



CalCube MiniLED

Ultra-Large Screen Calibration Technology

V2.1

XI'AN NOVASTAR TECHNOLOGY CO., LTD

Quick Start Guide

1 Calibration Preparation

1.1 Introduction

The ultra-large screen calibration technology of NovaStar does not require changing cabinet connections during calibration. No matter how large your LED screen is, 2K, 4K or larger, using this technology can directly calibrate it all at once, with no need to divide the large screen into smaller screens for separate calibration.

This document describes how to calibrate a large screen using CalCube MiniLED and NovaLCT.

1.2 Software Installation

CalCube MiniLED is installed in the same way as an ordinary application. You can install it by following the setup wizard. After installation, a computer restart is required.

Operating environment: Windows 7 (64-bit only), Windows 10 (64-bit only). All operations in this document are performed in Window 10.

Note:

If any security alert from anti-virus software or firewall appears during installation, choose to allow the installation.

1.3 System Architecture

Figure 1-1 System architecture – Using a single serial port

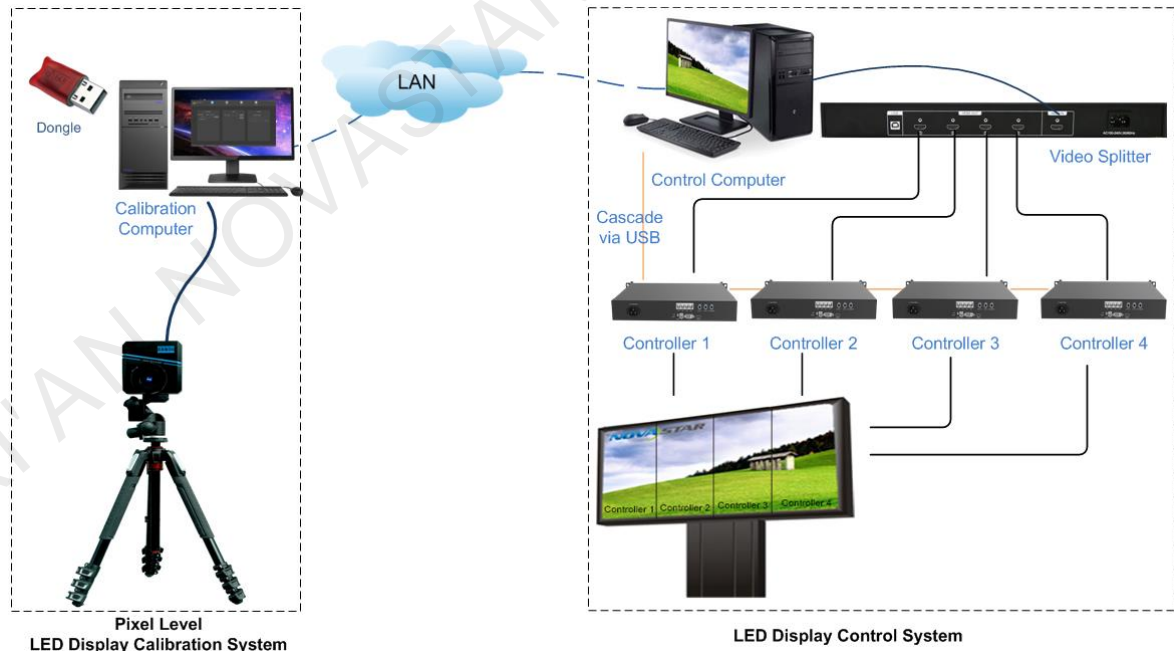


Figure 1-2 System architecture – Using multiple serial ports

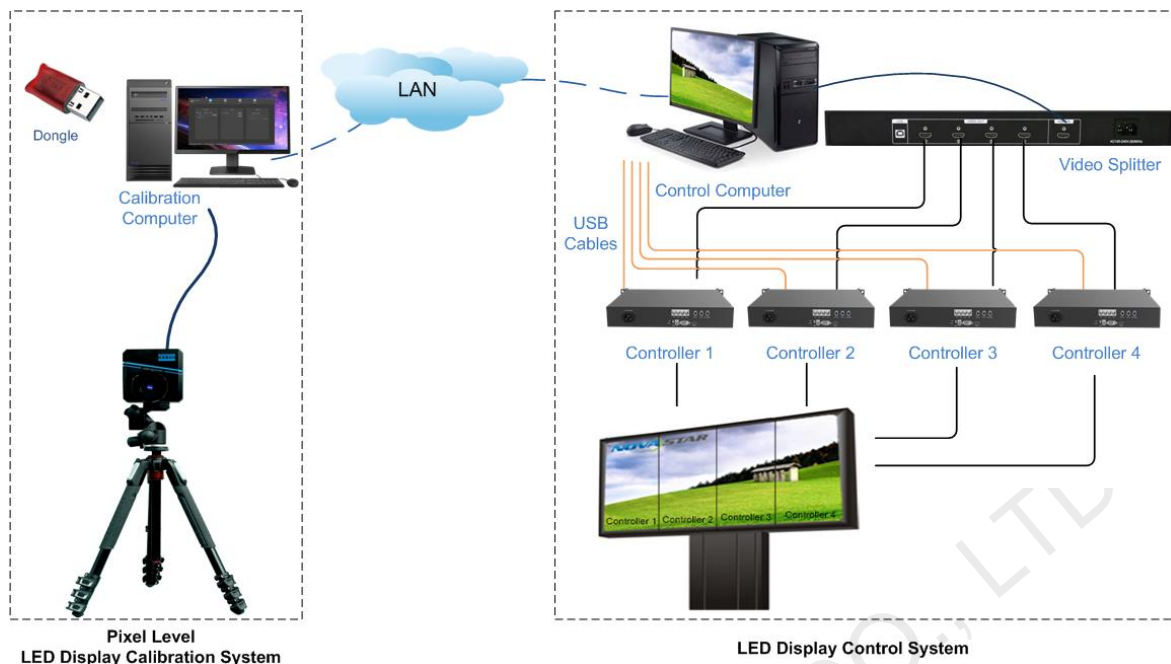


Figure 1-3 System architecture – Connecting video splitters

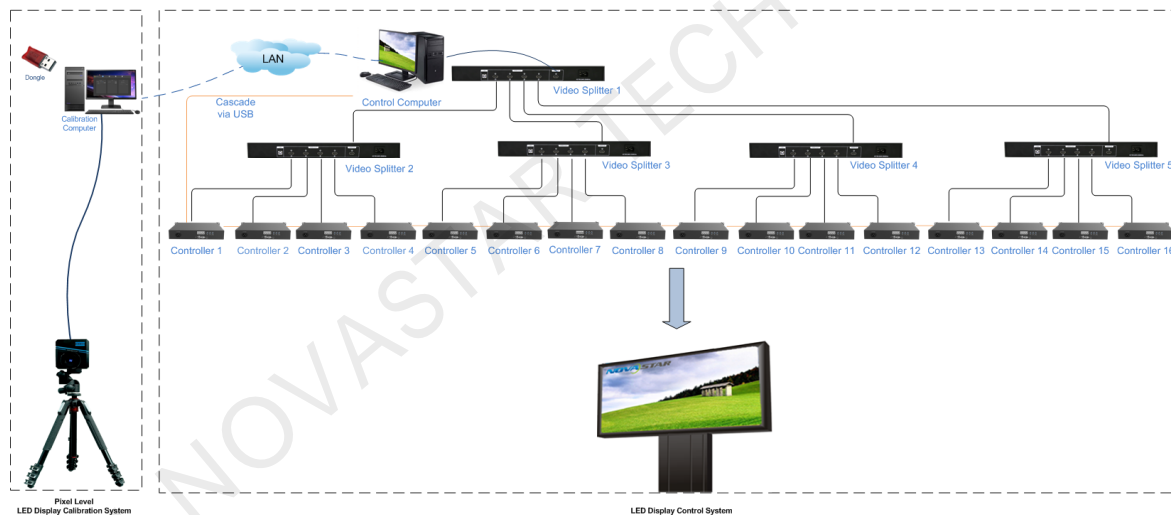
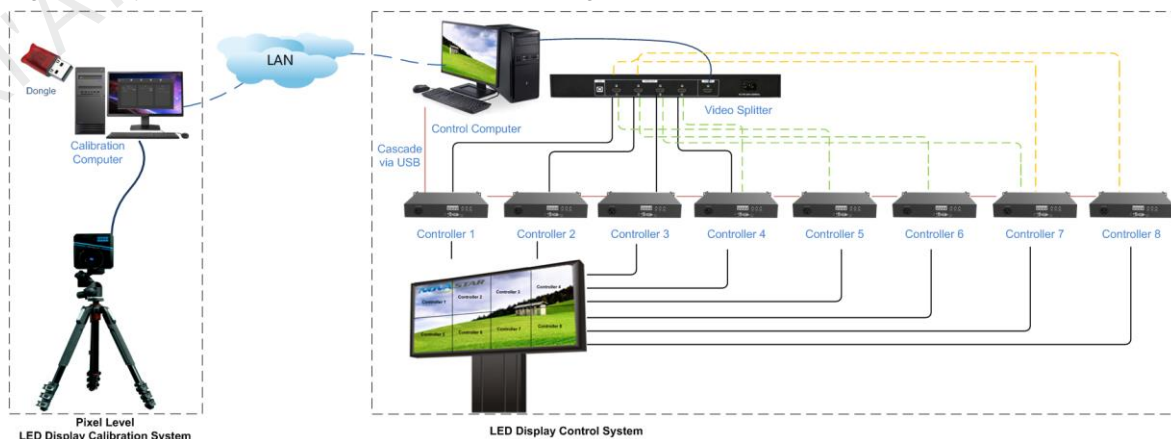


Figure 1-4 System architecture – Video splitters not enough



- The controllers can be connected to the control computer via a single or multiple serial ports, as illustrated in Figure 1-1 and Figure 1-2.

- Generally, the number of video splitter output connectors is the same as the number of controllers. The images of all the video splitter output connectors are the same and they do not have the connection order requirement.
- If there are more than 4 controllers, multiple HDMI 1-4 splitters must be used. Up to 2 tiers of splitters can be used and they can support 16 controllers at most, as shown in [Figure 1-3](#).
- If the HDMI 1-4 splitter does not have enough output connectors, use HDMI cables to connect the splitter to controllers that load the screen partitions that you want to calibrate in each time until the entire screen is calibrated. As shown in [Figure 1-4](#), use HDMI cables to connect the splitter to different controllers in three times, respectively, to let the corresponding loaded screen partitions display the image for calibration in each time. The connections of the three times are illustrated in different colors in the figure.

The calibration computer and control computer can build a local area network (LAN) through the following three methods.

- Connect the two computers with Ethernet cable and set their IP addresses to be on the same network segment. This is suitable for short-distance calibration.
- Connect the two computers to the LAN ports of a router with Ethernet cables. This is suitable for scenarios where it is not convenient to extend the Ethernet cable.
- Connect the two computers to a wireless point-to-point remote communication device. This is suitable for long-distance calibration.

Note:

- When two computers are used, the calibration computer's Ethernet port needs to be connected directly to the C3200 camera. To realize communication between the calibration computer and control computer, connect a HUB (See the following figure) that converts USB to Ethernet port to a USB port of the calibration computer.



- When using the calibration solution of displaying image on screen via hardware, do not use the splitter. Cascade the controllers directly via serial port.
- You are advised to disable firewalls on the two computers to avoid communication failure between them.

1.4 Configuration of Combined Screen

Prerequisites

- The output resolution of the control computer's graphics card must be greater than or equal to the maximum loading capacity of each controller.
- The output resolutions of the video splitter, control computer and controller must be the same.
- The NovaLCT software version must be V5.3.1 or later.

Procedure

- Configure screens

Step 1 Double-click the desktop shortcut of NovaLCT to start the control software.

Step 2 Choose **User > Advanced Synchronous User Login** to enter the login page.

Step 3 Enter the password (default: "admin") and click **Login**.

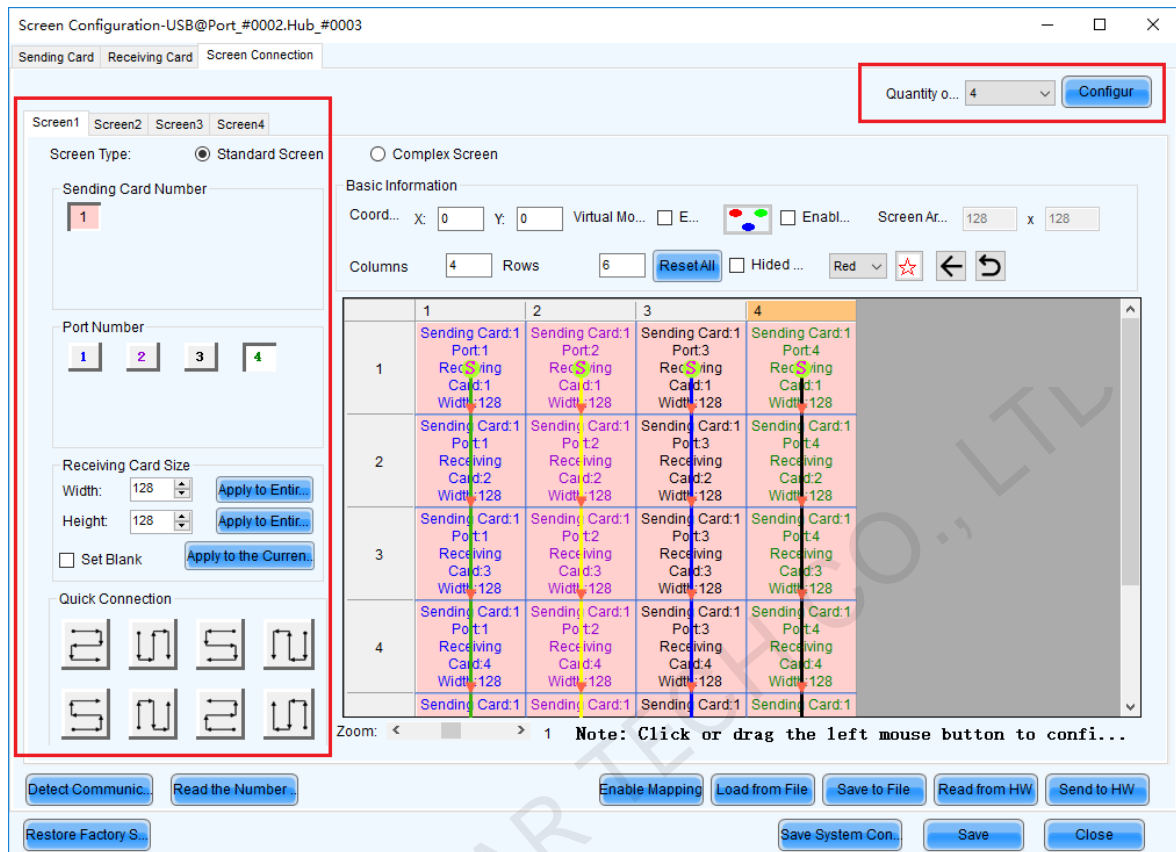
Step 4 Click **Screen Configuration** to enter the screen configuration selection page.

Step 5 Click **Next** to enter the screen configuration page.

Step 6 Click the **Screen Connection** tab to enter the screen connection page.

Step 7 Set the number of screens according to the number of the used sending devices, and click **Configure**, as shown in [Figure 1-5](#).

Figure 1-5 Setting screen quantity



Step 8 Choose **Screen 1** and its corresponding sending card (for example, sending card 1), and then set the size and connection pattern of the cabinets of the screen.

Step 9 In the **Columns** and **Rows** text boxes, enter the numbers of rows and columns of the cabinets loaded by the current sending card.

Step 10 Connect the output ports of the sending card to the cabinets according to the cabinet connection pattern.

Step 11 Configure **Screen 2**, **Screen 3** and **Screen 4** according to [Step 8](#) to [Step 10](#).

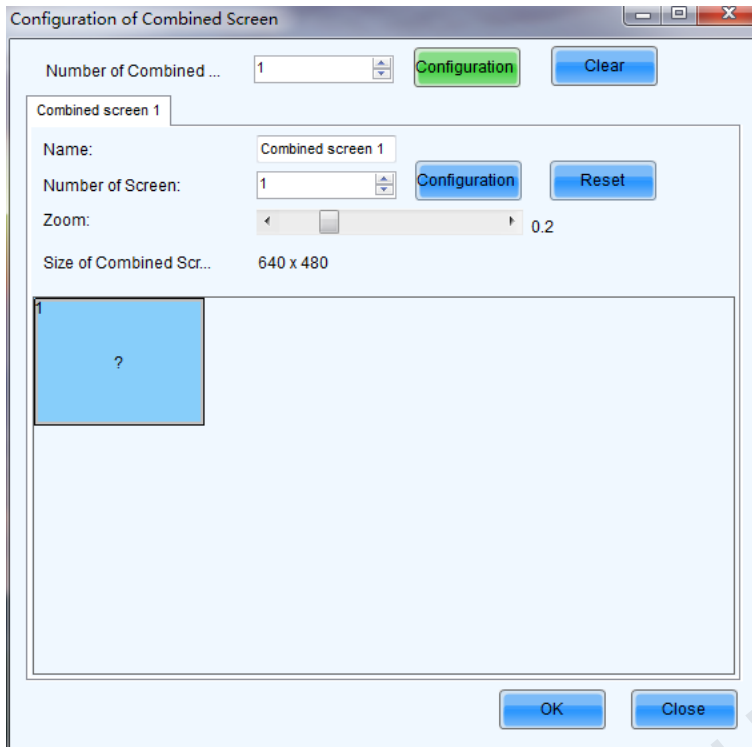
Step 12 After all the screens are configured, click **Send to HW** to send the screen configuration information to receiving cards.

Step 13 Click **Save** to send and save the screen configuration information to receiving cards.

- Configure combined screen

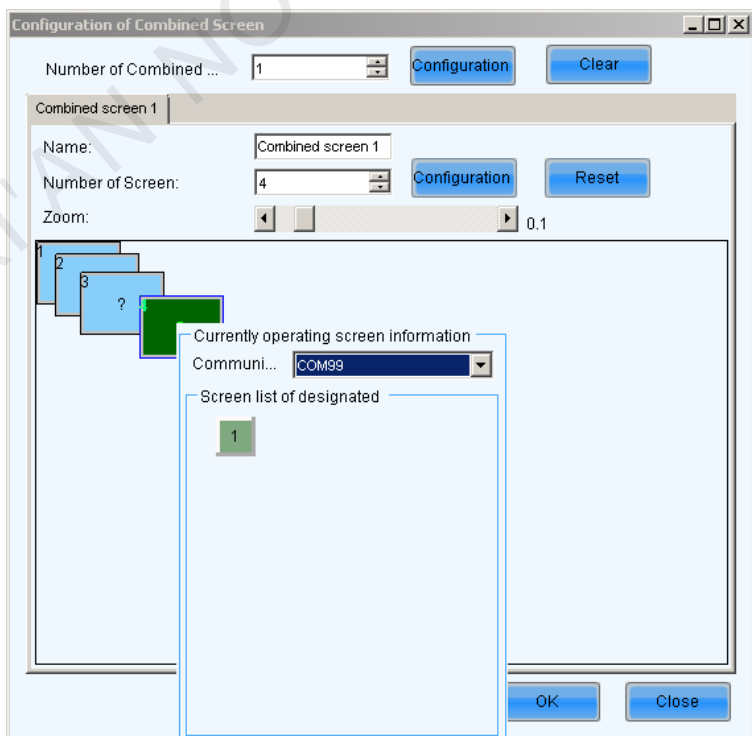
Step 1 In NovaLCT, Choose **Settings > Multiple-screen Management** to enter the **Configuration of Combined Screen** page, as shown in [Figure 1-6](#).

Figure 1-6 Configuration of combined screen



- Step 2 Choose **Number of Combined Screen** and click **Configuration** to set the number of combined screens and configure the screen to be calibrated as a combined screen.
- Step 3 Enter the name of the combined screen in the **Name** text box. You are advised to enter a name that is easy to identify, such as direction.
- Step 4 Set the number of screens of the combined screen in the **Number of Screen** text box.
- Step 5 Click **Configuration**. The blank area below will display the screen currently being configured.
- Step 6 Click the screen configured in [Step 4](#) and select the corresponding screen on the page that appears, as shown in [Figure 1-7](#).

Figure 1-7 Configuration of combined screen

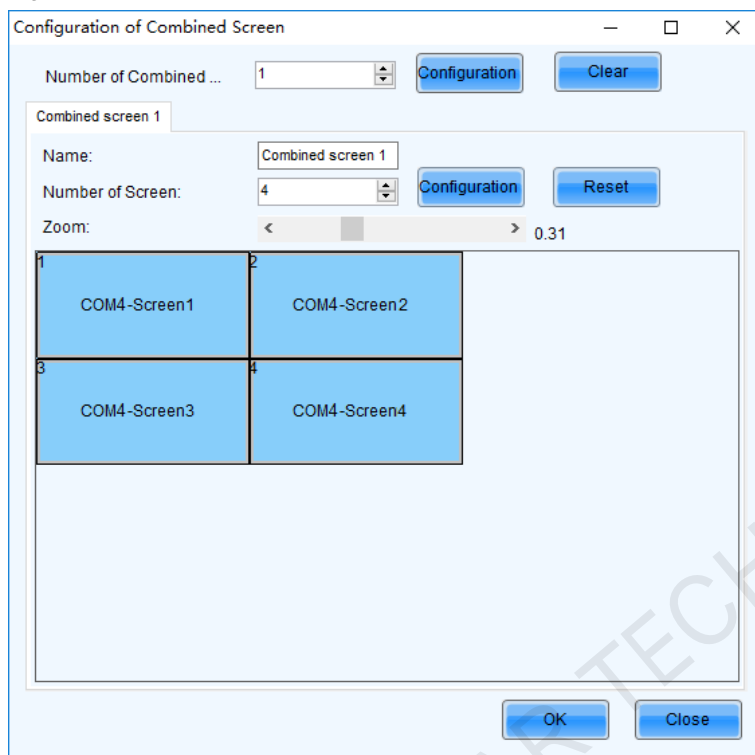


Step 7 Drag the screens with the mouse respectively to combine the screens.

Note:

Make sure that there are no blank or overlapped areas between two screens in the combined screen.

Figure 1-8 Combined screen

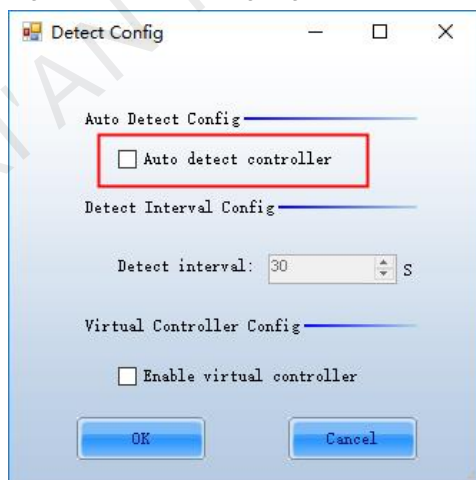


Note:

After the screens are combined, you can drag the slider next to **Zoom** to zoom in the screens to check whether there are seams between the screens. If there are seams, you must change the screen position.

Step 8 Right-click the Mars Server Provider icon  in the status bar and select **Detect Config** to enter its page.

Figure 1-9 Detect Config page



Step 9 Deselect **Auto detect controller**, as shown in the figure above.

1.5 NovaLCT Monitoring

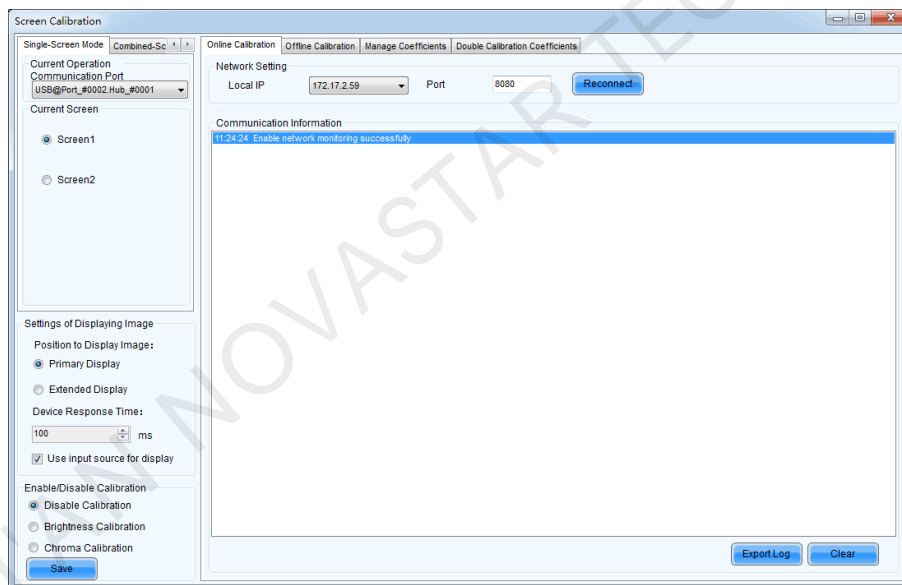
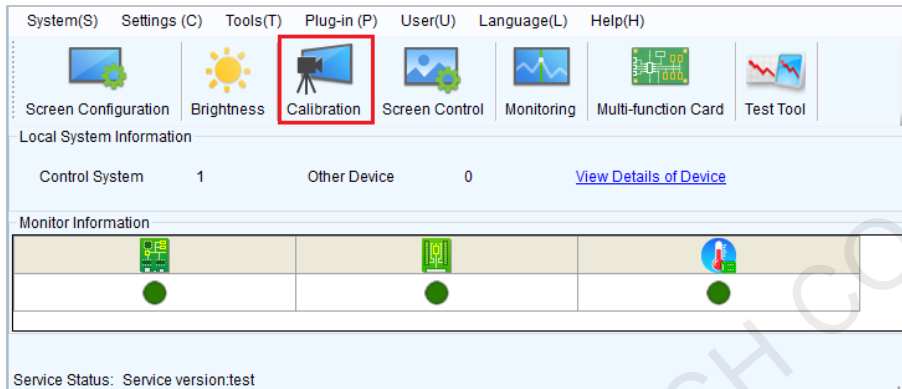
On the homepage of NovaLCT, click the **Calibration** icon to enter the **Screen Calibration** page.

If **Enable network monitoring successfully** is displayed under **Communication Information**, it indicates that the monitoring settings in NovaLCT are done. If the network monitoring failed, change the port No. and click **Reconnect** to try again.

Click the **Combined-Screen Mode** tab to open the combined-screen option. Select the name of the combined screen that you have configured.

In the combined-screen mode, you must select **Use input source for display** under **Settings of Displaying Image** and enter the device response time. Device response time is the interval between displaying the image on screens loaded by different controllers.

Figure 1-10 Monitoring



1.6 Calibration Camera Settings

1.6.1 Calibration Camera Position

Fixed-Focus Lens

When using a fixed-focus lens for calibration, make sure that the LED display image is in the center of the preview area and takes only 4/5 of the preview area.

For example, when calibrating a COB screen with a pixel pitch of P0.9, the best distance for 4K screens is 7 m to 8 m, and the best distance for 2K screens is 3 m to 4 m.

Note:

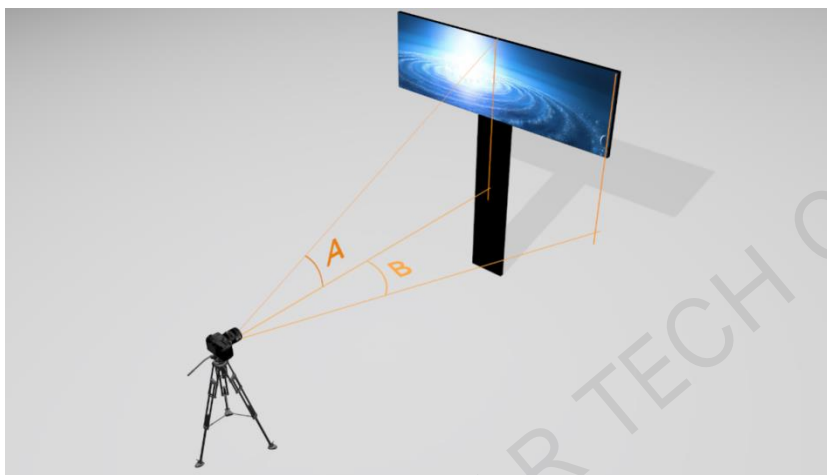
The camera lens needs to be perpendicular to the center of the screen (left and right center + up and down center) to avoid a large angle, otherwise abnormal results such as Moiré are likely to occur.

Zoom Lens

The calibration distance for a zoom lens can be calculated using the angle calculation method.

- Step 1 Face the camera to the LED display and place the camera on the center line between the left and right sides of the display.
- Step 2 Ensure the angle between the perpendicular line from the camera to the LED display and the line from the camera to the 4 edges of the LED display must be less than 30°. As illustrated in [Figure 1-11](#), both angle A and B must be less than 30°.

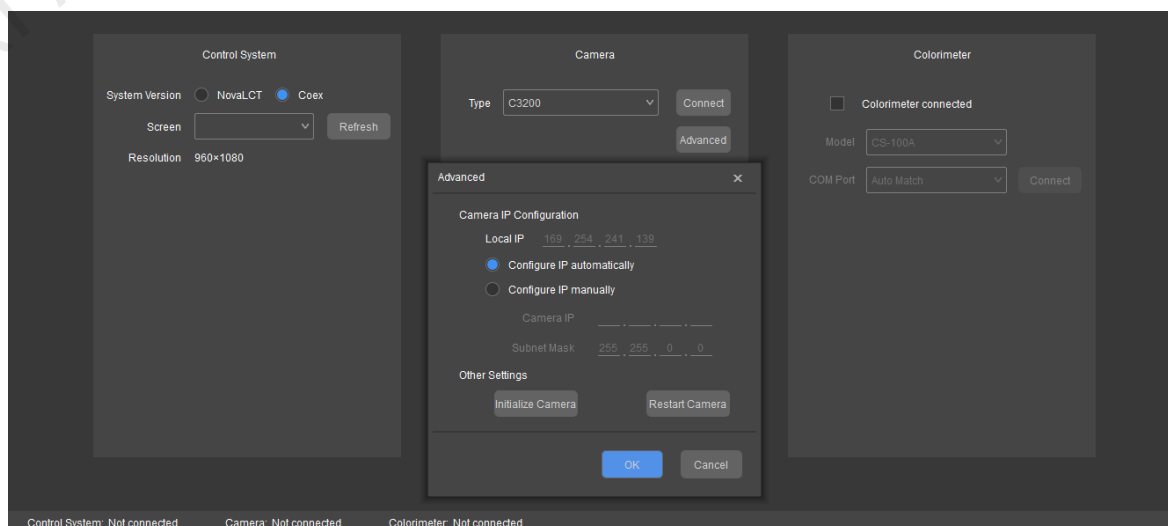
Figure 1-11 Illustration of calibration angle



1.6.2 Camera Settings

C3200 Camera

- Step 1 Connect the C3200 camera to an external power supply.
- Step 2 Connect the camera to the calibration computer with USB cable.
- Step 3 Click **Connect** in the **Camera** area. After successful connection, a prompt saying "Camera connected successfully" is displayed and the model of the connected device is displayed next to **Camera** in the status bar at the bottom.
- Step 4 When you connect the C3200 camera for the first time for calibration, click the **Advanced** button and click **Initialize Camera** to adjust the collection efficiency of the C3200 to the best.



Note:

Because the C3200 camera has a compatibility issue with some computers and causes connection failure, you can reconnect the camera by disabling the network adapter connected to the C3200 and re-enabling it.

C1200 Camera

- Step 1 Connect the C1200 camera to an external power supply.
- Step 2 Connect the camera to the calibration computer with USB cable.
- Step 3 Click **Connect** in the **Camera** area. After successful connection, a prompt saying "Camera connected successfully" is displayed and the model of the connected device is displayed next to **Camera** in the status bar at the bottom.


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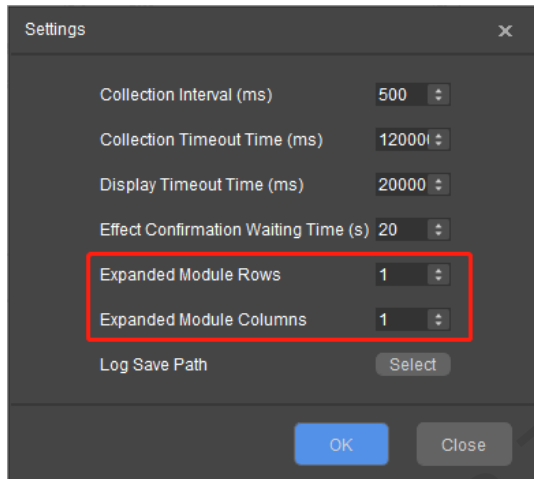
2 Procedure for Calibrating an Ultra-Large Screen

After the combined screen is configured and the camera is positioned properly, you can start calibrating the ultra-large screen. The procedure for calibrating an ultra-large screen is the same as calibrating a common screen. For details, see *CalCube MiniLED Calibration User Manual*.

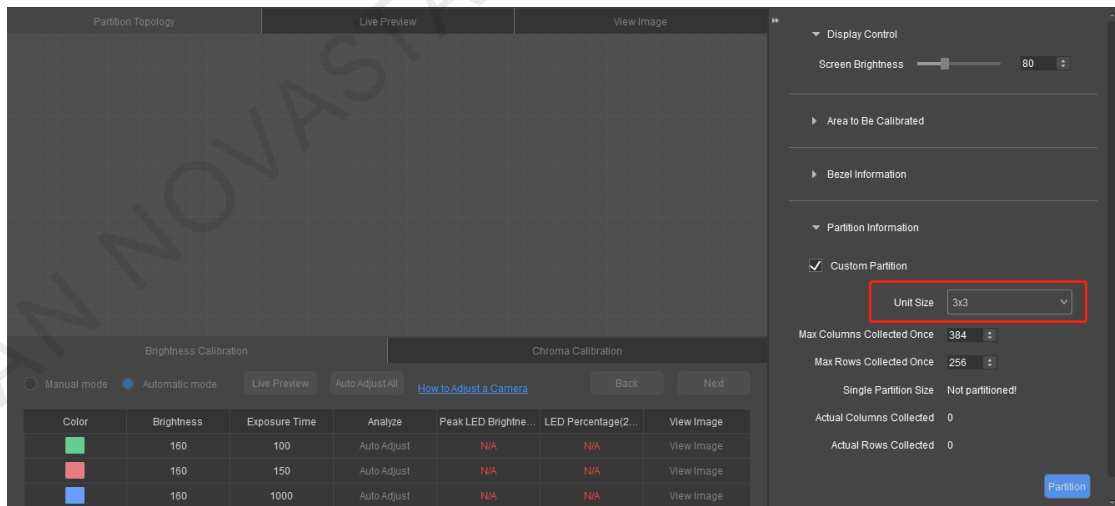
Note:

To calibrate a screen larger than 4K, you are advised to do the following settings based on the general calibration procedure.

- Set **Expanded Module Rows** and **Expanded Module Columns**: On the main user interface click  and select **Settings**. On the **Setting** page, set the two parameters. The default value is 1. You can adjust them appropriately based on the partition size.



- Set **Unit Size** of partition: Before camera parameter analysis, use the **Custom Partition** function to set **Unit Size** to 3x3. Each partition size will be about 2K.



3 Troubleshooting

This chapter introduces some common problems that may occur during ultra-large screen calibration and the corresponding solutions.

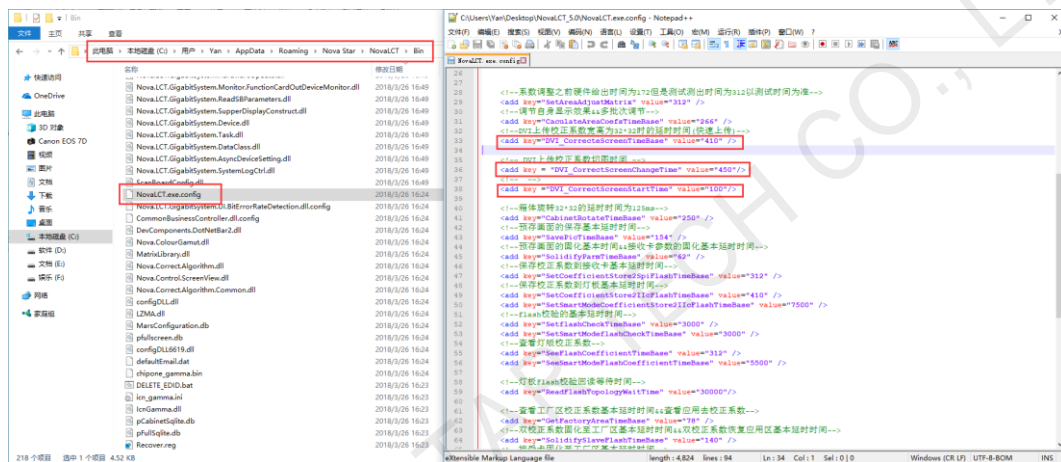
3.1 Screen Blurred and Coefficients not Uploaded After Calibration Procedure Finished

Cause: The delay time of coefficient uploading is too short.

Solution 1: Change the delay time of coefficient uploading in NovaLCT.

Change the delay time (unit: millisecond) in NovaLCT installation directory\Bin\NovaLCT.ext.config file, and then restart the software.

Figure 3-1 Changing the delay time



Explanation of delay time:

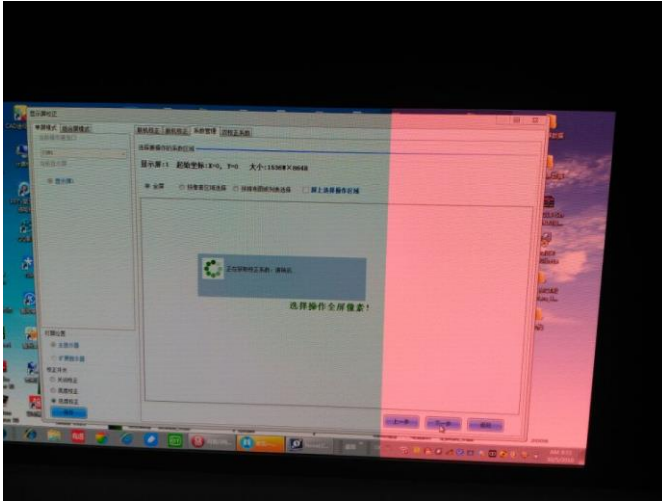
- **DVI_CorrectScreenStartTime:** The waiting time between starting to upload calibration coefficients quickly and starting to display the first image.
- **DVI_CorrectScreenChangeTime:** The waiting time between displaying the image from PC and sending the image to the receiving card to process. This time is to ensure the image can be rendered completely.
- **DVI_CorrectScreenTimeBase:** The waiting time between starting to process the image by the receiving card and displaying the next image. This time is to ensure that the previous image can be processed completely by the receiving card.

Solution 2: After completing the calibration, check the image of LED positioning to ensure it is right. Then, use NovaLCT to upload coefficients.

Figure 3-2 Blurred screen 1



Figure 3-3 Blurred screen 2



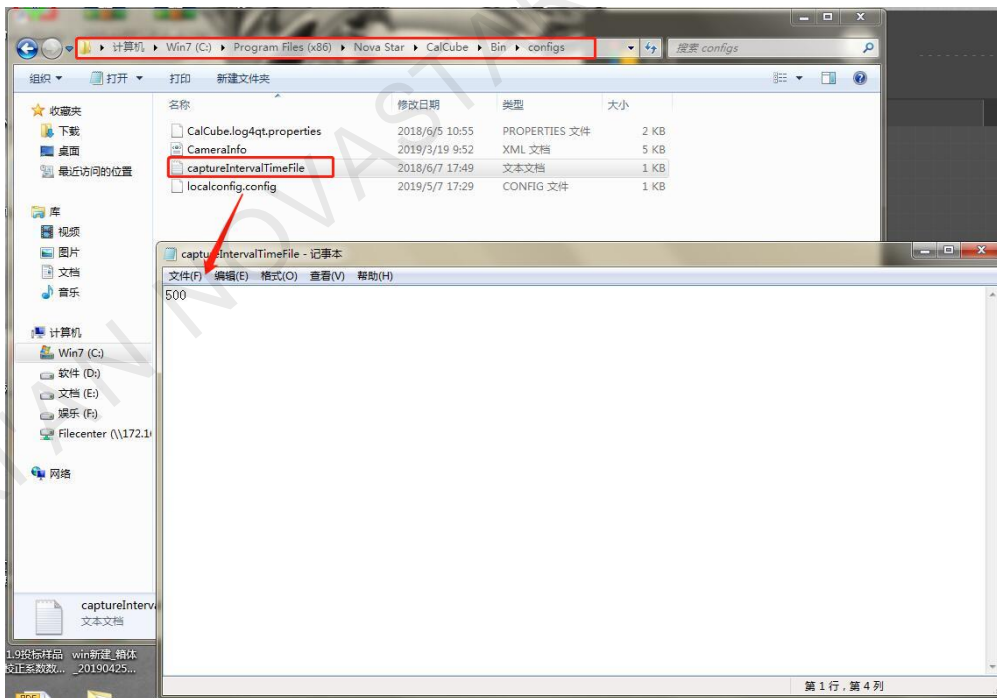
3.2 LED Positioning Wrong or Rows/Columns Lost Due to Displaying Image Asynchronously on Areas Loaded by Different Sending Cards

Cause: There is a delay time when the hardware sends the image to be displayed.

Solution 1: Change the delay time of taking picture by the calibration software.

Go to the calibration software installation directory\Bin\ configs\captureIntervalTimeFile. Right-click the file, click **Open with** and then select **Notepad**. In the opened Notepad file, change the delay time parameter (unit: millisecond). (There is no need to restart the software.)

Figure 3-4 Changing the delay time



Solution 2: Restart the sending card and receiving card.

3.3 Brightness Error Prompt for Image Analysis During Calibration and Camera Reconnection Needed

Solution 1: Close the prompt window and restart the calibration procedure. The calibration software will decrease the speed of image analysis in order to lower the memory usage.

Solution 2: Follow the prompts to reconnect the camera and try again.

3.4 LED Percentage too High or Low While Peak LED Brightness Is Normal

Cause: The new camera parameter analysis algorithm in this software has constrains on the unreasonable LED percentage in order to ensure the final calibration effect. Please follow the prompt information to adjust the LED percentage and try again.

Solution 1: If you cannot adjust the LED percentage to be normal following the prompt, try to adjust the exposure time manually in the software and then analyze camera parameters again.

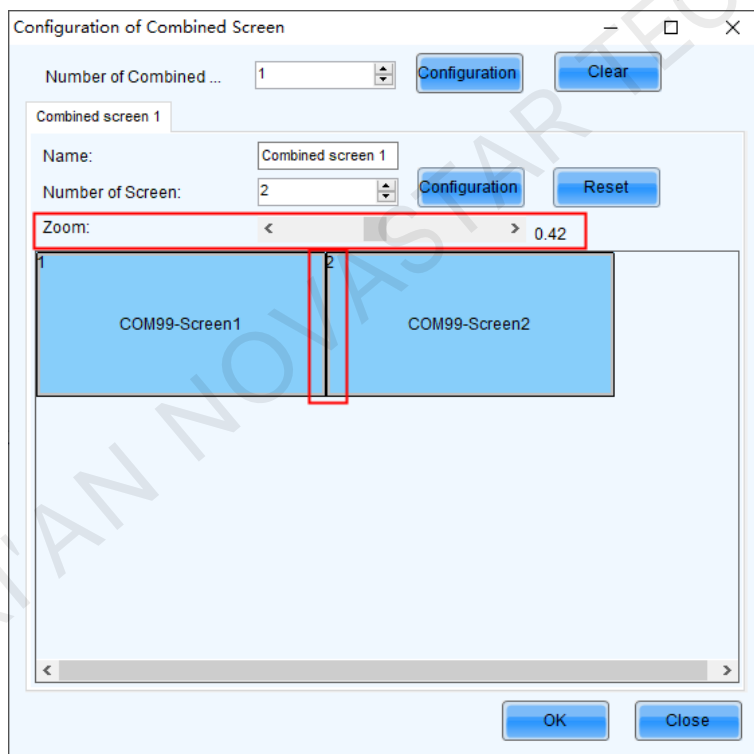
Solution 2: If you cannot adjust the LED percentage to be normal following solution 1, try to adjust the camera aperture at the same time and then analyze camera parameters again.

For this problem, if you have any comments or better suggestions, please contact the calibration R&D team.

3.5 Image in Unit Size Mode Displayed Incorrectly on Screen

Cause: In the combined screen configured in NovaLCT, there are overlapped areas or gaps between screens.

Solution: When configuring the combined screen, ensure that there are no overlapped areas or gaps between screens. You can zoom in the screens to check and ensure they are spliced seamlessly.



3.6 Coefficient Uploading Failed or Displaying Image on Partition Having Problems

Cause: During coefficient uploading, communication between NovaLCT and calibration software timed out.

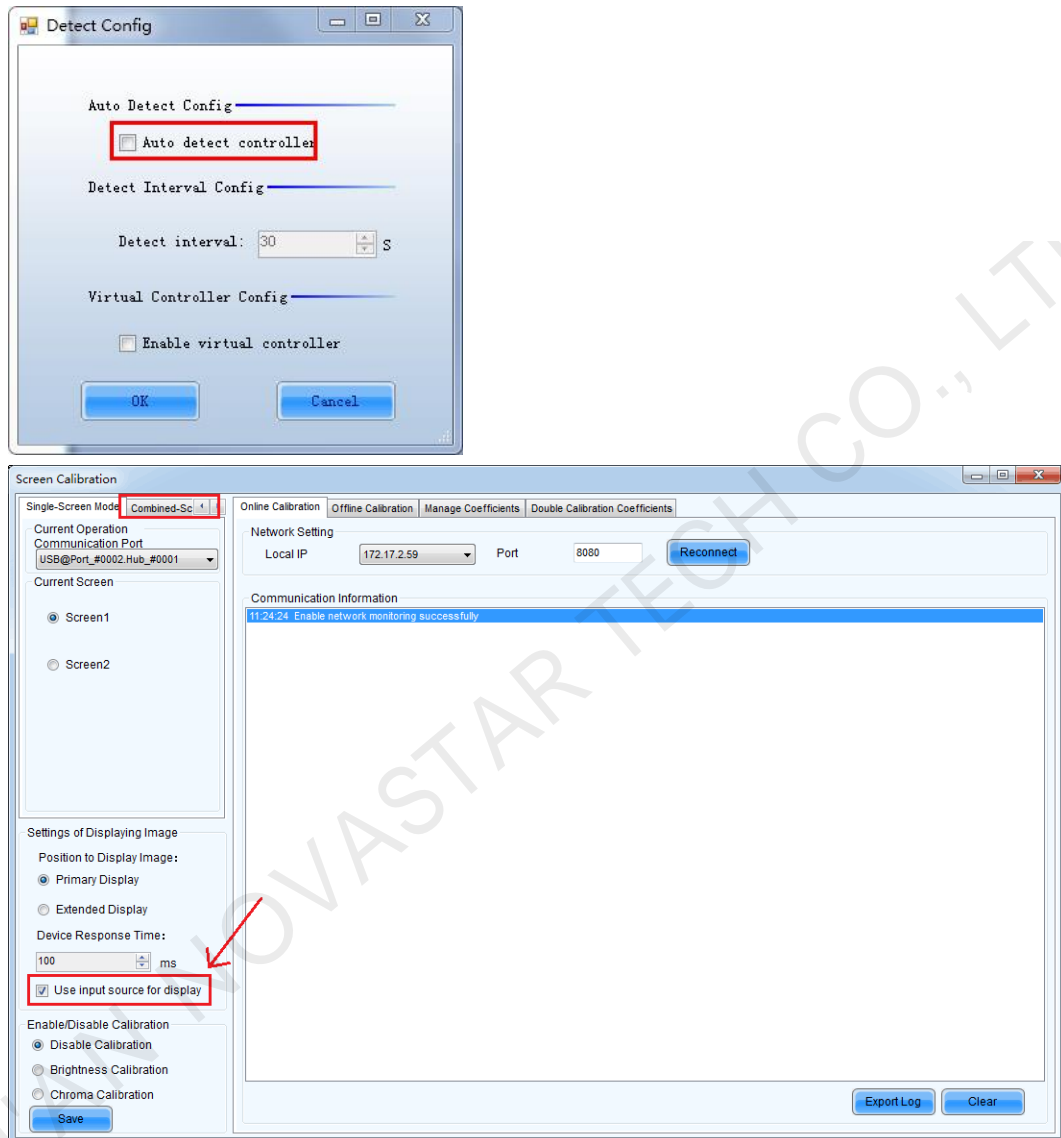
Solution 1: Close the NovaLCT monitoring, as shown in [Figure 3-5](#). Disable the NovaLCT server, as shown in [Figure 3-6](#).

Solution 2: In NovaLCT, select **Use input source for display** on the **Screen Calibration** page.

Figure 3-5 NovaLCT monitoring



Figure 3-6 Disabling NovaLCT server



3.7 CalCube MiniLED Gets Stuck or NovaLCT Failed to Send Commands When Using CalCube MiniLED or NovaLCT Again After Calibration Procedure Stops for a While

Cause: Since the NovaLCT server is disabled after NovaLCT is started, as described in section 3.6, the automatic reconnection service of NovaLCT is also disabled. The connection between NovaLCT and CalCube MiniLED is actually invalid.

Solution: Right-click the server icon in the status bar and select **Restart** to restart the NovaLCT server and establish the connection again.



3.8 LED Display Frozen After Disconnecting and Reconnecting Ethernet Cable of the Sending Card or Serial Cable

Cause: When the CalCube MiniLED and NovaLCT are connected and you select a partition, the LED display is already frozen. After you disconnect and then reconnect the Ethernet cable or serial cable, the LED display is still frozen.

Solution: Before disconnecting and reconnecting the Ethernet cable or serial cable, ensure that the LED display is not frozen. To unfreeze the LED display, use one of the following methods.

1. In CalCube MiniLED, click **Display Control** and select **Full-Screen Display**.
2. In NovaLCT, choose **Tools > Screen Control** and click **Normal** under **Display Control**.

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