



## AI Smart Recording controller TS-0663PH

### Embedded Software: Automatic Recording Control Embedded Software V3.11



## Description

Featuring an integrated hardware design and an embedded Linux operating system, this device comes with a 17.3-inch touchscreen display and highly integrates UHD video capture, recording, live streaming, directing and switching, image segmentation and splicing, and local echo output. It enables various functional modules such as live video streaming, intelligent directing, UHD recording, remote control, image recognition and tracking, and multi-party interaction. This device is an independently developed touchscreen integrated recording and broadcasting equipment designed for the needs of the education industry, and can meet the requirements of scenarios such as comprehensive live teaching, interactive learning, and practical training.

## Features

### I. Hardware Parameters

- \*Employing a domestically produced main control chip, an integrated hardware design, and an embedded Linux operating system, this device highly integrates audio and video acquisition, encoding, decoding, professional directing, live streaming, video-on-demand, and recording system modules. It is easy to use, maintain, and highly secure. The controller comes with 1TB of storage space, capable of storing up to 1000 lessons, supporting frequent use for over a year. It also supports automatic deletion of old files when the hard drive is full and allows for cyclic recording.
- \*Display Module: The controller features a 17.3-inch capacitive touchscreen with a resolution of 1920\*1080; it uses tempered glass with a surface hardness of 7H and a light transmittance of 85%; the touchscreen allows for director control and viewing of pre-production footage. It also features a three-in-one power-on, power-off, and power-saving button: a long press controls power on/off; a tap enters the system and locks the screen; it supports real-time CPU usage monitoring; and it supports 0-100% screen brightness adjustment.
- \*The screen must meet the requirement of being free of blue light hazard. It complies with the definition of no blue light hazard for lamps and lamp systems in IEC 62471:2006, which is that it does not cause blue light hazard (LB) to the retina within 10,000s (about 2.8h), and the limit LB is  $\leq 100 \text{ W} \cdot \text{m}^{-2} \cdot \text{sr}^{-1}$ .
- \*Video input: It has 4 HDMI input interfaces, of which 3 support 3840\*2160@30fps UHD video capture, and 2 support HDMI audio capture, which can be connected to signal sources such as computers and cameras.
- \*Video output: It has 3 HDMI output interfaces, all of which support 3840\*2160@30fps UHD video output. Two of them support audio output and can be connected to external display devices such as large screens and monitors.
- \*Audio interfaces: The controller has one 3.5mm audio input interface, two Phoenix terminal audio input interfaces, one 3.5mm audio output interface, and two Phoenix terminal audio output interfaces to meet the audio access needs of multiple scenarios; the controller has built-in speakers and can directly play local preview video and audio.
- \*Control Interfaces: The controller has 3 RS-232 Phoenix terminal interfaces and 1 RS-485 Phoenix terminal interface. The RS-232 terminals are equipped with 12V power supply and can be connected to various serial port protocol devices to power them. It has 2 USB interfaces, which can be used to connect USB flash drives or keyboards and mice, and supports video capture and file copying functions. It also has 2 Type-C interfaces, which can be used for device debugging and docking.



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- \*Network interfaces: The controller has 5 802.3ab 1000Base-T gigabit network ports, 4 of which are equipped with PoE power supply, and a single network cable can simultaneously realize data transmission and device power supply; it supports IPv4 and IPv6 dual network protocols.
- \*Wireless microphone interface : Built-in integrated wireless audio receiver module, which can simultaneously connect  $\geq 2$  wireless microphones, supports  $\geq 2$  frequency pairing modes, and allows real-time viewing of audio acquisition status via a 17.3-inch touchscreen .
- \*Wired microphone interface: Equipped with one RJ45 audio interface, which can be connected to a stand microphone. It supports 48V phantom power to ensure stable operation of the stand microphone and is suitable for audio acquisition needs in classrooms and other scenarios.
- \*Integrated wireless module and device management : Built-in independent on/off control for WiFi, Bluetooth, and Starlight modules, allowing for separate searching, pairing, and connection to corresponding wireless networks, Bluetooth peripherals, and Starlight devices; supports UHF co-frequency scanning, and can be paired with UHF wireless microphones; supports phantom power on/off .

#### II. Software Functions

- \*Based on the B/S architecture, users can access functions such as directing, live streaming management, signal management, group management, user management, file management, scheduled recording, central control management, and system management by logging into the web interface.
- \*The recording controller has a built-in encryption algorithm, ensuring that genuine machines require activation before use and supporting the use of license dates.
- \*It supports point-and-click control mode, allowing users to switch videos, rotate the camera up and down and left and right by dragging their fingers. The director's small screen will follow the operation.
- \*It supports H.264/H.265 video encoding and decoding protocols, and AAC, PCM, G.711A, G.711U, and ADPCM audio encoding protocols, ensuring high-fidelity audio and accurate synchronous recording of audio and video.
- \*The device can simultaneously access and decode 6 4K network cameras, and can synthesize and output 4K resolution PGM images from 4 resource images. It supports 6-channel image synthesis output and can achieve simultaneous online preview of 6 images. It supports 4-channel HDMI input acquisition, 3 of which support 3840x2160@30fps video input, and 2 channels of HDMI embedded audio input.
- \*It supports recording 7 video streams, and the recorded file formats support MP4, AVI, MOV, FLV, TS and MKV, with a bitrate of 256kbps~20Mbps; it also supports a recording countdown function, which can be freely set to 3s, 5s and 10s countdown recording.
- \*Supports simple user mode and advanced mode settings; User settings: supports one-click setting of four levels: UHD, HD, SD, and Smooth; Advanced settings: allows customization of resolution, bitrate, and frame rate; Bitrate supports 256kbps~20Mbps, supports dynamic encoding and static encoding selection, supports custom resolution and different resolution aspect ratio settings, including 9:16, 16:9, 32:9, etc., and supports resolution of 3840x2160@30fps; supports 25/30/60 frame rate settings, and also supports 15/20 low frame rate settings.
- \*It supports video file segment recording, and the segment duration can be customized. The segment duration for TS file format can be set from 30 to 480 minutes, while the duration for other file formats can be set from 30 to 240 minutes. A single recording session can last up to 12 hours without interruption, and users can end the recording early as needed.
- \*Audio Management: Supports mixing settings management; each audio acquisition and output port can be individually controlled for volume or muted; supports independent settings for external speakers; supports AAC, PCM, G.711A, G.711U, and ADPCM formats; audio sampling rates support 48K, 44.1K, and 8K.
- \*It supports local video preview and playback, allowing users to preview and view currently recorded videos. It offers multiple playback speed options, supporting 0.5x, 1x, 1.5x, and 2x video playback speed adjustment. It also supports web-based file preview and has a built-in VOD module, allowing users to play, pause, and skip video files online via the network.
- \*Supports multiple broadcast control methods: It features an embedded broadcast control console, which allows real-time preview of 7 video feeds, 1 PGM video feed, and 6 resource channels via an integrated touchscreen ; it supports remote broadcast control via a web interface and can be used with the built-in automatic broadcast control module for fully automated broadcast control ; it also supports serial port control protocols and standard network API protocols.
- \*Supports screen layouts: Supports seven screen layouts, including three-screen, four-screen, and dialogue screens, to meet personalized needs; supports two custom screen layouts.
- \*Supports switching effects: including 12 screen switching effects such as gradient, wipe, push in, expand, and fly in.
- \*It supports custom subtitle settings, including 9 template presets, 10 font sizes, 8 font colors, solid color or slogan background image selection, free mouse dragging position, and quick positioning functions for top left, top right, bottom left, and bottom right.
- \*Supports adding intros and outros : Users can choose from available resource channel images or customize uploaded images for display. Supported image formats include JPG, JPEG, PNG, and BMP. MP4 uploads can also be added to the channel as intros or outros.
- \*Supports adding watermark logos: Users can upload custom logo images and it supports removing red, green, blue, and white backgrounds.



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- \*Live Streaming Management: Supports live streaming functionality, allowing simultaneous live streaming to up to 50 users within a local area network; supports the standard RTMP streaming protocol, enabling simultaneous push of three RTMP streams; connects to third-party live streaming platforms for online live streaming, facilitating the expansion of the number of live streams; and supports customizable start and end times for streaming.
- \*File Upload: Supports automatic file upload and backup, and can be used with third-party FTP file servers to automatically push courseware to the file server; file upload and download can automatically adjust bandwidth to prevent network congestion.
- \*USB flash drive recording: Supports real-time recording of USB flash drives, allowing you to take the recording with you as soon as you stop; supports USB flash drive read/write speed detection, and allows you to set different bitrates for recording based on the USB flash drive speed.
- \*Anomaly Repair: Video files damaged due to power supply abnormalities can be repaired. The repairable file formats include MP4, AVI, MOV, FLV, and MKV video container formats.
- \*Scheduled Recording: Once the scheduled recording time is edited, the recording will automatically proceed at the designated time, and a file name will be automatically generated along with information such as the venue, speaker, and topic.
- \*It supports one-click reset to prevent system malfunctions caused by file corruption, IP address loss, or administrator password loss; it also supports one-click upgrade, allowing users to upgrade the system by importing firmware when new features are available.
- \*It features software-based central control; by entering the central control command in the recording and broadcasting management interface, users can perform central control operations through the interface and connect to other devices for one-click control. It supports integration and control via an Android recording and broadcasting app and also supports integration with a private cloud platform server. After successful integration, the cloud platform can provide unified management and control of the devices, facilitating the management of multiple recording and broadcasting devices.
- \*It features a built-in speech-to-text function with two usage modes: built-in speech-to-text service and third-party speech-to-text server. It can transcribe speech into text and display it on the PGM screen, and automatically generate subtitle files. It also supports hot word extraction through AI analysis.
- \*It supports integration with internal educational resource platforms to enable resource on-demand and shared application functions; it supports selecting viewing content by platform, grade level, subject, version, and textbook, with automatic caching and HD video playback; and it supports video content playback operations such as on-demand, drag-and-drop, playback, and jumping.
- \*Built-in blue/green screen keying technology accurately identifies teachers and extracts them from real-world backgrounds, then composites them into any virtual scene. It supports adjustable color tolerance to adapt to different lighting environments, ensuring stable and natural keying results. The interface is user-friendly, requiring no professional image processing experience for quick deployment. It supports custom background images or videos, making it suitable for various applications such as virtual classrooms, high-quality course recording, remote teaching, and educational promotional videos, significantly enhancing the visual appeal and immersive experience of teaching content.

#### III. Interactive Functions

- \*Built-in video interaction function enables interaction between 4 recording controllers: In discussion mode, students in the classroom can choose to speak or mute; in mute mode, students in the classroom cannot speak, but can watch the live broadcast of the speaker.
- \*Supports contact list functionality: In discussion mode, users can enter the device name or IP address in the top search box to find existing contacts, or create new contacts on the right side of the search box. Added contacts can be dialed, edited, or deleted using the buttons on their right.
- \*Supports classroom gathering function: In the interactive interface, the main lecturer can directly gather classroom terminals that have participated in classroom interaction with one click without any additional configuration, which is convenient and fast.
- \*Supports access control: In interactive mode, the main lecture room can set the screen and sound of the listening classroom terminals to be turned on and off, and the layout of the interactive screen can be set.
- \*Supports dual-screen dual-display functionality: In audio-visual interactive mode, it can output the screens of the main venue and sub-venues. When the main venue has auxiliary stream sharing enabled, both the main venue and sub-venues output the computer courseware content of the main venue; when the main venue does not have auxiliary stream sharing enabled, the main venue outputs the computer courseware content of the main venue, and the sub-venues output the computer courseware content of the sub-venues.
- \*It supports integration with the Dedicated Classroom interactive platform, enabling interaction between up to 50 recording and broadcasting controllers. It supports various screen layouts, can display up to 16 feeds simultaneously, and can automatically cycle through the feeds.
- \*Dialing: Supports dialing function; audio and video interaction can be achieved by entering the IP address of the interactive terminal.
- \*It supports customizable interactive frame rate and bit rate functions to ensure smooth interactive audio and video under various network conditions.
- \*It supports real-time viewing of network uplink and downlink speeds, allowing for intuitive monitoring of network transmission status, facilitating timely troubleshooting of network anomalies, optimization of network configuration, and ensuring stable operation of interactive functions.



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\*AI gesture control : It has 3 built-in AI gesture recognition functions, which can be used to start, pause and stop recording through preset gestures.

\*AI Voice Control : Supports voice control functionality, allowing users to start, pause, and stop recording via voice commands , further enhancing ease of use .

#### IV. AI Tracking Function

- 1.Built-in tracking strategy algorithm, no additional tracking controller configuration required. Supports free switching of tracking strategies to meet the needs of different tracking scenarios.
- 2.It supports freely setting the teacher image tracking screen mode and allows you to set the size of the teacher tracking screen according to actual needs.
- 3.It supports setting the tracking lock release time. After the locked teacher leaves the tracking area of the screen, the person will be automatically unlocked after the tracking lock release time is reached, and the system will return to the default state, waiting for the next person to enter the screen to start re-locking and tracking.
- 4.It supports setting tracking blocking areas, such as actively blocking areas that may interfere with the tracking effect, such as teacher observation areas, windows and curtains, classroom doors, and large-screen LCD TVs. The system will not perform image analysis and tracking calculations on the blocked areas to avoid these areas interfering with the overall tracking effect.
- 5.The student tracking feature allows multiple people to appear in the shooting frame after the tracked object is locked, and then switches to a panoramic view.
- 6.The teacher tracking feature supports height adaptation. After setting the close-up size, the system automatically recognizes the teacher's height and centers the image on the screen.

#### V. Analysis of Teaching Behaviors

- \*The controller supports student behavior analysis: without relying on an additional analysis controller, it can analyze, capture and statistically analyze various student behaviors during the learning process. By analyzing key actions such as focused listening (looking up), reading and thinking (looking down), interactive participation (raising hands), answering questions (standing), and attention shifting (turning head), it can generate detailed data analysis reports.
- \*The controller supports student facial expression analysis, covering a variety of emotions including anger, disgust, fear, happiness, neutrality, sadness, and surprise.
- \*The controller supports analysis of student classroom performance, including student participation, head-up rate, head-down rate, concentration level, inattentiveness, and classroom activity level.
- \*analyze teacher teaching methods, student guidance, blackboard writing, teacher-student interaction, and teacher roving without relying on an additional analysis controller .



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#### Specification

|                                          |                                                                                                                                                   |
|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| processor                                | 8 cores, 2.2GHz frequency , built-in 6 TOPS computing power                                                                                       |
| operating system                         | Linux                                                                                                                                             |
| storage space                            | 1TB                                                                                                                                               |
| power supply                             | DC 24V/5A                                                                                                                                         |
| Power consumption                        | 120 W                                                                                                                                             |
| Screen size                              | 17.3 inches                                                                                                                                       |
| Video Protocol                           | H.264 , H.265                                                                                                                                     |
| Video bitrate                            | 256Kbps~20Mbps                                                                                                                                    |
| Video output format                      | Supports MP4, AVI, MOV, FLV, TS, and MKV formats.                                                                                                 |
| Audio Protocol                           | AAC, G.711A, G.711U, PCM, ADPCM                                                                                                                   |
| Live Streaming Protocol                  | Supports RTSP, RTMP, TS and UDP real-time protocol streaming.                                                                                     |
| Network Protocol                         | Supports TCP, UDP, RTMP, RTSP, FTP, DHCP, and HTTP protocols.                                                                                     |
| Interaction methods                      | Capacitive touch interaction/mouse                                                                                                                |
| Input resolution                         | 3840x2160@30fps, 2560*1600@60fps, 2560*1440@60fps, 2048*1152@60fps, 1920*1200@60fps,<br>1920x1080@60/50/30/25fps, 1680*1050@60fps, 1280*720@60fps |
| Output resolution                        | 3840x2160@30fps、 1920x1080@60/50/30/25fps                                                                                                         |
| network port                             | Five 802.3ab 1000Base-T gigabit network interfaces, four of which support PoE power supply.                                                       |
| USB interface                            | Two USB 2.0 ports, supporting connection to mouse/USB flash drive/video switcher.                                                                 |
| Control Interface                        | 3 RS-232 interfaces, 1 RS-485 interface, with 12V power supply.                                                                                   |
| Audio input interface                    | 1 3.5mm audio input, 2 Phoenix connector audio inputs, 2 HDMI inputs with audio , 1 RJ45 audio jack.                                              |
| Audio output interface                   | 1 3.5mm audio output, 2 Phoenix connector audio outputs, 2 HDMI audio outputs                                                                     |
| Video input interface                    | 4- channel HDMI video interface                                                                                                                   |
| Video output interface                   | 3 HDMI video interfaces                                                                                                                           |
| Operating temperature                    | -10℃ to 45℃ (ambient temperature under well-ventilated conditions)                                                                                |
| relative humidity of working environment | 20%~80% relative humidity, no condensation                                                                                                        |
| Dimensions (L×H×D)                       | 401.8 * 257.3 * 41.8 mm                                                                                                                           |
| weight                                   | 3.6 kg                                                                                                                                            |