

**WISENET**

# **NETWORK VIDEO DECODER**

User Manual

SPD-151

CE

# Network Video Decoder

## User Manual

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### Copyright

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### Trademark

Each of trademarks herein is registered. The name of this product and other trademarks mentioned in this manual are the registered trademark of their respective company.

### Restriction

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### Disclaimer

Hanwha Techwin makes the best to verify the integrity and correctness of the contents in this document, but no formal guarantee shall be provided. Use of this document and the subsequent results shall be entirely on the user's own responsibility. Hanwha Techwin reserves the right to change the contents of this document without prior notice.

❖ Design and specifications are subject to change without prior notice.

❖ The initial administrator ID is “admin” and the password should be set when logging in for the first time.  
Please change your password every three months to safely protect personal information and to prevent the damage of the information theft.  
Please, take note that it's a user's responsibility for the security and any other problems caused by mismanaging a password.

## IMPORTANT SAFETY INSTRUCTIONS

Read these operating instructions carefully before using the unit.  
Follow all the safety instructions listed below.  
Keep these operating instructions handy for future reference.

- 1) Read these instructions.
- 2) Keep these instructions.
- 3) Heed all warnings.
- 4) Follow all instructions.
- 5) Do not use this apparatus near water.
- 6) Clean the contaminated area on the product surface with a soft, dry cloth or a damp cloth. (Do not use a detergent or cosmetic products that contain alcohol, solvents or surfactants or oil constituents as they may deform or cause damage to the product.)
- 7) Do not block any ventilation openings, Install in accordance with the manufacturer's instructions.
- 8) Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- 9) Do not defeat the safety purpose of the polarized or grounding- type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- 10) Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
- 11) Only use attachments/accessories specified by the manufacturer.
- 12) Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/ apparatus combination to avoid injury from tip-over.
- 13) Unplug this apparatus during lightning storms or when unused for long periods of time.
- 14) Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
- 15) This product is intended to be supplied by Listed Power Unit marked "Class 2" or "LPS" and rated 12 Vdc, Min. 1.8 A.
- 16) The wired LAN hub providing power over the Ethernet (PoE) in accordance with IEEE 802-3af shall be a UL Listed device with the output evaluated as a Limited Power Source as defined in UL60950-1.
- 17) Associated Ethernet wiring shall be limited to inside the building.



## Standards Approvals



- ! Any changes or modifications in construction of this device which are not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
- ✍ This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
  - This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

## BEFORE START

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This manual provides operational information necessary for using the product and contains a description about each component part and its function as well as menu or network settings.

You have to keep in mind the following notices :

- Hanwha Techwin retains the copyright on this manual.
- This manual cannot be copied without Hanwha Techwin's prior written approval.
- We are not liable for any or all losses to the product incurred by your use of non-standard product or violation of instructions mentioned in this manual.
- Prior to opening the case, please consult a qualified technician first. Whenever this is needed power must be removed from the unit.

## Warning

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### Battery

It is essential that when changing the battery in the unit, the replacement battery must be of the same type otherwise there may be a possibility of an explosion.

The following are the specifications of the battery you are using now.

- Normal voltage : 3V
- Normal capacity : 210mAh
- Continuous standard load : 0.4mA
- Operating temperature : -20°C ~ +60°C  
(-4°F ~ +140°F)

#### CALIFORNIA USA ONLY

This Perchlorate warning applies only to primary CR (Manganese Dioxide) Lithium coin cells in the product sold or distributed ONLY in California USA.  
"Perchlorate Material - special handling may apply,  
See [www.dtsc.ca.gov/hazardouswaste/perchlorate](http://www.dtsc.ca.gov/hazardouswaste/perchlorate)."

### Caution

- Connect the power cord into a grounded outlet.
- The Mains plug is used as a disconnect device and shall stay readily operable at any time.
- Batteries shall not be exposed to excessive heat such as sunshine, fire or the like.
- Risk of Explosion if Battery is replaced by an Incorrect Type. Dispose of Used Batteries According to the Instructions.

### Operating Temperature

The guaranteed operating temperature range of this product is 0°C ~ 40°C (32°F ~ 104°F).

This product may not work properly if you run right after a long period of storage at a temperature below the guaranteed one.

Prior to using a device that has been stored for a long period in low temperatures, allow the product to stand at room temperature for a period.

### Security Precautions

The initial administrator ID is "admin" and the password should be set when logging in for the first time.

Please change your password every three months to safely protect personal information and to prevent the damage of the information theft.

Please, take note that it's a user's responsibility for the security and any other problems caused by mismanaging a password.

# CONTENTS

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<b>OVERVIEW</b> 3	3	Important Safety Instructions
	4	Before Start
	5	Contents
	6	Features
	7	Part Names and Functions (Front)
	7	Part Names and Functions (Rear)

<b>CONNECTING WITH OTHER DEVICE</b> 8	8	Connecting to an external device
	8	Connecting the USB
	8	Connect Ethernet
	8	Connect power
	9	Connecting ground wire
	9	Connecting the Network

<b>NETWORK CONNECTION AND SETUP</b> 10	10	Using Device Manager
	10	How to connect to a network decoder
	11	Login

<b>VIDEO WALL</b> 12	12	Video wall settings
-------------------------	----	---------------------

<b>LAYOUT</b> 14	14	layout
---------------------	----	--------

<b>MENU SETUP</b> 19	19	System Setup
	22	Network Configuration

<b>VIDEO WALL CONFIGURATION GUIDE</b> 24	24	video wall configuration guide
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<b>APPENDIX</b> 26	26	Product Specification
	27	Product Overview
	27	Default Setting
	28	Troubleshooting
	29	Open Source License Report on the Product


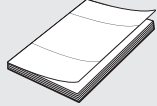



## FEATURES

This product can monitor the video and audio from network cameras.  
Provides an environment in which you can set this product on your PC.

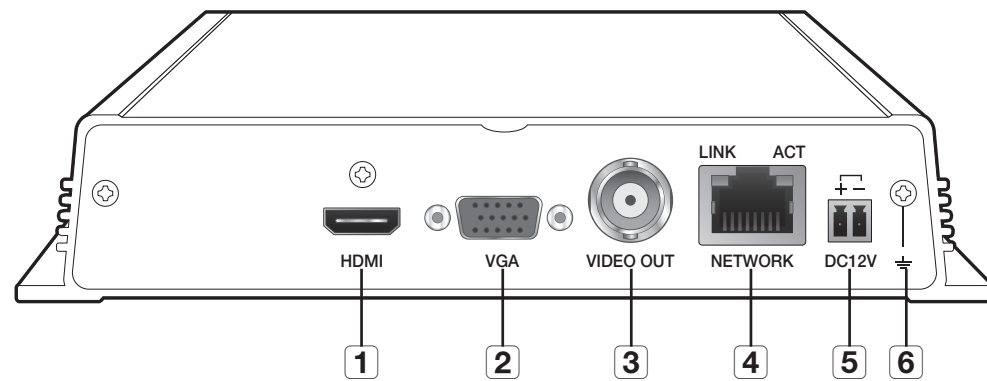
- Convenient Web UIs
- 4K camera resolution support
- Outputs a 4K high definition image using HDMI
- Supports ONVIF Profile S standard and RTP / RTSP protocols
- 49 channels simultaneous output (HDMI: 32 channels, VGA: 16 channels, CVBS: 1 channel)
- Various user defined layout support
- SSM VM sync

## Package Contents

Please unwrap the product, and place the product on a flat place or in the place to be installed.  
Please check the following contents are included in addition to the main unit.

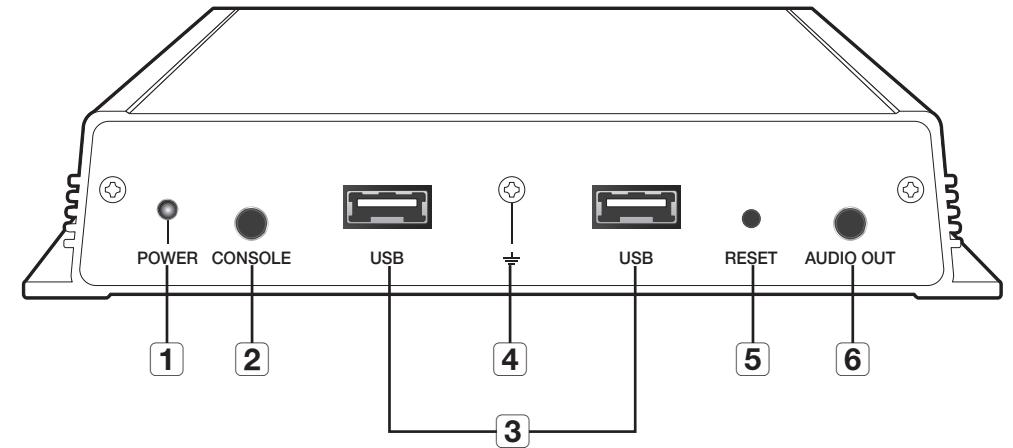
		
Decoder	Quick Guide	Terminal block
		
Taping screw	Plastic Anchor	

## PART NAMES AND FUNCTIONS (FRONT)



Part Names	Functions
<b>1</b> HDMI	HDMI connector port.
<b>2</b> VGA	VGA Video Signal Output Port.
<b>3</b> VIDEO OUT	A CVBS video display terminal.
<b>4</b> NETWORK	This is a terminal to connect to Ethernet cable. <ul style="list-style-type: none"> <li>Power input can be provided using PoE. (Please see "Product specifications" for the PoE power specifications.)</li> </ul>
<b>5</b> DC12V	This is a terminal to connect a designated power supply.
<b>6</b> Ground connection	Terminal to connect a separate ground cable. <ul style="list-style-type: none"> <li>Add a ground cable to support the safe use of the device.</li> </ul>

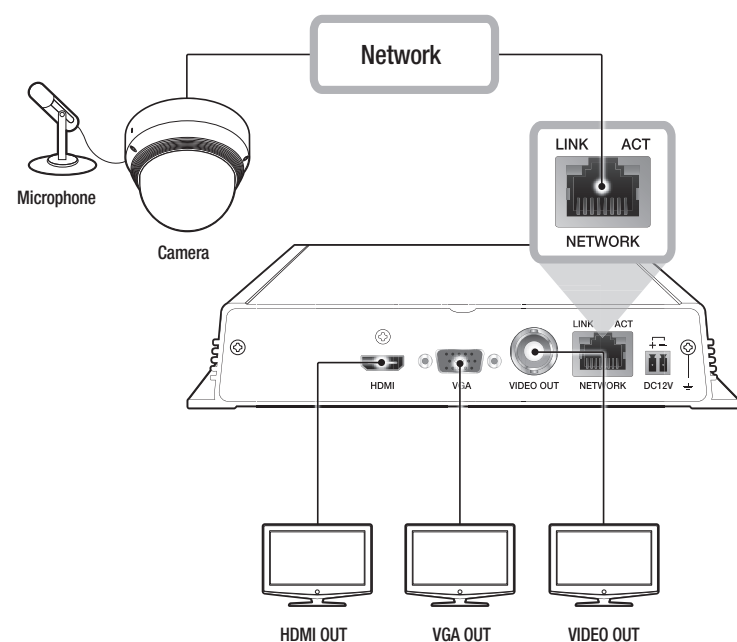
## PART NAMES AND FUNCTIONS (REAR)



Part Names	Functions
<b>1</b> POWER	It displays the power ON/OFF status using an LED.
<b>2</b> CONSOLE	[CONSOLE] is a terminal for later customer service.
<b>3</b> USB	[USB] is a terminal for later customer service.
<b>4</b> Ground connection	Terminal to connect a separate ground cable. <ul style="list-style-type: none"> <li>Add a ground cable to support the safe use of the device.</li> </ul>
<b>5</b> RESET	This button can be used to initialize the device if you have forgotten your password. If you press and hold the button for about 10 seconds, the password initialization pop-up window will open, prompting you to reset the password.
<b>6</b> AUDIO OUT	This is a terminal for voice signal output (3.5 mm).

# connecting with other device

## CONNECTING TO AN EXTERNAL DEVICE

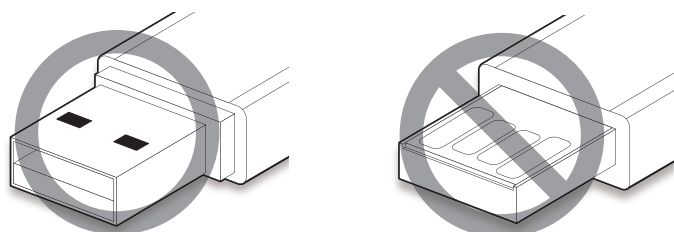


- ! Unrated or improper power source may cause damage to the system. Ensure that you use only the rated power source before pressing the POWER button.

## CONNECTING THE USB

1. On the front of the product, there is a USB port.
2. You can connect your USB memory through the USB port.
3. The product supports hot plugging function that enables connecting/disconnecting USB devices while in operating the system.

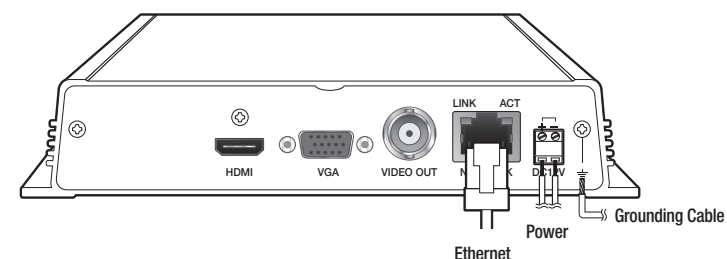
- ! Some USB devices may fail to function properly due to compatibility issue, please check the device before using.
- Only USB storage devices that comply with the standards (having a metal cover) are guaranteed for data transfer.
- A worn-out USB connector pin might deteriorate the delivery of USB signal.



## CONNECT ETHERNET

Connect the Ethernet cable to connect it to a local network or the internet. It can be connected without a power adapter by supplying power separately from the PoE switch.

- Please see "Product specifications" for the PoE power specifications. (Page 28)



## CONNECT POWER

When using a normal Ethernet cable, connect to the power adapter for power supply. Connect the (+, -) wires of the power adapter to the power input terminal of the network video decoder using a screwdriver.

- ! When using PoE and DC 12V power simultaneously, the device will be operated with the external power (DC 12V).
  - If you use and connect a router with a PoE function, no external power is required.
  - PoE should be compatible with IEEE 802.3af.
- As DC 12V has polarity, be careful when you connect it.
- When connecting external devices, you must first turn off the power to the devices.
- Connect the set and adapter power cable first, and then plug it into a wall socket rated 220V.
- Do not extend the adapter output cable.
- If you need to extend the power cable, contact the service center.

## Power Cable Specification for Each Model

Input power	Wire Type (AWG)	Cable Length (Max.)
DC 12V	#18	19m
	#16	30m



## CONNECTING GROUND WIRE

Connect the ground wire to the FG screw at the right side of the power input terminal using a screwdriver.

- ! Grounding protects the product from being damaged by lightning.
- When connecting, be sure to turn off the power to devices.

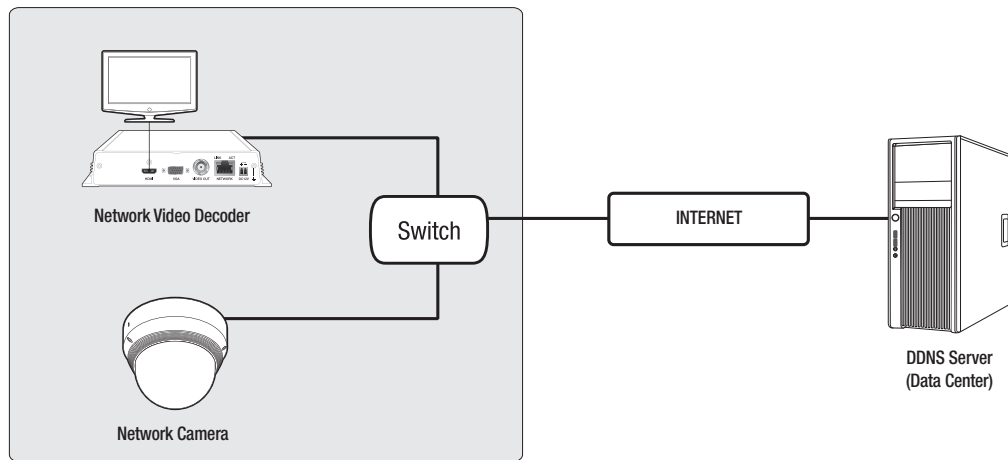
### Recommended specifications for ground wire

- Length: Maximum 3M
- Thickness: 18AWG or thicker  
Ex) UL1007 AWG18/16, UL1015 AWG18/16/14/12, UL2468 AWG18/16/14

## CONNECTING THE NETWORK

- ✍ For more information about network connection, refer to "**Network Configuration**". (Page 24)

### How to install the network video decoder



# network connection and setup

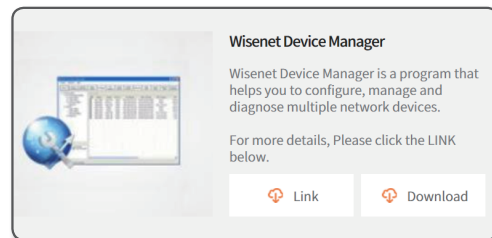
## USING DEVICE MANAGER

Wisenet Device Manager allows you to set up and run your network and easily check the network status.

### Installing Device Manager

To download the Device Manager program, visit the official website of Hanwha Techwin (<http://www.hanwha-security.com>).

1. On the website, go to <Technical Guides> - <Online Tool> to download Device Manager.
2. Download and install the Device Manager program.
  - Once installed, the program will run automatically.
  - For the details of how to use Device Manager, see <Help> in the main menu.



### Watch the video guide of Device Manager

On the Download screen of the Device Manager program, click <  Link >.

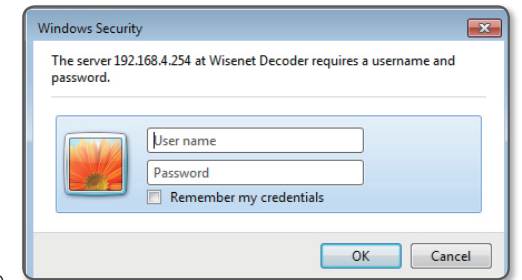
You can learn about the following in the video.

- Device Manager intro
- Product login and password change
- Use project
- Change product IP
- Check product information report
- Save and restore product settings
- Camera video settings
- Camera setup settings
- Download/update firmware

## HOW TO CONNECT TO A NETWORK DECODER

### Normally, you would

1. Launch the Internet browser.
2. Enter the IP address of the network decoder in the address bar.  
ex)
  - IP address (IPv4) : 192.168.1.200 → `http://192.168.1.200`  
- the Login dialog should appear.
  - IP address (IPv6) : 2001:230:abcd:ffff:0000:0000:ffff:1111 → `http://[2001:230:abcd:ffff:0000:0000:ffff:1111]`  
- The login dialog should appear.





### If the HTTP port is other than 80

1. Launch the Internet browser.
2. Enter the IP address and HTTP port number of the network decoder in the address bar.  
ex) IP address : 192.168.1.200:HTTP Port number(8080)  
→ `http://192.168.1.200:8080`  
- The login dialog should appear.

## LOGIN


Your preferred language and a new password must be entered during your initial connection after purchase.

1. Select a language for the <Language> field.
2. In the <New P/W> field, enter a new password for the admin account.
3. In the <Confirm P/W> field, reenter the new password for the admin account.
4. Click the [Apply] button.  
After the new password is successfully registered, a login screen appears.

-  For security, be sure to change the password in <User>-<Administrator> in the setting screen.
- If you enter a user name and password, and then check the 'Save password in the password list' checkbox, the user name and password will be automatically set for the next time you connect.
-  You cannot double-login with the "admin" account.
- It takes about five minutes after you disconnect from the "admin" account to access the user account.

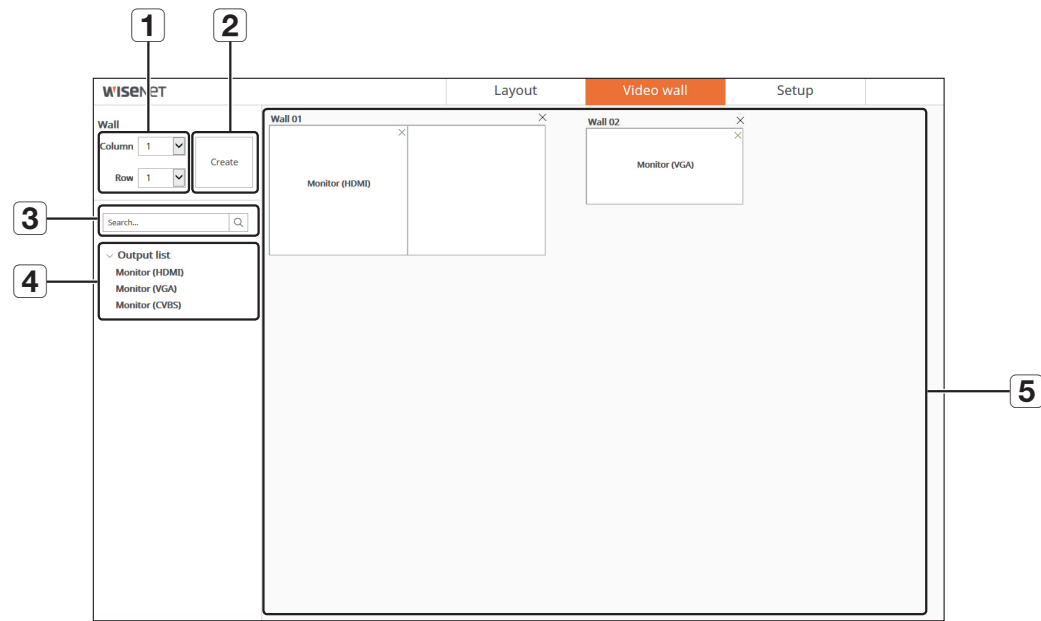
## System Requirements

The minimum hardware and operating system requirements for running the web viewer are:

Name	Minimum specifications
OS	<ul style="list-style-type: none"> <li>- Supported OS: Windows : 7, 8.1, 10 Mac OS X : 10.10, 10.11, 10.12, 10.13</li> <li>- Supported browsers: Google Chrome 63, Apple Safari 11 (Mac OS X only), MS Edge 41, MS Explorer 11</li> <li> It is recommended to use the browsers shown below for optimal use since this product is optimized for these.                             <ul style="list-style-type: none"> <li>- Chrome 63 or higher, Safari 11 or higher</li> </ul> </li> </ul>
Network	10/100/1000 Ethernet NC

## VIDEO WALL SETTINGS

Sets the placement and layout of the connected monitors.



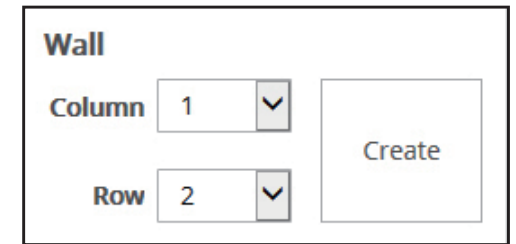
Menu name	Function description
1	<b>Column/Row</b> Sets the number of rows and columns of video walls to be created.
2	<b>Video wall creation</b> Creates as many video walls as you set.
3	<b>Search</b> Searches the monitor from the output list.
4	<b>Output list</b> Displays a list of connected monitors. Connected monitors are enabled.
5	<b>Background</b> The generated video walls are placed.

### To set the video wall

1. Set the number of columns/rows in the upper left of the video wall screen.
2. Click the <Create> button.
3. The set video wall is registered on the right side of the screen.

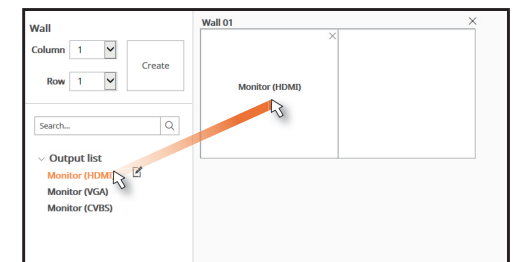


- If more than one monitor is assigned to the created video wall, you cannot enter the layout menu.



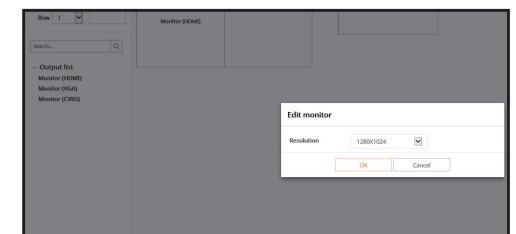
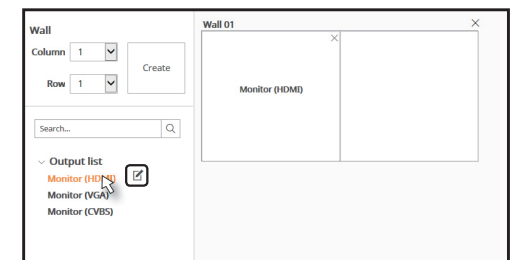
### To assign a monitor

1. From the list of connected monitors on the left side of the screen, choose the monitor you want to assign to the video wall, then click and drag it there.
2. To delete a monitor assigned to the video wall, click [ X ] in the upper right corner of the assigned monitor.



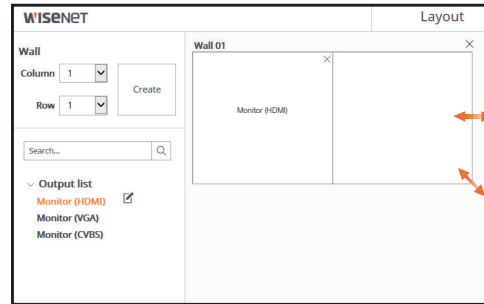
### To edit a monitor

1. When you select a monitor from the monitor list, the Edit Monitor button appears.
  2. Click the [ Edit ] button to set the resolution of the monitor.
- Resolutions : HDMI monitor can be set to 1280x1024, 720P, 1080P, 1440P, and 2160P. VGA monitor can be set to 1280x1024, 720p, and 1080P.

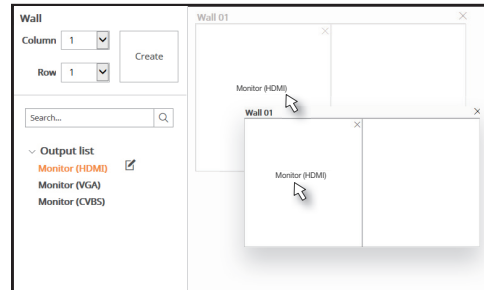


## Editing video wall

1. When you hover the mouse cursor over a video wall edge, the mouse cursor is changed and the video wall can be zoomed in and out. You can zoom in on a video wall to overlap with other video walls.

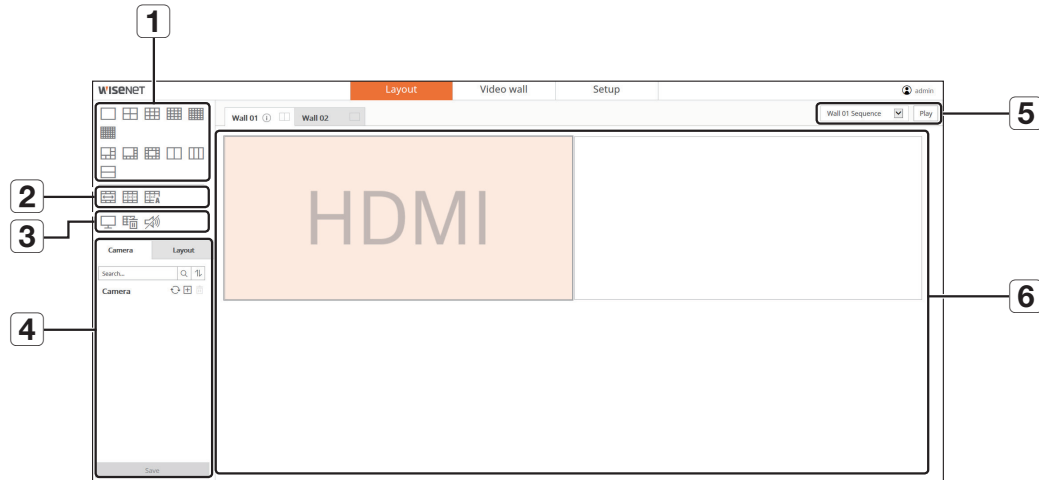








2. You can move a video wall by clicking and dragging it.
3. Click the [ X ] button in the top right corner of the video wall and the confirmation popup will appear. Select <OK> to delete the video wall.



## LAYOUT

-  Create walls from the video wall menu. At least one monitor must be assigned to each video wall you create. Refer to the "Video wall settings" menu (page 14)

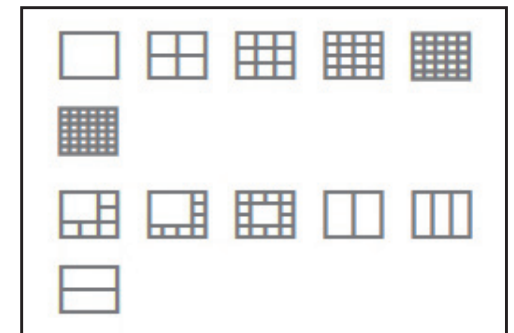


	Menu name	Function description
1	Split screen	Select split screen for each monitor.
2		Select two or more monitors and merge them.
		Select a merged tile and release it.
		Release all merged tiles.
3		Select whether to use the OSD display. When OSD display is selected, the camera information is displayed in the upper left corner of the monitor screen.
		All cameras assigned to the monitor will be deleted.
		Select Audio On/Off. <ul style="list-style-type: none"> <li>If audio is on, when you hover over it with the mouse cursor, you can check the audio channel currently turned on using a tooltip.</li> </ul>

	Menu name	Function description
4	Camera	Add, edit, and delete cameras.
	Layout	Add, edit, and delete layouts.
5	Sequence playback	The layout of the selected video wall is played back sequentially. <ul style="list-style-type: none"> <li>At least two layouts must be created before they can be played back.</li> </ul>
6	Video wall monitor	The set video monitor is displayed.


### Changing the split screen

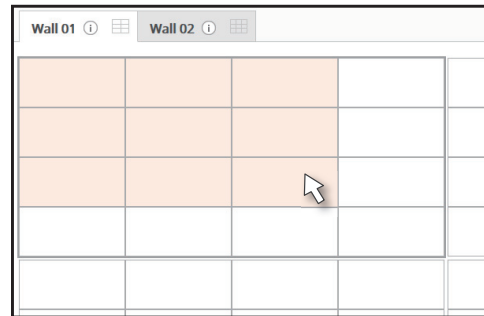
If you click the button when selecting the split screen, the screen changes to the split screen.



## Merge/unmerge monitor tiles

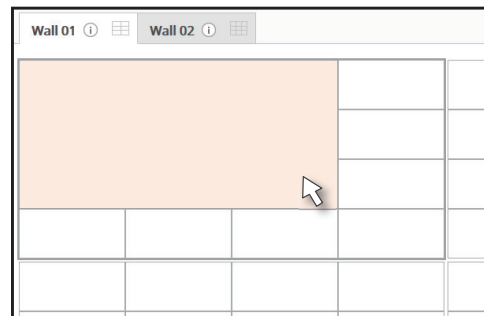
### To merge monitor tiles

1. Select two or more monitor tiles to be merged and click the  button.



2. The selected tiles are merged into a single tile.


- ! Merging split screens between monitors is possible only when the screen is equally divided into NxN (2x2, 3x3, 4x4).

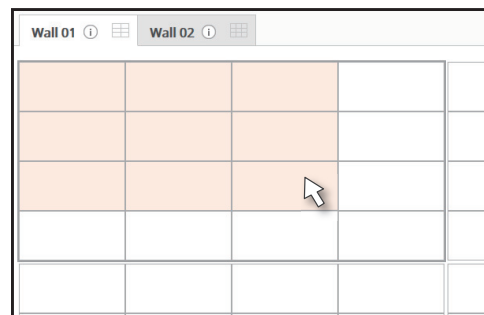


### To release a monitor tile

1. Select the merged tile and click the  button.




2. The selected tile is split into its original state.
3. If you click the  button without selecting a specific merged tile, all of the tiles you've merged will be un-merged.

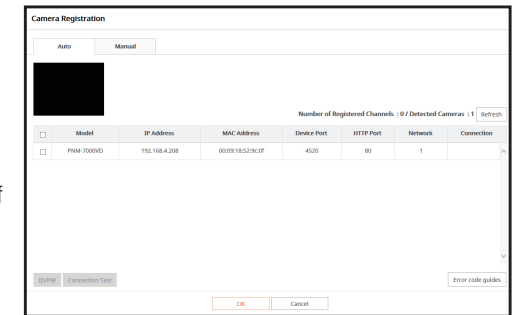


## To register a camera

Network cameras can be registered and assigned to each monitor.

### To auto-search for and register a network camera

1. Press the  button on the camera item.
2. Search for a network camera connected.
  - An already registered camera will be marked in blue in the list.
  - If you search for the camera again or if the IP is an old IP that was not assigned by the DHCP server (such as -192.168.1.200), then press the **<Refresh>** button to check if a new IP has been assigned.
3. Select a camera from the camera list to see a **<Preview>** of its current video feed.
  - Camera searched with ONVIF does not provide previews.
4. Check the checkbox next to a network camera that you want to connect to.
  - You can select all of the network cameras in the list and provide **<ID>** and **<Password>** all at once.
  - Click a header at the top of the list to sort the list according to that header.



- ! When changing a camera ID/password in the camera web viewer, if the camera is already registered in the decoder, change the camera ID/password information registered in the decoder as well.
5. Click on the **<ID/PW>** button to enter the selected network camera's **<ID>** and **<Password>**.
  6. Press the **<Connection Test>** button to make a connection to a camera.
  7. Press **<OK>** to register the selected camera.

## To manually search for and register a network camera

1. Press the <Manual> button.
2. The manual search window will appear.
3. Select a channel and protocol used to connect to a camera.  
The input items may differ depending on the selected protocol.

- Wisenet : Comply with the internal network protocols adopted by Hanwha Techwin.
- ONVIF : Means the camera supports ONVIF protocols. When connecting a camera that its name cannot be found from the list, select <ONVIF>.

- If the time difference between the ONVIF camera and the decoder is not 2 minutes, they cannot be connected. In this case, there is a way to change the ONVIF camera time, or to synchronize the time to the NTP server (when the timezone is the same) for both the camera and the decoder, or to use the decoder as the NTP server.

- RTSP : Comply with RFC 2326, one of "**Real Time Streaming Protocol (RTSP)**" for real-time streaming.
4. If you select the <Wisenet> protocol, check options as necessary.
    - Model : Select a camera model.
      - Wisenet Network Camera/Encoder : Means the camera/encoder supports Hanwha Techwin's SUNAPI, SVNP protocol. When connecting a camera that does not appear in the camera list, select Wisenet Network Camera/Encoder.
      - MultiDirectional Network Camera : You can register Hanwha Techwin's multidirectional cameras and multi-imager cameras. A MultiDirectional Network Camera is a camera that has multiple camera modules in one body.
    - Address type : Select an address type of the camera.  
Address type can be different depending on connected product model.
      - Static(IPv4) / Static(IPv6) : Used to provide the IP address of the camera manually.
      - Wisenet DDNS : This is available only if the camera is registered with the Wisenet DDNS(ddns.hanwha-security.com) server. Provide the registered domain for DDNS ID.  
Ex) http://ddns.hanwha-security.com/snb5000 → provide "snb5000" for Wisenet DDNS
      - URL : Used for URL address input.

- Refer to the user manual of the connected camera and check the DDNS specification that is supported by the camera.

- IPv4 : Enter the IP address of the camera.
- Device Port : Provide the device port of the camera.
- HTTP Port : Provide the HTTP port of the camera.
- ID : Provide the ID of the camera that you want to register.
- Password : Enter the password of the camera to be registered.

5. Select <ONVIF> or <RTSP> for the protocol and enter your input for each field appears.

- ONVIF Address / RTSP URL : Enter the camera's RTSP access address that supports ONVIF or RTSP.
- IPv4 : Enter the IP address of the camera.
- ONVIF port : Enter the ONVIF port of the camera.
- RTSP access address : Enter the RTSP access address of the camera that supports ONVIF or RTSP. Refer to the manual for each camera for the access address of the specific RTSP.
- ID : Enter the ID for accessing via ONVIF/RTSP protocol.
- Password : Enter the password for accessing via ONVIF/RTSP protocol.
- More Detail : If <More Detail> button clicked, setup window will appear. Select a mode that is supported by the network camera in RTSP connection mode.
  - TCP : The connection type with the network camera will switch to "RTP over TCP".
  - UDP : The connection type with the network camera will switch to "RTP over UDP".
  - HTTP : The connection type with the network camera will switch to "RTP over TCP (HTTP)".
  - HTTPS : The connection type with the network camera will switch to "RTP over TCP (HTTPS)".

## If you want to check the error details of camera registration

If you failed to register a camera, the reason for the failure will be displayed.

- **Connection failed due to unknown error.** : This message appears if the camera has failed to be registered due to unknown connection status.
- **Due to the camera account locking, access has failed.** : When you enter a wrong ID/password 5 times to login to the camera account, this message is displayed. Try to log in again after 30 seconds. If the same message appears, you may need to check whether someone has tried to access your camera account from the outside.
- **Connected successfully.** : This message appears if the camera is connected successfully.
- **Incorrect model information. Provide the correct model information.** : This message appears if the model information provided for registering the camera is incorrect.
- **Authentication has failed** : This message appears if the ID or password provided for registering the camera is incorrect.
- **Connection has failed due to excessive concurrent users.** : This message appears if the concurrent user count exceeds the upper limit.
- **Connection has failed due to incorrect HTTP port information.** : This message appears if the HTTP port number of the camera is invalid.
- **Connection has failed. Unknown connection status.** : This message appears if the camera has failed to be connected due to a unknown error.

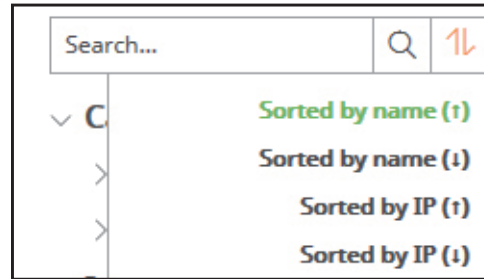


## To edit a registered camera

### Sorting camera list

You can sort the camera list by name/IP by clicking the right < [↕] > button of the search.

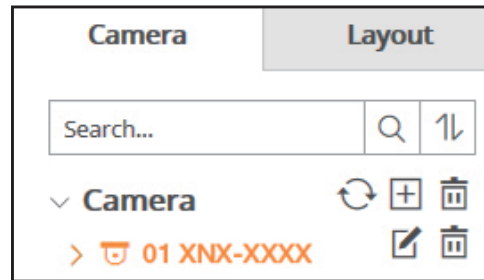
- When 'sort by IP (in ascending order)' is selected, the cameras are sorted in IPv4 order, and cameras registered by URL/IPv6 are sorted after the list.



### Editing camera

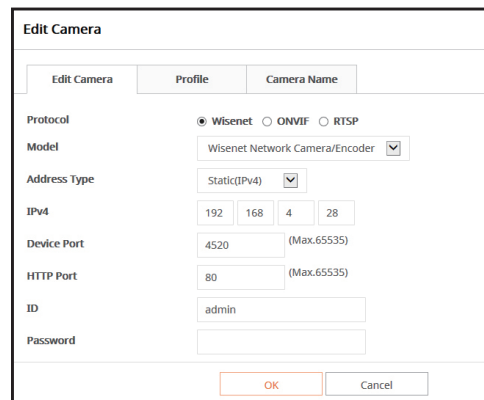
1. Select a camera you want to edit from the camera list.

- Click the [↻] button to update camera access information again.



2. When you click the [✎] button to the right of the selected camera, the camera modification popup window appears.

3. Edit the information you want to change and click <OK>.

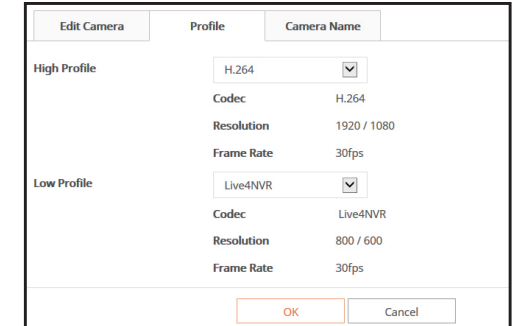


## Video profile

You can set the video profile of the connected network camera.

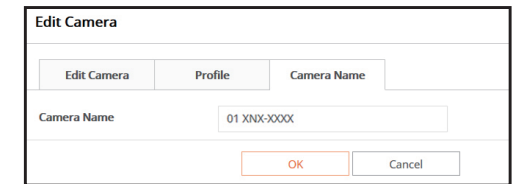
- Can only be set to a profile supported by the camera.

- After high resolution and low resolution are set individually, required resolutions can be assigned in the layout.
  - See "Assigning a camera". (page 20)



## Camera name

The camera name can be set.



## Deleting a camera

Select a camera you want to delete, and click the [🗑] button to delete the camera.

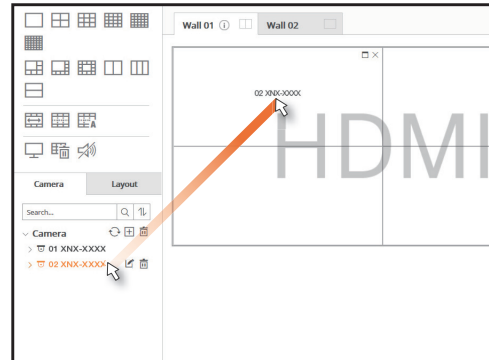
- If you click the right [🗑] button of the camera, you can delete it from the entire list of cameras.

## Assigning a camera

1. From the connected camera list on the left side of the screen, drag the camera you want to assign to the monitor.
2. To delete the assigned camera, click [ × ] in the upper right corner of the assigned monitor.



- If you assign the camera by clicking and dragging it, a low resolution profile will be automatically assigned for layouts with more than 4 split screens, and a high resolution profile will be automatically assigned for layouts with 4 split screens or less.
- If you drag the high-resolution and low-resolution profiles that appear when you click the <[ ]> arrow to the left of the camera list, you can directly assign them to the corresponding profiles.
- When this is [ ] clicked, the video wall is enlarged to full screen. When this is [ × ] clicked, the video wall zoom changes to the original size.



## Setting the layout

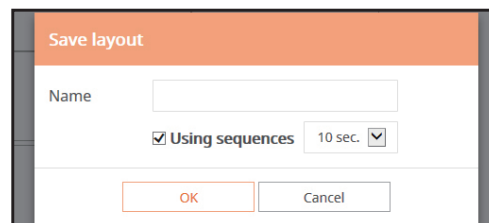
If you do not add or save the layout after registering the camera, the screen will not appear.

### To add a layout

1. Click the [ + ] button.
2. Set the name of the layout you want to add and check whether to use the sequence. When Sequence Use is selected, if you set the sequence switching time, the sequence will be played back at the set time interval.
3. Click the <OK> button to add the layout.

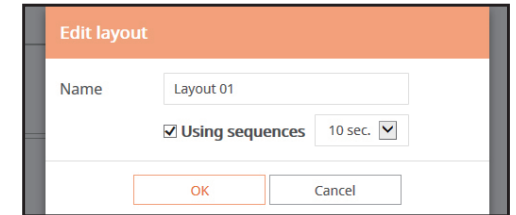


- You can search your registered layouts using the <Search> field.



### To edit a layout

1. Select a layout you want to edit and click the [ ✎ ] button.
2. After modifying the information you want to change, click <OK>.

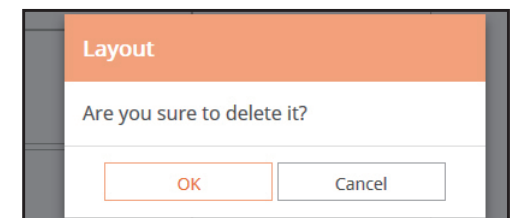


### To delete a layout

1. Select a layout you want to delete and click the [ 🗑 ] button.
2. Click <OK>.



- If you do not press the <Save> button, the changes will not be saved.



# menu setup

System, User, Camera device (SSM mode), Network can be set as desired.

## SYSTEM SETUP

You can set the date/time/language, system management, and log information.

### Date/Time/Language

#### Setting the Date/Time/Language

You can check and setup the current Date/Time and time related properties, as well as the language used for the interface on the screen.

• System time settings: Sets the time to be applied to the system.

- Date & Time : Sets the date and its format that will appear on the screen.

- Manual: Set the system time manually.

- Date: Sets the date to be applied to the system.

- Time: Sets the time to be applied to the system.

- Time Zone : Sets the time zone of the residential area where the decoder is installed based on the standard time (GMT).

■ GMT (Greenwich Mean Time) is standard World Time and the basis of world time zone.

• DST : Set up Daylight Saving Time with its period to make the time earlier than the GMT of its time zone by 1 hour during the set period.

• Time Sync. : Specify the use of synchronization with the time server.

If you select to use the <Server>, the current time will be synchronized on a regular basis by the server defined as <Server>.

If this is the case, you cannot change the time setting manually.

- Time Sync. : Specify the use of synchronization with the time server.

- Server : Enter an IP or URL address of the time server.

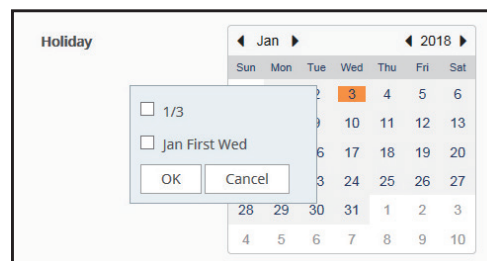
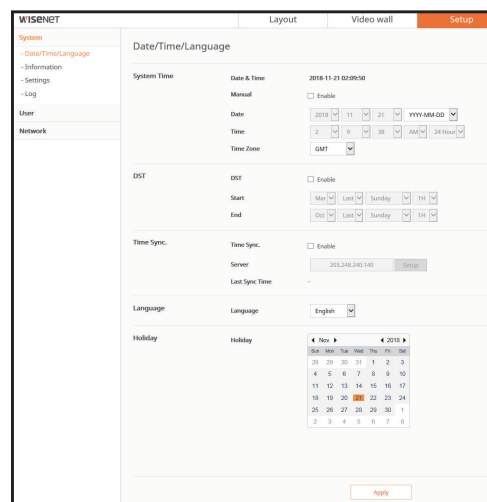
- Last Sync Time : Displays the most recent synchronization time from the selected time server.

• Language : Select your language. Sets the language for the interface.

English, French, German, Spanish, Italian, Chinese, Russian, Korean, Polish, Japanese, Dutch, Portuguese, Turkish and Swedish languages are supported.

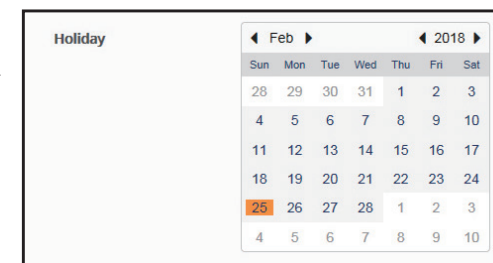
• Holiday : A user can select specific dates as holidays according to their own preferences. The same applies to the <Alarm Out Schedule> setting as a holiday.

■ e.g. every first day of a year is set to be a holiday if you select January 3 and check <1/3>, and every first day of a year and every first Wednesday of January are set to be holidays if you check <1/3> and <Jan First Wed>.



#### To use the calendar

1. Select year and month.  
Select the <◀▶> key on both ends of year and month to move back/forward to the previous/next year or previous/next one month.
2. Select a date and click on the <OK> button.  
■ When the system log is executed, the date with data to be retrieved is displayed in red.



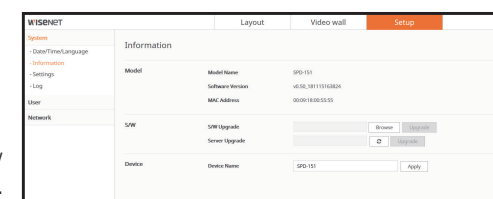
### System Management

You can check the system version, update to a newer version, as well as data backup and initialization.

#### Checking the System Information

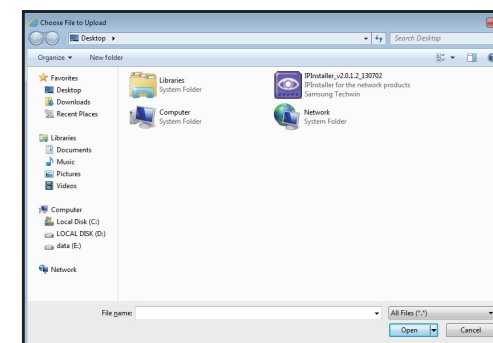
You can check the current software version and MAC address before proceeding with the upgrade.

- Model : Shows the current system's information. The values can not be changed by a user.
- S/W Upgrade : Locate the firmware file you want to upgrade using your browser and select it to upgrade.  
- When you click the <Browse> button, a popup window appears that allows you to select a file to be uploaded.
- Server Upgrade : Click the [ ] button to upgrade to any new firmware.
- Device Name : This is the name that appears when you connect to a decoder in the Network Viewer.



#### To upgrade the current software version

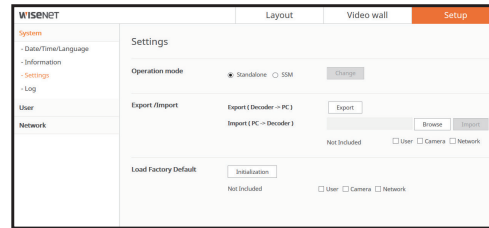
1. Click the [Browse] button.
2. Select the software to upgrade and click the [Open] button.
3. Click the [Upgrade] button.



## Settings

The information set in the decoder can be applied equally to other decoders using the storage medium.

- Operation mode : As a means of video wall control and configuration, you can select the mode of operation as <Standalone> or <SSM>. After selecting the operation mode and clicking the <Change> button, it initializes to the corresponding mode and reboots.
  - When connecting to the web viewer in SSM mode, only the <Setup> function is activated in the web viewer. Detailed layout and video wall settings can be configured in SSM.
  - When connecting to the web viewer in SSM mode, the 'Setup > Device' setting item is added. For details, refer to 'Device'. (page 23)
- Export : The information set in the decoder is saved to the storage media connected to the PC.
- Import : Applies the setting information stored in the storage media connected to the PC to the decoder.
  - Uncheck the checkbox of an item(s) that you want to import. Only items other than the selected setting items are applied to the decoder.
    - The <Export> and <Import> settings must be used in the same software version. Importing into a settings file created by a different version of the software may cause abnormal operation.
- Load Factory Default : You can change the setting state of the decoder to its initial state. Uncheck the checkbox of an item(s) that you want to reset. Then, only the other items than the selected one will return to the factory default. If <Initialization> is selected, a confirmation dialog for "Load Factory Default" prompts. Press <OK> to initialize the system to the factory default.
  - If you reset the user, you will need to reset your password.



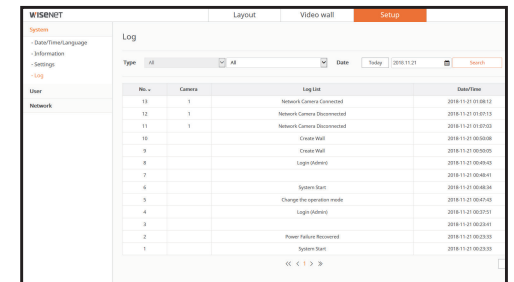
## Log Information

You can check the history information related to the system.

### Checking the system log

System Log shows log and timestamp on every system start up, system shutdown, and changes on system settings.

- Search Day : Click the Calendar icon to display the calendar window, or use the direction buttons to specify the search period of the system log.
  - For using the calendar, refer to "To use the calendar". (Page 21)
- Search : Specify the date and press this button to display the search result in the log list.
- Type : When there are too many logs, you can display logs of the desired format by selecting the type.
- Export : Store all log information recorded in the decoder to the storage media connected to the PC.



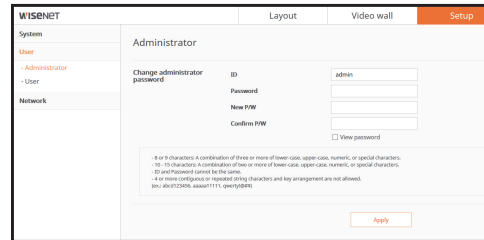
## User

Specific functions or setting privilege of the decoder can be assigned differently for each user.

### Setting the Administrator

You can set and change Administrator's ID and password.  
The administrator can use and set all menu items and functions.

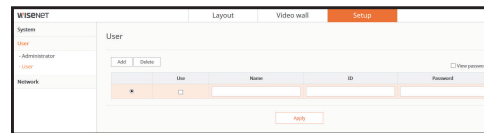
- ID : Change the admin ID.
- Password : Checks the current password.
- New P/W : Enter new password.
- Confirm P/W : Confirms the new password.
  - If **<View password>** is selected, the password will no longer be hidden on the screen when you type it.



- The initial administrator ID is admin, and the password must be reset at initial login.
- Please change your password every three months to safely protect personal information and to prevent the damage of the information theft.  
Please, take note that it's a user's responsibility for the security and any other problems caused by mismanaging a password.

### Adding a user

1. When you click the [ **Add** ] button, the Add User window appears.
2. Check **<Use>** and enter your name and ID/password.
3. Press **<Apply>**. Registered user information is saved.



### To delete user information

1. Select the user information you want to delete and press the [ **Delete** ] button.
2. The selected user information entry is deleted.

### Accessing using the user account

You can only change the layout when you are logged in with a user account.

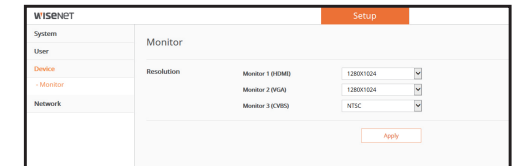
## Device

Sets PC output resolution and monitor resolution.

- **<Device>** is a menu that is displayed as a setting item only when 'Operation mode' is set to **<SSM>**.

### Setting up your monitor

This sets the monitor resolution for each decoder.  
HDMI output supports 1280x1024, 720p, 1080p, 1440p, and 2160p resolutions, and VGA output supports 1280x1024, 720p, and 1080p resolutions.



## NETWORK CONFIGURATION

You can configure settings for using the network function.

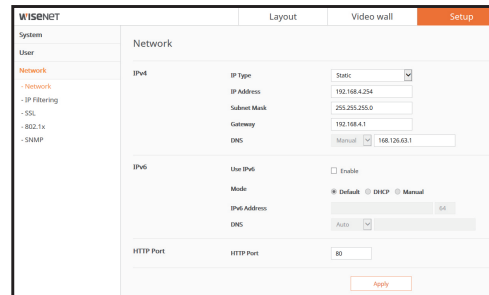
### Network

You can set the network connection route and protocol.

#### Setting a network connection

Used for camera connection and web viewer/SSM access and connection.

- IP Type : Select a network connection type.
- IP Address, Subnet Mask, Gateway, DNS  
**<Static>** : You can manually enter IP address, subnet mask, gateway and DNS.  
**<DHCP>** : IP address, subnet mask and gateway values will be automatically set.  
**<PPPoE>** : IP address, subnet mask and gateway values will be automatically set.
- User ID, Password : If you set the connection mode to PPPoE, you need to enter "User ID" and "Password" to register in PPPoE.



-  You can manually input DNS of <DHCP> and <PPPoE> when it selected to <Manual>.

#### Connecting and Setting the Network

Networking may differ from the connection method, check your environment before setting the connection mode.

##### When no router is used

- **Static mode**
  - Internet connection method : You can connect with a fixed IP and a leased line, or connect the decoder with remote users in a LAN environment.
  - How to set up the decoder network : Set <Network> in the <Network> menu of the connected decoder to <Static>.
    - Consult your network manager for IP, Gateway and Subnet Mask.
- **DHCP mode**
  - Internet connection method: You can connect the decoder directly to the cable modem, connect the decoder directly to the DHCP-based modem, or connect the decoder directly to the optical LAN.
  - How to set up the decoder network: Set <Network> in the <Network> menu to <DHCP>.

##### • PPPoE

- Internet connection method: The PPPoE modem is connected directly to the decoder, and the PPPoE connection uses an ID and password.
- How to set up the decoder network: Set <Network> in the <Network> menu of the connected decoder to <PPPoE>.
  - PPPoE <User ID> and <Password> should be the same to the PPPoE user information. If you don't know the ID and password, consult your PPPoE service provider.

##### When a router is used


-  To avoid conflict with the static IP of the decoder, check the following.

##### • Setting the decoder using a static IP

- Internet connection method: You can connect the decoder to an IP router to which the PPPoE/Cable modem is connected, or the decoder to an IP router in the local network (LAN) environment.

##### • Setting the decoder network

1. Set <Network> in the connected decoder menu to <Static>.
2. Check whether the set IP address is in the static IP range provided by the Broadband Router. IP Address, Gateway, and Subnet Mask : Consult your network manager.
  - Check whether the set IP address is in the static IP range provided by the Broadband Router.

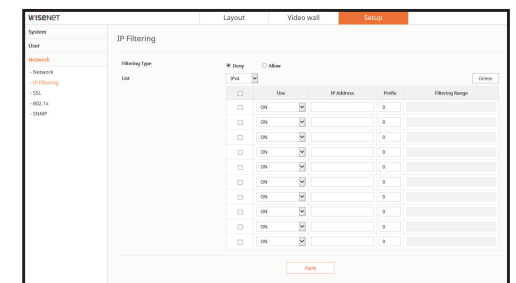
-  If a DHCP server is configured with starting address (192.168.0.100) and end address (192.168.0.200), you should set the IP address out of the configured DHCP range (192.168.0.2 ~ 192.168.0.99 and 192.168.0.201 ~ 192.168.0.254).

3. Check the Gateway address and subnet mask are equal to those set in the Broadband Router.

## IP Filtering

You can prepare the list of IP addresses to allow or block access to a specific IP address.

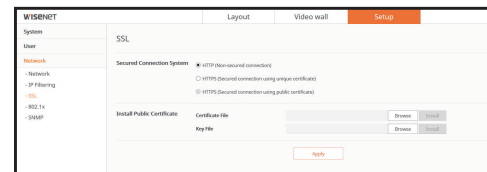
- Filtering Type :
  - Deny : If you select reject, access to the registered IP address will be limited.
  - Allow : If you choose permit, then they can only access the registered IP addresses.
- Use : Select the checkbox for the IP address that will use IP filtering.
- IP Address : Enter the IP address for filtering.
- Filtering Range : If you enter an IP address or prefix, then the range of IP addresses blocked or permitted will be displayed.



## SSL

You can select a security connection system or install public certificates.

- Secured Connection System : You can select a type of security connection system.
  - HTTP (Non-secured connection)
  - HTTPS (Secured connection using unique certificate)
  - HTTPS (Secured connection using public certificate)



- ! It is recommended to use a secure connection when the decoder device is connected to the external Internet, or in a security-critical environment.
- Install Public Certificate : You can scan and register public certificates to be installed. If you want to use a certificate, you need to install a certificate file along with an encryption file.
  - The <HTTPS (Secured connection using public certificate)> menu can be selected only if there is a registered public certificate.

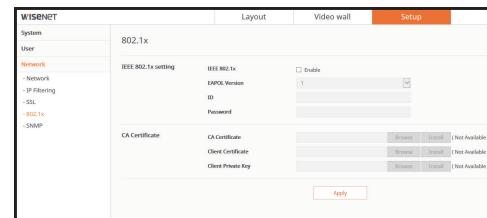
## 802.1x

When connecting to a network, you can select whether to use the 802.1x protocol and install a corresponding certificate.

802.1x is a certificate system for the server and the client. It can guarantee robust performance against hacking into the Tx/Rx network data, virus or information leaks.

By using this system, you can block access from a client who is not certified and only allow communication to certified users and thus increase the level of security.

- EAPOL Version : Select the EAPOL version to be used as protocol.
  - Some switch hubs will not operate if you set them to version <2>. Select version <1>.
- ID : Enter the ID provided by the RADIUS server administrator.
  - If the entered ID does not match the ID of the client's certificate, it won't be processed properly.
- Password : Enter the password provided by the RADIUS server administrator.
  - If the password you entered does not match that of the client's private key, it won't be processed properly.
- CA Certificate : Select this only if your public certificate includes the public key.
- Client Certificate : Select if the public certificate includes a client's authentication key.
- Client Private Key : Select it if the public certificate contains the client private key.

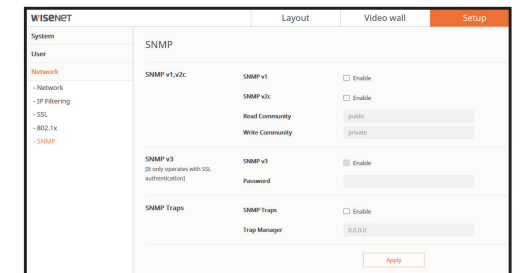


- ✍ For successful implementation of the 802.1x operating environment, the administrator must use the RADIUS server. In addition, the switch hub connected to the server must be a device that supports 802.1x.
- If the time setting of the RADIUS server, the switch hub and an NVR device do not match, communication between them can fail.
- If a password is assigned to the client's private key, the server administrator should confirm the ID and password. The ID and password allow up to 30 characters each. (But it only supports letters, numbers and special characters ("-", "\_", ".", " " 3 types) only. Accessing non password-protected files is allowed without entering a password.
- The 802.1x support protocol of the decoder unit is EAP-TLS.
- You need to install all three certificates to use 802.1x.
- <Enable IEEE 802.1x> When this option is deselected, the disconnection may not work depending on the settings of the switch hub connected. Configure settings to let switch hub update the authentication at regular intervals.

## SNMP

The SNMP protocol allows system or network administrators to remotely operate network equipment settings.

- Enable SNMP v2c : SNMP version 1 is used.
  - Enable SNMP v2 : SNMP version 2 is used.
    - Read Community : Enter the name of read-only community to access the SNMP information. By default it is set to <public>.
    - Write Community : Enter the name of write-only community to access the SNMP information. By default, it is set to <private>.
  - Enable SNMP v3 : SNMP version 3 is used.
    - Password : Set the initial user password for SNMP version 3.
  - Enable SNMP Traps : SNMP trap is used to send important events and conditions to the Admin System.
    - Trap Manager : Enter the IP address to which messages will be sent.
- ! SNMP v3 can be set only if the security connection method is set to HTTPS mode. Refer to "SSL" for more details. (Page 25)

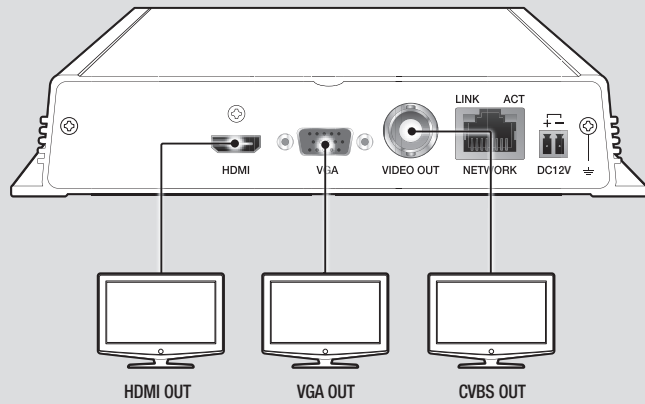




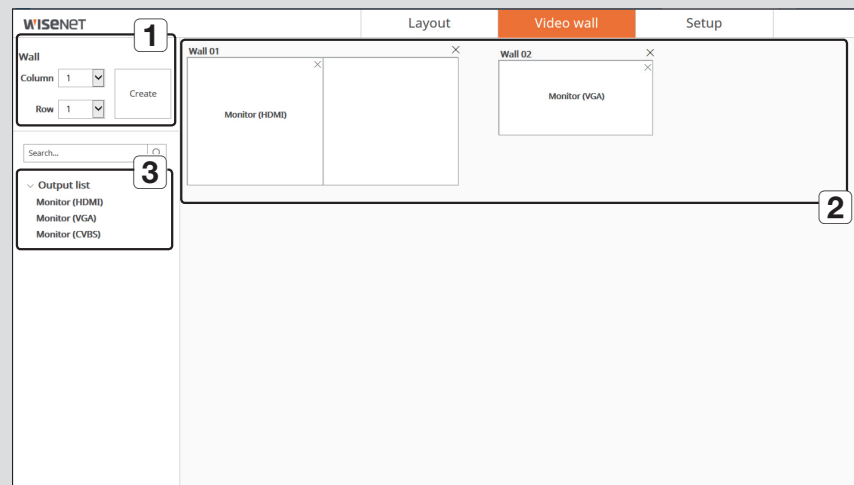
# video wall configuration guide

## VIDEO WALL CONFIGURATION GUIDE

1. Monitor output for each decoder after the set boots



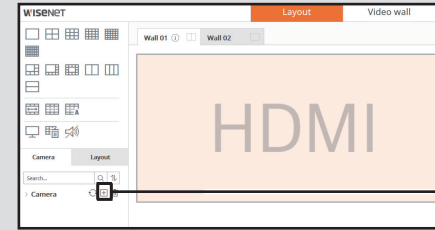
2. Configure the video walls and allocate monitors.



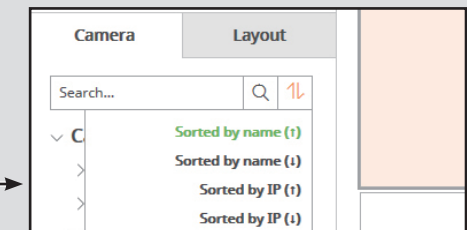
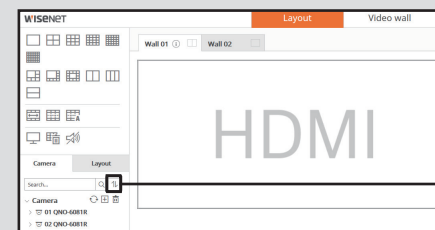
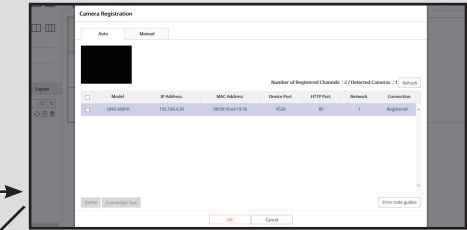
- 1 Create video walls.
- 2 Add video walls (Wall 01 2X1, Wall 02 1X1)
- 3 Assign monitors

3. Registering camera

1 Add a camera



2 Add cameras with automatic/manual registration

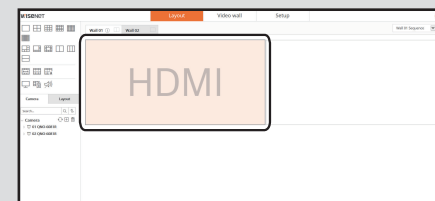


3 Select the camera list sort function

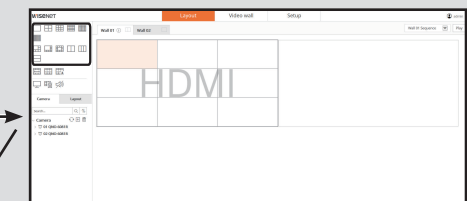
4 Sort by name(↑)/IP or ascending(↓) descending.

4. Setting Video Wall Layout

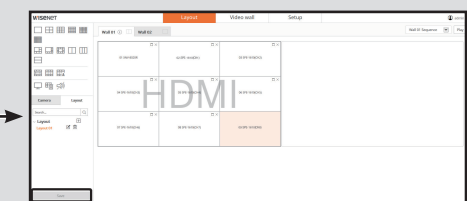
1 Specify the monitor of the corresponding video wall to be applied by clicking it



2 Select and apply a split mode to the selected monitor (Can be applied to each monitor)



3 Assign it to the corresponding tile with the mouse in the camera list

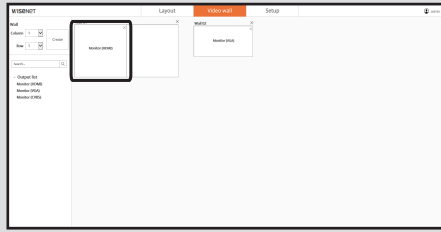


4 Repeat steps 1 to 4 if a layout is added after saving your layout



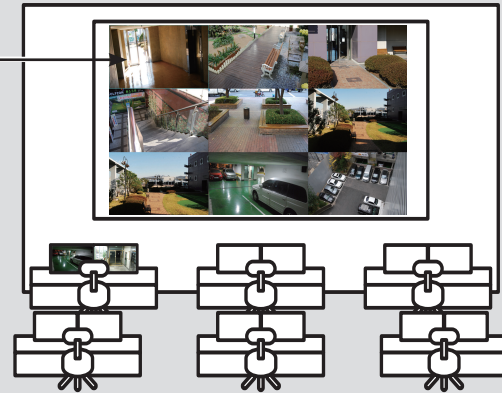
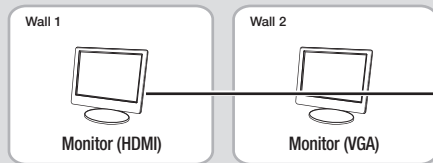
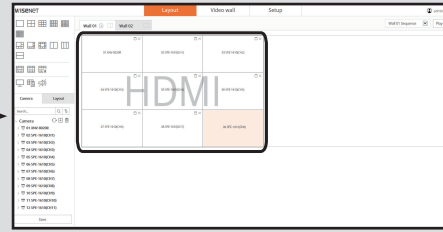
5. Monitoring by video wall

1 Select a monitor on the Wall tab



2 Set the layout of the selected monitor on the Layout tab

- When this is [ ] clicked, the video wall is enlarged to full screen.
- When this is [ X ] clicked, the video wall zoom changes to the original size.



3 The layout is applied in real time

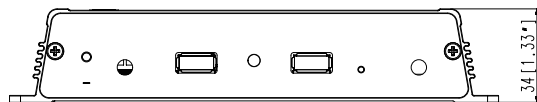
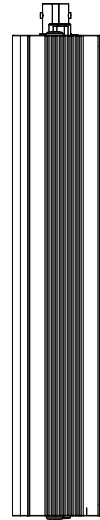
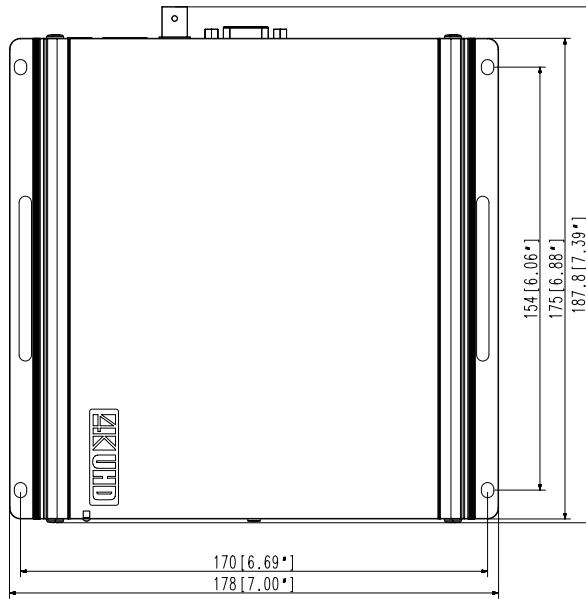
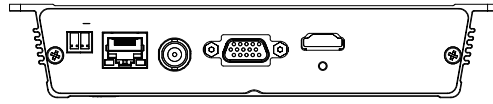
**PRODUCT SPECIFICATION**

Item		Details	
H/W	CPU	Embedded CPU	
	Operating System	Embedded Linux	
	Video output	HDMI	1ea (up-to 4K)
		VGA	1ea (up-to 1080p)
		CVBS	1ea
		Video-out Format	3840x2160@60HZ/30HZ(HDMI), 2560x1440@60HZ/30HZ(HDMI), 1920x1080@60HZ, 1280x1024@60H, 1280x720@60Hz
	External	Ethernet	1ea (10/100/1000BASE-T)
		USB	USB 2.0 2ea (Reserved)
		Audio output	1ea
		LED	Power, Network
	Environmental	Operating Temperature	0°C to +40°C (+32°F to +104°F)
		Humidity	20% ~ 85% RH
	Electrical	Power	12V DC, PoE (IEEE802.3af)
		Power Consumption	Max. 8.4W (12V DC), Max. 8.4W (PoE)
	Mechanical	Color / Material	Dark Gray / Metal
		Dimension (WxHxD)	W178.0 x H34.0 x D187.8mm (7.01" x 1.34" x 7.39")
		Weight	Approx. 0.68Kg (1.50 lb)

Item		Details	
S/W	Video	Codec	H.265/H.264/MJPEG
		Max. Decoding Performance	16x2M(1080P)@30fp, 8MP@30fps
		Max. Decoding Resolution	Up-to 12MP
		Max. Decoding Bandwidth	200Mbps
		Division (/monitor)	(HDMI) 1/2x2/3x3/4x4/5x5/6x6(32Ch Only) (VGA) 1/2x2/3x3/4x4 (CVBS) 1
		Layout	Up-to 20ea/monitor, Sequence support
	Merge	Monitor Merge	1x2, 2x1 (HDMI+VGA)
		Tile Merge	Support
	Audio	Codec	G.711/G.726/AAC
	Management software		Web-Viewer, SSM (Over 2.10.3)
	OS		Windows : 7, 8.1, 10 Mac OS X : 10.10, 10.11, 10.12, 10.13
	Web Browser		Google Chrome 63, Apple Safari 11 (Mac OS X only), MS Edge 41, MS Explorer 11
	Time setting		NTP/Manual
	Export/Import		Configuration Export/Import
	Log		Max. 20000 (System log, Event log each)
	Protocol		Over SUNAPI 2.3, SVNP support

## PRODUCT OVERVIEW

unit : mm (inches)



## DEFAULT SETTING

To reset the system, move to "**System Management > Settings > Load Factory Default**" and press the **<Initialization>** button.

This returns the factory default settings.

- When you initialize with the **<Authority Management Settings>** included, you are required to reboot the camera and reset the password.
- The initial administrator ID is "**admin**" and the password should be set when logging in for the first time.
- Please change your password every three months to safely protect personal information and to prevent the damage of the information theft. Please, take note that it's a user's responsibility for the security and any other problems caused by mismanaging a password.

**TROUBLESHOOTING**

Problem	Action
Live video will be slow or cut off.	<ul style="list-style-type: none"> <li>The frame number set for multiple data transmission set in camera or network environment could differ from the actual rate of transmission. Click the OSD icon on the left side of the layout to check the camera-specific settings and the number of frames to be played. When registering the camera, create a profile called Live4NVR and set HL264 800*600 30fps as the default setting. If you already have Live4NVR, you can use it without changing your settings. If necessary, change the number of frames in the camera using the camera web page or another connected device.</li> <li>If you keep seeing video slow down or cut off, then check the network environment or camera condition.</li> </ul>
The system does not turn on and the indicator on the front panel does not work at all.	<ul style="list-style-type: none"> <li>Check if the power supply system is properly connected.</li> <li>Check the system for the input voltage from the power source.</li> <li>If the power is still off after trying the above steps, check or replace your power adaptor.</li> <li>Check the connection status of your PoE cable.</li> </ul>
Some channels display just a black screen even if they receive video sources.	<ul style="list-style-type: none"> <li>Check if the camera is properly supplied with power.</li> <li>Check the video output connecting the camera's webviewer.</li> <li>Check if the network port is properly connected and the network setting is set correctly.</li> <li>Change the hub supporting Gigabit, it may solves.</li> </ul>
Only the logo is displayed repeatedly on the monitor screen.	<ul style="list-style-type: none"> <li>There is a problem with the mainboard, or the software is damaged. Contact service center for detailed inspection.</li> </ul>
No video is played on the connected monitor.	<ul style="list-style-type: none"> <li>Check if the necessary cables are connected to the monitor properly.</li> <li>The monitor might not support the decoder output (HDMI or VGA). (Output resolution: HDMI : 720P, 1080P, 1440P, 2160P / VGA : 1280x1024, 720P, 1080P). Please check the screen resolution supported by your monitor.</li> <li>For a 4K video, check if your cable supports HDMI 2.0.</li> </ul>
The camera is not connected or the PC fails to connect to the product.	<ul style="list-style-type: none"> <li>Check if the network cable is connected properly.</li> <li>Ensure that you have set Network – Connection Mode.</li> <li>Check the IP setting of the PC or camera.</li> <li>Try the Ping Test.</li> <li>Check if there is a different device near the product uses the same IP.</li> </ul>

Problem	Action
I registered my camera, but I cannot see any video on the monitor.	<ul style="list-style-type: none"> <li>Check whether the camera is connected. (The connection icon should be visible on the left.)</li> <li>For a video wall in the assigned layout, a monitor must be assigned in the "Video Wall" tab.</li> </ul>
In the web viewer, the screen does not switch automatically.	<ul style="list-style-type: none"> <li>Make sure that the sequence layout setting on the left is checked.</li> </ul>
The Live screen is too bright or too dark.	<ul style="list-style-type: none"> <li>Check the video settings of the registered camera.</li> </ul>
A pop-up window is prompting me to reset the time due to a battery problem.	<ul style="list-style-type: none"> <li>This is displayed when there is an error in the time setting of the decoder's built-in clock, or when there is a problem in the internal clock-related part. Contact our service center or your dealer for inspection.</li> </ul>
It is difficult to set the network when using a router.	<ul style="list-style-type: none"> <li>For more information, refer to the user manual.</li> <li>If you use the router for network connection, refer to the "<b>Connecting and Setting the Network</b>" section in this manual.</li> </ul>
I forgot the password.	<ul style="list-style-type: none"> <li>You can reset the password by pressing the groove on the back of the set. (See the description of step 5 on page 7)</li> </ul>
No audio is output from a monitor connected via HDMI.	<ul style="list-style-type: none"> <li>Audio is output only from AUDIO OUT. (See the description of step 6 on page 7)</li> </ul>
The VGA screen appears to be tilted.	<ul style="list-style-type: none"> <li>If there is a black screen background, the screen may not be adjusted automatically depending on the monitor. If you display all the images on the split screen and perform automatic adjustment of the monitor, you can display the images at the center of the screen on the monitor.</li> </ul>

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```

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```
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The following individuals contributed in part to the Network Time Protocol Distribution Version 4 and are acknowledged as authors of this work.

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3. [3]Viraj Bais <vbais@mailman1.intel.com> and [4]Clayton Kirkwood <kirkwood@striderfm.intel.com> port to WindowsNT 3.5

4. [5]Michael Barone <michael.barone@lmco.com> GPSVME fixes

5. [6]Karl Berry <karl@owl.HQ.ileaf.com> syslog to file option

6. [7]Greg Brackley <greg.brackley@bigfoot.com> Major rework of WINNT port. Clean up recvbuf and iosignal code into separate modules.

7. [8]Marc Brett <Marc.Brett@westgeo.com> Magnavox GPS clock driver

8. [9]Piete Brooks <Piete.Brooks@cl.cam.ac.uk> MSF clock driver, Trimble PARSE support

9. [10]Reg Clemens <reg@dwf.com> Oncore driver (Current maintainer)

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11. [12]Casey Crellin <casey@csc.co.za> vxWorks (Tornado) port and help with target configuration

12. [13]Sven Dietrich <sven\_dietrich@trimble.com> Palisade reference clock driver, NT adj. residuals, integrated Greg's Winnt port.

13. [14]John A. Dundas III <dundas@salt.jpl.nasa.gov> Apple A/UX port

14. [15]Torsten Duwe <duwe@immd4.informatik.uni-erlangen.de> Linux port

15. [16]Dennis Ferguson <dennis@mrbill.canet.ca> foundation code for NTP Version 2 as specified in RFC-1119

16. [17]Glenn Hollinger <glenn@herald.usask.ca> GOES clock driver

17. [18]Mike Iglesias <iglesias@uci.edu> DEC Alpha port

18. [19]Jim Jagielski <jim@jagubox.gsfc.nasa.gov> A/UX port

19. [20]Jeff Johnson <jbj@chatham.usdesign.com> massive prototyping overhaul

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21. [23]Poul-Henning Kamp <phk@FreeBSD.ORG> Oncore driver (Original author)

22. [24]Frank Kardel [25]<Frank.Kardel@informatik.uni-erlangen.de> PARSE <GENERIC> driver (14 reference clocks), STREAMS modules for PARSE, support scripts, syslog cleanup

23. [26]William L. Jones <jones@hermes.chpc.utexas.edu> RS/6000 AIX modifications, HPUX modifications

24. [27]Dave Katz <dkatz@cisco.com> RS/6000 AIX port

25. [28]Craig Leres <leres@ee.lbl.gov> 4.4BSD port, ppsclock, Magnavox GPS clock driver

26. [29]George Lindholm <lindholm@ucs.ubc.ca> SunOS 5.1 port

27. [30]Louis A. Mamakos <louie@ni.umd.edu> MD5-based authentication

28. [31]Lars H. Mathiesen <thorinn@diku.dk> adaptation of foundation code for Version 3 as specified in RFC-1305

29. [32]David L. Mills <mills@udel.edu> Version 4 foundation: clock discipline, authentication, precision kernel; clock drivers: Spectracom, Austron, Arbiter, Heath, ATOM, ACTS, KSI/Odetics; audio clock drivers: CHU, WWW/H, IRIG

30. [33]Wolfgang Moeller <moeller@gwdgv1.dnet.gwdg.de> VMS port

31. [34]Jeffrey Mogul <mogul@pa.dec.com> ntptrace utility

32. [35]Tom Moore <tmoore@fievel.daytonoh.ncr.com> i386 svr4 port

33. [36]Kamal A Mostafa <kamal@whence.com> SCO OpenServer port

34. [37]Derek Mulcahy <derek@toybox.demon.co.uk> and [38]Damon Hart-Davis <d@hd.org> ARCRON MSF clock driver

35. [39]Rainer Pruy <Rainer.Pruy@informatik.uni-erlangen.de> monitoring/trap scripts, statistics file handling

36. [40]Dirce Richards <dirce@zk3.dec.com> Digital UNIX V4.0 port

37. [41]Wilfredo Sánchez <wsanchez@apple.com> added support for NetInfo

38. [42]Nick Sayer <mrapple@quack.kfu.com> SunOS streams modules

39. [43]Jack Sasportas <jack@innovativeinternet.com> Saved a Lot of space on the stuff in the html/pic/ subdirectory

40. [44]Ray Schnitzler <schnitz@unipress.com> Unixware1 port

41. [45]Michael Shields <shields@tembel.org> USNO clock driver

42. [46]Jeff Steinman <jss@pebbles.jpl.nasa.gov> Datum PTS clock driver

43. [47]Harlan Stenn <harlan@pfcs.com> GNU automake/autoconfigure makeover, various other bits (see the Changelog)

44. [48]Kenneth Stone <ken@sdd.hp.com> HP-UX port

45. [49]Ajit Thyagarajan <ajit@ee.udel.edu> IP multicast/anycast support

46. [50]Tomoaki TSURUOKA <tsuruoka@nc.fukuoka-u.ac.jp> TRAK clock driver

47. [51]Paul A Vixie <vixie@vix.com> TrueTime GPS driver, generic TrueTime clock driver

48. [52]Ulrich Windl <Ulrich.Windl@rz.uni-regensburg.de> corrected and validated HTML documents according to the HTML DTD

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This software is provided 'as is' with no explicit or implied warranties in respect of its properties, including, but not limited to, correctness and/or fitness for purpose.



Hanwha Techwin cares for the environment at all product manufacturing stages, and is taking measures to provide customers with more environmentally friendly products.

The Eco mark represents Hanwha Techwin's devotion to creating environmentally friendly products, and indicates that the product satisfies the EU RoHS Directive.



### Correct Disposal of This Product (Waste Electrical & Electronic Equipment)

(Applicable in the European Union and other European countries with separate collection systems)

This marking on the product, accessories or literature indicates that the product and its electronic accessories (e.g. charger, headset, USB cable) should not be disposed of with other household waste at the end of their working life. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate these items from other types of waste and recycle them responsibly to promote the sustainable reuse of material resources.

Household users should contact either the retailer where they purchased this product, or their local government office, for details of where and how they can take these items for environmentally safe recycling.

Business users should contact their supplier and check the terms and conditions of the purchase contract. This product and its electronic accessories should not be mixed with other commercial wastes for disposal.



### Correct disposal of batteries in this product

(Applicable in the European Union and other European countries with separate battery return systems.)

This marking on the battery, manual or packaging indicates that the batteries in this product should not be disposed of with other household waste at the end of their working life. Where marked, the chemical symbols Hg, Cd or Pb indicate that the battery contains mercury, cadmium or lead above the reference levels in EC Directive 2006/66. If batteries are not properly disposed of, these substances can cause harm to human health or the environment.

To protect natural resources and to promote material reuse, please separate batteries from other types of waste and recycle them through your local, free battery return system.

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