PTZOptics 12X NDI®|HX ZCAM

User Manual

Model No: PT12X-NDI-ZCAM

V1.2

(English)

Preface

Thank you for using the HD Professional Video Conferencing Camera. This manual introduces the function, installation and operation of the HD camera. Prior to installation and usage, please read the manual thoroughly.

Precautions

This product can only be used in the specified conditions in order to avoid any damage to the camera:

- Don’t subject the camera to rain or moisture.
- Don’t remove the cover. Removal of the cover may result in an electric shock, in addition to voiding the warranty. In case of abnormal operation, contact the manufacturer.
- Never operate outside of the specified operating temperature range, humidity, or with any other power supply than the one originally provided with the camera.
- Please use a soft dry cloth to clean the camera. If the camera is very dirty, clean it with diluted neutral detergent; do not use any type of solvents, which may damage the surface.

Note

This is an FCC Class A Digital device. As such, unintentional electromagnetic radiation may affect the image quality of TV in a home environment.

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Supplied Accessories

When you unpack your camera, check that all the supplied accessories are included:

- Camera 1
- AC Power Adaptor 1
- This User Manual 1

Notes

- **Electrical Safety**

  Installation and operation must be in accordance with national and local electric safety standards. Do not use any power supply other than the one originally supplied with this camera.

- **Polarity of power supply**

  The power supply output for this product is 12VDC with a maximum current supply of 2A. Polarity of the power supply plug is critical and is as follows.

- **Handling**
  - Avoid any stress, vibration, or moisture during transportation, storage, installation and operation.
  - Do not lift or move the camera by grasping the camera head. Do not turn the camera head by hand. Doing so may result in mechanical damage.
  - Do not expose camera to any corrosive solid, liquid, or gas to avoid damage to the cover which is made of a plastic material.
  - Ensure that there are no obstacles in the tilt or pan ranges of the camera lens.
  - Never power camera on before installation is complete.
- **Do not dismantle the camera** - The manufacturer is not responsible for any unauthorized modification or dismantling.

Features

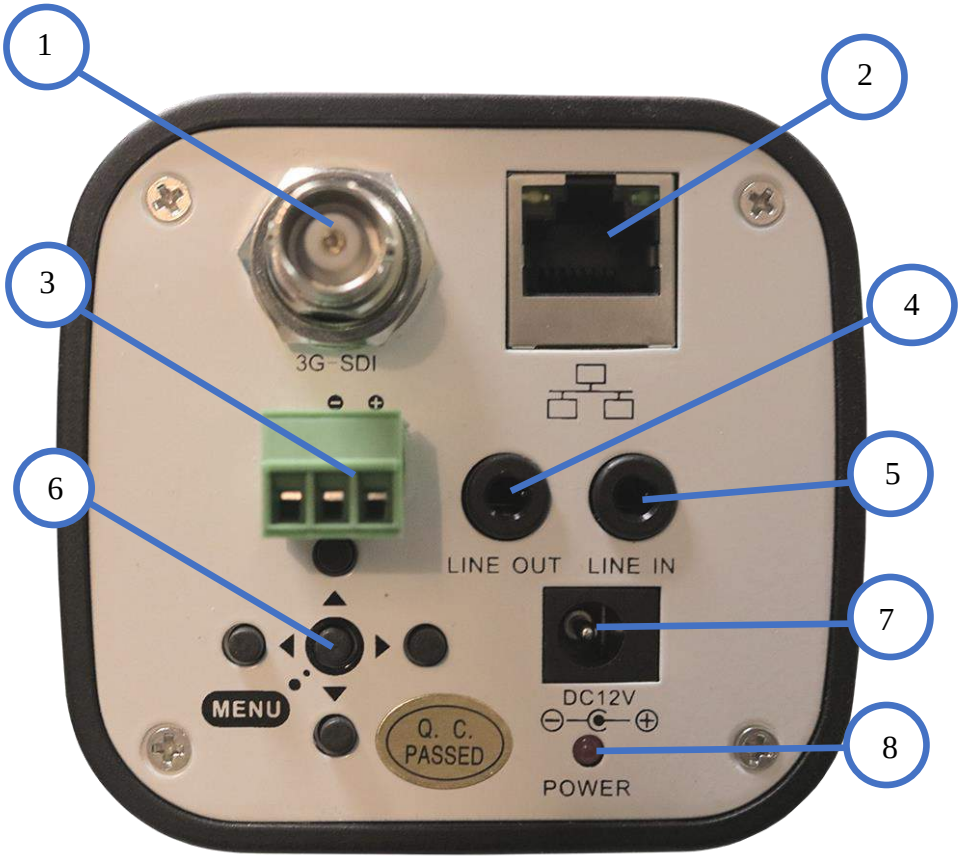
1. Supports simultaneous NDI®|HX & 3G-SDI (See Video System section for resolution & frame rate)
2. Allows for NDI®|HX control through NDI® approved platforms that offer control such as the NDI® Studio Monitor.
3. Panasonic 1/2.7” inch HD CMOS Sensor
4. 12X Optical Zoom
5. 72.5° Field of View
6. 3G-SDI High Definition Video Output up to 60 frames per second
7. 0.5 Lux @ F1.8 AGC ON
8. Full 1920x1080p HD Resolutions up to 60 frames per second
9. 2D & 3D noise reduction with our latest “low noise CMOS sensor”
10. Button controls on back of camera
11. RS485 remote camera control interface
12. H.264 IP streaming output (dual stream) up to 30 frames per second
13. Web-based IP remote camera control
14. Standard 1/4-20 female thread for camera mounting
15. Power over Ethernet – Supports PoE 802.3af
16. Hold left button on Menu Navigation for 5+ seconds to toggle Dynamic or Static IP addressing.
17. Hold up button on Menu Navigation for 5+ seconds to Zoom In
18. Hold down button on Menu Navigation for 5+ seconds to Zoom Out
19. 3-year warranty

Product Specifications

Model	PT12X-NDI-ZCAM
Type	PTZOptics 3G-SDI HD 1080p Color Video Box Camera
Features	
Video System	1080p-60/50/30/25, 1080i-60/50, 720p-60/50 (With IP stream/NDI®|HX currently limited to max 1080p30)
Sensor	Panasonic 1/2.7", CMOS, Total Pixels: 2.12M, Effective Pixels: 2.07M
Scanning Mode	Progressive
Lens	12x; f3.5mm – 42.3mm; F1.8 - F2.8
Minimal Illumination	0.5 Lux (@F1.8, AGC ON)
Shutter	1/30s - 1/10000s
White Balance	Auto, Indoor, Outdoor, One-Push, Manual
Backlight Compensation	Support
Digital Noise Reduction	2D & 3D Digital Noise Reduction
Video S/N	≥55dB
Horizontal Angle of View	6.9° - 72.5°
Vertical Angle of View	3.9° - 44.8°
Ceiling Installation	Yes
Image Mirroring	Yes
Number of Presets	255
Preset Accuracy	0.1°
Video coding standards	H.264, H.265, MJPEG
Video Freeze	Yes
Face Detection	Via Future Firmware Update
Input/Output	
HD Output	1x SDI (3G-SDI), BNC female
	1x RJ45 IP 10/100/1000 Ethernet Port
Network Interface and Output	1x RJ45: 10M/100M/1000M Adaptive Ethernet port
Audio Input	1-ch 3.5mm audio interface, LINE IN (embedded on IP Stream only)
Audio Output	Not active on this model
Control Input / Output	1x RS-485: 3pin phoenix port, Max Distance: 1500m, Protocols: VISCA/Pelco-D/Pelco-P
IP Video Features	
Video Compression	H.265/H.264/M-JPEG
Video Stream	Main Stream, Sub Stream
Main Stream Resolution	1920x1080, 1280x720, 1024x576, 960x540, 640x480, 640x360

Sub Stream Resolution	1280x720, 1024x576, 720x576, 720x480, 720x408, 640x360, 480x270, 320x240, 320x180
Video Bit Rate	32Kbps ~ 20480Kbps
Bit Rate Type	Variable Rate, Fixed Rate
Frame Rate	50Hz: 1fps ~ 50fps, 60Hz: 1fps ~ 60fps (SDI) | 50Hz: 1fps ~ 25fps, 60Hz: 1fps ~ 30fps (IP Stream)
Audio Compression	AAC
Audio Bit Rate	96Kbps, 128Kbps, 256Kbps
Support Protocols	TCP/IP, HTTP, RTSP, RTMP, DHCP, Multicast, etc.
General Specifications	
Power Connector	JEITA type (DC IN 12V) or RJ45 via PoE 802.3af
Input Voltage	12VDC (10.8 - 13.0V DC)
Current Consumption	0.5A (Max)
Operating Temperature	14°F - 104°F [-10°C ~ 40°C]
Storage Temperature	-40°F - 140°F [-40°C ~ 60°C]
Power Consumption	6W (Max)
Dimensions (w x h x d) in.	3.1” x 2.9” x 5.7” (6.3” including SDI)
Dimensions (w x h x d) mm.	78mm x 73mm x 143mm (160mm including SDI)
Weight	1.4 lbs. [0.63kg]

Main Unit



1. 3G-SDI Video Output
2. RJ-45 Network/NDI®|HX Connection
3. Phoenix Connector (RS485)
4. Audio Line Output (Not active)
5. Audio Line Input
6. Menu Navigation Buttons
7. DC12V Power Jack
8. Power LED Indicator

Serial Communication Control

- RS485 Communication Control

  The camera can be controlled via RS485, Half-duplex mode, with support for VISCA, Pelco-D or Pelco-P protocol.

  The parameters of RS485 are as follows:

  Baud rate: 2400, 4800 or 9600 bps.

  Start bit: 1 bit.

  Data bit: 8 bits.

  Stop bit: 1 bit.

  Parity bit: none.

Note: As this camera does not have pan or tilt functionality, not all of the commands in the following command list will apply.

VISCA Command List

Part 1: Camera-Issued Messages

ACK/Completion Message			
Command	**Function**	**Command Packet**	**Comments**
ACK/Completion Messages	ACK	z0 4y FF (y: Socket No.)	Returned when the command is accepted.
	Completion	z0 5y FF (y: Socket No.)	Returned when the command has been executed.

z = Camera Address + 8

Error Messages			
Command	**Function**	**Command Packet**	**Comments**
Error Messages	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 during auto focus.

Part 2: Camera Control Commands

Command	Function	Command Packet	Comments
AddressSet	Broadcast	88 30 01 FF	Address setting
IF_Clear	Broadcast	88 01 00 01 FF	I/F Clear
CAM_Power	On	8x 01 04 00 02 FF	Power ON/OFF
	Off	8x 01 04 00 03 FF	
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/Off
	Manual Focus	8x 01 04 38 03 FF	
	Auto/Manual	8x 01 04 38 10 FF	
CAM_ZoomFocus	Direct	8x 01 04 47 0p 0q 0r 0s 0t 0u 0v 0w FF	pqrs: Zoom Position 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(sharpness)	Auto	8x 01 04 05 02 FF	Sharpness Auto

	Manual	8x 01 04 05 02 FF	Sharpness Manual
CAM_Aperture(sharpness)	Reset	8x 01 04 02 00 FF	Aperture Control
	Up	8x 01 04 02 02 FF	
	Down	8x 01 04 02 03 FF	
	Direct	8x 01 04 42 00 00 0p 0q FF	pq: Aperture Gain
CAM_PictureEffect	Off	8x 01 04 63 00 FF	Picture Effect Setting
	B&W	8x 01 04 63 04 FF	
CAM_Memory	Reset	8x 01 04 3F 00 pp FF	pp: Memory Number(=0 to 127)
	Set	8x 01 04 3F 01 pp FF	
	Recall	8x 01 04 3F 02 pp FF	
CAM_LR_Reverse	On	8x 01 04 61 02 FF	Image Flip 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_RegisterValue	-	8x 01 04 24 mn 0p 0q FF	mm: Register No. (=00-7F) pp: Register Value (=00-7F)
CAM_ColorGain	Diret	8x 01 04 49 00 00 00 0p FF	p: Color Gain setting 0h (60%) to Eh (200%)
SYS_Menu	Off	8x 01 06 06 03 FF	Turns off the menu screen
Pan_tiltDrive	Up	8x 01 06 01 VV WW 03 01 FF	VV: Pan speed 0x01 (low speed) to 0x18 (high speed) WW: Tilt speed 0x01 (low speed) to 0x14 (high speed) YYYY: Pan Position ZZZZ: Tilt Position
	Down	8x 01 06 01 VV WW 03 02 FF	
	Left	8x 01 06 01 VV WW 01 03 FF	
	Right	8x 01 06 01 VV WW 02 03 FF	
	Upleft	8x 01 06 01 VV WW 01 01 FF	
	Upright	8x 01 06 01 VV WW 02 01 FF	
	DownLeft	8x 01 06 01 VV WW 01 02 FF	
	DownRight	8x 01 06 01 VV WW 02 02 FF	
	Stop	8x 01 06 01 VV WW 03 03 FF	
	AbsolutePosition	8x 01 06 02 VV WW 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF	
	RelativePosition	8x 01 06 03 VV WW 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF	
	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 0: DownLeft YYYY: Pan Limit Position 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	Single Command For Video Flip
	Flip-H	8x 01 04 A4 01 FF	
	Flip-V	8x 01 04 A4 02 FF	
	Flip-HV	8x 01 04 A4 03 FF	
CAM_SettingSave	Save	8x 01 04 A5 10 FF	Save Current Setting
CAM_Iridix	Direct	8x 01 04 A7 00 00 0p 0q FF	pq: Iridix Position
CAM_AWBSensitivity	High	8x 01 04 A9 00 FF	High
	Normal	8x 01 04 A9 01 FF	Normal
	Low	8x 01 04 A9 02 FF	Low
CAM_AFZone	Top	8x 01 04 AA 00 FF	AF Zone weight select
	Center	8x 01 04 AA 01 FF	
	Bottom	8x 01 04 AA 02 FF	
CAM_ColorHue	Direct	8x 01 04 4F 00 00 00 0p FF	p: Color Hue setting 0h (− 14 degrees) to Eh (+14 degrees

Part 3: Query Commands

Inquiry Command List			
Command	**Command packed**	**Inquiry Packet**	**Comments**
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	Auto Focus
		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_Nosise2DModeIng	8x 09 04 50 FF	y0 50 02 FF	Auto Noise 2D
		y0 50 03 FF	Manual Noise 3D
CAM_Nosise2DLevel	8x 09 04 53 FF	y0 50 0p FF	Noise Reduction (2D) p: 0 to 5
CAM_Noise3DLevel	8x 09 04 54 FF	y0 50 0p FF	Noise Reduction (3D) 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(00: VHD, 01:MR, 08:T) cd: Hardware Version mnpq: ARM Version rstu: FPGA Version vw: Camera model 01: C Type 02: M Type 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 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
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 dater: Big Version Numbers: Little Version Numberuuuu: Yearvv: Monthww: 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_AFSensitivityInq	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_IridixInq	8x 09 04 A7 FF	y0 50 00 00 0p 0q FF	pq: Iridix 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
CAM_AWBSensitivityInq	8x 09 04 A9 FF	y0 50 00 FF	High
		y0 50 01 FF	Normal
		y0 50 02 FF	Low

Block Inquiry Command List			
Command	**Command packed**	**Inquiry Packet**	**Comments**
CAM_LensBlockInq	8x 09 7E 7E 00 FF	y0 50 0u 0u 0u 0u 00 00 0v 0v 0v 0v 00 0w 00 FF	uuuu: Zoom Position vvvv: Focus Position w.bit0: Focus Mode 1: Auto 0: Manual
CAM_CameraBlockInq	8x 09 7E 7E 01 FF	y0 50 0p 0p 0q 0q 0r 0s tt 0u vv ww 00 xx 0z FF	pp: R_Gain qq: B_Gain r: WB Mode s: Aperture tt: AE Mode u.bit2: Back Light u.bit1: Exposure Comp. vv: Shutter Position ww: Iris Position xx: Bright Position z: Exposure Comp. Position
CAM_OtherBlockInq	8x 09 7E 7E 02 FF	y0 50 0p 0q 00 0r 00 00 00 00 00 00 00 00 00 FF	p.bit0: Power 1:On, 0:Off q.bit2: LR Reverse 1:On, 0:Off r.bit3~0: Picture Effect Mode
CAM_EnlargementBlockInq	8x 09 7E 7E 03 FF	y0 50 00 00 00 00 00 00 00 0p 0q rr 0s 0t 0u FF	p: AF sensitivity q.bit0: Picture flip(1:On, 0:Off) rr.bit6~3: Color Gain(0h(60%) to Eh(200%)) s: Flip(0: Off, 1:Flip-H, 2:Flip-V, 3:Flip-HV) t.bit2~0: NR2D Level u: Gain Limit

Note:

The [x] in the above table is the camera address, [y] = [x + 8].

Part 4: VISCA over IP Command List

Command	Function	Command Packet	Comments
CAM_Zoom	Stop	81 01 04 07 00 FF	
	Tele (Standard)	81 01 04 07 02 FF	
	Wide (Standard)	81 01 04 07 03 FF	
	Tele (Variable)	81 01 04 07 2p FF	p = (low) – 7 (high)
	Wide (Variable)	81 01 04 07 3p FF	
	Direct	81 01 04 47 p q r s FF	pqrs: Zoom Position
CAM_Focus	Stop	81 01 04 08 00 FF	
	Far (Standard)	81 01 04 08 02 FF	
	Near (Standard)	81 01 04 08 03 FF	
	Far (Variable)	81 01 04 08 2p FF	p = (low) – 7 (high)
	Near (Variable)	81 01 04 08 3p FF	
	Direct	81 01 04 48 p q r s FF	pqrs: Focus Position
	Auto Focus	81 01 04 38 02 FF	
	Manual Focus	81 01 04 38 03 FF	
	Auto/Manual Toggle	81 01 04 38 10 FF	
	Focus Lock	81 0a 04 68 02 FF	Prevents any other operation or command from adjusting the current focus state
	Focus Unlock	81 0a 04 68 03 FF	
CAM_WB	Auto	81 01 04 35 00 FF	Normal Auto
	Indoor Mode	81 01 04 35 01 FF	Indoor Mode
	Outdoor Mode	81 01 04 35 02 FF	Outdoor Mode
	OnePush Mode	81 01 04 35 03 FF	OnePush WB Mode
	Manual	81 01 04 35 05 FF	Manual Control Mode
	OnePush Trigger	81 01 04 10 05 FF	OnePush WB Trigger
CAM_RGain	Reset	81 01 04 03 00 FF	Manual Control of R Gain
	Up	81 01 04 03 02 FF	
	Down	81 01 04 03 03 FF	
	Direct	81 01 04 43 00 00 p q FF	pq: R Gain
CAM_BGain	Reset	81 01 04 04 00 FF	Manual Control of B Gain
	Up	81 01 04 04 02 FF	
	Down	81 01 04 04 03 FF	
	Reset	81 01 04 44 00 00 p q FF	pq: B Gain
CAM_AE	Full auto	81 01 04 39 00 FF	Automatic Exposure mode
	Manual	81 01 04 39 03 FF	Manual Control mode
	Shutter Priority	81 01 04 39 0A FF	Shutter Priority Automatic Exposure mode
	Iris Priority	81 01 04 39 0B FF	Iris Priority Automatic Exposure mode
	Bright	81 01 04 39 0D FF	Bright Mode (Manual control)

CAM_Iris	Reset	81 01 04 0B 00 FF	Iris Setting
	Up	81 01 04 0B 02 FF	
	Down	81 01 04 0B 03 FF	
	Direct	81 01 04 4B 00 00 p q FF	pq: Iris Position
CAM_Shutter	Reset	81 01 04 0A 00 FF	Default Shutter Setting
	Up	81 01 04 0A 02 FF	
	Down	81 01 04 0A 03 FF	
	Direct	81 01 04 4A 00 00 p q FF	pq: Shutter Position
CAM_Backlight	On	81 01 04 33 02 FF	Back Light Compensation On/Off
	Off	81 01 04 33 03 FF	
CAM_Flicker	-	81 01 04 23 0p FF	p: Flicker Settings – (0: Off, 1: 50Hz, 2: 60Hz)
CAM_PictureEffect	Off	81 01 04 63 00 FF	Picture Effect Setting
	B&W	81 01 04 63 04 FF	
CAM_Memory	Reset	81 01 04 3F 00 pp FF	pp: Memory Number(Hex 0,0 – 3,F)
	Set	81 01 04 3F 01 pp FF	
	Recall	81 01 04 3F 02 pp FF	
Preset Recall Speed	Preset Speed	81 01 06 01 p FF	p: is speed grade,the values are (0x1~0x18）
CAM_LR_Reverse	On	81 01 04 61 02 FF	Image Flip Horizontal On/Off
	Off	81 01 04 61 03 FF	
CAM_PictureFlip	On	81 01 04 66 02 FF	Image Flip Vertical On/Off
	Off	81 01 04 66 03 FF	
Pan Tilt Drive	Up	81 01 06 01 VV WW 03 01 FF	VV: Pan Speed 0x01 (Low) to 0x18 (high) WW: Tilt Speed 0x01 (Low) to 0x18 (high)
	Down	81 01 06 01 VV WW 03 02 FF	
	Left	81 01 06 01 VV WW 01 03 FF	
	Right	81 01 06 01 VV WW 02 03 FF	
	Up Left	81 01 06 01 VV WW 01 01 FF	
	Up Right	81 01 06 01 VV WW 02 01 FF	
	Down Left	81 01 06 01 VV WW 01 02 FF	
	Down right	81 01 06 01 VV WW 02 02 FF	
	Stop	81 01 06 01 VV WW 03 03 FF	
	Absolute Position	81 01 06 02 VV WW Y Y Y Y Z Z Z Z FF	YYYY: Pan Position WWWW: Tilt Position
	Relative Position	81 01 06 03 VV WW Y Y Y Y Z Z Z Z FF	
	Home	81 01 06 04 FF	
	Reset	81 01 06 05 FF	
CAM_Brightness	Direct	81 01 04 A1 00 00 0p 0q FF	pq: Brightness Position
CAM_Contrast	Direct	81 01 04 A2 00 00 0p 0q FF	pq: Contrast Position

CAM-Flip	Off	81 01 04 A4 00 FF	Single Command For Video Flip
	Flip-H	81 01 04 A4 01 FF	
	Flip-V	81 01 04 A4 02 FF	
	Flip-HV	81 01 04 A4 03 FF	
CAM_SettingSave	Save	81 01 04 A5 10 FF	Save Current Setting
CAM_AWBSensitivity	High	81 01 04 A9 00 FF	High
	Normal	81 01 04 A9 01 FF	Normal
	Low	81 01 04 A9 02 FF	Low
CAM_AFZone	Top	81 01 04 AA 00 FF	AF Zone priority select
	Center	81 01 04 AA 01 FF	
	Bottom	81 01 04 AA 02 FF	
CAM_ColorHue	Direct	81 01 04 4F 00 00 00 0p FF	p: Color Hue 0h (−14 degrees) to Eh (+14 degrees)
OSD_Control	Open/Close	81 01 04 3F 02 5F FF	

Part 5: VISCA over IP Query Commands

Command	Command Package	Return Package	Note
CAM_ZoomPosInq	81 09 04 47 FF	90 50 p q r s FF	pqrs: Zoom Position
CAM_FocusAFModeInq	81 09 04 38 FF	90 50 02 FF	Auto Focus
		90 50 03 FF	Manual Focus
CAM_FocusPosInq	81 09 04 48 FF	90 50 0p 0q 0r 0s FF	pqrs: Focus Position
CAM_WBModeInq	81 09 04 35 FF	90 50 00 FF	Auto
		90 50 01 FF	Indoor Mode
		90 50 02 FF	Outdoor Mode
		90 50 03 FF	OnePush Mode
		90 50 05 FF	Manual
CAM_RGainInq	81 09 04 43 FF	90 50 00 00 0p 0q FF	pq: R Gain
CAM_BGainInq	81 09 04 43 FF	90 50 00 00 0p 0q FF	pq: R Gain
CAM_AEModeInq	81 09 04 39 FF	90 50 00 FF	Full Auto
		90 50 03 FF	Manual
		90 50 0A FF	Shutter Priority (SAE)

		90 50 0B FF	Iris Priority (AAE)
		90 50 0D FF	Bright
CAM_ShutterPosInq	81 09 04 4A FF	90 50 00 00 0p 0q FF	pq: Shutter Position
CAM_IrisPosInq	81 09 04 4B FF	90 50 00 00 0p 0q FF	pq: Iris Position
CAM_BrightPosInq	81 09 04 4D FF	90 50 00 00 0p 0q FF	pq: Bright Position
CAM_ExpCompModeInq	81 09 04 3E FF	90 50 02 FF	On
		90 50 03 FF	Off
CAM_ExpCompPosInq	81 09 04 4E FF	90 50 00 00 0p 0q FF	pq: ExpComp Position
CAM_BacklightModeInq	81 09 04 33 FF	90 50 02 FF	On
		90 50 03 FF	Off
CAM_Noise2DModeInq	81 09 04 50 FF	90 50 02 FF	Auto Noise 2D
		90 50 03 FF	Manual Noise 2D
CAM_Noise2DLevel	81 09 04 53 FF	90 50 0p FF	Noise Reduction (2D) p: 0 to 5
CAM_Noise3DLevel	81 09 04 54 FF	90 50 0p FF	Noise Reduction (3D) p: 0 to 8
CAM_FlickerModeInq	81 09 04 55 FF	90 50 0p FF	p: Flicker Settings(0: OFF, 1: 50Hz, 2: 60Hz)
CAM_ApertureModeInq (Sharpness)	81 09 04 05 FF	90 50 02 FF	Auto Sharpness
		90 50 03 FF	Manual Sharpness
CAM_ApertureInq	81 09 04 42 FF	90 50 00 00 0p 0q FF	pq: Aperture Gain
CAM_PictureEffectModeInq	81 09 04 63 FF	90 50 02 FF	Off
		90 50 04 FF	B&W
CAM_LR_ReverseInq	81 09 04 61 FF	90 50 02 FF	On
		90 50 03 FF	Off
CAM_PictureFlipInq	81 09 04 66 FF	90 50 02 FF	On
		90 50 03 FF	Off
CAM_ColorGainInq	81 09 04 49 FF	90 50 00 00 00 0p FF	p: Color Gain setting 0h (60%) to Eh (200%)

CAM_PanTiltPosInq	81 09 06 12 FF	90 50 0w 0w 0w 0w	wwww: Pan Position
		0z 0z 0z 0z FF	zzzz: Tilt Position
CAM_GainLimitInq	81 09 04 2C FF	90 50 0q FF	p: Gain Limit
CAM_BrightnessInq			
CAM_ContrastInq			
CAM_FlipInq	81 09 04 A4 FF	90 50 00 FF	Off
		90 50 01 FF	Flip-H
		90 50 02 FF	Flip-V
		90 50 03 FF	Flip-HV
CAM_AFZone	81 09 04 AA FF	90 50 00 FF	Top
		90 50 01 FF	Center
		90 50 02 FF	Bottom
CAM_ColorHueInq	81 09 04 4F FF	90 50 00 00 00 0p FF	p: Color Hue setting 0h (−14 dgrees) to Eh (+14 degrees)
CAM_AWBSensitivityInq	81 09 04 A9 FF	90 50 00 FF	High
		90 50 01 FF	Normal
		90 50 02 FF	Low

Part 6: 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

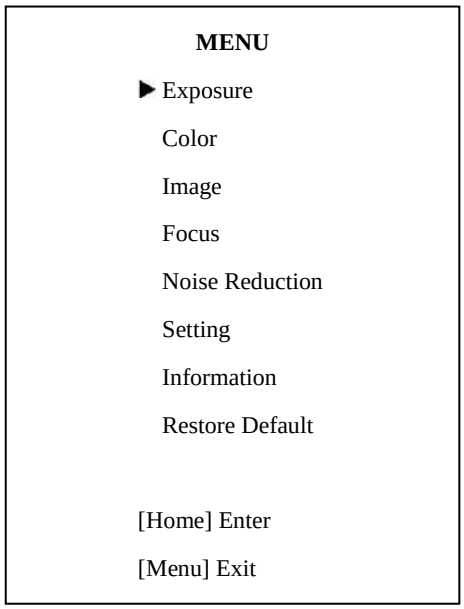
Part 7: Pelco-P Protocol Command List

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

Menu Settings

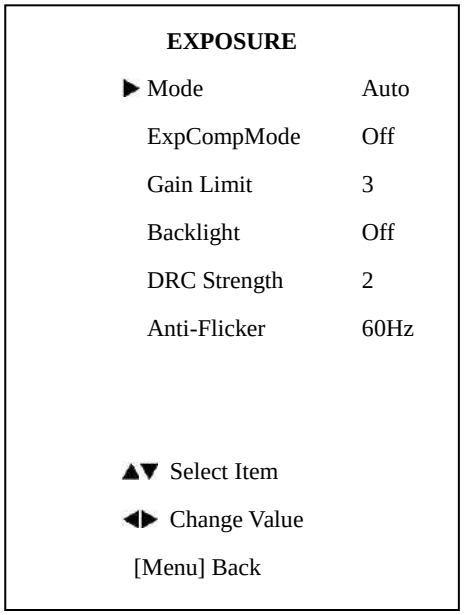
1. MENU

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



2. EXPOSURE

Move the cursor to the Exposure item in the main menu and press [HOME] button. The EXPOSURE menu appears, as shown in the following figure.



Mode: Exposure mode. Optional items: Auto, WDR, Bright, AAE, SAE, Manual

ExpCompMode: Exposure compensation mode, Optional items: On, Off (Effective only in Auto mode). ExpComp: Exposure compensation value, Optional items: -7 ~ 7(Effective only when ExpCompMode is On)

Backlight: Set the backlight compensation, Optional items: On, Off (Effective only in Auto mode)

Gain Limit: Maximum gain limit. Optional items: 0 ~ 15 (Effective only in WDR, Bright, AAE modes)

Anti-Flicker: Anti-flicker. Optional items: On, Off, 50Hz, 60Hz (Effective only in Auto, Bright mode)

DRC: Dynamic Range Control Strength, Optional items: 0 ~ 8.

Bright: Intensity control, Optional items: 00~17. (Effective only in Bright mode)

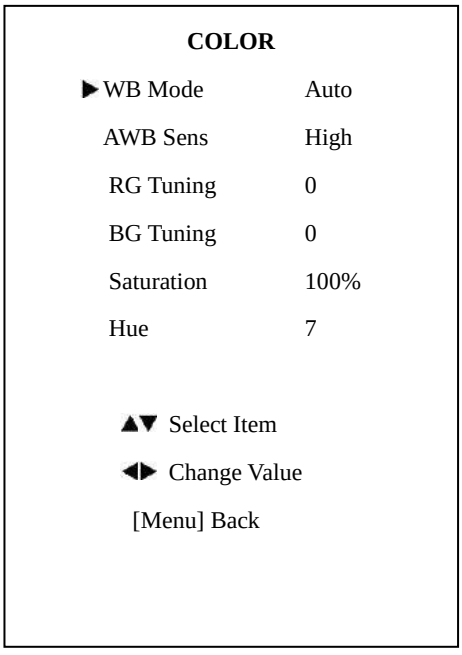
Iris: Aperture value. Optional items: F1.8, F2.0, F2.4, F2.8, F3.4, F4.0, F4.8, F5.6, F6.8, F8.0, F9.6, F11.0, Close（Effective only in AAE, Manual mode）

Shutter: Shutter value. Optional items: 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 (Effective only in SAE, Manual mode)

Strength: Wide Dynamic Range strength. Optional items: 0-6

3. COLOR

Move the cursor to the Color item in the main menu and press [HOME] button, COLOR menu appears, as shown in the following figure.



WB-Mode: White balance mode. Optional items: Auto, VAR, Manual, One Push, Outdoor & Indoor

R Gain: Red gain. Optional items: 0~255（Effective only in Manual mode）

B Gain: Blue gain. Optional items: 0~255 (Effective only in Manual mode）

RG Tuning: Red gain fine-tuning, Optional items: -10 ~ +10（Effective only in Auto, VAR, & One Push mode）

BG Tuning: Blue gain fine-tuning, Optional items: -10 ~ +10（Effective only in Auto, VAR, & One Push mode）

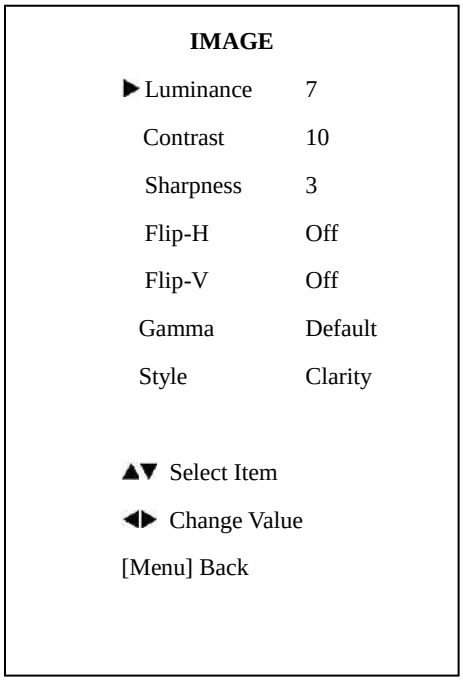
Saturation: Color Saturation. Optional items: 60% ~ 200%.

Hue: Chroma adjustment, Optional items:0 ~ 14

AWB sens: The white balance sensitivity, Optional items: Low, Middle, High.

4. IMAGE

Move the cursor to the Image item in the main menu and press [HOME] button, IMAGE menu appears, as shown in the following figure.



Luminance: Brightness adjustment. Optional items: 0 ~ 14

Contrast: Contrast adjustment. Optional items: 0 ~ 14

Sharpness: Sharpness adjustment. Optional items: 0 ~ 15

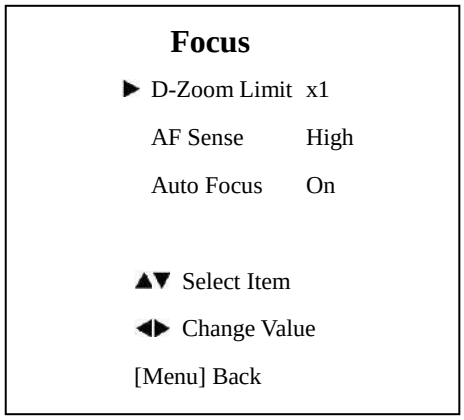
Flip-H: Image flipped horizontally. Optional items: On, Off

Flip-V: Image Flip Vertical. Optional items: On, Off

Gamma: Optional items: Default, 0.45, 0.5, 0.56, 0.63

Style: Image presets. Optional items: Soft, 5S, Clarity (LED), Norm, Clarity, Bright

5. Focus



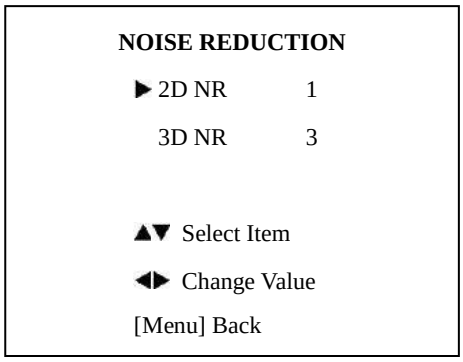
D-Zoom Limit: Amount of digital zoom. Optional items: x1, x2, x4, x8, & x16

AF Sense: Automatic focusing sensitivity options, Optional items: Low, Middle, High

Auto Focus: Enables auto focus, Optional items: On, Off

6. NOISE REDUCTION

Move the cursor to the Noise Reduction item in the main menu and press [HOME] button, NOISE REDUCTION menu appears, as shown in the following figure.

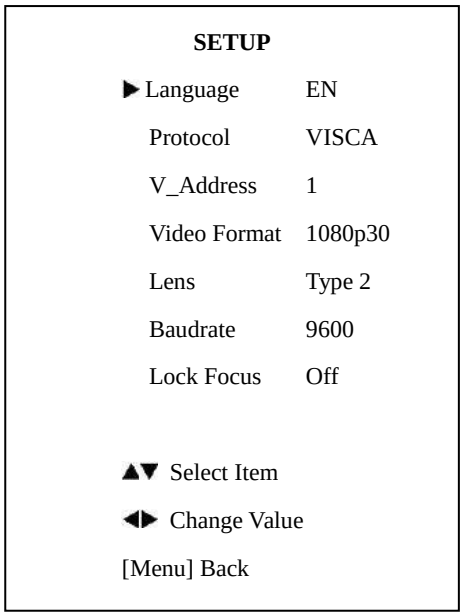


NR2D-Level: 2D noise reduction. Optional items: Close, Auto, 1 ~ 5

NR3D-Level: 3D noise reduction. Optional items: Close, 1 ~ 8

7. SETUP

Move the cursor to the Setup item in the main menu and press [HOME] button, SETUP menu appears, as shown in the following figure.



Language: Menu language, Optional items: EN, Chinese, Russian

Protocol: Control protocol type. Optional items: VISCA, PELCO-D, PELCO-P

V_Address: VISCA address, Decided according to the argument of Protocol; Optional items: VISCA (1~7), PELCO-D (0~254), PELCO-P (0~31)

Baudrate: Serial port baud rate. Optional items: 2400, 4800, 9600

P_D_Address: PELCO-D address; Optional items: 0 ~ 254

P_P_Address: PELCO-P address; Optional items: 0 ~ 31

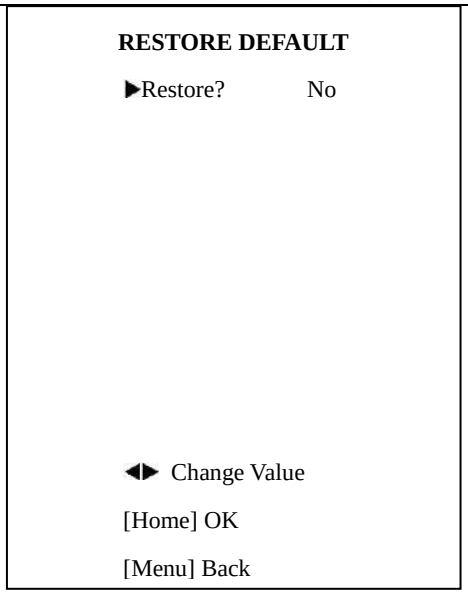
Video Format: Change resolution & frame rate, Optional items: 1080p60, 1080p30 720p60, 1080i60

Lens: Optional items: Type 1, Type 2

Lock Focus: Locks current focus position. Optional items: Off, On

8. RESTORE DEFAULT

Move the cursor to the Restore Default item in the main menu and press [HOME] button, RESTORE DEFAULT menu appears, as shown in the following figure.



Restore: Reset all settings to factory default settings. Optional items: Yes, No

Note: Press [HOME] button to confirm, All parameters are then restored to default values, including IR Remote address, VISCA Address and Pelco addresses.

9. Saving

Save: Save setting changes. Optional items: Yes, No

Network Connection

1. Operating Environment

Operating System: Windows 2000/2003/XP/Vista/7/8.1/10

Network Protocol: TCP/IP

Client PC: P4/128M RAM/40G HD/ support for scaled graphics card, support for DirectX 8.0 or more advanced version.

2. Equipment Installation

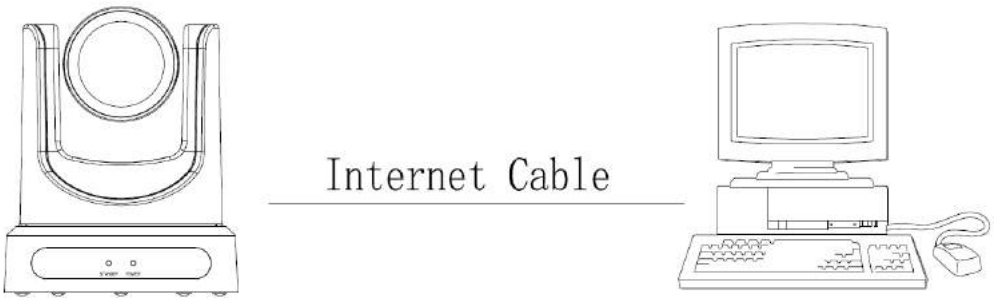
1) Connect camera to your network via a CAT5 or CAT6 patch cable or directly to your PC via a CAT5 or CAT6 crossover cable.

2) Turn on camera power.

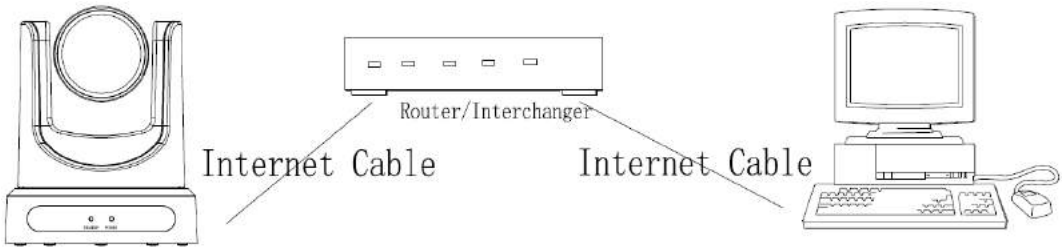
3) If successful, the orange network light will illuminate and the green light will start flashing. If unsuccessful, the patch cable is bad, you are using the wrong cable (patch *aka "straight-thru"* cable for connection through a LAN; crossover for a direct PC connection) or you have connected to an inactive network jack.

3. Network Connection

Connection method between network camera and computer, as in pictures 1.1 and 1.2, below:



Picture 1.1 Direct connections via "cross-over" network cable

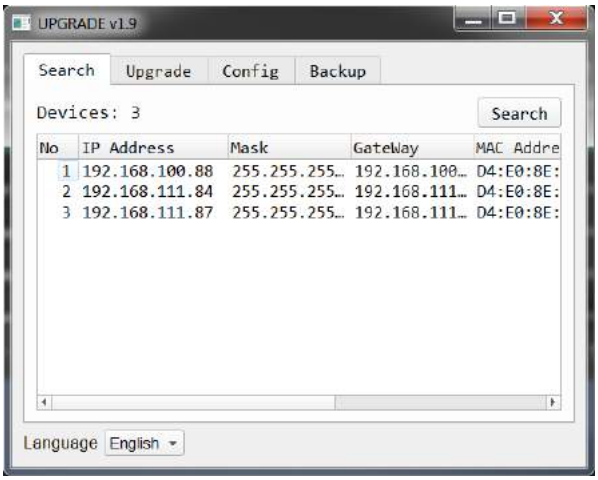


Picture 1.2 Connections to LAN via patch cable to LAN wall jack or LAN switch

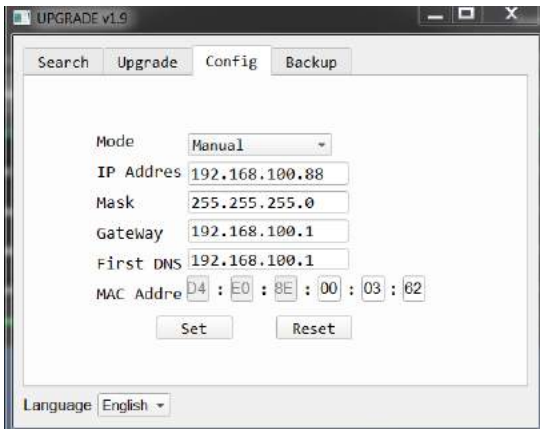
Setting up a Network Video Stream with the PTZOptics camera

(Also see information on camera web information in the following section)

1. The first thing you are going to want to do to get your camera up and streaming on your network is to connect your camera to power, to an active network port on your network and finally to power the camera on.
2. Next, go online and download the IP address setting tool, for Windows Operating Systems, from the PTZOptics Download Page. Once you complete the installation and launch the tool "UPGRADE v2.7" you should be able to click the "Search" button to locate all of the available PTZOptics cameras on your network.

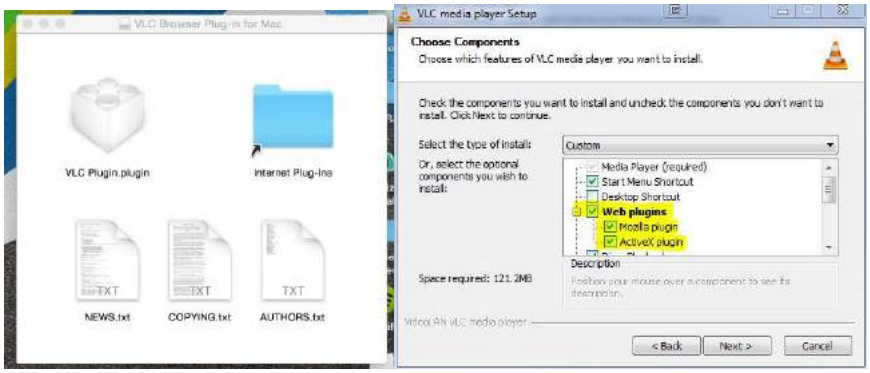


3. The next thing you would want to do is change your cameras IP address to be in the same range as your network. The camera comes with a default static IP address of 192.168.100.99. You will need to update that to be in the same range as your network. If you look at my example above, you can see, from other cameras on my network, that my network is set up to be in the range of 192.168.111.XXX. *Please see the "Extras" section at the end of this document for further information on finding your network IP scheme*
4. Once you know your IP range you can right click on the camera you wish to change the IP address for and click "config". *NOTE: if you need to find the IP range of your network, you can do so by following the guide in the extras section at the end of this document.*



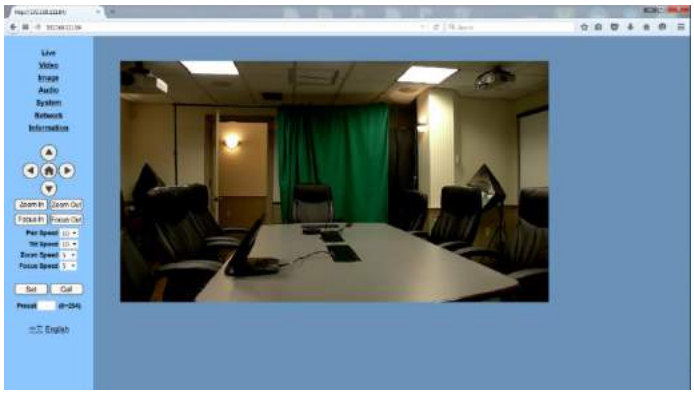
You should now be able to set your cameras IP address to one in the range of your network. You should be able to leave the subnet mask alone, unless you are configuring the camera for use across (example: 192.168.111.1)
(Note that in more complex network environments you may have to request a "STATIC IP" from the IT department to prevent any possible complications on your network in addition to the appropriate Network Mask, Default Gateway and First DNS for that Static IP)

5. Now that you have set the Static IP address of your PTZOptics camera, you should be able to pull up the video feed in a web browser. *We recommend using Mozilla Firefox ESR. You can view our* knowledge base article *for setup.*
6. If you go into the browsers mentioned above and type in the Static IP address you assigned to your camera, in step 4, you will be prompted for a Username and Password, both are "admin" by default.
7. You may be prompted to download the VLC Player Plugin; be sure to allow for both the Mozilla plugin and the ActiveX plugin if on a PC. If you are on a MAC, you need to move the VLC plugin, once downloaded, into the internet plugins folder. See the images below for further clarification.

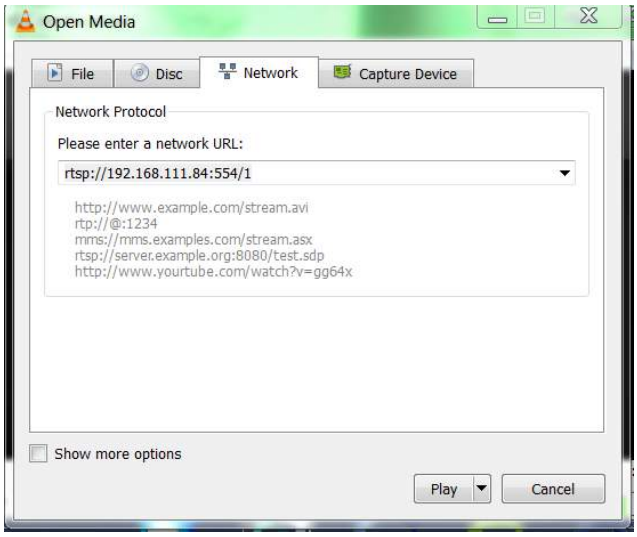


8. You should now be able to see the IP interface in the recommended browser with your live camera feed. You should have full PTZ control over your camera using the PTZ controls on the left side. You can adjust many of your camera's settings via the IP interface.

The main thing to note about the IP interface is that all adjustments will occur on the IP stream only. It will not affect the HDMI, SDI or USB connections of the camera. In addition, presets set in the IP interface will not be the same as the IR remote presets and vice-versa.



9. You should now be able to receive an RTSP stream from your camera. The following video, https://www.youtube.com/watch?v=hmqI0hjT0UI&feature=youtu.be, shows how to setup an RTSP stream in Wirecast. You'll see how to use ONVIF to easily set up 2 PTZOptics cameras with Wirecast, the ONVIF feature must be enabled in the "Network" settings for ONVIF discovery, in addition to setting up a standard RTSP stream.
10. You can test the RTSP stream in VLC media player. Once you install VLC and launch the program you should be able to go to the "Media" drop down menu and then select "Open Network Stream". In the network URL, you should enter "rtsp://<ip-address>:554/1". In the example below, for a PTZOptics camera with the static IP address of 192.168.111.84, the RTSP stream would accessed by entering rtsp://192.168.111.84:554/1. The "554" part is the port number used by the cameras, and the "1" is the stream number. (There are two RTSP network streams available; one for HD content "1" and one for SD content "2")



EXTRAS

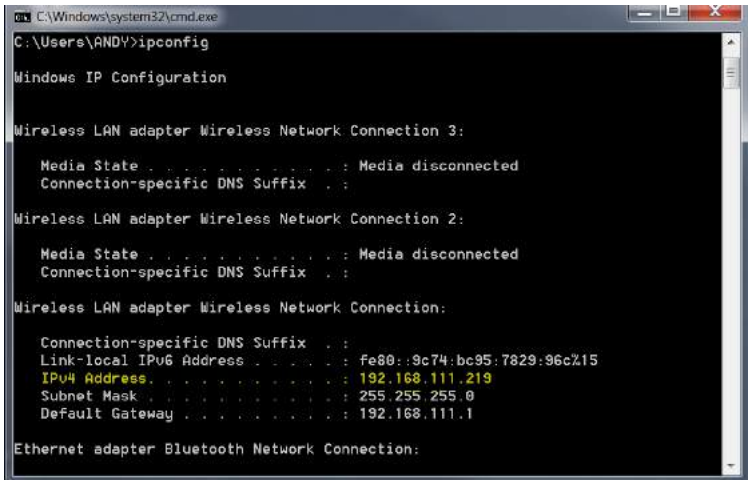
1. **Discovering your Network IP range**. *NOTE: Changing your IP address without talking to your network admin could lead to conflicts with your network. If you change your address to one that is already is use it will cause communication problems.*

If you need to discover the IP address range of your network you can do so by using command prompt for Windows or Terminal for Macs.

To do this on a PC, you would type “CMD” into your search bar in the Windows menu. You should see a black box pop up with the ability to type in the box.

If you type “ipconfig” and hit “Enter” on your keyboard you will see a bunch of information pop up in your command prompt.

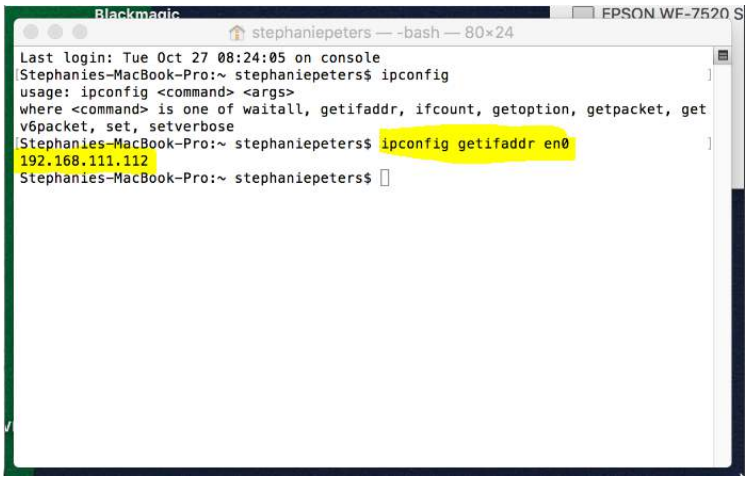
When you see “IPV4 Address” that is your computers IP address on your current network. So you would use the first 3 sets of numbers from this as your IP range.



If you need to find the IP range of your MAC computer, you would first open a new finder window and then go to Applications, and then Utilities. You should see the program “Terminal” in that menu, select that program.

Now, you would type in “IP config getifaddr en0” Once you type this string and click “Enter” on your keyboard you will receive back an IP address.

So the IP range of my network, according to my MAC is 192.168.111.xxx, you can use this to figure out the IP range in which your camera needs to be set.



Camera Web Interface

1 Homepage introduction

1.1 Home Page

All pages include 2 areas:

On the left is the menu and camera control

On the right is real time monitoring - displaying video image and the Parameter settings

1.2 Video viewing window

Click "**Live**" in the menu area. The video viewing window will be resized based upon video resolution, the higher the resolution is, the bigger the playing area is. Double click the viewing window and it will show in full-screen. Double click again and it will return to the initial size.

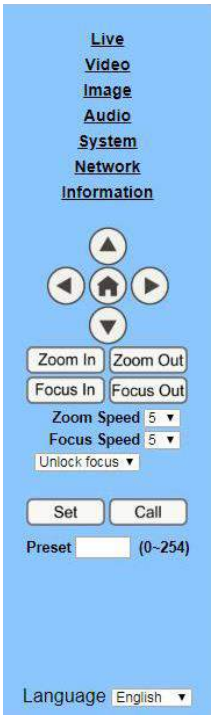
The Status bar in the viewing window is as shown below:

1）Video playback/pause button: controls real-time video. Pause to freeze the image, play to return to live video.

2）Audio control buttons: Mute and Volume controls for audio input on camera, if being used.

3）Full screen button will switch between Full Screen and Windowed view.

1.3 Menu & Control



1) Pan and Tilt control: Up, Down, Left and Right arrows and the home button allow for control over the OSD Menu. Click the home button to open the OSD Menu.

2) Zoom: Zoom in and Zoom out buttons allow for wide or narrow (tele) views of the space.

3) Focus: Focus In and Focus Out buttons allow for fine manual focus adjustment if the camera has any problems autofocusing on a difficult object.

4) Speed Control: Zoom and Focus speeds can be set at any rate between 0 – 7.

5) PTZ Presets: After manually setting up a shot that you would like to return to later, you can save presets for quick recall of these positions. Type a number between 0 and 254 into the Preset box. Click the "Set" button to save the current location with that preset number. Click the “Call” button to cause the camera to return to that position. This enables smooth, quick and convenient control without the need to manually drive the camera.

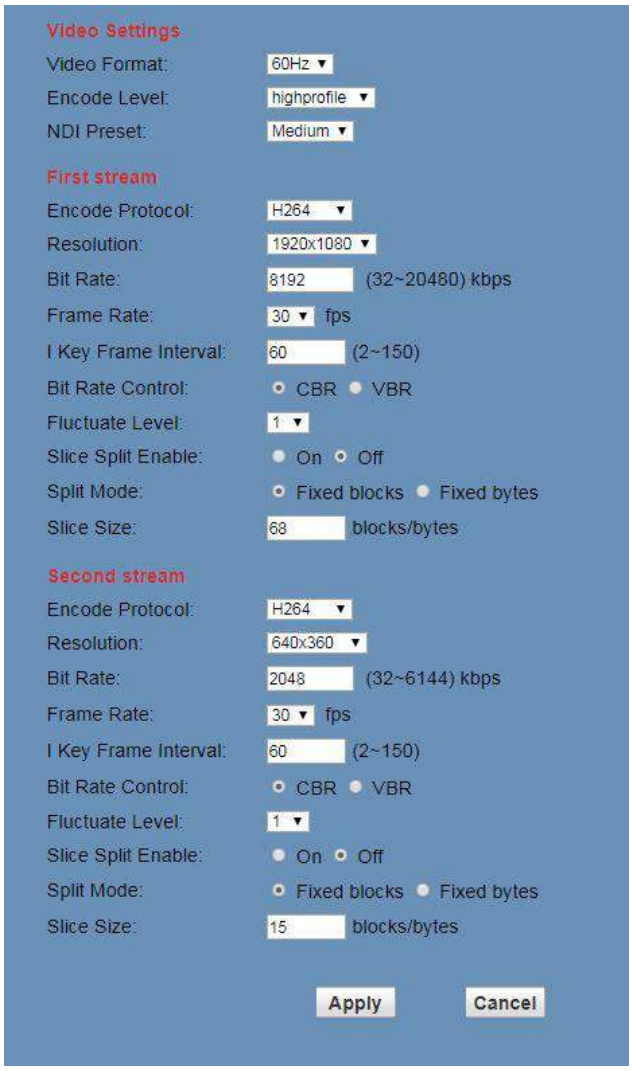
1.4 Language selection

Click either “Russian”, “Chinese” or “English” to change the language of the menu.

1 Media

1.1 Video Setup

Click "Video". The streaming parameters may now be set in the right side area. The camera can send 2 simultaneous streams. For example, you can send one stream in HD and one in SD so that both PCs and phones may have their own stream resolution.



1) **Video Settings**

Video format

Supports 50HZ(PAL) and 60HZ(NTSC) and OSD formats. 60Hz is used for North America.

Video Coding

You must select both Encode Protocol and Encode Level for H.264. Camera streaming supports either H.264 - with choice of "baseline", "mainprofile" and "highprofile" formats or H.265 video encoding (Note H.265 will override and lockout some other video settings).

2) **First Stream**

Resolution

Set the desired video stream resolution. The first stream allows 1920x1080, 1280x720, 1024x576, 960x540, 640x480, 640x360. The second stream allows for 1280x720, 1024x576, 720x480, 720x408, 640x360, 480x270, 320x240, or 320x180. Higher resolutions will consume more bandwidth.

Bit Rate

Users can assign the bit rate of the stream (from 32 – 20480 kbps for 1st stream and 32-6144 kbps for 2nd stream). Higher bit rates will provide for a higher quality image, if your network bandwidth is sufficient to support the rate.

Maximum frame rate:

Users can specify the maximum frame rate (fps or frames per second). Higher frame rates provide smoother video but require higher bit rate settings.

I key frame interval:

Affects the quality of the video compression. This setting defines how many predicted frames will be used for each actual frame (from 2-150). Shorter intervals increase video quality at the cost of requiring higher bit rates in order to look good.

Bit Rate Control method:

Constant bit rate: video encoder will encode at a constant rate as set in bitrate setting

Variable bit rate: video encoder will encode at a variable rate with maximum as set in bit rate setting, allowing for low motion scenes to use less bandwidth.

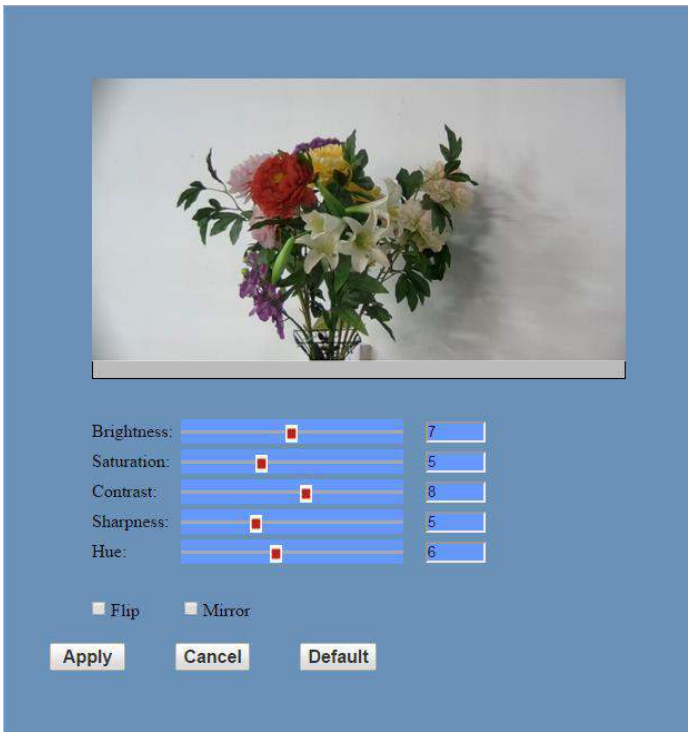
Fluctuate level

This setting affects how aggressive variable bit rate adjustments will be (1-6). Spikes that are too large may affect video quality. Low levels will not save on as much bandwidth.

3) **Second Stream** (See parameters above for first stream).

1.2 Image Setup

Click “Image”. The image parameters may now be set in the right side area.



Brightness

Image brightness 0-14. Use the slider control. The box on the right shows the corresponding numerical value. The Default setting is 7.

Saturation

Color Saturation 0-14. Use the slider control. The box on the right shows the corresponding numerical value. The Default setting is 4.

Contrast

Contrast 0-14. Use the slider control. The box on the right shows the corresponding numerical value. The Default setting is 10.

Sharpness

Sharpness 0-15. Use the slider control. The box on the right shows the corresponding numerical value. The Default setting is 3.

Hue

Hue 0-14. Use the slider control. The box on the right shows the corresponding numerical value. The Default setting is 7.

Flip & Mirror

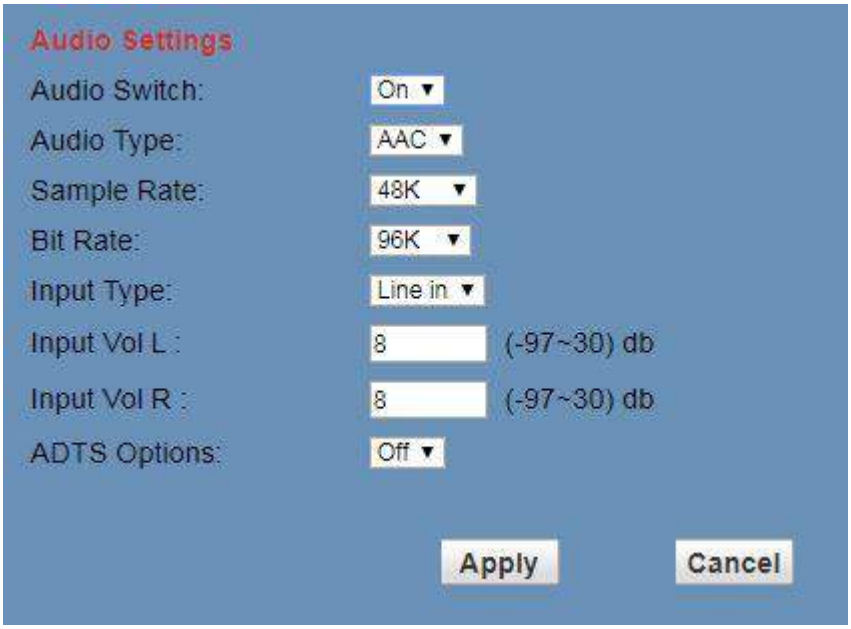
Check the “Flip” box to invert the image vertically for a ceiling mount. Check the “Mirror” box to invert the image horizontally. The default setting is unchecked.

Apply, Cancel and Default Buttons

After adjusting the parameters, press the "Apply" button to save settings. Press the "Cancel" button to cancel the adjustment of the parameters. Press the "Default" button to return to the default value.

1.3 Audio Setup

Click “Audio”. The audio parameters may now be set in the right side area.



Audio Switch: Turn audio embedding on or off.

Audio Type: AAC is the only audio format currently supported.

Sample rate: Selectable as either 44.1 K and 48 K.

Bit rate: Selectable among 96k, 128k or 256k

Input Type: Currently Line in only

Input VolL: Sets the volume of the left audio channel (from -97 to +30dB)

Input VolR: Sets the volume of the right audio channel (from -97 to +30dB)

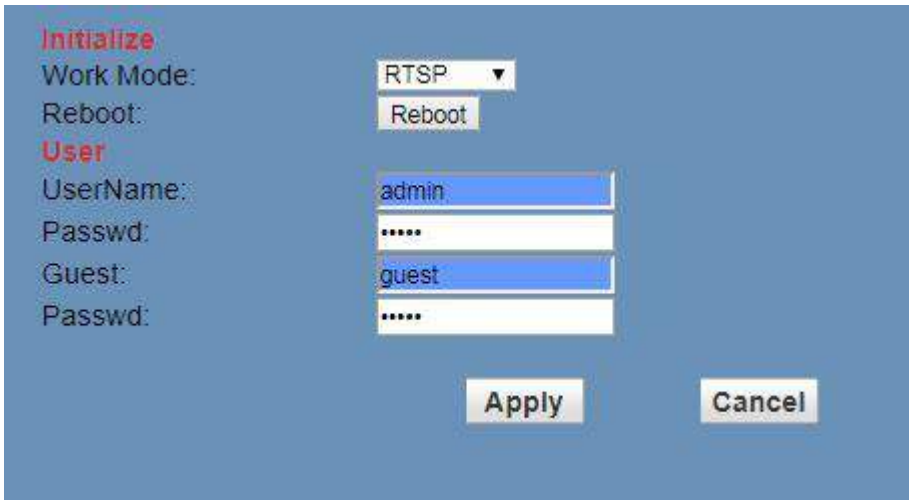
ADTS: Audio Data Transport Stream: Set to ‘On’ or ‘Off (use for MPEG 2 only – may not be applicable on all models)

Apply and Cancel Buttons

After modifying the parameters, press the "Apply" button to save. Press the "Cancel" button to leave settings unchanged.

1.4 System Settings

Click “System”. The system parameters may now be set in the right side area.



1) Initialize

Work Mode: RTSP (Real Time Streaming Protocol) is the only streaming protocol currently supported.

Reboot: Click the "Reboot" button to initiate a system restart. This is required after changing some settings.

2) User

User and Password: The user can modify the password (letters and Numbers only).

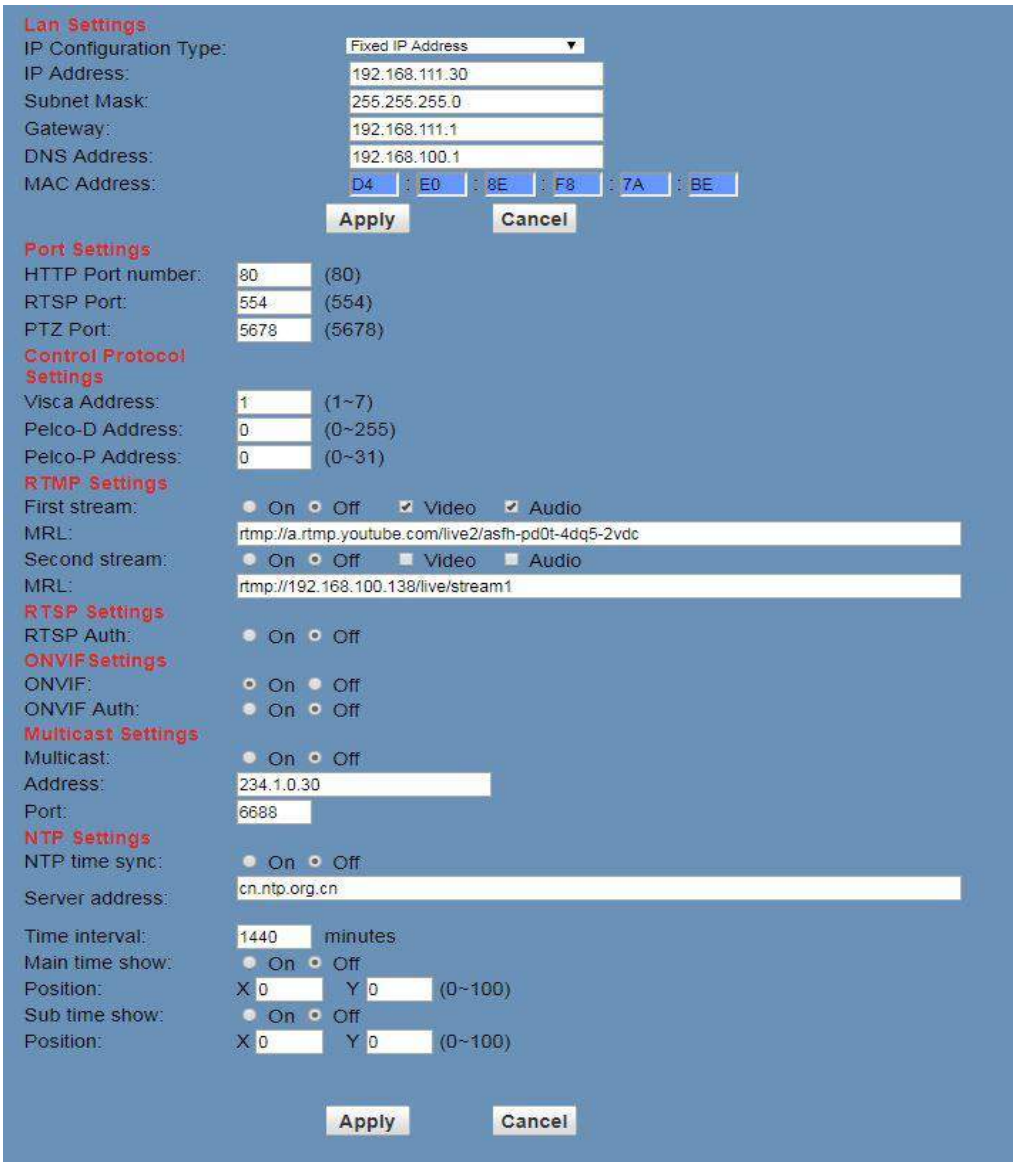
The default settings are UserName: **admin** and Password: **admin**

Apply and Cancel Buttons

After modifying the parameters, press the "Apply" button to save. Press the "Cancel" button to leave settings unchanged.

1.5 Network Settings

Click “Network”. The network parameters may now be set in the right side area.



1) LAN Settings

IP settings for the device can be set here using either static (fixed) or DHCP (dynamic) addressing as selected from the drop down list. The Default the IP address of the camera is 192.168.100.99. The MAC address can be modified but should be left as set by the factory. Please note that after changing the IP settings for the camera, you may not be able to reconnect until your PC is set for and connected to the same subnet or visible via proper network routing.

2) Port Settings

While the IP address identifies the device, the camera uses multiple ports.

HTTP Port: This is the port for the web application (the default http port: 80)

RTSP Port: The camera supports the RTSP streaming protocol. The default port: 554.

PTZ Port: Supports camera control via the TCP protocol. The default port: 5678.

3) Control Protocol Settings

Control addresses for VISCA (1-7), Pelco-D (0-254) and Pelco-P (0-31) may be set here.

4) RTMP settings

RTMP streaming may be enabled for 2 separate streams to a streaming server (or servers). Note: A separate streaming server is required for use of RTMP streaming. Set 1st and 2nd stream to 'On' or 'Off', check to include video and/or audio and type in the address and port or domain of the streaming server (MRL - Media Resource Locator).

5) RTSP Authorization

Turn authorization 'On' or 'Off' for RTSP streaming.

6) ONVIF Setting

Turn ONVIF compatibility 'On' or 'Off' (for ONVIF compatible streaming and control).

Turn ONVIF authorization 'On' or 'Off' (enables username and password to ONVIF stream).

7) Multicast Setting

Turn Multicast streaming 'On' or 'Off' (Note: Do not attempt to use Multicast streaming unless your network has been setup and tested to support multicast, e.g. IGMPv3. Significant network performance issues may result otherwise. Also note: The public internet does not support multicast streaming).

Address and Port Settings: enter the multicast address and port to be used.

8) Apply and Cancel Buttons

After modifying the parameters, press the "Apply" button to save. Press the "Cancel" button to leave settings unchanged.

1.6 Device Information

Click “Information”

Shows the current device information, as shown below. You may change the device ID as required for your application.

Network Camera Control Protocol

Setup camera for IP (First see “Setting up the Camera’s IP” section above)

Control Notes:

PTZ over TCP/UDP

The camera currently supports various PTZ control methods, including RS232, RS485, IR remote control, web interface, HTTP-CGI and TCP/UDP protocol

The camera includes an internal TCP server. The default port number is 5678. When client and server set up a TCP connection, the client sends PTZ command to the internal server and the server will then parse and execute the PTZ commands.

The camera includes an internal UDP server. The default port number is 1259. When client and server set up a UDP connection, the client sends PTZ commands to the internal server and the server will then parse and execute the PTZ commands.

The command format based on VISCA is shown above in the Serial Communication Control Section

HTTP CGI Method: The camera’s integrated web server supports HTTP CGI for PTZ Control

Pan and Tilt control URL format as below:

http://[Camera IP]/cgi-bin/ptzctrl.cgi?ptzcmd&[action]&[pan speed]&[tilt speed]

Parameter Descriptions:

[Camera IP]: Camera IP Address;

[Action] Includes: up, down, left, right, ptzstop;

[Pan Speed]: 1(low speed) – 24(high speed);

[Tilt Speed]: 1(low speed) – 20(high speed);

Zoom control URL format as below:

http://[Camera IP]/cgi-bin/ptzctrl.cgi?ptzcmd&[action]&[zoom speed]

Parameter Descriptions:

[Action] Includes: zoomin, zoomout, zoomstop;

[Zoom Speed]: 0(low speed) – 7(high speed);

Focus Control URL format as below:

http://[Camera IP]/cgi-bin/ptzctrl.cgi?ptzcmd&[action]&[focus speed]

Parameter Descriptions:

[Action] Includes: focusin, focusout, focusstop;

[Focus Speed]: 0(low speed) – 7(high speed);

Preset Position Control URL format as below:

http://[Camera IP]/cgi-bin/ptzctrl.cgi?ptzcmd&[action]&[position number]

Parameter Descriptions:

[Action] Includes: posset, poscall:

[Position Number]: 0 – 89, 100 – 254 PTZ on IP Network

PTZ / OSD Menu Access Control URL format as below:

http://[camera ip]/cgi-bin/param.cgi?navigate_mode&[menu]

Parameter Descriptions:

[Menu] Includes: OSD (On Screen Display Menu), PTZ (Pan, Tilt, & Zoom Control)

OSD Menu Navigation Control URL format as below:

http://[camera ip]/cgi-bin/ptzctrl.cgi?ptzcmd&[action]

Parameter Descriptions:

[Action] Includes: up, down, enter, return

Home Position Control URL format:

http://[camera ip]/cgi-bin/ptzctrl.cgi?ptzcmd&home

Photobooth Functionality

Your PTZOptics camera has the ability to quickly, and easily, take a series of four (4) still images or video files that are stored on the camera and made accessible with a standard web browser on the same network. We'll cover how to use this new feature to take still images, videos and how to retrieve them.

Photos

You have two (2) options to initiate a series of four (4) still images being captured…

You can enter the following HTTP string into any web browser on the same network as the camera to initiate a series of four (4) still images.

Take Still Images: http://<camera ip>/cgi-bin/booth.cgi?0&4&X&photo&0

In this example the variable "X" is utilized to add additional delay, in seconds, between still images being taken. The variable "X" can have any value from 1 – 9, with the values representing time in seconds.

You can also press the "F1" button on your IR remote to initiate a "quick capture" that has, approximately, a four (4) second delay between four (4) still images being captured.

To retrieve your series of four (4) still images you will need to open a standard web browser with network access to the camera and use the following HTTP strings to retrieve the still image files as desired.

Still Image 1: http://<camera ip>/photo1.jpg
Still Image 2: http://<camera ip>/photo2.jpg
Still Image 3: http://<camera ip>/photo3.jpg
Still Image 4: http://<camera ip>/photo4.jpg

Videos

You have two (2) options to initiate a series of four (4) videos being captured…

You can enter the following HTTP string into any web browser on the same network as the camera to initiate a series of four (4) video recordings.

Take Video: http://<camera ip>/cgi-bin/booth.cgi?0&4&X&video&Y

In this example the variable "X" is utilized to add additional delay, in seconds, between videos being taken. The variable "X" can have any value from 1 – 9 with the values representing time in seconds.

In this example the variable "Y" is utilized to adjust the overall length, in seconds, of each video file. The variable "Y" can have any value from 1 – 10 with the values representing time in seconds.

You can also press the "F2" button on your IR remote to initiate a "quick capture" that has, approximately, a four (4) second delay between four (4) ten (10) second videos being captured.

To retrieve your series of four (4) videos you will need to open a standard web browser with network access to the camera and use the following HTTP strings to retrieve the video files as desired.

Video 1: http://<camera ip>/video1.mp4
Video 2: http://<camera ip>/video2.mp4
Video 3: http://<camera ip>/video3.mp4
Video 4: http://<camera ip>/video4.mp4

Video Note: It can take the camera time for the video files to be fully captured and processed; if they are not retrievable please wait an additional 30 – 60 seconds for the process to complete.

NDI®|HX Upgrade Guide

This process will walk you through upgrading your non-NDI®|HX PTZOptics camera to an NDI®|HX source.
Please read all instructions prior to attempting your NDI®|HX camera upgrade. If you have purchased an NDI® model, not an NDI-Ready model, you will not be required to license the camera as it is already licensed.

Three Easy Steps:

1. Install the latest NDI®|HX driver
2. Update camera firmware
3. Enter your NDI®|HX license

Step 1:

- Download and install the NDI®|HX driver https://www.newtek.com/ndihx/products/

Please note this will also install the NewTek® NDI Studio Monitor

Step 2:

Download the appropriate camera firmware & update

- Ensure both your Windows PC and camera are connected to the same local network
- Obtain appropriate camera firmware for your model from https://ptzoptics.com/firmware-finder/
- Update camera firmware through Upgrade software available at https://ptzoptics.com/downloads/

Step 3:

- From your Windows PC, open NewTek® NDI Studio Monitor and from upper-left menu select a corresponding camera, then click “Register” from bottom-right corner.
- Enter your NDI®|HX license key & click “Enable NDI®|HX”
- Enjoy your low-latency high-quality NDI®|HX camera

If you have additional cameras to upgrade, please repeat the steps in this installation guide as required to enable NDI®|HX.
A separate NDI|HX license key is required for each camera.
NewTek®, NDI®, & NDI®|HX are all registered trademarks by NewTek®.
Please note that your license key is non-transferrable

Maintenance and Troubleshooting

Camera Maintenance

- If the camera will not be used for a long time, please turn off the power switch.
- Use a soft cloth or lotion-free tissue to clean the camera body.
- Use a soft dry lint-free cloth to clean the lens. If the camera is very dirty, clean it with a diluted neutral detergent. Do not use any type of solvent or harsh detergent, which may damage the surface.

Unqualified Applications

- Do not shoot extremely bright objects for a long period of time, such as sunlight, ultra-bright light sources, etc...
- Do not operate in unstable lighting conditions, otherwise the image may flicker.
- Do not operate close to powerful electromagnetic radiation, such as TV or radio transmitters, etc…

Troubleshooting

- No image
    1. Check whether the power cord is connected, voltage is OK, POWER lamp is lit.
    2. Check whether the camera can "self-test" after startup (camera will do a brief pan-tilt tour and return to the home position, or if preset 0 is set, the camera will return to the preset 0 position).
    3. Check the BOTTOM dip switch and make sure the two dip switches are both set OFF. These switches are not used in operating mode.
    4. Check that the SDI cable is connected correctly.
        1. If SDI, make sure that the destination device is accessing the SDI port that you plugged into.
- Abnormal display of image
    1. Check setting of rotary dial on rear of camera. Be sure to use a resolution and refresh rate that is supported by your software.
- Image is shaky or vibrating.
    1. Check whether camera is mounted solidly or sitting on a steady horizontal and level surface.
    2. Check the building and any supporting furniture for vibration. Ceiling mounts are often affected by building vibration more than wall mounts.
    3. Any external vibration that is affecting the camera will be more apparent when in tele zoom (zoomed in) settings.

Control

- Serial communication does not control the camera
  1. Make sure the camera is on and functioning with the IR remote control.
  2. Verify that the RS485 cable is connected correctly and using the proper pinout.
  3. Verify the communication settings of the control software or device (e.g. joystick).
  4. Verify that the communication port on the controlling device is activated (e.g. Com port on PC).
  5. Verify that all communication settings in the OSD Setup Menu correlate to the commands being used (e.g. VISCA address).

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