Cabinet Tool

User Manual

Contents

1 Software Introduction

The Cabinet Tool is a configuration tool for the new-generation control system of Xi'an NovaStar. Tech Co., Ltd. It is mainly used for lighting up modules, configuring cabinets, burning programs, and managing calibration coefficients. Users can import the cabinet library file (.ncp) generated by this tool into VMP to quickly apply the configurations to the control system.

Note

The Cabinet Tool currently allows you to enable or disable calibration for managing calibration coefficients. The functionality for uploading, saving, reading back, and erasing calibration coefficients is still being debugged and refined.

2 Environment Setup

2.1 Software Installation

Prerequisites

- Obtain the installation package of Cabinet Tool.
- A computer running Windows 10 or a later system.

Installing Software

Double-click the installation file and follow the setup wizard. If a firewall prompt appears, choose allow to continue the installation.

Installation Result

If the installation is successful, the Cabinet Tool shortcut  appears on the desktop.

2.2 Software Authorization

The unauthorized version of Cabinet Tool only allows users to send NCP files, whereas the authorized version enables them to both send and save NCP files on the hardware.

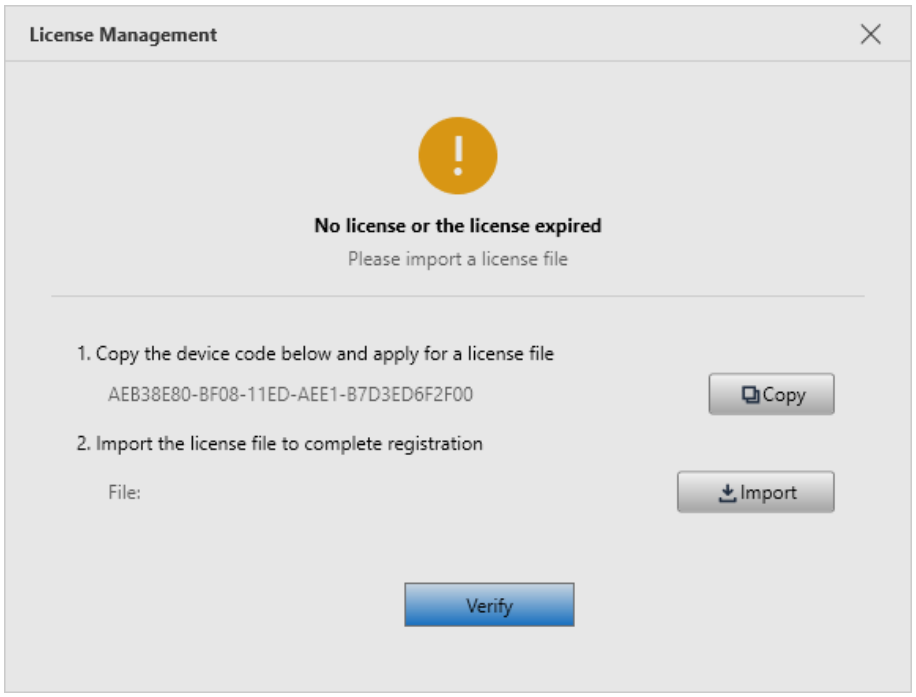
Prerequisites

None

Procedure

Step 1 From the menu bar, select **Authorize** > **License Management**.

Figure 2-1 License management



Step 2 Click **Copy** and send the device code to NovaStar and apply for a license file.

Step 3 Click **Import**, and then select the license file and click **Open**.

Step 4 Click **Verify**

A prompt will be displayed after the authorization is successful.

2.3 Connect Devices

There are two ways to establish a connection between the Cabinet Tool on the control computer and the cabinets:

- Direct connection: Connect the control computer to the cabinets directly using an Ethernet cable.

  Supported receiving cards: CA50E, CA50C, XA50.

- Connect to cabinets through a LED display controller: Connect the control computer to a controller using an Ethernet cable.

  Supported controllers:

  - COEX 5G devices: CX80 Pro, CX40 Pro, CY60.
  - COEX 1G devices: MX6000 Pro, MX2000 Pro, MX40 Pro, MX30, MX20, KU20, KT60 Pro, SP60 Pro.
  - M3 devices: MCTRL series, MSD300

  There is no requirement for the receiving card model in this connection setup, as long as the controller supports the receiving card.

3 Main Functions

3.1 Device Management

Step 1 On the homepage, click 

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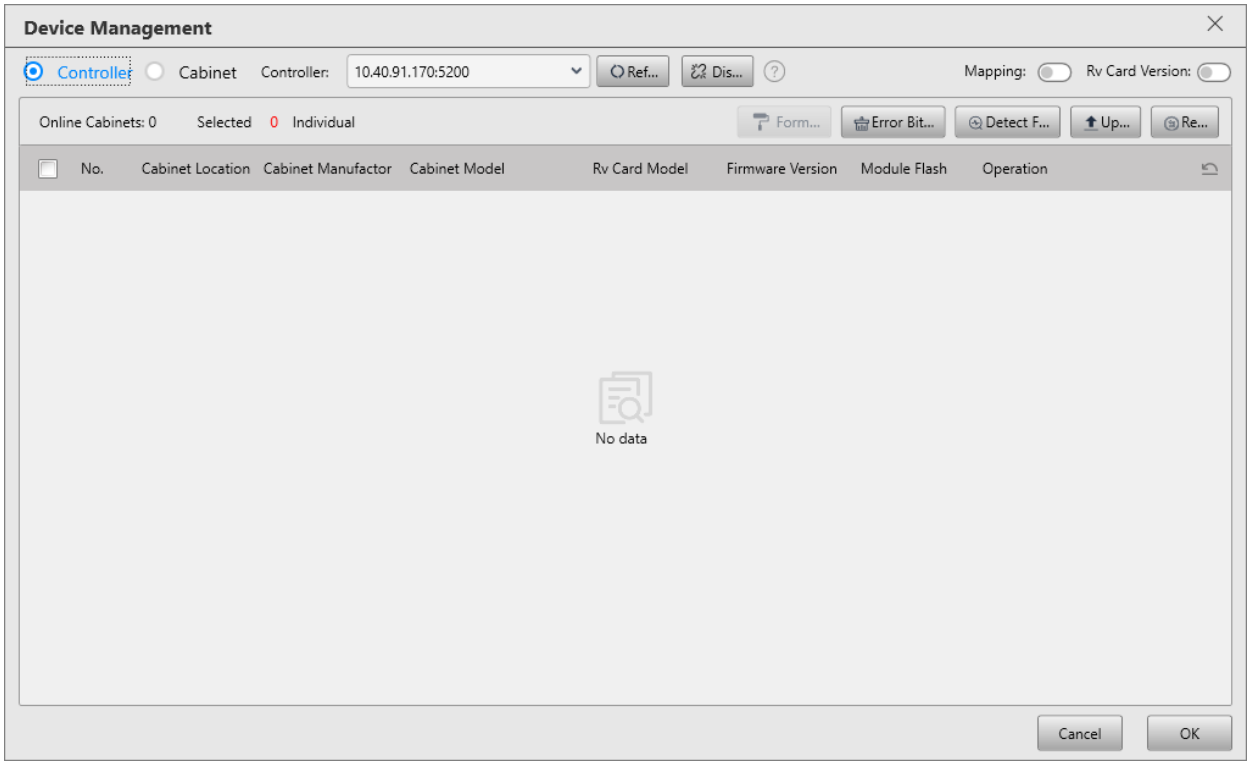
Step 2 On the displayed **Device Management** screen, choose **Controller** or **Cabinet** based on the device connection.

Figure 3-1 Device Management

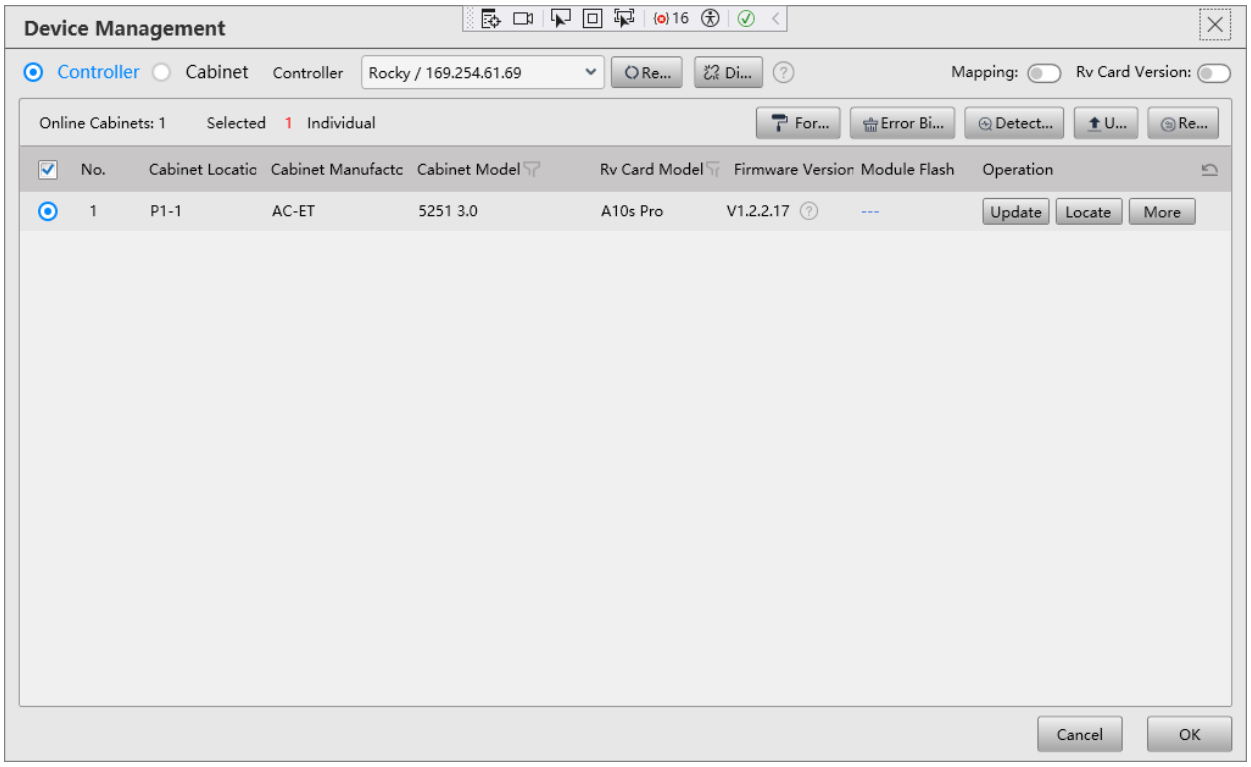


Step 3 Click **Refresh**.

Step 4 Select a controller or network card from the drop-down list.

After successfully connecting to the device, an icon ( ) will appear next to the device name to indicate that it is connected. To end the connection, simply click **Disconnect**.

Figure 3-2 Connect to devices



Step 5 Select one or all of the cabinets from the cabinet list and do the following as required:

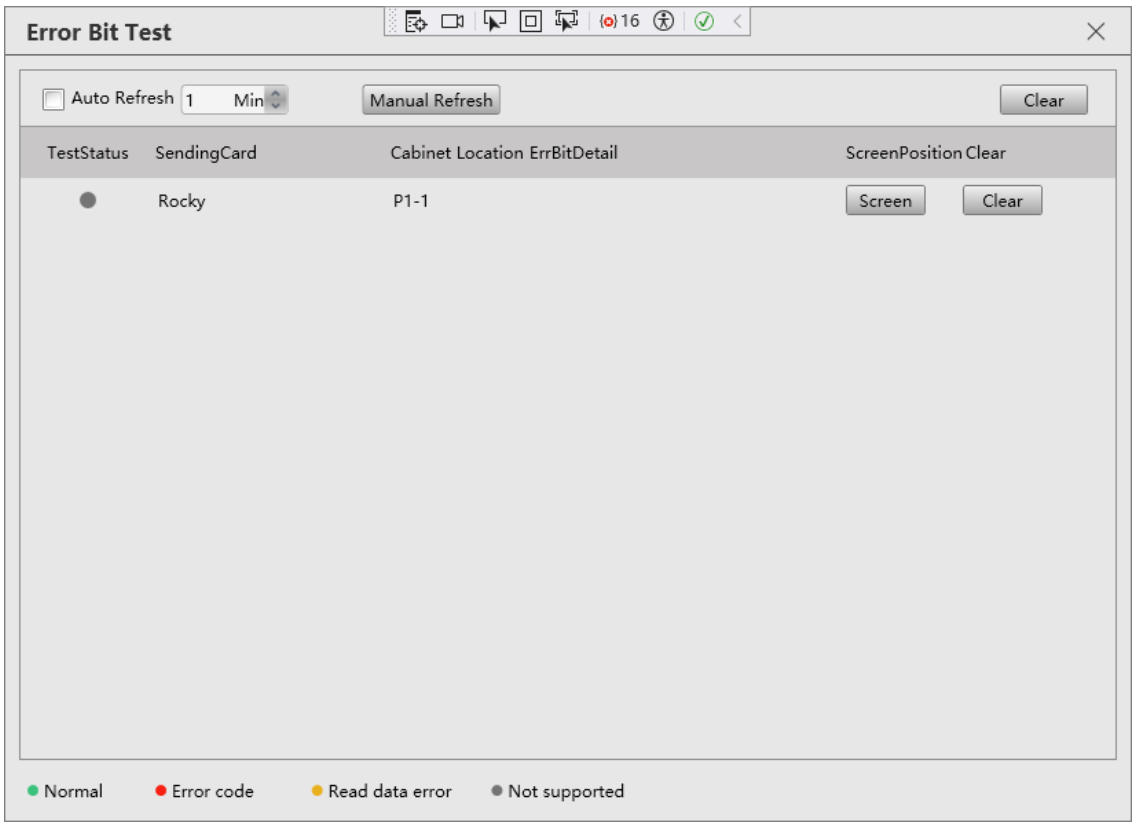
- Copy the firmware program and configuration file

  Click **Format Painter** and wait for the readback is complete. Then, select other cabinets and click **Start** to let other cabinets share the same firmware and configuration file as the current cabinet.

- Error bit test

  Click **Error Bit Test**, and then perform manual error bit test, set up auto error test, and clear errors on the displayed window.

  For cabinets with errors, you can view the error details and click **Screen Display** to pinpoint the error.



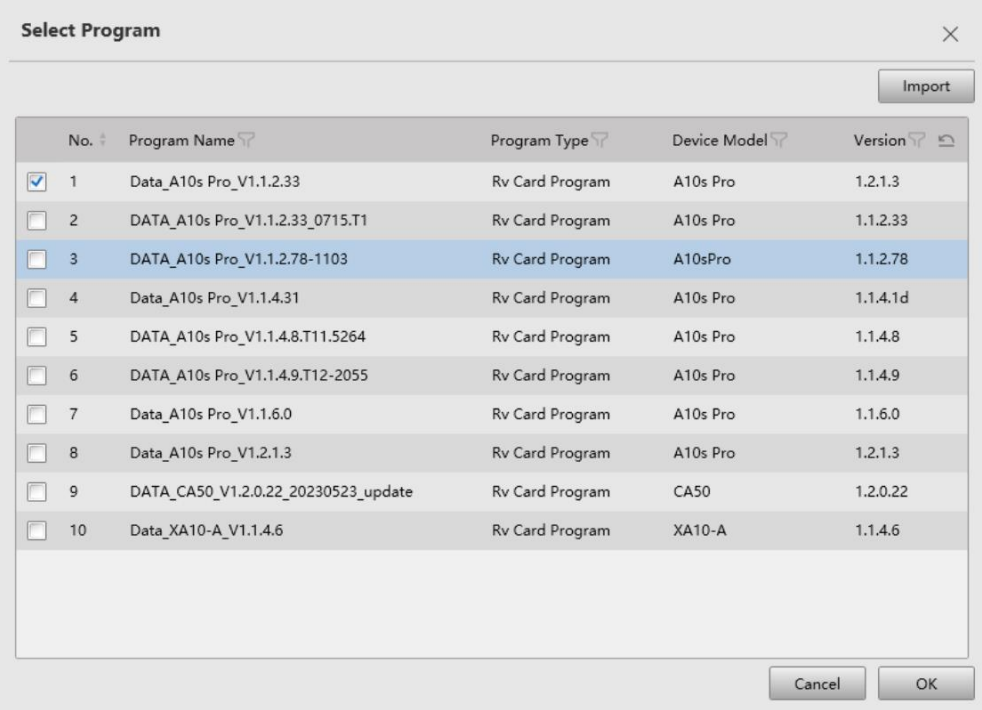
- Detect flash

  Click **Detect Flash.** If the module has flash memory, you can click the test result and view the details on the pop-up window.

- Update firmware

  Click **Update** and then select a receiving card program file on the pop-up window and click **OK**.

  If the program file you need is not listed, you can click **Import** to import the program file (.image) into the Cabinet Tool.



- Restart cabinet

  Click **Restart** or click **More** and then click **Restart** on the pop-up menu.

- Locate cabinet

  Click **Locate** to see the cabinet's position on the screen.

- Upload configuration file

  Click **More** and then choose **Upload Configuration File** on the pop-up menu. Select a cabinet configuration file (.rcfgx) on the pop-up window and click **Open**.

- Upload image quality file

  Click **More** and then choose **Upload Image Quality File** on the pop-up menu. Select an image quality file (.vglcx) on the pop-up window and click **Open**.

- Enabling Mapping

  Enable the **Mapping** function by toggling on this switch to .

- View MCU and FPGA version

  Hover the mouse over the next to the **Firmware Version** column, or set the **Receiving Card Version** to .

3.2 Module Design

3.2.1 Add Module

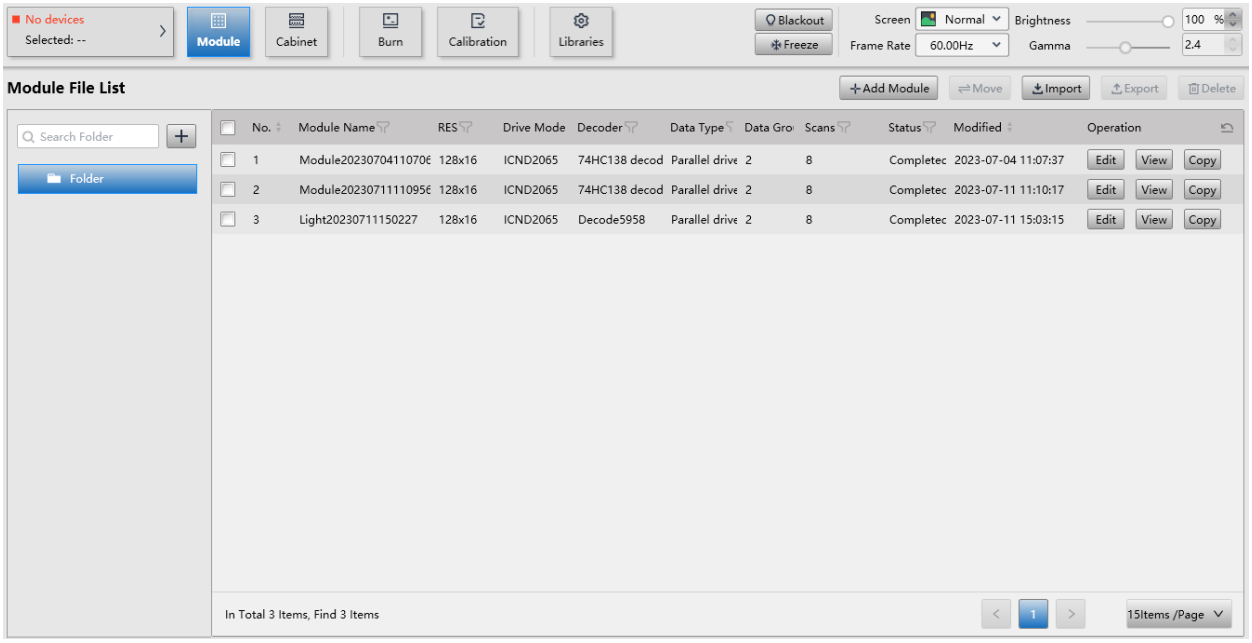
Prerequisites

Obtain the specifications of the modules.

Procedure

Step 1 On the homepage, click **Module**.

Figure 3-3 Module



Step 2 On the left side of the screen, select a folder to store the new modules.

The folder is used for organizing and managing modules. You can search folders by name (case sensitive) or click  to add new folders.

The right-click menu operations are as follows:

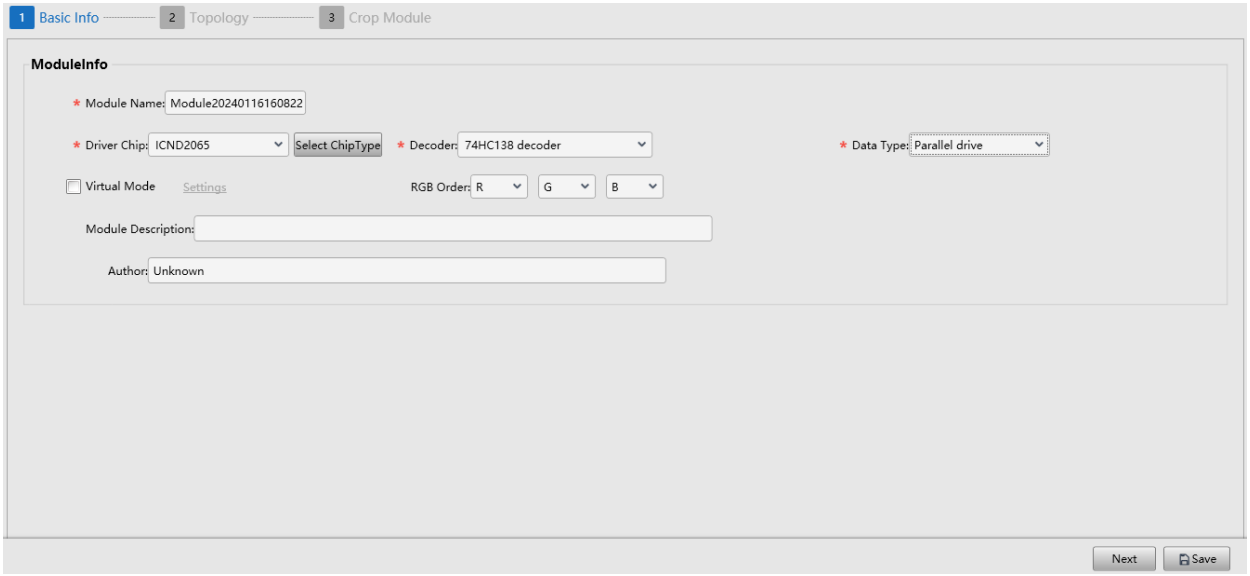
- Add: Add a sub-folder or a new folder either above or below the selected folder.
- Move: Move up or down the selected folder.
- Level: Level up or down the selected folder.
- Rename: Rename the selected folder.
- Delete: Delete the selected folder.

You can also drag to adjust the position and level of a folder.

Step 3 Click **Add Module**.

Step 4 Enter a module name on the **Basic Info** screen.

Figure 3-4 Basic information



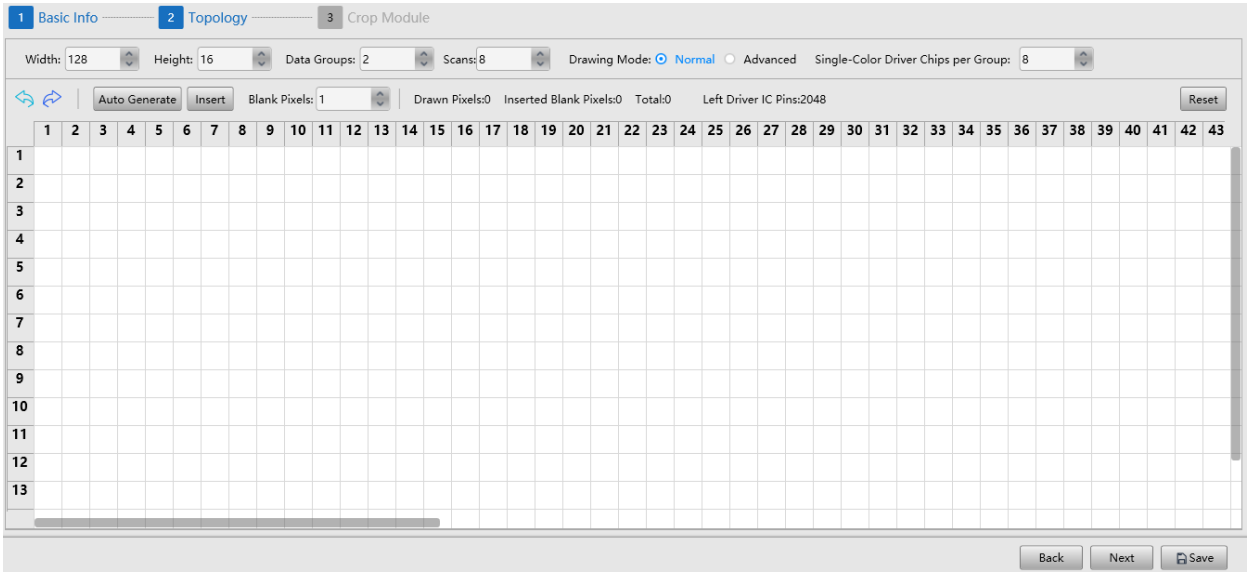
Step 5 Set relevant parameters based on the module specifications.

- Driver Chip: Select the type of driver chip. You can enter a chip type directly or select from the drop-down list. You can also click **Select Chip Type** and then select from the pop-up window.
- Decoder: the decoder chip type.
- Data Type: the output format of RGB data.
- Virtual Mode: For modules with shared pixels (sub-pixels), complete the settings including RGB layout, color and range based on the pixel design.
- RGB Order: the RGB order of the pixels.

Step 6 Once the basic information of the module is all filled out, click **Next**.

Step 7 On the **Topology** screen, set the relevant parameters including **Width**, **Height**, **Data Groups**, **Scans**, **Drawing Mode**, and **Single-Color Driver Chips per Group** based on the module specifications.

Figure 3-5 Topology



About **Drawing Mode**:

- Normal: Same pixel topology for different scans.
- Advanced: Any pixel position drawing.

The formula for calculating **Single-Color Driver Chips per Group** is as below. When it cannot be divided exactly, any unused channels can be inserted with blank pixels.

Single-Color Driver Chips per Group = Pixels per scan / Chip channels

Step 8 Click on the grids in the topology one by one to draw the pixels. When drawing adjacent pixels, you can use the arrow keys on the keyboard.

- : Undo.
- : Redo.
- **Auto Generate**: Complete pixel position drawing for the first row of pixels quickly.
- **Insert**: Insert blank Pixels.

  Input a value for **Blank Pixels** and each time you click **Insert**, blank pixels equal to the value will be inserted at the current position. For example, if you set the **Blank Pixels** to 2, clicking **Insert** 3 times will insert a total of 6 blank pixels at the current position.
- **Reset**: Reset the module topology.

Step 9 Once the pixel drawing is complete, do the following as required.

- Save Module: Click **Save**.
- Crop Module: Click **Next** to continue to Step 10

Step 10 Select **Extract Row** and click on the rows that need to be cropped, or select **Extract Column** and click on the columns that need to be cropped, or select **Crop** and click on the pixels that need to be cropped. Finally, click **Crop**.

Related Operations:

- Restore Pixels: Select the cropped pixels and click **Restore**.
- Reset Row, Column, or Pixel: Select **Extract row**, **Extract column** or **Crop**, and then click **Reset**.

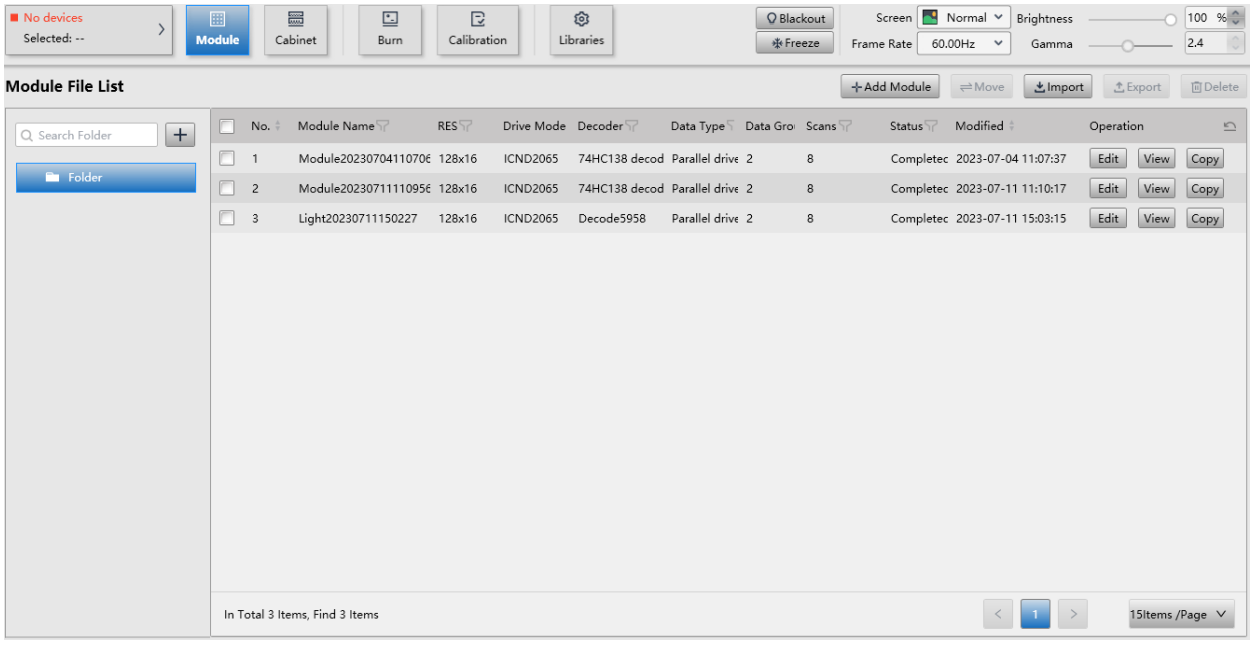
Step 11 Once the cropping is complete, click **Save**.

The file will be displayed in the **Module File List** after clicking **Save**.

3.2.2 Manage Module

On the homepage, click **Module** to display the **Module File List** screen.

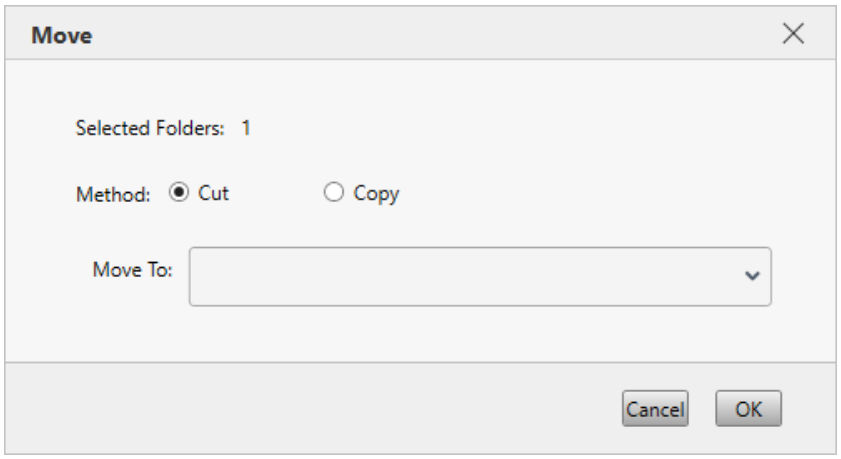
Figure 3-6 Module File List



Do the following as required:

- Move Module

Select one or more modules and click **Move**. On the pop-up window, select how to move the module, and then click **OK**.



- Import module

  Click **Import**, select a module file, and then click **Open**.

- Export module

  Select one or more modules and click **Export**. Then, select a file path and click **Save**.

- Delete Module

  Select one or more modules and click **Delete**. On the prompt window, click **OK**.

- Edit module

  Click **Edit** or double-click to change the module setup. Once complete, click **Save**.

- View module

  Click **View** to see the module details on the pop-up window.

- Copy module

  Click **Copy** and enter a new module name, and then click **OK**.

3.3 Cabinet Design

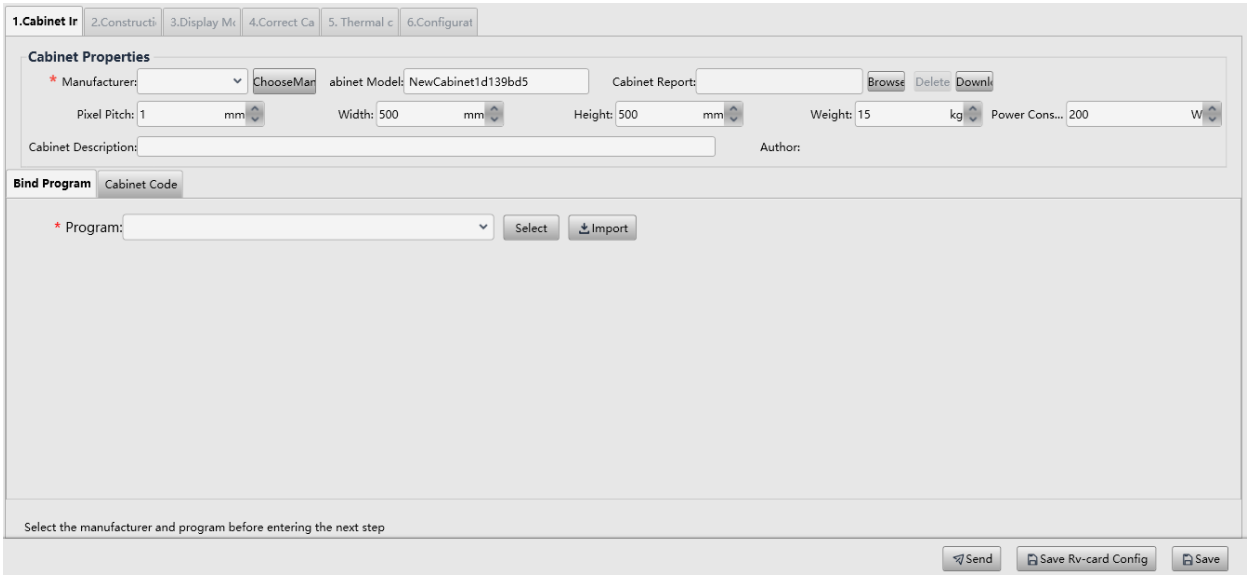
3.3.1 Add Cabinet

On the homepage, click **Cabinet**. Then, select a folder for storing new cabinets and click **Add Cabinet** and set relevant parameters on the following tabs: 1. Cabinet Info; 2. Construction; 3. Display Mode; 4. Correct Cabinets; 5.Thermal Compensation; 6. Configuration.

Once the cabinet is configured, click the button at the bottom-right corner to save and send the configuration to the receiving card.

The file will be displayed in the Cabinet Files after clicking save.

Figure 3-7 Add cabinet



3.3.1.1 Cabinet Info

Prerequisites

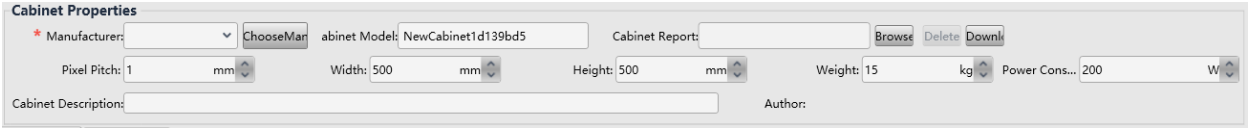
Obtain the specifications of the cabinet before continuing with the operation.

Procedure

Step 1 Fill out relevant parameters under the **Cabinet Properties** based on the cabinet specifications.

There are no restrictions on the file format for the cabinet report, and you can upload, download or delete reports as needed.

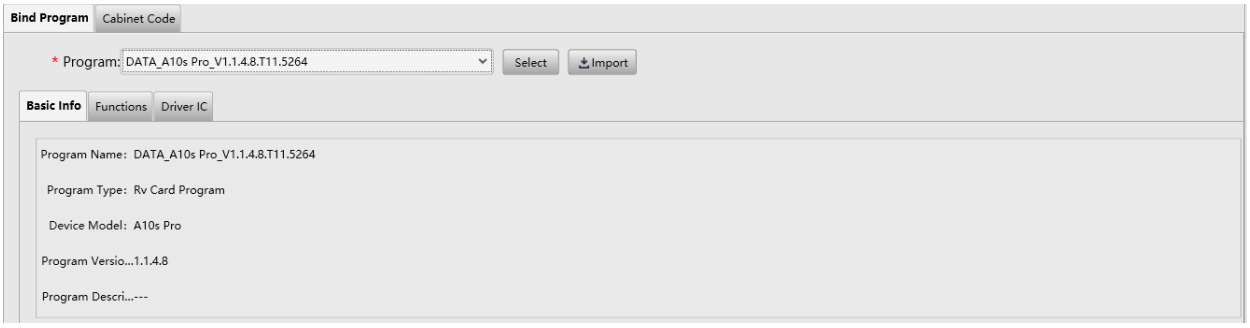
Figure 3-8 Cabinet properties



Step 2 On the **Bind Program** tab, select a program from the drop-down list. If there is no program you want from the drop-down list, you can click **Select** to download a program from the cloud to your computer and then click **Use**. Or, you can also click **Import** and then select a program file on the pop-up window and click **Open**.

The program information including basic information, functions, and driver IC will be listed below.

Figure 3-9 Bind program



Step 3 Select the **Cabinet Code** tab.

Step 4 Click **New Cabinet Code**, enter a cabinet SN on the pop-up window, and then click **OK**.

The cabinet code must be unique and does not accept any duplicate values. Additionally, you have the option to import, edit, or delete cabinet codes.

3.3.1.2 Construction

Step 1 Under the **Module Library** tab, select a module folder from the drop-down list on the left.

To import modules, please click **Import** > select the module file (.modules/.module2/.module) you want on the pop-up window > click **Open**.

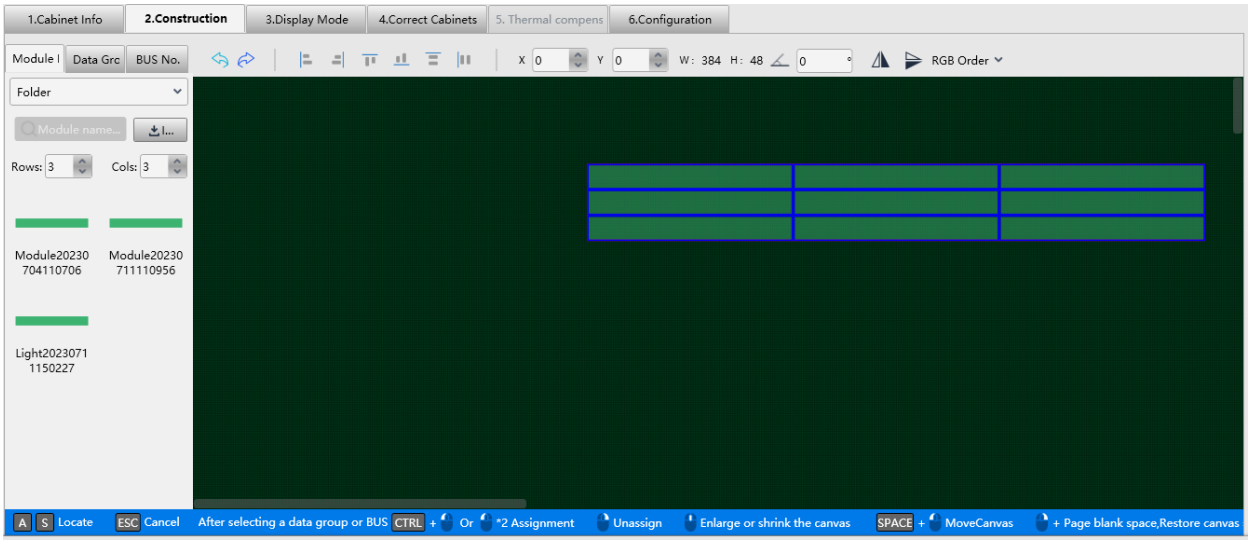
Step 2 Set the number of rows and columns of the module.

Step 3 Hover the mouse over a module under the module list to view the detailed information and drag the module you want to the editing area.

For example, if **Rows** and **Cols** are both set to 3, dragging a module to the editing area will add the same module of 3 rows and 3 columns.

When there are multiple modules under the module list, you can search for the module you want by keywords.

Figure 3-10 Construction



Step 4 Select a module and do the following as required to adjust the configuration.

- View Module Details

  Right-click on the module and select **Details** from the pop-up menu. Then, you can check the detailed information on the pop-up window.

- Crop Module

  a. Right-click on the module and select **Crop** from the pop-up menu.

  b. On the pop-up window, select **Extract Row** and click on the rows that need to be cropped, or select **Extract Column** and click on the columns that need to be cropped, or select **Crop** and click on the pixels that need to be cropped. Finally, click **Crop**.

  c. Once the cropping is complete, click **Save** to close the window. If **Sync to module file list** is selected when saving the change, the cropped module will be saved to Module Library.

- Copy Module

  – Press **Ctrl**+**C** and **Ctrl**+**V**.

  – Right-click on the module, select **Copy** from the pop-up menu, and then press **Ctrl**+**V**.

- Delete Module

  – Press **Delete**.

  – Right-click on the module and select **Delete** from the pop-up menu.

- Sync to Module Library

  Right-click on the module and select **Sync to Module Library** from the pop-up menu. Enter a new module name on the pop-up window and click **OK** to save the module to Module Library.

- Module Alignment

  Click the alignment buttons.

- Move Module

  Drag the module or input X and Y coordinates.

- Rotate Module

  Input a rotation angle and press **Enter** or click on other positions on the screen.

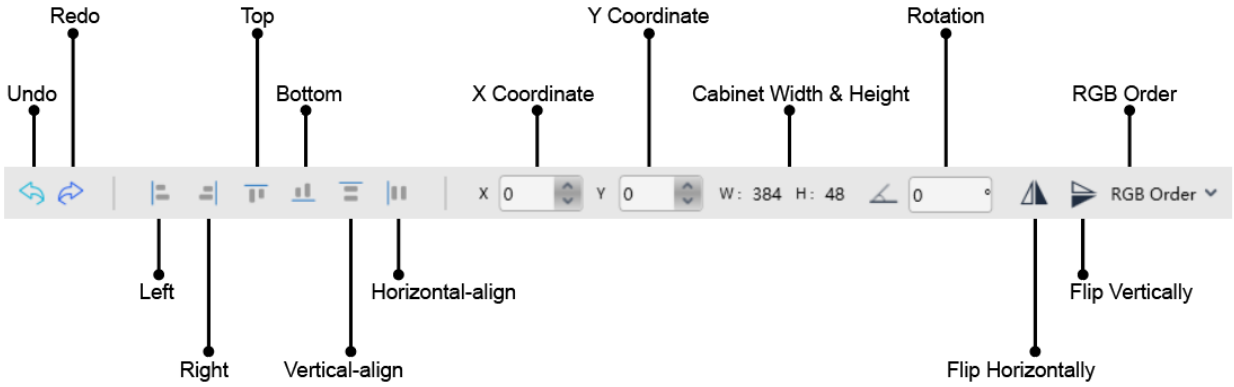
- Flip Module

  Click the flip buttons.

- Adjust RGB Order

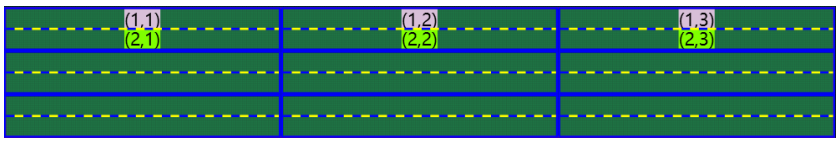
  Click **RGB Order** and set the RGB order of the pixels on the pop-up box.

Figure 3-11 Toolbar

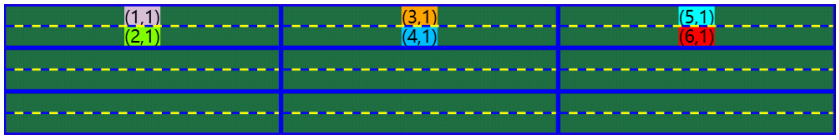


Step 5 Select the **Data Group** tab, set the start data group, and then select or deselect **Cascade**.

- When **Cascade** is selected, you can assign the same two data groups to each module.



- When **Cascade** is not selected, you can assign two data groups to each module in sequence according to the data group number.



Step 6 Hold down the **Ctrl** key and left-click, or simply double-click, on modules to assign a data group for the module.

Tip: You can also hold down the **Ctrl** key and drag the left mouse button over multiple modules to quickly add data groups.

Step 7 Depending on whether the module has flash memory, you can do the following to set the flash memory arrangement of the cabinet.

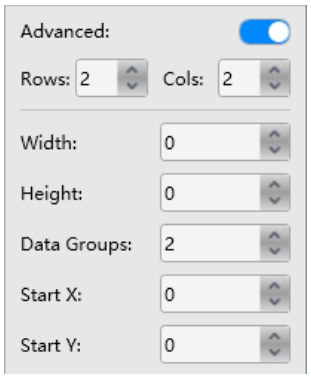
- Yes, the module has flash memory: Proceed to Step 8.
- No, the module has no flash memory: No further action needed.

Step 8 Select the **Bus No.** tab, set the start bus, and then select or deselect **Cascade**.

Step 9 Hold down the **Ctrl** key and left-click, or simply double-click, on modules to assign a bus no. for the module.

Step 10 To access more flexible settings, enable **Advanced** ( ) and fill out the required parameters.

Figure 3-12 Advanced Mode



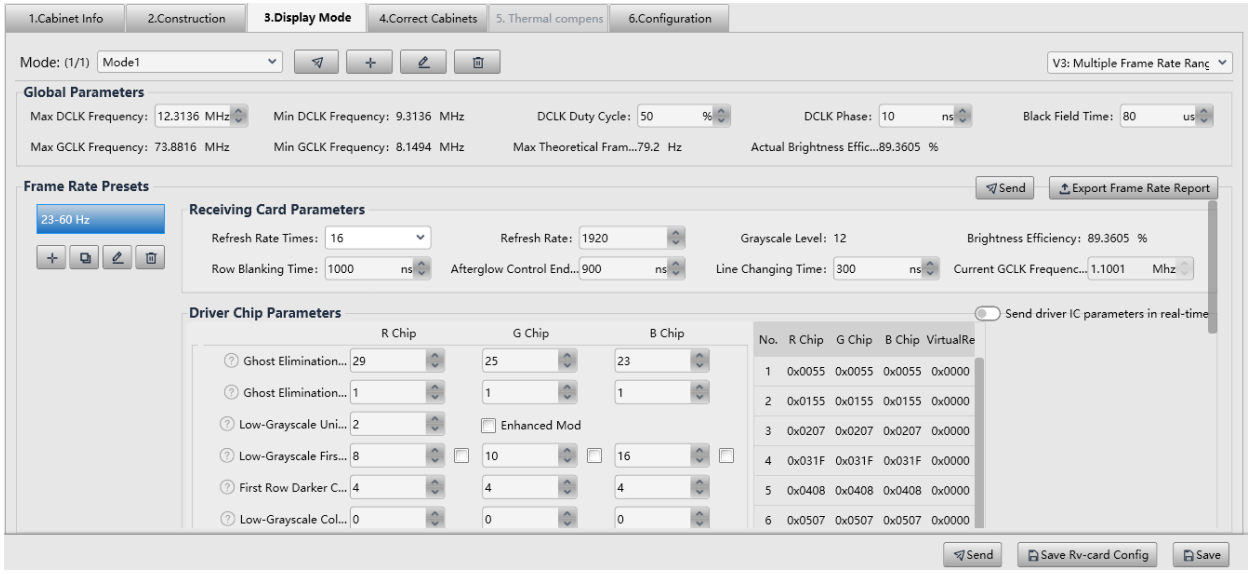
3.3.1.3 Display Mode

Step 1 Select an existing mode or click + to add a new mode.

All configuration parameters for the **3. Display Mode** and **4. Correct Cabinets** tabs are included in the mode.

- : Send all configuration parameters for the current mode to the receiving card.
- : Edit the current mode's name.
- : Delete the current mode.

Figure 3-13 Display Mode



Step 2 On the top right of the screen, select the Frame Rate Adaptive version from the drop-down list.

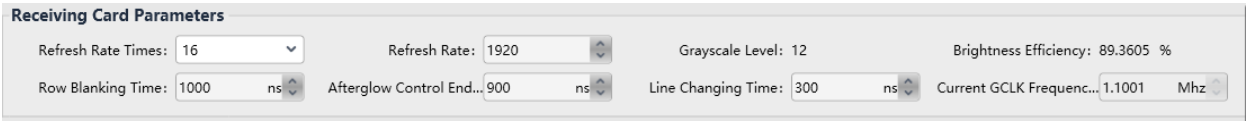
Step 3 If the driver chip supports Frame Rate Adaptive V3, set the frame rate. Otherwise, skip this step.

- Add frame rate: Click +.
- Copy frame rate: Select a frame rate and click .
- Edit frame rate: Select a frame rate and click .
- Delete frame rate: Select a frame rate and click .
- Export frame rate report: Select a frame rate and click **Export Frame Rate Report**.

Step 4 Set receiving card parameters.

The parameters vary depending on the driver IC.

Figure 3-14 Receiving card parameters



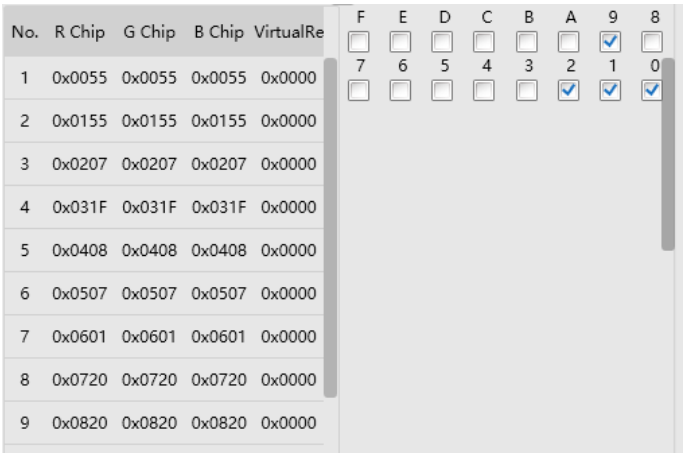
- Refresh Rate: Indicates the rate of updating the image on the display. Increasing refresh rate reduces image flickering, allowing for a more stable image.
- Refresh Rate Times: Indicates the times of refresh rate.
- Grayscale Level: Indicates the shades of gray on the screen. The greater the grayscale level, the more shades of gray that can be displayed on the screen. For example, if the grayscale level is set to 16 bits, the screen can display up to 65536 shades of gray.
- Brightness Efficiency: It is calculated from other performance parameters.
- GCLK Frequency: Indicates the frequency of grayscale clock.
- Frequency Divider: Frequency division coefficient.
- DCLK Phase: Indicates the phase of shift clock. When there are mismatching or flashing pixels, adjust this parameter to fix the problem.
- DCLK Duty Cycle: Indicates the duty cycle of shift clock. Set it to 50% in general.
- DCLK Frequency: Indicates the frequency of shift clock.
- Row Blanking Time: Used to adjust the ghost problem of the scanning type display. If the ghost problem is serious, increase the parameter value.
- Afterglow Control Ending Time: Works with row blanking time and line changing time to adjust the ghost of the scanning type display.
- Line Changing Time: Works with row blanking time to adjust the ghost of the scanning type display.

Step 5 Set driver chip parameters. If the driver chip supports Frame Rate Adaptive V3, toggling on **Send driver IC parameters in real-time** to will send parameter adjustments to the receiving card in real time.

- Current Gain: Color temperature parameters for the modules. Select **Linked** to set the current gain of red, green and blue to the same value. Deselect **Linked** to adjust the current gain of red, green and blue separately.
- Cross Elimination Settings: Select **Enable** and click **Eliminate Cross** to remove dead pixels.

The hexadecimal values of the RGB driver chip registers are displayed in a table. After selecting a value, the corresponding 16-bit binary value will be displayed on the right. Select any value to set it to 1; deselect to set it to 0. To adjust the register value, double-click on the value in the table or check/uncheck the checkbox.

Figure 3-15 Driver Chip Register



Step 6 Set decoding chip parameters.

Step 7 Click **Send** on the top right of the screen if you want to send the parameters to the receiving card. Otherwise, skip this step.

3.3.1.4 Correct Cabinets

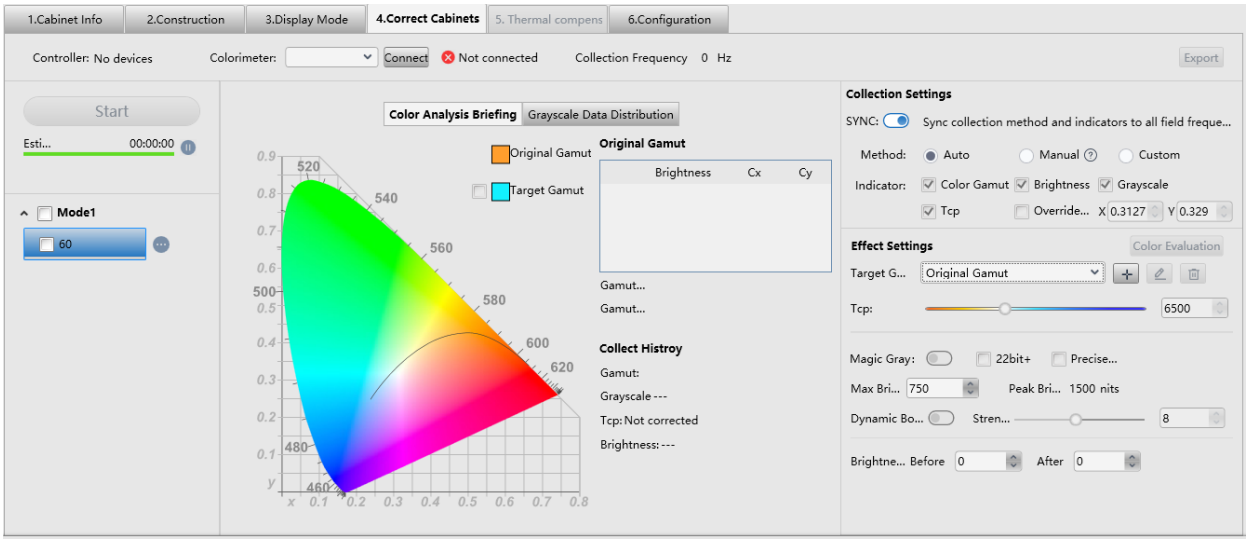
To import image quality files (.nrf/.vglcx), click  next to the frame rate on the left of the screen and then select **Import** from the pop-up menu. Select an image quality file on the pop-up window and click **Open**. If you do not have any image quality files, do the followings:

Note

When collecting the display data, if you select the auto or custom collection method, a CA410-VP427, CA410-P427, or CA410-P427H (when brightness is over 3,000 nits) colorimeter should be used and the device connection must be completed; no colorimeter is required for manual collection.

Step 1 Select mode and frame rate on the left of the screen.

Figure 3-16 Cabinet Correction



Step 2 If you want all frame rates to use the same collection method and indicators, set **Sync collection method and indicators to all field frequencies** to enabled ( ). Otherwise, please set it to disabled.

Step 3 Do the following according to the collection method of the display data.

- Automatic
  a. Set the collection method to **Auto**.
  b. Select a colorimeter model from the drop-down list.

     When the hardware connection is normal, the Cabinet Tool will automatically establish communication with the colorimeter after selecting a model.
  c. Click **Start** to automatically collect the relevant display data through the colorimeter.
- Manual
  a. Set the collection method to **Manual**.
  b. Select **Gamut**, manually collect the relevant display data, and then double-click the value in the table and modify it.
  c. Select **Brightness** and then set the brightness before and after calibration.
  d. Click **Start** to apply the color gamut and brightness data.
- Custom
  a. Set the collection method to **Custom**.
  b. Set the collection indicators.
  c. Click **Start** to automatically collect the relevant display data through the colorimeter.

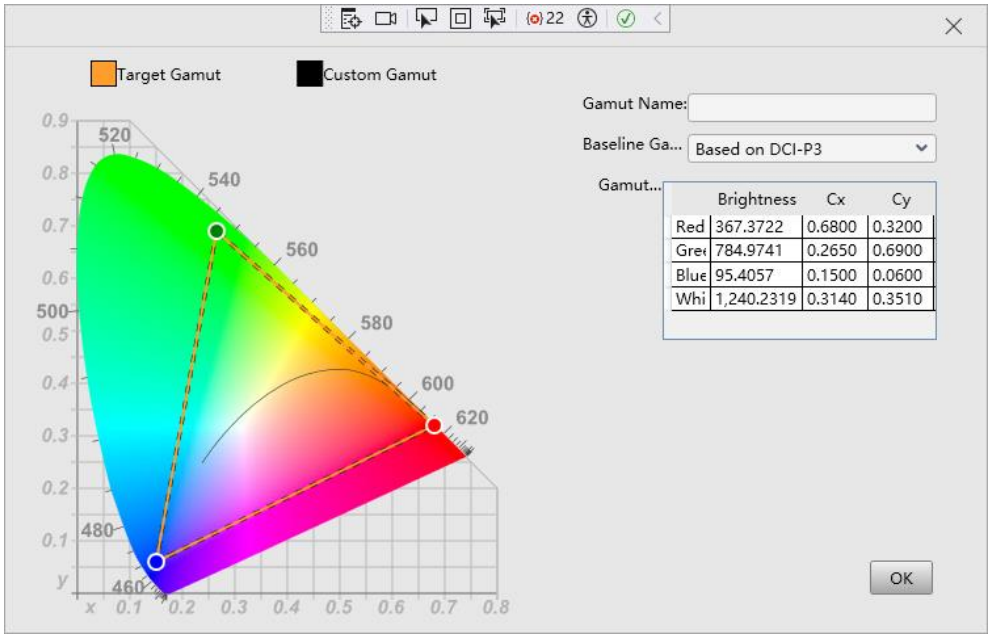
Step 4 Under the **Effect Settings**, set the following parameters and view the effect on the screen.

- Target Gamut

Select a target gamut from the drop-down list. To view the target gamut in the color gamut diagram, select **Target Gamut**.

Do the following to add custom gamut.

a. Click  on the right of the drop-down list to open the **Add Custom Gamut** window.



b. Enter a custom gamut name.

c. Select a baseline gamut from the drop-down list.

d. Double-click the cells in the table to change the gamut values or drag the vertex of the black triangle in the color gamut diagram to modify it.

e. Click **OK** once you are done.

Select a custom gamut and then click  to edit it, or click  to delete it.

- Color Temperature

  Drag the slider to set the color temperature, or set the value in the entry box.

- Magic Gray

  Toggle switch to enable/disable this function. When this is enabled, **22bit+** and **Precise Grayscale** can be selected.

- Max Brightness

  Set the max brightness of the screen in the entry box. **Peak Brightness** is the max brightness measured by the colorimeter.

- Dynamic Booster

  Toggle switch to enable/disable this function. When this is enabled, drag the slider to adjust the intensity of the Dynamic Booster.

- Brightness

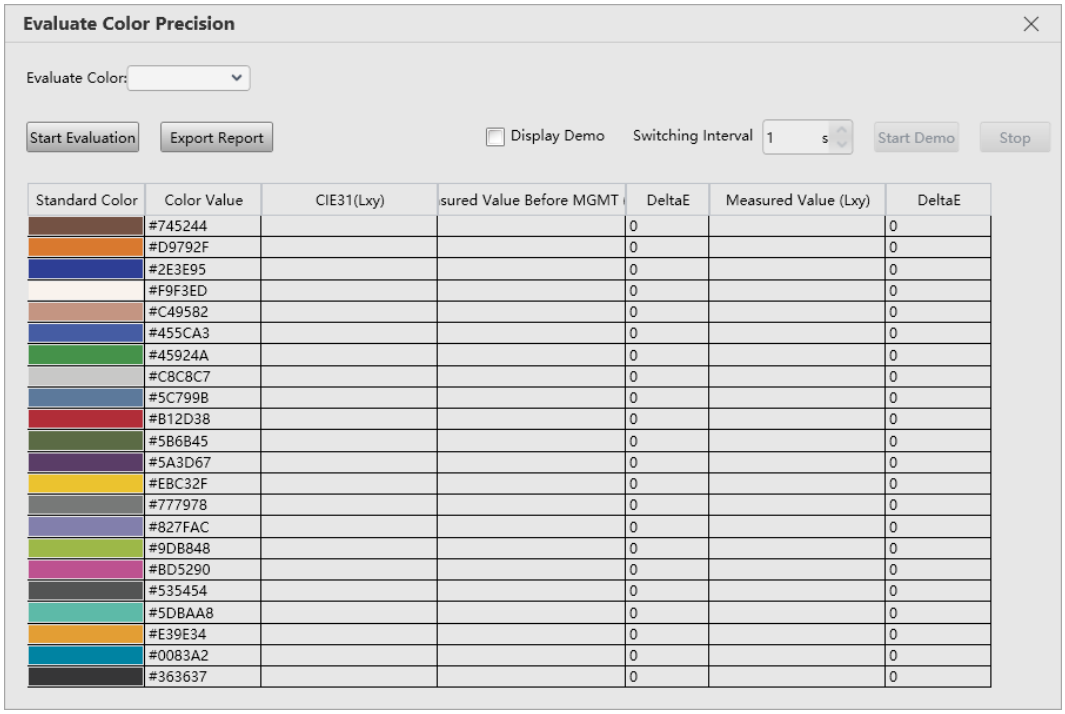
  Set the brightness before and after calibration to adjust the effect.

Step 5 Click  next to the frame rate and then select **Export** from the pop-up menu to save the configuration into a file.

Select **Clear** if you want to remove all image quality configurations.

Step 6 If you want to evaluate the color precision, do the following.

1. Click **Color Evaluation**.



2. On the Evaluate Color Precision screen, select a gamut from the drop-down list and click **Start Evaluation**.
3. Select **Display Demo**.
4. Click any of the colors in the table and check their effect on the LED screen. Or, you can set the auto color switching interval and then click **Start Demo** to check the effects of all colors on the screen.
   - CIE31: The standard value of brightness, Cx and Cy of the color.
   - Measured Value Before MGMT: The measured value of brightness, Cx and Cy of the color in the original color gamut.
   - Measured Value: The measured value of brightness, Cx and Cy of the color in the target color gamut
   - DeltaE: The deviation between the measured value and standard value.
5. Deselect **Display Demo**, click **Export Report** to save the evaluation result into a file.

3.3.1.5 Thermal Compensation

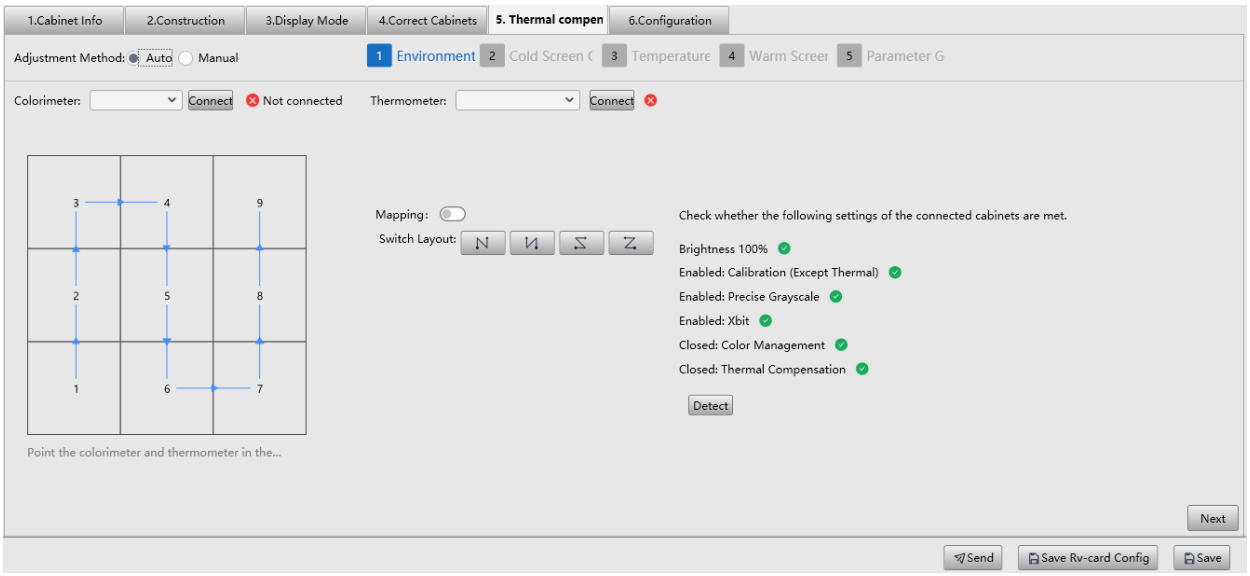
Prerequisites

- The cabinet layout is 3x3.
- You already have a thermal compensation file (.cofe).
- The colorimeter (model CA-410 or CS-150) and thermometer (model OPTCSLT 15SF CB1) are connected.

Procedure

Step 1 Do the following on the **Environment** interface and then click **Next**.

Figure 3-17 Environment



1. Select a colorimeter and a thermometer from the drop-down lists.

   If the colorimeter and thermometer are properly connected, the software will automatically establish communication with them after selecting from the drop-down lists.

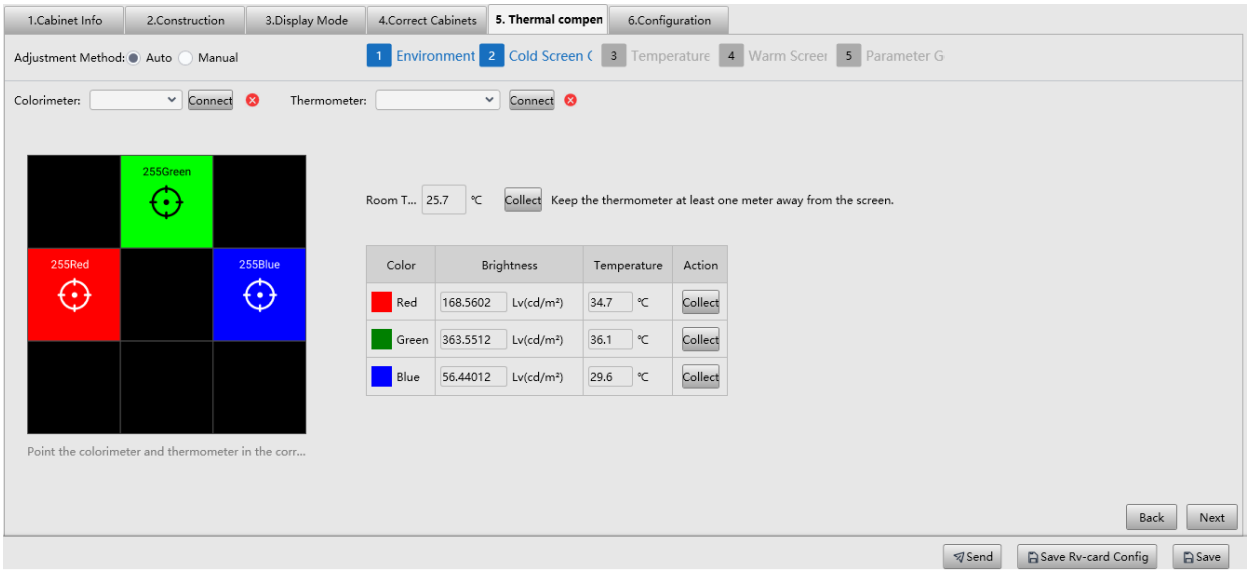
2. Select a cabinet layout based on the LED screen's actual topology.

   To display the cabinet layout on the LED screen, simply set the **Mapping** setting to enabled ( ).

3. Click **Detect** to check if the cabinet settings meet the requirements. If they do not, take appropriate action accordingly.

Step 2 Do the following on the **Cold Screen Collection** interface and then click **Next**.

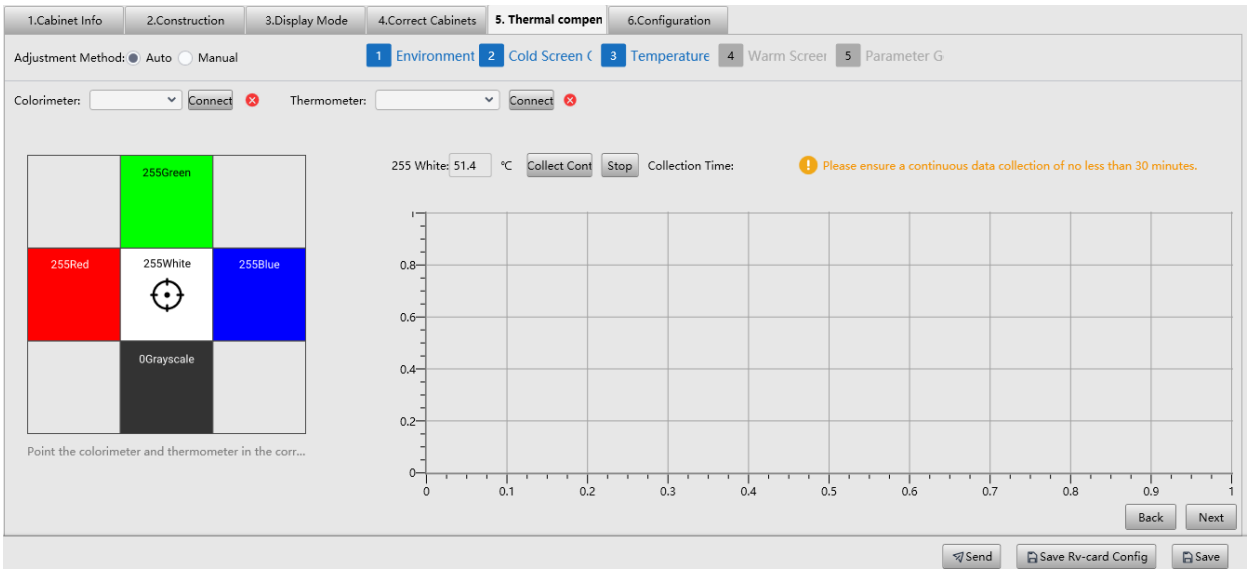
Figure 3-18 Cold screen collection



1. Place the thermometer at least 1 meter away from the LED screen and then click **Collect** to start collecting the room temperature data.
2. Place the thermometer and colorimeter tightly close to the cabinet displaying red and then click **Collect** to start collecting the cabinet brightness and temperature data.
3. Repeat the above to collect the brightness and temperature data of the cabinets displaying green and blue.

Step 3 Do the following on the **Temperature Rise Collection** interface and then click **Next**.

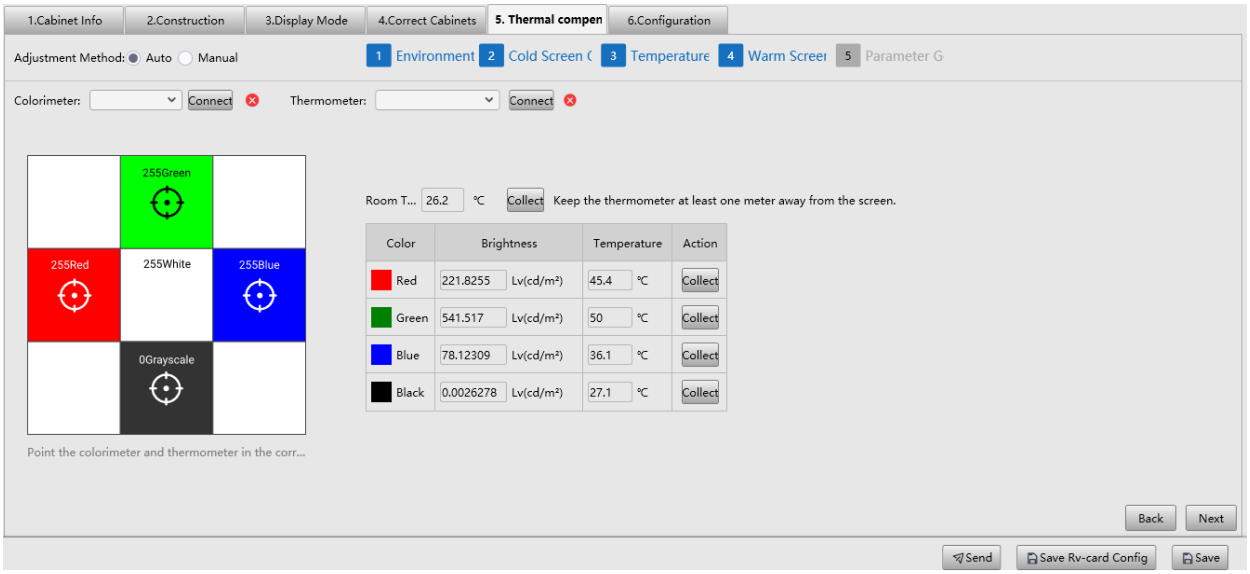
Figure 3-19 Temperature rise collection



1. Place the thermometer and colorimeter tightly close to the cabinet displaying white and then click **Continuous Collect**.
2. Ensure a continuous data collection of no less than 30 minutes, until the data curve reaches a stable state.
3. Click **Stop** once the process is completed.

Step 4 Do the following on the **Warm Screen Collection** interface and then click **Next**.

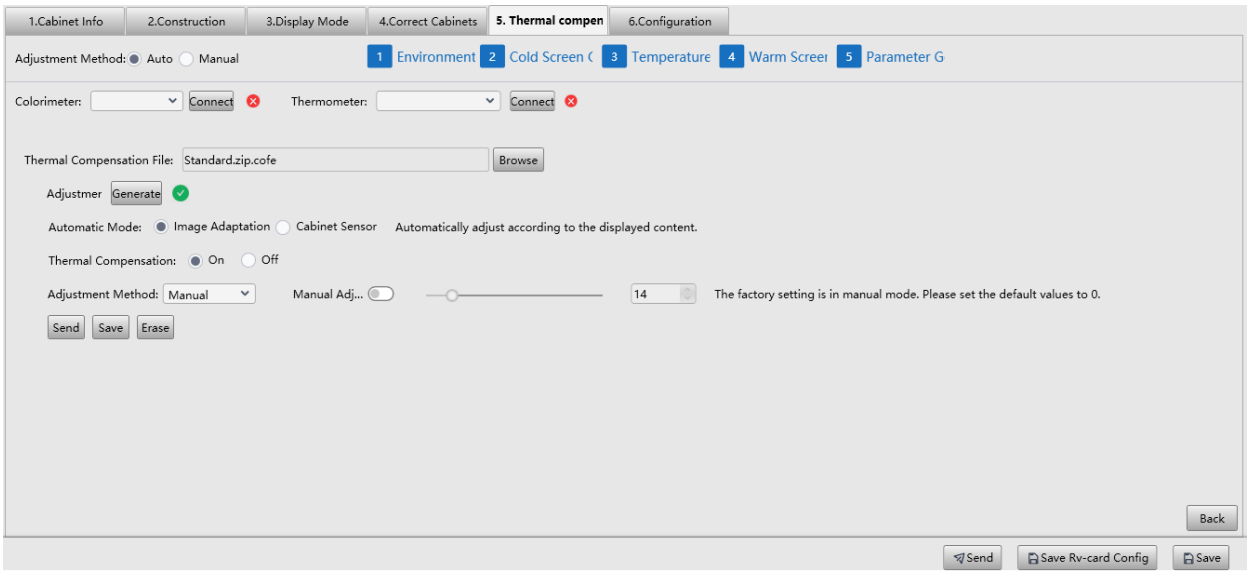
Figure 3-20 Warm screen collection



1. Place the thermometer at least 1 meter away from the LED screen and then click **Collect** to start collecting the room temperature data.
2. Place the thermometer and colorimeter tightly close to the cabinet displaying red and then click **Collect** to start collecting the cabinet brightness and temperature data.
3. Repeat the above to collect the brightness and temperature data of the cabinets displaying green, blue, and black.

Step 5 Do the following on the **Parameter Generation** interface.

Figure 3-21 Parameter generation

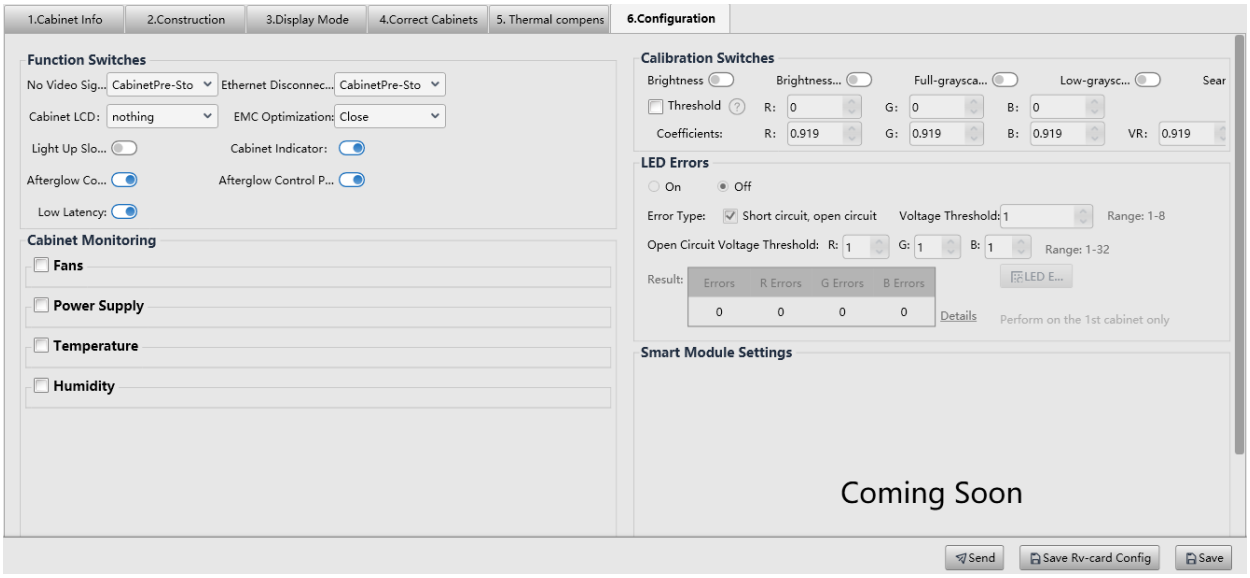


1. Click **Browse** to select thermal compensation file from the pop-up window. Then, click **Open**.
2. Click **Generate** to generate the adjustment file by combining the collected data with the thermal compensation file.
3. Select the automatic adjustment mode, which is to adjust automatically according to the display content or the cabinet temperature sensor.
4. Turn on or off thermal compensation.
5. Set the adjustment mode to **Manual** or **Auto**. After selecting **Manual**, you can set the **Manual Adjustment** to enabled ( ) and adjust the adjustment strength.
6. After setting is completed, click **Send** to send the thermal compensation parameters to the receiving cards.
7. Click **Save Rv-card Config** to save the thermal compensation parameters in the receiving card.

   If you want to erase the thermal compensation parameters in the receiving card, click **Erase**.

3.3.1.6 Configuration

Figure 3-22 Configuration



Set the following parameters based on your needs:

- Function Switches
  - No Video Signal: The displayed image of the cabinets when there is no video source signal.
  - Ethernet Disconnected: The displayed image of the cabinets when the Ethernet is disconnected.

- Cabinet LCD: Enable/Disable cabinet LCD backlight.
- EMC Optimization: Set the intensity of EMC optimization.
- Light Up Slowly: Make the display become brighter slowly after the power is supplied.
- Cabinet Indicator: Enable/Disable cabinet indicators.
- Afterglow Control Signal: Enable or disable afterglow control signal.
- Afterglow Control Polarity: Enable it to set the polarity to high. Disable it to set the polarity to low.
- Low Latency: Enable/Disable low latency. When this is enabled, the receiving card can reduce image delay by 1 frame.

- Cabinet Monitoring
  a. Select the metrics you want to monitor, which include **Fans**, **Power Supply**, **Temperature**, and **Humidity**.
  b. Set relevant parameters and alert thresholds.
- Calibration Switches
  a. Enable/Disable the calibration switches as you need. Switches include **Brightness**, **Brightness & Chroma**, **Full-grayscale**, **Low-grayscale**, and **Seams**.
  b. Select **Threshold** and set the values for R, G, and B.

     Threshold: When the grayscale level is less than or equal to the specified level, use the average calibration coefficients, other than the pixel level calibration coefficients. This fixes the display problems in low grayscale after the screen is calibrated, such as mottling, color blocks and grayscale spikes.

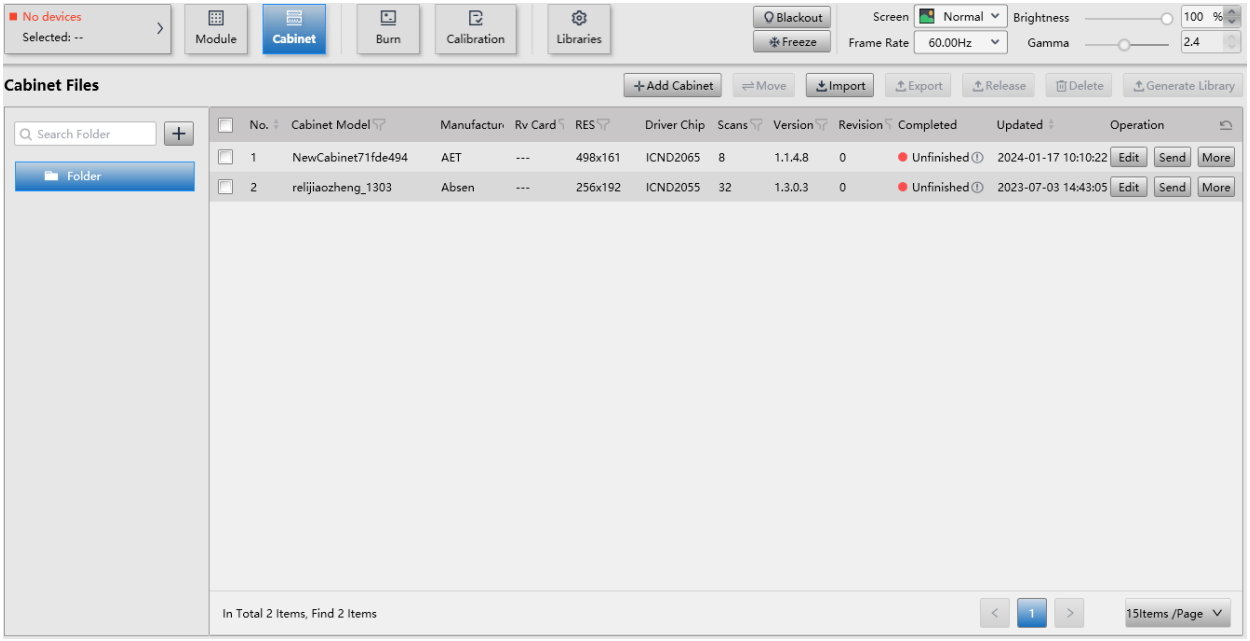
     The R, G, and B values are the Y-axis values corresponding to the X-axis values (the specified grayscale level) in the Gamma table. If the device does not support individual Gamma adjustment for RGB, set the R, G and B to the same value.
- LED Errors
  a. Select **Enable** if the cabinet supports LED error detection.

     Currently only the XM11202G driver chip is supported.
  b. Select **Short circuit & Open circuit**.
  c. Set **Voltage Threshold**.
  d. Set **Open Circuit Voltage Threshold** for R, G, and B.
  e. Click **LED Errors**
  f. View the errors of the cabinet.
  g. Click **Details** to view the errors of each module.

3.3.2 Manage Cabinet

On the homepage, click **Cabinet** to display the **Cabinet Files** screen.

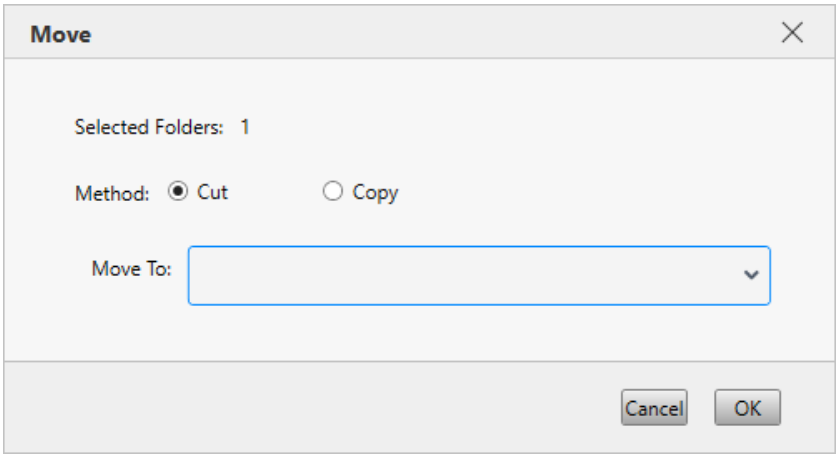
Figure 3-23 Cabinet Files



Do the following as required:

- Move Cabinet

  Select one or more cabinets and click **Move**. On the pop-up window, select how to move the module and then click **OK**.



- Import Cabinet

  Click **Import**, select a cabinet file, and then click **Open**.

- Export Cabinet

  Select one or more cabinets and click **Export**. Then, select a file path and click **Save**.

- Release Cabinet

  Select one or more cabinets and click **Release**. Click **Confirm** on the pop-up window.

  Click **History** on the pop-up window to check the released versions. Released versions will also be added to **Libraries** > **Cabinet Version**.

- Delete Cabinet
  - Select one or more cabinets and click **Delete**.
  - Click **More** and then select **Delete** from the pop-up menu.

- Edit Cabinet

  Click **Edit** or double-click to change the cabinet setup. Once complete, click **Save**.

  You can also go to **Libraries** > **Cabinet Version** and click **Edit** to change the cabinet setup.

- Send Cabinet

  Click **Send** to send the cabinet library file to the receiving card.

- Copy Cabinet

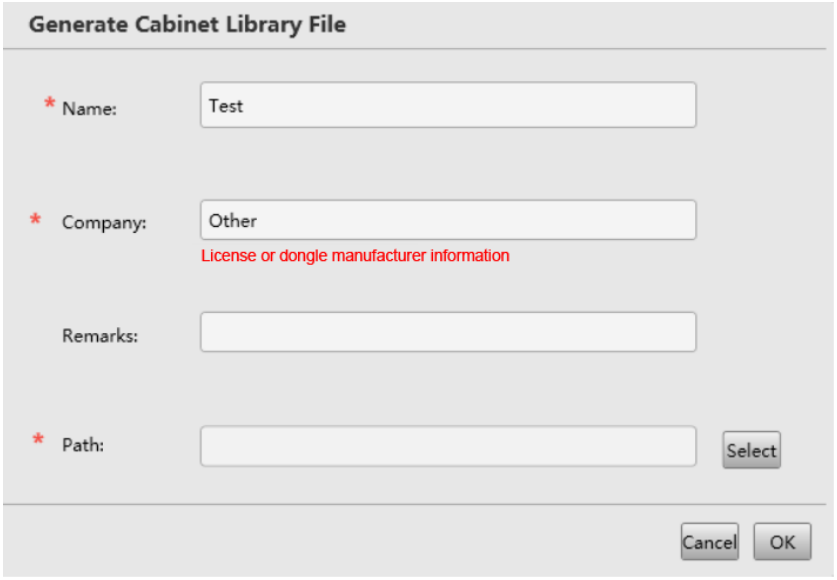
  Click **More** and then select **Copy** from the pop-up menu. Enter a new cabinet name and then click **OK**.

- Generate Library

  Cabinet Library File (.ncp) contains receiving card configuration file and firmware package.

  a. Once a cabinet is released, select the cabinet and click **Generate Library**.
  b. Enter a library name and company name on the pop-up window.
  c. Click **Browse**, select a path, and then click **Save**.
  d. Click **OK** to generate a cabinet library file.

Figure 3-24 Generate Cabinet Library File



3.4 Burning Program

Note

When the module has a flash memory, a serial number can be burned into the module.

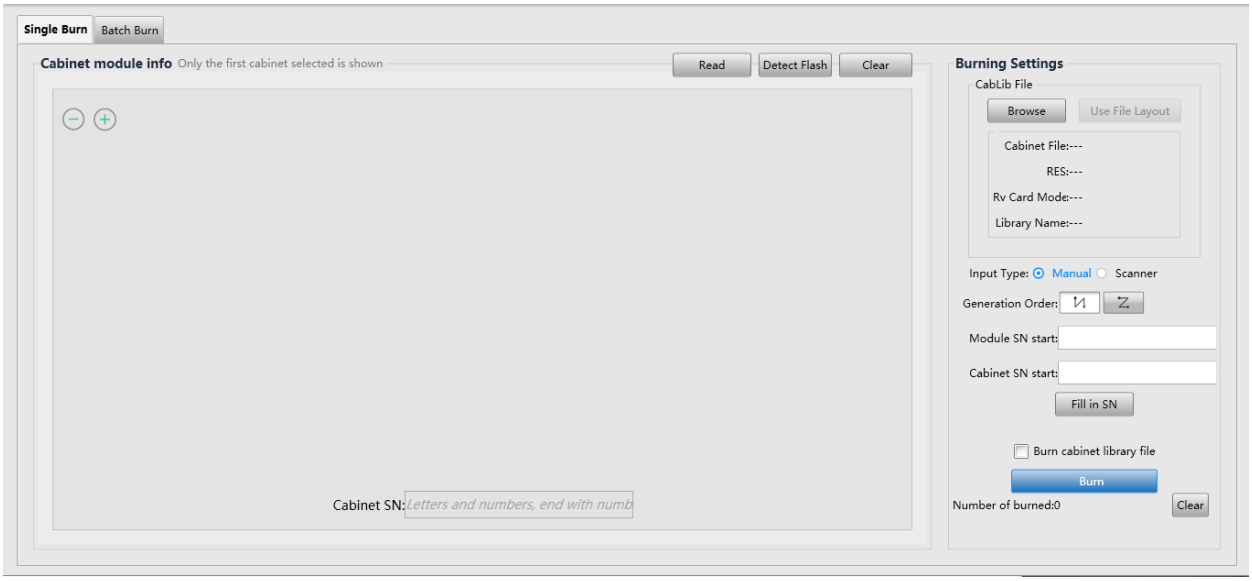
Smart module program can be burned into smart modules.

3.4.1 Single Cabinet Burn

Step 1 On the homepage, click **Burn**.

Step 2 On the **Single Burn** tab, click **Read** to read back and display the cabinet information.

Figure 3-25 Single Burn

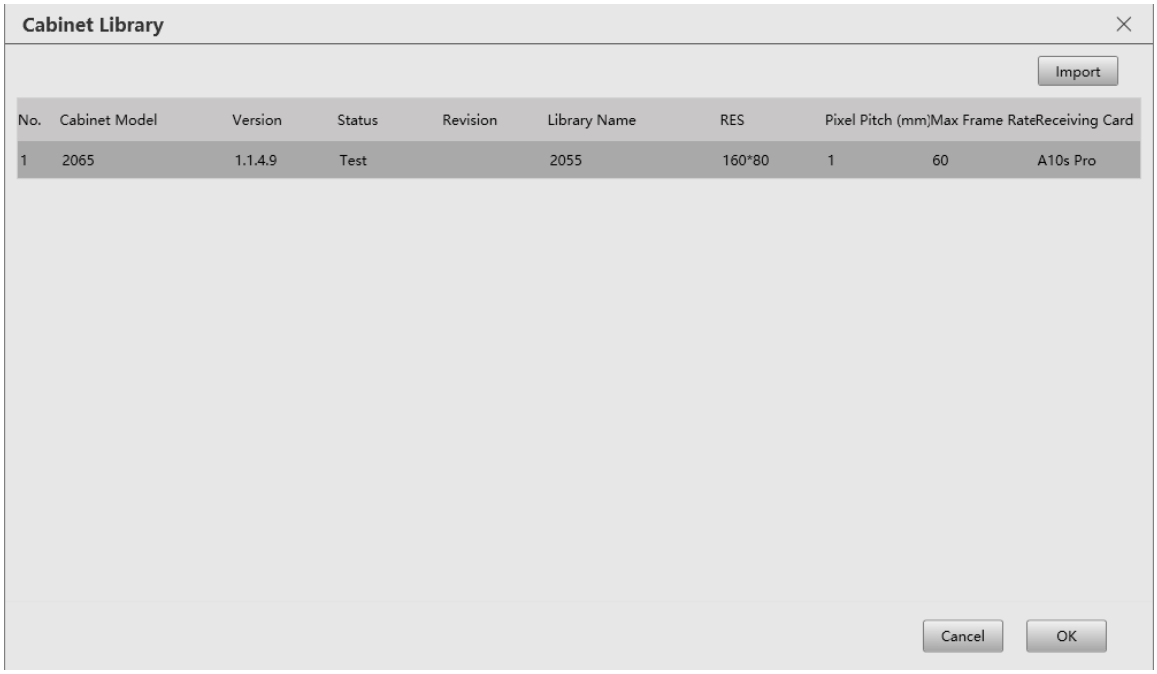


Only the first cabinet and its serial number will be displayed on the screen. Click **Detect Flash** to check the module flash status.

- : Zoom out the cabinet.
- : Zoom in the cabinet.

Step 3 Fill in the burning settings.

- Burn Cabinet File
  a. Click **Browse**.
  b. On the pop-up window, click **Import**, select a cabinet file (.ncp), and then click **Open**.
  c. Click **OK** to close the prompt once the file is imported.



  d. Click **OK** to close the **Cabinet Library** window.

     The cabinet related information is displayed on the right of the screen.
  e. If the module layout in the cabinet is different from what is in the cabinet file, click **Use File Layout**. Otherwise, skip this step.
  f. Select **Burn cabinet library file**.

- Burn Module SN

  Do the following according to the input type of the serial number.

  – Input manually.

    Select **Manual** as the input type. Select the generation order, enter the module and cabinet start serial number, and then click **Fill in SN**.

    : Generate module SNs from top to bottom for all the columns from left to right.

    : Generate module SNs from left to right for all the rows from top to bottom.

  – Input by scanner.

    Select **Scanner** as the input type. Select the generation order, and follow the order to scan the barcodes on the modules to read the serial numbers.

  Click **Clear** to remove the serial numbers on the screen.

Step 4 Click **Burn** once you are done.

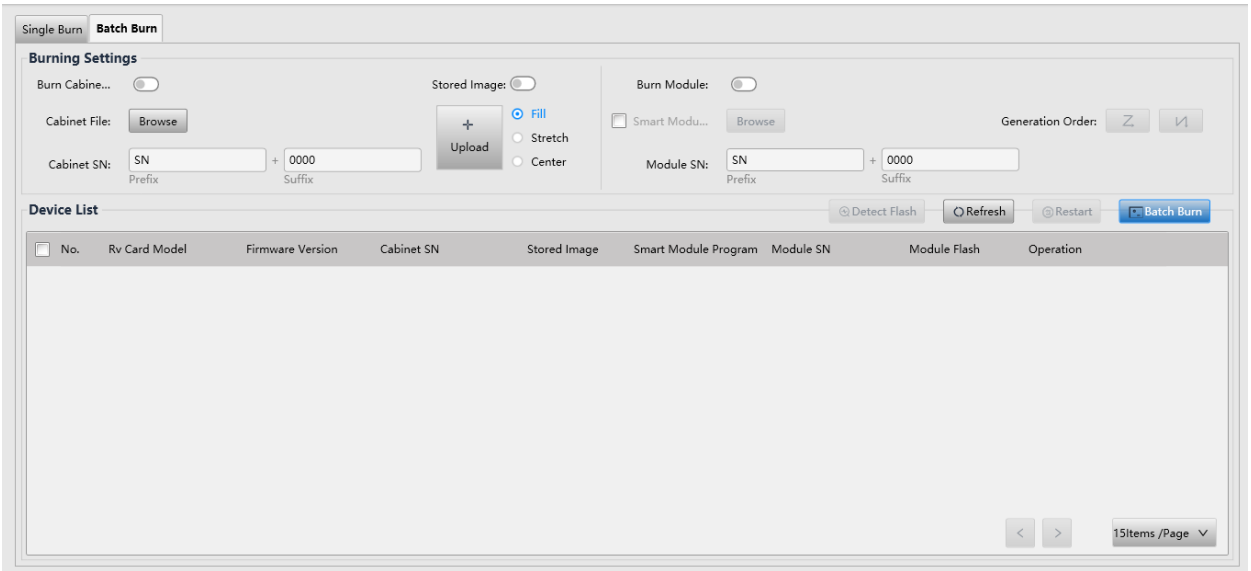
Click **Clear** if you want to reset the number of cabinets burned to 0.

3.4.2 Batch Burn

Step 1 On the homepage, click **Burn**.

Step 2 Select **Batch Burn** tab.

Figure 3-26 Batch Burn



Step 3 Fill in the burning settings according to the following.

- Burn Cabinet File

  a. Set Burn Cabinet File to .
  b. Click **Browse**, and then select a cabinet file from the pop-up window or click **Import** to import a cabinet file.
  c. Click **OK** to close the Cabinet Library window.
  d. Enter the cabinet start serial number.

- Stored Image

  For CX series + 5G receiving card, or 5G receiving card + 5G network card.

  a. Set Stored Image to .
  b. Click **Upload**, and then select an image and click **Open**.
  c. Select **Fill**, **Stretch**, or **Center**.

- Burn Module
  a. Set Burn Module to  .
  b. For customized smart module program, select **Smart Module Program** > click **Browse** > select the program file > click **Open**. Otherwise, skip this step.
  c. Enter the module start serial number.

Step 4 Select the cabinets you want to burn under the device list.

Click **Refresh** to refresh the list.

Step 5 Click **Batch Burn**.

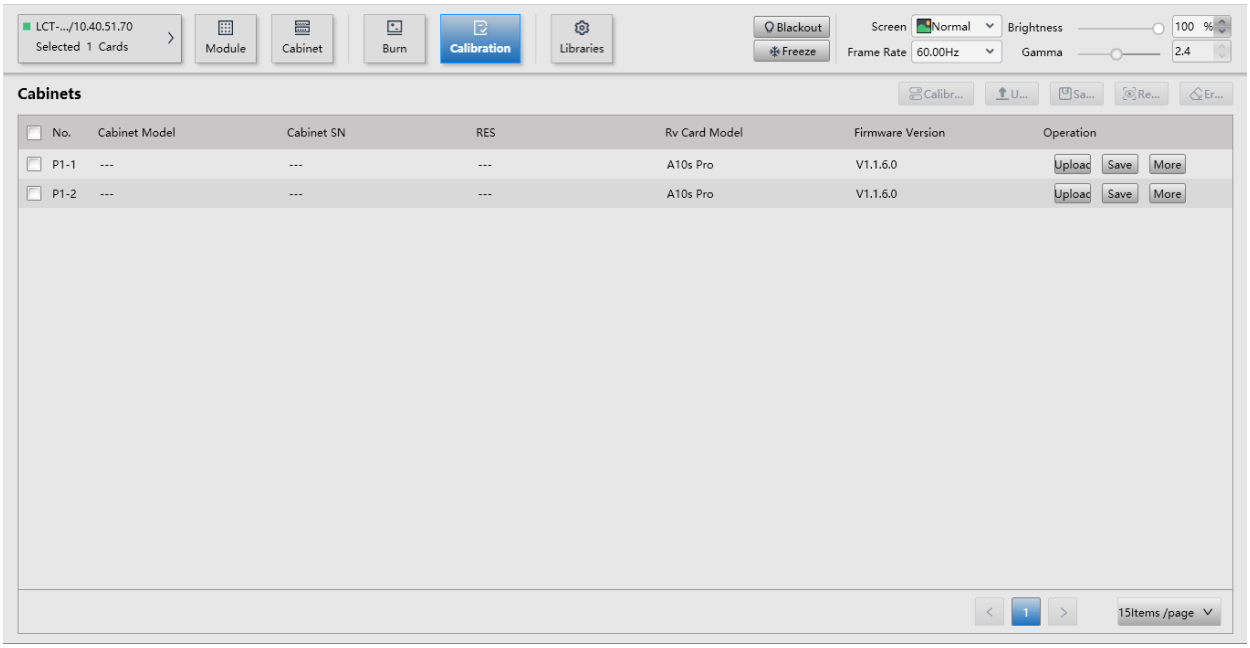
You can also perform the following operations if needed:

- Detect Flash: Click **Detect Flash.**
- Restart Cabinet: Click **Restart**.

3.5 Calibration Coefficients Management

On the homepage, click **Calibration** to open the Calibration Coefficients screen. Select one or more cabinets to perform the following operations as required.

Figure 3-27 Calibration Coefficients Management



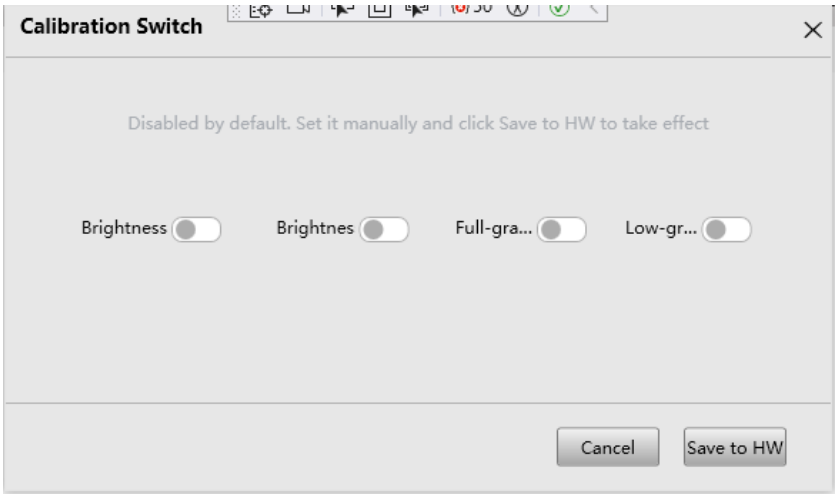
Enable/Disable calibration switches

Step 1 Click **Calibration Switches**.

Step 2 Set **Brightness**, **Brightness and chroma**, **Full-grayscale**, and **Low-grayscale** on the pop-up window.

The calibration switches are set to disabled by default. To enable, set the switches to  .

Figure 3-28 Calibration Switches



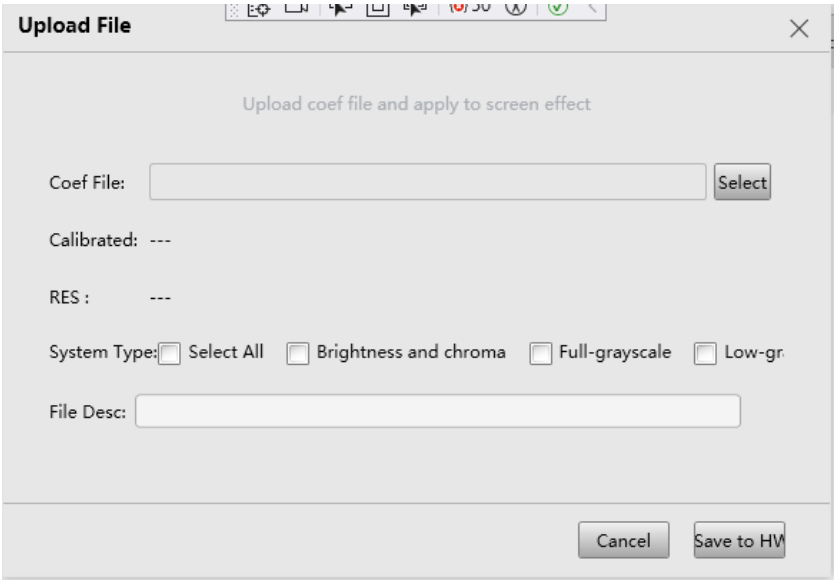
Step 3 Click **Save to HW** once you are done.

Upload calibration coefficients

Step 1 Click **Upload**.

Step 2 On the pop-up window, click **Browse** > select a calibration coefficient file (.db) > click **Open**.

Figure 3-29 Upload File



Step 3 Select the type of calibration coefficients, which include **Brightness and chroma**, **Full-grayscale**, and **Low-grayscale**. To select all types at once, check **Select All**.

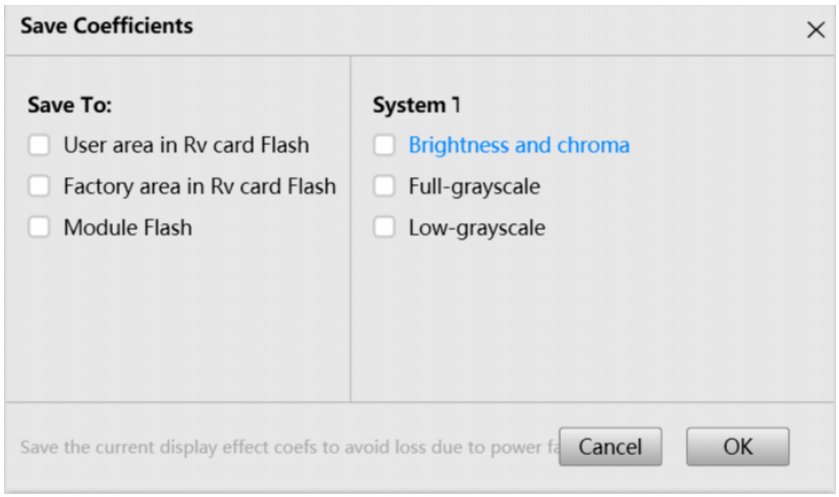
Step 4 Click **Save to HW** once you are done to save the coefficients to the receiving card.

Save calibration coefficients

Step 1 Click **Save**.

Step 2 On the pop-up window, select the target location and type of the calibration coefficients to be saved.

Figure 3-30 Save Coefficients



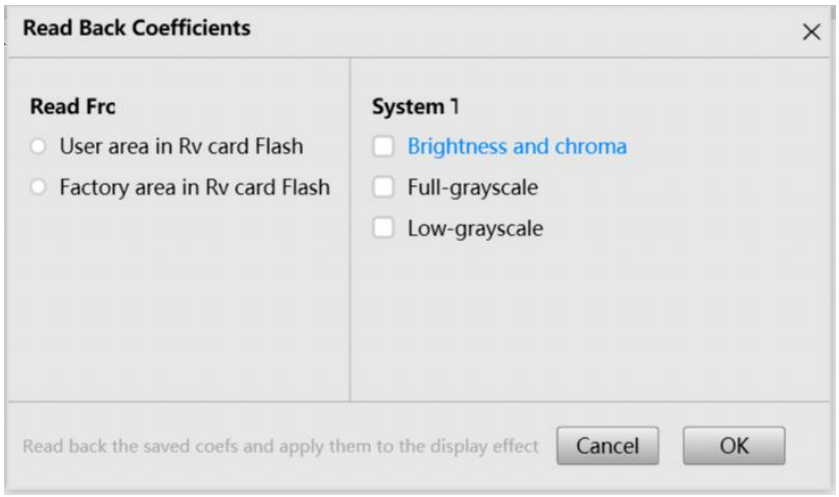
Step 3 Click **OK** once you are done to save the coefficients to the target location.

Read calibration coefficients

Step 1 Click **Read**.

Step 2 On the pop-up window, select the source location and type of the calibration coefficients to be read.

Figure 3-31 Read Back Coefficients



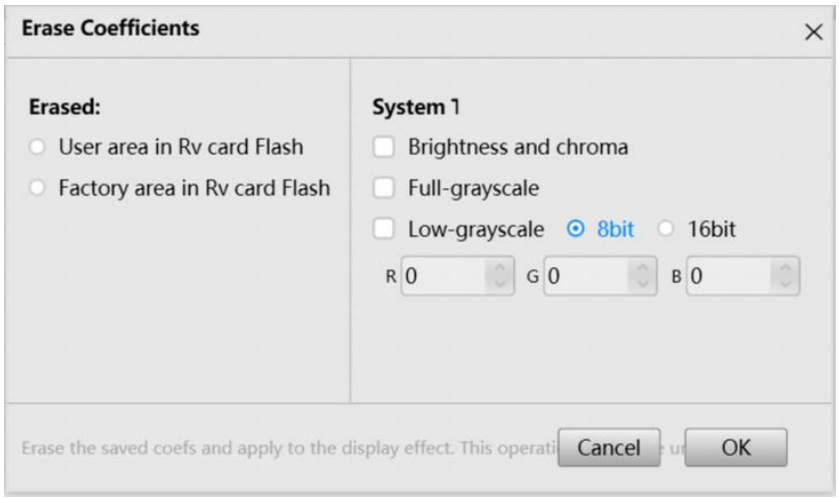
Step 3 Click **OK** once you are done.

Erase calibration coefficients

Step 1 Click **Erase**.

Step 2 On the pop-up window, select the target location and type of the calibration coefficients to be erased.

Figure 3-32 Erase Coefficients



Step 3 Click **OK** once you are done.

3.6 Library Management

3.6.1 Manage Cabinet Version

On the homepage, click **Libraries**. In the **Cabinet Version** tab, do the following as required:

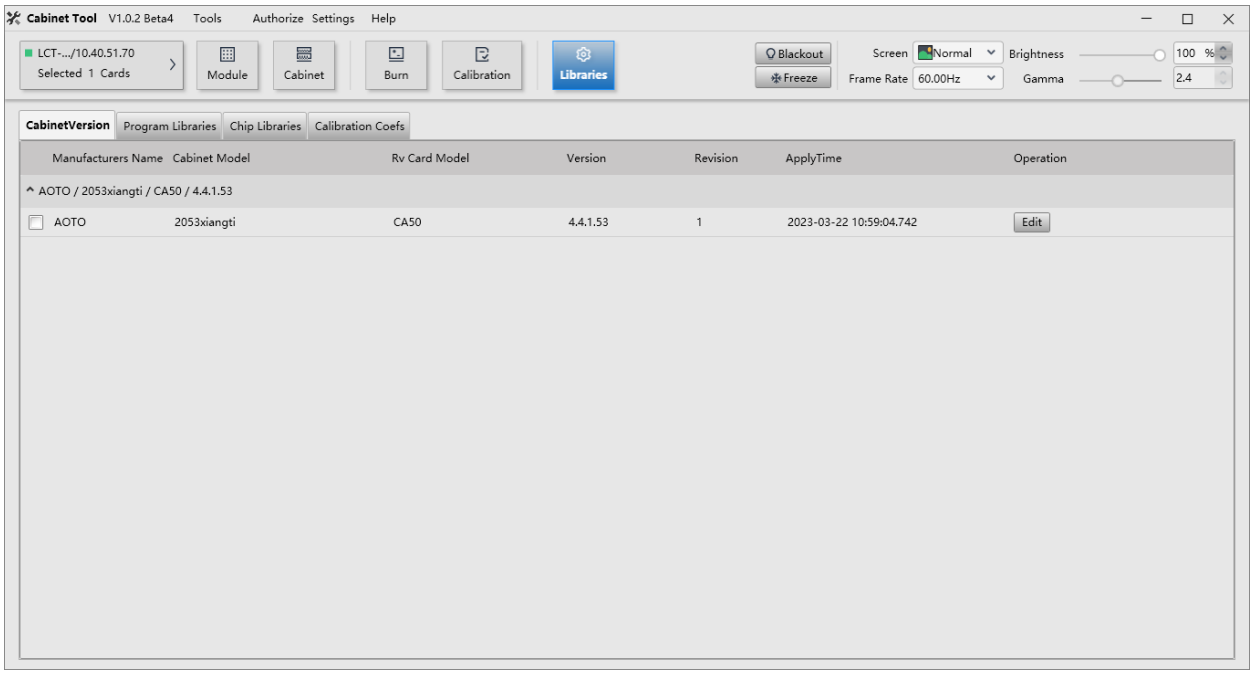
- View Cabinet Version

  Click to view more information about the cabinet version.

- Edit Cabinet

  Click **Edit** to change the cabinet version information.

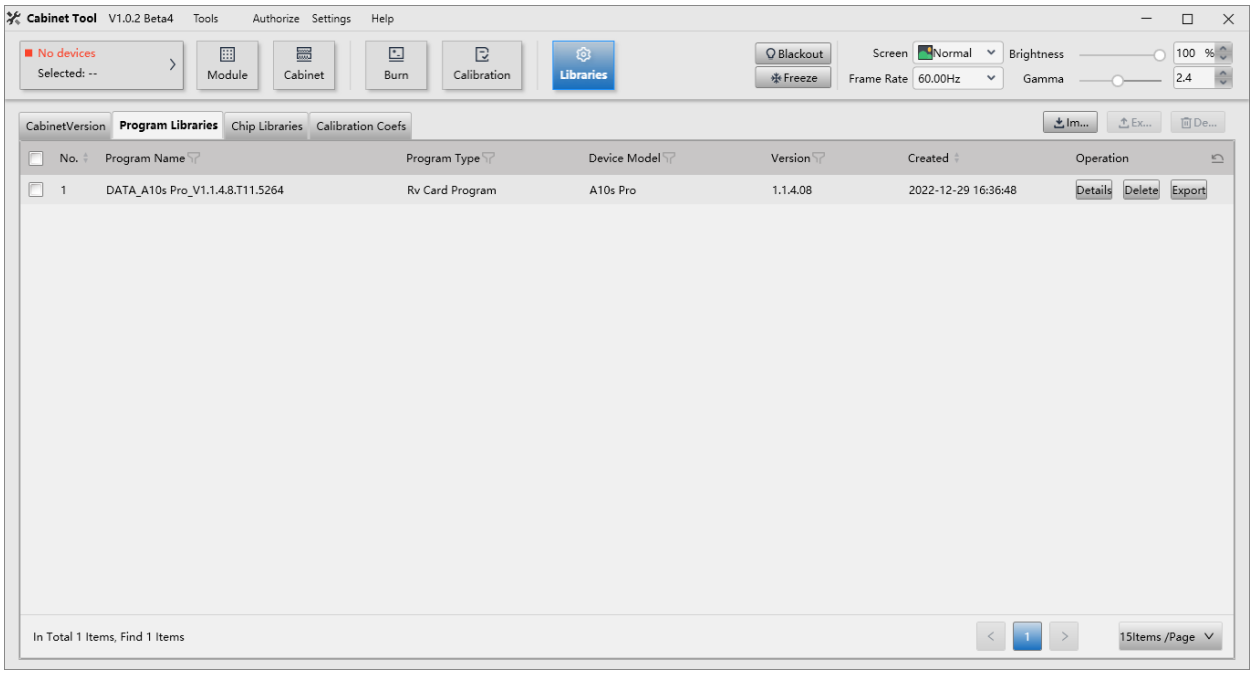
Figure 3-33 Cabinet Version



3.6.2 Manage Program Libraries

On the homepage, click **Libraries** and then go to the **Program Libraries** tab.

Figure 3-34 Program Libraries



Do the following as required:

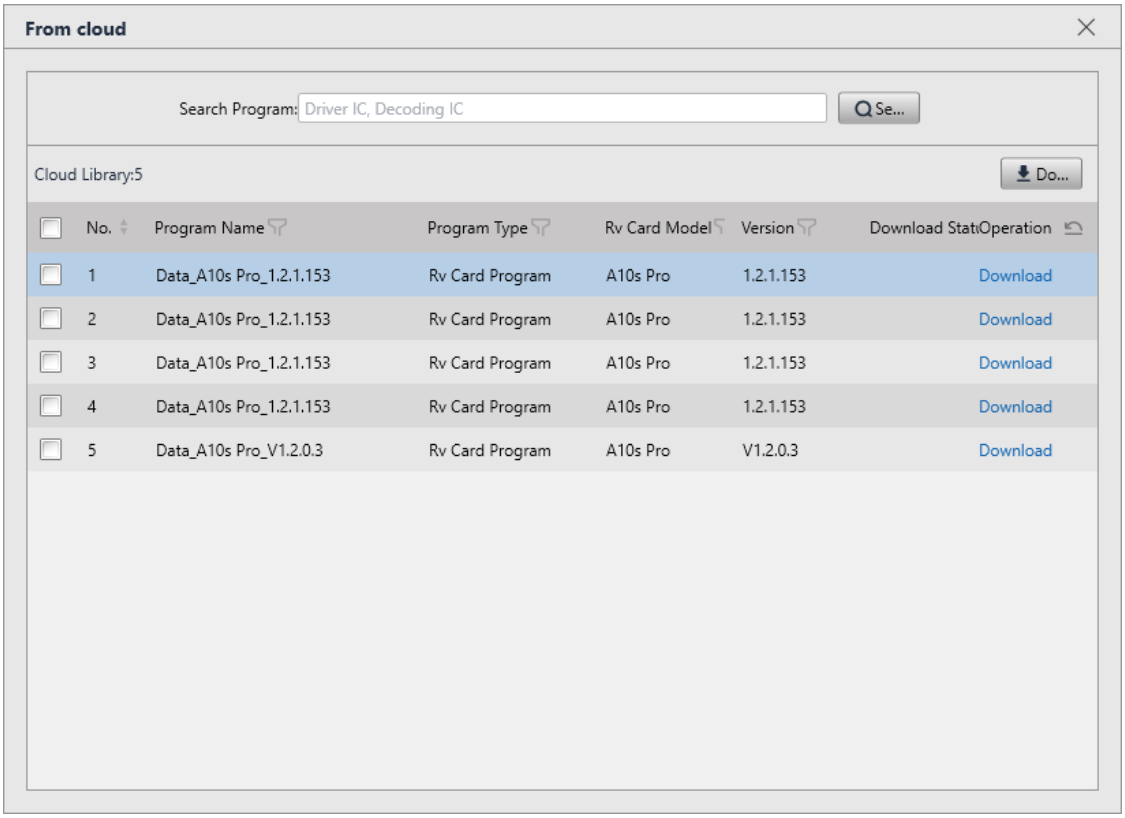
- Import File

  Click **Import** and then select a program file (.image) on the pop-up window and click **Open**.

  Once imported, the program file will be available when upgrading cabinet.

- Fetch from Cloud

  Click **Fetch from Cloud** and then search for and download programs on the pop-up window.



- Export File

  Select one or more files and click **Export**. Select a file path on the pop-up window and click **OK**.

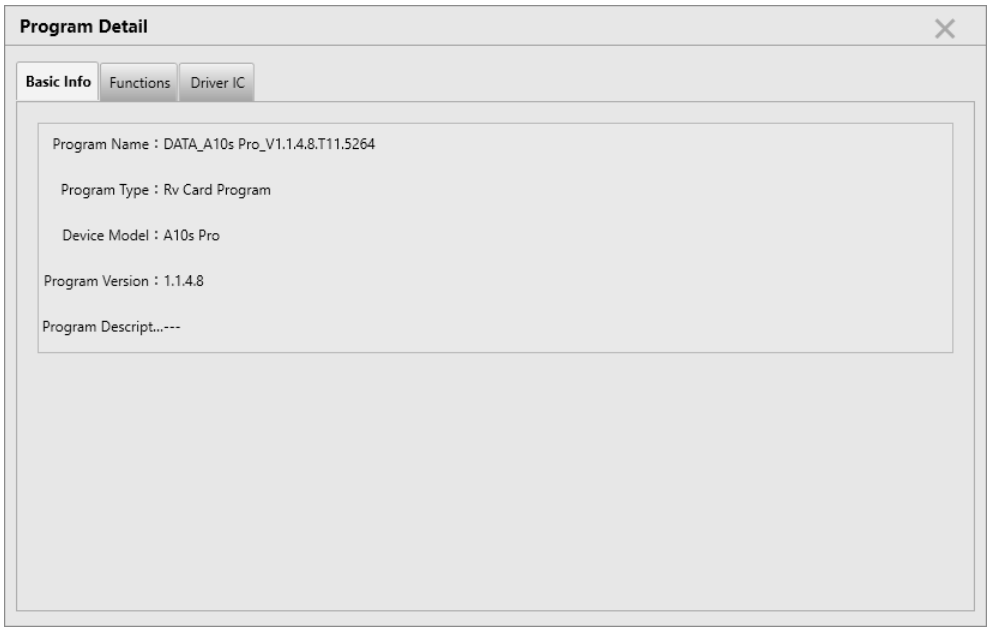
- Delete File

Select one or more files, click **Delete** and then click **OK**.

- View Details

  Click **Details** to check more information about the program in the pop-up window.

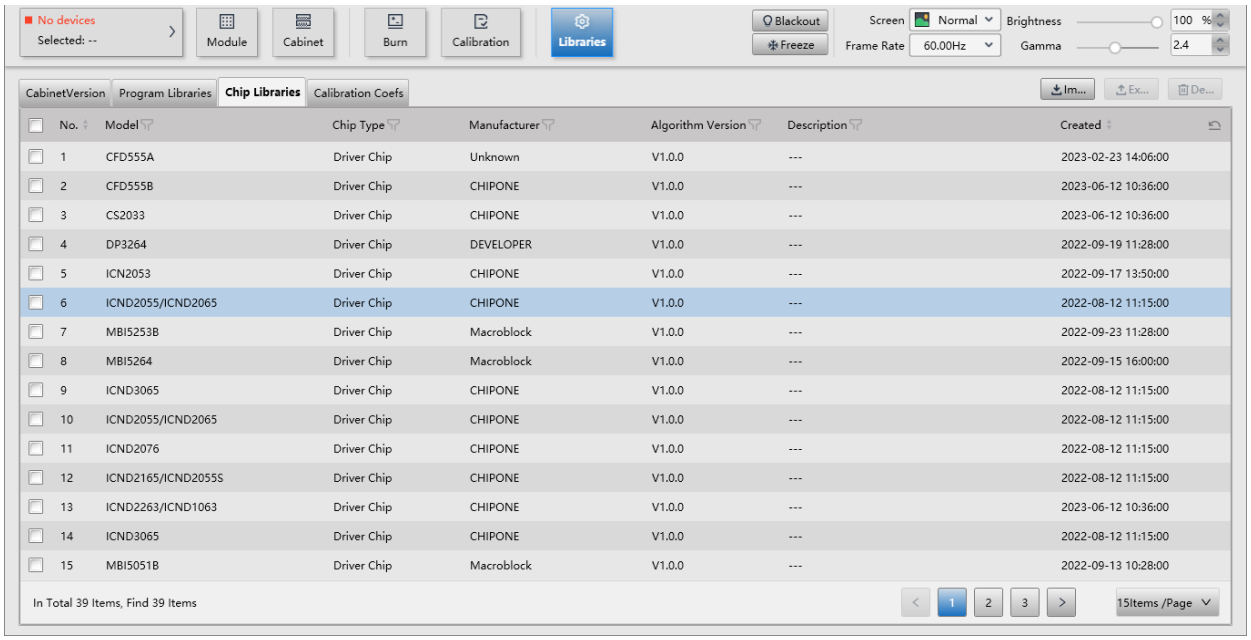
Figure 3-35 Program details



3.6.3 Manage Chip Libraries

On the homepage, click **Libraries** and then go to the **Chip Libraries** tab.

Figure 3-36 Chip Libraries



Do the following as required:

- Import File

  Click **Import** and then select a chip file (.zip) on the pop-up window and click **Open**.

- Export File

  Select one or more files and click **Export**. Select a file path on the pop-up window and click **Save**.

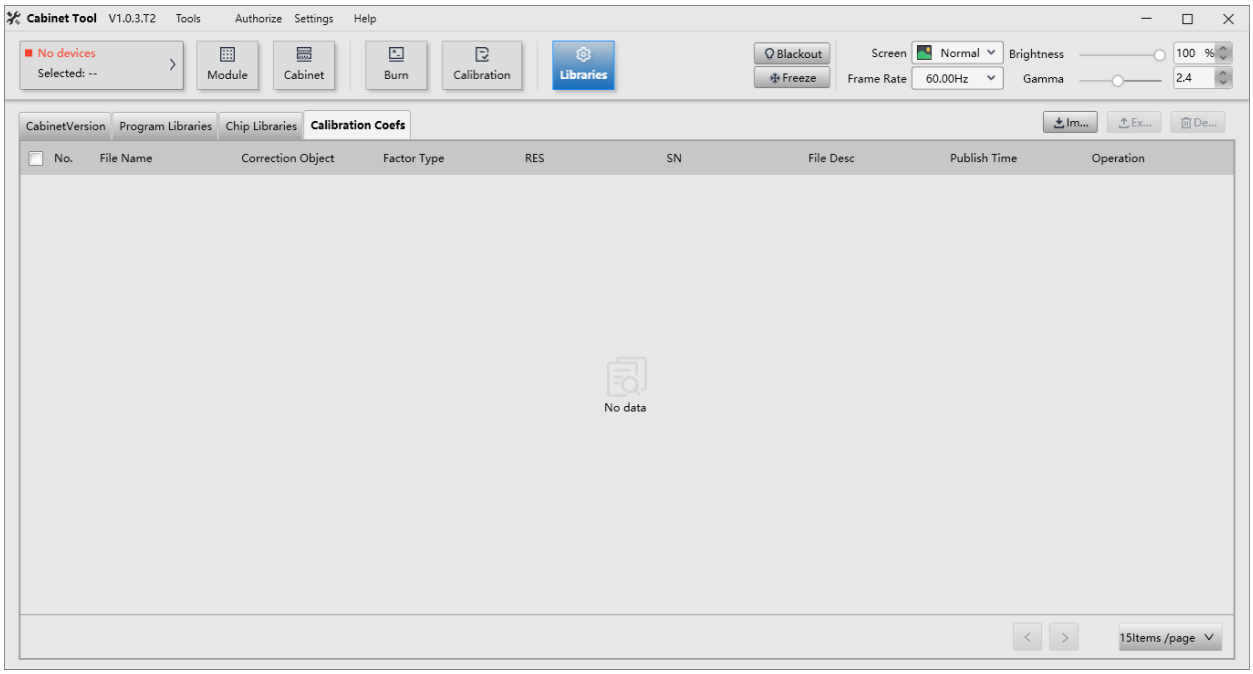
- Delete File

Select one or more files, click **Delete** and then click **OK**.

3.6.4 Manage Calibration Coefs

On the homepage, click **Libraries** and then go to the **Calibration Coefs** tab to import, export, and delete calibration coefficient files.

Figure 3-37 Calibration Coefs



4 Display Management

4.1 Set Test Pattern

Select **Tools** > **Display Test** from the menu bar to set up test patterns.

For detailed instructions, please refer to *Test Tool User Manual*.

4.2 Collect Display Data

Use a colorimeter to collect the display data and save it as a file.

Prerequisites

Use a CA410-VP427, CA410-P427, or CA410-P427H (when brightness is over 3,000 nits) colorimeter and complete the device connection.

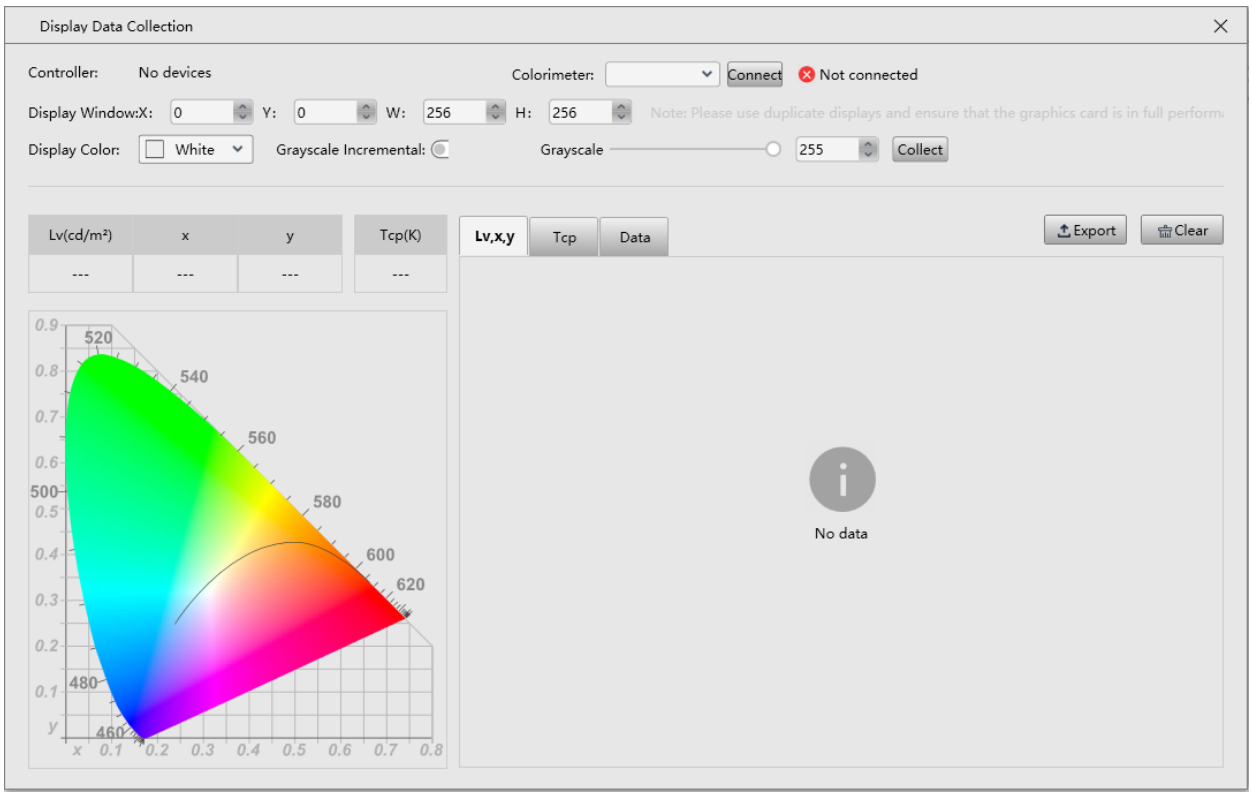
Procedure

Step 1 From the menu bar, select **Tools** > **Collect Display Data**.

Step 2 Select a colorimeter model from the drop-down list.

When the hardware connection is normal, the Cabinet Tool will automatically establish communication with the colorimeter after selecting a model.

Figure 4-1 Display Data Collection



Step 3 Set the window coordinates and dimcensions for the test pattern.

Step 4 Select a color for the test pattern from the drop-down list.

Step 5 Set a fixed grayscale value or enable **Grayscale Incremental** by toggling on and specify the grayscale range.

Step 6 Click **Collect**.

Step 7 Once the collecting process is completed, click **Export**. Then, select a file path on the pop-up window and click **Save**.

To clear the collected data, click **Clear**.

4.3 Screen Control

Click **Blackout** or **Freeze**, or select **Normal** or other images on the top right of the homepage to set the displayed image and set frame rate.

- Blackout: Black out the displayed image and the input image remains normal.
- Freeze: Freeze the displayed image and the input image remains normal.

4.4 Set Brightness and Gamma

Set the brightness and Gamma values on the top right of the homepage.

5 Software Settings

5.1 Changing the display language

From the menu bar, select **Settings** > **Language** and select the target language.

5.2 View Software Information

From the menu bar, select **Help** > **About**. On the pop-up window, click **Release Notes**, **User Agreement**, or **Website** for more detailed information.

5.3 Update

From the menu bar, select **Help** > **Update**. On the pop-up window, check if there is any updated version. If yes, click **Update Now**.

5.4 View User Manual

From the menu bar, select **Help** > **User Manual** to open the Cabinet Tool user manual.

5.5 Export Log

From the menu bar, select **Help** > **Export Log** > choose a path in the pop-up window > click **OK** to export the log.

6 Troubleshooting

6.1 Display flashing when debugging frame rates at certain rates

Issue

When debugging frame rates at certain rates, the screen image is displayed at the right position as supposed, but it actually flickers and flashes.

Possible Causes

Black field time is too low.

Solution

Increase black field time.

6.2 Pixel flickering when debugging at certain frame rate

Issue

When debugging at certain frame rate, the screen image is displayed at the right position as supposed, but pixel flickering can be seen on the screen.

Possible Causes

- Cause 1: DCLK phase and duty cycle are not set correctly.
- Cause 2: Display blurring/flickering at high frame rates may be caused by insufficient receiving card bandwidth or load capacity.

Solution

- Solution 1: Adjust DCLK phase and duty cycle.
- Solution 2: Adjust the configuration.

6.3 The screen brightness is reduced at frame rates over 100 Hz

Issue

The screen brightness is reduced at frame rates over 100 Hz.

Possible Causes

The black field time is too low at higher frame rates.

Solution

Increase black field time.

6.4 Afterglow issue for slash lines

Issue

The afterglow problem occurs when the test pattern contains slash lines.

Possible Causes

- The blanking time is less than 300 ns.
- The line changing time and the blanking time do not match.

Solution

Adjust the line changing time and the blanking time.

6.5 Color cast at low grayscale for gradient test patterns

Issue

The color cast problem occurs when the test pattern is set to gradient.

Possible Causes

The driver chip register values are not correct.

Solution

Adjust the driver IC register values via the **Cabinet** > **Edit** > **Display Mode** tab.

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