LevelOne

User Manual

HVE-6501T/6501R

HDMI over IP PoE Transmitter/Receiver

Ver 1.0

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HVE-650 series HDMI over IP PoE T/R

Product Overview

LevelOne **HVE-650** series are high performance HDMI over IP PoE distribution system. Designed with transmitting units(**HVE-6501T**) and receiving units (**HVE-6501R**).　it allows you to can simultaneously send out an HDMI to one or more HDMI display. The HVE-650 series is designed for everything from small domestic installations to large commercial applications. Use it for home theatres, retail centers, transportation hubs, leisure facilities, educational facilities, corporate environments and more.

Powerful Distribution Capabilities

Can be used to distribute Full-HD digital content from multiple sources more than 200 remote displays on a LAN by cascading managed switches, allowing the farthest display without distance limitations(via fiber switch) from the 1080p source devices while sustaining picture & sound quality. support Point-to-Point, Point-to-Multipoint, and Multipoint-to-Multipoint broadcasting architecture, adding more displays without adding LAN bandwidth loading.

Key Features

- Flexible and scalable HDMI 1080p Video Broadcasting with Gigabit Ethernet LAN
- Multicasting and broadcasting architecture, no more bandwidth loading
- Transmits an HDMI signal over one CAT5e/6/7 cable.
- HDMI 1.3b and HDCP 1.2 compliant
- Dual power input: 802.3af compliant PoE & DC5V
- Up to 16 transmitters and more than 200 receivers possible in a single system
- Built-in DIP switch to change Group ID and Utility for remotely
- RS-232 Control Pass-Thru to control HDMI display from transmitter side

Package Content

HVE-6501T:	HVE-6501R:
■　　Power Adapter	■　　Power Adapter
■　　CD Manual/Utility	■　　CD Manual/Utility
■　　Quick Installation Guide	Quick Installation Guide

GETTING THE BEST RESULTS

Many factors influence the quality and reliability of an HDMI® signal distribution installation. The following are the main factors to consider, and basic precautions that will ensure the best possible performance.

1. **Dedicated network.**

The HVE-650/660 Series is designed to operate on a dedicated Gigabit Ethernet network, not to be combined with other network traffic or with access to the internet.

2. **Resolution tracking.**

Set up the source to output the best resolution that all TVs are capable of displaying. The HVE-650/660 Series supports 720p and 1080p. If some TVs in the network are not capable of accepting 1080p, the higher resolution sets may not be shown to their best advantage.

3. **Source resolution and video/sound quality**.

Sources, such as satellite receivers or cable boxes, can output at low resolutions or deliver extremely compressed video material, yielding poor results. Consider the source when planning and troubleshooting your system.

4. **Display devices.**

The perceived quality of the video image depends heavily upon the type and quality of the TVs or projectors used. High quality displays should be expected to produce a noticeably better image.

5. **Distance between the transmitter and the receiver.**

Long distances are possible, but premium quality Cat 5e/6 cables are necessary for the longest runs.

6. **Source and TV connection cables.**

Use short, premium HDMI cables; low quality cables are often unreliable. Always use good strain relief methods or locking cables to prevent cables from becoming loose over time.

7. **Interference from nearby electrical devices**

It can have an adverse effect on signal quality. For example, older computer monitors often emit very high electromagnetic fields that can interfere with the performance of nearby video equipment.

Device Appearance Description

HVE-6501R

1. LEDs
2. Push Button1
3. Push Button2
4. Group ID
5. DC input 5V/A
6. Gigabit Ethernet Port
7. HDMI Output
8. RS-232 for TV

HVE-6501T

9. LEDs
10. Push button1
11. Group ID
12. DC input 5V/A
13. Gigabit Ethernet Port
14. HDMI In
15. RS-232 for TV

LED Behavior

Function Description

Function	LED Behavior	Description
DATA	Blinking	Blinking while data transmission
	On	Ethernet link, no data transfer
	Off	Ethernet no link, no data transfer
Link	On/off/blinking	Connect status for T or R
PWR	On/off/blinking	Power status

Check List of LED State and action

DEVICE State	LED State			
	Host		Client	
	PWR	LINK	PWR	LINK
Power on, host and client not connect	Blinking →On	Off → Blinking →On	Blinking →On	Off → Blinking
Power on, host and client connect	Blinking →On	Off → Blinking →On	Blinking →On	Off → Blinking →On
Press the host "PB" button to disconnect	On	Off	On	Blinking
Press the client "PB1" button to disconnect	On	On	On	Off
host power off	Off	Off	On	Blinking
client power off	On	On	Off	Off
Host Engineering Mode	Blinking	Off→Blinking	N/A	N/A
Client Engineering Mode	N/A	N/A	Blinking	Off→Blinking

System Components:

- **HVE-6501 Transmitter**

Specifications:

- 1 GIGA LAN(802.3af PoE): UTP/STP 1000Mbps Ethernet Port
- 1 HDMI IN: 19-pin type A female
- 1 DB-F RS232 Port
- Power : DC5V/1A or 802.3af PoE
- GROUP ID: 4-pin DIP switch able to set up 16 groups
- 1 DATA LED
- 1 LINK LED
- 1 PWR LED
- 1 RESET Button
- Size: 120 x 90 x 28 (H) mm, 0.8 kg
- Plug and Play Installation
- Support DVI with HDMI-to-DVI adapter cable
- LAN Bandwidth: 150Mbps for 1080p

- **HVE-6501 Receiver**

Specifications:

- 1 GIGA LAN(802.3af PoE) : UTP/STP 1000Mbps Ethernet
- 1 HDMI Out: 19-pin type A female
- 1 DB-M RS232 Port
- Power jack : DC5V/1A or 802.3af PoE
- 1 DATA LED
- 1 LINK LED
- 1 PWR LED
- 1 PB (Push Button)1
- 1 PB (Push Button)2
- Size: 120 x 90 x 28 (H) mm, 0.8 kg
- Plug and Play Installation
- Support DVI with HDMI-to-DVI adapter cable
- LAN Bandwidth: 150Mbps for 1080p

Installation:
- ## HVE-6501T Transmitter

1. **DC5V:** Connect it to the external AC adapter which plugs into an electrical outlet. Or via 802.3af PoE PSE to GIGA LAN port.
2. **GIGA LAN:** Connect directly to a Receiver or to a GIGA(1000Mbps) Ethernet Switch using CAT5e/6 cable.
3. **HDMI IN:** Connect to an HDMI source device with an HDMI M-M cable. Use an HDMI --> DVI adapter if the source is DVI.
4. **RS232:** Connect to the RS232 port of the device you want to configure.


LEDs , button and Group ID setting
1. **POWER LED Blinking:** power on and the unit is booting up.
2. **POWER LED On:** power on and the unit is active.
3. **LINK LED Off:** LAN is not connected.
4. **LINK LED On:** LAN is connected.
5. **DATA LED Blinking:** if Transmitter is connecting with LAN, or the HDMI source is removed.
6. **DATA LED On:** All the connections are working.
7. **RESET Button:** change Link / Unlink; Engineering Mode and Reset to default using this button. Please to see the **RESET Button Descriptions.**
8. **GROUP ID:** Set up the Transmitter's group ID by adjusting the 4-pin DIP switch, ON means "1", OFF means "0", there are 16 groups available to set up.

Multicast IP Address
255.0.0.XXX & 255.0.1.XXX, the XXX are resolved by the 4-pin DIP Switch on the Transmitter.

● **Receiver**

1. **DC5V:** Connect to the supplied AC adapter and plug into an electrical outlet.
2. **GIGA LAN:** Connect directly to a Transmitter or to a GIGA(1000Mbps) Ethernet Switch using CAT6 cable.
3. **HDMI OUT:** Connect to an HDMI display device with an HDMI M-M cable. Use an HDMI --> DVI adapter if the display is DVI.
4. **RS232:** Connect to the RS232 port of the device you want to configure.

LEDs , button and Group ID setting
1. **POWER LED Blinking:** power on and the unit is booting up.
2. **POWER LED On:** power on and the unit is active.
3. **LINK LED Off:** LAN is not connected.
4. **LINK LED On:** LAN is connected.
5. **DATA LED Blinking:** The Receiver is connecting with Transmitter, or the HDMI source is removed.
6. **DATA LED On:** All the connections are working.
7. **PB 1** : Change Link/Unlink; Firmware Upgrade Mode and Reset to default* using this button. Please to see the **Button Descriptions.**
8. **PB 2 :** change between Video Mode / Graphic Mode ; Anti-Dither ; Update EDID* using this button. Please to see the **Push Button Descriptions.**
9. **GROUP ID:** The Receiver's default GROUP ID is "0000"

● **Transmitter & Receiver IP Address**

The default setting is for "auto ip" mode and uses the 169.254.xxx.xxx private IP domain range. The IP of target TX/RX board is resolved by its hostname using DNS protocol. The RX's HDMI GUI will display the RX's IP address and the connected TX's IP address. You can see the RX's HDMI GUI by connecting it with power adapter and HDMI monitor only, without LAN cable.
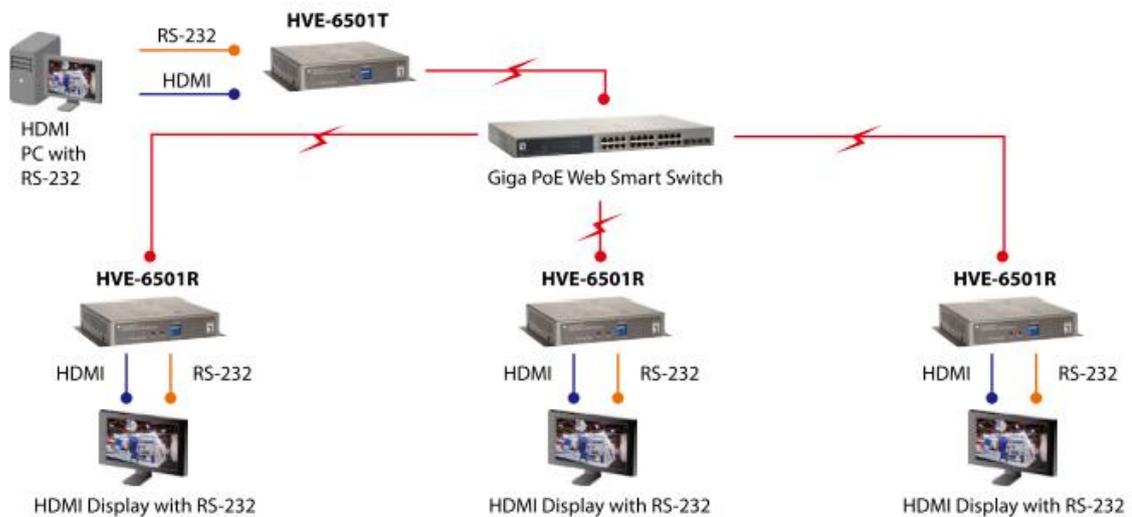
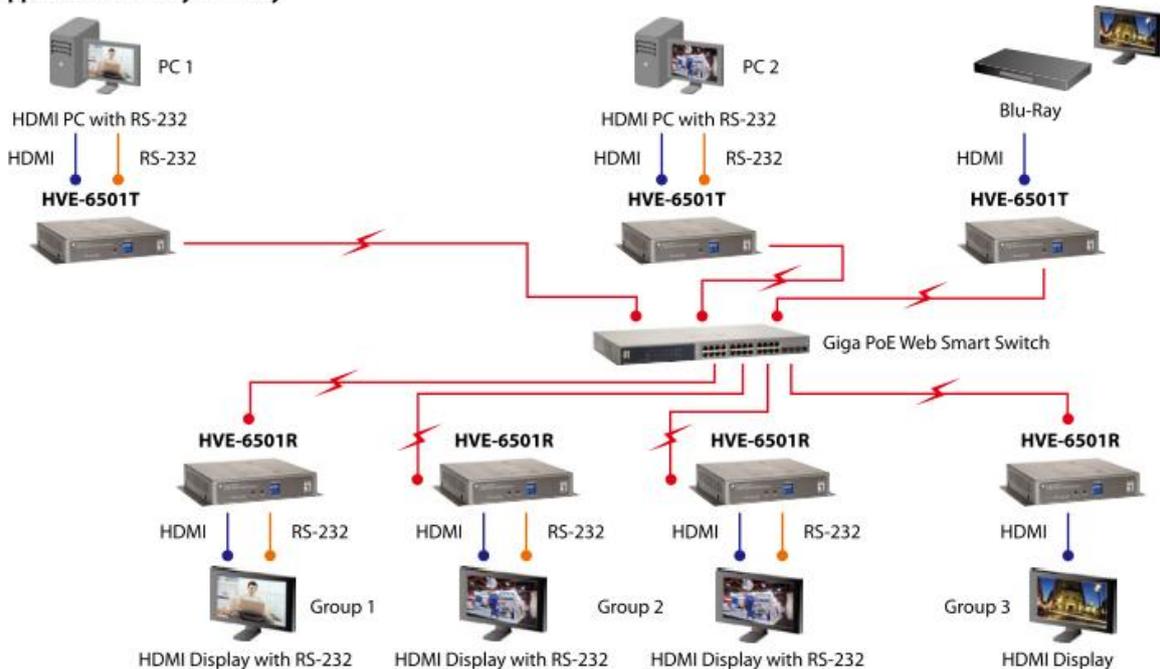## ● Configurations

Application 1: One-to-One
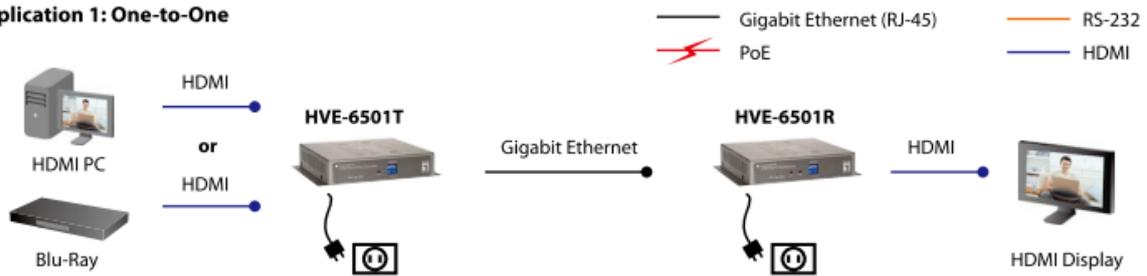
- Extend the Full HD source up to 100 meters over a single CAT6 cable.

Application 2: One-to-Many

- Distribute the Full HD source to many of remote displays.

Application 3: Many-to-Many

- Connect up to 16 Transmitters with many of remote displays through the **IGMP-enabling** Gigabit Ethernet Switches to construct a right-sized matrix you need.

- Each Transmitter (source) requires 150Mbps bandwidth for broadcasting 1080p, so Fiber Optic connection between Ethernet Switches is recommended for many-to-many application.
- Support cascading Ethernet Switches up to 3 layers.

RESET Button Descriptions :

	Button State		
	HVE6501T(Host)	HVE-6501R(Client)	
	Button	Button 1	Button 2
Short Press	Link on : Link Link off :Unlink	Link on : Link Link off :Unlink	Video Mode/ Graphic Mode*
Long Press (3 sec)	NA	NA	Anti-Dither (1/2/off)*
Long Press on Boot (6~8 sec) (PWR & LINK Blinking)	Firmware Upgrade Mode*	Firmware Upgrade Mode*	Update EDID*
Long Press on Boot (PWR & LINK Blinking)	Firmware Upgrade Mode and Reset to default*	Firmware Upgrade Mode and Reset to default*	NA

Button Feature	Descriptions
Video Mode/ Graphic Mode	User can select to change between Video Mode / Graphic Mode using this button. The button setting will be saved to flash, and write-in after rebooting. Video Mode: FW will automatically trade-off between bandwidth and video quality to ensure smooth video playing experience. Graphic Mode: FW will fix the trade-off to ensure best graphic/text viewing experience.
Anti-Dither (1/2/off)	Anti-Dithering Mode is design to work with ATI graphic cards that provide dithering output. Dithering output is used to make coloring looks better than it's original color depth. It uses visual transient to create a half-tone effect. However, this presents great difficulty for Video Compression to maintain low bandwidth even if the source display seems static. Currently, we only see Dithering Output with ATI graphic cards. To resolve this issue, HVE-6501 provides Anti-dithering for 1 bit, 2 bit, or off. If the source content does not generate dithering output, and this feature is turn on. It will create a blocking effect because Video Engine are unable to detect pixel changes. User can avoid this issue by turning this feature to off.
Update EDID	"Update EDID" feature is used for Multicast Mode to select which monitor/TV EDID is used for system wide

	EDID usage. During multicast setup, there maybe monitor/TV that has lower resolution. For example, 1 monitor/TV with 720p resolution with mostly 1080p solutions. Please select the monitor/TV with lowest resolution, to ensure all can be displayed correctly. For customer that are using 1 pair of Host/Client with Multicast mode, the end user must update EDID correctly. If not, it will cause many compatibility issue. Operation: Once the button event is triggered correctly at the client side, when system is setup correctly for Multicast. The selected EDID will be update to Host Side EEPROM.
Firmware Upgrade Mode	1. Static IP: 192.168.0.88 2. User can connect to http://192.168.0.88 webpage for firmware update. 3. Firmware update file name will be: Host :webfwh.bin Client :webfwc.bin
Reset to Default	1. Reset Any changes in SPI flash setup flag. 2. After Reset to Default and reboot cycle, will use default setting.

How to Use RS232 over IP

HVE-650/660 series support a feature called "RS232 over IP". This feature redirects RS232 data from client/host to host/client. the RS232 redirection is automatically established between host and clients. There is no need to explicitly issue commands for establishing redirection. The FW code will automatically link the host and clients all together using a pre-configured baudrate setting (default is 9600-8n1). Normally, this static baudrate setting is pre-configured on Manufacturing. Also you can change baudrate setting by Link Utility, you can refer to next chapter.
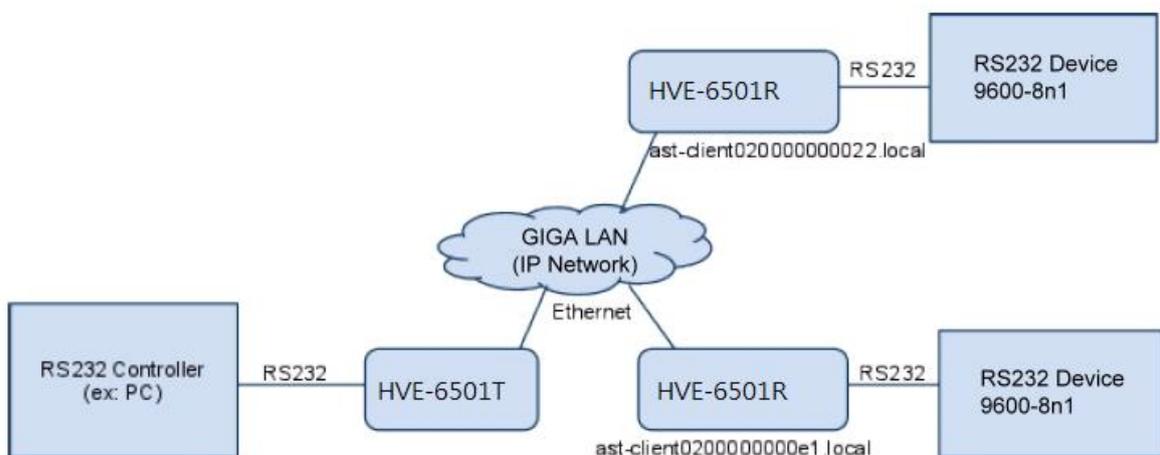
Link Utility

The Link Utility is working with Widows XP Service Pack 2 or later O/S version. It is suggested to operate with O/S of ：

Windows XP Service Pack 3
Windows Vista Service Pack 2
Windows 7

Either at the website of http://developer.apple.com/networking/bonjour/ or the CD in the package, you may download bonjoursdksetup.exe and execute the program. You may find the following message after executing the program. HVE-6501 is able to configure and change the baud rate of RS232 over IP and Multicast group ID. This tool supports DNS protocol and programmed by Open Source code.
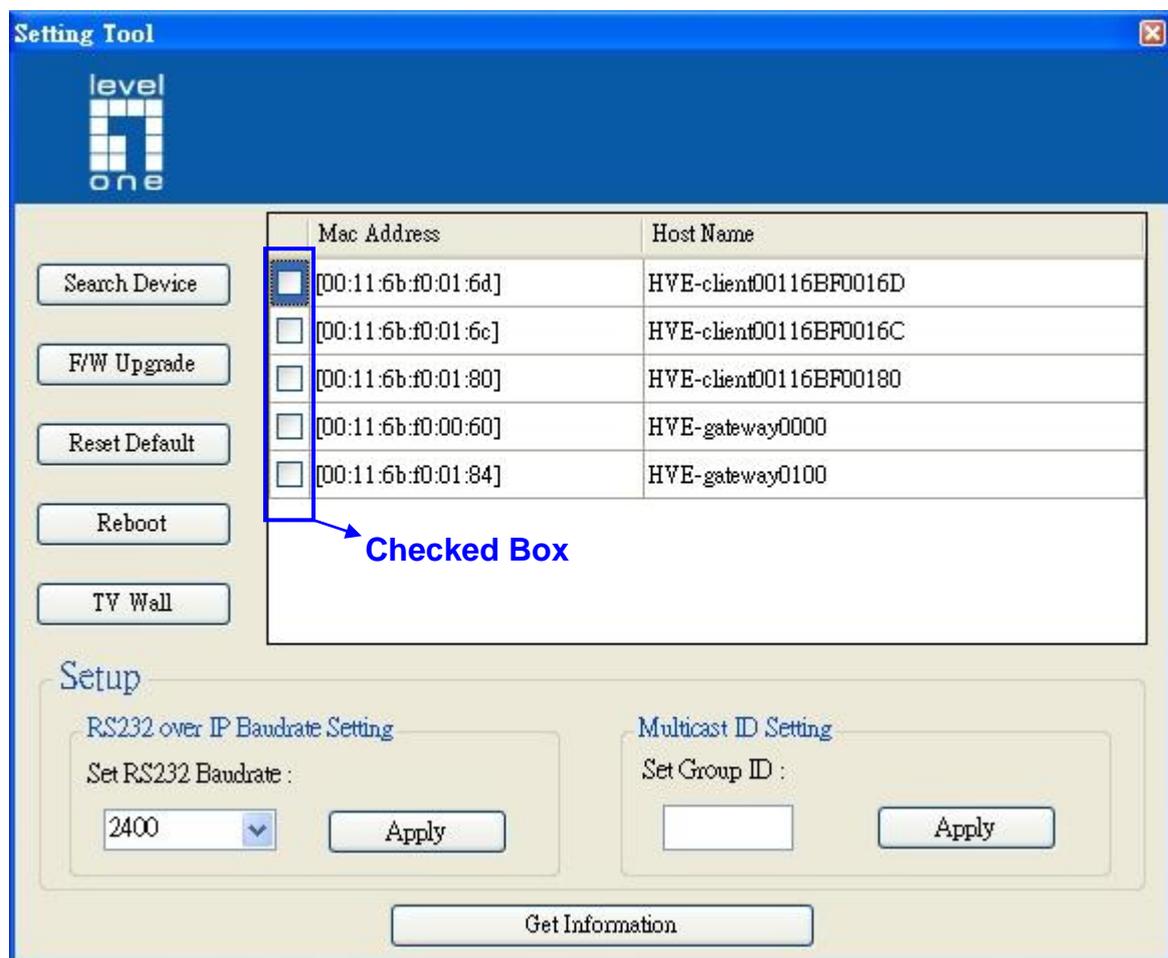
Check box : You may perform firmware update and other function keys.

Search Device : show the devices hostname and MAX in the network for other function.

F/W Upgrade : when click Firmware Upgrade, the Window IE is initializing for firmware upgrading.

Reset Default : When click it, the device is reset to default, click Reboot to complete

Reboot : click it for rebooting.

TV Wall : when the firmware is for TV Wall mode,(Host Name prefix is HVE-6601), the webpage is showing below:
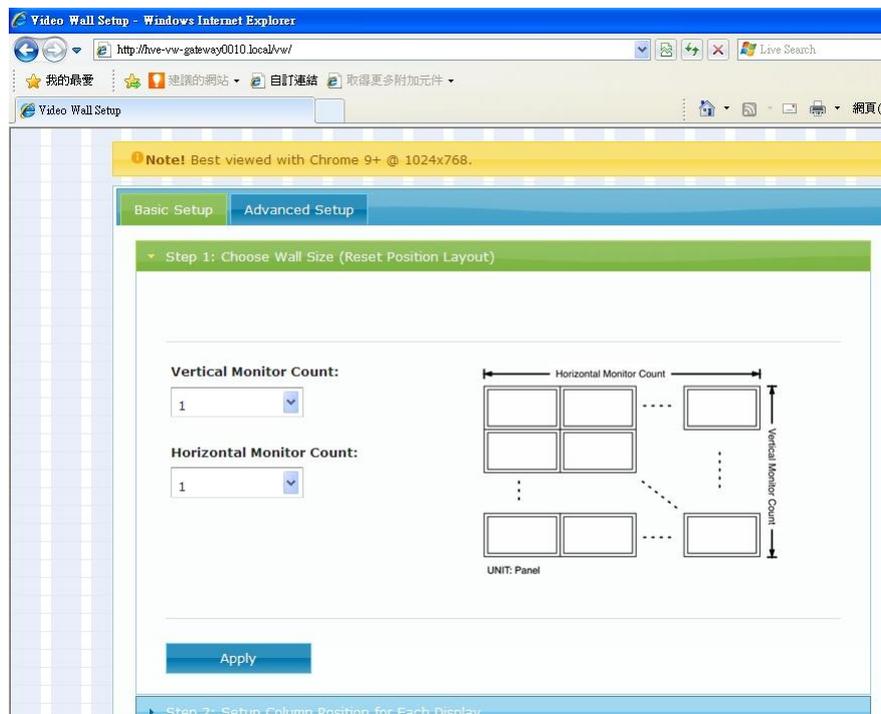
Please refere to How to Setting TV Wall document.

RS232 over IP Baudrate Setting : default Baud rate is at 9600bps. Other speed of 2400, 9600, 19200, 38400, 57600,115200, 230400 is available for selection. It has to be rebooted once the baud rate has been chosen.

Multicast ID Setting : To configure Multicast Group ID, the value can be 0000, 0001, 0010,0011, …… 1111, etc. and it will be needed for rebooting once the ID has been selected. This setting is with priority and 4 DIP Switch is no function.
In case, the ID shall be followed by DIP Switch, the device must be Reset to default.
If the configuration goes incorrectly, the setting will indicate the following message for the status.

Wrong Group ID Please set again: 0000~1111

確定

Get Information : Click this to show all devices Mac address, IP address, Host Name, Baud rate, Group ID. And save for other configuration profile in .csv file sub-name.

InformationForm

Save

MAC address	IP address	Host Name	Baudrate	Group ID
[00:11:6b:f0:01:84]	169.254.6.80	HVE-gateway0010	19200	0010
[00:11:6b:f0:00:60]	169.254.5.152	HVE-gateway1000	9600	1000
[00:11:6b:f0:01:6c]	169.254.5.216	HVE-client00116BF0016C	19200	0010
[00:11:6b:f0:01:6d]	169.254.5.221	HVE-client00116BF0016D	19200	0010
[00:11:6b:f0:01:80]	169.254.6.60	HVE-client00116BF00180	9600	1000

Notes:

Please remove MAC ID used on other LAN card to prevent the MAC ID conflict. The device will automatically create the IP address of 169.254.x.x which is assigned to HDMI TX/RX LAN card IP. If the same IP address is used by other LAN card, the Windows will generate a routing table which may confuse the information access. To correct the situation, simply delete this routing table and remove other LAN card. Then you may use the Tool normally.

The following to show how to delete the routing information:

You need to delete the routing information circled by red line. The instruction is:

```
C:\Documents and Settings\User>route delete 169.254.0.0 mask 255.255.0.0 192.168
.62.197

C:\Documents and Settings\User>_
```

Referencing :

```
route delete 157.0.0.0 MASK 255.0.0.0  157.55.80.1
         destination^       ^mask       ^gateway
```

How to Download Bonjoursdksetup.exe

1. Log-n the webpage of http://developer.apple.com/opensource/

2. Drag down the web page and click "Bonjour SDK for Windows"

3. Apply ID or use the registered ID and password.

4. You may see the page while click "Join now". Click the red line circled and get the link.

5. Click "Get Started"

6. Select "Create Apple ID" and click "Continue". Follow the steps to complete the registration procedure.
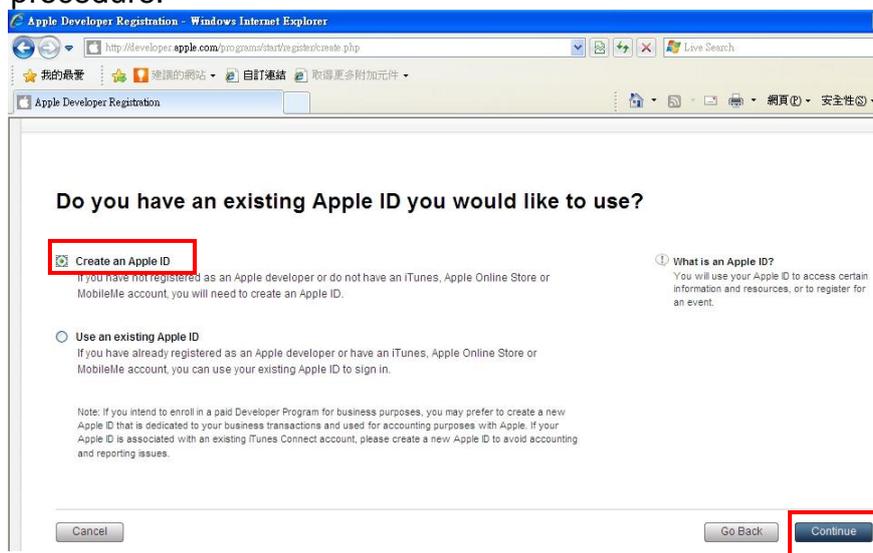
7. You may get your Apple ID and password after registration completion. File this Apple ID and password on Step 3 and click "Sign in". The page below will be seen.

Click to execute the program or save for future installation.