Ultra HD Seamless Mixing Matrix System

User Manual

TS-9472UHM

Please read it carefully before operating the equipment

Notification

WARNING

To ensure the reliability of the equipment and the safety of personnel, please observe the following when installing, using and maintaining:

- If any of the following conditions are found, please immediately turn off the power, plug out and quickly contact your nearest dealer. Do not continue using this unit, which may cause a fire or electric shock.

  - If you find smoke or have a strange taste from the machine.
  - If water or metal falls into the machine.
  - If the unit is dropped or the case is damaged.
  - If the wire is damaged (wire core exposure, broken wire, etc.).

- If the machine contains high-pressure parts, in order to avoid the fire or electric shock, absolutely don't open the case, if any questions please inform your nearest dealer.
- Do not place cups, bowls, vases or metal and other water-filled substances on the unit. Serious spilled liquid may cause a fire or electric shock.

- Never expose the unit to rain and any moisture or water, which may cause electric shock or fire.

- Do not place metal objects or flammable materials from the vents on the machine cover, nor place coins, which may cause fire or electric shock.

- Do not place heavy objects on the unit to avoid personal injury or property damage when the unit is slipping.
- Make sure that the volume is turned on at the beginning of the boot, and the high volume of the boot may cause hearing problems.

- Make sure that the volume is turned on at the beginning of the boot, and the high volume of the boot may cause hearing problems.

- For long-term accumulation of dust to be cleaned, please inform your dealer to regularly clean the machine, so as to avoid damage to the machine or cause a fire.

- The battery must be replaced with the same type of product and the correct installation should be made in order to avoid electrical damage and explosion hazard.

- The product is a Class I device. The device must be well connected to ground. The power plug must be connected to a power outlet with a grounding device to ensure that the equipment is fully grounded.

- This product uses a power plug or appliance input socket as a disconnecting device with the power supply, and must be disconnected if necessary for safety reasons.

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This equipment is only suitable for safe use at altitudes under 2000 meters.

Precautions

1. The installation environment

When installing the unit, in order to ensure the normal cooling of the host, should avoid the poor ventilation of the place or high temperature environment, to avoid direct sunlight.

Recommend to install cabinet or other well-ventilated place indoor. If you use the machine in the outdoors, please pay attention to waterproof, moisture, lightning protection measures.

Avoid installing in a violent place of vibration; do not place other equipment on the machine.

2. To avoid electric shock and fire

Do not touch the hands and the source with wet hands

Do not spill liquid on the machine, so as to avoid short-circuit or fire inside the machine.

Do not place other equipment directly on the top of the unit.

Non-professional service personnel Do not disassemble the unit yourself to avoid damage and electric shock.

3. Transport and handling

The packaging of the machine is designed and tested to ensure that the host will not be accidentally damaged during transport. It is best to use the original packaging when handling the unit.

Do not move the host device between the place or cold or over hot to avoid condensation inside the machine, affecting equipment life.

4. Please follow the warning instructions on this product, the warning signs on behalf of:

	Applicable to 2000 meters above sea level and below safe use
	Safe use only in non-tropical climates

5. Agreement

Please strictly follow the instructions in this manual. The software, hardware and appearance of this product will be upgraded and updated continually. The above changes will be made without notice.

Non-professional maintenance personnel, do not remove the product, to avoid damage and electric shock.

Foreword

This user manual mainly introduces the operation method of TS-9472UHM and its board, main performance parameters and common troubleshooting methods.

This manual is only for user operation instructions and is not for maintenance service purposes. From the date of issue, if there is any change in the function or related parameters, additional explanations will be provided. For more details, please refer to the manufacturer or distributors..

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Chapter 1. Introduction

TS-9472UHM is a matrix switcher with high configuration flexibility. It adopts high-performance hardware, supports all kinds of HD digital/analog signal switching. It provides a one-stop solution to multiple video and control signal distribution and processing in places like broadcasting and TV station, multimedia conference hall, large screen display project, TV teaching, command center, etc.

TS-9472UHM supports direct signal input and output including HDMI, DVI, VGA, CVBS, YPbPr, SDI. It also provides twisted-pair (HDBaseT) input and output cards. By using of twisted-pair transmitter, it can realize the transmitting distance extended to 150M. Besides, it provides Fiber input and output card, which can realize the transmitting distance up to 300M together with Fiber transmitter. It can also make the transmitting distance to 20KM by using single-mode Fiber transmitter. TS-9472UHM adopts fully digital signal processing technology, ensures the signal without distortion and transmits top-quality image to display equipment.

1.1 Product Equipment

The intelligent HD mixing matrix can consist of any of the following input and output cards:

- Input cards: TS-9404HI、TS-9404DI、TS-9404CI、TS-9404HBI、TS-9404HBI-M、TS-9404FI、TS-9404SI
- Output cards: TS-9404HO、TS-9404DO、TS-9404CO、TS-9404HBO、TS-9404HBO-M、TS-9404FO、TS-9404SO

Required card：

- TS-9404CON control card (standard)

1.2 Features

1. Standardized chassis design, can be installed in the cabinet, support 72×72 signal switching.
2. Modular design, 4-ch signal for one card, support HDMI, DVI, VGA, CVBS, SDI, HDBaseT, optical fiber of any input / output signal card, and can be matched as required to improve system flexibility.
3. Matrix of single interface type or multi-interface type can be available by customized configuration of various types of the same or different input and output cards , such as HDMI matrix, DVI matrix, VGA matrix, YUV matrix, Video matrix.
4. Support user-defined output resolution , up to 1080P.
5. Support seamless switching function, no black screen signal when switching .

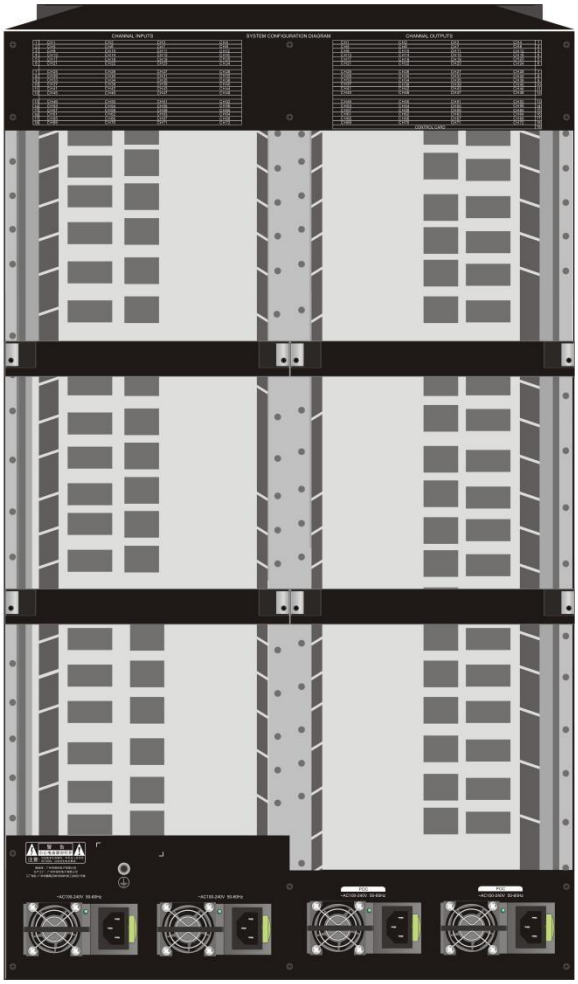
6. The control mode is flexible, support RS-232, RS-485, mobile phone APP, and one port or website control mode, matrix switching can be controlled through the remote KVM keyboard based on HDBaseT/fiber.
7. Supports switch through PC software control.
8. Supports power-off memory function.
9. Support audio and video signal synchronization switch, in quick switching response.
10. Support analog audio and HDMI embedded audio input for option.
11. Support simultaneous output of analog audio and HDMI embedded audio.
12. HDBaseT input and output signals support bidirectional RS-232 and bi-directional IR signal transmission, and can switch RS-232 and IR signals independently.

Chapter 2. Hardware Description

Design Sketch

Front panel:

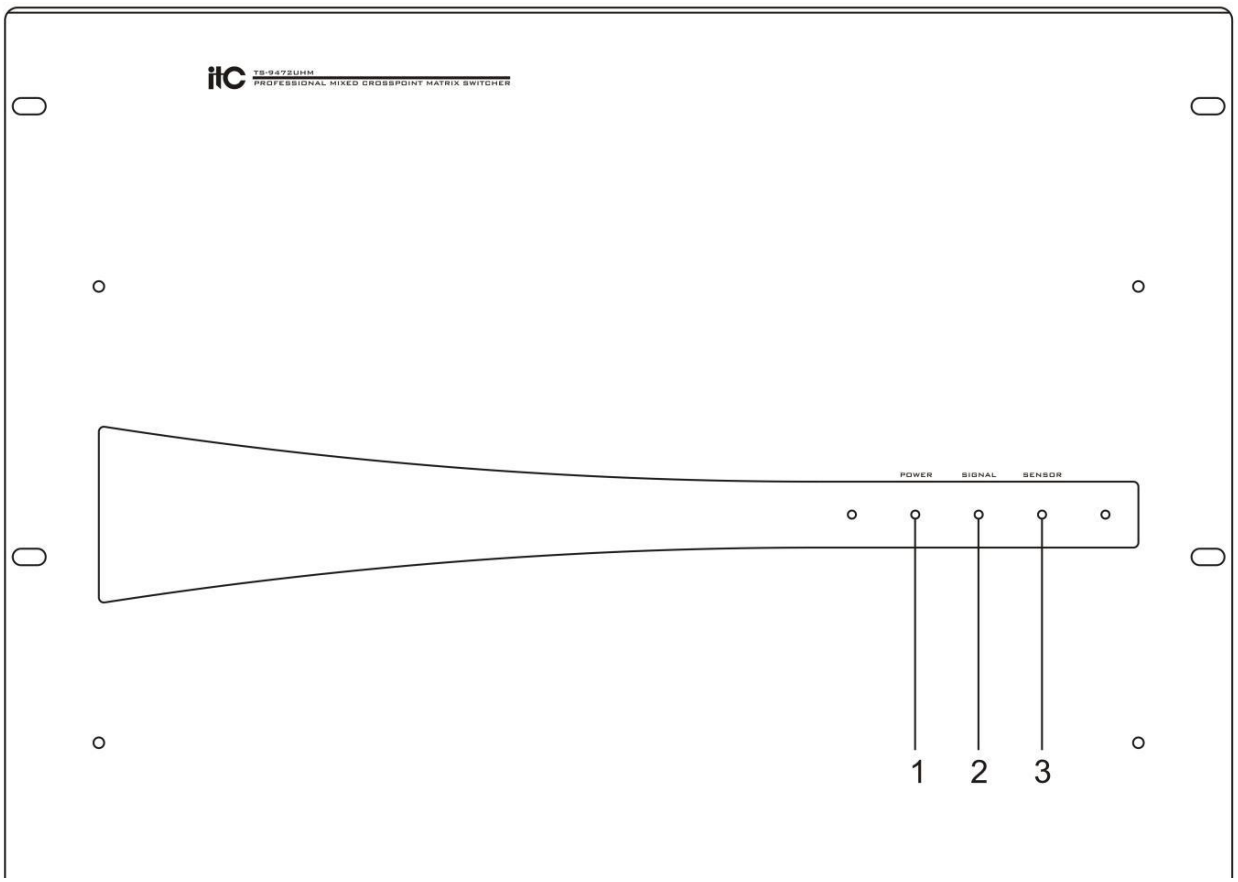
Rear Panel:



Chapter 3. Control Panel Operation Instructions

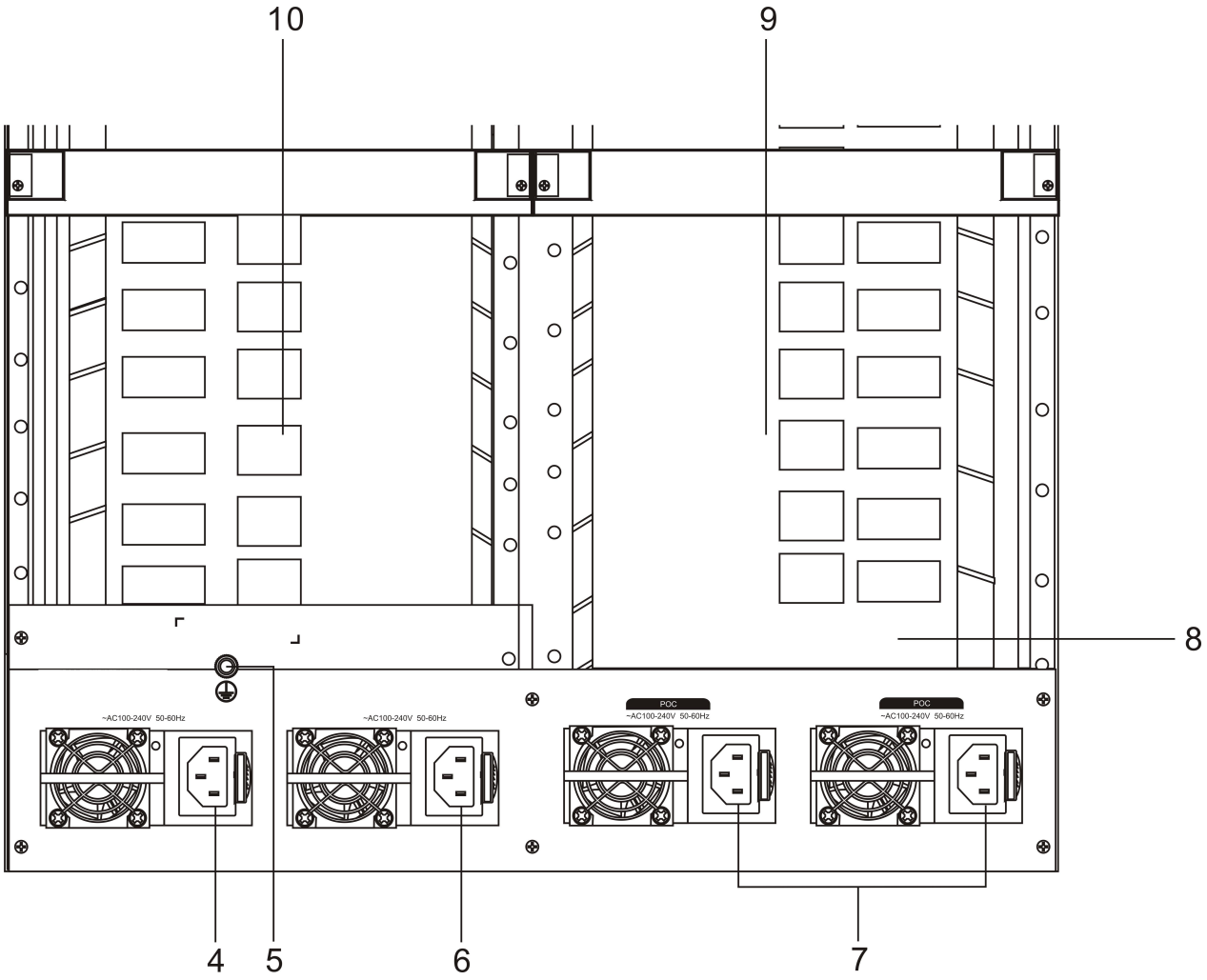
3.1 Matrix panel description

Front panel of TS-9472UHM:



1. Power light.
2. Signal status indicator light.
3. Infrared sensor receiving window （optional functions）.

Back panel of TS-9472UHM:



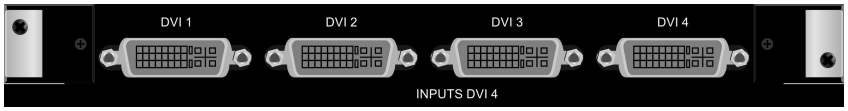
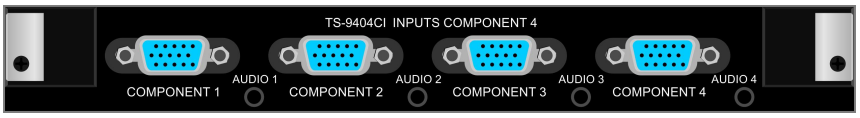
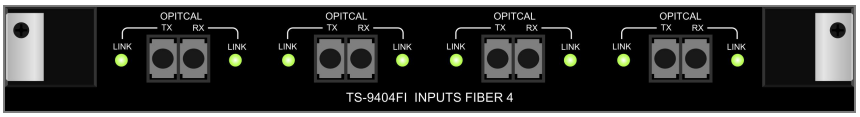
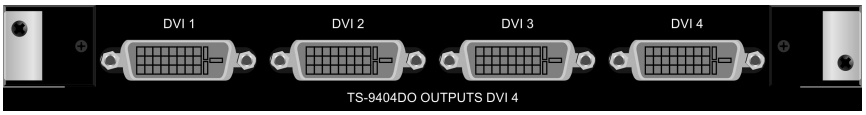
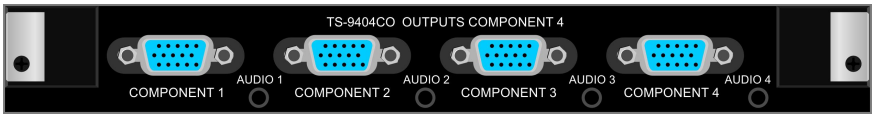
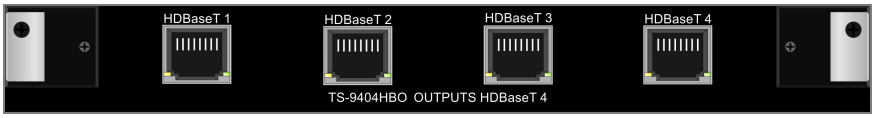
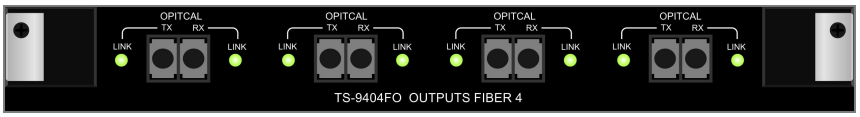
4. AC power input socket .
5. Grounding column.
6. Redundant power input socket.
7. POC power input socket .
8. RS485 / RS232 / TCP Matrix control pan.
9. Output card insertion area.
10. Input card insertion area.

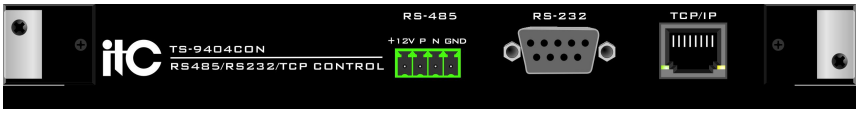
3.2 Host technical parameters

Technical specifications / Model	TS-9472UHM
Number of input cards or channesl	18/72
Number of output cards or channesl	18/72
Support input card type	TS-9404HI、TS-9404DI、TS-9404CI、TS-9404HBI、TS-9404HBI-M、TS-9404FI、TS-9404SI
Support output card type	TS-9404HO、TS-9404DO、TS-9404CO、TS-9404HBO、TS-9404HBO-M、TS-9404FO、TS-9404SO
Serial port control	
Serial Control Interface	RS-232，9-pin female D-type connector
Baud rate and protocol	Baud rate：9600，Data bits：8 bits，Stop bit：1，No parity bit
Serial control port structure	2=TX，3=RX，5=GND
Ethernet control	
Ethernet control interface	RJ-45 main interface
Ethernet control protocol	TCP/IP
Ethernet control rate	Self-adaption10M/100M，Full or half duplex
Specification	
Power supply	~220-240V 50-60Hz，International adaptive power supply
Storage, usage temperature	-20°～+70°C
Storage, usage humidity	10%～90%
Chassis size	484(L)×712(W)×356(H)mm
Product weight	36Kg(NO Insert I/O board)
Maximum power consumption (IO card with maximum power consumption)	600W
Mean time between failures	30,000 hours
Warranty	1 year free warranty, lifetime maintenance

Chapter 4. input, output board description

4.1 board type

Model /Name	Product Design Sketch
TS-9404HI Input board	
TS-9404DI Input board	
TS-9404CI Input board	
TS-9404HBI Input board	
TS-9404FI Input board	
TS-9404SI Input board	
TS-9404HO output board	
TS-9404DO output board	
TS-9404CO output board	
TS-9404HBO output board	
TS-9404FO output board	
TS-9404SO output board	

TS-9404CON control board	

4.2 Input board

4.2.1 TS-9404HI 4-Channel HDMI HD Seamless Input board Features

1. Support 4 channels HDMI-A female interface seamless input, 3.5mm audio seat;
2. Quick and seamless switching, no flicker, no black screen;
3. Power off-site switching memory protection function, unique ESD electrostatic protection function;
4. Support hot swap, support audio and video signals to switch;
5. Support analog audio and HDMI embedded audio selection input;
6. Enter the longest distance up to 20M (Recommended to use certified HDMI wire, such as Molex TM wire, according to the different cable quality transmission distance varies);
7. Compatible with HDMI1.3a standard, HDCP1.3 protocol, DVI1.0 protocol;
8. Perfect display of 1920×1080P@60Hz HD image, maximum support resolution:
   HDPC: 1920X1200P@60_24bit;
   HDTV: 1920X1080p@60_36bit;
9. Simple installation, plug and play, extremely convenient.

4.2.2 TS-9404DI 4-Channel DVI video signal input board Features

1. Support 4-Channel DVI-I female interface seamless input;
2. Quick and seamless switching, no flicker, no black screen;
3. Power off-site switching memory protection function, unique ESD electrostatic protection function;
4. Support hot swap;
5. Compatible with HDMI1.3a standard, HDCP1.3 protocol, DVI1.0 protocol;
6. Perfectly display 1920×1080P@60Hz HD image, maximum support resolution:
   HDPC: 1920X1200P@60_24bit;
   HDTV: 1920X1080p@60_36bit;
7. Easy to install, plug and play, extremely convenient.

4.2.3 TS-9404CI 4-Channel Component Video Input board Features

1.4-channel DB15 interface seamless input, 3.5mm audio seat;
2. Quick and seamless switching, no flicker, no black screen;
3. Power off-site switching memory protection function, unique ESD electrostatic protection function;
4. Support hot swap, support audio and video signals to switch;
5. Select DVI, VGA, CVBS, YPbPr any kind of signal input;

6. The maximum supported resolution: HDPC: 1920x1200P@60_24bit;

HDTV: 1920x1080P@60_36bit;

7. Easy to install, plug and play, extremely convenient.

4.2.4 TS-9404HBI/TS-9404HBI-M 4 channel HDBaseT input board card function Features

1. Support 4-Channel high-speed RJ45 interface input;

2. Quick and seamless switch, no flicker, no black screen;

3. On-site witching memory protection function at power-off , with special ESD electrostatic protection function;

4. Support hot plug, and support audio and video signals to switch together;

5. Support infrared serial port input,can realize infrared serial port switching;

6. Use CAT5e/6 wire input TS-9404HBI longest distance up to 100M; TS-9404HBI-M longest distance up to 70M;

7. Compatible with HDBaseT protocol;

8. Maximum support resolution: HDPC:1920X1200P@60_24bi;

HDTV: 1920 x1080p @ 60 _36bit;

9. Easy to installation, plug and play, extremely convenient.

4.2.5 TS-9404FI 4-Channel Optical Input Board Card Features

1. Support 4-Channel high-speed two-core LC fiber interface input.

2. Supports the highest resolution up to 1080P;

3. Quick and seamless switching, no flicker, no black screen;

4. On-site witching memory protection function at power-off

5. Support hot plug, support audio and video signal to switch together;

6. Support infrared serial port input, can achieve infrared serial port switching;

7. Applicable LC two-core single and multi-mode optical fiber technology, transmission distance up to 20 kilometers;

8. All-digital zero-compression technology using high-performance signal transmission;

9. Enter the maximum support resolution: HDPC:1920x1200P@60_24bit;

HDTV: 1920x1080P@60_36bit;

10. Easy to installation, plug and play, extremely convenient.

4.2.6 TS-9404SI 4-Channel SDI input board Features

1. Supports 4-channel SDI video signal input.

2. Bandwidth up to 19Mbps to 2.97Gbps.

3. Quick and seamless switching, no flicker, no black screen.

4. Support power-off field switching memory protection.

5. Use SYV75-5 wire to input the longest distance up to 100M at 1920x1080p30Hz

(recommended to use certified special wire).

6. Compatible with various formats of SDI signals, including: SD/HD/3G-SDI (Adaptive).
7. Maximum support resolution 1080P, fully compatible with HDTV.
8. Easy to install, plug and play, extremely convenient.

4.3 Output Board Card

4.3.1 TS-9404HO 4-Way HDMI HD Seamless Board Features

1. Support 4-channel HDMI-A female interface seamless output, 3.5mm audio seat;
2. Quick and seamless switching, no flicker, no black screen;
3. On-site switching memory protection function at power-off, with special ESD protection;
4. Support hot plug, support audio and video signal to switch together;
5. Support simultaneous output of analog audio and HDMI embedded audio;
6. It is recommended that the maximum output distance is less than 10 meters at 1920x1200@60 hours (recommended to use certified HDMI special cable, such as Molex TM cable, different transmission distance varies depending on the quality of the cable)
7. Compatible with HDMI1.3a standard, HDCP1.3 protocol, DVI1.0 protocol;
8. Perfectly displaying 1920×1080P@60Hz HD image, maximum support resolution:
   HDPC: 1920X1200P@60_24bit;
   HDTV: 1920X1080p@60_36bit;
9. Plug and play, extremely convenient.

4.3.2 TS-9404DO 4-Way DVI Video Signal Output Board Card Features

1. Support 4-channel DVI-D female interface seamless output;
2. Quick and seamless switching, no flicker, no black screen;
3. On-site switching memory protection function at power-off, with special ESD protection;
4. Support hot plug;
5. It is recommended that the maximum output distance is less than 10 meters at 1920x1200@60 hours (recommended to use certified DVI special cable, such as Molex TM cable, different transmission distance varies depending on the quality of the cable)
6. Compatible with HDMI1.3a standard, HDCP1.3 protocol, DVI1.0 protocol;
7. Perfectly displaying 1920×1080P@60Hz HD image with maximum support resolution:
   HDPC: 1920X1200P@60_24bit;
   HDTV: 1920X1080p@60_36bit;
8. Plug and play, extremely convenient.

4.3.3 TS-9404CO 4-Way Component Video Output Board Card Features

1. Support 4-channel DB15 interface seamless output, 3.5mm audio seat.
2. Can choose any VGA, CVBS, YPbPr signal output.
3. Quick and seamless switching, no flicker, no black screen;
4. On-site switching memory protection function at power-off, unique ESD protection;
5. Support hot plug, support audio and video signal to switch together;
6. Support analog audio output;
7. Perfectly displaying 1920×1080P@60Hz HD image with maximum support resolution:
   HDPC: 1920X1200P@60;
   HDTV: 1920X1080p@60;
8. Plug and play, extremely convenient.

4.3.4 TS-9404HBO/TS-9404HBO-M 4-channel HDBaseT output board Features

1. Support 4-way high-speed RJ45 interface output;
2. Quick and seamless switching, no flicker, no black screen;
3. Power off-site switching memory protection function, unique ESD electrostatic protection function;
4. Support hot swap, support audio and video signals to switch;
5 support infrared serial output, infrared serial port can be switched;
6. Use CAT5e/6 wire output TS-9404HBO longest distance up to 100M, TS-9404HBO-M longest distance up to 70M;
7. Compatible with HDBaseT protocol;
8. The maximum supported resolution: HDPC: 1920X1200P@60_24bit;
   HDTV: 1920x1080p@60_36bit;
9. Simple installation, plug and play, extremely convenient.

4.3.5 TS-9404FO 4-Channel Optical fiber output board Features

1.Support 4-way high-speed two-core LC fiber interface output;
2. Supports the highest resolution up to 1080P;
3. Quick and seamless switching, no flicker, no black screen;
4. On-site switching memory protection function at power failure;
5. Support hot swap, support audio and video signal switching;
6. Support infrared serial output, can achieve infrared serial port switching;
7. Applicable LC two-core single and multi-mode optical fiber technology, transmission distance up to 20 kilometers;
8. Using full digital zero compression technology with high-performance signal transmission;
9. Output maximum support resolution: HDPC: 1920x1200P@60_24bit;
HDTV: 1920x1080P@60_36bit;
10. Easy to install, plug and play, extremely convenient.

4.3.6 TS-9404SO 4 Channel SDI output board Features

1. Supports 4-channel SDI video signal output.
2. Bandwidth up to 19Mbps to 2.97Gbps.
3. Quick and seamless switching, no flicker, no black screen.
4. Support power-off field switching memory protection.
5. Use SYV75-5 wire to output the longest distance up to 100M (recommended to use certified special wire).
6. Compatible with various formats of SDI signals, including: SD/HD/3G-SDI (Adaptive).
7. Maximum support resolution 1080P, fully compatible with HDTV.
8. Easy to install, plug and play, extremely convenient.

4.4 Control board

TS-9404CON Matrix Control Card Features

1. Support RS232 control matrix
2. Support network port control matrix
3. Support RS485 control matrix

4.5 Technical specifications of each board

Model	**TS-9404HI**
Protocol	Support the standard of HDMI1.3a, protocol of HDCP1.3 and DVI1.0
Pixel bandwidth	165MHz, Full digital
Interface bandwidth	6.75Gbp, Full digital
Maximum resolution supported	Normal-PC： 1600x1200@60_24bit
	HDPC: 1920x1200P@ 60_24bit
	HDTV：1920x1080P@60_36bit
Clock Jitter	<0.15 Tbit
Risetime	<0.3Tbit (20%--80%)
Falltime	<0.3Tbit (20%--80%)
Maximum transmission delay	5nS(±1nS)
Signal type	HDMI-A all-digital T.M.D.S. Signal in the specification of HDMI 1.4
Interface	4-Way HDMI-A female interface, 4-Channel 3.5mm audio jack
Signal intensity	T.M.D.S +/- 0.4Vpp
Min/max electrical level	T.M.D.S 2.9V/3.3V
Maximum DC bias error	15mV
Maximum power consumption	15W
Product weight	0.5Kg
Suggested input distance≤	20 meters

Model	**TS-9404HO**
Protocol	Support HDMI1.3a protocol, HDCP1.3 protocol, DVI1.0 protocol
Pixel bandwidth	165MHz, Full digital
Interface bandwidth	6.75Gbp, Full digital
Maximum resolution supported	Normal-PC： 1600x1200@60_24bit
	HDPC: 1920x1200P@ 60_24bit
	HDTV：1920x1080P@60_36bit
Clock Jitter	<0.15 Tbit
Risetime	<0.3Tbit (20%--80%)
Falltime	<0.3Tbit (20%--80%)
Maximum transmission delay	5nS(±1nS)
Signal type	HDMI-A all-digital T.M.D.S. Signal in the specification of HDMI 1.4
Signal intensity	T.M.D.S +/- 0.4Vpp
Interface	4-Way HDMI-A female interface, 4-Channel 3.5mm audio jack
Min/Max electrical level	T.M.D.S 2.9V/3.3V
Maximum DC bias error	15mV
Maximum power consumption	15W
Product weight	0.5Kg
Suggested input distance≤	10 meters

Model	**TS-9404DI**
Protocol	Compatible with HDMI1.3a standard, HDCP1.3 protocol, and DVI1.0 protocol.
Pixel bandwidth	165MHz, Full digital
Interface bandwidth	6.75Gbp, Full digital
Maximum resolution supported	HDPC: 1920x1200P@ 60_24bit
	HDTV：1920x1080P@60_36bit
Clock Jitter	<0.15 Tbit
Risetime	<0.3Tbit (20%--80%)
Falltime	<0.3Tbit (20%--80%)
Maximum transmission delay	5nS(±1nS)
Signal type	CVBS、VGA、YPbPr、DVI Any signal can be input
Interface	4-Way DVI-I female interface
Signal intensity	T.M.D.S +/- 0.4Vpp
Min/Max electrical level	T.M.D.S 2.9V/3.3V
Maximum DC bias error	15mV
Maximum power consumption	15W
Product weight	0.5Kg

Model	**TS-9404DO**
Protocol	Support HDMI1.3a protocol, HDCP1.3 protocol, DVI1.0 protocol.
Pixel bandwidth	165MHz, Full digital
Interface bandwidth	6.75Gbp, Full digital
Maximum resolution supported	Normal-PC： 1600x1200@60_24bit
	HDPC: 1920x1200P@ 60_24bit
	HDTV：1920x1080P@60_36bit
Clock Jitter	<0.15 Tbit
Risetime	<0.3Tbit (20%--80%)
Falltime	<0.3Tbit (20%--80%)
Maximum transmission delay	5nS(±1nS)
Signal type	DVI-D Full Digital T.M.D.S. Signals in the DVI 1.0 Specification
Signal intensity	T.M.D.S +/- 0.4Vpp
Interface	4-Way DVI-D female interface
Min/Max electrical level	T.M.D.S 2.9V/3.3V
Maximum DC bias error	15mV
Maximum power consumption	15W
Product weight	0.5Kg
Suggested input distance≤	10 meters

Model	**TS-9404CI**
Interface	4-Way DB15 interface input, 4-Channel 3.5mm audio jack
Composite Video CV	
Gain	0dB
Bandwidth	150MHz @ -3dB
Differential phase error	0.1°,3.58-4.43 MHz
Differential gain error	0.1% , 3.58-4.43 MHz
Signal intensity	1Vpp : Composite video（CVBS）
Min/Max electrical level	Analog signal: -2V/+2V
Input resistance	75 Ω
Return loss	<-30dB@5MHz
Y/C video	
Gain	0dB
Bandwidth	150MHz @ -3dB
Differential phase error	0.1°,3.58-4.43 MHz
Differential gain error	0.1% , 3.58-4.43 MHz
Signal intensity	1Vpp : Composite video（CVBS）
Min/Max electrical level	Analog signal: -2V/+2V
Input resistance	75 Ω
Return loss	<-30dB@5MHz

Component video YPbPr	
Gain	0dB
Bandwidth	150MHz @ -3dB
Differential phase error	0.1°,3.58-4.43 MHz
Differential gain error	0.1% , 3.58-4.43 MHz
Signal intensity	1Vpp：S Terminal video(Y/C)
Min/Max electrical level	Analog signal: -2V/+2V
Input resistance	75 Ω
Return loss	<-30dB@5MHz
VGA video	
Gain	0dB
Bandwidth	380 MHZ
Signal intensity	0.63Vpp to 0.9 Vpp
Min/Max electrical level	RGB signal:0V/1.0V
	HV signal：0V/5.0V
Input resistance	75 Ω
Return loss	<-30dB@5MHz
Other	
Maximum power consumption	28W
Product weight	0.7Kg

Model	**TS-9404CO**
Interface	4-Way DB15 interface output
Composite video CV	
Gain	0dB
Bandwidth	150MHz @ -3dB
Differential phase error	0.1°,3.58-4.43 MHz
Differential gain error	0.1% , 3.58-4.43 MHz
Signal intensity	1Vpp : Composite video（CVBS）
Min/Max electrical level	Analog signal: -2V/+2V
Input resistance	75 Ω
Return loss	<-30dB@5MHz
Component video YPbPr	
Gain	0dB
Bandwidth	350MHz @ -3dB
Differential phase error	0.1°,3.58-4.43 MHz
Differential gain error	0.1% , 3.58-4.43 MHz
Signal intensity	1Vpp：（Y in component video）
	0.3Vpp：(Pb Pr/CbCr in component video)
Min/Max electrical level	Analog signal：-2V/+2V
Input resistance	75 Ω
Return Loss	<-30dB@5MHz

VGA Video	
Gain	0dB
Bandwith	380 MHZ
Signal intensity	0.63Vpp to 0.9 Vpp
Min/Max electrical level	RGB signal：0V/1.0V
	HV signal：0V/5.0V
Input resistance	75 Ω
Return loss	<-30dB@5MHz
VGA Synchronization signal	
Input/output signal type	RGBHV、RGBS、RGsB、RsGsBs
Maximum transmission delay	Level : 90ns Vertical: 160ns
Maximum rise/fall time	4ns
Other	
Maximum power consumption	15W
Product weight	0.5Kg

Model	**TS-9404HBI**
Interface	4-Way high-speed RJ45 seat
Protocol	HDBaseT protocol
Pixel bandwidth	165MHz, Full digital
Interface bandwidth	2.25Gbps, Full digital
Maximum resolution supported	Normal-PC： 1600x1200@60_24bit
	HDPC: 1920x1200P@ 60_24bit
	HDTV：1920x1080P@60_36bit
Signal type	High-speed differential signals defined in the HDBaseT protocol
Network cable power supply	It has POE power supply function, which can provide remote power supply for TS-9506 series twisted pair transmitter.It makes the system wiring easy
Maximum DC bias error	15mV
Specifications	
Maximum power consumption	26W
Product weight	0.5Kg
Recommended maximum input distance	The maximum distance is 100 meters at 1600x1200@60 (NEXANS CAT5e/6 wire is recommended)

Model	**TS-9404HBO**
Interface	4-Way high-speed RJ45 seat
Pixel bandwidth	165MHz, Full digital
Interface bandwidth	2.25Gbps, Full digital
Maximum resolution supported	Normal-PC：1600x1200@60_24bit
	HDPC: 1920x1200P@ 60_24bit

	HDTV：1920x1080P@60_36bit
Signal type	High-speed differential signals defined in the HDBaseT protocol
Network cable power supply	It has POE power supply function, which can provide remote power supply for TS-9506 series twisted pair transmitter.It makes the system wiring easy.
Maximum DC bias error	15mV
Specification	
Maximum power consumption	21W
Product weight	0.5Kg
Maximum input distance	100 meters

Model	**TS-9404FI**
Input	4-Way fiber signal (two-core single and multi-mode)
Input connector	Two-core LC fiber interface
Transmission power	-5dB (Standard)
Maximum loss	13dB
Wavelength	Multimode 850nm/Single Mode: 1310-1620nm(可选)
Multimode fiber specifications	50/125 μ m
Single-mode fiber specifications	9/125 μ m
Interface bandwidth	3.25Gbps，Full digital
Clock Jitter	<0.15 Tbit
Risetime	<0.3Tbit (20%--80%)
Falltime	<0.3Tbit (20%--80%)
Recommended maximum input distance	OM3 multimode fiber: less than 500 meters, single mode fiber: 2~20 kilometers
Specification	
Maximum power consumption	8W
Product weight	0.5Kg

Model	**TS-9404FO**
Output	4-Way fiber signal (two-core single and multi-mode)
Output connector	Two-core LC fiber interface
Transmission power	-5dB(Standard)
Maximum loss	13dB
Wavelength	Multimode 850nm / Singlemode 1310-1620nm (optional)
Multimode fiber specifications	50/125 μ m
Single-mode fiber specifications	9/125 μ m
Interface bandwidth	3.25Gbps，Full digital
Clock Jitter	<0.15 Tbit
Risetime	<0.3Tbit (20%--80%)
Falltime	<0.3Tbit (20%--80%)

Recommended maximum output distance	OM3 multimode fiber: less than 500 meters, single mode fiber: 2~20 kilometers
Specification	
Maximum power consumption	8W
Product weight	0.5Kg

Model	**TS-9404SI**
Input	4-way SDI signal
Interface	Female port BNC connector
Gain	0db
Locked rate	Automatic
Operating standard	SMPTE 292M,SMPTE 259M,SMPTE 242M,ITU-RBT.601
	ITU-RBT.1120
Input return loss	<-14 dB @ 1MHz ~ 1.5GHz
Output return loss	<-12 dB @ 1MHz ~ 1.5GHz
Maximum rate	2.97Gbps
Type of data	8 or 10bit
Input and output electrical levels	0.80Vp-p+/- 10%
Input and output resistance	75 Ω
Balanced type	Automatic
Maximum input distance	100 meters
Specification	
Consumption	10W
Product weight	0.8Kg

Model	**TS-9404SO**
Output	4-Way SDI signal
Interface	Female port BNC connector
Gain	0db
Locked rate	Automatic
Operating standard	SMPTE 292M,SMPTE 259M,SMPTE 242M,ITU-RBT.601
	ITU-RBT.1120
Input return loss	<-14 dB @ 1MHz ~ 1.5GHz
output return loss	<-12 dB @ 1MHz ~ 1.5GHz
Maximum rate	2.97Gbps
Type of data	8 or 10bit
Input and output electrical levels	0.80Vp-p+/- 10%
Input and output resistance	75 Ω
Balanced type	Automatic
Maximum output distance	100 meters
Specification	
Consumption	10W
Product weight	0.8Kg

4.6 HDMI high definition seamless card instruction classification description

Serial debug assistant

Serial port protocol:

Baud rate：9600bps.

Data bit：8bits

Stop bit：1bit

Check bit：NO

Flow control：NO

Note: must be used with the main output card.

ASCII instruction (Computer to matrix)	Command function	Return(matrix to Computer)	Illustration
[X1],[X2]SETIN.	Open the input card to set the function,Setting up the [X1], [X2] channel	<Set Succeed!>	1,2SETIN.
01C02	Set to external audio input	<Set Succeed!>	01C02
03C02	Set to internal audio input	<Set Succeed!>	03C02

Note: must be used with the main output card.

ASCII instruction (Computer to matrix)	Command function	Return(matrix to Computer)	For example
/:ScanPortType;	Check card type and information	<In/37/HDMI/1920x1080@60HZ/V1.0>	/:ScanPortType;
[X1],[X2]SETOUT.	Open the component output card to set the function,Setting the [X1], [X2] channel	<Set Succeed!>	1,2SETOUT.
01C08.	The output video resolution is set to 1024 X 768@60Hz	<Set Succeed!>	01C08.
02C08.	The output video resolution is set to 1280 X 720@60Hz	<Set Succeed!>	02C08.
03C08.	The output video resolution is set to 1280 X 1024@60Hz	<Set Succeed!>	03C08.
04C08.	The output video resolution is set to 1366 X 768@60Hz	<Set Succeed!>	04C08.
05C08.	The output video resolution is set to 1400 X 1050@60Hz	<Set Succeed!>	05C08.
07C08.	The output video resolution is set to 1440 X 900@60Hz	<Set Succeed!>	07C08.
08C08.	The output video resolution is set to 1600 X 1200@60Hz	<Set Succeed!>	08C08.
09C08.	The output video resolution is set to 1680 X 1050@60Hz	<Set Succeed!>	09C08.

11C08.	The output video resolution is set to 1920 X 1080@60Hz	<Set Succeed!>	11C08.

4.7 Classified description of DVI video signal card

ASCII instruction (Computer to matrix)	Command function	Return(matrix to Computer)	Illustration
TS-9404DI			
/:ScanPortType;	Check card type and information	<Port/StartScanning> <In/001/Not online!> <In/002/Not online!> <In/003/Not online!> <In/004/Not online!>	/:ScanPortType;
[X1],[X2]SETIN.	Open the component output card to set the function,Setting the [X1], [X2] channel	<Set Succeed!>	1,2SETIN.
01C02.	CVBS input	<Set Succeed!>	01C02.
03C02.	YPbPr input	<Set Succeed!>	03C02.
05C02.	VGA input	<Set Succeed!>	05C02.
06C02.	HDMI/DVI input	<Set Succeed!>	06C02.
08C15.	Automatic adjustment (only for VGA input)	<Set Succeed!>	08C15.

Note: must be used with the main output card.

ASCII instruction (Computer to matrix)	Command function	Return(matrix to Computer)	Illustration
/:ScanPortType;	Check card type and information	<In/37/DVI/1920x1080@60HZ/V1.0>	/:ScanPortType;
[X1],[X2]SETOUT.	Open the component output card to set the function,Setting the [X1], [X2] channel	<Set Succeed!>	1,2SETOUT.
Output resolution setting			
01C08.	The output video resolution is set to 1024 X 768@60Hz	<Set Succeed!>	01C08.
02C08.	The output video resolution is set to 1280 X 720@60Hz	<Set Succeed!>	02C08.
03C08.	The output video resolution is set to 1280 X 1024@60Hz	<Set Succeed!>	03C08.
04C08.	The output video resolution is set to 1366 X 768@60Hz	<Set Succeed!>	04C08.

05C08.	The output video resolution is set to 1400 X 1050@60Hz	<Set Succeed!>	05C08.
07C08.	The output video resolution is set to 1440 X 900@60Hz	<Set Succeed!>	07C08.
08C08.	The output video resolution is set to 1600 X 1200@60Hz	<Set Succeed!>	08C08.
09C08.	The output video resolution is set to 1680 X 1050@60Hz	<Set Succeed!>	09C08.
11C08.	The output video resolution is set to 1920 X 1080@60Hz	<Set Succeed!>	11C08.

4.8 Classification and description of component video card instruction

Note: must be used with the main input card.

ASCII instruction (Computer to matrix)	Command function	Return(matrix to Computer)	Illustration
Component configuration function configuration			
[X1],[X2]SETOUT.	Open the component input card setting function, which is effective for [X1] and [X2] channels.	<Set Succeed!>	1,2SETOUT.
1EXITSET.	Closing the function of the component input and output card	<Set Succeed!>	1EXITSET.
Board component output video format selection (you must first open the card settings function)			
01C02.	Component output is selected as CVBS video	<Set Succeed!>	01C02.
03C02.	Component output is selected as YPbPr video	<Set Succeed!>	03C02.
05C02.	Component output is selected as VGA video	<Set Succeed!>	05C02.
Component input card resolution setting (You must first open the card setting function)			
01C08.	The output video resolution is set to 1024 X 768@60Hz	<Set Succeed!>	01C08.
02C08.	The output video resolution is set to 1280 X 720@60Hz	<Set Succeed!>	02C08.
03C08.	The output video resolution is set to 1280 X 1024@60Hz	<Set Succeed!>	03C08.
04C08.	The output video resolution is set to 1366 X 768@60Hz	<Set Succeed!>	04C08.
05C08.	The output video resolution is set to 1400 X 1050@60Hz	<Set Succeed!>	05C08.
07C08.	The output video resolution is set to 1600 X 900@60Hz	<Set Succeed!>	07C08.
08C08.	The output video resolution is set to 1600 X	<Set Succeed!>	08C08.

	1200@60Hz		
09C08.	The output video resolution is set to 1680 X 1050@60Hz	<Set Succeed!>	09C08.
11C08.	The output video resolution is set to 1920 X 1080@60Hz	<Set Succeed!>	11C08.

4.9 Classified description of HDBaseT card instruction

Serial debug assistant

Serial port protocol:

Baud rate：9600bps.

Data bit：8bits

Stop bit：1bit

Check bit：NO

Flow control：NO

Note: must be used with the main output card.

ASCII instruction (Computer to matrix)	Command function	Return(matrix to Computer)	Illustration
/:ScanPortType;	Check card type and information	<In/37/HDMI/1920x1080@60HZ/V1.0>	/:ScanPortType;
[X1],[X2]SETOUT.	Open the component output card to set the function,Setting the [X1], [X2] channel	<Set Succeed!>	1,2SETOUT.
01C08.	The output video resolution is set to 1024 X 768@60Hz	<Set Succeed!>	01C08.
02C08.	The output video resolution is set to 1280 X 720@60Hz	<Set Succeed!>	02C08.
03C08.	The output video resolution is set to 1280 X 1024@60Hz	<Set Succeed!>	03C08.
04C08.	The output video resolution is set to 1366 X 768@60Hz	<Set Succeed!>	04C08.
05C08.	The output video resolution is set to 1400 X 1050@60Hz	<Set Succeed!>	05C08.
07C08.	The output video resolution is set to 1440 X 900@60Hz	<Set Succeed!>	07C08.
08C08.	The output video resolution is set to 1600 X 1200@60Hz	<Set Succeed!>	08C08.
09C08.	The output video resolution is set to 1680 X 1050@60Hz	<Set Succeed!>	09C08.

11C08.	The output video resolution is set to 1920 X 1080@60Hz	<Set Succeed!>	11C08.

4.10 Instruction classification of fiber-optic card

Note: must be used with the main output card.

ASCII instruction (Computer to matrix)	Command function	Return(matrix to Computer)	Illustration
/:ScanPortType;	Check card type and information	<In/37/HDMI/1920x 1080@60HZ/V1.0>	/:ScanPortTyp e;
[X1],[X2]SETOUT.	Open the component output card to set the function, Setting the [X1], [X2] channel	<Set Succeed!>	1,2SETOUT.
01C08.	The output video resolution is set to 1024 X 768@60Hz	<Set Succeed!>	01C08.
02C08.	The output video resolution is set to 1280 X 720@60Hz	<Set Succeed!>	02C08.
03C08.	The output video resolution is set to 1280 X 1024@60Hz	<Set Succeed!>	03C08.
04C08.	The output video resolution is set to 1366 X 768@60Hz	<Set Succeed!>	04C08.
05C08.	The output video resolution is set to 1400 X 1050@60Hz	<Set Succeed!>	05C08.
07C08.	The output video resolution is set to 1440 X 900@60Hz	<Set Succeed!>	07C08.
08C08.	The output video resolution is set to 1600 X 1200@60Hz	<Set Succeed!>	08C08.
09C08.	The output video resolution is set to 1680 X 1050@60Hz	<Set Succeed!>	09C08.
11C08.	The output video resolution is set to 1920 X 1080@60Hz	<Set Succeed!>	11C08.

4.11 Classified description of SDI card instruction

Note: must be used with the main output card.

ASCII instruction (Computer to matrix)	Command function	Return(matrix to Computer)	Illustration
/:ScanPortType;	Check board card type and information	<In/37/HDMI/1920x 1080@60HZ/V1.0>	/:ScanPortTy pe;
[X1],[X2]SETOUT.	Open the component output card to set the function,Setting the [X1], [X2] channel	<Set Succeed!>	1,2SETOUT.
02C08.	The output video resolution is set to 1280 X	<Set Succeed!>	02C08.

	720@60Hz		
18C08.	The output video resolution is set to 1920 X 1080@30Hz	<Set Succeed!>	18C08.
19C08.	The output video resolution is set to 1920 X 1080@25Hz	<Set Succeed!>	19C08.
20C08.	The output video resolution is set to 1280 X 720@50Hz	<Set Succeed!>	20C08.
21C08.	The output video resolution is set to 1280 X 720@30Hz	<Set Succeed!>	21C08.
22C08.	The output video resolution is set to 1920 X 1080i@60Hz	<Set Succeed!>	22C08.
23C08.	The output video resolution is set to 1920 X 1080i@50Hz	<Set Succeed!>	23C08.

Chapter 5. Control instruction

Matrix instruction

Serial port protocol:

Baud rate:9600

Data bit：8

Stop bit:：1

Check bit: NO

Ethernet：

Agreement：TCP

Default IP: 192.168.0.2

PORT:5000

ASCII instruction (Computer to matrix)	Command function	Return(matrix to Computer)	Illustration	Remark
/*Type;	Check Matrix model	TS-9472UHM	/*Type;	
/^Version;	Software version	V1.0	/^Version;	
/:BellOff;	Close the buzzer	<Closed The Bell.>	/:BellOff;	
/:BellOn;	Open the buzzer	<Opened The Bell.>	/:BellOn;	
/:HeartBeat;	PC software with a heartbeat package	<HeartBeat>	/:HeartBeat;	
/:ScanPortType;	Scan port type	<In/37/HDMI/1920x1080@60HZ/V1.0>	/:ScanPortType;	
[x]All.	[x] Road input to all road outputs,[X1]=0 to turn off all output video	V:[x1] To All.	5All.	
All$.	Close all channels	V:0 To All.	All$.	
<^SPORT>	Check the Current matrix network port number	<SPORT:[X1]>	<^SPORT>	Default：5000
<^SIPR>	Check the Current matrix network IP number	<SIPR:[X1].[X2].[X3].[X4]>	<^SIPR>	Network IP：192.168.0.2
<^SUBR>	Check the current network subnet mask number	<SUBR:[X1].[X2].[X3].[X4]>	<^SUBR>	Default subnet mask：255.255.255.0
<^GAR>	Check the current network gateway number	<GAR:[X1].[X2].[X3].[X4]>	<^GAR>	Default gateway: 192.168.0.1

<^SHAR>	Check the current network hardware address number	<SHAR:[X1].[X2].[X3].[X4].[X5].[X6]>	<^GAR>	
<#SPORT[5000]>	Set the network port number of the matrix	<Set Network Succeed!>	<#SPORT5000>	Reelectric power is effective
<#SIPR[192].[168]. [0]. [2]>	Setting the matrix network IP	<Set Network Succeed!>	<#SIPR192. 168. 0. 2>	Reelectric power is effective
<#GAR[192].[168].[0]. [1]>	Setting the network gateway number	<Set Network Succeed!>	<#GAR192.168. 0. 1>	Reelectric power is effective
<#SUBR[255].[255].[255].[0]>	Setting the network subnet mask	<Set Network Succeed!>	<#SUBR255.255 .255.0>	Reelectric power is effective
<#SHAR[00].[11].[22].[33].[44].[55]>	Setting the network hardware address	<Set Network Succeed!>	<#SHAR00.11.22.33.44.55>	Reelectric power is effective
<#NETDEFAULT>	Network configuration reset to the factory default settings.	<Set Network Succeed!>	<#NETDEFAULT>	Reelectric power is effective
[RX1]R[TY1].	[RX1] connection of serial port receiving channel of input port To the output port serial port sending channel [TY1] (RS232 forward channel switching)	RS:[RX1]->[TY1]	2R3.	
[RX1]S[TY1].	Output port serial port receiving channel [RX1] connect to input port serial port sending channel [TY1]	TS:[RX1]->[TY1]	3S2.	
[RX1]Q[TY1].	The input port infrared receiving channel [RX1] is connected to the output port infrared transmitting channel [TY1] (IR forward channel switching).	IR:[RX1]->[TY1]	2Q3.	
[RX1]F[TY1].	The infrared receiving channel [RX1] of the output port is connected to the infrared transmitting channel [TY1] of the input port.	TR:[RX1]->[TY1]	3F2.	

[RX1]T[TY1].	Input port serial / infrared receiving channel [RX1] connected to the output port / infrared transmission channel [TY1] (RS232/IR forward channel switching)	T:[RX1]->[TY1]	2T3.	
[x1] V[y1].	[x1] road input to [y1] road output, video switching. When [X1] is 0, it means closing Y1 road video	V:[x1] -> [x2]	2V3.	
[x1] V[y1],[y2],[y3]....	[x1] road input to [y1][y2][y3] output	V:[x1] -> [x2]	2V3，4，5，6，7.	
Status[x].	Query the output current state of the [x] Channel.	V:[x1] -> [x2]	Status2.	
Status.	Query the current state of all output channels.	V:[x1] -> [x2]	Status.	
Save[Y].	Save the current state to the [Y] group, [Y] is the 0-9 numeric key.	<Save to F1!>	Save2.	
Recall[Y].	Recovery from the [Y] group, [Y] is the 0-9 numeric key.	<Recall from F1!>	Recall2.	
Clear[Y].	Clear the stored [Y] group data, and the status is all closed.	<Clear F1!>	Clear2.	
[x1],[x2]SETIN.	Activate [x1],[x2] input channel to preset state.	<Set Succeed!>	2，3，4，5，6SETIN.	
[x1],[x2]SETOUT.	Activate [x1],[x2] input channel to preset state	<Set Succeed!>	2，3，4，5，6SETOUT.	
01C08.	The resolution is set to 1024 X 768@60Hz	<Set Succeed!>	01C08.	Only supported output card
02C08.	The resolution is set to 1280 X 720@60Hz	<Set Succeed!>	02C08.	
03C08.	The resolution is set to 1280 X 1024@60Hz	<Set Succeed!>	03C08.	
04C08.	The resolution is set to 1366 X 768@60Hz	<Set Succeed!>	04C08.	
05C08.	The resolution is set to 1400 X 1050@60Hz	<Set Succeed!>	05C08.	
07C08.	The resolution is set to 1400 X 900@60Hz	<Set Succeed!>	07C08.	
08C08.	The resolution is set to	<Set Succeed!>	08C08.	

	1600 X 1200@60Hz			
09C08.	The resolution is set to 1680 X 1050@60Hz	<Set Succeed!>	09C08.	
11C08.	The resolution is set to 1920 X 1080@60Hz	<Set Succeed!>	11C08.	
01C02.	Set to analog audio input	<Set Succeed!>	01C02.	Only support TS-9404HI
03C02.	Set to analog audio input	<Set Succeed!>	03C02.	
01C02.	Set to CVBS	<Set Succeed!>	01C02.	Only support TS-9404DI/CI /CO
03C02.	Set to Ypbpr	<Set Succeed!>	03C02.	
05C02.	Set to VGA	<Set Succeed!>	05C02.	
06C02.	Set to DVI	<Set Succeed!>	06C02.	Only support TS-9404DI
07C02.	Set to DVI output	<Set Succeed!>	07C02.	Only support TS-9404DO/HO
08C02.	Set to HDMI output	<Set Succeed!>	08C02.	

Note: Before setting the resolution, please send the active channel instruction "[x1],[x2]SETIN." or "[x1],[x2]SETOUT."

Ultra HD Seamless Mixing Matrix System

Version 0.1