4 Display Video Wall Processor

User's Guide

Model

DVI-VIDEOWALL-4

Table of Contents

Section 1: Getting Started

1.1 Important Safeguards

Please read all of these instructions carefully before you use the device. Save this manual for future reference.

What the warranty does not cover

- Any product, on which the serial number has been defaced, modified or removed.
- Damage, deterioration or malfunction resulting from:
    - Accident, misuse, neglect, fire, water, lightning, or other acts of nature, unauthorized product modification, or failure to follow instructions supplied with the product.
    - Repair or attempted repair by anyone not authorized by us.
    - Any damage of the product due to shipment.
    - Removal or installation of the product.
    - Causes external to the product, such as electric power fluctuation or failure.
    - Use of supplies or parts not meeting our specifications.
    - Normal wear and tear.
    - Any other causes which does not relate to a product defect.
- Removal, installation, and set-up service charges.

1.2 Safety Instructions

- Do not dismantle the housing or modify the module.
- Dismantling the housing or modifying the module may result in electrical shock or burn.
- Refer all servicing to qualified service personnel.
- Do not attempt to service this product yourself as opening or removing housing may expose you to dangerous voltage or other hazards
- Keep the module away from liquids.
- Spillage into the housing may result in fire, electrical shock, or equipment damage. If an object or liquid falls or spills on to the housing, unplug the module immediately.
- Have the module checked by a qualified service engineer before using it again.

1.3 Regulatory Notices Federal Communications Commission (FCC)

This equipment has been tested and found to comply with Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.
Any changes or modifications made to this equipment may void the user's authority to operate this equipment.

1.4 Introduction

The DVI-VIDEOWALL-4 Display Dual-Image Video Wall Processor is a powerful and fully real time data/video processor for multiple flat panel displays or projectors. With the most flexibility on the input side, the unit accepts VGA, DVI, CVBS, S-Video, and YPbPr and splits the input onto the connected 4 displays. The DVI-VIDEOWALL-4 can display up to 2 video inputs from the front end video mixer. Thru DVI transmission, the quality of the outcome videos is guaranteed. The output display is grained up to 255 by 255 squares. Virtually any setups for the display layout can be possible by the provided software. The embedded mixer is an advanced video processor for multimedia presentations. It supports up to four video inputs, of which two can be outputted simultaneously in Picture-In-Picture (PIP) or Picture-Aside-Picture (PAP) modes. The DVI-VIDEOWALL-4 allows you to manipulate input videos, wherever position and whatever sizes you want for viewing. The embedded scaler converts signals from input sources to match the native resolution of monitors, flat panel displays, projectors as well as user-selectable output settings up to WUXGA (1920x1200). The DVI-VIDEOWALL-4 sends the resulting mixed video thru DVI interface to the connected monitors/projectors based on the display layout. The layout can be readily modified to fit your applications and optimize visual effects. Typical applications include digital signage, and broadcasting/education/ surveillance systems etc. Supports 16 DVI-D input channel and 16 DVI-D output channels

- Four DVI outputs from 640x480 to 1920x1200
- Each DVI output has an independent controllable display area.
- Can be cascaded to obtain more displays.
- Two graphic (DVI / VGA) and two video (Component / Composite) Inputs, from 640x480 to 1920x1200, interlaced or progressive
- PIP, PAB, Full screen modes and adjustable size& position through software.
- Titles, borders and single color background.
- Resize, position, flip, zoom& pan and blend output video.
- Image parameters and layouts are automatically saved in memory and can be used later.
- Several Image parameters and layouts can be saved in computers and can be loaded for later use.
- Video parameters adjustable (brightness, contrast, color temperature, etc.).
- User-selectable output settings, up to 1920x1200.
- Built-in factory reset switch
- Perfectly as a video screen splitter, a video converter and a video switcher.
- Firmware upgradable for support of new features and technology enhancements.
- Software control through RS-232.
- System management over IP
- 2U size.

1.5 Package Contents

Before you start the installation of the converter, please check the package contents.

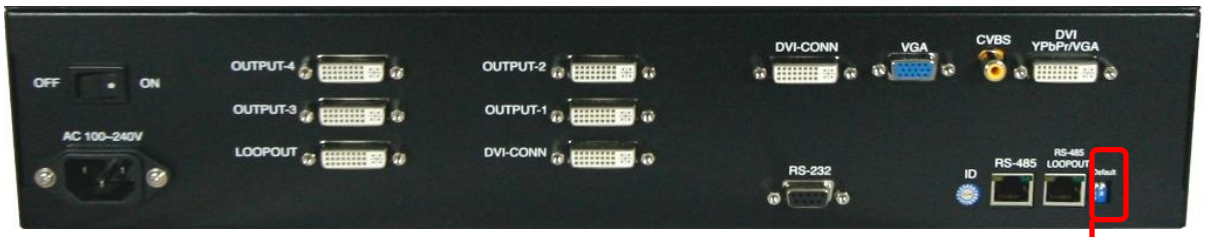
- DVI-VIDEOWALL-4 x 1
- DVI to DVI/VGA Y-Cable x 1
- VGA to Component Adapter x 1
- DVI to VGA Adapter x 1
- 30cm DVI to DVI Cable x 1
- RS232 to USB Adapter x 1
- Software CD x 1
- AC Power Supply x 1
- User's Manual x 1

1.6 Device Features

1.6.1 Inputs and Outputs

The DVI-VIDEOWALL-4 has four inputs and accepts both graphics and video signals, which come from computers and NTSC/PAL video sources respectively. There is a concept of main channel and sub channel for this device. You can pick up two of the four inputs, one is for main channel and the other is for sub channel, and then the DVI-VIDEOWALL-4 will display two of them simultaneously on the same screen. Figure 2 shows the rear panel connectors for the video inputs of a DVI-VIDEOWALL-4 and Table 1 illustrates how you can connect video devices and display to DVI-VIDEOWALL-4.

Rear Panel



To reset the DVI-VIDEOWALL-4 to factory default settings: Turn on the DVI-VIDEOWALL-4 then switch both DIP Switches simultaneously up and down to reset the unit to factory default settings

The I/O ports support various resolutions from 640x480 up to 1920x1200. For more details see Supported Modes section.

1.6.2 I/O Connectors

Connectors		Video Source
Input Connectors	**DVI IN**	DVI
		VGA (DVI to VGA Adapter)
		Component (YPbPr) (DVI to VGA Adapter and VGA to Component Adapter)
		1 x DVI 1 x VGA (DVI to DVI/VGA Y Cable
		1 x DVI 1 x Component (DVI to DVI/VGA Y Cable and VGA to Component Adapter)
	VGA	VGA
	Composite	CVBS (NTSC/PAL0
	Bridge Connectors	2 x DVI
Output Connectors		**Display**
	DVI-I OUT	DVI Display
		VGA Display (DVI to VGA Adapter)
		1 x DVI Display 1 x VGA Display (DVI to DVI/VGA Y Cable)

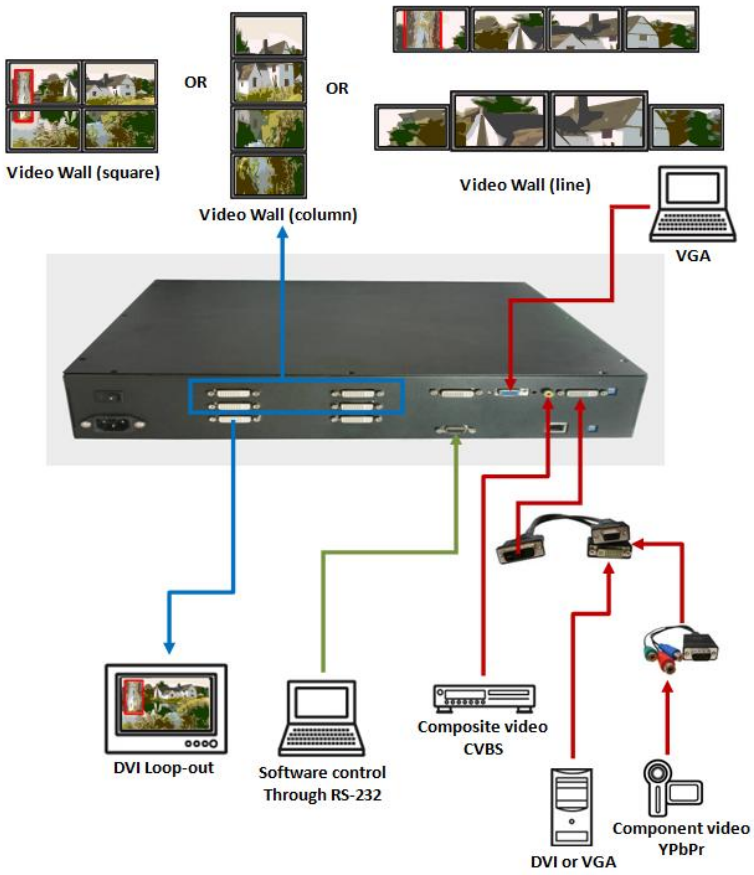
1.7 Before Installation

- Put the product in an even and stable location. If the product falls down or drops, it may cause an injury or malfunction.
- Don’t place the product in too high temperature (over 50°C), too low temperature (under 0°C) or high humidity.
- Use the AC power adapter with correct specifications. If inappropriate power supply is used then it may cause a fire.
- Do not twist or pull by force ends of the optical cables. It can cause malfunction.
- To prevent fire or shock hazards, do not expose this device to rain or moisture.
- Do not immediately use after moving from low temperature to high temperature as this causes condensation

Section 2: Installation

Follow these instructions for installation of DVI-VIDEOWALL-4:

1. Mount or fix the DVI-VIDEOWALL-4 safely
2. While DVI-VIDEOWALL-4 switched off, connect monitors/projectors or other DVI displays by using 1 male to male high quality DVI cable to DVI-VIDEOWALL-4
3. Plug-in DVI to DVI/VGA Y cable to DVI-IN
4. Plug-in VGA to Component Adapter to VGA connector of the Y cable
5. Connect a device equipped with DVI output (such as PC) to DVI connector of the Y cable
6. Connect a device with VGA output (such as laptop) to VGA connector of DVI-VIDEOWALL-4
7. Connected a device with Composite video output to composite input of DVI-VIDEOWALL-4
8. Turn ON DVI-VIDEOWALL-4
9. Turn ON all connected devices and then control the display output thru RS232 and included software



Connection Diagram

2.1 Software Installation and Setup

2.1.1 System Requirements

1. The DVI-VIDEOWALL-4 provides a software control program which runs under Microsoft Windows 98, 2000, XP through the interface of RS-232 serial control.
2. Before you click on the icon of the software, make sure you have secured the connection between your computer COM port and the DVI-VIDEOWALL-4.
3. The DVI-VIDEOWALL-4 provides software control. To make sure all information shown in the software is synchronized with those in the device, please click “Connect” to acquire the latest data from the DVI-VIDEOWALL-4 after you press any key on the remote control.

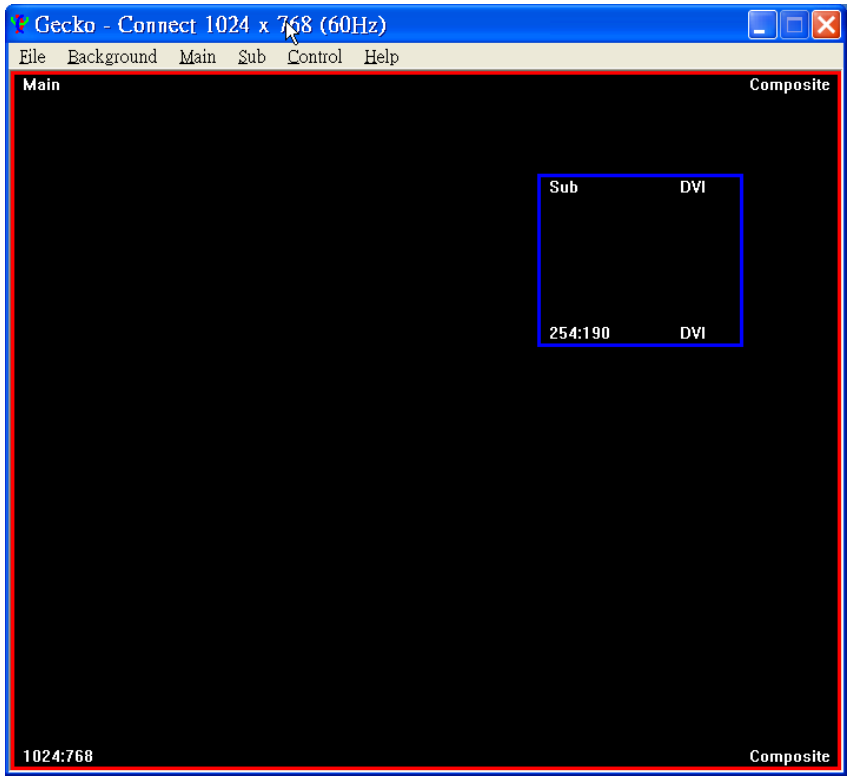
2.1.2 Software Connection

1. Power up the DVI-VIDEOWALL-4 and you can see Vacuum Fluorescent Display (VFD) on the front panel blinks. Make sure the serial port (RS-232) connection secure.
2. The first step after running the software is to automatically detect if the device responses correctly through RS-232 port. The process takes 5-15 seconds. If the device is not connected, a warning window will show up as the figure below.

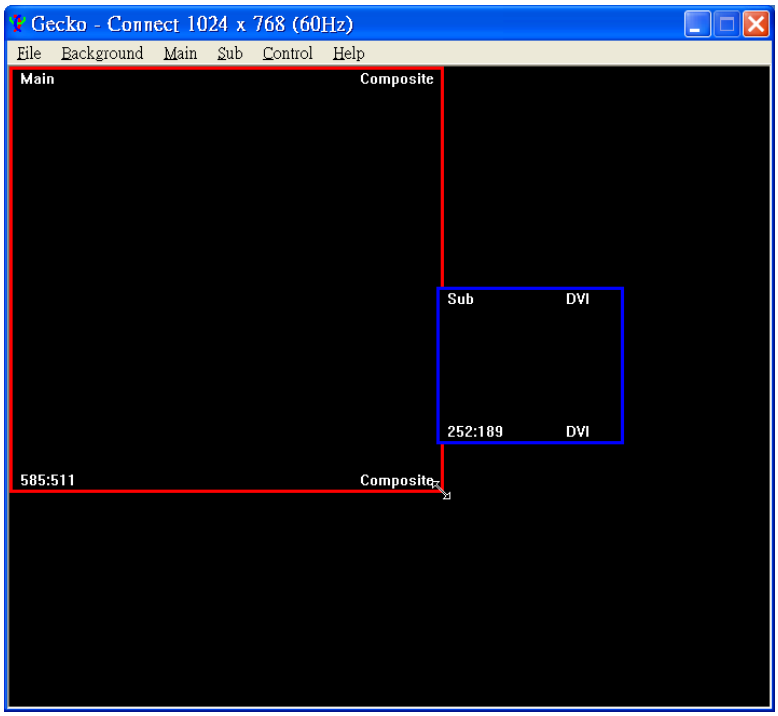
If” device is not ready” error pops up then:

- *Ensure that DVI-VIDEOWALL-4 is powered on.*
- *Please ensure that serial cable (RS232) is connected properly and available serial port is free to be used by DVI-VIDEOWALL-4*

3. If the serial connection is established, you will see a Windows as shown below:



4. While you move the mouse's cursor near the borders, in either red or blue, the icon of the cursor will change as shown below:



2.1.3 Software Operation

The software has following menu options available:

1. File	a. Connect b. Save Settings c. Load Settings d. IR Control e. Auto Sleep f. Device ID g. Factory Reset h. Exit
2. Background	a. Resolution b. Layout c. HFlip d. VFlip e. SWAP f. Color
3. Main	a. Input Source b. Visible c. Border d. Label e. Layer f. Pause g. Full Screen h. Color Balance i. Auto Config
4. Sub	a. Input Source b. Visible c. Border d. Label e. Layer f. Pause
5. Control	a. Border b. Image c. Color d. Zoom e. Pattern f. HS/VS Delay g. EDID Code

1. File

a. **Connect:** This will synchronize the status of the DVI-VIDEOWALL-4 with that of the software, especially after IR commands are sent.

b. **Save Setting:** This will save current user preferred settings such as the positions and sizes of the videos, the width or color of border etc. into your favorite setting files.

c. **Load Setting:** The function will load the favorite settings from the previously saved file.

d. **IR Control:** This will enable or disable the IR remote control.

e. **Auto Sleep:** This decides if the DVI-VIDEOWALL-4 enters the deep sleep mode if the video signal cannot be detected in the main channel.

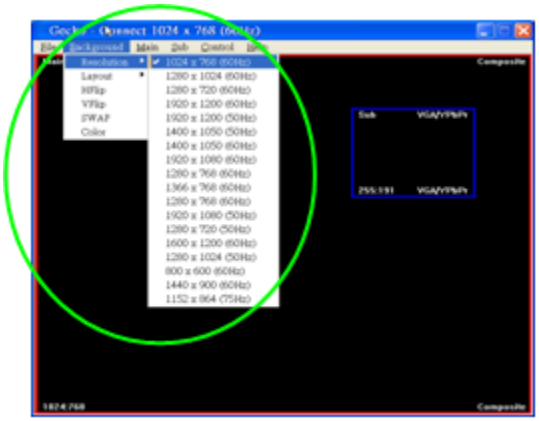
f. **Device ID:** This is for identifying the DVI-VIDEOWALL-4 while multiple devices are cascaded by RS-232 over CAT5 module.

1. **Assign an ID for the connected DVI-VIDEOWALL-4:** type a number in the "ID Number" of the device ID setting area and then click "Write".
2. **Read the ID of the connected DVI-VIDEOWALL-4:** click "Read" and the ID will show up.
3. **Super Control:** all devices cascaded will receive and respond the same way when you are operating the control software.
4. **Single Device Control:** remove the check beside the "Super Control" and type a number that represent a specific MX-1003A and then click "Apply". Exit the "Device ID Setting" and click "Connect".

g. **Factory Reset:** This will restore all the system values back to the factory default.

h. **Exit:** Quit the software.

2. Background



a. **Resolution:** Change the output resolution.

b. **Layout:** The preset layout for main & sub channels.

c. **HFlip:** Horizontally flip the output video.

d. **VFlip:** Vertically flip the output video.

e. **SWAP:** Swap the main and sub channel.

f. **Color:** The background color selection.

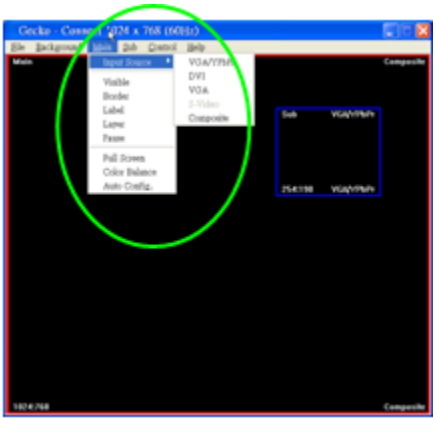
3. Main

a. **Input Source:** Select a video/graphic input of the main channel.

b. **Visible:** Display the main channel or not.

c. **Border:** Display the main channel's border.

d. **Label:** Display the main channel's label. Users can define the content of the label.



e. **Layer:** This will make the main channel overlays the sub channel.

f. **Pause:** Freeze the display of the main channel.

g. **Full Screen:** Display the main channel full screen.

h. **Color Balance:** Automatically do the color balance while the main channel's input is from VGA/YPbPr.

i. **Auto Config.:** Automatically do the auto adjustment while the main channel's input is from VGA/YPbPr.

4. Sub

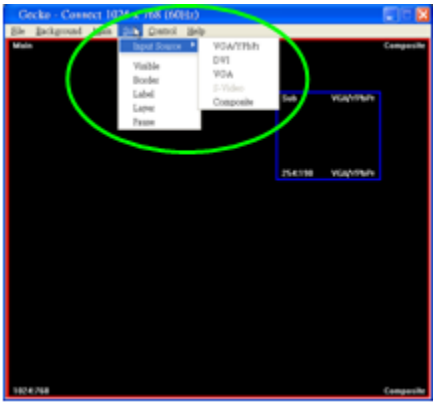
a. **Input Source:** Select a video/graphic input of the sub-channel.

b. **Visible:** Display the sub-channel or not.

c. **Border:** Display the sub-channel's border.

d. **Label:** Display the sub-channel's label. Users can define the content of the label.

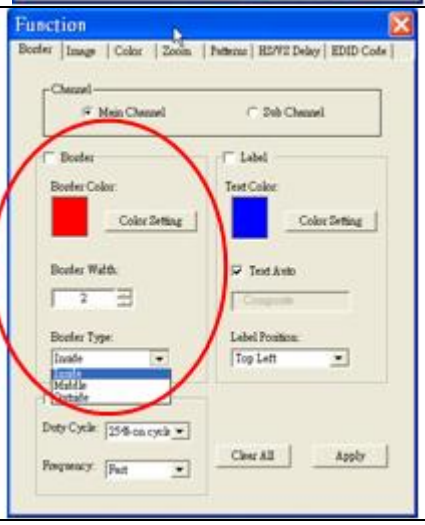
e. **Layer:** This will make the sub-channel overlays the main channel.

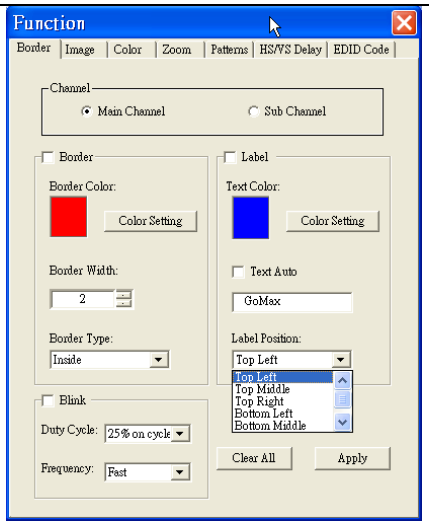


f. **Pause:** Freeze the display of the sub channel.

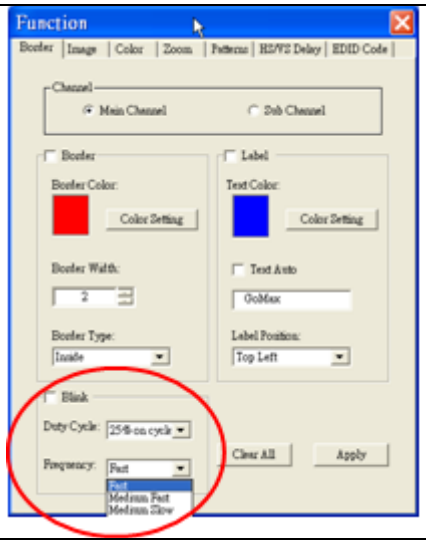
5. Control-Setting Dialog

a. Border

	Select main or sub channel for further settings "Clear All": Clear all OSD items "Apply": Apply the settings
	1. **Border Color:** Setup border's color by clicking on "Color setting". 2. **Border Width:** Input border's width. 3. **Border Type:** The placement of border has three types: Option Inside means the added border is fully inside the video. Option Outside means the added border is completely outside the video and this added border can overlay the other video input. Option Middle simply adds the border half inside the video and half outside the video.

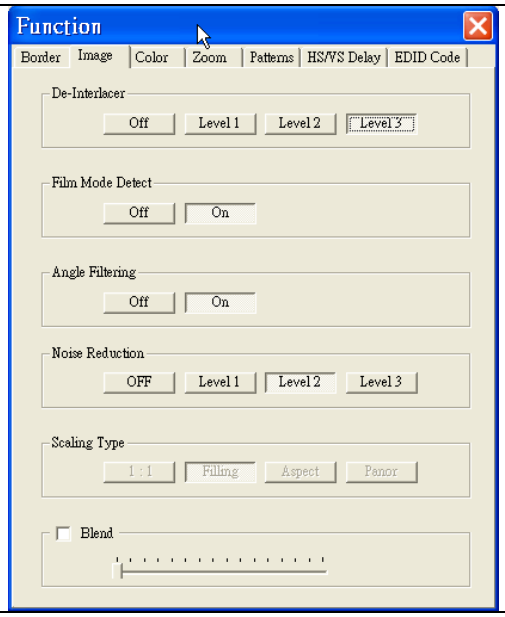
<table>
<tr>
<td> 
</td>
<td>4. Text Color: Select the color of the label by clicking on “Color Setting” button.

5. Text Auto: While selecting “Text Auto”, the label on the screen for each channel will display its corresponding input channel type. While unselecting “Text Auto”, users can input the desired string to be displayed.

* Only 15 English characters can be displayed at most.</td>
</tr>
<tr>
<td> 
</td>
<td>6. Duty Cycle: The duty cycle of blinking of OSD borders and labels.

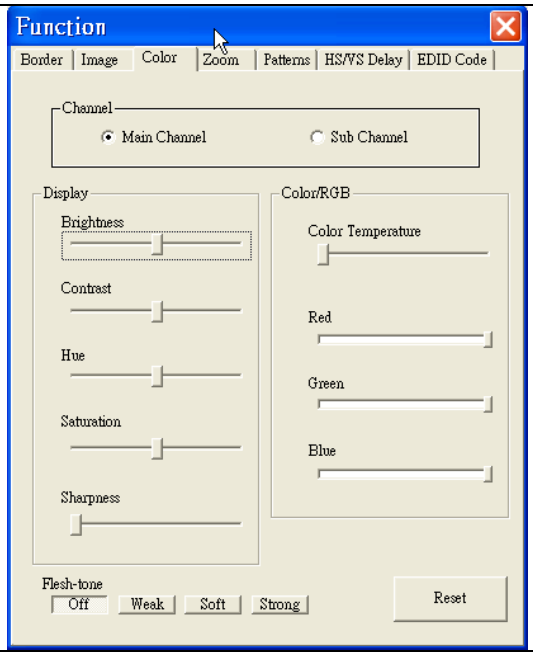
7. Frequency: How fast the blink.</td>
</tr>
</table>

b. Image



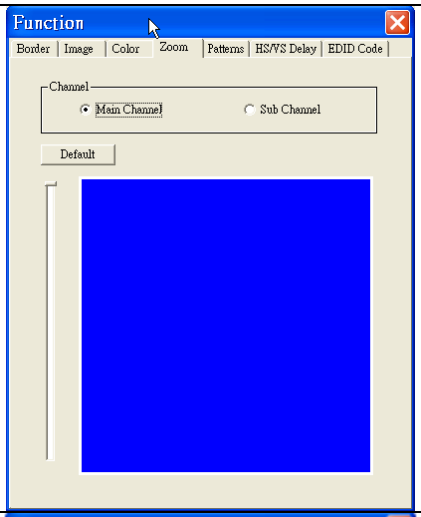
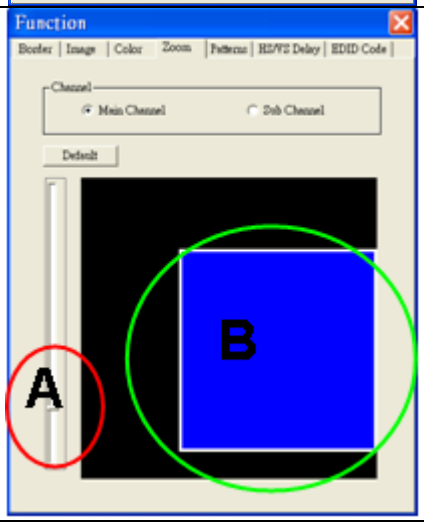
1. Choose the scaling type for the main channel at full screen display.
2. While Blend is selected, users can use the slider to control the degree of blending.

c. Color

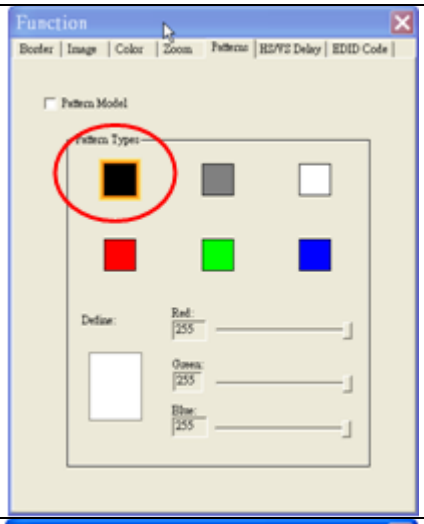
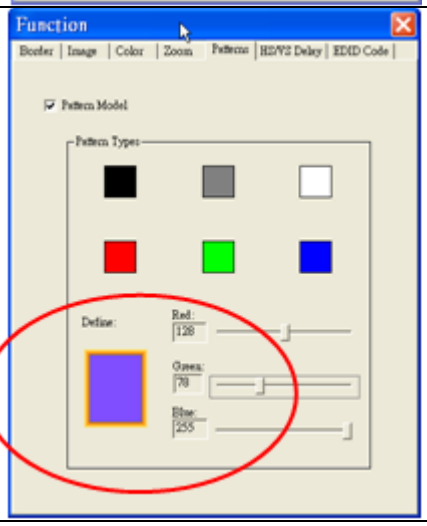


1. Select the main or sub channels.
2. Reset: Restore all the setting on this page back to their default values.

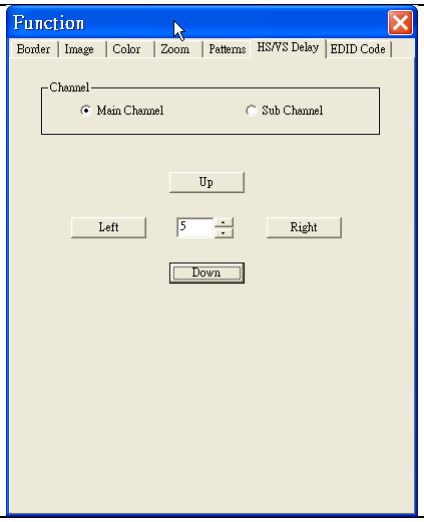
d. Zoom

	1. Select the main or sub channel. 2. Default: Restore the selected channel without zoom effect.
	3. This slider controls the ratio of Zoom. 4. The workplace for controlling the displayed area after zooming the selected video.

e. Pattern

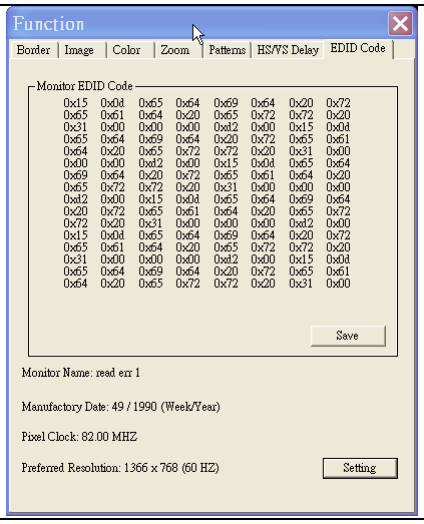
<table>
<tr>
<td> 
</td>
<td>1. While “Pattern Model” is chosen, the output will display the selected pattern. While unselecting this item, the output display works normally.
2. The orange border indicates which pattern is currently selected. Users can choose one of the provided patterns by moving cursor and clicking at the desired one.</td>
</tr>
<tr>
<td> 
</td>
<td>3. Define the pattern’s color by clicking at the rectangle inside the ellipse, and then use the sliders for choosing R, G, B depths.</td>
</tr>
</table>

f. HS / VS Delay



1. Select the main or sub channel.
2. The fine movement of the selected channel.

g. EDID Code

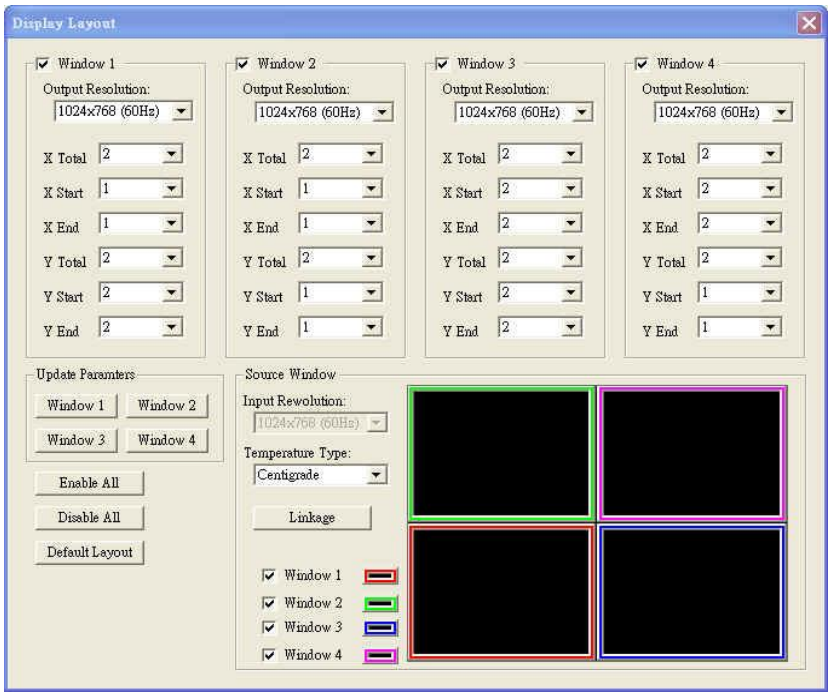


1. **Save:** Save the read back EDID Content in PC.
2. **Setting:** Automatically setup the output resolution according to the content of EDID.

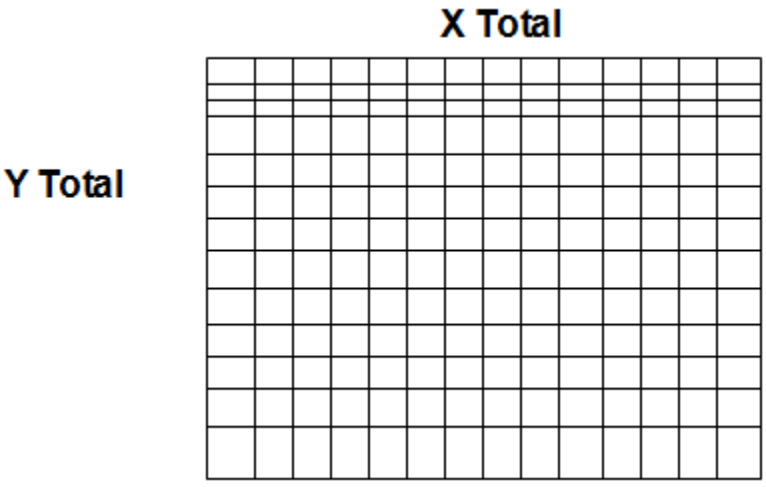
This setting is according to the content of EDID, and the optimum resolution for the monitor might be different because of the limited information of the acquired EDID info.

Control Display Layout

Users can define the resolution of the output video to displays.

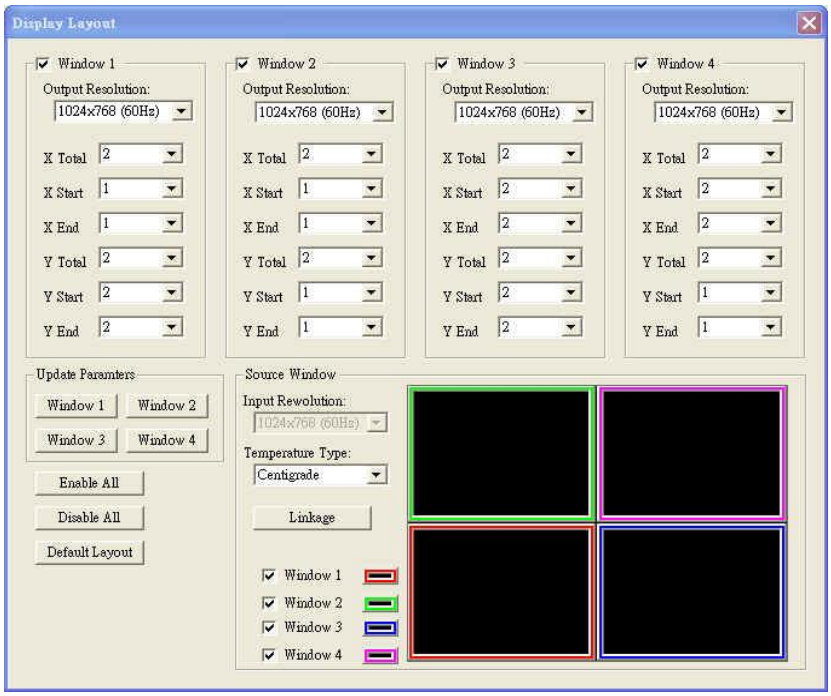


X Total & Y Total



X Start, X End, Y Start, Y End

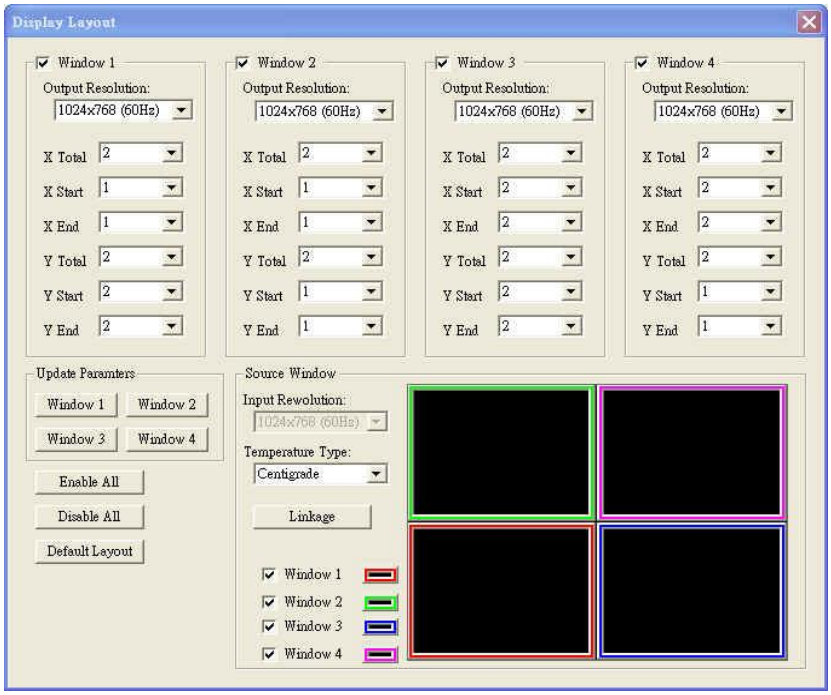
For each display, users can define which section in the resulting mixed video should be displayed. After setup the X Total and Y Total, users need to define the upper-left (X Start, Y Start) and bottom-right (X End, Y End) corners for each display. The area to be displayed by default is quad view as shown.



To activate the new settings for each display, please click the "Window x" button under "Update Parameters" section on the left of the control interface.

Enable All, Disable All, Default Layout

Clicking on "Disable all" button will make all the connected monitors have an identical display, i.e., the output from the front end mixer. "Default Layout" will replace the current display layout with the default quad view layout. "Enable All" button updates the connected display with the setup parameters.



In “Temperature Type”, there are two types of temperature representation, Celsius and Fahrenheit, for the VFD display.

2.2 Cascading Multiple Devices

The DVI-VIDEOWALL-4 has a dual view processor, which allows you to see 2 videos on the same screen. When you add an additional DVI-VIDEOWALL-4 or DVI-VIDEOWALL-9, you can get additional 4 or 9 video outputs. For example, 2 devices of DVI-VIDEOWALL-4 cascaded can provide 8 video outputs displayed simultaneously on the connected displays.

Section 3: Specifications and Supported Resolutions

3.1 Specifications

Model	**DVI-VIDEOWALL-4**
Description	4 Display Dual Image Video Wall Processor
Output Displays	4
Dual Output Support	Yes (DVI & VGA)
Video Loop Out	Yes
Video Bandwidth	DVI Single Link - 4.95Gbps
	VGA - 165 MHz
	Component - 30 MHz
	CVBS – 13.5 MHz
Supported Resolutions	480i / 480p / 720p / 1080i / 1080p (60) / 1920x1200@75 / 1600x1200@60
Audio Support	No
Control	RS232 / RS485
Embedded Video Mixer	Yes (Dual View)
Ability to Cascade	Yes (up to 255 units)
Input TMDS Signal	1.2 Volts (peak – peak)
ESD Protection	Human body model - ± 15kV (air gap discharge) & ±8kV (contact discharge
Input	2 x VGA
	1 x DVI
	1 x Component
	1 x Composite
	1 x RS232
	1 x RS485
Output	5 x DVI
	4 x VGA
DVI Connector Type	DVI-I (29-Pin female, digital only)
VGA Connector Type	HD-15 (15-pin D-sub female)
RS232 Connector	DE-9 (9-pin D-sub female)
RCA Connector	75Ω
RJ45 Connector	WE/SS 8P8C with 2 LED indicators
Dimensions	7.1" x 4" x 0.9" (L x W x H)
Size	2U Rack-mount with ears
Power Supply	AC 100-240V
Power Consumption	40 Watts (max)
Operating Temperature	0~40°C [32~104°F]
Storage Temperature	-20~60°C [-4~140°F]
Relative Humidity	20~90% RH [no condensation]

3.2 Supported Resolutions

The following resolutions are supported by DVI-VIDEOWALL-4

3.2.1 DVI-IN

Supported Mode	Resolution
NTSC/480i/525i	720x240 @60Hz
PAL/576i/625i	720x288 @50Hz
480p/525p	720x483 @60Hz
480p (16:9)	960x483 @60Hz
576p/625p	720x756 @50Hz
(HDTV) 720p	1280x720 @50Hz
(HDTV) 720p	1280x720 @60Hz
(HDTV) 1080i	1920x1080 @50Hz
(HDTV) 1080i	1920x1080 @60Hz
(HDTV) 1080p	1920x1080 @30Hz
VESA	720x400 @85Hz
VESA	640x350 @85Hz
VESA	640x400 @85Hz
IBM	720x400 @70Hz
IBM	720x350 @70Hz
IBM	640x350 @70Hz
IBM	640x400 @70Hz
VESA	640x480 @60Hz
MAC	640x480 @67Hz
VESA	640x480 @72Hz
VESA	640x480 @75Hz
VESA	640x480 @85Hz
VESA	800x600 @56Hz
VESA	800x600 @60Hz
VESA	800x600 @72Hz
VESA	800x600 @75Hz
VESA	800x600 @85Hz

Supported Mode	Resolution
MAC	832x624 @75Hz
VESA	1024x768 @60Hz
MAC	1024x768 @60Hz
VESA	1024x768 @70Hz
IBM	1024x768 @72Hz
VESA	1024x768 @75Hz
MAC	1024x768 @75Hz
VESA	1024x768 @85Hz
VESA	1152x864 @75Hz
MAC	1152x870 @75Hz
SUN	1152x900 @66Hz
SUN	1152x900 @76Hz
VESA	1280x960 @60Hz
VESA	1280x960 @85Hz
VESA	1280x1024 @60Hz
HP	1280x1024 @60Hz
IBM	1280x1024 @67Hz
HP	1280x1024 @72Hz
VESA	1280x1024 @75Hz
SUN	1280x1024 @76Hz
VESA	1600x1200 @60Hz
VESA	1920x1200 @60Hz

3.2.2 VGA

Supported Mode	Resolution
VESA	640x480 @60Hz
VESA	800x600 @60Hz
VESA	1024x768 @60Hz
VESA	1280x1024 @60Hz
VESA	1600x1200 @60Hz
VESA	1920x1200 @60Hz

3.2.3 DVI-OUT

Supported Mode	Resolution
(HDTV) 720p	1280x720 @50Hz
(HDTV) 720p	1280x720 @60Hz
(HDTV) 1080p	1920x1080 @60Hz
VESA	640x480 @60Hz
VESA	800x600 @60Hz
VESA	1024x768 @60Hz
VESA	1152x864 @75Hz
VESA	1280x1024 @60Hz
VESA	1280x1024 @50Hz
VESA	1280x768 @60Hz
VESA	1366x768 @60Hz
VESA	1400x1050 @60Hz
VESA	1400x1050 @50Hz
VESA	1152x864 @75Hz
VESA	1600x1200 @60Hz
VESA	1920x1200 @50Hz
VESA	1920x1200 @60Hz

Section 4: General Troubleshooting

Problem	Possible Solution
No Power	• Ensure that DVI-VIDEOWALL-4 is plugged in • If you are recovering from power outage, accidentally unplug the adapter or other power surge conditions, leave the device off for a while and then power it on again.
No or Distorted Image	• Make sure all cables are in good working condition and properly connected to the DVI-VIDEOWALL-4 and displays. • Configure the output video resolution so that it doesn't excess the native resolution of the display. (in this case, the message of "out of range" is usually showed on your screen)
Poor Quality	• We suggest that don't use T-connectors to split your video source into to images displayed on two different screens. That will lower output video quality. Use a distribution amplifier instead of T-connectors. • Make sure the video source is not compressed and maintains the highest native resolution.
Wrong Color	• Press "Color Balance" key for auto configuration. Auto color configuration only works at VGA and YPbPr inputs.

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