Putron Electronics

Composite-Video Matrix Switchers System

User Manual

Putron

MCV Series ---Composite Video/Stereo Audio Matrix Switcher

Please read this manual carefully before using this product.

Notice：

This **MCV Matrix Switchers User Manual** takes example of the Matrix model MCV1616. It can be used as user's manual of other MCV matrix switcher models. This manual is only an instruction for operators, not for any maintenance usage. The functions described in this version are updated till Feb 2008. Any changes of functions and parameters since then will be informed separately. Please refer to the dealers for the latest details.

All product function is valid till 2008-1-1

⚠ Safety Operation Guide

In order to ensure the credibility use of the product and the user's safety, please comply with the following items during installation and maintenance:

①

The system must be earthed properly. Please do not use two blades plugs and ensure the alternating power supply ranged from 100v to 240v and from 50Hz to 60Hz.

②

Do not put the switcher in a place of too hot or too cold.

③

To avoid any damage by over heat, please keep the working environment good in ventilation to radiate the heat when running the switcher.

④

The switchers should be turned off when in rainy and humid days or nonuse for a long time,

⑤

The alternating power supply line should be disconnected with the power socket during the following operation.

A. Take out or reinstall any component of the switcher
B. Disconnect or re-connect any connector of the switcher

⑥

Please do not attempt to maintain and uncover the switcher for there is a high-voltage component inside and the risk of the electric shock.

⑦

Do not splash any chemical product or liquid on or near the equipment.

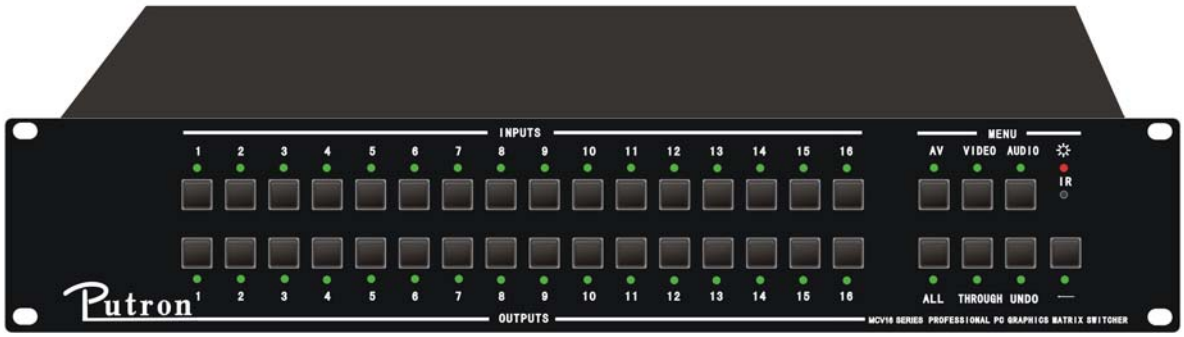
Contents

1. Introduction

1.1 About MCV Matrix Switcher System

MCV series Matrix switcher is a high-performance professional video and audio signal switcher that can be used for cross switching of multi computer and audio signal.

MCV series switcher mostly apply in broadcasting TV engineering, multi-media meeting room, big screen display engineering, television education, command control center or other fields. It provides power-fail locale protection function, LED indicating, shortcut selecting. With RS232 interface, it can be worked with PC, remote control system and any other far-end control system devices.The user manual takes MCV1616A as the example; other models can take reference from it too.



F 1-1 MCV 1616A

1.2 MCV Matrix Switcher Models

According to different situation and users, the MCV series can be classified into the following models:

Specifications / Models	A/V Input	A/V Output	RS232 Interface	LCD Display
MATRIX MCV44A	4	4	√	×
MATRIX MCV82A	8	2	√	×
MATRIX MCV84A	8	4	√	×
MATRIX MCV88A	8	8	√	×
MATRIX MCV164A	16	4	√	×
MATRIX MCV168A	16	8	√	×
MATRIX MCV1616A	16	16	√	×
MATRIX MCV248A	24	8	√	×
MATRIX MCV2416A	24	16	√	×
MATRIX MCV2424A	24	24	√	×
MATRIX MCV328A	32	8	√	×
MATRIX MCV3216A	32	16	√	×

Specifications / Models	A/V Input	A/V Output	RS232 Interface	LCD Display
MATRIX MCV3224A	32	24	√	×
MATRIX MCV3232A	32	32	√	×
MATRIX MCV4832A	48	32	√	×
MATRIX MCV4848A	48	48	√	×
MATRIX MCV6432A	64	32	√	×
MATRIX MCV6448A	64	48	√	×
MATRIX MCV6464A	64	64	√	×
MATRIX MCV9664A	96	64	√	×
MATRIX MCV9696A	96	96	√	×
MATRIX MCV12864A	128	64	√	×
MATRIX MCV12896A	128	96	√	×
MATRIX MCV128128A	128	128	√	×

2. Packing of the Product

MCV Matrix Switcher

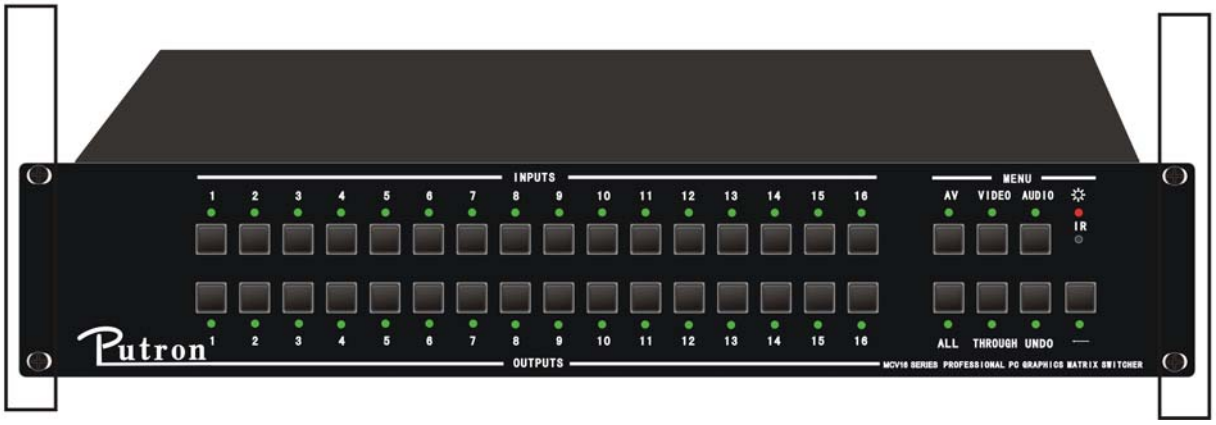
RS-232 Communication Cord

Power Supply Cord

CD with Application

3. Installation

MCV matrix switchers adopt metal shell and can be stacked with other device. Moreover, they are rack-mountable enclosure and can be installed in the standard 19” rack.



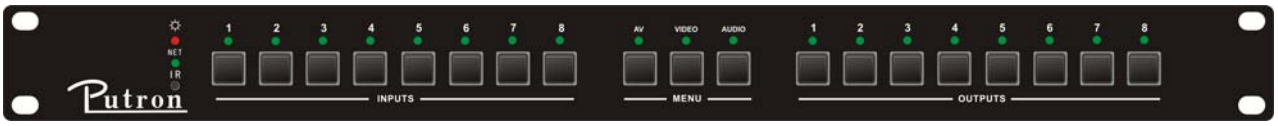
F 3-1 Installing the MCV matrix switcher in the standard 19" rack

4. Front View of the Product

4.1 Front View of the MCV44A Series

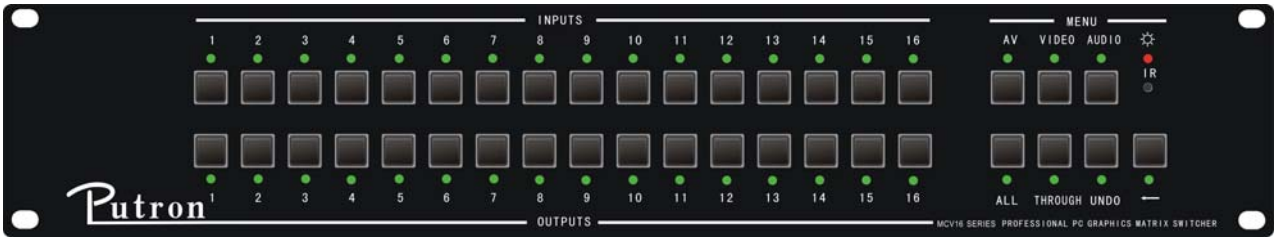
F 4-1 Front view of the MCV44A

4.2 Front View of the MCV8 Series



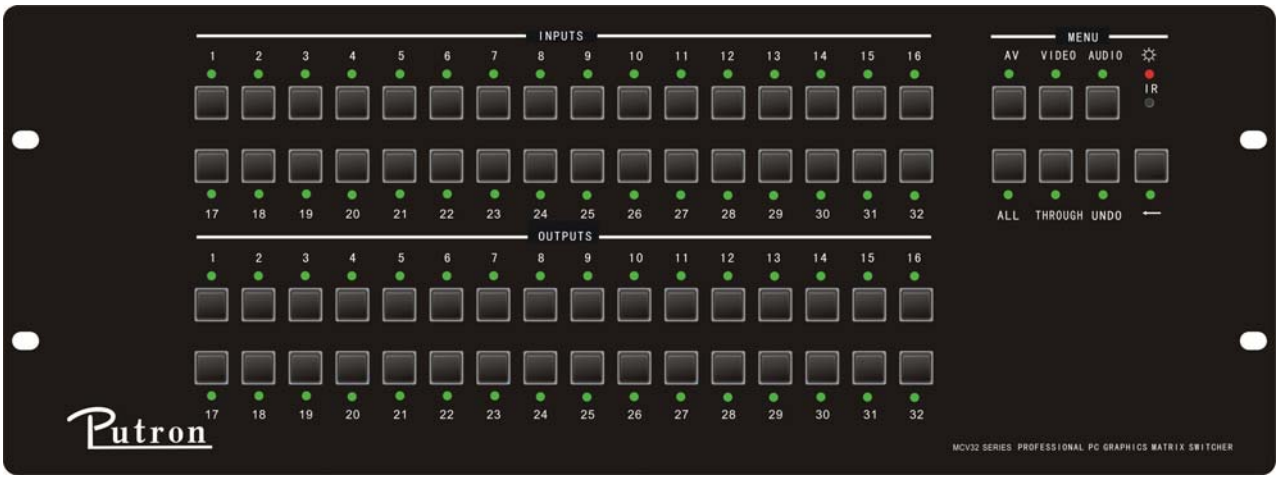
F 4-2 Front view of the MCV82A, MCV84A, MCV88A

4.3 Front View of the MCV16 Series



F 4-3 Front view of the MCV164A, MCV168A, MCV1616A

4.4 Front View of the MCV24, 32 Series



F 4-4 Front view of the MCV248A, MCV2416A, MCV2424A, MCV328A, MCV3216A, MCV3224A, MCV3232A

Some more models:

MCV 48 channels series
MCV 64 channels series
MCV 96 channels series
MCV128 channels series
Please contact us for more information: info@putron.com or visit website: www.putron.com

5. Rear View of the Product

5.1 Rear View of the MCV44A Series

F 5-1 Rear view of the MCV44A

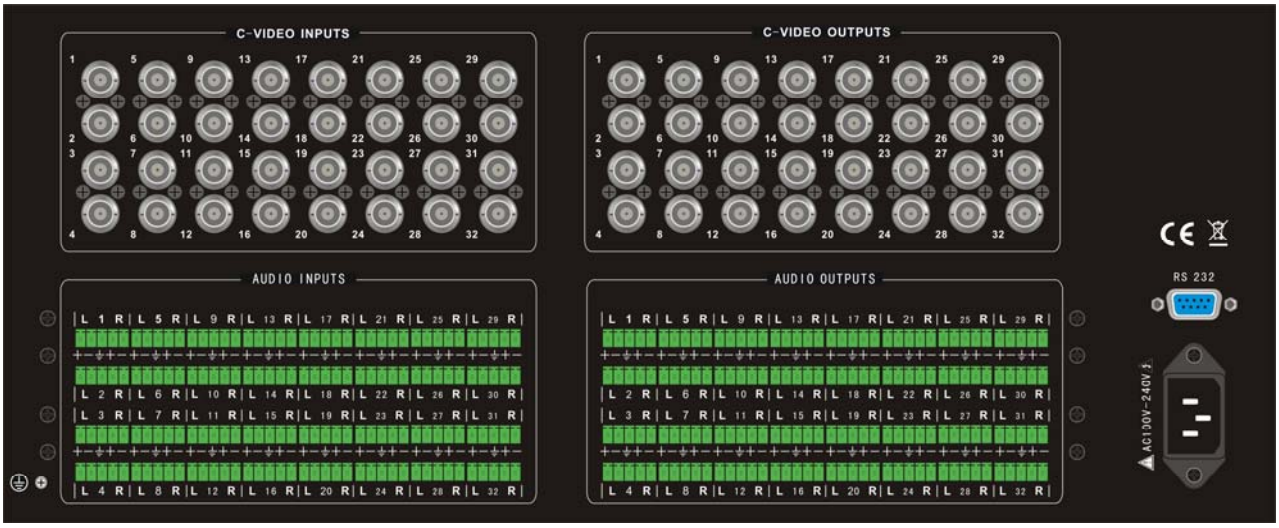
5.2 Rear View of the MCV88A Series

F 5-2 Rear view of the MCV82A,MCV84A,MCV88A

5.3 Rear View of the MCV1616A Series

F 5-3 Rear view of the MCV164A,MCV168A, MCV1616A

5.4 Rear View of the MCV24, 32 Series



F 5-4 Rear view of the MCV2424A,MCV3232A

Some more models:

MCV 48 channels series
MCV 64 channels series
MCV 96 channels series
MCV128 channels series
Please contact us for more information: info@putron.com or visit website: www.putron.com

6. External Connection

6.1 Introduction of the Input and Output Connectors

According to different type of matrix, computer signal I/O interface are make up of Channel 4，Channel 8 for RCA terminals; Channel 16，Channel 24，Channel 32，Channel 48，Channel 64，Channel 96，Channel 128 BNC female terminals, audio signal I/O terminals are make up of Channel 2，Channel 4，Channel 8，Channel 16，Channel 24，Channel 32，Channel 48，Channel 64，Channel 96，Channel

128 3.8mm captive screw connectors(or RCA terminals). The channel number of MCV1616A signal I/O terminals are form Channel 1 to Channel 8 and Channel 9 to Channel 16 (form left to right, display in two rows), The interfaces are video terminals (BNC), audio left state terminals (white RCA), audio right state terminals (red RCA). Please refer to shell silk-screen figure about other types of interface.

6.2 Connection of RS-232 Communication Port

Except the front control panel, the MCV matrix switcher can be control 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-pin D connector. The definition of its pins is as the table below.

Pin	RS-232	Description
1	N/u	Not used
2	Tx	Transmit data
3	Rx	Receive data
4	N/u	Not used
5	Gnd	Signal ground
6	N/u	Not used
7	N/u	Not used
8	N/u	Not used
9	N/u	Not used

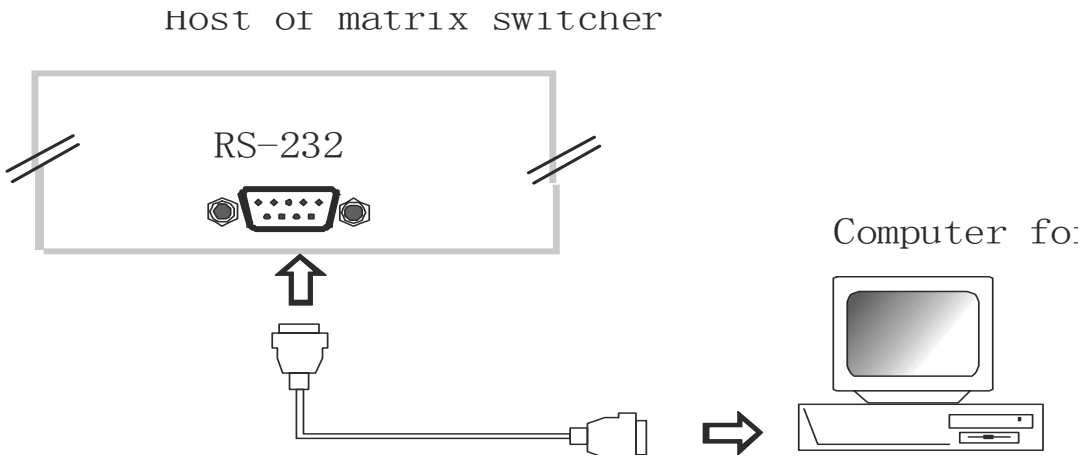
6.2.1 Connection with Control Systems

With the RS-232 port, the MCV matrix switchers can be control by several kinds of control systems.

6.2.2 Connection with Computer

When the switcher connects to the COM1 or COM2 of the computer with control software, users can control it by that computer.

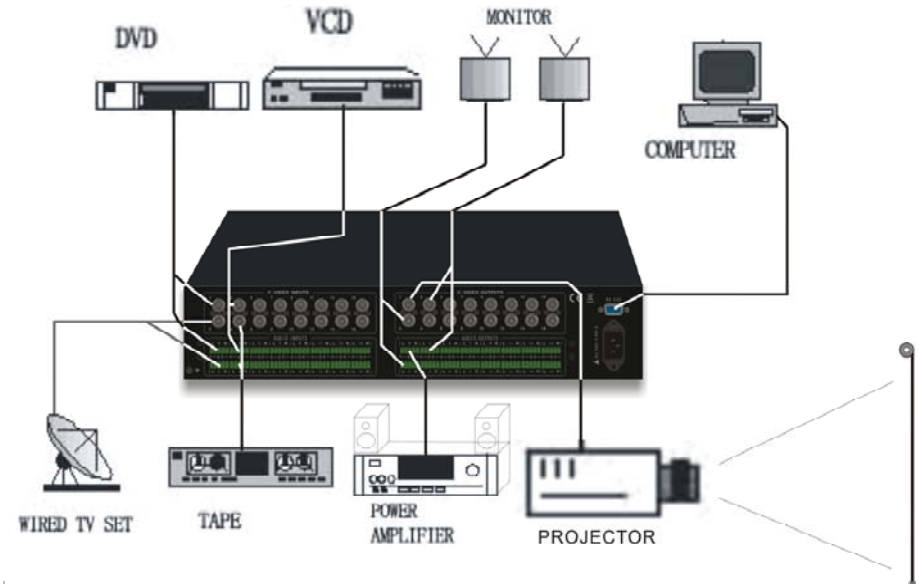
To control the switcher, users may use the RS232 software



F 6-1 Connection between MCV matrix switcher and the computer

6.3 How to Connect with the Input and Output Terminals

The MCV matrix switchers may take DVD players, video tape recorders, camcorders, cable TV and video showing platform as their input signal source, and projectors, RP TVs, video tape recorders and amplifiers as their output signal destinations.

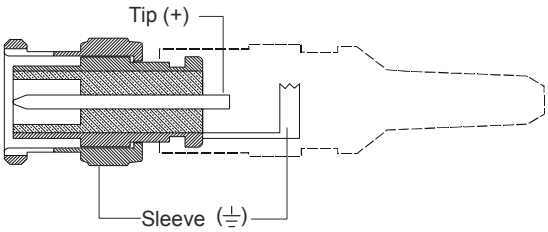


F 6-2 Connection of MCV matrix switcher system

6.4 How to Connect with the MCV Devices

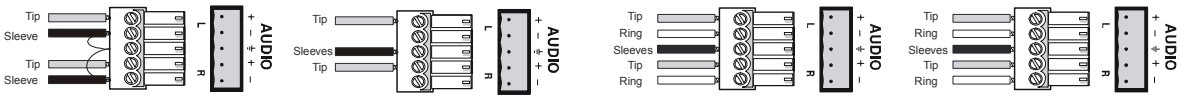
Connection of the MCV Matrix with BNC Video Connectorsand Captive Screw Audio Connectors

A）Connection of BNC video connectors



BNC Connector

B）Connection of captive screw audio connectors (unbalanced/balanced)



Unbalanced Input Unbalanced Output Balanced Input Balanced Output

7. Operation of the Control Panel

7.1 Front Panel Description

"AV" AV synchronal button: To transfer video and audio signal synchronously by the switcher
Example: To transfer both the video and the audio signals from input channel No.3 to output channel No.4.
Operation: Press buttons in this order "AV","3",, "4"".

"VIDEO" Video button: To transfer only video signals from input channel to output channel
Example: To transfer video signals from input channel No.3 to output channel No.4.
Operation: Press buttons in this order "VIDEO", "3", "4".
Example: To mute the video of output channel "6"(cut the video).
Operation: Press buttons in this order "VIDEO". "6"

"AUDIO" Audio button: To transfer only audio signals from input channel to output channel
Example: To transfer audio signals from input channel No.2 to output channel No.3.
Operation: Press buttons in this order ""AUDIO", "2", "3"".

" ← " Backspace button: To backspace the latest input button

"THROUGH" Through button: To transfer the signals directly to the corresponding output channels
Example: To transfer the signals from input channel No. 3 to their corresponding output channels
Operation: Press buttons in this order "3", "THROUGH"

"ALL" All button: To transfer an input channel to all output channels or switch off all the output channels
Example1: To transfer video and audio signals from input channel No.7 to all output channels
Operation: Press buttons in this order "7", "ALL"
Example2: To transfer all input signals to the corresponding output channels respectively. In another word, to switch to this status: 1->1, 2->2, 3->3, 4->4……16->16.
Operation: Press buttons in this order "ALL", "THROUGH"

"UNDO" Undo button: To resume to the status before the command just performed

"1,2,3,4" I/O Keypads: Keys to select I/O channels.
Example: To transfer input channel No.3 to output channel No.1
Operation: Press buttons in this order : "3" in INPUT area, "1" in OUTPUT area.
Example: Check the input channel of the output "7"
Operation: Press button "7" of output, then, you will see the LED of relative input channel will be on.

7.2 Command Format of the Switching Operation

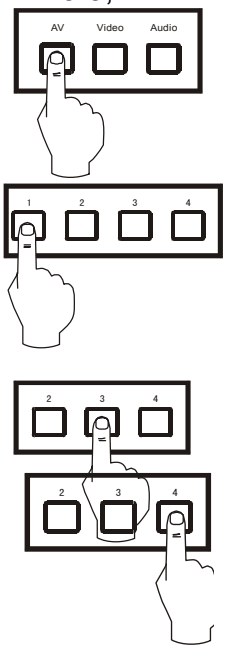
With the front control panel, the switcher could be control directly and rapidly by pressing the buttons under below format.

"Menu" +"Input Channel" +"Output Channel 1"

"Menu": "AV", "Audio", "Video"
"Input Channel": Fill with the number of input channel to be controlled
"Output Channel": Fill with the number of output channels to be controlled

7.3 Examples of Operation

Example 1: To transfer video and audio signals from input channel No.1 to output channel No.3,4



1, Press the button for switching mode "AV" for the switching mode of video and audio ("Audio" for the switching mode of audio only; "Video" for the switching mode of video only)

2, Press the button for input channel number"1"

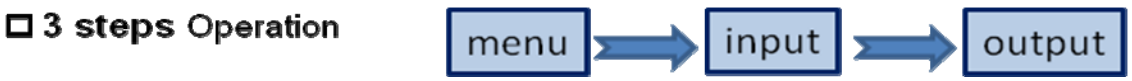
3,Press the button for the first output channel number "3"

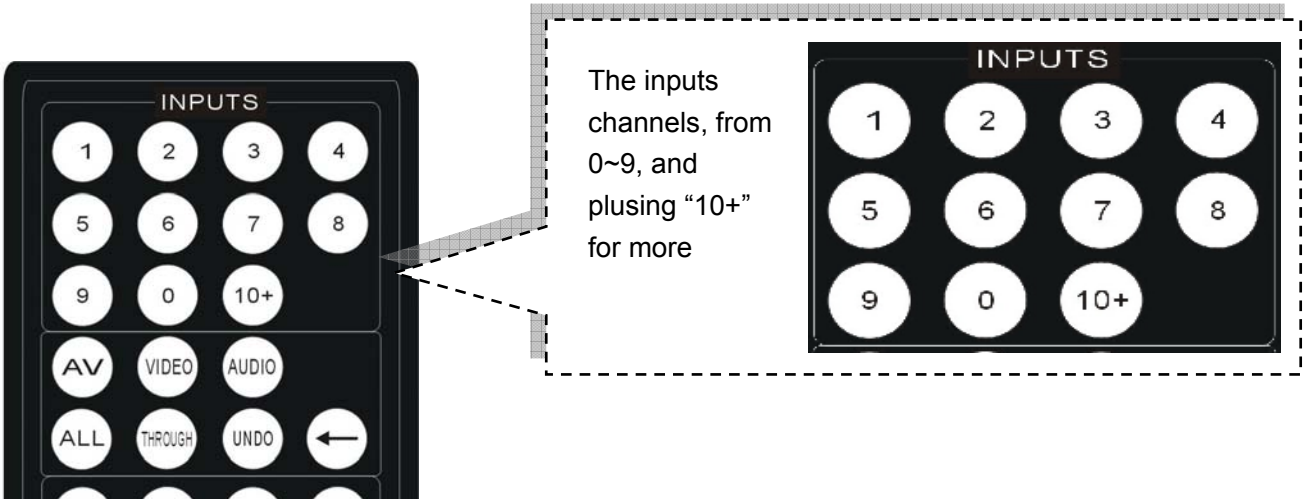
4, Press the button for the second output channel number "4"

Then, switching OK ! audio/video switching from "1" to "3" and "4"

8. Usage of the Remote Controller

With the infrared remote controller, the matrix switcher could be control remotely. Because the function buttons on the remote controller are the same with the ones on the front control panel, the remote controller shares the same control operation and command format with the control panel. P





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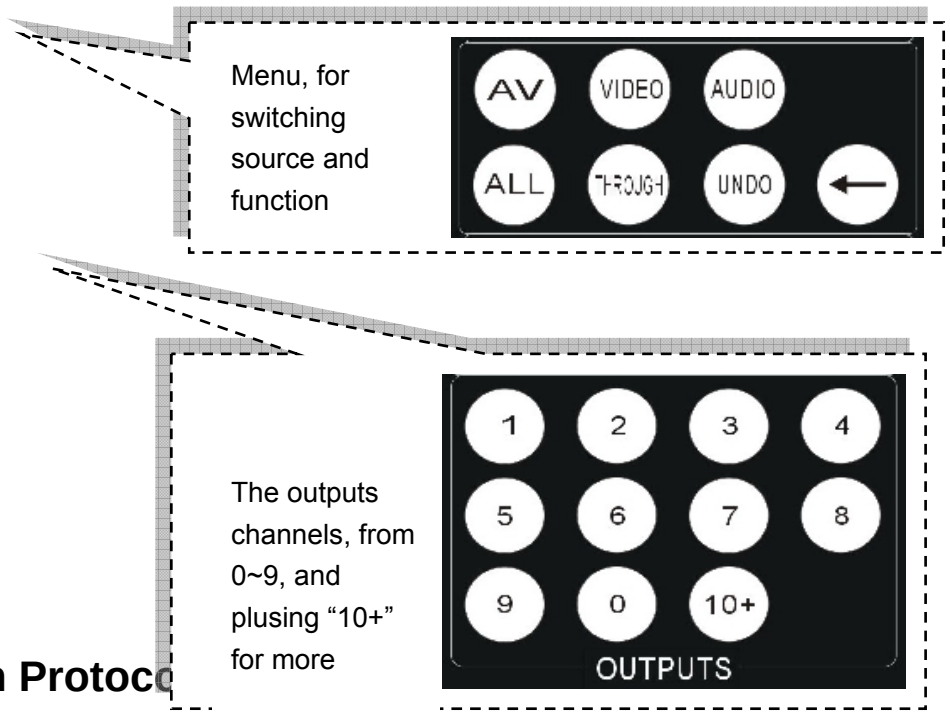

9. Communication Protoc

With this command system, the RS232 software is able to control and operate the MCV Matrix remotely.

Communication protocol:

Baud rate: 9600 Data bit: 8 Stop bit: 1 Parity bit: none

Command Types	Command Codes	Functions
System Command	/*Type;	Inquire the models information.
	/%Lock;	Lock the keyboard of the control panel on the Matrix.
	/%Unlock;	Unlock the keyboard of the control panel on the Matrix.
	/^Version;	Inquire the version of firmware
	/:MessageOff;	Turn off the feedback command from the com port. It will only show the “switcher OK”.
	/:MessageOn;	Turn on the feedback command from the com port.
	Undo.	To cancel the previous operation.
	Demo.	Switch to the “demo” mode, 1->1, 2->2, 3->3 … and so on.
	[x1]All.	Transfer signals from the input channel [x1] to all output channels
	All#.	Transfer all input signals to the corresponding output channels respectively.
	All$.	Switch off all the output channels.
	[x1]#.	Transfer signals from the input channel [x1] to the output channel [x1].
	[x1]$.	Switch off the output channel [x1].

Operation Command （PUTRON2.0 Command System）	[x1] V[x2].	Transfer the video signals from the input channel [x1] to the output channel [x2].
	[x1] V[x2],[x3],[x4].	Transfer the video signals from the input channel [x1] to the output channels [x2], [x3] and [x4].
	[x1] A[x2].	Transfer the audio signals from the input channel [x1] to the output channel [x2].
	[x1] A[x2],[x3],[x4].	Transfer the audio signals from the input channel [x1] to the output channels [x2], [x3] and [x4].
	[x1] B[x2].	Transfer both the video and the audio signals from the input channel [x1] to the output channel [x2].
	[x1] B[x2],[x3],[x4].	Transfer both the video and the audio signals from the input channel [x1] to the output channels [x2], [x3] and [x4].
	Status[x1].	Inquire the input channel to the output channel [x1].
	Status.	Inquire the input channel to the output channels one by one.
	Save[Y].	Save the present operation to the preset command [Y]. [Y] ranges from 0 to 9.
	Recall[Y].	Recall the preset command [Y].
	Clear[Y].	Clear the preset command [Y].

Note:

1. [x1], [x2], [x3] and [x4] are the symbols of input or output channels ranged according to the model of the matrix switcher. If the symbols exceed the effective range, it would be taken as a wrong command.
2. In above 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 “.” and “;”.

Detail Examples:

1、 Transfer signals from an input channel to all output channels: [x1]All.
Example: To transfer signals from the input channel No.3 to all output channels. Run Command: “3All.”

2、 Transfer all input signals to the corresponding output channels respectively: All#.
Example: If this command is carried out on an MVG1616-A matrix switcher, the status of it will be: 1->1, 2->2, 3->3, 4->4……16->16.

3、 Switch off all the output channels: All$.
Example: After running this command, there will be no signals on all the output channels.

4、 Check the version of the firmware: /^Version;
To check the version of the firmware.

5、 Switch off the detail feedback command from the COM port: /:MessageOff;
Switch off the detail feedback information from the COM port. But, it will leave the “switch OK” as the feedback, when you switch the matrix.

6、 Switch on the detail feedback command from the COM port: /:MessageOn;
Switch on the detail feedback information from the COM port. it will show the detail switch information when it switch. Example: when switch 1->2 for Audio, it will feedback “A0102”.

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

Example: To transfer signals from the input channel No.5 to the output channel No.5. Run Command: “5#.”

8、Switch off an output channel: [x]$.

Example: To switch off the output channel No.5. Run Command: “5$.”

9、Switch video signals command: [x1] V[x2].

Example: To transfer the video signals from the input channel No.3 to the output channel No.5. Run Command: “3V5.”

10、Switch audio signals command: [x1] A[x2].

Example: To Transfer the audio signals from the input channel No.10 to the output channel Run Command: “10A2.”

11、Switch both video and audio signals synchronously: [x1] B[x2].

Example: To transfer both the video and the audio signals from the input channel No.120 to the output channel No.12,13,15. Run Command: “120B12,13,15.”

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

Example: To inquire the input channel to the output channel No.23. Run Command: “Status23.”

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

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

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

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

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

Example: To recall the preset command No.5. Run Command: “Recall5.”

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

Example: To clear the preset command No.5. Run Command: “Clear5.”

10. Technical Specifications

Series / Specifications	MCV44A	MCV8 Series	MCV16 Series	MCV24 Series	MCV32 Series	MCV48, 64 Series	MCV96, 128 Series
Video							
Models included	MCV44A	MCV82A MCV84A MCV88A	MCV164A MCV168A MCV1616A	MCV248A MCV2416A MCV2424A	MCV328A MCV3216A MCV3224A MCV3232A	MCV4832A MCV4848A MCV6432A MCV6448A MCV6464A	MCV9664 MCV9696 MCV12864 MCV12896 MCV128128
Gain	0 dB						

Series / Specifications	MCV44A	MCV8 Series	MCV16 Series	MCV24 Series	MCV32 Series	MCV48, 64 Series	MCV96, 128 Series
Bandwidth	100MHz (-3dB) , fully loaded 0 -10MHz:≤+/- 0.1dB 0 -30MHz:≤+/- 0.5dB			150MHz (-3dB) , fully loaded 0 -10MHz:≤+/- 0.1dB 0 -30MHz:≤+/- 0.5dB			
Cross talk sum	-50dB @ 5 MHz, -45dB @ 10 MHz						
Differential phase I/0S	<1.28°，3.58MHz						
Differential phase error	0.1%, 3.58-4.43MHz						
Differential gain error	0.1°, 3.58-4.43MHz						
Maximum transfer delay	5nS(±1nS)						
Switching speed	200 ns (Max)						
Signal type	Composite video						
Input video							
Connector	RCA	RCA	BNC female	BNC female	BNC female	BNC female	BNC female
Maximum/ Minimum level	Analog signals: 0.5V ~ 2.0V p-p						
Impedance	75 Ω						
Echo loss	-30dB@5MHz						
Genlock	0.3V-0.4Vp-p						
Max error in DC offset	15mV						
Output video							
Connector	RCA	BNC female					
Maximum/ Minimum level	Analog signals: 0.5V ~ 2.0V p-p						
Impedance	75 Ω						
Echo loss	-30dB@5MHz						
DC offset	±5mV (Maximum)						
Transition type	Vertical interval						

Series / Specifications	MCV44A	MCV8 Series	MCV16 Series	MCV24 Series	MCV32 Series	MCV48, 64 Series	MCV96, 128 Series
Sync signal							
Input/output signals	NTSC 3.58，NTSC4.43，PAL，SECAM						
Audio signal							
Input connector	RCA		RCA	3.8mm with screw , 5 pole			
Output connector	RCA		RCA	3.8mm with screw , 5 pole			
Gain	0dB						
Frequency respond	20 Hz ¯ 20 kHz,						
General harmonic distortion + noise	0.03% @ 1 kHz （under rating voltage）						
S/N	>90dB						
Segregation rate	>80dB @ 1 kHz						
Y/C interferer	<-80dB @ 1 kHz, fully loaded						
CMRR	>75dB @: 20 Hz ~ 20 kHz						
Signal	Stereo ， balanced /unbalanced						
Impedance	Input：>10 kΩ（balanced /unbalanced） Output：50 Ω （unbalanced），100 Ω（balanced）						
Maximum input level	+19.5dBu, （balanced /unbalanced）						
Gain error	±0.1dB @20 Hz ~ 20 kHz						
Max output level	+19.5dBu, （balanced /unbalanced）						
Control type							
Serial control port	RS-232, 9-pin FD connector						
Baud rate and protocol	Baud rate: 9600 Data bit: 8 Stop bit: 1 Parity bit: none						

Series / Specifications	MCV44A	MCV8 Series	MCV16 Series	MCV24 Series	MCV32 Series	MCV48, 64 Series	MCV96, 128 Series
Serial control poling protocol	2 = TX, 3 = RX, 5 = GND						
Ethernet	**Connector**	RJ-45 Female（Optional accessory）					
	Protocol	TCP/IP					
	Speed	Full/half-duplex 10/100M					
Control application	Switch 2.0						
Features							
Power supply	100VAC ~ 240VAC, 50/60 Hz, universal international power supply						
Temperature	Storing and operating temperature: -20° ~ +70°C						
Humidity	Storing and operating humidity: 10% ~ 90%						
Size	485(L)X245(W)X50mm(H)	485(L)X245(W)X100mm(H)	485(L)X245(W)X150mm(H)	485(L)X245(W)X285mm(H)	485(L)X245(W)X285mm(H)	485(L)X265(W)X465mm(H)	485(L)X265(W)X920mm(H)
Weight	1.8kg	3.5kg	4.6 kg	9.0 kg	9.0 kg	16.8 kg	29.5kg
MTBF	30,000 hours						
Quality guarantee	1 year free guarantee						

11. Troubleshooting & Maintenance

1) When the output image in the destination device connected to the MCV Matrix has ghost, such as the projector output with ghost, please check the projector's setting or try another high quality connection cord.

2) When there is a color losing or no video signal output, it may be the unmatched MCV connector order between the input and output end.

3) When the remote controller doesn't works:
   A. Maybe the battery is run out of, please change a new one.
   B. Maybe the controller is broken, please ask the dealer to fix it.

4) When user can not control the MCV Matrix by computer through its COM port, please check the COM port number in the software and make sure the COM port is in good condition.

5) When switching , the beeper beeps but without any output image：
   A. Check with oscilloscope or multimeter if there is any signal at the input end. If there is no signal input, it may be the input connection cord broken or the connectors loosen.
   B. Check with oscilloscope or multimeter if there is any signal at the output end. If there is no signal output, it may be the output connection cord broken or the connectors loosen.
   C. Please make sure the destination device is exactly on the controlled output channel
   D. If it is still the same after the above checking, it may be something wrong in the switcher. Please send it to the dealer for fixing.
   E.
6) If the output image is interfered, please make sure the system is earthed well.

7) If the static becomes stronger when connecting the BNC connectors, it may be due to the incorrect earthing of the power supply, Please earth it again correctly, and otherwise it would bring damage to the switcher or shorten its natural life.

8) If the Matrix can not be controlled by the keys on the front panel, RS232 port or remote controller, the host may has already been broken. Please send it to the dealer for fixing.