



4K Video Synthesizer

LM-SH41-4K2K

User Manual

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Chapter One Installation Notes

For your safety and equipment security, please be sure reading the safety instructions carefully before using the machine.

If you have doubts in the use, please read this manual first. Described in detail in the body of the device operation. If you still have questions, please contact us, we will give you a satisfactory answer as soon as possible. Specifications subject to release to change without notice, please understand. When installing, please note the following:

1, power supply:

Please use with protection to single-phase three-wire AC 100-240V power supply, and ensure that the entire engineering system using the same protected. You can not use unprotected power, the power cord ground pin can not be destroyed.

2, Power:

When you need to move equipment or other work must outage, to shut off all power, including the power switch, unplug the power plug, so as to ensure the safety of your equipment.

3, Cable:

Items can not put pressure on the power supply lines, signal lines, communication lines, cable should keep from trample or extrusion, to prevent the risk of leakage or short circuit.

4, Signal cable:

Inserting or pulling the signal line to the device, the device needs outage, so as not to damage the device. Hot plug caused damage not covered under warranty.

5, Vents:

The outer surface of the device may have openings for heat dissipation, do not block these openings, in order to avoid heat build-up, the risk of damage to the equipment or cause fire.

6, Equipment placement:

Should a reasonable settlement for devices such as standard rack mount, chassis, cabinets, or placed on a stable flat work surface to prevent the unit from dropping.

7, surroundings:

Equipment working environment should pay attention to dust, moisture, in particular, to prevent the liquid from soaking and splashing into the interior of the device.

8, service:

All repairs should be done by qualified service personnel , untrained Never attempt to repair equipment. To prevent the risk of electric shock, do not open the cabinet.

9, Safety Precautions:

- ① the internal high-voltage equipment, non-professional maintenance personnel shall not open the case, to avoid danger;
- ② non-dripping or splashing, prohibited place any container with liquid items on the device;
- ③ for the prevention of fire,for biding a device near the fire;
- ④ for adequate ventilation, equipment should be maintained at least20CM void of the front and rear panels;
- ⑤ devices should be immediately unplug the power cord and handled by professional maintenance personnel such as eerie noise, smell or smoke;
- ⑥ In the case of lightning or unused for long periods, unplug the power cord;
- ⑦ not stuffed any object to ventilation holes of the device to avoid damage to the equipment or electric shock;
- ⑧ not to place the device near water or other damp places;
- ⑨ the device should not be placed near heat sink or other high temperature places;
- ⑩ properly organize the power cord to prevent breakage;
- ⑪ the following conditions should unplug the device power cord, handled by qualified service personnel:

- 1) the power cord is damaged or frayed;
- 2) When the liquid has been spilled into the device;
- 3) The device is dropped or the cabinet damaged;
- 4) This device malfunction or significant performance changes.

This device is not suitable for non-professionals to operate the debugger, users are subject to professional training and guidance.

Please read carefully before using and this manual should be properly preserved for later use.

Chapter two Product Introduction

1 Product description

LM-SH41-4K2K is a high-performance HD 4K Quad video multiplexers, its main function is to make the four HD or analog signals displayed simultaneously on a super-high-definition display unit under quad mode , and contain PIP, POP function.

LM-SH41-4K2K HD 4K Quad video multiplexers supports 1 channel VGA, 2-way DP, 4-way HDMI signal input. Maximum input signal DP supports 3840x2160 @ 60HZ, the highest HDMI input signal can support 3840x2160 @ 30HZ, maximum output resolution up to 3840x2160 @ 60HZ.

It supports 1 channel HDMI 2.0 output, the output resolution and refresh rate up to 3840x2160 @ 60HZ, the output refresh rate of high-definition 4K Quad video multiplexers is the highest on the market. Meanwhile, if the four 1920 * 1080 signals input, 4K display unit may quad display mode, point-to-point display 4-way high-definition signals, four full HD 1080P video signals can be completely uncompressed displayed on a 4K display unit and 4 source image effects with one 1080P signal source connected with a single 1080P display unit without any distinction.

Meanwhile, LM-SH41-4K2K Quad video multiplexers can also supports USB Salvo, switch to a certain computer signal displayed full screen by button or remote control , the corresponding host computer USB Salvo, so realize the need of video conferencing's functional requirements like Salvo mouse, keyboard .

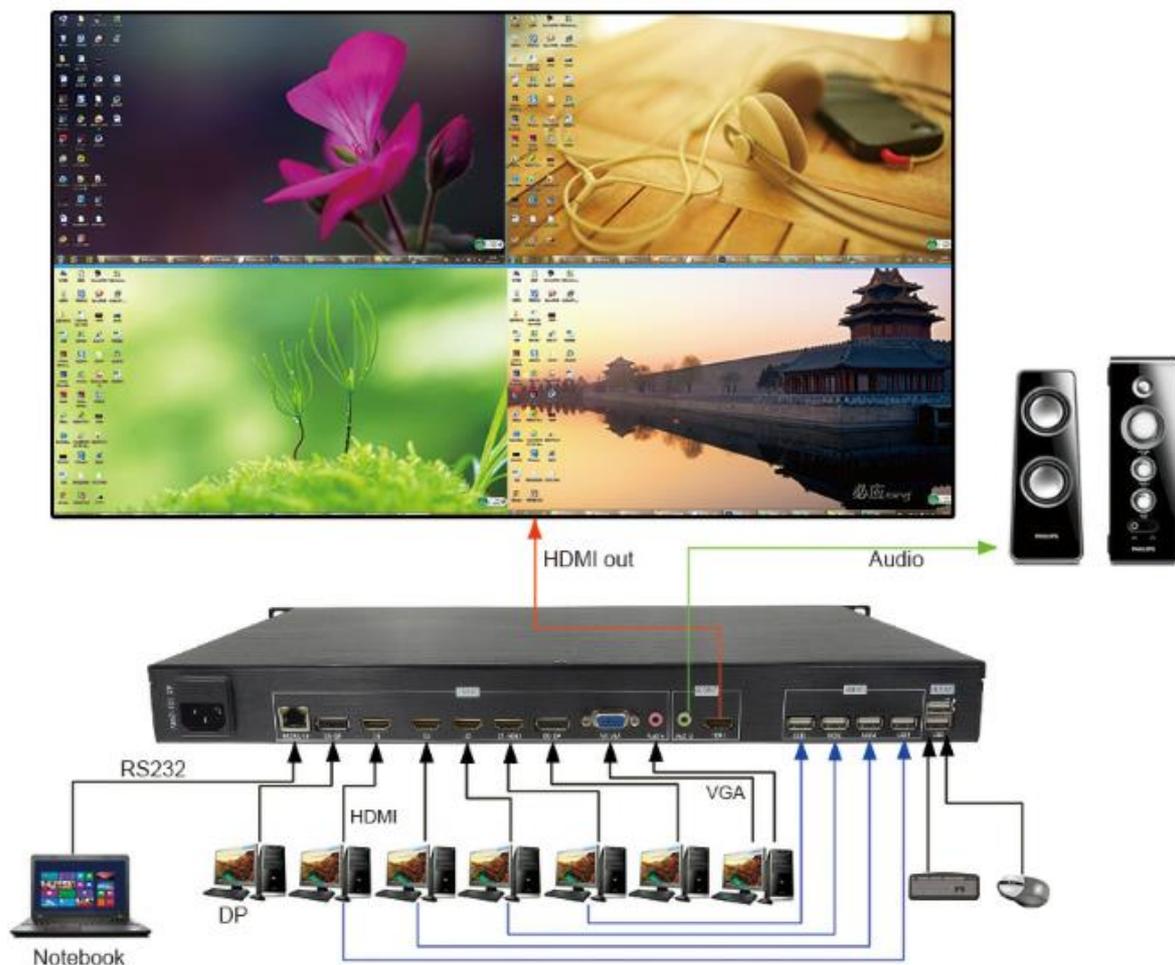
LM-SH41-4K2K HD Quad video multiplexers is currently use a relatively large number of standard products on the market, products are mainly used in where need to use a single display unit simultaneously display multiple HD signals workplace like video conferencing, teaching, exhibitions .

2 The main function

- Support one VGA, 2-way DP, 4-way HDMI (including 3-way compatible mobile signal) input signal, the input resolution up to 3840 * 2160 @ 60HZ, backward compatible
- Support 1 channel HDMI2.0 output, the output resolution up to 3840 * 2160 @ 60HZ
- Support point-to-point display 4-way 1920 * 1080 full HD signal
- Input and output signal widely support audio, and 3.5mm headphone jack support the left and right channel stereo output
- 2-way USB signal output, USB connection support mouse and keyboard, and USB with image Salvo

- Single screen simultaneously displays four HD digital / analog signals, or switching to a signal full-screen display
- Support image fixed position POP, PIP function
- Widely support 90V ~ 264V AC input, can be commonly use to any country worldwide
- Standard 19-inch 1U chassis drawing, directly on the cabinet
- Support control by a chassis button, IR remote control, RS-232 serial control and the control

3 System topology



4 Machines pictures



- ① The Corresponding LED Lights Green
- ② IR Remote Control
- ③ Set The Partition Mode
- ④ USB Signal
- ⑤ Power ON/OFF



- ⑥ Power Input
- ⑦ RS232 port
- ⑧ D5:DP input
- ⑨ D4:HDMI/mobile signal input
- ⑨ D3:HDMI/mobile signal input
- ⑨ D2:HDMI/mobile signal input
- ⑨ D1:HDMI input
- ⑩ D0:DP input
- ⑪ AO:VGA input
- ⑫ Audio input
- ⑬ Audio output
- ⑭ HDMI output
- ⑮ USB input
- ⑯ USB output

5 LM-SH41-4K2K Quad HD video multiplexers Specifications

name	specification
Signal input	
Input port	1VGA、 2DP、 4HDMI、 4USB、 1right and left channel audio
Resolution	DP support highest resolution of 3840*2160@60HZ and downward compatibility HDMI support highest resolution of 3840*2160@30HZ and downward compatibility
Color depth	24bit,1677 ten thousand
PIP、 POP mode	Fixed model
output	
interface	1 HDMI2.0 connect display device and support video、 audio sync output; One 3.5 mm audio right and left stereo 2 USB 2.0,one connect mouse the other connect keyboard
Resolution	Can choose 3840*2160/60HZ, 3840*2160@30HZ, 1920*1080@60HZ,1280*720@60HZ
Color depth	24bit,1677 ten thousand
Control mode	RS232、 IR、 case key
Cotrol software	Not available
voltage	AC 90~260V
dimension	441mm(L)*44mm(H)*239mm(W)
Power	No more than 15w
audio	Audio input supports 3.5mm audio interface input, for Binding VGA;

Third Chapter Machine installation

1 Unpacking

Check the host and accessories. Including the host, CD, power cable, remote control, warranty card, manual.

2 Install the machine

display unit setting: LM-SH41-4K2K HD Quad video multiplexers Support 1 channel HDMI2.0 output, the display unit input signal is set to HDMI; if there are several HDMI input signals simultaneously, the signal source is set to HDMI input port.

output and display unit is connected: place Quad video multiplexers is completed, a signal output via HDMI cable docking with HDMI port of the corresponding display unit.

If you need an external audio, devices connect with external audio through the headphone jack at both ends 3.5mm audio cable .

□ Input Signal Connection: Connect the computer or other signal source output devices with splitter input port via HDMI cable, VGA cable or DP line ;

If VGA require audio feature, use both ends with 3.5MM headphone jack cable to connect the computer and the input Audio ports of device ;

3. Power on

After finishing connecting the cables that we have talked above , insert the 100~240V AC power supply, turn on the power switch, power indicator lights is red for power-on state, the light is red for standby mode.

Chapter Four Device Port Description

In the process of using the device, you need to first get to know each input and output video port so that operate the equipment more skilled. Device input and output ports consists of three parts, namely, an input section, output section, USB section.

1 Input section

Input portion of the chassis rear panel INPUT box ,by A0: VGA, D0: DP, D1: HDMI, D2: mobile signal, D3: mobile signal, D4: mobile signal, D5: DP, RS232 / IR, Audio composed of nine input port, under function for each port:

A0: VGA: VGA signal input;

D0: DP --- DP: signal input, maximum input resolution / refresh rate to 3840x2160 @ 60HZ, backward compatible;

D1: HDMI: HDMI input signal, the input resolution up to 3840x2160 @ 30HZ, backward compatible;

D2: mobile signal: HDMI input signal, the input resolution up to 3840x2160 @ 30HZ, backward compatible; compatible mobile signal mobile phone signal through the Micro USB to HDMI input;

D3: mobile signal: HDMI input signal, the input resolution up to 3840x2160 @ 30HZ, backward compatible; compatible Mobile High-Definition Link mobile phone signal through the Micro USB to HDMI input;

D4: mobile signal: HDMI input signal, the input resolution up to 3840x2160 @ 30HZ, backward compatible; compatible Mobile High-Definition Link mobile phone signal through the Micro USB to HDMI input; D5: DP:

RS232 / IR: using RJ45 to RS232 line, control through computer control software or in the control; IR signals can also be transferred via cable, the remote control receiver away from the device may also be implemented by infrared remote control;

Audio: Bind VGA video signal input, can be synchronized switching with the VGA signal.

2 Output section:

The input section of the chassis's rear panel OUTPUT frame, HDMI interface directly connected to the display unit; Audio can be directly connected to an external sound, high power audio playback.

3 USB section

USB input section contain the USB1, USB2, USB3, USB4 input port in INPUT box, which are connected with the respective host computer.

USB output section consists of two USB ports of OUTPUT ,can connect a USB mouse and keyboard at the same time, to achieve a single set of mouse and keyboard controls 4 mainframe imultaneously.

Connection Description:

1, through the cable four signal source is connected with the input port of the device;

2, by setting so that each window (as shown below Signal 1, Signal 2, Signal 3, Signal 4 four window) display is not the same as the signal source is different (setting mode refer to the next chapter of the remote control), do not change display window position of the signal source;

3, via the USB cable so that the 4computer's USB port respectively, connect with USB1, USB2, USB3, USB4 of the device; eg :A image of computer is displayed in the window position of the 1signal,then the computer's USB cable must be connected to the USB1 port of the device, similar to other computer connection.

chapter Five Remote control operation

Properly connect the output signal and display terminal , then you need to properly connect the input signal source and the device . via remote control, chassis button and control software to set different display modes, such as quad display, select a signal full-screen display, the PIP and other functions . This chapter describes how to operate the equipment via infrared remote control, if you are use our devices for the first time, configure or settings as follows

1, the window position of signal definition:

Before using LM-SH41-4K2K Quad video multiplexers, we must understand the definition of signal 1, signal 2, signal 3 and signal 4:

Signal 1 is also called window1, in the top left corner of the screen;

Signal 2 is also known as window 2, in the lower left corner of the screen;

Signal 3 also known as window 3, in the upper right corner of the screen;

Signal 4 also known as window 4, in the lower right corner of the screen;

As the picture show:



2 Setting the resolution

If the output resolution of the device is higher than the physical resolution of the display unit, the display may not display images ; if the output resolution of the device is lower than the physical resolution of the display unit, the image display but not the best, so we must select identical or similar resolution output .

SWITCH button on the remote control switching in turn the output resolution of the device, so that the output resolution of device with physical resolution of the display unit fit that achieve optimal effect, when switching the resolution we must note the following:

☆, each time you press the SWITCH of remote control, need about 2 seconds before you can switch to the next resolution;

☆, if the output resolution of device is higher than the physical resolution of the display unit, the display unit will not display images, or display does not support ,and press the MENU button of remote control does not pop up any menu;

☆, after switching resolution, if the display unit can support the resolution, will pop up input resolution at side of the screen, you can selected the best resolution that support the display unit by switching.

☆, press the MENU key, pop up menu, shows that the resolution setting can be displayed properly.

3. Set the quad display mode:

First press buttons 0 of the remote control or cabinet , so display under Quad mode,but press the 0 key may not post an image, you need to operate the following steps.

4, enter the setup menu:

Press the MENU key of remote control, pop-up menu like Figure 1, the signal source menu in red press the OK key or the → key appears input signal selection menu as Figure 2, you can choose the signal, as shown below:



Figure1, main menu

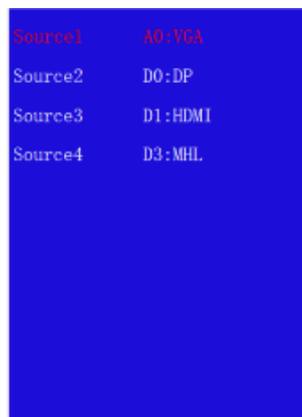
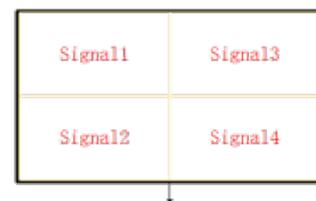


Figure2, signal menu



3, signal path definitions

5, the window displays signal settings

Select different input source, as follows:

1, the upper left corner signal 1, signal 2, signal 3 and signal 4 display position fixed, but the four signal ports can be arbitrarily selected AO: VGA port input signal, so the signal 1 select AO: VGA

2, the lower left corner shows DO: DP port input signal, so the signal 2 select D0: DP

3, the top right corner shows D1: HDMI port signal, so the signal 3 select D1: HDMI

4, the bottom right corner shows D3: mobile signal, so the signal 4 select D3: mobile signal

6, the screen mode switching:

By clicking the shortcut keys on the remote control, you can achieve fast switching signal or mode, the following is the definitions of each key:

key1: signal1 full screen display, audio, video and USB sync switch;

Key 2: signal2 full screen display, audio, video and USB sync switch;

key3: signal3 full screen display, audio, video and USB sync switch;

keys4: signal 4 full-screen display, audio, video and USB sync switch;

Key 0: 4 split screen display;

UA1 key: sound and USB switch to signal1 channel;

UA2 key: sound and USB switch to signal 1 channel;

UA3 key: sound and USB switch to signal 1 channel;

UA4 key: sound and USB switch to signal 1 channel;

7, brightness and contrast adjustment

7.1 while adjusting all signals window:

Press the MENU key to pop-up menu, then the region is set to Full state, and respectively adjust brightness or contrast, all windows can change the brightness or contrast simultaneously;

7.2 adjust one single channel:

Press the MENU key to pop-up menu, then the region is set to 1, and adjust the brightness or contrast, that is you can only adjust the signal 1 window; other windows similar to that.

8, other keys functions

SOURCE key: 4 split screen, 2 split screen, POP and PIP various modes switch by turns;

 keys: Power on / off;  key: Mute on / off;

 key: volume -, press sound reduction;

 key: volume + press to increase the sound

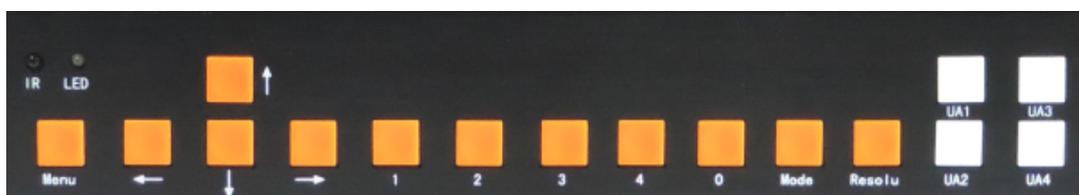
SWITCH: switch different resolutions, after each press, please interval 2-3 seconds;

 :Return key;

 : VGA signal correct, for the VGA input signal offset or not full screen situation, one-click calibration;

Chapter Six button operation

Through the chassis button, you can easily call in quick mode, call mode are correspond with the remote controller. the following only describes the purpose of each button:



Menu: ↑, ↓, ←, →: up, down, left and right navigation keys;

1: The first window full-screen ;

2: the 2nd window full-screen ;

3: the3rd window full-screen ;

4:the 4th window full-screen;

0: Four split screen display;

Mode: split screen mode switch turns;

Resolu: resolution switching;

UA1: Audio and USB mouse, keyboard, switch to the first window;

UA2: Audio and USB mouse, keyboard, switch to the second window;

UA3: Audio and USB mouse, keyboard, switch to the third window;

UA4: Audio and USB mouse, keyboard, switch to the 4th window

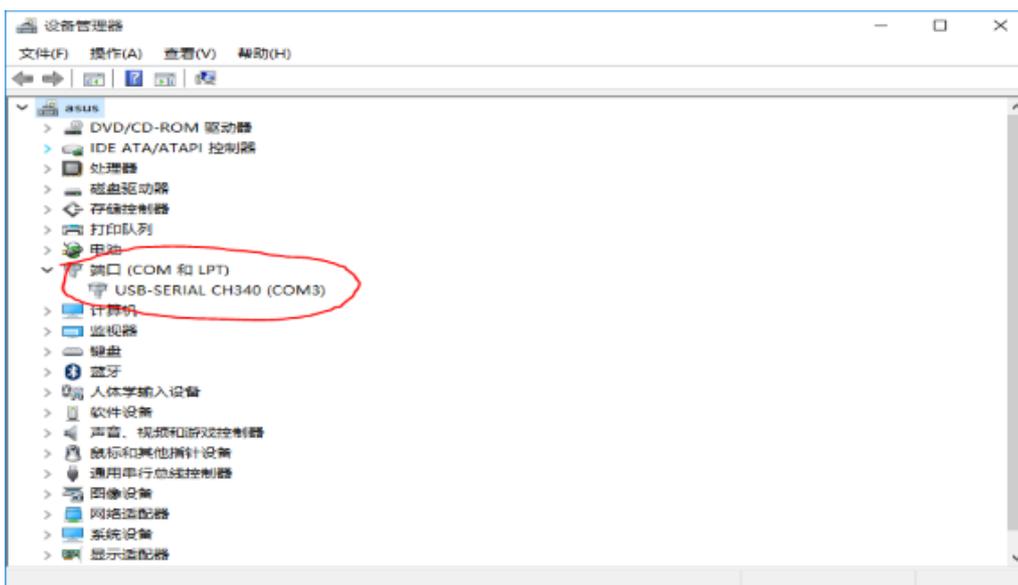
Chapter Seven Software Operation

1, RS-232 serial cable connection

First, the RS-232 line connecte with supporting RS-232 port to RJ45 network cable, the other end of the RS-232 is connected with the equipment.

2, check the computer settings

View computer COM port if is normal to see these steps: Right-click the desktop "My Computer" - "Properties" - "Device Manager", as shown below COM port number:



3, run the software

The random distribution of the CD-ROM control software folder copy to control computer, and open VideoConverter file, such as on the following screen:



4, the communication settings

Click on the right end of the list of serial port drop-down menu → select serial number → click open, you can control the device.

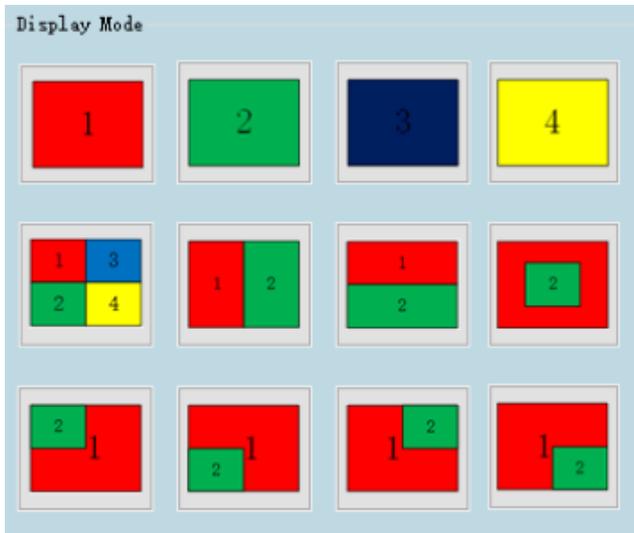


5, resolution settings

Click on the right side of the resolution ,Resolution drop-down menu, select the appropriate resolution and refresh rate depending on the physical resolution of the monitor. Such as the display unit physical resolution is 3840 * 2160, support for 4K maximum refresh rate is 30HZ, so you should choose 3840 * 2160 @ 30HZ in this item.

6, switch the mode

By clicking the icon of display mode, shortcut control the mode, as shown below, respectively: 1,2,3,4 window full screen, quad mode, the left and right split mode, down and up two split mode, PIP display mode



7, the audio portion

As shown below, each menu definition of the audio portion:

Switch: Device on / off;

Volume -: volume down;

Volume +: volume increase;

Mute: Mute on / off;

USB / Audio 1: USB peripherals, and audio switch to the first window;

USB / Audio 2: USB peripherals, and audio switch to the second window;

USB / Audio 3: USB external devices and audio switch to the third window;

USB / Audio 4: USB external devices and audio switch to the fourth window;



8, menu settings

Through the menu settings, it can be switched signals of each window, adjust the brightness, resolution adjustment, language setting, the setup menu (below) each keys definition:

↑: Up navigation key ;

↓: down navigation key;

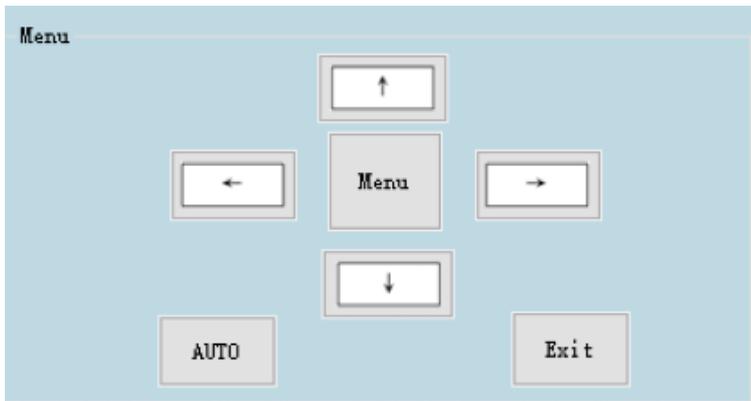
←: Left navigation key;

→: Right navigation key;

Menu: The menu key;

AUTO: VGA signals automatically corrected;

Exit: Exit menu



Chapter Eight Control Code

Baud Rate: 9600

Data Bits: 8

Stop bits: 1

checksum: None

```
#define _RS232_MENU_MSG (menu)           0x22 0x10 0x10 0x20 0x33
#define _RS232_LEFT_MSG (left navigation) 0x22 0x10 0x11 0x21 0x33
#define _RS232_RIGHT_MSG (right navigation) 0x22 0x10 0x12 0x22 0x33
#define _RS232_EXIT_MSG (back/exit)      0x22 0x10 0x13 0x23 0x33
#define _RS232_POWER_MSG (on/off)       0x22 0x10 0x14 0x24 0x33
#define _RS232_UP_MSG (up navigation)    0x22 0x10 0x15 0x25 0x33
```

#define _RS232_DOWN_MSG (down navigation)	0x22	0x10	0x16	0x26	0x33
#define _RS232_4P (quad mode)	0x22	0x10	0x30	0x40	0x33
#define _RS232_1P_FULL (window1 full-screen)	0x22	0x10	0x31	0x41	0x33
#define _RS232_2P_FULL (window2 full-screen)	0x22	0x10	0x32	0x42	0x33
#define _RS232_3P_FULL (window3 full-screen)	0x22	0x10	0x33	0x43	0x33
#define _RS232_4P_FULL (window4 full-screen)	0x22	0x10	0x34	0x44	0x33
#define _RS232_POP_LR (left and right)	0x22	0x10	0x35	0x45	0x33
#define _RS232_POP_TB (up and down)	0x22	0x10	0x36	0x46	0x33
#define _RS232_PIP_LT (top left)	0x22	0x10	0x37	0x47	0x33
#define _RS232_PIP_LB (bottom left)	0x22	0x10	0x38	0x48	0x33
#define _RS232_PIP_RT (top right)	0x22	0x10	0x39	0x49	0x33
#define _RS232_PIP_RB (bottom right)	0x22	0x10	0x3A	0x4A	0x33
#define _RS232_PIP_MID (center)	0x22	0x10	0x3B	0x4B	0x33
#define _RS232_L_MODE (UA1)	0x22	0x10	0x3C	0x4C	0x33
#define _RS232_N_MODE (UA2)	0x22	0x10	0x3D	0x4D	0x33
#define _RS232_M_MODE (UA3)	0x22	0x10	0x3E	0x4e	0x33
#define _RS232_K_MODE (UA4)	0x22	0x10	0x3F	0x4F	0x33
#define _RS232_OUTPUT_1280*720@60HZ	0x22	0x10	0x40	0x50	0x33
#define _RS232_OUTPUT_1920*1080@60HZ	0x22	0x10	0x41	0x51	0x33
#define _RS232_OUTPUT_2560x1440@60HZ	0x22	0x10	0x42	0x52	0x33
#define _RS232_OUTPUT_3840*2160@30HZ	0x22	0x10	0x43	0x53	0x33
#define _RS232_OUTPUT_3840*2160@60HZ	0x22	0x10	0x44	0x54	0x33
#define _RS232_MUTE(mute on/off)	0x22	0x10	0x45	0x55	0x33
#define _RS232_VOL_DEC (volume-)	0x22	0x10	0x46	0x56	0x33
#define _RS232_VOL_INC (volume +)	0x22	0x10	0x47	0x57	0x33
#define _RS232_Auto_MESSAGE (VGA correction)	0x22	0x10	0x56	0x66	0x33