PTZOptics EPTZ NDI®|HX ZCAM G2

User Manual

Model No: PTEPTZ-NDI-ZCAM-G2

V1.0

(English)

www.ptzoptics.com || 1 800 486-5276

Preface

Thank you for purchasing a PTZOptics camera. This manual introduces the function, installation and operation of the 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

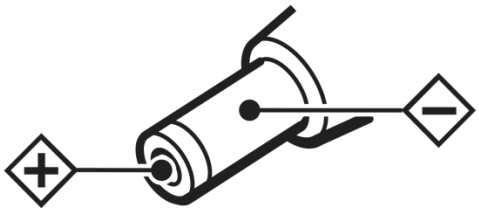
Notes

- **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 1A.
  Polarity of the power supply plug is critical and is detailed in the image below.



- **Handling**
  - Avoid any stress, vibration, or moisture during transportation, storage, installation and operation.
  - Do not expose camera to any corrosive solid, liquid, or gas to avoid damage to the casing or components.
  - 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

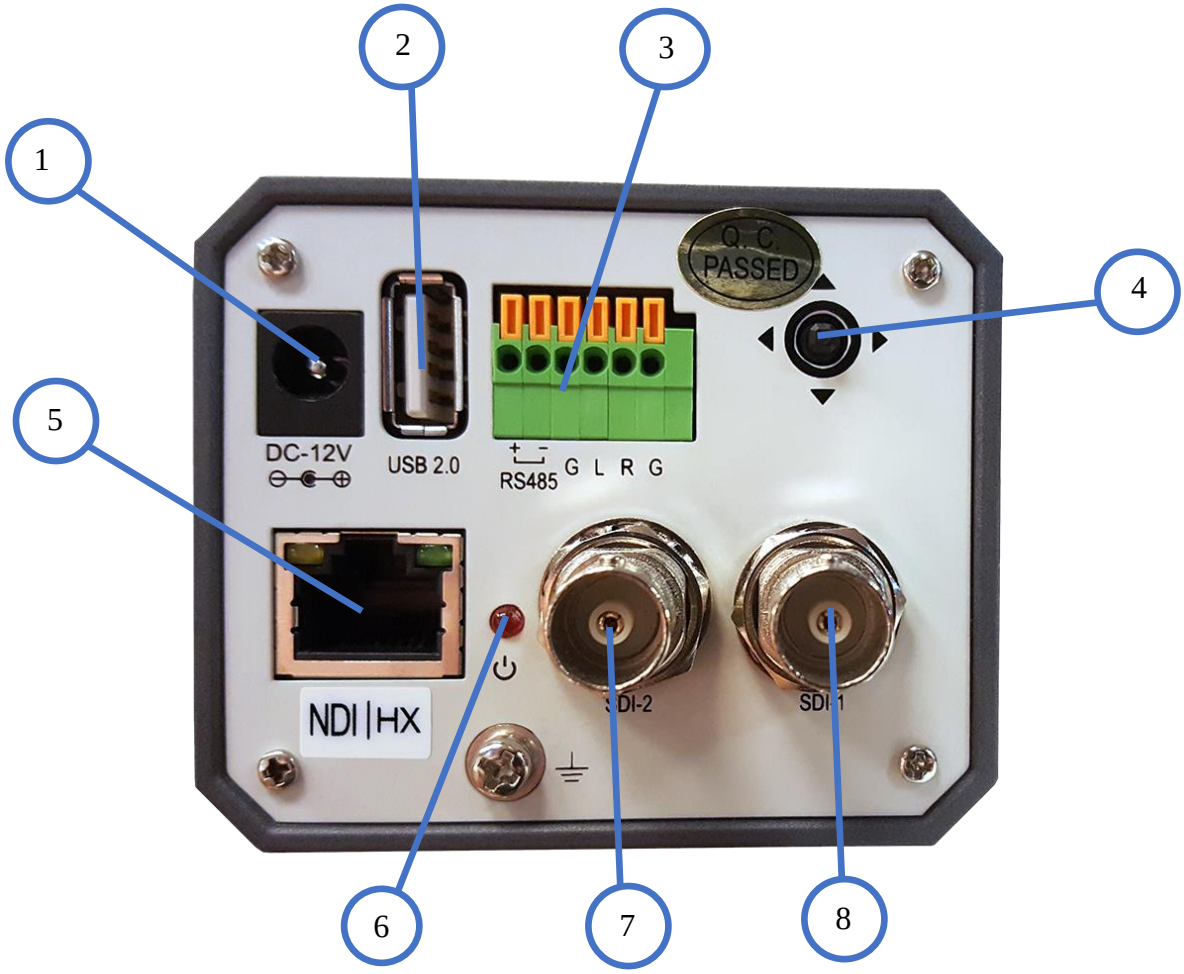
- Image Sensor
  - Panasonic 1/2.5” inch HD CMOS Sensor
  - Full 1920x1080p HD Resolutions up to 30 frames per second
  - 2D & 3D noise reduction with our latest “low noise CMOS sensor”
  - 0.5 Lux @ F1.8 AGC ON
  - 104° Field of View
- Video Outputs
  - Simultaneous NDI®|HX & Dual 3G-SDI output capabilities
  - Two (2) 3G-SDI High Definition Video Output up to 30 frames per second
  - NDI®|HX, H.264, H.265, & MJPEG IP streaming output (up to 3 streams) up to 30 frames per second
- Control of EPTZ and Settings
  - Allows for NDI®|HX control through NDI® approved platform
  - PTZOptics VISCA over IP
  - RS485 remote camera control interface
  - Web-based IP remote camera control
  - Button controls on back of camera
    - Hold left on Menu Navigation button for 5+ seconds to toggle Dynamic or Static IP addressing
    - Hold up on Menu Navigation button for 5+ seconds to Zoom In
    - Hold down on Menu Navigation button for 5+ seconds to Zoom Out
- Installation
  - Standard 1/4-20 female thread for camera mounting (2 on top, 2 on bottom)
  - Power over Ethernet – Supports PoE 802.3af
  - 12VDC 1A Power Supply provided for non-PoE infrastructure
- Warranty
  - 3-year warranty

Product Specifications

Model	PTEPTZ-NDI-ZCAM-G2
Type	PTZOptics NDI®|HX & 3G-SDI HD 1080p Camera
Features	
Video System	1080p-30/25, 1080i-30/25, 720p-30/25
Sensor	Panasonic 1/2.5", CMOS, Effective Pixels: 8.51M
Scanning Mode	Progressive
Lens	F=2.8mm 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, VAR
Backlight Compensation	Support
Digital Noise Reduction	2D & 3D Digital Noise Reduction
Video S/N	≥55dB
Horizontal Angle of View	104°
Vertical Angle of View	65°
Ceiling Installation	Yes
Image Mirroring	Yes
Number of Presets	255
Preset Accuracy	0.1°
Video coding standards	NDI®|HX, H.264, H.265, MJPEG
Video Freeze	Yes
Face Detection	Via Future Firmware Update
Input/Output	
HD Output	2x 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	1x 3 pin phoenix port audio interface, LINE IN (embedded on IP Stream only)
Control Input / Output	1x RS-485: 2pin phoenix port, Max Distance: 1500m, Protocols: VISCA/Pelco-D/Pelco-P
IP Video Features	
Video Compression	NDI®|HX / H.265 / H.264 / M-JPEG
Video Stream	Three (3) IP Video Output Streams Available
First Stream Resolution	1920x1080, 1280x720, 1024x576, 960x540, 640x480, 640x360
Second Stream Resolution	3840x2160, 1920x1080, 1280x720, 1024x576, 720x576 (50Hz), 720x480 (60Hz), 720x408, 640x360, 480x270, 320x240, 320x180

Third Stream Resolution	1024x576, 960x540, 720x576 (50Hz), 720x480 (60Hz), 720x408, 640x360, 480x270, 320x240, 320x180
Video Bit Rate	32Kbps ~ 102400Kbps
Bit Rate Type	Variable Rate, Fixed Rate
Frame Rate	50Hz: 1fps ~ 25fps, 60Hz: 1fps ~ 30fps
Audio Compression	AAC
Audio Bit Rate	48Kbps, 64Kbps, 96Kbps, 128Kbps
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	0.3A (Max)
Operating Temperature	14°F - 104°F [-10°C ~ 40°C]
Storage Temperature	-40°F - 140°F [-40°C ~ 60°C]
Power Consumption	3.6W (Max)
Dimensions (w x h x d) in.	2.8” x 2.4” x 5.6” (6.3” including SDI)
Dimensions (w x h x d) mm.	72mm x 60mm x 143mm (162mm including SDI)
Weight	1.4 lbs. [0.63kg]
Boxed Weight	2.0 lbs. [0.90 kg]

Main Unit



1. DC12V Power Jack
2. USB 2.0 connection (Future use)
3. Phoenix Connector (RS485 & audio)
4. Menu Navigation Buttons
5. RJ45 Network/NDI®|HX Connection
6. Power LED Indicator
7. 3G-SDI Video Output 2 (EPTZ View)
8. 3G-SDI Video Output 1 (Full View)

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

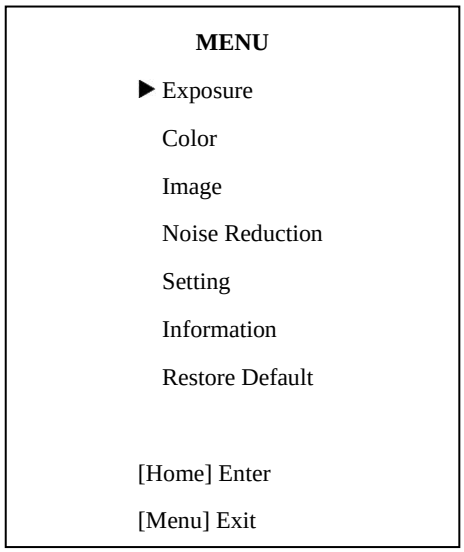
Part 7: Pelco-P Protocol Command List

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

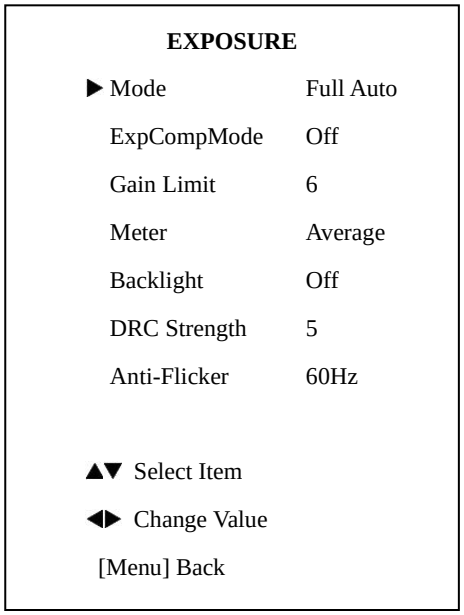
1. MENU

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: Full Auto, Bright, Shutter Priority, & Manual

ExpCompMode: Exposure compensation mode, Optional items: On, Off (Effective only in Auto & Smart mode).

ExpComp: Exposure compensation value, Optional items: -7 ~ 7 (Effective only when ExpCompMode is On)

Meter: Meter value, Optional items: Average, Center, Bottom, Top

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 Bright, AAE modes)

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

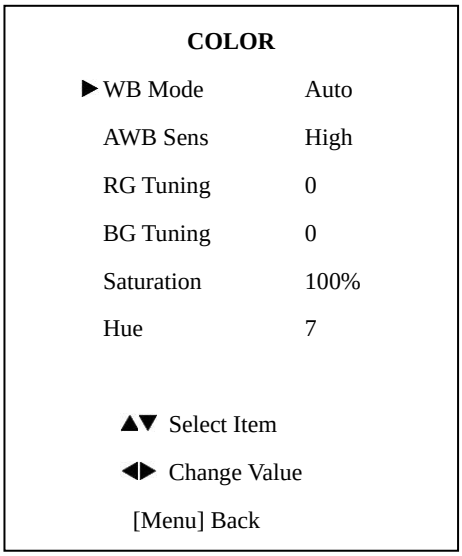
DRC Strength: Dynamic Range Control Strength, Optional items: 0 ~ 8.

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

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)

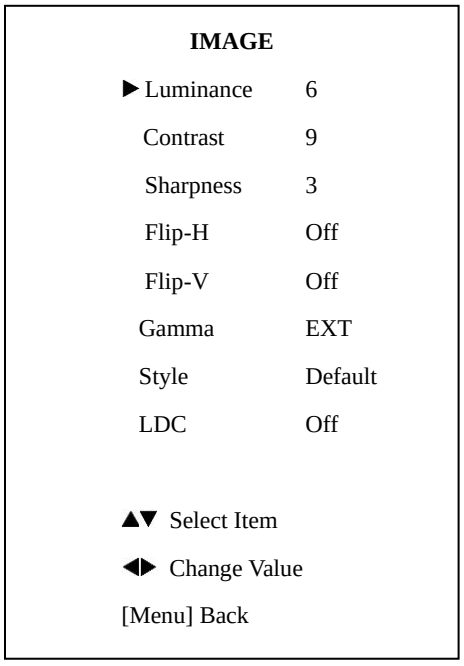
Saturation: Color Saturation. Optional items: 60% ~ 200%.

Hue: Chroma adjustment, Optional items:0 ~ 14

AWB sens: The white balance sensitivity. Optional items: Low, Middle, High. (Effective only in Auto & One Push Mode)

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 ~ 14

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,

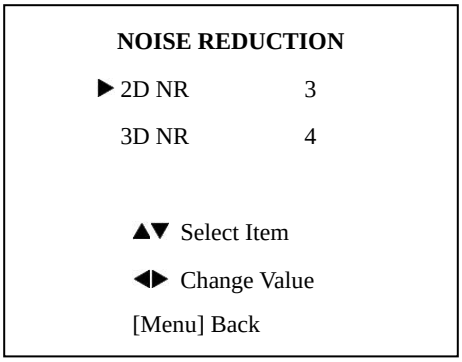
0.63, 0.4, EXT

Style: Image presets. Optional items: Bright, PC, Clarity, Clarity (LED), Normal, Default

LDC: Lens Distortion Correction, Optional items: Off, -10 ~ +10

5. 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.



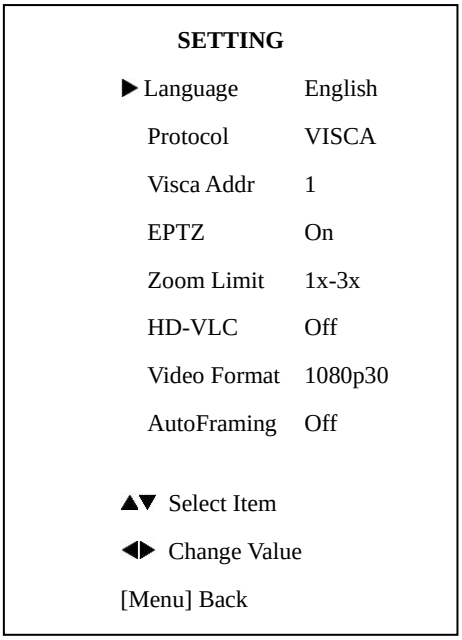
NR2D-Level: 2D noise reduction, Optional items: Close, Auto, 1 ~ 5

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

Dynamic Filter: Noise reduction filter, Optional items: Close, 1r ~ 6r

6. SETTING

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



Language: Menu language, Optional items: English, Chinese, Russian, Italian, German, French, & Spanish

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

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

EPTZ: Electronic PTZ. Optional items: Off, On

Zoom Limit: EPTZ Zoom Limit; Optional items: 1x-3x, 1x-4x, 1x-8x, 2x-4x, 2x-8x, 3x-8x

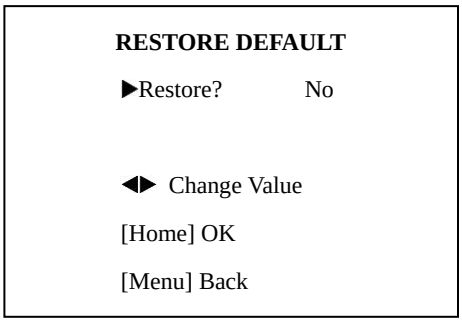
HD-VLC: High Definition Visually Lossless Codec for extended cable reach; Optional items: Off, On

Video Format: Change resolution & frame rate, Optional items: 1080p30, 1080p25

Auto Framing: Beta auto framing feature. Optional items: Off, On

7. 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.

8. Saving

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

Network Connection

1. Operating Environment

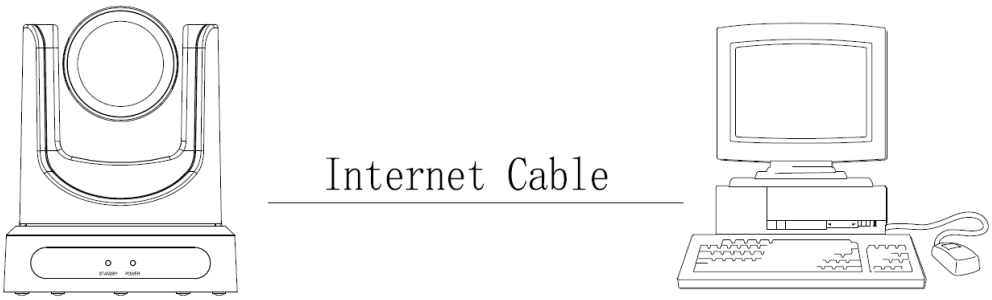
- Operating System: Windows 2000/2003/XP/Vista/7/8.1/10
- Network Protocol: TCP/IP
- Client PC: CPU(P4/2+GHz)/128M RAM/40Gb HD support for scaled graphics card, support for DirectX 8.0 or more advanced version.

2. Equipment Installation

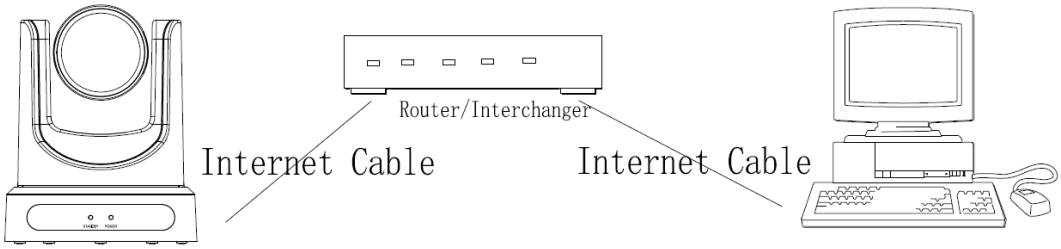
1) Connect camera to your network via a CAT5/6 patch cable or directly to your PC.
2) Turn camera on by plugging in power from power supply or using PoE.
3) If successful, the orange network light will illuminate, and the green light will start flashing.
4) If unsuccessful, examine if the patch cable is bad or if you have connected to an inactive network jack.

3. Network Connection

Please see examples of the connection method between network camera and computer, as in pictures 1.1 and 1.2, below.



Picture 1.1 Direct connections via a standard "patch cable" / network cable

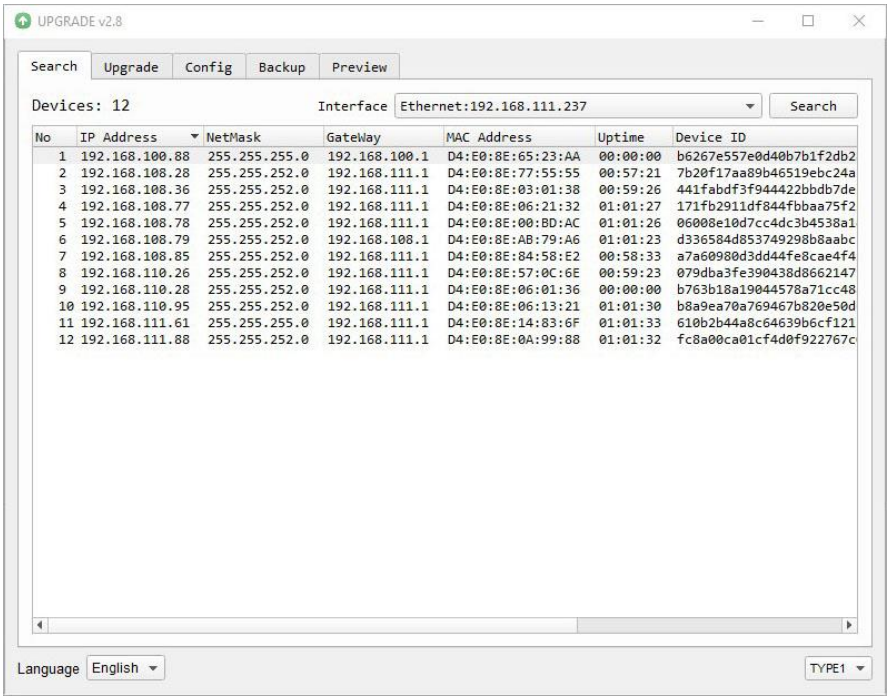


Picture 1.2 Connections to LAN via patch cable to LAN wall jack or LAN switch

Setting up a Network Video Stream with the PTZOptics camera

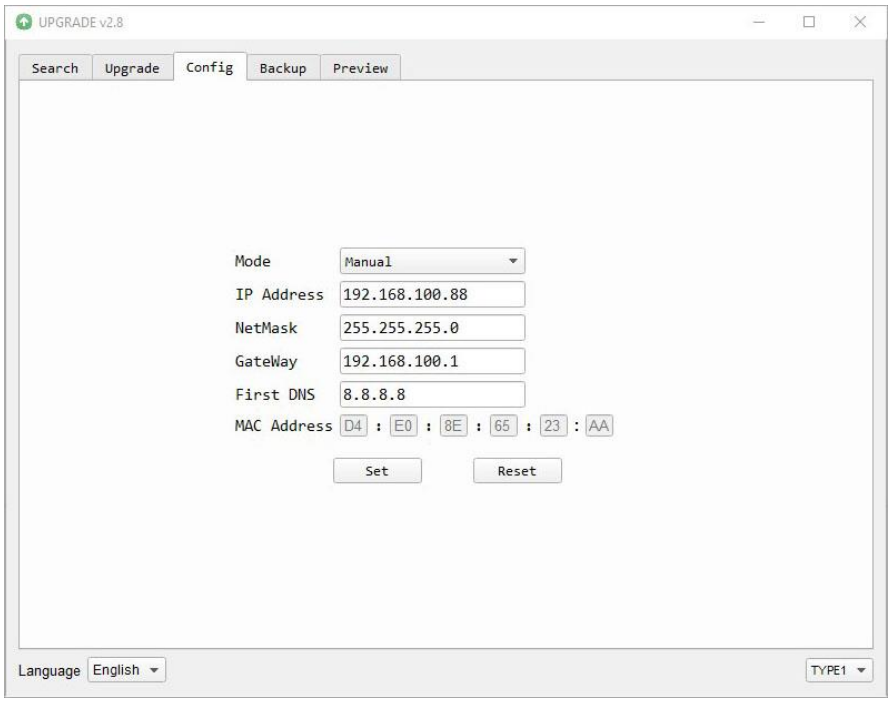
(Also see information on camera web information in the following section)

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 and to an active network port on your network. (Note it will power on when power is applied via power supply or PoE)
2. Next, go online and download the **IP Address Settings Tool**, for Windows & MacOS, from the PTZOptics Download Page. Once you complete the installation and launch the tool "UPGRADE vX.X" you should be able to click the "Search" button to locate all the available PTZOptics cameras on your network.
    a. If you are having issues with camera discovery…
        i. There is likely an issue with mDNS not being enabled / configured properly
        ii. The Network Drop Down may be on the wrong network interface
        iii. You can always revert to the direct PC to Camera connection as shown in the previous section



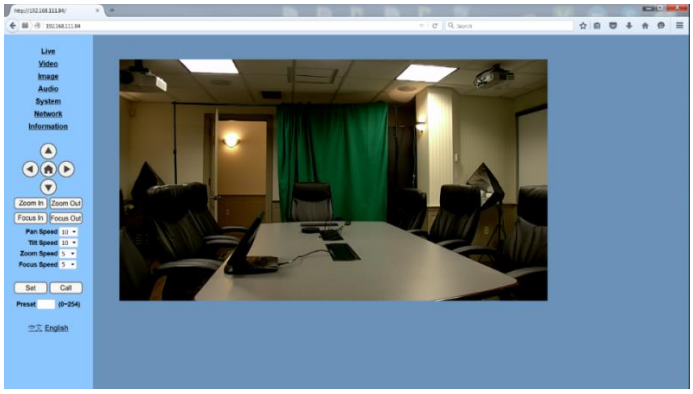
3. The next thing you would want to do is change your camera's IP address to be in the same range as your network. The camera comes with a default static IP address of 192.168.100.99. You will need to update that to be in the same range as your network. If you look at the example above, you can see from the other cameras on the 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.

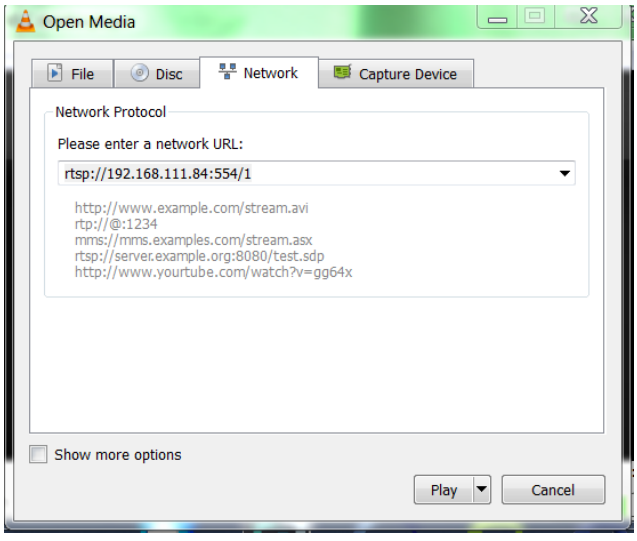


   You should now be able to set your camera's IP address to one in the range of your network. You should be able to leave the subnet mask alone, unless you are configuring the camera for use across subnets.
   (Note that in more complex network environments you may have to request a "STATIC IP" from the 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 access the WebUI for control and settings in the web browser.
6. Open your desired browser 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 PTZOptics ActiveX component for live viewing if utilizing Microsoft Internet Explorer (not Edge) to enable a live preview of the video feed for control and tuning.
8. You should have full PTZ control over your camera using the PTZ control on the left side. You can adjust many of your camera's settings via the IP interface and is using Internet Explorer with the PTZOptics ActiveX plugin you will also receive a live preview.



9. You should now be able to pull an RTSP stream from your camera into VLC, WireCast, vMix, etc…
    a. You can test the RTSP stream in VLC Media Player
    b. 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".
    c. In the network URL, you should enter "rtsp://<IP Address>:544/1".
        i. In the example below, for a PTZOptics camera with the static IP address of 192.168.111.84, the RTSP stream would be accessed by entering "rtsp://192.168.111.84:554/1".
        ii. The "554" part is the port number used by the camera, and the "1" is the stream number.
        iii. There are up to three RTSP network streams available.
            1. One for HD content "1"
            2. One for SD content "2"
            3. One for SD content "3"



EXTRAS

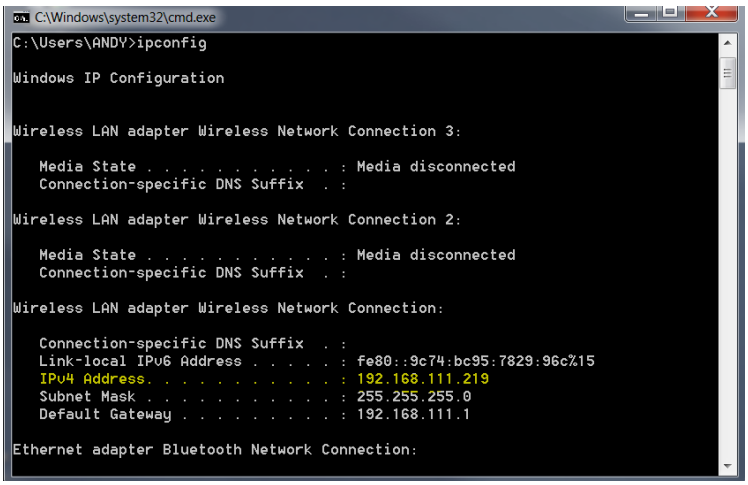
1. **Discovering your Network IP range**.
   a. *Changing your IP address without talking to your network admin could lead to conflicts with your network.*
   b. *If you change your address to one that is already in use it will cause communication problems.*

2. 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.

3. 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.

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

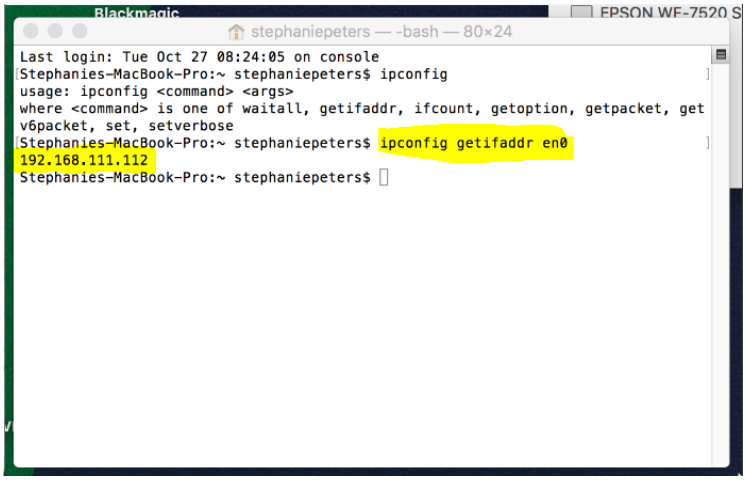
5. When you see “IPV4 Address” that is your computers IP address on your current network. So you would use the first 3 sets of numbers from this as your IP range.



6. 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.

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

8. 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.


Blackmagic
EPSON WF-7520 S
stephaniepeters — -bash — 80×24
Last login: Tue Oct 27 08:24:05 on console
Stephanies-MacBook-Pro:~ stephaniepeters$ ipconfig
usage: ipconfig <command> <args>
where <command> is one of waitall, getifaddr, ifcount, getoption, getpacket, get
v6packet, set, setverbose
Stephanies-MacBook-Pro:~ stephaniepeters$ ipconfig getifaddr en0
192.168.111.112
Stephanies-MacBook-Pro:~ stephaniepeters$

Camera Web Interface

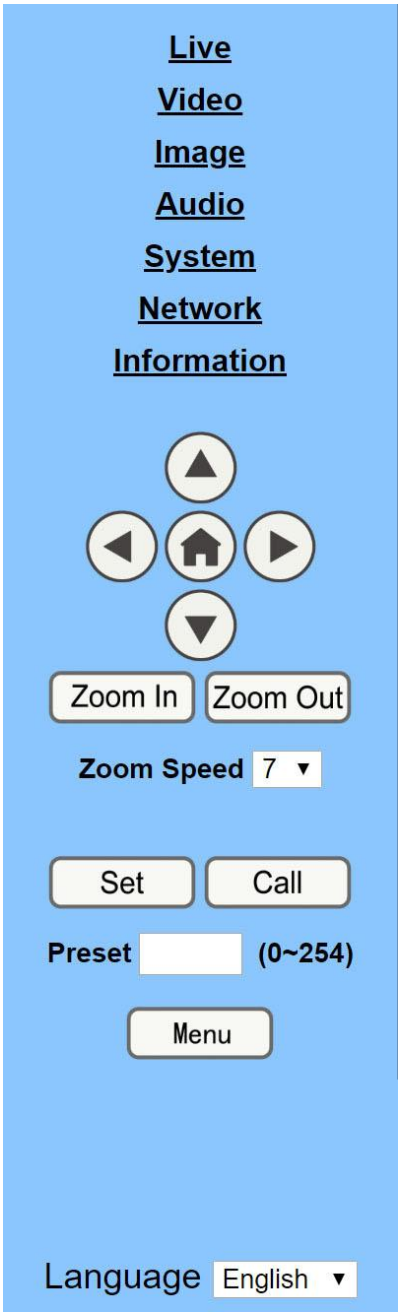
1 Homepage introduction

1.1 Home Page

1) The left pane features PTZ, Preset, and OSD Control Options

2) The right pane features configuration options and a live preview (IE only)

1.2 Menu & Control



1) Configuration Options: Live Preview, Video Parameters, Image Settings, Audio Settings, IP Output Settings, Network Configuration, and Camera Info

2) OSD Control: The MENU button will open / close the OSD. Up, Down, Left and Right arrows allow for navigation and changing options.

3) Pan / Tilt Control: The Up, Down, Left and Right arrows allow electronic pan and tilt when EPTZ has been enabled. (Electronic Pan/Tilt is available once you have electronically zoomed in.)

4) Zoom Control: Zoom in and zoom out buttons allow for adjustment wide or tele when EPTZ is enabled from the OSD.

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

6) PTZ Preset: After manually settings 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 enabled smooth, quick and convenient control without the need to manually drive the camera.

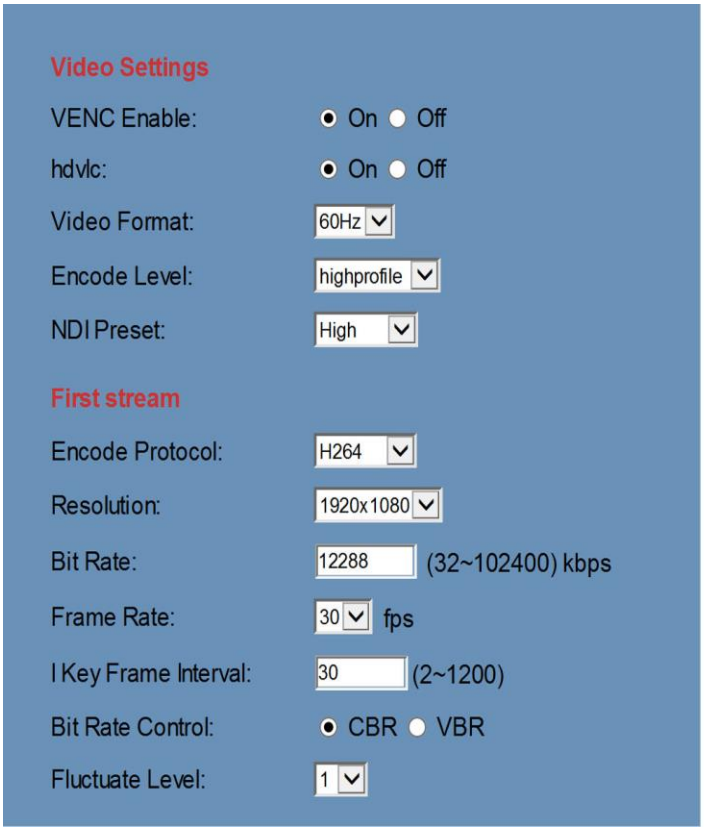
1.3 Language selection

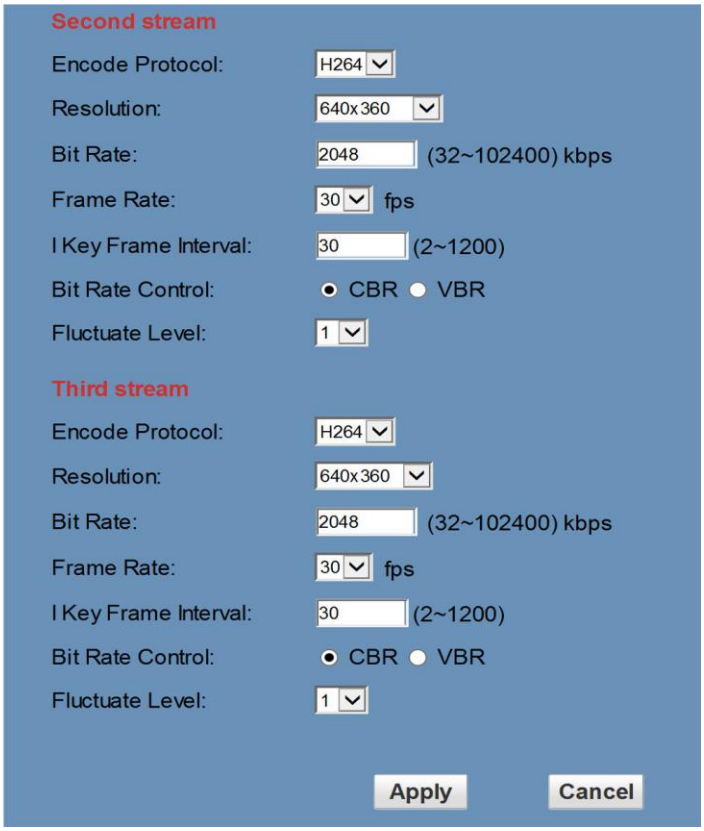
Click either “Russian”, “Chinese” or “English” to change the language of the menu.

1 Media

1.1 Video Setup

Click "**Video**". The streaming parameters may now be set in the right side area. The camera can send three (3) 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**

VENC Enable:

Users can enable or disable the Video Encoding portion of the camera (On for NDI®|HX output)

HDVLC:

Enable High Definition Visually Lossless Codec for extended cable reach.

HD over 550m of Belden 543945 CCTV coax at 270Mb/s

Full HD over 300m of Belden 543945 CCTV coax at 540Mb/s

HD over 150m of Cat-5e/6 UTP cable at 270Mb/s

Video Format

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

Video Coding:

H.264 (High Profile, Main Profile, Base Line) *Note may override / lockout other settings

H.265 (High Profile, Main Profile, Base Line) *Note may override / lockout other settings

MJPEG (Singe Stream Output only) *Note may override / lockout other settings

2) **Streams (Streams 1 – 3)**

NDI® Modes:

Users can select from pre-determined high-quality IP stream settings for use with NDI®

NDI Medium will provide 1920 x 1080 @ 30 fps output for use with NDI®

NDI Low will provide 1280x720 @ 30 fps output for use with NDI®

Both modes set the NDI® thumbnail / low bandwidth options for a 640 x 360 @ 30fps output

Resolutions:

The first stream allows for 1920x1080, 1280x720, 1024x576, 960x540, 640x540, 640x480, 640x360 resolutions.

The second stream allows for 3840x2160@15, 1920x1080, 1280x720, 1024x576, 720x480, 720x408, 640x360, 480x270, 320x240, 320x180 resolutions.

The third stream allow for 1024x576, 960x540, 720x480, 720x408, 640x360, 480x270, 320x240, 320x180 resolutions.

Bit Rate:

Users can assign the bit rate of the stream (from 32 – 102499 kbps for all three streams).

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.

Output is limited to a maximum of 30 fps.

I Key Frame Interval:

This setting defines how many predicted frames will be used for each actual frame provided (from 2-1200). Shorter intervals increase video quality at the cost of requiring higher bit rates in order to look good, it is best to consult the recommended settings for your ingestion system.

Bit Rate Control Method:

Constant Bit Rate: The video encoder will encode at a constant rate as set in bitrate setting.

Variable Bit Rate: The video encoder will encode at a variable rate with maximum as set in bit rate setting. This should only be used when working against bandwidth constraints.

Fluctuate Level:

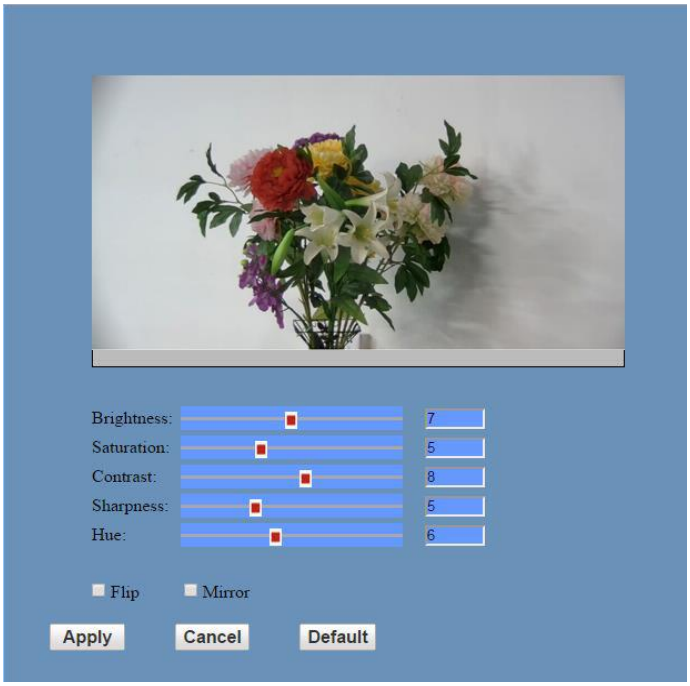
This setting affects how aggressive variable bit rate adjustments will be (1 – 6).

Spikes that are too large may affect video quality.

Low levels will not save on as much bandwidth.

1.2 Image Setup

Click "**Image**". The image parameters may now be set in the right side area.



Brightness

Image Brightness can be adjusted from 0-14 using the presented slider control.

The box on the right shows the corresponding numerical value. *(Default is 7)*

Saturation

Color Saturation can be adjusted from 0-14 using the presented slider control.

The box on the right shows the corresponding numerical value. *(Default is 4)*

Contrast

Contrast can be adjusted from 0-14 using the presented slider control.

The box on the right shows the corresponding numerical value. *(Default is 10)*

Sharpness

Sharpness can be adjusted from 0-15 using the presented slider control.

The box on the right shows the corresponding numerical value. *(Default is 3)*

Hue

Hue can be adjusted from 0-14 using the presented slider control.

The box on the right shows the corresponding numerical value. *(Default is 7)*

Flip & Mirror

Check the "Flip" box to invert the image vertically for a ceiling mount.

Check the "Mirror" box to reverse the image horizontally. *(Default is unchecked)*

Apply, Cancel and Default Buttons

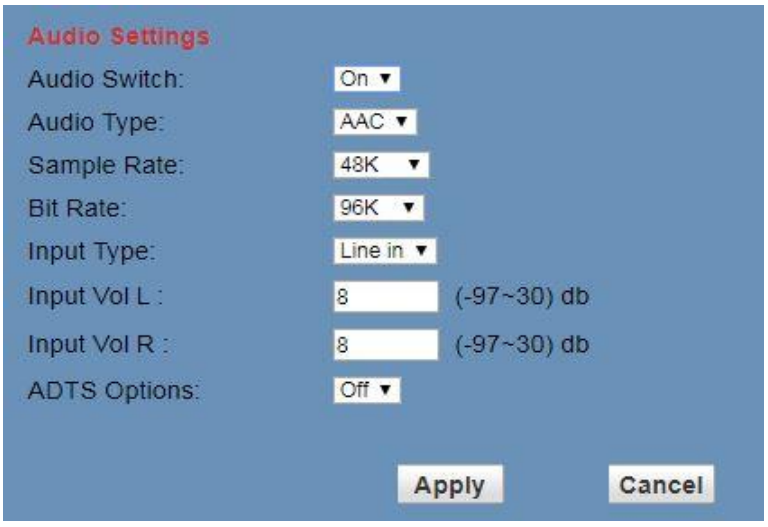
After adjusting the parameters, press the "Apply" button to save settings.

Press the "Cancel" button to cancel any adjustment of the parameters.

Press the "Default" button to return to the default values.

1.3 Audio Setup

Click "**Audio**". The audio parameters may now be set in the right side area.



Audio Switch

Enable or Disable Audio Embedding

Audio Type Settings

AAC

Sample Rate Settings

16K, 44.1K, or 48K

Bit Rate Settings

96K, 128K, or 256K

Input Type / Parameters

Line in

Note: 3.5mm stereo un-balanced line level input *(No amplification from camera port)*

Input Vol L Settings

Sets the volume of the left audio channel *(-97 to +30dB)*

Input Vol R Settings

Sets the volume of the right audio channel *(-97 to 30+dB)*

ADTS Options

Audio Data Transport Stream: Set to 'On' or 'Off' *(Use with MJPEG only)*

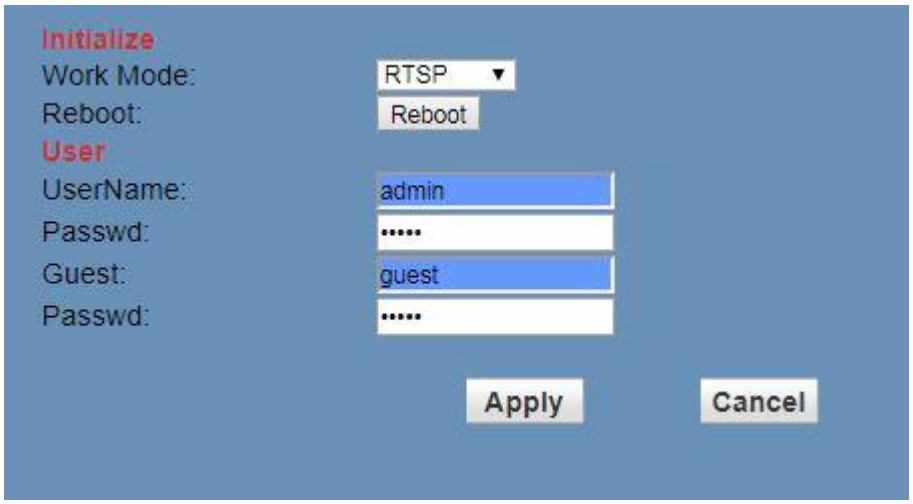
Apply and Cancel Buttons

After modifying the parameters, press the "Apply" button to save.

Press the "Cancel" button to discard any changes made prior to clicking "Apply"

1.4 System Settings

Click "**System**". The system parameters may now be set in the right side area.



3) Initialize

Work Mode

Legacy feature to support Third-Party solutions and has no standard use.

Reboot

The “Reboot” button will initiate a system restart. Tis is required after changing most settings.

4) User

User and Password

Users can modify the Admin / Guest password (letters and numbers only).

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

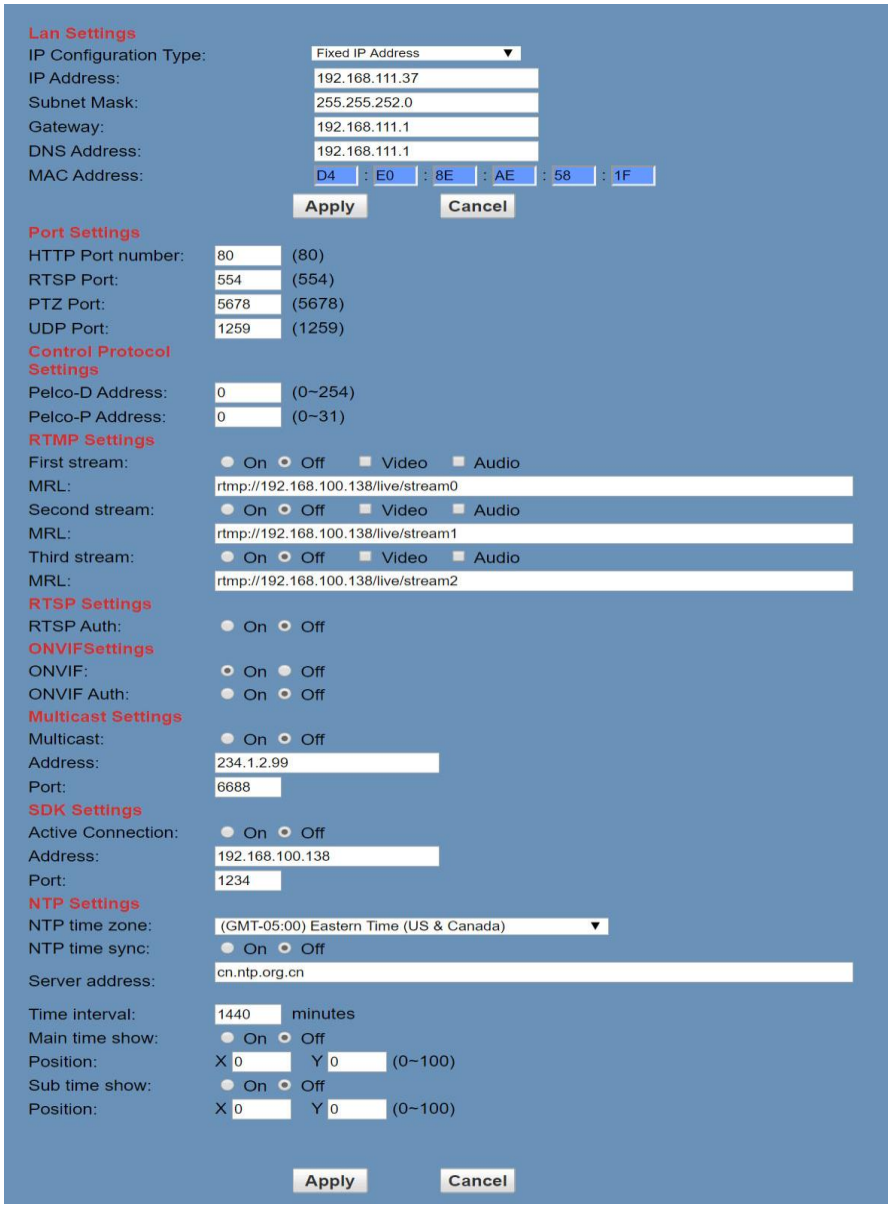
Apply and Cancel Buttons

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 this device can be set here for either Static (fixed) or DHCP (dynamic) addressing.

The Default IP address of the camera is set to 192.168.100.99.

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 using the default port of 80.

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

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

UDP Port: Supports camera control via the UDP protocol using the default port of 1259.

3) **Control Protocol Settings**

Control IDs / address for Pelco-D (0-255) and Pelco-P (0-31) may be set here.

4) **RTMP settings**

The camera provides for up-to three RTMP (Pull from camera) streams to an RTMP server or servers.

Note: An RTMP streaming server is required for use of RTMP streaming.

Set 1st, 2nd, and/or 3rd stream to 'On' or 'Off' as desired.

Check to include video and/or audio as desired.

Enter the address provided from / for the RTMP server as provided in the MRL location.

5) **RTSP Authorization**

Enable or disable authorization for the RTSP output stream(s).

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** *(Only use if your network has been configured to support multicast)*

Turn Multicast streaming 'On' or 'Off' *(Reboot required to commit)*.

Address and Port Settings: Enter the desired multicast address and port to be used by the camera.

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 or outages may result otherwise. The public internet does not support multicast streaming.

8) Apply and Cancel Buttons

After modifying the parameters, press the "Apply" button to save.

Press the "Cancel" button to leave settings unchanged.

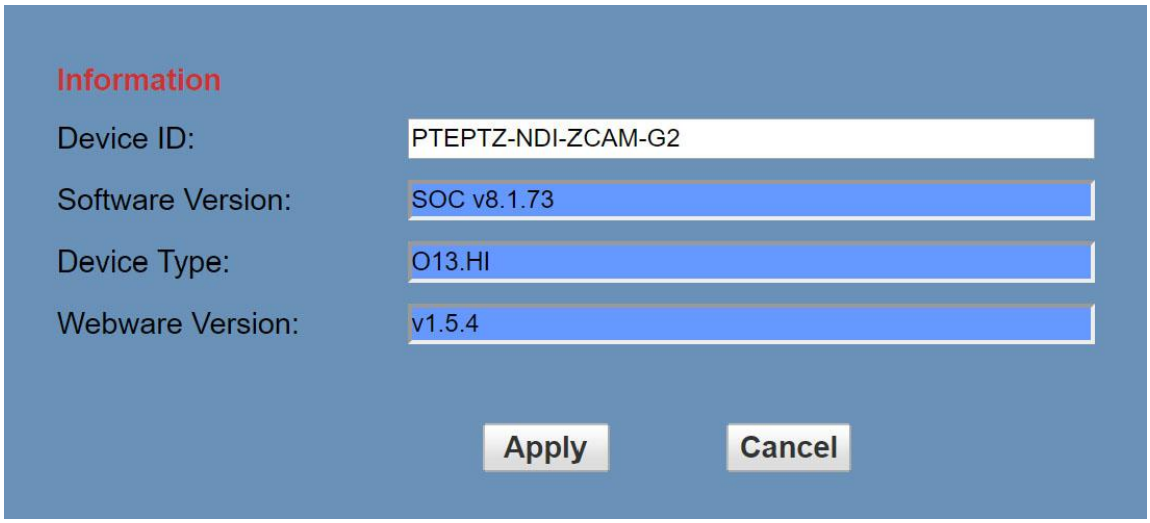
1.6 Device Information

Click "**Information**"

Shows the current device information, as shown below.

You may change the device ID as required for your application.

(This is utilized by NDI® Software when identifying your camera on the network)



Network Camera Control Protocol

Setup camera for IP (First see "Setting up the Camera's IP" section above)

Control Notes for PTZ Control

The camera currently supports various PTZ control methods including:
RS485, the web interface, HTTP-CGI and TCP/UDP protocols

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

The camera includes an internal UDP server with the default port number of 1259.
When client and server set up a UDP connection, the client sends 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 control.
Please see command list below for reference.

Control				
Function	**Command**	**Variable**	**Values**	**Comments**
Pan & Tilt	http://**[camera ip]**/cgi-bin/ptzctrl.cgi?ptzcmd&**[action]**&**[pan speed]**&**[tilt speed]**	**[camera ip]**	*Camera's current IP	
		[action]	up	moves camera 'up'
			down	moves camera 'down'
			left	moves camera 'left'
			right	moves camera 'right'
			leftup	moves camera 'left' & 'up'
			rightup	moves camera 'right' & 'up'
			leftdown	moves camera 'left & 'down'
			rightdown	moves camera 'right' & 'down'
			ptzstop	tells camera to 'stop' moving
		[pan speed]	1	slowest 'pan' speed
			…	ranges from 1 - 24
			24	fastest 'pan' speed
		[tilt speed]	1	slowest 'tilt' speed
			…	ranges from 1 – 20
			20	fastest 'tilt' speed

Zoom	http://**[camera ip]**/cgi-bin/ptzctrl.cgi?ptzcmd&**[action]**&**[zoom speed]**	**[camera ip]**	*camera's current IP	
		[action]	zoomin	zooms camera in
			zoomout	zooms camera out
			zoomstop	stops zooming
		[zoom speed]	1	slowest 'zoom' speed
			…	ranges from 1 – 7
			7	fastest 'zoom' speed
Focus	http://**[camera ip]**/cgi-bin/ptzctrl.cgi?ptzcmd&**[action]**&**[focus speed]**	**[camera ip]**	*camera's current IP	
		[action]	focusin	focuses camera in
			focusout	focuses camera out
			focusstop	stops focusing
		[focus speed]	1	slowest 'focus' speed
			…	ranges from 1 – 7
			7	fastest 'focus' speed
Focus Lock	http://**[camera ip]**/cgi-bin/param.cgi?ptzcmd&**[action]**_mfocus	**[camera ip]**	*camera's current IP	
		[action]	lock	locks focus state
			unlock	unlocks focus state
Home Position	http://**[camera ip]**/cgi-bin/ptzctrl.cgi?ptzcmd&home	**[camera ip]**	*cameras current IP	
Preset	http://**[camera ip]**/cgi-bin/ptzctrl.cgi?ptzcmd&**[action]**&**[position number]**	**[camera ip]**	*cameras current IP	
		[action]	posset	position 'set'
			poscall	position 'call'
		[position number]	0	beginning of range 1
			…	range 1 from 0-89
			89	end of range 1
			100	beginning of range 2
			…	range 2 from 100-254
			254	end of range 2
Direct Position Recall	http://**[camera ip]**/cgi-bin/ptzctrl.cgi?ptzcmd&**[mode]**&**[pan speed]**&**[tilt speed]**&**[pan position]**&**[tilt position]**	**[camera ip]**	*cameras current IP	
		[mode]	abs	absolute positioning
			rel	relative positioning
		[pan speed]	1	slowest 'pan' speed
			…	ranges from 1 - 24

			24	fastest ‘pan’ speed
		[tilt speed]	1	slowest ‘tilt’ speed
			…	ranges from 1 - 20
			20	fastest ‘tilt’ speed
		[pan position]	0000 or FFFF	home position
			0001	first step ‘pan’ right
			…	range from 0000 - 0990 (HEX)
			0990	last step ‘pan’ right
			FFFE	first step ‘pan’ left
			…	range from FFFF - F670 (HEX)
			F670	last step ‘pan’ left
		[tilt position]	0000 or FFFF	home position
			0001	first step ‘tilt’ up
			…	Range from 0001 - 0510 (HEX)
			0510	last step ‘tilt’ down
			FFFE	first step tilt down
			…	range from FFFF - FE51 (HEX)
			FE51	last step tilt down
Direct Zoom Recall	http://**[camera ip]**/cgi-bin/ptzctrl.cgi?ptzcmd&zoomto&**[zoom speed]**&**[zoom position]**	**[camera ip]**	*cameras current IP	
		[zoom speed]	0	slowest ‘zoom’ speed
			…	range from 0 – 7
			7	fastest zoom speed
		[zoom position]	0000	full wide
			…	range from 0000 - 4000 (HEX)
			4000	full tele

Navigation

Function	Command	Variable	Values	Comments
OSD Access	http://**[camera ip]**/cgi-bin/param.cgi?navigate_mode&**[mode]**	**[camera ip]**	*cameras current IP	
		[mode]	OSD	calls OSD Menu
			PTZ	P/T/Z Control Mode
OSD Menu Navigation	http://**[camera ip]**/cgi-bin/ptzctrl.cgi?ptzcmd&**[action]**	**[camera ip]**	*cameras current IP	
		[action]	up	moves menu ‘up’
			down	moves menu ‘down’
			enter	selects an OSD option
			return	returns to previous menu

Image Adjustments				
Function	**Command**	**Variable**	**Values**	**Comments**
Image Settings	http://**[camera ip]**/cgi-bin/param.cgi?post_image_value&**[mode]**&**[level]**	**[camera ip]**	*cameras current IP	
		[mode]	bright	adjust brightness
			saturation	adjust saturation
			contrast	adjust contrast
			sharpness	adjust sharpness
			hue	adjust hue
		[level]	0	beginning of range
			…	ranges from 0 – 14
			14	end of range
Image Orientation	http://**[camera ip]**/cgi-bin/param.cgi?post_image_value&**[mode]**&**[state]**	**[camera ip]**	*cameras current IP	
		[mode]	Flip	flipped image adjustments
			Mirror	mirror image adjustments
		[state]	1	flip / mirror
			0	default
Default Image Settings	http://**[camera ip]**/cgi-bin/param.cgi?get_image_default_conf	**[camera ip]**	*cameras current IP	defaults all image settings above

JPEG Snapshot				
Function	**Command**	**Variable**	**Values**	**Comments**
Take Snapshot	http://**[camera ip]**/snapshot.jpg	**[camera ip]**	*cameras current IP	
Change Resolution	http://**[camera ip]**/cgi-bin/snapshot.cgi?post_snapshot_conf&resolution =**[size]**	**[camera ip]**	*cameras current IP	
		[size]	1920x1080	Sets JPEG resolution to 1920x1080
			960x600	Sets JPEG resolution to 960x600
			480x300	Sets JPEG resolution to 480x300

Photobooth Pictures				
Take Pictures	http://**[camera ip]**/cgi-bin/booth.cgi?0&4&**[delay]**&photo&0	**[camera ip]**	*cameras current IP	
		[delay]	1	Shortest delay
			…	Delay in seconds 1 – 9
			9	Longest delay
Download Pictures	http://**[camera ip]**/photo**[num]**.jpg	**[camera ip]**	*cameras current IP	
		[num]	1	Pictures 1
			…	Pictures 1 - 4
			4	Pictures 4
Video Recording				
Function	**Command**	**Variable**	**Values**	**Comments**
Take Video	http://**[camera ip]**/cgi-bin/booth.cgi?0&4&**[delay]**&video&**[length]**	**[camera ip]**	*cameras current IP	
		[delay]	1	shortest delay
			…	delay in seconds 1 - 9
			9	longest delay
Get Video	http://**[camera ip]**/video**[num]**.jpg	**[num]**	1	video 1
			…	videos 1 – 4
			4	video 4
Inquiries				
Function	**Command**	**Variables**	**Values**	**Comments**
Video	http://**[camera ip]**/cgi-bin/param.cgi?get_media_video	**[camera ip]**	*cameras current IP	Network video configuration
Audio	http://**[camera ip]**/cgi-bin/param.cgi?get_media_audio	**[camera ip]**		Network audio configuration
Network	http://**[camera ip]**/cgi-bin/param.cgi?get_network_conf	**[camera ip]**		Network configuration
Information	http://**[camera ip]**/cgi-bin/param.cgi?get_device_conf	**[camera ip]**		Camera information
Serial Number	http://**[camera ip]**/cgi-bin/param.cgi?get_serial_number	**[camera ip]**		Serial number *Not always accurate

NDI®|HX Connection Guide

This connection guide will explain the method to connect your NDI®|HX camera to your PC for use with software applications.

Three Easy Steps:

1. Install the latest NDI® Tools
2. Connect your camera to the NDI® Virtual Input
3. Select the NDI® Virtual Input in your software of choice

Step 1:

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

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

Step 2:

- Open the NDI® Virtual Input
- Select your camera of choice from the NDI® Virtual Input in your system tray

Step 3:

- Open your software of choice
- Go to video settings and select video source as "NewTek NDI® Video"

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 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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