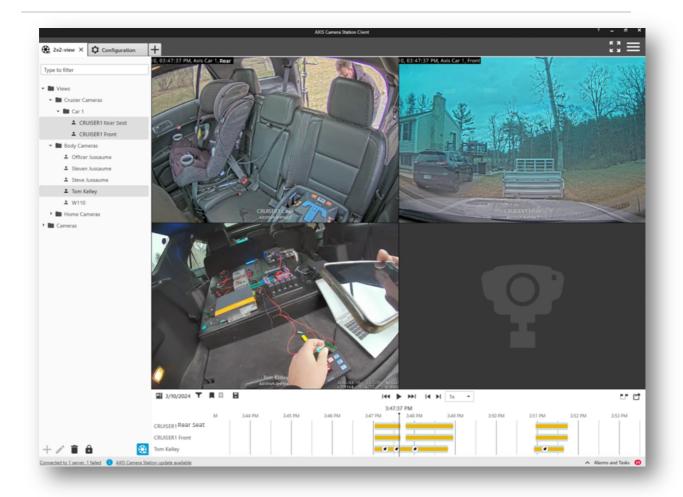
The vehicles today cannot be assigned to a user. This is why the server was given a server name that relates to the name of the vehicle. When recorded video transfer over to the central server, it will come in with the server's name and camera name. Video will only populate once the video has been recorded and replicated to the central server. During setup, recording test clips should be performed and test footage transferred to the central server, which will allow for verification that everything is working, and easier vehicle organization on the central server. Once all the vehicles have replicated some video, they will appear as a "camera" and a "view".

- Rick click on Views > New Folder > Rename folder Cruiser Cameras > OK
- Right click on Cruiser Cameras > New Folder > Rename folder with the name of a vehicle
- Repeat and create an individual folder for each vehicle
- Drag and drop each vehicle view/camera into the associated folder



Now that all the video is organized, a user will be able to open the body worn folder and the associated vehicle folder that they were assigned that day.

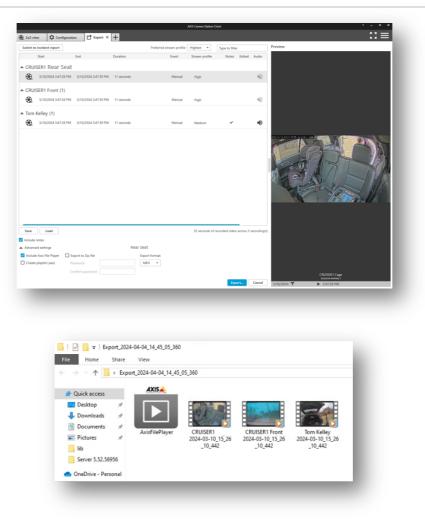
- Hold ctrl and select the body worn camera and the vehicle cameras and drag them into the view area.
- Go to the recordings symbol and go to the date and time of the BWC incident.
- Because the vehicle was assigned to that user on that day, the body worn camera video will be aligned with the in-vehicle video.
- The user can play the video back all at the same time and export the required clips at the same time.



- Click on the export marker flags and adjust the timeline markers to the area of footage that needs to be exported.
- Then click the Export button

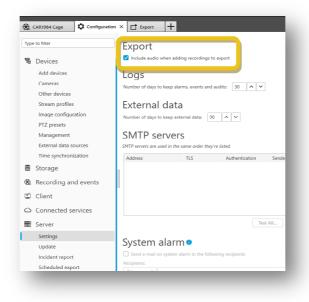


- Select the destination you want the file to be sent to
- Click export
- Now you in-vehicle video and BWC video are all in one folder with a file player

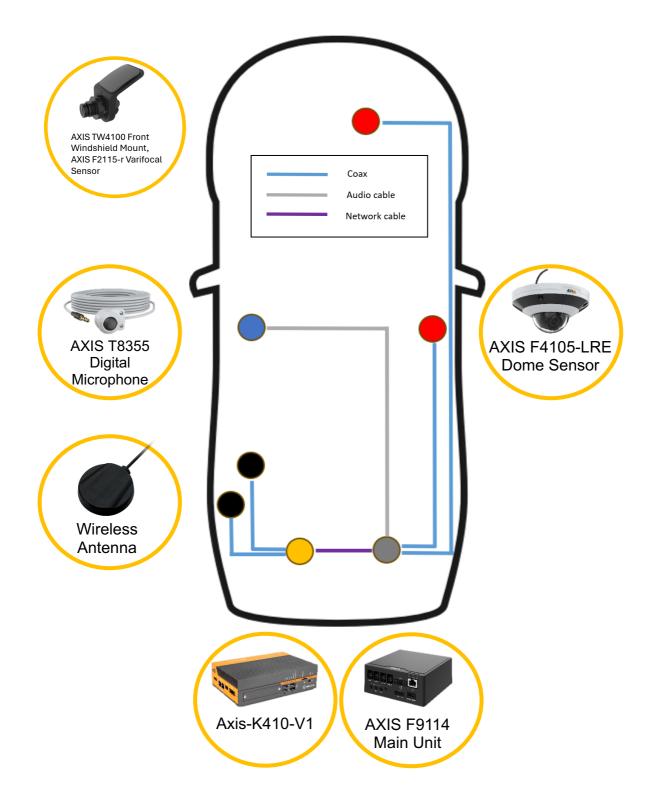


When exporting video ensure that audio is included in the stream if audio was recorded. This setting can be configured on the central server to always be enabled by going to:

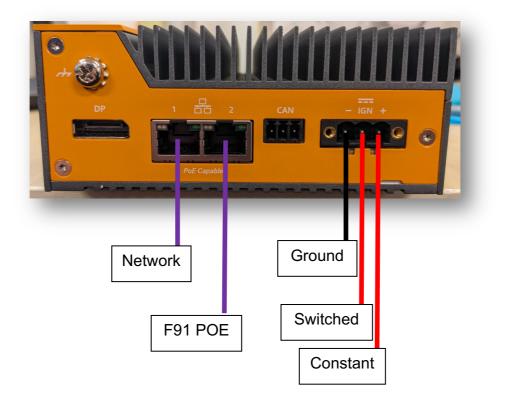
Configuration > Server > Settings > Check off "Include audio when adding recordings to the export"



Wiring Diagrams



Primary power and connectivity



Wire Size and Fuses

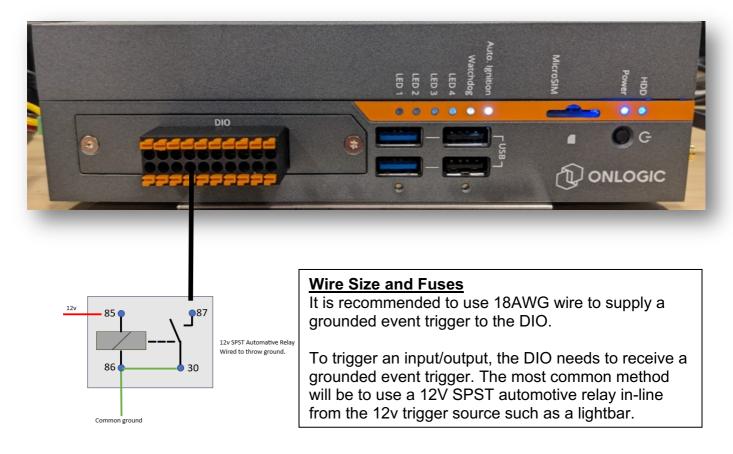
It is recommended to use 16AWG wire from the power distribution unit to the server.

The server should have a 7.5amp fuse inline from the positive power source to the server.

Powering the DIO

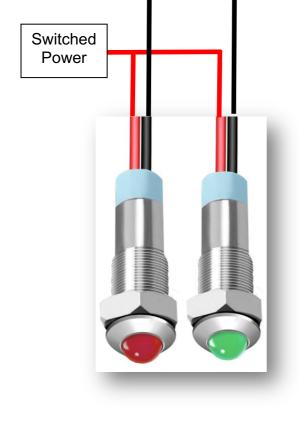


Event Trigger Wiring



Indication LED Wiring





Wire Size and Fuses

It is recommended to use 18AWG wire to supply a grounded event trigger to the DIO.

The LED's will be grounded to the output terminals and will become lit when the Component is ready and when a recording is on-going.

Any 12v LED will work. The DIO supports no more than 150mA.

Manually Programming Ignition-sense

Ignition-sense can be manually programmed. The pre-programmed PowerShell script should be used initially, however the need to adjust the hard-off-timer or the shutdown-voltage threshold may arise. After running the PowerShell script, this is how additional settings can be applied.

Make sure that you have downloaded the OnLogic Hardware Control Application and placed it on the desktop of the in-vehicle server. The file can be download here: https://static.onlogic.com/resources/firmware/utilities/hwc 1.2.0.zip

- Unzip the file and place the folder on the desktop
- Rename the folder on the desktop to HWC
- Open the folder and rename the HWC file HWC
- Go into AXIS Camera Station > Server > Components > right click on Event Bridge > Stop

Programming

- 1) Run command prompt as the Administrator
- 2) Now you will need to "cd" (change the directory) to direct the commands to the hwc folder
- 3) Type: cd c:\
- 4) Type: cd users\axis (axis = PC admin name)
- 5) Type: cd desktop
- 6) Type: cd hwc
 - a. Now you will be able to begin programing the timer shut down sequence
- 7) Type: **hwc ign set ignition-sense -v 1** (This will enable ignition sense and the server may reboot)
- 8) These are the additional commands you can program. Just by enabling ignition sense, the default times are set below, but can be updated by executing these command lines with the time/power levels you desire.
 - a. hwc ign set low-power-mode -v 1
 - b. hwc ign set shutdown-timer -v 10
 - c. hwc ign set startup-timer -v 10
 - d. hwc ign set hard-off-timer -v 3000
 - e. hwc ign set shutdown-voltage -v 600
 - i. Make sure that hard hard time is in addition to the shutdown-timer
 - ii. If you set 10,800 secs (3hrs) for shutdown, hard timer should be 10,800 (3hrs) + 3600 (1hr) = 14400
 - iii. This is all very customizable

Command	Description	Possible Values
ignition-sense	Enables or disables ignition sense	0=off, 1=on
low-power-mode	Reduces idle power consumption (recommended on when ignition sense is used)	0=off, 1=on
startup-timer	The delay between IGN power being applied and the unit turning on	1-2147483647 (seconds)
shutdown-timer	The delay before Windows is shut down when IGN power is cut	1-2147483647 (seconds)
hard-off-timer	After the shutdown timer has completed, power will be fully cut after X number of seconds. This is useful in case the system freezes at shutdown.	1-2147483647 (seconds)
low-voltage-timer	The low voltage shutdown can be delayed by X number of seconds. A value of at least 10 is recommended to avoid voltage drop related shutdowns – i.e. when the engine is started.	30-2147483647 (seconds)
shutdown-voltage	The unit can shut itself down when a certain low voltage threshold is reached. This helps prevent over discharging a battery. (1150 => 11.5V)	600-4700 (centi-volts)

If you want to see the current state of ignition sense, or any of the other settings, you can type:

- iv. hwc ign get ignition-sense
- v. You can check the state of other settings by typing their command with **get** and without the -v (value)