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1 Camera

1.1 Parameter Settings

Must choose:

1. Image quality, on RAW option, please choose [RAW], and select the following [-] on JPEG option, turn it to M mode on dial of camera.

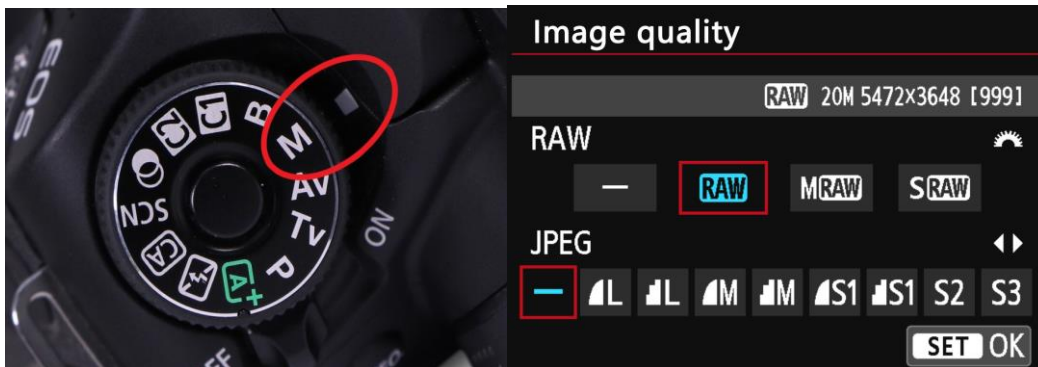


Figure 1.1 Camera Setup

2. You can use AF mode on the lens, but MF mode is recommended, because MF mode is focusing faster with higher accuracy.



Figure 1.2 Lens Setup

3. Flash firing: Disable WI-FI: Disable
4. Make sure camera stay on photo mode. Do not use video mode.

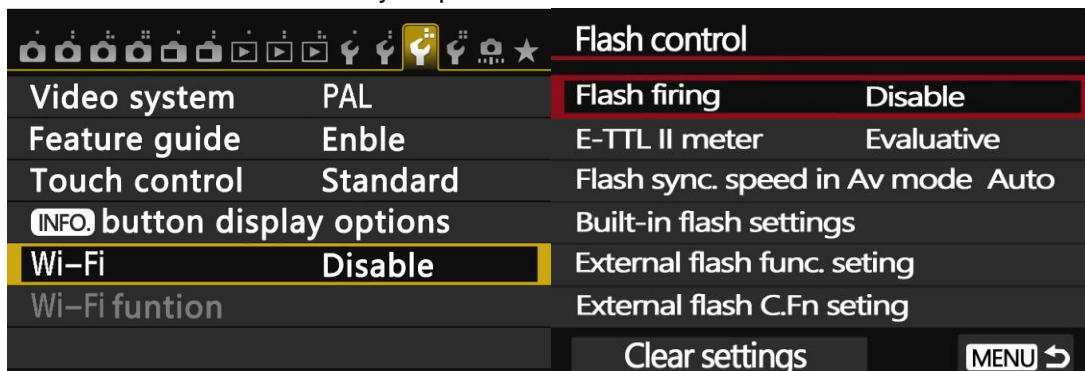


Figure 1.3 Camera Main Setup Example

Optional:

1. [Exposure simulation] set to [close].
2. [Metering timer] set to [4 seconds].
3. [Auto Focus / drive]– [Artificial Intelligence servo 1/ part 2 Image First] set to [2. Release / drive speed is preferred].

1.2 Camera Support

The camera models currently supported:

EOS 40D
Eos - 1ds Mark III
EOS DIGITAL REBEL Xsi / 450d/kiss X2
EOS DIGITAL REBEL Xs / 1000d/kiss F
EOS 50D
EOS 5D Mark II
EOS Kiss X3 / EOS REBEL T1i / EOS 500D
EOS 7D
EOS - 1D Mark IV
EOS Kiss X4 / EOS REBEL T2i / EOS 550D
EOS 60D
EOS Kiss X5 / EOS REBEL T3i / EOS 600D
EOS Kiss X50 / EOS REBEL T3 / EOS 1100D
EOS 5D Mark III
EOS Kiss X6i / EOS 650d / EOS REBEL t4i
EOS 6D
EOS Kiss X7i / EOS 700d / EOS REBEL t5i
EOS 70D
EOS 70D Mark II

Note:

The software supports those cameras in theory, but only EOS7D and EOS70D are tested, so we can't make sure all of cameras would work.

2 Operation Setup

2.1 Calibration Mode

Run LED Correction software, select “Parameter input” and choose “Correction Mode”.

1. Screen calibration, usually for the screen of fixed installation, outdoor and indoor.
2. Single cabinet calibration, usually for the screen of rental.

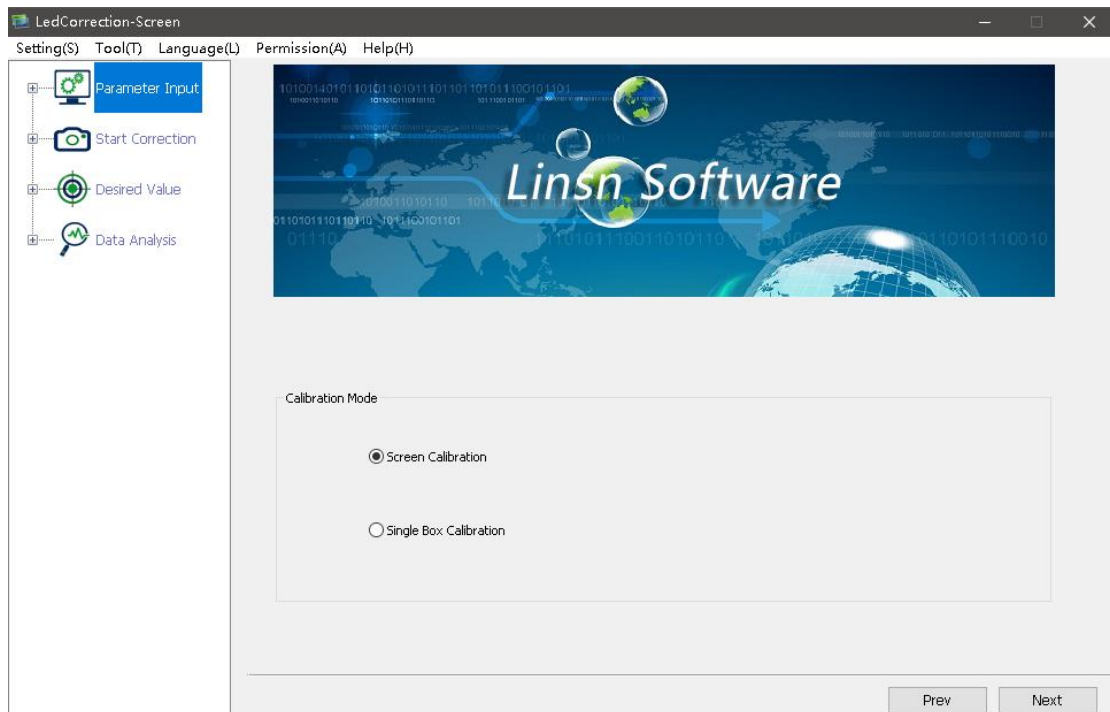


Figure 2.1 Calibration Mode

2.2 Correcting Data

Click Next to enter parameter input--correct data interface

as pictured 2 shown in this interface, enter LED the actual height and width of the screen, the module height and width data are used to correct the data automatic stitching. Enter the package edge information. After the data entry is complete, click Apply. Select the partition mode. partition correction is divided into regular partitions and partition points,

and the normal partition is to divide the display into multiple small areas and then to light and correct them one by one. The separation point correction is to divide the LED display into rows or columns and then to light and correct it on every other row or column.

If the indoor or outdoor screen is small, the separation point correction is recommended because it's faster. When Background correction function is applied, the contents of the led screen are not copied from the computer that operates the correction software but are directly displaying the correction process. Using background correction requires that the computer display settings be changed to Extended mode.

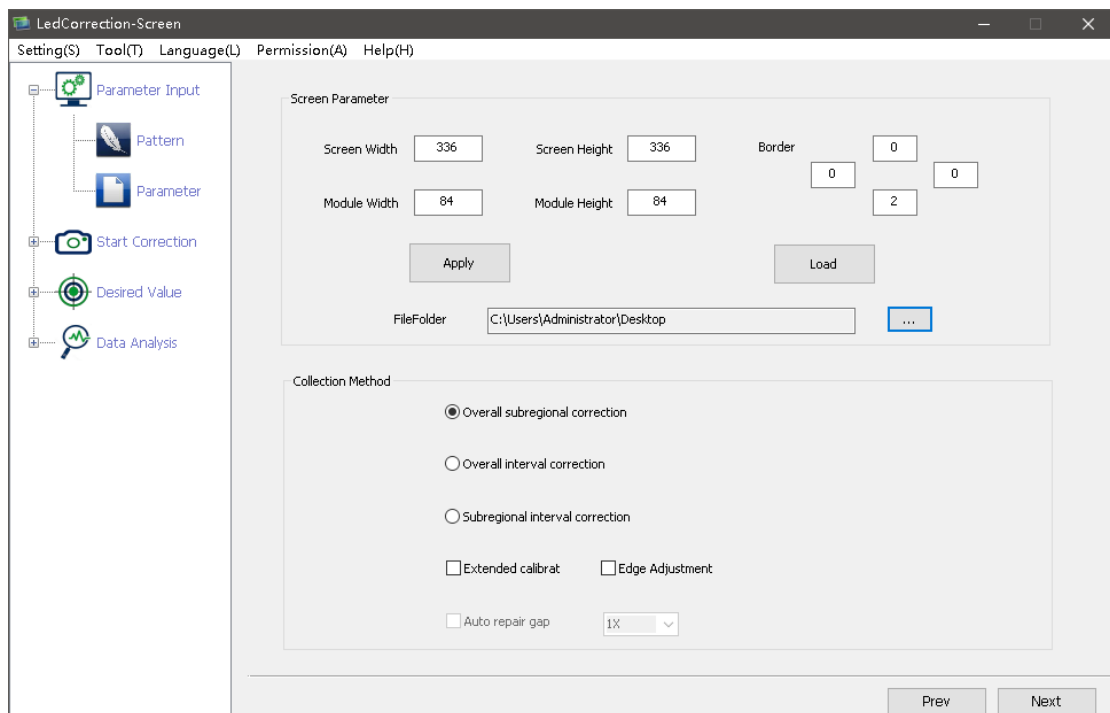


Figure 2.2 Calibration Data Window

Only the interval correction supports the automatic seam repair feature.

2.2.1 General Partitions

Single partition point: width and height both are no more than 200 points, as Figure2.3 is shown (Figure 2.3 for 192x192 single Box correction data), just click the middle space to make the middle part into **Reddish brown**. Then click Next.

Figure 2.4 is for 1152x768 large screen correction, which is divided into several small parts (192x192) and then to correct them one by one. Click on the first area to change the white to **reddish brown**. Then click Next.

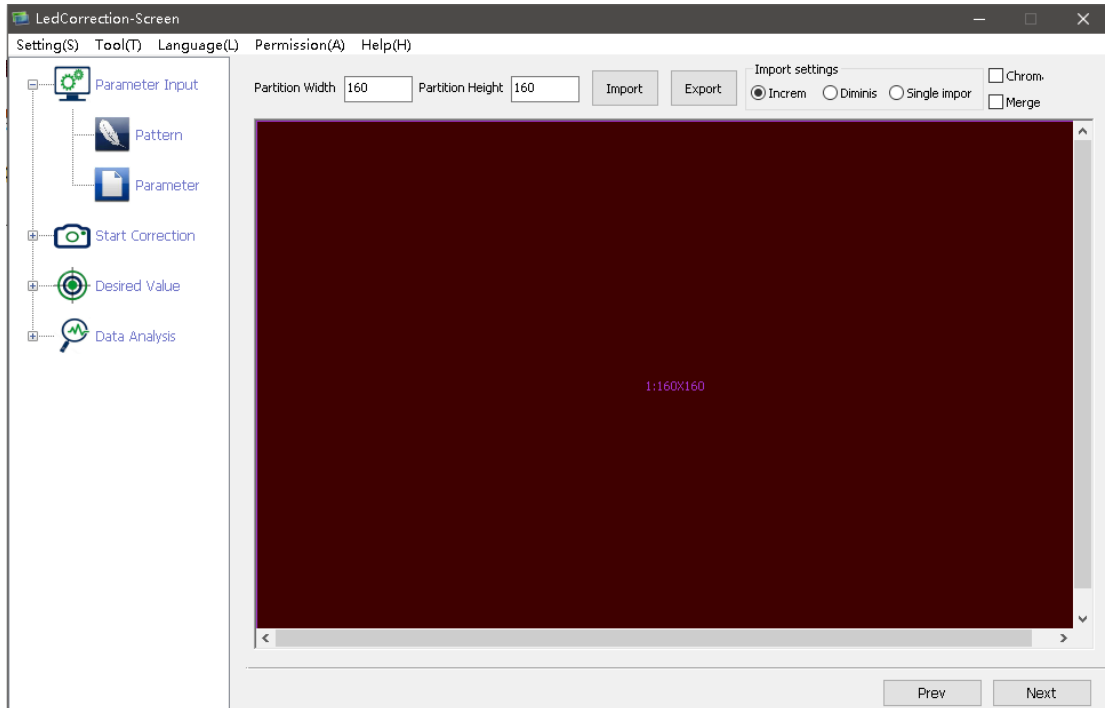


Figure 2.3 Single Box correction zoning

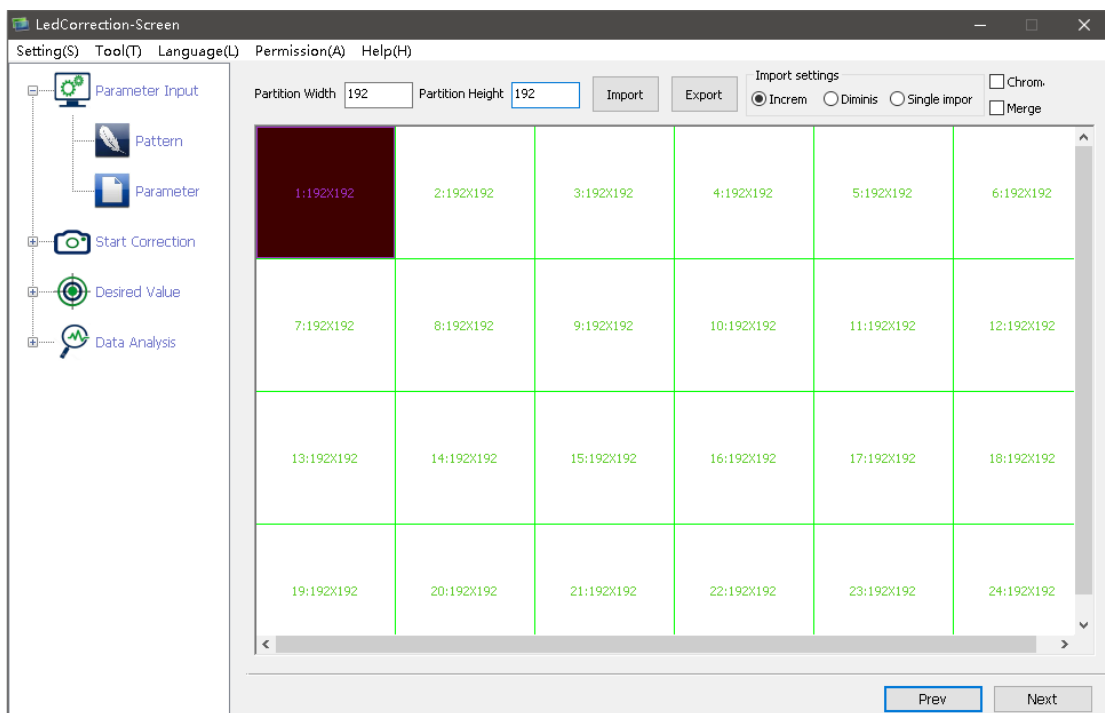


Figure 2.4 Large screen correction partition

2.2.2 Point Partition

The interval correction is generally used for small pitch screens or large screen corrections without moving the camera. As shown in the picture is a width 1152 point, Height 768 Point screen which use the interval correction. X,Y directions are separated by 6 points and 4 points respectively, Click the first area to change the white to reddish brown . Then click Next.

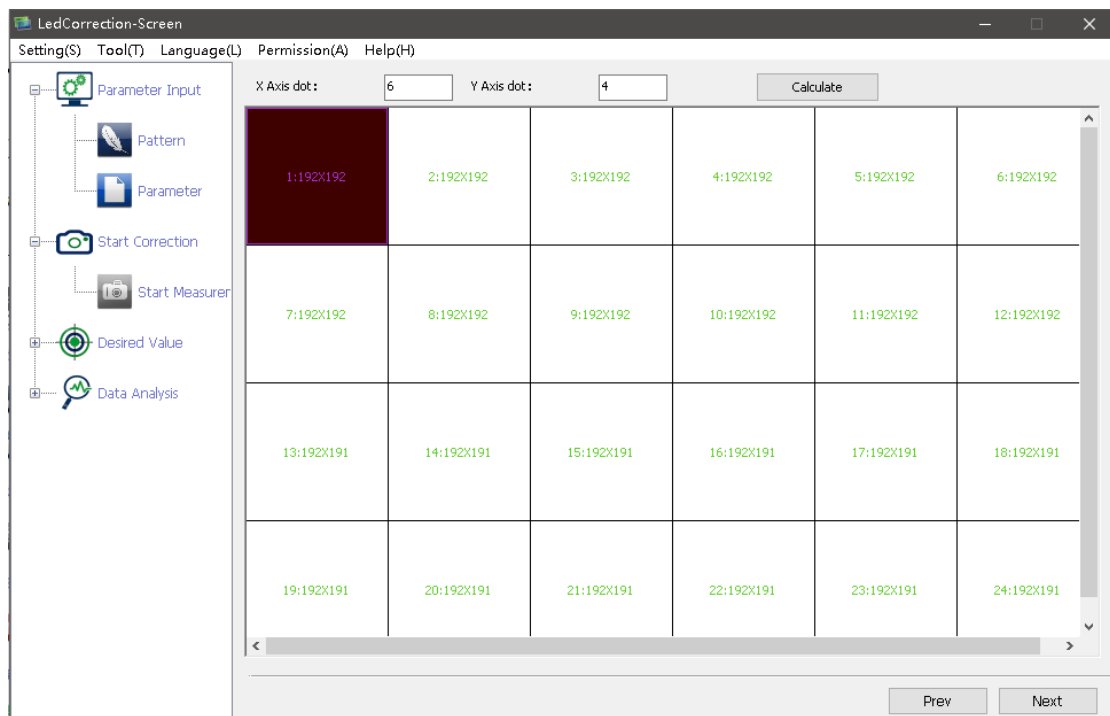


Figure 2.5 interval correction partition

2.2.3 Partition points

The partition-point correction is often used for super-large screen correction, whose advantages are bigger correction areas and fewer movement of camera compared with normal partition; and bigger correction areas and less obvious gap between the Partition compared with the single-point correction.

As is shown in the figure2.6, after selecting the partition point mode, the interface is similar to a regular partition, and the difference is that the single partition has at most 2k

lights in total. Click on the first area to change the white to reddish brown . Then click Next.

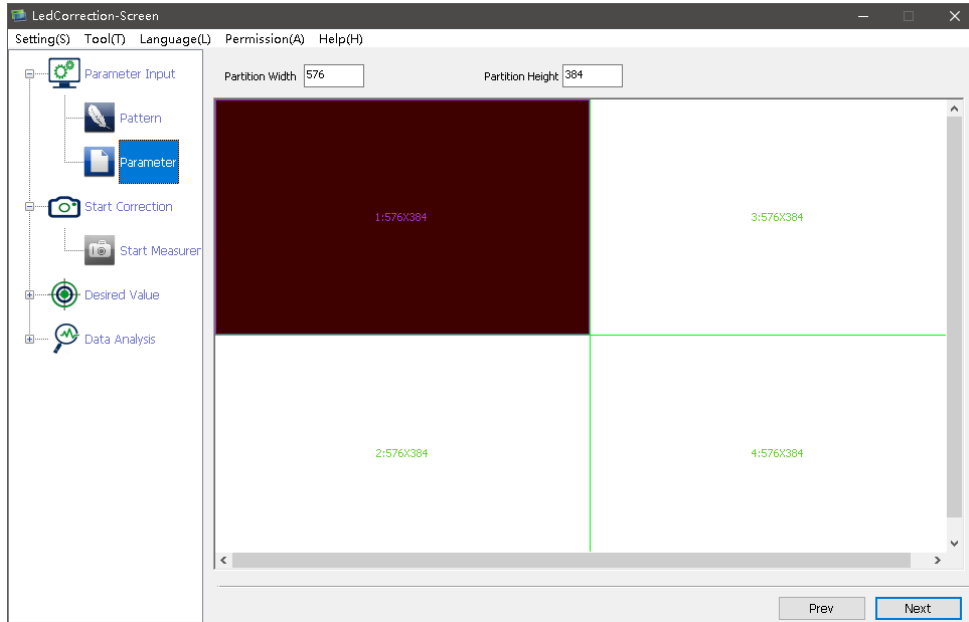


Figure 2.6 Partition Point mode

After a single partition number is made clear, open the data acquisition interface, fill the partition points into the edit box as is shown in below picture, each partition points can be different from one another.

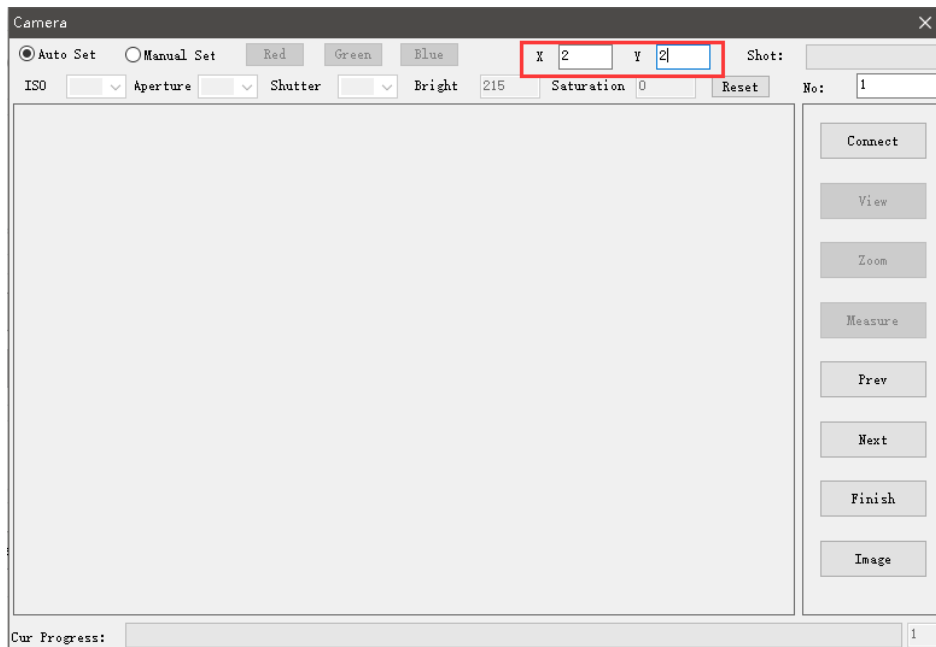


Figure 2.7 Data Acquisition Window

2.3 Start Correction

After setting up the partition information, enter the start measurement interface, click Data collection directly, and open the data acquisition interface for correction.

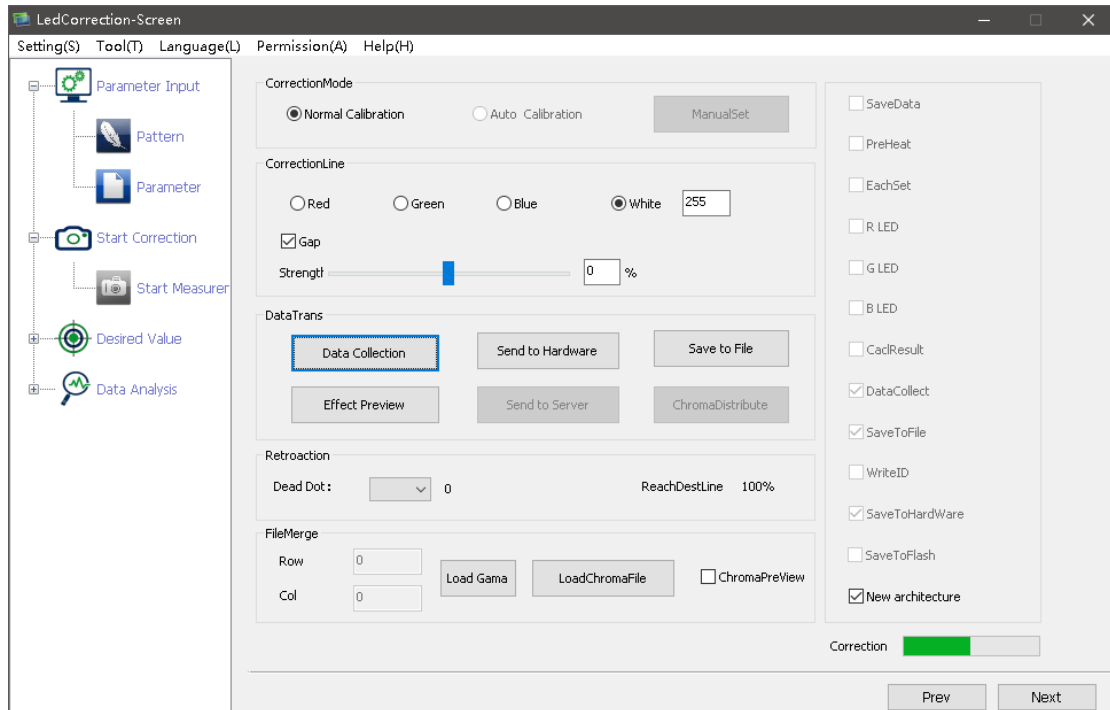


Figure 2.8 start the measurement Window

2.4 Data Acquisition

Make sure that the computer is connected to the camera before entering the data acquisition interface. Click the camera connection, if the camera connection failed, check whether the USB cable is connected well or not and check the mode dial to choose M partner. After the successful connection, click Start Preview, keep the Shooting screen parallel with the white border basically, and let the selected area to be basically filled within white boxes, never let the shooting images go beyond the white box. Then use the manual focus to make each single light on the screen visible and no overlap. Reduce focus slightly, shoot in a slightly running position (but the focus error cannot be too large in case it affects analysis), click Start Measurement. Keep the camera's ISO, aperture, shutter speed as default settings(no need to change).

Single box:

The measurement will be completed automatically after clicking the Start Measurement (you'll know when the Completion Measurement prompt box appears). After changing the box, click Start measurement directly. The measurement data is automatically numbered and saved, and the path is the Filebr folder under the Software installation path . Default file name is R10000-x.RVS

Large screen Correction:

The measurement will be completed automatically after clicking the start measurement (you'll know when the Completion Measurement prompt box appears). The brightness data is automatically saved. The save path is the Filebr folder under the Software installation path . The default file name is Screen.RVS.



Figure 2.9 Data Acquisition Window

2.4.1 Camera Adjustment

The adjustment mode of the camera is divided into automatic adjustment and manual adjustment, and the preset is automatic adjustment. In the automatic adjustment mode Click to start measurement will first adjust the camera parameters, adjust the correct

before entering the data acquisition stage. The whole process of camera adjustment to the collection is automatically completed by the software.

Manual adjustment mode Operation steps: Select the manual adjustment mode through the radio button, connect the camera (click the Camera Connection button), start the preview adjust camera angle, focal length and focus, click Red, Green and blue three buttons respectively to the red, green and blue display to shoot. After the shooting, the software will prompt for excessive exposure or insufficient exposure. Adjust the camera and screen parameters according to the prompts.

Adjustment method:

Exposure Excess: 1. Reduce the aperture (the larger the number is the smaller the aperture). 2. increase the shutter speed. 3. reduces screen brightness.

Insufficient Exposure: 1. Increase the aperture (the larger the number is the smaller the aperture). 2. reduce the shutter speed. 3. improves screen brightness.

The above three optional parameters can be changed by one or three optional.

saturation is also one of the parameters that reflect the imaging quality, and the reasonable range of saturation is A ~ - between.

2.5 Correcting targets

The correction target is the menu that modifies the expected value of corrected data after the correction is completed. The default 85 can be changed according to the actual situation, generally no need to change.

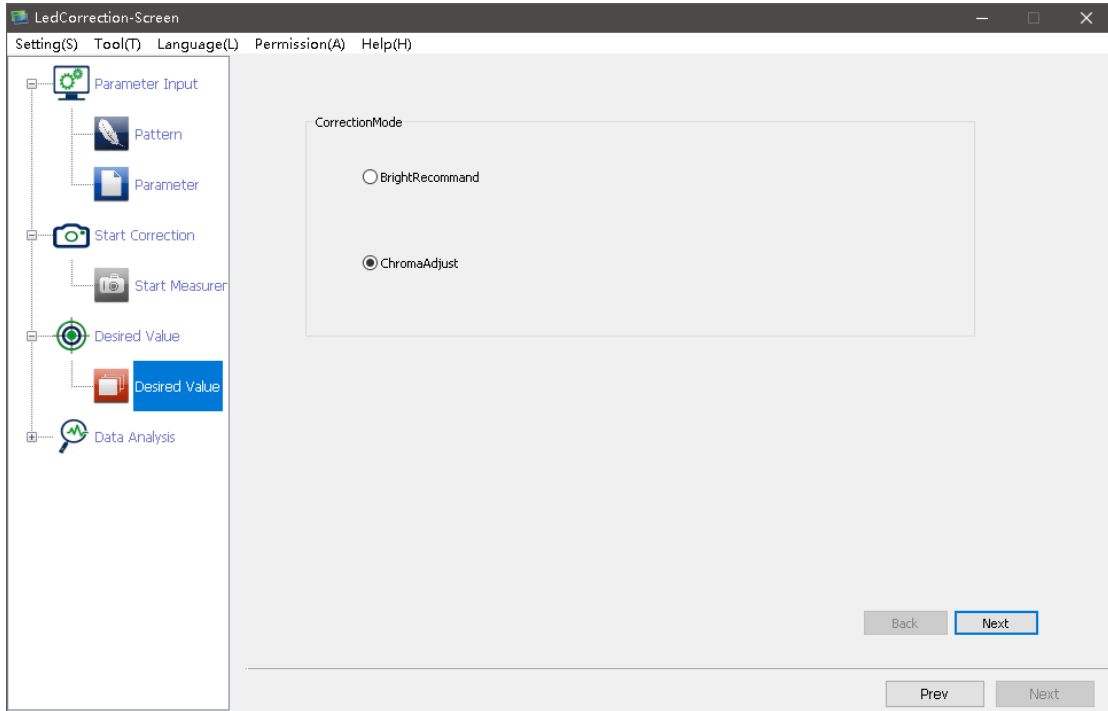


Figure 2.10 Correcting target Window

2.6 Data Analysis

The data analysis interface is the interface used to view corrected data and adjust the correction data, the picture below is the data analysis interface to view all the correction data for red, green and blue.

The data tuning feature includes selecting where you want to modify, directly using adding and lowering adjustment data, changing a specific value in all data (the original brightness) to a set value (new brightness), and clicking the Edge Brightness button to enter the Edge brightness interface so as to change the data.



Figure 2.11 Data Analysis Window

Trimming Function: * means it can be applies to all data.

Module:

The module serial number is the Ordinal number of the module in the box, the number is from top to bottom, from left to right. The module row and column lines number is the module's columns and rows that need to be modified. Click the small triangle button to increase or decrease the brightness. A box can also be used as a module to split the seam between the boxes.

Screen Edge brightness:

The screen edge brightness is to increase or decrease the brightness for a certain row or column of all data.

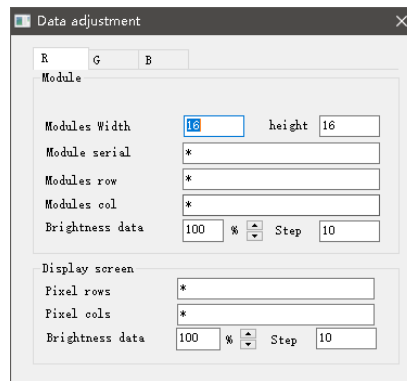


Figure 2.12 Trimming Seam Window

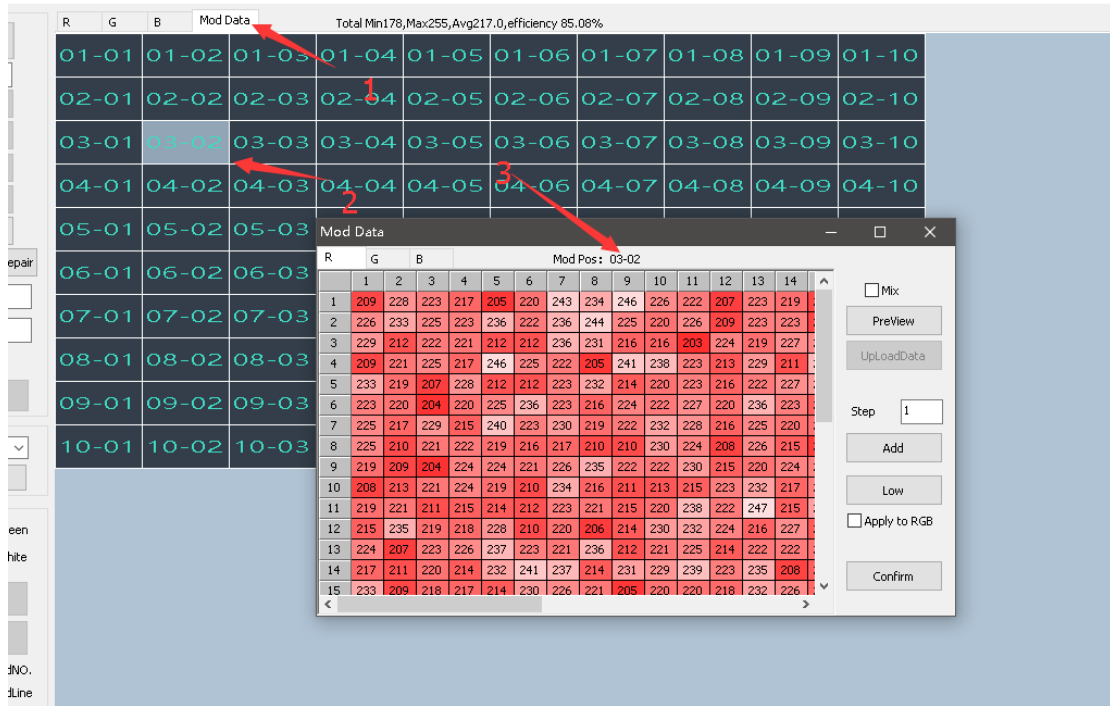


Figure 2.13 Module Data

The interface also provides module-level data throttling.

2.7 Other features

2.7.1 Loading Data

Loading Data function in the calibration data interface, the specific effect is to open the correction file, no need to input any data, click Load and there will be file Management window as shown below, select the correction file you want to view and click Open, and then you'll see data analysis interface.

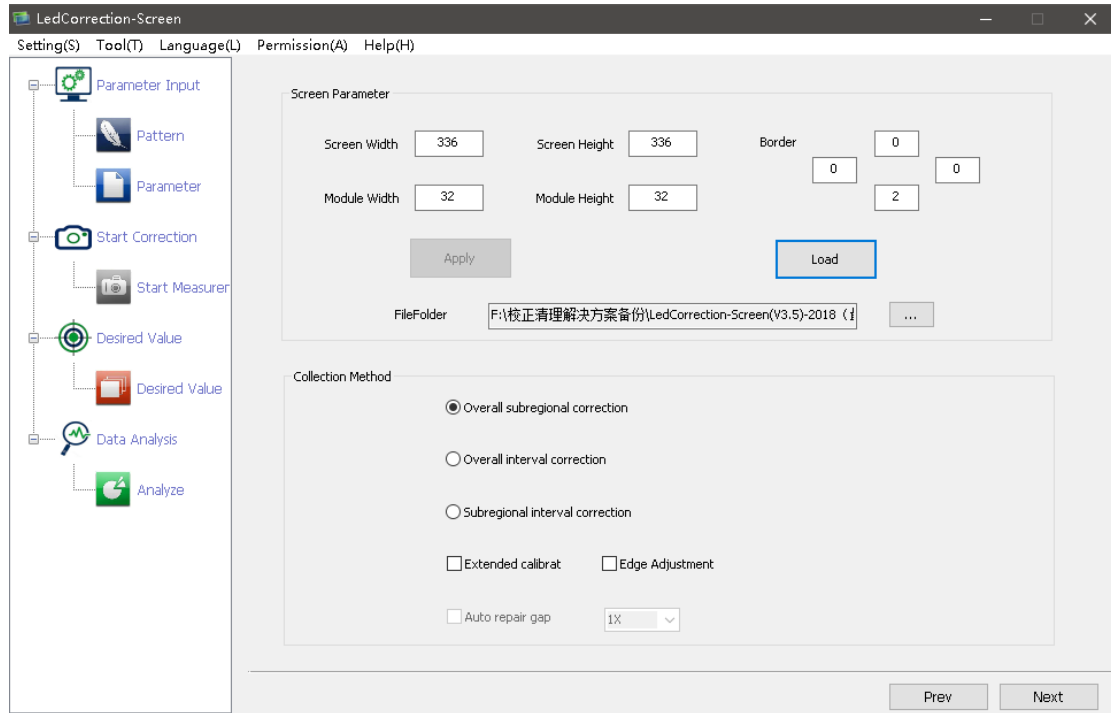


Figure 2.14 Correction Data Window

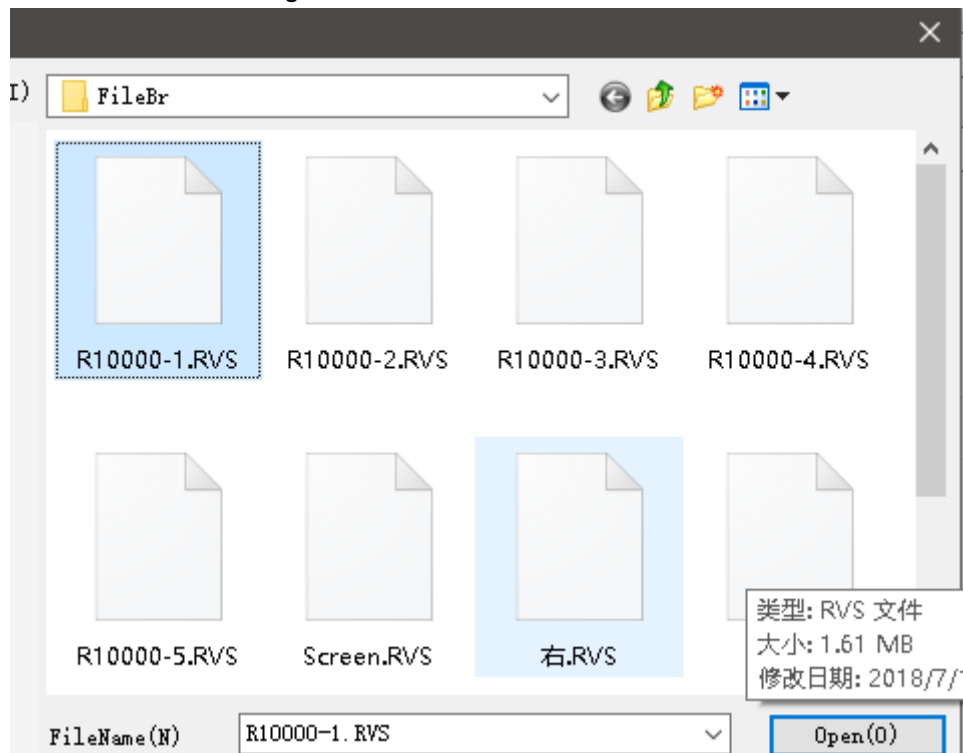
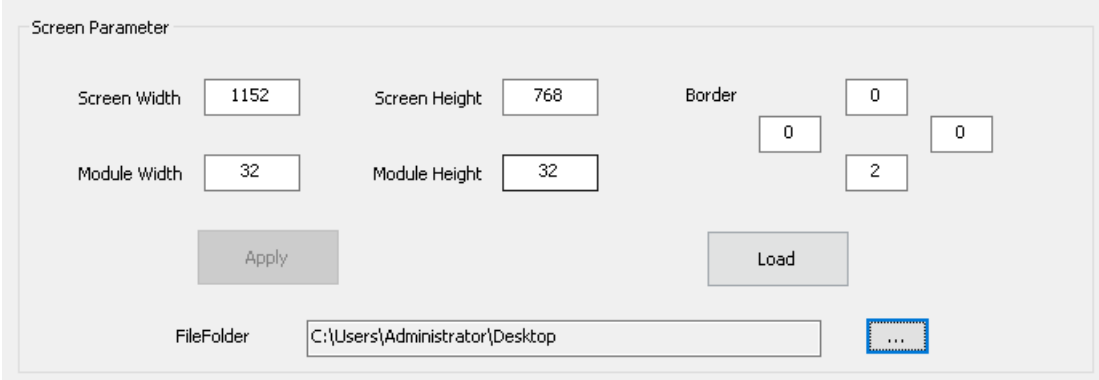


Figure 2.15 File Management Window

2.7.2 Single box correction data stitching

This function is to combine single box file into a whole screen files, for example, there is a 192x192 single box data, now stitching it into a 6 x 4 (width x height) whole screen, the step is: Open the correction data interface to input the whole screen width and height data, here is width $192 \times 6 = 1152$, Height for $192 \times 4 = 768$. Select General Partition and then click Next.



Screen Parameter

Screen Width Screen Height Border

Module Width Module Height

FileFolder

Figure 2.16 Correcting Data

after entering the interface as shown in the figure, fill in a single resolution, here is 192x192 , in the import settings, select the Import, the incremental way is called file by file name from small to large import, from left to right, from top to bottom, descending way is on the contrary, a single import is to click a region to import a box of correction data. When the import settings are completed, click the Import partition to start importing the data. after the data import is completed, it can be viewed and modified in the data analysis interface. After modifying, you can start the measurement interface to save to the file to save the whole screen data, you can also use the partition function to export single box data, the export path is the original data folder, whose name begins with a R2000.

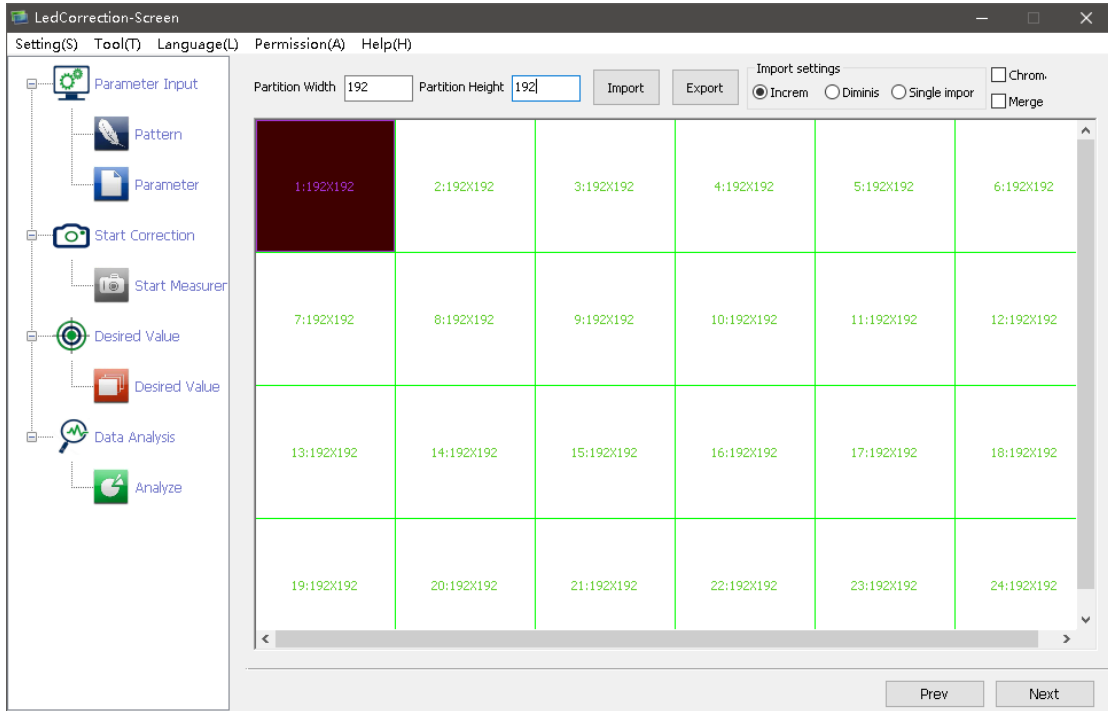


Figure 2.17 Partition window

2.7.3 Preview Function

Preview is used to preview the correction before the data is sent, you can preview the correction effect after the measurement is completed, and select the color you want to preview by correcting the radio box in the process.

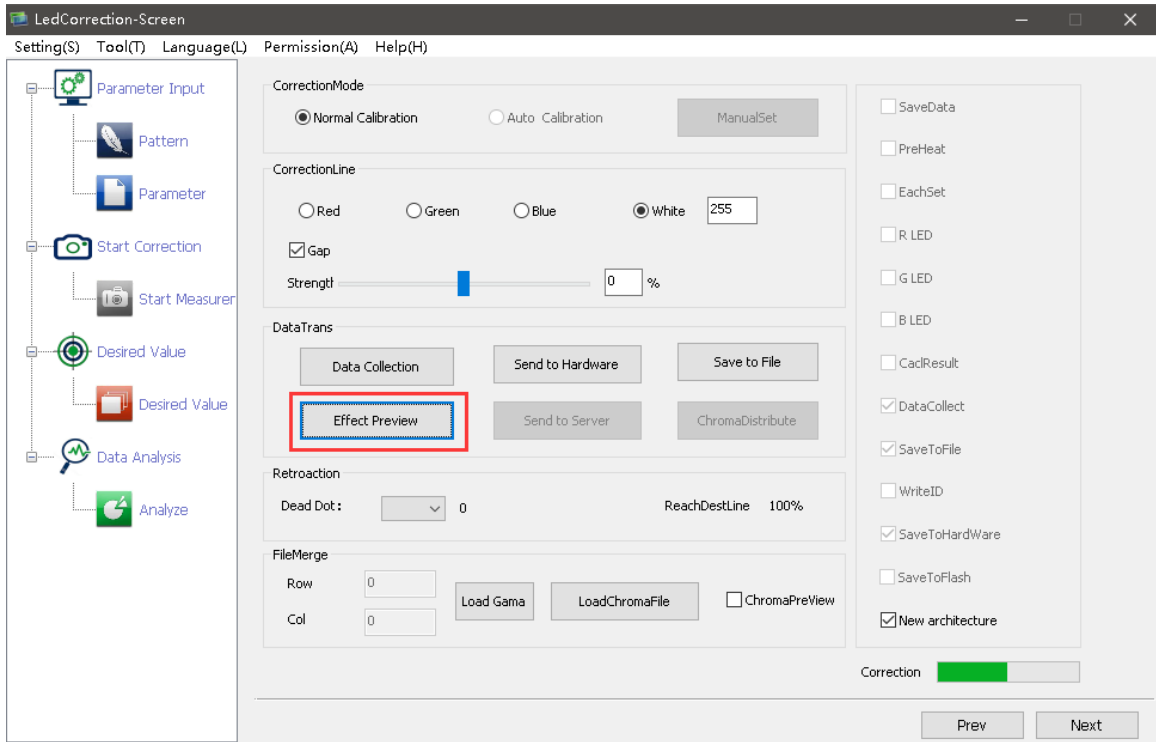


Figure 2.18 Start measurement window

You can also preview the effect through the Data analysis processing interface

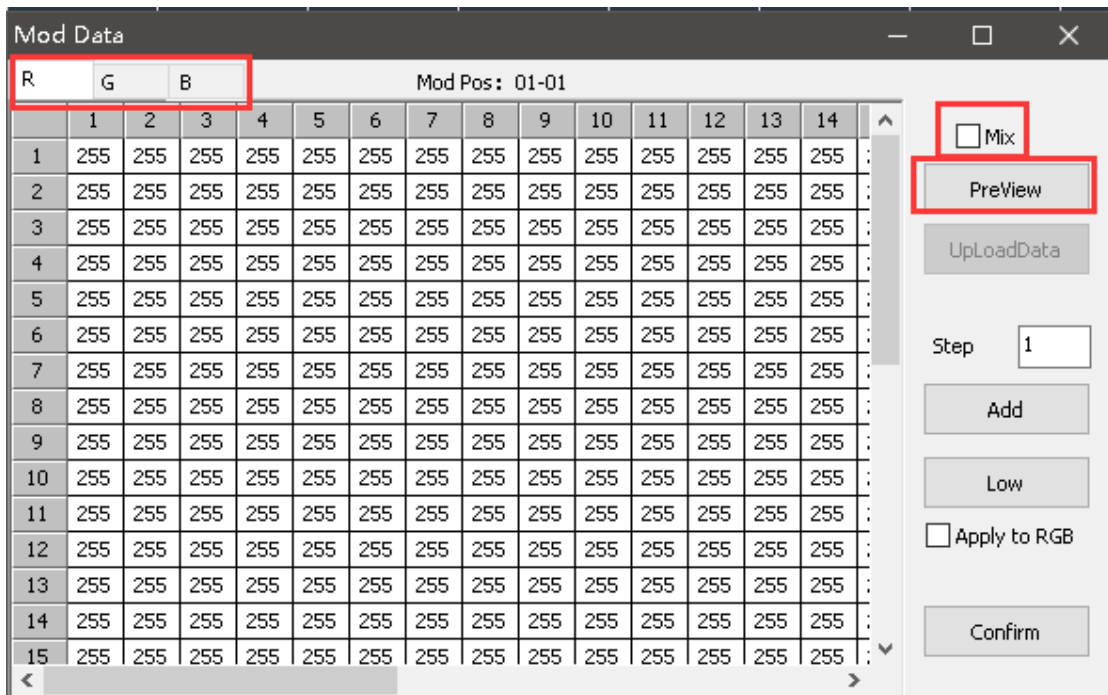


Figure 2.19 Module Data Analysis Interface

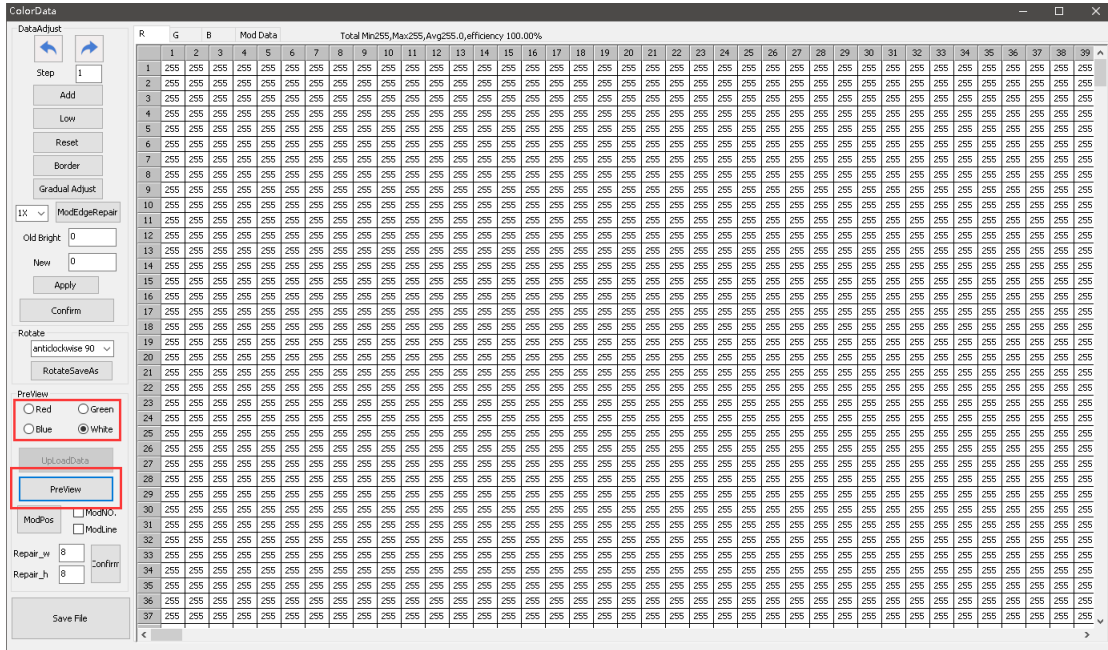


Figure 2.20 data analysis and processing

2.7.4 Dirty Point Repair

After the correction, you found that there are one or two dots on the screen, brightness is significantly higher or lower than other positions (may be the camera lens dust caused), the use of dirty point repair can effectively improve the correction effect.

Instructions:

Open the Data analysis interface, click the Preview, check the location of the dirty spots, select the appropriate box size.

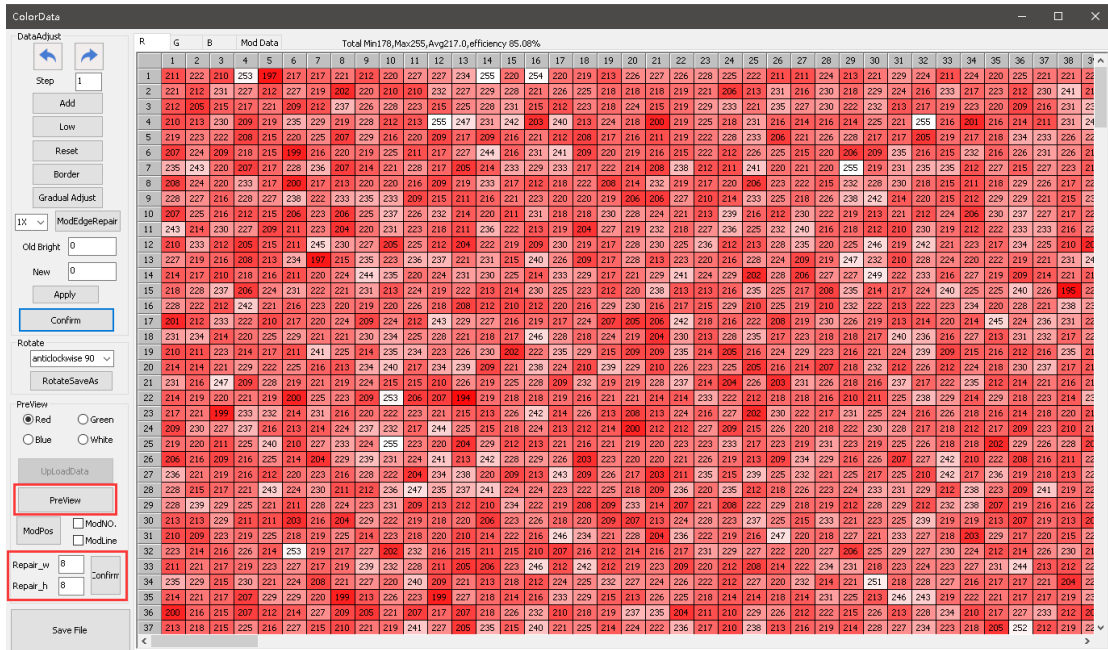


Figure 2.21 data analysis and processing

With the mouse focus on the preview window, right-click the small black box shown in the picture, the dirty dots in the circle, then left-click and the dirty point gets repaired, then click the Data analysis processing interface to complete.

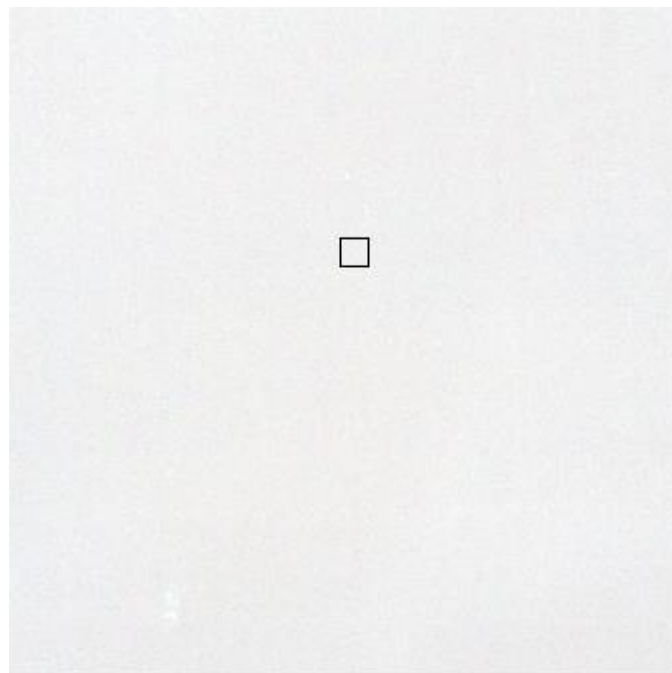


Figure 2.22 Dirty Point Repair

2.7.5 View Images

as shown in the picture, the calibration software provides CR2 Image viewing function, click the Select Image button to open the image, you can select more than one image, when there are multiple images, click the Last and the NEXT button to view. You can also drag the image directly into the interface for viewing, support scaling (Ctrl + mouse wheel), local drag (click Drag on the left mouse button), or save the current image (BMP, JPEG, PNG, GIF format are supported). The interface title bar shows image information.

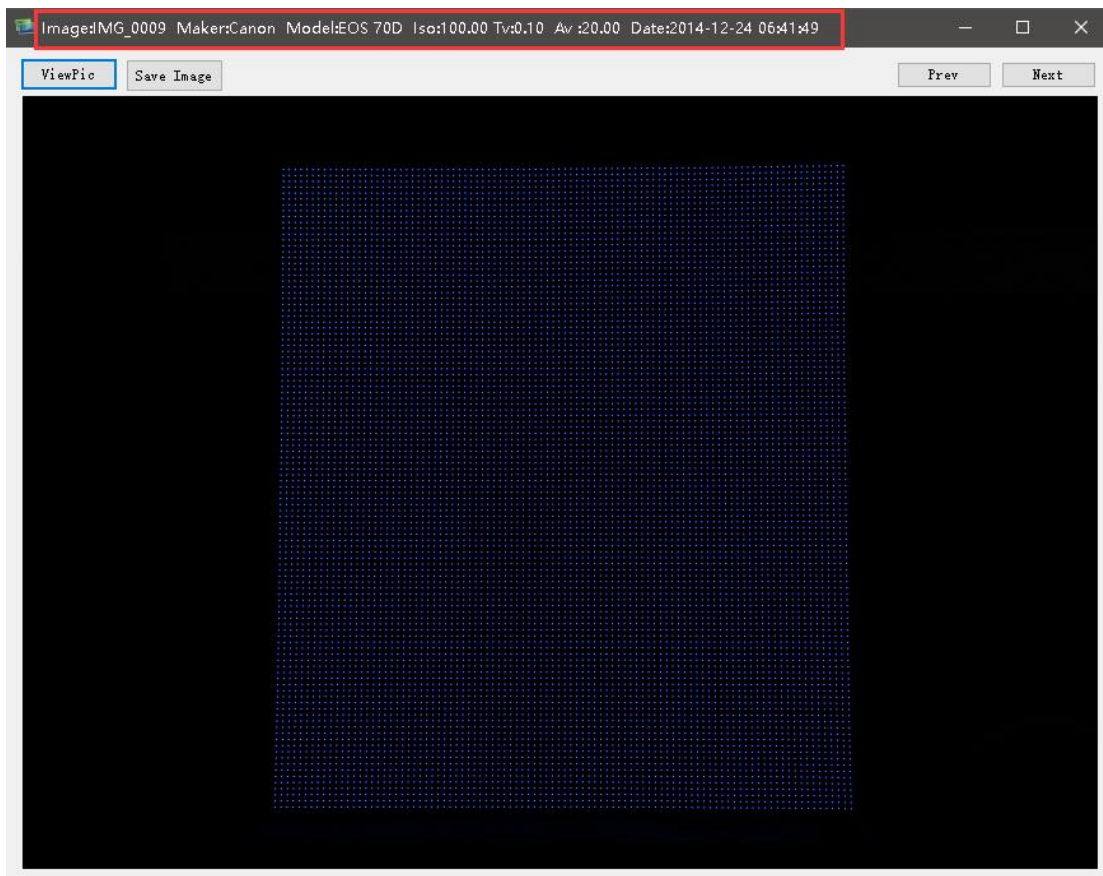


Figure 2.23 View Image window

3 Network-Connection Control

3.1 Software Description

Remote correction requires network connection so the remote correction server Ledcorrection_server needs to be turned on.

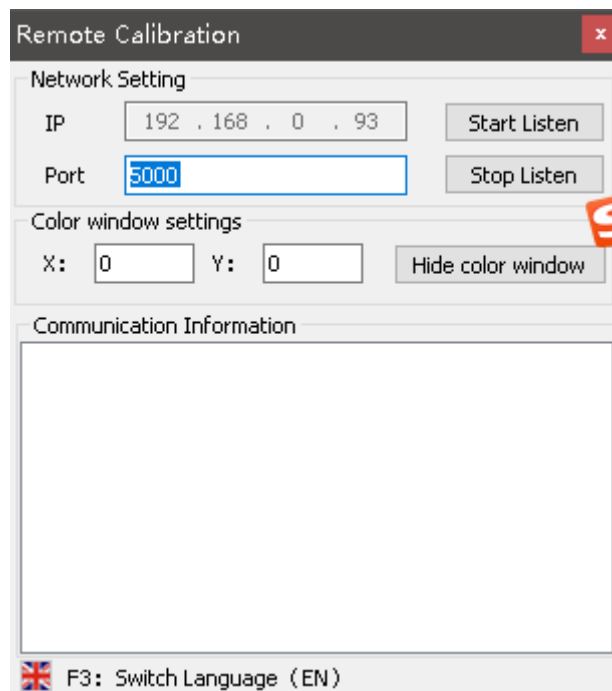


Figure 3.1 Remote Calibration Server

When it's on, shortcut keys F3 can switch languages, currently support Simplified Chinese, Traditional Chinese and English. Color window settings is to adjust the Color window position, when using background extension correction, the screen resolution needs to be filled in.

After setting the language and Color window position, it can be corrected online with the correction software.

3.2 Online correction

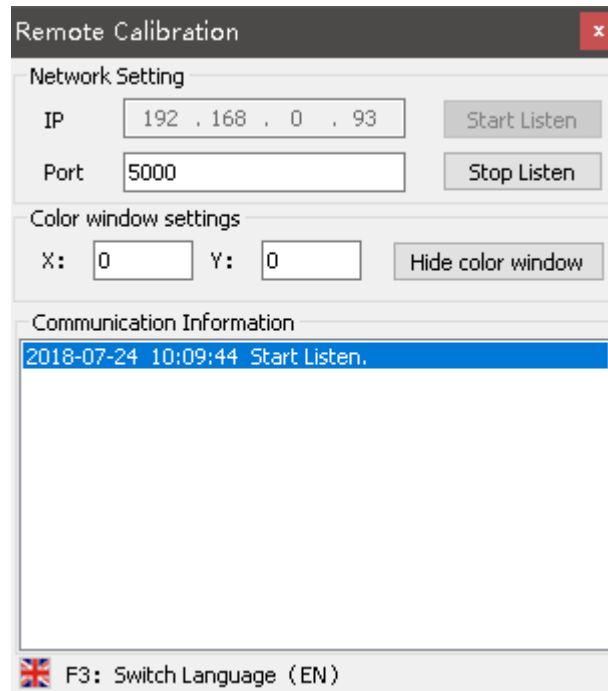


Figure 3.2 Remote Calibration Server

Open the server and click to open Listen, the Information bar showing like above means the successful beginning of listening. Here, the server-side operation ends.

Open up the correction software and find the tool on the menu bar--online control (or use the shortcut key 'Ctrl'+ 'D') to open the online control interface

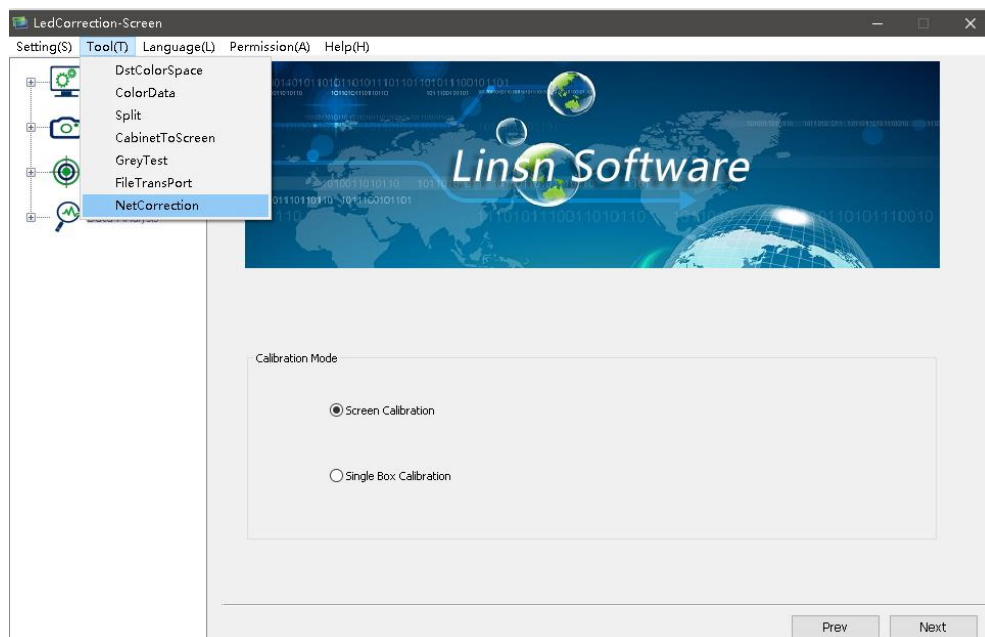


Figure 3.3 Calibration Software

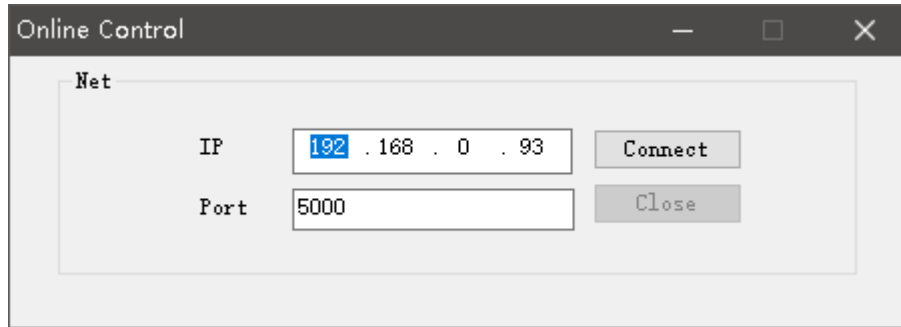


Figure 3.4 Online Control window

After entering the online control interface, input the IP address in the edit box which should be kept same with the **remote correction server consistent** IP address. The port number keeps the same. Then click Connect.

The Server message box showing that Successful connection with the client means ok.

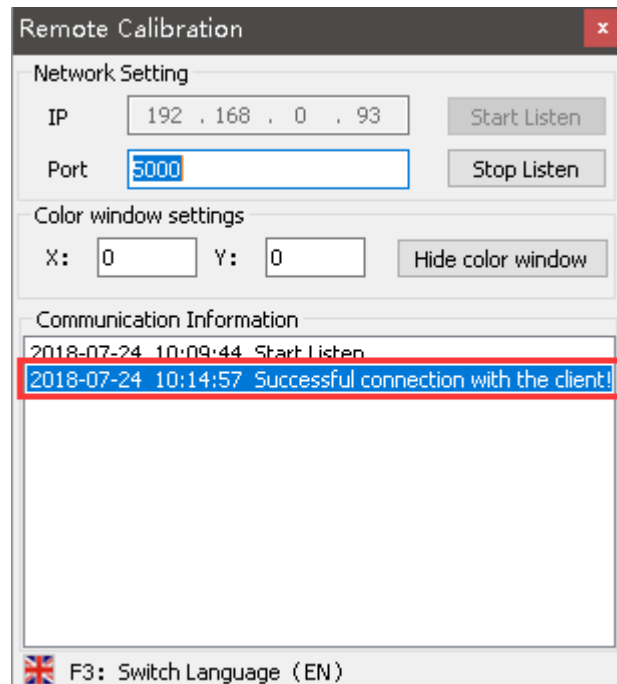


Figure 3.5 Online control Server

After the server and client connection is successful, you can turn off the online control interface directly and start normal correction.

After you use remote correction, you need to upload the data and send the data locally to the server before previewing the effect.

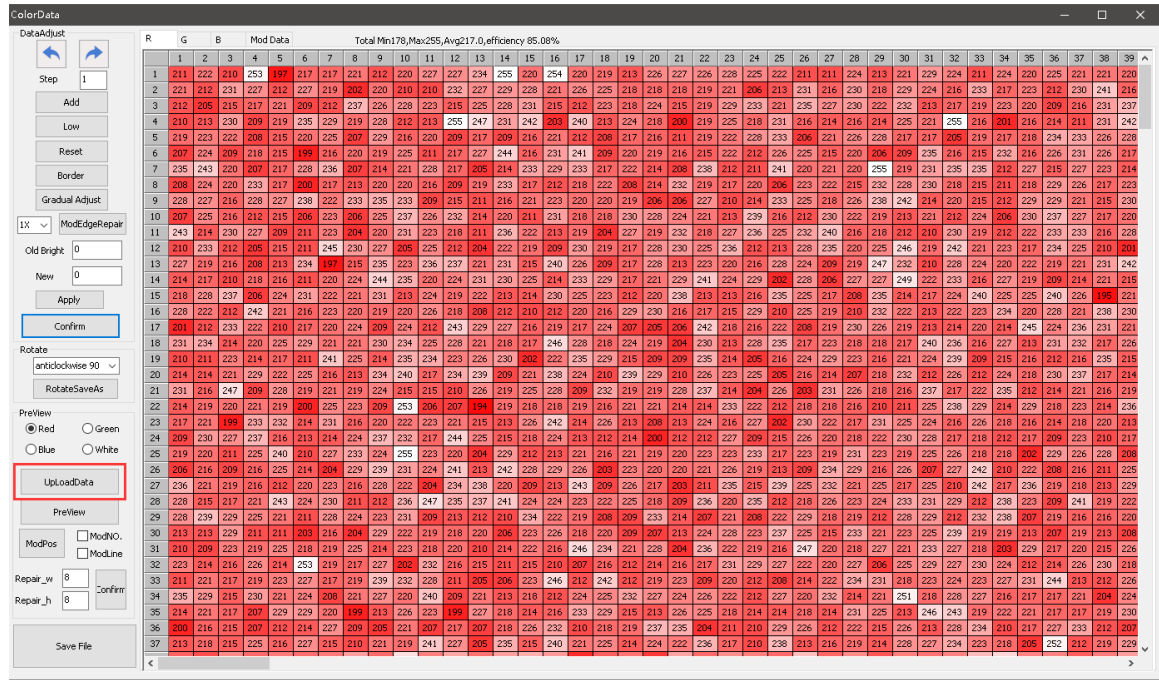


Figure 3.6 data analysis and processing window

4 Description

4.1 Description

According to the test of new software calibration in scene, we made following descriptions:

1. Select Dark Night to make calibration, after the completion of the correction, uniformity brightness means the correction is successful.
2. after the correction, uniformity increases obviously, but the brightness will be reduced.
3. after the correction, looking from the front shows the best display, vision from any other angle is as good as looking from the front.
4. When the outdoor large screen needs correction, camera is far from the LED screen, then you can use the router for remote calibration, which requires both ledcorrection_server software and calibration software, Ledcorrection_server software needs to be installed on the computer that controls the display screen, then connect calibrate software to the camera.
5. Calibration software supports measurement without connecting to serial port, also supports preview correction effect, no need to issue data before seeing the effect of correction.
6. Depending on the situation of the scene, you can choose whether to use regular or partition-point partitions, both support package edge processing, and four package edge can be different. The long width points after the wrapping are not required to be divided with no remainder by the dividing points.
7. The correction process can be flexible to change the partition, such as: only a small piece of the current large partition is not good, you can change the partition, even only for that small piece.
8. Outdoor Large screen correction using long lens, indoor correction using short lens.

4.2 Frequently Asked Questions

Question 1: Failed to connect camera

Answer:

- 1.confirm that the camera is a model supported by the software (the supported camera models are listed in section II of chapter I)
- 2.confirm that the camera is in manual mode (M).
- 3.make sure that the camera is on instead of off.

Question 2: How to adjust the camera while previewing?

Answer:

- 1.The screen has to be kept basically parallel to the white border, the selected area to be basically filled within white squares, not allowed to go beyond the white box.
- 2.Manually focus on each small light of the screen, make sure it's visible and no coincide. Slightly reduced focus, shot in a slightly running position (but the focus error should be kept as less as possible to avoid the negative affect for analysis).

Question 3: Why there are cross grains on the screen after correcting?

Answer:

- 1.shutter too fast, increase the shutter and reduce brightness to maintain brightness.
- 2.refresh rate is too low, increase the refresh rate.

Question 4: Why there are moire phenomenon (water ripple) on the screen after correcting?

Answer:

- 1.Make sure that the image is covered with frame.
- 2.reduce the partition, and increase the focal length.
- 3.a slight reduction in focus, and shooting in a slightly running position (but the focus error should be kept as less as possible to avoid the negative affect for analysis).

Question 5: After correction, why does red have little change except brightness?

Answer:

After experiments and theoretical analysis, the sensitivity of the human eye to changes in different color light is different:

for process color: white (W) > Yellow (Y) > Purple (P) > Cyan (C)

for monochrome: Blue (B) > Green (G) > Red (R)

So it's not that the red is almost unchanged, it's that the human eye is insensitive to red changes, and it's difficult to detect its changes.

Question 6: No obvious effect after correction?

Answer:

Check the photo you've taken, especially for the deformation of light point.

If the light point is distorted, it indicates that the camera is shaking during filming. The camera photographed the wobble, it's common Especially in the case of long distance, long focal length and long exposure time.

Solution: appropriately shorten distance, shorten the focal length, reduce exposure time