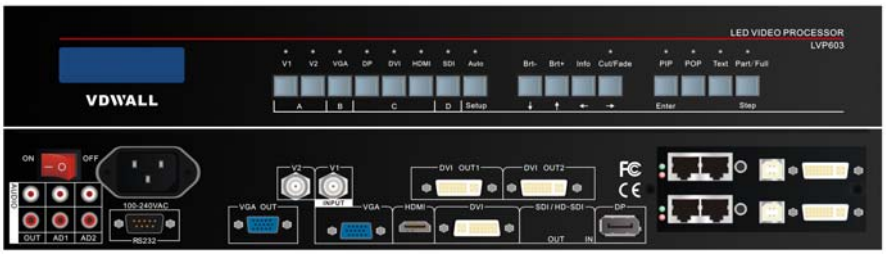
LVP603
LED Video Processor

USER'S MANUAL



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I. Safety Precautions

Danger!

There is high voltage in the processor, to prevent any unexpected hazard, unless you are maintenance, please do not open the cover of the device.

Warning!

1. This device shall not encounter water sprinkle or splash, please do not place anything containing water on this device.
2. To prevent fire, keep this device far from any fire source.
3. If this device gives out any strange noise, smoke or smell, please immediately unplug the power cord from receptacle, and contact local dealer.
4. **Please do not plug or unplug DVI signal cable when the device on power.**

Caution!

1. Please thoroughly read this manual before using this device, and keep it well for future reference.
2. In the event of lighting or when you are not going to use the device for a long time, please pull the power plug out of receptacle.
3. Nobody other than professional technicians can operate the device, unless they have been appropriately trained or under guidance of technicians.
4. To prevent equipment damage or electric shock, please don't fill in anything in the vent of the device.
5. Do not place the device near any water source or anywhere damp.
6. Do not place the device near any radiator or anywhere under high temperature.
7. To prevent rupture or damage of power cords, please handle and keep them properly.
8. Please immediately unplug power cord and have the device repaired, when
   1) Liquid splashes to the device.
   2) The device is dropped down or cabinet is damaged.
   3) Obvious malpractice is found or performance degrades.

II. Connections of hardware

1. Rear view

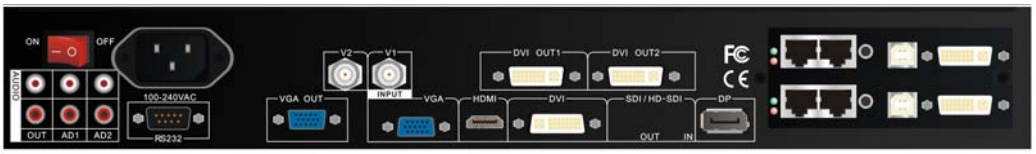


Figure 1

2. Port description

1） Video Input

LVP603 supports 6-channel signal input, including:

Port name	Description
V1~V2	2-channel PAL/NTSC composite video input
VGA	1-channel computer analog signal input
DP(DisplayPort)	1-channel DisplayPort digital hd signal input
DVI	1-channel computer digital signal input
HDMI	1-channel HDMI digital HD signal input

2） Audio Input

LVP603 supports 4-channel stereo audio switch. Of which, 2 channels are DP and HDMI audios, the other 2 channels are AD1, AD2 external input audio. AD1 and AD2 can be mapped to the any one of all video inputs, and will be switched synchronous to the selection of video input signals.

3） Video Output

Port name	Description
VGA OUT	1-channel analog RGBHV signal output, it can be connected to a local display device and used as monitor (it is strongly recommended to use this port when operating and setting **LVP603**).
DVI OUT 1 / DVI OUT 2	2 same DVI digital graphic signal output, it can be connected with external LED transmission card or LED transmission box

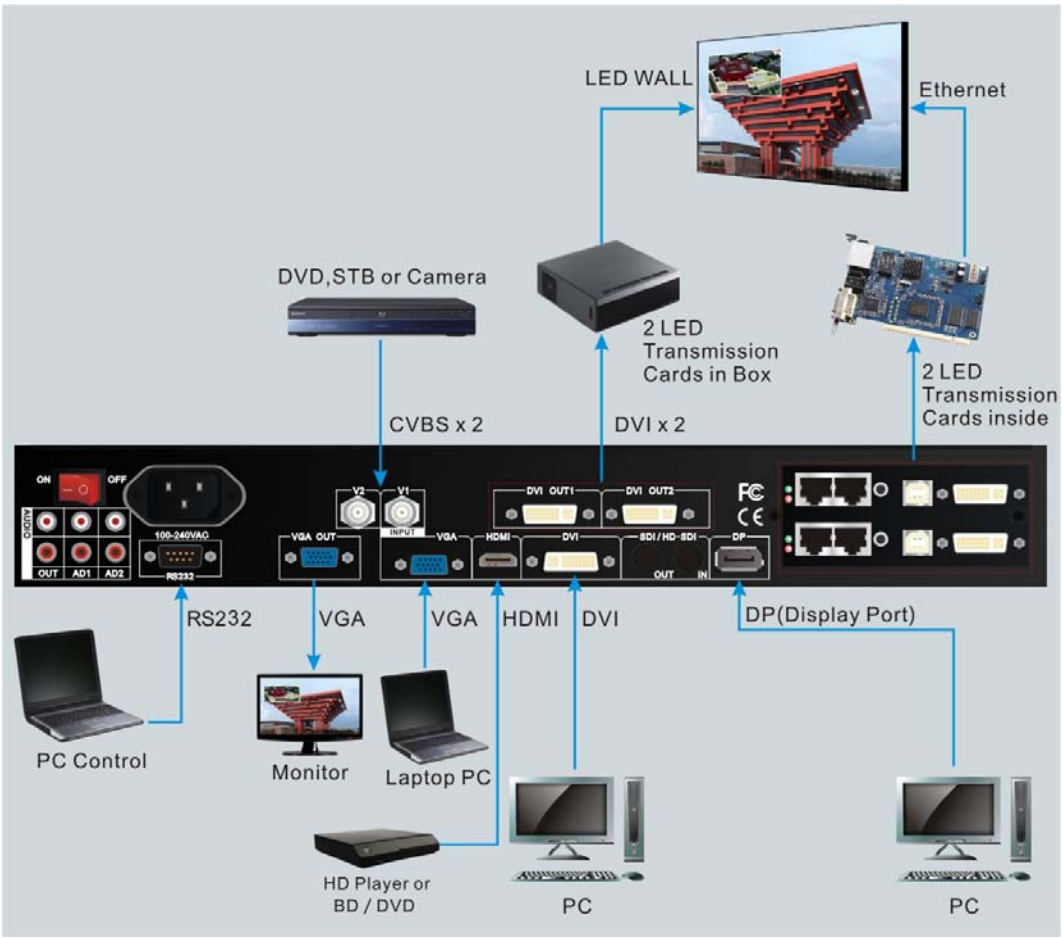
4） Audio Output (AUDIO OUT)

Corresponds to the selected video input signal, output this channel audio input signals.

5） Signals of other ports

RS232 serial communication port

3. Connection diagram



III. Frontal panel operations

1. Diagram of frontal panel

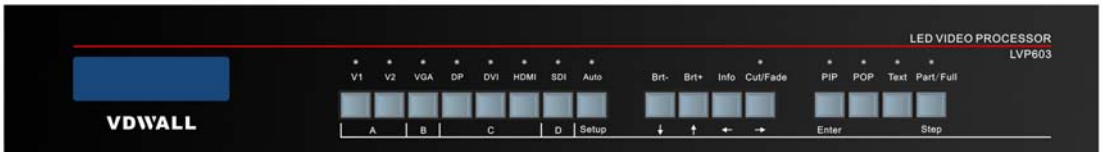


Figure 2

2. Button instructions (operation mode):

There are 16 buttons on the frontal panel of LVP603, all these buttons will be operable after start. they have the following functions as described below:

1) Select input video source

Port name	Description
V1~V2	2-channel PAL/NTSC composite video input
VGA	1-channel computer analog signal input
DP(Display Port)	1-channel DisplayPort digital HD signal input
DVI	1-channel computer digital signal input
HDMI	1-channel HDMI digital HD signal input

Switch audio input while operating above buttons; select the audio signal input from corresponding video input to output it through **Audio OUT**.

Notes: when user has selected input signal, the current input signal source that you selected, e.g.: INPUT=**HDMI** will appear in the LCD. In the meantime, the indicator above the corresponding button will indicate the status of current input signal source. If there is no valid signal input, the indicator will blink and dark screen appears; if the signal is valid, the indicator will illuminate.

2) VGA input auto adjustment (Auto)

When the current VGA input source of **LVP603** is a valid signal, press this button, **LVP603** will automatically adjust the sampling parameters of the VGA signals, so as to make VGA picture clean and complete.

In general, this operation is made only when new VGA signal source is to be connected in. Sometimes user need repetitively do such adjustment till VGA picture looks clean, complete and stable.

3) Select output brightness

Button names	Description
BRT -	Decrease output image brightness of **LVP603,** the lowest brightness is 0.
BRT +	Increase output image brightness of **LVP603,** the highest brightness is 64.

LVP603 supports 32 levels Brightness, "0" represents the lowest brightness, and 64 represents the highest brightness. To ensure full gray level of output image, normally the output brightness is set as 64!

4) Information display (Info)

This button can be operated to display the following two status information:

Current settings of LVP603: press "Info" button to display current settings and information of **LVP603**. There are total 29 items of information. Press "Info" button again before the information disappears in LCD, the next entry of information will appear in LCD.

Status of current input signal source: press current input selection button, then press "Info" immediately, the input signal source selected, e.g.: "In: HDMI", will appear in line 1 in LCD, and the status of current input signal source will appear in line 2 in LCD. If no valid signal is input, "No Input" will appear in LCD; if the signal is valid, its input signal format such as "**1080p_60Hz**" will appear in LCD.

5) Select Cut / Fide mode

LVP603 can realize seamless or fading in/out switching effects, i.e.: Cut, Fide, between the signals coming from the following 3 groups. But if the signals come from the same group, LVP603 can only realize freezing seamless switching effect.

A	B	C
V1，V2	VGA	DP，DVI，HDMI

Cut: the moment the LED indicator above the button is off. In this mode, user can transiently shift picture seamlessly without flickering, tremble, stasis, delay, black screen occurring. Cut is the default special effect switching mode of LVP603.

Fide (Fading-in/out mode): the moment the LED indicator above the button is on. In this mode, user can shift the picture coming from different input signal groups in fading-in/out mode without flickering, tremble, stasis, delay, black screen occurring.

Freezing seamless switching: the pictures coming from the same group can only be shifted in freezing seamless switching mode. That is to say, after you select another input signal which belongs to the same group with that of currently displayed signal, current signal will first be frozen, then be superseded transiently by the signal you selected.

6) PIP / POP

PIP mode of LVP603 allows user to insert a PIP window in current picture, and the size and location of the PIP window can be changed freely. The signals to be displayed in PIP window can either be signals coming from other groups or be current signal itself. Here we define current picture as background, and the picture to be added as PIP.

Operating procedures:

Enter PIP display mode: Press PIP button, the indicator above the button is on, LVP603 will enter **PIP** mode, in the meantime, the corresponding input signal codes of background and PIP will appear in LCD, e.g.: "background=V1, PIP=DVI".

Change PIP: while in PIP mode, press buttons to select another input signal coming from other groups or current signal itself, this picture will be set as PIP.

Change the background: you must first press PIP button to disable PIP mode. Select appropriate input signal as background, then press PIP button to switch to PIP mode, then select a new PIP picture.

Enter POP mode: press POP button while in PIP mode, the indicator above the button is ON, and LVP603 will enter POP mode. The moment the LED is divided into two sectors respectively on the left and on the right, which display the input signals of background

and PIP respectively. The information "Left=V1, Right =DVI" appears in LCD. User can shift PIP and POP modes by pressing POP button.

7) Text Overlay mode(Text)

LVP603 can add caption, company logo or animation onto current picture, while current picture is normally displayed, press Text button to go to caption adding mode, then select the signal source of caption. The captions can be made by office software such as Powerpoint.

8) Part / Full

Press this button to switch between Part / Full display mode.

While in non-multi-screen mode, this operation is only to switch over when the input signal is PC (**VGA** / **DP** / **DVI** / **HDMI**), and other signals can work only in the Full display mode.

Mode	Description
Full	Full screen display. LED displays entire input picture, the moment the indicator above the button is OFF.
Part	Part screen display. LED only displays a part of input picture, the moment the indicator above the button is ON.

While multi-screen display mode, press this button, the picture will change in part or full screen mode.

Caution: In part screen display mode. please don't activate PIP/POP function, otherwise, the LED will be unable to display the picture completely.

IV. Setup

The following setup must be made by relevant qualified technicians. For ordinary users, unless they have received adequate relevant training, they shall not attempt the following setup operations!

There are 29 items in 6 categories available for you to set in **LVP603**. Technicians can set these items as necessary, for details see the table below:

Category		Items		Description
1	Language Selection	1	***Language 语言***	
2	Output Image Setup	2	***Hori_Start***	Output horizontal start
		3	***Hori_Width***	Output width
		4	***Vert_Start***	Output vertical start
		5	***Vert_Height***	Output height
		6	***Out Format***	Output resolution
3	Brightness / Color	7	***Brightness***	
		8	***Color***	
		20	***Definition***	
4	PIP/POP Output Image Setup	9	***PIP_ H_Start***	PIP Output horizontal start
		10	***PIP_H_Width***	PIP Output width
		11	***PIP_V_Start***	PIP Output vertical start
		12	***PIP_V_Heigh***	PIP Output height
		13	***PIP_Frame***	
		14	***POP _Height***	
5	Text Overlay Setup	15	***Text_Mode***	
		16	***Text_Thd_RGB***	
		17	***Text_Thd_R***	
		18	***Text_Thd_G***	
		19	***Text_Thd_B***	
6	Input Image Setup	21	***Input_Width***	Width of input image
		22	***Input_Height***	Height of input image
		23	***Hori_In_Str***	Input horizontal start
		24	***Vert_In_Str***	Input vertical start
7	Audio Configurations	25	***Audio1 Confi***	Audio1 configurations
		26	***Audio2 Confi***	Audio2 configurations
		27	***Exit Setup***	
8	Factory district Setup	16	***Device_Init***	
		17	***Bias***	
		18	***Auto ADC***	

1. Enter Setup of LVP603

Press "Setup" for consecutive 8 times while in operation mode, "Password**: 8 Enter Setup …**" will appear in LCD, **LVP603** will enter the No.1 setup item.

After **LVP603** enters the setup mode, the 7 buttons on frontal panel will have the functions as defined in table below:

Name	Functions
Step	Select step value 1 or 10
↑	Move to next item
↓	Move to last item
←	Decrease value or select last value
→	Increase value or select next value
Enter	Save the adjustment or selected values
Setting	Enter or exit setting mode

After **LVP603** enters setting mode, the relevant setting information will be displayed in LCD as per the layout shown in the figure below:

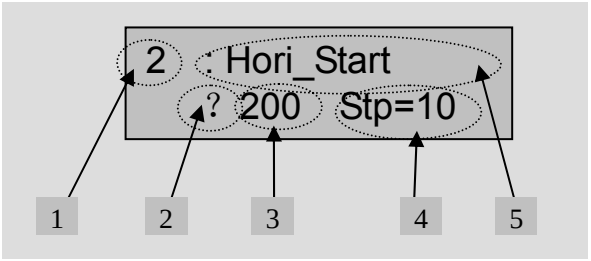


Figure 3

As shown in above figure, LCD consists of five sectors:

Sector	Description
1	The No. of current setting item
2	？: ask you whether to save the adjustment； ！: The adjustment already be saved and takes effect.
3	Newly adjusted value
4	Step value
5	Name of current setting item

2. Select language

Item 1: "***Language*** *语言* "

After entering setting mode, **LVP603** will enter the first setting item

"***Language 语言***". **LVP603** supports Chinese and English display, press "**←**" or "**→**" to select either of them, then press "**Enter**" to save it and make it valid.

3. Output image setup

LVP603 outputs images from VGA OUT, DVI OUT1 and DVI OUT2. There are 7 output formats as listed in the table below. User can enter the No.6 setting item "***Out Format"*** to select one of them.

	Format
1	1024×768_60
2	1024×768_75
3	1280×1024_60
4	1280×1024_75
5	1600×1200_60
6	1920×1080_50
7	1920×1080_60

Item 6: "***Out_Format"***

Press "←" or "→" key to select 1 output format listed under this option, then press "**Enter**" to save it.

If you select "**1024×768_60**", the output resolution of **LVP603** will be 1024×768; the vertical refresh rate is 60Hz.

However, the resolution of LED screen is not exactly 1024×768 pixels. When the resolution of LED screen is less than 1024×768 pixels, we can set **LVP603** to output the images exactly fitting the resolution of LED screen, so that the LED could display a full frame of image. See the schematic diagram below:

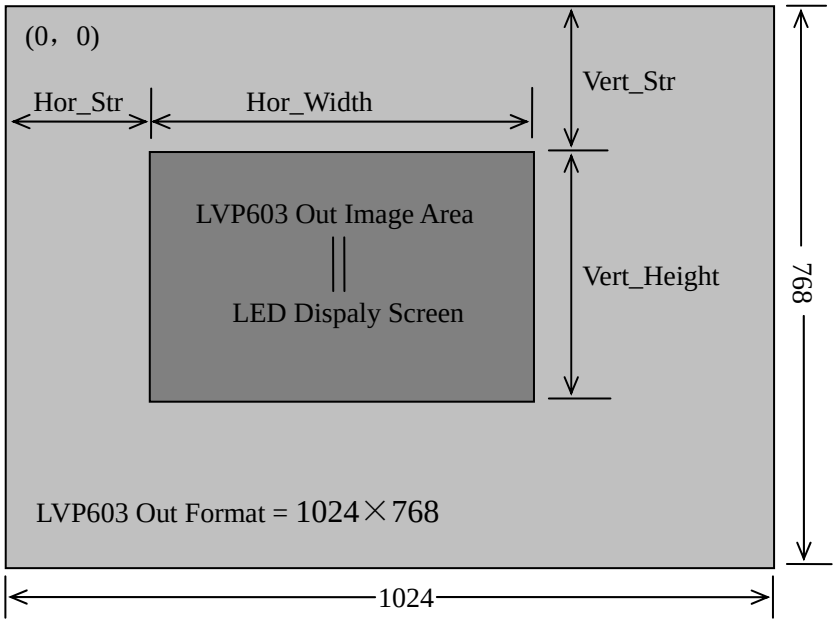


Figure 4

As above figure shows: the size and location of **LVP603** output images are defined by 4 groups of parameters, which correspond to four setting items respectively, for details of their relationship see Table 5 below:

No. of setup item	Setup Item Name	Names of parameters
2	***Hori_Start***	Hor_Str
3	***Hori_Width***	Hor_Width
4	***Vert_Start***	Vert_Str
5	***Vert_Height***	Vert_Height

The start coordinates (0, 0) of **LVP603** output image is defined in the left top of 1024×768 pixels output area.

Set the four setup items as listed in above table as per the size of current LED screen (pixels) and start position of the input image that LED displays. Press " ↑ " or " ↓ " to select setup item, press "←" or "→" to increase or decrease the values of current item. Press "**Enter**" to save the settings.

4. Brightness / Color / *Definition*

Item 7: "***Brightness"***

LVP603 supports 32 levels Brightness, "0" represents the lowest

brightness, and 64 represents the highest brightness.

Press "←" or "→" to increase or decrease the values of brightness. Press "**Enter**" to save the settings.

To ensure full gray level of output image, normally the output brightness is set as **64**!

Item 8: "***Color"***

For V1, V2, DP and HDMI video input source, **LVP603** can set color saturation for them ranging from 22 to 38. The lower this value is, the weaker the color looks; the higher this value is, the stronger the color looks. Press "←" or "→" to increase or decrease the values of color saturation. Press "**Enter**" to save the settings.

Normally the value of color saturation is set as **30**!

Item 20: "***Definition"***

LVP603 provides "sharp" or "normal" as options of definition. In sharp mode, the picture edge looks clearly, and image has higher definition; while in "normal" mode, the picture looks milder. Normally the value of ***Definition*** saturation is set as "normal"!

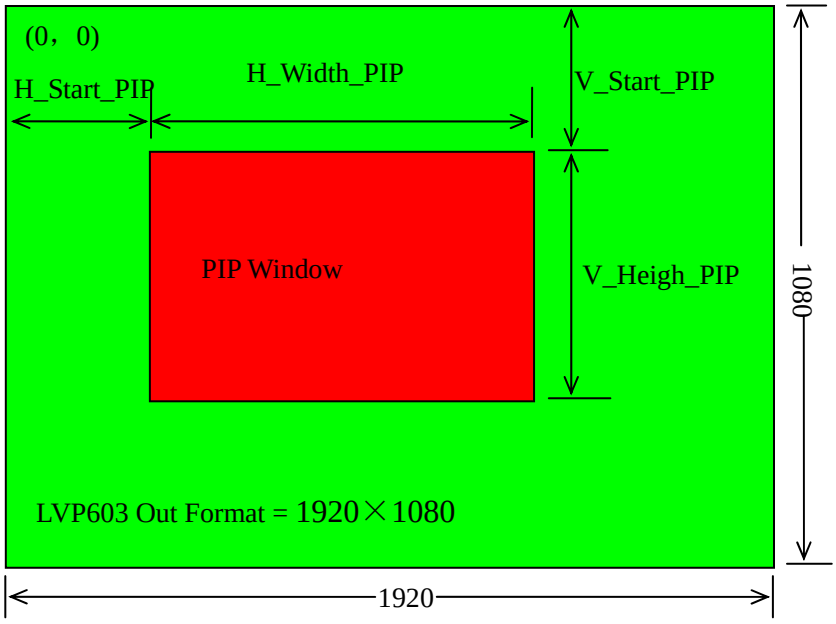
5. PIP/POP Output Image Setup

Items 9~12: "***PIP image output setup***"

LVP603 PIP image window is located in LED screen. As in PIP mode the PIP image is to be zoomed-in/out after being added to background, it means that 4 values listed in items 9~12 in the table below don't represent their pixels in LED, but represent the width and height value of output resolution "***Out_Format***" in the 6th option of setting menu. For details see figure below (provided "***Out_Format***" adopts 1920×1080 mode).

9	***PIP_ H_Start***	***PIP horizontal start***
10	***PIP_H_Width***	***PIP width***
11	***PIP_V_Start***	***PIP vertical start***
12	***PIP_V_Heigh***	***PIP height***

Note: the minimum values of ***PIP_H_Width*** and ***PIP_V_Heigh*** are both 128.

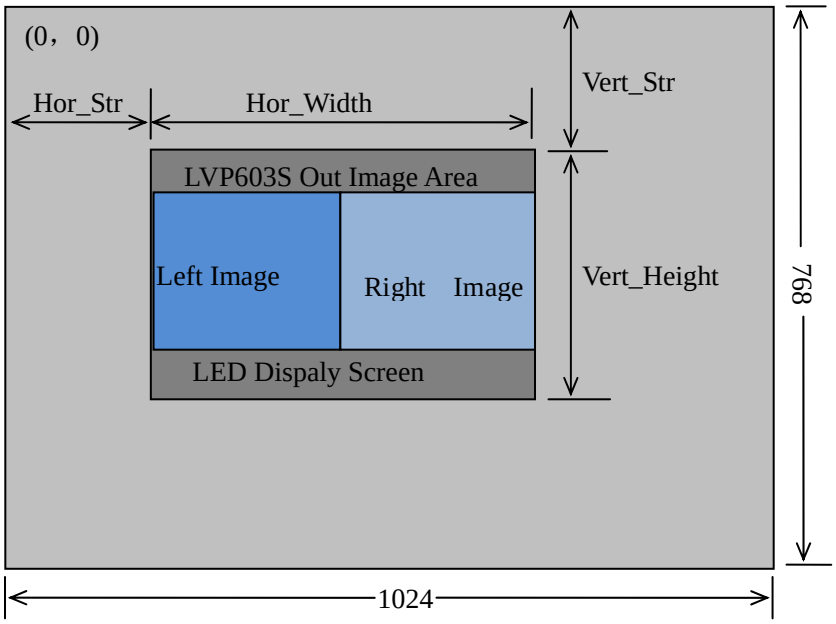


Item 13: "***PIP_Frame***"

User can set frame mode in PIP image window of LVP603. There are 4 setting options, i.e.: "No frame", "black 2 line", "white 2 line" and "blue 2 line".

Item 14: "***POP_Height***"

LVP603 allows users to set **POP** image height by themselves. Like items 9~12, this value doesn't represent the actual LED pixels. Its minimum value is 128. When this value is less than the maximum value, the image will be located in the centre of display as the figure below shows:



6. Text Overlay Setup

15	***Text Mode***
16	***Text_Thd_RGB***
17	***Text_Thd_R***
18	***Text_Thd_G***
19	***Text_Thd_B***

Item 15: "***Text Mode***"

LVP603 allows user to set caption knock-out "< threshold" or ">threshold". If it is less than threshold value, it means that the image of caption signal less than current color threshold value will be added to background, while the part greater than threshold will be automatically filtered. If it is greater than threshold value, it means that the image of caption signal greater than current color threshold value will be added to background.

Item 16: " ***Text_Thd_RGB***"

LVP603 users can set R, G, B values of caption threshold value by themselves, the three values can be set to be the same within 0~252.

Item 17~19: " ***Text_Thd_R/G/B***"

The three options are used to set R, G, B values respectively as a certain value within 0~252.

The following figure shows an example of caption adding function. The caption document in this sample is made using Powerpoint. Its parameters are set as below:

15	***Caption knock-out mode***	***<Threshold***
16	***Caption threshold RGB***	***232***
17	***Caption threshold R***	***Default***
18	***Caption threshold G***	***Default***
19	***Caption threshold B***	***Default***

Background

Text

Text Overlay

7. Input image setup

LVP603 supports multiple machines to work together in parallel, in such mode, a number of small LED screen make up a large screen. If the output format of **LVP603** is: 1920×1080, when 2 sets of **LVP603** are connected in parallel, they can connect any LED screen of no higher than 3840×1080 pixels.

When a number of **LVP603** are connected in parallel in applications, user should set input image parameters of each **LVP603.** For details of parameters see the table below:

Items No.	Item Name
21	***Input_width***
22	***Input_height***
23	***Hori_In_Str***
24	***Vert_In_Str***

Caution: When work together in parallel, each set of **LVP603** should retain the same data in set-up of brightness, bias and Definition as a result to keep the image compatibility.

Figure below shows the example of a 2×2 sets of **LVP603** connected in parallel, in which 4 small LEDs make up a large screen. Provided the resolution of each small LED is 1728×960, the output image of each set of **LVP603** will first be set as below:

Out Format = 1920×1080

Hori_Width = 1728

Vert_Height = 960

Then we should set the input images of each set of **LVP603**. As shown in figure below, to show a complete large picture, each set of **LVP603** shall capture the corresponding part of input images.

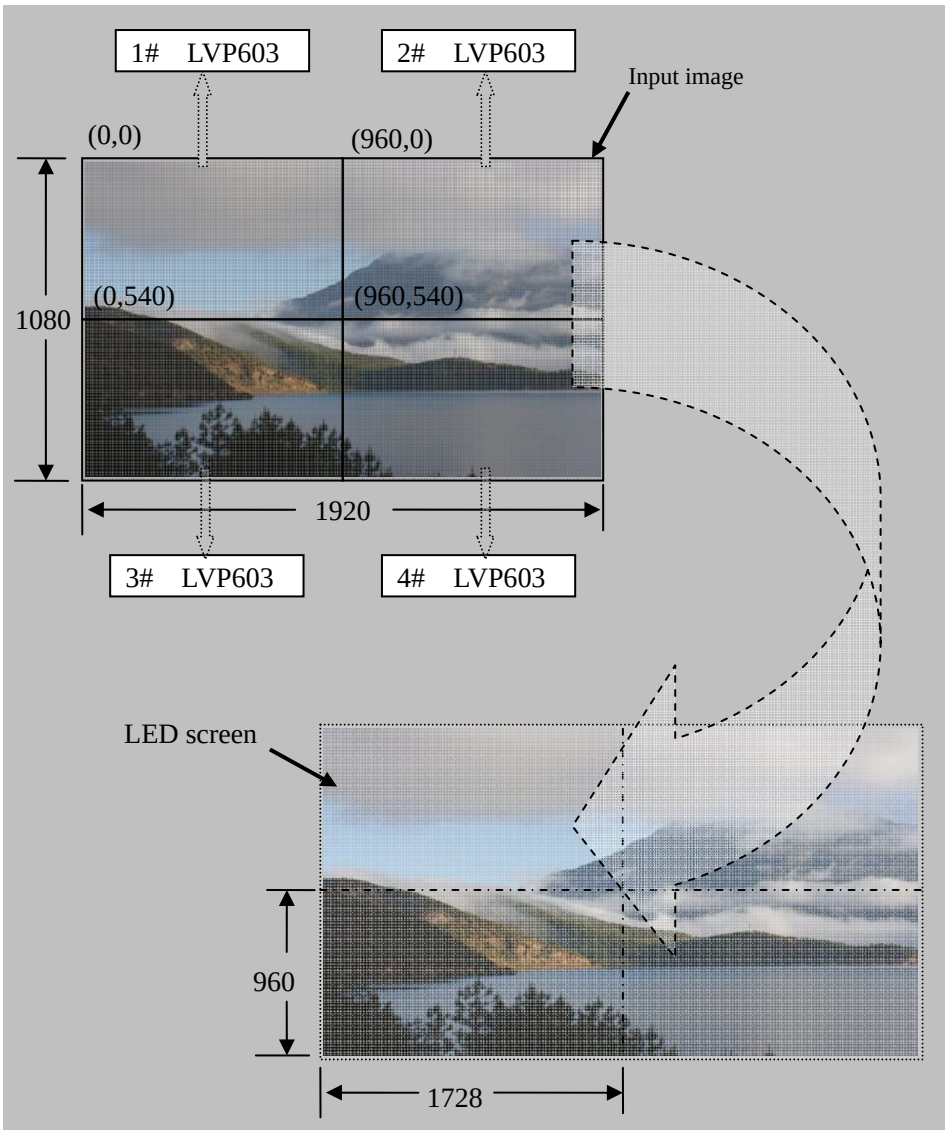


Figure 5

Item 21: "***Input_Width"***

This item has four values for your choice, i.e.: **100%**, **1/2**，**1/3** and **1/4**. **100%** means that 100% images in horizontal direction are input; **1/N** (N=2, 3, 4) means only **1/N** images are input. If 3 sets of **LVP603** are connected in parallel in horizontal direction, each set of **LVP603** will capture 1/3 of input image. Press "←" or "→" key to select width of input image, then press "**Enter**" to save the settings.

As shown in Figure 5, the width of input image for the 4 sets of **LVP603** should be set as:

***Input_Width* = 1 / 2**

Item 22: "***Input_Height"***

This item has four values for your choice, i.e.: **100%**, **1/2**, **1/3** and **9/16**. **100%** means that 100% images in vertical direction are input; **1/N**(N=2,3) means only **1/N** image are input. If 3 sets of **LVP603** are connected in parallel in horizontal direction, each set of **LVP603** will capture 1/3 of input image. When the hori-width and vert-height ratio of the image signal source is 16:9, the black borders will appear in the upper and lower part of the display, which can be adjusted by the items, 9/16 and NO.24 "Ver In Str". Press " ←" or " →" key to select height of input image, then press "**Enter**" to save the settings.

As shown in Figure 5, the height of input image for the 4 sets of **LVP603** should be set as:

***Input_Height* = 1 / 2**

Item 23: "***Hori_In_Str*** "

It is used to set the horizontal start point of input image from which **LVP603** will capture. As shown in Figure 5, the the horizontal start point of the four sets of **LVP603** are set as below respectively:

1# **LVP603 *Hori_In_Str* = 0**
2# **LVP603 *Hori_In_Str* = 960**
3# **LVP603 *Hori_In_Str* = 0**
4# **LVP603 *Hori_In_Str* = 960**

Item 24: "***Vert_In_Str***"

It is used to set the vertical start point of input image from which **LVP603** will capture. As shown in Figure 5, the the vertical start point of

the four sets of **LVP603** are set as below respectively:

1# **LVP603 *Vert_In_Str* = 0**
2# **LVP603 *Vert_In_Str* = 0**
3# **LVP603 *Vert_In_Str* = 540**
4# **LVP603 *Vert_In_Str* = 540**

8. Audio configurations

LVP603 supports 4-channel stereo audio switch. Of which, 2 channels are DP and HDMI audios, the other 2 channels are AD1, AD2 external input audio. AD1 and AD2 can be mapped to the anyone of all video inputs, and will be switched synchronous to the selection of video input signals.

If **HDMI (DP)** is external input audio, when switched to another signals, you should choose the external audio signal input or **HDMI (DP)** itself audio signal.

Item 25: "***Audio1 Config*** "

Press " ←" or " →" to select 1 channel signal from all video input signals **,** map **AD1** external input as audio input signals to the video signals in this channel, then press " **Enter**" to save the settings.

Item 26: "***Audio2 Config*** "

Press " ←" or " →" to select 1 channel signal from all video input signals**,** map **AD2** external input as audio input signals to the video signals in this channel, then press " **Enter**" to save the settings.

Notes: AD1, AD2 can't be mapped to the video input signals in the same channel.

9. Exit setup

Item 27: "***Exit Setup*** "

Press " ↑ " to move to the last item: " ***Exit setup*** ", then press " ←" or " →" to select " **YES** ", then press " **Enter**" to exit setup mode.

If you press " **Setup**" key while in any setup mode, the system will skip to the No.27 item.

10. Factory district setup

The following setups must be made by relevant qualified technicians or follow the guidance of the plant technician. otherwise the incorrect and improper operation will result to abnormal situation.

Item 28: "***Device_Init"***

After enter the No.27 Item from the No.26 Item, press "V1" for 5 times，and then press " ↑ "move to the No.28 Item: ***"Device_Init"***, click "←" or "→" to select "Yes", then click "Enter" to restore to the factory default setup, and mention ***"please power off & on again"***, and then just follow the instruction.

Item 29: "***Bias"***

In order to decrease the noise on gray scale display, the LED display system usually removes the lower gray scale one of all input signals, which will cause the lose of the video information, especially in dark scene ,such as night view.

LVP603 can improve problems as follow mentioned by adjusting the ***" Bias"***, whose limit ranging from 0 to 32. When losing the signal of dark scene, you can restore the drop-out information to the LED display by increasing the value.

Normally in order to keep the completeness of output signals, the standard value is set as **0**!

Item 30: "***Auto ADC"***

After inputting the analog signal to the video processor who's ADC has not been revised, the picture on the display may appear some bad phenomena, such as color cast, extreme-darkness. **LVP603** can overcome all of problems by automatically revising white balance in terms of the input analog signals (AV, and VGA). Figure below shows the method of ***"Auto ADC"***.

When switched to the corresponding analog input signal, the processor will receive and output the signal to the LED display, then, get into the No.30 Item, press " ←"or " →" to select " Yes", at last, press " **Enter**" to carry on auto ADC.

Caution: All video processors have gone though the auto ADC, please use this item delicately!

V. Specifications

Inputs		
Nums/Type	2×Composite video 1×DP(DisplayPort) 1×VGA (RGBHV) 1×DVI 1×HDMI	
Video system	PAL/NTSC	
Composite Video Scope/Impedance	1V (p_p) / 75Ω	
VGA Format	PC (VESA)	≤1600x1200 @60HZ
VGA Scope/Impedance	R, G, B = 0.7 V (p_p) / 75Ω	
DVI Format	SD/HD(EIA-861B)	≤1920x1080P @60HZ
	PC(VESA)	≤1600x1200 @60HZ
HDMI Format (HDCP)	SD/HD(EIA-861B)	≤1920x1080P @60HZ
	PC(VESA)	≤1600x1200 @60HZ
DP Format	SD/HD(EIA-861B)	≤1920x1080P @60HZ
	PC(VESA)	≤1600x1200 @60HZ
Input Connectors	VGA：15pin D_Sub(Female) DVI：24+1 DVI_D Composite video：BNC DP: DisplayPort	
Outputs		
Nums/Type	1×VGA (RGBHV) 2×DVI	
VGA/DVI Format	1024×768@60Hz/75Hz 1280×1024@60Hz/75Hz 1600×1200@60Hz 1920×1080p@50Hz/60Hz	
VGA Scope/Impedance	R, G, B = 0.7 V (p_p) / 75Ω	
Output Connectors	VGA：15pin D_Sub(female) DVI OUT1：24+5 DVI_I DVI OUT2：24+1 DVI_D	
Others		
Control	Panel Button	
Power	100-240VAC 60W 50/60Hz	
Operating Temp	5-40 ℃	
Humidity	15-85%	
Dimensions	155 mm (height) ×350mm (width) ×485mm (length)	

Weight	5.6 Kg