AVIPAS

Model: AV-2020

20x HD All-in-one PTZ Camera



User Manual

V1.0

Please read this user manual

thoroughly before using.

www.avipas.com

Preface

Thank you for using this HD All-in-one PTZ Camera.

This manual introduces the functions, installation process and operation of the HD camera. Prior to installation and usage, please read the manual thoroughly.

Precautions

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

- Do not subject the camera to rain or moisture.
- Do not remove the cover. Otherwise, you may risk receiving an electric shock. In case of unintended equipment operation, contact an authorized engineer.
- Never operate under unspecified temperature, humidity or power supply.
- Please use 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 a class A production. Electromagnetic radiation at certain frequencies may affect the image quality of TV in home environment.

CONTENT

SAFETY GUIDES 1
PACKING LIST 2
QUICK START 2
PRODUCT HIGHLIGHTS. 3
CAMERA SPECIFICATIONS 3
CAMERA INTERFACE. 5
CAMERA DIMENSION. 5
IR REMOTE CONTROLLER. 6
VISCA IN (RS232) PORT. 9
OSD MENU 10
UVC CONTROL 13
WEB SETTINGS 14
VIEW RTSP STREAM VIA VLC 18
VISCA OVER IP 19
VISCA PROTOCOL 22
PELCO-D PROTOCOL 29
PELCO-P PROTOCOL 30
WARRANTY 32

SAFETY GUIDES

1. Electric Safety Installation and operation must accord with electric safety standard.
2. Use caution to transport Avoid stress, vibration or soakage in transport, storage and installation.
3. Polarity of power supply

The power supply of this product is +12V, the max electrical current is 2A. Polarity of the power supply plug is shown in the drawing below.



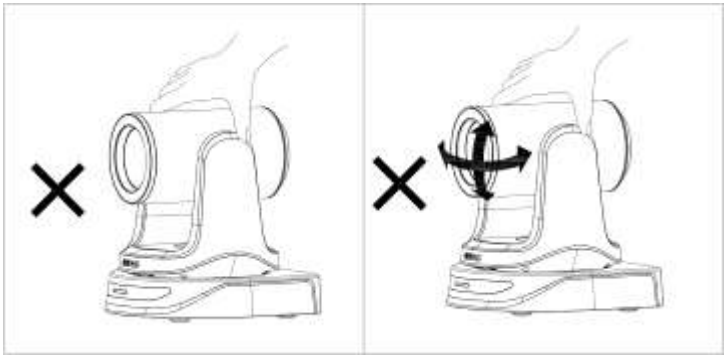
4. Installation precautions

Do not grasp the camera lens when carrying it. Do not touch camera lens by hand. Mechanical damage may result from doing so. Do not use in corrosive liquid, gas or solid environment to avoid any cover (plastic material) damage. Make sure there is no obstacle within rotation range. Do not power on before installation is completed.

5. Do not dismantle the camera We are not responsible for any unauthorized modification or dismantling.

CAUTION! Certain frequencies of electromagnetic field may affect the image of the camera!

Note:
Video quality may be affected by the specific frequencies of electromagnetic field.
Never grasp the head of the camera, or move the camera by hand when it is working. Otherwise, mechanism maybe affected.

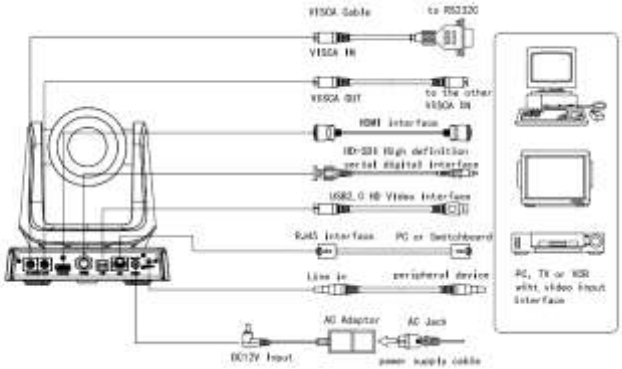


PACKING LIST

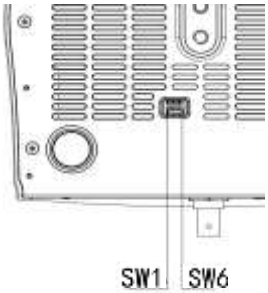
When unpacked, check if all supplied accessories are included:
Camera ····· 1pc
Power Adapter····· 1pc
Power Cable ····· 1pc
RS232 Control Cable····· 1pc
USB2.0 Cable ····· 1pc
Remote Controller ····· 1pc
User Manual ····· 1pc
Double-sided Adhesive····· 1pc

QUICK START

1. External interface: RS232 I/O, HDMI output, 3G-SDI output, USB2.0 output, LAN output, DC12V power, Audio input. Please check all connections before powering on the device.



2. Dial switch settings (at the bottom of the camera):



Dial Switch (ARM)			
	SW-1	SW-2	Instruction
1	OFF	OFF	Updating mode
2	ON	OFF	Debugging mode
3	OFF	ON	Undefined
4	ON	ON	Working mode

Dial Switch			
	SW-3	SW-4	Instruction
1	OFF	OFF	reserve
2	ON	OFF	reserve
3	OFF	ON	reserve
4	ON	ON	reserve

Dial Switch (USB)			
	SW-5	SW-6	Instruction
1	OFF	OFF	Updating mode
2	ON	OFF	Working mode
3	OFF	ON	Undefined
4	ON	ON	Undefined

PRODUCT HIGHLIGHTS

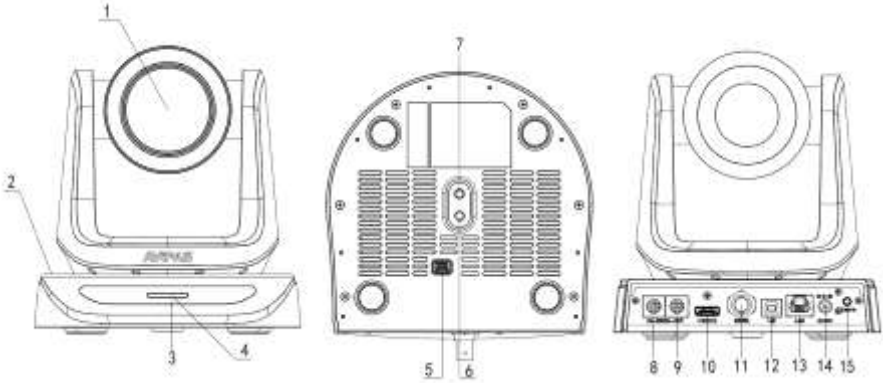
- Adopts advanced ISP, 1/2.8-inch 2.1MP sensor, providing full HD video resolution.
- High-quality 20x optical zoom, 2x digital zoom lens with 60-degree field of view.
- IP, HDMI, 3G-SDI, USB video output interface, compatible with different applications.
- White Balance/ Exposure/ Focus/ Iris can be adjusted automatically or manually.
- Support PoE+: one single CAT5/6 for video, control and power, highly efficient video encoding.
- Support line-in function, AAC and LPCM audio encoding.
- Advanced focusing algorithm: fast and precise focusing performance during movement.
- Smooth PTZ mechanism, accurate pan tilt motor control.
- Up to 128 presets available.
- Support VISCA, PELCO-P, PELCO-D and VISCA over IP control protocol; IP VISCA over both TCP and UDP.
- Support RS232 daisy chain, up to 7 cameras under VISCA protocol.
- Support upside-down (ceiling) installation, H/V flip.
- Support RS232/UVC control
- Standard UVC1.1 protocol, seamlessly compatible with all major video conferencing software and platforms

CAMERA SPECIFICATIONS

Video Format	HDMI: 1920*1080P60/59.94/50/30/29.97/25/24; 1920*1080I60/59.94/50 1280*720P60/59.94/50/30/29.97/25
	SDI: 1920*1080P60/59.94/50/30/29.97/25/24; 1920*1080I60/59.94/50 1280*720P60/59.94/50/30/29.97/25
	USB: 1920*1080P30; 1280*720P30; 1024*576P30; 960*540P30; 720*576P30; 640*480P30; 640*360P30; 352*288P30; 320*240P30

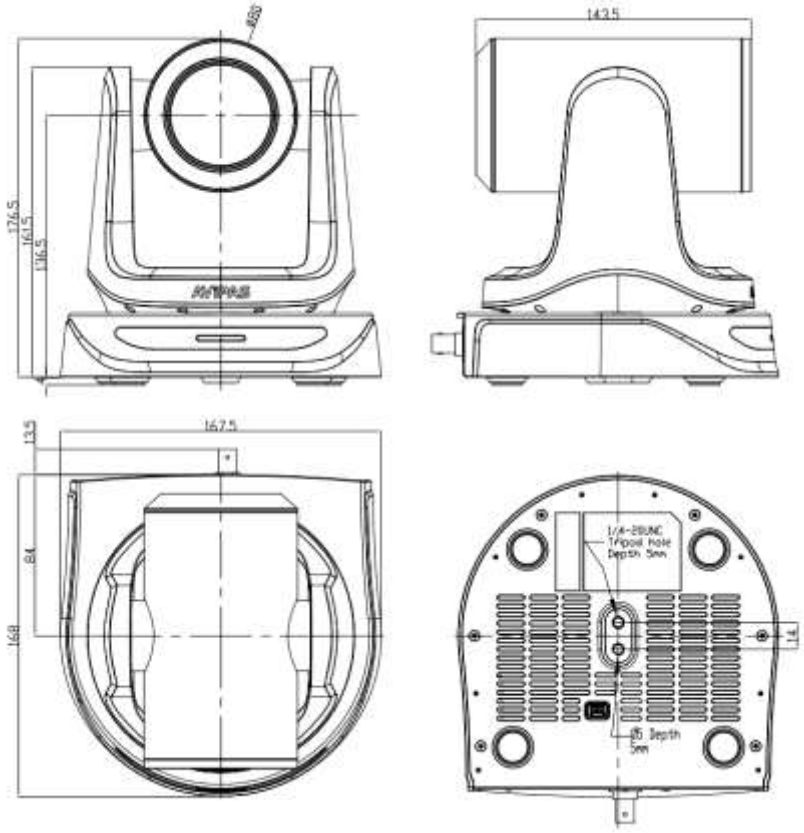
	RJ45: 1920*1080@1~30 / 1280*720@1~30 / 1024*576 @1~30 (Main stream) 1280*720@1~30 / 1024*576@1~30 / 640*360 @1~30 (Sub stream)
Video Interface	HDMI,3G-SDI, RJ45, USB2.0
Sensor	1/2.8" 2.1MP CMOS sensor
Zoom	f4.9~98mm, F1.5~3.0 View angle: 60°(Far)~3.23°(Near)
Rotation Angle	Pan: -170° ~ +170° Tilt: -90° ~ +90°
Rotation Speed	Pan: 0°~120°/s Tilt: 0°~80°/s
Preset:	remote controller: 10; RS232: 128; Accuracy: 0.1°
Control Port	RS232, RJ45 (VISCA over IP), USB2.0(UVC1.1)
Network Speed	1000M
Video encode	H.264/H.265 (default: H.264)
Bit Rate Control	Variable Bit Rate, Constant Bit Rate
Video Bit Rate	1024Kbps~163840Kbps
IP Protocol	TCP/IP, HTTP, RTSP, RTMP, DHCP, Onvif
PoE+	Support
Daisy Chain	RS232 serial daisy chain (up to 7 units under VISCA protocol)
Minimum Lux	0.1 Lux (F1.5)
White Balance	Auto/Indoor/Outdoor/Manual/AWT/PUSH
Exposure	Auto/Manual/Bright/Shutter/Iris
Focus	Auto/Manual
Iris	Auto/Manual
Electric Shutter	Auto/Manual
Gamma	Support
WDR	Support
BLC	Support
2D/3D Noise Reduction	Support
Anti-Flicker	OFF/50Hz/60Hz
H/V Flip	Support
Input Voltage	DC12V/ PoE+
Power Consumption	11W
Dimension	6.6*6.6*7.1inch (67.5*168*180.5mm)
Net Weight	3.1lb (1.4kg)

CAMERA INTERFACE



1. Camera Lens
2. Camera Base
3. IR Receiver Panel
4. Power Indicator Light
5. Dial Switch
6. Tripod Screw Hole
7. Installation Hole
8. RS232 Control Input
9. RS232 Control Output
10. HDMI Output
11. 3G-SDI Output
12. USB Output
13. RJ45 Output
14. DC12V Power Jack
15. Line-in Audio Input

CAMERA DIMENSION(MM)



IR REMOTE CONTROLLER





POWER

Under normal working mode, press POWER to enter standby mode;

Press it again, the camera will start self-configuration, then go back to HOME position.

It will go to preset position 0 if the preset is set.

FREEZE （do NOT support USB output）

Press FREEZE to freeze/ unfreeze the image.

IRT (IR Transfer/IR Pass)

Open / close the IR pass function. Once press the IRT key, the camera will receive and pass the IR remote control signal to the codec/terminal (via VISCA IN port).



SET 1~SET4 ADDRESS SETTING

To set the current camera's address (ID), press and hold the key for 3seconds until the backlight of that key is ON.

CAM1~CAM4（CAMERA SELECTING）

Press the corresponding camera number to select the camera.



NUMERIC KEY (1-9)

Set preset: press and hold the number for 3 seconds to set preset position.

Call preset: press the corresponding number to call preset position.

CLR PRE (CLEAR PRESET)

Press CLR PRE + number key to clear the corresponding preset position.

Press and hold the key to clear all existing preset positions.



FOCUS

Manually adjust focus, only valid under manual mode.

ZOOM

Manually adjust zoom.

NAVIGATE KEY: UP/DOWN/LEFT/RIGHT

Under camera normal mode, use navigate keys to pan/ tilt;
After entering camera OSD, use navigate keys to select and enter submenu.

OK /HOME KEY

Under camera normal mode, press OK to make the camera go back to its HOME position;
After entering camera OSD, press OK to confirm selection.



AF: Auto focus

MF: Manual focus

RESET: Press and hold for 3 seconds to reset camera

MENU: Enter OSD menu



LEARN+LIMIT L: Set the pan tilt left limit position.

LEARN+LIMIT R: Set the pan tilt right limit position.



LEARN+LMT CLR: Clear all limit position.

BLC OFF/ BLC ON：Back light off/on

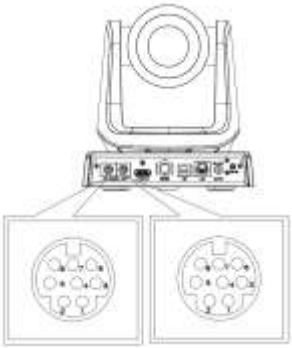
BRIGHT-/BRIGHT+: Set image brightness, only valid under bright priority exposure mode.



Video Format Selection:

Press and hold for 3 seconds to select different video format output.

VISCA IN （RS232 PORT）



No.	V_IN	V_OUT
1	DTR	DTR
2	DSR	DSR
3	TXD	TXD
4	GND	GND
5	RXD	RXD
6	A	
7	IR OUT	
8	B	

VISCA IN	RS485
1	
2	
3	
4	
5	
6	A(+)
7	IR OUT
8	B(-)

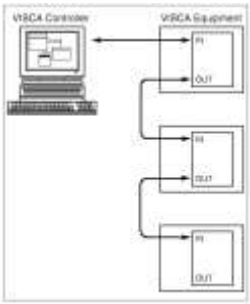
VISCA IN & DB9 Connection

Camera VISCA IN		**Windows DB-9**	
1	DTR	6	DSR
2	DSR	4	DTR
3	TXD	2	RXD
4	GND	5	GND
5	RXD	3	TXD
6	A (+)		
7	IR OUT		
8	B (-)		

VISCA IN &Mini DIN Connection

Camera VISCA IN		**Mini DIN**	
1	DTR	1	DSR
2	DSR	2	DTR
3	TXD	5	RXD
4	GND	4	GND
5	RXD	3	TXD
6	A (+)	6	NC
7	IR OUT	7	NC
8	B (-)	8	NC

VISCA Network Construction:



SERIAL PORT CONFIGURATION

Parameter	**Value**	**Parameter**	**Value**
Baud rate	2400/4800/9600/115200	Stop Bit	1bit
Start Bit	1 bit	Check Bit	None
Data Bit	8 bit		

OSD MENU

1. Under working mode, press the MENU key on the IR remote controller, to enter the OSD menu as shown bellow:



2. After entering the main menu, use navigate UP/DOWN keys to select the from the main menu options.

3. Press RIGHT key to enter sub menu; use UP/DONW key to select the sub menu; use LEFT/RIGHT key to change current settings.

4. Press MENU key again to return to the previous menu, repeat and exit the OSD menu.

5. OSD Menu setting list

SYSTEM	PROTOCOL	Optional item: VISCA/ PELCO-P/ PELCO-D	Default: VISCA
	ADDRESS	VISCA: 1~7 PELCO-P/D: 1~255	Default: 1
	BAUD RATE	2400/ 4800/ 9600/ 115200	Default: 9600
	PTL LOCK	Protocol lock: once set, above protocol settings will be locked	Default: OFF
	RS485	RS485 ON/OFF	Default: ON
	VISCA	OVER ALL/ OVER IP/ OVER COM	Default: OVER ALL
	LANGUAGE	Chinese/ English	Default: English

EXPOSURE	EXPOSURE MODE	AUTO/ MANUAL/ SHUTTER/ IRIS/ BRIGHT	Default: AUTO
	SHUTTER	Shutter speed: 1/30~1/10000, only valid under MANUAL and SHUTTER mode	Default: AUTO
	IRIS	Iris setting: CLOSE~F1.8, only valid under MANUAL and IRIS mode	Default: AUTO
	GAIN	Gain setting:0dB~30dB, only valid under MANUAL mode	Default: AUTO
	EBRIGHT	Bright setting:0~27, only valid under BRIGHT priority mode.	Default: AUTO
	BRIGHT	0~15	Default: 8

	WD MODE	ON/OFF	Default: OFF
	WD LEVEL	WDR Level	Default: 1
	BLC	ON/OFF	Default: OFF

IMAGE	WB MODE	ATW/ MANUAL/ AUTO/ INDOOR/ OUTDOOR/ PUSH	Default: ATW
	R GAIN	Red gain level: 0~255, only valid under manual white balance mode.	Default: AUTO
	B GAIN	Blue gain level:0~255, only valid under manual white balance mode	Default: AUTO
	FLICK	Anti-Flicker setting: 50/60HZ	Default: 50HZ
	DZOOM	ON/OFF	Default: OFF
	FOCUS	Select focus mode	Default: AUTO

QUALITY	2D NR	2D noise reduction: the bigger value, the less noise on image, the lower the resolution	Default: OFF
	3D NR	3D noise reduction: OFF/AUTO/0~4, the bigger value, the less motion noise on image, high value will cause image smear.	Default: AUTO
	SHARPNESS	Sharpness setting: 0~15	Default: 3
	CONTRAST	Set contrast level	Default: 8
	SATURATION	Set saturation level	Default: 8
	GAMMA	Select gramma level	Default: 0
	AF SENSITIVITY	LOW/ NORMAL/ HIGH	Default: NORMAL

PTZ	SPEEDBYZ	SpeedByZoom: proportional speed, the bigger zoom, the slowerspeed	Default: ON
	FLIP.HOR	Flip horizontal	Default: OFF
	FLIP VER	Flip vertical	Default: OFF
	PT SPD	Pan tilt speed	Default: 18
	ZOOM SPD	Zoom speed	Default: 5

	MENU MIR	NORMAL/ MIRROR	Default: NORMAL

FORMAT	1080P59.94	After selecting the system, press OK to confirm. If it is the currently selected system, it will not be activated.
	1080P50	
	1080I59.94	
	1080I50	
	1080P29.97	
	1080P25	
	720P59.94	
	720P50	
	720P29.97	
	720P25	
	1080P60	
	1080P30	
	720P60	
	720P30	
	1080I60	
	1080P24	

IP	DHCP	ON/OFF	Use up/down/left/right navigation keys to select item to set, and use numeric keys to enter parameters. Press menu button to return.
	IP	192.168.001.188	
	MASK	255.255.255.000	
	GW (Gateway)	192.168.001.001	
	MAIN	Default: 1920*1080	
	BITRATE	Default: 04096k	
	SUB	Default: 1280*720	
	BITRATE	Default: 02048k	

RESET	SYS RESET	Reset communication settings to default
	CAM RESET	Reset camera settings to default
	PT RESET	Reset pan/tilt settings to default

	ALL RESET	Reset all settings to default

INFO	IR ADDR	Camera IR control address
	USB	USB firmware version
	CLIENT	Default client end protocol: VISCA
	MODEL NO.	Model number
	ARM VER	ARM firmware version
	FPGA VER	FPGA firmware version
	CAM VER	Camera version
	RELEASE	Software release date

SET IP ADDRESS IN MENU

In order to facilitate customer debugging, the camera supports IP address configuration under OSD.

1. Press "MENU" to enter the camera OSD, then select “IP”;



2. Press “ ▸ ” navigation key to enter the IP setting interface. Select the parameter needs to be changed using the navigation “▲” and “▼”keys”;

3. Use numeric keys to set the corresponding parameters. After finishing entering, press the "MENU" again to complete and save the setting;

4. Press "MENU" again to exit menu.

UVC CONTROL

1. Make sure the USB2.0 camera output is connected to the USB2.0 port on the PC/MAC, and it is recognized by the PC Device Manager. If connected to the USB3.0 port, video resolution may be compromised.

2. The interval of control commands sending from the server (via USB) to the camera should be no less than 250ms.

PU_BRIGHTNESS_CONTROL	81 01 04 4d 00 00 0p 0q FF
PU_CONTRAST_CONTROL	81 01 04 A2 00 00 0p 0q FF
PU_SATURATION_CONTROL	81 01 04 A1 00 00 0p 0q FF
PU_SHARPNESS_CONTROL	8x 01 04 42 00 00 0p 0q FF
PU_GAMMA_CONTROL	8x 01 04 5B 0p FF
PU_WHITE_BALANCE_TEMPERATURE_CONTROL	8x 01 04 35 0X FF
PU_BACKLIGHT_COMPENSATION_CONTROL	81 01 04 33 02/03 FF
PU_POWER_LINE_FREQUENCY_CONTROL	8x 01 04 AA 00/01/02 FF
CT_ZOOM_ABSOLUTE_CONTROL	8x 01 04 47 0p 0q 0r 0s FF
CT_PANTILT_ABSOLUTE_CONTROL	8x 01 06 02 VV WW 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z F
CT_PANTILT_RELATIVE_CONTROL	8x 01 06 01 pp qq rr ss FF
CT_ZOOM_RELATIVE_CONTROL	8x 01 04 07 pp FF

WEB SETTINGS

1. Download and install Flash Player

When access the camera via Internet Explorer browser for the first time, Flash Player needs to be installed. We recommend users download it from flash official website to get latest version:

https://www.flash.cn/english

After installation is complete, it will be listed in PC's Programs and Features Control Panel:

2. Login

To access the camera interface, open IE browser, input IP address (**default IP address is 192.168.1.188**). Users can select language (Chinese/English). **Default username: admin Default password: admin**



3. Real-time Preview

When log in to the web interface for the first time, a message below will show. Please go to IE browser "Settings", allow pop-ups and allow running Flash Player.





On the Preview interface shown above, there is a virtual control panel on the right-hand side. Options include pan, tilt, zoom, focus, presets, focus speed and zoom speed. On the bottom of image preview, main stream and sub stream preview can be selected.

4. Configuration

Click "**Setting**" to enter camera configuration interface shown below:



Video Encode: To set image encoding mode, main stream and sub stream resolution/bit rate/frame rate, bit rate control option, I frame interval, etc. as shown above.



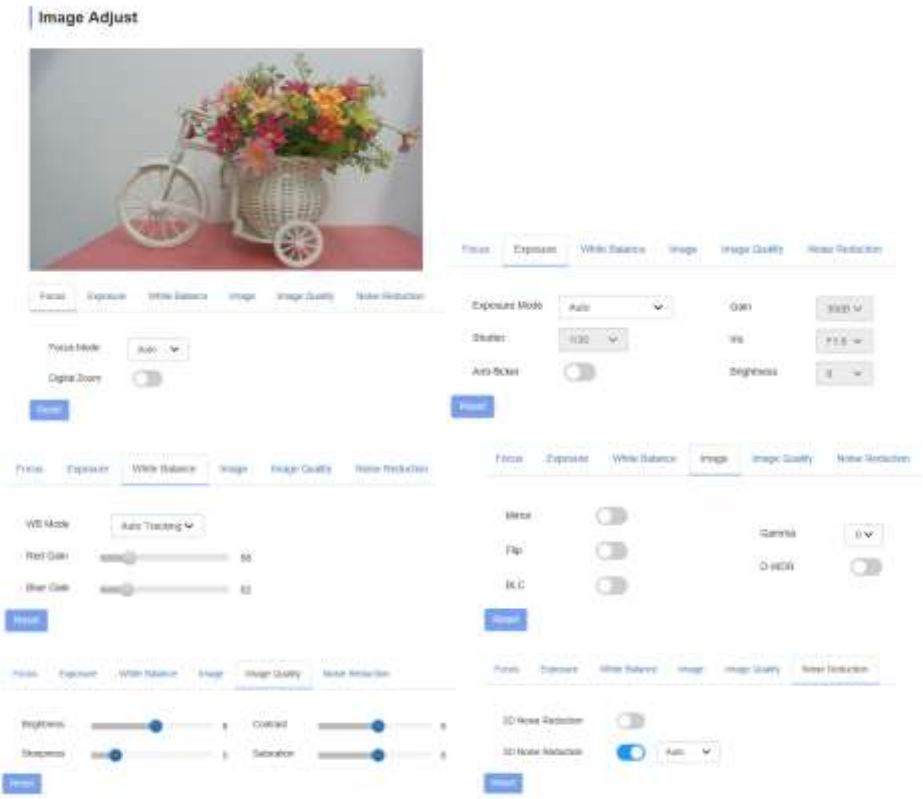
Video Transmission: To set RTMP settings.



Audio Setting: To enable/disable embedded audio. Audio encoding mode can be selected. Parameters such as sampling rate and bit rate can be adjusted.



Image Parameter: To set focus, exposure, white balance, image, image quality, noise-reduction, etc.



Ethernet: To set DHCP mode, IP address, subnet mask, default gateway, http port, web port, main stream port and sub stream port. Default settings are as following:

DHCP	OFF	Default gateway	192.168.1.1
IP address	192.168.1.188	HTTP port	80
Subnet mask	255.255.255.0	RTSP port	554

Firmware upgrade: To update the camera ISP. Steps are shown below:

Click “clicking to upload file”, in the dialog box, select the upgrade file. Click “upgrade” to start the updating process.

DO NOT power off or do any operation when upgrading. Please reboot the camera at least 5 min after the upgrade is finished.

Then re-login to web interface, select “Reset all” to reset the camera completely.



Reset to default: To reset the camera to default settings.

Reset simply: reset camera image settings; Reset completely: reset all camera settings including IP configurations, image settings, language and protocol; Reboot: reboot ISP part of the camera.

Account Setting: To set camera account username and password.





USING VLC TO VIEW RTSP/RTMP VIDEO

Default RTSP main streaming URL: rtsp://192.168.1.188/stream/main

Default RTSP sub streaming URL: rtsp://192.168.1.188/stream/sub

Default RTMP main streaming URL: rtmp://192.168.1.188:1935/app/rtmpstream0

Default RTMP sub streaming URL: rtmp://192.168.1.188:1935/app/rtmpstream1

VISCA OVER IP

VISCA over IP means VISCA protocol transmit via IP. This can be used to reduce RS232/RS485 cable layout (the controller must support IP communication function).



Communication port specs:

- Control port: RJ45 Gigabit LAN
- IP protocol: IPv4
- Transmit protocol: UDP
- IP address: set via web interface or OSD menu
- Port address: 52381
- Confirm send/transmission control: depend on applied program
- Applied range: in the same segment, not suitable for bridge network.
- To apply, enter camera OSD, choose VISCA option: OVER IP

How to use VISCA over IP

VISCA Command

Commands are sent from controller to peripheral equipment (camera), and when peripheral equipment receives commands, it returns ACK. When the command is executed, a complete message will be returned.

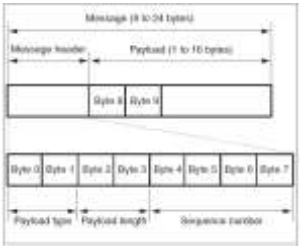
VISCA Inquiry

Inquiry is sent from controller to peripheral equipment (camera), and when peripheral equipment receives the command, it will return required message.

VISCA Reply

It is sent from peripheral equipment (camera) to controller. ACK, which is the complete message, can be either reply or error reply.

Command format: Note that LAN output is big-endian, and LSB is in the front.



Payload type: data definitions are listed below:

Name	Value (Byte 0)	Value (Byte 0)	Value (Byte 0)
VISCA command	0x01	0x00	Stores the VISCA command.
VISCA inquiry	0x01	0x10	Stores the VISCA inquiry.
VISCA reply	0x01	0x11	Stores the reply for the VISCA command and VISCA inquiry, or VISCA device setting command.
VISCA device setting command	0x01	0x20	Stores the VISCA device setting command.
Control command	0x02	0x00	Stores the control command.
Control reply	0x02	0x01	Stores the reply for the control command.

Payload length: Valid data length in Payload (1~16), is the command length.

For example, when valid data length is 16-byte, Byte 2: 0x00; Byte 3: 0x10

Controller will save sequence number of each command, when one command sent, the sequence number of the command will add 1; when the sequence number reaches the max, it will return back to 0. The peripheral equipment will save sequence number of each command, and return the sequence number to controller.

Payload: According to Payload type, the following data will be saved.

- VISCA command: Save VISCA command packet
- VISCA inquiry: Save VISCA message packet
- VISCA reply: Save VISCA return packet
- VISCA device setting command: Save VISCA equipment setting command packet.
- Control command: The following data is saved in control command payload

Name	Value	Description
RESET	0x01	Resets the sequence number to 0. The value that was set as the sequence number is ignored.
ERROR	0x0Fyy	yy=01: Abnormality in the sequence number.
		yy=02: Abnormality in the message (message type)

- Controlled reply: The following data is saved in return command payload of control command.

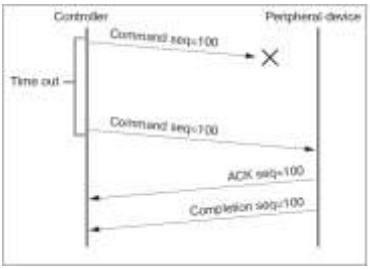
Message	Value	Description
ACK	0x01	Reply for RESET.

Delivery confirmation:

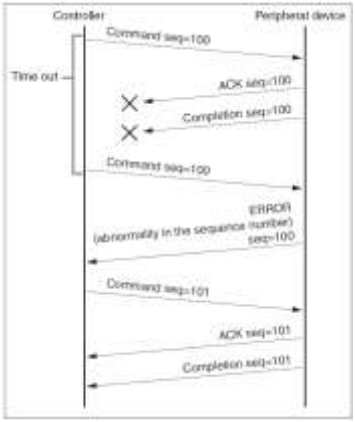
VISCA over IP uses UDP as transmission communication protocol. UDP communication message transmission is not stable, it is necessary to confirm delivery and resent in application.

Generally, when controller sends a command to peripheral equipment, controller will wait for the return message then send the next command, we can detect and confirm if the peripheral equipment receive the commands from its return message's lag time. If controller detects it overtime, it is regarded as error transmission. Controller will resend the commands to check peripheral's status. The resent command sequence number is same as the last one. Following chart lists possible received message and the corresponding status after the resent command.

Lost message	Received message for retransmission	Status after retransmission	Correspondence after retransmission
Command	ACK message	Command is performed by retransmission.	Continue processing.
ACK message	ERROR (Abnormality in the sequence number.)	Command has been performed. If only the ACK message is lost, the completion message returns.	If the result by the completion message is needed, retransmit by updating the sequence number.
Completion message for the command	ERROR (Abnormality in the sequence number.)	Command has been performed.	If the result by the completion message is needed, retransmit by updating the sequence number.
Inquiry	Reply message	Inquiry is performed by retransmission.	Continue processing.
Reply message for the inquiry	ERROR (Abnormality in the sequence number.)	Inquiry has been performed.	If the result by the reply message is needed, retransmit by updating the sequence number.
Error message	Error message	Command is not performed. If the error cause eliminates, normal reply is returns (ACK, reply message).	Eliminate the error cause. If normal reply returns, continue processing.
Inquiry of the VISCA device setting command	Reply message of the VISCA device setting command	Inquiry has been performed by retransmission.	Continue processing.
Reply message of the VISCA device setting command	ERROR (Abnormality in the sequence number.)	Inquiry has been performed.	If the result by the reply message is needed, retransmit by updating the sequence number.



Sequence chart when command lost



Sequence chart when returned message lost

Note: Do not change IP address, subnet mask, or gateway parameters under VISCA over IP mode, otherwise, it will cause network inconsistency.

VISCA PROTOCOL

Part1 Camera Return Commands

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

z = camera adderss+8

Error Messages		
	Command Packet	**Note**
Syntax Error	z0 60 02 FF	Returned when the command format is different or when a command with illegal command parameters is accepted
Command Not Executable	z0 61 41 FF	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 type	**function**	**command**	
AddressSet	Broadcast	88 30 01 FF	Address setting

Command type	function	command	
IF_Clear	Broadcast	88 01 00 01 FF	I/F Clear
CommandCancel		8x 21 FF	
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 (0(wide) ~0x4000(tele))
	Direct with speed	8x 0A 04 47 0t 0p 0q 0r 0s FF	t: spd 0~7 pqrs: Zoom Position (0(wide) ~0x4000(tele))
CAM_DZoom	ON	8x 01 04 06 02 FF	
	OFF	8x 01 04 06 03 FF	
	Combine Mode	81 01 04 36 00 FF	Combine with optical zoom control
	Separate Mode	81 01 04 36 01 FF	Separate with optical zoom control
	Stop	81 01 04 06 00 FF	Enable In separate mode
	Tele (Variable)	81 01 04 06 2p FF	Enable In separate mode
	Wide (Variable)	81 01 04 06 3p FF	Enable In separate mode
	Direct	81 01 04 46 0p 0q 0r 0s FF	Enable In separate mode
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)	81 01 04 08 2p FF	p=0 (Low) to 7 (High)
	Near (Variable)	81 01 04 08 3p FF	p=0 (Low) to 7 (High)
	Direct	8x 01 04 48 0p 0q 0r 0s FF	pqrs: Focus Position
	Auto Focus	81 01 04 38 02 FF	
	Manual Focus	81 01 04 38 03 FF	
	One Push AF	8x 01 04 18 01 FF	
CAM_ZoomFocus	Direct	8x 01 04 47 0p 0q 0r 0s 0t 0u 0v 0w FF	pqrs: Zoom Position (0(wide)~ 0x4000(tele)) tuvw: Focus Position
CAM_WB	Auto	8x 01 04 35 00 FF	
	Indoor	8x 01 04 35 01 FF	
	Outdoor	8x 01 04 35 02 FF	

Command type	function	command	
	OnePush	8x 01 04 35 03 FF	
	ATW	8x 01 04 35 04 FF	
	Manual	8x 01 04 35 05 FF	
	Sodium lamp	8x 01 04 35 08 FF	
	fluorescent	8x 01 04 35 09 FF	
	OnePush Trigger	8x 01 04 10 05 FF	
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 (0~0xFF)
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 (0-0xFF)
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_Shutter	Reset	8x 01 04 0A 00 FF	Shutter Setting
	Up	8x 01 04 0A 02 FF	
	Down	8x 01 04 0A 03 FF	
	Direct	8x 01 04 4A 00 00 0p 0q FF	pq: Shutter Position (0~0x15)
CAM_Iris	Reset	8x 01 04 0B 00 FF	Iris Setting(0~0xD)
	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 (0~ 0x11)
CAM_Gain	Reset	8x 01 04 0C 00 FF	Gain Setting (0~0x0F)
	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 Positon (0~0x0E)
CAM_Bright	Reset	8x 01 04 0D 00 FF	Bright Setting

Command type	function	command	
	Up	8x 01 04 0D 02 FF	
	Down	8x 01 04 0D 03 FF	
	Direct	8x 01 04 4D 00 00 0p 0q FF	pq: Bright l Positon (0~0x1B)
CAM_OverallBright	Direct	8x 01 04 A4 00 00 0p 0q FF	pq: Bright l Positon (0~0x0F) different with AE BRIGHT
CAM_WDR	On	8x 01 04 3D 02 FF	Exposure Compensation ON/OFF
	Off	8x 01 04 3D 03 FF	
	Direct	8x 01 04 D3 pq FF	pq: ExpComp Position (0~0x6)
CAM_BackLight(BLC)	On	8x 01 04 33 02 FF	BackLight On
	Off	8x 01 04 33 03 FF	BackLight Off
CAM_Sharpness	Reset	8x 01 04 02 00 FF	
	Up	8x 01 04 02 02 FF	Aperture Control
	Down	8x 01 04 02 03 FF	
	Direct	8x 01 04 42 00 00 0p 0q FF	pq: Aperture Gain (0~0x0F)
CAM_Memory(preset)	Reset	8x 01 04 3F 00 0p FF	p: Preset Number (=0 to 127) Corresponds to 0 to 9 on the Remote Commander
	Set	8x 01 04 3F 01 0p FF	
	Recall	8x 01 04 3F 02 0p 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_RS485Ctl	On	8x 01 06 A5 02 FF	
	Off	8x 01 06 A5 03 FF	
CAM_Saturation	Saturation	8x 01 04 A1 00 00 0p 0q FF	Pq: saturation level 0x00~0xff
CAM_Contrast	Contrast	8x 01 04 A2 00 00 0p 0q FF	Pq: Contrast level 0x00~0xff
CAM_SpeedByZoom	On	8x 01 06 A0 02 FF	
	Off	8x 01 06 A0 03 FF	
CAM_PTSpeed	PT Speed	8x 01 04 C1 00 00 0p 0q FF	Pq: PT speed 0x05~0x18
CAM_ZoomSpeed	Zoom Speed	8x 01 04 D1 00 00 0p 0q FF	Pq: Zoom speed 0x01~0x07
CAM_ZoomDisplay	On	8x 01 06 C2 02 FF	
	Off	8x 01 06 C2 03 FF	
CAM_IRaddress	IR address	8x 01 06 D8 0p FF	p: IR address 1~4
CAM_Gamma	Gamma set	81 01 04 5B 0p FF	P: Gamma NO (0~6)
CAM_MountMode	UP	8x 01 04 A4 02 FF	Mount Up

Command type	function	command	
	Down	8x 01 04 A4 03 FF	Mount Down
CAM_ColorGain	Direct	8x 01 04 49 00 00 00 0p FF	(0~0x0E)
CAM_2D Noise Reduction	Direct	8x 01 04 53 0p FF	0 – OFF 1 – ON
CAM_3D Noise Reduction	Direct	8x 01 04 54 0p FF	0 – OFF 1 – AUTO 2-5 – level
FLICK	50HZ	81 01 04 23 01 FF	
	60HZ	81 01 04 23 02 FF	
	OFF	81 01 04 23 00 FF	
VideoSystem Set		8x 01 06 35 00 pp FF	pp: Video format 1080P60 0x2E 1080P50 0x2F 1080I60 0x01 1080I50 0x04 1080P30 0x06 1080P25 0x08 720P60 0x09 720P50 0x0C 720P30 0x0E 720P25 0x11
CAM_IDWrite		8x 01 04 22 0p 0q 0r 0s FF	pqrs: Camera ID (=0000 to FFFF)
IP address control	IP set	8x 01 04 AB 0p 0q 0r 0s 0m 0n 0x 0y FF	Set ip to :pq.rs.mn.xy
	Mask set	8x 01 04 AC 0p 0q 0r 0s 0m 0n 0x 0y FF	Set mask to :pq.rs.mn.xy
	Gateway set	8x 01 04 AD 0p 0q 0r 0s 0m 0n 0x 0y FF	Set gateway to : pq.rs.mn.xy
SYS_Menu	Menu On	8x 01 06 06 02 FF	Turn on the menu
	Menu Off	8x 01 06 06 03 FF	Turn off the menu
	Menu Back	8x 01 06 06 10 FF	Menu step back
	Menu Ok	8x 01 7E 01 02 00 01 FF	Menu ok
IR_Receive	On	8x 01 06 08 02 FF	IR(remote commander) receive ON/OFF
	Off	8x 01 06 08 03 FF	
	On/Off	8x 01 06 08 10 FF	
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(TBD) ZZZZ: Tilt Position(TBD)
	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	

Command type	function	command	
	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	Set	8x 01 06 07 00 0W 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF	W:1 UpRight 0:DownLeft YYYY: Pan Limit Position(TBD) ZZZZ: Tilt Limit Position(TBD)
	Clear	8x 01 06 07 01 0W 07 0F 0F 0F 07 0F 0F 0F FF	

Part 2 Camera Control Command

Command type	command	return	note
CAM_PowerInq	8x 09 04 00 FF	y0 50 02 FF	On
		y0 50 03 FF	Off(Standby)
CAM_ZoomPosInq	8x 09 04 47 FF	y0 50 0p 0q 0r 0s FF	pqrs: Zoom Position
CAM_FocusModeInq	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 04 FF	ATW
		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_GainPosiInq	8x 09 04 4C FF	y0 50 00 00 0p 0q FF	pq: Gain Position
CAM_ BrightPosiInq	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_ApertureInq	8x 09 04 42 FF	y0 50 00 00 0p 0q FF	pq: Aperture Gain
CAM_MemoryInq	8x 09 04 3F FF	y0 50 pp FF	pp: 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_IDInq	8x 09 04 22 FF	y0 50 0p 0q 0r 0s FF	pqrs: Camera ID
CAM_DHCPInq	8x 09 04 AE FF	y0 50 pp FF	
CAM_IPInq	8x 09 04 AB FF	y0 50 0p 0p 0q 0q 0r 0r 0s 0s FF	
CAM_MASKInq	8x 09 04 AC FF	y0 50 0p 0p 0q 0q 0r 0r 0s 0s FF	
CAM_GATEWAYInq	8x 09 04 AD FF	y0 50 0p 0p 0q 0q 0r 0r 0s 0s FF	
CAM_FlareModeInq	8x 09 04 B6 FF	y0 50 pp FF	
CAM_FlareBrightModeInq	8x 09 04 B7 FF	y0 50 pp FF	
CAM_FlareRed	8x 09 04 B8 FF	y0 50 pp FF	
CAM_FlareGreen	8x 09 04 B9 FF	y0 50 pp FF	
CAM_FlareBlue	8x 09 04 BA FF	y0 50 pp FF	
CAM_IDInq			
CAM_VersionInq	8x 09 00 02 FF	y0 50 ab cd mn pq rs tu vw FF	
VideoSystemInq(Telycam)	8x 09 06 23 FF	y0 50 pp FF	pp: Video format
VideoSystemInq(Sony)	8x 09 04 24 72 FF	y0 50 0p 0p FF	pp: Video format
IR_Transfer	8x 09 06 1A FF	y0 50 02 FF	On
		y0 50 03 FF	Off
IR_Receive	8x 09 06 08 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
IR_ReceiveReturn		y0 07 7D 01 04 00 FF	Power ON/OFF
		y0 07 7D 01 04 07 FF	Zoom tele/wide
		y0 07 7D 01 04 38 FF	AF On/Off
		y0 07 7D 01 04 33 FF	CAM_Backlight
		y0 07 7D 01 04 3F FF	CAM_Memory
		y0 07 7D 01 06 01 FF	Pan_tiltDrive
Pan-tiltMaxSpeedInq	8x 09 06 11 FF	y0 50 ww zz FF	ww: PanMaxSpeed zz: Tilt Max Speed
Pan-tiltPosInq	8x 09 06 12 FF	y0 50 0w 0w 0w 0w 0z 0z 0z 0z FF	wwww: PanPosition zzzz: Tilt Position
MainstreamResolutionInq	8x 09 04 C2 00 FF	y0 50 0p 0q 0r 0s 0m 0n 0x 0y FF	pqrs : Column(x size) mnxy: Line (y size) only support:1920*1080,3840*2160
MainstreamRateInq	8x 09 04 C2 01 FF	y0 50 0p 0q 0r 0s 0m 0n 0x 0y FF	pqrsmnxy: bitrate (1024~16384)
SubstreamResolutionInq	8x 09 04 C3 00 FF	y0 50 0p 0q 0r 0s 0m 0n 0x 0y FF	pqrs : Column(x size) mnxy: Line (y size) only support:1280*720, 1024*576, 640*360

SubstreamRateInq	8x 09 04 C3 01 FF	y0 50 0p 0q 0r 0s 0m 0n 0x 0y FF	pqrsmnxy: bitrate (1024~16384)

Note: 【x】 means the camera address: 【y】=【x + 8】.

VISCA Pan Tilt Absolute Position Value

Pan Angle	VISCA Value	Tilt Angle	VISCA Value
-170	0xF670	-30	0xFE50
-135	0xF868	0	0x0000
-90	0xFAF0	30	0x01B0
-45	0xFD78	60	0x0360
0	0x0000	90	0x510
45	0x0288		
90	0x0510		
135	0x0798		
170	0x0990		

VISCA Pan Tilt Speed Value

Pan (Degree/Second)		Pan (Degree/Second))	
0	0.3	0	0.3
1	1	1	1
2	1.5	2	1.5
3	2.2	3	2.2
4	2.4	4	3.6
5	2.6	5	4.7
6	2.8	6	6
7	3.0	7	8
8	3.2	8	10
9	3.4	9	12
10	3.8	10	15
11	4.5	11	18
12	6	12	23
13	9	13	30
14	15	14	39
15	19	15	48
16	25	16	59
17	32	17	69
18	38	18	80
19	45		
20	58		
21	75		
22	88		
23	105		
24	120		

PELCO-D PROTOCOL COMMAND LIST

Function	**Byte1**	**Byte2**	**Byte3**	**Byte4**	**Byte5**	**Byte6**	**Byte7**
Up	0xFF	Address	0x00	0x08	Pan Speed	Tilt Speed	SUM
Down	0xFF	Address	0x00	0x10	Pan Speed	Tilt Speed	SUM

Left	0xFF	Address	0x00	0x04	Pan Speed	Tilt Speed	SUM
Right	0xFF	Address	0x00	0x02	Pan Speed	Tilt Speed	SUM
Upleft	0xFF	Address	0x00	0x0C	Pan Speed	Tilt Speed	SUM
Upright	0xFF	Address	0x00	0x0A	Pan Speed	Tilt Speed	SUM
DownLeft	0xFF	Address	0x00	0x14	Pan Speed	Tilt Speed	SUM
DownRight	0xFF	Address	0x00	0x12	Pan Speed	Tilt Speed	SUM
Zoom In	0xFF	Address	0x00	0x20	0x00	0x00	SUM
Zoom Out	0xFF	Address	0x00	0x40	0x00	0x00	SUM
Focus Far	0xFF	Address	0x00	0x80	0x00	0x00	SUM
Focus Near	0xFF	Address	0x01	0x00	0x00	0x00	SUM
Set Preset	0xFF	Address	0x00	0x03	0x00	Preset ID	SUM
Stop	0xFF	Address	0x00	0x00	Pan Speed	Tilt Speed	SUM
Clear Preset	0Xff	Address	0x00	0x05	0x00	Preset ID	SUM
Call Preset	0Xff	Address	0x00	0x07	0x00	Preset ID	SUM
Query Pan Position	0Xff	Address	0x00	0x51	0x00	0x00	SUM
Query Pan Position Response	0Xff	Address	0x00	0x59	Value High Byte	Value Low Byte	SUM
Query Tilt Position	0Xff	Address	0x00	0x53	0x00	0x00	SUM
Query Tilt Position Response	0Xff	Address	0x00	0x5B	Value High Byte	Value Low Byte	SUM
Query Zoom Position	0Xff	Address	0x00	0x55	0x00	0x00	SUM
Query Zoom Position Response	0Xff	Address	0x00	0x5D	Value High Byte	Value Low Byte	SUM

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
Upleft	0Xa0	Address	0x00	0x0C	Pan Speed	Tilt Speed	0Xaf	XOR
Upright	0Xa0	Address	0x00	0x0A	Pan Speed	Tilt Speed	0Xaf	XOR
DownLeft	0Xa0	Address	0x00	0x14	Pan Speed	Tilt Speed	0Xaf	XOR

DownRight	0Xa0	Address	0x00	0x12	Pan Speed	Tilt Speed	0Xaf	XOR
Zoom In	0Xa0	Address	0x00	0x20	0x00	0x00	0Xaf	XOR
Zoom Out	0Xa0	Address	0x00	0x40	0x00	0x00	0Xaf	XOR
Focus Far	0Xa0	Address	0x00	0x80	0x00	0x00	0Xaf	XOR
Focus Near	0Xa0	Address	0x01	0x00	0x00	0x00	0Xaf	XOR
Stop	0Xa0	Address	0x00	0x00	Pan Speed	Tilt Speed	0Xaf	XOR
Set Preset	0xA0	Address	0x00	0x03	0x00	Preset ID	0xAF	XOR
Clear Preset	0xA0	Address	0x00	0x05	0x00	Preset ID	0xAF	XOR
Call Preset	0xA0	Address	0x00	0x07	0x00	Preset ID	0xAF	XOR
Query Pan Position	0xA0	Address	0x00	0x51	0x00	0x00	0xAF	XOR
Query Pan Position Response	0xA0	Address	0x00	0x59	Value High Byte	Value Low Byte	0xAF	XOR
Query Tilt Position	0xA0	Address	0x00	0x53	0x00	0x00	0xAF	XOR
Query Tilt Position Response	0xA0	Address	0x00	0x5B	Value High Byte	Value Low Byte	0xAF	XOR
Query Zoom Position	0xA0	Address	0x00	0x55	0x00	0x00	0xAF	XOR
Query Zoom Position Response	0xA0	Address	0x00	0x5D	Value High Byte	Value Low Byte	0xAF	XOR

Warranty

Thank you for your interest in the products of AVIPAS Inc.

This Limited Warranty applies to HD Conference Camera purchased from AVIPAS Inc.

This Limited Warranty covers any defect in material and workmanship under normal use within the Warranty Period. AVIPAS Inc. will repair or replace the qualified products at no charge.

AVIPAS Inc. provides a two (2)-year warranty (from the date of purchase) for this HD Conference Camera.

This Limited Warranty does not cover problems including but not limited to: improper handling, malfunction or damage not resulting from defects in material.

To receive warranty service, please contact AVIPAS Inc. first. We will decide whether a repair or replacement is needed and will advise you of the cost of such repair or replacement.

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Contact Details:

AViPAS Inc.

Address: 4320 Stevens Creek Blvd. Suite 227
San Jose, CA 95129

Phone: 1-844-228-4727

Fax: (408) 228-8438

Email: info@avipas.com

Website: http://www.avipas.com