TK-UD4P 4K Splicing Matrix Processor

I. Product Overview

The TK-UD4P is an all-in-one processor integrating 4K splicing and matrix switching functions. Its core highlight lies in supporting one-click free switching between splicing mode and matrix mode, achieving "one device with dual purposes": it not only has the capability of splicing 5-channel 4K signals, but also can serve as a 4-input 4-output matrix switcher, which greatly improves equipment utilization and scenario adaptability.

The device comes with a comprehensive interface configuration to meet signal requirements across multiple scenarios: the input side supports access to 4-channel HDMI signals and 1-channel DP signal, while the output side supports 4-channel HDMI signal output.

- **Splicing Mode**

Supports splicing layouts including 1x2, 2x1, 2x2, 1x3, 3x1, 1x4 and 4x1. It allows free switching of 5-channel 4K input signals, with all input signals switchable to the large screen for spliced display.
Enables simultaneous display of multiple signals on the splicing wall in quad-split, side-by-side split and top-bottom split modes. Users can freely select the signal source for each split screen, with synchronized audio and video output and flexible audio switching.

- **Matrix Mode**

Supports arbitrary switching between inputs and outputs, and features seamless input signal switching to realize fast switching without black screen.
The matrix also supports a 4-screen preview function, displaying 4 input signals on a single monitor simultaneously.
Allows selection of any 4 channels from 5 input channels for use in matrix mode.

- **Application Scenarios**

With its superior functions, the product is suitable for various video surveillance projects, splicing projects, exhibition halls, control centers and other scenarios.

II. Main Functions

- All-in-one splicing and matrix device, enabling free switching with one click.
- Supports key light display, allowing users to identify the current device status via the key lights.
- Supports 1-channel DP input and 4-channel HDMI input. HDMI 1 and HDMI 2 ports support 4K@30Hz output, while HDMI 3, HDMI 4 and DP ports support 4K@60Hz output, with downward compatibility.
- A single unit supports 4-channel HDMI output (5-channel HDMI output is optional). The output resolutions include 1024768@60Hz, 1280800@60Hz, 1280720@60Hz, 19201080@60Hz and 1920*1200@60Hz (splicing mode only), and the output resolution is switchable.

- Supports HDMI embedded audio and 1-channel independent 3.5mm audio, with flexible audio switching.
- Supports control via remote controller, RS232 and chassis keys.

Matrix Functions

- Matrix mode supports seamless switching and two-key quick switching functions.
- Matrix mode supports 4-screen split display for any single output.

Splicing Functions

- Supports 180° image rotation and left-right mirroring functions for any display unit, enabling upside-down placement of the upper-layer LCD screens.
- Supports adjustment of the overall picture brightness and contrast in splicing mode.
- Splicing mode supports custom conventional layouts including 1x2, 2x1, 2x2, 1x3, 3x1, 1x4 and 4x1.
- Any splicing mode supports quad-split, left-right dual-split, top-bottom dual-split and picture-in-picture (displayed at the top-left corner) to show multiple signal sources.
- Supports 90°, 180° and 270° rotation of the overall input picture.
- Features edge masking function; splicing mode supports horizontal and vertical splicing gap adjustment.

III. Detailed Introduction

1. Input and Output Signals

Input Parameters

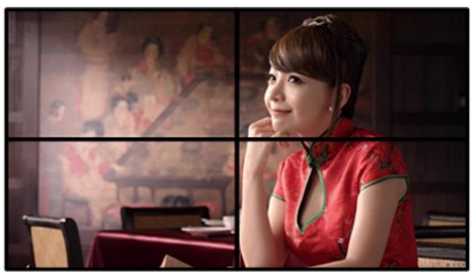
Supports 4-channel HDMI input and 1-channel DP input, with a maximum resolution of 4K@60Hz. HDMI 1 and HDMI 2 ports support 4K@30Hz, while HDMI 3, HDMI 4 and DP ports support 4K@60Hz. In matrix mode, any 4-channel signals can be selected for switching and display.

Output Parameters

A single unit supports 4-channel HDMI output (5-channel output is optional). The output resolutions include 1920x1080@60Hz, 1024768@60Hz, 1280800@60Hz, 1280720@60Hz, 19201080@60Hz and 1920*1200@60Hz (1920x1200@60Hz is only supported in splicing mode), and the resolution is freely switchable.

2. Free Switching Between Matrix and Splicing Modes

The device deeply integrates core matrix and splicing functions without requiring additional hardware support. Users can quickly switch the working mode via the remote controller or chassis keys, which meets the needs of signal splicing display and flexible signal scheduling, and is suitable for rapid mode switching in multiple scenarios.



or

3. Matrix Seamless Switching Function

The matrix function of the product is a 4-input 4-output seamless matrix. It supports selecting any 4-channel input signals from 4-channel HDMI and 1-channel DP signals for switching, and has a two-key quick switching function to realize free switching between any inputs and outputs. It also has a preview function that can display 4 input signals on a single monitor. In addition, the matrix supports seamless switching, achieving lag-free and black-screen-free switching with simple and quick operation.

4. Splicing Function

The product adopts an integrated design for its splicing function. A single unit can realize spliced output of 4-channel HDMI and 1-channel DP signals, and can be set to various splicing modes such as 1x2, 2x1, 2x2, 1x3, 3x1, 1x4 and 4x1. Meanwhile, in any splicing mode, the splicing wall also supports overall quad-split, side-by-side split, top-bottom split and picture-in-picture display at the top-left corner, and the signal source for each split screen can be freely selected.

2x2 Splicing Quad-split Function

2x2 Splicing Side-by-side Split Function

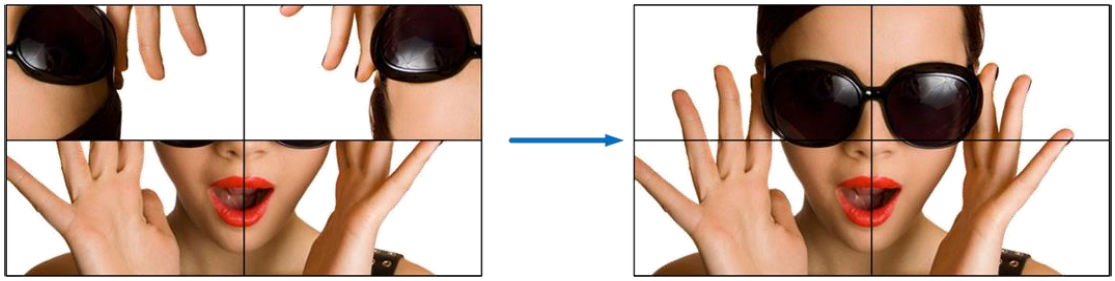
2x2 Splicing Top-bottom Split Function

2x2 Splicing Picture-in-picture

Single Signal Source 2x2 Splicing

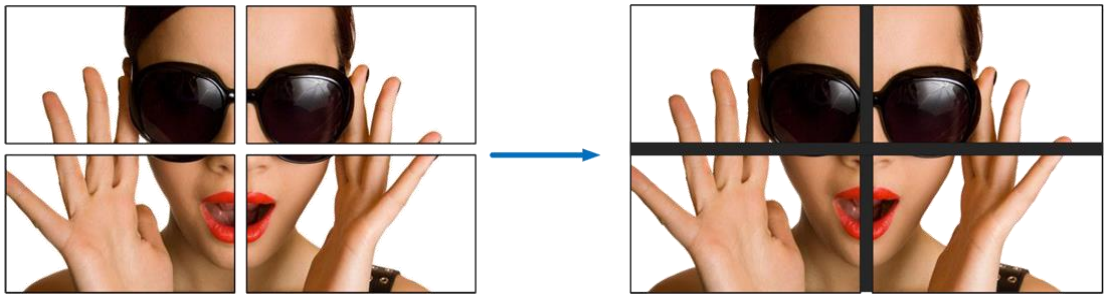
4.1 180° Image Rotation Function

Compared with ordinary splicing products, the TK-UD4P has a 180° mirror flip function for each individual display unit. When using ordinary LCD TVs for splicing, users can flip the upper row of LCD TVs 180°, which greatly reduces the splicing gaps of LCD screens and minimizes image distortion caused by excessive gaps.



4.2 Edge Masking Function

All splicing display units have certain physical bezel gaps. Without edge masking processing, the image will appear visually stretched and unnatural. After edge masking processing, the image will be free from deformation and stretching, presenting a more natural and realistic visual effect. See the following comparison pictures of images before and after edge masking processing:



4.3 90°, 180° and 270° Image Rotation Functions

Compared with ordinary splicing products, the TK-UD4P supports 90° and 270° rotation of the entire signal source, enabling vertical screen splicing.

Vertical Screen 1x3 Mode

4.4 Left-right Mirroring Function

Through settings, the image can be flipped left and right without vertical flipping, which is the left-right mirroring function, as shown in the following figure:

5. Control Methods

Remote Control: Users can set any splicing mode or realize arbitrary input-output switching in matrix mode via the remote controller, which is simple and convenient.

Chassis Key Control: Through chassis keys, users can quickly switch between matrix mode and splicing mode, set any splicing mode, or realize arbitrary input-output switching in matrix mode.

Serial Port Control: By connecting to upper computer software via serial port, users can set any splicing mode or realize arbitrary input-output switching in matrix mode with one click.

Central Control: The TK-UD4P all-in-one matrix-splicing processor provides common control codes. Users can write the control codes into the central control system as needed to achieve centralized control via central control.

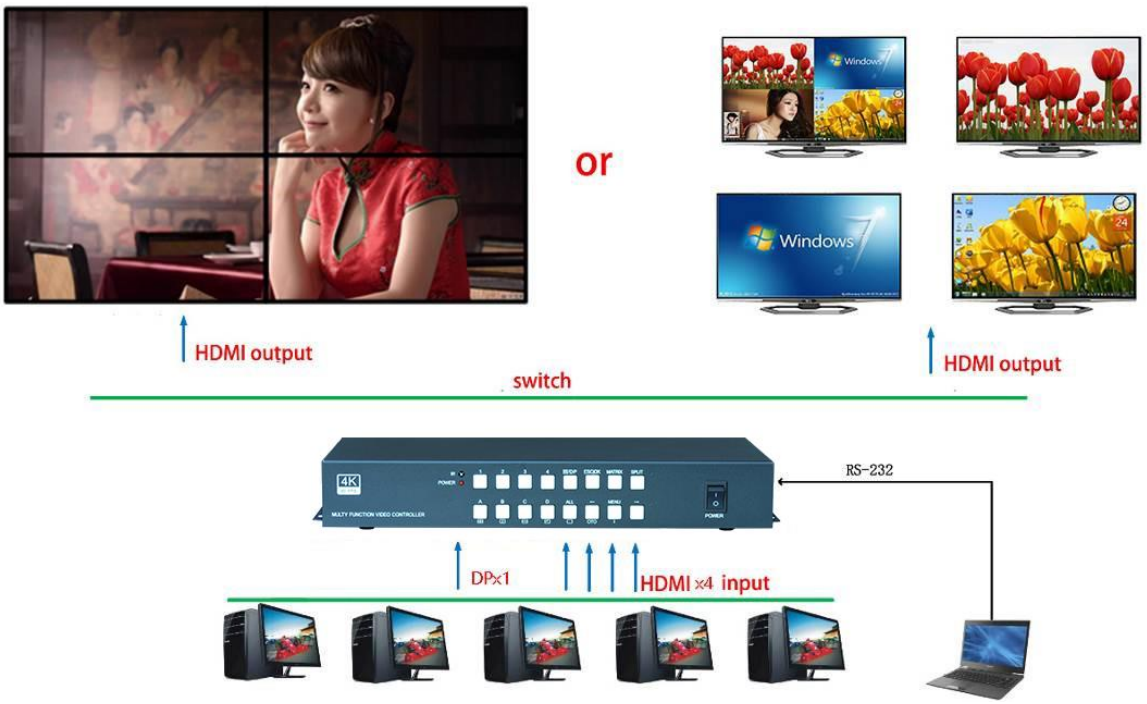
6. Audio Output

The product supports 1-channel 3.5mm independent audio output, and each HDMI output supports embedded audio, realizing synchronized audio and video output with free switching of input audio.

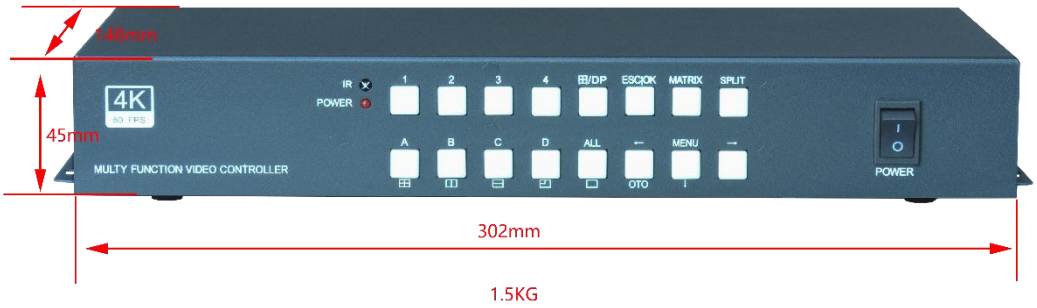
7. Key Light Status Recognition Function

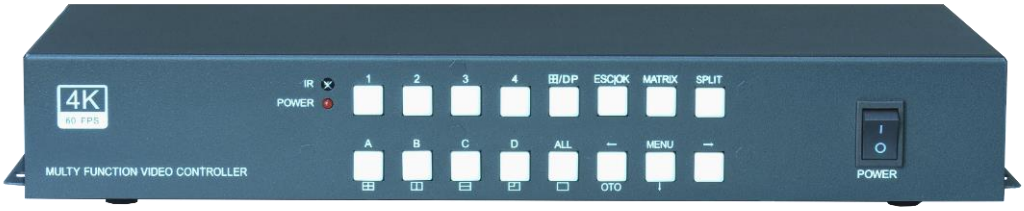
Through the on/off status of the LED lights, users can intuitively identify the current working mode (matrix/splicing), input signal source connection status and corresponding output ports, grasp the device operation status in real time, and achieve more efficient operation.

IV. Product Topology Diagram



V. Product Pictures and Dimension Drawings





Front Panel

Rear Panel

VI. Technical Parameters of TK-UD4P All-in-one Matrix-splicing Controller

Name	Specifications
Signal Input	
Input Interfaces	4-channel HDMI input, 1-channel DP input
Resolution	DP supports 4K@60Hz; HDMI 1/2 support 4K@30Hz; HDMI 3/4 support 4K@60Hz, with downward compatibility
Output	
Output Interfaces	Standard configuration: 4 HDMI ports supporting synchronized audio and video output; 5 HDMI ports output is optional; 1 3.5mm audio port for left and right channel stereo, connected to stereo speakers
Output Resolution	1024768@60Hz, 1280800@60Hz, 1280720@60Hz, 19201080@60Hz, 1920*1200@60Hz (splicing mode only); switchable resolution
Color Format	RGB 4:4:4
Control Methods	Chassis keys, remote controller, RS232
Input Voltage	DC12V/1.92A
Display Modes	1x2, 2x1, 2x2, 1x3, 3x1, 1x4, 4x1, etc.
Chassis	Device Dimension: 302mm (L) x 148mm (W) x 45mm (H); Weight: 1.50KG Packaging Dimension: 400mm (L) x 250mm (W) x 95mm (H); Weight: 2.05KG
Power Consumption	Max. 25W