

FLEX MINI



RGBlink®

User Manual

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Thank you for choosing our product!

This User Manual is designed to show you how to use this video processor quickly and make use of all the features. Please read all directions and instructions carefully before using this product.

Declarations

FCC/Warranty

Federal Communications Commission (FCC) Statement

This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area may cause harmful interference, in which case the user will be responsible for correcting any interference.

Guarantee and Compensation

RGBlink provides a guarantee relating to perfect manufacturing as part of the legally stipulated terms of guarantee. On receipt, the purchaser must immediately inspect all delivered goods for damage incurred during transport, as well as for material and manufacturing faults. RGBlink must be informed immediately in writing of any complaints.

The period of guarantee begins on the date of transfer of risks, in the case of special systems and software on the date of commissioning, at latest 30 days after the transfer of risks. In the event of justified notice of compliant, RGBlink can repair the fault or provide a replacement at its own discretion within an appropriate period. If this measure proves to be impossible or unsuccessful, the purchaser can demand a reduction in the purchase price or cancellation of the contract. All other claims, in particular those relating to compensation for direct or indirect damage, and also damage attributed to the operation of software as well as to other service provided by RGBlink, being a component of the system or independent service, will be deemed invalid provided the damage is not proven to be attributed to the absence of properties guaranteed in writing or due to the intent or gross negligence or part of RGBlink.

If the purchaser or a third party carries out modifications or repairs on goods delivered by RGBlink, or if the goods are handled incorrectly, in particular if the systems are commissioned operated incorrectly or if, after the transfer of risks, the goods are subject to influences not agreed upon in the contract, all guarantee claims of the purchaser will be rendered invalid. Not included in the guarantee coverage are system failures which are attributed to programs or special electronic circuitry provided by the purchaser, e.g. interfaces. Normal wear as well as normal maintenance are not subject to the guarantee provided by RGBlink either.

The environmental conditions as well as the servicing and maintenance regulations specified in this manual must be complied with by the customer.

Operators Safety Summary

The general safety information in this summary is for operating personnel.

Do Not Remove Covers or Panels

There are no user-serviceable parts within the unit. Removal of the top cover will expose dangerous voltages. To avoid personal injury, do not remove the top cover. Do not operate the unit without the cover installed.

Power Source

This product is intended to operate from a power source that will not apply more than 230 volts rms between the supply conductors or between both supply conductor and ground. A protective ground connection by way of grounding conductor in the power cord is essential for safe operation.

Grounding the Product

This product is grounded through the grounding conductor of the power cord. To avoid electrical shock, plug the power cord into a properly wired receptacle before connecting to the product input or output terminals. A protective-ground connection by way of the grounding conductor in the power cord is essential for safe operation.

Use the Proper Power Cord

Use only the power cord and connector specified for your product. Use only a power cord that is in good condition. Refer cord and connector changes to qualified service personnel.

Use the Proper Fuse

To avoid fire hazard, use only the fuse having identical type, voltage rating, and current rating characteristics. Refer fuse replacement to qualified service personnel.

Do Not Operate in Explosive Atmospheres

To avoid explosion, do not operate this product in an explosive atmosphere.

Installation Safety Summary

Safety Precautions

For all product installation procedures, please observe the following important safety and handling rules to avoid damage to yourself and the equipment.

To protect users from electric shock, ensure that the chassis connects to earth via the ground wire provided in the AC power Cord.

The AC Socket-outlet should be installed near the equipment and be easily accessible.

Unpacking and Inspection

Before opening product shipping box, inspect it for damage. If you find any damage, notify the shipping carrier immediately for all claims adjustments. As you open the box, compare its contents against the packing slip. If you find any shortages, contact your sales representative.

Once you have removed all the components from their packaging and checked that all the listed components are present, visually inspect the system to ensure there was no damage during shipping. If there is damage, notify the shipping carrier immediately for all claims adjustments.

Site Preparation

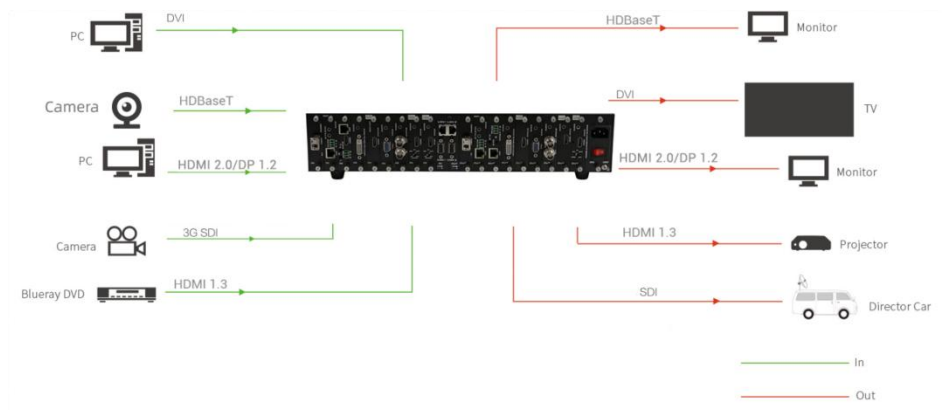
The environment in which you install your product should be clean, properly lit, free from static, and have adequate power, ventilation, and space for all components.

Chapter 1 Your Product

1.1 Product Overview

This is a modular matrix switcher with de-embedd, transmission, distribution and switch functions for audio. 3 models optional to meet your requirements in the conferencing, radio & television project, multimedia conferencing hall, large screen display project, television teaching, command control center and so on.

All the input and output cards are using 1-card 1-port, the signals are including the DVI, HDMI, DP, HDBaseT, VGA, 3G-SDI. Users are able to have mixed signals inputs and mixed signals outputs.



FLEX 9(MINI) Connection Diagram

1.2 Product Features

- 1-card 1-port fully modular architecture
- Quick seamless switching
- Embedded audio with audio embedding and de-embedding (interface: 3.5mm audio jack)
- Support RGB/YUV4:4:4, 4K60 Input&Output
- Support EDID, HDCP2.2
- Centralized cross-platform controls up to 254 devices
- Support signal switch among CVBS/YPbPr/HDMI/DP/DVI/SDI/HDBaseT
- Support dual network and dual backup
- Support dual power modules and backup
- Save and load up to 40 presets
- Control via crystal button, Web, APP and RS232
- Support auto-storing when power off and auto-restoring data when booting

1.3 Technical Datasheet

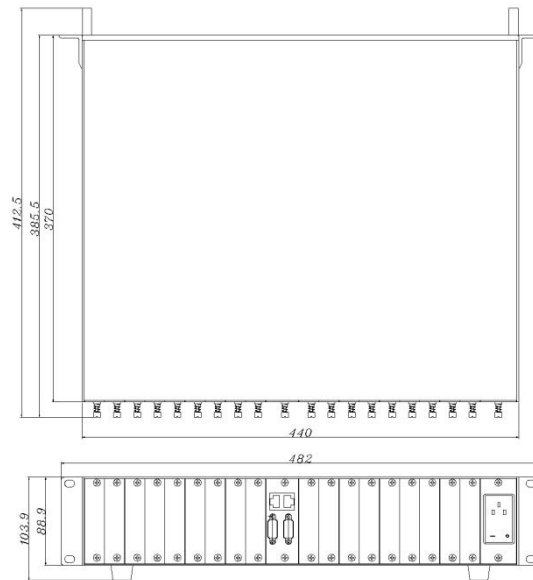
Model	FLEX 9(MINI)	FLEX 18(MINI)	FLEX 36(MINI)
Slot	9 slots, 9 inputs/outputs	18 slots, 18 inputs/outputs	36 slots, 36 inputs/outputs
Input Module	Single module,support HDMI,DP,DVI,3G-SDI,YPbPr,CVBS,HDBaseT inputs		
Output Module	Single module,support HDMI,DP,DVI,3G-SDI,YPbPr,CVBS,HDBaseT outputs		
Protocols	HDMI 2.0/DVI 1.0/HDCP 2.2/EDID		
Color Space	RGB444,YUV444,YUV422, x.v.Color		
Resolution	640×480---1920×1200@60Hz(VESA), 480i---4K60Hz(HDTV)		
Control	Keys,RS232,LAN		
Dimension (mm)	(2U) 482(L)*412.5(W)*103.9(H)	(4U) 482(L)*420.5(W)*192.1(H)	(8U) 482(L)*420.5(W)*370.6(H)
Weight	6KG(net)	12.5KG(net)	25KG(net)
Power	17W(net)	21W(net)	30W(net)
Power	AC 110V-240V, 50/60HZ		
Power Connector	1 x IEC	2 x IEC	2 x IEC
Working Temperature	-10℃ - 50℃		
Store Temperature	-25℃ - 55℃		



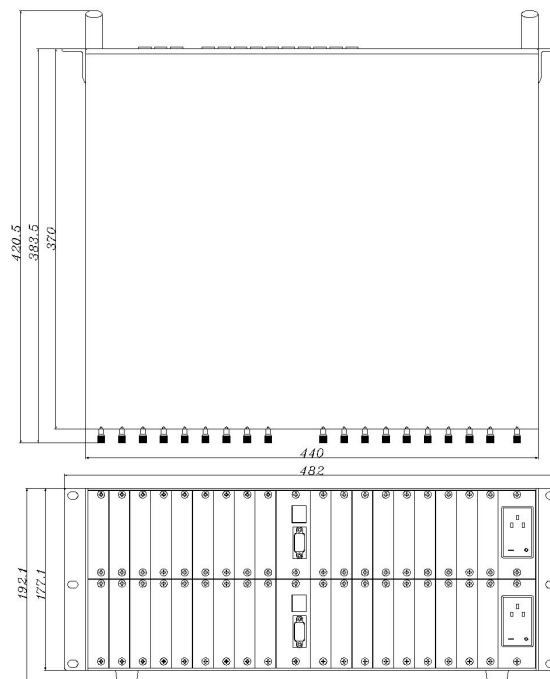
Note: TWO power modules are needed to work simultaneously for FLEX 36(MINI) to avoid overload.

1.4 Dimensions

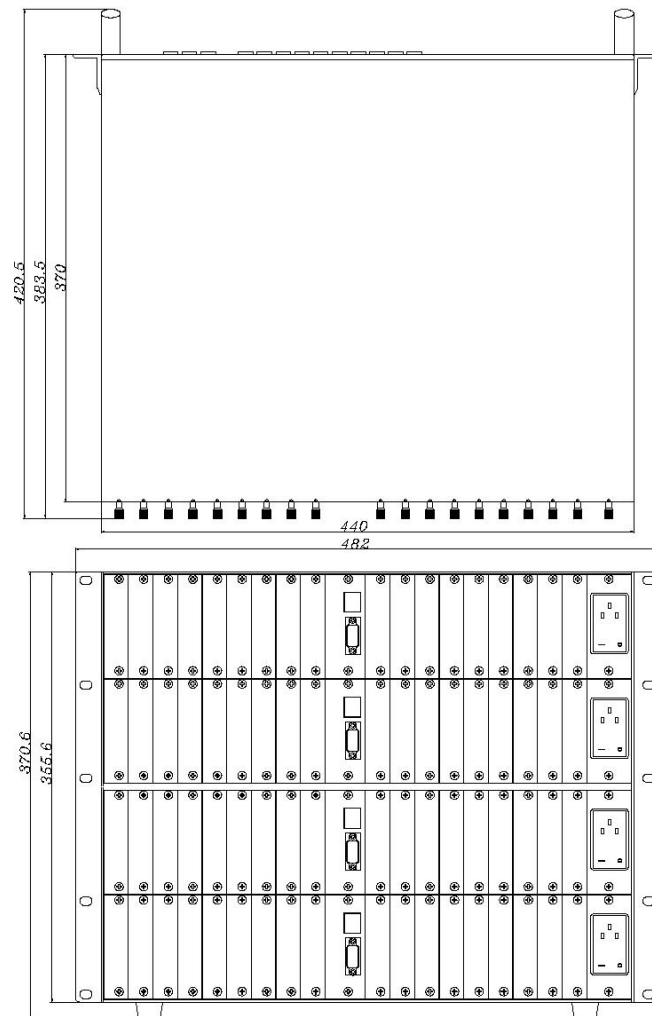
FLEX 9(MINI)



FLEX 18(MINI)



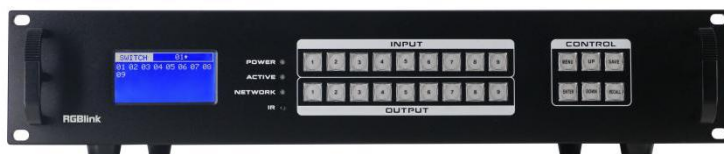
FLEX 36(MINI)



1.5 Panels

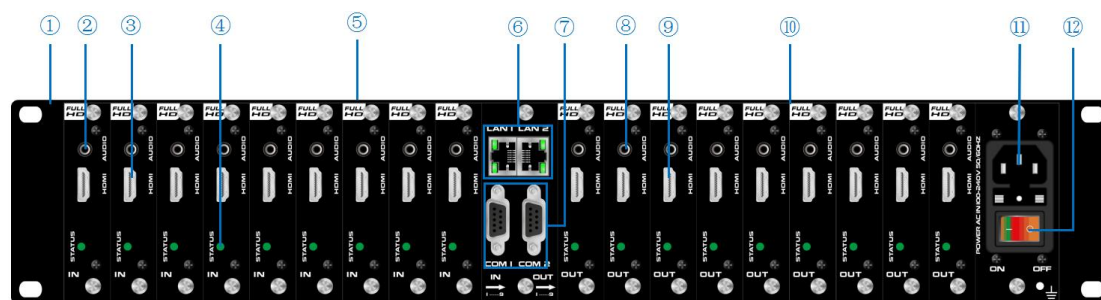
Note: Take FLEX 9(MINI) as example.

Front Panel



Name	Description	
LCD Screen	Operation information real-time Display	
POWER	light up after power on, it will light off after power off	
ACTIVE	Flashing while using the buttons/ WEB switching successfully	
NETWORK	Flashing while using the WEB control operation	
IR	IR remote control receiver	
OUTPUT	Input buttons with background light, from 1~9 input buttons	
INPUT	Output buttons with background light, from 1~9 output buttons	
CONTROL	MENU	Select between View, Switch, Scene Save/ Recall and Setup
	UP	Upward and short cut button for switching to ALL outputs
	SAVE	For saving the scene or setup
	ENTER	Enter button
	DOWN	Downward and short cut button for canceling to ALL outputs
	RECALL	For recalling the saved scene

Rear Panel



No.	Name	Description
①	Rack Ear	For installing on the 19 inch Rack Cabinet
②	3.5mm Audio	External 3.5mm audio embedded
③	HDMI Port	HDMI input card
④	Status Indicator	Power on indicator
⑤	Input Slots	Supports DVI/HDMI/VGA/CVBS/YPbPr/FIBER/HDBaseT inputs
⑥	LAN Ports	Dual LAN ports for WEB/TCP/IP control
⑦	RS232 Ports	Dual RS232 ports for 3 rd parties control
⑧	3.5mm Audio	External 3.5mm audio de-embedded
⑨	HDMI Port	HDMI output card
⑩	Output Slots	Supports DVI/HDMI/VGA/CVBS/YPbPr/FIBER/HDBaseT outputs
⑪	Power Port	AC 220V-240V 50/60Hz
⑫	Power Switch	Power ON/OFF switch with light

Chapter 2 Use Your Product

The LCD display screen will light up after power and turned on. It shows the current operation status, press MENU button, it will keep recycling between VIEW, SWITCH, SCENE, SETUP four different interface. The default interface is VIEW.

2.1 Front Buttons Switching Operation

2.1.1 Switching operation

Switching with industry 2-key fast switching, first press the input button and then select/press output button. Details are as follow:

- There are 1~9 nine input buttons, 1~9 nine output buttons. First press MENU to show SWITCH interface, then can continue the next switching step.
- Press input number at the INPUT area, the input button will light up with blue light.
- Then press output number at the OUTPUT area, and the output button will light up. Users also can press the UP button to realize 1 to ALL switching.
- If need to cancel switching, can press the button again to cancel. Users also can press the DOWN button to cancel all outputs.

2.1.2 Scene Operation

- The system can save 40 scenes, after switching successfully in the SWITCH interface, press MENU button and switch to SCENE interface.
- Enter the wanted scene save number(1~9), then press SAVE. If want to reload the saved scene, press the scene number and press RECALL button.

2.1.3 Setup Operation

- First press MENU switch to SETUP interface, then continue next operation.
- Via SETUP, it can realize IP address changing, in SETUP interface can use UP/ DOWN button to position, enter the needed IP address from the left button side, then press SAVE button to save.

2.1.4 View Operation

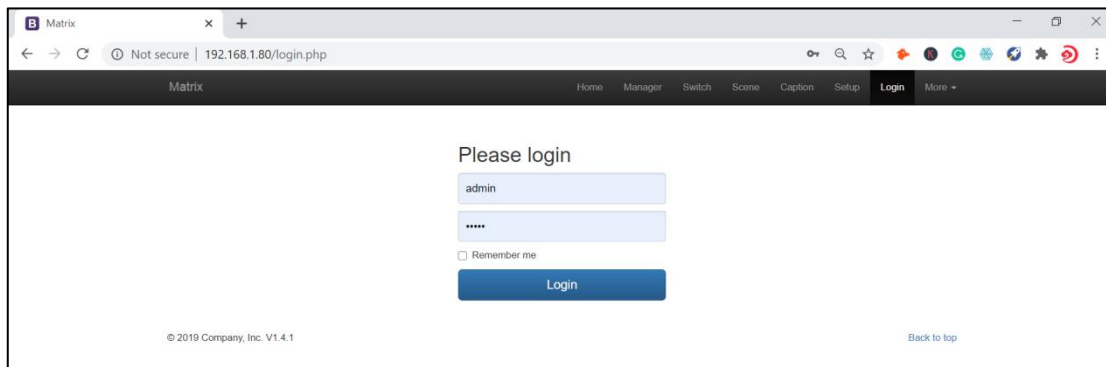
- Via MENU button switch to VIEW interface, will display the current switching status

2.2 WEB Control

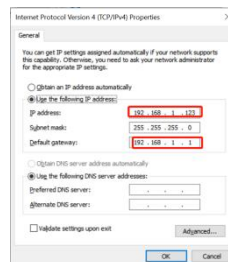
The default IP address are 192.168.0.80(LAN1) and 192.168.1.80(LAN2).

2.2.1 Login Operation

Accordingly to connected LAN port, enter the corresponding IP address, if using the LAN2, then enter 192.168.1.80 in the browse(Recommend with Google Chrome) as below:

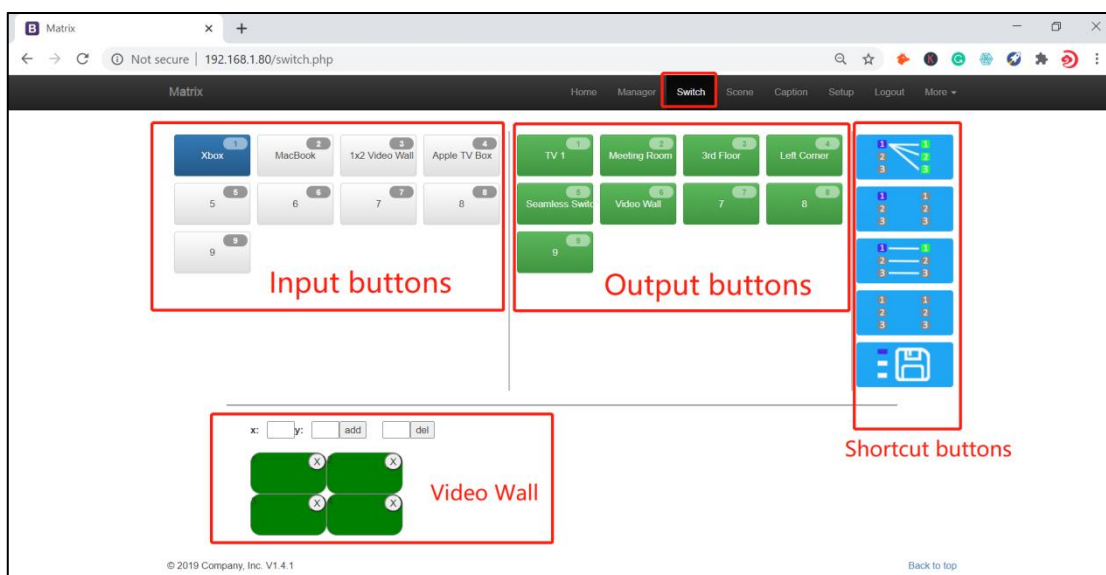


Note: The default user name and password is the same: admin, click login after entering. Please make sure the control PC is at the same IP segment.



2.2.2 Switch

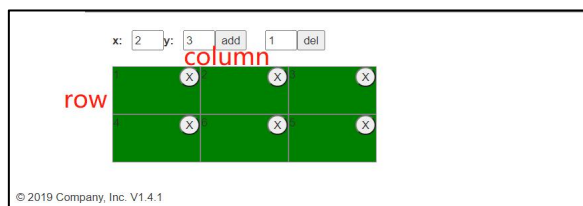
Switch interface



Users can do the input sources switching by clicking the Input buttons first, then pressing the Output buttons. Or users can use the shortcut buttons on the right for the fast switching:

	Switch one input to all the outputs
	Close one input to all the outputs
	Switch all inputs on all outputs
	Close all inputs to all outputs
	Switch to the scenes Save and Recall interface

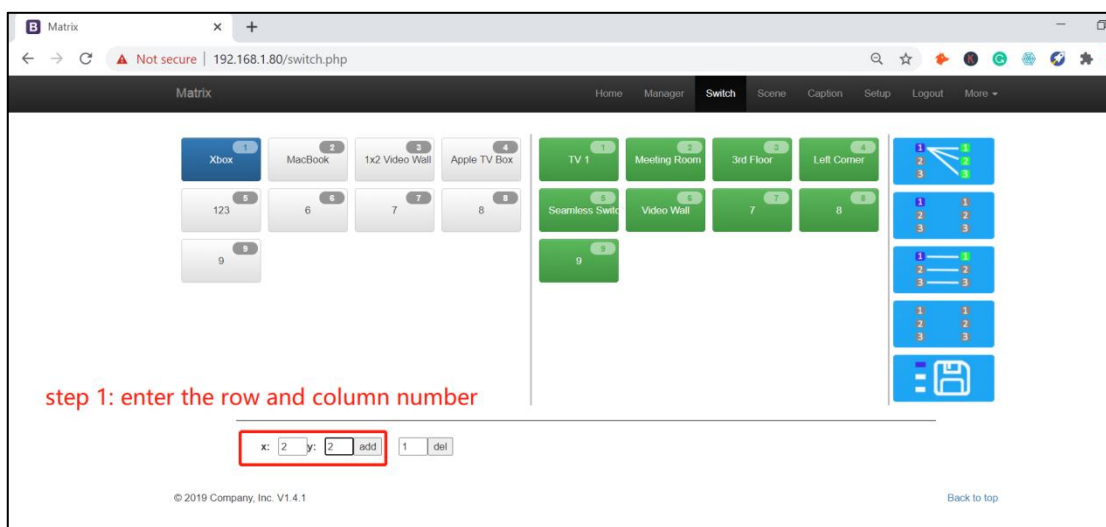
Users also can do the Video wall settings on the WEB GUI bottom by simply adding the x&y(x: for the rows; y: for column).



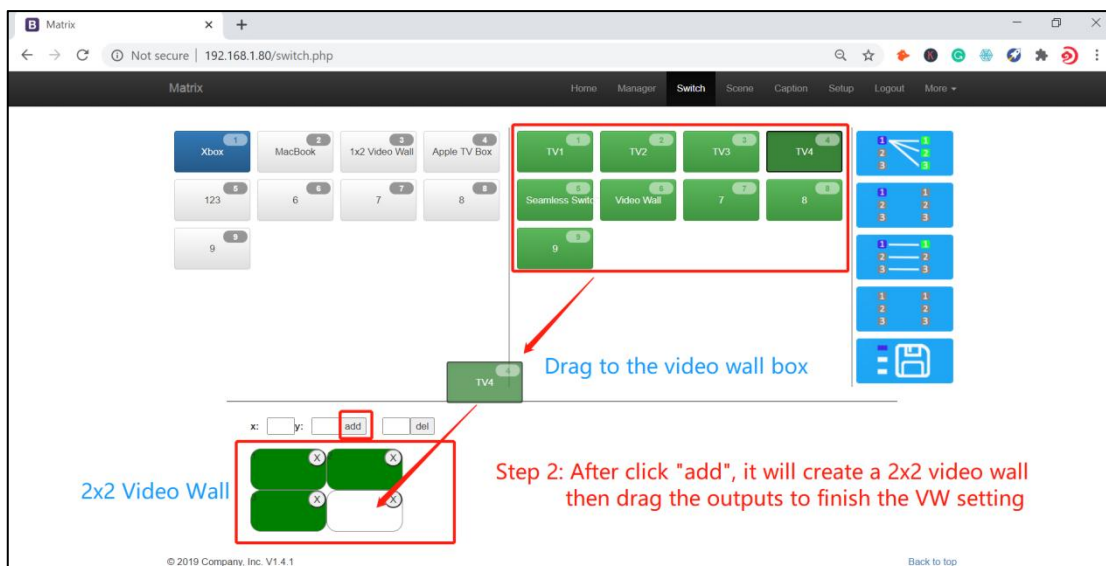
Note that this video wall function only works with the 1080P HDMI/HDBaseT and 4K60 HDMI output card only.

Below the steps to create the video walls:

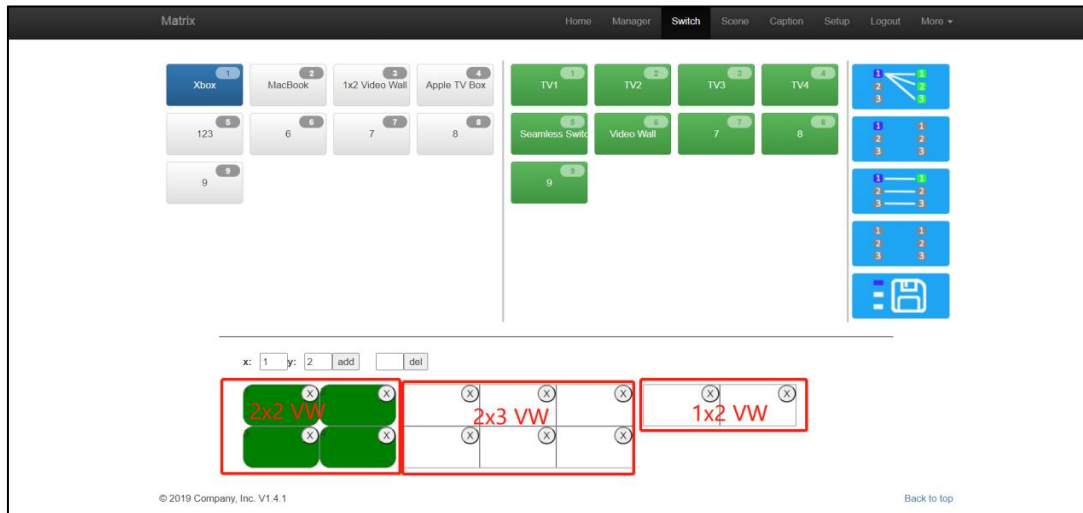
Step1: Enter the video wall Row(x) and column(y) numbers, and then click “add”, example to create a 2x2:



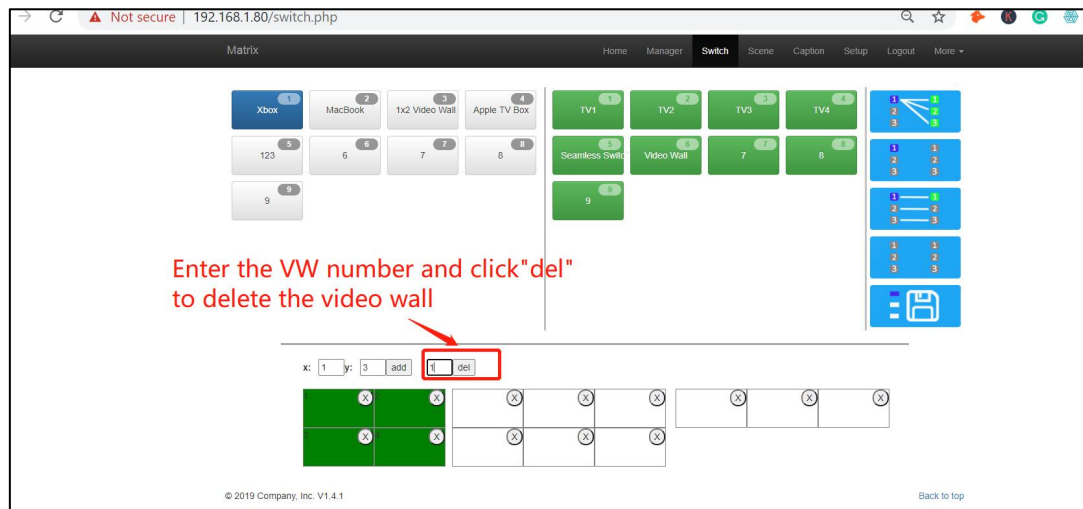
Step 2: Click “add” to create the 2x2 video wall, then drag the outputs to the video wall box.



Users can have multiple video walls by the same way to create, for the 9x9 matrix switcher, the video wall configuration will be limited to 9, it means the configuration could be 3x4 video wall.

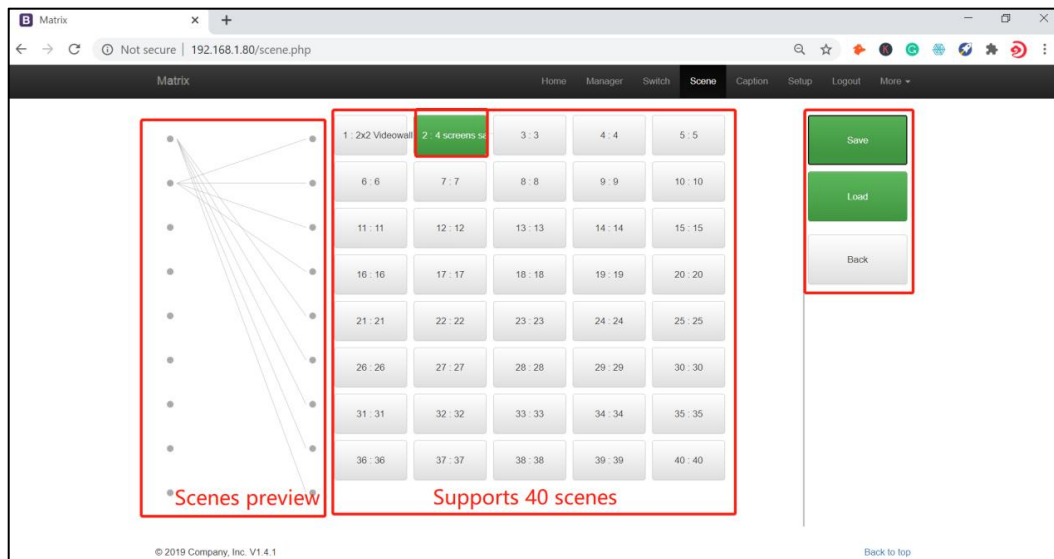


To delete the video wall, users will only need to enter the video wall number in the del box and click “del”.



2.2.3 Scene

Scene Interface

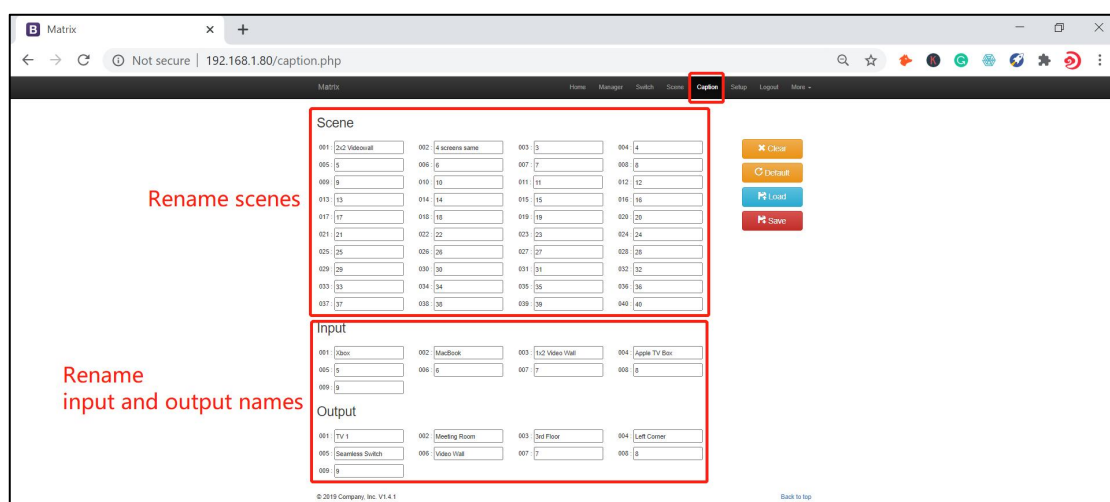


It can support 40 scenes in total, users can preview each scene switching status by clicking on any of the scene number. Click “Save” to save the switching status, and “Load” to recall the scenes. “Back” to return back to the switch interface.

2.2.4 Caption

For changing the input, output and scenes' name

Users can rename the scenes, input and output names here, users can change all the names and then need to click the “Save” button on the right. After renamed the names, users will see the input, output and the scenes names have changed once click to the “Switch” and “Scenes” interface. With this renaming function, it can be easier for the users to know the sources and ends.

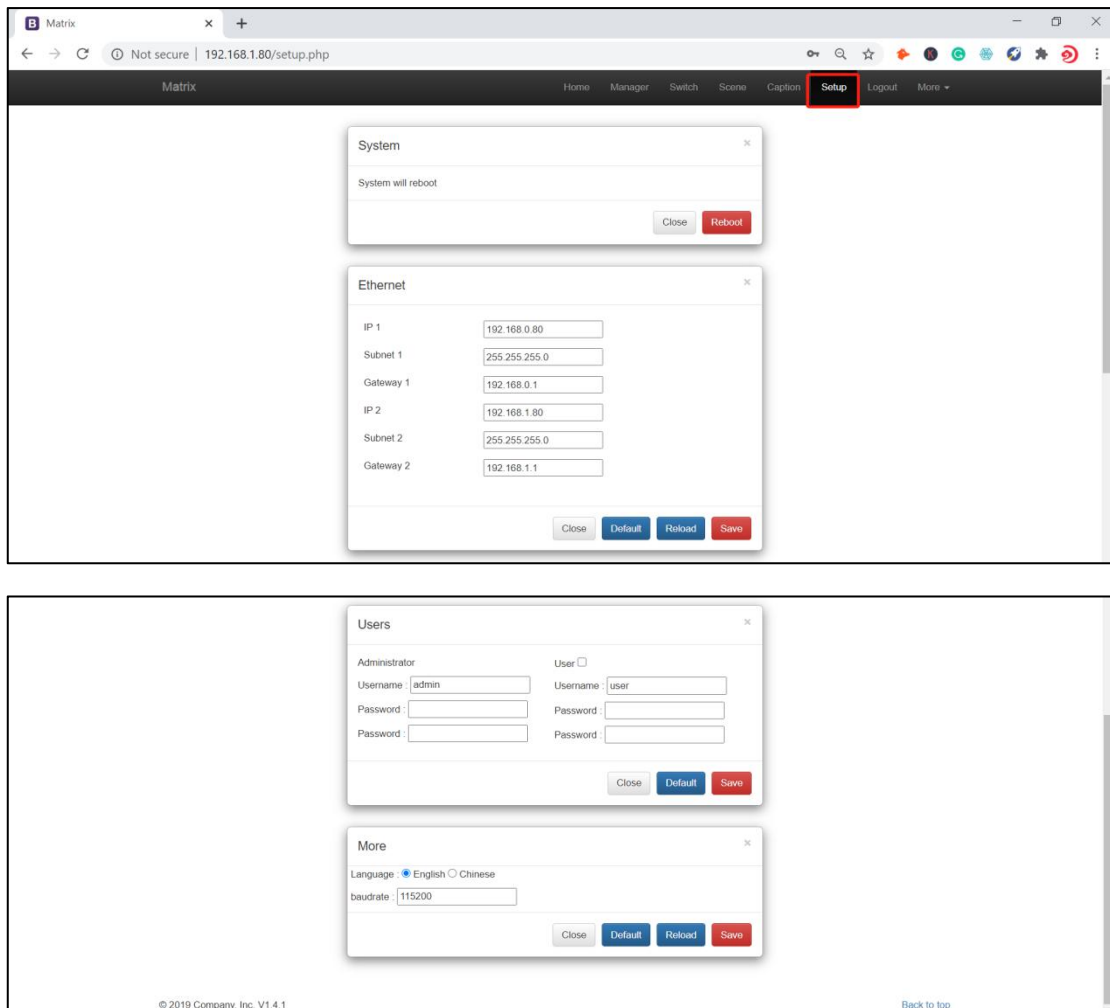




2.2.5 Setup

Setup interface

Users can reboot, change the IP address, set up the login user names, language and the RS232 baud rate settings here. After changed the IP address, will need to reboot the matrix switcher, then the new IP address will take effect.



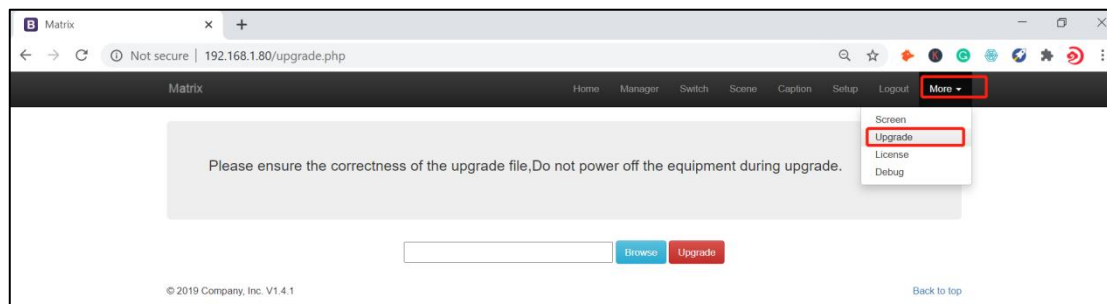
2.2.6 More

For the more interface, users mainly can do the firmware upgrade here.

Screen is for the other matrix models which with the touch screen, so users can monitor the touch screen switching status.

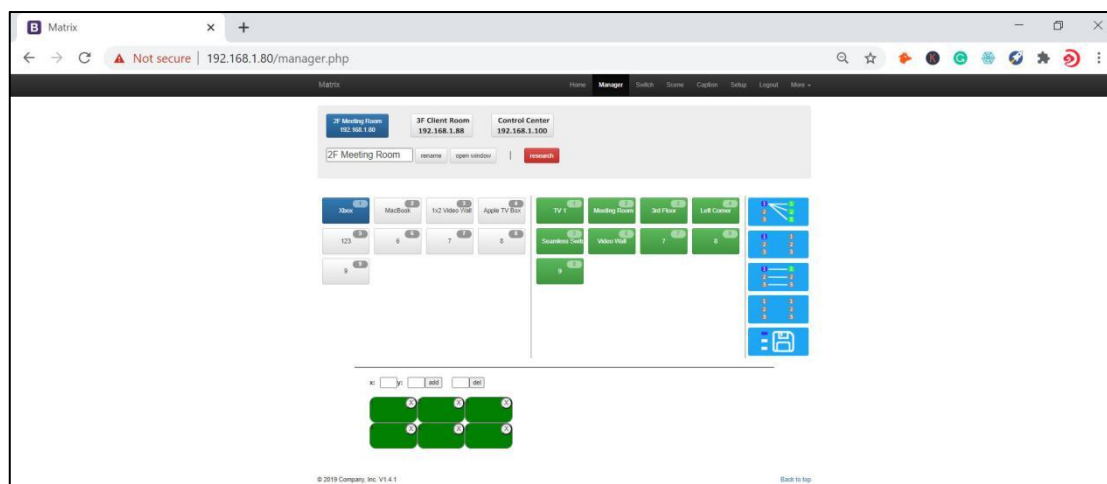
For the upgrade, users need to check with the factory to get the firmwares, the firmware is “.zip” format.

License and Debug is for factory engineering team to have the technical support.



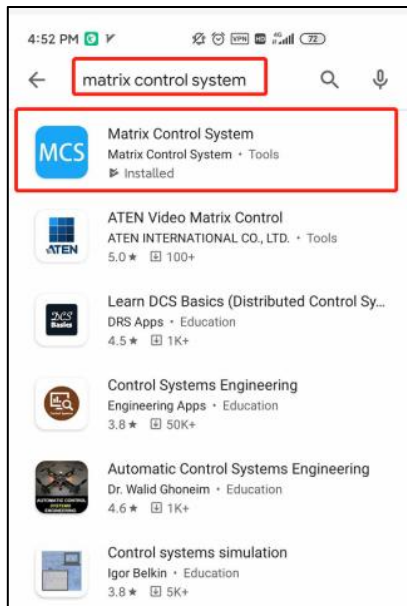
2.2.7 Manager

This Manager interface, it allows the users to manage at most 254 units of the matrices which are installed at the same area network and at the same gateway but different IP addresses. As below are showing 3 matrices, users can rename each matrix and click button to do the switching or open in a new manage window.

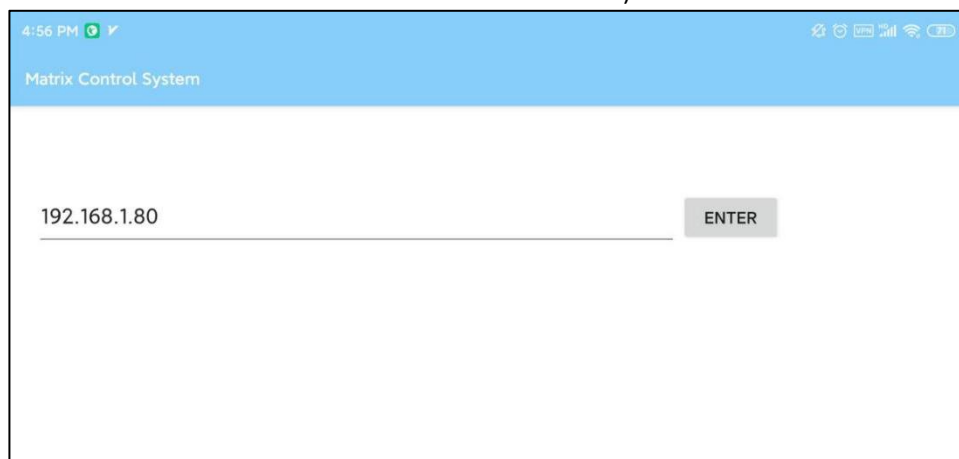


2.3 APP Control

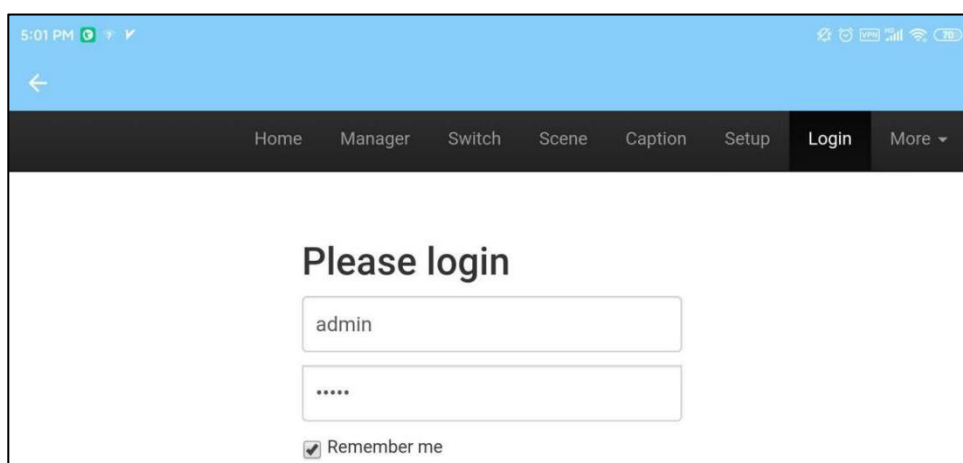
The matrix switchers also can support the iOS and Android APP control, users can search the keyword “Matrix Control System” in Apple store or the Google Play Store.



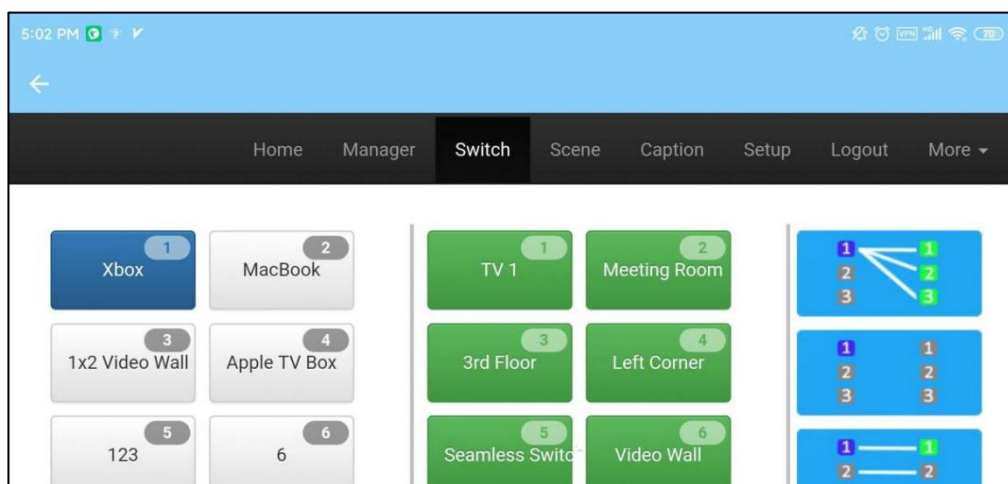
Step 1: Make sure the matrix well connected with the WIFI router, and the iPad/Android devices are connected to this same WIFI. Then open on the MCS(matrix control system) APP and Enter the IP address of the matrix switcher(the default IP addresses are: 192.168.0.80 or 192.168.1.80):



Step 2: After Enter the IP address, it will need to login, the default user name and password both are the admin:



Step 3: After log in successfully, users can do the same functions as the WEB GUI operation:



2.4 IR Remote Control

*Please NOTE: The EDID is not functional on this IR remote control for this FLEX 9(MINI) 9x9 Modular Matrix Switcher as it couldn't support the EDID management.

Inputs Switch:
 number(1~9) ---> SWITCH ---> number(1~9) ---> ENTER
Eg: input 1 to output 1:
 1--> SWITCH ---> 1 ---> ENTER
Inputs Switch to multiple outputs:
 number(1~9) ---> SWITCH ---> number(1~9)--->ENTER---> number(1~9)--->ENTER
Eg: input 2 to output 1,2,3,9:
 2 --> SWITCH --> 1 --> ENTER ---> 2 ---> ENTER ---> 3 ---> ENTER ---> 9 ---> ENTER

Scene Save(total 40 scenes):
 number(0~9) ---> SAVE
Eg: Save the current switch to scene2:
 2--> SAVE(The LCD Screen will show 2 saved)
Scene Recall(total 40 scenes):
 number(0~9) ---> RECALL
Eg: Recall the scene10:
 10 --> RECALL(The LCD Screen will show 10 loaded)



2.5 COM Control Commands

RS232 cable with straight-through connection(USB-RS232 can be used directly to control)

Communication protocol:

Baud rate: 115200

Data bit: 8

Stop bit: 1

Check bit: None

Commands	Explanation	Function description
YAll.	Y=1,2,3,4.....	Switch Input Y to all the outputs Eg. "1ALL." means switch input 1 to all outputs
All1.	One to one	Switch all the channels to be one to one. Eg.1->1,

		2->2, 3->3.....
YXZ.	Y=1,2,3,4..... Z=1,2,3,4.....	Switch Input Y to Output Z Eg. "1X2." means switch Input 1 to output 2
YXZ&Q&W.	Y=1,2,3,4..... Z=1,2,3,4..... Q=1,2,3,4..... W=1,2,3,4.....	Switch Input Y to Output Z, Q, W Eg. "1X2&3&4." means switch Input 1 to Output 2, 3, 4
SaveY.	Y=1,2,3,4.....	Save current status to scene Y Eg. "Save2." means saving current status to Scene 2
RecallY.	Y=1,2,3,4.....	Recall the saved scene Y Eg. "Recall2." means recall the saved Scene 2
BeepON.	Beep sound	Buzzer on
BeepOFF.		Buzzer off
Y?.	Y=1,2,3,4.....	Check the Input Y to outputs switching status Eg. "1?." means to check Input 1 switching status

Note:

- Every command ends with a period "." and it can't be missing.
- The letter can be capital or small letter.
- Switch success will return as "OK", and failed will return as "ERR".

2.6 Trouble Shooting and Attention

No signal on the display?

- Make sure all the power cord well connected.
- Check the display switcher and make sure it is in good condition.
- Make sure the the DVI cable between the device and display are short than 7 meters.
- Reconnect the DVI cable and restart the system.
- Make sure the signal sources are on.
- Check the cables between the devices and displays are connected correctly.
- Dial the switcher 7 to 1, then dial the switcher 1,2 and choose the corresponding inputs.
- Make sure the resolution less than WUXGA(1920*1200)/ 60HZ.
- Make sure the display can support the output resolution.

Chapter 3 Order Code

3.1 Product Code

710-0009-01-0	FLEX 9(MINI)
710-0018-01-0	FLEX 18(MINI)
710-0036-01-0	FLEX 36(MINI)

3.2 Module Code

3.2.1 Input Modules

790-0009-01-0	FLEX MINI Series Single 4K60 HDMI Input Module (seamless)
790-0009-02-0	FLEX MINI Series Single 3G SDI Input Module (with audio) (seamless)
790-0009-03-0	FLEX MINI Series Single 3G SDI Input Module (seamless)
790-0009-04-0	FLEX MINI Series Single HDMI 1.3 Input Module (seamless)
790-0009-05-0	FLEX MINI Series Single 1080P 70m HDBaseT Input Module (seamless)
790-0009-06-0	FLEX MINI Series Single 1080P 100m HDBaseT Input Module (seamless)
790-0009-07-0	FLEX MINI Series Single 4K60 HDMI Input Module (direct)
790-0009-10-0	FLEX MINI Series Single 4K30 35m HDBaseT Input Module (direct)
790-0009-11-0	FLEX MINI Series Single 4K30 70m HDBaseT Input Module (direct)
790-0009-12-0	FLEX MINI Series Single 1080P DVI Input Module (seamless)
790-0009-13-0	FLEX MINI Series Single DP 1.2 Input Module (seamless)

3.2.2 Output Modules

790-0009-21-0	FLEX MINI Series Single 4K60 HDMI Output Module (seamless)
790-0009-23-0	FLEX MINI Series Single 3G SDI Output Module (seamless)
790-0009-24-0	FLEX MINI Series Single HDMI 1.3 Output Module (seamless)
790-0009-25-0	FLEX MINI Series Single 1080P DVI Output Module (seamless)
790-0009-26-0	FLEX MINI Series Single 1080P 70m HDBaseT Output Module (seamless)
790-0009-27-0	FLEX MINI Series Single 1080P 100m HDBaseT Output Module (seamless)

790-0009-28-0	FLEX MINI Series Single 4K60 HDMI Output Module (direct)
790-0009-31-0	FLEX MINI Series Single 4K30 35m HDBaseT Output Module (direct)
790-0009-32-0	FLEX MINI Series Single 4K30 70m HDBaseT Output Module (direct)
790-0009-34-0	FLEX MINI Series Single DP 1.2 Output Module (seamless)

Chapter 4 Support

4.1 Contact us

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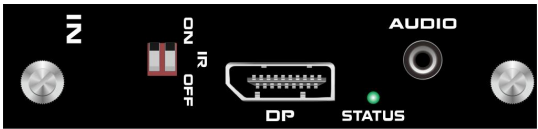




Flight Forum Eindhoven
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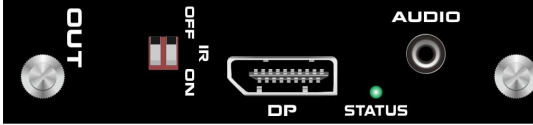
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Chapter 5 Appendix

5.1 Specification

Input Module	Input Module 1: FLEX MINI Series Single 4K60 HDMI Input Module(seamless)	
		4K60 HDMI2.0 input,HDCP2.2 audio embedded,3.5mm interface seamless switch 4k60Hz 4:4:4, transmission up to 10m via HDMI cable
	Input Module 2: FLEX MINI Series Single 3G SDI Input Module(with audio)(Seamless)	
		single SD/HD/3G-SDI input&loop resolution up to 1080P60Hz,downward compatibility audio embedded,3.5mm interface seamless switch
	Input Module 3: FLEX MINI Series Single 3G SDI Input Module(Seamless)	
		single SD/HD/3G-SDI input&loop resolution up to 1080P60Hz,downward compatibility custom input resolution seamless switch
	Input Module 4: FLEX MINI Series Single HDMI 1.3 Input Module(Seamless)	
		HDMI input,HDCP resolution up to 1080P,downward compatibility audio embedded,3.5mm interface seamless switch
	Input Module 5: FLEX MINI Series Single 1080P 70m HDBaseT Input Module(Seamless)	
		single HDBaseT input transmission up to 70m via CAT5E/6/7(1080P60) bi-directional IR/RS232 control seamless switch work with HDBaseT transmitter
	Input Module 6: FLEX MINI Series Single 1080P 100m HDBaseT Input Module(seamless)	
		single HDBaseT input transmission up to 100m via CAT5E/6/7(1080P60) bi-directional IR/RS232 control seamless switch work with HDBaseT transmitter
	Input Module 7: FLEX MINI Series Single 4K60 HDMI Input Module(direct)	
		4K60 HDMI2.0input,HDCP2.2 audio embedded,3.5mm interface does not support seamless switch 4k60Hz 4:4:4,transmission up to 10m via HDMI cable


Output Module	Input Module 8: FLEX MINI Series Single 4K30 35m HDBaseT Input Module(direct)	
		single HDBaseT input/loop 4K30Hz signal transmission up to 40m via CAT5E/6/7 bi-directional IR/RS232 control does not support seamless switch
	Input Module 9: FLEX MINI Series Single 4K30 70m HDBaseT Input Module(direct)	
		single HDBaseT input/loop 4K30Hz signal transmission up to 70m via CAT5E/6/7 bi-directional IR/RS232 control does not support seamless switch
	Input Module 10: FLEX MINI Series Single 1080P DVI Input Module(Seamless)	
		DVI-I,with HDMI/DVI/VGA/YPBPR/CVBS input signals resolution up to 1080P,downward compatibility audio embedded,3.5mm interface seamless switch
	Input Module 11: FLEX MINI Series Single DP 1.2 Input Module(Seamless)	
		4K60 DP input signals HDCP2.2 seamless switch arbitrary resolution input 4k60Hz4:4:4, transmission up to 10m via DP cable
	Output Module 1: FLEX MINI Series Single 4K60 HDMI Output Module(seamless)	
		HDMI2.0 4K60Hz output, 4: 4: 4 HDCP2.2,custom resolution and image adjustment audio embedded seamless switch transmission up to 10m via HDMI cable
	Output Module 2: FLEX MINI Series Single 3G SDI Output Module(seamless)	
		dual SD/HD/3G-SDI output audio embedded,3.5mm interface seamless switch,custom resolution splice transmission up to 25m via SDI cable
	Output Module 3: FLEX MINI Series Single HDMI 1.3 Output Module(seamless)	
		single HDMI output audio embedded,3.5mm interface seamless switch transmission up to 25m via HDMI cable
	Output Module 4: FLEX MINI Series Single 1080P DVI Output Module(seamless)	
		DVI-I,support HDMI/DVI/VGA/YPBPR/CVBS+LR output resolution up to 1080P,custom output resolution audio embedded,3.5mm interface seamless switch

		transmission up to 25m via HDMI cable
Output Module 5: FLEX MINI Series Single 1080P 70m HDBaseT Output Module(seamless)		
		<p>single HDBaseT output</p> <p>transmission up to 70m via CAT5E/6/7(1080P60)</p> <p>bi-directional IR/RS232 control</p> <p>seamless switch</p> <p>work with HDBaseT transmitter</p>
Output Module 6: FLEX MINI Series Single 1080P 100m HDBaseT Output Module(seamless)		
		<p>single HDBaseT output</p> <p>transmission up to 100m via CAT5E/6/7(1080P60)</p> <p>bi-directional IR/RS232 control</p> <p>seamless switch</p> <p>work with HDBaseT transmitter</p>
Output Module 7: FLEX MINI Series Single 4K60 HDMI Output Module(direct)		
		<p>4K60 HDMI2.0 output,HDCP2.2</p> <p>audio embedded,3.5mm interface</p> <p>does not support seamless switch</p> <p>4K60Hz 4:4:4,transmission up to 10m via HDMI cable</p>
Output Module 8: FLEX MINI Series Single 4K30 35m HDBaseT Output Module(direct)		
		<p>single HDBaseT output</p> <p>4K30Hz,transmission up to 40m via CAT5E/6/7</p> <p>bi-directional IR/RS232 control</p> <p>does not support seamless switch</p>
Output Module 9: FLEX MINI Series Single 4K30 70m HDBaseT Output Module(direct)		
		<p>single HDBaseT output</p> <p>4K30Hz,transmission up to 70m via CAT5E/6/7</p> <p>bi-directional IR/RS232 control</p> <p>does not support seamless switch</p>
Output Module 10: FLEX MINI Series Single DP 1.2 Output Module(seamless)		
		<p>DP 4K60Hz output, 4: 4: 4</p> <p>HDCP2.2,custom resolution and image adjustment</p> <p>audio embedded</p> <p>seamless switch</p> <p>Splicing function</p> <p>any resolution input</p> <p>any resolution output below 4K</p> <p>transmission up to 10m via DP cable</p>

5.2 Dial Setting


1. The module above can be used in all three model:FLEX 9(MINI),FLEX 18(MINI)and FLEX 36(MINI).SDI, fiber and HDMI input/output module can be set via dial switch.

Input Module

Resolution Set				Signal Selection				IR Switch	
D3	D4	D5	Description	D7	D1	D2	Description	D8	Description
0	0	0	1024*768	1	0	0	CVBS input	0	OFF
0	0	1	1360*768	1	0	1	YPBPR input	1	ON
0	1	0	1920*1200	1	1	0	VGA input	<div>eg:</div> <div>1. If select DVI input,dial D7 =0,and then D1,D2=11.</div> <div>2. If select 3.5mm audio input,dial D6=0</div>	
0	1	1	720P/60	1	1	1	DVI input		
1	0	0	No definition	0	X	X	D7=0,auto-detection of inputs		
1	0	1	No definition	When ON=0,digital =1					
1	1	0	1080P/50						
1	1	1	1080P/60						
Audio and Image				<div>0</div> <div>1</div> <div></div>					
D6	Version	Description							
1	1	Display image normally							
0		180° mirroring							
1	2	HDMI audio input							
0		3.5mm audio input							

Output Module

Output Module


Resolution Set						Color Space				IR Switch	
D2	D3	D4	D5	D6	Description	D1	Descri	D7	Descri	D8	Descri
0	0	0	0	0	1024*768@60	0	RGB	0	mirror	0	IR_ON
0	0	0	0	1	800*600@60	1	YUV	1	normal	1	IR_OFF
0	0	0	1	0	1280*800@60	<div>When ON=0,digital should be 1</div> <div><div>0</div><div>1</div><div></div></div>					
0	0	0	1	1	1280*1024@60						
0	0	1	0	0	1360*768@60						
0	0	1	0	0	1366*768@60						
0	0	1	1	0	1400*1050@60						
0	0	1	1	1	1440*900@60						
0	1	0	0	0	1680*1050@60						
0	1	0	0	1	1600*1200@60						
0	1	0	1	0	1920*1200@60						
0	1	0	1	1	1600*1200@60	<div>Eg:</div> <div>1. If select RGB output, D1=0</div> <div>2. If select 1920*1200@60 output resolution, D2, D3, D4,D5,D6=01010</div> <div>3. If select mirror output,D7=0</div>					
0	1	1	0	0	1680*1050@60						
0	1	1	0	1	1400*900@75						
0	1	1	1	0	640*480@75						
0	1	1	1	1	800*600@75						

1	0	0	0	0	480i60	4. If turn on IR,D8=0
1	0	0	0	1	576i50	
1	0	0	1	0	480p60	
1	0	0	1	1	576p50	
1	0	1	0	0	1280*720@24	
1	0	1	0	1	1280*720@25	
1	0	1	1	0	1280*720@30	
1	0	1	1	1	1280*720@50	
1	1	0	0	0	1280*720@60	
1	1	0	0	1	1080i50	
1	1	0	1	0	1080i60	
1	1	0	1	1	1080p24	
1	1	1	0	0	1080p25	
1	1	1	0	1	1080p30	
1	1	1	1	0	1080p50	
1	1	1	1	1	1080p60	


Note: the dial switch set above are not applicable to 4K60 input/output module.

2. Steps of 4K60 modules adjustment.

Input Module

Resolution Set					Audio Embedded		NC			
D1	D2	D3	D4	Description	D5	Description	D6	D7	D8	Description
0	0	0	0	1080P/60	0	External audio	-	-	0	IR_OFF
0	0	0	1	1080P/50	1	HDMI audio input			1	IR_ON
0	0	1	0	3840*2160/50	<p>When ON = 0,digital should be 1</p>  <p>Eg:</p> <ol style="list-style-type: none"> 1. If select 3.5mm audio input,D5=0 2. If select 1920*1200@60,D1,D2,D3,D4=1101 3. If turn on IR,D8=1 					
0	0	1	1	720P/60						
0	1	0	0	4096*2160/50						
0	1	0	1	1366*768/60						
0	1	1	0	1024*768/60						
0	1	1	1	3840*2160/30						
1	1	1	1							
1	0	0	0	4096*2160/30						
1	0	0	1	480p/60						
1	0	1	0	720p/50						
1	0	1	1	576p/50						
1	1	0	0	3840*2160/60						
1	1	0	1	1920*1200/60						
1	1	1	0	4096*2160/60						

Output Module

Resolution Set					Color Space			NC			
D1	D2	D3	D4	Description	D5	D6	Descri	D7	Descri	D8	Descri
0	0	0	0	1080P/60	1	1	RGB444	0	ON	0	IR_OFF
0	0	0	1	1080P/50	0	1	YUV444	1	OFF	1	IR_ON
0	0	1	0	3840*2160/50	1	0	YUV422				
0	0	1	1	720P/60	0	0	YUV420				
0	1	0	0	4096*2160/50	<div>When ON =0,digital should be 1</div> <div></div> <div>Eg:</div> <div>1. If select RGB444,D5,D6=1</div> <div>2. If select 1920*1200@60,then D1,D2,D3,D4=1101</div>						
0	1	0	1	1366*768/60							
0	1	1	0	1024*768/60							
0	1	1	1	3840*2160/30							
1	1	1	1								
1	0	0	0	4096*2160/30							
1	0	0	1	480p/60							
1	0	1	0	720p/50							
1	0	1	1	576p/50							
1	1	0	0	3840*2160/60							
1	1	0	1	1920*1200/60							
1	1	1	0	4096*2160/60							

5.3 Terms & Definitions

●**RCA:** Connector used primarily in consumer AV equipment for both audio and video. The RCA connector was developed by the Radio Corporation of America.

●**BNC:** Stands for Bayonet Neill-Concelman. A cable connector used extensively in television (named for its inventors). A cylindrical bayonet connector that operates with a twist-locking motion .

●**CVBS:** CVBS or Composite video, is an analog video signal without audio. Most commonly CVBS is used for transmission of standard definition signals. In consumer applications the connector is typically RCA type, while in professional applications the connector is BNC type.

●**YPbPr:** Used to describe the colour space for progressive-scan. Otherwise known as component video.

●**VGA:** Video Graphics Array. VGA is an analog signal typically used on earlier computers. The signal is non-interlaced in modes 1, 2, and 3 and interlaced when using in mode.

●**DVI:** Digital Visual Interface. The digital video connectivity standard that was developed by DDWG (Digital Display Work Group). This connection standard offers two different connectors: one with 24 pins that handles digital video signals only, and one with 29 pins that handles both digital and analog video.

●**SDI:** Serial Digital Interface. Standard definition video is carried on this 270 Mbps data transfer rate. Video pixels are characterized with a 10-bit depth and 4:2:2 color quantization. Ancillary data is included on this interface and typically

includes audio or other metadata. Up to sixteen audio channels can be transmitted. Audio is organised into blocks of 4 stereo pairs. Connector is BNC.

●**HD-SDI:** High-definition serial digital interface (HD-SDI), is standardized in SMPTE 292M this provides a nominal data rate of 1.485 Gbit/s.

●**3G-SDI:** Standardized in SMPTE 424M, consists of a single 2.970 Gbit/s serial link that allows replacing dual link HD-SDI.

●**6G-SDI:** Standardized in SMPTE ST-2081 released in 2015, 6Gbit/s bitrate and able to support 2160p@30.

●**12G-SDI:** Standardized in SMPTE ST-2082 released in 2015, 12Gbit/s bitrate and able to support 2160p@60.

●**U-SDI:** Technology for transmitting large-volume 8K signals over a single cable. a signal interface called the ultra high definition signal/data interface (U-SDI) for transmitting 4K and 8K signals using a single optical cable. The interface was standardized as the SMPTE ST 2036-4.

●**HDMI:** High Definition Multimedia Interface: An interface used for the transmission of uncompressed high definition video, up to 8 channels of audio, and control signals, over a single cable.

●**HDMI 1.3:** Released on June 22 2006, and increased the maximum TMDS clock to 340 MHz (10.2 Gbit/s). Support resolution 1920 × 1080 at 120 Hz or 2560 × 1440 at 60 Hz). It added support for 10 bpc, 12 bpc, and 16 bpc color depth (30, 36, and 48 bit/px), called deep color.

●**HDMI 1.4:** Released on June 5, 2009, added support for 4096 × 2160 at 24 Hz, 3840 × 2160 at 24, 25, and 30 Hz, and 1920 × 1080 at 120 Hz. Compared to HDMI 1.3, 3 more features added which are HDMI Ethernet Channel (HEC) , audio return channel (ARC), 3D Over HDMI, a new Micro HDMI Connector, an expanded set of color spaces.

●**HDMI 2.0:** Released on September 4, 2013 increases the maximum bandwidth to 18.0 Gbit/s. Other features of HDMI 2.0 include up to 32 audio channels, up to 1536 kHz audio sample frequency, the HE-AAC and DRA audio standards, improved 3D capability, and additional CEC functions.

●**HDMI 2.0a:** Was released on April 8, 2015, and added support for High Dynamic Range (HDR) video with static metadata.

●**HDMI 2.0b:** Was released March, 2016, support for HDR Video transport and extends the static metadata signaling to include Hybrid Log-Gamma (HLG).

●**HDMI 2.1:** Released on November 28, 2017. It adds support for higher resolutions and higher refresh rates, Dynamic HDR including 4K 120 Hz and 8K 120 Hz.

●**DisplayPort:** A VESA standard interface primarily for video, but also for audio, USB and other data. DisplayPort (or DP) is backwards compatible with HDMI, DVI and VGA.

●**DP 1.1:** Was ratified on 2 April 2007, and version 1.1a was ratified on 11 January 2008. DisplayPort 1.1 allow a maximum bandwidth of 10.8 Gbit/s (8.64 Gbit/s data rate) over a standard 4-lane main link, enough to support 1920x1080@60Hz

●**DP 1.2:** Introduced on 7 January 2010, effective bandwidth to 17.28 Gbit/s support increased resolutions, higher refresh rates, and greater color depth, maximum resolution 3840 × 2160@60Hz

●**DP 1.4:** Publish on 1 Mar, 2016. overall transmission bandwidth 32.4 Gbit/s ,DisplayPort 1.4 adds support for Display Stream Compression 1.2 (DSC), DSC is a "visually lossless" encoding technique with up to a 3:1 compression ratio. Using DSC with HBR3 transmission rates, DisplayPort 1.4 can support 8K UHD (7680 × 4320) at 60 Hz or 4K UHD (3840 × 2160) at 120 Hz with 30 bit/px RGB color and HDR. 4K at 60 Hz 30 bit/px RGB/HDR can be achieved without the need for DSC.

●**Multi-mode Fiber:** Fibers that support many propagation paths or transverse modes are called multi-mode fibers, generally have a wider core diameter and are used for short-distance communication links and for applications where high power must be transmitted.

●**Single-mode Fiber:** Fiber that support a single mode are called single-mode fibers. Single-mode fibers are used for most communication links longer than 1,000 meters (3,300 ft).

●**SFP:** Small form-factor pluggable , is a compact, hot-pluggable network interface module used for both telecommunication and data communications applications.

●**Optical Fiber Connector:** Terminates the end of an optical fiber, and enables quicker connection and disconnection than splicing. The connectors mechanically couple and align the cores of fibers so light can pass. 4 most common types of optical fiber connectors are SC, FC, LC,ST.

●**SC:** (Subscriber Connector), also known as the square connector was also created by the Japanese company – Nippon Telegraph and Telephone. SC is a push-pull coupling type of connector and has a 2.5mm diameter. Nowadays, it is used mostly in single mode fiber optic patch cords, analog, GBIC, and CATV. SC is one of the most popular options, as its simplicity in design comes along with great durability and affordable prices.

●**LC:** (Lucent Connector) is a small factor connector (uses only a 1.25mm ferrule diameter) that has a snap coupling mechanism. Because of its small dimensions, it is the perfect fit for high-density connections, XFP, SFP, and SFP+ transceivers.

●**FC:** (Ferrule Connector) is a screw type connector with a 2.5mm ferrule. FC is a round shaped threaded fiber optic connector, mostly used on Datacom, telecom, measurement equipment, single-mode laser.








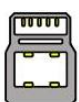


●**ST:** (Straight Tip) was invented by AT&T and uses a bayonet mount along with a long spring-loaded ferrule to support the fiber.

●**USB:** Universal Serial Bus is a standard that was developed in the mid-1990s that defines cables, connectors and communication protocols. This technology is designed to allow a connection, communication and power supply for peripheral devices and computers.

●**USB 1.1:** Full-Bandwidth USB, specification was the first release to be widely adopted by the consumer market. This specification allowed for a maximum bandwidth of 12Mbps.

- **USB 2.0:** or Hi-Speed USB, specification made many improvements over USB 1.1. The main improvement was an increase in bandwidth to a maximum of 480Mbps.
- **USB 3.2:** Super Speed USB with 3 varieties of 3.2 Gen 1(original name USB 3.0), 3.2Gen 2(original name USB 3.1), 3.2 Gen 2x2 (original name USB 3.2) with speed up to 5Gbps,10Gbps,20Gbps respectively.

USB version and connectors figure:

	Type A	Type B	Mini A	Mini B	Micro-A	Micro-B	Type C
USB 2.0							
USB 3.0							
USB 3.1&3.2							

- **NTSC:** The colour video standard used in North America and some other parts of the world created by the National Television Standards Committee in the 1950s. NTSC utilizes an interlaced video signals.

- **PAL:** Phase Alternate Line. A television standard in which the phase of the colour carrier is alternated from line to line. It takes four full images (8 fields) for the colour-to-horizontal images (8 fields) for the colour-to-horizontal phase relationship to return to the reference point. This alternation helps cancel out phase errors. For this reason, the hue control is not needed on a PAL TV set. PAL, is widely used in needed on a PAL TV set. PAL, is widely used in Western Europe, Australia, Africa, the Middle East, and Micronesia. PAL uses 625-line, 50-field (25 fps) composite colour transmission system.

- **SMPTE:** Society of Motion image and Television Engineers. A global organization, based in the United States, that sets standards for baseband visual communications. This includes film as well as video and television standards.

- **VESA:** Video Electronics Standards Association. An organization facilitating computer graphics through standards.

- **HDCP:** High-bandwidth Digital Content Protection (HDCP) was developed by Intel Corporation an is in wide use for protection of video during transmission between devices.

- **HDBaseT:** A video standard for the transmission of uncompressed video (HDMI signals) and related features using Cat 5e/Cat6 cabling infrastructure.

- **ST2110:** A SMPTE developed standard, ST2110 describes how to send digital video over and IP networks. Video is transmitted uncompressed with audio and other data in a separate streams. SMPTE2110 is intended principally for broadcast production and distribution facilities where quality and flexibility are more important.

●**SDVoE:** Software Defined Video over Ethernet (SDVoE) is a method for transmission, distribution and management AV signals using a TCP/IP Ethernet infrastructure for transport with low latency. SDVoE is commonly used in integration applications.

●**Dante AV:** The Dante protocol was developed for and widely adopted in audio systems for the transmission of uncompressed digital audio on IP based networks. The more recent Dante AV specification includes support for digital video.

●**NDI:** Network Device interface (NDI) is a software standard developed by NewTek to enable video-compatible products to communicate, deliver, and receive broadcast quality video in a high quality, low latency manner that is frame-accurate and suitable for switching in a live production environment over TCP (UDP) Ethernet based networks. NDI is commonly found in broadcast applications.

●**RTMP:** Real-Time Messaging Protocol (RTMP) was initially a proprietary protocol developed by Macromedia (now Adobe) for streaming audio, video and data over the Internet, between a Flash player and a server.

●**RTSP:** The Real Time Streaming Protocol (RTSP) is a network control protocol designed for use in entertainment and communications systems to control streaming media servers. The protocol is used for establishing and controlling media sessions between end points.

●**MPEG:** Moving Picture Experts Group is a working group formed from ISO and IEC developing standards that allow audio/video digital compression and Transmission.

●**H.264:** Also known as AVC (Advanced Video Coding) or MPEG-4i is a common video compression standard. H.264 was standardized by the ITU-T Video Coding Experts Group (VCEG) together with the ISO/IEC JTC1 Moving Picture Experts Group (MPEG).

●**H.265:** Also known as **HEVC** (High Efficiency Video Coding) H.265 is the successor to the widely used H.264/AVC digital video coding standard. Developed under the auspices of ITU, resolutions up to 8192x4320 may be compressed.

●**API:** An Application Programming Interface (API) provides a predefined function which allows access capabilities and features or routines via a software or hardware, without accessing source code or understanding the details of inner working mechanism. An API call may execute a function and/or provide data feedback/report.

●**DMX512:** The communication standard developed by USITT for entertainment and digital lighting systems. The wide adoption of the Digital Multiplex (DMX) protocol has seen the protocol used for a wide range of other devices including video controllers. DMX512 is delivered over cable of 2 twisted pairs with 5pin XLR cables for connection.

●**ArtNet:** An ethernet protocol based on TCP/IP protocol stack, mainly used in entertainment/events applications. Built on the DMX512 data format, ArtNet enables multiple “universes” of DMX512 to be transmitted using ethernet networks for transport.

●**MIDI:** MIDI is the abbreviation of Musical Instrument Digital Interface. As the name indicates the protocol was developed for communication between electronic musical instruments and latterly computers. MIDI instructions are

triggers or commands sent over twisted pair cables, typically using 5pin DIN connectors.

●**OSC:** The principle of Open Sound Control (OSC) protocol is for networking sound synthesizers, computers, and multimedia devices for musical performance or show control. As with XML and JSON, the OSC protocol allows sharing data. OSC is transported via UDP packets between devices connected on an Ethernet.

●**Brightness:** Usually refers to the amount or intensity of video light produced on a screen without regard to colour. Sometimes called black level.

●**Contrast Ratio:** The ratio of the high light output level divided by the low light output level. In theory, the contrast ratio of the television system should be at least 100:1, if not 300:1. In reality, there are several limitations. Well-controlled viewing conditions should yield a practical contrast ratio of 30:1 to 50:1.

●**Colour Temperature:** The colour quality, expressed in degrees Kelvin (K), of a light source. The higher the colour temperature, the bluer the light. The lower the temperature, the redder the light. Benchmark colour temperature for the A/V industry include 5000°K, 6500°K, and 9000°K.

●**Saturation:** Chroma, Chroma gain. The intensity of the colour, or the extent to which a given colour in any image is free from white. The less white in a colour, the truer the colour or the greater its saturation. Saturation is the amount of pigment in a colour, and not the intensity.

●**Gamma:** The light output of a CRT is not linear with respect to the voltage input. The difference between what you should have and what is actually output is known as gamma.

●**Frame:** In interlaced video, a frame is one complete image. A video frame is made up of two fields, or two sets of interlaced lines. In a film, a frame is one still image of a series that makes up a motion image.

●**Genlock:** Allows synchronisation of otherwise video devices. A signal generator provides a signal pulses which connected devices can reference. Also see Black Burst and Color Burst.

●**Blackburst:** The video waveform without the video elements. It includes the vertical sync, horizontal sync, and the Chroma burst information. Blackburst is used to synchronize video equipment to align the video output.

●**Colour Burst:** In colour TV systems, a burst of subcarrier frequency located on the back part of the composite video signal. This serves as a colour synchronizing signal to establish a frequency and phase reference for the Chroma signal. Colour burst is 3.58 MHz for NTSC and 4.43 MHz for PAL.

●**Colour Bars:** A standard test pattern of several basic colours (white, yellow, cyan, green, magenta, red, blue, and black) as a reference for system alignment and testing. In NTSC video, the most commonly used colour bars are the SMPTE standard colour bars. In PAL video, the most commonly used colour bars are eight full field bars. On computer monitors the most commonly used colour bars are two rows of reversed colour bars

●**Seamless Switching:** A feature found on many video switchers. This feature causes the switcher to wait until the

vertical interval to switch. This avoids a glitch (temporary scrambling) which often is seen when switching between sources.

● **Scaling:** A conversion of a video or computer graphic signal from a starting resolution to a new resolution. Scaling from one resolution to another is typically done to optimize the signal for input to an image processor, transmission path or to improve its quality when presented on a particular display.

● **PIP:** Picture-In-Picture. A small image within a larger image created by scaling down one of image to make it smaller. Other forms of PIP displays include Picture-By-Picture (PBP) and Picture- With-Picture (PWP), which are commonly used with 16:9 aspect display devices. PBP and PWP image formats require a separate scaler for each video window .

● **HDR:** is a high dynamic range (HDR) technique used in imaging and photography to reproduce a greater dynamic range of luminosity than what is possible with standard digital imaging or photographic techniques. The aim is to present a similar range of luminance to that experienced through the human visual system.

● **UHD:** Standing for Ultra High Definition and comprising 4K and 8K television standards with a 16:9 ratio, UHD follows the 2K HDTV standard. A UHD 4K display has a physical resolution of 3840x2160 which is four times the area and twice both the width and height of a HDTV/FullHD (1920x1080) video signal.

● **EDID:** Extended Display Identification Data. EDID is a data structure used to communicate video display information, including native resolution and vertical interval refresh rate requirements, to a source device. The source device will then output the provided EDID data, ensuring proper video image quality.

5.4 Revision History

The table below lists the changes to the User Manual.

Format	Time	ECO#	Description	Principal
V1.0	2021-09-13	0000#	First Release	Sylvia
V1.1	2022-12-06	0001#	1.Add product dimensions 2.Revise key features	Aster
V1.2	2023-04-04	0002#	1.Revise product codes 2.Revise key features	Aster
V1.3	2023-05-29	0003#	1.Revise connection diagram 2.Revise technical datasheet	Aster
V1.4	2023-07-26	0004#	Add module specification in Appendix	Aster
V1.5	2023-08-07	0005#	1.Revise application diagram 2.Add DP 1.2 Input & output optional module	Aster
V1.6	2023-09-20	0006#	1.Revise order codes	Aster

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