

# BC-7 Series 4K SDI+IP True Dual Output PTZ Camera

## USER MANUAL

Part One: Camera User Manual

VERSION: BC-7-M-02202021



**BC-7-4K20S-S6MNB**

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# Operating Instructions

Thank you for purchasing our product. If there are any questions, please contact the authorized dealer.

Before operating the unit, please read this manual thoroughly and retain it for future reference.

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# IMPORTANT INFORMATION

## Legal Notice

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Attention:

To ensure account security, please change the password after your first login. You are recommended to set a strong password (no less than eight characters). Password login does not apply to some models that do not need password login.

The contents of this document are subject to change without prior notice. Updates will be added to the new version of this manual. We will readily improve or update the products or procedures described in the manual.

Best effort has been made to verify the integrity and correctness of the contents in this document, but no statement, information, or recommendation in this manual shall constitute formal guarantee of any kind, expressed or implied. We shall not be held responsible for any technical or typographical errors in this manual.

The product appearance shown in this manual is for reference only and may be different from the actual appearance of your device.

This manual is a guide for multiple product models and so it is not intended for any specific product.

In this manual, the illustrations of displayed interface, parameters displayed, drawings and value ranges may vary with models. Please see the actual product for details.

Due to uncertainties such as physical environment, discrepancy may exist between the actual values and reference values provided in this manual.

Use of this document and the subsequent results shall be entirely on the user's own responsibility.

## Symbols

Symbol	Description
 <b>WARNING!</b>	Contains important safety instructions and indicates situations that may cause bodily injury.
 <b>CAUTION!</b>	User must be careful and improper operations may cause damage or malfunction of product.
 <b>NOTE!</b>	Indicates useful or supplemental information about the use of product.

## Safety Information

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### WARNING!

Installation and removal of the unit and its accessories must be carried out by qualified personnel. You must read all of the Safety Instructions supplied with your equipment before installation and operation.

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### Warnings:

- If the product does not work properly, please contact your dealer. Never attempt to disassemble the camera yourself. (We will not assume any responsibility for problems caused by unauthorized repair or maintenance.)
- This installation should be made by a qualified service person and should conform to all the local codes.
- When shipping, the camera should be packed in its original packaging.
- Make sure the power supply voltage is correct before using the camera.
- Do not drop the camera or subject it to physical shock.
- Do not touch sensor modules with fingers. If cleaning is necessary, use a clean cloth with a bit of ethanol and wipe it gently. If the camera will not be used for an extended period of time, put on the lens cap to protect the sensor from dirt.
- Do not aim the camera lens at the strong light such as sun or incandescent lamp. The strong light can cause fatal damage to the camera.

### Maintenance Precautions:

- If there is dust on the front glass surface, remove the dust gently using an oil-free brush or a rubber dust blowing ball.
- If there is grease or a dust stain on the front glass surface, clean the glass surface gently from the center outward

using anti-static gloves or an oil-free cloth. If the grease or the stain still cannot be removed, use anti-static gloves or an oil-free cloth dipped with detergent and clean the glass surface gently until it is removed.

- Do not use organic solvents, such as benzene or ethanol when cleaning the front glass surface.

## Regulatory Compliance

### FCC Part 15

This equipment has been tested and found to comply with the limits for digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This product complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

This device may not cause harmful interference.

This device must accept any interference received, including interference that may cause undesired operation.



### LVD/EMC Directive

This product complies with the European Low Voltage Directive 2006/95/EC and EMC Directive 2004/108/EC.



### WEEE Directive–2002/96/EC

The product this manual refers to is covered by the Waste Electrical & Electronic Equipment (WEEE) Directive and must be disposed of in a responsible manner.

# WHAT'S IN THE BOX

Note: The camera color may be in white or black per the item that is purchased.

	Camera X 1
	IR Remote Controller X 1 (2 X AA Batteries Required )
	Camera Power Adaptor and Power cord X 1
	Bag of Mounting Screws X 1
	RJ45 to RS232 Extension Cable X 1
	RJ45 to RS422 Extension Cable X 1
	Welcome Card X 1

## Accessories (Optional)

	RS232 8 Pin Mini Din to Phoenix Terminal Block (VCC-CC8MDP)
	Wall Mount (VCC-WM)
	Ceiling Mount (VCC-CM)

# Overview

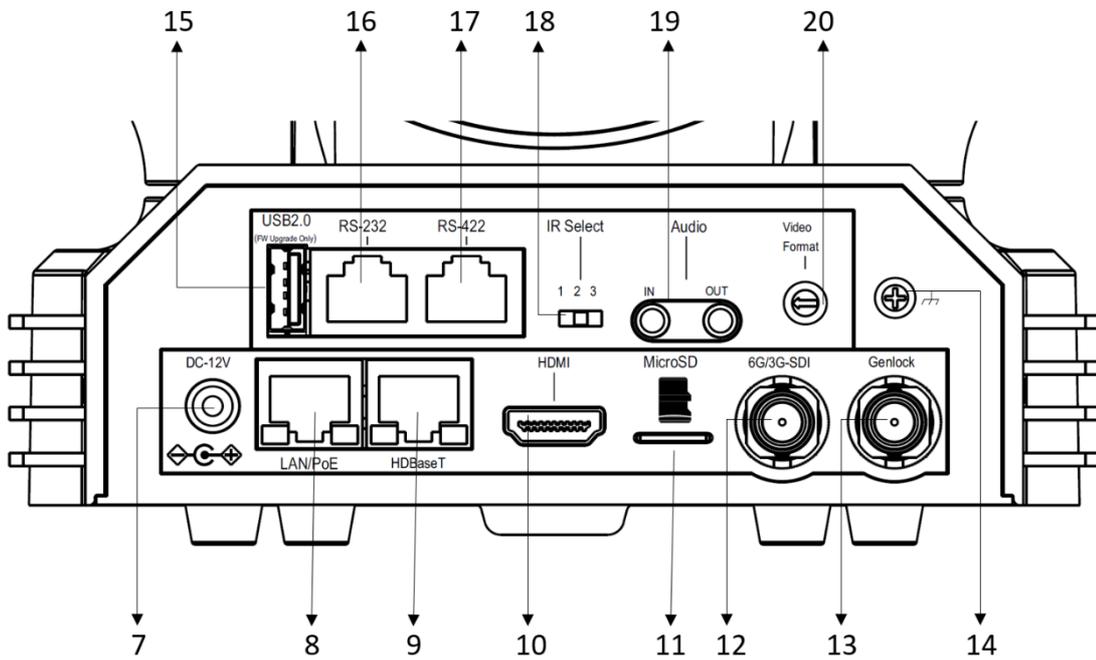
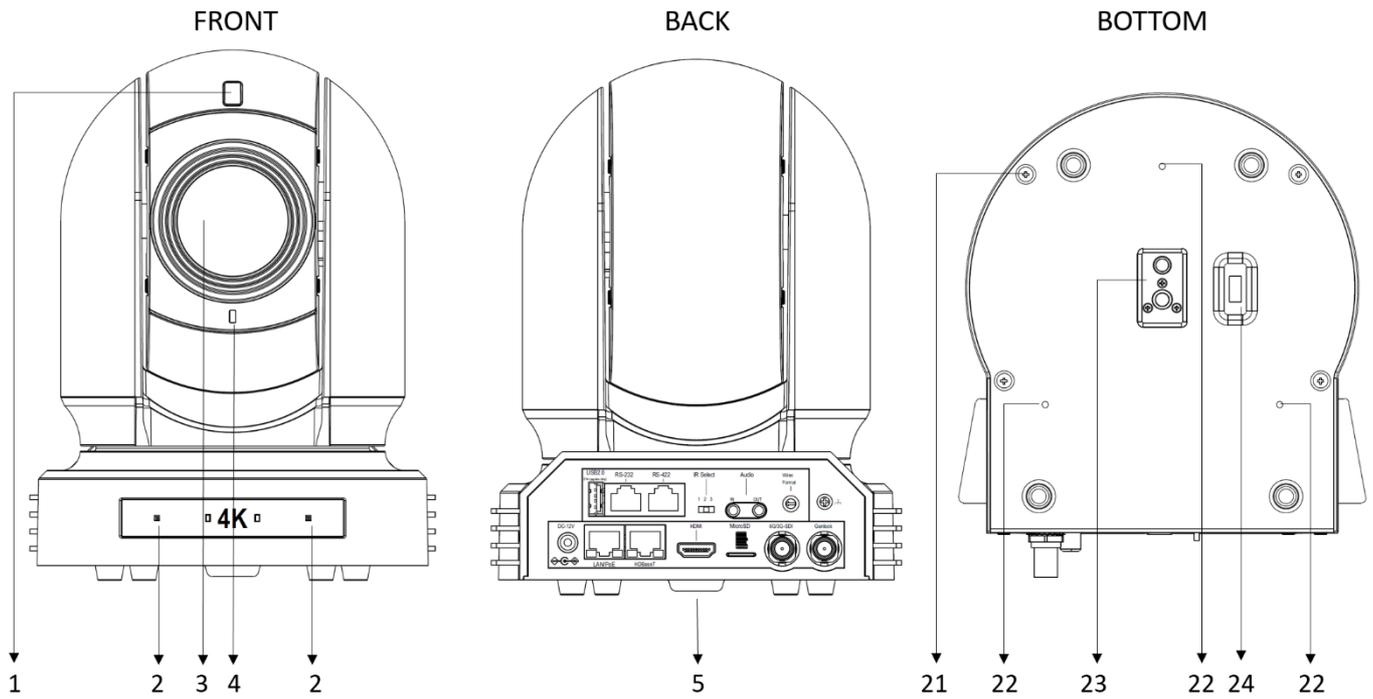
This user guide is suitable for the following models:

BC-7-4K20S-S3MNB/W (FHD, White)  
BC-7-4K20S-S3MNB/B (FHD, Black)  
BC-7-4K20S-S6MNB/W (4K, White)  
BC-7-4K20S-S6MNB/B (4K, Black)  
BC-7-4K20S-LS-4K (FHD-4K Upgrade License)

## Features

- 1/2.5 Inch CMOS sensor, Effective pixel number: 8.51 Megapixels
- Resolution: Up to 2160P29.97, 1080P59.94, 1080i59.94;
- IP Resolution: Up to 2160P30, 1080P60
- Zoom: Optical Zoom 20X, Up to 30X in 4K and 40X in Full HD with SRZ (Super Resolution Zoom) feature
- Black Level, Color Matrix, Image stabilizer(20X) and true WDR 130dB
- Video Output: HDMI (4K), 6G-SDI, IP (4K), CVBS simultaneously
- True Dual Output PTZ camera provides simultaneous 3G-SDI + IP.
- HDBaseT interface provides One Cable Solution, a single Cat 5e/6 cable carries uncompressed 4K video, audio, RS232/422 control and IR control, 4K IP video streaming and IP control, power(POH) for running distance up to 80-100 meters.
- $\pm 175$ -degree continuous pan,  $-30^{\circ}$ ~  $+90^{\circ}$ -degree continuous tilt
- 128 presets, Speed up to 150 degrees/sec
- Standard mounting and ceiling mounting with E-Flip function
- Control supports RS-232 control, RS-422/485 control, VISCA-over-IP, IP-Onvif, IR Remote Controller
- Presets store camera directions and image parameters (Up to 6 presets on remote controller or 128 presets via protocol programming)
- Image parameter setting restore with presets and quick access operation
- IP Protocol RTSP, RTMP for online video streaming
- Genlock for external synchronization.
- Local storage Micro SD card up to 32GB supported
- Supports Audio input, Audio output with IP streaming
- Power: DC 12V, PoE (IEEE802.3at), POH (Power Over HDBaseT)
- Firmware upgrade via USB2.0 or IP
- License upgradable from FHD to 4K

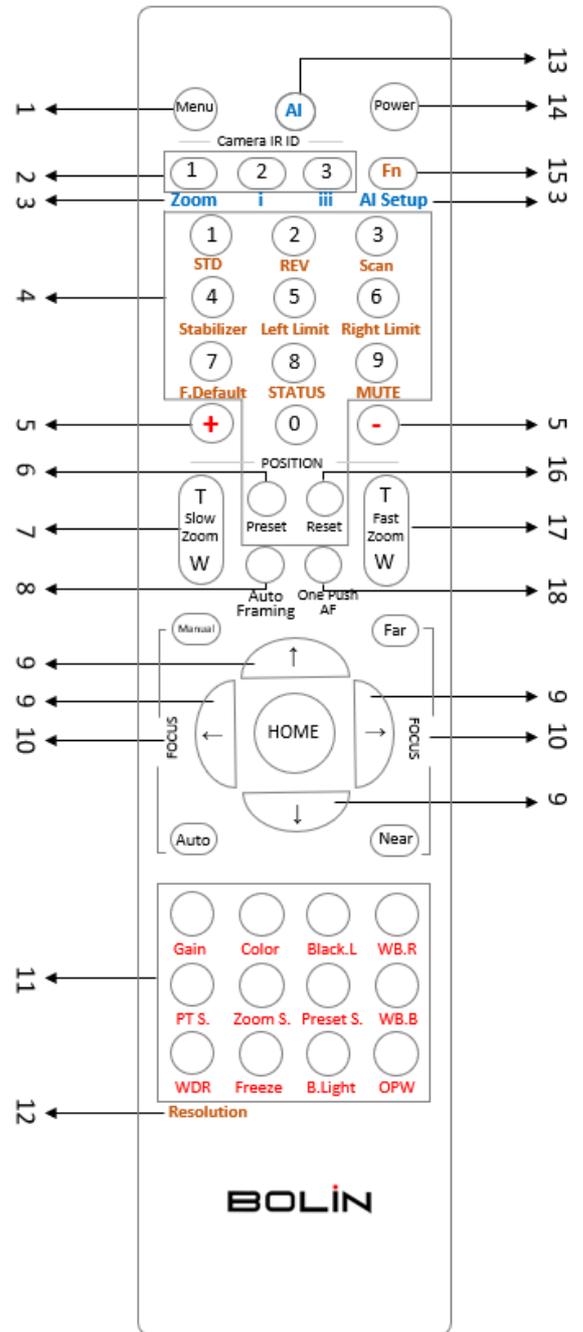
# Camera Diagrams



1. **Front Tally Light**
2. **IR Remote Controller Sensors**  
These are sensors to receive commands from infrared remote controller.
3. **Lens**  
This is a 20X magnification optical zoom lens of 4K image
4. **Power LED Indicator**  
Turns green when the camera is connected to power outlet. When the power is turned on, it takes about 15 to 30 seconds to display the image after LED turns on.
5. **Back Panel**
6. –
7. **12V DC Power Port**  
Connect the supplied DC power adaptor and cord.
8. **RJ45 Port for IP Network Video Streaming and IP Control**  
For VISCA over IP control and IP video streaming with POE (IEEE802.3bt) power input.
9. **RJ45 Port for HDBaseT Video Output**  
For HDBaseT output, provides video, control, audio and IP video streaming/control including power to camera transmit up to 80-100 meters over one CAT6 network cable.
10. **HDMI Port (HDMI 1.4)**
11. **Micro SD Card Port**
12. **6G/3G-SDI Video Output**
13. **External Synchronization/Genlock**
14. **Ground**
15. **USB2.0 Port**  
For firmware upgrade only
16. **RS232 Control Port (RJ45)**  
RJ45 to RS232 convertor cable is provided.
17. **RS-422 Control Port (RJ45)**  
RJ45 to RS422 convertor cable is provided
18. **IR Remote ID Selector**  
Camera ID for IR remote controller
19. **Audio Output/Input(Line-in/out)**
20. **Video Format Selector**  
For video format selection
21. **Bottom piece screws (Open them without authorization will violate warranty regulation)**
22. **Fix Mounting Holes**  
For original wall/ceiling mount bracket
23. **Tripod mounting holes**
24. **Bottom DIP Switch**

# Remote Controller

1. MENU, on screen menu display ON/OFF
2. Camera IR ID Selector for Remote Control.
3. AI Features, available when AI button (13#) is pressed. (Not activated, for future use).
4. Positioning Function and Number Buttons
  - Preset Position Calling and Setting
5. Value adjusting + for Feature Item NO.11.
6. Preset button, to set preset position.
7. Zoom. Telescope and Wide with slow speed.
8. Auto Framing. (Not activated).
9. Direction Control
  - PAN-TILT direction control
  - OSD menu navigator
  - HOME: Home position, confirm button, Enter button.
10. FOCUS
  - Manual Focus, Far, Near
  - Auto Focus
11. Features Direct Control, work with Value Adjust key + and – to make the feature adjustments.
  - Gain, Image gain adjustments
  - Color, Image color saturation adjustments
  - Black L, Image Black Level adjustments
  - WB.R, Image White Balance Red adjustments
  - PT S, Pan/Tilt Speed adjustments
  - Zoom S, Zoom Speed adjustments
  - Preset S, Preset Speed adjustments
  - WB.B, Image White Balance Blue adjustments
  - WDR, Wide Dynamic Range adjustments
  - Freeze, To get a frozen image.
  - B Light, Back Light compensation
  - OPW, One Push White Balance
12. Video Format Switching, Works with pressing and holding Fn button.
  - You can change the video format by keep pressing the button. (When video format is changed, the camera would restart and the screen turns black for few seconds.)
13. AI Mode key (Not activated, for future use)
  - Press AI button once, then press one of the AI features (Printed in color blue).
14. Power (Press and hold for 3 second)
  - Power ON the camera to turn the camera in operation status.
  - Power OFF the camera to turn the camera in standby status.
  - When the camera is powered OFF, the camera turns to the back and would be on standby mode.
  - When the camera is powered ON, the camera turns to the front.
  - Powering the camera ON/OFF would not restart the camera.
15. Fn Function Mode key
  - Press and hold the Fn key, and press one of the function buttons that printed in color brown.
16. Reset button, to cancel preset that has been set.
17. Zoom. Telescope and Wide with fast speed.
18. One Push AF
  - Press once to focus.



## Notes

- AAA Battery is not included with the remote controller.

# System Configuration

## Connection

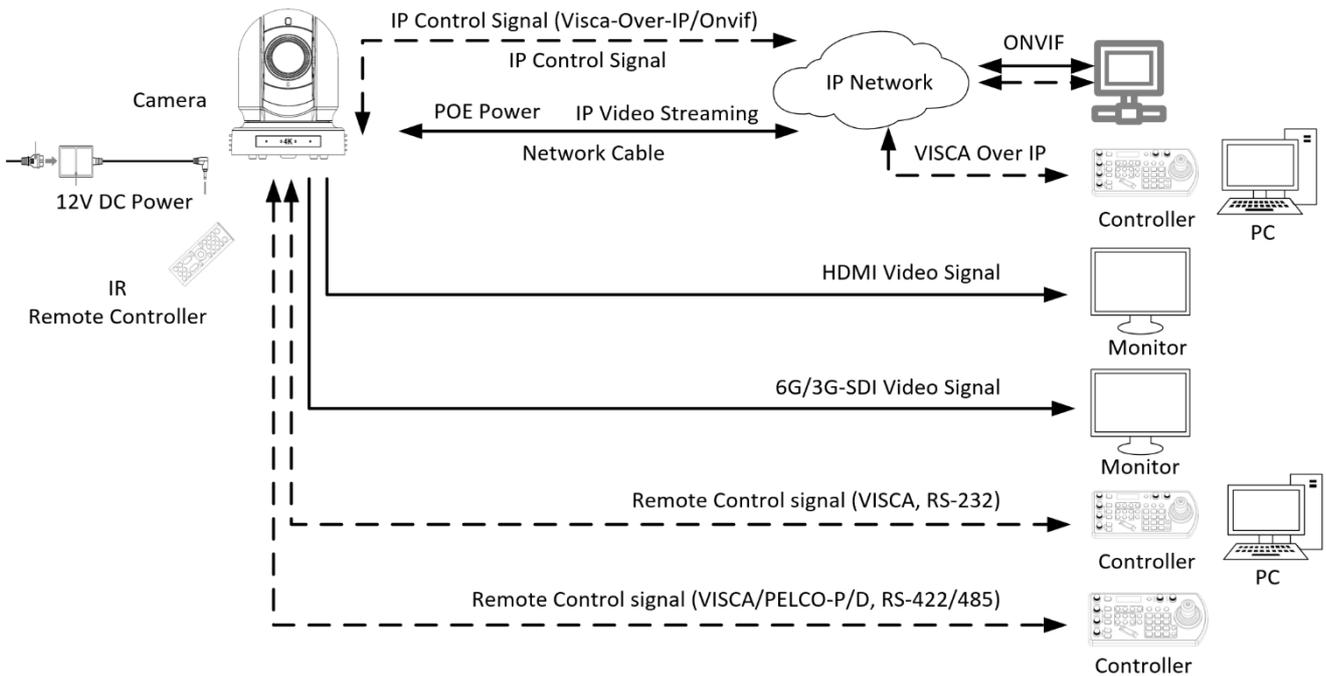
When the camera is connected to a computer and joystick keyboard with a VISCA cable (cross type, RS-232), you can operate the camera with the computer and the joystick keyboard.

When the camera is connected to a joystick keyboard with a control cable (cross type, RS-422/485), you can operate the camera's pan, tilt, zoom with the joystick keyboard.

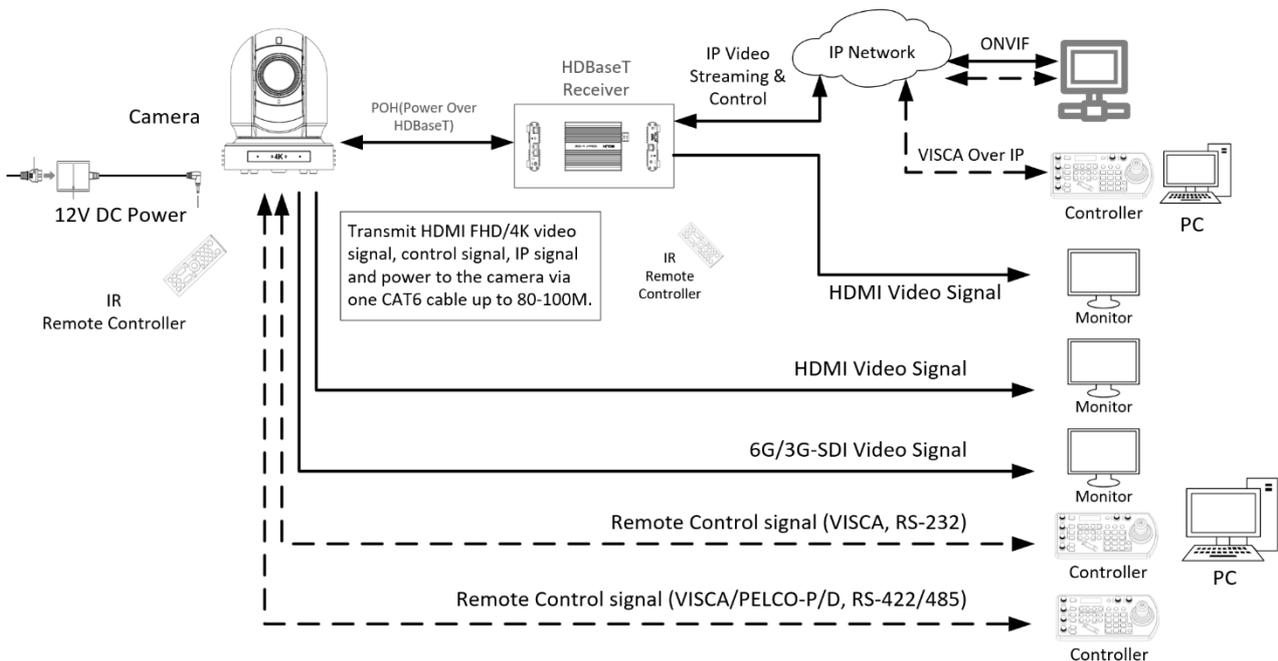
When the camera is connected to a IP joystick keyboard with a network cable, you can operate the camera's pan, tilt, zoom with the joystick keyboard via IP Onvif or Visca-Over-IP protocol.

In this connection configuration, HDMI cable, SDI video cable, data cable, Network cable is required. To obtain these third-party components or accessories, consult the dealer where you bought your camera.

### Connection with Serial + IP control with SDI/HDMI + IP video output



### Connection with Serial + IP control with SDI/HDMI + IP video output via HDBaseT output.



## Power

- Use only the DC power adaptor (JEITA type4) supplied with the unit. Do not use any other DC power adaptor.
- If using POE to power the camera, PoE+(IEEE802.3bt) is supported
- Ensure that the POE power source has sufficient power budget to power the camera, or some features may not function properly
- You can use One-Cable POH (Power Over HDBaseT) power up the camera via CAT6 cable when HDBaseT video card is used.



## Cable Requirements

- **Network Cable:** 10/100 Mbps Ethernet CAT 5/5E/6 UTP cables are applicable to the ANSI/EIA/TIA-568A/B and ISO/D. Eight wires in the network cable need to be inserted in parallel into the top of the cable connector. The cable connector needs to be crimped in position. When the cable connector is in position, ensure that the metal pieces of the cable connector are parallel to each other and the clamp of the cable connector is intact.
- **SDI video cable: 6G-SDI**
  - Belden 4694R/RG-6/U is a suitable cable to transmit broadcast-quality video:

4694R Coax - 4K Ultra-High-Definition Coax Cable for 12G-SDI



### General Description:

12 GHz, 4K UHD Precision Video Coax, RG-6/U Type, 75 Ohm, 18 AWG solid .040" silver plated copper conductor, gas-injected foam HDPE insulation, Duofoil® bonded to core + tinned copper braid shield (95% coverage), PVC jacket.

### Usage (Overall)

Suitable Applications: SMPTE 2082-1 12 Gb/s UHD TV, SMPTE 2081-1 6 Gb/s UHD TV, SMPTE 424M 3 Gb/s HD-SDI 1080p

- **SDI video cable: 3G-SDI**
  - Belden 1694A/5CFB is a suitable cable to transmit broadcast-quality video:

# 1694A

## COAXIAL CABLES

6.44

### Precision Video Cable for Analog and Digital

RG-6/U and RG-11/U Type



Description	Part No.	UL NEC/ C(UL) CEC Type	Standard Lengths		Standard Unit Weight		Conductor (stranding) Diameter Nom. DCR	Nominal Core OD		Shielding Materials Nom. DCR	Nominal OD		Nom. Imp. of Prop. (-)	Nominal Capacitance		Nominal Attenuation				
			Fl.	m	Lbs.	kg		Inch	mm		Inch	mm		pF/Fl.	pF/m	MHz	dB/ 100 Ft.	dB/ 100m		
<b>RG-6/U Type • 18 AWG Solid .040" Bare Copper Conductor • Duofoil® (100% Coverage) + Tinned Copper Braid Shield (95% Coverage)</b>																				
<b>Gas-injected Foam HDPE Insulation • PVC Jacket (Available in 10 colors)*</b>																				
SDI/HD TV	<b>1694A</b>	NEC:	500'	152.4	20.5	9.3	18 AWG	.180	4.57	Duofoil + 95%	2.75	6.99	75	82%	16.2	53.1	1	2	.8	
Digital Video		CMR	1000	304.8	45.0	20.5	(solid)			TC Braid							3.6	.5	1.5	
75°C		CEC:	4500	1371.6	202.5	91.9	.040"			2.852/M'	9.252/km							10	.7	2.4
		CMG FT4					BC			6.452/M'	21.052/km							71.5	1.6	5.2
																		135	2.1	6.9
																		270	3.0	9.7
																		360	3.4	11.3
																		540	4.3	13.9
																		720	4.9	16.1



Conductor:

AWG	Stranding	Material	Nominal Diameter
18	Solid	Bare Copper	0.04 in.

Shield Material

Type	Layer	Material	Coverage
Tape	1	Aluminum / Polyester / Aluminum	100%
Braid	2	Tinned Copper	95%

Nom. Capacitance Conductor to shield	Nom. Inductance	Nom. Char. Impedance
16.2 pF/ft	0.106 $\mu$ H/ft	75 Ohm

## Obtain Signal

The camera can simultaneously have SDI video output and HDMI video output and IP video output.

### Video Signal

#### HDMI HD Video signal

1. Connect the camera to a HD monitor/TV using HDMI cable.
2. Turn on the camera, video will display on the monitor after running initializing.
3. Information of the camera initial setting status will display for 5 seconds.
4. You can set the video format of the camera to the one you want to display.

#### SDI Video Signal

The camera can simultaneously stream SDI video output with HDMI video output.

1. Connect SDI cable in between the camera your SDI Device/display.
2. You now have SDI video output.
3. SDI video only supports 1080P.

#### IP Video Signal

The camera can simultaneously stream IP video output and SDI video output and HDMI video output.

1. Connect the camera to the network using Cat5/Cat6 network cable.
2. You need to have a web browser or VMS client software ready for IP video streaming.
3. PELCO address and Baud Rate setting on the camera must be as same as the setting on camera IP WEB interface.
4. To obtain IP video and configure IP video, please refer to Network Camera User Manual Part Two.

#### CVBS Video Signal

1. Connect CVBS cable in between the camera and your CVBS Device/display.
2. You now have CVBS video output.

### Audio IN / OUT

- On rear panel, a microphone or audio source can be connected to the **Audio IN** port, which feeds audio into the camera
- A speaker can be connected to the **Audio OUT** port, which will output any audio that is captured on the **Audio In** port
- See Manual part 2 for more information about Audio capture
- Audio Line-in is embedded with camera HDMI, SDI and IP video signal.

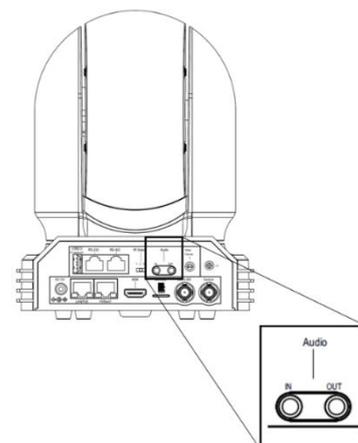


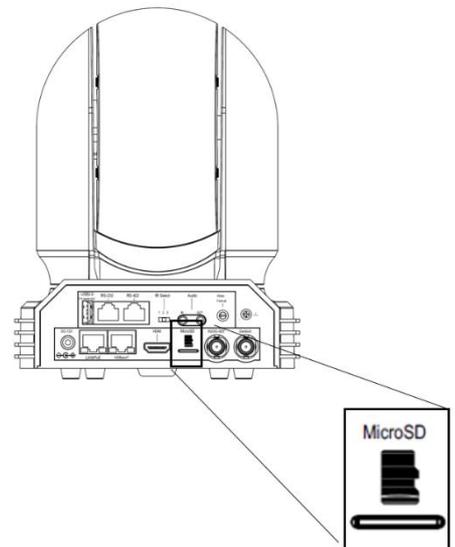
Table: Audio input & output relationship

Audio Input	SDI Audio Embedded	HDMI Audio Embedded	HDBaseT Audio Output	IP Audio Output	*Audio Line- out
Mic Built-in	NO	NO	NO	NO	YES, IP Audio
Audio Line-In	YES	YES	YES, Audio Line-out & HDMI Audio embedded	YES	YES, IP Audio

## SD Card (Not Activate, for future supported by software upgrade)

Micro SD card can be inserted to the camera for local recording.

- Ensure that the Micro SD card's pins are faced downward (logo faced up)
  - Slide the card into the slot, and click into place
  - To remove the card, click inward, and it will pop outward and may be removed
  - See Manual part 2 for more information regarding SD recording
- Currently, the following Micro SD cards are supported:



Brand	Size	Format	Type	Class	Transfer Bus
Samsung	64GB	FAT32	NA	10	NA
Kingston	64GB	FAT32	SDXC	10	IU1
SanDisk	64GB	FAT32	SDXC	10	IU1
SanDisk	128GB	FAT32	SDXC	10	IU1
Western Digital	32GB	FAT32	SDXC	10	IU1
Western Digital	64GB	FAT32	SDXC	10	IU1

## Camera Initial setting status Information

Information of the camera initial setting status will display for 5 seconds.

1. Camera PELCO ID for RS-485 control
2. Camera VISCA ID for RS-422/232 control
3. Camera ID for IR Remote Controller
4. IR remote control signal receive current setting
5. Baud Rate current setting
6. Control COMM Port current setting
7. HDMI video format current setting
8. HDMI current setting
9. Model number
10. MCU firmware version
11. FPGA firmware version

## Camera Status Info Display

PELCO ID	1
VISCA ID	1
IR ID	01
IR-RECEIVE	ON
BAUD RATE	9600
COMM TYPE	232
FORMAT	2160P29.97
HDMI OUT	RGB
MODEL TYPE	----
MCU FW:	V0B210B32010AA006
FPGA FW:	V027 4K

# Camera Control Methods and System Configurations

This unit has multiple ways of controlling the camera and various system configuration capabilities using optional products. This section describes the ways of controlling and typical system examples with the required components and usage of each system.

1. Use the Infrared Remote Controller
2. Use RS-232 (VISCA)
3. Use RS-422/485 (VISCA/PELCO P/D)
4. IP Control (See Network Camera User Manual Part Two)
5. Use HDBaseT One-Cable control

## Use the Infrared Remote Controller

To operate the camera from a short distance.



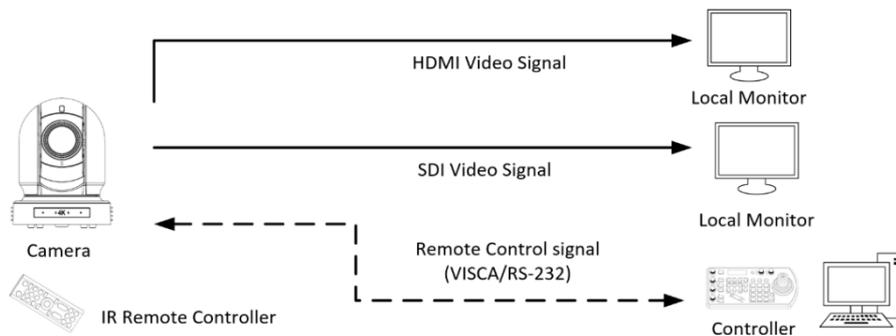
For IR remote control details, refer to Operation Using the Infrared Remote Controller.

## Use RS-232 (VISCA)

You can use RS-232 port to connect to optional controllers, such as joystick control keyboard, control PC station, to operate the camera.

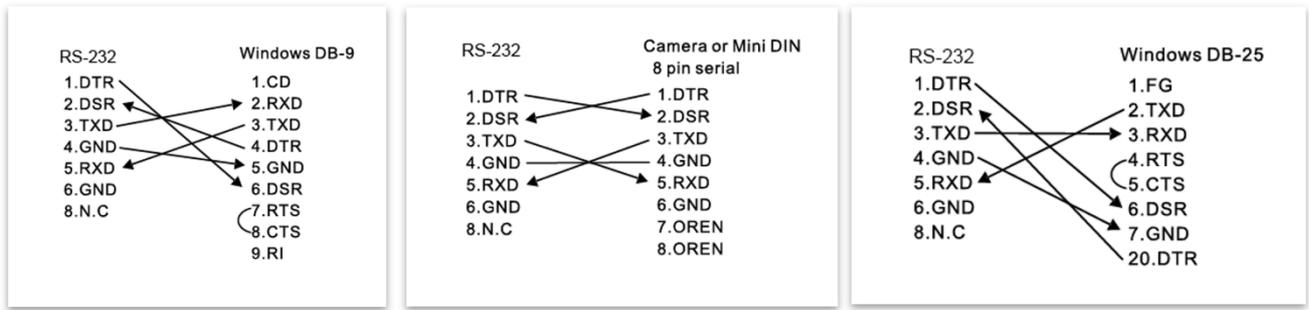
To perform pan/tilt and zoom operations using the joystick of the control keyboard, and to perform the Preset operation using the control buttons.

An application software that supports this unit is needed if you use PC station.

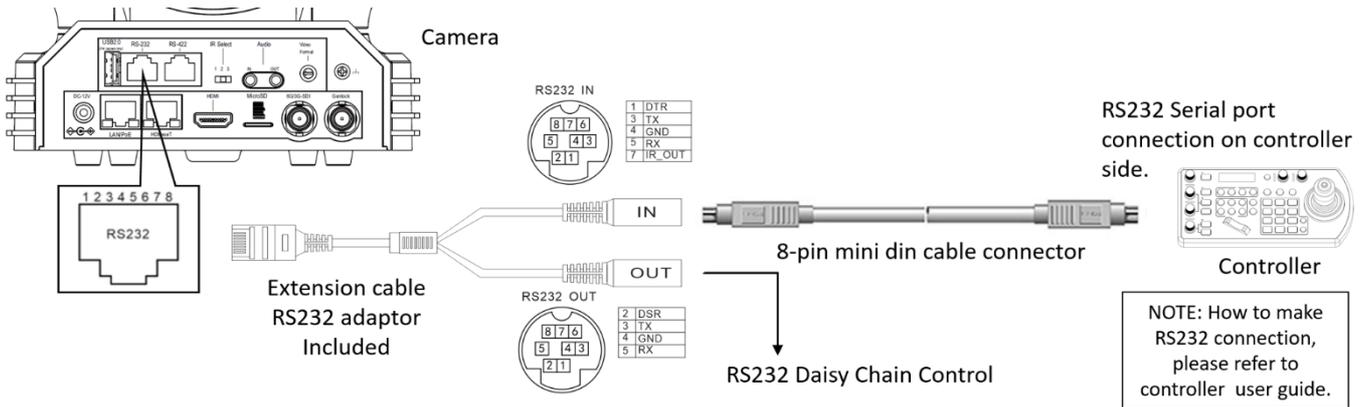


### RS232 Connection

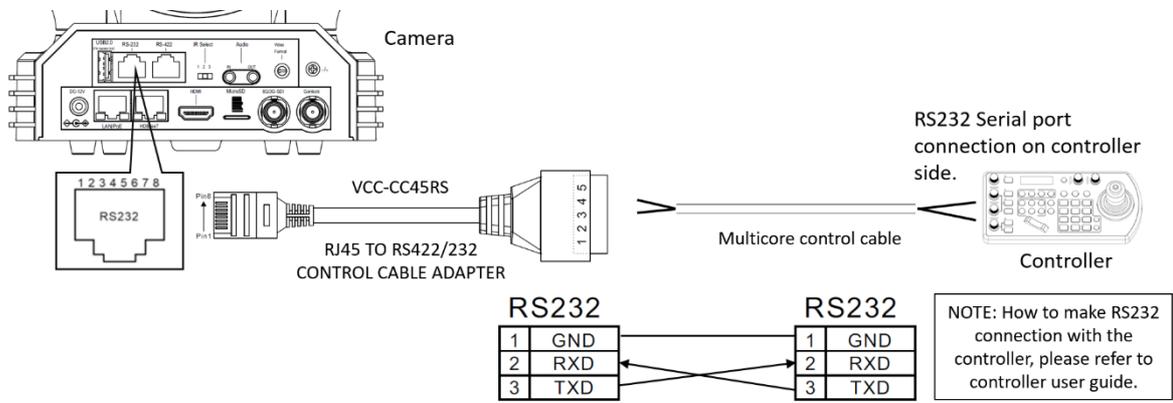
1. Set RS232 control method on Bottom Dip Switch.
2. Set Baud Rate on Bottom Dip Switch to the same as Baud Rate setting on the keyboard you are using.
3. Set specific camera address that you want to control the camera for on Bottom Dip Switch.
4. If you want to have the camera address to be automatically assigned by VISCA controller, set camera Dip Switch address to 0.
5. Reboot the camera by turning it Off/On after the Bottom Dip Switch has been set up correctly.
6. Camera supports Daisy Chain connection up to 7 cameras.
7. Use the RJ45 to RS232 (VISCA) control cable. The controller must be VISCA compatible.
8. You can make RS232 connection cable if you have the following applications:



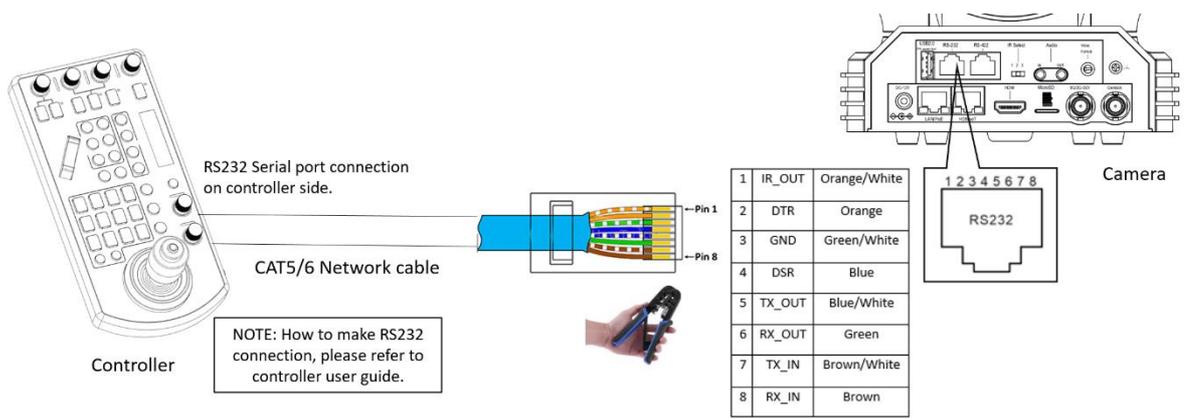
9. Use extension cables included RJ45 to RS232 8 pin Mini Din adaptor to make RS232 connection for your control device.



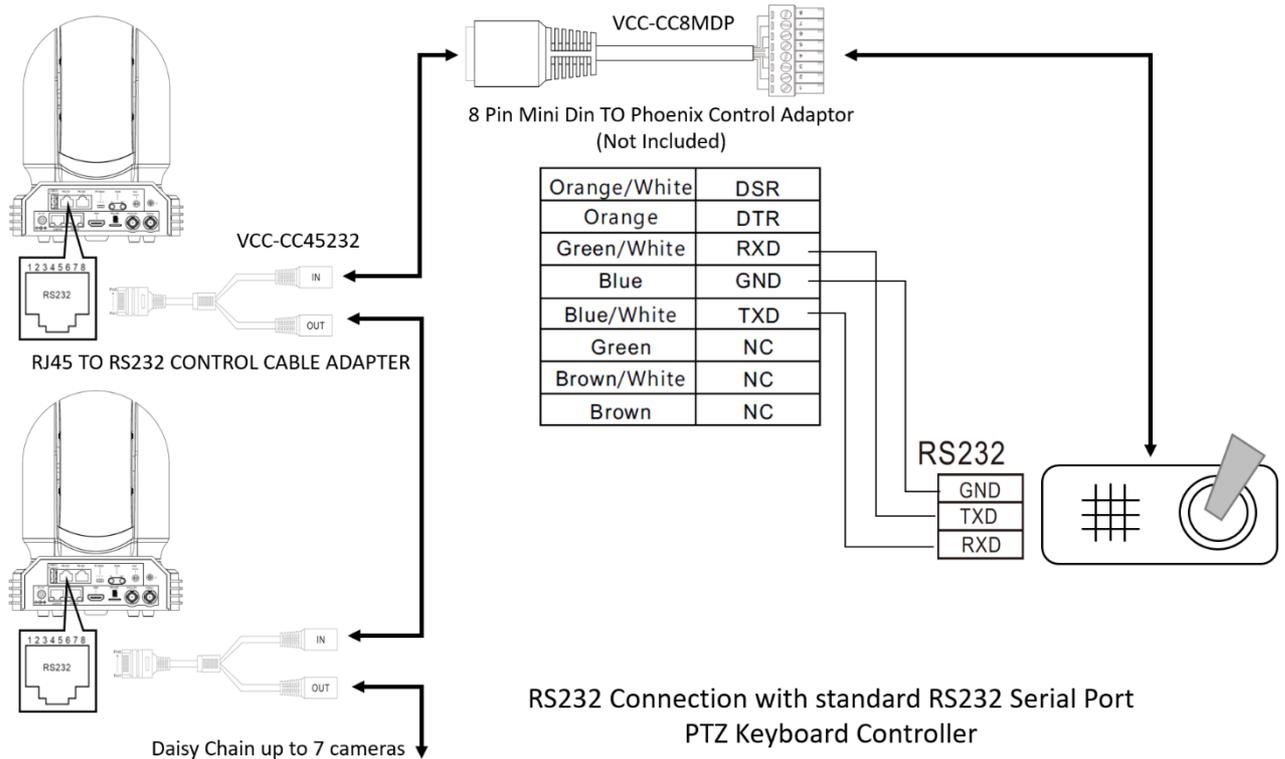
10. Use extension cables included RJ45 to RS422/232 Phoenix terminal contact adaptor to make RS232 connection for your control device.



11. Or you can use CAT5/6 network cable (**T-568B standard pinout**) to make RS232 connection by following the pin definition below:



12. How to make RS232 Daisy Chain multiple camera connection with standard RS232 serial port controller as below:

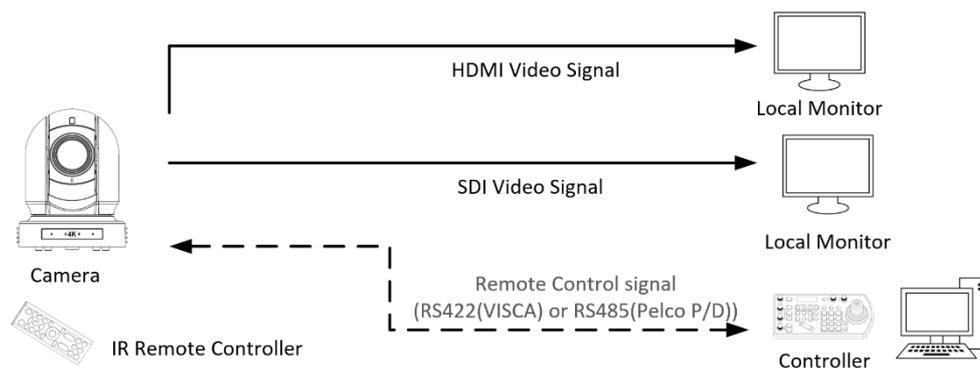


## Use RS-422(VISCA) / RS485 (PELCO P/D)

You can use RS-422/485 port connect to optional controllers, such as joystick control keyboard, control PC station, to operate the camera.

To perform pan/tilt and zoom operations using the joystick of the control keyboard, and to perform the Preset operation using the control buttons.

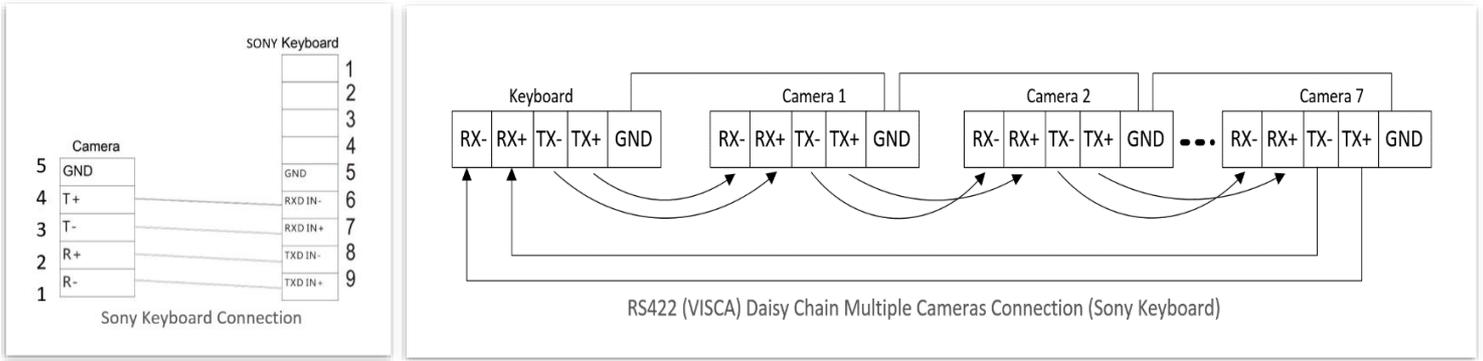
An application software that supports this unit is needed if you use PC station.



## RS422 (VISCA) connection

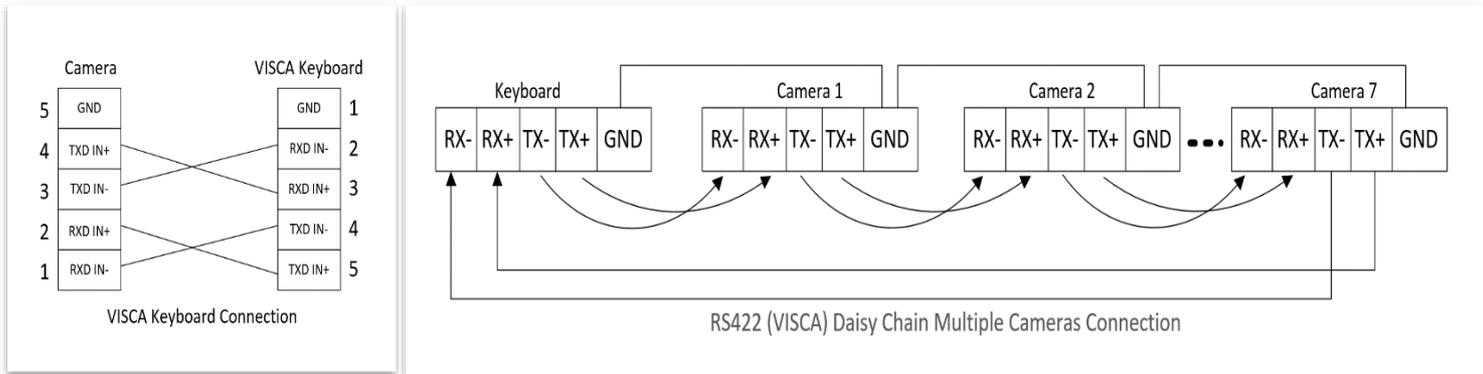
1. Set RS422 control method on Bottom Dip Switch.
2. Set Baud Rate on Bottom Dip Switch to the same as Baud Rate setting on the keyboard you are using.
3. Set specific camera address that you want to control the camera for on Bottom Dip Switch.
4. If you want to have the camera address to be automatically assigned by VISCA controller, set camera Dip Switch address to 0.
5. Reboot the camera by turning it Off/On after the Bottom Dip Switch has been set up correctly.
6. Use the RJ45 to RS422 control cable. The controller must be VISCA compatible.
7. Camera supports Daisy Chain connection up to 7 cameras.
8. The connection of SONY keyboard is different than other VISCA (Non-Sony) keyboard.
9. How to make RS422 connection and RS422 Daisy Chain multiple cameras connection with SONY controller as below

# SONY Keyboard RS422 Connection

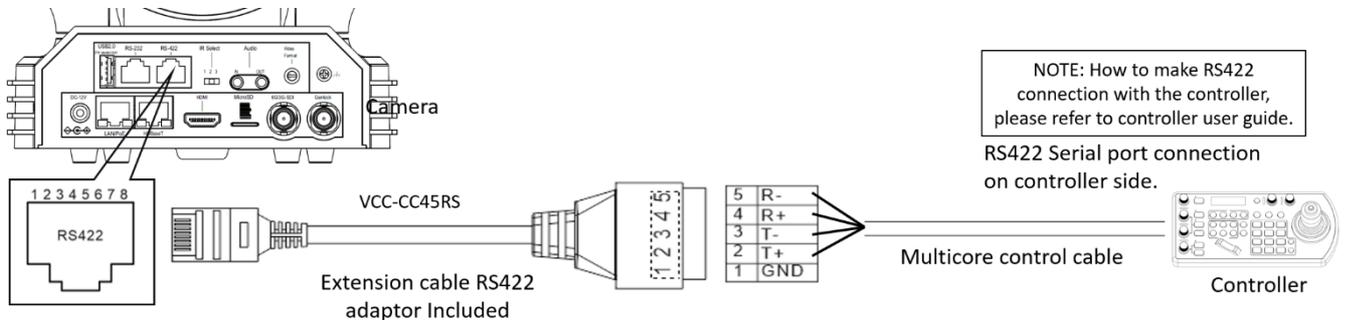


10. How to make RS422 connection and RS422 Daisy Chain multiple cameras connection with Non-Sony controller as below:

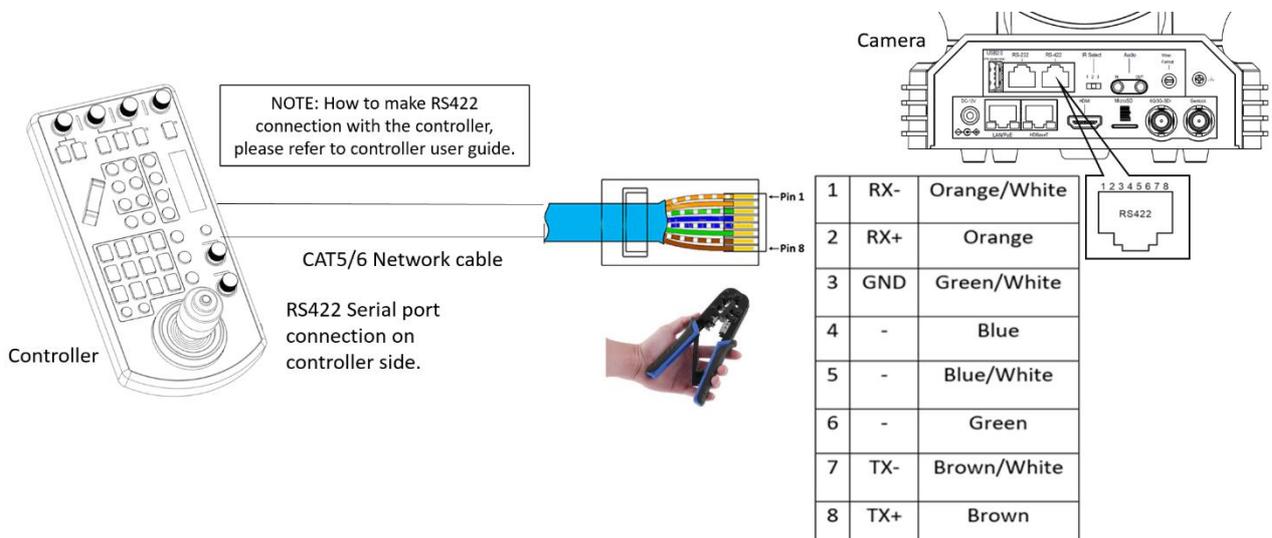
# VISCA (Non-Sony) Keyboard RS422 Connection



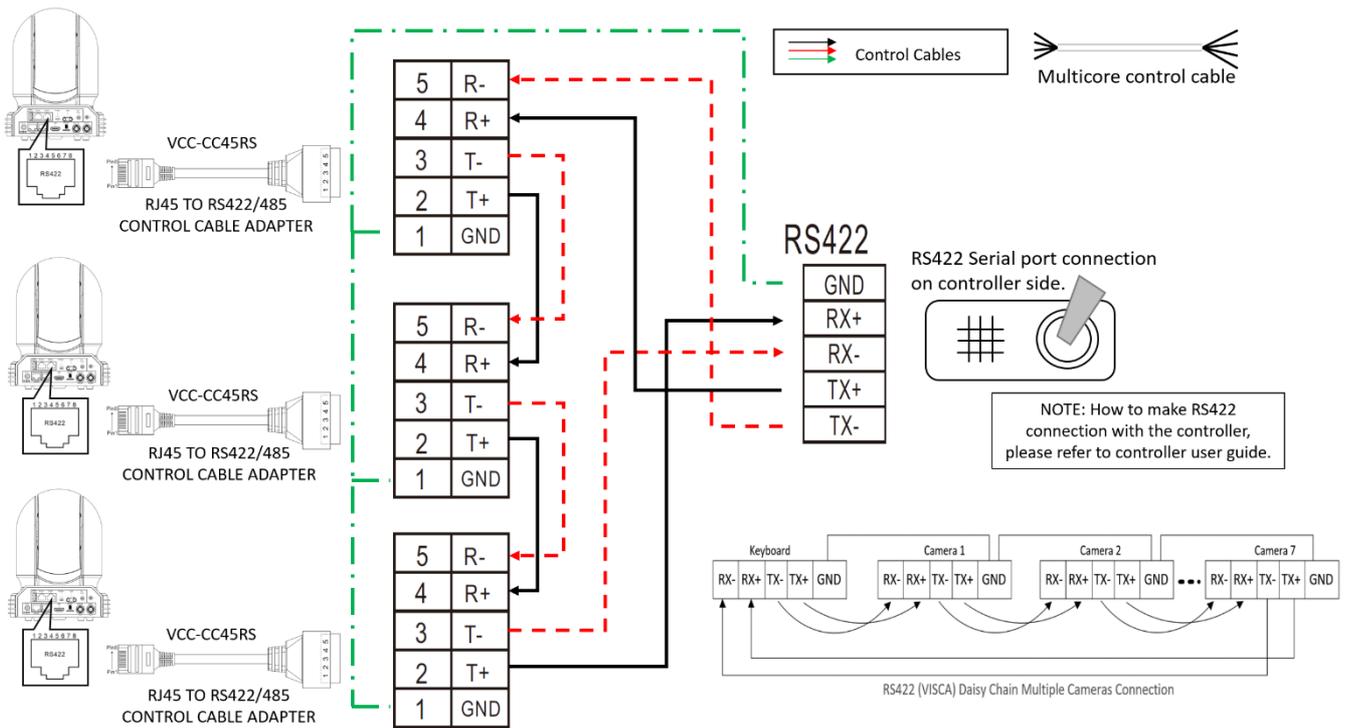
11. Use extension cables RJ45 to RS422 Phoenix connector adaptor included to make RS422 connection for your control device.



12. Or you can use CAT5/6 T-568B Standard Ethernet cable direct connect between the camera and the controller to make RS422 connection by following the pin definition below:



13. How to make RS422 Daisy Chain multiple camera connection with RS422 standard serial port controller:

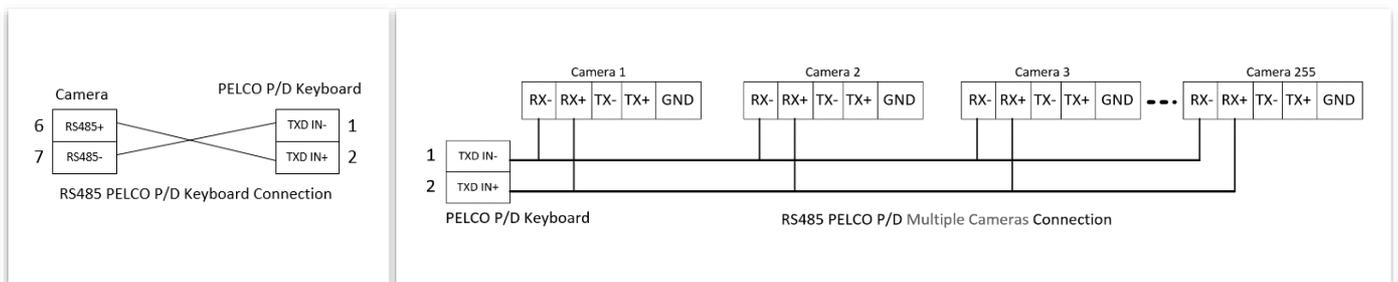


## PELCO P/D Keyboard RS485 Connection

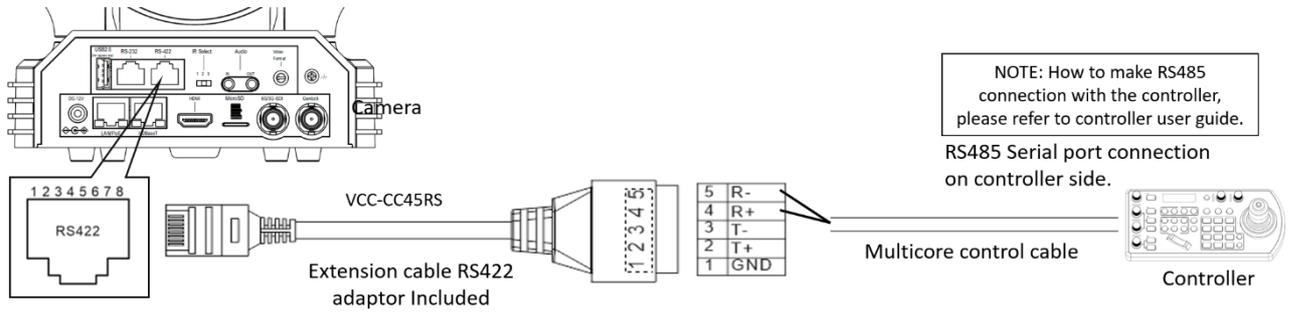
**NOTE: Use RS422 ports for RS485 connection. Only use TX+ and TX- for RS485 connection.**

- Set RS422 control method on Bottom Dip Switch.
- Set Baud Rate on Bottom Dip Switch to the same as Baud Rate setting on the keyboard you are using.
- Set the camera ID on OSD menu by remote controller
- Reboot the camera by turning it Off/On after the Bottom Dip Switch has been set up correctly.
- Use PELCO P/D compatible keyboard.
- Use preset 95# on the keyboard to bring up/exit camera OSD menu.
- Use joystick and Button “OPEN” or “CLOSE” to navigate OSD menu.
- To operate keyboard, please refer to the user manual of the keyboard you are using.

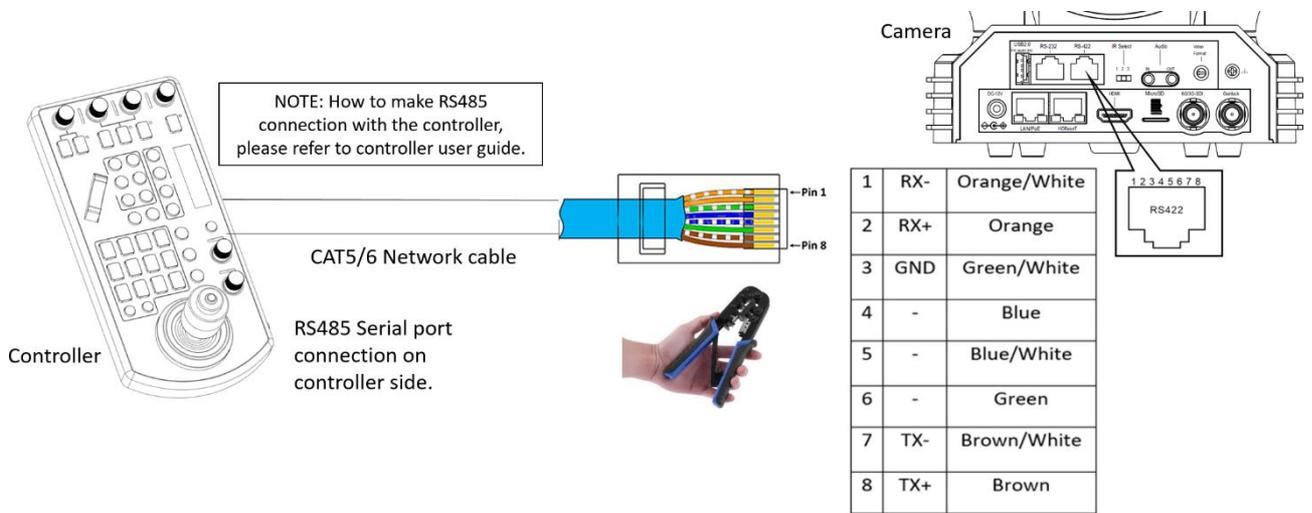
## PELCO RS485 Connection



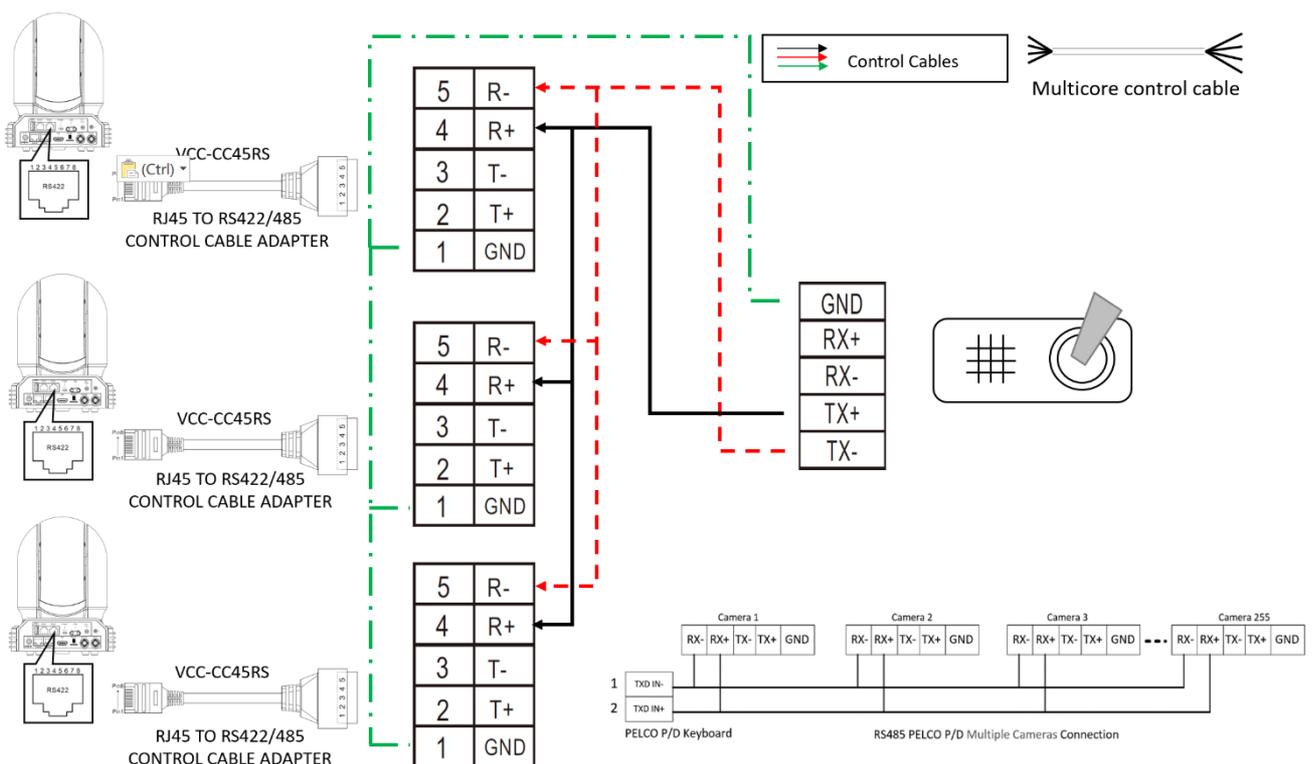
- Use extension cables included RJ45 to RS422 Phoenix connector adaptor to make RS485 connection for your control device.



- Or you can use CAT5/6 T-568B Standard Ethernet cable direct connect between the camera and the controller to make RS485 connection by following the pin definition below:



- How to make RS485 multiple cameras connection with RS485 standard serial port controller:



**Note**

For RS-232 VISCA control, this unit supports daisy chain connection for using multiple cameras. For control details, refer to Operating Instructions of control keyboard/station software.

- You need to match the communication speed (Baud Rate) between the camera and the joystick controller.
- You cannot use the RS-232 connections while you are using the RS422/485 connection.

**Operating Multiple Cameras Using RS-232,422/485**

- Using RS-232 (VISCA), you can connect to 7 cameras.
- Using RS-422 (VISCA), you can connect to 7 cameras.
- Using RS-485 (PELCO), you can connect to 255 cameras.
- Using RS-485 (PELCO), all camera addresses must be set up before the connection. You can set the camera address by operating OSD menu, or by setting the Dip Switch on the bottom of the camera. In this case, you can use multiple control keyboards.

## How to make the connection with BOLIN products

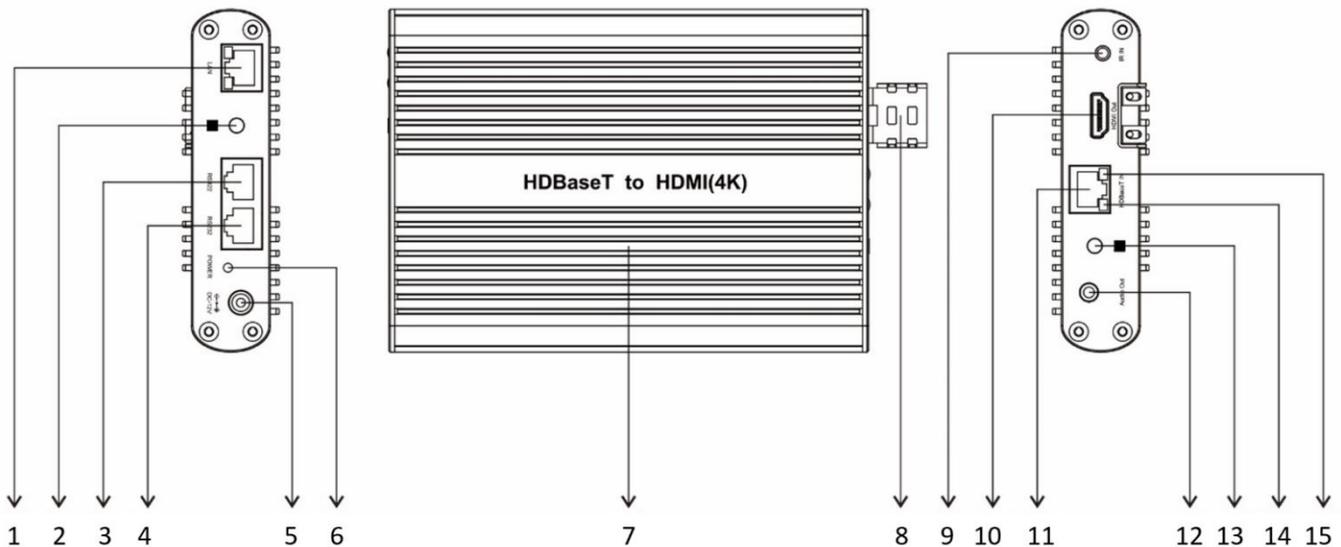
Please see the User Guide “BOLIN Camera and Keyboard Controller Connection” that you can download it at [www.bolintechnology.com](http://www.bolintechnology.com) product pages.

# Use HDBaseT Video Output

This camera supports HDBaseT, which provides FHD/4K HDMI video, control (RS232/422, IR), audio, IP video streaming and IP control plus power for the camera transmit up to 80-100 meters via one Cat6 cable.

HDBaseT Receiver must be used for HDBaseT signal transmit.

## HDBaseT Receiver



### 1. LAN Port (RJ45, IP Pass-Thru)

Connect network switch or router to this port for Dual Output HDMI+IP HDBaseT camera.

NOTE:

This HDBaseT receiver is not an IP video encoder. The LAN Port is the IP video extension for the IP video output on the camera side. Do not use it as an IP video encoder.

### 2. IR Remote Controller Indicator

These are sensors to receive commands from infrared remote controller, distance up to 10 meters. You can use IR remote controller to control the camera from the remote side via HDBaseT receiver.

### 3. RS-422 Control Port

Use RJ45 to RS-422 extension adapter cable to remotely control PTZ camera.  
RS232 Control Port

### 4. Use RJ45 to RS-232 extension adapter cable to remotely control PTZ camera

### 5. 12V DC Power Port

Connect include 12V DC power adaptor and cord.

### 6. Power LED Indicator

Turns red when the device is connected to power outlet.

### 7. Heat-sink surface panel

All aluminum body for quick heat dissipation.

### 8. HDMI Upholder

For tightening up HDMI port in stabilization.

### 9. 3.5mm IR IN

Connect to an IR receiver, The IR signal received from this port can send out via HDBaseT receiver.

### 10. v1.4b HDMI Video Output

Connect to HDMI source display.

### 11. RJ45 Port for HDBaseT Input (POH)

Support One-Cable transmission of camera power (POH), 4K video and control signal. Connects to the HDBaseT camera via CAT5e/CAT6 cable. (Transmission distances of up to 100M/328ft)

### 12. 3.5mm jack Audio Out

### 13. HDBaseT Port Signal Link indicator

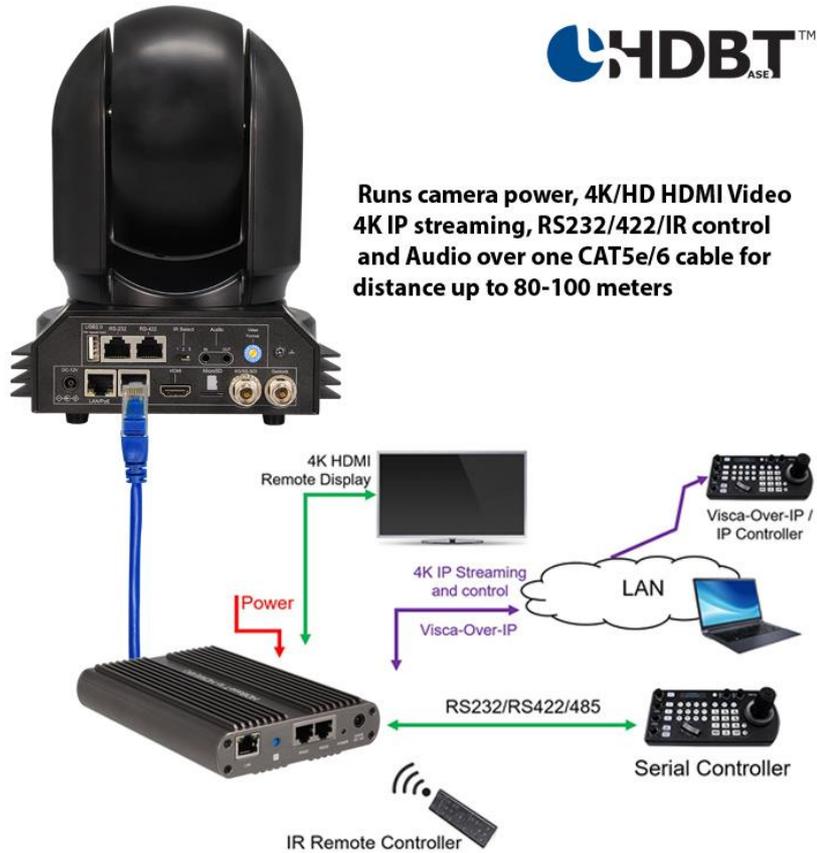
The LED lit GREEN when the camera is powered on.

### 14. HDBaseT Port Signal Link indicator

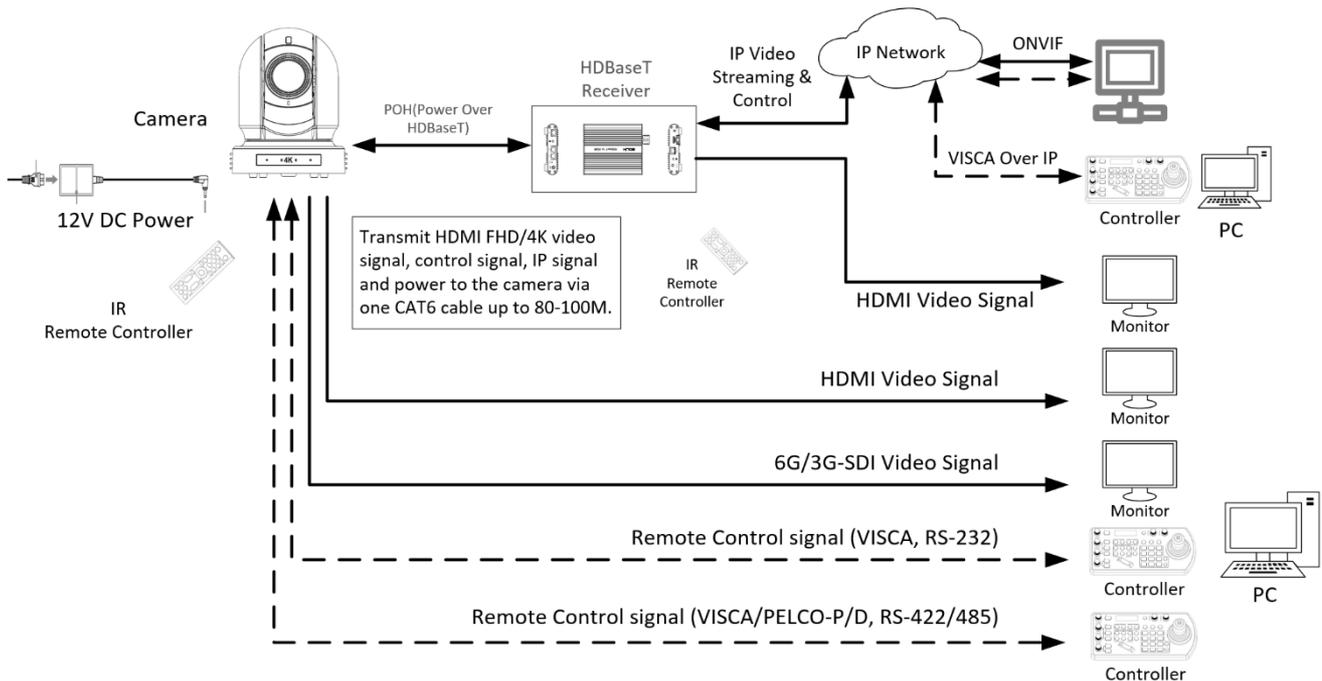
The LED flashes ORANGE when the camera transmits data with HDBaseT.

# HDBaseT Connection

Use CAT6 cable to connect the HDBaseT receiver to the camera HDBaseT port.



## System connection with Bolin HDBaseT Receiver

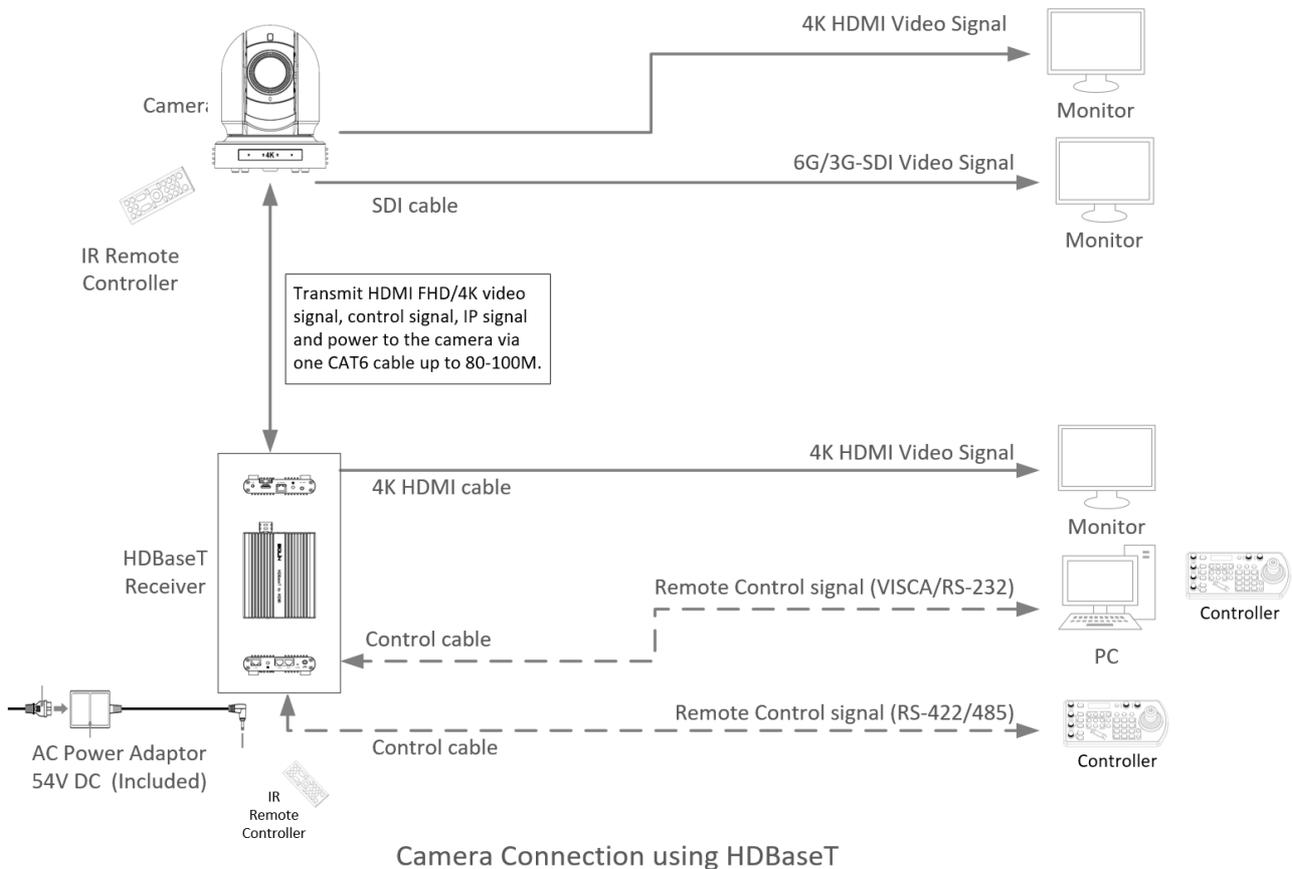


## Power up the camera using HDBaseT receiver

Bolin HDBaset receiver uses 54V DC 2.77Amp power adaptor to provide power to the HDbaseT unit. The HDBaseT receiver unit provides power to the camera via CAT6 cable, the power standard is compatible with POH(Power-Over-HDBaseT), POE(IEEE802.3af/at/bt) which is up to 97W.

## Use HDBaseT Receiver to obtain HDMI 4K / HD Video signal

1. Use Cat 6 network cable to connect the camera to HDBaseT Receiver.
2. Connect HDBaseT Receiver to a 4K or HD monitor/TV using HDMI cable. For displaying 4K video, a HDMI version 1.4 needs to be used.
3. Power on the HDBaseT Receiver, the camera will be powered on by the receiver, video will display on the monitor after running initializing.
4. Information of the camera initial setting status will display for 5 seconds.
5. You can set the video format of the camera to the one you want to display.



## Control the camera using HDBaseT Receiver

Using HDBaseT you can have following methods of controlling to the camera.

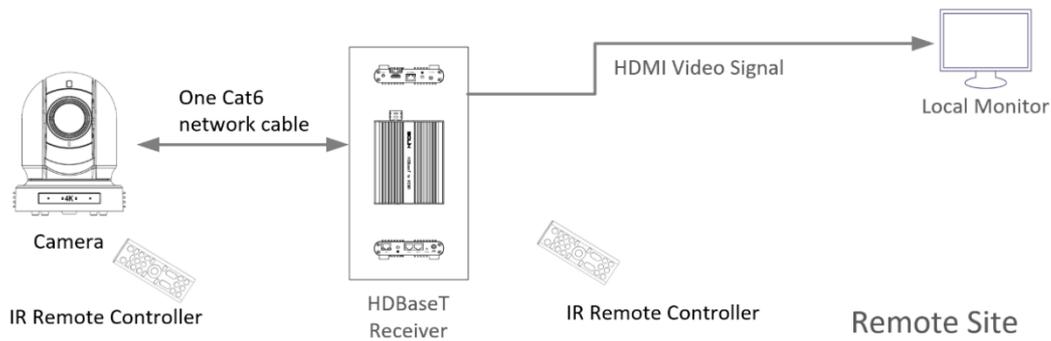
1. Use the Infrared Remote Controller
2. Use RS-232 (VISCA)
3. Use RS-422/485 (VISCA/PELCO P/D)
4. Use HDBaseT Receiver to control.

### NOTE:

***In order to use HDBaseT method of controlling, must set the camera in RS232 control method on Dip Switch.***

## Use the Infrared Remote Controller

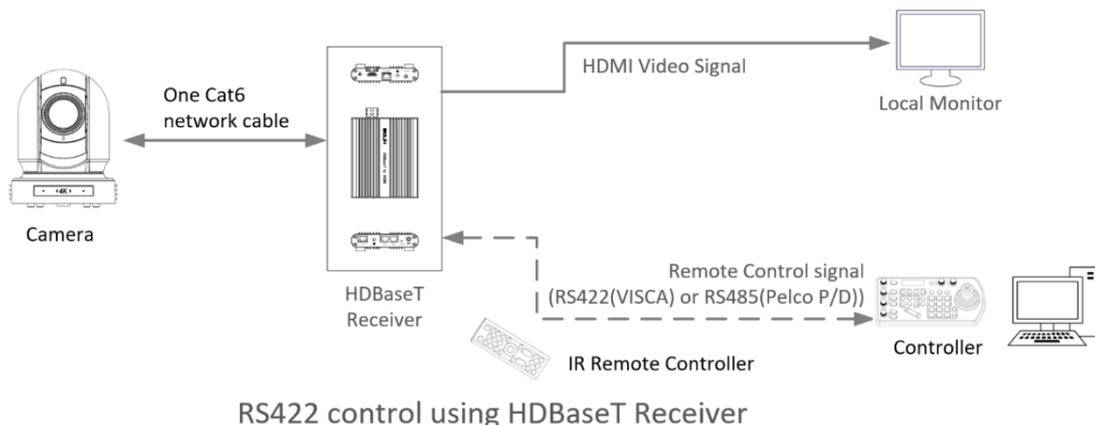
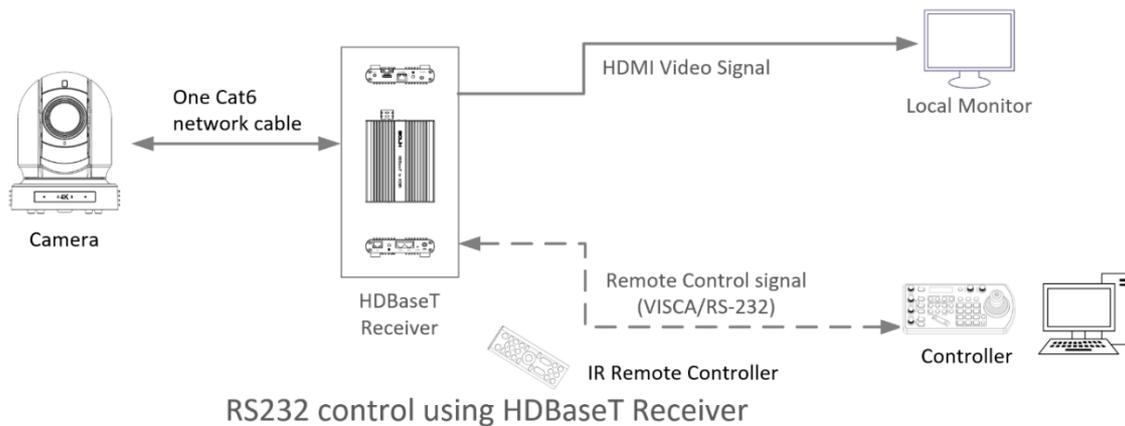
Via HDBaseT, you can use IR remote controller to control the camera from the remote side that is up to 100 meters away.



## RS232/RS422 Control

Must set the camera in RS232 control method on Bottom Dip Switch.

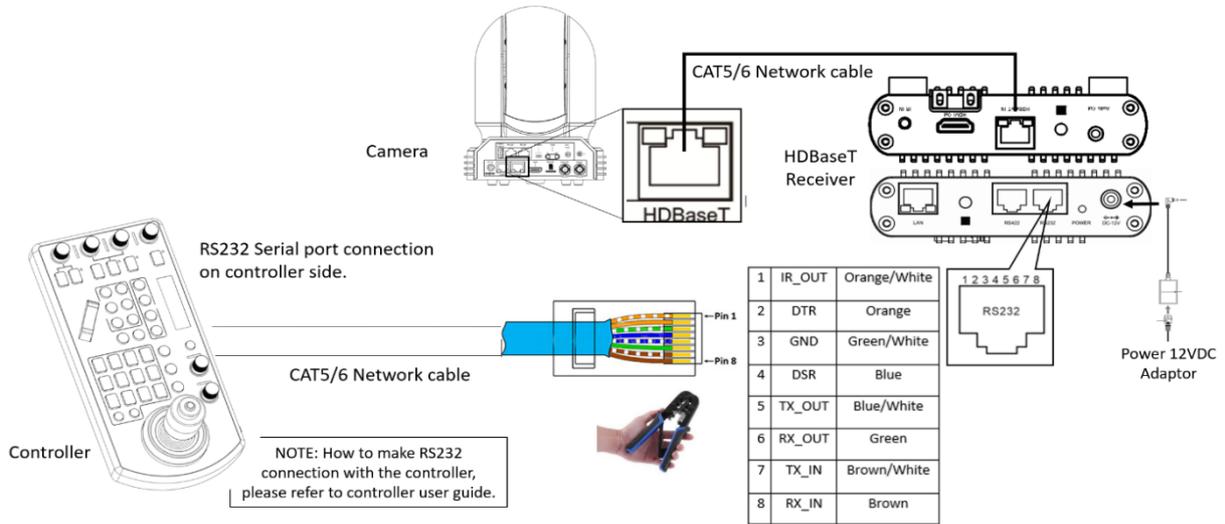
1. Set Baud Rate on Bottom Dip Switch to the same as Baud Rate setting on the keyboard you are using.
2. Reboot the camera by turning it Off/On after the Bottom Dip Switch has been set up correctly.
3. Device supports RS232 and RS422/485 control.
4. RS232 on HDBaseT receiver does not support daisy chain control.
5. Use Cat 6 network cable to connect from the camera HDBaseT port to HDBaseT Receiver input port.
6. HDBaseT will provide the power to the camera via the network cable.
7. Make the control connection in between HDBaseT Receiver and keyboard as following:



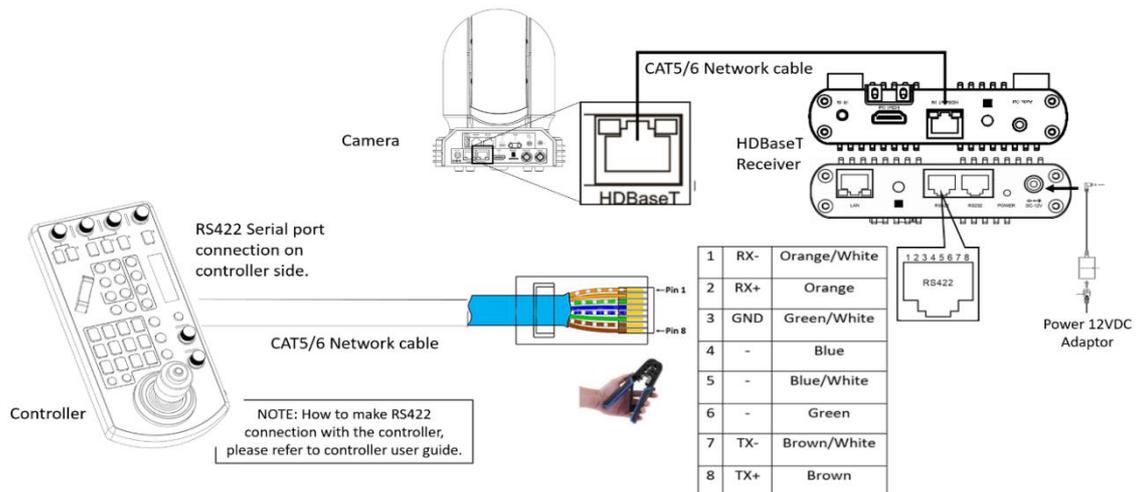
## RS232/422 Connection between the HDBaseT receiver and the controller:

To make the RS232/RS422/RS485 control cable connection between the HDBaseT receiver and the controller:

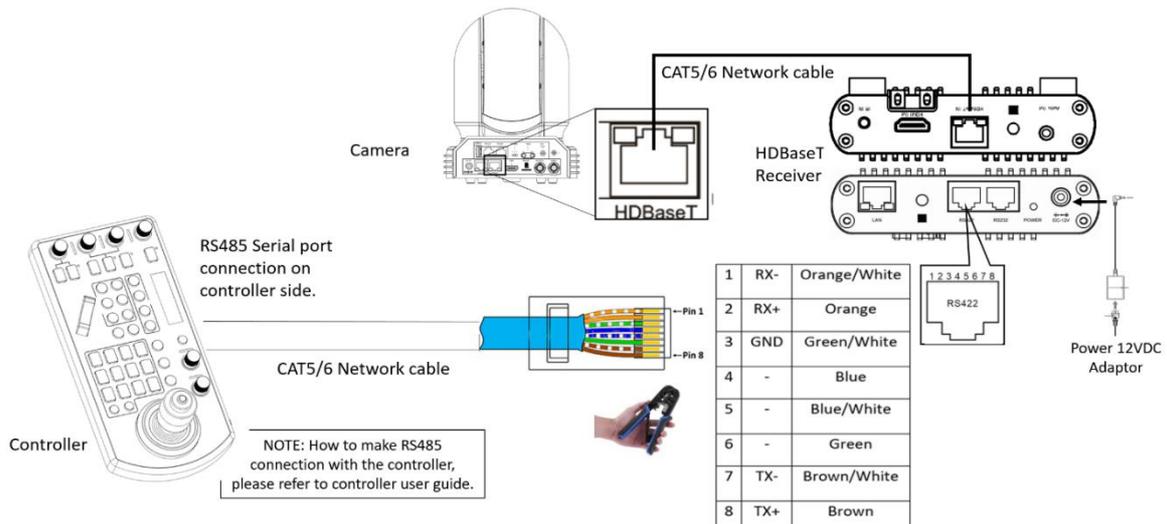
1. Use CAT6 network cable to make the RJ45 connector to connect to the HDBaseT Receiver.
  - a) RS232: Make RJ45 connector for HDBaseT Receiver RS232 port as following:



- b) RS422: Make RJ45 connector for HDBaseT Receiver RS422 port as following:

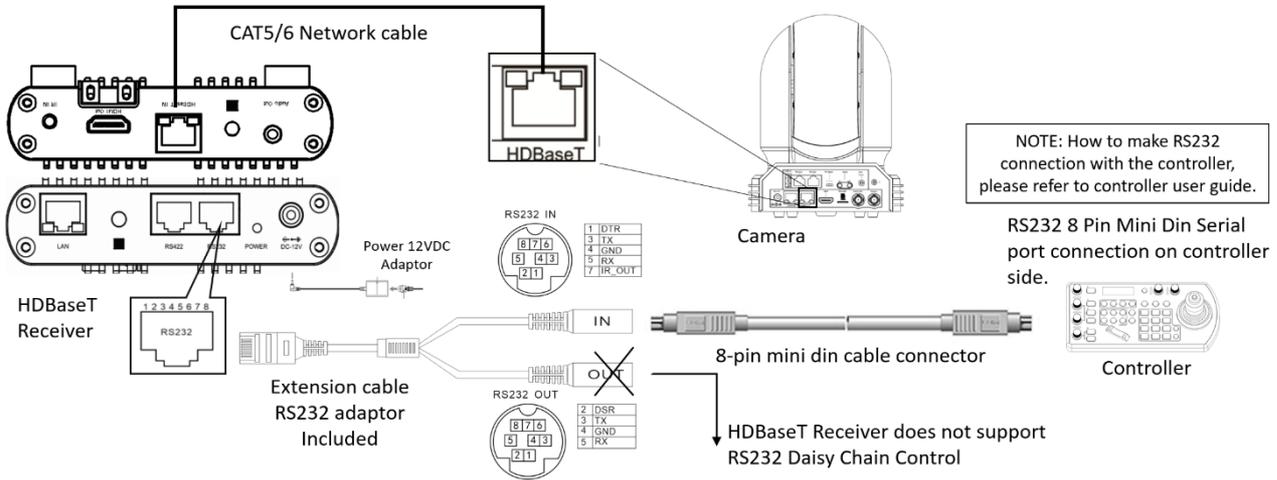


- c) RS485: Make RJ45 connector for HDBaseT Receiver RS485 port as following:

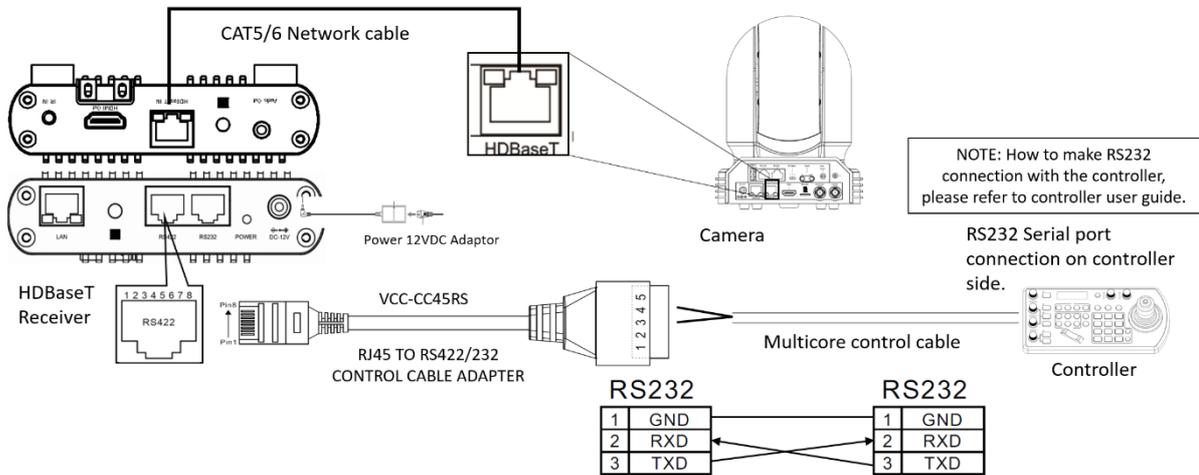


**NOTE: Use RS422 ports for RS485 connection. Only use TX+ and TX- for RS485 connection.**

- d) The RS232/RS422 serial port connection on controller side, please refer to the user guide of the controller.
2. Use extension cables included to connect the RS232/RS422/RS485 control to the controller:
  - a) **RS232 Connection: RJ45 to RS232 extension adaptor cable.** Use extension cables included to make RS232 connection for your control device.
    - You have to use 8-Pin Mini Din Serial RS232 Cable
    - HDBaseT does not support RS232 daisy chain control. So only plug in to "IN" 8-pin Mini Din port for RS232 control.



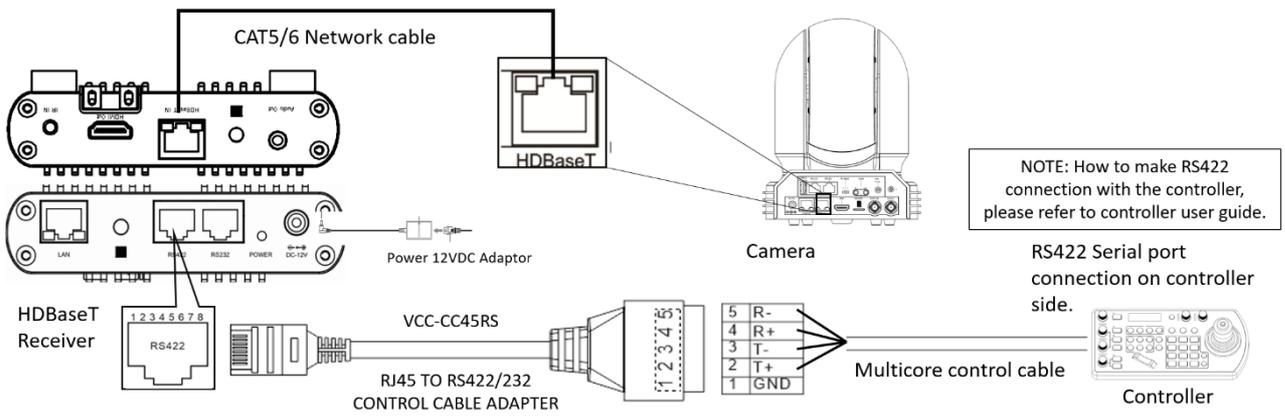
- b) **RS232 Connection: RJ45 to RS422/232 Phoenix terminal contact adaptor:** Use extension cables included to make RS232 connection for your control device.



- c) **RS422 Connection: RJ45 to RS422/232 Phoenix terminal contact adaptor:** Use extension cables included to make RS422 connection for your control device.
  - Make the RS422 connection as following pinout definition instruction:
  - If you have more than one HDBaseT receivers to make multiple camera connection for RS422 daisy chain control

**NOTE:**

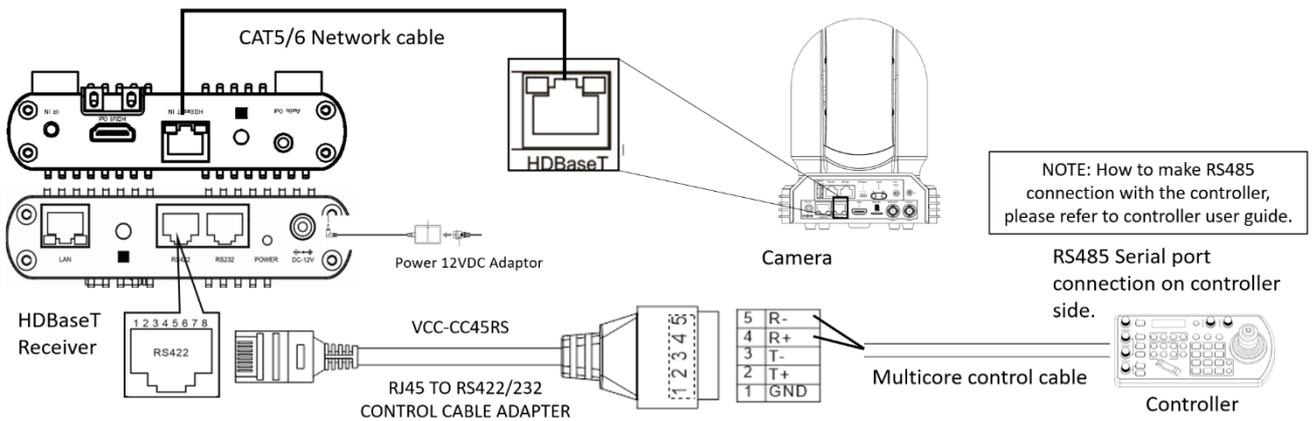
You cannot use the RS-232 connections and the RS422/485 connection and the same time.



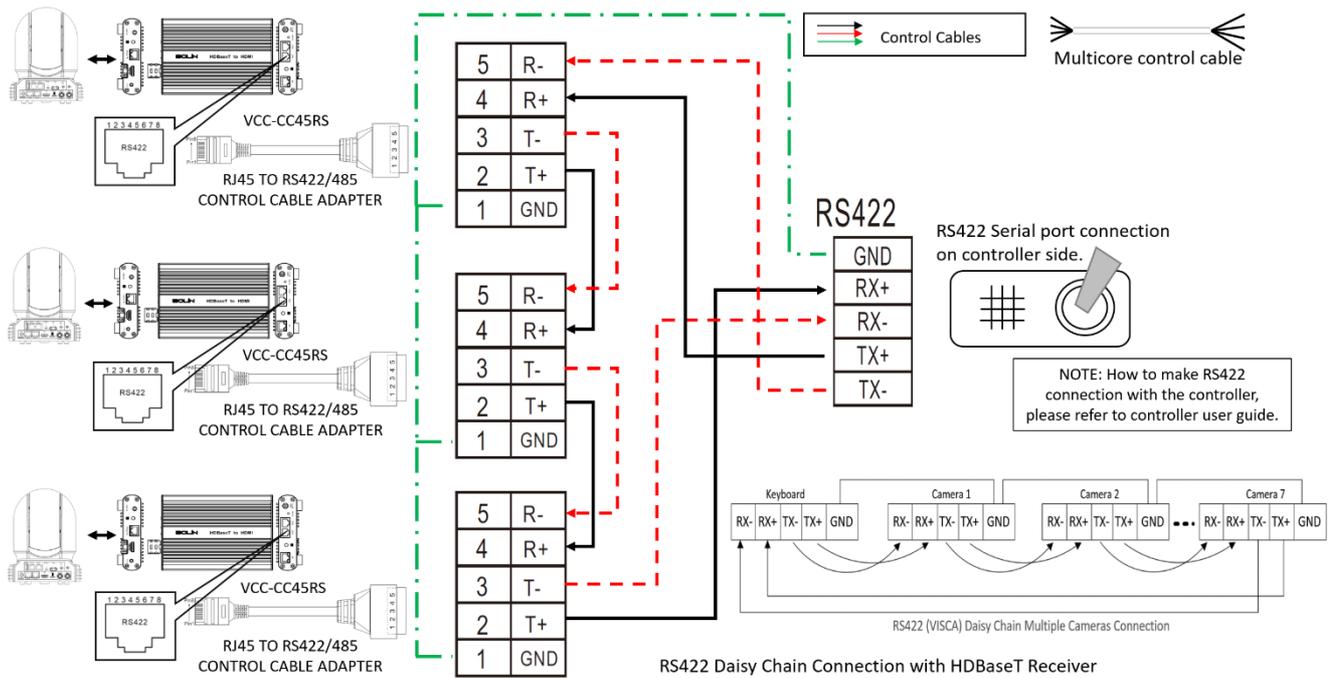
d) **RS485 Connection: RJ45 to RS422/232 Phoenix terminal contact adaptor:** Use extension cables included to make RS485 connection for your control device.

**NOTE: Use RS422 ports for RS485 connection. Only use TX+ and TX- for RS485 connection.**

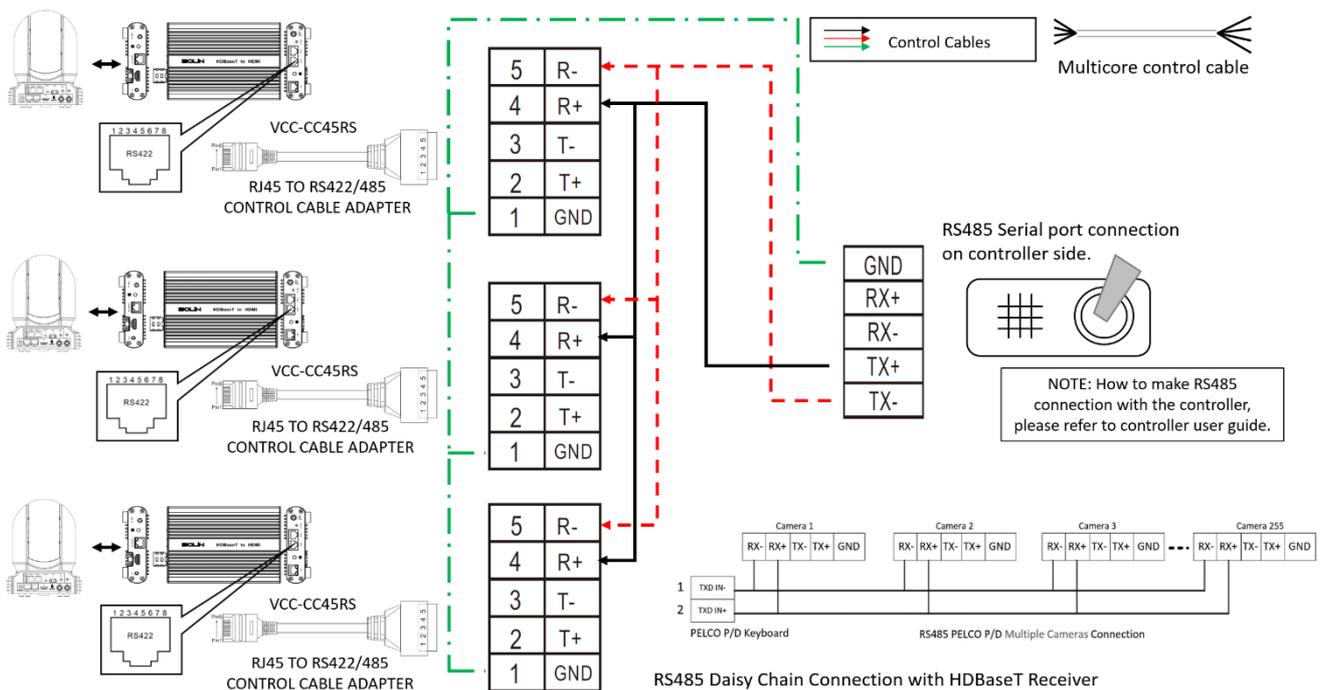
- Make the RS485 connection as following pinout definition instruction:
- If you have more than one HDBaseT receivers to make multiple camera connection for RS485 daisy chain control



### 3. RS422 Daisy Chain multiple camera connection via HDBaseT receivers:



### 4. RS485 Daisy Chain multiple camera connection via HDBaseT receivers:



## Operating Multiple Cameras Using RS-422/485

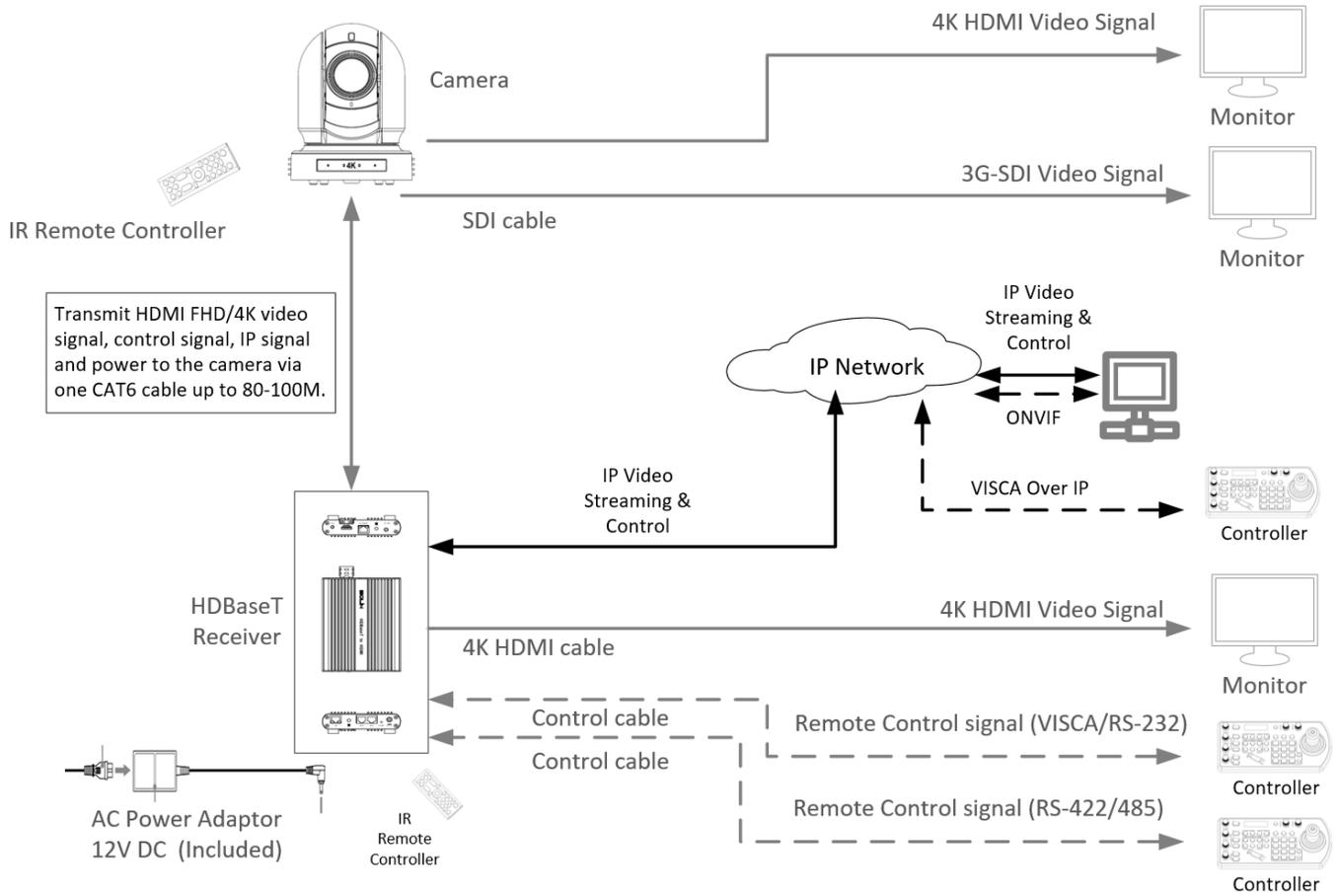
- Using RS-422 (VISCA), you can connect up to 7 cameras.
- Using RS-485 (PELCO), you can connect up to 255 cameras.
- Using RS-485 (PELCO), all camera addresses must be set up before the connection. You can set the camera address by operating OSD menu, or by setting the Dip Switch on the bottom of the camera.
- In this case, you can use multiple control keyboards.
- The joystick of the remote keyboard controller allows comfortable pan/tilt and zoom operations.

# Use IP Streaming and Control via HDBaseT

Bolin HDBaseT Receiver supports IP Pass-Thru feature, which allows the camera transmit IP video streaming and IP control via the HDBaseT receiver.

**NOTE:**

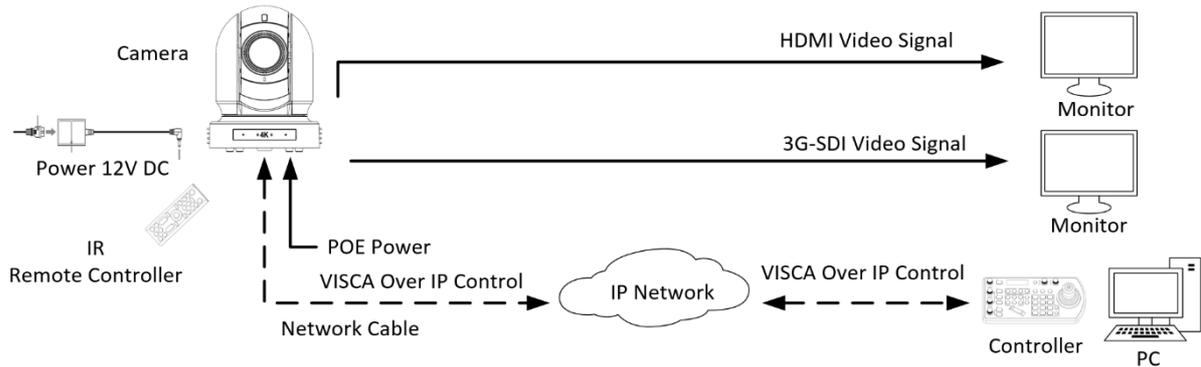
*This HDBaseT receiver is not an IP video encoder. The LAN Port is IP Pass-Thru for the camera with IP control or IP streaming functionality. Do not use it as an IP video encoder.*



IP Camera Connection using HDBaseT

# VISCA over IP Control

With VISCA over IP function, you can control the camera using VISCA protocol on a controller equipped with IP communication capabilities via LAN.



The communication specifications of VISCA over IP are followings:

- Interface: RJ-45 10/100M
- Interface protocol: IPv4
- Transport protocol: UDP
- IP address: 192.168.0.13 By default
- Port: 52381

## VISCA over IP Network Configuration

### Re-assign the camera

The default information of the IP camera is following:

- Static IP: 192.168.0.13
- Subnet mask: 255.255.255.0
- Gateway: 192.168.0.1
- VISCA over IP control port: **52381**.

The camera IP address needs to be assigned to the IP address that works with your local network.

### Controlling via VISCA over IP

- Connect the network port on the camera to the network switch.
- Set the IP address and other network information appropriately to communicate on your network
- Connect the VISCA over IP-compatible controller to the network
- Configure the controller to access the camera's IP address and VISCA over IP port
- **The IP port within on your control must be set to 52381 to communicate with the camera.**
- Select VISCA protocol on your IP control device.

### Recommended way to re-assign the IP address:

1. Create a local network within which the camera and your PC/Laptop are connected.
2. Install and run the IP-FINDER tool (You can contact Bolin Technical support team for tool requirements)
3. The IP-FINDER can find the camera IP address, which is the default :192.168.0.13
4. Click the search button, select the camera you want to Assign IP address, edit the IP address to the one that matches your local network credential.
5. Once the IP address has been changed successfully, you can access the IP camera via your local network.

#### Note

How to re-assign the IP address to the camera, please refer to user manual Part Two-IP Camera user guide.

Item	MAC Address	IP Address	Device Name	Model Number	Serial Number	Main Boa...	Driver Bo...	ImageMo...
<input checked="" type="checkbox"/>	44:03:77:e0:12:b2	192.168.1.109	ISP	ZM154B1	202010150071	4.03	-	-
<input checked="" type="checkbox"/>	44:03:77:e0:14:c0	192.168.2.214	ISP	ZM154B1	202010260032	4.03	-	-
<input checked="" type="checkbox"/>	44:03:77:e0:14:bf	192.168.2.171	ISP	ZM154B1	202010260031	4.03	-	-
<input checked="" type="checkbox"/>	44:03:77:e0:03:04	192.168.5.161	PTZCamera0...	VCC7-4K20S-3SM18	ZM001122445577	1.56	-	-
<input checked="" type="checkbox"/>	44:03:77:e0:13:dc	192.168.2.151	ISP	ZM154B1	202010150369	4.03	-	-

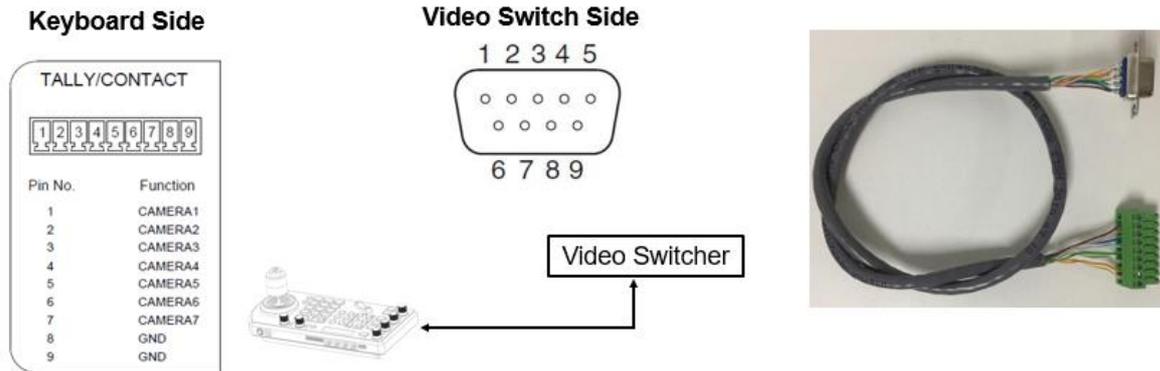
# Tally Light GPI I/O connection

The camera is equipped with a Tally lamp that quickly distinguishes when the camera is in use. In order to use camera Tally Light function, you need a video switch and a keyboard (not included).

## GPI connection with RS422 VISCA control connection

### Cable Preparation

1. Build standard multiple cameras RS-422 daisy chain control connection between the keyboard controller and the cameras. (For more RS422 control information details please refer to Keyboard Controller user guide)
2. Built Tally/Contact Function cable connection between the Keyboard Controller and Video Switcher (Sony)

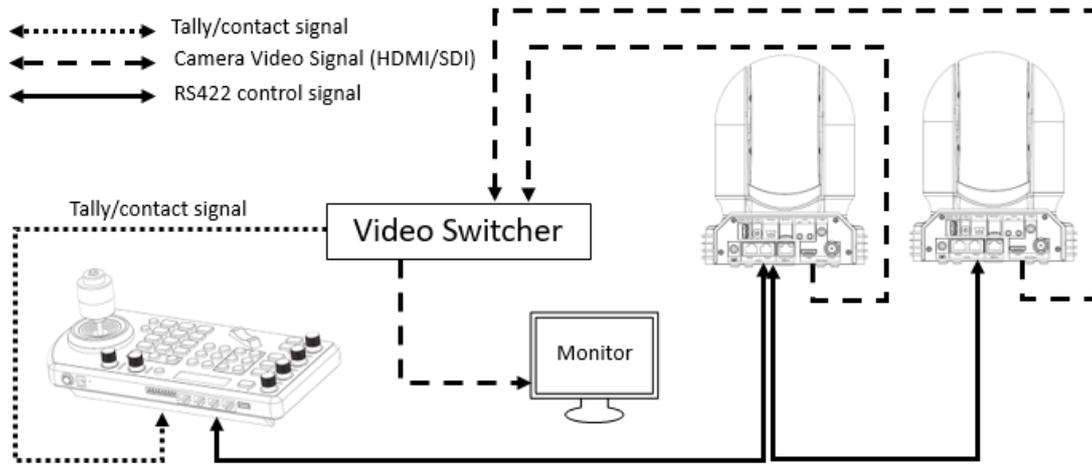


1. Keyboard side we use pin 1 to pin 8, Video Switch side we use pin 1 to pin 9 except pin 8;
2. Keyboard pin 8 connected with Video Switch pin 9;
3. Keyboard pin 1 connected with Video Switch pin 1, pin 2 connected with pin 2, the rest may be deduced by analogy, ...pin 7 connected with pin 7

### Set UP

1. GPI I/O Input mode - Tally signal is sent by Video Switch
  - a. Connect camera with keyboard by standard RS-422 control cable;
  - b. Connect keyboard with video switch by tally function cable;
  - c. Access to KEYBOARD SETTING > GPI I/O > Setting, and change it to Input mode, then Exit to home directory;
  - d. After done above operations, we can switch to different camera by video switch, for example, if we switch to camera 1 on video switch, it will send tally signal to keyboard via the tally function cable, and keyboard will transmit this tally signal to camera 1 via standard RS-422 control cable, so camera 1 tally light will turn on, and keyboard can control camera 1 pan and zoom;

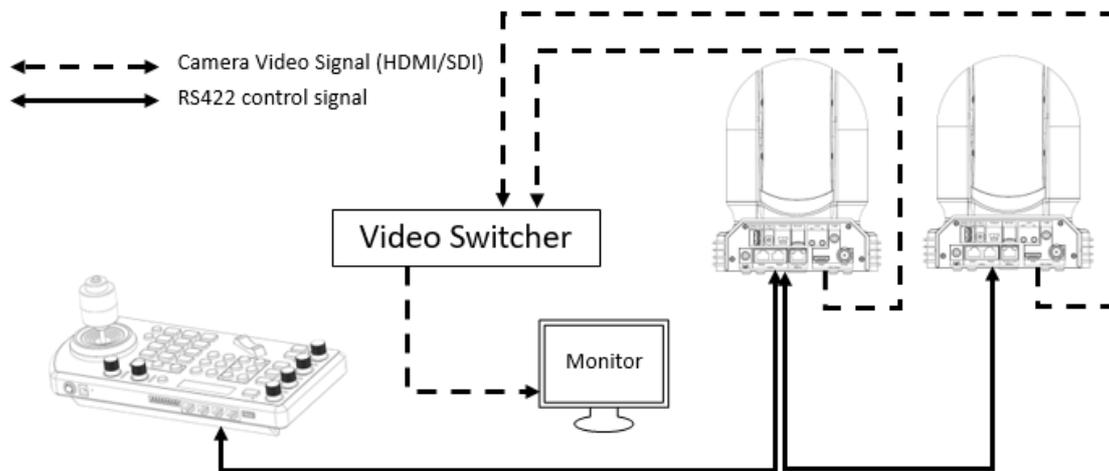
- e. If switch to camera 2 on video switch, then camera 2 tally light will on and camera 1 tally light will off;



Tally Light GPI Connection – Using RS422 VISCA Control Protocol

Diagram when GPI is select “Input”

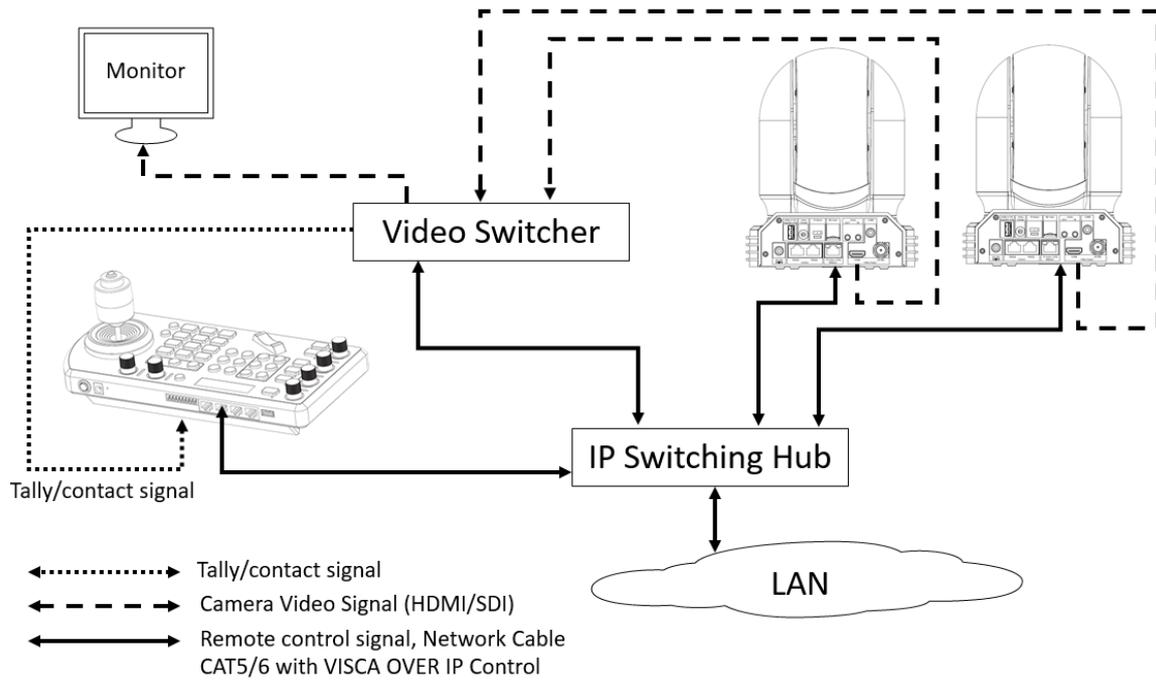
2. GPI I/O Output mode -Tally signal is sent by Keyboard Controller
  - a. Connect camera with keyboard by standard RS-422 control cable;
  - b. Access to KEYBOARD SETTING > GPI I/O > Setting, and change it to Output mode, then Exit to home directly;
  - c. After done above operation, we can switch to different camera by keyboard, for example, if we switch to camera 1 on keyboard, it will send tally signal to camera 1 via standard RS-422 control cable, so camera 1 tally light will turn on, and keyboard can control camera 1 pan and zoom;
  - d. If switch to camera 2 on keyboard, then camera 2 tally light will on and camera 1 tally light will off;



Tally Light GPI Connection – Using RS422 VISCA Control Protocol

Diagram when GPI is select “Output”

## GPI connection with VISCA OVER IP control connection



Tally Light GPI Connection – Using VISCA OVER IP Control Protocol  
– With Visca Over IP ready Camera

# DIP SWITCH SETTINGS

The Dip switches are for setting the camera configuration for following items:

1. Camera ID Address for RS-485 PELCO protocol
2. Video output / Video color space
3. RS-232 / RS-422/485 selection
4. RS-232 / RS-422/485 baud rate
5. Video resolutions selection
6. IR remote controller ID

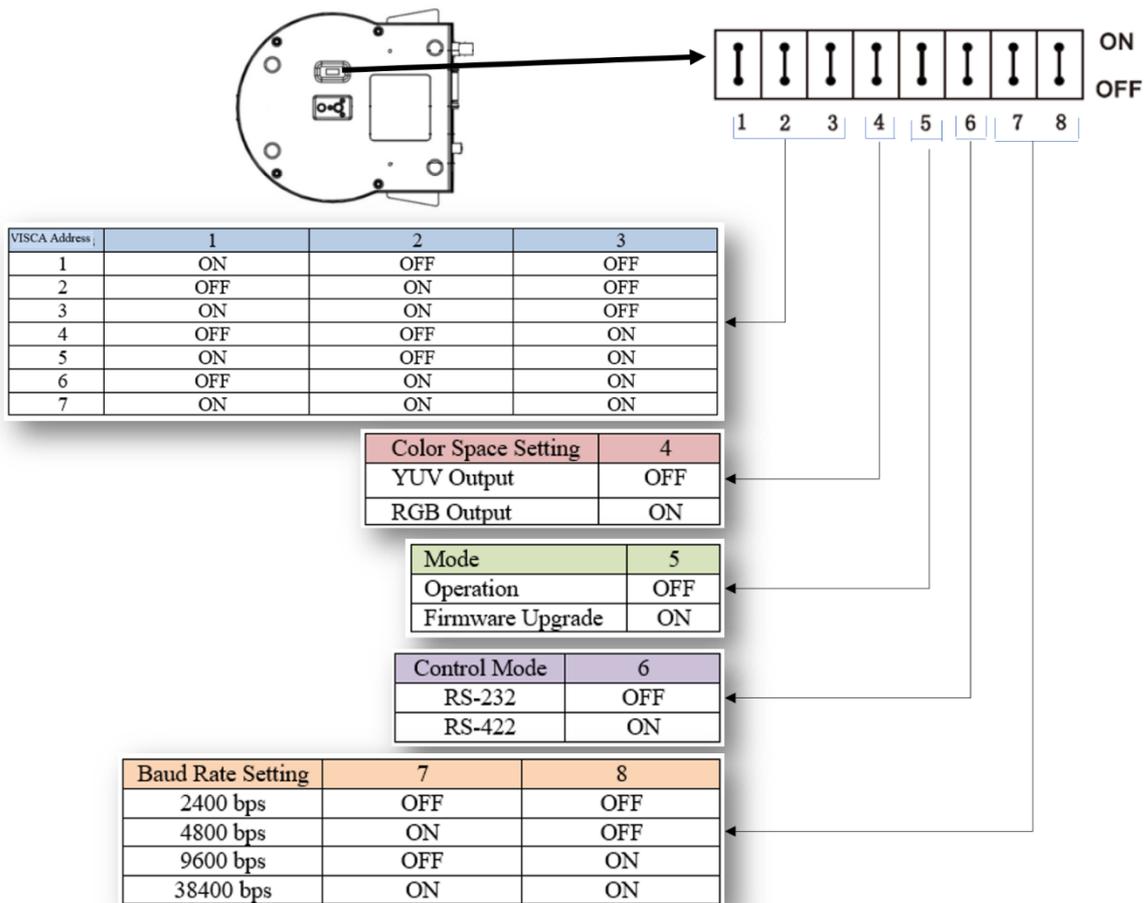
## Setting of the BOTTOM DIP Switches

Turn off power to the camera before changing the DIP switch settings.  
Power on the camera to have the new Dip Switch setting activated.

From the above list, No.1 Camera ID address and NO.2 Video resolution settings can be set in camera OSD menu as well. The camera takes either the way of OSD menu setting or the way of bottom DIP switch setting. They override each other. After the camera is turned on, the camera takes the last setting before it is turned on, either set through the OSD or bottom DIP switch.

## The Bottom DIP Switch Settings

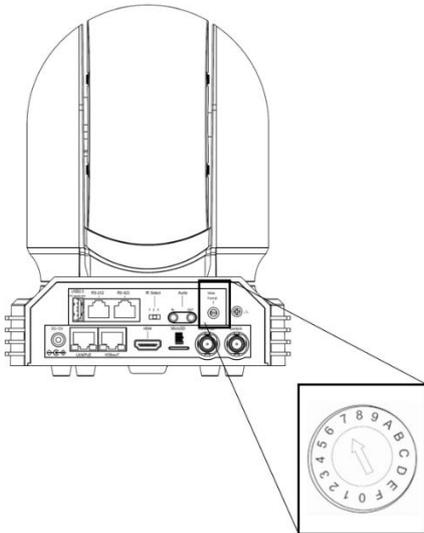
- Bit 1~3: Camera Address setting for VISCA protocol
- Bit 4: Video Output/Video Color Space
- Bit 5: Reserved
- Bit 6: RS-232/RS-422
- Bit 7~8: RS-232/RS-422 Baud Rate



## Setting of the back panel Rotate DIP Switches

The Rotate Dip Switch is for setting video format.

Use small screw driver to turn the switch, the arrow points to the Numbers or the Letters. The video format that the Number or Letter stands for refer to the video format as the chart following:



Numbers & Letters	Video Resolution
0	1080i59.94
1	1080p29.97
2	720p59.94
3	1080p59.94
4	2016p29.97
5	1080i60
6	1080p23.98
7	1080p30
8	1080p60
9	1080i50
A	1080p25
B	720p50
C	1080p50
D	2160p25
E	720p60
F	-

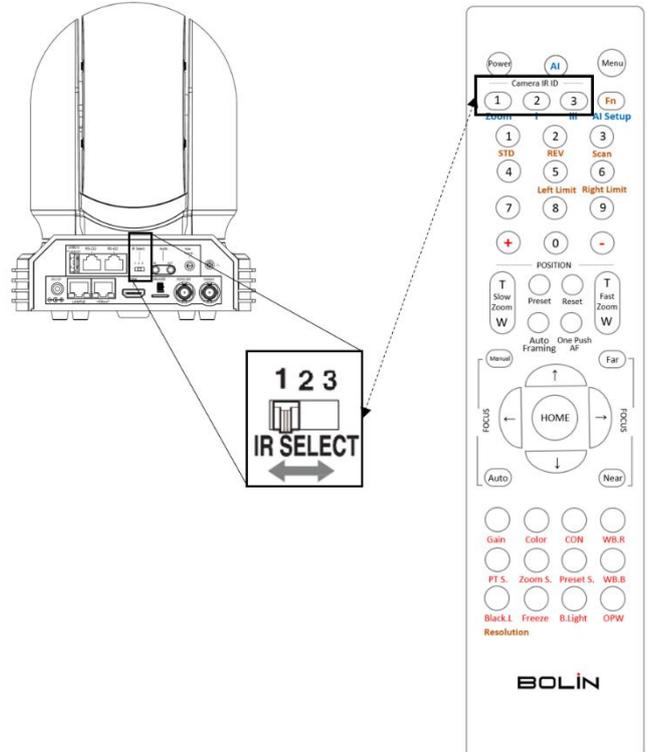
## IR Remote Controller ID Setting

Set the IR SELECT switch on the back panel of the camera to 1, 2 or 3, which is the camera ID number that you want to operate on the Remote Controller for.

For example, when the camera IR ID is selected 1, on the remote controller, press the Camera IR ID button 1, the camera will be controlled by remote controller.

When the camera IR ID is selected 3, on the remote controller, press the Camera IR ID button 3, the camera will be controlled by remote controller.

Always check the IR ID on both camera and remote sides if they match when the camera doesn't response to the remote control.



# Adjusting and Setting with Menus

## About On-Screen Menus

You can change various settings, such as shooting conditions and system setup of the camera, while observing menus displayed on a connected computer screen.

This section explains how to read the on-screen menus before starting menu operations.

The menu parameters may vary according to the different product model numbers.

### Note

You cannot perform pan/tilt operations while the menu is displayed.

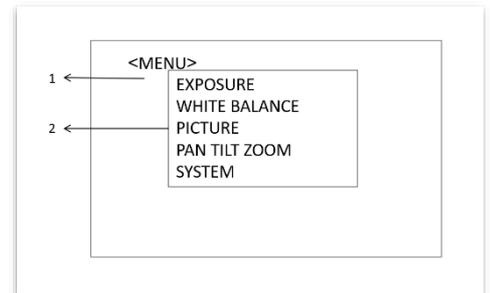
## Main Menu

To display the main menu, press the MENU button on the supplied infrared remote controller or Bolin PTZ keyboard controller.

### 1. Selected Items

Selects a setting menu.

The selected item is shown by the arrow cursor. The arrow cursor moves up or down by pressing the “↑, ↓” button on the infrared remote controller.



### 2. Menu Items

To display a setting menu, select one using the “↑, ↓” button on the infrared remote controller and press the HOME button on the infrared remote controller.

## Setting Menus

The setting menu selected on the main menu is displayed.

### 1. Setting Menu

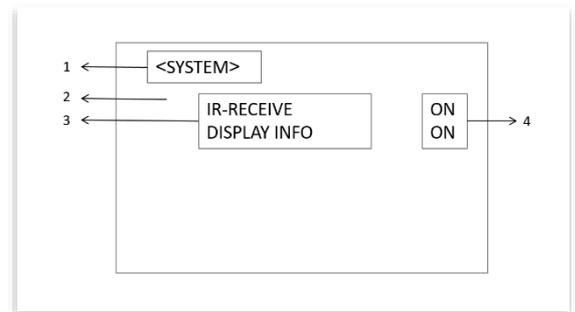
The name of the setting menu currently selected is displayed here.

### 2. Selected Item

Selects a setting item.

The selected item is shown by the arrow cursor.

Move the cursor up or down by pressing the “↑, ↓” button on the infrared remote controller.



### 3. Setting Items

The setting items for this setting menu are displayed. Select the setting item using the “↑, ↓” button on the infrared remote controller.

### 4. SetValue

The currently set values are displayed.

To change a set value, use the “←, →” button on the infrared remote controller.

### Note

In some product models, only use “←” button on the infrared remote controller to change the value. To confirm the value, you can use either “→” button or HOME button.

## Control Button

You can select the item by pressing “↑, ↓, ←, →” and HOME button.

1. You can select a menu item by “↑, ↓” button on the infrared remote controller. The selected item is shown by the arrow cursor. You can change the value of the item by pressing “←, →” button.

2. You can move to the next layer by pressing the HOME button.

3. You can return to the normal display by pressing the MENU button.

### Note

When you are operating the menu using the infrared remote controller, you cannot set IR- RECEIVE in the SYSTEM menu to OFF. To set IR- RECEIVE to OFF, use the appropriate VISCA command.

## EXPOSURE Menu

The EXPOSURE menu is used to set the items related to exposure.

### MODE (Exposure Mode)

**FULL AUTO:** Iris, Gain and Shutter Speed can be set automatically. The exposure is adjusted automatically using the values set for SLOW SHUTTER, S. SHUTTER LIMIT, AE SPEED, GAIN LIMIT, GAIN POINT, HIGH SENSITIVITY, MAX SPEED, MIN SPEED, BACK LIGHT, SPOT LIGHT and EX-COMP.

**MANUAL:** Adjust the GAIN, electronic shutter speed (SPEED), iris (IRIS), and HIGH SENSITIVITY manually.

**IRIS PRI:** Iris Priority mode. The iris can be set freely by the user. The gain and shutter speed are set automatically according to the brightness of the subject.

The exposure is adjusted automatically using the values manually set for iris (IRIS), GAIN LIMIT, GAIN POINT, AE SPEED, MAX SPEED, MIN SPEED, BACK LIGHT, SPOT LIGHT and EX-COMP

**SHUTTER PRI:** Shutter Priority mode. The shutter speed can be set freely by the user, the iris and gain are set automatically, according to the brightness of the subject.

The exposure is adjusted automatically using the values manually set for electronic shutter speed (SPEED), GAIN LIMIT, AE SPEED, BACK LIGHT, SPOT LIGHT and EX-COMP

**BRIGHT:** Bright mode. The bright control function adjusts both gain and iris using an internal algorithm, according to a brightness level freely set by the user. Exposure is controlled by gain when dark, and by iris when bright. As both gain and iris are fixed, this mode is used when exposing at a fixed camera sensitivity. When switching from Full Auto or Shutter Priority Mode to Bright Mode, the current status will be retained for a short period of time.

The exposure is adjusted automatically using the values manually set for the bright level (LEVEL) and HIGH SENSITIVITY.

**GAIN PRI:** Gain Priority mode. Adjust with Variable Gain, Auto Iris and Shutter speed.

Adjust the GAIN, GAIN POINT, AE SPEED, HIGH SENSITIVITY, MAX SPEED, MIN SPEED, BACK LIGHT, SPOT LIGHT and EX-COMP

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### EXPOSURE MENU: FULL AUTO

MODE	FULL AUTO
SLOW SHUTTER	OFF
S. SHUTTER LIMIT	1/12
AE SPEED	01
GAIN LIMIT	30dB
GAIN POINT	OFF
POINT POSITION	0dB
HIGH SENSITIVITY	OFF
MAX SPEED	1/1750
MIN SPEED	1/50
BACK LIGHT	OFF
SPOT LIGHT	OFF
EX-COMP.	OFF

### EXPOSURE MENU: MANUAL

MODE	MANUAL
GAIN	12dB
SPEED	1/50
IRIS	F2.8
HIGH SENSITIVITY	OFF

### EXPOSURE MENU: IRIS PRI

MODE	IRIS PRI
IRIS	F2.8
GAIN LIMIT	30dB
GAIN POINT	OFF
POINT POSITION	0dB
AE SPEED	01
MAX SPEED	1/1750
MIN SPEED	1/50
BACK LIGHT	OFF
SPOT LIGHT	OFF
EX-COMP	OFF

### EXPOSURE MENU: SHUTTER PRI

MODE	SHUTTER PRI
SPEED	1/50
GAIN LIMIT	30dB
AE SPEED	01
BACK LIGHT	OFF
SPOT LIGHT	OFF
EX-COMP	OFF

### EXPOSURE MENU: BRIGHT

MODE	SHUTTER PRI
LEVEL	24
HIGH SENSITIVITY	OFF

### EXPOSURE MENU: GAIN PRI

MODE	GAIN PRI
GAIN	9dB
GAIN POINT	OFF
POINT POSITION	30dB
AE SPEED	01
HIGH SENSITIVITY	OFF
MAX SPEED	1/1750
MIN SPEED	1/50
BACK LIGHT	OFF
SPOT LIGHT	OFF
EX-COMP	OFF

When you select one from various exposure modes, some of the following setting items that are required for the selected mode will appear.

**GAIN:** Select the gain from the following:

0dB, 3dB, 6dB, 9dB, 12dB, 15dB, 18dB, 21dB, 24dB, 27dB, 30dB, 33dB, 36dB

**GAIN LIMIT:**

The gain limit can be set at Full Auto, Iris Priority, Shutter Priority mode. Use this setting when you want to obtain image in which signal-to-noise ratio is particularly important.

Select the gain limit from the following: 9dB, 12dB, 15dB, 18dB, 21dB, 24dB, 27dB, 30dB, 33dB, 36dB

**GAIN POINT:**

Set the Gain Point in the middle between 0dB and gain limit. The shutter speed can be changed from the point when the set gain value is reached. When you want to obtain the motion-priority image, use this setting.

**HIGH SENSITIVITY:**

In this mode, the maximum gain increases, enabling to obtain a brighter output even in a darker environment. However, if the gain reaches high level, the image will have a large amount of noise.

**IRIS:** Select the iris from the following: F11, F10, F9.6, F8.7, F8.0, F7.3, F6.8, F6.2, F5.6, F5.2, F4.8, F4.4, F4.0, F3.7, F3.4, F3.1, F2.8

**SLOW SHUTTER:**

When set to "On," the slow shutter functions automatically when the light darkens. This setting is available only when the Exposure mode is set to "Full Auto." The initial setting is "Slow Shutter Off."

**S. SHUTTER LIMIT:**

When the subject becomes dark, the shutter speed becomes slow and the gain is increased. This is a function to put a limit on the shutter speed. It prevents the camera shake when you shoot a moving subject in a dark place.

Select the S. Shutter limit from the following: 1/30, 1/20, 1/15, 1/10, 1/8, 1/6, 1/4, 1/3, 1/2, 2/3, 1/1.

**AE SPEED:**

The AE Speed function allows you to reduce the exposure response speed. Usually the camera is set up so that the optimum exposure can be obtained automatically within about 1 second. However, using the slow AE Speed function allows you to lengthen the auto exposure response speed from the initial setup speed.

**Maximum SPEED (Maximum Shutter Limit)**

The brighter the object is, the shutter speed will increase. This is the function to set the upper limitation on the shutter speed. This will help to make images smooth with less inconsistent motions when you shoot bright objects.

**Minimum SPEED (Minimum Shutter Limit)**

When the subject becomes dark, the shutter speed becomes slow and the gain is increased. This is a function to put a limit on the shutter speed. It prevents the camera shake when you shoot a moving subject in a dark place.

**BACKLIGHT:**

When the background of the subject is too bright, or when the subject is too dark due to shooting in the AE mode, back light compensation will make the subject appear clearer.

**SPOT LIGHT:**

This menu allows you to enable/disable spotlight compensation by adjusting the exposure darker when a part of the object is bright, such as a person's face in spotlight. You can choose either ON or OFF. This setting is enabled when MODE is FULL AUTO, SHUTTER PRI, IRIS PRI, or GAIN PRI. SPOT LIGHT becomes disabled when BACK LIGHT is ON.

**EX-COMP:** (Exposure Compensation)

When MODE is set to one of FULL AUTO, IRIS PRI, SHUTTER PRI or GAIN PRI, set this item to ON to

enable exposure compensation. When you set EX-COMP to ON, LEVEL appear and you can select the exposure compensation level from the following:

-10.5, -9, -7.5, -6, -4.5, -3, -1.5, 0, +1.5, +3, +4.5, +6, +7.5, +9, +10.5

If you set the level to 0, exposure compensation will be disabled. Level +10.5 is the brightest and -10.5 is the darkest compensation value.

When EX-COMP is set to OFF, exposure compensation does not function.

## WHITE BALANCE Menu

The WHITE BALANCE menu is used to select the white balance mode.

### MODE (white balance mode)

Select the white balance mode from the following:

**AUTO:** This mode computes the white balance value output using color information from the entire screen. It outputs the proper value using the color temperature radiating from a black subject based on a range of values from 2500K to 7500K. This mode is the initial setting.

**SPEED (white balance speed):** You can adjust the speed at which the camera reaches the white convergence point when AUTO1 or AUTO2 is chosen. Choose a value from 1, 2, 3, 4, and 5. 5 is the fastest and 1 is the slowest.

**OFFSET:** The white convergence point can be shifted when WHITE BALANCE mode is AUTO1, AUTO2, or ONE PUSH. The range is from -7 to 0 to +7. White balance is shifted toward blue when a negative value is chosen, and it is shifted toward red when a positive value is chosen.

**INDOOR:** 3200K Base Mode

**OUTDOOR:** 5800K Base Mode

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WHITE BALANCE MENU

WB MODE	AUTO
SPEED	3
OFFSET	0
MATRIX	OFF

WHITE BALANCE MENU

WB MODE	INDOOR
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WHITE BALANCE MENU

WB MODE	OUTDOOR
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### MATRIX (Color Matrix)

You can emphasize or weaken a specific color region while keeping the white convergence point unchanged. When you turn this ON, the following items are displayed for adjustment.

**SELECT:** You can choose an internal preset matrix for matrix calculation. You can choose from STD, HIGH SAT, FL LIGHT, MOVIE, STILL, CINEMA, PRO, ITU709, and B/W. This becomes disabled when MATRIX is turned OFF.

**LEVEL (color level):** You can adjust the color density of the picture. Choose a value in the range from 0 to 14. The greater the number, the denser the colors, and vice versa. This becomes disabled when MATRIX is turned OFF.

**PHASE:** You can adjust the color tone of the entire picture. Choose a value from -7 to 0 to +7. This becomes disabled when MATRIX is turned OFF.

**R-G, R-B, G-R, G-B, B-R, B-G:** You can set a coefficient for each combination of RGB individually, to adjust the hue of the entire picture. Choose a value from -99 to 0 to +99. This becomes disabled when MATRIX is turned OFF.

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WHITE BALANCE MENU

WB MODE	AUTO
SPEED	3
OFFSET	0
MATRIX	ON
SELECT	STD
LEVEL	4
PHASE	0
R-G	00
R-B	00
G-R	00
G-B	00
B-R	00
B-G	00

**OPW (One Push White Balance):** The One Push White Balance mode is a fixed white balance mode that may be automatically readjusted only at the request of the user (One Push Trigger), assuming that a white subject, in correct lighting conditions, and occupying more than 1/2 of the image, is submitted to the camera. One Push White Balance data is lost when the power is turned off. If the power is turned off, reset One Push White Balance.

**NOTE: When you select the OPW (One Push White Balance)**

Perform the following operations:

1. Place an image of white subject (For example: A piece of white paper) in the center of the screen.
2. Press the HOME button of the infrared remote controller.

The one-push white balance adjustment is activated.

WHITE BALANCE MENU

WB MODE	OPW
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**ATW (Auto Tracking White Balance):** Auto Tracking White balance (2000K to 10000K), allows the camera to adjust the tone according to the temperature of the light source illuminating the subject

**USER:** This is a mode that enables you to manually set the control of R and B gain up to 256 steps.

**NOTE: When you select USER, R. GAIN (red gain) and B. GAIN (blue gain) appear. You can select each item in the range from 0 to 255.**

WHITE BALANCE MENU

WB MODE	USER
R GAIN	188
B GAIN	167

**OUTDOOR AUTO:** This is an auto white balance mode specifically for outdoors. It allows you to capture images with natural white balance in the morning and evening.

WHITE BALANCE MENU

WB MODE	OUTDOOR AUTO
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**SVL AUTO: Sodium Vapor Lamp Auto:** This is an auto white balance mode that is compatible with sodium vapor lamps.

WHITE BALANCE MENU

WB MODE	SVL AUTO
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**SVL: Sodium Vapor Lamp:** This is a fixed white balance mode specifically for sodium vapor lamps.

WHITE BALANCE MENU

WB MODE	SVL
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**SVLO AUTO: Sodium Vapor Lamp Outdoor Auto:** This is an auto white balance mode specifically for outdoors, which is compatible with sodium vapor lamps.

WHITE BALANCE MENU

WB MODE	SVL OUTDOOR A.
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## DETAIL Menu

### MODE

When you choose AUTO, contour correction signal is automatically added.

When you want to make adjustment by yourself, choose MANUAL. Only LEVEL will be displayed when you choose AUTO.

**LEVEL:** You can set the volume of the contour correction signal. Choose a value from 0 to 15. The greater the value, the stronger the contour correction signal.

**BANDWIDTH:** You can set the bandwidth for signals undergoing contour emphasis. You can choose from DEFAULT, LOW, MIDDLE, HIGH, and WIDE. For example, when you choose MIDDLE, the middle range of the signals is elevated, and contours in that middle range are emphasized.

**CRISPENING:** You can choose the fineness of the objects subject to contour correction with contour correction signals.

Choose a value from 0 to 7. When you choose a higher value, minute contour correction signal elements are removed, and only the high level contour correction signals are left, which reduces noise. When you choose a lower value, minute contour correction signal elements are added to the picture, increasing noise.

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DETTALL MENU

DETAIL MODE	AUTO
LEVEL	3

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DETTALL MENU

DETAIL MODE	MANUAL
BANDWIDTH	DEFAULT
CRISPENING	0
H/V BALANCE	-2
B/W BALANCE	TYPE1
LIMIT	3
HIGHLIGHT DETAIL	0
SUPER LOW	0

**H/V BALANCE:** You can choose the ratio for horizontal and vertical contour correction signal elements. Choose a value from -2 to 0 to +2. When you choose a higher value, the horizontal contour correction elements become greater compared to the vertical elements.

**B/W BALANCE:** You can adjust the balance between contours in black on the low brightness side of the spectrum and contours in white on the high brightness side. Choose from TYPE1 to TYPE5. The ratio of contours in black is higher for

TYPE1 while the ratio of contours in white is higher for TYPE5.

**LIMIT:** You can set the maximum value for the amount of contour emphasis in black on the low brightness side of the spectrum and in white on the high brightness side. Choose a value from 0 to 7.

**HIGHLIGHT DETAIL:** You can adjust the level of contour added to brightly-lit objects. Choose a value from 0 to 4. Adjust this when you want to emphasize the contour of a brightly-lit object in a bright background.

**SUPER LOW:** Emphasizes contours in the super low range. Choose a value from 0 to 7. The greater the value, the greater the contour emphasis. Contrast and resolution increase.

## PICTURE Menu

### Noise Reduction (NR)

The NR function removes noise (both random and non-random) to provide clearer images. This function has six steps: levels 1 to 5, plus off. The NR effect is applied in levels based on the gain, and this setting value determines the limit of the effect. In bright conditions, changing the NR level will not have an effect. When it is set to level 7Fh, you can set NR of 2D/3D individually.

#### 2D NR:

2D Noise Reduction is a method of reducing noise within an image by comparing frame-to-frame, removing the variations that do not appear in each frame

#### 3D NR

3D Noise Reduction is a method of reducing noise by comparing variances within the same frame, as well as comparing frame-to-frame. This will reduce noise without leaving trails behind a moving object.

#### FLIP:

Image E-Flipper – Used when ceiling mounting or upright mounting. Set to OFF is upright mode, set to ON is for ceiling mount.

#### MIRROR:

You can have the image as seen in a mirror, with the right side as though it were the left.

#### COLOR

You can configure the color gain from 1-15. Use this setting when bright color is particularly important.

#### HUE

You can adjust color phase from 1-15.

#### ND FILTER:

The ND Filter installed in front of the CMOS image sensor can be engaged or disengaged by the mechanical structure. The adjustable range of Iris and shutter speed are increased by using the ND Filter.

There are 2 types of ND Filters, and by combining them, the light quantity can be used at 1x (Filter Off), 1/4x, 1/16x, or 1/64x.

#### IR CUT FILTER

An infrared (IR) Cut-Filter can be disengaged from the image path for increased sensitivity in low light environments. The ICR will automatically engage depending on the ambient light, allowing the camera to be effective in day/night environments. When the auto ICR mode is set to NIGHT, the image becomes black and white.

#### CHROMA SUPPRESS (Low-Illumination Chroma Suppress Mode)

You can configure a Chroma suppress mode for low illumination conditions. This can be useful when color noise is particularly noticeable in such conditions. Four levels (disabled and three levels) are available for the low-illumination Chroma suppress mode.

You can set the brightness from OFF, LOW, MID, HIGH

#### HLC MODE

HLC (Highlight Light Compensation) is a function to adjust AE and AF, and to perform the masking of light area as required when a high intensity spot light is detected.

#### STABILIZER

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#### PICTURE MENU

2D NR	2
3D NR	2
FLIP	OFF
MIRROR	OFF
COLOR	5
HUE	8
ND FILTER	OFF
IR CUT FILTER	DAY
CHROMA SUPPRESS	OFF
HLC MODE	OFF
STABILIZER	OFF

When the image stabilizer function is set to ON, you can obtain the image with less screen blur caused by shaking. The correction effect can be achieved at the vibration frequency around 10 Hz. The image stabilizer function uses the digital zoom method. Although there are changes in the angle of view and resolution, the sensitivity is maintained.

**Note:** The image stabilizer function may not work under the environment of high frequency vibration components. When using the camera under such environment, set the image stabilizer function to Off.

## GAMMA

You can choose the type of basic curve for GAMMA correction.

**STANDARD:** Standard setting (same as the MOVIE setting on the camera).

**STRAIGHT:** This selects a straight GAMMA curve.

**PATTERN:** You can choose a gamma curve from 512 patterns stored in the camera. You can specify the pattern out of 512 patterns using PATTERN and PATTERN FINE. PATTERN defines the upper two digits of the pattern, and PATTERN FINE defines the last digit.

**PATTERN:** Choose a value from 0 to 51. This can be chosen When SELECT is PATTERN.

**PATTERN FINE:** Choose a value from 0 to 9. When PATTERN is 0, 0 cannot be chosen for PATTERN FINE. When PATTERN is 51, a value larger than 2 cannot be chosen for PATTERN FINE. This can be chosen when SELECT is PATTERN.

**OFFSET:** You can choose the offset of the output level of gamma curves. Choose a value from -64 to 0 to +64.

**LEVEL:** Gamma level, you can choose a level value from -7 to 0 to +7.

**BLACK GAMMA:** You can adjust the black gamma level to recreate gradation in the dark areas of the picture or to suppress noise with black-out. Choose a value from -7 to 0 to +7.

**BLACK GAMMA RANGE:** You can adjust the brightness range for which BLACK GAMMA becomes effective. Choose from LOW, MIDDLE, and HIGH. The range becomes small when LOW is chosen, and it becomes large when HIGH is chosen.

**BLACK LEVEL:** You can adjust the master BLACK LEVEL. Choose a value from -48 to 0 to +48.

### VISIBILITY ENHANCER (VE)

Depending on the imaging scene, the Visibility Enhancer function makes the darker part of a camera image brighter, and automatically correct brightness and contrast to show bright parts clearly.

## NETWORK

It may take a short while to display the network information after you select the NETWORK menu.

The network menu is for displaying IP configuration information of the IP encoder that is built-in with the camera.

The IP configuration is currently not available to be modified via OSD menu. You need to use your PC internet browser to configure the IP network setting of the camera.

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GAMMA MENU

GAMMA	STANDARD
PATTERN	51
PATTERN FINE	2
OFFSET	0
LEVEL	0
BLACK GAMMA	0
BLACK GAMMA RANG	LOW
BLACK LEVEL	0
VISIBILITY ENHANCER	OFF

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NETWORK MENU

IPv4	192.168.002.234
SUBNET MASK	255.255.255.0
GATEWAY	192.168.002.001
MAC ADDRESS	00:26:C2:01:02:EE

# PAN TILT ZOOM Menu

The PAN TILT ZOOM menu is used to select the pan/tilt/ zoom mode.

**DIGITAL ZOOM:**

Set to DIGITAL ZOOM ON, 12X digital zoom (with SRZ feature, 18X zoom at 4K, or 24X zoom at FHD) is activated.

You can set digital zoom to ON or OFF. When set to OFF, digital zoom does not operate, and only optical zoom is available. When set to ON, digital zoom takes over after optical zoom reaches MAX (12X). Up to 200X/300X can be zoomed digitally.

When digital zoom is available, the resolution decreases

**ZOOM RATIO OSD (Zoom times display):**

Set Ratio OSD to ON, the number of the zoom ratio that you are operating displays on screen.

**AF SENSITIVITY:**

**NORMAL:** Reaches the highest focus speed quickly. Use this when shooting a subject that moves frequently.

**LOW:** Improves the stability of the focus. When the lighting level is low, the AF function does not take effect, even though the brightness varies, contributing to a stable image.

**MF SPEED:**

Manual Focus variable speed, that has eight speed levels.

**NEAR LIMIT:**

Can be set in a range from OVER, 8cm, 10cm, 14cm, 18cm, 25cm, 35cm, 55cm, 80cm, 1m, 1.2m, 1.5m, 2.0m, 3m, 5m.

**ADAPTIVE PT:**

Set to ON, Pan Tilt speed would be adaptive with the zoom range.

Turn ON to automatically adjust the Pan and Tilt speed with various zoom ratios. For example, the higher zoom ratio you use, the slower the speed of P/T.

**P/T SPEED:**

Set P/T Speed value to from 0 to 5 (The speed from low to high), to change the speed of P/T on remote controller.

**PRESET SPEED:**

Set preset speed value from 0 to 5 to change the preset speed.

**PAN DIRECTION:**

Camera horizontal Left and right orientation setting, option: Normal/Invert

**TILT DIRECTION:**

Camera tilt up and down orientation setting, option: Normal/Invert

**TRACE MEMORY**

PTZ Trace is a function used to record pan/tilt/zoom operations, controlled by remote commander or a remote controller, and then to play back the operations as required. UP to 100 pan/tilt/zoom commands can be recorded for up to 60 seconds.

- TRACE NO: Select the TRACE number to record, play back or delete.
- PLAY TIMES: How to play back the recorded operations, can be set to Once or Unlimited.
  - Once: The recorded trace memory will be only running one time then stop.
  - Unlimited: The recorded trace memory will be only running unlimited times and never stop until quit the Trace Memory mode or the PTZ movement is triggered manually.
- RECORD: Record operations.
- MEMORY: Play back or delete the recorded operations.

**Recording Trace Memory (pan/tilt/zoom operations)**

- Select the trace number you want to record in TRACE NO.
- Move the cursor to RECORD and press the HOME button (Or joystick right click).  
\*Setting menu (enter to record) is display at the top left corner of the screen
- Move the camera position to the Start Position where you want the Trace to start from.  
\*Recording status is display at the top of the screen

OSD

EXPOSURE
WHITE BALANCE
DETAIL
PICTURE
GAMMA
NETWORK
>PAN TILT ZOOM
SYSTEM

PAN TILT ZOOM MENU

DIGITAL ZOOM	OFF
ZOOM RATIO OSD	OFF
AF SENSITIVITY	NORMAL
MF SPEED	2
NEAR LIMIT	14cm
ADAPTIVE PT	ON
P/T SPEED	3
PRESET SPEED	5
PAN DIRECTION	NORMAL
TILT DIRECTION	NORMAL

Trace Memory

TRACE NO	1
PLAY TIMES	ONCE
RECORD	
MEMORY	PLAY

- Call preset 1 to start the trace recording
- Perform the pan/tilt/zoom operations you want to record, during recording, elapsed commands number at the top of the screen increases in increments of 1 when the camera received one command.

**NOTE:** If using the remote commander, pan/tilt/zoom operations can't be performed simultaneously. If using the joystick controller, pan/tilt/zoom operations can't be performed simultaneously

- Call preset 1 to finish and stop the trace recording

**NOTE:** The recording automatically stops after the maximum recording time has elapsed.

### Playing Trace Memory (pan/tilt/zoom operations)

- Select the recorded trace number you want to play in TRACE NO.
- Move the cursor to MEMORY, select PLAY and press HOME button to begin playback.

**NOTE:** Playback stops if a pan/tilt/zoom operation is performed during playback by using the remote commander or a joystick controller.

### Deleting recorded Trace Memory (pan/tilt/zoom operations)

- Select the trace number you want to delete in TRACE NO.
- Move the cursor to MEMORY, select DELETE and press HOME button, it will display "DELETE TRACE YES", press HOME button again, this trace will be deleted.

## SYSTEM MENU

### PELCO ID

When using RS485 (PELCO P/D) control, Set Camera ID to the address that you want to control to.

This value is from 1-255.

### IR-RECEIVE (Infrared Signal Reception)

When this is set to OFF, the camera does not receive the signal from the infrared remote controller.

Be sure to keep it set to ON when you use the infrared remote controller.

#### Note

You cannot set IR-RECEIVE to OFF when you operate the menu using the infrared remote controller. To set it to OFF, use the appropriate VISCA controller.

### DISPLAY INFO

When this item is set to ON, the message of the camera configuration appears for about 10 seconds on the screen, after the camera is powered on or rebooted.

### PRESET MEMORY:

This feature allows you to save the image parameter to PRESET memory, turn it on to save most image parameters like as picture, white balance, exposure, focus mode, zoom positions when you call the preset.

### FACTORY RESET

You can select this item to set camera back to Factory Default setting by pressing HOME button to confirm the action. All data of the camera that have been set will be deleted.

### TALLY MODE

When the tally mode is set to ON, the tally light on the camera will be turned on.

If you connect the camera with Bolin keyboard controller, you can set the GPI I/O to Output mode in Keyboard Setting, then you can do tally control via the keyboard directly.

### TELE CONVERT MODE

You can shoot using 2x magnification.

OFF: Does not use the magnification function.

ON: Uses the magnification function. Gain 2X-80X zoom range with 1080p resolution.

#### NOTE

- Available only when VIDEO FMT is set to 1080p resolution.
- The angle of view when TELE CONVERT MODE is set to ON is narrower than when set to OFF.

#### OSD

```
EXPOSURE
WHITE BALANCE
DETELL
PICTURE
GAMMA
NETWORK
PAN TILT ZOOM
>SYSTEM
```

#### SYSTEM MENU

```
PELCO ID      1
IR-RECEIVE   ON
DISPLAY INFO  ON
PRESET MEMORY ON
FACTORY RESET
TALLY MODE    OFF
AUDIO         OFF
RELOAD PRESET 1  ON
VIDEO FMT     1080P29.97
MCU FW:       V08210B32010A0006
FPGA FW:      V027 4K
```

**AUDIO**

This item is set to OFF by default, user can set it to ON to enable camera MIC to capture audio signal.

**RELOAD PRESET 1:**

When this item is set to ON, preset 1 is set to Home position. The camera goes to Home position when it is powered on or reset.

**VIDEO FORMAT:**

This Video Format selection will determine the video format of both SDI and HDMI.

You can change the video format by adjusting this item. Select the item, press “←” button to choose the video format you want to set to, then press “→” (Pressing “→” button changes value on some product models) or HOME button to confirm it. After you confirm your choice, press HOME button again to restore it. The camera will reboot by itself. The new video format is activated.

You can cancel it by pressing the MENU button.

The video formats that you can select from are:

- 2160P: 29.97/25/23.98/24
- 1080P: 60/59.94/50/30/29.97/25/23.98/24
- 1080I: 60/59.94/50
- 720P: 60/59.94/50

**MCU FW:**

Software Version Number of MCU that is currently running on the camera, you may need this information for technical support.

**FPGA FW:**

Software Version Number of FPGA that is currently running on the camera, you may need this information for technical support.

OSD	SYSTEM MENU
EXPOSURE	PELCO ID I
WHITE BALANCE	IR-RECEIVE ON
DETELL	DISPLAY INFO ON
PICTURE	PRESET MEMORY ON
GAMMA	FACTORY RESET
NETWORK	TALLY MODE OFF
PAN TILT ZOOM	AUDIO OFF
>SYSTEM	RELOAD PRESET 1 ON
	VIDEO FMT 2160P29.97
	MCU FW: V08210832010AA006
	FPGA FW: V027 4K

**True Dual Output video format setting**

This camera supports Bolin True Dual Output functionality, means that you can have relevant IP streaming when SDI/HDMI video is set to any format you want to set to. It takes SDI/HDMI video format setting as priority.

The following table chart shows the relationship between SDI/HDMI video format and IP video format.

True Dual Output Video Format			
SDI/HDMI	IP Resolution/Frame Rate		
<b>2160p29.97</b>	2160p30	1080p30	
<b>2160p25</b>	2160p25	1080p25	
<b>2160p23.98</b>	2160p24	1080p24	
<b>2160p24</b>	2160p24	1080p24	
<b>1080p60</b>	1080p60	1080p30	720p60
<b>1080p59.94</b>	1080p60	1080p30	720p60
<b>1080p50</b>	1080p50	1080p25	720p50
<b>1080p30</b>	1080p30		
<b>1080p29.97</b>	1080p30		
<b>1080p25</b>	1080p25		
<b>1080p23.98</b>	1080p24		
<b>1080p24</b>	1080p24		
<b>720p60</b>	720p60		
<b>720p59.94</b>	720p60		
<b>720p50</b>	720p50		
<b>1080i60</b>	1080p60	1080p30	720p60
<b>1080i59.94</b>	1080p60	1080p30	720p60
<b>1080i50</b>	1080p50	1080p25	720p50

# Firmware Upgrade

There are 4 types of firmware with this camera can be upgradable. The latest camera firmware is available to be downloaded from Bolin website: [www.bolintechnology.com](http://www.bolintechnology.com).

- MCU (Micro Control Unit) firmware upgrade via USB
- IP encoder firmware upgrade via IP network
- FPGA firmware upgrade via IP network
- Resolution FHD to 4K firmware via IP network.

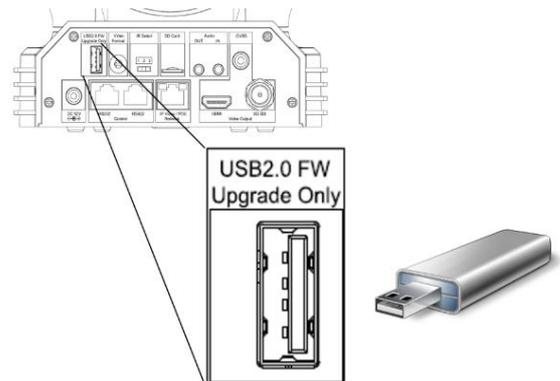
**NOTE:** The firmware upgrade process is intended to be performed under the supervision of a BOLIN-Authorized repair technician. For assistance with this, please contact your authorized BOLIN Technology dealer, installer, or integrator. BOLIN Technology Technical Support can also be reached for assistance with this process

## Upgrading MCU Firmware

MCU Firmware can be upgraded by following these steps:

1. Load the .bin file onto a flash drive (Formatted as FAT32), and name the file “HD20.bin”
2. With the camera powered off, insert the flash drive to the USB port on the back panel of the camera
3. Apply power to the camera

The green indicator light above the lens will turn red for a few seconds while the upgrade takes place. Once the upgrade is finished, the light will turn green, and the camera will proceed through a normal boot cycle. Check the data on the OSD boot screen



## Upgrading IP encoder firmware

You can upgrade camera IP encoder module Firmware via IP network.

Connect and configure your camera with your local network successfully, log in the camera IP web interface, go to System, Maintenance section to upgrade the firmware.

How to make Firmware upgrade for IP Encoder, please refer to User Manual Part Two.

## Upgrading FPGA firmware

You can upgrade camera FPGA Firmware via IP network.

Connect and configure your camera with your local network successfully, log in the camera IP web interface, go to System, Maintenance section to upgrade the firmware.

How to make Firmware upgrade for FPGA, please refer to User Manual Part Two.

## Video resolution upgrade

If you bought the camera that is FHD version, now you decide to upgrade it to 4K version. We can make it for you, please contact your local dealer where you bought the camera from or Bolin technical support team for help with containing the upgrade license.

The firmware for the FHD-To-4K upgrading is upgradable via IP network.

This firmware upgrade gives you following features added to the camera that you bought:

1. The camera you have bought is BC-7-4K20S-S3MNB with FHD resolution and 3G-SDI output.
2. By purchasing a license BC-7-4K20S-LS-4K, you can have following features added to the camera:
  - a. Resolution will be upgrade to 4K, 2160p30.
  - b. SDI video output will be upgraded to 6G-SDI.
  - c. Other features may be upgraded.

Connect and configure your camera with your local network successfully, log in the camera IP web interface, go to System, Maintenance section to upgrade the firmware.

How to make Firmware upgrade for FPGA, please refer to User Manual Part Two.

# Operation Using the Infrared Remote Controller

## Pan/Tilt and Zoom Operation

### Panning and Tilting

1. Press the POWER switch.

The camera will turn on and perform the pan/tilt reset operation automatically.

2. Press the arrow button to pan or tilt the camera.

While checking the picture on the screen, press the desired arrow button.

**To move the camera in short increments,** press the button just for a moment.

**To move the camera in long increments,** press and hold the button.

**To move the camera diagonally,** press the “←, →” button while holding down the “↑, ↓” button.

### Restore to starting position

Press the HOME button.

### If the camera moves in a different direction from the one that you intended

The camera is preset so that the image output from the camera is rotated toward the right whenever you press the “←, →” button.

### To face the camera toward the opposite direction

You might wish to face the camera toward the opposite direction from that of the button you pressed, for example, when you change the direction of the camera while checking the picture on the screen. In such a case, press and hold the Fn key, then press the 2 (REV) button.

Arrow button	Movement of the camera	Setting
		 While holding down  Press

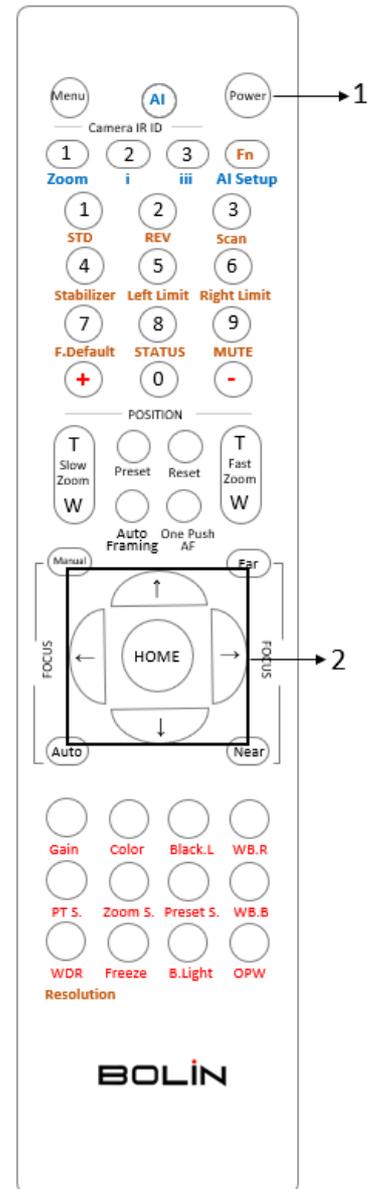
### To reset the setting

To reset the setting, press and hold the Fn key, then press the 1 (STD) button.

Arrow button	Movement of the camera	Setting
		 While holding down  Press

### Note

The above setting only changes the signal emitted from the infrared remote controller, and does not change the setting of the camera itself. Therefore, repeat the setting for each infrared remote controller if you are using more than one infrared remote controller.



### When the STANDBY lamp is blinking

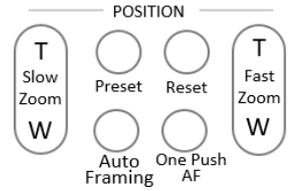
If the camera is moved forcibly, or a finger or other object interferes with camera movement, the camera may fail to memorize the pan/tilt position.

Press the PAN-TILT RESET button to reset the pan/tilt position.

### Zooming

Button (Slow Zoom) [T] - Zoom-IN and [W] - Zoom-OUT slowly

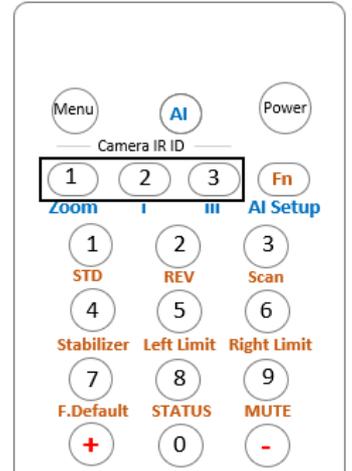
Button (Fast Zoom) [T] - Zoom-IN and [W] - Zoom-OUT quickly



### Operating Multiple Cameras with Infrared Remote Controller

1. Set the DIP Switch on the rear panel of the camera to the number of camera you want to operate to 1, 2 or 3.  
(See DIP Switch setting instruction)
2. Press one of the Camera IR ID button on the IR remote controller, the button will be illuminated, that means the camera that is set to IR ID Number will respond to the IR controller.
3. Always firstly check if the IR ID is set correctly same as the IR ID set on the camera when the camera is not responding to the IR controller.

Then, you can operate the camera(s) specified by number. Every time you operate the camera(s) using the IR remote controller, the Camera IR ID button pressed in step 2 flashes.



### Adjusting the Camera Focus

Focusing on a Subject

#### Focusing the camera on a subject automatically

Press the AUTO button.

The camera focuses on the subject at the center of the screen automatically.

#### Focusing the camera on a subject manually

After pressing the MANUAL button, press either the FAR or the NEAR button to have the camera focus on the subject.

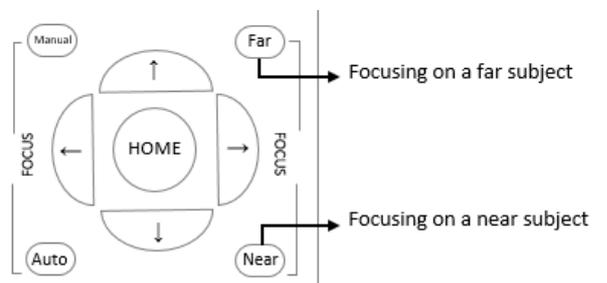
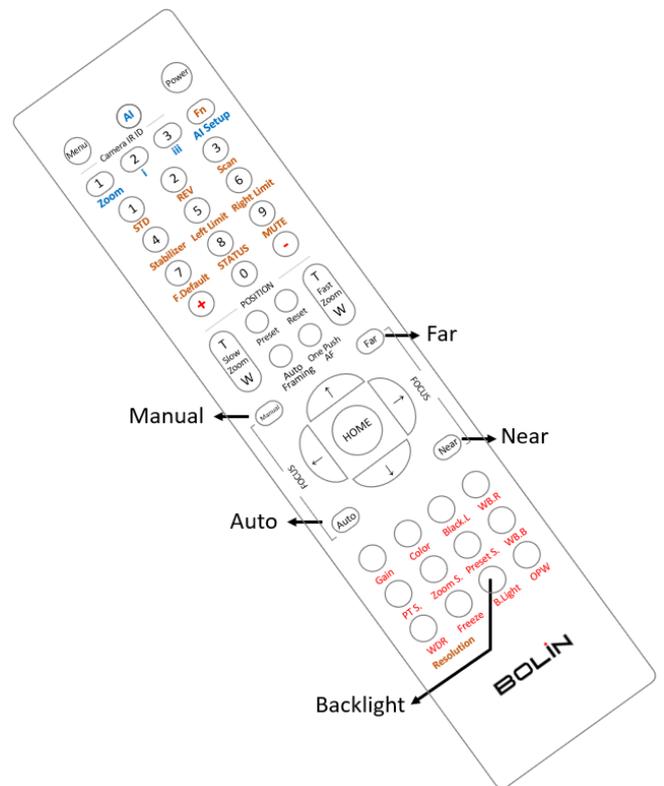
#### Shooting with Back Lighting

When you shoot a subject with a light source behind it, the subject becomes dark. In such a case, press the BACK LIGHT button.

To cancel the function, press the BACK LIGHT button again.

#### Note

The BACK LIGHT function is effective if MODE is set to FULL AUTO in the EXPOSURE menu of the camera.



# Storing the Camera Settings in Memory — the Presetting Feature

## Memory (Preset)

Using the preset function, 9 sets of camera shooting conditions can be stored and recalled. 9 sets of camera shooting conditions can be stored and recalled by using remote controller. Up to 128 presets via protocol programming.

This function allows you to achieve the desired status instantly, even without adjusting the following items each time.

- Pan/Tilt Position
- Zoom Position
- Focus Auto/Manual
- Focus Position
- AE Mode
- Shutter control parameters
- Bright Control
- Iris control parameters
- Gain control parameters
- Exposure Compensation On/Off
- Exposure Level
- Backlight Compensation On/Off
- White Balance Mode
- R/B Gain
- Aperture Control
- WD Parameter

The settings stored using this function are recalled when the power is turned on.

1. Press the PAN-TILT RESET button to reset the pan/ tilt position.
2. Adjust the position, zooming, focusing and backlighting of the camera.

While holding down the PRESET button, press any of the POSITION buttons, [1] to [9], in which you want to store the settings.

## Recalling the stored settings

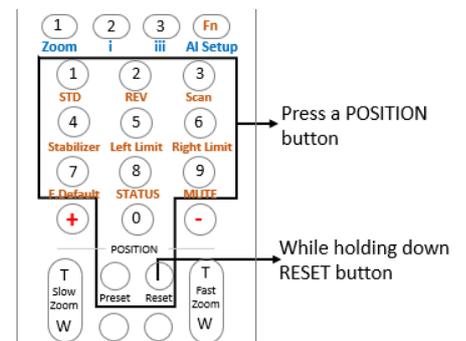
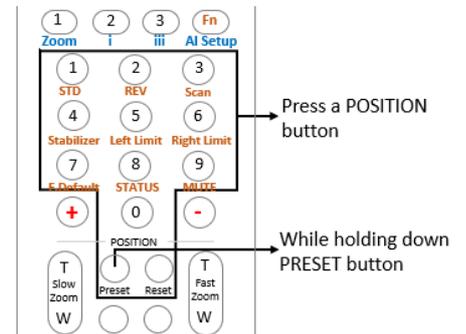
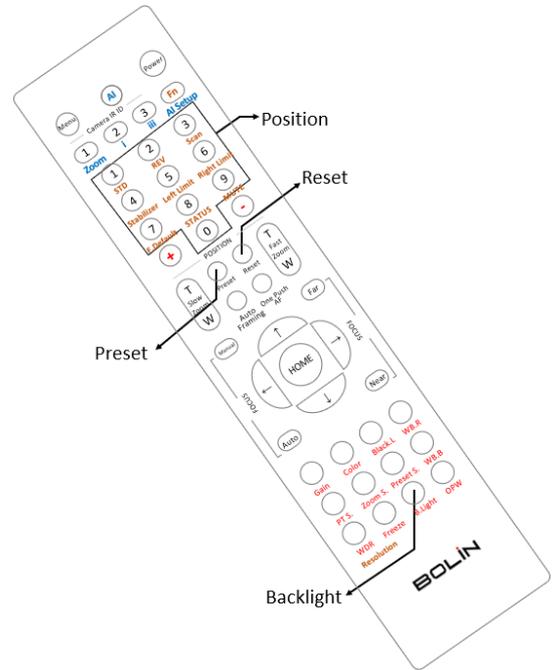
Press any of the POSITION buttons, [1] to [9], in which you have stored the settings.

## Cancelling the preset memory

While holding down the RESET button, press the POSITION button from which you want to cancel the settings.

### Notes

- When the power is turned on, the camera starts with the settings stored in POSITION 1.
- If you want to retain the previous pan and tilt positions, etc. before the power is turned off and turned on again, store those positions in POSITION 1.
- When you are storing or cancelling the settings in one POSITION, you cannot call up, store or cancel the settings in another POSITION.
- When the menu is displayed on the screen, you cannot perform the operation for storing, recalling, or cancelling the setting. Be sure to return to the normal display before starting these operations.



## Adjusting the camera

Adjusting the camera, including camera image parameter (Gain, Color, Contrast, White Balance (Red & Blue), Black Level), camera speed (Pan/Tilt speed, zoom speed and preset speed), as well as Freeze, Back Light and One Push White Balance.

### Gain-Adjust Gain

Press Gain button, the Gain button light will on, then press “+” or “-” button to adjust the Gain value.

After done, press other button in this area, the Gain button light will off.

### Color-Adjust Color

Press Color button, the Color button light will on, then press “+” or “-” button to adjust the Gain value.

After done, press other button in this area, the Color button light will off

### CON-Adjust Contrast

Press CON button, the CON button light will on, then press “+” or “-” button to adjust the Contrast value.

After done, press other button in this area, the CON button light will off.

### WB.B-Adjust White Balance (Red)

Press WB.R button, the WB.R button light will on, then press “+” or “-” button to adjust the White Balance Red color value.

After done, press other button in this area, the WB.R button light will off.

### WB.B-Adjust White Balance (Blue)

Press WB.B button, the WB.B button light will on, then press “+” or “-” button to adjust the White Balance Blue color value.

After done, press other button in this area, the WB.B button light will off.

### PT S.-Adjust Pan/Tilt Speed

Press PT S button, PT S button light will on, then press “+” or “-” button to adjust Pan/Tilt speed value.

After done, press other button in this area, the PT S button light will off.

### Zoom S.-Adjust Zoom Speed

Press Zoom S button, Zoom S button light will on, then press “+” or “-” button to adjust zoom speed value.

After done, press other button in this area, the Zoom S button light will off.

### Preset S.-Adjust Preset Speed

Press Preset S button, Preset S button light will on, then press “+” or “-” button to adjust preset speed value.

After done, press other button in this area, the Preset S button light will off.

### Black L.-Adjust Black Level

Press Black L button, Black L button light will on, then press “+” or “-” button to adjust black level value.

After done, press other button in this area, the Black L button light will off.

### B.Light-Adjust Back Light

Press B Light button, B Light button light will on, then press “+” or “-” button to adjust back light value.

After done, press other button in this area, the B Light button light will off.

### Freeze-Set Freeze

Press Freeze button, Freeze button light will on, the camera image will be frozen, press Freeze button again, Freeze button light will off, and camera image will back to normal

### OPW-Set One Push Whit Balance

Press OPW button, OPW button light will on, camera will be automatically readjusted white balance.

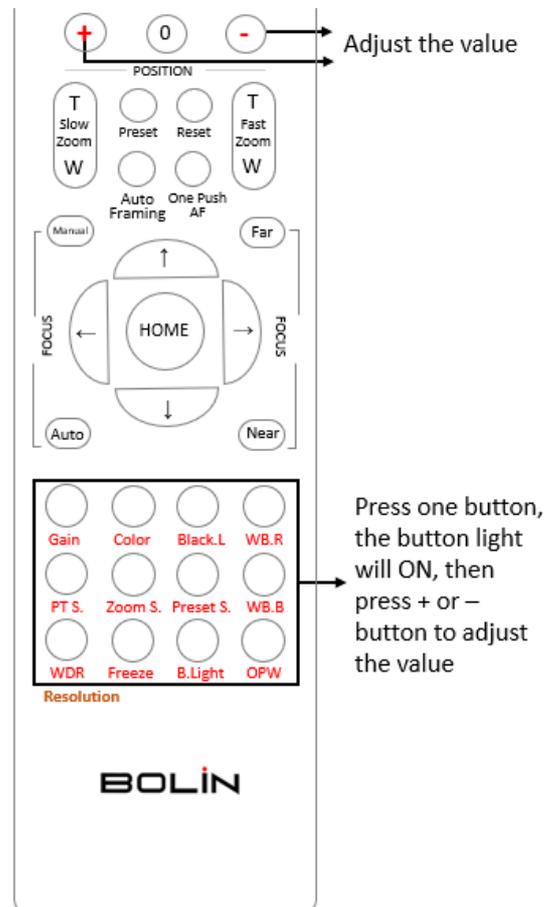
NOTE:

When you select the OPW (One Push White Balance), please perform the following operations:

1. Place an image of white subject (For example: A piece of white paper) in the center of the screen.
2. Press the OPW button of the infrared remote controller. the one-push white balance adjustment is activated.

NOTE:

After done, press other function button which in different color, the red color button light will off



## AI Feature Mode (reserved for future use)

This IR Remote Controller can be used for BOLIN AI (Auto Framing/Auto Tracking) camera, we can set this IR controller to AI mode, to set up AI feature quickly.

### AI Button:

Press AI button, the IR controller will switch to AI mode.

### Zoom:

AI Feature, it is available when AI button is pressed. Adjust the zoom position of the person within the image, for example Close Up, Half-Body, Full-Body.

**i:** AI feature

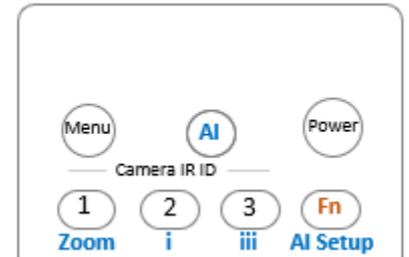
Single target mode, use this mode when there is only one person as a tracking target in the camera image.

**iii:** AI feature

Multi-target mode, use this mode when there are more than one person as a tracking target in the camera image.

### AI Setup:

Press it to bring up AI setting menu.



## Fn Mode Key

Press and hold the Fn key, then press one of the function buttons that printed in color brown to have extra feature settings.

### REV:

To face the camera toward the opposite direction, press and hold the Fn key, then press 2 (REV) button.

### STD:

To reset the setting that configured in REV step, press and hold the Fn key, then press 1 (STD) button.

### Scan:

To set the camera in scan mode, press and hold the Fn key, then press 3 (Scan) button. Press one more time to stop the scanning.

**NOTE:** If set Left limit / Right Limit, auto scanning will run within the limit position range.

### Left Limit:

To set the leftmost position that the camera can pan to.

Use the arrow keys to turn the camera to the leftmost position you want to set, press and hold the Fn key, then press 5 (Left Limit) button and hold for 1 second, the left limit position has been set. When the camera is turned to the left and reach the left limit position, the camera will stop.

Press and hold Fn key, then press 5 (Left Limit) and hold for 3 seconds, the left limit position will be deleted.

### Right Limit:

To set the rightmost position that the camera can pan to.

Use the arrow keys to turn the camera to the rightmost position you want to set, press and hold the Fn key, then press 6 (Right Limit) button and hold for 1 second, the right limit position has been set. When the camera is turned to the right and reach the right limit position, the camera will stop.

Press and hold Fn key, then press 6 (Right Limit) and hold for 3 seconds, the right limit position will be deleted.

### NOTE:

When the HOME position or the preset position set is not within the Left Limit / Right Limit range, the remote controller operate HOME position or preset call command is invalid.

### F.Default:

To restore the camera to factory settings, press and hold Fn key, then press 7 (F.Default) button.

### STATUS

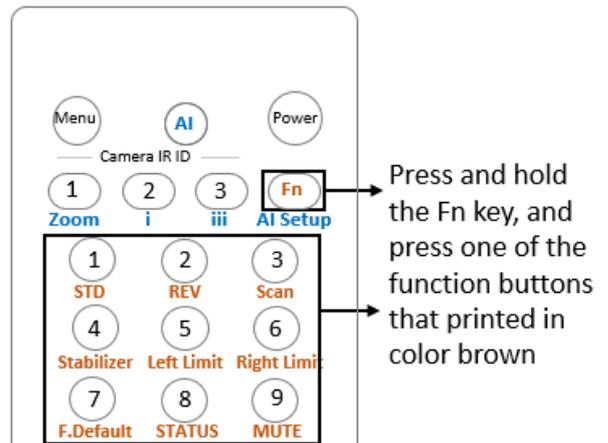
To pull out the camera Status menu, press and hold Fn key, then press 8 (Status) button.

### MUTE

To enable or disable the audio signal from the SDI/HDMI output, press and hold Fn key, then press 9 (Mute) button to enable, press one more time to disable the mute.

### Resolution:

To change the video resolution, press and hold Fn key, then press the Resolution button to populate a menu where you can switch resolutions.



## Changing Video Resolutions

- Press and hold Fn button, then press the Resolution button to populate a menu where you can switch resolutions
- Use the arrow keys to navigate
- Press Home to select
- Screen will show 'CHANGING...'
- Press Menu to exit



Press and hold Fn key, then press this button to switch between available resolution

# Menu Configuration

The menus of the camera are configured as described below. The initial settings of each item are in bold.

## OSD Menu Configuration

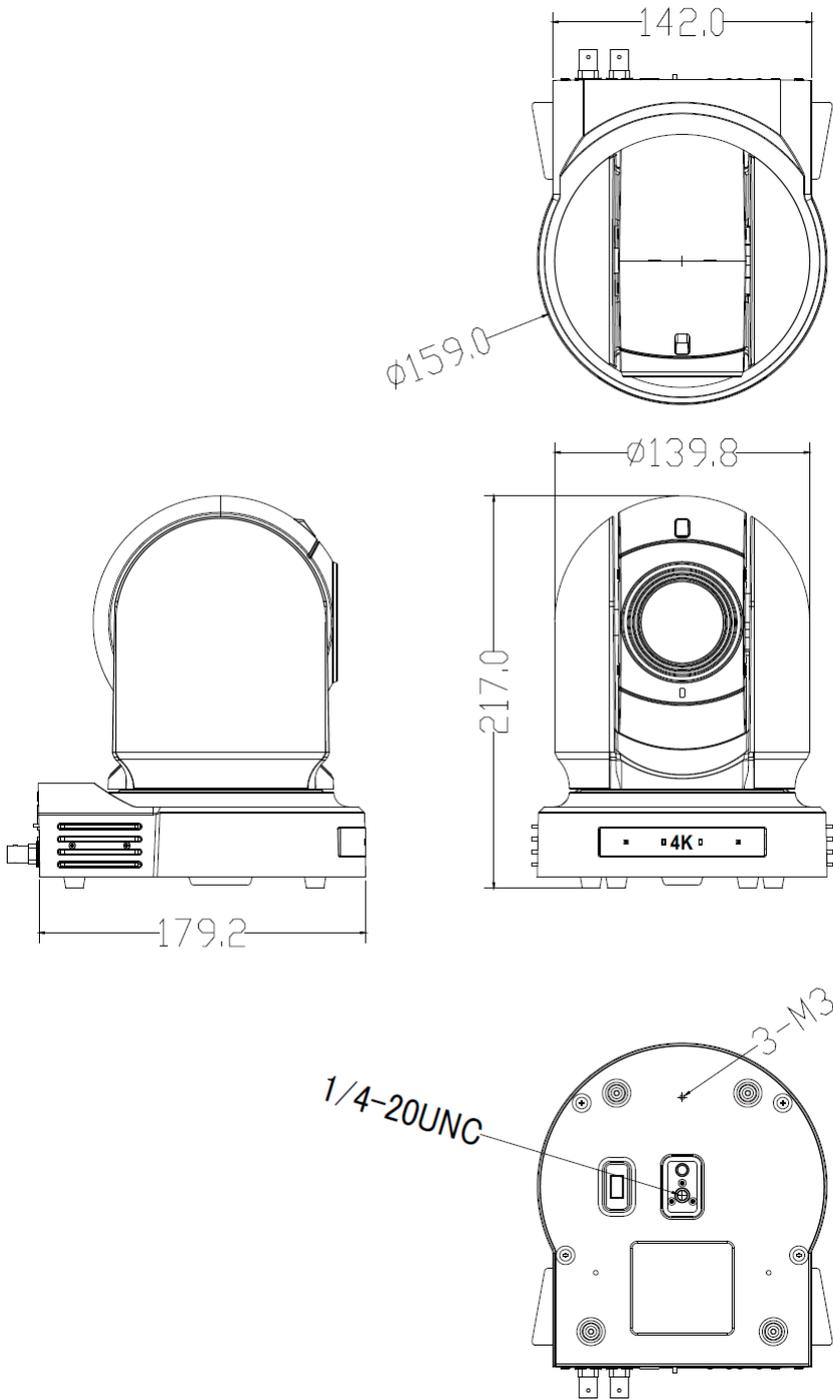
Menu	EXPOSURE	MODE	FULL AUTO	SLOW SHUTTER	OFF, ON
				S. SHUTTER LIMIT	1/1, 2/3, 1/2, 1/3, 1/4, 1/6, 1/8, 1/10, 1/15, 1/20, 1/30, 1/50
				AE SPEED	1-48
				GAIN LIMIT	27dB, 30dB, 33dB, 36dB
				GAIN POINT	OFF, ON
				POINT POSITION	0dB, 3dB, 6dB, 9dB, 12dB, 15dB, 18dB, 21dB, 24dB, 27dB (Adjustable when GAIN POINT set to ON)
				HIGH SENSITIVITY	OFF, ON
				MAX SPEED	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, 1/10K
				MIN SPEED	1/30, 1/50, 1/60, 1/90, 1/100, 1/125, 1/180, 1/250, 1/350, 1/500
				BACK LIGHT	OFF, ON
				SPOT LIGHT	OFF, ON
			EX-COMP	ON, OFF (When set to ON, the LEVEL can be adjusted) LEVEL: -10.5, -9, -7.5, -6, -4.5, -3, -1.5, 0, 1.5, 3, 4.5, 6, 7.5, 9, 10.5	
			MANUAL	GAIN	0dB, 3dB, 6dB, 9dB, 12dB, 15dB, 18dB, 21dB, 24dB, 27dB, 30dB, 33dB, 36dB
				SPEED	1/1, 2/3, 1/2, 1/3, 1/4, 1/6, 1/8, 1/12, 1/15, 1/20, 1/25, 1/30, 1/50, 1/60, 1/100, 1/120, 1/150, 1/215, 1/300, 1/425, 1/600, 1/1000, 1/1250, 1/1750, 1/2000, 1/3500, 1/6000, 1/10K
				IRIS	F11, F10, F9.6, F8.7, F8.0, F7.3, F6.8, F6.2, F5.6, F5.2, F4.8, F4.4, F4.0, F3.7, F3.4, F3.1, F2.8
				HIGH SENSITIVITY	OFF, ON
			IRIS PRI	IRIS	F11, F10, F9.6, F8.7, F8.0, F7.3, F6.8, F6.2, F5.6, F5.2, F4.8, F4.4, F4.0, F3.7, F3.4, F3.1, F2.8
				GAIN LIMIT	27dB, 30dB, 33dB, 36dB
				GAIN POINT	OFF, ON
				POINT POSITION	0dB, 3dB, 6dB, 9dB, 12dB, 15dB, 18dB, 21dB, 24dB, 27dB (Adjustable when GAIN POINT set to ON)
				AE SPEED	1-48
				MAX SPEED	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, 1/10K
				MIN SPEED	1/30, 1/50, 1/60, 1/90, 1/100
				BACK LIGHT	OFF, ON
				SPOT LIGHT	OFF, ON
			EX-COMP	ON, OFF (When set to ON, the LEVEL can be adjusted) LEVEL: -10.5, -9, -7.5, -6, -4.5, -3, -1.5, 0, 1.5, 3, 4.5, 6, 7.5, 9, 10.5	
			SHUTTER PRI	SPEED	1/1, 2/3, 1/2, 1/3, 1/4, 1/6, 1/8, 1/12, 1/15, 1/20, 1/25, 1/30, 1/50, 1/60, 1/100, 1/120, 1/150, 1/215, 1/300, 1/425, 1/600, 1/1000, 1/1250, 1/1750, 1/2500, 1/3500, 1/6000, 1/10K
				GAIN LIMIT	27dB, 30dB, 33dB, 36dB
				AE SPEED	1-48
				BACK LIGHT	OFF, ON
				SPOT LIGHT	OFF, ON
			EX-COMP	ON, OFF (When set to ON, the LEVEL can be adjusted) LEVEL: -10.5, -9, -7.5, -6, -4.5, -3, -1.5, 0, 1.5, 3, 4.5, 6, 7.5, 9, 10.5	
			BRIGHT	LEVEL	0, 5-31
				HIGH SENSITIVITY	OFF, ON
			GAIN PRI	GAIN	0dB, 3dB, 6dB, 9dB, 12dB, 15dB, 18dB, 21dB, 24dB, 27dB, 30dB, 33dB, 36dB
				GAIN POINT	OFF, ON
				POINT POSITION	0dB, 3dB, 6dB, 9dB, 12dB, 15dB, 18dB, 21dB, 24dB, 27dB (Adjustable when GAIN POINT set to ON)
				AE SPEED	1-48
				HIGH SENSITIVITY	OFF, ON
				MAX SPEED	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, 1/10K
				MIN SPEED	1/30, 1/50, 1/60, 1/90, 1/100
				BACK LIGHT	OFF, ON
				SPOT LIGHT	OFF, ON
			EX-COMP	ON, OFF (When set to ON, the LEVEL can be adjusted) LEVEL: -10.5, -9, -7.5, -6, -4.5, -3, -1.5, 0, 1.5, 3, 4.5, 6, 7.5, 9, 10.5	

WHITE BALANCE	MODE	AUTO	SPEED	1-5
			OFFSET	-7 to 0 to +7
			MATRIX	OFF, ON (When set to ON, the below items can be adjusted)
			SELECT	STD, HIGH SAT, FL LIGHT
			LEVEL	0-14
			PHASE	-7 to 0 to +7
			R-G	-99 to 0 to +99
			R-B	-99 to 0 to +99
			G-R	-99 to 0 to +99
			G-B	-99 to 0 to +99
			B-R	-99 to 0 to +99
			B-G	-99 to 0 to +99
		INDOOR	MATRIX	OFF, ON
		OUTDOOR	MATRIX	OFF, ON
		OPW	OFFSET	-7 to 0 to +7
			MATRIX	OFF, ON
		ATW	SPEED	1-5
			OFFSET	-7 to 0 to +7
			MATRIX	OFF, ON
		USER	R GAIN	0-255
B GAIN	0-255			
MATRIX	OFF, ON			
OUTDOOR AUTO	MATRIX	OFF, ON		
SVL AUTO	MATRIX	OFF, ON		
SVL	MATRIX	OFF, ON		
SVL OUTDOOR A.	MATRIX	OFF, ON		
DETELL	MODE	AUTO	LEVEL	0-15
		MANUAL	BAND WIDTH	DEFAULT, LOW, MIDDLE, HIGH, WIDE
			CRISPENING	0-7
			H/V BALANCE	-2, -1, 0, 1, 2
			B/W BALANCE	TYPE1, TYPE2, TYPE3, TYPE4, TYPE5,
			LIMIT	0-7
			HIGHLIGHT DETALL	0-4
			SUPER LOW	0-7
			PICTURE	2D NR
3D NR	OFF, 1, 2, 3, 4, 5			
FLIP	OFF, ON			
MIRROR	OFF, ON			
COLOR	1-15			
HUE	1-15			
ND FILTER	OFF, 1/4, 1/16, 1/64,			
IR CUT FILTER	DAY, NIGHT			
CHROMA SUPPRESS	OFF, LOW, MID, HIGH			
HLC MODE	OFF, ON			
STABILIZER	OFF, ON			
GAMMA	GAMMA	STANDARD, STRAIGHT, PATTERN		
	PATTERN	0-51		
	PATTERN FINE	0, 1, 2		
	OFFSET	-64 to 0 to +64		
	LEVEL	-7 to 0 to +7		
	BLACK GAMMA	-7 to 0 to +7		
	BLACK GAMMA RANGE	LOW, MIDDLE, HIGH		
	BLACK LEVEL	-48 to 0 to +48		
	VISIBILITY ENHANCER	OFF, ON		
	EFFECT: 0, 1, 2, 3, -3, -2, -1 (Adjustable when VE set to ON)			

NETWORK	IPv4 ADDRESS	192.168.0.13
	SUBNET MASK	255.255.255.0
	GATEWAY	192.168.0.1
	MAC ADDRESS	xx-xx-xx-xx-xx-xx
PAN TILT ZOOM	DIGITAL ZOOM	OFF, ON, SRZ
	ZOOM RATIO OSD	OFF, ON
	AF SENSITIVITY	NORMAL, LOW
	MF SPEED	0-7
	NEAR LIMIT	OVER, 5m, 3m, 2m, 1.5m, 1.2m, 1.0m, 80cm, 55cm, 35cm, 25cm, 18cm, 14cm, 10cm, 8cm
	ADAPTIVE PT	ON, OFF
	P/Z SPEED	0-5
	PRESET SPEED	0-5
	PAN DIRECTION	NORMAL, INVERT
	TILT DIRECTION	NORMAL, INVERT
SYSTEM	PELCO ID	1-255
	IR-RECEIVE	ON, OFF
	DISPLAY INFO	ON, OFF
	PRESET MEMORY	ON, OFF
	FACTORY RESET	YES?
	TALLY MODE	OFF, ON
	OPERATING LED	OFF, RED, GREEN, BLUE, WHITE
	LEVEL	LOW, MID, HIGH
	AUDIO	OFF, ON
	RELOAD PRESET 1	ON, OFF
	VIDEO FMT	2160p: 29.97/25/24/23.98, 1080p: 60/59.94/50/30/29.97/25/24/23.98 1080i: 60/59.94/50 720p: 60/59.94/50
	MCU FW	VOK010BF0010AA003
	FPGA FW	V255

# Dimensions

Unit: mm





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