



A black ClearOne webcam is shown, featuring a large lens with technical markings such as "F1.8 F2.8", "1/3 inch CCD Sensor", and "10x Zoom". The camera is mounted on a sleek, curved black base. In front of the base lies a matching black remote control equipped with numerous buttons, including a numeric keypad and several colored function keys (red, green, yellow, blue).

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## COMPLIANCE

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# Introduction

## PREFACE

Thanks for using the UNITE 100 PTZ (Pan-Tilt-Zoom) HD camera.

This manual introduces the functions, installation, and operation of the HD camera. Please read the manual thoroughly before installation and usage.

## WARNING NOTES

Use this product only under the specified conditions to avoid any damage or danger.

**Moisture** - Do not expose the camera to rain or moisture.

**Shock Hazard** - Do not perform any unauthorized modification or dismantling. To reduce the risk of electric shock, do not remove the cover. Refer servicing to qualified personnel. ClearOne is not responsible for any unauthorized modification or dismantling.

**Environmental** - Never operate the camera when the temperature, humidity, or power are out of the authorized ranges. Do not expose the camera to corrosive materials, liquids or gasses.

**Cleaning** - To avoid scratching, use only a soft cloth and mild cleansers to clean the camera.

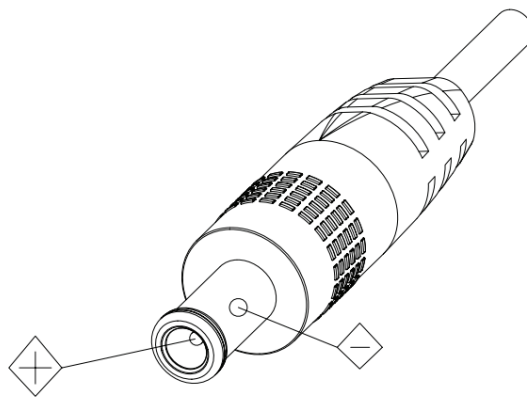
**Magnetism** - Strong electromagnetic fields near the camera may affect the image quality.

**Electrical Safety** - Installation and operation must comply with electrical safety standards.

**Transport** - Avoid stress, vibration, and moisture in transport, storage, and installation.

**Placement** - The camera must be placed on a level desk or platform, and it must not be installed on a slant. No object should restrict the camera range of motion.

**Power Supply Polarity** - The power supply is rated  $\pm 12$  VDC at 2 Amps. The polarity of the power supply as shown in the following drawing:



## FEATURES

The UNITE 100 camera has the following features.

1. Easy to use menu operation.
2. High-speed USB 3.0 interface, DVI-I interface (including HDMI and YPbPr).
3. Includes IR remote controller. The camera can receive both its own remote controller signals, and signals from terminal equipment through the VISCA IN to the terminal equipment IR receiver.

## PARTS INCLUDED

The UNITE HD Camera includes the following:

- Camera.
- Power adapter
- Power cable
- USB 3.0 data cable or DVI Cable
- RS232 cable
- Remote controller
- User manual
- Four double-side adhesive strips

Please check if your order is complete. Contact ClearOne if there is any question about your shipment.



## Installation

When setting up the camera, never move the camera by seizing the camera head. Don't rotate camera head by hand; otherwise, mechanical trouble will occur.

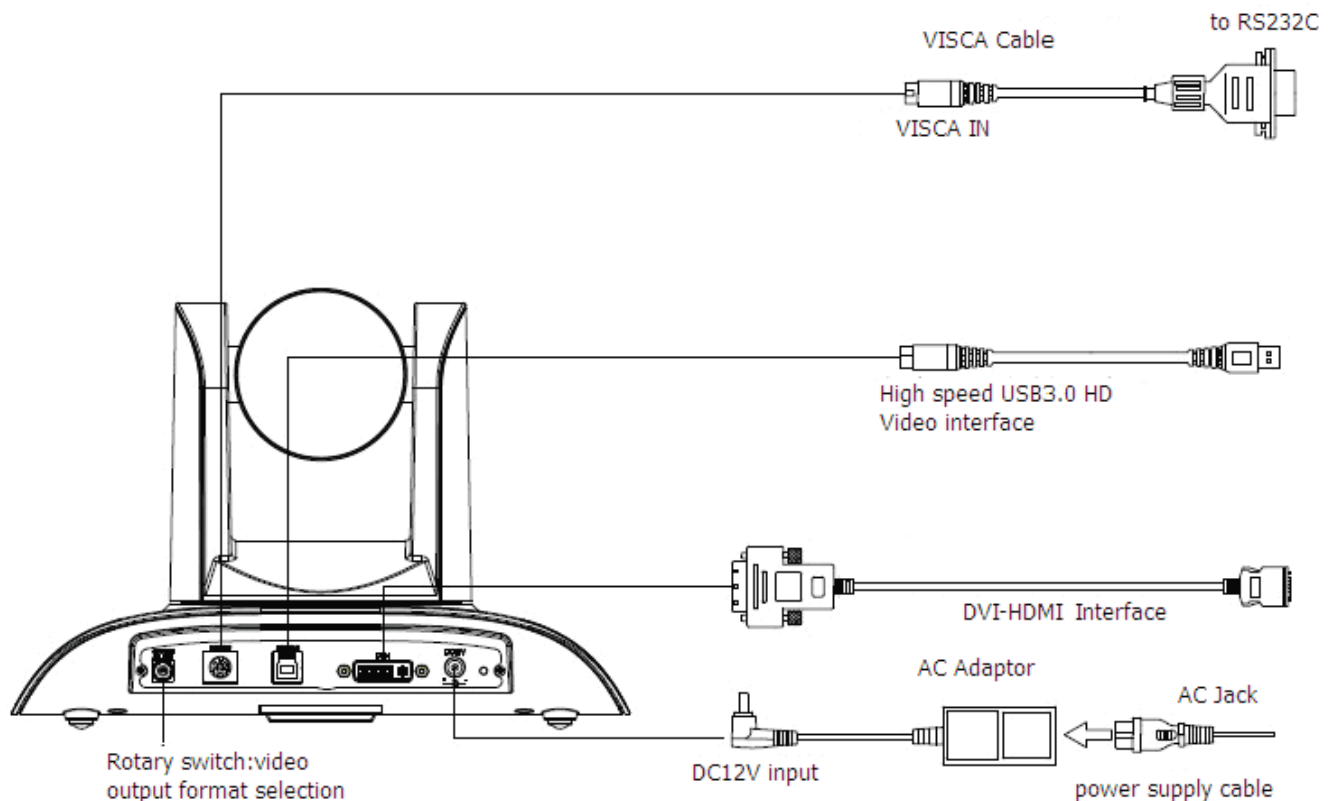
Observe all warnings listed at the beginning of this manual

For stability, the base can be fixed in place by the double-sided adhesive strips.

To prevent damage to the camera, never turn the camera power on before installation is completed.

## CONNECTIONS

The connections to the camera are as illustrated below:



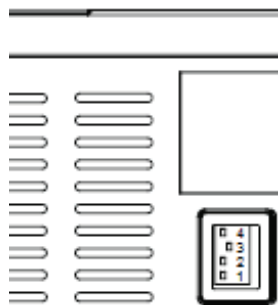
- » Note: You will connect the USB or DVI cable depending on which is sent with your equipment.

## SETUP

Perform the following:

1. Make the power connection, but don't plug in the supply to turn the camera power on.

2. Set the Working Mode switch setting at the bottom of the camera as shown in the following illustration:



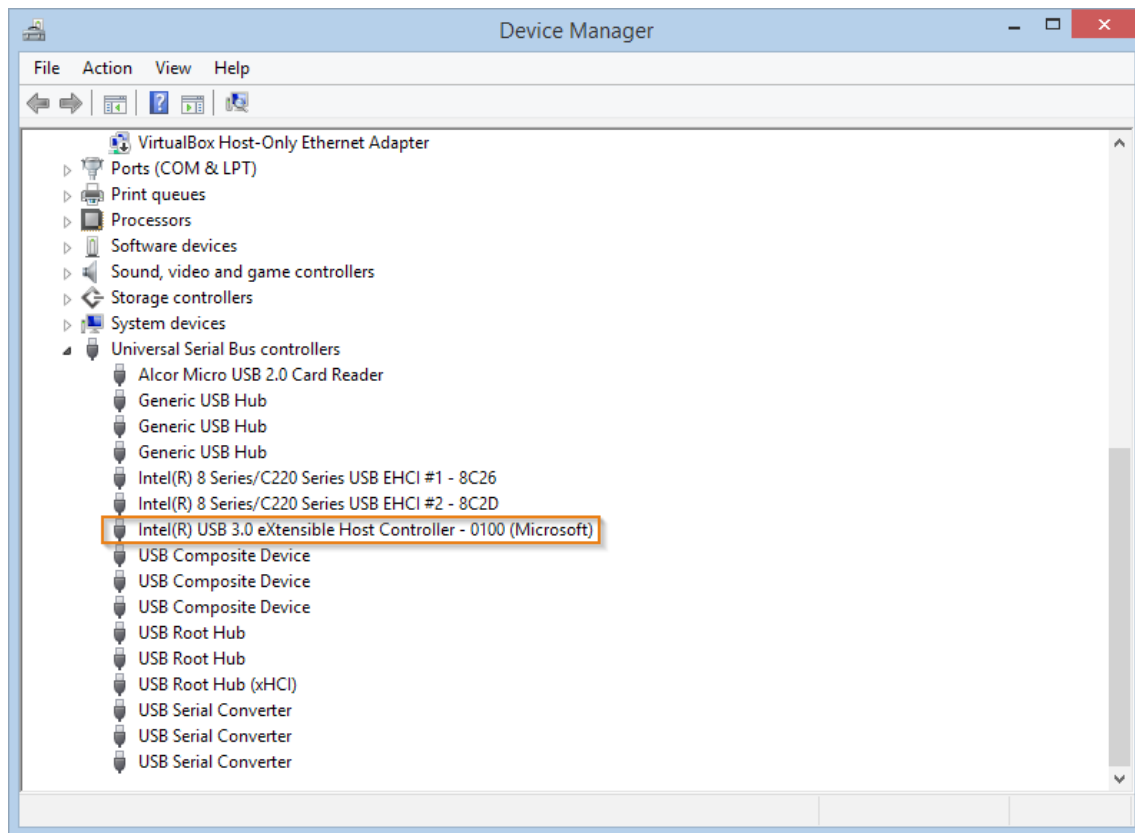
| Switch | Position |
|--------|----------|
| 1      | ON       |
| 2      | ON       |
| 3      | OFF      |
| 4      | ON       |

3. Plug in the power supply to turn the supply on, the camera indicator light illuminates red.



| Dial Position | Video Setting                 |
|---------------|-------------------------------|
| 0             | 1080P60                       |
| 1             | 1080P50                       |
| 2             | 1080P30                       |
| 3             | 1080P25                       |
| 4             | 720P60                        |
| 5             | 720P50                        |
| 6             | 720P30                        |
| 7             | 720P25                        |
| 8             | -----                         |
| 9             | -----                         |
| A             | -----                         |
| B             | -----                         |
| C             | -----                         |
| D             | -----                         |
| E             | -----                         |
| F             | Video format set via OSD menu |

4. Confirm that in the computer the camera is attached to, the computer device manager has universal serial bus (usb) controller are “USB3.0 Root Hub”and“USB3.0 eXtensible Host Controller.” If not, please install the Intel(R)\_USB\_3.0\_extensible\_Host\_Controller\_Driver.



5. When the camera is powered-on and begins to initialize, it will first rotate horizontally to the left limit position, then down to the bottom limit; finally it will move both horizontally and vertically to the middle position. The motor then stops running, and initialization is completed.

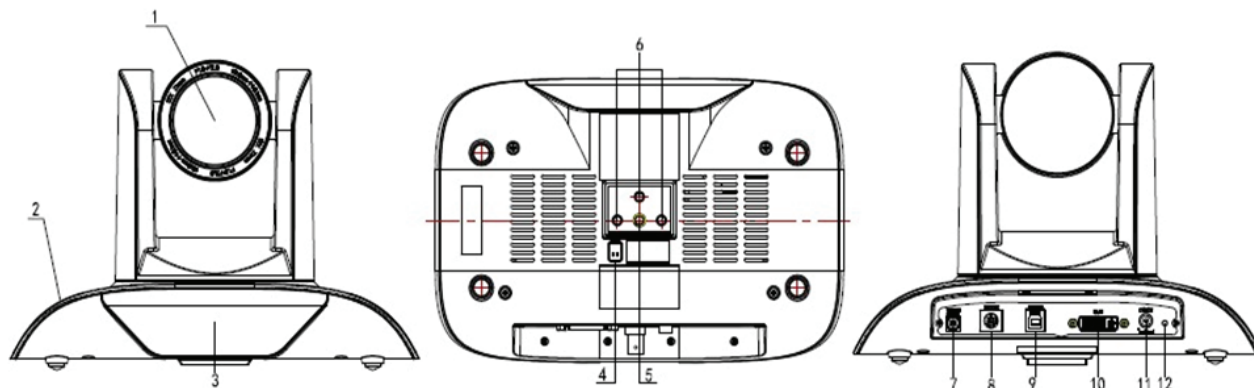
» **Note:** If the power-on mode is opened and saved at preset position 0 or 1, then the pan/tilt will be set to the 0 or 1 preset position.

6. Test the remote functionality with the camera by resetting the camera to it's factory settings through the On-Screen-Display (OSD) with the menu key of remote controller, **[MENU] -> <RESET> -> <ALL RESET>**, moving the left/right keys **◀ ▶** to select **<Yes>**, then confirm by **[HOME]** key as the following:

| RESET       |    |
|-------------|----|
| =====       |    |
| SYS. RESET  | NO |
| CAM. RESET  | NO |
| P T. RESET  | NO |
| ALL. RESET  | NO |
| BACK / MENU |    |

## Camera Physical Description

The following illustration shows the various features, controls, and connections:



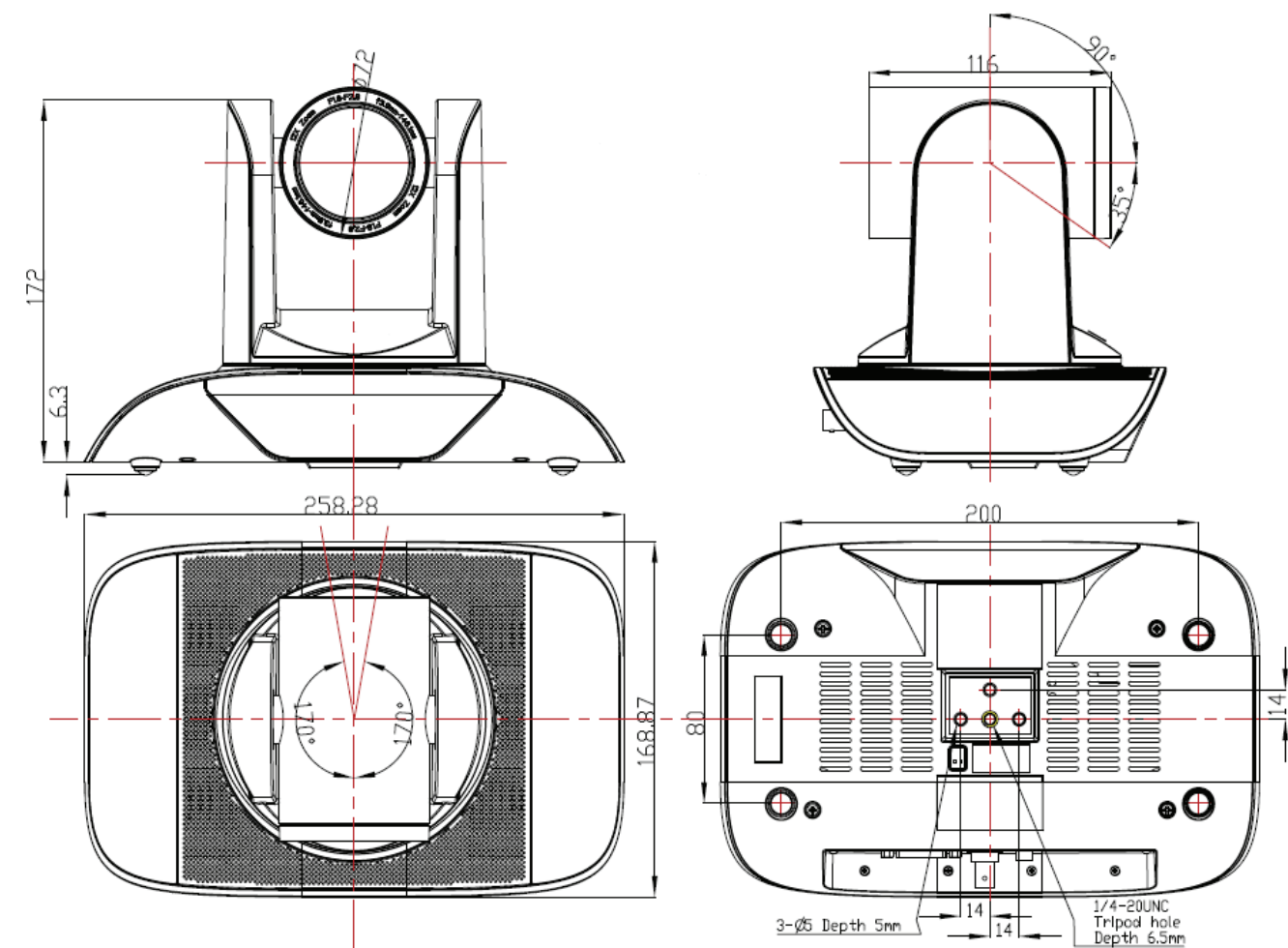
|  |   |
|--|---|
| 1. Camera Lens                         | 7. Video Output Format Selection Switch |
| 2. Camera Base                         | 8. RS232 Control Interface              |
| 3. Power Indicator Light               | 9. USB3.0 B Male Interface              |
| 4. Working Mode Selection Switch       | 10. DVI-I Video Output                  |
| 5. Tripod Screw Hole                   | 11. 12VDC Input Power Supply Jack       |
| 6. Mounting Holes (currently not used) | 12. Power Indicator Light               |

## CAMERA SPECIFICATIONS

|                                |  |
|--------------------------------|--|
| Video Format                   | 1080P60/50/30/25 720P60/50/30/25   |
| Video Output Interfaces        | USB3.0, DVI-I (including the HDMI and YPbPr signal)  |
| Image Sensor                   | 1/2.8 inch 2 Megapixels high quality HD CMOS Sensor  |
| Lens                           | 3.92mm ~ 47.3 mm, F1.8 - 2.8, angle of view: 72.5° - 6.3°  |
| Rotation                       | ±170° for pan rotation, and -30°~+90° for tilt rotation, support upside down installation  |
| Speed                          | 0.1°-180°/sec for pan rotation, 0.1°-80°/sec for tilt rotation   |
| Presets                        | 10 preset positions (up to 128 presets by serial command), precision error less than 0.2°  |
| White Balance, Exposure, Focus | Auto/Manual white balance/indoors/out doors/ Controller Auto/Auto-track white balance , Auto/Manual exposure (iris, shuttle), Auto/Manual/One Push focus |
| Wide Dynamic Range (WDR)       | Support WDR function with performance ≥100dB   |
| Control Interface              | 8 pins mini DIN, RS232, VISCA/Pelco-D/Pelco-P protocol   |
| Power Interface                | HEC3800 power jack , Power supply adapter: 12VDC/2A  |
| Max Power Consumption          | 12W  |
| Working Temperature            | 23°F to 113°F (-5°C to +45°C)  |
| Storage Temperature            | -4°F to -140°F (20°C to +60°C)   |
| Weight                         | 1.3 Kg   |

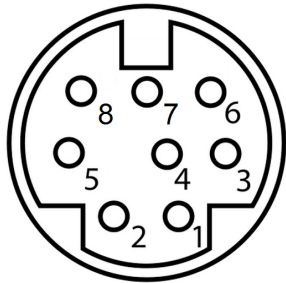


# DIMENSIONS



# RS232/DB9 INTERFACE

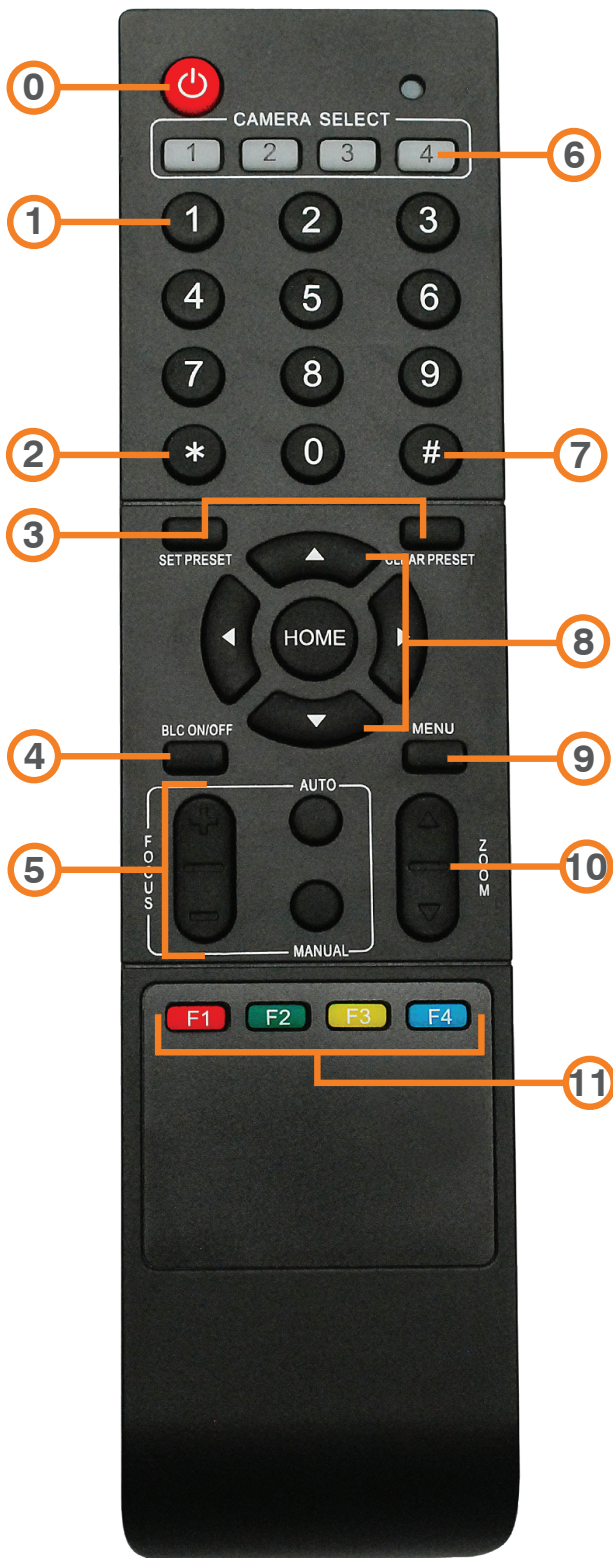
Note the required connections:

| Camera Pinout   | RS232 Interface     |                       | DB9 Interface       |                  |
|---|---------------------|-----------------------|---------------------|------------------|
|   | Camera Pin/Function | Mini DIN Pin/Function | Camera Pin/Function | DB9 Pin/Function |
|  | 1. DTR              | 1. DTR                | 1. DTR              | 1. CD            |
|   | 2. DSR              | 2. DSR                | 2. DSR              | 2. RXD           |
|   | 3. TXD              | 3. TXD                | 3. TXD              | 3. TXD           |
|   | 4. GND              | 4. GND                | 4. GND              | 4. DTR           |
|   | 5. RXD              | 5. RXD                | 5. RXD              | 5. GND           |
|   | 6. RS485-A          | 6. GND                | 6. RS485-A          | 6. DSR           |
|   | 7. IR OUT           | -                     | 7. IR OUT           | 7. RTS           |
|   | 8. RS485-B          | -                     | 8. RS485-B          | 8. CTS           |

# Camera Operation Using the Remote

This section describes the IR Remote Controller and its use with the Unite Camera.

## REMOTE CONTROLLER EXPLANATION



| Control  | Description  |
|----------|--|
| <b>0</b> | <b>Standby Key</b><br>After pressing the Standby Key, the camera will go into standby mode. The front indicator light is off, but blinks every 20 sec. Press the Standby Key again and the camera will perform a self-check and return back to the home position. If the power on mode is set, it will automatically run to the preset position. |
| <b>1</b> | <b>Number Keys</b><br>Used for setting or moving to presets.<br>If a preset has been established for a number, pressing that number key will move the camera to the assigned preset position.  |
| <b>2</b> | <b>* Key</b><br>Used in key combinations   |
| <b>3</b> | <b>Set Preset/Clear Preset Position Keys</b><br>Set a Preset Position Key:<br>Move camera to desired position,<br><b>Set Preset</b> + <b>0-9</b> number key:<br>Clear a Preset key:<br><b>Clear Preset</b> key + <b>0-9</b> number key<br>Clear all the Preset Position Keys:<br><b># + # + #</b>  |
| <b>4</b> | - Unavailable -  |
| <b>5</b> | <b>Focus Control Keys</b><br>Automatic focus: <b>Auto</b><br>Manual focus: <b>Manual</b><br><b>Focus +</b> : Adjust focus near to far<br><b>Focus -</b> : Adjust focus far to near   |

## REMOTE CONTROLLER EXPLANATION - CONT.

| Control   | Description  |
|-----------|--|
| <b>6</b>  | <b>Camera Selection</b><br>Select the camera to be controlled. (The camera address number is assigned using the Camera IR Remote Control Address Setting in control item 11 below.)  |
| <b>7</b>  | <b># Key</b><br>Used in key combinations.  |
| <b>8</b>  | <b>Pan/Tilt Control Keys</b><br>Tilt UP: Press key ▲ up<br>Tilt DOWN: Press key ▼ down<br>Pan LEFT: Press key ◀ left<br>Pan RIGHT: Press key ▶ right<br><b>HOME</b> key: Return to the middle position   |
| <b>9</b>  | <b>Menu</b><br>Open or close the On-Screen-Display (OSD) menu.   |
| <b>10</b> | <b>Zoom Key</b><br>Zoom OUT: press ZOOM ▲ key<br>Zoom IN: press ZOOM ▼ key<br>Press and hold the key, the camera will keep zooming in or zooming out and stops as soon as the key is released.   |
| <b>11</b> | <b>Camera IR Remote Control Address Setting</b><br>Camera Address No. 1: * + # + <b>F1</b><br>Camera Address No. 2: * + # + <b>F2</b><br>Camera Address No. 3: * + # + <b>F3</b><br>Camera Address No. 4: * + # + <b>F4</b><br>A single remote can be used to control up to 4 cameras if each one receives it's own Camera Address.<br><b>Example:</b> Pressing * + # + <b>F2</b> will assign address 2 to the camera. Afterwards, select Camera Address <b>2</b> with the Camera Select keys on the remote (see control 6 above) before the remote can be further used to control the camera. |

## Menu Control of the Camera

The UNITE camera settings can be controlled via the remote controller using the On-Screen-Display menus. This section describes the menu options and the settings they control.

In normal working mode, press the **[MENU]** key to display the menu.

### MAIN SCREEN

Use the remote control position keys **▲▼** to navigate to the menu item.

Then click the **[HOME]** key to open the menu item.

|                 |  |
|-----------------|--|
| MAIN            |  |
| =====           |  |
| Language / EN   |  |
| (SYSTEM OPTION) |  |
| (CAMERA OPTION) |  |
| (PT OPTION)     |  |
| (V. FORMAT)     |  |
| (RESET)         |  |
| (HELP)          |  |
| EXIT / MENU     |  |

**LANGUAGE:** Language setting, Chinese / English

**SYSTEM OPTION:** System setting submenu

**CAMERA OPTION:** Camera setting submenu

**PT OPTION:** Pan/Tilt setting submenu

**V. FORMAT:** Video Format setting submenu

**RESET:** Reset camera settings

**HELP:** Help describes menu key operation

**EXIT/MENU:** The **[MENU]** key exits the MAIN menu

### SYSTEM OPTION

From the MAIN MENU, move the pointer to **<SYSTEM OPTION>**, and then click the **[HOME]** key to enter the SYSTEM SET screen as shown:

|             |       |
|-------------|-------|
| SYSTEM SET  |       |
| =====       |       |
| PROTOCOL    | VISCA |
| ADDR        | 01    |
| B. RATE     | 9600  |
| RS485       | off   |
| ARM. VER    | 1.0A  |
| FPGA. VER   | 1.0   |
| MODEL       | UH-M  |
| BACK / MENU |       |

**PROTOCOL:** Reset condition VISCA

Protocol type:VISCA/Pelco-P/Pelco-D

**ADDR:** Reset condition: 01

VISCA=1~7 Pelco-P/Pelco-D = 1~63

**B. RATE:** Reset condition:9600

2400/4800/9600/115200

**RS485:** Reset condition:off

ON when using RS485 communication

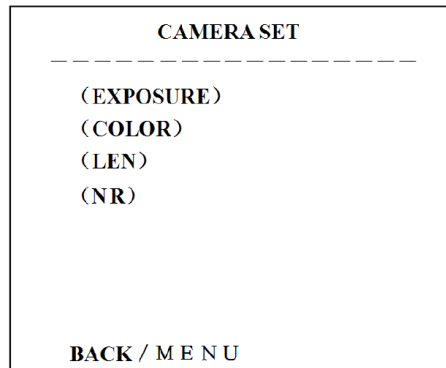
**ARM.VER/FPGA.VER/CAM.VER:** Software version information

**Model:** Camera internal identifier code, UH-M

**BACK/MENU:** The **[MENU]** key returns to the MAIN menu

## CAMERA OPTION

From the MAIN MENU, move the pointer to **<CAMERA OPTION>**, and then click the **[HOME]** key to enter the CAMERA SET screen as shown:



**EXPOSURE:** Exposure submenu

**COLOR:** Color settings submenu

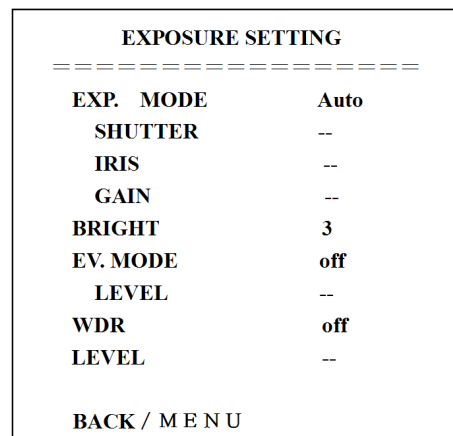
**LEN:** Lens focus submenu

**NR:** NR submenu

**BACK/MENU:** The **[MENU]** key returns to the previous menu

## Exposure Submenu

From the CAMERA SET screen, move the pointer to the **<EXPOSURE>**, and then click the **[HOME]** key to enter the EXPOSURE screen as shown:



**EXP. MODE:** Reset condition

Auto/Manual. Manual setting allows Shutter, Iris and Gain to be manually set

**SHUTTER:** Reset condition Default.

Available selections: 1/60 1/90 1/100 1/125 1/180  
1/250 1/350 1/500 1/725 1/1000 1/1500 1/2000  
1/3000 1/4000 1/6000 1/10000

**IRIS:** Reset condition Default

Aperture control of camera. 0-13

**GAIN:** Electronic amplification of the video signal. 0-15

**BRIGHT:** Brightness control. Reset condition 3, 0-9

**EV MODE:** Reset Condition: off, Available: On/Off (only available in Auto mode)

**WDR:** Wide Dynamic Range

**BACK/MENU:** The **[MENU]** key returns to the previous menu

### Color Submenu

From the CAMERA SET screen, move the pointer to the **<COLOR>**, and then click the **[HOME]** key to enter the COLOR screen as shown:

| COLOR       |      |
|-------------|------|
| =====       |      |
| WB.MODE     | ATW  |
| R.GAIN      | --   |
| B.GAIN      | --   |
| GAMMA       | 3    |
| SATURATION  | 3    |
| APERTURE    | 3    |
| FLICK       | 50HZ |
| NR LEVEL    | 5    |
| CONTRAST    | 3    |
| BACK / MENU |      |

**WB MODE:** Reset Condition: ATW

White balance mode setting: Auto, Indoor, Outdoor, OnePush, ATW, Manual

**R.GAIN:** Reset condition Default.

Red gain setting: 0-50 (only available in Manual mode)

**B.GAIN:** Reset condition Default

Blue gain setting: 0-50 (only available in Manual mode)

**GAMMA:** Reset Condition:0

GAMMA setting: 0-3

**SATURATION:** Reset condition 3, Saturation setting: 0-9

**APERTURE:** Reset Condition: 5, Aperture setting: 0-9

**FLICK:** Reset Condition: Off, FLICK setting: 50HZ/60HZ/OFF

**NR LEVEL:** Reset Condition: 2, NR LEVEL setting: 0-9

**CONTRAST:** Reset Condition: 3, CONTRAST setting:0-9

**BACK/MENU:** The **[MENU]** key returns to the previous menu

### LEN Submenu

From the CAMERA SET screen, move the pointer to the **<LEN>**, and then click the **[HOME]** key to enter the LEN screen as shown:

| LEN         |      |
|-------------|------|
| =====       |      |
| FOCUS       | Auto |
|             |      |
|             |      |
| BACK / MENU |      |

**FOCUS:** Auto, Manual, OnePush

**BACK/MENU:** The **[MENU]** key returns to the previous menu

## NR Submenu

From the CAMERA SET screen, move the pointer to the **<NR>**, and then click the **[HOME]** key to enter the NR screen as shown:

| NR          |   |
|-------------|---|
| =====       |   |
| 2NDR        | 3 |
| 3NDR        | 0 |
|             |   |
| BACK / MENU |   |

**2NDR:** 2D Noise reduction; 0-9

**3NDR:** 3D Noise reduction; 0-3

**BACK/MENU:** The **[MENU]** key returns to the previous menu

## PT OPTION (Pan/Tilt)

From the MAIN MENU, move the pointer to the **<PT OPTION>**, and then click the **[HOME]** key to enter the PT SET screen as shown:

| PT SET      |     |
|-------------|-----|
| =====       |     |
| POWER. ACT  | Off |
| SPEEDBYZ    | On  |
| MOUNT. MODE | Up  |
| IR M. SPEED | 16  |
| IR Z. SPEED | 07  |
| MIN. SPEED  | 0   |
| SCAN. SPEED | 10  |
|             |     |
| BACK / MENU |     |

**POWER ACT:** Reset Condition: Off

0/1 (The camera will move to no. 0/1 preset position after 12 seconds without control since power on), Off

**SPEEDBYZ:** Reset Condition: On

Only work for IR remote control: On (When the camera zoom becomes larger, rotation speed diminishes, Off

**MOUNT MODE:** Reset Condition: Up, UP, DOWN

**IR M. SPEED:** Reset Condition: 16, IR remote control move speed: 5-24

**IR Z. SPEED:** Reset Condition: 07, IR remote control zoom speed: 1-7

**MIN. SPEED:** Reset Condition: 0, Minimum start speed for serial command: 0-9

**SCAN. SPEED:** Reset Condition: 10, move speed: 4-15

**BACK/MENU:** The **[MENU]** key returns to the previous menu

## V. FORMAT OPTION

From the MAIN MENU, move the pointer to the **<V. FORMAT OPTION>**, and then click the **[HOME]** key to enter the VIDEO FORMAT screen as shown:

| VIDEO FORMAT |
|--------------|
| =====        |
| 1080P60      |
| 1080P50      |
| 108030       |
| 1080P25      |
| 720P60       |
| 720P50       |
| 720P30       |
| 720P25       |
|              |
| BACK / MENU  |

**Video Formats:** Select from the available formats:

1080P60, 1080P50, 1080P30, 1080P25, 720P60, 720P50, 720P30, 720P25

**BACK/MENU:** The **[MENU]** key returns to the previous menu



## RESET OPTION

From the MAIN MENU, move the pointer to the **<RESET OPTION>**, and then click the **[HOME]** key to enter the RESET screen as shown:

| RESET       |    |
|-------------|----|
| =====       |    |
| SYS. RESET  | NO |
| CAM. RESET  | NO |
| P T. RESET  | NO |
| ALL. RESET  | NO |
|             |    |
| BACK / MENU |    |

**SYS. RESET:** System reset:

Protocol: VISCA; Address: 1; baud rate:9600;  
RS485:Off

**CAM. RESET:** Camera parameter reset

**PT. RESET:** power action:

Off; speed by zone: On; mount mode: Up; IR  
move speed:16; IR zoom speed: 7;MIN.SPEED  
0;SCAN. SPEED 10

**ALL RESET:** reset above 3 items to factory default

**BACK/MENU:** The **[MENU]** key returns to the previous menu

## HELP OPTION

From the MAIN MENU, move the pointer to the **<Help>** selection, and then click the **[HOME]** key to enter the HELP screen as shown:

| HELP        |                |
|-------------|----------------|
| =====       |                |
| ^ V         | SELECT MENU    |
| < >         | CHANGE SETTING |
| HOME        | ENTER          |
| MENU        | RETURN         |
|             |                |
| BACK / MENU |                |

**DESCRIPTION:**

This screen tells how the keys on the IR Remote are used in the OSD Menu system. The Arrow, Home and Menu keys are shown:

**BACK/MENU:** The **[MENU]** key returns to the previous menu

## EXIT OPTION

From the MAIN MENU, press the **[MENU]** key again to enter the EXIT screen. This screen presents the option to save and exit the settings menus, or to exit without saving, as shown:

| EXIT              |        |
|-------------------|--------|
| =====             |        |
| SAVE?             | Yes/No |
|                   |        |
|                   |        |
|                   |        |
| OK/HOME BACK/MENU |        |

**SAVE:** To save settings: Yes/No

**OK/HOME:** The **[HOME]** key exits the menu system

**BACK/MENU:** The **[MENU]** key returns to the Main menu



## COM Control of the Camera

In normal working mode, the UNITE camera is able to be controlled via RS-232C/RS485 command (VISCA IN). The parameters of the RS232C/RS485 COM are as follows:

| Parameter | Description                        |
|-----------|------------------------------------|
| Baud Rate | 2400/4800/9600/<br>115200 bit/sec. |
| Start Bit | 1 bit                              |
| Data Bit  | 8 bit                              |
| Stop Bit  | 1 bit                              |
| Code      | None                               |

When the camera is first connected to power, the camera initializes by moving to the down left, then back to middle, with the farthest zoom rate in the auto focus and auto iris mode. After initialization, the camera moves to the preset No. 0 or 1 if it is established. Then the users can control the camera via serial command.

## VISCA PROTOCOL

### PART 1: CAMERA RETURN COMMAND

**z = Camera Address + 8**

| ACK/Completion Message |                 |  |
|------------------------|-----------------|--|
|                        | Command Packet  | Note   |
| ACK                    | <b>z0</b> 41 FF | Returned when the command is accepted.       |
| Completion             | <b>z0</b> 51 FF | Returned when the command has been executed. |

| Error Message          |                    |   |
|------------------------|--------------------|---|
|                        | Command Packet     | Note  |
| Syntax Error           | <b>z0</b> 60 02 FF | Returned when the command format is different or when a command with illegal command parameters is accepted   |
| Command Not Executable | <b>z0</b> 61 41 FF | Returned when a command cannot be executed due to current conditions. For example, when commands controlling the focus manually are received during auto focus. |

## PART 2: CAMERA CONTROL COMMAND

$y = x + 8$ , where  $x$  = the camera address you want to control.

| Command       | Function       | Command Packet                            | Note  |
|---------------|----------------|---|---|
| AddressSet    | Broadcast      | 88 30 01 FF                               | Address setting                                   |
| IF_Clear      | Broadcast      | 88 01 00 01 FF                            | I/F Clear   |
| CommandCancel |                | 8x 21 FF                                  |   |
| CAM_Power     | On             | 8x 01 04 00 02 FF                         | Power ON/OFF                                      |
|               | Off            | 8x 01 04 00 03 FF                         |   |
| CAM_Zoom      | Stop           | 8x 01 04 07 00 FF                         |   |
|               | Tele(Standard) | 8x 01 04 07 02 FF                         |   |
|               | Wide(Standard) | 8x 01 04 07 03 FF                         |   |
|               | Tele(Variable) | 8x 01 04 07 2p FF                         | p = 0 (low) - 7(high)                             |
|               | Wide(Variable) | 8x 01 04 07 3p FF                         |   |
|               | Direct         | 8x 01 04 47 0p 0q 0r 0s FF                | pqrs: Zoom Position                               |
|               | DirectSpeed    | 81 0A 04 47 0V 0p 0q 0r 0s FF             | V:Speed 0 (low) - 7 (high)<br>pqrs: Zoom Position |
| CAM_Focus     | Stop           | 8x 01 04 08 00 FF                         |   |
|               | Far(Standard)  | 8x 01 04 08 02 FF                         |   |
|               | Near(Standard) | 8x 01 04 08 03 FF                         |   |
|               | Direct         | 8x 01 04 48 0p 0q 0r 0s FF                | pqrs: Focus Position                              |
|               | One Push AF    | 8x 01 04 18 01 FF                         |   |
| CAM_ZoomFocus | Direct         | 8x 01 04 47 0p 0q 0r 0s<br>0t 0u 0v 0w FF | pqrs: Zoom Position<br>tuvw: Focus Position       |
| CAM_WB        | Auto           | 8x 01 04 35 00 FF                         |   |
|               | Indoor         | 8x 01 04 35 01 FF                         |   |
|               | Outdoor        | 8x 01 04 35 02 FF                         |   |
|               | OnePush        | 8x 01 04 35 03 FF                         |   |
|               | Manual         | 8x 01 04 35 05 FF                         |   |
| CAM_RGain     | Reset          | 8x 01 04 03 00 FF                         | Manual Control of R Gain                          |
|               | Up             | 8x 01 04 03 02 FF                         |   |
|               | Down           | 8x 01 04 03 03 FF                         |   |
|               | Direct         | 8x 01 04 43 00 00 0p 0q FF                | pq: R Gain  |
| CAM_Bgain     | Reset          | 8x 01 04 04 00 FF                         | Manual Control of B Gain                          |
|               | Up             | 8x 01 04 04 02 FF                         |   |
|               | Down           | 8x 01 04 04 03 FF                         |   |
|               | Direct         | 8x 01 04 44 00 00 0p 0q FF                | pq: B Gain  |

## Part 2: CAMERA CONTROL COMMAND - Continued

| Command         | Function         | Command Packet             | Note                                     |
|-----------------|------------------|----------------------------|--|
| CAM_AE          | Full Auto        | 8x 01 04 39 00 FF          | Automatic Exposure mode                  |
|                 | Manual           | 8x 01 04 39 03 FF          | Manual Control mode                      |
|                 | Shutter priority | 8x 01 04 39 0A FF          | Shutter Priority Automatic Exposure mode |
|                 | Iris priority    | 8x 01 04 39 0B FF          | Iris Priority Automatic Exposure mode    |
|                 | Bright           | 8x 01 04 39 0D FF          | Bright mode (Manual control)             |
| CAM_Shutter     | Reset            | 8x 01 04 0A 00 FF          | Shutter Setting                          |
|                 | Up               | 8x 01 04 0A 02 FF          |  |
|                 | Down             | 8x 01 04 0A 03 FF          |  |
|                 | Direct           | 8x 01 04 4A 00 00 0p 0q FF | pq: Shutter Position                     |
| CAM_Iris        | Reset            | 8x 01 04 0B 00 FF          | Iris Setting                             |
|                 | Up               | 8x 01 04 0B 02 FF          |  |
|                 | Down             | 8x 01 04 0B 03 FF          |  |
|                 | Direct           | 8x 01 04 4B 00 00 0p 0q FF | pq: Iris Position                        |
| CAM_Gain        | Reset            | 8x 01 04 0C 00 FF          | Gain Setting                             |
|                 | Up               | 8x 01 04 0C 02 FF          |  |
|                 | Down             | 8x 01 04 0C 03 FF          |  |
|                 | Direct           | 8x 01 04 0C 00 00 0p 0q FF | pq: Gain Position                        |
| CAM_Bright      | Direct           | 8x 01 04 4D 00 00 0p 0q FF | pq: Bright I Position                    |
| CAM_ExpComp     | On               | 8x 01 04 3E 02 FF          | Exposure Compensation ON/OFF             |
|                 | Off              | 8x 01 04 3E 03 FF          |  |
|                 | Reset            | 8x 01 04 0E 00 FF          | Exposure Compensation Amount Setting     |
|                 | Up               | 8x 01 04 0E 02 FF          |  |
|                 | Down             | 8x 01 04 0E 03 FF          |  |
|                 | Direct           | 8x 01 04 4E 00 00 0p 0q FF | pq: ExpComp Position                     |
| CAM_Aperture    | Reset            | 8x 01 04 02 00 FF          | Aperture Control                         |
|                 | Up               | 8x 01 04 02 02 FF          |  |
|                 | Down             | 8x 01 04 02 03 FF          |  |
|                 | Direct           | 8x 01 04 42 00 00 0p 0q FF | pq: Aperture Gain                        |
| CAM_Memory      | Reset            | 8x 01 04 3F 00 0p FF       | p: Memory Number (=0 to 127)             |
|                 | Set              | 8x 01 04 3F 01 0p FF       |  |
|                 | Recall           | 8x 01 04 3F 02 0p FF       | Corresponds to 0 - 9 on the Remote       |
| CAM_LR_Reverse  | On               | 8x 01 04 61 02 FF          | Image Flip Horizontal ON/OFF             |
|                 | Off              | 8x 01 04 61 03 FF          |  |
| CAM_PictureFlip | On               | 8x 01 04 66 02 FF          | Image Flip Vertical ON/OFF               |
|                 | Off              | 8x 01 04 66 03 FF          |  |

## Part 2: CAMERA CONTROL COMMAND - Continued

| Command          | Function         | Command Packet                                  | Note   |
|------------------|------------------|---|--|
| VideoSystem Set  |                  | 8x 01 06 35 00 0p FF                            | P: Video format<br>1:1080P60<br>2:1080P50<br>4:720P60<br>5:720P50<br>6:1080P30<br>7:1080P25<br>8:720P30<br>9:720P25  |
| CAM_IDWrite      |                  | 8x 01 04 22 0p 0q 0r 0s FF                      | pqrs: Camera ID (=0000 to FFFF)  |
| SYS_Menu         | OFF              | 8x 01 06 06 03 FF                               | Turn off the menu  |
| IR_Receive       | On               | 8x 01 06 08 02 FF                               | IR (remote commander) receive ON/OFF   |
|                  | Off              | 8x 01 06 08 03 FF                               |  |
|                  | On/Off           | 8x 01 06 08 10 FF                               |  |
| IR_ReceiveReturn | On               | 8x 01 7D 01 03 00 00 FF                         | IR (remote commander) receive message via the VISCA communication ON/OFF   |
|                  | Off              | 8x 01 7D 01 13 00 00 FF                         |  |
| Pan_tiltDrive    | Up               | 8x 01 06 01 VV WW 03 01 FF                      | VV: Pan speed 0x01 (low speed) to 0x18 (high speed)<br>WW: Tilt speed 0x01 (low speed) to 0x14 (high speed)<br>YYYY: Pan Position (TBD)<br>ZZZZ: Tilt Position (TBD) |
|                  | Down             | 8x 01 06 01 VV WW 03 02 FF                      |  |
|                  | Left             | 8x 01 06 01 VV WW 01 03 FF                      |  |
|                  | Right            | 8x 01 06 01 VV WW 02 03 FF                      |  |
|                  | Upleft           | 8x 01 06 01 VV WW 01 01 FF                      |  |
|                  | Upright          | 8x 01 06 01 VV WW 02 01 FF                      |  |
|                  | DownLeft         | 8x 01 06 01 VV WW 01 02 FF                      |  |
|                  | DownRight        | 8x 01 06 01 VV WW 02 02 FF                      |  |
|                  | Stop             | 8x 01 06 01 VV WW 03 03 FF                      |  |
|                  | AbsolutePosition | 8x 01 06 02 VV WW<br>0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF |  |
|                  | RelativePosition | 8x 01 06 03 VV WW<br>0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF |  |
|                  | Home             | 8x 01 06 04 FF                                  |  |
|                  | Reset            | 8x 01 06 05 FF                                  |  |
| Pan-tiltLimitSet | Set              | 8x 01 06 07 00 0W<br>0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF | W:<br>1 UpRight<br>0 DownLeft<br>YYYY: Pan Limit Position (TBD)<br>ZZZZ: Tilt Limit Position (TBD)   |
|                  | Clear            | 8x 01 06 07 01 0W<br>07 0F 0F 0F 07 0F 0F 0F FF |  |

### PART 3: INQUIRY COMMAND

$y=x+8$ , where  $x$  = the camera address you want to control.

| Command             | Command Packet | Return Packet                    | Note                             |
|---------------------|----------------|----------------------------------|----------------------------------|
| CAM_PowerInq        | 8x 09 04 00 FF | y0 50 02 FF                      | On                               |
|                     |                | y0 50 03 FF                      | Off (Standby)                    |
| CAM_ZoomPosInq      | 8x 09 04 47 FF | y0 50 0p 0q 0r 0s FF             | pqrs: Zoom Position              |
| CAM_FocusModelInq   | 8x 09 04 38 FF | y0 50 02 FF                      | Auto Focus                       |
|                     |                | y0 50 03 FF                      | Manual Focus                     |
| CAM_FocusPosInq     | 8x 09 04 48 FF | y0 50 0p 0q 0r 0s FF             | pqrs: Focus Position             |
| CAM_WBModelInq      | 8x 09 04 35 FF | y0 50 00 FF                      | Auto                             |
|                     |                | y0 50 01 FF                      | Indoor mode                      |
|                     |                | y0 50 02 FF                      | Outdoor mode                     |
|                     |                | y0 50 03 FF                      | OnePush mode                     |
|                     |                | y0 50 04 FF                      | ATW                              |
|                     |                | y0 50 05 FF                      | Manual                           |
| CAM_RGainInq        | 8x 09 04 43 FF | y0 50 00 00 0p 0q FF             | pq: R Gain                       |
| CAM_BGainInq        | 8x 09 04 44 FF | y0 50 00 00 0p 0q FF             | pq: B Gain                       |
| CAM_AEModelInq      | 8x 09 04 39 FF | y0 50 00 FF                      | Full Auto                        |
|                     |                | y0 50 03 FF                      | Manual                           |
|                     |                | y0 50 0A FF                      | Shutter priority                 |
|                     |                | y0 50 0B FF                      | Iris priority                    |
|                     |                | y0 50 0D FF                      | Bright                           |
| CAM_ShutterPosInq   | 8x 09 04 4A FF | y0 50 00 00 0p 0q FF             | pq: Shutter Position             |
| CAM_IrisPosInq      | 8x 09 04 4B FF | y0 50 00 00 0p 0q FF             | pq: Iris Position                |
| CAM_GainPosInq      | 8x 09 04 4C FF | y0 50 00 00 0p 0q FF             | pq: Gain Position                |
| CAM_BrightPosInq    | 8x 09 04 4D FF | y0 50 00 00 0p 0q FF             | pq: Bright Position              |
| CAM_ExpCompModelInq | 8x 09 04 3E FF | y0 50 02 FF                      | On                               |
|                     |                | y0 50 03 FF                      | Off                              |
| CAM_ExpCompPosInq   | 8x 09 04 4E FF | y0 50 00 00 0p 0q FF             | pq: ExpComp Position             |
| CAM_ApertureInq     | 8x 09 04 42 FF | y0 50 00 00 0p 0q FF             | pq: Aperture Gain                |
| CAM_MemoryInq       | 8x 09 04 3F FF | y0 50pp FF                       | pp: Memory number last operated. |
| SYS_MenuModelInq    | 8x 09 06 06 FF | y0 50 02 FF                      | On                               |
|                     |                | y0 50 03 FF                      | Off                              |
| CAM_LR_ReverselInq  | 8x 09 04 61 FF | y0 50 02 FF                      | On                               |
|                     |                | y0 50 03 FF                      | Off                              |
| CAM_PictureFliplInq | 8x 09 04 66 FF | y0 50 02 FF                      | On                               |
|                     |                | y0 50 03 FF                      | Off                              |
| CAM_IDInq           | 8x 09 04 22 FF | y0 50 0p 0q 0r 0s FF             | pqrs: Camera ID                  |
| CAM_VersionInq      | 8x 09 00 02 FF | y0 50 ab cd<br>mn pq rs tu vw FF |                                  |

### Part 3: INQUIRY COMMAND - Continued

| Command             | Command Packet | Return Packet                       | Note  |
|---------------------|----------------|-------------------------------------|---|
| VideoSystemInq      | 8x 09 06 23 FF | y0 50 0p FF                         | P: Video format<br>1:1080P60<br>2:1080P50<br>4:720P60<br>5:720P50<br>6:1080P30<br>7:1080P25<br>8:720P30<br>9:720P25 |
| IR_Receive          | 8x 09 06 08 FF | y0 50 02 FF                         | On  |
|                     |                | y0 50 03 FF                         | Off   |
| IR_ReceiveReturn    |                | y0 07 7D 01 04 00 FF                | Power ON/OFF  |
|                     |                | y0 07 7D 01 04 07 FF                | Zoom tele/wide  |
|                     |                | y0 07 7D 01 04 38 FF                | AF On/Off   |
|                     |                | y0 07 7D 01 04 33 FF                | CAM_Backlight   |
|                     |                | y0 07 7D 01 04 3F FF                | CAM_Memory  |
|                     |                | y0 07 7D 01 06 01 FF                | Pan_tiltDrive   |
| Pan-tiltMaxSpeedInq | 8x 09 06 11 FF | y0 50 ww zz FF                      | ww: Pan Max Speed<br>zz: Tilt Max Speed   |
| Pan-tiltPosInq      | 8x 09 06 12 FF | y0 50 0w 0w 0w 0w<br>0z 0z 0z 0z FF | www: Pan Position<br>zzzz: Tilt Position  |

### PELCO-D: PROTOCOL COMMAND LIST

x = Camera Address

| Function     | Byte1 | Byte2   | Byte3 | Byte4 | Byte5     | Byte6      | Byte7 |
|--------------|-------|---------|-------|-------|-----------|------------|-------|
| Up           | 0xFF  | Address | 0x00  | 0x08  | Pan Speed | Tilt Speed | SUM   |
| Down         | 0xFF  | Address | 0x00  | 0x10  | Pan Speed | Tilt Speed | SUM   |
| Left         | 0xFF  | Address | 0x00  | 0x04  | Pan Speed | Tilt Speed | SUM   |
| Right        | 0xFF  | Address | 0x00  | 0x02  | Pan Speed | Tilt Speed | SUM   |
| Upleft       | 0xFF  | Address | 0x00  | 0x0C  | Pan Speed | Tilt Speed | SUM   |
| Upright      | 0xFF  | Address | 0x00  | 0x0A  | Pan Speed | Tilt Speed | SUM   |
| DownLeft     | 0xFF  | Address | 0x00  | 0x14  | Pan Speed | Tilt Speed | SUM   |
| Upleft       | 0xFF  | Address | 0x00  | 0x0C  | Pan Speed | Tilt Speed | SUM   |
| Zoom In      | 0xFF  | Address | 0x00  | 0x20  | 0x00      | 0x00       | SUM   |
| Zoom Out     | 0xFF  | Address | 0x00  | 0x40  | 0x00      | 0x00       | SUM   |
| Focus Far    | 0xFF  | Address | 0x00  | 0x80  | 0x00      | 0x00       | SUM   |
| Focus Near   | 0xFF  | Address | 0x01  | 0x00  | 0x00      | 0x00       | SUM   |
| Set Preset   | 0xFF  | Address | 0x00  | 0x03  | 0x00      | Preset ID  | SUM   |
| Clear Preset | 0xFF  | Address | 0x00  | 0x05  | 0x00      | Preset ID  | SUM   |
| Call Preset  | 0xFF  | Address | 0x00  | 0x07  | 0x00      | Preset ID  | SUM   |

## PELCO-D: PROTOCOL COMMAND LIST - CONTINUED

| Function                     | Byte1 | Byte2   | Byte3 | Byte4 | Byte5           | Byte6          | Byte7 |
|------------------------------|-------|---------|-------|-------|-----------------|----------------|-------|
| Query Pan Position           | 0xFF  | Address | 0x00  | 0x51  | 0x00            | 0x00           | SUM   |
| Query Pan Position Response  | 0xFF  | Address | 0x00  | 0x59  | Value High Byte | Value Low Byte | SUM   |
| Query Tilt Position          | 0xFF  | Address | 0x00  | 0x53  | 0x00            | 0x00           | SUM   |
| Query Tilt Position Response | 0xFF  | Address | 0x00  | 0x5B  | Value High Byte | Value Low Byte | SUM   |
| Query Zoom Position          | 0xFF  | Address | 0x00  | 0x55  | 0x00            | 0x00           | SUM   |
| Query Zoom Position Response | 0xFF  | Address | 0x00  | 0x5D  | Value High Byte | Value Low Byte | SUM   |

## PELCO-P: PROTOCOL COMMAND LIST

**x = Camera Address**

| Function                     | Byte1 | Byte2   | Byte3 | Byte4 | Byte5           | Byte6          | Byte7 | Byte8 |
|------------------------------|-------|---------|-------|-------|-----------------|----------------|-------|-------|
| Up                           | 0xA0  | Address | 0x00  | 0x08  | Pan Speed       | Tilt Speed     | 0xAF  | XOR   |
| Down                         | 0xA0  | Address | 0x00  | 0x10  | Pan Speed       | Tilt Speed     | 0xAF  | XOR   |
| Left                         | 0xA0  | Address | 0x00  | 0x04  | Pan Speed       | Tilt Speed     | 0xAF  | XOR   |
| Right                        | 0xA0  | Address | 0x00  | 0x02  | Pan Speed       | Tilt Speed     | 0xAF  | XOR   |
| Upleft                       | 0xA0  | Address | 0x00  | 0x0C  | Pan Speed       | Tilt Speed     | 0xAF  | XOR   |
| Upright                      | 0xA0  | Address | 0x00  | 0x0A  | Pan Speed       | Tilt Speed     | 0xAF  | XOR   |
| DownLeft                     | 0xA0  | Address | 0x00  | 0x14  | Pan Speed       | Tilt Speed     | 0xAF  | XOR   |
| DownRight                    | 0xA0  | Address | 0x00  | 0x12  | Pan Speed       | Tilt Speed     | 0xAF  | XOR   |
| Zoom In                      | 0xA0  | Address | 0x00  | 0x20  | 0x00            | 0x00           | 0xAF  | XOR   |
| Zoom Out                     | 0xA0  | Address | 0x00  | 0x40  | 0x00            | 0x00           | 0xAF  | XOR   |
| Focus Far                    | 0xA0  | Address | 0x00  | 0x80  | 0x00            | 0x00           | 0xAF  | XOR   |
| Focus Near                   | 0xA0  | Address | 0x01  | 0x00  | 0x00            | 0x00           | 0xAF  | XOR   |
| Set Preset                   | 0xA0  | Address | 0x00  | 0x03  | 0x00            | Preset ID      | 0xAF  | XOR   |
| Clear Preset                 | 0xA0  | Address | 0x00  | 0x05  | 0x00            | Preset ID      | 0xAF  | XOR   |
| Call Preset                  | 0xA0  | Address | 0x00  | 0x07  | 0x00            | Preset ID      | 0xAF  | XOR   |
| Query Pan Position           | 0xA0  | Address | 0x00  | 0x51  | 0x00            | 0x00           | 0xAF  | XOR   |
| Query Pan Position Response  | 0xA0  | Address | 0x00  | 0x59  | Value High Byte | Value Low Byte | 0xAF  | XOR   |
| Query Tilt Position          | 0xA0  | Address | 0x00  | 0x53  | 0x00            | 0x00           | 0xAF  | XOR   |
| Query Tilt Position Response | 0xA0  | Address | 0x00  | 0x5B  | Value High Byte | Value Low Byte | 0xAF  | XOR   |

## PELCO-P: PROTOCOL COMMAND LIST - CONTINUED

| Function                     | Byte1 | Byte2   | Byte3 | Byte4 | Byte5           | Byte6          | Byte7 | Byte8 |
|------------------------------|-------|---------|-------|-------|-----------------|----------------|-------|-------|
| Query Zoom Position          | 0xA0  | Address | 0x00  | 0x55  | 0x00            | 0x00           | 0xAF  | XOR   |
| Query Zoom Position Response | 0xA0  | Address | 0x00  | 0x5D  | Value High Byte | Value Low Byte | 0xAF  | XOR   |



# Troubleshooting the Camera

## CAMERA MAINTENANCE

- If camera is not used for long time, turn off power adapter switch and AC plug.
- Use a soft cloth or tissue to clean the camera cover.
- Use a soft cloth to clean the lens; Use neutral cleanser if the lens is badly smeared. Do not use a strong or corrosive cleanser that could damage the lens.

## CAMERA MISUSE

- Do not use camera to view extremely bright objects, such as direct sunlight, lamplight etc.
- Do not use camera in variable light environments, otherwise the image will not stabilize.
- Do not operate in strong electromagnetic environments.
- Light levels below the cameras rating will give substandard images.

## TROUBLESHOOTING

### No Image

1. Check whether the power cord and voltage are correct, and the power indicator light is ON.
2. Turn off the power supply and on again to check whether the camera can auto-configure.
3. Check the switches at the bottom of the camera and make sure SW1 and SW2 two are ON in working mode.
4. Check that all wires are connected correctly.

### Abnormal Image Displayed

1. Check whether the video connecting wires are solidly connected in their sockets and all other camera wiring is correct.
2. If the camera can only work at one focus, and other positions can not be focused, change the position of the camera to see if this condition still exists. If yes, it may be caused by camera control drive system trouble.

### Image Dithering when at Maximum Zoom

Check whether the camera is on a fixed, solid surface, or if there is a vibrating mechanical object nearby that is shaking the camera.

### Remote Controller

1. Make sure the batteries are fresh and correctly installed.
2. Check the camera operation mode is correct.

# Compliance

## ELECTRICAL SAFETY ADVISORY

This equipment uses DC power supplied from an external source which can be subjected to electrical surges, typically lightning transients which are very destructive to customer terminal equipment. The warranty for this equipment does not cover damage caused by electrical surge or lightning transients. To reduce the risk of this equipment becoming damaged it is suggested that the customer consider installing a surge arrestor.

Any modifications to the device without express authorization from ClearOne is prohibited as per 47CFR15.21 and could void the users authority to operate the device.

## COMPLIANCE DETAILS

### FCC COMPLIANCE

FCC Part 15: This device complies with FCC Part 15 regulations for a Class A device.

- » **NOTE:** This Class A device complies with Part 15 of the FCC rules and Canadian ICES-003. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

### EUROPEAN COMPLIANCE

Details on European equipment compliance can be found on the ClearOne website.

# Service and Support

If you need assistance setting up or operating your product, please contact us. We welcome your comments so we can continue to improve our products and better meet your needs.

## TECHNICAL SUPPORT

Telephone: 1.800.283.5936  
E-mail: tech.support@ClearOne.com  
Web site: www.ClearOne.com

## SALES

Telephone: 1.800.707.6994  
E-mail: sales@ClearOne.com

## TECHSALES

Telephone: 1.800.705.2103  
E-mail: techsales@ClearOne.com

## PRODUCT RETURNS

All product returns require a Return Material Authorization (RMA) number. Contact ClearOne Technical Support before returning your product. Make sure you return all the items and packing materials that originally shipped with your product.

### HEADQUARTERS:

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