PB5000 HDMI Over IP

AV Matrix/VideoWall

Firmware version a6.4.26 web 2.1.x

User Guide

WWW.AAVARA.COM

Rev 2.1.1

Table of Contents

Information in this document is subject to change without notice.

I.**PB5000 models:**

Model	PB5000HD-S+E	PB5000-R+E
Sender/Receiver	Sender	Receiver
Max. Video Format	1080p60Hz Input	1080p60Hz Output
Max. Audio Format	2 ch LPCM	
Video Connector	HDMI Input	HDMI Output
RS232 Connector	DB15 x 1	DB15 x 1
IR Connector	Not activate	

Notice! PB5000HD-S+E sender doesn't function with IR pass-thru compatibility with PB5000-R+E.

II.**Ethernet Switch Setting**

1. Please select Layer 2/3 managed switch to work with Aavara AV Over IP.
2. Enable IGMPSnooping (Version 2) and have all senders/receivers in same VLAN group.
3. Enable IGMP Querier on major switch and disable Fast Leave on all switches, if multiple ethernet switches installed.
   Be sure network bandwidth between switches enough for video network, it can use Fiber connection or set **802.3ad Port Trunking/Link Aggregation** to increase bandwidth between switches.
4. If Ethernet switch is also used for other service like PC network or Voice Over IP:
   - Set different VLAN groups to divide different network service.
   - For RJ45 ports or Fiber ports used for other services, set **IGMP Blocked** (HP switch) or **Multicast Forward Forbidden** (Cisco switch), to avoid video streaming data taking effect.
5. Be sure to save the above setting before rebooting ethernet switch.

III.**PB5000 Hardware Installation**

1. Connect all Senders and Receivers to Gigabit Switch by Cat5e/6 cables and connect to video source and TV/Display with HDMI cables.
2. [Optional] Connect RS232 cables between PC/controller to Senders, TV/Displays to Receivers.
3. Plug-in DC power adapter to all Senders and Receivers. Units power on.
   If PoE switch or PoE injector connected, then it's not necessary to plug-in DC power adapter.
4. Power on all Video Sources and start to play video.

IV.**Integrate with 3rd Party Controller**

PB5000 supports following major 3rd party controller's integration:

- Control4, AMX, Crestron, RTI, Elan g!, Extron, Neets and more.

Aavara provides controller driver that allows 3rd part controller to control Aavara HDMI Over IP sender and receiver by IP command directly.

Please contact with Aavara representative or your distributor for 3rd party driver and user instruction.

V.IP Setting, Web Configuration & Control

A. To Know IP address of Aavara HDMI Over IP Sender and Receiver

Aavara HDMI Over IP sender and receiver have factory default IP within 169.254.xxx.xxx C class range, and netmask 255.255.0.0, IP address of each HDMI Over IP unit can be found by following way:

Unit IP Show On Screen OSD:

1. To set up a sender connect to a receiver by Cat5e cables (can be with or without Ethernet switch in between).

2. Receiver connected to a TV or Display with a HDMI cable.

3. Power on Sender, Receiver and TV/Display.

4. On right bottom of screen, it will show:
   - Local IP Receiver IP address
   - Remote IP Sender IP address

5. Then, please connect the sender to a PC/Notebook RJ45 port with a Cat5e cable and then power on.

6. To set PC/Notebook RJ45 port IP configuration as follows:
   - IP address: 169.254.0.100 (or any IP within 169.254.xxx.xxx range)
   - Netmask: 255.255.0.0

Or

Finding unit and IP in Bonjour Browser

Software Required:

1. **Apple Bonjour SDK** free download from Apple SDK web site, if you are using MS windows OS PC/NB. Apple MacPro or MacBook which doesn't require that, it has built-in OS X.
   - can be downloaded from Apple developer web site
2. **Bonjour Browser** for easily find out all senders and receivers on network.
   - Just google and download from Internet

1. To set PC/Notebook RJ45 port IP configuration as follows:
   - IP address: 169.254.0.100 (or any IP within 169.254.xxx.xxx range)
   - Netmask: 255.255.0.0
2. Setup all Cat5e cable connection between PC/Notebook, sender, receiver and Ethernet switch, then power on.
3. [Optional] Install Apple Bonjour SDK on your MS Windows PC/Notebook.
4. Launch Bonjour Browser and check HTTP service section. All Aavara HDMI Over IP sender and receiver can be found at following domain name:

   - Sender Aavara-gateway0000.local 0000 represent video channel number
   - Receiver Aavara-clientAAAAAAAAAAAA AAAAAAAAAAAA represent MAC address of receiver

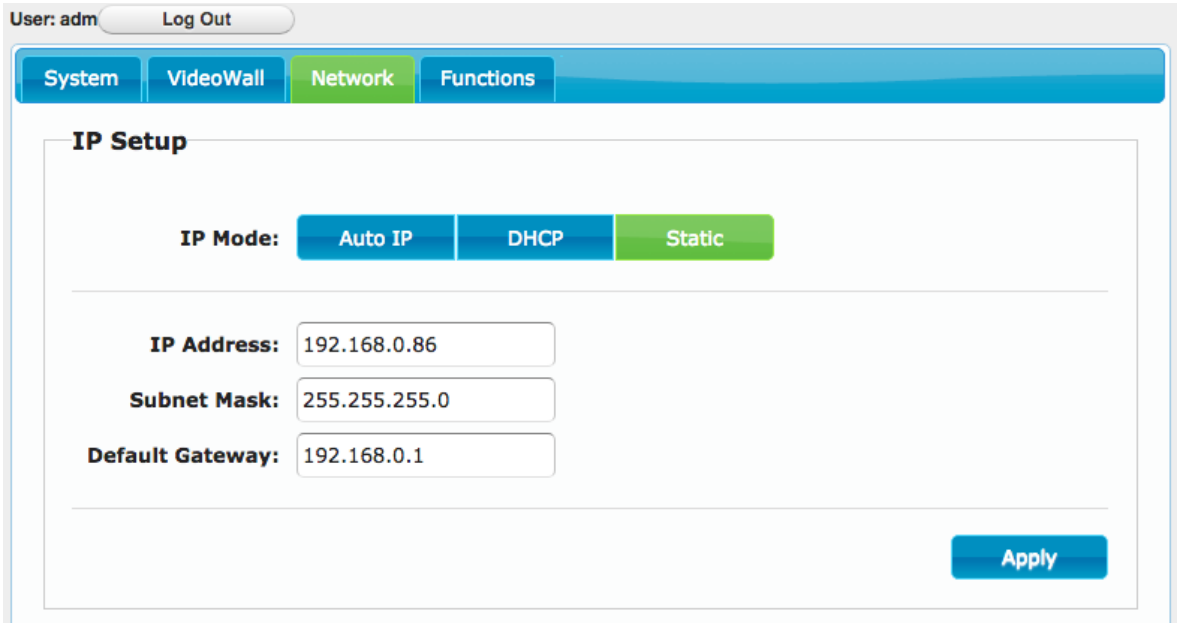
B. Launch AV Master Control Web page

http://[unit ip]/cfg.html Unit configuration web page (needed only when you want to change unit IP)

http://[unit ip]/index.html Aavara AV Master /Control web page

C. Change IP address of Sender and Receiver

Aavara HDMI Over IP sender and receiver have factory default IP within 169.254.xxx.xxx C class range, and netmask 255.255.0.0. Recommend that set static IP to each box. IP address of each HDMI Over IP unit, it can be changed by following way:



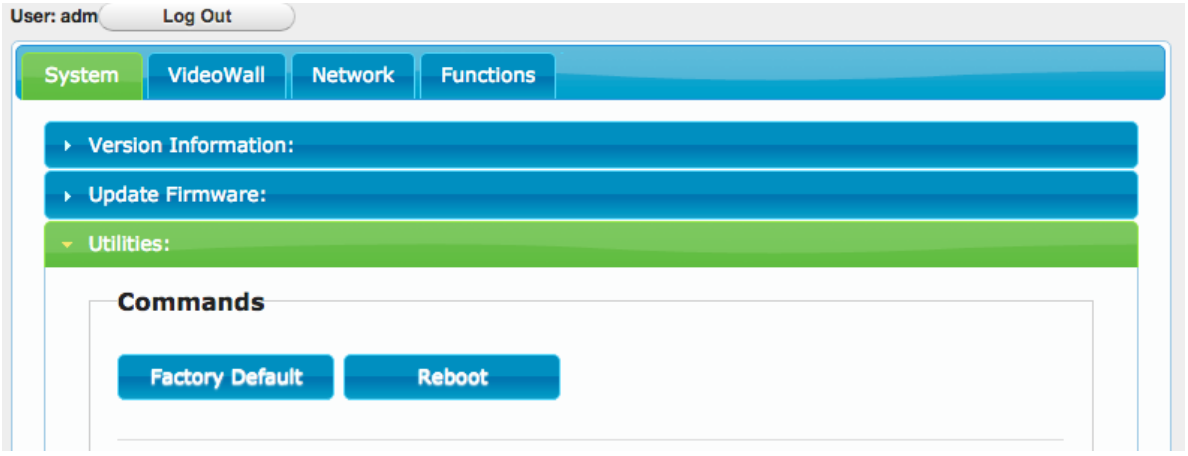
1. Launch Web browser with following URL, the Unit Web page will show:

   http://[unit ip]/cfg.html

3. Change IP Mode to Static
   - IP Address: Please assign an IP with correct format. (Ensure units' IP are at C or D class range).
   - Subnet Mask: 255.255.0.0 or base on proper ethernet network planning.
   - Default Gateway: Only if needed, please refer to gateway setting on Router.

4. Click Apply Button to save new setting, but unit need to reboot to get new setting effect.

5. Click System Tab → Utilities → Click Reboot button, reboot.



VI. **Aavara AV Master Web Interface**

Aavara AV Master Web interface, built-in in every Aavara HDMI Over IP unit, is a single web page setup and is able to control entire HDMI Over IP AV Matrix and VideoWall. It will only need to configure and operate Aavara AV Master Web Interface on One unit then that unit will become master control unit of entire system, usually recommend that use first sender, then all rest of units just take order.

To Connect Aavara AV Master Web Interface via PC/Tablet, please connect to same ethernet Switch/Wifi AP with following IP setting:

- IP address: any no conflict IP within same C or D class IP range with all senders and receivers.
- Netmask: 255.255.0.0 or value base network configuration that allows all units to see each other.

Factory default IP range is 169.254.xxx.xxx netmask 255.255.0.0

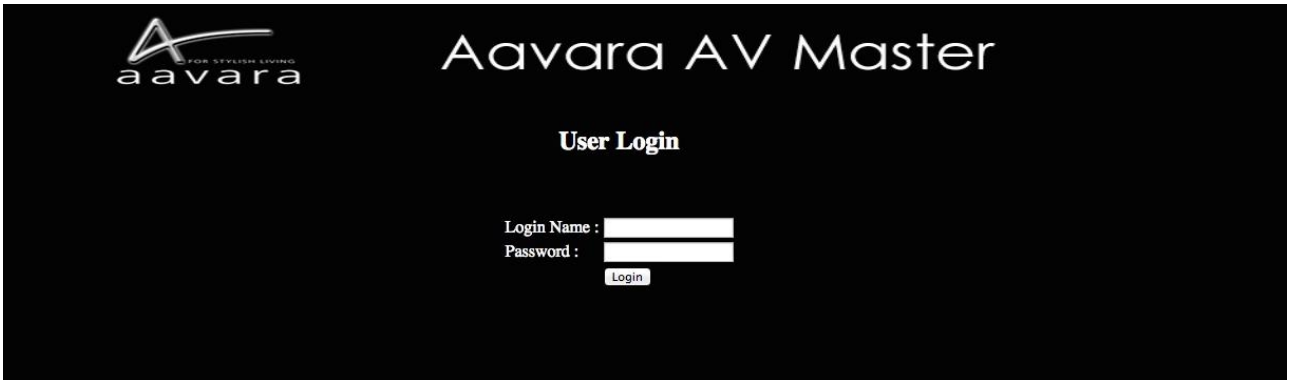
- Web browser: Google Chrome, Firefox, Safari are recommended.

Launch Web browser with following URL (domain name of sender at channel 0, default sender setting):

http://aavara-gateway0000.local

A. **User Login**

Every time when launches web browser and Aavara AV Master Web page, it will ask user to login.



System Default Login name and Password (Can be revised or deleted later on at User Management Tab) with Administrator authorization.

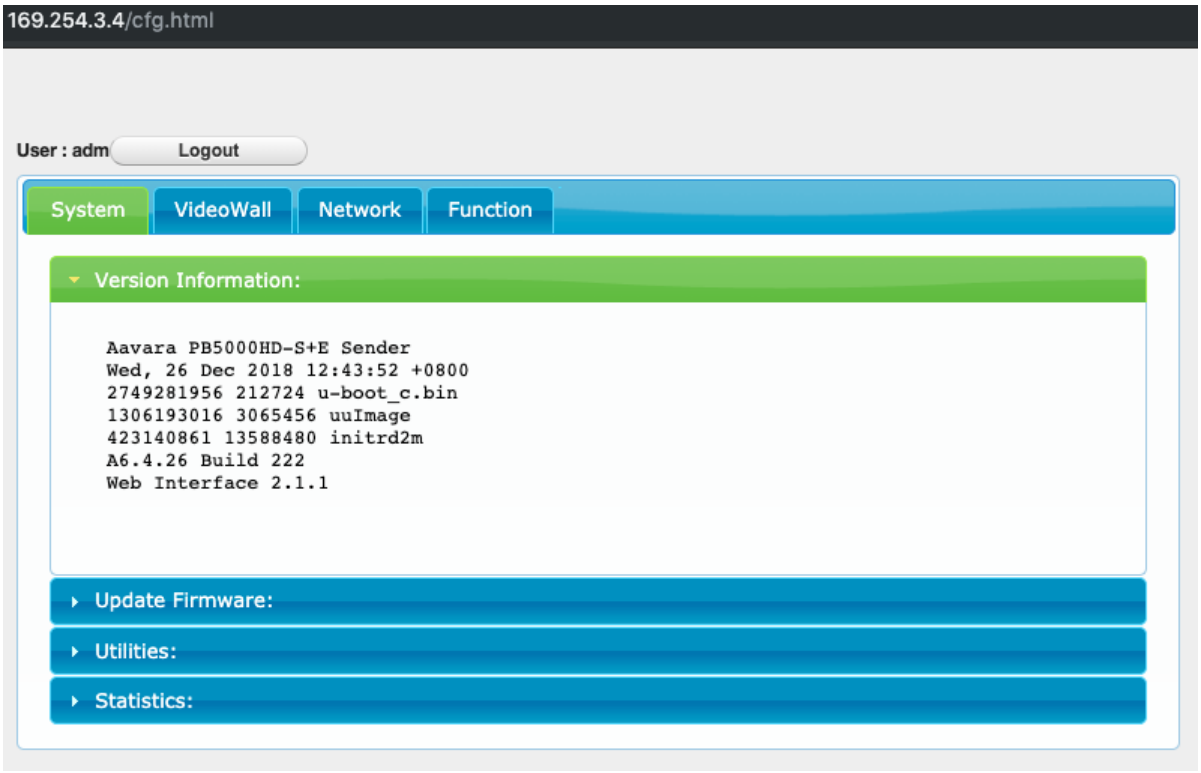
Login name: **adm**
Password: **adm**

After Login, on right top corner will show Login User info and Logout button.

User with **Administrator** authorization will see both AV Matrix/VideoWall/Control Operation and All Setup functions.

User with **Operator** authorization will see AV Matrix/VideoWall Operation functions only.

Only User with **Administrator** Authorization allow to access unit configuration cfg.html



Access other units' web page other than master control unit, will redirect web page/URL to master control unit's web page.

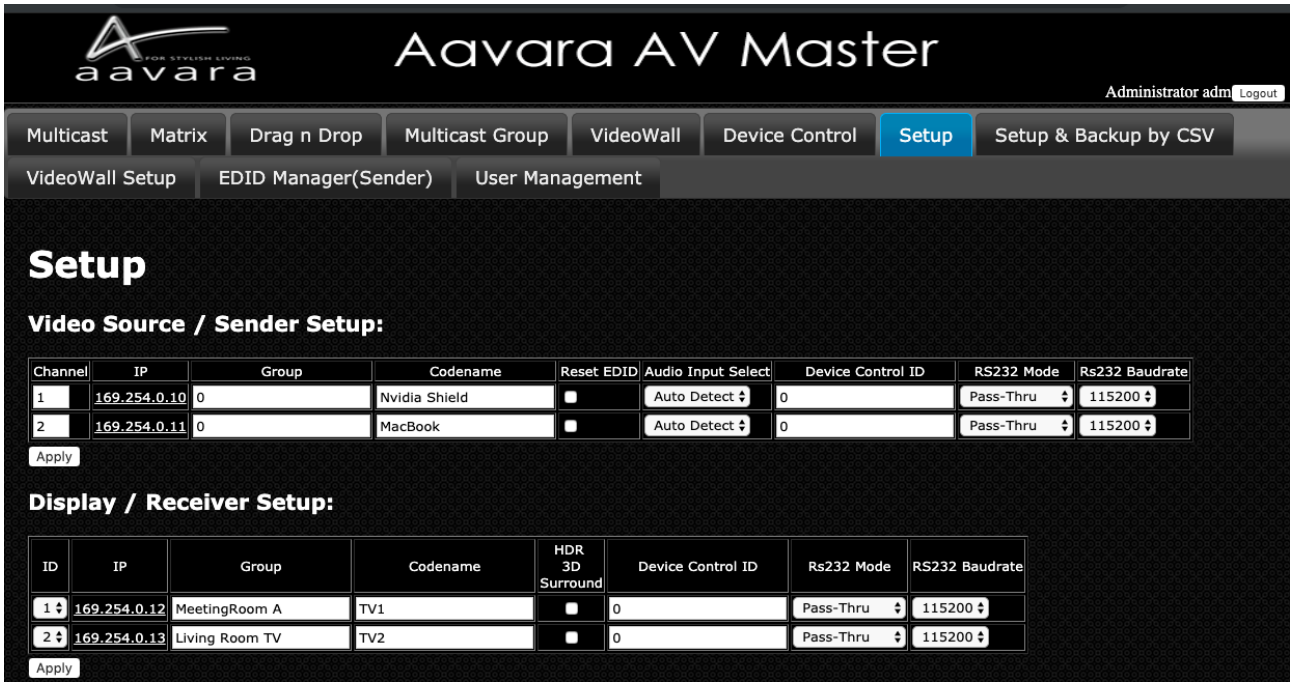
Once User Session expired, AV Master Web Interface will ask user to login again.

B. Setup within AV Master Web Interface

Click on Setup Tab at first time installation and change configuration later on, wait few seconds, AV Master will scan and list all Senders and Receivers. Please configure all parameters for Senders and Receivers, details at table below, according to installation & operation requirement. All settings will storage in this Sender or Receiver only and later on operation shall connect to this Sender/Receiver's web page only.

If any RS232 setting changed, the unit will need to reboot to get new setting effect.

For Device Control Command code setup, need to do by CSV file uploading way as next section showed.



Video Source/Sender:

Field	Description
Channel	Range 1 ~ 9999, Auto assign or manual change, each sender must have Unique Channel Number assign. No two or more Senders got same channel number.
IP	IP Address (Auto assign, or go Unit cfg.html for static IP assign)
Group	Sender's Group name for further management requirement.
Codename	Sender's Codename / Video Source name for further operation required.
Reset EDID	Reset Sender EDID table to factory default
Audio Input Select	Select Audio Source from HDMI or Analog Audio Input
Device Control ID	Match Device ID in Device Control CSV File (control by CEC(HDMI)/IR/RS232)
RS232 Mode	IP Command Rs232 command issue by IP command Pass-Thru RS232 command pass-thru between sender and receiver rs232 ports
RS232 Baudrate	Assign RS232 Baudrate, range 115,200 ~ 300 bps

Display/Receiver:

Field	Description
ID	Auto or Manual Assign, Each Receiver must have Unique ID Number assign. No two or more Receivers got same ID number.
IP	IP Address (Auto assign, or go Unit cfg.html for static IP assign)
Group	Receiver's Group name for further management requirement.
Codename	Receiver's Codename / Display name for further operation required.
HDR/3D/Surround	Enable (checked) / Disable (uncheck) EDID Copy to support HDR, 3D and Surround Sound output (LPCM/Dolby/DTS)
Device Control ID	Match Device ID in Device Control CSV File (control by RS232)
RS232 Mode	IP Command Rs232 command issue by IP command Pass-Thru RS232 command pass-thru between sender and receiver rs232 ports
RS232 Baudrate	Assign RS232 Baudrate , range 115,200 ~ 300 bps

Notice!

1. Please wait for few sec. AV Master will search all senders and receivers on network.
2. Each Sender must assign a unique video channel (CH) number, DON'T have two Senders with same number.
3. Group name and Codename supports English, French, Latin, German, Chinese and Japanese fonts, but it won't be able to show on OSD. Use underscores instead of spaces for the Group name and Codename fields.
4. If USB & RS232 setting changed, the unit will auto reboot to get new settings effect.
5. If any of HDMI device connected to Sender or Receiver doesn't not supports 3D or Multichannel audio, recommend that keep 3D Video & Surround option off to speed up video channel switching and maximum EDID compatibility.

C. Setup & Backup by CSV files

Setup by CSV Files

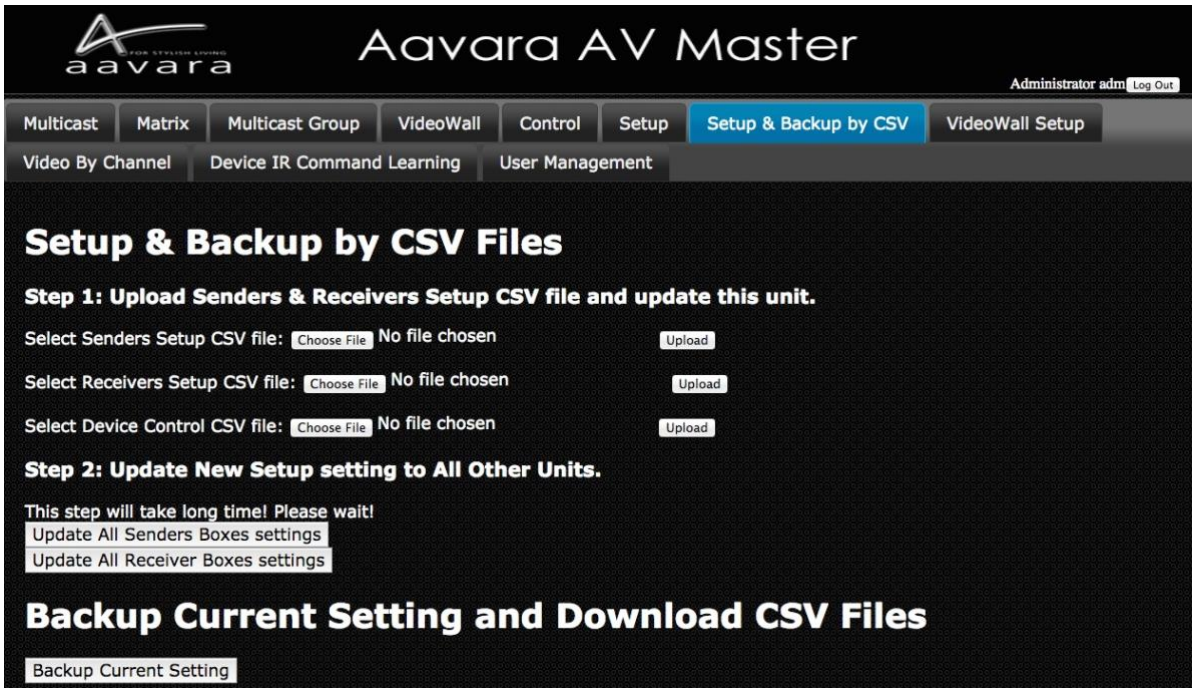
1. Please set static IP on each unit, at each unit' cfg.html, refer to IP setting section for more details.
2. Login user with Administrator authorization.
3. Refer to following CSV files details to plan and edit in Spreadsheet application. Then, save at CSV file format (divide field by a comma.)
4. Upload CSV files one by one.
5. Press button Updating all other units. This step will take long time updating if large scale matrix/VideoWall installed, please be patient.
6. Reboot all units after CSV files uploaded and all units updated.

Backup by CSV Files

1. Click Backup Current Setting Button. AV Master will collect all setting and convert into CSV files. Web Page will show Sender/Receiver/Control Download CSV file URLs.
2. Click the URL to download current CSV files.

Replace AV Master Control Unit

1. Get a new unit of sender or receiver.
2. Change IP setting to be same as the old Master Control Unit, refer to IP setting section for more details.
3. Upload Sender/Receiver/Device Control CSV Files
4. The unit is ready to replace the old Master Control Unit.



Sender CSV File Format & Parameter Description

Don’t change field sequence. First row field name can be changed. Use comma to divide field when saving CSV file.

Field / Parameter	Description	Parameter Value
IP	Sender IP	ie. 169.254.8.105 192.168.1.25
Channel	Assign unique channel number, don’t duplicate.	1 ~ 9999
Group	Sender Group name	English, German, French, Latin, Chinese and Japanese.
Codename	Sender Codename	English, German, French, Latin, Chinese and Japanese.
Audio Input Select	Select audio input on sender for audio streaming	Parameter value options: hdmi : HDMI audio analog : analog audio auto : auto select (analog first)
Device Control ID	To match Device ID in Device Control CSV File	Number must be match Device ID in Device Control CSV File
RS232 mode	IP Command Pass-Thru between sender and Receiver	Parameter value options: y : IP Command n : Pass-Thru
RS232 baudrate	RS232 baudrate setting	Parameter value options: 115200/57600/38400/28800/19200/14400/9600/4800/2400/1200/600/300

Receiver CSV File Format & Parameter Description

Don’t change field sequence. First row field name can be changed. Use comma to divide field when saving CSV file.

Field / Parameter	Description	Parameter Value
IP	Receiver IP	ie. 169.254.8.105 192.168.1.25
ID	Receiver ID, No duplicate	Number only, start form 1
Group	Receiver Group name	English, German, French, Latin, Chinese and Japanese.
Codename	Receiver Codename	English, German, French, Latin, Chinese and Japanese.
Channel	Receiver’s Channel	Number only, 0 ~ 9999
Device Control ID	To match Device ID in Device Control CSV File	Number must be match match Device ID in Device Control CSV File
RS232 mode	IP Command Pass-Thru between sender and Receiver	Parameter value options: y : IP Command n : Pass-Thru
RS232 baudrate	RS232 baudrate setting	Parameter value options: 115200/57600/38400/28800/19200/14400/9600/4800/2400/1200/600/300
vw_row	Total row of VideoWall	Number only, start from 1
vw_column	Total column of VideoWall	Number only, start from 1
vw_pos_row	This Display/Receiver’s row position in VideoWall	Number only, start from 1
vw_pos_column	This Display/Receiver’s column position in VideoWall	Number only, start from 1
vw_OW	Display outer dim. width unit: mm	Number only, start from 1
vw_OH	Display outer dim. height unit: mm	Number only, start from 1
vw_VW	Display viewable area dim. width unit: mm	Number only, start from 1
vw_VH	Display viewable area dim. height unit: mm	Number only, start from 1

Device Control CSV File Format & Parameter Description

Don’t change field sequence. First row field name can be changed. Use comma to divide field when saving CSV file.

Field / Parameter	Description	Parameter Value
Device Control ID	Device Control ID for match with Device Control ID in Sender/Receiver CSV file or Setup Tab in AV Master.	Number Only, start from 1
Codename	Device Codename	English, German, French, Latin, Chinese and Japanese.
command_type	Way to Control the Device	Parameter value options: cec : HDMI CEC ir : IR rs232_hex : RS232 command in HEX code rs232_ascii : RS232 command in Ascii code Notice! PB5000 series support only rs232_hex and rs_ascii command type.
power_on_name	Power On Command Codename	English, German, French, Latin, Chinese, Japanese.
power_on_cmd	Power On Command	Base on the way to control, and input control command code.
power_off_name	Power Off Command Codename	English, German, French, Latin, Chinese, Japanese.
power_off_cmd	Power Off Command	Base on the way to control, and input control command code.
cmd1_name	Command 1 codename	English, German, French, Latin, Chinese, Japanese.
cmd1_cmd	Command 1 command code	Base on the way to control, and input control command code.
cmd2_name	Command 2 codename	English, German, French, Latin, Chinese, Japanese.
cmd2_cmd	Command 2 command code	Base on the way to control, and input control command code.
cmd3_name	Command 3 codename	English, German, French, Latin, Chinese, Japanese.
cmd3_cmd	Command 3 command code	Base on the way to control, and input control command code.
cmd4_name	Command 4 codename	English, German, French, Latin, Chinese, Japanese.
cmd4_cmd	Command 4 command code	Base on the way to control, and input control command code.
cmd5_name	Command 5 codename	English, German, French, Latin, Chinese, Japanese.
cmd5_cmd	Command 5 command code	Base on the way to control, and input control command code.
cmd6_name	Command 6 codename	English, German, French, Latin, Chinese, Japanese.
cmd6_cmd	Command 6 command code	Base on the way to control, and input control command code.
cmd7_name	Command 7 codename	English, German, French, Latin, Chinese, Japanese.

cmd7_cmd	Command 7 command code	Base on the way to control, and input control command code.
cmd8_name	Command 8 codename	English, German, French, Latin, Chinese, Japanese.
cmd8_cmd	Command 8 command code	Base on the way to control, and input control command code.
cmd9_name	Command 9 codename	English, German, French, Latin, Chinese, Japanese.
cmd9_cmd	Command 9 command code	Base on the way to control, and input control command code.
cmd10_name	Command 10 codename	English, German, French, Latin, Chinese, Japanese.
cmd10_cmd	Command 10 command code	Base on the way to control, and input control command code.

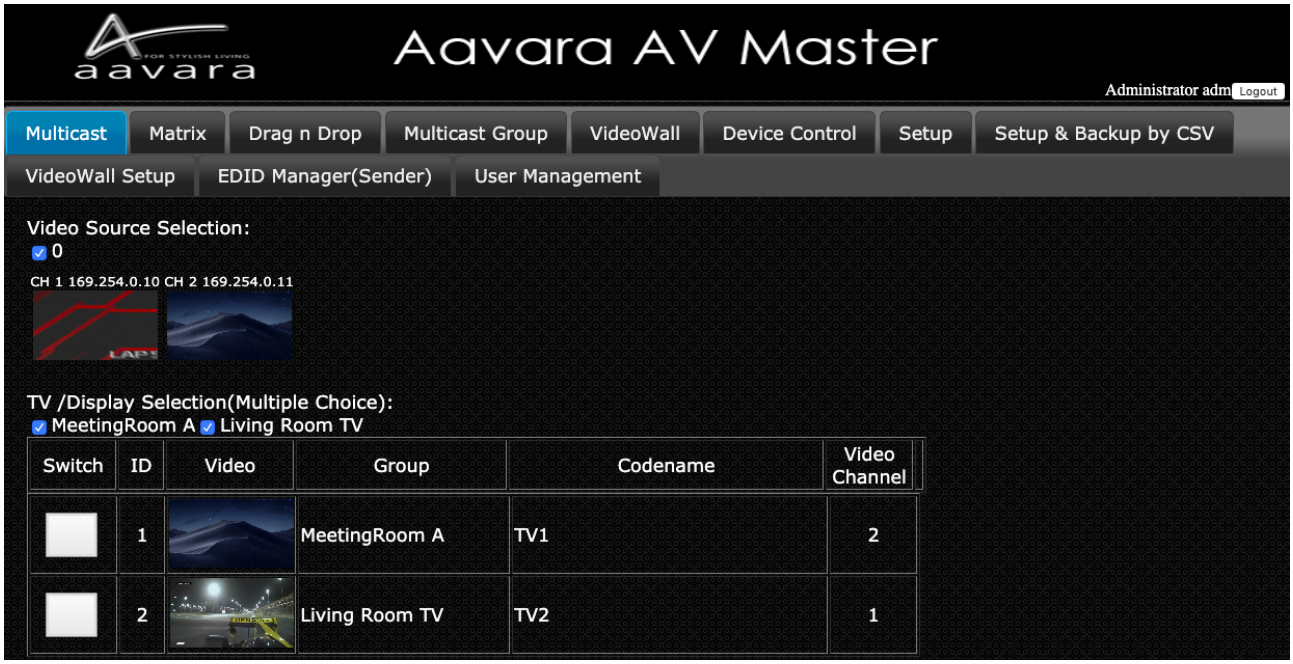
RS232 HEX code format:

HEX code format can be any one of below:

- FF010204
- FF 01 02 04
- 0xFF 0x01 0x02 0x04
- 0XFF 0X01 0X02 0X04

D. **Multicast**

1. Select a video source/sender.
2. Select Display/Receiver which you would like to switch (Multiple choices).



3. Click Apply Button

E. **Matrix**

- Click Switch Button on the cell to match both of the row & column of target Receiver and Sender that you

want to switch.

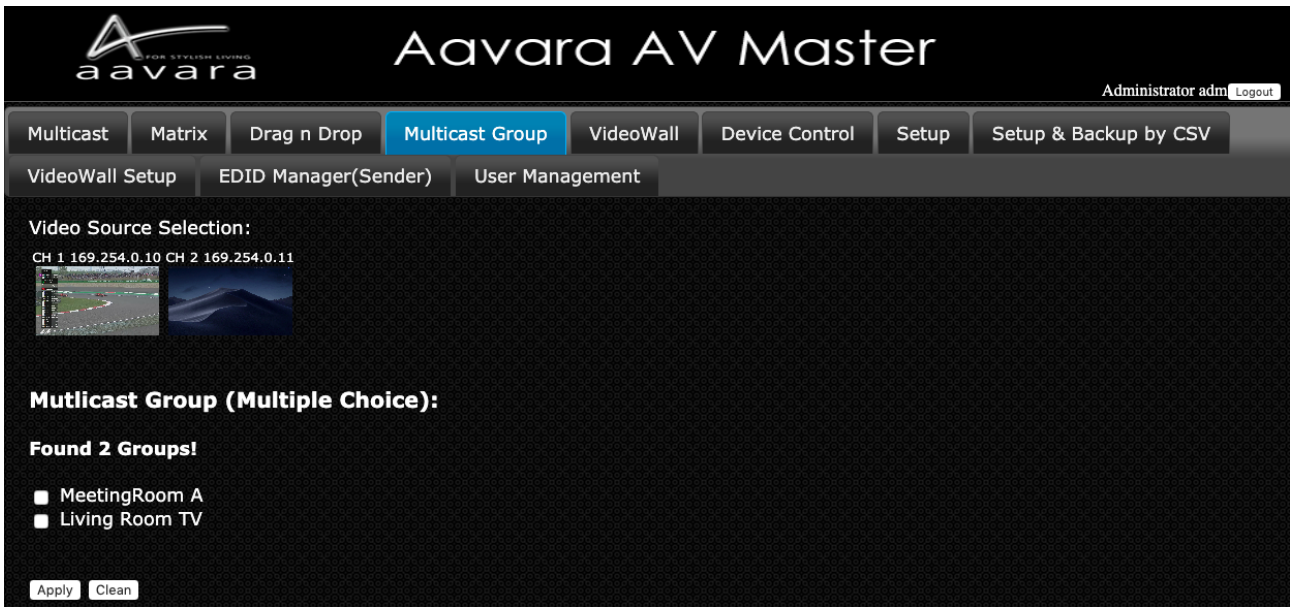
F. **Drag n Drop**

- Just Drag [Video Source] Screenshot image and drop on [Display] Screenshot image to switch target display's receiver channel.

- Drag n Drop works with Mouse Cursor w/ PC and Touch panel w/ iPad/Tablet.

G. **Multicast Group**

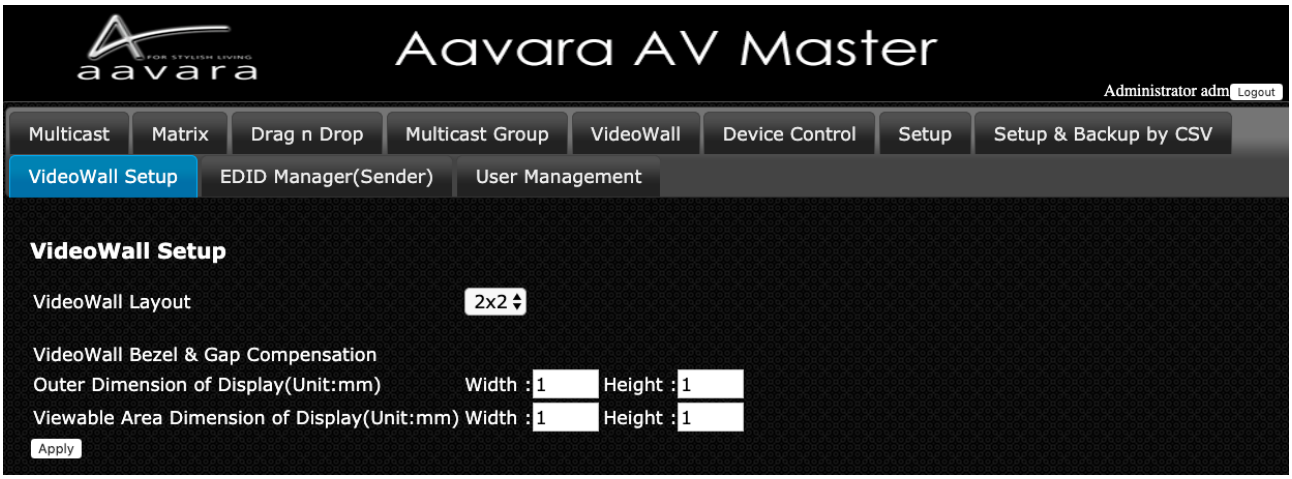
1. Select a video source/sender.
2. Select Receiver Group that you would like to switch (Multiple choices).



H. Click Apply ButtonVideoWall Setup

Step 1 VideoWall Layout / Bezel & Gap Compensation

1. Select VideoWall layout from 2x2
2. Input Outer and Viewable area dimension of display for Bezel & Gap compensation. Unit: mm.

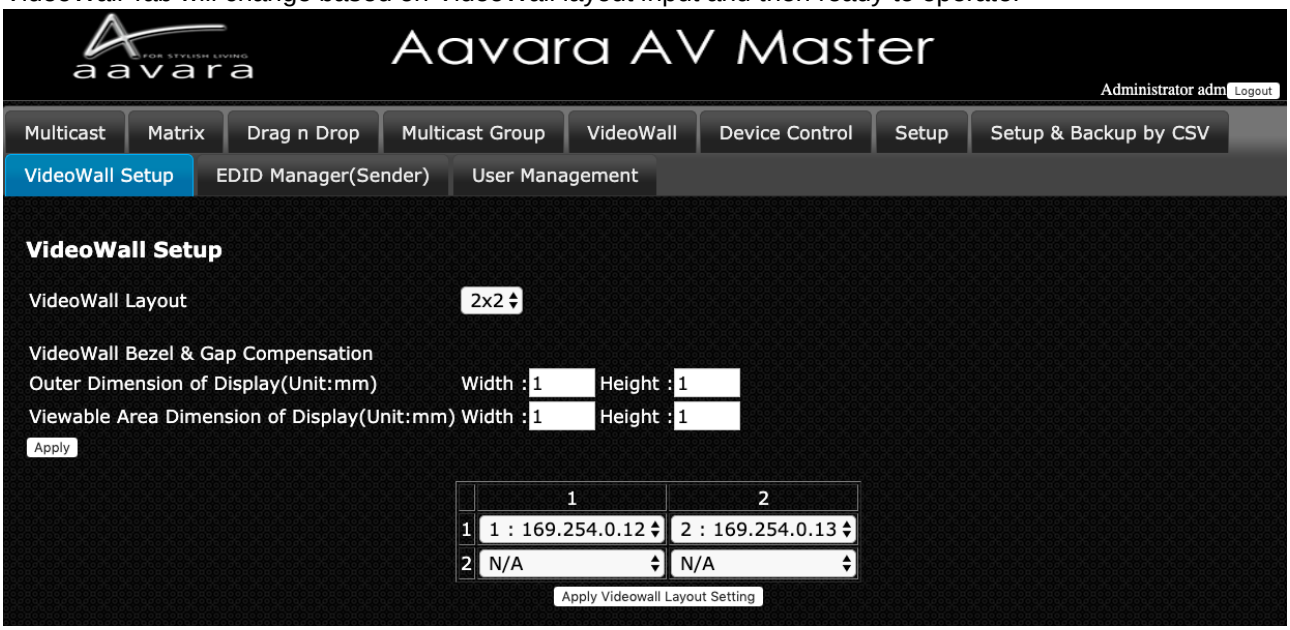


Step 2 Display Position at VideoWall Matching

Once Click on Apply Button of VideoWall layout configuration, a table will show up as VideoWall layout, select right receiver in every cell of table which matched row and column display actual position. For position on VideoWall without display, select N/A.

After all displays/receivers in video wall being located, Click Apply button.

VideoWall Tab will change based on VideoWall layout input and then ready to operate.

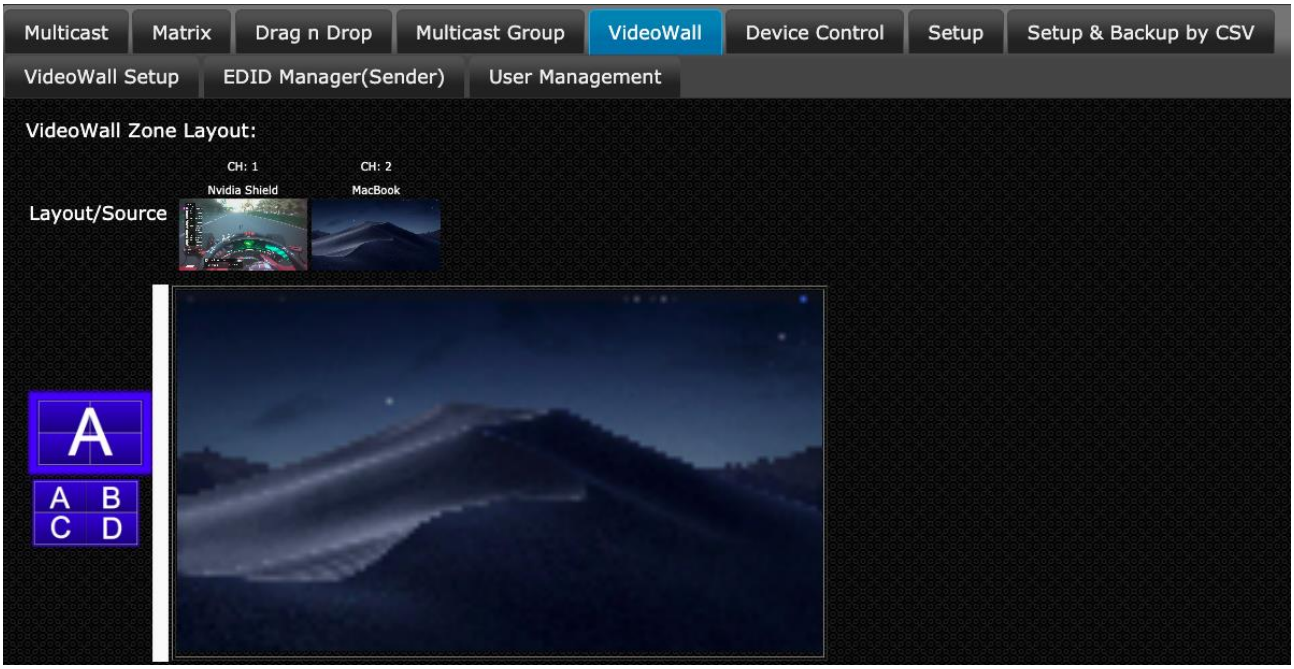


I. VideoWall

Once VideoWall Setup completed in VW Setup Tab, VideoWall Tab will show right VideoWall layout selection.

1. Select one of VideoWall Zone Layout selection at first left Column.
2. Select Video channel at Top Row.
3. Drag the Video Source Screenshot image and drop on the Videowall Zone you like to show.

VideoWall will show layout and video channel you selected.

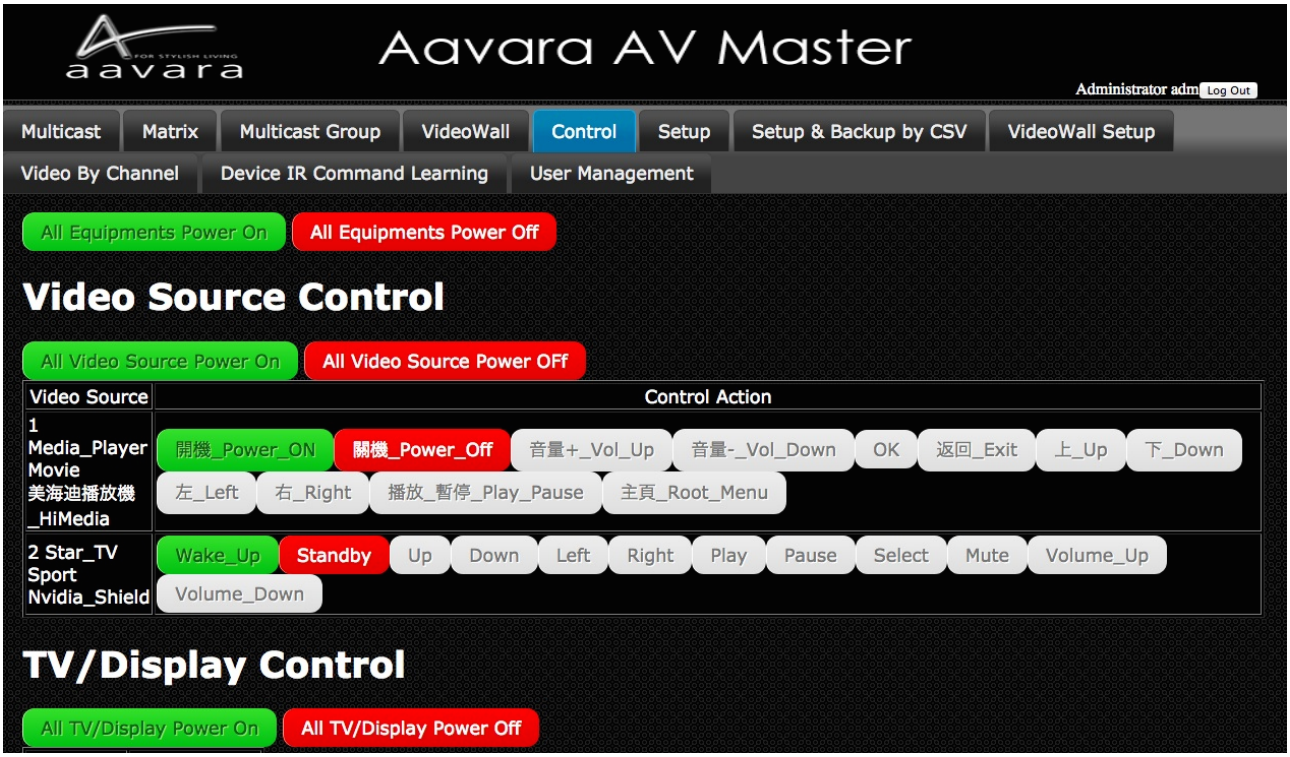


J. Control

Aavara AV Master Web can control external devices like TV/Display/Projector & Video Source Device by CEC(via HDMI connection), RS232 and IR. Please edit and upload Device Control CSV file and set Device Control ID to each sender and receiver, AV Master will bring in all control command buttons of that device.

Notice! PB5000/PB7000 series supports only RS232 IP commands type. PB9000 series will support RS232, IR, and CEC command type.

Click on the button of control action requested, control command will send out to target external device immediately.

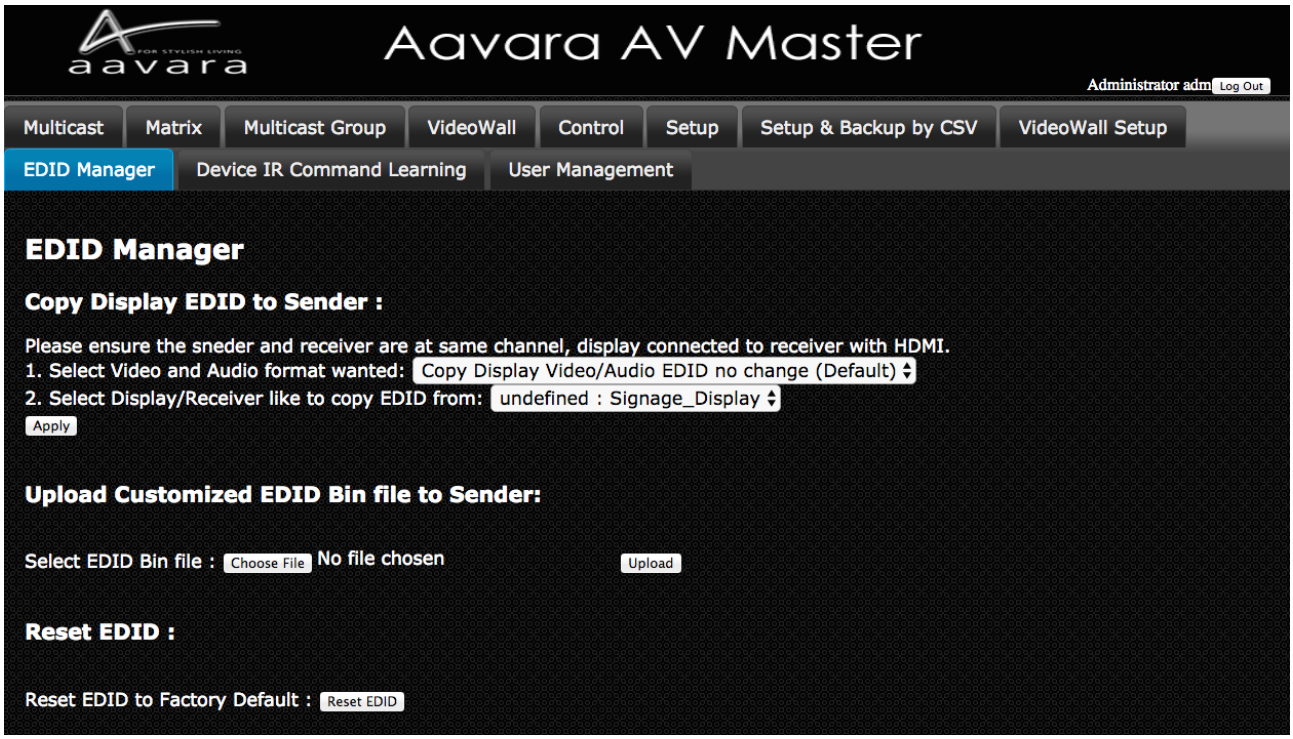


K. EDID Manager (Only Available on Sender)

Copy Display EDID to Sender

Ensure that target display/receiver has HDMI connection between display and receiver, network connection between sender and receiver, and sender/receiver at same video channel, before Copy Display EDID to sender action.

1. To improve EDID compatibility, add HDR and multi-channel audio support, options as follows:
   - Copy Display EDID w/o any change (Default)
   - Video no change, All Audio Formats
   - 1080p HDR w/ All Audio Formats
   - 1080p HDR Audio format no change
2. Select Display/Receiver that you'd like to copy EDID from
3. Click Apply button
4. Display EDID will be copied, send to sender at same channel with receiver, and save at sender. Sender will use this EDID to do EDID handshaking with Video Source Device.

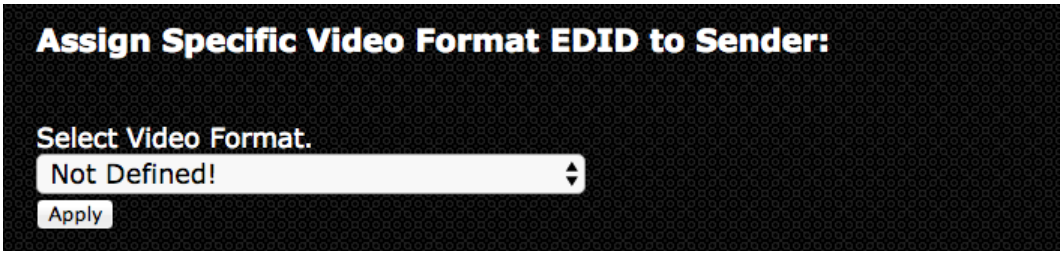


Assign Specific Resolution/Timing EDID to Sender

Notice! This functions only support by PB9000 series model. PB5000 and PB7000 series models doesn't support this.

Select and assign Specific Resolution/Timing EDID to Sender for handshaking with Video Source device for solving EDID compatible issue or allow video source output video/audio format as assigned.

1. Select Video Format
2. Click Apply Button
3. Recommend that have HDMI unplug n plug-in between video source and sender for good EDID handshake.



Upload Customized EDID Bin file to SenderEdit customize EDID Bin with EDID editor (not included), then upload to sender. Sender will use customized EDID table to handshake with Video Source device for solving EDID compatible issue or allow video source output video/audio format as assigned.

1. Use any EDID edit software to customize EDID table and save as standard EDID BIN file.
2. Go **EDID MGR** tab.
3. Select customized EDID bin file and Click Upload button.
4. **Once Customized EDID BIN file upload completed, please check the HEX code of [EDID used] whether it's same as customized EDID.**

Reset EDID to default

Just click on Reset EDID to Default Button, then Sender EDID table with reset to default one.

Download Current EDID

Just click on Reset EDID to Default Button, then Sender EDID table with reset to default one.

Reset EDID :

Reset EDID to Factory Default : Reset EDID

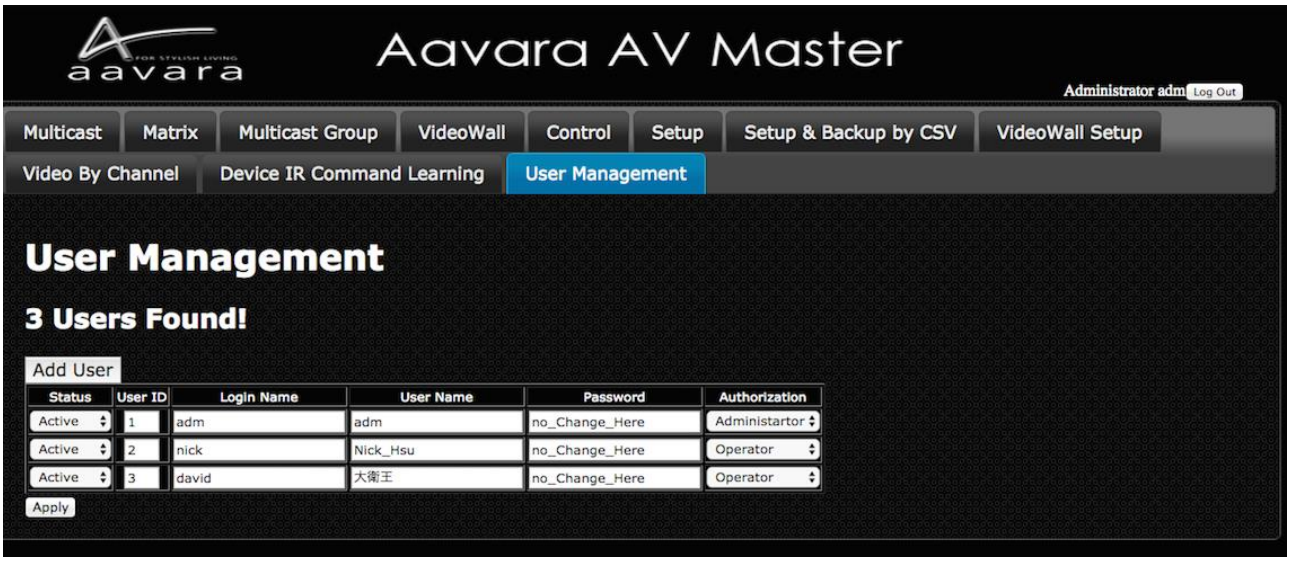
EDID Used Now

```
00 ff ff ff | ff ff ff 00 | 59 24 03 00 | 01 00 00 00 |
05 19 01 03 | 80 3d 23 78 | 2a 5f b1 a2 | 57 4f a2 28 |
0f 50 54 bf | ef 80 71 40 | 81 00 81 c0 | 81 80 95 00 |
a9 c0 b3 00 | d1 00 04 74 | 00 30 f2 70 | 5a 80 b0 58 |
8a 00 60 59 | 21 00 00 1e | 00 00 00 fd | 00 18 4b 1e |
5a 1e 00 0a | 20 20 20 20 | 20 20 00 00 | 00 fc 00 47 |
65 6e 65 72 | 69 63 5f 34 | 4b 0a 20 20 | 00 00 00 ff |
00 30 0a 20 | 20 20 20 20 | 20 20 20 20 | 20 20 01 3f |
02 03 39 c3 | 4b 90 04 1f | 13 03 12 20 | 0f 1e 24 26 |
35 09 7f 04 | 0f 7f 04 15 | 07 50 3d 1f | c0 5f 54 01 |
57 06 00 67 | 54 00 83 5f | 00 00 6e 03 | 0c 00 10 00 |
80 3c 20 10 | 80 01 02 03 | 04 02 3a 80 | d0 72 38 2d |
40 10 2c 45 | 80 60 59 21 | 00 00 1e 01 | 1d 00 72 51 |
d0 1e 20 6e | 28 55 00 60 | 59 21 00 00 | 1e 02 3a 80 |
18 71 38 2d | 40 58 2c 45 | 00 60 59 21 | 00 00 1e 00 |
00 00 00 00 | 00 00 00 00 | 00 00 00 00 | 00 00 00 9d |
```

Download Sender EDID to Bin file.

L. User Management

User Management Tab



Add User
Press Add User button to add more user info.

Field	Description
Status	3 User Status: 1. Active this user can login and use. 2. Suspend this user can't login, but user info will keep in system. 3. Delete Delete this user, and user info will be erased.
User ID	Every User needs to assign an ID, no duplicate.
Login Name	Use for login, English and number letters only.
User Name	Use to identify user. English, German, French, Latin, Chinese, Japanese are accepted.
Password	User Password, English & number only. Once real password input and updated, it will not show on web again. Every time User Management table refreshes, it will show "no_Change_Here". As long as "no_Change_Here" not change, password will not change.
Authorization	Two User Authorization: - Administrator can access all operation and setup functions. - Operator can access all operation functions only.

Notice! If multiple senders and receivers installed, once click Apply button, user info updating will take some time, please wait for user info update completed.