

LVP603S LED Video Processor

USER'S MANUAL

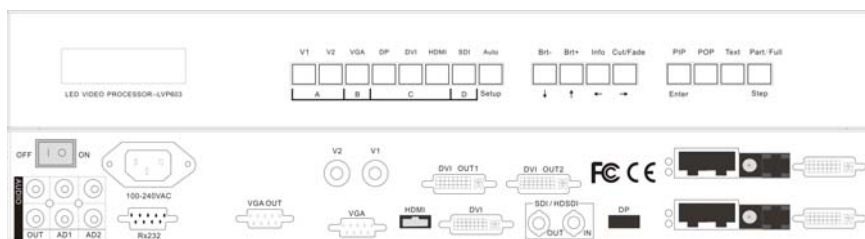


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I. Safety Precautions

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

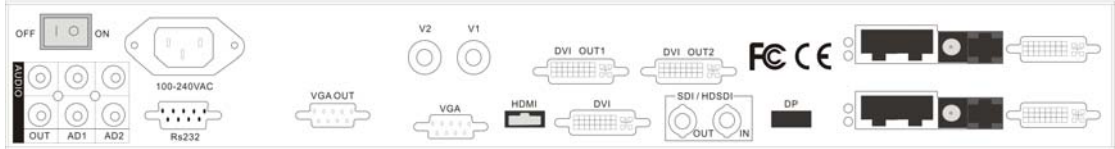


Figure 1

2. Port description

1) Video Input

LVP603S supports 7-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
SDI/HDSDI (IN)	1-channel digital video signal input (SD/HD)

2) Audio Input

LVP603S supports 5-channel stereo audio switch. Of which, 3 channels are DP, HDMI and SDI 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 LVP603S).
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
SDI/HD SDI (OUT)	1-channel digital video signal loop output

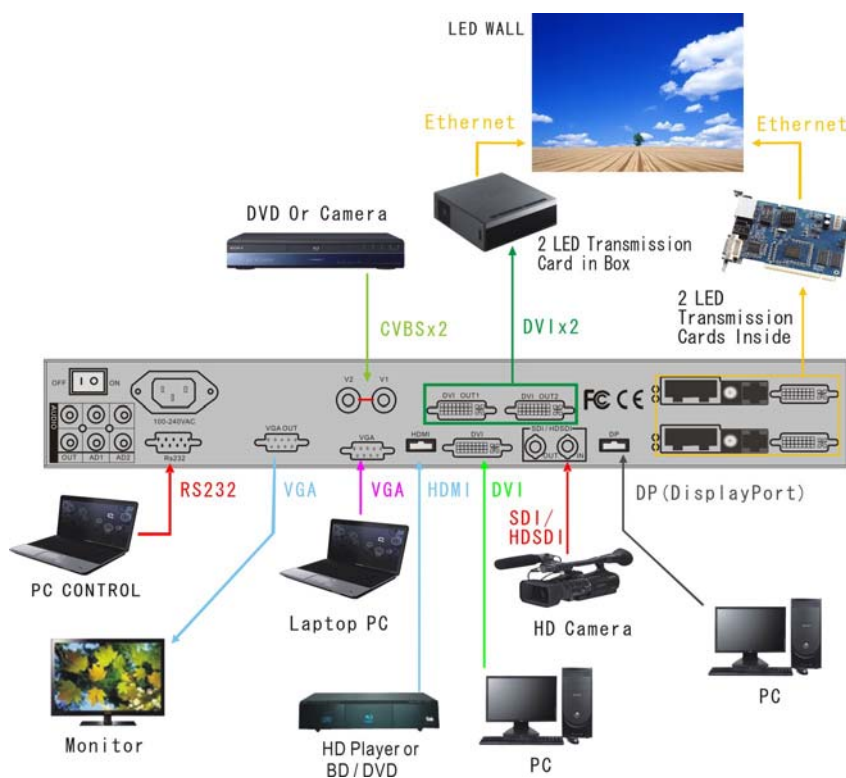
4) Audio Output (AUDIO OUT)

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

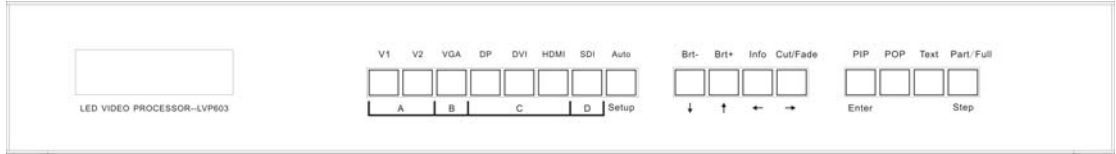


Figure 2

2. Button instructions (operation mode):

There are 16 buttons on the frontal panel of LVP603S, 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
SDI/HDSDI (IN)	1-channel digital video signal input (SD/HD)

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 **LVP603S** is a valid signal, press this button, **LVP603S** 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 LVP603S , the lowest brightness is 0.
BRT +	Increase output image brightness of LVP603S , the highest brightness is 64.

LVP603S 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 LVP603S: press “Info” button to display current settings and information of **LVP603S**. 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

LVP603S can realize seamless or fading in/out switching effects, i.e.: Cut, Fide, between the signals coming from the following 4 groups. But if the signals come from the same group, LVP603S can only realize freezing seamless switching effect.

A	B	C	D
V1, V2	VGA	DP, DVI, HDMI	SDI

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 LVP603S.

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 LVP603S 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, LVP603S 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 LVP603S 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)

LVP603S 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 **LVP603S**. 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 LVP603S

Press "Setup" for consecutive 8 times while in operation mode, "Password: 8 Enter Setup ..." will appear in LCD, LVP603S will enter the No.1 setup item.

After LVP603S 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 LVP603S enters setting mode, the relevant setting information will be displayed in LCD as per the layout shown in the figure below:

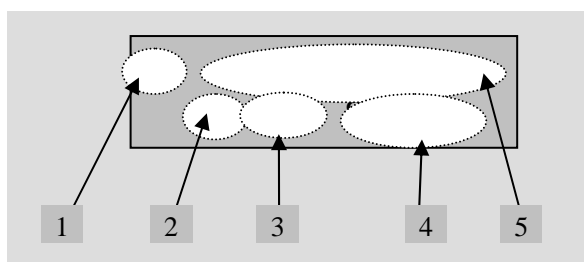


Figure 3

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, **LVP603S** will enter the first setting item "**Language 语言**". **LVP603S** 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

LVP603S 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 **LVP603S** 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 **LVP603S** 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:

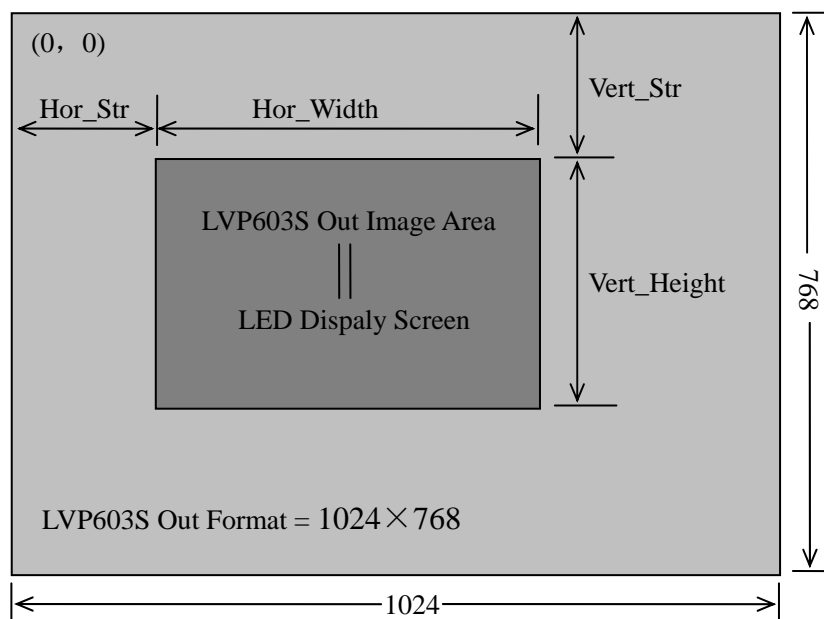


Figure 4

As above figure shows: the size and location of **LVP603S** 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 **LVP603S** 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**”

LVP603S 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, **LVP603S** 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”

LVP603S 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”!

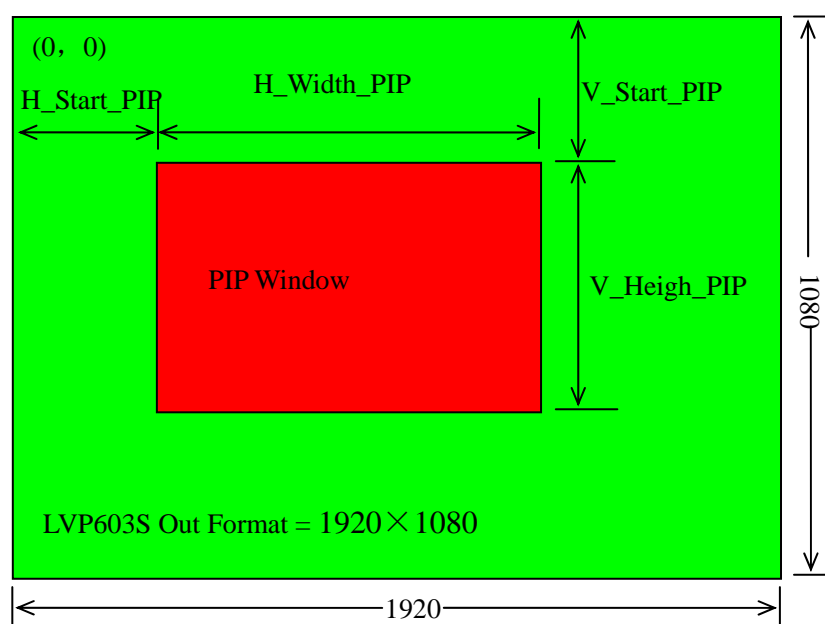
5. PIP/POP Output Image Setup

Items 9~12: “PIP image output setup”

LVP603S 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.

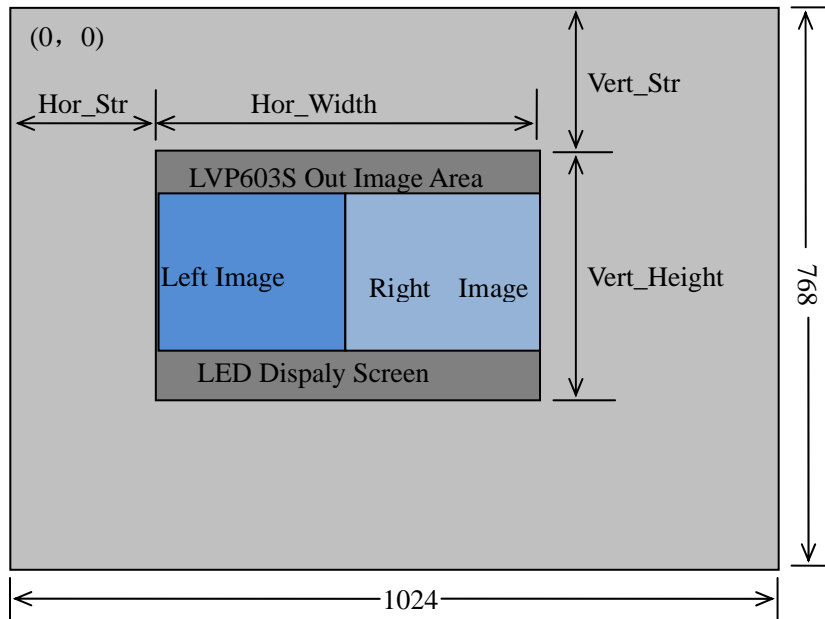


Item 13: "**PIP_Frame**"

User can set frame mode in PIP image window of LVP603S. There are 4 setting options, i.e.: "No frame", "black 2 line", "white 2 line" and "blue 2 line".

Item 14: "**POP_Height**"

LVP603S 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	<i>Text Mode</i>
16	<i>Text_Thd_RGB</i>
17	<i>Text_Thd_R</i>
18	<i>Text_Thd_G</i>
19	<i>Text_Thd_B</i>

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

LVP603S 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***"

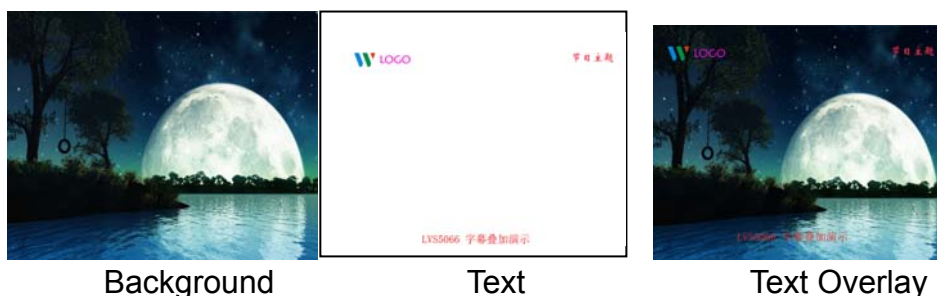
LVP603S users can set R, G, B values of caption threshold value by themselves, the three values can be set to be the same within 0~252.

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



7. Input image setup

LVP603S 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 **LVP603S** is: 1920×1080, when 2 sets of **LVP603S** are connected in parallel, they can connect any LED screen of no higher than 3840×1080 pixels.

When a number of **LVP603S** are connected in parallel in applications, user should set input image parameters of each **LVP603S**. 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 **LVP603S** 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 **LVP603S** 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 **LVP603S** 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 **LVP603S**. As shown in figure below, to show a complete large picture, each set of **LVP603S** shall capture the corresponding part of input images.

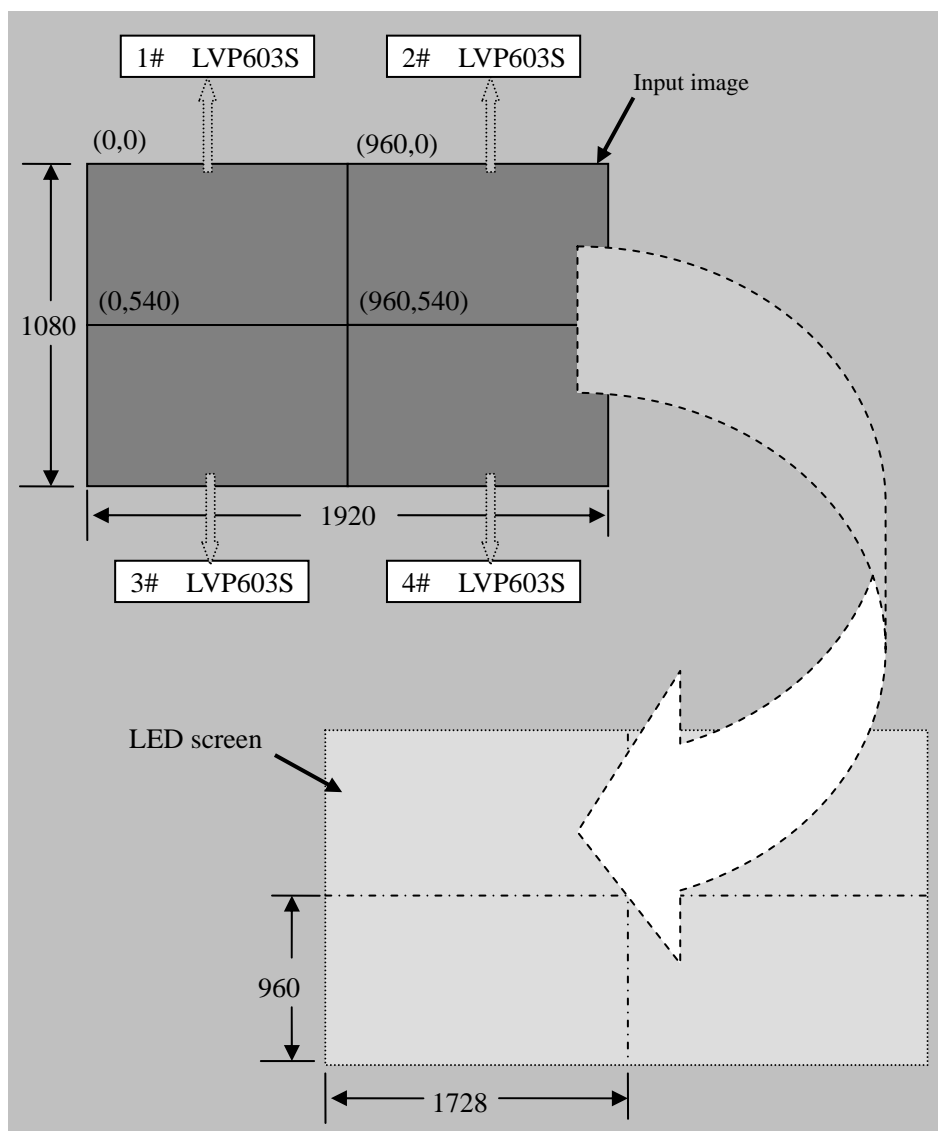


Figure 5

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 **LVP603S** are connected in parallel in horizontal direction, each set of **LVP603S** 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 **LVP603S** 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 **LVP603S** are connected in parallel in horizontal direction, each set of **LVP603S** 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 **LVP603S** 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 **LVP603S** will capture. As shown in Figure 5, the the horizontal start point of the four sets of **LVP603S** are set as below respectively:

- 1# **LVP603S Hori_In_Str = 0**
- 2# **LVP603S Hori_In_Str = 960**
- 3# **LVP603S Hori_In_Str = 0**
- 4# **LVP603S Hori_In_Str = 960**

Item 24: "**Vert_In_Str**"

It is used to set the vertical start point of input image from which

LVP603S will capture. As shown in Figure 5, the the vertical start point of the four sets of **LVP603S** are set as below respectively:

- 1# **LVP603S Vert_In_Str = 0**
- 2# **LVP603S Vert_In_Str = 0**
- 3# **LVP603S Vert_In_Str = 540**
- 4# **LVP603S Vert_In_Str = 540**

8. Audio configurations

LVP603S supports 5-channel stereo audio switch. Of which, 3 channels are DP, HDMI and SDI 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/ SDI)** is external input audio, when switched to another signals, you should choose the external audio signal input or **HDMI (DP/SDI)** 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.

LVP603S 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. **LVP603S** 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.18 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 1×SDI (HDSDI)	
Video system	PAL/NTSC	
Composite Video Scope/Impedance	1V (p_p) / 75 Ω	
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
SDI format	SDI-SMPTE	576i @50HZ
	259M-C	480i @60HZ
HDSDI format	HDSDI-SMPTE	1080i @50HZ/60HZ
	292M	720P @60HZ
	SMPTE	
	274M/296M	
Input Connectors	VGA: 15pin D_Sub(Female) DVI: 24+1 DVI_D Composite video: BNC DP: DisplayPort SDI/HDSDI: BNC	
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 °C
Humidity	15-85%
Size	155 mm (high) × 350mm (wide) × 485mm (length)
Weight	5.6 Kg

VI. Notes to model

LVP603S: with **SDI / HDSDI** input interface.

LVP603: without **SDI / HDSDI** input and interface. So all instructions regarding **SDI, HDSDI** in above don't apply to this model.