

User Manual

色度校正时代来临

NovaCLB-Screen Full-Screen Calibration System

V5.1.1NS140100035

Contents

1	:	SYST	EM OVERVIEW	3
	1.1	1 I	NTRODUCTION	3
	1.2	2 4	ADVANTAGES	4
	1.3	3 5	System Structure	4
2		AUTH	IORIZATION MANAGEMENT	5
3		CALI	BRATION MODES	6
				~
4		FULL	-SCREEN CALIBRATION	0
	4.1	1 1	NITIALIZATION	8
	4.2	2 5	Settings	10
		4.2.1	Common Settings	10
		4.2.2	Original Settings	13
		4.2.3	Targets Settings	13
	4.3	3 (CAMERA SETTINGS	17
	4.4	4 F	Partition Mode	18
	4.5	5 (CAMERA PARAMETERS	22
	4.6	6 F	PARTITION	25
	4.7	7 E	ELIMINATE BOUNDARIES	30
5		SEAN	A BRIGHTNESS CALIBRATION	31
	5.1	1 I	NITIALIZATION	32
	5.2	2 8	Screen Info	32
	5.3	3 (CAMERA SETTINGS	33
	5.4	4 F	Partition Mode	34
	5.5	5 F	PARTITION	35
6		NEW	MODULE	39
	6.1	1	NITIALIZATION	40
	6.2	2	MODULE LOCATION	40
	6.3	3 (CAMERA SETTINGS	43
	6.4	4 (CAMERA PARAMETERS	44
	6.5	5 N	MODULE CALIBRATION	45
7		CALI	BRATION INTERRUPTION (SEARCHING LED POSITION FAILED)	45
8		EVAL	UATE UNIFORMITY	49
	8.1	1 I	NITIALIZATION	49
	8.2	2 (CAMERA SETTINGS	50
	8.3	3 (CAMERA PARAMETERS	51
	8.4	4 L	JNIFORMITY EVALUATION	51

9	SCR	REEN	DATA MERGING	52
10	S	CREE	EN TO CABINET	54
1(D.1	Oper	RATION PROCEDURE	56
1().2	Oper	RATION INSTRUCTION	56
	10.2	2.1	Import database	56
	10.2	2.2	Draw topological graph	57
	10.2	2.3	Set resolution of each cabinet	58
	10.2	2.4	Number the cabinet	62
	10.2	2.5	Set target database	67
	10.2	2.6	File path	67
	10.2	2.7	Switch	67
11	S	CREE	EN UPDATE TARGETS	67
12	C	ABIN	ET TO SCREEN	69
13	N	ονα	CLB-SCREEN HELP	75
1:	3.1	Νετν	VORK SETTINGS	75
1:	3.2	LCT	MONITOR SETTINGS	76
1:	3.3	Prin	CIPLE OF BRIGHTNESS AND COLOR CALIBRATION	77
1:	3.4	Сам	ERA OPERATING SKILLS	78
1:	3.5	SUBA	AREA IMAGING OPERATING SKILLS	79
1:	3.6	STEF	PS TO CHECK CALIBRATION EFFECTS	80
1:	3.7	WATI	ER RIPPLE IN FULL-SCREEN CALIBRATION	81
14	R	ELEA	ASE NOTES	82

1 System Overview

1.1 Introduction

Brightness/Color uniformity is of the most important factors that affect the image quality of a full color LED display. Because of the limitations of manufacturing process, including system structure design, LED lights selection, electronic components welting, system cooling, LED brightness decaying and many others, LED displays suffer the brightness/color uniformity loss, which is also the most serious problem of this field.

Facing this fact, Nova pixel level calibration system does not intervene the manufacturing process of a LED display to reduce its brightness/color uniformity. Instead, it performs brightness/color adjustment to the display after it has been completely produced. By adjusting the brightness/color of each LED light according to the software analytical results from the measured brightness/color values of the LED lights, Nova pixel level calibration system can help the LED display acquiring perfect uniformity.



Fig.1-1The LED display effects comparison before and after calibration

NovaCLB is applicable for the following two occasions:

- Factory single cabinet pixel level calibration (Factory calibration). Correct each cabinet on the production line to ensure good brightness/color uniformity of the cabinets when produced.
- Field LED display pixel level calibration (Full-screen calibration). Perform calibration for a LED display at where it locates to improve its brightness/color uniformity.

Factory calibration is more efficient and lower in cost than Full-screen calibration. But for cabinets of which the LED lights optical axis directions consistency is not well managed, results of factory calibration will not be as good as that of filed calibration. During factory calibration, the matching NovaCLB-Cabinet is needed.

Full-screen calibration requires engineers to be presence and Full-screen installation of calibration instruments. And what's more, Full-screen calibration can only be performed only at night when it's dark. Despite its complexity and low efficiency (compared with factory calibration), Full-screen calibration can greatly improve the brightness/color uniformity of a LED display and thus results in amazing image quality of the display. During Full-screen calibration, the matching NovaCLB-Screen is needed.

1.2 Advantages

- 1) Camera calibration technology enabling accurate brightness/color measurement;
- 2) performance with brightness variation less than $\pm 1\%$ and color variation less than 0.003;
- 3) Be capable of eliminating color diversity of LED lights from different manufacturing batches;
- 4) Be capable of eliminating brightness/color diversity between subareas or cabinets;
- 5) Arc shape and irregular shape LED display calibration supported;
- 6) Supporting automatic calibration for the replaced module;
- 7) Precise calibration coefficients up to 16bits resulting in outstanding calibration
- Close loop intelligent calibration resulting in easy and high efficiency calibration. One LED display, one person; 25 minutes,600K pixels;
- 9) Adopt RGB to begin the collection mechanism and collection-processing mechanism at the same time during the calibration process so as to improve the efficiency;
- 10) Support correction to the boundary difference between partitions so as to enable smooth transition between partitions;
- 11) No extra power supply required.

1.3 System Structure







Fig. 1-3System architecture for calibration of ultra-large screen – Using a single serial port



Fig. 1-4System architecture for calibration of ultra-large screen – Using multiple serial ports The controllers can be connected to the control computer via a single or multiple serial ports.

- Via a single serial port: Connect the control computer via USB cable to the control port of the first controller and cascade all the controllers via USB cables, as illustrated in Fig. 1-3.
- Via multiple serial ports: Connect the control computer to the control port of each controller, as illustrated in as illustrated in Fig. 1-4.

2Authorization Management

NovaCLB-Screen adopts the management methods of encryption lock and authorized file binding authorization; and every dongle corresponds to one authorized file, which is combined with the file authorization.

Insert dongle to the USB port of the computer; click menus "Author" on the main interface; enter to the

Authorization manage window, click to import the authorized file (in the USB drive) corresponding to the dongle.

Multiple authorized file can be imported. Thus, dongles can be replaced directly when there are multiple dongles. It is not necessary to reload authorization file every time when replacing dongles. Plug in dongles and it can be used.

🖳 A	uthorizatio	n Manage	any Appen	×	
	authori	zation documents	list:		
	Num	Author ID	Camera ID		
	1	1574099562	024021004379	Add	
	2	1766925753	023022004469		
				Delete	
		4	Ok	Cancel	

Fig.2-1Authorization management

3Calibration Modes

According to different requirements, calibration is divided into three modes:**full-screenpixel level** calibration,seam brightness calibration,new module calibration and evaluation of the uniformity before and after calibration.

4Full-Screen Calibration

Procedures of full-screen pixel level calibration:

1) Initialization

Online(online calibration with LCT), create new calibration information files, initializing specifications of modules.

2) Camera Settings

Choose a camera type: digital camera or Caliris camera. Then, click "Connect".

3) Partition Settings

Brightness and chroma of display screen will be collected by camera. The screen need to be partitioned into multiple areas with appropriate size for calibration owing to the limitation of camera resolution.

4) Camera Parameters

Adjust camera parameters.

5) Partitions Calibration

Guide customers to perform pixel level calibration on each LED, which signally improve the display uniformity.

Calibration Mode	Nova Screen	Calibration
Camera Settings Partition Mode	- Choose Calibration Mode	
Partition	○ Seam Brightness Cal ○ New Module ○ Evaluate Uniformity	ibration
	TAP	
	. 27	Back
Control system: NovaLCT	Mode: Ordinary Chroma	pratian mode

4.1 Initialization

Calibration Auth	orize Common Settings Fools - Language (语言) - Help
Calibration Mode	Online Control System
Initialization	IP 172.16.5.177 Port: 8080 Connect Disconnect Module Size
Settings	Screen Type 💿 Single Screen 🤎 Combine Screen
Partition Mode	Screen 1 Screen 512*256
Camera Parameters	Pixel Width 32 📫 Pixel Height 32 📩
Partition	₩ Module size same
	Calibration Database
	New Load
	File Name:
	File Directory:
	Back Next
Control system: N	waLCT Mode:Ordinary Chroma

Fig. 4-2Network Settings Interface of Calibration Initialization

1) Control System Connection

Use calibration software together with NovaLCT or connect NovaStar's video controller NovaPro HD via cable to calibrate display screen.

NovaLCT Connection

Ensure that the NovaCLB-Screen computer can communicate with the NovaLCT computer well, fill the IP and port (The default is 8080, which can be modified) from NovaLCT in the location of IP and port from NovaCLB-Screen, then click "Connect" button. Fig.4-3 will pop up and the connection is done.

Screen Calibration	
Current operation communication	Online Calibration Offline Calibration Manage Coefficients
COM4 👻	Network Setting Local IP: 172.16.3.218 Port: 8060 Reconnect
Current Screen	Calibration Mode
Screen1	Coefficient Uploading Mode: Fast Upload
	Communication Log
Screen2	17:20:51 Casting successor 17:20:51 Casting successor is ready Entering the calibration mode 17:20:51 Casting the version of controller systemSucceed
Screen3	17:20:51 Communication failed, Can not enter calibration mode, please try again 17:20:51 Communication failed, Can not enter calibration mode, please try again 17:20:52 Executed and executed/accellationation control Common Common Common Common Common Common Common Common
Screen4	17.20:53 Reply data packetsOnGetDisplayCountSucceed
	17/20/53 Receive data packetSetCorrectionScreenindexSucceed 17/20/53 Set the current screen index:1 17/20/53 SecremEntPrioring.com/Entering.com/Entering/SecremEntering.com/Entering.co
	17:20:53 Reply data packetsSetCorrectionScreenIndexSucceedI 17:20:53 Receive data packetsOn/edDisplayInfoSucceedI
	17.2033 recerved in teginary area information- 17.2033 Screen0
	17:20:53 Screen X0 17:20:53 Screen Y0 17:20:53 Screen Width:%84
	17:20:53 Screen Height 128 17:20:53 Screen Type standard
Display Screen	11/2/L31 https://data.pocketS0ficetBisplayInfoSucceed 17/20.53 ScreentEnter the calibration mode succeed
fain Display 👻	
Enable/Disable Calibraion	
Disable	
Save	Save
Calibration Authorize	e Common Settings Tools Tools Tools Help
Calibration Mode	Online Control System
Tnitialization	IP 172.16.5.177 Port: 8080 Connect Disconnect
	Module Size
Settings	
Partition	Screen Type 🔸 Single Screen 📢 Combine Screen
Mode	Screen 1 Screen 512*256
🚳 Camera Parameters	Pixel Width 32 📫 Pixel Height 32 🗧
Partition	✔ Module size same
	Calibration Database
	New Load
	File Name:
	File Directory:
PL	
	Back Next
Control system: NovaLCI	Mode:Ordinary Chroma

Fig. 4-3Prompt message from NovaLCT when connection is successful

2) ScreenType

"Single Screen" and "Combine Screen"are supported.

Single screen: Refers to a screen configured on NovaLCT.

Combine screen: Refers to a large screen that combines the screes configured on NovaLCT through"Multiple-screen Management".

3) Screen Resolution

The resolution of display is the width and height in the pixel level.

After NovaCLB-Screen is connected with NovaLCT or NovaPro successfully, the bottom of the interface will show display count and the corresponding resolution of connected NovaLCTor NovaPro. Users could

choose display number as needed, the default value is the first one.

4) Module Size

Check "Module size same" and set the module width and module height of module if the size of all modules are same. The function of **Seam Brightness Calibration** will not be supported if the size of modules are not same. This will require another seam correction method (correction based on pixel).

5) Calibration Database

A new database can be created or an existing database can be loaded to store the information like calibration coefficients, calibration time, screen size, etc. It shall be kept properly.

In combined-screen mode, newly created database contains the database of each single screen(named bythe sequence number of the com port and screen), which makes it convenient to maintain in future.

4.2 Settings

4.2.1 Common Settings

Common Settings 0	riginal Settings Targets Settings
LED Pixel Arrangement:	Three LEDs
	○ Four LEDs
	🔘 One or Two LEDs
	O thers
Ambient Brightness:	Low
Direction To Identify Led:	Automatic Search 🔻
Broken LEDs Ratio Allowed:	3 🔷 🛠
Calibration process para	V Enable background off
	V Enable gap calibration
	Coefficients uploading stably
	Deal the shade
	📄 Save all subareas' pic
Brightness data amend	Splice cabinets freely
Calibration Pictures Path:	d:\Users\Administrator\Documents\NovaCLB-Sc Browse
Screen Type:	💿 Regular Screen 💿 Irregular Screen

1) LED Pixel Arrangement

Pixel Arrangement is the count of every pixel, the common ones are three LEDs arrangement, Virtual pixel of 3 led, four LEDs arrangement, etc.

2) Ambient Brightness

Ambient Brightness is the brightness of surrounding environment while calibrating. In general, darkroom is "none" and the brightness is "low" at night. It's "High" at nightfall or a cloudy day. It is unsuited to calibrate in sunny day.

3) Direction to Identify LED

The Direction can be divided into four diagonal directions which are from four angles of rectangle. It is www.novastar.tech10

used when identify LED and the default direction is automatic search. The software will detect from four directions respectively and select the best result. When the LED of top left angle can't display normally, please change the direction. For example, users try to identify LED from bottom right when the first row or the first column is covered.

4) Broken LEDs Ratio Allowed

If the LEDs which can't be identified in calibrating zone are greater than the ratio. The calibrating flow will stop and some prompt messages will be presented. Please be sure whether the "broken lights are too much" or "some LED pixels are covered" is appeared. If the problem can't be solved, users could turn up this ratio to calibrate forcibly.

5) Calibration Process Parameters

> Enable background off

Background removal is to remove background light. Generally, calibration is required only to be conducted under relatively dark environment.But if background removal is enabled, calibration can be conducted even if the environment is not dark enough.

After "**Enable background off**" is selected, the interface shown in Fig. 4-5 is displayed when the calibration starts. Users can drag the four vertexes of the quadrangle or adjust the positions of the four vertexes with the mouse or the arrow keys on the keyboard. The area within the quadrangle is the valid calibration area. So, the unwanted light around the screen to be calibrated is removed.

firm area of display screen						
peration introduction 1. Drag four corners of t 2. If the positions of th	he display scr e four corners	een; of the displa	y screen are 1	normal, directly	click the scr	een to confirm.
splay screen position info	ormation					
Vpper (1244, 420)	Vpper	(4452, 463)	Lower	(1328, 3367)	Lower	(4307, 3447)
Mark the display area					Confir	m Cancel

Fig. 4-4Screen Area Determination

> Enable gap calibration

This is an option enabled duringnormal partition calibration. Gap calibration is mainly used for calibration of LED displays with small pixel pitch to solve the bright and dim line caused by cabinet assembly. Note: bright and dim line must be inside Partitions.

Click "Normal setting" on the main menu to pop up the window below, and then check "Enable gap calibration".

Coefficient Uploading Stably

Coefficient uploading stably means to upload calibration coefficients via serial cable. The speed is slower. Default calibration coefficient uploading method is via video cable. The speed is faster. If there's something wrong with the video cable, serial cable can be used as alternative by selecting coefficient uploading stably.

Deal the shade

Enable this option if some subareas are blocked by leaves, wires, etc. or the camera lens has dirty spots. The software will detect the blocked subareas automatically and deal with them.

Save all subareas' pictures

Check "Save all subareas' pictures (Need more space)" to save all pictures of subareas. Don't check to

only save the pictures of current subarea.

Splice cabinets freely

If "**Splice cabinets freely**" is selected, the system will automatically calculate the calibration coefficients of the cabinet edges. After calibration, when the cabinets are used to form a screen next time, each cabinet can be placed at any position in the screen.

Note: If "**Splice cabinets freely**" is selected, it requires that the cabinets in the screen must be from the same batch and there are no obvious dark or brighter blocks between cabinets.

If "**Splice cabinets freely**" is not selected, after calibration, the position of each cabinet cannot be changed. That is to say, when the cabinets are used to form a screen next time, the position of each cabinet must be the same as their position during calibration.

6) Brightness Data Correction

Enable or disable brightness data correction. Module data correction is used when the brightness and Chroma have modular difference. Module size is the minimum unit module.

💀 Setting X	
☑ Enable Amend	
☑ Enable Module Amend	
Module Rows 4	
Module Columns 4	
OK Cancel	

7) Calibration Pictures Path

broswer to set the position where the collected images are saved during calibration.

8) Screen Type

Click

Set the type of the screen. Screen types include regular screen and irregular screen. Generally, regular screens refer to rectangular screen while irregular screens refer to non-rectangular screens such as round and triangle screens.

4.2.2 Original Settings

Use colorimeter to measure original values.

Original brightness and chroma is the original brightness and chroma parameters information of the display to be calibrated when calibration is closed.

It's important to set these parameters correctly for the result of calibration.

The colorimeter here means instruments that can measure LED color, like: light gun, color analyzer, Spectral radiation brightness meter, etc.

4.2.3Targets Settings

Brightness calibration

www.novastar.tech13

Correct	±Mode —						
	🔘 Brig	htness Calibr	ation				
	💿 Ordi	nary Chroma C	alibration				
	⊖ Mult	iple bin Chro	ma Calibrat	tion			
Update	Targets						
		Brightness	Сх	Cy			
	Red	810.00	0.6874	0.3003			
	Green	1620.00	0.1726	0. 7359	Auxiliary		
	Blue	276.00	0.1330	0.0825			
	White	2706.00	0.3250	0.3282			
	Colo	or Temperature	•				
					0 K		
	5000-	6500 9300					
						<u> </u>	
						5	

Fig. 4-5 Targets Settings

Brightness calibration can only change the brightness of R, G, B, and it will not attenuate the color gamut. But it can't eliminate the difference in color between LEDs.

	🖷 Settings				-	- 🗆	×	
	Common Settings (Original Sett	ings Targe	ts Settings				
	CorrectMode							
	Ist Brig	htness Calibr	ation					
	🔿 Ordi	nary Chroma C	Calibration					
	⊖ Mult	iple bin Chro	oma Calibrat	tion				
	-Update Targets							
		Brightness	Сх	Cy				
	Red	810.00	0.6874	0.3003				
	Green	1620.00	0.1726	0.7359	Auxiliary			
	Blue	276.00	0.1330	0.0825				
	White	2706.00	0.3250	0.3282				
	🗌 Cola	or Temperature	e					
					0 4	(
	5000-	6500 9300						
						- (
					ОК	Cancel		
L								
		Fig. 4-6	Brightn	iess adju	stment			
				Auxiliar	y			
Adjust the RGB brightn	less in the fig	ure abov	e or clic	k	🗏 to adj	ust in tl	he figur	e below.
Q.	Brightness A	Adjust					x	J.
	-Brightness A	.djust(tte	nuation	ratio) —]
	Red					P.	8%	
	Green 4					b	8%	
	or cent					,	0.0	
	Blue					4	4%	
	📃 Synchrono	ously						

Fig. 4-7 Adjusting brightness by auxiliary tool

• Ordinary Chroma calibration

Brightness and Color calibration can change the brightness of R, G, B, and attenuate the color gamut. But it can uniform brightness and color between LEDs.

Users can adjust target brightness and color value by the in the textbox directly. Recommend using the first method

Correct	tMode			-				
	🔵 Brigh	tness Calibr	ation					
	🖲 Ordin	ary Chroma C	alibration					
	() Multi	ple bin Chro	na Calibrat	tion				
11 1 .		-						
Update	largets-	Brightness	Cx	Cy				
	Red	810.00	0.6874	0.3003				
	Green	1620.00	0.1726	0. 7359	Auxiliar	у		
	Blue	276.00	0.1330	0.0825	\geq			
	White	2706.00	0.3250	0.3782				
	Color	• Temperature						
					0	К		
	💓 Brig	ghtness Adjus	st 📕				×	
	Brig	htness Adjus	t(ttenuatio	on ratio) —				
	Red	<				>	10%	
	Gree	n <				>	10%	
	Blue	۲.				>	8%	
		ynchronously						

Fig. 4-8 Ordinary Chroma Calibration

After adjustment, click button to look up the current brightness and color value in CIE 1931 Color Diagram.



Fig.4-9Measuring and Target Color Gamut in CIE 1931 Color Diagram

The white triangle in the image is corresponding to measuring color gamut, the black triangle is corresponding to target color gamut. To realize the uniformity after calibration, the target color gamut should less than measuring color gamut. From the image above, users can get the attenuation of color gamut. Users can also click the right mouse button in Color Diagram to choose to add the color coordinate to "Target Brightness and Color" value.

The former method is recommended. Users can also check "Color Temperature" and directly enter an appropriate color temperature value, or drag the bar to set color temperature value, or click to use the recommended color temperature value, where three commonly used color temperature values are provided: 5000K, 6500K, 9300K.

Common Set	ttings	Original Satt	inge Targ	ets Settings			
_Correct	+Wode						
COLLEC	() Brig	htness Calibr	ation				
	0rdi	, nary Chroma C	alibration	1			
	⊖ w ₁]+	inle bin Chro	ma Calibra	.tion			
	-	ipie bin chio	ma caribie				
Update	Targets	Brightness	Cx	Сv			
	Red	770.18	0.6874	0.3003			
	Green	1641.56	0.1726	0. 7359	Auxiliary		
	Blue	294.26	0.1330	0.0825			
	White	2706.00	0.3136	0.3236			
	🔽 Cola	or Temperature	2				
					6500 K		
	5000	↑ ↑ 6500 9300					

Fig. 4-10 Expected Color Temperature

• Multiple bin Chroma calibration

Multiple bin chrome calibration is mainly used for adjusting the brightness difference after multi-batch of lamps or lamp panels have been mixed.

The operation steps of **multiple bin Chroma Calibration** is basically the same as **"Ordinary Chroma Calibration"** pattern.

4.3 Camera Settings

During calibration, camera must be connected computer correctly, aimed at the partition and be able to take photos normally. It is required to choose camera type before connecting camera. Digital camera refers to Canon camera and industrial camera is HS1000. After the camera is connected, camera status

is as the figure below. Click "Next" to move on to partition mode to do the relevant camera settings. See details in <u>13.4 Camera operating skills</u>.

Calibration Author	ize Common Settings	· · Language (语言)	Help -
Calibration Mode	Comoro	Part	tition Topological Graph And Screen Control
Initialization	🖸 Digital camera	O Caliris	Connect
Partition Mode	Camera Status:	Canon EOS 6D Connect	ted!
Camera Parameters			
Fartition Partition			~
			$ O^{-1}$
			Back Next
Control system: Nova	LCT Mode:Ordinary Chroma		
Calibration Authori	ize Common Settings	· Language(语言)	Felp -
Calibration Mode	6	Par	tition Topological Graph And Screen Control
Initialization	Camera O Digital camera	● Caliris	Disconnect
Partition	Camera Status:	C1200 Connected!	
Camera			
Partition			
Eliminate the			

Fig. 4-11Connect Camera to LCT

4.4 Partition Mode

Due to the limitation of the camera's resolution, the screen needs to be divided into several proper

subareas to be calibrated.

Partition calibration can achieve the specific process of display calibration after the setting of calibration parameters is completed.



Fig. 4-12Partition calibration Flow Diagram

Note: Please ensure that the distance between the camera and the screen is not changed before the last partition is calibrated. The angle of the camera can be adjusted.

Calibration Authorize	e Common Settings I Tools - Language (语言) - Help -
Calibration Mode	Partition Topological Graph And Screen Control Partition Size Tips: suggested subarea size less than 224 x 150, for quad-LED layout
Camera Settings Partition	display, maximum subarea: 128 x 96. Patition Width: Partition Heght: Vint Block Size:
Camera Parameters	Exsit some leds obscured(Borders)
Partition	
	Back Next
Control system: NovaLC	T Mode:Brightness

Fig. 4-13 Partition Mode

Click Recommend, thus the software will calibrate the proper pixel size of a single partition according to the display size and conduct auto-partition.

Click to set the unit size when adopting customized partition, where columns and rows collected by the camera cannot exceed the default value "224×150", while Caliris is "480×330". and the partition size (unit columns and rows ×columns and rows collected by the camera) is displayed at the

OK

bottom of the interface. After setting is finished, click

Tips: suggested display, maximu	l capture size is less † um subarea: 128 x 96.	han 224 x 150, for (quad-LED layout
Basic Vint:	3*3 🔻		
Capture LED Colomns:	224 🌲	Capture LED Rows:	150
Partition size:	: 672*450		

When finished, you can see the result as shown in Fig 4-14.

🚺 Topological Graph And Screen Co	ontrol	J
Topological Graph		
1	2	
3	4	
🔲 Select All	Selected	
Recommended priority	Calibrated	
Screen	Control	0.1
Color 🧿 Red 💽 Gree	n OBlue OWhite	
Brightness	▶ 50 🖨	
🔲 Show dot	50/100	
🔲 Enable Calibration		

Fig. 4-14 Topography Graph And Screen Control Window

Topography Graph

It is composed of divided subareas. Number these subareas from left to right, from top to bottom.

Screen Control

It is used to realize the control of screen color, brightness and division switch.

The right window can move together with the main window, and can shut down if unnecessary. Click

"Partition Topological Graph And Screen Control" on the right page, it will popup.

If there is binding around the display, it is necessary to check "Exsit some leds obscured" and input the

columns and rows of borders and then click is to view the screen. The operation is successful when see the fist rows or columns have on it .

Calibration Authorize	Common Settings Tools - Language (语言) - Help
Calibration Mode Initialization	Partition Topological Graph And Screen Control Partition Size Tips: suggested subarea size less than 224 x 150, for quad-LED layout display, maximum subarea: 128 x 96. Patition Width: 64
Partition Mode Camera Parameters	Vint Block Size: 1*1
Eliminate the boundaries	Left 2 2 Right 0 2 Columns 2 2 Solution 2 2 Top rows 2 2 Solution rows 0 2
Control system: NovaLCT	Back Next

Fig. 4-15 Setting the number of rows and columns of borders

After division, click "Next", enter into "Camera Parameters".

4.5 Camera Parameters

Calibration Mode	Paramete	r Adjustm	ent					Par	titi	on Topol	logical Graph /	And Screen C	ontrol
T Initialization	0	anual Mo	de		4 (utomati	c M	ode				Auto Al	1
Camera Settings	Color	Brightr (%)	iess	Expos	ure	Apertu	re	IS	5	Auto	Saturation [60, 100]	Area [50, 150]	Checl
Partition	Red	50	-	300	-	25	-	100	•	Auto			Ŕ
Mode	Green	50	-	300	-	25	•	100	-	Auto			Ŕ
Camera	Blue	50	-	300	-	25	•	100	-	Auto			2
Partition													

Fig. 4-16 Camera settings – digital camera

Calibration Autho	rize Common Set	tings	· Canguage (语言)	Felp •	
Calibration Mode	Parameter Adju	stment	<u>Partition T</u>	'opological Graph An	d Screen Control Saturation Adjustment
Camera Settings	Color	Brightness (%)	Exposure	Saturation [60, 100]	Area [50, 150]
Partition	R	50	300	N/A	N/A
Mode	G	50	300	N/A	N/A
Camera	В	50	300	N/A	N/A
Fartition				. c ^C	
			<u> </u>	Back	Next
Control system: Nov	vaLCT Mode:Ordir	ary Chroma			

Fig. 4-17 Camera settings – Caliris camera

The figures above are the interfaces after the cameras are connected successfully. The Caliris camera does not have the preview window. To view the position of the screen in the camera, choose **Saturation**

Adjustment>Live Preview.For other operating skills of camera, click to open the quick start guide. No matter manual mode or automatic mode is adopted, adjust the saturation till the result reaches "Normal", and adjust the image size to "Fit". During this process, make sure that the camera faces to the partition.

Notice: If the image area is relatively small when the saturation is normal, the micro focus ring can be adjusted to blur the image. After zooming the camera window, the image seen in camera window is different from the actual image. User can solve the problem by clicking the LED light spot in the image prompted by magnifying glass to separate them.

🥺 Saturation Adjustment		
Live Preview Image Viewing		
Note: This red area is the imaging area proportion of the smallest image. Flease adjust the image to be larger than or equal to this area.	15 👘 %	Parameter Adjustment Real-Time Analysis @ Automatic Mode Hanual Mode Auto All
		Color Brightness(%) Exposure Analyze Saturation Area
		R 20 T 300 Automatic N/A N/A
		G 20 - 300 - Automatic N/A N/A
		B 20 V 300 V Automatic M/A M/A
		Notice
		Ensure that images of LEDs do not overlap after saturation analysis!
		Images of LEDs overlapped:
		Images of LEDs not overlapped:
		and the second second second second

Fig. 4-18 Adjusting saturation of Caliris camera

- Live Preview: Preview the live image of LED screen shown in the camera. The preview image can be zoomed by the following 2 methods with a zooming range of 15%–3200%.
 - Drag the slider.
 - In the preview area, click to zoom in and right-click to zoom out.
- **Image Viewing**: View the images captured by the camera during saturation analysis. Users can view the image in Red, Green and Blue separately.
- Parameter Adjustment: The Real-Time Analysis function is available only for Caliris camera.
 - If Real-Time Analysis is selected, after users select a color for preview, the system will analyze the image of that color in live preview in real time and adjust its Saturation and Area values to be Normal.
 - If **Real-Time Analysis** is not selected, the color selection buttons are hidden, but the **Automatic Mode**, **Manual Mode**, and **Auto All** buttons appear. The adjustment parameters for Caliris and digital cameras are the same.
- Automatic Mode
- This mode is the default mode. Under this mode, users just need to click on then the software will automatically analyze and adjust the saturation and finally achieves "normal". If failed, please check the calibration environment and parameters, then try again.
 - Manual Mode
- Under this mode, users should adjust calibrate brightness, exposure time and aperture size. When adjusting, give priority to "aperture", followed by "exposure", and finally "brightness".
- For the Caliris camera, after saturation analysis, ensure that the images of LEDs are not overlapped. If they are overlapped, please adjust the camera parameters again to ensure that the saturation analysis result is normal and they are not overlapped.

Note: The default brightness 50. Automatic analysis is advisable. Manual adjustment can be carried out if experienced. Next step can be taken only if the analysis result is normal. Saturation between 60 and 100 is normal. It is proper to adjust the image size to 50~150.

You can click <u>to view the images obtained during saturation analysis in order to help find</u> problems. When red, green, blue analyses are all completed, click **Next** to enter the **Partition**page. For the Caliris camera, you must close the **Saturation Adjustment** page to go back to the camera settings page and then click **Next** to enter the **Partition** page.

www.novastar.tech24

4.6 Partition



Fig. 4-19Partition

1) Automatic calibration Mode

Users just need to click "Start" button, the software can do the following things automatically: analyze red, green and blue led, generate coefficients, upload coefficients, save to hardware and to database. It will

make calibration more convenient and efficient. Users may also manage this flow according to their own requirements. Click "Customize", you can see fig. 4-20.

🕖 Customize Steps	×
Steps	
🗌 Warm up	
🗹 Analyze Red LEDs	
🖂 Analyze Green LEDs	
🗹 Analyze Blue LEDs	
🗹 Generate Coefs	
🗹 Save To Database	
🗹 Upload Coefs	
🗹 Save To Hardware	
ОК	Cancel

Fig. 4-20Customize Window

2) Manual Calibration Mode

Users can separately operate every step of the calibration process.

For the partition is completed, users can test whether the calibration effect is good through "pictures control" on the right side of this window.

3) Upload calibration coefficients

Upload calibration coefficients to screen.

Coefficients of area without accessing video data could not be uploaded if the subareas are across two or more screens during calibration. Selectmultiple subareas from topological graph after calibration is completed and right click to upload the coefficients. Please note that only the subareas loaded by the sending device connected to the control computer with a video cable can be selected and the selected subareas need to form a rectangle.

🚺 Topological Graph And Sc	reen Control	- ×
Topological Graph		
	Modify	
	Coefficients uploadin	45
	Save to hardware	
Salast All	Selected	
Becommended priori	ty Calibrate	A
5	creen Control	
Color 📀 Red	Green 😳 Blue	D White
Brightness <		► 50 ÷
Show dot	_	50/100
Enable Calibrati	on	
	1011	

Fig. 4-21Uploading calibration coefficients via topological graph

4) Pause Calibration

Some emergency situations may happen during the calibration process, such as sudden appearance of

obstruction. User can click to st

to stop calibration under such condition. When user clicks

to continue calibration, the camera will start shooting from the last picture.



Calibration Author:	ze Common Settings	Tools - Language (语言)	Help •	
Calibration Mode	📝 Automatic Mode	Partition	n Topological Graph And Screen Contro	1
Initialization Camera Settings	Automa	atic Calibration Mode	Calibration Process Custon Warm up Analyze Red LEDs	<u>ni ze</u>
Partition Mode Camera Parameters	Notice	The calibration is paused!	Analyze Green Analyze Blue Generate Coefs	¢ ¢
Partition			 Save To Database Upload Coefs Save To Hardware 	
c	<u>Update Targets</u>			
	Non-uniformity Broken Le	eds Target can achieve LEU	Back Next	
Control system: Nova	LCT Mode:Ordinary Chroma			
Control system: Nova	UCT Mode:Ordinary Chroma	Tools - Language (语言)	Help	<u>.</u>
Control system: Nova	LCT Mode:Ordinary Chroma	Fools - Language (语言) Partition	Help -	
Control system: Nova Calibration Calibration Calibration Mode Initialization	LCT Mode:Ordinary Chroma	Fools - Language (语言) Partition atic Calibration Mode	Help - Help - Calibration Process Custon Warm up	.:
Control system: Nova Calibration Calibration Calibration Mode Initialization Camera Settings Partition Mode	LLT Mode:Ordinary Chroma	Fools • Language (语言) Fools • Language (语言) Partition atic Calibration Mode g red Led image (1/4) g green Led image	Help A Topological Graph And Screen Control Calibration Process Custon Warm up Analyze Red LEDs Analyze Green Analyze Blue	
Control system: Nova Calibration Calibration Calibration Mode Initialization Camera Settings Partition Mode Partition Partition	LCT Mode:Ordinary Chroma	Tools · Language (语言) Partition atic Calibration Mode g red Led image (1/4) g green Led image g blue Led image g blue Led image	Help A Topological Graph And Screen Contro Calibration Process Custom Warm up Analyze Red LEDs Analyze Green Analyze Blue Generate Coefs Save To Database	ize ∲∕ ∲∕
Control system: Nova Calibration Calibration Calibration Calibration Mode Initialization Camera Settings Partition Mode Camera Partition Mode Partition	LCT Mode:Ordinary Chroma	Fools · Language (语言) Partition atic Calibration Mode g red Led image (1/4) g green Led image g blue Led image g blue Led image	Help A Topological Graph And Screen Contro Calibration Process Custor Warm up Analyze Red LEDs Analyze Green Analyze Blue Generate Coefs Save To Database Upload Coefs Save To Hardware	l jr jr
Control system: Nova Calibration Calibration Calibration Mode Thitialization Camera Settings Partition Camera Camera Partition Partition	LCT Mode:Ordinary Chroma	Cools - Language (I百言) Partition atic Calibration Mode g red Led image (1/4) g green Led image g blue Led image Pause	Help A Topological Graph And Screen Contro Calibration Process Custon Warm up Analyze Red LEDs Analyze Blue Generate Coefs Save To Database Upload Coefs Save To Hardware	
Control system: Nova Calibration Calibration Calibration Mode Initialization Camera Settings Partition Mode Camera Partition Partition	LCT Mode:Ordinary Chroma	Fools • Language (i吾言) Fools • Language (i百言) Partition atic Calibration Mode g red Led image (1/4) g green Led image g blue Led image Pause eds Target can achieve LED	Help A Topological Graph And Screen Control Calibration Process Custor Tarm up Analyze Red LEDs Analyze Green Analyze Blue Generate Coefs Save To Database Upload Coefs Save To Hardware Save To Hardware	

Fig. 4-22Pause Calibration

5) Change the target value

The user can click <u>Update Targets</u> to change the target value in target calibration interface if the calibration result is not satisfying after partition calibration. Brightness calibration, ordinary chroma calibration and multiple bin chroma are all supported. Multiple bin chroma calibration supports blue calibration which is mainly used for optimizing blue effect.

The user can input the value manually or modify the target value with auxiliary tools. Click



view gamut distribution diagram after modification.

-Correc	tMode	original Sett.	ings im se	to bettings			
	O Brig	ghtness Calibr	ation				
	🔘 Or di	inary Chroma C	alibration				
	⊖ Mult	tiple bin Chro	ma Calibra	tion			
Update	Targets	5					
		Brightness	Cx	Cy			
	Red	810.00	0.6874	0.3003			
	Green	1620.00	0.1726	0. 7359	Auxiliary		
	Blue	276.00	0.1330	0.0825			
	White	2706.00	0.3250	0.3282			
	□ C₀1	or Temperature					
	-				0 K		
	5000-	6500 9300					

Fig. 4-23Change the target value

Restore:Restore the calibration mode and target value to the value shown when the interface is opened just.

Preview: View the effect on the display after the target value has been modified.

Enable correction: this option to view the effect of the latest correction coefficient on the display.

Click Apply if the corrected target value is satisfying, and thus the system will prompts "Whether apply the corrected target value into all partitions?" Check'Yes', and thus the system will recalculate the corrected correction coefficient of partition and load the new one. Click "No", and thus the target value will only be applied into the partition needs correction.

Notice		
8	The changed target will be applied to all uncorrected partitions, whether to recompute the corrected partitions' coefficients and upload?	
	Yes No	

When the calibration of a partition is done, click "Next Partition" to calibrate the next partition. If the Caliris camera is used for calibration, change the partition and click "Image Preview" to view whether the camera faces the partition.

If there are still differences among these partitions after all partitions are calibrated, select "Eliminate the boundaries" to eliminate the differences.

4.7 Eliminate Boundaries

If there are multiple partitions, click Eliminate the boundaries > Coefficients simulation > Upload Coefs > Save to Hardware > Save to Database buttons in order. The system will eliminate the boundaries, upload the coefficients, save the parameters to the hardware and save the adjustment data to database.

Calibration Author	ize Common Settings Tools . Language (IEE) . Help
Calibration Mode Initialization Camera Settings Partition Mode Parameters Same Partition Camera Partition Camera Partition	Eliminate the boundaries of the partitions Eliminate the Coefficients Simulation Upload Coefs Save to Database
Control system: Nova	Back Nave LLT Mode: Ordinary Chrona .::

Fig. 4-24 Eliminate partition boundaries

- Eliminate the boundaries: Eliminate the brightness and Chroma non-uniformities on the boundaries between partitions.
- **Coefficients Simulation**: The software uses the calibration coefficients to restore the display effect before calibration. The restored image is called simulation image. The calibration engineer can compare the effect on the simulation image and the actual effect before calibration to see whether they are consistent.

Click **Coefficients Simulation** to enter its page, as shown below.



Fig. 4-25 Coefficients simulation

- Draw ID: Draw partition ID on the simulation image.
- Color: Indicates the display color on the screen that has been simulated.
- Mode: Indicates the mode of the simulation image. It has three modes: original color, gray and false color.
 - Original color mode: The simulation image is a color image. The color of the simulation image is the same as the display color.
 - Gray mode: The simulation image is a grayscale image in the selected display color.
 - > False color mode: Use a color to represent a brightness range.
- Upload Coefs: Upload the coefficients to the receiving cards.
- Save To Hardware: Save the coefficients to the receiving cards.
- Save to Database: Save the coefficients to the database.

5Seam Brightness Calibration

The bright/dark line on the display can be adjusted by the function of **Seam Brightness Calibration** when it is located at the splice between lamp panels or cabinets. The effect can be very remarkable if the operation is proper.

Select "Seam Brightness Calibration" as calibration mode.

Calibration Aut	horize Common Settings Tools - Language (語言) Help	
Calibration Mode	Nova Screen Calibration	
Camera Settings Partition Mode	Choose Calibration Mode © Full-screen @ Seam Brightness Calibration	
	- New Module Evaluate Uniformity	
	Ruck	
Control system: N	NovaLCT Mode:Ordinary Chroma	

Fig. 5-1The mode of Modify dark or bright lines

5.1 Initialization

Setting of Initialization is the same as pixel level calibration. Please refer to 4.1 Initialization.

Calibration	
Mode	Online
Initialization	
	IP 172, 16, 20, 47 Port: 8080 Connect Disconnect
Screen Info	Module Size
Comme	Screen Type 💿 Single Screen 📀 Combine Screen
Settings	Screen 1 Screen 128*128
Partition	Pixel Width 0 🔷 Pixel Height 0
Mode	Module size same
Partition	
	Calibration Database
	New
	File Name: New Screen-2016127180-Seam. Nspro
	File d:\Users\Administrator\Desktop\1206Test\New Directory: Screen=2016127180-Seam

Fig. 5-2 Choose Calibration Mode

5.2 Screen Info

The operation process varies with the calibration of display and can be divided into without calibration,

www.novastar.tech32

Screen calibration and Cabinet calibration. The user need to load database and pay attention to the following items in the latter two situations:

- 1) Screen Calibration, The full-screen calibration must be conducted with NovaCLB-Screen V4.0 or higher version; moreover, the size of module must be identical.
- 2) Cabinet calibration, the cabinet database must be converted to full-screen database at first.

30)		\odot	-	· 🌍	1			
Calibration	Authorize	Common Settings	Tools	Language (语言)	Help			
Calibra Mode	tion	-Calibration Info	rmation					
🚏 Initializ	ation	Without	calibration			Brightn attenuation	ess n sett	
Screen 3	Info) Screen ca	libration (No	eed to load screen	database)			
Camera Settin;	gs	Cabinet of converted	alibration (1 1 from cabine	Need to load screen t)	. databse			
Partiti Mode	on	-Seam Information						
Sertiti 🗾	ion	Seams Loca	tion Amor	ng modules		-		
		Pixel Widt	h: 32	2 🚔 Pixel H	eight:	32 🜲		
				8		Back	Next	
Control syst	em: Not Con	nected Mode:Ordina	ary Chroma					

Fig. 5-3 Screen Info

Seam Information

- Select the position of seams among two types: between cabinets or between modules (it is located between cabinets generally).
- > Fill in the number of columns and rows of each module.

Click

Mext > after setting to enter the Partition Mode.

5.3 Camera Settings

Camera need to connect normally to computer, face directly toward the subarea and take pictures normally. Camera status is shown in the figure below. Click "Next" to start partition.

Calibration Authorize Common Settings Tools - 「 」	
Calibration Mode Partition Topological Graph And Screen Con	<u>itrol</u>
Digital camera Disconnect	
Screen Info Camera Status: Canon EOS 6D Connected!	
Camera Settings	
Partition Mode	
Partition	
	KV
Back	
Control system: NovaLCT Mode:Ordinary Chroma	.::

Fig. 5-4 Camera Settings

5.4 Partition Mode

Start to modify bright and dark lines when the initialization of calibration is completed. The screen need to be divided into multiple areas with appropriate size for calibration due to the limitation of camera resolution.

Please refer to 4.3 Partition Mode for the setting of partition.

Cali	bration	Authorize	Common Settings	Tools	Language (语言)	Help		
	Calibra Mode	tion			Partition	Topological Gr	aph And Screen Con	<u>atrol</u>
F I	nitializ	ation	Partition Size Tip: Auto Parti modify.	ition to reco	mmend partitions,	and click the	e Customsize to	
	Screen	Info	Pixel Columns I Single Partitio	In 3n: 128	Pixel Singl	Rows In e Partition:	128	
5	Camera Setting	52	Vint Block Size	:: 3 * 3		Recommend	Customsize	
	Partiti Mode	on						
.	Partiti	on						

Fig. 5-5 Partition Mode

5.5 Partition

Calibration Authori	Tools Language (语言) Language (语言) Partition Topolog Modify	rical Graph And Screen Control Calibration Process
Camera Settings Partition Partition	Auto Modify Manual Trim Save To Mardware Save to Database	 Generate Coefs Upload Coefs Save To Hardware
Control system: Noval	LCT Mode:Ordinary Chroma	Back Next

Fig. 5-6Modifying bright and dark lines

1) Preparation

Before enabling auto modification, point the camera to the partition and adjust the focal length and focus ring of the camera to makes sure that the entire partition is within the viewfinder of the camera and each partition is separate. Click image preview to adjust the aperture size while using a Caliris camera.

	Calibration	Authorize	Common Settings	Tools	· Language (语言)	Relp	•
7 4	Calibra Mode Mode Initializ Screen Screen Camera Settin Node Partiti	ation Info gs ion	Auto Modi	fy (Partition y Manual Trim Save to Database Image Fr	eviews	 cal Graph And Screen Control Calibration Process Analyze Green O Generate Coefs Upload Coefs Save To Hardware Save To Database
	Control sust	en : Novel CT	Mode Ordinary Chr				Back

Fig. 5-7 Common Settings
2) Auto Modify

Auto Hodify Click and the interface shown in Fig.5-8will be displayed when start modify. Users can use the mouse to drag the four vertexes of the quadrangle to select the valid area to be calibrated. The unwanted light around the screen to be calibrated is removed.



Fig. 5-8Confirm area of display screen

3) Manual fine adjustment

(

The user can conduct manual trim if the modification result is not satisfying after auto-modification.

lick	Manual Tr	im	to	o ent	er the	fine M	Nanual Trim interface of system as shown below:
		🚽 Coeffi	cients 1	Trim			
		T					Instructions
		Tip	s: Yell	low means	select all 1	eds, while gree	en means select some leds. Region opt 📝 Colomns 📝 Rows 🚮 💽
		1		2	3	4	
						+	
		5		6	7	8	
			_			<u> </u>	
		- a		10	1.1	12	
		- 1		10		- 12	
		13	3	14	15	16	
							•
							🕅 Lock Selected 🛛 🕅 Show Wumber
		Manual	Trim				
				📝 Enabl	e modify effe	ct	
			0.800	*			↑ 1.200 1.000
							1.000

Fig. 5-9Manual trim

Operation steps of manual fine adjustment:

 a) Users can select the edge or point requiring fine adjustment by dragging mouse window or clicking the mouse. Yellow means that the whole edge is selected; green means that partial LEDs are selected.

As both directions in the window option are considered as checked in default setting, the edges in the rows and columns can be selected. If only "columns" is checked in the window option, user can only check the edge in the columns of the window.



Fig. 5-10Region option 1

2	<u>.</u>	Coeffici	ents T	rim					a da ha			1	
	ĺ	lopolog Tips	Yell	ow mean	s sel	ect all]	.eds,	while green	means select some leds.	Region opt	V Colomns	Rows	Instructions
		1		2	1	3		4					
		5		6		7		8					
. 1		9		10	1	11		12					
		13	1	14	1	15	1	16					
	ľ												
	c ⁶	lanual 1	rim									Lock Selected	Show Number
				🔽 Enal	ble mo	dify eff	ect						
		0	0.800	•					↓			▶ 1.200 1 .	000
									1.000				

Fig. 5-11 Region option 2

The edge need trimming can be selected with a single click of the mouse.

logy	s Irim								Instructions
ips: Ye	ellow means	select all le	ds, while gree	n means select some leds.	Re	gion opt	🔽 Colomns	Rows	2 2
1	2	3	4						
5	6	7	8						
9	10	11	12						
3	14	15	16						
al Trim								Lock Selected	Show Humber
	👿 Enabl	e modify effe	ct						
0.80	00 🔸							1.200	. 000
				↑ <u>1.000</u>					

Fig. 5-12 Clicking the mouse to select the edge to be adjusted

Double-click the edge to pop up the following screen, you can click or select the light spot to be trimmed. Hold Ctrl or shift key to click the mouse to select multiple spots.

- Advanced options	
Tips: Select by click or region!	-
0	-
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	21 22 23 24 25 26 27 28 29 30 31
	OK Cancel

Fig. 5-13 Select the light spots to be trimmed

After selecting the light spots, green indicates the light spots that have been selected, as shown below.

	Coeff	icients	Trim					
ſ	Topol Tij	ogy ps: Yel:	low means	sele	ct all :	leds, 1	while gree	n means select some leds. Region opt 👽 Colomns 📄 Rows 🛃 💽 💽
	1		2		3	I	4	
	5	5	6		7	I	8	
	9	,	10		11	I	12	
	1	3	14		15		16	
	Manual	l Trim						Lock Selected Show Number
			📝 Enabl	le moo	dify eff	fect		
		0.800	•					↑ 1.200 1.000

Fig. 5-14After selecting the light spots

Lock Selected: Lock the selected edge or spot.

Show number: When checked, number will be displayed on the screen.

- b) Drag the lever to fine adjust the coefficient. When checking "Enable modify effect", it indicates that trimming is conducted based on the previous correction. When not checking, it indicates that trimming is conducted based on automatic correction.
- 4) If the Modify effect is satisfactory, click _________ to save the coefficient to hardware. And

then click

to save the correction coefficient to database.

6New Module

Connect control system (NovaLCT or NovaPro) to start on-line calibration.

Select "New Module" as calibration mode and click "Next" to enter the interface of initialization.

Calibration Aut	horize Common Settings Tools Language (语言)	
Calibration Mode Initialization	Nova Screen Calibration	
Camera Settings Camera Parameters	Choose Calibration Mode Full-screen Seam Brightness Calibration New Module Evaluate Uniformity	
	Rack	
Control system: N	KovaLCT Mode:Ordinary Chroma	

Fig. 6-1 New Module

6.1 Initialization

Setting of Initialization is the same as pixel level calibration. Please refer to 4.1 Initialization.

Calibration	Online Control System
Tnitialization 🔐	IP 172, 16, 20, 47 Port: 8080 Connect Disconnect
Module Location	Module Size
Camera Settings	Screen 1 Screen 128*128
Camera Parameters	Pixel Width O A Pixel Height O
Calibration	modife 21%e 2#me
	Calibration Database
	File Name: New Screen-2016127180-Seam. Nspro
	File d:\Users\Administrator\Desktop\1206Test\New Directory: Screen-2016127180-Seam

Fig. 6-2 Initialization

6.2 Module Location

The position of the new module shall be located accurately so as to perform accurate calibration for the

new module.

1) Manual setting

If the calibration personnel knows clearly about the coordinate position of the new module, manual setting can be used to quickly set the coordinate and the module size, and click "Next" to connect to the camera.

	Salibration	Authorize		Taals	Language (语言)	Help.		
	Calibration Calibra Mode Initializ Module Locati Camera Settin Camera Camera Calibra	Authorize tion ation gs .ers tion	Common Settings Manually Start position: Module Size: Areas to be	Tools	Language (语言) e position Y 0 章 H 32 章	Auxiliary recognition (0,0): display size	:: (64, 64)	
ľ	Control syst	em: NovaLCT	Mode:Ordinary Ch	roma	K			1

Fig. 6-3Manually set the module position

2) Auxiliary recognition

If the position of the new module cannot be located accurately, click recognition; and the following steps are as follows:

Auxiliary

NovaPro does not support Auxiliary recognition, please check "Manually set the module position" to input the start position and size of Module.

	\bigcirc	~ . 🌮	. [
Calibration Authorize	Common Settings	Tools Language (语言) Help
Calibration Mode Initialization Initialization Camera Settings Camera Parameters Calibration	Manually set Start position: M Module Size: W Areas to be cap	t the module position X 0 A Y 0 A 32 A H 32 A ptured: starting coordinate	Auxiliary recognition e: (0,0); display size: (69,64)
			Back Next
Control system: NovaLCT	Mode:Ordinary Chrom	na	

Fig. 6-4 Auxiliary recognition

 a) Set the module size, click "Next", and it can be seen that the screen is divided into multiple partitions with numbers (the software defaults to conduct partition as every partition has 4x4 modules).



Fig. 6-5 Module Size information

b) Select number of the area where the new module is, then click "Next", and the screen displays the partition separately as well as the module number.

User can click "Reset the area size" to reset the amount of the module in every area, as shown in the following figure; after setting, click "Reposition", and click "OK", and the screen will display the area division after repositioning.



Fig. 6-6 Select Region



Fig. 6-7 Re-divide the area

c) Confirm the number of the new module, and click "OK".

Confirm		×	
Module No.:	1	~	\sim
📝 Show Number	1 2 3		
	Done	Cancel	$\sim O^{1}$

Fig. 6-8 Confirm Module location

6.3 Camera Settings

Camera need to connect normally to computer, face directly toward the subarea and take pictures normally. After successfully connecting camera, adjust its parameters.

Calibration Calibra	Authorize	Common Settings Too	Language (语言)	Help -
Mode Initializ Module Locati	ation Ca	mera © Digital camera Camera Status:	Partitio Industrial camera Canon EOS 6D Connected!	on Topological Graph And Screen Control
Canera Paramet	ers tion			

Fig. 6-9 Camera Connection

6.4 Camera Parameters

alibration Authori	ze Commo	on Settin	gs	Tool	s	Lani	guag	e (语言	• [)	Hel	-		
Calibration Mode	Parameter	- Adjustm	ent					Par	titi	on Topol	ogical Graph i	And Screen C	ontrol
•	© M	anual Mod	le		0 A	utomati	c M	ode				Auto Al	1
Module Location	Color	Brightn (%)	ess	Exposu	ure	Apertu	re	IS)	Auto	Saturation [60, 100]	Area [50, 150]	Check
Camera	Red	50	-	300	-	22	-	100	-	Auto			*
Settings	Green	50	-	300	-	22	•	100	-	Auto			2
Camera	Blue	50	-	300	-	22	•	100	-	Auto			2
Calibration													

No matter manual mode or automatic mode is adopted, adjust the saturation till the result reaches "Normal", and adjust the image size to "Fit".

Please refer to 4.3 Camera Settings for detailed description.

After completing setting, click "Next".

Calibration Mode	Parameter	r Adjustm anual Moo	ent de		•	Automat	ic M	Par ode	titi	ion Topol	ogical Graph .	And Screen C	ontro
Module Location	Color	Brightn (%)	less	Expos	re	Apert	ure	IS	D	Auto	Saturation [60, 100]	Area [50, 150]	Che
Camera Camera	Red	80	-	300	-	36	-	125	-	Auto	Normal (78)	Fit(72)	1
Settings	Green	28	-	200	-	36	-	100	•	Auto	Normal (87)	Fit(79)	3
Camera	Blue	45	-	200	-	36	-	100	•	Auto	Normal (73)	Fit(72)	1
Calibration													

Fig. 6-10 Camera Settings

6.5 Module Calibration

The software defaults to check "Automatic mode" and click "Start", and the software will finish the calibration to the module automatically.

User can cancel checking "Automatic mode", and manually complete the module calibration according to the calibration procedures on the right.

Calibration Authorize Common Settings Tools Language(语言) Help	.
Calibration Mode Initialization Module Location Camera Settings Initialization Calibration Coefficient	Calibration Process Thitialization Analyze Red Analyze Gree Analyze Blue
Camera Parameters Calibration Color: O Red Oreen Blue O White	 Generate Coefs Upload Coefs Save To Hardware Save To Database
Brig Enable Calibration Select All 30/100	Back

Fig. 6-11 Module calibration

7 Calibration Interruption (Searching LED position failed)

No matter full-screen calibration or module calibration, after the calibration is enabled, various problems at the site may cause led position failed leading to calibration interruption, such as screen binding, dead LED or interference light. Generally, artificial location is adopted to help solve these problems, and this section will introduce solutions for several common situation.

1) Normal binding

Normal binding means that the whole columns or rows at the edge of the screen is wrapped regularly, and the error of search appears as not enough detected columns and rows, as shown in the following figure: Solution:

- a) Check "There exists some wrapped LED light", and click "Next".
- b) The software detects four sides of the screen respectively, and the software defaults "Auto switch". User needs to pay attention to the state of the software (namely at which row or column) while observing the lights lighting up at which stage of the screen, then record which state so as to select state at the "result" and click "Next".
- c) After the four sides of the screen are detected, the software continues for calibration.

🖳 Error position analyse and process	
The searched LED ligth rows:60 The re	al LED ligth rows:64
The searched LED ligth columns:64 The re	al LED ligth columns:64
The searched led broken ratio: 146.73% The al	lowed max led broken ratio: 3%
Direction of searching LED point: 『From Lower Left to U	pper Right
	· فُرْعَاهَاهُ إِذَا وَاوَا هُ
Method	
Please see LED position diagram, and select the corresponding p	rocessing method.
Re-capture	O There exists some wrapped LED light
Seaching LED position failed, manually adjust the position	🔘 Terminate calibration, try to get image again
The error does not affect the calibration, cotinue	🗸 Modify the broken led rat 3 🖨 🛠
	next
Get the wrapped LED rows on the top	Get the wrapped LED rows on the top
Switching Mode	Switching Mode
💿 Auto Switch 💿 Manual Switch	💿 Auto Switch 💿 Manual Switch
Current Status	Current Status
● 1	○ 1 ○ 2 ○ 3
Result	Result
Which status is the first to see some	Which status is the first to see some 5
Previous New+	Previous Next

Fig. 7-1Solution for Normal binding

- 2) User considers the binding to be normal and calibration can be forced to continue.Sometimes, user considers the binding to have a little effect, then checks "The error does not affect the calibration, continue", then click "Next" to continue calibration.
- 3) Dead LED is reasonable, continue calibration

The number and location of the Dead LED detected match the actual situation, which means that the

screen actually has these Dead LEDs at these positions, and this situation is called normal Dead LED. Solutions:

- i. Check "The error does not affect the calibration, continue" and click "Next" to continue calibrating
- ii. Check "Modify the broken led ratio" and turn up the allowable dead light rate.



Fig. 7-2Dead LED is reasonable

4) Dead LED increased by failure of searching

It is the failure of point location that leads to the increasing number of dead LEDs or the offset of point location.

Solution:

a) Check "Searching LED position failed, manually adjust the position", and click "Next";

Full-Screen Calibration System User Manual

or position analyse and process	CONTRACTOR OF A DE CONTRACTOR OF A DE CONTRACTOR OF A DE CONTRACTOR A DE CONTR	
The searched LED ligth rows:128 The	e real LED ligth rows:128	
The searched LED ligth columns:134 The	e real LED ligth columns:136	
The searched led broken ratio: 41.88% The	e allowed max led broken ratio: 3‰	
Direction of searching LED point: "From Lower Right t	to Upper Left	#
and Flease see LED position diagram, and select the corresponding	g processing method.	
Re-capture	There exists some wrapped LED light	
Seaching LED position failed, manually adjust the position	on 💿 Terminate calibration, try to get image again	
The error does not affect the calibration, cotinue	🕑 Modify the broken led rat 3 🚖 🐐	
		next

Fig. 7-3 Death light rate is more than the normal range

b) Adjust the first wrongLED point on the searching direction to right position, then click "search again".

Manual adjust LED position	
Notice: Please adjust the first wrong LED point on the searching direction to right position, then click 'Searc	h
Again .	
Direction of searching LED point: "From Lower Right to Upper Left	
و بر ج ج ج ج ج ح ج ح ج ح ج ح ج ح ج ح ح ح ح	
Method	
Search direction of LED R. From Lower Right to Unner Left	
: Search Again	
Back	Next

Fig. 7-4 Search again

Search again: Conduct search again according to the current location direction and initial point;

c) After the searching is successful, continue calibration.

5) Search result differs a lot from actual situations, calibration abandoned

If the result of search differs a lot from the actual situation, for example, searching result is that there are Dead LEDs at the up side and down side of the screen, but actually, there are Dead LEDs at left and right sides, under this situation, it is suggested to abandon calibration.

6) The number of rows and columns increases in the detection result

The result of search failed is that the number of rows or columns is greater than actual situation.

Solution: This result is caused by two possibilities: one is interference light which is eliminated as the

www.novastar.tech48

solution; the other is that the resolution of sending card is inconsistent with that of graphics card, then the resolution of the sending card shall be set on LCT.

8 Evaluate Uniformity

After the calibration is completed, evaluate the uniformity before and after calibration and you can find the uniformity changes obviously.

Calibration Authorize	Common Settings Tools Language (语言)	
Calibration Mode Initialization	Nova Screen Calibration	
Camera Parameters	Choose Calibration Mode Pull-screen Seam Brightness Calibration New Module Evaluate Uniformity	
	Rack	
Control system: NovaLCT	Mode:Ordinary Chroma	

Fig. 8-1 Choose calibration mode

8.1 Initialization

It is required to connect control system and set evaluation area during initialization. The maximum evaluation area can be up to 224X150.

Calibration Authorize	Common Settings Tools Language (语言)	
Calibration Mode Initialization	Online Control System IP 172, 16, 20, 47 Port: 8080 Module Size Screen Type @ Single Screen Combine Screen	
Camera Parameters	Screen 1 Screen Resolution 128*128 Eliminate Area Tips:Display width up to 224, display height up to 150.	
	Start Column 0 🚖 Widte 128 🛓 Start Row 0 🔄 Height 128 🛓 Display	
	Back	
Control system: NovaLCT	Mode:Ordinary Chroma	

Fig. 8-2 Initialization

8.2 Camera Settings

Calibration	uthorize	Common Settings Too	Language (语言)	Relp -
Calibrati Mode	on Ca ion	mera	Partiti	on Topological Graph And Screen Contr
Camera Settings	s	🧼 Digital camera Camera Status:	Industrial camera Canon EOS 6D Connected!	Ul Sconnect
Evaluate	-			

During calibration, camera must be connected computer correctly, aimed at the partition and be able to take photos normally. It is required to choose camera type before connecting camera. Digital camera refers to Canon camera and industrial camera is HS1000. After the camera is connected, camera status

is as the figure below. Click "Next" to move on to partition mode to do the relevant camera settings. See details in <u>13.4 Camera operating skills</u>.

8.3 Camera Parameters

Calibration Authori	ize Commo	on Settin	gs	Tools	S	- Lang	guag	e (语言	•	Hel	-		
Calibration Mode	Parameter	· Adjustma anual Mod	ent		•	Lutomati	c M	Par ode	titi	on Topol	logical Graph :	And Screen C	ontrol
Camera Settings	Color	Brightn (%)	ess	Exposu	re	Apertu	re	IS)	Auto	Saturation [60, 100]	Årea [50, 150]	Check
Camera	Red	45	-	200	-	22	-	100	-	Auto	Normal (74)	Fit(58)	*
Parameters	Green	20	-	200	-	29	-	100	-	Auto	Normal (87)	Fit(73)	2
Frelnate	Blue	20	-	200	-	22	-	100	-	Auto	Normal (81)	Fit(68)	*
											Back		Next

No matter manual mode or automatic mode is adopted, adjust the saturation till the result reaches "**Normal**", and adjust the image size to "**Fit**".

Please refer to 4.3 Camera Settings for detailed description.

After completing setting, click "Next".

8.4 Uniformity Evaluation

After evaluation, you can see the parameters and visual image change obviously.



Fig. 8-3 Evaluate calibration

The closer the uniformity is to 0, the better the uniformity is. The narrower the wave peak of brightness distribution figure is, the better the uniformity is.

9Screen Data Merging

Spot calibration often encounters such situation: a large screen is applied with multiple sending cards for loading, and a video processor and a video stitching device are used between the graphics card and the sending card to connect the frames; at this moment, the display and the large screen are not in point-to-point display, and during calibration, the video process equipment needs to be skipped, and the large screen shall be divided into multiple split screen for respective calibration; and after calibration, unsmooth transition may appear at the adjacent area of the split screens, which is commonly known as layering. The full screen date merging tool is for solving this problem.

At the main interface of the software, click "Tools" \rightarrow "Full screen data merging"; after opening the tool, assume that the full screen has been divided into four regions for calibration, set 2 rows and 2 columns of split screen.

Calibration Authorize	Common Settings	wage(语言)		
Calibration Mode	Soreen Data	Merging abinet Topolog	zical Graph And Screen Con	trol
F Initialization	Screen Upda	te Targets	Calibration Process	
Screen Info	Cadinet 10	Soreen	🚺 Analyze Green	<i>"</i>
Camera Settings			🜔 Generate Coefs	
Partition Mode	Auto Modity M	anual Trim	1 Index Confe	
Pertition	Save To Hardware	to Natabase	O oproad coers	
			🜔 Save To Hardware	
			🜔 Save To Database	\mathbf{x}
			Back	t T
Control system: Not Com	nected Mode:Ordinary Chroma			
NovaCLB-ScreenMer	ge V1.2			×
Language Operati	ng Instructions		1	
Split-screen column number: Split-screen to	2 Split-scree number: opological graph	n row 2	Ok	
Tips: The righ	t key can select database	2		
	JASTA		2	
4				
	3		4	
Detection of	bright dark blocks			
Folder save	_		Select	
Current	0+0			

Fig. 9-1Full screen region data merging

Select one of the regions, click right button of the mouse \rightarrow "Select database", load the corresponding full screen database; After loading successfully, see the information related to the database; and load the full screen database corresponding to all regions according to the same procedures, as shown in the figure below.

www.novastar.tech53

NovaCLB-ScreenMerge V1.2	
Language Operating Instructions	
Split-screen 2 Split-scre column number: number: Split-screen topological graph Tips: The right key can select database	en row 2 💂 Ok
1 Col: 128, Row: 128 FileName: 0414全屏验证01.mdb	2 Col: 128, Row: 128 FileName: 0414全屏验证01.mdb
3 Col: 128, Row: 128 FileName: 0414全屏验证01.mdb	4 Col: 128, Row: 128 FileName: O414全屏验证O1.mdb
Detection of bright dark blocks	
Folder save path::	Select
Current 256*256 resolution:	Area merger

Fig. 9-2Loading the database

Click "Select" to set the storage directory for the database generated after merging.

Pay attention to whether current resolution ratio of all regions are matched to the full screen resolution or not; after confirming they are matched, click "Area merger".

If the option "Split-screen databases" is checked, four databases after merging will be generated; if the option "Entire-screen databases" is checked, one database will be generated after merging.

10 Screen to Cabinet

Full-screen converting cabinet software can switch the full-screen database into cabinet or module database according to a certain resolution. It can be switched to single database or multiple databases based on different needs.

Calibration Authorize Common Se	ettings Tools - Language (语言) - Help
Initialization	Screen Data Merging Screen To Cabinet Screen Update Targets Cabinet To Screen
Settings Settings Partition Mode Camera Parameters Partition	se Calibration Mode © Full-screen © Seam Brightness Calibration © New Module
	C Evaluate Uniformity
Control system: Not Connected Mo	de:Ordinary Chroma

Fig. 10-1 Screen to cabinet

10.1 Operation procedure



10.2 Operation instruction

This chapter will illustrate operation steps of all procedures for users in detail.

10.2.1 Import database

ase file Language (Lang.)	Operating Instructions						
Emport database	Topological graph						1
Close database	Press 'Ctrl+A' to select all cabinets	Operation instruction	Zoom: <		>	1.0 X	1/2
v 5							
Draw topological							
lution settings							
128 🗘							
y 128 🗘							
Setting							
ering mode							
uto 🔿 Manual 🔿 Import							
bering Z-shar V							
arting int Posi Upper ~							
rection:							
w/Col							
xed digit: 3 🤍							
mber of A-							
itial 1							
Mber: A01							
Number							
				v 11		p l'	_
	Cabinet Selected	completed Grid tex	t land	settings		writing failed	
et database							
Single Multiple					_		
Le path:				Upen	New	Start	

Fig. 10-2 Import Screen database

10.2.2 Draw topological graph

Set the number of rows and columns of the cabinet, and then click topological graph in the right window of the software.

Draw topological

to generate a

Note that the sum of the resolution of all rows and all columns of the cabinet shall be equal to the resolution of the screen. Therefore, under the premise that resolution of each cabinet is known, number of rows and columns of the cabinet shall be calculated accurately.

abinets					1.5				
	1	2	3	4	5	_			
• 1									
2									
3									
4									
5									
5									
C	abinet	Currently	Savin	ε, μ	Grid text	Unr	easonable	Readir	ng or
		selected	compl	eted —		set	tings	writin	ng railed
							-	Iou	

Fig. 10-3 Draw topological

10.2.3 Set resolution of each cabinet

First, select the cabinet which will be set in certain resolution, then set the resolution, and click

Setting

The cabinets can have different resolution; however, for cabinets on the same row, rows of the resolution shall be the same, and for cabinets on the same column, columns of the resolution shall be the same;

when the resolution setting is irrational, the color will appear; the sum of the resolution of all rows and all columns of the cabinet shall be equal to the resolution of the screen.

Instruction of the right-click menu of the cabinet:

Right-click on the topological graph will show two options in the right-click menu, "Partition averagely" and "Clear settings". "Partition averagely": partition the resolution of the display averagely on the drawn topological graph of the cabinet with resolution of each cabinet being the same. "Clear settings": clear the resolution and cabinet name set on the topological graph.

The following methods can be used to select the cabinet:

a) Select the first cabinet, hold down the mouse and drag according to the direction of arrow in the figure; the result is as follows:



b) Press the "Ctrl" key to conduct multiple selections; the result is as follows:





c) Select one cabinet as the start, press the "Shift" key, and then select another cabinet as the end.In this way, the rectangular area from the start cabinet to the end cabinet can be selected; the result is as follows:





d) Press "Ctrl+A" to select all cabinets and the result is as follows:



The topological graph with set resolution is shown as follows:

NovaCLB	B-ScreenToCabinet V2.0.1	_	-	_			-	
Database f	file Language (Lang.)	Operating Ins	tructions					
Topologic Colum n	cal graph	Topologica Press'Ctr cabinets	l graph 1+A' to sele	ect all		Operation is	nstruction	Zoom: < _ > 1.0 👿
Row	5		1	2	3	4	5	
Resolutio	Draw topological) 1	(25, 25)	(25, 25)	(25, 25)	(25, 25)	(28, 25)	
Colum n Row	128 * 128 * Setting	2	(25, 25)	(25, 25)	(25, 25)	(25, 25)	(28, 25)	
Aumbering Auto Numberi method: Storting	ng mode o O Manual ting Z-shar V	3	(25, 25)	(25, 25)	(25, 25)	(25, 25)	(28, 25)	
Point P Directi Row/Col number:	Posi	4	(25, 25)	(25, 25)	(25, 25)	(25, 25)	(28, 25)	
Fixed of Number digit: Initial value:	digit: 3 ▼ of A- 1 1	5	(25, 28)	(25, 28)	(25, 28)	(25, 28)	(28, 28)	
Number:	A01 Number							
		Ca	binet	Currently selected	Savir compl	eted	Grid text	Unreasonable Reading or settings writing failed
larget da O Sing	atabase 🔘 Multiple							
File pa	ath:							Open New Start
rent res	solution: 128*128							Completed 0 Failed: 0 View converting rec

Fig. 10-4 Resolution setting

10.2.4 Number the cabinet

Numbering can be automatic or manual.

1) Automatic numbering

Check "Auto", select numbering method, row/column number, number of digit, and set fixed digit and

Number

initial value, a	nd then click
------------------	---------------

💿 Auto	🔘 Manual
Numbering method: Starting Point Posi Direction: Row/Col number: Fixed digit: Number of digit: Initial value:	Z-shar Row direction Column direction Z-shape N-shape 2-shape N-shape A- 1
Number:	A01

Fig. 10-5 Select Numbering mode

Numbering method: column direction, row direction, Z-shaped, ∽-shaped, 己-shaped, N-shaped.

Row/column number: When selecting column direction and row direction, it needs to select the first row/column, the second row/column, the third row/column..., the nth row/column, and number them respectively. The following figure is the topological graph after being numbered.



Fig. 10-6 Numbering according to row, column

If Z-shaped, ∽-shaped, 己-shaped, N-shaped is selected, there is no need to select row/column number

every time. The software will number all the cabinets according to the Z-shaped, as shown in the following figure:

NovaCLB-Screen	eenToCabinet V2.0.1	-		-		-	-		
Database file	Language (Lang.) 0	perating Ins	tructions						
-Topological g	raph	Topological	l graph						
Colum 5 n	A V	Press 'Ctr cabinets	l+Å' to sele	ct all		<u>Operation i</u>	nstruction ZO	om:	▶ 1.0 🔀 📥
Row 5	*		1	2	3	4	5		
	Draw topological	▶ 1	A-001 (25, 25)	A-002 (25, 25)	A-003 (25, 25)	A-004 (25, 25)	A-005 (28, 25)		
Resolution se	ttings		,						
Colum 25 n Row 25	Setting	2	A-006 (25, 25)	A-007 (25, 25)	A-008 (25, 25)	A-009 (25, 25)	A- 010 (28, 25)		
Numbering mod Auto Numbering method:	e Manual Z-shag V	3	A-011 (25, 25)	A-012 (25, 25)	A-013 (25, 25)	A-014 (25, 25)	A-015 (28, 25)		
Starting Point Posi. Direction: Row/Col number:	Upper v	4	A-016 (25, 25)	A-017 (25, 25)	A-018 (25, 25)	A-019 (25, 25)	A-020 (28, 25)		
Fixed digit Number of digit: Initial value:	: 3 ▼ A- 1	5	A-021 (25, 28)	A-022 (25, 28)	A-023 (25, 28)	A-024 (25, 28)	A-025 (28, 28)		$\langle \vee$
Number:	A01 Number								
		Cal	pinet	Currently selected	Savin compl	g eted	Grid text	Unreasonable settings	Reading or writing failed
-Target databa	se 🔘 Multiple								
File path:								Open	New Start
Current resoluti	on: 128*128							Completed 0 Fa	iled: 0 View converting record

Fig. 10-7 Z-shaped Numbering





🖳 NovaCl	B-Scre	enToCabinet V2.0.1	a		-	-	-	-		x
Database	file	Language (Lang.) Op	erating Ins	tructions						
Topolog	ical gr	aph	Topologics	l graph						
Colum n	5		Press 'Ctu cabinets	∶l+A′ to sele	ct all		<u>Operation i</u>	<u>nstruction</u> Zo	bom: • 1.0 🔀	t
Row	5	×		1	2	3	4	5		
		Draw topological	▶ 1	A-001	A-002	A-003	A-004	A-005		
Resolut	ion set	tings		(20, 20)	(20, 20)	(20,20)	(20, 20)	(20, 23)		
Colum n Row	25 25	Setting	2	A− 010 (25, 25)	A-009 (25, 25)	A-008 (25, 25)	A-007 (25, 25)	A−006 (28, 25)		
Numberi: Au Numbe: metho	ng mode to ring d:	Manual 2-sha; ▼	3	A-011 (25, 25)	A-012 (25, 25)	A-013 (25, 25)	A-014 (25, 25)	A-015 (28, 25)		
Start Point Direc Row/C numbe:	ing Posi tion: ol r:	. Upper -	4	A-0 20 (25, 25)	A-019 (25, 25)	A-018 (25, 25)	A-017 (25, 25)	A-016 (28, 25)		
Fixed Numbe: digit Initi value	digit: r of al :	3 • A- 1	5	A-021 (25, 28)	A-022 (25, 28)	A-023 (25, 28)	A-024 (25, 28)	A-025 (28, 28)		
Numb e:	rl	A01 Number						'		
			Ca	binet	Currently selected	Savin compl	g eted	Grid text	Unreasonable Reading or settings writing failed	
Target	databas	ie								
Sir	ngle	🔘 Multiple								
File j	path:								Open New Start	
Current re	solutio	on: 128*128							Completed 0 Failed: 0 View converting reco	rd

Fig. 10-9 己-shaped Numbering



Fig. 10-10 N-shaped Numbering

Fixed digit: fixed numbering character at the beginning of the number which can be set by the user; it can

be any character, for example, A-, B-, number-, etc.

Number of digit: number of digit for the number, 1-4 digits; as shown in the following figure, the numbers of the first and second column have 2 digits; the number of the second column has one digit; the fourth column has 4 digits; and the fifth column has 3 digits.



Fig. 10-11 Set the number of digit

Initial value: it means the initial value of the digit position in a single numbering process; for example,

A-01 to A-08 can be used for the first column, and the initial value of the second column can be set as 9.

2) Manual numbering

Each time, number shall be entered manually; for example, enter the number A01, select the first cabinet,

and then click **Number** to finish the numbering of the first cabinet; then enter A02, select the

second cabinet, and then click Interest to finish the numbering of the second cabinet; and the following can be done in a similar way to finish numbering of all cabinets.

umbering mode-	
🔘 Auto	💿 Manual
Numbering method: Starting Point Posi	N-sha; 🔻 Vpper 🔻
Direction:	-
Row/Col number:	
Fixed digit:	3 👻
Number of digit: Initial value:	B- 1
Number:	A01
	Number
Double cl will add	ick, number 1 automatically

Fig. 10-12 Select Manual numbering mode

10.2.5 Set target database

There can be single target database or multiple target databases. For single target database, all cabinets or modules will be saved to one database and one database will be generated. For multiple target databases, single cabinet or module will be saved as one database, and multiple databases will be generated which are named after the number of each cabinet or module.

10.2.6 File path

In the case of saving as one single database, there are two situations. One is to save the cabinet data to

the existing database which requires clicking been to open the existing database. The other is to

save the cabinet data to a new database, which requires clicking to create a new database on some path of the computer.

In the case of saving as multiple databases, click to select the saving path of the cabinet database.

10.2.7 Switch

After completion of settings of all the options above, click

11 Screen Update Targets

If the brightness and chroma of the full screen is not satisfactory after the calibration is completed, the full-screen target value can be modified through this function.

www.novastar.tech67

The operation is as follows:

Calibrati Mode	authorize Co	mmon Settings	Tools Screen I Screen 1	Data Merging Fo Cabinet	言) Hei	1p			-
Initializat	i on	Nova	Cabinet	Update Target To Screen	s [b]	rati	on		
Camera Settings									
Partition Mode	L	Choose Cali	bration Mode						
Camera Parameter	2		 Full-screen Seam Brights New Module 	ness Calibrat	ion				
			 New module Evaluate Uni 	i formi ty					
						R	ark -	Next	
ntrol system	: Not Connecte	ed Mode:Ordi	nary Chroma						
ntrol system NovaCLB-Scree	: Not Connecte	ed Mode:Ordi	nary Chroma						
ntrol system NovaCLB-Scree nguage(语言)	: Not Connecte enSolver V2.0 Operating Ins	ed Mode:Ordi	nary Chroma						
ntrol system NovaCLB-Scree nguage(語言) Original Database	: Not Connecte enSolver V2.0 Operating Ins	ed Mode:Ordi :tructions	nary Chroma	2	4			Broswe	
ntrol system NovaCLB-Scree nguage(语言) Original Database Target Database:	: Not Connecte enSolver V2.0 Operating Ins	ed Mode:Ordi	nary Chroma	R				Broswe Broswe	
ntrol system NovaCLB-Screen nguage(语言) Original Database Target Database: -Module Size-	: Not Connect:	ed Mode:Ordi	nary Chroma	Update Ca	libration Mod	le		Broswe Broswe	
ntrol system NovaCLB-Screet nguage(语言) Original Database Target Database: —Module Size— Pixel Wid	Not Connect: enSolver V2.0 Operating Ins	ed Mode:Ordi tructions	nary Chroma	Update Cai	libration Mod	le		Broswe Broswe	
ntrol system NovaCLB-Screen nguage(语言) Driginal Database Target Database: —Module Sire- Pixel Wid	th 0	ed Mode:Ordi	nary Chroma	Update Ca ©	libration Mod Brightness Ordinary Chro	le		Broswe Broswe	
ntrol system NovaCLB-Screen nguage(语言) Driginal Database: Target Database: Module Sire- Pixel Wid	th 0	ed Mode:Ordi	nary Chroma	Update Ca © ©	libration Mod Brightness Ordinery Chro Mulitiple bir	le oma a Chroma		Broswe Broswe	
ntrol system NovaCLB-Screen nguage(语言) Original Database: Module Size- Pixel Wid I Module : Originals	th 0	ed Mode:Ordi	nary Chroma	Update Cal © © Update Tau	libration Mod Brightness Ordinary Chro Mulitiple bir rgets	le oma a Chroma		Broswe	
ntrol system NovaCLB-Scree nguage(语言) Doriginal Database Target Database: -Module Size- Pixel Wid I Module s Originals Originals	th 0 size same	ed Mode:Ordi	ht 0 *	Update Ca Update Tau	libration Mod Brightness Ordinary Chro Mulitiple bir rgets Lum	le n Cr	Су	Broswe Broswe	
ntrol system NovaCLB-Screen nguage(语言) Original Database: Module Size- Pixel Wid I Module : Originals Red	th 0 size same	ed Mode:Ordi	nary Chroma	Update Cai Update Tai Red	libration Mod Brightness Ordinary Chro Mulitiple bir rgets Lum 823.68	le oma a Chroma Cx 0.6874	Cy 0.3003	Broswe	
ntrol system NovaCLB-Screen nguage(语言) Driginal Database: Module Size- Pixel Wid I Module size- Pixel Wid I Module size- Pixel Wid I Module size- Red Green	th 0 5 size same	ed Mode:Ordi	nary Chroma	Update Ca Update Tai Red Green	libration Mod Brightness Ordinary Chro Mulitiple bir rgets Lum 823.68 1850.77	le oma a Chroma Cx 0.6874 0.1726	Cy 0.3003 0.7359	Broswe Broswe	
ntrol system NovaCLB-Screen nguage(语言) Database Database: Indule Sire- Pixel Wid I Module si Originals Red Green Blue	th 0 5 Size same	ed Mode:Ordi	nary Chroma	Update Ca Update Tau Red Green Blue	libration Mod Brightness Ordinery Chro Mulitiple bir rgets Lum 823.68 1650.77 285.55	le om a a Chrom a Cx 0.6874 0.1726 0.1330	Су 0.3003 0.7359 0.0825	Broswe Broswe	
ntrol system NovaCLB-Screen nguage(语言) Original Database: Module Sire- Pixel Wid I Module : Originals Red Green Blue Original Tar	th 0 1 Solver V2.0 Operating Ins th 0 1 Size same Lum 900,00 1800.00 1800.00 gets Lum	ed Mode:Ordi	nary Chroma	Update Cai Update Tau Red Green Blue White	libration Mod Brightness Ordinary Chro Mulitiple bir rgets Lum 823.68 1650.77 285.55 2760.00	le oma n Chroma Cx 0.6874 0.1726 0.1330 0.3235	Су 0.3003 0.7359 0.0825 0.3287	Broswe Broswe	
ntrol system NovaCLB-Screen nguage(语言) Driginal Database: Module Sire- Pixel Wid I Module : Originals Red Green Blue Original Tar, Red	: Not Connect: enSolver V2.0 Operating Ins th 0 5 size same Lum 900.00 1800.00 gets Lum 823.68	ed Mode:Ordi	nary Chroma	Update Ca Update Tar Red Green Blue White	libration Mod Brightness Ordinary Chro Mulitiple bir rgets Lum 823.68 1650.77 285.55 2760.00 Color Ten	le oma a Chroma Cx 0.6874 0.1726 0.1330 0.3235 mperature	Cy 0.3003 0.7359 0.0825 0.3267	Broswe Broswe	
ntrol system NovaCLB-Screen nguage(语言) Database Database: -Module Sire- Pixel Wid I Module : Originals Red Green Blue Original Tarr Red Green	Not Connected enSolver V2.0 Operating Ins iize same bum 900.00 1800.00 300.00 gets Lum 823.68 1850.77	ed Mode:Ordi	nary Chroma	Update Ca Update Tau Red Green Blue White	libration Mod Brightness Ordinary Chro Mulitiple bin rgets Lum 823.68 1650.77 285.55 2760.00 Color Ten	le om a a Chroma Cx 0.6874 0.1726 0.1330 0.3235 mperature	Cy 0.3003 0.7359 0.0825 0.3267	Broswe Broswe Auxiliary 5935 K	
ntrol system nguage (语言) Original Database: Module Size- Pixel Wid I Module Size- Red Green Blue Creen Ked Green	: Not Connect: enSolver V2.0 Operating Ins th 0 5 size same 200,00 1800,00 300,00 200,000 200,00000000	ed Mode:Ordi	nary Chroma	Update Ca Update Ca Update Tau Red Green Blue White	libration Mod Brightness Ordinary Chro Mulitiple bir rgets Lum 823.68 1650.77 285.55 2760.00 Color Ter 5000	le oma a Chroma Cx 0.6874 0.1726 0.1330 0.3235 mperature Pixel Widt 8500	Cy 0.3003 0.7359 0.0825 0.3267 h Pixel 9300	Broxwe Broxwe Auxiliary 5935 K Height	
ntrol system NovaCLB-Screen nguage (语言) Doriginal Database Target Database: -Module Size- Pixel Wid I Module Size- Pixel Wid I Module Size- Pixel Wid I Module Size- Pixel Wid I I Module Size- Pixel Wid I I I I I I I I I I I I I I I I I I I	: Not Connect: enSolver V2.0 Operating Ins th 0 2 size same Lum 900.00 1800.00 1800.00 gets Lum 823.68 1650.77 285.55	ed Mode:Ordi	nary Chroma	Update Ca Update Tau Red Green Blue White	libration Mod Brightness Ordinary Chro Mulitiple bir rgets Lum 823.68 1650.77 285.55 2760.00 Color Tel 5000	Le om a a Chrom a Cx 0.6874 0.1726 0.1330 0.3235 mperature Pixel Widt 6500	Cy 0.3003 0.7359 0.0825 0.3267 h Pixel 9300	Broswe Broswe Broswe Saos K Height	
ntrol system NovaCLB-Screen nguage (语言) Database Database: Module Size- Pizel Wid I Module Size- Pizel Wid I Module Size- Pizel Wid I Module Size- Pizel Wid I Red Green Blue Original Tar, Red Green Blue White	: Not Connect: enSolver V2.0 Operating Ins th 0 2 iize same yoo, 00 1800.00 300.00 gets Lum 823.68 1850.77 285.55 2760.00	ed Mode:Ordi	nary Chroma	Update Cal	libration Mod Brightness Ordinary Chro Mulitiple bir rgets Lum 823.68 1650.77 285.55 2760.00 Color Tet 5000	le oma a Chroma Cx 0.6874 0.1726 0.1330 0.3235 mperature Pixel Widt 6500	Cy 0.3003 0.7359 0.0825 0.3287 h Pixel 9300	Broswe Broswe Sroswe	

Fig. 11-1 Screen update targets

Click the first **Brosser** to import the original database, and click the second **Brosser** to set the

route of the target database.

Operations of target value modification are the same as4.2.3 Target Settings.

After the modification is completed, click

to save and apply the target value.

Click the first **Brosser** and it can be individually loaded into the database or project. After being individually loaded into the database, the colorimetric correction mode cannot be changed. After being loaded into project, the correction modes can be changed freely. The information of modules also can be

Apply

modified. Then click the second **Broswer** to set the path of the target database. The target value can be changed in the same way as the setting of "expected brightness and chroma".

After the change, click to save the target value and apply.

12 Cabinet to Screen

To upload cabinet database, upload one cabinet at a time. For a screen that is composed of many cabinets, it takes a lot of time to upload databases of all cabinets. Now, use the cabinet-to-screen tool NovaCLB-Cabinet-To-Screen to change cabinet database into a screen database, and database uploading can be completed once.

The specific operation is as follows:

1) Load cabinet databases



					Operating Instructions	language (语)
abinet Databases						
						Browser
						Delete
reen Setting	A Cubicut Cubicas		Terementer			
abinet Kows 5	Cabinet Columns 3	Y		Zoom.	•	▶ 1.00
Default	Setted	Blank	Converted	Convert	Failed	
rget Database						17
						New
						Convert
ovaCLB-CabinetToScre	en V2.0					
cabinetrostre						
					Operating Instructions	language (语言
abinet Databases	111、01签件技工信户立楼。1		N.		Operating Instructions	language (语言
abinet Databases E:\Others\MyDatabase=J E:\Others\MyDatabase=J	ALL\01箱体校正信息文档.md	lb	A		Operating Instructions	language (语] Browser
abinet Databases E: \Others\MyDatabase=J E: \Others\MyDatabase=J E: \Others\MyDatabase=J	ALL\01箱体校正信息文档.md ALL\4号箱子公共变自身.mdb ALL\9个箱体测试.mdb	b	A		Operating Instructions	language(语言 Browser Delete
abinet Databases E:\Others\MyDatabase=J E:\Others\MyDatabase=J E:\Others\MyDatabase=J :reen Setting	ALL\01箱体校正信息文档.md ALL\4号箱子公共变自身.mdb ALL\9个箱体测试.mdb	b S	AL		Operating Instructions	language(语音 Browser Delete
abinet Databases E:\Others\MyDatabase= E:\Others\MyDatabase= E:\Others\MyDatabase= creen Setting Sabinet Rows 3	ALL\01箱体校正信息文档.md ALL\4号箱子公共变自身.mdb ALL\9个箱体测试.mdb 会 Cabinet Columns 8		Topography	Zoom	Operating Instructions	language (语言 Browser Delete
abinet Databases E:\Others\MyDatabase-J E:\Others\MyDatabase-J E:\Others\MyDatabase-J creen Setting Cabinet Rows 3	ALL\01箱体校正信息文档.md ALL\4号箱子公共变自身.mdb ALL\9个箱体测试.mdb	b 3 \$	Topography	Zoom	Operating Instructions	language(语言 Browser Delete 1.00
abinet Databases E:\Others\MyDatabase- E:\Others\MyDatabase- E:\Others\MyDatabase- creen Setting Cabinet Rows 3	ALL\01箱体校正信息文档.md ALL\4号箱子公共变自身.mdb ALL\9个箱体测试.mdb Cabinet Columns 5	ab 9 3 ▲	Topography	Zoom	Operating Instructions	language(语言 Browser Delete 1.00
abinet Databases E:\Others\MyDatabase- E:\Others\MyDatabase- E:\Others\MyDatabase- creen Setting Cabinet Rows 3	ALL\01箱体校正信息文档.md ALL\4号箱子公共变自身.mdb ALL\9个箱体测试.mdb Cabinet Columns	ab 3 ★	Topography	Zoom	Operating Instructions	language(语言 Browser Delete 1.00
abinet Databases E:\Others\MyDatabase= E:\Others\MyDatabase= E:\Others\MyDatabase= reen Setting Cabinet Rows 3	ALL\01箱体校正信息文档.mdb ALL\4号箱子公共变自身.mdb ALL\9个箱体测试.mdb ① Cabinet Columns	b 9 3 ₹	Topography	Zoom	Operating Instructions	language (语言 Browser Delete 1.00
abinet Databases E:\Others\MyDatabase= E:\Others\MyDatabase= E:\Others\MyDatabase= creen Setting Cabinet Rows 3	ALL\01箱体校正信息文档.mdb ALL\4号箱子公共变自身.mdb ALL\9个箱体测试.mdb Cabinet Columns		Topography	Zoom	Operating Instructions	language (语言 Browser Delete) 1.00
abinet Databases E: \Others\MyDatabase= E: \Others\MyDatabase= E: \Others\MyDatabase= creen Setting Cabinet Rows 3	ALL\01箱体校正信息文档.md ALL\4号箱子公共变自身.mdb ALL\9个箱体测试.mdb	lb 3 T	Topography	Zoom	Operating Instructions	language(语言 Browser Delete) 1.00
abinet Databases E: \Others\MyDatabase-1 E: \Others\MyDatabase-1 E: \Others\MyDatabase-1 rreen Setting Cabinet Rows 3	ALL\01箱体校正信息文档.md ALL\4号箱子公共变自身.mdb ALL\9个箱体测试.mdb	b 3 X	Topography	Zoom	Operating Instructions	language (语言 Browser Delete) 1.00
abinet Databases E: \Others\MyDatabase- E: \Others\MyDatabase- E: \Others\MyDatabase- creen Setting Sabinet Rows 3	ALL\01箱体校正信息文档.md ALL\4号箱子公共变自身.mdb ALL\9个箱体测试.mdb	b 3 x	Topography.	Zoom	Operating Instructions	language (语言 Browser Delete) 1.00
abinet Databases E:\Others\MyDatabase- E:\Others\MyDatabase- E:\Others\MyDatabase- creen Setting Cabinet Rows 3	ALL\01箱体校正信息文档.md ALL\4号箱子公共变自身.mdb ALL\9个箱体测试.mdb		Topography.	Zoom	Operating Instructions	language(语符 Browser Delete) 1.00
abinet Databases B: \Others\MyDatabase- B: \Others\MyDatabase- B: \Others\MyDatabase- reen Setting abinet Rows 3	ALL\01箱体校正信息文档.md ALL\4号箱子公共变自身.mdb ALL\9个箱体测试.mdb	15 3 2	Topography	Zoom	Operating Instructions	language (语言 Browser Delete) 1.00
abinet Databases E: \Others\MyDatabase- E: \Others\MyDatabase- E: \Others\MyDatabase- creen Setting Cabinet Rows 3	ALL\01箱体校正信息文档.md ALL\4号箱子公共变自身.mdb ALL\9个箱体测试.mdb	ib 3 *	Topography	Zoom	Operating Instructions	language (语言 Browser Delete) 1.00
abinet Databases E: \Others\MyDatabase- E: \Others\MyDatabase- E: \Others\MyDatabase- creen Setting Cabinet Rows 3	ALL\01箱体校正信息文档.md ALL\4号箱子公共变自身.mdb ALL\9个箱体测试.mdb	ib 3 ★	Topography	Zoom	Operating Instructions	language (语言 Browser Delete 1.00
abinet Databases E:\Others\MyDatabase- E:\Others\MyDatabase- E:\Others\MyDatabase- creen Setting Cabinet Rows 3	ALL\01箱体校正信息文档.md ALL\4号箱子公共变自身.mdb ALL\9个箱体测试.mdb ① Cabinet Columns	B 3 ★	Topography	Zoom	Operating Instructions	language (语言 Browser Delete 1.00
abinet Databases E:\Others\MyDatabase= E:\Others\MyDatabase= E:\Others\MyDatabase= creen Setting Cabinet Rows 3	ALL\01箱体校正信息文档.md ALL\4号箱子公共变自身.mdb ALL\9个箱体测试.mdb ① Cabinet Columns		Topography	Zoom	Operating Instructions	language (语言 Browser Delete 1.00
abinet Databases E:\Others\MyDatabase= E:\Others\MyDatabase= E:\Others\MyDatabase= creen Setting Cabinet Rows 3	ALL\01箱体校正信息文档.md ALL\4号箱子公共变自身.mdb ALL\9个箱体测试.mdb		Topography	Zoom	Operating Instructions	language (语言 Browser Delete) 1.00
abinet Databases E:\Others\MyDatabase- E:\Others\MyDatabase- E:\Others\MyDatabase- creen Setting Cabinet Rows 3	ALL\01箱体校正信息文档.md ALL\4号箱子公共变自身.mdb ALL\9个箱体测试.mdb	b 3 x	Topography	Zoom	Operating Instructions	language (语言 Browser Delete) 1.00
abinet Databases E:\Others\MyDatabase= E:\Others\MyDatabase= E:\Others\MyDatabase= cabinet Rows 3	ALL\01箱体校正信息文档.md ALL\4号箱子公共变自身.mdb ALL\9个箱体测试.mdb	b 3 x	Topography	Zoom	Operating Instructions	language (语) Drowser Delete) 1.00
abinet Databases E:\Others\WyDatabase- E:\Others\WyDatabase- E:\Others\WyDatabase- creen Setting Cabinet Rows 3	ALL\01箱体校正信息文档.md ALL\4号箱子公共变自身.mdb ALL\9个箱体测试.mdb		Topography	Zoom	Operating Instructions	language (语) Drowser Delete , 1.00
abinet Databases E: \Others\MyDatabase- E: \Others\MyDatabase- E: \Others\MyDatabase- creen Setting abinet Rows 3	ALL\01箱体校正信息文档.md ALL\4号箱子公共变自身.mdb ALL\9个箱体测试.mdb	b 3 *	Topography	Zoom	Operating Instructions	language(语辞 Browser Delete) 1.00
abinet Databases E:\Others\MyDatabase- E:\Others\MyDatabase- E:\Others\MyDatabase- creen Setting Cabinet Rows 3	ALL\01箱体校正信息文档.md ALL\4号箱子公共变自身.mdb ALL\9个箱体测试.mdb Cabinet Columns Setted	b 3 *	Topography	Zoom Zoom	Operating Instructions	Language (iFi) Browser Delete 1.00
abinet Databases E:\Others\MyDatabase= E:\Others\MyDatabase= E:\Others\MyDatabase= creen Setting Cabinet Rows 3 Default arget Database	ALL\01箱体校正信息文档.md ALL\4号箱子公共变自身.mdb ALL\9个箱体测试.mdb Cabinet Columns	b 3 *	Topography Converted	Zoom	Operating Instructions	language (语言 Delete) 1.00
abinet Databases E:\Others\MyDatabases E:\Others\MyDatabases E:\Others\MyDatabases Creen Setting Cabinet Rows 3 Default arget Database	ALL\01箱体校正信息文档.md ALL\4号箱子公共变自身.mdb ALL\9个箱体测试.mdb Cabinet Columns	b 3 *	Topography Converted	Zoom	Operating Instructions	Language(语言 Delete) 1.00

Fig. 12-1Load Cabinet Databases

2) Topography

:\Other :\Other :\Other	s\MyDatabas s\MyDatabas s\MyDatabas	e-ALL\4号: e-ALL\4号: e-ALL\9个:	副本代(正)言 箱子公共3 箱体测试。	≡思乂怕→ 变自身.m .mdb	db						Browser Delete
een Set	ting										
abinet I	lows 3	-	Cabinet	Columns	3	÷	Topography		Zoom	•	▶ 1.00
	1	2	:	3							
1											
	-										
2											
3											
											• T
	Default		Setted			Blank	Con	erted	Convert F	ailed	

Fig. 12-2 Topography

3) Setting Cabinet ID

Double click a cabinet on the topology and enter its ID (for viewing onsite). Cabinet ID should be manually entered.

To set a position of the screen black, double-click this position, check "set black", and enter the pixel row and column number.
Full-Screen Calibration System User Manual

1 .						Operati	ng Instructions	language (语言
abinet Databases R:\Others\MwDetebes	。	自文档 mdb						P
E:\Others\MyDatabas	se-ALL\4号箱子公共变	<u>(</u> 自身. mdb						Drowser
E:\Others\MyDatabas	se-ALL\9个箱体测试.m	ndb						Delete
reen Setting								
abinet Rows 3	Cabinet Co	olumns 3	-	Topogr aphy		Zoom		1.00
1	2 3							
• 1								
			Setting Cabir	iet	×	Ŋ		
						ו		
2			Cabinet ID	3	Set Blank			
-								
				OK	Cancel			
						J		
3								
Defen3 *	S.44.3		Plank	Converted		onwert Reiled		
Derault	Setted		DIANK	Converted	L L	onvert railed		
rget Database								New

Fig. 12-3 Setting Cabinet

Cabinet Databases				
E:\Others\MyDatabase-ALL\O E:\Others\MyDatabase-ALL\4 E:\Others\MyDatabase-ALL\9	1箱体校正信息文档.mdb 号箱子公共变自身.mdb 个箱体测试.mdb	XP,		Browser Delete
-Screen Setting Cabinet Rows 3	Cabinet Columns 3	Topography	Zoom ∢	 <u>۱</u>
1 2 1 3 (128,96) (1 2 6 (128,96) 7 3 7 (128,96)	3 5 2 (128,128) 9 Setting Cabinet Cabinet ID Blank Co 1 Blank Rows 9	Set Blank 28 36 OK Cancel		
Default Target Database	Setted	Blank Converted	Convert Failed	

Fig. 12-4 Set Black

•	NovaCLB-C	CabinetToScre	en V2.0		22	1 BORN	2.4	41-4	2 -	1		×
	Cabinet Da	itabases							Operating Instr	uctions	language (语言	D
	E:\Others	s\MyDatabase=/	LL\01箱体校正	信息文档.mdb							Browser	
	E:\Other: E:\Other:	s\MyDatabase=/	UI\4号箱子公井 UI\9个箱体测ii	t变自身.mdb t.mdb							Delete	
	Screen Set	ting		····								
	Cabinet R	iows 3	🚔 Cabinet	Columns 3	×	Topography		Zoom	•		▶ 1.00	
		1	2	3								
		3	5	2								
		(128, 96)	(128, 96)	(128, 128)								
	▶ 2	6 (128.96)	Blank (128.96)	1 (128, 128)								
		(120, 30)	(120, 50)	(120, 120)								
		7	8	3								
	3	(128,96)	(128, 96)	(128, 128)								
	_											
											* J	
		Default	Sette	4	Blank	Conv	erted	Convert Fa	ailed			
	Target Dat	abase									New	
											Convert	

Fig. 12-5 Setting back is over

4) Create a target database, that is, a full-screen database.

NovaCLB-CabinetToScreen V2	2.0		E ana J	
Cabinet Databases			Operating Instruction	ns language(语言)
E:\Others\MyDatabase=ALL\01 E:\Others\MyDatabase=ALL\45	箱体校正信息文档.mdb B箱子公共变白身 mdb			Browser
E:\Others\MyDatabase=ALL\9	个箱体测试.mdb			Delete
Screen Setting				
Cabinet Rows 3	Cabinet Columns 3	Topography	Zoom 🕢	• 1.00
1 2	5 2			
(128, 96) (1	28, 96) (128, 128)			
▶ 2 (128, 96) (11	81 ank 1 28, 96) (128, 128)			
3 7 (128, 96) (1:	8 3 28, 96) (128, 128)			
Default	Setted	Blank Converted	Convert Failed	
Target Database E:\Others\MyDatabase-ALL\	df. mdb			New Convert

Fig. 12-6 Create a target database

5) Click "Convert" to convert the cabinet database into a full-screen database.

Full-Screen Calibration System User Manual

reen Set abinet R	ting ows 3	≑ Cabine	t Columns 3	A.	Topogr aphy		Zoom	*	1.00	
1	1	2	3							
2	6 (128, 96)	Blank (128, 96)	(128	Current o	conversion box: 3					
3	7 (128, 96)	8 (128, 96)	(128, 128)			Ca	ncel			



	1	Cabinet	Columns 3	T	Topography	Zoom	•	•
1	3 (128, 96)	5 (128, 96)	2 (128, 128)					
▶ 2	6 (128, 96)	Blank (128, 96)	1 (128, 128)					
3	7 (128, 96)	8 (128, 96)	3 (128, 128)					

Fig. 12-8Conversion is over

13 NovaCLB-Screen Help

13.1 Network Settings

If the distance between the calibration computer and the NovaLCT or NovaPro control computer is within 100m when performing calibration, Ethernet cables can be used to connect the two computers. Otherwise, wireless routers should be used.

Here the wireless router in the figure below will be taken as an example to introduce how to set and use a wireless router.



Fig. 13-1 Wireless router

1) Connect the wireless router to the control computer through network cable into the yellow interface.



Fig. 13-2 Ports for Connection

2) Enable the wireless networking capabilities of calibration computer to connect to wireless router. Note: whether using network cable or wireless router, you need to set the IP of the two computers and the default IP of wireless while calibrating with NovaLCT.And you need to set the IP of calibration computer, NovaPro, and the default IP of wireless when calibrating with NovaPro.

You need to set the IP of the two computers and the default IP of wireless router to be within the network segment.

	Local Area Connection Properties	Internet Protocol (TCP/IP) Properties
Disable Status Repair Bridge Connections Create Shortcut	General Advanced Connect using: Image: Configure Image: Connection uses the following items: Configure This connection uses the following items: Image: Configure Image: Context of Microsoft Networks Image: Context of Microsoft Networks Image: Context of Microsoft Networks Image: Context of Microsoft Networks Image: Context of Microsoft Networks Image: Context of Microsoft Networks Image: Context of Microsoft Networks Image: Context of Microsoft Networks Image: Context of Microsoft Networks Image: Context of Microsoft Networks Image: Context of Microsoft Networks Image: Context of Microsoft Networks Image: Context of Microsoft Networks Image: Context of Microsoft Networks Image: Context of Microsoft Networks	General You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings. Obtain an IP address automatically Obtain an IP address automatically Obtain an IP address: IP address: IP address: IP address: ISSUINE mask: ISSUINE mask
Delete Rename Properties	Install Universal Properties Description Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks. ✓ ✓ Show icon in notification area when connected ✓ ✓ Notify me when this connection has limited or no connectivity OK Cancel	Obtain DNS server address automatically Obtain DNS server addresses: Preferred DNS server: Atemate DNS server: Cancel

Fig. 13-3 IP Configurations

13.2 LCT Monitor Settings

Ensure that network is normal. Then users need to open NovaLCT-Mars, and choose advanced users. The password is **admin**, as shown in fig. 13-4

System(S) Settings (C) Tools(T)	Plug-in (P) User(U) Language(L)	Help(H)
🔤 🔆		
Screen Configuration Brightness C	Calibration Screen Control Monitoring	Multi-function Card Test Tool
- Local System Information	IN	
Control System 1	Other Device Unknown	View Details of Device
Monitor Information		
	<u>12</u>	
	•	
Service Status: Service version:3.1		

Fig. 13-4 LCT Main Interface

After loading by advanced user, calibration options will appear on NovaLCT-Mars toolbar. Click into the calibration page.

System(S) Settings	(C) Tools(T)	Plug-in (P)	User(U) La	inguage(L)	Help(H)		
	<u>.</u>		~	$\sim \sim$		~~~	
Screen Configuration	Brightness	Calibration	Screen Control	Monitoring	Multi-function Card	Test Tool	Ŧ
-Local System Informatio	n						
Control System	1	Other Devi	ce O	V	iew Details of Device		
Monitor Information							
			P				
•			•				
		1					
Service Status: Service v	ersion:3.1					$\overline{\mathbf{x}}$.::

Fig. 13-5Calibration Page

After getting into the calibration page, please check the network settings to make sure network is normal and then click "Reconnect". The message of "Listening succeed" shown in the following message window indicates that calibration service has been activated. If not, please check the network.

🖳 Screen Calibration	
Current operation communication —	Online Calibration Offline Calibration Manage Coefficients
COM4 •	Network Setting Port 8080 Reconnect
Current Screen	Calibration Mode
Screen1	Coefficient Uploading Mode: Fast Upload
	Communication Log
Screen2	11149/17 Listering Succeeds

Fig. 13-6Enter into Calibration Mode

13.3 Principle of Brightness and Color Calibration

Generally speaking, it is recommended that users select brightness and color calibration mode. Higher uniformity can be obtained. For some customers demanding more colorful and brighter, they can choose brightness calibration only.

Brightness calibration: Brightness calibration is to adjust the brightness of LED lights to improve the brightness uniformity. In the brightness calibration, brightness of most lights will be properly lowered. Fig.13-7 shows an example of brightness adjustment of green LED lights, in which there are two brightness distribution curves corresponding to before and after calibration (adjustment) respectively. Before calibration, the brightness values of green LED lights are scattered between 2400 – 3300 cd/m², but after calibration those are concentrated almost at2500 cd/m², representing high brightness uniformity.



Fig. 13-7Brightness Values Distribution Before and After Calibration

Brightness and color calibration: Brightness and color calibration is based on the theory of RGB color match. It adjusts the coordinates of LED lights in the RGB color coordinate system to reduce the color diversity. As shown in Fig.13-8, the large triangle is the gamut of a LED display before calibration , while the small one is the gamut of same LED display after calibration. The R, G and B color coordinates of LED lights scatter in relative large areas when before corrected while those after calibration are concentrated, which represents high color uniformity.



Fig. 13-8Gamut of A LED Display Before and After Calibration

Note:When performing the brightness and color calibration, proper coordinates for R, G and B should be chosen in order to avoid color distortion.

13.4 Camera Operating Skills

Digital Camera:

- a) Connect the camera to the computer through USB. Set the camera to "ON".Click "Connect to camera." After "Connected" is displayed, the camera will be automatically controlled by the software.
- b) Set the mode dial to "M" (manually) and lens focus if to "MF" (manual focus). If the lens

supports the anti-shake function ("OS" on Sigma cameras), set to "OFF."

Switch between the viewfinder and LCD: Enable "Live view shoot" in the "MENU" of the camera and c)

to switch between the viewfinder and LCD.

Tip: When LCD framing is enabled, users can press

times of the original size, and ten times of the original size for images

Caliris Camera:

- a) Connect the camera to the power supply and use a USB cable to connect the camera to the computer. Please make sure that the indicator on the camera turns green.
- b) Click "Image Preview" on the software to view the image collected by the camera in real time.
- c) Adjust the focal length and focus ring to make the image larger than the red box in the image preview window. If the image is too bright, adjust the aperture to decrease its size.

Adjustment of the Camera Saturation:

Click "Analyze." The software automatically calculates the saturation. Adjust the aperture size, time of exposure and calibration brightness value to enable the saturation to be normal. The saturation value ranging from 60 to 100 is normal, and the area value ranging from 50 to 150 is fit. The adjustment principle is as follows: the adjustment must be conducted in the following order: aperture size > time of exposure > calibration brightness value. Generally, the aperture value is inversely proportional to the saturation, and the time of exposure and brightness are directly proportional to the saturation.

Mode Initializat	n Par	ameter O Ma	Adjustm inual Mod	ent le		• A	lutomat	ic Me	Par ode	titi	on Topol	ogical Graph /	And Screen C	ontrol
Module Location	C	olor	Brightn (%)	ess	Expos	ure	Apert	ure	IS	0	Auto	Saturation [60, 100]	Area [50, 150]	Chec
Camera		Red	50	-	300	-	22	-	100	-	Auto			Ŕ
Settings Settings	Ga	reen	50	-	300	-	22	-	100	-	Auto			Ŕ
Camera	В	lue	50	-	300	-	22	-	100	-	Auto			2
Calibrati	n													

Fig.13-9Camera Parameters Adjustment

13.5 Subarea Imaging Operating Skills

During the calibration for large screens, point the camera toward the partition to be calibrated and adjust the focal length to make sure the partition is in the viewfinder. You can view the partition through the LCD while using a digital camera, or through the image preview function while using a Caliris camera.

Because of the outer part of the lens decreases in imaging quality, the direction of the camera should be adjusted to ensure the subarea image is at the central part of the whole image. And the size of the subarea image should be about 4/5 of the whole image size. That is to leave 1/10 of the whole image at sides, as shown in Fig 13-10.



Fig. 13-10Imaging of A Subarea

For factory calibration, it is not recommended to use the maximum lens focus length. Because the pixel size is less than the supported maximum subarea size, the suitable focus length is that makes the cabinet view center is at the center of the whole view.Length and width are half of the length and width of imaging of a subarea, i.e., reserve 1/5 for top, bottom, left and right respectively.

13.6 Steps to Check Calibration Effects

It may occur unsatisfactory calibration effects in some areas of screen after calibration, then troubleshoot according to calibration effect is needed. Before checking, users should know how to check"Camera Image Collection".

Click magnifying glass icon ² in Partition calibration page, then measurement image page appears. First, observe the image resolution and integrity, second, observe whether all led points have been selected. As shown in Fig.13-11:



Fig. 13-11View of Collection Images

Screen fuzzy phenomenon1: there appears some bright or dark lines in vertical direction between subareas.

Analysis: Generally speaking, it is because of poor quality of imaging, users may check whether LED image clear or not on "Camera Image Collection". Generally both Oversize resolution when partition setting and not clear focus when the imaging may lead poor quality of imaging.

Screen fuzzy phenomenon2: there appears water ripples in subareas

Analysis: Generally speaking, it is because of inadequate sampling. Show red, green and blue image on LED screen after calibration to find out undesirables color. Slightly adjust the focus or re-focus, then repeat the calibration of the color, you can solve the problem.

Moreover, some scene reasons may also lead unsatisfactory, for example, outside light interference, lens jitter by site windy and imaging fuzzy by rain and snow. In order to reach the most ideal effect, engineers need to avoid these influences of external environment.

13.7 Water Ripple in Full-Screen Calibration

Full-screen calibration may appear full screen of a color rendering water ripple, blue share the highest frequency. This is due to that the display resolution is too large, and the relative lack of camera resolution leads the low sampling frequency. It is known as moiré patterns phenomenon in optical imaging. Try below resolutions to solve this problem, and then collect R/G/B again.

- 1) Change camera angle. Rotate camera lightly to change its angle to eliminate or reduce the existing moiré patterns.
- 2) Change camera position. Move camera up or down or left or right to reduce moiré patterns.
- 3) Change camera focusing. Too clear focus and details may cause moiré patterns, please adjust camera aperture to reduce camera focus Clarity, furthermore to reduce moiré patterns.

- 4) Change camera lens. Try different focus length to reduce or eliminate moiré patterns.
- 5) Try to divide the full screen into several parts to perform calibration when performing full screen correction. The reduction of imaging points can help eliminate Moiré Effect.

Document Version Release Date Software Version V1.0.0 2012-09-25 First Release V2.0.0 2012-12-19 NovaCLB-ScreenV1.9.0 V2.2.0 2013-09-06 NovaCLB-ScreenV2.0.0 V3.1.0 2014-03-07 NovaCLB-ScreenV3.1.0 V3.2.0 2014-04-08 NovaCLB-ScreenV3.2.0 V3.3.1 2015-01-26 NovaCLB-ScreenV3.3.1 V3.4.0 2015-04-21 NovaCLB-ScreenV3.4.0 V4.0.0 2015-09-22 NovaCLB-ScreenV4.0.0 V5.0.0 2016-12-14 NovaCLB-ScreenV5.0.0 V5.1.0 2018-04-20 NovaCLB-Screen V5.1.0 V5.1.1 2019-03-01 NovaCLB-Screen V5.1.1 IANNOVASTA

14 Release Notes