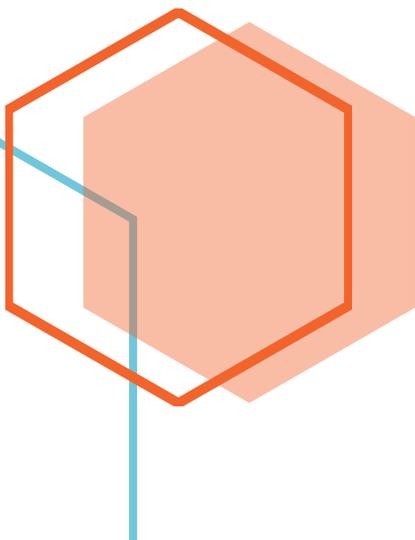# MM5000-B (Rainbow) series

UHD Multi-window Layout Edge-blending Processor

User Manual

Multiple views, multiple lives
Shanghai Mviewtech Co., Ltd
www.mviewtech.com

Content

Shanghai Mviewtech Co., Ltd

Product Overview

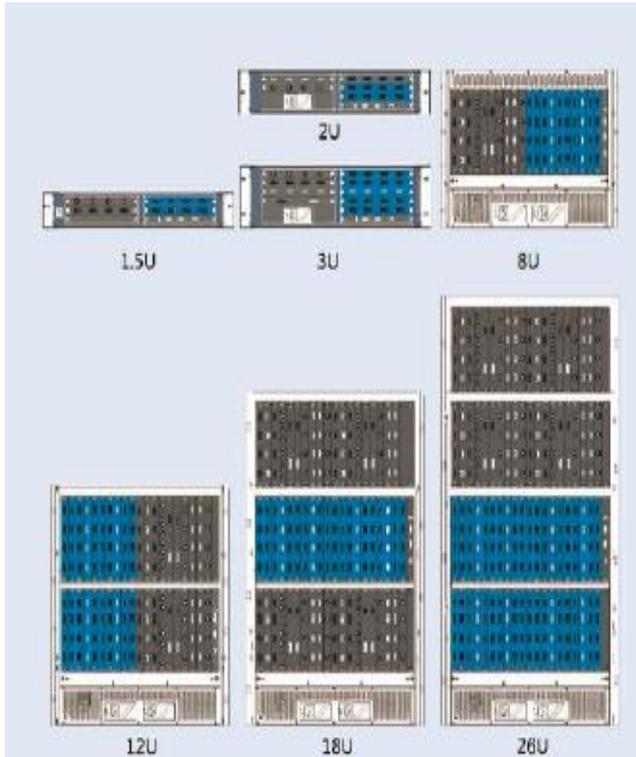MM5000-B (Rainbow) series UHD Multi-window Layout
Edge-blending Processor
(1.5U，3U，8U，12U，26U)

MM5000-B (Rainbow) series UHD multi-window layout edge-blending processor is one high performance video/image processing system adopted pure hardware wire speed architecture. This series processor is applied widely in education research, government notice, information publication, administrative management, military command，exhibition display, security monitoring, sales activities etc. With powerful signal processing ability, it is capable of multiple HD/UHD image/video signal sources capturing, high resolution digital signal processing, complex image conversion, and multi-channel edge-blending functions.

Stable operation

Adopted the modular design, the stability and scalability of MM5000-B are greatly improved.

Widely Compatible

a. With different available modules，MM5000-B supports any resolution projector.

b. Adopted available modules，MM5000-B supporting floating sub-window in high-resolution, roaming, overlay applications, signal black border erasing and real time display self-defined script can commonly receive multiple signals, and also UHD signals as Displayport / HDMI/ Duallink DVI.
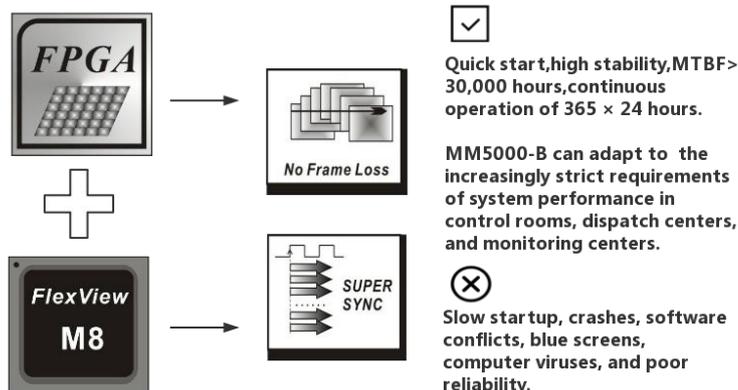
Powerful Fusion Function

Supporting chromatic aberration correction, dark field compensation, M*N edge fusion, night scene mode, complex geometric correction function, fine grid correction, four-sided fusion Bandwidth 0-2048 continuously adjustable and other functions.
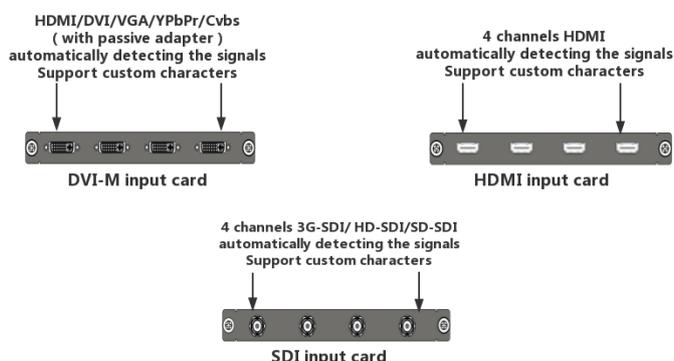
Product Features

l Architecture l

- **FPGA architecture**
  MM5000-B without embedded operation system has excellent image processing performance based on Flexview M8 processing algorithm.

FPGA

No Frame Loss

FlexView M8

SUPER SYNC

Quick start,high stability,MTBF> 30,000 hours,continuous operation of 365 × 24 hours.

MM5000-B can adapt to the increasingly strict requirements of system performance in control rooms, dispatch centers, and monitoring centers.

Slow startup, crashes, software conflicts, blue screens, computer viruses, and poor reliability.

MM5000-B adopted the 4th generation hardware processing architecture and Flexview M8 algorithm supports pixel by pixel output, receiving multiple 4K/8K signals sources, and real-time processing without frame loss. With the help of high-speed paralleled processing, super sync and full frame technologies, the processor guarantees all outputs in super sync and no image tearing.

l Input Cards l

- **Different combinations of multiple input cards** support DVI-M、HDMI、Displayport、VGA、DVI、DualLink DVI、SDI、CVBS、HDBaseT、YPbPr/YCbCr、IP.

HDMI/DVI/VGA/YPbPr/Cvbs
(with passive adapter)
automatically detecting the signals
Support custom characters

DVI-M input card

4 channels HDMI
automatically detecting the signals
Support custom characters

HDMI input card

4 channels 3G-SDI/ HD-SDI/SD-SDI
automatically detecting the signals
Support custom characters

SDI input card

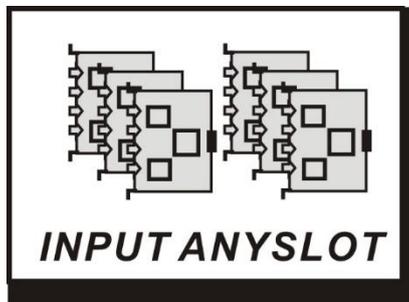Displayport 1.2/HDMI 2.0 input card supports 4K@60Hz、8K@30Hz and other self-defined resolutions.

Displayport 1.1/HDMI 1.4b/Duallink DVI input card supports 4K@30Hzand other self-defined resolutions.

Product Features

- **UHD input card** supports up to 8Kx4K with multiple inputs in synchronization.
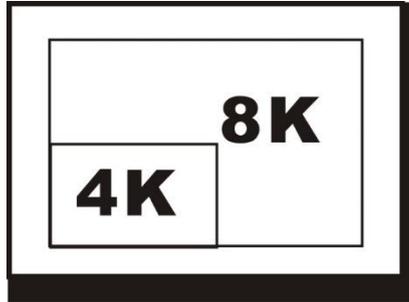
- **Expandable input slot** offers more possibilities.


l Output Cards l

- HD and SD output cards support 800x600-2048x1200 @60Hz resolution, and simultaneously support active stereo output 1024x768-1280x800 @120Hz.
- UHD fusion output card supports 1920x1080 @120Hz and 4K, such as 3840x2160@30Hz in HDMI and 4096x2160@30Hz in HDMI .
- Support projector rotation of 0-360 degrees, 1 degree as unit (optional).
- The output supports redundant backup to prevent accidental electrostatic damage.
- Support mask function (optional).

l System Control l

- Support LAN or RS232 remote control.
- Support external RS232 to control matrix and projector.
- Support redundant power and visual operation on all universal platform.

Product Features

l Multi-window Capability l

- Flexible multi-window capability supports to display multiple signals in strict synchronization.
- Support up to 7 HD layers in single output.
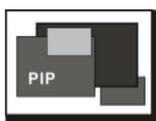
PIP

The window layers can overlap,so-called "picture in picture" function, which makes the way to layout more flexible and freer .The smaller picture is not controlled by the area of the lower picture , and can be displayed across the boundary of the larger one.


EDID

Support EDID (Extended Display Identification Data) reading, modification, resolution supported by custom Displayport input (up to 8Kx4K), which greatly improves the compatibility with large screen display devices, making the output adapt to various conventional and non-conventional applications.
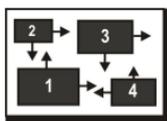
Window roaming

The signal window can be roamed freely in the background picture of all outputs to display at any position on the big screen.
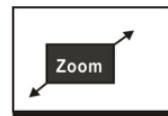
Zooming function

Each layer can be scaled arbitrarily,meanwhile, the height and width can be enlarged or reduced individually or in combination.Compensated by unique video processing algorithms,the image quality is not lost.

- In addition, MM5000-B supports **"Scan line and refresh rate doubling "**, **"Seamlessly real-time switching"**, and **" Black border erasing / cropping"** to improve the overall image quality.

Scan line and refresh rate doubling	The scan line or refresh rate of image signals can be doubled to improve the quality of the low frame rate signal, which enhances screen overall quality greatly.
Seamlessly real-time switching	HD signal processing mechanism based on internal hardware ensures that single or multiple signals can be seamlessly switched in real time.
Black border erasing / cropping	MM5000-B can perfectly solve the problem of black border caused by front-end signals (especially non-standard camera output signals).

Product Features

I Fusion Technology I

- New generation of advanced functions such as Chromatic aberration correction, dark field compensation, multi-level fusion processing, and night scene mode are upgraded.
- New generation of fast geometric correction and fine grid correction technology, are comparable to the ease of software fusion.

➢ **Automatic fusion band generation and edge feathering technology**

MM5000-B supports 4 sides fusion of the projector; supports any fusion of 1 × N, N × 1, N × M. The width of the fusion band is continuously adjustable from 0 to 2048 pixels.

automatic fusion band generation

effect after geometric correction

effect after edge feathering

Product Features

➢ **Non-linear geometric correction**

The third-generation digital optical geometry correction combined with the MM5000-B's ultra-wide pixel processing circuit has achieved ultra-subpixel geometric correction capabilities. Its third-generation non-linear multi-filter and texture compensation technology improve the picture quality fidelity. In addition, MM5000-B, with 17x17 grid correction function, can realize the high-performance

multi-channel curved, cylinder, sphere and other irregular projection screen.

➢ **Chromatic aberration correction**

To solve the problem of slight color difference in the projector, MM5000-B can be divided into 8 segments to adjust RGB, so as to keep the pure white consistent. At the same time, MM5000-B provides the RGB color correction function.

projection picture with chromatic aberration

projection picture after processing

Product Features

➢ **Fusion curve adjustment in pure white mode**

It is difficult to be completely consistent when the entire image is pure white, so the function is especially added. (cannot be used with chromatic aberration correction)

➢ **Dark field compensation and light leakage adjustment**

In a pure dark environment, a part of the light from the projector still hits the projection screen, so that a bright band appears in the middle. MM5000-B can enhance the non-imposed part of the light intensity to offset this bright band. After the projector is geometrically corrected, light leakage bands will appear. But MM5000-B can adjust the different widths of the light leakage bands, and increase the black level of the light leakage band to keep it consistent with the fused and non-fused areas.
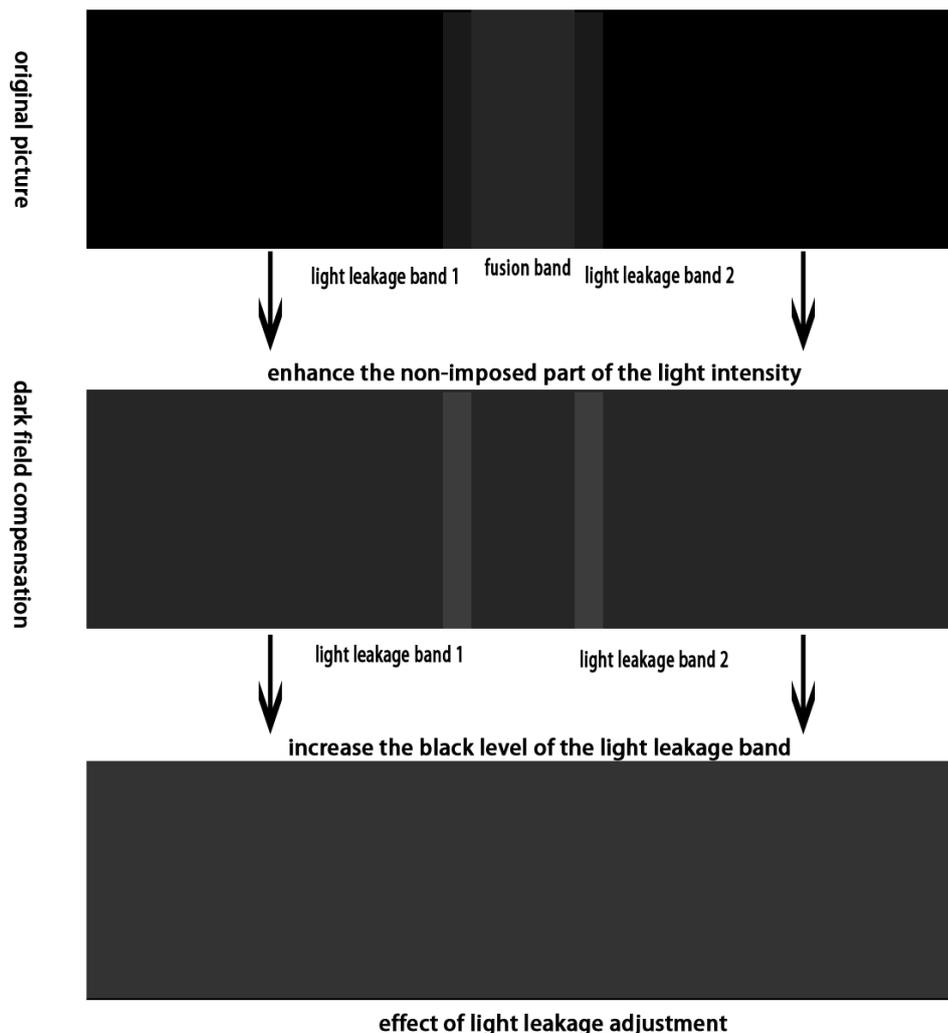
Product Features

> **Night scene mode**

After increasing the black level, the contrast is decreased. The pure black state will become a little gray, which makes some objects invisible in the night mode. When the night scene mode is turned on, the contrast is effectively improved.

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Product	MM5000-B (Rainbow) series UHD Multi-window Layout Edge-blending Processor
Input Source	
Input Card and Signal Format Supported	1. Different combinations of multiple input formats，including DVI-M, HDMI,,Displayport, VGA, DVI, DualLink DVI, SDI, CVBS, HDBaseT, YPbPr/YCbCr, IP. 2. DVI-M input is compatible with HDMI, DVI, VGA, YPbPr and Cvbs via passive adapter; 3. Displayport 1.2/HDMI 2.0 input card support 4K@60Hz, 8K@30Hz and other self-defined resolutions; 4. Displayport 1.1/HDMI 1.4b/Duallink DVI card support 4K@30Hz and other self-defined resolutions.
Max Num. of Input Cards	9 cards /3U; 19 cards /8U; 39 cards /12U; 72 cards /24U
Output	
Output Card and Signal Format Supported	Support DVI-I, HDMI, Duallink DVI and HDBaseT etc.
Max num. of Output Cards	80 channels
Fusion Function	
Fusion Capability	Full programmable transition curves, Dark field and Light leakage compensation, Pure-white and Non-pure white transition curves, 4 edges fusion
Geometric Correction Ability	The 3rd generation super sub-pixel geometric correction, High-level pixel fidelity control technology, Non-linear multi-filter and Texture compensation technology, support curved, cylinder, sphere or other irregular shaped projection screen,17X17 grid correction
Other Image/Video Processing Function	
Image/Video Processing Capability	1. Support single screen split / screen overlay / multi-screen display 2. Support all signal output in sync, and real-time echo 3. Support window overlap, roaming, moving, zooming and cropping etc. 4. Support character overlay and customizing characters 5. Support any rectangle screen jointing, support output remap 6. Support projectors installed in any angle(optional)
Control Spec	
Network Control	RJ - 45 X1,adaptive for cable up10M/100M, open API
Serial Port Control	RS - 232X 2, can be controlled by the 3rd part device as switcher or screen
Panel Control	Support visual touch Pad and real-time display (optional)
Electrical Specifications and Reliability	
Power Supply	AC 100~240V / 50Hz ~ 60Hz
Power Consumption	Based on the num. of input and output cards
Operating Temperature	0—50℃
Operating Humidity	15-85%
Operating System	Pure hardware architecture without embedded operation system
Startup Time	Less than 3 seconds
Weight	Based on the real configuration
Accessories	AC Power cable 1.5m RS232 serial port cable, 2m network cable with RJ45 plug Software CD

Input / Output Cards

l Input cards l

4 Channels DVI-M Input Card

- Support HDMI/DVI/VGA/YPbPr/Cvbs
- Support up to 1920x1200@60Hz
- Support EDID、OSD
- Support auto adjust for analog signal

Spec sheet		
Port	DVI-M　（support HDMI/DVI/VGA/YPbPr/Cvbs with passive adapter）	
Spec	Input Signal	HDMI/DVI/VGA/YPbPr/Cvbs
	Input Signal Level	Refer to the relevant signal standard
	Impedance	50ohm
	Input Bandwidth	165Mhz
	Input Channels	4
	Power Consumption	18W

- Support HDMI/DVI
- Support up to 1920x1200@60Hz
- Support EDID、OSD
- Support HDCP

4 Channels DVI Input Card

Spec sheet		
Port	DVI-D	
Spec	Input Signal	HDMI/DVI
	Input Signal Level	TMDS
	Impedance	Differential 100ohm
	Input Bandwidth	165Mhz
	Input Channels	4
	Power Consumption	12W

Input / Output Cards

4 Channels HDMI Input Card

- Support HDMI/DVI
- Support up to 1920x1200@60Hz
- Support EDID、OSD
- Support HDCP
- Support enhancing input function

Spec sheet		
Port	HDMI (Type A)	
Spec	Input Signal	HDMI/DVI
	Input Signal Level	TMDS
	Impedance	Differential 100ohm
	Input Bandwidth	165Mhz
	Input Channels	4
	Power Consumption	12W

- Support 4K HDMI
- Support up to 3840x2160@30Hz, 3840x1200@60Hz etc.
- Support EDID、OSD
- Support HDCP

2 Channels HDMI 4K Input Card

Spec sheet		
Port	HDMI1.4b	
Spec	Input Signal	HDMI
	Input Signal Level	TMDS
	Impedance	Differential 100ohm
	Input Bandwidth	300Mhz
	Input Channels	2
	Power Consumption	12W

Input / Output Cards

Duallink DVI/Displayport Input Card

- Support Duallink DVI/Displayport/ DVI
- Support up to 3840x2160@30Hz, 3840x1200@60Hz etc.
- Support EDID、OSD
- Support DP/HDCP

Spec sheet		
Port	Duallink DVI/ Displayport 1.1A	
Spec	Input Signal	DP/DVI-DL
	Input Signal Level	TMDS /CML
	Impedance	Differential 100ohm
	Input Bandwidth	330/360Mhz
	Input Channels	2
	Power Consumption	12W

- Support HDbaseT
- Support up to 1920x1200@60Hz
- Support EDID、OSD
- Support input cropping
- Support HDCP

4 Channels HDbaseT Input Cards

Spec sheet		
Port	HDbaseT	
Spec	Input Signal	HDbaseT
	Input Signal Level	Refer to HDbaseT standards
	Input Bandwidth	165Mhz
	Input Channels	4
	Power Consumption	30W

Input / Output Cards

4 Channels 3G/HD/SD SDI Input Card

- Support 3G/HD/SD SDI
- Support up to 1920x1080@60Hz
- Support OSD
- supports long-line automatic equalization (100m)

Spec sheet		
Port	SDI BNCX4	
Spec	Input Signal	3G/HD/SD SDI
	Input Signal Level	2.0V VPP
	Impedance	75ohm
	Input Bandwidth	2.97gbps
	Input Channels	4
	Power Consumption	12W

- Support PAL, NTSC and SECAM video
- Support adjustment of video signal brightness, contrast and other parameters
- Support high-quality motion compensation
- Support OSD

8 Channels Cvbs input card

Spec sheet		
Port	Analog BNC X8	
Spec	Input Signal	PAL、NTSC、SECAM
	Input Signal Level	1.0V VPP
	Impedance	75ohm
	Input Bandwidth	27Mhz/36 Mhz
	Input Channels	8
	Power Consumption	12W

Input / Output Cards

2 Channels IP Input Card

- Support IP network coded signal
- Support up to 4K/1920x1200@60Hz
- Support EDID、OSD
- Support input cropping

Spec sheet		
Port	10/100 / 1000M Ethernet X2	
Spec	Input Signal	10/100 / 1000M Ethernet
	Input Signal Level	IEEE standard
	Input Channels	1
	Power Consumption	18W

- Support HdbaseT/HDMI
- Support up to 3840x2160@30Hz, 3840x1200@60Hz etc.
- Support EDID、OSD
- Support HDCP and input cropping

HDbaseT/HDMI 4K Input Card

Spec sheet		
Port	HDbaseT 、 HDMI1.6b	
Spec	Input Signal	HDbaseT/HDMI
	Input Signal Level	Refer to standard
	Impedance	Differential 100ohm
	Input Bandwidth	300Mhz
	Input Channels	2
	Power Consumption	12W

Input / Output Cards

2 Channels DP 4K Input Card

- Support DP
- Support up to 3840x2160@30Hz, 3840x1200@60Hz etc.
- Support EDID、OSD
- Support DP、HDCP

Spec sheet		
Port	Displayport 1.1A	
Spec	Input Signal	DP
	Input Signal Level	CML
	Impedance	Differential 100ohm
	Input Bandwidth	360Mhz
	Input Channels	2
	Power Consumption	12W

- Support DP/HDMI
- Single port supports 7680x2160@30Hz, 3840x2400@60Hz etc.
- Support EDID、OSD
- Support HDCP

DP1.2/HDMI 2.0 4K60/8K Input Card

Spec sheet		
Port	Displayport 1.2、HDMI 2.0	
Spec	Input Signal	DP/HDMI
	Input Signal Level	CML/TMDS
	Impedance	Differential 100ohm
	Input Bandwidth	600Mhz
	Input Channels	2
	Power Consumption	18W

Input / Output Cards

l Output cards l

- Support digital signal conversion into DVI-I signal output
- Support up to 1920x1200@60Hz
- Support multi-window roaming、 Seamlessly real-time switching etc.

2 Channels DVI Output card

Spec sheet		
Port	DVI-I	
Spec	Input Signal	DVI/HDMI
	Input Signal Level	TMDS
	Impedance	Differential 100ohm
	Input Bandwidth	165Mhz
	Input Channels	2
	Power Consumption	20W

HDMI 4K Fusion Output Card

- Support digital signal conversion into HDMI signal output
- Support 3840x2160@30Hz, 4096x2160@30Hz，1920x1200@120Hz
- Support multi-window roaming、 Seamlessly real-time switching etc.

Spec sheet		
Port	DVI-I / VGA（with passive adapter）X2	
Spec	Input Signal	HDMI 1.4b
	Input Signal Level	TMDS source
	Impedance	50ohm
	Input Bandwidth	300Mhz
	Input Channels	1+1 backup
	Power Consumption	30W

Input / Output Cards

l Other cards l

- Support controlling system
- Support software connecting with upper computer
- Support standard RS232 input/output, RJ45 100M network port

System Control Card

Spec sheet		
Port	RS232 10/100M Ethernet	
Spec	Input Signal	RS232/RJ45
	Default network address	192.168.1.200
	RS232 Baud rate	9600
	RS232 Protocol	without parity, 8-bit data and 1-bit stop
	RS232 loop out	For
	Power Consumption	20W

- Support connecting monitors to view real-time echo screens that are fully synchronized with the big screen

Real-time Preview Card

Spec sheet		
Port	DVI	
Spec	Output Signal	DVI
	Signal Standard	TMDS
	Max Num. Of Preview Signals	8

Preview Card

- Support IP network to send up to 64 signals on the processor after encoding. You can check the signal status and display the big screen status in real time through a computer or pad.

Spec sheet		
Port	10/100/1000M Ethernet x1, HDMI	
Spec	Output Signal	10/100/1000M Ethernet
	Signal Standard	IEEE 802.3
	Max Num. Of Preview Signals	64

Input / Output Cards

- Support input and output of synchronization signal.
- Support active stereo signal VESA standard transmission system drive.
- Supports both VESA standard 3-pin professional sync interface and BNC coaxial sync input and output.

3D syn cards

Spec sheet		
Port	VESA 3PIN & BNC	
Spec	Input Signal	VESA 3PIN/BNC
	Interface Standard	VESA
	Support 3D or not	FOR
	Synchronization Precision	Ps
	Power Consumption	10W

Analog Audio Input & Output Card

- Support adjusting sound volume
- Support non-pop audio switching
- Support extracting input digital (HDMI), analog audio

Spec sheet		
Port	3.5mm audio	
Spec	Input & Output Signal	3.5mm unbalance
	Maximum Output Signal Level	2Vrms/+8.2dBu
	Maximum Input Signal Level	1Vrms
	Output Load Impedance	>1Kohm
	Input Impedance	10Kohm
	Maximum sampling rate	192KHz
	Input & Output Channels	4/4
	Power Consumption	10W

Contact Us

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