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UpanelS II

PRODUCT MANUAL

Narrow Pixel Pitch LED Display

UNILUMIN GROUP CO.LTD.

Revision Records

Version	Revised Content	Date
01	Initial release	Jan .11, 2022

The manual may be modified without any prior notice.

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Instructions

Thank you for choosing our product. Please read the Product Manual carefully before using the product. The manual may contain errors despite all our efforts, and may be subject to change without prior notice. Contact us if you have any questions or suggestion when using the manual. We will try our best to help you resolve the problems in time, and highly appreciate your suggestions.

`

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Trademark

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Read the following content carefully to ensure correct use of the LED display products:

◆ WARNING!

The LED display may be damaged and become irreparable if you ignore the following warnings.

1) Do not place the LED display upside down or throw it during transport and storage.
2) Do not incline, scratch, or crash the LED display during installation.
3) Do not wet or submerge the LED display into water.
4) Do not direct the air outlet of an air conditioner to the LED display.
5) Do not place or use the LED display in an environment with volatile, corrosive or flammable chemical products.
6) Do not use the LED display outdoors in rainy days or when the humidity is higher than 80%.
7) Do not clean the LED display with water or chemical solvents.
8) Do not use any electrical accessories not approved by the equipment manufacturer.
9) Make sure the LED display and its auxiliary devices are grounded correctly and reliably before they are used.
10) Switch off the power immediately and contact the professional personnel when the LED display has any abnormal conditions such as peculiar smell, smoke, electric leakage, and abnormal temperature.

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◆ CAUTION!

The optimum displaying effect may fail to be achieved if you ignore the following cautions.

1) Wear antistatic gloves when installing or repairing the product.
2) Ensure good ventilation for the LED display when designing the heat dissipation solution.
3) Keep the storage environment of the LED display well ventilated and dry, with a humidity not exceeding 85%.
4) Use single-phase power supply for an LED display with the total power consumption not exceeding 3 kW, and three-phase power supply for an LED display with the total power consumption exceeding 3 kW.
5) Ensure that the LED display is powered on at least twice per week, and at least 2 hours each time.
6) Installing the LED display in the following places may result in an equipment failure and reduce its lifespan: near the sea, in an area with salt and alkali or sulphurous gases, near a kitchen exhaust position, or at a place where the difference between indoor and outdoor temperatures is great. Consult our professional personnel at the service center if the LED display must be installed in any of these places.
7) If the product is shipped to Spain, the Spanish manual will be attached accordingly.
8) Altitude during operation (m):5000m or less.

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Contents

Chapter 1 Product Introduction 1
1.1 Features 1
1.2 Cabinet Appearance 2
1.3 Specification 3
1.4 System Solution 7
1.5 Scope of Application 8
Chapter 2 Installation and Wiring 9
2.1 Out-of-Box Inspection 9
2.2 General Installation 9
2.2.1 Installation of Fixed LED Display-Rear Installation(Optional) 10
2.2.2 Installation of Fixed LED Display-Front Installation(Optional) 12
2.3 Module Flatness Adjustment 20
2.3.1 Module Flatness Adjustment 20
2.4 Wiring for LED Display 21
2.4.1 Common Cables 21
2.4.2 Signal Cable Connection 22
2.4.3 Power Cable Connection 23
2.4.4 Smart Control Distribution Box 24
Chapter 3 LED Display Control Setting 26
3.1 Power-on Testing 26
3.2 Starting the Hardware 27
3.3 Unilumin N series - Software Control Setting 27
3.3.1 Installing the Software 27
3.3.2 Display Configuration 28
3.3.3 Brightness Adjustment 32
3.3.4 Correction Coefficient Management 34
3.3.4.1 Setting Coefficients for a New Receiving Card 36
3.3.4.2 Setting Coefficients for a New Module 39
3.3.4.3 Replace Module with Flash 41

Unilumin

3.3.5 Pre-storing Picture 42
3.4 Unilumin K series - Software Control Setting 44
3.4.1 Installing the Software 44
3.4.2 Display Configuration 44
3.4.2.1 Login to the Display Settings Interface 44
3.4.2.2 Set the Sending Card 45
3.4.2.3 Screen Parameters Setting 48
3.4.2.4 Display Connection 49
3.4.3 Brightness Adjustment 49
3.4.4 Calibration 52
3.4.4.1 Setting Coefficients for a New Module 52
Chapter 4 LED Display Playing Setting 56
4.1 Unilumin N series - LED Display Playing Setting 56
4.1.1 Selecting a Playing Solution 56
4.1.2 Playing Setting 57
4.1.2.1 Display Window Setting 57
4.1.2.2 Startup Setting 58
4.1.3 Editing Professional Playing Solution 59
4.1.3.1 Editing the Time Segment 59
4.1.3.2 Editing the Program Page 61
4.1.3.3 Editing the Display Window 64
4.1.3.4 Editing the Media 67
4.1.3.5 Playing the Media 70
4.1.4 Saving and Opening a Playing Solution 72
4.2 Unilumin K series - LED Display Playing Setting 74
4.2.1 Set the Count and Size of the Screen 74
4.2.2 Setting the Program Page 75
4.2.3 Adjust Window Position and Size 78
4.2.4 Playing the Program 79
4.2.5 Edit Window 81
4.2.6 Timed Playback and Control 82

Unilumin

Chapter 5 Startup, Shutdown, and Maintenance 85
5.1 Startup Sequence 85
5.2 Shutdown Sequence 85
5.3 Daily Maintenance 85
5.4 Warm-up Operation 86
5.4.1 Unilumin N series - Setting the Prestored Picture 86
5.4.2 Unilumin N series - Ageing Operation 87
5.4.3 Unilumin K series - Ageing Operation 89
Chapter 6 MP - LED Display Control-setting 90
6.1 Power-on Testing 90
6.2 Preparation 90
6.2.1 Video Input 91
6.2.2 Custom Input Bandwidth Calculations 91
6.2.3 Creating a Raster Map 91
6.2.4 Dual Input Cards 93
6.3 Connections 95
6.3.1 IP Addressing 95
6.3.2 Display Configuration 96
6.3.3 Web UI 97
Chapter 7 MP - Playing on the LED Display 98
7.1 Creating Maps 98
7.1.1 Tile details 99
7.1.2 Position Tools 102
7.1.3 Tile Configuration 103
7.1.4 The maintenance 104
7.2 Seams Pane 105
7.3 Input Pane 108
7.3.1 Sync 110
7.3.2 Output Window 112
7.3.3 Input Adjustments 113
7.3.4 EOTF Adjustments 115

Unilumin

7.4 Output Pane 119
7.4.1 Display Gamut 119
7.4.2 Report 121
7.4.3 Light science 123
7.4.4 Camera (Advanced) 123
7.5 Devices Pane 124
7.5.1 Processing Tab 124
7.5.2 Network Switches 126
7.5.3 Display Devices Tab 127
7.6 Health Pane 128
7.6.1 Alerts 128
7.6.2 Heat map 129
7.6.3 Reports 130
7.7 Settings Pane 130
7.7.1 Processor Settings 131
7.7.2 Saved Configurations 135
7.7.3 Preview Pane 138
Chapter 8 Troubleshooting and Component Replacement 140
8.1 Common Faults and Troubleshooting Methods 140
8.1.1 Failure in Lighting up the Display 140
8.1.2 Incomplete Picture or Incorrect Position of Picture Displayed 140
8.1.3 Screen Blinking 141
8.1.4 Blinking of a Cabinet in the Display 141
8.1.5 Failure in Lighting up of a Cabinet in the Display 141
8.1.6 Failure in Lighting up Part of the Modules in the Cabinet 142
8.2 Replacement of Main Components 142
8.2.1 Replacement of Module 142
8.2.2 Replacement of Power Supply 147
8.2.3 Replacement of Receiving Card 149
8.2.3 Replacement of HUB Card 150
Chapter 9 Packaging Transportation and Storage 151

Unilumin

9.1 Packaging 151
9.2 Transportation 151
9.3 Storage 151
Chapter 10 After-Sales and Warranty 152
10.1 Warranty Scope 152
10.2 Warranty Period 152
10.3 Warranty Service 152
11.3.1 Warranty Service Types 152
10.4 Disclaimerjavascript:; 153
10.5 Warranty Service Process 154
10.6 Other 155
10.7 Product Warranty Card 156
Contact Information 157

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Chapter 1 Product Introduction

The UpanelSⅡ series is a new generation of small pitch LED display product launched by Unilumin. Designed for HD display application scenarios, the UpanelSⅡ series has a standard aspect ratio of 16:9 and has achieved perfect match between video signals and display terminals. The ultra-thin design makes the LED display fully integrate with scenarios. The exclusive function of intelligent module improves user experience and changes maintenance methods fundamentally. Meanwhile, front&rear maintenance design suits more occasions demand. Common cathode flip chip SMD provides high contrast ratio, greatly enriching the LED display color level, and presents a more delicate visual impact effect. Ultra-low standby power consumption of the screen, more energy-saving and environmentally friendly. Freely and seamlessly spliced into any size display to meet the needs of the application environment.

1.1 Features

1) Intelligent Module, Front and rear maintenance design provides a better maintenance experience.
2) 5G bandwidth, 240 Hz frame frequency, smooth picture and low delay.
3) Common cathode Flip chip provides ultra-high contrast and delicate display.
4) Ultra-low standby power consumption, more energy-saving and environmentally friendly.
5) Wireless connection between module and cabinet.

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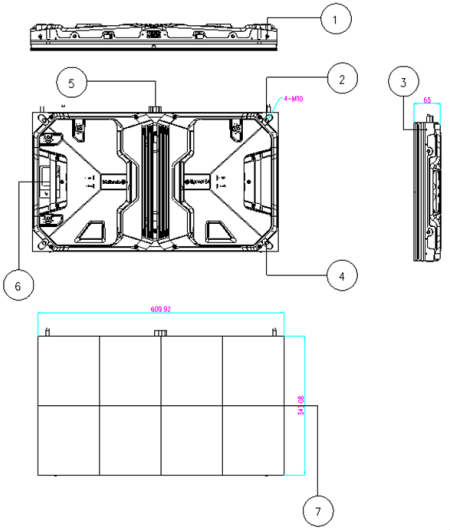
1.2 Cabinet Appearance



1. Upper/lower shoulder screw hole
2. Cabinet positioning column
3. Left/right shoulder screw hole
4. Cabinet mounting hole
5. Power port
6. Cabinet handle
7. Module

Fig 1-1 Cabinet Appearance

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1.3 Specification

Parameter		Upanel0.9SII	Upanel1.2SII	Upanel1.5SII	Upanel1.9SII	Upanel2.5SII
Physical Parameter	Pixel composition	1R1G1B				
	LED type	SMD				
	Pixel per Cabinet(dots)	640×360	480×270	384×216	320x180	240x135
	Cabinet size（mm）	600（W）×337.5（H）×39.5（D）				
	Aspect Ratio	16：9	16：9	16：9	16：9	16：9
	Material	Die-casting aluminium				
	Planeness(mm)	≤0.15	≤0.15	≤0.15	≤0.15	≤0.15
	Weight(kg)	7.5kg/panel	7.5kg/panel	7.5kg/panel	7.5kg/panel	7.5kg/panel
	Refresh rate(Hz)	3840	3840	3840	3840	3840
	Frame frequency(Hz)	50/60	50/60	50/60	50/60	50/60
	Data interconnection	Sign cable≤100m,Multi-mode optical fiber≤300m,Single-mode optical fiber≤10km				
Optical Parameter	Brightness(nits)	600	600	600	600	600
	Color temperature(K)	2000~9500K(adjustable)				
	Viewing angle	160/160	160/160	160/160	160/160	160/160
Electrical Parameter	Input voltage(V)	AC 100~240V				
	Input frequency(Hz)	50~60	50~60	50~60	50~60	50~60
	Input power<max> (W/Cabinet)	161±15	144±15	130±15	125.8±15	130±15
	Input power<typical> (W/Cabinet)	51±15	45±15	43±15	75.2±15	43±15
Circumstance Paramete	Working temperature/humidity	-20~+60/10~85%				
	Storage temperature/humidity	-10~+40/10~80%				
	Ingress protection	Rear IP30				

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Parameter		Upanel0.9SII Pro	Upanel1.2SII Pro	Upanel1.5SII Pro	Upanel1.9SII Pro	Upanel2.5SII Pro
Physical Parameter	Pixel composition	1R1G1B				
	LED type	SMD				
	Pixel per Cabinet(dots)	640×360	480×270	384×216	320x180	240x135
	Cabinet size（mm）	600（W）×337.5（H）×39.5（D）				
	Aspect Ratio	16：9	16：9	16：9	16：9	16：9
	Material	Die-casting aluminium				
	Planeness(mm)	≤0.15	≤0.15	≤0.15	≤0.15	≤0.15
	Weight(kg)	7.5kg/panel	7.5kg/panel	7.5kg/panel	7.5kg/panel	7.5kg/panel
	Refresh rate(Hz)	3840	3840	3840	3840	3840
	Frame frequency(Hz)	50/60	50/60	50/60	50/60	50/60
	Data interconnection	Sign cable≤100m,Multi-mode optical fiber≤300m,Single-mode optical fiber≤10km				
Optical Parameter	Brightness(nits)	1000	1000	1000	1000	1000
	Color temperature(K)	2000~9500K(adjustable)				
	Viewing angle	160/160	160/160	160/160	160/160	160/160
Electrical Parameter	Input voltage(V)	AC 100~240V				
	Input frequency(Hz)	50~60	50~60	50~60	50~60	50~60
	Input power<max> (W/Cabinet)	137.1±15	126±15		144±15	134±15
	Input power<typical> (W/Cabinet)	90.2±15	90±15		45±15	42±15
Circumstance Paramete	Working temperature/humidity	-20~+60/10~85%				
	Storage temperature/humidity	-10~+40/10~80%				
	Ingress protection	Rear IP30				

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Parameter		Upanel0.9SII Pro	Upanel1.2SII Pro	Upanel1.5SII Pro	Upanel1.9SII Pro	Upanel2.5SII Pro
Physical Parameter	Pixel composition	1R1G1B				
	LED type	SMD				
	Pixel per Cabinet(dots)	640×360	480×270	384×216	320x180	240x135
	Cabinet size（mm）	600（W）×337.5（H）×39.5（D）				
	Aspect Ratio	16：9	16：9	16：9	16：9	16：9
	Material	Die-casting aluminium				
	Planeness(mm)	≤0.15	≤0.15	≤0.15	≤0.15	≤0.15
	Weight(kg)	7.5kg/panel	7.5kg/panel	7.5kg/panel	7.5kg/panel	7.5kg/panel
	Refresh rate(Hz)	3840	3840	3840	3840	3840
	Frame frequency(Hz)	50/60	50/60	50/60	50/60	50/60
	Data interconnection	Sign cable≤100m,Multi-mode optical fiber≤300m,Single-mode optical fiber≤10km				
Optical Parameter	Brightness(nits)	1200 ~ 1500	1200 ~ 1500	1200 ~ 1500	1200 ~ 1500	1200 ~ 1500
	Color temperature(K)	2000~9500K(adjustable)				
	Viewing angle	160/160	160/160	160/160	160/160	160/160
Electrical Parameter	Input voltage(V)	AC 100~240V				
	Input frequency(Hz)	50~60	50~60	50~60	50~60	50~60
	Input power<max> (W/Cabinet)	137.1±15	126±15		144±15	134±15
	Input power<typical> (W/Cabinet)	90.2±15	90±15		45±15	42±15
Circumstance Paramete	Working temperature/humidity	-20~+60/10~85%				
	Storage temperature/humidity	-10~+40/10~80%				
	Ingress protection	Rear IP30				

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Note：Specifications are for reference only and are subject to change without notice.

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1.4 System Solution

The display system consists of the LED display, sending box, control PC, matrix, splicing controller and power distribution box (refer to the shipping list for details). The following shows a topology of the system for reference:

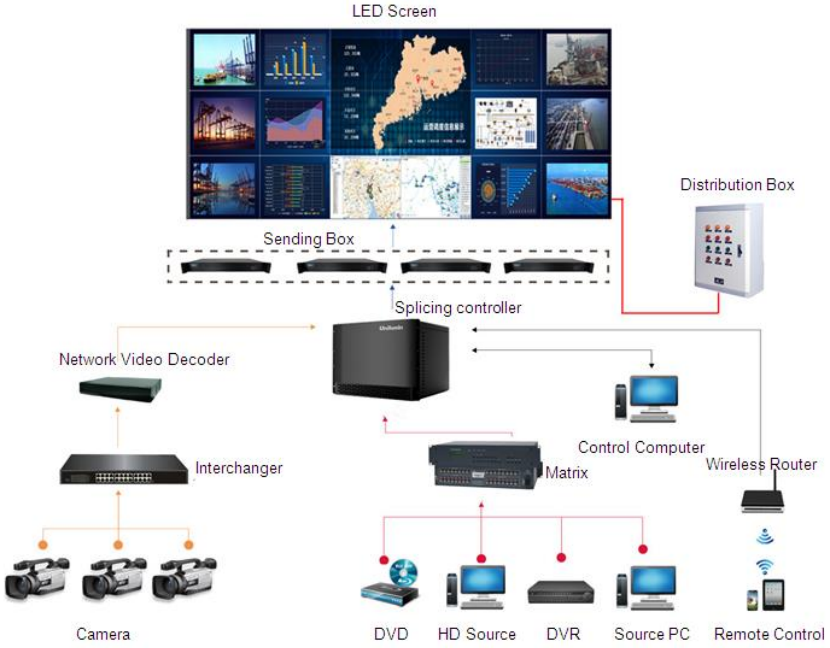


Fig 1-2 System Topology

1.5 Scope of Application

The UpanelSⅡ series products can be assembled seamlessly into a screen of any size, and are extensively used as fixed LED displays for advertisements in public places such as Conference room, command and control room, exhibition hall, airport, station, urban rail and other public places display, as well as hotel lobby, company lobby, shopping mall, brand store, promotion site and home theater and other fields.

Control Room

Immersive experience

Meeting Room

Upscale Retail

Chapter 2 Installation and Wiring

2.1 Out-of-Box Inspection

Check whether the packages are damaged. If the packages are intact, check the main components against the shipping list. If any inconsistency is found, contact us in time.

The main components include cabinets, signal cable, power cable, USB cable, DVI cable, and sending box. For details about the components, refer to the shipping list.

2.2 General Installation

Screen calibration is performed on the UpanelSⅡ series product before shipment, and the product needs to be installed sequentially according to the cabinet number, as shown in Fig 2-1:

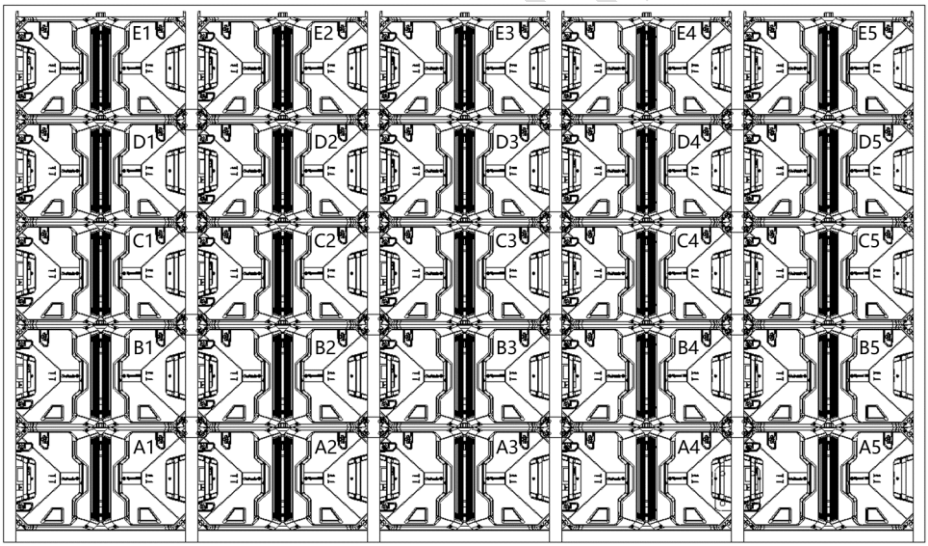


Fig 2-1 Rear View of the Display

2.2.1 Installation of Fixed LED Display-Rear Installation(Optional)

1) Check whether the bottom beam is level. Make sure that its levelness is within ±1mm.
2) Install the cabinets sequentially from bottom to top and from middle to both sides. In addition, fix the connecting plates and cabinets with installation screws to the square tubes.
3) Keep proper joints and flatness between the cabinets during cabinet installation.
4) After the installation of the cabinet is completed,Connect the power cable and the signal cable between the cabinets;
5) The installation of the screen is completed.

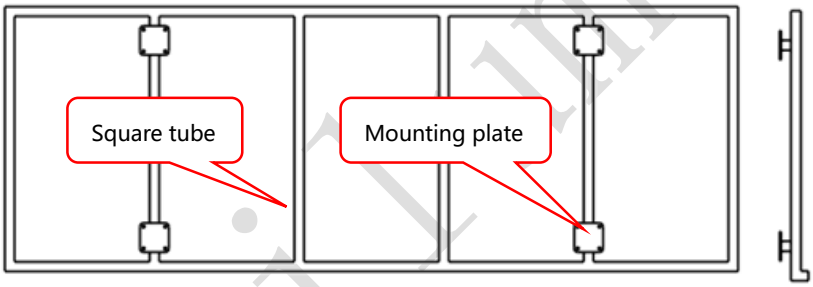


Fig 2-2 Profile Installation

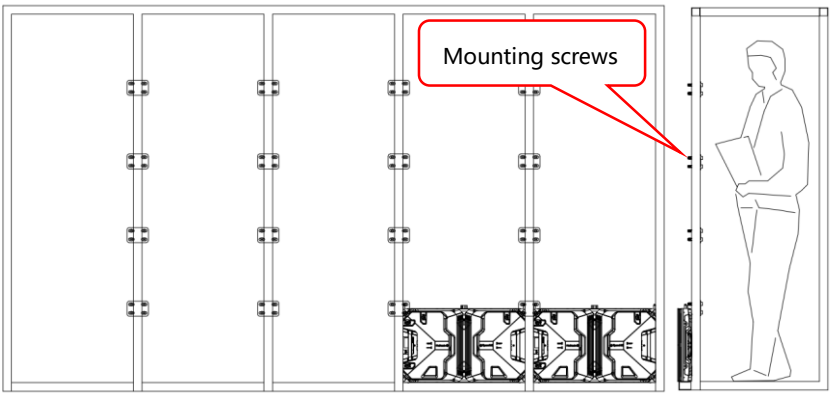


Fig 2-3 Cabinet Fastening

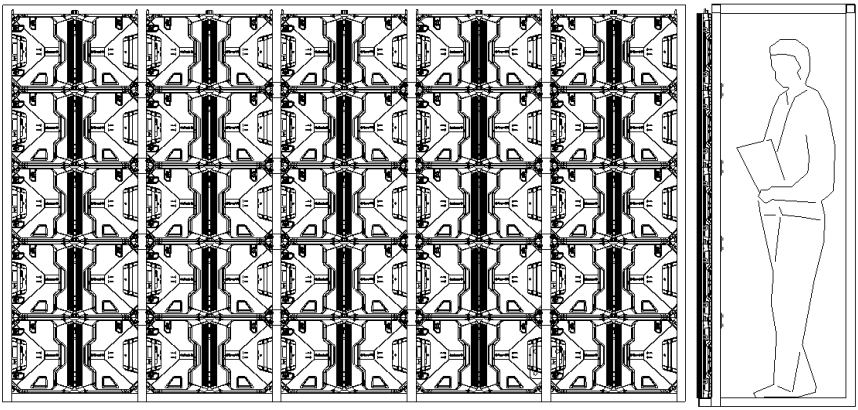


Fig 2-4 Rear View of Cabinet Installation

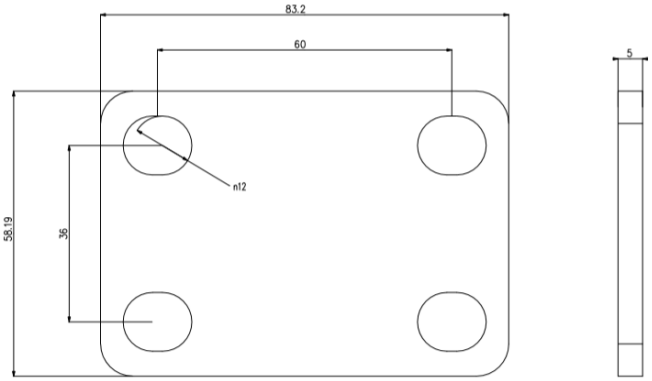


Fig 2-5 Rear maintenance installation plate

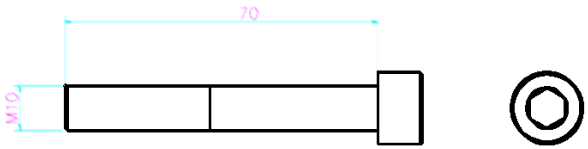


Fig 2-6 Rear installation M10×70 Inner hexagon bolt

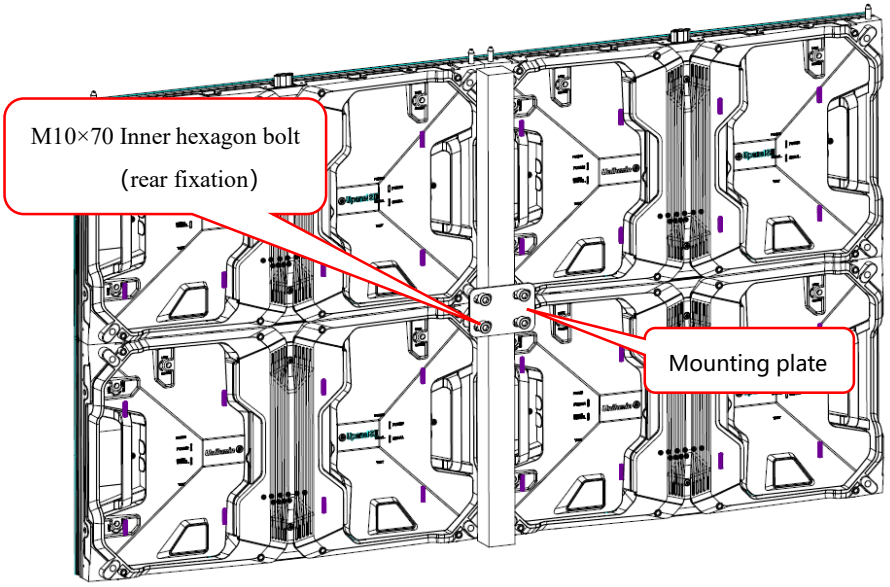


Fig 2-7 Back view of rear maintenance Installation Details

2.2.2 Installation of Fixed LED Display-Front Installation(Optional)

1) Check whether the bottom beam is level. Make sure that its levelness is within ±1mm.
2) Install the cabinets sequentially from bottom to top and from middle to both sides. In addition, fix the connecting plates and cabinets with installation screws to the square tubes.
3) Keep proper joints and flatness between the cabinets during cabinet installation.
4) After the installation of the cabinet is completed,Connect the power cable and the signal cable between the cabinets;
5) Install the module on the corresponding cabinets.During the module installation keep flatness between the modules during modules installation;
6) The installation of the screen is completed.

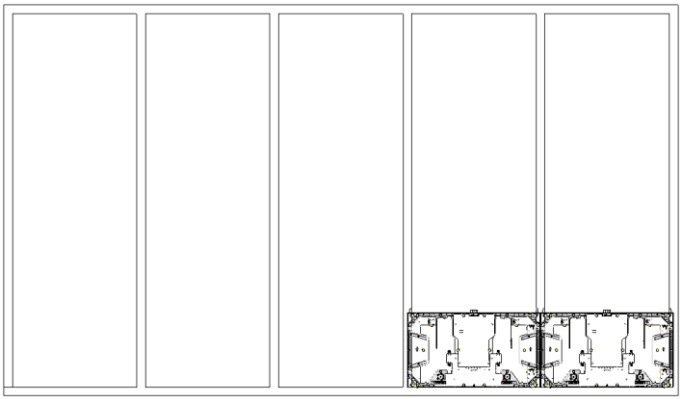


Fig 2-8 Cabinet Fastening

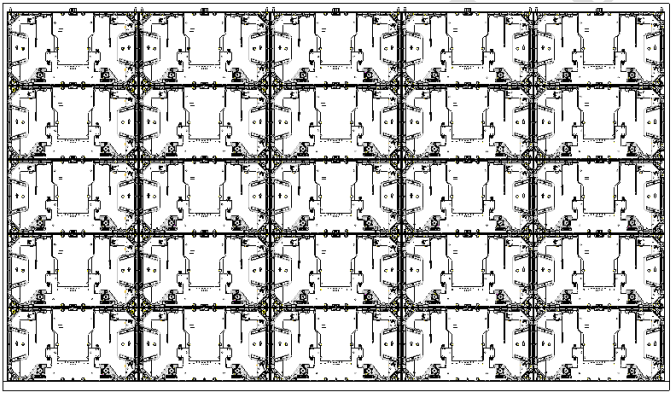


Fig 2-9 Front View of Cabinet Installation

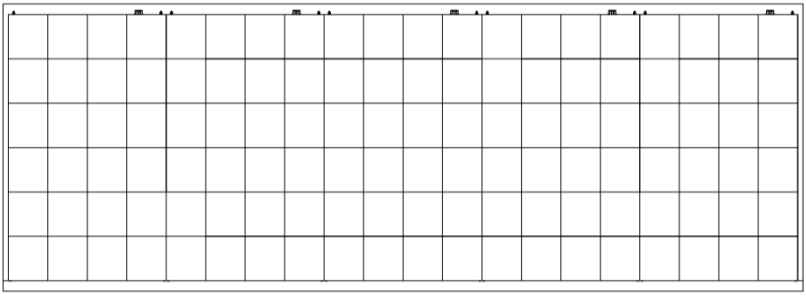


Fig 2-10 Front View of the Display

2.2.3 **Installation of Fixed LED Back Strip Installation(Optional)**

Back strip selection:

According to the size of the display, select the corresponding back strip (2-in-1 back strip, 3-in-1 back strip, 4-in-1 back strip, 5-in-1 back strip), as shown in Figure2-11.

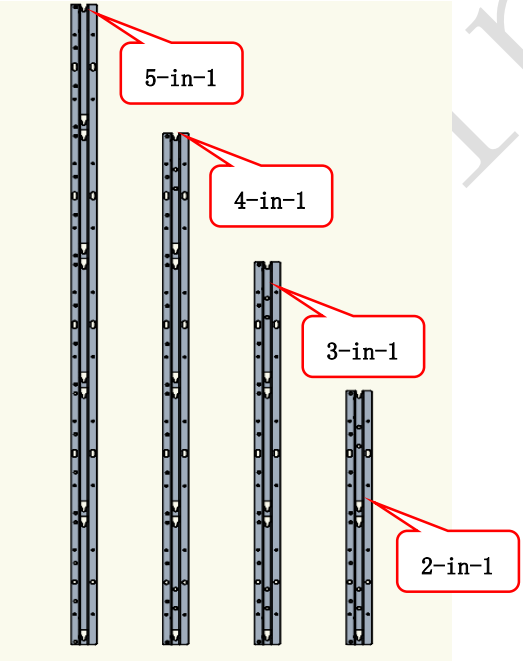


Fig 2-11 Back strips of different sizes

Installation steps:

1. Install the first back strip on the wall that needs to be fixed on according to the screen size, and check whether the back strip is vertical, as shown in Figure 2-12.

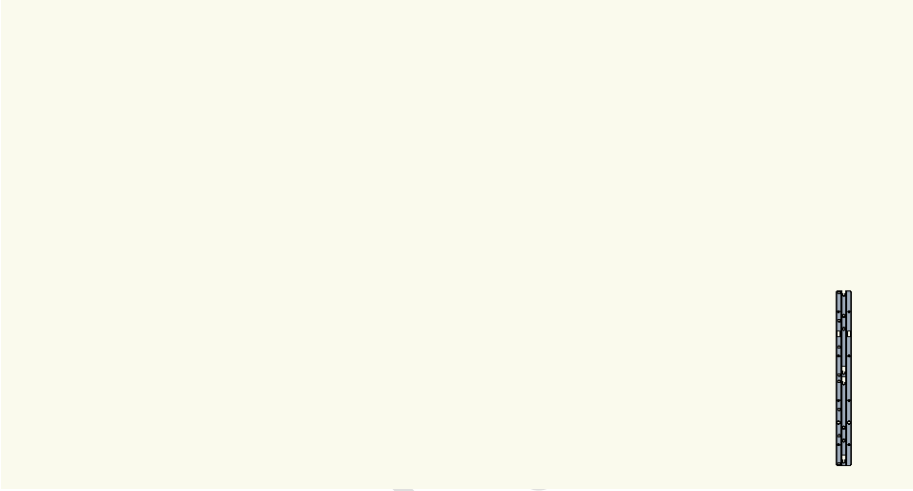


Fig 2-12 Installing the first back strip

2. Fix the positioning device on the first back strip, confirm the specific position of the second back strip, and remove the positioning device after fixing the second back strip. According to the positioning device, repeat the above steps to complete the installation of other back strips, and ensure that all back strips are vertical;

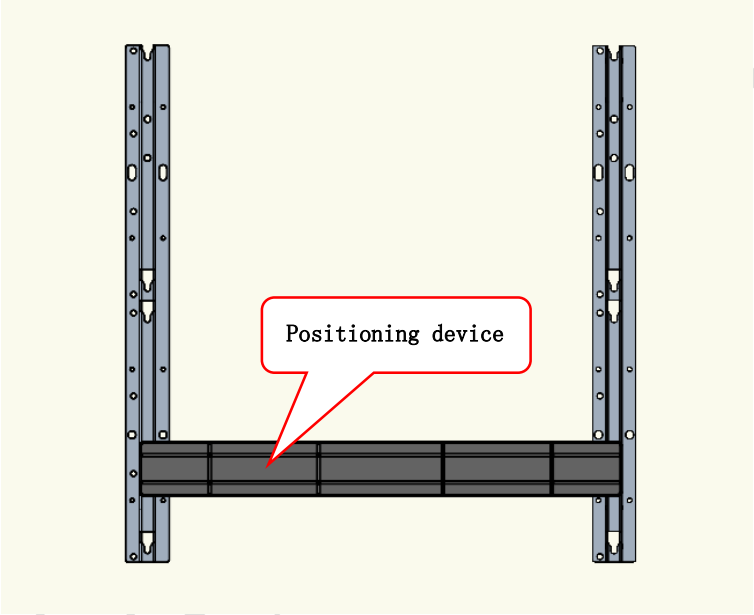


Fig. 2-13 Mounting the back strip according to the positioning device

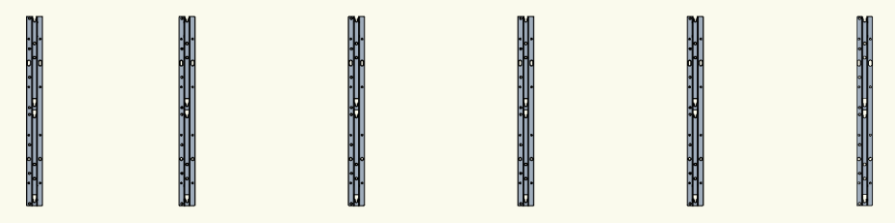


Fig 2-14 The installation of the back strip is complete

3. Install the hanging pin on the cabinet, align the cabinet with the installation hole on the back strip, and hang the cabinet on the back strip. The other cabinets are then hung on the back strip from the bottom to the top, from the middle to the sides. This is shown in Figure 2-15，2-16，2-17.

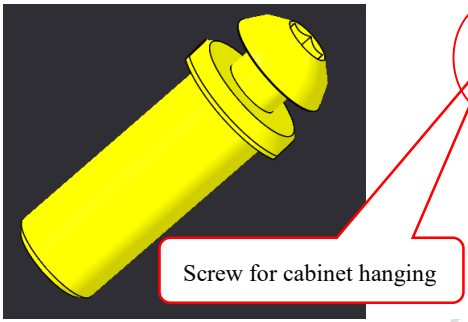


Fig 2-15 Hanging pin

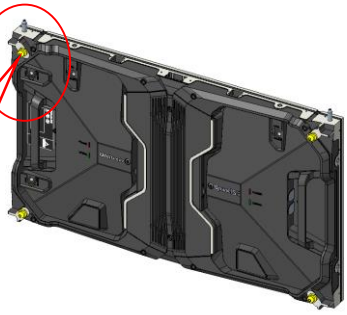


Fig 2-16 Back of the enclosure

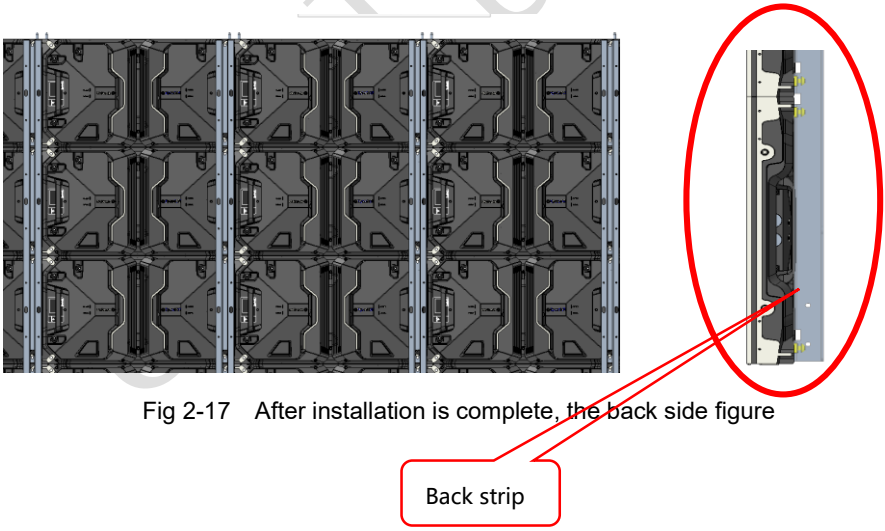


Fig 2-17 After installation is complete, the back side figure

4. If there are multiple rows of back strip to install, when installing the next row, you need to install the connector on the first back strip of the previous row, so as to confirm the position of the first back strip of the next row, connect the upper and lower back strips and ensure that the upper and lower back strips are on the same vertical line, and then repeat the above steps to complete the installation of other back strips and ensure that all the back strips are vertical. The cabinet is then hung on the back strip from the bottom to the top, from the middle to the two sides.

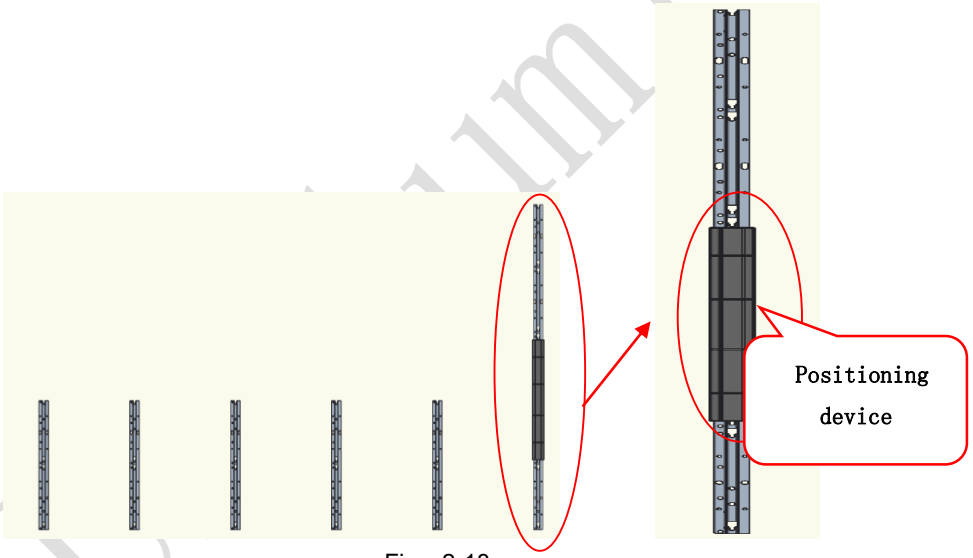


Fig 2-18

5. The installation of the back strip depends on the size of the cabinet. Different cabinet sizes have different mounting distances in the center of the back strip.

Note: Confirm the array of the back strip according to the drawing of the order, the above array is for reference only.

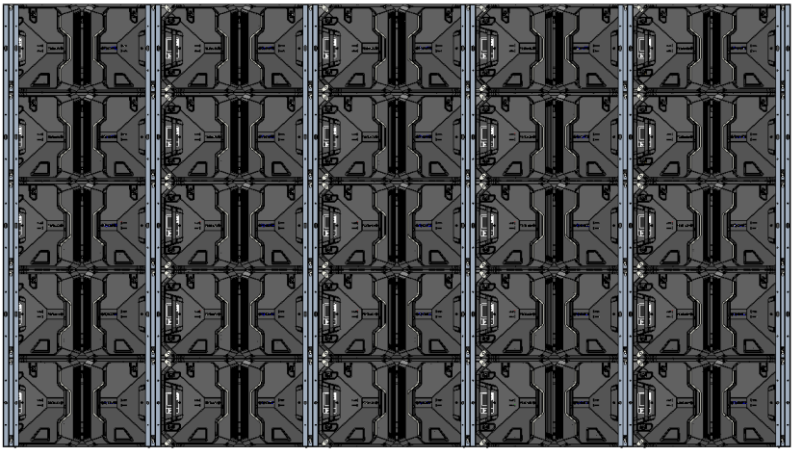


Figure 2-19 Back image after installation is complete

2.3 Module Flatness Adjustment

2.3.1 Module Flatness Adjustment

When there is a deviation in flatness between adjacent modules, use the adjustment tool to adjust the magnet on the box. At the low end, the module regulates the adjustable magnets until the module is flush with the adjacent modules. (one module has 8 adjustable magnets)

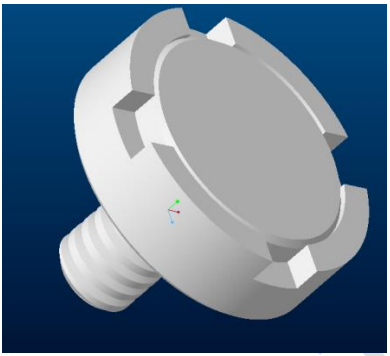


Fig 2-20 Adjustable magnet

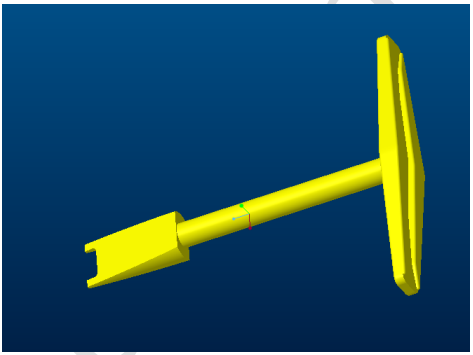


Fig 2-21 Adjusting tool

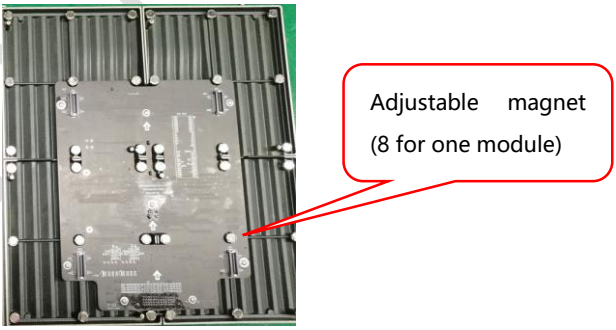


Fig 2-22 Schematic diagram of adjustable magnet

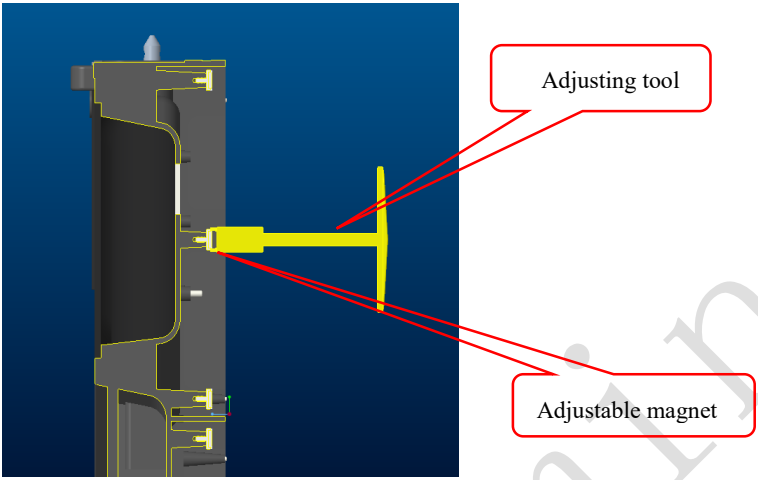


Fig 2-23 Schematic diagram of module flatness adjustment

2.4 Wiring for LED Display

2.4.1 Common Cables

Incoming Power Cables

USB Cable

DVI Cable

Incoming Signal Cable

Signal Cable for cabinet connection

2.4.2 Signal Cable Connection

Signal cables shall be connected based on the wiring diagram of the delivered products for the project.

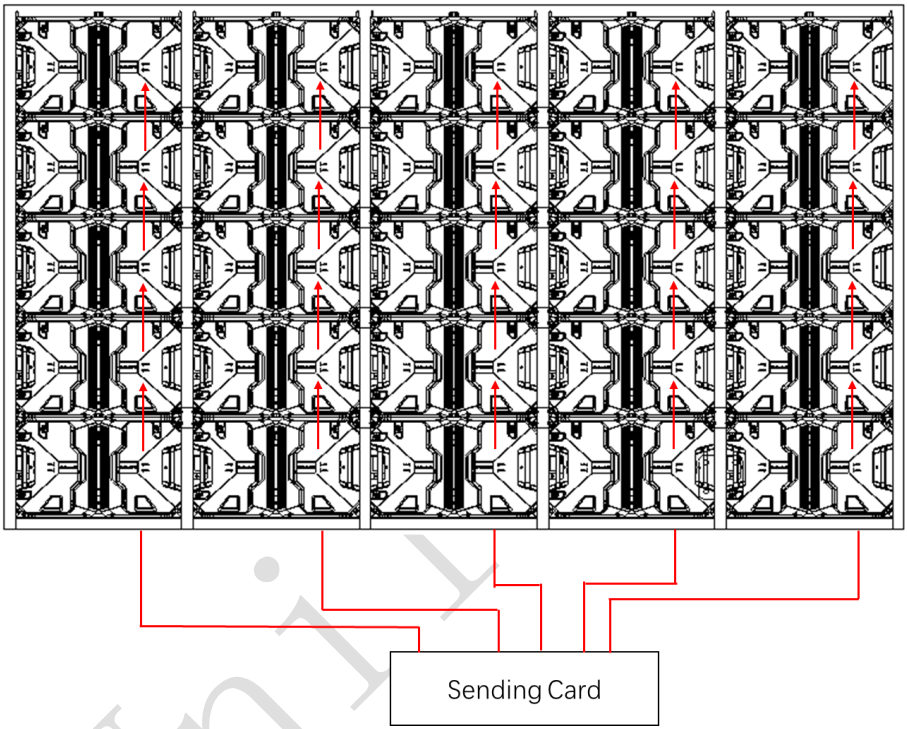


Fig 2-24 Signal Cable Connection Diagram of Upanel1.2SⅡ

2.4.3 Power Cable Connection

Power cables shall be connected based on the wiring diagram of the delivered products for the project.

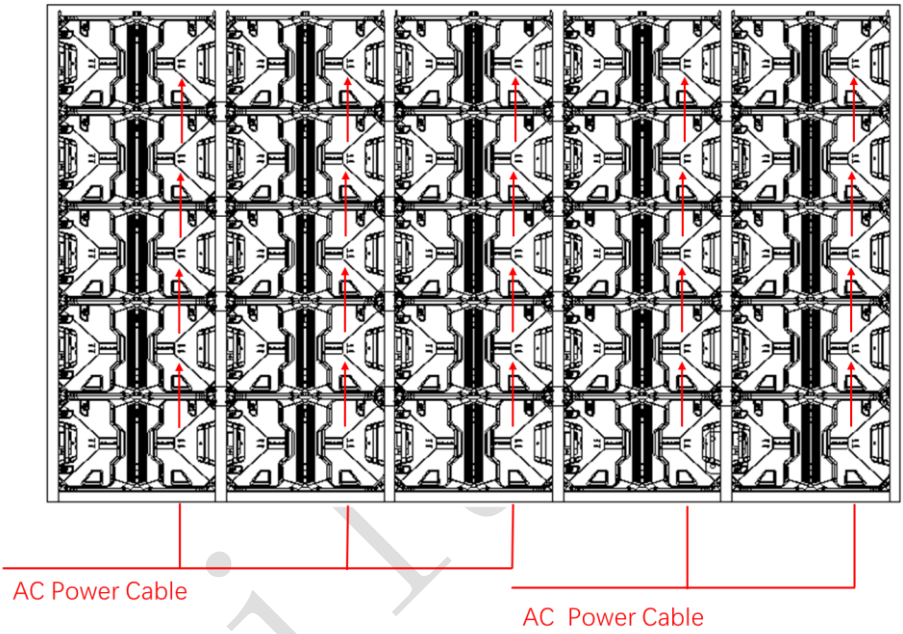


Fig 2-25 Power Cable Connection Diagram of Upanel1.2SⅡ

2.4.4 Smart Control Distribution Box

The Smart Control Distribution Box can be used for distributing electric power to the LED display, and has the function for real-time monitoring of the temperature, humidity, smoke, and mains voltage of the external environment. The control software has the scheduled start/stop function, allowing you to set any time for the LED display to be remotely started or stopped.

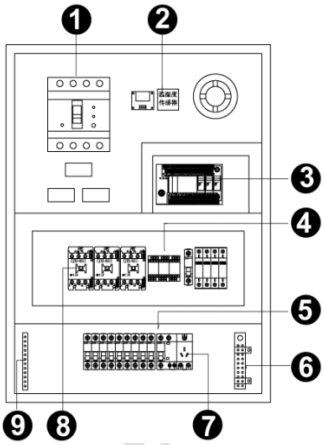


Fig 2-26 Internal Structure of Distribution Box

SN	Component	Remark (s)
1	Main switch	MCCB
2	Temperature sensor	Used for temperature detection
3	PLC	Used for smart control
4	Relays	Used to control the ON/OFF of the AC contactor
5	Circuit breaker	MCB,Connect to display live wire
6	Neutral wire socket	Connect neutral wire
7	Power Port	/
8	AC Contactor	Used to control the ON/OFF of the current
9	Earth wire socket	Connect earth wire

PLC connection of the smart control distribution box:

The PLC communication system is RS485, It uses converter from control computer RS232 to RS485. For more detail information, please refer to our Intelligent Power Distribution Management System Manual.

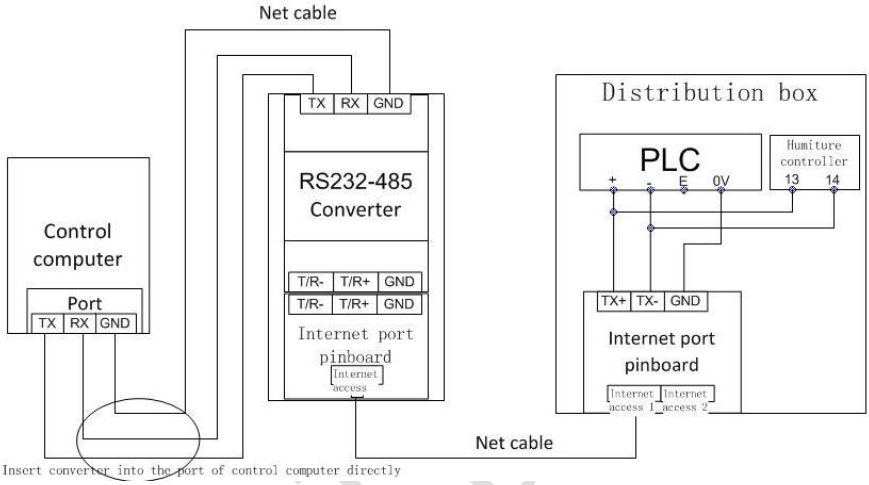


Fig 2-27 Distribution Box PLC Connection Diagram

Chapter 3 LED Display Control Setting

3.1 Power-on Testing

Before performing control setting on the LED display, confirm that each device is connected correctly.

1) Before turning on the power of the LED display, you must use a multimeter to test the live wire, neutral wire, and ground wire of the AC power supply, in order to ensure they are not conductive with each other.
2) The ground wire must be in reliable contact with the ground, and kept away properly from the live wire. The connected power supply shall be distant from high-power equipment.
3) When the 3-phase and 5-wire system is adopted, the load shall be distributed evenly among the phases to ensure three-phase balance as far as possible.
4) The input voltage must meet the voltage requirements indicated the cabinet rating label.
5) Connect the USB cable provided for the sending box to the USB port on the control PC.
6) Check whether cables for the LED display are connected in accordance with the power cable and signal cable connection diagrams provided for the delivered products.

Unilumin

3.2 Starting the Hardware

Start the control PC Windows system. After the graphics card driver is activated, set graphics card of the control PC to replication mode and confirm that the green indicator of the sending box is blinking normally (blinking once per second).

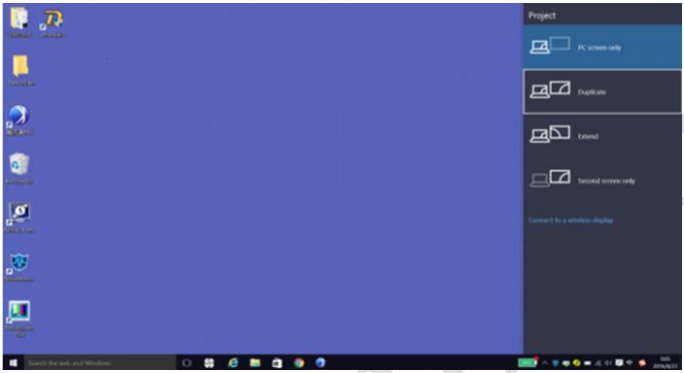


Fig 3-1 Replication Mode

3.3 Unilumin N series - Software Control Setting

3.3.1 Installing the Software

7) Open the optical disk provided for the delivered products. Install the LED control software UniLCT-Mars stored in the optical disk to the control PC. Then install UniStudio.

Fig 3-2 Software Installation

NOTE: You can follow the software installation wizard to install the software.

3.3.2 Display Configuration

Run UniLCT-Mars. Make sure that **Control System** on the main window is 1. Click the **User** option and select **Advanced Login**, as shown in Figure 3-3.

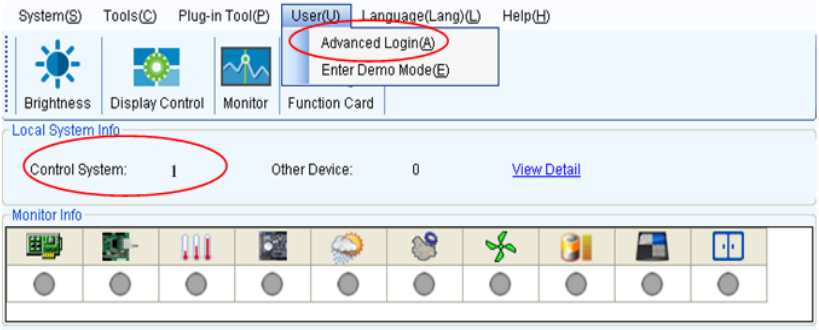


Fig 3-3 Main Window of UniLCT-Mars

Enter the initial password “admin”, as shown in Figure 3-4, to go to the advanced user window.

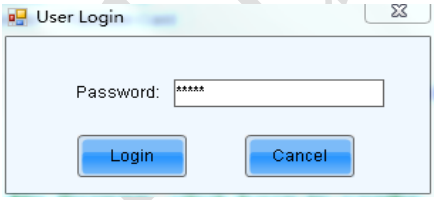


Fig 3-4 User Login

After login, click **Screen Config** on the main window, as shown in Figure 3-5:

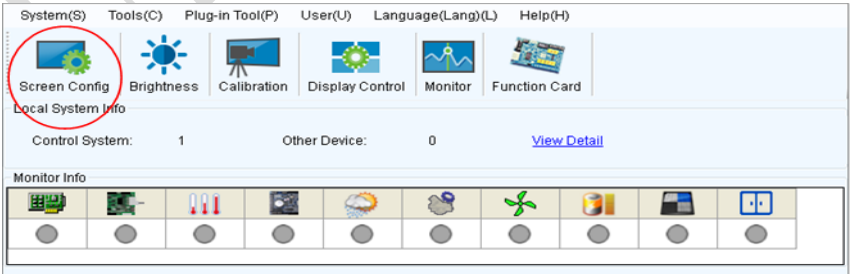


Fig 3-5 Main Window for Advanced User

Click **Next**, as shown in Figure 3-6:

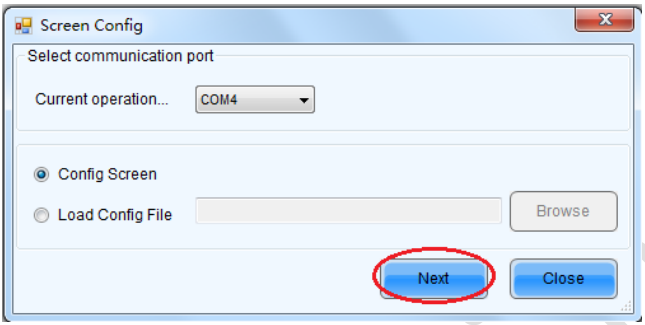


Fig 3-6 Screen Configuration

The following window is displayed. Set **Sending Board Resolution** (1920×1080 recommended). Set **Graphics Output Resolution** to the same value as **Sending Board Resolution**. Then click **Save** to save the settings.

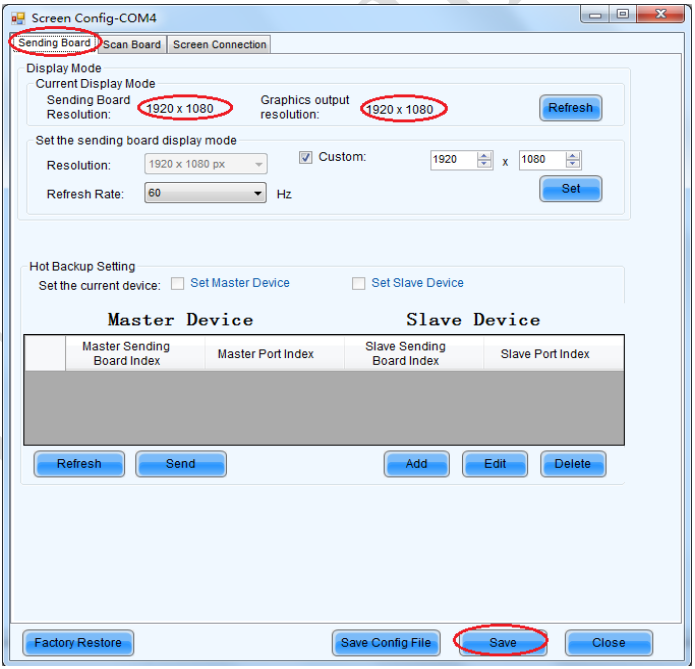


Fig 3-7 Sending Board Configuration

After configuring the parameters on the **Sending Board** page, click **Scan Board** to display the following window:

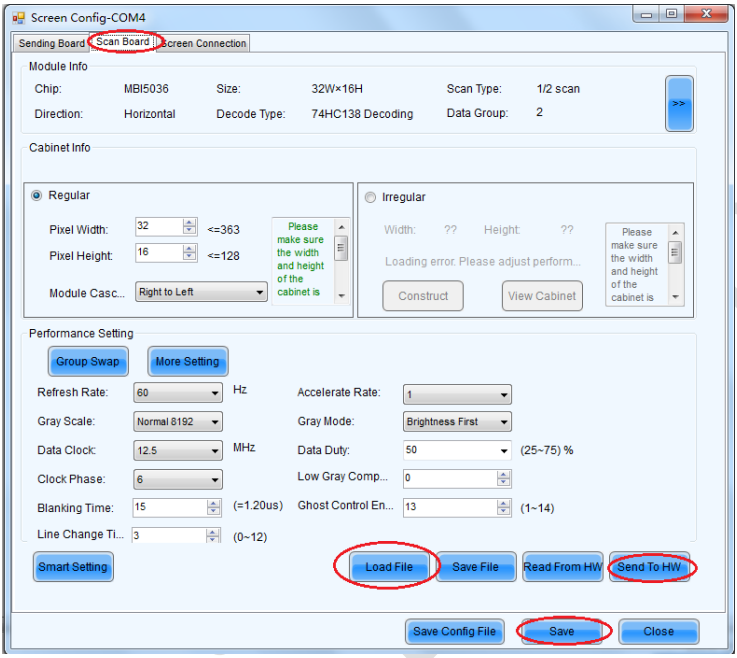


Fig 3-8 Scan Board Configuration

1） Click **Load File** to load the file xxxx.rcfg stored in the optical disk.

2） Click **Send to HW**.

3） After sending, confirm that the loaded picture received by scan board is normal on the screen. Then click **Save**.

After configuring the parameters on the **Scan Board** page, click **Screen Connection** to display the following window:

1) Click **Read File** to load the file xxxx.scr stored in the optical disk, as shown in Figure 3-9.

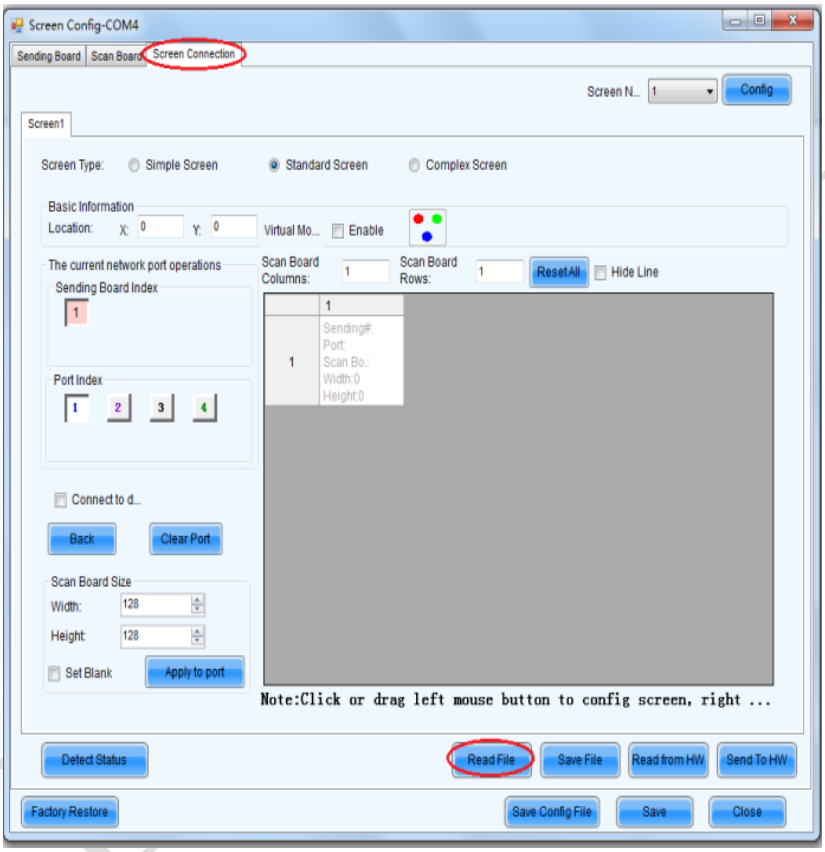


Fig 3-9 Screen Connection

2) Click **Send to HW**.

3) After sending, confirm that the screen is complete. Then click **Save**.

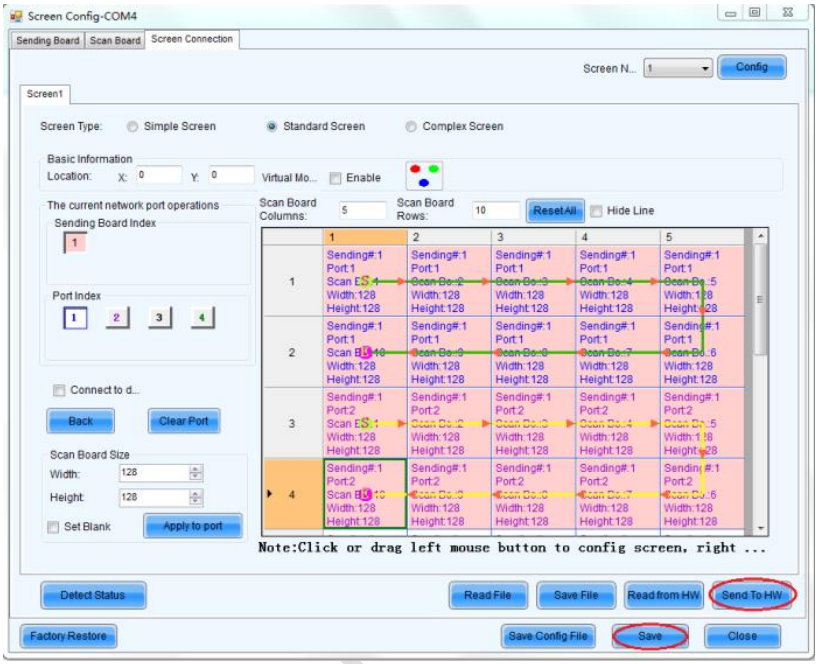


Fig 3-10 Screen Connection with Loaded File

3.3.3 Brightness Adjustment

On the main window, click **Brightness**, as shown in Figure 3-11, to display the brightness adjustment interface:

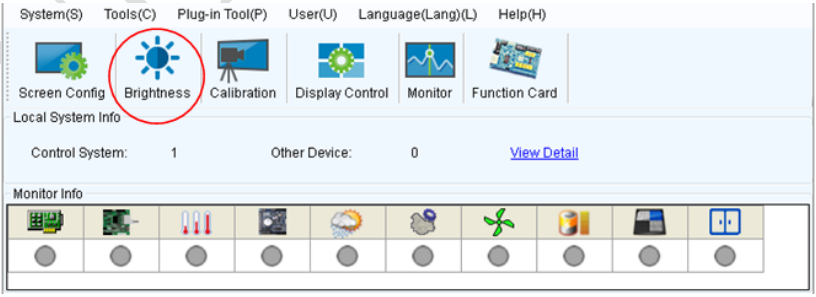


Fig 3-11 Main Window for Advanced User

There are four brightness adjustment modes, namely **Manual**, **Schedule**, **Auto**, and **Auto Adjustment by Hardware**. After adjustment is finished, click **Save to HW** to save the adjustment results to the hardware.

1. Manual Adjustment

Select **Manual** and adjust the brightness by dragging the scroll bar below **Brightness Adjustment** or directly modifying the brightness value (the maximum value is 255) next to the scroll bar.

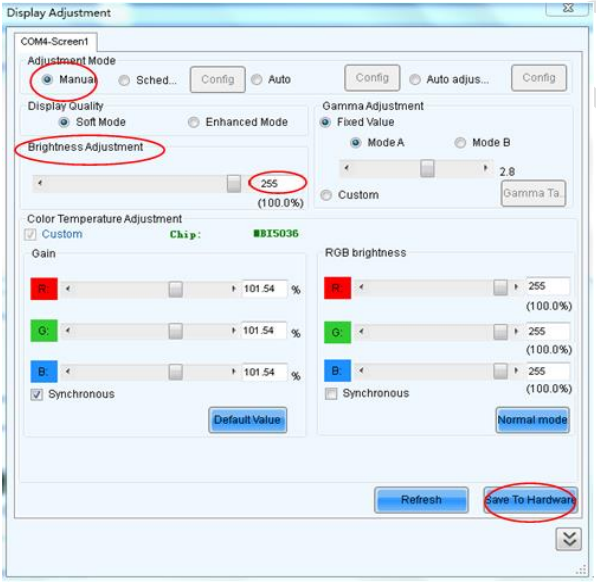


Fig 3-12 Manual Adjustment

Display Quality: Includes Soft mode and Enhanced mode. The Soft mode is generally used for indoor LED displays while the Enhanced mode is used for outdoor LED displays.

Gamma Adjustment: Includes Mode A and Mode B. The LED display in Mode A can light up earlier than that in Mode B.

Gain: For chips with current gain function, adjusting the current gain can improve the chip's current output.

RGB brightness: Adjusts the brightness of Red (R), Green (G) or Blue (B) separately.

2. Automatic Adjustment

Schedule, **Auto**, and **Auto Adjustment by Hardware** are automatic adjustment modes. Automatic adjustment function is not recommended for indoor LED display products because the indoor environment has stable ambient light and is rarely affected by the ambient brightness. If you really need to use this function, you can configure this function by using the wizard.

3.3.4 Correction Coefficient Management

The UTWII series products have been subject to correction before shipment. To ensure the optimum displaying effect of the screen, you need to activate the correction function when using the LED display, and to reload the correction coefficients after replacing the modules or receiving card. This Section introduces how to upload the correction coefficients after replacing the modules or receiving card.

On the main window, click **Calibration**, as shown in Figure 3-13, to display the screen calibration interface:

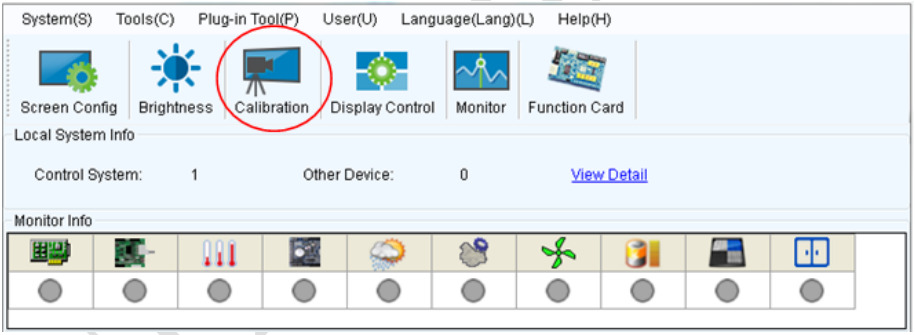


Fig 3-13 Main Window for Advanced User

Configure **Enable/Disable Calibration** to **Brightness**, click **Save**, and then click **Manage Coefficients** to display the following window:

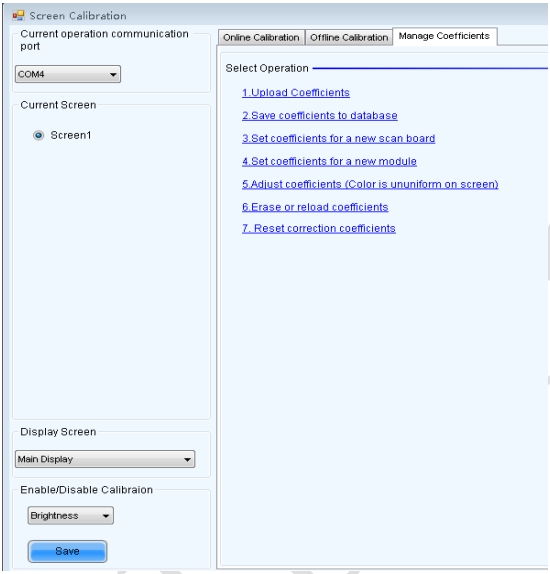


Fig 3-14 Manage Coefficients

Upload coefficients: Upload the correction coefficient database generated by the software or read back by the display screen to the screen.

Save coefficients to database: Read back and save the coefficients from the screen to the coefficient database.

Set coefficients for a new scan board: After replacing the scan board (receiving card), set the correction coefficients for the new receiving card.

Set coefficients for a new module: After replacing a module, set the correction coefficients for the new module.

Adjust Coefficients (Color is uniform on screen): Adjust the correction coefficients for a selected area on the screen to achieve a satisfactory effect.

Erase or reload Coefficients: Erase or reload the correction coefficients for a selected area on the LED display.

Reset Correction Coefficients: Reset the calibration coefficients on whole or selected section of LED display.

3.3.4.1 Setting Coefficients for a New Receiving Card

1) As shown in Figure 3-15, select **Topology or List**. Select the position of the replaced receiving card. Click **Next**:

Fig 3-15 Selecting Area for New Receiving Card

2) Select the coefficient source. Click **Browse** at **Select Database**.

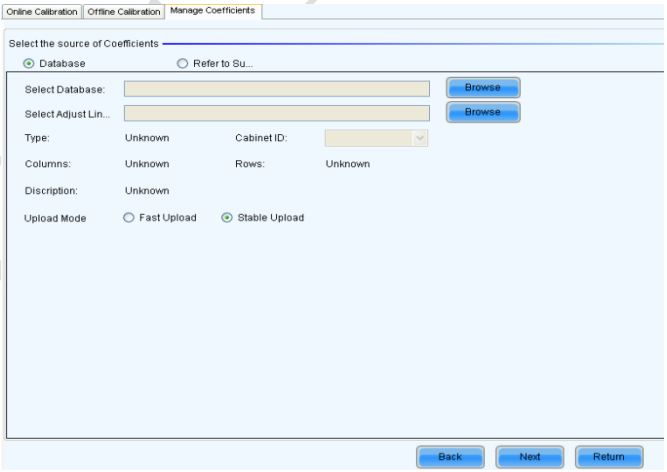


Fig 3-16 Obtaining Correction Coefficients for Receiving Card

3) Select the corresponding correction coefficients:

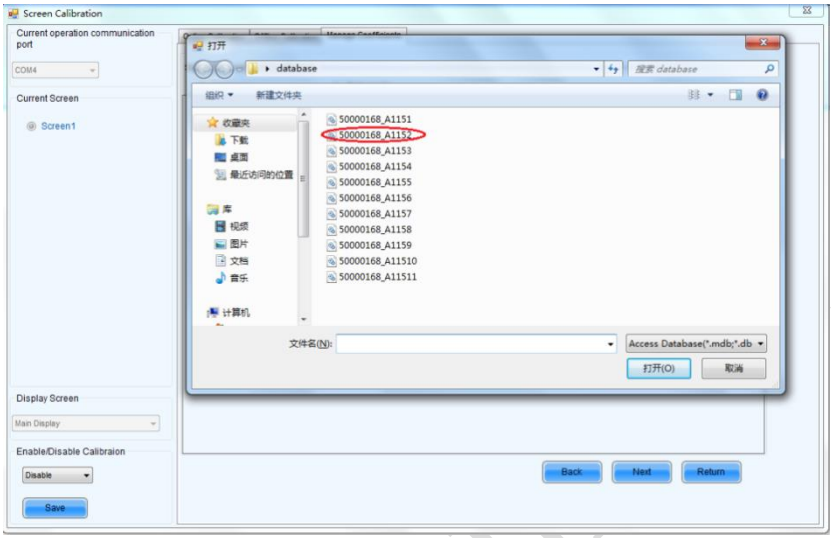


Fig 3-17 Selecting Correction Coefficients for Receiving Card

4) Select **Stable Upload** and click **Next**:

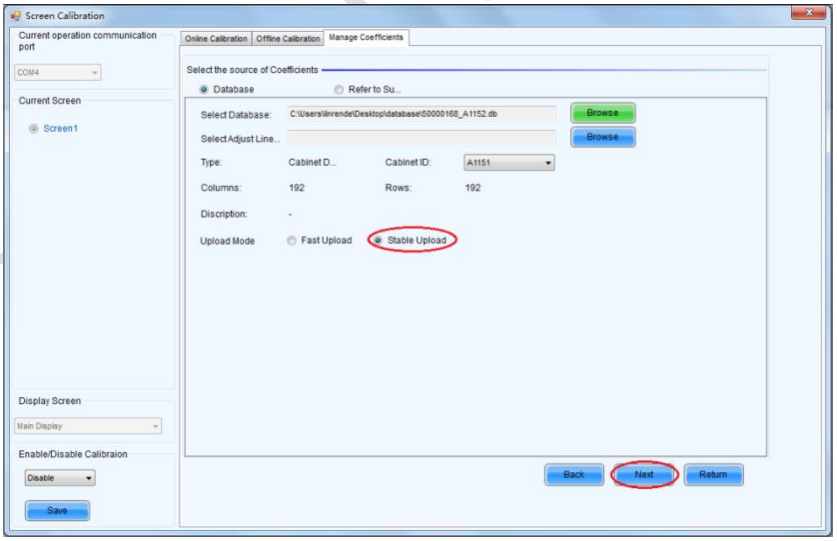


Fig 3-18 Uploading Correction Coefficients

5) Adjust Coefficient: Perform a simple adjustment if the displaying effect is not good enough after you upload the coefficient. Then click **Next**.

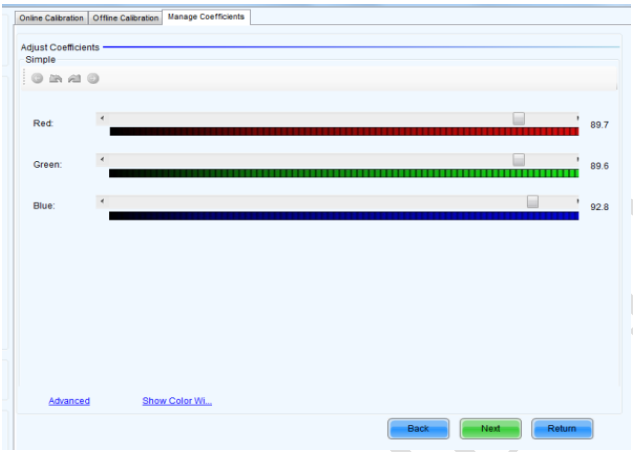


Fig 3-19 Simple Adjustment

Red：Adjust the red brightness value of calibration coefficients.

Green：Adjust the green brightness value of calibration coefficients.

Blue：Adjust the blue brightness value of calibration coefficients.

6) Save Coefficients: Click **Save** to save the correction coefficients to the hardware. The saved coefficients are retentive even after a power failure. Then click **Finish**.

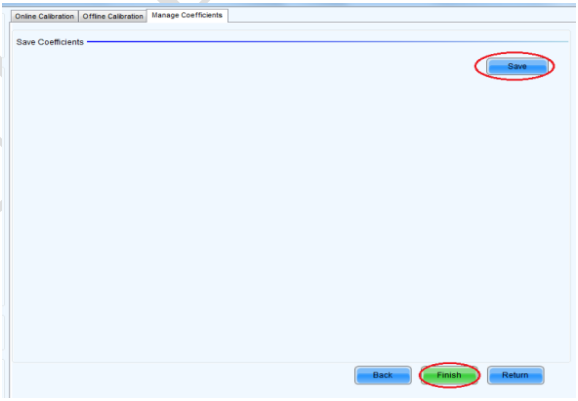


Fig 3-20 Saving Correction Coefficients

3.3.4.2 Setting Coefficients for a New Module

1） Select Position of the New Module: Select **Topology or List**. Then select the position of the receiving card where the new module is located. Double click the selected position:

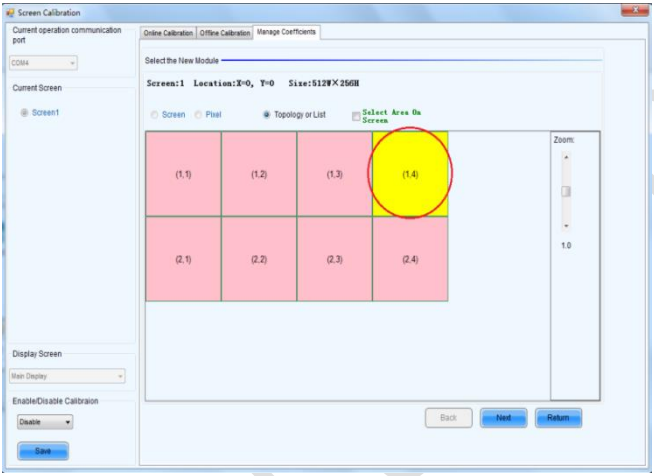


Fig 3-21 Selecting Cabinet for the New Module

2） Choose **Display Mode** to **Modules**. Select the position of the new module and click **Next**.

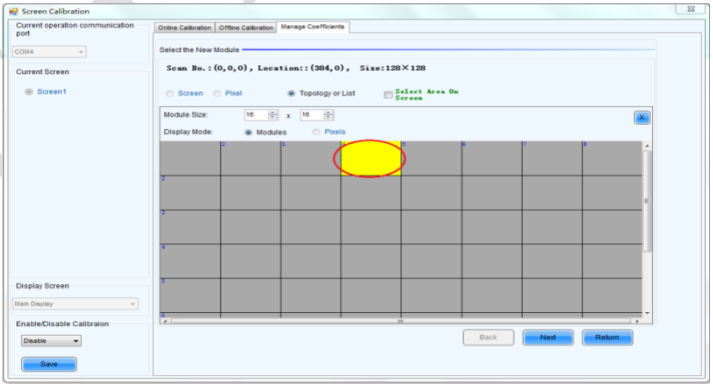


Fig 3-22 Selecting Position of New Module

Module Size： Set the size of the module in a cabinet. The software determines each module arrangement based on module size and cabinet size.

3） Adjust the coefficients (similar to the steps of coefficient adjustment in setting coefficients for a new scan board). For details, refer to Step 2 and Step 3 in Section 3.5.1).

4） Save the correction coefficients to the hardware (Use similar steps in setting coefficients for a new receiving card. For details, refer to Step 4, Step 5, and Step 6 in Section 3.5.1) so that they are retentive after a power failure.

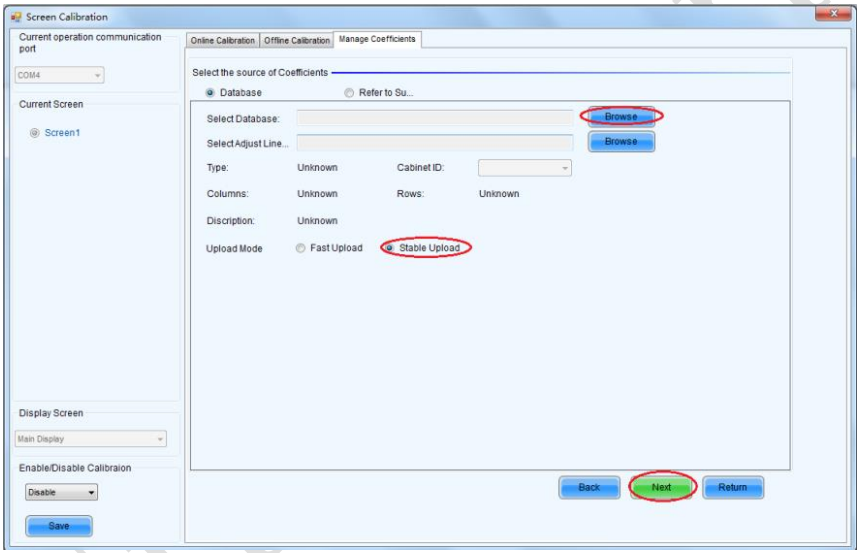
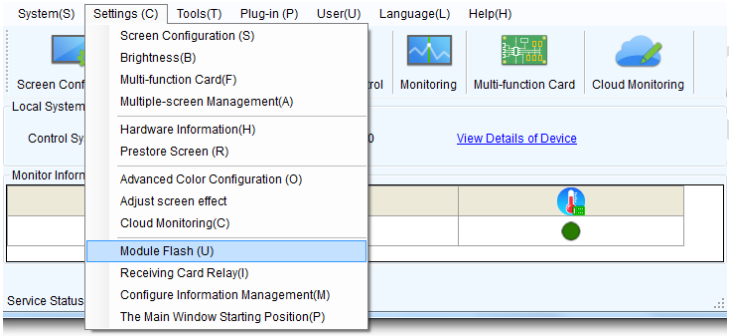


Fig 3-23 Obtaining Correction Coefficients for a New Module

3.3.4.3 Replace Module with Flash

The module of UTWII has Flash, which can save the calibration coefficient. After replacing the module, make sure that the receiving have read coefficient from the Flash and save.

Click **Setting** on the main window and select **Module Flash**, as shown in following fig.



Main Window

Click **Check Coefficient in Modules**, the receiving card will read coefficient from module, then **Click Save Calibration Coefficient on Receiving Card**

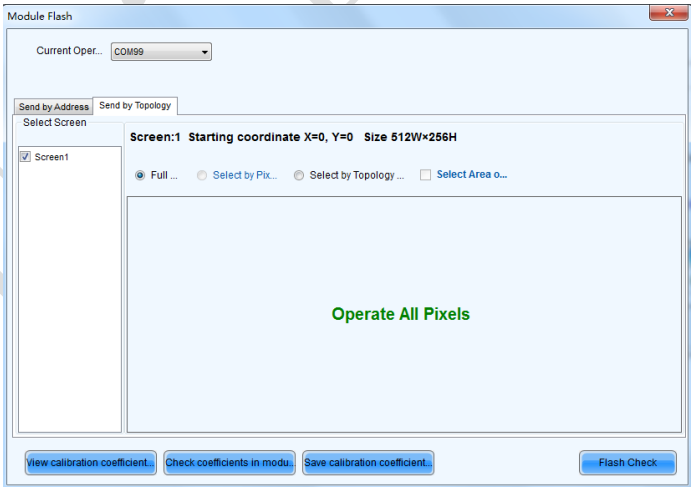
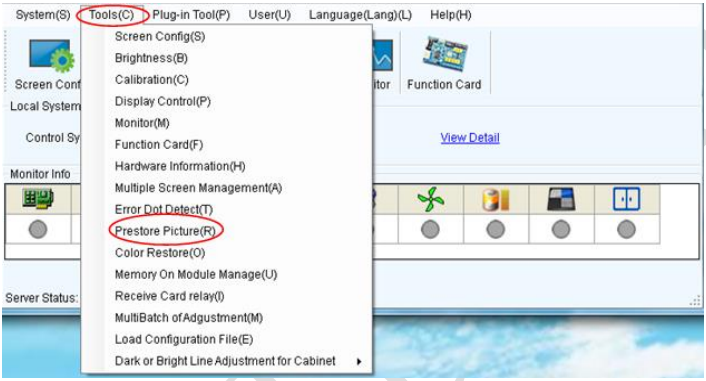


Fig 3-24 Save Calibration Coefficient on Receiving Card

3.3.5 Pre-storing Picture

On the Prestore Picture interface, you can save a picture as the prestored picture for the screen. This prestored picture can be set as a screen displayed upon booting, signal cable disconnection, or DVI signal absence.

On the main window, click **Tool** and select **Prestore Picture**, as shown in Figure 3-25.



Prestore Picture

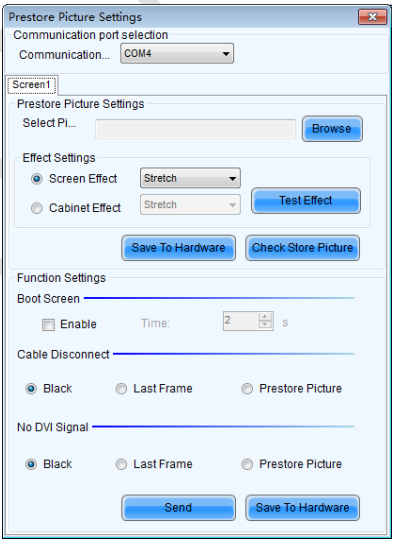


Fig 3-25 Prestore Picture Settings

1）Prestore Picture Settings

Select Picture: Click **Browse** to select the directory of the picture.

Screen Effect: Set the selected picture to be displayed on the whole screen by means of stretching, tiling, or centering.

Cabinet Effect: Set the selected picture to be displayed on each cabinet of the screen by means of stretching, tiling, or centering (the number of pictures displayed by each cabinet shall be equal to the number of receiving cards in the cabinet).

Click **Test Effect** to display the selected picture on the screen.
Click **Save to Hardware** to save the picture as a prestored picture to the hardware.
Click **Check Store Picture** to display the stored picture on the screen so as to check its effect.

2） Function Settings

Boot Screen: Set whether to use the prestored picture and set the displaying time of the prestored picture when the screen is powered on.

Cable Disconnect: Set the picture to be displayed by the cabinet whose signal cable is disconnected.

No DVI Signal: Set the picture to be displayed in the period in which the screen does not receive any DVI signals.

Click **Send** to the settings to the hardware (the settings will be lost if you do not click **Save to Hardware**).

Click **Save to Hardware** to save the current settings so that these settings are retained even if there is a power failure.

Unilumin

3.4 Unilumin K series - Software Control Setting

3.4.1 Installing the Software

Open the optical disk provided for the delivered products. Install the LED control software Unilumin.exe stored in the optical disk to the control PC.

Fig 3-26 Software Installation

NOTE: You can follow the software installation wizard to install the software.

3.4.2 Display Configuration

3.4.2.1 Login to the Display Settings Interface

1) Open the software, enter the main window, click “Control” → “LED Screen Settings”; enter the password: 168 in the pop-up password box ,then enter the LED Screen Settings interface, as shown below:

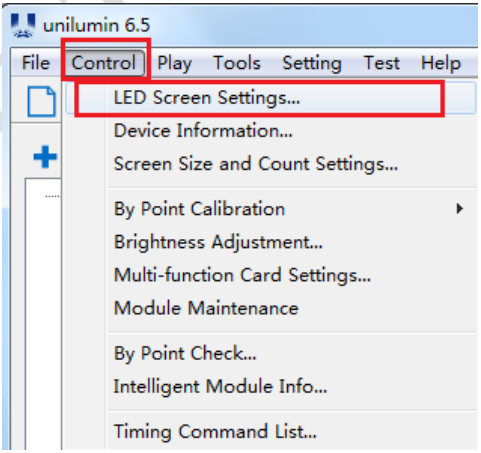


Fig 3-27 Main Window

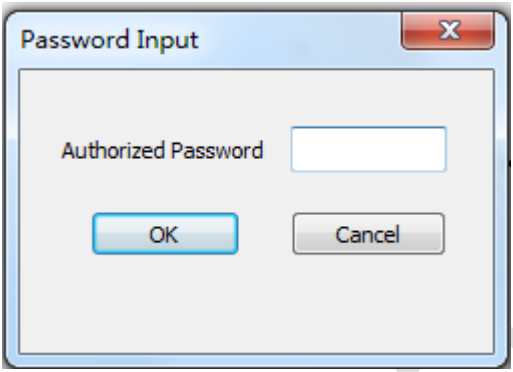


Fig 3-28 Enter the Password

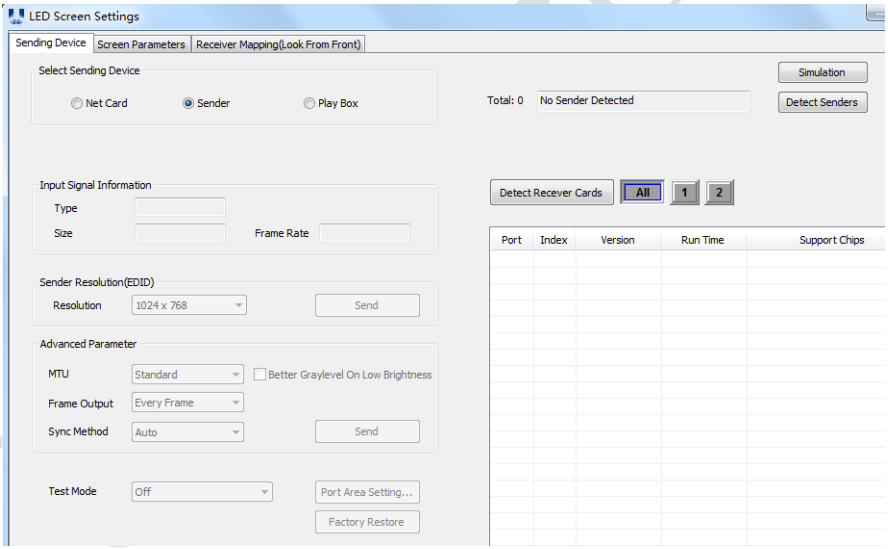


Fig 3-29 LED Screen Settings

3.4.2.2 Set the Sending Card

1) Detect Senders

Enter the LED Screen Settings interface, select the “Sending Device” page, and then click “Sender” → “Detect senders”. If the sending card is detected, the “Sending

Device" page will display the information of the sending card in detail: the card type and quantity, the input signal information of the sending card, etc, as shown below:

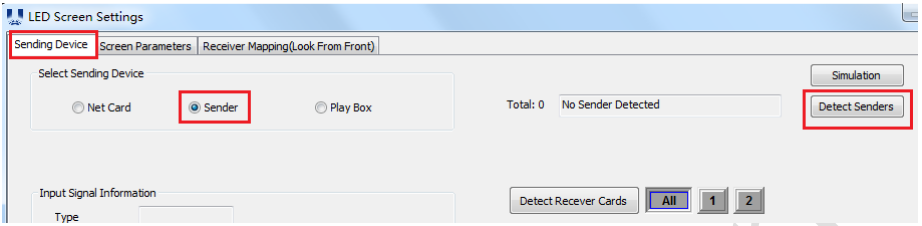


Fig 3-30 Detect Senders

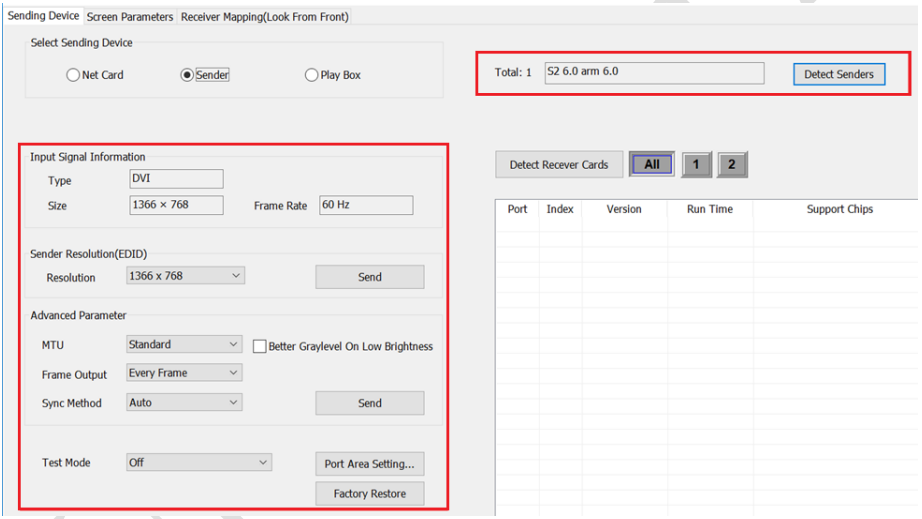


Fig 3-31 Sending Card Information

2) Input Signal View

After detecting the sending card , if the video signal is connected properly. The video input signal type, frame rate, width and height are displayed in detail in the "Input Signal Information".

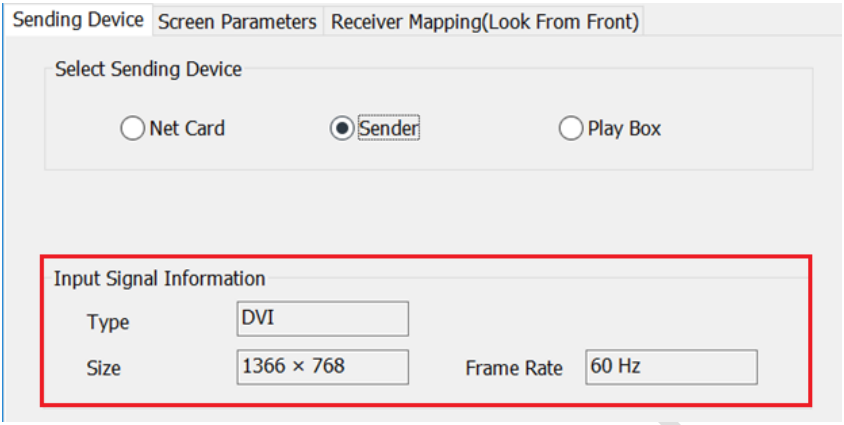


Fig 3-32 Input Signal Information

3) Settings the Sending Card Parameters

After detecting the sending card, can make some settings on the sending card parameters on the “Sending Device” page.

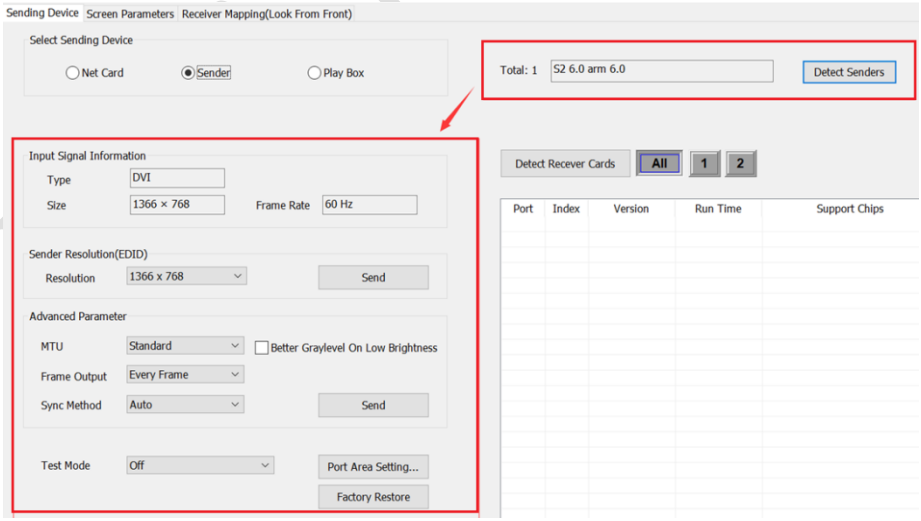


Fig 3-33 Settings the Sending Card Parameters

3.4.2.3 Screen Parameters Setting

After setting the send card interface, click “Screen Parameters” to set the screen parameters:

1) Click "Load…" to load the "xxxx. rcvbp " file on the CD

2) Click "Send"

3) After sending is complete, confirm that the display screen menu of the single receiving card is normal, click “Save to Receivers” to save

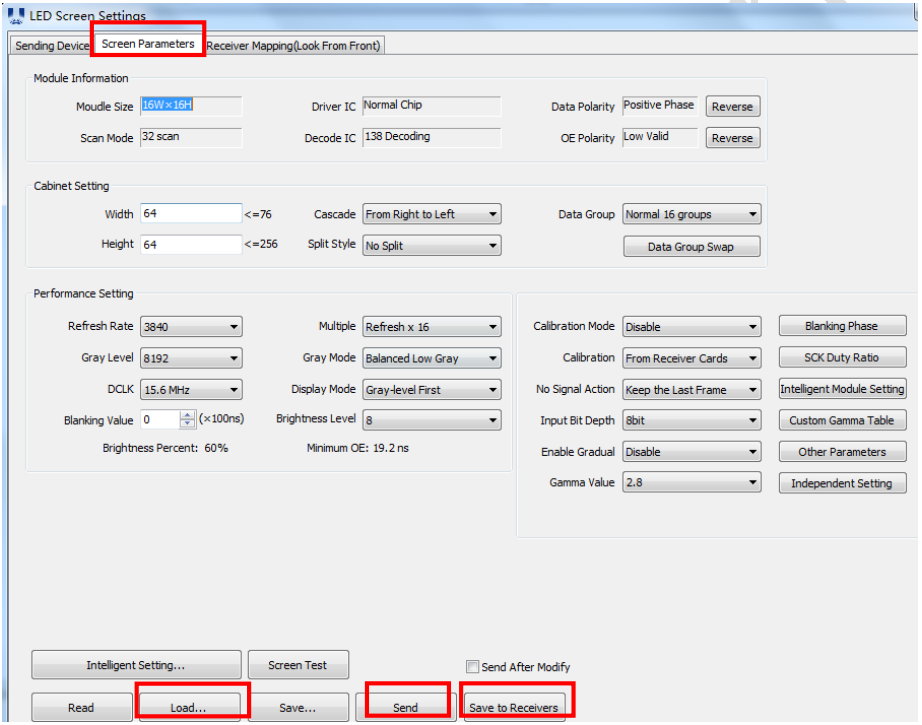


Fig 3-34 Screen Parameters

3.4.2.4 Display Connection

After the screen parameters are solidified to the receiving card, click on “Receiver Mapping” to setting, connect the display.

1) Click "Load…" , load the "xxxx. mapping " files on the disc;

2) Click "Send";

3) After sending is complete, confirming that the display screen menu is normal, click “Save to Devices” to save.

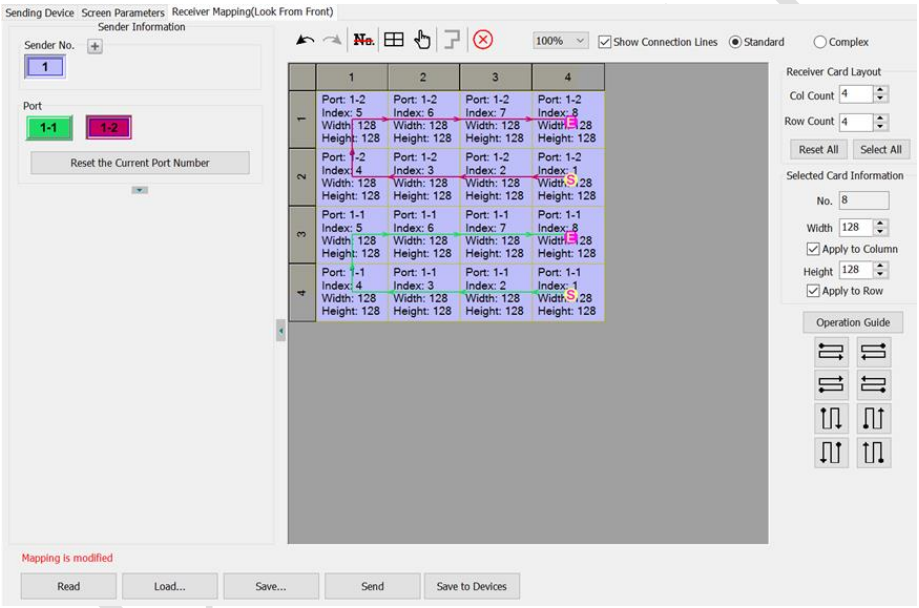


Fig 3-35 Receiver Mapping

3.4.3 Brightness Adjustment

In the main window, click “Control” → “Brightness Adjustment” , enter the brightness adjustment interface and adjust the brightness.

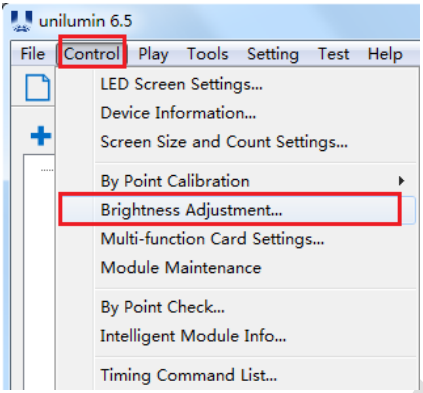


Fig 3-36 Brightness Adjustment

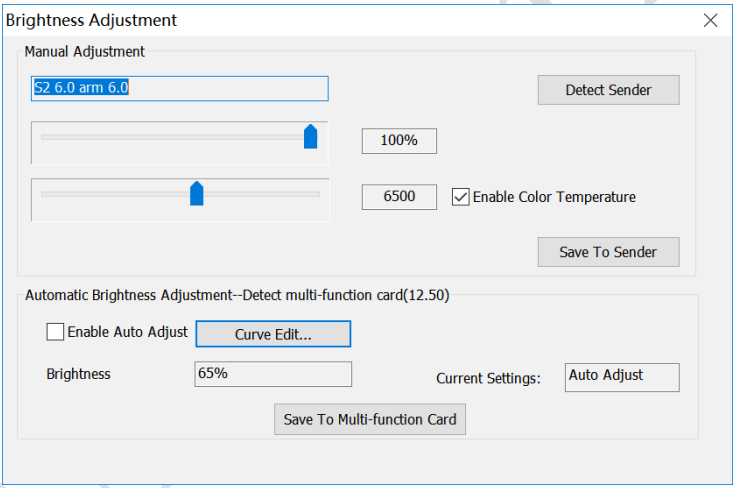


Fig 3-37 Brightness Adjustment Interface

There are various ways to adjust the brightness: automatic adjustment of multi-function card, timing brightness adjustment, manual adjustment, white balance adjustment, brightness correction adjustment, etc.

1) Manual adjustment: In the brightness adjustment interface, manually pull the brightness bar to change the brightness percentage , adjust the brightness of the display.

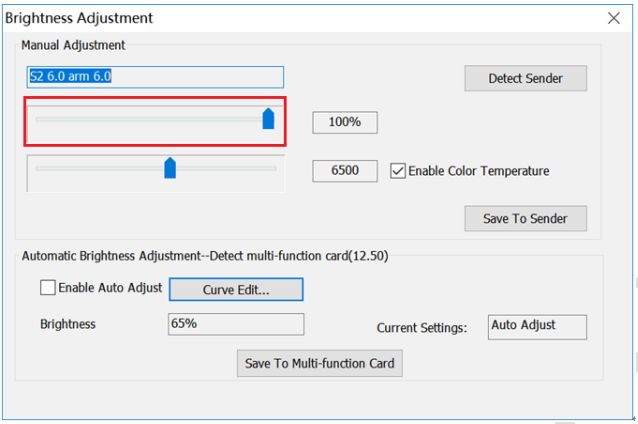


Fig 3-38 Manual Brightness Adjustment

2) Automatic brightness adjustment: In the brightness adjustment interface, check “Enable auto adjust” and click “Save to Multi-function Card”. The brightness is the current brightness percentage of the display.

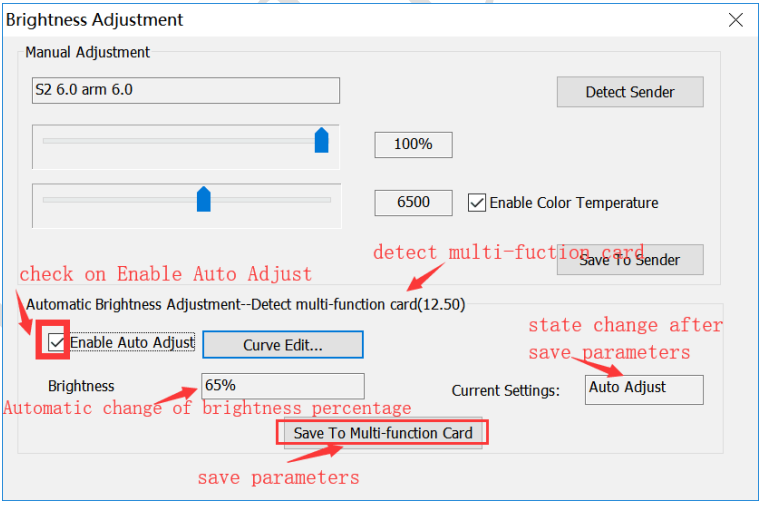


Fig 3-39 Automatic Brightness Adjustment

3.4.4 Calibration

3.4.4.1 Setting Coefficients for a New Module

1) First set the window to be greater than or equal to the actual screen pixel size;

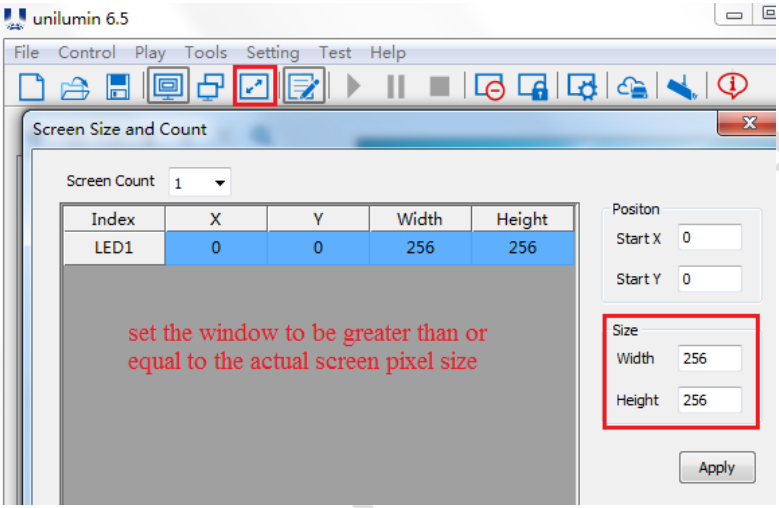


Fig 3-40 Screen Size and Count

2) In the main window, click “Control” → “By Point Calibration” → “Brightness Calibration” ,enter the calibration interface;

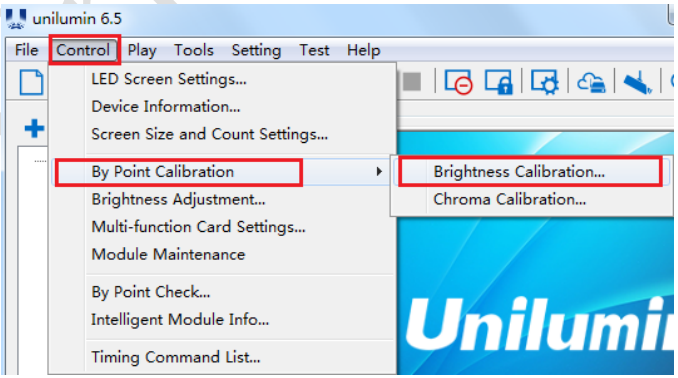


Fig 3-41 Main Windown

3) Click “Get Screen Information” → “Read” ,get screen information and read back the screen correction coefficient;

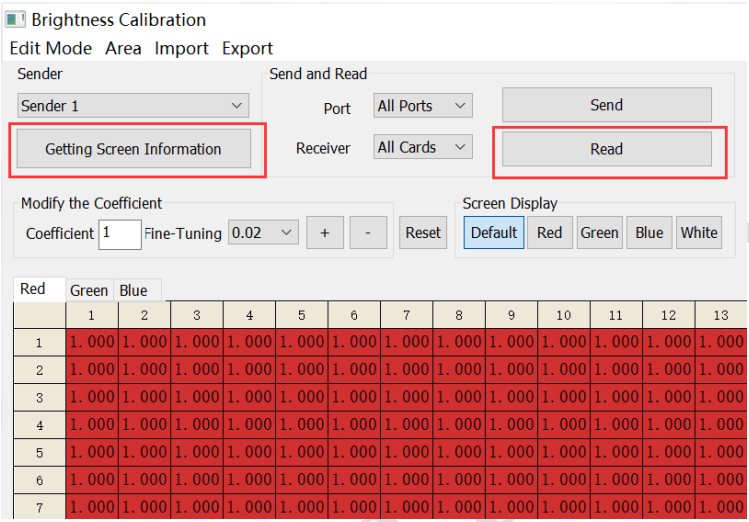


Fig 3-42 Brightness Calibration

4) Click “Import” → “By Region” → “Normal” to import the correction coefficient of the replaced spare module;

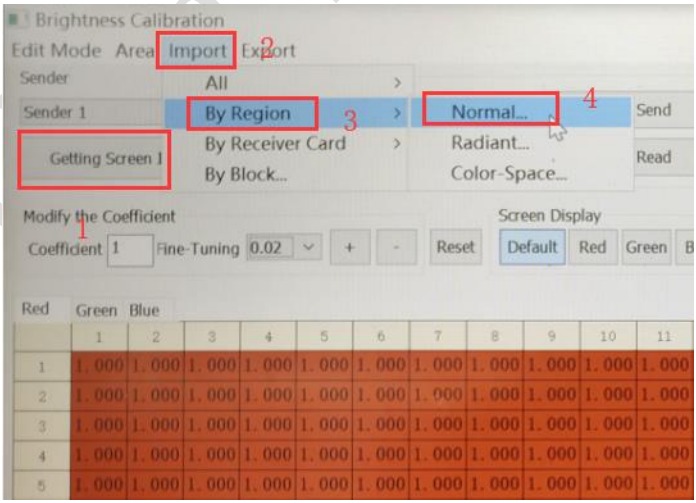


Fig 3-43 Brightness Calibration

5) Enter the location of the module that needs to resend the correction coefficient;

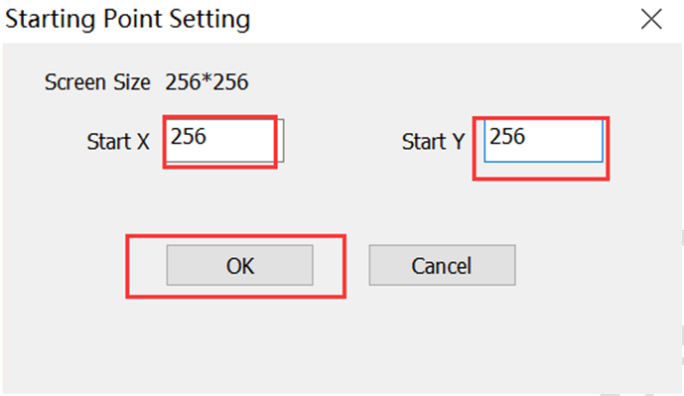


Fig 3-44 Starting Point Setting

6) Selecting a correction coefficient file for the module of the corresponding area;

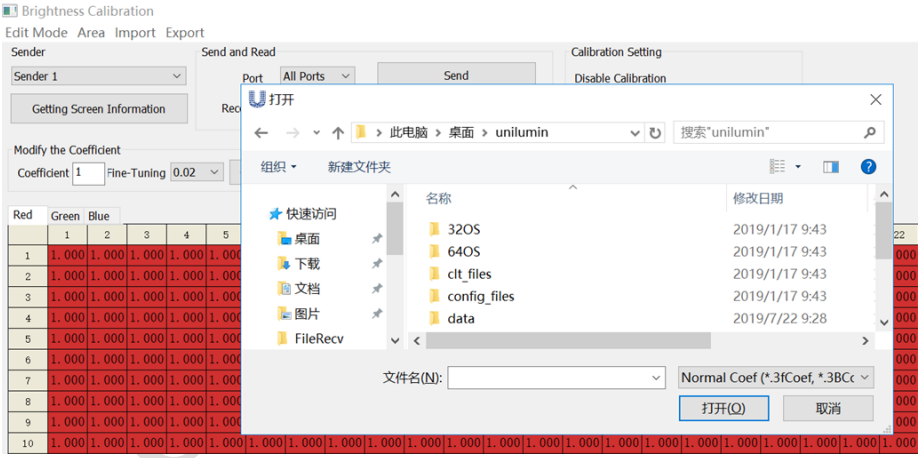


Fig 3-45 Selecting Correction File

7) After importing the calibration file, click "Send" to enable brightness correction;

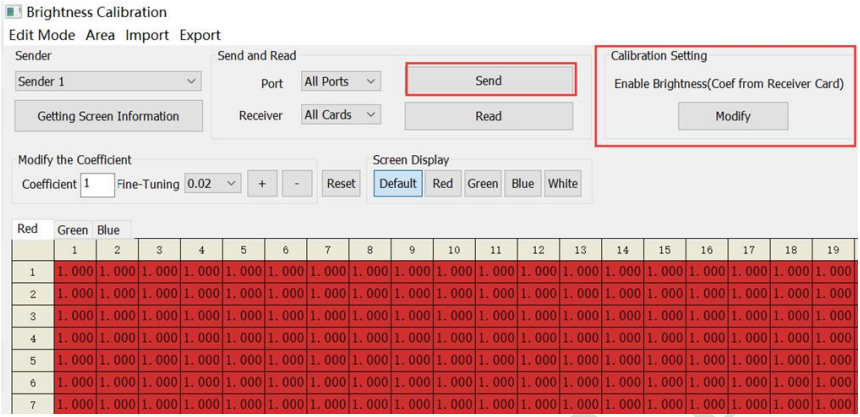


Fig 3-46 Brightness Calibration

8) Open the LED screen setting window, on the screen parameter page :select “Brightness” in the “Calibration Mode”, select “From Receiver Card” in the “Correction”, and then click “Save to Receivers”.

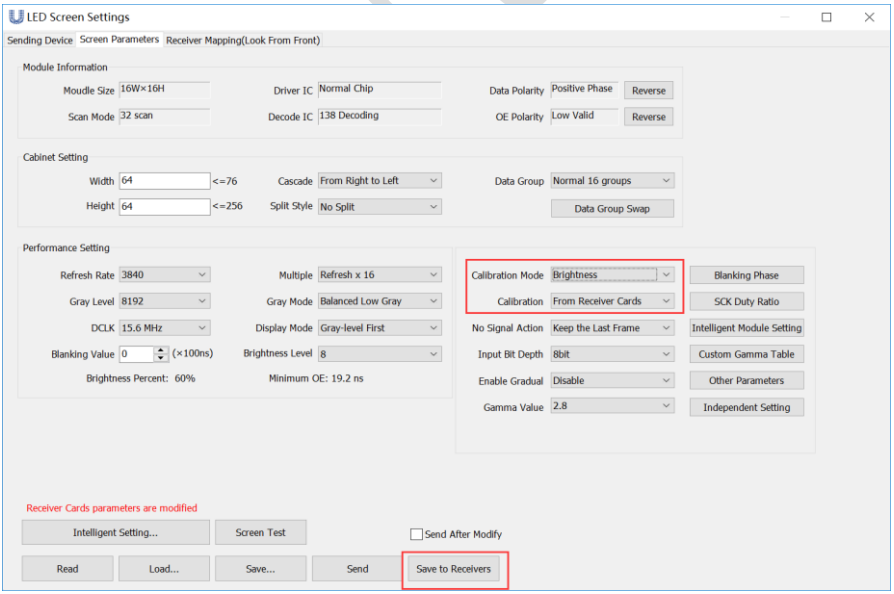


Fig 3-47 LED Screen Setting

Chapter 4 LED Display Playing Setting

4.1 Unilumin N series - LED Display Playing Setting

4.1.1 Selecting a Playing Solution

The playing software UniStudio has three playing modes, namely Simple playing program, Professional playing program, and Priority programs of the page. Professional playing program is used most commonly. This Section introduces the Professional playing program only.

Run the software to enter the main window. Click **Setting** > **Switch schedule mode**. On the editing mode setting window, select **Professional playing program** and click **OK**. As showed in Fig 4-1 and Fig 4-2.

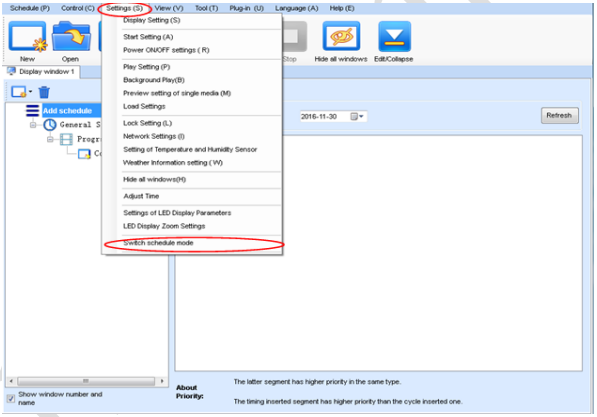


Fig 4-1 Switching Schedule Mode

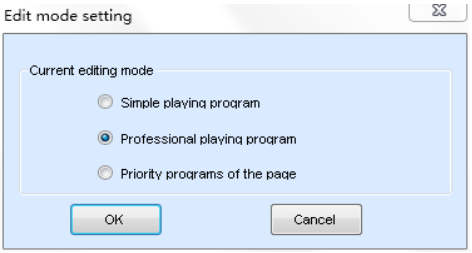


Fig 4-2 Edit Mode Setting

4.1.2 Playing Setting

4.1.2.1 Display Window Setting

Run the UniStudio, click **Settings** and select **Display Setting**, as in following fig:

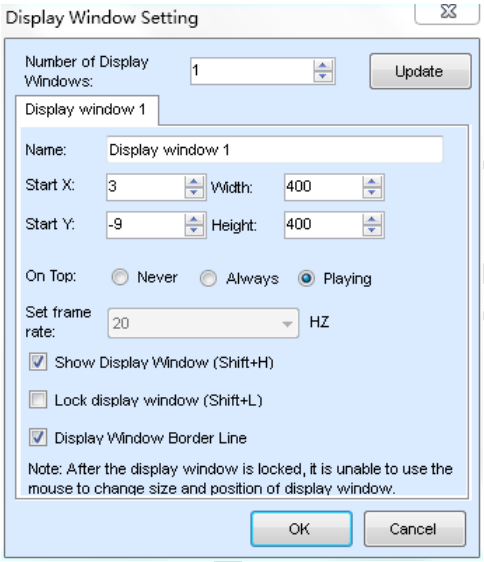


Fig 4-3 Display Window Setting

Number of Display Windows: Indicates the number of display windows. To increase or decrease the number of display windows, re-enter the number of display windows in the box next to **Number of Display Windows** and then click **Update**.

Start X: Indicates the horizontal start point of the display window.

Start Y: Indicates the vertical start point of the display window.

Width: Indicates the horizontal pixel value of the display.

Height: Indicates the vertical pixel value of the display.

Other configuration items are set to the default values.

4.1.2.2 Startup Setting

On the main window of the software, click **Setting** > **Start Setting** to enable the software to run automatically upon startup of the PC and to automatically activate a playing solution. See Fig 4-4:

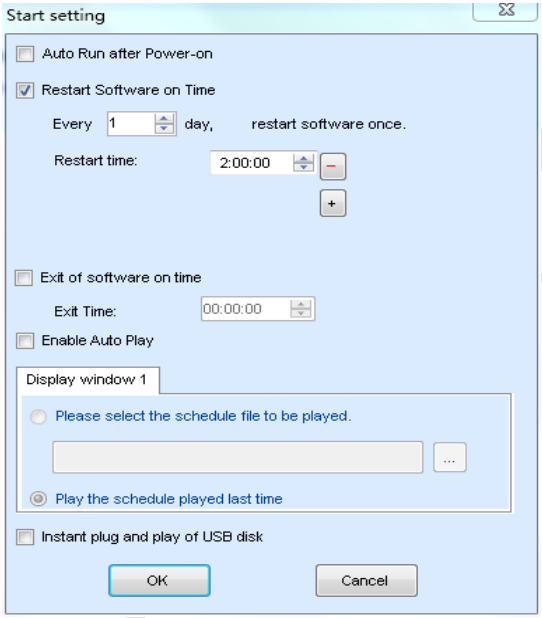


Fig 4-4 Startup Setting

Auto Run after Power-on: If you enable this function, UniStudio will run automatically the next time when the PC is started.

Restart Software on Time: If you enable this function, set the restart interval and time, and click **OK**, UniStudio will be automatically restarted after the PC time reaches the preset restart time. After the software is restarted, the window information and playing status before restart will be automatically recovered.

Exit of software on time: If you enable this function and set the exit time, the software will exit automatically upon the preset time. This function can prevent damages to the uploaded data caused by forcible exit of the software.

Enable Auto Play: If you enable this function and specify a playing solution for the screen, the software will automatically activate the specified playing solution once the software is started.

Instant plug and play of USB disk: If you enable this function, the PC will automatically read and activate the playing solution once the USB flash drive is inserted to the PC. If you do disable this function, the PC cannot implement the plug-and-play function even though you have inserted the USB flash drive to the PC.

4.1.3 Editing Professional Playing Solution

4.1.3.1 Editing the Time Segment

1) Creating a playing solution

On the main window of the software, click **Schedule** > **New**, as shown in Fig 4-5:

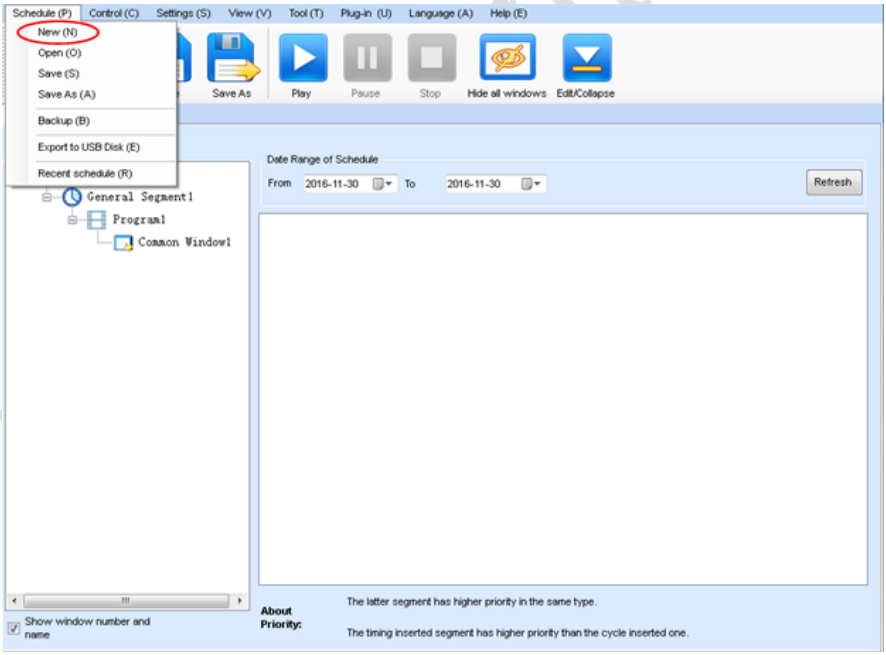


Fig 4-5 Creating a Playing Solution

2) Editing the properties of the playing solution

After adding a general time segment or interstitial segment, click **General Segment 1** to edit the properties displayed in the segment editing area on the right side, as shown in Fig 4-6**:**

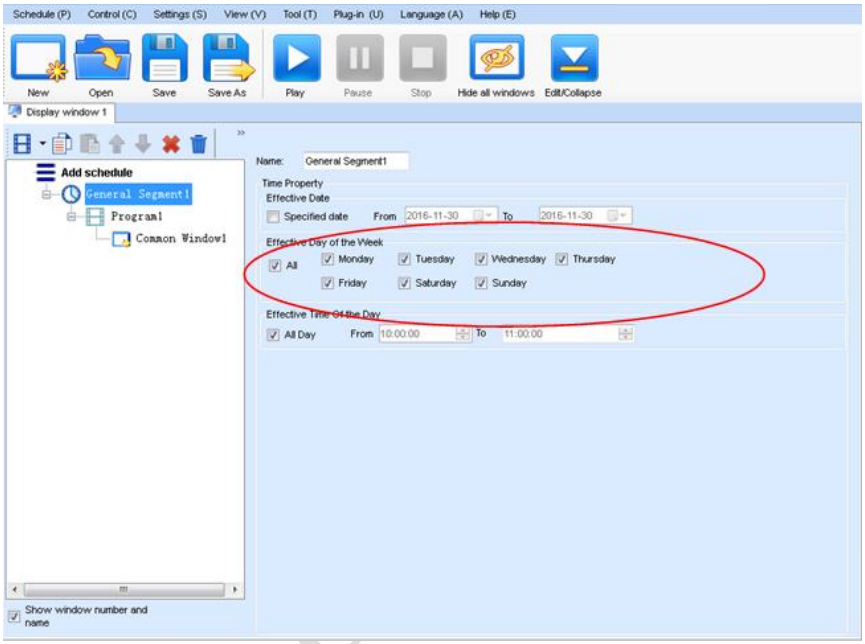


Fig 4-6 Properties of General Time Segment

4.1.3.2 Editing the Program Page

1) Creating a program page

As shown in Fig 4-7, right click **General Segment** or click the **Add Global Program Page** in the toolbar to create a program page:

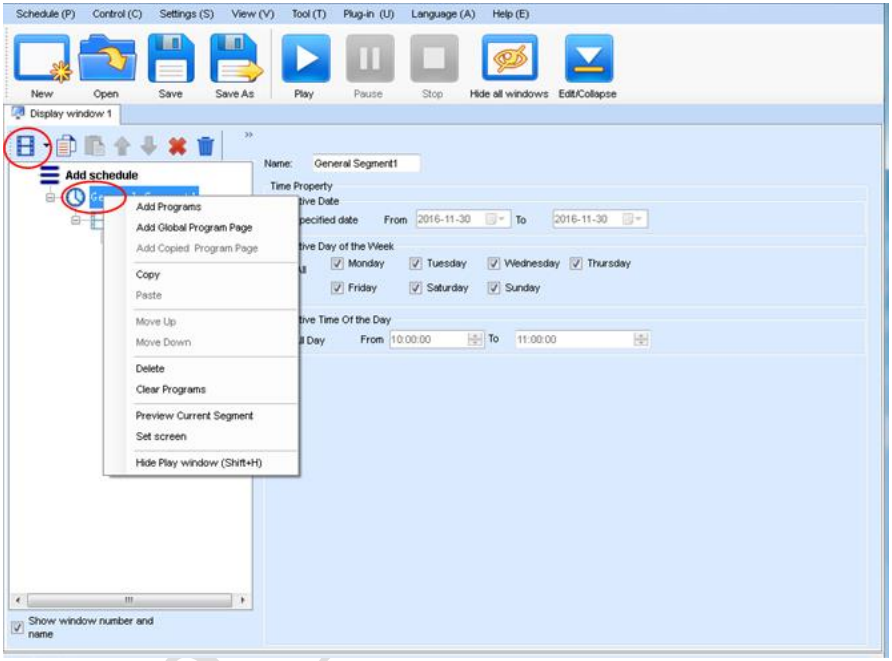


Fig 4-7 Creating a Program Page

2) Setting the properties

After creating the program page, click **Program 1** and set the background, displaying mode, and other properties displayed on the property page on the right side. See Fig 4-8:

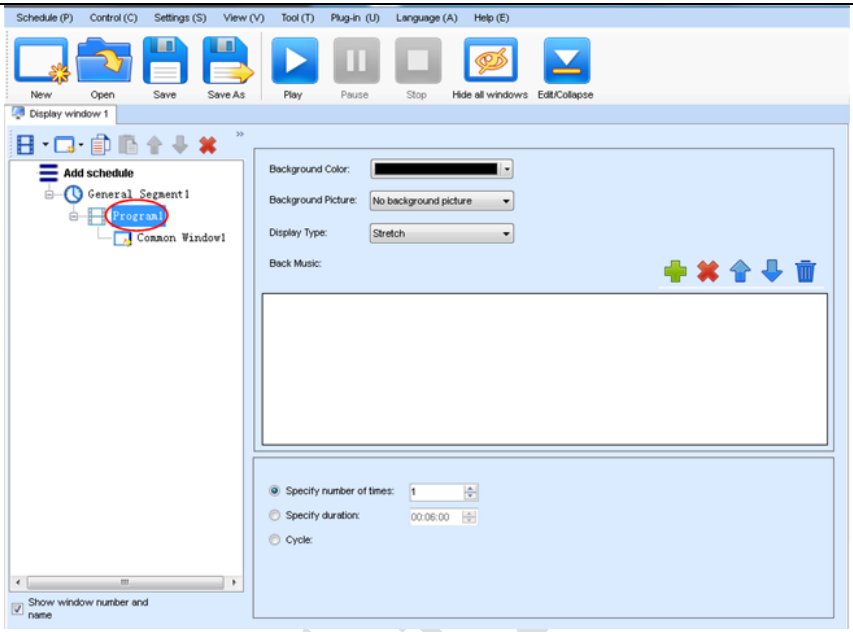


Fig 4-8 Properties of Program Page

If you select **Specify Number of Times**, the next general program page is played after the preset **Times to Play** for the display window with the longest playing time on the current program page has been reached.

If you select **Specify Duration**, the next program page is played after the preset **Play Duration** for the current program page has been reached.

If you select **Cycle**, the current program page will be played cyclically all the time.

When the current program page is played, the background picture or colour of the program page is displayed in the area not covered by the display window, as shown in Figure 4-9:

Fig 4-9 Background of Program Page

After adding the program page, you can move, copy, paste, or delete the program page by using the toolbar in the program page editing area, or by using the short-cut menu, as shown in Fig 4-10.

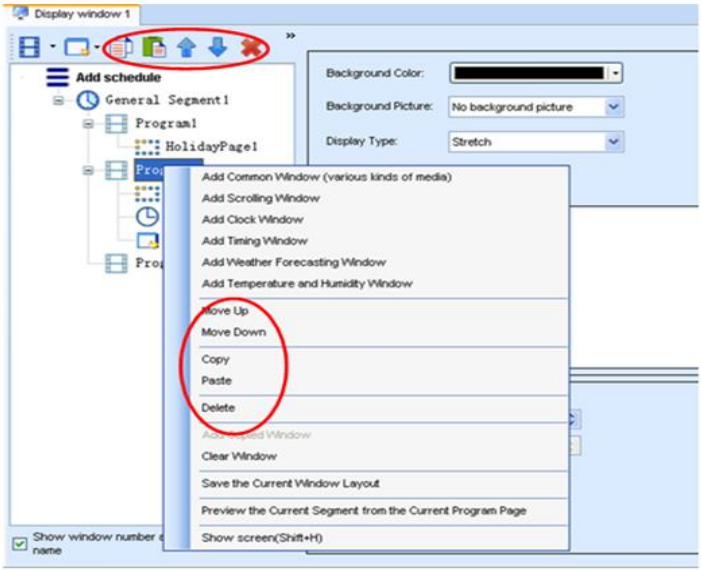


Fig 4-10 Program Page Operation Menu

4.1.3.3 **Editing the Display Window**

1) Adding a display window

After adding a program page, you need to add a display window to this program page. Click **Add Window** on the toolbar of the program page to add a window to the current program page. See Fig 4-11:

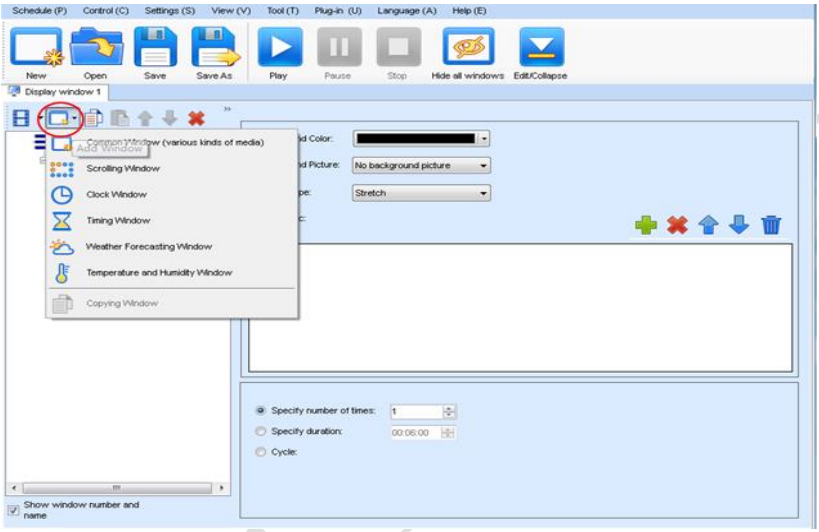


Fig 4-11 Adding a Window to Program Page

After the window is added, the added window is selected and displayed on the screen, as shown in Fig 4-12:

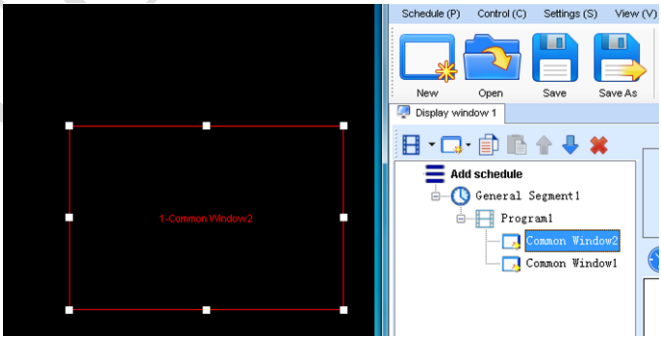


Fig 4-12 Added Window

2) Setting the location and size of the display window

The location and size of the new window is generated randomly and can be adjusted based on actual conditions by using either of the following two methods:

a) Directly specify the new location and size in the setting pane, as shown in Fig 4-13:

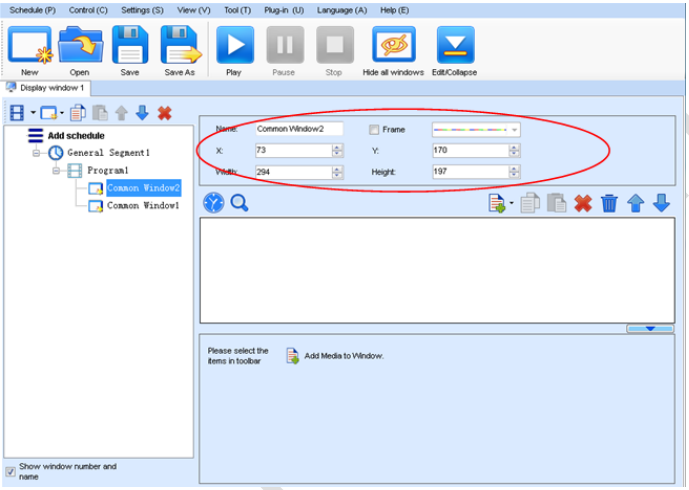


Fig 4-13 Setting the Window Size

b) Click the display window on the screen and adjust its size by using the mouse, as shown in Fig 4-14:

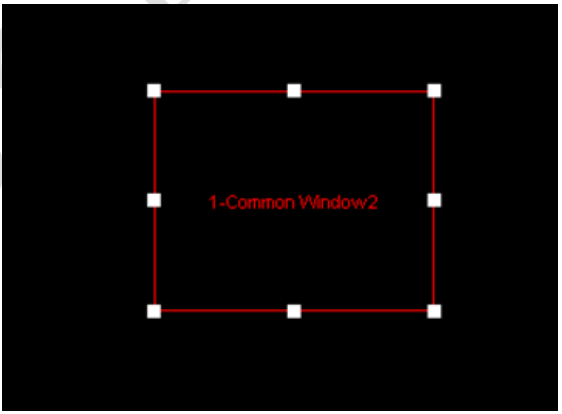


Fig 4-14 Adjusting the Window Size Using the Mouse

3) Deleting a display window

Select the window to be deleted. Click the delete key to delete the window, as shown in Fig 4-15:

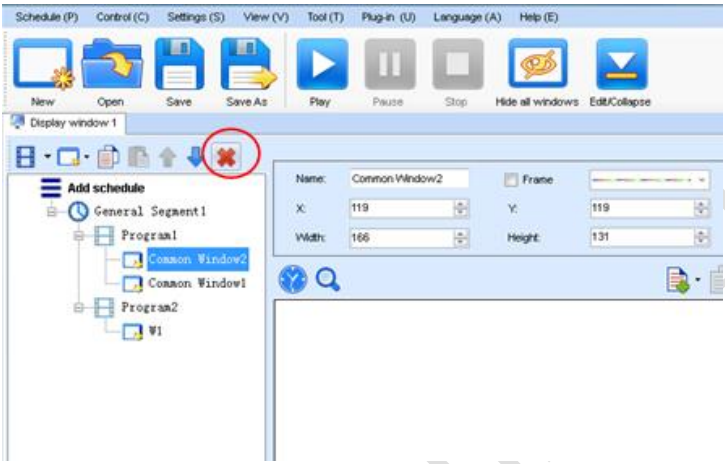


Fig 4-15 Deleting the Display Window

4) Moving a display window

Select the program or window. Click the direction key to adjust the playing sequence, as shown in Fig 4-16:

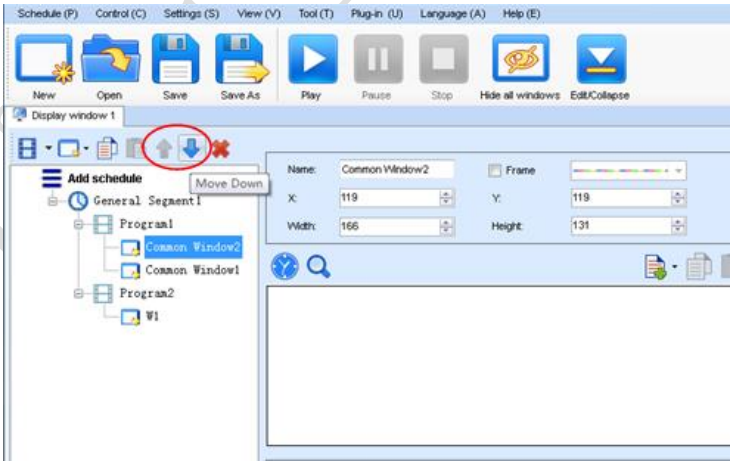


Fig 4-16 Moving a Display Window

4.1.3.4 Editing the Media

1) Adding the media

The type of window for adding the media is **Common Window**. Click the **Add Media** button of a common window to select media of different types to be added into the media list. See Fig 4-17:

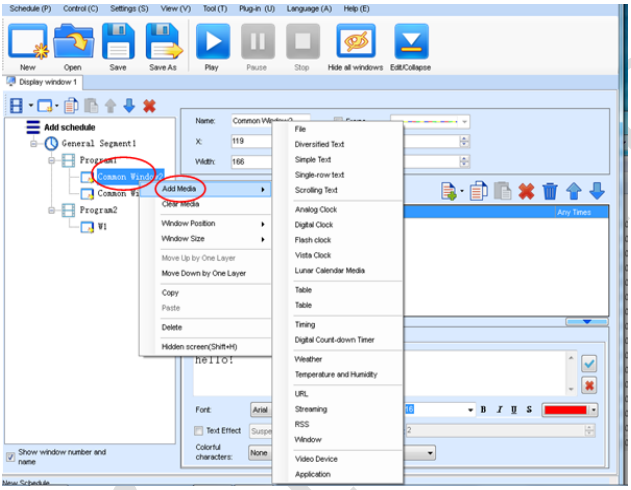


Fig 4-17 Adding the Media

After adding the media, you can set the media texts and properties, as shown in Figure 4-18.

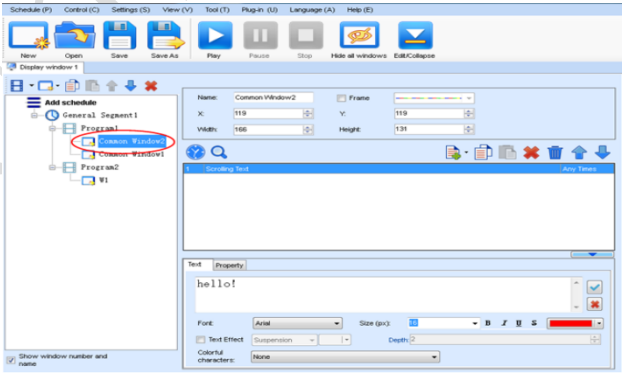


Fig 4-18 Media Setting Window

2) Setting the media properties

Different media have different properties. After a medium in the media list is selected, the property page of this medium is displayed below the selected medium. On this property page, you can change the properties of the medium. See Fig 4-19:

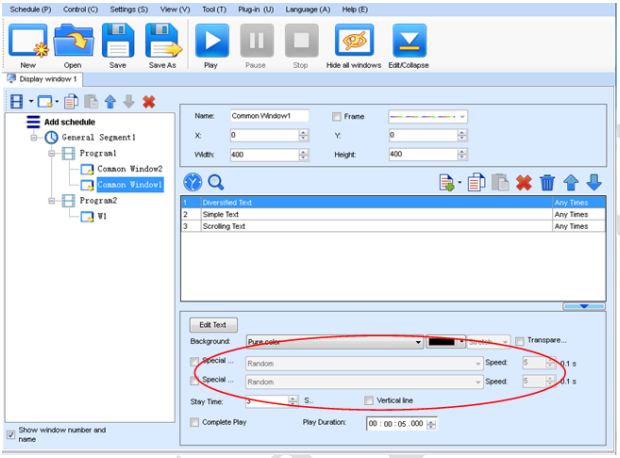
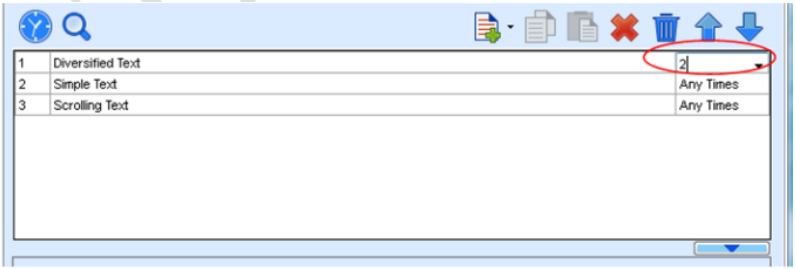


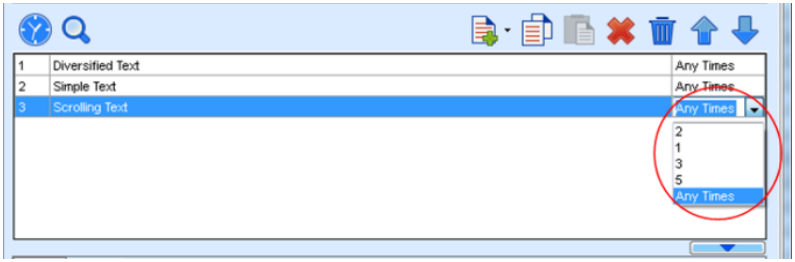
Fig 4-19 Properties of Medium

3) Editing the media in the common window

In an actual application, if different playing times are required for different media, you can select the media in the media list and then double click **Times to Play** to modify the playing times by either entering a new value or selecting a value from the drop-down list. See Fig 4-20:



Double click



Modify

Fig 4-20 Changing the Media Playing Times

Right click the media to perform operations on the selected media, as shown in Fig 4-21:

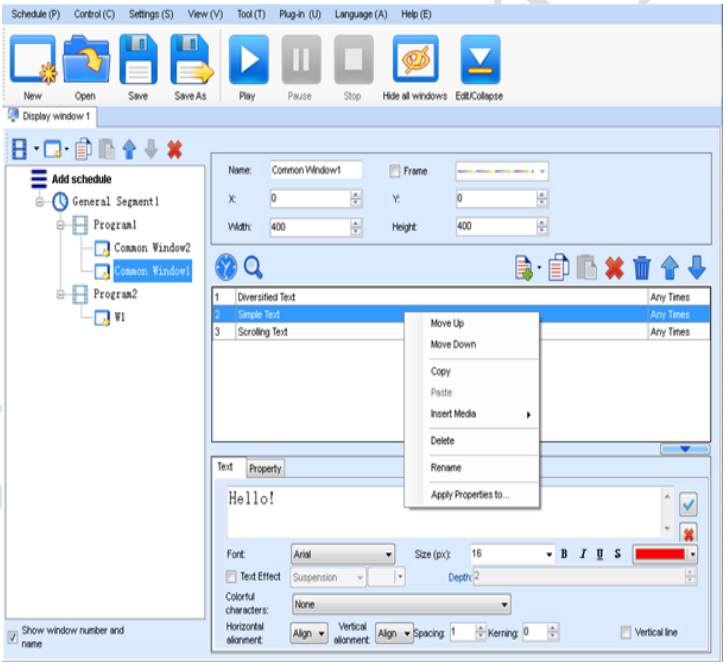


Fig 4-21 Media Operation Menu

Right click a blank area in the media playlist. A media playing menu is displayed, as shown in Fig 4-22:

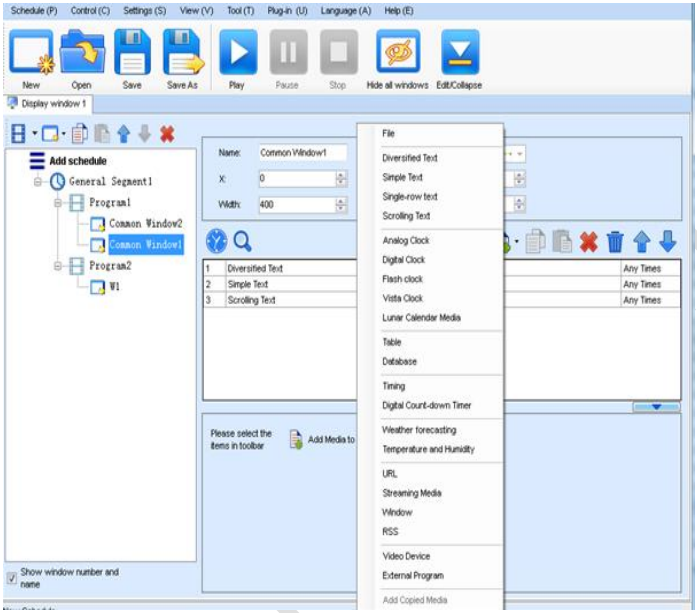


Fig 4-22 Media Playing Menu

4.1.3.5 Playing the Media

After the playing mode is edited or loaded, click the play key on the main toolbar to start the current playing mode, as shown in Fig 4-23:

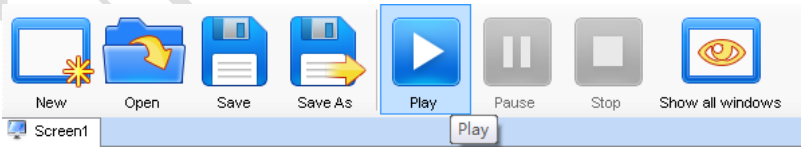


Fig 4-23 Play Key on the Toolbar

After play is activated, the editing page is switched to the playing page, as shown in Fig 4-24:

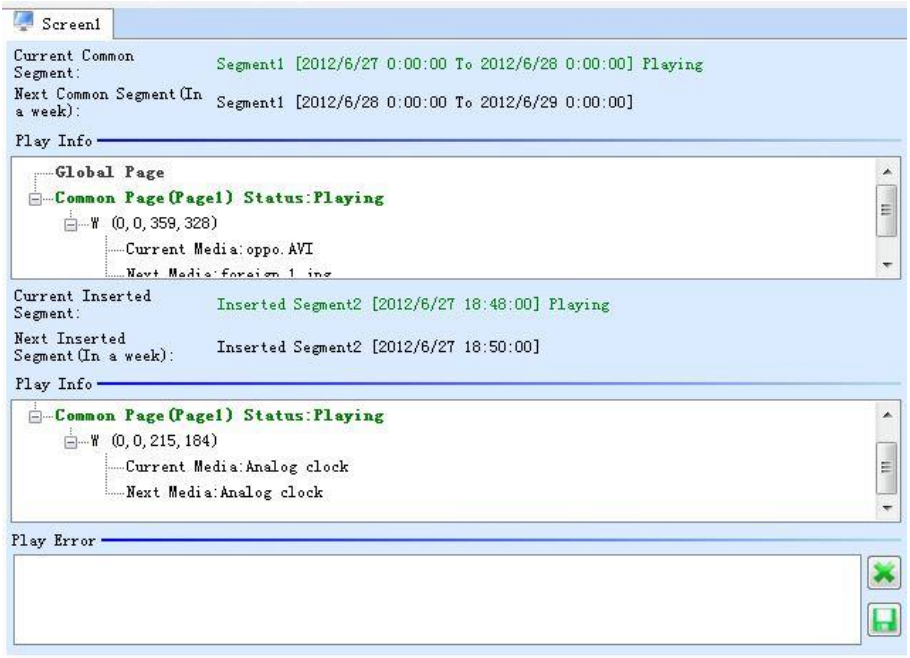


Fig 4-24 Play Information Page

Clicking **Pause** or **Stop** on the toolbar can pause or stop the currently played program. You can also perform this operation by using the operation menu that appears when you right click the display window. See Fig 4-25:

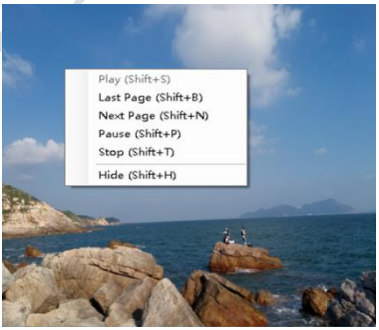


Fig 4-25 Short-cut Menu

Attention: All display windows on the same program page plays simultaneously. If the display windows overlap with each other, the upper-layer windows will cover the lower-layer windows. For example, if you add a common window and then a clock window of the same size and coordinate, the common window will cover the clock window when they are playing. If you want to display the clock window, you need to click **Pause**, perform the **Move Up** operation to move the clock window to the front side of the common window, and then click **Play**. If the clock is displayed transparently, the clock will overlay the media of the common window when the playing solution is played upon the moving operation. Figure 4-26 shows the displaying effect:

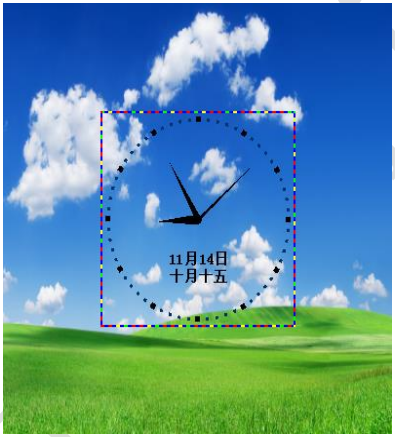


Fig 4-26 Transparent Displaying Effect of the Clock

4.1.4 Saving and Opening a Playing Solution

Save: After a playing solution is created, you can click **Schedule** on the toolbar and select **Save** or **Save As** to save the playing solution in the format of **xxxx.plym**. See Fig 4-27:

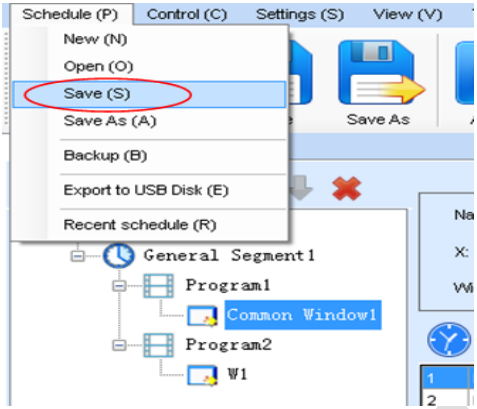


Fig 4-27 Saving a Playing Solution File

Open: After a playing solution is saved, you can directly click **Schedule** in the toolbar and select **Open** to open the playing solution. See Fig 4-28:

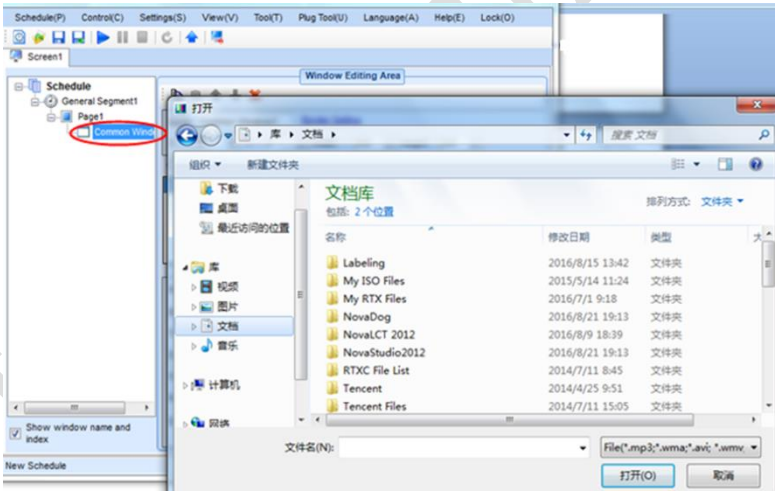


Fig 4-28 Opening a Playing Solution File

4.2 Unilumin K series - LED Display Playing Setting

4.2.1 Set the Count and Size of the Screen

Open the software, click "Control " → "Screen Size and Count Settings" in the main window, as shown below:

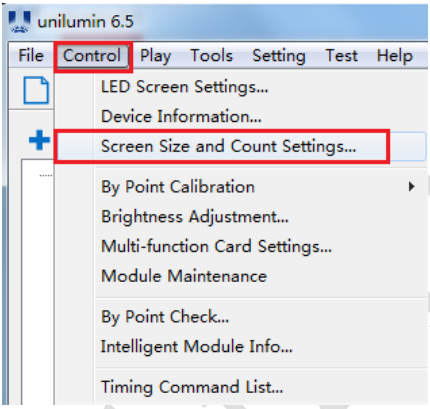


Fig 4-29 Main Window

Set the count of LED screens and the starting position and size of the screen in the " Screen Size and Count " window.

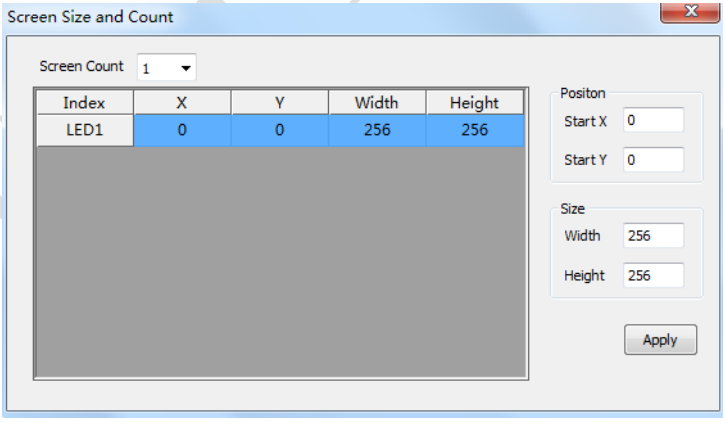


Fig 4-30 Screen Size and Count Settings

4.2.2 Setting the Program Page

The program page is divided into two types: "Normal Page" and "Global Page".

Global Page: The program page that is played continuously during playback, can contain multiple windows. Only one global page can be set per screen.

Normal Page: The normal page can contain multiple windows, and each normal page can have different window layouts.

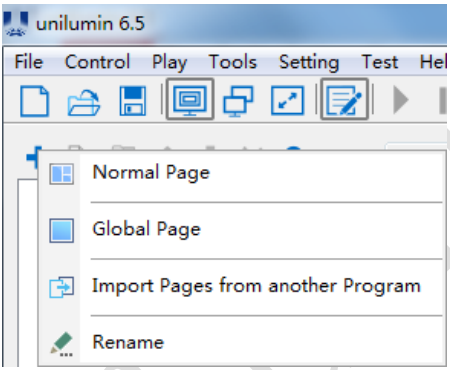


Fig 4-31 Program Page

1) Click the button on the program editing toolbar , pop up the menu to create a new program page;

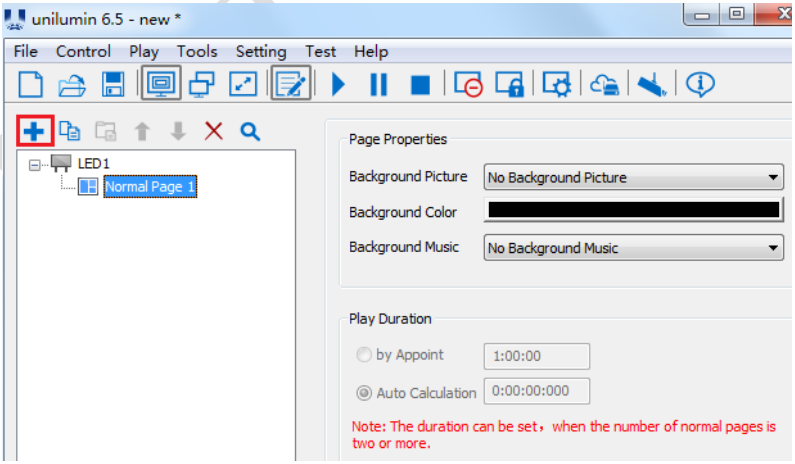


Fig 4-32 Adding New Program Page

2) After creating the program page, click the Add button or right click on the program page node to bring up the add program window menu.

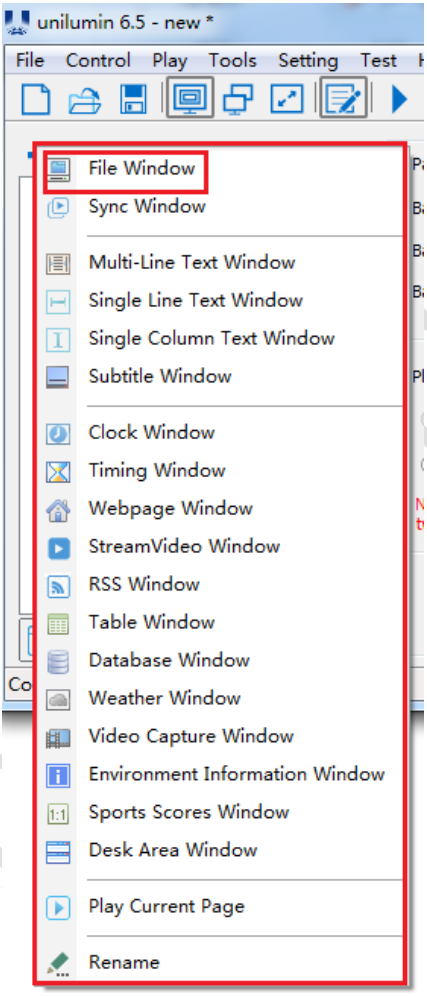


Fig 4-33 Add Program Window Menu

3) After adding the file window, select the file window and click the Add button to select the desired material.

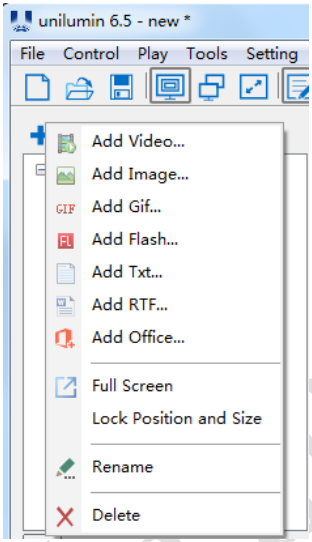


Fig 4-34 Material Menu

4) After adding the material, can set the material properties in the property box, as shown below:

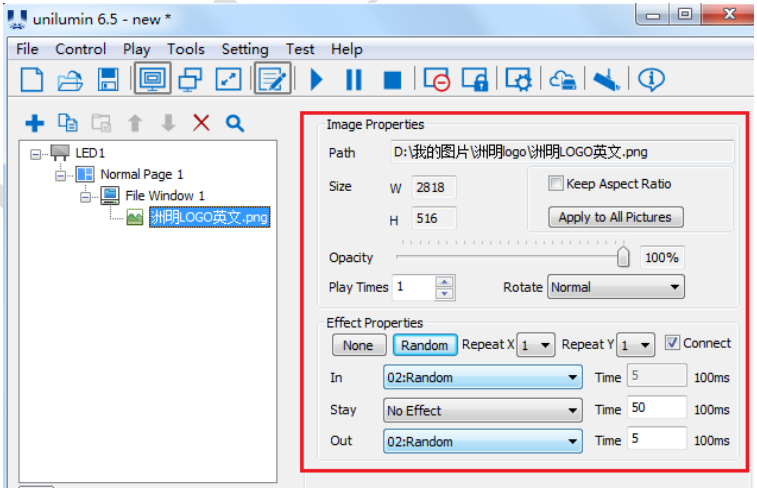


Fig 4-35 Display Setting Interface

4.2.3 Adjust Window Position and Size

Method One: Select the play window and then drag the mouse to adjust its size and position.

Method Two: Set it in the window properties, as shown below:

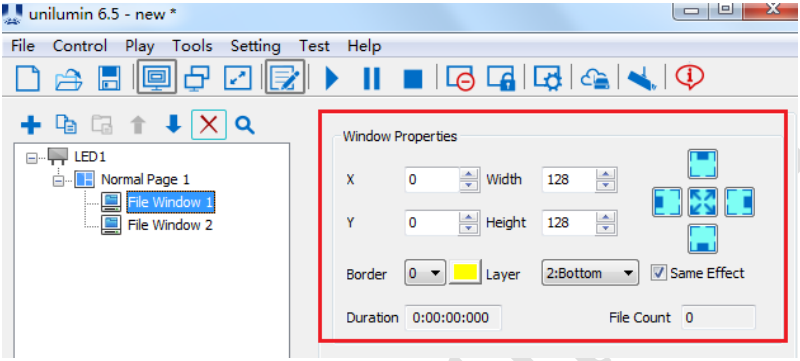


Fig 4-36 Window Properties

The coordinate X: It lies on the top left corner of the window in pixels, which is accordingly on the left boundary of the LED screen.

The coordinate Y: It lies on the top left corner of the window in pixels, which is accordingly on the upper boundary of the LED screen.

Width: The width of the window in pixels.

Height: The height of the window in pixels.

Window operation icon: For window shortcuts, there are left, right, top, bottom, and maximize.

Border: To set the width of the window border line in pixels.

Color: To select the color of the window border line.

Layer: The window in the program page has a hierarchical position relationship, and "1: top" is for the most front.

Same Effect: The files in the window are played with the same special effects. Get rid of this check, you can set different effects. If checked, the image in the file window can be set to different duration and special effects.

Duration: The time is required for all programs to play in this window.

File Count: The number of programs within this window.

4.2.4 Playing the Program

1) Play the current program file, click the play button or click the main window "Play" → "Play" to start playing.

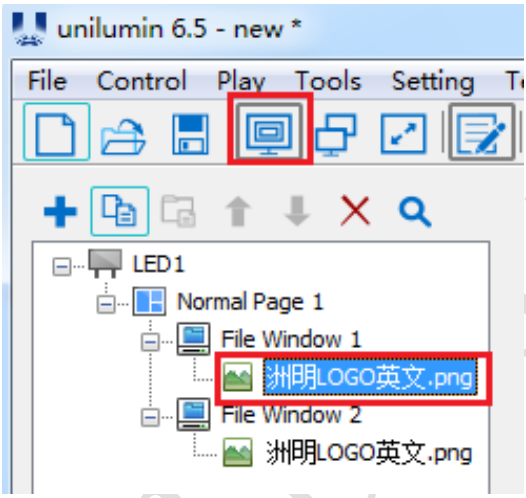


Fig 4-37 Play the Current Program File

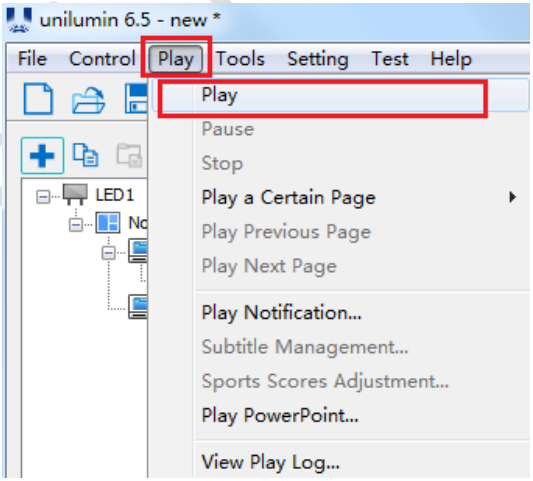


Fig 4-38 Play the Current Program File

2) Play multiple programs at the same time: Set the playback content, click the program page that want to play or click the “File” → “Open” button to open the file that want to play, then click “Play” → “Play” to play multiple programs. The program plays as shown in the figure:

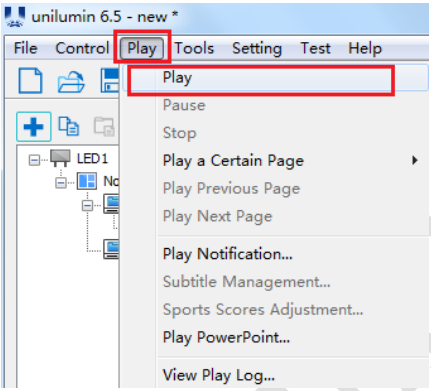


Fig 4-39 Play Setting

Fig 4-40 Program Plays

4.2.5 Edit Window

1) Delete: Select the material/window to be deleted, click the delete button to delete the material/window; or right click on the material/window to be deleted, and in the pop-up options, click “Delete”, as shown below:

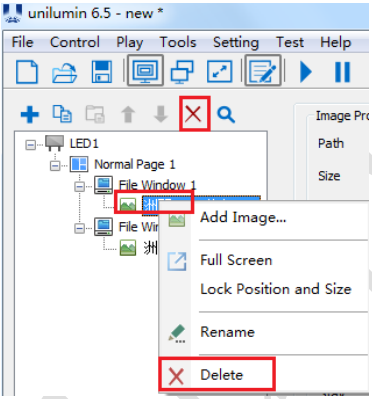


Fig 4-41 Delete

2) Copy: Select the window that want to copy, click the Copy button , click the copied location, and click the Paste button .

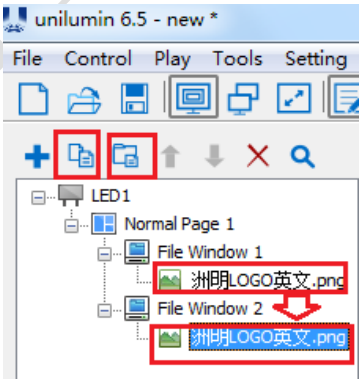


Fig 4-42 Copy

3) Save: After making the desired program page, click the button to save the button or click “File” → “Save” to save the program.

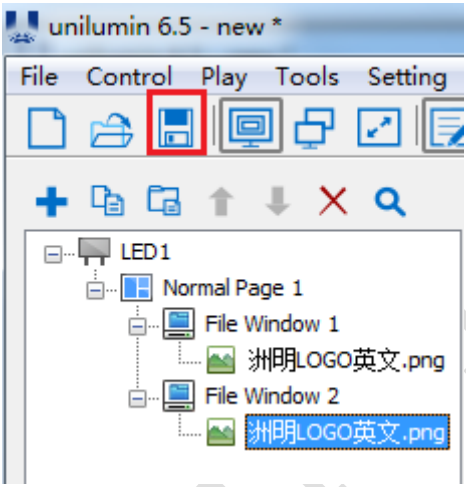


Fig 4-43 Save

4.2.6 Timed Playback and Control

1) Click “Control” → “Timing Command List” to enter the timing instruction list window;
2) Click “Add...” to add an instruction. In the “Timing Command List” window, set the execution content and time of the instruction. If there are multiple instructions, repeat the operation.
3) The details of the instructions include: play, pause, play program, power on LED display, power off LED display, show on LED display, show off LED display, set brightness, show LED play screen, hide LED play screen, restart this application, close this application, restart computer, shut down computer.

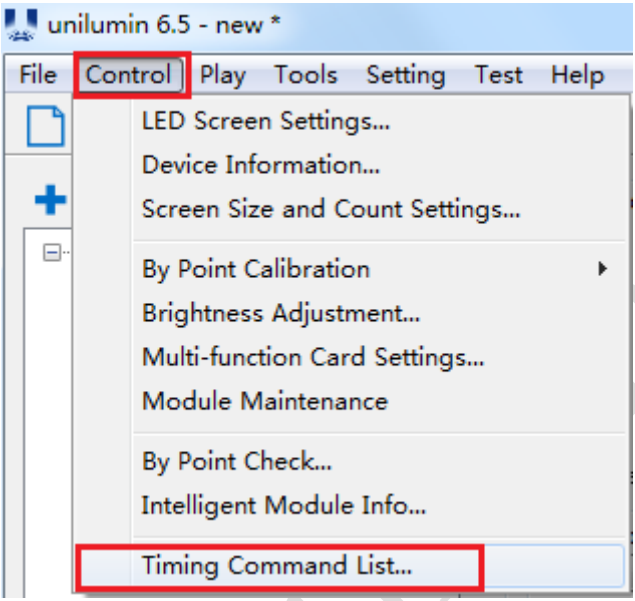


Fig 4-44 Timing Command List

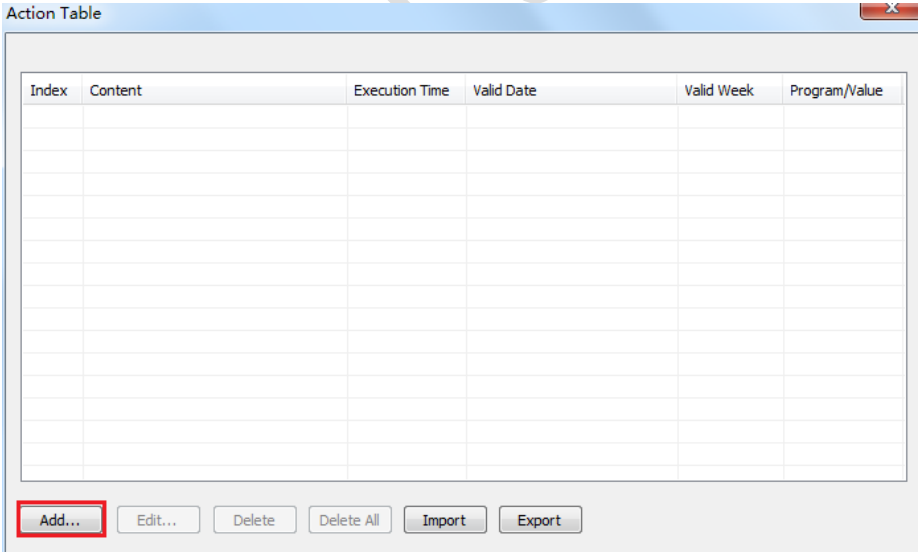


Fig 4-45 Action Table

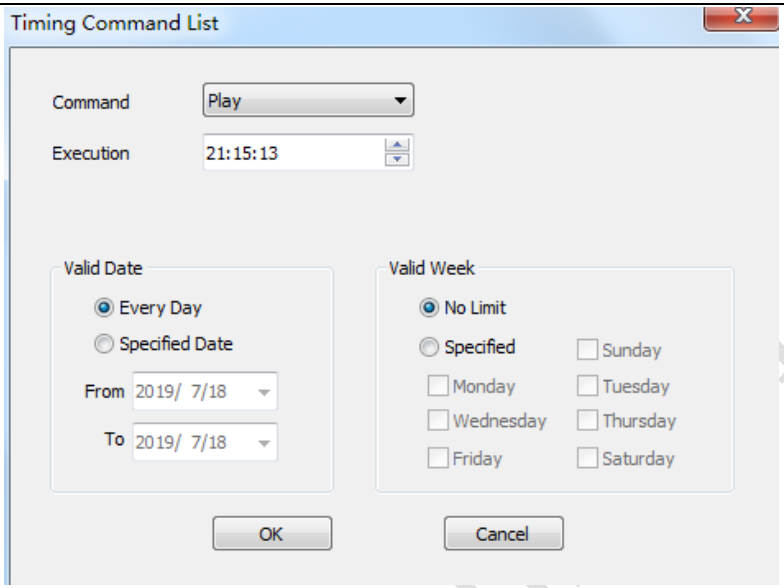


Fig 4-46 Timing Command List

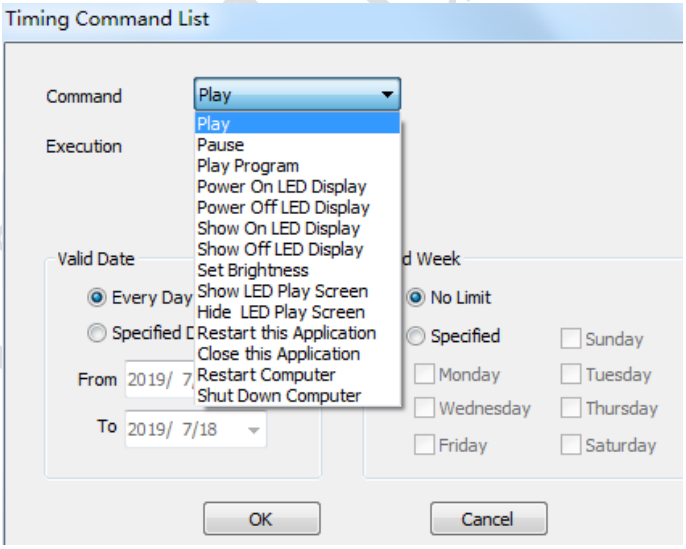


Fig 4-47 Setting Timing Command List

Chapter 5 Startup, Shutdown, and Maintenance

5.1 Startup Sequence

1) Start the distribution box for the LED display.
2) Start the control computer.
3) Start the video processor.
4) Start the sending box.
5) Screen color will reach to best status after 5 minutes lighting up.(Color gradually c hanges as the temperaure warms up)

5.2 Shutdown Sequence

1) Shut down the video processor.
2) Shut down the sending box.
3) Shut down the control PC.
4) Shut down the distribution box for the LED display.

5.3 Daily Maintenance

1) Check whether ambient temperature and humidity meet the operating conditions for the LED display on a daily basis.
2) Use the LED display and its auxiliary devices at least twice a week and two hours each time. Before using the LED display, perform warm-up operations if it has been idle for 14 days (for details about warm-up operations, see Section 5.4).
3) It is recommended that you should use a soft antistatic brush to clear dust on the screen surface monthly in order to achieve an optimum displaying effect.
4) Check the parts in the distribution box quarterly. Check whether the power cables and signal cables for the LED display are connected securely and safely, and whether the display is grounded reliably.
5) Check whether the steel structure is secure on a yearly basis.

Unilumin

5.4 Warm-up Operation

If the LED display has been idle for 14 days, perform warm-up operations before using the LED display.

Set the prestored picture as follows when you initially start the LED display. This setting is for warm-up operation only. You do not need to set the prestored picture if the LED display is used frequently.

5.4.1 Unilumin N series - Setting the Prestored Picture

For details about how to set the prestored picture, refer to Section 3.6. Select a black background picture. Set **Boot Screen** to 60 seconds. Set both **Cable Disconnect** and **No DVI Signal** to **Prestored Picture**. Then click **Save to Hardware**. See Fig 5-1.

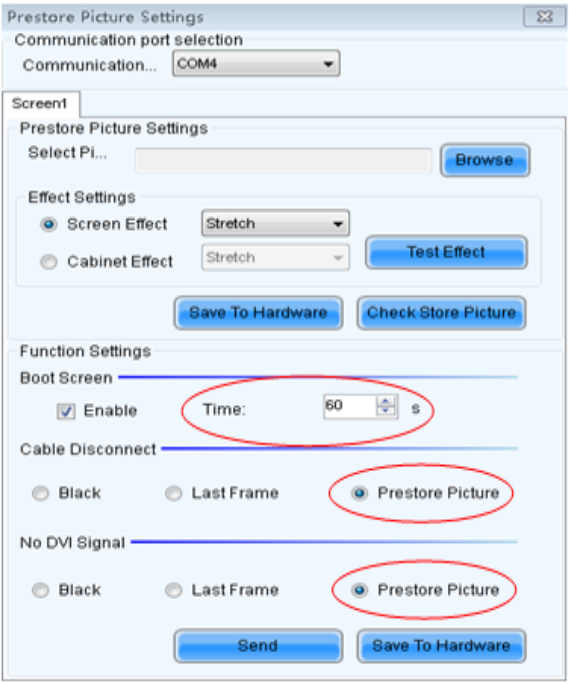


Fig 5-1: Prestore Picture Setting

5.4.2 Unilumin N series - Ageing Operation

On the main window, click **Brightness** to enter the brightness adjustment interface, as shown in Fig 5-2:

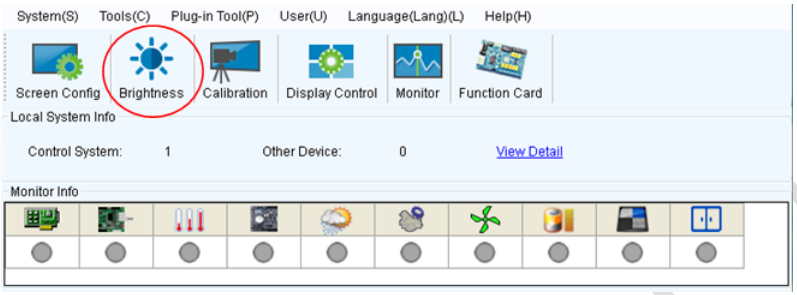


Figure 5-2 Main Window for Advanced User

Select **Manual** and set the brightness to 26 (the brightness is about 10%) by dragging the scroll bar below **Brightness Adjustment**. See Fig 5-3:

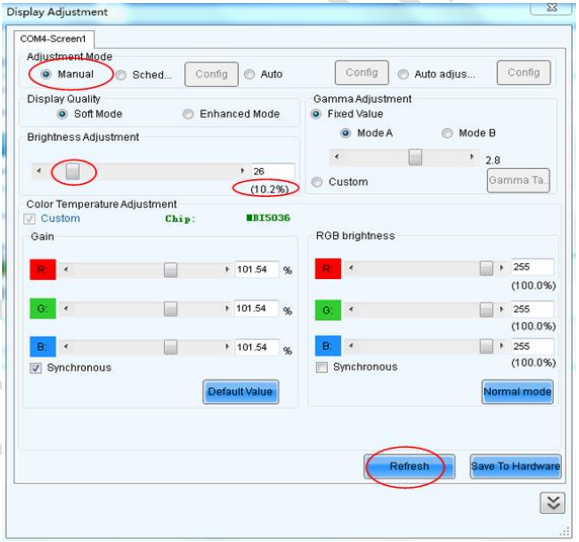


Fig 5-3 Manual Adjustment

NOTE: It is recommended that manual brightness adjustment be finished within 60 seconds.

Return to the main window. Click **Display Control** to enter the **Screen Control** interface. Set **Self Test** to **White**. Click **Send** to finish the operation. As showed in Fig 5-4 and Fig 5-5.

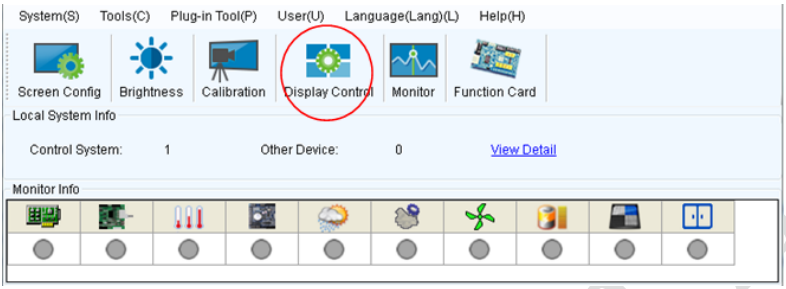


Fig 5-4 Display Control

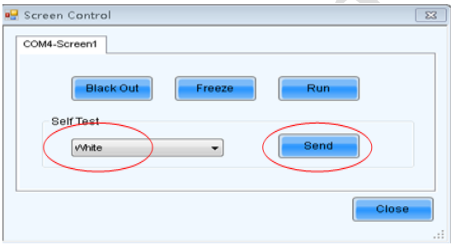


Fig 5-5 Display Control

Adjust the screen brightness and perform ageing based on the steps described in Section 5.4.2.

SN	Display Brightness	Ageing time
1	10%	1 h
2	30%	2 h
3	60%	2 h
4	80%	2.5 h
5	100%	0.5 h

5.4.3 Unilumin K series - Ageing Operation

If the display is not used for 14 consecutive days, please follow the instructions below for aging before using it again.

In the main window, click "Test" - "Aging Test" to enter the aging interface. Drag the playback window on the software to the display area of the display.

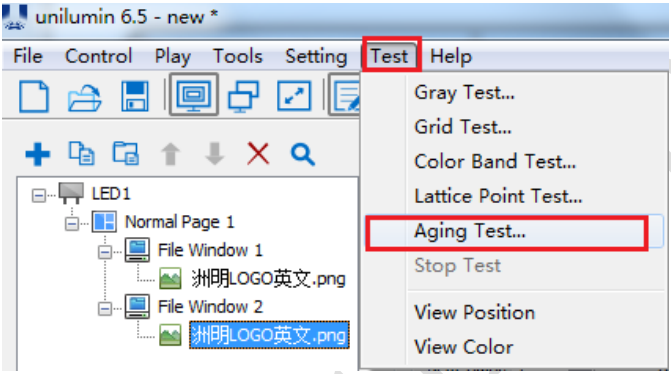


Fig 5-6 Aging Test

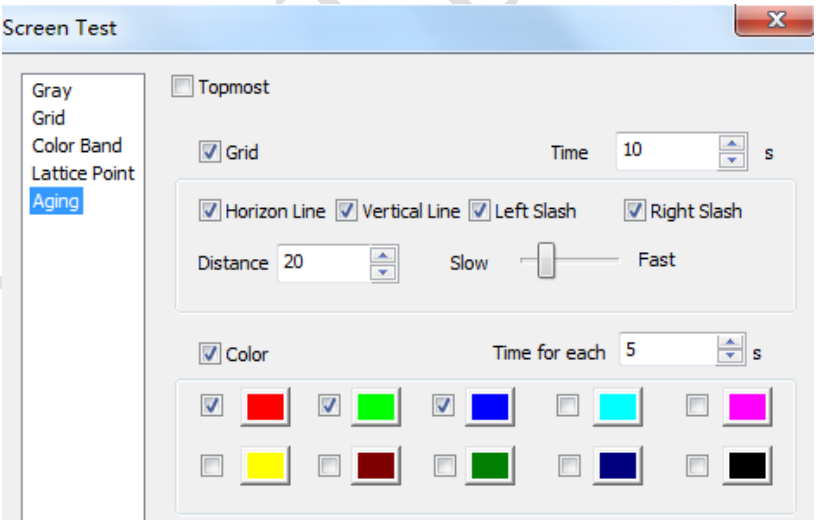


Fig 5-7 Screen Test

Chapter 6 MP - LED Display Control-setting

6.1 Power-on Testing

Before performing control setting on the LED display, confirm that each device is connected correctly.

8) Before turning on the power of the LED display, you must use a multimeter to test the live wire, neutral wire, and ground wire of the AC power supply, in order to ensure they are not conductive with each other.
9) The ground wire must be in reliable contact with the ground, and kept away properly from the live wire. The connected power supply shall be distant from high-power equipment.
10) When the 3-phase and 5-wire system is adopted, the load shall be distributed evenly among the phases to ensure three-phase balance as far as possible.
11) The input voltage must meet the voltage requirements indicated the cabinet rating label.
12) Connect the USB cable provided for the sending box to the USB port on the control PC.
13) Check whether cables for the LED display are connected in accordance with the power cable and signal cable connection diagrams provided for the delivered products.

6.2 Preparation

This chapter covers the activities and considerations that need to be made prior to ordering equipment. If assistance is needed with any of the items below, Megapixel VR is available to assist. Please contact a sales associate. Ensure compatibility of the display product being considered with the HELIOS system. The HELIOS system can be used with a continuously expanding list of products. Please see the HELIOS software release notes available on the Megapixel VR website for current product compatibility.

Unilumin

6.2.1 Video Input

Pixel dimensions - The number of pixels in the final display is a major factor in selecting a video input type. If at all possible it is best to first settle on a quantity of pixels that need to be driven before selecting an input format.

Input formats - Select an input format that can support the required pixels. HELIOS accepts three input formats:

- HDMI
- DisplayPort
- SDI

6.2.2 Custom Input Bandwidth Calculations

HDMI and DisplayPort can support custom input resolutions and frame rates, it is important to confirm that the intended resolution/frame rate will fit within the bandwidth limits. Bandwidth limit confirmation is less of a concern when using SDI since SDI is a controlled standard with fixed formats

Input	Frequency	Maximum Pixel Dimensions	Maximum Bandwidth
HDMI	60Hz	4096 x 2160	14.4G
DisplayPort	60Hs	5120 x 2880	22.6G

The following formula is used make the maximum bandwidth calculation:

(Pixel Width * Pixel Height) * Frame Rate * (Bits/Pixel * 3) = Maximum Bandwidth

As an example, the largest standard aspect ratio DisplayPort signal HELIOS supports is 5K (5120x2880) @60 Hz 8bit. Bits per pixel is multiplied by 3 since each pixel gets a red, green, and blue signal.

(5120 * 2880) * 60 * (8 * 3) = 21,233,664,000 (21.2G)

6.2.3 Creating a Raster Map

It is a good idea to create a raster map drawing to document which portion of the video signal serves which portion of the display. The example below contains two separate displays (blue tiles). In this case, the pixel dimensions of both displays will fit on a 6K raster. The larger 8K and DCI 8K rasters are shown for reference.

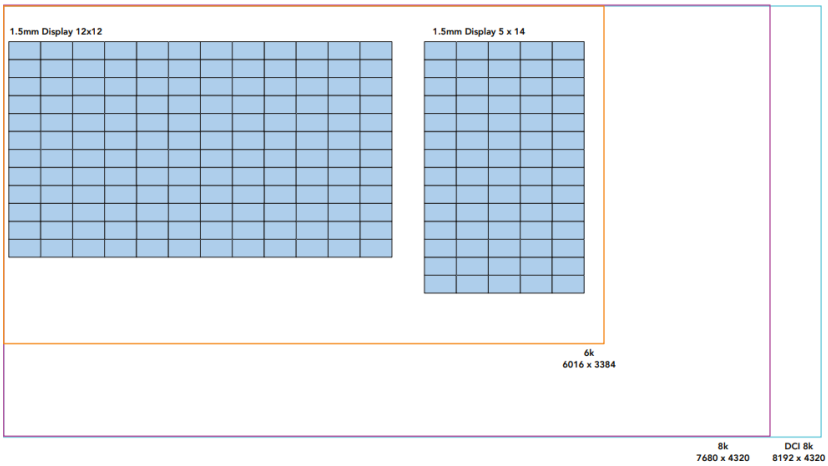


Fig 6-1 Example raster map

Sometimes, the ‘as built’ shape of the system does not fit any horizontal or vertical rasters, but the total number of pixels can. This is the case with a long ribbon display. Rasters can be rearranged, (within certain limitations) on the front end if necessary. In the end, the picture to be transmitted to a display needs to fit inside of the pixel dimensions of one of the three supported input signals (HDMI, DisplayPort, or SDI). For long strip style displays this means that the incoming picture needs to be divided into segments, these are labeled with capital letters in the example below (A, B, C etc.). Content can be created in segments or the segmentation can be accomplished with media processing equipment prior to the HELIOS Processor. The example below shows a dual HDMI input configuration (see the following section on dual input cards).

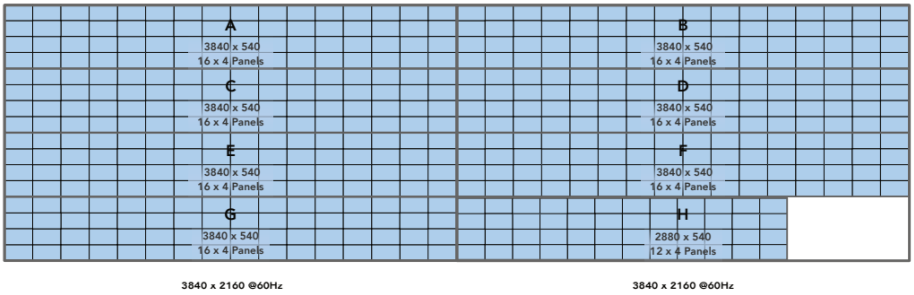


Fig 6-2 Long ribbon display map example

6.2.4 Dual Input Cards

If the total number of pixels will not fit any single input raster, the system can be fed video from multiple input cards. A HELIOS Processor with the necessary hardware (dual DisplayPort or dual HDMI cards) can receive dual video signals of the same type of signal. When HELIOS is outfitted with two of the same card type (DisplayPort or HDMI) it will stitch the two rasters together into one continuous output to tiles. Please see the Input Setup section in Chapter 5 for more information on configuring this mode.

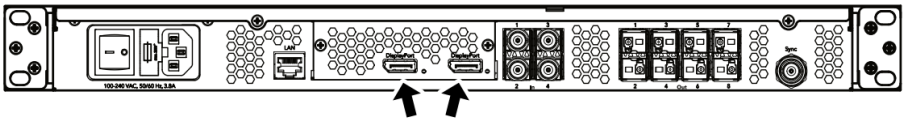


Fig 6-3 Dual DisplayPort Input Card Configuration

Data Distribution At this point it can be helpful to draw out the data topology (Fig 10). Decide if the display will be cabled vertically or horizontally. Calculate the number of network switches it will take to distribute data to the display. In the system example below we use a tile with the pixel dimensions 480 x 270 (tiles are 129,600 pixels). From the Output Port Capacity table in Appendix G we see that a 1Gbps switch port running a color bit depth of 12 at 30Hz can support up to 850,000 pixels (850,000 / 129,600 = 6.5). If bit depth and frequency requirements change, the system bandwidth must be recalculated. This tells us we can safely put 6 of these tiles on a 1Gb link.

Bit Depth	10	10	10	12	12	12
Device	Switch Port	Switch Port	HELIOS Fiber	Switch Port	Switch Port	HELIOS Fiber
Ethernet Speed (Gbps)	1	2.5	10	1	2.5	10
Video FPS						
24	1,275,000	3,187,500	12,750,000	1,062,500	2,656,250	10,625,000
25	1,225,000	3,062,500	12,250,000	1,020,000	2,550,000	10,200,000
30	1,020,000	2,550,000	10,200,000	850,000	2,125,000	8,500,000
48	635,000	1,587,500	6,350,000	531,000	1,328,125	5,312,500
50	610,000	1,525,000	6,100,000	510,000	1,275,000	5,100,000
60	510,000	1,275,000	5,100,000	425,000	1,062,000	4,250,000
120	240,000	600,000	2,400,000	200,000	500,000	2,000,000
144	195,000	487,500	1,950,000	160,000	400,000	1,600,000
240	100,000	250,000	1,000,000	90,000	225,000	900,000

Fig 6-4 Output capacity table

Check to make sure the entire data load on each network switch is within the limits of 10Gb fiber. In this case, we are using a color bit depth of 12 at 30Hz. So, the 10Gb link can support 8,500,000 pixels / 129,000 = 65.58 tiles per 10Gb link. With only 24 tiles in the example system we know we are well within the limits. Always aim to distribute data evenly, spread the load across switches and switch ports as evenly as possible.

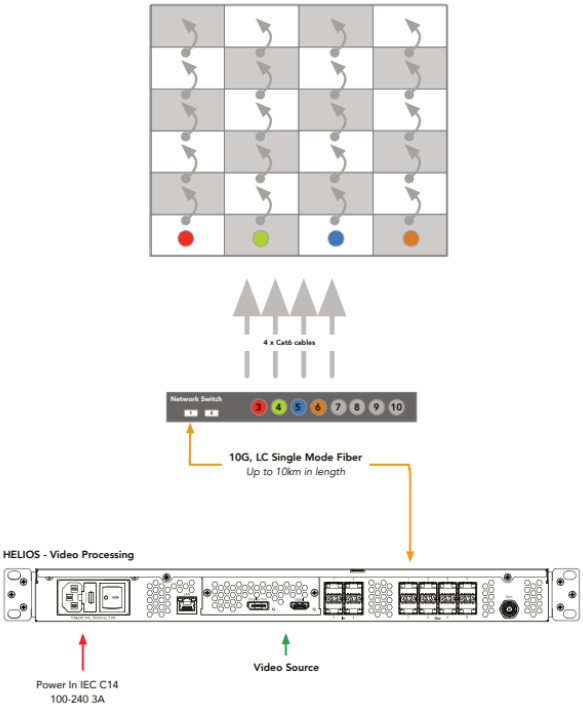


Fig 6-5 Example data distribution drawing

Cable infrastructure - Check that the types of cables chosen are appropriate for the display type and for the location. This is the point at which site specific considerations need to be made. Important items to check:

• Where will the video source device reside?

• Is the HELIOS Processor close enough to the video source device to be within the specification of the video protocol being used (e.g. HDMI, DisplayPort, and SDI).

• Is there power for the HELIOS Processor at the location?

• Has power for the network switches been allotted?

• What is the distance from the HELIOS Processor to the network switches at the display? Is this under the 10km specification of the single-mode fiber?

• What is the distance from the network switch to the first panel in the display that each drives? Is this under the 100 meter limit of the copper Ethernet signal?

6.3 Connections

The HELIOS system consists of the HELIOS Processor, the network switches, and the fiber link between them. The HELIOS Processor is designed to be the receiver unit that the primary video signal connects to. We recommend installing the HELIOS Processor near source equipment. The network switches are intended to be placed next to the LED display panels. The system is always aware of the components that are connected to it and where the components are connected.

6.3.1 IP Addressing

The IP address of the HELIOS Processor is reported on the front screen of the HELIOS Processor. Regardless of what the final network settings for the HELIOS system will be, the web UI client must initially be conFigd to the network that the HELIOS Processor is on so that the web UI is accessible. Each device and operating system has slightly different ways to make these settings, please refer to the instructions of the particular device being used. A HELIOS Processor that has been factory reset will be set to DHCP/Auto IP by default. This is the mode that should be used when operating the HELIOS Processor with a wireless router attached to the control port. If the HELIOS Processor has discovered a DHCP server, the HELIOS Processor will likely have a 192.168.XX.YY address. If it has not been served an IP address by DHCP, the HELIOS Processor will default to an automatic private address (169.254.XX.YY). If DHCP/Auto IP is the chosen mode, the web UI host device must also be set to DHCP in order to join the same network.The HELIOS Processor can be conFigd to a fixed IP as well. If this is the desired mode, ensure both the IP and the subnet mask for the web UI host have been set to the correct range.

The IP address of the HELIOS can be set using the front panel interface.

1. Press the encoder on the front of the HELIOS unit, then turn the encoder to select

Settings.

2. Select IP Adressing.

3. Choose between DHCP or Static IP, depending on the network that the HELIOS needs to join.

4. Once the settings have been made press **Apply**.

The IP address of the HELIOS can also be set using the web UI interface under **Settings** > **Processors Settings** > **Networking**.

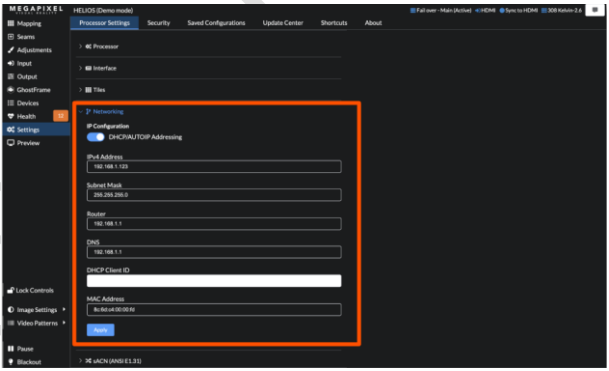


Fig 6-6 Web UI Network Settings

6.3.2 Display Configuration

Front Panel UI

The front panel interface is targeted towards getting remote web UI access to HELIOS. When the encoder is rotated (not pressed) the HELIOS will cycle through four (4) data

display pages. The fourth page (shown below) will display a QR code for the IP address of the unit. The front menu also has a few other basic controls for settings and operation of the display. To conFig the IP address settings, press the encoder, highlight the **Settings** menu option, and press the encoder to select.

Fig 6-7 Front Panel IU

6.3.3 Web UI

The web UI contains all of the other controls that are needed for setting up a display system. The web UI conFigs the HELIOS Processor for the various supported video panels and provides controls to the input and output signal parameters such as selection of source, position and color.

In the previous chapter on Networking this guide discusses the necessary settings to both the HELIOS Processor and the device that is to be used as the web UI host. Having conFigd these settings correctly is a prerequisite. The web UI will not be accessible if this has not been done. The HELIOS web UI runs remotely on any device capable of supporting Chrome or Safari web browsers. Shown below is the mapping pane of the HELIOS web UI.

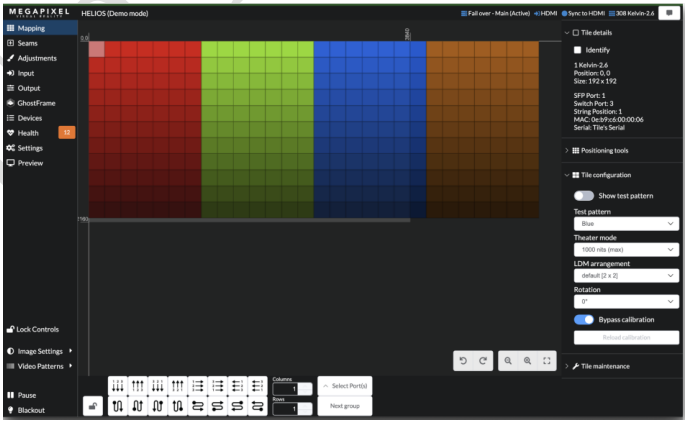


Fig 6-8 HELIOS Web UI

Chapter 7 MP - Playing on the LED Display

7.1 Creating Maps

The HELIOS Processor uses a map to determine which segments of the incoming raster to consider as an ‘active pixel region’. Areas of the incoming raster that are not associated with display fixtures, are never transmitted to the system. If only two fixtures are mapped, only two fixtures worth of panel data is transmitted.

If tiles have been discovered they will be placed on the map. By default, when panels are discovered, they are all stacked in the top left (0,0) position. HELIOS does not support offline mapping. Only automatically discovered tiles can be mapped.

If tiles have been discovered they will be placed on the map. By default, when panels are discovered, they are all stacked in the top left (0,0) position. HELIOS does not support offline mapping. Only automatically discovered tiles can be mapped.

The mapping tools at the bottom of the page are used to move the panels into the positions that they occupy in the physical system. Select a group of panels, define the columns and rows that they should be arranged in, then select the cable order. When the cable order icon button is pressed, the selected panels will be re-ordered. HELIOS can undo and redo maps incase something did not turn out as desired. Panel locations can also be adjusted manually by drag and drop or by typing the desired X and Y coordinates.

Display panels are tinted according to the network switch that the panels are connected to (Red = 1, Green =2, Blue = 3 etc.). In the example below the system has been cabled in columns with seven columns per port. There are four network switches in the system example below.

Unilumin

7.1.1 Tile details

Fig 7-1 Mapping Pane

The right side of the mapping pane has accordion menus with tools to manage tiles. Select at least one tile to see information about it.

Fig 7-2 Tile details

Directly below, is an Identify checkbox. When this is checked ON, selected tiles will be highlighted in the system (blue dot on tile in the user interface). The Identify behavior has two modes (1) Rear indicators only or (2) Front identify & Rear indicator. On the Processor Settings tab in the Tiles accordion, a drop down menu offers these two choices.

The **Show Indicators** toggle on the **Settings** → **Processor Settings** pane, enables/disables the rear tile run time indicators (i.e solid blue, red, etc.). The **Identify** function operates independently, it will be available even when this setting is disabled.

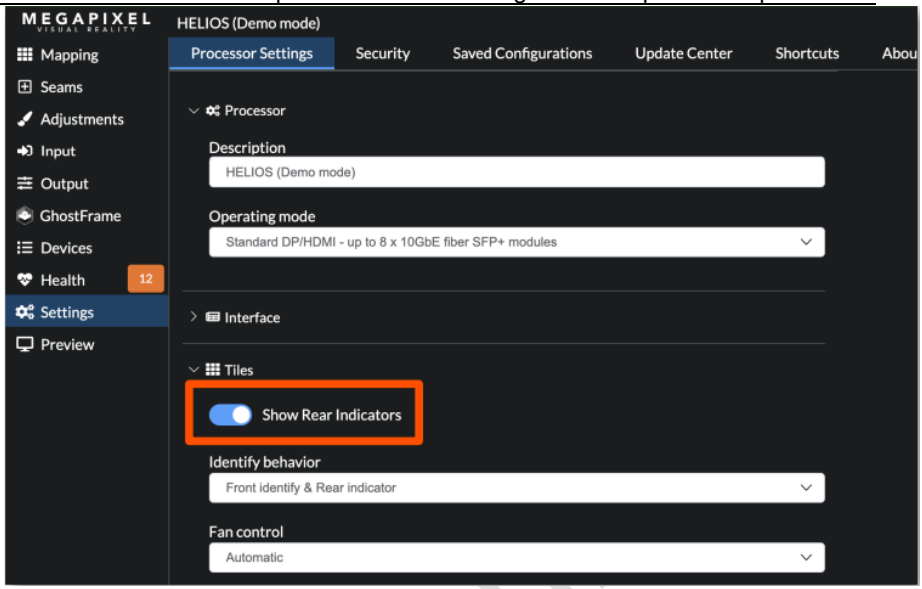


Fig 7-3 Tile Identify behavior

Directly below, is an Identify checkbox. When this is checked ON, selected tiles will be highlighted in the system (blue dot on tile in the user interface). The Identify behavior has two modes (1) Rear indicators only or (2) Front identify & Rear indicator. On the Processor Settings tab in the Tiles accordion, a drop down menu offers these two choices.

7.1.2 Position Tools

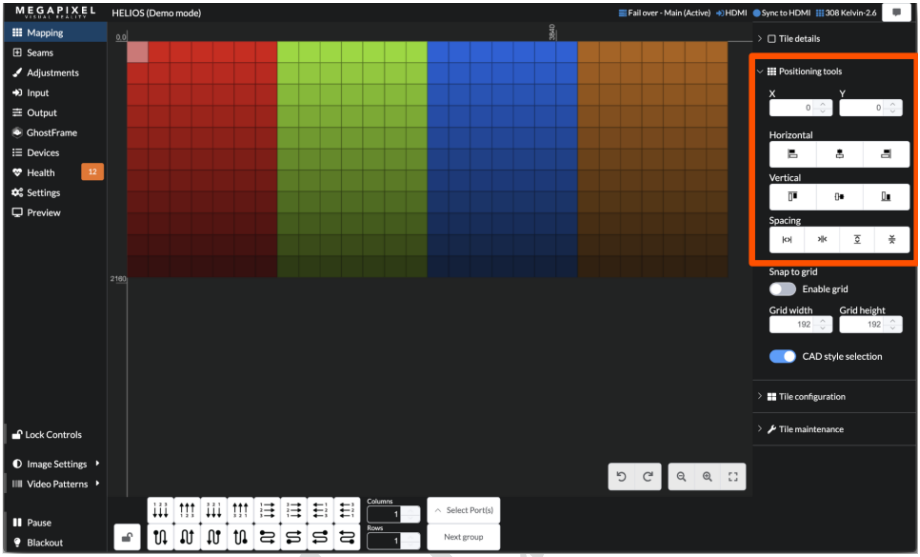


Fig 7-4 Positioning tools

The mapping tools section contains alignment and spacing tools to aid in manual positioning tiles on the map. A grid with a Snap to grid function is available. Set the grid to the pixel size of the tiles being mapped to ensure accurate positioning of all tiles.

The CAD style selection toggle can help make the selection style behave in a more familiar way. When this mode is ON dragging from right to left only selects the tiles inside the drag boundary zone. When this mode is OFF the drag right to left action selects all tiles that the drag boundary touches. Regardless of how CAD style selection is set, dragging from left to right always selects everything that is touched by the selection box.

7.1.3 Tile Configuration

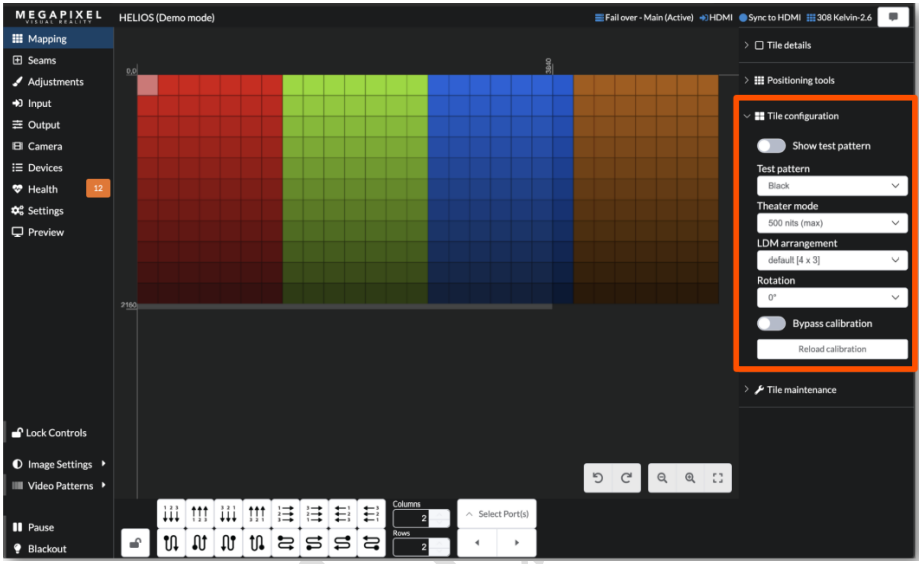


Fig 7-5 Tile configuration.

Test pattern toggle - Select the tile test pattern desired and then choose to enable it with the toggle. These patterns are tile patterns that each individual tile calls up from on board memory. This is different from the Video Patterns located above Pause and Blackout that send a video signal from the HELIOS to the entire array of tiles.

Theater mode - A special low light level calibration configuration. If a tile has been calibrated for special low light situations, the tile will utilize full bit-depth at the selected lower luminance. If a tile does not have this additional calibration file, it will not support theater mode and will default to showing maximum luminance.

LDM arrangement - A single tile type can sometimes have multiple LDM configurations. If the tile type being used supports this, the drop down menu will list them here.

Rotation - Rotate the video being displayed on a tile so that the tile can be physically installed at a rotated angle but still display right side up video. Keep in mind that rotated tiles may not look the same as other non rotated tiles. LED panels with vertically stacked diode SMDs are especially affected by rotation changes to their

viewing angle.

Reload calibration - Reload calibration is useful if an LDM has been replaced and calibration data needs to be reloaded.

Bypass calibration (Advanced) - This toggle is available as an advanced function for rare cases where tile calibration data is suspect. Turn the toggle on to disable tile's uniformity correction and color space retargeting.

7.1.4 The maintenance

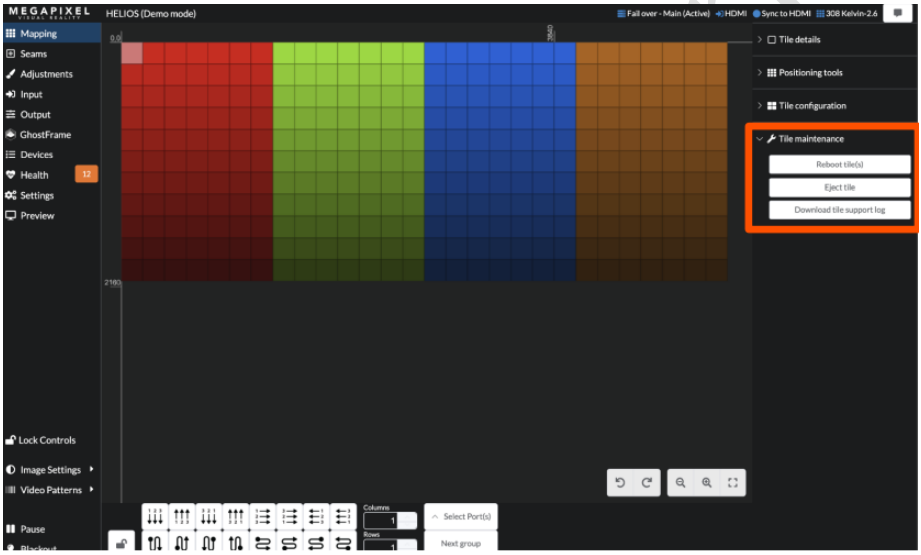


Fig 7-6 Tile maintenance.

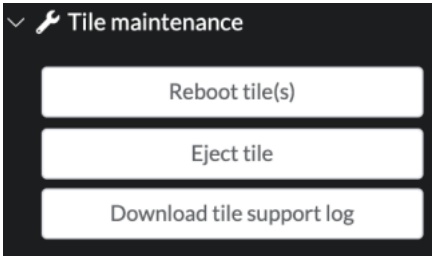
Reboot tile(s) - HELIOS can send soft reboot commands to selected tiles. Select tiles to reboot and press the Reboot Tiles(s) button. Caution using this feature in a show environment! The tile(s) will go black as they reboot.

Eject tile - Some tiles have an ejection mechanism this button can be used to trigger it. Once ejected a tile will lose communication with HELIOS. For safety reasons only one tile at a time can be ejected.

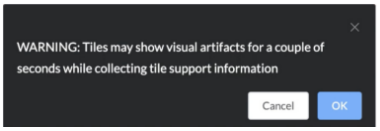
Download tile support log - Requests technical support logs from selected tile(s). These logs contain current state and some activity logs since boot that are used by MVR technicians and developers for troubleshooting. When tiles report information in

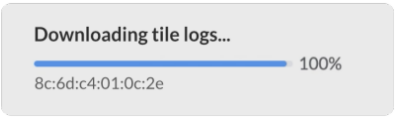
this manner they may show visual artifacts for a few seconds as the tile is processing and sending the log.

1. Press the Download tile support log button.

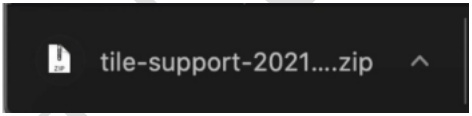


2. A warning will appear. Press OK to continue with the download.





3. After pressing OK a zip'ed log file is downloaded to the download location set in the browser.



7.2 Seams Pane

Displays occasionally have minor intensity variations at physical tile seams. This is usually caused by inconsistent physical gaps between tiles. Prior to adjusting seams electronically, the installation should be checked for hardware inconsistencies (e.g. latches not engaged, tiles and LDMs not seated properly). The HELIOS Processor provides seam correction by specifically adjusting the intensity of the edge LEDs. Shown below is a selection of horizontal seams highlighted in light blue. When using the Tile Seams tab, each selectable region in the user interface is the edge of a tile. When using the LDM Seams tab each selectable regions is an LDM (LED module) boundary.

We have found that video game controllers are well suited for the seam correction

workflow. The HELIOS UI supports Xbox and Playstation* controllers. The game controller connects via USB or Bluetooth to the laptop or mobile device that is running the HELIOS web UI. Multiple users are supported as each browser connection can have a game controller connected.

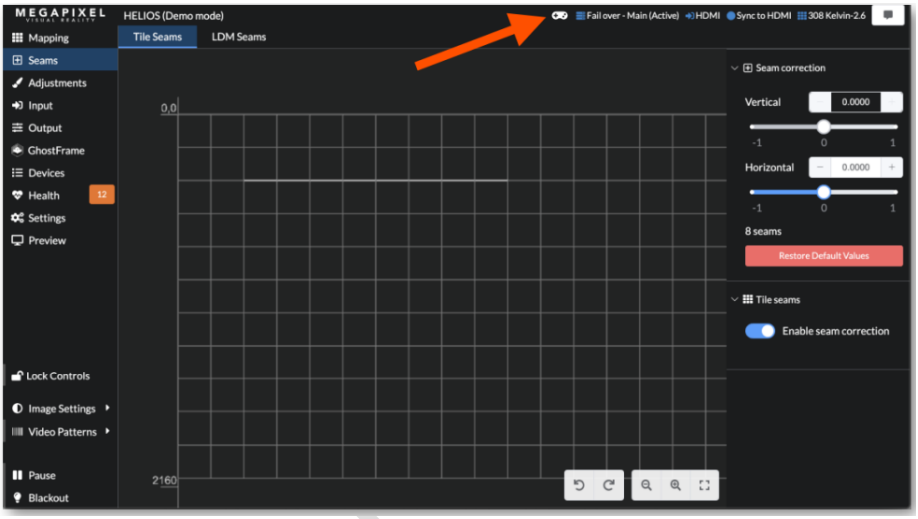


Fig 7-7 Seams pane.

Steps to setup a Bluetooth controller with a mobile host:

1. Begin with the controller turned off. Then, put the controller in pairing mode:
   ▪ Xbox - press the Xbox button to turn on the controller. Then, press and hold the Connect button for a few seconds.
   ▪ PlayStation - press and hold the PS and Share buttons at the same time until the light bar begins to flash. 2. Navigate to the Settings and ensure Bluetooth is turned on.
   ▪ Find the name of the controller under Other Devices. Tap the name to connect.
2. With the web browser in focus and connected to HELIOS press the X button on the controller.
3. A game pad icon should appear on the HELIOS UI confirming the link with the game controller.

The warning below is shown when a user connects to HELIOS using the https:// protocol, as each HELIOS includes its own self-signed certificate.

As browsers move to requiring a secure context for gamepad support, users will need to use an https:// connection to enjoy gamepad powered seam correction. Existing http:// (no ‘s’) connection will soon no-longer register that a game controller is even connected.

This change was defined by the W3C who are concerned with protecting the privacy & security of users on the internet. We are actively exploring options, but for now a user has to connect to HELIOS using the https:// protocol to be able to use gamepads on Firefox, and soon the other major browsers.

If a warning such as the one below appears when connecting to HELIOS via https://, press the Advanced… button on the warning page and Accept the Risk and Continue in order to bypass the warning.

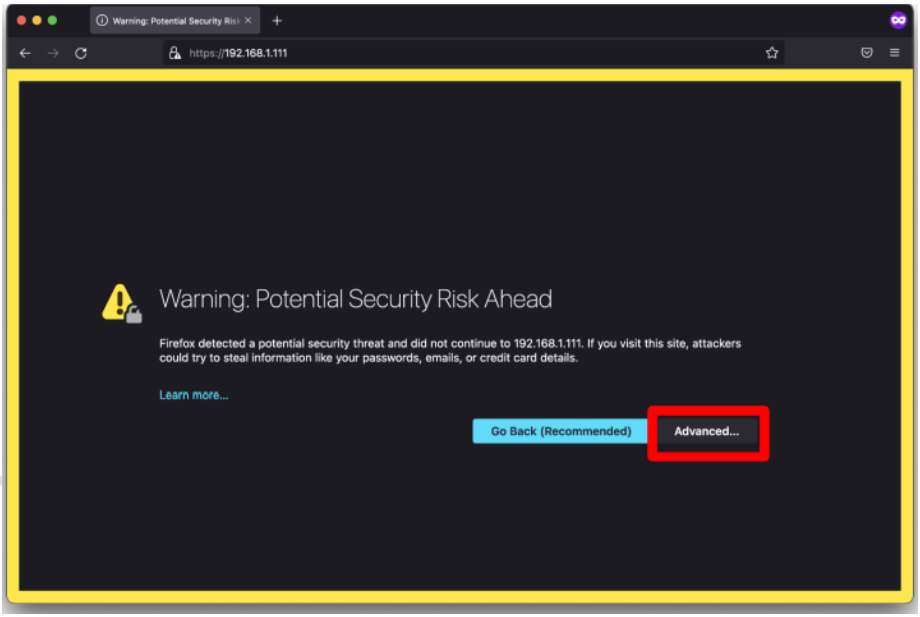


Fig 7-8 https:// warning ‘Advanced’

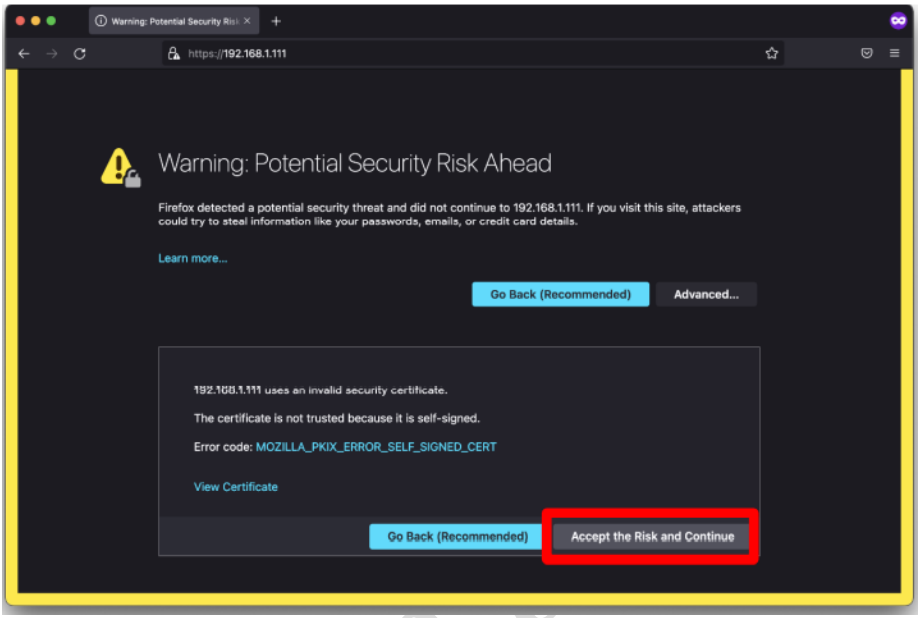


Fig 7-9 Game pad warning 'Accept the Risk and Continue'

7.3 Input Pane

The HELIOS Processor supports three different types of input formats (HDMI, DisplayPort, and SDI). The HELIOS interface for selecting inputs is a drop down menu on the Inputs pane (highlighted by the orange rectangle in the example below). After a factory defaults restore, HELIOS will automatically select the first valid input that it receives. As an example, if the first valid input HELIOS receives is HDMI, HELIOS will be select and remain selected on HDMI even if the signal is no longer present. If HDMI is then unplugged and DisplayPort plugged in, the HELIOS needs the user to select the DisplayPort source manually. Changes are sent live to the entire system immediately.

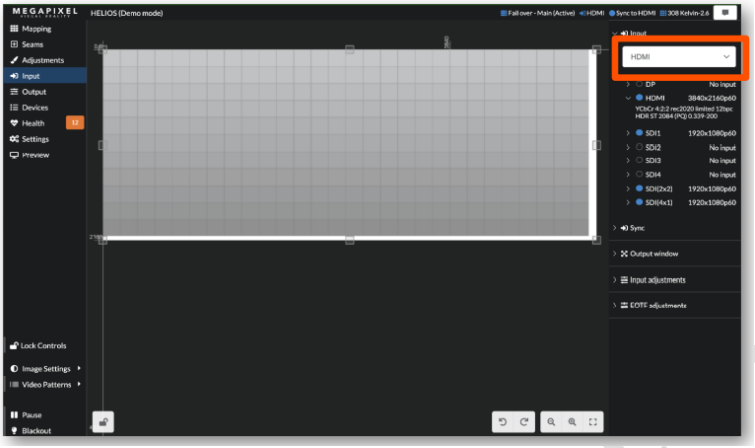


Fig 7-10 Input select.

When an external sync (genlock) is not present, HELIOS will lock to the frequency of the input signal. If using an external sync we strongly discourage using a different frequency than the selected input signal. Mismatched frequencies can cause stuttering and vertical tearing between displays, along with other undesirable artifacts.

Sync offset - shows how far away that input's sync is from the system's sync. If HELIOS is locked to input it should be close to zero. For external genlock it should be a fixed value (non-changing). The key thing to look for is a stable value. If sync offset is incrementing or decrementing, the source is shifting relative to the sync. A shifting sync offset is a reliable indication that the source is not locked. If the sync offset frequency is shifting more than half of a frame time, something is adding a large delay to the signal.

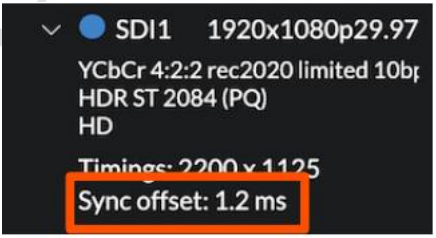


Fig 7-11 Sync offset

In the case of multiple inputs, the joined inputs will show the sync offset for the primary input. Expand the other inputs to check that they also have similar sync offsets to the primary. If the inputs are not in sync, the stitching options will turn orange/yellow

to prompt the user that one of the links is bad. With HELIOS conFigd for an SDI 2x2. SDI1 sync offset is likely 0, and SDI2-4 should also be close to zero. If they are not, or if the sync offset values are not stable, then those signals are not using the same clock.

HELIOS supports 120Hz input signals (see the Input Capability Matrix in Appendix G). 120Hz operation can decrease system latency by half (compared to a 60Hz setup) and improve the on camera appearance of some displays. Using a 120Hz input source will reduce the maximum quantity of pixels by half (e.g. 4,250,000 pixels per 10Gb HELIOS port to 2,125,000 pixels). 720P and 1080P are the best suited input resolutions for 120Hz operation. HELIOS supports 2x2 SDI inputs. The quadrants match the physical port layout on the HELIOS unit; the top left input (input #1) is the top left quadrant, the bottom right input (input #4) is the bottom right quadrant.

When HELIOS has dual HDMI or dual DisplayPort cards installed, the two rasters are stitched together automatically. The input drop down menu will show the stitched rasters as two options (1x2) one wide by two tall or (2x1) two wide by one tall.

Fig 7-12 Dual DisplayPort selection

7.3.1 Sync

HELIOS can sync frames to either the frame rate of the inbound signal or to an external genlock. When an external genlock signal is required (as is the case with redundant systems), use the Allow external sync toggle to enable it.

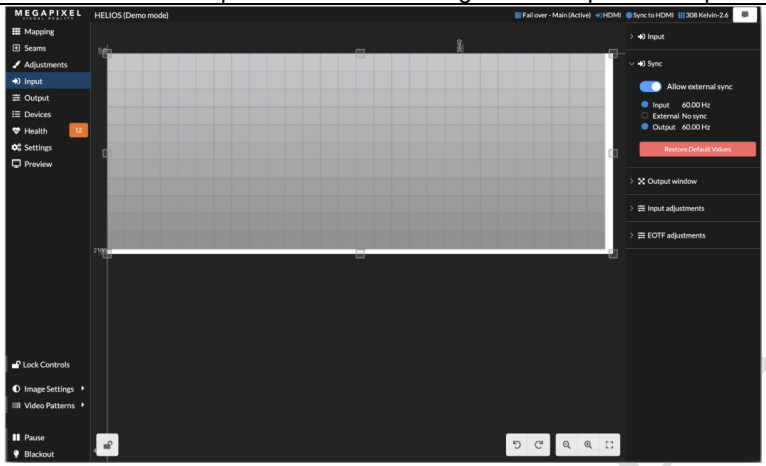


Fig 7-13 Sync settings

HELIOS has hidden Sync controls under the Advanced Mode toggle. Enable Advanced Mode under Settings → Processor settings → Advanced, to reveal the hidden controls, then return to the Sync panel to use them.

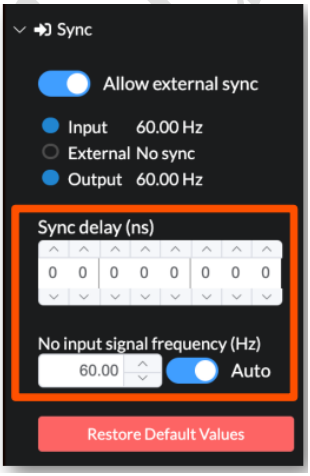


Fig 7-14 Advanced Sync settings

NanoSync (Advanced)

HELIOS NanoSync gives users the most accurate sync control of any LED system. HELIOS synchronizes the actual light output of the LED tile to the source within 1/4 microsecond (250 nanoseconds). Often HELIOS delivers frames much faster than other

equipment such as projectors. Cameras can also require precise alignment to match with the shutter exposure. **No Input signal frequency (Hz) - (Advanced)**

If the inbound signal is ever lost, HELIOS will continue to output test patterns at the frame rate of the last valid input. There are some cases where it is useful to toggle Auto off in order to set the output frequency manually so that test patterns are generated at the frequency of a future valid signal before it arrives.

7.3.2 Output Window

The input signal is contained within the output window (light grey region with small square handles). The output window allows for sizing and positioning of the inbound video signal using the output window controls. Drag any of the handles (circled below) on the edges of the window to manually resize or use the numerical fields to enter precise values. Generally, the output window size should be set to the aspect ratio of the input signal to avoid distorting the picture.

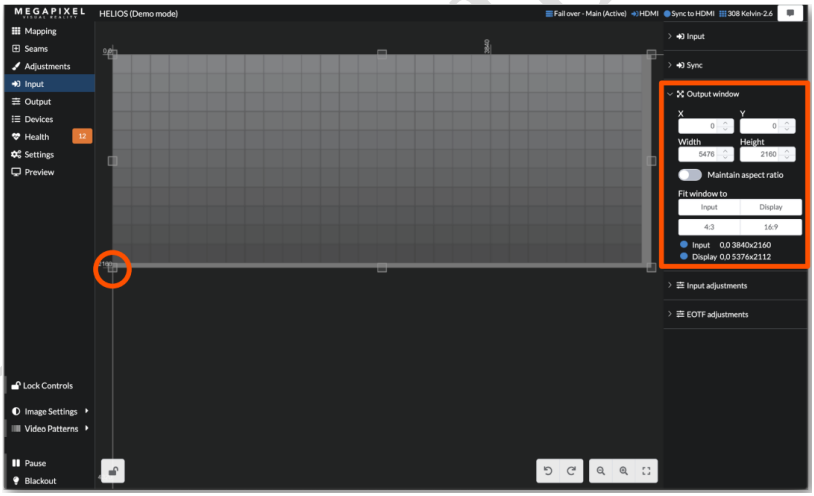


Fig 7-15 Output window

Crop (Advanced)

To display only a portion of an input signal, use the crop function by enabling **Advanced Mode** under **Settings → Processor settings → Advanced**. Toggle the **Enable Cropping** function **ON** and enter the size and position coordinates for the crop box.

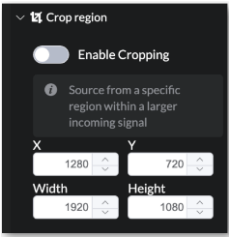


Fig 7-16 Crop region controls

7.3.3 Input Adjustments

The input adjustments section allows the user to make visual changes (brightness, contrast, saturation) to each of the incoming signals independently. Input adjustment settings are saved separately for each input.

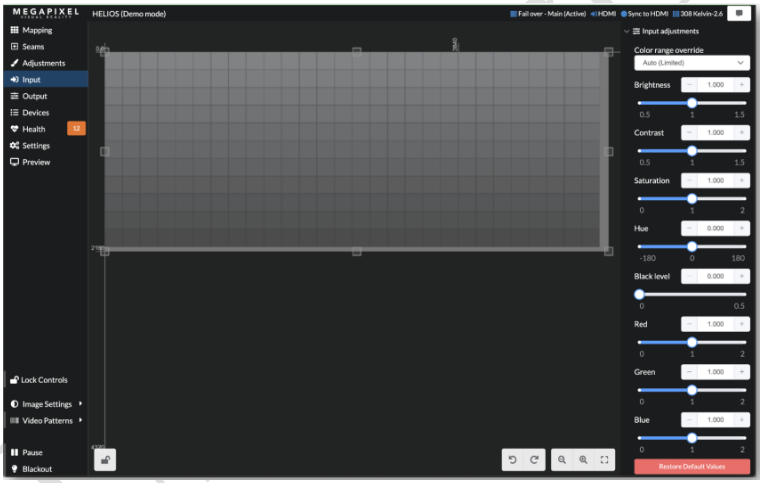


Fig 7-17 Input adjustments

Color range override - defines how to interpret the levels of values in the video signal. The range of values used to interpret the video is defined by two quantization ranges, Limited and Full. Limited video content is contained within 16 - 235 standard for video. In the limited range, 16 and below is treated as pure black and 235 - 255 is treated as pure white. Full range video content uses the full 0-255 range (pure black is 0 and pure white is 255). The way that HELIOS interprets the video must match how it was encoded. If this isn't set correctly there can be a complete loss of shadow detail or

conversely, washed out highlights. If Auto does not identify the encoding correctly this toggle is the location to make a manual selection.

Brightness - adjusts the incoming image to be lighter or darker. First, adjust the brightness to reproduce black correctly then, contrast.

NOTE: This brightness control adjusts the incoming video brightness and should not be used for adjusting the luminance of the display.

Contrast - increases or decreases the differences in brightness across the image. Saturation - increases or decreases purity of colors. Full desaturation turns colors grey.

Hue - changes the color of the video, re-mapping it around the color wheel.

Black level - a combined brightness + contrast control. See Low Level Noise Reduction in Appendix D for how this control is used to eliminate low level noise in an image.

RGB gains - boost or reduce the amount of Red, Green or Blue in the image. Note that these controls are intended for content correction/tweaking. To adjust the RGB levels of the display it is recommended to instead use the Output → RGB Gains.

High Dynamic Range

HDR on HELIOS is comprised of several features all working together: bit depth, gamut, and decoding with an HDR transfer function. Standard definition content uses the the typical SDR gamma curve. HDR uses an entirely different function to map a higher range of brightness onto a display. HDR is more than just brightness, it also includes a wider range of colors. As such, the system must use, at minimum, 10 bit color. HELIOS should ideally be set to 12 bits if possible. Check that the bandwidth is sufficient under the **Outputs** pane **Display bit depth** accordion. A true HDR end result requires that the entire pipeline, from content to wall, is aligned and capable of supporting HDR.

HDR Checklist:

1. The tiles must be capable of a wide gamut.

2. Output gamut needs to be set to Automatic (see the Output pane Display gamut accordion). 3. Content must be encoded in HDR.

4. The playback device must support HDR.

5. HELIOS must receive the signal and recognize it as HDR. Check under the disclosure triangle to see the details of the input signal. In the example below, HELIOS

is receiving a PQ signal. If for some reason an HDR input signal is not recognized as HDR, use the manual override discussed on the next page.

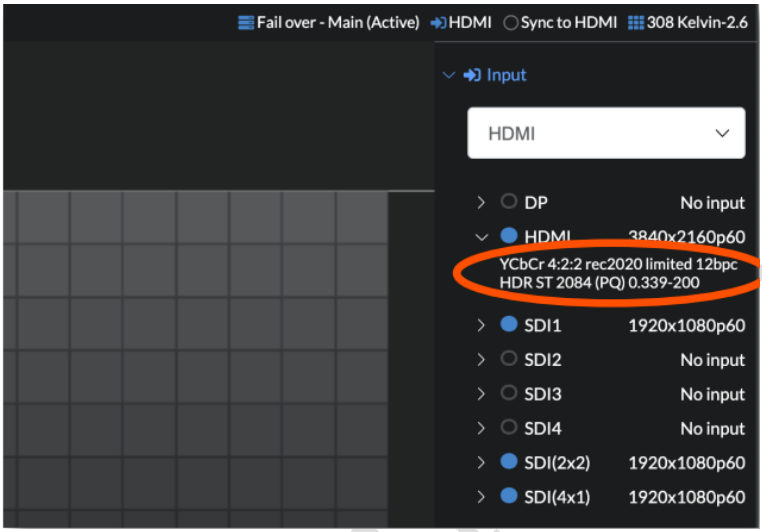


Fig 7-18 Input signal info

NOTE: When connecting consumer playback equipment such as an Apple TV or an Xbox to be an input source it is important to be mindful that these units default to a 4:2:0 color scheme. HELIOS does not fully support 4:2:0. When HELIOS receives a 4:2:0 color signal, it will send a black and white image to the tiles. Set the input source to 4:2:2 in order to regain full color operation.

7.3.4 EOTF Adjustments

The HELIOS EOTF (Electro Optical Transfer Function) adjustments are used to inspect and manually override EOTF settings encoded in the source signal's metadata. If content has a standard dynamic range, it should be interpreted with the SDR setting. Content encoded with a high dynamic range should be set to the EOTF with which it was mastered. Most HDR content will have a metadata label indicating which transfer function was used. HELIOS with default settings, should automatically recognize and select the correct EOTF for the content. If for some reason the user needs to override the automatic settings, this drop down menu allows for manual selection.

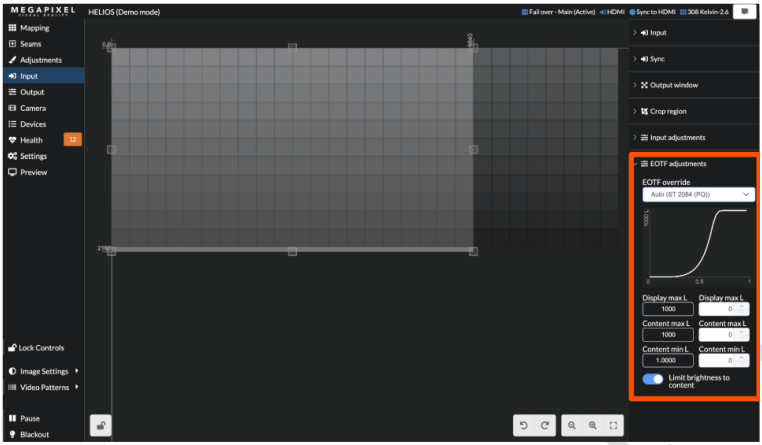


Fig 7-19 EOTF adjustments

When HELIOS is operating in default mode the override controls; Display max L, Content max L, and Content min L are read only values (left example below). With Advanced mode ON (see the Advanced mode in the Processor Settings section) editable fields appear. Advanced users may enter specific numbers here. If the correct values are not known, keep the field values at zero. The system is in automatic mode when these values are at zero. If non-zero values are entered, keep Advanced mode ON so that the values affecting the system are visible.

Fig 7-20 Advanced mode adjustments

The PQ curve is defined in nits. As such, PQ content reports a max L (luminance) to HELIOS. In other words, PQ content needs to be displayed at the brightness level at which it is mastered. The graph below the drop down is provided to help explain the relationship between the content max L and display max L. If there is a max L mismatch between the content and the display, the graph shows how the mismatch is being handled.

Example (A) - display max L and content max L are both 10,000 nits.

Example (B) - display max L is 10,000 nits, content max L is 1,000 nits. HELIOS can show all the content directly 1:1.

Example (C) - display max L is 1,000 nits, content max L is 10,000 nits. HELIOS introduces rolloff to preserve highlights.

Example (D) - HELIOS will also show the curves of SDR and other supported transfer functions.

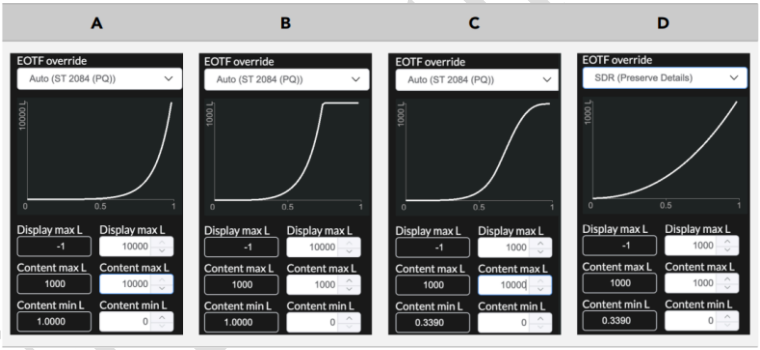


Fig 7-21 EOTF max L graph examples

If PQ encoded content calls for a level that exceeds the capabilities of the tiles, the limit will be the tile's maximum brightness. The Limit brightness to content toggle is available for cases where the content's brightness information is not desired. If tiles are being limited by PQ encoded content and a brighter display is needed, turn OFF the toggle. The HELIOS will ignore the content brightness and allow the tiles to reach their max brightness.

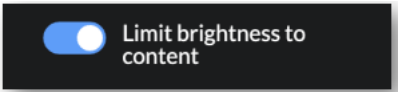


Fig 7-22 Limit brightness toggle

PQ is currently the only signal which advertises and uses content light levels. HLG uses display max L but ignores content levels. The numerical fields are not used for SDR + traditional HDR signals. Display max L is always determined by the connected tiles. Tiles will still respect the Output adjustment → Limit to lowest tile max setting. If it is not set, then tiles should all be at the same brightness regardless of the EOTF. An image settings popup will notify when the Limit brightness to content or the Limit to lowest tile max is being applied. In a scenario where HELIOS is receiving a PQ signal, with content max L set to 100 nits, and the tile max L is 500 nits, the Image Settings adds the words (Limited by content) below the nits value report. If the EOTF is switched to where content max L is no longer used, the input settings message also goes away.

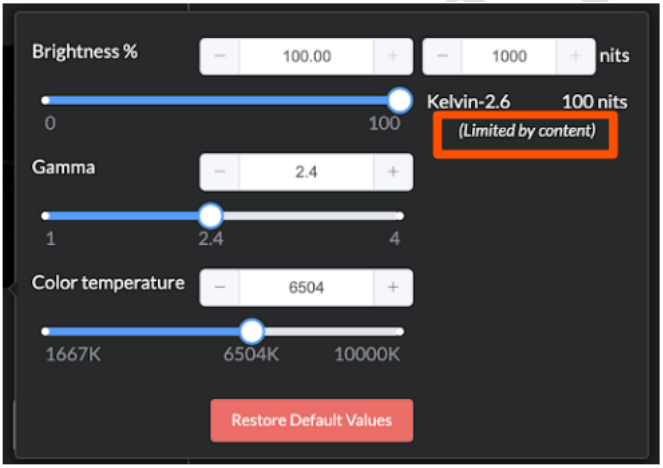


Fig 7-23 Limit message

NOTES:

• When the content level is unknown or not advertised, content max L is assumed to be the same as display max L. In other words, content is assumed to have been mastered for the display.

• In the case of mixed tile types, brightness is restricted to the tile type with the lowest peak brightness. Mixed tile type systems are not recommended.

7.4 Output Pane

7.4.1 Display Gamut

The gamut tool sets the range of each color for the system using CIE1931 chromaticity (x & y) coordinates to define the targeted value for red, green, and blue. The user can choose a standard preset from a drop down list (Rec. 2020 in the example below) or set custom targets to match the display being driven by the HELIOS processor to other devices, such as a projector. Tile capabilities are indicated by the entire rainbow region (both transparent and opaque). The achievable colors for a system are indicated by the opaque rainbow region at the center. Lastly, a black region (identified by the orange arrow below) indicates colors targeted by the settings that are beyond the capability of the display. If the color targets are set within the display capabilities, this black region will not appear.

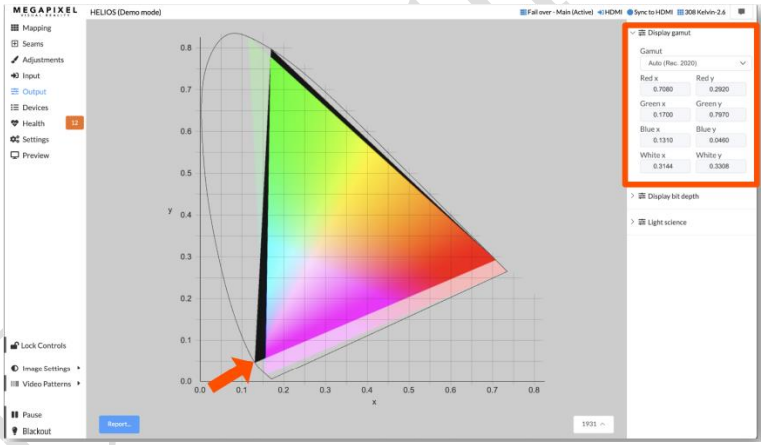


Fig 7-24 Display gamut

In the example below, the large transparent triangle shows the capabilities of the tile are greater than the targets of the system. It also shows a small black region on the left (orange arrow below) where some blue colors are out of range.

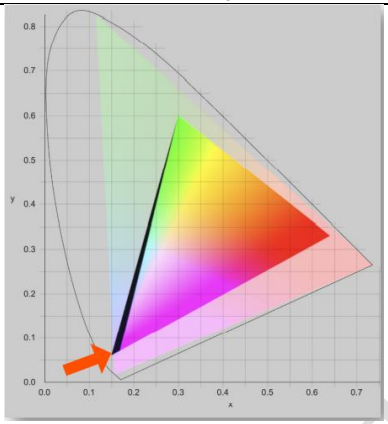


Fig 7-25 Targets are in bounds

Tiles can only show colors within their capabilities, regardless of gamut settings. In the example below, the color targets were set extremely wide, placing them outside the display's range. Therefore, HELIOS shows a wide black perimeter region.

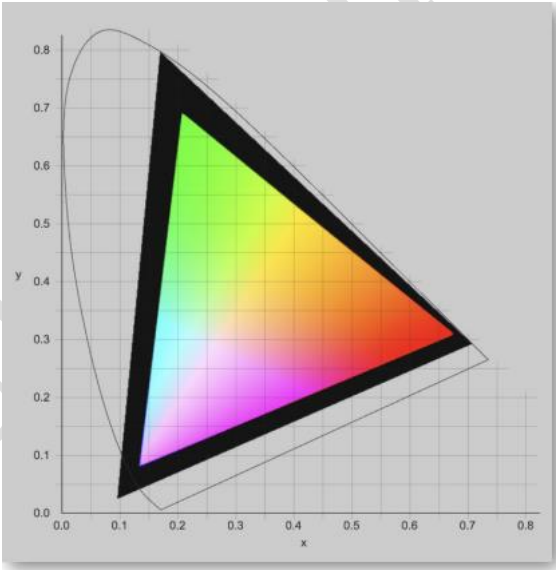


Fig 7-26 Targets out of bounds

Each tile type has its own color capabilities. When a system is made up of mixed tile types HELIOS is set to widest gamut. Widest will determine the widest possible gamut from all connected tiles. This can result in a lowest common denominator color

target selection; tiles with wider gamut capabilities will be restricted to the more narrow gamut setting to match all tile capabilities.

HELIOS can generate a Tile Calibration Report for a system. Press the blue Report… button to open the report in a new tab.

7.4.2 Report

HELIOS can generate a Tile Calibration Report for a system. Press the blue Report… button to open the report in a new tab.

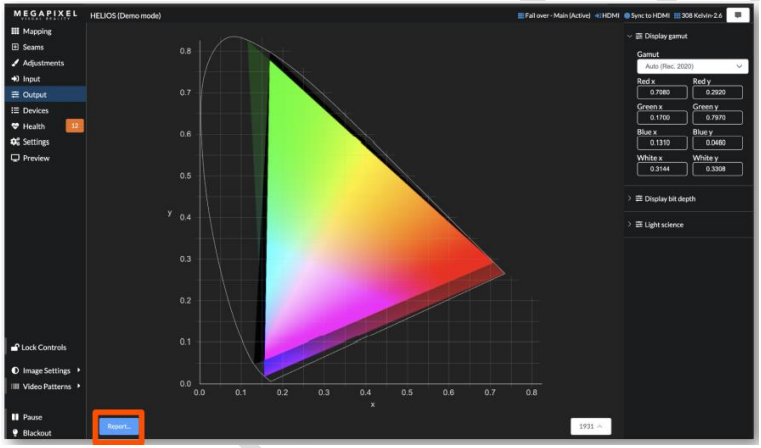


Fig 7-27 Color report button

The Tile Calibration Report (shown below) is useful for content creators and colorists who need to know the color capabilities of the system.

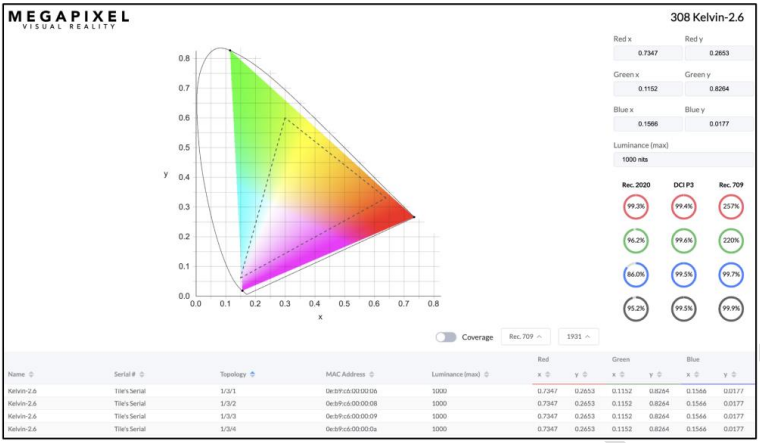


Fig 7-28 Tile Calibration Report

Custom Gamut (Advanced)

HELIOS supports custom gamut settings. Enable Advanced Mode under **Settings → Processor settings → Advanced**.

Display bit depth

The system can operate at 10 bit or 12 bit. This menu controls the current setting and shows per-port bandwidth percent utilization. 12 bit operation is recommended. Selecting 10 bit operation will reduce bandwidth utilization.

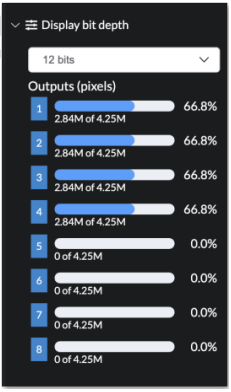


Fig 7-29 Display bit depth

7.4.3 Light science

Low light levels can be challenging for LED displays. Banding can appear in low light level, smooth gradients as tiles struggle to reproduce the low light level signal. HELIOS can improve the visual appearance of these dark regions by expanding the bit depth in the video signal. HELIOS normally uses 10 or 12 bits per color, but with Light science enabled, it will increase the bits per color to 22 (default) or as high as 32 effectively smoothing low light level banding.

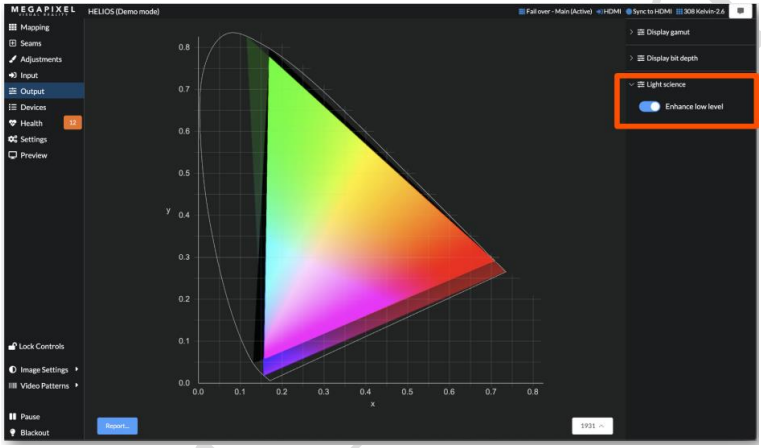


Fig 7-30 Light Science

7.4.4 Camera (Advanced)

Without a GhostFrame license, HELIOS will display the Camera pane. The Camera pane is a limited subset of the full GhostFrame tools. As such, all of the rules and methodology discussed in the previous section of GhostFrame apply to Camera. The Camera pane is used for aligning camera shutters to colored slices. One video slice and colored slices are possible, but stills and additional video slices require a GhostFrame license.

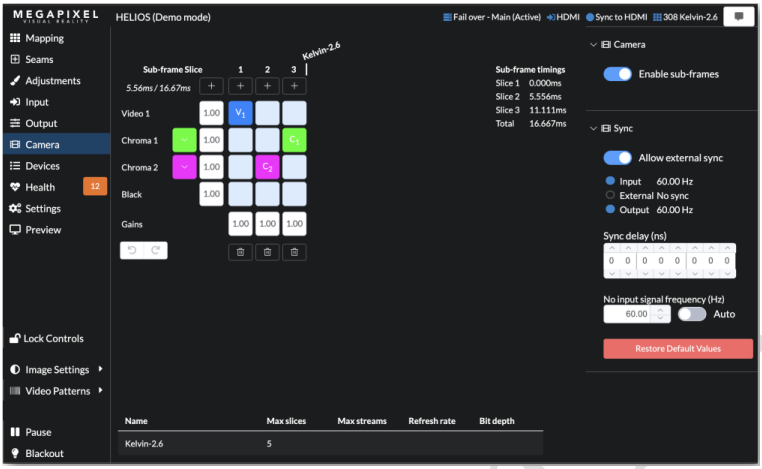


Fig 7-31 Camera interface

NOTE: Tile test patterns disable Camera. Tile test patterns and tile Identify are mutually exclusive to Camera.

7.5 Devices Pane

The Devices pane is a dynamic list of all connected system devices. The information is split into two tabs, a Processing tab and a Display Devices tab. This pane is usually the first place a system technician will check to discover the status of a system.

7.5.1 Processing Tab

Divided starting at the top with information for the HELIOS Processor(s) followed by Network Switches.

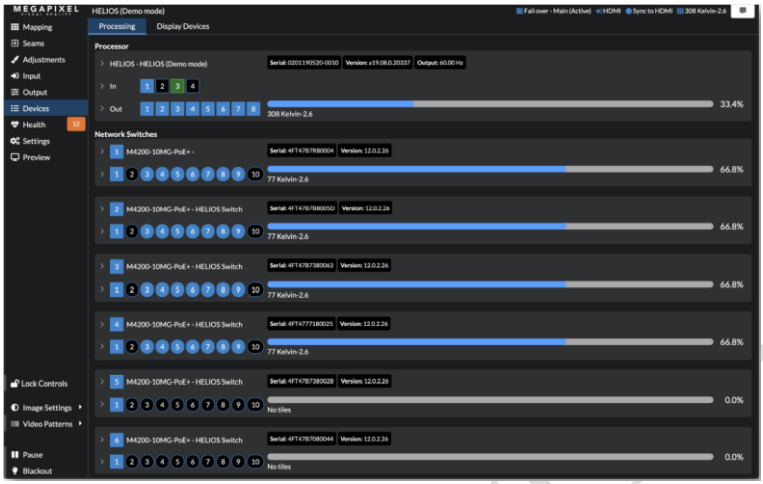


Fig 7-32 Devices pane

Processor

The main device section of the HELIOS Processor displays the full list of tracked parameters. Use the description field to name the processor as desired. This is the same as changing the name in **Settings > Description**.

Fig 7-33 Devices Pane - HELIOS Parameters.

The **In** section of the HELIOS Processor displays details about the input SFP+ units. The square icon with the number on it is the input icon. When this icon is a blue square with white text (input 1 in the example below) the unit is receiving video through the SFP+. When the HELIOS recognizes the SFP+ but there is no video, the icon will be a dark green (input 3 in the example below). In both blue and dark green modes the there will be parameters displayed and a label regarding the type of SFP+ that is in the slot. A black with light blue outline icon (ports 2 and 4 in the example below) indicates that the HELIOS unit does not recognize any SFP+ in the slot.

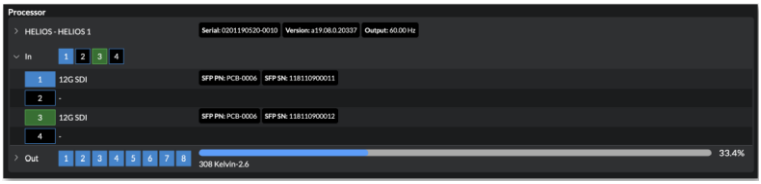


Fig 7-44 Devices Pane - HELIOS Inputs

The Out section shows the status of the outputs and a percentage of utilization of the entire HELIOS Processor. Expand the output section of the HELIOS Processor to see details about the outputs.

The shape and the color of the port indicators relate to the port connection. Links connecting to a processor are square. So all the processor ports are square. The port on the switch connecting to HELIOS will be square (as it's connected to a processor). Similarly the upstream port on the first tile in a chain is also square (as it links back to a processor). Standard HELIOS outputs will always be square since all Standard HELIOS output SFP+ units are 10Gb.

Each port shows a progress style bar showing the port's percent utilization. Underneath the bar is the quantity and type of tiles connected.

Indicator Color	Meaning
Orange	Unsupported SFP
Red	< 1GbE link speed
Blue	1 GbE - 2.5 GbE
Dark Blue	10 GbE
Dark Green	SFP with no link
Inverted Blue	SFP with link

Fig 7-45 Devices pane - HELIOS Outputs

7.5.2 Network Switches

This section displays details for the network switches. Enter a description for the switch if this is helpful for managing the system. This assigned description is persisted within the switch. A remote reboot switch button can also be found here.

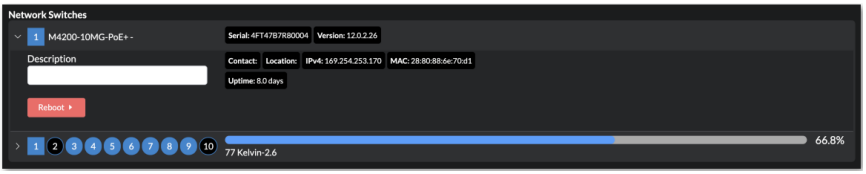


Fig 7-46 Devices pane - Network Switch Parameters

The ports section displays details about the ports. Here again, the square shape icon indicates that 0/1 is connected to a processor. Switch port IDs use slot/port nomenclature. On standard size switches, all ports are considered slot 0; port IDs are numbered 0/1 - 0/9 as shown in the example below. HELIOS also works with larger switches with up to 96 ports. These switches are divided into 12 slots of 8 ports each. Numbering follows the same schema starting with slot 0.

To the right of each port ID is a percent utilization bar with connected tile quantity and type below.

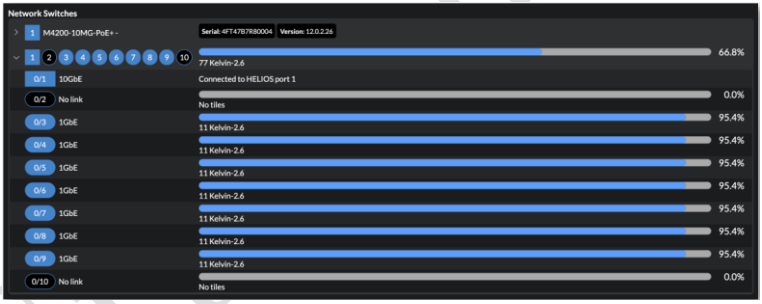


Fig 7-47 Devices pane - Network Switches

7.5.3 Display Devices Tab

The Display Devices section contains a list of connected tiles with detailed parameters and status for each. The list can be sorted by any of the column headers. The Alerts column can be especially useful to identify all devices with active alerts.

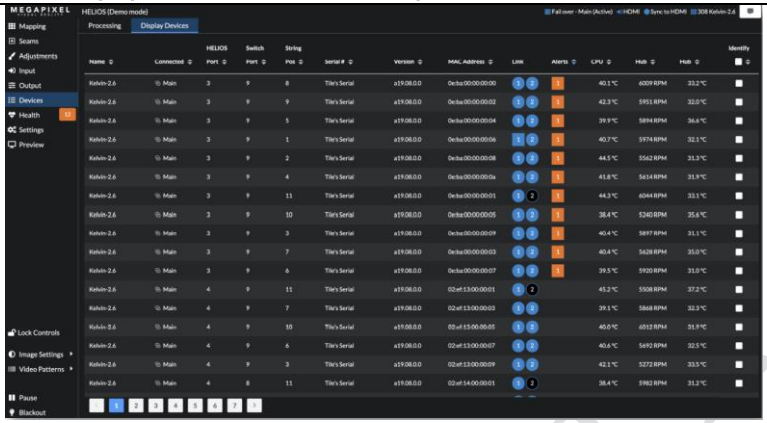


Fig 7-48 Devices pane - Display Devices

7.6 Health Pane

The health pane contains comprehensive network status information about all parts of a connected HELIOS system. This pane contains three tabs; Alerts, Heat map and Reports.

7.6.1 Alerts

To help prioritize alerts, the HELIOS color codes alert badges based on the severity of the condition.

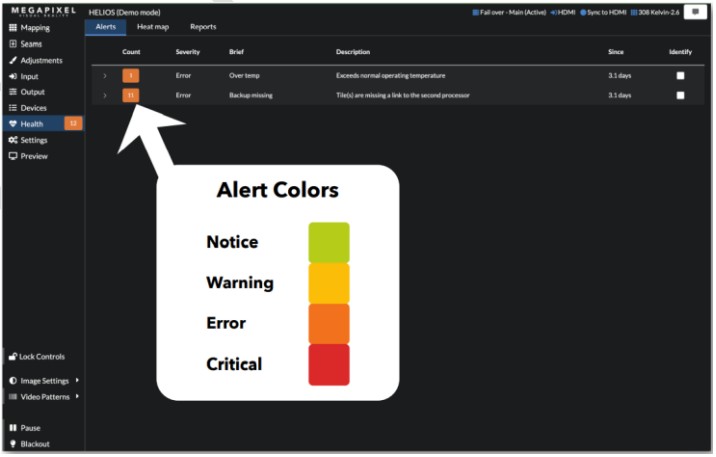


Fig 7-49 Alert Color Codes

The alerts tab provides a list of devices that need attention. Use the disclosure triangle to reveal details about the location of each alert within the system.

Fig 7-50 Alerts tab

7.6.2 Heat map

The heat map tab displays thermal information for tiles in the system. Temperatures are indicated in a rainbow palette that shows thermal differences in 5º degree increments.

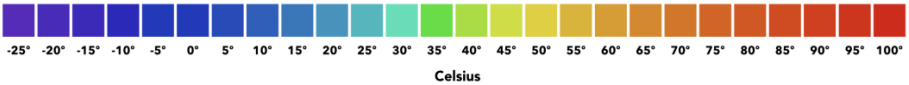


Fig 7-51 Color to temperature

In the example below, one tile has raised an alert with a CPU at 89.5ºC. Use this view to quickly identify any temperature anomalies in the system. The heat map is not just useful for recognizing panels that are excessively hot. It is good practice to warm LED panels up prior to being used at full brightness. Use the heat map to monitor progress and to confirm when panels are ready for use.

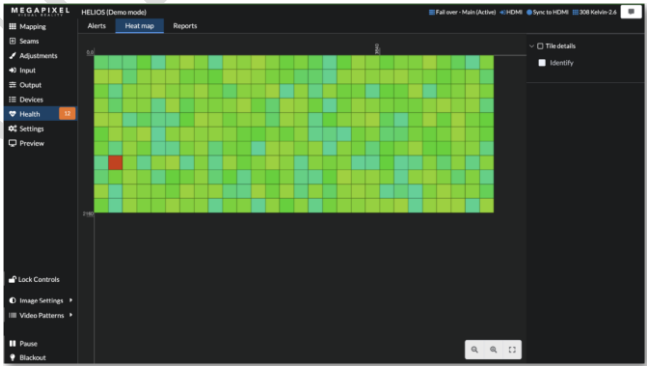


Fig 7-52 Heat map

7.6.3 Reports

The reports tab can fetch data from tiles and provide a downloadable (csv file format) report for several data points in the system. This function queries tiles for the information when a selection is made with the drop down menu. The page will be blank until a report type has been selected. In the example below, Alerts was selected.

Device Serial Numbers - Centralized view of all SNs, useful for inventory tracking.

Device Versions - Active device versions.

Tile counters - Total run time along with various diagnostic counters to help with troubleshooting cable issues.

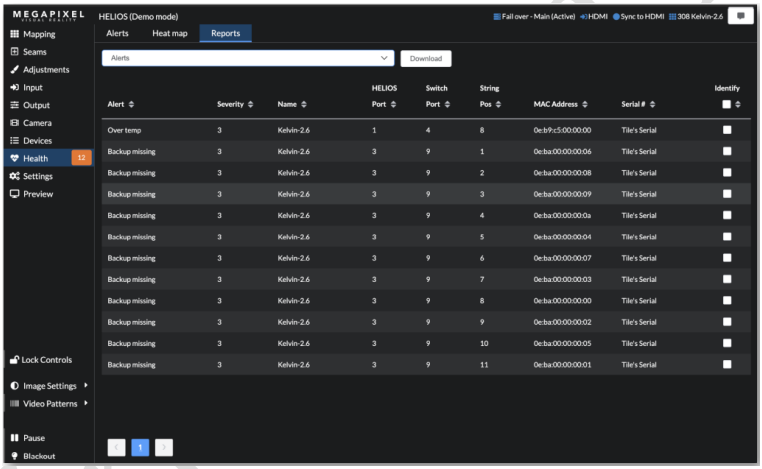


Fig 7-53 Reports tab

7.7 Settings Pane

The Settings Pane contains six tabs; Processor Settings, Security, Saved Configurations, Update Center, Shortcuts and About.

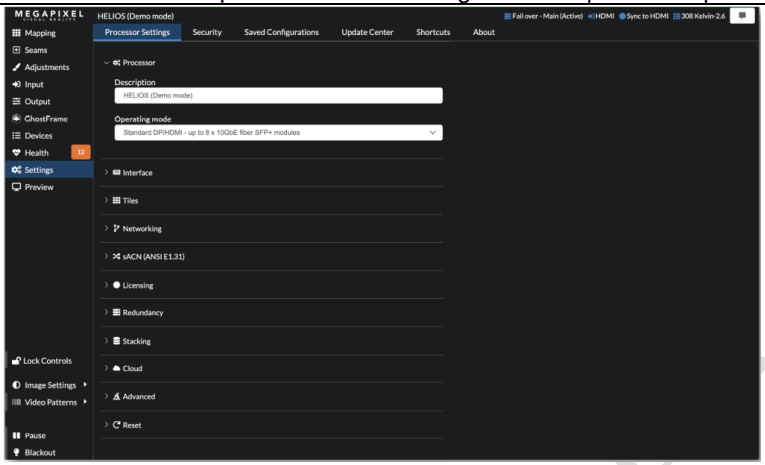


Fig 7-54 Processor settings.

7.7.1 Processor Settings

• **Processor**

Description - Enter the name of the processor, changes are updated live.

Operating Mode –

- **Standard license** - HELIOS can use both 10GbE fiber SFP+ modules or 1GbE copper SFP modules.
- **Junior license** - HELIOS can only use 1GbE copper SFP modules.

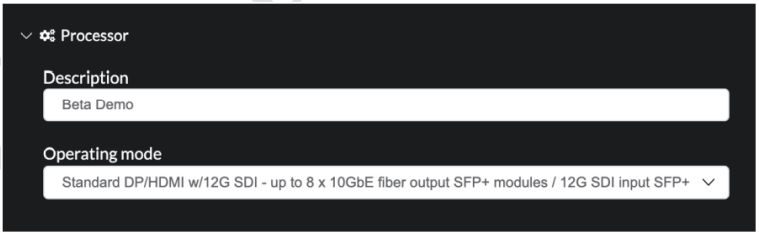


Fig 7-55 Description and Operating mode selection

Operating Mode (continued) - Changing the operating mode will trigger a pop-up warning asking for confirmation. Select Switch Mode to change and reconFig the system for the new module type.

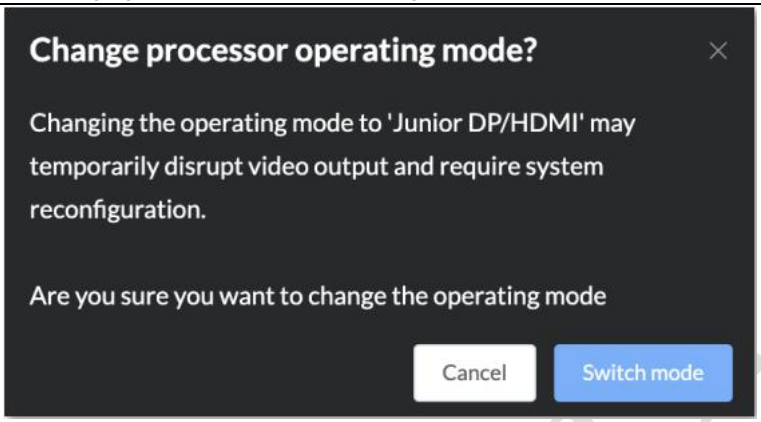


Fig 7-56 Switch mode confirmation

• **Interface** - Select between a dark or a light colored theme.

Fig 7-57 Theme selection

• **Tiles** - Show / Hide tile indicators.

Fig 7-58 Tile Indicator controls

• **Networking** - ConFig the IP settings of the HELIOS Processor.

• **sACN (ANSI E1.31)** - Use the sACN or E1.31 protocols to control the HELIOS Processor. When sACN is active, GUI controls are locked out.

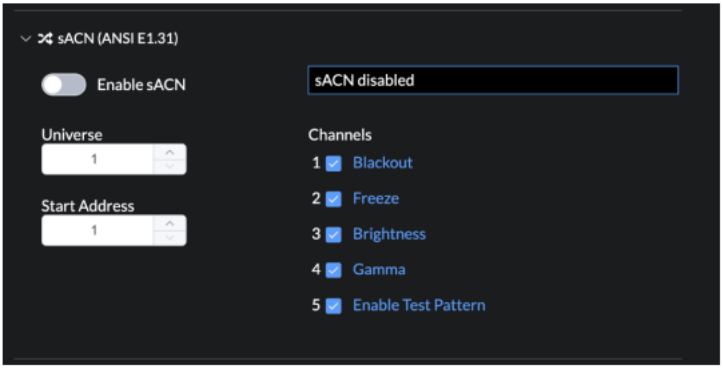


Fig 7-59 sACN

The table below shows how HELIOS will behave when it receives the listed values.

Channel	Function	Value
1	Blackout	0 = Normal operation | 1 - 255 = Blackout
2	Freeze	0 = Normal operation | 1 - 255 = Freeze
3	Brightness	Slider position % mapped to sACN
4	Gamma	Slider position % mapped to sACN
5	Test Pattern	0 = Normal operation | 1 - 255 = Show test pattern

• **Licensing -** HELIOS units require a license to operate. There are two main types of licenses, HELIOS Standard and HELIOS Junior, other specialized licenses such as the GhostFrame license are also available. Shown below is a HELIOS Standard license. To enter a license use the Activate license button. This button allows license activation via an activation key. The web UI will then communicate with the MVR licensing server to generate a license for the system. Alternately, to obtain a license the system ID and serial number will need to be sent to a MVR reprsentative. The About tab (shown later in this section) has a Download Support Archive button. Contact your Megapixel VR representative with this archive to obtain new or upgrade existing licenses. Once the new license file has been obtained, select the Upload license button, then navigate to the license file on the local host machine to load a license into the HELIOS.

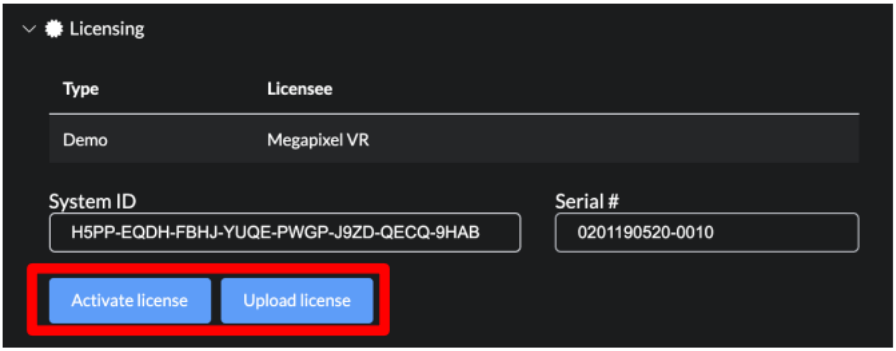


Fig 7-60 Licensing

• **Redundancy (Advanced)** - Please see the Data Redundancy section in Appendix F for details.

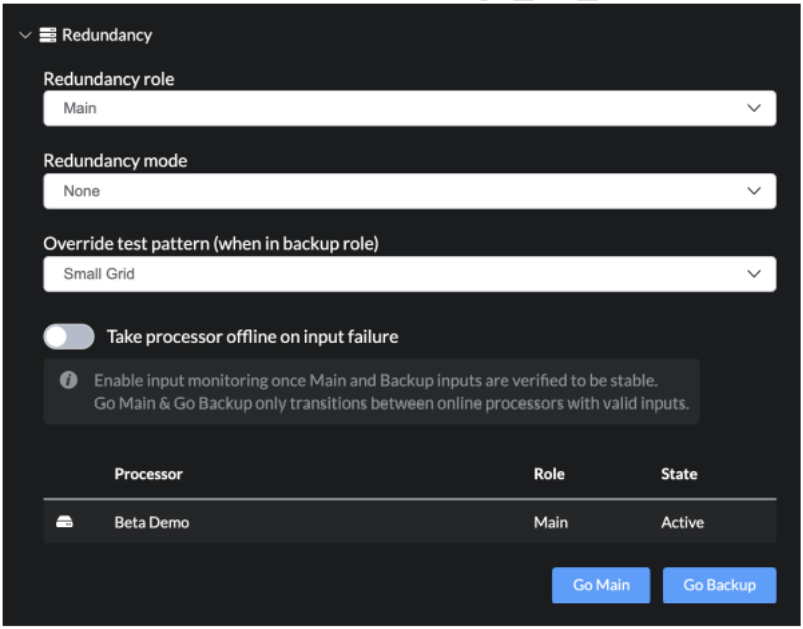


Fig7-61 Redundancy settings

• **Stacking (Advanced)** - Stacking allows individual processors that operate sections of a large screen to synchronize functions such as blackout, pause, and color adjustments. In most cases, stacking should be used with redundancy in the HELIOS

system.

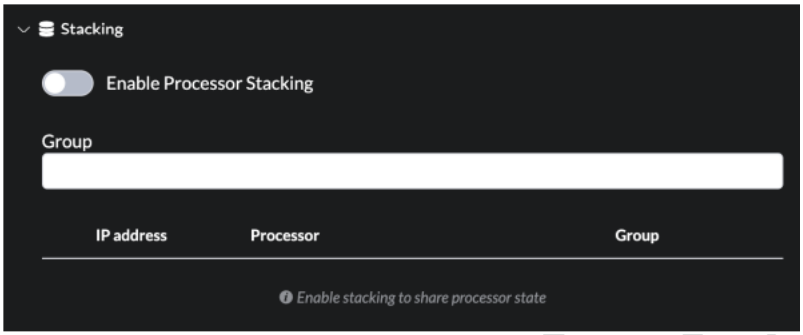


Fig 7-62 Stacking settings

• Cloud - Enable analytics to be sent to the development team.

• Advanced - When advanced features are enabled, several features that have not been selected for general release will show up throughout the user interface.

• Reset - Returns a unit to factory defaults. It removes all mapping, saved configurations, and saved software/firmware. Creating a saved configuration prior to resetting is recommended.

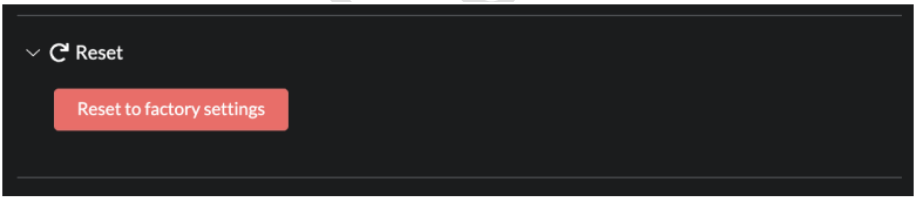


Fig 7-63 Reset to Factory defaults

7.7.2 Saved Configurations

The Saved Configurations is used to export a collection of settings. This is useful for configuring a spare unit or to save a progress state while building a new system. It is also the recommended method for documenting and storing full configurations. Select New to create a saved configuration.

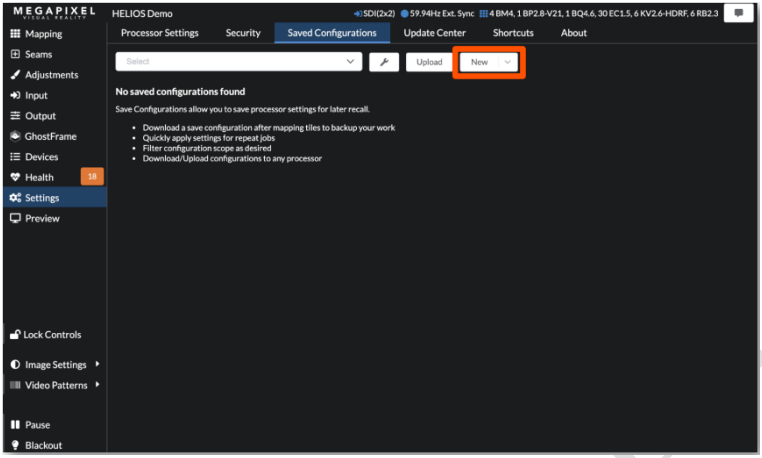


Fig 7-64 Blank 'Saved Configurations' pane

The system automatically assigns a title based on system time and date, which can be customized by editing the field. Below the name of the configuration is a list of system parameter filters. If certain parameters are not desired, use the toggle to remove that particular parameter. For example, inputs often have similar color settings across processors in a multi processor system. Rather than manually entering the same input color adjustments to all processors, create a New Saved Configuration with specific input settings enabled and upload to each processor.

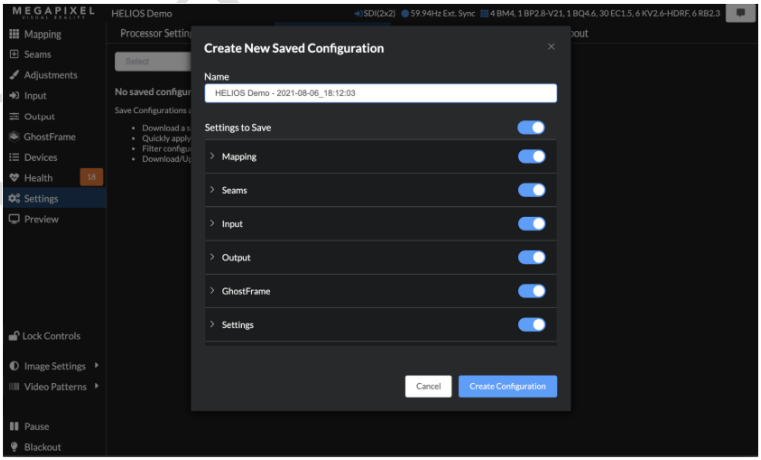


Fig 7-65 Default configuration name

The New button has ‘quick access‘ file management options under the drop down on the right of the button.

Download - retrieve the configuration as a file

Update - overwrite the existing configuration with recent changes

Rename - change the name of the file

Clone - duplicate the file

Delete - remove the file

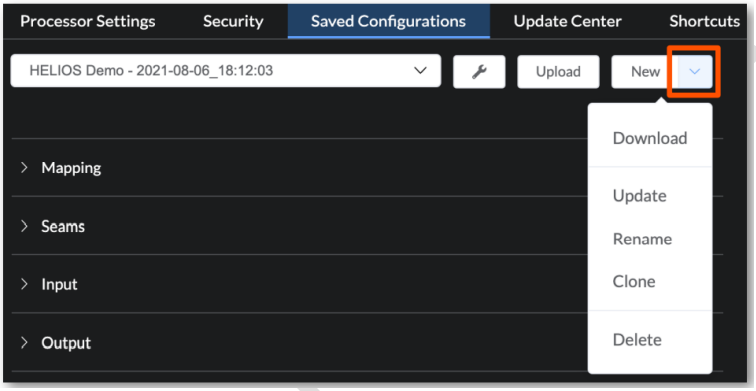
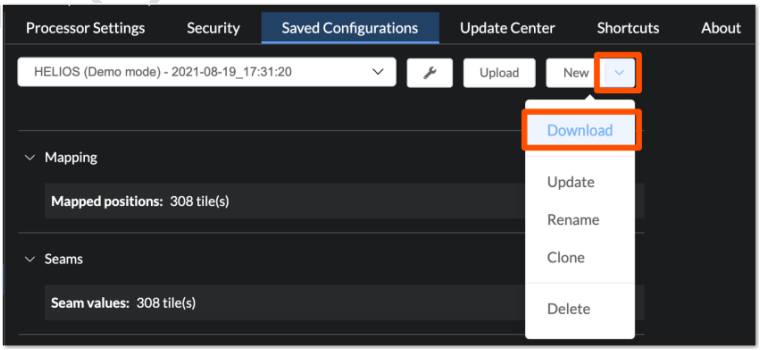


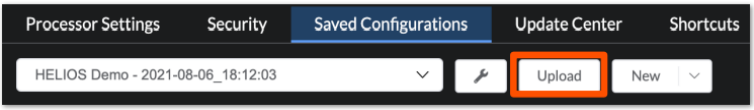
Fig 7-66 Blank ‘Saved Configurations’ pane

The following steps detail how to move a configuration file from one processor to another.

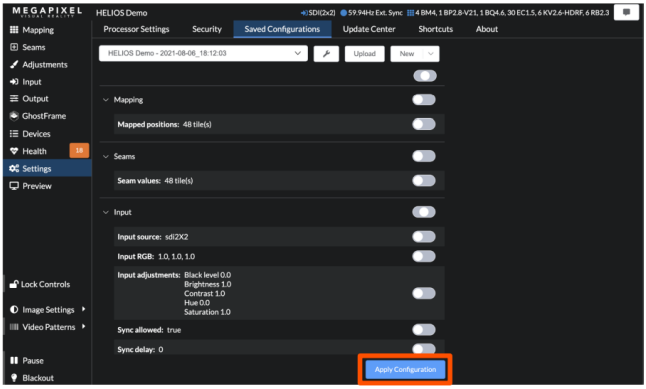
1. After the configuration file has been created, select the file with the drop down menu. Then use the disclosure triangle on right side of the New button to select Download from the options.



2. Connect to the target processor, navigate back to the Saved Configurations tab and Upload the configuration file.



4. Apply Configuration to activate the file.



7.7.3 Preview Pane

The Preview pane displays a low resolution, low frame rate version of actively connected inputs. The layout of the preview window layout will reconFig based on which inputs are active and which input is selected. In the example below the HELIOS unit is receiving a quad SDI signal, but the unit has HDMI selected as the current input. Four active SDI feeds are visible below a black HDMI preview.

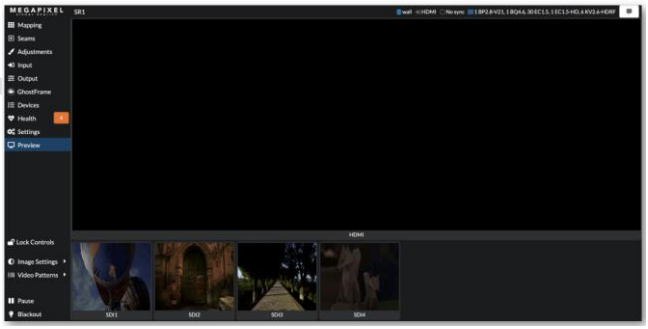


Fig 7-67 Preview pane - No HDMI input

In the example below SDI 1 has been selected as the input. The preview pane shows SDI 1 maximized at the top. Other active, but not selected inputs are shown as thumbnails at the bottom of the pane.

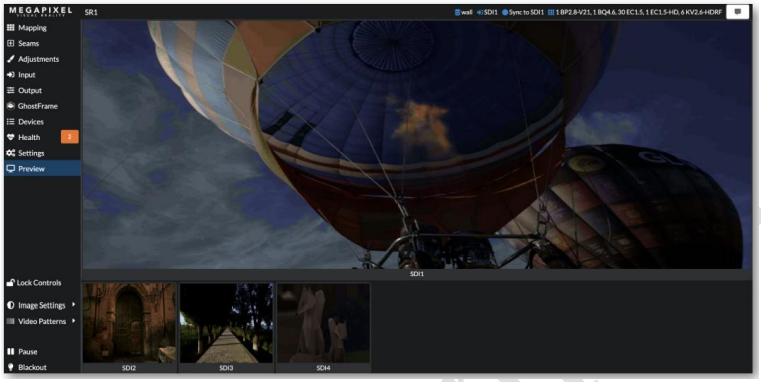


Fig 7-68 Preview pane - SDI 1 selected

With either of the Quad SDI (SDI 1x4 or SDI 2x2) input options selected, the Preview pane stitches the four SDI feeds together.

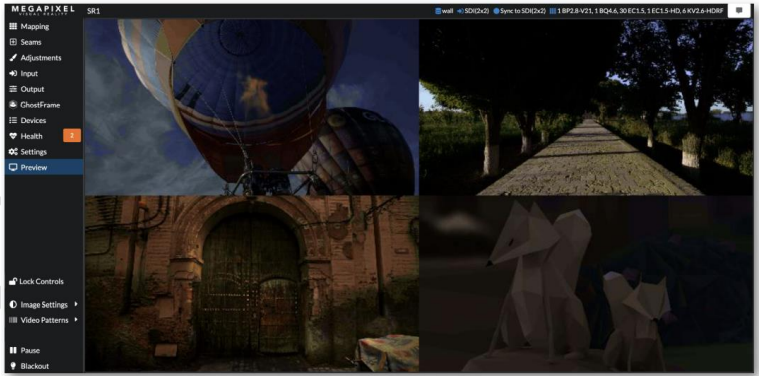


Fig 7-69 Preview pane - Quad SDI

Chapter 8 Troubleshooting and Component Replacement

8.1 Common Faults and Troubleshooting Methods

8.1.1 Failure in Lighting up the Display

Causes:

1) No power is supplied to the display or the control devices.
2) The LED display does not have input signals.
3) The control PC is in sleep mode or the graphics card is set incorrectly.

Troubleshooting method:

1) Check AC power input of the display and the control devices.
2) Check cables between the sending box and the receiving card. Check whether the DVI cable between the control PC and the sending box is connected reliably.
3) Check whether the control PC is in sleep mode or monitor protection mode. If the control PC is not in sleep mode, check whether the graphics card is conFigd properly on the software.

8.1.2 Incomplete Picture or Incorrect Position of Picture Displayed

Causes:

1) The connecting file for the screen is incorrect.
2) Receiving card signal cables between cabinets do not contact properly.
3) The displaying position and screen size are set incorrectly.

Troubleshooting method:

1) Check whether the display's signal cable connection method is same to that of the loaded file xxxx.scr.
2) Check whether the signal cable is connected to the cabinet receiving card. If the receiving card is faulty, replace the receiving card.
3) Check whether Displaying Position and Screen Size on the software are set to actual screen size.

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8.1.3 Screen Blinking

Causes:

1) The ports on the sending box are loose, or the signal cables are too long.
2) The output resolution of the playing device or sending box is set incorrectly.

Troubleshooting method:

1) Check whether the DVI cable and signal cable are connected to the display and devices, or whether the length of signal cables exceeds the maximum transmission distance (the effective transmission distance shall not exceed 10 m for DVI cable, 100 m for signal cable, 300 m for multi-mode optical fiber, and 15 km for single-mode optical fiber).
2) Check whether the resolution of the playing device and the sending box is greater than or equal to the resolution of the screen.

8.1.4 Blinking of a Cabinet in the Display

Causes:

1) The output of receiving card or hub card is faulty.
2) The receiving card program is incorrect.

Troubleshooting method:

1) Check whether the receiving card signal cable and hub card in the cabinet are connected correctly.
2) Check the receiving card program for the cabinet or check the receiving card.

8.1.5 Failure in Lighting up of a Cabinet in the Display

Causes:

1) The power supply, receiving card, or hub card for the cabinet is faulty.
2) Signal output of the previous cabinet is faulty.

Troubleshooting method:

1) Check voltage at the DC side of the power supply and the receiving card power supply. Check the receiving card signal indicator light in the cabinet. Check whether the hub card contacts properly with the receiving card.
2) Check output signals of the receiving card of the previous cabinet, or replace the signal cable.

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8.1.6 Failure in Lighting up Part of the Modules in the Cabinet

Causes:

1) Output of the power supply for the modules is faulty.
2) Output of signal which controls the related modules is faulty.

Troubleshooting method:

1) Check DC voltage for the modules.
2) Check the hub card ports or flat cables that control the modules.

8.2 Replacement of Main Components

Before performing maintenance on the LED display, cut off the power supply to ensure your personal safety and equipment safety.

8.2.1 Replacement of Module

Cut off the power supply of the display, replace a module of the LED display based on the following steps:

A. During the LED display connected to power:

Method 1: Find out the failure cabinet, popping out integrate module by intelligent bracelet.

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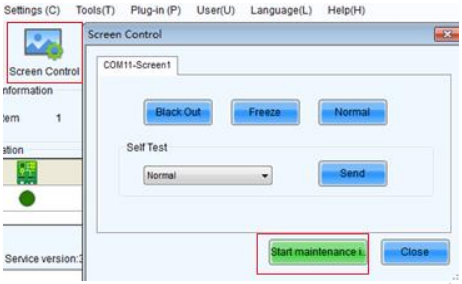
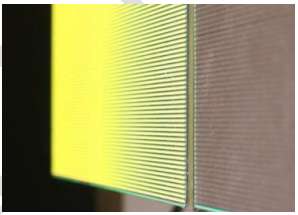
Steps	Picture	Description
Step 1		Find the failure cabinet
Step 2		With induction hand ring approaching the module (module two-thirds height position in the middle of the area)
Step 3		Wait for the module to pop out.
Step 4		Hold the module bottom and remove the module from front side slowly, loose the back rope and replace a new one.

Method 2: Find out the failure cabinet, popping out integrate module by software.

Steps	Picture	Description
Step 1		Log in to the software, click on the screen control → start the maintenance interface → enter the password: unilumin or admin
Step 2		Select the faulty module, click the right mouse button, and click the pop-up option
Step 3		Wait the module pop-up out gently
Step 4		Hold the module bottom and remove the module from front side slowly, loose the back rope and replace a new one.

B. switch off the power:

Find out the failure cabinet and switch off the power. Replace a module of the LED display based on the following steps:

Front Maintenance	Picture	Description
Step 1		Find out the failure cabinet and switch off the power.
Step 2		take the module out from the cabinet by tool and replace it.

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Rear Maintenance	Picture	Description
Step 1		Find the faulty cabinet and disconnect the power supply
Step 2		Unmount the cabinet cover
Step 3		take the integrate module out through the rail
Step 4		Take the module out by suction tool and replace it

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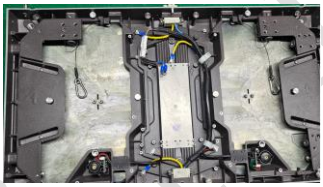
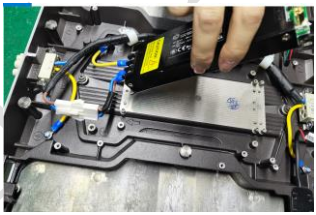
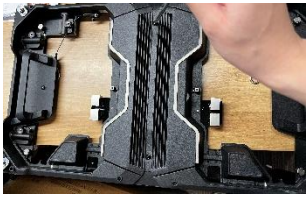
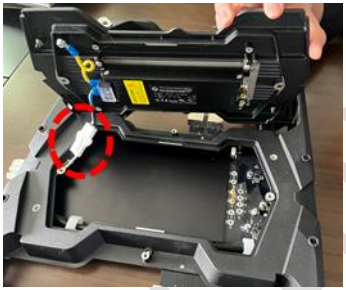
8.2.2 Replacement of Power Supply

Cut off the power supply of the display , replace a power supply of the LED display based on the following steps:

Front maintenance	Picture	Description
Step 1		Remove the integrated module out of the fault cabinet,then remove the screw fixing the HUB card .
Step 2		Remove the power supply cover
Step 3		Remove the power supply and replace it.

Unofficial

Rear maintance	picture	description
Step 1		Unmount the power supply cover
Step 2		Disconnect the power supply wire
Step 3		Take it off and replace it

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8.2.3 Replacement of Receiving Card

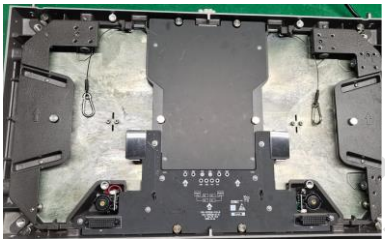
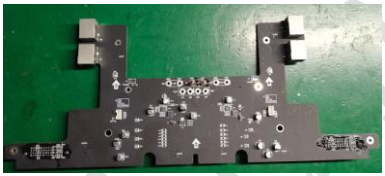
Cut off the power supply of the display , replace receiving card of the LED display based on the following steps:

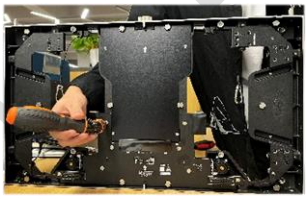
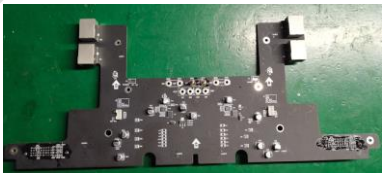
Front maintenance	Picture	Description
Step 1		Remove the module of the fault cabinet
Step 2		Remove the fixing screw of the HUB card
Step 3		Remove the failure receiving card and replace it

Unilumin

8.2.3 Replacement of HUB Card

Cut off the power supply of the display , replace HUB card of the LED display based on the following steps:

Front maintenance	Picture	Description
Step 1		Remove the module of the fault box,loosen the fixing screws of the left and right adapter plate,and remove them
Step 2		Remove the faulty HUB card and replace it

Front maintenance	Picture	Description
Step 1		Unmount the screw fixed the HUB
Step 2		Take it off and replace it

Chapter 9 Packaging Transportation and Storage

9.1 Packaging

The UMiniII series products would be packed in carton, and the carton is vacuum-packed in an anti-static bag, and finally packed in heavy-duty carton, as shown below:

Fig 9-1 Package in Carton

Fig9-2 Package in Heavy-Duty Carton

9.2 Transportation

The cabinets must be packaged before transportation. The product shall not be placed upside down or horizontally, and must be protected against the wind, rain, direct sunlight, and corrosive liquid during transportation. The stacking layers shall not exceed three layers for plywood cases.

9.3 Storage

The cabinets shall be stored in an environment with an ambient temperature ranging from -20°C to +55°C and a relative humidity ranging from 10% to 85% RH. Do not store the cabinets in an environment with volatile, corrosive, or flammable chemical products.

Chapter 10 After-Sales and Warranty

10.1 Warranty Scope

This Warranty Policy applies to LED display products (hereinafter referred to as “Products”) purchased directly from Unilumin Group Co., Ltd. (hereinafter referred to as “Unilumin”) and within Warranty Period. Any products not purchased directly from Unilumin does not apply to this Warranty Policy.

10.2 Warranty Period

The warranty period shall be in accordance with the specific sales contract. Please make sure warranty card or other valid warranty documents are in safekeeping.

10.3 Warranty Service

Products shall be installed and used strictly aligned with the Installment Instructions and Cautions for Use stated in the product manual. If Products have defects of quality, materials, and manufacturing during normal use, Unilumin provides warranty service for Products under this Warranty Policy.

11.3.1 Warranty Service Types

1) Online Remote Free Technical Service:

The remote technical guidance provided through instant messaging tools such as telephone, mail, and other means to help solve simple and common technical problems. This service is applicable for technical problems including but not limited to the connection issue of signal cable and power cable, system software issue of software use and parameter settings, and replacement issue of the module, power supply, system card, etc.

2) Return to Factory Repair Service:

For problems of Products that cannot be solved by online remote service, Unilumin will confirm with the customers whether to provide returning to the factory repair service. If factory repair service is needed, customer shall bear the freight, insurance, tariff and customs clearance for return delivery of the returned products or parts to Unilumin’s service station. And Unilumin will send back the repaired products or parts to customer and only bear one-way freight. Unilumin will reject unauthorized return delivery via pay upon arrival and will not be liable for any tariffs and custom clearance fees. Unilumin

shall not be held liable for any defects, damages or losses of the repaired products or parts due to transportation or improper package.

3) Provide On-site Engineer Service for Quality Issues:

If there is a quality issue as stipulated in Article 5 of this Warranty Policy, and Unilumin believes the condition is necessary, on-site engineer service free of charge will be provided. In this case, customer shall provide a fault report to Unilumin for on-site service application. The content of the fault report shall include but not limited to photos, videos, number of faults, etc., to enable Unilumin to conduct preliminary fault judgment. If the quality problems is not covered by this Warranty Policy after the on-site investigation of Unilumin's engineer, customer shall pay travel expenses and technical service fees as per Article 7.4. Defective parts replaced by Unilumin's on-site engineers shall be the property of Unilumin.

10.4 Disclaimer javascript:;

No warranty liability shall be assumed by Unilumin for defects or damages due to the following conditions:

1) Unless written agreed otherwise, this Warranty Policy does not apply to consumables, including but not limited to connectors, networks, fiber optic cables, cables, power cables, signal cables, aviation connectors, and other wire and connections.
2) Defects, malfunctions or damages caused by improper use, improper handling, improper operation, improper installation/disassembly of the display or any other customer misconduct. Defects, malfunctions or damages caused during transportation.
3) Unauthorized disassembly and repair without permission of Unilumin.
4) Improper use or improper maintenance not in accordance with the product manual.
5) Man-made damages, physical damages, accident damages and product misuse, such as component defect damage, PCB board defect, etc.
6) Product damage or malfunction caused by Force Majeure Events, including but not limited to war, terrorist activities, floods, fires, earthquakes, lightning, etc.
7) The product shall be stored in a dry, ventilated environment. Any product defects, malfunctions or damages caused by storage in an external environment that does not comply with the product manual, including but not limited to extreme weather,

humidity, salt haze, pressure, lightning, sealed environment, compressed space storage etc.

8) Products used in conditions not meeting product parameters including, but not limited to lower or higher voltage, extreme or excessive power surges, improper power conditions.
9) Defects, malfunctions, or damages caused by non-compliance with technical guidelines, instructions, or precautions during the installation.
10) Natural loss of brightness and color under normal conditions. Normal degradation in the performance of the Product, normal wear and tear.
11) Lack of necessary maintenance.
12) Other repairs not caused by product quality, design, and manufacturing.
13) Valid warranty documents cannot be provided. Product serial number is torn or damaged. Product shell or other external parts are damaged.
14) Repairs after Warranty Period.
15) Products which have too significant damages caused by mishandling, accidents, improper maintenance, and failure to comply with product manual to be prepared.
16) Products malfunctions caused by unmatched play or control devices that are not provided by Unilumin. If Products are damaged arising out of the aforementioned unmatched devices and require Unilumin's repair, charging rate shall be as per Article 7.4.

10.5 Warranty Service Process

1) Remote Service Process:

Submit service requirements through website, email, telephone and other service channels of Unilumin with warranty card or contract number. Specific content of the service and contact information shall be provided.

2) Product Return to Repair Process:

Submit service requirements through the website, email, telephone and other service channels of Unilumin with warranty card or contract number. Packing list of the returned product and postal information to receive the repaired product shall be provided.

Unilumin's postal information is stipulated in Article 11.

Customer instructions:

a) Shall provide a brief fault report (can be attached to the surface of the repaired item)

b) Shall provide packing list (including contract number, model and quantity of the repaired item)

c) Shall provide receipt postal information (company name, address, consignee, contact information, etc.)

d) To avoid damages of the returned products during transportation, please be cautious about the package and protection of the products. Unilumin is not responsible for any damages to the returned products or parts during delivery.

3) On-site Engineer Service Process:

Submit service requirements through the website, email, telephone and other service channels of Unilumin with warranty card or contract number. Service content, site address, contact information, and visa application information shall be provided.

10.6 Other

This Warranty Policy is a standard application of Unilumin. No other third party (including any agent, distributor or sales representative) is authorized to make any representations or warranties that are different from this Warranty Policy. Unless otherwise confirmed by Unilumin in written forms of contract or other documents, any warranty clauses that conflict with this Warranty Policy shall be deemed to be automatically invalid. Final power of interpretation of this Warranty Policy shall be be vested in Unilumin.

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10.7 Product Warranty Card

Product Warranty Card					
Order No.		Shipment Date		Warranty Period	
Product Model				Product Quantity	
Customer Name		Contact Information			
Customer Address:					
Remark(s):					
Warranty Record					
Warranty Date	Fault and Troubleshooting		Completion Date	Signature of Customer	

Unilumin

Contact Information

Shenzhen Headquarters

Headquarter Address: No. 112 Yongfu Road, Qiaotou Community, Fuyong Street, Bao'an District, Shenzhen

Pingshan manufacturing center: No. 6 North Lanjing Road, Pingshan New District, Shenzhen.

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Website: www.unilumin.com

Service Department Tel: + 86- (0) 755-29592226 (direct line)

24-hour service hotline: 400-677-3888

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UNILUMIN GROUP CO.,LTD.

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