![LIGHTSPEED Technologies logo]

4K60 MULTI VIEWER
MV-4K-4X1

12V · HDMI IN1 · HDMI IN2 · HDMI IN3 · HDMI IN4 · HDMI OUT · AUDIO OUT · RS232 · IR EXT.

TX RX G

POWER · INPUT1 · INPUT2 · INPUT3 · INPUT4 · IR · SOURCE · LAYOUT · AUDIO

User Manual

Table of Contents

Introduction

Overview

This product is a multi-screen video processor which supports 4K@60Hz input and output. I
t features up to 4 channels of 4K/UHD video signals to be simultaneously displayed on one 4K/UHD display. It also supports seamless switching between 4 input signals, and supports multiple screen layouts
including Original, Dual-view, H mode, Master mode, PIP mode and Quad mode to meet different image display needs.
It can be controlled by multiple methods including front panel buttons, IR remote, and RS232.

Features

- 4 HDMI Inputs and 1 HDMI Output.

HDMI inputs and HDMI output support resolutions up to 4K@60Hz 4:4:4 8bit, and compatible with HDCP 2.2.

- Supports multiple-view function, multiple inputs can be displayed on one display.
- Supports multiple screen layout modes, including Original, Dual-view, H mode, Master mode, PIP mode and Quad mode.
- Supports seamless switching of four inputs in the same layout.
- Rich control options, including IR Remote, front panel buttons, and RS232 control.

Package Contents

- 1 x Video Processor
- 1 x DC 12V Power Adapter with US Pins
- 1 x Phoenix Male Connector (3.5mm, 3 Pins)
- 1 x IR Remote
- 1 x IR Receiver Cable
- 4 x Mounting Brackets (with Screws)
- 2 x Rack Brackets (with Screws)
- 1 x User Manual

Specifications

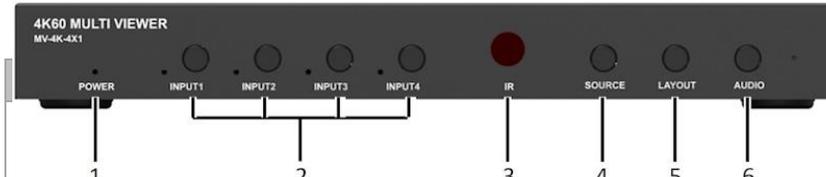| Technical	
Input/output ports	4 x HDMI IN, 1 x HDMI OUT, 1 x AUDIO OUT, 1 x RS232 (3-pin, 3.5mm phoenix connector), 1 x IR EXT., 1 x DC 12V IN
Input/Output signal type	HDMI 2.0 up to 4K@60Hz 4:4:4 8bit and HDCP 2.2
Input/Output Resolution Supported	**VESA:** 800×600^8, 1024×768^8, 1280×768^8, 1280×800^8, 1280×960^8, 1280×1024^8, 1360×768^8, 1366×768^8, 1440×900^8, 1600×900^8, 1600×1200^8, 1680×1050^8, 1920×1200^8, 2048×1152^8, $3840 \times 2160^{2,3,5,6,8}$, $4096 \times 2160^{2,3,5,6,8}$ **SMPTE:** $1280 \times 720P^{6,7,8}$, $1920 \times 1080P^{6,7,8,9}$ 1 = at 23.98 Hz, 2 = at 24 Hz, 3 = at 25 Hz, 4 = at 29.97 Hz, 5 = at 30 Hz, 6 = at 50 Hz, 7 = at 59.94 Hz, 8 = at 60 Hz, 9 = at 120 Hz **Note:** HDMI output automatically selects the maximum resolution according to the connected display, and the forced output resolution can be set through API commands.
Maximum Data Rate	18 Gbps
Audio Format	**HDMI IN/OUT: Fully supports audio formats in HDMI 2.0 specification, including PCM, Dolby TrueHD, Dolby Atmos, DTS-HD Master Audio, DTS:X** **AUDIO OUT: Stereo**
Control	Front Panel Buttons, IR Remote, RS232

General	
Operating Temperature	0°C to 45°C (32°F to 113°F)
Storage Temperature	-20°C to 70°C (-4°F to 158°F)
Humidity	10% to 90%, non-condensing
ESD Protection	Human-body Model: ±8kV (Air-gap discharge)/±4kV (Contact discharge)
Power Supply	DC 12V 2A
Power Consumption (Max)	10.69W
Device Dimension (W x H x D)	215mm x 25mm x 120.2mm/8.46" x 0.83" x 4.72"
Product Weight	0.78kg/1.72lbs

Transmission Distance

Cable Type	Range	Supported Video
HDMI	Input/Output: 5m/16ft	1080P@60Hz 4K@30Hz 4:4:4 24bpp 4K@60Hz 4:4:4 24bpp

Panel Description

Front Panel

2	INPUT SELECT (1-4)	**1~4 buttons:** Press the button to enter Original mode and switch to the corresponding HDMI IN source. **LED:** LED is located on the left of the button. • **On:** Active video input. • **Off:** No video input.
3	IR window	Receive IR signals.
4	SOURCE	Press the button to switch the video source in the current layout mode. (Switching sequence please refer to "Input Video and Audio Source Switching" section.)
5	LAYOUT	Press the button to switch layout mode. Switching sequence is Original→ Dual-view→ PIP→ H→Master→ Quad→ Original. (Please refer to "Layout Modes" section to get detail information about layout modes.)
6	AUDIO	Press to switch audio channel in some layout modes. (Switching sequence please refer to "Input Video and Audio Source Switching" section.)

Rear Panel
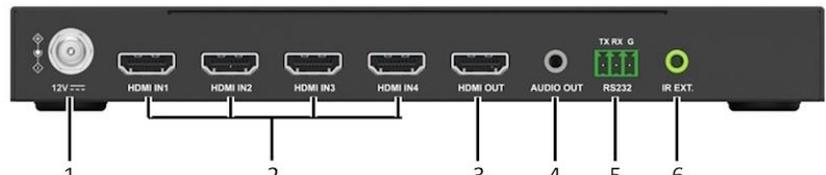
		...er provided.
	HDMI OUT	Connect to an HDMI display.
4	AUDIO OUT	Connect to an audio device for de-embedding audio output from HDMI OUT.
5	RS232	Connect to a RS232 control device for API control.
6	IR EXT.	Connect to the IR receiver cable provided.

Installation and Wiring

Installation

Note:

Before installation, please ensure the device is disconnected from the power source.
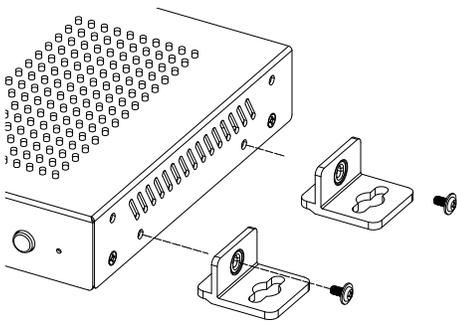
Steps to install the device on a suitable location:

Attach the installation bracket to the enclosure using the screws provided in the package separately.

The bracket is attached to the enclosure as shown.

Repeat steps 1-2 for the other side of the unit.

Attach the brackets to the surface you want to hold the unit against using the screws (provided by others).

Wiring

Warnings:

Before wiring, disconnect the power from all devices.

During wiring, connect and disconnect the cables gently.

Steps for device wiring:

1. Connect an HDMI sources (such as Blu-ray player, Xbox, PS3/4, etc.) to HDMI IN ports of the device.
2. Connect HDMI displays (e.g., TV, LED/LCD display, etc.) to HDMI OUT port of the device.
3. Connect for additional control options:
   - Audio de-embedding output: Connect an audio receiver such as a speaker to AUDIO OUT port of the device.

RS232 Control:

Connect to a control PC or control system to RS232 port of the device.

4. Connect DC 12V power adapter provided to the device.
5. Power on all attached devices.
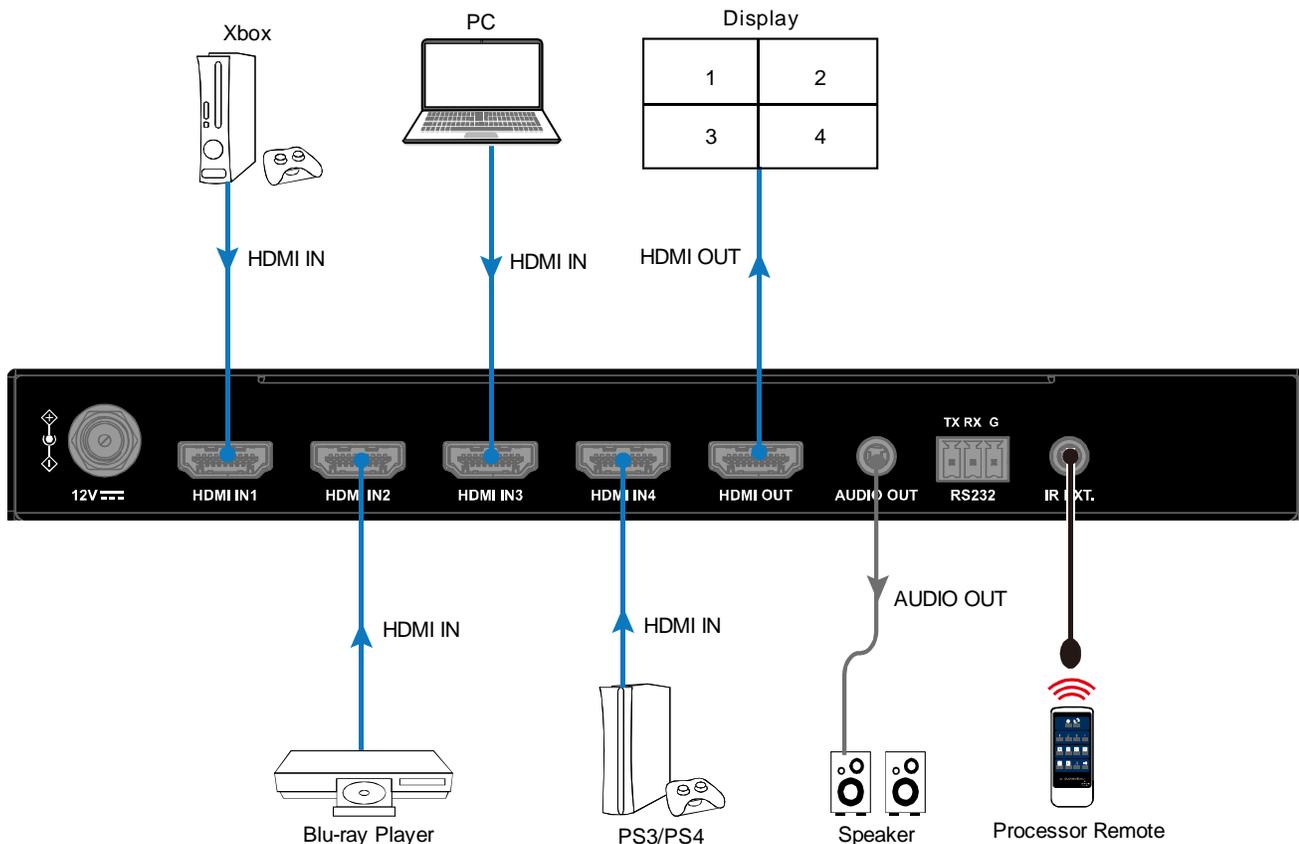
Layout Modes

Layout Mode Introduction

The device supports 6 layout modes on the connected display, including Original mode, Dual-view mode, PIP mode, H mode, Master mode, and Quad mode. The processor supports seamless switching of input sources in the same layout mode.

1. Original mode: Only one original input signal source without image processing is selected to be shown on the connected display. (See Figure 1: Original Mode).
2. Dual-view mode: Two input signals are selected simultaneously to be shown as two screens on the connected display. (See Figure 2: Dual-view Mode.)
3. PIP mode: Two input signals are selected simultaneously to be shown as two screens on the connected display. The smaller screen covers on the lower right corner above the larger one by default (See Figure 4: PIP mode), and its location can be changed to bottom right (default), top right, top left and bottom left positions through API commands. The size of the smaller one is 1/16 of the larger one and can be changed through API Commands.
4. H mode: The four input signals are selected simultaneously to be shown as figure 4: H mode. The left and right screens can better display the contents of the smart phone.
5. Master mode: The four HDMI input sources is shown as 4 screens simultaneously on the connected display (See Figure 5: Master Mode). The master input can be selected from HDMI IN 1~4, and the slave screens are in same size.
6. Quad mode: The four HDMI input sources is shown as 4 screens in same size simultaneously on the connected display (See Figure 6: QUAD mode).
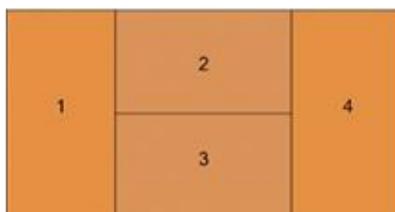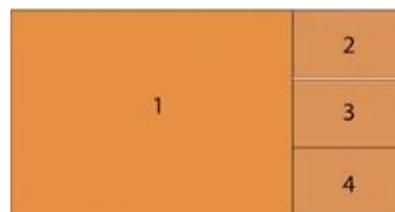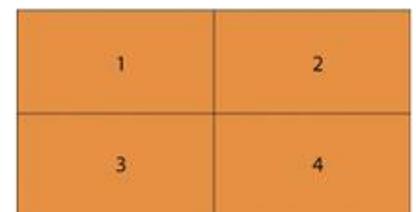

ORIGINAL
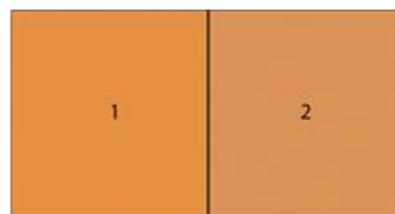
DUAL-VIEW
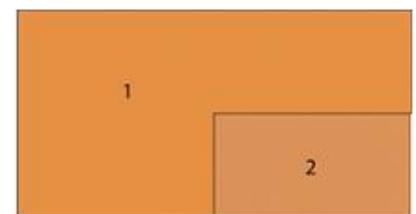
PIP

H

MASTER

QUAD

Input Video and Audio Source Switching

After one layout mode is selected, users can circularly switch video and audio sources in the layout mode through front panel or IR remote, or respectively select input source through API commands (please refer to the separate document "*API Command Set_MV-4K-4X1*" to get detailed information).

Circularly switching sequence is shown as the following function table. "1/2/3/4" indicates HDMI IN 1/2/3/4, and "-" indicates invalid.

Layout Mode	Input Switch	Audio Switch
Original	1→2→3→4→1	Current selected input ↔ Mute
Dual-View	1&2→2&3→3&4→4&1→1&2	Current selected input (left) →Current selected input (right) →Mute→Current selected input (left)
PIP	1&2→2&3→3&4→4&1→1&2	Current selected input (left) → Current selected input (right) →Mute→Current selected input (left)
H	-	1→2→3→4→mute→1
Master	1→2→3→4→1 (for the master screen)	1→2→3→4→mute→1
Quad	-	1→2→3→4→mute→1

Screen Stretch Mode Switching

By default, the image on the display is shown in normal aspect ratio in order to keep it undistorted. If users want to set one selected input's image to stretch to fill the entire screen, users can use the API command "SET VIDIN_STRETCH prm prm1<CR><LF>" to change it.

For example, in Dual-View mode, by default, it is shown as figure 1, if users want to set input 1 to stretch full screen, send command "*SET VIDIN_STRETCH 1 0 <CR><LF>*", and input 1' s image will be shown as figure 2. More detail API information, please refer to the separate document "*API Command Set_ MV-4K-4X1*".
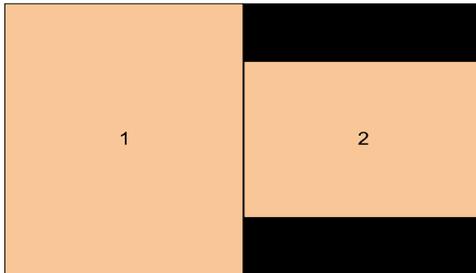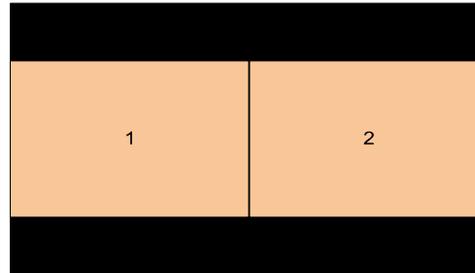

Figure 1

Figure 1

Control Operations

Users can control the device through front panel buttons, IR remote, and RS232 (API Commands).

Front Panel Control

Users can switch among the four inputs or input groups and six modes through front panel buttons.

Operations are as follows:

1. Press "LAYOUT" button to select one layout mode to display. Press continuously to switch layout modes as the following sequence: Original → Dual-view → PIP → H → Master → Quad → Original.
2. Press "SOURCE" button continuously to switch input source in current selected layout mode. Switching sequence refers to the function table in "Input Video and Audio Source Switching" section.
3. Press "INPUT SELECT BUTTON" to enter Original mode, and select the 1/2/3/4 button to switch to corresponding input as source.
4. Press "AUDIO" button to switch audio channel in some layout modes. Switching sequence refers to the function table in "Input Video and Audio Source Switching" section.

IR Remote Control

Users can switch among the four inputs and six modes for the output display by pointing the provided IR remote directly to the IR window on front panel or point to the IR receiver head connected to the rear panel.

Note: Switching sequence of video and audio in different layout mode refers to the function table in "Input Video and Audio Source Switching" section.

Button	Function
⏻	Press the button to mute/unmute HDMI output of the device. The button can mute/unmute the HDMI output and send CEC command to power off/on to the connected display simultaneously. Note: When mute the display, it will show black screen.
4K/1080	Press the button to switch output resolution between 4K@60Hz and 1080P@60Hz.
1 2 3 4	Press to switch to original mode, and select HDMI IN 1/2/3/4 as signal source.
♬	Press the button to switch audio channel in current layout mode.
🔇	Press the button to mute the audio in current layout mode. Press again to exit the mode and return to the audio channel selected before the mute operation.
▢	Press the button to switch to Original mode and press continuously to switch among HDMI IN 1~4 sources.
1 2	Press the button to switch to Dual-view mode, and press again to switch to next group sources.
⊞	Press the button to switch to H mode and press again to switch to next group sources.
⊡	Press the button to switch to PIP mode and press again to switch to next group sources.
⊞	Press the button to switch to Quad mode.
⊟	Press the button to switch to Master mode. Press this button continuously to cycle 1→2→3→4→1 to the Master screen.
System Code Switch	The button is used to switch between the two sets of IR system codes ("00" and "4E") of the provided IR remote. It is used to solve the problem of IR code conflict between IR remote control and other IR devices.

RS232 Control

Advanced users may need to control the device through RS232 serial communication. Connect a control PC or control system to the RS232 port of the processor. API command for RS232 control is available in the separate document "API Command Set_MV-4K-4X1". A professional RS232 serial interface software (e.g., Serial Assist) may be needed as well.

Before executing the API command through RS232 serial connection, please ensure RS232 interface of the device and the control PC are configured correctly.

Parameters	Value
Baud Rate	115200 bps
Data Bits	8 bits
Parity	None
Stop Bits	1 bit
Flow Control	None