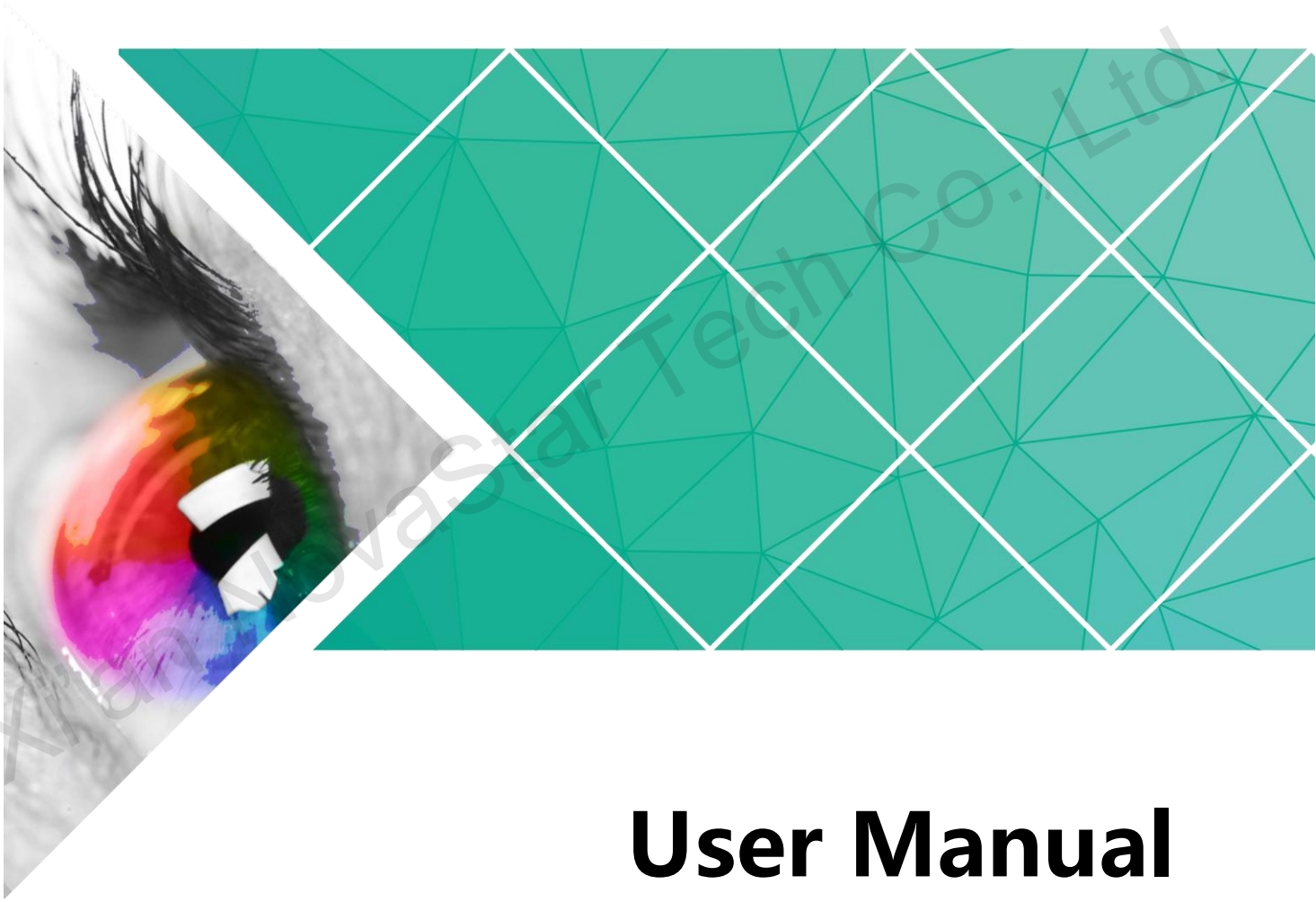
N9

Multi-Screen Splicing Video Processor



User Manual

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Website: www.novastar.tech

Contents

1 Overview

1.1 Positioning

The N9 is a high-performance multi-screen splicing video processor independently developed by NovaStar. Using high-performance video processing technologies, it is capable of processing and outputting ultra-high quality images. The N9 also provides powerful video signal receiving capability. It can support 9 inputs and 4 DVI outputs at the same time. A single N9 can load up to an 8KK screen, and multiple N9 units can be cascaded for output.

The N9 can work with NovaStar's desktop console C1 and make the operation of N9 on stage more convenient. It is also equipped with brand-new smart management software V-Can from NovaStar to provide richer image mosaic effects.

Thanks to the powerful capabilities of receiving and processing a variety of video signals, the N9 can be widely used in various scenarios, such as intermediate and high-end rental, stage control, media centers, big conference sites, exhibition sites and concert control centers.

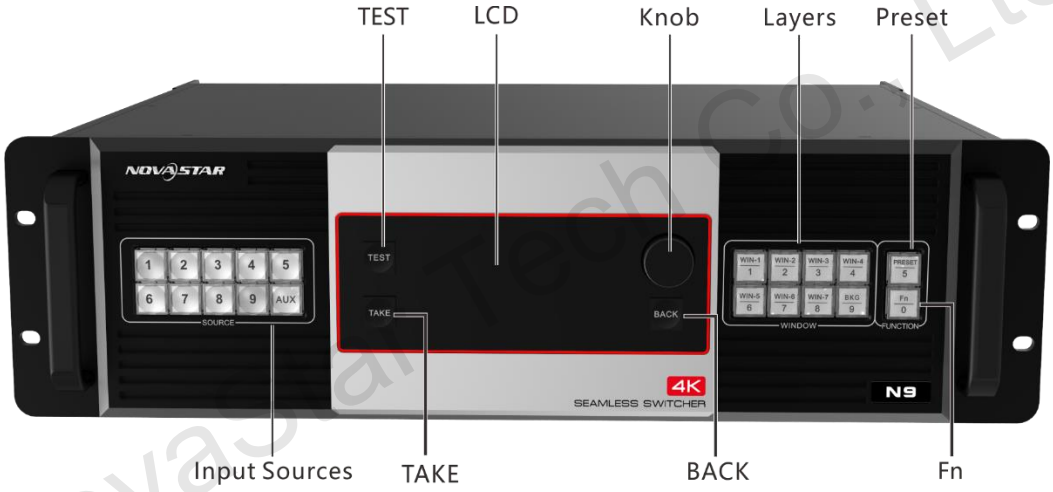
1.2 Features

- Up to 9 inputs, including 1 × dual-link DP 1.1 (can be replaced by HDMI 1.4, DP 1.1 or dual-link DVI), 2 × HDMI 1.3 (can be replaced by DVI/VGA/CVBS), 4 × DVI, 1 × DP 1.2 and 1 × 3G-SDI.
- Up to 7 layers supported at the same time. Max. resolution of each layer: 3840×2160, 7680×1080 or 1920×4320.
- Customized BKG settings
  You can load an image file from the control computer or capture an input source image displayed on the screen as the BKG image.
- Shaped layer, layer mask and color keying supported
- Layer cloning and Z-order layer sorting supported
- Input source image cropping supported
- Quick mosaic and custom mosaic
- EDID management supported
  The N9 supports custom EDID and standard EDID.

- 4 × DVI mosaic output, 4 × DVI backup output, 1 × HDMI preview output, and 2 × Aux output
- Output resolution settable. The mosaic width of 4 outputs can be up to 15360x600.
- 4 × single-link mosaic output, or 2 × dual-link mosaic output
- Input, PVW, PGM and prompter monitoring supported by MVR connector
- Layer position and size adjustable
- Layers can be added with borders of custom widths and colors.
- 32 presets
- A total of 32 user presets can be created and saved as templates which can be used directly and conveniently.
- Intuitive color LCD screen and clear button indicator prompt on the front panel, simplifying system control and operation.
- Genlock synchronization and synchronization with any input source supported, achieving output vertical synchronization.

2 Appearance

2.1 Front Panel



Button	Function
Input source buttons	Indicate input source status. • On, dark: Signal source is accessed but not in use. • On, bright: Signal source is accessed and in use. • Off: No signal source is accessed or the accessed source is abnormal.
LCD screen	Display the current device status and settings menu.
Knob	• On the home screen, press the knob to enter the operation menu screen. • On the operation menu screen, rotate the knob to select a menu item, and press the knob to confirm the selection or enter the submenu. • When a menu item with parameters is selected, you can rotate the knob to adjust the parameters. Please note that after adjustment, you need to press the knob again to confirm the adjustment.
BACK button	Press the button to exit the current menu or operation.
TAKE button	Switch PVW to PGM.

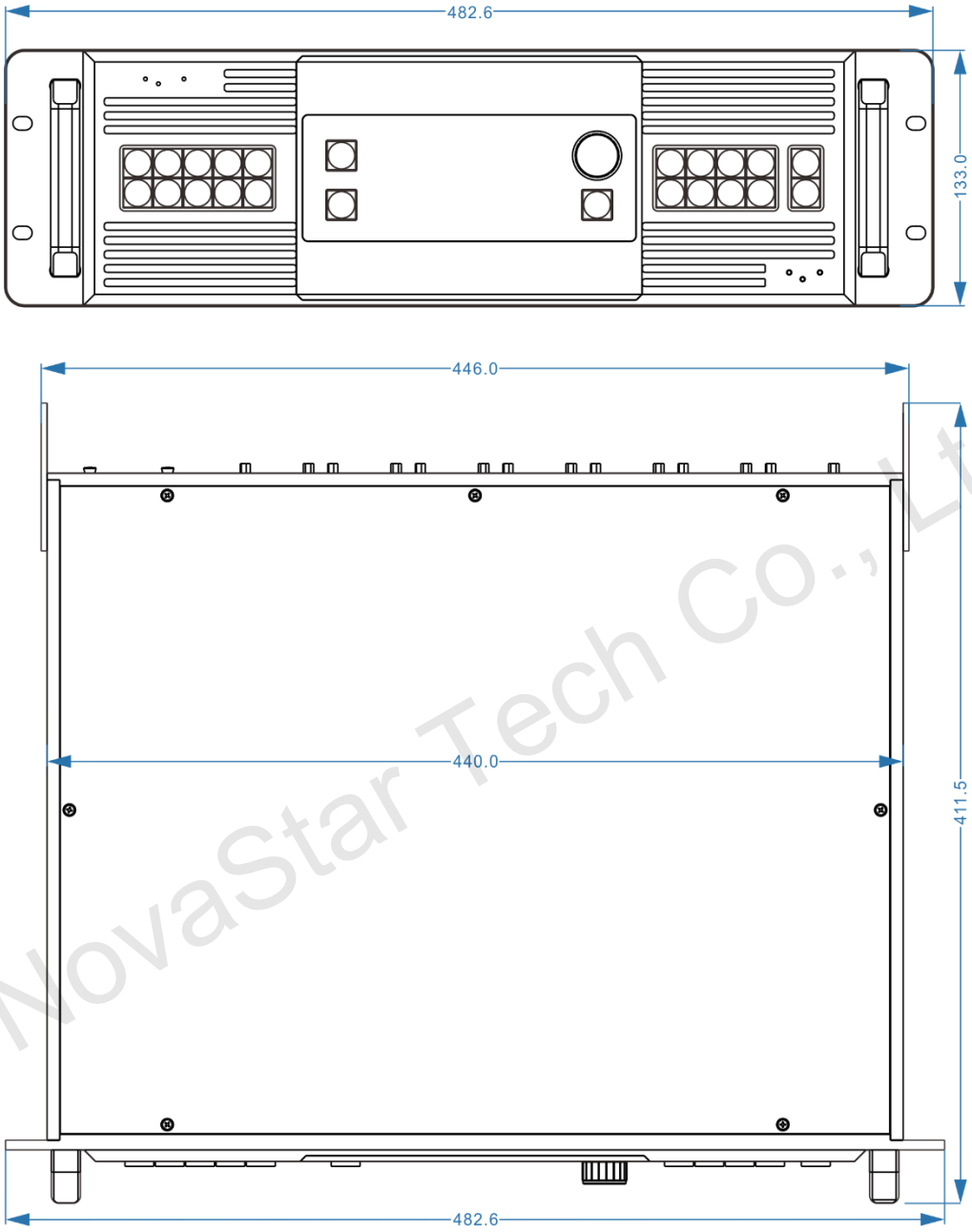
Button	Function
TEST button	Enter the test patterns menu.
Layer shortcut buttons	Press a button to enter the corresponding layer property menu for quick settings. • On: Layer is open. • Flashing: Property menu of the corresponding layer is opened and being edited. • Off: Layer is closed. • On the home screen, hold down a layer button to close the layer. • BKG: Open or close the BKG.
Preset button	Press it to enter the preset menu. A total of 32 presets can be loaded, saved and deleted, etc.
Fn button	A custom function button

2.2 Rear Panel

Input	
INPUT-1	Dual-link DP 1.1 input, 3840×1080@60Hz and downward compatible This connector can be replaced by an HDMI 1.4, DP 1.1 or dual link DVI connector based on user requirement.
INPUT-2	HDMI 1.3, 1920x1080@60Hz and downward compatible This connector can be replaced by DVI, VGA or CVBS connector based on user requirement to accept different video sources.
INPUT-3	
INPUT-4	DVI1–DVI4, VESA standard compliant, 1920x1080@60Hz and downward compatible
INPUT-5	
INPUT-6	

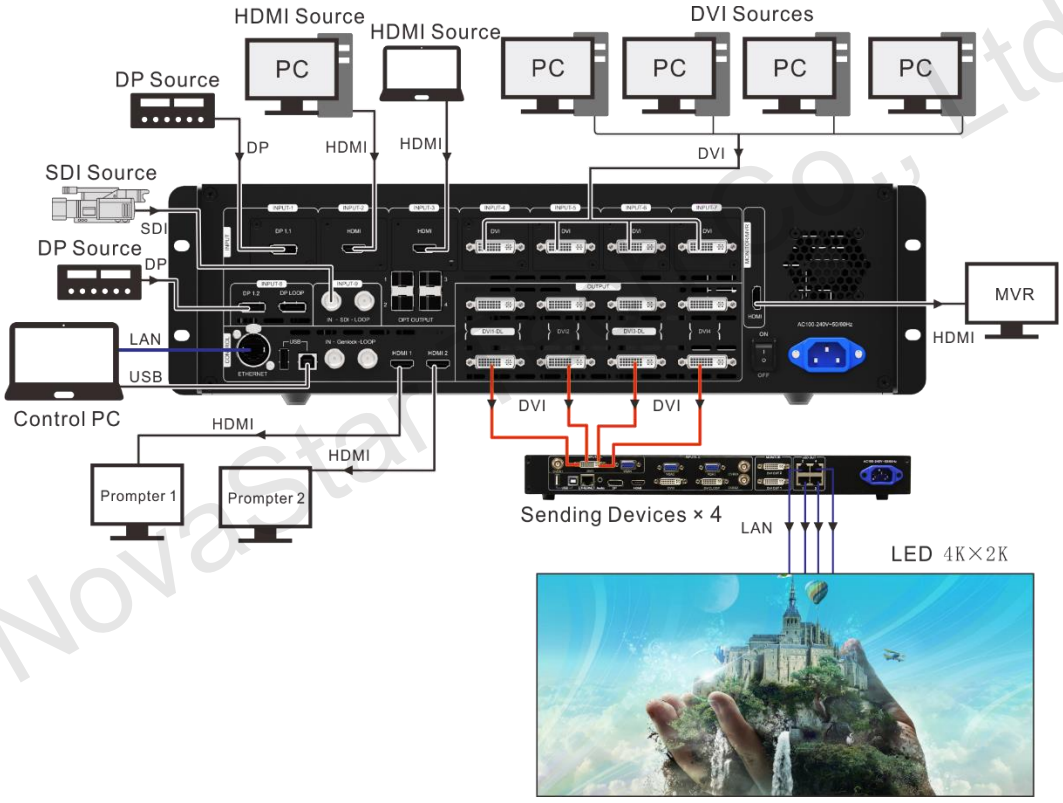
INPUT-7	
INPUT-8	DP 1.2, 3840x2160@60Hz and downward compatible
	DP1.2 LOOP
INPUT-9	3G-SDI, 1920x1080@60Hz and downward compatible
	SDI LOOP
Output	
HDMI	HDMI output connector, capable of monitoring 9 input sources, PVW and PGM.
DVI1-DL/PGM1	DVI1 output If the output mode is set to dual link, this connector is DuallinkOut1.
DVI2/PGM2	DVI2 output If the output mode is set to dual link, this connector is invalid.
DVI3-DL/PVW1	DVI3 output If the output mode is set to dual link, this connector is DuallinkOut2.
DVI4/PVW2	DVI4 output If the output mode is set to dual link, this connector is invalid.
HDMI1/HDMI2	2 Aux output connectors
Control	
ETHERNET (RJ45)	A control connector
USB USB (Type-B)	For the connection with control computer
USB USB (Type-A)	For cascading N9 units
IN–Genlock–LOOP	For synchronizing cascaded devices

2.3 Dimensions



单位：mm

3 Applications



4 Operations

4.1 Operation Instructions

Knob

- On the home screen, press the knob to enter the operation menu screen.
- On the operation menu screen, rotate the knob to select a menu item, and press the knob to confirm the selection or enter the submenu.
- When a menu item with parameters is selected, rotate the knob to adjust the parameters. Please note that after adjustment, you need to press the knob again to confirm the adjustment.

ESC

Press the button to exit the current menu or operation.

Lock/Unlock

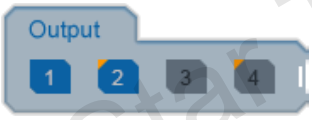
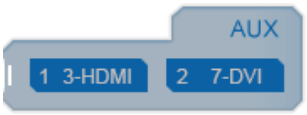
Hold down the knob and **ESC** button simultaneously to lock or unlock the buttons.

4.2 Home Screen

After the device is powered on, the home screen is shown as below.

Figure 4-1 Home screen

User interface description:

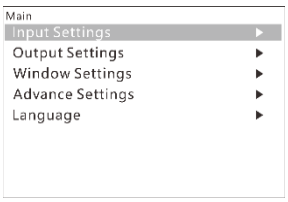
Area	Icon	Description
Layers		Layer icon descriptions:  • 1: Layer no. • 8-DP: Input source of the layer • 4K: 4K input source. For the input sources of other resolutions, no icon will be displayed here.
Output		Optical fiber output status descriptions: • 1: Optical fiber output port 1 is enabled. • 2: Optical fiber output port serves as the backup. • 1: Optical fiber output port is not enabled.
AUX		• 1 3-HDMI: AUX 1 is enabled, and the input source is the HDMI source of Input 3. • 2 7-DVI: AUX 2 is enabled, and the input source is the DVI source of Input 7.
Function icons on the left		The device is connected to the control PC via USB port.
		The device is connected to the control PC via Ethernet port.
		The device is not connected to the control PC.
		Switch mode
		Take mode
		Buttons on the front panel are locked.

Area	Icon	Description
		Buttons on the front panel are unlocked.
Function icons on the right		Function icons for Fn shortcut buttons
		Normal
		Blackout
		Test pattern
		PGM frozen
		Genlock lost
		Genlock normal and enabled
		Genlock disabled
		Genlock abnormal
BKG status		BKG disabled
		BKG enabled

4.3 Input Settings

On the home screen, press the knob to enter the operation menu screen. Rotate the knob to select **Input Settings**, and then press the knob to enter the submenu.

Figure 4-2 Input settings



4.3.1 Standard EDID

The N9 allows for resolution settings. Only standard EDIDs are supported.

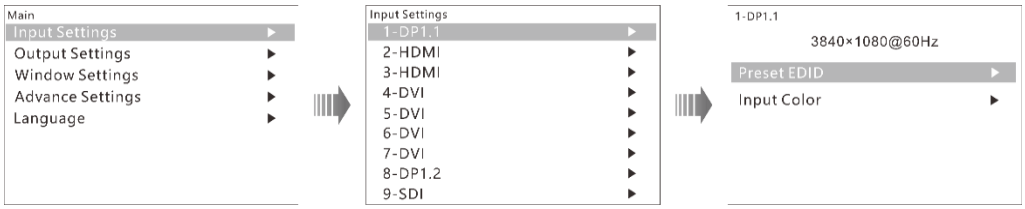
Step 1 On the **Input Settings** screen, rotate the knob to select an input source and press the knob to enter the input source settings screen.

Step 2 Rotate the knob to select **Standard EDID** and press the knob to enter the standard EDID settings screen.

Step 3 Select a standard resolution and refresh rate by rotating the knob.

Step 4 Rotate the knob to select **Apply** and press the knob to confirm the selection.

Figure 4-3 Standard EDID settings of input source



Note:

For different input sources, the supported EDIDs are different.

If a custom EDID is required, you can set it on the control PC or C1 desktop console.

When the input source is SDI, the EDID setting is not supported.

4.3.2 Input Color

Step 1 Rotate the knob to select **Input Settings**, and then press the knob to enter the input source settings screen.

Step 2 On the **Input Settings** screen, rotate the knob to select an input source.

Step 3 Press the knob to enter the input source settings screen.

Step 4 Rotate the knob to select **Input Color** and press the knob to enter the input color settings screen.

Step 5 Rotate the knob to adjust the input color parameters and press the knob to confirm the settings.

For the detailed input color parameter settings, please refer to Table 4-1.

Figure 4-4 Input color settings

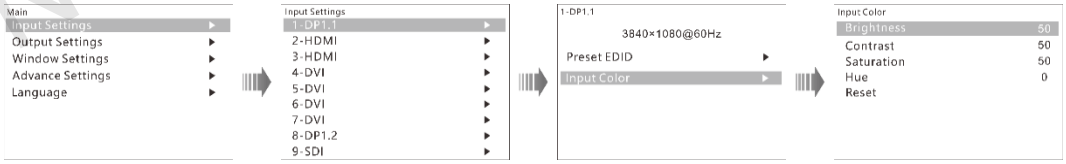


Table 4-1 Input color parameter settings

Name	Value Range	Default Value	Description
Brightness	0–100	50	Adjust the screen brightness. The larger this value is, the brighter the screen will be.
Contrast	0–100	50	Adjust the difference between the darkest and brightest areas of the image displayed on the screen. The larger this value is, the bigger this difference will be.
Saturation	0–100	50	Adjust the purity or vividness grade of the image color. The larger this value is, the purer the

			color will be.
Hue	-180–180	0	Adjust the gradation or variety of the image color. The larger this value is, the intenser the color will be.
Reset			Reset all the input color parameters to the default values.

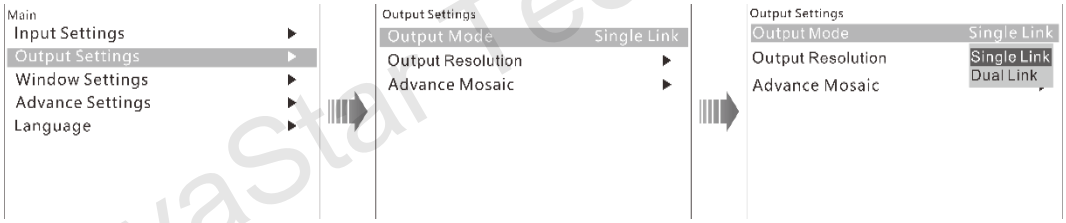
4.4 Output Settings

4.4.1 Output Mode

The N9 supports both single link and dual link output modes. When it is set to single link mode, DVI1, DVI2, DVI3 and DVI4 are used as single link connectors for mosaic output. When it is set to dual link mode, DVI1 and DVI3 are used for output, while DVI2 and DVI4 are unavailable.

On the main menu screen, rotate the knob to choose **Output Settings** > **Output Mode**, and then rotate the knob again to select **Single Link** or **Dual Link**.

Figure 4-5 Output mode settings

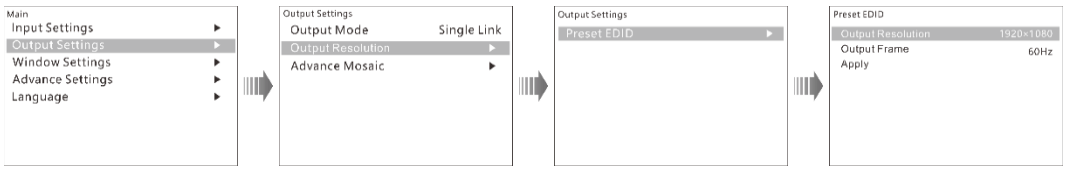


4.4.2 Output Resolution

Set the resolution of the output connector. The N9 only supports standard resolutions. If you want to set the resolution of an individual output connector, you can set it on the control PC or C1 desktop console.

On the main menu screen, rotate the knob to choose **Output Settings** > **Output Resolution** > **Standard Resolution** to enter the standard resolution settings screen. Then rotate the knob again to set **Resolution** and **Refresh Rate**, and press the knob to confirm the selection.

Figure 4-6 Output resolution settings



When you have completed the output resolution settings, rotate the knob to select **Apply** and press it to make the settings take effect.

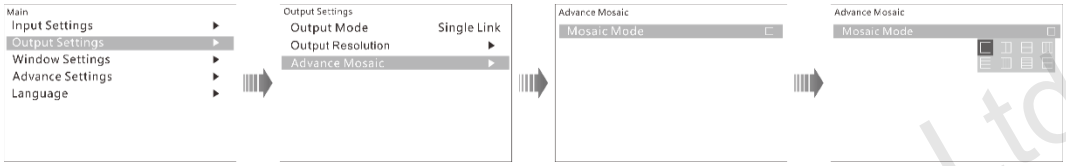
4.4.3 Advanced Mosaic

The N9 provides eight DVI output connectors (four main and four backup). It supports both single DVI connector output and multiple DVI connectors mosaic output.

The supported mosaic layouts including 1×1, 1×2, 1×3, 1×4, 2×1, 3×1, 4×1 and 2×2. You can select different layouts based on the screen structure and resolution.

On the main menu screen, rotate the knob to choose **Output Settings** > **Advanced Mosaic** > **Mosaic Layout** to enter the mosaic layout settings screen. Then rotate the knob again to select a desired layout, and press the knob to confirm the selection.

Figure 4-7 Advanced mosaic settings

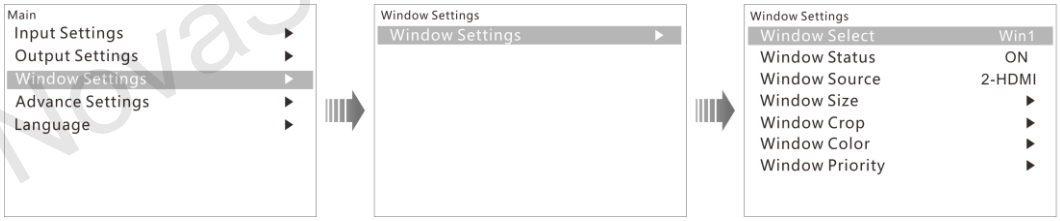


4.5 Layer Settings

The N9 supports at most 7 layers, each of which supports the resolution up to 3840×2160.

On the main menu screen, rotate the knob to choose **Layer Settings** > **Layer Settings** to enter the layer settings screen as shown in Figure 4-8.

Figure 4-8 Layer settings



- **Layer**: Select a layer.

  Layer is selected by default. Press the knob and rotate it to select a layer.
- **Layer Status**: Set the status of the selected layer. Status: **On** and **Off**.

  Rotate the knob to select **Layer Status**, and press the knob and rotate it again to select **On** to open the selected layer.
- **Input Source**: Select the input source of the layer. Only when the layer status is set to **On**, this menu item is available.

  Rotate the knob to select **Input Source**, and press the knob the rotate it again to select an input source for the selected layer.
- **Layer Size**: Set the width, height and position of the selected layer. Only when the layer status is set to **On**, this menu item is available.

  Rotate the knob to select **Layer Size**, and press the knob to enter the layer size settings screen. You can set **H Width**, **V Height**, **Initial X** and **Initial Y** of the layer.

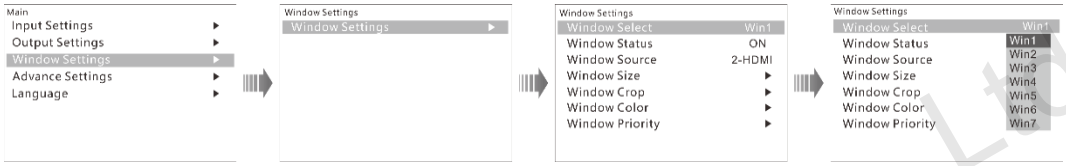
- **Input Crop**: Crop the input source image of the layer and then make the cropped part full screen. Only when the layer status is set to **On**, this menu item is available.

  Rotate the knob to select **Input Crop**, and press the knob to enter the input crop settings screen. You can set the input crop status as **On** or **Off**, and set **H Width**, **V Height**, **Initial X** and **Initial Y** of the cropped part.

4.5.1 Selecting Layer

Layer lists the names of layers (Layer 1–Layer 7). You can select one layer each time from the list.

Figure 4-9 Selecting layer

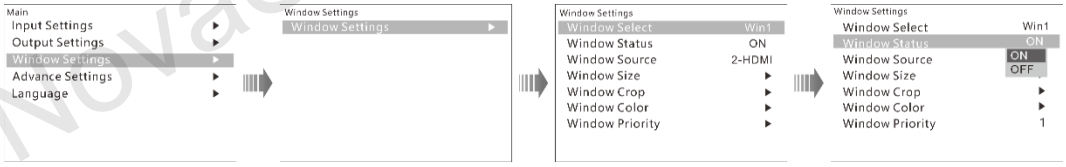


1. Rotate the knob to select **Layer**.
2. Press the knob to enter the layer selecting screen.
3. Rotate the knob to select a layer and press it to confirm the selection.

4.5.2 Layer Status

Set the layer status as **On** or **Off**. When the status is **On**, the layer is visible. When the status is **Off**, the layer is invisible.

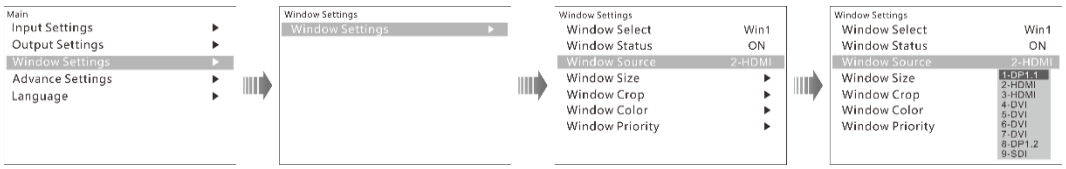
Figure 4-10 Layer status



4.5.3 Input Source

Set or change the input source of the selected layer.

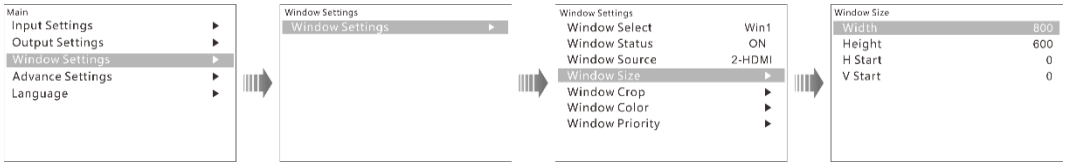
Figure 4-11 Selecting input source



4.5.4 Layer Size

Set the size and position of the selected layer.

Figure 4-12 Setting layer size



- **H Width**: Set the horizontal width of the layer. The default value is 800.
- **V Height**: Set the vertical height of the layer. The default value is 600.
- I**nitial X**: Set the horizontal initial coordinate of the layer. The reference point is the top left corner of the layer. The default value is 0.
- **Initial Y**: Set the vertical initial coordinate of the layer. The reference point is the top left corner of the layer. The default value is 0.

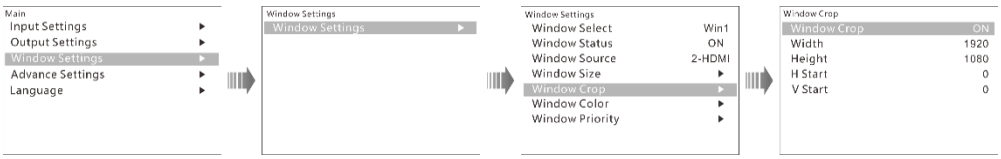
4.5.5 Input Cropping

Crop a desired part of the displayed image and make the cropped part full screen as shown in Figure 4-13.

Figure 4-13 Input cropping

Step 1 On the **Layer Settings** screen, rotate the knob to select **Input Crop** and press the knob to enter the input cropping settings screen.

Figure 4-14 Input cropping



Step 2 **Status** is selected by default. Press the knob and rotate it to select **On** to enable the cropping function.

Step 3 You can set the related parameters by rotating the knob. The related parameters are shown in Figure 4-13.

- **H Width**: Set the horizontal width of the cropped part.
- **V Height**: Set the vertical height of the cropped part.
- **Initial X**: Set the horizontal offset of the cropped part upon the whole image. The reference point is the top left corner of the layer.

- **Initial Y**: Set the vertical offset of the cropped part upon the whole image. The reference point is the top left corner of the layer.

4.5.6 Adjusting Layer Color

Adjust the layer color. The detailed color parameters are shown in Table 4-2.

Figure 4-15 Adjusting layer color

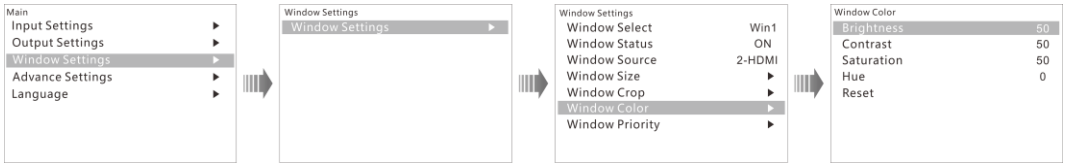


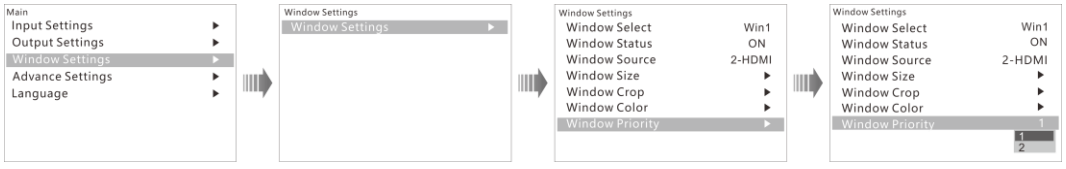
Table 4-2 Layer color parameter descriptions

Name	Value Range	Default Value	Description
Brightness	0–100	50	Adjust the screen brightness. The larger this value is, the brighter the screen will be.
Contrast	0–100	50	Adjust the difference between the darkest and brightest areas of the image displayed on the screen. The larger this value is, the bigger this difference will be.
Saturation	0–100	50	Adjust the purity or vividness grade of the image color. The larger this value is, the purer the color will be.
Hue	-180–180	0	Adjust the gradation or variety of the image color. The larger this value is, the intenser the color will be.
Reset			Reset all the layer color parameters to the default values.

4.5.7 Layer Priority

Set the layer priority. Press the knob to enter the priority setting screen. Then rotate the knob the select the layer priority and press it to confirm the selection.

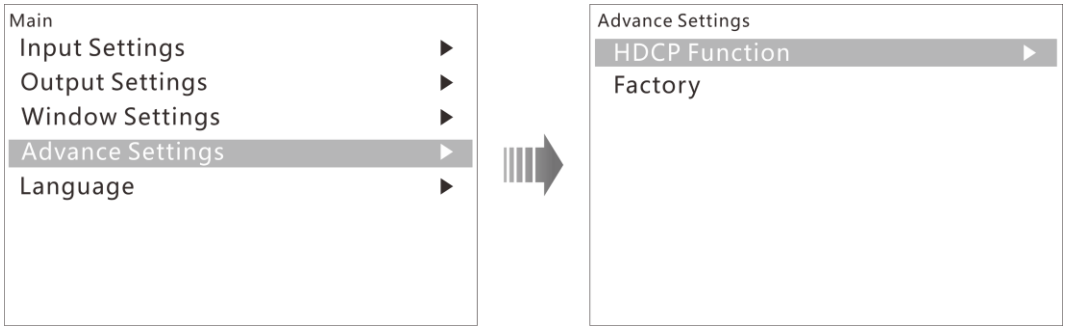
Figure 4-16 Setting layer priority



- 1: When the priority is set to 1, the main layer will be brought to front.
- 2: When the priority is set to 2, the main layer will be sent to back.

4.6 Advanced Settings

Figure 4-17 Advanced settings



4.6.1 HDCP Function

Turn on or turn off the HDCP function.

- On: When this function is turned on, the device will play and process the HDCP-encrypted video source.
- Off: When this function is turned off, the device will not process the HDCP-encrypted video source.

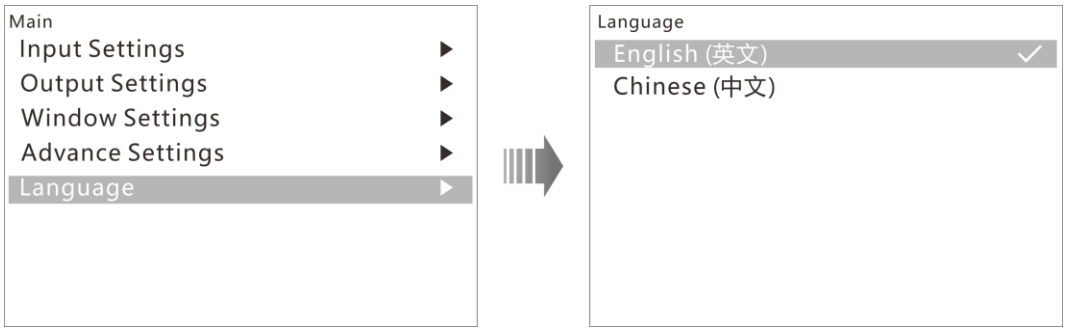
4.6.2 Factory Reset

Reset the device to its factory settings.

4.7 Language

Currently the N9 supports only Chinese and English. You can change the UI language as required.

Figure 4-18 Language settings



5 Specifications

Connector Specifications	
Connector	**Resolution**
DP 1.1	800×600@24/25/30/48/50/60/72/85/100/120Hz 1024×768@24/25/30/48/50/60/72/85/100/120Hz 1280×720@24/25/30/48/50/60/72/85/100/120Hz 1280×768@24/25/30/48/50/60/72/85/100/120Hz 1280×800@24/25/30/48/50/60/72/85/100/120Hz 1280×1024@24/25/30/48/50/60/72/85/100/120Hz 1366×768@24/25/30/48/50/60/72/85/100/120Hz 1440×900@24/25/30/48/50/60/72/85/100/120Hz 1600×1200@24/25/30/48/50/60/72/85/100/120Hz 1680×1050@24/25/30/48/50/60/72/85/100/120Hz 1920×1080@24/25/30/48/50/60/72/85/100/120Hz 1920×1200@24/25/30/48/50/60/72/85/100Hz 1920×2160@24/25/30/48/50/60Hz 2048×640@24/25/30/48/50/60/72/85/100/120Hz 2048×1152@24/25/30/48/50/60/72/85/100Hz 2048×1536@24/25/30/48/50/60/72/85Hz 2304×1125@24/25/30/48/50/60/72/85/100Hz 2560×816@24/25/30/48/50/60/72/85/100/120Hz 2560×960@24/25/30/48/50/60/72/85/100Hz 2560×1600@24/25/30/48/50/60Hz 3840×1080@24/25/30/48/50/60Hz 3840×2160@24/25/30Hz
DP 1.2	800×600@24/25/30/48/50/60/72/85/100/120Hz 1024×768@24/25/30/48/50/60/72/85/100/120Hz 1280×720@24/25/30/48/50/60/72/85/100/120Hz 1280×768@24/25/30/48/50/60/72/85/100/120Hz 1280×800@24/25/30/48/50/60/72/85/100/120Hz

	1280×1024@24/25/30/48/50/60/72/85/100/120Hz 1440×900@24/25/30/48/50/60/72/85/100/120Hz 1600×1200@24/25/30/48/50/60/72/85/100/120Hz 1680×1050@24/25/30/48/50/60/72/85/100/120Hz 1920×1080@24/25/30/48/50/60/72/85/100/120Hz 1920×1200@24/25/30/48/50/60/72/85/100/120Hz 1920×2160@24/25/30/48/50/60/72/85/100/120Hz 2048×640@24/25/30/48/50/60/72/85/100/120Hz 2048×1152@24/25/30/48/50/60/72/85/100/120Hz 2048×1536@24/25/30/48/50/60/72/85/100/120Hz 2304×1152@24/25/30/48/50/60/72/85/100/120Hz 2560×816@24/25/30/48/50/60/72/85/100/120Hz 2560×960@24/25/30/48/50/60/72/85/100/120Hz 2560×1600@24/25/30/48/50/60/72/85/100/120Hz 3840×1080@24/25/30/48/50/60/72/85/100/120Hz 3840×2160@24/25/30/48/50/60Hz
HDMI	800×600@24/25/30/48/50/60/72/85/100/120Hz 1024×768@24/25/30/48/50/60/72/85/100/120Hz 1280×720@24/25/30/48/50/60/72/85/100/120Hz 1280×768@24/25/30/48/50/60/72/85/100/120Hz 1280×800@24/25/30/48/50/60/72/85/100/120Hz 1280×1024@24/25/30/48/50/60/72/85Hz 1366×768@24/25/30/48/50/60/72/85/100/120Hz 1440×900@24/25/30/48/50/60/72/85/100Hz 1600×1200@24/25/30/48/50/60Hz 1680×1050@24/25/30/48/50/60/72Hz 1920×1080@24/25/30/48/50/60Hz
DVI	800×600@24/25/30/48/50/60/72/85/100/120Hz 1024×768@24/25/30/48/50/60/72/85/100/120Hz 1280×720@24/25/30/48/50/60/72/85/100/120Hz 1280×768@24/25/30/48/50/60/72/85/100/120Hz 1280×800@24/25/30/48/50/60/72/85/100/120Hz 1280×1024@24/25/30/48/50/60/72/85Hz 1366×768@24/25/30/48/50/60/72/85/100/120Hz 1440×900@24/25/30/48/50/60/72/85/100Hz 1600×1200@24/25/30/48/50/60Hz 1680×1050@24/25/30/48/50/60/72Hz 1920×1080@24/25/30/48/50/60Hz
SDI	3G-SDI, 1920×1080@60Hz and downward compatible 800×600@60Hz, 1024×768@60Hz, 1280×720@60Hz, 1280×768@60Hz, 1280×800@60Hz, 1280×1024@60Hz,

	1366×768@60Hz, 1440×900@60Hz, 1600×900@60Hz, 1680×1050@60Hz, 1600×1200@60Hz, 1680×1050@60Hz, 1920×1080@60Hz
Overall Specifications	
Connector	**Description**
Power connector	AC 100 V–240 V 50/60 Hz
Operating temperature	0°C–50°C
Storage temperature	-10°C–60°C
Dimensions	3U standard chassis 482.6 mm × 139.5 mm × 411.5 mm
Power consumption	
Weight	