



**VPT300 Intelligent Camera**  
**V500R003C10**

# **Product Overview**

**Issue**      **04**  
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# About This Document

## Purpose

This document describes the positioning, features, application scenarios, and technical specifications of the VPT300, an intelligent camera developed by Huawei.

## Intended Audience





This document is intended for:


- End users
- Huawei agents

## Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol Conventions

Symbol	Description
 <b>DANGER</b>	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
 <b>WARNING</b>	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
 <b>CAUTION</b>	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
 <b>NOTICE</b>	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury.

Symbol	Description
 <b>NOTE</b>	<p>Calls attention to important information, best practices and tips.</p> <p>NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.</p>

## Change History

Changes between document issues are cumulative. The latest document issue contains all the changes made in earlier issues.

### Issue 04 (2017-11-15)

This issue is the fourth official release. It has the following updates:

- Added 6.1 Maintenance Using the VPC600.
- Updated 7.1 Physical Specifications.

### Issue 03 (2017-10-25)

This issue is the third official release. It updated 3 Application Scenarios.

### Issue 02 (2017-05-15)

This issue is the second official release. It updated the product image.

### Issue 01 (2017-01-05)

This issue is the first official release.

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# 1 Product Positioning

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The Huawei VPT300 intelligent camera (VPT300 for short) is designed for small and medium conference rooms in enterprises and educational institutions. The VPT300 works with the Huawei TE40/TE50/TE60/TX50 videoconferencing endpoint (TE40/TE50/TE60/TX50 or endpoint for short) to implement intelligent tracking, improving communication efficiency and delivering optimal conferencing experience.

Each VPT300 integrates a dual-camera system that supports face detection and 16 microphones (microphone array). The dual-camera system tracks the human face by capturing video images. The microphone array detects sound and locates the sound source using sound localization. Generally, the VPT300 supports speaker tracking with accurate localization and fast focus.

# 2 Product Highlights

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The VPT300 provides optimal video layouts with features such as fast localization and speaker close-up, delivering an immersive conference experience.

## Dual-Camera System, Implementing Fast Localization

The dual camera system:

- Supports 84-degree wide angle
- Shoots video images for face detection.
- Automatically detects two participants who are having a conversation and displays their video images separately in two panes.
- Takes close-up video images of objects within the detection range and calculates their depth of field (DoF) for fast localization.
- Uses a facial recognition algorithm to provide accurate positioning and flexible tracking.

## AutoFrame, Providing Optimal Video Layouts

- The VPT300 automatically adapts to conference scenarios to present best-quality video images.
- Based on the number, location, and motion of participants, the VPT300 can be automatically adjusted to provide a dynamic overview of the entire conference room.

## Panoramic and Close-up Video Images Displayed in PiP Mode

The panoramic view and close-up video images can be displayed in Picture in Picture (PiP) mode. That is, the panoramic view is displayed in full-screen mode and the close-up video images in the small window. This allows you not to miss any details and helps improve communication efficiency.

## SDI Port, Addressing Long-Distance Transmission of Video Images

The SDI port transmits video images taken by the VPT300 to an endpoint that is up to 60 m away without any distortions. Compared with the analog port, the SDI port does not have any attenuation when transmitting RGB and YPbPr video signals, providing quality video at lower costs.

# 3 Application Scenarios

The VPT300 works in a conference room smaller than 50 m<sup>2</sup> in conjunction with Huawei's VPC600 HD camera and Huawei's TE40/TE50/TE60/TX50 videoconferencing endpoint. It intelligently tracks speakers within a 140-degree range of 10 m radius. A VPT300 can be equipped with two VPC600s to implement intelligent tracking. The two VPC600s are connected to the VPT300 through the HD-VI input ports on both sides at its back (shown in [Figure 3-1](#)). The video output resolutions of both VPT300 and two VPC600s are 1080p 50/60 fps.

**Figure 3-1** Two VPC600s installed on a VPT300





The VPT300 is connected to a TE40/TE50/TE60/TX50 endpoint through the HD-VI or 3G-SDI cable. Use the 3G-SDI cable if your VPT300 is remotely away from that endpoint.

## Connecting to an Endpoint Using the HD-VI Cable

**Figure 3-2** shows how a VPT300 is connected to a TE40 using the HD-VI cable. Connect the VPT300 to a TE50, TE60, or TX50 in the same way.

**Figure 3-2** Connecting a VPT300 to a TE40 using the HD-VI cable



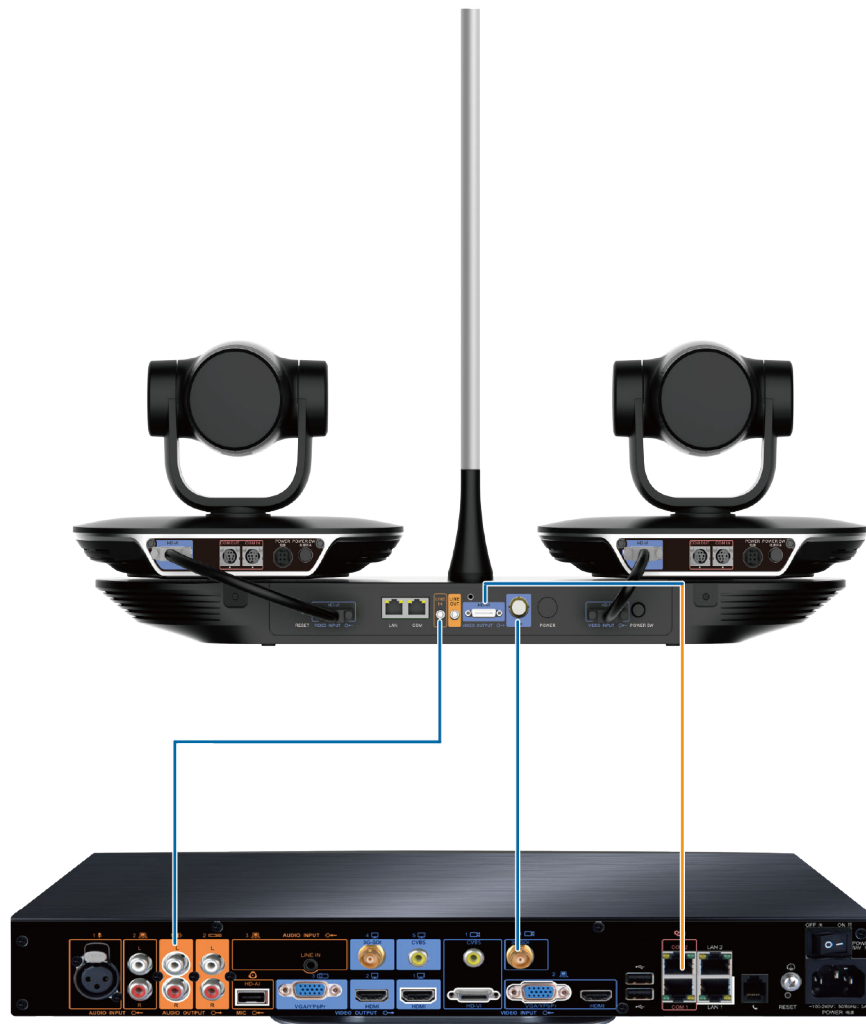
Connecting is performed as follows:

- Use the HD-VI cable delivered with the TE40 to connect the HD-VI output port on the VPT300 to video input port 1 (that is, HD-VI input port) on the TE40.
- Use the audio cable delivered with the VPT300 to connect the LINE IN audio input port on the VPT300 to audio output port 1 on the TE40.

## Connecting to an Endpoint Using the 3G-SDI Cable

**Figure 3-3** shows how a VPT300 is connected to a TE50 using the 3G-SDI cable. Connect the VPT300 to a TE60 or TX50 in the same way.

**Figure 3-3** Connecting a VPT300 to a TE50 using the 3G-SDI cable



Connecting is performed as follows:

- Connect the 3G-SDI input port on the VPT300 to video input port 3 (that is, 3G-SDI input port) on the TE50.
- Use the audio cable delivered with the VPT300 to connect the LINE IN audio input port on the VPT300 to audio output port 1 on the TE50.
- Connect one end of the HD-VI to DVI/Serial cable (delivered with the TE50) to the HD-VI output port on the VPT300 and connect the other end of the cable to the COM 1 or COM 2 port on the TE50 through a network cable.

# 4 Product Structure

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## 4.1 Appearance

The VPT300 has a compact design, which consists of a base, a sound pickup pole, and two VPC600s.

**Figure 4-1** shows the appearance of the VPT300.

**Figure 4-1** VPT300 appearance



**Figure 4-2** shows the base and sound pickup pole of the VPT300.

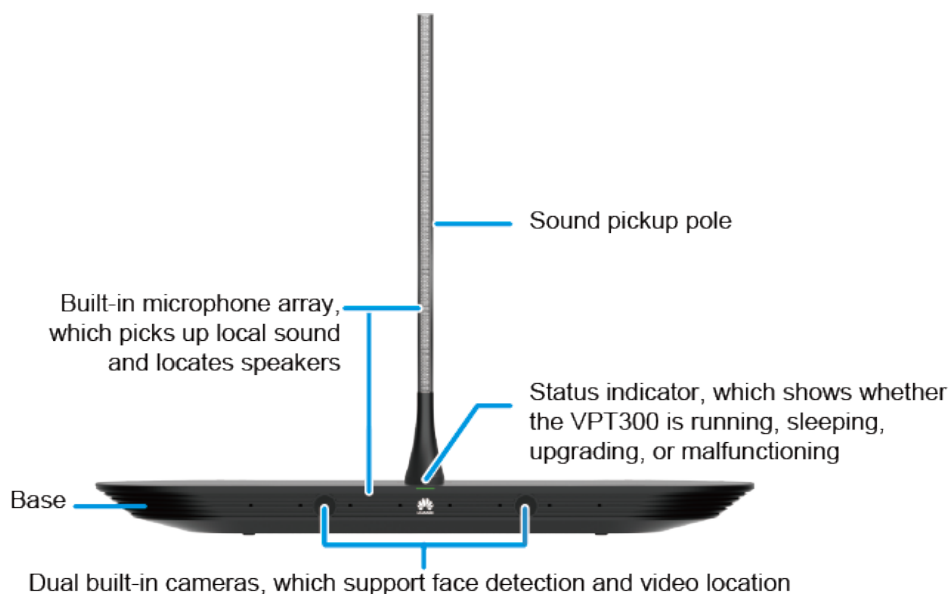
**Figure 4-2** VPT300 base and sound pickup pole



## 4.2 Front Panel and Rear Panel

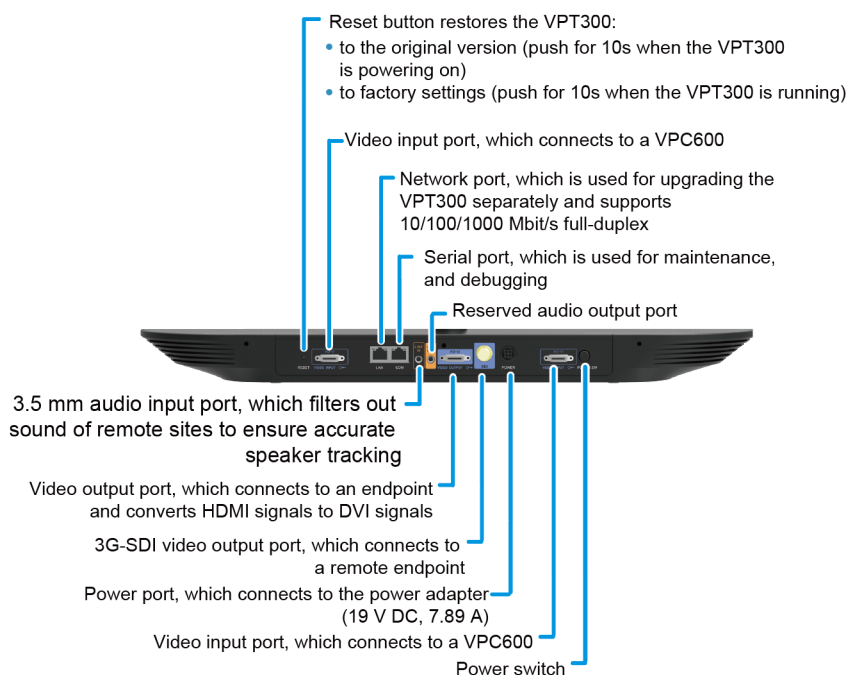
**Figure 4-3** shows the front panel of the VPT300.

**Figure 4-3** VPT300 front panel



**Figure 4-4** shows the rear panel of the VPT300.

**Figure 4-4** VPT300 rear panel



**Table 4-1** describes the VPT300 indicator status.

**Table 4-1** VPT300 indicator status

When the indicator is...	The VPT300 is...
off	powered off
blinking green twice per second	powering on
blinking green four times per second	upgrading
steady green	working properly
blinking yellow once per second	encountering an IP conflict
blinking green (on for 1s, off for 2s)	on standby
steady red	faulty (hardware)
steady yellow	faulty (software)
blinking yellow twice per second	overheating

# 5 Features

## 5.1 Automatic Tracking

The VPT300 automatically detects and identifies the conference status, takes panoramic and close-up video images, and tracks speakers. The VPT300 also supports PiP to enhance interaction experience. Specifically, the VPT300:

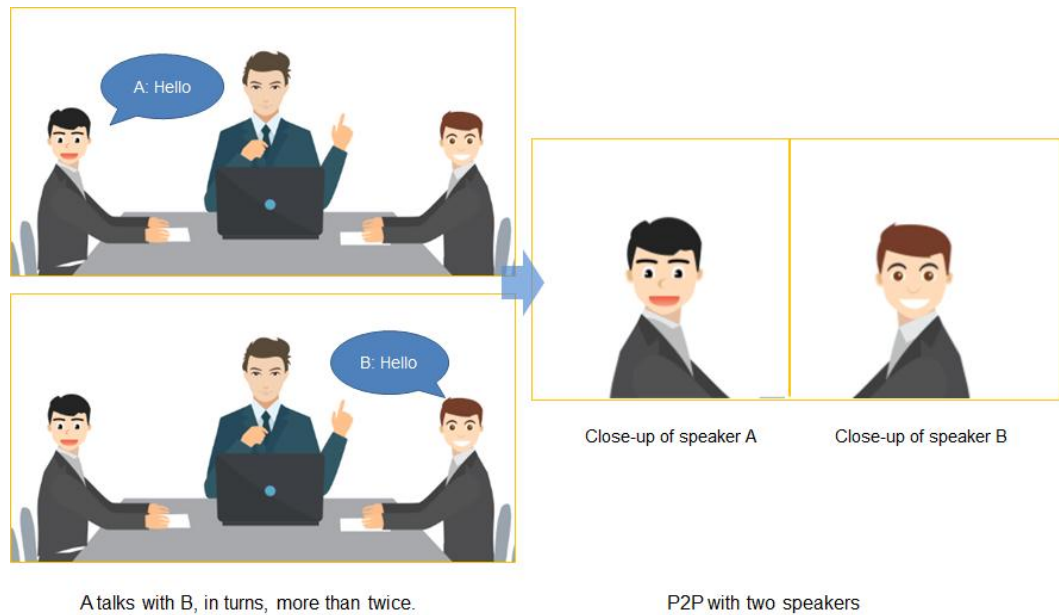
- Automatically detects two participants who are having a conversation and displays their video images separately in two panes.
- Enters the AutoFrame mode and automatically presents optimal video images when no participant is speaking.
- Takes close-up video images of the speaker when only one participant is speaking or multiple participants are speaking in turn.
- Takes a panoramic view when many participants are speaking at the same time or in turn.

**Figure 5-1** Automatic Tracking1



When someone speaks, VPT300 will automatically detect the speaker and display the close-ups of the speaker.

**Figure 5-2 Automatic Tracking2**



## 5.2 Manual Tracking

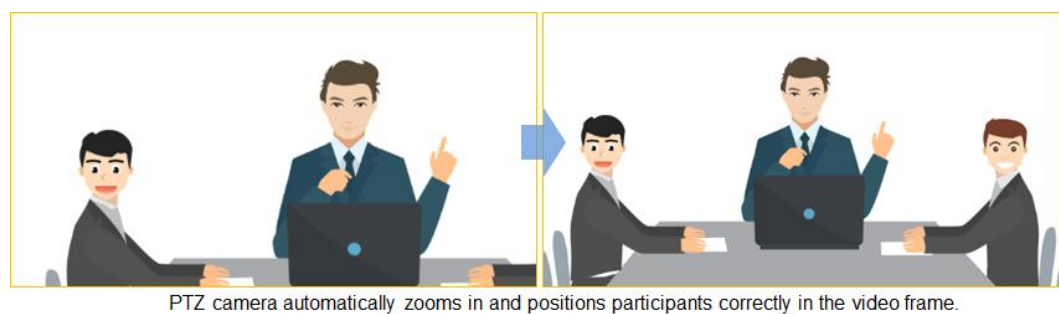
After the VPT300 that has two VPC600s installed is connected to an endpoint, you can use the endpoint's remote control to control the VPC600s. However, only one VPC600 can be controlled at a time, which can be specified on the endpoint's web interface.

## 5.3 AutoFrame

The VPT300 automatically adjusts its dual cameras to:

- Capture new participants who come into the conference room.
- Display video images of remaining participants at the center of the display after some participants leave the conference room.
- Detect moving participants and adjust to the optimal angle after detecting no more movement.

**Figure 5-3 AutoFrame-1**



**Figure 5-4** AutoFrame-2



PTZ camera identifies the movement of meeting participants and optimizes the images

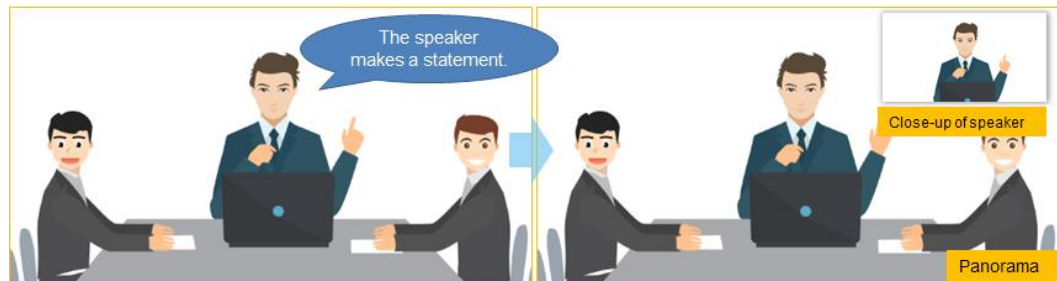
## 5.4 PiP Display

The PiP mode can be configured for the VPT300 on the web interface of the connected endpoint and takes effect immediately. However, this mode is available only when the VPT300 has automatic tracking enabled.

If the PiP mode is enabled, the VPT300 will display panoramic and close-up video images in PiP mode. When a participant is speaking, the VPT300 displays the panoramic view in full-screen mode and the close-up video of the speaker in a small window at any of the four corners. When the participant stops speaking, the small window disappears.

If the PiP mode is disabled, close-up video images will be displayed in full-screen mode.

**Figure 5-5** PiP Display



The speaker talks

PiP display

## 5.5 Transmission of Infrared Signals

The VPC600 on the VPT300 can transmit infrared signals received from the remote control of the TE40/TE50/TE60/TX50 endpoint to the VPT300. Subsequently, the VPT300 transmits signals to the endpoint, and as a result, the endpoint can be controlled by the remote control.

This function is required when the endpoint is placed inside a cabinet and cannot directly receive infrared signals from the remote control.

## 5.6 Sleep and Wake-up

You can put the VPT300 and its VPC600 in sleep mode and wake them up from the connected TE40/TE50/TE60/TX50 endpoint.



- The VPT300 in sleep mode will wake up if you upgrade the VTP300 or use the VPT300 to upgrade the VPC600.
- The VPT300 can be put in sleep mode, so can its connected VPC600.
- When putting a VPC600 in sleep mode, the VPT300 rotates the VPC600 to the sleep position and makes it enter the low-power-consumption state.
- When you use the remote control of the TE40/TE50/TE60/TX50 endpoint to wake up the VPC600 in sleep mode, the VPC600 will transmit the infrared signals to the VPT300. As a result, both VPC600 and VPT300 will have woken up.
- After being woken up, the VPC600 will rotate to its initial position.

## 5.7 Security

The VPT300 provides a variety of security features, such as authentication of debug users, whitelist, and protocol anti-attack.

### System Layer Security

Security maintenance of the system layer ensures a smooth running of the operating system and supports stable services at the application layer.

The VPT300 uses a customized Android operating system, which delivers enhanced security and immunity to viruses.

The Android operating system that the VPT300 has installed has been hardened and does not allow any third-party applications.

### Network Layer Security

The VPT300 IP address is configured by the administrator using command lines. It must be deployed on the private network and completely isolated from the public network.

### Protocol Anti-Attack Measures

The communication port matrix is provided in the product documentation. Only services and ports mentioned in the communication port matrix can be enabled.

The communication port matrix contains the following information:

- Open ports
- Transport layer protocols used by the ports
- Network elements (NEs) that use the ports to communicate with peer NEs
- Application layer protocols used by the ports and description of the services at the application layer
- Whether services at the application layer can be disabled
- Authentication modes adopted by the ports
- Port functions (such as data traffic control)

Robustness testing tools are used to scan protocols to ensure that there are no high-risk vulnerabilities.

## Protection of Sensitive Data

- To prevent sensitive data from being disclosed, the VPT300 checks the complexity of the default password and user-defined passwords. A password is displayed as dots (.) or asterisks (\*) when entered in the password input box, and entered passwords cannot be copied.
- Sensitive data such as passwords and other encrypted contexts is displayed as asterisks (\*) in logs.
- No proprietary encryption algorithms are used.

## System Management and Maintenance Security

- Software packages (including patch packages) are released after being scanned by at least five types of mainstream antivirus software with no alarms generated. In special cases, an explanation is provided for alarms.
- Scanning records (including antivirus software name and version, virus library version, scanning time, and scanning results) are archived and released with the software package (including patch packages) to customers.
- All account access operations and system abnormalities are logged.

# 6 Operation and Maintenance

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## 6.1 Maintenance Using the VPC600

Using the buttons and OLED screen of either VPC600 on a VPT300, you can set the following parameters for the VPT300:

- Tracking mode: auto, AutoFrame, or manual
- Sensitivity: low, medium (default), or high
- Video layout: full screen, PiP, or 2-pane

**Figure 6-1** MODE and SELECT buttons on the VPC600



Using the VPC600, set the tracking mode, sensitivity, or video layout of the VPT300 as follows:

1. Press the **SELECT** button to select **TRACK**, **SENSITIVE** or **LAYOUT**.
2. Press the **MODE** button to move between the options.
3. Press the **SELECT** button to select the desired option.

 **NOTE**

After you press the **MODE** button to move to an option, the option that appears on the LCD screen blinks, indicating that it does not take effect. Press the **SELECT** button to select it. It will take effect and stop blinking.

Parameter	Value	Description
TRACK	<ul style="list-style-type: none"> <li>● AUTO</li> <li>● AUTONOFRA</li> <li>● AUTOFRA</li> <li>● MANUAL</li> <li>● NA</li> </ul>	<p>Specifies the tracking mode of the VPT300. The options are as follows:</p> <ul style="list-style-type: none"> <li>● <b>AUTO</b>: The VPT300 automatically rotates to the direction in which voice comes. If no one speaks, the VPT300 automatically adjusts the focal length based on the number of participants detected by the dual-camera system to display the panoramic view of all participants.</li> <li>● <b>AUTOFRA</b>: The VPT300 automatically adjusts the focal length based on the number of participants detected by the dual-camera system to display the panoramic view of all participants.</li> <li>● <b>AUTONOFRA</b>: The VPT300 automatically rotates to the direction in which voice comes.</li> <li>● <b>MANUAL</b>: In this mode, you need to manually rotate the VPT300.</li> <li>● <b>NA</b>: This option is reserved. Do not select it.</li> </ul>
SENSITIVE	<ul style="list-style-type: none"> <li>● LOW</li> <li>● MIDDLE</li> <li>● HIGH</li> <li>● NA</li> </ul>	<p>Specifies the sensitivity for the VPT300's voice tracking function. The options are as follows:</p> <p>Four options are available: LOW, MIDDLE, HIGH, and NA. (NA is a reserved option. Do not select it.)</p> <p>The <b>SENSITIVE</b> setting takes effect only when <b>TRACK</b> is set to <b>AUTO</b>, <b>AUTONOFRA</b>, or <b>AUTOFRA</b>.</p>
LAYOUT	<ul style="list-style-type: none"> <li>● FULL</li> <li>● PIP</li> <li>● POP</li> <li>● NA</li> </ul>	<p>Specifies the video layout of the VPT300. The options are as follows:</p> <ul style="list-style-type: none"> <li>● <b>FULL</b>: Video of the speaker is displayed in full-screen mode.</li> <li>● <b>PIP</b>: The panoramic view is displayed in full-screen mode, and the speaker view is displayed in the small window.</li> <li>● <b>POP</b>: Two speakers are displayed in two separate panes.</li> <li>● <b>NA</b>: This option is reserved. Do not select it.</li> </ul> <p>The <b>LAYOUT</b> setting takes effect only when <b>TRACK</b> is set to <b>AUTO</b> or <b>AUTONOFRA</b>.</p>

## 6.2 Maintenance Using the Web Interface

The VPT300 and its VPC600s can be maintained by the web interface of the TE40/TE50/TE60/TX50 endpoint of V600R006C00 or later. The web interface allows you to:

- Export configuration data of the VPT300 with just one click.
- Set the upgrade password of the VPT300.
- Specify the sensitivity of speaker tracking, which can be low, medium (default), or high.
- Set video parameters of the camera to which the VPT300 connects.
- Configure the tracking mode, including automatic, AutoFrame, and manual.
- Enable or disable PiP and specify the position of the small window.
- Set the IP address, subnet mask, and gateway address of the VPT300.

## 6.3 Remote Maintenance Using Command Lines

You can use SSH/Telnet command lines to:

- Query the VPT300 and VPC600 version numbers, serial numbers, and electronic labels.
- Restart the VPT300.
- Specify the sensitivity of speaker tracking.

## 6.4 Log Management

User operations and system events are logged, which help engineers maintain the VPT300 and locate faults. Logs are saved as files.

Users can log in to the VPT300 by Telnet or SSH and run specific commands to query all or some log records. However, VPT300 logs cannot be queried or exported from the web interface of the TE40/TE50/TE60/TX50 endpoint.

Logs are classified into system logs and user logs, which have three levels: information, alarm, and error.

Neither system logs nor user logs can exceed 5 MB. If logs reach 5 MB, the latest logs will overwrite the earliest logs.

## 6.5 VPT300 and VPC600 Upgrade

You can upgrade the VPT300 to the latest version to fix its vulnerabilities, and then enjoy new functions provided in the latest version. Information regarding the upgrade is as follows:

- The VPT300 can be upgraded using the upgrade tool released with it or using the TE40/TE50/TE60/TX50 upgrade tool.
- The VPC600 can be upgraded using the upgrade tool released with the VPT300 or using the TE40/TE50/TE60/TX50 upgrade tool.
- The VPT300 can continue its upgrade after a pause.

- The upgrade starts only after the upgrade package is verified. The upgrade request will be rejected if the system detects that the upgrade package provided is not the required upgrade package.
- VPT300s can be upgraded in batches (10 at most) or one by one.

## 6.6 Restoration to Factory Settings or Original Version

If the VPT300 encounters some problems and is unrecoverable, contact the administrator or Huawei technical support engineers for assistance.

To restore the VPT300 to the factory settings, push the reset button for 10 seconds when the VPT300 is running. This operation is irrevocable.

To restore the VPT300 to the original version, push the reset button for 10 seconds when the VPT300 is powering on. This operation is irrevocable.

# 7 Technical Specifications

## 7.1 Physical Specifications

**Table 7-1** lists physical specifications of the VPT300.

**Table 7-1** Physical specifications

Item	Specification
<b>Electricity Supply Requirements</b>	
Input voltage range	100 V AC to 240 V AC
Output voltage	19 V DC, 7.89 A
Working frequency	50 Hz to 60 Hz
Typical power consumption of a VPT300 not equipped with any VPC600s	23 W
Maximum power consumption of a VPT300 not equipped with any VPC600s	35 W
Typical power consumption of a VPT300 equipped with two VPC600s	61 W
Maximum power consumption of a VPT300 equipped with two VPC600s	88 W
<b>Working State Environment Requirements</b>	
Ambient temperature	0°C to 40°C
Relative humidity	10% to 90%
Operating altitude	Up to 5000 m
Noise	Below 35 dB in the 0°C to 40°C environment



Item	Specification
<b>Non-Working State Environment Requirements</b>	
Relative humidity	0% to 95% (non-condensing)
<b>Dimensions and Weight</b>	
VPT300 dimensions (H x W x D)	40 mm (without the sound pickup pole)/418 mm (with the sound pickup pole) x 530 mm x 170 mm
Package dimensions (H x W x D)	405 mm x 755 mm x 285 mm
VPT300 net weight	<ul style="list-style-type: none"> <li>● 6.2 kg (including the two VPC600s)</li> <li>● 2.8 kg (excluding the two VPC600s)</li> </ul>
<b>Built-in Camera Features</b>	
Exposure mode	Automatic and manual
White balance	Automatic and manual
<b>Built-in Microphone Features</b>	
Sound pickup capabilities	<ul style="list-style-type: none"> <li>● Sound pickup distance: 10 m</li> <li>● Sound pickup range: 140°</li> </ul>
<b>Others</b>	
Resolution	Output resolution: 1080p 50/60 fps <b>NOTE</b> The output resolution of the VPT300 automatically matches the resolution of the video input port on the connected endpoint.

## 7.2 Ports and Protocols

[Table 7-2](#) lists ports provided and protocols used by the VPT300.

**Table 7-2** Port description

Port	Quantity and Description	Protocols Compliance and Standards	Remarks
Video input port	2 x HD-VI	DVI Revision 1.0 TMDS	Connect to two VPC600s to provide video input and power supplies.
	2 x Built-in camera	-	-

Port	Quantity and Description	Protocols Compliance and Standards	Remarks
Video output port	1 x HD-VI	DVI Revision 1.0 TMDS	Connects to an endpoint and converts HDMI signals to DVI signals but not to YPbPr signals.
	1 x SDI	SMPTE296M/ SMPTE274M/ SMPTE292M/ SMPTE424M	Connect to an endpoint that is far away in a large conference or training room.
Audio input port	1 x 3.5 mm	-	Connects to an endpoint.
	16 x Built-in microphone	-	-
Audio output port	1 x 3.5 mm	-	Reserved audio output port
Communication control input	1 x VISCA IN	VISCA	Used for debugging and cannot be cascaded.
Network port	1 x 10/100/1000 Mbit/s LAN	-	Used to upgrade the VPT300.
Power port	1	-	-

## 7.3 Standards Compliance

**Table 7-3** lists protocols supported by the VPT300.

**Table 7-3** Protocols supported by the VPT300

Item	Protocol Supported
Network transmission protocols	TCP, DHCP, Telnet, SSH, HTTP, and HTTPS
IP protocol	IPv4

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# A Glossary

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## A

**AutoFrame** Based on the number, location, and motion of participants, this function automatically adjusts the camera to provide a dynamic overview of the full room.

## C

**COM** component object model

## D

**DHCP** Dynamic Host Configuration Protocol

**DVI** digital visual interface

**Dynamic Host Configuration Protocol (DHCP)** A client-server networking protocol. A DHCP server provides configuration parameters specific to the DHCP client host requesting information the host requires to participate on the Internet network. DHCP also provides a mechanism for allocating IP addresses to hosts.

## H

**HDMI** high definition multimedia interface

**HTTPS** See Hypertext Transfer Protocol Secure

**Hypertext Transfer Protocol Secure (HTTPS)** An HTTP protocol that runs on top of transport layer security (TLS) and Secure Sockets Layer (SSL). It is used to establish a reliable channel for encrypted communication and secure identification of a network web server. For details, see RFC2818.

## P

**PiP** Picture in Picture

**PTZ** PTZ is an acronym for pan, tilt, and zoom. Users can control a camera using PTZ operations.

## R

**RGB** red green blue

**recognition** Consumer awareness of having seen or heard an advertising message.

## S

**SDI** See serial digital interface.

**SSH** See Secure Shell.

**Secure Shell (SSH)** A set of standards and an associated network protocol that allows establishing a secure channel between a local and a remote computer. A feature to protect information and provide powerful authentication function for a network when a user logs in to the network through an insecure network. It prevents IP addresses from being deceived and simple passwords from being captured.

**serial digital interface (SDI)** An interface that transmits data in a single channel in sequence.

**sound localization** A listener's ability to identify the location or origin of a detected sound in direction and distance. It may also refer to the methods in acoustical engineering to simulate the placement of an auditory cue in a virtual 3D space (see binaural recording).

## T

**Telnet** A standard terminal emulation protocol in the TCP/IP protocol stack. Telnet allows users to log in to remote systems and use resources as if they were connected to a local system. Telnet is defined in RFC 854.