Cisco TelePresence PrecisionHD Camera

Camera Guide
What's in this guide?

The top menu bar and the entries in the Table of Contents are all hyperlinks, just click on them to go to the topic.

We recommend you visit our web site regularly for updated versions of the user documentation. Go to: http://www.cisco.com/go/telepresence/docs

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Chapter 1
Introduction
About this guide

This user guide describes the information needed to install and use the PrecisionHD 1080p cameras. Some information about the PrecisionHD 720p camera is also included.

Applies to the products listed below:

- PrecisionHD Camera 1080p12x
- Precision 40 Camera (PrecisionHD Camera 1080p4x S2)
- PrecisionHD Camera 1080p4x
- PrecisionHD Camera 1080p2.5x
- PrecisionHD Camera 720p

User documentation

The user documentation for the Cisco TelePresence systems, running the TC and CE software, have several guides aimed at various user groups:

- Video conference room primer
- Video conference room acoustics guidelines
- Getting started guide for the TelePresence systems
- User guide for the TelePresence systems
- Administrator guides for the TelePresence systems
- Camera guide for the PrecisionHD cameras
- API reference guides
- TC Console user guide
- Physical interfaces guides
- Regulatory compliance and safety information guides
- Legal and licensing information for products using TC and CE software

Download the user documentation

Go to [http://www.cisco.com/go/telepresence/docs](http://www.cisco.com/go/telepresence/docs) and select your product to see the user documentation for your product.

Software

The camera software is automatically upgraded through the codec.

**NOTE:** The Cisco TelePresence Precision 40 and PrecisionHD 1080p2.5x cameras are not supported by the C series codecs, and are only updated when connected to a SX20 codec. We do not recommend using the Precision 40 and PrecisionHD 1080p2.5x cameras with C series codecs.

The Cisco TelePresence PrecisionHD Camera 1080p4x is not supported by the SX20 codec.
Chapter 2
Physical interface
PrecisionHD Camera 1080p12x

Part number: CTS-PHD-1080P12XG=
Spare PID: CTS-PHD-1080P12XS2=

HDMI and HD-SDI
- HDMI is the main video source. The maximum resolution is 1080p60.
- HD-SDI* is the secondary video source. The maximum resolution is 1080p30.
- The HDMI and HD-SDI* can be used simultaneously. The maximum resolution is 1080p30, if you want both to run with the same resolution.

Camera control
Camera control is used for controlling the pan, tilt and zoom, and for powering up the camera.

Power
- When the camera is used with a Cisco codec, power is supplied through the Camera control cable.
- When the camera is used with non-Cisco codecs, you may have to connect the power separately.

Extra camera
For multi-camera setup, e.g. when you connect cameras in a daisy chain**:
- The first camera in the chain is powered by the camera control cable. The next must use the 12V DC Power in.
- Use an extra camera cable between the Extra camera sockets.

Ethernet
For software upgrades on daisy chained cameras. Requires software version TC3.0 or higher on the Codec C series.

Kensington lock
The Kensington lock may be used to prevent the camera from being moved from its place or to prevent theft.

* Not supported with Codec SX20, C20, C40 and C60.
** Not supported with Codec C20.
PrecisionHD Camera 1080p4x

Part number (for C series): CTS-PHD-1080P4XS=

HDMI and camera control

HDMI video out
- HDMI is the video out source.
- The maximum resolution is 1080p30/720p60.

Camera control
Camera control is used for controlling the pan, tilt and zoom, and for powering up the camera.

Daisy chain control is not supported. The camera can be used in a chain of multiple cameras, but only as the last camera in the chain.

Power
- When the camera is used with a Cisco codec, power is supplied through the Camera control cable.
- When the camera is used with non-Cisco codecs, you may have to connect the power separately.

USB
For future use.

Kensington lock
The Kensington lock may be used to prevent the camera being moved from its place or to prevent theft.

**CAUTION!** Do not pan or tilt the PrecisionHD 1080p4x camera by hand.

**NOTE:** The early shipments of the Quick Set C20 came with an interim version of the PrecisionHD Camera 1080p4x (the PrecisionHD Camera 1080p4x*).

* Available for a limited period of time.

See the "Technical specifications" on page 36 section for details.
Precision 40 Camera*

Only available as a part of the Cisco TelePresence SX20 Quick Set.

Spare PID: CTS-PHD1080P4XS2

HDMI and camera control

Video Out
• HDMI is the video out source.
• The maximum resolution is 1080p60.

Camera control
Camera control is used for controlling the pan, tilt and zoom, and for powering up the camera.

Daisy chain control is not supported. The camera can be used in a chain of multiple cameras, but only as the last camera in the chain.

Power
• When the camera is used with a Cisco codec, power is supplied through the Camera control cable.
• When the camera is used with non-Cisco codecs, you may have to connect the power separately.

USB
For future use.

Kensington lock
The Kensington lock may be used to prevent the camera being moved from its place or to prevent theft.

*Formerly PrecisionHD Camera 1080p4x S2
PrecisionHD Camera 1080p2.5x

Only available as a part of the Cisco TelePresence SX20 Quick Set.

Spare PID: CTS-PHD-2.5X=

The camera can be mounted on a screen with the camera bracket that is part of the SX20 Quick Set bundle, or it can stand on an even surface. The image flips automatically.

HDMI and camera control

Video out
- HDMI is the video out source.
- The maximum resolution is 1080p60.

Camera control
Camera control is used for controlling the pan, tilt and zoom, and for powering up the camera.

Power
For future use.

USB
For future use.

The LED is lit during a call.
The LED is continuously lit when the system is in use. It flickers when the system receives signals from the remote control and blinks when rebooting. The LED pulsates when the system is in Standby mode.
PrecisionHD Camera 720p

HDMI
- HDMI is the main video source.
- The maximum resolution is 720p30.

Camera control
Camera control is used for controlling the pan, tilt and zoom, and for powering up the camera.

Power
- When the camera is used with a Cisco codec, power is supplied through Camera control cable.
- When the camera is used with non-Cisco codecs, you may have to connect power separately.

Extra camera
If you want to connect cameras in a daisy chain*:
- The first camera in the chain is powered by the camera control cable. The other cameras must use the 12V DC Power in.
- Use an extra camera cable between the Extra camera sockets.

Kensington lock
The Kensington lock may be used to prevent the camera being moved from its place or to prevent theft.

* Not supported with Codec C20.
Chapter 3
Connecting to a codec
SX20 Codec configurations

Connecting to the Precision 40* and PrecisionHD 1080p2.5x cameras
Connect the combined custom HDMI and camera control cable:
- From the HD VIDEO OUT connector on the camera.
- To the CAMERA connector on the SX20. Visca™ protocol is supported.

Connecting to PrecisionHD Camera 1080p12x
Connect the combined custom HDMI and camera control split cable:
- From the HD VIDEO OUT (HDMI) connector on the camera.
- From the CODEC CONTROL IN (RJ45) connector on the camera.
- To the 2nd or 3rd ETHERNET PORT (RJ45) on the SX80.

SX80 Codec configurations

Connecting to the Precision 40 Camera*
Connect the combined custom to HDMI and camera control split cable:
- From the HD VIDEO OUT connector on the camera.
- To the CAMERA (HDMI) connector on the codec SX80. We recommend using the 1st camera input for the main camera.
- To the 2nd or 3rd ETHERNET PORT (RJ45) on the SX80.

Codec C20 configurations

Connecting to the PrecisionHD Cameras 1080p12x and 1080p4x
Connect the HDMI cable:
- From the HD VIDEO OUT (HDMI) connector on the camera.
- To the CAMERA (HDMI) connector on the Codec C20.
Connect the camera control cable:
- From the CODEC CONTROL IN (RJ45) connector on the camera.
- To the CAMERA CONTROL (RS-232) connector on the Codec C20. Visca™ protocol is supported.

*Formerly PrecisionHD Camera 1080p4x S
Codec C40 configurations

Connecting to the PrecisionHD Cameras 1080p12x and 1080p4x*

Connect the HDMI cable:
• From the HD VIDEO OUT (HDMI) connector on the camera.
• To the HDMI 1 IN (HDMI) connector on the Codec C40.

Connect the camera control cable:
• From the CODEC CONTROL IN (RJ45) connector on the camera.
• To the CAMERA CONTROL (RS–232) connector on the Codec C40. Visca™ protocol is supported.

Codec C60 configurations

Connecting to the PrecisionHD Cameras 1080p12x and 1080p4x*

Connect the HDMI cable:
• From the HD VIDEO OUT (HDMI) connector on the camera.
• To the HDMI 1 IN (HDMI) connector on the Codec C60.

Connect the camera control cable:
• From the CODEC CONTROL IN (RJ45) connector on the camera.
• To the CAMERA CONTROL (RS–232) connector on the Codec C60. Visca™ protocol is supported.

Codec C90 configurations

Connecting to the PrecisionHD Cameras 1080p12x and 1080p4x*

Basic setup
Connect the HDMI cable:
• From the HD VIDEO OUT (HDMI) connector on the camera.
• To the HDMI 1 IN (HDMI) connector on the Codec C90.

Connect the camera control cable:
• From the CODEC CONTROL IN (RJ45) connector on the camera.
• To the CAMERA CONTROL (RS–232) connector on the Codec C90. Visca™ protocol is supported.

Other configuration for 1080p12x

The HDMI <1..4> and HD-SDI <1..4> connectors can be used for the camera. The HDMI and HD-SDI can be used simultaneously.

Connect the HD-SDI cable:
• From the HD-VIDEO OUT (HD-SDI) connector on the camera.
• To the HD-SDI <1..4> connector on the Codec C90.
Cable options for Precision 40* and PrecisionHD 1080p2.5x

- **PrecisionHD Camera 1080p2.5x**
  - Custom plug camera cable

- **Precision 40 Camera**
  - Custom plug camera cable
  - Custom to HDMI and RJ45 female split cable

*Formerly PrecisionHD Camera 1080p4x S2*
Cable options for PrecisionHD Camera 1080p4x and 1080p4x*

PrecisionHD Camera 1080p4x
HDMI and RJ45 to RS 232 cables

C20 codec

PrecisionHD Camera 1080p4x*
HDMI and RJ45 to RS 232 cables

C series codecs (C40 codec)
Cable options for PrecisionHD Camera 1080p12x

HDMI and RJ45 to RS 232 cables

C series codecs (C40 codec)

SX80 codec

Custom to HDMI and RJ45 split cable

SX20 codec
Camera cables

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. This cable can be used with the C20, C40, C60 and C90 Codecs.

Part number: CAB-2HDMI-5M=

HD-SDI cable

The HD-SDI cable must be purchased separately. The maximum recommended length of HD-SDI cable is 100 meters. This cable can be used with the C90 Codec.

HDMI to DVI-D adapter

A HDMI to DVI-D adapter is used when connecting a camera to a MXP Codec or a Video Switch.

Daisy chain camera cable

CAB-VCDC-6.5M= PrecisionHD Camera Daisy-Chain cable for Visca Control-6.5m

CAB-VCDC-20M= PrecisionHD Camera Daisy-Chain cable for Visca Control-20m

Camera cable

Control cable for use with C90, C60, C40:

- CAB-VC-5M= Visca Control Cable 5m - DB9 to RJ45
- CAB-VS-6.5M= Visca Control Cable 6.5m - DB9 to RJ45 - requires PSU-CAM-V=
- CAB-VS-20M= Visca Control Cable 20m - DB9 to RJ45 - requires PSU-CAM-V=

Pin-out for cables

If you must assemble your own cables, the tables show the pin-out required.

### Pin-out—Daisy chain camera cable

<table>
<thead>
<tr>
<th>Signal name</th>
<th>RJ11 pin</th>
<th>RJ45 pin</th>
<th>Signal name</th>
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<tbody>
<tr>
<td>GND</td>
<td>1</td>
<td>2</td>
<td>GND</td>
</tr>
<tr>
<td>Presence +12Vdc</td>
<td>2</td>
<td>1</td>
<td>Presence +12Vdc</td>
</tr>
<tr>
<td>TX</td>
<td>3</td>
<td>3</td>
<td>RX</td>
</tr>
<tr>
<td>RX</td>
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<td>GND</td>
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<td>7</td>
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<td>NC</td>
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<tr>
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<td>4</td>
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<tr>
<td>NA</td>
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### Pin-out—camera cable

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<th>RJ45 pin</th>
<th>D-SUB pin</th>
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<td>+12Vdc</td>
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<td>4</td>
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<td>GND</td>
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<td>5</td>
</tr>
<tr>
<td>RX</td>
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<td>NC</td>
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<td>1</td>
</tr>
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<td>NC</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>GND</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>+12Vdc</td>
<td>8</td>
<td>4</td>
</tr>
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</table>
Pin out – Custom plug camera cable

The custom cable is used when connecting a SX20 codec to a PrecisionHD Camera 1080p2.5x or Precision 40 Camera (Formerly PrecisionHD Camera 1080p4x S2).

Part number: CAB-HDMI-PHD4XS2

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<td>3</td>
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<td>24</td>
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</tr>
<tr>
<td>Shell</td>
<td>Shell</td>
</tr>
</tbody>
</table>
Pin out – Custom to HDMI and RJ45 camera cable

The custom plug to HDMI and RJ45 plugs cable is used when connecting a SX20 codec to PrecisionHD 1080p4x and 1080p12x cameras.

Part number: CAB-HDMI-PHD12XS

<table>
<thead>
<tr>
<th>Pin#</th>
<th>Signal name</th>
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<tbody>
<tr>
<td>1</td>
<td>TMDS Data2+</td>
</tr>
<tr>
<td>2</td>
<td>TMDS Data2 Shield</td>
</tr>
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<td>3</td>
<td>TMDS Data2-</td>
</tr>
<tr>
<td>4</td>
<td>TMDS Data1+</td>
</tr>
<tr>
<td>5</td>
<td>TMDS Data1 Shield</td>
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<td>TMDS Data0+</td>
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<td>TMDS Data0 Shield</td>
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<td>12</td>
<td>TMDS Clock-</td>
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<td>Utility (Reserved N.C. on device)</td>
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<td>20</td>
<td>+12V Power</td>
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<tr>
<td>21</td>
<td>GND</td>
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<td>22</td>
<td>RS232 level (output)</td>
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<td>23</td>
<td>RS232 level (input)</td>
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<td>24</td>
<td>Shell</td>
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<td></td>
<td>SHELL</td>
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<td></td>
<td>Shell</td>
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</tbody>
</table>
Pin out — Custom to HDMI female and RJ45 female camera cable

The custom plug to HDMI female and RJ45 female plugs cable is used as an extension when connecting a SX20 codec to PrecisionHD 1080p4x and 1080p12x cameras.

Part number: CAB-PHD4XS2-SPLIT

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<th>HDMI A type female plug</th>
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<td>3</td>
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Chapter 4
Daisy chaining
Daisy chaining PrecisionHD Camera
1080p12x

A single daisy chain with PrecisionHD 1080p12x cameras can have:

- Three cameras when using a Codec C60
- Seven cameras when using a Codec C90

Locate the extra camera and power connectors:

- **Power**: The first camera in the chain is powered up from the codec by a VISCA camera control cable. Additional cameras must use the 12V DC Power in.
- **Extra camera cable**: The daisy chained cameras are connected by a VISCA Extra Camera cable (maximum length 20 m / 65.6 ft) between the Extra Camera In and Codec Control In sockets.
- **HDMI and HD-SDI**: The HDMI and HD-SDI outputs can be used simultaneously on the same camera.

**NOTE**: Only the first camera’s software is automatically updated in a daisy chain. To update the other cameras you have to connect them directly to the codec.

Example:
PrecisionHD 1080p12x cameras in a daisy chain

![Diagram of a daisy chain with three cameras connected to a codec](image-url)
Daisy chaining PrecisionHD Camera
1080p4x

**NOTE:** The PrecisionHD 1080p4x can only be used as the last camera in a daisy chain. Here depicted as the third camera.

A single daisy chain can have:

- Three cameras when using a Codec C60
- Seven cameras when using a Codec C90

Locate the extra camera and power connectors:

- **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 a VISCA Extra Camera cable (maximum length 20 m / 65.6 ft) between the Extra Camera and Codec Control sockets

**NOTE:** Only the first camera’s software is automatically updated in a daisy chain. To update the other cameras you have to connect them directly to the codec.

![Daisy chaining diagram]

**Example:**
PrecisionHD 1080p4x camera in a daisy chain

---

VISCA™ is a trademark of Sony Corporation
Daisy chaining PrecisionHD Camera
720p

A single daisy chain can have:
- Three cameras when using a Codec C60
- Seven cameras when using a Codec C90

Locate the extra camera and power connectors:
- **Power**: The first camera in the chain is powered up from the codec by a VISCA camera control cable. Additional cameras must use the 12V DC Power in.
- **Extra camera cable**: The daisy chained cameras are connected by a VISCA Extra Camera cable (maximum length 20 m / 65.6 ft) between the Extra Camera and Codec Control sockets

**NOTE**: Only the first camera’s software is automatically updated in a daisy chain. To update the other cameras you have to connect them directly to the codec.
Chapter 5

Video output formats

PrecisionHD Camera 1080p12x
PrecisionHD Camera 1080p12x

The PrecisionHD Camera 1080p12x has DIP switches for video output format setting.

**NOTE:** The early shipments of the Quick Set C20 came with an interim version of the PrecisionHD Camera 1080p4x (the PrecisionHD Camera 1080p4x*). The interim version has DIP switches for video output format setting, see the table on this page.

### Video output formats

The DIP switches 1 to 5 set the video output format for the camera. The DIP switches are located under the camera. The default setting is **Auto**, see the table to the right.

#### Maximum resolution:
- 1080p60 for PrecisionHD 1080p12x zoom
- 1080p30 for PrecisionHD 1080p4x* zoom
- 1080p30 for HD-SDI**

#### Line voltage frequency

The camera automatically detects the line voltage frequency when it is 50 or 60Hz. If there is a different line voltage, you can set the video output format to a specific value (use the DIP switches) to override the auto frequency detection.

Set the PrecisionHD 1080p DIP switch (country specific setting):
- 50Hz: 00011, gives 1080p50 (720p50 for HD-SDI)
- 60Hz: 00100, gives 1080p60 (720p60 for HD-SDI)

When using a Cisco codec, it is recommended to use 60Hz.

### DIP switch table

<table>
<thead>
<tr>
<th>Switch</th>
<th>HDMI</th>
<th>HD-SDI**</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 0 0 0 0</td>
<td><strong>Auto</strong></td>
<td></td>
</tr>
<tr>
<td>0 0 0 0 1</td>
<td>1920x1080p25</td>
<td>1920x1080p25</td>
</tr>
<tr>
<td>0 0 0 1 0</td>
<td>1920x1080p30</td>
<td>1920x1080p30</td>
</tr>
<tr>
<td>0 0 1 1 1</td>
<td>1920x1080p50**</td>
<td>1280x720p50***</td>
</tr>
<tr>
<td>0 1 0 0 0</td>
<td>1280x720p60**</td>
<td>1280x720p60***</td>
</tr>
<tr>
<td>1 0 0 0 1</td>
<td>Software control</td>
<td></td>
</tr>
</tbody>
</table>

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. This is the default setting.

**Software:** For more on the Software control setting, read about video mode selections in the Appendix section. Go to: [Camera control with VISCA™ protocol](#).

* Available for a limited period of time.
** Not supported with Codec C20.
*** Do not use with the PrecisionHD Camera 1080p4x*. 
Chapter 6
Appendices
Camera control with VISCA™ protocol

The information in this chapter applies to:

- PrecisionHD Camera 1080p12x
- PrecisionHD Camera 1080p4x
- Precision 40 Camera*
- PrecisionHD Camera 1080p2.5x

NOTE: Some of the VISCA™ commands do not apply to the PrecisionHD 1080p4x, PrecisionHD 1080p2.5x and Precision 40 cameras. These commands are marked with an * (asterisk) throughout this section.

NOTE: The VISCA™ commands for PrecisionHD 720p camera can be found in the MXP Reference User Guide for System Integrators.

Go to: http://www.cisco.com/go/telepresence/docs

The camera uses an RS-232 control interface that resembles the Sony VISCA™ protocol. The VISCA protocol (Video System Control Architecture) is a Sony protocol for synchronized control of multiple video peripherals.

VISCA™ is a trademark of Sony Corporation.

RS-232 Parameters

At startup, the communication parameters for the RS-232 interface must be set to:

- 9600 bits per second
- 8 data bits
- No parity
- 1 stop bit
- No hardware flow control
- No software flow control

All of the RS-232 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.

RS-232 commands and inquiries

You can find a list of all the available commands and inquiries together with the results and comments on the following pages.

*Formerly PrecisionHD Camera 1080p4x S2
VISCA™/RS–232 control protocol

The codec uses the Sony Visa protocol to control the cameras.

Interfacing the camera

When interfacing to the camera the codec uses an RS–232 control interface that resembles the Sony VISCA™ protocol.

Supported cameras

The following Cisco PrecisionHD cameras are supported:

- PrecisionHD Camera 1080p12x
- PrecisionHD Camera 1080p4x
- Precision 40 Camera*
- PrecisionHD Camera 1080p2.5x

Currently there is support for detection of the following third party cameras:

- Sony HD1
- Sony HD7

VISCA message format

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 generates a response. Commands and responses (messages) have the following format:

- Address byte (1)
- Message bytes (1..14)
- Terminator byte (1)

See the illustration for details.

Minimum length of any command or response is 3 bytes:

1. **Address byte (1)**: In this example there is one host, i.e. the codec (the host is the unit controlling the camera). The host has the 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 must 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. **Terminator 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

*Formerly PrecisionHD Camera 1080p4x S2
**VISCA™/RS–232 control protocol, continued**

NOTE: Some VISCA™ commands do not apply to the PrecisionHD 1080p4x, PrecisionHD 1080p2.5x and Precision 40 cameras.

### Network and interface commands

<table>
<thead>
<tr>
<th>Command set</th>
<th>Command packet</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>IF_Clear</td>
<td>8x 01 00 01 ff</td>
<td>Clear command buffer. Stop any current operation in progress.</td>
</tr>
<tr>
<td>Address_Set</td>
<td>8x 30 0p ff</td>
<td>p = address for this device. If x=8 (broadcast), increase p with 1 before sending to chain.</td>
</tr>
<tr>
<td>Command_Cancel *</td>
<td>8x 2p ff</td>
<td>p = Socket ID. PrecisionHD 1080p 12x does not support multiple sockets. Commands always runs to completion. Do not use it.</td>
</tr>
</tbody>
</table>

### Push messages

Messages sent from camera to controller.

<table>
<thead>
<tr>
<th>Command set</th>
<th>Command packet</th>
<th>Reply and comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network_Change y0</td>
<td>38 ff</td>
<td>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.</td>
</tr>
<tr>
<td>IR_Push y0</td>
<td>07 7d 02 gg hh</td>
<td>If IR mode is on, IR codes received by the camera are sent to the controller. gg = IR ID hh = keycode</td>
</tr>
</tbody>
</table>

### Camera commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Command Packet</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power_On</td>
<td>8x 01 04 00 02 ff</td>
<td>Power control. This command stores the zoom and focus value and reset these motors. Used for PrecisionHD 720p if the camera has been on for a long time. NOTE: These commands do not power the camera on or off. They only reset the motors.</td>
</tr>
<tr>
<td>Power_Off</td>
<td>8x 01 04 00 03 ff</td>
<td></td>
</tr>
<tr>
<td>Video_Format</td>
<td>8x 01 35 0p 0q 0r 0s ff</td>
<td>Selects video format. p = reserved q = video mode. See the video format table. r = Used in PrecisionHD 720p camera. Can be recycled.</td>
</tr>
<tr>
<td>WB_Auto</td>
<td>8x 01 04 35 00 ff</td>
<td>WB: White Balance</td>
</tr>
<tr>
<td>WB_Table_Manual</td>
<td>8x 01 04 35 06 ff</td>
<td></td>
</tr>
<tr>
<td>WB_Table_Direct</td>
<td>8x 01 04 75 0p 0q 0r 0s ff</td>
<td>Used if Wbmode = Table manual. If Wbmode is not Table manual, the table index is stored and used next time Table manual mode is entered. p = reserved q = video mode.</td>
</tr>
<tr>
<td>AE_Auto</td>
<td>8x 01 04 39 00 ff</td>
<td>AE: Automatic Exposure</td>
</tr>
<tr>
<td>AE_Manual</td>
<td>8x 01 04 39 03 ff</td>
<td></td>
</tr>
<tr>
<td>Iris_Direct</td>
<td>8x 01 04 4B 0p 0q 0r 0s 0s ff</td>
<td>Used if AE mode = Manual. p = reserved q = video mode. Range 0..50</td>
</tr>
</tbody>
</table>

* Does not apply to PrecisionHD 1080p4x, PrecisionHD 1080p2.5x and Precision 40 cameras
**VISCA™/RS-232 control protocol, continued**

**NOTE:** Some VISCA™ commands do not apply to the PrecisionHD 1080p4x, PrecisionHD 1080p2.5x and Precision 40 cameras.

Camera commands, continued...

<table>
<thead>
<tr>
<th>Command</th>
<th>Command Packet</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gain_Direct</td>
<td>8x 01 04 0c 0p 0q 0r 0s ff</td>
<td>Used if AE mode = Manual. pqrs: Gain position, values: 12-21dB.</td>
</tr>
<tr>
<td>Backlight_On</td>
<td>8x 01 04 33 02 ff</td>
<td>BacklightCompensation mode</td>
</tr>
<tr>
<td>Backlight_Off</td>
<td>8x 01 04 33 03 ff</td>
<td></td>
</tr>
<tr>
<td>Mirror_On</td>
<td>8x 01 04 61 02 ff</td>
<td>Sony calls this CAM_LR.Reverse. RR (FT/AT mirror command).</td>
</tr>
<tr>
<td>Mirror_Off</td>
<td>8x 01 04 61 03 ff</td>
<td></td>
</tr>
<tr>
<td>Flip_On</td>
<td>8x 01 04 66 02 ff</td>
<td>Sony calls this CAM_ImgFlip.</td>
</tr>
<tr>
<td>Flip_Off</td>
<td>8x 01 04 66 03 ff</td>
<td></td>
</tr>
<tr>
<td>Gamma_Auto</td>
<td>8x 01 04 51 02 ff</td>
<td>Gamma mode. Default uses gamma table 4.</td>
</tr>
<tr>
<td>Gamma_Manual</td>
<td>8x 01 04 51 03 ff</td>
<td></td>
</tr>
<tr>
<td>Gamma_Direct</td>
<td>8x 01 04 52 0p 0q 0r 0s ff</td>
<td>pqrs: Gamma table to use in manual mode. Range 0-7.</td>
</tr>
<tr>
<td>MM_Detect_On</td>
<td>8x 01 50 30 01 ff</td>
<td>Turn on the Motor Moved Detection. The camera recalibrates if touched.</td>
</tr>
<tr>
<td>MM_Detect_Off</td>
<td>8x 01 50 30 00 ff</td>
<td>Turn off the Motor Moved Detection. The camera does not recalibrate if</td>
</tr>
<tr>
<td>Call_LED_On</td>
<td>8x 01 33 01 01 ff</td>
<td>Refers to the LED on top of the camera. It is always off on startup.</td>
</tr>
<tr>
<td>Call_LED_Off</td>
<td>8x 01 33 01 00 ff</td>
<td></td>
</tr>
<tr>
<td>Call_LED_Blink</td>
<td>8x 01 33 01 02 ff</td>
<td></td>
</tr>
<tr>
<td>Power_LED_On</td>
<td>8x 01 33 02 01 ff</td>
<td>Green power LED. If switched to off and stored to startup profile, it is always off.</td>
</tr>
<tr>
<td>Power_LED_Off</td>
<td>8x 01 33 02 00 ff</td>
<td></td>
</tr>
</tbody>
</table>

**PTZF - movement commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Command Packet</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>IR_Output_On</td>
<td>8x 01 06 08 02 ff</td>
<td>See IR push message.</td>
</tr>
<tr>
<td>IR_Output_Off</td>
<td>8x 01 06 08 03 ff</td>
<td></td>
</tr>
<tr>
<td>IR_CameraControl_On</td>
<td>8x 01 06 09 02 ff</td>
<td>Lets the up/down/left/right/zoom+/~ on the IR remote control the camera directly. Those keycodes are sent to the controller if the IR Output is on.</td>
</tr>
<tr>
<td>IR_CameraControl_Off</td>
<td>8x 01 06 09 03 ff</td>
<td></td>
</tr>
<tr>
<td>Zoom_Stop</td>
<td>8x 01 04 07 00 ff</td>
<td></td>
</tr>
<tr>
<td>Zoom_Tele</td>
<td>8x 01 04 07 2p ff</td>
<td>p = speed parameter, a (low) to b (high)</td>
</tr>
<tr>
<td>Zoom_Wide</td>
<td>8x 01 04 07 3p ff</td>
<td></td>
</tr>
<tr>
<td>Zoom_Direct</td>
<td>8x 01 04 47 0p 0q 0r 0s ff</td>
<td>pqrs: zoom position</td>
</tr>
<tr>
<td>ZoomFocus_Direct</td>
<td>8x 01 04 47 0p 0q 0r 0s ff</td>
<td>pqrs: zoom position, tuvw: focus position</td>
</tr>
<tr>
<td>Focus_Stop</td>
<td>8x 01 04 08 00 ff</td>
<td></td>
</tr>
<tr>
<td>Focus_Far</td>
<td>8x 01 04 08 2p ff</td>
<td>p = speed parameter, a (low) to b (high)</td>
</tr>
<tr>
<td>Focus_Near</td>
<td>8x 01 04 08 3p ff</td>
<td></td>
</tr>
<tr>
<td>Focus_Direct</td>
<td>8x 01 04 48 0p 0q 0r 0s ff</td>
<td>pqrs: focus position</td>
</tr>
<tr>
<td>Focus_Auto</td>
<td>8x 01 04 38 02 ff</td>
<td>Autofocus mode on/off.</td>
</tr>
<tr>
<td>Focus_Manual</td>
<td>8x 01 04 38 03 ff</td>
<td>* Does not apply to PrecisionHD 1080p4x, PrecisionHD 1080p2.5x and Precision 40 cameras</td>
</tr>
</tbody>
</table>

**NOTE:** If the mode is on auto, camera may disable autofocus when focus is ok. Autofocus is turned back on when camera is moved using Zoom_Tele/ Wide, PT_Up/Down/Left/Right. This also applies for IR_CameraControl movement.
### VISCA™/RS–232 control protocol, continued

**NOTE:** Some VISCA™ commands do not apply to the PrecisionHD 1080p4x, PrecisionHD 1080p2.5x and Precision 40 cameras.

#### PTZF - movement commands, continued...

<table>
<thead>
<tr>
<th>Command</th>
<th>Command Packet</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT_Stop</td>
<td>8x 01 06 01 03 03 03 03 ff</td>
<td>Reset pan/tilt to center position. This also re-synchronizes the motors.</td>
</tr>
<tr>
<td>PT_Reset</td>
<td>8x 01 06 05 ff</td>
<td></td>
</tr>
<tr>
<td>PT_Up</td>
<td>8x 01 06 01 0p 0t 03 01 ff</td>
<td>p: pan speed t: tilt speed Right -&gt; increment pan Up -&gt; increment tilt</td>
</tr>
<tr>
<td>PT_Down</td>
<td>8x 01 06 01 0p 0t 03 02 ff</td>
<td>Left -&gt; decrement pan Down -&gt; decrement tilt</td>
</tr>
<tr>
<td>PT_Left</td>
<td>8x 01 06 01 0p 0t 01 03 ff</td>
<td></td>
</tr>
<tr>
<td>PT_Right</td>
<td>8x 01 06 01 0p 0t 02 03 ff</td>
<td></td>
</tr>
<tr>
<td>PT_UpLeft</td>
<td>8x 01 06 01 0p 0t 01 01 ff</td>
<td></td>
</tr>
<tr>
<td>PT_UpRight</td>
<td>8x 01 06 01 0p 0t 02 01 ff</td>
<td></td>
</tr>
<tr>
<td>PT_DownLeft</td>
<td>8x 01 06 01 0p 0t 01 02 ff</td>
<td></td>
</tr>
<tr>
<td>PT_DownRight</td>
<td>8x 01 06 01 0p 0t 02 02 ff</td>
<td></td>
</tr>
<tr>
<td>PT_Direct</td>
<td>8x 01 06 02 0p 0t 0q Or 0s 0u 0v 0w 0x 0y ff</td>
<td>p: max pan speed t: max tilt speed qrsu: pan position vwxy: tilt position Attempts to linearize movement.</td>
</tr>
<tr>
<td>PTZF_Direct</td>
<td>8x 01 06 20 0p 0q 0s 0t 0u 0v 0w 0x 0y 0z 0g 0h 0i 0j 0k ff</td>
<td>Sets all motors in one operation. pqrs: pan tuvw: tilt xygz: zoom hjik: focus Attempts to linearize movement for pan and tilt. The focus value will not be used if the camera is in continuous autofocus mode. <strong>NOTE:</strong> Never route this message through Sony cameras.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Command</th>
<th>Command Packet</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT_Limit_Set *</td>
<td>8x 01 06 07 00 0x 0p 0q Or 0s 0t 0u 0v 0w ff</td>
<td>x=1: Up/Right x=0: Down/Left pqrs: Pan limit tuvx: Tilt limit. This command is valid until the next time the camera boots.</td>
</tr>
<tr>
<td>PT_Limit_Clear *</td>
<td>8x 01 06 07 01 0x [...] ff</td>
<td>x=1: Up/Right x=0: Down/Left Sony specifies several filler bytes after 0x. These can be ignored.</td>
</tr>
</tbody>
</table>

* Does not apply to PrecisionHD 1080p4x, PrecisionHD 1080p2.5x and Precision 40 cameras
**VISCA™/RS-232 control protocol, continued**

NOTE: Some VISCA™ commands do not apply to the PrecisionHD 1080p4x, PrecisionHD 1080p2.5x and Precision 40 cameras.

### Inquiries

<table>
<thead>
<tr>
<th>Command</th>
<th>Command Packet</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAM_ID_Inq</td>
<td>8x 09 04 22 ff</td>
<td>Resp: 90 50 zz xx 00 yy ff Only zz, which identifies the camera, is relevant. zz = 0x50 for this camera.</td>
</tr>
<tr>
<td>CAM_SWID_Inq</td>
<td>8x 09 04 23 ff</td>
<td>Resp: y0 50 [1-125 bytes ASCII SWID] ff. Never route this message through Sony cameras.</td>
</tr>
<tr>
<td>CAM_HWID_Inq</td>
<td>8x 09 04 24 ff</td>
<td>The response is the Module Serial Number stored in EEPROM. The number is converted to ASCII: y0 50 [12 bytes ASCII HWID] ff.</td>
</tr>
<tr>
<td>Zoom_Pos_Inq</td>
<td>8x 09 04 47 ff</td>
<td>Resp: y0 50 0p 0q 0r 0s ff pQRS: zoom position</td>
</tr>
<tr>
<td>Focus_Pos_Inq</td>
<td>8x 09 04 48 ff</td>
<td>Resp: y0 50 0p 0q 0r 0s ff pQRS: focus position</td>
</tr>
<tr>
<td>Focus_Mode_Inq</td>
<td>8x 09 04 38 ff</td>
<td>Resp: y0 50 0p ff p=2: Auto, p=3: Manual</td>
</tr>
<tr>
<td>PanTilt_Pos_Inq</td>
<td>8x 09 06 12 ff</td>
<td>Resp: y0 50 0p 0q 0r 0s 0t 0u 0v 0w ff pQRS: pan position tuvw: tilt position</td>
</tr>
<tr>
<td>Power_Inq</td>
<td>8x 09 04 00 ff</td>
<td>Resp: y0 50 0p ff p=2: On, p=3: Off</td>
</tr>
<tr>
<td>WB_Mode_Inq</td>
<td>8x 09 04 35 ff</td>
<td>Resp: y0 50 0p ff p=0: Auto, p=6: Table manual</td>
</tr>
<tr>
<td>WB_Table_Inq</td>
<td>8x 09 04 75 ff</td>
<td>Resp: y0 50 0p 0q 0r 0s ff pQRS: Table used if table mode is on.</td>
</tr>
<tr>
<td>AE_Mode_Inq</td>
<td>8x 09 04 39 ff</td>
<td>Resp: y0 50 0p ff p=0: Auto, p=3: Manual</td>
</tr>
<tr>
<td>Backlight_Mode_Inq</td>
<td>8x 09 04 33 ff</td>
<td>Resp: y0 50 0p ff p=2: On, p=3: Off, p=4: Auto</td>
</tr>
<tr>
<td>Mirror_Inq</td>
<td>8x 09 04 61 ff</td>
<td>Resp: y0 50 0p ff p=2: On, p=3: Off</td>
</tr>
</tbody>
</table>

### Command Packets

<table>
<thead>
<tr>
<th>Command</th>
<th>Command Packet</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flip_Inq</td>
<td>8x 09 04 66 ff</td>
<td>Whether the video is flipped or not. Resp: y0 50 0p ff p=2: On, p=3: Off</td>
</tr>
<tr>
<td>Gamma_Mode_Inq</td>
<td>8x 09 04 51 ff</td>
<td>Resp: y0 50 0p ff p=2: Auto, p=3: Manual</td>
</tr>
<tr>
<td>Gamma_Table_Inq</td>
<td>8x 09 04 52 ff</td>
<td>Resp: y0 50 0p 0q 0r 0s ff pQRS: Gamma table in use if on manual mode.</td>
</tr>
<tr>
<td>Call_LED_Inq</td>
<td>8x 09 01 33 01 ff</td>
<td>Resp: y0 50 0p ff p=2: On, p=3: Off, p=4: Blink</td>
</tr>
<tr>
<td>Power_LED_Inq</td>
<td>8x 09 01 33 02 ff</td>
<td>Resp: y0 50 0p ff p=2: On, p=3: Off</td>
</tr>
<tr>
<td>Video_System_Inq</td>
<td>8x 09 06 23 ff</td>
<td>y0 50 0p 0q 0r 0s ff pQRS=video mode currently being output on the HDMI port. See chapter on DIP switches.</td>
</tr>
<tr>
<td>DIP_Switch_Inq*</td>
<td>8x 09 06 24 ff</td>
<td>y0 50 0p 0q 0r 0s ff pQRS contains the bit pattern of the DIP switch. See chapter on DIP switches.</td>
</tr>
<tr>
<td>IR_Output_Inq</td>
<td>8x 09 06 08 ff</td>
<td>Resp: y0 50 0p ff p=2: On, p=3: Off</td>
</tr>
<tr>
<td>ALS_RGain_Inq*</td>
<td>8x 09 50 50 ff</td>
<td>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 software.</td>
</tr>
<tr>
<td>ALS_BGain_Inq*</td>
<td>8x 09 50 51 ff</td>
<td></td>
</tr>
<tr>
<td>ALS_GGain_Inq*</td>
<td>8x 09 50 52 ff</td>
<td></td>
</tr>
<tr>
<td>ALS_WGain_Inq*</td>
<td>8x 09 50 53 ff</td>
<td></td>
</tr>
<tr>
<td>Up side down_Inq*</td>
<td>8x 09 50 70 ff</td>
<td>Resp: y0 50 0p ff p=0: Camera is upright. p=1: Camera is upside down.</td>
</tr>
</tbody>
</table>

* Does not apply to PrecisionHD 1080p4x, PrecisionHD 1080p2.5x and Precision 40 cameras.
VISCA™/RS–232 control protocol, continued

NOTE: Some VISCA™ commands do not apply to the PrecisionHD 1080p4x, PrecisionHD 1080p2.5x and Precision 40 cameras.

Software upload commands

The CRC algorithm used, is the same as in the XModem protocol. CRC for the 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.

<table>
<thead>
<tr>
<th>Command set</th>
<th>Command packet</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>SW start</td>
<td>8x 01 50 a2 0p 0q 0r 0s 0t 0u 0v 0w ff</td>
<td>( \text{pqrstuvw} ) = size, ( \text{pq} \text{-LSB} ) Returns y050ff if ok. Fatal errors: Returns y06006ff if upload is already in progress. Returns y06007ff if unable to access the flash.</td>
</tr>
<tr>
<td>SW end</td>
<td>8x 01 50 a1 ff</td>
<td>Sent after last software packet, and instructs the camera to verify new application. Command may take up to 30 seconds to complete. Returns y050ff if ok. Issue a camera reboot to activate new software. Returns y06008ff if verification of sw failed.</td>
</tr>
<tr>
<td>SW abort</td>
<td>8x 01 50 a3 ff</td>
<td>Abort software upload that’s in progress</td>
</tr>
<tr>
<td>SW packet</td>
<td>8x a0 pp qq rr ss [256 bytes data]</td>
<td>( \text{ppqq} ) = 16 bit packet id, ( \text{pp} \text{-LSB} ) ( \text{rrss} ) = 16 bit CRC, ( \text{rr} \text{-LSB} ) Returns y0 50 ff if packet ok. -&gt; send next one. Returns y0 60 0ff if crc error -&gt; retransmit packet. Returns y0 60 0a ff if id error -&gt; retransmit packet. Fatal errors: y0 60 0b ff not in upload mode y0 60 0c ff error writing data to flash</td>
</tr>
</tbody>
</table>

Debug commands for Cisco cameras

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

<table>
<thead>
<tr>
<th>Command set</th>
<th>Command packet</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAM_PingPong_Reset *</td>
<td>8x ae ff</td>
<td>Reset ping ctr to 0.</td>
</tr>
<tr>
<td>CAM_Ping *</td>
<td>8x af 0p 0q 0r 0s [256 bytes data] ff</td>
<td>( \text{pqrs} ) = Pingval. Camera responds with OK if correct pingval is received. Increase ctr with 1 for next packet. Data section is dumped to stdout if it fails.</td>
</tr>
<tr>
<td>CAM_Stdin *</td>
<td>8x a4 [0-256 bytes stdin] 00 ff</td>
<td>Send command to the command interpreter.</td>
</tr>
<tr>
<td>CAM_Debug_Mode *</td>
<td>8x 01 39 0q ff</td>
<td>( q=0 ): Debug mode off. ( q=1 ): Debug mode on. Camera sends stdout as visca messages in the following format: y0 50 [0-256 bytes stdout] 00 ff</td>
</tr>
</tbody>
</table>

Other commands

<table>
<thead>
<tr>
<th>Command set</th>
<th>Command packet</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAM_Boot</td>
<td>8x 01 42 ff</td>
<td>Reboot the camera. This also resets serial speed to 9600.</td>
</tr>
<tr>
<td>CAM_Speed</td>
<td>8x 01 34 0p ff</td>
<td>( p=0 ): Serial speed 9600. ( p=1 ): Serial speed 115200. Reply is sent before the speed switch takes place. Please wait 20 seconds after ok before sending new commands.</td>
</tr>
</tbody>
</table>
VISCA™/RS–232 control protocol, continued

NOTE: The information on this page only applies to PrecisionHD Camera 1080p12x.

Video mode selection

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 is used. If both are set to auto, resolution is controlled automatically by EDID.

DIP Switch settings

The switches are numbered 1 to 5. The VISCA column shows the value that must be used when using the CAM_Video_Format command.

NOTE: The DIP switches are only read by the software at startup/boot. Therefore if the DIP switches are changed the camera must be rebooted.

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

DIP switch table

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>VISCA</th>
<th>HDMI</th>
<th>HD-SDI</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>x</td>
<td>Auto*</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0x0000</td>
<td>1080p25</td>
<td>1080p25</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0x0001</td>
<td>1080p30</td>
<td>1080p30</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0x0002</td>
<td>1080p50</td>
<td>720p50</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0x0003</td>
<td>1080p60</td>
<td>720p60</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0x0004</td>
<td>720p25</td>
<td>720p25</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0x0005</td>
<td>720p30</td>
<td>720p30</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0x0006</td>
<td>720p50</td>
<td>720p50</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0x0007</td>
<td>720p60</td>
<td>720p60</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0x0009</td>
<td>SW control</td>
<td></td>
</tr>
</tbody>
</table>

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: Used when controlling cameras using the VISCA protocol.

PrecisionHD 1080p12x, from below

The DIP switches 1 to 5
Technical specifications

**PrecisionHD 1080p2.5x Camera**
Available with the SX20 Quick Set
- 1080p60 Full High Definition
- 2.5x optical zoom (5x with digital zoom*)
- USB output: 1080p30/720p60 (For future use)
- Mount upside down—camera orientation automatically detected and picture flipped
- Pan speed: 100°/s, range: -30° to +30°
- Tilt speed: 30°/s, range: -25° to +5°
- 52.5° vertical field of view
- 83° horizontal field of view
- F# 2.0 - 2.9
- Focus distance 0.3 m – ∞
- 1920 x 1080 pixels progressive @ 60fps
- 1280 x 720 pixels progressive @ 60fps
- Automatic or manual focus, brightness and white balance
- New connector (combining HDMI and VISCA)
- Far-end camera control
- Height: 85 mm/3.35 in
- Width: 95 mm/3.74 in
- Depth: 130 mm/5.12 in
- Weight: 0.5 kg/1.1 lbs

* Available with for software version TC7.1 and later.

**Precision 40 Camera**
Available with the SX20 Quick Set and SX80 codec
- 1080p60 Full High Definition
- 1/3" CMOS
- 4x optical zoom (8x with digital zoom)**
- HDMI output
- Mount upside down select option through VISCA™
- Pan speed: 100°/s, range: -90° to +90°
- Tilt speed: 30°/s, range: -25° to +15°
- 43.5° vertical field of view
- 70° horizontal field of view
- F# 1.7 - 2.3
- Focus distance 0.3 m – ∞
- 1920 x 1080 pixels progressive @ 60fps
- 1280 x 720 pixels progressive @ 60fps
- Automatic or manual focus, brightness and white balance
- Far-end camera control
- Daisy chain support (can only be in the end of a chain)
- Height (at max tilt): H 150.5 mm/5.92 in
- Width: 212 mm/8.35 in
- Depth: 138.5 mm/5.45 in
- Weight: 1.44 kg/3.17 lbs

**PrecisionHD Camera 1080p4x**
Available with the Quick Set C20
- 1080p30/720p60 Full High Definition
- 4x optical zoom
- HDMI output
- Mount upside down (select option through VISCA™)
- Pan speed: 100°/s, range: -90° to +90°
- Tilt speed: 30°/s, range: -25° to +15°
- 43.5° vertical field of view
- 70° horizontal field of view
- F# 1.7 - 2.3
- Focus distance 0.3 m – ∞
- 1920 x 1080 pixels progressive @ 30fps
- 1280 x 720 pixels progressive @ 60fps
- Automatic or manual focus, brightness and white balance
- Far-end camera control
- Daisy chain support (can only be in the end of a chain)
- Height (at max tilt): H 151 mm/5.94 in
- Width: 212 mm/8.35 in
- Depth: 138 mm/5.43 in
- Weight: 1.44 kg/3.17 lbs

**Formerly PrecisionHD Camera 1080p4x S2**
PrecisionHD Camera 1080p4x*

**NOTE:** This is an interim version* of the 4x camera; available for a limited period of time.

- 1080p60 Full High Definition
- 4x optical zoom
- HDMI and HD-SDI outputs with ability to share picture simultaneously through both ports
- Mount upside down—camera orientation automatically detected and picture flipped
- 1/3" CMOS
- Pan speed: 100°/s, range: -90° to +90°
- Tilt speed: 40°/s, range: -25° to +15°
- 43.5° vertical field of view
- 72° horizontal field of view
- F# 1.7
- Focus distance 0.3 m–∞
- 1920 x 1080 pixels progressive @ 30fps
- Other formats supported (configurable through DIP-switch):
  - 1920 x 1080@30Hz
  - 1920 x 1080@25Hz
  - 1280 x 720@30Hz
  - 1280 x 720@25Hz
- Automatic or manual focus, brightness and white balance
- Far-end camera control
- Daisy chain support (can only be in the end of a chain)
- Height (at max tilt): 172 mm/6.8 in
- Width: 220 mm/8.7 in
- Depth: 147 mm/5.8 in
- Weight: 1.8 kg/3.97 lbs

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**PrecisionHD Camera 1080p12x**

- 1080p60 Full High Definition
- 12x optical zoom
- HDMI and HD-SDI outputs with ability to share picture simultaneously through both ports
- Mount upside down—camera orientation automatically detected and picture flipped
- 1/3" CMOS
- Pan speed: 100°/s, range: -90° to +90°
- Tilt speed: 40°/s, range: -25° to +15°
- 43.5° vertical field of view
- 72° horizontal field of view
- F# 1.7-2.2
- Focus distance 0.3 m–∞
- 1920 x 1080 pixels progressive @ 60fps
- Other formats supported (configurable through DIP-switch):
  - 1920 x 1080@60Hz (HDMI only)
  - 1920 x 1080@50Hz (HDMI only)
  - 1920 x 1080@30Hz
  - 1920 x 1080@25Hz
  - 1280 x 720@60Hz
  - 1280 x 720@50Hz
  - 1280 x 720@30Hz
  - 1280 x 720@25Hz
- Automatic or manual focus, brightness and white balance
- Far-end camera control
- Daisy chain support (VISCA™ protocol camera)
- 15 near and far-end camera presets
- Height (at max tilt): 167 mm/6.6 in
- Width: 222 mm/8.8 in
- Depth: 145 mm/5.7 in
- Weight: 1.7 kg/3.75 lbs

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**PrecisionHD Camera 720p**

- 720p30 High Definition
- 7x optical zoom
- 1/3" CMOS
- Pan range: -90° to +90°
- Tilt range: -20° to +10°
- 42° vertical field of view, 72° total vertical field of view
- 70° horizontal field of view, 250° total horizontal field of view
- F# 1.7
- Focus distance 0.3 m–∞
- 1280 x 720 pixels progressive @ 30fps
- Automatic or manual focus, brightness and white balance
- Far-end camera control
- Daisy chain support (VISCA™ protocol camera)
- Height (at max tilt): 172 mm/6.8 in
- Width: 222 mm/8.8 in
- Depth: 145 mm/5.7 in
- Weight: 1.7 kg/3.75 lbs

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* The early shipments of the Quick Set C20 came with an interim version of the PrecisionHD Camera 1080p4x (the PrecisionHD Camera 1080p4x*).
Cisco contacts

On our web site you will find an overview of the worldwide Cisco contacts.

Go to: http://www.cisco.com/web/siteassets/contacts

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