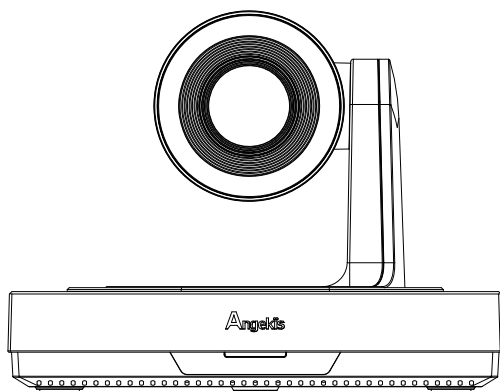




# BLADE VS

## U2-10FHD3

USB 2.0 PTZ Camera



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# SAFETY GUIDES

1. Before operating the camera, please read and follow all the instructions in the manual.  
For safety reasons, always keep this user manual close to the camera.
2. The Blade VS's power input range is 100-240VAC (50-60Hz). Always ensure the power supply input is within this rate before turning it on.
3. The camera power voltage is 12VDC with a rated currency of 1.5A. We recommend that you use it with the original power supply adapter supplied by the factory.
4. Please keep the power cable, video cable and control cable in a safe place. Protect all cables especially the Connectors.
5. Operational environment: 0℃-50℃ with humidity less than 90%. To avoid any danger, do not put anything inside the Camera and keep out from corrosive liquid.
6. Avoid stress, vibration and damp during transportation, storage and installation.
7. Do not detach the camera housing and cover. If there's a need for service, contact your authorized technicians.
8. RF cable and control cable should be individually shielded and cannot be substituted with other cables. Do not direct the camera lens towards strong light (sun or intensive light).
9. Use a dry cloth to clean the camera housing. Apply it with a neutral cleaning agent to clean. To avoid damage on the camera lens, never use strong or abrasive cleaning agents on the camera housing.
10. Do not move the camera by holding the camera head. To avoid any mechanical issues, do not use your hands to rotate the camera head.
11. Place the camera on a fixed and smooth desk or base and avoid leaned Installation.
12. Power Supply Polarity (Drawing)



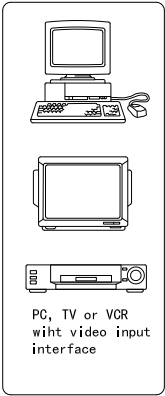
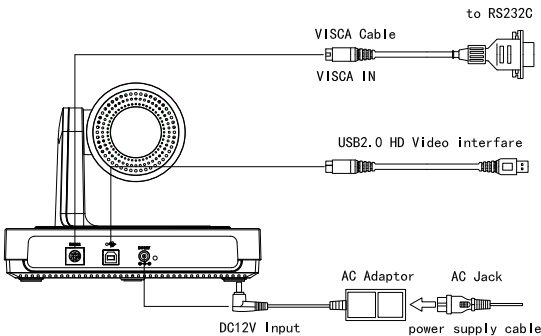
# ACCESSORIES

Check all bellow items when open the package:

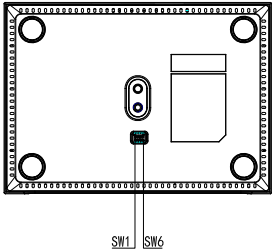
|                       |       |       |
|-----------------------|-------|-------|
| Camera                | ----- | 1 PCS |
| Power Adapter         | ----- | 1 PCS |
| Power Cable           | ----- | 1 PCS |
| RS232 Control Cable   | ----- | 1 PCS |
| USB2.0 Cable          | ----- | 1 PCS |
| Remote Controller     | ----- | 1 PCS |
| User Manual           | ----- | 1 PCS |
| Double-sided Adhesive | ----- | 1 PCS |

# QUICK START

1. Ensure to check all cable connection before turning it on



2. Dial Switch Setting (at the bottom of the camera):



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

| FUNCTION(IR CODE TYPE) |      |      |             |
|------------------------|------|------|-------------|
|                        | SW-3 | SW-4 | Instruction |
| 1                      | OFF  | OFF  | Undefined   |
| 2                      | ON   | OFF  | Undefined   |
| 3                      | OFF  | ON   | Undefined   |
| 4                      | ON   | ON   | Undefined   |

| FUNCTION(USB) |      |      |             |
|---------------|------|------|-------------|
|               | SW-5 | SW-6 | Instruction |
| 1             | OFF  | OFF  | Undefined   |
| 2             | ON   | OFF  | Undefined   |
| 3             | OFF  | ON   | Undefined   |
| 4             | ON   | ON   | Undefined   |

# PRODUCT HIGHLIGHTS

The New Blade VS delivers an amazing suite of features and maintains the beautiful optics you have come to expect from Angekis. Technical improvements and a class leading build quality compliment the Blades brilliantly sharp resolution and stunning colour reproduction, all at a ground-breaking price. Not only that, this stylish looking camera is ideal for cloud-based conferencing!

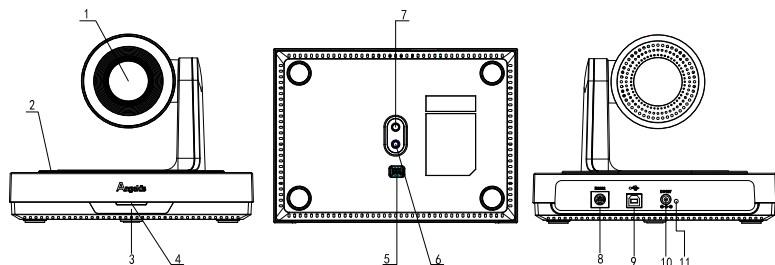
- 10x Optical zoom and 10x Digital zoom option
- Full HD resolution at 30fps via USB 2.0 Video format YUY2 and MJPG
- Adopts advanced DSP, 1/2.8 inch 5MP image sensor
- Rapid switching between different video formats: less than 1 second
- Easy firmware upgrade
- USB2.0 high speed output
- Compatible with the major videoconferencing software (UVC1.5 protocol standard)
- 62.5° FOV and 350° pan rotation
- Visca over USB2.0, RS232 up to 128 pre-sets
- RF remote controller with 10 pre-sets
- Zoom Room remote RF Controller supported
- On screen NECC via custom Angekis app Video mute control
- Kensington lock hole
- 3D noise reduction
- Day/Night vision switch

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# PRODUCT SPECIFICATION

|               |                                                                        |                             |
|---------------|------------------------------------------------------------------------|-----------------------------|
| Resolution    | MJPG                                                                   | 1080P30K 720P30K 640x480p30 |
|               | YUV                                                                    | 640x480p30                  |
| Video Output  | USB2.0                                                                 |                             |
| Sensor        | 1/2.8", 5MP CMOS                                                       |                             |
| Lens          | F4.7~47.mm(10X), F1.8 – 14, HFOV:62.5°(Wide)-6.43°(Tele)               |                             |
| P/T Rotation  | Pan: ±170°; Tilt:-30°~+90°, Mountable                                  |                             |
| P/T speed     | Pan: 0.1°-120°/s; Tilt: 0.1°-80°/s                                     |                             |
| Presets       | 10 via RF remote setting, 128 via VISCA control, preset accuracy :0.1° |                             |
| Control       | RS232, RS485, USB2.0                                                   |                             |
| Min. Lux      | 0.01lux                                                                |                             |
| White Balance | Auto/Manual                                                            |                             |
| Focus         | Auto/Manual                                                            |                             |
| Iris          | Auto/Manual                                                            |                             |
| Shutter       | Auto/Manual                                                            |                             |
| WDR           | Supported                                                              |                             |
| BLC           | Supported                                                              |                             |
| 2 DNR         | Supported                                                              |                             |
| 3 DNR         | Supported                                                              |                             |
| Input Voltage | DC12V                                                                  |                             |
| Dimension     | 200mm x 143mm x 152mm                                                  |                             |
| Net weight    | 1.25KG                                                                 |                             |

# CAMERA INTERFACE

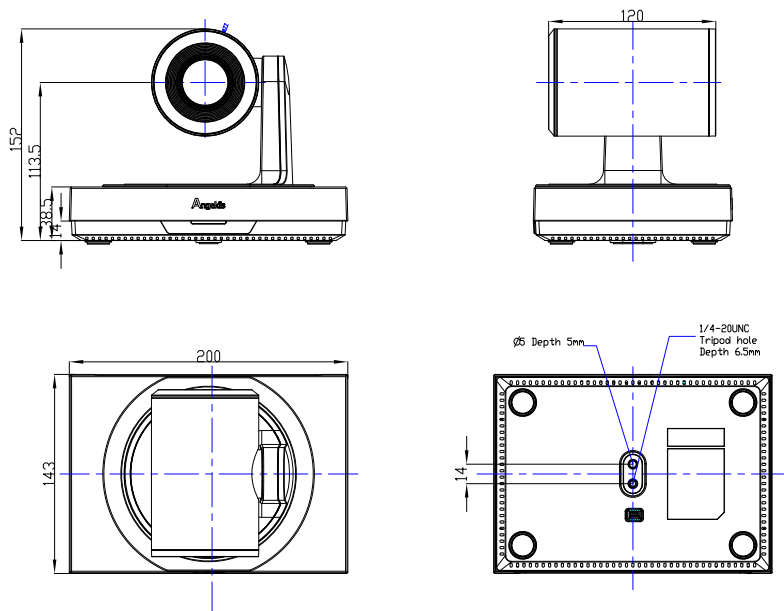


- 1.Camera Lens
- 2.Camera Base
- 3.RF Receiver Panel
- 4.Indicator Light

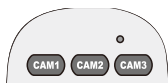
- 5. Dial Switch
- 6. Tripod Screw Hole
- 7. Installation Hole
- 8.RS232(VISCA IN) Port

- 9. USB2.0 Port
- 10. DC12V Power Input
- 11. Power Indicator light

## CAMERA DIMENSION(MM)



# RF REMOTE CONTROLLER



## LED Function Instruction

Press any button and shows red: Current selection is to control the camera 1;  
Press any button and shows green: Current selection is to control the camera 2;  
Press any button and shows blue: Current selection is to control the camera 3;

## CAM1/CAM2/CAM3

Short press to select the camera 1/2/3



Focus (Left): +/-  
Manual focus, only valid under manual focus model;  
Zoom (Right): +/-  
Control the lens zoom rate;



## Navigation : Up/Down/Left/Right

In normal working mode, use navigate key to control pan/tilt;

Confirm/Home button:

In normal working mode, short press to let the camera go back to Home position.



Menu button: show the camera version



## Number buttons

Set Preset: Long press(3seconds) the number button to save preset;

Clear Preset: Clear + number button to clear the relative preset;

Long press(3seconds) the Clear button to clear all preset;

Run Preset: Short press the number button to run the relative preset.

Power button 

In normal work mode, short press one time, camera will enter standby mode;  
short press again, the camera will start self-configuration and go to HOME position;

## Camera address setting from remote control

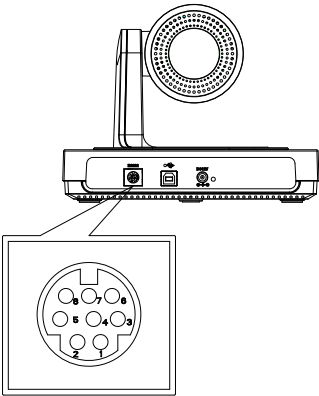
1.Power off other cameras in the room, then power on the camera wait to pair

2.Holding CAM1/CAM2/CAM buttons to set need camera addressK

LED will flash 3 times showing you a successfully setting.



# VISCA IN PORT



| No. | function |
|-----|----------|
| 1   | DTR      |
| 2   | DSR      |
| 3   | TXD      |
| 4   | GND      |
| 5   | RXD      |
| 6   | A        |
| 7   | IR OUT   |
| 8   | B        |

VISCA IN & RS485 Connection

| Camera VISCA IN |        | RS485 |
|-----------------|--------|-------|
| 1               | DTR    |       |
| 2               | DSR    |       |
| 3               | TXD    |       |
| 4               | GND    | GND   |
| 5               | RXD    |       |
| 6               | A(+)   | A(+)  |
| 7               | IR OUT |       |
| 8               | B(-)   | B(-)  |

VISCA IN&DB9 Connection

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

## SERIAL PORT CONFIGURATION:

| Parameter | Value              | Parameter  | Value |
|-----------|--------------------|------------|-------|
| Baud rate | 2400, 9600, 115200 | Stop Bit   | 1bit  |
| Start Bit | 1 bit              | Verify Bit | None  |
| Date Bit  | 8 bit              |            |       |

# VISCA PROTOCOL

## Part1 Camera Return Command

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

z = camera address + 8

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

## Part2 Camera Control Command

| Command                                   | Function       | Command package                        | Note                                                                 |
|-------------------------------------------|----------------|----------------------------------------|----------------------------------------------------------------------|
| AddressSet                                | Broadcast      | 88 30 01 FF                            | Address setting                                                      |
| IF_Clear                                  | Broadcast      | 88 01 00 01 FF                         | I/F Clear                                                            |
| CAM_Power                                 | On             | 8x 01 04 00 02 FF                      | Power ON/OFF                                                         |
|                                           | Off            | 8x 01 04 00 03 FF                      |                                                                      |
| Part 2 Camera Control Command<br>CAM_Zoom | Stop           | 8x 01 04 07 00 FF                      | p = 0(low)~7(high)<br><br>pqrs: Zoom Position (0(wide)~0x4000(tele)) |
|                                           | Tele(Standard) | 8x 01 04 07 02 FF                      |                                                                      |
|                                           | Wide(Standard) | 8x 01 04 07 03 FF                      |                                                                      |
|                                           | Tele(Variable) | 8x 01 04 07 2p FF                      |                                                                      |
|                                           | Wide(Variable) | 8x 01 04 07 3p FF                      |                                                                      |
|                                           | Direct         | 8x 01 04 47 0p 0q 0r 0s FF             |                                                                      |
| CAM_Focus                                 | Stop           | 8x 01 04 08 00 FF                      | pqrs: Focus Position                                                 |
|                                           | 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             |                                                                      |
|                                           | One Push AF    | 8x 01 04 18 01 FF                      |                                                                      |
| CAM_ZoomFocus                             | Direct         | 8x 01 04 47 0p 0q 0r 0s 0t 0u 0v 0w FF | pqrs: Zoom Position (0(wide)~0x4000(tele))<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                      |                                                                      |

| Command     | Founction        | Command package            | Note                          |
|-------------|------------------|----------------------------|-------------------------------|
|             | OnePush          | 8x 01 04 35 03 FF          |                               |
|             | Manual           | 8x 01 04 35 05 FF          |                               |
|             | Outdoor Auto     | 8x 01 04 35 06 FF          |                               |
|             | Sodium Lamp Auto | 8x 01 04 35 07 FF          |                               |
|             | Sodium Auto      | 8x 01 04 35 08 FF          |                               |
| CAM_RGain   | Reset            | 8x 01 04 03 00 FF          | Manual Control of R Gain      |
|             | Up               | 8x 01 04 03 02 FF          |                               |
|             | Down             | 8x 01 04 03 03 FF          |                               |
|             | Direct           | 8x 01 04 43 00 00 0p 0q FF | pq: R Gain (0~0xFF)           |
| CAM_Bgain   | Reset            | 8x 01 04 04 00 FF          | Manual Control of B Gain      |
|             | Up               | 8x 01 04 04 02 FF          |                               |
|             | Down             | 8x 01 04 04 03 FF          |                               |
|             | Direct           | 8x 01 04 44 00 00 0p 0q FF | pq: B Gain (0~0xFF)           |
| CAM_AE      | Full Auto        | 8x 01 04 39 00 FF          | Automatic Exposure mode       |
|             | Manual           | 8x 01 04 39 03 FF          | Manual Control 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 (0~0x15) |
| 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 (0~ 0x11)   |
| 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 Positon (0~0x0E)     |
| CAM_Bright  | Reset            | 8x 01 04 0D 00 FF          | Bright Setting                |
|             | Up               | 8x 01 04 0D 02 FF          |                               |
|             | Down             | 8x 01 04 0D 03 FF          |                               |
|             | Direct           | 8x 01 04 4D 00 00 0p 0q FF | pq: Bright I Positon ()       |
| CAM_WDR     | On               | 8x 01 04 3D 02 FF          | WDR ON/OFF                    |

| Command                | Founction         | Command package            | Note                                                                                                                                                                     |
|------------------------|-------------------|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                        | Off               | 8x 01 04 3D 03 FF          |                                                                                                                                                                          |
|                        | Direct            | 8x 01 04 D3 0p FF          | pq: WDR Position (1~0x06)                                                                                                                                                |
| CAM_BackLight          | On                | 8x 01 04 33 02 FF          | BackLight On                                                                                                                                                             |
|                        | Off               | 8x 01 04 33 03 FF          | BackLight Off                                                                                                                                                            |
| 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 (0~0x04)                                                                                                                                               |
| CAM_Memory             | Reset             | 8x 01 04 3F 00 0p FF       | p: Memory Number(=0 to 127)<br>Corresponds to 0 to 9 on the Remote Commander                                                                                             |
|                        | Set               | 8x 01 04 3F 01 0p FF       |                                                                                                                                                                          |
|                        | Recall            | 8x 01 04 3F 02 0p FF       |                                                                                                                                                                          |
| CAM_LR_Reverse         | On                | 8x 01 04 61 02 FF          | Image Flip Horizontal ON/OFF                                                                                                                                             |
|                        | Off               | 8x 01 04 61 03 FF          |                                                                                                                                                                          |
| CAM_PictureFlip        | On                | 8x 01 04 66 02 FF          | Image Flip Vertical ON/OFF                                                                                                                                               |
|                        | Off               | 8x 01 04 66 03 FF          |                                                                                                                                                                          |
| CAM_ColorGain          | Direct            | 8x 01 04 49 00 00 00 0p FF | (0~0x0E)                                                                                                                                                                 |
| CAM_2D Noise Reduction | Direct            | 8x 01 04 53 0p FF          | 0Ω OFF 1Ω ON                                                                                                                                                             |
| CAM_3D Noise Reduction | Direct            | 8x 01 04 54 0p FF          | 0:OFF 1ΩAUTO 2~5ΩLEVEL                                                                                                                                                   |
| FLICK                  | 50HZ              | 81 01 04 23 01 FF          |                                                                                                                                                                          |
|                        | 60HZ              | 81 01 04 23 02 FF          |                                                                                                                                                                          |
| Freeze                 | Freeze On         | 81 01 04 62 02 FF          | Freeze On Immediately                                                                                                                                                    |
|                        | Freeze Off        | 81 01 04 62 03 FF          | Freeze Off Immediately                                                                                                                                                   |
|                        | Preset Freeze On  | 81 01 04 62 22 FF          | Freeze On When Running Preset                                                                                                                                            |
|                        | Preset Freeze Off | 81 01 04 62 23 FF          | Freeze Off When Running Preset                                                                                                                                           |
| IR_Transfer            | Transfer On       | 8x 01 06 1A 02 FF          | Receive IR(remote commander)<br>CODE from VISCA communication<br>ON/OFF                                                                                                  |
|                        | Transfer Off      | 8x 01 06 1A 03 FF          |                                                                                                                                                                          |
| Pan_tiltDrive          | Up                | 8x 01 06 01 VV WW 03 01 FF | VV: Pan speed 0x01 (low speed)<br>to 0x18 (high speed)<br>WW: Tilt speed 0x01 (low speed)<br>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 |                                                                                                                                                                          |

| Command          | Founction        | Command package                              | Note                                                                                      |
|------------------|------------------|----------------------------------------------|-------------------------------------------------------------------------------------------|
|                  | DownLeft         | 8x 01 06 01 VV WW 01 02 FF                   |                                                                                           |
|                  | DownRight        | 8x 01 06 01 VV WW 02 02 FF                   |                                                                                           |
|                  | Stop             | 8x 01 06 01 VV WW 03 03 FF                   |                                                                                           |
|                  | AbsolutePosition | 8x 01 06 02 VV WW 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF |                                                                                           |
|                  | RelativePosition | 8x 01 06 03 VV WW 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF |                                                                                           |
|                  | Home             | 8x 01 06 04 FF                               |                                                                                           |
|                  | Reset            | 8x 01 06 05 FF                               |                                                                                           |
| Pan-tiltLimitSet | Set              | 8x 01 06 07 00 0W 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF | W:1 UpRight 0:DownLeft<br>YYYY: Pan Limit Position(TBD)<br>ZZZZ: Tilt Limit Position(TBD) |
|                  | Clear            | 8x 01 06 07 01 0W 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF |                                                                                           |

### Part3 Inquiry Command

| Command           | Command Packet | Return Packet              | Note                       |
|-------------------|----------------|----------------------------|----------------------------|
| CAM_PowerInq      | 8x 09 04 00 FF | y0 50 02 FF<br>y0 50 03 FF | On<br>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<br>y0 50 03 FF | Auto Focus<br>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_ReverseInq   | 8x 09 04 61 FF | y0 50 02 FF                      | On                                   |
|                     |                | y0 50 03 FF                      | Off                                  |
| CAM_PictureFlipInq  | 8x 09 04 66 FF | y0 50 02 FF                      | On                                   |
|                     |                | y0 50 03 FF                      | Off                                  |
| CAM_IDInq           | 8x 09 04 22 FF | y0 50 0p 0q 0r 0s FF             | pqrs: Camera ID                      |
| CAM_VersionInq      | 8x 09 00 02 FF | y0 50 ab cd mn pq rs tu vw FF    |                                      |
|                     |                | y0 50 02 FF                      | On                                   |
| IR_Transfer         | 8x 09 06 1A FF | y0 50 03 FF                      | Off                                  |
|                     |                |                                  |                                      |
| Pan-tiltMaxSpeedInq | 8x 09 06 11 FF | y0 50 ww zz FF                   | ww: PanMaxSpeed zz: Tilt Max Speed   |
| Pan-tiltPosInq      | 8x 09 06 12 FF | y0 50 0w 0w 0w 0w 0z 0z 0z 0z FF | www: PanPosition zzzz: Tilt Position |

Note:  $\tilde{x}$  means the camera address ;  $\tilde{y}$   $\tilde{R} = \tilde{x} + 8\tilde{R}$  .

#### VISCA PAN TILT ABSOL UTE POSITION VALUE

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

#### VISCA PAN TILT SPEED VALUE

| Pan(degree/second) |     | tilt(degree/second) |     |
|--------------------|-----|---------------------|-----|
| 0                  | 0.3 | 0                   | 0.3 |
| 1                  | 1   | 1                   | 1   |
| 2                  | 1.5 | 2                   | 1.5 |
| 3                  | 2.2 | 3                   | 2.2 |
| 4                  | 2.4 | 4                   | 3.6 |
| 5                  | 2.6 | 5                   | 4.7 |
| 6                  | 2.8 | 6                   | 6   |
| 7                  | 3.0 | 7                   | 8   |
| 8                  | 3.2 | 8                   | 10  |
| 9                  | 3.4 | 9                   | 12  |
| 10                 | 3.8 | 10                  | 15  |
| 11                 | 4.5 | 11                  | 18  |
| 12                 | 6   | 12                  | 23  |
| 13                 | 9   | 13                  | 30  |

|    |     |    |    |
|----|-----|----|----|
| 14 | 15  | 14 | 39 |
| 15 | 19  | 15 | 48 |
| 16 | 25  | 16 | 59 |
| 17 | 32  | 17 | 69 |
| 18 | 38  | 18 | 80 |
| 19 | 45  |    |    |
| 20 | 58  |    |    |
| 21 | 75  |    |    |
| 22 | 88  |    |    |
| 23 | 105 |    |    |
| 24 | 120 |    |    |

| Shutter speed |    | 60/30mode | 50/25mode | Iris |    |       |
|---------------|----|-----------|-----------|------|----|-------|
|               | 21 | 1/10000   | 1/10000   |      | 0  | close |
|               | 20 | 1/6000    | 1/6000    |      | 1  | F14   |
|               | 19 | 1/4000    | 1/3500    |      | 2  | F11   |
|               | 18 | 1/3000    | 1/2500    |      | 3  | F9.6  |
|               | 17 | 1/2000    | 1/1750    |      | 4  | F8    |
|               | 16 | 1/1500    | 1/1250    |      | 5  | F6.8  |
|               | 15 | 1/1000    | 1/1000    |      | 6  | F5.6  |
|               | 14 | 1/725     | 1/600     |      | 7  | F4.8  |
|               | 13 | 1/500     | 1/425     |      | 8  | F4    |
|               | 12 | 1/350     | 1/300     |      | 9  | F3.4  |
|               | 11 | 1/250     | 1/215     |      | 10 | F2.8  |
|               | 10 | 1/180     | 1/150     |      | 11 | F2.4  |
|               | 9  | 1/125     | 1/120     |      | 12 | F2    |
|               | 8  | 1/100     | 1/100     |      | 13 | F1.6  |
|               | 7  | 1/90      | 1/75      |      |    |       |
|               | 6  | 1/60      | 1/50      |      |    |       |
|               | 5  | 1/30      | 1/25      |      |    |       |
|               | 4  | 1/15      | 1/12      |      |    |       |
|               | 3  | 1/8       | 1/6       |      |    |       |
|               | 2  | 1/4       | 1/3       |      |    |       |
|               | 1  | 1/2       | 1/2       |      |    |       |
|               | 0  | 1/1       | 1/1       |      |    |       |
| Gain          | 0  | 0dB       |           | Gain | 8  | 16dB  |
|               | 1  | 2dB       |           |      | 9  | 18dB  |
|               | 2  | 4dB       |           |      | 10 | 20dB  |
|               | 3  | 6dB       |           |      | 11 | 22dB  |
|               | 4  | 8dB       |           |      | 12 | 24dB  |
|               | 5  | 10dB      |           |      | 13 | 26dB  |
|               | 6  | 12dB      |           |      | 14 | 28dB  |
|               | 7  | 14dB      |           |      | 15 | 30dB  |

# PELCO-D PROTOCOL COMMAND LIST

| Function                     | Byte1 | Byte2   | Byte 3 | Byte 4 | Byte5           | Byte6          | Byte 7 |
|------------------------------|-------|---------|--------|--------|-----------------|----------------|--------|
| Up                           | 0xFF  | Address | 0x00   | 0x08   | Pan Speed       | Tilt Speed     | SUM    |
| Down                         | 0xFF  | Address | 0x00   | 0x10   | Pan Speed       | Tilt Speed     | SUM    |
| Left                         | 0xFF  | Address | 0x00   | 0x04   | Pan Speed       | Tilt Speed     | SUM    |
| Right                        | 0xFF  | Address | 0x00   | 0x02   | Pan Speed       | Tilt Speed     | SUM    |
| Upleft                       | 0xFF  | Address | 0x00   | 0x0C   | Pan Speed       | Tilt Speed     | SUM    |
| Upright                      | 0xFF  | Address | 0x00   | 0x0A   | Pan Speed       | Tilt Speed     | SUM    |
| DownLeft                     | 0xFF  | Address | 0x00   | 0x14   | Pan Speed       | Tilt Speed     | SUM    |
| DownRight                    | 0xFF  | Address | 0x00   | 0x12   | Pan Speed       | Tilt Speed     | SUM    |
| Zoom In                      | 0xFF  | Address | 0x00   | 0x20   | 0x00            | 0x00           | SUM    |
| Zoom Out                     | 0xFF  | Address | 0x00   | 0x40   | 0x00            | 0x00           | SUM    |
| Focus Far                    | 0xFF  | Address | 0x00   | 0x80   | 0x00            | 0x00           | SUM    |
| Focus Near                   | 0xFF  | Address | 0x01   | 0x00   | 0x00            | 0x00           | SUM    |
| Set Preset                   | 0xFF  | Address | 0x00   | 0x03   | 0x00            | Preset ID      | SUM    |
| Clear Preset                 | 0xFF  | Address | 0x00   | 0x05   | 0x00            | Preset ID      | SUM    |
| Call Preset                  | 0xFF  | Address | 0x00   | 0x07   | 0x00            | Preset ID      | SUM    |
| Query Pan Position           | 0xFF  | Address | 0x00   | 0x51   | 0x00            | 0x00           | SUM    |
| Query Pan Position Response  | 0xFF  | Address | 0x00   | 0x59   | Value High Byte | Value Low Byte | SUM    |
| Query Tilt Position          | 0xFF  | Address | 0x00   | 0x53   | 0x00            | 0x00           | SUM    |
| Query Tilt Position Response | 0xFF  | Address | 0x00   | 0x5B   | Value High Byte | Value Low Byte | SUM    |
| Query Zoom Position          | 0xFF  | Address | 0x00   | 0x55   | 0x00            | 0x00           | SUM    |
| Query Zoom Position Response | 0xFF  | Address | 0x00   | 0x5D   | Value High Byte | Value Low Byte | SUM    |

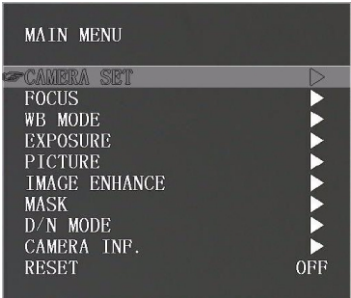


# PELCO-P PROTOCOL COMMAND LIST

| Function                     | Byte1 | Byte2   | Byte 3 | Byte 4 | Byte5           | Byte6          | Byte 7 | Byte 8 |
|------------------------------|-------|---------|--------|--------|-----------------|----------------|--------|--------|
| 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    |
| Query Zoom Position          | 0xA0  | Address | 0x00   | 0x55   | 0x00            | 0x00           | 0xAF   | XOR    |

# OSD MENU

1. Under working mode, press the menu button  on the IR remote, to enter the OSD menu; press the menu button again to exit and save modified parameters.



2. Use the navigate button to select the main menu. As above picture, once been selected, the main menu will change to grey color background, and the right side will show all parameters under this sub menu:



3. In the second grade menu, press the up/down navigate button to select the sub menu, use left/right navigate button to set the parameter;
4. Select the last option ñreturn ñand press the right navigate button to get back to previous menu;
5. Press OSD button  again to exit the menu.

|               |            |                       |
|---------------|------------|-----------------------|
| CAMERA<br>SET | LANGUAGE   | Chinese/English       |
|               | PROTOCOL   | VISCA/PELCO-P/PELCO-D |
|               | ADDRESS    | 1~7                   |
|               | BAUD RATE  | 2400,9600,115200      |
|               | PARITY BIT | NONE                  |
|               | RETURN     | Back to the main menu |

|          |                |                                                               |
|----------|----------------|---------------------------------------------------------------|
| FOCUS    | FOCUS MODE     | AUTO/MANUAL/PUSH                                              |
|          | SENSITIVITY    | LOW/MID/HIGH                                                  |
|          | FOCUS LIMIT    | 1.5M/2M/3M/6M/10M                                             |
|          | D_ZOOM         | OFF/ON                                                        |
|          | ZOOM SPEED     | 0-7                                                           |
|          | LENS INIT      | OFF/5K/10K/15K/20K/EXE                                        |
|          | DIS ZOOM RATIO | OFF/ON                                                        |
|          | RETURN         | Back to the main menu                                         |
| WB MODE  | WB MODE        | ATW/MANU/MANU2/SON./FL./AUTO/IDR./ODR./PUSH                   |
|          | B_GAIN         | 0~255 (Only Valid when WB MODE set to MANU)                   |
|          | R_GAIN         | 0~255 (Only Valid when WB MODE set to MANU)                   |
|          | RETURN         | Back to the main menu                                         |
| EXPOSURE | EXP MODE       | AUTO/MANU/IRIS/SHUT/BRL                                       |
|          | SHUT TIME      | Shutter time: 1/1~1/5000 Only Valid when EXP MODE set to MANU |
|          | IRIS           | Iris value: 0-13 Only Valid when EXP MODE set to MANU         |
|          | AGC            | Gain value: 0dB~15dB Only Valid when EXP MODE set to MANU     |
|          | BRIGHT         | Brightness value: 0-27 Only Valid when EXP MODE set to BRI    |
|          | SLOW SHUT      | OFF/ON                                                        |
|          | FLICK          | OFF/50HZ/60HZ                                                 |
|          | RETURN         | Back to the main menu                                         |
| PICTURE  | BRIGHTNESS     | 1-15                                                          |
|          | SHARPNESS      | 0-15                                                          |

|                  |                 |                                             |
|------------------|-----------------|---------------------------------------------|
|                  | CONSTRAS<br>T   | 0-15                                        |
|                  | SATURATIO<br>N  | 0-14                                        |
|                  | MIRROR          | Image 180degree rotation left/right: OFF/ON |
|                  | PIC FLIP        | Image 180degree rotation up/down: OFF/ON    |
|                  | FREEZE          | OFF/ON                                      |
|                  | DEFOG           | OFF/1-15                                    |
|                  | RETURN          | Back to the main menu                       |
| IMAGE<br>ENHANCE | 2D NR           | OFF/ON/Ī                                    |
|                  | 3D NR           | OFF/AUTO/ 2-4                               |
|                  | D_WDR           | OFF/1-6                                     |
|                  | GAMMA           | 0-4                                         |
|                  | BACKLIGHT       | OFF/ON                                      |
|                  | HIGHLIGHT       | OFF/ON                                      |
|                  | RETURN          | Back to the main menu                       |
| MASK             | MASK<br>SWITCH  | ON/OFF                                      |
|                  | COLOUR          | WHITE/YELLOW/GRAY/GREEN/VIOLET/RED/         |
|                  | INDEX           | 1-8                                         |
|                  | INDEX<br>SWITCH | OFF/ON                                      |
|                  | ROW START       | 0-1919                                      |
|                  | ROW END         | 1-1920                                      |
|                  | LINE START      | 0-1079                                      |
|                  | LINE END        | 1-1079                                      |
|                  | RETURN          | Back to the main menu                       |
| D/N MODE         | D/N MODE        | DAY/NIGHT/AUTO/EXT                          |
|                  | DAY TO<br>NIGHT | 15-126                                      |
|                  | NIGHT TO<br>DAY | 5-190                                       |

|                |                 |                                                |
|----------------|-----------------|------------------------------------------------|
|                | SWITCH<br>DELAY | 1-60                                           |
|                | GAIN LIMIT      | 2-511                                          |
|                | RETURN          | Back to the main menu                          |
| CAMERA<br>INF. | IMAGE VER.      | PC-V0.0.6 (changes without additional notices) |
|                | IMAGE DATE      | 16.10.20 (changes without additional notices)  |
|                | CONTROL<br>VER. | UC V0.1.4 (changes without additional notices) |
|                | CONTROL<br>DATE | 17.01.07 (changes without additional notices)  |
|                | BAUDRATE        | 9600                                           |
|                | PARITY BIT      | NONE                                           |
|                | FRAMERATE       | 1080P30                                        |
|                | RETURN          | Back to the main menu                          |

## UVC CONTROL

|    | Control Requests                     | Control Selector                         |
|----|--------------------------------------|------------------------------------------|
| 1  | Brightness Control                   | PU_BRIGHTNESS_CONTROL                    |
| 2  | Contrast Control                     | PU_CONTRAST_CONTROL                      |
| 3  | Hue Control                          | PU_HUE_CONTROL                           |
| 4  | Saturation Control                   | PU_SATURATION_CONTROL                    |
| 5  | Sharpness Control                    | PU_SHARPNESS_CONTROL                     |
| 6  | Gamma Control                        | PU_GAMMA_CONTROL                         |
| 7  | White Balance Temperature<br>Control | PU_WHITE_BALANCE_TEMPERATURE_CONTR<br>OL |
| 8  | Gain Control                         | PU_GAIN_CONTROL                          |
| 9  | Power Line Frequency Control         | PU_POWER_LINE_FREQUENCY_CONTROL          |
| 10 | Zoom (Absolute) Control              | CT_ZOOM_ABSOLUTE_CONTROL                 |
| 11 | Zoom (Relative) Control              | CT_ZOOM_RELATIVE_CONTROL                 |
| 12 | PanTilt (Absolute) Control           | CT_PANTILT_ABSOLUTE_CONTROL              |
| 13 | PanTilt (Relative) Control           | CT_PANTILT_RELATIVE_CONTROL              |

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