OPERATING MANUAL

FOR

HDMI MULTIVIEWER SWITCHER-4K

Model ML 401HMVS-4K

User Manual

Milestone™ Electronics Pvt. Ltd.

1. Introduction

The high-performance 4×1 quad multi-viewer supports four routes HDMI high definition input contents to be displayed on one HDMI screen. It supports audio output selected from different input sources independently. 8 multi-view display modes are also supported. Output resolutions can be adjusted up to 4K30Hz. The product can be controlled via front panel buttons, IR remote and RS-232 control.

Models available

ML- 401 HMVS-4K	4 HDMI Inputs with 1 HDMI Multi view Output

2. Features

☆ HDCP 1.4 compliant

☆ Support 10.2Gbps video bandwidth

☆ Input and output resolution is up to 4K@30Hz, as specified in HDMI 1.4b

☆ Support auto switching and manual switching

☆ Seamless switching between inputs and combined multiple images on single UHD monitor in multi-view display mode

☆ Seamless switching in single-view display mode

☆ Support 8 display modes: SINGLE, PIP, PBP (1), PBP (2), Triple (1), Triple (2), Quad (1), Quad (2)

☆ Support LPCM, DD, DD+, DTS audio channel

☆ Support audio de-embedding via the analog audio port

☆ Support independent audio selection

☆ Support OSD display in multi-view display mode

☆ Control via front panel button, IR remote and RS-232 commands

☆ Advanced EDID management

☆ Compact design for easy and flexible installation

3. Specifications

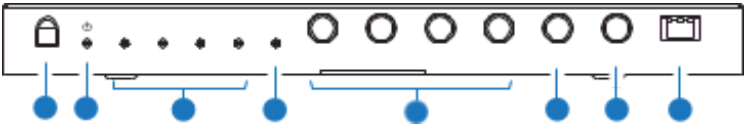
Technical	
HDMI Compliance	HDMI 1.4b
HDCP Compliance	HDCP 1.4
Video Bandwidth	Up to 10.2Gbps
Video Resolution	**Input:** Up to 4K@30Hz **Output:** 720P@60Hz,1080P@60Hz,1920x1200P@60Hz, 4K@30Hz
Color Depth	8-bit,10-bit,12-bit
Color Space	RGB_4:4:4, YCbCr_4:4:4, YCbCr_4:2:2, YCbCr_4:2:0
Audio Formats	**HDMI IN/OUT:** LPCM 2.0, LPCM 5.1, Dolby 2.0, Dolby 5.1, Dolby Digital Plus, DTS 2.0, DTS 5.1 **L/R OUT** [3.5mm L/R]：PCM 2.0;
IR Level	5Vp-p
IR Frequency	Fixed Frequency 38KHz
ESD Protection	IEC 61000-4-2: ±8kV (Air-gap discharge) & ±4kV (Contact discharge)

Connection	
Input	4× IN [HDMI Type A, 19-pin female]
Output	1× OUT [HDMI Type A, 19-pin female] 1× L/R OUT [3.5mm stereo jack]
Control	1× RS-232 [3pin-3.81mm Phoenix Connector] 1× IR EXT [3.5mm stereo jack]
Mechanical	
Housing	Metal
Color	Black

Dimensions	176mm [W] × 68mm [D] × 18mm [H]	
Weight	300g	
Power Supply	Input: AC 100~240V 50/60Hz, Output: DC 5V/1A	
Power Consumption	2.75W (Max)	
Operation Temperature	0°C ~ 40°C / 32°F ~ 104°F	
Storage Temperature	-20°C ~ 60°C / -4°F ~ 140°F	
Relative Humidity	20~90% RH (non-condensing)	
Recommended HDMI Cable		
Video Resolution	4K30	1080P 4:4:4
HDMI Cable Length (HDMI IN / OUT)	5m/16ft	10m/33ft
The use of “Premium High Speed HDMI” cable is highly recommended.		

1. Operation Controls and Functions

Front Panel



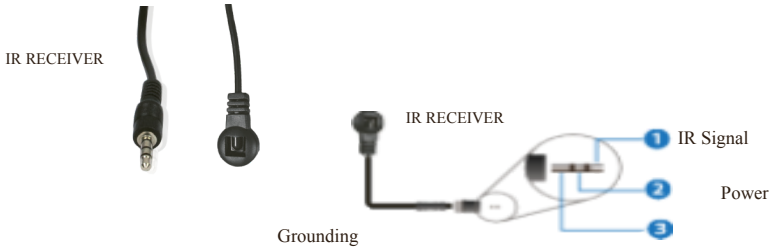
No.	Name	Function Description
1	IR window	IR signal receiving window.
2	Power LED	When the device is powered on, the power LED is green; When the device is stand by, the power LED is red.
3	IN 1/2/3/4 LED	**Single-view mode:** When the IN 1/2/3/4 port is selected as an input channel, the corresponding green LED will be on. **Multi-view mode:** When the IN 1/2/3/4 port is selected as an input audio source, the corresponding green LED will be on.
4	AUTO LED	When the auto switching mode is enabled, the green LED will be on.
5	IN 1/2/3/4 switch button	**Single-view mode:** Press the button IN 1/2/3/4 to switch to the corresponding input channel. **Multi-view mode:** IN 1/2/3/4 corresponds to the window 1/2/3/4. For example, pressing IN 1 can switch the four input sources circularly to output on window 1. IN 2/3/4 is the same.
6	MV button	Press this button to circularly switch the 8 display modes: SINGLE, PIP, PBP (1), PBP (2), Triple (1), Triple (2), Quad (1), Quad (2).
7	AUDIO	In multi-view mode, press this button to switch the audio of the four input sources circularly.

	button	
8	EDID DIP switch	Used for EDID setting. 111 - Copy OUT port sink EDID 110 - 4K@30Hz, Audio 2.0ch PCM 101 - 4K@30Hz, Audio 5.1ch PCM 100 - 1080P, Audio 2.0ch PCM 011 - 1080P, Audio 5.1ch PCM 010 - 1920x1200, 2.0ch 001 - 1920x1200, 5.1ch 000 - Defined by RS-232 command

Rear Panel

No.	Name	Function Description
9	OUT port	HDMI signal output port, connected to an display device such as TV or Monitor with HDMI cable.
10	IN 1/2/3/4 port	HDMI signal input ports, connected to source devices such as DVD or PS5 with HDMI cable.
11	L/R OUT	PCM 2.0 analog audio output port.
12	RS-232	Connects to a PC or control system for serial update and command control.
13	IR EXT	IR signal receiving port, connected with IR Receiver cable. If the IR signal receiving window of the unit is blocked or the unit is installed in a closed area out of infrared line of sight, the IR receiver cable can be inserted to the “IR EXT” port to receive the IR remote signal.
14	DC 5V	DC 5V/1A power input port.

5. IR Pin Definition



1. IR Remote

: Power on the device or set it to standby mode.

MUTE: Press this button to enable or disable the audio output.

INPUT:

HD 1/2/3/4:

Single-view Mode: Press HD 1/2/3/4 to switch to the corresponding HDMI input channel.

Multi-view Mode: HD 1/2/3/4 corresponds to the window 1/2/3/4. For example, pressing HD 1 can switch the four input sources circularly to output on window 1. HD 2/3/4 is the same.

AUTO: Press this button to enable or disable auto switching for input signal sources.

: In single-view mode, press to select the input source circularly.

AUDIO: In multi-view mode, press to switch the audio of the four input sources circularly.

OUTPUT:

720P/1080P/1200P/4K: Press to select the corresponding resolution to output.

MULTI-VIEWER:

OSD: Press to switch three OSD display states: no OSD, display current input channels, display current input channels and borders.

16:9: Press to switch the aspect ratio between full-screen and 16:9. **POS:** Press to switch the position of PIP view: top left, bottom left, top right, bottom right.

SIZE: Press to switch the size of PIP view: large, middle, small.

Display Mode: Press to select the multi-view modes as follow:

Single PIP PBP (1) PBP (2) Triple (1) Triple (2) Quad (1) Quad (2)

4. API Commands

Connect the RS-232 port of the product to a PC with a 3-pin phoenix connector cable and an RS-232 to USB cable. Then, open a Serial Command tool on PC to send API commands to control the product. The API command list is shown as below.

ASCII Commands

Serial port protocol: Baud rate: 115200 (Default); Data bit: 8; Stop bit: 1; Check bit: 0

Command	Function	Example	Feedback	Default
System Setting				
help!	Lists all commands	help!		
r status!	Get device current status	r status!	get the unit all status: power,video/audio crosspoint, edid, scaler	
r type!	Get device model	r type!	4x1 HDMI Multiviewer	
r fw version!	Get firmware version	r fw version!	mcu fw version :vx.xx.xx	
s power z!	Power on/off the device, z=0~1(z=0 power off, z=1 power on)	s power 1!	power on system initializing... initialization finished! mcu fw version x.xx.xx	
r power!	Get current power state	r power!	power on /power off	
s reboot!	Reboot the device	s reboot!	reboot… system initializing... initialization finished! mcu fw version : x.xx.xx	

s reset!	Reset to factory defaults	s reset!	reset to factory defaults system initializing... initialization finished! mcu fw version : x.xx.xx

Command	Function	Example	Feedback	Default
Output Setting				
s output res x!	Set output resolution (x=1~4) 1.3840x2160p30, 2.1920x1080p60, 3.1280x720p60, 4.1920x1200p60(rb)	s output res 1!	out resolution: 3840x2160p30	3840x 2160p30
r output res!	Get output resolution	r output res!	out resolution: 3840x2160p30	

EDID Setting				
s input edid x!	Set hdmi input edid mode (x=1~7) 1. 4k30, 2.0ch 2. 4k30, 5.1ch 3. 1080p, 2.0ch 4. 1080p, 5.1ch 5. 1920x1200, 2.0ch 6. 1920x1200, 5.1ch 7. copy from hdmi out	s input edid 1!	input edid: 4k30, 2.0ch	4k30, 2.0ch
r input edid!	Get input edid mode	r input edid!	input edid: 4k30, 2.0ch	
Audio Setting				
s output audio x!	Set output audio source (x=0~4) 0. follow window 1 selected source 1. hdmi 1 input audio 2. hdmi 2	s output audio 0!	output audio: follow window 1 selected source	output audio: follow window 1 selected source

	input audio 3. hdmi 3 input audio 4. hdmi 4 input audio			
r output audio!	Get output audio source	r output audio!	output audio: follow window 1 video source	
s output audio mute x!	Set output audio mute on/off (x=0~1) 0. mute off 1. mute on	s output audio mute 0!	output audio mute: off	off
r output audio mute!	Get output audio mute on/off	r output audio mute!	output audio mute: off	
Command	**Function**	**Example**	**Feedback**	**Default**
Single-view Mode Setting				
s auto switch x!	Enable/disable auto switch feature (x=0~1) 0.disable auto switch 1.enable auto switch	s auto switch 0!	auto switch off	auto switch off
r auto switch!	Get auto switch feature	r auto switch!	auto switch off	
s in source x!	Route input source to output (x=1~4) 1. hdmi 1 2. hdmi 2 3. hdmi 3 4. hdmi 4	s in source 1!	hdmi 1	hdmi 1
r in source!	Get output selected input source	r in source!	hdmi 1	

Multi-view Mode Setting				
s multiview x!	Set multi-viewer display mode (x=1~5) 1. single screen 2. pip 3. pbp 4. triple screen 5. quad screen	s multiview 1!	single screen	single screen
r multiview!	Get multi-viewer display mode	r multiview!	single screen	

s window x in y!	Select one input for one display window for the current multiview mode. (x=1~4) 1. window 1 2. window 2 3. window 3 4. w indow 4 (y=1~4) 1. hdmi 1 2. hdmi 2 3. hdmi 3 4. hdmi 4	s window 1 in 1!	window 1 select hdmi 1	
Command	**Function**	**Example**	**Feedback**	**Default**
Multi-view Mode Setting				
r window x in!	Get windows selected input source (x=0~4) 0.all 1.window 1 2.window 2 3.window 3 4.window 4	r window 1 in!	window 1 select hdmi 1	
s window border y!	Set the border mode of the specified window. (y=0~1) 0. off 1. on	s window border 1!	window border on	off

r window border!	Get the border mode of windows.	r window border!	window border on	

s window x border color y!	Set the border color of the specified window. (x=1~4) 1.window 1 2.window 2 3.window 3 4. win dow 4 (y=1~9) 1.black 2.red 3.green 4.blue 5.yellow 6.magenta 7.cyan 8.white 9.gray	s window 1 border color 1!	window 1 border color:black	yellow
r window x border color!	Get the border color of windows (x=0~4) 0.all 1.window 1 2.window 2 3.window 3 4.window 4	r window 1 border color!	window 1 border color:black	
Command	**Function**	**Example**	**Feedback**	**Default**
Multi-view Mode Setting				
s window source osd x!	Set window source osd switch (x=0~1) 0. off 1. on	s window source osd 1!	window source osd: on	window source osd: off
r window source osd!	Get window source osd switch!	r window source osd!	window source osd: on	
s pip position x!	Set pip window position (x=1~4) 1.left top 2.left bottom 3.right top 4.right bottom	s pip position 3!	pip on right top	pip on right top
r pip position!	Get pip window positon	r pip position!	pip on right top	
s pip size x!	Set pip window size (x=1~3) 1.small 2.middle 3.large	s pip size 3!	pip size: large	pip size: large
r pip size!	Get pip window size	r pip size!	pip size: large	
s pbp mode x!	Set pbp windows display mode (x=1~2) 1.pbp mode 1 2.pbp mode 2	s pbp mode 1!	pbp mode 1	pbp mode 1

r pbp mode!	Get pbp windows display mode	r pbp mode!	pbp mode 1	
s pbp aspect x!	Set pbp windows display aspect ratio (x=1~2) 1. full screen 2. 16:9	s pbp aspect 1!	pbp aspect: full screen	pbp aspect: full screen
r pbp aspect!	Get pbp windows display aspect ratio	r pbp aspect!	pbp aspect: full screen	
s triple mode x!	Set triple windows display mode (x=1~2) 1.triple mode 1 2.triple mode 2	s triple mode 1!	triple mode 1	triple mode 1
r triple mode!	Get triple windows display mode	r triple mode!	triple mode 1	
Command	**Function**	**Example**	**Feedback**	**Default**
Multi-view Mode Setting				
s triple aspect x!	Set triple windows display aspect ratio (x=1~2) 1. full screen 2. 16:9	s triple aspect 1!	triple aspect: full screen	triple aspect: full screen
r triple aspect!	Get triple windows display aspect ratio	r triple aspect!	triple aspect: full screen	
s quad mode x!	Set quad windows display mode (x=1~2) 1. quad mode 1 2. quad mode 2	s quad mode 1!	quad mode 1	quad mode 1
r quad mode!	Get quad windows display mode	r quad mode!	quad mode 1	
s quad aspect x!	Set quad windows display aspect ratio (x=1~2) 1. full screen 2. 16:9	s quad aspect 1!	quad aspect: full screen	quad aspect: full screen
r quad aspect!	Get quad windows display aspect ratio	r quad aspect!	quad aspect: full screen	

1. Application Example