WOXCON

User Manual

WOXCON

MMX1616-N

Modular Matrix Switcher 16x16

Version: MMX1616-N_2017V2.6

Preface

Read this user manual carefully before using this product. Pictures shown in this manual is for reference only, different model and specifications are subject to real product.

This manual is only for operation instruction only, not for any maintenance usage. In the constant effort to improve our product, we reserve the right to make functions or parameters changes without notice or obligation. Please refer to the dealers for the latest details.

FCC Statement

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. It has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial installation.

Operation of this equipment in a residential area is likely to cause interference, in which case the user at their own expense will be required to take whatever measures may be necessary to correct the interference.

Any changes or modifications not expressly approved by the manufacture would void the user's authority to operate the equipment.

SAFETY PRECAUTIONS

To insure the best from the product, please read all instructions carefully before using the device. Save this manual for further reference.

- Unpack the equipment carefully and save the original box and packing material for possible future shipment
- Follow basic safety precautions to reduce the risk of fire, electrical shock and injury to persons.
- Do not dismantle the housing or modify the module. It may result in electrical shock or burn.
- Using supplies or parts not meeting the products' specifications may cause damage, deterioration or malfunction.
- Refer all servicing to qualified service personnel.
- To prevent fire or shock hazard, do not expose the unit to rain, moisture or install this product near water.
- Do not put any heavy items on the extension cable in case of extrusion.
- Do not remove the housing of the device as opening or removing housing may expose you to dangerous voltage or other hazards.
- Install the device in a place with fine ventilation to avoid damage caused by overheat.
- Keep the module away from liquids.
- Spillage into the housing may result in fire, electrical shock, or equipment damage. If an object or liquid falls or spills on to the housing, unplug the module immediately.
- Do not twist or pull by force ends of the optical cable. It can cause malfunction.
- Do not use liquid or aerosol cleaners to clean this unit. Always unplug the power to the device before cleaning.
- Unplug the power cord when left unused for a long period of time.
- Information on disposal for scrapped devices: do not burn or mix with general household waste, please treat them as normal electrical wastes.

Table of Contents

1. Introduction

1.1. About Modular Matrix Switcher 16x16

Modular Matrix Switcher 16x16 is a high-performance video and audio modular matrix switcher supporting max 16 input signal sources and 16 output display synchronously. It supports different video signals with cross switching. Every video or audio signal is transmitted and switched independently to decrease signal attenuation. Modular Matrix Switcher 16x16 supports various changeable cards including HMDI, DVI, VGA, SDI and HDBaseT etc. Users can choose to insert different signal card for different application.

Modular Matrix Switcher 16x16 boasts power off memory and audio signal can be switched separately or jointly with video signal. It has 1 RS232 port and 1 optional TCP/IP port for convenient control from third-party.

With its flexible design, Modular Matrix Switcher 16x16 can be used for different project and tend to be an all-in-one solution. It is the combo solution for multimedia conference rooms, control rooms, broadcasting rooms, shopping center etc. It will handle all the audiovisual management, including the switching, driving, scaling etc.

1.2. Features

- Modular chassis with configurable I/O slots, ranging from 4x4 to 16x16.
- Various I/O cards, includes HDMI, HDBaseT, SD/HD/3G-SDI, DVI and VGA cards (Compatible with YUV, YC & CVBS.) to configure any matrix.
- Truly cross-point switching, any input to any output, regardless signal format.
- Support HDMI1.4a, support 3D.
- Integrated HDBaseT technology.
- Controllable via button, RS232 & optional TCP/IP, also compatible with 3rd parties control.
- HDCP compliant.
- LCD display.

1.2.1. Modular Matrix Switcher signal card (changeable cards)

Modular Matrix Switcher 16x16 supports multiple signal cards as listed in the following charts:

Input Cards

Spec / Models	Inputs	Signal Format
4I-HD	4	HDMI
4I-HS	4	HDMI& analog audio
4I-DV	4	DVI
4I-DS	4	DVI, HDMI, VGA, AV, YPbPr
4I-VG	4	VGA
4I-VA	4	VGA& analog audio
4I-SD	4 inputs& LOOP	SDI
4I-SS	4 inputs& LOOP	SDI
4I-TP	4	HDMI TP, IR, RS232
4I-UH	4	HDMI& analog Audio
4I-UF	4	Optical Fiber
4I-BT	4	HDBT, RS232, Audio

Output Cards

Spec / Models	Outputs	Signal Format
4O-HD	4	HDMI
4O-HS	4	HDMI& analog audio
4O-DV	4	DVI
4O-DS	4	DVI, HDMI, VGA, AV, YPbPr
4O-VG	4 VGA& Stereo audio	VGA, analog audio
4O-SD	4 outputs& LOOP	SDI
4O-TP	4	HDMI TP, IR, RS232
4O-UH	4	HDMI& analog Audio
4O-UF	4	Optical Fiber
4O-BT	4	HDBT, RS232, Audio

1.3. Package List

- 1 x Modular Matrix Switcher 16x16
- 1 x IR remote (Not include battery)
- 1 x RS232 cable
- 1 x Power Cord
- 4 x Plastic cushions
- 1 x User manual

Notes: Confirm all the accessories are included, if not, please contact with the dealers.

2. Panel Description

2.1. Modular Matrix Switcher 16x16

2.1.1. Front Panel

Figure 2- 1 Front Panel of Modular Matrix Switcher 16x16

No.	Name	Description
①	IR	IR sensor, receive IR signal sent from IR remote
②	Power indicator	Illuminate red once powered on
③	LCD screen	Display real-time operation status
④	INPUTS	Back-lit buttons for input selection, ranges from 0~ 9, 16 selectable channels in total.
⑤	OUTPUTS	Back-lit buttons for output selection, ranges from 0 ~ 9, 16 selectable channels in total.
⑥	MENU	**AV**: transfer video and audio signal synchronously
		,: division button, to divide the output channels when switching to more than one channel.
		UNDO: Undo button, to resume to the status before the command just performed.

		ENTER: confirm switching operation. Operation will not be executed by the matrix without confirmation.
		ALL: select all input/output channel
		THROUGH: To transfer the signals directly to the corresponding output channels.
		←: Backspace button, to backspace the last press.

2.1.2. Rear Panel

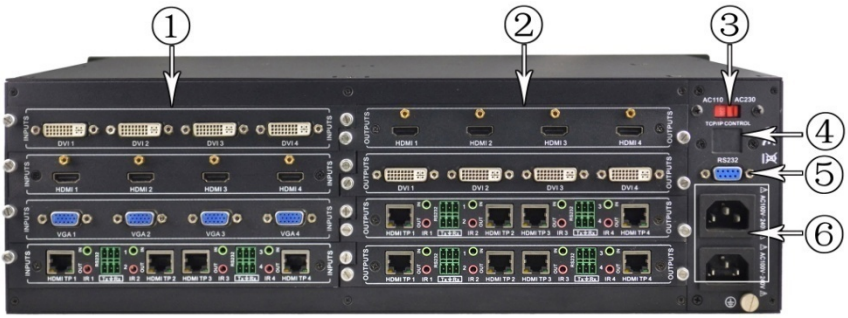


Figure 2- 2 Rear Panel of Modular Matrix Switcher 16x16

No.	Name	Description
①	INPUTS	Input signal card slots, 4 in total
②	OUTPUTS	Output signal card slots, 4 in total
③	Power switch	Switch between AC110V and AC230V to access different power
④	TCP/IP	(Optional) Used for TCP/IP control port
⑤	RS232	Serial control port, connect with RS232 port of control device.
⑥	Power ports	Connect with household alternating current power, including one redundant power.

Note: There are only 4 input and 4 output slots for Modular Matrix Switcher 16x16, which enables only 4 input cards and 4 output cards to be installed on Modular Matrix Switcher 16x16. The input/output cards can be changed based on your requests and supports hot plug and play.

2.2. Changeable Cards

Modular Matrix Switcher 16x16 supports expansion through various changeable input/ output cards of different signals including DVI, HDMI, VGA, twisted pair, SDI etc. Here is a brief introduction to the changeable cards.

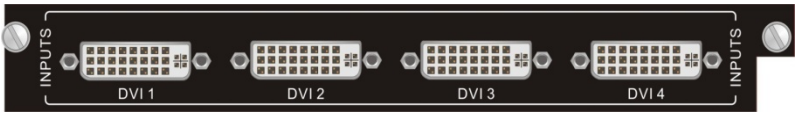
2.2.1. 4I-DV & 4O-DV

DVI signal card. (Please check the specification from *5.2.1*)

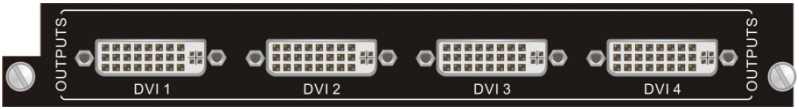
It is fully compatible with HDMI1.3 and HDCP, but not supporting analogy signal.

It is embedded EDID management technology, supporting DDC.

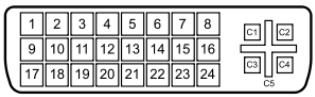
4I-DV: input card, maximum four input signal. Input signal can pass to output device through 4O-DV or other kinds of output cards.



4O-DV: output card, maximum four output signal, output signals from 4I-DV, or other kinds of input cards.



Pin Layout of the DVI-I connector (Dual-Link). (Female)



Pin	Function	Pin	Function
1	T.M.D.S.Data2-	13	T.M.D.S.Data3+
2	T.M.D.S.Data2+	14	+5V Power
3	T.M.D.S. Data 2/4 Shield	15	Ground (return for +5V, Hsync and Vsync)
4	T.M.D.S. Data 4-	16	Hot Plug Detect
5	T.M.D.S. Data 4+	17	T.M.D.S. Data 0-
6	DDC Clock	18	T.M.D.S. Data 0+
7	DDC Data	19	T.M.D.S. Data 0/5 Shield
8	Analog Vertical Sync	20	T.M.D.S.Data5-
9	T.M.D.S.Data1-	21	T.M.D.S.Data5+
10	T.M.D.S.Data1+	22	T.M.D.S. Clock

			Shield
11	T.M.D.S.Data1/3 Shield	23	T.M.D. S. Clock +
12	T.M.D.S.Data3-	13	T.M.D.S.Data3+
C1	RED	C2	Analog Green
C3	Analog Blue	C4	Horizontal Sync Analog
C5	GND		

Note: Pin C1~C5 are not used in 4I-DV & 4O-DV.

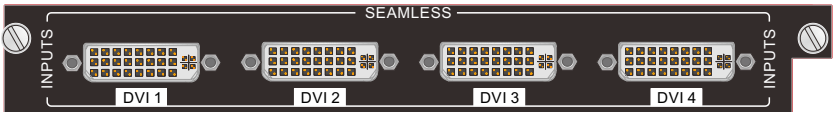
2.2.2. 4I-DS& 4O-DS

Seamless DVI signal card. (*Please check the specification from 5.2.2*)

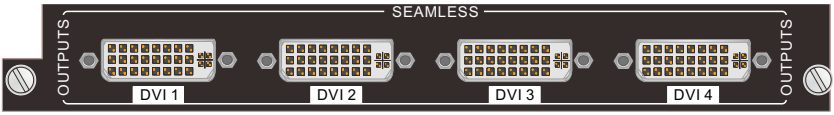
It is fully compatible with HDMI1.3& HDCP, and supports seamless transmission for high-definition DVI, HDMI, VGA, AV, YPbPr signals. Signal format can be modified via RS232 commands.

It boasts embedded EDID management (only for HDMI/ DVI signal), supporting DDC.

4I-DS: seamless input card, maximum four input signal. It can automatically identify the format of input signal. Input signal can pass to output device through 4O-DS, or other kinds of output cards.



4O-DS: seamless output card, maximum four output signal. Automatically recognize output signal (HDMI/ DVI), and output resolution is adjustable. Output signal can come from 4I-DS, or from other kinds of input cards. It supports off memory for resolution, signal format, HDCP compliant status.



Note:

1) When 4O-DS works with input cards except 4I-DS, to ensure reliable seamless output, adjust the input signals to any one of the following 5 resolutions: 1024x768, 1280x720, 1600x1200, 1920x1080, 1920x1200.
2) Before using 4O-DS, upgrade the front-board and backboard of Modular Matrix Switcher 16x16. Seek technical assistant from our technical supporters.
3) DVI interfaces on the signal card are same with the interfaces on 4I-DV& 4O-DV. Pin C1~C5 are used in 4I-DS & 4O-DS.

   When connecting to VGA, YPbPr or C-VIDEO signal, insert converting cables according to specific pin definitions (see the figures below):

   DVI- C-VIDEO:

Pin	Signal
C1	Yellow
C5	GND
Other pins are unused.	

DVI- YPbPr:

Pin	Signal	Pin	Signal
C1	RED	C2	GREEN
C3	BLUE	C5	GND
Other pins are unused.			

DVI- VGA (female):

Pin	Signal	Pin	Signal
C1	RED	C2	GND
C3	GREEN	C4	Horizontal Sync Analog
8	Vertical Sync Analog		
Other pins are unused.			

2.2.3. 4I-HD & 4O-HD

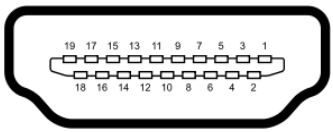
HDMI signal card. (Please check the specification from 5.*2.3*)

It boasts embedded EDID management, and supports DDC. It's also compliant with DVI signal & HDCP.

4I-HD: input card, maximum four input signal. Input signal can pass to output device through 4O-HD, or other kinds of output cards.

4O-HD: output card, maximum four output signal, output signals from 4I-HD, or other kinds of input cards.

Pin layout of the HDMI connectors (female).



No.	Signal	No.	Signal
1	TMDS Data 2+	**20**	SHELL
2	TMDS Data 2 Shield	**19**	Hot Plug Detect
3	TMDS Data 2-	**18**	+5V Power
4	TMDS Data 1+	**17**	Ground
5	TMDS Data 1 Shield	**16**	DDC Data
6	TMDS Data 1-	**15**	DDC Clock
7	TMDS Data 0+	**14**	No Connect
8	TMDS Data 0 Shield	**13**	CEC
9	TMDS Data 0-	**12**	TMDS Clock-
10	TMDS Clock+	**11**	TMDS Clock Shield

2.2.4. 4I-HS & 4O-HS

Seamless HDMI signal card with auxiliary audio port (Please check the specification from 5.*2.4*)

It boasts seamless switch that provides real-time audio& video switching; support HDMI1.3& HDCP1.2, compliant with DVI signal;

HDMI embeded audio and auxiliary stereo audio supports PCM format, audio source selectable via designed command (default: HDMI embeded audio);

Built in scaler handles various resolution, output resolution adjustable via command.

4I-HS: input card, maximum four input signal. Input signal can pass to output device through 4O-HS, or other kinds of output cards.

4O-HS: output card, maximum four output signal, output signals from 4I-HS, or other kinds of input cards.

HDMI connectors of 4I-HS & 4O-HS are same with the 4I-HD & 4O-HD.

Note: When 4O-HS works with input cards except 4I-HS, to ensure reliable seamless output, adjust all the input signals to the same designed resolution: 1024x768, 1280x720, 1600x1200, 1920x1080, or 1920x1200.

2.2.5. 4I-VG & 4O-VG

VGA signal card. (Please check the specification from *5.2.5*)

Scale all inputs to 1080p or 1920x1200

The bandwidth is up to 350MHz (-3dB);

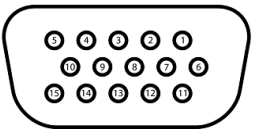
Input signal can be VGA (RGBHV), YPbPr, S-video, C-video or CVBS;

Output card only supports VGA output

4I-VG: input card, maximum four input signal, support VGA (RGBHV), YPbPr, S-video, C-video& CVBS. Input signal can pass to output device through any kinds of output cards.

4O-VG: output card, maximum four VGA output signal and 4 stereo audio outputs, output video signal from 4I-VG, or other kinds of input cards, and output audio signal from the audio of the input signal.

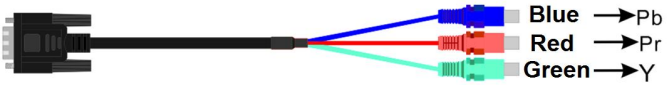
Pin layout of the VGA connectors (female):



Pin	Signal	Pin	Signal
1	RED	9	KEY/PWR
2	GREEN	10	GND
3	BLUE	11	ID0/RES
4	ID2/RES	12	ID1/SDA
5	GND	13	HSync
6	RED_RTN	14	VSync
7	GREEN_RTN	15	ID3/SCL
8	BLUE_RTN		

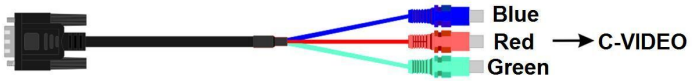
When connecting to YPbPr or C-VIDEO signal, insert converting cables according to specific pin definitions (see the figures below):

VGA- YPbPr:



Pin	Signal	Pin	Signal
1	RED	6	GND
2	GREEN	7	GND
3	BLUE	8	GND
Other pins are not used.			

VGA- C-VIDEO:



Pin	Signal	Pin	Signal
1	RED	6	GND
7	GND	8	GND
Other pins are not used.			

2.2.6. 4I-VA

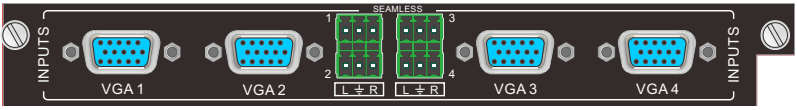
VGA signal card. (*Please check the specification from 5.2.6*)

Scale all inputs to 1080p or 1920x1200;

Input signal can be VGA (RGBHV), YPbPr, S-video, C-video or CVBS;

4 stereo audio inputs.

4I-VA: input card, maximum four VGA inputs and four stereo audio inputs. Input signal can pass to output device through any kinds of output cards.



The VGA connector and source connection are same with the 4I-VG.

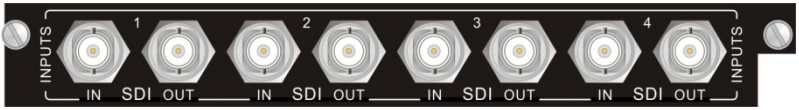
2.2.7. 4I-SD & 4O-SD

SDI signal card. (Please check the specification from 5.2.7)

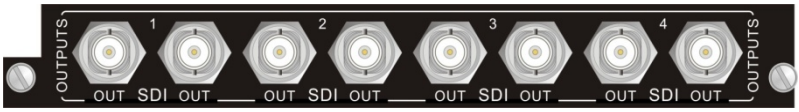
It is compatible with different SDI signal formats, including SD/HD/3G-SDI (adaptive)

Every port has loop output for local monitoring.

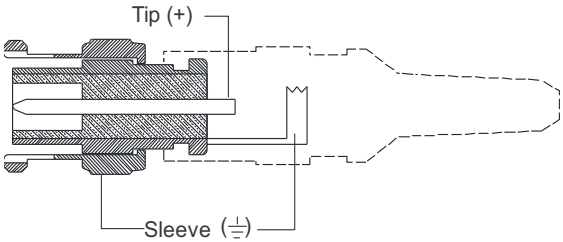
4I-SD: input card, maximum four input signal. Input signal can pass to output device through 4O-SD, or other kinds of output cards.



4O-SD: output card, maximum four output signal, output signals from 4I-SD, or other kinds of input cards.



The BNC connector is shown as the figure below.



BNC Connector

2.2.8. 4I-SS

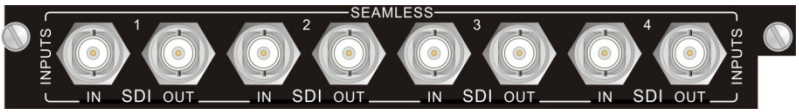
Seamless SDI signal card (Please check the specification from 5.*2.8*)

It is compatible with different SDI signal formats, including SD/HD/3G-SDI (adaptive), support seamless transmission for high-definition signal up to 1080p;

Auto-detect input resolution and scale to 1080p@60Hz (default resolution, adjustable via command);

Every port has loop output for local monitoring.

4I-SS: input card, maximum four input signal. Input signal can pass to output device through 4O-SD, or other kinds of output cards.



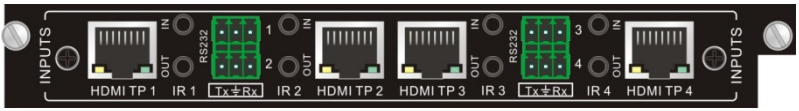
BNC connectors are same with 4I-SD & 4O-SD's.

2.2.9. 4I-TP & 4O-TP

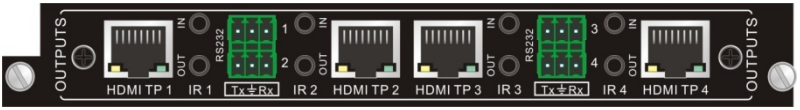
Twisted pair card (HDMI/DVI extender). (Please check the specification from 5.*2.9*)

Support HDTV, compatible with HDMI1.3 and HDCP

4I-TP: input card, maximum input four HDMI TP signal. Input signal can pass to output device through 4O-TP, or other kinds of output cards, need to work with HDBT Transmitters.



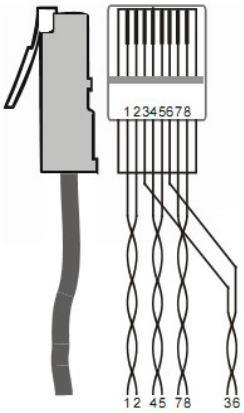
4O-TP: output card, maximum output four HDMI TP signal, output signals from 4I-TP, or other kinds of input cards, need to work with HDBT Receivers.



How the indicators work:

Color	Definition	Status
Yellow	Power Indicator	Blink once powered on; Turn off when there is no power.
Green	Link Indicator	Light when the port is connected with CAT5e/6; Turn off when there is no connection.

Pin layout of the HDBT connector:



Pin	Color
1	orange white
2	orange
3	green white
4	blue
5	blue white
6	green
7	brown white
8	brown

1st Group	4--5
2nd Group	1--2
3rd Group	3--6
4th Group	7--8

Notice: Cable connectors MUST be metal one, and the shielded layer of cable MUST be connected to the connector's metal shell, to well share the grounding.

2.2.10. 4I-UH & 4O-UH

4K HDMI signal card. (Please check the specification from 5*.2.10*)

Support HDMI 1.4a& HDCP 1.4 compliance; Compatible with DVI signal; Support high-definition HDMI source up to 4kx2k, 1080p 3D compliance;

Provide auxiliary audio port as supplement to HDMI embedded audio, audio source selectable via command "AUDIO[X]I[Z].", [X] stands for output port, [Z] stands for audio source (0 is for HDMI embedded audio, 1 is for analog audio)

It also boasts embedded EDID management.

4I-UH: input card, maximum four input signal. Input signal can pass to output device through 4O-UH, or other kinds of output cards.

Note: When matching with output cards that do not support 4kx2k, adjust the input resolution to 1080p to enable reliable output.

4O-UH: output card, maximum four output signal, output signals from 4I-UH, or other kinds of input cards, HDCP compliant status settable via RS232 command

The HDMI connector is same with 4I-HD& 4O-HD's.

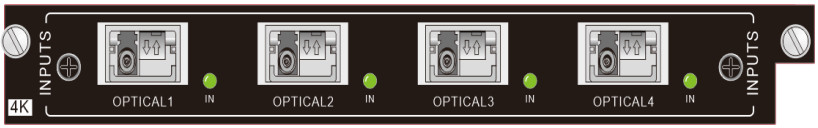
2.2.11. 4I-UF & 4O-UF

4K optical signal card. (Please check the specification from 5.*2.11*)

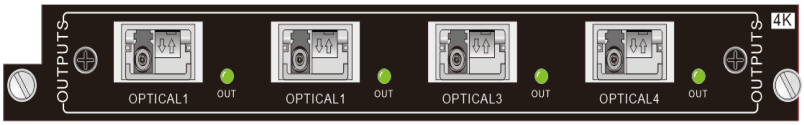
Work with single-mode/ multi-mode module to realize long-distance optical fiber transmission, support multi-mode transmission up to 300m and single mode transmission up to 2km.

High bandwidth: 10.2Gbps; Compliant with HDMI 1.4, capable to transmit 4K×2K& 1080P 3D (max) signals;

4I-UF: input card with indicators, maximum four input signal, corresponding indicator illuminates green when there is input signal. Input signal can pass to output device through 4O-UF, or pass through other kinds of output cards.



4O-UF: output card with indicators, maximum four output signal, output signals from 4I-UF, or other kinds of input cards; corresponding indicator illuminates green when there is output signal.



Note:

1. Use the 4I-UF/ 4O-UF with optical fiber transmitter/ receiver.
2. Multi-mode transmission may include the following cases:

   Single-mode optical fiber module& Multi-mode optical fiber cable

   Multi-mode optical fiber module& Multi-mode optical fiber cable
3. Before using 4I-UF & 4O-UF, upgrade the front-board and backboard of Modular Matrix Switcher 16x16. Seek technical assistant from our technical supporters.

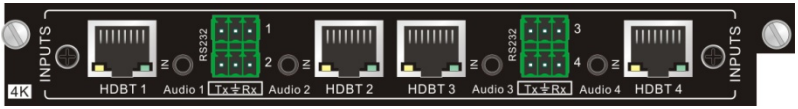
2.2.12. 4I-BT & 4O-BT

4K Twisted pair card (Please check the specification from *5.2.12*)

Support HDTV, compatible with HDBT 1.0, HDMI1.4a& HDCP1.4; Wide resolution range from 480p~ 4kx2k, 1080p 3D compliant; Extend HDBT signal up to 70m at 1080p or 40m at 4k; Bi-directional RS232 transmission on single cable; Audio source selectable via corresponding command; Auxiliary audio ports support stereo signal.

It also boasts embedded EDID management.

4I-BT: input card, maximum input four HDBT signal. Input signal can pass to output device through 4O-BT, or other kinds of output cards, need to work with HDBT transmitters.



Note: When matching with output cards that do not support 4kx2k, adjust the input resolution to 1080p to enable reliable output.

4O-BT: output card, maximum output four HDBT signal, output signals from 4I-BT, or other kinds of input cards, need to work with HDBT receivers.

The indicators and pin layout is the same with 4I-TP & 4O-TP's. Refer to *2.2.9 4I-TP & 4O-TP* for detailed information.

3. System Connection

3.1. Usage Precautions

1) System should be installed in a clean environment and has a prop temperature and humidity.

2) All of the power switches, plugs, sockets and power cords should be insulated and safe.

3) All devices should be connected before power on.

3.2. Connection Diagram

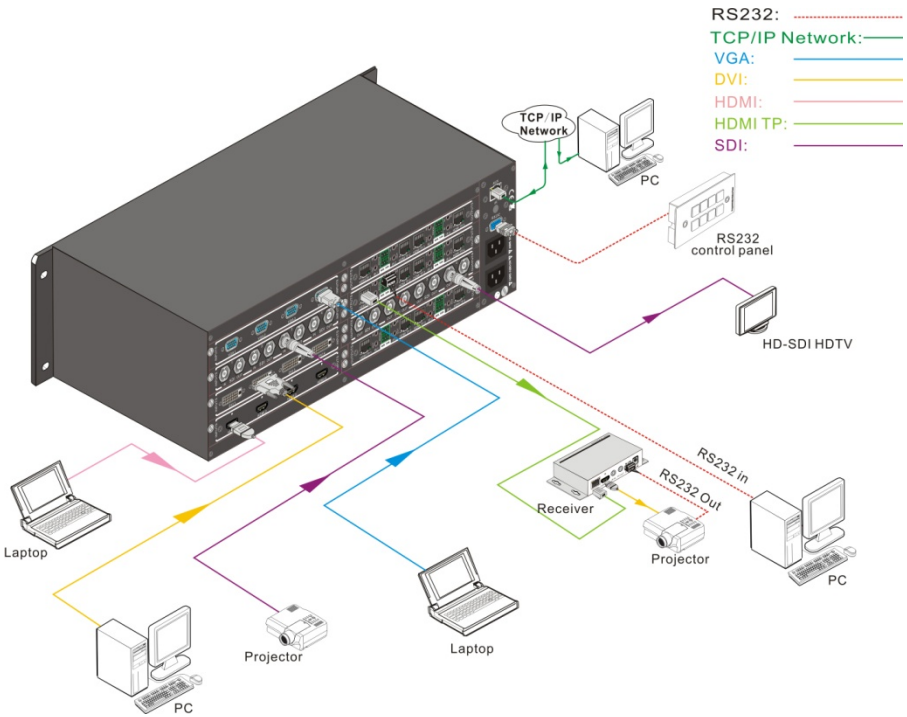


Figure 3- 1 System Diagram

Note: All the input/output signal cards don't support hot-plug while input& output ports on the cards support hot-plug.

3.3. Application

Modular Matrix Switcher series has a good application in various occasions, such as radio & television, multi-media meeting room, big screen displaying, television education and command & control center etc.

4. Control Operations

4.1. Front Panel Button control

Users can control Modular Matrix Switcher 16x16 rapidly and directly with its front panel buttons. To switch AV signal, please operate the buttons under the following format:

Format: "**Input Channel**" + "**AV**" +"**Output Channel**"+"**Enter**"

Note:

1) "Input Channel": Fill with the number of input channel to be controlled,

2) "Output Channel": Fill with the number of output channels to be controlled. Press "All" to select all the outputs.

3) Use "**,**" button to separate multiple I/O channels, and press "**ENTER**" button to confirm the operation.

4) The input/output channels on the rear panel are counting from left to right, top to bottom.

5) The input delay time between two numbers of every input& output channel must be less than 5 seconds; otherwise the operation will be cancelled.

Example:

1. To transfer input 1 to output 11, press input "**1**", output "**1**" "**1**" and "**Enter**".
2. To transfer signals from input 1 to all output channels, press buttons in this order: "**1**", "**All**".

Other Functional Buttons:

Buttons	Description	Operation
UNDO	return to the previous status	Status 1: Input 6 -> output 6 Press input "6" + "AV"+ output 4 to change the connection. Press "Undo" to return to Status 1.
←	Backspace the last operation	If you press buttons "1", "AV", "2", "←" in order, then "2" will be canceled.
THROUGH	Get straight I/O connection, e.g. input 1-> output 1, input 2-> output 2.	Format: "Input Channel"+"Through" If you press buttons "ALL", "THROUGH" in order, then the result will be like input 1→ output 1, input 2→output 2, input 3→output 3 … input 16→output 16.

4.2. IR Remote control

With the IR remote, Modular Matrix Switcher 16x16 could be controlled remotely. As the function buttons on the IR remote are the same with the ones on the front panel, the IR remote shares the same operations and commands with the control panel. Press the buttons under below format:

"**Input Channel**" + "**Switch Mode**" +"**Output Channel**"

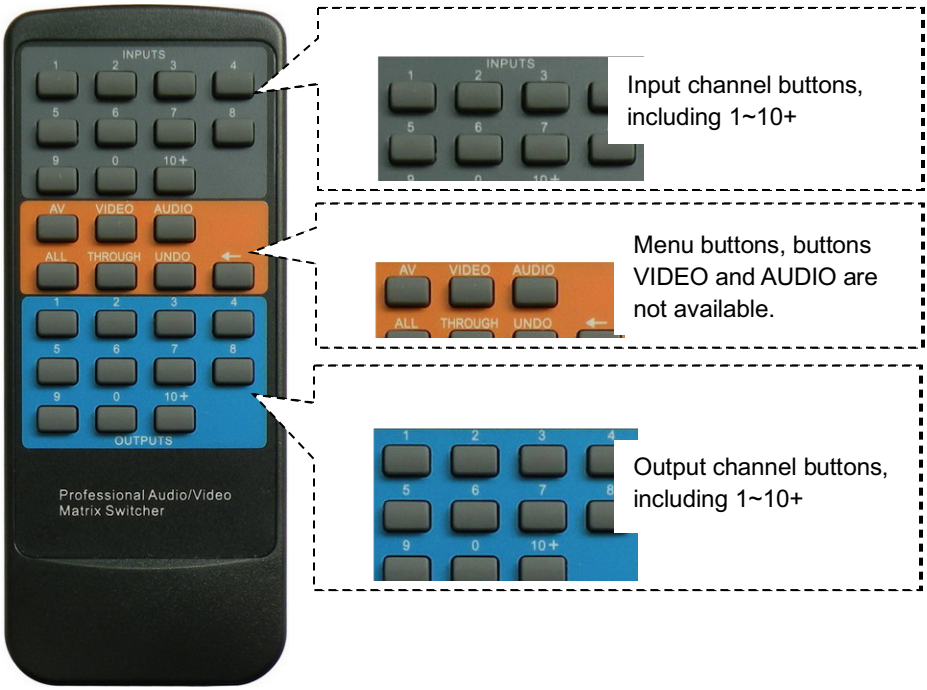


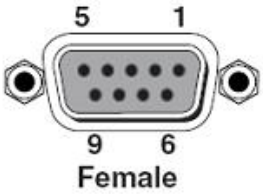
Figure 4- 1 Panel of the IR Remote

4.3. RS232 Control

4.3.1. Connection of RS232 Communication Port

Except the front control panel and IR remote, Modular Matrix Switcher 16x16 can be controlled by far-end control system or through the Ethernet control via the RS-232 communication port.

This RS-232 communication port is a female 9- D connector. The definition of its pin layout is shown in the table below.



No.	Pin	Function
1	N/u	Unused
2	Tx	Transmit
3	Rx	Receive
4	N/u	Unused
5	Gnd	Ground
6	N/u	Unused
7	N/u	Unused
8	N/u	Unused
9	N/u	Unused

When Modular Matrix Switcher 16x16 connects to the RS232 port of a computer with control software, users can control it by that computer. To control the switcher, users need to use RS232 control software.

4.3.2. RS232 Communication Commands

With this command system, users are able to control and operate the Modular Matrix Switcher 16x16 with RS232 software remotely.

Note:

1. Please disconnect all the twisted pairs before sending command EDIDUpgrade[X].

2. In the commands, “[”and “]” are symbols for easy reading and do not need to be typed in actual operation.

3. Please remember to end the commands with the ending symbols “.” or “;”.

4. Type the command carefully, it is case-sensitive.

5. Commands pertaining to EDID only avails for signal cards that support EDID management.

6. Modular Matrix Switcher 16x16 boasts 6 in-built EDID data, the chart below illustrates the detailed information:

No.	Detailed Information
1	1080p 2D 5.1CH
2	1080p 2D 2.0CH
3	720p 2D 5.1CH
4	720p 2D 2.0CH
5	4kx2k 2D 5.1CH
6	4kx2k 2D 2.0CH

Update in-built EDID data by sending command **UpgradeIntEDID[x].**.

Communication protocol: Baud rate: 9600; Data bit: 8; Stop bit: 1; Parity bit: none.

Command	Description	Feedback
/*Type;	Inquire the models information.	MODULAR1616
/%Lock;	Lock front panel buttons.	System Locked!
/%Unlock;	Unlock front panel buttons.	System Unlock!
/^Version;	Inquire the firmware version.	Vx.x.x
/:MessageOff;	Turn off the feedback command from the com port. It will only show “switcher OK”.	Closed The Message Return.
/:MessageOn;	Turn on the feedback command from the com port.	Enabled The Message Return.
Undo.	Cancel the previous operation.	Undo
Demo.	Switch to the “demo” mode, 1->1, 2->2, 3->3 … and so on.	Demo Mode AV: 01->001 … …
[x]All.	Transfer signals from the input channel [x] to all output channels	01 To All
All#.	Transfer all input signals to the corresponding output channels respectively.	All Through.
All$.	Switch off all the output channels.	All Closed.
[x]#.	Transfer signals from the input channel [x] to the output channel [x].	01 Through.
[x]$.	Switch off the output channel [x].	AV: 01 Closed.
All@.	Switch on all the output.	All Open.
[x]@.	Switch on output [x].	01 Open.
[x1]V[x2].	Transfer the video signals from input [x1] to output [x2].	V: 01->001
[x1]B[x2].	Transfer audio& video signal from input [x1] to output [x2].	AV: 01->001
Status[x].	Inquire the input channel to the output channel [x].	V: 01->001 A: 01->001
Status.	Inquire the input channel to the output channels one by one.	V: 01->001 A: 01->001 … …

Save[Y].	Save the present operation to the preset command [Y]. [Y] ranges from 0 to 9.	Save To F8
Recall[Y].	Recall the preset command [Y].	Recall From F8 V: 01->001 A: 01->001 … …
Clear[Y].	Clear the preset command [Y].	Clear F8
PWON.	Work normally.	PWON
PWOFF.	Enter in standby mode.	PWOFF
HDCPON.	Turn on the HDCP output.	HDCPON
HDCPOFF.	Turn off the HDCP output.	HDCPOFF
/V00.	Inquire the version of backboard software.	Vx.x.x
UpgradeIntEDID[x].	Upgrade built-in EDID data. Supports 6 types of EDID data (see *Note 6*). When the switcher gets the command, it will show a message to send EDID file (.bin file).	
EDIDUpgrade[x].	Upgrade EDID data of input ports When the switcher gets the command, it will show a message to send EDID file (.bin file). Operations will be canceled after 10 seconds.	
EDID/[x]/[y].	Set the EDID data of input port [x] to built-in EDID data of type [y]. [y]= 1~6.	
EDIDG[x].	Get EDID data from output [x] and display the data on serial port control software.	
EDIDMInit.	Reset factory default EDID for every input channel.	EDIDMInit
EDIDM[X]B[Y].	Manually EDID switching. Enable input [Y] to learn the EDID data of output[X]. If there is problem learning the EDID data, it will automatically set the default EDID data for input [Y].	EDIDM2B1

USER/[Y]/[X]:*****;	Custom command for signal cards, [Y]=I/O; [X]= port number; *****: User-definable command, e.g. 0623%	
%0911.	Restore factory default. All I/O connection will be restored to straight through: 1->1, 2->2,…; saved operation status will remain the same.	
4I-HS		
USER/I/[x]:02xx%;	Set the brightness of input [x] to xx, xx=00~99	02xx%
USER/I/[x]:03xx%;	Set the contrast of input [x] to xx, xx=00~99	03xx%
USER/I/[x]:04xx%;	Set the saturation of input [x] to xx, xx=00~99	04xx%
USER/I/[x]:05xx%;	Set the sharpness of input [x] to xx, xx=00~99	05xx%
USER/I/[x]:0607%;	Set picture's color temperature	0607%
USER/I/[x]:0608%;	Configure image scale	0608%
USER/I/[x]:0614%;	Configure picture mode	0614%
USER/I/[x]:0617%;	Restore input [x] to factory default.	0617%
USER/I/[x]:0619%;	Set the resolution of input [x] to 1360x768, HD	0619%
USER/I/[x]:0626%;	Set the resolution of input [x] to 1024x768, XGA	0626%
USER/I/[x]:0627%;	Set the resolution of input [x] to 1280x720, 720P	0627%
USER/I/[x]:0628%;	Set the resolution of input [x] to 1280x800, WXGA	0628%
USER/I/[x]:0629%;	Set the resolution of input [x] to 1920x1080, 1080P	0629%
USER/I/[x]:0620%;	Set the resolution of input [x] to 1920x1200, WUXGA	0620%
USER/I/[x]:0621%;	Set the resolution of input [x] to 1600x1200, UXGA	0621%
USER/I/[x]:0698%;	Software update	0698%
USER/I/[x]:0686%;	Set the output signal of input [x] to HDMI	0686%
USER/I/[x]:0711%;	Select HDMI embeded audio as audio source	0711%

USER/I/[x]:0712%;	Select analog audio as audio source	0712%
4O-HS		
USER/O/[x]:0804%;	Set the resolution of output [x] to 1280x720P @60Hz	Resolution Out03 1280x720P
USER/O/[x]:0813%;	Set the resolution of output [x] to 1280x1080P @60Hz	Resolution Out03 1920x1080P
USER/O/[x]:0824%;	Set the resolution of output [x] to 1024x768 @60Hz	Resolution Out03 1024x768
USER/O/[x]:0826%;	Set the resolution of output [x] to 1280x1024 @60Hz	Resolution Out03 1280x1024
USER/O/[x]:0837%;	Set the resolution of output [x] to 1920x1200 @60Hz	Resolution Out03 1920x1200
USER/O/[x]:0617%;	Restore output [x] to factory default.	0617%
GetResolution[x].	Capture output resolution of output [x]	
USER/O/[x]:0110%;	Enable analog audio output	0110%
USER/O/[x]:0111%;	Disable analog audio output	0111%
4I-VA		
USER/I/[x]:0648%;	Switch on audio of input [x]	0648%
USER/I/[x]:0649%;	Switch off audio of input [x]	0649%
USER/I/[x]:0684%;	Set the color space to YCBCR	0684%
USER/I/[x]:0685%;	Set the color space to RGB	0685%
USER/I/[x]:0686%;	Set the input signal to HDMI	0686%
USER/I/[x]:0687%;	Set the input signal to DVI	0687%
USER/I/[x]:0622%;	Set the signal of input channel [x] to VGA.	0622%
USER/I/[x]:0623%;	Set the signal of input channel [x] to YCBCR.	0623%
USER/I/[x]:0624%;	Set the signal of input channel [x] to SVIDEO.	0624%
USER/I/[x]:0625%;	Set the signal of input channel [x] to CVIDEO.	0625%
USER/I/[x]:0626%;	Set the resolution of input [x] to 1024x768@60Hz.	0626%
USER/I/[x]:0627%;	Set the resolution of input [x] to 1280X720@60Hz.	0627%
USER/I/[x]:0628%;	Set the resolution of input [x] to 1280X800@60Hz.	0628%

USER/I/[x]:0619%;	Set the resolution of input [x] to 1360X768@60Hz.	0619%
USER/I/[x]:0621%;	Set the resolution of input [x] to 1600X1200@60Hz.	0621%
USER/I/[x]:0629%;	Set the resolution of input [x] to 1920X1080@60Hz.	0629%
USER/I/[x]:0620%;	Set the resolution of input [x] to 1920X1200@60Hz.	0620%
USER/I/[x]:0617%;	Restore input [x] to factory default.	0617%
USER/I/[x]:0606%;	Auto-adjust VGA signal	0606%
USER/I/[x]:0698%;	Update software	0698%
4I-VG		
USER/I/[x]:0622%;	Set the signal of input channel [x] to VGA.	0622%
USER/I/[x]:0623%;	Set the signal of input channel [x] to YCBCR.	0623%
USER/I/[x]:0624%;	Set the signal of input channel [x] to SVIDEO.	0624%
USER/I/[x]:0625%;	Set the signal of input channel [x] to CVIDEO.	0625%
USER/I/[x]:0626%;	Set the resolution of input [x] to 1024x768@60Hz.	0626%
USER/I/[x]:0627%;	Set the resolution of input [x] to 1280X720@60Hz.	0627%
USER/I/[x]:0628%;	Set the resolution of input [x] to 1280X800@60Hz.	0628%
USER/I/[x]:0629%;	Set the resolution of input [x] to 1920X1080@60Hz.	0629%
4I-SS		
USER/I/[x]:02xx%;	Set the brightness of input [x] to xx, xx=00~99	02xx%
USER/I/[x]:03xx%;	Set the contrast of input [x] to xx, xx=00~99	03xx%
USER/I/[x]:04xx%;	Set the saturation of input [x] to xx, xx=00~99	04xx%
USER/I/[x]:05xx%;	Set the sharpness of input [x] to xx, xx=00~99	05xx%
USER/I/[x]:0607%;	Set picture’s color temperature	0607%

USER/I/[x]:0608%;	Configure image scale	0608%
USER/I/[x]:0614%;	Configure picture mode	0614%
USER/I/[x]:0617%;	Restore input [x] to factory default.	0617%
USER/I/[x]:0619%;	Set the resolution of input [x] to 1360x768, HD	0619%
USER/I/[x]:0626%;	Set the resolution of input [x] to 1024x768, XGA	0626%
USER/I/[x]:0627%;	Set the resolution of input [x] to 1280x720, 720P	0627%
USER/I/[x]:0628%;	Set the resolution of input [x] to 1280x800, WXGA	0628%
USER/I/[x]:0629%;	Set the resolution of input [x] to 1920x1080, 1080P	0629%
USER/I/[x]:0620%;	Set the resolution of input [x] to 1920x1200, WUXGA	0620%
USER/I/[x]:0621%;	Set the resolution of input [x] to 1600x1200, UXGA	0621%
USER/I/[x]:0698%;	Software update	0698%
4I-DS		
USER/I/[x]:02xx%;	Set the brightness of input [x] to xx, xx=00~99	02xx%
USER/I/[x]:03xx%;	Set the contrast of input [x] to xx, xx=00~99	03xx%
USER/I/[x]:04xx%;	Set the saturation of input [x] to xx, xx=00~99	04xx%
USER/I/[x]:05xx%;	Set the sharpness of input [x] to xx, xx=00~99	05xx%
USER/I/[x]:0606%;	(For 4I-DS/ VA) Auto-adjust VGA input signal	0606%
USER/I/[x]:0607%;	Set picture's color temperature	0607%
USER/I/[x]:0608%;	Configure image scale	0608%
USER/I/[x]:0614%;	Configure picture mode	0614%
USER/I/[x]:0617%;	Restore input [x] to factory default.	0617%
USER/I/[x]:0619%;	Set the resolution of input [x] to 1360x768, HD	0619%
USER/I/[x]:0626%;	Set the resolution of input [x] to 1024x768, XGA	0626%

USER/I/[x]:0627%;	Set the resolution of input [x] to 1280x720, 720P	0627%
USER/I/[x]:0628%;	Set the resolution of input [x] to 1280x800, WXGA	0628%
USER/I/[x]:0629%;	Set the resolution of input [x] to 1920x1080, 1080P	0629%
USER/I/[x]:0620%;	Set the resolution of input [x] to 1920x1200, WUXGA	0620%
USER/I/[x]:0621%;	Set the resolution of input [x] to 1600x1200, UXGA	0621%
USER/I/[x]:0698%;	Software update	0698%
USER/I/[x]:0686%;	Set the output signal of input [x] to HDMI	0686%
USER/I/[x]:0687%;	Set the output signal of input [x] to DVI	0687%
4O-DS		
USER/O/[x]:0201%;	Set the output source of output [x] to YPbPr	0201%
USER/O/[x]:0202%;	Set the output source of output [x] to VGA	0202%
USER/O/[x]:0203%;	Set the output source of output [x] to C-VIDEO	0203%
USER/O/[x]:0804%;	Set the resolution of output [x] to 1280x720P @60Hz	Resolution Out03 1280x720P
USER/O/[x]:0813%;	Set the resolution of output [x] to 1280x1080P @60Hz	Resolution Out03 1920x1080P
USER/O/[x]:0824%;	Set the resolution of output [x] to 1024x768 @60Hz	Resolution Out03 1024x768
USER/O/[x]:0826%;	Set the resolution of output [x] to 1280x1024 @60Hz	Resolution Out03 1280x1024
USER/O/[x]:0837%;	Set the resolution of output [x] to 1920x1200 @60Hz	Resolution Out03 1920x1200
USER/O/[x]:0106%;	Switch on the HDCP compliance of output [x]	0106%
USER/O/[x]:0107%;	Switch off the HDCP compliance of output [x]	0107%
GetResolution[x].	Capture output resolution of output [x]	
GetVGAPortMode[x].	Inquire the output status of VGA port [x]	

USER/O/[x]:0617%;	Restore output [x] to factory default.	0617%
4I-UH/BT		
AUDIO[X]I[Z].	Select audio source for input [X] [X] is port number; [Z] stands for audio source, can be 0 (embedded HDMI audio) or 1 (analog audio)	AUDIO1I0.

Examples:

1、Transfer signals from an input channel to all output channels: [x]All.

Example: Send “3All.” to transfer signals from the input 3 to all output channels.

2、Transfer all input signals to corresponding output channels respectively: All#.

Example: If this command is carried out, the status of matrix will be: 1->1, 2->2, 3->3, 4->4…… 8->8….

3、Switch off all the output channels: All$.

Example: After running this command, there will be no signals on all the outputs.

4、Switch off the detail feedback command from the COM port: /:MessageOff;

But, it will leave the “switch OK” as the feedback, when you switch the matrix.

5、Switch on the detail feedback command from the COM port: /:MessageOn;

It will show the detail switch information when it switch. Example: when switch 1->2, it will feedback “AV01 to 02”.

6、Transfer signals from an input channel to corresponding output channel: [x]#.

Example: “5#.” to transfer signals from the input 5 to the output 5.

7、Switch off an output channel: [x]$.

Example: “5$.” to switch off the output 5.

8、Switch signal: [x1] B[x2].

Example: “12B12,13,15.” to transfer signal from the input 12 to output 12,13,15.

9、Inquire the input channel to the output channel [x]: Status[x].

Example: Send “Status3.” to inquire the input channel to the output 3.

10、Inquire the input channel to the output channels one by one: Status.

Example: “Status.” to inquire the input channel to the output channels one by one.

11、Save the present operation to the preset command [Y]: Save[Y].

Example: “Save7.” to save the present operation to the preset command No.7.

12、Recall the preset command [Y]: Recall[Y].

Example: “Recall5.” to recall the preset command No.5.

13、Clear the preset command [Y]: Clear[Y].

Example: “Clear5.” to clear the preset command No.5.

14、EDID management command:. EDIDM[X]B[Y].

Example: “EDIDM5B3.” to enable input 3 to learn the EDID data of output 5.

15、Command for signal cards: USER/[Y]/[X]***.**

Example: “USER/I/7:0623%;” to set the input 7 to support YPbPr signal, the card is plugged in the second input slot of the matrix.

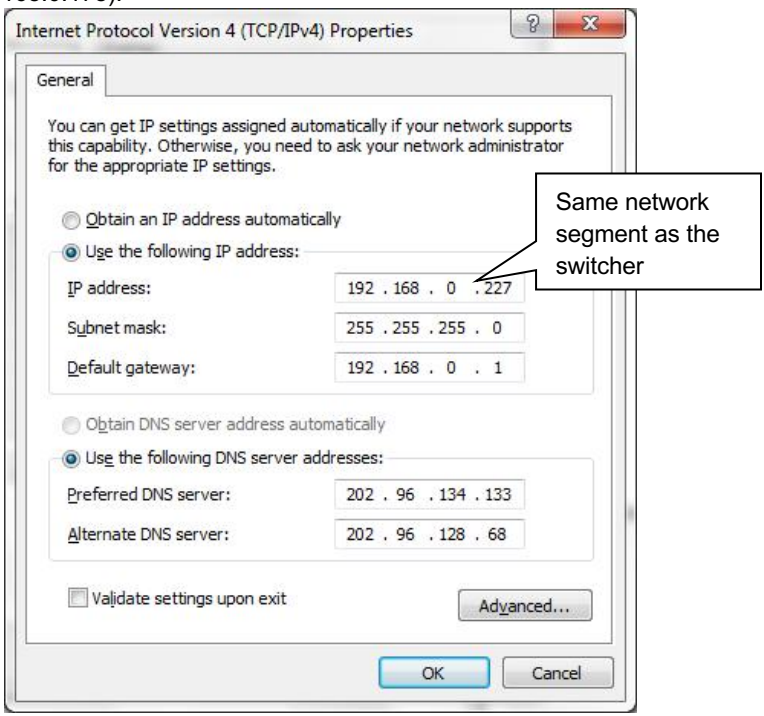
4.4. TCP/IP Control (Optional)

4.4.1. Control Modes

TCP/IP default settings: IP is 192.168.0.178, Gateway is 192.168.0.1, and Serial Port is 4001. IP & Gateway can be changed as you need, Serial Port cannot be changed.

- **Controlled by Single PC**

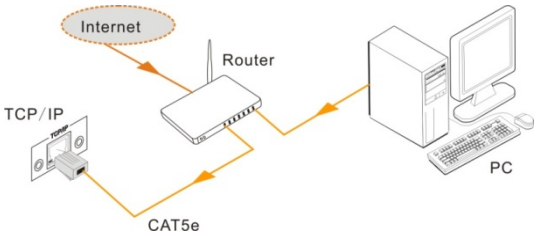
Connect a computer to the TCP/IP port of the Modular Matrix Switcher 16x16, and set its network segment to the same as the default IP of the Modular Matrix Switcher 16x16 (192.168.0.178).



- **Controlled by PC(s) in LAN**

The Modular Matrix Switcher 16x16 can be connected with a router to make up a LAN with the PC(s), this make it able to be controlled in a LAN. When control, just make sure the Modular Matrix Switcher 16x16’s network segment is the same with

the router. Please connect as the following figure for LAN control.



Step1. Connect the TCP/IP port of the Modular Matrix Switcher 16x16 to Ethernet port of PC with twisted pair.

Step2. Set the PC's network segment to the same as the Modular Matrix Switcher 16x16. Do please remember the PC's original network segment.

Step3. Set the Modular Matrix Switcher 16x16's network segment to the same as the router.

Step4. Set the PC's network segment to the original one.

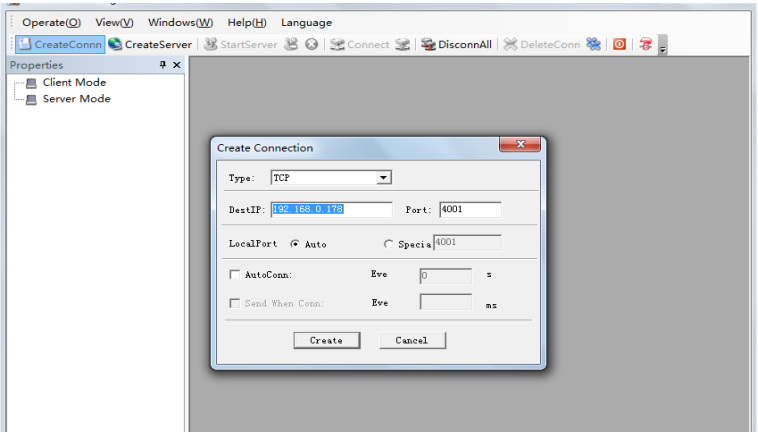
Step5. Connect the Modular Matrix Switcher 16x16 and PC(s) to the router. In the same LAN, each PC is able to control the Modular Matrix Switcher 16x16 asynchronously.

Then it's able to control the device via a TCP/IP communication software.

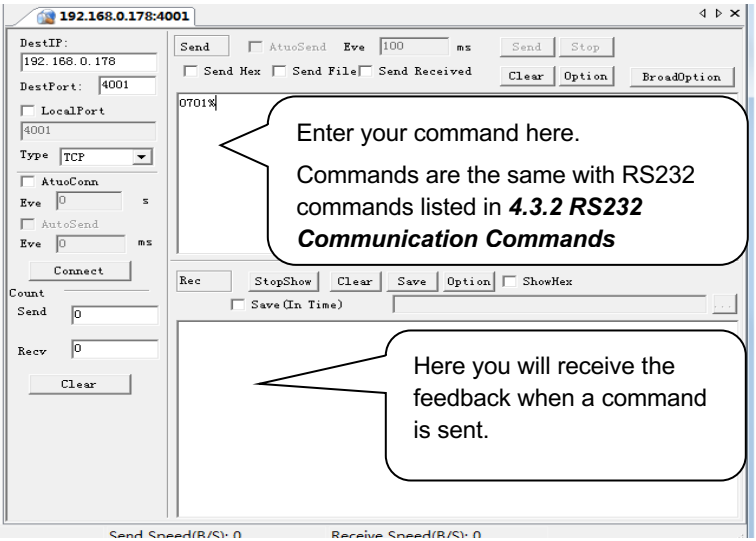
4.4.2. Control Modular Matrix Switcher 16x16 via TCP/IP communication software

(Exampled by TCPUDP software)

1) Connect a computer and Modular Matrix Switcher 16x16 to the same network. Open the TCPUDP software (or any other TCP/IP communication software) and create a connection, enter the IP address and port of Modular Matrix Switcher 16x16 (default IP: 192.168.0.178, port:4001):



2) After connect successfully, we can enter commands to control the Modular Matrix Switcher 16x16, as below:

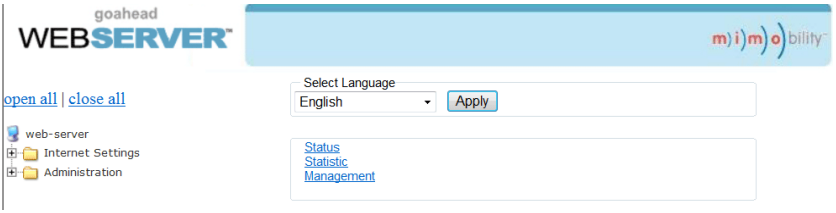


4.4.3. TCP/IP Configuration

Type the designed website 192.168.0.178:100 in your browser. Enter correct username and password to log in the WebServer:

Username: admin; **Password**: admin

Here is the main configuration interface of the WebServer:



In this interface, you can:

- Change website display language
- Modify network settings: Go to Internet Settings -> WAN
- Upgrade TCP/IP module: Go to Administration -> Upload Program -> Select program file -> Start upgrading

  Reboot the device after upgrading.

5. Specification

5.1. Main Unit

Control parts			
Serial control port	RS-232, 9- female D connector	Configurations	2 = TX, 3 = RX, 5 = GND
Installation	Rack Mountable	Front panel control	Buttons
Options	TCP/IP control		
General			
Power Supply	100VAC ~ 240VAC, 50/60Hz	Power Consumption	84W (Max)
Temperature	-10 ~ +40℃	Humidity	10% ~ 90%
Dimension (W*H*D)	483 x 133x 320mm (3U high)	Weight	3.5Kg

5.2. Changeable Cards

5.2.1. 4I-DV & 4O-DV

4I-DV		**4O-DV**	
Input	4 DVI	Output	4 DVI
Input Connector	Female DB24+5/HDMI	Output Connector	Female DB24+5/HDMI
Input Level	T.M.D.S. 2.9V~3.3V	output Level	T.M.D.S. 2.9V~3.3V

Input Impedance	75Ω	Output Impedance	75Ω
General			
Gain	0 dB	Bandwidth	340 MHz (10.2 Gbit/s)
Video Signal	DVI 1.0/HDMI 1.3 full digital T.M.D.S signal	Switching Speed	200ns (Max.)
Max Time-delay	5nS (±1nS)	Crosstalk	<-50dB@5MHz
EDID and DDC	Supports Extended Display Identification Data (EDID) and Display Data Channel (DDC) data using DVI and HDMI standards. EDID and DDC signals are actively buffered		
HDCP	Compliant with HDCP using DVI and HDMI 1.3 standards		

5.2.2. 4I-DS & 4O-DS

4I-DS		**4O-DS**	
Input	4 DVI	Output	4 DVI
Input Connector	Female DB24+5/HDMI	Output Connector	Female DB24+5/HDMI
Input Level	T.M.D.S. 2.9V~3.3V	output Level	T.M.D.S. 2.9V~3.3V
Input Impedance	75Ω	Output Impedance	75Ω
General			
Gain	0 dB	Bandwidth	340 MHz (10.2 Gbit/s)
Video Signal	DVI,HDMI,VGA,C-VIDEO,YPbPr	Switching Speed	200ns (Max.)
Max Time-delay	5nS (±1nS)	Crosstalk	<-50dB@5MHz
EDID and DDC	Supports Extended Display Identification Data (EDID) and Display Data Channel (DDC) data using DVI and HDMI standards. EDID and DDC signals are actively buffered		
HDCP	Compliant with HDCP using DVI and HDMI 1.3 standards		

5.2.3. 4I-HD & 4O-HD

4I-HD		**4O-HD**	
Input	4 HDMI	Output	4 HDMI
Input Connector	Female HDMI	Output Connector	Female HDMI
Input Level	T.M.D.S. 2.9V~3.3V	output Level	T.M.D.S. 2.9V~3.3V

Input Impedance	75Ω	Output Impedance	75Ω
General			
Gain	0 dB	Bandwidth	6.75 Gbps
Video Signal	DVI 1.0/HDMI 1.3 full digital T.M.D.S signal	Max Time-delay	5nS (±1nS)
Switching Speed	200ns (Max.)	Crosstalk	<-50dB@5MHz
EDID and DDC	Supports Extended Display Identification Data (EDID) and Display Data Channel (DDC) data		
HDCP	Compliant with HDCP		

5.2.4. 4I-HS & 4O-HS

4I-HS		**4O-HS**	
Input	4 HDMI 4 Analog Audio	Output	4 HDMI 4 Analog Audio
Input Connector	19-pin Type-A Female 3-pin pluggable terminal block	Output Connector	19-pin Type-A Female 3-pin pluggable terminal block
Power Consumption	8W	Power Consumption	12W
Color Depth	8, 10, 12 bit	Color Depth	8 bit
General			
Video Signal	HDMI, DVI	Audio Signal	PCM
Bandwidth	6.75 Gbps	Standards	HDMI1.3& HDCP1.2
Work Temperature	0~50℃	Reference Humility	10%~90%
EDID and DDC	Supports Extended Display Identification Data (EDID) and Display Data Channel (DDC) data		

5.2.5. 4I-VG & 4O-VG

4I-VG		**4O-VG**	
Input	4 VGA	Output	4 VGA
Input Connector	Female 15 pin HD	Output Connector	Female 15 pin HD
Input Level	0.5 ~ 2.0Vp-p	Output Level	0.5 ~ 2.0Vp-p
Input	75Ω	Output	75Ω

Impedance		Impedance	
Video Signal	VGA (RGBHV), YPbPr, S-video, C-video& CVBS.	Video Signal	VGA
General			
Gain	0 dB	Bandwidth	350MHz (-3dB)
Switching Speed	200ns (Max.)	Crosstalk	<-50dB@5MHz

5.2.6. 4I-VA

Video		**Audio**	
Input	4 VGA	Input	4 Stereo Audio
Input Connector	Female 15 pin HD	Input Connector	3-pin Pluggable Terminal Block
Input Level	0.5 ~ 2.0Vp-p	CMRR	>90dB @20Hz ~ 20KHz
Input Impedance	75Ω	Input Impedance	>10KΩ
General			
Gain	0 dB	Bandwidth	YPbPr:170MHz; C-video:150MHz; VGA:170MHz
Video Signal	VGA (RGBHV), YPbPr, S-video, C-video& CVBS		
Switching Speed	200ns (Max.)	Crosstalk	<-50dB@5MHz

5.2.7. 4I-SD & 4O-SD

4I-SD		**4O-SD**	
Input	4 SDI	Output	4 SDI
Input Connector	Female BNC	Output Connector	Female BNC
Input Level	0.8Vp-p ± 10%	output Level	0.8Vp-p ± 10%
Input Impedance	75Ω	Output Impedance	75Ω
General			
Gain	Unity	Maximum Data Rate	4.95Gbps
Transmission Distance	300M (Max.)	Data rate Lock	Auto

Input Return Loss	<-14 dB @ 1 MHz ~ 1.5 GHz	Input Return Loss	<-14 dB @ 1 MHz ~ 1.5 GHz
Video Standard	SMPTE 292M, SMPTE 259M, SMPTE 424M, ITU-RBT.601, ITU-RBT.1120	Data Type	8bit, 10bit, 12bit
Audio Bits per Sample	18 bits per channel, 2 channels (L, R)		
Switching Speed	200ns (Max.)	Crosstalk	<-50dB@5MHz

5.2.8. 4I-SS

Input		**Output**	
Input	4 SDI	Output	4 SDI
Input Connector	Female BNC	Output Connector	Female BNC
General			
Audio Signal	SDI, HD-SDI, 3G-SDI	Color Depth	8, 10, 12 bit
Transmission Distance	1080p≤100M	Max Resolution	1080p
Bandwidth	6.75Gbps	Power Consumption	8.7W
Work Temperature	0~50℃	Reference Humility	10%~90%

5.2.9. 4I-TP & 4O-TP

4I-TP		**4O-TP**	
Input	4 RJ45	Output	4 RJ45
Input Connector	Female RJ45	Output Connector	Female RJ45
Input Impedance	75Ω	Output Impedance	75Ω
Video General			
Transmission Distance	1080p≤70M	Bandwidth	6.75Gbps
Resolution range	800x600 ~ 1920x1200	Transmission Distance	70M(Max)
SNR	>70dB@	Return Loss	<-30dB@ 5KHz

	100MHz-100M		
HDMI Standard	Support HDMI1.3 and HDCP	Differential Phase Error	±10° @ 135MHz_100M

5.2.10. 4I-UH & 4O-UH

4I-UH			
Video Input		**Audio Input**	
Input	4 HDMI	Input	4 Analog
Input Connector	Female HDMI	Input Connector	3.5mm pluggable terminal block
Min.～Max. Level	T.M.D.S. 2.9V~3.3V	Input Impedance	75Ω
Input Impedance	100Ω (Differential)	Frequency Response	20Hz～20K Hz
4O-UH			
Video Output		**Audio Output**	
Output	4 HDMI	Output	4 Stereo
Output Connector	Female HDMI	Output Connector	3.5mm Stereo audio connector
Min.～Max. Level	T.M.D.S. 2.9V~3.3V	Output Impedance	75Ω
Output Impedance	100Ω (Differential)	Frequency Response	20Hz～20K Hz
General			
Gain	0dB	Max Resolution	4Kx2K
Transmission Distance	1080P≤70m 4Kx2K ≤ 40m	Switching Speed	200ns (Max.)
Work Temperature	0~50℃	Reference Humility	10%～90%
SNR	>70dB@ 100MHz-100M	Return Loss	<-30dB@ 5KHz
Supported Audio Format	Embedded HDMI audio: PCM, Dobly Digital, DTS, DTS-HD Analog audio: PCM		
HDMI Standard	Support HDMI1.4& DVI1.0		
EDID& HDCP Management	Compliant with HDCP 1.4; Support manual EDID management		

5.2.11. 4I-UF & 4O-UF

4I-UF	**4O-UF**

Input	4 Fiber Optical	Output	4 Fiber Optical
Input Connector	SPF Fiber Optical Connector	Output Connector	SPF Fiber Optical Connector
Fiber Type	Multi-mode, Single mode	Fiber Type	Multi-mode, Single mode
General			
Data Rate	10.2 Gbps	Color Depth	8bit, 10bit, 12bit, 16bit
Work Temperature	0～55℃	Reference Humility	10%～90%
Optical Fiber Mode			
Connector	LC connector		
Resolution	Up to 4Kx2K		
Transmission Distance	2km (Single mode transmission, using Single Mode Optical Module and OM3 Single Mode Fiber Cable) 300m (Multi-mode transmission, using Single/ Multi mode Optical Module and OM3 Multi-Mode Fiber Cable)		
Data Rate	10.2Gbit/s		

5.2.12. 4I-BT & 4O-BT

4I-BT			
Video Input		**Audio Input**	
Input	4 HDBT	Input	4 Stereo
Input Connector	4 Female RJ45 (with dual-color indicator)	Input Connector	3.5mm Stereo audio connector
Min.～Max. Level	T.M.D.S 2.9V～3.3V	Input Impedance	75Ω
Input Impedance	100Ω (Differential)	Frequency Response	20Hz～20K Hz
4O-BT			
Video Output		**Audio Output**	
Output	4 HDBT	Output	4 Stereo
Output Connector	4 Female RJ45 (with dual-color indicator)	Output Connector	3.5mm Stereo audio connector
Min.～Max. Level	T.M.D.S 2.9V～3.3V	Output Impedance	75Ω
Output Impedance	100Ω (Differential)	Frequency Response	20Hz～20K Hz

Control Part			
Control Signal	4 RS232	Control Connector	3-pin pluggable terminal block
Protocol	TCP/IP		
General			
Gain	0dB	Bandwidth	10.2Gbps
Max Resolution	4Kx2K	Crosstalk	<-50dB@5MHz
Transmission Distance	1080P≤70m 4Kx2K ≤ 40m	Switching Speed	200ns (Max.)
Work Temperature	0~50℃	Reference Humility	10%～90%
Supported Audio Format	Embedded HDMI audio: PCM, Dobly Digital, DTS, DTS-HD Analog audio: PCM		
HDMI Standard	Support HDMI1.4a		
EDID& HDCP Management	Compliant with HDCP 1.4; Support manual EDID management		

6. Troubleshooting & Maintenance

Problems	Causes	Solutions
Output image with ghost	Bad quality of the connecting cable	Try another high quality cable
	Impropriate image setting of the displayer	Adjust corresponding image settings
Output image with color losing or no video signal output	Fail connection	Reconnect the displayer and the matrix
No output image when switching	No signal at the input / output end	Check with oscilloscope or multimeter if there is any signal at the input/ output end.
	Fail or loose connection	Make sure the connection is good
	The switcher is broken	Send it to authorized dealer for repairing.
IR remote does not work	Run out of battery	Change for another battery
	IR remote is broken	Send it to authorized dealer for repairing.
POWER indicator doesn't work or no respond to any operation	Fail connection of power cord.	Make sure the power cord connection is good.
EDID management does not work normally	The HDMI cable is broken at the output end.	Change for another HDMI cable which is in good working condition.
There is a blank screen on the display when switching	The display does not support the resolution of the video source.	Switch again.
		Manage the EDID data manually to make the resolution of the video source automatically compliant with the output resolution.

Static becomes stronger when connecting the video connectors	Bad grounding	Check the grounding and make sure it is connected well.
Cannot control the device by control device (e.g. a PC) through RS232 port	Wrong RS232 communication parameters	Type in correct RS232 communication parameters.
	Broken RS232 port	Send it to authorized dealer for checking.
Cannot control the device by front panel buttons while can control it through RS232 port	The front panel buttons are locked	Send command **50605%** to unlock the front panel buttons.
Cannot control the device by RS232 / IR remote / front panel buttons	The device has already been broken.	Send it to authorized dealer for repairing.

If your problem persists after following the above troubleshooting steps, seek further help from authorized dealer or our technical support.

7. Customer Service

The return of a product to our Customer Service implies the full agreement of the terms and conditions hereinafter. There terms and conditions may be changed without prior notice.

1) Warranty

The limited warranty period of the product is fixed 3 (three) years.

2) Scope

These terms and conditions of Customer Service apply to the customer service provided for the products or any other items sold by authorized distributor only.

3) Warranty Exclusions:

- Warranty expiration.
- Factory applied serial number has been altered or removed from the product.
- Damage, deterioration or malfunction caused by:
  - ✓ Normal wear and tear.
  - ✓ Use of supplies or parts not meeting our specifications.
  - ✓ No certificate or invoice as the proof of warranty.
  - ✓ The product model showed on the warranty card does not match with the model of the product for repairing or had been altered.
  - ✓ Damage caused by force majeure.
  - ✓ Servicing not authorized by distributor.
  - ✓ Any other causes which does not relate to a product defect.
- Shipping fees, installation or labor charges for installation or setup of the product.

4) Documentation:

Customer Service will accept defective product(s) in the scope of warranty coverage at the sole condition that the defeat has been clearly defined, and upon reception of the documents or copy of invoice, indicating the date of purchase, the type of product, the serial number, and the name of distributor.

Remarks: For further assistance or solutions, please contact your local distributor.