SWMicro Video Wall Controller User Guide

This user guide provides basic instructions for setting up SEADA SolarWall Micro video wall controllers using its management software.

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1. Production Introduction

1.1. Product Profile

The SWMicro series video wall controllers are the all-in-one solution available from SEADA technology. Based on cutting edge Crossbar express technology, they provide excellent performance and flexibility for video wall applications.

SWMicro series controllers apply Crossbar technology to provide high bandwidth for real-time processing of all input signals and better system performance. The layout of the windows can be configured separately by the universal SWMicro management software, which offers flexibility within an intuitive interface.

SWMicro controllers are also able to offer extremely fast start-up performance and a working environment free of viruses and software conflicts, ensuring 24/7 hassle free operational ability.

1.2. Product Capability

- Advanced Crossbar technology
- 8 HDMI inputs or 4 HDMI with 1 4K HDMI/DP
- Up to 16 HDMI outputs
- Multi clients' support
- User access control
- Input capture freeze
- Robust FPGA video data process technology
- No PC vulnerabilities
- Two or Four-window overlay mode*
- Low power consumption
- Multi video walls support in one system
- HDCP compliant
- Supports custom pre-set layouts
- Offline Preset
- Layouts looping ability
- Arbitrary positioning and overlapping of windows on the video wall
- Picture-in-Picture display of two or four live, moving video input signals over any output screen*

*Output ports amount is halved when working on Four-window mode.

1.3. Specification & Parameters

Controller Chassis	19” ANST/EIA RS-310C standard industrial chassis
Input Channel	8 HD HDMI inputs or 4 HD HDMI inputs with 1 4K HDMI/DP Input
Input Format	HDMI/DP
Output Channel	Up to 16 outputs
Output Format	HDMI
HDCP Support	Yes
Power Supply	Single
Input Voltage	AC 100V to 240V, 50/60Hz
Operation System	Windows 7/8/10
Warranty	2 years
Operating temperature range	0~40 degrees centigrade
Operating humidity range	10%~90%
Storage temperature range	0~60 degrees centigrade
Storage humidity range	10%~90%
Control Interface	RS232 or 10/100/1000M Ethernet Port

1.4. Models and Scales

Models	Chassis	Dimension (mm) (W*D*H)	HD Input	4K Input	HDMI Output
SWMicro08	1.5U	482*350*66	8	0	8
SWMicro12	1.5U	482*350*66	8	0	12
SWMicro16	1.5U	482*350*66	8	0	16
SWMicroP08	1.5U	482*350*66	4	1	8
SWMicroP12	1.5U	482*350*66	4	1	12
SWMicroP16	1.5U	482*350*66	4	1	16

2. Hardware Overview

2.1. Rear Panel (SWMicro12 as an example)

- **LAN (10M/100M/1000M) and RS232-IN Port are for PC control**
- **HDMI Inputs:** 8 x HDMI HD inputs
- **HDMI Outputs:** 12 x HDMI outputs
- **Power Supply Socket and Switch:** 110 ~ 240VAC
- **RS232-OUT port and RUN-ENG switch are for future development**

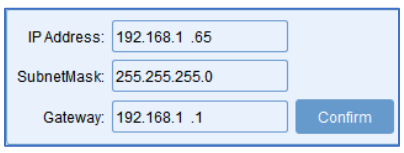
2.2. Rear Panel (SWMicroP12 as an example)

- **LAN (10M/100M/1000M) and RS232-IN Port are for PC control**
- **HDMI Inputs:** 4 x HDMI HD inputs and 1 x HDMI 4K input
- **DP inputs:** 1 x DP 4K input
- **HDMI Outputs:** 12 x HDMI outputs
- **Power Supply Socket and Switch:** 110 ~ 240VAC
- **RS232-OUT port and OK-UP switch are for future development**

3. Connection Setup

3.1. Ethernet (LAN) Connection

Connect the SWMicro unit with the control PC using CAT cable. Make sure the PC is in the same network segment of static IP address as SWMicro.



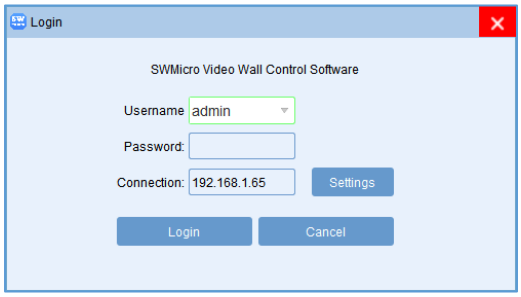
Left is the default IP setting of SWMicro. Users can change the IP address once connected.

3.2. RS232 (Serial Port) Connection

RS-232 control, baud rate 115200, DB9 connector.

4. SWMicro Software User Guide

Users can run the SWMicro.exe software directly without installation. Software can be downloaded from the SEADA website (https://seada.co.uk/downloads). Double click the SWMicro software to get the Dialog box as below. The default password for '**admin**' is '**admin'**.



By clicking '**Setting**', users can either choose to control SWMicro via LAN or Serial Port. The default connection setting for SWMicro is '**LAN connection**'.

- **LAN connection**

The default static IP address for SWMicro is 192.168.1.65. Users need to change the IP address of their PC to static IP address and the same network segment as SWMicro in '**Ethernet Properties'**.

IP address: any address between 192.168.1.2 and 192.168.1.254 except the address which has been taken by SWMicro.

Subnet Mask: 255.255.255.0

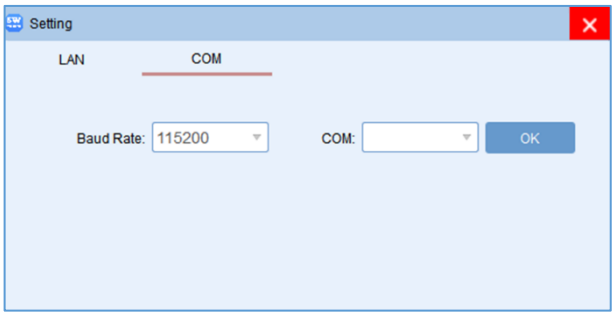
Default Gateway: 192.168.1.1

Connect SWMicro with a CAT cable to the control PC (cable included in the package):

- Select the '**Username**'.
- Type in the '**Password**'.
- Click '**Login**' to continue.

- **Serial Port connection**

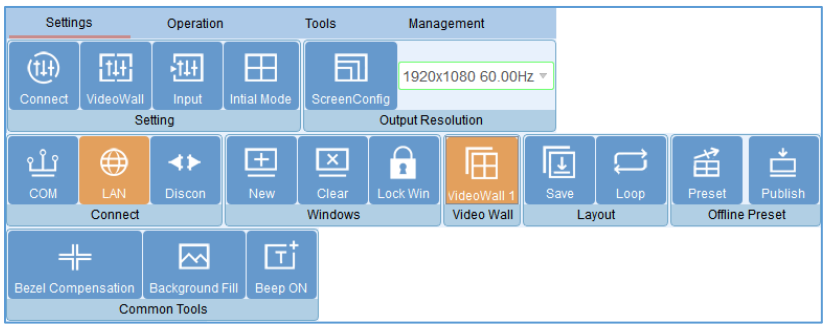
Users can also connect SWMicro with a serial cable to the control PC (cable included in the package):



- Click '**Settings**'.
- Choose '**COM**'.
- Choose the Serial Port (COM).
- Click '**OK**' and '**Login**' to continue

SWMicro will be connected automatically after login. If not, please refer to '**Troubleshooting**' section in this user manual.

Once SWMicro is connected to the control PC, it will load the settings from the unit. The default setting for the new unit out of package is 2x4/3x4/4x4 video wall with input 1 across the screens depending upon the SWMicro model type. All outputs are set at a resolution of 1920x1080@60 by default.



Below is a brief introduction for each tabs and more details will be included in the following sections.

- **Connect:** Config the device network settings.
- **VideoWall:** Set up the video wall layout.
- **Input:** View and edit the input format (DP/HDMI) of the connected unit.
- **Initial Mode:** Set up the initial splicing of each output screen or all output screens.
- **ScreenConfig:** Add and modify customised output screen resolutions.
- **New:** Set up windows on the screen according to the initial mode. User can also open a new window onto the videowall by dragging & dropping drawing in the video wall display area.
- **Clear:** Close all existing windows on the video wall.
- **Lock Win:** Lock all windows in the video wall display area to avoid accidental adjustment.
- **Save/Loop:** Save/Load pre-set video wall layouts and loop saved layouts on the output screen.
- **Preset/Publish:** Preset the video wall content offline and publish it when necessary.
- **Bezel Compensation:** Correct the bezels of the output screen.
- **Background Fill:** Change the background colour of the output screen.

Right click on the video wall, users can use the tools in '**Dropdown menu**' to set up each window individually. Some of these functions can be accessed using the tool bar on the right-top of each window.

- **Top:** Bring the selected window to top of all windows.
- **Bottom:** Send the selected window to bottom of other windows.
- **Position:** Modify the size and position of the selected window.
- **Lock:** Lock the selected window to avoid accidental adjustment.

• **Maxsize:** Maximise the size of the selected window to the whole video wall and click again to return the window back to origin.

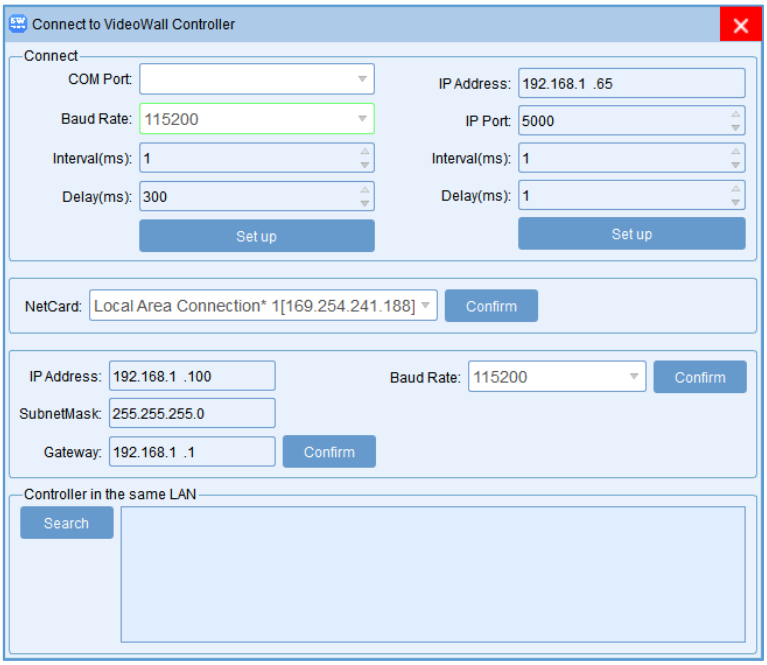
• **Close:** Close the selected window.

• **Freeze Panes:** Freeze the content of the selected window and click again to unfreeze.

• **Join Output Group:** Convert a single window into a 2-window group (usually for 1080P inputs), 1x4 or 2x2 window group (usually for 4K inputs) to operate as one signal.

4.1. Video Wall Settings

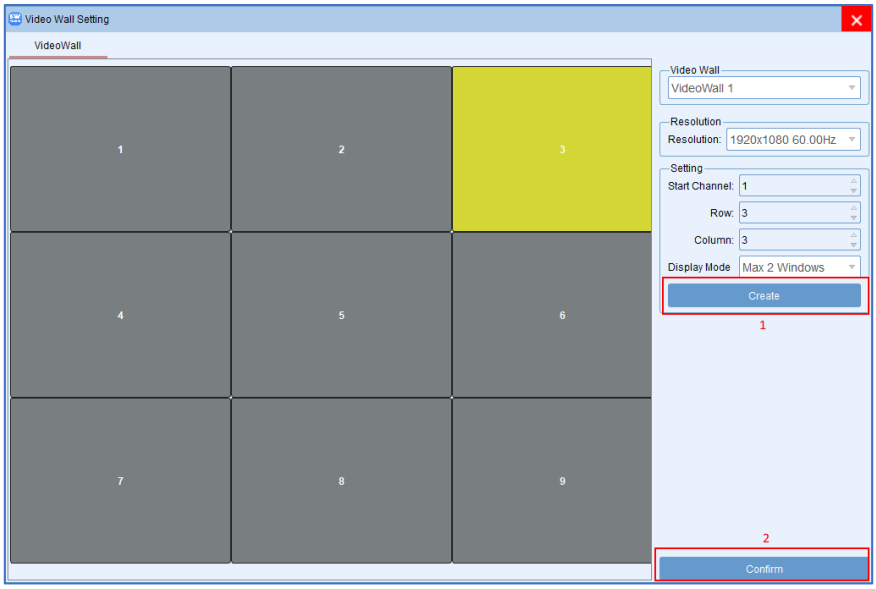
4.1.1. Connection



Users can find all the device network information in this window and do the modification if needed. The first section is used to set the connection of the control PC to SWMicro. The second section sets the NetCard for the connection. The third section can be used to adjust the default IP address and baud rate of SWMicro for further use.

Users can also find the IP address of SWMicro using '**Search**' which only requires either RS232 or ethernet connection.

4.1.2. Videowall Layout Setup

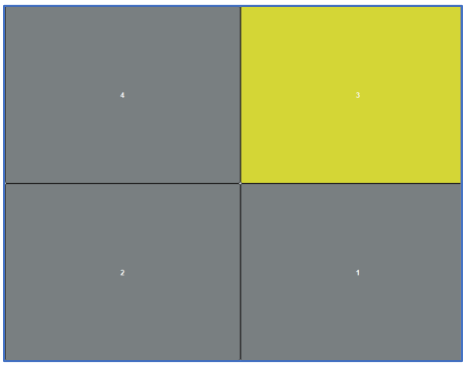


Users can set up the layout of the video wall in '**VideoWall Setting**' by simply choosing the number of rows and columns for the video wall. Total screen amount is up to 8/12/16 for SWMicro video wall controllers depending upon the model type. Users can also set up either 2 or 4 windows in a single output screen to achieve '**picture-in-picture**'.

After the videowall is edited, user needs to press '**Create**', '**Confirm**' (red 1 and 2) and close the window. Then user needs to wait for the loading bar to process before operating on the videowall.

Note: In the '**Max 4 windows**' mode, the second screen will loop out and repeat the output on the previous screen. In this case, only half of the outputs can be used to display different contents. For example, when using '**Max 4 windows**' mode, in the case there are 8 outputs, output '**1, 3, 5, 7**' will display the assigned contents and output '**2, 4, 6, 8**' will duplicate the contents of the former outputs.

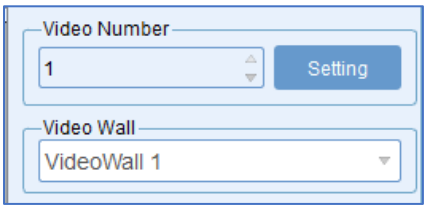
A. <u>Re-map output</u>



User can re-map the output connected to the screens by dragging and dropping a certain window to another window in videowall setting. While double clicking on a certain output, user can also change the name of it.

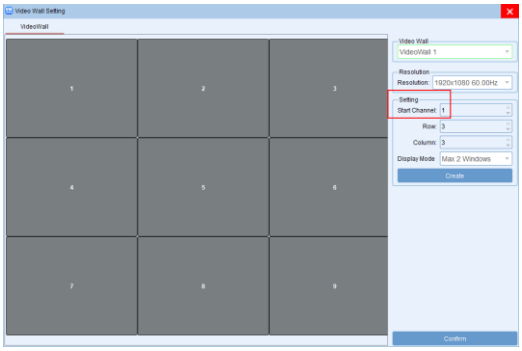
Note: '**Name change**' will only change the name of the output but won't re-map the signal. For example, if user change the name of output '**1**' to '**2**', the output will stay as output '**1**' with only the name changed to '**2**' The output can only be re-mapped by dragging and dropping.

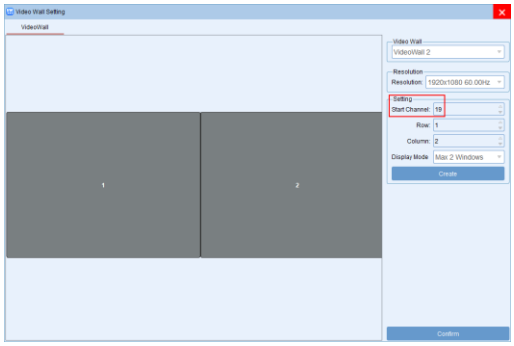
B. Multiple videowall



SWMicro/SWmicroP supports up to 4 videowalls. To enable that, click anywhere (except where user can type in contents) on the videowall setting window and type in '**admin**'. An extra option will pop out allowing the user to change the number of the videowall. Entering the videowall number and clicking '**Setting**', user can config each videowall with the dropdown list.

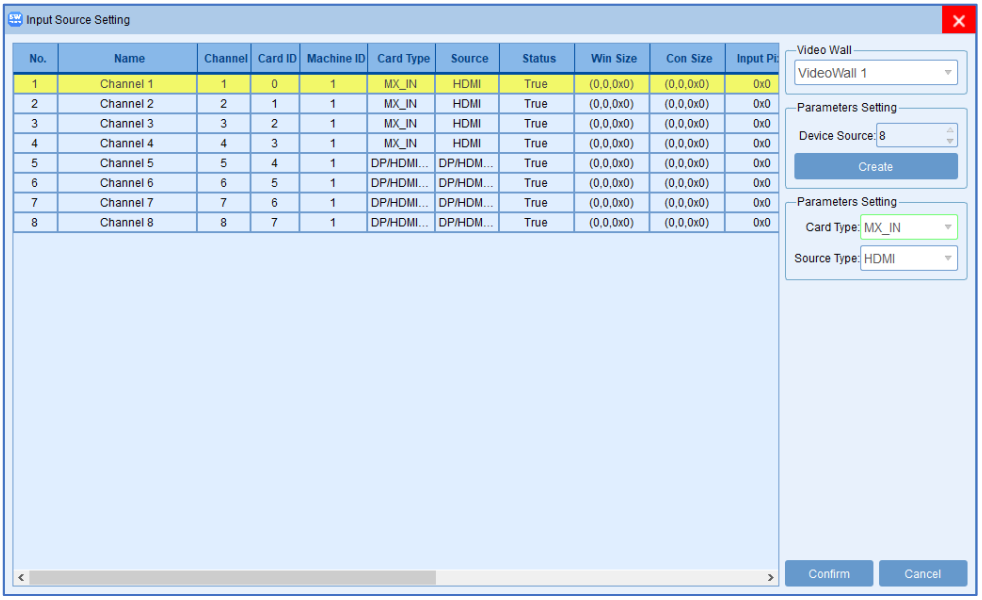
Note 1: Each output port will take two channels, therefore start channel of the second and the following videowall has to be changed. For example, if the first videowall is a 3x3 videowall, which will take channel 1 to 18 (red marked), the start channel of the second videowall will be '19'. (red marked)





Note 2: Only videowalls on different output cards can be set at different resolutions. For example, if user has two 1x2 videowall from output card 1, the resolution of both videowall has to be the same.

4.1.3. Input

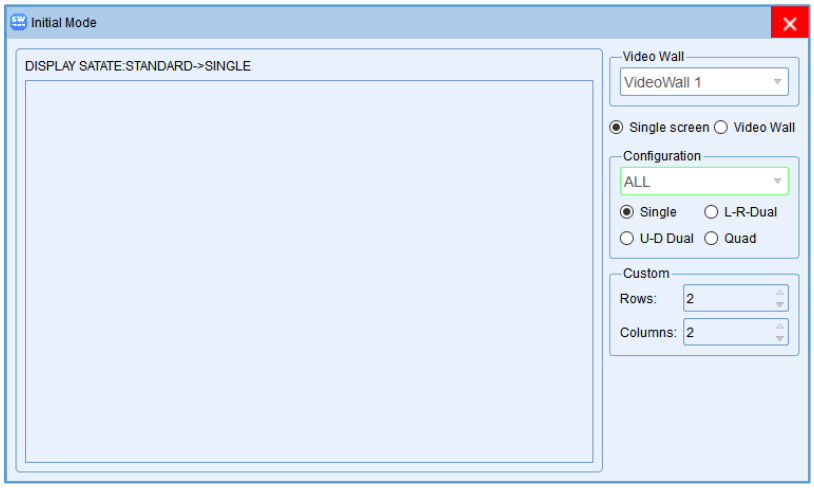


Users can view and edit inputs if necessary. **By default, new units will have all input settings done and user will not need to change anything in this section**. However, after certain operations, for example adding extra videowalls, user might want to re-config the inputs.

For SWMicro, all '**Card Type**' must be selected as '**MX_IN**' and '**Source Type**' as '**HDMI**'.

For SWMicroP, '**Card Type**' of the first four channel needs to be selected as '**MX_IN**' and '**Source Type**' as '**HDMI**'. '**Card Type**' and '**Source Type**' of the rest channels should be '**DP/HDMI2.0**'.

4.1.4. Initial Mode



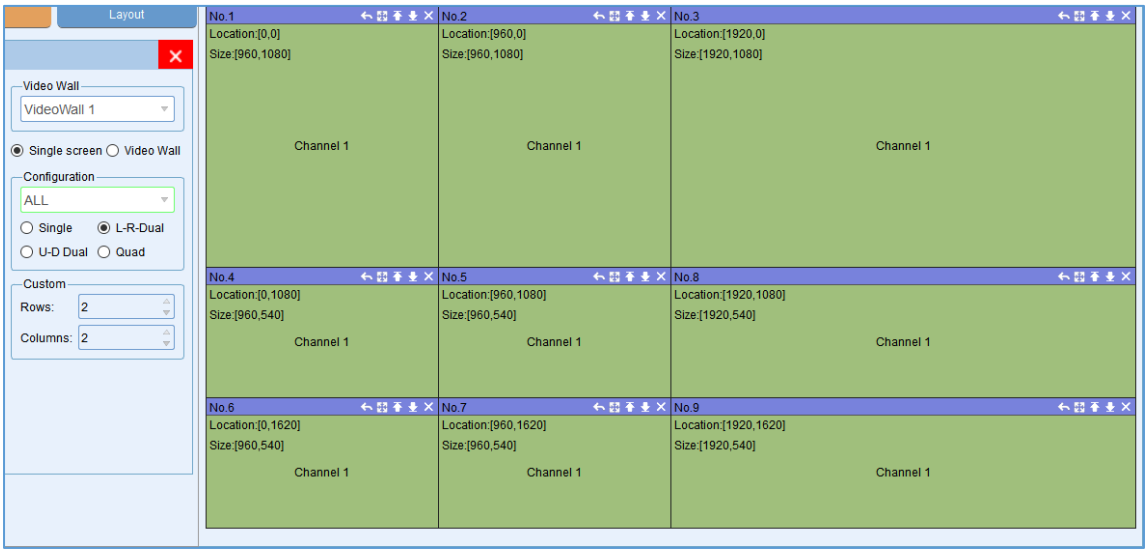
Instead of self-modifying the video walls each time, users can modify the '**initial mode**' to save pre-set configuration for each output screen or all output screens.

- **Single Screen:** Each screen can be configured into 4 different modes individually: single window, left-right dual windows, up-down dual windows, and quad windows.

- **Video Wall:** The video wall will be covered by '**A**x**B**' windows with an equal size, where '**A**' is the number of windows in the row and '**B**' number of windows in the column.

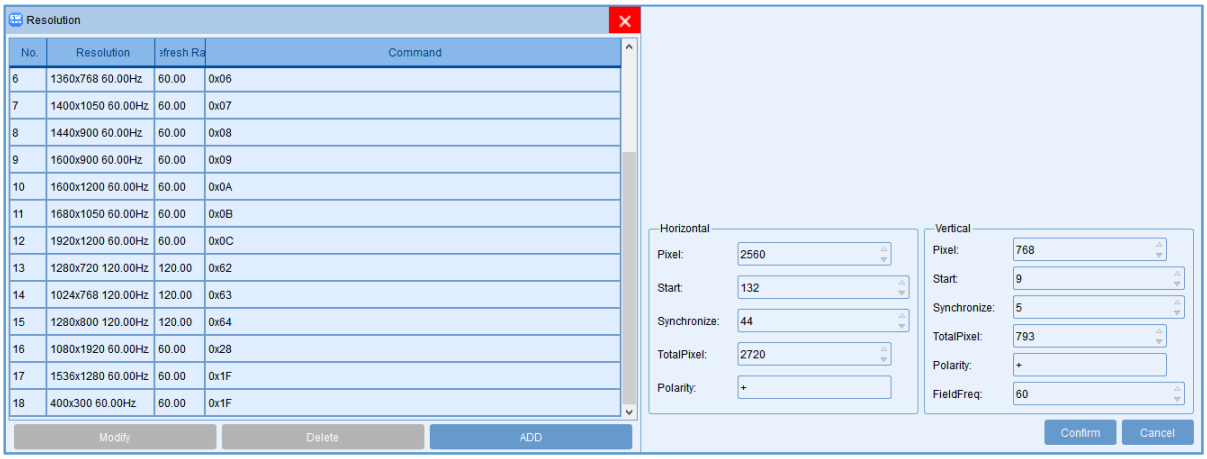
Note: The number of windows in each screen still follows the '**Single Display**' configuration in '**VideoWall Setting**'.

After all settings are done, close the window and click '**New**' under '**Operation**', the saved video wall will be generated automatically on the main window as shown below.



4.1.5. Screen Configuration

Users can add customised screen resolutions for the video wall.



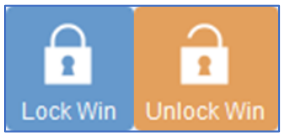
4.2. Operations

4.2.1. New/Clear Window

Users can load the pre-set video wall from the '**initial mode**' by clicking '**New**'. The default setting for the software is a single window from input 1 in each output screen. Two other ways can open a new window onto video wall as well by dragging & dropping or selecting a signal and drawing in the video wall display area.

By clicking '**Clear**', all the windows on the current video wall will be closed.

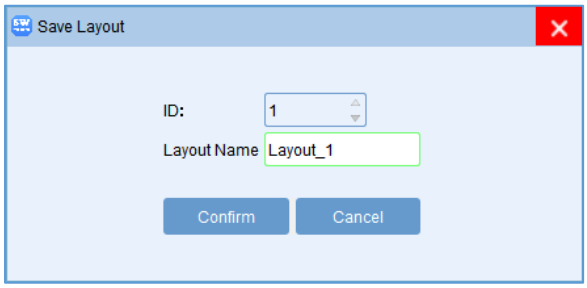
4.2.2. Lock/Unlock Window

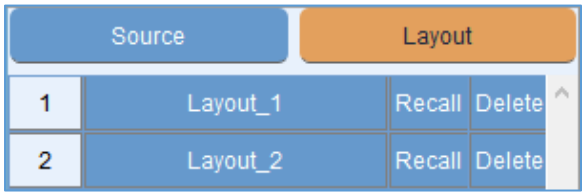


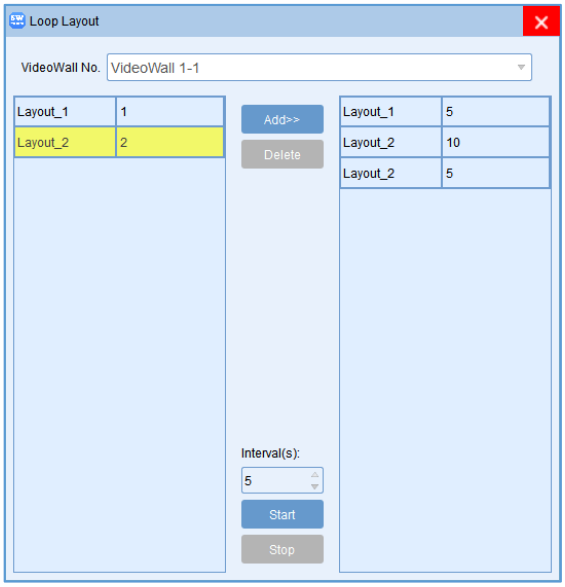
By clicking '**Lock Win**', all the windows on the current video wall will be locked to avoid accidental adjustments. Each window can also be locked separately using the '**Lock**' option in the '**Dropdown menu**'. Users can cancel the lock of windows by clicking '**Unlock Win**'.

Note: User can still add new windows onto the videowall display area under '**Lock**' mode.

4.2.3. Save/Recall and loop Layouts





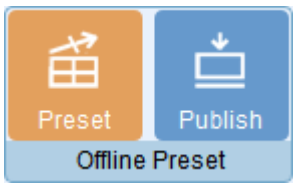


Users can save the video wall layouts and recall them later via the '**Layout**' menu on the left of the software. Users can save up to 32 pre-set layouts.

Note: The layouts are saved on SWMicro, therefore whenever the control PC is connected, the software can load the saved layouts from SWMicro.

Users can also loop the saved layouts at a pre-set interval (minimum 5 seconds).

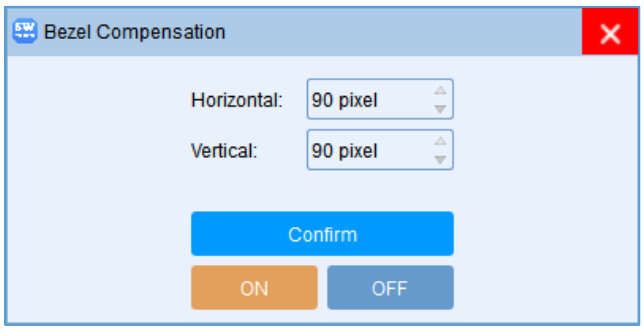
4.2.4. Preset/Publish

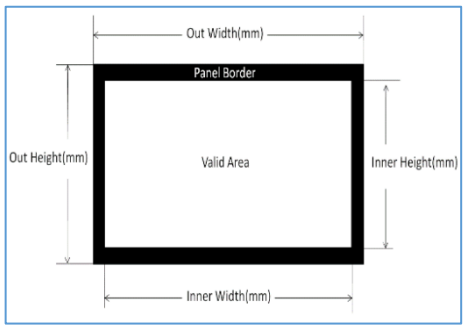


By clicking '**Preset**', when users make changes of layouts on the videowall, it will not reflect in real time. Instead, after '**Publish**' has been clicked, the changes will be made.

4.3. Common Tools

4.3.1. Bezel Compensation



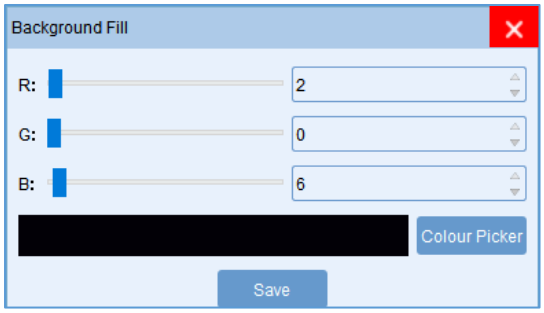


Users can set up the bezel correction for the video walls here to compensate the frame of the screens to make the whole video wall look like one large screen

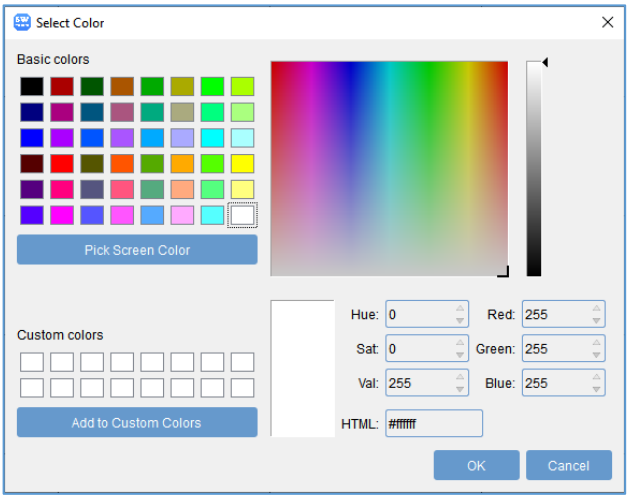
without any distortion. Users can use pixels of the screen frame width to set up the bezel correction here. The bezel compensation can be set either ON or OFF for comparison.

Note: '**Horizontal**' is the summarisation of inner and outer height and '**Vertical**' stands for the summarisation of inner and outer width.

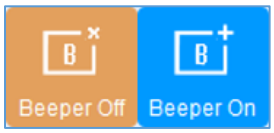
4.3.2. Background Fill



Users can set up the background colour for the video wall here. Users can either use the slider bars or the colour picker to choose the background colour for the video wall.



4.3.3. Beeper On/Off

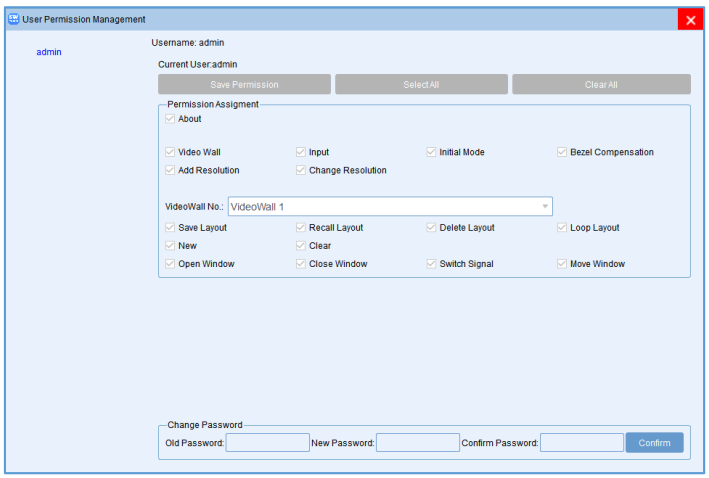


Users can set the beeper in SWMicro to '**ON**'. SWMicro will give an alarm each time when an operation is performed in the software. The function can be switched off by clicking the button again to set it to '**Beeper Off**'.

4.4. User Management

4.4.1. User Permission Setup

'**Admin**' can add and delete users to access the SWMicro software.



'**Admin**' can also set up levels of permission for different users to access the software. Once the permission is saved for a particular user, there will be a restriction of accessing certain functions, either unable to see the function icon or receive a warning when accessing. The user permission can only be assigned by '**admin**'.

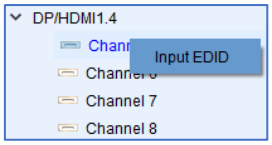
4.4.2. User Password Setup

'**Admin**' can set up the password for different users without knowing the old password of that user.

'**User level**' can also change the password by themselves, while they need to enter the old password.

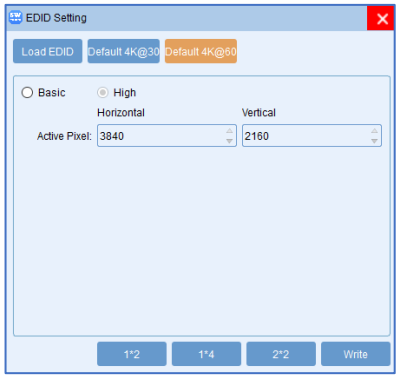
4.5. Set up 4K input

4.5.1. Change input EDID



For standard 4K input signal, user can skip this step. This step is only necessary if the input has its own EDID logic, for example some TV boxes, or the output is not properly displayed on the screen.

Right-click on any channel under DP/HDMI2.0 in the input list and EDID setting will pop up. User can then either choose the preset 4K@60 or 4K@30 EDID from the system or load personal EDID.

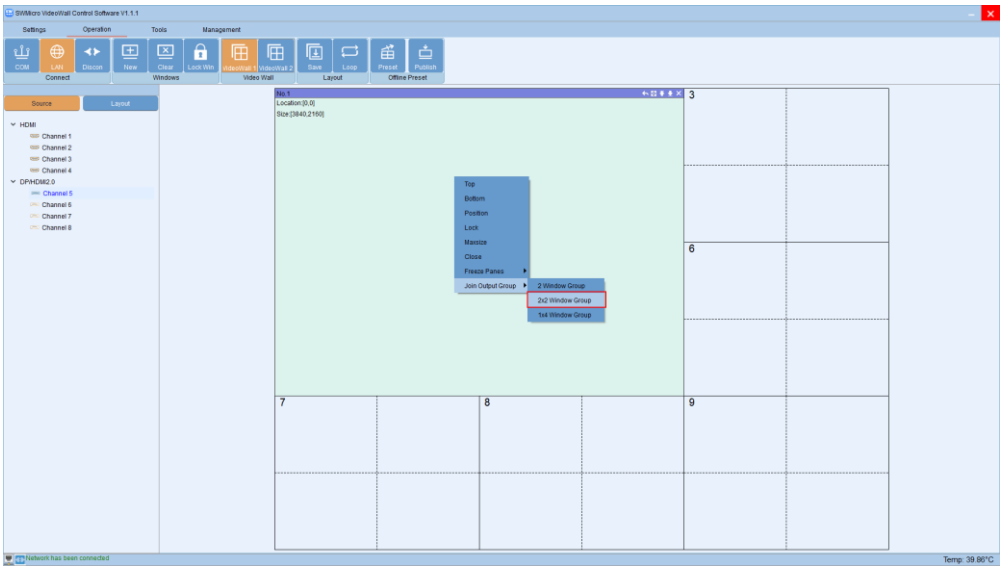


Note: After a new EDID is written, it is compulsory to re-plug the HDMI connected to the 4K port on SWMicroP.

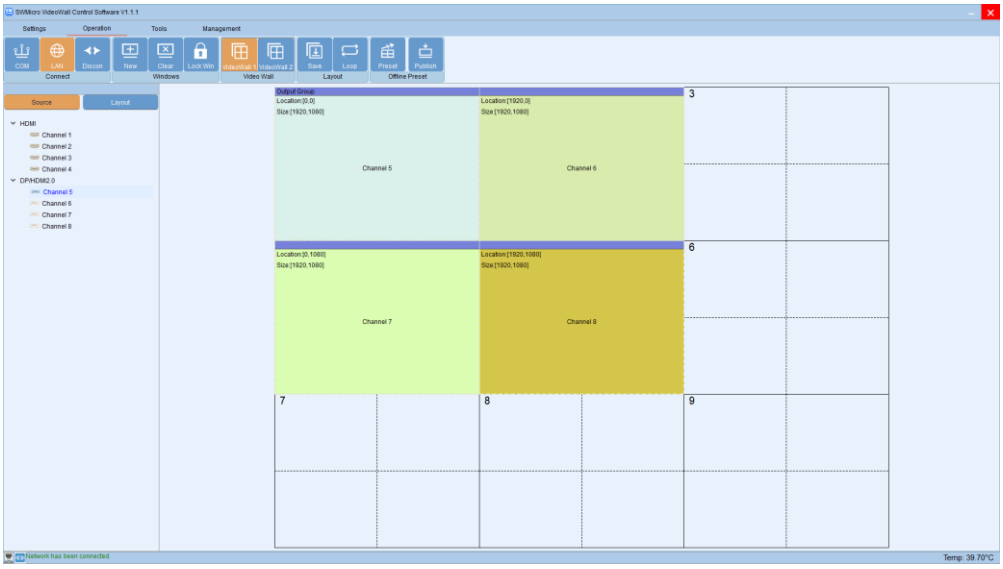
Note 2: '1x2' and 'two window group' are only for inputs at 1080P.

4.5.2. Open a 4K signal

When there is an input connected to the 4K DP or HDMI port of SWMicroP, open any channel from the DP/HDMI2.0 list on the videowall. Then right-click the window and select 2x2 window group.



After that, drag&drop any signal from the DP/HDMI2.0 list onto this window and the software will automatically fill out the 2x2 group window with the 4K inputs. Then user can operate the whole 2x2 signal group as a single 4K video source to move across the videowall or change its size for display.



Note 1: There are four channels due to that the single 4K DP/HDMI signal of SWMicro is split into four 1080P signals. Therefore, user can manipulate the 4K signal either in four individual windows or a single 4K signal group.

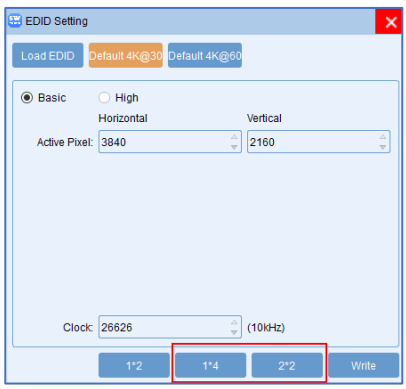
Note 2: For an output group, the number of windows that can be opened on a single screen still follows the window limitation set in videowall setup referring to section 4.1.2. Therefore, when setting up a 4k input, user needs to pay extra attention to avoid reaching the window limitation. (**2 window on each output.**)

For example, when opening a 4k signal on a 3x3 videowall, as the window in the central will have 4 signals opened on the same output port, the output will not be displayed properly. It is recommended to use 1x4 window group instead of 2x2 window group to avoid this.

Below are some recommended window group settings for different sizes of videowalls.

Size of Videowall	2x2	3x3	4x4
Window Group	2x2	1x4	2x2

Note 3: In '**EDID setting**' referring to section 4.5.1, there are two options: 1x4 and 2x2 for 4K input signals. They must be always consistent with the value chosen for the window group when opening the 4K signal. By default, both the EDID and the 4K input signal group will be on the 2x2 mode. In the case user needs to change the window group to 1x4, it is compulsory to change the EDID setting to 1x4 as well. Otherwise, the content will not be displayed properly.



5. Troubleshooting

5.1. Corrupted Characters

a) Open '**Clock and Region**' in '**Control Panel**'.

b) Select '**Change data, time or number format**'.

c) Select '**Change system locale**' under '**Administrative**' tab.

d) Tick '**Beta: Use Unicode UTF-8 for worldwide language support**', click '**OK**' and '**Apply**'.

5.2. No Connection

a) Ensure the SWMicro is powered up.

b) Ensure the PC and SWMicro at the same IP group.

c) Ensure the IP address is correct for SWMicro.

d) Restart the SWMicro software.

5.3. No Output

a) Ensure the video source is on.

b) Ensure the SWMicro and screens are powered on.

c) Ensure the connection to screens are OK.

d) Ensure that the output resolution is set up correctly. (i.e., if the output resolution is at 1080p and the screen only takes 720p.)

6. SWMicro Command Lines

- All spaces shown in the command are required.
- All commands in this section are always terminated with the ASCII carriage-return character, 0x0d.

This is represented by the ⏎ symbol in each command.

➢ Serial Port:

Baud rate: 115200

➢ UDP Socket:

Module default IP: 192.168.1.65

Target port: 5000

Local port: 5001

All commands sent via UDP must include an 8-bytes header.

header[0]: 0x00

header[1]: 0x04

header[2]: 0x00

header[3]: 0x00

header[4]: the first segment of the device IP address, for example '192' from '192.168.1.65'.

header[5]: the second segment of the device IP address, for example '168 from '192.168.1.65'.

header[6]: the third segment of the device IP address, for example '1' from '192.168.1.65'.

header[7]: the fourth segment of the device IP address, for example '65' from '192.168.1.65'.

For example: Close all windows on the screen for device (192.168.1.65)

00 04 00 00 c0 a8 01 41 3c 72 73 65 74 2c 30 3e

Black: Headers (Don't change)

Single Underline: Device IP address

Double Underline: Converted serial port commands to hex

6.1. Create a new display window

6.1.1. Serial Port

<open,W_ID,SourceChl,SourceType,x0,y0,x1,y1>

W_ID: Window ID, starts from 1.

SourceChil: Input channel, starts from 0.

SourceType: Inputs type, fixed at 0.

x0: The horizontal start of the window, starts from 0.

y0: The vertical start of the window, starts from 0.

x1: The horizontal end of the window.

y1: The vertical end of the window.

For example:

Create window 1	<open,1,0,0,0,0,1919,1079>
Create window 2	<open,2,0,0,2290,113,4587,1234>
Create window 3	<open,3,0,0,692,1400,2981,2574>
Create window 4	<open,4,0,0,787,1786,5106,3037>

UDP Socket

Open a new window on window 1 from input source 1

00 04 00 00 c0 a8 01 41 3c 6f 70 65 6e 2c 31 2c 30 2c 30 2c 30 2c 30 2c 31 39 31 39 2c 31 30 37 39 3e

6.2. Move the windows and switch the sources

6.2.1. Serial Port

<move,W_ID,SourceChl,SourceType,x0,y0,x1,y1>

W_ID: Window ID, starts from 1.

SourceChil: Input channel, starts from 0.

SourceType: Inputs type, fixed at 0.

x0: The horizontal start of the window, starts from 0.

y0: The vertical start of the window, starts from 0.

x1: The horizontal end of the window.

y1: The vertical end of the window.

For example:

Move window 1	<move,1,0,0,0,0,959,539>
Move window 2	<move,2,0,0,0,0,1919,1079>
Switch window 1 with input channel 2	<move,1,1,0>
Switch window 2 with input channel 3	<move,2,2,0>

6.2.2. UDP Socket

Move window 1

00 04 00 00 c0 a8 01 41 3c 6d 6f 76 65 2c 31 2c 31 2c 30 2c 30 2c 30 2c 39 35 39 2c 35 33 39 3e

Switch window 1 with input channel 2

00 04 00 00 c0 a8 01 41 3c 6d 6f 76 65 2c 31 2c 31 2c 30 3e

6.3. Close all output windows

6.3.1. Serial Port

<reset,wallID>

wallID: Video wall display group ID, starts from 0.

For example:

Close all the window of video wall group 1.

<rset,0>

6.3.2. UDP Socket

Close all the windows of video wall group 1

00 04 00 00 c0 a8 01 41 3c 72 73 65 74 2c 30 3e

6.4. Layout save

6.4.1. Serial Port

<save,mode,groupID,modeIndex,sname>

groupID: fixed at 0.

modeIndex: Layout mode serial number starts from 0

Sname: Layout mode name.

For example:

Save layout 1 and name is Layout_1	<save,mode,0,0,004c00610079006f00750074005f0031>
Save layout 2 and name is Layout_2	<save,mode,0,1,004c00610079006f00750074005f0032>
Save layout 3 and name is Layout_3	<save,mode,0,2,004c00610079006f00750074005f0033>
Save layout 4 and name is Layout_4	<save,mode,0,3,004c00610079006f00750074005f0034>

6.4.2. UDP Socket

Save Layout mode 1 and mode name is Layout_1

00 04 00 00 c0 a8 01 41 3c 73 61 76 65 2c 6d 6f 64 65 2c 30 2c 30 2c 30 30 34 63 30 30 36 31 30 30 37 39 30 30 36 66 30 30 37 35 30 30 37 34 30 30 35 66 30 30 33 31 3e

Save Layout mode 2 and mode name is Layout_2

00 04 00 00 c0 a8 01 41 3c 73 61 76 65 2c 6d 6f 64 65 2c 30 2c 31 2c 30 30 34 63 30 30 36 31 30 30 37 39 30 30 36 66 30 30 37 35 30 30 37 34 30 30 35 66 30 30 33 32 3e

6.5. Layout recall

6.5.1. Serial Port

<load,mode,groupID,modeIndex>

groupID: fixed at 0.

modeIndex: Layout mode serial number starts from 0

For example:

Recall layout 1	<load,mode,0,0>
Recall layout 2	<load,mode,0,1>
Recall layout 3	<load,mode,0,2>

6.5.2. UDP Socket

Recall Layout Layout_1

00 04 00 00 c0 a8 01 41 3c 6c 6f 61 64 2c 6d 6f 64 65 2c 30 2c 30 3e

Recall Layout Layout_3

00 04 00 00 c0 a8 01 41 3c 6c 6f 61 64 2c 6d 6f 64 65 2c 30 2c 32 3e