Milestone PRO

MPX Series
Full Intelligent Splicing Processor Hardware User Manual

M1.0

The meaning of symbols

■ Safety instructions

For your safe and correct use of equipments, we use a lot of symbols on the equipments and in the manuals, demonstrating the risk of body hurt or possible damage to property for the user or others. Indications and their meanings are as follow. Please make sure to correctly understand these instructions before reading the manual.

	This is A level product, which may cause radio interference in the living environment. In this case, users may need to take the feasible measures to get around the interference.
	Remind users that the dangerous voltage without insulation occurring within the equipment may cause people suffer from shock.
	CE certification means that the product has reached the directive safety requirements defined by the European Union. Users can be assured about the use of it.
	SGS certification means that the product has reached the quality inspection standards proposed by the world's largest SGS.
	This product passed the ISO9001 international quality certification (certification body: TUV Rheinland, Germany).
	Warning: in order to avoid electrical shock, do not open the machine cover, nor is the useless part allowed to be placed in the box. Please contact the qualified service personnel.

■ General information instructions

	It lists the factors leading to the unsuccessful operation or set and the relevant information to pay attention.

Important note

Warning

In order to ensure the reliable performance of the equipment and the safety of the user, please observe the following matters during the process of installation, use and maintenance:

The matters needing attention of installation

- Please do not use this product in the following places: the place of dust, soot and electric conductivity dust, corrosive gas, combustible gas; the place exposed to high temperature, condensation, wind and rain; the occasion of vibration and impact . Electric shock, fire, wrong operation can lead to damage and deterioration to the product, either;
- In processing the screw holes and wiring, make sure that metal scraps and wire head will not fall into the shaft of controller, as it could cause a fire, fault, or incorrect operation;
- When the installation work is over, it should be assured there is nothing on the ventilated face, including packaging items like dust paper. Otherwise this may cause a fire, fault, incorrect operation for the cooling is not free;
- Should avoid wiring and inserting cable plug in charged state, otherwise it is easy to cause the shock, or electrical damage;
- The installation and wiring should be strong and reliable, contact undesirable may lead to false action;
- For a serious interference in applications, should choose shield cable as the high frequency signal input or output cable, so as to improve the anti-jamming ability of the system.

Attention in the wiring

- Only after cutting down all external power source, can install, wiring operation begin, or it may cause electric shock or equipment damage;
- This product grounds by the grounding wires .To avoid electric shocks, grounding wires and the earth must be linked together. Before the connection of input or output terminal, please make sure this product is correctly grounded;
- Immediately remove all other things after the wiring installation. Please cover the terminals of the products cover before electrification so as to avoid cause electric shock.

Matters needing attention during operation and maintenance

- Please do not touch terminals in a current state, or it may cause a shock, incorrect operation;
- Please do cleaning and terminal tighten work after turning off the power supply. These operations can lead to electric shock in a current state;
- Please do the connection or dismantle work of the communication signal cable , the expansion module cable or control unit cable after turning off the power supply, or it may cause damage to the equipment, incorrect operation;
- Please do not dismantle the equipment, avoid damaging the internal electrical component;
- Should be sure to read the manual, fully confirm the safety, only after that can do program changes, commissioning, start and stop operation.

Matters needing attention in discarding product

- Electrolytic explosion: the burning of electrolytic capacitor on circuit boards may lead to explosion;
- Please collect and process according to the classification, do not put into life garbage;
- Please process it as industrial waste, or according to the local environmental protection regulations.

Preface

This manual mainly describes MPX -VW1616-4K, MPX -VW3232-4K, MPX -VW6868-4K intelligent splicing processor hardware introduction and hardware operation methods, main parameters, common troubleshooting solutions.

If the technical parameters and system usage in this manual are changed, the manufacturer will update the version of the manual. Please use the latest user manual.

Version	Update	Date
1.0		2024.7.9

Contents

1. Overview

The MPX Series Hybrid Splicing Matrix is a modular LED/LCD processor designed for multimedia environments, with options in 3.5U, 6.5U, and 11U sizes. It supports 12 to 52 mixed input channels, ensuring flexibility and stability through FPGA-based hardware design. Featuring a front panel LCD display and buttons, the processor enables real-time IP address display and configuration. Its modular design supports arbitrary input/output card mixing for online maintenance and expansion, accompanied by hot-swappable fans and redundant power supplies for uninterrupted operation.

The Intelligent Splicing Processor facilitates seamless signal switching (fiber, DVI, HDMI) and supports high-resolution signal capture, splicing output, input signal cropping, and processing. With KVM management for mouse and keyboard control over multiple computers, it also supports on-screen display, banner settings, and splicing matrix integration. The system utilizes a B/S architecture for visual management through multiple clients without an external server and supports intelligent coordination for third-party device integration.

1.1. Product equipment

MPX -VW1616-4K
MPX -VW3232-4K
MPX -VW6868-4K
The hybrid splicing matrix can be formed using various input and output cards

Input cards:
MPX -VW4I-4K input card (4K×2K 4 HDMI signal input)
MPX-HDT4I-4K input card (4K×2K 4 HDBaseT signal input)

Seamless output card:
MPX-VW4O-4K (2) (4Kx2K 4 HDMI signal output)
MPX -VW2O-4K (4) (4K×2K 2 HDMI signal output)
MPX-HDT4O-4K (4Kx2K 4 HDBaseT signal output)
MPX-HDT2O-4K (4Kx2K 2 HDBaseT signal output)

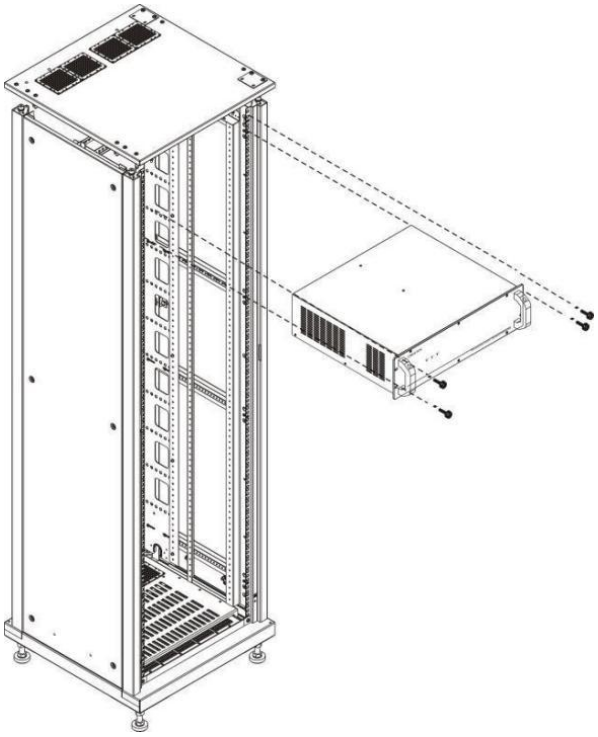
Preview card:
MPX-VWP-4K preview card (video signal encoding output)

Real time monitor card:
MPX-HM-4K (4Kx2K HDMI hard echo card)

1.2. Features

- Multiple chassis size options: 3.5U, 6.5U, and 11U, supporting up to 12/32/52 channels for mixed insertion.
- Hardware audio-video switcher and splicing processor based on FPGA architecture.
- Front panel equipped with an LCD display and buttons, providing real-time display of device IP addresses and control over device switching.
- Modular design supporting mixed insertion of input/output cards, online maintenance expansion, and redundant power supply.
- Cross-conversion of various signals, including fiber, DVI, HDMI, and HDBaseT.
- Support for 4K resolution input signal capture, seamless output, and splicing output.
- A single processor supports a maximum of 120 channels of 4096 x 2160 @60Hz 4:4:4 signal input.
- Each splicing output card can achieve video splicing and functions such as image window scaling and overlay.
- Support for irregular resolution settings, with a maximum of 4096 x 2160 @60Hz 4:4:4.
- High-definition background image settings unaffected by power loss, supporting splicing base images.
- Real-time cropping, black edge removal, edge masking, and region enlargement for input videos.
- Customization of large-screen banners, welcome slogans, real-time clock display, etc.
- Parallel processing of two signals, ensuring no black screens, no flickering, no fragments, and low latency.
- KVM management, allowing mouse and keyboard control of multiple computers with remote keyboard switching.
- Support for channel logos and character overlays, with customizable character colors, sizes, and positions.
- Splicing output supports multi-layer windows, resolution of 4096 x 2160 @60Hz 4:4:4.
- Support for window locking and batch operation confirmation to ensure fixed window positions.
- Simultaneous management of multiple display wall groups, supporting real-time management and output mapping.
- Frame synchronization technology to address issues of misalignment and tearing in high-speed motion scenes.
- Intelligent scaling technology to preserve image details, eliminate jagged edges, and maintain good sharpness.

1.3. Installation



1.4. System diagram

2. Hardware description

2.1. MPX -VW1616-4K panel Diagram

MPX -VW1616-4K front panel:

MPX -VW1616-4K rear panel:

2.2. MPX -VW3232-4K panel Diagram

MPX -VW3232-4K front panel:

MPX -VW3232-4K rear panel:

2.3. MPX -VW6868-4K panel Diagram

MPX -VW6868-4K front panel:

MPX -VW6868-4K rear panel:

2.4. Connection of the matrix and peripheral devices

2.4.1 Input Interface Description

Input any combination of input signal types for MPX -VW4I-4K and MPX-HDT4I-4K

2.4.2 Output Interface Description

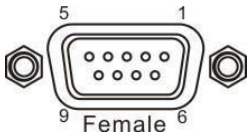
Output any combination of input signal types for MPX-VW4O-4K (2), MPX -VW2O-4K (4), MPX-HDT4O-4K, MPX-HDT2O-4K, and MPX-HM-4K.

2.4.3 Control Card Ports and Connection Methods

The hybrid splicing matrix features a standard RS-232 serial communication port. It supports switching via infrared remote control and can be controlled by various systems, including personal computers, Milestone Pro control systems, and other third-party control systems

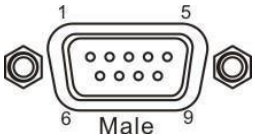
2.4.4 Matrix RS-232 Control Interface

"The hybrid splicing matrix offers 2 RS-232 serial interfaces (one DB9 female, one DB9 male) for matrix control. The pinout for the DB9 female RS-232 port is as follows:"



Pinout	Signal	Description
1	-	-
2	TXD	RS-232 protocol, send data
3	RXD	RS-232 protocol, receive data
4	-	-
5	GND	Signal Ground
6	-	-
7	-	-
8	-	-
9	-	-

The pinout for the DB9 male connector of the RS-232 port is as follows:

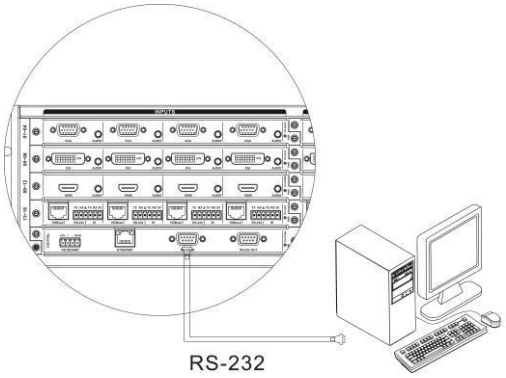


Pinout	Signal	Description
1	-	-
2	RXD	RS-232 protocol, send data
3	TXD	RS-232 protocol, receive data
4	-	-
5	GND	Signal Ground
6	-	-
7	-	-
8	-	-

9	-	-

2.4.5 Connection between the Matrix and Control Computer

Connect the computer's COM1 or COM2 serial port to the matrix host's RS-232 port using an RS-232 cable. Use control commands as outlined in 'Chapter Five, Instruction Set' for matrix control.



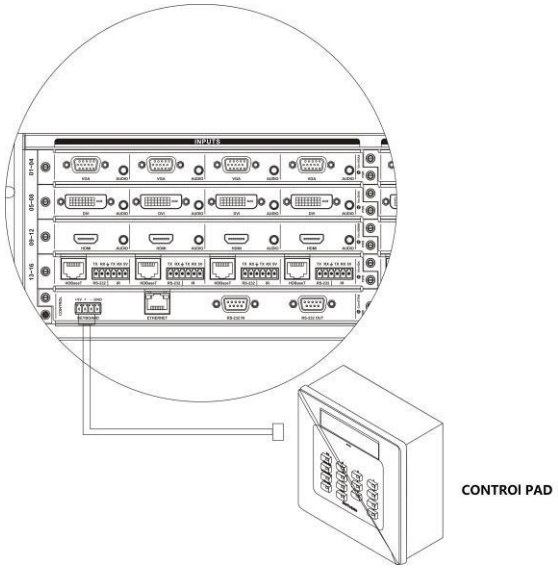
Matrix keyboard interface

The matrix offers 1 KEYBOARD interface for connecting to the MPX-MKB100 extended keyboard, enabling channel switching. The KEYBOARD interface uses a 4-pin 3.8mm Phoenix connector with the following pinout:

Pinout	Signal	Description
1	+5V	Output DC5V/1A for MKB100 Provides power supply
2	+	RS-485 protocol，DATA+
3	-	RS-485 protocol，DATA-
4	GND	Signal Ground

Connection between the Matrix and Extended Keyboard

Connect the matrix host's KEYBOARD interface to the MPX-MKB100 extended keyboard's MATRIX interface using a designated cable for matrix control. Refer to the MPX-MKB100 Matrix Keyboard User Manual' for further details.



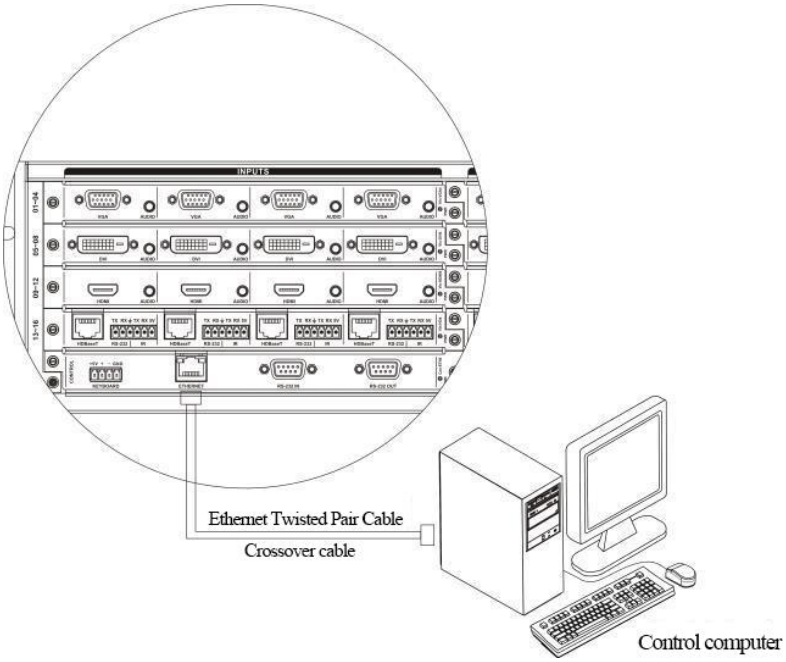
Matrix Ethernet Interface

Hardware connection method

The matrix can be hardware connected to the Ethernet adapter in two ways:

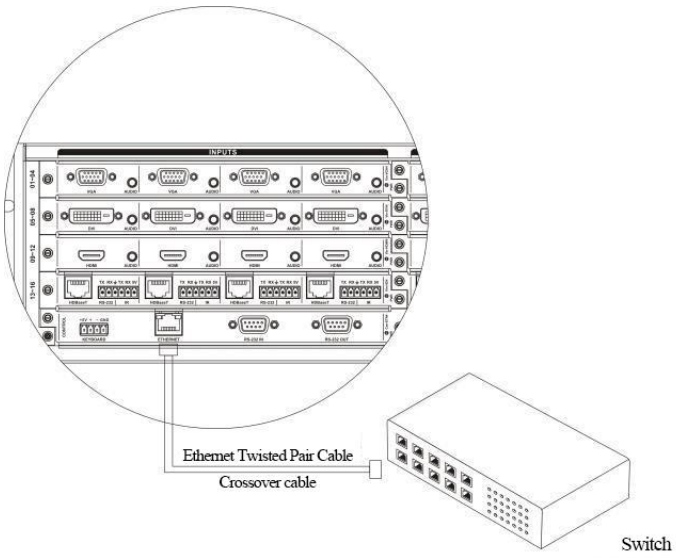
1) Cross-Connection Method

The matrix and the control computer are directly connected using a CAT5 crossover cable.



2) Straight-Through Connection Method

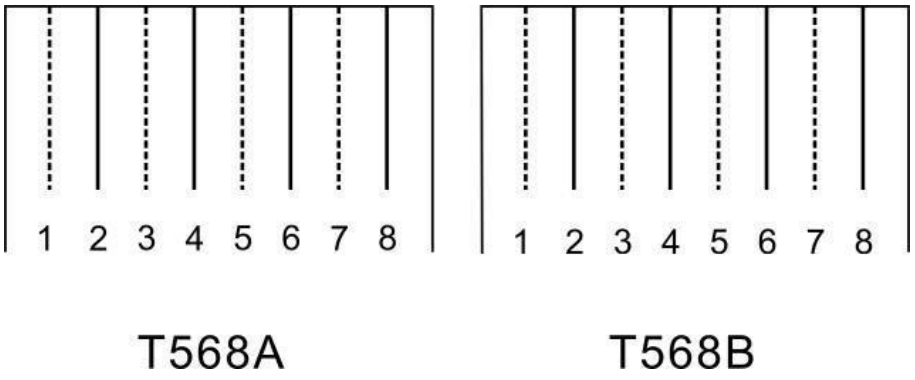
The matrix is connected to an Ethernet switch or hub using a straight-through CAT5 cable.



RJ45 Straight-Through and Crossover Cable Wiring Guide

Using CAT5e cables in the system, RJ-45 connectors (crystal heads) are installed at both ends to connect network devices. The standard wiring ensures symmetry for interference cancellation, with four color-coded pairs of finely twisted wires in CAT5e cables.

Two wiring standards for twisted pair cables: EIA/TIA 568B and EIA/TIA 568A.



T568A wiring sequence							
1	2	3	4	5	6	7	8
White Green	Green	White Orange	Blue	White Blue	Orange	White Brown	Brown

T568B wiring sequence							
1	2	3	4	5	6	7	8
White Orange	Orange	White Green	Blue	White Blue	Green	White Brown	Brown

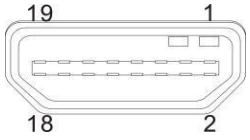
Straight-through cable: Both ends are wired following the T568B standard.

Crossover cable: One end is wired following the T568A standard, and the other end is wired

following the T568B standard.

HDMI Port Description

HDMI-A Type Line Description:
Connect various devices like DVD players, desktop computers, projectors, etc., for versatile audio-video usage, including projectors, video recorders, computer monitors, amplifiers, and more.



PIN	Function
1	TMDS Data2+
2	TMDS Data2 Shield
3	TMDS Data2–
4	TMDS Data1+
5	TMDS Data1 Shield
6	TMDS Data1–
7	TMDS Data0+
8	TMDS Data0 Shield
9	TMDS Data0–
10	TMDS Clock+
11	TMDS Clock Shield
12	TMDS Clock–
13	CEC
14	Reserved (in cable but N.C. on device)
15	SCL
16	SDA
17	DDC/CEC Ground
18	+5V Power
19	Hot Plug Detect

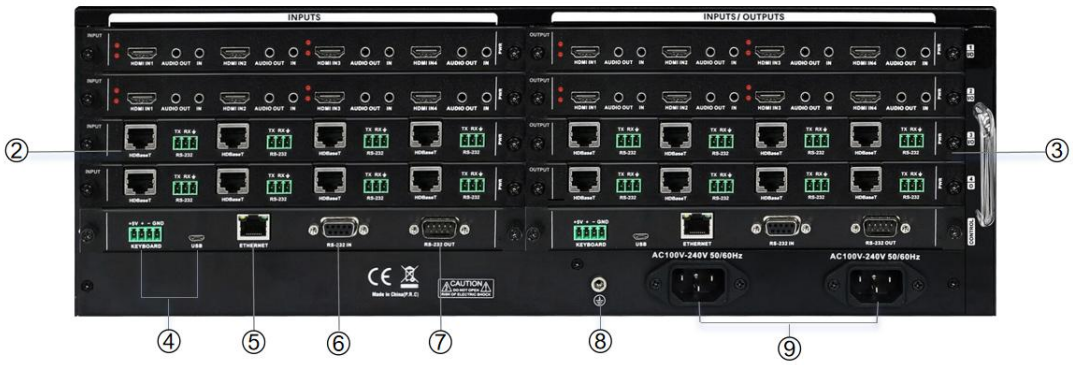
3. Hardware description

3.1. Matrix Panel Description

3.1.1 MPX -VW1616-4K Panel Description

MPX -VW1616-4K Front Panel:

MPX -VW1616-4K Rear Panel:



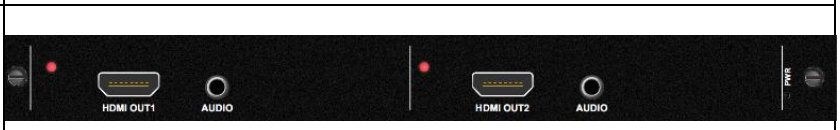
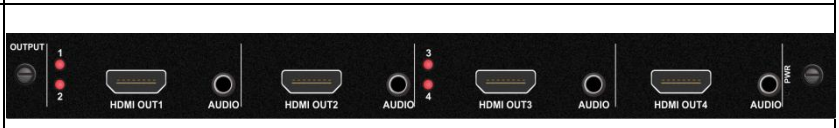
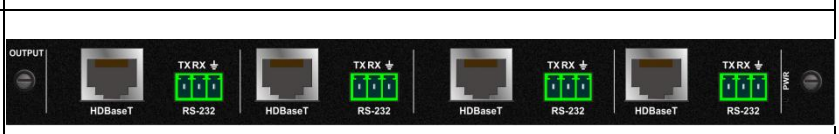
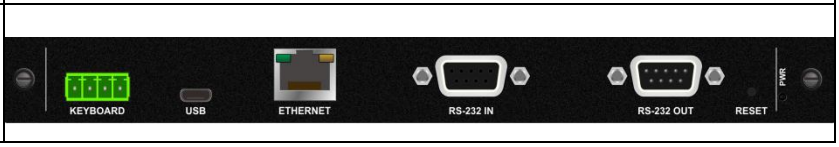
A. Display Screen – Shows matrix status, commands, and results.
B. 0~9 Channel Buttons – Input/output channel selection, / and ALL for isolating multiple channels, and ALL for selecting all output channels.
C. Control Command Buttons – Change IP, video switch (V), matrix splice (M), save scene (SAVE), recall scene (RECALL), and menu selection.

① POWER: Power, ACTIVE: Command status, SENSOR: Infrared receiver.
② INPUTS – Signal input ports (16/32/68).
③ INPUTS/OUTPUTS – Signal inputs/output ports (16/32/68).
④ KEYBOARD – Interface for MPX-MKB100 extended keyboard. USB – Reserved.

⑤ ETHERNET – RJ45 network interface with indicator lights.
⑥ RS-232 IN – Independent RS-232 serial input (DB9 female).
⑦ RS-232 OUT – Independent RS-232 serial output (DB9 male).
⑧ Grounding Post.
⑨ Power Input – AC100~240V 50/60Hz input, supports dual power redundancy.

4. Card Description

4.1. Card Categories

Mode/Name	Appearance
MPX -VW4I-4K HDMI input card	
MPX-HDT4I-4K HDBasT input card	
MPX -VW2O-4K (4) output card (2 HDMI signal output)	
MPX-VW4O-4K (2) HDMI output card(4 signal output)	
MPX-HDT2O-4K Seamless Output Card(2 HDBaseT signal output)	
MPX-HDT4O-4K HDBaseT Output Card(4 output)	
MPX-HM-4K Real Time Monitor Output Card	
MPX -VWP-4K (1 Network Loopback Preview)	
MPX -CC5 Advanced Control Card	

4.2. Input card

4.2.1 MPX -VW4I-4K input card features

◆ ★4 HDMI-A interfaces, 8 3.5mm audio jacks.

- ★Input distance up to 10 meters.
- Hot-swappable, supports seamless switching of audio and video signals.
- ★Supports selection between 3.5mm analog audio and HDMI embedded audio input.
- ★Supports digital audio de-embedding to 3.5mm audio jacks.
- Supports EDID reading function.
- Compatible with HDMI 2.0 standard, HDCP 2.2 protocol, DVI 1.0 protocol.
- Maximum supported resolution: UHDTV: 3840x2160@60Hz; DCI 4K: 4096x2160@60Hz.
- Supports fast seamless switching without flickering or black screens.
- Supports power-off scene switching memory protection and unique ESD electrostatic protection.

4.2.2 MPX-HDT4I-4K Input Card Features:

- 4 high-speed RJ45 interfaces for seamless output, with 4 3-pin Phoenix connectors.
- CAT6a cables support output distances up to 100 meters at 4K@60Hz.
- Hot-swappable design for seamless switching of audio and video signals.
- Supports serial port input/output.
- Serial port switching capabilities.
- Compatible with HDBaseT protocol.
- Maximum supported resolution: UHDTV: 3840x2160@60Hz; DCI 4K: 4096x2160@60Hz.

4.3. Output Card

4.3.1 MPX-VW4O-4K(2) Splicing Output Card Features:

- 4 HDMI-A interfaces with seamless output and 4 3.5mm audio jacks.
- Output distance up to 10 meters.
- Hot-swappable with seamless audio and video signal switching.
- ★Simultaneous output of analog and HDMI embedded audio.
- Supports EDID reading.
- HDMI 2.0, HDCP 2.2, DVI 1.0 compliant.
- Maximum resolution: UHDTV 3840x2160@60Hz; DCI 4K 4096x2160@60Hz.
- Fast seamless switching with no flickering or black screens.
- Power-off scene switching memory protection and ESD electrostatic protection.
- Single screen can open 2 windows, signals can overlay, roam, and scale freely.

4.3.2 MPX-HDT4O-4K Splicing Output Card Features:

- 4 high-speed RJ45 interfaces and 4 3-pin Phoenix connectors.
- LED/LCD splicing function.
- Uses CAT6a cables for output up to 100 meters.

◆ Hot-swappable and supports serial port switching.
◆ Compatible with HDBaseT protocol.
◆ Supports seamless output on 4 twisted pair channels, with onboard RS232 interface.
◆ Single screen can open 2 windows, signals can overlay, roam, and scale freely.

4.3.3 MPX-VW2O-4K(4) 4K Splicing Output Card Features:

◆ 2 HDMI-A interfaces with seamless output and 2 3.5mm audio jacks.
◆ Output distance up to 10 meters.
◆ Hot-swappable for seamless audio and video signal switching.
◆ ★Simultaneous output of analog and HDMI embedded audio.
◆ Supports EDID reading.
◆ HDMI 2.0, HDCP 2.2, DVI 1.0 compliant.
◆ ★Maximum resolution: 4K×2K@60Hz.
◆ Single screen can open 4 windows, signals can overlay, roam, and scale freely.

4.3.4 MPX-HDT2O-4K Splicing Output Card Features:

◆ 2 high-speed RJ45 interfaces and 2 3-pin Phoenix connectors.
◆ LED/LCD splicing function.
◆ Uses CAT6a cables for output up to 100 meters.
◆ Hot-swappable with serial port switching.
◆ Compatible with HDBaseT protocol.
◆ Supports seamless output on 2 twisted pair channels, with onboard RS232 interface.
◆ Single screen can open 4 windows, signals can overlay, roam, and scale freely.

4.4. Preview Card

MPX -VWP-4K Preview Card Features:

◆ 1 RJ45 interface for simultaneous preview of all input video signals.
◆ Maximum video resolution: 1080P@30fps.
◆ H.264 multi-stream encoding with frame rates from 1/16 to 30fps.
◆ Hot-swappable design.

One preview card can be inserted into the output card slot of a matrix

4.5. Real Time Monitor Card

MPX-HM-4K Real Time Monitor Card Features:

- ◆ It can support up to 4 groups of splicing wall sync on display. Four groups of splicing walls can be output by one HDMI port, or divided into four HDMI ports for output. Each HDMI port displays a group of splicing wall
- ◆ Compatible with HDMI2.0 standard, HDCP2.3 protocol, DVI1.0 protocol;
- ◆ Maximum supported resolution:3840*2160@60Hz, YUV4:4:4 sampling
- ◆ With output status detection, comes with LED status indicator

One real time monitor card can be inserted into the output card slot of a matrix

4.6. Control Card

MPX -CC5 Advanced Control Card Features:

- ◆ 2 DB9 serial ports for peripheral control.
- ◆ 1 USB reserved interface.
- ◆ 1 RJ45 interface for programmable functions.
- ◆ 1 4P Phoenix keyboard interface.
- ◆ 1 3P Phoenix serial port for debugging and command reception.
- ◆ Hot-swappable design.
- ◆ Supports programmable control

4.7. Specifications and Technical Parameters

MPX -VW4I-4K & MPX-VW4O-4K (2) technical parameters

Model / Specification	MPX -VW4I-4K	MPX-VW4O-4K (2)
Protocol		
HDMI2.0 standard，HDCP2.2 protocol, DVI1.0 protocol；		
Video		
Gain	0dB	
Pixel Bandwidth	600MHz,full digital	
Interface Bandwidth	6Gbps, full digital(Total 18Gbps, each color is 6Gbps)	
Resolution	4096×2160@60(Backward Compatible)	
Bit Clock Jitter	<0.15 Tbit	

Bit Rise Time	<0.3Tbit (20%--80%)	
Bit Fall Time	<0.3Tbit (20%--80%)	
Maximum Transfer	5nS(±1nS)	
Interface	4 HDMI-A interface、4 3.5mm audio jack	
Signal Strength	T.M.D.S. +/- 0.4Vpp	
Minimum/Maximum	T.M.D.S. 2.9V/3.3V	
Impedance	50 Ω	
EDID	Optional Default EDID And Reading Functionality	N/A
Maximum DC	15mV	
Suggested Maximum Input/output	Input Less than 10m, 3840x2160@ 60(Use certified HDMI cables, e.g., Molex TM cables, as recommended)	Output up to 10 meters at 3840x2160@60 resolution (Use certified HDMI cables, e.g., Molex TM cables, as recommended)
Product Weight	About 0.5KG	About 0.5KG
Maximum Power Consumption	20W	30W

MPX-HDT4I-4K & MPX-HDT4O-4K parameters

Model / Specification	MPX-HDT4I-4K	MPX-HDT4O-4K
Link port Input/output		
Interfaces	4 high-speed RJ45 ports and 4 3-pin Phoenix connectors	
Supported protocol	HDBaseT protocol	
Pixel Bandwidth	600MHz, full digital	
Interface Bandwidth	6Gbps, full digital(Total 18Gbps, each color is 6Gbps)	
Resolution	4096×2160@60(Backward Compatible)	
Signal Type	HDBaseT high-speed differential signals defined in the protocol	
POE via Ethernet cable	Powered with POC (+12V), this card can supply power to our CAT5 series transmitters through the Ethernet cable.	Powered with POC (+12V), this card can supply power to our CAT5 series receivers through the Ethernet cable.
Impedance	50 Ω	
EDID	Optional Default EDID	N/A

Maximum DC	15mV	
Suggested Maximum Input/output	Up to 100 meters at 3840x2160@60 (recommended using NEXANS CAT6a cables)	
Product Weight	About 0.5KG	About 0.5KG
Maximum Power Consumption	35W	45W

MPX -VW2O-4K (4) technical parameters

Model / Specification	MPX-VW2O-4K(4)
Protocol	
HDMI2.0 standard，HDCP2.2 protocol, DVI1.0 protocol；	
Video	
Gain	0dB
Pixel Bandwidth	600MHz, full digital
Interface Bandwidth	6Gbps full digital (total 18Gbps, each color is 6Gbps)
Resolution	4096x2160@60 (Backward Compatible)
Bit Clock Jitter (Clock Jitter)	<0.15 Tbit
Bit Rise Time	<0.3Tbit (20%--80%)
Bit Fall Time	<0.3Tbit (20%--80%)
Maximum Transfer	5nS(±1nS)
Interface	4 HDMI-A interface、2 3.5mm audio jack
Signal Strength	T.M.D.S. +/- 0.4Vpp
Minimum/Maximum	T.M.D.S. 2.9V/3.3V
Impedance	50 Ω
EDID	N/A
Maximum DC	15mV
Suggested Maximum Input/output	Output up to 10 meters at 3840x2160@60 resolution(Use certified HDMI cables, e.g., Molex TM cables, as recommended)
Product Weight	About 0.5KGM
Maximum Power Consumption	30W

MPX-HDT2O-4K technical parameters:

Model / Specifications	MPX-HDT2O-4K
Link port Input/output	
Interface	2 high-speed RJ45 ports and 2 3-pin Phoenix connectors
Video	
Supported protocol	HDBaseT protocol。
Pixel Bandwidth	600MHz, full digital
Interface Bandwidth	6Gbps, full digital (total 18Gbps, each color is 6Gbps)
Resolution	4096x2160@60(Backward Compatible)
Number of Windows	Single screen supports 4 windows, with overlay, roaming, and flexible zooming
Control Scale	Controls up to 68 screens, manages multiple screen groups, and supports saving/recalling 255 presets
Signal Types	High-speed differential signals defined in the HDBaseT protocol
(POE) via Ethernet cable	Powered with POC (+12V), compatible with our CAT5 series transmitters, providing power through the Ethernet cable
Impedance	50Ω
EDID	N/A
Maximum DC Bias Error	15mV
Suggested Maximum Input/output Distance	Up to 100 meters at 3840x2160@60 (recommended using NEXANS CAT6a dedicated cables)
Product Weigh	About 0.5KGM
Maximum Power Consumption	45W

MPX -VW1616-4K/3232/6868 Technical specifications

Model / Specifications	MPX-VW1616-4K	MPX -VW3232-4K	MPX -VW6868-4K
Protocol			
Number of Connectable Input	7/28	16/64	30/120

Cards / Input Channels			
Number of Connectable Output Cards / Output Channels	4/16	8/32	17/68
Supported Input Card Types		MPX -VW4I-4K 、MPX-HDT4I-4K	
Supported Seamless Output Card Types		MPX-HDT4O-4K、MPX-HDT2O-4K	
Supported Spliced Output Card Types		MPX-VW4O-4K (2)、MPX -VW2O-4K (4)、	
Supported Preview Card Types		MPX -VWP-4K	
Support Real Time Monitor Card Types		MPX-HM-4K	
Interface Bandwidth		18Gbps	
Serial Port Control			
Baud Rate and Protocol		Baud Rate: 9600, Data Bits: 8, Stop Bits: 1, No Parity	
Serial Control Port Structure		9-pin Female D-type Connector: 2=TX, 3=RX, 5=GND;9-pin Male D-type Connector: 2=RX, 3=TX, 5=GND	
KEYBOARD Control Interface			
Keyboard Control Interface		4-pin 3.8mm Phoenix Interface	
Usage Method		Used in conjunction with the MCP100 Extension Keyboard	
Keyboard Control Port Structure		+5V=DC5V,+=DATA+,-=DATA-	
Ethernet Control			
Ethernet Control Interface		RJ-45 Female Connector	
Ethernet Control Protocol		TCP/IP	
Ethernet Control Rate		Adaptive 10M/100M, Full Duplex or Half Duplex	
Specifications			
System Operating Power		100VAC~240VAC， 50/60Hz, international adaptive power supply	
Storage, Operating Temperature		0～+50°C	
Storage, Operating Humidity		20%～70%	
Chassis Dimensions	3.5U	6.5U	11U
Product Weight (excluding any cards)	About 14KG	About 22KG	About 29KG
Idle Power Consumption (excluding any cards)	About 15W	About 40W	About 90W
Dimensions (LxWxH)mm	445x400x156	445x400x289	445x400x489
Mean Time Between Failures	30,000h		

Warranty	1-year free warranty, lifetime maintenance

5. Instruction Set

5.1. MPX-VW Matrix Commands

Serial Port Protocol: Baud Rate: 9600 Data Bits: 8 Stop Bits: 1 Parity: None Ethernet: Protocol: TCP, IP: 192.168.1.190 Port: 6666
Symbolic Command Meanings:

[X1], [X2]... [Xn]: Corresponding input ports
[Y1], [Y2]... [Yn]: Corresponding output ports
[TX1], [TX2]... [TXn]: Serial port/infrared transmission channels for the respective input ports
[RX1], [RX2]... [RXn]: Serial port/infrared reception channels for the respective input ports
[TY1], [TY2]... [TYn]: Serial port/infrared transmission channels for the respective output ports
[RY1], [RY2]... [RYn]: Serial port/infrared reception channels for the respective output ports
H represents an Arabic numeral, and n is the number of input/output interfaces for the corresponding device model (e.g., MPX -VW1616-4K, where n can be a maximum of 16).

Remove the square brackets "[x]" when entering commands. For example, $[x]AudioA! should be input as $8AudioA!

Instructions (pc->X9 processor)	Function description	Parameter Description	Returned messages
System settings			
/*Type;	Matrix model query (return type is uncertain)	NO	<VH-VH0808>/<VH-VH1616>
/^Version;	Control card version query	NO	<Ver2.0.1>
<^Max_Chan>	Maximum number of channels of the device		<^Max_Chan8>/<^Max_Chan16>
/:BellOff;	Turn off the buzzer	NO	<Bell Off>
/:BellOn;	Turn on the buzzer	NO	<Bell On>
/:HeartBeat;	Heartbeat packet with device		<HeartBeat>
/:ScanPortType;	Scan card slot	Card types include:HDMI/DVI/VGA/SDI/CAT5/YUV/IP/CVBS/Browse/Fiber/HDMI_4K/Fiber_4K/CAT_4K/PJ_HDMI/PJ_DVI/	<Port/StartScanning> <Port/7/In/HDMI/Ver3.1/Ver1.2> <Port/StopScanning>

		PJ_CAT/PJ_HDMI2 /PJ_DVI2/PJ_CAT2 /PJ_DMI4K/U_BO OT/Unknow	
/:ScanPortResolutio n;	Scan resolution		<Resolution/7/In/19 20x1080x60Hz>
AllTemperatureIn!	Analyze the temperature of all input cards		<temp/[5,8]/In/24.5 >
AllTemperatureOut !	Analyze the temperature of all output cards		<temp/[9,12]/Out/34 .5>
AllAnalyseIn!	Analyze the status of the input card		
AllAnalyseOut!	Analyze the status of the input card		
Status[x].	Query the input signal corresponding to the [x]th output		V:[x1] -> [x2]
Status.	Query the input signals corresponding to all outputs	Return command same as the signal switching command.	
<#TestColor[x],[y], [z],[r],[g],[b]>	Port [y] graphic test mode.	[x]:1 Input 2：Output [y]:Channel [z]:0x00: Pass-through. 0x01: Red, green, and blue color bars 0x02:16-level grayscale. 0x03:32-level grayscale. 0x04:64-level grayscale. 0x05: Red grid 0x06: Green grid 0x07: Blue grid 0x08: White grid 0x09:Horizontal scrollbar 0x0A: Vertical scrollbar	<TestColor[x],[y],[z],[r],[g],[b]>

		0x0B: Solid color (depending on RGB values).	
<#SignalMode[x],[y],[z],[r],[g],[b]>	No graphic input port outputs graphics (input is only solid color).	[x]:1 Input 2：Output [y]:Channel [z]:0x00: Pass-through. 0x01: Red, green, and blue color bars 0x02:16-level grayscale. 0x03:32-level grayscale. 0x04:64-level grayscale. 0x05: Red grid 0x06: Green grid 0x07: Blue grid 0x08: White grid 0x09:Horizontal scrollbar 0x0A:Vertical scrollbar 0x0B: Solid color (depending on RGB values).	<SignalMode[x],[y],[z],[r],[g],[b]>
<#Preview192.168.1.191>	IP address of the preview card	On startup, it fetches user's previous preview video IP settings.	<Preview192.168.1.191>
Signal Switching			
[x]V[y].	Switch input [x] to output [y], video on/off.		V:[x] -> [y]
[x]V[y1],[y2],[y3].	Switch input [x] to outputs [y1], [y2], [y3], video switching		V:[x] -> [y1] V:[x] -> [y2] V:[x] -> [y3]
[x]All.	Input [x] to all outputs, close all output videos when [X1] is 0	return command same as the signal switching command	
All$.	Close the signal of all output ports		

All#.	Video and infrared serial ports correspond directly.		
[RX1]R[TY1].	Route [RX1] to [TY1] for serial communication (RS232 forward channel)		RS:[RX1]->[TY1]
[RX1]S[TY1].	Route [RX1] to [TY1] for serial communication (RS232 reverse channel).		TS:[RX1]->[TY1]
[RX1]Q[TY1].	Connect input IR [RX1] to output IR [TY1] (Forward IR channel switch)		IR:[RX1]->[TY1]
[RX1]F[TY1].	Connect output IR [RX1] to input IR [TY1] (Forward IR channel switch)		TR:[RX1]->[TY1]
[RX1]T[TY1].	Input RS232/IR [RX1] to output RS232/IR [TY1] (Forward RS232/IR switch)		T:[RX1]->[TY1]
[RX1]K[TY1].	KVM box switching		
Matrix presets			
Save[Y].	Save the current state to group [Y]		<Save to F1!>
Recall[Y].	Recall the state saved in group [Y].		Return the saved state of the current preset.
Clear[Y].	Clear the state saved in group [Y].		<Clear F1!>
Network settings.			
<^SPORT>	Query the current matrix network port number.		<SPORT:[X1]>
<^SIPR>	Query the current matrix network IP address.		<SIPR:[X1].[X2].[X3].[X4]>

<^SUBR>	Query the current network subnet mask.		<SUBR:[X1].[X2].[X3].[X4]>
<^GAR>	Query the current network gateway		<GAR:[X1].[X2].[X3].[X4]>
<^SHAR>	Query the current network hardware address.		<SHAR:[X1]:[X2]:[X3]:[X4]:[X5]:[X6]>
<#SPORT[5000]>	Set the network port number of the matrix		<SPORT:[X1]>
<#SIPR[192].[168].[0].[2]>	Set the matrix network IP address		<SIPR:[X1].[X2].[X3].[X4]>
<#GAR[192].[168].[0].[1]>	Set the network gateway address.		<SUBR:[X1].[X2].[X3].[X4]>
<#SUBR[255].[255].[255].[0]>	Set the network subnet mask.		<GAR:[X1].[X2].[X3].[X4]>
<#SHAR[98]:[00]:[c1]:[00]:[00]:[01]>	Set the network hardware address (in hexadecimal).		<SHAR:[X1]:[X2]:[X3]:[X4]:[X5]:[X6]>
<#NETDEFAULT>	Restore network settings to factory defaults.		
Set preview card network parameters			
<^HSSPORT>	Query preview card port number		<HSSPORT:[X1>
<^HSSIPR>	Query preview card IP address		<HSIPR:[X1].[X2].[X3].[X4]>
<^HSSUBR>	Query the subnet mask number of the preview card		<HSUBR:[X1].[X2].[X3].[X4]>
<^HSGAR>	Query the current network gateway number.		<HGAR:[X1].[X2].[X3].[X4]>
<^HSSHAR>	Query the current network hardware address for the preview card		<HSHAR:[X1]:[X2]:[X3]:[X4]:[X5]:[X6]>
<#HSSPORT[5000]>	Set the preview card port number.		<HSPORT:[X1]>
<#HSSIPR[192].[168].[0].[2]>	Set the preview card IP.		<HSIPR:[X1].[X2].[X3].[X4]>
<#HSGAR[192].[168].[0].[1]>	Set the preview card gateway.		<HSUBR:[X1].[X2].[X3].[X4]>

<#HSSUBR[255].[255].[255].[0]>	Set the preview card subnet mask.		<HGAR:[X1].[X2].[X3].[X4]>
<#HSSHAR[98]:[00]:[c1]:[00]:[00]:[02]>	Set the preview card hardware address (in hexadecimal).		<HSHAR:[X1]:[X2]:[X3]:[X4]:[X5]:[X6]>
<#HSNETDEFAULT>	Restore factory settings for the preview card.		
<^HSResolution>	Current resolution.		<^HSResolution_is_1280*720> or <^HSResolution_is_800*600> or <^HSResolution_is_640*480> or <^HSResolution_is_352*288>
<^HSResolution1280*720>	Set the resolution of the preview card.	Common resolutions include: 1280*720、800*600、640*480、352*288	
<^ViewIP>	Query the configured preview stream address IP		<ViewIP[192].[168].[0].[2]>
<#ViewIP[192].[168].[0].[2]>	Configure the software to preview the video stream address IP.		
<#ViewSplit[x]>	Set the preview screen.	0：2*2、1：3*3、2：4*4、 3：5*5、4：6*6、	<ViewSplit[x]>
<#ViewAuto>	Set the preview screen.		<ViewAuto>
<^ViewSplit>	Query the preview screen.		<ViewSplit[x]>
<#LoopSplit[x]>	Set HDMI preview split screen.	0：4*4、1：5*5、2：6*6、	<LoopSplit[x]>
<#LoopAuto>	Device HDMI preview automatically split screen		<LoopAuto>
<^LoopSplit>	Query HDMI preview split screen		<LoopSplit[x]>
VGA setting			

$[x]VGAIn!	Set to VGA signal input		<$[x]VGAIn!>
$[x]YUVIn!	Set to YPbPr signal input		<$[x]YUVIn!>
<#Cmd_Baud[x]>	[x] ： baud rate 0:9600 1:38400 2:115200 3:230400		
<#Cmd_Port[x]>	x: 0 COM0 1 COM1 2:KeyBoard		<Cmd_Port[x]>
<^Cmd_Port>	Return command port and baud rate		<Cmd_Port[x]> <Cmd_Baud[x]>
<#Cmd_Send[x]>	Send central control command x: command ID	Failure means there is no set command	<Send_failed>
Enter characters			
SetOSD[x].	Set input character parameters of [x]th path	Return the character status of the current port, and the meaning of the returned status is consistent with the setting command	<OSD Closed> <Color255,0,0> <CharPos0,0> <OSD Bgcolor Closed> <BgColor0,0,0> <CharSpeed0> <ColorDir0>
CharOpen.	Character display on		<OSD Opened>
CharClose.	Character display off		<OSD Closed>
<#CharColorR,G,B>	Character color settings		<CharColorR,G,B>
<#CharPos[x1],[x2]>	Character color settings		<CharPos[x1],[x2]>
CharBgOpen.	Character background color on		<OSD Bgcolor Opened>
CharBgClose.	Character background color off		<OSD Bgcolor Closed>
<#CharBgColorR,G,B>	Character background color settings		<BgColorR,G,B>
<#CharSpeed[x1]>	Character movement speed, 0 stops moving		<CharSpeed[x1]>
<#CharDir[x1]>	Character	1: left 2: right	<CharDir[x1]>

	movement direction		
<CharErase>	Erase the characters of the current channel		<Set Succeed!>
Input crop			
<^CropInput[x1]>	Returns the cropping status of input [x1]		<^CropInput[x1],[x2],[x3],[x4],[x5]>
<#CropInput[x1],[x2],[x3],[x4],[x5]>	Input image crop: x1: Input x2: Horizontal position x3: Vertical position x4: Horizontal size x5: Vertical size. 0 for both size parameters indicates no cropping		<^CropInput[x1],[x2],[x3],[x4],[x5]>
<#ColorSpace[x],[y]>	Input color space setting [x]: Input channel [y]: Corresponding color space	0：RGB 1：YCbCr422 2：YCbCr444 3：YCbCr420 255：Auto	<ColorSpace[x],[y]>
<^ColorSpace[x]>	Query the color space of input channel [x]		<ColorSpace[x],[y]>
Input and output settings			
$[x]DefaultIn!	[x]th input restores factory settings		<Set Succeed!>
$[x]DefaultOut!	The [x]th output is restored to factory settings.		<Set Succeed!>
$[x]AudioA!	Channel [x] input analog audio/Phoenix infrared serial port input		<Set Succeed!>
$[x]AudioD!	Channel [x] input digital audio/network port infrared serial port input		<Set Succeed!>
$[x]AudioAOut!	Channel [x] output analog		<Set Succeed!>

	audio/Phoenix infrared serial port input		
$[x]AudioDOut!	Channel [x] output digital audio/network port infrared serial port input		<Set Succeed!>
$[x]AudioOn!	Channel [x] output audio is turned on		<Set Succeed!>
$[x]AudioOff!	Channel [x] output audio is turned off		<Set Succeed!>
All output resolutions			
<#Canvas[x],[x1],[x2],[x3]>	Set the [x]th LED resolution size x1, x2	For example, the LED resolution of port 1 is 1536x968x60Hz <#Canvas1,1536,968,60>	<Canvas[x],[x1],[x2],[x3]>
$[x]->800x600x60Hz!	Channel [x] output resolution 800x600x60Hz (except SDI)		<$[x]->800x600x60Hz!>
$[x]->1024x768x60Hz!	The output resolution of channel [x] is 1024x768x60Hz (except SDI)		<$[x]->1024x768x60Hz!>
$[x]->1280x720x50Hz!	The output resolution of channel [x] is 1280x720x60Hz (except SDI)		<$[x]->1280x720x50Hz!>
$[x]->1280x720x60Hz!	The output resolution of channel [x] is 1280x720x60Hz		<$[x]->1280x720x60Hz!>
$[x]->1280x768x60Hz!	The output resolution of channel [x] is 1280x768x60Hz (except SDI)		<$[x]->1280x768x60Hz!>

$[x]->1280x800x60Hz!	The output resolution of channel [x] is 1280x800x60Hz (except SDI)		<$[x]->1280x800x60Hz!>
$[x]->1280x960x60Hz!	The output resolution of channel [x] is 1280x960x60Hz (except SDI)		<$[x]->1280x960x60Hz!>
$[x]->1280x1024x60Hz!	The output resolution of channel [x] is 1280x1024x60Hz (except SDI)		<$[x]->1280x1024x60Hz!>
$[x]->1360x768x60Hz!	The output resolution of channel [x] is 1360x768x60Hz (except SDI)		<$[x]->1360x768x60Hz!>
$[x]->1366x768x60Hz!	The output resolution of channel [x] is 1366x768x60Hz (except SDI)		<$[x]->1366x768x60Hz!>
$[x]->1440x900x60Hz!	The output resolution of channel [x] is 1400x900x60Hz (except SDI)		<$[x]->1440x900x60Hz!>
$[x]->1600x900x60Hz!	The output resolution of channel [x] is 1600x900x60Hz (except SDI)		<$[x]->1600x900x60Hz!>
$[x]->1600x1200x60Hz!	The output resolution of channel [x] is 1600x1200x60Hz (except SDI)		<$[x]->1600x1200x60Hz!>
$[x]->1920x1080x25Hz!	The output resolution of channel [x] is 1920x1080x25Hz		<$[x]->1920x1080x25Hz!>

	(valid for SDI HDMI card)		
$[x]->1920x1080x30Hz!	The output resolution of channel [x] is 1920x1080x30Hz (valid for SDI HDMI card)		<$[x]->1920x1080x30Hz!>
$[x]->1920x1080x50Hz!	The output resolution of channel [x] is 1920x1080x60Hz		<$[x]->1920x1080x50Hz!>
$[x]->1920x1080x60Hz!	The output resolution of channel [x] is 1920x1080x60Hz		<$[x]->1920x1080x60Hz!>
$[x]->1920x1200x60Hz!	The output resolution of channel [x] is 1920x1200x60Hz (except SDI)		<$[x]->1920x1200x60Hz!>
$[x]->1920x540x50Hz!	The output resolution of channel [x] is 1920x540x50Hz (1920x1080ix50Hz)	The sub-resolution software should show 1920x1080ix50Hz	<$[x]->1920x540x50Hz!>
$[x]->1920x540x60Hz!	The output resolution of channel [x] is 1920x540x60Hz (1920x1080ix60Hz)	The sub-resolution software should show 1920x1080ix60Hz	<$[x]->1920x540x60Hz!>
$[x]->2560x1080x25Hz!	The output resolution of channel [x] is 2560x1080x25Hz	Only 4K cards	<$[x]->2560x1080x25Hz!>
$[x]->2560x1080x30Hz!	The output resolution of channel [x] is 2560x1080x30Hz	Only 4K cards	<$[x]->2560x1080x30Hz!>
$[x]->3840x2160x25Hz!	The output resolution of channel [x] is	Only 4K cards	<$[x]->3840x2160x25Hz!>

	3840x2160x25Hz		
$[x]->3840x2160x30Hz!	The output resolution of channel [x] is 3840x2160x30Hz	Only 4K cards	<$[x]->3840x2160x30Hz!>
$[x]->4096x2160x25Hz!	The output resolution of channel [x] is 4096x2160x25Hz	Only 4K cards	<$[x]->4096x2160x25Hz!>
$[x]->4096x2160x30Hz!	The output resolution of channel [x] is 4096x2160x30Hz	Only 4K cards	<$[x]->4096x2160x30Hz!>
$[x]->3840x2160x60Hz!	The output resolution of channel [x] is 3840x2160x60Hz		<$[x]->3840x2160x60Hz!>
$[x]->4096x2160x60Hz!	The output resolution of channel [x] is 4096x2160x60Hz		<$[x]->4096x2160x60Hz!>
Echo settings			
<#EchoSplit[x]>	Set echo split screen	Single screen or quad screen 0: Quad screen 1: Single screen	<EchoSplit[x]>
<^EchoSplit>	Query echo split screen		<EchoSplit[x]>
<#EchoArray[x1],[x2],[x3],[x4]>	Four sets of splicing walls corresponding to [x1]...[x4]		<EchoArray[x1],[x2],[x3],[x4]>
<^EchoArray>	Query the video wall echo settings		<EchoArray[x1],[x2],[x3],[x4]>
<#EchoUpdate>	Update echo parameters (hot-swappable access splicing card		<EchoUpdate>
<#EchoOpen>	Turn on echo		<EchoOpen>
<#EchoClose>	Turn off echo		<EchoClose>

<^EchoState>	Query the echo status		<EchoOpen><Echo Close>
EDID operation commands			
[R]EDIDTo[T].	Copy the EDID of channel [R] output to input channel [T]		
<#UpdateEDID[x]/[data]>	Update the EDID of the [x]th input		
UpdateEnd.	update completed		
[R]EDIDTo[T].	Copy the EDID of channel [R] output to input channel [T]		
IP Card settings			
SetIP[x].		Returns the local network parameters of the current port	
TurnLeft.	Turn left		
TurnRight.	Turn right		
TurnUp.	Turn up		
TurnDown.	Turn down		
TurnStop.	Stop turning		
FocusFar.	Focus on distance		
FocusNear.	Focus near		
<#LocalSIPR[192].[168].[0].[2]>	Set IP card IP address	<LocalSIPR[192].[168].[0].[2]>	
<#LocalGAR[192].[168].[0].[1]>	Set IP card IP gateway	<LocalGAR[192].[168].[0].[1]>	
<#LocalSUBR[255].[255].[255].[0]>	Set IP card IP subnet mask	<LocalSUBR[255].[255].[255].[0]>	
<#LocalSHAR[08]:[20]:[51]:[00]:[00]:[01]>	Set the IP card IP hardware address	<LocalSHAR[08]:[20]:[51]:[00]:[00]:[01]>	
<#Connect[192].[168].[0].[2]>	Connect to current IP card	<Connect On><Connect Off>	And return to the current split screen mode
<#SetChnStreamAddr/[x1]/[x2]/[x3]>	Update the URL address of a specific	<Set Succeed!>	

	channel. [x1]: Channel 1 or 2, [x2]: Corresponding channel image, [x3]: Signal list ID		
<#SetChnVoMode[x]>	Set split screen mode (0 to 4) single screen, 4 screens, 9 screens, 16 screens, 25 screens	<SetChnVoMode[x]>	
<#SetCardMode[x]>	Set port mode	<SetCardMode[x]>	0: Output one port image 1: Output two port images
		<IPC_chn1,0,2,2>	0: Not switched N: Switched ipc id
<#MULTICAST>	Set multicast address mode		
<#RSTP>	Set RTSP streaming mode		
/:ScanIPCList;	Get the IPC list (valid for web)		
Splicing subtitle settings			
<^Title[x]>	Returns the subtitle status of video wall [x]	Example of return code for splicing wall 2	<^TitleClose2> <^TitleLeft2> <^TitleSpeed2,0> <^TitleColor2,200,76,76> <^TitlePosH2,0> <^TitlePosV2,0> <^TitleBgClose2> <^TitleBgColor2,83,50,50>
<#TitleOpen[x]>	Subtitles on		<^TitleOpen[x]>
<#TitleClose[x]>	Subtitles off		<^TitleClose[x]>
<#TitleBgOpen[x]>	Subtitle background color turned on		<^TitleBgOpen[x]>
<#TitleBgClose[x]>	Subtitle background color off		<^TitleBgClose[x]>
<#TitleBgColor[x],[R],[G],[B]>	Subtitle background color R, G, B		<^TitleBgColor[x],[R],[G],[B]>

<#TitleLeft[x]>	Subtitles move left		<^TitleLeft[x]>
<#TitleRight[x]>	Subtitles move right		<^TitleRight[x]>
<#TitleSpeed[x],[y]>	Subtitle moving speed (moving speed set to 0 means no movement)		<^TitleSpeed[x],[y]>
<#TitleColor[x],[R],[G],[B]>	Subtitle color R, G, B		<^TitleColor[x],[R],[G],[B]>
<#TitlePosH[x],[y]>	Horizontal position of subtitles (used when still) [y] 0 to 65535		<^TitlePosH[x],[y]>
<#TitlePosV[x],[y]>	Subtitle vertical position (multiples of 16 pixels) [y] max 255		<^TitlePosV[x],[y]>
<#TitleUpdate[x]>	Videowall[x] Subtitle status update		<Set Succeed>
<#ErasePic[x]>	Erase videowall[x] basemap		<ErasePic[x]>
<#EraseTitle[x]>	Erase videowall[x] subtitles		<EraseTitle[x]>
<^Pic_Sta>	Basemap status query		
<#PIC_CLOSE[x]>	Videowall[x] basemap off		<PIC_CLOSE[x]>
<#PIC_OPEN[x]>	Splicing wall [x] base image is		<PIC_OPEN[x]>
<#PIC_Snap[x]>	Channel[x] basemap screenshot		<PIC_Snap[x]>
<#SavePic[x]>	Save the splicing wall [x] base image		<SavePic[x]>
<#CLOCK_SWITCH[x],[y]>	Real-time time display switch [x]: Port [y]: 11 Turn on time and date 1: Turn on time 10: Turn on date		
<#CLOCK_SIZE[x],[y]>	Real time display size (maximum 255)		
<#CLOCK_POS[x],[y],[z]>	Real-time time display position [y]: horizontal position		

	[z]: vertical position		
<#Rtc_Clock[x],[x1],[x2],[x3],[x4],[x5]>	Set system time year, month, day, hour, minute, second, week	For example, Tuesday, November 16, 2021 14:30:05 <#Rtc_Clock2021/11/16/14/30/05/2>	
<^CLOCK_INFO[x]>	Clock display status of port [x]	Return switch, size and position	
Stitching settings			
<#SetDelay[x],[y]>	Set the delay of splicing port [x], [y] delay size		<SetDelay[x],[y]>
<#MARGINH[x],[x1]>	Splicing wall [x] Horizontal screen spacing [x1]: Splicing screen spacing		<MARGINH[x],[x1]>
<#MARGINV[x],[x1]>	Splicing wall [x] Vertical screen spacing [x1]: Splicing screen spacing		<MARGINV[x],[x1]>
<#MAP[x],[x1],[x2]>	Videowall [x] window [x1] mapped to [x2]		<MAP[x],[x1],[x2]>
<#SIZE[x],[x1],[x2]>	Video wall [x] resolution [x1], [x2]>	Unified settings for LCD	<SIZE[x],[x1],[x2]>
<#SIZE_X[x],[x1],[x2],[x3],[x4]>	Video wall [x] Horizontal resolution of each window	[x1]--[x4] corresponds to the first to fourth columns	<SIZE_X[x],[x1],[x2],[x3],[x4]>
<#SIZE_Y[x],[x1],[x2],[x3]>	Videowall [x] Vertical resolution of each window	[x1]--[x3] corresponds to the first to third columns	<SIZE_Y[x],[x1],[x2],[x3]>
<#LOGICVIR[x],[x1],[x2]>	Splicing wall [x] rows and columns [x1]: number of horizontal window rows [x2]: number of vertical window rows	Virtually re-dividing video wall rows	<LOGICVIR[x],[x1],[x2]>
<#VIR[x],[x1],[x2]	Splicing wall [x]		<VIR[x],[x1],[x2]>

>	rows and columns [x1]: number of horizontal window rows [x2]: number of vertical window rows		
<#OPEN[x],[x1],[x2],[x3],[x4],[x5],[x6],[x7]>	Splicing wall [x] rows and columns [x1]: number of horizontal window rows [x2]: number of vertical window rows		<OPEN[x],[x1],[x2],[x3],[x4],[x5],[x6],[x7]>
<#MOVE[x],[x1],[x2],[x3]>	Moving window parameter settings: [x]: Splicing wall identification [x1]: Window identification [x2]: Window horizontal position [x3]: Window vertical position		<MOVE[x],[x1],[x2],[x3]>
<#RESIZE[x],[x1],[x2],[x3],[x4],[x5]>	Window stretching parameter settings: [x]: Splicing wall logo [x1]: Window logo [x2]: Window horizontal position [x3]: Window vertical position [x4]: Window horizontal size [x5]: Window vertical size		<RESIZE[x],[x1],[x2],[x3],[x4],[x5]>
<#LAYER[x],[x1],[x2]>	Window layer parameter settings: [x]: Splicing wall identification [x1]: Window identification [x2]: Layer number		<LAYER[x],[x1],[x2]>
<#CLOSE[x],[x1]>	Window closing settings: [x]:		<CLOSE[x],[x1]>

	Splicing wall logo [x1]: Window logo		
<#CLOSEALL[x]>	Close all windows of videowall [x]		<CLOSEALL[x]>
<^JOINT>	Query the splicing status of all splicing walls	The return code is the same as the window return code	
<^JOINT[x]>	Query all splicing status of [x] splicing wall	The return code is the same as the window return code	
<^SIZE>	Query PC window size	The return code LCD prefix is SIZE LED is "<SIZE_X <SIZE_Y"	<SIZE[x],[x1],[x2]>
<^VIR>	Query the PC window array		<VIR[x],[x1],[x2]>
<^LOGICVIR>	Query the logical virtual screen queue		<LOGICVIR[x],[x1],[x2]>
<^MAP>	Query mapping relationship		<MAP[x],[x1],[x2]>
<^MARGIN>	Query the setting parameters of screen spacing		<MARGIN[x],[x1]>
<#SavePJ[x],[Y]>	Save the current mode of video wall [x] to group [y]		<SavePJ[x],[Y]>
<#RecallPJ[x],[Y]>	Call the saved plan of group [y] of splicing wall [x]	The return code is the same as the window return code	
<#ClearPJ[x],[Y]>	Clear the plan saved in group [y] of splicing wall [x]		<ClearPJ[x],[Y]>
[x]M[x1],[x2]	[x]: Input source [x1]: Splicing wall [x2]: Splicing window	Replace the input source of window [x2]	[x]M[x1],[x2]

6. Operation instructions

6.1. Seamless output card switching

Example 1. Switch the matrix "first input" to "second output", then the key operation is:

Press in sequence	Display printing	Remark
1	1	Select "First Input"
V/M	1V	Press once to switch the matrix V
2	1V2	Select "Second Output"
ENTER	SwitchOK !	Switching completed. If there is no input connected to the card, it will display Notonline!

Example 2. To switch the matrix "first input" to "second output", and "third output", the key operations are:

Press in sequence	Display printing	Remark
1	1	Select "First Input"
V/M	1V	Press once to switch the matrix V
2	1V2	Select "Second Output"
,	1V2,	delimiter
3	1V2,3	Select 'Third Output
ENTER	SwitchOK !	Switching completed. If there is no input connected to the card, it will display Notonline!

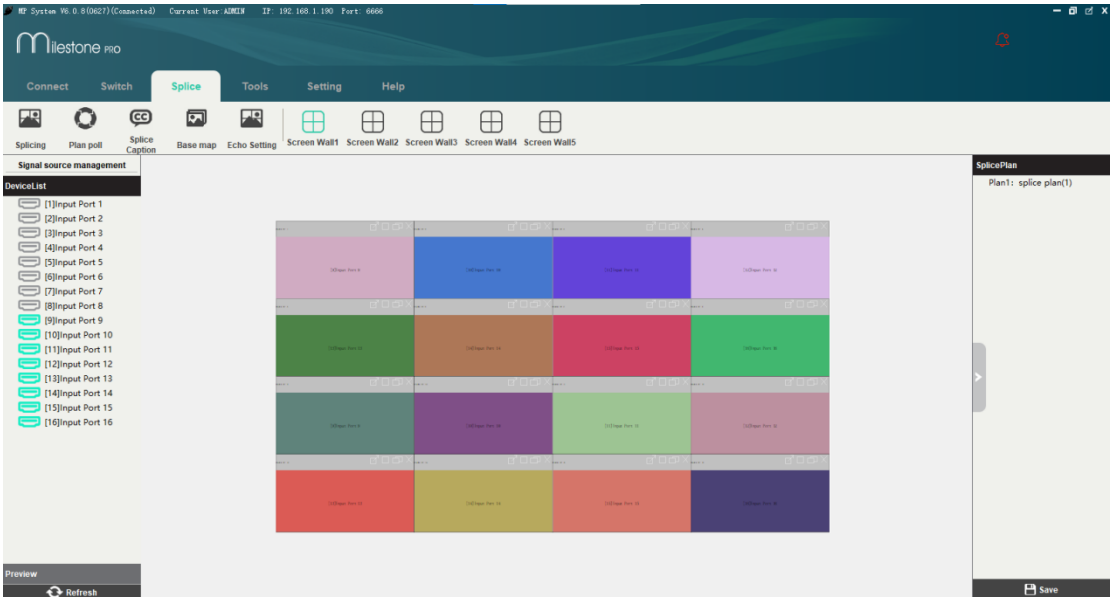
Example 3. Switch the matrix "first input" to "all outputs", then the key operation is:

Press in sequence	Display printing	Remark
1	1	Select "First Input"
ALL	1All.	Switch completed

Note: The above example operation is limited to seamless output card switching.

6.2. Splicing output card switching

Pressing the "V/M" key toggles between seamless ("V") and splicing ("M") output card switching. There are five windows with IDs 1 to 5 on "ScreenWall1."



To display the signal from "Input 1" in "Window ID:5" on "Wall1," press the corresponding key sequence.

Press in sequence	Display printing	Remark
1	1	Select "First Input"
V/M	1V	One press for matrix switching
V/M	1M	One more press for splicing switching.
1	1M1	Select 'Splicing Wall 1
/	1M1/5	Interval
5	1M1/5	Select 'Window ID: 5'
ENTER	SwitchOK !	Switching completed

Note: This operation is limited to switching the splicing output card.

6.3. Save call switching state

To save the current seamless output card switching state and assign it to a number (0-9) for future recall, the key operation is:

Press in sequence	Display printing	Remark
SAVE	SaveSwitchPlan	
2	SaveSwitchSwitchOK !	Successfully saved to 'State 2'

To recall a previously saved seamless output card switching state in the matrix, the key operation is:

Press in sequence	Display printing	Remark
RECALL	RecallSwitchPlan	
2	RecallSwitchSwitchOK !	Successfully saved to 'State 2'

To save the current splicing output card switching state in the matrix, the key operation is:

Press in sequence	Display printing	Remark

SAVE	SaveSwitchPlan	Pressing once saves the seamless output card state
SAVE	SavePJ Wall:Plan:	Pressing again saves the splicing output card state
1	SavePJ Wall:1Plan:	Select 'Splicing Wall 1'
1	SwitchOK ! Wall:1Plan:1	Choose to save in 'Plan1'

To recall a previously saved splicing output card switching state in the matrix, the key operation is:

Press in sequence	Display printing	Remark
RECALL	RecallSwitchPlan	Pressing once saves the seamless output card state
RECALL	RecallPJ Wall:Plan:	Pressing again saves the splicing output card state
1	RecallPJ Wall:1Plan:	Select 'Splicing Wall 1'
1	SwitchOK ! Wall:1Plan:1	Choose to save in 'Plan1'

6.4. Query settings

Query network parameters.

Press in sequence	Display printing	Remark
IP	IPSETTING 192.168.001.190	Show IP address
IP	PORTSETTING 6666	Show port number
IP	GATEWAYSET 192.168.001.001	Show gateway
IP	SubnetMaskSET 255.255.255.000	Show subnet mask

To modify the network parameters and change the IP address from the original 192.168.001.190 to 192.168.001.180, the key operation is:

Press in sequence	Display printing	Remark
IP	IPSETTING 192.168.001.190	Show IP address
◀		Enter edit mode, now the edit cursor is displayed

◀ or ▶		Move the cursor to the desired modification position
8		Input the desired modification value
ENTER	Set Succeed!	Set Succeed!

To change the port number, gateway, and subnet mask, press the "IP" key to enter the interface, and then press ◀ for modification.

Note: Network parameter changes require a restart.

Note: Use the web interface for modifying network parameters; key operations won't apply.

7. Common troubleshooting methods

Malfunction phenomenon	Solutions
Matrix unable to switch	● Check for correct command input. A single beep indicates the device received the correct command and processed it
	● If no response from the device, check wiring. The 'active' indicator on the front panel should blink when data is received.
	● Check if the device is receiving proper power supply.
Matrix output has no image	● Check device ports by sending a scan slot command or using PC software. Functional cards display type (HDMI/DVI, etc.) and firmware version.
	● Check for input signals using scan slot command or PC software. 'No input' will be displayed when there's no signal.
	● No input source, corresponding lights on matrix output won't light up. Check if the display end detects the signal.
	● If no signal is detected, check if the display device works by direct connection. Ensure the display supports the matrix's resolution. If not, change the matrix resolution. Test the matrix directly with a monitor
	● Check if cables are in good condition. Test by using a different video cable
Matrix input has no image	● Verify input signals using scan slot command or PC software. 'No input' indicates no signal
	● If 'no input' is shown, check the monitor for incoming signals. When there's input, the light next to the input port turns red.
	● Please confirm if the resolution of the input device is supported by our matrix (refer to the manual for details).
	● Check cables, test with a different video cable
Stitching output has no image	● Refer to 'No Image on Matrix Output'
	● Check if splicing parameters are correctly set. Follow the sequence of combination, screen mapping, and resolution. Ensure correct mapping of windows to output ports. Refresh the software to confirm.

	● Confirm valid signal for the drawn window's input source.
Video flickers or jitters	● Switch different inputs to a fixed output to identify input or output end issues.
	● Confirm if the interfaces are properly connected.
	● Verify if the cables are in good condition. Test by replacing the cables.
	● Lower resolution for testing. If low resolution is fine but high resolution has issues, replace with a good or shorter cable
The signal is not full	● Switch different input signals to different output devices to confirm if it's an input or output issue
	● If output is not full screen, adjust display ratio on the output device. For VGA, use auto-adjust or adjust matrix resolution.
	● If input is not full screen, adjust input resolution or test directly with the display device to confirm signal source is normal.
	● If there's a black border on the input end, update the matrix's input card EDID: ● Connect a display device that fills the screen. ● Connect it to the matrix's HDMI or DVI output. ● Read EDID from output to input or use software's EDID function. ● EDID function is only for HDMI or DVI.
Image color is abnormal	● Check cables, replace or use a shorter one for testing.
	● Confirm if the display device is functioning properly.
	● If VGA is not working, send commands or use PC software to adjust VGA color parameters
Output audio is abnormal	● Check if the input device audio is normal. When connecting a computer input, ensure the computer's audio is set to digital audio output, which can be checked in the computer's audio properties.
	● Whether the output device supports audio input.
	● When there is no audio on the HDMI input card, please confirm whether the HDMI input is analog or digital. The input can only be analog or digital, and the output supports simultaneous analog and digital input out.

If you need other details, please contact the manufacturer, thank you!