



Avonic PTZ Camera 30/20x/12x zoom

CM70-IP/CM71-IP/CM73-IP

www.avonic.com | User Manual | Version 1.02

Disclaimer, Contact and CE Marking

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CE Marking

The Product has a CE Marking. The CE labels are placed at the bottom of the Product and on the packaging. See the respective figures below:



Figure 1: CE Marking (Product)



Figure 2: CE Marking (Packaging)

EU Declaration of Conformity

The Avonic Declaration of Conformity is in accordance with EN ISO/IEC 17050-1 and generated using the ProductIP compliance platform.

Table 1: EU Declaration of Conformity

Declaration number:	DOCIP 819694	
Name and address of manufacturer / EU-AR:	Avonic Exportweg 11a 2645ED Delfgauw Netherlands	
THIS DECLARATION OF CONFORMITY IS ISSUED UNDER THE SOLE RESPONSIBILITY OF:		
Name and address of manufacturer:	Avonic Exportweg 11a 2645ED Delfgauw Netherlands	
Product identification:	PTZ Camera 12x/20x/30x Zoom White AV-CM7x	
THE PRODUCTS MENTIONED IN THIS DECLARATION ARE IN CONFORMITY WITH:		
EU Community Legislation	Restriction of Hazardous Substances (RoHS) Directive 2011/65/EU [OJEU L174/88-110, 01.07.2011] Electromagnetic Compatibility (EMC) Directive 2014/30/EU [OJEU L96/79-106, 29.03.2014] Ecodesign energy-related products Directive 2009/125/EC [OJEU L285/10-35, 31.10.2009] Low Voltage Directive (LVD) 2014/35/EU [OJEU L96/357-374, 29.03.2014]	
Harmonised standards	Safety of electrical equipment EN 60065:2014 + AC:2016 + AC:2017 + AC:2017 + AC:2018 Electromagnetic Compatibility (EMC) EN 55020:2007 + A11:2011 + A12:2016 EN 55032:2015 + AC:2016 EN 55035:2017 EN 61000-3-2:2014 EN 61000-3-3:2013 Restricted substances in electrical products EN 50581:2012 EN IEC 63000:2018 Ecodesign Regulation (EC) 278/2009 - Ecodesign of external power supplies (EPS)	
Other specifications:		
Notified Body:		
Additional Information:		
SIGNED FOR AND ON BEHALF OF:		
Place and date of issue:	Delfgauw, 24 October 2019	
Signature:		
Name, function:	Walter Harrewijn, CEO	
Company name:	Avonic	

Important Information

Liability

Avonic will NOT be held responsible for any damage or injury caused by unqualified persons carrying out these tasks, or by not following the instructions in this Manual.

Intended Use and Non-Intended Use

Installation



The following applies to the *installation* of the camera:

- The installation activities described in this Manual should ONLY be executed by experienced technicians.
- The installation activities should NOT be executed by minors, mentally disabled persons or other persons not qualified to perform these tasks.





Operation





The following applies to the *operation* of the camera:





- The operational activities described in this Manual should ONLY be executed by people with enough technical knowledge to perform the activities in a safe manner.
- This Product is specifically developed for video conferencing / streaming via internet by companies, institutes and universities. It is NOT meant for private use in the residential area.
- This Product should ONLY be used indoors.
- This Product is NOT a medical device and should NOT be used as a substitute for professional medical judgment. It is NOT designed or intended for use in the diagnosis of disease or other conditions, or in the cure, mitigation, treatment, or prevention of any condition or disease. Please consult your healthcare provider prior to making any decisions related to your health.

Important Precautions

	This Product is NOT intended for use where failure of the device could lead to death, personal injury, or severe environmental damage.
	Be sure that you have COMPLETELY READ and UNDERSTOOD ALL information in this Manual before unpacking, installing and using this Product. Keep the Manual in a safe place for future reference or download it from www.avonic.com .
	Failure to follow the SAFETY NOTES as described in this chapter could result in fire, electric shock, injury, or damage to this Product or other property.
	Power this Product ONLY with the included cable and power adapter. Other adapters may not meet applicable safety standards, and could pose a risk of death or injury when connected.

Symbols Used in This Manual

Symbol	Meaning	Description
	Danger	Not following the instructions associated with this symbol may lead to personal injury and / or serious damage to the Product.
	Electrical Shock	Not following the instructions associated with this symbol may lead to life-threatening situations and / or serious damage to the Product.

Symbol	Meaning	Description
	Important	The information associated with this symbol requires special attention.
	Information	The information associated with symbol refers to a general remark or a reference to other documentation.
	Instruction	This symbol refers to one or more user instructions.
	Recycling	Specific parts of the Product can be re-used.

Acronyms

The following acronyms are used in this Manual:

AAE	Aperture Auto Exposure
AWB	Aperture White Balance
BLC	Black Light Control
CCM	Customizable Color Matrix
CMOS	Complementary Metal Oxide Semiconductor
DRC	Dynamic Range Compression
EV	Exposure Value
HD	High Definition
HDMI	High-Definition Multimedia Interface
IP	Internet Protocol
MJPEG	Motion-JPEG
NR	Noise Reduction
OSD	On-Screen Display
PoE	Power over Ethernet
PTZ	Pan / Tilt / Zoom
RTMP	Real-Time Messaging Protocol
RTSP	Real-Time Streaming Protocol
SAE	Shutter Auto Exposure
SDI	Serial Digital Interface
SKU	Stock Keeping Unit
SNR	Signal to Noise Ratio
SRT	Secure Reliable Transport
UDP	User Datagram Protocol

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Introduction

Purpose of This Manual

This Manual describes the safety precautions and the instructions for safe unpackaging, installation, operation, maintenance and disposal of the Avonic CM70-IP, CM71-IP and CM73-IP cameras.



In this Manual, the Avonic CM70-IP, CM71-IP and CM73-IP cameras are referred to as the 'Product'.

Target Audience

This Manual is developed for installation technicians who install the Product at client sites, and for IT professionals who are responsible for operating the Product.

Document Structure

The Manual is subdivided into the following *Chapters*:

1. *Introduction*
2. *Safety*
3. *Product Overview*
4. *Unpacking*
5. *Mounting and Installation*
6. *Operation*
7. *Maintenance*
8. *Transport and Storage*
9. *Disposal and Recycling*
10. *Troubleshooting*





Additionally, it contains the following

- *Appendix A - VISCA Settings and Command List*
- *Appendix B - Dimensions*
- *Appendix C - HTTP API*
- *Appendix D - CMOS Image Sensor Characteristics*

Safety

This chapter contains important safety information regarding the unpacking, installation and use of the camera.

Important Precautions

	This Product is NOT intended for use where failure of the device could lead to death, personal injury, or severe environmental damage.
	Be sure that you have COMPLETELY READ and UNDERSTOOD ALL information in this Manual before unpacking, installing and using this Product. Keep the Manual in a safe place for future reference or download it from www.avonic.com .
	Failure to follow the SAFETY NOTES as described in this chapter could result in fire, electric shock, injury, or damage to this Product or other property.
	Power this Product ONLY with the included cable and power adapter. Other adapters may not meet applicable safety standards, and could pose a risk of death or injury when connected.

Intended Use



See section *Intended Use and Non-Intended Use* on page iv for details.

Handling



To prevent the risk of injury, take the following precautions when handling this Product:

- Handle the Product with care. It is made of metal, glass, and plastic and has sensitive electronic components inside.
- The Product can be damaged if dropped, burned, punctured or crushed, or if it comes into contact with liquid.
- Do not pick up and move the Product unit while a tripod is attached. The fitting may break under the weight of the tripod, which may result in injury.
- If you suspect any damage to the Product, discontinue its use, as it may cause overheating or injury.

Mounting



To prevent the Product from falling down which may cause injuries:

- Set up this Product on a hard, stable surface or mount it to a wall or ceiling.
- ONLY use an Avonic mount for mounting to a wall or ceiling.
- Ensure the mounting construction is capable of supporting four times the weight of the Product. (See 'General Specifications > Weight product' in the Product Datasheet for the exact weight.)
- Use a safety loop or drop protection that prevents the Product from falling if the mounting construction fails.
- During installation, NEVER install a Product above a person.
- Check the installation at least once a year. An improper mounting could cause the unit to fall off, resulting in personal injury.

Ventilation



To prevent the risk of life-threatening injury or damage to the Product or other property, caused by electric shock or fire hazard due to overheating:

- Maintain adequate ventilation by NOT installing or placing the Product unit in a bookcase, built-in cabinet or any other confined space.
- Ensure that curtains or any other material does NOT obstruct the ventilation.

Repair



Take the following precautions if the Product should be repaired:

- Don't open this Product and don't attempt to repair it yourself. Disassembling the Product may damage it or may cause injury to you.
- If this Product is damaged, malfunctioning, or if it comes into contact with liquid, contact Avonic or an Avonic Authorized Service Provider.
- Repairs by service providers other than Avonic or an Avonic Authorized Service Provider may not involve the use of Avonic genuine parts and may affect the safety and functionality of the device. *You can find more information about repairs and service at www.avonic.com.*

Power and Adapter



To prevent the risk of life-threatening injury or damage to the Product or other property, caused by electric shock or fire hazard:

- Power this Product ONLY with the included cable and power adapter. Other adapters may not meet the applicable safety standards. They could pose a risk of death or injury when connected.
- Do NOT use damaged cables.
- Do NOT power the Product in a moist / wet environment.
- Before you power the Product, ensure the cable is fully inserted into the power adapter.
- Plug the power adapter directly into a power outlet.
- Do NOT use the power adapter at a moist / wet location.
- Do NOT connector disconnect the power adapter with wet hands.
- Keep the Product, cable, and power adapter in a dry and well-ventilated area when in use.
- Stop using the power adapter and any cables if any of the following conditions exist:
 - The power adapter plug or prongs are damaged.
 - The cable becomes frayed or otherwise damaged.
 - The power adapter is exposed to excessive moisture, or liquid is spilled into it.
 - The power adapter has been dropped, and its enclosure is damaged.

Atmospheric Conditions



To prevent the risk of injury or damage to the Product or other property caused by a potentially explosive atmosphere:

- Do NOT use this Product in an area with a potentially explosive atmosphere, such as areas where the air contains high levels of flammable chemicals, vapors, or particles (such as grain, dust, or metal powders), may be hazardous.
- Exposing this Product to environments having high concentrations of industrial chemicals, including near evaporating liquified gasses such as helium, may damage or impair this Product functionality.
- Obey all signs and instructions.

Product Overview

Description

The cameras in the Avonic CM70-IP / CM71-IP / CM73-IP series comprise a high-quality PTZ camera line with simultaneous HDMI, 3G-SDI, USB 2.0 and IP-stream Ethernet outputs. The cameras of this line are designed for fixed, indoor installations.

The cameras include a rich feature set, that is usually found on broadcast-grade cameras. For example: a user-adjustable Color Matrix and SRT streaming (licensed premium functions).

The cameras have the ability to deliver outstanding quality under low light conditions, thanks to its high-quality SNR CMOS sensor. The sensor delivers Full HD 1080p60 video.

Each camera can be accessed remotely through a WebGUI, in which the user can set up and operate a specific camera.

Each camera is provided with an On-Screen Display (OSD) menu, an integrated on-screen menu that can be accessed within the camera to change specific functions that effect how the camera processes an image. The OSD Menu is visible on the HDMI, SDI, and IP outputs.



Features

Each camera in the Avonic CM70-IP / CM71-IP / CM73-IP series has the following features:

- 20x/12x/30x Optical Zoom glass lens.
- High SNR CMOS combined with Digital Noise Reduction (DNR) for a clear picture, even under very low light conditions.
- Full HD 1920 x 1080p60 resolution and Pristine image quality.
- The camera can be powered using Ethernet port with PoE (802.3af) functionality, accessed via WebGUI and controlled by VISCA over IP / Onvif for video streaming.
- H265, H264, optional SRT and MJPEG compression at a bitrate up to 40Mbit, thus enabling Full HD video stream by ultra-low latency over RTSP, RTMP, UDP, Unicast, Multicast support.
- 3G-SDI, HDMI, USB 2.0 (1080p30) and IP.
- Camera control using common protocols: VISCA, Pelco-D / P via RS-232, RS-485, IP (VISCA), Onvif or IR.
- Remote control included.
- Supports up to 255 presets with 0.1° accuracy and High-Speed Pan-Tilt function.
- Balanced audio input with embedding into IP stream, SDI and HDMI outputs.
- Configurable audio offset.
- Optional premium features: SRT streaming, Tally light, configurable Color Matrix. License AV-LC70-1 (sold separately).

Unpacking

This describes the contents of a complete Product package, and instructions for safe unpacking and (if necessary) Product return.

It is subdivided into the following sections:

1. Package Contents
2. Handling Precautions
3. Unpacking the Camera
4. Return Procedure

Package Contents

The following tables contains an overview of the package contents of the Product.

No.	Quantity	Description	Avonic SKU
1	1 pc	PTZ Camera	AV-CM70/71/73-IP-B/W
2	1 pc	Remote Control	AV-CM40-RC
3	1 pc	USB cable type A to type A	AV-USB20-AA
4	1 pc	Power Supply 12V/A	AV-CM40-PSU
5	1 pc	RS-232 9-pin D-Sub female to DIN -8 male	AV-CM-RS-232
6	1 pc	5-way Phoenix Balanced audio conn.	AV-PHNX-5
7	1 pc	2-way Phoenix RS-485 connector	AV-PHNX-2

Each item is visualized below and referenced by the associated number in the table above:



Figure 3: Package Contents

Handling Precautions



Always take the camera by its base and do *not* move the position of the lens manually. See below.

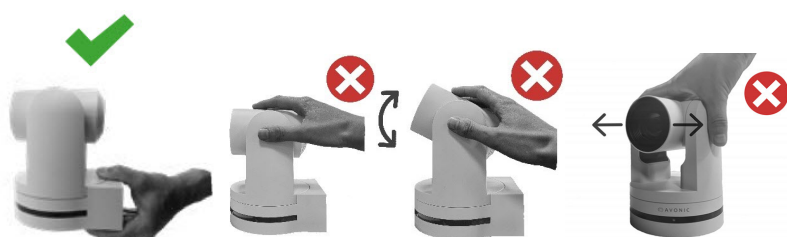


Figure 4: Handling Precautions

Unpacking the Camera



Execute the following steps to unpack the camera and associated components:

1. Open the box.
2. Verify that the contents of the box exactly matches the items as described in [Package Contents](#) on page 13. If this is NOT the case, contact Avonic and stop here.

The camera should be in its protective foam as follows:



Figure 5: Camera in Foam

3. Verify that the plastic camera bag is sealed. If this is NOT the case, contact Avonic and stop here.
4. Break the seal of the sealed camera bag.
5. Take the camera out of the bag. Be sure to follow the [Handling Precautions](#) on page 13 while doing so.
6. Install the camera following the steps as described in the chapter [Mounting and Installation](#) on page 15

Return Procedure



If, for any reason, you have to return the camera to Avonic, Execute the following steps:

1. Place the camera back in its protective foam. *Verify that the lens is in HORIZONTAL position!*
2. Place the camera with *all* of its components in the box.
3. Verify that the contents of the box *exactly* matches the items as described in [Package Contents](#).
4. Contact [Avonic](#) for the Return Procedure.

Mounting and Installation

This chapter describes the steps you have to perform to mount and install the Product in a correct and safe manner.

These steps are subdivided into the following groups, each of which is described in a separate section:

1. Mounting on Wall or Ceiling
2. Connecting the Components to the Camera
3. Connecting a Controller to a Camera



Take the following precautions to prevent the Product from falling down which may cause injuries:

- Set up this Product on a hard, stable surface, or mount it to a wall or ceiling.
- ONLY use an Avonic mount for mounting to a wall or ceiling.
- Ensure the mounting construction is capable of supporting four times the weight of the Product. (See 'General Specifications > Weight product' in the Product Datasheet for the exact weight.)
- Use a safety loop or drop protection that prevents the Product from falling if the mounting construction fails.
- During mounting and installation, NEVER install a Product above a person.
- Check the installation at least once a year. An improper mounting could cause the unit to fall off, resulting in personal injury.

Mounting on Wall or Ceiling

The following accessories (AV-MT200 and AV-MT250) are separately available if the client wants to mount the camera to the wall or ceiling. Contact your Avonic reseller or local distributor for purchasing details.

Table 2: Camera Accessories



Wall and Ceiling mount (AV-MT200)

SKU white: AV-MT200-W

SKU black: AV-MT200-B



Ceiling mount (AV-MT250)

SKU white: AV-MT250-W

SKU black: AV-MT250-B



Visit www.avonic.com to download instructions for mounting the camera to the wall or ceiling using the accessories AV-MT200 or AV-MT250.

Connecting the Components to the Camera



Execute the following steps to connect the components to the camera:

1. Connect all provided components (see [Package Contents](#)) to the ports at the rear of the camera. The figure below shows the applicable ports.



Figure 6: Camera Ports

1. Kensington Lock
2. Balanced Audio Line in 5-pin Phoenix connector
3. RS-485 two-wire serial communication with 2-pin Phoenix connector
4. System Selector (see Using the Select Switch on page 51)
5. RS-232 mini-DIN-8 IN (connect the supplied RS-232 cable)
6. RS-232 mini-DIN-8 OUT for daisy chaining RS-232 connection
7. BNC 3G-SDI output, SMPTE 425M level A.
8. HDMI Type A
9. USB2.0 Type A, UVC video output and control
10. RJ45 Ethernet connection, with PoE
11. DC12V power with locking screw (connect the supplied DC PSU)
12. Power ON/OFF
13. Fall protection eye

2. If you have connected the power cable to the camera, set the power switch at the back of the camera to the 'ON' position. If you use a PoE Ethernet connection instead, ensure that the Power switch is always 'ON'.

After empowering the camera, it starts initializing by first rotating the Pan-Tilt to the maximum top right position and then to the center.



If position preset '0' has been stored, this is the position that will be called after initialization.

The current IR-channel setting and IP Address of the camera are displayed on the [OSD Menu](#).

From this point onwards, the user can start controlling the camera.

Connecting a Controller to a Camera

You can connect one or more cameras to an VISCA IP controller.



See <https://avonic.com/en/product-categorie/controllers/> for an overview of the available controllers.

A controller gives you direct control over the most important camera settings (e.g., Pan, Tilt, Zoom, Focus, White Balance). You can access all other settings through the [OSD Menu](#) of the camera using the controller. The camera(s) can be connected via a serial connection to USB, HDMI, SDI, RS-232, RS-485, or via a LAN Ethernet connection. Each of these options is described below.

Connecting via USB, HDMI or SDI



Execute the following steps to connect the camera to a desktop or a (computer) monitor via USB, HDMI or SDI:

1. Connect the camera to the desktop or monitor via the USB, HDMI or SDI port (see figure above).
2. Open the Windows Camera app or a third-party camera app.
3. Open the Settings.
4. Select the camera you just connected, or click on the option / icon to change the camera to the camera you just connected.
5. Press the **MENU** button on the provided IR Remote Control to open the **OSD Menu**.



See [Using the Remote Control](#) for more information on how to use the Remote Control.

Serial Connecting via RS-232 or RS-485

COM Port Settings

In default working mode, the camera can connect to a VISCA controller via an RS-232 or RS-485 serial interface. The applicable COM port settings are (where '*' stands for 'Default value'):

RS-232

- Baud rate: 2400/4800/9600*/115200
- Start bit: 1 bit
- Data bit: 8 bits
- Stop bit: 1 bit

RS-485 (half-duplex mode)

- Baud rate: 2400/4800/9600*
- Start bit: 1 bit
- Data bit: 8 bits
- Stop bit: 1 bit



See [Appendix A - VISCA Settings and Command List](#) on page 58 for the command list.

RS-232 Interface



Connect the controller to the back of the camera via the RS-232 cables as shown in the figures below:

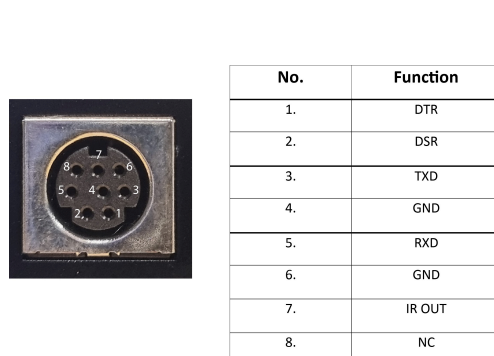


Figure 7: RS-232 Interface (Mini DIN-8)

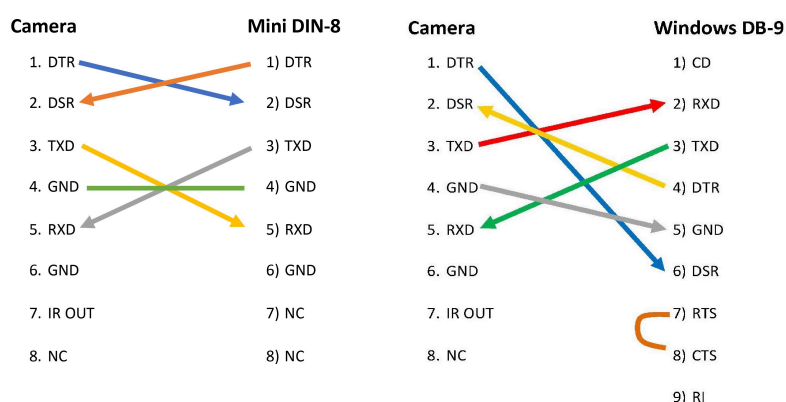


Figure 8: RS-232 Cable and Interface Connection (Mini DIN-8 and Windows DB-9)

RS-232 Network Connection



Execute the following steps to connect the controller to the back of the camera(s) via RS-232:

1. Make the connection using *daisy chaining* network architecture.
2. Keep in mind that the maximum cable length for RS-232 is 10-15m.

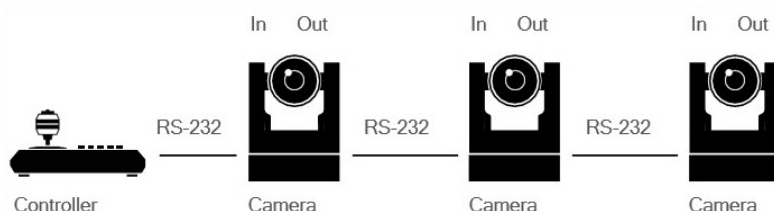


Figure 9: RS-232 Network Connection Diagram

RS-485 Interface



Connect the controller to the + and - at the back of the camera via the RS-485 cables, as shown in the figure below. Note that the color of the connecting cables (red and black in the figure) may vary.

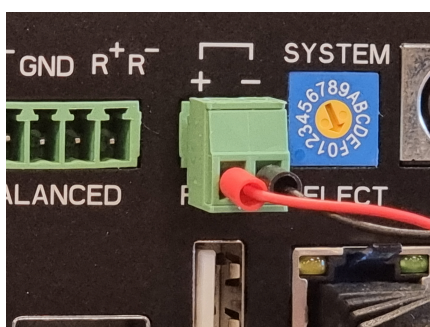


Figure 10: RS-485 Interface

RS-485 Network Connection



Execute the following steps to connect multiple cameras to RS-485:

1. Attach the cameras to a 2-wire twisted pair bus (maximum length 1200m) that is terminated at both ends with a 120Ω-impedance resistor.
2. Ensure that the maximum distance from the bus to the camera or controller is 5m. If you use only ONE camera, the impedance resistor is not needed.

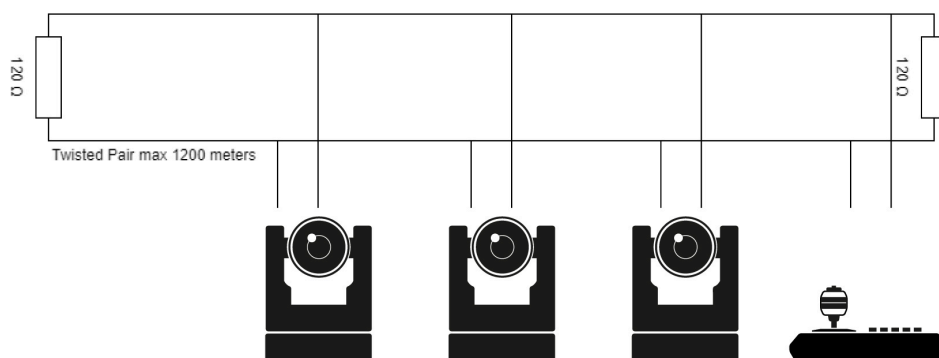


Figure 11: RS-485 Network Connection Diagram

Connecting via LAN

Avonic IP cameras can be controlled by any device using the Visca over IP protocol (see the command list in [Appendix A - VISCA Settings and Command List](#)).

Settings

By default, the IP address of the camera is "192.168.5.163" with "admin" for both the username and password.

The control parameters for the CM7x-IP cameras are as follows:

- IP Address: 192.168.5.163
- Username: admin
- Password: admin
- TCP or UDP port: 1259

IP (Network) Connection



Execute the following steps an Avonic PoE camera to a LAN:

1. Use a standard (PoE) switch. If the unit is simultaneously connected to both PoE and its own power supply, the power supply will take priority. If the power supply is disconnected when PoE is present, the camera will remain operational without interruption.
2. Ensure that addressing is done via IP. When using VISCA over IP, the 'x' in all the '8x' addresses is always '1', where the Visca address in a Visca over IP environment is always 1. (See [Appendix A - VISCA Settings and Command List](#) for more information.)

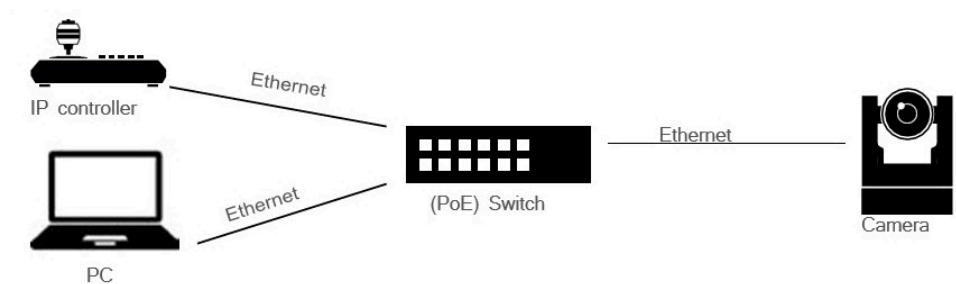


Figure 12: IP Network Connection Diagram

Operation

1. WebGUI
2. Using the Remote Control
3. Other Key Combinations
4. OSD Menu
5. Using the Select Switch

WebGUI

You can access the camera through a WebGUI where you can set up and operate one or more cameras.

Login

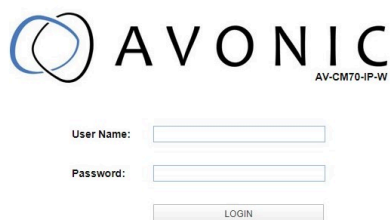


Figure 13: WebGUI > Login



Execute the following steps to log on to the WebGUI:

1. Open your web browser. Enter the default IP address "192.168.5.163". The *Login* screen appears.
2. Enter "admin" for both the *User Name* and *Password* and Click **LOGIN** to continue.



If **DHCP** is enabled and no **DHCP** server is available, the camera will automatically appoint an IPv4 link-local address between **169.254.0.0** and **169.254.255.255**. The IP address is shown on the screen at start-up.

After a successful login, the WebGUI is displayed. Here, you can select various tabs that are described below.

LOCAL

In this tab, you can see a preview of the camera IP video output. For example:

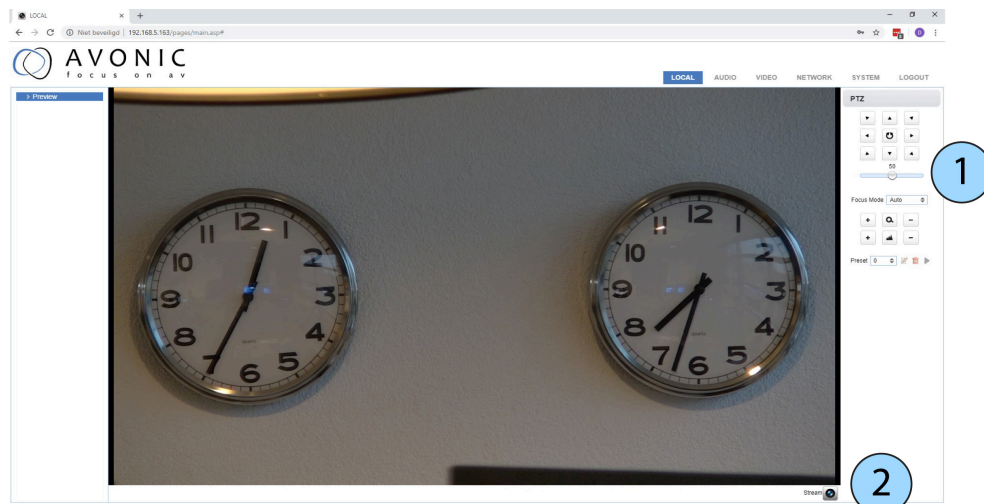


Figure 14: WebGUI > Preview



Execute the following steps to see a preview of the camera IP video output:

1. Use the options on the right to adjust the PTZ control, speed by zoom slider, focus and zoom functionalities.
2. Click on the camera icon below the screen to switch the preview between main stream and sub stream.



The Preview feature **ONLY** works if the main or sub stream is set to 'H264' (see [VIDEO - Camera Settings](#)).

AUDIO

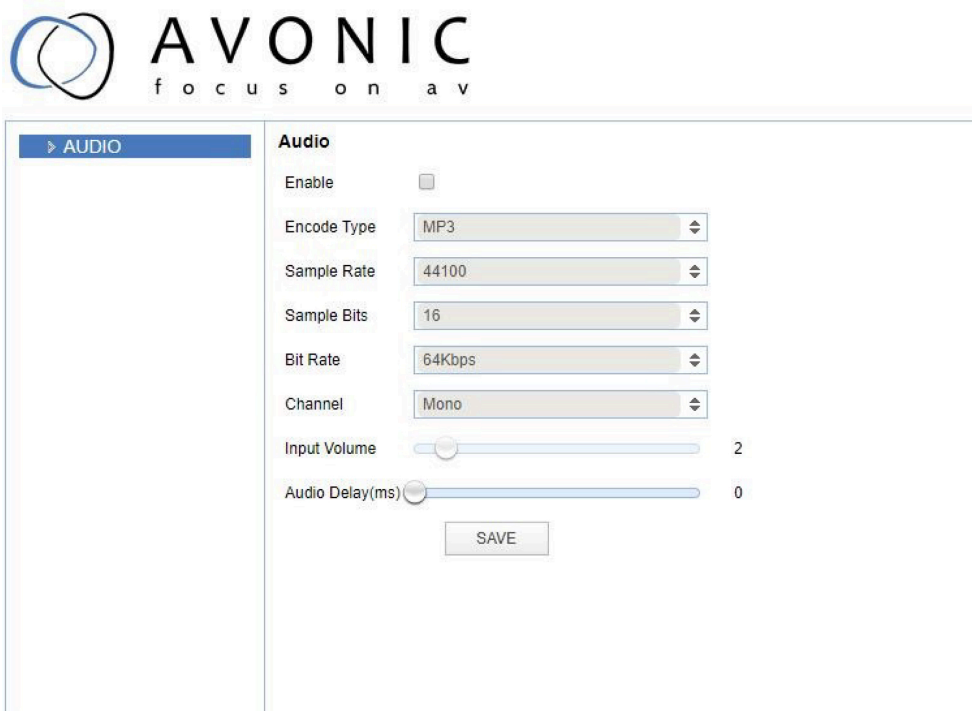


Figure 15: WebGUI > Audio



Make your settings as follows:

1. Enable (checked) or disable (blank) embedding of audio input (camera rear).
2. Select the encoding type: mp3, AAC or G.711A.
3. Select the sample rate: 16000, 32000, 44100 or 48000.
4. Set the sample bits always to 16.
5. Select the Bitrate: 32, 48, 64, 96 or 128 Kbps.
6. Select the Channel: Mono or Stereo.
7. Set the Input Volume: 1 ~ 10.
8. Set the Audio Delay (ms): 0 ~ 200.
9. Click **SAVE** to apply your settings. A small confirmation dialogue appears in the bottom right corner.

VIDEO

You can use the VIDEO tabs (described below) to define your settings for the video output, including the main settings of the camera's OSD.

VIDEO - Video Encoder

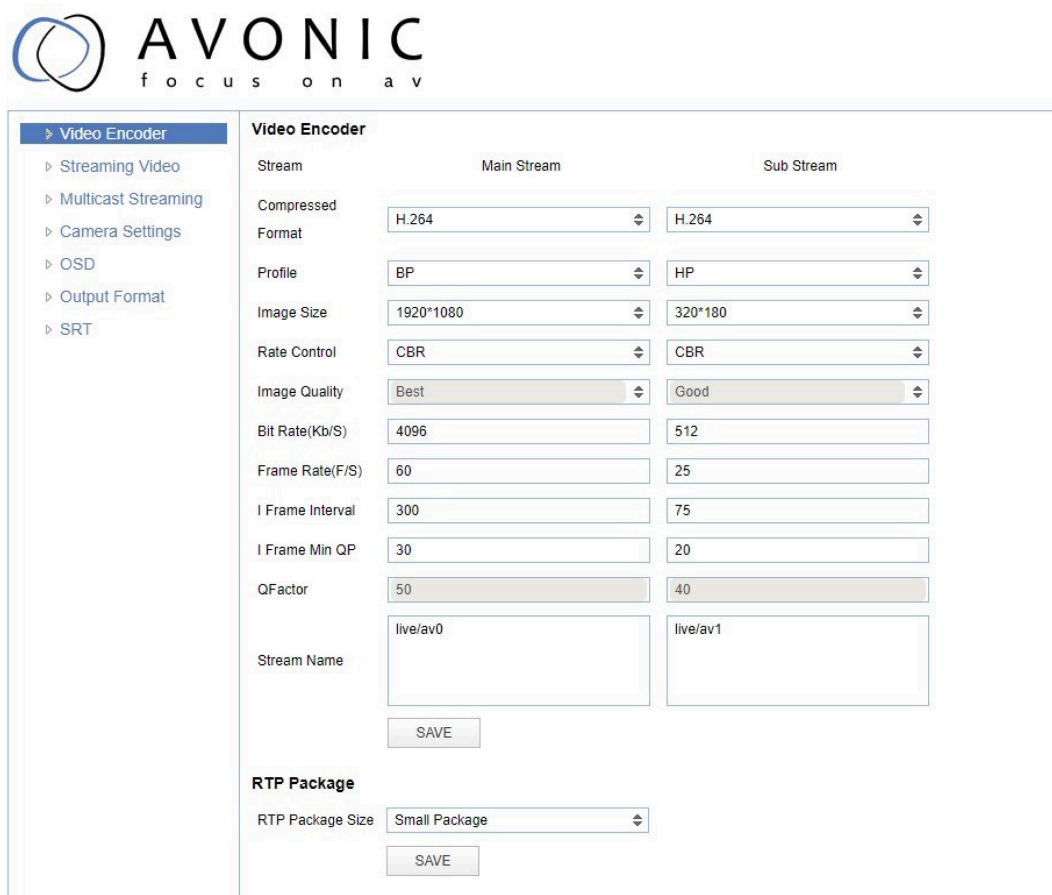


Figure 16: WebGUI > VIDEO > Video Encoder

The Video Encoder settings are listed below.

Video Encoder Option	Main Stream	Sub Stream
Compressed Format	MJPEG/ H.264/ H265	MJPEG/ H.264/ H265
Profile	BP/ MP/HP	BP/ MP/HP
Image Size	1920*1080/1280*720	1920*1080/1280*720/ 320*180/ 320*240/ 640*360
Rate Control	CBR (constant bit rate) / VBR (variable bit rate) depending on format	
Image quality	Fixed at 'best'	Fixed at 'good'
Bit Rate(Kb/s)	64-40960	64-40960
Frame Rate (F/s)	5-60 frames per second	5-30 frames per second
I FrameInterval	1-300	1-150
I Framemin. QP	10-51	10-51
Streamname	live/av0	live/av1
RTSP Link	rtsp://<ip-address>/live/av0	rtsp://<ip-address>/live/av1
RTP Package	Small Package (standard MTU size, 1500 bytes) Big Package (approx. 60kb MTU size)	



NDI uses the **Main Stream** of the camera. Execute the following steps to save your settings:

1. Click **SAVE** to apply your settings. A small confirmation dialogue appears in the bottom right corner.
2. Reboot the camera if you changed RTP package.

VIDEO - Streaming Video

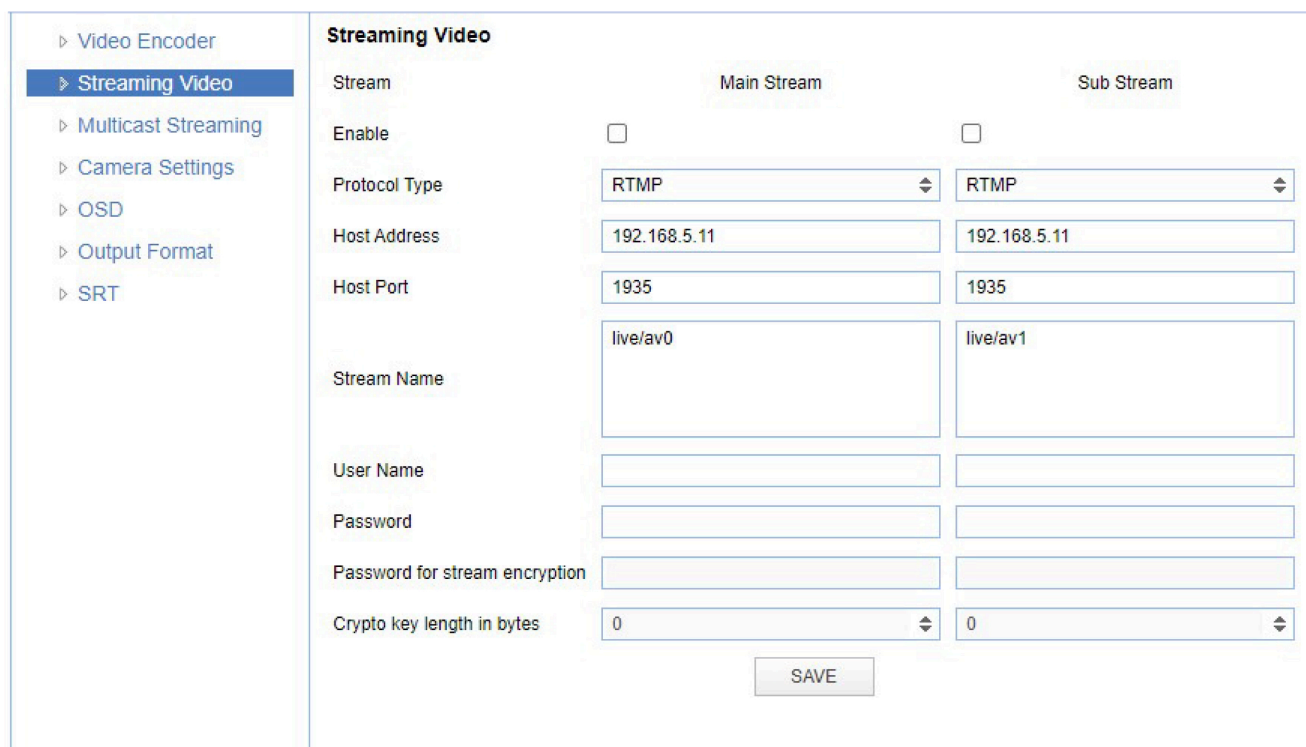


Figure 17: WebGUI > VIDEO > Streaming Video

The recommended Streaming Video settings are listed below.

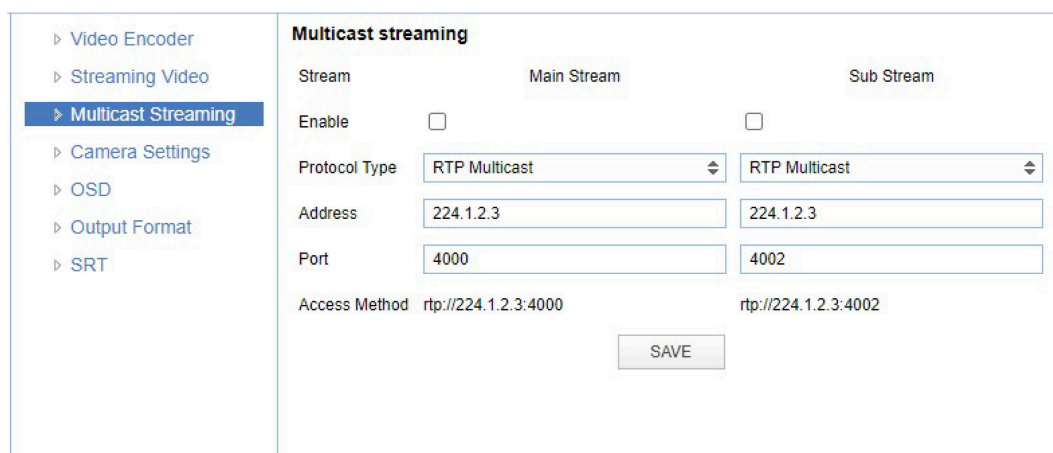
Stream Option	Main Stream	Sub Stream
Enable	Mark checkbox to enable	Mark checkbox to enable
Protocol Type	RTMP, SRT	RTMP, SRT
Host Address	192.168.5.11	192.168.5.11
Host Port	1935	1935
Stream Name	live/av0	live/av1
User Name	Empty is default setting	Empty is default setting
Password	Empty is default setting	Empty is default setting
Password for stream encryption*	Empty is default setting	Empty is default setting
Crypto Key Length in bytes	0, 16, 24, 32	0, 16, 24, 32



Execute the following steps to save your settings:

1. (* in the table) Enter a value for *Password for stream encryption* if the selected *Protocol Type* is "SRT".
2. Click **SAVE** to apply your settings. A small confirmation dialogue appears in the bottom right corner.

VIDEO - Multicast Streaming



The interface shows settings for Multicast streaming, divided into Main Stream and Sub Stream sections. The Main Stream section has an 'Enable' checkbox, a 'Protocol Type' dropdown set to 'RTP Multicast', an 'Address' field set to '224.1.2.3', a 'Port' field set to '4000', and an 'Access Method' field set to 'rtp://224.1.2.3:4000'. The Sub Stream section has an 'Enable' checkbox, a 'Protocol Type' dropdown set to 'RTP Multicast', an 'Address' field set to '224.1.2.3', a 'Port' field set to '4002', and an 'Access Method' field set to 'rtp://224.1.2.3:4002'. A 'SAVE' button is located at the bottom center.

Figure 18: WebGUI > VIDEO > Multicast Streaming

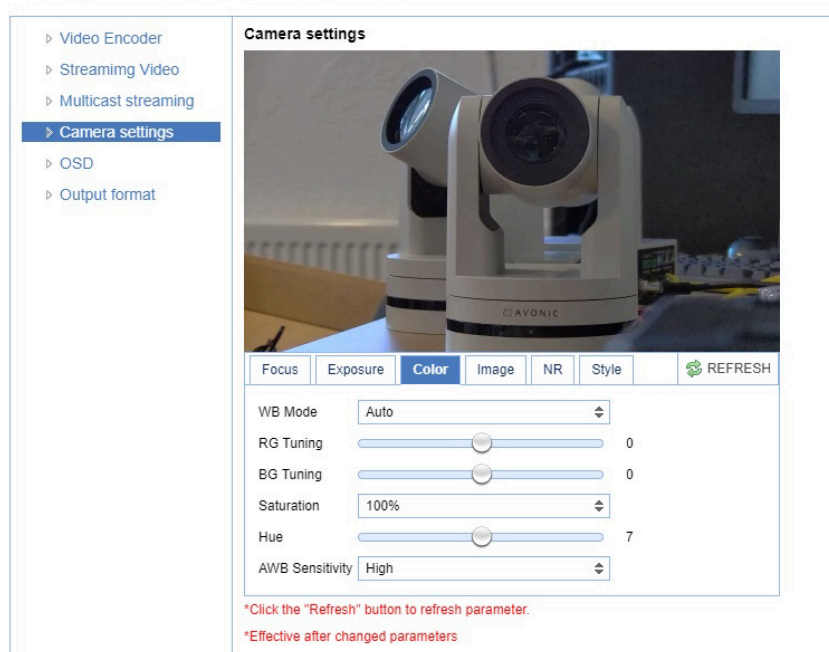
The recommended Multicast Streaming settings are listed below.

Stream Option	Main Stream	Sub Stream
Enable	Mark checkbox to enable/ disable	Mark checkbox to enable/ disable
Protocol Type	RTP/ TS Multicast/ TS Unicast	RTP/ TS Multicast/ TS Unicast
Address (multicast)	224.0.0.0~ 239.255.255.255	224.0.0.0~ 239.255.255.255
Address (unicast)	Specify the IP address to which you want the Unicast stream pushed.	
Port	4000 (default)	4002 (default)
Access Method	rtp://224.1.2.3:4000	rtp://224.1.2.3:4002



Click **SAVE** to apply your settings. A small confirmation dialogue appears in the bottom right corner.

VIDEO - Camera Settings

The interface shows the 'Camera settings' section with a video preview of a PTZ camera. Below the preview are tabs for Focus, Exposure, Color, Image, NR, and Style, with a 'REFRESH' button. The 'Color' tab is active, showing settings for WB Mode (Auto), RG Tuning (0), BG Tuning (0), Saturation (100%), Hue (7), and AWB Sensitivity (High). A red note at the bottom states: '*Click the "Refresh" button to refresh parameter. *Effective after changed parameters'.

Figure 19: WebGUI > VIDEO > Camera Settings



Execute the following steps to define your camera settings:

1. Use the **Camera Settings** tabs (described below) to change the OSD settings as if you are using the remote control.
2. If you have changed a value with the remote control, update the WebGUI using the **REFRESH** button.



A picture is shown **ONLY** if the main video stream is set to H264.

Focus

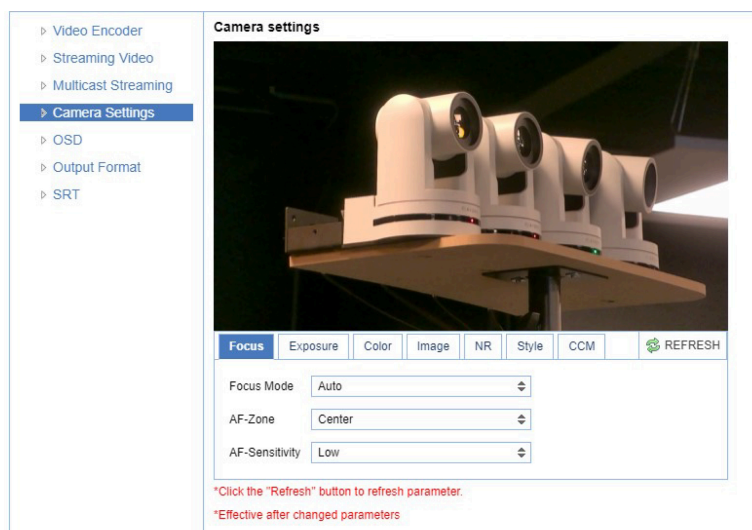


Figure 20: WebGUI > VIDEO > Camera Settings > Focus

The three Focus settings are explained below.

Focus Mode

Auto

The camera determines the focus position by itself and will adjust to the contents of the filmed object.

Manual

The user is able to set a fixed focus position manually. This can be useful when the contents of the filmed object are not clear towards the background and the autofocus has difficulty finding the correct focusing.

One-push

The camera will focus once and will keep the focus in that position until another focus command is sent.

AF-Zone

This setting defines the area where the autofocus is aimed at.

AF-sensitivity

Sets the level of speed with which the autofocus responds. This can be useful if you have people walking through the picture. If the setting is 'High', the camera will respond immediately. If the setting is 'Low' or 'Medium', the camera will not react to sudden and short changes in the picture.



Note that in some cases the autofocus will have some difficulties to focus. We strongly recommend to focus manually to avoid autofocus issues. See also the [Troubleshooting/ Image](#) in this manual.

Exposure

If you click in the field after the option 'mode', you will see that you have the following Exposure options: Auto, Manual, SAE, AAE and Bright. These options are described below.

Auto Exposure Mode

In Automatic exposure mode, the camera determines the iris and shutter settings. See the settings below:

EV (Exposure Value): ON/OFF and Level

If the light conditions require this, you can create a quick adjustment to your current exposure settings without actually changing the fundamental values like iris and shutter.



Take care to not 'overdo' the settings or the picture will become washed out bright or too dark.

BLC (Back Light Compensation): ON/OFF

Compensate for having to film against bright light directly into the lens. See the pictures below:

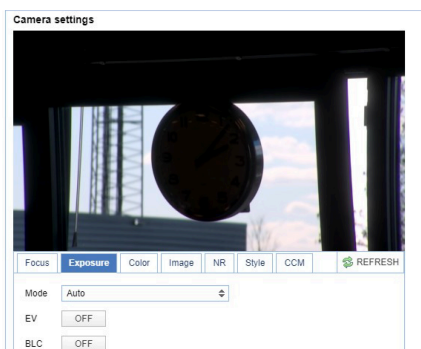


Figure 21: Camera Settings > Auto Expo (BLC OFF)

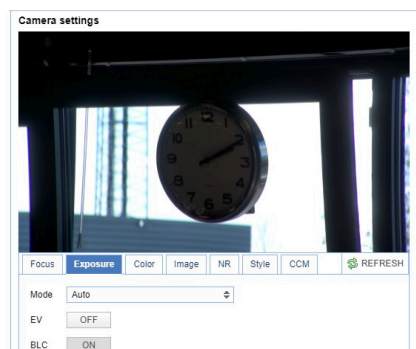


Figure 22: Camera Settings > Auto Expo (BLC ON)

Flicker

This setting handles the flickering of artificial lighting in its operating space. Options are 50Hz, 60Hz and OFF.

G.Limit

Gain limit is the maximum level of artificial brightness and contrast that the camera can automatically add to the image. This setting will make a significant difference to the overall picture.



Within reason this setting add noise to the picture in dark areas and produce a washed out, greyish picture.

DRC

Dynamic Range Compression has a similar effect on the picture as the above mentioned gain limit. The DRC works by compressing the natural dynamic range of the image by taking out the darkest and lightest parts. This can be a particular helpful setting when the light conditions are challenging. The differences should be clearly visible in dark parts of the image, as they will become lighter/more grey as the level of DRC increases.

Manual Exposure Mode

Focus	Exposure	Color	Image	NR	Style	CCM	REFRESH
<div>Mode: Manual</div> <div>Shutter: 1/100</div> <div>Iris: F1.8</div> <div>DRC: 7</div>							

Figure 23: WebGUI > VIDEO > Camera Settings > Manual Exposure Mode

In Manual exposure mode, you can manually set the shutter, Iris and DRC options.

Shutter

The shutter setting determines the amount of time per second that the sensor is exposed. The range of the shutter speed setting is 1/25th of a second (40 milliseconds) to 1/10000th of a second (0.1 milliseconds).

If you shoot a video with a shutter time of 1/25th of a second, you can imagine that the video becomes blurry and overexposed. The faster the shutter is set to open and close, the sharper your filmed object will become. However, the amount of light that falls onto the sensor is also diminished.



If you are inexperienced or if the light conditions change a lot, it's best practice to keep the camera on the automatic exposure setting.

Iris

The Iris is a part of a lens that regulates the amount of light that passes through the lens and onto the sensor, by altering the diameter of the hole through which the light enters. The diameter of the hole is measured in *F-stop* value. A higher value lets in less light, while a lower setting lets in more light.

This setting affects the length of the depth of field. The higher F-stop you use, the deeper your depth of field. Reason: the smaller the aperture, the more focused the light beams will be, resulting in a more focused image.

DRC

Dynamic Range Compression has a similar effect on the picture as the above mentioned gain limit. The DRC works by compressing the natural dynamic range of the image by taking out the darkest and lightest parts. This can be a particular helpful setting when the light conditions are challenging. The differences should be clearly visible in dark parts of the image, as they will become lighter/more grey as the level of DRC increases.

SAE Mode (Shutter Auto Exposure)

In this mode, the shutter speed is user-adjustable. The camera automatically decides the best Iris F-stop value for an optimal exposure setting.



Keep in mind that the shutter speed is the amount of time that each frame of the sensor has been exposed to light.

To compensate for poor lighting conditions, it is possible to adjust the *DRC (Dynamic Range Compression)*. The DRC works by compressing the natural dynamic range of the image, by taking out the darkest and lightest parts. This can be a particular helpful setting when the light conditions are challenging. The differences should be clearly visible in dark parts, as they will become lighter / more grey as the level of DRC increases.

AAE Mode (Aperture Auto Exposure)

The camera will automatically set the shutter speed based on the Iris F-stop value (aperture) set by the user. As the camera determines the preferable shutter speed, it is possible to turn the anti flicker setting to the required 50Hz or 60Hz to eliminate the effects of a shutter functioning at 1/50th of a second, for example. In this mode, both the Gain limit and DRC are available to compensate for challenging light conditions.

Bright Mode

This mode is to try and create a decent image when the light conditions are exceptionally poor.

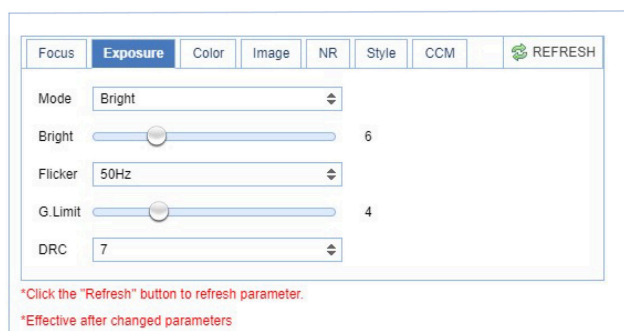


Figure 24: WebGUI > VIDEO > Camera Settings > Bright Exposure Mode

In this mode, you should keep the Bright level, Gain limit and DRC as low as possibly acceptable to avoid getting too much noise in the picture. If the level of noise in the image becomes unacceptable, you can use noise reduction to smooth the picture over.

Color

The color modes inside the camera are designed in such a way that the video output of the camera can match the current light conditions to produce accurate colors. There are several automatic preset modes and a manual mode to set the colors to the preference of the user.

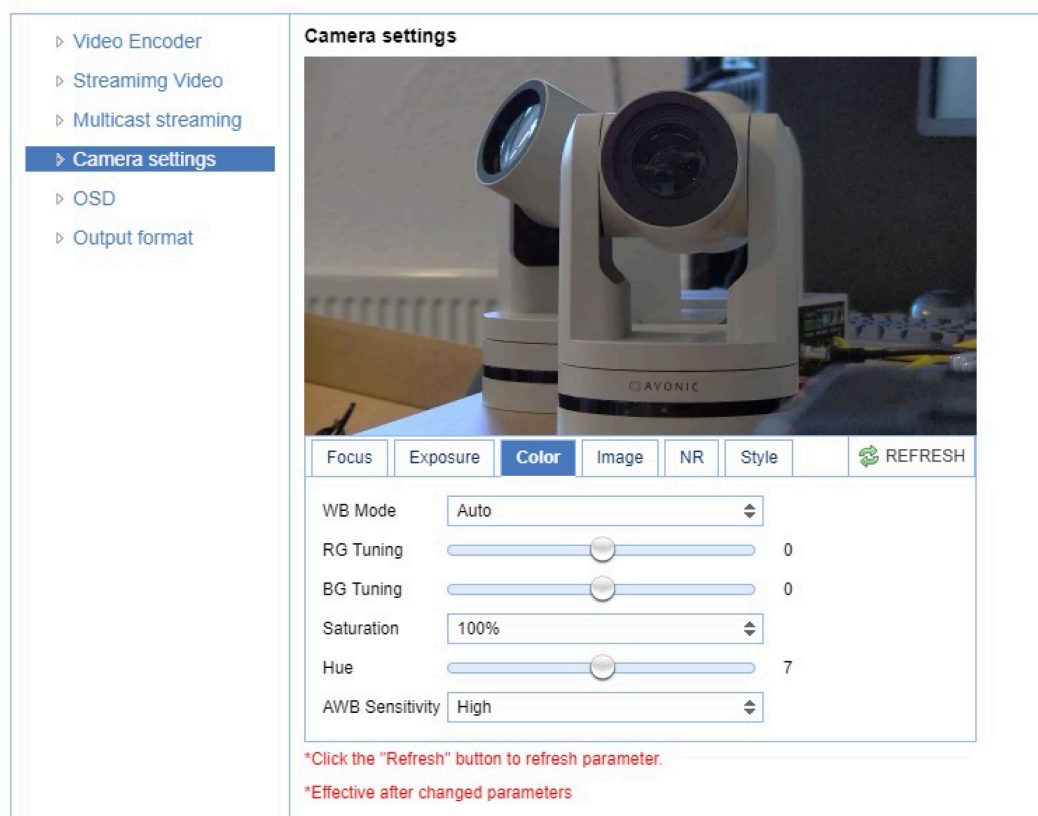


Figure 25: WebGUI > VIDEO > Camera Settings > Color

The settings are listed below.

WB mode auto	The camera continuously measures and defines the light conditions and acts accordingly. In this mode, there are some adjustments that can be made to tune the image to the preference of the user.
RG Tuning	Red Gain Tuning, increase or decrease red.
BG Tuning	Blue Gain Tuning, increase or decrease blue.
Saturation	How saturated the image's colors are. 0% would produce a black and white image.
Hue or tint	The balance between green and red. 0 is green, 14 is red.
AWB Sensitivity	This setting indicates how quickly the camera responds to changing light settings.

Image

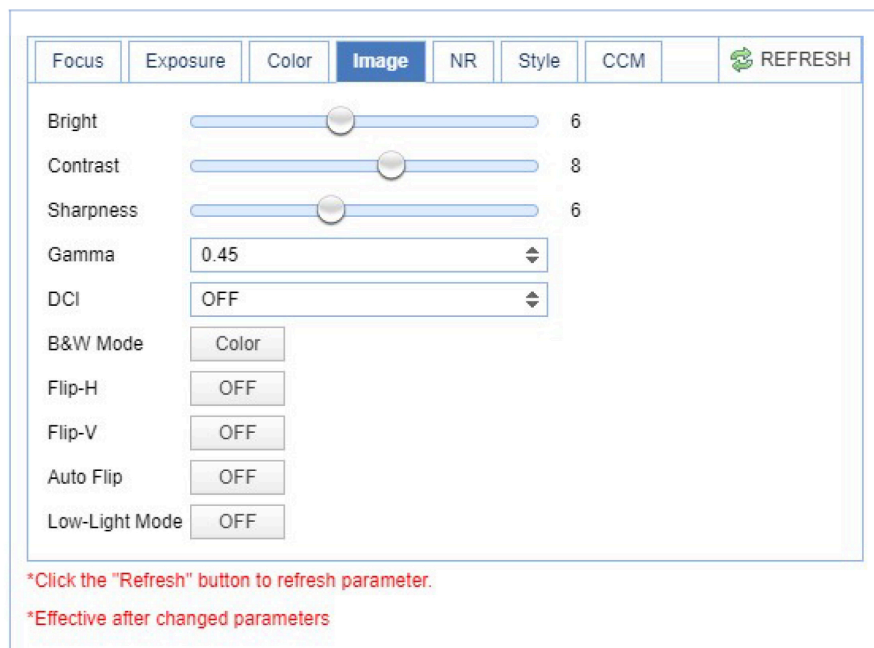


Figure 26: WebGUI > VIDEO > Camera Settings > Image

These are settings that have an effect on the image post-processing. Basically, these settings are all artificial: they don't affect the optical parts of the camera itself.

The settings are listed below.

Bright	The amount of detail that is visible in darker areas of the image. <i>Be careful not to set this setting too high, as you will see that the image becomes 'milky-white'.</i>
Contrast	The amount of detail that is visible in lighter areas of the image.
Sharpness	Artificial contrast, be careful no to set this too high as it will create a sort of 'halo' around sharp edges of filmed objects. The setting of sharpness coincides with the setting of noise reduction.
Gamma	The gamma curve selection has to do with the perception of the human eye to lighter and darker. If you select a higher rate of gamma, you will see that the picture become darker, but you get also more detail.
DCI	The Dynamic Contrast affects the contrast of the picture. The higher the number, the more contrast you will get.
B&W Mode	Black and White Mode makes the picture black and white.
Flip-H, Flip-V, Auto flip	The Flip-H mode turns the picture horizontally, while the Flip-V mode turns it vertically by 180 degrees. When Auto Flip is on, the camera will automatically flip the picture horizontal and vertical.
Low-Light Mode	The Low-Light mode is present to be able to film when the environment in which the camera sits is almost completely dark. The frame rate will drop to 10 frames per second, to catch as much light on the sensor as possible. If this mode is needed to produce a picture, add more light to the scene to get better results.

NR (Noise Reduction)

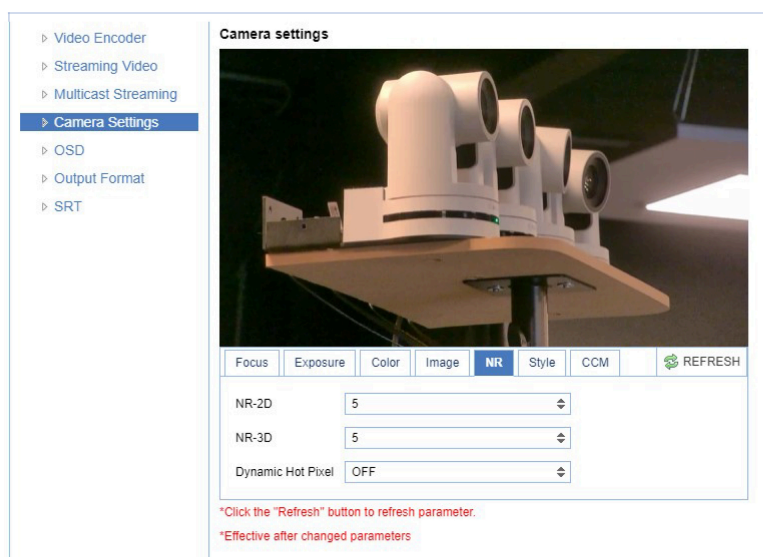


Figure 27: WebGUI > VIDEO > Camera Settings > NR

Noise reduction can be used to soften the image when noise is present due to poor lighting conditions. The higher the amount of noise reduction, the softer the image will get, ultimately resulting in loss of details.

Be careful when adjusting the noise reduction, as it can take away the natural 'crispness' of the image. You will lose the natural 'crispness' of the image, if you set the dynamic contrast and gain too high (this will cause more noise). Better practice is to add light to the filmed object.

The settings are as follows:

NR-2D	Used for still-standing objects.
NR-3D	Used for moving objects.
Dynamic Hot Pixel	A dynamic hot pixel is a defective pixel which look much brighter than they should and will sometimes become visible due to long exposure shots of the camera at a higher rate of light sensitivity. This is often visible as sparkles in the picture. The Dynamic Hot Pixels mode corrects the pixel so that the pixel will appear as normal on the filmed picture.

Style

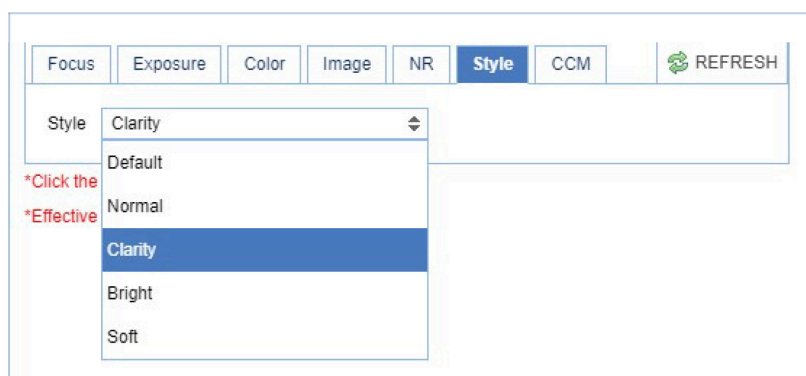


Figure 28: WebGUI > VIDEO > Camera Settings > Style

Here, you can choose the style you want, such as **Default** (standard setting), **Normal** (which makes the picture more 'natural'), **Clarity** (makes the picture more clear), **Bright** (which makes the picture more bright) and **Soft** (which softens the picture).

CCM (Customizable Color Matrix)

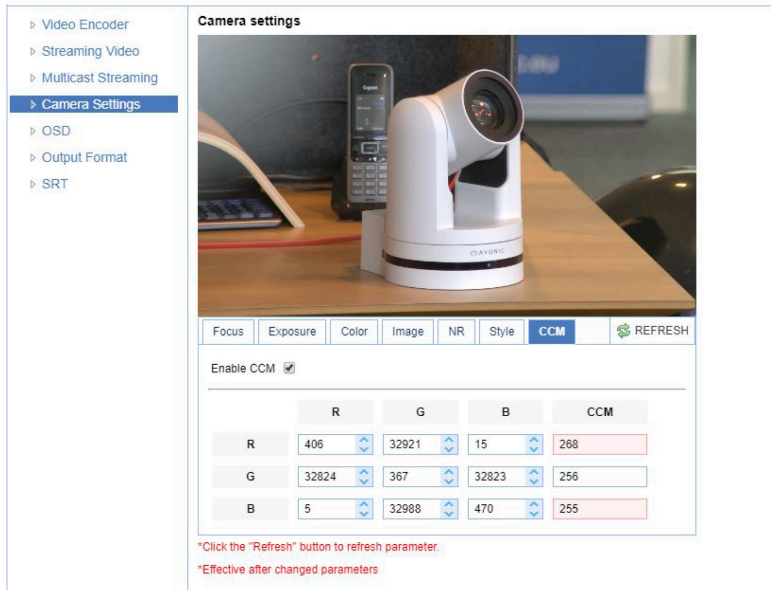


Figure 29: WebGUI > VIDEO > Camera Settings > CCM

If you have purchased the additional license for SRT and the Customizable Color Matrix (CCM), the Camera Settings menu will have an extra tab in the camera settings: CCM. The CCM is intended to finetune the color settings of the camera to seamlessly integrate with an existing camera system.

VIDEO - OSD

Video Encoder

Streaming Video


Multicast streaming

Camera settings

OSD

Output format

OSD



Show Time ☒

Show Title ☒

Time Font Color

White

Title Font Color

White

SAVE

OSD Offset

Title

▲

◀

▶

▼

OSD Font Size

According to the resolution ☒

Scale size automatically

Master Stream OSD Font Size

48

Slave Stream OSD Font Size

48

SAVE

Figure 30: WebGUI > VIDEO > OSD

In this area, you can put a camera name and time as overlay on the IP stream (the overlay feature is exclusively available on the IP stream, not on other outputs).



Note that only the output of the camera will be shown with the main stream set to H264.

Fields

You can enable or disable *Show Time* and *Show Title* can be enabled or disabled by marking or unmarking the checkbox next to the respective setting (the time and name settings can be found under the tab **SYSTEM**, sections **Attributes** and **Time**).

You can use the dropdown menus *Time Font Color* and *Title Font Color* to set the desired font colors.

You can use the directional arrows on the right to move the title and time to the preferred position on the screen.

OSD Font Size (related to Camera Name and Time)

You can use *Scale size automatically* for both main stream and sub stream. If checked, the camera name and time overlay will always scale with the image, keeping the proportions intact.



Click **SAVE** to apply your settings. A small confirmation dialogue appears in the bottom right corner.

VIDEO - Output Format

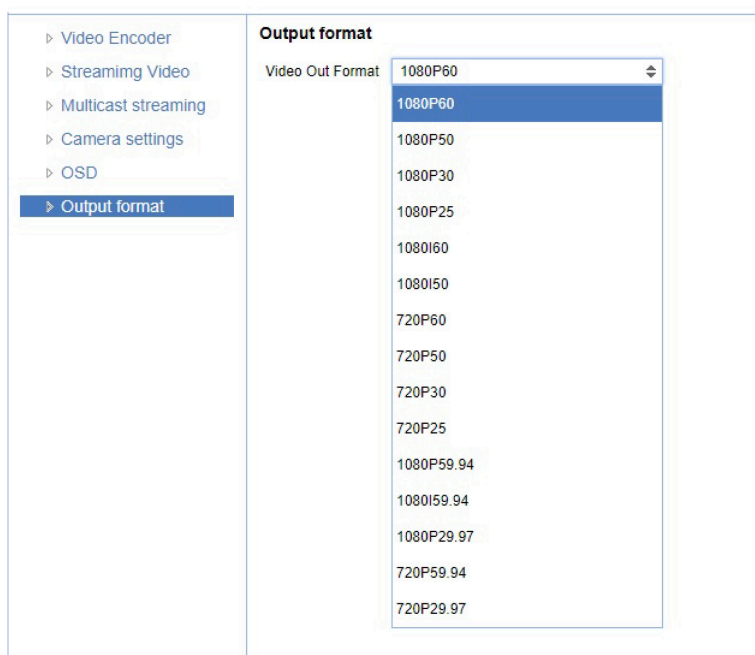


Figure 31: WebGUI > VIDEO > Output Format

This setting is related to the output resolution and frame rate on the HDMI and SDI connectors.

Use the WebGUI to set the resolution of the main and sub IP streams. The resolution of the USB output is determined by the computer that is connected to it.



Click **SAVE** (not shown here) to apply your settings. A small confirmation dialogue appears in the bottom right corner.



Video output over IP cannot be a higher resolution than the physical SDI/HDMI output setting.


VIDEO - SRT

These settings are related to the SRT streaming protocol. You can define the port, passkey and encryption bit.

i When not using Encryption, please make sure to set the *Crypto key length* to 0.


SRT Listener Mode and Caller Mode are both supported. You define the Listener mode settings here, whereas you define the Caller Mode settings in the [Streaming Video tab](#).

See the respective figures below for the Listener and Caller Mode Settings, respectively.



<ul style="list-style-type: none"> ▷ Video Encoder ▷ Streaming Video ▷ Multicast Streaming ▷ Camera Settings ▷ OSD ▷ Output Format ▷ SRT 	<h3>SRT</h3> <p>Port SRT <input type="text" value="9000"/></p> <p>Password for stream encryption <input type="password"/></p> <p>Crypto key length in bytes <input type="text" value="0"/></p> <p><input type="button" value="SAVE"/></p>
--	---

Figure 32: WebGUI > VIDEO > SRT (Listener Mode)



<ul style="list-style-type: none"> ▷ Video Encoder ▷ Streaming Video ▷ Multicast Streaming ▷ Camera Settings ▷ OSD ▷ Output Format ▷ SRT 	<h3>Streaming Video</h3> <p>Stream Main Stream</p> <p>Enable <input type="checkbox"/></p> <p>Protocol Type <input type="text" value="SRT"/></p> <p>Host Address <input type="text" value="192.168.5.11"/></p> <p>Host Port <input type="text" value="1935"/></p> <p>Stream Name <input type="text" value="live/av0"/></p> <p>User Name <input type="text"/></p> <p>Password <input type="password"/></p> <p>Password for stream encryption <input type="password"/></p> <p>Crypto key length in bytes <input type="text" value="0"/></p> <p><input type="button" value="SAVE"/></p>
--	--

Figure 33: WebGUI > VIDEO > Streaming Video (Caller Mode)

NETWORK



Use the tabs on the NETWORK screen to define the appropriate **Port**, **Ethernet** and **DNS** settings.

Port Settings

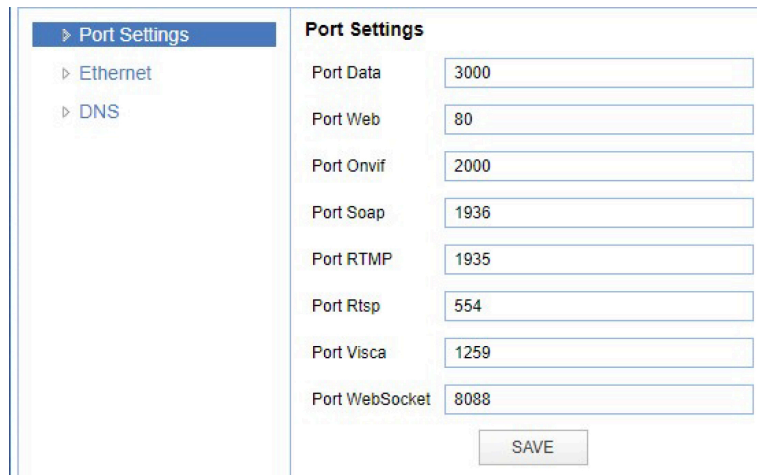


Figure 34: WebGUI > NETWORK > Port Settings

You can define specific ports for the different streaming outputs and protocols the camera supports.



Make sure these settings don't interfere with other uses and services on the same network.



Click **SAVE** to apply your settings. A small confirmation dialogue appears in the bottom right corner.

NETWORK - Ethernet

In this section, you can specify the IP settings for the Ethernet adapter.

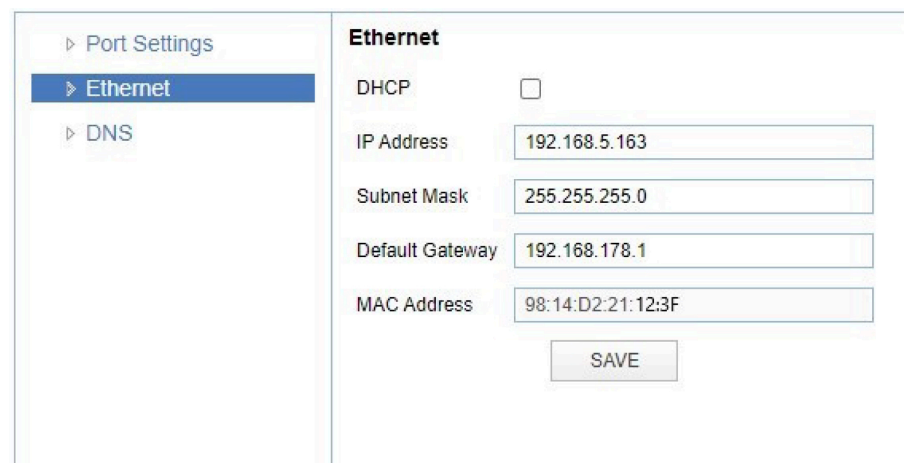


Figure 35: WebGUI > NETWORK > Ethernet



Execute the following steps to save your settings:

1. Click **SAVE** to apply your settings. A small confirmation dialogue appears in the bottom right corner.
2. Reboot the camera.

NETWORK - DNS

Here, you can specify the **Preferred** and **Alternative DNS Server**.

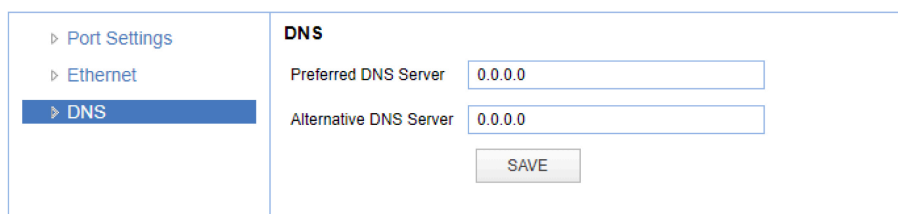


Figure 36: WebGUI > NETWORK > DNS



Click **SAVE** to apply your settings. A small confirmation dialogue appears in the bottom right corner.

SYSTEM

You can use the **SYSTEM** tabs (described below) to define the desired system settings.

License

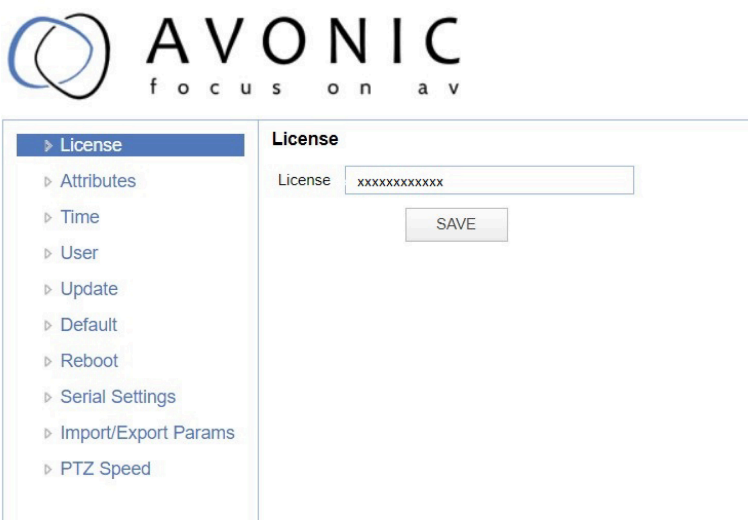


Figure 37: WebGUI > SYSTEM > License

If you have purchased the license for the premium features of this camera, you can enter the License key here to unlock these features. **Reboot is not required as the license is instantly activated.**



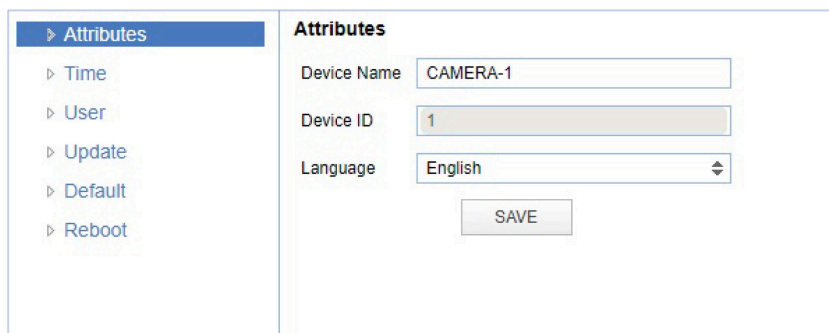
You can acquire a license through your local sales channel or directly at Avonic.



Execute the following steps to enter your license key:

1. Enter your license key in the *License* field.
2. Click **SAVE** to apply your settings. A small confirmation dialogue appears in the bottom right corner

Attributes



The screenshot shows the 'Attributes' page in the WebGUI. On the left is a sidebar with a tree view containing 'Attributes' (selected), 'Time', 'User', 'Update', 'Default', and 'Reboot'. The main content area is titled 'Attributes' and contains three input fields: 'Device Name' with the value 'CAMERA-1', 'Device ID' with the value '1', and 'Language' with a dropdown menu showing 'English'. Below these fields is a 'SAVE' button.

Figure 38: WebGUI > SYSTEM > Attributes

Specifying a specific device name to be displayed in the OSD can be useful when using multiple cameras on the same LAN. The Device-ID is always 1 (addressing is done via IP). The language cannot be changed.

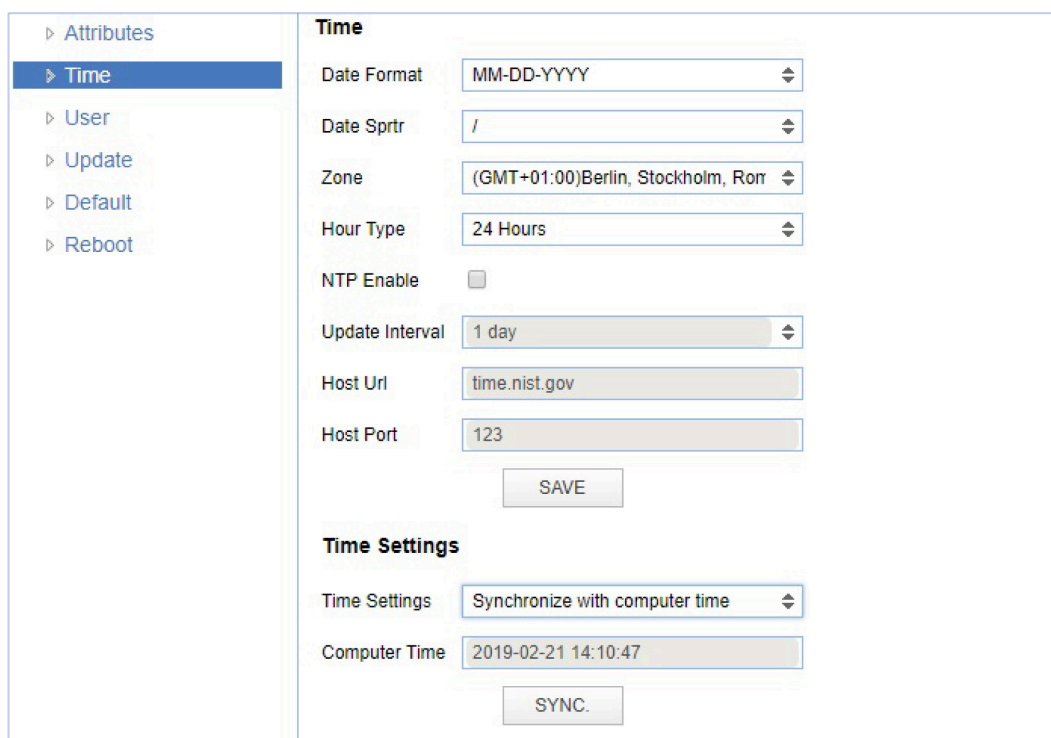


The ONVIF protocol does NOT accept spaces in the camera name.



Click **SAVE** to apply your settings. A small confirmation dialogue appears in the bottom right corner.

Time



The screenshot shows the 'Time' page in the WebGUI. The sidebar on the left has 'Time' selected. The main content area is titled 'Time' and contains several settings: 'Date Format' (dropdown: MM-DD-YYYY), 'Date Sprtr' (dropdown: /), 'Zone' (dropdown: (GMT+01:00)Berlin, Stockholm, Rom), 'Hour Type' (dropdown: 24 Hours), 'NTP Enable' (checkbox: unchecked), 'Update Interval' (dropdown: 1 day), 'Host Url' (text input: time.nist.gov), and 'Host Port' (text input: 123). Below these is a 'SAVE' button. Under the heading 'Time Settings', there is a 'Time Settings' dropdown (selected: Synchronize with computer time) and a 'Computer Time' text input (value: 2019-02-21 14:10:47). At the bottom is a 'SYNC.' button.

Figure 39: WebGUI > SYSTEM > Time

You can *manually* set the time and date, or synchronize the time and date via a computer or an external server on the LAN or WAN.



Either click **SAVE** to apply your manual settings, or **SYNC** to synchronize the time and date.

User

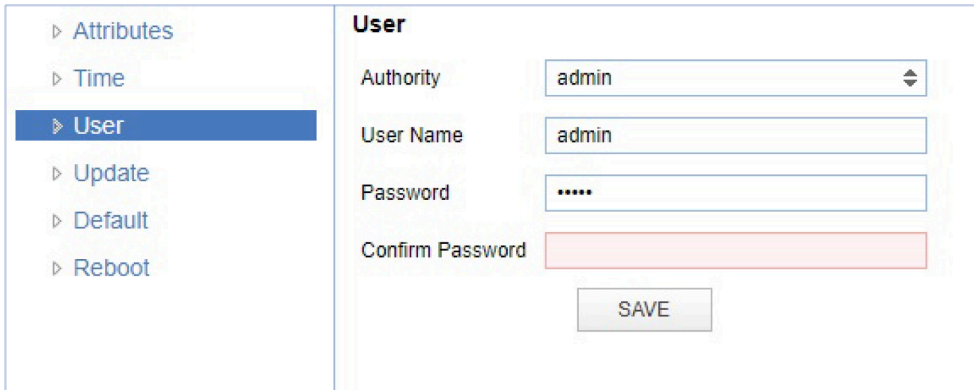


Figure 40: WebGUI > SYSTEM > User

You can define different users with specific permission levels and different username / passwords combinations. There are 2 levels of users: *administrators* with access to all features, and *user-1* and *user-2* with access to the preview and PTZ controls.



Click **SAVE** to apply your settings. A small confirmation dialogue appears in the bottom right corner.

Update

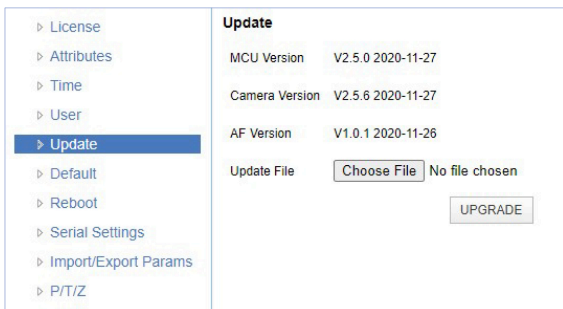


Figure 41: WebGUI > SYSTEM > Update

By default, this screen shows a readout of the current firmware versions. The *Update file* provides a firmware upgrade functionality via this screen. When the camera is done uploading and processing the update, it will automatically reboot.



Execute the following steps to perform a firmware upgrade.

1. Click **Choose File** to select the firmware update file.
2. Click **UPGRADE** to start the firmware upgrade wizard.
3. Follow the steps in the wizard.
4. Wait until the process finishes and reboots.
5. Refresh your browser and log in again after the reboot.

Default

If necessary, you can perform a factory reset. This restores all default settings.



Figure 42: WebGUI > SYSTEM > Default



Click on the button **This will restore the factory defaults** to perform a factory reset. When completed, the camera automatically reboots. The camera will be ready for use again after the boot cycle.

Reboot

If necessary, you can manually perform a camera reboot.

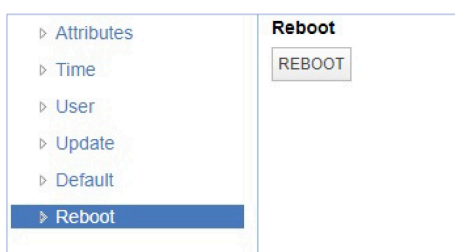


Figure 43: WebGUI > SYSTEM > Reboot



Click on the button **Reboot** to reboot the camera. It will be ready for use again after the boot cycle.

Serial Settings

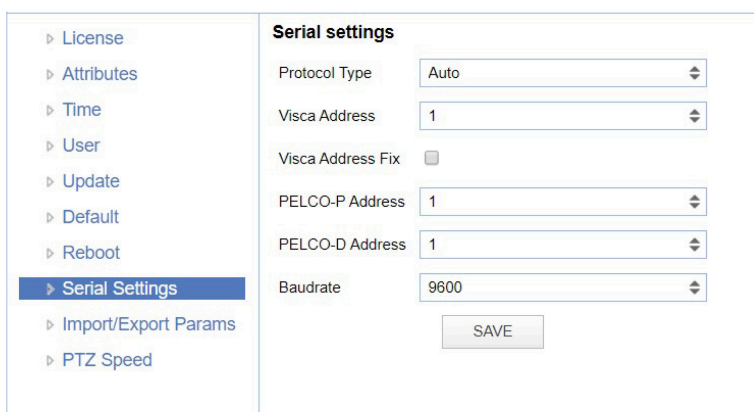


Figure 44: WebGUI > SYSTEM > Serial Settings

You can choose the preferred protocol to use and the accompanying address to go with it. Or you can select the default protocol type 'Auto' to let the camera detect which protocol is being used.

Note that *addressing* is still needed, even with the automatic setting.



Click **SAVE** to apply your settings. A small confirmation dialogue appears in the bottom right corner.

Import/Export Parameters

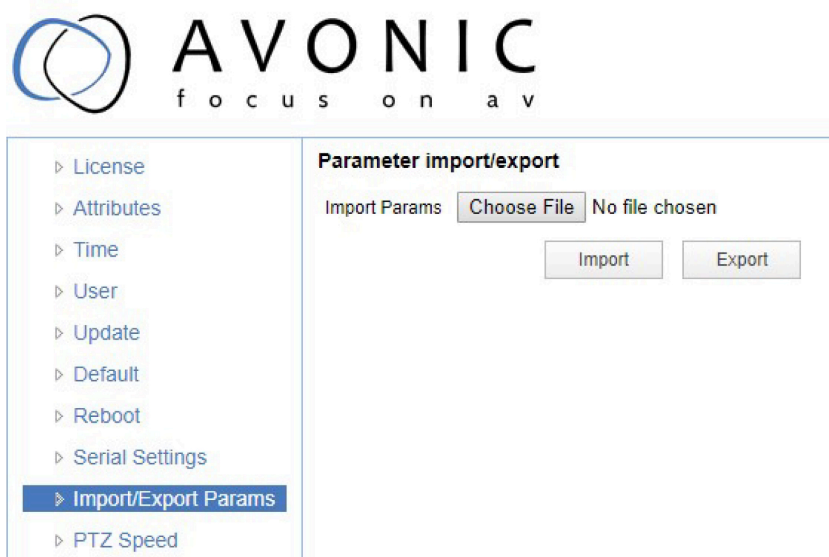


Figure 45: WebGUI > SYSTEM > Import/Export

The CM7x cameras have the ability to import or export a configuration.



Execute the following steps to import or export your configuration parameters:

1. Select the appropriate button to import or export your configuration parameters.
2. Follow the steps in the wizard that appears.



The exported settings do NOT include any presets that are stored in the camera!

P/T/Z

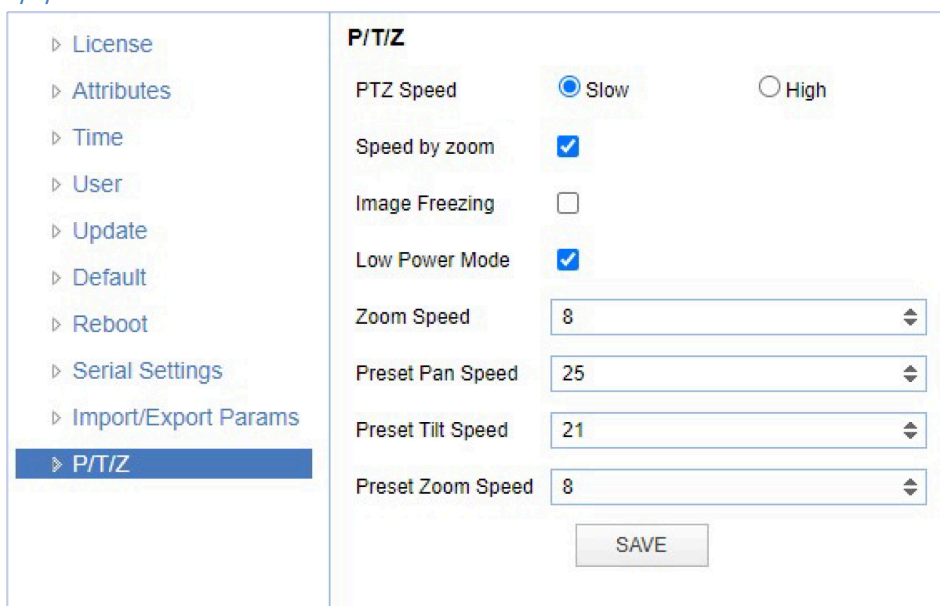


Figure 46: WebGUI > SYSTEM > P/T/Z

In this window, you can define various P/T/Z settings for your camera. These are:

PTZ Speed

It is possible to increase the maximum pan and tilt speed, this can be useful in a conference system where quick action is necessary. The camera will produce slightly more noise when this setting is set to 'high'.

Speed by zoom	This mode affects PTZ speed when the camera is zoomed in to its max. If you move the stick of your controller when this mode is disabled, it will move too fast to control it. Enabling reduces this speed in relation to the current zoom factor.
Image Freezing	You can freeze the image when the camera moves from one preset to another preset when you use your (remote) controller.
Low Power Mode:	The camera will go in stand by mode to reduce its power when this mode is enabled.
Note	In order to reduce the power the camera uses, the camera will shut down the IP Port. To activate the camera again, use a serial connection or the IR Remote to set off the Low Power Mode.
Zoom Speed	You can set the speed to which the camera will zoom in to the image. The higher the number, the faster the camera will zoom in. This works only when the remote controller is used to control the camera.
Preset Pan, Tilt and Zoom Speed	This mode affects the speed to which the camera is switching from one preset to another when you use your (remote) controller. The higher the number, the faster it will switch.

MJPEG Snapshot

The Avonic CM7x-IP cameras are equipped with a MJPEG snapshot feature to, for example, implement into third party software.



To access the MJPEG snapshot feature, use the following format: <http://IP/img/capjpg/snapshot.jpg>.

Every time the page is refreshed, the picture will be updated.

Using the Remote Control

The Product is provided with an IR Remote Control for full control of the camera and use of the OSD menu.



Figure 47: Remote Control

The various options (a. through n.) are described below.

a. Power



1. Press the **Power** button to turn on the camera. If the position preset '0' has been stored, this will be called after initialization.
2. Press the **Power** button again to turn the camera off. It will turn to the back when turned off, this is called the "privacy mode".

b. Set

This button has *no* function with this camera.

c. Camera Select

Up to 4 different cameras can be controlled with one IR remote Control. You can use the **camera select** buttons [**1,2,3,4**] to select the IR channel that the remote control is using. The default camera IR channel is 1.



1. To control a camera on first use, select camera 1 (IR channel 1) on the remote control.
2. To control a second camera, you first need to change the IR channel stored in the camera from 1 to 2. Then do the following:
 - a. First turn off the other cameras in the room you don't want to change, to prevent that other cameras also get changed accidentally.
 - b. Select camera 1 on the remote control, because the camera is still configured to listen to IR channel 1.
 - c. Press **[*]+[#]+[F2]** to change the IR channel inside the camera to IR channel 2. The camera will confirm this on the screen.
 - d. Select camera 2 on the remote control to control this camera.

Key Combinations: (Default IR address is 1)

[*]+[#]+[F1]	Camera Address No. 1
[*]+[#]+[F2]	Camera Address No. 2
[*]+[#]+[F3]	Camera Address No. 3
[*]+[#]+[F4]	Camera Address No. 4



The Function buttons F1, F2, F3 and F4 are the colored buttons on the remote.

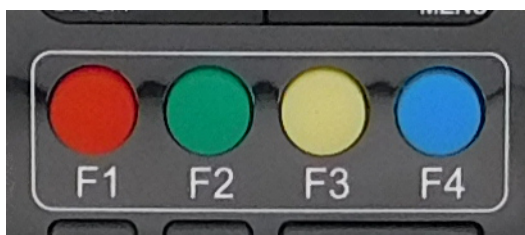


Figure 48: Function Buttons on Remote

d. Number Keys

The number keys are used to call presets.



Press the number **[0-9]** of the desired preset and the camera will respond accordingly (See 'h' on how to set & clear presets).

e. Focus + -



1. Push the button [manual focus] first before using the focus buttons.
2. Focus the camera with the **[+]** and **[-]** button.

If the camera does not respond, check if the camera is set to auto-focus.

f. Auto/Manual Focus



Set the camera to 'auto focus' or 'manual focus'.

If the camera is configured to 'auto focus', the buttons [Focus + -] are disabled.

If the camera is in 'manual focus' and the *Zoom* buttons are used, the camera automatically switches to 'auto focus'.

g. Zoom + -



Zoom the camera with these buttons.

h. Set & Clear Preset

A preset is a specific position of a camera that you save in the camera. A preset is assigned to a number from 0-9.



1. To set a preset, first point the camera in a specific directing and a specific zoom position.
2. Assign the position to a number with the button *Set Preset*.
3. You can call the preset by pressing one of the numbers 0-9 on the remote control.

Set Preset: [SET PRESET]+[<number>]

Call Preset: [<number>]

Clear Preset: [CLEAR PRESET]+[<number>]

If the position preset '0' has been stored, this position will be called after initialization.



Use ONLY presets between 0-9 when using the Remote Control. For presets 10 or higher you need a serial or IP connection!

i. PTZ Keys (up/down/left/right)



Use these keys to move the camera in the desired direction.

j. Home



Use this key to set the direction of the camera to the center position.

k. BLC ON/OFF



Use this key to enable / disable the Back Light Control feature.

l. Menu



1. Use the *Menu* button to open the *On Screen Display (OSD)* menu. This menu is visible on the HDMI/SDI/IP output.
2. If the menu is not in English, press [*]+[#]+[4] to change the Menu language into English.

m. Function Keys (F1/F2/F3/F4)

Used to configure the IR channel of the camera. See '[c. Camera Select](#)' above for instructions.

n. Blank Buttons

These buttons have NO function with this camera.

Other Key Combinations

The following key combinations on the Remote Controller have specific functions. These are:

Combination	Function
[*]+[#]+[4]	Menu set to English
[*]+[#]+[6]	Restore factory defaults
[*]+[#]+[9]	Flip switch (just temporary flip to view the image flipped)
[*]+[#]+[Auto]	Enter into the aging mode, only for quality control purposes
[*]+[#]+[Manual]	Restore the default username, password, and IP address
[#]+[#]+[#]	Clear all presets
[#]+[#]+[0]	Switch the video format to 1080p60*
[#]+[#]+[1]	Switch the video format to 1080p50*
[#]+[#]+[2]	Switch the video format to 1080i60*
[#]+[#]+[3]	Switch the video format to 1080i50*
[#]+[#]+[4]	Switch the video format to 720p60*
[#]+[#]+[5]	Switch the video format to 720p50*
[#]+[#]+[6]	Switch the video format to 1080p30*
[#]+[#]+[7]	Switch the video format to 1080p25*
[#]+[#]+[8]	Switch the video format to 720p30*
[#]+[#]+[9]	Switch the video format to 720p25*



The camera returns to the video output setting of the rotary dial after a reboot.



Use ONLY presets between 0-9 when using the Remote Control. For presets 10 or higher you need a serial or IP connection!

OSD Menu

Each camera is provided with an

On-Screen Display (OSD) Menu.

This is an integrated on-screen menu that can be accessed within the camera to change specific functions that effect how the camera processes an image.

The OSD Menu is visible on the HDMI, SDI, USB and IP outputs.

The OSD menu can be accessed by the Remote Control or an Avonic PTZ controller.

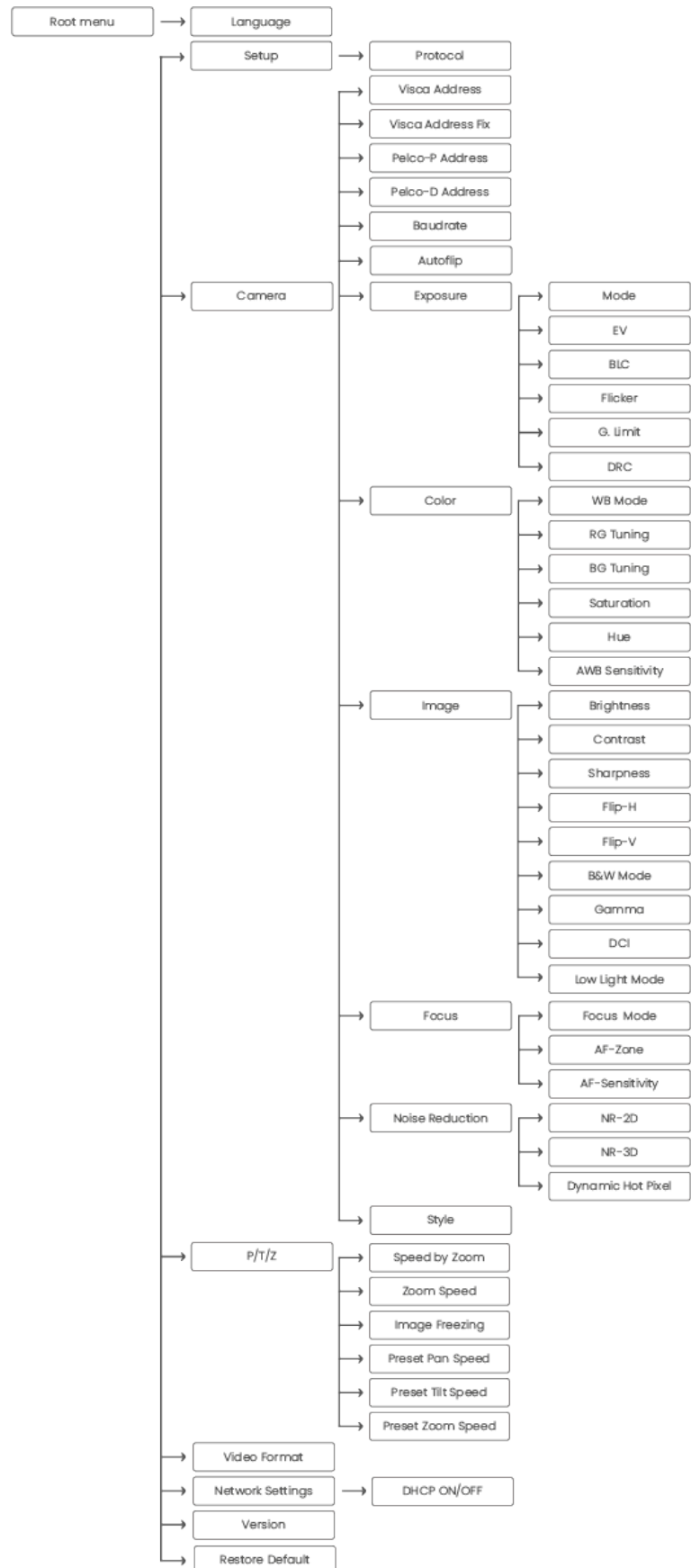


Figure 49: OSD menu structure

1. MENU

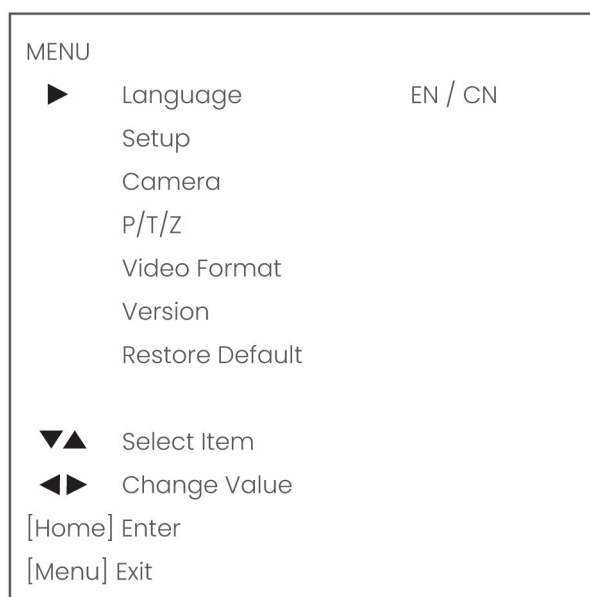


Figure 50: OSD - MENU



1. Press the **MENU** button to display the main menu on the screen.
2. Use the arrow buttons to move the cursor to the item to be set. Press the **HOME** button to enter the corresponding sub-menu.
3. Press [◀▶] to change settings. Press [**MENU**] again to go back.

2. SETUP

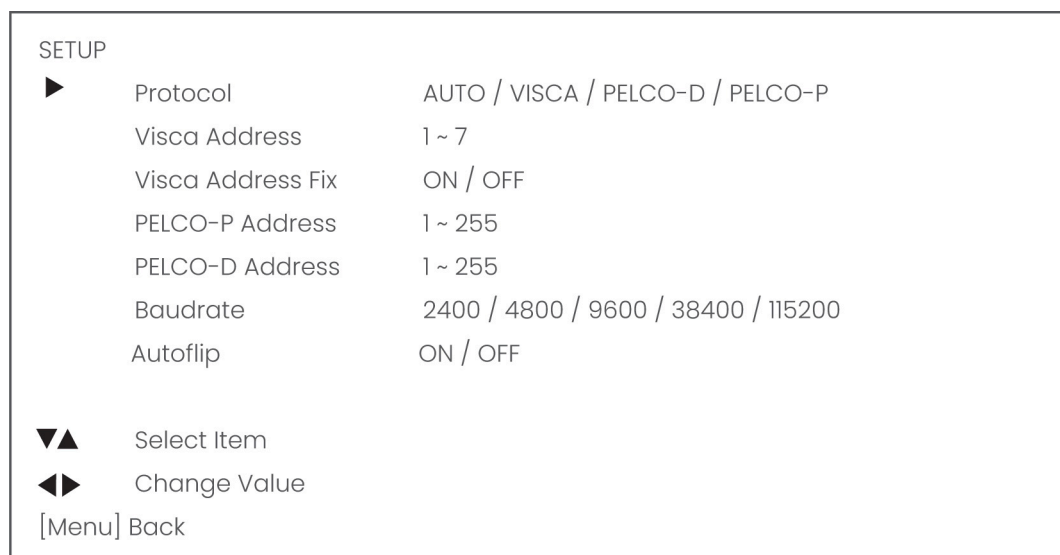


Figure 51: OSD - SETUP

3. CAMERA

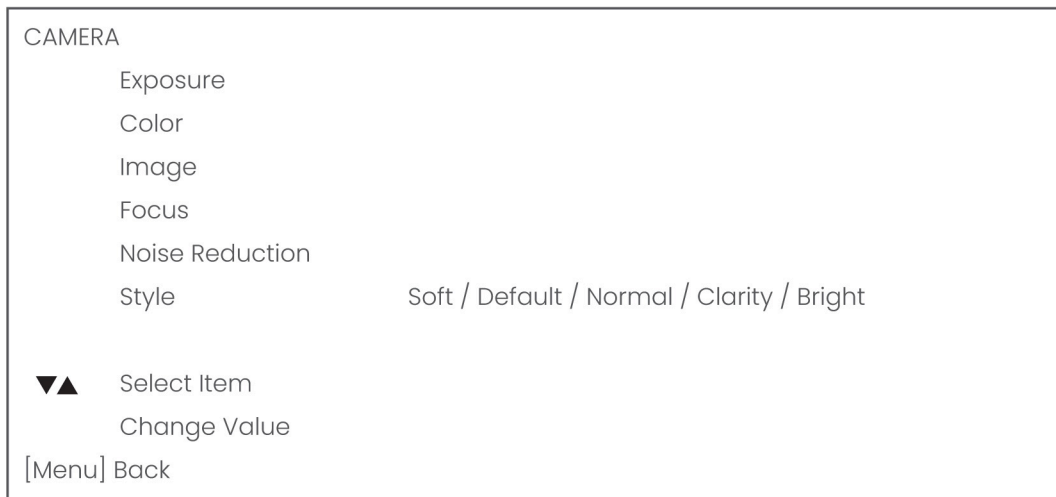


Figure 52: OSD - CAMERA

3.1 EXPOSURE



Figure 53: OSD - EXPOSURE

3.2 COLOR

COLOR	
WB Mode	Auto / 2400K ~ 7100K 100K increments / Manual / OnePush
RG Tuning	-10 ~ 10
BG Tuning	-10 ~ 10
RG	0 ~ 255
BG	0 ~ 255
Saturation	60% ~ 200%
Hue	0 ~ 14
AWB Sensitivity	Low / Middle / High
▼▲ Select Item	
◀▶ Change Value	
[Menu] Back	

Figure 54: OSD - COLOR

3.3 IMAGE

The Flip function can be set, although the camera has an automatically flip function.

IMAGE	
Brightness	0 ~ 14
Contrast	0 ~ 14
Sharpness	0 ~ 15
Flip-H	ON / OFF
Flip-V	ON / OFF
B&W-Mode	Color / B&W
Gamma	0.45 / 0.50 / 0.55 / 0.63 / Default
DCI	1 ~ 8 / Close
Low Light Mode	ON / OFF
▼▲ Select Item	
◀▶ Change Value	
[Menu] Back	

Figure 55: OSD - IMAGE

3.4 FOCUS

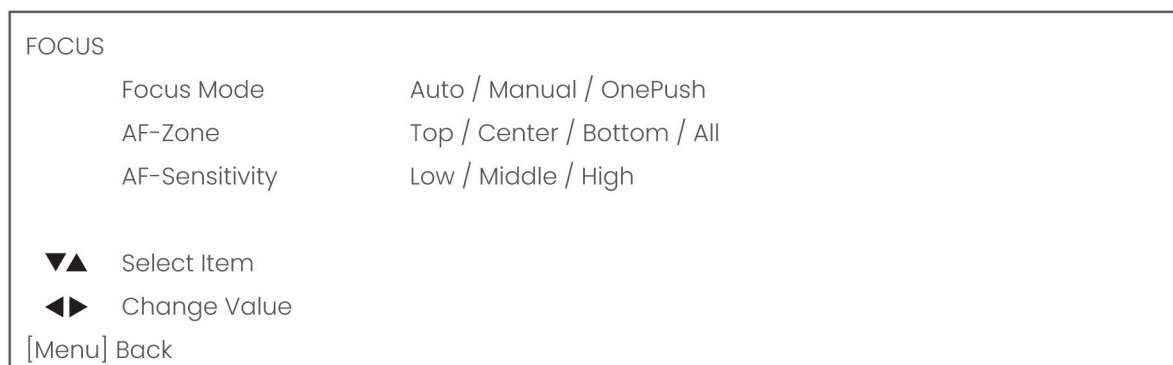


Figure 56: OSD - FOCUS

3.5 NOISE REDUCTION

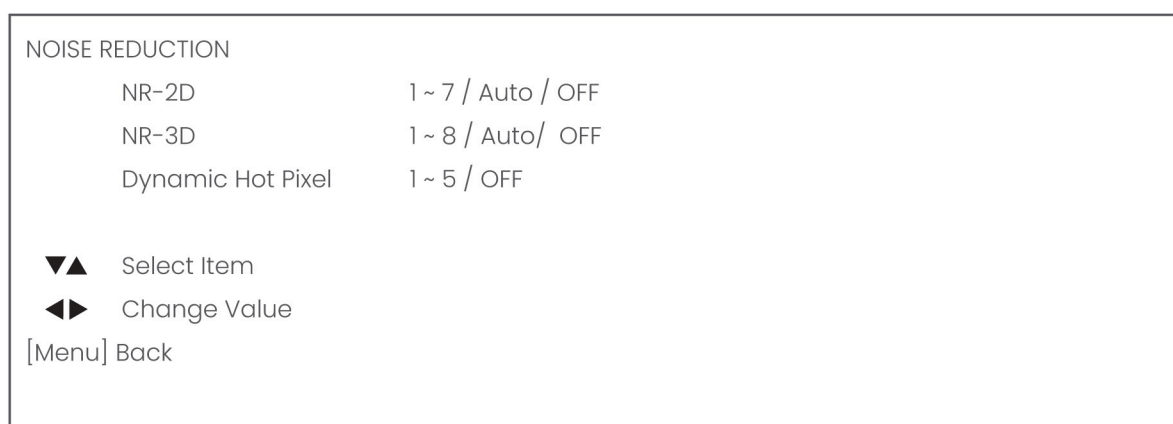


Figure 57: OSD - NOISE REDUCTION

3.6 STYLE

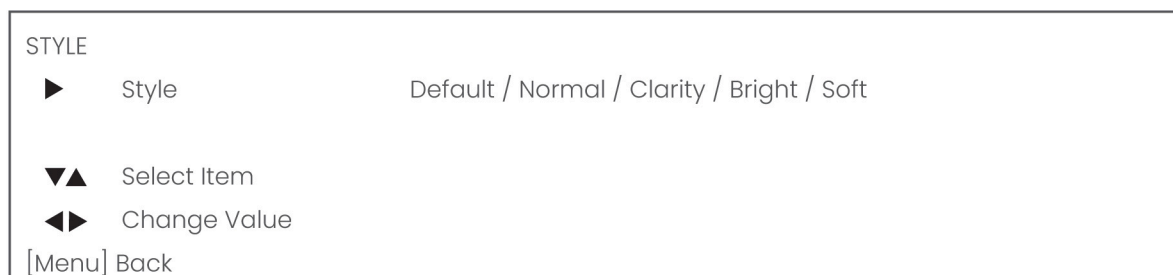


Figure 58: OSD - STYLE

4. PTZ

PTZ	
Speed by Zoom	ON / OFF
Zoom Speed	1 ~ 8
Image Freezing	ON / OFF
Preset Pan Speed	1 - 25
Preset Tilt Speed	1 - 21
Preset Zoom Speed	1 - 8
▼▲ Select Item ◀▶ Change Value [Menu] Back	

Figure 59: OSD - PTZ

6. NETWORK SETTINGS

DHCP	ON/OFF
IP Address	xxx.xxx.xxx.xxx
[Menu] Back	

Figure 60: OSD - NETWORK SETTINGS

7. VERSION

VERSION			
MCU Version	nr	date	
Camera Version	nr	date	
AF Version	nr	date	
[Menu] Back			

Figure 61: OSD - VERSION

8. RESTORE DEFAULT


RESTORE DEFAULT	
Restore default?	NO / YES
▼▲ Select Item ▶ Change Value	
[Menu] Back	
[Home] OK	

Figure 62: OSD - RESTORE DEFAULT

Using the Select Switch

The rear of the Product is provided with a Select Switch that can be used to manually select a video format. This switch is important for the video quality during video recording or streaming.

See the table below for a description of the possible settings and the associated video output quality.



0	1080p60	8	720p30
1	1080p50	9	720p25
2	1080i60	A	1080p59.94
3	1080i50	B	1080i59.94
4	720p60	C	720p59.94
5	720p50	D	1080p29.97
6	1080p30	E	720p29.97
7	1080p25	F	Default (via OSD / WebGUI)

Figure 63: Select Switch

A few notes on the select switch:

- The setting 'F' is the *default* setting. If you set the switch to 'F', you can set the video format via the [OSD Menu](#) or the [WebGUI](#).
- The *highest* video output quality 1080p60 (setting '0').
- The *lowest* video output quality is 720p25 (setting '7').



It is recommended to set up the video output through the WebGUI or the OSD Menu, because this is much easier, than selecting the [video output](#) manually. If this is not possible, you can use the Select Switch.



IMPORTANT

- After changing the switch, you need to restart the camera to take effect.
- 720p30, 720p29.97 and 720p25 are not supported by the SDI output.
- There are four ways to select the video output of the camera (OSD / direct button combination on the remote control / WebGUI / rotary dial). The rotary dial takes priority after a reboot, except on setting F, where all the outputs are defined digitally.

Maintenance

Camera Maintenance



Take the following actions to maintain the camera:

- If you will not be using the camera for a long time, turn off the power switch and disconnect the AC powercord of the AC adaptor to the outlet.
- Use a soft cloth or tissue to clean the camera cover.
- Please use the soft dry cloth to clean the lens. If the camera is very dirty, clean it with diluted neutraldetergent.



Do not use any type of solvents, which may damage the surface.

Usage Precautions



Take the following precautions to ensure good image quality:

- Do not film extreme bright objects for a prolonged period of time, such as sunlight, light sources, etc.
- Do not operate in unstable lighting conditions, otherwise the produced image could be less than optimal.
- Do not operate close to powerful electromagnetic radiation, such as TV or radio transmitters, etc.

Transport and Storage

The camera must be transported in its original packaging box. Inside the box, it is recommended to wrap the camera in the original plastic bag and to place it in the protective foam.

Specific guidelines apply to the environmental temperature and humidity when operating and storing the camera.



See '*Operating humidity*' and '*Storage temperature*' in the provided **Datasheet** for the applicable values.

Disposal and Recycling

In general, the term 'E-Waste' applies to items of all types of electrical and electronic equipment and its parts that have been discarded by the owner as waste without the intention of re-use.

Avonic outsources the disposal and recycling of its E-Waste camera materials to the **Stichting Open**.



See <https://stichting-open.org/> for more information about the disposal and recycling.

Troubleshooting

General



1. Turn the camera off and on again and check if the problem persists.
2. If it does, restore to the factory default.

Power Issues



If the camera does NOT perform a self-test and / or if the power LED is OFF:

1. Check the net power.
2. Check the power supply.
3. Check the physical power button on the back of the camera.

Image

No image



1. Check the power of the camera and monitor.
2. Check the quality and length of the video cable.
3. Check if the video specifications of monitor match the specifications of the camera.
4. Check if the Iris under *Exposure settings* is set to 'closed'.

Abnormal image



1. Check the quality and length of the video cable.
2. Check the cable connections.
3. Check if the Iris under *Exposure settings* is set to 'closed'.

Dithering or flickering image



1. Check the camera fixation and nearby vibration sources.
2. Check the *Anti-flickering* setting in the OSD.
3. Check the *Noise Reduction* settings in the OSD.

Color issues



Check the OSD settings for *exposure*, white balance, color temp, Red and Bluetuning.



When experiencing image problems, you may also check [Appendix D - CMOS Image Sensor Characteristics](#)

Autofocus Issues



- Check the [autofocus](#) (position, speed etc.) before streaming
- Check [Video/Camera Settings](#) in de WebGUI or the OSD menu (for example: if the image is too bright, too dark, or too noisy, the camera will have difficulties to focus)



Check environmental conditions and the subject of focussing. The camera will have difficulties to focus in the following situations:

- Light: Strong light, low light/dark areas and backlight conditions
- Moving subjects
- Small objects before a plain or solid background
- Blurry or unsharp subjects: filming through wet glass or dirty objects
- Distance: filming two or more different subjects, some near and some far away
- Position in the image: subject positioned in the corners of the picture
- Faces: partly hidden faces, sideways filmed faces, diagonal or up side down
- When the camera itself moves, or when the iris is narrowed down



When you experience one or more of the above mentioned problems check also our [Appendix - CMOS characteristics](#)

Control

No self-test (PTZ cameras only) and no power LED



1. Check the net power
2. Check the power supply

Remote Controller does not work



1. Check the power of the controller.
2. Check the RS-232 or RS-485 cable quality, length, polarity and network architecture.
3. Check the serial communication settings on the camera and controller.
4. Check the VISCA / PELCO address settings on the camera and controller.
5. Check the IP network settings on the camera and controller.

WebGUI

Cannot enter WebGUI



1. Check the network cable.
2. Check if the computer is connected to the same subnet as the camera.
3. Use an *incognito* window in your browser, sometimes cache issues arise when using multiple cameras that have the same default IP address
4. Reset the factory default IP settings by pressing **[*] [#] [Manual]** and **Reboot**.

Firmware update failed



1. Check firmware file integrity, download it again.
2. Make sure you are trying to flash the UVC file for the correct color camera (ARM is generic, UVC is color-dependent).

Appendix A - VISCA Settings and Command List



To control the camera, in all the '8x' addresses, you have to replace the 'x' with the serial Visca address that is set in the camera.

When using VISCA over IP, the 'x' in all the '8x' addresses is always '1', as the unique identifier is the IP address.

VISCA over IP

The Avonic IP camera is implemented with a TCP server. The TCP port number is **1259** by default and can be altered in the [WebGUI](#). Once the connection between client and server is set up, the client will be able to send PTZ commands to the server. The server then parses and executes the PTZ command.

The Avonic IP Camera also has an implemented UDP server. The UDP port number is fixed on **1259**. Once the connection between client and server is set up, the client will be able to send PTZ commands to the server. The server then parses and executes the PTZ command.



Pay attention to the fact that the camera does not send back any communication via UDP!

The VISCA over IP command list is based on the VISCA protocol. Not all VISCA commands are implemented.

The PTZ Command format is according to the definition of the VISCA protocol. The VISCA address of the camera is set to 1 by default and can be changed in the WebGUI. As all cameras are uniquely identified by their IP address, all VISCA serial addresses of the cameras that are controlled over IP do not necessarily have to be unique.

Default settings:

- TCP port 1259
- UDP port 1259 (same port as TCP; is correct)
- VISCA address 1

Camera Return Commands

All parameter values are in HEX.

- x = Camera Address
- y = Socket Number
- z = Camera Address + 8

Return/complete Command			
Command	Function	Command Packet	Comments
ACK/Completion Messages	ACK	90 4y FF (y: Socket No.)	Return when the command is accepted.
	Completion	90 5y FF (y: Socket No.)	Return when the command has been executed.

Error Command			
Command	Function	Command Packet	Comments
Error Messages	Syntax Error	90 60 02 FF	Returned when the command format is different or when a command with illegal command parameters is accepted.
	Command Buffer Full	90 60 03 FF	Indicates that two sockets are already being used (executing two commands) and the command could not be accepted when received.
	Command Canceled	90 6y 04 FF (y: Socket No.)	Returned when a command which is being executed in a socket specified by the cancel command is canceled. The completion message for the command is not returned.
	No Socket	90 6y 05 FF (y: Socket No.)	Returned when no command is executed in a socket specified by the cancel command, or when an invalid socket number is specified.
	Command Not Executable	90 6y 41 FF (y: Execution command Socket No. Inquiry command: 0)	Returned when a command cannot be executed due to current conditions. For example, when commands controlling the focus manually are received during auto-focus.

Camera Control Commands

All parameter values are in HEX

- x = Camera Address
- y = Socket Number
- z = Camera Address + 8

Camera Control Commands			
Command	Function	Command Packet	Comments
Address Set	Broadcast	88 30 01 FF	Address setting
CAM_Power	On	8x 01 04 00 02 FF	Power ON
	Off	8x 01 04 00 03 FF	Power OFF
	Reboot	8x 0A 01 06 01 FF	Reboot
CAM_Zoom	Stop	8x 01 04 07 00 FF	
	Tele (Standard speed)	8x 01 04 07 02 FF	
	Wide (Standard speed)	8x 01 04 07 03 FF	
	Tele (Variable speed)	8x 01 04 07 2p FF	p = 0(low speed) -F(high speed)
	Wide (Variable speed)	8x 01 04 07 3p FF	
	Direct	8x 01 04 47 0p 0q 0r 0s FF	pqrs(0-F): Zoom Position
	Zoom Wide ~ Tele	00 00 00 00 ~ 04 00 00 00 (PQRS)	
CAM_Focus	Stop	8x 01 04 08 00 FF	
	Far (Standard speed)	8x 01 04 08 02 FF	
	Near (Standard speed)	8x 01 04 08 03 FF	
	Far (Variable speed)	8x 01 04 08 2p FF	p = 0(low) - F(high)
	Near (Variable speed)	8x 01 04 08 3p FF	
	Direct Focus Position	8x 01 04 48 0p 0q 0r 0s FF	min p = 0, q = 0, r = 0, s = 0 max p = 0, q = 6, r = E, s = A
	Auto Focus	8x 01 04 38 02 FF	AF On
	Manual Focus	8x 01 04 38 03 FF	AF Off
	Auto/Manual	8x 01 04 38 10 FF	AF Toggle On/Off
	OnePush mode	8x 01 04 38 04 FF	
	OnePush trigger	8x 01 04 18 01 FF	
	Focus Near ~ Far	Variable ~ 00 00 00 00 (PQRS)	pqrs: Focus Position
CAM_WB	Auto	8x 01 04 35 00 FF	Normal Auto
	Indoor mode	8x 01 04 35 01 FF	Indoor mode
	Outdoor mode	8x 01 04 35 02 FF	Outdoor mode
	OnePush mode	8x 01 04 35 03 FF	One Push WB mode
	Manual	8x 01 04 35 05 FF	Manual Control mode
	OnePush trigger	8x 01 04 10 05 FF	One Push WB Trigger

Camera Control Commands			
Command	Function	Command Packet	Comments
CAM_Bgain	Reset	8x 01 04 04 00 FF	Manual Control of BGain
	Up	8x 01 04 04 02 FF	
	Down	8x 01 04 04 03 FF	
	Direct	8x 01 04 44 00 00 0p 0q FF	pq: B Gain
CAM_AE	Full Auto	8x 01 04 39 00 FF	Automatic Exposure mode
	Manual	8x 01 04 39 03 FF	Manual Control mode
	Shutter priority	8x 01 04 39 0A FF	Shutter Priority Automatic Exposure mode
	Iris priority	8x 01 04 39 0B FF	Iris Priority Automatic Exposure mode
	Bright	8x 01 04 39 0D FF	Bright Mode(Manual control)
CAM_Iris	Reset	8x 01 04 0B 00 FF	Iris Setting (CAM_AE is set to Iris Priority)
	Up	8x 01 04 0B 02 FF	
	Down	8x 01 04 0B 03 FF	
	Direct Iris Position	8x 01 04 4B 00 00 0p 0q FF	min p = 0 q = 0 max p = 0, q = C
CAM-Shutter	Direct	8x 01 04 4A 00 00 0p 0q FF	min p = 0 q = 0 max p = 1 q = 0
CAM_Gain	Reset	8x 01 04 0C 00 FF	Gain Setting
	Up	8x 01 04 0C 02 FF	
	Down	8x 01 04 0C 03 FF	
	Direct	8x 01 04 0C 00 00 0p 0q FF	pq: Gain Position
	Gain Limit	8x 01 04 2C 0p FF	p:Gain Position
CAM_Bright (only works with exposure mode Bright enabled)	Reset	8x 01 04 0D 00 FF	Bright Setting
	Up	8x 01 04 0D 02 FF	
	Down	8x 01 04 0D 03 FF	
	Direct	8x 01 04 0D 00 00 0p 0q FF	pq: Bright Position
CAM_ExpComp(EV and EV Level)	On	8x 01 04 3E 02 FF	Exposure Compensation On/Off
	Off	8x 01 04 3E 03 FF	
	Reset	8x 01 04 0E 00 FF	Exposure Compensation Amount Setting
	Up	8x 01 04 0E 02 FF	
	Down	8x 01 04 0E 03 FF	
	Direct	8x 01 04 4E 00 00 0p 0q FF	pq: ExpComp Position

Camera Control Commands			
Command	Function	Command Packet	Comments
CAM_BackLight	On	8x 01 04 33 02 FF	Back Light Compensation On/Off
	Off	8x 01 04 33 03 FF	
CAM_NR(2D)Mode	Auto	8x 01 04 50 02 FF	NR2D Auto/Manual
	Manual	8x 01 04 50 03 FF	
CAM_NR(2D)Level	-	8x 01 04 53 0p FF	p: NR Setting (0: Off, level 1 to 5)
CAM_NR(3D)Level	-	8x 01 04 54 0p FF	p: NR Setting (0: Off, level 1 to 8)
CAM_Flicker	-	8x 01 04 23 0p FF	p: Flicker Settings (0: Off, 1: 50Hz, 2: 60Hz)
CAM_DHotPixel	-	8x 01 04 56 0p FF	p: Dynamic Hot PixelSetting (0: Off, level 1 to 6)
CAM_Aperture (sharpness)	Reset	8x 01 04 02 00 FF	Aperture Control
	Up	8x 01 04 02 02 FF	
	Down	8x 01 04 02 03 FF	
	Direct	8x 01 04 42 00 00 0p 0q FF	pq: Aperture Gain
CAM_PictureEffect	Off	8x 01 04 63 00 FF	Picture Effect Setting
	B&W	8x 01 04 63 04 FF	
CAM_Memory(preset)	Reset	8x 01 04 3F 00 pp FF	pp: Memory Number (=0 to 127)
	Set	8x 01 04 3F 01 pp FF	
	Recall	8x 01 04 3F 02 pp FF	
CAM_LR_Reverse	On	8x 01 04 61 02 FF	Image Flip HorizontalOn/Off
	Off	8x 01 04 61 03 FF	
CAM_PictureFlip	On	8x 01 04 66 02 FF	Image Flip VerticalOn/Off
	Off	8x 01 04 66 03 FF	
Freeze	Freeze ON	8x 04 04 62 02 FF	Freeze ON immediately
	Freeze OFF	8x 04 04 62 03 FF	Freeze OFF immediately
	Preset Freeze ON	8x 04 04 62 22 FF	Freeze ON when running preset
	Preset Freeze OFF	8x 04 04 62 23 FF	Freeze OFF when running preset
SYS_Menu	Off	8x 01 06 06 03 FF	Turns the OSD menu On/Off
	On	8x 01 06 06 02 FF	

Camera Control Commands			
Command	Function	Command Packet	Comments
CAM_ColorGain	Direct	8x 01 04 49 00 00 00 0P FF	p: Color Gain setting 0h (60%) to Eh (200%)
Pan_tiltDrive	Up	8x 01 06 01 VV WW 03 01 FF	VV: Pan speed 0x01(low speed) to 0x18 (high speed) WW: Tilt speed 0x01(low speed) to 0x14 (high speed) YYYY: Pan Position ZZZZ: Tilt Position
	Down	8x 01 06 01 VV WW 03 02 FF	
	Left	8x 01 06 01 VV WW 01 03 FF	
	Right	8x 01 06 01 VV WW 02 03 FF	
	Upleft	8x 01 06 01 VV WW 01 01 FF	
	Upright	8x 01 06 01 VV WW 02 01 FF	
	DownLeft	8x 01 06 01 VV WW 01 02 FF	
	DownRight	8x 01 06 01 VV WW 02 02 FF	
	Stop	8x 01 06 01 VV WW 03 03 FF	
	AbsolutePosition	8x 01 06 02 VV WW 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF	
	RelativePosition	8x 01 06 03 VV WW 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF	
	Pan range: -170° ~ +170°	0F 06 07 00 ~ 50 00 09 09 (YYYY)	
	Tilt range: -30° ~ +90°	0F 0E 04 05 ~ 00 05 01 00 (ZZZZ)	
	Home	8x 01 06 04 FF	
	Reset	8x 01 06 05 FF	

Camera Control Commands			
Command	Function	Command Packet	Comments
Pan_tiltLimitSet	LimitSet	8x 01 06 07 00 0W 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF	W: 1 UpRight 0: Down-Left
	LimitClear	8x 01 06 07 01 0W 07 0F 0F 0F 07 0F 0F 0F FF	YYYY: Pan Limit Position ZZZZ: Tilt Position
CAM_AFSensitivity	High	8x 01 04 58 01 FF	AF Sensitivity High/ Normal/Low
	Normal	8x 01 04 58 02 FF	
	Low	8x 01 04 58 03 FF	
CAM_SettingReset	Reset	8x 01 04 A0 10 FF	Reset Factory Setting
CAM_Brightness	Direct	8x 01 04 A1 00 00 0p 0q FF	pq: Brightness Position
CAM_Contrast	Direct	8x 01 04 A2 00 00 0p 0q FF	pq: Contrast Position
CAM_Flip	Off	8x 01 04 A4 00 FF	Single Command ForVideo Flip
	Flip-H	8x 01 04 A4 01 FF	
	Flip-V	8x 01 04 A4 02 FF	
	Flip-HV	8x 01 04 A4 03 FF	
CAM_Autoflip	Autoflip ON	8x 01 02 70 02 FF	Autoflip ON
	Autoflip OFF	8x 01 02 70 03 FF	Autoflip OFF
CAM_SettingSave	Save	8x 01 04 A5 10 FF	Save Current Setting
CAM_Iridix	Direct	8x 01 04 A7 00 00 0p 0q FF	pq: Iridix Position
CAM_AWBSensitivity	High	8x 01 04 A9 00 FF	High
	Normal	8x 01 04 A9 01 FF	Normal
	Low	8x 01 04 A9 02 FF	Low
CAM_AFZone	Top	8x 01 04 AA 00 FF	AF Zone weight select
	Center	8x 01 04 AA 01 FF	
	Bottom	8x 01 04 AA 02 FF	
CAM_ColorHue	Direct	8x 01 04 4F 00 00 00 0p FF	p: Color Hue setting0h (– 14 degrees) to Eh (+14 degrees)
Pan-tilt_MaxSpeed	High SpeedPan/Tilt ON	8x 0A 01 31 03FF	High Speed PTON
	High SpeedPan/Tilt OFF	8x 0A 01 31 02FF	High Speed PTOFF
ARM/MCU_Version Inq	Inquiry ARM/MCU Version	8x 09 0A 0103 FF	
CAM/UVC_Version Inq	Inquiry Cam/UVC version	8x 09 00 02FF	
CAM_TallyLight(Cm7x only with license active)	Red	8x 01 7E 010A 00 02 03 FF	Tally Light RedON
	Green	8x 01 7E 010A 00 03 02 FF	Tally Light GreenON
	Off	8x 01 7E 010A 00 03 03 FF	Tally Light OFF

Camera Control Commands			
Command	Function	Command Packet	Comments
Preset_H_Speed	Horizontal (Pan) speedbetween presets	81 01 03 01 qqFF	qq= speed setting1 ~ 25 (1 = 00 HEX, 25 = 18 HEX)
Preset_V_Speed	Vertical (Tilt) speedbetween presets	81 01 03 02qq FF	qq = speed setting1 ~ 21 (1 = 00 HEX, 21 = 14 HEX)
Preset_Z_Speed	Zoom speed betweenpresets	81 01 03 03qq FF	qq = speed setting1 ~ 8 (1 = 00 HEX, 8 = 07 HEX)
Blue_Tuning (autowhitebalance active)	more or less blue whilemaintaining auto white balance active	81 0A 01 13 ppFF	pp = setting -10 ~ +10(00~14 HEX)
Red_Tuning (autowhitebalance active)	more orless red while maintaining auto white balance active	81 0A 01 12 ppFF	pp = setting -10 ~ +10(00~14 HEX)
VideoSystem_Set		8x 01 06 35 00 pp FF	pp: Video Format
			00: 1080p60
			01:1080p50
			02: 1080i60
			03: 1080i50
			04: 720p60
			05: 720p50
			06: 1080p30
			07: 1080p25
			08: 720p30
			09: 720p25
			0A: 1080p59.94
			0B: 1080i59.94
			0C: 720p59.94
			0D: 1080p29.97
			0E: 720p29.97

Inquiry Commands

all parameter values are in hex

- x = camera address
- y = socket number
- z = camera address + 8

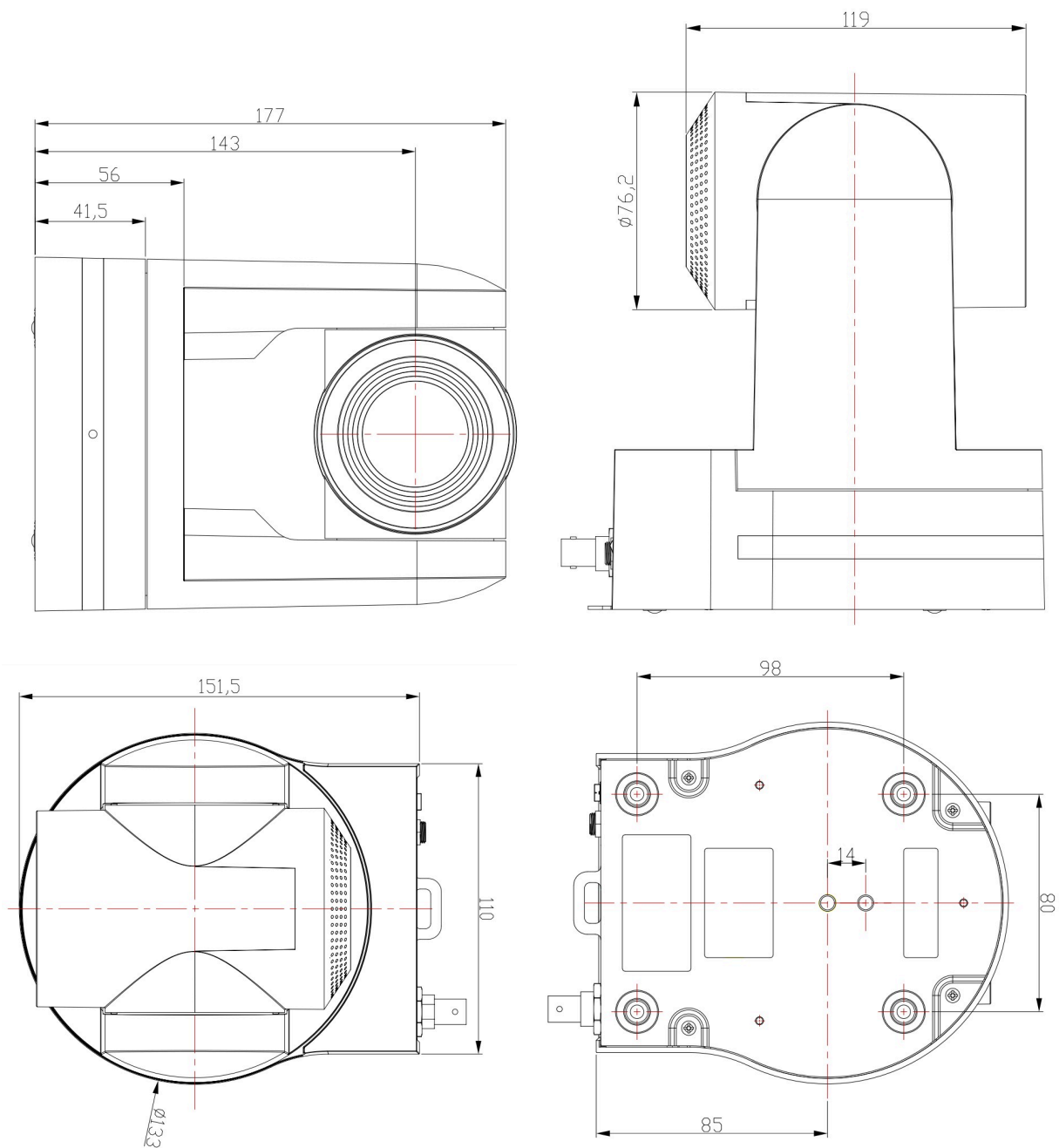
Inquiry Commands			
Command	Function	Command Packet	Comments
CAM_ZoomPosInq	8x 09 04 47 FF	90 50 0p 0q 0r 0s FF	pqrs: Zoom Position
CAM_FocusAFModeInq	8x 09 04 38 FF	90 50 02 FF	Auto Focus
		90 50 03 FF	Manual Focus
		90 50 04 FF	OnePush Focus
CAM_FocusPosInq	8x 09 04 48 FF	90 50 0p 0q 0r 0s FF	pqrs: Focus Position
CAM_WBModeInq	8x 09 04 35 FF	90 50 00 FF	Auto
		90 50 01 FF	Indoor mode
		90 50 02 FF	Outdoor mode
		90 50 03 FF	OnePush mode
		90 50 05 FF	Manual
CAM_RGainInq	8x 09 04 43 FF	90 50 00 00 0p 0q FF	pq: R Gain
CAM_BGainInq	8x 09 04 44 FF	90 50 00 00 0p 0q FF	pq: B Gain
CAM_AEModeInq	8x 09 04 39 FF	90 50 00 FF	Full Auto
		90 50 03 FF	Manual
		90 50 0A FF	Shutter priority
		90 50 0B FF	Iris priority
		90 50 0D FF	Bright
CAM_ShutterPosInq	8x 09 04 4A FF	90 50 00 00 0p 0q FF	pq: Shutter Position
CAM_IrisPosInq	8x 09 04 4B FF	90 50 00 00 0p 0q FF	pq: Iris Position
CAM_BrightPosInq	8x 09 04 4D FF	90 50 00 00 0p 0q FF	pq: Bright Position
CAM_ExpComp-ModeInq	8x 09 04 3E FF	90 50 02 FF	On
		90 50 03 FF	Off
CAM_ExpCompPosInq	8x 09 04 4E FF	90 50 00 00 0p 0q FF	pq: ExpComp Position
CAM_Backlight-ModeInq	8x 09 04 33 FF	90 50 02 FF	On
		90 50 03 FF	Off
CAM_Noise2DLevel	8x 09 04 53 FF	90 50 0p FF	Noise Reduction (2D) p: 0 to 5
CAM_Noise3DLevel	8x 09 04 54 FF	90 50 0p FF	Noise Reduction (3D) p: 0 to 8
CAM_FlickerModeInq	8x 09 04 55 FF	90 50 0p FF	p: Flicker Settings(0: OFF, 1: 50Hz, 2: 60Hz)
CAM_Aperture-ModeInq (Sharpness)	8x 09 04 05 FF	90 50 02 FF	Auto Sharpness
		90 50 03 FF	Manual Sharpness

Inquiry Commands			
Command	Function	Command Packet	Comments
CAM_ApertureInq(Sharpness)	8x 09 04 42 FF	90 50 00 00 0p 0q FF	pq: Aperture Gain
CAM_PictureEffectModeInq	8x 09 04 63 FF	90 50 02 FF	Off / Color
		90 50 04 FF	B&W
CAM_MemoryInq	8x 09 04 3F FF	90 50 0p FF	p: Memory number last operated.
SYS_MenuModeInq	8x 09 06 06 FF	90 50 02 FF	On
		90 50 03 FF	Off
CAM_LR_ReverseInq	8x 09 04 61 FF	90 50 02 FF	On
		90 50 03 FF	Off
CAM_PictureFlipInq	8x 09 04 66 FF	90 50 02 FF	On
		90 50 03 FF	Off
CAM_ColorGainInq	8x 09 04 49 FF	90 50 00 00 00 0p FF	p: Color Gain setting 0h (60%) to Eh (200%)
CAM_BTuningInq	81 09 0A 01 13 FF	90 50 pp FF	pp = setting -10 ~ +10 (00~14 HEX)
CAM_RTuningInq	81 09 0A 01 12 FF	90 50 pp FF	pp = setting -10 ~ +10 (00~14 HEX)
VideoSystemInq	8x 09 06 23 FF	90 50 00 FF	1920x1080p60
		90 50 01 FF	1920x1080p50
		90 50 02 FF	1920x1080i60
		90 50 03 FF	1920x1080i50
		90 50 04 FF	1280x720p60
		90 50 05 FF	1280x720p50
		90 50 06 FF	1920x1080p30
		90 50 07 FF	1920x1080p25
		90 50 08 FF	1280x720p30
		90 50 09 FF	1280x720p25
		90 50 0A FF	1920x1080p59.94
		90 50 0B FF	1920x1080i59.94
		90 50 0C FF	1280x720p59.94
		90 50 0D FF	1920x1080p29.97
		90 50 0E FF	1280x720p29.97
Pan-tiltMaxSpeedInq	8x 09 06 11 FF	90 50 ww zz FF	ww: Pan Max Speed zz: Tilt Max Speed
Pan-tiltPosInq	8x 09 06 12 FF	90 50 0w 0w 0w 0w 0z 0z 0z 0z FF	www: Pan Position zzzz: Tilt Position
CAM_GainLimitInq	8x 09 04 2C FF	90 50 0q FF	p: Gain Limit

Inquiry Commands			
Command	Function	Command Packet	Comments
CAM_DHotPixelInq	8x 09 04 56 FF	90 50 0q FF	p: Dynamic Hot PixelSetting (0: Off, level 1 to 6)
CAM_AFSensitivityInq	8x 09 04 58 FF	90 50 01 FF	High
		90 50 02 FF	Normal
		90 50 03 FF	Low
CAM_BrightnessInq	8x 09 04 A1 FF	90 50 00 00 0p 0q FF	pq: Brightness Position
CAM_ContrastInq	8x 09 04 A2 FF	90 50 00 00 0p 0q FF	pq: Contrast Position
CAM_FlipInq	8x 09 04 A4 FF	90 50 00 FF	Off
		90 50 01 FF	Flip-H
		90 50 02 FF	Flip-V
		90 50 03 FF	Flip-HV
CAM_IridixInq	8x 09 04 A7 FF	90 50 00 00 0p 0q FF	pq: Iridix Position
CAM_AFZone	8x 09 04 AA FF	90 50 00 FF	Top
		90 50 01 FF	Center
		90 50 02 FF	Bottom
CAM_ColorHueInq	8x 09 04 4F FF	90 50 00 00 00 0p FF	p: Color Hue setting 0h (–14 degrees) to Eh (+14 degrees)
CAM_AWBSensitivityInq	81 09 04 A9 FF	90 50 00 FF	High
		90 50 01 FF	Normal
		90 50 02 FF	Low
CAM_ZoomPosInq	8x 09 04 47 FF	90 50 0p 0q 0r 0s FF	pqrs: Zoom Position
CAM_FocusAFModeInq	8x 09 04 38 FF	90 50 02 FF	Auto Focus
		90 50 03 FF	Manual Focus
CAM_FocusPosInq	8x 09 04 48 FF	90 50 0p 0q 0r 0s FF	pqrs: Focus Position
CAM_WBModeInq	8x 09 04 35 FF	90 50 00 FF	Auto
		90 50 01 FF	Indoor mode
		90 50 02 FF	Outdoor mode
		90 50 03 FF	OnePush mode
		90 50 05 FF	Manual
CAM_RGainInq	8x 09 04 43 FF	90 50 00 00 0p 0q FF	pq: R Gain
CAM_BGainInq	8x 09 04 44 FF	90 50 00 00 0p 0q FF	pq: B Gain

Inquiry Commands			
Command	Function	Command Packet	Comments
CAM_AEModeInq	8x 09 04 39 FF	90 50 00 FF	Full Auto
		90 50 03 FF	Manual
		90 50 0A FF	Shutter priority
		90 50 0B FF	Iris priority
		90 50 0D FF	Bright
CAM_ShutterPosInq	8x 09 04 4A FF	90 50 00 00 0p 0q FF	pq: Shutter Position
CAM_IrisPosInq	8x 09 04 4B FF	90 50 00 00 0p 0q FF	pq: Iris Position
CAM_BrightPosInq	8x 09 04 4D FF	90 50 00 00 0p 0q FF	pq: Bright Position
CAM_PowerInq	8x 09 04 00 FF	y0 50 02 FF	On
		y0 50 03 FF Off	Off (Standby)

Appendix B - Dimensions



Appendix C - HTTP API



NOTE 1: After calling the http API, if succeeded: returns {"nRetVal":0, "szError":""}, if failed: returns {"nRetVal":-1879048185, "szError":""} and the param of nRetVal is less than zero, it applies to all APIs.

It should take along this URL "http://192.168.5.126/ajaxcom?szCmd=" with all the next APIs. Beyond that, every key can not take along white space, for example, this " key " is error, and this "key" is right.



NOTE 2: No spaces are allowed in the key values when using the API.



NOTE 3: Depending on the client used to send the commands, minor adjustments need to be applied. For example, when using cURL from the windows command line interface, quotation marks need to be doubled, while the API lists: {"SysCtrl":{"PtzCtrl":{"nChanel":0,"szPtzCmd":"preset_set","byValue":0}}}

The correct cURL command would be: curl "http://192.168.5.163/ajaxcom" --data-raw "szCmd={\"SysCtrl\":{\"PtzCtrl\":{\"nChanel\":0,\"szPtzCmd\":\"preset_call\",\"byValue\":0}}}"

PTZ

PTZControl

Code: [http://192.168.5.126/ajaxcom?szCmd={\"SysCtrl\":{\"PtzCtrl\":{\"nChanel\":0,\"szPtzCmd\":\"left_start\",\"byValue\":50}}}](http://192.168.5.126/ajaxcom?szCmd={\)

Command	Setting	Function	Command
nChanel	0		
byValue	0,100 used to control the speed of ptz		
szPtzCmd			
		leftstart	left_start
		leftstop	left_stop
		leftup start	leftup_start
		leftup stop	leftup_stop
		leftdown start	leftdown_start
		leftdown stop	leftdown_stop
		rightstart	right_start
		rightstop	right_stop
		rightup start	rightup_start
		rightdown start	rightdown_start
		rightdown stop	rightdown_stop
		upstart	up_start
		upstop	up_stop
		downstart	down_start
		downstop	down_stop



In the columns with the code, is the code in most of the settings separated over multiple lines to make the table lay-out readable. If you copy and paste these codes, note that you have to write and read them as **one line without white spaces**.

PTZ

Set PTZ Speed			
Command	Code	Command	Setting
szCmd	{\"SetEnv\":{\"PTZSpeed\": \"nPTZSpeed\":1}}	nPTZSpeed	0: Slow
			1: High

Set Speed By Zoom			
Command	Code	Command	Setting
szCmd	{\"SetEnv\":{\"ArmPtz\":{\"bSpeedByZoom\":0}}	bSpeedByZoom	1: on 0: off

Set Image Freezing			
Command	Code	Command	Setting
szCmd	{\"SetEnv\":{\"ArmPtz\":{\"bImageFreezing\":0}}	bImageFreezing	1: on 0: off

Set Low Power Mode			
Command	Code	Command	Setting
szCmd	{\"SetEnv\":{\"ArmPtz\":{\"emLowPowerMode\":0}}	emLowPowerMode	2: on 3: off

Set Zoom Speed			
Command	Code	Command	Setting
szCmd	{\"SetEnv\":{\"ArmPtz\":{\"nZoomSpeed\":0}}	nZoomSpeed	0 - 7

Set Preset Pan Speed			
Command	Code	Command	Setting
szCmd	{\"SetEnv\":{\"ArmPtz\":{\"nPresetPanSpeed\":0}}	nPresetPanSpeed	0 - 24

Set Preset Tilt Speed			
Command	Code	Command	Setting
szCmd	{\"SetEnv\":{\"ArmPtz\":{\"nPresetTiltSpeed\":0}}	nPresetTiltSpeed	0 - 20

Set Preset Zoom Speed			
Command	Code	Command	Setting
szCmd	{\"SetEnv\":{\"ArmPtz\":{\"nPresetZoomSpeed\":0}}	nPresetZoomSpeed	0 - 7

Focus Mode			
Focus Mode			
Code	{\"SetEnv\":{\"VideoParam\":{\"stAF\": {\"emAFMode\":3,\"nChannel\":0}}}}		
Command	Setting		
nChanel	0		
emAFMode	2: Auto		
	3: Manual		
	4 OnePush		
Zoom and focus			
Code	{\"SysCtrl\":{\"PtzCtrl\":{\"nChanel\":0,\"szPtzCmd\":\"zoomdec_start\",\"byValue\":0}}}		
Command	Setting	Function	Command
nChanel	0		
byValue	0		
szPtzCmd			
		Zoom add start	zoomadd_start
		Zoom add stop	zoomadd_stop
		Zoom decrease stop	zoomdec_start
		Zoom decrease stop	zoomdec_stop
		Focus add start	focusadd_start
		Focus add stop	focusadd_stop
		Focus decrease start	focusdec_start
		Focus decrease stop	focusdec_stop

Preset			
Code	{\"SysCtrl\":{\"PtzCtrl\":{\"nChanel\":0,\"szPtzCmd\":\"preset_set\",\"byValue\":0}}}		
Command	Setting	Function	Command
nChanel	0s		
ByValue	0, 254		
szPtzCmd			
		Set preset	preset_set
		Call preset	preset_call
		Clean preset	preset_clean

Audio Configure			
Get audio configure			
Code	{\"GetEnv\":{\"Audio\":{\"}}}		
Set audio configure			
Code	{\"SetEnv\":{\"Audio\":{\"nSampleBits\":16,\"nAudioSmstMask\":[33554888,33554888,33554433],\"bEnable\":0,\"nInpVolume\":4,\"nBitRate\":64,\"nAEncType\":7,\"byAudioCodecList\":[6,7,2],\"nSampleRate\":44100,\"nChannel\":1}}}		
Function	Code	Command	Setting
Enable	{\"SetEnv\":{\"Audio\":{\"bEnable\":1}}}	bEnable	0: off 1: on
Encode Type	{\"SetEnv\":{\"Audio\":{\"nAEncType\":7}}}	nAEncType	6: Mp3AAC 7: G.711A 2:
Sample Rate	{\"SetEnv\":{\"Audio\":{\"nSampleRate\":32000}}}	nSampleRate (Onlysupporting these sample rates and gy11a can only be 8000.)	16000 32000 44100 48000
Sample Bits	{\"SetEnv\":{\"Audio\":{\"nSampleBits\":16}}}	nSampleBits	16
Bit Rate	{\"SetEnv\":{\"Audio\":{\"nBitRate\":96}}}	nBitRate	32 48 64 96 128
Channel	{\"SetEnv\":{\"Audio\":{\"nChannel\":2}}}	nChannel	1: Mono Stereo 2:
Input Volume	{\"SetEnv\":{\"Audio\":{\"nInpVolume\":5}}}	nInpVolume (range from 1 to 10.)	Exp:[1, 10]

Video Configure	
Video Encode	
Get video encode parameters	
Code	<code>{"GetEnv":{"VideoEncode":{"nChannel":-1}}}</code>
Set video encode parameters	
Code	<code>{"SetEnv":{"VideoEncode":[{"stSlave":{"byIFrameMinQP":20,"byImageQuality":1,"szStreamName":"live/av1","dwVideoCodecMask":160,"emBitRateCtrl":0,"byImageSizeList":[26,7,9,27,4,5],"dwMaxBitRate":40960,"nFrameRate":25,"nMaxFrameRate":30,"emVideoCodec":5,"nIFrameInterval":75,"emImageSize":27,"nBitRate":512,"byProfile":2},"stMaster":{"byIFrameMinQP":20,"byImageQuality":0,"szStreamName":"live/av0","dwVideoCodecMask":160,"emBitRateCtrl":0,"byImageSizeList":[5,4,9],"dwMaxBitRate":40960,"nFrameRate":25,"nMaxFrameRate":60,"emVideoCodec":5,"nIFrameInterval":75,"emImageSize":5,"nBitRate":4096,"byProfile":2},"nChannel":0}]}}</code>

Video Configure			
Video Encode			
Function	Code	Command	Setting
Compressed Format	<code>{"SetEnv":{"VideoEncode": [{"stMaster":{"emVideoCodec":5},"nChannel":0}]}}</code>	emVideoCodec	5: H.264 7: H.265 (Profile only supports BP profile)
Profile	<code>{"SetEnv":{"VideoEncode": [{"stMaster":{"byProfile":0},"nChannel":0}]}}</code>	byProfile	0: BP 1: MP 2: HP
	<code>{"GetEnv":{"VideoEncode":{"nChannel":-1}}}</code> and receive its returning value. Compared to webpage and this, you can know the different value meaning different image size.	byImageSizeList (Lists all imagesize, different products have different image size)	
Image Size	<code>{"SetEnv":{"VideoEncode": [{"stMaster":{"emImageSize":4},"nChannel":0}]}}</code>	emImageSize	5: 1920*1080 4: 1280*720 9: 640*480 27: 320*180 26: 640*360
Rate Control	<code>{"SetEnv":{"VideoEncode": [{"stMaster":{"emBitRateCtrl":1},"nChannel":0}]}}</code>	emBitRateCtrl	0: CBR 1: VBR

Video Configure			
Video Encode			
Image Quality	<code>{"SetEnv":{"VideoEncode": [{"stMaster": {"byImageQuality":5,"nChannel":0}]}}</code>	byImageQuality	0: worst quality 1: between 2: between 3: between 4: between 5: Best quality
Bit Rate (kb/s)	<code>{"SetEnv":{"VideoEncode": [{"stMaster": {"dwMaxBitRate":200,"nChannel":0}]}}</code>	dwMaxBitRate	[64, 40960]
Frame Rate (F/S)	<code>{"SetEnv":{"VideoEncode": [{"stMaster": {"nFrameRate":25,"nChannel":0}]}}</code>	nFrameRate	[5, 60]
Frame Interval	<code>{"SetEnv":{"VideoEncode": [{"stMaster": {"nIFrameInterval":70,"nChannel":0}]}}</code>	nIFrameInterval	[1, 300]
Frame Min QP	<code>{"SetEnv":{"VideoEncode": [{"stMaster": {"byIFrameMinQP":70,"nChannel":0}]}}</code>	byIFrameMinQP	[10, 51]
Stream Name	<code>{"SetEnv":{"VideoEncode": [{"stMaster": {"szStreamName":"live/av01","nChannel":0}]}}</code>	szStreamName	user-defined

Video Configure

Stream Publish

Get stream publish parameters

Code	<code>{"GetEnv":{"StreamPublish":{"nChannel":-1}}}</code>
------	---

Set stream publish parameters

Code	<code>"SetEnv":{"StreamPublish":[{"stSlave":{"wHostPort":1935,"szHostUrl":"192.168.5.11","nProtolType":2,"szStreamName":"live/av1","bEnable":0,"nAbProtolMask":1,"szSrtKey":"","wSrtKeyLen":0,"szUserName":"","szPassword":"","stMaster":{"wHostPort":1935,"szHostUrl":"192.168.5.11","nProtolType":3,"szStreamName":"live/av0","bEnable":0,"nAbProtolMask":1,"szSrtKey":"111111111","wSrtKeyLen":0,"szUserName":"","szPassword":"","nChannel":0}}]}</code>
------	---

NOTE: When modifying one param, you should take along wHostPort. Otherwise, the host port will be zero.

Function	Code	Command	Setting
Enable	<code>{"SetEnv":{"StreamPublish":[{"stMaster":{"wHostPort":1935,"bEnable":1,"nProtolType":3,"nChannel":0}}]}</code>	bEnable	0: off 1: on
Protol Type		nProtolType	2: srt 3: rtmp
Host Address	<code>{"SetEnv":{"StreamPublish":[{"stMaster":{"wHostPort":1935,"nProtolType":3,"szHostUrl":"192.168.5.12"},"nChannel":0}}]}</code>	szHostUrl	user-defined

Video Configure			
Stream Publish			
Host Port	{\"SetEnv\":{\"StreamPublish\":[{\"stMaster\":{\"wHostPort\":19355,\"nProtoType\":3,\"nChannel\":0}}]}}	wHostPort	[0,65535]
Stream Name	{\"SetEnv\":{\"StreamPublish\":[{\"stMaster\":{\"wHostPort\":19355,\"nProtoType\":3,\"szStreamName\":\"live/1213\",\"nChannel\":0}}]}}	szStreamName	user-defined
User Name	{\"SetEnv\":{\"StreamPublish\":[{\"stMaster\":{\"wHostPort\":19355,\"nProtoType\":3,\"szUserName\":\"123\",\"nChannel\":0}}]}}	szUserName	user-defined
Password	{\"SetEnv\":{\"StreamPublish\":[{\"stMaster\":{\"wHostPort\":19355,\"nProtoType\":3,\"szPassword\":\"123\",\"nChannel\":0}}]}}	szPassword	user-defined
SrtKey (SRT Effectie)	{\"SetEnv\":{\"StreamPublish\":[{\"stMaster\":{\"wHostPort\":19355,\"nProtoType\":3,\"szSrtKey\":\"0123456789\",\"nChannel\":0}}]}}	szSrtKey	user-defined
SrtKeyLen (SRTEffectie)	{\"SetEnv\":{\"StreamPublish\":[{\"stMaster\":{\"wHostPort\":19355,\"nProtoType\":3,\"wSrtKeyLen\":\"0\",\"nChannel\":0}}]}}	wSrtKeyLen	[0-32]

RTP Multicast	
Get rtp multicast parameters	
Code	{\"GetEnv\":{\"StreamRTPMulticast\":{\"nChannel\":-1}}}
Set rtp multicast parameters	
Code	{\"SetEnv\":{\"StreamRTPMulticast\":[{\"stSlave\":{\"nProtoType\":0,\"bEnable\":0,\"wMultiCastPort\":4002,\"szMultiCastUrl\":\"224.1.2.3\",\"stMaster\":{\"nProtoType\":1,\"bEnable\":0,\"wMultiCastPort\":4000,\"szMultiCastUrl\":\"224.1.2.3\",\"nChannel\":0}}]}}
NOTE: When modifying one param you should take along bEnable and awMultiCastPort. Otherwise, it will be set to 0. Suggesting that when setting env, you can distinguish the stMaster and stSlave.	

Video Configure			
RTP Multicast			
Function	Code	Command	Setting
Enable	{\"SetEnv\":{\"StreamRTPMulticast\":[{\"stMaster\":{\"bEnable\":1,\"wMultiCastPort\":4004,\"nChannel\":0}}]}}	bEnable	0: off 1: on
Protol Type	{\"SetEnv\":{\"StreamRTPMulticast\":[{\"stMaster\":{\"bEnable\":1,\"nProtoType\":1,\"wMultiCastPort\":4004,\"nChannel\":0}}]}}	nProtoType	0: RTP 1: TS
Multicast Address	{\"SetEnv\":{\"StreamRTPMulticast\":[{\"stMaster\":{\"bEnable\":0,\"szMultiCastUrl\":\"224.1.2.23\",\"wMultiCastPort\":4004,\"nChannel\":0}}]}}	SzMultiCastUrl	224.0.0.0~ 255.255.255.0
Multicast Port	{\"SetEnv\":{\"StreamRTPMulticast\":[{\"stMaster\":{\"bEnable\":1,\"wMultiCastPort\":4004,\"nChannel\":0}}]}}	wMultiCastPort	Even [0, 65535]

Video Parameters				
Get video parameters				
Code	{\"GetEnv\":{\"VideoParam\":{\"nChannel\":-1}}}			
Set video parameters				
Focus				
Function	Code	Command	Setting	
Focus Mode	{\"SetEnv\": {\"VideoParam\": [{\"stAF\": {\"emAFMode\":2},\"nChannel\":0}]}]}	emAFMode	2:	Auto
			3:	Manual
			4:	OnePush
AF-Zone	{\"SetEnv\": {\"VideoParam\": [{\"stAF\": {\"emAFZone\":1},\"nChannel\":0}]}]}	emAFZone	0:	Top
			1:	Center
			2:	Bottom
			3:	All
AF-Sensitivity	{\"SetEnv\": {\"VideoParam\": [{\"stAF\": {\"nSensitivity\":1},\"nChannel\":0}]}]}	nSensitivity	1:	High
			2:	Middle
			3:	Low

Exposure				
Mode	{\"SetEnv\":{\"VideoParam\": [\"stExp\": {\"stExpMode\":{\"emExpMode\":0}}, \"nChannel\":0]}}	emExpMode	0: 3: 10: 11: 13:	Auto Manual SAE AAE Bright
Exposure: Auto				
EV	{\"SetEnv\":{\"VideoParam\": [\"stExp\": {\"expcomp_mode\":2},\"nChannel\":0]}}	expcomp_mode	2: 3:	ON OFF
EV Level	{\"SetEnv\":{\"VideoParam\": [\"stExp\": {\"expcomp\":8},\"nChannel\":0]}}	Expcomp	[0, 14]	
BLC	{\"SetEnv\":{\"VideoParam\": [\"stExp\": {\"backlight\":2},\"nChannel\":0]}}	backlight	2: 3:	ON OFF

Video Configure				
Video Parameters				
Exposure: Auto				
Function	Code	Command	Setting	
Flicker	{\"SetEnv\": {\"VideoParam\": [\"stExp\": {\"antiflicker\":0},\"nChannel\":0]}}	antiflicker	0: 1: 2:	OFF 50HZ 60HZ

Video Configure				
Video Parameters				
G.Limit	{\"SetEnv\": {\"VideoParam\": [{\"stExp\": {\"gainLimit\":5},\"nChannel\":0}]]}	gainLimit	[0, 15]	
DRC	{\"SetEnv\": {\"VideoParam\": [{\"stExp\": {\"drc\":6},\"nChannel\":0}]]}	drc	[0, 8]	
Exposure: Manual				
shutter	{\"SetEnv\":{\"VideoParam\": [\"stExp\":{\"stShutter\": {\"nShutter\":16}},\"nChannel\":0]}}	nShutter	[0, 16]	
Iris	{\"SetEnv\":{\"VideoParam\": [\"stExp\":{\"stIris\": {\"nIris\":12}},\"nChannel\":0]}}	nIris	[0, 12]	
DRC	{\"SetEnv\": {\"VideoParam\": [{\"stExp\": {\"drc\":8},\"nChannel\":0}]]}	drc	[0, 8]	
Exposure: SAE				
shutter	{\"SetEnv\":{\"VideoParam\": [\"stExp\":{\"stShutter\": {\"nShutter\":16}},\"nChannel\":0]}}	nShutter	[0, 16]	
DRC	{\"SetEnv\": {\"VideoParam\": [{\"stExp\": {\"drc\":7},\"nChannel\":0}]]}	drc	[0, 8]	
Exposure: AEE				
Flicker	{\"SetEnv\": {\"VideoParam\": [{\"stExp\": {\"antiflicker\":0},\"nChannel\":0}]]}	Antiflicker	0: 1: 2:	OFF 50HZ 60HZ
G.Limit	{\"SetEnv\": {\"VideoParam\": [{\"stExp\": {\"gainLimit\":5},\"nChannel\":0}]]}	gainLimit	[0, 15]	
Iris	{\"SetEnv\":{\"VideoParam\": [\"stExp\":{\"stIris\": {\"nIris\":12}},\"nChannel\":0]}}	nIris	[0, 12]	
DRC	{\"SetEnv\": {\"VideoParam\": [{\"stExp\": {\"drc\":6},\"nChannel\":0}]]}	drc	[0, 8]	
Exposure: Bright				
Bright	{\"SetEnv\": {\"VideoParam\": [{\"stExp\": {\"bright\":0},\"nChannel\":0}]]}	bright	[0, 23]	
Flicker, G.Limit, DRC	You can find the same configure at AAE			

Video Configure			
Video Parameters			
Color			
Function	Code	Command	Setting
WB Mode	{\"SetEnv\": {\"VideoParam\": [{\"stColor\": {\"stWbMode\": {\"emWbMode\": 0}}, \"nChannel\": 0}]}}	emWbMode	0: Auto 1: 3000K 7: 3500K 2: 4000K 8: 4500K 4: 5000K 9: 5500K 10: 6000K 6: 6500K 11: 7000K 5: Manual 3: OnePush
RG Tuning	{\"SetEnv\": {\"VideoParam\": [{\"stColor\": {\"rgaintuning\": 0}, \"nChannel\": 0}]}}	rgaintuning	[0, 20]
BG Tuning	{\"SetEnv\": {\"VideoParam\": [{\"stColor\": {\"bgaintuning\": 20}, \"nChannel\": 0}]}}	bgaintuning	[0, 20]
Saturation	{\"SetEnv\": {\"VideoParam\": [{\"stColor\": {\"saturation\": 0}, \"nChannel\": 0}]}}	saturation	[0, 14]
Hue	{\"SetEnv\": {\"VideoParam\": [{\"stColor\": {\"hue\": 14}, \"nChannel\": 0}]}}	hue	[0, 14]
AWB Sensitivity	{\"SetEnv\": {\"VideoParam\": [{\"stColor\": {\"awbsens\": 0}, \"nChannel\": 0}]}}	awbsens	0: Low 1: Middle 2: High
Image			
Bright	{\"SetEnv\": {\"VideoParam\": [{\"stImg\": {\"luminance\": 0}, \"nChannel\": 0}]}}	luminance	[0, 4]
Contrast	{\"SetEnv\": {\"VideoParam\": [{\"stImg\": {\"contrast\": 0}, \"nChannel\": 0}]}}	contrast	[0, 14]

Video Configure				
Video Parameters				
Sharpness	{\"SetEnv\": {\"VideoParam\": [{\"stImg\": {\"sharpness\":1},\"nChannel\":0}]]}	sharpness	[0, 15]	
Gamma	{\"SetEnv\": {\"VideoParam\": [{\"stImg\": {\"gamma\":0},\"nChannel\":0}]]}	gamma	[0, 4] 0: 1: 2: 3: 4:	Default 0.45 0.50 0.55 0.63
DCI	{\"SetEnv\": {\"VideoParam\": [{\"stImg\": {\"dci\":0},\"nChannel\":0}]]}	dci	[0, 8] 0:	OFF
B&W Mode	{\"SetEnv\": {\"VideoParam\": [{\"stImg\": {\"nBWMode\":0},\"nChannel\":0}]]}	nBWMode	0: 4:	Color B & W
Flip-H	{\"SetEnv\": {\"VideoParam\": [{\"stImg\": {\"nFlipH\":3},\"nChannel\":0}]]}	nFlipH	2: 3:	ON OFF

Video Configure				
Video Parameters				
Image				
Function	Code	Command	Setting	
Flip-V	{\"SetEnv\": {\"VideoParam\": [{\"stImg\": {\"nFlipV\":2},\"nChannel\":0}]]}	nFlipV	2: 3:	ON OFF
AutoFlip	{\"SetEnv\": {\"VideoParam\": [{\"stImg\": {\"nAutoFlipV\":2},\"nChannel\":0}]]}	nAutoFlipV		ON OFF
DZoom	{\"SetEnv\": {\"VideoParam\": [{\"stImg\": {\"nEZoom\":3},\"nChannel\":0}]]}	nEZoom	2: 3:	ON OFF
NR				
NR-2D	{\"SetEnv\": {\"VideoParam\": [{\"stNR\": {\"noise2D\":0},\"nChannel\":0}]]}	noise2D	[0, 8]	
NR-3D	{\"SetEnv\": {\"VideoParam\": [{\"stNR\": {\"noise3D\":0},\"nChannel\":0}]]}	noise3D	[0, 8] 0: 8:	OFF Auto
Dynamic Hot Pixel	{\"SetEnv\":{\"VideoParam\": [\"stNR\": {\"dhotpixel\":3},\"nChannel\":0}]]}	dhotpixel	[0, 5] 0:	OFF

Video Configure				
Video Parameters				
Style	<code>{"SetEnv":{"VideoParam": [{"stColor": {"nStyleInx":0,"nChannel":0}}]}</code>	nStyleInx	[0, 4] 0: 1: 2: 3: 4:	Default Normal Clarity Bright Soft

Video OSD			
Get video parameters			
Code	{\"GetEnv\":{\"VideoOsd\":{\"nChannel\":-1}}}		
Set set video parameters			
Code	{\"SetEnv\":{\"VideoOsd\":[\"stTime\": {\"bEnable\":1,\"nIndex\":0,\"nXPos\":0,\"szText\":\"\", \"nYPos\":10000, \"stFtColor\": {\"byAlpha\":128,\"byRed\":255,\"byGreen\":255,\"byBlue\":255},\"stBkColor\": {\"byAlpha\":0, \"byRed\":0,\"byGreen\":0,\"byBlue\":0}},\"stTitle\": {\"bEnable\":0,\"nIndex\":0,\"nXPos\":0,\"szText\":\"\", \"nYPos\":0,\"stFtColor\": {\"byAlpha\":128,\"byRed\":255,\"byGreen\":255,\"byBlue\":255},\"stBkColor\": {\"byAlpha\":0,\"byRed\":0,\"byGreen\":0,\"byBlue\":0}},\"nChannel\":0}]]}		
NOTE: All params can be saved by this command and also you can set one param alone.			
Function	Code	Command	Setting
Show Time	{\"SetEnv\":{\"VideoOsd\":[\"stTime\": {\"bEnable\":1}, \"nChannel\":0]}}	bEnable	0: Not show 1: Show
Show Title	{\"SetEnv\":{\"VideoOsd\":[\"stTitle\": {\"bEnable\":1}, \"nChannel\":0]}}	bEnable	0: Not Show 1: Show

Video Configure			
Video OSD			
Set video parameters			
Function	Code	Command	Setting
Time FontColor	<code>{"SetEnv":{"VideoOsd":[{"stTime":{"stFtColor":{"byAlpha":128,"byRed":255,"byGreen":255,"byBlue":0},"nChannel":0}}]}</code>	byAlpha	128
		white	rgb (255,255,255)
		black	rgb (0,0,0)
		yellow	rgb (255,255,0)
		red	rgb (255,0,0)
		blue	rgb (0,0,255)

Function	Code	Command	Setting
Title FontColor	{ "SetEnv": {"VideoOsd": [{"stTitle": {"stFtColor": {"byAlpha":128,"byRed":255,"byGreen":255, "byBlue":0}}, "nChannel":0}]}}}	byAlpha	128
		white	rgb (255,255,255)
		black	rgb (0,0,0)
		yellow	rgb (255,255,0)
		red	rgb (255,0,0)
		blue	rgb (0,0,255)
OSD Offsetx pos	Time: {"SetEnv": {"VideoOsd": [{"stTime": {"nXPos":9200},"nChannel":0}]}}	nXPos	[0, 10000]
	Title: {"SetEnv": {"VideoOsd": [{"stTitle": {"nXPos":9200},"nChannel":0}]}}		
OSD Offsety pos	Time: {"SetEnv": {"VideoOsd": [{"stTime": {"nYPos":1200},"nChannel":0}]}}	nYPos	[0, 10000]
	Title: {"SetEnv": {"VideoOsd": [{"stTitle": {"nYPos":1200},"nChannel":0}]}}		

OSD Font Size				
Get OSD font size parameters				
Code	{\"GetEnv\":{\"TTFFontSize\":{\"nChannel\":-1}}}			
Set video parameters				
Code	{\"SetEnv\":{\"TTFFontSize\":{\"nFontSize\":[48,48],\"bAutoSize\":1}}}			
Function	Code	Command		Setting
			bAutoSize	0: off,1: on
			nFontSize	[8,200]

Video Configure				
Video Out				
Get video out parameters				
Code	{\"GetEnv\":{\"VideoOut\":{\"nChannel\":-1}}}			
Set video out parameters				
Code	{\"SetEnv\":{\"VideoOut\":{\"nNetMode\":2,\"emVoutFormat\":9,\"byFormatList\":[10,9,4,3,8,7,6,5,26,25,20, 21,22,23,24]}}}			
Function	Code	Command	Setting	
		nNetMode: default value 2, do not modify it	– HD output – HD output + SD network – SD output + HD network	
		emVoutFormat: Setting the current video out format.	10:	1080P60
		9:	1080P50	
		4:	1080P30	
		3:	1080P25	
		8:	1080I60	
		7:	1080I50	
		6:	720P60	
		5:	720P50	
		26:	720P30	
		25:	720P25	
		20:	1080P59.94	
		21:	1080I59.94	
		22:	1080P29.97	
		23:	720P59.94	
		24:	720P29.97	

SRT			
Get network SRT parameters			
Code	{\"GetEnv\":{\"NetWork\":{\"nChannel\":-1}}}		
Set network SRT parameters			
Code	{\"SetEnv\":{\"NetWork\":{\"stSrt\":{\"wSrtLen\":0,\"wSrtPort\":9000,\"szSrtPin\":\"xxxxxxxxxx\"}}}}		
Function	Code	Command	Setting
crypto key length in bytes		wSrtLen	[0-32]
Port SRT		wSrtPort	Default 9000
Password stream encryption		szSrtPin	user-defined

Network Configure			
Get network port parameters			
Code	{\"GetEnv\":{\"NetWork\":{\"nChannel\":-1}}}		
Set network port parameters			
Code	{\"SetEnv\":{\"NetWork\":{\"stNetPort\": {\"wPortSoap\":1936,\"wPortData\":3000,\"wPortWeb\":80, \"wPortRtsp\":554,\"wPortVisca\":1259,\"wPortOnvif\":2000,\"wPortRtmp\":1935}}}}		
	You can also set one of these parameters like this: {\"SetEnv\":{\"NetWork\":{\"stNetPort\":{\"wPortSoap\":1936}}}}		
Port Settings			
Function	Code	Command	Setting
Port Data		wPortData	[0, 65535]
Port Web		wPortWeb	[0, 65535]
Port Onvif		wPortOnvif	[0, 65535]
Port Soap		wPortSoap	[0, 65535]
Port Rtmp		wPortRtmp	[0, 65535]
Port Rtsp		wPortRtsp	[0, 65535]
Port Visca		wPortVisca	[0, 65535]

Ethernet			
Get Ethernet parameters			
Code	{\"GetEnv\":{\"NetWork\":{\"nChannel\":-1}}}		
Set Ethernet parameters			
Code	\"SetEnv\":{\"NetWork\":{\"stEth\":[{\"byValid\":5,\"szIPAddr\":\"192.168.5.126\",\"szSubMask\": \"255.255.255.0\",\"szMacAddr\":\"E4:77:D4:01:8A:49\",\"szGateway\":\"192.168.5.1\", \"bDefault\":1}]]}}		
Function	Code	Command	Setting
DHCP	{\"SetEnv\":{\"NetWork\":{\"stEth\":[{\"byValid\":5}]]}}	byValid	5:off 7: on
IP Address	{\"SetEnv\":{\"NetWork\":{\"stEth\":[{\"szIPAddr\":\"192.168.5.127\"}]]}}		
Subnet Mask	{\"SetEnv\":{\"NetWork\":{\"stEth\": [{\"szSubMask\":\"255.255.255.0\"}]]}}		
Default Gateway	{\"SetEnv\":{\"NetWork\":{\"stEth\":[{\"szGateway\":\"192.168.5.1\"}]]}}		

DNS			
Get dns parameters			
Code	{\"GetEnv\":{\"NetWork\":{\"nChannel\":-1}}}		
Set dns parameters			
Code	{\"SetEnv\":{\"NetWork\":{\"stDns\":{\"szDns1\":\"8.8.8.8\",\"szDns2\":\"0.0.0.0\"}}}}		
Function	Code	Command	Setting
Preferred DNS Server	{\"SetEnv\":{\"NetWork\":{\"stDns\":{\"szDns1\":\"8.8.8.8\"}}}}		
Alternative DNS Server	{\"SetEnv\":{\"NetWork\":{\"stDns\":{\"szDns2\":\"8.8.8.8\"}}}}		

System Configure			
Get sysattr parameters			
Code	{\"GetEnv\":{\"SysAttr\":{\"nChannel\":-1}}}		
Set sysattr parameters			
Code	{\"SetEnv\":{\"SysAttr\":{\"nLanguage\":0,\"szDeviceID\":\"1\",\"emVideoStandard\":1,\"szDevName\":\"testname\"}}}		
Function	Code	Command	Setting
Device Name		szDevName	user-defined, cannot use white space
Device ID		szDeviceID	cannot modify
Language		nLanguage	0: Simplified Chinese 2: English

License	
Get License parameters	
Code	:{\"QueryState\":{\"QueryLicenseState\":{}}}
Set License parameters	
Code	{\"SetEnv\":{\"LicenseKey\":{\"bLicenseEnable\":0,\"szKeyText\":\"483B4EB1D0\"}}}

SysTime			
Get system time parameters			
Code	{\"QueryState\":{\"QuerySysTime\":{\"}}}		
Set system time parameters			
Code	{\"SetEnv\":{\"SysTime\":{\"nDateSprtr\":2,\"nDateFormat\":0,\"nZone\":1,\"nHourType\":0,\"stNtp\":{\"bEnable\":1,\"nHostPort\":123,\"nUpdateInterval\":2,\"szHostUrl\":\"ntp4.aliyun.com\"}}}}		
Function	Code	Command	Setting
Date Format	{\"SetEnv\":{\"SysTime\":{\"nDateFor-mat\":0}}}	nDateFor-mat	0: YYYY-MM-DD 1: MM-DD-YYYY 2: DD-MM-YYYY
Date Sprtr	{\"SetEnv\":{\"SysTime\":{\"nDateSprtr\":0}}}	nDateSprtr	0: . 1: - 2: /

System Configure			
SysTime			
Function	Code	Command	Setting
Zone	{\"SetEnv\":{\"SysTime\":{\"nZone\":0}}}	nZone	[0, 32] 0: GMT 1: GMT+01:00 2: GMT+02:00 3: GMT+03:00 4: GMT+03:30 5: GMT+04:00 6: GMT+04:30 7: GMT+05:00 13: GMT+08:00 20: GMT-01:00 31: GMT-11:00 32: GMT-12:00
Hour Type	{\"SetEnv\":{\"SysTime\":{\"nHourType\":0}}}	nHourType	0: 24 Hours 1: 12 Hours

System Configure				
SysTime				
NTP Enable	{\"SetEnv\":{\"SysTime\":{\"stNtp\":{\"bEnable\":1}}}}	bEnable	0: off 1: on	
Update Interval	{\"SetEnv\":{\"SysTime\":{\"stNtp\":{\"nUpdateInterval\":2}}}}	nUpdateInterval	[1, 10]	
Host URL	{\"SetEnv\":{\"SysTime\":{\"stNtp\":{\"szHostUrl\":\"time.nist.gov\"}}}}	szHostUrl	user-define, ntp server address	
Host Port	{\"SetEnv\":{\"SysTime\":{\"stNtp\":{\"nHostPort\":123}}}}	nHostPort	user-defined: [0, 65535]	
Time Settings	Synchronize with computer time or set manual: {\"SysCtrl\":{\"SetTime\":{\"bTimeType\":1,\"nZone\":19,\"stDateTime\":{\"dwYear\":2018,\"byHour\":15,\"byMinute\":38,\"byDay\":1,\"byMonth\":11,\"bySecond\":2}}}}			
Synchronize with NTP Server	{\"SysCtrl\":{\"SyncNtp\":\"\"}}			

System Configure			
SysUser			
Get sysuser parameters			
Code	{\"GetEnv\":{\"SysUser\":{\"}}}		
Set sysuser parameters			
Code	{\"SetEnv\":{\"SysUser\":{\"stUsers\": [{\"nUserType\":0,\"szUserName\":\"admin\",\"szPassword\":\"admin\"}, {\"nUserType\":1,\"szUserName\":\"user1\",\"szPassword\":\"user1\"}, {\"nUserType\":1,\"szUserName\":\"user2\", \"szPassword\":\"user2\"}]]}}		
Function	Code	Command	Setting
Authority		nUserType	0: admin 1: user1 or user 2
User Name		szUserName	user-define: do not use white space
Password		szPassword	user-define,do not use white space Note: This command must set three users at the same time.

Update	
Get update parameters	
Code	<code>{"QueryState":{"QueryVersion":{}}}</code>
Code	Get the return value and split it like this: <code>szText.Format("%d.%d.%d%d-%d-%d", (stVersion.dwCamVersion >> 16) & 0xFF, (stVersion.dwCamVersion >> 8) & 0xFF, (stVersion.dwCamVersion & 0xFF), (stVersion.dwCamDate >> 16) & 0xFFFF, (stVersion.dwCamDate >> 8) & 0xFF, (stVersion.dwCamDate & 0xFF));</code>
Set update parameters	
Not supported update with API, you can do this through webpage.	

Default	
Code	<code>{"SysCtrl":{"Default":{}}}</code>

Reboot	
Code	<code>{"SysCtrl":{"Reboot":{}}}</code>



The URL supports to set all params at one time and also can set one of them through split URL into one other command. Different commands can be found at different settings.

Appendix D - CMOS Image Sensor Characteristics

White Flecks

Although the CMOS image sensors are produced with high-precision technologies, fine white flecks may be generated on the screen in rare cases. These flecks are caused by natural and / or artificial radiation, which causes a “false exposure” on the image sensor. The shape of these spots may vary from dots to lines or other—sometimes irregular— shapes.

These spots occur in random locations of the image, occur only in a single frame and are more visible in dark images. This is a principle issue of all image sensors and *is not a malfunction*.

The white flecks especially tend to be seen in the following cases:

- When operating at a high ambient temperature
- When you have raised the gain (sensitivity)



The white flecks may be reduced by turning the camera off, then on again.

Aliasing

When fine patterns, stripes, or lines are shot, they may appear jagged or flickering. *Aliasing* refers to the effect that is produced when a signal is imperfectly reconstructed from the original signal. It occurs when a signal is not sampled at a high enough frequency to create an accurate representation.

This effect is shown in the following example of a *sinusoidal function*:

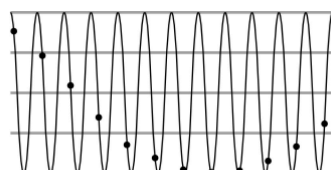


Figure 64: Sinusoidal Function

In this example, the dots represent the sampled data and the curve represents the original signal. Because there are not enough sampled data points, the resulting pattern produced by the sampled data is a poor representation of the original.

Focal Plane

Owing to the characteristics of the pickup elements (CMOS image sensors) for reading video signals, subjects that quickly move across the screen may appear slightly skewed (i.e., tilted to the left or right, depending on the direction of camera or subject movement). Since a CMOS sensor typically captures one row at a time within approximately 1/60th or 1/50th of a second (depending on the refresh rate), it may result in a “rolling shutter” effect. In such cases, the image is skewed.

Flash Band

If you film a strobe or quick-flashing light, brightness may differ between the upper and lower halves of the picture. See the Focal Plane explanation above for a clarification of this occurrence.

Flicker

If you are recording under lighting that is produced by discharge tubes (such as fluorescent, sodium or mercury-vapor lamps), the screen may flicker, colors may vary, or horizontal stripes may appear distorted.



In such cases, set the *anti-flicker* setting to 'on'.



Depending on lighting types, such occurrences may not be improved with the anti-flicker setting. It is recommended to set the shutter speed to 1/100s in areas of 50 Hz power supply frequency, and to 1/60s in areas of 60 Hz power supply frequency.



Avonic PTZ Camera 30/20x/12x zoom
CM70-IP/CM71-IP/CM73-IP
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