AVONIC


# Avonic PTZ Camera 20x zoom

AV-CM40

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# INTRODUCTION

Thank you for your Avonic purchase. Before beginning to operate this device, please read the manual in order to make sure the best performance is obtained. Save this manual for future reference.

## Contact

For any questions or suggestions, contact your reseller or the local distributor of Avonic. Find the local distributor on the website of Avonic. For the most recent version of the manual or datasheet, look at the Avonic website: www.avonic.eu

## Join Avonic

 facebook.com/avonicPTZ

 linkedin.com/company/avonic

 twitter.com/avonic

## Safety Notes

- Installation and servicing should only be done by Qualified Service Personnel and conform to all local codes.
- This unit is designed for indoor use only and it must not be installed where exposed to water or other liquids and moisture.
- Before powering on the device, check the input power voltage carefully.
- Avoid shock and vibration when transporting and installing the device.
- Electronic devices produce heat. Do not block the ventilation slots of the device and make sure the installation environment is well ventilated to avoid overheating.
- Before cleaning, unplug the power cable. Use a soft, damp cloth to clean the device, do not use strong or abrasive detergent to clean that will damage the device.
- If you wish to dispose this product, please contact Avonic to obtain info about the disposal procedure.

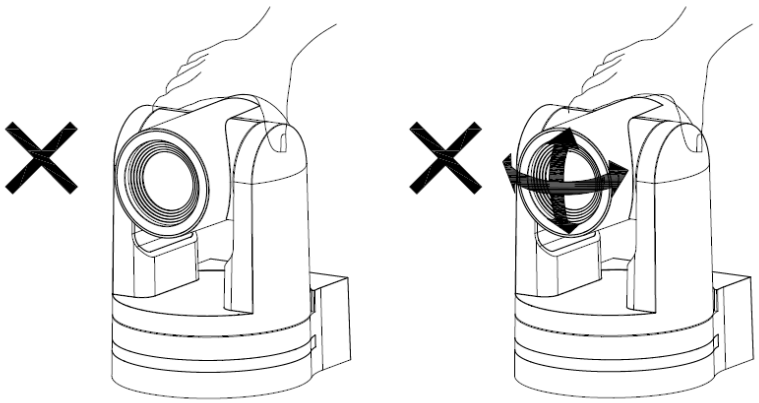
# PACKAGE CONTENTS AND ACCESSORIES

## Contents

| Quantity | Description | Avonic SKU |
|---|---|---|
| 1 pc | PTZ Camera | AV-CM40 |
| 1 pc | Power Supply 12V/A | AV-CM40-PSU |
| 1 pc | Remote Control | AV-CM40-RC |
| 1 pc | USB cable type A to type A | |
| 1 pc | RS232 9-pin male to 8-pin male | AV-CM-RS232 |

## Handling precautions

Be cautious to take the camera by its base. When placing back the camera in its protective foam, be sure the lens is in horizontal position.



## Accessories

Avonic Ceiling mount
SKU white : CM-CMW
SKU black: CM-CMB

Avonic Wall mount
SKU white : CM-WMW
SKU black: CM-WMB

Wall and Ceiling mount
SKU white : AV-MT200-W
SKU black: AV-MT200-B

# PRODUCT OVERVIEW

The Avonic CM40 is a high-quality PTZ camera, with an HDMI, USB2.0 and 3G-SDI output. The camera is designed for fixed installations and high quality video in low light conditions. The camera is equipped with high quality components like a Panasonic CMOS sensor and a glass lens with 20x optical zoom. Control the camera over RS232 or RS485 with any controller with VISCA or PELCO support.

## Features

- Panasonic high-quality 1/2.8 inch, 2.07 million effective pixels HD CMOS sensor
- The output frame rate up to 60fps in 1080P
- 20x Optical Zoom, glass lens.
- Remote Control Using RS232/485 interface, all the parameters of the camera can be remotely controlled.
- Leading autofocus algorithm for a fast, accurate and stable auto-focusing lens.
- Low noise and High SNR: Low Noise CMOS effectively ensures high SNR of the camera.
- Advanced 2D/3D noise reduction technology is also used to further reduce the noise while ensuring image sharpness.
- High accuracy, silent step driving motor makes for accurate fast and quiet panning and tilting.
- Multi-Format Video Outputs: HDMI 1.4a, 3G-SDI, USB2.0.
- The 3G-SDI is available for 100m transmission at 1080p60 format (SMPTE 424M). The output image is 8-bit YCbCr 4:2:2 level A (SMPTE 425M).
- Auto-Flip function
- Low-power sleep function: the consumption is lower than 500mW in sleep mode.
- Supports Multiple Control Protocols: VISCA, PELCO-D, PELCO-P protocols which can also be automatically recognized.

# INSTALLATION

## Connections


1. 3.5mm jack audio Line in, embeds audio on HDMI and SDI
2. RS-485 two-wire serial communication with 2-pin Phoenix connector
3. System Selector (see Installation for more details)
4. RS-232 mini-DIN-8 IN (connect the supplied RS-232 cable)
5. RS-232 mini-DIN-8 OUT for daisy chaining RS-232 connection
6. 3G-SDI video output SMTPE 424M compliant
7. HDMI Type A
8. USB2.0 Type A, UVC video output
9. RJ45 Ethernet connection (for firmware update only)
10. DC12V power with locking screw (connect the supplied DC PSU)
11. Power ON/OFF

## System Select Switch


| | | | |
|---|---|---|---|
| 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 | Via OSD/Webgui |

CAUTION:

a. After changing the switch, you need to restart the camera to take effect.

b. 720 p30 and 720 p25 only supported by the HDMI output.

c. There are three ways to select the video output (via OSD, direct button combination on the remote control, or via the rotary dial) of the camera, but the rotary dial takes priority after a reboot, except on setting F where all the outputs are defined digitally.

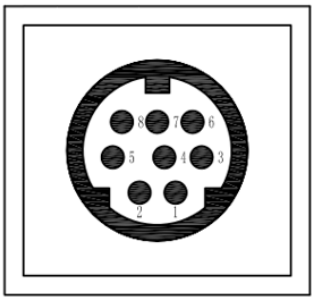
### Power adapter

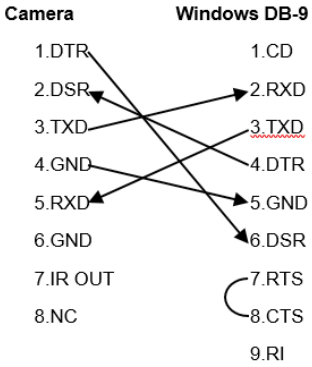
This equipment is equipped with a 12V/2A DC power supply. Insert the power supply according to the requirements, turn on the power switch.

### Power On

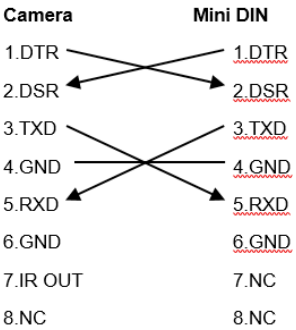
Pan-Tilt will rotate to the maximum position of top right after the camera started, then it returns to the center, the process of initialization is finished. (Note: If the position preset 0 has been stored, the position preset 0 will be called after initialization). From this point onwards the user can control the camera with RC or Serial Communication.

## RS232 Interface



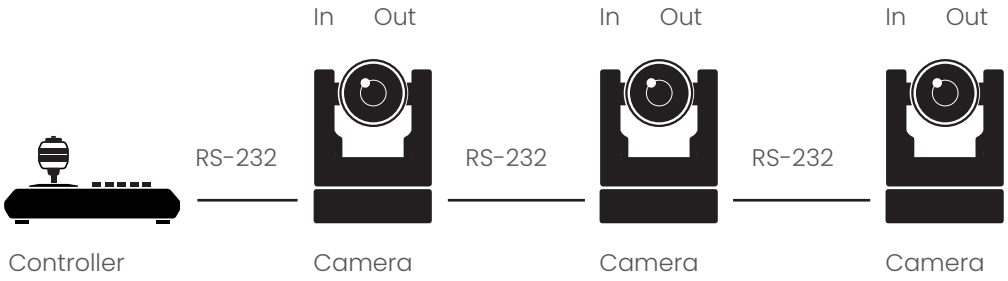




| No. | Function |
|---|---|
| 1 | DTR |
| 2 | DSR |
| 3 | TXD |
| 4 | GND |
| 5 | RXD |
| 6 | GND |
| 7 | IR OUT |
| 8 | NC |



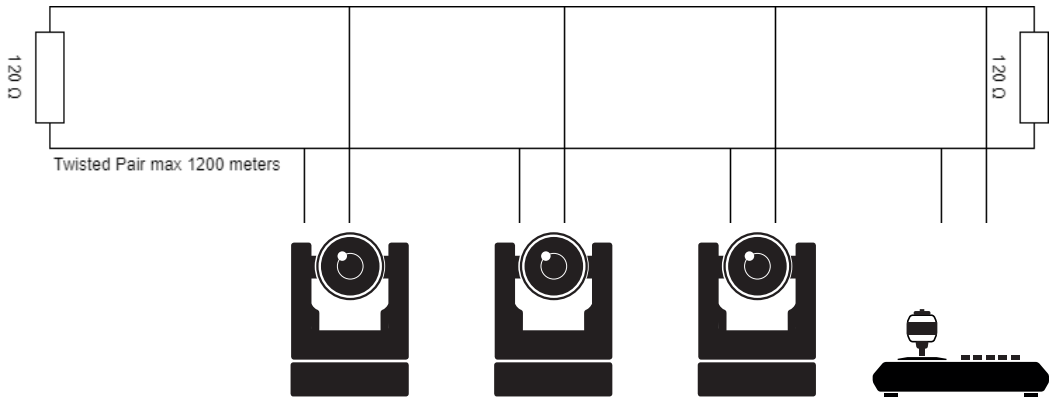
## VISCA network connection diagram

When connecting multiple cameras through RS-232, use daisy chaining network architecture. Max cable length for RS-232 is 10-15m.




## RS485 network connection diagram

To connect multiple cameras by RS485, the cameras are attached to a 2-wire twisted pair bus (max length 1200m) that is terminated at both ends with a 120 Ω impedance resistor. The maximum distance from the bus to the camera or controller is 5m.




## IP network connection

The camera is equipped with a limited WebGUI to perform a firmware upgrade. The camera can be attached directly to a PC with standard network patch cable or to a network switch. For further information, see chapter **Operation section WebGUI.**

# OPERATION

## Remote controller


a. Power

b. Set

c. Camera select

d. Number Keys

e. Focus + -

f. Auto/Manual Focus

g. Zoom + -

h. Set & Clear Preset

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

j. Home

k. BLC (Back Light Control) ON/OFF

l. Menu

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

n. Blank buttons

### a. Power

Press the power button to turn on the camera. If the position preset 0 has been stored, the position preset 0 will be called after initialization. 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 1 IR remote Control. With the camera select buttons [1,2,3,4] you can select the IR channel the remote control is using. The default camera IR channel is 1.
To control a camera on first use, please select camera 1 (IR channel 1) on the remote control. To control a second camera you first need to change the IR channel stored in the camera from 1 to 2.

- First turn off the other camera's in the room you don't want to change, to prevent that other camera's also get changed accidentally.
- Select camera 1 on the remote control, because the camera is still configured to listen to IR channel 1.
- Press [*]+[#]+[F2] to change the IR channel inside the camera to IR channel 2. The camera will confirm this on screen.
- Select camera 2 on the remote control to control this camera.

Key Combinations: (Default IR address is 1)

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

### d. Number Keys

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

### e. Focus + -

Push the button [manual focus] first before using the focus buttons. 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 in auto-focus or manual-focus. If the camera is configured to auto-focus the buttons [Focus + -] are disabled. When the camera is in "manual focus" modus and the Zoom buttons are used, the camera automatically switces to auto-focus.

### g. Zoom + -

Zoom the camera with these buttons. When the camera is in "manual focus" modus and the Zoom buttons are used, the camera automatically switches to auto-focus.

### h. Set & Clear Preset

A preset is a specific position of a camera that you save into the camera. A preset is assigned to a number from 0-9. To set a preset first point the camera in a specific directing and a specific zoom position. Now assign the position to a number with the button "Set Preset". You can call the preset by pressing the number 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.

### i. PTZ keys (up/down/left/right)

Move the camera in a direction.

### j. Home

Set the direction of the camera to a center position.

### k. BLC (Back Light Control) ON/OFF

Change the Back light control setting.

### l. Menu

The Menu button opens the "On Screen Display (OSD)" menu. This menu is visible on the HDMI/SDI/IP output. If the menu is not in English, please press [*]+[#]+[4] to change the Menu language to 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.

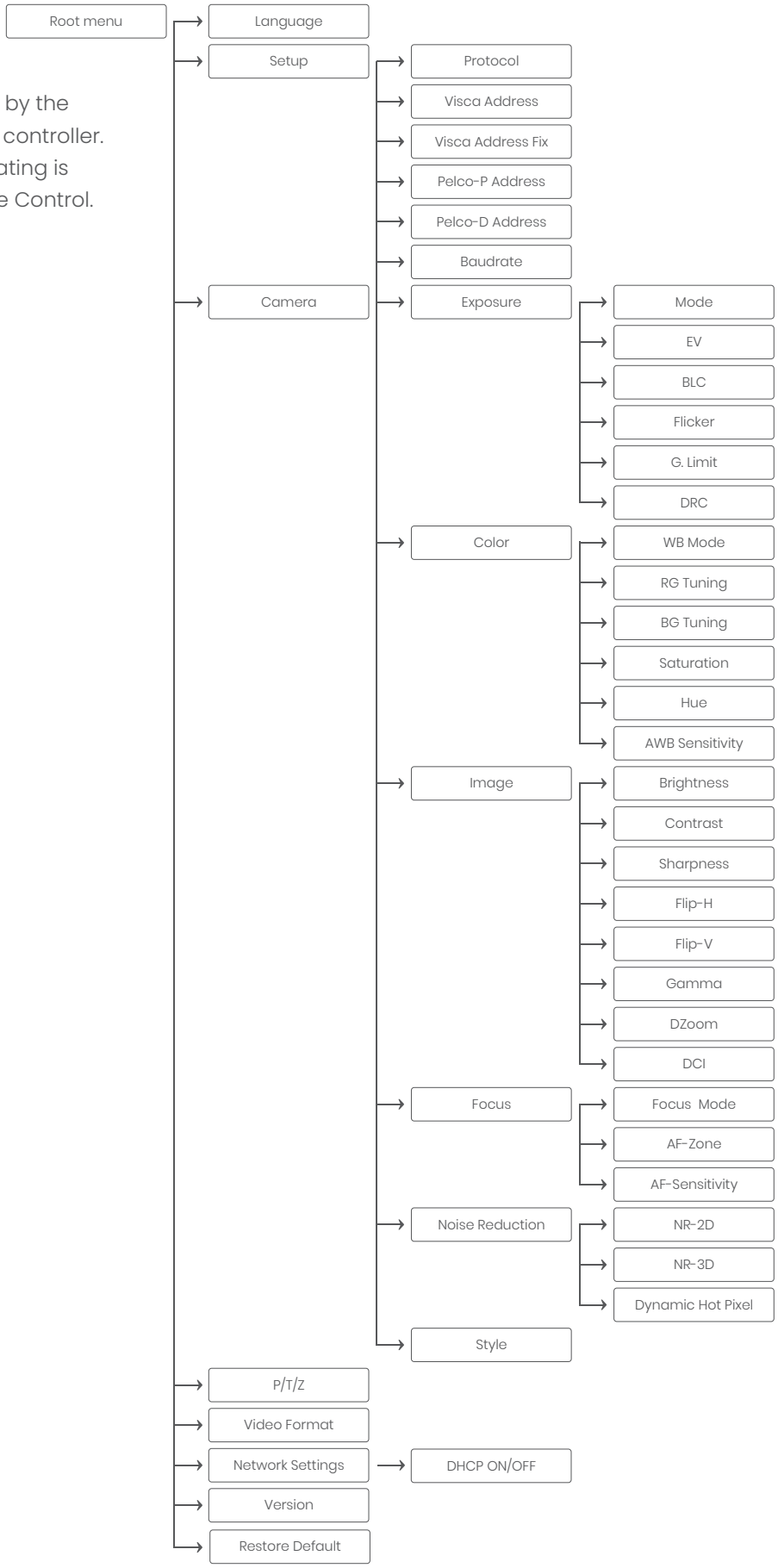
## Other Key Combinations

| | |
|---|---|
| [*]+[#]+[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 to1080p60* |
| [#]+[#]+[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* |

***NOTE: THE CAMERA RETURNS TO THE VIDEO OUTPUT SETTING OF THE ROTARY DIAL AFTER A REBOOT**

# OSD MENU

The OSD menu can be accessed by the Remote Control or an Avonic PTZ controller. In the following pages, the navigating is described for using the IR Remote Control.



### 1. MENU

Press [MENU] button to display the main menu on the screen. Use the arrow buttons to move the cursor to the item to be set. Press the [HOME] button to enter the corresponding sub-menu. Press [

| MENU | | |
|---|---|---|
| ▶ | Language | EN / CN |
| | Setup | |
| | Camera | |
| | P/T/Z | |
| | Version | |
| | Restore Default | |
| ▼▲ | Select Item | |
| ◀▶ | Change Value | |
| [Home] Enter | | |
| [Menu] Exit | | |

### 2. SETUP

| SETUP | | |
|---|---|---|
| ▶ | Protocol | AUTO / VISCA / PELCO-D / PELCO-P |
| | Visca Address | 1 ~ 7 |
| | Visca Address Fix | ON / OFF |
| | PELCO-P Address | 1 ~ 255 |
| | PELCO-D Address | 1 ~ 255 |
| | Baudrate | 2400 / 4800 / 9600 / 115200 / 38400 |
| ▼▲ | Select Item | |
| ◀▶ | Change Value | |
| [Menu] Back | | |

### 3. CAMERA

| CAMERA | | |
|---|---|---|
| ▶ | Exposure | |
| | Color | |
| | Image | |
| | Focus | |
| | Noise Reduction | |
| | Style | Soft / Default / Normal / Clarity / Bright |
| ▼▲ | Select Item | |
| ◀▶ | Change Value | |
| [Menu] Back | | |

### 3.1 EXPOSURE

| EXPOSURE | | |
|---|---|---|
| ▶ | Mode | Auto / Manual / SAE / AAE / Bright |
| | Iris | F11 ~ F1.8 / CLOSE |
| | Shutter | 1/25 ~ 1/10000 |
| | EV | ON / OFF |
| | EV Level | -7 ~ +7 |
| | BLC | ON / OFF |
| | Flicker | 50Hz / 60Hz / OFF |
| | G. Limit | 0 ~ 15 |
| | DRC | 1 ~ 8 / CLOSE |
| ▼▲ | Select Item | |
| ◀▶ | Change Value | |
| [Menu] Back | | |

### 3.2 COLOR

| COLOR | | |
|---|---|---|
| ▶ | WB Mode | Auto / 3000K / 4000K / 5000K / 6000K / 7000K / 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 | | |

### 3.3 IMAGE

The Flip function can be set, althoug 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 |
| | DZoom | ON / OFF |
| | DCI | 1 ~ 8 / Close |
| ▼▲ | Select Item | |
| ◀▶ | Change Value | |
| [Menu] Back | | |

### 3.4 FOCUS

| FOCUS | | |
|---|---|---|
| ▶ | Focus Mode | Auto / Manual / OnePush |
| | AF-Zone | Top / Center / Bottom / All |
| | AF-Sensitivity | Low / Middle / High |
| ▼▲ | Select Item | |
| ◀▶ | Change Value | |
| [Menu] Back | | |

### 3.5 NOISE REDUCTION

| NOISE REDUCTION | | |
|---|---|---|
| ▶ | NR-2D | 1 ~ 7 / Auto / OFF |
| | NR-3D | 1 ~ 8 / OFF |
| | Dynamic Hot Pixel | 1 ~ 5 / OFF |
| ▼▲ | | |
| ◀▶ | Select Item | |
| | Change Value | |
| [Menu] Back | | |

### 4. PTZ

| | | |
|---|---|---|
| PTZ | | |
| ▶ | Speed by Zoom | ON / OFF |
| | Zoom Speed | 1 ~ 8 |
| | Image Freezing | ON / OFF |
| | Acc Curve | Slow / Fast |
| ▼▲ | Select Item | |
| ◀▶ | Change Value | |
| [Menu] Back | | |

### 5. NETWORK

| | | |
|---|---|---|
| NETWORK SETTING | | |
| ▶ | DHCP | ON/ OFF |
| | IP Address | xxx.xxx.xxx.xxx |
| [Menu] Back | | |

### 6. VERSION

| | | | |
|---|---|---|---|
| VERSION | | | |
| ▶ | MCU Version | nr | date |
| | Camera Version | nr | date |
| | AF Version | nr | date |
| [Menu] Back | | | |

### 7. RESTORE DEFAULT

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

# Serial Communication Control

**COM port settings**

In default working mode, an Avonic camera is able to connect to a VISCA controller with RS-232 or RS-485 serial interface.

The camera can be controlled via RS-232, the parameters of RS-232C are as follows:

- Baud rate: 2400/4800/9600/115200
- Start bit: 1 bit.
- Data bit: 8 bits.
- Stop bit: 1 bit.
- Parity bit: none.

The camera can be controlled via RS-485, Half-duplex mode. The parameters are:

- Baud rate: 2400/4800/9600
- Start bit: 1 bit.
- Data bit: 8 bits.
- Stop bit: 1 bit.
- Parity bit: none.

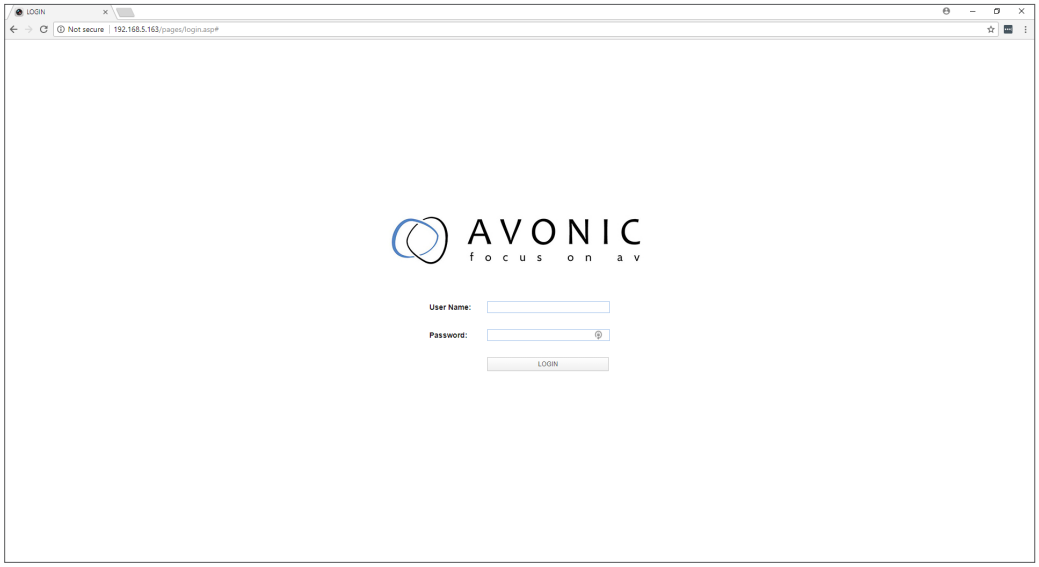
# WebGUI

The camera is equipped with a limited WebGUI to setup minimal functionality to perform a firmware upgrade.

## Login

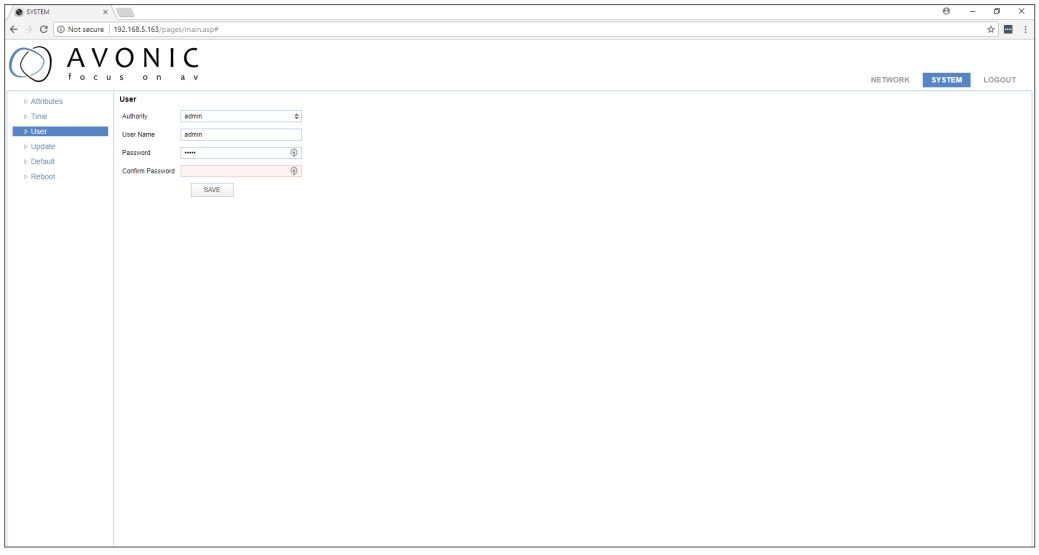
The default IP address is: **192.168.5.163**
The default username is : **admin**
The default password is : **admin**

The login screen looks like this:



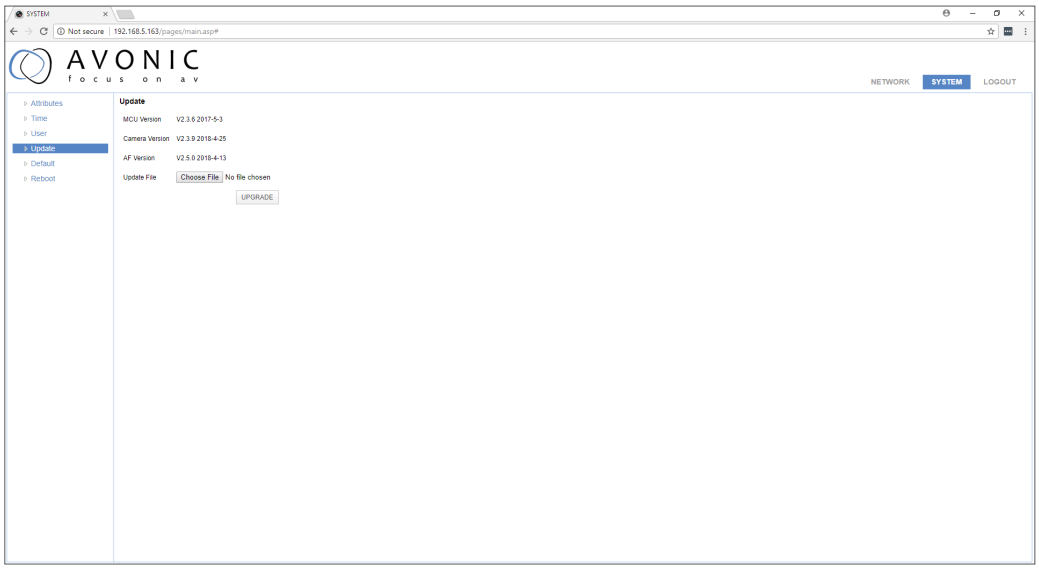

## System

In the System Tab it is possible to change username and password, perform a firmware upgrade, reset the camera to Default settings and Reboot the camera.



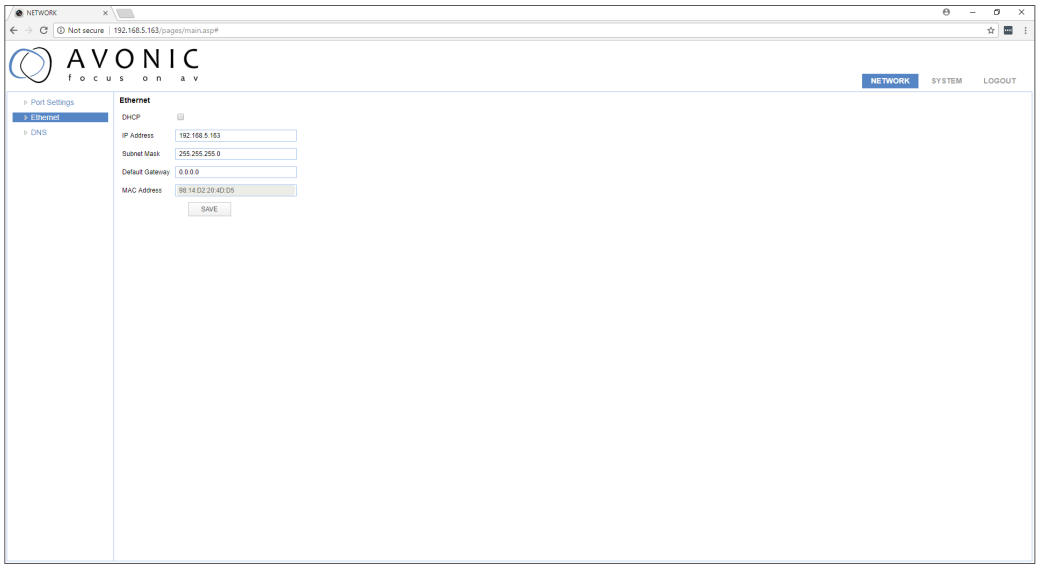
## Update

The update form gives information on the current firmware versions and the possibility to update the firmware by choosing an upgrade file provided by Avonic. Do not turn off the camera while updating.



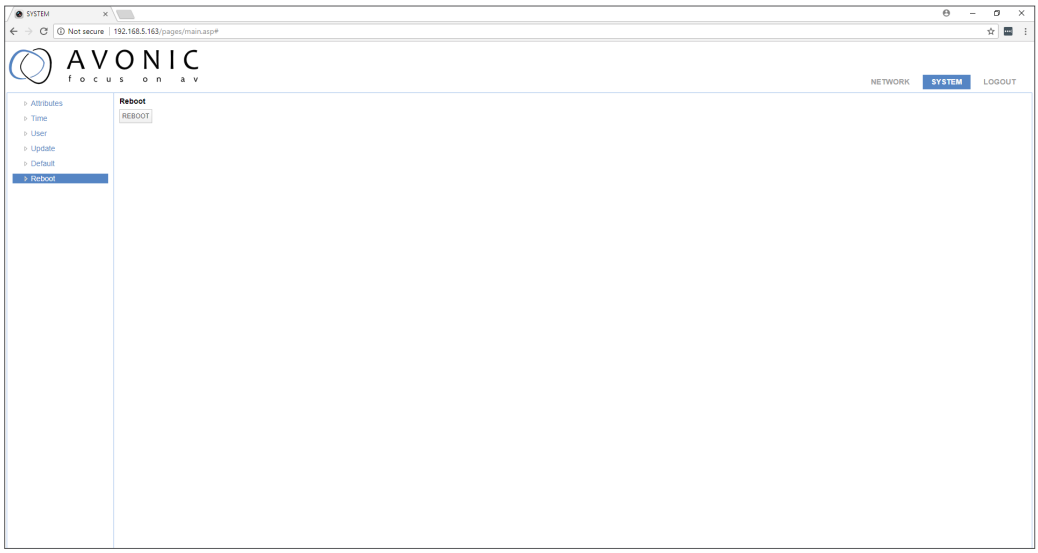

## Network

In the Network Tab network IP settings can be changed. These settings involve DHCP or fixed IP address, DNS- and port settings. Save changed settings and Reboot the camera to activate any changes.



## Reboot

If any changes made, these settings will only take effect after a reboot of the camera.



# MAINTENANCE

## Camera Maintenance

- If the camera will not be used for a long time, please turn off the power switch, disconnect AC power cord of AC adaptor to the outlet.
- Use 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 neutral detergent. Do not use any type of solvents, which may damage the surface.

## Unauthorized Use

- 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.

# TROUBLESHOOTING

## General Advice

- Turn the camera off and on again and check if the problem persists.
- Restore to Factory Default

## Power Issues

- No self-test (applies only to PTZ cameras) and no power LED
  - Check the net power
  - Check the power supply
  - Check the physical power button on the back of the camera

## Image

- No image
  - Check power of camera and monitor
  - Check video cable quality and length
  - Check if video specifications of monitor match the specs of the camera
- Abnormal image
  - Check video cable quality and length
  - Check cable connections
- Dithering or flickering image
  - Check camera fixation and nearby vibration sources
  - Check anti-flickering setting in OSD
  - Check Noise Reduction settings in OSD
- Color issues
  - Check options in OSD, like exposure, white balance, color temp, Red and Blue tuning

## Control

- No self-test (PTZ cameras only) and no power LED
  - Check the net power
  - Check the power supply
- Remote Controller does not work
  - Check power of the controller
  - Check RS-232 or RS-485 cable quality, length, polarity and network architecture
  - Check serial communication settings on both camera and controller
  - Check VISCA / PELCO address settings on both camera and controller
  - Check IP network settings on both camera and controller

## WebGUI

- Cannot enter WebGUI
  - Check network cable
  - Check if PC is in the same subnet as camera
  - Reset the factory default ip settings by pressing [*] [#] [Manual] and Reboot
- Firmware update failed
  - Check firmware file integrity, download it again.

# APPENDIX A

## VISCA Camera Return Command List

x= Camera Address [1-7]
y= Socket Number
z = Camera Address + 8
All parameter values are in HEX

| Command | Function | Command Package | Notes |
|---|---|---|---|
| **CAM_Zoom** | Stop | 8x 01 04 07 00 FF | |
| | Tele(Standard) | 8x 01 04 07 02 FF | |
| | Wide(Standard) | 8x 01 04 07 03 FF | |
| | Tele(Variable) | 8x 01 04 07 2p FF | p = 0(low) - 7(high) |
| | Wide(Variable) | 8x 01 04 07 3p FF | |
| | Direct | 8x 01 04 47 0p 0q 0r 0s FF | pqrs: Zoom Position |
| **CAM_Focus** | Stop | 8x 01 04 08 00 FF | |
| | Far(Standard) | 8x 01 04 08 02 FF | |
| | Near(Standard) | 8x 01 04 08 03 FF | |
| | Far(Variable) | 8x 01 04 08 2p FF | p = 0(low) - 7(high) |
| | Near(Variable) | 8x 01 04 08 3p FF | |
| | Direct | 8x 01 04 48 0p 0q 0r 0s FF | pqrs: Focus Position |
| | 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 |
| **CAM_ZoomFocus** | Direct | 8x 01 04 47 0p 0q 0r 0s 0t 0u 0v 0w FF | pqrs: Zoom Position<br>p=0-4 qrs=0-F<br>tuvw: 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 |

| | | | |
|---|---|---|---|
| **CAM_RGain** | Reset | 8x 01 04 03 00 FF | Manual Control of R Gain |
| | Up | 8x 01 04 03 02 FF | |
| | Down | 8x 01 04 03 03 FF | |
| | Direct | 8x 01 04 43 00 00 0p 0q FF | pq: R Gain |
| **CAM_Bgain** | Reset | 8x 01 04 04 00 FF | Manual Control of B Gain |
| | 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_SlowShutter** | AutoSlowShutterLimit | 8x 01 04 2A 0p 00 FF | |
| **CAM_Iris** | Reset | 8x 01 04 0B 00 FF | Iris Setting |
| | Up | 8x 01 04 0B 02 FF | |
| | Down | 8x 01 04 0B 03 FF | |
| | Direct | 8x 01 04 4B 00 00 0p 0q FF | pq: Iris Position |
| **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** | 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 | 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 |
| 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 | ND2D 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 Pixel Setting (0: 0ff, level 1 to 6) |
| CAM_ApertureMode (automatic sharpness adjustment if iris aperture is changed) | Auto | 8x 01 04 05 02 FF | Sharpness Auto |
| | Manual | 8x 01 04 05 02 FF | Sharpness Manual |
| CAM_Sharpness | Reset | 8x 01 04 02 00 FF | Sharpness 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: Sharpness Gain (00~0F) |
| CAM_PictureEffect | Off | 8x 01 04 63 00 FF | Picture Effect Setting |
| | B&W | 8x 01 04 63 04 FF | |
| CAM_Memory | Reset | 8x 01 04 3F 00 pp FF | pp: Memory Number(=00 to FE) |
| | 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 Horizontal On/Off |
| | Off | 8x 01 04 61 03 FF | |
| CAM_PictureFlip | On | 8x 01 04 66 02 FF | Image Flip Vertical On/Off |
| | Off | 8x 01 04 66 03 FF | |
| CAM_ColorGain | Direct | 8x 01 04 49 00 00 00 pp FF | pp: Color Gain setting 00 (60%) to 0E -200% |
| SYS_Menu | Off | 8x 01 06 06 03 FF | OSD Off |
| | On | 8x 01 06 06 02 FF | OSD On |

| | | | |
|---|---|---|---|
| **Pan_tiltDrive** | Up | 8x 01 06 01 VV WW 03 01 FF | VV: Pan speed 01h (low speed) to 18h (high speed)<br><br>WW: Tilt speed 01h (low speed) to 14h (high speed)<br><br>YYYY: Pan Position<br><br>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 v0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF | |
| | Home | 8x 01 06 04 FF | |
| | Reset | 8x 01 06 05 FF | |
| **Pan_tiltLimitSet** | LimitSet | 8x 01 06 07 00 0W 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF | W: 1 UpRight<br>0: DownLeft<br><br>YYYY: Pan Limit Position<br><br>ZZZZ: Tilt Position |
| | LimitClear | 8x 01 06 07 01 0W 07 0F 0F 0F 07 0F 0F 0F FF | |
| **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 | |
| | Flip-H | 8x 01 04 A4 01 FF | |
| | Flip-V | 8x 01 04 A4 02 FF | |
| | Flip-HV | 8x 01 04 A4 03 FF | Single Command For Video Flip |
| **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_AWBSensitivit y** | 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 | AutoFocus Zone 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 setting 0h (- 14 dgrees) to Eh ( +14 degrees |

## VISCA Query Command List

x= Camera Address
y= Socket Number
z = Camera Address + 8
All parameter values are in HEX

| Command | Command Package | Return Package | Note |
|---|---|---|---|
| CAM_PowerInq | 8x 09 04 00 FF | y0 50 02 FF | On |
| | | y0 50 03 FF | Off(Standby) |
| | | y0 50 04 FF | Internal power circuit error |
| CAM_ZoomPosInq | 8x 09 04 47 FF | y0 50 0p 0q 0r 0s FF | pqrs: Zoom Position |
| CAM_FocusAFModeInq | 8x 09 04 38 FF | y0 50 02 FF | Autofocus |
| | | y0 50 03 FF | Manual Focus |
| CAM_FocusPosInq | 8x 09 04 48 FF | y0 50 0p 0q 0r 0s FF | pqrs: Focus Position |
| CAM_WBModeInq | 8x 09 04 35 FF | y0 50 00 FF | Auto |
| | | y0 50 01 FF | Indoor mode |
| | | y0 50 02 FF | Outdoor mode |
| | | y0 50 03 FF | OnePush mode |
| | | y0 50 05 FF | Manual |
| CAM_RGainInq | 8x 09 04 43 FF | y0 50 00 00 0p 0q FF | pq: R Gain |
| CAM_BGainInq | 8x 09 04 44 FF | y0 50 00 00 0p 0q FF | pq: B Gain |
| CAM_AEModeInq | 8x 09 04 39 FF | y0 50 00 FF | Full Auto |
| | | y0 50 03 FF | Manual |
| | | y0 50 0A FF | Shutter priority |
| | | y0 50 0B FF | Iris priority |
| | | y0 50 0D FF | Bright |
| CAM_ShutterPosInq | 8x 09 04 4A FF | y0 50 00 00 0p 0q FF | pq: Shutter Position |
| CAM_IrisPosInq | 8x 09 04 4B FF | y0 50 00 00 0p 0q FF | pq: Iris Position |
| CAM_BrightPosInq | 8x 09 04 4D FF | y0 50 00 00 0p 0q FF | pq: Bright Position |
| CAM_ExpCompModeInq | 8x 09 04 3E FF | y0 50 02 FF | On |
| | | y0 50 03 FF | Off |
| CAM_ExpCompPosInq | 8x 09 04 4E FF | y0 50 00 00 0p 0q FF | pq: ExpComp Position |
| CAM_BacklightModeInq | 8x 09 04 33 FF | y0 50 02 FF | On |
| | | y0 50 03 FF | Off |
| CAM_Noise2DModeInq | 8x 09 04 50 FF | y0 50 02 FF | Auto Noise 2D |
| | | y0 50 03 FF | Manual Noise 3D |

| | | | |
|---|---|---|---|
| CAM_Noise2DLevel | 8x 09 04 53 FF | y0 50 0p FF | Noise Reduction (2D)<br>p: 0 to 5 |
| CAM_Noise3DLevel | 8x 09 04 54 FF | y0 50 0p FF | Noise Reduction (3D)<br>p: 0 to 8 |
| CAM_FlickerModeInq | 8x 09 04 55 FF | y0 50 0p FF | p: Flicker Settings(0: OFF, 1: 50Hz, 2: 60Hz) |
| CAM_ApertureModeInq(Sharpness) | 8x 09 04 05 FF | y0 50 02 FF | Auto Sharpness |
| | | y0 50 03 FF | Manual Sharpness |
| CAM_ApertureInq(Sharpness) | 8x 09 04 42 FF | y0 50 00 00 0p 0q FF | pq: Aperture Gain |
| CAM_PictureEffectModeInq | 8x 09 04 63 FF | y0 50 02 FF | Off |
| | | y0 50 04 FF | B&W |
| CAM_MemoryInq | 8x 09 04 3F FF | y0 50 0p FF | p: Memory number last operated. |
| SYS_MenuModeInq | 8x 09 06 06 FF | y0 50 02 FF | On |
| | | y0 50 03 FF | Off |
| CAM_LR_ReverseInq | 8x 09 04 61 FF | y0 50 02 FF | On |
| | | y0 50 03 FF | Off |
| CAM_PictureFlipInq | 8x 09 04 66 FF | y0 50 02 FF | On |
| | | y0 50 03 FF | Off |
| CAM_RegisterValueInq | 8x 09 04 24 mm FF | y0 50 0p 0p ff | mm: Register No. (00 to FF) pp: Register Value (00 to FF) |
| CAM_ColorGainInq | 8x 09 04 49 FF | y0 50 00 00 00 0p FF | p: Color Gain setting 0h (60%) to Eh (200%) |
| CAM_IDInq | 8x 09 04 22 FF | y0 50 0p 0q 0r 0s FF | pqrs: Camera ID |
| CAM_VersionInq | 8x 09 00 02 FF | y0 50 ab cd mn pq rs tu vw FF | ab: Factory Code<br>cd: Hardware Version<br>mnpq: ARM Version<br>rstu: FPGA Version<br>vw: Camera model<br>01: C Type<br>02: M Type<br>03: S Type |
| VideoSystemInq | 8x 09 06 23 FF | y0 50 00 FF | 1920x1080i60 |
| | | y0 50 01 FF | 1920x1080p30 |
| | | y0 50 02 FF | 1280x720p60 |
| | | y0 50 04 FF | NTSC |
| | | y0 50 05 FF | NTSC |
| | | y0 50 06 FF | NTSC |
| | | y0 50 07 FF | 1920x1080p60 |
| | | y0 50 08 FF | 1920x1080i50 |
| | | y0 50 09 FF | 1920x1080p25 |

| | | | |
|---|---|---|---|
| | | y0 50 0A FF | 1280x720p50 |
| | | y0 50 0C FF | PAL |
| | | y0 50 0D FF | PAL |
| | | y0 50 0E FF | PAL |
| IR_Receive | 8x 09 06 08 FF | y0 50 02 FF | On |
| | | y0 50 03 FF | Off |
| Pan-tiltMaxSpeedInq | 8x 09 06 11 FF | y0 50 ww zz FF | ww: Pan Max Speed<br>zz: Tilt Max Speed |
| Pan-tiltPosInq | 8x 09 06 12 FF | y0 50 0w 0w 0w 0w 0z 0z 0z 0z FF | wwww: Pan Position<br>zzzz: Tilt Position |
| CAM_TypeInq | 8x 09 00 03 FF | y0 50 01 FF | C Type |
| | | y0 50 02 FF | M Type |
| | | y0 50 03 FF | S Type |
| CAM_DateInq | 8x 09 00 04 FF | y0 50 0r ss uu uu vv ww 0D FF | Version information<br>r: Big Version Number<br>ss: Little Version Number<br>uuuu: Year<br>vv: Month<br>ww: Day |
| CAM_ModeInq | 8x 09 04 A6 FF | y0 50 00 FF | Mode0 |
| | | y0 50 02 FF | Mode2 |
| CAM_GainLimitInq | 8x 09 04 2C FF | y0 50 0q FF | p: Gain Limit |
| CAM_DHotPixelInq | 8x 09 04 56 FF | y0 50 0q FF | p: Dynamic Hot Pixel Setting (0: 0ff, level 1 to 6) |
| CAM_AFSensitivityI nq | 8x 09 04 58 FF | y0 50 01 FF | High |
| | | y0 50 02 FF | Normal |
| | | y0 50 03 FF | Low |
| CAM_BrightnessInq | 8x 09 04 A1 FF | y0 50 00 00 0p 0q FF | pq: Brightness Position |
| CAM_ContrastInq | 8x 09 04 A2 FF | y0 50 00 00 0p 0q FF | pq: Contrast Position |
| CAM_FlipInq | 8x 09 04 A4 FF | y0 50 00 FF | Off |
| | | y0 50 01 FF | Flip-H |
| | | y0 50 02 FF | Flip-V |
| | | y0 50 03 FF | Flip-HV |
| CAM_DRCInq | 8x 09 04 A7 FF | y0 50 00 00 0p 0q FF | pq: DRC Position |
| CAM_AFZone | 8x 09 04 AA FF | y0 50 00 FF | Top |
| | | y0 50 01 FF | Center |
| | | y0 50 02 FF | Bottom |
| CAM_ColorHueInq | 8x 09 04 4F FF | y0 50 00 00 00 0p FF | p: Color Hue setting 0h (- 14 degrees) to Eh ( +14 degrees |

## Pelco-D Protocol Command List

| Function | Byte1 | Byte2 | Byte3 | Byte4 | Byte5 | Byte6 | Byte7 |
|---|---|---|---|---|---|---|---|
| Up | 0xFF | Address | 0x00 | 0x08 | Pan Speed | Tilt Speed | SUM |
| Down | 0xFF | Address | 0x00 | 0x10 | Pan Speed | Tilt Speed | SUM |
| Left | 0xFF | Address | 0x00 | 0x04 | Pan Speed | Tilt Speed | SUM |
| Right | 0xFF | Address | 0x00 | 0x02 | Pan Speed | Tilt Speed | SUM |
| Zoom In | 0xFF | Address | 0x00 | 0x20 | 0x00 | 0x00 | SUM |
| Zoom Out | 0xFF | Address | 0x00 | 0x40 | 0x00 | 0x00 | SUM |
| Focus Far | 0xFF | Address | 0x00 | 0x80 | 0x00 | 0x00 | SUM |
| Focus Near | 0xFF | Address | 0x01 | 0x00 | 0x00 | 0x00 | SUM |
| Set Preset | 0xFF | Address | 0x00 | 0x03 | 0x00 | Preset ID | SUM |
| Clear Preset | 0xFF | Address | 0x00 | 0x05 | 0x00 | Preset ID | SUM |
| Call Preset | 0xFF | Address | 0x00 | 0x07 | 0x00 | Preset ID | SUM |
| Auto Focus | 0xFF | Address | 0x00 | 0x2B | 0x00 | 0x01 | SUM |
| Manual Focus | 0xFF | Address | 0x00 | 0x2B | 0x00 | 0x02 | SUM |
| Query Pan Position | 0xFF | Address | 0x00 | 0x51 | 0x00 | 0x00 | SUM |
| Query Pan Position Response | 0xFF | Address | 0x00 | 0x59 | Value High Byte | Value Low Byte | SUM |
| Query Tilt Position | 0xFF | Address | 0x00 | 0x53 | 0x00 | 0x00 | SUM |
| Query Tilt Position Response | 0xFF | Address | 0x00 | 0x5B | Value High Byte | Value Low Byte | SUM |
| Query Zoom Position | 0xFF | Address | 0x00 | 0x55 | 0x00 | 0x00 | SUM |
| Query Zoom Position Response | 0xFF | Address | 0x00 | 0x5D | Value High Byte | Value Low Byte | SUM |

## Pelco-P Protocol Command List

| Function | Byte1 | Byte2 | Byte3 | Byte4 | Byte5 | Byte6 | Byte7 | Byte8 |
|---|---|---|---|---|---|---|---|---|
| Up | 0xA0 | Address | 0x00 | 0x08 | Pan Speed | Tilt Speed | 0xAF | XOR |
| Down | 0xA0 | Address | 0x00 | 0x10 | Pan Speed | Tilt Speed | 0xAF | XOR |
| Left | 0xA0 | Address | 0x00 | 0x04 | Pan Speed | Tilt Speed | 0xAF | XOR |
| Right | 0xA0 | Address | 0x00 | 0x02 | Pan Speed | Tilt Speed | 0xAF | XOR |
| Zoom In | 0xA0 | Address | 0x00 | 0x20 | 0x00 | 0x00 | 0xAF | XOR |
| Zoom Out | 0xA0 | Address | 0x00 | 0x40 | 0x00 | 0x00 | 0xAF | XOR |
| Focus Far | 0xA0 | Address | 0x00 | 0x80 | 0x00 | 0x00 | 0xAF | XOR |
| Focus Near | 0xA0 | Address | 0x01 | 0x00 | 0x00 | 0x00 | 0xAF | XOR |
| Set Preset | 0xA0 | Address | 0x00 | 0x03 | 0x00 | Preset ID | 0xAF | XOR |
| Clear Preset | 0xA0 | Address | 0x00 | 0x05 | 0x00 | Preset ID | 0xAF | XOR |
| Call Preset | 0xA0 | Address | 0x00 | 0x07 | 0x00 | Preset ID | 0xAF | XOR |
| Auto Focus | 0xA0 | Address | 0x00 | 0x2B | 0x00 | 0x01 | 0xAF | XOR |
| Manual Focus | 0xA0 | Address | 0x00 | 0x2B | 0x00 | 0x02 | 0xAF | XOR |
| Query Pan Position | 0xA0 | Address | 0x00 | 0x51 | 0x00 | 0x00 | 0xAF | XOR |
| Query Pan Position Response | 0xA0 | Address | 0x00 | 0x59 | Value High Byte | Value Low Byte | 0xAF | XOR |
| Query Tilt Position | 0xA0 | Address | 0x00 | 0x53 | 0x00 | 0x00 | 0xAF | XOR |
| Query Tilt Position Response | 0xA0 | Address | 0x00 | 0x5B | Value High Byte | Value Low Byte | 0xAF | XOR |
| Query Zoom Position | 0xA0 | Address | 0x00 | 0x55 | 0x00 | 0x00 | 0xAF | XOR |
| Query Zoom Position Response | 0xA0 | Address | 0x00 | 0x5D | Value High Byte | Value Low Byte | 0xAF | XOR |

# APPENDIX B DIMENSIONS