1 Series 4K HDBaseT Zoom Camera

USER MANUAL

VERSION: FBC-4KHDB-M-02202021

© 2021 Bolin Technology
# Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IMPORTANT INFORMATION</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>WHAT’S IN THE BOX</strong></td>
<td>5</td>
</tr>
<tr>
<td><strong>OVERVIEW</strong></td>
<td>6</td>
</tr>
<tr>
<td><strong>Model Numbers</strong></td>
<td>6</td>
</tr>
<tr>
<td><strong>FEATURES</strong></td>
<td>6</td>
</tr>
<tr>
<td><strong>CAMERA DIAGRAMS</strong></td>
<td>7</td>
</tr>
<tr>
<td><strong>Camera</strong></td>
<td>7</td>
</tr>
<tr>
<td><strong>HDBaseT Receiver</strong></td>
<td>8</td>
</tr>
<tr>
<td><strong>Remote Controller</strong></td>
<td>9</td>
</tr>
<tr>
<td><strong>Power</strong></td>
<td>10</td>
</tr>
<tr>
<td><strong>Cable Requirements</strong></td>
<td>10</td>
</tr>
<tr>
<td><strong>Audio In / Out</strong></td>
<td>11</td>
</tr>
<tr>
<td><strong>SYSTEM CONFIGURATION</strong></td>
<td>11</td>
</tr>
<tr>
<td><strong>Connection</strong></td>
<td>11</td>
</tr>
<tr>
<td><strong>Obtain Video Signal</strong></td>
<td>12</td>
</tr>
<tr>
<td><strong>Camera Control Methods and System Configurations</strong></td>
<td>13</td>
</tr>
<tr>
<td><strong>Control the camera without using HDBaseT Receiver</strong></td>
<td>13</td>
</tr>
<tr>
<td><strong>Use the Infrared Remote Controller</strong></td>
<td>13</td>
</tr>
<tr>
<td><strong>Control the camera using HDBaseT Receiver</strong></td>
<td>14</td>
</tr>
<tr>
<td><strong>Use RS-232 (VISCA)</strong></td>
<td>15</td>
</tr>
<tr>
<td><strong>Use RS-422(VISCA)/RS-485 (PELCO P/D)</strong></td>
<td>17</td>
</tr>
<tr>
<td><strong>PELCO P/D Keyboard RS485 Connection</strong></td>
<td>20</td>
</tr>
<tr>
<td><strong>How to Make the Connection with BOLIN Products</strong></td>
<td>23</td>
</tr>
<tr>
<td><strong>Tally Light GPI I/O Connection</strong></td>
<td>24</td>
</tr>
<tr>
<td><strong>Adjusting and Setting with Menus</strong></td>
<td>26</td>
</tr>
<tr>
<td><strong>Exposure Menu</strong></td>
<td>27</td>
</tr>
<tr>
<td><strong>White Balance Menu</strong></td>
<td>28</td>
</tr>
<tr>
<td><strong>Picture</strong></td>
<td>29</td>
</tr>
<tr>
<td><strong>Picture1 Menu</strong></td>
<td>29</td>
</tr>
<tr>
<td><strong>Picture2</strong></td>
<td>30</td>
</tr>
<tr>
<td><strong>Gamma</strong></td>
<td>30</td>
</tr>
<tr>
<td><strong>Zoom Menu</strong></td>
<td>31</td>
</tr>
<tr>
<td><strong>System Menu</strong></td>
<td>32</td>
</tr>
<tr>
<td><strong>Operation Using the Infrared Remote Controller</strong></td>
<td>33</td>
</tr>
<tr>
<td><strong>Pan/Tilt and Zoom Operation</strong></td>
<td>33</td>
</tr>
<tr>
<td><strong>Operating Multiple Cameras with Infrared Remote Controller</strong></td>
<td>34</td>
</tr>
<tr>
<td><strong>Adjusting the Camera Focus</strong></td>
<td>34</td>
</tr>
<tr>
<td><strong>Storing the Camera Settings in Memory — the Presetting Feature</strong></td>
<td>35</td>
</tr>
<tr>
<td><strong>Menu Configuration</strong></td>
<td>39</td>
</tr>
<tr>
<td><strong>Dimension</strong></td>
<td>41</td>
</tr>
<tr>
<td><strong>Installation</strong></td>
<td>41</td>
</tr>
</tbody>
</table>
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.

Copyright

Copyright 2015-2021 Bolin Technology all rights reserved. No part of this manual may be copied, reproduced, translated, or distributed in any form or by any means without prior consent in writing from our company.

Trademarks and Registered Trademark Acknowledgement

- Bolin Technology (BOLIN Technology) and the other BOLIN’s trademarks are property of BOLIN Technology.
- Microsoft, Windows, ActiveX, and Internet Explorer are registered trademarks of Microsoft Corporation in the U.S. and/or other countries.
- HDMI, the HDMI logo and High-Definition Multimedia Interface are the trademarks or registered trademarks of HDMI Licensing, LLC in the United States and other countries.
- The Software may contain h.264/AVC video technology, the use of which requires the following notice from MPEG-LA, L.L.C.: THIS SOFTWARE IS LICENSED UNDER THE AVC PATENT PORTFOLIO LICENSE FOR THE PERSONAL AND NON-COMMERCIAL USE OF A CONSUMER TO (I) ENCODE VIDEO IN COMPLIANCE WITH THE AVC STANDARD (“AVC VIDEO”) AND/OR (II) DECODE AVC VIDEO THAT WAS ENCODED BY A CONSUMER ENGAGED IN A PERSONAL AND NON-COMMERCIAL ACTIVITY AND/OR WAS OBTAINED FROM A VIDEO PROVIDER LICENSED TO PROVIDE AVC VIDEO. NO LICENSE IS GRANTED OR SHALL BE IMPLIED FOR ANY OTHER USE. ADDITIONAL INFORMATION MAY BE OBTAINED FROM MPEG LA, L.L.C. SEE http://www.mpeglaca.com.
- HEVC/h.265 Covered by one or more claims of patents listed at patentlist.hevcadvance.com
- HDBaseT is a trademark of the HDBaseT Alliance.
- ONVIF trademarks and logos are to be used per the guidelines established in this and other ONVIF policies and documents including the ONVIF Rules of Membership and the ONVIF Logo Guidelines1.
- Other trademarks, company names and product names contained in this manual are the property of their respective owners.

IMPORTANT INFORMATION

Legal Notice

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 continually 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.

Safety Information

---

**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.

**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

Camera:

- Camera X 1
- IR Remote Controller X 1
- 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
- User Manual X 1

HDBaseT Receiver (Not included with the camera, order separately)

- HDBaseT Receiver X 1
- Power Adaptor/Power cord X 1
- Bag of Mounting Screws X 1
- Rackmount X 2
- Rubber Pads X 4
- RJ45 to RS232 Extension Cable X 1
- RJ45 to RS422 Extension Cable X 1

Accessories (Optional)

- RS232 8 Pin Mini Din to Phoenix Terminal Block
Overview

Model Numbers
This user guide is suitable for the following models:

- FBC-1-4K12S-SMB
- BL-BR4K-1 (HDBaseT Receiver for HDBaseT built-in camera models, not included with the camera, order separately)

Features

- 1 Inch “Exmor R” CMOS sensor, Effective pixel number: 20.5 Megapixels
- Resolution: 4K, 1080P, 720P
- Zoom: Optical 12X, Digital 12X. SRZ Feature: Up to 18X in 4K and 24X in FHD via Super Resolution Zoom
- Video Output: HDMI(4K), 3G-SDI, HDBaseT
- Image stabilizer and true WDR 130dB.
- Power: DC 12V, HDBaseT PoE
- 64 Degrees wide angle
- 16 zoom positions
- ePTZ supported
- Two IR receivers for remote controlling the camera from the front side and back side.
- IR remote control, RS-232 control, RS-422/485 control
- You can use the infrared remote controller to set the camera and to select zooming from the setting menu.
- The camera has HDBaseT HDMI video adapter built-in to have longer distance (Up to 100M) of HDMI transmission to carry video signal, control signal, audio, IR remote control, power to the camera by one single cable.
- 3.5mm Jack Audio Input/Output
- IR Control Extension Input. You can use IR remote controller to control the camera from the remote side via HDBaseT receiver.
- The camera can be used as for 4K HDMI output or HD-SDI output without using HDBaseT Receiver.
- Standard mounting and ceiling mounting with E-Flip function
1. Built-in Audio Mics
2. Tally Light
3. IR Receiver
4. Built-in Audio Mics
5. Power Switch
6. 12V DC Power Port
   Connect the supplied DC power adaptor and cord with power port type: YC8-4pin
7. HDMI(4K) Video Output Port
   HDMI 1.4b
8. RJ45 Port for HDBaseT signal output
10. RS-232 Control Port
    RJ45 to RS232 extension cable is provided.
11. SDI Port
    3G-SDI
12. RS-422/485 Control Port
    RJ45 to RS422 extension cable is provided.
13. Audio Line-in/out, 3.5mm Audio Input/output
18. LAN Port (RJ45, IP Pass-Through)
   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.
   • It is not for use with model VCC-8-4K20S-3SMB.

19. 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.

20. RS-422 Control Port
   Use RJ45 to RS-422 extension adapter cable to remotely control PTZ camera. (Extension cable detail view on page 15)

21. RS232 Control Port
   Use RJ45 to RS-232 extension adapter cable to remotely control PTZ camera (Extension cable detail view on page 15)

22. 12V DC Power Port
   Connect include 12V DC power adaptor and cord.

23. Power LED Indicator
   Turns red when the device is connected to power outlet.

24. Heat-sink surface panel
   All aluminum body for quick heat dissipation.

25. HDMI Upholder
   For tightening up HDMI port in stabilization.

26. 3.5mm IR IN
   Connect to an IR receiver. The IR signal received from this port can send out via HDBaseT receiver.

27. v1.4b HDMI Video Output
   Connect to HDMI source display.

28. RJ45 Port for HDBaseT Input (802.3at PoE+)
   Support One-Cable transmission of camera power (POE+), 4K video and control signal. Connects to the HDBaseT camera via CAT5e/CAT6 cable. (Transmission distances of up to 100M/328ft)

29. 3.5mm jack Audio Out

30. HDBaseT Port Signal Link indicator
   The LED lit GREEN when the camera is powered on.

31. HDBaseT Port Signal Link indicator
   The LED flashes ORANGE when the camera transmits data with HDBaseT.
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.
Power

- Use only the DC power adaptor (power port type: YC8-4pin) supplied with the unit. Do not use any other DC power adaptor.
- Use POH Power Over HDBaseT to power up the camera. Use CAT5e/6 network cable connect the camera from HDBaseT port and the HDBaseT receiver to run distance up to 100 meters over one cable.
- Do not need to need to use the 12VDC power adapter for powering the camera when HDBaseT POH is being 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 Cable: For broadcast use, Belden1694A/5CFB is a suitable cable to transmit broadcast-quality video:

<table>
<thead>
<tr>
<th>Conductors</th>
<th>AWG</th>
<th>Stranding</th>
<th>Material</th>
<th>Nominal Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>18</td>
<td>Solid</td>
<td>Bare Copper</td>
<td>0.04 in.</td>
</tr>
</tbody>
</table>

Shield Material

<table>
<thead>
<tr>
<th>Type</th>
<th>Layer</th>
<th>Material</th>
<th>Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tape</td>
<td>1</td>
<td>Aluminum / Polyester / Aluminum</td>
<td>100%</td>
</tr>
<tr>
<td>Braid</td>
<td>2</td>
<td>Tinned Copper</td>
<td>95%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>16.2 pF/ft</td>
<td>0.106 µH/ft</td>
<td>75 Ohm</td>
</tr>
</tbody>
</table>
Audio In / Out

- On real panel, a microphone or audio source can be connected to the audio LINE IN port, which feeds audio into the camera.

Table: Audio input & output relationship

<table>
<thead>
<tr>
<th>Audio Input</th>
<th>SDI Audio Embedded</th>
<th>HDMI Audio Embedded</th>
<th>HDBaseT Audio Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mic Built-in</td>
<td>YES</td>
<td>NO</td>
<td>YES, Audio Line-out</td>
</tr>
<tr>
<td>Audio Line-In</td>
<td>YES</td>
<td>NO</td>
<td>YES, Audio Line-out</td>
</tr>
</tbody>
</table>

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 a control cable (cross type, RS-422/485), you can operate the camera’s pan, tilt, zoom with the joystick keyboard. 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.
Obtain Video Signal
HDMI 4K / HD Video signal

1. The camera video format is set to 1080P59.94 by default, so that you can have the video display on regular HD monitor/TV. Do not set camera video format to 4K resolution until you have a 4K monitor/TV ready for displaying.
2. Change the camera video format setting to 4K if a 4K display is ready.
3. Connect the camera to a 4K or HD monitor/TV using HDMI cable. For displaying 4K video, a HDMI version 1.4 needs to be used.
4. Turn on the camera, video will display on the monitor after running initializing.
5. Information of the camera initial setting status will display for 5 seconds.
6. 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, does not support 4K format.

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.
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. Baud Rate current setting
5. Control COMM Port current setting
6. Video format current setting
7. HDMI format current setting
8. SDI format current setting
9. Firmware version

<table>
<thead>
<tr>
<th>Camera Status Info Display</th>
</tr>
</thead>
<tbody>
<tr>
<td>PELCO ID</td>
</tr>
<tr>
<td>VISCA ID</td>
</tr>
<tr>
<td>IR ADDRES</td>
</tr>
<tr>
<td>BAUD RATE</td>
</tr>
<tr>
<td>HDMI FMT</td>
</tr>
<tr>
<td>SDI FMT</td>
</tr>
<tr>
<td>HDMI OUT</td>
</tr>
<tr>
<td>SV:</td>
</tr>
</tbody>
</table>

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 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 (PELCO P/D)
4. Use HDBaseT Receiver to control.

Control the camera without using HDBaseT Receiver

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.

There are two IR receivers on the front side and back side of the camera for the camera control.

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

1. Use one single CAT6 T-568B Standard Ethernet cable direct connect between the camera and the HDBaseT Receiver.
2. HDBaseT carries up to 4K HDMI video signal, RS232/RS422/RS485 control signal, Audio, IR control signal, Power to the camera.
3. Set Baud Rate on the camera the same as Baud Rate set on the keyboard you are using.
4. Reboot the camera by turning it Off/On after the camera address and Baud Rate have been set up correctly.
5. Device supports RS232 and RS422/485 control.
6. RS232 on HDBaseT receiver does not support daisy chain control.
7. Use Cat 6 network cable to connect the camera to HDBaseT Receiver.

HDBaseT RJ45 Connector pinout

Use Cat 6 network cable to make the RJ45 connectors to connect to the camera. RJ45 Connection instruction is following:
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 camera ID address (Default 1) in the camera OSD menu.
2. Set Baud Rate (Default 9600) in the camera OSD menu to the same Baud Rate as the Baud Rate set on the keyboard you are using.
3. If you want to have the camera address to be automatically assigned by VISCA controller, set the camera address to 0.
4. Reboot the camera by turning it Off/On after the camera address and Baud Rate have been set up correctly.
5. Camera does not support Daisy Chain control.
6. The controller must be VISCA compatible.
7. Use the RJ45 to RS232 (VISCA) control cable. Or, you can make RS232 connection cable if you have the following applications:
8. Use the adaptor cable RJ45 to RS232 8 pin Mini Din adaptor included to make RS232 connection for your control device.

9. Use extension cables included RJ45 to RS422/232 Phoenix terminal contact adaptor to make RS232 connection for your control device.
10. Or you can use CAT5/6 network cable (T-568B standard pinout) to make RS232 connection by following the pin definition below:

```
<table>
<thead>
<tr>
<th>Pin</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>IR_OUT</td>
</tr>
<tr>
<td>2</td>
<td>DTR</td>
</tr>
<tr>
<td>3</td>
<td>GND</td>
</tr>
<tr>
<td>4</td>
<td>DSR</td>
</tr>
<tr>
<td>5</td>
<td>TX_OUT</td>
</tr>
<tr>
<td>6</td>
<td>RX_OUT</td>
</tr>
<tr>
<td>7</td>
<td>TX_IN</td>
</tr>
<tr>
<td>8</td>
<td>RX_IN</td>
</tr>
</tbody>
</table>
```

NOTE: How to make RS232 connection, please refer to controller user guide.

Use RS-422(VISCA)/RS-485 (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.

System Configuration
RS422 (VISCA) connection
1. Set RS422 camera ID address (Default 1) in the camera OSD menu.
2. Set Baud Rate (Default 9600) in the camera OSD menu to the same Baud Rate as the Baud Rate set on the keyboard you are using.
3. If you want to have the camera address to be automatically assigned by VISCA controller, set the camera address to 0.
4. Reboot the camera by turning it Off/On after the camera address and Baud Rate have been set up correctly.
5. Camera supports Daisy Chain connection up to 7 cameras.
6. The controller must be VISCA compatible.
7. Use the RS422 control cable provided by third party controller. The controller must be VISCA compatible.
8. Camera supports Daisy Chain connection up to 7 cameras.
9. The connection of SONY keyboard is different than other VISCA (Non-Sony) keyboard.
10. How to make RS422 connection and RS422 Daisy Chain multiple cameras connection with SONY controller as below.

SONY Keyboard RS422 Connection

VISCA (Non-Sony) Keyboard RS422 Connection

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

NOTE: How to make RS422 connection with the controllers, please refer to controller user guide. RS422 Serial port connection on controller side.
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:

![Diagram of RS422 connection with CAT5/6 cable](image)

**NOTE:** How to make RS422 connection with the controller, please refer to controller user guide.

- RX: Orange/White
- RX+: Orange
- GND: Green/White
- 4: Blue
- 5: Blue/White
- 6: Green
- 7: TX- Brown/White
- 8: TX+ Brown

OR

![Diagram of RS422 connection without HDBaseT Receiver](image)

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

![Diagram of RS422 Daisy Chain Connection](image)

**NOTE:** How to make RS422 connection with the controller, please refer to controller user guide.
14. How to make RS422 Daisy Chain multiple camera connection using HDBaseT 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.*

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 the camera ID on OSD menu by remote controller
4. Reboot the camera by turning it Off/On after the Bottom Dip Switch has been set up correctly.
5. Use PELCO P/D compatible keyboard.
6. Use preset 95# on the keyboard to bring up/exit camera OSD menu.
7. Use joystick and Button “OPEN” or “CLOSE” to navigate OSD menu.
8. To operate keyboard, please refer to the user manual of the keyboard you are using.

**PELCO RS485 Connection**
9. Use extension cables included RJ45 to RS422 Phoenix connector adaptor to make RS485 connection for your control device.

10. 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:
11. How to make RS485 Daisy Chain multiple cameras connection with RS485 standard serial port controller:

12. How to make RS485 Daisy Chain multiple camera connection using HDBaseT with RS422 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 product pages.
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)

**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;

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

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;
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. For a complete configuration menu, see “Menu Configuration” (page 24).

Bring out the OSD menu:
1. If you are using PELCO protocol keyboard, use preset 95# on the keyboard to bring up/exit camera OSD menu, use joystick to navigate the menu.
2. If you are using VISCA protocol keyboard, find “Menu” button on the keyboard, press the button to bring up the OSD menu.

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.

1. Selected Items
Selects a setting menu.
The selected item is shown by the cursor. The 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 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. Set Value
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 cursor (Color change). 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:** The exposure is adjusted automatically using the sensitivity, electronic shutter speed, and iris.

**MANUAL:**
Adjust with variable (GAIN), electronic shutter speed (SPEED) and iris (IRIS) manually.

- **GAIN:** Adjust with Variable Gain (0 to 36 dB, 13 steps, 38 steps on High sensitivity mode), Auto Iris and Shutter speed. Select the gain from the following:
  0, 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36 dB
- **GAIN LIMIT:** The gain limit can be set at Full Auto, Shutter Priority, Iris Priority, Bright, Spot Exposure and Manual in AE mode. Use this setting when you want to obtain images with a focus on the signal-to-noise ratio. Select the gain from the following:
  9, 12, 15, 18, 21, 24, 27, 30, 33, 36 dB
- **SPEED:** Select the electronic shutter speed from the following:
  1/1, 2/3, 1/2, 1/3, 1/4, 1/6, 1/8, 1/10, 1/15, 1/20, 1/30, 1/50, 1/60, 1/90, 1/100, 1/125, 1/180, 1/250, 1/350, 1/500, 1/725, 1/1000, 1/1500, 1/2000, 1/3000, 1/4000, 1/6000, 1/10K sec
- **IRIS:** Select the iris the following:

**IRIS PRI:**
- Iris Priority mode. The exposure is adjusted automatically using the sensitivity and electronic shutter speed. Adjust with Variable Iris (F2.8 to F11, 17 steps) manually.

**SHUTTER PRI:**
- Shutter Priority mode. The exposure is adjusted automatically using the sensitivity and iris. Adjust with Variable Shutter Speed (1/1 to 1/10,000 sec., 16 high-speed shutter speeds plus 12 low-speed shutter speeds), Auto Iris and Gain. Adjust the electronic shutter speed (SPEED) manually.

**BRIGHT:**
- Adjust with Variable Iris and Gain (F11 to F2.8, 29 steps and High Sensitivity Mode at 33 steps).

**GAIN PRI:**
- Adjust with Variable Gain (0 to 36 dB, 13 steps, 38 steps on High sensitivity mode), Auto Iris and Shutter speed.
EX-COMP (Exposure Compensation)
When MODE is set to one of FULL AUTO, SHUTTER PRI or IRIS PRI, set this item to ON to enable exposure compensation. When you set EX-COMP to ON, LEVEL appears 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.

High Sensitivity
ON/OFF, in this mode, the maximum gain increases, enabling to obtain a brighter image even in a dark environment. However, if the gain reaches high level, the image will have a large amount of noise.

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

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 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.

High Resolution Mode
This mode enhances edges and produces higher definition images.

Slow AE (Auto Exposure)
The slow AE Response 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 response function allows you to lengthen the auto exposure response speed from the initial setup speed (01h) to approx. 10 minutes (30h) (at normal shutter speed).

GAIN LIMIT
The gain limit can be set at Full Auto, Shutter Priority, Iris Priority, Bright, Spot Exposure and Manual in AE mode. Use this setting when you want to obtain images with a focus on the signal-to-noise ratio.
Select the gain from the following: 9, 12, 15, 18, 21, 24, 27, 30, 33, 36DB

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.

INDOOR: 3200K Base Mode

OUTDOOR: 5800K Base Mode

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.

**ATW (Auto Tracing White Balance):** Auto Tracing White balance (2000K to 10000K)
**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.

**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.

**SODIUM VAPOR LAMP (AUTO/OUTDOOR AUTO):** This is an auto white balance mode specifically for outdoors, which is compatible with sodium vapor lamps.
- **SVL AUTO:** Sodium Vapor Lamp Auto: This is an auto white balance mode that is compatible with sodium vapor lamps.
- **SVL:** Sodium Vapor Lamp: This is a fixed white balance mode specifically for sodium vapor lamps.
- **SVL OUTDOOR AUTO:** Sodium Vapor Lamp Outdoor Auto: This is an auto white balance mode specifically for outdoors, which is compatible with sodium vapor lamps.

## PICTURE

The PICTURE menu is used to set the items related to the picture.

There are 2 menu selections regarding the PICTURE settings (PICTURE1 and PICTURE2). The PICTURE settings begin in PICTURE1, and PICTURE2 is a continuation of the picture settings.

### PICTURE1 Menu

**SHARPNESS:**
Picture sharpness value ranges from 0 to 15. You can enjoy emphasized edge and high-resolution images.

**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 turn it ON to display the video reversely.

**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.

**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.

**NOISE REDUCTION:**
Noise reduction - you can enjoy clearer images by removing unnecessary noise. You can select 6 levels from OFF (MIN), 1 to 5 (MAX).

**STABILIZER**
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.

**STABLE ZOOM:**
Stable Zoom is a function to perform correction using the image stabilizer function according to the zoom magnification and zoom the image up to approx. 24x smoothly by combining the optical zoom with the digital zoom. By zooming the image furthermore using the digital zoom, the image is zoomed up to 288x. On the wide side, the image without the
deterioration in resolution can be obtained because the digital zoom is not used. On the other hand, the correction effect by the image stabilizer function is maximized on the tele side, reducing the blur.

**NR (Noise Reduction):**
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.

**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.

**PICTURE2**

**CHROMA:**
You can set the brightness from OFF, LOW, MID, HIGH in each mode of the variable gamma mode.

**DE-FLICKER:**
You can turn it ON if the Video output format frame rate is difference from your country’s electricity Frequency.

**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.

**EFFECT: (Picture Effect)**
- Black & White: Monochrome Image
- OFF: No effects will be applied to the image

**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.

**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.

**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.

ZOOM Menu

The ZOOM menu is used to select the zoom mode.
DIGITAL ZOOM: OFF, ON, SRZ

- **OFF**: When set to OFF, digital zoom does not operate, and only optical zoom is available.
- **ON**: Set to DIGITAL ZOOM ON, 12X digital zoom is activated. The resolution would be compromised when digital zoom is activated.
- **SRZ (Supper Resolution Zoom)**: Through the use of “all pixel super resolution technology” developed by Sony Corporation, this product provides superior images while maintaining the resolution without degrading image quality, even when magnified. By combining with optical zoom 20×, zoom is achieved up to 30× in 4K and 40× in FHD.

**ZOOM RATIO OSD (Zoom times display):**
Set Ratio OSD to ON, the number of the zoom times that you are operating displays on screen.

**AF Sensitivity:** NORMAL, LOW
- **NORMAL**: Reaches the highest focus speed quickly. Use this when shooting a subject that moves frequently. Usually, this is the most appropriate mode.
- **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 Speed, Value: 0-7
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, 2m, 3m, 5m

**AF MODE:** Auto Focus Mode
The Auto Focus (AF) function automatically adjusts the focus position to maximize the high frequency content of the picture in a center measurement area, taking into consideration the high luminance and strong contrast components. The minimum focus distance is 80 mm at the optical wide end and 1000 mm at the optical tele end.

- **Normal AF Mode**
  This is the normal mode for AF operations.
- **Interval AF Mode**
  The mode used for AF movements carried out at particular intervals. The time intervals for AF movements and for the timing of the stops can be set in one-second increments using the Set Time Command. The initial setting for both is set to 5 seconds.
- **Zoom Trigger Mode**
  When zoom position is changed, it becomes AF mode during the pre-set value (initial setting is set to 5 seconds). Then it stops.
SYSTEM Menu

PELCO ID
When using RS485 (PELCO P/D) control, Set PELCO ID to the address that you want to control to. This value is from 000-255.

VISCA ID
When using RS422/ RS232 (VISCA) control, Set Camera VISCA ID to the address that you want to control to. This value is from 0-7.

IR ADDRESS (Infrared Signal Reception)
Camera ID for IR Remote Controller. Value: 1-3

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.

BAUDRATE:
This is the rate at which the camera expects commands to be transferred from the keyboard controller. This setting needs to match the baud rate on the keyboard controller

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.

PRESET MEMORY
Set the Preset Memory ON/OFF. The presets can be set to memorize the video image parameters that are with the presets. This function allows you to achieve the desired status instantly with the presets, 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

VIDEO FMT:
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; 1080p:59.94/50; 1080i:59.94/50; 720p:59.94/50
You can select SDI video format are: 1080p:59.94/50/29.97/25/23.98; 720p:59.94/50.
SDI 1080p23.98 can be gained when Video FMT is set to 2160p:29.97/25.

SV (Software Version):
This item refers to the MCU firmware version that is currently running on the device.
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.

<table>
<thead>
<tr>
<th>Arrow button</th>
<th>Movement of the camera</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>↑</td>
<td>While holding down</td>
<td></td>
</tr>
<tr>
<td>→</td>
<td></td>
<td></td>
</tr>
<tr>
<td>←</td>
<td></td>
<td></td>
</tr>
<tr>
<td>↓</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

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.

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.

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**

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

Operating EPTZ

You can use ePTZ feature to make digital pan and tilt image movement with displaying 1080p image resolution.

ePTZ only works when the camera resolution is set to 4K, 2160p29.97, the image resolution will be switched into 1080p30 when ePTZ feature is turned on. The image resolution will be switched back to 2160p29.97 when ePTZ feature is turned off.

To turn on ePTZ feature:
- Before you want to use EPTZ, make sure the image resolution is on 4K, 2160p29.97.
- Use remote controller, press and hold “↑” button for 3 seconds and release.
- Use keyboard, push the joystick to up and hold for 3 seconds and release.
- OSD menu will pop up.
- Select YES (Home button on remote controller, right push joystick) to activate EPTZ feature.
- Image would be in black for few seconds and then go into enlarged 1080p image.
- You can use “←, →, ↑, ↓” buttons to move the image.
- You can still optical zoom feature while EPTZ is on.
- It’s normal when you see image moving is a bit jumpy.

To turn off ePTZ feature:
- Use remote controller, quickly press 2 or more times “↑” button.
- Use keyboard, quickly push the joystick to up for 2 or more times.
- OSD menu will pop up.
- Select YES (Home button on remote controller, right push joystick) to turn off EPTZ feature.
- Image would be switched back to 4K, 2160p29.97.
Menu Configuration

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

**OSD Menu Configuration**

<table>
<thead>
<tr>
<th>Menu</th>
<th>EXPOSURE</th>
<th>MODE</th>
<th>FULL AUTO</th>
<th>SLOW SHUTTER</th>
<th>OFF, ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX SHUTTER</td>
<td>1/30, 1/50, 1/60, 1/90, 1/100, 1/125, 1/180, 1/250, 1/350, 1/600, 1/725, 1/1000, 1/1500, 1/2000, 1/3000, 1/4000, 1/6000, 1/10K</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MIN SHUTTER</td>
<td>1/1, 2/3, 1/2, 1/3, 1/4, 1/6, 1/10, 1/15, 1/20, 1/30, 1/50, 1/60, 1/90, 1/100, 1/125, 1/180, 1/250, 1/350, 1/500, 1/725, 1/1000, 1/1500, 1/2000, 1/3000, 1/4000, 1/6000, 1/10K</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HIGH RESOLUTION</td>
<td>OFF, ON</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**GAIN LIMIT**
- **MANUAL**

**SPEED**
- **MANUAL**
  - 1/1, 2/3, 1/2, 1/3, 1/4, 1/6, 1/10, 1/15, 1/20, 1/50, 1/60, 1/90, 1/100, 1/125, 1/180, 1/250, 1/350, 1/500, 1/725, 1/1000, 1/1500, 1/2000, 1/3000, 1/4000, 1/6000, 1/10K

**IRIS**
- **MANUAL**
  - F1.1, F1.0, F0.9, F0.8, F0.7, F0.6, F0.5, F0.4, F0.3, F0.2, F0.1, F2.8

**SHUTTER PRI**
- **MANUAL**
  - 1/1, 2/3, 1/2, 1/3, 1/4, 1/6, 1/10, 1/15, 1/20, 1/30, 1/60, 1/90, 1/100, 1/125, 1/180, 1/250, 1/350, 1/500, 1/725, 1/1000, 1/1500, 1/2000, 1/3000, 1/4000, 1/6000, 1/10K

**GAIN PRI**
- **MANUAL**

**BRIGHT**
- **MANUAL**
  - LEVEL: 5 – 33

**WHITE BALANCE**
- **MANUAL**
  - AUTO
  - INDOOR
  - OUTDOOR
  - OPW
  - ATW
  - USER

**HIGH SENSITIVITY**
- **MANUAL**
  - OFF, ON
<table>
<thead>
<tr>
<th>PICTURE</th>
<th>SHARPNESS</th>
<th>0-15</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FLIP</td>
<td>OFF, ON</td>
</tr>
<tr>
<td></td>
<td>MIRROR</td>
<td>OFF, ON</td>
</tr>
<tr>
<td></td>
<td>ND FILTER</td>
<td>OFF, ND1, ND2, ND3</td>
</tr>
<tr>
<td></td>
<td>COLOR</td>
<td>1-15</td>
</tr>
<tr>
<td></td>
<td>HUE</td>
<td>1-15</td>
</tr>
<tr>
<td></td>
<td>NOISE REDUCTION</td>
<td>OFF, 1-5</td>
</tr>
<tr>
<td></td>
<td>2D NR</td>
<td>OFF, 1, 2, 3, 4, 5</td>
</tr>
<tr>
<td></td>
<td>3D NR</td>
<td>OFF, 1, 2, 3, 4, 5</td>
</tr>
<tr>
<td></td>
<td>STABILIZER</td>
<td>OFF, ON</td>
</tr>
<tr>
<td></td>
<td>STABILIZER ZOOM</td>
<td>OFF, ON</td>
</tr>
<tr>
<td>PICTURE2</td>
<td>CHROMA</td>
<td>OFF, LOW, MID, HIGH</td>
</tr>
<tr>
<td></td>
<td>DE FlickER</td>
<td>OFF, ON</td>
</tr>
<tr>
<td></td>
<td>HLC MODE</td>
<td>OFF, ON</td>
</tr>
<tr>
<td></td>
<td>EFFECT</td>
<td>OFF, B&amp;W</td>
</tr>
<tr>
<td></td>
<td>BACKLIGHT COM</td>
<td>OFF, ON</td>
</tr>
<tr>
<td>GAMMA</td>
<td>GAMMA</td>
<td>STANDARD, STRAIGHT, PATTERN</td>
</tr>
<tr>
<td></td>
<td>PATTERN</td>
<td>0-51</td>
</tr>
<tr>
<td></td>
<td>PATTERN FINE</td>
<td>0, 1, 2</td>
</tr>
<tr>
<td></td>
<td>OFFSET</td>
<td>-64 to 0 to +64</td>
</tr>
<tr>
<td></td>
<td>BLACK GAMMA</td>
<td>-7 to 0 to +7</td>
</tr>
<tr>
<td></td>
<td>BLACK GAMMA RANGE</td>
<td>LOW, MIDDLE, HIGH</td>
</tr>
<tr>
<td></td>
<td>BLACK LEVEL</td>
<td>-64 to 0 to +64</td>
</tr>
<tr>
<td></td>
<td>VISIBILITY ENHANCER</td>
<td>OFF, ON</td>
</tr>
<tr>
<td></td>
<td>EFFECT: 0, 1, 2, 3, -1 (Adjustable when VE set to ON)</td>
<td></td>
</tr>
<tr>
<td>ZOOM</td>
<td>DIGITAL ZOOM</td>
<td>OFF, ON, SRZ</td>
</tr>
<tr>
<td></td>
<td>ZOOM RATIO OSD</td>
<td>OFF, ON</td>
</tr>
<tr>
<td></td>
<td>AF SEN</td>
<td>NORMAL, LOW</td>
</tr>
<tr>
<td></td>
<td>MF SPEED</td>
<td>0-7</td>
</tr>
<tr>
<td></td>
<td>NEAR LIMIT</td>
<td>OVER, 8cm, 10cm, 14cm, 18cm, 25cm, 35cm, 55cm, 80cm, 1m, 1.2m, 1.5m, 2m, 3m, 5m</td>
</tr>
<tr>
<td></td>
<td>AF MODE</td>
<td>NORMAL, INTERVAL, TRIGGER</td>
</tr>
<tr>
<td>SYSTEM</td>
<td>PELCO ID</td>
<td>1-255</td>
</tr>
<tr>
<td></td>
<td>VISCA ID</td>
<td>1-7</td>
</tr>
<tr>
<td></td>
<td>IR ADDRESS</td>
<td>ON, OFF</td>
</tr>
<tr>
<td></td>
<td>FACTORY RESET</td>
<td>YES?</td>
</tr>
<tr>
<td></td>
<td>BAUDRATE</td>
<td>9600</td>
</tr>
<tr>
<td></td>
<td>RELOAD PRESET 1</td>
<td>ON</td>
</tr>
<tr>
<td></td>
<td>PRESET MEMORY</td>
<td>ON</td>
</tr>
<tr>
<td></td>
<td>HDMI OUT</td>
<td>RGB</td>
</tr>
<tr>
<td></td>
<td>VIDEO FMT</td>
<td>2160p: 29.97/25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1080p: 59.94/50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1080i: 59.94/50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>720p: 59.94/50</td>
</tr>
<tr>
<td></td>
<td>SDI FMT</td>
<td>1080p: 29.97/25, 24.98</td>
</tr>
<tr>
<td></td>
<td></td>
<td>720p: 59.94/50</td>
</tr>
<tr>
<td></td>
<td>SV</td>
<td>50E5050350B0A007</td>
</tr>
</tbody>
</table>
Dimension
Unit: mm

Installation
Rack mount on HDBaseT
Secure the HDMI cable on the HDMI upholder.