

# User Guide

## **TANDBERG** PrecisionHD 1080p Camera



Thank you for choosing TANDBERG!

Your TANDBERG PrecisionHD 1080p Camera has been designed to give you many years of safe, reliable operation.

This user guide has been divided into several chapters, all of which provide different information. You can access the chapters directly by clicking on the menu bar at the top of this page.

You will find that some places information has been copied from other chapters (but adapted, when needed) to let you have all the relevant information there and then. This helps eliminating the need to read through long sections before you can even think of getting started.

Our main objective with this user guide was to address your goals and needs. Please let us know how well we succeeded!

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## Chapter 2 Getting started



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## The camera at a glance

**Video out (HDMI, HD-SDI).** For video signals, connect from the video out on the camera to the video in on the codec.

**Power and camera control.** For power in and camera control, connect from the camera control & power on the camera to the Camera port on the codec. When the camera is used with TANDBERG codecs power will be supplied through Camera Control cable. When used with non-TANDBERG codecs, you may have to connect power separately.

## HDMI and HD-SDI

- HDMI is the main source for video out when connected to a codec. Maximum resolution is 1080p60.
- HD-SDI is the secondary source for video. Maximum resolution is 1080p30 (maximum recommendable cable length is then 100m).
- The HDMI and HD-SDI can be used simultaneously. The maximum resolution is then 1080p30 if you want both to run with the same resolution.

## Cable lengths

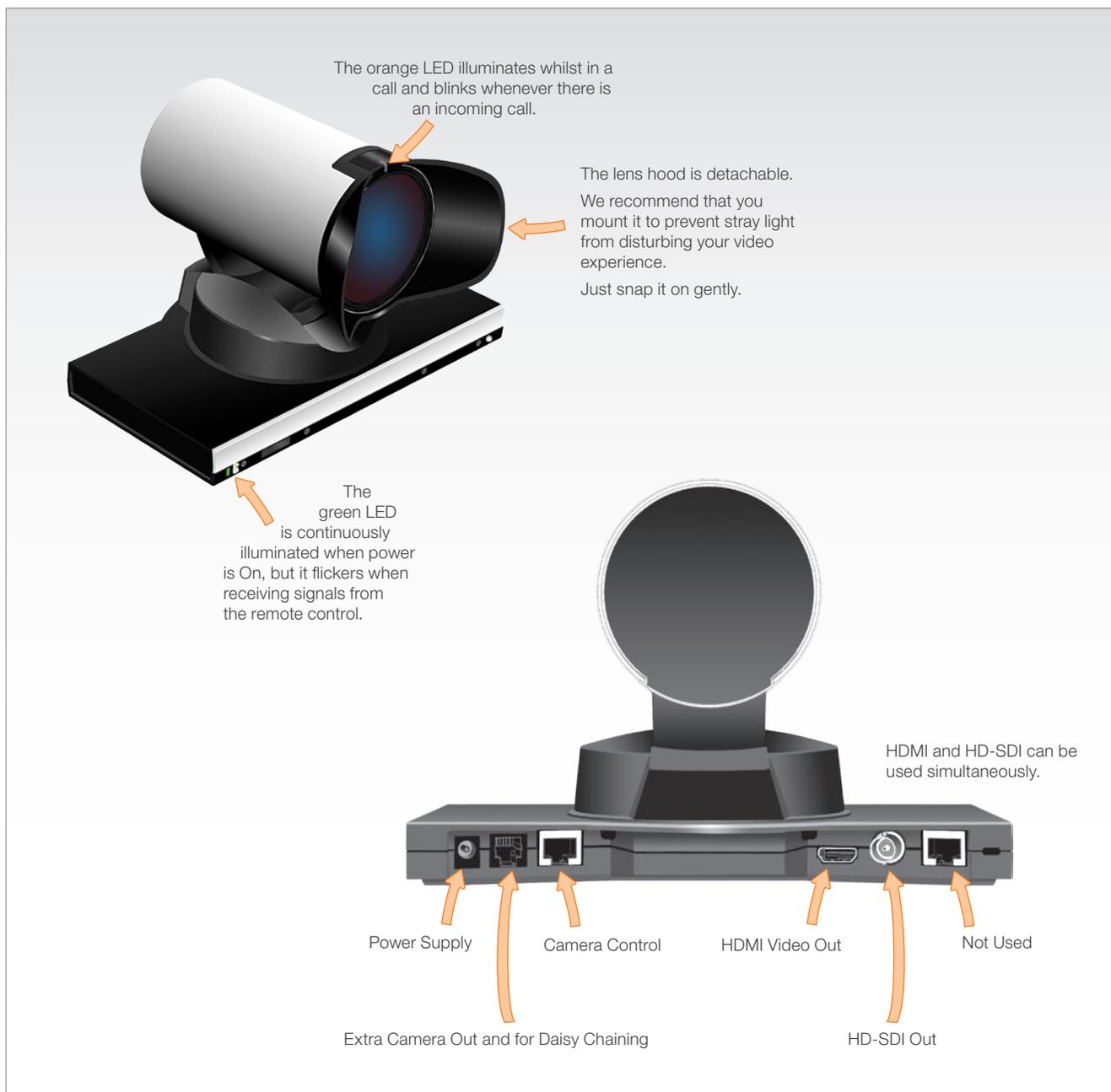
Maximum length of HDMI cable is 15 meter with a category 2 certified good quality HDMI cable.

The maximum recommendable length of HD SDI cable is 100m.

## Cascaded cameras

The sockets named Extra Camera Out and Power In are used when connecting cameras in daisy chain.

- The first camera in the chain is powered up by the camera control cable. The next cameras must use the 12V DC Power in.
- The daisy chained cameras are connected by using an extra camera cable between the Extra Camera sockets.



## Best view (face recognition)

This camera is capable of face recognition when used with TANDBERG C90 Codecs. Observe that the feature is still a preview feature. Consequently, the functionality is subject to change without further notice in order to take advantage of further developments.

The face recognition system aims to search for faces in order to optimize the picture frame, hence the name **Best View**. Once a face or group of faces has been detected camera zoom and camera angle will be changed accordingly to obtain an optimal presentation on the screen.

### Kindly observe the following:

- The Best View optimization process may take up to 5 seconds.
- The detection of faces works better when people look towards the camera.
- The area from the eyebrows down to just below the lips should be uncovered.
- Beard is normally not a problem.

## Using Best View

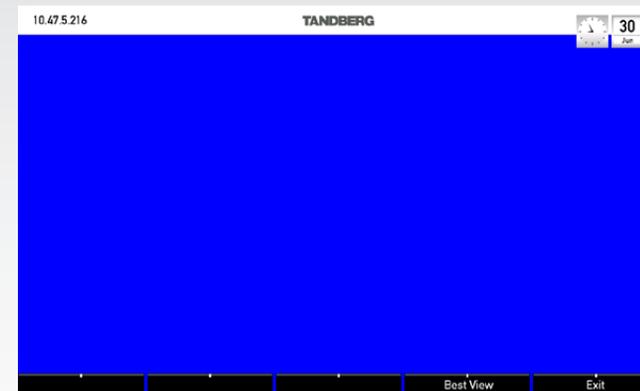
Note that Best View works with TANDBERG C90 Codecs only!

1. On the TRC5 remote control press the **Home** key to produce the main menu, if needed.
2. Navigate down to Settings, then press the **Right arrow** key produce the submenu and press again to produce the Layout submenu.
3. Select **Selfview** to be shown as required.
4. Press **Home** to collapse the menus
5. Navigate to Camera control and press the **Right arrow** key.

The soft keys menu will now be displayed as shown to the right.

6. Press the corresponding key on the remote control to start the Best View function.

The system will now look for human faces and adjust the zoom and camera angle to obtain a best fit.



Press the corresponding **Soft** key to engage the Best View feature.

## Chapter 3

# Connecting the camera



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## Connecting the camera

The HDMI and HD-SDI can be used simultaneously.

### HDMI cable

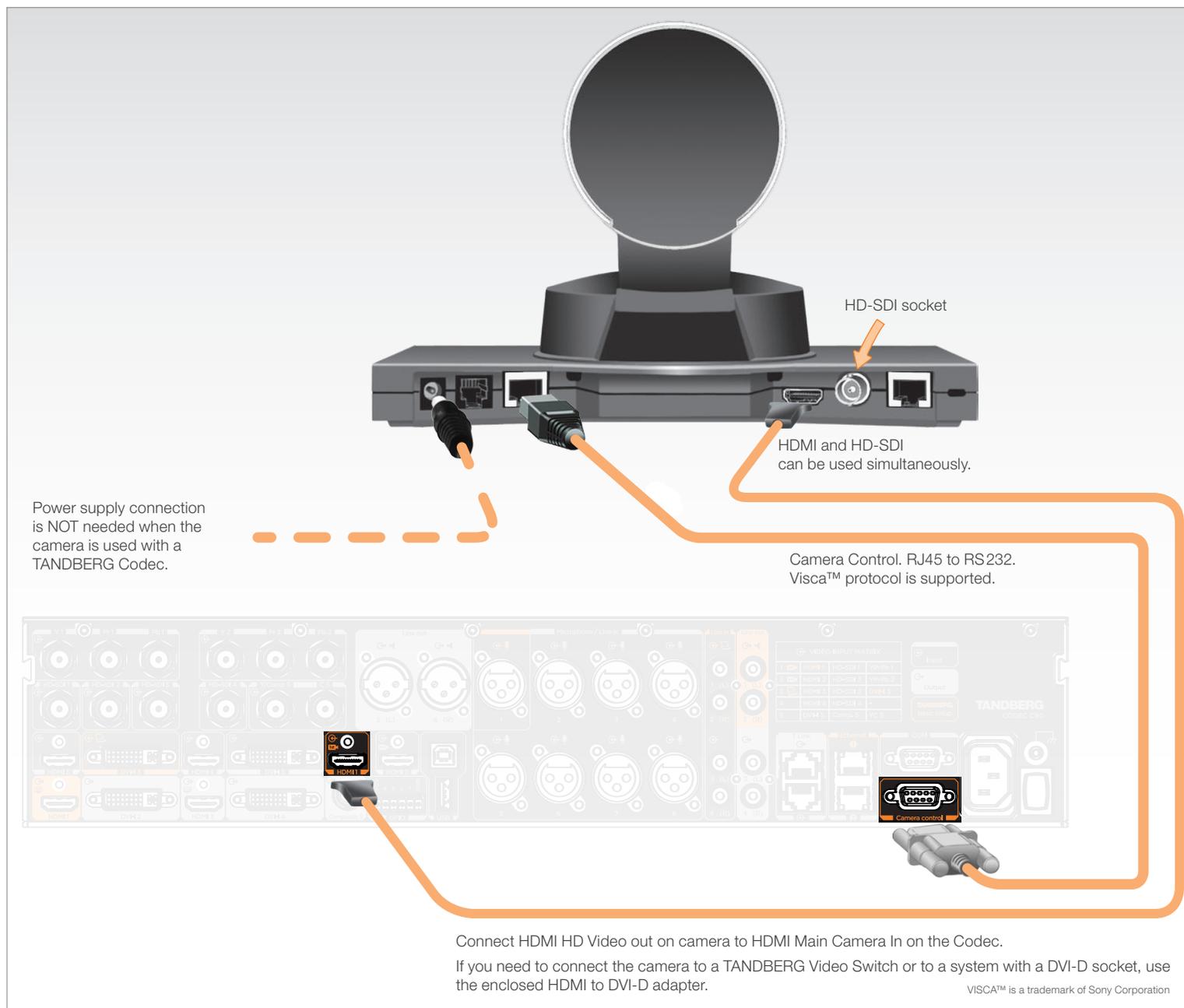
The HDMI cable delivered with the camera is 5 meters. Maximum length is 15 meter with a category 2 certified good quality HDMI cable.

### HD-SDI cable

The HD-SDI cable must be purchased separately.

### HDMI to DVI-D adapter

The HDMI to DVI-D adapter is used when connecting to a TANDBERG MXP codec or TANDBERG Video Switch



## Video output formats

This section describes the video output formats for the TANDBERG PrecisionHD 1080p camera.

### DIP switch settings for video output formats

The video output format for the camera is set by DIP switches. The DIP switches are found on the bottom side of the camera.

The default setting is Auto. When using HDMI, the video output format is automatically detected. See the table to the right.

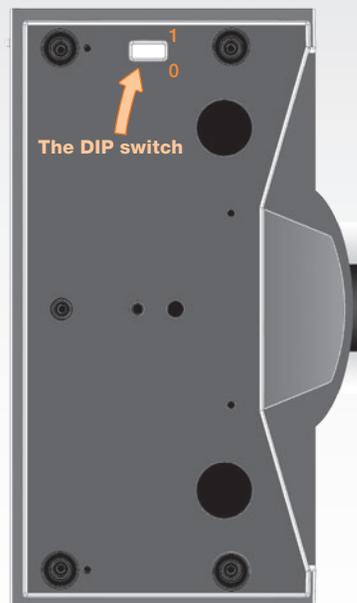
Maximum resolution for HDMI is 1080p60.

Maximum resolution for HD-SDI is 1080p30.

Note that the camera must be switched off and on again to make the new DIP switch settings effective.

### Line voltage frequency

The camera will automatically detect the line voltage frequency when it is 50 or 60Hz. You may set the video output format to a specific value (use the DIP switches) to override the auto frequency detection, if a different line voltage frequency is an issue.



DIP Switch table for video formats						
1	2	3	4	5	HDMI	HD-SDI
0	0	0	0	0	Auto	
0	0	0	0	1	1080p25	1080p25
0	0	0	1	0	1080p30	1080p30
0	0	0	1	1	1080p50	720p50
0	0	1	0	0	1080p60	720p60
0	0	1	0	1	720p25	720p25
0	0	1	1	0	720p30	720p30
0	0	1	1	1	720p50	720p50
0	1	0	0	0	720p60	720p60
0	1	0	0	1	Software control	

The table shows the different settings available for the HDMI and the HD-SDI outputs.

**Auto:** Camera negotiates format over HDMI. HD-SDI tracks HDMI and defaults to 1080p30 in absence of HDMI sync.

**Software:** For more on the **Software control** setting, see [▶ Video mode selection](#).

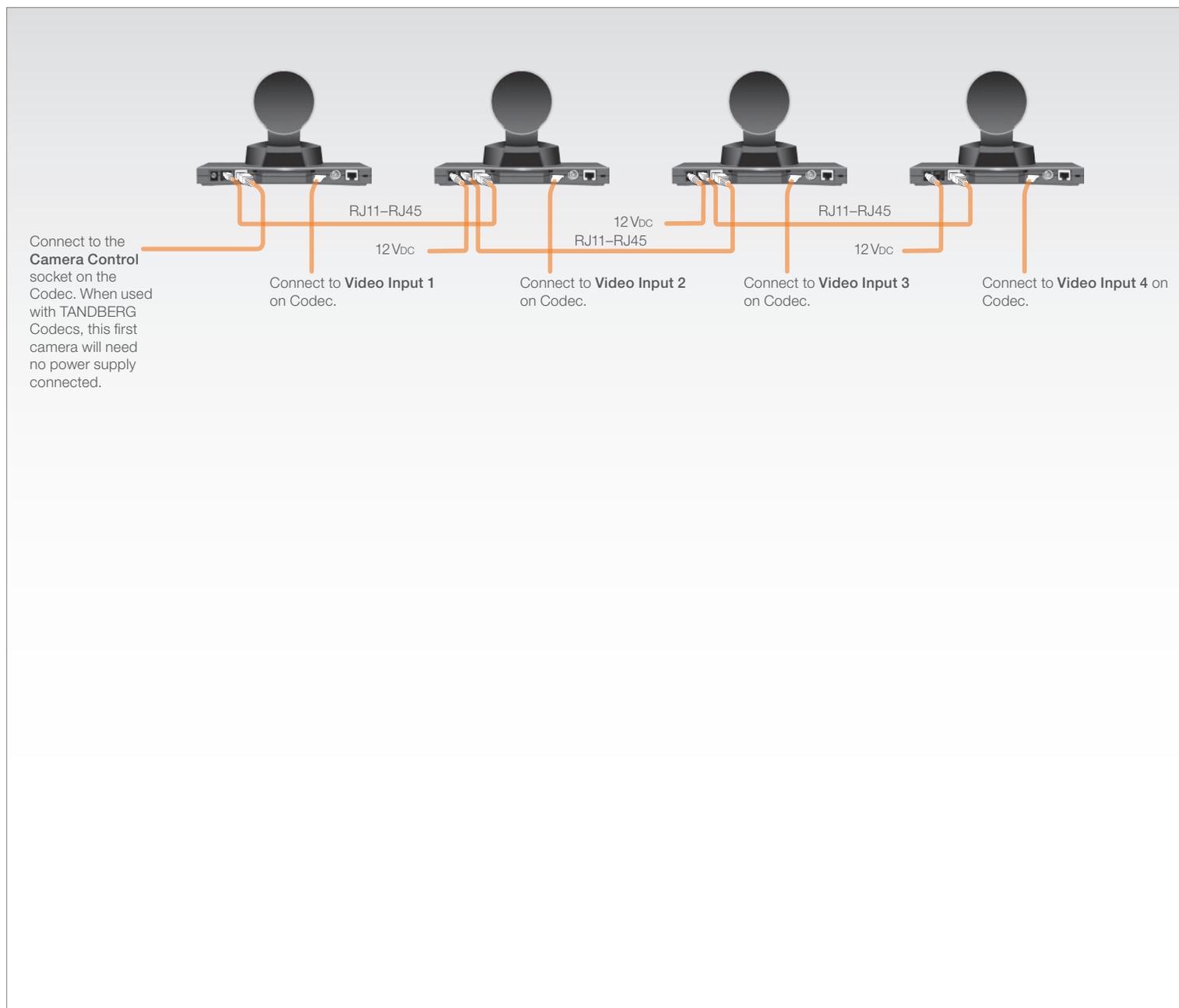
## Cameras in daisy chain

A single daisy chain can have up to seven cameras.

### Cascaded cameras

The sockets named Extra Camera and Power In are used when connecting cameras in daisy chain.

- HDMI and HD-SDI. The HDMI and HD-SDI can be used simultaneously on the same camera.
- Power. The first camera in the chain is powered up from the codec by the VISCA camera control cable. Additional cameras must use the 12V DC Power in.
- Extra camera cable. The daisy chained cameras are connected by using the VISCA Extra Camera cable between the Extra Camera In and Codec Control In sockets



## Chapter 4

# Making your own cables



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## Making your own cables

If you need to assemble your own cables, the tables to the right show the pin-out required.

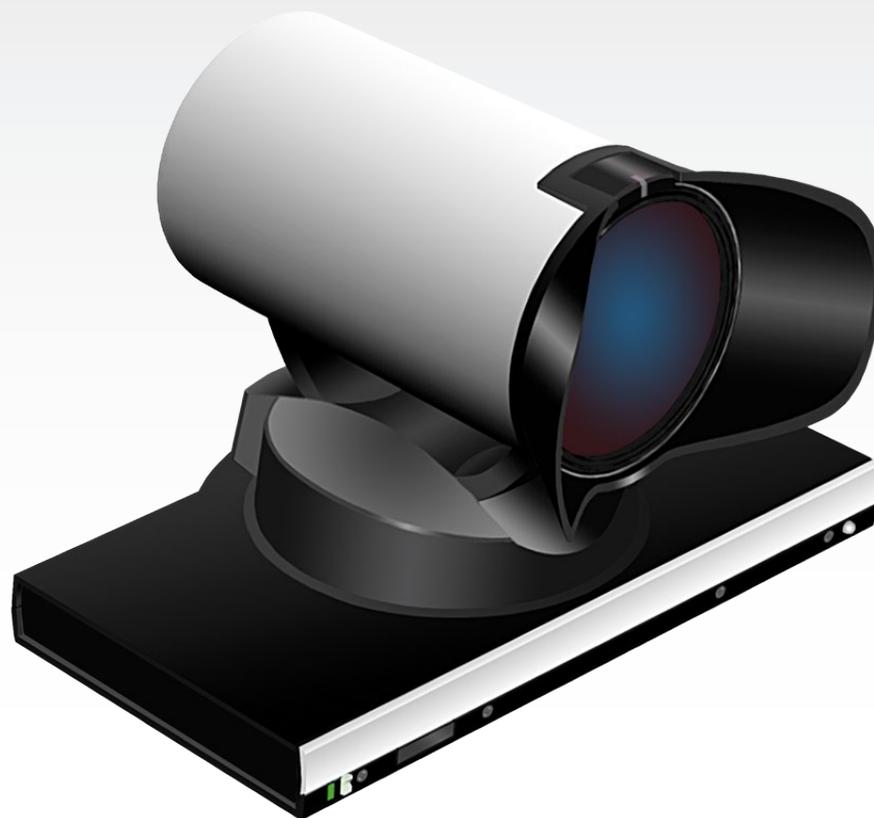
Pin-out—TANDBERG camera cable RJ45 (8 pin) to D-SUB			
<i>Signal name</i>	<i>RJ45 pin</i>		<i>D-SUB pin</i>
+12Vdc	1	Twisted pair	4
GND	2		5
RX	3	Twisted pair	2
TX	6		3
NC	4	Twisted pair	1
NC	5		6
GND	7	Twisted pair	5
+12Vdc	8		4

Pin-out—VISCA Camera control RJ45 8 pins shielded modular jack	
<i>Pin</i>	<i>Signal name</i>
8	+12V (2.8mA current source when connected in daisy chain)
7	GND
6	TXD (out)
5	NC (no connect)
4	NC (no connect)
3	RXD (in)
2	GND
1	+12V

Pin-out—VISCA Daisy chain RJ11 6 pins modular jack	
<i>Pin</i>	<i>Signal name</i>
6	GND
5	GND
4	RXD (in)
3	TXD (out)
2	Presence (12V in daisy chain)
1	GND

## Chapter 5

# Controlling cameras from remote



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## Interfacing to the camera using the VISCA protocol

The TANDBERG PrecisionHD 1080p camera uses an RS-232 control interface that resembles the Sony VISCA™ protocol.

### RS232 Parameters

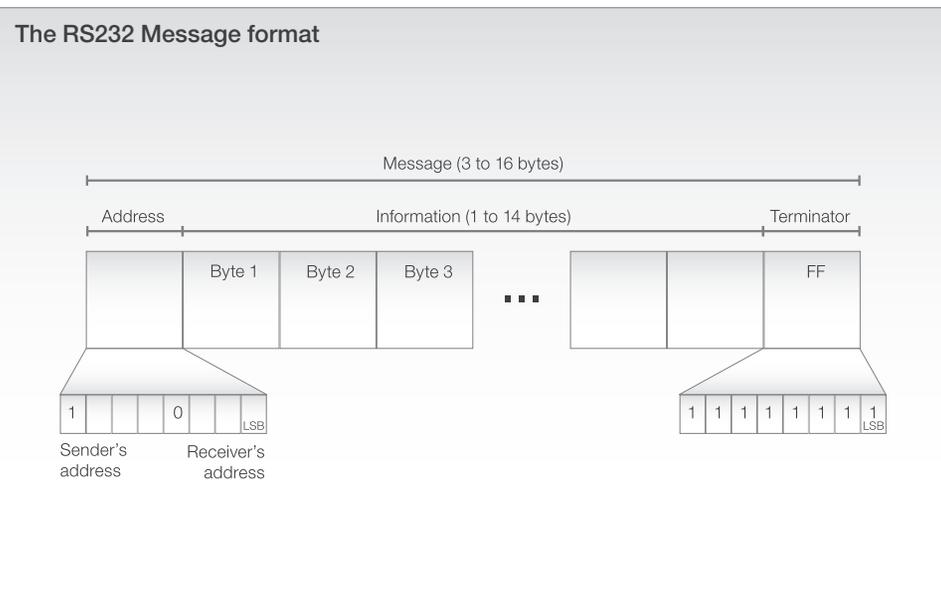
At startup, the communication parameters for the RS232 interface must be set to:

- 9600 bits per second
- 8 databits
- No parity
- 1 stopbit
- No hardware flow control
- No software flow control

All parameters except speed are fixed and not user configurable. The speed may be changed by issuing the Speed command defined on the following pages. All control bytes are pure binary information, i.e. the control bytes are not ASCII-encoded.

### RS232 Commands and inquiries

A list of all the available commands and inquiries together with the result and comments are found in the table on the following pages.



## VISCA messages

A particular command is recognized by the message information after the address byte.

### Message Format

Commands are initiated from the host (i.e. the codec or any other external controller) to the camera.

After a camera has been issued a command, the camera will generate a response. Commands and responses (messages) have the following format:

- Address byte (1)
- Information bytes (1..14)
- Terminating byte (1)

See the above illustration for details.

### The minimum length of any command or response is 3 bytes:

1. **Address byte (1):** Let us assume there is one host, i.e. the codec (the host is the unit controlling the camera). The host has address 0. The four least significant bits of the address byte contain the address of the receiver. In the case of a broadcast message, the receiver address should be set to 8. When we are operating a single camera, the address is 1. Hence, address bytes in messages from the host are 0x81, and messages from the camera to the host are 0x90 (the protocol allows for up to 7 cameras).
2. **Message bytes (1..14):** Any number of bytes containing the actual message information. Bytes may have any value in the range 0...254. The value 255 (i.e. hexadecimal FF) is reserved for the terminating byte.
3. **Terminating byte (1):** All messages must be terminated with a byte containing all 1's, i.e. decimal 255 (or hexadecimal FF).

## Command and response exchange

When the camera receives a command, it responds with either:

- **Completion message: 90-5Y-FF**  
Returned by camera when execution of commands and inquiries are completed.
- **Error packets: 90-6Y-...FF**  
Returned by camera instead of a completion message when command or inquiry failed to be executed.

General error messages, unless otherwise specified:

- **90-6Y-01-FF** Message length error (>14 bytes)
- **90-6Y-02-FF** Syntax error
- **90-6Y-03-FF** Command buffer full
- **90-6Y-04-FF** Command cancelled
- **90-6Y-05-FF** No socket (to be cancelled)
- **90-6Y-41-FF** Command not executable

### Y = socket number

A camera may contain two buffers so that two commands, including the command being executed, can be received.

**NOTE:** The PrecisionHD 1080p camera supports a single socket only. Consequently, the Y always assumes the value **Y=0**.

### There are exceptions to these rules:

- An Initialize message will respond as indicated in the Table of Commands (this message is in fact a broadcast message, and any unit other than the host receiving the broadcast message must pass it on).
- Do not route commands or replies that are longer than 16 bytes through Sony cameras. The easiest way to avoid this is to put the TANDBERG cameras first in the chain. Commands and replies that are longer than 16 bytes are clearly marked below.

## Network and interface commands

Command Set	Command Packet	Comments
IF_Clear	8x 01 00 01 ff	Clear command buffer. Stop any current operation in progress. Does not do much on Rover.
Address_Set	8x 30 0p ff	p = address for this device. If x=8 (broadcast), increase p with 1 before sending to chain.
Command_Cancel	8x 2p ff	p = Socket ID. Rover does not support multiple sockets. Commands will always run to completion. Don't use it

## Push messages

Messages sent from camera to controller.

Command Set	Command Packet	Reply and Comments
Network_Change	y0 38 ff	This indicates that cameras have been added to or removed from the chain. It is recommended to wait 9 seconds after receiving this message before doing a full reconfigure.
IR_Push	y0 07 7d 02 gg hh ff	If IR mode is on, IR codes received by the camera will be sent to the controller. gg = IR ID hh = keycode
BestView_Done_Push	y0 0a 61 0p 0q ff	First push message sent after BestView is done. pq = Number of frames detected. The camera will generate pq Res_Push messages after this message.
BestView_Res_Push	y0 0a 62 0p 0q [tiltpos] [panpos] [tiltSize] [panSize] [yPos] [xPos] [yDim] [xDim] [trackDur] [quality] [speech] ff	pq = Face number, should be less than or equal to pq given in Done_Push. Parameters specified in brackets are unsigned 16 bit quantities, defined as "0p 0q Or 0s". [tiltpos] and [panpos] are 16 bit signed. Make sure this message is not routed through Sony cameras.

### Camera commands

Command	Command Packet	Comments
Power_On	8x 01 04 00 02 ff	Power control. This command stores the zoom and focus value and reset these motors. Used for Tiger if the camera was on for a long time.
Power_Off	8x 01 04 00 03 ff	
Video_Format	8x 01 35 0p 0q 0r ff	Selects video format. p = reserved. q = video mode. r = See the chapter about the DIP switch settings
WB_Auto	8x 01 04 35 00 FF	WB: White Balance
WB_Table_Manual	8x 01 04 35 06 ff	
WB_Table_Direct	8x 01 04 75 0p 0q 0r 0s ff	Used if WBmode = Table manual pqrs = wb table.
AE_Auto	8x 01 04 39 00 FF	AE: Automatic Exposure.
AE_Manual	8x 01 04 39 03 FF	
Iris_Direct	8x 01 04 4B 0p 0q 0r 0s FF	Used if AE mode = Manual. pqrs: Iris position, range 0..50
Gain_Direct	8x 01 04 4c 0p 0q 0r 0s FF	Used if AE mode = Manual. pqrs: Gain position, values:12-21dB.
Backlight_On	8x 01 04 33 02 FF	BacklightCompensation mode
Backlight_Off	8x 01 04 33 03 FF	
Mirror_On	8x 01 04 61 02 ff	Sony calls this CAM_LR_Reverse. RR (FT/AT mirror command)
Mirror_Off	8x 01 04 61 03 ff	
Flip_On	8x 01 04 66 02 ff	Sony calls this CAM_ImgFlip.
Flip_Off	8x 01 04 66 03 ff	
Gamma_Auto	8x 01 04 51 02 ff	Gamma mode. Default uses gamma table 4.
Gamma_Manual	8x 01 04 51 03 ff	
Gamma_Direct	8x 01 04 52 0p 0q 0r 0s ff	
MM_Detect_On	8x 01 50 30 01 ff	Turn on the Motor Moved Detection (camera recalibrates if touched)
MM_Detect_Off	8x 01 50 30 00 ff	Turn off the Motor Moved Detection (camera does not recalibrate if touched)

Command	Command Packet	Comments
Call_LED_On	8x 01 33 01 01 ff	Refers to orange LED on top of camera. Will always be off at startup.
Call_LED_Off	8x 01 33 01 00 ff	
Call_LED_Blink	8x 01 33 01 02 ff	
Power_LED_On	8x 01 33 02 01 ff	Green power LED. If switched to off and stored to startup profile, it will always be off.
Power_LED_Off	8x 01 33 02 00 ff	
IR_Output_On	8x 01 06 08 02 ff	See IR push message.
IR_Output_Off	8x 01 06 08 03 ff	
IR_CameraControl_On	8x 01 06 09 02 ff	Lets up/down/left/right/zoom+/- on the IR remote control the camera directly. Those keycodes will be sent to the controller if IR Output is on.
IR_CameraControl_Off	8x 01 06 09 03 ff	
BestView_On	8x 01 50 60 0p 0q ff	Turn BestView on or off. pq=time (in seconds) Will generate push message(s) as specified above when the time runs out.
BestView_Stop	8x 01 50 60 00 00 ff	

PTZF - movement commands

Command	Command Packet	Comments
Zoom_Stop	8x 01 04 07 00 ff	
Zoom_Tele	8x 01 04 07 2p ff	p = speed parameter, a (low) to b (high)
Zoom_Wide	8x 01 04 07 3p ff	
Zoom_Direct	8x 01 04 47 0p 0q 0r 0s ff	pqrs: zoom position
ZoomFocus_Direct	8x 01 04 47 0p 0q 0r 0s 0t 0u 0v 0w ff	pqrs: zoom position tuvw: focus position
Focus_Stop	8x 01 04 08 00 ff	
Focus_Far	8x 01 04 08 2p ff	p = speed parameter, a (low) to b (high)
Focus_Near	8x 01 04 08 3p ff	
Focus_Direct	8x 01 04 48 0p 0q 0r 0s ff	pqrs: focus position
Focus_Auto	8x 01 04 38 02 ff	Autofocus mode on/off. <b>NOTE:</b> If mode is auto, camera may disable autofocus when focus is ok. Autofocus will be turned back on when camera is moved using Zoom_Tele/Wide, PT_Up/Down/Left/Right. Ditto for IR_CameraControl movement.
Focus_Manual	8x 01 04 38 03 ff	
PT_Stop	8x 01 06 01 03 03 03 03 ff	
PT_Reset	8x 01 06 05 ff	Reset pan/tilt to center position. Will also resynchronize motors.
PT_Up	8x 01 06 01 0p 0t 03 01 ff	p pan speed t: tilt speed  Right -> increment pan Left -> decrement pan Up -> increment tilt Down -> decrement tilt
PT_Down	8x 01 06 01 0p 0t 03 02 ff	
PT_Left	8x 01 06 01 0p 0t 01 03 ff	
PT_Right	8x 01 06 01 0p 0t 02 03 ff	
PT_UpLeft	8x 01 06 01 0p 0t 01 01 ff	
PT_UpRight	8x 01 06 01 0p 0t 02 01 ff	
PT_DownLeft	8x 01 06 01 0p 0t 01 02 ff	
PT_DownRight	8x 01 06 01 0p 0t 02 02 ff	

Command	Command Packet	Comments
PT_Direct	8x 01 06 02 0p 0t 0q 0r 0s 0u 0v 0w 0x 0y FF	p: max pan speed t: max tilt speed qrsu: pan position vwxy: tilt position Attempts to linearize movement.
PTZF_Direct	8x 01 06 20 0p 0q 0r 0s 0t 0u 0v 0w 0x 0y 0z 0g 0h 0i 0j 0k ff	Sets all motors in one operation. pqrs: pan tuvw: tilt xyzg: zoom hijk: focus Never route this message through Sony cameras. Attempts to linearize movement for pan and tilt
PT_Limit_Set	8x 01 06 07 00 0x 0p 0q 0r 0s 0t 0u 0v 0w ff	x=1: Up/Right x=0: Down/Left pqrs: Pan limit tuvx: Tilt limit. This command is valid only to next boot.
PT_Limit_Clear	8x 01 06 07 01 0x [...] ff	x=1: Up/Right x=0: Down/Left Sony specifies lots of filler bytes after 0x. Ignore them.

## Inquiries

Command	Command Packet	Response
CAM_ID_Inq	8x 09 04 22 ff	Resp: 90 50 zz xx 00 yy ff Only zz, which identifies the camera, is relevant. zz = 0x50 for this camera.
CAM_SWID_Inq	8x 09 04 23 ff	Resp: y0 50 [1-125 bytes ASCII SWID] ff. Never route this message through Sony cameras.
CAM_HWID_Inq	8x 09 04 24 ff	The response is the Module Serial Number stored in EEPROM. The number is converted to ASCII : y0 50 [12 bytes ASCII HWID] ff.
Zoom_Pos_Inq	8x 09 04 47 ff	Resp: y0 50 0p 0q 0r 0s ff pqrs: zoom position
Focus_Pos_Inq	8x 09 04 48 ff	Resp: y0 50 0p 0q 0r 0s ff pqrs: focus position
Focus_Mode_Inq	8x 09 04 38 ff	Resp: y0 50 0p ff p=2: Auto, p=3: Manual
PanTilt_Pos_Inq	8x 09 06 12 ff	Resp: y0 50 0p 0q 0r 0s 0t 0u 0v 0w ff pqrs: pan position tuv: tilt position
Power_Inq	8x 09 04 00 ff	Resp: y0 50 0p ff p=2: On, p=3: Off
WB_Mode_Inq	8x 09 04 35 ff	Resp: y0 50 0p ff p=0: Auto , p=6: Table manual
WB_Table_Inq	8x 09 04 75 ff	Resp: y0 50 0p 0q 0r 0s ff pqrs: Table used if table mode
AE_Mode_Inq	8x 09 04 39 ff	Resp: y0 50 0p ff p=0: Auto, p=3: Manual
Backlight_Mode_Inq	8x 09 04 33 ff	Resp: y0 50 0p ff p=2: On, p=3: Off
Mirror_Inq	8x 09 04 61 ff	Resp: y0 50 0p ff p=2: On, p=3: Off
Flip_Inq	8x 09 04 66 ff	Is video flipped or not? Resp: y0 50 0p ff p=2: On , p=3: Off
Gamma_Mode_Inq	8x 09 04 51 ff	Resp: y0 50 0p ff p=2: Auto, p=3: Manual

Command	Command Packet	Response
Gamma_Table_Inq	8x 09 04 52 ff	Resp: y0 50 0p 0q 0r 0s ff pqrs: Gamma table in use if manual mode.
Call_LED_Inq	8x 09 01 33 01 ff	Resp: y0 50 0p ff p=2: On, p=3: Off, p=4: Blink
Power_LED_Inq	8x 09 01 33 02 ff	Resp: y0 50 0p ff p=2: On, p=3: Off
Video_System_Inq	8x 09 06 23 ff	y0 50 0p 0q 0r 0s ff pqrs=video mode currently being output on the HDMI port. See chapter on DIP switches.
DIP_Switch_Inq	8x 09 06 24 ff	y0 50 0p 0q 0r 0s ff pqrs contains the bit pattern of the DIP switch. See chapter on DIP switches.
IR_Output_Inq	8x 09 06 08 ff	Resp: y0 50 0p ff p=2: On, p=3: Off
ALS_RGain_Inq	8x 09 50 50 ff	Ambient Light Sensor Resp: y0 50 0p 0q 0r 0s 0t 0u 0v 0w ff pqrstuv=32 bit unsigned integer, relative gain value. The integration time is a constant set in the camera SW.
ALS_BGain_Inq	8x 09 50 51 ff	
ALS_GGain_Inq	8x 09 50 52 ff	
ALS_WGain_Inq	8x 09 50 53 ff	
BestView_Inq	8x 09 50 60 ff	Resp: y0 50 0p 0q 0r 0s ff pq=0: BestView not running. pq>0: BestView running, time specified when started rs: Time spent so far
Up side down_Inq	8x 09 50 70 ff	Resp: y0 50 0p ff p=0: Camera is upright. p=1: Camera is upside down.

## Software upload commands

The CRC algorithm used is the same as in the XModem protocol. CRC for last data packet is only calculated for the actual data bytes in the packet. Pad last packet with 0x00 so that the data section is 256 bytes long. The PacketID counter starts at 0.

Command	Command Packet	Comments
SW start	8x 01 50 a2 0p 0q 0r 0s 0t 0u 0v 0w ff	<p>pqrstuvw = size, pq=LSB Returns y050ff if ok.</p> <p>Fatal errors: Returns y06006ff if upload already in progress. Returns y06007ff if unable to access the flash.</p>
SW end	8x 01 50 a1 ff	<p>Sent after last SW packet, instructs camera to verify new application. Command may take up to 30 seconds to complete.</p> <p>Returns y050ff if ok. Issue a camera reboot to activate new software.</p> <p>Returns y06008ff if verification of sw failed.</p>
SW abort	8x 01 50 a3 ff	Abort sw upload in progress
SW packet	8x a0 pp qq rr ss [256 bytes data]	<p>ppqq = 16 bit packet id, pp=LSB rrss = 16 bit CRC, rr=LSB</p> <p>Returns y0 50 ff if packet ok. -&gt; send next one.</p> <p>Returns y0 60 09 ff if crc error -&gt; retransmit packet.</p> <p>Returns y0 60 0a ff if id error -&gt; retransmit packet</p> <p>Fatal errors: y0 60 0b ff not in upload mode y0 60 0c ff error writing data to flash</p> <p>NOTE: Entire message after 8x a0... is raw data, so it may contain 0xff. Header is kept as short as possible. Never route this message through Sony cameras.</p>

## Debug commands

Never route these messages through Sony cameras. They are provided for Rover debugging only, and do not conform to the Visca length requirements.

Command	Command Packet	Comments
CAM_PingPong_Reset	8x ae ff	Reset ping ctr to 0.
CAM_Ping	8x af 0p 0q 0r 0s [256 bytes data] ff	<p>pqrs = Pingval. Camera will respond with OK if correct pingval received. Increase ctr with 1 for next packet. Data section will be dumped to stdout if it fails.</p>
CAM_Stdin	8x a4 [0-256 bytes stdin] 00 ff	Send command to the command interpreter.
CAM_Debug_Mode	8x 01 39 0q ff	<p>q=0: Debug mode off.</p> <p>q=1: Debug mode on. Camera will send stdout as visca messages in the following format: y0 50 [0-256 bytes stdout] 00 ff</p>

## Other commands

Command	Command Packet	Comments
CAM_Boot	8x 01 42 ff	Reboot the camera. This will also reset serial speed to 9600.
CAM_Speed	8x 01 34 0p ff	<p>p=0: Serial speed 9600. p=1: Serial speed 115200. Reply will be sent before the speed switch takes place. Please wait 20ms after ok before sending new commands.</p>

## Video mode selection

### Method

The DIP switch selection has priority over the selection made by the CAM\_Video\_Format command. If the DIP switch is set to auto, the CAM\_Video\_Format setting will be used. If both are set to auto, resolution will be controlled automatically by EDID.

### DIP Switch

Switches are numbered 1 to 5. The VISCA column shows the value that should be used when using the CAM\_Video\_Format command. The DIP switches are only read by the SW at startup/boot. So if the DIP switches are changed the camera must be rebooted.

If an undefined mode is selected, the output will default to auto.

1	2	3	4	5	Visca	HDMI	HD-SDI
0	0	0	0	0	x	Auto*	
0	0	0	0	1	0x0000	1080p25	1080p25
0	0	0	1	0	0x0001	1080p30	1080p30
0	0	0	1	1	0x0002	1080p50	720p50
0	0	1	0	0	0x0003	1080p60	720p60
0	0	1	0	1	0x0004	720p25	720p25
0	0	1	1	0	0x0005	720p30	720p30
0	0	1	1	1	0x0006	720p50	720p50
0	1	0	0	0	0x0007	720p60	720p60
0	1	0	0	1	0x0009	SW control	

\* Camera negotiates format over HDMI, HD-SDI tracks HDMI, and defaults to 1080p30 in absence of HDMI sync.



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