

# CH4120K

## 4K30 4x1 Seamless Scaling Switcher with IR and RS-232

User Manual | Version: V2.6

For B2B conference rooms, smart classrooms, exhibition systems, broadcast environments, digital operating rooms, hospitality venues, and professional AV integration.

| Model Number        | CH4120K                                                                                                        |
|---------------------|----------------------------------------------------------------------------------------------------------------|
| Product Positioning | 4K30 4x1 HDMI Seamless Scaling Switcher                                                                        |
| Key Features        | HDMI 1.4, 3840x2160@30Hz, 4 HDMI inputs, seamless scaler switching, IR remote, RS-232 control, EDID management |

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# 1. Safety Reminders

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Thank you for choosing the PANIO CH4120K 4K30 4x1 HDMI Seamless Scaling Switcher. To ensure stable performance and operational safety throughout installation, daily operation, and long-term deployment, please read this section carefully before using the unit, and retain this manual for future reference.

## Safety Instructions

- Before applying power, verify that the chassis and the complete AV system share a common ground reference. Proper grounding helps minimise static discharge, electromagnetic interference and surge-related failures.
- Use only the supplied DC 12V/1.5A power adapter or a certified replacement with identical electrical rating. Do not substitute uncertified adapters.
- Power down the unit and disconnect the power cord before cabling, relocation, rack installation, or service work. During lightning storms or extended periods of non-use, disconnect mains power.
- Do not place heavy objects on HDMI, control, IR, audio, or power cables. Avoid pinching, sharp bending, or pulling cables by force.
- HDMI signals are sensitive to cable quality. Use certified cables suitable for 4K30 operation, and keep cable runs within practical installation limits.
- Install the unit in a level, well-ventilated location away from high temperature, high humidity, dust, liquids, chemical exposure, and strong electromagnetic interference.
- All service work must be performed by PANIO authorised personnel. Do not open the chassis without authorisation, as this may cause personal injury and will void the warranty.

# 2. Product Introduction

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PANIO CH4120K is a professional 4x1 HDMI seamless scaling switcher designed to route four HDMI source devices to one HDMI display with fast, clean switching. Each HDMI input may use a different source format, while the scaler output can be fixed to a selected resolution for stable display integration.

The unit supports manual switching, automatic source switching, automatic scan switching, IR remote operation, and RS-232 serial commands. It also supports EDID learning and internal EDID recall through serial control, making it suitable for system integrators who need predictable source compatibility and reliable field deployment.

The compact metal chassis, front-panel control keys, rear-panel IR extension jack, audio de-embedding output, and 12V power design make the unit suitable for meeting rooms, classrooms, exhibition displays, broadcast rooms, bars, restaurants, and other professional AV environments.

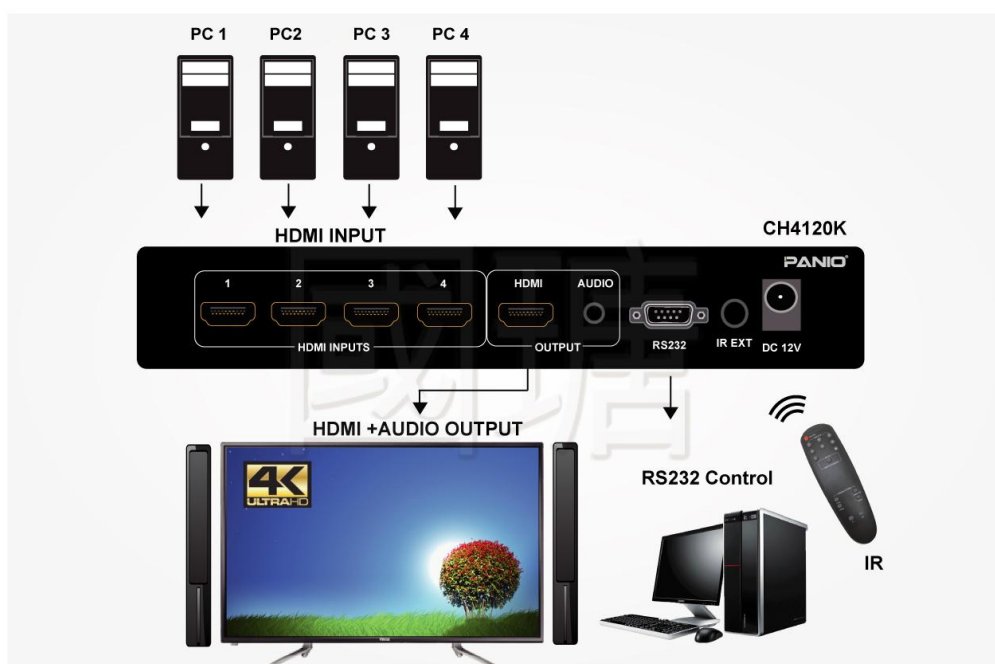
# 3. Key Features

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- Supports HDMI 1.4 with maximum input and output resolution up to 3840x2160@30Hz, backward compatible with lower resolutions.
- Supports 4 HDMI inputs and 1 HDMI output for professional source-to-display routing.
- Provides seamless scaler switching, allowing each HDMI input to use different source resolutions while maintaining a stable output format.
- Fixed output resolution can be selected from 3840x2160@30Hz, 1920x1080@60Hz, 1280x720@60Hz, and 1366x768@60Hz.

- Supports automatic switching mode and automatic scan switching mode for unattended source rotation.
- Supports front-panel push-button control, IR remote control, rear-panel IR extension receiver, and RS-232 serial command control.
- Supports EDID learning from the connected display and internal EDID recall through serial commands.
- Supports HDMI audio de-embedding to analog audio output for PCM 2.1 audio applications.
- Front-panel LED indicators show active input channel and selected output resolution status.
- Compact metal enclosure with mounting ears for professional installation.

## Diagram



## 4. Technical Specifications

### 4.1 System Specifications

| Item                     | Specification                       |
|--------------------------|-------------------------------------|
| Model Number             | CH4120K                             |
| System Architecture      | 4x1 HDMI seamless scaling switcher  |
| HDMI Standard            | HDMI 1.4                            |
| HDCP                     | HDCP 1.4, backward compatible       |
| Maximum Input Resolution | 3840x2160@30Hz, backward compatible |

|                           |                                                                   |
|---------------------------|-------------------------------------------------------------------|
| Maximum Output Resolution | 3840x2160@30Hz                                                    |
| Scaler Function           | Seamless switching; selectable fixed output resolution            |
| Output Resolution Modes   | 3840x2160@30Hz / 1920x1080@60Hz / 1280x720@60Hz / 1366x768@60Hz   |
| Audio De-embedding        | Analog audio output, PCM 2.1                                      |
| EDID Management           | Display EDID learning and internal EDID recall via serial command |
| Switching Methods         | Front-panel buttons / IR remote / RS-232 / Auto / Auto scan       |
| Control Methods           | RS-232, front-panel buttons, IR remote control                    |

## 4.2 Interface Specifications

| Interface           | Specification & Quantity       |
|---------------------|--------------------------------|
| HDMI Inputs         | 4 x HDMI input ports           |
| HDMI Output         | 1 x HDMI output port           |
| Analog Audio Output | 1 x audio de-embedding output  |
| RS-232 Control      | 1 x RS-232 serial control port |
| IR Extension        | 1 x IR EXT receiver input      |
| Power Input         | 1 x DC 12V/1.5A power input    |

## 4.3 Mechanical & Environmental Specifications

| Item                             | Specification                                  |
|----------------------------------|------------------------------------------------|
| Chassis Material / Colour        | Metal enclosure / Black                        |
| Dimensions with Mounting Ears    | 338 mm (W) x 103.6 mm (D) x 27 mm (H)          |
| Dimensions without Mounting Ears | 310 mm (W) x 103.6 mm (D) x 27 mm (H)          |
| Net Weight                       | 0.9 kg                                         |
| Power Supply                     | DC 12V/1.5A power adapter                      |
| Power Consumption                | No-load: 3 W; full-load: 9 W                   |
| Installation                     | Desktop, cabinet, or mounting-ear installation |

## 4.4 Output Resolution & HDMI Cable Recommendation

| Output Resolution | Recommended Cable / Note                                              |
|-------------------|-----------------------------------------------------------------------|
| 3840x2160@30Hz    | Use certified HDMI cable for stable 4K30 operation.                   |
| 1920x1080@60Hz    | Recommended for common conference and display systems.                |
| 1280x720@60Hz     | Recommended for legacy displays or bandwidth-sensitive installations. |

1366x768@60Hz

Recommended for selected LCD panels or fixed-format displays.

*Note: Use certified HDMI cables and verify the source/display settings when operating at 3840x2160@30Hz.*

## 5. Package Contents

### 5.1 Standard Packing List

| Item                                                 | Qty. | Unit |
|------------------------------------------------------|------|------|
| CH4120K 4x1 4K30 Seamless Scaling Switcher main unit | 1    | pc   |
| IR receiver cable                                    | 1    | pc   |
| IR remote control                                    | 1    | pc   |
| DC 12V/1.5A power adapter                            | 1    | pc   |
| Power adapter conversion plug                        | 1    | pc   |
| Mounting ears                                        | 1    | pair |
| User manual                                          | 1    | pc   |

*Note: Please verify the items above upon unpacking. If anything is missing or appears damaged, contact your authorised PANIO sales or service representative immediately.*

## 6. Panel Layout & Port Description

### 6.1 Front Panel Description

| Name            | Function Description                                                                                                              |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------|
| ON/OFF          | Power switch for turning the unit on or off.                                                                                      |
| LED Indicators  | Show power, active input channel, automatic mode, and output resolution status.                                                   |
| Resolution Keys | Select one of the fixed scaler output resolutions.                                                                                |
| AUTO Button     | Short-press to enter automatic switching mode. Press and hold for approximately 3 seconds to enter automatic scan switching mode. |
| Input 1-4 Keys  | Directly select HDMI input 1-4. The corresponding input indicator lights when the channel is active.                              |
| IR Window       | Front-panel IR receiving window for the supplied remote control.                                                                  |

### 6.2 Rear Panel Description

| Name        | Function Description                                                                  |
|-------------|---------------------------------------------------------------------------------------|
| HDMI IN 1-4 | Connect to HDMI source devices such as PCs, media players, cameras, or set-top boxes. |
| HDMI OUTPUT | Connect to the HDMI display, projector, video processor, or downstream AV             |

|           |                                                                                                                       |
|-----------|-----------------------------------------------------------------------------------------------------------------------|
|           | device.                                                                                                               |
| AUDIO OUT | Analog audio de-embedding output for connection to an amplifier or powered speaker system.                            |
| RS-232    | Serial control port for PC or central control system integration.                                                     |
| IR EXT    | Connect the supplied IR receiver cable when the front IR window is blocked or the unit is installed inside a cabinet. |
| DC 12V    | DC 12V/1.5A power input.                                                                                              |

## 7. Installation & Operation

### 7.1 Standard Connection

- Connect HDMI source devices to HDMI IN 1-4.
- Connect the HDMI OUTPUT port to a display, projector, or downstream HDMI device.
- Connect the AUDIO OUT port to an audio amplifier or powered speakers if analog audio output is required.
- For centralised control, connect the controller or PC to the RS-232 port.
- If the unit is installed inside a cabinet or the front IR window is blocked, connect the IR receiver cable to IR EXT and place the receiver in line of sight.
- Connect the DC 12V/1.5A power adapter and turn the front-panel power switch on.

### 7.2 Front-Panel Operation

- Power on: connect the 12V/1.5A power adapter and switch the front-panel power switch upward. The power indicator should light when the device is operating normally.
- Video switching: press input key 1-4 to select the required source. The selected input indicator lights and the display changes to that source.
- Automatic switching: press AUTO once. The unit automatically detects active inputs and switches to the newly connected source. Press any input key to exit automatic mode.
- Automatic scan switching: press and hold AUTO for approximately 3 seconds. The unit cycles through active inputs in the sequence 1-4-1 with an approximate 3-second interval. Press any input key to exit scan mode.
- Output resolution: press the front-panel resolution key to select 720P, 1366x768, 1080P, or 4K30 fixed scaler output.

### 7.3 IR Remote Operation

- Standby: aim the IR remote at the front IR window or external IR receiver and press Standby. Press again to exit standby mode.
- Video switching: press number key 1-4 on the IR remote to switch directly to the required input.
- AUTO mode: press AUTO on the remote to enter automatic switching mode. Press AUTO again or select an input to return to manual operation.
- Output resolution: press the remote resolution key for 4K, 1080P, 720P, or 1366 output. The corresponding front-panel indicator lights when the setting is applied.

## 8. Advanced Control & API Commands

CH4120K supports RS-232 serial command control. Connect the controller or PC to the rear-panel RS-232 port, then use a serial terminal or control-system processor to send commands.

### 8.1 Serial Port Parameters

| Item      | Default Value |
|-----------|---------------|
| Baud Rate | 115200        |
| Data Bits | 8             |
| Stop Bits | 1             |
| Parity    | None          |

*Note: Commands are plain ASCII strings. The command examples below follow the syntax provided in the source manual.*

### 8.2 Switching & Mode Commands

| Function                 | Command          |
|--------------------------|------------------|
| Switch to input signal 1 | XX+XXSWIN=X1,1\$ |
| Switch to input signal 2 | XX+XXSWIN=X1,2\$ |
| Switch to input signal 3 | XX+XXSWIN=X1,3\$ |
| Switch to input signal 4 | XX+XXSWIN=X1,4\$ |
| Auto mode                | XX+XXSWMOD=X,1\$ |
| Manual mode              | XX+XXSWMOD=X,2\$ |
| Device standby           | XX+XXSTANDBY=X\$ |
| Factory reset            | XX+XXFACT=X\$    |

### 8.3 Output Format & Resolution Commands

| Function                          | Command                |
|-----------------------------------|------------------------|
| HDMI output format                | XX+XXOUTMOD=X,1,1\$    |
| DVI output format                 | XX+XXOUTMOD=X,2,1\$    |
| Set output resolution to 1366x768 | XX+XXSETOUTRES=X,1,1\$ |
| Set output resolution to 720P     | XX+XXSETOUTRES=X,2,1\$ |
| Set output resolution to 1080P    | XX+XXSETOUTRES=X,3,1\$ |
| Set output resolution to 4K30     | XX+XXSETOUTRES=X,4,1\$ |

### 8.4 EDID & System Commands

| Function | Command |
|----------|---------|
|----------|---------|

|                                              |                      |
|----------------------------------------------|----------------------|
| Learn display EDID to HDMI input 1           | XX+XXEDIDH=X,1,1\$   |
| Learn display EDID to HDMI input 2           | XX+XXEDIDH=X,2,1\$   |
| Learn display EDID to HDMI input 3           | XX+XXEDIDH=X,3,1\$   |
| Learn display EDID to HDMI input 4           | XX+XXEDIDH=X,4,1\$   |
| Set internal 4K EDID to selected input       | XX+XXEDIDINT=X,2,X\$ |
| Set internal 1080P EDID to selected input    | XX+XXEDIDINT=X,3,X\$ |
| Set internal 720P EDID to selected input     | XX+XXEDIDINT=X,4,X\$ |
| Set internal 1024x768 EDID to selected input | XX+XXEDIDINT=X,5,X\$ |

## 9. Troubleshooting & Notes

### 9.1 Troubleshooting

| Symptom                                                | Possible Cause & Suggested Action                                                                                                       |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| No video output                                        | Verify that the display and switcher are powered on. Check HDMI cables and confirm that the selected input source is active.            |
| Image noise, flicker, colour shift, or distorted image | Replace the HDMI cable and test again. Confirm that the selected output resolution is supported by the display.                         |
| Video switches but audio is missing                    | Confirm that the source uses HDMI digital audio and that analog audio output is connected to the correct amplifier or speaker system.   |
| Audio output is intermittent                           | Check grounding, cable routing, and source audio settings. Avoid running signal cables parallel to high-power cables.                   |
| IR remote not working                                  | Check the remote battery and line of sight. If the unit is installed in a cabinet, connect and position the external IR receiver cable. |
| RS-232 control has no response                         | Verify baud rate 115200, data bits 8, stop bits 1, parity none. Confirm wiring and command syntax.                                      |
| Auto switching does not work as expected               | Confirm that AUTO mode is enabled and verify the active/inactive status of each HDMI source.                                            |

### 9.2 Notes

- Provide stable power and an appropriate installation environment according to the equipment specification.
- Use certified HDMI cables and avoid excessive cable length, sharp bends, or poor connector fit.
- Plan cable routing carefully in cabinets and racks. Avoid strong electromagnetic interference and power-line coupling.
- Before using EDID or RS-232 commands in a control system, validate all command behaviour with a serial terminal.
- For long-term operation, periodically check connector tightness, cable condition, and chassis ventilation.

## 10. Warranty Service

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PANIO International Co., Ltd. provides a one-year limited warranty from the date of purchase from PANIO or an authorised reseller. Within this period, the unit will be repaired, replaced, or otherwise serviced under the warranty terms when a non-induced fault occurs in the course of normal operation and in accordance with official service requirements.

The warranty does not cover damage caused by misuse, abnormal voltage, lightning strikes, accidental impact, unauthorised disassembly or modification, or the use of non-original power adapters or cables. Software, firmware, and user data are the user responsibility to back up; PANIO is not liable for data loss.

To request after-sales service, please contact PANIO International Co., Ltd. or your authorised service representative with the model number (CH4120K), product serial number, date and channel of purchase, a clear description of the fault, and a brief diagram of the on-site connection topology.