



INSTRUCTIONS

Calibration Pro

USER MANUAL

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1. Introduction

Calibration pro is a professional of LED display calibration software ,it was by Colorlight, which integrates advanced algorithms ,such as AI intelligence and machine vision to achieve accurate and efficient calibration of the display.

1.1 Operational environment

Components of-calibration system

- Computers

One or two PC (PC for capture and PC for control)

Operating system: Windows 10 with 64 bits system is recommended.

RAM >= 16G(CCM 6000 cameras require 64G)

Graphics card: DVI or other HD port (Using “by sender card” mode)

- camera*1(Canon70D, 80D, 90D, 7D, 7DMarkII,CCM6000;CCM6000 is recommended)



Fig.1-1 CCM6000



Fig.1-2 Canon Camera

- Lens*1(Canon was re-equipped with EF 70-300mm f/4-5.6L IS USM , CCM6000 includes a lens)



Fig.1-3 Lens

CCM was re-equipped with Milivus 2/35 lens .



Fig.1-4 Lens

- Head*1(Canon was re-equipped with Manfrotto-410,CCM6000 was re-equipped with Manfrotto-405)



Fig.1-5Head

- Tripod*1(MT190GOC4TB -190GO is recommended)



Fig.1-6 Tripod

- AC adapter of camera*1



Fig.1-7 AC Adapter

- ND filter (Used when the screen is highlighted)



Fig.1-8 ND filter

1.2 Camera assembly

1.2.1 Open the tripod

As shown in figure 1-9, the height of the tripod is recommended to be directly opposite the center of the screen or close to the height of the viewer.



Fig.1-9 The

1.2.2 Head Installation

Align the mounting hole at the bottom of tripod head with the positioning bolt of the tripod, and turn the head clockwise tightly. As shown in figure 1-10.



Fig.1-10 Head Installation

Finished installation as shown in figure 1-11.



Fig.1-11 Head installation completed

1.2.3 Lens Installation

- (1) Following Fig.1-12 arrow direction, toggle the release lever of the heads to the appointed position.
- (2) Adjust the lens direction consistent with the head.
- (3) Follow the steps below to complete lens installation.

Firstly, insert the base rear of the lens clip into the dovetail groove of the heads. And then press the front of the lens, and the release lever will rebound automatically. Finish lens installation, as Fig.1-13 shown.



Fig.1-12 Lens installation



Fig.1-13 Lens installation completed

1.2.3.2 CCM6000 lens installation

Note: This installation operation needs to be carried out in a dust-free environment.



Fig.1-14CCM6000

1.2.4 Camera Installation

1.2.4.1 Canon Camera Installation

(1) Rotate and remove the lens cover and the body cover.

(2) Camera Installation: as shown in figure 1-15.

Firstly, to align the red or white mark between the lens and the camera; secondly, pushing the lens into the camera; lastly, to rotate the camera in the direction of the arrow shown until the lens snap into place.



Fig.1-15 Camera Installation

(3) Switch the lens focus mode to <MF>, and turn off the optical stabilizer(OS for Sigma, IS for Canon), as shown in figure 1-16.



Fig.1-16 Focus Mode

(4) Camera installation is complete (as shown in figure 1-17). Connect the camera to the computer via USB cable, and now you can begin to calibrate.



Fig.1-17 Installation completed

1.2.4.2 CCM6000 Installation

The camera is connected with the connecting piece, connecting piece is locked with the buckle at the top of the holder (as shown in figure 1-18).



Fig.1-18 Installation complete

1.3 Installation and un-installation

1.3.1 Installation

- 1) Double-click the installation icon , select a language

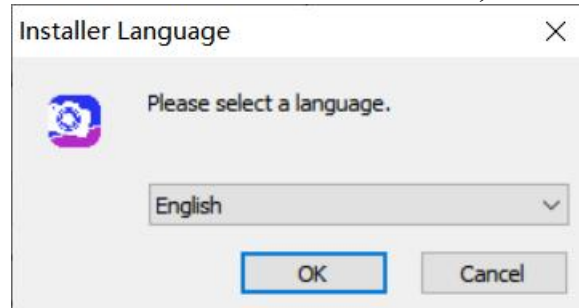


Fig.1-19 Installer language

- 2) Enter welcome interface.

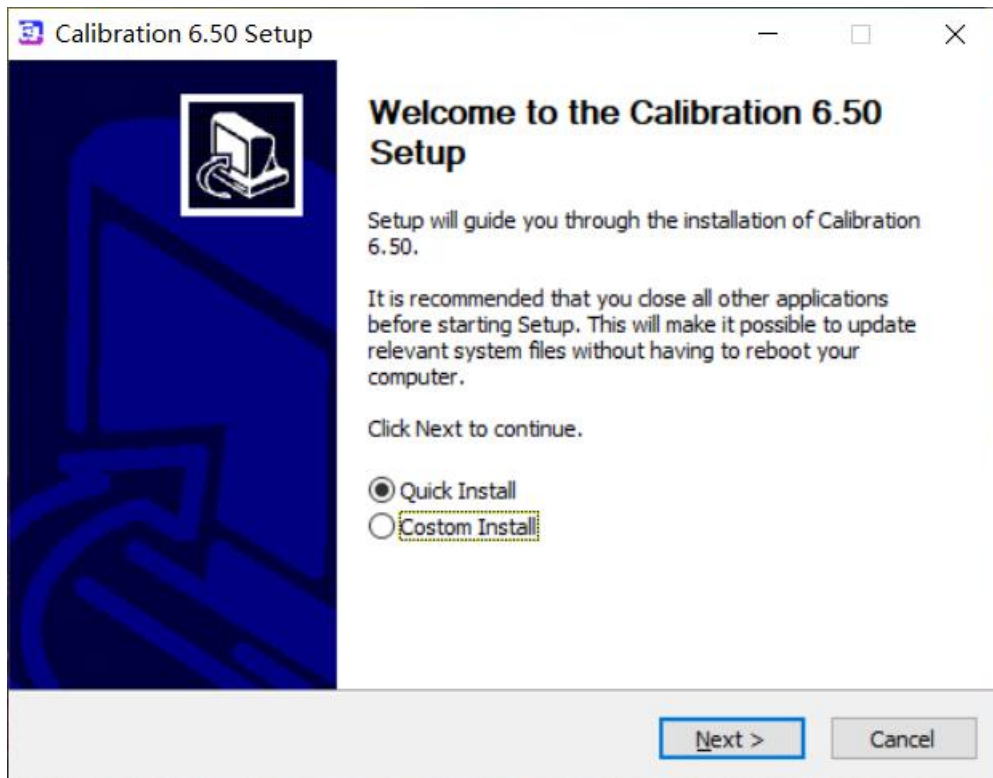


Fig.1-20 Welcome page

- Select Quick Install, click Next, and the software will automatically complete the installation;
- Select Custom Installation and click Next to enter the Select Installation Path window;
- 3) Choose a directory for installation and click [**Next**].

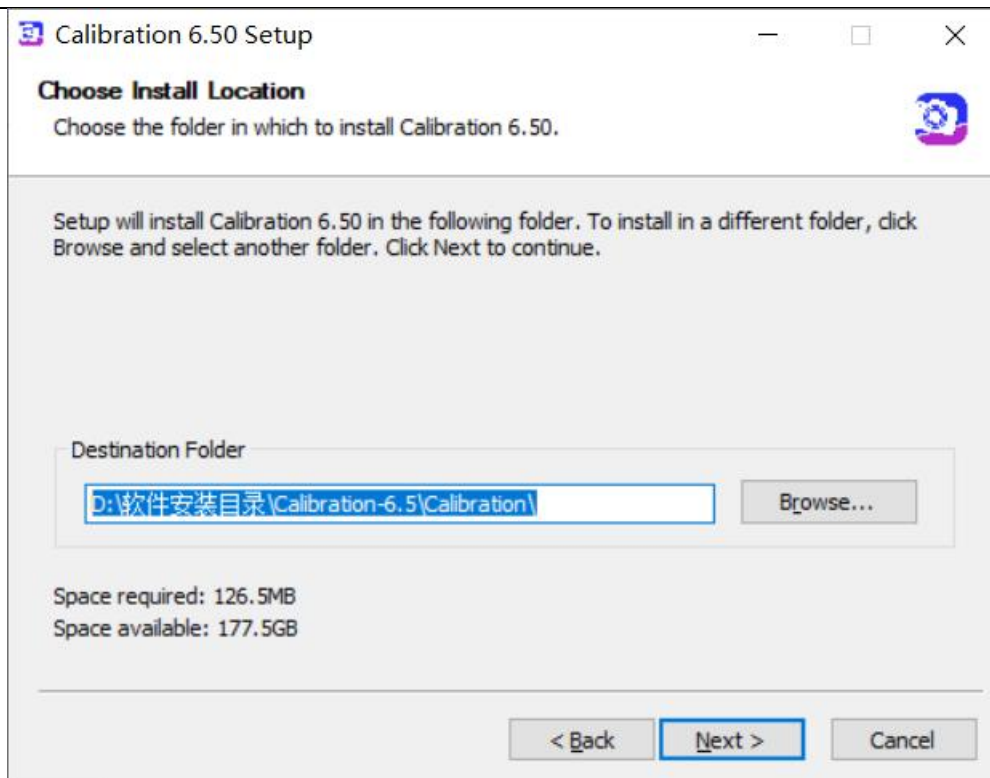


Fig.1-21 Choose install location

4) Choose components.

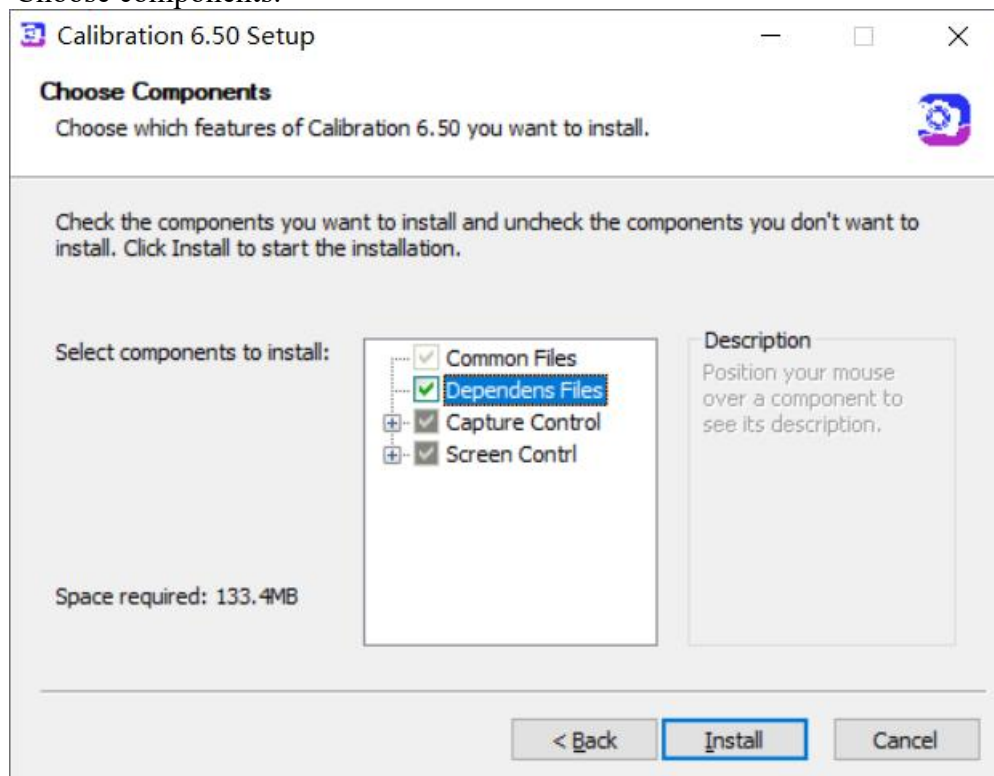


Fig.1-22 Choose components

5) Finish installation.

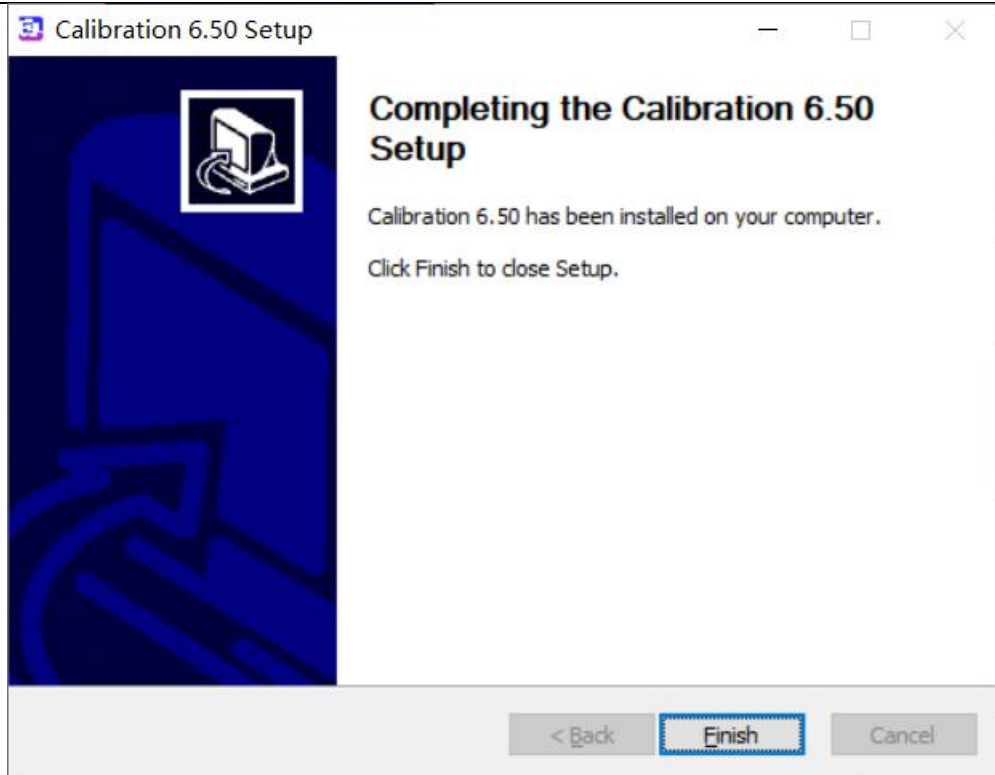


Fig.1-23 Setup completion

Software can be run directly after installation, desktop shortcut will be generated



automatically by system, right-click and choose **[Run as administrator]** to run the client application

1.3.2 Un-installation

Internal uninstall application: select [**all application**→ **calibration**→ **uninstall**] from the start menu, software can be removed automatically.



Fig.1-24 Uninstall application

2. Calibration Instruction

2.1 Software interface

When open the software, the main interfaces (shown as Fig.2-1) will appear. Preview interface is for server application and operation interface is for client application, also work when you separately run them on two computers.

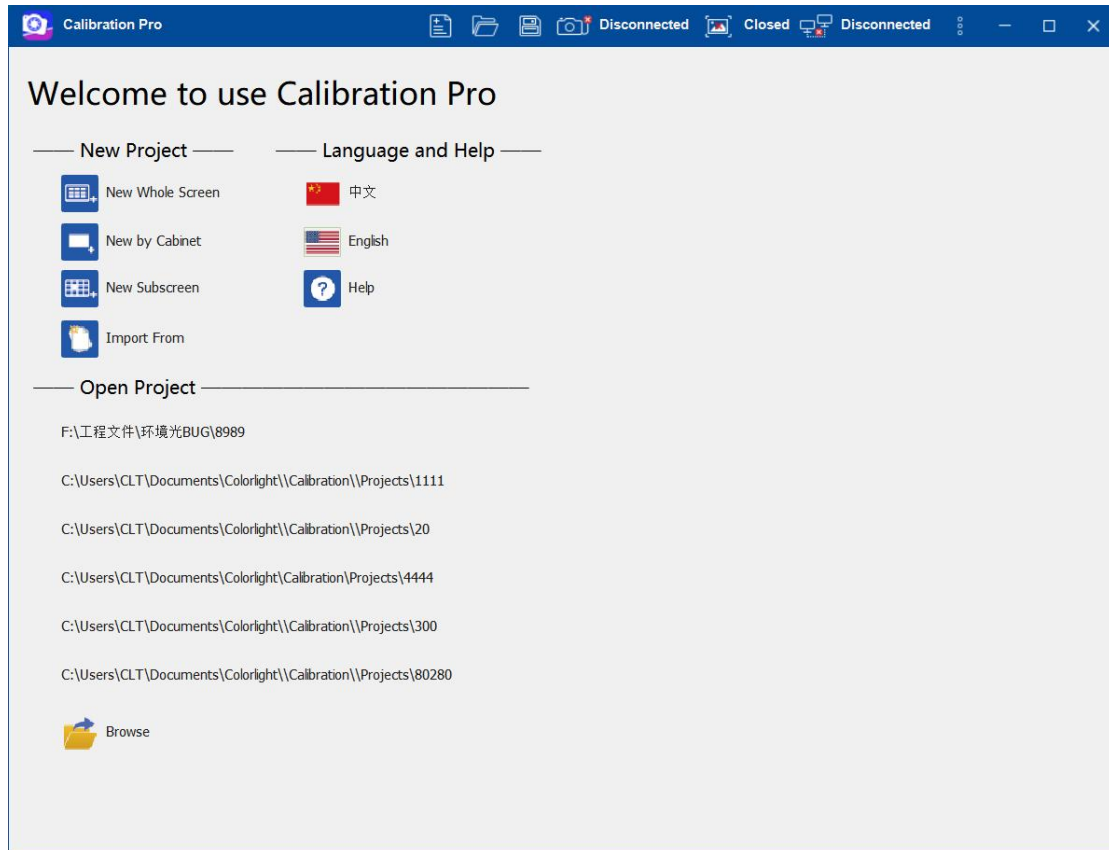


Fig.2-1 Client

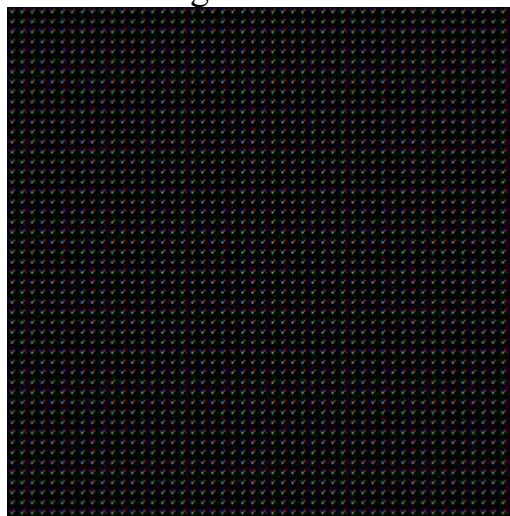


Fig.2-2 Server

2.2 Homepage

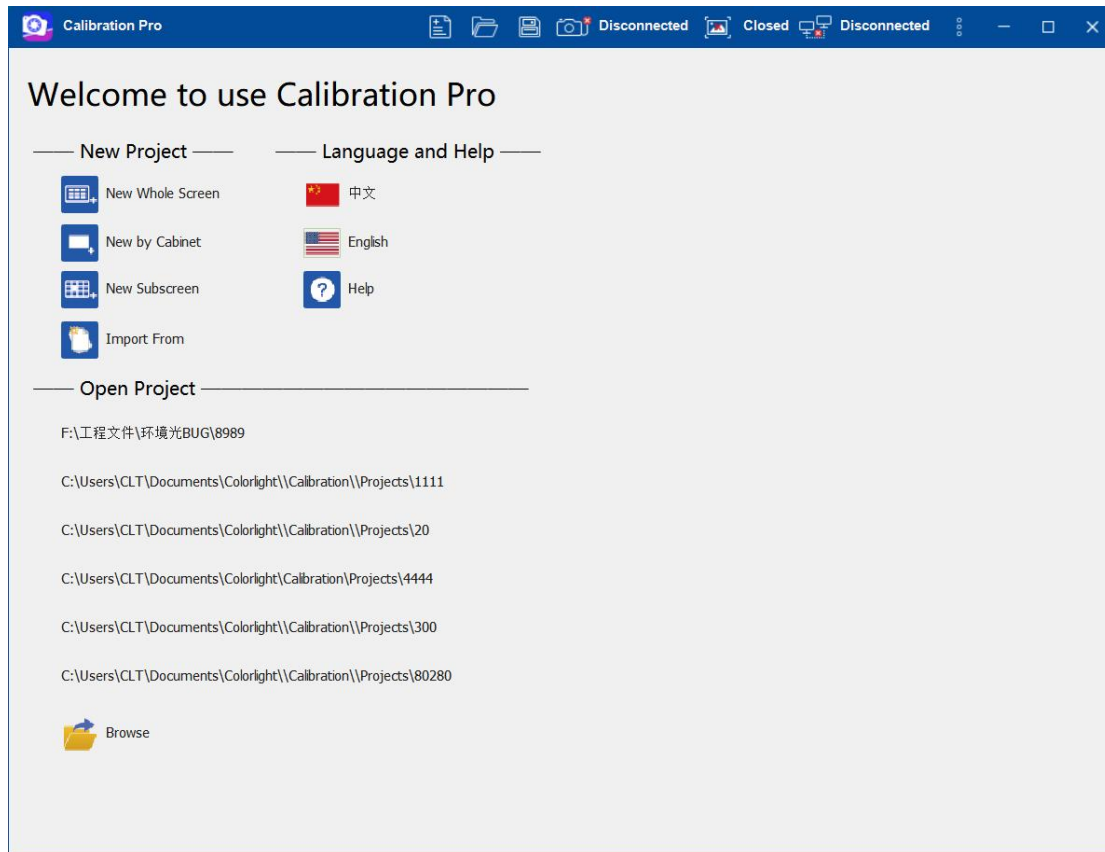


Fig.2-3 Homepage

2.2.1 New project



New Integrated: Open new integrated wizard.



New Cabinet: Open new Cabinet wizard.



New Subscreen: Open new subscreen wizard



Import From: Open import wizard, when calibration multiple screens with the same specification.

2.2.2 Language and help



中文: Switch to Chinese.



English: Switch to English.



Help: Open the software manuals.

2.2.3 Open Project

Recent projects will be shown here, you may click to open them.



Browse: Open calibration project file you choosed.

3. Integrated calibration

3.1 Configure the screen

Set the right parameters for display through LEDVISION , then send and save the setting data to the receiver card.

Note: please close the LEDVISION after configuring parameters, then enter to Calibration.

3.2 Create a New Calibration

Step 1: New Project Wizard-1



Open the software, select the [ **New Integrated**] to create a calibration (shown as Fig. 3-1)

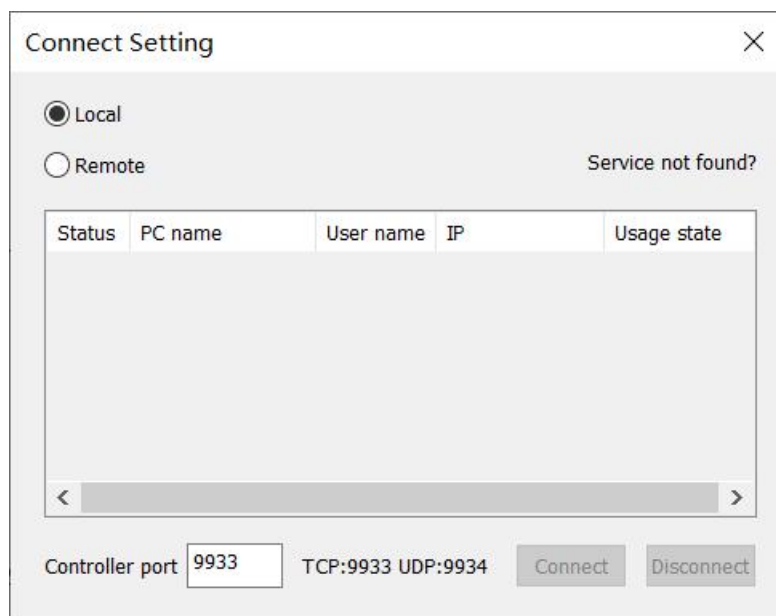


Fig.3-1 Project wizard-1

Choose the calibration type, Local or remote.

‘Local’ means the client and server of Calibration will be executed in the same computer;for 2 PC, you should choose ‘Remote’.

Step 2

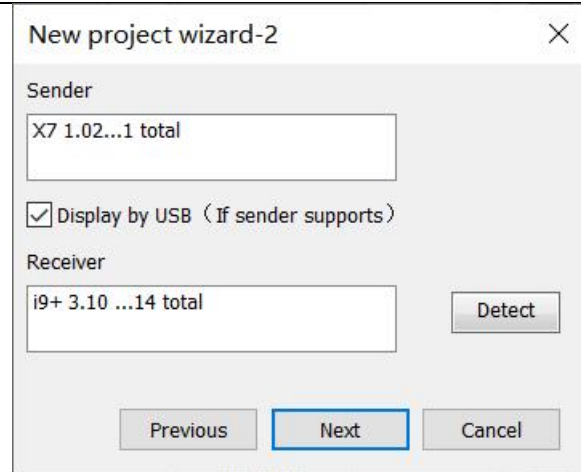


Fig.3-2 Project wizard-2

This step is about the senders and receivers of the screen, the software will detect them automatically. If they are detected as expected and then click 'Next'.

Step 3

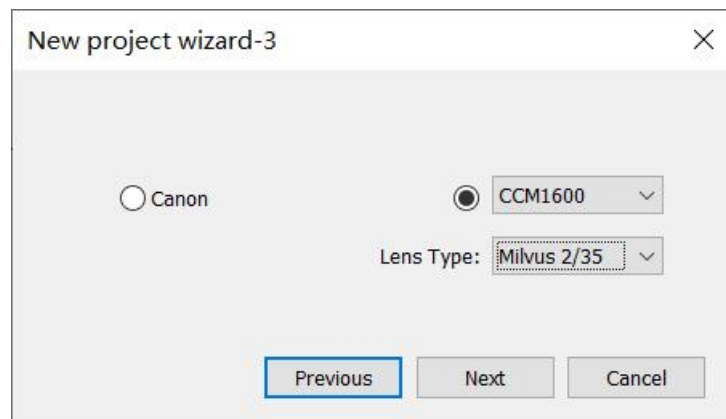


Fig.3-3 Project wizard-3

Select the camera model. When the camera is not connected, the Canon camera is selected by default. Canon camera is connected, and canon camera is automatically selected; CCM6000 camera is connected, and CCM6000 camera is automatically selected.

Step 4

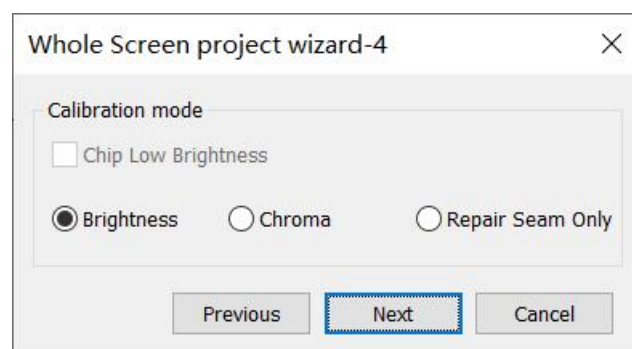
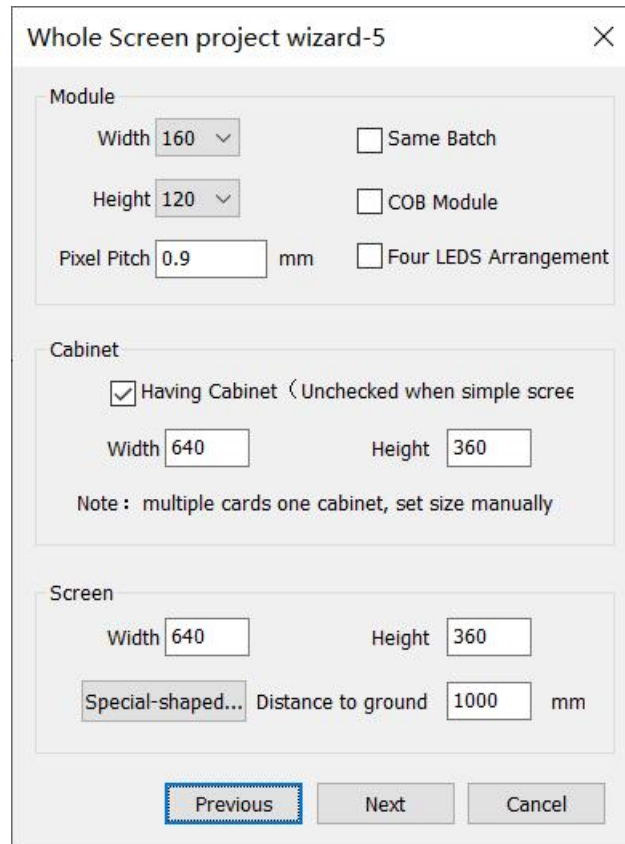


Fig.3-4 Project wizard-4

Calibration mode: Brightness、Chroma and Repair Seam Only, The receiving card program supports chip low brightness calibration, and the chip low brightness calibration check cabinet can be checked.

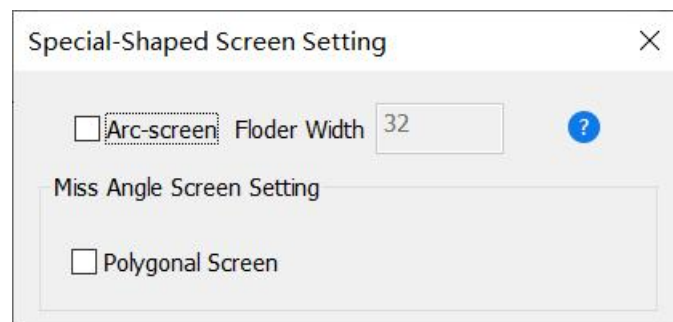
Step 5



The dialog box 'Whole Screen project wizard-5' contains the following settings:

- Module:**
 - Width: 160 (dropdown)
 - Height: 120 (dropdown)
 - Pixel Pitch: 0.9 mm
 - ☐ Same Batch
 - ☐ COB Module
 - ☐ Four LEDS Arrangement
- Cabinet:**
 - ☒ Having Cabinet (Unchecked when simple scree)
 - Width: 640
 - Height: 360
 - Note: multiple cards one cabinet, set size manually
- Screen:**
 - Width: 640
 - Height: 360
 - Special-shaped... (button)
 - Distance to ground: 1000 mm
- Buttons: Previous (highlighted), Next, Cancel

Fig.3-5 Project wizard-5



The dialog box 'Special-Shaped Screen Setting' contains the following settings:

- ☐ Arc-screen (highlighted) Folder Width: 32 (with a blue question mark icon)
- Miss Angle Screen Setting:**
 - ☐ Polygonal Screen

Fig.3-6 Project wizard-5

The **Whole Screen project wizard -4** (Fig.3-6) dialog cabinet contains the following items:

“Module Width”、“Module Height”、“Screen Width”、“Cabinet Width”、“Cabinet Height”、“Screen Height”、“Pixel Pitch”. The software can automatically display the information of the above items.

If there is more than one sender, you need to manually enter the width and height of the screen. If there is no smart module, you need to select the width and height of the module.

Having Cabinet: Checked by default. Clear the check cabinet if the screen is

simple screen.

Grid module: Check if there is a difference between the left 、 right Pixel Pitch and the upper 、 lower Pixel Pitch on the screen.

COB Module: Select the check cabinet if the screen to be calibrated is COB display screen.

Four LEDS Arrangement : Select the check cabinet if the screen to be calibrated is Four LEDS Arrangement screen.

Pixel Pitch : The software will automatically display the value if the client is connected to the server; the default value is 0, which is invalid, if the client is not connected to the server. You can manually enter the actual value of the pixel pitch.

arc-screen: Select the check cabinet if the screen is an arc-screen combined by hard modules or cabinets. Folder width refers to the number of pixel columns between the fold lines (as shown in Fig.3-6) .

Polygonal Screen : Check when rectangular modules with the same row and column are spliced into a screen with irregular boundary.

tance to ground : The screen height above the ground, for automatic recommendation for shooting distance.

Step 6

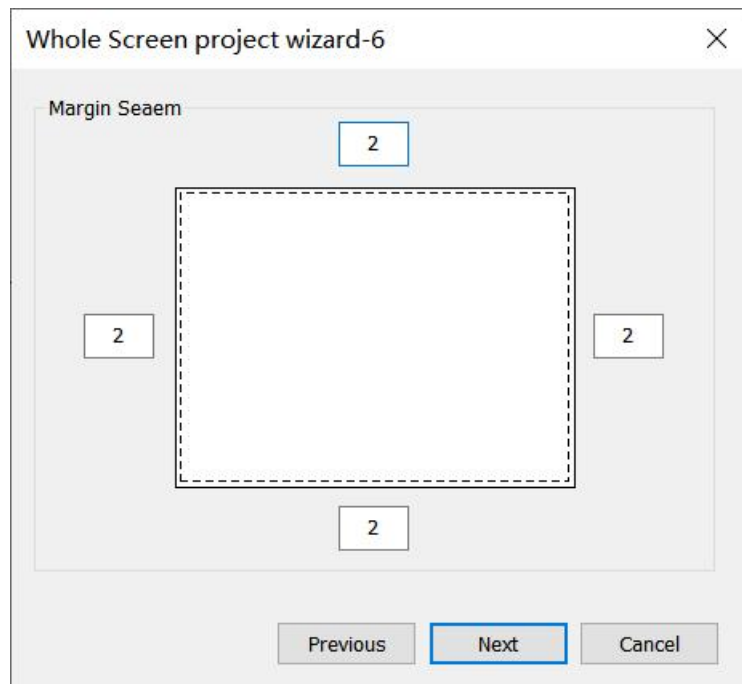


Fig.3-7 Whole Screen Project wizard-6

Edge Reserved is used when the lamps on the edge of the screen is blocked.

Step 7

1. The wizard 6 is shown like 3-8 when the sender is not connected receiver or no sender connected or only one sender connected.

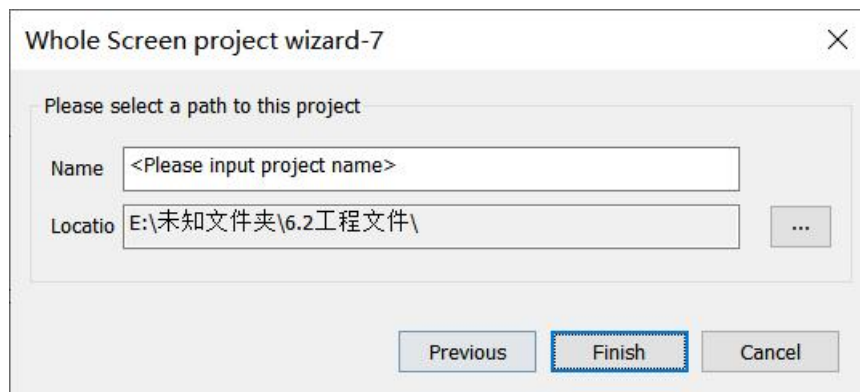


Fig.3-8 Project wizard-6

Name: By default, it is < please enter the project name >, you need to re-enter the project name.

Location: The path to save photos and other data generated during calibration.
click next to entry main interface.

2. The wizard 6 is shown like 3-9 when the number of sender is more than 1.

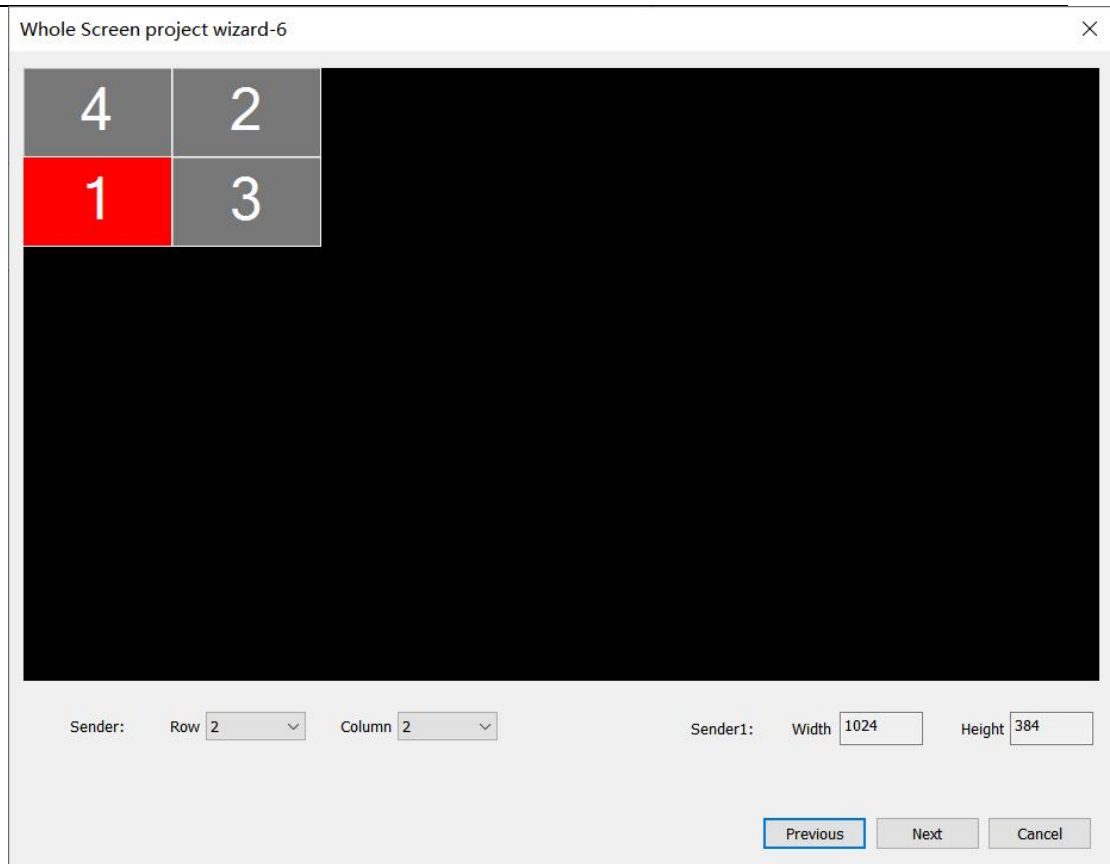


Fig.3-9 Project wizard 6

1) **Sender Row/Column:** Set the sender row and column according to the actual sender layout.

2) **Sender Width/Height:** Current selected sender width or height.

click next to entry wizard 7.

Step 7

It is shown as fig.3-9

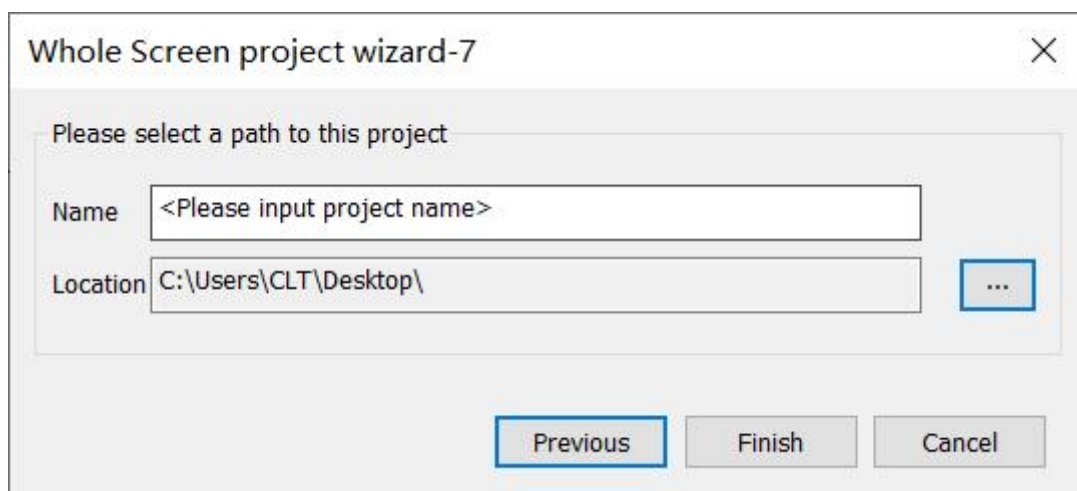


Fig.3-10 Project wizard 7

3.3 Connect to Server

Running calibration, select [**setting** -> **Connect**] to enter setting page, and input the correct server IP. (Running CMD.exe and input [**ipconfig**] then you can get this computer IP address is 127.x.x.x). The server port is the same as the client (the server port default is **9933**, please do not change if not necessary)

Ensure that the client and the server are in the same network area if you select [Remote].

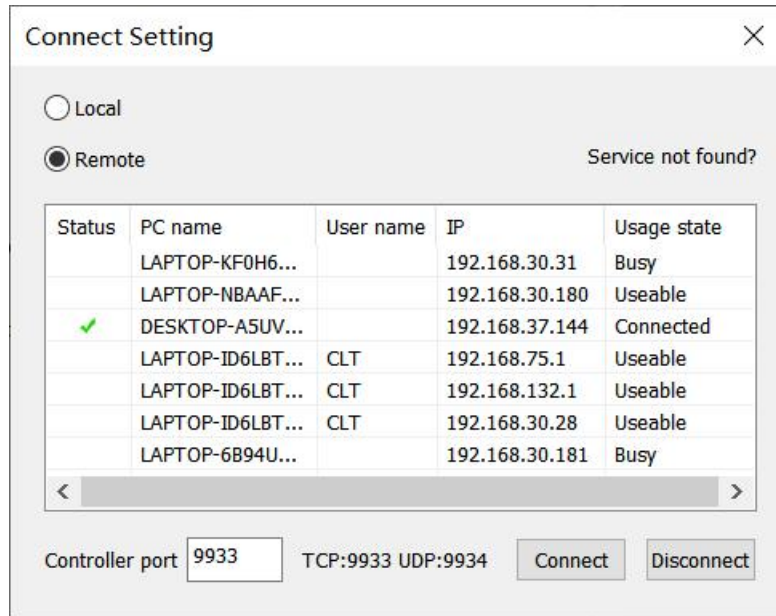


Fig. 3-11 Server Port Connect Window

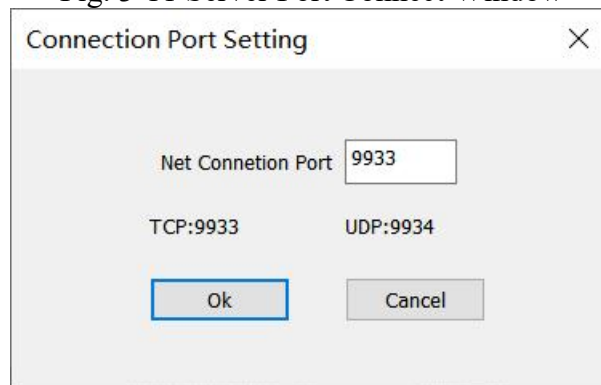


Fig. 3-12 Server Connection Pot Window

Check the client status bar to make sure the client and server port has been connected. As shown in Fig.3-13.

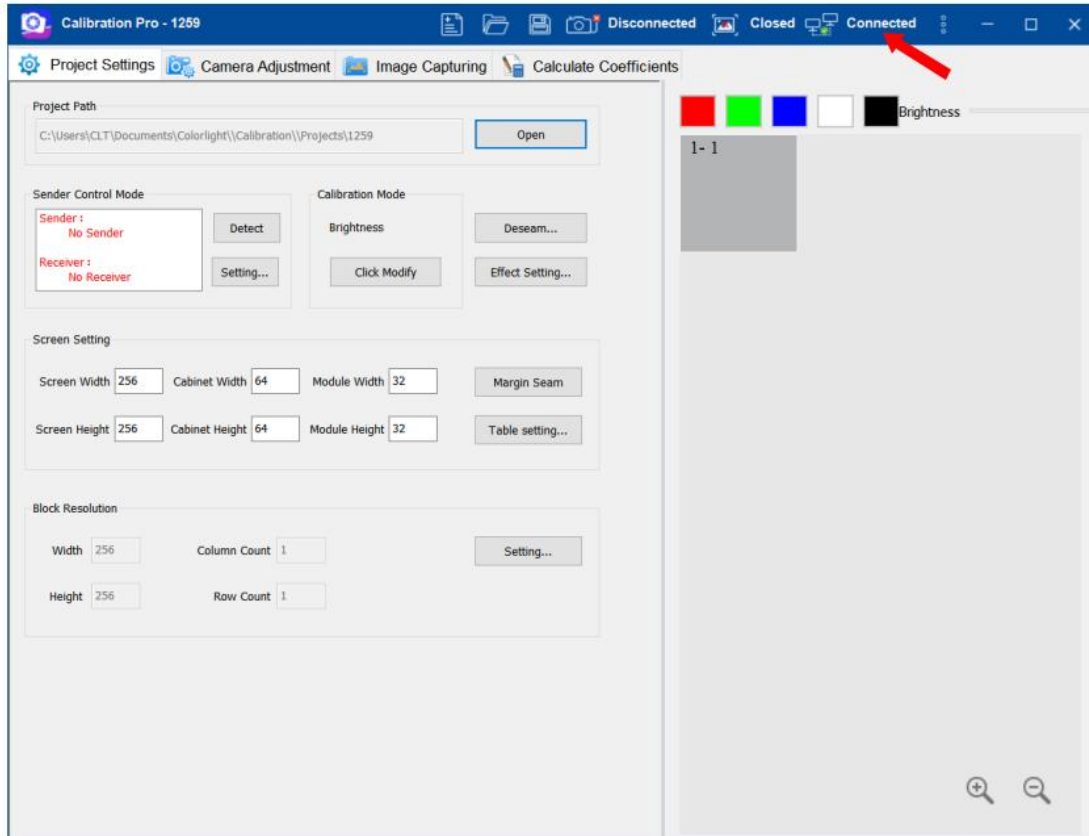


Fig.3-13 Successful Connection Tip

CaliProServer support up to 64 senders.

3.4 Screen display

3.4.1 Display with sender card

While the server is connected, the client will detect sender card and receiver card automatically. Result will be shown as Fig.3-14 sender control mode

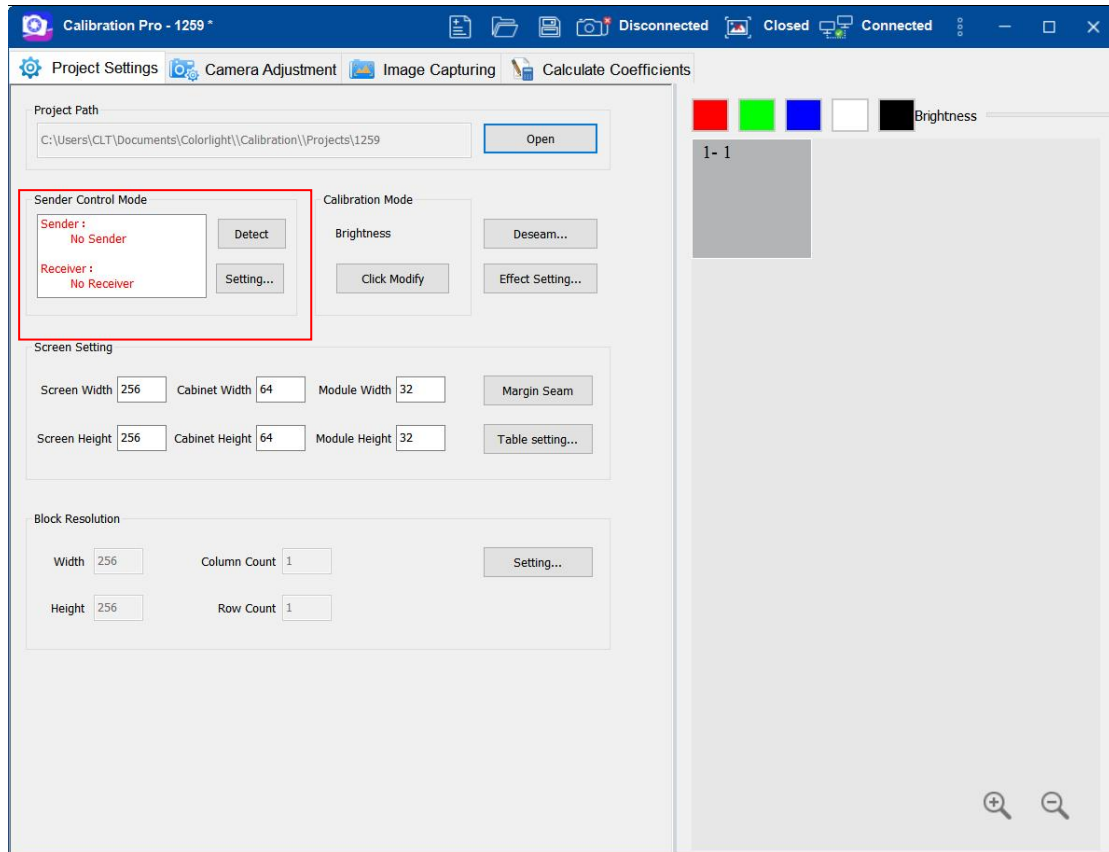


Fig. 3-14 sender control mode

Detect: detect sender card and receiver card immediately.

When you have more than 1 sender card, you should set as section 3.4.2.1.

3.4.1.1 Sender Card Setting

Clicked [**Sender Card Setting**] to set sender cards. As Fig. 3-15:

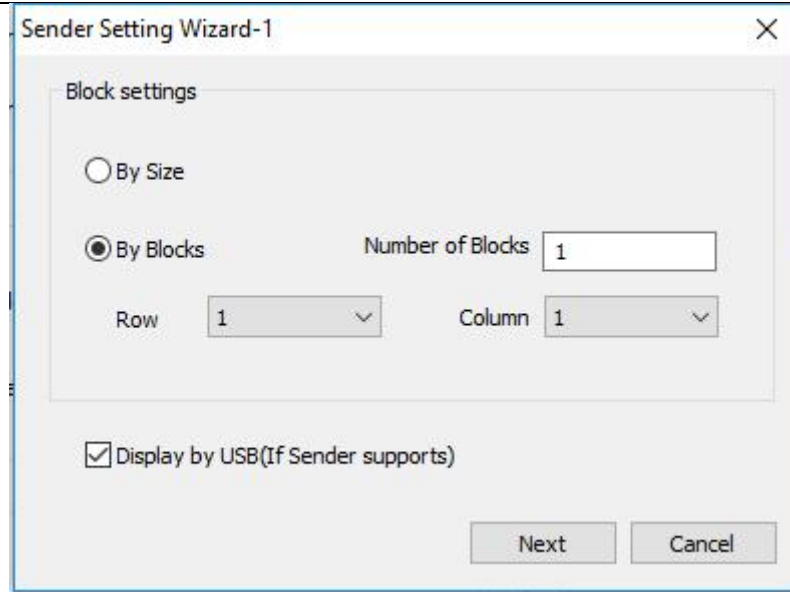


Fig. 3-15 Sender Card Setting Wizard-1

NOTE:

Block Setting-----1) by Size Divide the screen by the size of block;

2) by Blocks When selected [**Rule Layout**], divide the screen according to rows and columns , otherwise average divide the screen width;

Export Setting----- Set the name rule of exported coefficient file;

Display by USB----- Use USB to control the display of screen.

After set the rule of sender cards according to the actual area controlled by sender card, clicked [**Next**], then show the view(as shown Fig. 3-16):

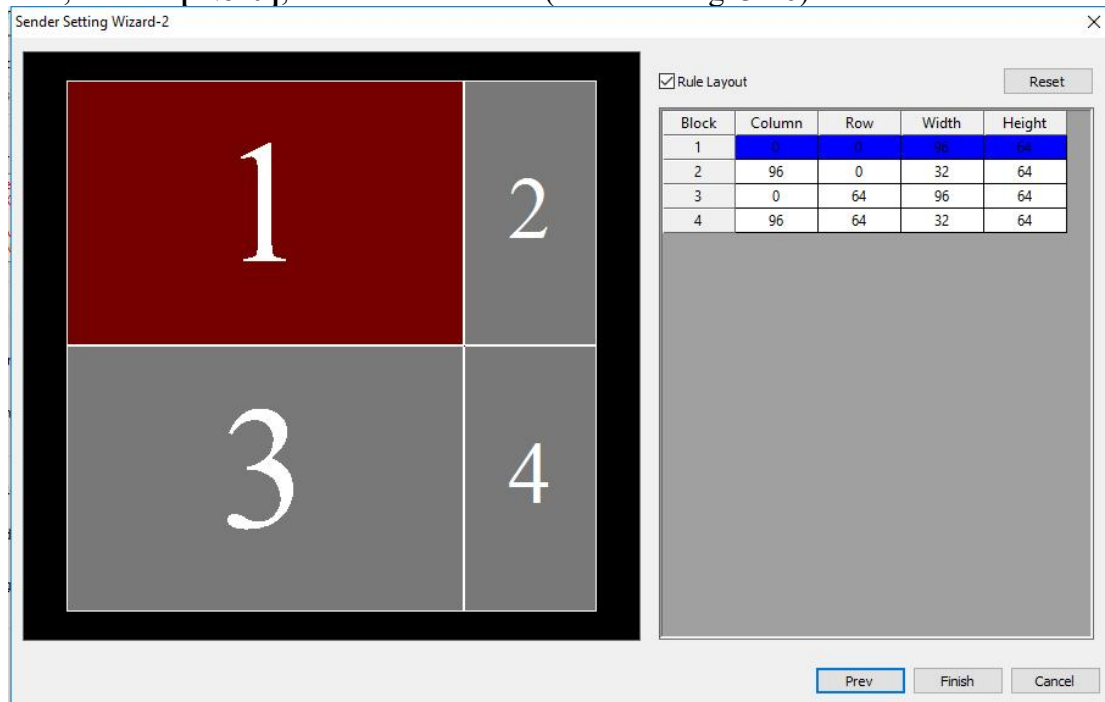


Fig. 3-16 Sender Card Setting Wizard-2

When the Setting doesn't match the actual, you can modify the parameters of corresponding partition.

Rule layout: The sender cards in the same row can only have the same height; Similarly, the sender cards in the same column can only have the same width.

Reset: Reset all sender cards layout.

You can drag the sender card in the left side to exchange with others, you can also resize the sender card(s) with dragging the boundary in terms of module size.

3.5 Basic parameter setting

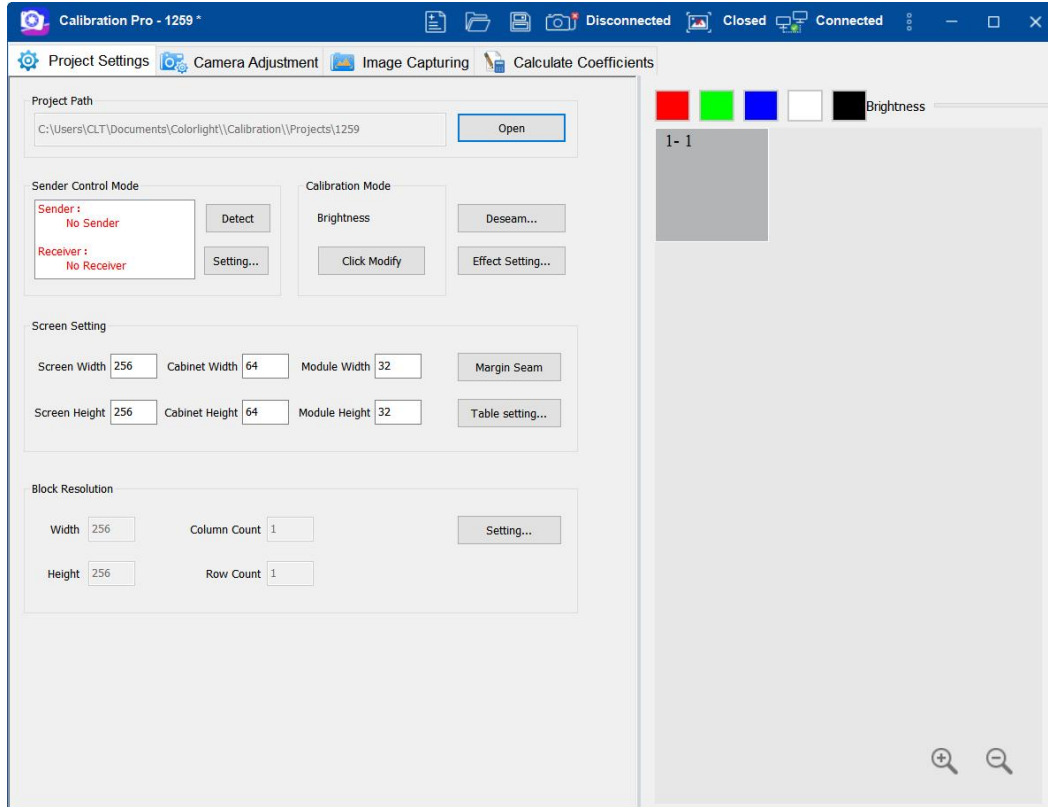


Fig. 3-17 Basic Parameter Setting Window

- 1) Corresponding to select the send mode and the calibration mode.
- 2) See chapter 5 for more details on deseam settings and chapter 6 for more details on display effect settings.
- 3) Set the actual size of the screen, cabinet and module to the correspond editors. For more details on Margin Seam settings refer to Fig.3-19.

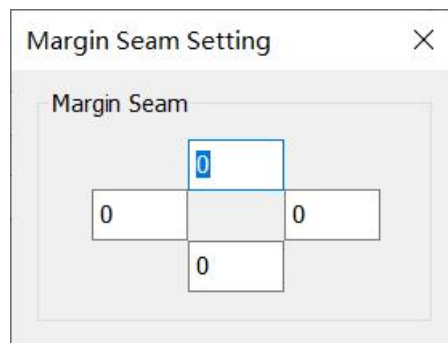


Fig. 3-18 Margin Seam Setting Window

It shall be set according to the actual number of hemmed and shielded lamp beads on site.

- 4) The Margin Seam settings should according to the field situation. See Fig.

3-20 for more details on tablecloth settings.

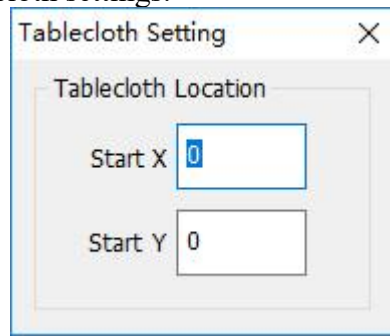


Fig. 3-19 Tablecloth Setting Window

5) Change tablecloth location to set the screen offset.

6) Block Resolution: The numerical size is determined by camera resolution.

7) when using canon camera: We suggest the width×height of a single photo is 150×100.

8) when using CCM1600: We suggest the width×height of a single photo is 150×100.

9) when using CCM6000: We suggest the width×height of a single photo is 960×640.

Note: The last row and the last column cannot be too small; you can view **Setting** in the [**Block Resolution**] area(as shown Fig. 3-20).

10) cob module:Overlapping point value: the default recommendation is 256,Otherwise, 16.

11) You can click **Setting** and enter the number of skip points in the **Spick Number** area in the pop-up window. The number of skip points must be odd if the screen to be calibrated is **Four LEDS Arrangement** screen.

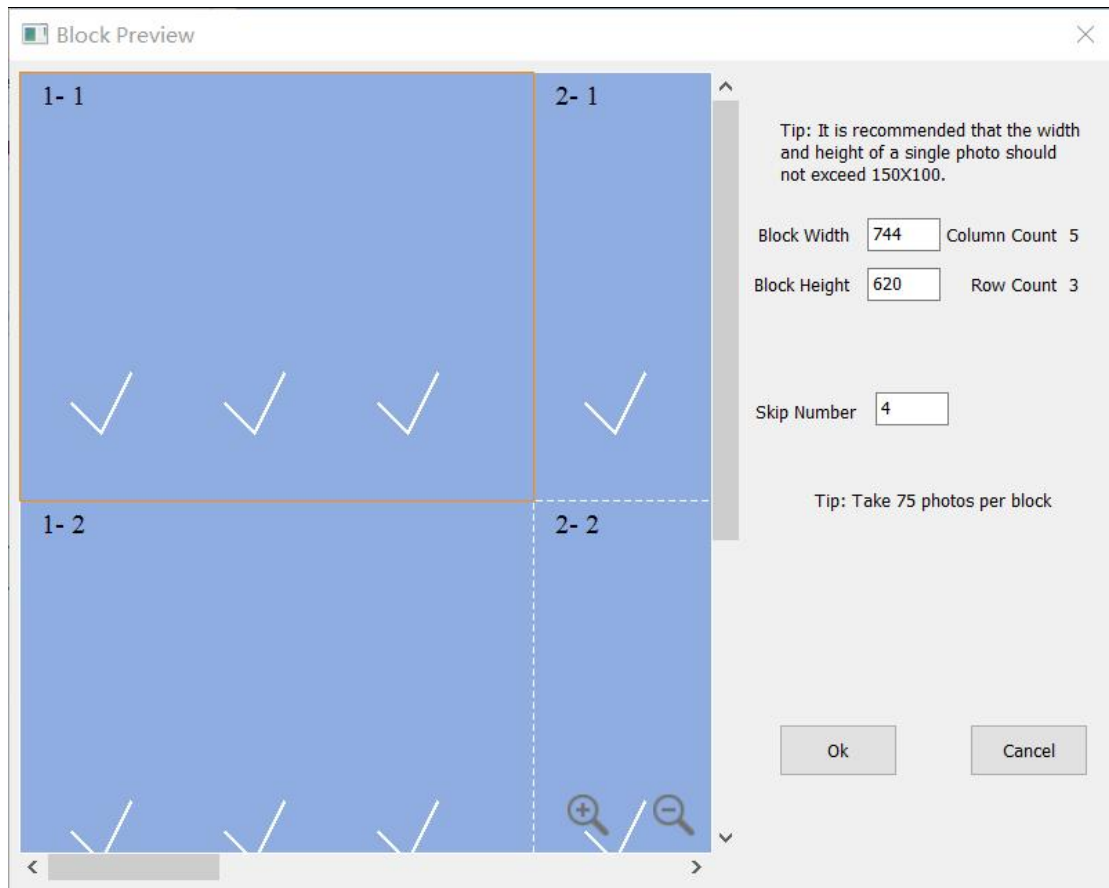


Fig.3-20 Block Preview Window

Select [**block preview**] → [**block map**], and choose one block from it as camera adjustment area. At this time, the corresponding area on LED screen will be selected and lighted (present in the form of white frame plus LED tricolor).

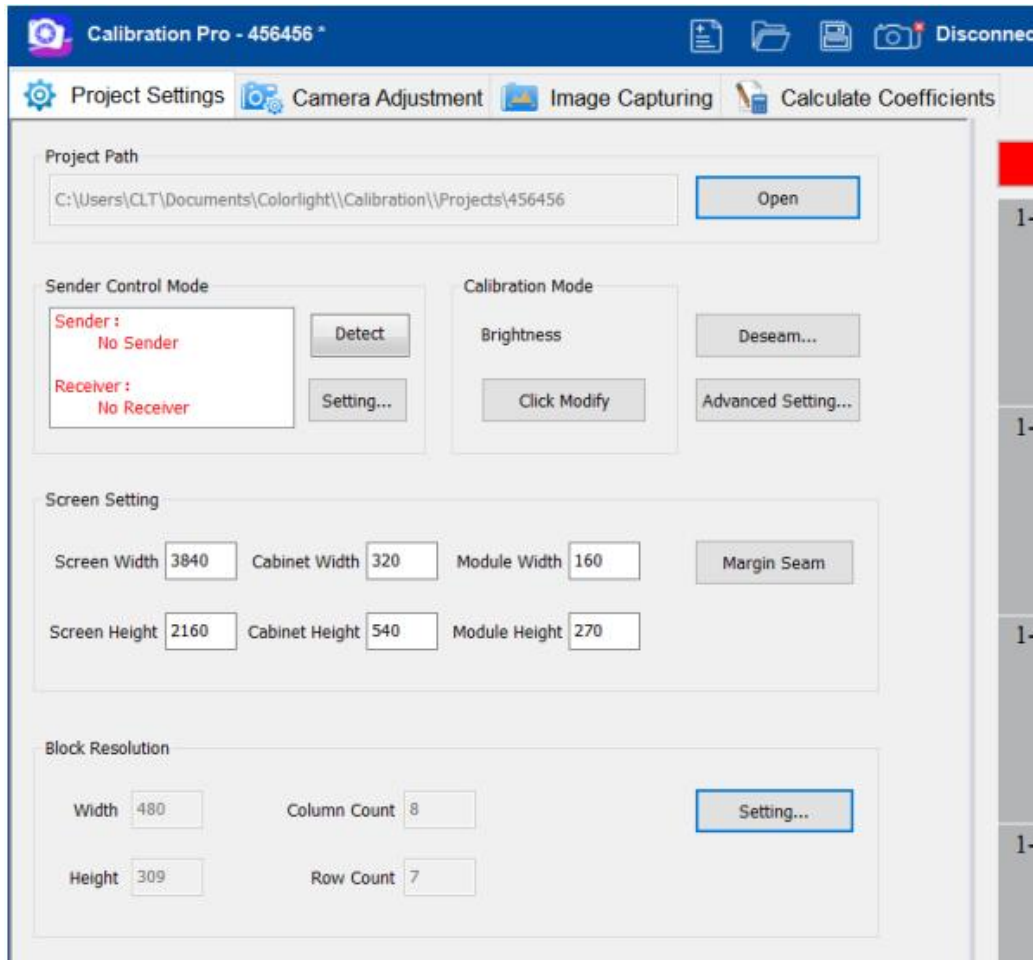


Fig.3-21 Block resolution setting

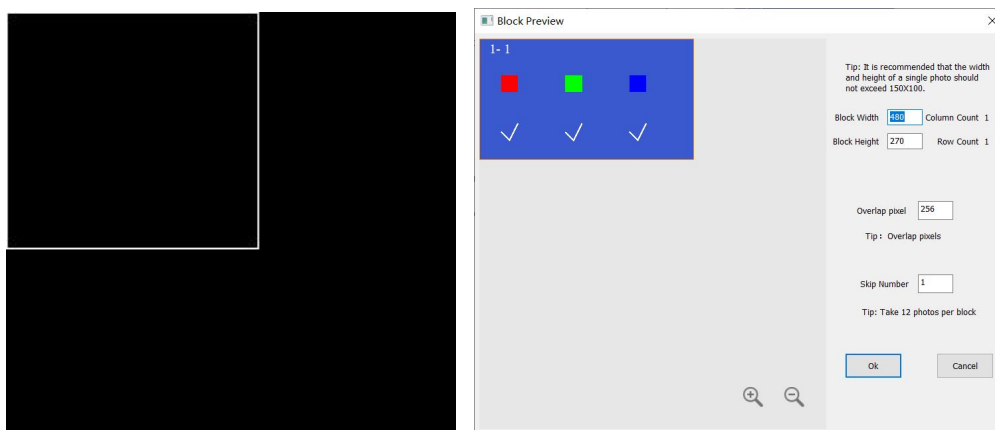


Fig.3-22 Operation Effect

12) Acquisition grayscale setting: using industrial phase calibration cob project,

the acquisition grayscale setting is displayed;

a. Color calibration: Showing the collection setting of highlight gray scale, "Highlight Collection": displaying the collection gray scale 233 and the collection gray scale 217, with the collection gray scale 217 checked by default, which can be unchecked only for low-highlight calibration.

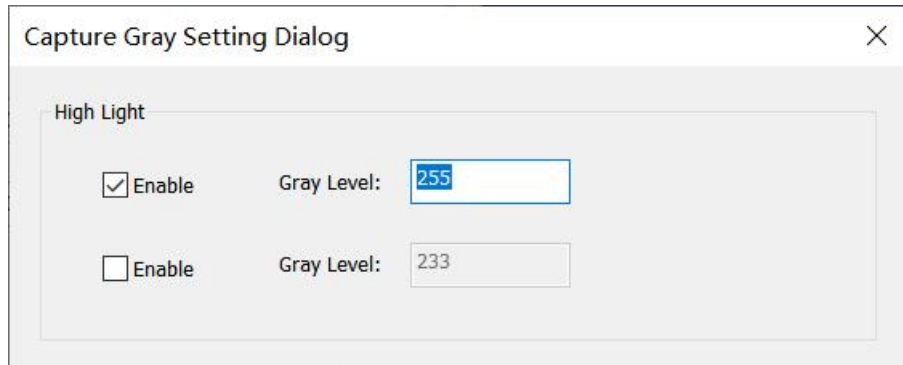


Fig.3-23Collect highlight gray level

b. Bright calibration: Display high and low brightness gray scale acquisition, "Low brightness gray scale": 1, 2 and 3 gray scales are checked by default, and the check of "Low brightness gray scale" can be canceled when only highlighting calibration is performed. As shown in Figure 3-24.

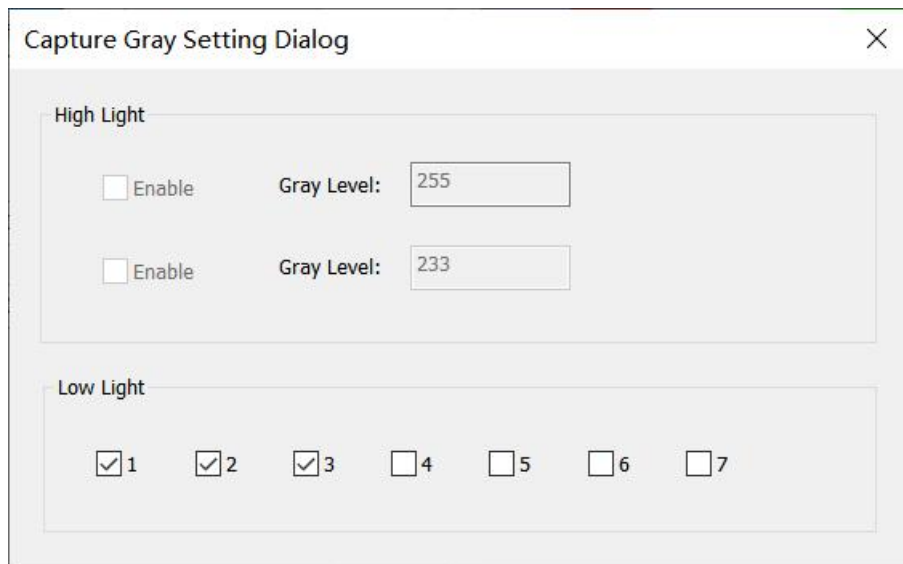


Fig.3-24 capture gray

c. Chip Low Brightness Calibration

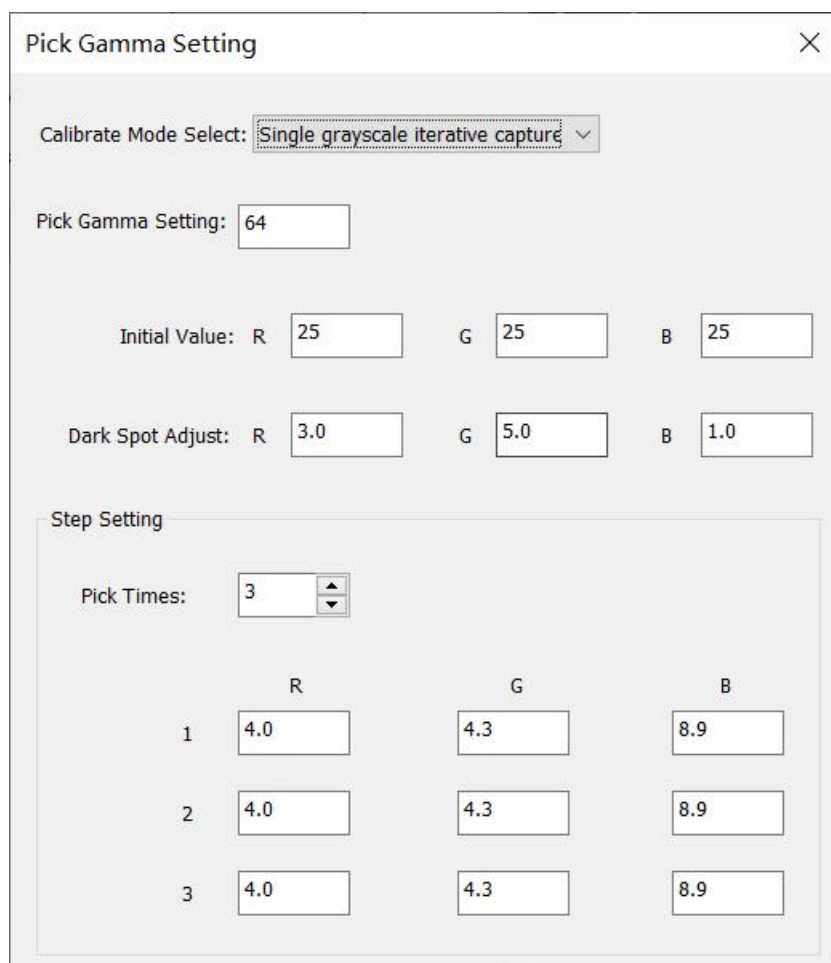
I. Single grayscale iterative capture calibration:

Pick Gamma Setting:Set the gamma value of the current actual acquisition, the default value is 64.

Initial Value:Set the coefficient collected by the initial low brightness calibration, The default value is 16.,The higher the initial value, the higher the graying brightness.

Pick Times:Set the number of times to iterate the acquisition,The default value is 3.

Step size setting: set the step size required for each time according to the acquisition times, and the default is 1, 2, 2.



	R	G	B
1	4.0	4.3	8.9
2	4.0	4.3	8.9
3	4.0	4.3	8.9

Fig.3-25 Single grayscale iterative capture

II.Multi grayscale capture:

Pick Gamma Setting:Set the gamma value of the current actual acquisition, the default value is 64.

Pick Times:Set the number of times to be collected. The default is 4.

Initial coefficient setting: set the initial coefficient of each time according to the number of times of acquisition. The default values are 0, 0.1, 0.2, 0.3;

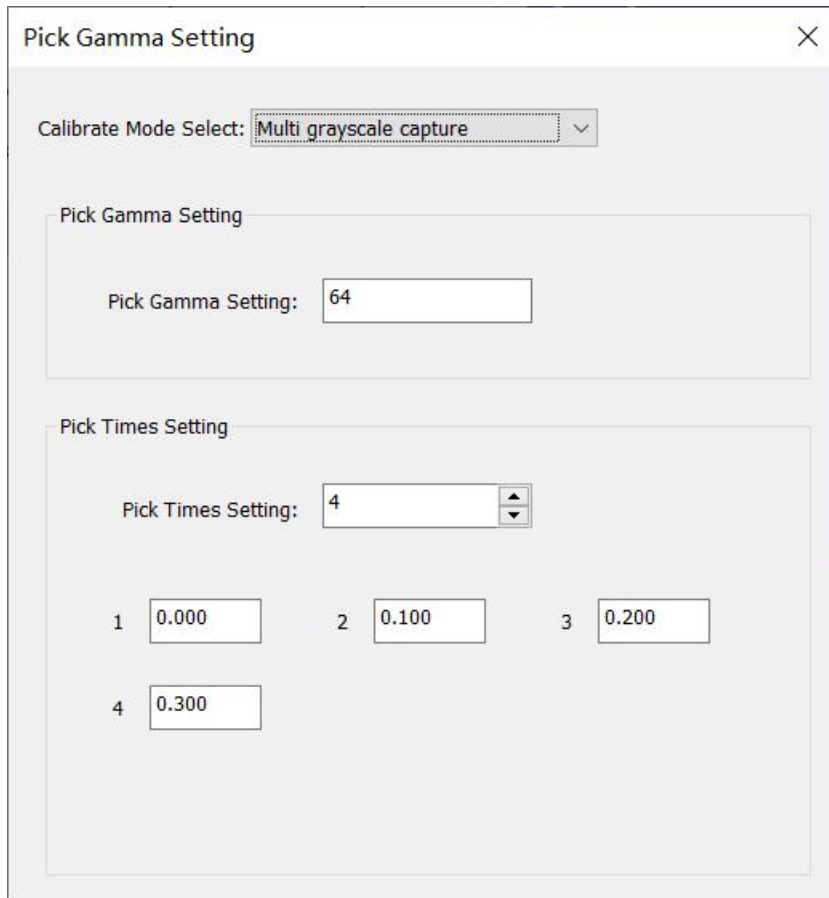


Fig.3-26 Multi grayscale capture

3.6 Camera preparation

1. To set up the camera
2. Canon Camera: Start the camera and shift to **M mode**, and then connect to the computer via USB cable.

3. a. Canon Camera: Select [**connect camera** ] in the tool bar. Its icon will be changed to  after the connection finished.

b. CCM1600 or CCM6000 camera: If the PC has connected the encryption USB stick of the corresponding camera, Select [**connect camera** ] in the tool bar. Its icon will be changed to  after the connection finished. If the PC does not insert an encryption USB flash disk or an incorrect encryption USB flash disk is

inserted, Select [connect camera ] in the tool bar, The prompt "Camera not authorized, connection failed" pops up.

4. Select [**start EVF** ], which is in the tool bar too. Its icon will be changed to  after that. At this time, the real-time scene can be seen on the monitoring area.

5. Accommodate camera to enable the selected area of the LED display to fall into the white square frame of monitoring area.

- a) The selected area should be parallel to the square frame.
- b) The selected area should be filled in the white square frame. A little overpass is permitted but not too much.
- c) The selected area cannot be larger than the monitoring area.



Fig.3-27

3.7 Camera adjustment

3.7.1 Auto adjustment

When measuring the light manually, check the screen conditions in real time through the viewing frame to facilitate manual adjustment of parameters, as shown below:

1) canon:

The frame image will display the actual image in real time, as shown in Figure 3-28. It is necessary to ensure that the partition frame is covered as much as possible and within the framing.

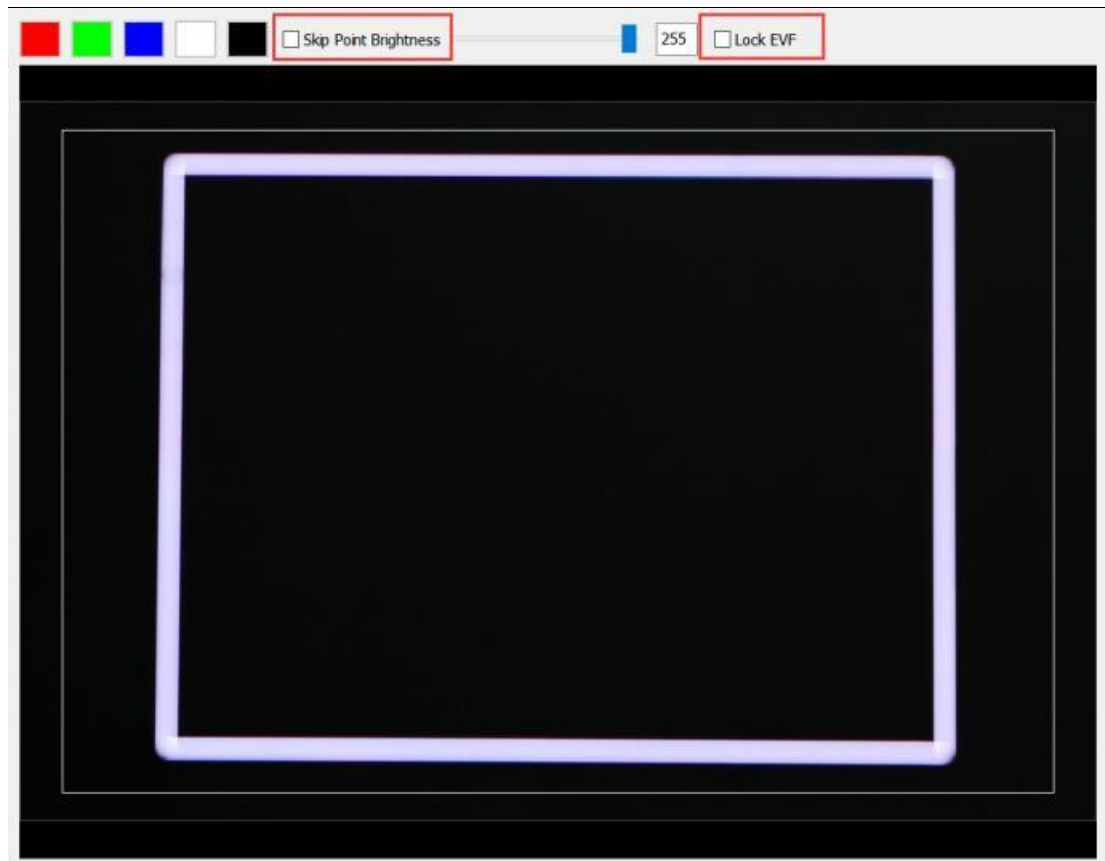


Fig.3-28

2) CCM:

Connect CCM1600 or CCM6000 camera, as shown in Figure 3-29, check [Lock the viewfinder], check [Display at intervals] when there is a jumping point, and arbitrarily select a certain color of red, green, blue and white. At this time, the corresponding partition at the top of the screen will display the corresponding color at intervals according to the jumping point size; Slide the mouse into the lower right display frame, and slide the mouse wheel to zoom in and out in real time. This function can be used to check the light point.

side of frame:



: Click to enlarge the image in the display frame;



: Click to restore the image displayed in the display cabinet to 1:1.



: Click and move the mouse to the display frame to select a certain part of the area for local amplification;



: View the picture of the currently selected color for manual metering.

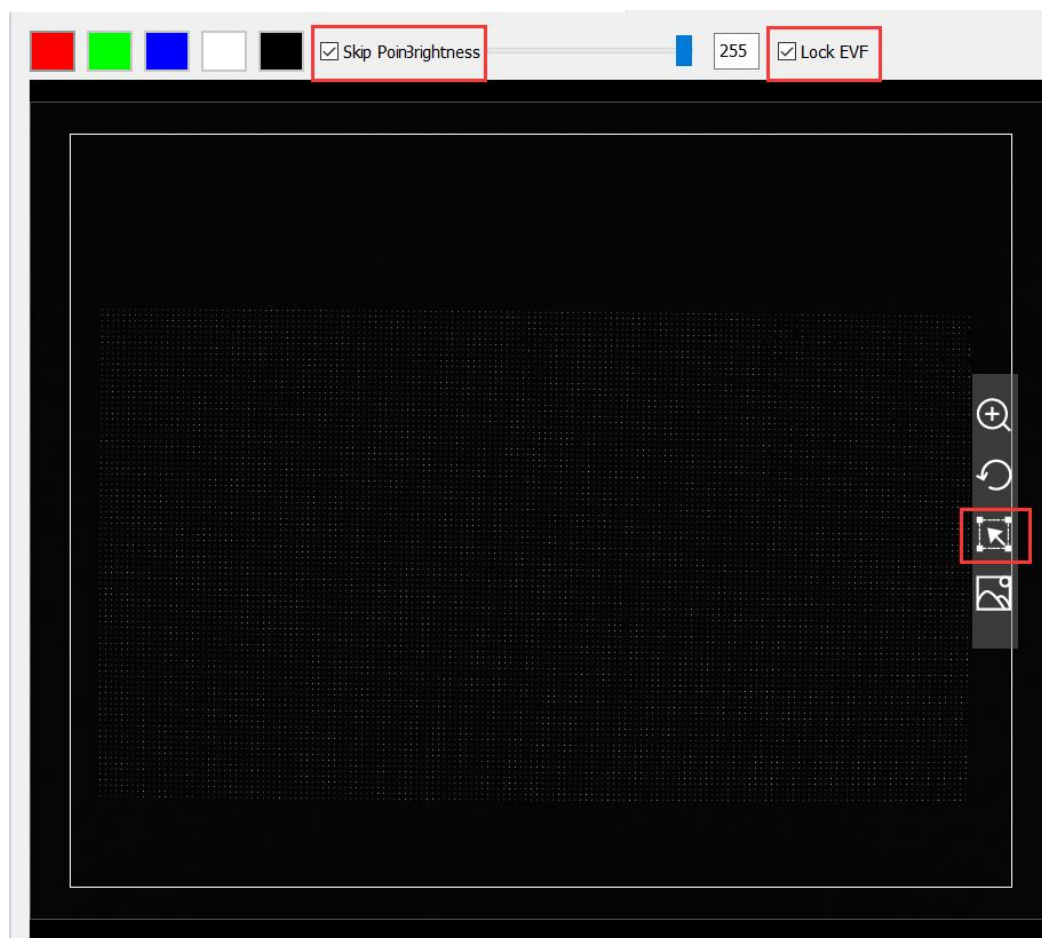
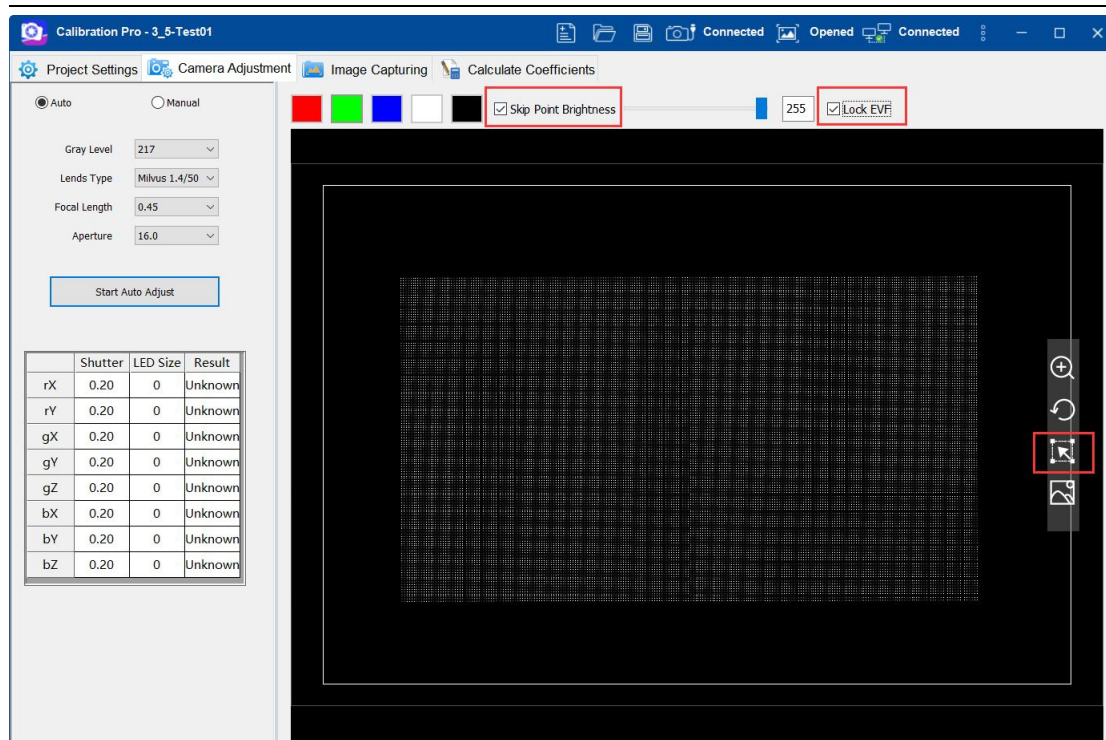


Fig.3-29 Auto adjustment

3.7.2 Auto adjustment

3.7.2.1 canon auto adjustment

Click "Start automatic metering", and the program will automatically adjust the camera parameters to make the exposure normal.

When the light spot sizes do not meet the requirements in the automatic metering process, the red, green and blue light spot sizes are displayed in red letters on a yellow background. After metering is completed, a pop-up window will display "Automatic metering is completed, please switch to the photo taking interface to take photos".

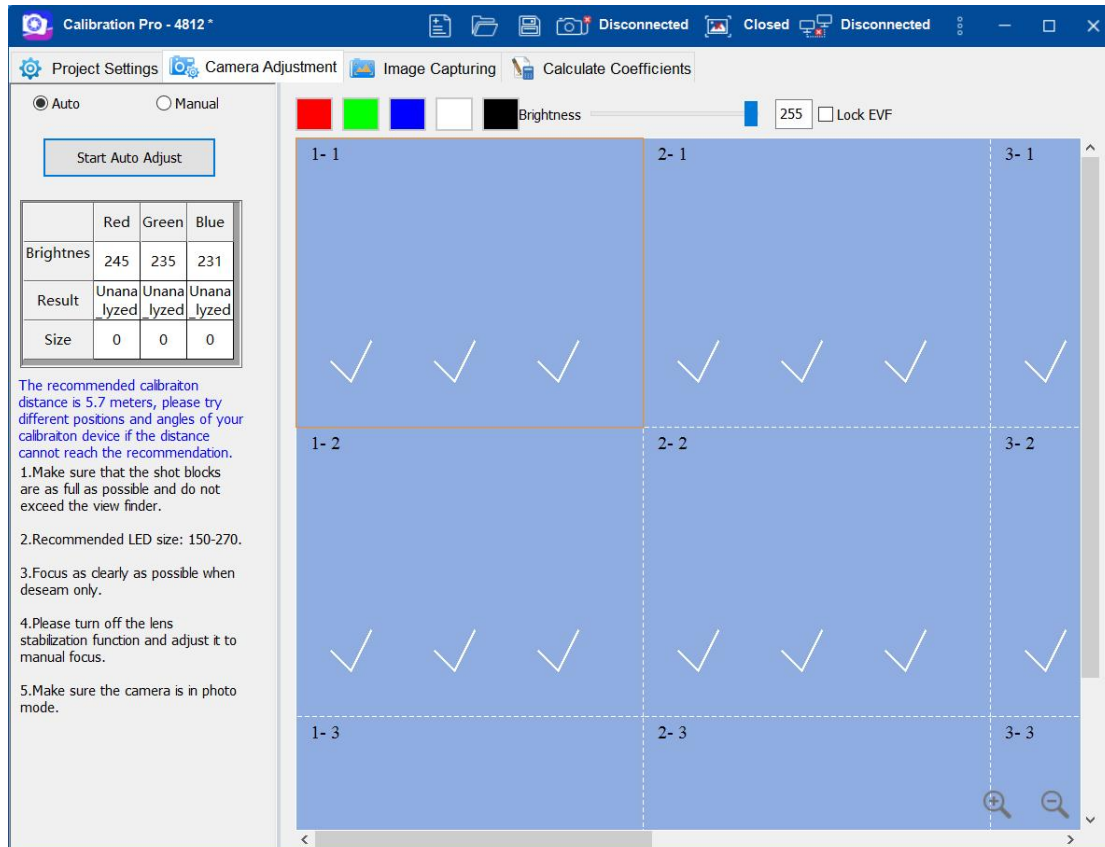


Fig.3-30 Auto adjustment

3.7.2.2 CCM auto adjustment

3.7.2.2.1 Regular screen auto adjustment

Select CCM1600 camera or CCM6000 camera, click "Start automatic metering", the software starts to control the corresponding filter wheel to rotate to the corresponding position for measurement, and the detection results are all displayed normally, so that the image can be collected. The automatic camera adjustment page is as follows:

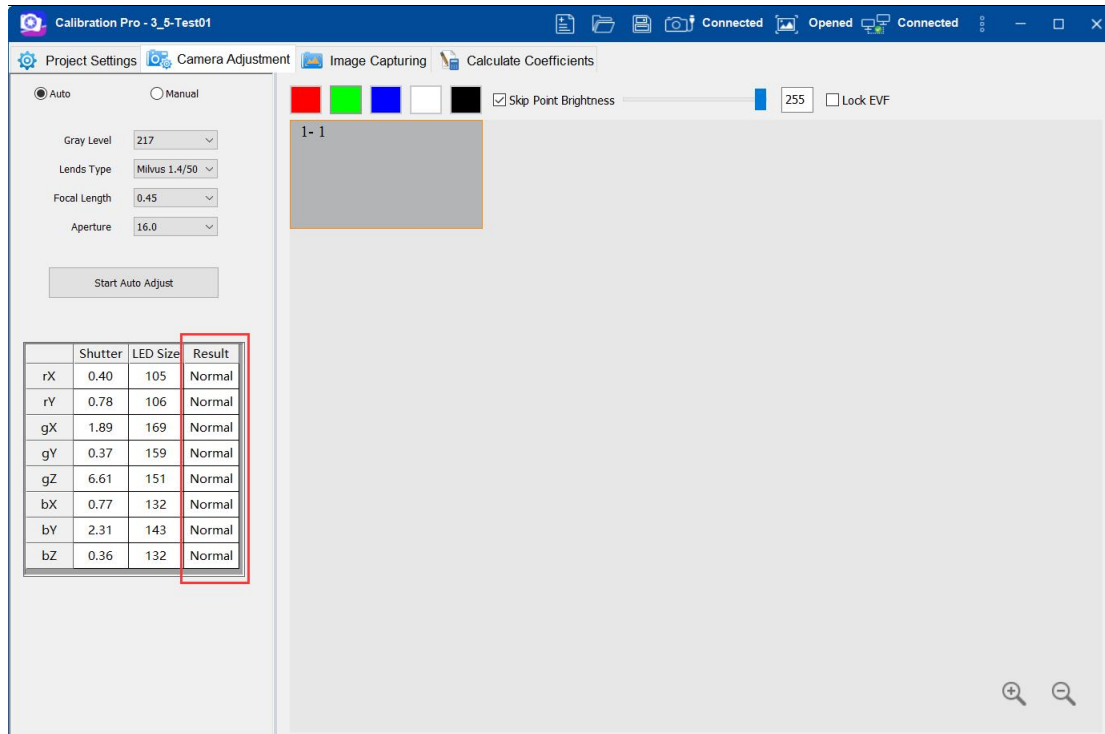


Fig.3-31 Auto adjustment

3.7.2.2.2 Second Calibration auto adjustment

Capture Gray Setting Dialog ,Check the second calibration:

1) Brightness Calibration, Select acquisition gray-scale -1, click the "Start Auto Adjust" button to adjust the brightness, After the adjustment is completed, calibrate the acquisition gray-scale -1, After the calibration is completed, enable the calibration, Select acquisition gray-scale -2 on the camera adjustment interface, click to start automatic metering, and adjust the camera. When the detection results are normal, image acquisition of acquisition gray-scale -2 can be started.

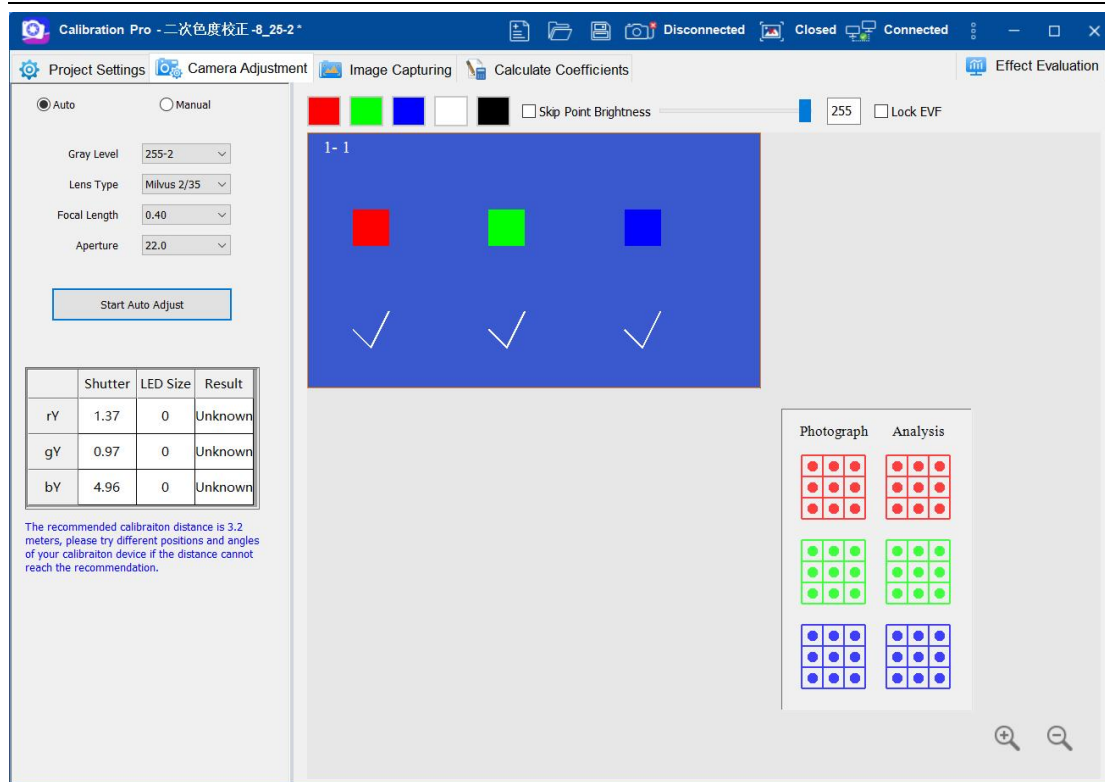


Fig.3-32 Brightness

2) Brightness and Chroma Calibration, Select acquisition gray-scale -1, click the "Start Auto Adjust" button to adjust the brightness. After the adjustment, calibrate the acquisition gray-scale -1. After the calibration is completed, enable the calibration. Select acquisition gray-scale -2 on the camera adjustment interface, click the "Start Auto Adjust" button, the software enables the chromaticity calibration, and adjust the camera of acquisition gray-scale -2. If the detection results are normal, the acquisition gray-scale -2 image can be conducted.

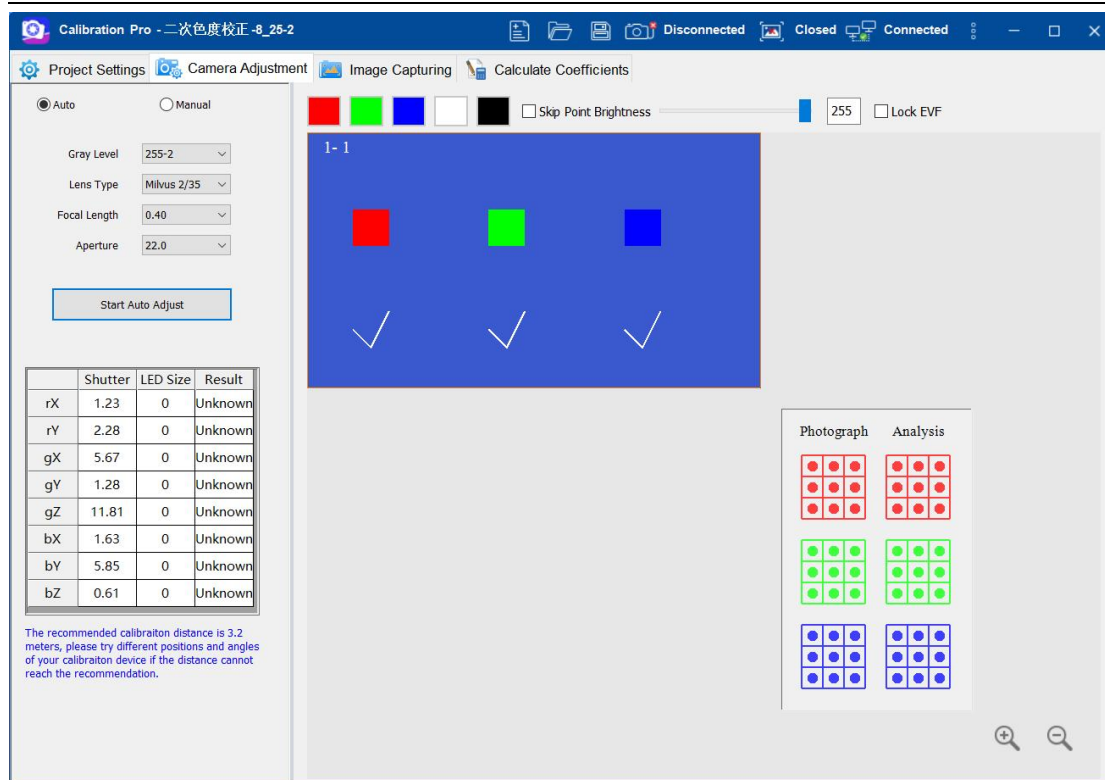


Fig.3-33 Chroma

3.7.2.2.3 Chip Low Brightness auto adjustment

1) **Single grayscale iterative capture calibration**, Click the "Start Auto Adjust" button, the software will send the gamma value, initial coefficient, enable chip low brightness calibration, and start camera adjustment.

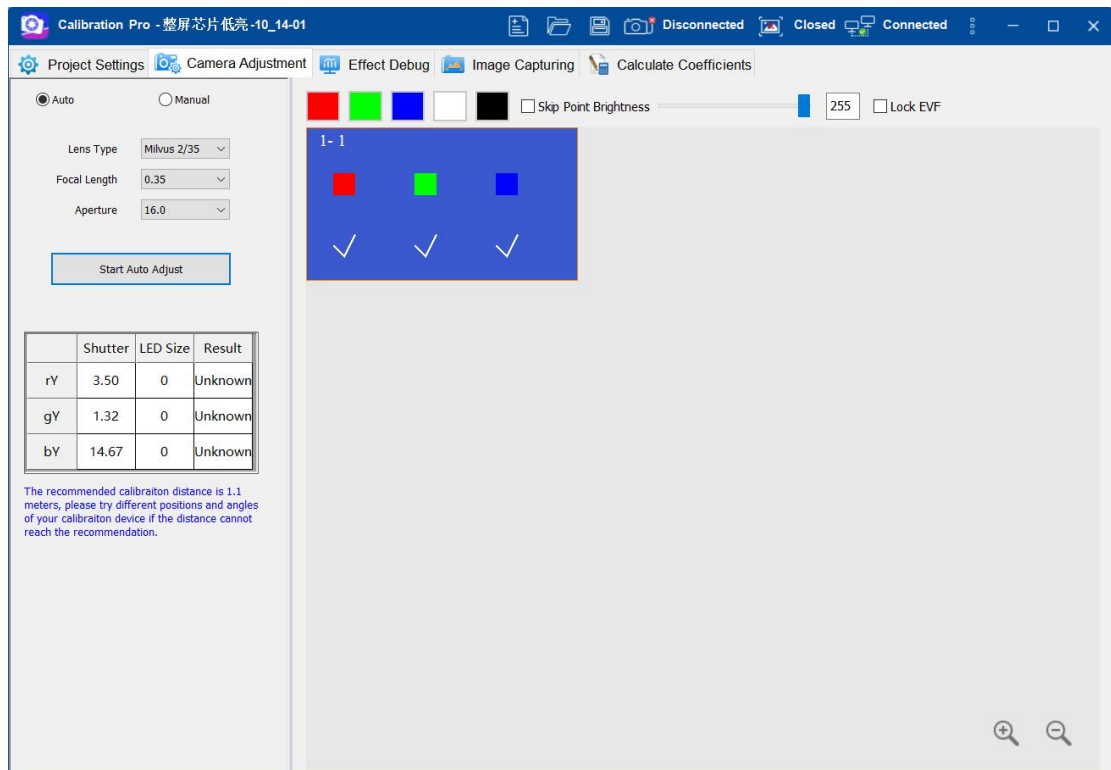


Fig.3-34 Single grayscale iterative capture

2) **Multi grayscale capture**, Select the acquisition times as 1, click the "Start Auto Adjust" button, the software first sends the gamma value and the initial coefficient for the first time, and enables chip low brightness calibration to start camera adjustment. The first auto adjustment is completed, the software first sends the gamma value and the initial coefficient for the second time, and enables chip low brightness calibration. The software completes camera adjustment for all acquisition times in turn.

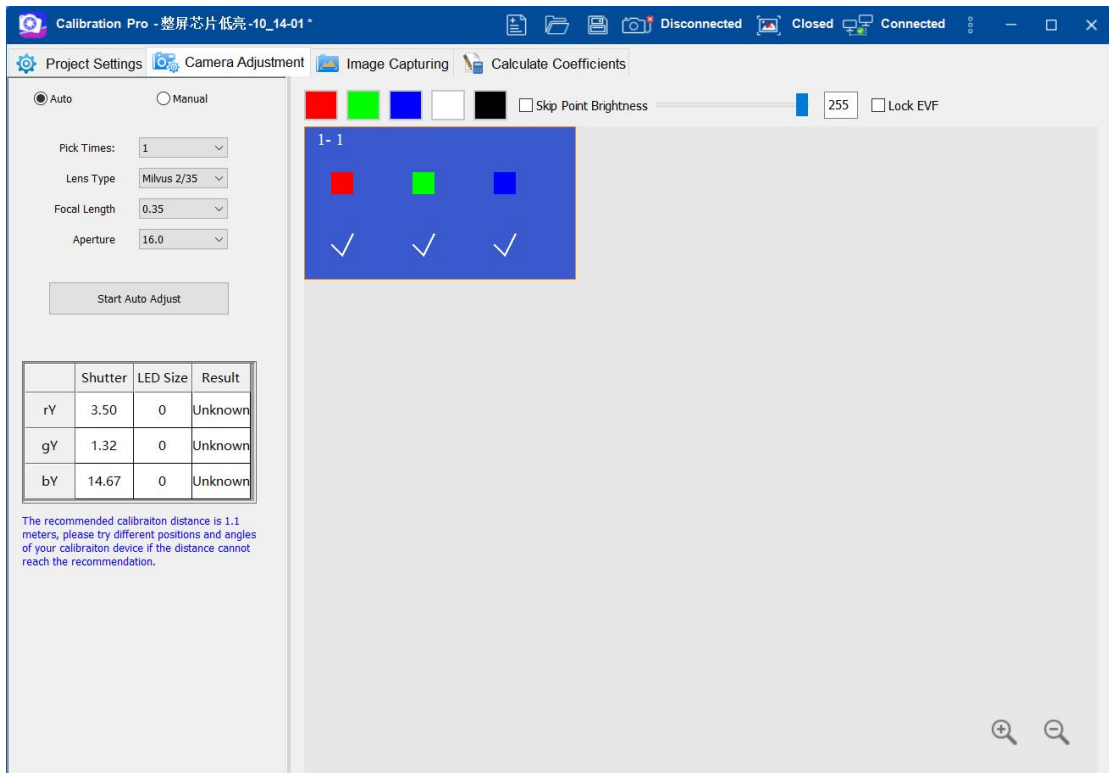


Fig.3-35 Multi grayscale capture

Camera parameter setting, click "Collect Grayscale" 、"Lends Type"、"Focal Length"、"Aperture"to switch the gray scale and Camera parameters to be collected, as shown in Figure 3-30.

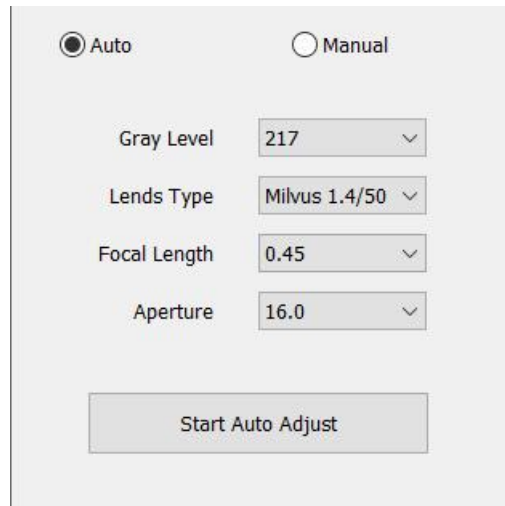


Fig.3-36 Collect Grayscale and Camera parameters

For the use of ccm6000 camera calibration file, Insert the encrypted U disk of the currently used camera. On the camera adjustment page, select the lens model, aperture and ambiguity actually used by the current camera, and the software will automatically apply the corresponding calibration file.

After metering, when the size of light points is seriously inconsistent with the actual size, the pop-up window will prompt "Automatic metering is completed, please switch to the photo-taking interface to take photos, warning: the number of light points is too small" or "Automatic metering is completed, please switch to the photo-taking interface to take photos, warning: too many light points". When this happens, please check whether there are too many dead lights on the screen.

3.7.3 Manual adjustment

Switch to manual adjustment by clicking the radio button 'manual'.

NOTE: During the metering process, please notice two parts(as shown Fig. 3-37):

3.7.3.1 canon manual adjustment

Project Settings
 Camera

☐ Auto
 ☒ Manual

Red Green Blue

Shutter 0"6

Aperture 32

ISO 400

Brightness 195

Result Too Bright

LED Size 82

Recommended LED size: 150-270

Detect

Dark Light

	Red	Green	Blue
Shutter	0"6	0"6	0"5
Aperture	32	32	32
ISO	400	400	400

Warning: The Number Of LEDs was Too few!

Fig. 3-37 Camera Adjustment

- When validation result shows “ Normal”, and the lamp size is less than 150, it prompts with red font, orange yellow background in ①. When it happens, please tune the aperture to make the real-time image blurred, then re-metering;
- When the lamp size doesn't match the actual , it shows “ Warning: the Number Of Lamps Does Not Match The Actual Number”. With it happens, please check if there are too many dead lamp on the screen.

3.7.3.2 CCM adjustment

3.7.3.2.1 Regular screen manual adjustment

Connect CCM1600 or CCM6000 camera, select in "Camera Adjustment" and enter the manual metering interface, as shown in Figure 3-38-A and 3-38-B.

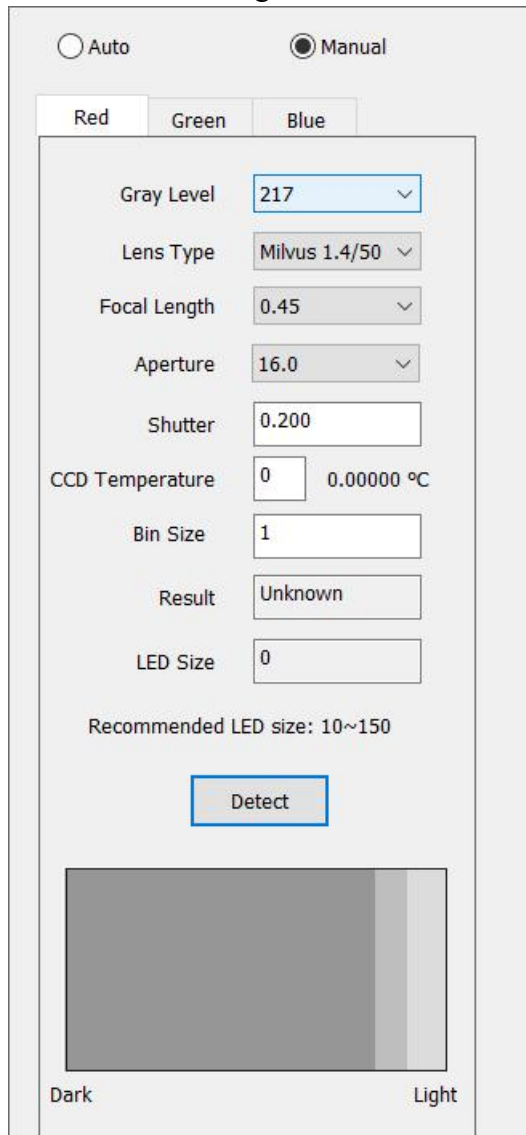


Figure 3-38-A shows the manual metering interface for the Red, Green, and Blue components. The interface includes a 'Manual' tab and a 'Detect' button. The settings are as follows:

Parameter	Value
Gray Level	217
Lens Type	Milvus 1.4/50
Focal Length	0.45
Aperture	16.0
Shutter	0.200
CCD Temperature	0.00000 °C
Bin Size	1
Result	Unknown
LED Size	0

The 'Detect' button is highlighted with a blue border. Below the settings is a grayscale calibration chart with 'Dark' and 'Light' labels.

Figure 3-38-A

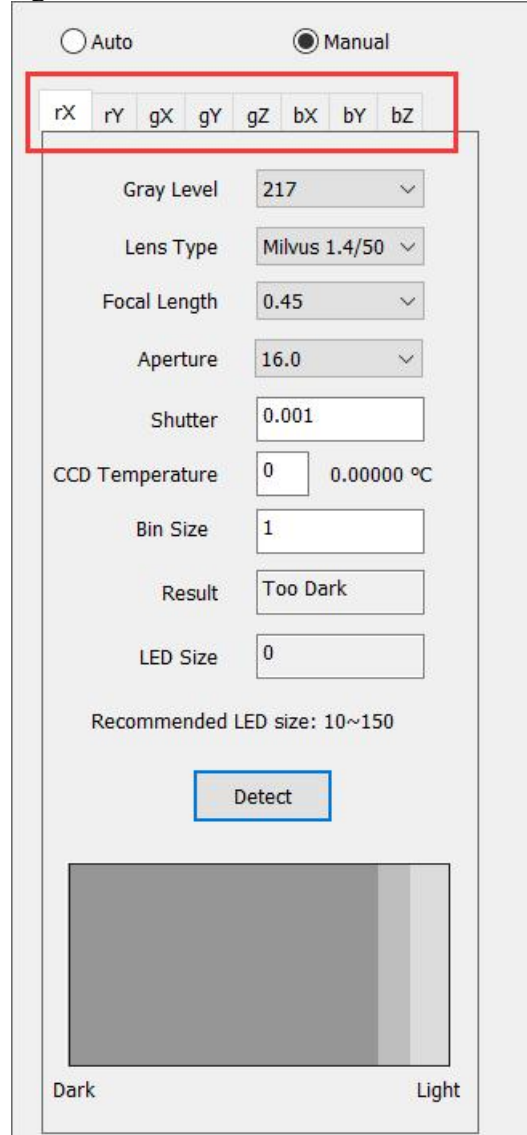


Figure 3-38-B shows the manual metering interface for the color calibration components (rX, rY, gX, gY, gZ, bX, bY, bZ). The interface includes a 'Manual' tab and a 'Detect' button. The settings are as follows:

Parameter	Value
Gray Level	217
Lens Type	Milvus 1.4/50
Focal Length	0.45
Aperture	16.0
Shutter	0.001
CCD Temperature	0.00000 °C
Bin Size	1
Result	Too Dark
LED Size	0

The 'Detect' button is highlighted with a blue border. Below the settings is a grayscale calibration chart with 'Dark' and 'Light' labels.

Figure 3-38-B

a.bright calibration : manual metering has three components: red, green and blue.
b.color calibration : There are eight components in manual metering, namely, 'XR',' YR',' XG',' YG',' ZG',' XB',' Yb' and' ZB'. After metering of each component is completed, you can switch to metering of the next component until metering of all components is completed. Select "Shutter", manually enter a numerical value to modify the shutter size, and click "Test" to see if the "test result" is normal. As shown in Figure 3-39, the image can be collected after all components are measured manually.

☐ Auto
 ☒ Manual

rX
rY
gX
gY
gZ
bX
bY
bZ

Gray Level

217

Lens Type

Milvus 1.4/50

Focal Length

0.45

Aperture

16.0

Shutter

0.367

CCD Temperature

0

0.00000 °C

Bin Size

1

Result

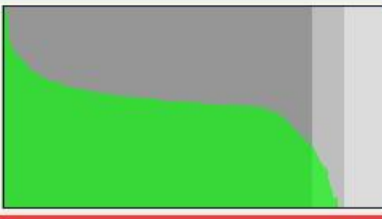
Normal

LED Size

159

Recommended LED size: 10~150

Detect



Dark

Light

Figure 3-39

3.7.3.2.2 Second Calibration manual adjustment

1) **Brightness Calibration**, Click "R", select acquisition times - 1, click "Test" button, the software will collect a photo for analysis and prompt the test results, select acquisition times - 2, click "Test" button, start calibration, the software will collect a photo for analysis and prompt the test results.

2) **Brightness and Chroma Calibration**, Click a component in turn, select the acquisition times - 1, click the "Test" button, the software will collect a photo for analysis and prompt the test results, select the acquisition times - 2, click the "Test" button, start the calibration, the software will collect a photo

for analysis and prompt the test results.

3.7.3.2.3 Chip Low Brightness Calibration manual adjustment

1) **Single grayscale iterative capture calibration**, Select "R\G\B" in sequence, click the "Test" button, the software will send the gamma value and initial coefficient, and enable the chip low brightness calibration for photographic analysis.

2) **Multi grayscale capture**, Select "R\G\B" in sequence, select the acquisition times as 1/2/3/4, click the "Detection" button, the software will first send the gamma value, the initial coefficient of the first time, and enable the chip low light calibration for photographic analysis.

Manual Setting:

1. Click the [**detect**] button under red, green, blue, histogram generated from the image automatically taken by camera will be shown within the black square frame.
2. Check the histogram in preview frame to see shooting effect.
 - a) The standard histogram: the lower right corner of the corresponding color slope should be closed to the lower right corner of the square frame, staining to the right edge is not permitted.
 - b) Example in red:

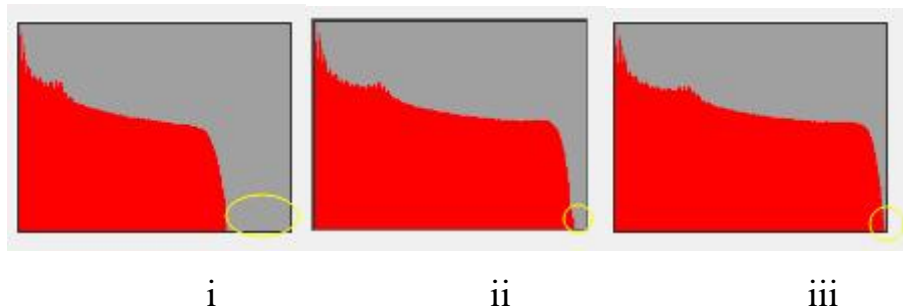


Fig. i too faint,

Fig. iii too bright,

Fig. ii standard

3. Adjust relevant parameters according to the above standards. Re-auto setting or manual setting can be made if the picture can not meet requirements. Rules of manual settings listed as below:
 - A) When too much bright
 - Reduce the shutter time (requires refresh rate increased)
 - Lower brightness percentage
 - B) When too faint
 - Increase the shutter time (requires environment improved)

➤ Increase brightness percentage

4. Repeat step1-step3, to confirm picture histogram meet the requirements.

Note: Parameters change together with camera adjustment. Please save new setting parameters after the accomplishment of shutter adjustment.

3.8 Effect Debug

Project wizard-5, check the chip low brightness calibration, select single gray scale iterative acquisition calibration, and the menu bar displays the effect debugging page, including automatic adjustment and manual adjustment pages.

1、 Auto adjustment: the initial default value of step size is 1, 2, 2; Click the "Start Auto Adjustment" button, and the software will first take photos and analyze. After taking photos and analyzing, it will generate coefficients and save the coefficients to the chip. After the coefficients are saved successfully, the software will automatically update the step size and display the current adjustment status: in photo analysis, in generating coefficients, in saving coefficients to the chip, and display the step size adjustment results that are too small, normal, and too large until the adjustment step size stops properly.

2、 manual adjustment:when the cabinet calibration data already exists in the project, manually modify the step size value of the table, click the "Application Coefficients" button, and the software will send the coefficients after the application step size to the chip low brightness coefficients.

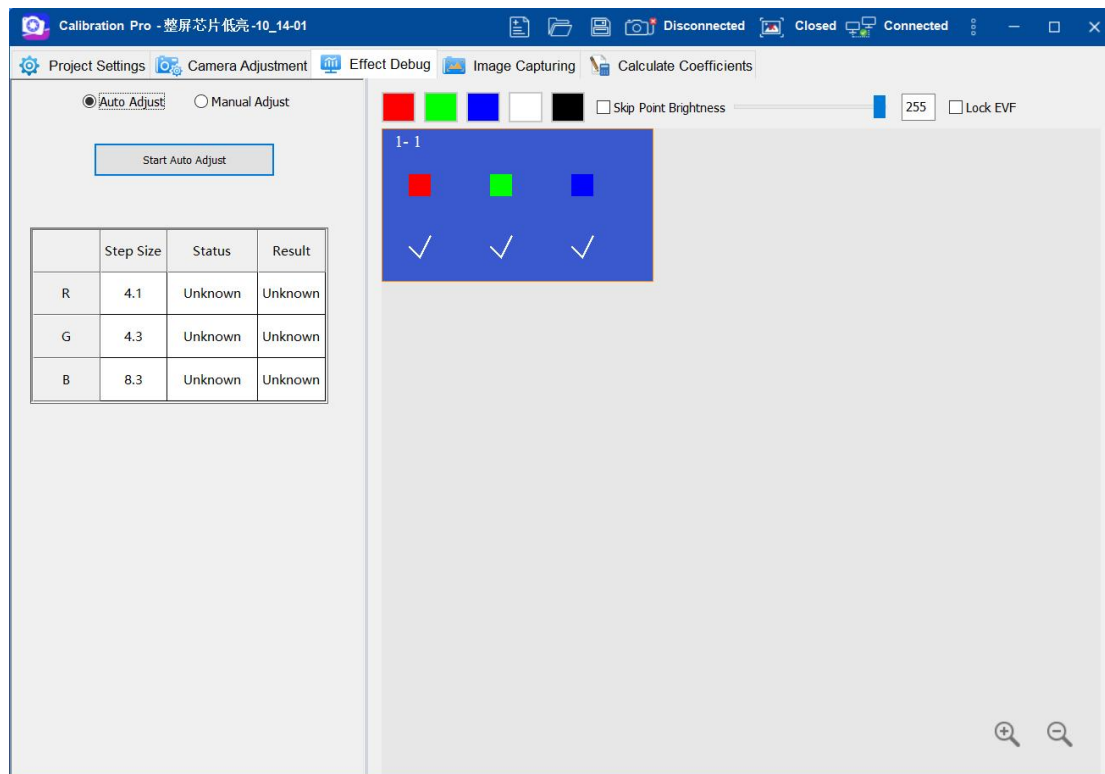


Figure 3-40 effect debug

3.9 Shooting photos part

3.9.1 Shooting photos part

1. Select one block from the [**Shooting photos**] in the partition map, then click [**Monitor**].
2. Adjust the camera to make the screen displayed area position in the preview area of the white cabinet of Tab [**shooting photos**] .
3. Click [Batch Shoot] in photograph page,

a.regular screen calibration,take one RGB photo of the area (if the jump function is enabled, several jump matrices);

b.cob module chroma calibration,check whether the ambient light is strong or weak. On the "Image Collection" page, click "Take a picture". Before collecting each component, the software will take a picture of the background in black screen.

After shooting photo, the corresponding block area will display RGB matrix in the partition map. In the case of shooting failed, click [**Reshoot**] to reshoot the failed photo if enable the skip points function.

c.Second Calibration

I.Brightness Calibration:Select the Gray Level -1, select the acquisition zone, and click the "Photograph" button. The software will first close the calibration, and the software will take RGB photos of the area according to the jump point; Select the Gray Level -2, select the acquisition zone, click the "Photograph" button, the software enables brightness calibration, and then take RGB photos of the area according to the jump point.

II.Brightness and Chroma Calibration:Select the Gray Level -1, select the acquisition zone, and click the "Photograph" button. The software will first close the calibration, and the software will take RGB photos of the area according to the jump point; Select the Gray Level -2, select the acquisition zone, click the "Take Picture" button, the software first enables chromaticity calibration, and then takes pictures of each component of the area according to the skip point (I.e the pictures of rX, rY, gX, gY, gZ, bX, bY, bZ).

d.Chip Low Brightness Calibration

I.**Single grayscale iterative capture calibration**,Select the acquisition partition, click the "Take a Picture" button, the software will first send gamma, initial coefficient, enable chip low light calibration, complete the first acquisition, generate a coefficient for the first acquisition, automatically switch the acquisition times to the next acquisition times, and send the new coefficient for the first acquisition to the chip according to the receiving card included in the partition, then start the next acquisition, and execute in sequence until all acquisition times complete the acquisition.

II.**Multi grayscale capture**,Select the acquisition partition, click the "Photograph" button, the software will first send gamma, the first acquisition coefficient, enable chip low light calibration, complete the first acquisition, automatically switch the acquisition times to the next acquisition times, and execute in sequence until all acquisition times complete the acquisition.

4. After shooting a selected block of RGB, the screen will automatically display the next block. Repeat step 2-4, to complete shooting photos for whole screen.

5. The calibrated object can be modified as **[Spare]** only when at least one block in the partition map of the conventional screen has accomplished analysis. Click **[Modify]**. In the pop-up **[Calibration Object Setting]** window, you can select **[Spare]**, and the analysis file and photo file of the Spare object can be loaded automatically.

Note: If you set up **[Deseam Only]** in the **[basic parameters]** setting page, only need to shoot red color in each partition.

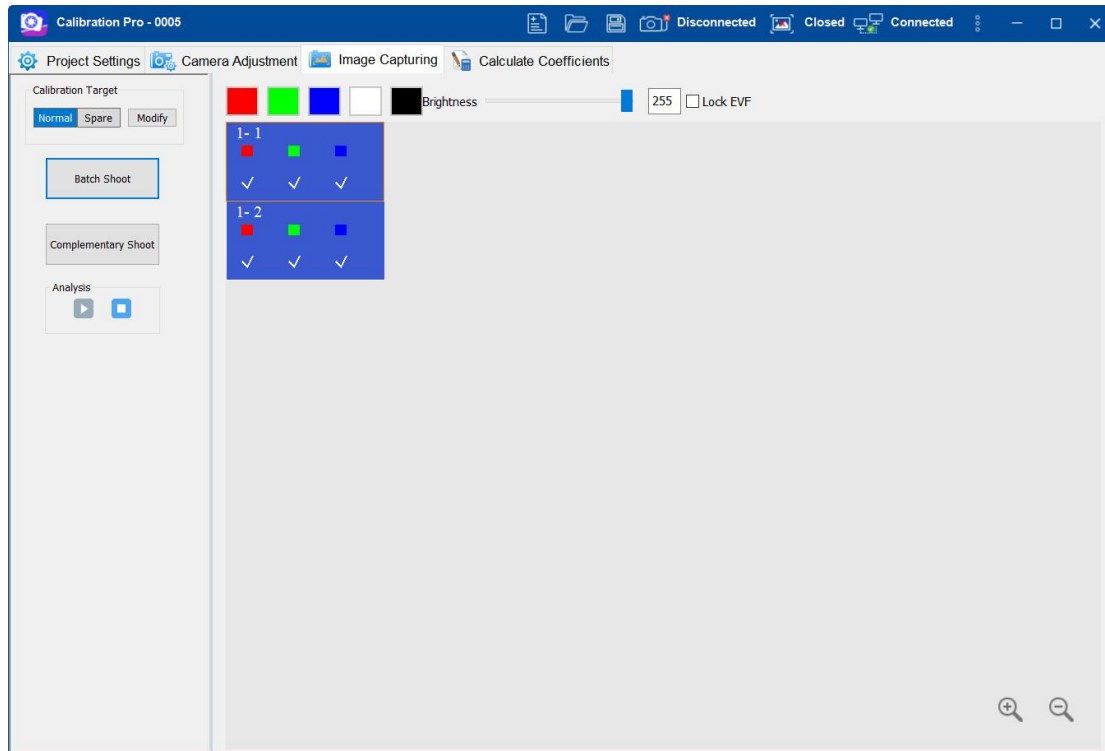


Fig.3-41 Shooting Photo

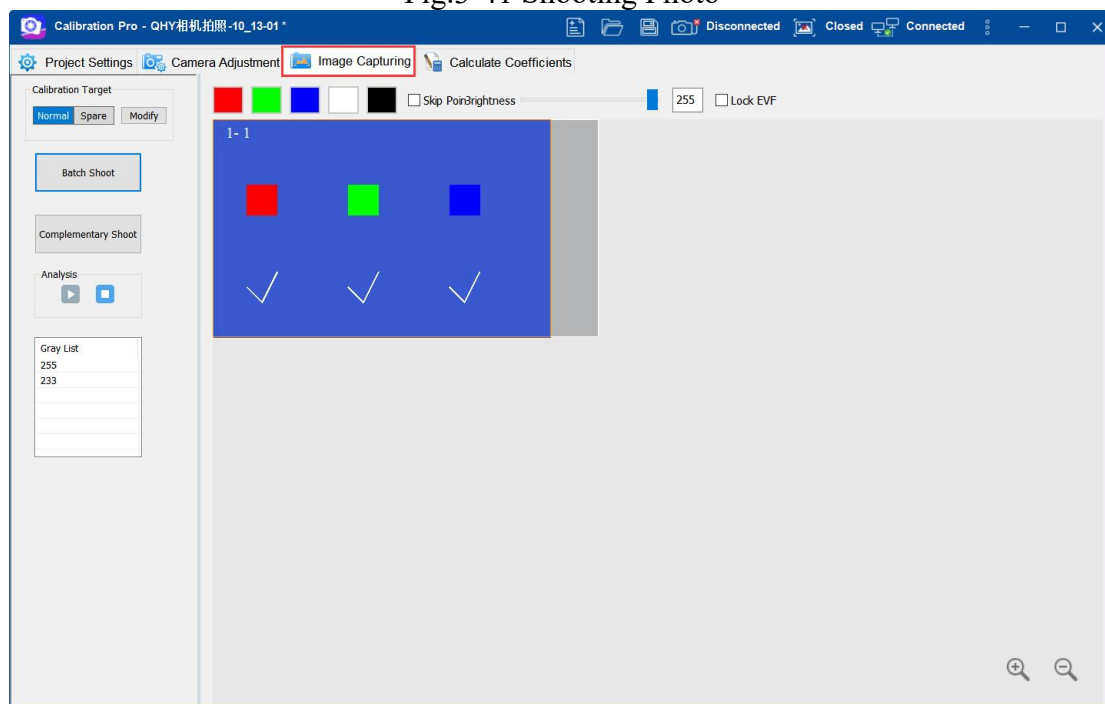


Fig.3-42 Shooting Photo

A. select the gray scale to be collected in the gray scale list, as shown in figure 3-36.

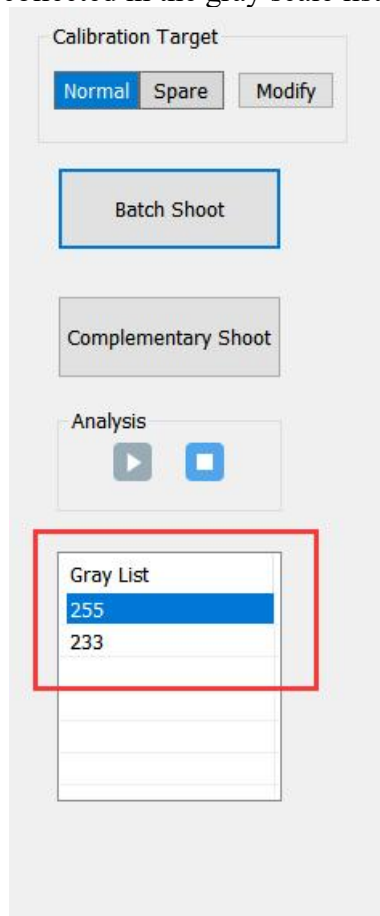


figure 3-43.

B. Secondly, move the mouse to the partition map on the right, click to select the photo partition, as shown in Figure 3-44, and a white border will appear on the corresponding screen.

6.cob module calibration, switch to spare parts calibration, the software copies a copy of the original calibration data, and locks the calibration mode, sewing settings, effect settings, acquisition gray scale settings, brightness after calibration, and related functions such as original color gamut, target color gamut, white priority and advanced settings in the color gamut settings.

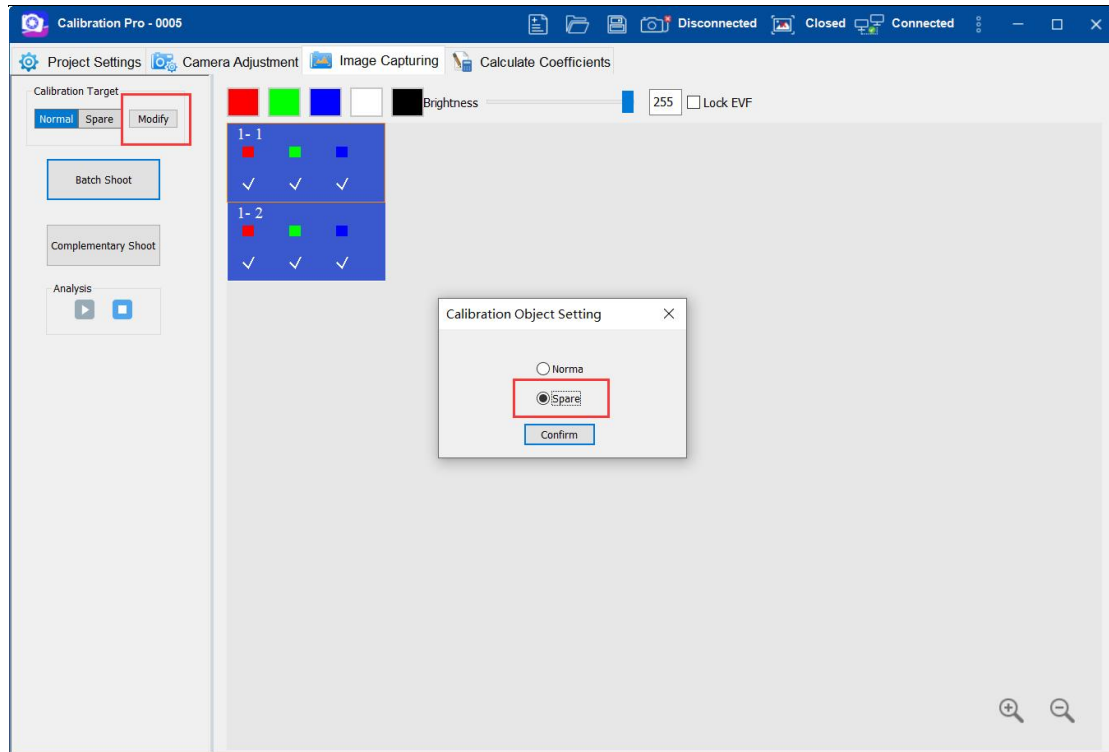


Fig.3-44 Switching to Spare

3.9.2 Effect Evaluation

1、The brightness of the whole screen is Calibration, When a partition is collected and analyzed in the project, the effect evaluation button is displayed on the upper right corner of the menu bar, as shown in the following figure:

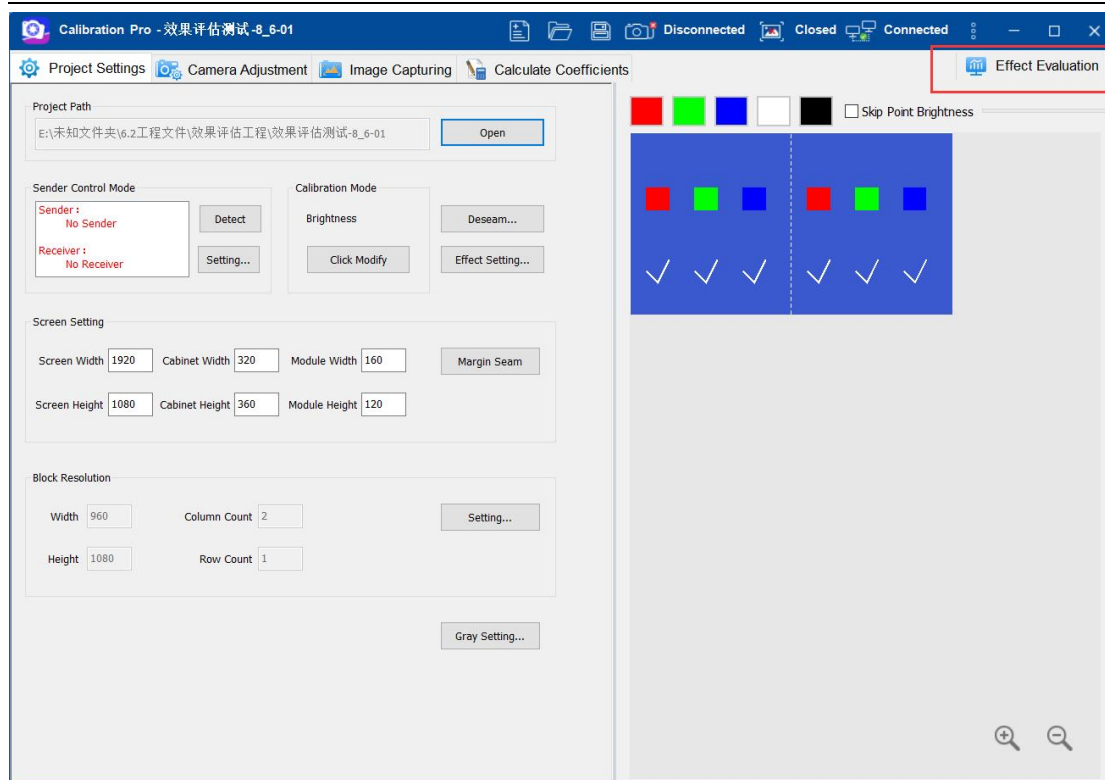


Fig.3-45 effect evaluation

- 2、Click "Effect Evaluation" button, Enter the effect evaluation setting window, where x and y are the starting point coordinates of the effect evaluation area. The default (x, y) coordinates are (0,0). The "width and height of the evaluation area" are the width and height of the actual area to be evaluated, and the default is the width and height of the partition; Select the acquisition partition, click the "Photograph" button, and the software enables calibration to complete the acquisition. The corresponding partition area in the partition map will display a red green blue rectangle cabinet, indicating that the corresponding photo is taken.
- 3、After shooting, click the "Start Analysis" icon button to start photo analysis. The RGB check cabinet will be displayed in the corresponding block area in the partition map. Click the "Stop Analysis" icon button to stop the software analysis.
- 4、After completing the calibration of the acquisition area in the evaluation area, click the "Start Evaluation" button, and the software will count the mean value, mean square error, display brightness loss and other information in the corresponding evaluation area, and draw a histogram.
- 5、Click the "red, green and blue" button, the screen will display red, green and blue, and the statistical histogram will display the statistical information of the corresponding colors.
- 6、Click the "Download icon" button to export the evaluation report of the current evaluation area.

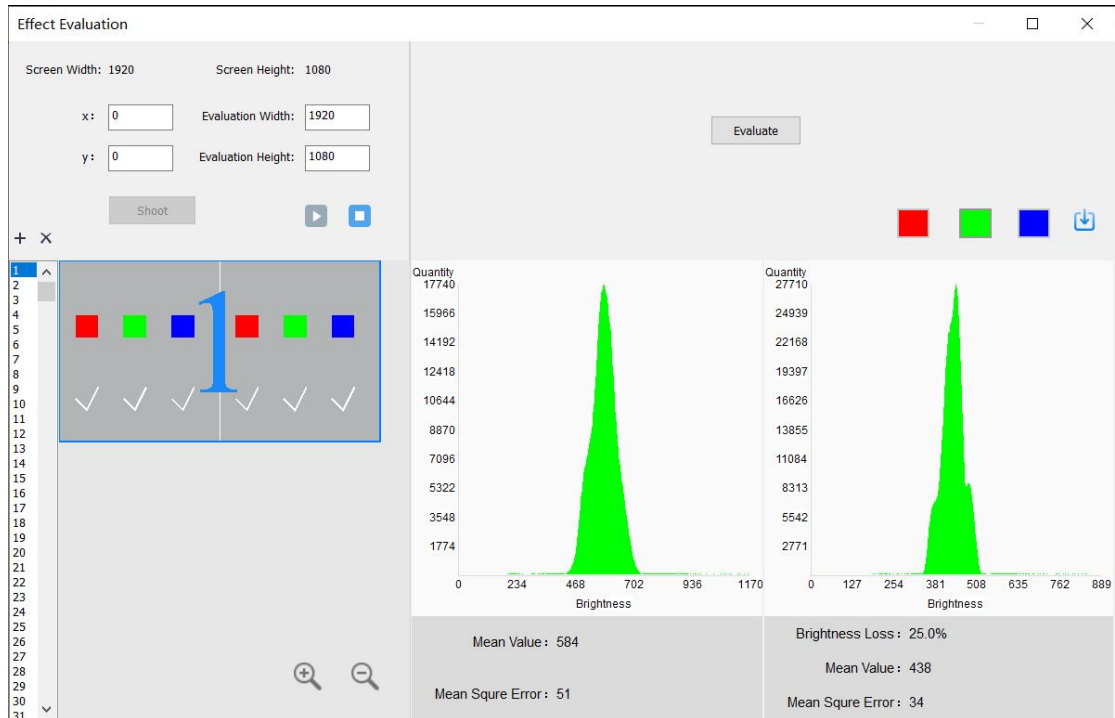


Fig.3-46 evaluation report

3.10 Generate coefficient

3.10.1 Brightness extraction

Start brightness extraction for images with clicking [**start analysis**] on [**shooting**] after shooting. (when completed the analysis of corresponding RGB images, a check mark will appear in corresponding area, as Fig. 3-47 shown).

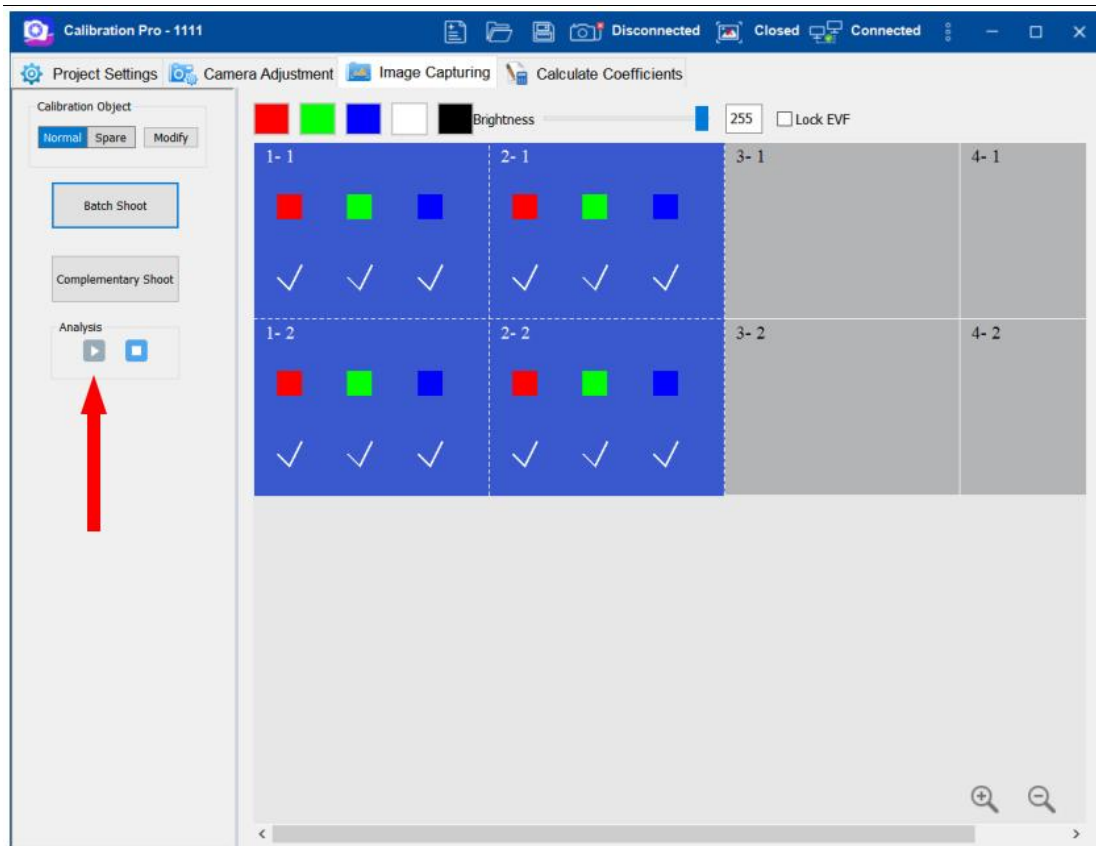


Fig. 3-47 Start Analysis

Analysis going with shooting can save lots of time if the computer has a good configuration.

3.10.2 Generate coefficient

1. The extracted brightness maps can be checked by selecting [**Coefficient**] → [**Brightness Chart**], as Fig.3-48 shown;

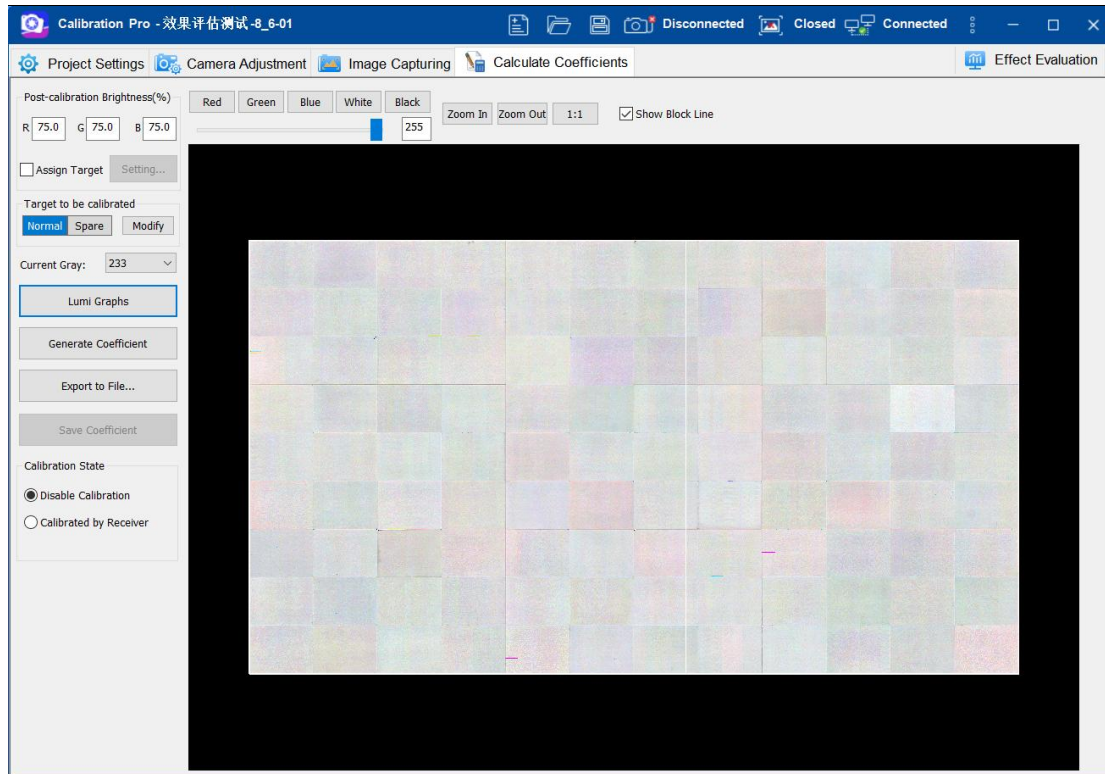


Fig. 3-48 generate coefficient

2.Cob module chroma calibration, brightness map display has X, Y and Z switching display, as shown in Figure 3-49.

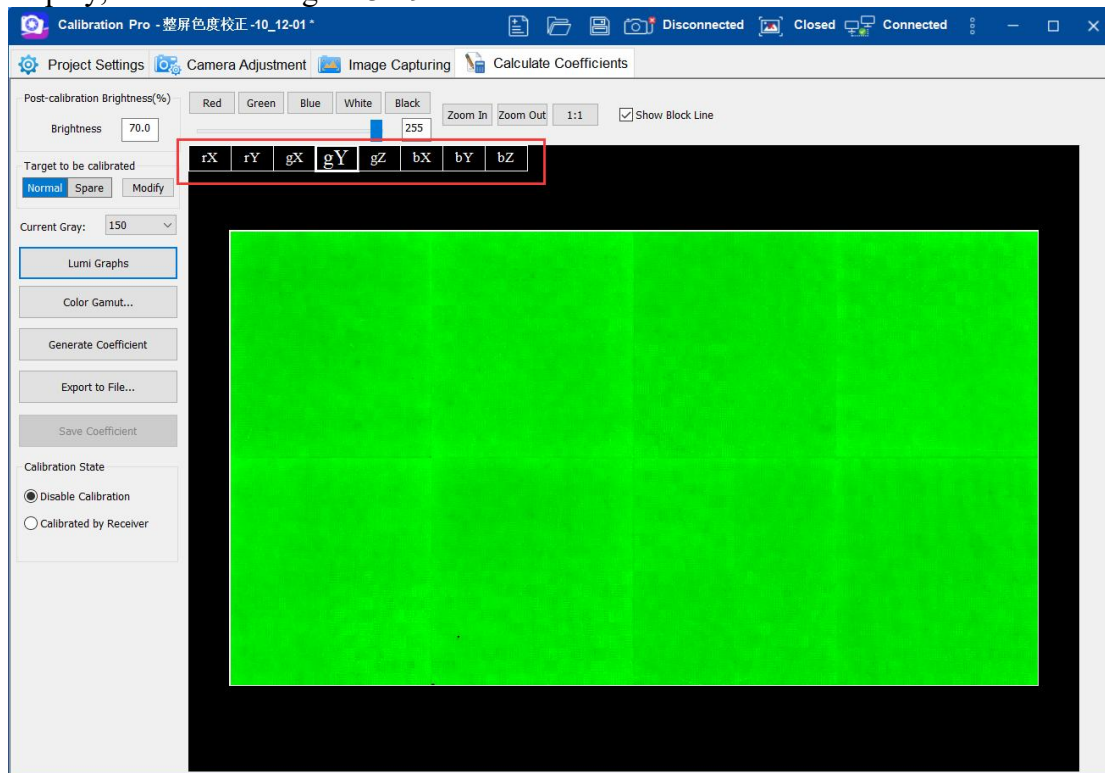


Fig. 3-49 chroma lumi graphs

3. For second brightness calibration, select the gray level 200-1 and 200-2 to display the brightness calibration interface; For second chroma calibration, select the gray level 200-1 to display the brightness calibration interface; Select the gray level 200-2 to display the chroma calibration interface.

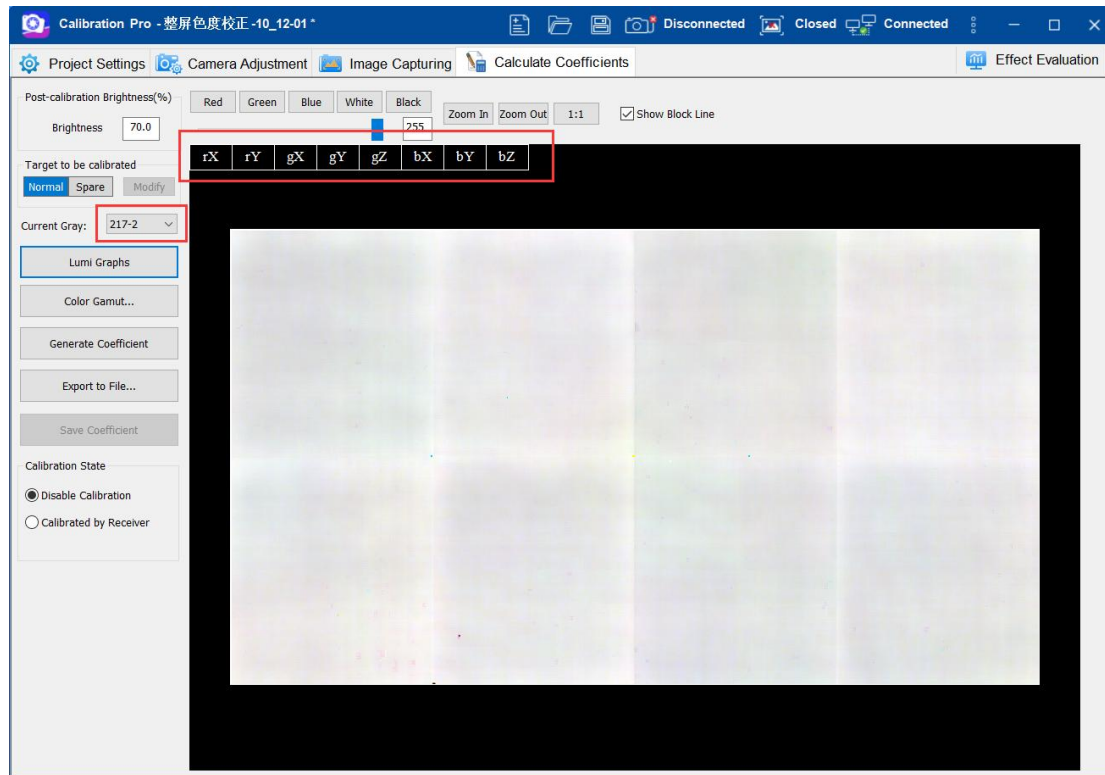


Fig. 3-50 second chroma calibration

4. It will use Normal data When the [**Calibration Target**] was choosen by [**Normal**], and spare data by [**spare**].

5. [**Brightness(%)**]: Percentage of RGB means the retained brightness percentage after calibration (default value is 85).

6. A calibration coefficient will be created and saved in memory until the analysis of all images have been done (part of images that have been completely analyzed can be checked),For second calibration and brightness calibration: select the acquisition times as gray level -1, click the "Generate Coefficient" button, and the software will automatically save the brightness calibration coefficient to the project folder; Chromaticity calibration: select the acquisition number as gray level - 1, click the "generation coefficient" button, and the software will automatically save the chromaticity calibration coefficient to the project folde.

7. After generating integrated coefficient.

I.Regular screen Calibration:Click the "Save Coefficient" button, as shown in the following steps a and b.

II.Double layer calibration: click the "Save Coefficient" button to pop up the "Send Coefficient to Upper Layer" and "Send Coefficient to Lower Layer" drop-down buttons, click the "Send Coefficient to Lower Layer" button, as shown in steps a and b below; Click the "Send coefficient to higher level" button, as shown in the following a

and b operation steps.

a. If there is no intelligent module in the cabinet, click "Save Coefficient" to pop up two drop-down buttons of Send Coefficient to All and Send Coefficient to Designated Area, and click Send Coefficient to All to send the calibration coefficient to all receiving cards; Click Send Coefficient to Designated Area, and the following window of Send Coefficient to Designated Area will pop up.

b. There are intelligent modules in the cabinet. Click "Save Coefficient" to pop up two drop-down buttons of sending coefficient to receiving card and sending coefficient to module. Click "Save coefficient to module" to pop up two drop-down buttons of sending coefficient to all and sending coefficient to designated area. Click "Send coefficient to all" to send calibration coefficient to all modules. Click Send Coefficient to Designated Area, and the following window of Send Coefficient to Designated Area will pop up. It takes a long time to send the coefficient. Please wait patiently, and you will be prompted "Send Completed" when sending is completed.

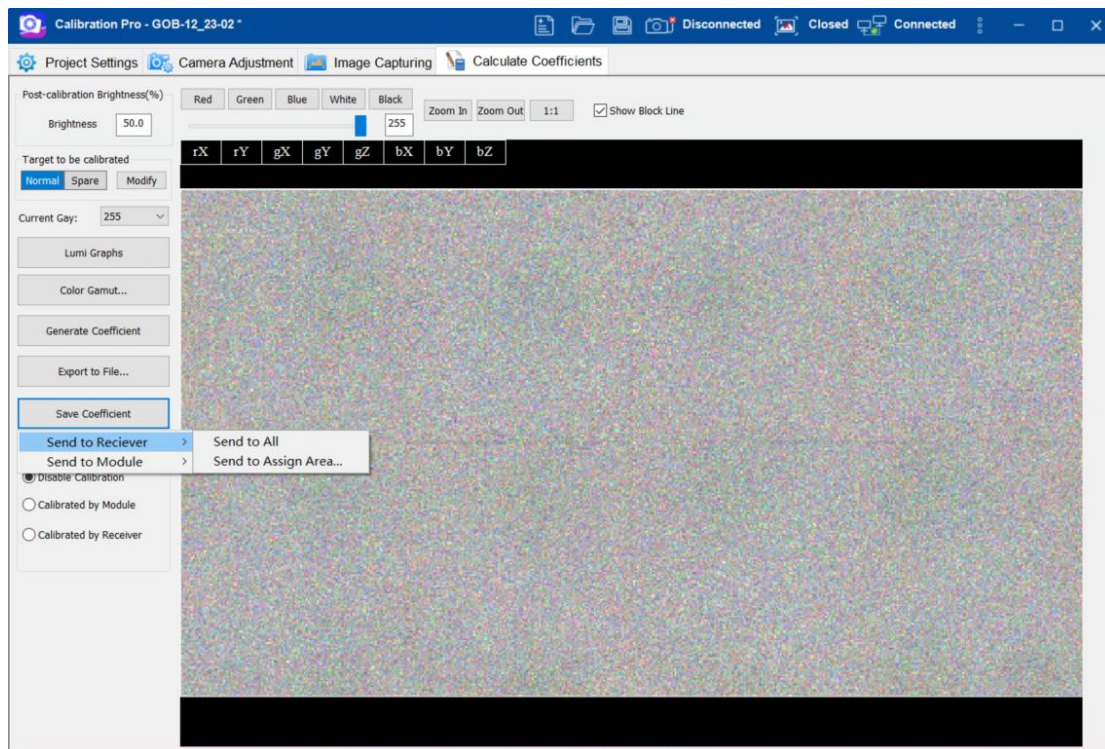


Figure 3-51 save coefficient

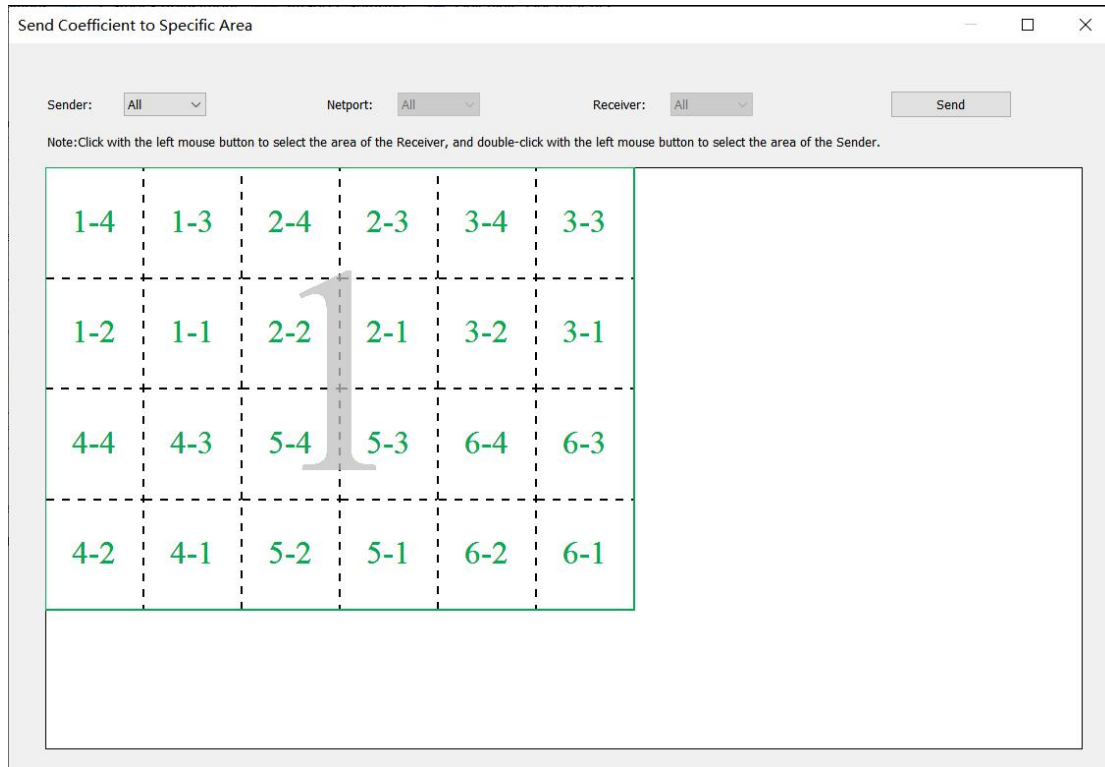


Figure 3-52 send coefficient to specific area

8. After saving the coefficient to receiver, click [**Calibration by Receiver Card**] to enable calibration. (please make sure all the receiver cards have been detected before saving); When the receiving card supports low-gray calibration, the check cabinet "Enable low-light calibration" is displayed in the calibration situation; The receiving card does not support low-gray calibration. Click Save Coefficient to the receiving card, and a prompt pops up: "This receiving card does not support high-low brightness calibration!" .

9. After generating integrated coefficient, left click [**Export to File**] and select [**Export All**] to export coefficient into file .3fcoef or .9fcoef file.

- a. [**Export All**]: Export screen coefficient by calibration mode;
- b. [**Export by Sender**]: Export each sender's coefficient by choosen [**Name By Coordinate**] or [**Name By Row and Column**] or [**Name By Index**];
- c. [**Export By Block**]: Export screen coefficient by split block size;

3.10.3 Eliminate Camera Dust And Worms

1. Eliminate Camera Dust: Choosen [**Eliminate Camera Dust Effect**] in [**Effect Setting**] as page 7.1 shown, click [**Lumi Graphs**] in [**Calculate Coefficients**], the software will automatically identify the camera dust and eliminate it. This option is checked by default.

2. Eliminate Worms: Choosen [**Mark Worms**] in [**Calculate Coefficients**], the software will automatically identify the worms and mark it, and emilinate the worms

by Generate Coefficient. This option is not checked by default.

3. Manual Mark: After generating lumi graphs, right click the worms or camera dust area on the lumi graphs, choose option on the pop menu.

4. Introducing Pop Menu:

(1) Add Dirty: Take the mouse pint as the center and automatically select a rectangular border with 20x20 pixel. Trag the border to cover the camera dust area by mouse or use keyboard $\uparrow \downarrow \leftarrow \rightarrow$.

(2) Add worms: Take the mouse pint as the center and automatically select a rectangular border with 2 pixel width and module width as length. Default direction by automatically calculation.

(3) Worms Dirction: Manual set the dirction of the worms.

(4) Hide/Show Mark Border: Hide or show all of the marked border.

(5) Delete: Delete the selected border.

(6) Clear All Mark: Clear all the marked border.

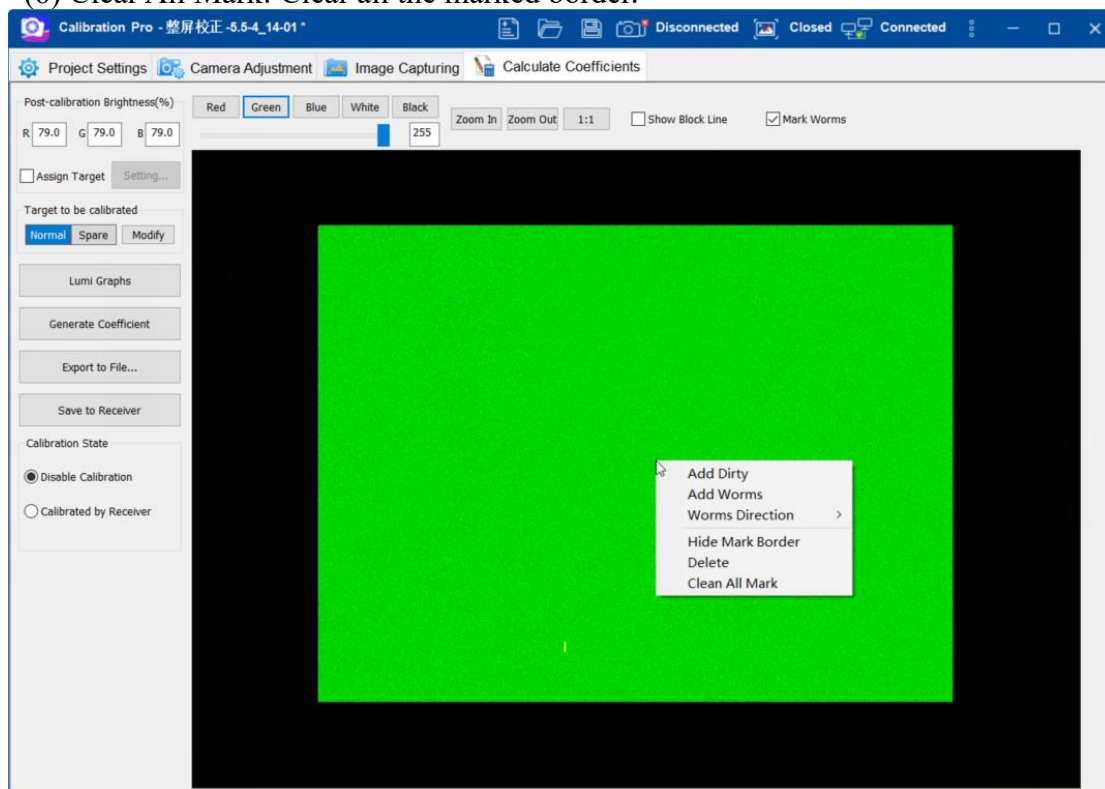


fig.3-53 manual mark worms and Camera dust

4. Single cabinet calibration

4.1 Create single cabinet calibration

Step 1/2/3:

Open the software, select the [ **New Cabinet**] to create a calibration (shown as Fig. 3-4). Input the project's name and click [next] to entry Cabinet project wizard-1.

Step 1: The first three steps is same as integrated calibration. So let's introduce from step four.

Step 2: Cabinet project wizard-4

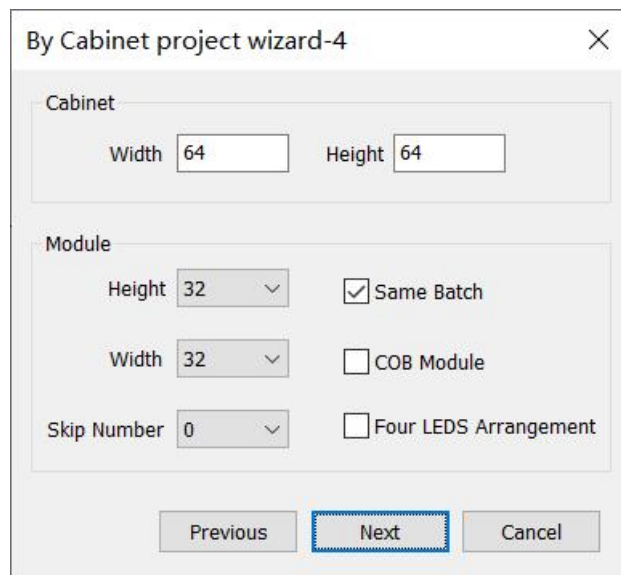


Fig. 4-1 Cabinet project wizard-4

cabinet project wizard-1 (Fig. 4-1), includes below settings:

“cabinet Width”, “cabinet Height”, “Module Width”, “Module Height”.

Jump Number will be auto calculated according to cabinet width and height setting.

Grid module: Check if there is a difference between the left 、 right Pixel Pitch and the upper 、 lower Pixel Pitch on the screen.

Step 3: cabinet project wizard-5

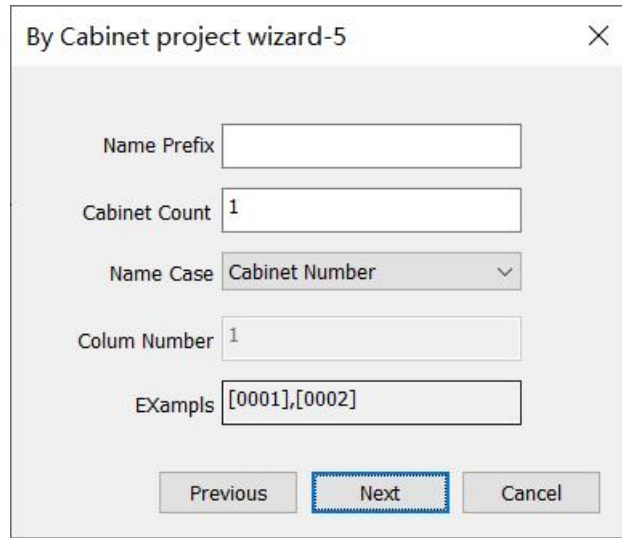


Fig. 4-2 cabinet project wizard-5

cabinet project wizard-2 includes below settings (Shown as Fig. 4-2):

Prefix: Project name.

cabinet count: Cabinet amount of the project.

Name Case: “cabinet Number”, “Row-Col” and “Col (ABC)-Row”, you can chose different naming methods.

Col Number: The number of columns of the screen, related to cabinet naming.

Example: Showing cabinet naming example according to user’s “prefix”, “Name case” and “Col number” settings.

Same Batch: Check if all cabinets of the project are the same batch, otherwise uncheck it.

Module edge color cast: Check if see “cross” phenomenon on cabinet, otherwise uncheck it.

Step 6: cabinet project wizard-6

Same as integrated calibration, refer to Step 6 of 3.2.

4.2 Capture Gray Setting

I.Single graysacle iterative capture calibration:

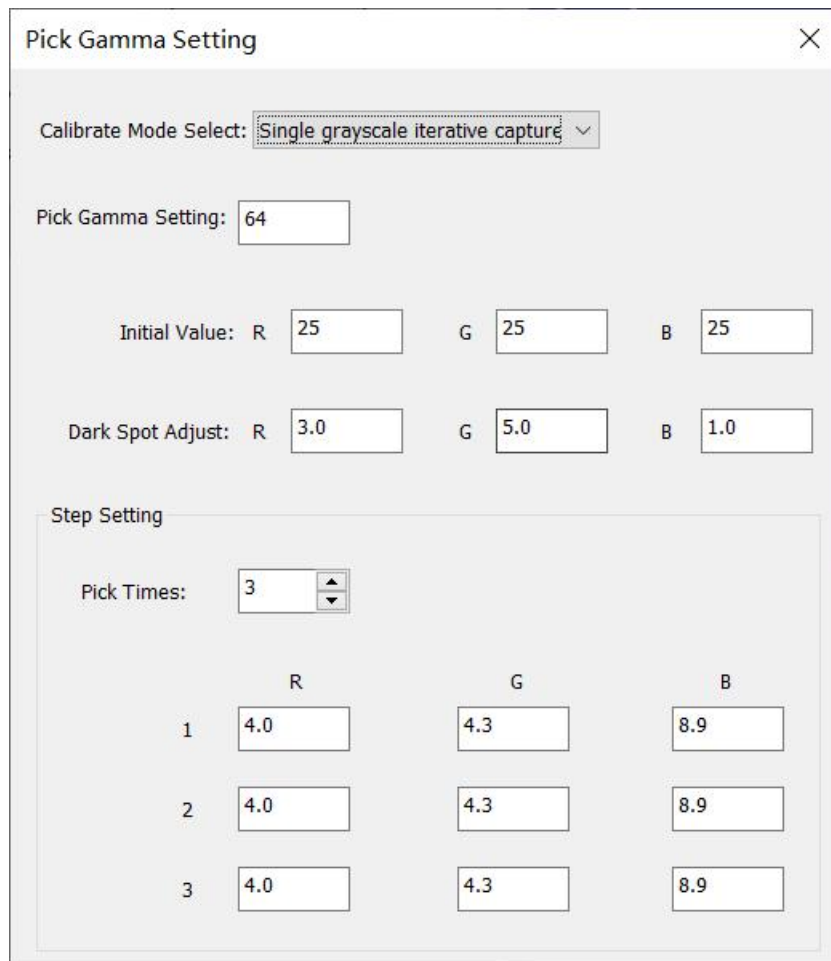
Pick Gamma Setting:Set the gamma value of the current actual acquisition, the default value is 64.

Initial Value:Set the coefficient collected by the initial low brightness calibration, The default value is 16.,The higher the initial value, the higher the graying brightness.

Pick Times:Set the number of times to iterate the acquisition,The

default value is 3.

Step size setting: set the step size required for each time according to the acquisition times, and the default is 1, 2, 2.



	R	G	B
1	4.0	4.3	8.9
2	4.0	4.3	8.9
3	4.0	4.3	8.9

Fig.4-3 Single grayscale iterative capture

II. Multi grayscale capture:

Pick Gamma Setting: Set the gamma value of the current actual acquisition, the default value is 64.

Pick Times: Set the number of times to be collected. The default is 4.

Initial coefficient setting: set the initial coefficient of each time according to the number of times of acquisition. The default values are 0, 0.1, 0.2, 0.3;

×

Pick Gamma Setting

Calibrate Mode Select:

Multi grayscale capture

▼

Pick Gamma Setting

Pick Gamma Setting:

64

Pick Times Setting

Pick Times Setting:

4

▲▼

1

0.000

2

0.100

3

0.200

4

0.300

Fig.4-4 Multi grayscale capture

4.3 Shooting process

4.3.1 Camera adjustment

Camera adjustment refers to section 3.6, 3.7.

4.3.2 Effect Debug

Effect debug refers to section 3.8.

4.3.3 Image Capturing

4.3.3.1 Regular screen Image Capturing

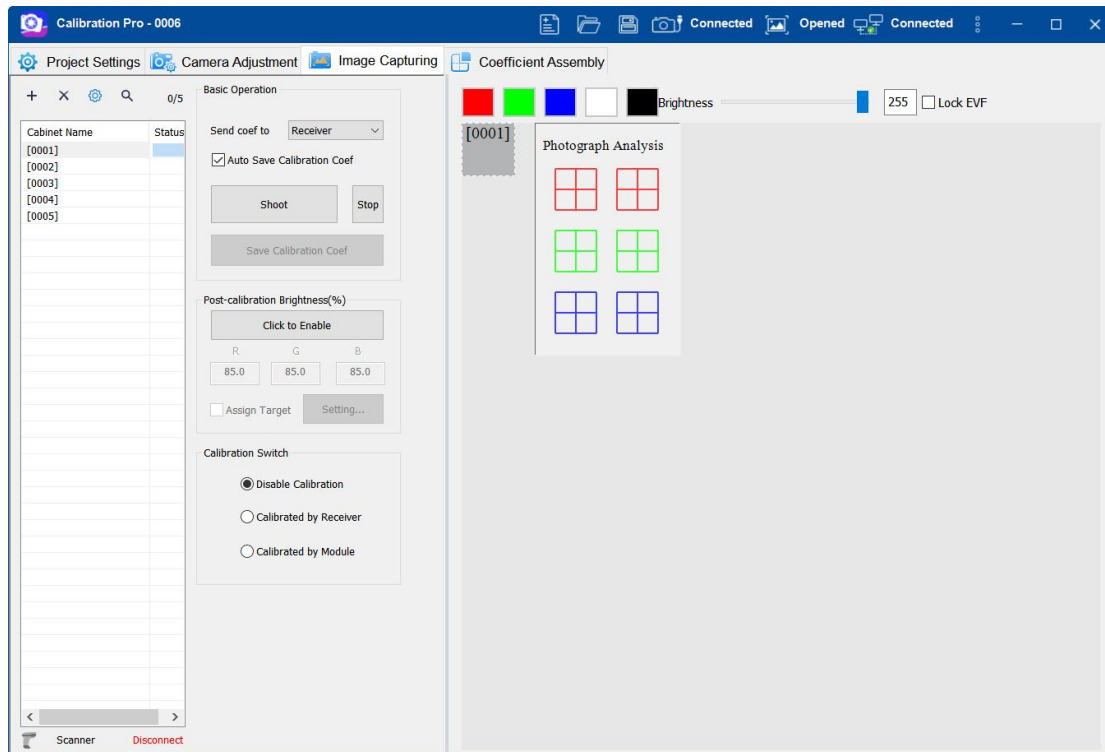


Fig. 4-5 single cabinet shooting

1. Click the [**Batch Shoot**] button, and start shooting from the first cabinet.
2. After analysis completed (Fig.4-4 ,when three colors present $\checkmark$, it means that all the analysis are completed), the correct coefficient will be auto sent to receiver card (By default, the coefficient will be sent to receiver card automatically. Or, you may uncheck [**Auto Save Calibration Coef**] to disabled the function.).
3. After saving the calibration coefficient, it will pop up a dialog cabinet. Calibration mode will be turned on automatically in i series mode, if in classic mode, you need to turn it on manually. Click [**OK**] on the dialog cabinet, it will switch to next cabinet automatically, by switching to different colors,you can check calibration effect. as Fig.4-5 shown.
4. Mark the cabinet and then change to the next cabinet, repeat step 2 to 4 until all the cabinets are calibrated.

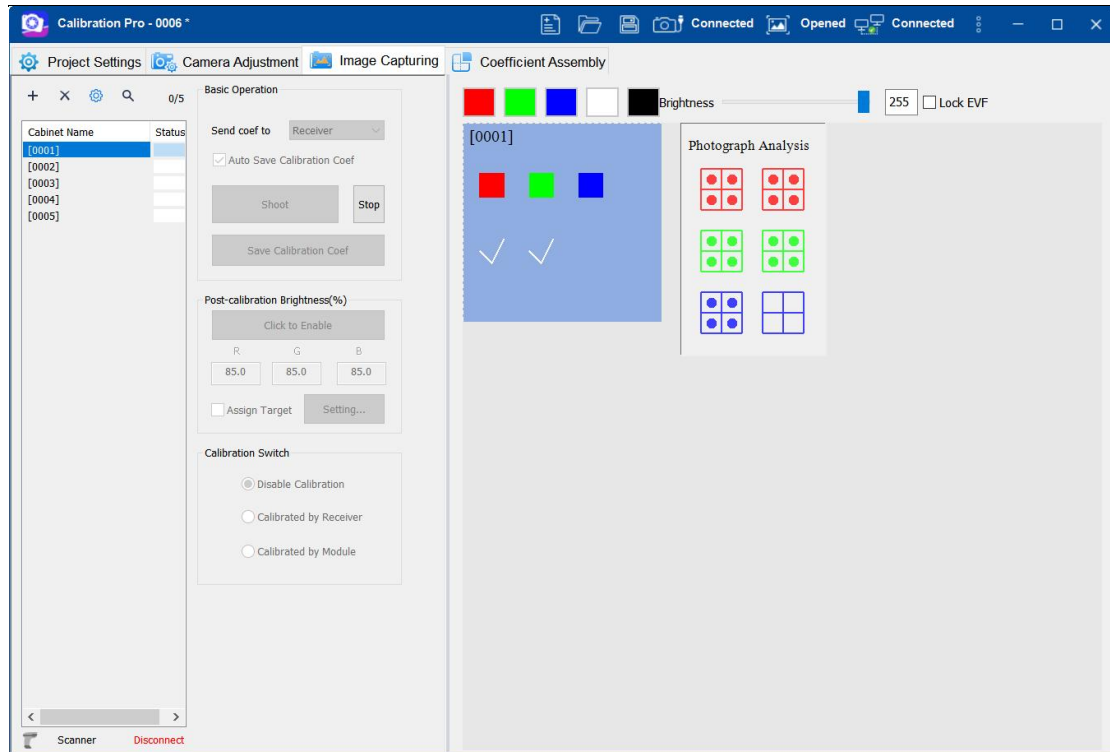


Fig.4-6 Analysing

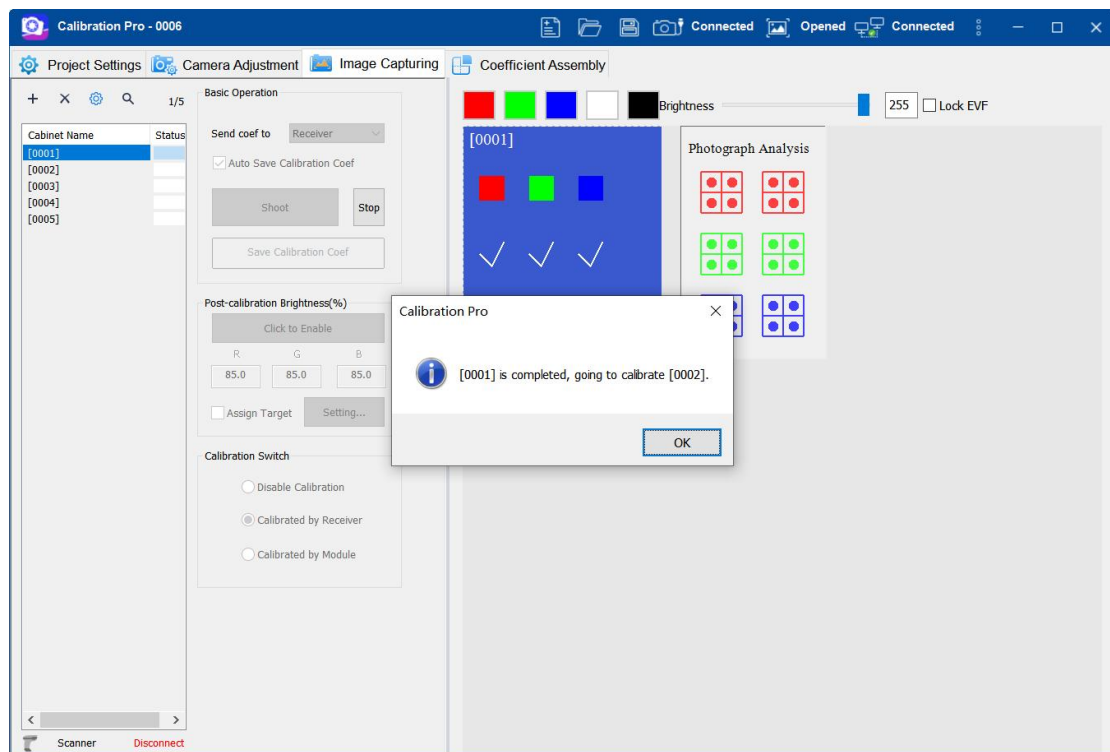


Fig.4-7 Finished

4.3.3.2 Chip Low Brightness Image Capturing

4.3.3.2.1 Single graysacle iterative capture Image Capturing

- 1、Click the "Shoot" button, the software will first send the acquisition gamma,

initial coefficient, enable the chip low light calibration, and then conduct the first photo analysis. After completing the first acquisition analysis, a coefficient of the first acquisition will be generated, and the acquisition times will be automatically switched to the next acquisition times. The coefficient of the first acquisition will be sent to the chip low light, and the next acquisition will start, and the next acquisition will be executed in sequence until all acquisition times are completed.

2、 Select the second cabinet, click the "shoot" button, the software completes the current acquisition times, and conducts fcl response test, completing five acquisition tests.

3、 After marking the cabinet and indicating the order, replace it with the next cabinet and repeat step 1 until all cabinet are calibrated.

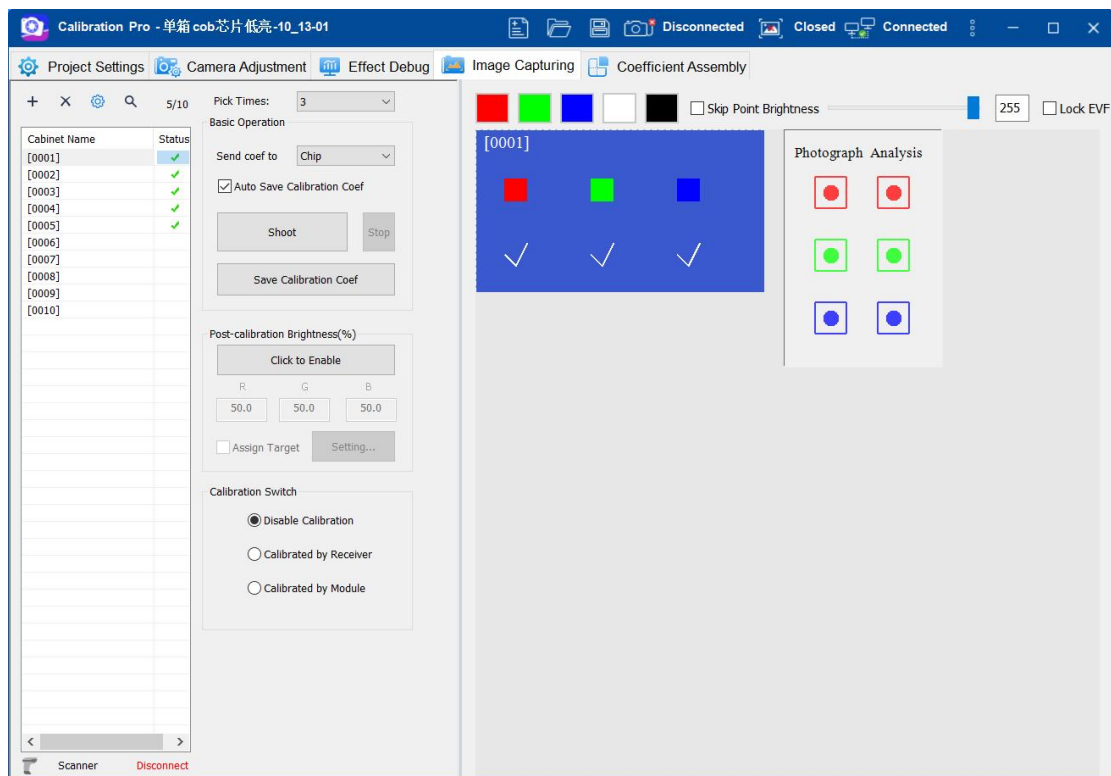


Fig.4-8 Single grayscale iterative capture

4.3.3.2.2 Multi grayscale capture Image Capturing

1、 Click the "Shoot" button, the software will first send the acquisition gamma, initial coefficient, enable low brightness calibration, and then conduct the first photo analysis to complete the first acquisition. The software will automatically switch the acquisition times to the next acquisition times, and send the initial coefficient of the second acquisition, and then start the second acquisition, and execute in sequence until all acquisition times complete the acquisition

2 、 After the analysis is completed, the calibration coefficients will be automatically saved to the chip (by default, automatic saving of calibration coefficients has been enabled, or you can cancel the check before "auto save Calibration Coefficients" and change to manual saving of coefficients).

3、 After save Calibration Coefficient, a prompt cabinet will pop up, and cabinet

calibration will automatically start calibration; Click OK on the pop-up cabinet, and it will automatically jump to the next cabinet. You can check the calibration effect by switching different colors.

4、Click Modify to set the corrected brightness of the target gray scale. The corrected brightness of the current target gray scale is applied to the cabinet that is corrected late.

5、After marking the cabinet and indicating the order, replace it with the next cabinet and repeat steps 1-3 until all cabinet are calibrated.

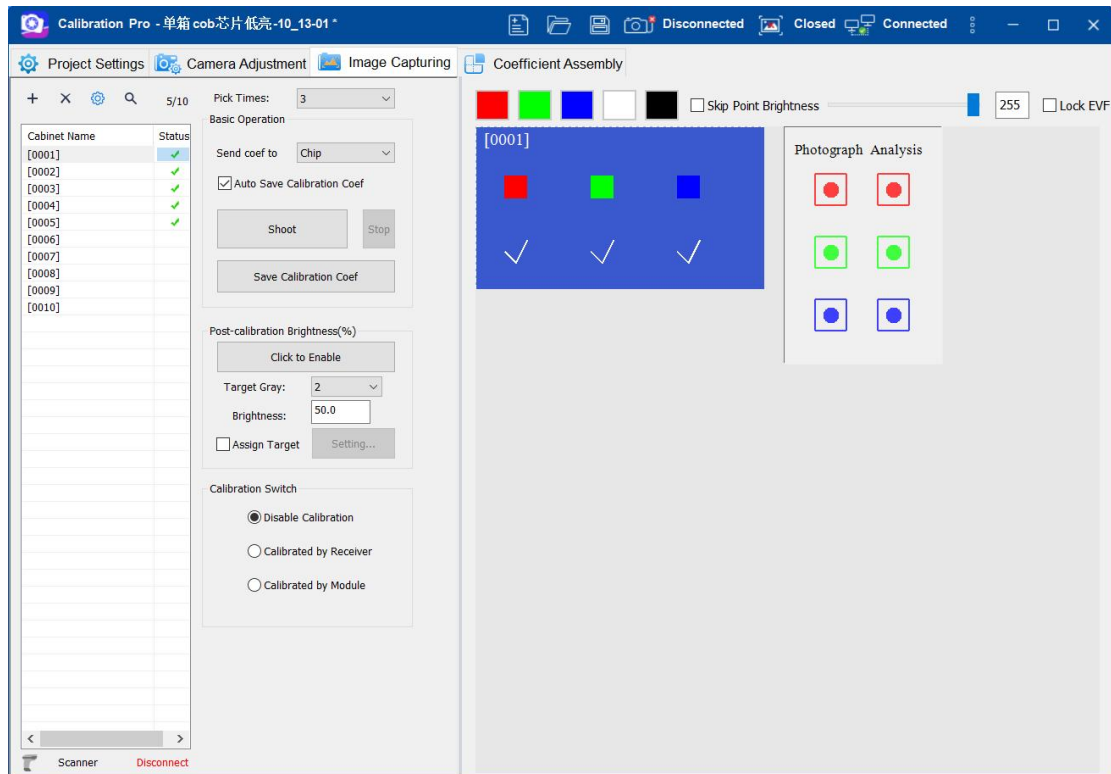


Fig.4-9 multi grayscale capture

4.3.4 Reference model

The model file use to emilinate cross line, not checked by default. If checked the [Use Model] and select the model file, the cabinet of calibrated need send coefficient anew.

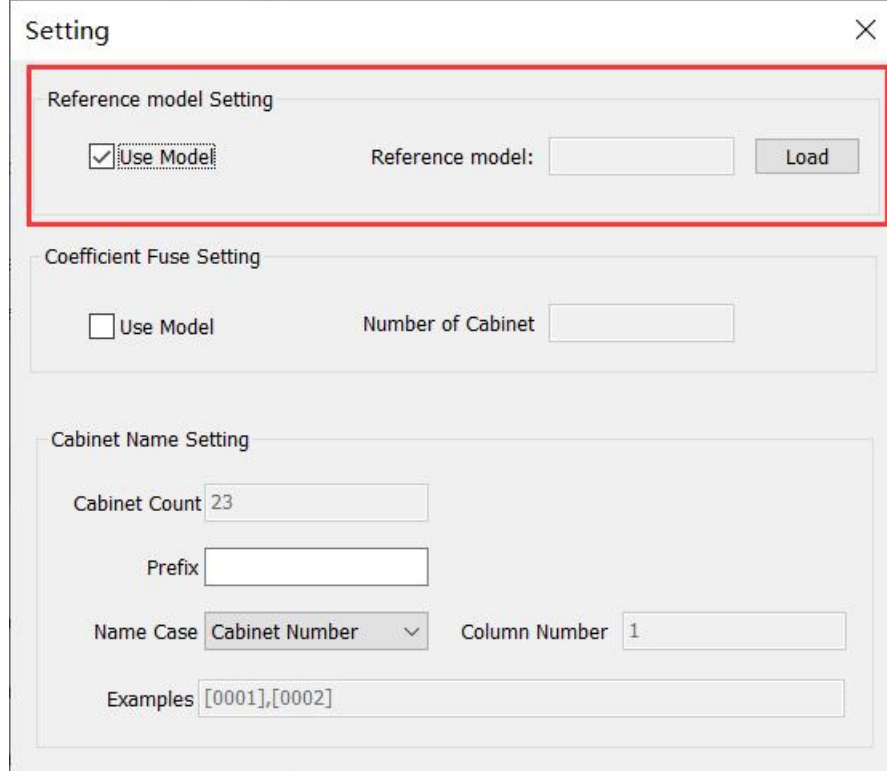


Fig.4-10 Reference Model setting

4.3.5 Coefficient Fusion

4.3.5.1 Regular screen Coefficient Fusion

This option is use for solve the vignetting. Not checked by default.

Number of Cabinet: The number of cabinet is 8 by default. The fusion coefficient is not applied to the first n count, it is generated after finish the nth and apply to the subsequent cabinet, the first n count need to be send coefficient anew.

Notice: Change number of cabinet will generate fusion coefficient anew and the calibrated cabinet need to be send coefficient anew.

"Apply and generate coefficient": click the "Apply and generate coefficient" button, and the software will regenerate a coefficient according to the current settings, including: reference model settings, coefficient fusion model settings, brightness after calibration and other parameters

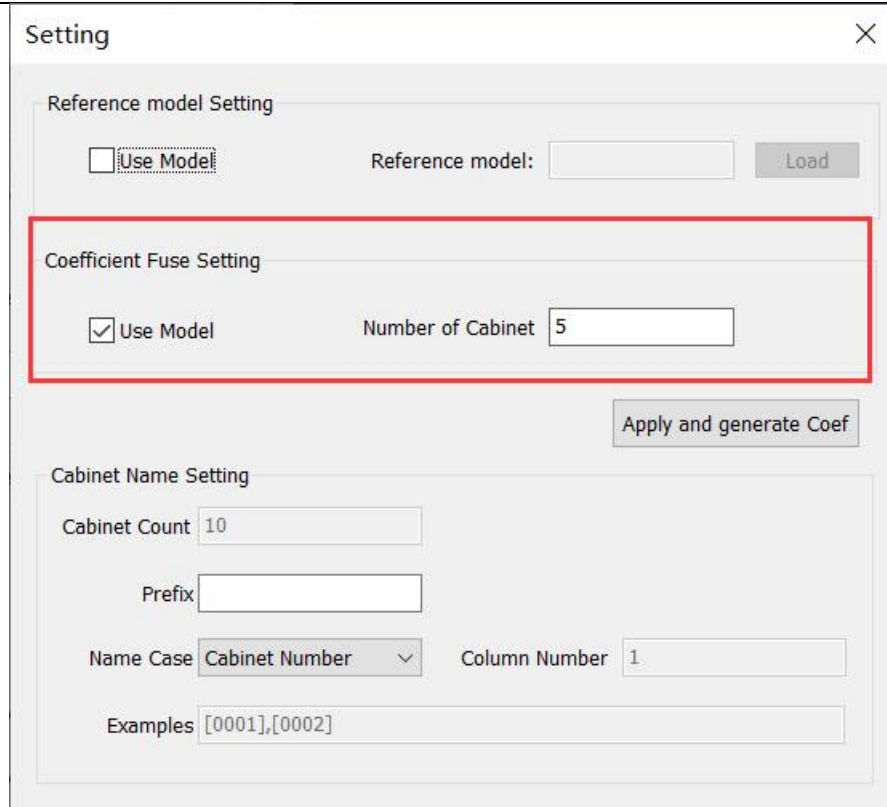


Fig.4-11 Coefficient Fuseion Setting

4.3.5.2 Chip Low Calibration Coefficient Fusion

The coefficient fusion setting is enabled by default. The number of fusion cabinet n is 9 by default. The fusion coefficient is not applied to the first n cabinet. After the calibration of n cabinet, the fusion coefficient is generated and applied to the subsequent calibration cabinets. The first n cabinets need to resend the coefficient.

Build the 16 calibrated cabinets by 4 * 4. In the software, click the "Set" button, check the coefficient fusion setting to [Enable], set the number of fusion cabinets to 16, check whether there is gradient between the cabinets after building. If there is gradient, click the "Apply and generate coefficient" button after completing the gradient adjustment, and the software will regenerate the dark corner and gradient model according to the currently adjusted parameters, In addition, an original coefficient and an application model coefficient are automatically generated again. After the 16th cabinet, click to take a picture, and the software automatically applies the current model generation coefficient until all cabinets are calibrated.

Change the number of fusion cabinets, modify the gradient setting value, and close the window without clicking the "Apply and Generate Coefficients" button. The software will delete the current fusion model, and the corrected cabinets need to resend the coefficients.

Setting

Reference model Setting

☐ Use Model
 Reference model:

Coefficient Fuse Setting

☒ Use Model
 Number of Cabinet

	R	G	B
Vertical Gradient	-1.0	2.0	2.0
Horizontal Gradient	0.0	2.0	1.0

Cabinet Name Setting

Cabinet Count

Prefix

Name Case
Column Number

Examples

Fig.4-12 Parameter Setting

4.3.6 Calibration Log

The calibration log will log the process and excetion during calibrating in the cabinet project.

- 1.Plan Cabinet: Is same as the number of cabinet list.
- 2.Remain Cabinet: Plan Cabinet – Calibrated Cabinet.
- 3.Exception: The number of cabinet that unable calibration.
- 4.All: Display all process and exception.
- 5.Data: Display data for the specified date.
- 6.Process: Display all records that cabinet has finished or add cabinet or delete cabinet or cabinet name changed.
- 7.Exception: Display all records that param has changed.

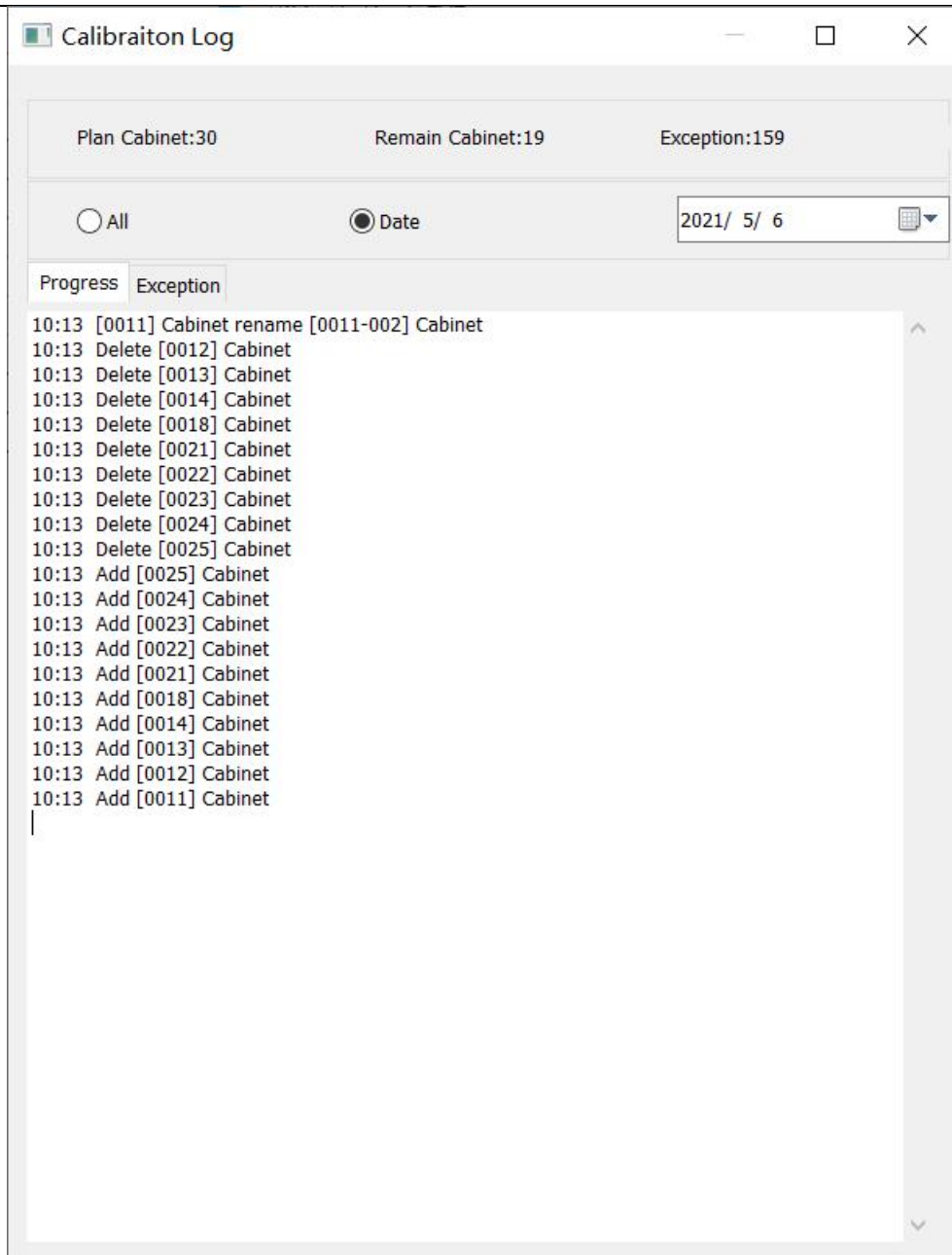


Fig.4-13 Calibration Log

5. Deseam Setting

5.1 Fuction Intrudction

Deseam is to minimize the physical seam between cabinets(or modules). After shot the screen and analyzed the photos, the software will automatically adjust the luminance of the pixels on the edge to benefit the display effect of LED screen.

5.2 Enable deseam

To deseam your screen, you should:

- 1.Show the deseam setting dialog by selecting [**Basic**] → [**Desam...**].
- 2.Check the [Enable] button to enable deseam.
- 3.Input the width and height of tile/module.

5.3 Deseam factor

‘Desam factor’ is the adjustment range of deseam. 1 is the recommended value. If you get a poor effect after deseam, you may adjust the factor to change the effect. If a dark line (or bright line) is still too dark (or too bright) after deseam, you should increase the factor; On the opposite, if a dark line (or bright line) is too bright (or too dark) after deseam, you should decrease it.

5.4 Deseam only

You may check the [Desam only] button only if you just need deseam and don’t need brightness/chromaticity Calibration. In deseam only mode, you should focus the camera on a clear focus, and only green color will be shot.

5.5 Eliminate difference

Check the [Eliminate difference] to enable eliminate difference.

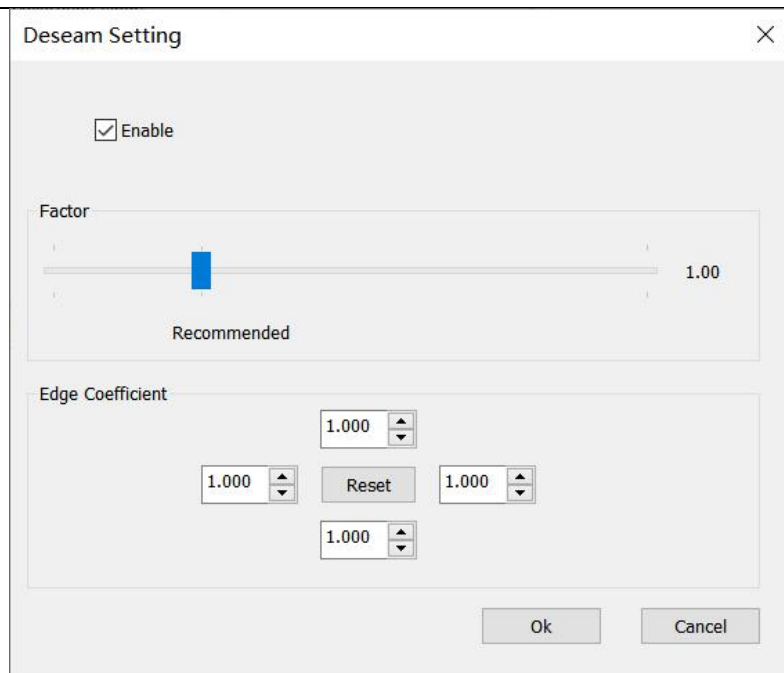


Fig.5-1 Deseam Setting

The interface of deseam setting is shown in Fig.5-1.

6. Effect Setting

6.1 Effect setting overview

Effect setting is used for adjusting calibration effect and fixing screen flaws after calibration. The effect options will vary with your selections (**COB Module**) in the **Whole Screen project wizard-4** dialog cabinet. There is an effect description appearing below every option. If you select the **Same Batch** check cabinet and clear the **COB Module** check cabinet, the advanced setting dialog cabinet is as shown in Fig.7-1.

1)New project wizard, do not check "COB module"

a.Canon camera,the advanced setting dialog cabinet is as shown in Fig.6-1.

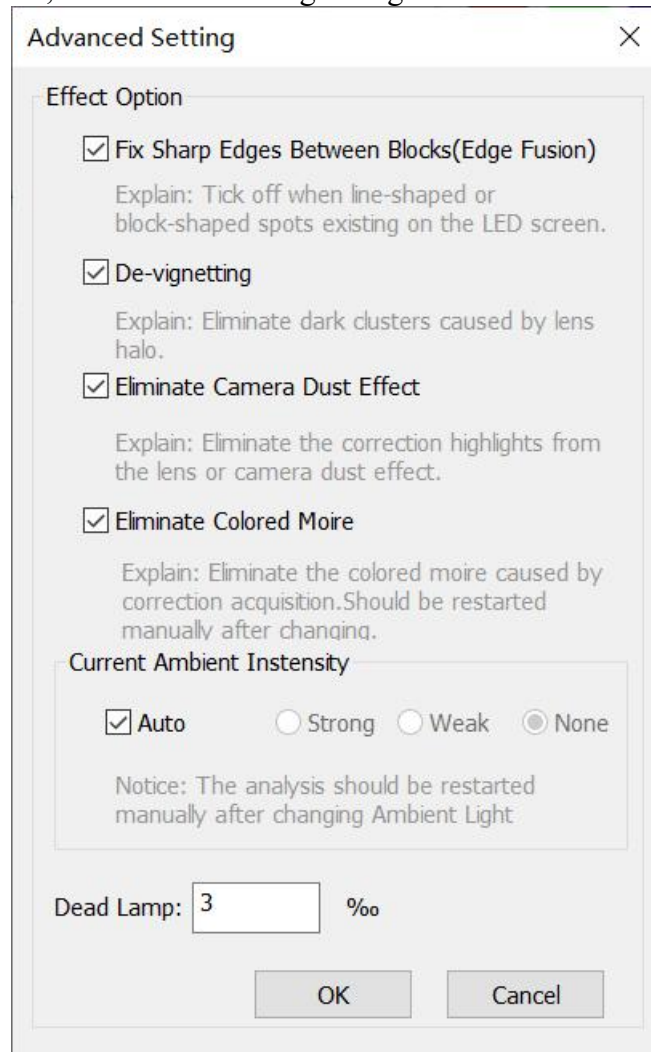


Fig. 6-1 Effect Setting-1

The default check ensures interchangeability after calibration, eliminates dark corners, eliminates dirt spots, eliminates moire marks, and automatically.

b.CCM camera,the advanced setting dialog cabinet is as shown in Fig.6-2.

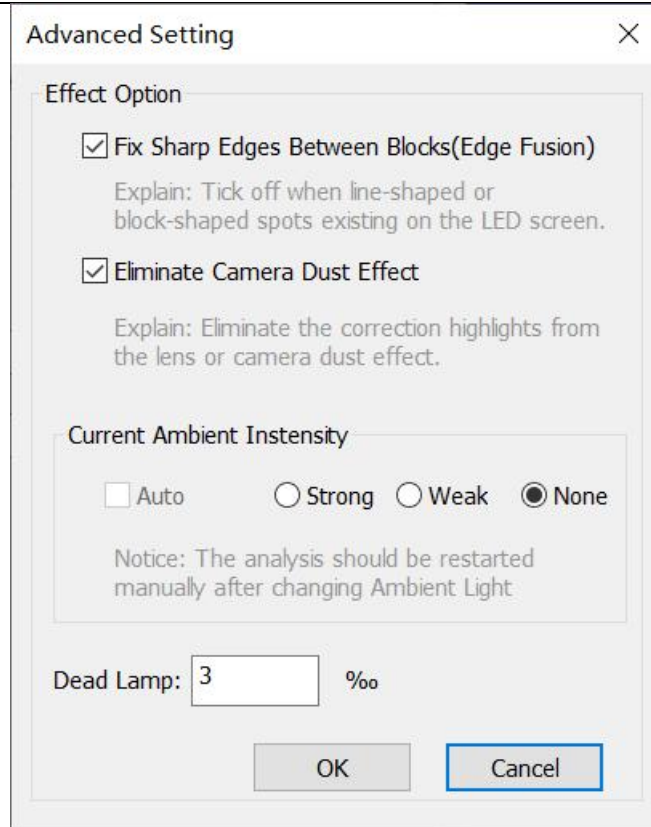


Fig. 6-2 Effect Setting-2

By default, check to ensure interchangeability after calibration, eliminate dirt spots and ensure no ambient light.

2)New project wizard, Check "COB module".

a.Canon camera,the advanced setting dialog cabinet is as shown in Fig.6-3.

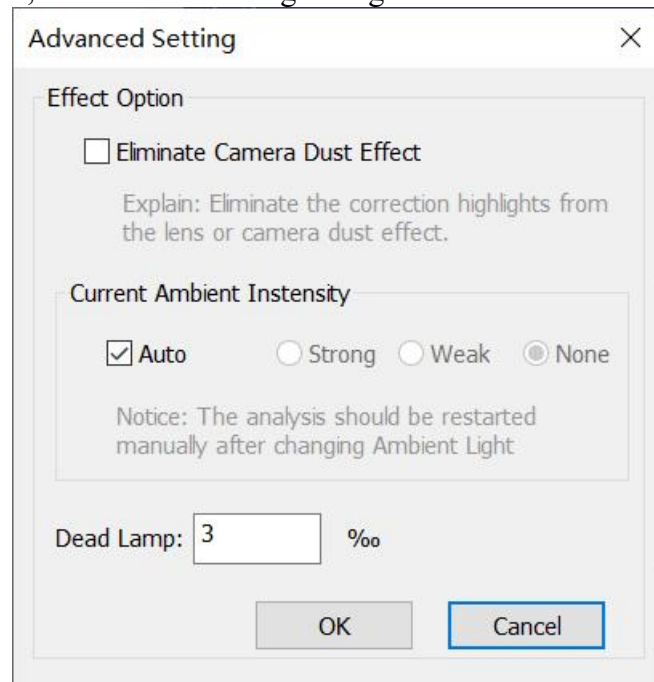


Fig. 6-3 Effect Setting-3

b.CCM camera,the advanced setting dialog cabinet is as shown in Fig.6-4.

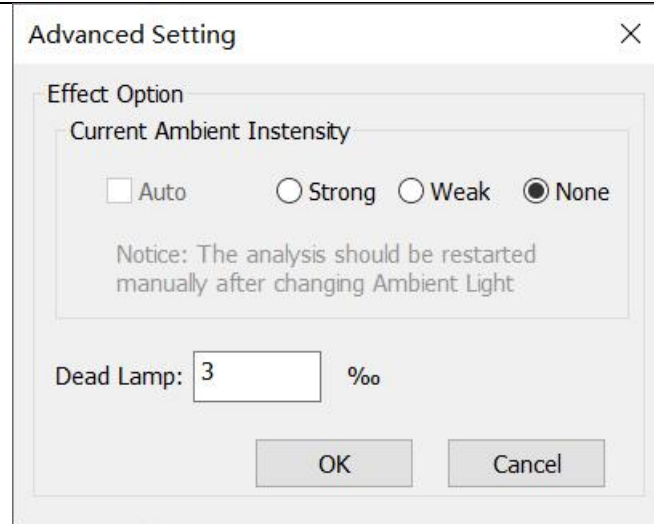


Fig. 6-4 Effect Setting-4

6.2 Turn on “Eliminate Differ”

“Eliminate Differ” option will eliminate the discrepancy between different calibrated blocks.

This option will take effect after generating a new “Brightness Chart” under “Coefficients” page.

6.3 Eliminate vignette

“Eliminate Vignette” will eliminate dark clusters caused by lens halo.

This option will take effect after new analysis of shoots.

6.4 Eliminate dirt

“Eliminate Dirt” will eliminate the bright spot caused by dirt on lens or body of camera after calibration.

This option will take effect after new analysis of shoots.

6.5 Ambient light

The ambient light can be automatically identified by default. Or you can clear the Auto check cabinet, and select [**Strong**] or [**Weak**] according to the actual ambient light to effectively prevent the interference of ambient light.

After modifying the item, you need to perform the analysis again.

6.6 Eliminate Colored Moire

“Eliminate Colored Moire” will eliminate the colored moire caused by calibration acquisition.

After modifying the item, you need to perform the analysis again.

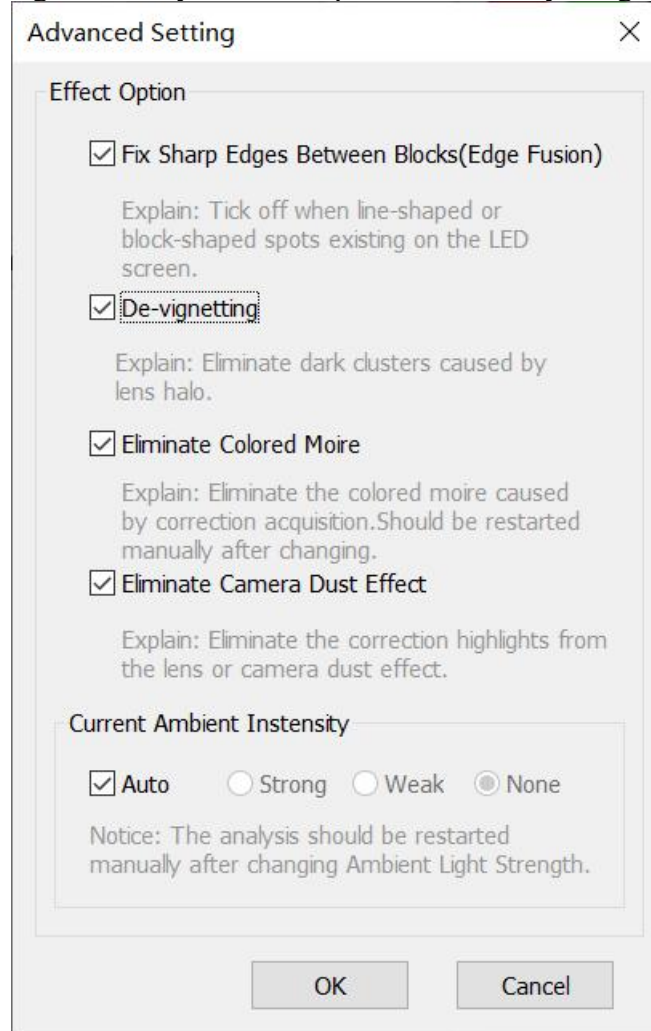


Fig. 6-4 Effect Setting-4

6.7 Dead Lamp

The dead Lamp is the proportion of the number of dead lights on the screen to the number of lights on the screen, and the unit is one thousandth.

7. Brightness and Chroma calibration

7.1 cali mode

1. Select [**Brightness and Chroma**] as calibration type in [**coefficient**] page. As shown in Fig.7-1.

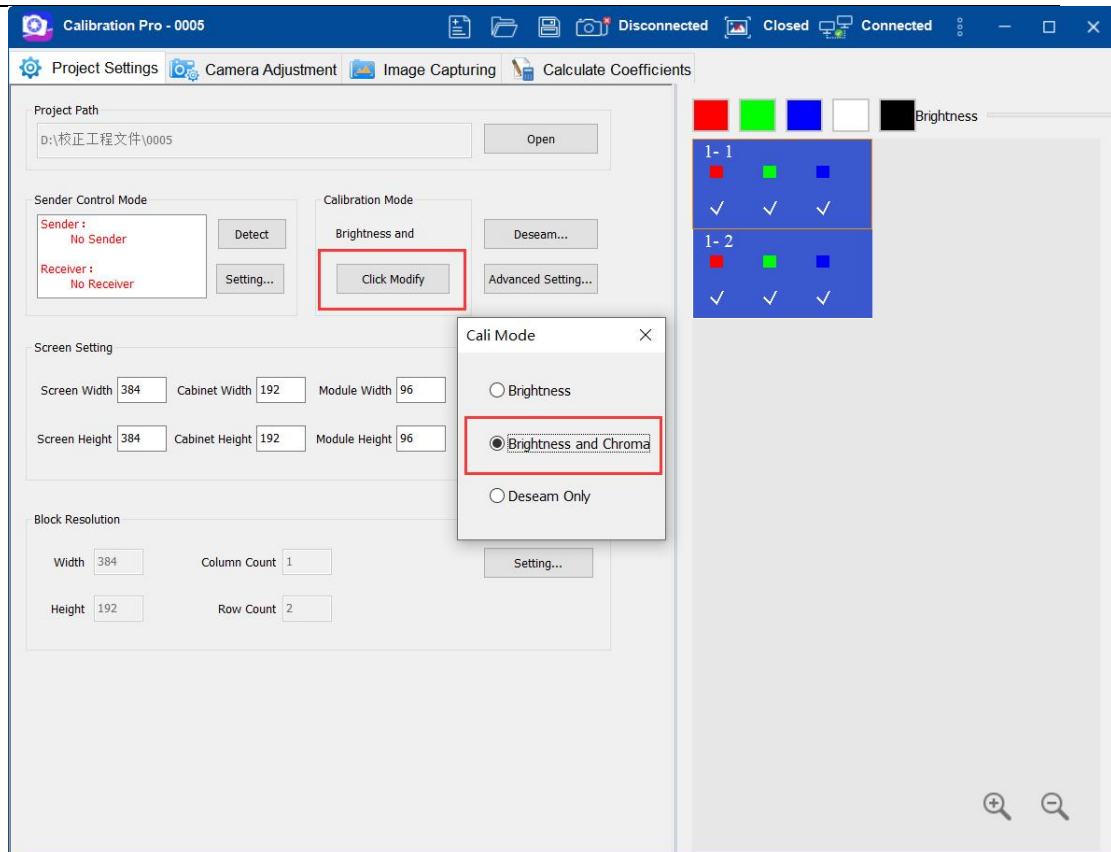


Fig.7-1 Select “Brightness and Chroma” Calibration

7.2 chroma calibration

2. 1)Switch to [Coefficients] page.
- 2)Click [Brightness Chart]. Skip this step if it’s a cabinet calibration.
- 3)Click [Color Gamut..], which shown as Fig. xxxx & Fig. xxxxx.

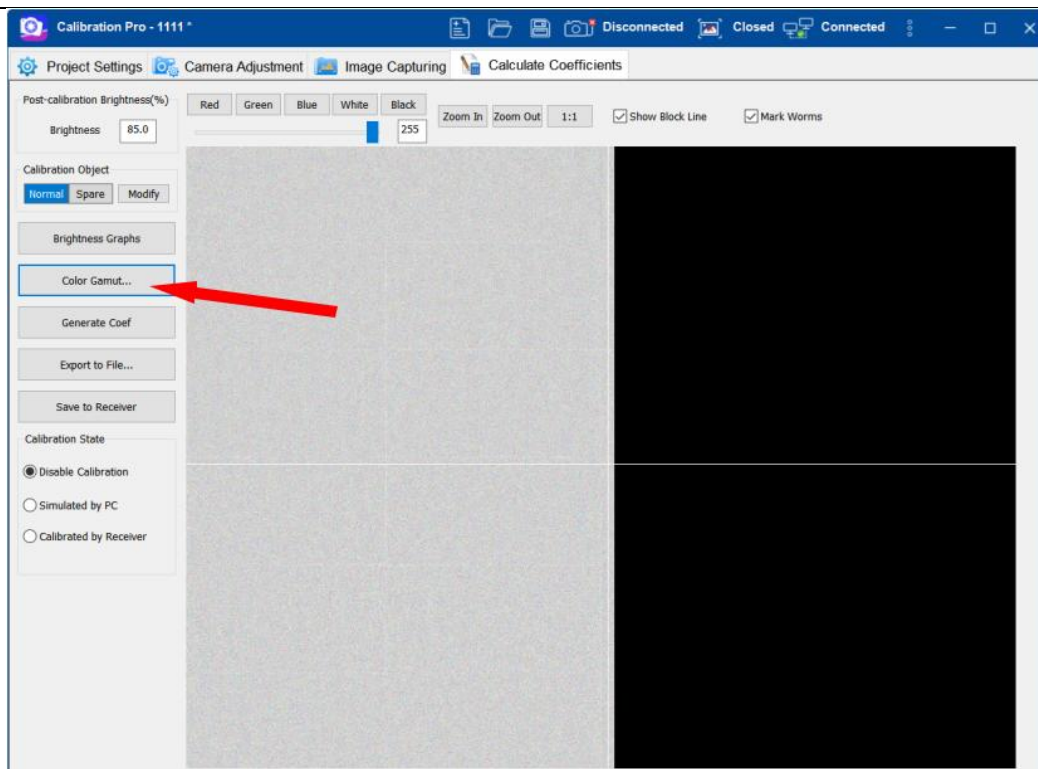


Fig.7-2 Setting entrance of whole screen calibration

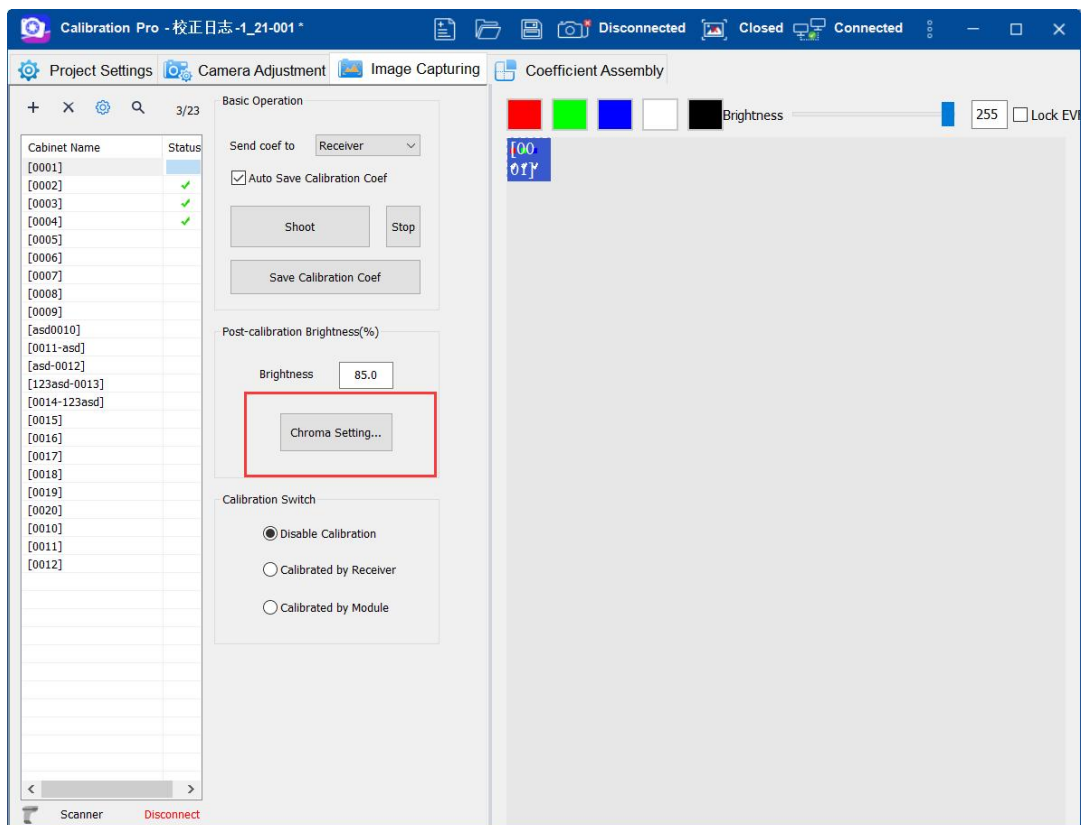


Fig.7-3 Setting entrance of single cabinet color gamut

7.3 chroma calibration

7.3.1 canon calibration

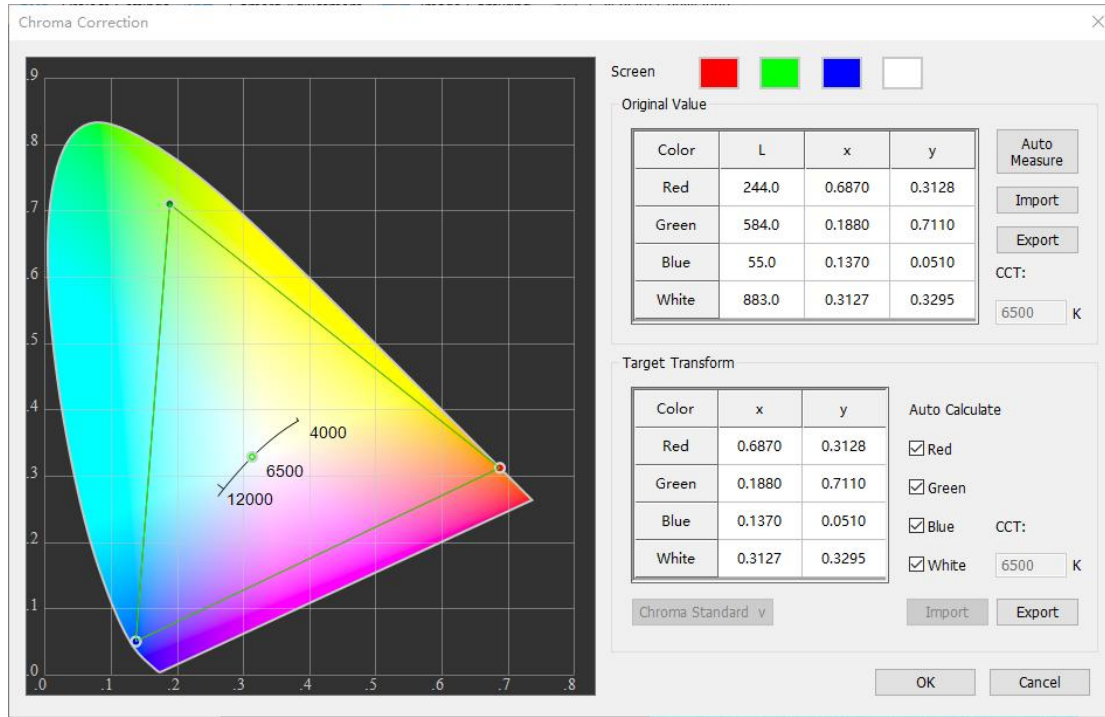


Fig.7-4 color gamut setting

a) With the chromemeter, select [**Auto Measure**], then input the brightness and chroma data manually before calibration. Without the equipment, just skip to c).

b) After automatic measurement , collect the white data to verify.

c) Color gamut :

We recommend checking [red] [green] [blue] of [**Auto Calculate**], it can calibrate the different chroma under the retain gamut in maximum and reduce chroma loss.

Please uncheck [red] [green] [blue] of [**Auto Calculate**] and input the coordinate of target color manually or drag the point in Chromaticity diagrams if the users have special requirements for color gamut.

Built in sRGB, AdobeRGB, PAL, NTSC, Rec.601, Rec.709, Rec.2020, DCI-P3 color coordinate parameters.

d) White balance :

We recommend checking [white] of [**Auto Calculate**], the built-in algorithm will keep the white point coordinates before calibration.

Please uncheck [white] of [**Auto Calculate**] and input the coordinate of target white point manually if the users have special requirements for white balance.

Built in D65 color coordinate parameters.

e) Color temperature:

If you need to change the color temperature, you can uncheck **[white]** of **[Auto Calculate]**, then input the target color temperature, built-in algorithms will automatically calculate the color coordinates.

f) Approx value:

when the target color gamut over the original color gamut, you can click [Approx value], algorithms will automatically calculate and limit the exceeded part in the nearest original color gamut.

7.3.2 CCM calibration

1. Complete the partition photo collection and analysis, and the software automatically recommends the target color gamut after generating the brightness map.

2.white first: The initial default value is 100. Pull the roller bar or enter a specific value to set the corrected white uniformity intensity. The larger the value, the better the white uniformity.

3.Color block intensity: the initial default value of R, G and B is 1.1. Pull the roller bar or enter a specific value to set the color block intensity of the screen before calibration.

4.Complementary color intensity: the initial default value of R, G and B is 100. Pull the roller bar or enter a specific value to set the complementary color intensity;

Note: After the color gamut is set, click "Generate Brightness Map" again before it can be applied to the brightness map.

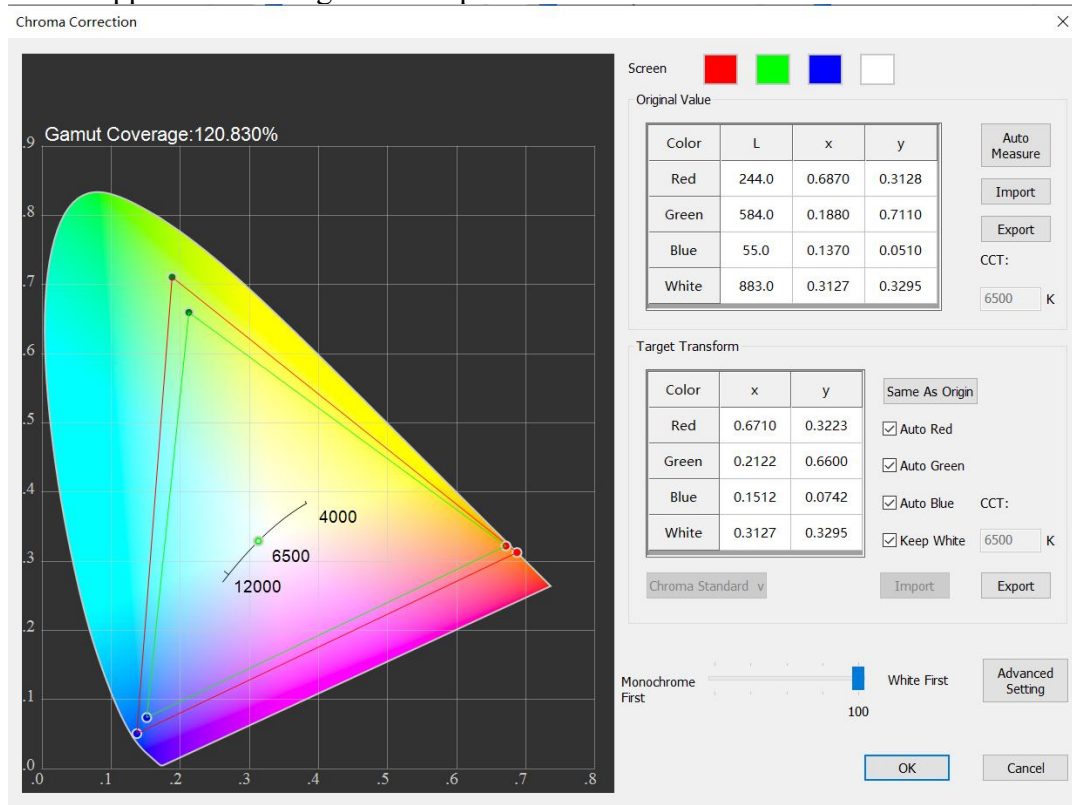


Fig.7-4 chroma calibration

8. Tools

8.1 coef Rotate Tools

You can rotate the cabinet or screen coefficient, which is clockwise by default

1, By Cabinet:Can carry out the cabinet or set the cabinet width and high resolution.

2, By screen:Can set the screen width and high resolution of the cabinet.

Rotation:90°、180°、270°.

3, coefficient before adjustment: The storage path of coefficients before adjustment can be selected by cabinet.

4, coefficient after adjustment: The storage path of the adjusted coefficient can be selected by cabinet.

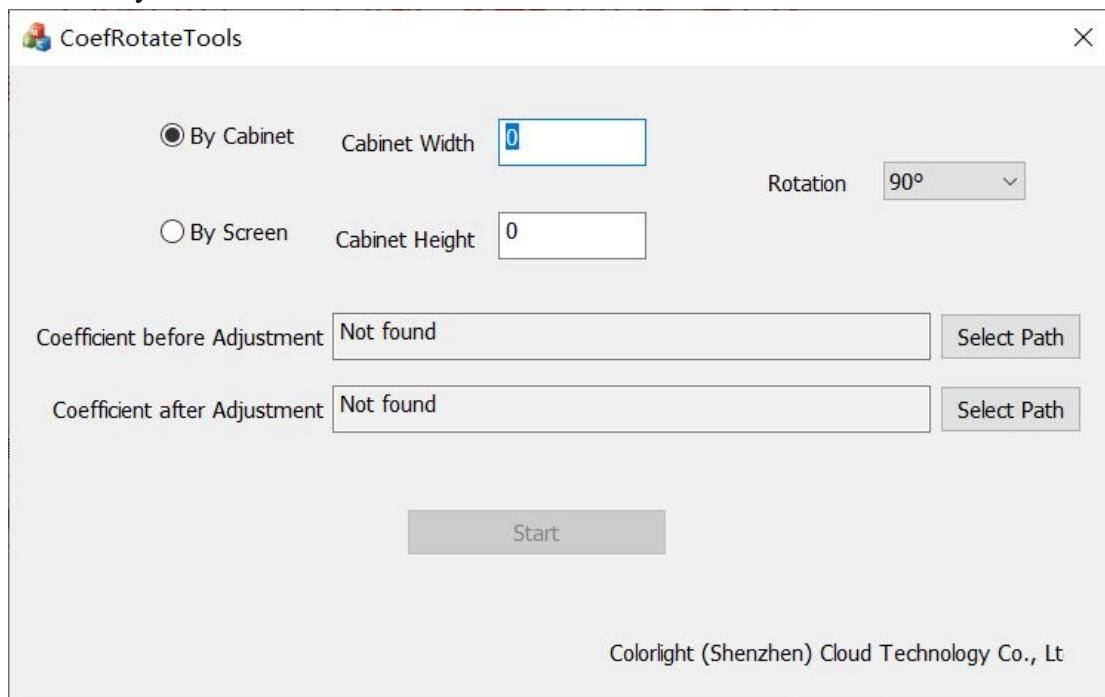


Fig.8-1 Coef Rotate Tools

8.2 Cross Tools

The cabinet can be used to solve the problems that the edge of the module is reddish and the middle is bluer due to the heating phenomenon of lamp beads.

1, By Cabinet:Can carry out the cabinet or set the cabinet width and high resolution.

2, By screen:Can set the screen width and high resolution of the cabinet.

3, Cold screen cabinet coefficient, select the storage path of cold screen cabinet calibration coefficient.

4, Thermal screen cabinet coefficient, select the storage path of thermal screen cabinet calibration coefficient, and the cold screen coefficient file name and thermal screen coefficient file name need to be the same;

5, Repairing the front cabinet coefficient, and selecting the storage path of the cabinet calibration coefficient before repairing;

6, Repairing the cabinet body coefficient, and selecting the storage path of the cabinet

body calibration coefficient after repair;

7, Crosshair strength coefficient, which is displayed as 1 by default, can be modified according to actual situation.

Set, click Start, the software automatically generates the cabinet calibration coefficient after repair, click Export Reference Model, and export the Current crosshair model file.

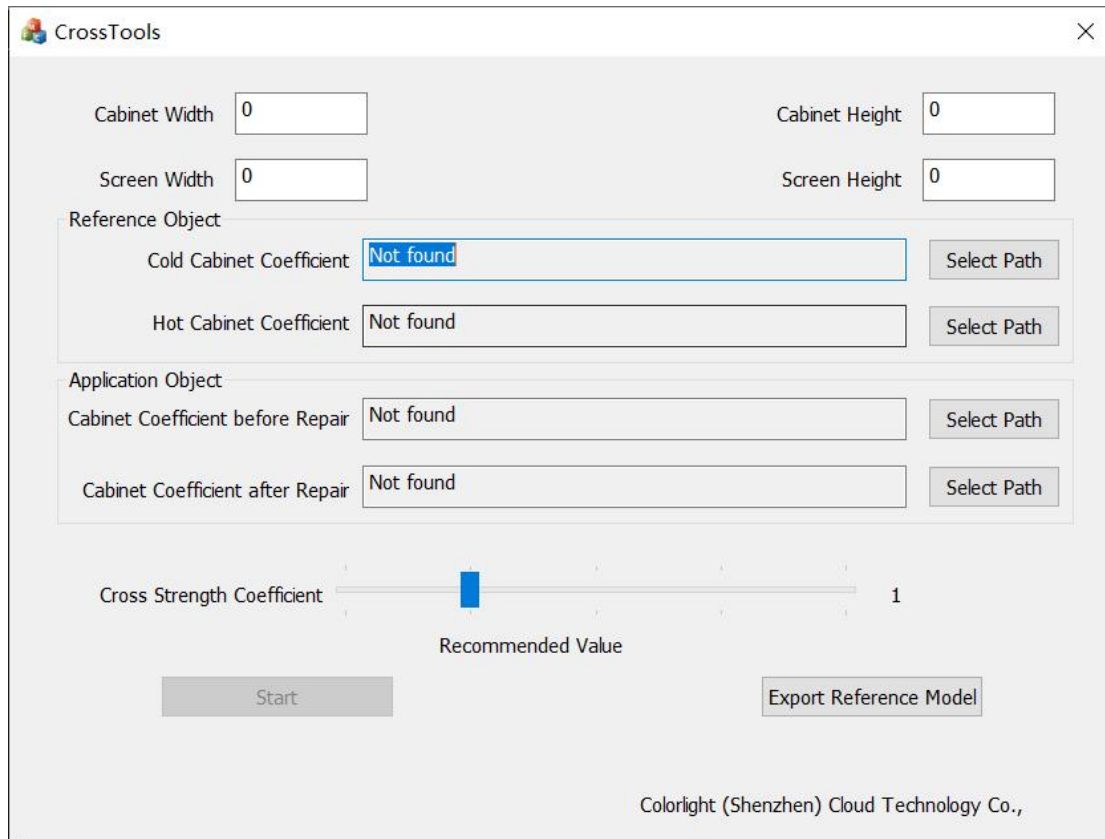


Fig.8-2 Cross Tools

8.3 Gamma Test

Collect gray scale data according to the current screen gamma.

1. Control the screen, detect the transmitter and control the screen.
- 2, Connecting the light gun, connecting the currently used light gun.
- 3, Reset the curing parameters and screen body, modify the customized gamma table state in the configuration parameters to be inactive, the calibration mode to be inactive, the specified calibration coefficient to be inactive under low gray, and the color gamut adjustment to be inactive, and send and cure to the receiving card; Modifier brightness level and color temperature adjustment are not enabled, low brightness gray scale optimization is not enabled, and color space conversion is not enabled.
- 4, Screen detection, automatic screen color inspection.
- 5, Color measurement: select the color to be measured at present.
- 6, Thermal screen time, the time required for the screen to light up before gamma measurement.

- 7, Measurement range, the default display is 0- the current maximum gamma value, which can be modified manually.
- 8, Measuring step, setting measuring step.
- 9, Measure according to the gamma meter, and use the current screen reference gamma meter to measure.
- 10, Custom gamma table. After loading the custom gamma table successfully, a green check mark will be displayed on the right.
- 11, Number of measurements, the number of times required for each gamma measurement.
- 12, File saving path, select the location where the measurement data will be saved after the measurement is completed.

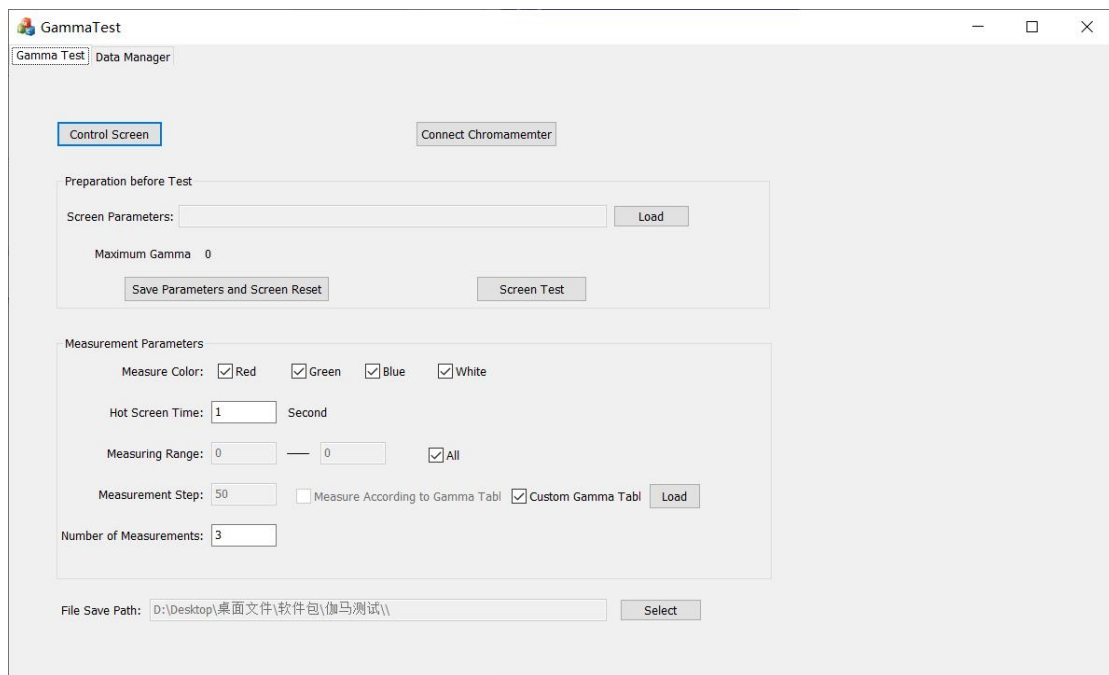


Fig.8-3 gamma test

- 13, Import: the data of previous gamma measurement can be imported manually.
- 14, Export, which can manually export the data of current gamma measurement.
- 15, Measurement: gamma measurement is carried out according to the current gamma measurement setting parameters.
- 16, Draw line segment, click 2 points, and a straight line segment will be drawn automatically at 2 points.

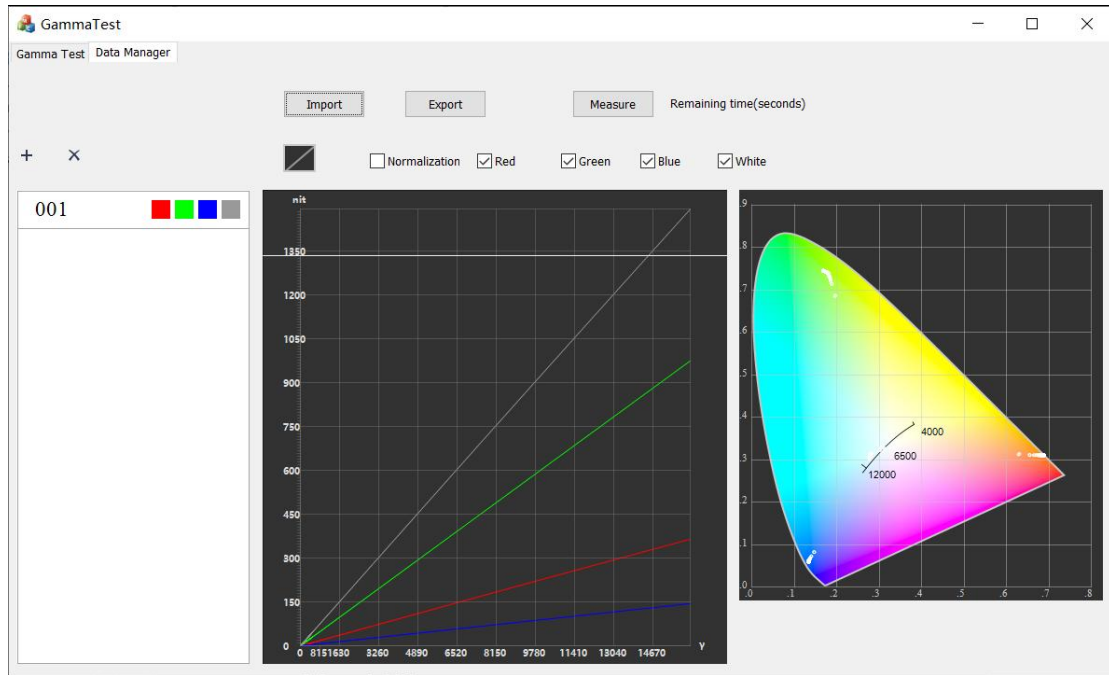


Fig.8-4 data manger

8.4 Coef Adjust

Solve the problem of obvious light dark color difference when the whole screen calibration backup module is replaced to other areas.

- 1, Reference area coefficient file: import original full screen calibration coefficient.
- 2, Location of adjustment area coefficient: select the storage location of spare parts coefficient to be adjusted.
- 3, Click the "Start" button, enter the name of the spare parts coefficient to be adjusted in the table, click the "Start" button, and the software will export a new full screen coefficient of the reference area coefficient under the reference area coefficient folder, and export a new adjusted coefficient under the adjustment area coefficient folder.

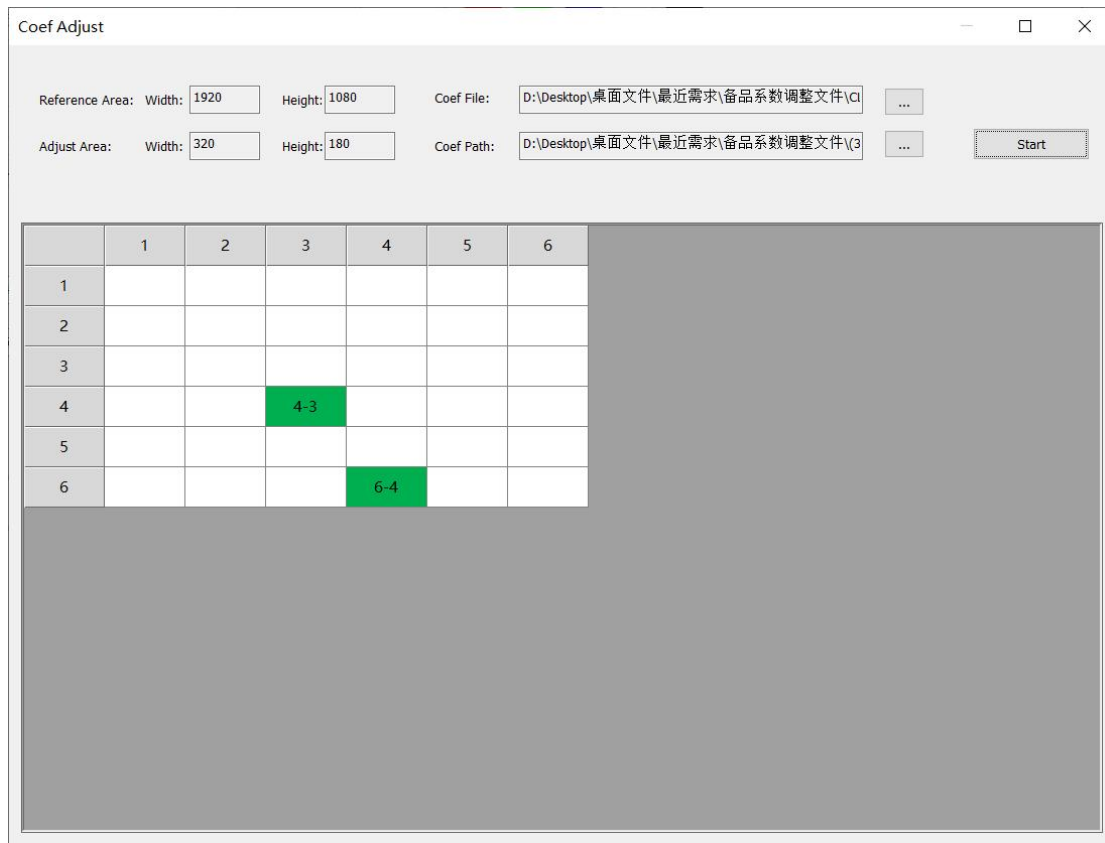


Fig.8-5 coef adjust

9. Suggestion on calibration

1. Shift the camera to **M mode**.
2. Gray scale and brightness can not be modified at random while shooting. Because changes will have impacts on RGB color photos;
3. Calibration is suggested to take at night, a better brightness uniformity is the key point.
4. Calibration can make a better uniformity but a reduction on brightness
5. After calibration, view from front is the best, viewing angle and viewing effect from side can not be improved.

10. FAQ

Q: Failed to detect receiver card.

- A: 1. Ensure the stable connection between hardwares.
2. Improve the frame time.
3. Select the right net card under the drop down list.

Q: Can not open after installation?

- A: 1. Confirm whether the software installation plug-in is complete.
2. Verify that the EOS utility software is closed.

Q: Failed to connect Client.

A: 1. Ensure the stable connection between hardwares.(If the hardware connection is normal, the NIC should light on.)

2. Make sure the target IP is correct (the local IP is 127.X.X.X) by executing ping command.

3. Make sure the server port is the same as the client.

Try to telnet the target port (Generally, if you can ping the target IP but cannot connect to the target port, it was mainly disable by the firewall or router).

Q: After open the software, the screen appears abnormal phenomenon such as flashing, flower screen.

A: Please adjust the screen to normal status via LEDVISION and then save it to the receiver card.

Q: Failed to connect the camera.

A: 1. Confirm that the camera model is supported by the software (Software currently only support part of the Canon camera, please contact the technical support for details), please pay attention that the EOS 7D is not the same as the EOS 7D MARK II.

2. Confirm the stable connection between hardwares.

3. Confirm that the camera is open but not dormant.

4. Confirm that the camera is shift to manual mode (M mode).

5.The dongle is not connected when using CCM series cameras.

6.When using CCM series camera, the driver is not installed, reinstall the

software, and check all plug-ins of the software when installing.

Q: Failed to shoot the photos.

A: 1. Confirm that the camera model is supported by the software (Software currently only support part of the Canon camera, please contact the technical support for details), please pay attention that the EOS 7D is not the same as the EOS 7D MARK II.

2. Confirm that the camera is shift to manual mode (M mode).
3. Close the lens auto-focus function.

Q: Why the shutter can't be set more than 1/30?

A: 1. Confirm that the camera is shift to manual mode (M mode).

2. Confirm that the multi-function dial is set to shooting mode instead of movie mode.

Q: Fail to analyze photos.

A: 1. Confirm that the camera model is supported by the software (Software currently only support part of the Canon camera, please contact the technical support for details), please pay attention that the EOS 7D is not the same as the EOS 7D MARK II.

2. Try to re-install the software to ensure that components are completed.

3. Please check the shooting quality. Check it like this: click [**open...**] in the [**Photos**] page, then using brightness extract, grey-scale map or histogram function to manual analysis photos whether there is out of focus, overexposure, underexposure, shake, etc.

4. Partition is so large that leads to the dense lamp. (Using the skip point function to reduce lamps density)

5. Too much broken point/dislocation can affect the results of the analysis.

6. The available memory is limited.

Q: The shooting quality is bad after shooting again and again.

A: Out of focus:

1. SLR cameras need to start EVF or use the camera's LIVE mode focus in order to improve the focusing accuracy.

2. Using manual focus to improve accuracy when the auto focus effect is not good enough.

Overexposure/underexposure:

Reset the correct camera parameters on camera adjustment page.

Shake:

1. Make sure shooting system stability.
2. Close the lens and the camera stabilization function.

Q: Screen brightness/saturation reduced after calibration.

A: Brightness calibration makes the screen evenly by reducing the lighter point brightness, thus the screen brightness will decline after calibration.

Chroma calibration makes the screen evenly by reducing the saturation, and it contains the function of the brightness calibration, thus the screen brightness and the saturation will decline after calibration.

Q: Screen appears the noise after calibration.

A: 1. Please check the shooting quality. Check it like this: click [**open...**] in the [**Photos**] page, then using brightness extract, grey-scale map or histogram function to manual analysis photos whether there is out of focus, overexposure, underexposure, shake, etc.

2. Partition is so large that leads to the dense lamps and increase the sampling error.

3. If the gamma table that referred by simulator is not the same as the target, please send parameters to receiver cards.

Q: Screen appears horizontal band after calibration.

A: 1. Shutter speed is too fast, you need to set the shutter slower, and reduce the screen brightness darker to maintain the brightness at the same time.

2. The refresh rate is too low, you need to increase the refresh rate.

Q: Screen appears moire pattern.

A: The phenomenon is caused by the interference system error of the lamp frequency and the pixel frequency.

The system error is divided into two parts, the position error and the brightness error.

Solutions:

1. Confirm the frame was filled with images.
2. Decreasing partition and increasing focus (You need to re-photometry after adjusting the focus).
3. Decreasing focus slightly (You need to re-photometry after adjusting the focus),

and then you will shooting in a slightly out of focus condition (But this measure requires the focusing error can not be too large). Enable the skip point function to improve the spacing if you need.

4. Close deseam function for the impact of the position error can be eliminated.



Visual Future

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