TLC-700-U3
USB3.0 HD Video Camera

User Manual

Version V1.0（English）

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（**English**）

Contents

SAFETY GUIDES

1.Before operation, please fully read and follow all instructions in the manual. For your safety, always keep this manual with the camera.

2.The camera power input range is **100-240VAC(50-60Hz)**,ensure the power supply input within this rate before powering on.

3.The camera power voltage is 12VDC, rated currency is 2A. We suggest 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℃, humidity less than 90%.To avoid any danger, do not put anything inside the camera, and keep away from the corrosive liquid.

6.Avoid stress, vibration and damp during transportation, storage and installation.

7.Do not detetch the camera housing and cover. For any service, please contact 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, such as the sun or the intensive light.

9.Use a dry and soft cloth to clean the camera housing. Applied with neutral cleaning agent when there is need 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 mechanical trouble, do not rotate the camera head by hand.

11.Put the camera on fixed and smooth desk or platform, avoid leaned installation.

12. Power Supply Polarity(Drawing)
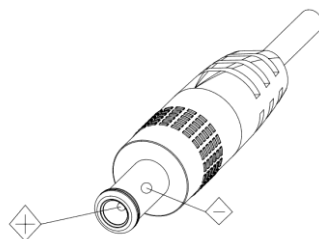
Note: the video quality may be affected by the specific frequencies of electromagnetic filed.
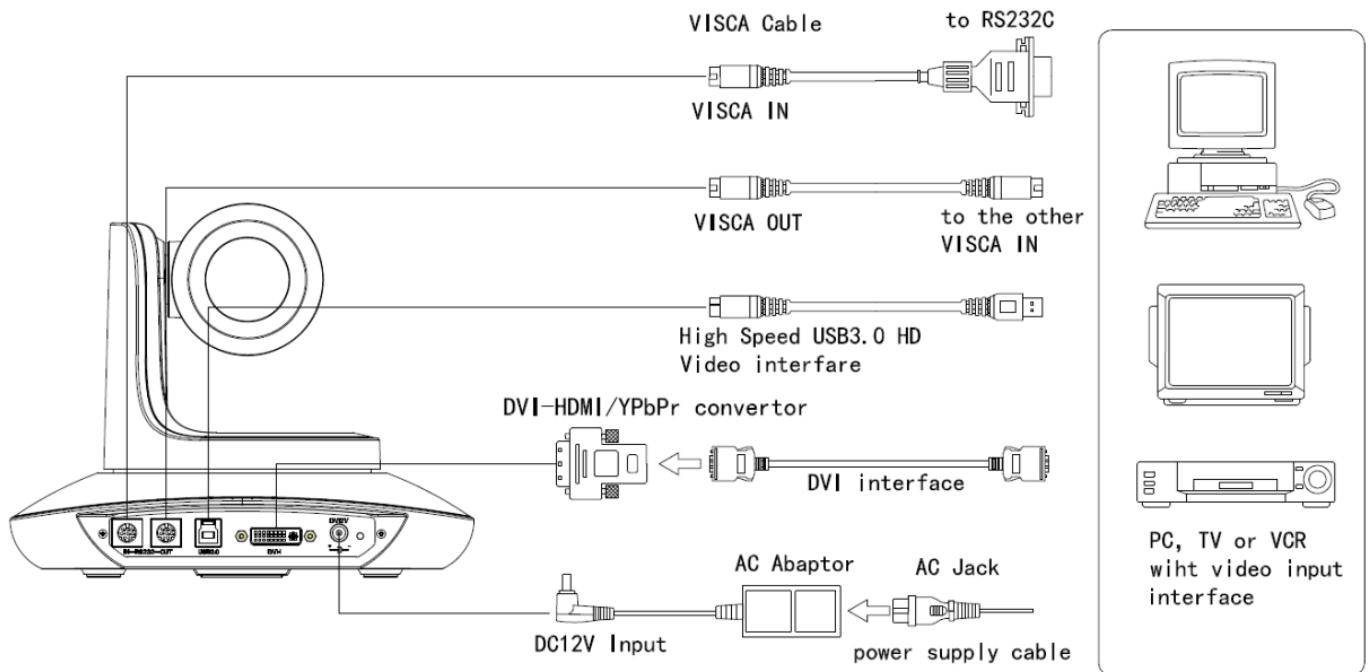
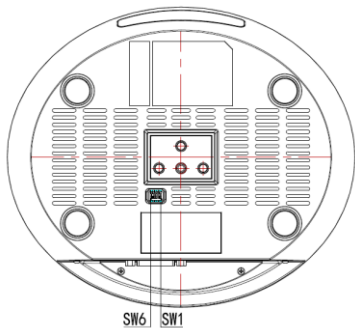# ACCESSORIES

Check all bellow items when open the package:
Camera ………………………………………………1
Power Adapter …………………………………………1
Power Cable ……………………………………………1
RS232 Control Cable ……………………………………1
USB3.0 Cable …………………………………………1
Remote Controller ……………………………………1
User Manual ……………………………………………1
Double-sided Adhesive …………………………………1

QUICK START

1.Check all cable connections before power on.

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

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

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

| Dial Switch（IR CODE TYPE）			
	SW-3	SW-4	Instruction
1	OFF	OFF	Off(Close IR receiver)
2	ON	OFF	Undefined
3	OFF	ON	SEJIN 4PPM CODE
4	ON	ON	NEC CODE(standard)

PRODUCT HIGHLIGHTS

1. Fashionable and smart design, with advanced DSP, 1/2.86 inch sensor, provides ultra crystal and smooth image.
2. 20X optical zoom & 12X digital zoom, specially designed for big rooms application.
2. DVI-I(HDMI) &USB3.0 simultaneously output.
3. Fast switching between different video format: only 3 seconds needed.
4. USB2.0 compatible.
5.Daisy chain function: with both Visca in and Visca out port.
6. Multi language menu: English, Chinese, Russian, Spanish.
7.IR transfer/IR pass function: except receiving the camera remote controller signal, the camera can also receive other codec's IR remote control signal, and pass these IR control signal to the codec's IR receiver (via VISCA IN port).

CAMERA SPEC

1. Video Format: 1080p60/50/30/25; 720p60/50/30/25; 1080i60/50.
2. Video Output: DVI-I(HDMI), USB3.0
3. Sensor：1/2.86 inch 2.3MP HD CMOS sensor
4. Lens：f4.7～94mm(20X optical zoom)，F1.6 – 3.5
5. Angle of View: 57.4°
5.Rotation Angle: Pan rotation:±170°; Tilt rotation: -30° ~+90°, support up-side down installation
6. Rotation Speed: Pan speed:0.1°-120°/s; Tile speed: 0.1°-80°/s
7.Preset: 10 via IR remote setting, (128 via COM setting）, preset accuracy :0.1°
8. Support Auto/Manual White Balance, Auto/Manual Exposure (Iris, Shutter), Auto/ Manual/ OnePush Focus.
9. Support WDR function.
10. Control signal port: 8 pin mini DIN--RS232, VISCA/Pelco-D/Pelco-P protocol
11. Power voltage: DC12V/2.0A; power port: HEC3800.
12.Max comsumption:12W
13. Working temperature: -5 ~ 45℃
14. Storage temperature:-20 ~ 60℃
15. Net weight: 1.25KG（2.8LBS）

CAMERA INTERFACE
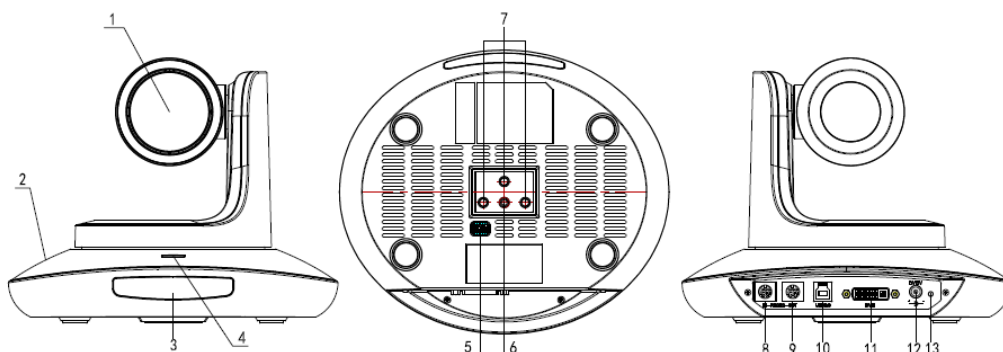
1. Camera Lens	5.Dial Switch	9.VISCA OUT port
2. Camera Base	6. Tripod Screw Hole	10.USB3.0 port
3. Power Indicator Light	7. Installation Hole	11.DVI-I port
4. IR Receiver Panel	8.VISCA IN port	12. Power Input 12VDC
		13.Power indicator

CAMERA DIMENSION(mm)
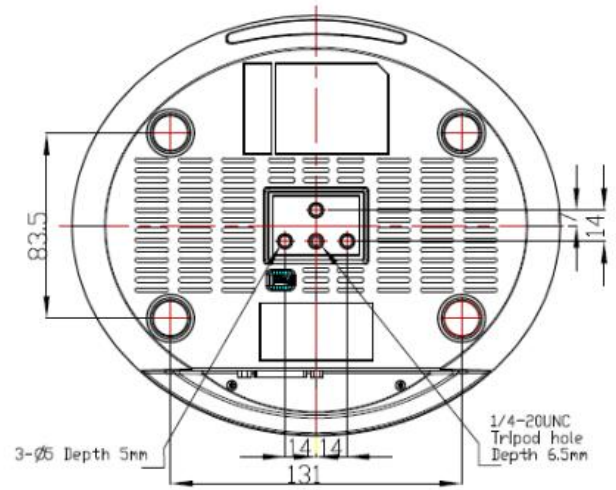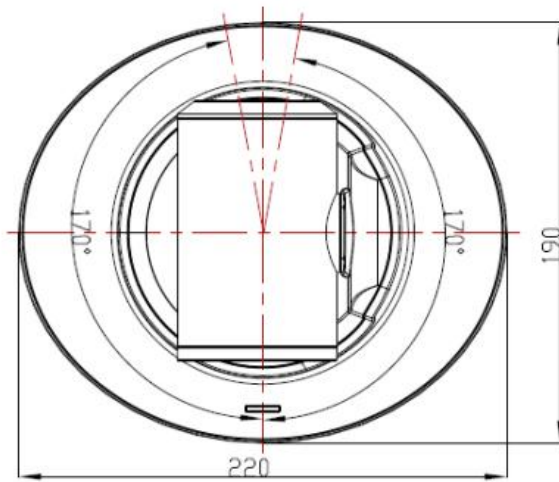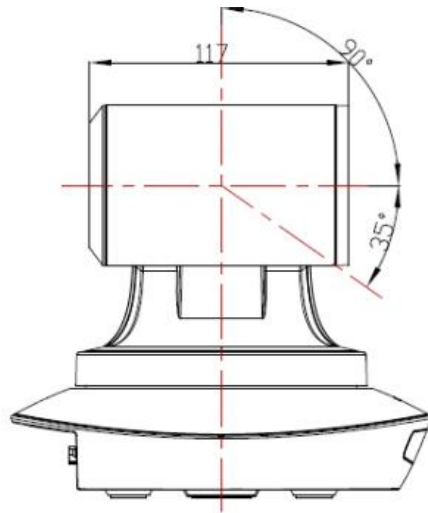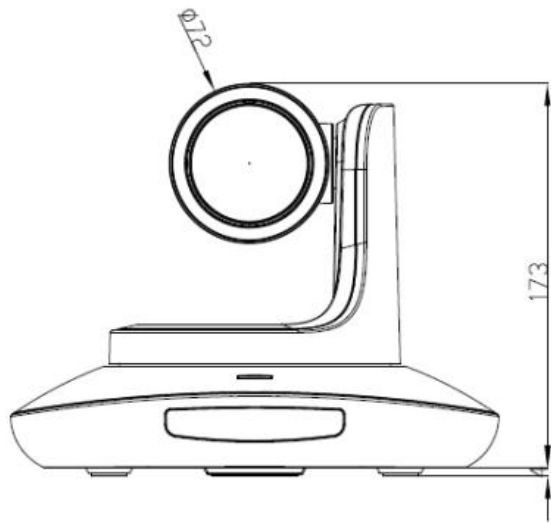
IR REMOTE CONTROLLER

POWER

Under normal working mode, short press POWER key, the camera will enter stand by mode;
Press it again, the camera will do self-configuration, then go back to HOME position.
It will go to preset position if power on model has been set before.

FREEZE

Short press FREEZE key to freeze/ unfreeze the image.(not work for USB3.0 camera)

IRT(IR Transfer/IR Pass)

Open or close the IR pass function. Once press the IRT key, the camera will receive and
pass the IR remote control signal to the codec/terminal(via VISCA IN port).
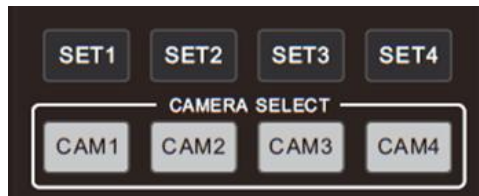
SET 1~SET4　ADDRESS SETTING

Long press for 3seconds until the key light ON, to set camera address.

CAM1~CAM4（CAMERA SELECTING）

Short press to select the relative camera.
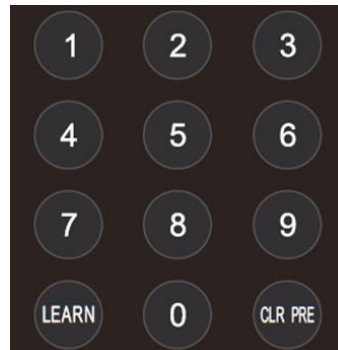
NUMBER KEY(1-9)

Set preset: long press(3 seconds) the number key to set preset.

Run preset: Short press the number key to run preset.

CLR PRE(CLEAR PRESET)

CLR PRE+ number key: to clear the relative preset.

Long press to clear all preset.

LEARN

Reserved, not available now.

FOCUS KEY(ON THE LEFT)

Manual focus, only valid under manual focus model.

ZOOM KEY(ON THE RIGHT SIDE)

Set the zoom rate

NAVIGATE KEY: UP/DOWN/LEFT/RIGHT

Under working mode, use navigate key to set the pan tilt, and select menu when enter OSD.

OK /HOME KEY

Under working mode, short press OK to make the camera go back to HOME position; and confirm the selection when enter OSD.

AF: Auto Focus

MF: Manual Focus

RESET: Reset camera

MENU: Enter OSD menu

LIMIT L: Set the pan tilt left limit position.

LIMIT R: Set the pan tilt right limit position.

LMT CLR: Clear the limit position.
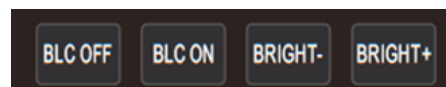
BLC OFF/ BLC ON：Close/open back light compensation

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

Video Format Keys:

Long press 3 seconds to select different video format output.

VISCA IN(RS232) PORT
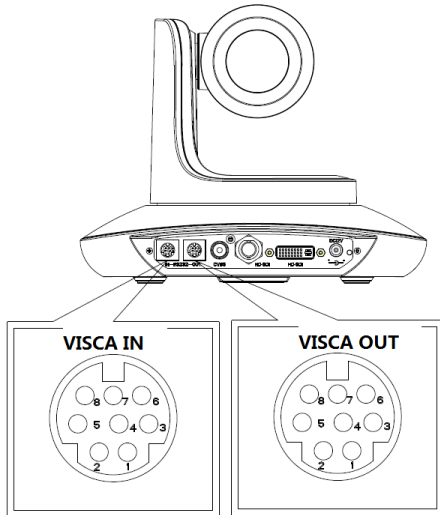
No.	Function
1	DTR
2	DSR
3	TXD
4	GND
5	RXD
6	A
7	IR OUT
8	B

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 & Mini DIN Connection

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

VISCA IN & DB9 Connection

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

VISCA Network Construction：
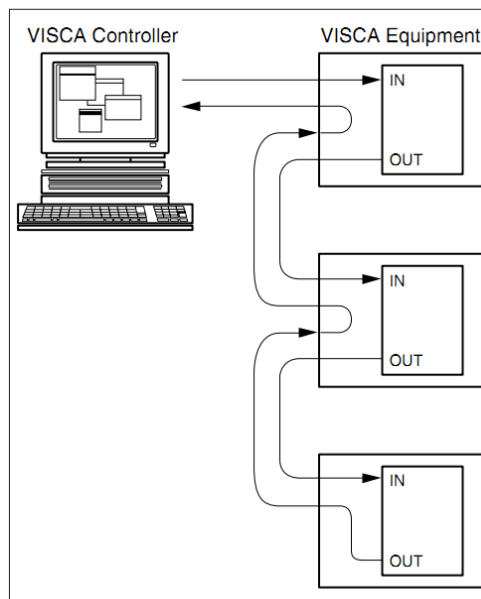
SERIAL PORT CONFIGURATION

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

VISCA PROTOCOL

Part1 Camera Return Command

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

z = camera adderss+8

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

Part 2 Camera Control Command

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 (0(wide) ~0x4000(tele))
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 0t 0u 0v 0w FF	pqrs: Zoom Position (0(wide)~ 0x4000(tele)) tuvw: Focus Position
CAM_WB	Auto	8x 01 04 35 00 FF	
	Indoor	8x 01 04 35 01 FF	
	Outdoor	8x 01 04 35 02 FF	
	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

Command	Function	Command Packet	Note
	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 l Positon ()
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 (0~0x0E)
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 (Preset)	Reset	8x 01 04 3F 00 0p FF	p: Memory Number(=0 to 127) Corresponds to 0 to 9 on the Remote Commander
	Set	8x 01 04 3F 01 0p FF	
	Recall	8x 01 04 3F 02 0p FF	
CAM_LR_Reverse	On	8x 01 04 61 02 FF	Image Flip Horizontal ON/OFF
	Off	8x 01 04 61 03 FF	
CAM_PictureFlip	On	8x 01 04 66 02 FF	Image Flip Vertical ON/OFF
	Off	8x 01 04 66 03 FF	
CAM_MountMode	UP	8x 01 04 A4 02 FF	Mount Up
	Down	8x 01 04 A4 03 FF	Mount Down
CAM_ColorGain	Direct	8x 01 04 49 00 00 00 0p FF	(0~0x0E)
CAM_3D Noise Reduction	Direct	8x 01 04 54 0p FF	(0~0x03)
FLICK	OFF	81 01 04 23 00 FF	

Command	Function	Command Packet	Note
	ON	81 01 04 23 01 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
VideoSystem Set		8x 01 06 35 00 pp FF	pp: 0~21 Video format 0:1080P60 1:1080P50 2:1080I60 3:1080I50 4:1080P30 5:1080P25 6:720P60 7:720P50 8:720P30 9:720P25 10:1024*768P30 11:800*600P30 12:1024*576P30 13:960*540P30 14:704*576P30 15:640*480P30 16:576*448P30 17:768*448P30 18:640*360P30 19:512*288P30 20:352*288P30 21:176*144P30
CAM_IDWrite		8x 01 04 22 0p 0q 0r 0s FF	pqrs: Camera ID (=0000 to FFFF)
SYS_Menu	Menu On	8x 01 06 06 02 FF	Turn on the menu
	Menu Off	8x 01 06 06 03 FF	Turn off the menu
	Menu Back	8x 01 06 06 10 FF	Menu step back
	Menu Ok	8x 01 7E 01 02 00 01 FF	Menu ok
IR_Transfer	Transfer On	8x 01 06 1A 02 FF	Receive IR(remote commander) CODE from VISCA communication ON/OFF
	Transfer Off	8x 01 06 1A 03 FF	
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) WW: Tilt speed 0x01 (low speed) to 0x14 (high speed) YYYY: Pan Position(TBD) ZZZZ: Tilt Position(TBD)
	Down	8x 01 06 01 VV WW 03 02 FF	
	Left	8x 01 06 01 VV WW 01 03 FF	
	Right	8x 01 06 01 VV WW 02 03 FF	
	Upleft	8x 01 06 01 VV WW 01 01 FF	
	Upright	8x 01 06 01 VV WW 02 01 FF	
	DownLeft	8x 01 06 01 VV WW 01 02 FF	
	DownRight	8x 01 06 01 VV WW 02 02 FF	
	Stop	8x 01 06 01 VV WW 03 03 FF	
	AbsolutePosition	8x 01 06 02 VV WW 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF	
	RelativePosition	8x 01 06 03 VV WW 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF	
	Home	8x 01 06 04 FF	
	Reset	8x 01 06 05 FF	
Pan-tiltLimitSet	Set	8x 01 06 07 00 0W 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF	W:1 UpRight 0:DownLeft YYYY: Pan Limit Position(TBD) ZZZZ: Tilt Limit Position(TBD)
	Clear	8x 01 06 07 01 0W 07 0F 0F 0F 07 0F 0F 0F FF	

Part 3 Inquiry Command

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_FocusModeInq	8x 09 04 38 FF	y0 50 02 FF	Auto Focus
		y0 50 03 FF	Manual Focus
CAM_FocusPosInq	8x 09 04 48 FF	y0 50 0p 0q 0r 0s FF	pqrs: Focus Position
CAM_WBModeInq	8x 09 04 35 FF	y0 50 00 FF	Auto
		y0 50 01 FF	Indoor mode
		y0 50 02 FF	Outdoor mode
		y0 50 03 FF	OnePush mode
		y0 50 04 FF	ATW
		y0 50 05 FF	Manual
CAM_RGainInq	8x 09 04 43 FF	y0 50 00 00 0p 0q FF	pq: R Gain
CAM_BGainInq	8x 09 04 44 FF	y0 50 00 00 0p 0q FF	pq: B Gain
CAM_AEModeInq	8x 09 04 39 FF	y0 50 00 FF	Full Auto
		y0 50 03 FF	Manual
		y0 50 0A FF	Shutter priority
		y0 50 0B FF	Iris priority
		y0 50 0D FF	Bright
CAM_ShutterPosInq	8x 09 04 4A FF	y0 50 00 00 0p 0q FF	pq: Shutter Position
CAM_IrisPosInq	8x 09 04 4B FF	y0 50 00 00 0p 0q FF	pq: Iris Position
CAM_GainPosiInq	8x 09 04 4C FF	y0 50 00 00 0p 0q FF	pq: Gain Position
CAM_ BrightPosiInq	8x 09 04 4D FF	y0 50 00 00 0p 0q FF	pq: Bright Position
CAM_ExpCompModeInq	8x 09 04 3E FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_ExpCompPosInq	8x 09 04 4E FF	y0 50 00 00 0p 0q FF	pq: ExpComp Position
CAM_ApertureInq	8x 09 04 42 FF	y0 50 00 00 0p 0q FF	pq: Aperture Gain
CAM_MemoryInq	8x 09 04 3F FF	y0 50pp FF	pp: Memory number last operated.
SYS_MenuModeInq	8x 09 06 06 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_LR_ReverseInq	8x 09 04 61 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_PictureFlipInq	8x 09 04 66 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_IDInq	8x 09 04 22 FF	y0 50 0p 0q 0r 0s FF	pqrs: Camera ID
CAM_VersionInq	8x 09 00 02 FF	y0 50 ab cd mn pq rs tu vw FF	
VideoSystemInq	8x 09 06 23 FF	y0 50 pp FF	pp: 0~21 Video format 0:1080P60 1:1080P50 2:1080I60 3:1080I50 4:1080P30 5:1080P25 6:720P60 7:720P50 8:720P30 9:720P25 10:1024*768P30 11:800*600P30 12:1024*576P30 13:960*540P30 14:704*576P30 15:640*480P30 16:576*448P30 17:768*448P30 18:640*360P30 19:512*288P30 20:352*288P30 21:176*144P30

IR_Transfer	8x 09 06 1A FF	y0 50 02 FF	On
		y0 50 03 FF	Off
IR_Receive	8x 09 06 08 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
IR_ReceiveReturn		y0 07 7D 01 04 00 FF	Power ON/OFF
		y0 07 7D 01 04 07 FF	Zoom tele/wide
		y0 07 7D 01 04 38 FF	AF On/Off
		y0 07 7D 01 04 33 FF	CAM_Backlight
		y0 07 7D 01 04 3F FF	CAM_Memory
		y0 07 7D 01 06 01 FF	Pan_tiltDrive
Pan-tiltMaxSpeedInq	8x 09 06 11 FF	y0 50 ww zz FF	ww: Pan Max Speed zz: Tilt Max Speed
Pan-tiltPosInq	8x 09 06 12 FF	y0 50 0w 0w 0w 0w 0z 0z 0z 0z FF	wwww: Pan Position zzzz: Tilt Position

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

VISCA Pan Tilt Absolute Position Value

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

VISCA PanTilt Speed Value

Pan(degree/second)		tilt(degree/second)	
0	0.1	0	0.1
1	1	1	1
2	2	2	2
3	3.5	3	3
4	5	4	4.5
5	6.5	5	5.5
6	7.5	6	6.5
7	8.5	7	8
8	10	8	10
9	12	9	12
10	15	10	15
11	18	11	18
12	21	12	21
13	24	13	24
14	27	14	26
15	31	15	29
16	35	16	33
17	40	17	35
18	50	18	38
19	60		
20	70		
21	85		
22	100		
23	140		
24	180		

VISCA Exposure Value

	Value	NTSC	PAL		Value	F no.
Shutter speed	15	1/10000(1/20000)	1/10000(1/20000)	Iris	00	close
	14	1/6000(1/12000)	1/6000(1/12000)		05	F14
	13	1/4000(1/8000)	1/3500(1/7000)		06	F11
	12	1/3000(1/6000)	1/2500(1/5000)		07	F9.6
	11	1/2000(1/4000)	1/1750(1/3500)		08	F8
	10	1/1500(1/3000)	1/1250(1/2500)		09	F6.8
	0F	1/1000(1/2000)	1/1000(1/2000)		0A	F5.6
	0E	1/725(1/1450)	1/600(1/1200)		0B	F4.8
	0D	1/500(1/1000)	1/425(1/850)		0C	F4
	0C	1/350(1/700)	1/300(1/600)		0D	F3.4
	0B	1/250(1/500)	1/215(1/430)		0E	F2.8
	0A	1/180(1/360)	1/150(1/300)		0F	F2.4
	09	1/125(1/250)	1/120(1/240)		10	F2
	08	1/100(1/200)	1/100(1/200)		11	F1.6
	07	1/90(1/180)	1/75(1/150)			
	06	1/60(1/120)	1/50(1/100)			
	05	1/30(1/60)	1/25(1/50)			
	04	1/15(1/30)	1/12(1/25)			
	03	1/8(1/15)	1/6(1/12)			
	02	1/4(1/8)	1/3(1/6)			
	01	1/2(1/4)	1/2(1/3)			
	00	1/1(1/2)	1/1(1/2)			
Gain	00	−3dB		Gain	08	14dB
	01	0dB			09	16dB
	02	2dB			0A	18dB
	03	4dB			0B	20dB
	04	6dB			0C	22dB
	05	8dB			0D	24dB
	06	10dB			0E	26dB
	07	12dB			0F	28dB

Zoom Rate & Zoom Value

Optical Zoom		Digital Zoom	
Zoom Rate	Zoom Value	Zoom	Rate
x1(wide)	0x0000	x1	0x4000
x2	0x1851	x2	0x6000
x3	0x22BE	x3	0x6A80
x4	0x28F6	x4	0x7000
x5	0x2D45	x5	0x7300
x6	0x3086	x6	0x7540
x7	0x3320	x7	0x76C0
x8	0x3549	x8	0x7800
x9	0x371E	x9	0x78C0
x10	0x38B3	x10	0x7980
x11	0x3A12	x11	0x7A00

x12	0x3B42	x12	0x7AC0
x13	0x3C47		
x14	0x3D25		
x15	0x3DDF		
x16	0x3E7B		
x17	0x3EFB		
x18	0x3F64		
x19	0x3FBA		
x20(tele)	0x4000		

PELCO-D PROTOCOL

Function	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
Up	0xFF	Address	0x00	0x08	Pan Speed	Tilt Speed	SUM
Down	0xFF	Address	0x00	0x10	Pan Speed	Tilt Speed	SUM
Left	0xFF	Address	0x00	0x04	Pan Speed	Tilt Speed	SUM
Right	0xFF	Address	0x00	0x02	Pan Speed	Tilt Speed	SUM
Upleft	0xFF	Address	0x00	0x0C	Pan Speed	Tilt Speed	SUM
Upright	0xFF	Address	0x00	0x0A	Pan Speed	Tilt Speed	SUM
DownLeft	0xFF	Address	0x00	0x14	Pan Speed	Tilt Speed	SUM
DownRight	0xFF	Address	0x00	0x12	Pan Speed	Tilt Speed	SUM
Zoom In	0xFF	Address	0x00	0x20	0x00	0x00	SUM
Zoom Out	0xFF	Address	0x00	0x40	0x00	0x00	SUM
Focus Far	0xFF	Address	0x00	0x80	0x00	0x00	SUM
Focus Near	0xFF	Address	0x01	0x00	0x00	0x00	SUM
Set Preset	0xFF	Address	0x00	0x03	0x00	Preset ID	SUM
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

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
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

OSD MENU

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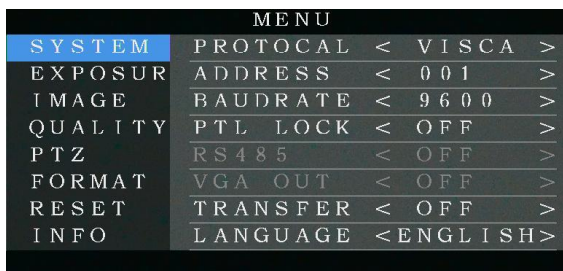

2.After enter the main menu, use the navigate key [UP] [DOWN] to select the main menu. Once been selected, the main menu will change to blue background, and the right side will show all sub menu options .

3.Press the navigate key [RIGHT] to enter sub menu; use [UP] [DOWN] key to select the sub menu;use [LEFT] [RIGHT] key to select parameter.

4. Press the MENU key again to return to previous menu. Press the MENU key continuously to exit the OSD menu.

Before exiting, will show up a window to select whether need to save all settings(use [LEFT] [RIGHT] key to set). As bellow:
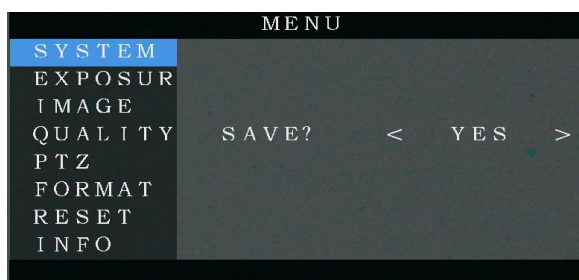
5.OSD Menu Setting List

SYSTEM	PROTOCOL	VISCA,PELCO-P,PELCO-D
	ADDRESS	VISCA:1~7 PELCO-P/D:1~255
	BAUD RATE	2400,4800,9600,115200
	PTL LOCK	Protocol lock: once set, above protocol setting will be locked, to avoid changes
	RS485	RS485 ON/OFF (RS485 function is customized)
	VGA OUT	VGA output can be YPbPr or VGA output (customized)
	TRANSFER	IR Transfer/IR Pass function
	LANGUAGE	Chinese, English, Spanish, Russian

EXPOSURE	EXPOSURE MODE	AUTO、MANUAL、BRIGHT、SHUTTER、IRIS
	SHUTTER	Shutter speed:1/8~1/10000, only valid under manual/SHUTTER mode
	IRIS	Iris setting:CLOSE~F1.8, only valid under manual/IRIS mode
	GAIN	Gain setting:0dB~28dB , only valid under manual/GAIN mode
	BRIGHT	Bright setting:0~15, only valid under bright priority mode.
	BLC	Back light compensation ON/FF
	BLC LEVEL	Set back light compensation level

IMAGE	WB MODE	White Balance: AUTO、INDOOR、OUTDOOR、MANUAL、ONEPUSH、ATW
	R GAIN	Red gain level: 0~255, only valid under manual white balance mode.
	B GAIN	Blue gain level:0~255 , only valid under manual white balance mode.
	COLOR G	Color gain setting: 0~14
	FLICK	Anti-Flicker setting:ON/OFF, to reduce the video flicker

QUALITY	2D NR	2D noise reduction:0~5, the bigger value, the less noise on image, the lower resolution
	3D NR	3D noise reduction:0~3, the bigger value, the less motion noise on image.
	SHARPNESS	Sharpness setting: 0~6, the higher value, the higher resolution.
	CONTRAST	Set contrast value
	SATURATION	Set saturation value
	TRACK MOD	Track mode:PRECISE/FLUENT
	GAMMA	Set gamma value

PTZ	PWR ACT	Set power on action: OFF, PRE1, PRE2
	SPEEDBYZ	Speed by zoom: proportional speed, the bigger zoom, the slower speed.
	MOUNT M	Mount mode: up, down
	FLIP.HOR	Flip horizontal
	FLIP VER	Flip vertical
	PT SPD	Set pan tilt speed
	ZOOM SPD	Set zoom speed
	MENU MIR	Menu mirror function

VIDEO FORMAT	1080P60	720P30	576*448P30	
	1080P50	720P25	768*448P30	
	1080I60	1024*768P30	640*360P30	
	1080I50	800*600P30	512*288P30	Once selected, press OK key to confirm.
	1080P30	1024*576P30	352*288P30	
	1080P25	960*540P30	176*144P30	
	720P60	704*576P30		
	720P50	640*480P30		

RESET	SYS RESET	System reset
	CAM RESET	Camera reset
	PT RESET	Pan tilt reset
	ALL RESET	All reset

MESSAGE	IR ADDR	Camera IR control address
	FOCUS	Focus mode
	CLIENT	Client protocol, can't be changed
	MODEL NO.	Model number
	ARM VER	ARM version
	FPGA VER	FPGA version

CAM VER	Camera version
RELEASE	Software release date

IR TRANSFER(IR PASS)

1 IR transfer(IR Pass) function available by setting the SW3 and SW4(at the bottom of the camera). Currently the camera support NEC and SEJIN 4PPM code. For customized with other code, pls contact us for adding:

	Dial Switch（IR CODE TYPE）		
	SW-3	SW-4	Note
1	OFF	OFF	Off（Close IR Transfer）
2	ON	OFF	Undefined
3	OFF	ON	SEJIN 4PPM CODE
4	ON	ON	NEC CODE(standard)

2. Once the camera power on and finish configuration:

if set to NEC code, can enable the IR transfer function via OSD menu or via serial command.

if set non NEC code, then can enable it only via VISCA IN port.

3. Put the targeted remote controller towards to the camera IR receiver, press keys on the remote controller, then the camera will output the received IR code via VISCA IN port.

4. IR Transfer output format:

<u>XX XX XX XX</u> FF

XX XX XX XX: Remote Controller Code	FF: End Code

6. The camera can save all settings, no need to re-set after power off and on.

UVC CONTROL

1. Only run the client software after the USB3.0 HD camera has completed self-configuration(the IR indicator in blue color and will not flash); If run the software before the camera configuration finishes, may cause black video issue.

2. Make sure the USB3.0 camera is recognized by the PC Device Manager. In case the PC does not recognize the camera(with warning of "MFG"), following bellow steps:

1).Go to Device Manager.

2).Right click on the device(yellow warning with "MFG ") and select "Update Driver Software".

3).Next select "Browse my computer for Driver Software" and then select "Let me pick from a list of device drivers on My computer".

4).Next select "USB Composite Driver" and continue install the driver up to over.

5).Then it should come up as "USB3.0 HD CAMERA".

3. Make sure the interval of different video format switching more than 3 seconds, otherwise black video maybe caused.

4. Make sure the interval of control command sending from the server(via USB cable) to the camera no less than 250ms.

5. Support standard UVC interface.

UVC Property	Corresponded VISCA Command
PU_BACKLIGHT_COMPENSATION_CONTROL	8x 01 04 33 02 FF
PU_BRIGHTNESS_CONTROL	8x 01 04 4D 00 00 0p 0q FF
PU_GAIN_CONTROL	8x 01 04 49 00 00 00 0p FF
PU_SHARPNESS_CONTROL	8x 01 04 42 00 00 0p 0q FF
PU_WHITE_BALANCE_TEMPERATURE_CONTROL	8x 01 04 35 0p FF
CT_ZOOM_ABSOLUTE_CONTROL	8x 01 04 47 0p 0q 0r 0s FF
CT_PANTILT_ABSOLUTE_CONTROL	8x 01 06 02 VV WW 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z F
PU_CONTRAST_CONTROL	8x 01 04 53 0p FF
PU_HUE_CONTROL	8x 01 04 54 0p FF

6. Note: different to standard UVC protocol, PU_CONTRAST_CONTROL means 2D noise reduction, not CONTRAST value; PU_HUE_CONTROL means 3D noise reduction, not HUE（chroma）value.