

NovaCLB-Cabinet

Cabinet Calibration System

V4.1.2 NS140100055



User Manual

Statement

Dear users,

Welcome to use NovaCLB, a pixel-by-pixel calibration system of cabinet. It is our great pleasure to offer this manual to help you understand and use the product. We have striven for precision and reliability during the compilation of this manual. The contents of this manual are subject to change without notice. If you have any problem in use or you have any suggestion, please feel free to contact us according to the contact information provided in this manual. We will do our utmost to satisfy your needs. We would like to express our sincere thanks to your suggestions and make assessment for adoption as soon as possible.

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Definitions of document identifiers

	NOTE: Information that requires special consideration.
() I	TIP: Advice or prompt for users.

Contents

1	C	Over	rview	1
2	C	Calik	bration Preparation	1
	2.1		Laying out calibration darkroom	1
	2.2		Locating the cabinet	3
3	N	lova	aLCT-Mars Preparation	4
	3.1		Selecting appropriate calibration methods	9
4	c	Cabi	inet Calibration	. 10
	4.1		Calibration of first cabinet	11
	4	.1.1	Calibration preparations	11
	4	.1.2	2 Configuration of measuring instruments	. 19
	4	.1.3	3 Calibration target	. 24
	4	.1.4	Calibration	. 41
	4.2		Calibration of subsequent cabinets	. 54
	4.3		Identification of simulation diagram	. 58
	4.4		Method to view simulation diagram	. 59
	4.5		Cases of the identification of simulation diagram	. 63
5	C	Calik	bration of Newly-installed Modules	. 68
	5.1		Preparations	. 69
	5	5.1.1	Configuration of information database	. 69
	5	5.1.2	2 Cabinet control	. 71
	5.2		Camera	. 74
	5.3		Module calibration	. 75
6	ι	Jplo	pading Coefficients (factory use)	. 76
7	c	Cabi	inet Database Division	. 79
	7.1		Operating procedure	. 79
	7.2		Procedure demonstration	. 80

8	C	abinet to Screen	83
9	Α	uthorization	89
10)	Precautions	90
	10.1	1 Precautions for database and batch management	90
	10.2	2 Precautions for calibration process	91
	10.3	3 Precautions for calibration results detection	91
	10.4	4 Operating skills of camera	92
	10.5	5 Precautions for use of camera	94
	10.6	6 Precautions for saving database	94
11	I	Troubleshooting	94
12	2	Document Version Description	95

1 Overview

NovaCLB-Cabinet is a cabinet calibration software used in conjunction with M3 series of NovaStar. This application software is specialized in providing a whole solution for cabinet calibration of LED displays, which is used for calibration of regular cabinets before leaving factory, calibration of old cabinets, calibration of rental cabinets and so on. Calibration is capable of significantly improving the uniformity of LED display and eliminating the differences among cabinets as well as the border lines of cabinets.

2 Calibration Preparation

2.1 Laying out calibration darkroom

- Calibration darkroom is required to be sealed and not be disrupted by external light. Meanwhile, the darkroom shall be covered with low-reflectance black materials on the surroundings to reduce the reflected light.
- 2) Darkroom width: 3 m (suggested); length: camera calibration distance.

The camera calibration distance mainly depends on the pixel pitch and LED cabinet resolution (namely the cabinet size).

The colorimeter measuring distance is the same as the camera calibration distance by default.

The software automatically reads the cabinet resolution. You only need to enter the pixel pitch next to **Led Spacing** on the **Cabinet Paras** page and the calibration distance (**Distance**) can be calculated directly.

<u> </u>		
Preparation 🕱	Environmental Parameters	
Database	Led Spacing: 10 mm	
Cabinet Control	Distance: 19.2 m Tip: Recommended:0.0m-0.0m	
Cabinet Paras	Information	
Calibration Paras	Led Arrangement: Three Four Other	
Measurement Tool ≫	Screen Type	
Correct target 💝	Kegular Screen	
Calibration 🛛		
Tools 🛛 🕹		
Authorization lock\$		
Language (语言) 🗴		
中文(zh-CN)	- (
English (en)	G	
한국어 (ko-KR)	Back Next	
×		

With consideration of space reserved for the computer, camera and personnel activities, the maximum distance of darkroom shall be added by 2–3 m;

Pixel Pitch (mm)	Cabinet Width/Height (mm)	Camera Calibration Distance Range (m)	Recommended Calibration Distance (m)
10	128	7.4~18.4	12.9
7.5	160	6.9~17.2	12.05
6.66	144	5.5~13.8	9.65
3.9	256	5.8~14.3	10.05
2.54	135	3.8~9.4	6.6
1.25	480	3.5~8.6	6.05
0.83	540	2.6~6.5	4.55

Table. 2-1 Recommend calibration distance for some common cabinets

- 3) Distance of calibration should be more than 20m, and draw a scale on the ground with paint to locate calibration distance.
- 4) Install hygrometer thermometer to track the changes of temperature and humidity. Calibration darkroom should be equipped with an air conditioner. Turned on the air conditioner half an hour

before each calibration and adjust the temperature and humidity to specified values. When calibrating cabinets of the same batch, the temperature fluctuation shall be no more than 2° C.

- 5) Fully aging all cabinets before calibration, it is not recommended for calibrating the cabinets with different aging time.
- 6) During the calibration, the position of the cabinet and calibration instrument must be fixed, and the cabinet must be placed on a chassis to prevent it from being affected by the light reflected from the ground.
- 7) Suitable cabinet handling processes to avoid long time delay in cabinet replacement.
- 8) Equipped with high-performance computer to improve the calibration efficiency.

2.2 Locating the cabinet

- 1) A slot is recommended to be equipped on the chassis to fix the cabinet.
- 2) The outer surface of the chassis should be made of material with low reflectivity.
- 3) Front surface of the cabinet should be paralleled to or slightly extend from the chassis to prevent chassis from blocking LED on cabinet surface when sampling; (see the figure below)



Fig. 2-1 Surface of the cabinet extends from the chassis.

4) Chassis height is approximately 0.5m, slightly higher than the minimum tripod height;



Fig. 2-2 Chassis height is slightly higher than the height of tripod (no elevation on site, generally used for indoor

screens)

 If condition allows, chassis can be designed to support retroversion cabinet placement, in order to simulate the elevation from on-site view;



Fig. 2-3 Cabinet tilted to simulate elevator (There is elevator on site, generally used for outdoor screen)

6) Moving the position of camera and chassis is strictly prohibited during calibration.

1.	Moving camera, turning the camera focal length and other operations are
	strictly prohibited during the calibration.
2.	Each cabinet must be placed in the same position during calibration.
	draw lines along both sides of the contact between the cabinet and the
	chassis after the location of the first cabinet is determined in order to
	determine the location of subsequent cabinets. Consistent tilt angle for each
	cabinet must be ensured for cabinet tilt calibration.

3 NovaLCT-Mars Preparation

Run NovaLCT-Mars on the control computer, turn on the cabinets normally and set some general settings. Critical steps and precautions will be introduced through the following graphical representation. See *Nova M3 Series Control System User Manual* for the detailed steps of cabinets settings.

1) Logging in the advanced user page

System(S) Settings (C) Tools(T) Plug-in (<u>P</u>) Use	er(<u>U</u>) Language(<u>L</u>)	Help(<u>H</u>)	
		Advanced Synchrono	us System UserLogin(<u>A</u>)	
		Enter demonstration	mode(<u>E)</u>	
Brightness Screen Control Mor	nitorina Multi-fu	Media Player Login(T)	
Local System Information			,	
Control System 0	Other Device	0	View Details of Device	
Monitor Information				
<u> </u>	0	· ·	Ŭ	
Sonico Status: Sonico vorcion:2.1				
Service Status. Service version.s. i				.::
	User Login		×	
		admin		
	Password	*****		
	Login	Cancel		

Fig. 3-1 Logging in the advanced user page of NovaLCT-Mars

2) Setting parameters of sending card

system(s) Setting:	s (C) Tools(T)) Plug-in (P)	User(U) La	inguage(L) I	Help(H)	
Screen Configuration	Brightness	Calibration S	creen Control	Monitoring	Multi-function Card	Test Tool
Local System Informat	tion	C				
Control System	0	Other Device	0	<u>Vie</u>	w Details of Device	
Monitor Information						
						lı
Service Status: Service	version:3.1					
	Screen Confi - Select Com	guration munication Port			—	
	Screen Confi - Select Comi Current Op	guration munication Port eratio COM6			•	
	Screen Confi Select Com Current Op	guration munication Port eratio COM6 rre Screen onfig			Browse	

🖷 Screen Config-COM5
Sending Board Scan Board Screen Connection
Display Mode Sending board resolution and graphics output resolution must be consistent Current Display Mode Sending Board 1440 x 900 Graphics output 1440 x 900 Refresh
Set the sending board display mode
Resolution: 1440 x 900 px 🗸 🖾 Custom: 1440 🛧 x 900 🛧
Refresh Rate: 60 Hz
Hot Backup Setting
Master Device Slave Device
Master Sending Board Index Master Port Index Slave Sending Board Index Slave Port Index
Refresh Send Add Edit Delete
HDMI Settings
Auto Select
Audio Input S Evternal
Bit Of Input S 12 Bit Send Resresh
Factory Restore Save Config File Save Close

Fig. 3-2 Setting parameters of sending card

- 3) Start LED display(referring to Nova M3 Series Control System User Manual)
- 4) Setting performance parameters of receiving card.

reen Configuration	-COM6	nection		_	-	
Module Information						
Chip:	MBI5036 S	ize:	32W×16H	Scanning Type	1/2 scan	
Direction:	Horizontal D	ecoding Type)	74HC138 Decoding	Data Groups	8	>>
Cabinet Information	n					
Regular			💿 Irregul	ar		
Width (Pixel)	128 🚔 <=	1061 Pl	ease 🔺 Width:	?? Height:	??	Please
Height (Pixel)	32 🌲 <=:	32 make	esure theLoadii	ng error. Please try to a	djust pe	make sure 🔲
Modulo Cocc	From right to left	widt	hand htof		Cohinot	and height
Module Odde	. To in fight to fold				oubilier	
Performance Settin	igs					
Data Group E	More Settings					~
Refresh Rate	480 🔻	Hz	Refresh Rate Ti 4	•		
Grayscale level	Normally bright 👻		Grayscale Mode	efreshing rate firs 👻		
Shift Clock Fre	125 💌	MHz	B Duty cycle	rightness first	25~75) %	
Dhasa Daaiiisa			Low Gravecale C	rayscale first		
Phase Position	2 🗸			erformance balancing		
Row Blanking	25 🚔	(=2.00us)	Ghost Control En 20		1~24)	
Line Changing	3 🚔	(0~19)				
Brightness Effi	69.14%		Minimum OE wid 6	64 ns		
Smart Settings		Load from	File Receiving car	Save to File Read	from ReS	end to Recei
			2	Save	to factoryR	estore factor
			Save	System Con	Save	Close

Fig. 3-3 Setting performance parameters



5) Configuring LED display.

Screen Configuration-COM6	
Screen1	Quantity o 1 Configur
Screen Type: ◎ Simple Screen Coordinat <u>X:</u> 0 <u>Y:</u> 0	Standard Screen Ormplex Screen Virtual Mo Enable
Port for Operation Sending Card Number 1 Ethernet port No. 1 2 Connect to d Receiving Card Size Width: 128 * Height: 128 * Set Blank Apply to the Curren	Columns 1 Rows 1 ResetAll Hided 1 Sending Card:1 Port.1 Receiving Card:1 Width:128 E
Detect Communicat	Open Mapping Load from File Save to File Read from HW Send to HW
Restore Factory S	Save System Con Save Close

Fig. 3-4 Display configuration

6) Starting calibration

As shown in the following figure, prompt "Enable network monitoring successfully" indicates that online calibration succeeded.

System(S) Settings (C)	Tools(T) Plug-in (P)	User(U) Language(I	.) Help(H)	
Screen Configuration		Control Manitor	ng Multi-function Card	
- Local System Information -				Cloud Monitoring
Control System 1	Other Device	e 0	View Details of Device	
Manitau Information				
wonitor mormation				
la de la dela dela dela dela dela dela d				
•				
	·	·		
Ocuries Obstanting Ocuries and	i0.4			
Service Status: Service vers	sion:3.1			

Screen Calibration		
Single-Screen Mode Combined-Sc	Online Calibration Offline Calibration Manage Coefficients Double calibration coefficients	
Current Operation Communication Port COM6	Network Setting Local IP 172.16.3.218 - Port 8080 Reconnect	
Current Screen	Communication Information	
Screen1	10:32:23 Enable network monitoring successfully	



3.1 Selecting appropriate calibration methods

1) Select different calibration modes according to different conditions of cabinet.

If calibrating a whole cabinet, select Cabinet Calibration mode.

If the cabinet has new modules which have replaced the old or broken ones, select New Module Calibration to calibrate newly replaced modules only.

- 2) Select different measuring modes according to the difference of cabinet types:
- Single measurement mode of colorimeter (light gun): This mode requires only using once colorimeter for auxiliary calibration before calibration. The requirement of accuracy is not high. So ordinary colorimeter is acceptable. This mode supports the calibration of cabinets in most occasions. All the cabinets produced in the same batch and having no obviously different aging time and no obvious module effect can adopt this mode.
- Cabinet-by-cabinet measurement mode of colorimeter: In this mode, colorimeter is required for each cabinet calibration. CS2000 is recommended as standard equipment. This mode supports the calibration of rental cabinets of different batches and cabinets with serious module differences.
- 3) Select different preheating time according to the heat dissipation capacity of cabinet:
- No preheating mode: In this mode, there is no need to consider the changes of brightness and chroma uniformity caused by temperature changes during cabinet pre-heating. The calibration of the cabinet will be carried out immediately after the cabinet is turned on. The calibration efficiency of this method is higher and the calibration time of each cabinet is within 1 minute.

Preheating mode: In this mode, the cabinet is required to be preheated for a designated time according to certain brightness and calibration begins after its temperature is becoming balanced. The calibration efficiency of this method is lower and the calibration time of each cabinet is about 4 to 6 minutes. Users can design a special preheating room to preheat the cabinet to be calibrated in advance in order to improve the calibration efficiency.

4 Cabinet Calibration

Specific calibration process is designed in order to achieve better calibration effect, improve calibration efficiency and eliminate border lines among cabinets during cabinet calibration via NovaCLB-Cabinet:



Fig. 4-1 Calibration process

In NovaCLB-Cabinet, it is required to study the measured parameters of LED cabinet of every specification. Therefore, when calibrating each batch of cabinets, the software will automatically take 5, 10 or 20 cabinets as the sample cabinets and generate common parameters. The calibration parameters may not be suitable for the sample cabinet. So, when the calibration of this batch of cabinets is fully completed, the software will automatically analyze the ID of sample cabinets to be re-calibrated, which usually ranges within 1 to 5. These cabinets need to be re-calibrated.

4.1 Calibration of first cabinet

Calibration software mainly includes three parts: calibration preparation \rightarrow configuration of measuring instruments \rightarrow calibration target \rightarrow calibration. Details are introduced as follows:

4.1.1 Calibration preparations

4.1.1.1Configuration of information base

The calibration information base is different from the calibration coefficient database. Information base not only records the calibration coefficients of all the cabinets of the display screen, but also manages all the parameters related to calibration. In this way, the users can record all the calibration information of each display screen, and the brightness and chromaticity standards, time of calibration, uniformity and dead point information of each cabinet before and after the calibration, etc.

Meanwhile, the software automatically control the database size in the information base. When the calibration coefficient of the cabinet exceeds 1.8 G, the software will automatically compress the data or create a new database and the user only needs to save the operation after cabinet calibration is completed.

It is suggested that clients manage the calibration information base by taking the display screen as a unit. Therefore, create an information base for this display screen while calibrating.

Select "Cabinet calibration" as calibration mode.

^	
Preparation 💝	
Measurement Tool 🛠	Nova Calibration for Cabinet
Camera	Important notes: Each batch of cabinets requires a corresponding information file (database), the
Colorimeter	it properly. Calibration Mode
Barcode gun	O Cabinet Calibration O New Module Survey Representation Survey Representati
Correct target 💝	Cabinets: 64
Calibration 🛛	Screen Description:
Tools 🛛 🕹	Screen Information File
Authorization lock&	New Load Save As
Language(语言) 🕹	Directory; C:\Users\Administrator\Desktop\New calibration project\New calibration project(1).NCPro
	Images saving address
	D:\我的文档\NovaCLB-Cabinet\CorrectFile Browse
	Save all cabinets' images (Need large space)
×	Back Next
Camera:Disconnected	Colorimeter:Disconnected Barcode Gun:Disconnected Callibrated:0 Times: 00:00:00

Fig. 4-2 Main interface of calibration software

- Calibration mode: Select Cabinet Calibration.
- Screen parameters: Parameter information herein is specific to big screen of the current cabinet and can be set. As users manage the calibration information base taking a display screen as the unit, objectively recording the full screen parameters will help the later management of information base.
- Screen information file: A corresponding information file (calibration project) need to be created for each display screen, which will record the information of the display screen, the calibration coefficients of each cabinet, and the relevant calibration parameters.
 - > New : Create a new calibration project;
 - Load: Load existed calibration project files;
 - Save as: Modify name and path of the project files.

- Backup database: The software defaults to check this option. Enabling backup data can
 effectively prevent database file being damaged due to abnormal close of software or sudden
 blackout of computer.
- Image saving address: Select a location to save cabinet images during calibration. If "Save all cabinets' images" is checked, all cabinet images will be saved. Otherwise, only images of the current calibrated cabinet are saved.

4.1.1.2 Cabinet control

Preparation 🛠	
Database	Online
Cabinet Control	NovaLCT IP: 1/2. 16. 1.149 Fort: 8080 Connect Disconnect
Cabinet Paras	LCT Load Area: Cols: 128 Rows: 96 Advanced settings
Calibration Paras	Receiving card parameter files
Measurement Tool ≯	Sending Ethernet Receiving File Modify
Correct target ≯	R
Calibration 🛛	Acquire receiving card parameter file Clear
Tools 💝	Module Size
Authorization lock%	Fixel Width 128 🖈 Pixel Height 128 束
Language (语言) 🏼 🕹	✔ Module size same
N	<u>Cabinet Control</u> Instructions
*	Back Next
amera:Disconnected	Colorimeter:Disconnected Barcode Gun:Disconnected Callibrated:0 Times: 00:00:00

Fig. 4-3 Cabinet configuration

- 1) Online: Input IP of the computer operated in LCT client and port number and click "connect". After the interface prompt the connection is successful, start online calibration. At this time, control system automatically enters into calibration mode. We can see Gamma value of the LED screen is set as 1.
- Advanced settings: Size of LCT loading area could be seen below this bar after connecting to LCT successfully.

Click Advanced settings according to the requirement to modify cabinet resolution, starting row/column

coordinates at top left corner and unit size.

Correction of advance	ed configuration of	cabinet			×	
Resolution of area to be corrected:	Columns: 258 🚔	Rows:	256 🚔	Coordinate System:		
Starting lines and columns in upper left corner of	Column: 1	Row:	1	Settings	Screen test	
Unit Size setting Basic unit coloumn:	2	Basic	uint row:	2		
					Confirm	r

In general, there is no need to modify the default parameters after connecting to LCT during cabinet calibration process.

Acquire receiving

3) Acquire receiving card parameter file: Click card parameter file to acquire receiving card parameter file of current batch. Single receiving card parameter could be modified. Set a name easy to recognize for the file. Select the file in the dropdown list and then send it to receiving card.

Send file to receiving card but

In general, click receiving card button during calibration process to save the configuration file to local of calibration software side after LCT configure the first cabinet of this batch successfully. After one cabinet is calibrated, switch to next one. Select send configuration file directly to turn on the cabinet. It ensures that the subsequent cabinets can use the same receiving card parameters of the first cabinet.

4) Module information

If the sizes of module are the same, check "Module size same" and set the rows and columns of module.

Correct target ⇒	Environmental Parameters
Calibration 😞	Led Spacing: 20 mm Distance: 15 m (Recommended 16m-50m)
Calibration	Information
Calibration Record	Led Arrangement: () Three O Four Other
Common Color Comut Tool	Screen Type Regular Screen @ Irregular Screen
Data Analysis And Processing	Border Settings
Database Division	Lert Columns: 5 🔄 🔊 Right Columns: 15 🔄 🔊
Cabinet To Screen	Note: When the number of basic unit columns/rows (interval pixels) is greater than 1. if the number of pixels on the cabinet edge is
Authorization lock	less than the unit size, the border must be set. Otherwise, image analysis will fail. The actual number of pixels on the cabinet edge after the border is removed must be greater than or equal to the unit size you set
Language (语言) 余 由文 (zh-CN)	
English (en)	
한국어 (ko-KR)	Back Next
Camera:Disconnected	Colorimeter:Disconnected Barcode Gun:Disconnected Callibrated:3 Times: 00:00:00

4.1.1.3 Cabinet parameters

Fig. 4-4 Cabinet parameters

- 1) Environmental parameters of cabinet: It mainly refers to the environmental conditions of calibration, such as LED pixel pitch of cabinet and the calibration distance of cabinet.
- 2) Cabinet information: Set LED arrangement (which includes the number of LED in each pixel).
- 3) Screen Type: Screen types include regular and irregular screens.

When the screen is irregular and the number of pixels in the row/column on the cabinet edge is less than the number of basic unit rows/columns, the row/column on the cabinet edge must be set as border. Specific setting rules are as follows.

• When the numbers of both basic unit rows and columns are 1, there is no need to set borders.

• When the number of basic unit rows or columns is greater than 1, set the row/column on the cabinet edge where the number of pixels are less than that of basic unit rows/columns as the border.

Take the following figure as an example. Currently, the numbers of both basic unit rows and columns are set to 2. The number of pixels in the row on the edge in area 1 is less than the number of basic unit rows. Therefore, the row in area 1 must be set as the border. Similarly, the number of pixels in the column on the edge in area 3 is less than the number of basic unit columns. Therefore, the column in area 3 must be set as the border.



	Audio Promot Parameters
Preparation 🛠	
	Audio Prompt: 💿 Continuous 🔘 Once 👘 Close
Database	
	Audio File: U:\KuanJian\BaiDuWangFan\BaiduNetdisk\sounds\2. ** Select
Cabinet Control	Led Identification
Cabinet Paras	Allowed Dead Leds Natio: IU 😴 🇞 Note Advanced
	Identification Direction:
libration Poror	
arioracion raras	Cabinet number
	Set whether to enable automatic case numbering and numbering rule Advanced under enabled status settings
easurement Tool ≯	
	Display color setting after correction
Correct target 💝	Display color: 💿 White 🔘 Black
	Brichtmar Data Convertion
Calibration 💝	brightness bata correction
	Settings
Tools 🛛 💝	Edge correction parameter
	Autoritie - Select receified
thorization lock	Edge correction I Automatic Configuration
Language (语言) A	
amerale Of HX X	
由文 (-1-CN)	
ΨX(In-UN)	
English(en)	
#17010 m	
안국어(ko-KR)	
	Dack Next
¥	

4.1.1.4Calibration parameters

Fig. 4-6 Calibration parameters

1) Audio prompt parameters:

If the brightness of cabinet and result of module difference detection are abnormal after calibration completed, it indicates that the target value has been exceeded and it will cause a warning sound. The type of audio prompt can be set, including continues, once or closed.

2) LED pixel-by-pixel identification of the parameters

Advanced

Advanced settings: Click to set the scale of width and height of the module used for

identifying LED lamp point, and it is suggested to use the default value.

 \triangleright

🧿 Advanced Setting		×
Weight Ratio of Template: Height Ratio of Template:	0.8 0.8	(0-1.5) (0-1.5)
	OK	Cancel

- Directions of pixel-by-pixel identification: Choose" \> " ("from top left to bottom right"), " ∧" (from bottom left to top right), " ∧" (from top right to bottom left) and " \`" ("from bottom right to top left"). When LED at top left corner of the cabinet can't display normally, try to start from the bottom right corner to identify LED.
- Allowed Dead Leds Ratio: If the number of LEDs that cannot be identified in the cabinet is greater than the setting proportion, calibration process will automatically stop and prompt. Please confirm whether there are too much dead point in cabinet or certain part of LED pixel in cabinet is covered at this time. If the problem is still unable to be solved, you can try to increase the proportion for forcible calibration. When the screen type is set to irregular, the maximum allowed dead LEDs are 900.

Advanced settings

3) Cabinet numbering

It defaults to manual numbering. Click

1				
to modify	numbering	mode	and	rule.

🖳 Case numberi.	• ×
Numbering mode	
Manual	Automatic
Fixed bit:	A-
Digit order	2 🔻
Initial value:	1
Example:	A-01
Ok	Cancel

4) Brightness Data Correction

Adjust the screen data collected by the camera. You can select **Absolute Calibration** to eliminate the brightness and chroma difference among cabinets.

5) Edge correction parameter: Select "Automatic generation" or "Specified configuration". When the specified configuration is selected, click "Add" to add edge correction factor. Now select filling the correction parameters manually or check "File import" to import the correction parameter file which is generated through the tool "Data Analysis and Processing".

Add edge correc	tion factor				
Name: Create	edge corre	ction param	eter		
📝 File import				Import file	
	Top	Bottom	Left	Right	
Red:	0.98	0.98	0.98	0.98	
Green:	0.98	0.98	0.98	0.98	
Blue:	0.98	0.98	0.98	0.98	
	P			OK Cancel	

Fig. 4-7 Add edge correction factor

4.1.2 Configuration of measuring instruments

4.1.2.1Camera

Adjust the saturation of camera to "Normal" and imaging size to "Fit".

Automatic adjustment and manual adjustment could be selected during the process.

Please refer to 10.4 Operating skills of camera.

*												
Cabinet Control												
Cabinet Paras	Camera	Operation —			_	_						
	🔘 Di	DigitalCamera O Caliris Connect Disconnect										
Calibration Paras	Canon	Canon EOS 70D										
Measurement Tool 🐟												
	Satura	tion Adjustme	nt —							_		
Camera	The r	ecommended in	nterva	: satu	ration[6	30-1	.00], I	ED	area[50-15	0]. If satura	tion is nor	rmal but
	area and s	analysis again	e aaju n.	st the	camera	m1 (ero co)Ke	made the 1	mage brur on	the camer:	a window
Colorimeter	(a) A.			Harna	1 4.4.						Auto	A11
Barcada sup		icomacie mode		manua	r mode							
Dat code gui	Color	Brightness (%) Exp	osure	Apertu	re	ISC)	Analyze	Saturation	Area	Check
Correct target 🕉	R	20	- 300	0 🔻	29	-	100	•	Automatic	N/A	N/A	P
	G	20	- 300	0 💌	29	•	100	•	Automatic	N/A	N/A	<u> </u>
Calibration 💝	В	20	- 300	0 💌	29	-	100	•	Automatic	N/A	N/A	<u> </u>
Tools 💝												
Authorization lock												
Language (语言) 🗴												
中文(zh-CN)												
Reglich (op)												
angrish (en)	Back Next											
*												

Fig. 4-8 Adjusting saturation of digital camera

A Calibratian Para											
Calibration raras	Camera Opera	tion									
Measurement Tool 🛠	DigitalCamera @ Caliris Connect Disconnect										
Camera	C Test										
Colorimeter	Saturation Adjustment										
Barcode gun	The recomm area is low and analys:	ended interva: satu », please adjust the is again.	ration[60-100],LED ar camera micro coke ma	ea[50-150].If saturat: de the image blur on t	ion is normal but the camera window						
Correct target 💝					Saturation Adjustment						
Calibration 🛛 💝	Color	Brightness(%)	Exposure	Saturation	Area						
	R	20	300	N/A	N/A						
Tools ≫	G	20	N/A								
Authorization lock*	В	20	300	N/A	N/A						
Language (语言) 🗴											
中文(zh-CN)											
English (en)											
한국어(ko-KR)	CX										
	Back Next										
Camera:Connected Co	olorimeter:Disco	onnected Barcod	e Gun:Disconnected	Callibrated:0 Time	s: 00:00:00						

Fig. 4-9 Caliris camera settings

The two figures above are the pages after the digital and Caliris cameras are connected successfully. The Caliris camera does not have the preview window. To view the position of the screen in the Caliris camera, choose **Saturation Adjustment** > **Live Preview**. You can adjust the camera parameters to adjust the saturation and area. Saturation adjustment for the digital camera can be automatic or manual, and for the Caliris camera, it has the real-time analysis, automatic and manual modes.

- Automatic Mode: Click **Auto All**, and the brightness, exposure, aperture and ISO parameters will be adjusted automatically until the **Saturation** and **Area** values become **Normal**.
- Manual Mode: Modify the brightness, exposure, aperture and ISO parameters manually to adjust the Saturation and Area values until they become Normal.

If a Caliris camera is connected, click Saturation Adjustment to enter the adjustment page.

As shown in the figure below, the adjustment page has 2 tabs.

NovaCLB-Cabinet User Manual

-	10 14	Parameter	Adjustment					
0	15 👾 %	Real-T	ime Analysi	s 💿 Aut	tomatic M.	ode 🦳 Manual	L Hode	Auto All
								1
		Color	Brightnes	s (%) I	Exposure	Analyze	Saturation	Are
		R	20		300 -	Automatic	N/A	N/A
		G	90	-	300 -	Automatic	N/A	N/A
		В	20	-	300	Automatic	N/A	N/A
		Notice						
		Ensure t	that images	of LEDs o	do not ov	erlap after sa	turation analys	isl
		Thores o	of LEDs over	lanned.				
		Yunders .	or mond over	Tablea.				
		Images of	of LEDs not	overlappe	ed:			
		Images o	of LEDs not	overlappe	ed:			
		Images «	of LEDs not	overlappe	ed:			
		Images o	of LEDs not	overlappe	ed:			
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		Inges c	of LEDs not	overlappe	ed:			
		Inages c	e de le constante de la constante de	overlappe	ed:			
		Inges o	of LEDs not	overlappe	ed:			

- 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.

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.

4.1.2.2Configuration of colorimeter

Please install the driver of colorimeter (CS2000, CS100, CS150 or PR655) and connect USB data cable

to the USB interface on computer without converting cable before using colorimeter.

	*	
	Preparation 💝	Is colorimeter carried?
		O Yar
	Measurement Tool ☆	Use Colorimeter means light gun, color analyzer and other instruments of measuring LED color characteristic.
	Camera	© No
	Colorimeter	
	Barcode gun	
	Correct target 🛠	
	Calibration 💝	
	Tools 🛛 💝	
	Authorization lock🛠	
	Language (语言) 🕹	
		~ 0.1
		Back Next
	čamera:Disconnected	Colorimeter:Disconnected Barcode Gun:Disconnected Callibrated:0 Times: 00:00:00
1	*	
	Preparation 🕹	Is colorimeter carried?
	Measurement Tool 🛠	© Yes
	Camera	Colorimeter means light gun, color analyzer and other instruments of measuring LED color characteristic.
	Colorimeter	
	COTOLIMETEL	Colorimeter operating
	Barcode gun	Manual
	Correct target 🛠	Auto by Colorimeter (more accurate)
	Calibration 🛛	Model: CS2000
	Tools 🛛 🕹	COM: Connect Disconnect
	Tools Authorization lock>	COM: Connect Disconnect
	Tools ¥ Authorization lock Language(语言) ¥	COM: Connect Disconnect
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	Tools ¥ Authorization lock Language(语言) ¥	COM: Connect Disconnect

Fig. 4-10 Colorimeter configuration

4.1.2.3Barcode scanner

If the system is equipped with a barcode scanner, port and Baud rate need to be set under this interface, and the software shall be connected. After calibration is enabled, there is no need to input cabinet number because the barcode scanner can automatically read the cabinet number.

The Baud rate of the software is 9600 by default and it is not necessary to modify. The "COM", namely the device port of computer corresponding to the barcode scanner cannot have conflict with other device ports.



Fig. 4-11 Barcode scanner setting

4.1.3 Calibration target

NovaCLB provides different calibration target setting modes for users to select based on actual cabinet situations.

These situations are: there is no brightness and chroma difference among modules or cabinets, there is brightness and chroma difference among modules or cabinets, Supplementary order (cases delivered from go down in different time need to be put together).

Calibration target setting includes original value obtainment and target value setting.



4.1.3.1 There is no brightness and chroma difference among modules or

cabinet

1) Measuring original value

If no colorimeter is available, skip this step and adopt default value as original value.

2) Setting target value

The software supports the three modes of **Brightness calibration**, **Ordinary chroma calibration**, and **Multiple bin chroma calibration**. **Brightness calibration** will only change the brightness of three primary colors R, G and B without loss of the color gamut of the display screen. But it could not eliminate the difference of chroma on the LED. **Ordinary chroma calibration** will change the brightness of the three primary colors and lose a small part of the color gamut. But it could make the LED brightness and chroma attain high consistency. **Multiple bin chroma calibration** can eliminate difference of brightness and chroma among modules or cabinets and supports blue adjustment which is mainly to optimize blue effect. But it will lose some of the white effect.

Setting calibration target through the following method:

Drag "brightness decay" pull rod and choose the proper brightness decay proportion. When "Ordinary chroma calibration" is selected, the software will generate a coefficient in accordance with the "chromaticity calibration standard". When "Brightness calibration" is selected, it will generate the coefficient in accordance with the "brightness calibration standard". When "Multiple bin chroma correction" is selected, it will generate the coefficient in accordance with the "brightness calibration standard". When "Multiple bin chroma correction" is selected, it will generate the coefficient in accordance with the "brightness calibration standard". When "Multiple bin chroma calibration standard", for example, when "20%" is selected for the brightness calibration, the brightness after the calibration will be 20% decayed than the brightness before the calibration.



Fig. 4-12 Setting calibration mode and target value

Check "Enable color temperature". The color temperature of the screen will not be changed when pulling the rod to set brightness decay.

Click the color button in interface to set chroma value in color gamut mapping.

Note: The original color gamut value here is not the true original value of the display. It's just a relative original value of software default. The target value acquired is also relative target value.



Fig. 4-13 Custom adjustment of color gamut

3) After setting target value is completed, click "Completion" enter next interface. If not satisfied with the target value, click "Reset" to return to last step to reset.

*								
Preparation 🛛 🕹	Origina	al value			-Target v	alue		
		Brightness	Cx	Cv		Brightness	Cx	Cy
Measurement Tool 💝		6		-,	Red:	805.620	0.6870	0.3000
	Red:	902.000	0.6900	0.3000				
Correct target 😞					Green:	1790.640	0.1730	0.7306
	Green	: 1990.000	0.1700	0.7400				
Correct target					Blue:	300.830	0.1330	0.0820
Calibration ≯	Blue:	327.000	0.1300	0.0800	White:	2897.0901	0.3131	0.3290
Tools		0.						
10015 🕹	Correcti	on mode: Of	orrection	oma	Colour (temperature:	6483	
Authorization lock								
	Rese	t						
Language(语言) 🕹								
								• `
						_		
						H	Back	Next
×		D ¹		1 0 0'			1 7	
Camera:Disconnected	Colorimete	er:Disconnect	ted Barc	ode Gun:Disco	nnected C	allibrated:0	limes: 00):00:00

Fig. 4-14 Original value and target value after setting

4.1.3.2There is some bright and color difference among cabinets or

modules

When there is some bright and color difference among cabinets to be calibrated, the original value must be measured by colorimeter.

1) Measuring original values



NovaCLB-Cabinet V4.1				terne internet	
Cabinet Control	Colorimeter configuration —				
Cabinet Paras	1. Please firstly p	ut the sample case a	t a fixed positio	on	
Calibration Paras	value, please set t	suring area	e case s bilghth	ess and thromatic	
leasurement Tool 🕱	Locate the centre of	a circle: (-,-)			1
Camera	Locate radius:	*		Setup	
Colorimeter	3. Fix colorimeter	position			
	4 8.4				
Barcode gun	Original value	ue			
Barcode gun Correct target	Original value	50 V		Measurement	
Barcode gun Correct target Correct target	A. Set original value Original value Measure brightness: Color	50 V Brightness	Сх	Measurement Cy	< 7
Barcode gun Correct target	4. Set original value Measure brightness: 5 Color RedLed	0 V Brightness 902	Cx 0.69	Measurement Cy 0.3	
Barcode gun Correct target Correct target Calibration	4. Set original value Measure brightness: 5 Color RedLed GreenLed	0 ~ Brightness 902 1990	Cx 0.69 0.17	Cy 0.3 0.74	
Barcode gun Correct target Correct target Calibration Calibration	4. Set original value Measure brightness: 5 Color RedLed GreenLed BlueLed	0 ~ Brightness 902 1990 327	Cx 0.69 0.17 0.13	Cy 0.3 0.74 0.08	
Barcode gun Correct target Correct target Calibration Calibration Record	A. Set original value Original value Measure brightness: Color RedLed GreenLed BlueLed Whether to gauge the cabinet one by one:	0 ~ Brightness 902 1990 327 • Yes () No	Cx 0.69 0.17 0.13	Cy 0.3 0.74 0.08	
Barcode gun Correct target Correct target Calibration Calibration Record Tools	A. Set original value Original value Measure brightness: Color RedLed GreenLed BlueLed Whether to gauge the cabinet one by one:	00 V Brightness 902 1990 327 (Yes O No	Cx 0.69 0.17 0.13	Cy 0.3 0.74 0.08	
Barcode gun Correct target Correct target Calibration Calibration Calibration Record Calibration Record Calibration Color Gamut Tool	A. Set original value Original value Measure brightness: Color RedLed GreenLed BlueLed Whether to gauge the cabinet one by one:	00 ~ Brightness 902 1990 327 • Yes () No	Cx 0.69 0.17 0.13	Measurement Cy 0.3 0.74 0.08	

Measuring area: As the colorimeter has limited focal circle size when measuring the brightness and chromaticity of cabinets, set the measuring area before using the colorimeter to measure it in order to more precisely acquire the brightness and chromaticity distribution of cabinets.

Click

Setup

and the interface below appears:



Fig. 4-15 Setting of measuring area

Modify the "center" and "radius" of the circle to make sure the green part in the figure above is the same as the location and ratio of the measurement area of actual colorimeter in the cabinet. Then click "OK".

Measurement mode: There are two modes including "Manual" and "Auto by colorimeter". "Manual", in which the user shall fill in the brightness and chromatic value. "Auto by colorimeter" means that after connecting the colorimeter to the computer, click the "Measure" button and the software will automatically control the colorimeter to make the measurement. At present it supports CS-2000 and CS100 colorimeter produced by Konica Minolta Inc.

Measured values: Regulate measurement brightness of colorimeter.

Whether to gauge the cabinet one by one: Check "Yes", and the colorimeter will be started to measure the cabinets one by one. If the present calibration software has been connected to the colorimeter (currently supporting CS2000/CS100/CS150), the software will automatically collect the brightness and chromaticity measured values of the cabinets when executing "gauge one by one". If it is not connected to a colorimeter, the following dialogue box will pop up when start calibration, requesting the user to manually fill in the measured value. Click "OK" and go to the next step.
esolution:	Cols:	128	Rows .	128
esoracion.	0013.	120	nows.	
olorimeter Lo	ocate Circle: :	(64, 64)	Radius:	16
ease follow lease end thi ues	the above measur s cabibration an	ements;If n d return to	eed to modi the 'color	fy, imeter'!
ease follow ease end thi ues Color	the above measur s cabibration an Brightness	ements;If n d return to Cx	eed to modi the 'color	fy, imeter'! Cy
ease follow ease end thi ues Color RedLed	the above measur s cabibration an Brightness 900	ements: If n d return to Cx 0.6	eed to modi the 'color 9	fy, imeter'! Cy 0.3
ease follow ease end thi ues Color RedLed GreenLed	the above measur s cabibration an Brightness 900 1800	ements:If n d return to Cx 0.6 0.1	eed to modi the 'color 9 7	fy, imeter'! Cy 0.3 0.74

Fig. 4-16 Measuring brightness and chroma

2) Selecting a calibration mode and set target values

The software supports the three modes of **Brightness calibration**, **Ordinary chroma calibration**, and **multiple bin chroma calibration**. **Brightness calibration** will only change the brightness of three primary colors R, G and B without loss of the color gamut of the display screen. But it could not eliminate the difference of chroma on the LED. **Ordinary chroma calibration** will change the brightness of the three primary colors and lose a small part of the color gamut. But it could make the LED brightness and chroma attain high consistency. **Multiple bin chroma calibration** can eliminate difference of brightness and chroma among modules or cabinets and supports blue adjustment which is mainly to optimize blue effect. But it will lose some of the white effect.

*	Correction m	ode					
Preparation 🛠	○ Bright correct	ntness ection		Ordinary correctio	chroma n	Multiple correct:	e bin chroma ion
Database	Target value	setting					
Cabinet Control		Brightness	Сх	Cy		Brightness decay ;	proportion
Cabinet conditi	Red	805.62	0.6870	0.3000	•	Þ	10%
Cabinet Paras	Green	1790.64	0.1730	0. 7306	•	٢	10%
Calibration Paras	Blue	300.83	0.1330	0.0820	•	٢	8%
Measurement Tool 🌫	White	2897.09	0.3131	0.3290	•	Þ	10%
Correct target 🛠	E	nable colour	temperatur	re			6483 r
Correct target		5000 1 ⁺ 6500	↑) 9300			L	
Calibration 🛠							
Calibration							
Calibration Record							О·)
Tools 🛛 🕹							
Authorization lock%							
Language(语言) 🕹							
						Back	Completion
	L Colorimeter	Disconnecte	ed L Barco	de Gun:Dis	connected	Callibrated:0 T	imes: 00:00:00

Fig. 4-17 Setting calibration target

Use the following methods to set calibration targets:

Drag "brightness decay" pull rod and choose the proper brightness decay proportion. When "Ordinary chroma calibration" is selected, the software will generate a coefficient in accordance with the "chromaticity calibration standard". When "Brightness calibration" is selected, it will generate the coefficient in accordance with the "brightness calibration standard". When "Multiple bin chroma correction" is selected, it will generate the coefficient in accordance with the "brightness calibration standard". When "Multiple bin chroma correction" is selected, it will generate the coefficient in accordance with the "brightness calibration standard". When "Multiple bin chroma calibration standard", for example, when "20%" is selected for the brightness calibration, the brightness after the calibration will be 20% decayed than the brightness before the calibration.

Select "Enable color temperature" to set a proper color temperature and then modify other parameters.

Look over color gamut figure: Click the color button in interface, the following form interface will pop up:



Fig. 4-18 Color gamut

The white triangle in the above diagram is the original value of the software. If measured by colorimeter, it is the real color gamut of the cabinet. The black triangle is the target color gamut to be reached after the calibration. With this diagram, the change of cabinet color gamut before and after the calibration is shown clearly. By right clicking "add" to change target color gamut. By right clicking "expand" to set the true color gamut of the cabinet as the expect color gamut, i.e., losing no color gamut.

Completion 3) After setting target value is completed, click enter next interface. If not satisfied with the Reset target value, click

to return to last step to reset.

Preparation Image: Control in a state	\$	1		
Batabase Brightness Cx Cy Batabase Brightness Cx Cy Red: 902,000 0.6900 0.3000 Cabinet Control Green: 1990,000 0.1700 0.7400 Cabinet Paras Elue: 327,000 0.1300 0.0800 Easurement Tool X Correction mode: Ordinary chroms Colour temperature: 6483 Correct target Reset Nather: Serier Back Next Authorization Record Tools Next Next Next	Preparation ጵ	Original value	Target value	
Database Ref. 902.000 0.6900 0.3000 Gabinat Control Green: 1990.000 0.1700 0.7400 Gabinat Faras Blue: 327.000 0.1300 0.0900 Calibration Parus Blue: 327.000 0.1300 0.0900 Messurement Tool ¥ Correction mode: Correction Ordinary chrome Colour temperature: 8483 Correct target & Calibration Reset Escet Escet Calibration Reset Barcode GunzDisconnected Calibrated:0 Times: 00:00:00		Brightness Cx Cv	Brightness Cx	Cy
Cabinet Control Cabinet Paras Calibration Paras Blue: 327,000 0.1700 Blue: 327,000 0.1300 Correct target A Correct target Calibration A Calibration A Calibration A Calibration A Calibration Beard Calibration A Calibration Correct target A Calibration A Calibration A Calibration Correct target A Calibration A Calibration A Calibration Correct target A Calibration A Calibration Correct target A Calibration A Calibration Correct target A Calibration B Calibration A Calibration Correct target A Calibration A Calibration A Calibration A Calibration A Calibration Correct A Calibration A Calibration Beacd Tools X Namera:Disconnected Correct:Disconnected Barcode Gun:Disconnected Calibrated:0 Times: 00:00:00	Database	Red: 902.000 0.6900 0.3000	Red: 805.620 0.6870	0.3000
Cabinet Pares Cabinet Pares Calibration Pares Blue: 327.000 Blue: 327.000 Correction mode: Ordinary chrone Correction mode: Ordinary chrone Correct target Calibration	Cabinet Control		Green: 1790.640 0.1730	0. 7306
Calibration Paras Blue: 327.000 0.1300 0.0600 White: 2897.0901 0.3131 0.3290 Measurement Tool X Correction mode: Ordinary chroma Colour temperature: 6463 Image: 6463 Correct target Reset Image: 6463 Image: 6463 Image: 6463 Image: 6463 Calibration Reset Image: 6463 Image: 6463 Image: 6463 Image: 6463 Calibration Reset Image: 6463 Image: 6463 Image: 6463 Image: 6463 Calibration Reset Image: 6463 Image: 6463 Image: 6463 Image: 6463 Calibration Reset Image: 6463 Image: 6463 Image: 6463 Image: 6463 Calibration Reset Image: 6463 Image: 6463 Image: 6463 Image: 6463 Calibration Reset Image: 6463 Image: 6463 Image: 6463 Image: 6463 Language: (Image: 6463 Image: 6463 Image: 6463 Image: 6463 Image: 6463 Image: 6463 Language: 6463 Image: 6463 Image: 6463 Image: 6463 Image: 6463 Image: 6463 Image: 6463<	Cabinet Paras	Green: 1990.000 0.1700 0.7400	Blue: 300.830 0.1330	0.0820
Heasurement Tool 》 Correction mode: Ordinary chroma correction. Colour temperature: 6483 Correct target Reset Calibration Reset Language (语言) 》 Back amera:Disconnected Colorimeter:Disconnected Colorimeter:Disconnected Colorimeter:Disconnected Colorimeter:Disconnected Colorimeter:Disconnected	Calibration Paras	Blue: 327.000 0.1300 0.0800	White: 2897.0901 0.3131	0. 3290
Correct target Correct target Calibration Calibration Calibration Record Tools Authorization lock Language(语言) > Back Hext amera:Disconnected Colorimeter:Disconnected Barcode Gun:Disconnected Callibrated:0 Times: 00:00:00	Measurement Tool 🎸	Correction mode: Ordinary chroma correction	Colour temperature: 6483	
Correct target Calibration 《 Calibration Calibration Record Tools ※ Authorization lock% Language (语言) ※ Back Next amera:Disconnected Colorimeter:Disconnected Barcode Gun:Disconnected Callibrated:0 Times: 00:00:00	Correct target 🛠	Reset		
Calibration 《 Calibration Calibration Record Tools * Authorization lock Language(语言) * amera:Disconnected Colorimeter:Disconnected Barcode Gun;Disconnected Callibrated:0 Times: 00:00:00	Correct target			
Calibration Calibration Record Tools * Authorization lock? Language (语言) * amera:Disconnected Colorimeter:Disconnected Barcode Gun;Disconnected Callibrated:0 Times: 00:00:00:	Calibration 🛠			
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Tools * Authorization lock Language(语言) * amera:Disconnected Colorimeter:Disconnected Barcode Gun:Disconnected Callibrated:0 Times: 00:00:00:	Calibration Record)
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Language (语言) ¥ Sack Next amera:Disconnected Colorimeter:Disconnected Barcode Gun:Disconnected Callibrated:0 Times: 00:00:00:	Authorization lock&			
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JOVASTAN	mera:Disconnected	Colorimeter:Disconnected Barcode Gun:Dis	sconnected Callibrated:0 Times: 00:	00:00

4.1.3.3 Supplementary order (cases delivered from go down in different

*			
Preparation 🛠	Data source operation		
Database	Import from public colour g	amut tool	
Cabinet Control	💮 Import multi-batch adjustm Correction mode	ent documents from LCT	
Cabinet Paras	Ordinary chroma corre	ection 💿 Multiple bin chroma correctio	n
Calibration Paras	Uriginal value Brightne	Cx Cy	
Measurement Tool ≽	Red 902 0	0.69 0.3	
	Green 1990 (0. 17 0. 74	
Correct target 🙊	Blue 327 (0.13 0.08	
Correct target	Target value	-	
Calibration 🛠	Brightne	Cx Cy	
Calibustian	Red 805.624 0	0. 3	
Calibration	Green 1790.6438 0	. 173 0. 7306	
Calibration Record	300.832153 0	. 133 0. 082	
Tools 💝	Manually adjust target val of original value	ue 🔲 Blue correction(Optimizing the blue calibration effect, may cause white loss))
Authorization lock🌫			
Language(语言) 🖇	Ċ.		
		Back	pletion
▼ amoralDisconnected ↓	Colorimator Disconnected Percede C	uniDisconnected Callibrated 0 Times 00:00	

time need to be put together)

Fig. 4-19 Calibration of supplementary order

1) Importing original values from public color gamut tool.

It is necessary to import the original value and the target value of the batch to be calibrated.

Click "Common color gamut tool" in the menu bar to select the batch being calibrated.



* Preparation *	Data source operation
Measurement Tool 🎸	Import from public colour gamut tool
Correct target 🕹	Import multi-batch adjustment documents from LCT
Calibration 🛛	Ordinary chroma correction Multiple bin chroma correction
Tools 🛠	Which batch does current calibration belong
Common Color Gamut Tool	to?
Data Analysis And Processing	Batchl
Database Division	© Batch2 Tar
Cabinet To Screen	Red Lum:900.0 Cx:0.6900 Cy:0.3000 Green Lum:1800.0 Cx:0.1700 Cy:0.7400
Authorization lock	Blue Lum:300.0 Cx:0.1300 Cy:0.0800
Language(语言) 🎸	OK Cancel
	of original value calibration effect, may cause white loss)
*	Back Completion
Camera:Disconnected	Colorimeter:Disconnected Barcode Gun:Disconnected Callibrated:0 Times: 00:00:00

Fig. 4-20 Using common color gamut tool to set target value

2) Importing original value and target value file

The file is in .lxy format generated through LCT multi batch adjustment.

System(S) Settings (C)	Tools(T) Plug-in (P) User(U) Language(L) Help(H)
	Calibration(C)
	Screen Control(P)
Screen Configuration Bri	Monitoring(M) -function Card Cloud Monitoring
Local System Information —	Led Error Detection(T)
Control Contours 1	Multi-batch Adjustment(B)
Control System 1	Controller Cabinet Configuration File Import (E)
Monitor Information	Quickly Adjust Dark or Bright Lines (Q)
Hereno	Video Control(V)
Service Status: Service version	on:3.1 .::

It is necessary to import the files of current batch to be calibrated.

Freparation >	Data source op	eration ———			
Measurement Tool 🌫	🔘 Impor	t from public co	lour gamut tool		Import
Correct target 😞	Impor Correction mod	t multi-batch a le	djustment docume	ents from LCT	
Correct target) Ordinary chrom	a correction	🔘 Multiple bi	n chroma correction
Calibration 🛠	Uriginal value	Brightne	Cx	Cy	
Calibration	Red	902	0.69	0.3	
	Green	1990	0.17	0.74	
Calibration Record	Blue	327	0.13	0.08	
Tools 🛛 🕹	Target value -				
uthorization lock		Brightne	Cx	Cy	
	Red	805.624	0.687	0.3	
Language(语言) 🞸	Green	1790.6438	0.173	0.7306	
	Blue	300.832153	0.133	0.082	
	of o	ally adjust targ riginal value	et value 🔲 Blu cal	e correction(Optim ibration effect,may	zing the blue / cause white loss)
					Back Next
amera:Disconnected	Colorimeter:Disco	nnected Barco	ode Gun:Disconn	ected Callibrate	d:0 Times: 00:00:00

Fig. 4-21 Importing original value and target value files

3) Manually adjusting the original and target brightness and chroma of RGB.

The software supports the two modes of **Ordinary chroma calibration** and **Multiple bin chroma calibration**. **Ordinary chroma calibration** will change the brightness of the three primary colors and lose a small part of the color gamut. But it could make the LED brightness and chroma attain high consistency. **Multiple bin chroma calibration** can eliminate difference of brightness and chroma among modules or cabinets and supports blue adjustment which is mainly to optimize blue effect. But it will lose some of the white effect.

Check "Manually adjust original value and target value" and select calibration mode. Select the number and double click to modify the value.

<pre> Freparation Measurement Tool Correct target </pre>	Data source ope	wration t from public co t multi-batch o e	olour gamut tool adjustment docume	nts from LCT	Import	_
Correct target	۲	Ordinary chrom	a correction	🔘 Multiple	bin chroma correction	
Calibration 🛠	Original value	Brightne	Cx	Cy		
Calibration	Red	902	0.69	0.3		
Calibration	Green	1990	0.17	0.74		
Calibration Record	Blue	327	0.13	0.08		
Tools 💝	Target value —	Brightne	Cx	Cy		
Authorization Lock>	Red	805.624	0.687	0.3		
Language (语言) 🛛 🕹	Green	1790.6438	0.173	0.7306		
	Blue	300. 832153	0.133	0.082	~O~`	
	Manua of or	lly adjust tar; jginal value	get value 🔲 Blue cali	e correction(Opt ibration effect,	imizing the blue may cause white loss)	
					Back Next	
Camera:Disconnected	Colorimeter:Disco	nnected Barc	ode Gun:Disconn	ected Callibra	ated:0 Times: 00:00:00	:

Fig. 4-22 Manually setting original and target value

4.1.4 Calibration

*		
Measurement Tool 🌫	Calibration Methods	Send Cabinet Parameters
	🔘 Manual 💿 Automatic 🛛 🔽 Customize	💽 Pre-Warm
Correct target 🛠		Gauge one by one
Correct target	Calibration Process	🚺 Analyze Red Led 📌
Calibration 🛠	🔘 Red 🔘 Green 🔘 Blue 💿 Red、Green、Blue	🚺 Analyze Green 🎪 Led
Calibration		🚺 Analyze Blue 🎪
	✓ Enable Gap Calibration	🜔 Create Coefs
Calibration Record	Vplaod Coeffients	💽 Upload Coefs
Tools 😞		🜔 Save To Database
Common Color	Uplaod Coefs Save To Flash Save To Database	Save cabinet name
Gamut Tool	Write in module Image Test Chrome distributi	Save module ID
Data Analysis And Processing		O Save To Flash
Database Division	Feedback	Save to Factory Area
	Dead Leds: Red V 0 that reaches 100%	
Cabinet To Screen	Common parameter	Il ash
Authorization lock#	The first: Uncreated 1 The first: Uncreated 1 third: Uncreated 1	Save receiving card parameters Current ID:
Language (语言) 🎸	0	
		Back Next

Fig. 4-23 Before calibration

Calibration methods: Including "Manual" and "Automatic".

 "Manual" refers to conduct each step of the calibration separately, which requires users to manually start next step after finishing the previous step on the software. The advantage is that the step can be conducted again if not satisfied after conducting any one step.

2) "Automatic", the so-called automatic calibration is actually to add each step of the "Manual" to an automatically operated process. After clicking "Start", the software will automatically operate the customized process.

After selecting "automatic", users can click "customize" button and select the step to be automatically executed by the software as shown in the screenshot below:

eps		
📝 Send Cabinet Parameters		
🥅 Fre-Warm (Display white screen in a		
Brightne 30 🔷 % period 0 丈 : 5 찾 : 0 文		
🗸 Analyze Red Led		
🖉 Analyze Green Led		
📝 Analyze Blue Led		
✔ Create Coefs		
🕼 Upload Coefs		
Quick uploading	5	
Save cabinet name		
Save module ID		
Numberi Not set		
Save To Flash		
Save To Flash		
 Save To Flash Save to Factory Area Write in module flash 		

Fig. 4-24 Customizing automatic calibration process

Pre-warm: It is a unique function of "Automatic". Check" Pre-warm" to enable pre-warm mode. This mode is to prevent some cabinets from changing after working a period of time and leading to the change of the brightness and chroma uniformity of the cabinets. Therefore, cabinets need to be pre-warmed before calibration. It is suggested to enable this function for the cabinets with poor heat dissipation and use the default parameters. If the pre-warm function is selected, the calibration page will be displayed as follows.

Correct target	Calibration Methods	O Send Cabinet Parameters
Calibration 😞	C Manual	C Pre-Warn
Calibration	Calibration Process	 Gauge one by one Analyze Red Led
Calibration Record	🔵 Red 💿 Green 💿 Blue 💿 Red、Green、Blue	🚺 Analyze Green 📌
Tools 🛠	TEnable Gap Calibration Stop	🚺 Analyze Blue 📌
Common Color	Uplaod Coeffients	O Create Coefs
Data Analysis And Processing	01-04-50	 Upload Coefs Save To Database
Database Division	Countdown: 01:04:38	Save cabinet name
Cabinet To Screen		O Save module ID
Authorization lock	Feedback	Save to Factory Area
Language(语言) 😞	Dead Leds: Red	• Write in module flash
中文(zh-CN)	Common parameter	• Save receiving card parameters
English (en)	first: second: third: third:	Current ID: 4
한국어 (ko-KR)		Back Next
×		

- Upload Coefs: You can choose to upload the coefficients to receiving card stably or quickly. Stable uploading ensures data accuracy. The coefficient uploading method defaults to quick uploading which uploads coefficients quickly.
- > Save cabinet name: Support for one cabinet with two cards.
- Save module ID: Supports the receiving cards with module flash function.
- a) Flash arrangement settings must be done first on receiving card configuration page of LCT. See detailed operations in the figure below.

Screen Configuratio	n-COM6	
Sending Card Receiv	ing Card Screen Connection	
- Module Informatio	n	
Chip:	MBI5036 Size: 32W×16H Scanning Type 1/2 scan	
Direction:	Horizontal Decoding Type 74HC138 Decoding Data Groups 8	>
Cabinet Informatio	n	
Regular	💿 Irregular	
Width (Pixel)	128 🚔 <=1061 Please 🔺 Width: ?? Height: ??	Please
Height (Pixel)	32 🚔 <= 32 that the	make sure
	width and heidth of	and height
Module Casc.	From right to left view Cabinet	of the
Performance Setti	ngs	
Data Group E	Mara Pattinga	
Data Oroup E		
Refresh Rate	48 Symmetrical/Data Group Extension	
Gravscale level	Nonitoring Card Data Line Adjustment	
Shift Clock Fre	Flash Arrangement	
Phase Position	2 Low Grayscale C 0	
Row Blanking	25 (=2.00us) Ghost Control En 20 (1~24)	
Line Changing .	. 3 🔄 (0~19)	
Brightness Effi	69.14% Minimum OE wid 664 ns	
Smart Settings	Load from File Receiving car Save to File Read from Re Se	end to Recei
	Save to factory	estore factor
	Save System Con Save	Close

Physical Arrangement And Setting o	of Module I	lash	_		Į	- 🗆 🗙
Number of Fl 4 Nu	mber of Fl	4 Arranged Wa	ay Custom	•	Back	ResetAll
BUS		1	2	3	4	
1 2 3 4	• 1	BUS 1 Serial number 0	BUS 1 Serial number 1	BUS 1 Serial number 2	BUS 1 Serial number 3	
5 6 7 8		Height 16 Number of data groups:	Height 16 Number of data groups:	Height 16 Number of data groups:	Height 16 Number of cata groups:	
9 1 1 1	2	BUS 1 Serial number 7 Midth 32	BUS 1 Serial number 6	BUS 1 Serial number 5	BUS 1 Serial number 4	
		Height 16 Number of cata groups:	Height 16 Number of data groups:	Height 16 Number of data groups:	Height 16 Number of data groups:	
	3	BUS 1 Serial number 8 Width 32	BUS 1 Serial number 9	BUS 1 Serial number 10	BUS 1 Serial number 11	
2 2 2 2		Height 16 Number of data groups:	Height 16 Number of data groups:	Height 16 Number of data groups:	Height 16 Number of cata groups:	
2 3 3 3	4	BUS 1 Serial number 15 Width 32	BUS 1 Serial number 14	BUS 1 Serial number 13	BUS 1 Serial number 12	
Flash Control Size		Height 16 Number of data groups:	Height 16 Number of data groups:	Height 16 Number of data groups:	Height 16 Number of data groups:	
Width 32						
Apply to Current BL						
Module Parameters						
Number of d 8 🚔						
Apply to Current						
Starting X Co 128 🚔						
Starting Y Co 128						
Prompt:After setting width	n and he	ight, click or drag le	eft mouse button o	r		
direction button to set the	informa	tion of each Flash,	and click right mo	ou	ОК	Cancel

Fig. 4-25 Physical Arrangement and of Module Flash

b) Send module flash arrangement settings to receiving card.

Screen Configuration-COM6	THE R. LEWIS CO., LANSING MICH.	
Sending Card Receiving Card	Screen Connection	
Module Information		
Chip: MBI5036	3 Size: 32W×16H Scanning Type 1/2 scan	>>
Direction: Horizont	al Decoding Type 74HC138 Decoding Data Groups 8	
Cabinet Information		
Regular	💿 Irregular	
Width (Pixel) 128	Image: Second state of the second state of	Please
Height (Pixel) 32	make sure that the Loading error. Please try to adjust pe	make sure the width
Module Case	vidth and height of	and height
Performance Settings		
Data Group E	re Settings	
Refresh Rate 480	Hz Refresh Rate Ti 4	
Grayscale level Normal	lly bright 👻 Grayscale Mode 🛛 Refreshing rate firs 👻	
Shift Clock Fre 12.5	✓ MHz Duty cycle 50	
Phase Position 2	Low Grayscale C 0	
Row Blanking 25	(=2.00us) Ghost Control En 20 (1~24)	
Line Changing 3	▲ (0~19)	
Brightness Effi 69.14%	6 Minimum OE wid 664 ns	
Smart Settings	Luad from File Receiving car Save to File Read from Re S	enu lo Recel.
	Save to factory.	lestore factor
	Save System Con Save	Close

Fig. 4-26 Send to receiving card

c) Back to "Cabinet Control" interface and click Card parameter file

*	
Preparation 😞	
Database	Online
Cabinet Control	NovaLCT IP: 172 . 16 . 14 . 193 Port: 8080 Connect Disconnect
Cabinet Paras	LCT Load Area: Cols: 512 Rows: 256 Advanced settings
Calibration Paras	Receiving card parameter files
Measurement Tool 🛠	Sending Ethemet Beceiving Modify
Camera	Please input config file name:
Colorimeter	2018-6-14-CabinetConfig Acquire receiving card Clear Clear
Barcode gun	OK Cancel
Correct target 🛛 🕹	Pixel Width 32 - Pixel Height 32 -
Calibration 🛠	☑ Module size same
Calibration	
Calibration Record	Cabinet Control Instruction
Tools ¥	Back
×	

^							
Preparation							
Database	Online						
Cabinet Control	Nov	vaLCT IP: 1	72.16.14	4 . 193 Port:	8080	Connect	Disconnect
Cabinet Paras	LCT	[Load Area:		Cols:	512 Rows:	256	Advanced settings
alibration Paras	Receiv	ving card paran	neter files —				
asurement Tool 🛠		Sending card	Ethemet port	Receiving card	File		Modify
	+	0	0	3	2018-6-14-Cabine	tConfig(0-0-3).rcfg	
Camera		0	0	2	2018-6-14-Cabine	tConfig(0-0-2).rcfg	
Colorimeter	Ace	quire receiving			_	Send file to	Clear
Barcode gun	Car	d parameter fi	e			receiving card	
Correct target 🛛 🕹	Module	e Size	32	¢	Pixel Height	32 🔹	
Calibration 💲		Module size sar	ne			7	
Calibration							
libration Record						Cabinet	Control Instructions
Tools ×						Back	Next
Tours T							A 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

Fig. 4-27 Acquire receiving card parameter file

d) Back to calibration custom process again and check"Save module ID". Click to start to set module number.

	g mode							
📄 Fi	xed bit bef				📝 Separator	-		
📃 Fi	xed bit aft				Numberi		-	Number
Insta	ncenu Al)1-1						
opologio	cal graph							
	1	2	3	4		Zoom		▶ 1.00
	-	-						
▶ 1	(32, 16)	(32, 16)	(32, 16)	(32, 16)				
2								
	(32, 16)	(32, 16)	(32, 16)	(32, 16)				
3	(32, 16)	(32, 16)	(32, 16)	(32, 16)				
4	<i></i>			<i></i>				
	(32, 16)	(32, 16)	(32, 16)	(32, 16)				
								v
							0	n Canes
								Canca
numbe	r				8			Canca
numbe: mbering	r mode			< P	8			K Canca
mumbe mbering	r mode red bit bef	Nova	ć	<u>s</u> P	Separator	-		
mbering Fix	r mode red bit bef red bit aft	Nova	ć		Separator Numberi	- Z-shape		Number
mbering v Fix Fix Instar	r mode ced bit bef ced bit aft No	Nova va-A01-1	Ŕ		✓ Separator Numberi	- [Z-shape		Number
numbe mbering Fix Fix Instar	r mode ced bit bef ced bit aft Noc nu No al graph	Nova va-A01-1	, P		Separator Numberi	- Z-shape		Number
mbering Fix Fix Instar pologic	r mode ted bit bef ted bit aft nce nu No al graph 1	Nova va-A01-1	3	4	Separator Numberi	- Z-shape Zoom 🗶	-	Number
numbe mbering V Fix E Fix Instar	r mode ted bit bef ted bit aft nce nu No al graph 1	Nova va-A01-1 2	3	4	Separator Numberi	- [Z-shape Zoom 🖌		Number
numbe mbering Pix Fix Instar pologic	r mode ted bit bef ted bit aft No al graph 1 1 (32,15)	Nova va-A01-1 2 2 (32, 16)	3 (32, 16)	4 (32, 16)	Separator Numberi	- Z-shape Zoom 🕢		Number
numbe mbering I Fix Instar	r mode ted bit bef ted bit aft No al graph 1 1 (32,16)	Nova va-A01-1 2 2 (32, 16)	3 (32, 16)	4 (32, 16)	Separator Numberi	- Z-shape Zoom 🗶		Number
numbe mbering Fix Fix Instar pologic	r mode ted bit bef ted bit aft No al graph 1 (32,15) 5	Nova va ⁻ A01-1 2 (32, 16) 6	3 3 (32, 16) 7	4 4 (32, 16) 8	Separator Numberi	- Z-shape Zoom 🗶		Number
numbe mbering Fiz Fiz Instar pologic	r mode red bit bef ree nu No al graph 1 (32,18) 5 (32,18)	Nova va-A01-1 2 (32, 16) 6 (32, 16)	3 3 (32, 16) 7 (32, 16)	4 4 (32, 16) 8 (32, 16)	Separator Numberi	- Z-shape Zoom 🗶		Number
numbe mbering Fix Fix Instar pologic	r mode ted bit bef ted bit aft No al graph 1 (32,15) 5 (32,16) 9	Nova va ⁻ A01-1 2 (32, 16) 6 (32, 16) 10	3 3 (32, 16) 7 (32, 16) 11	4 4 (32, 16) 8 (32, 16) 12	Separator Numberi	- Z-shape Zoom 🗶		Number
numbe mbering Fix Instar pologic	r mode ted bit bef ted bit aft No al graph 1 (32,16) 5 (32,16) 9 (32,16)	Nova va-A01-1 2 (32, 16) 6 (32, 16) 10 (32, 16)	3 3 (32, 16) 7 (32, 16) 11 (32, 16)	4 4 (32, 16) 8 (32, 16) 12 (32, 16)	Separator Numberi	- Z-shape Zoom 🗶		Number
numbe mbering Fix Fix Instar pologic	r mode ted bit bef red bit aft No al graph 1 1 (32,15) 5 (32,15) 9 (32,15)	Nova va ⁻ A01-1 2 (32, 16) 6 (32, 16) 10 (32, 16)	3 3 (32, 16) 7 (32, 16) 11 (32, 16)	4 4 (32, 16) 8 (32, 16) 12 (32, 16)	Separator Numberi	- Z-shape Zoom 🕢		Number
numbering Fiz Fiz Instar pologic 1 2 3 4	r mode red bit bef red bit aft vce nu No al graph 1 (32,16) 5 (32,16) 9 (32,16) 9 (32,16) 13	Nova va-A01-1 2 (32, 16) 6 (32, 16) 10 (32, 16) 14 (m, 12)	3 3 (32, 16) 7 (32, 16) 11 (32, 16) 15	4 4 (32, 16) 8 (32, 16) 12 (32, 16) 12 (32, 16) 16	Separator Numberi	- Z-shape Zoom 🗶		Number
number mbering Fix Instar pologic	r mode ted bit bef ted bit aft No al graph 1 (32,16) 5 (32,16) 9 (32,16) 13 (32,18)	Nova va-A01-1 2 (32, 16) 6 (32, 16) 10 (32, 16) 14 (32, 16)	3 3 (32, 16) 7 (32, 16) 11 (32, 16) 15 (32, 16)	4 4 (32, 16) 8 (32, 16) 12 (32, 16) 16 (32, 16)	Separator Numberi	- Z-shape Zoom 🕢		Number
number mbering Fix Instar pologic	r mode red bit bef red bit aft No al graph 1 (32,16) 5 (32,16) 9 (32,16) 9 (32,16) 13 (32,16)	Nova va-A01-1 2 (32, 16) 6 (32, 16) 10 (32, 16) 14 (32, 16)	3 3 (32, 16) 7 (32, 16) 11 (32, 16) 15 (32, 16)	4 4 (32, 16) 8 (32, 16) 12 (32, 16) 16 (32, 16)	Separator Numberi	- Z-shape Zoom 🕢		Number
numbe mbering Fix Instar pologic	r mode ted bit bef No al graph 1 (32,16) 5 (32,16) 9 (32,16) 13 (32,18)	Nova va=A01-1 2 2 (32, 16) 6 (32, 16) 10 (32, 16) 14 (32, 16)	3 3 (32, 16) 7 (32, 16) 11 (32, 16) 15 (32, 16)	4 4 (32, 16) 8 (32, 16) 12 (32, 16) 16 (32, 16)	Separator Numberi	- Z-shape Zoom 🕢		Number
numbe mbering Fix Instar pologic 1 2 3 4	r mode red bit bef No enu No al graph 1 (32,16) 5 (32,16) 9 (32,16) 13 (32,16)	Nova 2 2 (32,16) 6 (32,16) 10 (32,16) 14 (32,16)	3 3 (32, 16) 7 (32, 16) 11 (32, 16) 15 (32, 16)	4 4 (32, 16) 8 (32, 16) 12 (32, 16) 16 (32, 16)	Separator Numberi	- Z-shape Zoom 🕢		Number

Fig. 4-28 Set module number

Save receiving card parameters: Check this option to save parameters to receiving card and the parameters won't lost if the power is terminated.

4.1.4.1Calibration process

1) Starting calibration

a) Make sure that the lens of the camera is directed to the cabinet to be calibrated. If the system is connected to a barcode scanner, scan the bar code of the cabinet directly and the calibration will be started automatically.

You can see the Cabinet ID has been read automatically on the pop-up "cabinet ID" window.

Just click "OK". When the barcode scanner is not connected, click "start". The

"Cabinet ID" window will pop up and you need to enter the ID of the present cabinet.

If the Cabinet ID was set as automatic mode in 4.1.1.4 Calibration parameters, you

can see the Cabinet ID has been generated automatically on the pop-up "Cabinet ID" window and just click "OK".

🚺 Cabinet ID	×
Please For example: A-1,1-1, 001, etc	2.
Tip:Cabinet ID can not contain any of the following characters: /,:,*,?,*,<,>,',	
0	ж



"Cabinet ID" is the unique identifier for the cabinet in the batch and can't be repeated. After it is entered, click "OK" button to start the calibration. Then the button changes to "End Calibration".

b) During the process, the calibration software will automatically control the screen to display the corresponding colors. Operate the camera to collect image and analyze it intelligently. The corresponding progress can be viewed in the progress list on the right of the interface. During the calibration process, click "End Calibration" button to stop the current calibration process and

cancel the calibration. If an error prompt appears during calibration, the process stops automatically. Follow the prompt to change the settings and then click "Start Calibration" button to start the calibration again.

2) Adjusting calibration target

Before generating the coefficient, following interface will pop up. Adjust target value on the interface or directly adjust color gamut if not satisfied with previous target value. Click "Apply" to apply new value and subsequent cabinets will use this value as well.



Fig. 4-30 Modify target value-with colorimeter

3) Uploading coefficient

- a) Click the button and upload it to the coefficient control system. The screen will display the calibration results. If you are not satisfied, you can re-set the "Calibration Standard" for red, green and blue and upload again.
- b) Click Save To Flash to save the generated coefficients to hardware.
- c) Click Save To Database to save the generated coefficients to database.
- d) Click "Write in module flash". The software will check the consistency of coefficients saved in the
 Flash chip of current cabinet and the calibration coefficients sending from software to the cabinet.
 If they are consistent, the software will save the coefficient to Flash.

e) Click the "View Results" button and the following dialog box will pop up. Switch colors and calibration switch to view the calibrated results.

View effect				X
Effect view				
Color: 🔘 Red	🔘 Green	🔘 Blue	🔘 White	
Bright: 🔨				▶ 30/100
🔽 Correction enabl	ed			<u>Modify target</u>

Fig. 4-31 Cabinet image control

f) Click "Brightness data export" to export the brightness data of each lamp to the local Excel file.

4) Calibration information feedback

This column is mainly used to display the dead lamp information of current calibrated cabinet and inconsistent information before and after calibration.

5) Common parameter

The common parameters will be computed for three times during calibration. They will be generated respectively in the 5th, 10th and 20th cabinet. If the common parameter is not generated in the cabinet of the set number, it will be continuously generated in the following cabinet until it is generated. And the common parameter will be automatically saved to the database.

6) Calibration of first cabinet is completed

If "Manual calibration" is selected, the result of the single step will prompt after each step is completed such as "analysis completed", "uploading of coefficients completed", etc. If "Automatic calibration" is selected, it will display the information of the current step execution status in the status bar below and update the icon on the right side in real time. After all the calibration steps are completed, a dialogue box as shown below will pop up to prompt that the calibration of the present cabinet has been completed.

After the calibration of the cabinet is completed, the screen will be displayed as black so as to avoid being continuously lighted which may cause inconsistent brightness decay as the surrounding cabinets. If you need to view the calibration effect of other colors, click "View effect" to view.



Fig. 4-32 Notice for the completion of calibration

4.1.4.2Calibration record

* Preparation *	Update From Database
Measurement Tool 💝	Cabinet Catalog Detail
Correct target 💝	Filter: None ID: Detail
Calibration 🛠	Coeffients Dead Leds Expected Value Measured Value
Calibration	
Calibration Record	PixelCol PixelRow x1 x2
Tools 😞	
Common Color Gamut Tool	5
Data Analysis And Processing	
Database Division	
Cabinet To Screen	
Authorization lock	Empty Points Upload Coefs Save To Fals Image Test
Language (旧言) 炎	
*	Back Next
Camera:Disconnected	Colorimeter:Disconnected Barcode Gun:Disconnected Callibrated:0 Times: 00:00:00

Fig. 4-33 Calibration record

1) Cabinet Catalog: The catalog shows all the cabinet IDs saved in the database. Double-click an entry or selecting an entry and click "check" button, the column in the right will show the detailed data information of the cabinet.

2) Detail: This column lists the basic information of the cabinet, including calibration coefficient, uniformity, dead light records, target value of calibration, measured brightness and chroma. After reading calibration coefficient of a cabinet from the database, directly click "Upload Coefficient" at the bottom to upload.

4.2 Calibration of subsequent cabinets

Move on to next cabinet and calibrate the subsequent cabinets according to the steps as shown in the figure below.

*			
Measurement Tool 💝	Calibration Methods	0	Send Uabinet Parameters
	🔘 Manual 💿 Automatic 🛛 Customize	0	Pre-Warm
Correct target 🛠		0	Gauge one by one
Correct target	Calibration Process	0	Analyze Red Led 姠
Calibration 🛠	🔵 Red 🔘 Green 🔘 Blue 💿 Red v Green v Blue	0	Analyze Green 🍌
Calibration		0	Analyze Blue 🏻 📌
Calibration Regard	V Enable Gap Calibration	0	Create Coefs
	Uplaod Coeffients	0	Upload Coefs
Tools 😞		0	Save To Database
Common Color	Uplaod Coefs Save To Flash Save To Database	0	Save cabinet name
Gamut Tool	Write in module Trage Test	0	Save module ID
Data AnaLysis And Processing		0	Save To Flash
Database Division	Feedback	0	Save to Factory Area
Cabinet To Screen	Dead Leds: Red - 0 Rate of value that reaches 100%	0	Write in module flash
Authorization lock	The The first: Uncreated 1 second: Uncreated 1 third; Uncreated 1	O Curr	Save receiving card parameters ent ID:
Language(语言) 🕹			
	(Bac	k Next
¥			

Fig. 4-34 Start calibration for subsequent cabinet

🚺 Cabinet ID	×	(
Please	For example: A-1,1-1, 001, etc.	
Tip:Cabinet ID can of the following c /,:,*,?,",<,>,',	not contain any haracters: 	
	ОК	

Fig. 4-35 ID of subsequent cabinet

Click "**Image Test**" on the main interface to modify target value. Click "**Preview**" after the value has been modified to view result. If satisfied, click "**Apply**" to apply the calibration target to the subsequent cabinets.

*			
Measurement Tool ≎	Calibration Methods	0	Send Cabinet Parameters
Correct target 🕱	Manual O Automatic Customize	0	Pre-Warm
Correct target	Calibration Process	0	Gauge one by one
Colibration A	Red Green Blue @ Red Green Blue	0	Analyze Green 🍈
Calibration ×		0	Led 🖍 Analyze Blue
Calibration	Rnahle Gan Calibration Start	0	Led Create Coefs
Calibration Record		0	Upload Coefs
Tools 😞	Uplaod Loeffients	0	Save To Database
Common Color	Uplaod Coefs Save To Flash Save To Database	0	Save cabinet name
Gamut 1001 Data Analysis	Write in module Image Test Chroma distributi	0	Save module ID
And Processing		0	Save To Flash
Database Division	Feedback Rate of value	0	Save to Factory Ares
Cabinet To Screen	Jead Leds: Red V that reaches 100%	0	Write in module flash
Authorization lock🌫	The	0	Save receiving card parameters
Language(语言) 🕹		Curr	ent ID.
		Back	x Next
74	OVAS		

Effect view-					
		<u> </u>			
Color: 🧕) Red	🔘 Green	🔘 Blue	🔘 White	
Bright: 🔨					> 30/100
🔽 Correct:	ion enabled				Modify targ
					¥
Target value	e adjustment—				Restore
Correction n	node				lestore
© Brig corr	htness ection	0	Ordinary ch correction	roma	Multiple bin chroma correction
Target valu	e setting				
	Brightness	Cx	Су	Brig	htness decay proportion
Red	900.00	0.6900	0.3000	•	15%
Green	1800.00	0 1700	0.7400		0%
or cen	1000.00	0.1100	0.1100		
Blue	300.00	0.1300	0.0800	•	• 0%
White	3000.00	0.3236	0.3267	•	۶%
	Enable colour	temperatur	e		
		-0			5930 K
		● ↑ 6500		↑ 9300	
			$\left(\right)$		
					Preview Apply
		Fig	. 4-36 View	ring result	
	NI-t	-			
	INOTI	ue .			
) The	calibration is	s completed!	

Fig. 4-37 One click to complete the calibration of subsequent cabinets

1)	During the entire calibration process, the location of the chassis of the cabinet
	and the camera, focal length and configuration must remain unchanged. In case
	the improper operation causes the damage of the calibration site, a new
	database shall be rebuild to calibrate the remaining cabinets which are regarded
	as another batch (Make sure that the brightness and chroma standard for both
	calibrations shall remain unchanged).
2)	The location of each cabinet is required in strict consistency.
3)	Every 20 cabinets are monitored for calibration results using the functional

module "Simulate and Adjust coefficients" of "Data Analysis And Processing"
tool.

Cabinets requiring recalibration

After all cabinets are calibrated, it needs to calibrate the cabinet requiring recalibration again to ensure splicing results after calibration.

The list of cabinets requiring calibration will be directly displayed at the right side of the software interface. The reason why the cabinets need re-calibration will be judged automatically, and the user can check the reasons and pick out the cabinets requiring recalibration for the same reason, which is convenient to solve the problem once for all and recalibrate.

*		K	🕽 Re-Calil	bration Cabin	et List		×
Preparation 🛠			Calibrate	ed Cohinet: () Caliba	ating Cabinet: 64	
Database	Nova Calibration for Cabinet			0 v		ating capinet. of	
Cabinet Control	Important notes: Each batch of cabinets requires a corresponding information file (database), the		Abnorm	nal image	Edge	e correction factor	<u>Help</u>
Cabinet Paras	File Will record the correction factor of each capinet in the batch, please Keep it properly. Calibration Mode		Cabine	^t Calibrati	on Time	Reason for re-calibration	
Calibration Paras	© Cabinet Calibration						
Measurement Tool 🛠	Screen Parameters (optional) Cabinets: 64						
Camera	Screen -						
Colorimeter	Screen Information File						
Barcode gun	New Load Save As						
Correct target 😞	Directory:C:\Users\Administrator\Desktop\新建校正项目\新建校正项目_NCPro						
Correct target							
Calibration 😞	Images saving address D:\我的文档\BovaCLB-Cabinet\CorrectFile Browse						
Calibration	Save all cabinets' images (Need large space)						
Calibration Record	Back Next						
Camera:Disconnected	Colorimeter:Disconnected Barcode Gun:Disconnected Callibrated:0 Times: 00:00:00		•			m	•

Fig. 4-38 Recalibration

1) During the whole calibration process, the location of the cabinet pedestal and
the position, focal length and configurations of the camera must remain
unchanged. If improper operation results in any change to the calibration site, a
 new database must be created to calibrate the remaining cabinets which are
seemed as another batch. Ensure that the brightness and chroma standards

	must be the same as the first batch)
2)	For the first 30 cabinets, every 10 cabinets will be monitored by measurement
	data simulation software for their calibration effects. After the first 30 cabinets,
	every 20-40 cabinets will be simulated at the same time. The simulation of
	calibration database is a very important part of cabinet calibration.

4.3 Identification of simulation diagram

Simulation diagram is generated through some calculation based on the calibration coefficient of the cabinet. What the simulation diagram simulates is **the splicing of the cabinet before calibration**. So the simulation diagram could be interpreted as **the brightness analog diagram of cabinet**.



Fig. 4-39 Generating principle of simulation diagram

The above diagram shows the simulation diagram generation principle. If simulation diagram is unreasonable, look for reasons from three aspects:

(1) Unreasonable splicing before cabinet calibration (from the calibration direction).

It means abnormal situation on simulation diagram is caused by cabinet itself, please check the measured red, green and blue image in calibration software.

(2) Something wrong with the pictures collected by camera.

If most cabinets have problems, please adjust the camera or camera parameters for re-calibration;

If individual cabinet has problems, please re-calibrate the cabinet.

(3) Something wrong with the calibration software.

Simulation diagram identification method will be further introduced in Chapter 4.5.

The usage of measured data simulation software and the identification of simulation diagram will be briefly introduced as follows with examples (Please refer to "Cabinet measured data analysis software help file" for more information).

4.4 Method to view simulation diagram

Click "Data Analysis And Processing" to enter the cabinet database management platform NovaCLB-CabSolver.

Then click "Simulate and Adjust coefficients" to generate the simulation image under this function option. Besides the function of simulation, NovaCLB-CabSolver also has the functions of brightness analysis, database combination, and exporting/deleting cabinet.

Please refer to *NovaCLB-CabSolver Quick Start* for detailed operation instructions of the management

*		_]
Measurement Tool >	Calibration Methods	0	Send Cabinet Parameters
	Manual O Automatic Customize	0	Pre-Warm
Correct target 😞		0	Gauge one by one
Correct target	Calibration Process	0	Analyze Red Led 姠
Calibration 🛠	🔘 Red 🔘 Green 🔘 Blue 💿 Red、Green、Blue	0	Analyze Green 📌
Calibration		0	Analyze Blue 📌
Colliburation Record	The start Start Start	0	Create Coefs
Calibration Mecord	In and Coefficients	0	Upload Coefs
Tools 😞		0	Save To Database
Common Color	Uplaod Coefs Save To Flash Save To Database	0	Save cabinet name
Gamut Tool	Write in module Image Test Chroma distributi	0	Save module ID
And Processing		0	Save To Flash
Database Division	Feedback	0	Save to Factory Area
Cabinet To Screen	Rate of value Dead Leds: Red - 0 that reaches 100%		Write in module
	Common parameter	9	flash
Authorization lock>	The Uncreated 1 The Uncreated 1 The Uncreated 1 Uncreated 1	O Curr	Save receiving card parameters ent ID:
Language (语言) 💝			
		Bacl	k Next
×			

 \sim

Ebad Database + Language(旧言)	Information	Duinhtur er für skusie	Cinculate and falling an efficients	Dalata/Euroat Manua	Ochinethleure	Madifi Occofficiente finenzi ()
Cabinet List	Information	Brightness Analysis	Simulate and Adjust coefficients	Delete/Export Merge	L Cabinet Name	Modify Coefficients Avera;
Group Mode: 💿 Time						
 Type Resolution 						

Fig. 4-40 Access to cabinet calibration management software

1) Loading cabinet database

Click "Load database" and click "**Add files**" to directly import calibration database or click "**Add folders**" to import the databases of already calibrated cabinets in the folder as shown in the figure below.

: Load Database 👻 Language(语言)	•								
Add Files	Information	Brightness Analysis	Simulate and Adjust coefficients	Delete/Export	Merge	Cabinet Name	Modify Coefficients	Avera	4
Additionality									



2) Select "Order Splicing Simulation" or "Random Splicing Simulation":

Cabinet List	Information	Brightness Ar	nalysis Simulate a	and Adjust coefficients	Delete/Export Merge Cabinet Name Mo	dify Coefficients Avera
Cabinet List Last Two Weeks PublicTest-6-1-1.db	Information Paint ID: Splice: Color: Display:	 Brightness Ar Yse Order Red Gray 	Allysis Simulate a	● Blue ● Primary Color	Delete/Export Merge Cabinet Name Mo Cabinet total numbers: Simulation Range Total First N cabinet,N equals Last N cabinet,N equals Random N cabinet,N equals Range Tips:input the range as "1-	10 10 1 1 1 1 1 5 Simulation



 Switching "Do Not Draw ID" and "Draw All the IDs" to view whether the splicing among cabinets shown in the simulation diagram is normal.

Load Database 👻 Language(语	狺)	•										
Cabinet List		Information	Brightness A	Analysis Simulate a	and Adjust coefficients	Delete/8	Export N	vlerge	Cabinet Name	Modify Coefficients	Avera; 1	•
Last Two Weeks		Paint ID:	Vea	No.								
PublicTest-6-1-1.db		Splice:	Order	Random			с	abinett	otal numbers:	10		Simu
		Color	Red	Green	🔿 Blue							lation
		Display:	Crav	Ealse Color	Primary Color			Simula	tion Range			-
		Diopia).	U Oldy			€.		Tot	al		ſ	Orig
								Ein	at hi cohinot hi			jinals
								equ	Jais	1		Targ
								la: equ	st N cabinet,N Jals	1	-	lets Br
								© Ra equ	ndom N cabinet, Jals	N 1		ightnes:
								🔘 Ra	nge	1-1		s Modif
								<u>Tips:</u> i	nput the range a	<u>s '1-5'.</u>	ŀ	_
												Edge N
										Simulation		Aodify

Fig. 4-43 Selecting whether simulation diagram to draw ID or not

4) Switch display mode. Primary color, graying and pseudo color are the three expressions of measuring brightness. Some brightness differences difficult to be identified on the primary color diagram are easy to be identified on grayscale, pseudo color diagram.

Cabinet List	Information	Brightness An	alysis Simulate a	and Adjust coefficients	Delete/Export	Merge Cabinet Name	Modify Coefficients	Avera <u>(</u> 1
Last Two Weeks PublicTest-6-1-1.db	Paint ID: Splice: Color: Display:	 Yse Order Red Gray 	 No Random Green False Color 	 Blue Primary Color Primary Color 		Cabinet total numbers: Simulation Range Total First N cabinet,N equals Last N cabinet,N equals Random N cabine equals Range Tips:input the range	10 1 1 1 1 1 1 1 1 1 1 1 1 1	

Fig. 4-44 Switch display mode

5) Select simulation range, and then click **Simulation** to generate the simulation diagram.



Fig. 4-45 Simulation diagram

4.5 Cases of the identification of simulation diagram

The simulation diagram of NovaCLB-CabSolver is generated by calculation based on the cabinet calibration coefficients. What the simulation diagram simulates is the splicing results of the cabinets before calibration. The simulation diagram can be considered as the diagram of cabinet brightness simulation before calibration. With the simulation diagram, calibration engineers can see the rough result of spliced cabinets on the site (before calibration). If there is anything wrong with the measured brightness data, the engineers can see the unreasonable situations, for example:

- There are obvious boundary lines or difference between cabinets, but actually there is none (See Case 5).
 - Reasons: Modules on edges of cabinets or some lines of LEDs may have a problem.
- Most cabinets have serious modularity inside or regular defects (See Case 3 & 4).
 Reasons: It is generally caused by the cabinet process. On-site calibration is recommended.
- On the simulation diagram, a few cabinets have significant differences from other cabinets (gray or false color image) (See Case 6).
 Reasons: Maybe the camera is not stable during image capturing. It is recommend that these abnormal cabinets be re-calibrated.



Case 1: good effect and normal cabinet





Case1 (b) Green in pseudo color mode

Fig. 4-46 Case 1

Analysis: The measured data of green before calibration is rather ideal in this case. There is no significant abnormal data, and it also reflects that this batch of display screens has no obvious process problems although they have a handful of modular and slight blurred screen phenomenon at the same time. In addition, obvious lines within cabinet can be seen in the case, which is caused by module joints within cabinet and normal.

Conclusion: Normal.

Case 2: Edge lines among cabinets

B21	B20	B23	B22	B24	D14	E03
E02	E05	E04	F02	F16	F14	E12
E13	B27	A15	B25	B26	B19	D03
A17	A18	A19	A20	D02	D01	C14

Case2 (a) Green in primary color mode



Case2 (b) Green in pseudo color mode

Fig. 4-47 Case 2

Analysis: Obvious seam lines can be seen among the green cabinets in the case and show as horizontal lines. It is extremely unreasonable. Generally there should be no such condition before cabinet calibration. Therefore, there is something wrong with the pictures shot by camera.

Conclusion: It is suggested to decrease saturation and recalibrate.

Case 3: Serious effect of module

1		4							11	13	14		16
17					23	24	126		128	130			27
		31			34						41	42	43
44									54				59
		63	64								73		75
						83	84		86				91
	94	95	96			99							107
	110	111	112	113	114		116	117	118	120			123

Case3 (a) Green in primary color mode







Analysis: Green module effect in this case is very sever. In this situation, though the cabinet calibration can greatly improve the uniformity of cabinets, it is difficult to avoid a small brightness difference among the cabinets after splicing on the site since the brightness varies obviously.

Conclusion: It is suggested to calibrate on site to ensure to achieve the optimal effect. Cabinet calibration is able to improve a lot but unable to solve the problem completely.

Case: 4 : There are several cabinets with quite optimal uniformity

1-1	1-2	1-3	1-4	1-5	1-6	1-7	1-8	1-9
2-1	2-2	2-3	2-4	2–5	2–6	2-7	2–8	2-9
3-1		3–3	3-4	3-5	3-6	3–7	3–8	3-9
4-1	4-2	4–3	4-4	4-5	4-6	4-7	4-8	4-9
5-1	5-2	5–3	5-4	5-5	5-6	5-7	5-8	5-9

Case4 (a) Green in primary color mode



Case4 (b) Green in pseudo color mode

Fig. 4-49 Case 4

Analysis: The measured data of green is quite normal before calibration in this case. But the uniformity of cabinet3-5 is much better than other cabinets, which is quite abnormal.

Conclusion: Cabinet3-5 need recalibration.

Case5: Abnormal dark lines on cabinet edges


Case5 (a) Red in primary color mode



Case5 (b) Red in graying mode

Analysis: The simulation diagram in the case show that obvious dark lines can be found among cabinets before calibration of red. View the photos and find that the last line of red lights of the cabinet is darker. View the cabinet and find that the last line of red lights of the cabinet are tilted.

Conclusion: It is suggested to calibrate the lights in the last row after making them in the right location. Although the cabinet calibration can improve this situation in the calibration direction, it will still have dark line problem when viewing it in another direction after calibration.

5 Calibration of Newly-installed Modules

Calibrate the newly-installed modules which have replaced old or broken modules in order to keep

Fig. 4-50 Case 5

uniform visually with the surrounding modules.

5.1 Preparations

5.1.1 Configuration of information database

The calibration information base is different from the calibration coefficient database. Information base not only records the calibration coefficients of all the cabinets of the display screen, but also manages all the parameters related to calibration. In this way, the users can record all the calibration information of each display screen, and the brightness and chromaticity standards, time of calibration, uniformity and dead point information of each cabinet before and after the calibration, etc.

Meanwhile, the software automatically control the database size in the information base. When the calibration coefficient of the cabinet exceeds 1.8 G, the software will automatically compress the data or create a new database and the user only needs to save the operation after cabinet calibration is completed.

It is suggested that clients manage the calibration information base by taking the display screen as a unit. Therefore, firstly create an information base for this display screen while calibrating.

*	
Preparation 🛠	
Database	Nova Calibration for Cabinet
Cabinet Control	Important notes: Each batch of cabinets requires a corresponding information file (database), the file will record the correction factor of each cabinet in the batch, please keep
Measurement Tool ≽	it properly.
	Calibration Mode
Calibration 💝	C Labinet LaLibration S New Module
	Screen Parameters (optional)
Tools 🛠	Cabinets: 64
Common Color Gamut Tool	Screen - Description:
Data Analysis And Processing	Screen Information File
Database Division	New Load Save As
Cabinet To Screen	Directory:
Authorization lock	
Language(语言) 🕹	Images saving address
	Browse
	Save all cabinets' images(Need large space)
	Back
*	
Camera:Disconnected	Colorimeter:Disconnected Barcode Gun:Disconnected Callibrated:0 Times: 00:00:00

Fig. 5-1 Main interface of calibration software

- Screen parameters: Parameter information herein is specific to big screen of the current cabinet and can be adjusted. As users manage the calibration information base taking a display screen as the unit, objectively recording the full screen parameters will help future management of information base.
- 2) Screen information file: A corresponding information file (calibration project) need to be created for each display screen, which will record the information of the display screen, the calibration coefficients of each cabinet, and the relevant calibration parameters.
- > New : Create new project files of cabinet calibration and the database is the database of the module;
- Load: Load project files of the cabinet in which the module locates. Database in this file includes the database of the cabinet in which the module locate;
- Save as: Modify name and path of the project files.
- 3) Backup database: The software defaults to check this option. Enabling backup data can effectively

prevent database file being damaged due to abnormal close of software or sudden blackout of computer.

4) Image saving address: Select a location to save cabinet images during calibration. If "Save all cabinets' images" is checked, all cabinet images will be saved. Otherwise, only images of the current calibrated cabinet are saved.

Preparation 🛠	
Database	Online
Cabinet Control	NovaLCT IP: 1/2.16.1.149 Fort: 8080 Connect Disconnect
Measurement Tool 💝	LCT Load Area: Cols: 128 Rows: 96
Calibration 🛛 🛠	Receiving card parameter files
Tools 🛠	Sending Ethernet Receiving File Modify
Common Color Gamut Tool	
Data Analysis And Processing	Acquire receiving card parameter file
Database Division	
Cabinet To Screen	Manually set the module position
Authorization lock	Start p X: 0 X 10 X
Language(语言) 💝	Module 16 🐳 X 16 🐳
	Area to be captured: Start position: (0,0); Display size: Cabinet Control (32,32)
4	Back Next
¥	

5.1.2 Cabinet control



- 1) Online: Input IP of the computer operated in LCT client and port number and click "connect". After the interface prompt the connection is successful, start online calibration. At this time, control system automatically enters into calibration mode. We can see Gamma value of the LED screen is set as 1.
- 2) Acquire receiving card parameter file: Click card parameter file to acquire receiving card parameter file of current batch. Single receiving card parameter could be modified. Set a name easy to recognize for the file. Select the file in the dropdown list and then send it to receiving card.

Acquire receiving

In general, click "Save configuration file" button during calibration process to save the configuration file to local of calibration software side after LCT configure the first cabinet of this batch successfully. After one cabinet is calibrated, switch to next one. Select send configuration file directly to turn on the cabinet. It ensures that the subsequent cabinets can use the same receiving card parameters of the first cabinet.

3) Module location

It is necessary to locate the new module so as to calibrate new module precisely.

a) Manual setting

If the operator know about the location of the coordinates of new module, use manual setting to set. Set coordinates and module size quickly and click "Next" to connect camera.

A Preparation &	
Database	Online
Cabinet Control	NovaLCT IP: 172.16.1.149 Port: 8080 Connect Disconnect
Measurement Tool ↔	LCT Load Area: Cols: 128 Rows: 96
Calibration 🕹	Receiving card parameter files
Tools 😞	Sending Ethernet Receiving File Modify
Common Color Gamut Tool	S
Data Analysis And Processing	Acquire receiving card parameter file Clear
Database Division	
Cabinet To Screen	Manually set the module position
Authorization lock>	Start p X: 0 🔿 Y: 0 🗢 Auxiliary
Language(语言) 🎸	Module 16 💌 X 16 🖤
	Area to be captured: Start position: (0,0); Display size: (32,32)
	Back Next
Camera:Disconnected	Colorimeter:Disconnected Barcode Gun:Disconnected Callibrated:0 Times: 00:00:00

Fig. 5-3 Manually set the location of new module

b) Auxiliary identification

If unable to locate the location of module, click



and the following steps shown as

the figure below.

*	
Preparation 🛠	
Database	Online
Cabinet Control	NovalLI IP: 112.10.1.149 Fort. 0000
Measurement Tool 🍣	LCT Load Area: Cols: 128 Rows: 96
Calibration 🛛 💝	Receiving card parameter files
Tools 😞	Sending Ethernet Receiving File Modify
Common Color Gamut Tool	
Data Analysis And Processing	Acquire receiving card parameter file Clear
Database Division	
Cabinet To Screen	Manually set the module position
Authorization lock%	Start p X: 0 🖈 Y: 0 🐳
Language(语言) 💝	Module 16 🚔 X 16 🐳
	Area to be captured: Start position: (0,0); Display size: (32,32) <u>Cabinet Control</u> <u>Instructions</u>
	Back Next
amera:Disconnected	Colorimeter: Disconnected Barcode Gun: Disconnected Callibrated:0 Times: 00:00:00
amera.bisconnected	

NovaPro doesn't support auxiliary identification.

Fig. 5-4 Auxiliary identification

 a) Set module size and click "Next". The screen is divided into many partitions with number. (Software defaults to divide according to 4x4).

ModuleSize Inform	nation X				
Module Size:	16 🔿 x 16 🜩	1	2	3	4
		5	6	7	8
	Next	9	10	11	12

Fig. 5-5 Module size

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



Fig. 5-6 Confirming new module number

5.2 Camera

Adjust the saturation of camera to "Normal" and imaging size to "Appropriate".

Automatic adjustment and manual adjustment could be selected during the process.

Please refer to 10.4 Operating skills of camera.

Cabinet Paras									
Calibration Paras	Camera Op	eration talCamera	🔘 Caliri	s			Conn	ect Di	sconnect
Measurement Tool 🛠	C1200		-						
Camera	Saturatio	on Adjustment —							
Colorimeter	The rec area is and ana	ommended inter low,please ad lysis again.	va: satu just the	ation[camera	60-90] micro	,LED ar) coke ma	ea[50-150].If sa ade the image bl	turation is ur on the c	normal but amera window
Barcode gun									
Correct target 💝	Auto	matic Mode (O Manual	Mode			Image F:	review A	uto ALI
Calibration 💝	Color	Brightness (%)) Exp	osure	An	alyze	Saturation	Area	Check
Tools	G	20	▼ 300) 🔻	Aut	omatic	N/A	N/A N/A	
	В	20	30) 🔻	Aut	omatic	N/A	N/A	
Authorization lock>			**		-		,		
Language (语言) 🛠									• 1
中文(zh-CN)									
English (en)									
한국어 (ko-KR)								Back	Next
Camera:Connected Co	lorimeter	isconnected 1	Barcod	Gun	liscon	nected	L Callibrated 0	L Times: 00:	00.00



5.3 Module calibration

Calibration modes include **Manual** and **Automatic.** Automatic calibration allows customization. Please refer to 4.1.4 Calibration for calibration mode and operating skills.

Note: Save to database has two cases:

- 1) Module database is created in 5.1.1 Configuration of information database. So the database saved here is the database of latest calibrated module.
- 5.1.1 Configuration of information database has loaded the database of the cabinet in which the module locates. So input the ID of the cabinet in which the module locates during input of cabinet ID. Saved database is the cabinet database including the calibration coefficient of newly calibrated module.

<u> </u>	1	
Preparation 🛠	Calibration Methods Manual Automatic Customize	Initialization
Database		🚺 Analyze Red Led 🔅
Capinet Control	Calibration Process	
Measurement Tool 🍣	💿 Red 💿 Green 💿 Blue 💿 Red、Green、Blue	💽 Analyze Green 姠 Led
Calibration 🛠		💽 Analyze Blue 📌
Module Calibration	Uplaod Coeffients	
Tools 🛠	Uplaod Coefs Save To Flash	U Lreate Loefs
Gamut Tool	Same To Detabland	🚺 Upload Coefs
Data Analysis And Processing	Dave to bacabase	C
Database Division		Jave Io Flash
Cabinet To Screen		💽 Save To Database
Authorization lock&		The serial No. of cabinet(module) where
Language(语言) 🕹	CX.	the module is located:
		Back Next
¥		
Camera:Disconnected	Colorimeter:Disconnected Barcode Gun:Disconnected Callibrate	d:0 Times: 00:00:00 .::

Fig. 5-8 Module calibration

6 Uploading Coefficients (factory use)

The function is designed for cabinet calibration. After the calibration of all cabinets is completed, connect cabinet to full screen according to ID of receiving card via NovaLCT (above V4.4.1) and upload it to hardware. Operating steps are shown in the figure below:

Screen Calibration					
Single-Screen Mode Combined-Sc	Online Calibration Offline Calibration Manage C	oefficients			
Current Operation	Select Operation -				
COM99 V	1 Unload coefficients				
Current Screen	2 Save calibration coefficients to database				
Screen1	2. Save calibration coefficients to databas	4 2 <u>5</u>			
	4 Set coefficients for a new module	2			
	5 Adjust coefficients (Color is uniform on	screen)			
	6 Frase or reload calibration coefficients				
	7.Reset calibration coefficients				
	8.Upload Coefficients(factory use)				
					X V
Position for Turning on Screen					
Primary Display					
Extended Display					
Enable/Disable Calibration					
Disable calibration -					
Save					
Screen Calibration	A CONTRACTOR OF THE OWNER			1.00	↔ <u>- • × ×</u>
Screen Calibration	Online Calibration Offline Calibration Manage C	oefficients		-	🗢 💶 💌 🗙
Screen Calibration Single-Screen Mode Combined-Sc • • Current Operation Conversation Poet	Online Calibration Offline Calibration Manage C Select coefficient region to be operated	oefficients		an 199	
Screen Calibration Single-Screen Mode Combined-Sc + + Courrent Operation Communication Port COM99	Online Calibration Offline Calibration Manage C Select coefficient region to be operated	oefficients	12VX 256H	-	→ - • × ×
Screen Calibration Single-Screen Mode Combined-Sc + Current Operation Communication Port COM99 Current Screen	Online Calibration Offline Calibration Manage C Select coefficient region to be operated Screen:1 Starting coordinate	oefficients	12▼× 256H		
Screen Calibration Single-Screen Mode Combined-Sc Current Operation Communication Port COM99 Current Screen Screen1	Online Calibration Offline Calibration Manage C Select coefficient region to be operated Screen:1 Starting coordinate	oefficients	12▼×256H		Zooming
Screen Calibration Single-Screen Mode Combined-Sc () Current Operation Communication Port CoM99 Current Screen © Screen1	Online Calibration Offline Calibration Manage C Select coefficient region to be operated Screen:1 Starting coordinate	oefficients	12♥× 256H ID:4		Zooming
Screen Calibration Single-Screen Mode Combined-Sc + + - Current Operation Communication Port CoM99 - Current Screen © Screen1	Online Calibration Offline Calibration Manage C Select coefficient region to be operated Screen:1 Starting coordinate ID:1 ID:2 (1,1)	oefficients e X=0, Y=0 Size 5: ID:3 (1,3)	I2 V × 256н ID:4 (1,4)		Zooming
Screen Calibration Single-Screen Mode Combined-Sc + Current Operation Communication Port COM99 Current Screen Screen1	Online Calibration Offline Calibration Manage C Select coefficient region to be operated Screen:1 Starting coordinate ID:1 ID:2 (1,1) ID:2	oefficients e X=0, Y=0 Size 5: ID:3 (1,3)	ID:4 (1,4)		Zooming
Screen Calibration Single-Screen Mode Combined-Sc () Current Operation Communication Port COM99 Current Screen © Screen1	Online Calibration Offline Calibration Manage C Select coefficient region to be operated Screen:1 Starting coordinate ID:1 ID:2 (1,2)	oefficients e X=0, Y=0 Size 5: ID:3 (1,3)	I2▼×256H ID:4 (1,4)		Zooming
Screen Calibration Single-Screen Mode Combined-Sc () Current Operation Communication Port CoM99 Current Screen © Screen1	Online Calibration Offline Calibration Manage C Select coefficient region to be operated Screen:1 Starting coordinate ID:1 ID:2 (1,1) ID:2 (1,2)	Deefficients	I2₩×256H ID:4 (1,4)		Zooming
Screen Calibration Single-Screen Mode Combined-Sc + + Current Operation Communication Port CoM99 Current Screen © Screen1	Online Calibration Offline Calibration Manage C Select coefficient region to be operated Screen:1 Starting coordinate ID:1 ID:2 (1.1) (1.2) ID:5 ID:6 (2.1) (2.2)	Doefficients	I2₩×256H ID:4 (1,4) ID:8 (2,4)		Zooming
Screen Calibration Single-Screen Mode Combined-Sc + Current Operation Communication Port COM99 Current Screen Screen1	Online Calibration Offline Calibration Manage C Select coefficient region to be operated	Deefficients E X=0, Y=0 Size 5: (D.3 (1,3) ID:7 (2,3)	ID:4 (1,4)		Zooming
Screen Calibration Single-Screen Mode Combined-Sc () Current Operation Communication Port COM99 Current Screen © Screen1	Online Calibration Offline Calibration Manage C Select coefficient region to be operated	oefficients e X=0, Y=0 Size 5: ID:3 (1,3) ID:7 (2,3)	I2▼×256H ID:4 (1,4) ID:8 (2,4)		Zooming
Screen Calibration Single-Screen Mode Combined-Sc () Current Operation Communication Port CoM99 Current Screen © Screen1	Online Calibration Offline Calibration Manage C Select coefficient region to be operated	oefficients e X=0, Y=0 Size 5: ID:3 (1,3) ID:7 (2,3)	I2▼× 256H ID:4 (1,4) ID:8 (2,4)		Zooming
Screen Calibration	Online Calibration Offline Calibration Manage C Select coefficient region to be operated	oefficients	I2V×256H		Zooming
Screen Calibration Single-Screen Mode Combined-Sc + Current Operation Communication Port COM99 Current Screen Screen1 Screen1	Online Calibration Offline Calibration Manage C Select coefficient region to be operated	e X=0, Y=0 Size 5. ID.3 (1,3) ID:7 (2,3)	ID:4 (1,4)		Zooming
Screen Calibration Single-Screen Mode Combined-Sc (*) Current Operation Communication Port COM99 Current Screen © Screen1 Position for Turning on Screen Position for Turning on Screen	Online Calibration Offline Calibration Manage C Select coefficient region to be operated	e X=0, Y=0 Size 5: [D:3 (1,3) [D:7 (2,3)	I2 V ×256H		Zooming
Screen Calibration Single-Screen Mode Combined-Sc () Current Operation Communication Port COM99 Current Screen © Screen1 Position for Turning on Screen © Primary Display	Online Calibration Offline Calibration Manage C Select coefficient region to be operated	e X=0, Y=0 Size 5: ID:3 (1,3) ID:7 (2,3)	ID:4 (1.4)	Folder	Zooming
Screen Calibration Single-Screen Mode Combined-Sc () Current Operation Communication Port CoM99 Current Screen © Screen1 Position for Turning on Screen © Primary Display Extended Display Extended Display	Online Calibration Offline Calibration Manage C Select coefficient region to be operated	oefficients	I2V×256H	Folder	Zooming
Screen Calibration Single-Screen Mode Combined-Sc (*)* - Current Operation Communication Port Communication Port Communication Communication Port Communication Communication Port Communication Communication Port Communication Current Screen Image: Screen 1 Position for Turning on Screen Image: Primary Display Image: Extended Display Enable/Disable Calibration	Online Calibration Offline Calibration Manage C Select coefficient region to be operated Image: Coefficient region to be operated Image: Coefficient region to be operated ID:1 ID:2 Image: Coefficient region to be operated Image: Coefficient region to be operated ID:1 ID:2 Image: Coefficient region to be operated Image: Coefficient region to be operated ID:1 ID:2 Image: Coefficient region to be operated Image: Coefficient region to be operated ID:1 ID:2 Image: Coefficient region to be operated Image: Coefficient region to be operated ID:1 Image: Coefficient region to be operated Image: Coefficient region to be operated Image: Coefficient region to be operated Image: Coefficient region to be operated Image: Coefficient region to be operated Image: Coefficient region to be operated Image: Coefficient region to be operated Image: Coefficient region to be operated Image: Coefficient region to be operated Image: Coefficient region to be operated Image: Coefficient region to be operated Image: Coefficient region to be operated Image: Coefficient region to be operated Image: Coefficient region to be operated Image: Coefficient region to be operated Image: Coefficient region to be operated Image: Coefficient re	oefficients	ID:4 (1,4)	Folder	Zooming
Screen Calibration Single-Screen Mode Combined-Sc (*) Current Operation Communication Port COM99 Current Screen © Screen1 Position for Turning on Screen © Primary Display Enable/Disable Calibration Disable calibration	Online Calibration Offline Calibration Manage C Select coefficient region to be operated Screen:1 Starting coordinate ID:1 ID:2 ID:1 (1,1) (1,2) ID:5 ID:5 ID:5 ID:6 (2,1) ID:5 (2,2) Read Back ID Cabinet Database Location: Operate ID:5 Fast Upl ID:5 Stable U	Deefficients	I2V×256H	Folder	Zooming
Screen Calibration Single-Screen Mode Combined-Sc (*) Current Operation Communication Port COM99 Current Screen © Screen1 Position for Turning on Screen © Primary Display Enable/Disable Calibration Disable Calibration	Online Calibration Offline Calibration Manage C Select coefficient region to be operated	oefficients a ID:3 (1,3) ID:7 (2,3)	I2V×256H	Folder	Zooming

Fig. 6-1 Uploading coefficients (factory use)

Then click

Read Back ID

to read ID of receiving card. The ID may be empty because lower version of

NovaLCT haven't number the receiving card. Try to double click the cabinet on topological graph. ID information including starting coordinates, partition size and ID of receiving card can be modified on the following interface.

Modify receiving card ID	X	
 Receiving card ID information Tips:Location is relative to 	on o the location of the cabinet	
Column Number Row Number of		
Width		D • '
Height ID of receiving c	8	
ОК	Cancel	

Fig. 6-2 ID information of receiving card

Click Select to load cabinet database. If multiple databases are saved by taking cabinet as a unit, check "Folder" to import all cabinet at one time.

Click

to upload all the cabinet databases.

- > Quick upload: calibration coefficients will be uploaded to hardware in a short period of time.
- Stable upload: The upload speed is slower than quick upload. But it is more stable during uploading data.



Click

. The window below will pop u. Check whether the effect of current display is normal.

Yes and the current coefficients will be saved to receiving card.

	×
Please check whether the display effect is OK. Select 'Yes' to continue to save. Otherwise, the operation will be terminated.	
Yes No	

7 Cabinet Database Division

The function of Database Dividing Software is to divide cabinet database into cabinet database of single board or module database according to specific resolution. (Module database format is same to cabinet database and only the resolution is different).

7.1 Operating procedure



Fig. 7-1 Operating procedure of cabinet database division

Preparation 😞	
	Nova Calibration for Cabinat
Database	Nova calibration for cabinet
Cabinet Control	Important notes:
Harrison Tarly	Each batch of cabinets requires a corresponding information file (database), the file will record the correction factor of each cabinet in the batch, please keep it properly.
measurement lool 🌣	Calibration Mode
Calibration 🛠	🔘 Cabinet Calibration 🛛 💿 New Module
	Screen Parameters (optional)
Module Calibration	
	Cabinets: 64
Tools 🐟	
· · · · · · · · · · · · · · · · · · ·	Screen _ Description:
Common Color	
Gamut Tool	Screen Information File
Data Analysis And Processing	New Load Save As
Database Division	Directory:
Cabinet To Screen	
P	Images saving address
Authorization lock🌫	
	Browse
Language(语言) 🕹	
	Save all capinets images(Meed large space)
	Trail Trail
	Back Next
*	
amera:Disconnected	Colorimeter:Disconnected Barcode Gun:Disconnected Callibrated:0 Times: 00:00:00

7.2 Procedure demonstration

Import pat	h:	Select	📃 Folder		
-Division inf	ormation		📃 Autonumber	Tip:Double-click	to automatically number.
Uabinet resolution	:	•			
Total quan	tity of cabinets of the res	5			
Cabinet		-			
Cabinet					
division:	Row U	Col			
		Creat divis			
-Target cabin	et database				
Saving address:		Select			
Database t	ype:				
Single of a standard stand Standard standard stand Standard standard stand Standard standard st Standard standard stand Standard standard st Standard standard stand Standard standard stand Standard standard stan Standard standard standard stan	latabase				
Name of					
database:					
Multiple	e databases				
folder:					
	Start	Cancel	Topological graph scaling	•	۲.
Transformati	on progress display				
Number	Name of Row	Line Name of	Transformatio:	n	

riginal cabine	et database		
Import path:	Select F	older	
ivision inform	nation	Autonumber	Tip:Double-click to automatically number.
Cabinet resolution:		_	
Total quantit	ty of cabinets of the res		
Cabinet number:			
Cabinet	0 🖨 Row 0 🖨 Col		

Fig. 7-2 Open cabinet database division



-Original cabinet Import path:	atabase E:校正V校正-中文V箱体校正数挂	Select 📃	older Total cabinets: 64 Calibrated cabinets:	Language (Lang) (L) 10
Division informat Cabinet resolution: Total quantity of Cabinet number: Cabinet divi Cabinet divi	on 96*128 f cabinets of the resolution: 6 4 • Row 4 • Col Col Tabase Nase Start	creat divisi	Autonumber Tip:Double-click to automati Cabinet : Labinet : Cabinet : Cabinet : Cabinet : Line: 1Row Line: 1Row Line: 1Row Lin:: 1: Lin:: 1: Row: (0,23) Row: (0,23) Row: (0,23) Row: (0,23) Row: (0,23) Cabinet : Cabinet : Cabinet : Cabinet : Cabinet : Cabinet : Line: 2Row Line: Cabinet : Cabinet : Cabinet : Cabinet : Cabinet : Line: 2Row Line: Row Lin:: Lin:: Lin:: Lin:: Lin:: Row: Row: Row: Row: Row: Row: Row: Lin:: Cabinet : Lin:: Lin::	cally number. 3) W W
Transformation p	rogress display			
Number c	ame of Row Line abinet Row number	Name of database	Transformation status	

Fig. 7-4 Inputting division information

Cabinet resolution: Screen cabinets to convert by solution. As shown in the preceding figure, select the cabinets with resolution 96*96 (96 rows * 96 columns).

Select cabinet number: Select cabinet No. to be converted.

Generate divided cabinet topology: Divide a cabinet into multiple equal parts based on the cabinet No.

Modify resolution or No.: Select a cabinet from the topology and right-click to change its resolution or

No.

Automatic numbering: Select this option and double-click a cabinet to automatically number it.

Original cabinet	t database	
Import path:	E:校正校正-中文·箱体校正数据 Select 同 Folder Total cabinets: 64 Calibrated cabinets: 10	
Division informa Cabinet resolution:	ation Autonumber Tip:Double-click to automatically 96*128 Cabinet : C	number.
Total quantity Cabinet number: Cabinet divi	contraction 2 2 2 2 1 <t< td=""><td></td></t<>	
Target cabinet o Saving address: Database typ	database (24,47) <	
 Single data Name of database: Multiple data 	Cabinet:	
Name of fol	Start 3 Cancel Topological III >	
Transformation	progress display	
Number	Name of cabinet Row Line Name of Transformation status	

Fig. 7-5 Setting conversion information

Select: Select a location to save converted database.

Single database: Divide generated data based on No. and save it into a database.

Database name: Set the name of the database generated after division.

Multiple databases: Divide generated data based on No. and save it into different databases. These databases are saved in a folder.

Folder name: Set folder name and save cabinet databases.

Start to convert: Start to divide database.

Operation information list: Display conversion state in real time.

8 Cabinet to Screen

When uploading cabinet database, upload one cabinet each 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-CabinetToScreen to change cabinet database into a screen database, and database uploading can be completed once.

The specific operation is as follows:

1) Import cabinet database

Cabinet Databases	language(语言)
$\sim 0^{-1}$	Browser
Screen Setting	
Cabinet Rows 3 🗘 Cabinet Columns 3 文 Tenarmanhar Zoom 🗸	▶ 1.00
TARTECT	
HONAS	
Default Setted Blank Converted Convert Failed	
Target Database	Wan
	Convert

-Cabinet Databases					language(语言)
D:\Documents\3.29T3.	mdb				Browser Delete
Screen Setting Cabinet Rows 3	Cabinet Columns	3 Topography	Zoon	n «	► 1.00
					1.00
					$\cdot \cdot \cdot$
					3
Default	Setted	Blank Co	nverted Conver	t Failed	
larget batabase			XV		New
					Convert



2) Configuration cabinet topological graph

abinet Da	tahases									language (语言
E:\校正\	校正-中文\箱	体校正\数据库	\20140526-1.mdb							Browser Delete
creen Set Cabinet R	ting lows 3	Cabin	et Columns 3	×	Topogr aphy			Zoom	•	▶ 1.00
▶ 1	1	2	3							
2										
3										
rget Dat	Default abase	Set	ted	Blank	Conve	erted	C.	nvert F	ailed	
										New Convert

Fig. 8-2 Configuration of cabinet topological graph

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.

binet	Rows 3	Cabin	et Columns	5	Topography		Zoom	۱.0	
1	1 (256, 128)	2 (256, 128)	Ĵ	Setting Cabi	net	×	Ŋ		
2				Cabinet ID	3	Cancel			
3							J		

Fig. 8-3 Setting cabinet ID

Screen Setting		- 6				Delete
Cabinet Rows 3	🚖 Cabinet Co	lumns 5 📩	Topography	:	Zoom	۱.0 [•]
1 1 (256, 128) 2 (256, 128) 3 (256, 128)	2 3 2 (256, 128) (2 7 (256, 128) (2 (2 6 (2 6 (2 6) (2 6) (2 7) (2	4 3 4 (256, 128) ••• Setting Cabinet Cabinet ID Blank Columns Blank Rows	5 (256, 128) 8 256 128 0X	Set Blank Cancel		
Default Target Database	Setted	Blank	Converted	L Cor	wert Failed	

Fig. 8-4 Set Blank

inet	Rows 3	Cabine	et Columns 5		Topography		Zoom	•	۲
1	1 (256, 128)	2 (256, 128)	3 (256, 128)	4 (256, 128)	5 (256, 128)				
2	6 (256, 128)	7 (256, 128)	Bl ank (256, 128)	Blank (256, 128)	8 (256, 128)				
3	9 (256, 128)	Bl ank (256, 128)	10 (256, 128)	11 (256, 128)	12 (256, 128)				



4) Create target database, namely full screen database.

D:\Docum	ents\新建校正 tting	顷目 (748)-1. db							Browser Delete
Cabinet	Rows 3	Cabine Cabine	et Columns 5	*	Topography		Zoor	•	۱ .0
	1	2	3	4	5				
1	1 (256, 128)	2 (256, 128)	3 (256, 128)	4 (256, 128)	5 (256, 128)				
2	6 (256, 128)	7 (256, 128)	Bl ank (256, 128)	Blank (256, 128)	8 (256, 128)				
▶ 3	9 (256, 128)	Bl ank (256, 128)	10 (256, 128)	11 (256, 128)	12 (256, 128)				
Target De	Default	Sette	a 👘	Blank	Conv	erted 📕	Conver	t Failed	



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

abinet	Rows 3	E Cabin	et Columns 5	-	Topogr aphy	Zoo	n	• 1.00
1	1 (256, 128)	2 2 (256, 128)	3 3 (256, 128)	4 4 (256, 128)	5 (256, 128)			
2	6 (256, 128)	7 (256, 128)	B1 (256	Current	conversion box: 3			
3	9 (256, 128)	Blank (256, 128)	(256, 128)	(256, 128)	(256, 128)	Cancel		_
								. 1

Fig. 8-7 Converting process

C	Cabinet Da D:\Docume	tabases mts\新建校正I	页目 (748)-1. db			<u>P</u>			language (i Browser Delete
S	Screen Set Cabinet I	ting Rows 3	Cabine	t Columns <mark>5</mark>		Topography		Zoom <	• 1.0
	1	1 (256, 128)	2 2 (256, 128)	3 3 (256, 128)	4 4 (256, 128)	5 5 (256, 128)			
	2	6 (256, 128)	7 (256, 128)	Blank (256, 128)	Bl ank (256, 128)	8 (256, 128)			
	• 3	9 (256, 128)	Blank (256, 128)	10 (256, 128)	11 (256, 128)	12 (256, 128)			
T	larget Dat	Default	Sette	1	Blank	Converte	1	Convert Failed	
	D:\D	ocuments\Divi	sion database.	db					New Convert

Fig. 8-8 Converting completed

9 Authorization

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

When the software is operated, the following window will appear; click OK to open the software, where the software is not authorized and it cannot be used normally.

Warning	×
Can not find the authorized dog!	
ОК	

Insert dongle to the USB port of the computer. Click "Authorize lock management" on the software. Then

click to import the authorized file (in the disk) corresponding to the dongle.Multiple authorized file can be imported, thus, the software (after being copied to other computers) can be used by inserting the dongle.

*]
Preparation 🕱							
Database	Authori	zation documen	ts list:				
	Mum	Author ID	Camera ID	•			
Cabinet Control	1	1050319998	00604294		Add		
	2	1062903402	234024001649			J	
Measurement Tool 🌣	3	1198524237	024021004379		Delete		
	4	1388808311	00604291		Defete	ļ	
Calibration 🛠	5	1601157809	00604293	Ш			
Module Calibration	6	1654627156	00604545				
	7	1746573220	344055000937				
Tools 🐟	8	1766925753	023022004469				
	9	1887303001	1780901616				
Common Color Gamut Tool	10	1915203406	0161603114				
Data Analyzis	11	2093884491	00602938	-			
And Processing							
Detabora Division							
pacapase proision							
Cabinet To Screen							
Authorization lock							
hall and a big							
Authorization lock management							
Language (语言) 🏅							
*							
Camera:Disconnected	Colorimeter:Disconnected Barcode Gun:Disconnected Callibrated:0 Times: 00:00:00						

Fig. 9-1 Authorization management

10 Precautions

10.1 Precautions for database and batch management

The cabinet calibration software takes one batch of screens as a management unit. For each batch of the screens, a new database shall be created to manage the calibration parameters and calibration coefficients of these screens, which shall be properly managed by the manufacturer:

- 1) The cabinets to be calibrated and managed by the same database shall go through an aging process before they are calibrated. The time for aging must be almost approximately the same. Take a new screen for instance: the recommended time for aging before the calibration is 48h, and the aging time difference among different cabinets shall be no longer than 24h.
- If there are cabinets from different batches, different databases must be separately created for the cabinets.

- 3) Even in the same batch of cabinets, if there are cabinets of different sizes (for example, of different resolution), they must be calibrated as cabinets of another batch, and separate database should be created for them.
- 4) It shall be guaranteed that when calibrating the same batch of cabinets, the position of the cabinet to be calibrated and the camera, focus length and configuration shall remain unchanged. In case the improper operation result in the damage of the calibration site, a new database shall be created to calibrate the remaining cabinets which are seemed as another batch (At the same time, it shall be guaranteed that brightness and chromaticity standard for both calibrations shall remain unchanged).

10.2 Precautions for calibration process

Please strictly follow the calibration process of cabinet calibration software to calibrate cabinets one by one.

10.3 Precautions for calibration results detection

We can't visually observe the splicing results of LED display after the cabinet calibration. The untimely discovery of software error or improper operation may lead to unsatisfactory site splicing results. In this case, cabinet splicing simulation software (using the functional module "Simulate and Adjust coefficients" of "Data Analysis And Processing" tool) is needed for conducting simulation testing on calibrated cabinet, precautions are as follows:

- 1) After calibrating the 9th, 19th and 29th cabinets, please use the functional module "Simulate and Adjust coefficients" of "Data Analysis And Processing" tool to observe the calibration data, and if the data seems to be normal, you may go on with the calibration, and monitor the observed calibration result after the simulation of every 15~30 cabinets. If abnormal condition occurs, please timely adjust or contact NovaStar for troubleshooting.
- 2) Be sure to pick the cabinet in need of re-calibration hinted by calibration software and calibrate again. After the 20th cabinet calibration is completed, it is suggested to pick and calibrate cabinets need to be calibrated again, and subsequent cabinets should be calibrated from time to time. You can also pick and calibrate cabinets need to be calibrated again after all cabinets are calibrated.
- 3) For the display screen whose cabinets can't be all spliced to check the calibration results, we suggest

you to splice 3x3 cabinets to see the splicing results after the cabinet calibration.

10.4 Operating skills of camera

1) Preparations

A. Connect camera to computer through USB cable and keep the camera in ON status. Click "Connect camera" and prompt "Connection succeeded." Then control the camera via software automatically.



as M (manual) and switch focusing



to M (manual). Turn off



B.

if the lens has the function of anti-shaking (Sigma is OS).

C. Switching between eyepiece and LCD screen viewfinder: Enable "Live View Shooting" in the



menu and press is to switch between eyepiece and LCD screen viewfinder

2) Camera focusing

When calibrating cabinet, place the camera lens towards the cabinet to be calibrated and adjust the focal length to include the cabinet into the field of the camera.

The number of pixels of cabinet is generally less than the pixels that can be collected by the camera each time (The digital camera collects less than or equal to 224×150 pixels each time and the Caliris camera, 480×330 pixels.) Therefore, adjust the focal length to let the cabinet locate in the center of the camera imaging and let the cabinet take up half of the width and length of the imaging, i.e., reserve 1/5 of the total length and width on the four sides.



(a) Standard imaging



(b) Imaging is too small

- (c) Imaging is too large
- Fig. 10-1 imaging size of a subarea

Adjust imaging to a proper size. Then adjust focusing to set pixel size of module to above 50. After adjustment is completed, analyze camera parameters. Keep adjusting until the imaging size is normal.

*										
Cabinet Para	5									
Calibration Par	as C:	amera Oj	peration ——— talCamera	0	Caliris		$\overline{\langle } \rangle$	Corr	ect Dis	connect
Measurement To	ol ☆	C1200		Ŭ.	Q					
Camera	S	aturatio	on Adjustment	-	\overline{b}					
Colorimeter		The rec area is and ans	commended inter : low, please av lysis again.	rva: djus	saturation t the came	n[6 ra	0-90],LED are micro coke me	a[50-150].If s ade the image bi	aturation is n Lur on the cam	ormal but era window
Barcode gun	_									
Correct targe	t ¥	Auto	omatic Mode	0	Manual Mod	e		Image F	review Au	to All
Calibration	* (Color	Brightness (%	0	Exposure	-	Analyze	Saturation	Area	Check
		R	20		300	•	Automatic	Normal (89)	Fit(116)	P
Tools	*	G	20	-	300	•	Automatic	Normal (74)	Fit(137)	P
		В	20	-	300	•	Automatic	Normal (64)	Fit(123)	P
Authorization 1	ockt									
Language (语言	D 🛠									
中文(zh-CN)										
English (en)										
한국어 (ko-KR)								Back	Next
*										
Camera:Connecte	d Colori	meter:[Disconnected	Ba	rcode Gur	n:Di	sconnected	Callibrated:0	Times: 00:0	0:00

Fig. 10-2 Proper imaging size





3) Saturation adjustment

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. After the red (R) saturation, green (G) saturation and blue (B) saturation are normal, click "Apply".



If imaging size is "Too small", properly defocus. If it is still unreasonable after defocusing, try to adjust by moving camera.

10.5 Precautions for use of camera

During image capture, please check whether the camera is in "Full PC" if the camera has no action for a long time. If it is so, the camera need to be reset, and calibration can be conducted after reconnection.

10.6 Precautions for saving database

When the software is saving the database (calibration coefficient), please do not close the software, otherwise it may result in abnormality of the software. Abnormal information prompt will show abnormality of database operation.

11 Troubleshooting

Problem	Troubleshooting
Software alert: Point positioning errors	Change Identification Direction on the Calibration Paras page. Increase Allowed Dead LEDs Ratio on the Calibration Paras page.
Screen blurred after calibration	See Calibration > Measuring image . Normally, one LED lamp is framed by one square. Change Identification Direction and recalibrate the screen.
Software alert: Color	Check whether the screen is too dark, or the color on the screen when using camera to take

error of image data	pictures is wrong.
Software alert: Camera	Check the connection wire between camera and control computer.
not connected	Check the camera's remaining battery capacity.
Software alert:	Check whether the cabinet resolution is too large. 7D supports 192*144.
Unexpected error	Try to restart the calibration software, camera and computer.
Software alert: The	If the cabinet is seriously modularized, the calibration software may judge the not inclined
cabinet is inclined	cabinet as inclined. After you confirm that the cabinet is not inclined, choose to force the
(Actually it is not).	calibration to continue.
	Cabinet calibration requires that the cabinets before calibrated has consistent uniformity
The screen composed of	within a certain angle ranges. Some in-line cabinets have process problems in the angle.
some calibrated in-line	Therefore, the screen which is composed of those calibrated in-line cabinets has great
cabinets has great	uniformity difference at different angles. Cabinet calibration cannot fix the angle process
uniformity difference.	problem. It is recommended that you use NovaStar full screen calibration software to
	calibrate the screen which is composed of those in-line cabinets.

12 Document Version Description

Version	Date	Reasons for update
NovaCLB-Cabinet Calibration System User Manual -V1.0	Nov. 12, 2012	First release
NovaCLB-Cabinet Calibration System User Manual -V2.0	Jun. 18, 2013	Upgrading software
NovaCLB-Cabinet Calibration System User Manual -V2.1	Sept. 9, 2013	Corresponding version of software: NovaCLB-CabinetV1.2.3
NovaCLB-Cabinet Calibration System User Manual -V2.2.0	Jun. 6, 2014	Corresponding version of software: NovaCLB-CabinetV2.0.0
NovaCLB-Cabinet Calibration System User Manual -V2.2.1	Jul. 2, 2014	Corresponding version of software: NovaCLB-CabinetV2.0.0
NovaCLB-Cabinet Calibration System User Manual -V2.3.0	Oct. 13, 2014	Corresponding version of software: NovaCLB-CabinetV2.1.0

NovaCLB-Cabinet Calibration System User Manual -V3.0.0	Jun. 5, 2015	Corresponding version of software: NovaCLB-CabinetV3.0.0
NovaCLB-Cabinet Calibration System User Manual -V3.1.0	Jun. 6, 2016	Corresponding version of software: NovaCLB-CabinetV3.1.0
NovaCLB-Cabinet Calibration System User Manual -V4.0.0	Nov. 26, 2016	Corresponding version of software: NovaCLB-CabinetV4.0.0
NovaCLB-Cabinet Calibration System User Manual -V4.1.0	Jun. 13, 2018	Corresponding version of software: NovaCLB-CabinetV4.1.0
NovaCLB-Cabinet Calibration System User Manual -V4.1.1	Nov. 8, 2018	Corresponding version of software: NovaCLB-CabinetV4.1.1
NovaCLB-Cabinet Calibration System User Manual -V4.1.2	Jun. 6, 2019	Corresponding version of software: NovaCLB-Cabinet V4.1.2
I'AN NOVAS		