Marshall

Broadcast A/V Division

CV612-TWI/CV612-TBI

12x AI Auto Track and Framing PTZ Camera

User Manual

Table of Contents

Please Note

This manual details features, functions, installation, operation and recommendations. Please read this manual completely before installation and use.

Description of use

1. To prevent damage to this camera or other components within the workflow, please use it within its prescribed purpose and scope of operation.
2. Keep the device away from rain, moisture, or heavy humidity.
3. To prevent electric shock or damage to internal components, do not open the main case; only qualified technicians should conduct repairs.
4. Do not use the device beyond its temperature, humidity or power supply specifications.
5. When cleaning the camera lens, use a soft dry cloth. If dirt is harder to remove please use only a damp cloth or lens cleaning cloth. Do not use detergent, it may cause chemical residue to remain.

Careful handing

6. Avoid damage from heavy pressure, strong vibration or immersion during transportation, storage and installation.
7. It is preferred to carry the camera by its base and not the camera head, as this could lead to mechanical malfunction and damage internal mechanisms.
8. The product outer shell is made of organic materials. Do not use strong solvents such as acetone for cleaning. Always test any cleaning substances in a small area.
Power supply polarity
9. This camera uses DC 12V power supply. Accepted voltage range is +/- 10%.
Center pin is positive (+).

   The camera can also be powered over Ethernet. Check that the IP router, switch or power injector is rated PoE+

Install with care

10. This product should be placed on a stable desktop or other horizontal surfaces. It may also be mounted upside down from ceiling or other structure. It should always be installed in a level position relative to the subject as there are no image rotation correction adjustments.
11. During installation, ensure that there are no obstacles within rotation range of the head to limit its pan/tilt movements.
12. Ensure that there is no physical interference before powering on.
Do not disassemble the product without permission from manufacturer.
13. This product contains no parts which can be repaired in field or at site. Any damage arising from disassembly will void the product warranty

Magnetic field interference

14. Magnetic fields within a specific frequency may affect camera video images; this is an FCC Class A product intended for commercial or industrial use.

1. Installation – Key Points

1.1 Mounting Points and Connections

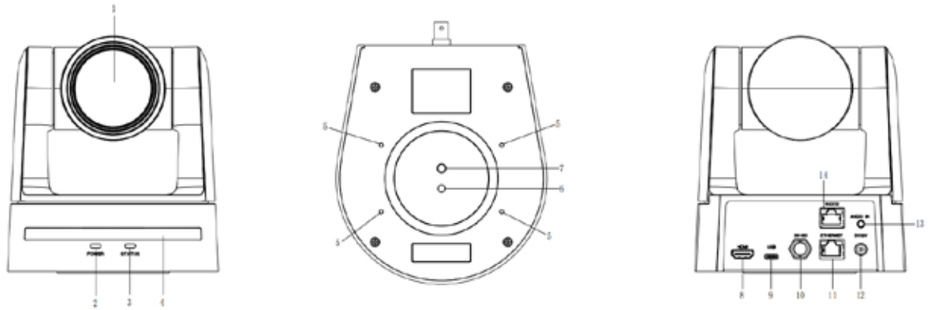


Figure1-1 Camera Physical Features

1. Lens	8. HDMI output interface
2. Power indicator	9. USB3.0 Type-C interface
3. Status indicator	10. 3G-SDI output interface
4. Infrared receiver	11. Ethernet interface
5. M3 mounting holes	12. DC12V input
6. Positioning hole	13. Audio input interface
7. 1/4”-20 UNC threaded mounting hole	14. RS232 interface

1.2 Power-ON initial setup (boot up)

1) **Power ON**: Connect the DC12V power supply included in box to power outlet and camera power input. Alternatively, connect the Ethernet port to a Router, Switch or Injector that is rated PoE+.

2) **Initial configuration:** Once powered up the power indicator light will start blinking, camera head will move from bottom left to the bottom, and then moves to the **HOME** position (horizontal and vertical center), while the camera module boots up. Self-test and boot up is complete when the **STATUS** light stops blinking and turns Green.

Note:

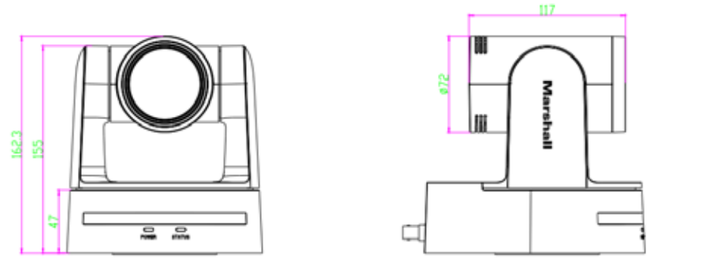
1. The default IR address of the camera and remote controller is #1 Press the Camera Select #1 button on the remote for first use.

2. Camera Preset positions may be saved and recalled via the Remote Control. If a Preset has been saved in position 0, that preset becomes the new **HOME** position the next time the camera is powered up.

2. Product overview

2.1 Dimensions & Accessories

2.1.1 Dimensions



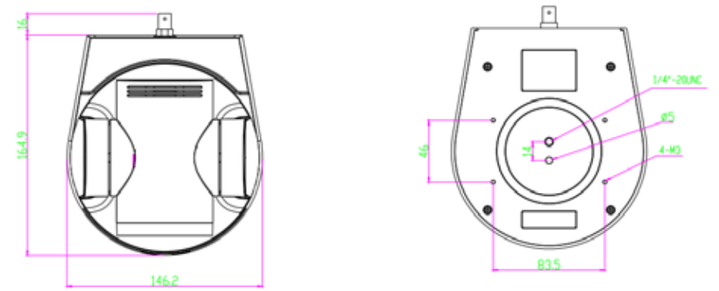


Figure 2.2 Camera dimensions

2.1.2 Supplied Accessories

During unpacking, please check that all the supplied accessories are included:

Power adapter – 12Volt
IR remote control
USB 3.0 Type-C Cable
“Thank You” card

2.2 Main Features

The CV612-TBI/TWI camera series offers high quality performance with a rich feature set. The features include advanced ISP processing algorithms to provide vivid images with deep color depth, crisp, and clear HD images with accurate color reproduction. The CV612 also supports advanced H.265/H.264 encoding which creates smooth IP video performance and clear images under less-than-ideal bandwidth conditions. In addition, the CV612 model supports AI image tracking that follows presenters accurately and smoothly. Video / audio outputs include 3G SDI, HDMI, Ethernet IP Stream and USB 3.0 compatible with many applications.

- **True High-Definition Image:** Built around a 1/2.8-inch-high quality, 2.07 megapixel CMOS sensor supporting resolutions and frame rates up to 1920x1080p at 60 fps.
- **Optical Zoom Lens:** 12X zoom lens ranges from 6.6° to a wide 70° Angle of View.
- **Leading Auto Focus Technology:** Cutting-edge auto focus algorithms makes for fast, accurate and stable auto-focus.
- **High SNR (signal-to-noise ratio):** The Low Noise CMOS imager ensures high SNR at the output
- Advanced noise reduction technology is also used while ensuring image sharpness.
- **Quiet PTZ**: With high-accuracy step motor technology, camera movement is quiet with smooth maneuvers and fast accurate destination presets.
- **Video Outputs:** Supports simultaneous 3G-SDI, HDMI, IP Streaming and USB 3.0 outputs. Note: for all outputs to function at the same time, the USB output (if used) should match the SDI output format/frame rate.
- **Multiple Compression types:** Supports high quality H.265/H.264/MJPEG video compression options for streaming.
- **Audio Input Interface:** A Stereo 3.5mm jack is provided for audio input. Input audio processing supports 48Khz/16-bit sampling. Streaming supports AAC audio coding. Analog audio input, when enabled, is embedded in all video outputs.
- **Multiple Network Protocol Support:** ONVIF, RTSP, RTMP, SRT protocols. RTP, MPEG-TS, UDP, Dante AV-H stream types.
- **Multiple Control Protocol Support:** Serial RS232 control supports VISCA, Pelco-D or Pelco-P with auto detection. Ethernet IP control is available via VISCA-over-IP, ONVIF, Dante AV-H and Web Browser.
- **Preset Positions:** Up to 10 Presets may be stored quickly via the IR Remote Control and up to 255 presets via IP control including Web Browser, a PTZ controller such as the Marshall VS-PTC-300 as well as 3rd-party controllers and applications.
- **AI tracking in 2 modes:** Real-time single-object “Monocular tracking” or 4-region tracking up to 8 meters (26 feet).

2.3 Technical specifications

Camera Specs	
Optical / Digital Zoom	12X (focal length 4.13～49.2mm) + approximately 8X digital Digital zoom. When digital zoom is enabled, it applies only after the optical zoom has reached its limit
Sensor	1/2.8-inch-high quality HD CMOS sensor
Effective Pixels Video Format	2.07 megapixel imager provides the following outputs **Available 3G-SDI / HDMI video formats and frame rates** 1920 x 1080p @ 60/59.94/50/30/29.97/25 fps 1920 x 1080i @ 60/59.94/50 fps 1280 x 720p @ 60/59.94/50 fps **Via USB 3.0 to PC** 1920 x 1080 @ 60/50/30/25 fps 1280 x 720 @ 60/50/30/25 fps 960 x 540 @ 30 fps 800 x 600 @ 30 fps 640 x 480 @ 30 fps **Via USB 2.0 to PC** 960 x 540 @ 30fps 800 x 600 @ 30 fps 720 x 576 @ 30 fps 720 x 480 @ 30 fps 640 x 480 @ 30 fps
Lens Viewing Angle	70.3° (wide) through 6.6° (telephoto)
Minimum Illumination	0.5 Lux (F1.8, AGC ON)
DNR	2D & 3D DNR
White Balance Modes	Auto / Manual / One Push / VAR (color temp selection)
Focus Modes	Auto / Manual / One Push
Iris Settings	Close/F11/9.6/8.0/6.8/5.6/4.8/4.0/3.4/2.8/2.4/2.0/1.8
Electronic Shutter Settings	Auto/Manual: 1/60, 1/90, 1/100, 1/125, 1/180, 1/250, 1/350, 1/500 1/725, 1/1000, 1/1500, 1/2000, 1/3000, 1/4000, 1/6000, 1/10000
BLC (back light comp)	ON/OFF
Video Adjustment Types	Brightness, Saturation, Contrast, Sharpness, Hue B/W mode: (color On / Off) i.e. not “night” or “IR” mode
SNR	>50dB
Input/ Output Interface	
Available Video Outputs	3G/HD-SDI, HDMI, Ethernet stream, USB 3.0 / 2.0 (YUY2 sampled)
Video Compression Format	MJPEG, H.264, H.265
Audio Input Interface	Two-channel line level on 3.5mm jack
Audio Output	Embedded into SDI, HDMI, Ethernet stream and USB
Audio Compression Format	AAC (for Ethernet stream and USB)
IP Interface	IP port, 1 Gigabit Ethernet via RJ45 jack
Network Protocol	RTSP/RTMP, ONVIF, SRT, Dante AV-H

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2.3 Technical specifications

IP Control Interface	Visca-over-IP, ONVIF
Serial Control Protocol	RS232 via RJ45 connector Supports: Visca, Pelco D, Pelco P protocols Baud Rates: 115200/38400/9600/4800/2400 (9600 Default)
Power Interface	PoE+ Ethernet or HEC3800 coaxial connector DC12V
Supply Adapter	AC 110V-AC 220V to DC12V / 2A (included with camera)
Input Voltage Range	DC12V±10%
Input Current	1.25A (Max)
Consumption	15W (Max)
PTZ Parameters	
Pan Rotation	340 degrees of pan (+/-170°) from default HOME position
Tilt Rotation	180 degrees of tilt (+/- 90°) from default HOME position
Pan Control Speed Range	0.42°/s ~ 60.32°/s
Tilt Control Speed Range	0.27°/s ~ 40.34°/s
Preset Speed	Pan: 60°/sec, Tilt: 30°/sec
Preset Number	255 presets possible, 10 presets by remote controller
AI Tracking	
	Realtime Single-Object “Monocular” tracking or 4-Region tracking
Other Parameters	
Store Temperature	-10℃～+70℃ -50 F ～+158 F
Store Humidity	20% - 90%
Working Temperature	-10℃～+50℃ -50 F ～ +122 F
Working Humidity	20% - 80%
Dimension	162.3mm x 146.2mm x 164.9mm (Height, Width, Length) 6.4 inches x 5.75 inches x 6.5 inches
Weight	1.49 kg / 3.30 lbs
Use Environment	Indoor
Accessories in Box	Power adapter, IR remote controller, USB 3.0 Type-C cable, Thank You card

3. Remote Control & On-Screen Menus

3.1 Remote Control Keys

3.1.1 Key Explanations

1. Standby Key (power button)

Press for 3 seconds, the camera will go into standby mode (low power mode). Press 3 seconds again to wake the camera. Camera will self-test and move to HOME position which is level and straight forward. Note: If Preset #0 has been save, that will be the HOME position.

2. Camera Select

Press a button 1-4 to select which camera to control

3. Number Key 0-9

Used to Set or Recall a PTZ presets

4, * and # Keys

These two keys are used for special short-cut operations. See Short-Cuts below.

5. Focus Control Keys

Auto Focus: Press the red AUTO button to put the camera in Auto Focus mode

Manual Focus: Press the blue MAN button to put the camera in Manual Focus mode

Press FOCUS + or FOCUS - to make manual focus adjustments

6. Zoom Control Key

Press ZOOM＋ to zoom in

Zoom－to zoom out

7. Set Preset and Clear Preset keys:

Press SET PRESET then a 0-9 number key to save the current PTZ settings

Press CLEAR PRESET then a 0-9 number key to clear a saved preset

To clear all saved presets, press the # key three times

8. Pan/Tilt Control Keys (circle with four arrow symbols)

Press Up ▲ Down ▼ Left ◀ Right ▼to move the camera in that direction

(Video image will move the opposite direction)

Press the HOME key to return the camera to the middle position

(The HOME key is also as the “Return” key in the menu system)

9. BLC ON/OFF Key (back light compensation)

Compensates the exposure where the subject is in front of a window, white board, etc. Press once to turn compensation ON, press again to turn it OFF

10. MENU Key

Press to display the on-screen menu system (OSD) on the video output

Press once to enter the menu system, press again to exit the menus.

The Menu key also acts as a “back” button to move back to a previous menu item

11. F1 – F4 Keys

Press F1 to turn Auto Tracking off

Press F2 to turn Auto Tracking on

Press F3 to switch between Single Object tracking and Regional tracking modes

Press F4 to capture new target object (person) for Single Object tracking

3.1.2 Short-cuts & special functions

The following functions may be quickly activated by pressing certain keys in sequence (not at same time).

Camera IR Remote Address Setting

Sets which camera is controlled by each CAMERA SELECT buttons 1-4.

*	#	F1	Set Camera to Address 1
*	#	F2	Set Camera to Address 2
*	#	F3	Set Camera to Address 3
*	#	F4	Set Camera to Address 4

Assuming the camera currently responds to Camera Select button 1, pressing ***** then **#** then **F2** will change the camera response to **Camera Select** button 2 and not button 1 any longer.

NOTE: This resets only the camera Remote ID number not Visca or Pelco ID address.

Special Key Combination Functions

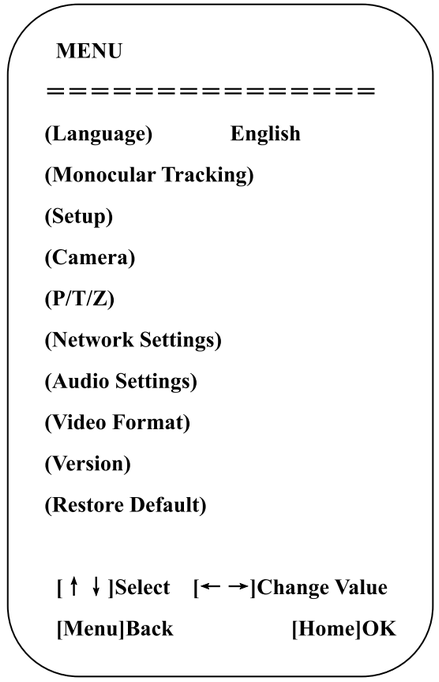
#	#	#	Clear all Presets
*	#	9	Flip Camera Image
*	#	6	Reset to Factory Defaults except ID, Password and IP Address
*	#	MAN	Reset to Factory Defaults including ID, Password and IP Address
*	#	4	Set Menu to English
*	#	3	Set Menu to Chinese
*	#	AUTO	Put camera into constant motion
#	*	AUTO	Stop constant motion

Change video output format (HDMI and SDI)

#	#	0	Set 1080p60
#	#	1	Set 1080p50
#	#	2	Set 1080i60
#	#	3	Set 1080i50
#	#	4	Set 720p60
#	#	5	Set 720p50
#	#	6	Set 1080p30
#	#	7	Set 1080p25
#	#	8	Set 720p30
#	#	9	Set 720p25

3.2 ON-SCREEN MENUS

Press the **MENU** key to display the On-Screen (OSD) menus. Use up/down arrows to move to a menu item and press **HOME** to select it. To back up to the previous step, press the **MENU** key.



Use **[↑↓] Select**: to move to a menu item. Use **[← →]** to change value or **HOME** to accept

3.2.1 Language

Move the pointer to **LANGUAGE**, press the **HOME** key to set language for on-screen menus

Select English or Chinese Default is English

3.2.2 Monocular Tracking (single-object tracking)

Move the pointer to **MONOCULAR TRACKING**, press the **HOME** key to set auto tracking

```
Monocular Tracking
==================
Tracking                OFF

[↑ ↓]Select [← →]Change Value
[Menu]Back
```

ıcking: select ON/OFF

ıcking Mode: select between Real-time Tracking (single object) and Region Tracking.

ɾget Display: presents an outline overlay on-screen to indicate the area the camera is tracking

```
Monocular Tracking
==================
Tracking            ON
Tracking Mode       Real-time Tracking
Target Display      OFF

[↑ ↓]Select [← →]Change Value
[Menu]Back
```

3.2.4 Camera

Move the pointer to **CAMERA**, press the HOME key to adjust the camera's image settings.

```
CAMERA
==================
(Exposure)
(Color)
(Image)
(Focus)
(Noise Reduction)
Style               Default
```

1)EXPOSURE

Move the pointer to the **EXPOSURE** menu, press the HOME key to adjust the camera's light sensitivity.
First, select a **MODE.**

```
EXPOSURE
==================
Mode                Auto
EV                  OFF
BLC                 OFF
Flicker             50Hz
G.Limit             7
DRC                 2

[↑↓]Select  [← →]Change Value
Menu Back
```


3.2.3 Setup

Move the pointer to **SETUP**, press the **HOME** key then adjust RS232 communication settings.

```
SETUP
==================
Protocol            Auto
Visca Address       1
PELCO-P Address     1
PELCO-D Address     1
Baudrate            9600
Auto Flip           OFF
Standby Mode        OFF

[↑ ↓]Select  [← →]Change Value
[Menu]Back
```

PROTOCOL: VISCA / Pelco-P / Pelco-D / Auto (In Auto mode, the camera can distinguish between Visca and Pelco protocols.)

Visca Address: Assign the address from 1 to 7

PELCO-P Address: Assign the address from 1 to 255

PELCO-D Address: Assign the address from 1 to 255

Baud rate: Select the desired communication rate: 2400/4800/9600/38400/115200 Default is 9600

Auto Flip: ON/OFF When auto is ON, image will automatically flip if camera is mounted upside down

Standby Mode: When Standby is ON, the camera will rotate into a lens-down position but remain powered. This is a privacy feature that keeps the camera from capturing an image accidentally. This feature is intended to work with the USB connection. When an application accesses the camera's USB output (via UVC protocol), the camera will exit Standby Mode and automatically return to normal operation. (**Note:** This is not the same Standby mode that happens when the power button is pressed for 3 seconds.)

Mode Choices: Auto, Manual, Shutter priority, Iris priority and Bright.

In any camera, there are multiple ways to adjust the amount of light that is received by the imager. Each method has certain trade-offs.

When one of the **Priority modes** is selected, that one method of light control is adjusted manually while other methods adjust themselves to produce a balance.

Auto Mode: The camera produces a balanced exposure while automatically compensating for changing lighting conditions.

Manual Mode: All exposure settings are adjustable manually and individually

Shutter Priority Mode: Set exposure by adjusting shutter time.

Available shutter speeds vary with camera frame rate.

For Frame rate 60 or 59.

Choose: 1/60, 1/90, 1/100, 1/125, 1/180, 1/250, 1/350, 1/500, 1/725, 1/1000, 1/1500, 1/2000, 1/3000, 1/4000, 1/6000, 1/10000

For Frame rate 50

Choose: 1/50, 1/75, 1/100, 1/120, 1/150, 1/215, 1/300, 1/425, 1/600, 1/1000, 1/1250, 1/1750, 1/2500, 1/3500, 1/6000, 1/10000

For Frame rate 30

Choose: 1/30, 1/60, 1/90, 1/100, 1/125, 1/180, 1/250, 1/350, 1/500, 1/725, 1/1000, 1/1500, 1/2000, 1/3000, 1/4000, 1/6000, 1/10000

For Frame rate 25

Choose : 1/25, 1/50, 1/75, 1/100, 1/120, 1/150, 1/215, 1/300, 1/425, 1/600, 1/1000, 1/1250, 1/1750, 1/2500, 1/3500, 1/6000, 1/10000

Iris Priority Mode: Set exposure by adjusting lens Iris.

Choose: Close, F11.0, F9.6, F8.0, F6.8, F5.6, F4.8, F4.0, F3.4, F2.8, F2.4, F2.0, F1.8

Bright Mode: Simplified method to adjust image Brightness. Provides a single-function method to set exposure. It is similar to adjusting Brightness on a monitor or television. Adjustable 0 to 23. Does not combine with other modes.

EV, EV Level: Exposure is adjusted by selecting a single **Exposure Value** from -7 to +7. This works as an offset to **Auto** mode and does not function in other modes.

BLC: Back light compensation. Works in **Auto mode** to compensate situations where a window or other bright surface may be behind the subject. Set OFF / ON

Flicker compensation: Used when the scene lighting power line frequency is different from the camera frame rate which can cause the image color to change periodically. For example, when shooting 1080p60 in a country that has 50Hz AC power. Can also compensate when a television screen is photographed by the camera and appears to flicker. Works only in Auto, Iris Priority and Bright modes. Set to OFF, 50Hz or 60Hz. Choose the setting that produces the best effect.

Gain Limit: Used to prevent Gain from being increased to an objectionable level (increased visual noise). Works only in Auto, Iris Priority and Bright mode. Adjustable 0 to 15. Default is 7

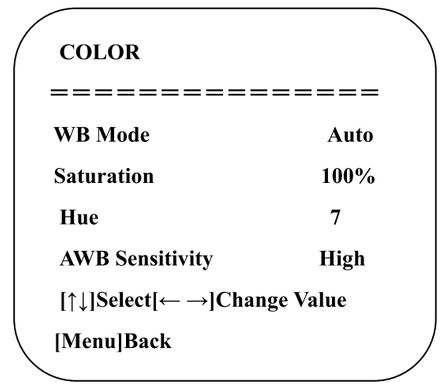
Gain: Adjusts camera apparent exposure by increasing the camera sensitivity. Works only in Manual or Shutter Priority modes. Adjustable 0 – 36. Default is 2. High levels of Gain can create visual noise / grain in the image.

DRC: Dynamic Range Compensation. Works with other modes to adjust overall exposure balance from dark to light. Adjustable 1 to 8 Default is 2

IRIS Priority: Close, F11, F9.6, F8.0, F6.8, F5.6, F4.8, F4.0, F3.4, F2.8, F2.4, F2.0, F1.8 (only available in Manual Exposure and Iris priority mode)

2) COLOR

Move the pointer to **COLOR,** press the HOME key to adjust the camera's color balance



Start with **WB Mode:** Select Auto, Manual, One Push or VAR

Auto mode: The camera makes all color adjustments based on the image it is capturing. This works well in most cases

Manual mode: Adjust **Red Gain** and **Blue Gain** to produce the best color balance. Adjust each from 0 to 255. Default for both is 100.

One Push: This is the traditional white balance method used in news and production cameras. Place a white or neutral gray card in the lighted area of the scene to be photographed. Zoom in on the card. Select One Push. The camera will adjust color balance in seconds.

VAR mode: (variable mode) Select the color temperature value that most closely matches the light sources in use. With incandescent light sources, the starting choice has often been 3200K. However, modern LED light sources are typically closer to 4300K. A sunny day can be 6500K or higher. Select from 2400K to 7100K for best balance.

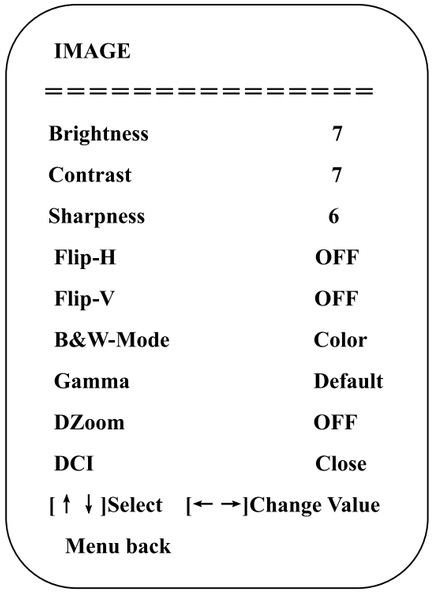
Saturation: Set color intensity to match the apparent color level in the scene. Select from 60% to 200%. Default is 100%.

Note: This is a control that is often overused. It is best to look away from the monitor for a few moments then go back to fine tune the Saturation.

Hue: Hue or "Tint" is a legacy control without much use in digital cameras except as used to create a special effect. Hue & Tint controls were necessary in composite, analog NTSC cameras to compensate for subcarrier phase shift. Digital television does not use a color subcarrier. Changing this adjustment affects ALL colors together so that improving one color will necessarily offset another. Adjust -15 to + 15. Default is 0 (recommended)

3) IMAGE

Move the pointer to **IMAGE**, press the **HOME** key to adjust various image characteristics



Brightness: Adjusting Brightness affects all areas of the image equally. Too high, the image is said to be “washed out”. Too low, the overall image will look dark and lack in contrast. Adjust from -16 to +16 Default is 0

Contrast: Increasing contrast will make light areas lighter and dark areas darker. It should be adjusted for the most natural-looking overall picture. It is normal for Brightness and Contrast controls to interact. Adjust from 0 to 14. Default 7

Sharpness: Sometimes called “Detail”, sharpness creates an enhanced edge around objects in an image. It creates the impression that it is improving focus. Setting it too high creates a visible white border. Adjust 0 to 15. Default 6

Flip-H: Flips image horizontally, “mirror mode”. Set On/Off (When Auto Flip is ON, this option will be disabled)

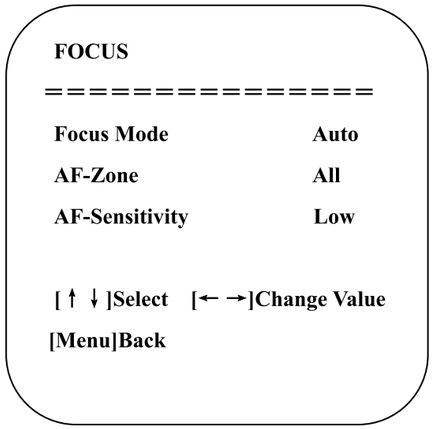
Flip-V: Flips image vertically “upside down”. Set On/Off (When Auto Flip is ON, this option will be disabled)

B&W Mode: Turns color on/off. (This is not IR or night vision mode.) Select Color/ B&W Default Color

DZoom: When turned ON, an additional 7X - 8X electronic magnification is added at the end of the optical zoom range. **Note:** Electronic magnification always increases visual noise and grain so it should be used sparingly. It is not the equivalent of optical zoom. Best used when you simply can’t “get the shot” with optical zoom. Set ON/OFF. Default OFF

4) FOCUS

Move the pointer to **FOCUS,** then press the **HOME** key to affect how the camera focuses.



Focus Mode Choices: Auto, Manual, One Push

Auto: The camera will attempt to maintain the sharpest focus. Close objects are prioritized Default is Auto.

Manual: Use the +/- keys on the remote to adjust focus

One Push: Switch to One Push to hold the current focus settings

AF-Zone: All, Top, Center, Bottom Default is All

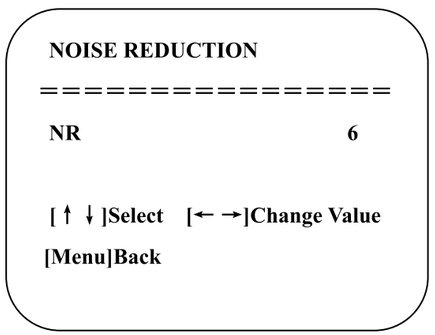
Selects the area of the image that Auto mode will make the sharpest

AF-Sensitivity: High, Middle, Low Default is Low

Sets the speed that Auto mode uses to achieve focus

5) NOISE REDUCTION

Move the pointer to the **Noise Reduction,** then press the **HOME** button to adjust the amount of visible noise / grain



Noise Reduction: Provides a mix of 2D, 3D noise reduction Set from 1 – 10 Default 6

Note: Noise Reduction set too high can create a blurring effect

6) STYLE

Move the pointer to **STYLE**, press the **MENU** key then use the Right Arrow key to select a choice

Choices are: Default, Meeting, Clarity, Bright, Soft

These are pre-built settings that can be quickly selected. Most of these settings have only minor effect

Default & Meeting: settings are nearly identical These are standard settings for most applications.

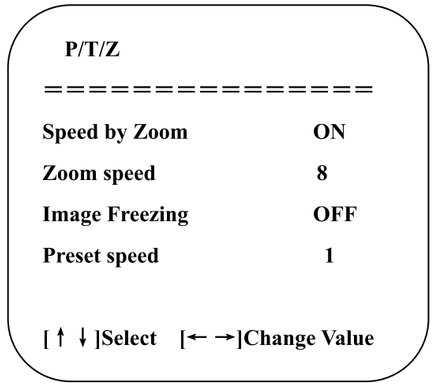
Clarity: This boosts the Sharpness effect

Bright: The general effect is a boost of the background

Soft: Flatness the contrast slightly

3.2.5 P/T/Z

Move the pointer to **P/T/Z**, then press **HOME** to adjust Pan / Tilt and Zoom functions



Speed by Zoom: This is a very useful function that is not present in some PTZ cameras. It links Pan / Tilt speed to the current Zoom amount. The result is that the apparent motion on-screen remains constant whether zoomed IN or OUT. When it is turned OFF, images will roll by very rapidly when the camera is zoomed IN and slowly when the camera is zoomed OUT. Set ON/ Off Default is ON (This function is only effective using the IR remote control.)

Zoom Speed: Sets the speed that the lens changes magnification Set from 1 to 8 Default is 5

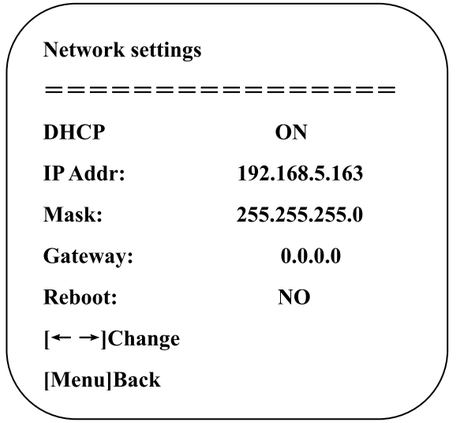
(Only effective using the IR remote control)

Image Freezing: Holds the current image on-screen until turned OFF. Set On/Off Default is OFF

Preset speed: Sets the speed that the camera will move from one **Preset** position to the other. Set 1 to 10 Default is 10

3.2.6 Network settings

Move the pointer to **Network Settings** then press the HOME key to change DHCP ON/OFF. OFF = Default Static address.



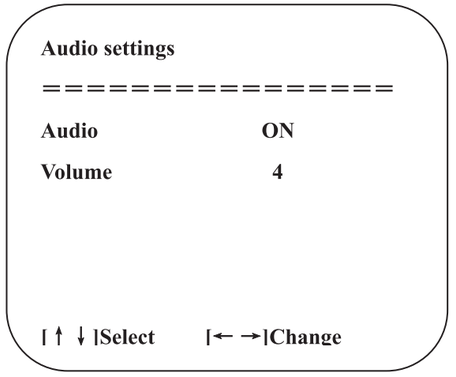
IP Address, Mask and Gateway are **NOT** adjustable on this page. See section **4.0 Static Addressing** below for details about creating a new Static address. **Note:** Use caution on this page. When a Static address has been set, accidentally switching to DHCP and back will force the Default static address (192.168.5.163), it will NOT return to the static address that was previously saved.

3.2.7 Audio settings

Move the pointer to **Audio Settings** key then press the **Home** key to change audio settings

Setting Audio to ON enables the 3.5 mm audio jack on the base of the camera. Set ON/OFF Default is ON

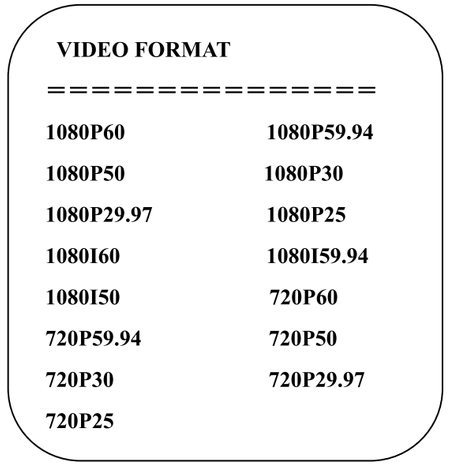
Change Volume as needed to match the audio source. Set from 1 to 10 Default is 4



3.2.8 Video Format

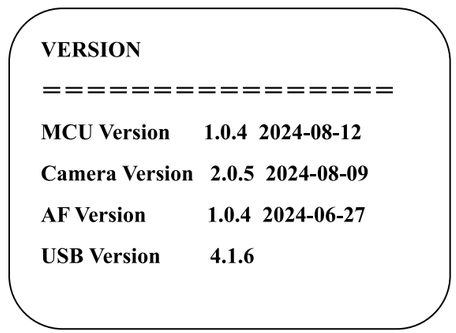
Move the pointer to **Video Format**, then press **HOME** to open the Video Format menu.
Use UP/DOWN arrow keys to move to the desired SDI / HDMI video output format then press **HOME** to select it.
When the format is selected, the camera will restart (picture will turn OFF for a few seconds).

NOTE: When the USB 3.0 output is accessed by an app such as OBS, VLC or other, the app will request a video format/frame rate from the camera. This has the effect of changing the master format/frame rate and the SDI output may go dark or change to the format requested by the app. In other words, **when both the SDI and USB outputs are required, the format/frame rates should be set to match.**



3.2.9 Version

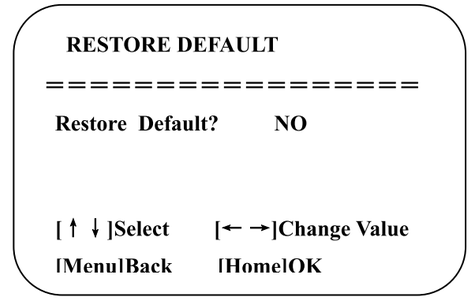
Move the pointer to VERSION, then press HOME to display the various Firmware versions currently installed in the camera. This is a display-only page, there are no settings available.



3.2.10 Restore Default

Move the pointer to Restore Default then press the HOME key

To restore menu Default settings, use the arrow key to change to YES then press HOME. The message, “Restore default now”, briefly appears on screen.



NOTE: This function does NOT change the current VISCA, PELCO addresses and Baud Rate. The IP address is also NOT changed.

4. Network Connection

4.1 Ethernet Connection

DHCP Connection

The simplest method to get the CV612 on a network to begin setup and testing is to start with the camera in DHCP Mode. Using the Remote Control and on-screen menus, check Network Settings and confirm that DHCP is ON.

In DHCP mode, it is safe to connect the camera directly to your network without address conflicts. The network will provide a working IP address which will appear in the Network Settings. It may be necessary to switch to another menu and back to refresh the network address display.

Once an address has been obtained, the camera can now be accessed via browser. See **Accessing the Web Client Section 4.2** below.

Static Addressing When it is desired to create a Static address for the camera, a different procedure is required.
First, turn **DHCP** mode OFF. This has the effect of setting the camera to the default IP address of **192.168.5.163**.
On a Windows computer, set the Ethernet (wired connection) address to a static address in this range. For example, set the computer address to something like **192.168.5.160**.
Set Subnet to **255.255.255.0**, Gateway to **192.168.5.1** and DNS to **0.0.0.0**
Make a direct Ethernet cable connection from the computer to the camera. (No router or switch, just the cable).
Log-in to the Web Client using the 192.168.5.163 address. See **Accessing the Web Client** below.
Once logged into the Web Client, Click on the Configuration tab in the upper right corner of the page.
Navigate to Network Configure / Ethernet.
Confirm that DHCP is still unchecked.
Enter the desired IP Address, Subnet Mask and Gateway.
Click SAVE. The camera will restart and is now set to the desired Static address.
Remove the connection between the computer and the camera.
Reset the computer to its normal Ethernet settings.

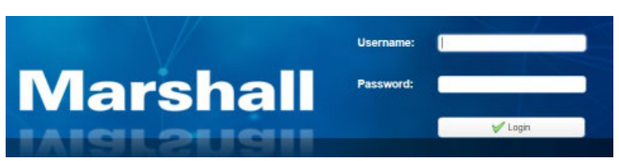
4.2 Accessing the Web Client

The CV612 camera offers extensive setup and control functions via web browser. Many of the functions that the IR Remote and on-screen menus provides are also available plus many more including setup and preview of video streaming. To access the Web Client it is necessary to know the current IP address of the camera and have a Windows-based computer attached to the same network. Most common web browsers such as Firefox will work. One of the valuable features of using the Web Client is that changes can be made to camera settings without causing menus to appear on-screen.

4.2.1 Web Log-in

Type the current IP address of the camera into the browser search window and press Enter. If the address is not known, use the IR remote to display it on screen.

A log-in screen similar to this will appear



The default ID and Password are both **admin**. Click Login. This log-in provides full administrative setup and control.

A popup window will appear offering to allow you to create a new ID and Password. This step can be skipped initially but is strongly recommended to create a new admin password for systems to be installed at a customer's location.

In addition to the "admin" level ID and Password, two other log-ins can be created. These are **user1** and **user2**.

Login-in to these levels the first time using **user1** or **user2** as the ID and Password. These can be changed to something the client will remember and use. User level log-ins allow full control of the camera functions but do not allow changing any parameters. User controls include: PTZ control, audio level, Preset set/run/delete, stream preview, and configure.

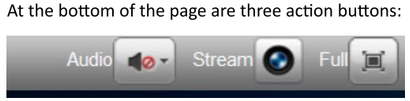
4.2.2 Preview Screen

Immediately after successful log-in the **Preview Screen**, appears. The camera provides an RTSP stream by default. Camera video should be visible in the Preview screen immediately.

There are three areas on the on this page that are important to note.

1. Action buttons

At the bottom of the page are three action buttons:



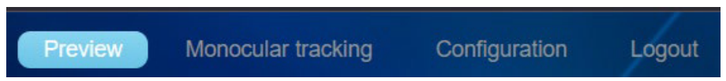
Audio: Turns audio monitoring ON/OFF. Monitors the 3.5mm audio input on the camera base.

Stream: Toggles preview between the Primary stream and the Sub Stream

Full: Takes the preview video to full screen mode. To return to normal mode, press the **ESC** key on the computer.

2. Function Tabs

Across the top of the screen are four tabs



Preview: Displays the current video stream and provides basic PTZ functions at the right side of the page.

Monocular tracking: Adds Auto Tracking setup functions to the controls on the right side of the page.

Configuration: Displays the full set of camera configuration options. On the left of the screen is a list of all Menu categories. To the right of that list is a setup page for each selected category.

Logout: Choose YES / NO to logout or remain in the Web Client. Once logged out, your ID and Password will be required to log-in again.

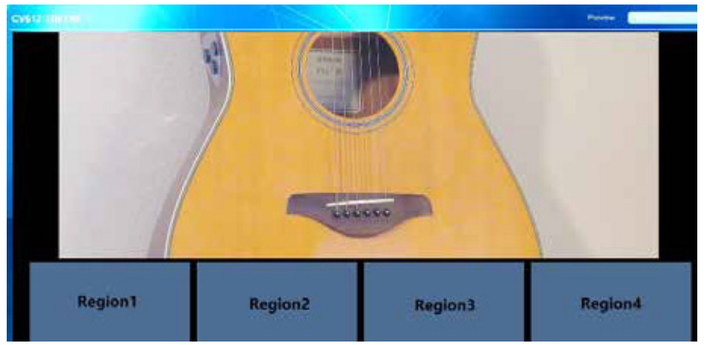
1. PTZ Manual / Auto Controls

To the right of the **Preview** and **Monocular** tracking pages are PTZ control buttons.

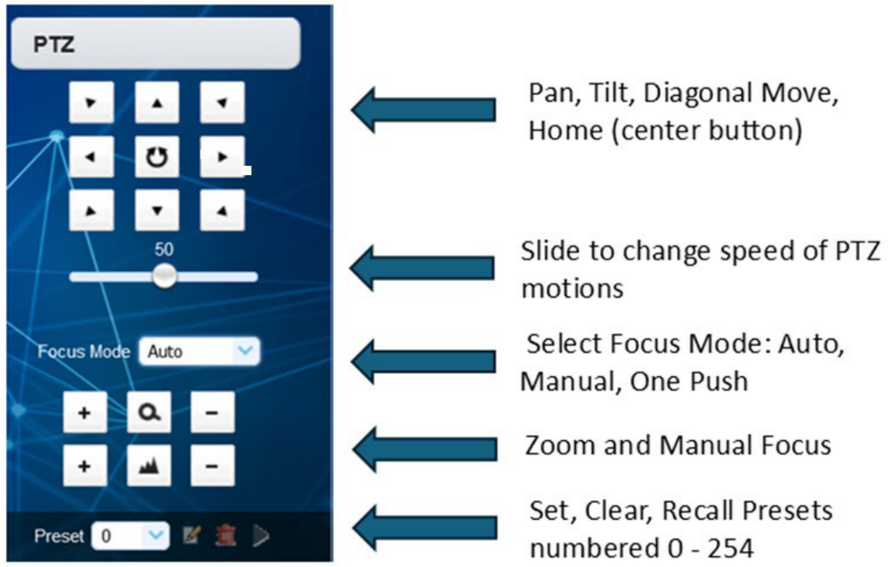
The **Preview** page provides **manual** PTZ control, Focus, Speed and Presets.

The **Monocular tracking** page has features for **auto tracking** and **zone tracking**.

Tip: On the Monocular tracking page, scroll down in the preview window using your mouse wheel to reveal four large buttons for quick access to tracking Zones.

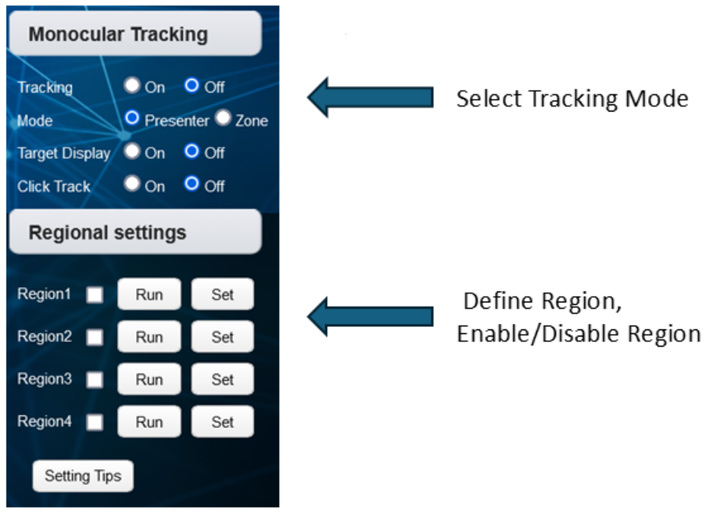


PTZ Manual Control Area



TIP: It is sometimes easier to use the IR Remote control to position the camera then save the Preset using the Web Client.

PTZ Tracking Control Area



Monocular Tracking means "Single Object" tracking. That is, the camera is designed to recognize a single object or person and not be distracted by other persons that may enter the area. When Tracking is ON and the Mode is **Presenter** the camera will attempt to stay with the Presenter despite other objects or persons entering the scene. When Tracking is ON but **Zone** is selected, the camera will move to that general zone when the subject or Presenter is in the area. It will not track the Presenter but, instead, center on the Zone. Up to four Zones may be defined. **NOTE:** It is important that these Zones overlap at least slightly when they are Set.

In Regional Settings, use the **Set** button to define the current Zone. Move the camera and use **Set** to again to define the next Zone. Check the boxes to make these Zones active.

NOTE: Manual PTZ controls are NOT active when either Presenter or Zone modes are active. In other words, the system is either in manual mode or auto-tracking mode.

Target Display On/ Off places a green box on the screen that shows where the current Zone is.

Click Track On/Off is the same as using the F4 key on the remote control. It captures the current person/object to track.

4.2.4 Configuration

Select the **Configuration tab**. The initial page should look like this:
On the left are a variety of Configuration items. On the right is an area with details and selections for the selected item.
Shown here is the top item "Audio Configure" and the available parameters.

1) Audio Configuration

Enable: Turns 3.5mm audio input jack ON/OFF. (Note: If Dante AV-H is enabled, this checkbox will be unchecked)

Encode Type: AAC Audio format used by IP Stream and USB outputs. Not selectable

Sampling Rate: 48000 (48KHz) Sampling rate for audio input and SDI, HDMI embedded outputs. Not selectable.

Sampling Bits: 16 bits per channel for SDI, HDMI embedded outputs. Not selectable.

Bit Rate: Set AAC streaming bit rate Kbits/second. Select 32, 48, 64, 96 or 128 Default is 64Kbs

Channel: Set audio input to Stereo / Mono

Note: When Mono is selected, input channels are summed resulting in approximate 6db boost

Input Audio volume: Set input volume level. With 1 volt RMS (AC Voltmeter) and input level = 1, Digital output (SDI, HDMI) will be approximately -18dB PPM (AES, EBU digital reference level)

To achieve this same output at the default setting of 4, input level should be approximately 0.325 volts RMS.

Click **SAVE** to make changes active.

2) Video configuration

Video Encode

NOTE: The camera provides the two RTSP streams shown here by default when powered ON. These streams are visible in the Preview page of the Web Client.

Stream: Main and Sub Streams may be configured independently

Compression Format: Select MJPEG, H.264, H.265. Default is H.264

Profile: Select High Profile (HP) or Main Profile (MP). HP is preferred for video production. Default is HP

Image Size: Set image format. Each of these results in either 16:9 or 4:3 aspect ratio output

Main choices: 1920x1080, 1280x720, 960x540, 800x600, 720x576, 720x480 Default is 1920x1080 (16:9)

Sub choices: 640x480, 640x360, 352x288, 320x240 Default is 640x360 (16:9)

Rate control: Choose Constant Bit Rate (CBR) or Variable Bit Rate (VBR). Default is CBR

CBR is preferred for video production

Image Quality: Set best, better, good, bad, worse and worst. Can only be set in MJPEG or VBR modes. It is recommended that these be left at their highest settings. May be useful when network congestion is high. However, other methods of dealing with congestion are available such as reducing the stream bit rate or using SRT encoding.

Bit Rate (Kb/s): Set the video bit rate by entering a new value. It is recommended that multiples of 512 be used rather than some arbitrary number. Defaults are **Main** 8192 **Sub** 1024

Frame Rate (F/S): Set the video stream frame rate. Higher frame rates provide smoother motion.

Set **Main** 5 to 60 fps, **Sub** 5 – 30 fps. Default is **Main** 60, **Sub** 30. It is recommended that the stream frame rate has some relationship to the camera video capture rate. In other words, if the camera is capturing 1080p60 or 59, stream rates of 60, 30 or 15 are best. If the camera is capturing 1080p50, stream rates of 50, 25 or 10 would be preferred.

I frame interval: Enter the desired I-frame interval. Higher numbers mean more reference frames are inserted in the stream (resulting in higher bit rates). Higher I-frame rates should improve stream quality but can also result in lower quality if network data rate becomes overloaded. It is recommended that I-frame values are related to the frame rate. For 1080p60, logical I-frame values would be 60, 30, 15, 12, 10, etc. Default is 30.

I Frame Minimum QP: set key framing minimum QP. Set 10 – 51 Default is 20

Stream Key: Substitute the default stream key for a custom stream key

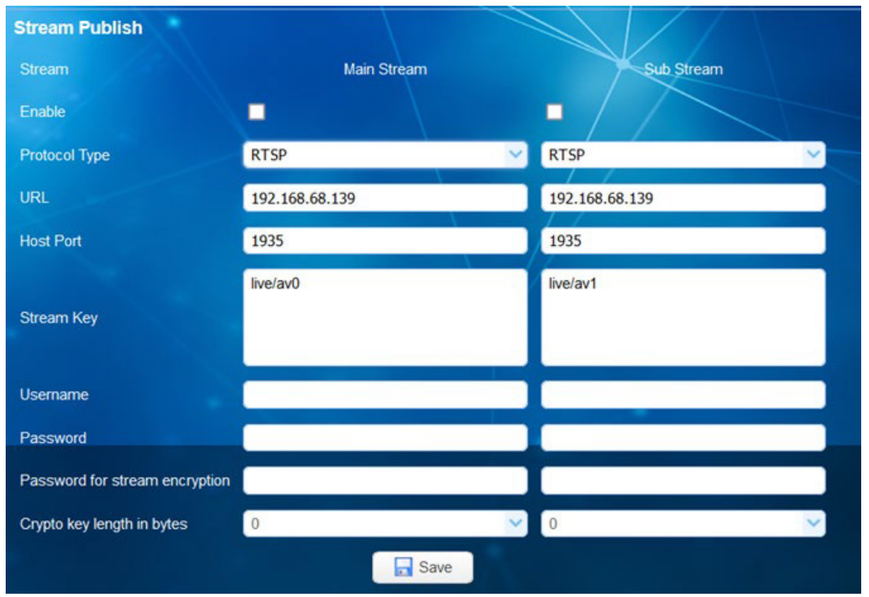
To receive an RTSP stream in a popular app like VLC or OBS Studio, etc., it is necessary to enter a long string like this:

rtsp://192.168.10.10:554/live/av0 for the Main stream or end with **av1** for the Sub stream.
The network address shown is just an example. The actual address of the CV612 camera should be substituted.

Note: The actual address can be easily determined by using the IR Remote to display it on-screen.

The last portion of the stream name **/live/av0** is called the Stream Key. It is recommended that the default key be used but it might be desirable to change it so that it is similar to other brands/models of cameras that are used in the same network so that they all have the same stream key and are easy to remember.

When settings are changed, click the **Save** button to display the "saved successfully" message.



Enable: Turn ON/OFF the main and sub stream. NOTE: RTSP stream is ON by default but not checked.

Protocol Type: Select RTSP, RTMP or SRT stream types

URL: Enter the current IP address of the camera here. Default is 192.168.5.11 and is just an example.

Host Port: Default port number is 1935. While any port number from 0 to 65535 may be used, it is recommended to avoid port numbers 0 through 1023 as these are considered “well known" ports and are used for specific functions on public networks.

Stream Key: Choose a different stream key: Defaults are live/av0, live/av1.

See Video Encode section above for more information.

Username: Set the stream user name (optional)

Password: Set the stream password (optional)

When User name and password are entered here, they must also be entered at the device or app receiving the stream. The stream User Name and Password can be turned on or off. See **RTSP Authentication** section below.

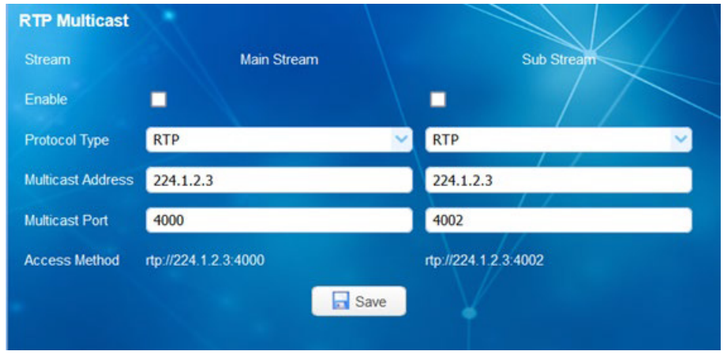
For example: If the non-passworded stream is: rtsp://192.168.10.10:554/live/av0
A stream with User name and Password of **Outer** and **Space** it would need to be entered as:

rtsp://Outer:Space@192.168.10.10:554/live/av0

Password for Stream Encryption
Crypto Length

For added security, the stream may be encrypted by entering a password and setting the length of the crypto key. Default is Password left blank, Length is 0.

When settings are changed, click the **Save** button to display the "saved successfully" message.



RTP Multicast:

Enable / Disable Main/Sub RTP code stream

Protocol Type: Select multicast via RTP or TS (transport stream) Default is RTP

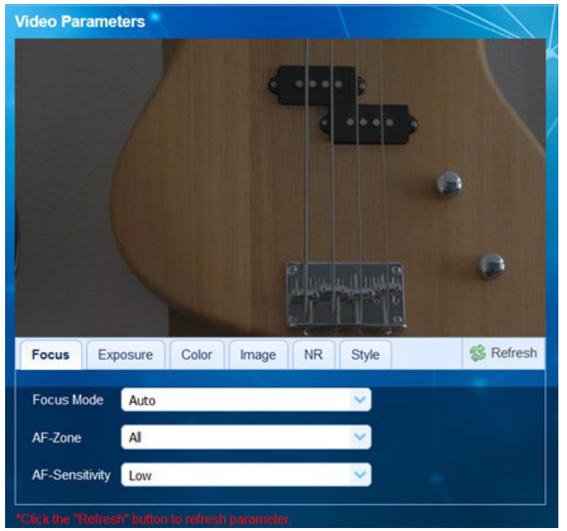
Multicast Address: can set multicast address Default address is 224.1.2.3

Multicast Port: Set multicast port Default ports Main 4000, Sub 4002. If port number is changed it is recommended that the new number be in the range 1024 – 65535.

Access Method: To access the stream via VLC or other app, use one of these methods.

rtp://224.1.2.3:4000； udp://@224.1.2.3:4000;

When settings are changed, click the **Save** button to display the "saved successfully" message.



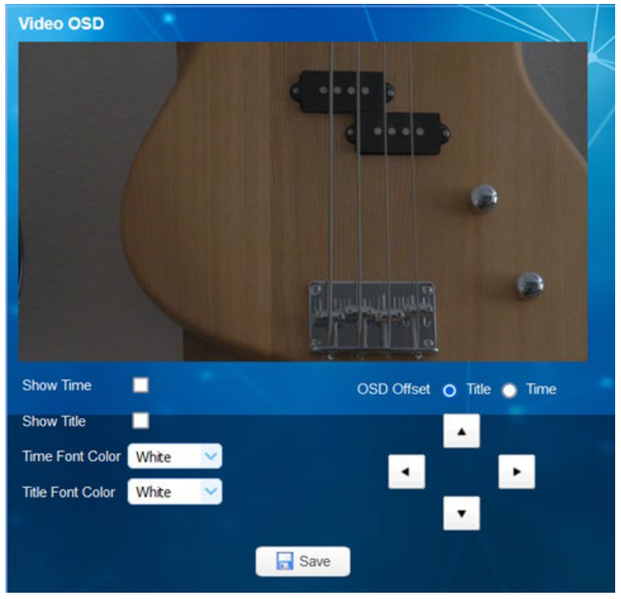
Video Parameters:

When the **Video Parameters** item is selected, a small Preview screen appears with tabs for various parameters.

These settings are the same as those available using the IR remote control.

Refer to section **3.2.3 Camera Settings** above for details of each parameter.

Note: Click “Refresh” to make changes effective.



Video OSD (on-screen display)

Date, Time and Title text can be displayed on the IP and USB streams by checking the appropriate check boxes.

The location of these text messages can be adjusted on this screen using the arrows

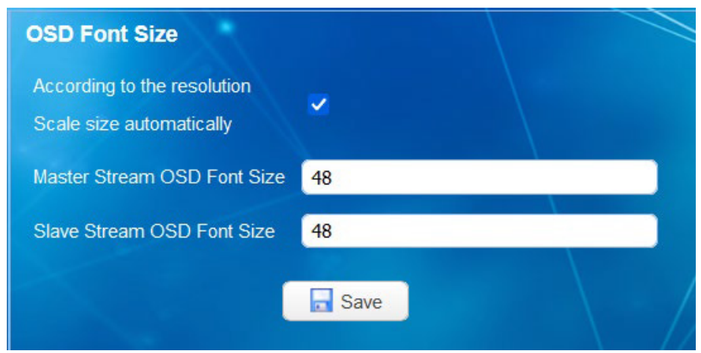
Show Time: Check the box to display Date and Time as set in the **System Configure** section below

Show Title: Check the box to display Text created in the **System Configure** section below

Font Color of Time: Set color of time and date Choose: white, black, yellow, red or blue. Default is white

Font Color of Title: Set color of title Choose: white, black, yellow, red or blue Default is white

When settings are changed, click the **Save** button to display the "saved successfully" message.



4) OSD Font Size

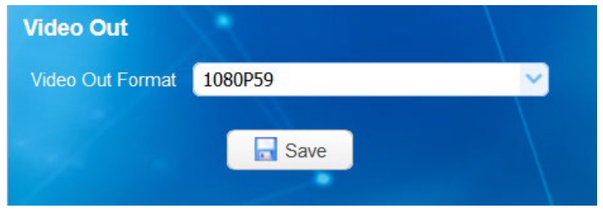
According to the video resolution Scale Size automatically:

Check this box to activate Default is checked, auto sizing

Main stream OSD font size, **Sub Stream OSD font size**

Font size can be adjusted in the range 28 to 200. Default is 48

When settings are changed, click the **Save** button to display the "saved successfully" message.



5) Video Out

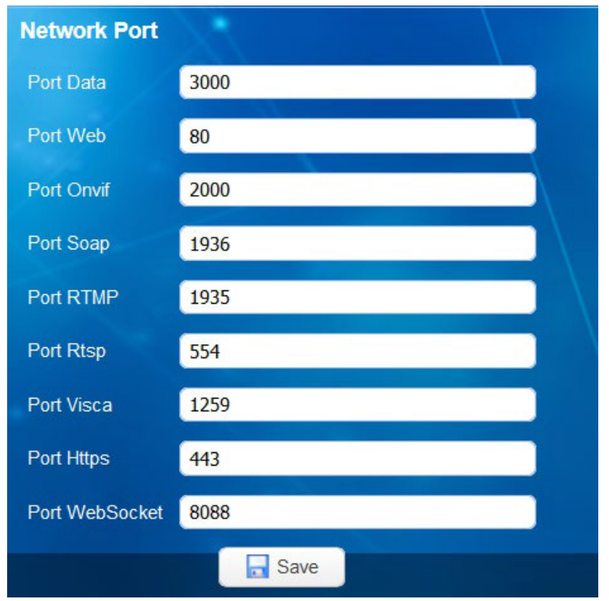
Video Output Format: Set the SDI and HDMI video output format.

This is independent of the Stream format but IS linked to the USB format.

Choices are: 1080p60, 1080p59.94, 1080p50, 1080p30, 1080p29.97, 1080p25, 1080i60, 1080i59.94, 1080i50, 720p60, 720p59.94, 720p50, 720p30, 720p29.97, 720p25 Default is 1080p60

When settings are changed, click the **Save** button to display the "saved successfully" message.

4.2.6 Network Configure



1) Network port

Port Data: Used internally by the Web browser Default is 3000

Port Web: Standard port for HTTP Internet traffic Default is 80

Port Onvif: Common port used for ONVIF protocol. ONVIF is typically used for interoperability between various surveillance and security systems Default is 2000

Port Soap: Early Internet protocol but still commonly used by AWS and AZURE Default is 1936

Port RTMP: Common RTMP port. Used with Wowza, Facebook and others. Default is 1935

Port RTSP: Common video streaming port for general use. Default is 554.

Port Visca: Used for Visca-over-IP camera control Default is 3001.

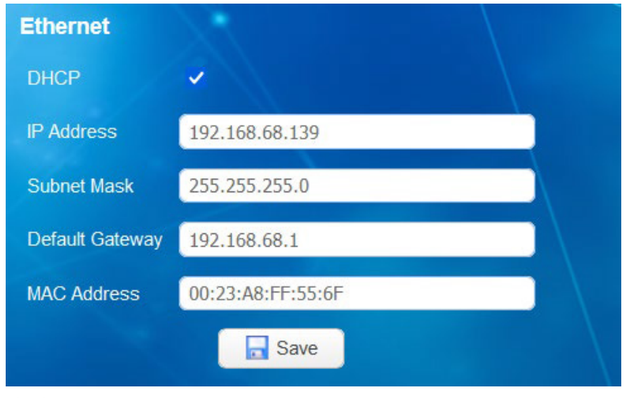
Click on the "Save" button, it will be valid when display "Save successful".

Port Https: Similar to port 80 but used for HTTPS secure traffic Default is 443.

Port WebSocket: Early web traffic port. Bi-directional. Used as an alternative to port 80 Default is 8088.

NOTE: While the system will accept port numbers from 0 to 65535, it is recommended that the default port numbers be used. When it is necessary to create a custom port number it is best to keep them in the range of 1024 to 65535 to avoid conflicts and confusion.

When settings are changed, click the **Save** button to display the "saved successfully" message.



2) Ethernet

DHCP: When DHCP is checked, the IP address of the camera will be automatically obtained from the network. Default is ON
When DHCP is not checked, the camera will be in Static address mode and the default address (default 192.168.5.163) will be forcibly set. To create a different Static address, it is necessary to first log-in via the Default address then set the desired new Address, Mask and Gateway.
See **Section 4.1 Ethernet Connection** for details

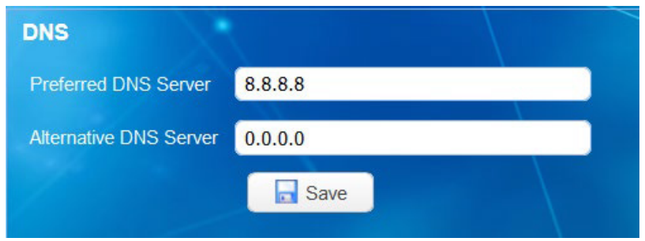
IP Address: Displays the current IP address Default is 192.168.5.163

Subnet Mask: Displays the current Subnet Mask Default is 255.255.255.0

Default Gateway: Displays the current Gateway Default is 0.0.0.0

Mac Address: Displays the physical MAC address of the camera. This cannot be changed.

When settings are changed, click the **Save** button to display the "saved successfully" message.

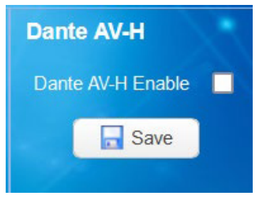


3) DNS parameters

Preferred DNS server: Set preferred DNS server. Default is 8.8.8.8

Alternate DNS server: Set alternate DNS server. Default is 0.0.0.0

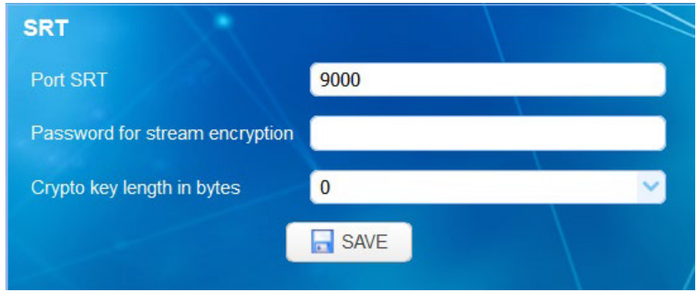
When settings are changed, click the **Save** button to display the "saved successfully" message.



Dante AV-H

Dante AV-H is an AV-over-IP technology developed by Audinate.

It works with the Dante Studio application which is an upgrade to the Dante Controller application.
Checking Dante AV-H Enable checkbox disables the camera's normal audio and uses Dante AV-H instead.
When this box and SAVE is checked, the Audio Configure checkbox (top menu item) will be unchecked.
Visit www.audinate.com for more information.

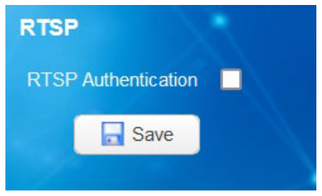


SRT

SRT is a streaming technology developed by Haivision. It adds encryption and adaptive flow control to improve transmission over congested Internet connections.

Port SRT Set the port number. Recommended to use the range 1024 – 65535. Default is 9000 (preferred)
Password & Crypto key. Set a password for stream encryption and the size of the crypto key if used.
Default is no password and Crypto key length = 0

To test SRT with the VLC app, enter **srt://address:9000** Replace "address" with the current IP address of the camera

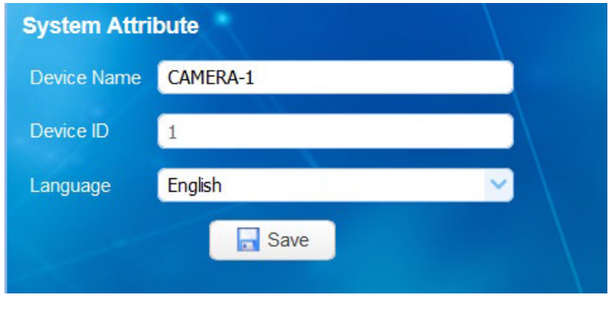


RTSP

RTSP Authentication enable / disable Check or uncheck
When checked, the RTSP Username and Password that was entered in the **Stream Publish** section above is activated in the RTSP stream.

When the setting is changed, click the **Save** button to display the "saved successfully" message.

4.2.7 System Configure



System Attribute

Information entered here can be displayed visibly in the IP and USB streams

Device Name: Enter a name or title Default is Camera1

Device ID: Enter a Device ID number if desired Default is 1 **NOTE:** This does not change the Visca or Pelco ID.

Language: Set the system language Choose: English, Chinese

When settings are changed, click the **Save** button to display the "saved successfully" message.

System Time

Information entered here can be displayed visibly in the IP and USB streams

Date Format: Set the displayed date format

Options are YYYY-MM-DD, MM-DD-YYYY, DD-MM-YYYY Default is YYYY-MM-DD

Date separator: Set the character that separates Day, Month, Year Options are **/ , : ; -**

Zone: Set the time zone

Hour Type: Set 24 or 12 hour time

NTP Enable: When checked, time is derived from the Internet

Update Interval: Sets how often the system time is updated Set from 1 to 10 day

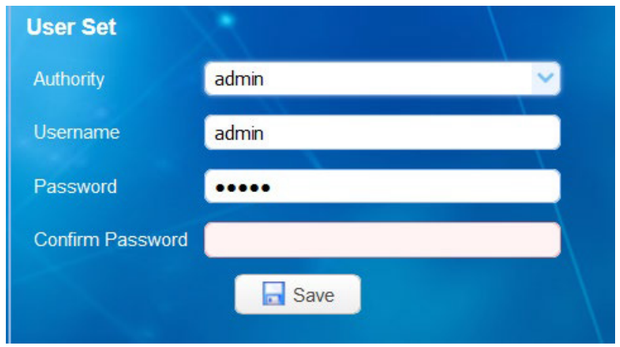
Host URL Choose the Internet source for time Default is time.nist.gov

Host Port Set port number for time communication Default is 123 (recommended)

When these settings are changed, click the **Save** button to display the "saved successfully" message.

Time Settings: Choose the current source for time.
Options are: computer time (local computer), NTP (Internet time), set manually (enter time in Computer Time window)

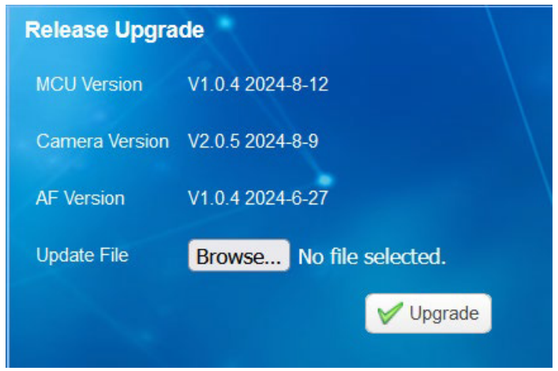
When the above setting is changed, click **Sync** to make change active



Sys User – User Set

The options listed here are the same ones offered when first logging onto the Web system.
Usernames and Passwords can be updated here.

When these settings are changed, click the **Save** button to display the "saved successfully" message.



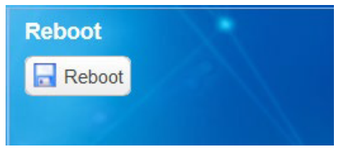
Update – Release Upgrade

Displays current Firmware versions
Update File provides ability to update firmware. Check **www.MarshallElectronics.net** for updates. Updates will be posted when available on the CV612 product page.

After updating firmware, reset the camera to Factory Defaults before using.

Default

Clicking this choice will change ALL settings to Factory Defaults including IP Address and Passwords
The camera will restart



Reboot

Click this choice will restart the camera without changing current settings.

In addition to IP control, the CV612 camera can also be controlled via the RS232 jack (RJ45 connector) on the camera base. Accepted protocols are: VISCA, Pelco-D and Pelco-P.

5. Visca & Pelco Camera Control Protocols

Protocols & Connections

In addition to IP control, the CV612 camera can also be controlled via the RS232 jack on the camera base (RJ45 connector).
The camera accepts VISCA, Pelco-D and Pelco-P protocols.

RS232 Parameters

Baud rate selectable: 2400 / 4800 / 9600 / 115200 bits/sec
Default is 9600 (recommended)
Data Bits: 8 Stop Bits: 1 Parity: None Flow Control: None

Visca-over-IP

TCP or UDP Port Number is 1259 (camera model CV612)
Camera Visca ID # should be set to 1 for all IP controlled cameras unless the cameras will be simultaneously controlled via RS232 and Ethernet.

5.1 VISCA protocol for Marshall PTZ Camera

In the list below, replace “x” with the camera’s Visca ID number (1 – 7).
Replace letters “pqrts” with number ranges shown in Comments.
Responses are returned with “y” or “z” replaced with the camera’s ID number + 8.
For example, if the camera ID is 1, “y” or “z” will be 9.
Several commands have single bytes “split” into two or two bytes split into four.
For example, a command may be shown as 0p 0q 0r 0t in the list. The command actual HEX values may be something like 01 20 (two bytes) but they may be entered in the command as 00 01 00 20 (distributed over 4 bytes).

5.1.1 Acknowledgements and Error Codes

Ack/Completion Messages		
	Command packet	**Note**
ACK	z0 41 FF	Returned when the command is accepted.
Completion	z0 51 FF	Returned when the command has been executed.

z = Visca address + 8

Error Messages		
	Command packet	**Note**
Syntax Error	z0 60 02 FF	Returned when the command format is different or when a command with illegal command parameters is accepted.
Command Buffer Full	z0 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	z0 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	z0 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	z0 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 from the IR remote during auto focus.

5.1.2 Camera Control Commands

Command	Function	Command packet	Note
CAM_Zoom continuous zoom until Stop Cmd or set Direct Position	Zoom Stop	8x 01 04 07 00 FF	
	Zoom Tele default speed	8x 01 04 07 02 FF	
	Zoom Wide default speed	8x 01 04 07 03 FF	
	Zoom Tele variable speed	8x 01 04 07 2p FF	p = 0(low) - 7(high)
	Zoom Wide variable speed	8x 01 04 07 3p FF	
	Direct Position default speed	8x 01 04 47 0p 0q 0r 0s FF	pqrs range: 0000 – 4000 HEX entered as: 00 00 00 00 to 04 00 00 00 typical value: 01 04 08 05
CAM _Focus Continuous focus change until Stop, Direct or Auto Cmd	Focus Stop	8x 01 04 08 00 FF	
	Focus Far default speed	8x 01 04 08 02 FF	
	Focus Near default speed	8x 01 04 08 03 FF	
	Focus Far variable speed	8x 01 04 08 2p FF	p = 0(low) - 7(high)
	Focus Near variable speed	8x 01 04 08 3p FF	
	Focus Direct default speed	8x 01 04 48 0p 0q 0r 0s FF	pqrs: Focus Position
	Auto Focus	8x 01 04 38 02 FF	Auto Focus On
	Manual Focus	8x 01 04 38 03 FF	Auto Focus Off
	One Push mode	8x 01 04 38 04 FF	Prepares for Focus Trigger
	One Push Trigger	8x 01 04 18 01 FF	Starts Focus
CAM _Zoom Focus (combined move)	Direct	8x 01 04 47 0p 0q 0r 0s 0t 0u 0v 0w FF	pqrs: Zoom Position tuvw: Focus Position split bytes actual range 0000 to 4000 HEX zoom entered as 00 00 00 00 to 40 00 00 00 Focus entered as 00 00 00 00 to 00 0B 05 00

Command	Function	Command packet	Note
CAM_AF Sensitivity	High	8x 01 04 58 01 FF	Auto Focus Sensitivity Level
	Normal	8x 01 04 58 02 FF	
	Low	8x 01 04 58 03 FF	
CAM_AF Zone	Top	8x 01 04 AA 00 FF	Auto Focus Region
	Center	8x 01 04 AA 01 FF	
	Bottom	8x 01 04 AA 02 FF	
	All	8x 01 04 AA 03 FF	
CAM_WB Color Temp (no effect if camera is in Auto WB mode)	2400K	8x 01 04 35 0C FF	
	2500K	8x 01 04 35 0D FF	
	2600K	8x 01 04 35 0E FF	
	2700K	8x 01 04 35 0F FF	
	2800K	8x 01 04 35 10 FF	
	2900K	8x 01 04 35 11 FF	
	3000K	8x 01 04 35 01 FF	
	3100K	8x 01 04 35 12 FF	
	3200K	8x 01 04 35 13 FF	
	3300K	8x 01 04 35 14 FF	
	3400K	8x 01 04 35 15 FF	
	3500K	8x 01 04 35 07 FF	
	3600K	8x 01 04 35 16 FF	
	3700K	8x 01 04 35 17 FF	
	3800K	8x 01 04 35 18 FF	
	3900K	8x 01 04 35 19 FF	
	4000k	8x 01 04 35 02 FF	
	4100K	8x 01 04 35 1A FF	
	4200K	8x 01 04 35 1B FF	
	4300K	8x 01 04 35 1C FF	

Command	Function	Command packet	Note
	4400K	8x 01 04 35 1D FF	
	4500K	8x 01 04 35 08 FF	
	4600K	8x 01 04 35 1E FF	
	4700K	8x 01 04 35 1F FF	
	4800K	8x 01 04 35 21 FF	
	4900K	8x 01 04 35 22 FF	
	5000K	8x 01 04 35 04 FF	
	5100K	8x 01 04 35 23 FF	
	5200K	8x 01 04 35 24 FF	
	5300K	8x 01 04 35 25 FF	
	5400K	8x 01 04 35 26 FF	
	5500K	8x 01 04 35 09 FF	
	5600K	8x 01 04 35 27 FF	
	5700K	8x 01 04 35 28 FF	
	5800K	8x 01 04 35 29 FF	
	5900K	8x 01 04 35 2A FF	
	6000K	8x 01 04 35 0A FF	
	6100K	8x 01 04 35 2B FF	
	6200K	8x 01 04 35 2C FF	
	6300K	8x 01 04 35 2D FF	
	6400K	8x 01 04 35 2E FF	
	6500K	8x 01 04 35 06 FF	
	6600K	8x 01 04 35 2F FF	
	6700K	8x 01 04 35 30 FF	
	6800K	8x 01 04 35 31 FF	
	6900K	8x 01 04 35 32 FF	
	7000K	8x 01 04 35 0B FF	
	7100K	8x 01 04 35 33 FF	
	Manual WB mode ON	8x 01 04 35 05 FF	Enables color temp (K) and Red/Blue Gain adjust
	One Push WB Mode Set	8x 01 04 35 03 FF	Enables One Push WB Trigger
	One Push WB Trigger	8x 01 04 10 05 FF	
	Auto WB mode ON	8x 01 04 35 00 FF	Disables Manual WB, color temp

Command	Function	Command packet	Note
CAM_RGain	Reset	8x 01 04 03 00 FF	Manual Control of Red Gain Default 100 decimal 64 HEX
	Up (step)	8x 01 04 03 02 FF	
	Down (step)	8x 01 04 03 03 FF	
	Direct	8x 01 04 43 00 00 0p 0q FF	pq: R Gain Range = 0 to 255 dec 00 00 to 06 04 split HEX
CAM_BGain	Reset	8x 01 04 04 00 FF	Manual Control of Blue Gain Default 100 decimal
	Up (step)	8x 01 04 04 02 FF	
	Down (step)	8x 01 04 04 03 FF	
	Direct	8x 01 04 44 00 00 0p 0q FF	pq: B Gain Range = 0 to 255 dec 00 00 to 06 04 split HEX
CAM_AE	Full Auto Set	8x 01 04 39 00 FF	Automatic Exposure mode
	Manual Set	8x 01 04 39 03 FF	Manual Exposure mode
	Shutter priority Set	8x 01 04 39 0A FF	Shutter Priority Automatic Exposure mode
	Iris priority Set	8x 01 04 39 0B FF	Iris Priority Automatic Exposure mode
	Bright Mode Set	8x 01 04 39 0D FF	Bright mode enable
CAM_Shutter	Reset default	8x 01 04 0A 00 FF	Default = 1/180 Shutter Setting
	Up (step)	8x 01 04 0A 02 FF	
	Down (step)	8x 01 04 0A 03 FF	

Continued on next page

Command	Function	Command packet	Note
CAM_Shutter	Direct	8x 01 04 4A 00 00 0p 0q FF	pq: Shutter Value Range 1/60 – 1/10,000 01 02 to 02 01 split HEX 1/60 01 02 1/90 01 03 1/100 01 04 1/125 01 05 1/180 01 06 1/250 01 07 1/350 01 08 1/500 01 09 1/725 01 0A 1/1000 01 0B 1/1500 01 0C 1/2000 01 0D 1/3000 01 0E 1/4000 01 0F 1/6000 02 00 1/10,000 02 01
CAM_Iris Up = smaller (less light) Down = larger (more light)	Reset	8x 01 04 0B 00 FF	Default = f1.8 Iris Setting
	Up (step)	8x 01 04 0B 02 FF	
	Down (step)	8x 01 04 0B 03 FF	
	Direct	8x 01 04 4B 00 00 0p 0q FF	pq: Iris Setting Range f1.8 to f11 00 0C to 00 01 f1.8 00 0C f2.0 00 0B f2.4 00 0A f2.8 00 09 f3.4 00 08 f4.0 00 07 f4.8 00 06 f5.6 00 05 f6.8 00 04 f8.0 00 03 f9.6 00 02 f11 00 01 Closed 00 00

Command	Function	Command packet	Note
CAM_Gain	Reset	8x 01 04 0C 00 FF	Default = 6 Gain Setting
	Up (step)	8x 01 04 0C 02 FF	
	Down (step)	8x 01 04 0C 03 FF	
	Direct	8x 01 04 4C 00 00 0p 0q FF	pq: Gain Level Range 00 ~ 24 HEX 0 – 36 Decimal
CAM_Gain Limit Sets Max Gain for Auto Exposure Mode	Gain Limit	8x 01 04 2C 0p FF	p: Gain limit level Range 00 ~ 0F HEX 0 – 9 Decimal
CAM Bright Mode (not Brightness)	Reset	8x 01 04 0D 00 FF	Default = 7 Bright Mode Set
	Up (step)	8x 01 04 0D 02 FF	
	Down (step)	8x 01 04 0D 03 FF	
	Direct	8x 01 04 4D 00 00 0p 0q FF	pq: Bright Mode Range 00 ~ 0E HEX 0 – 14 Decimal
CAM_Exp Comp (exposure compensation adds manual offset to auto exposure modes)	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	Default = – 2 Decimal Exposure Compensation Level
	Up (step)	8x 01 04 0E 02 FF	
	Down (step)	8x 01 04 0E 03 FF	
	Direct	8x 01 04 4E 00 00 0p 0q FF	Pq: ExpComp Level range 00 ~ 0E HEX 00 00 to 00 0E Default = 00 05 HEX -7 to +7 Decimal
CAM_Back Light	On	8x 01 04 33 02 FF	Back Light Compensation
	Off	8x 01 04 33 03 FF	
CAM_WDR Strength Wide Dynamic Range Level	Reset	8x 01 04 21 00 FF	Default = “Close” WDR Level Setting
	Up (step)	8x 01 04 21 02 FF	
	Down (step)	8x 01 04 21 03 FF	
	Direct	8x 01 04 51 00 00 00 0p FF	p: WDR Level range 0 ~ 8 HEX
CAM_NR Set Noise reduction	3D Type (frame compare)	8x 01 04 54 0p FF	p: NR Level range 0 ~ B HEX 0 – 11 Decimal

Command	Function	Command packet	Note
CAM Preset Speed (Speed Camera moves to Preset position)		8x 01 01 0p FF	p: Preset Speed range: 01 ~ 0A HEX 1 – 10 Decimal Default = 5
CAM_Flicker Comp Compensates for lighting flicker due to different power frequency	OFF	8x 01 04 23 00 FF	OFF
	50HZ	8x 01 04 23 01 FF	50HZ default for 60Hz cameras
	60HZ	8x 01 04 23 02 FF	60HZ default for 50Hz cameras
CAM_Aperture (Sharpness)	Reset	8x 01 04 02 00 FF	Default 6 Aperture Control “Sharpness”, “Detail”
	Up (step)	8x 01 04 02 02 FF	
	Down (step)	8x 01 04 02 03 FF	
	Direct	8x 01 04 42 00 00 0p 0q FF	pq: Aperture Gain range 0 ~ B HEX 00 00 to 00 0B 00 06 Default
CAM_Picture effect (B&W Mode)	B&W Mode ON	8x 01 04 63 04 FF	Default OFF
	OFF = (color ON)	8x 01 04 63 00 FF	
CAM_Preset (PTZ)	Reset (resets selected Preset #)	8x 01 04 3F 00 pq FF	pq: Preset Number range 00 ~ FE HEX 00 to 09 correspond to buttons 0 to 9 on IR Remote Web Browser can set Presets 0 - 254
	Set Selected Preset	8x 01 04 3F 01 pq FF	
	Recall Selected Preset	8x 01 04 3F 02 pq FF	

Command	Function	Command packet	Note
CAM_LR_Reverse	On	8x 01 04 61 02 FF	Image Flip Horizontal ON/OFF “Mirror”
	Off	8x 01 04 61 03 FF	
CAM_PictureFlip	On	8x 01 04 66 02 FF	Image Flip Vertical ON/OFF “Upside Down”
	Off	8x 01 04 66 03 FF	
CAM_ ColorSaturation	Direct	8x 01 04 49 00 00 00 0p FF	p:0 ~ E Default 0 0:60% 1:70% 2:80% 3:90% 4:100% 5:110% 6:120% 7:130% 8:140% 9:150% A:160% B:160% C:180% D:190% E:200%
CAM_IDWrite (operation unclear)		8x 01 04 22 0p 0q 0r 0s FF	pqrs: Camera ID (=0000 to FFFF) Values entered have no effect
SYS_Menu SYS_Menu	ON	8x 01 06 06 02 FF	Turn on OSD menu
	OFF	8x 01 06 06 03 FF	Turn off OSD menu
IR_Receive	ON	8x 01 06 08 02 FF	Enables / Disables IR remote control
	OFF	8x 01 06 08 03 FF	
CAM_Setting Reset (does not change Visca or IP Address)	Reset	8x 01 04 A0 10 FF	Reset to Defaults (Communication is not disturbed)
CAM_Brightness	Direct	8x 01 04 A1 00 00 0p 0q FF	pq: Brightness Level range 00 ~ 20 HEX - 16 to +16 Decimal Default 0 = 10 HEX pq Split byte as 01 00
CAM_Contrast	Direct	8x 01 04 A2 00 00 0p 0q FF	pq: Contrast Level range 00 ~ 0E HEX 0 – 14 Decimal Default 7 = 7 HEX Pq split byte as 00 07

Command	Function	Command packet	Note
CAM_Flip	OFF	8x 01 04 A4 00 FF	Single Command For all Video Flip Types
	Flip-H (mirror)	8x 01 04 A4 01 FF	
	Flip-V (upside down)	8x 01 04 A4 02 FF	
	Flip-HV (both)	8x 01 04 A4 03 FF	
CAM_Video System (SDI, HDMI format & frame rate)	Set Camera video system	8x 01 06 35 00 0p FF	p: 0:1080p60 1:1080p50 2:1080i60 3:1080i50 4:720p60 5:720p50 6:1080p30 7:1080p25 A:1080p59.94 B:1080i59.94 C:720p59.94 D:1080p29.97

Command	Function	Command packet	Note
Pan-Tilt Drive All run until stopped except Absolute Position & Relative Position	Tilt Up	8x 01 06 01 VV WW 03 01 FF	VV: Pan speed Range 01 to 18 HEX (low speed to high speed) WW: Tilt speed Range 01 to 14 HEX (low speed to high speed) YYYY: Pan Position Center: 00 00 00 00 CW Max 00 09 09 00 CCW Max 0F 06 07 00 ZZZZ: Tilt Position Center: 00 00 00 00 Up Max: 00 05 01 00 Down Max 0F 0A 0F 00
	Tilt Down	8x 01 06 01 VV WW 03 02 FF	
	Pan Left	8x 01 06 01 VV WW 01 03 FF	
	Pan Right	8x 01 06 01 VV WW 02 03 FF	
	Up & Left	8x 01 06 01 VV WW 01 01 FF	
	Up & Right	8x 01 06 01 VV WW 02 01 FF	
	Down Left	8x 01 06 01 VV WW 01 02 FF	
	Down Right	8x 01 06 01 VV WW 02 02 FF	
	Stop	8x 01 06 01 VV WW 03 03 FF	
	Absolute Position (Relative to camera body)	8x 01 06 02 VV WW 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF	
	Relative Position (Relative to current position)	8x 01 06 03 VV WW 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF	
	Home (Default center)	8x 01 06 04 FF	
	Reset	8x 01 06 05 FF	

Command	Function	Command packet	Note
Pan-Tilt Limit Set	Set	8x 01 06 07 00 0W 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF	W: 1: Up & Right 0: Down & Left YYYY: Pan Limit Position ZZZZ: Tilt Limit Position
	Clear	8x 01 06 07 01 0W 07 0F 0F 0F 07 0F 0F 0F FF	
Tracking	ON	8x 01 0B 00 00 02 FF	Auto Tracking mode
	OFF	8x 01 0B 00 00 03 FF	Manual mode
	Switch Target	8x 01 0B 00 00 00 FF	Change person being tracked
	Presenter Mode	8x 01 0B 00 01 00 FF	Also called Real-Time Tracking Mode
	Zone Mode	8x 01 0B 00 01 01 FF	Also called Regional Tracking
	Tracking Target ON	8x 01 0B 01 00 01 FF	On-screen display of target box
	Tracking Target OFF	8x 01 0B 01 00 00 FF	Normal Video
CAM_D Zoom (Digital zoom takes effect at end of optical zoom range)	ON	8x 01 04 06 02 FF	
	OFF	8x 01 04 06 03 FF	
CAM_Power	ON (wake)	8x 01 04 00 02 FF	
	OFF (standby)	8x 01 04 00 03 FF	

5.1.3 Inquiry Commands (Request for Status)

Command	Request	Response	Note
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	Auto Focus
		y0 50 03 FF	Manual Focus
		y0 50 04 FF	One Push mode
CAM_FocusPosInq	8x 09 04 48 FF	y0 50 0p 0q 0r 0s FF	pqrs: Focus Position
CAM_AFSensitivityInq	8x 09 04 58 FF	y0 50 01 FF	High
		y0 50 02 FF	Normal
		y0 50 03 FF	Low
CAM_AFZoneInq	8x 09 04 AA FF	y0 50 00 FF	Top
		y0 50 01 FF	Center
		y0 50 02 FF	Bottom
		y0 50 03 FF	All
CAM_WBModeInq	8x 09 04 35 FF	y0 50 00 FF	Auto WB Mode is ON
		y0 50 0C FF	2400K
		y0 50 0D FF	2500K
		y0 50 0E FF	2600K
		y0 50 0F FF	2700K
		y0 50 10 FF	2800K
		y0 50 11 FF	2900K
		y0 50 01 FF	3000K
		y0 50 12 FF	3100K

Command	Request	Response	Note
CAM_WBModeInq	8x 09 04 35 FF	y0 50 13 FF	3200K
		y0 50 14 FF	3300K
		y0 50 15 FF	3400K
		y0 50 07 FF	3500K
		y0 50 16 FF	3600K
		y0 50 17 FF	3700K
		y0 50 18 FF	3800K
		y0 50 19 FF	3900K
		y0 50 02 FF	4000K
		y0 50 1A FF	4100K
		y0 50 1B FF	4200K
		y0 50 1C FF	4300K
		y0 50 1D FF	4400K
		y0 50 08 FF	4500K
		y0 50 1E FF	4600K
		y0 50 1F FF	4700K
		y0 50 21 FF	4800K
		y0 50 22 FF	4900K
		y0 50 04 FF	5000K
		y0 50 23 FF	5100K
		y0 50 24 FF	5200K
		y0 50 25 FF	5300K
		y0 50 26 FF	5400K
		y0 50 09 FF	5500K
		y0 50 27 FF	5600K
		y0 50 28 FF	5700K
		y0 50 29 FF	5800K

Command	Request	Response	Note
CAM_WBModeInq	8x 09 04 35 FF	y0 50 2A FF	5900K
		y0 50 0A FF	6000K
		y0 50 2B FF	6100K
		y0 50 2C FF	6200K
		y0 50 2D FF	6300K
		y0 50 2E FF	6400K
		y0 50 06 FF	6500K
		y0 50 2F FF	6600K
		y0 50 30 FF	6700K
		y0 50 31 FF	6800K
		y0 50 32 FF	6900K
		y0 50 0B FF	7000K
		y0 50 33 FF	7100K
		y0 50 05 FF	Manual Mode is ON
		y0 50 03 FF	One Push Mode is ON
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

Command	Request	Response	Note
CAM_Gain Limitlnq	8x 09 04 2C FF	y0 50 0p FF	p: Gain Limit Setting
CAM_GainInq	8x 09 04 0C FF	Y0 50 0p FF	p: Gain Level
CAM_ BrightPosiInq	8x 09 04 4D FF	y0 50 00 00 0p 0q FF	pq: Bright Position
CAM_ExpCompM odeInq	8x 09 04 3E FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_ExpCompP osInq	8x 09 04 4E FF	y0 50 00 00 0p 0q FF	pq: ExpComp Position
CAM_BacklightM odeInq	8x 09 04 33 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_WDRStreng thInq	8x 09 04 51 FF	y0 50 0p FF	p: WDR Strength
CAM_NRLevel(3D) Inq	8x 09 04 54 FF	y0 50 0p FF	P:3D NR Level
CAM_FlickerMod eInq	8x 09 04 55 FF	y0 50 0p FF	p: Flicker Settings(0: OFF, 1: 50Hz, 2:60Hz)
CAM_ApertureInq	8x 09 04 42 FF	y0 50 00 00 0p 0q FF	pq: Aperture Gain
CAM_PictureEffe ctModeInq	8x 09 04 63 FF	y0 50 00 FF	Color
		y0 50 04 FF	B&W
CAM_PresetInq	8x 09 04 3F FF	y0 50 0p FF	p: Preset number last called
SYS_MenuModeInq	8x 09 06 06 FF	y0 50 02 FF	OSD Menu ON
		y0 50 03 FF	OSD Menu OFF
CAM_LR_Reversel nq	8x 09 04 61 FF	y0 50 02 FF	Mirror mode ON
		y0 50 03 FF	Mirror mode OFF
CAM_PictureFlipIn q	8x 09 04 66 FF	y0 50 02 FF	Vertical Flip ON
		y0 50 03 FF	Vertical Flip OFF
CAM_ColorSatura tionInq	8x 09 04 49 FF	y0 50 00 00 00 0p FF	p: Color Gain 0h (60%) to Eh (130%)

Command	Request	Response	Note
CAM_IDInq	8x 09 04 22 FF	y0 50 0p FF	p: Visca ID #1 - 7
IR_ReceiveInq	8x 09 06 08 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_BrightnessInq	8x 09 04 A1 FF	y0 50 00 00 0p 0q FF	pq: Brightness Level
CAM_ContrastInq	8x 09 04 A2 FF	y0 50 00 00 0p 0q FF	pq: Contrast Level
CAM_FlipInq	8x 09 04 A4 FF	y0 50 00 FF	Off
		y0 50 01 FF	Flip-H (mirror)
		y0 50 02 FF	Flip-V
		y0 50 03 FF	Flip-HV (both)
CAM_VersionInq	8x 09 00 02 FF	y0 50 ab cd mn pq rs tu vw FF	abcd : vender ID (0220) mn pq : model ID rs tu: ARM Version vw: reserved
VideoSystemInq (determine the current SDI / HDMI video format & frame rate)	8x 09 06 23 FF	y0 50 0p FF	p: 0:1080p60 1:1080p50 2:1080i60 3:1080i50 4:720p60 5:720p50 6:1080p30 7:1080p25 A:1080p59.94 B:1080i59.94 C:720p59.9 D:1080p29.97
Pan-TiltMaxSpeedInq	8x 09 06 11 FF	y0 50 ww zz FF	ww: Pan Max Speed 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 zzzz: Tilt Position
CAMPowerInq	8x 09 04 00 FF	Y0 50 0p FF	p: 02 Power OFF (standby) 03 Power ON (wake)

5.2 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
Upleft	0xFF	Address	0x00	0x0C	Pan Speed	Tilt Speed	SUM
Upright	0xFF	Address	0x00	0x0A	Pan Speed	Tilt Speed	SUM
DownLeft	0xFF	Address	0x00	0x14	Pan Speed	Tilt Speed	SUM
DownRight	0xFF	Address	0x00	0x12	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
Stop	0xFF	Address	0x00	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
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

5.3 Pelco-P Protocol Command List

Function	Byte1	Byte2	Byte 3	Byte 4	Byte5	Byte6	Byte 7	Byte 8
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
Upleft	0xA0	Address	0x00	0x0C	Pan Speed	Tilt Speed	0xAF	XOR
Upright	0xA0	Address	0x00	0x0A	Pan Speed	Tilt Speed	0xAF	XOR
DownLeft	0xA0	Address	0x00	0x14	Pan Speed	Tilt Speed	0xAF	XOR
DownRight	0xA0	Address	0x00	0x12	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
Stop	0xA0	Address	0x00	0x00	0x00	0x00	0xAF	XOR
Focus Far	0xA0	Address	0x01	0x00	0x00	0x00	0xAF	XOR
Focus Near	0xA0	Address	0x02	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
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

6. Camera Maintenance and Troubleshooting

6.1 Camera Maintenance

1) If camera is not used for long periods of time, please turn off power and remove power source.
2) Use soft cloth or tissue to clean the camera cover.
3) Use soft cloth to clean the lens; Use neutral cleanser if badly smeared.
   Do not use strong or corrosive cleanser or corrosive cleanser to avoid scratching.

6.2 Troubleshooting

- No video output
- Check to see if camera power supply is connected, the voltage is normal and the Status light is Green.
- Is camera in self-inspection or initiation mode during a restart (power-cycle).
- Check that the monitor or other device is compatible with the video output settings.
- In other words, a monitor that accepts only 1080i and the camera is set for 1080p
- When an application is accessing the USB output, the application has control of the USB format/ frame rate AND the SDI format/frame rate. Changing format settings in an application can cause the SDI output to go dark or change. For both the SDI and USB to operate at the same time, the format/ frame rates must match.

Image shaking when zooming-in or zooming-out

- Check mount or installation method to ensure camera is stable.

- Remote control doesn't work
- Check remote control address (1 through 4) is set to match the camera ID If the camera has been set back to the factory defaults, the remote control address is 1
- Check batteries
- Check that the green STAUS light on the base is ON
- If a menu is displayed on-screen, the Pan / Tilt controls will not operate until the menu is off screen
- The Serial port (RS232) doesn't work.
  - Check whether the camera serial protocol, baud rate, and ID number match the controller settings
  - Check control cable
  - If a custom cable has been made, try swapping + and – control wires.
- Web pages cannot log in
  - Check that the computer IP address is compatible with the IP address of the camera. The camera IP address can be displayed on-screen via the menus. For example, if the camera IP address is 192.168.5.163 and the computer IP address is 192.168.1.xxx, they will not communicate. The computer IP address will need to be set to 192.168.5.xxx (number from 2 – 254). The computer can then access the camera and the camera address can be changed.
  - Check that the log-in Username and Password may have been changed.

Copyright Information

Warranty

For Warranty information please refer to Marshall website page:
https:marshall-usa.com/company/warranty.php