DS-MSC14

Cascadable 1 to 4 multi-screen controller

OPERATION MANUAL

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Version 1.1 August 2011

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SAFETY PRECAUTIONS

Please read all instructions before attempting to unpack, install or operate this equipment and before connecting the power supply.

Please keep the following in mind as you unpack and install this equipment:

- Always follow basic safety precautions to reduce the risk of fire, electrical shock and injury to persons.
- To prevent fire or shock hazard, do not expose the unit to rain, moisture or install this product near water.
- Never spill liquid of any kind on or into this product.
- Never push an object of any kind into this product through any openings or empty slots in the unit, as you may damage parts inside the unit.
- Do not attach the power supply cabling to building surfaces.
- Use only the supplied power supply unit (PSU). Do not use the PSU if it is damaged.
- Do not allow anything to rest on the power cabling or allow any weight to be placed upon it or any person walk on it.
- To protect the unit from overheating, do not block any vents or openings in the unit housing that provide ventilation and allow for sufficient space for air to circulate around the unit.

REVISION HISTORY

VERSION NO.	DATE	SUMMARY OF CHANGE
v1.00	10/02/2015	First release
v1.01	10/02/2015	Updated text and Diagrams
v1.02	19/06/2015	Updated features text and amended RS-232 Commands
v1.03	30/06/2015	Updated Introduction text

CONTENTS

1. INTRODUCTION

The 1 by 4 HDMI TV Wall controller allows an HDMI input source to be displayed, in full screen or single mode, on up to 4 HDMI displays (TV or monitor). Multiple units can be cascaded to extend the HDMI signal up to as many displays as needed. The unit features bezel correction function. A simple control application enables users to control single or multiple units. The device supports video timings up to WUXGA@60RB and 1080p@60Hz, audio format up to 7.1CH LPCM at 192kHz sampling rate based on input source EDID. Control can be achieved through software application, Telnet and RS-232.

2. APPLICATIONS

- Instore video walls
- Public advertising displays
- Boardroom digital presentation
- Stock market 'ticker' displays

3. PACKAGE CONTENTS

1×1 to 4 Multi-screen Controller

1×12V/3 A DC Power Adaptor

1×Operation Manual

4. SYSTEM REQUIREMENTS

Source equipment such as DVD/Blu-ray players and any HDMI equipped output HD TVs/displays.

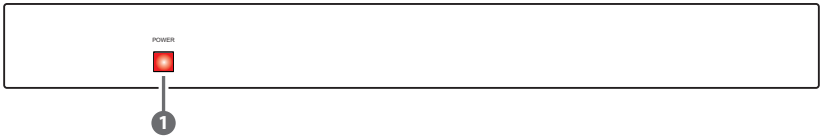
Note: Additional units are required for Video Wall arrays with more than 4 screens (2×2 Video Wall).

5. FEATURES

- HDMI, HDCP1.4 and DVI compliant
- Output source signal to 4 displays (2 by 2 Video wall) as a full screen or single image with adjustable Bezel Correction
- Cascade the HDMI signal up to as many as required
- Software application allows one button push to control all connected TV Wall devices
- Supports RS232 and Telnet controls
- Input resolutions support VGA~WUXGA and 480i~1080p
- Output resolutions support 720p~1080p
- Supports different input resolution and output resolution selectable from OSD menu. The factory default output resolution is native to the connected screen.
- Audio supports LPCM 2CH, 6CH, 8CH/AC3/DTS/Dolby Digital Plus/ Dolby TruHD & DTS-HD

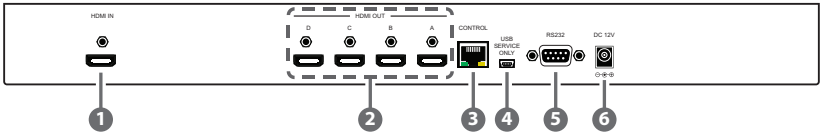
6. OPERATION CONTROLS AND FUNCTIONS

6.1 Front Panel



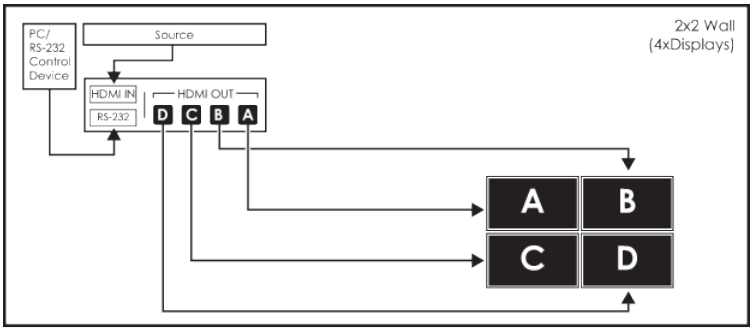
1. **POWER:** Press this button to power the unit ON or to set it to 'Standby' mode. When the unit is powered on, press and hold this button for 3 seconds to reset the system back to the 'Factory Default' settings.

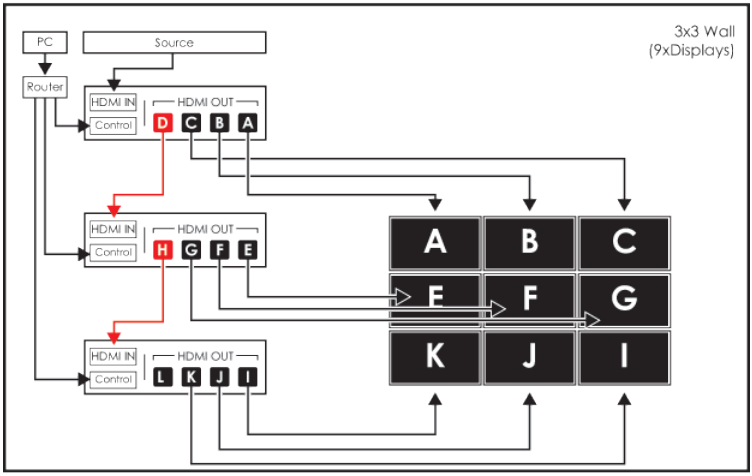
6.2 Rear Panel



1. **HDMI IN:** Connect to an HDMI source device such as a DVD/Blu-ray player or PC/Laptop.
2. **HDMI OUT A~D:** Connect to HDMI equipped TVs/displays for display of the image. Use Output D for cascading/bypassing the HDMI signal. It is recommended that the connection sequence of the displays should be as indicated in the following diagram.
3. **CONTROL:** Connect to an active network for Telnet control (Please refer to Sections 6.4 and 6.5) or control via the PC Application (Please refer to Section 6.6).
4. **USB SERVICE ONLY:** Manufacturer use only.
5. **RS-232:** Connect to a PC/Laptop with a D-sub 9-pin cable for RS-232 command sending and controlling over the unit (Please refer to Sections 6.3 and 6.4).

   Note: RS-232 control system is limited to a single Video Wall unit.
6. **DC 12V:** Connect the 12V DC power supply to the unit and plug the adaptor into an AC outlet.


2x2 Wall
(4xDisplays)
PC/
RS-232
Control
Device
Source
HDMI IN
RS-232
HDMI OUT
D C B A
A B
C D


3x3 Wall
(9xDisplays)
PC
Router
Source
HDMI IN
Control
HDMI OUT
D C B A
H G F E
L K J I
A B C
E F G
K J I

6.3 RS-232 Protocols

HDMI SPLITTER	
Pin	**Definition**
1	NC
2	TxD
3	RxD
4	NC
5	GND
6	NC
7	NC
8	NC
9	NC

▶
◀

RS-232 CONTROL (PC)	
Pin	**Definition**
1	NC
2	RxD
3	TxD
4	NC
5	GND
6	NC
7	NC
8	NC
9	NC

Baud Rate: 115200bps
Data Bit: 8 bits
Parity: None
Flow Control: None
Stop Bit: 1

6.4 RS-232 and Telnet Commands

ITEM	COMMAND	DESCRIPTION	PARAMETER
Resolution	RRES	Request resolution	0=720p@50 1=720p@60 2=1080p@24 3=1080p@25 4=1080p@30 5=1080p@50 6=1080p@60 7=1024x768@60 8=1280x800@60 9=1280x1024@60 10=1366x768@60 11=1440x900@60 12=1600x900@60 13=1600x1200@60 14=1680x1050@60 15=1920x1200@60 16=**Native**
	SRES 0~16	Set resolution	
OSD	ROSDD	Request OSD status	0=**Off** 1=On
	SOSDD 0/1	Set OSD status	
	ROSDH	Request OSD horizontal position	0~20 **(5)**
	SOSDH 0~20	Set OSD horizontal position	
	ROSDV	Request OSD vertical position	0~20 **(5)**
	SOSDV 0~20	Set OSD vertical position	

ITEM	COMMAND	DESCRIPTION	PARAMETER
OSD (Cont.)	ROSDT	Request OSD display timeout setting	0~50 **(50)** 0=Timeout off
	SOSDT 2~50	Set OSD display timeout in second	
	ROSDG	Request OSD gain correction	0~10 **(2)**
	SOSDG 0~10	Set OSD gain correction	
	SOSDI	Set OSD information status	On/**Off**
	SOSDR	Reset OSD to factory default	
Image	RBRI 1~4	Request brightness	1~4=Output A~D 0~100=Brightness value **(50)**
	SBRI 1~4 0~100	Set brightness	
	RCON 1~4	Request contrast	1~4=Output A~D 0~100=Contrast value **(50)**
	SCON 1~4 0~100	Set contrast	
	RSAT 1~4	Request saturation	1~4=Output A~D 0~100=Saturation value **(50)**
	SSAT 1~4 0~100	Set saturation	
	RHUE 1~4	Request hue	1~4=Output A~D 0~100=Hue value **(50)**
	SHUE 1~4 0~100	Set hue	
	SIMRE 1~4	Reset picture setting	1=Brightness 2=Contrast 3=Saturation 4=Hue
	SPIRE	Reset all picture setting	

ITEM	COMMAND	DESCRIPTION	PARAMETER
Ethernet	RIPM	Request IP mode	0=**DHCP** 1=Static
	SIPM 0/1	Set IP mode	
	RIPA	Request IP address	IP ADDR:IPA3.IPA2. IPA1.IPA0
	SIPA 0~255.0~255. 0~255.0~255	Set IP address	
	RMAA	Request Mask address	Mask ADDR:MAA3. MAA2.MAA1.MAA0
	SMAA 0~255.0~255. 0~255.0~255	Set Mask address	
	RGAA	Request Gateway address	Gate ADDR:GAA3. GAA2.GAA1.GAA0
	SGAA 0~255.0~255. 0~255.0~255	Set Gateway address	
	RETIME	Request Ethernet timeout	0=**Off** 1=10min 2=20min 3=30min 4=40min 5=50min 6=60min
	SETIME 0~6	Set Ethernet timeout	
	RLINK	Read link	IP000~255 IP010~255 IP020~255 IP030~255 MA000~255 MA010~255 MA020~255 MA030~255 GA000~255 GA010~255 GA020~255 GA030~255

ITEM	COMMAND	DESCRIPTION	PARAMETER
System	RMUTE	Request mute status	0=Unmute 1=Mute
	SMUTE 0/1	Set mute status	
	RPOW	Request power status	0=Power off 1=Power on
	SPOW 0/1	Set power status	
	RVER	Request version	
	SREL	Set re-link	
	SDEF	Reset to factory default	
TV Wall	RMNC 1~4	Request TV wall output value	1~4=Output A~D M=TV Wall M value N=TV Wall N value
	SMNC M N 1~4	Set TV wall output value	
	RCO 1~4	Request output TV wall position	1~4=Output A~D TV Wall position (M×N)
	SCO 1~4 Y	Set output TV wall position	
	RCBH 1~4	Request H Bezel Value	1~4=Output A~D 0~255=H bezel correction value
	SCBH 1~4 0~255	Set Output H Bezel Value	
	RCBV 1~4	Request V Bezel Value	1~4=Output A~D 0~255=V bezel correction value
	SCBV 1~4 0~255	Set Output V Bezel Value	
	RBEZ	Request Bezel status	0=Bezel off 1=Bezel on
	SBEZ 0/1	Set Bezel status	

ITEM	COMMAND	DESCRIPTION	PARAMETER
TV Wall (Cont.)	RMDN	Request unit's model no.	0~225=Model number setting value
	SMDN 0~255	Set unit's model no.	
	SWDE	Reset TV wall value	
	SHOT 0~23	Set hot setting	0=**1×1**, 1=2×2 2=3×3, 3=4×4 4=5×5, 5=6×6 6=2×3, 7=3×2 8=3×4, 9=4×2 10=4×3, 11=4×5 12=1×2, 13=2×1 14=1×3, 15=3×1 16=1×4, 17=4×1 18=2×4, 19=3×5 20=5×4, 21=5×3 22=6×2, 23=6×3
	SFAVE 1~5	Save favor setting	1~5=FAV 1~FAV 5
	RFAVE 1~5	Recall favor setting	
	RBY	Request cascade setting	0=Not cascade 1=**Cascade**
	SBY 0/1	Set cascade setting	

Note:

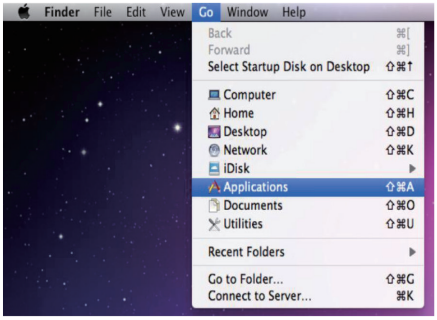
1. *Commands will be not executed unless followed by a carriage return (0x0D). Commands are case-sensitive.*
2. *RS-232 control can only be used with a single Videl Wall unit and can not be used to control additional connected units.*
3. *Values in **Bold** are the default settings.*

6.5 Telnet Control

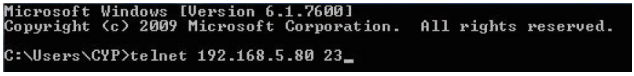
Before attempting to use the Telnet control, please ensure that both the HDMI Video Wall unit (via the 'CONTROL' port) and the PC/Laptop are connected to the active networks.

To access the Telnet control in Windows 7, click on the 'Start' menu and type "cmd" in the Search field then press Enter. Under Windows XP go to the 'Start' menu and click on "Run", type "cmd" with then press Enter.

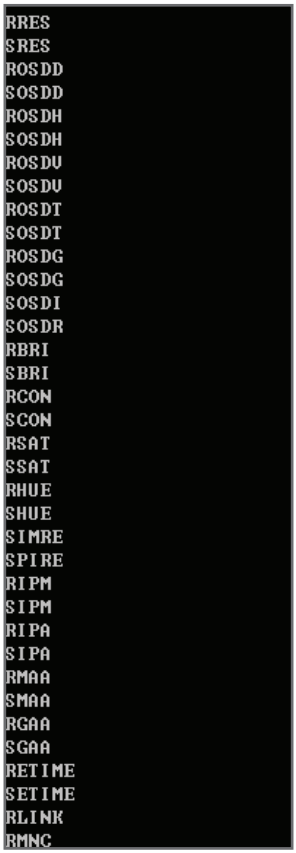
Under Mac OS X, go to Go→Applications→Utilities→Terminal. See below for reference.



Once in the command line interface (CLI) type 'telnet', then the IP address of the unit and hit Enter. If the Telnet port (unit's port) is not set to the default of "23" then the correct port number will need to be entered after the IP address as shown below.



This will bring us into the unit which we wish to control. Type 'HELP' to list the available commands.



Note:

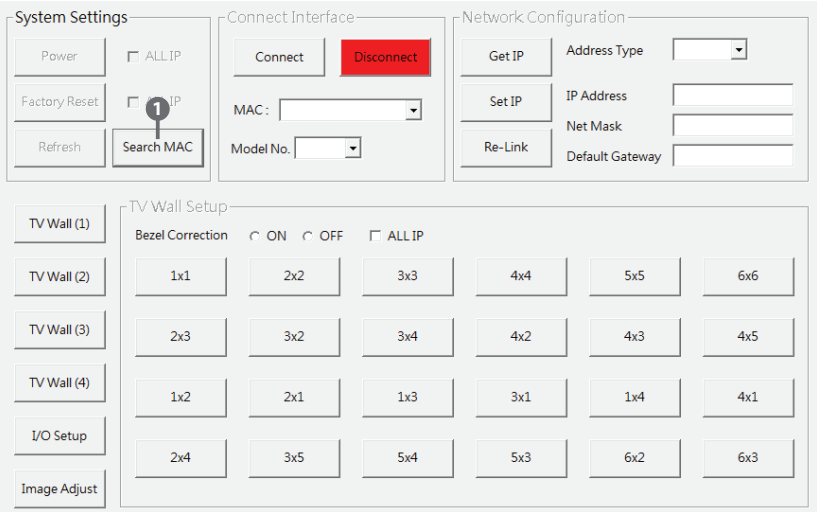
1. *All the commands will be not executed unless followed by a carriage return. Commands are case-insensitive.*
2. *If the IP is changed then the IP Address required for Telnet access will also change accordingly.*

6.6 PC Application Control

Navigate to the 1 by 4 HDMI Video Wall Splitter product page to download the software application installer.

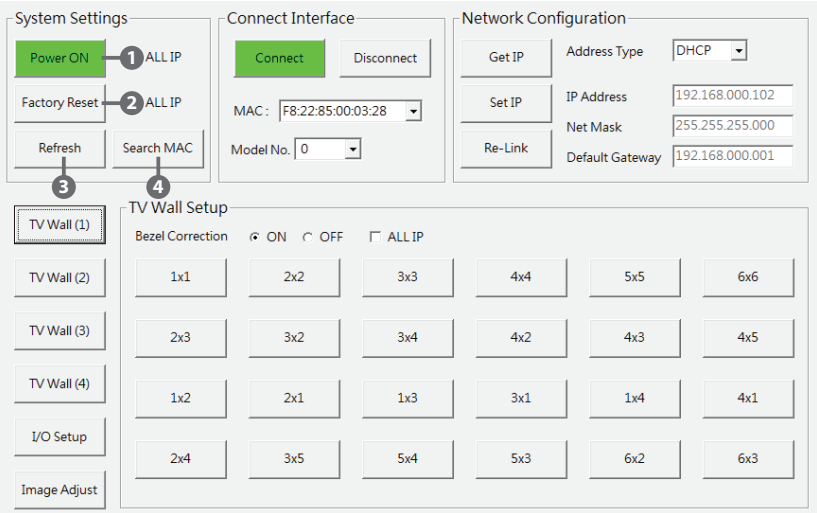
Warning: Before installing, please uninstall any previous versions of the software application.

Double click on the downloaded file to install the software. Once the application has installed successfully, click and open the application.



1 **Search MAC:** When the Video Wall unit is powered on or the network connection is reset, click on this button so that any Video Wall units attached to the network can be discovered.

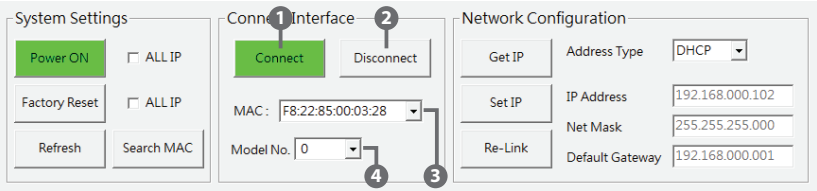
6.6.1 System Settings



1. **Power On:** Click on this button to switch the Video Wall unit on. To switch all units on, click "ALL IP" and then “Power ON”.
2. **Factory Reset:** Click on this button to reset the Video Wall unit back to default settings. To switch all units back to default setting click "ALL IP" and then “Factory Reset”.
3. **Refresh:** This button will refresh the selected Video Wall unit's pages except for Image Adjustment page.

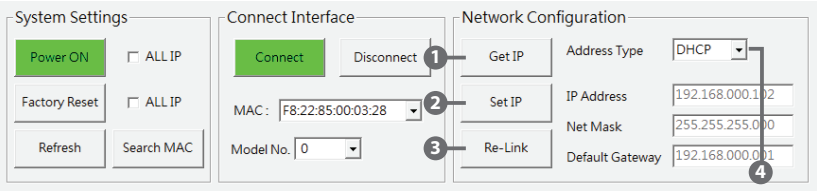
   Note: Image Adjustment settings can only be refreshed by clicking on the Refresh button on the page.
4. **Search MAC:** Click on this button to discover any Video Wall units that are connected to the network.

6.6.2 Connect Interface



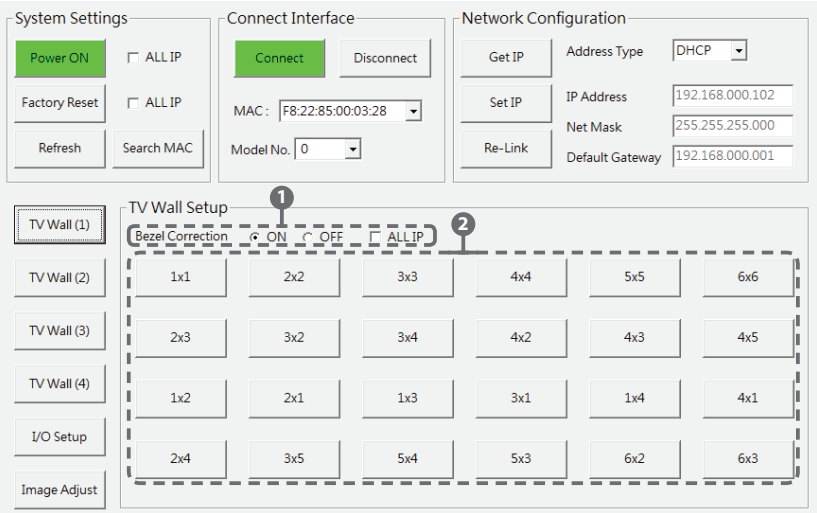
1. **Connect:** Click on this button to establish the link with the 'TV Wall Set'.
2. **Disconnect:** Click on this button to terminate the link between the Video Wall unit and the 'TV Wall Set'.
3. **MAC:** Click on this drop-down menu to show the available Video Wall units and select any MAC addresses to connect to. Settings will refresh automatically.
4. **Model No.:** When more than one Video Wall unit is in use, it is important that Model No. is set correctly order to split and arrange the image correctly.

6.6.3 Network Configuration



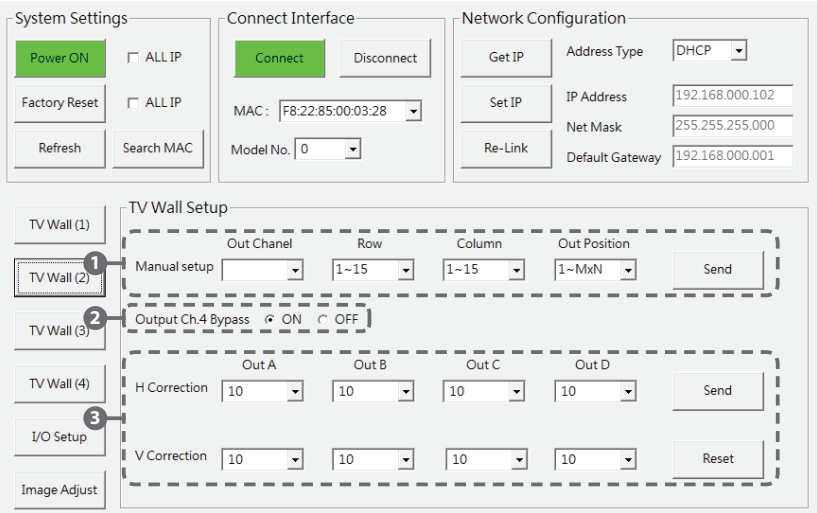
1. **Get IP:** Click on this button to get the current IP link status.
2. **Set IP:** To change the IP settings, click on this button and type the required IP Address, Net Mask and Default Gateway.
3. **Re-Link:** When the IP settings are done, click on this button to reset the IP link.
4. **Address Type:** Click on this drop-down menu to change the address type (DHCP/Static).

6.6.4 TV Wall Setup (1)



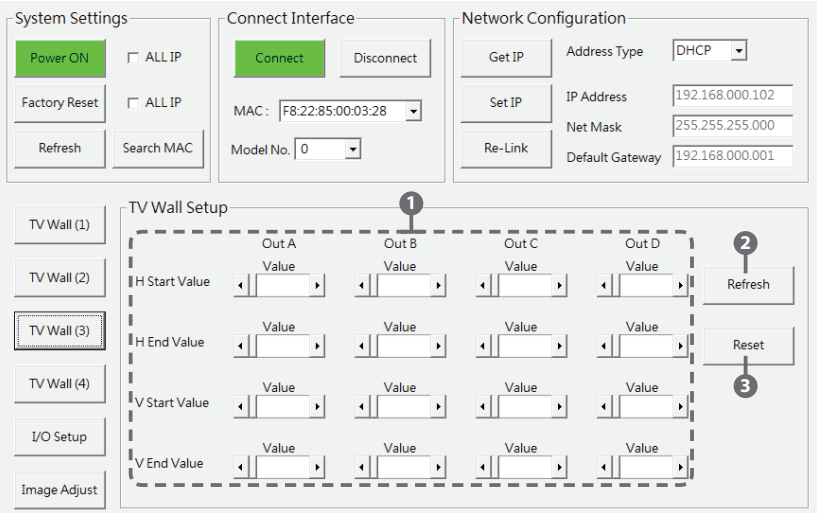
1. **Bezel Correction:** Allows the video wall's image to be adjusted to compensate for the screen bezel size. Click on "ALL IP" to activate Bezel Correction on all Video Wall units.
2. **Fast TV Wall Setting:** These buttons are pre-set options, click to set the desired pre-configured option.

6.6.5 TV Wall Setup (2)



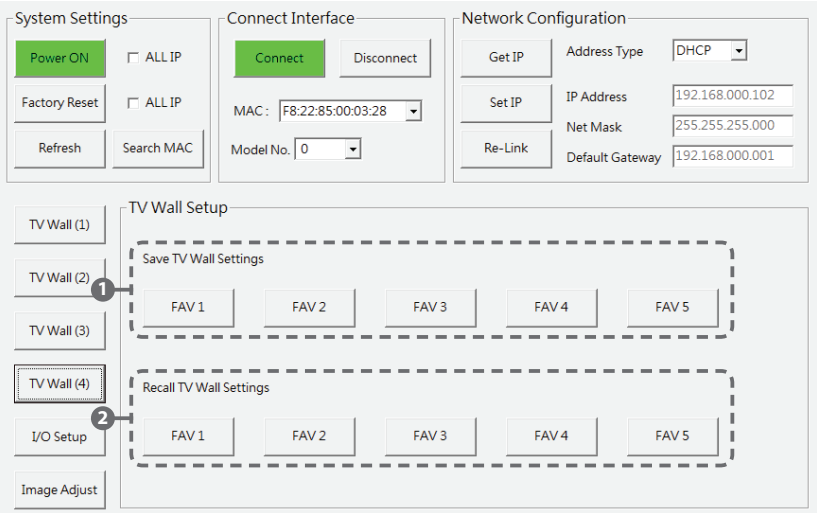
1. **Manual Setup:** Allows the user to individually set up outputs A to D in a specific horizontal and vertical positions (1~15).
2. **Output CH.4 Bypass:** Allows the Video Wall unit's output D to be set to cascade to additional units for larger video walls.
3. **H and V Correction:** Allows the horizontal and vertical positions of each output channel to be adjusted to compensate for the screen bezel size.

6.6.6 TV Wall Setup (3)



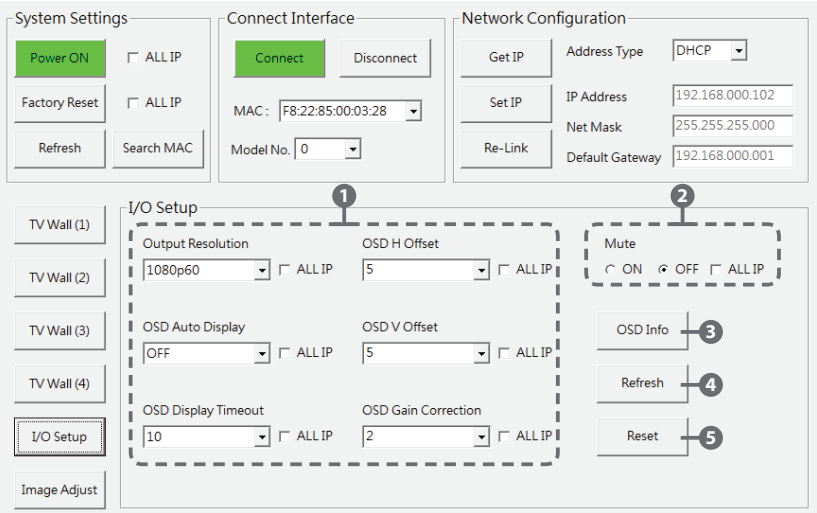
1. **H and V Start/End Value:** Allows the user to individually adjust the horizontal and vertical positions (0~225) of each of the outputs A to D.
2. **Refresh:** This button will refresh the H and V Setup page only.
3. **Reset:** This button will reset all the settings of the H and V Setup page back to factory default values.

6.6.7 TV Wall Setup (4)



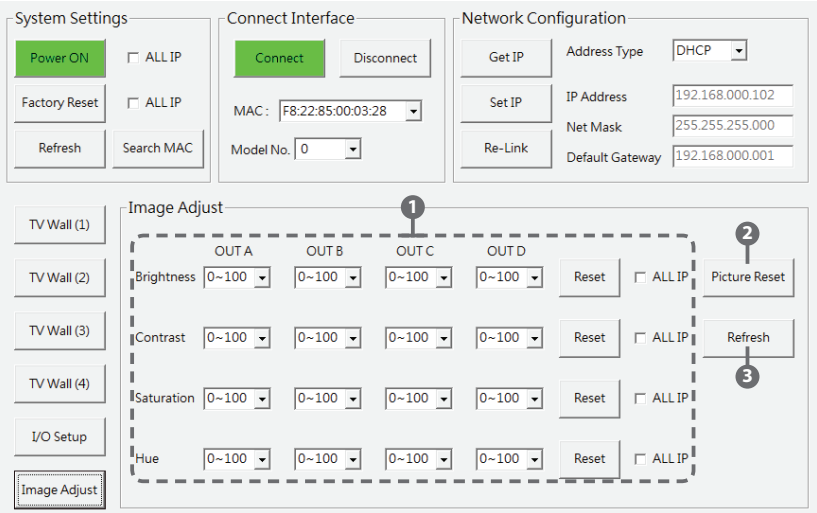
1. **Save TV Wall Settings:** These buttons will store the current video wall settings to favorite slots from FAV 1 to FAV 5. When all adjustments are complete, click the desired slot number to store the settings for later recall.
2. **Recall TV Wall Settings:** These buttons will recall the stored video wall settings from FAV 1 to FAV 5. Click the desired slot number to recall the settings.

6.6.8 I/O Setup



1. **Output Resolution:** Allows the user to set the Output Resolution. Click "ALL IP" to make adjustments to all connected Video Wall units simultaneously. Parameters and default values are as listed in RS-232 commands listing (see Section 6.4 for details).
2. **OSD Menu Adjustment:** Allows the user to make adjustments to the OSD menu. Click "ALL IP" to make adjustments to all connected Video Wall units simultaneously. Parameters and default values are as listed in RS-232 commands listing (see Section 6.4 for details).
3. **Refresh:** This button will refresh the I/O Setup page only.
4. **Reset:** This button will reset all the settings of the I/O Setup page back to factory default values.

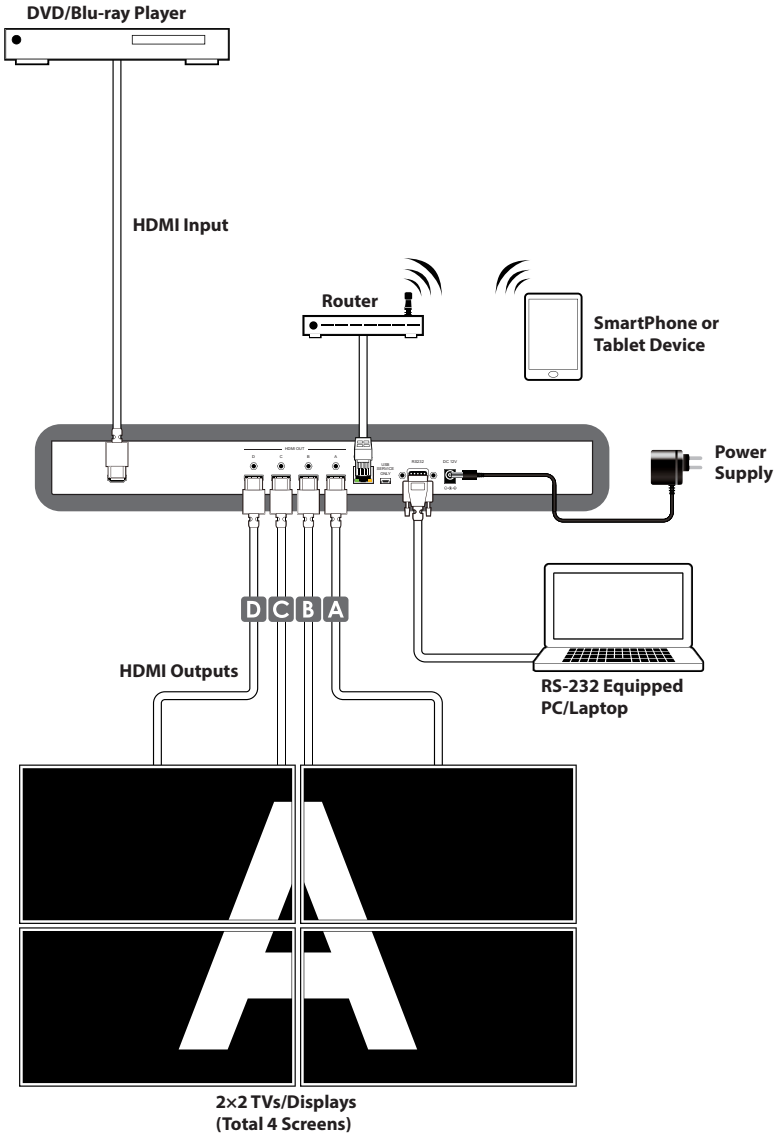
6.6.9 Image Adjust



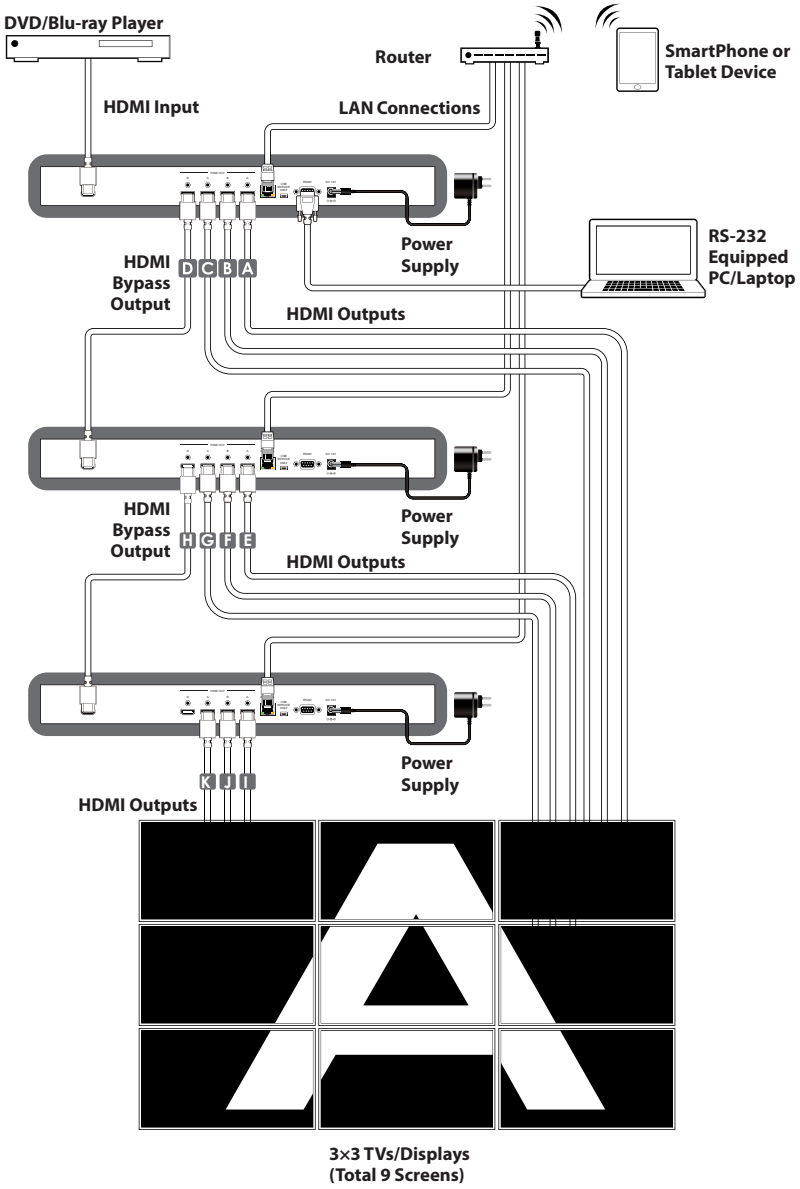
1. **Brightness, Contrast, Saturation and Hue Adjustment:** Allows the user to set the Image Adjustment parameters. Click "ALL IP" to make adjustments to all connected Video Wall units simultaneously. Parameters and default values are as listed in RS-232 commands listing (see Section 6.4 for details).
2. **Picture Reset:** This button will reset all the settings of the Image Adjustment page back to factory default value.
3. **Refresh:** This button will refresh the Image Adjustment page only.

7. CONNECTION DIAGRAM

Example 1: 2x2 Screen Configuration



Example 2: 3x3 Screen Configuration



8. SPECIFICATIONS

8.1 Technical Specification

Video Bandwidth	225 MHz/6.75 Gbps
Input Ports	1×HDMI (Female type), 1×Control (RJ45), 1×RS-232 (D-sub 9-pin), 1×USB (Service only)
Output Ports	4×HDMI (Female type)
HDMI Cable Distance	15m@1080p/8-bit 10m@1080p/12-bit
HDMI Audio Sampling Rates	Up to 192 kHz
ESD Protection	Human body model: ±8 kV (air-gap discharge) ±4 kV (contact discharge)
Power Supply	12 V/3 A DC (US/EU standards, CE/FCC/UL certified)
Dimensions	436 mm (W)×249 mm (D)×44 mm (H)/ Jacks Excluded 436 mm (W)×256 mm (D)×49 mm (H)/ Jacks Included
Weight	2815 g
Chassis Material	Metal
Colour	Black
Operating Temperature	0 ˚C~40 ˚C/32 ˚F~4 ˚F
Storage Temperature	–20 ˚C~60 ˚C/–4 ˚F~140 ˚F
Relative Humidity	20~90% RH (non-condensing)
Power Consumption	12.3 W

8.2 Supported Resolution

INPUT RESOLUTION	OUTPUT RESOLUTION
480i@59	720p@50
480p@60	720p@60
576i@50	1080p@24
576p@50	1080p@25
720p@50/60	1080p@30
1080i@50/60	1080p@50
1080p@24/50/60	1080p@60
640×480@60/72/75/85	1024×768@60
800×600@56/60/72/75/85	1280×800@60
1024×768@60/70/75/85	1280×1024@60
1280×768@60/75	1366×768@60
1280×1024@60/75	1440×900@60
1360×768@60	1600×900@60 (RB)
1366×768@60	1600×1200@60
1600×1200@60	1680×1050@60
1920×1200@60	1920×1200@60 (RB)

9. ACRONYMS

ACRONYM	COMPLETE TERM
CLI	Command Line Interface
DTS	Digital Theater System
DVI	Digital Visual Interface
EDID	Extended Display Identification Data
GUI	Graphical User Interface
HDCP	High-bandwidth Digital Content Protection
HDMI	High-Definition Multimedia Interface
HDTV	High-Definition Television
OSD	On-Screen Display
USB	Universal Serial Bus
VGA	Video Graphics Array
WUXGA	Widescreen Ultra Extended Graphics Array

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