

Installation and Maintenance manual

LED DISPLAY

[Models for indoor use]

LD-D091

LD-D121

LD-D151

MODEL: LD-D091, LD-D121, LD-D151

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(2) The contents of this manual are subject to change without notice.
(3) Great care has been taken in the preparation of this manual; however, should you notice any questionable points, errors or omissions, please contact us.
(4) The image shown in this manual is indicative only. If there is inconsistency between the image and the actual product, the actual product shall govern.
(5) Notwithstanding articles (3) and (4), we will not be responsible for any claims on loss of profit or other matters deemed to result from using this device.

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Important Information

Safety Precautions and Maintenance

FOR OPTIMUM PERFORMANCE, PLEASE NOTE
THE FOLLOWING WHEN SETTING UP AND
USING THE LED DISPLAY SYSTEM:

About the Symbols

To ensure safe and proper use of the product, this manual uses a number of symbols to prevent injury to you and others as well as damage to property. The symbols and their meanings are described below. Be sure to understand them thoroughly before reading this manual.

 WARNING	Failing to heed this symbol and handling the product incorrectly could result in accidents leading to major injury or death.
 CAUTION	Failing to heed this symbol and handling the product incorrectly could result in personal injury or damage to surrounding property.

Examples of symbols

	⚠ Indicates a warning or caution. This symbol indicates you should be careful of electric shocks.
	⊘ Indicates a prohibited action. This symbol indicates something that must be prohibited.
	● Indicates a mandatory action. This symbol indicates that the power cord should be unplugged from the power outlet.

- Be sure to read the following before using the product to use it correctly and safely.



WARNING



Do not apply vibrations or shocks to the product.



Do not install the product to unstable locations or locations subject to vibrations.



Always ask a technician to perform the installation.



Do not connect the cables with wet hands. Otherwise, it may cause an injury or an electrical shock.



Do not repair or modify the product yourself. Otherwise, it may cause an injury, a fire or an electrical shock.



In case of thunder, do not touch the power cord. Otherwise, it may cause an electrical shock.



Connect the product to the correct voltage. If the product is connected to a voltage other than the specified voltage, it may lead to a fire or an electrical shock.



In case of a malfunction (nothing is displayed on the screen, etc.) or if smoke, abnormal heat, or a strange sound or odor is generated, turn the power off and immediately ask a technician or your retailer for repair.



Install the product so that the vents are not obstructed.



Make sure there are enough people available to ensure safety (at least two people) when installing or moving the product. Otherwise, it may lead to an injury.



Be sure to ground the product. If the product is not grounded, there is a risk of electrical shock in case a malfunction occurs.



In case foreign matter has entered into the product, immediately disconnect the power supply and stop using the product.



After the installation, if a problem such as loose screws occurs, immediately ask a technician or your retailer for repair.



Do not put objects into the product. Otherwise, it may cause a fire or an electrical shock.



In case the product is in contact with water or another liquid, immediately disconnect the power supply and stop using the product. If you continue using the product in that state, it may lead to a malfunction, a fire, or an electrical shock.



When using the power connector (WAGO), do not use it outdoors or in a humid environment. Otherwise, it may cause a fire or an electrical shock.

CAUTION



When connecting the power cord to the product's AC IN terminal, make sure the connector is fully and firmly inserted.



Do not damage the power cord. Do not put heavy objects on it, place it near heaters, pull it with excessive strength, or apply a strong force on it while it is bent. A damaged power cord may cause a fire or an electrical shock.



Do not install the product in narrow places where heat tends to build up.



Do not use the product in an environment with low heat dissipation. Otherwise, it may cause a malfunction.



The RJ-45 port of the product is for use with the product only. Do not connect it to a network. Connecting this port to a network that may receive over-voltage current may cause damage to the product or an electrical shock.



Do not use the product in a vehicle or another means of transportation.



Do not place the product under direct sunlight or near heaters.



This product is designed to be used indoors. Do not use it outdoors. Otherwise, it may cause a malfunction.



Do not use or store the product in the following places.

- Near heaters
- Places with lots of humidity or dust, or places subject to oily smoke
- Places where water or oil may splash
- Places with lots of corrosive gases, such as near hot springs
- Places where the product may freeze
- Do not place the product on its side, face down, or upside down.
- Places with lots of vibrations



If you will not be using the product for a long time, disconnect it from the power distributor for safety purposes.



Disconnect the power supply when performing the maintenance.



Install the product in accordance with the local laws and regulations.



Use ESD gloves when handling Pixel cards to prevent static electricity from the human body and contamination due to finger oils, perspiration salts, flaking skin, and/or other forms of human excretory secretions. The LED displays and their electrical components are sensitive to biological agents and exposure to such risks degradation of materials and performance.

Eliminate any static electricity from your body before touching the Pixel cards by touching an aluminum sash, a door knob, or some other metal object.

This product can only be serviced in the country where it was purchased.

Recommended Use & Maintenance

About the LED lamps



The surface of the pixel card is vulnerable to shocks, so do not press or hit the surface.



LED lamps are sensitive to static electricity and surge voltage, which may damage their components and decrease their reliability.

Take measures against static electricity during the installation. Do not touch the LED display areas.



When you install the product or when you use it for the first time after leaving it unused for a long time, follow the instructions below.

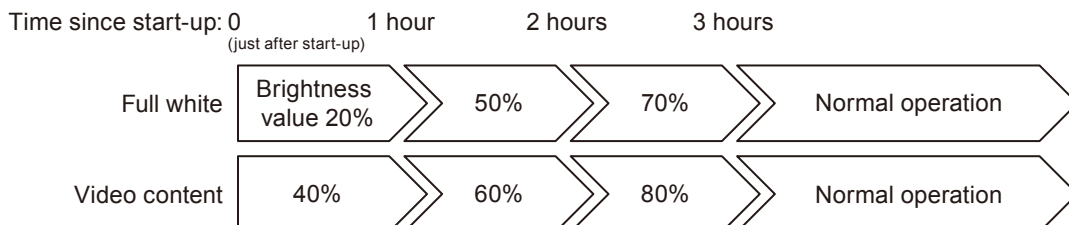
The LED lamps may absorb and hold moisture during the LED display installation or if not used for a long time. Therefore, in such cases, the brightness must be increased gradually during a break-in period before setting the normal brightness.

If the LED lamps are lit with 100% brightness while moisture is retained, the temperature will rise very quickly and the water inside the lamps will evaporate and expand. This will cause the encapsulating resin to expand, which may lead to separation of the boundary surface inside the LED lamps. This separation can cause the LED lamps not to light up properly.

Lamp break-in

Configure the brightness settings as shown below with a video displayed on the LED display.

After a break-in period of approximately 3 hours, the LED display can be used under normal conditions.

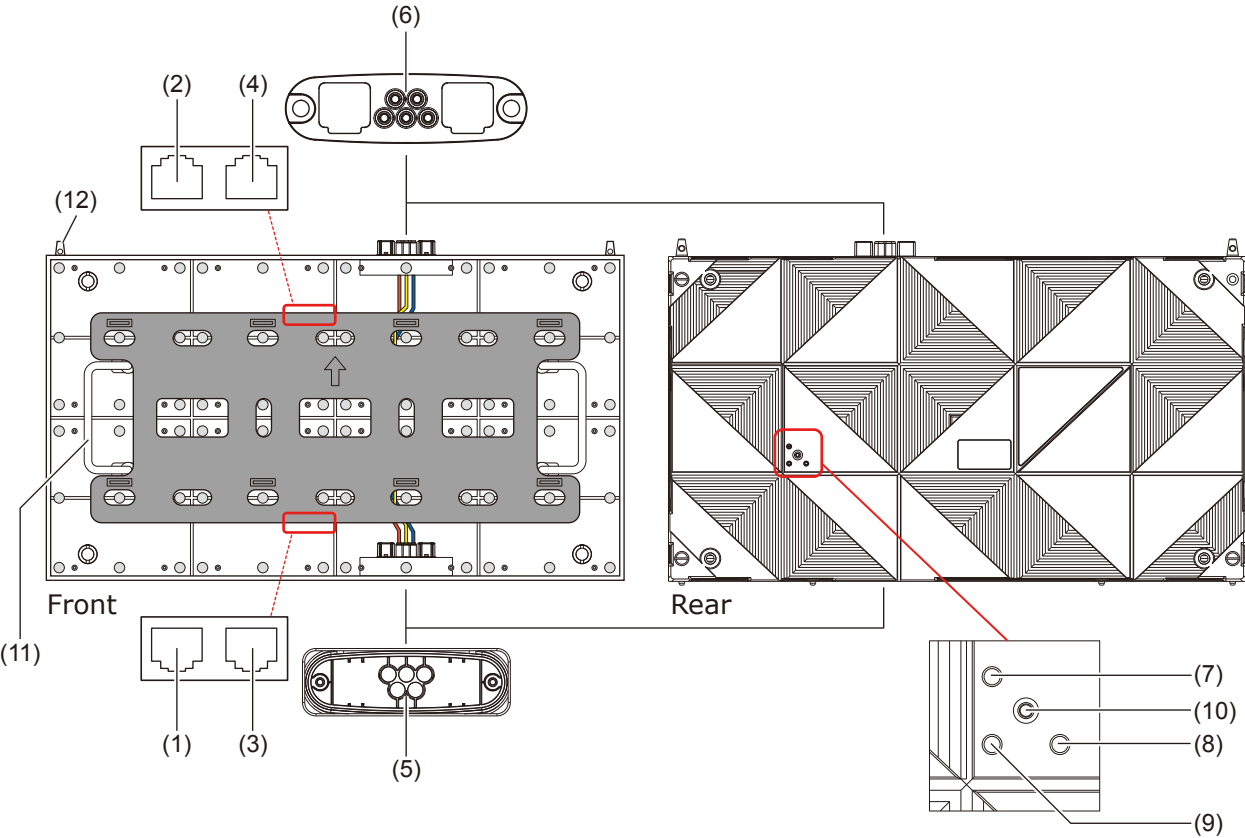


About the Pixel card



The surface of the pixel card is easily scratched, so handle it with care so as not to push or rub it with a hard object. Be careful not to stain the surface of the pixel card with your fingers. If the surface of the pixel card becomes dirty, wipe it gently with a dry cloth. Also, use a clean cloth and avoid using the same cloth repeatedly.

Parts Name

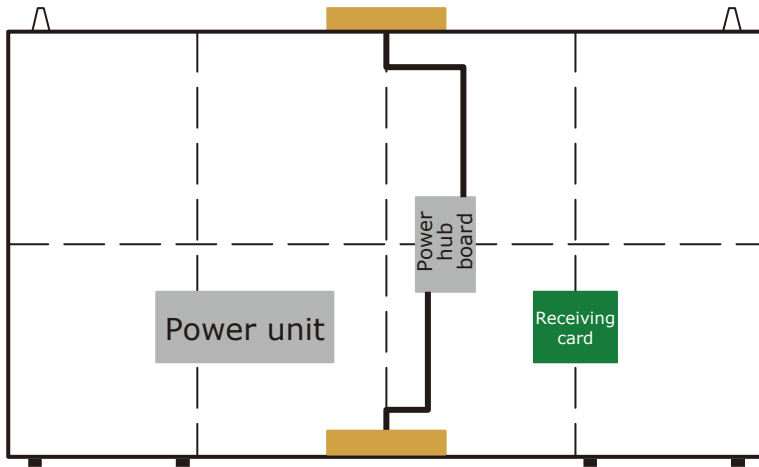


Name	Description
Interface connectors	Input and output connectors for the signal and AC power.
(1) (2) Signal input/output	To input the signal from the LED controller or the previous LED display. When a signal is input into (1), the signal is output from (2). When a signal is input into (2), the signal is output from (1).
(3) (4) Signal input/output	Not functioning with this product.
(5) (6) Power input (output)	When AC power is input into (5), AC power is output from (6). When AC power is input into (6), AC power is output from (5). Do not input AC power into both (5) and (6).
(7) Status lamp (red)	Lights up when power is on.
(8) Status lamp (blue)	Not functioning with this device.
(9) Status lamp (green)	Flashes at intervals of approximately 4 seconds when no signal is input. Flashes at intervals of about 1 second when a signal is being input.
(10) Test button	Used to display the test patterns. The displayed pattern changes each time the test button is pressed. The signal from the LED controller must be interrupted to display a test pattern.
(11) Handle	Use the handles when carrying and installing the cabinet.
(12) Guide pin	Used to align the cabinets when installing them on top of each other.

There are three types of cabinets.

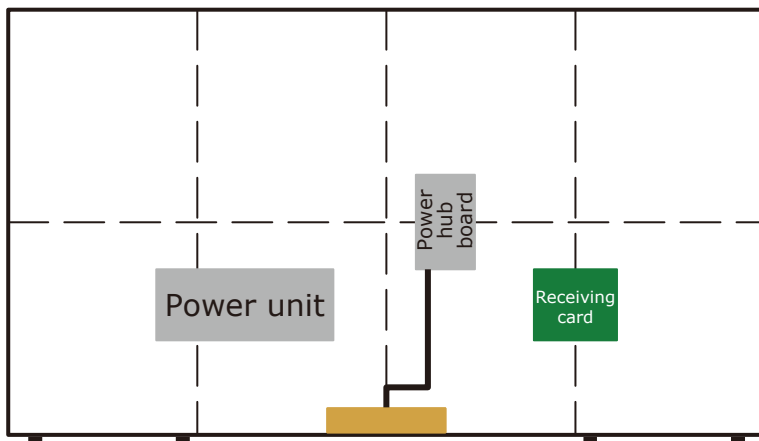
(1) When using other than the top

The connectors are equipped on the top and bottom sides. There are guide pins on the top.



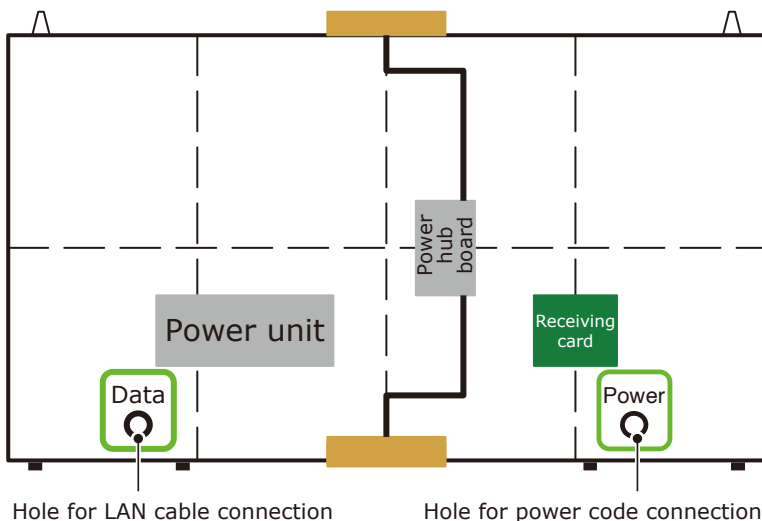
(2) When used at the top

There are no connectors on the top side. There are no guide pins.



(3) When connecting a LAN cable from the middle

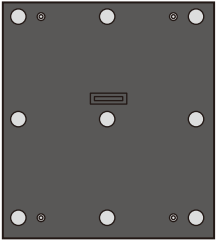
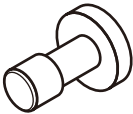
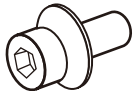
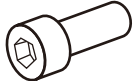
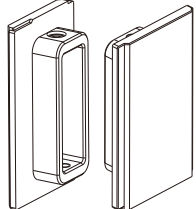
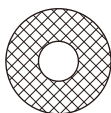
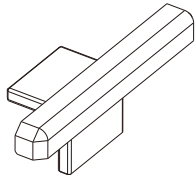
There is a hole for LAN cable connection on the rear.



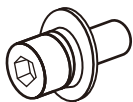
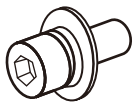
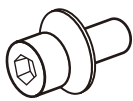
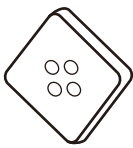
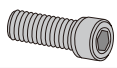
Set name list

4 x 4 frame set	LD-D121 x 16
5 x 5 frame set	LD-D151 x 25
6 x 6 frame set	LD-D091 x 36
8 x 8 frame set	LD-D121 x 64

Contents

No.	Parts	Specifications	Quantity				
			4 x 4 frame set	5 x 5 frame set	6 x 6 frame set	8 x 8 frame set	
	Pixel card pitch 0.9, 1.2, 1.5	152 x 171 mm	128	200	288	512	
	Cabinet	608 x 342 mm	16	25	36	64	
	Cabinet hanger pin	Head diameter 15 mm, thickness 5 mm, M8 external dental pattern, axis length 17 mm, stainless steel color	35 (30+5*1)	45 (40+5*1)	75 (70+5*1)	113 (108+5*1)	
1	Power bar cover plate		1	1	1	2	
2	Power bar screw (M8x20)	Hexagon socket head screw	17 (12+5*1)	21 (16+5*1)	25 (20+5*1)	29 (24+5*1)	
3	Power bar		1	1	1	2	
4	Power bar connecting part		-	-	-	1	
5	Screw for Power bar connecting		-	-	-	17 (12+5*1)	
6	Screw for corner frame bottom (M6x12)	Hexagon socket head screw	7 (2+5*1)	7 (2+5*1)	7 (2+5*1)	7 (2+5*1)	
7	Corner frame bottom (left, right)		2	2	2	2	
8	Overframe (left, right)		2	2	2	2	
9	Mounting bar		3	4	5	6	
	Washer		17 (12+5*1)	25 (20+5*1)	35 (30+5*1)	53 (48+5*1)	
10	Corner frame top (left, right)		2	2	2	2	
11	Overframe (top)		1	1	1	2	
	Slot nut		15 (10+5*1)	17 (12+5*1)	17 (12+5*1)	23 (18+5*1)	

*1: Spare parts

No.	Parts	Specifications	Quantity				
			4 x 4 frame set	5 x 5 frame set	6 x 6 frame set	8 x 8 frame set	
	Screw for overframe (M4×4)	Hexagon socket head screw	8 (3+5*1)	9 (4+5*1)	9 (4+5*1)	10 (5+5*1)	
	Screw for overframe (M4×8)	Hexagon socket head screw	12 (7+5*1)	13 (8+5*1)	13 (8+5*1)	18 (13+5*1)	
	Screw for cabinet (to Power bar) (M8×25)	Hexagon socket head screw	13 (8+5*1)	15 (10+5*1)	17 (12+5*1)	21 (16+5*1)	
	Adjustment plate		10	12	14	18	
	Screw for Adjustment plates	Hexagon socket head screw (M4 x 16)	45 (40+5*1)	53 (48+5*1)	61 (56+5*1)	77 (72+5*1)	
	Screw for connecting cabinets (M8×25)		53 (48+5*1)	85 (80+5*1)	125 (120+5*1)	229 (224+5*1)	
	LAN cable for the LED displays	120 mm	12	20	18	48	
	LAN cable between LED controller and display	20000 mm	4	5	18	8	
		24000 mm	-	-	-	8	
	Alignment bar		2	2	2	2	
	USB flash memory		1	1	1	1	
	Safety Manual		1	1	1	1	
	Precautions for installation sheet		1	1	1	1	

*1: Spare parts

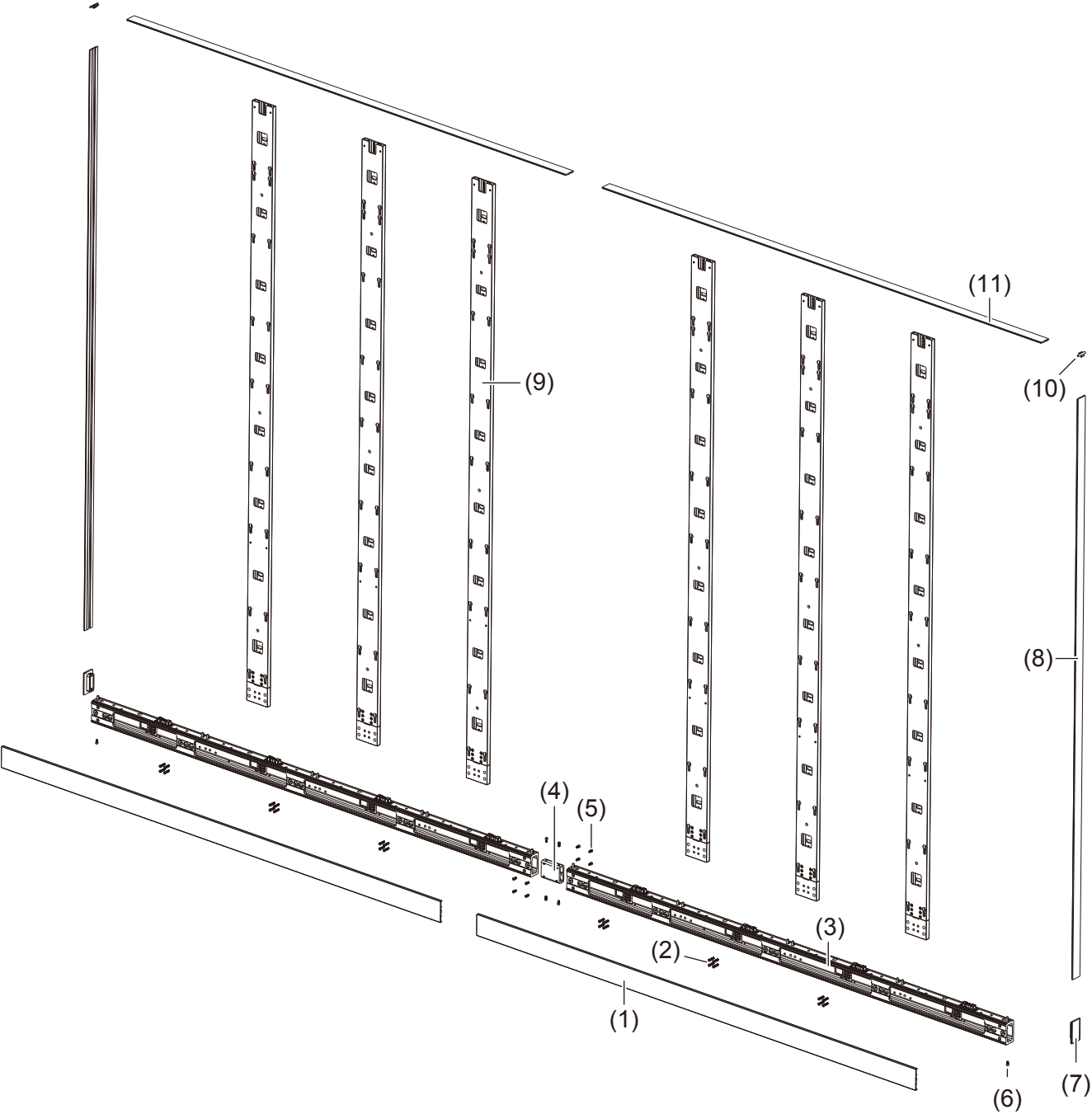
Four different wall-mount frames can be used depending on the system size. For other configurations, please contact your retailern.

Prepare by yourself

No.	Parts	Specifications	Quantity				
			4 x 4 frame set	5 x 5 frame set	6 x 6 frame set	8 x 8 frame set	
	LED controller	Novastar MCTRL660 PRO	1	1	-	-	
		Novastar MCTRL4K	-	-	2	1	
		Power cord for the LED controller	1	1	2	1	
	Power cord*2		*2	*2	*2	*2	

*2: Can be ordered by optional

8 x 8 frame set



Installation Example

1. Installation location

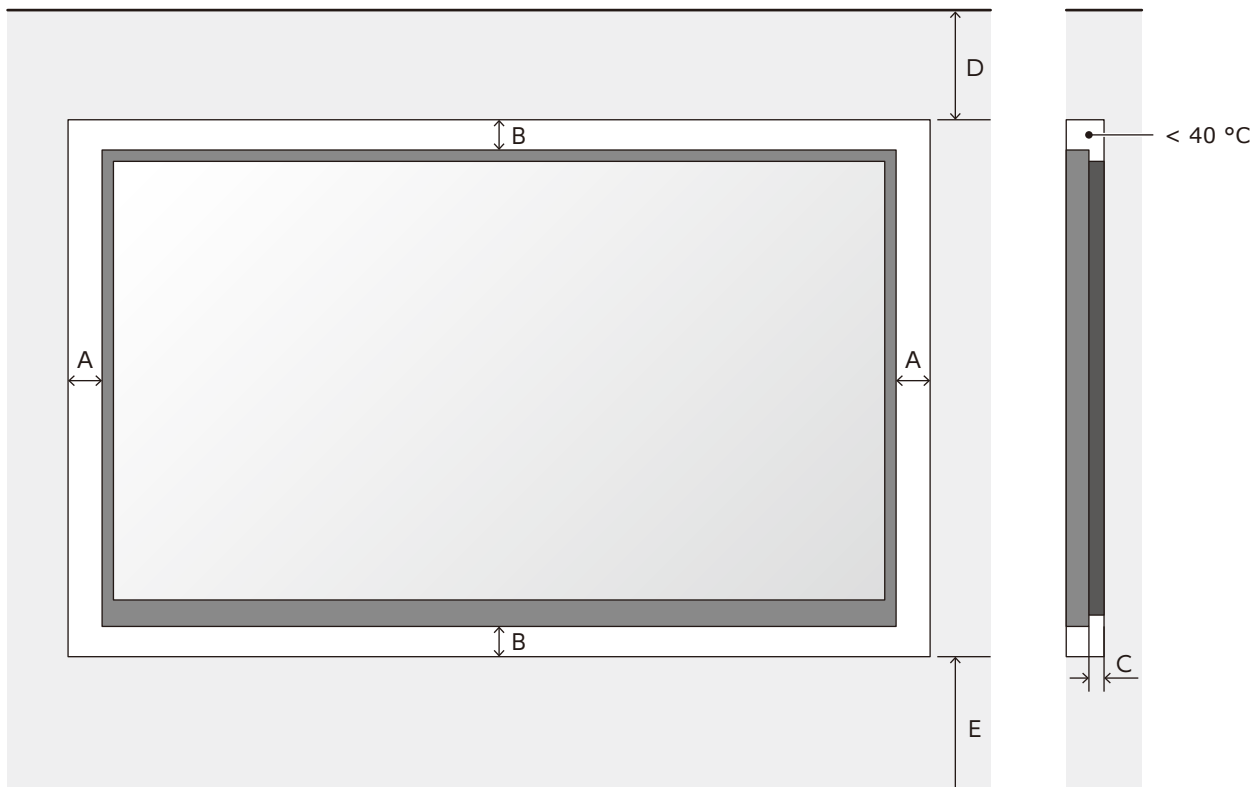
Before the installation, be sure to review the following safety precautions to ensure proper and safe installation.

⚠ CAUTION

- Ask a technician to perform the installation.
- Make sure the product is moved and installed by enough people to ensure safety.
- Make sure that the beams or the other structures to which the product is installed have enough strength to support the weight of the product, and make sure that the product is securely fixed.
- Do not install directly the product to a surface that has not enough strength.
- When installing the product in an environment with much dust or dirt, be careful to prevent such material from adhering to the connectors on the hub board and pixel card.
Adhesion of dust or dirt to the connectors may cause poor contact, leading to abnormalities of video display.
- When installing the product in a narrow place (in a wall, etc.), leave enough gaps around the LED screens to prevent an increase in the temperature.
Make sure to use the product lower than the normal operating temperature.
The top of the LED display should always be installed so that the temperature is below 40°C.
Pay particular attention to the installation environment (heat from the external environment, direct sunlight, heat generated by the number of displays) in order to facilitate cooling of the LED displays. If cooling is not sufficient, take measures, such as increasing the distance from the walls or installing a forced-air cooling system.
Ask a technician or your retailer for more details.

There is an example for setting.

In wall setting

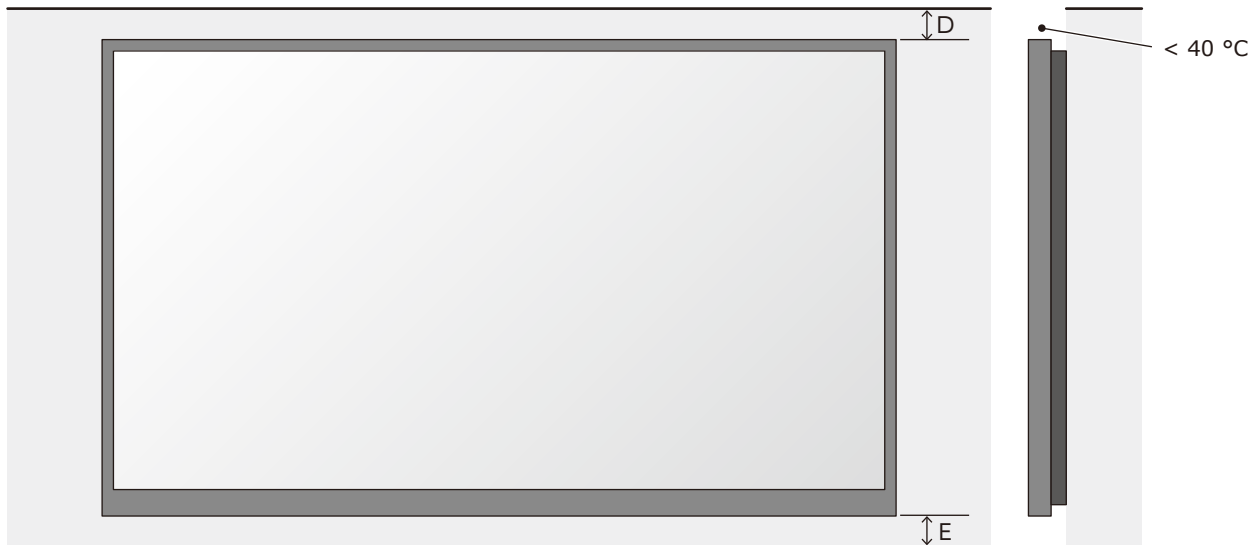


A	B	C
min. distance to sides	min. distance to top and bottom	min. distance between wall and system
60 mm	60 mm	20 mm

D	E
Recommended distance to ceiling	Recommended distance to floor
500 mm*	500 mm*

*: Depending on the temperature condition.

Wall mounting setting



D	E
Recommended distance to ceiling	Recommended distance to floor
500 mm*	500 mm*

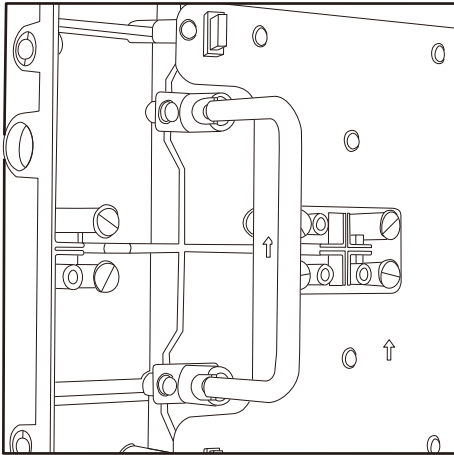
*: Depending on the temperature condition.

If the distances are lower than these value, the cooling might not sufficient. Take measures, such as increasing the distance from the walls or installing a forced-air cooling system.

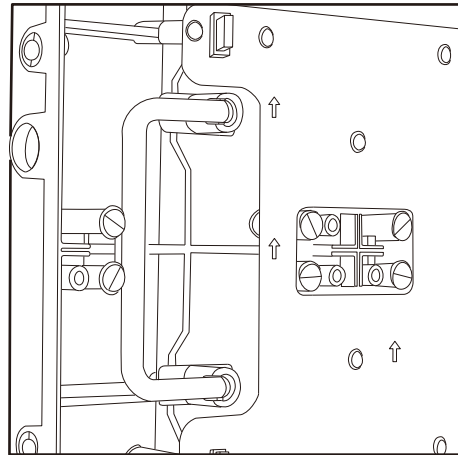
2. Handle

Use the handles when carrying and installing the cabinet.

Put the handles in their original positions after the installation work has been completed.



When carrying or installing the cabinet, pull out the handles on both sides.

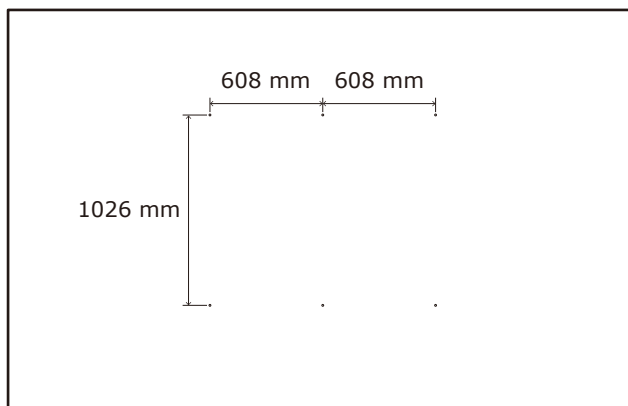


Put the handles back after the work has been completed.

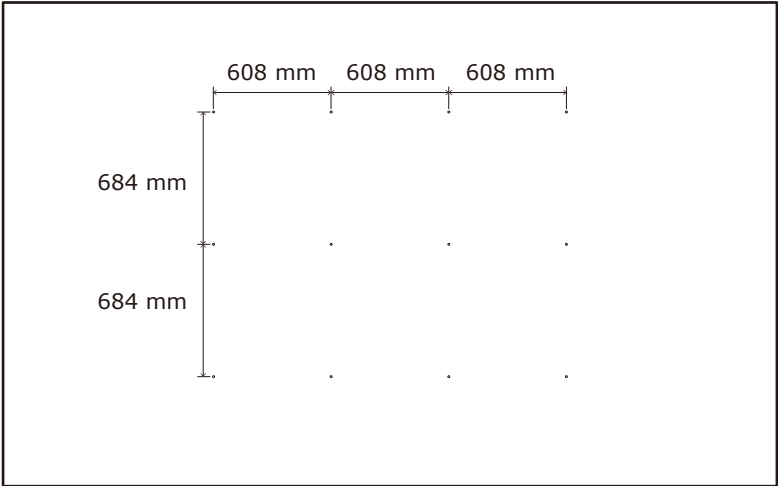
3. Mark the positions of the anchor points on the wall

- Mark the positions of the holes you will make for the anchor points (refer to the figures below and the "Anchor points number and positions" table on the next page).
- Before making the holes, check the verticality of the marks using a spirit level or a laser line level. (We recommend using a laser line level is recommended for accuracy.)

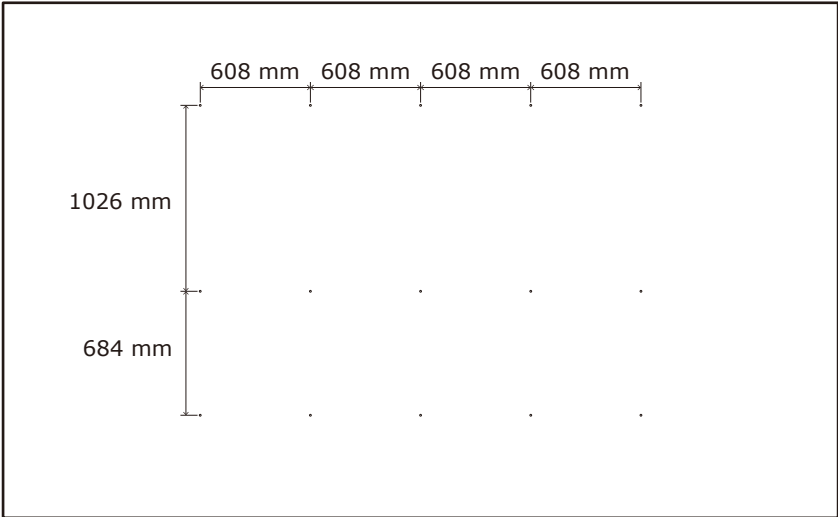
Anchor points positions: 4 x 4 frame set



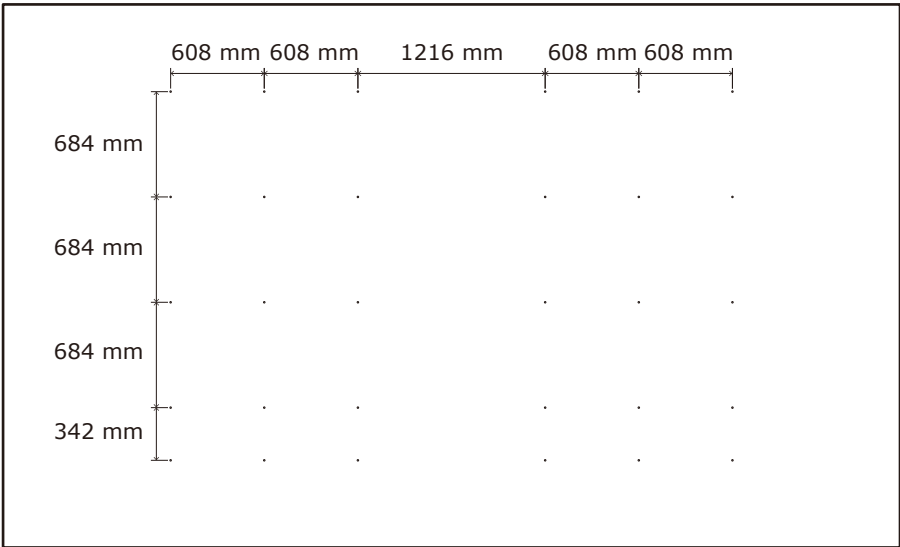
Anchor points positions: 5 x 5 frame set



Anchor points positions: 6 x 6 frame set



Anchor points positions: 8 x 8 frame set



Anchor points number and positions

Frame set	4×4	5×5	6×6	8×8
Anchor points (horizontal x vertical)	3×2	4×3	5×3	6×5
Horizontal distance	608 mm	608 mm	608 mm	Distance center: 1216 mm Others: 608 equally
Vertical distance	1026 mm	684 mm equally	Distance top row – middle row: 1026 mm Distance middle row – bottom row: 684 mm	Distance Bottom row: 342 mm, others 684 mm equally
Anchor size	Ø10 mm	Ø10 mm	Ø10 mm	Ø10 mm

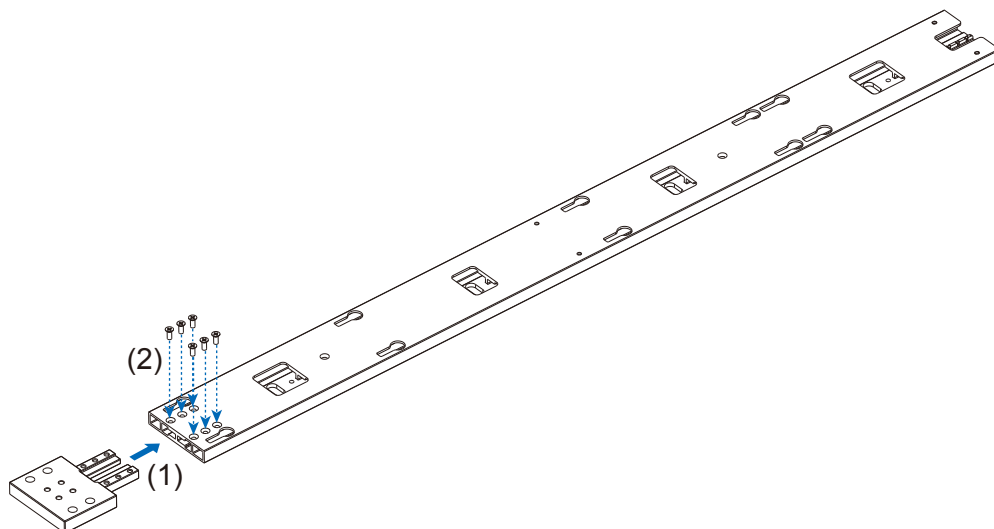
4. Make the holes at the anchor positions

- Make holes at the anchor positions using a suitable tool.
- Use screw anchors/anchor plugs as required.
- Remove the dust or dirt, and wipe off any drilling chips and dust.

5. Preparing mounting bar

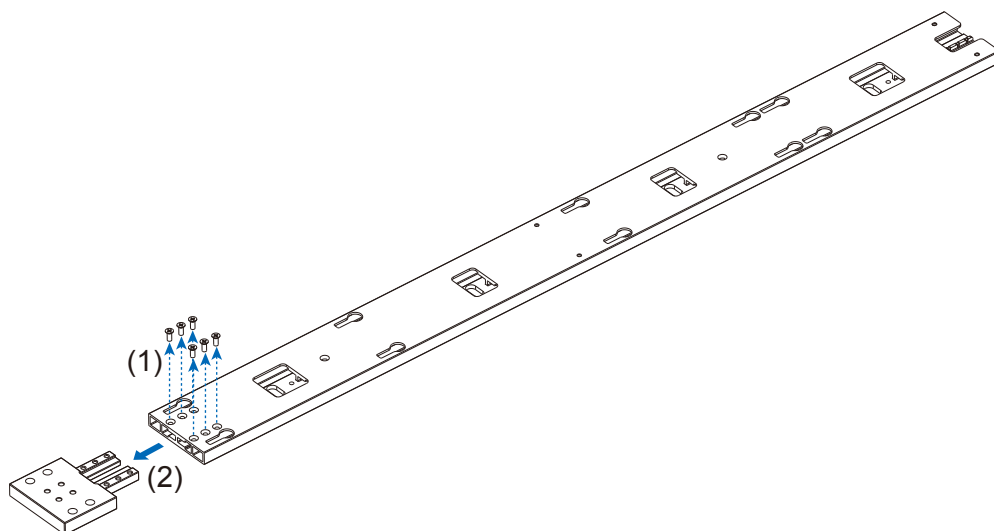
Attaching mounting bar connector

Insert the mounting bar connector and tighten it securely with 6 screws (M6 x 14).



Removing mounting bar connector

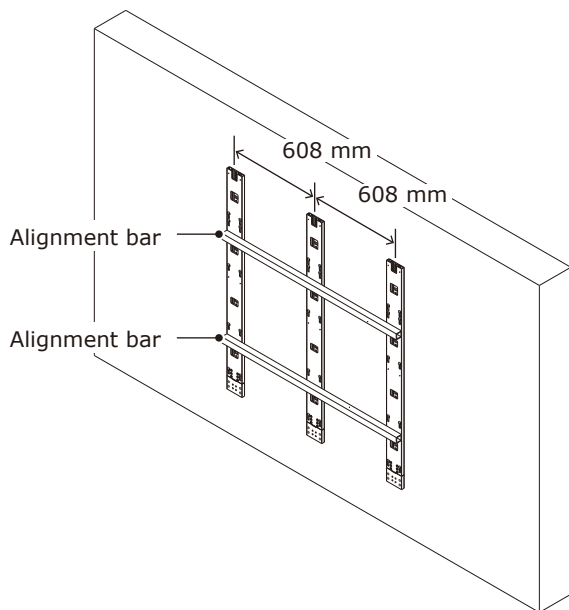
Remove the 6 screws (M6 x 14) holding the mounting bar connector, and pull out the mounting bar connector.



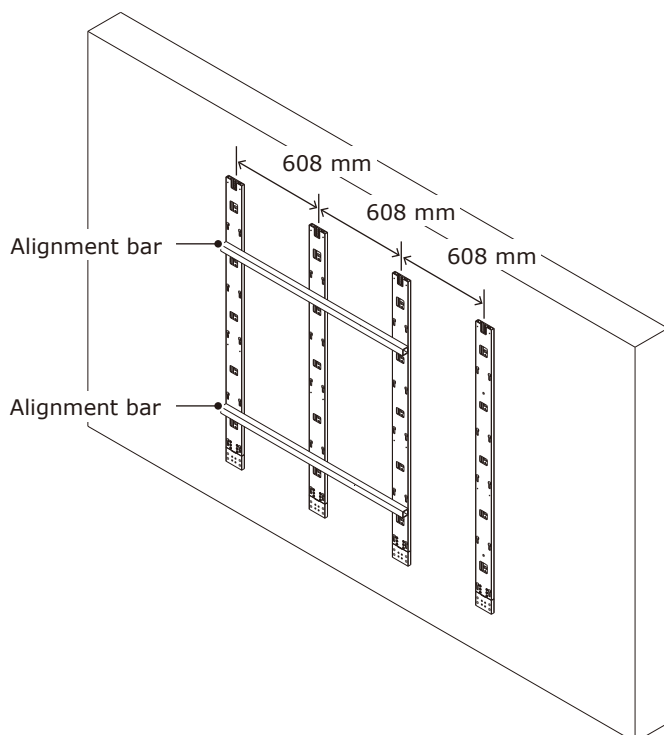
6. Install the mounting bars

- (1) Install the mounting bars on the anchor points on the wall.
- (2) Check the distance between the mounting bars using the alignment bars.

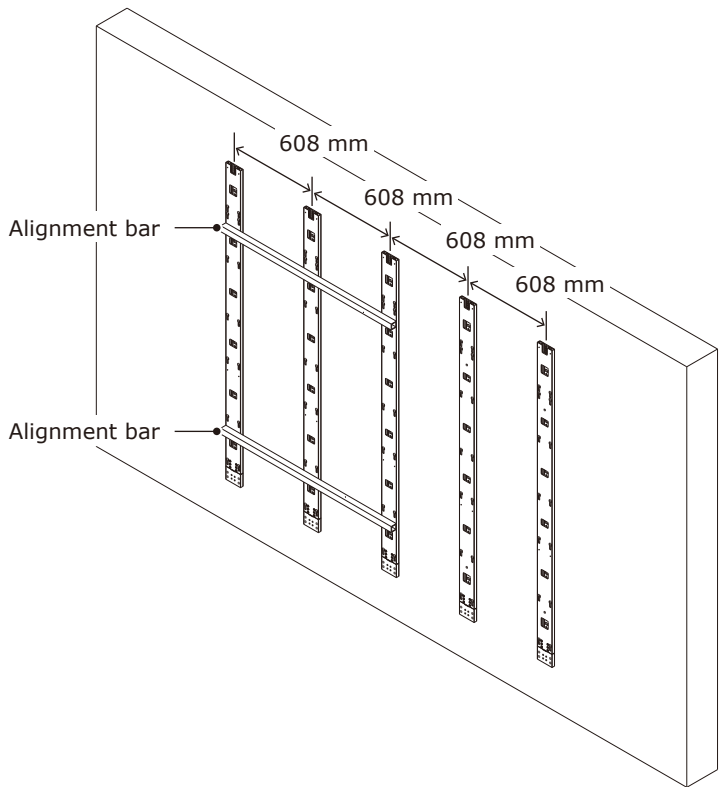
4 x 4 frame set



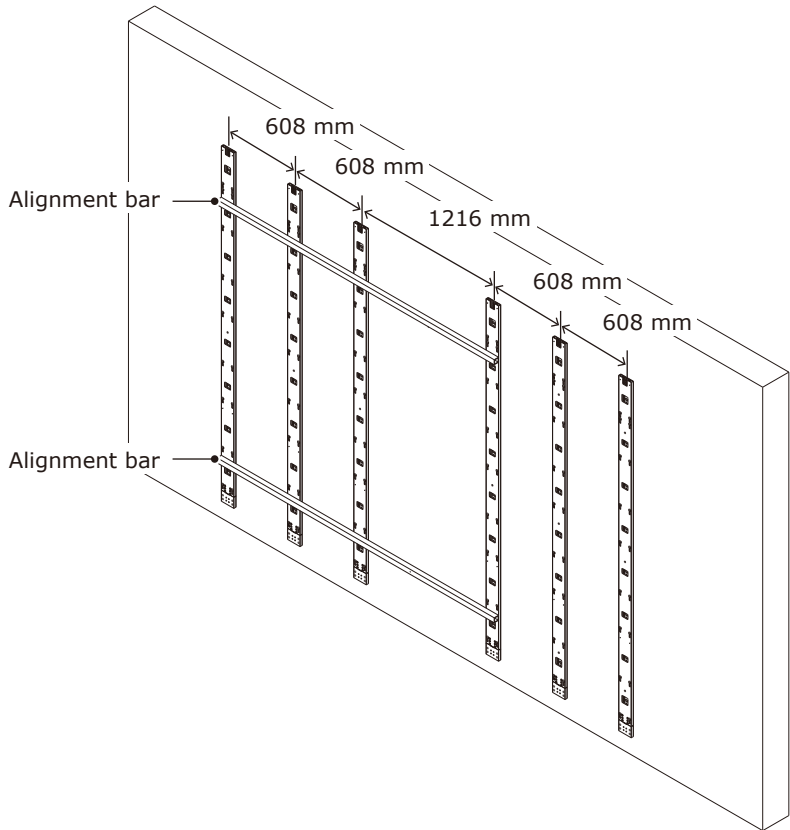
5 x 5 frame set



6 x 6 frame set

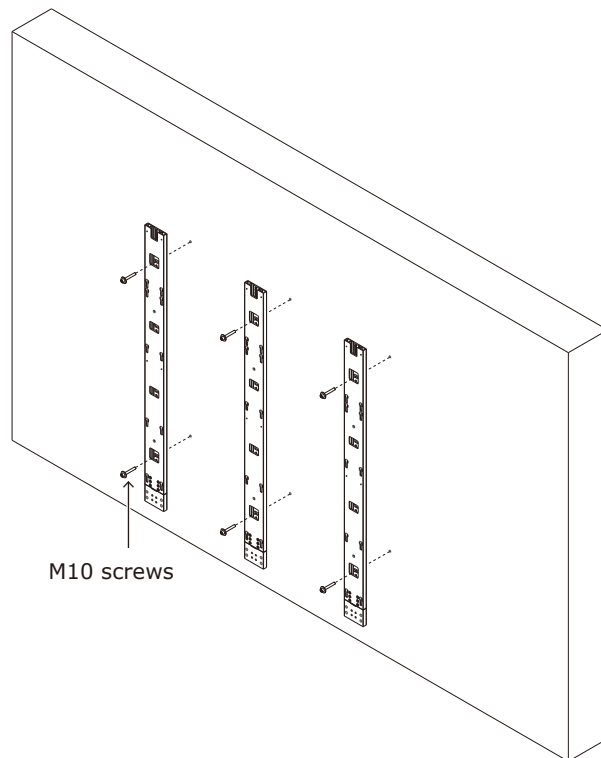


8 x 8 frame set



- (3) Check the evenness using a spirit level or a laser line level and the alignment bars together. Adjust the positions if required.

Wall mounted: Mounting bar installation (4 x 4 frame set)

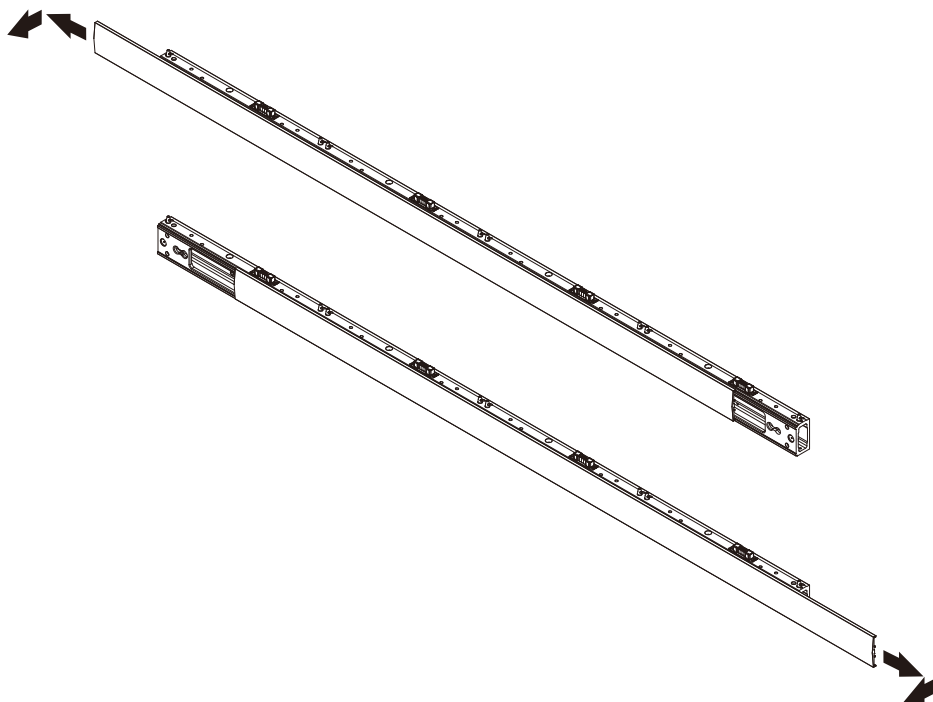


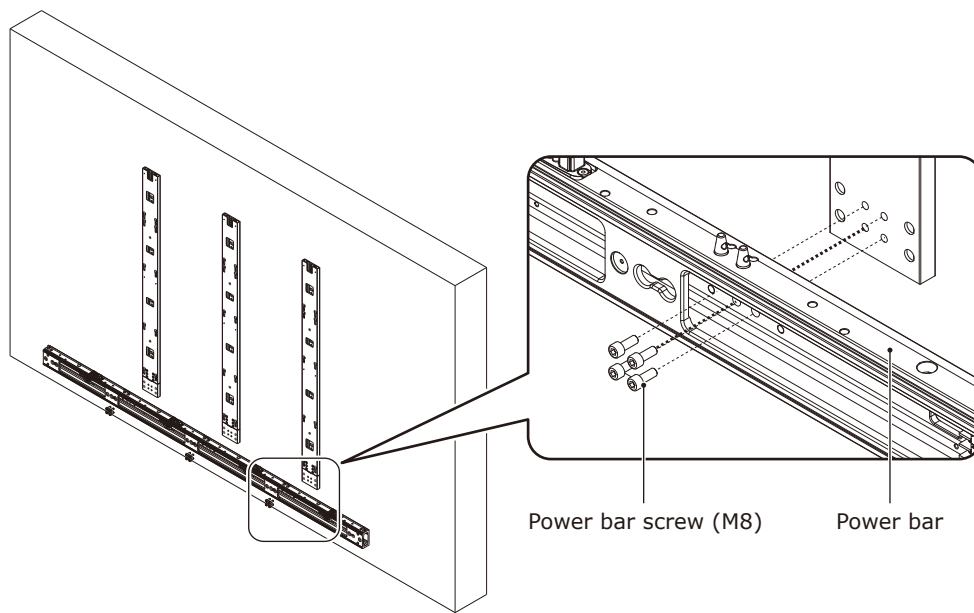
7. Install the power bar

Remove the power bar cover and install the power bar using Power bar screw (M8) screws.

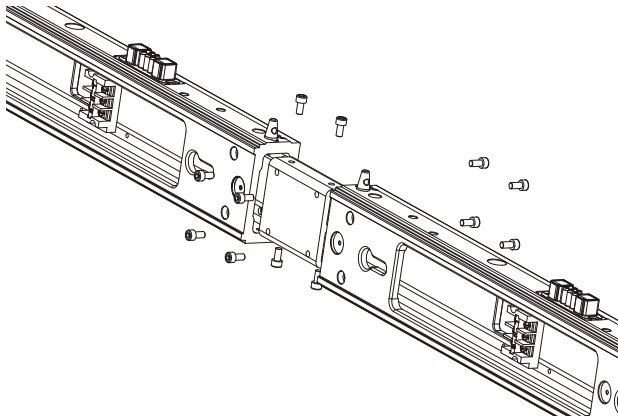
How to remove the power bar cover

Sliding the power bar cover for removing. Power bar cover can slide left or right.



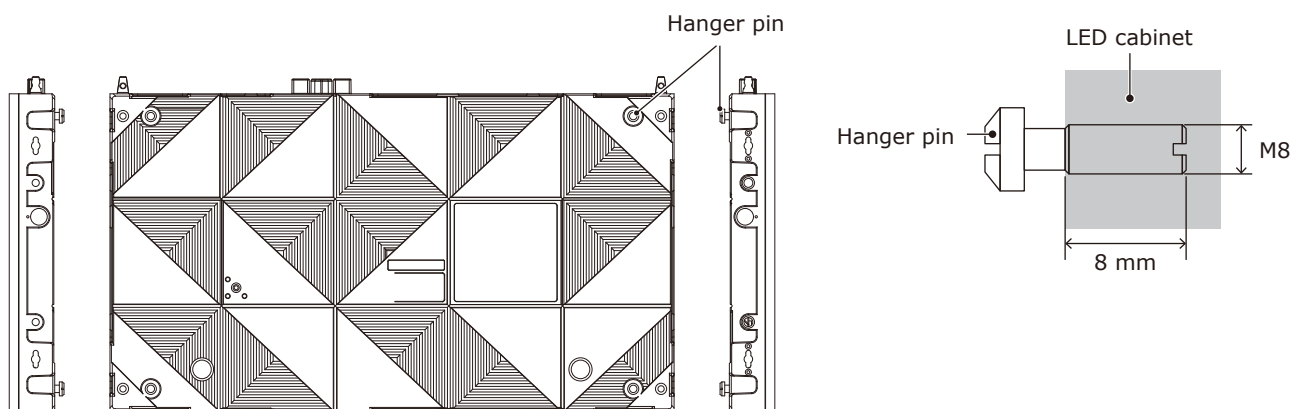


When using the 8 x 8 frame set, use the power bar connecting part to install the power bar.

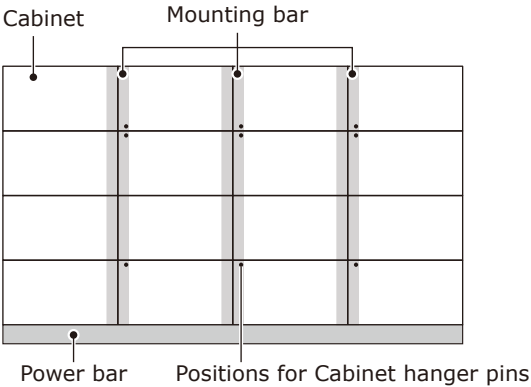


8. Install the cabinet hanger pins to the back of the cabinets

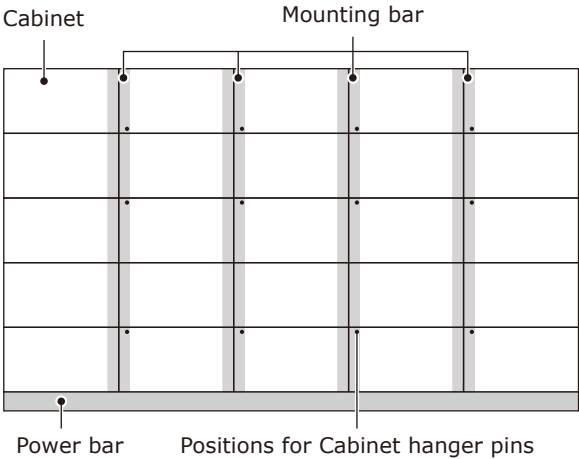
The following drawings indicate where Hanger pins are required. Insert the Hanger pins until the pitch of the screws is no longer visible.



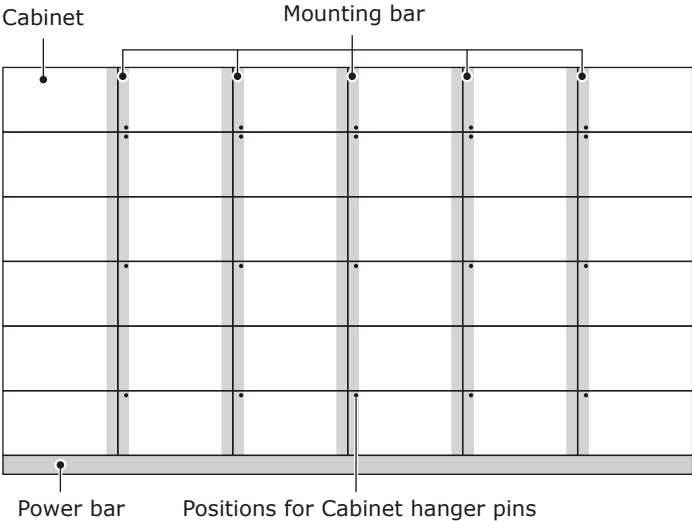
Cabinet hanger pins installation position
4 x 4 frame set



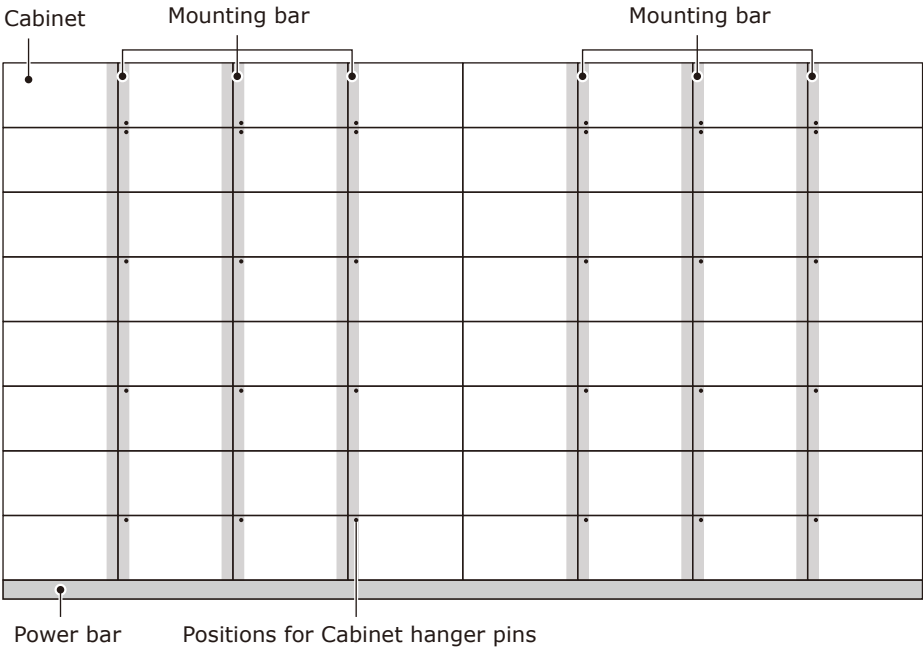
5 x 5 frame set



6 x 6 frame set

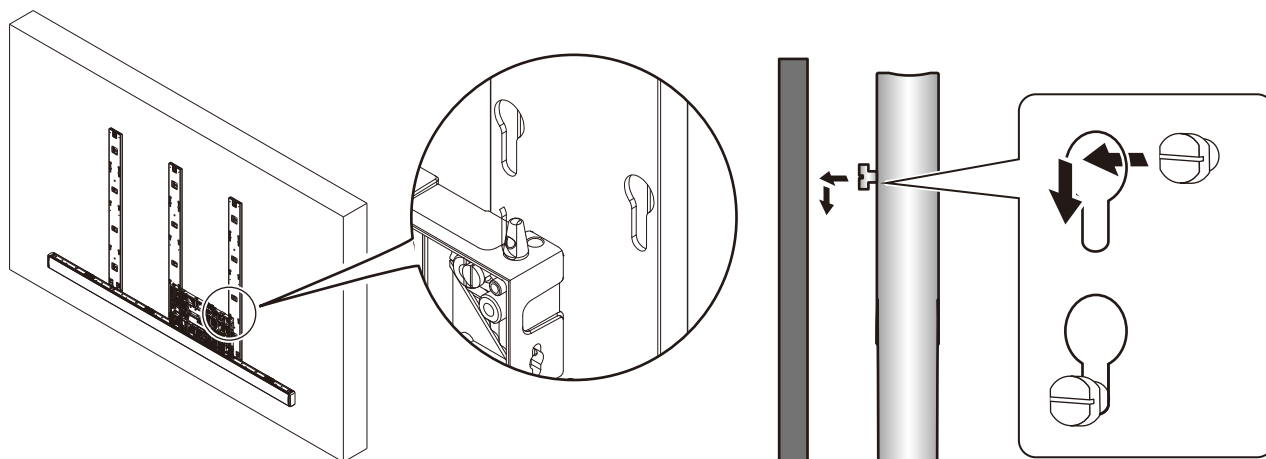


8 x 8 frame set

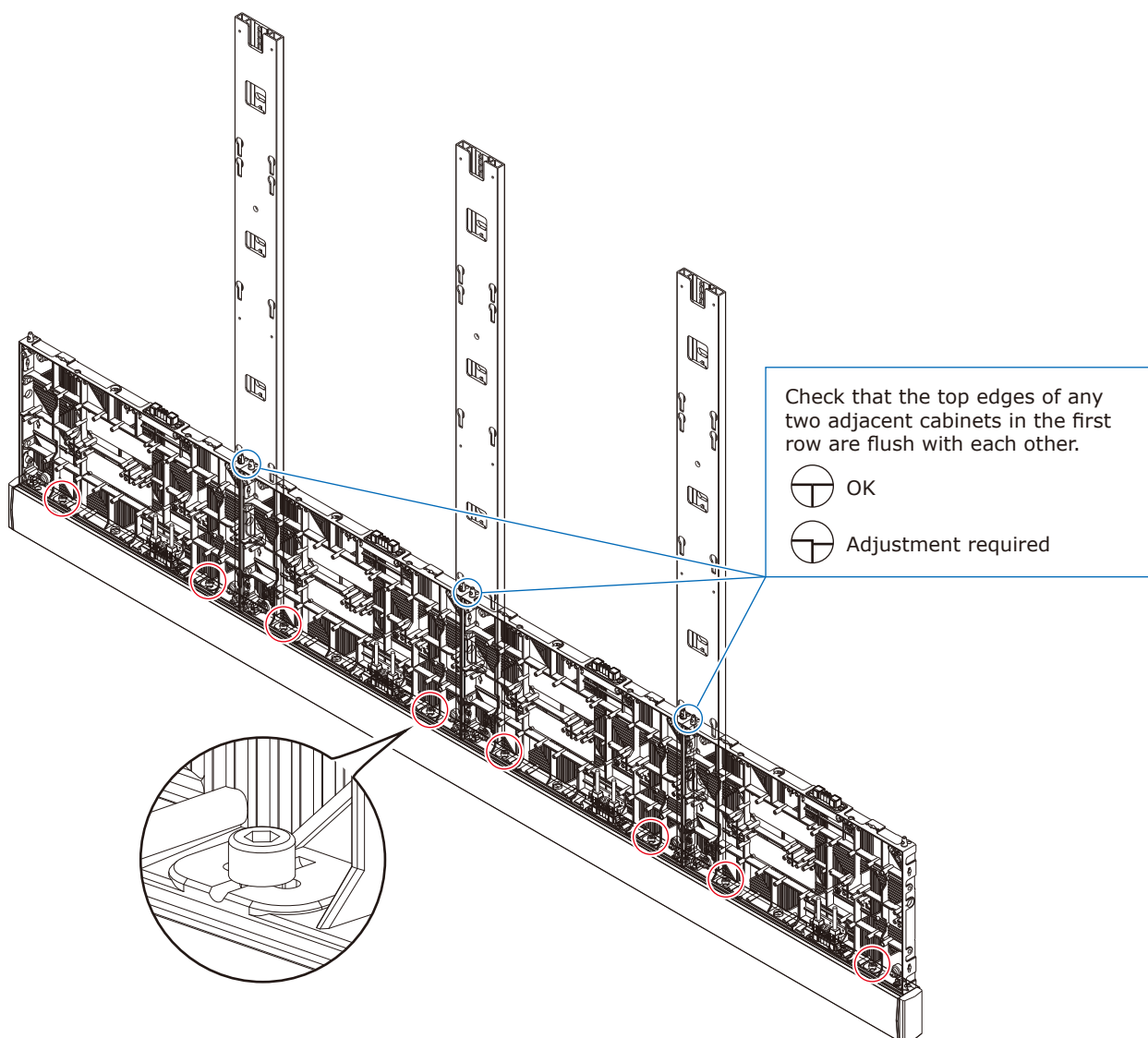


9. Install the cabinets

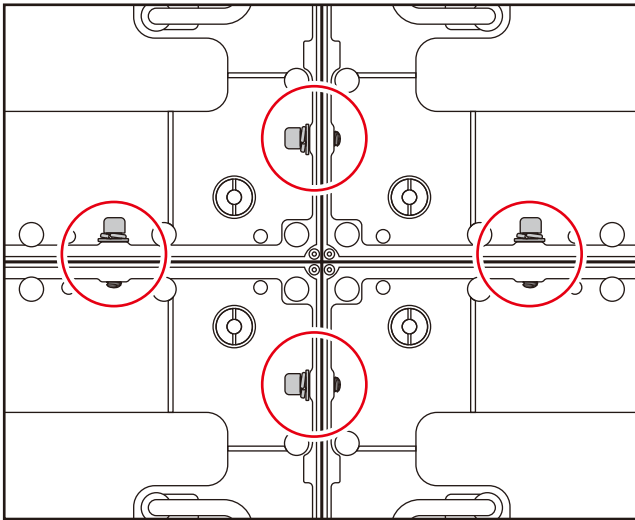
Hook the hanger pins, which have been inserted into the cabinets, into the holes on the mounting bars starting from the lowest row.



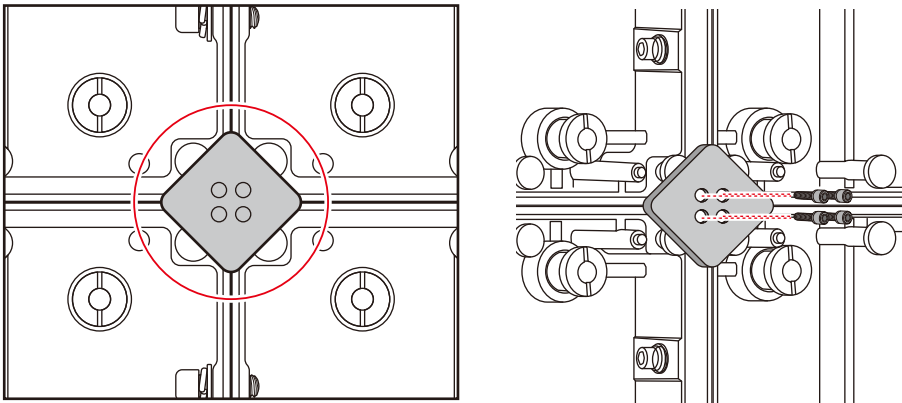
Fix temporarily the cabinets of the first row to the power bar.



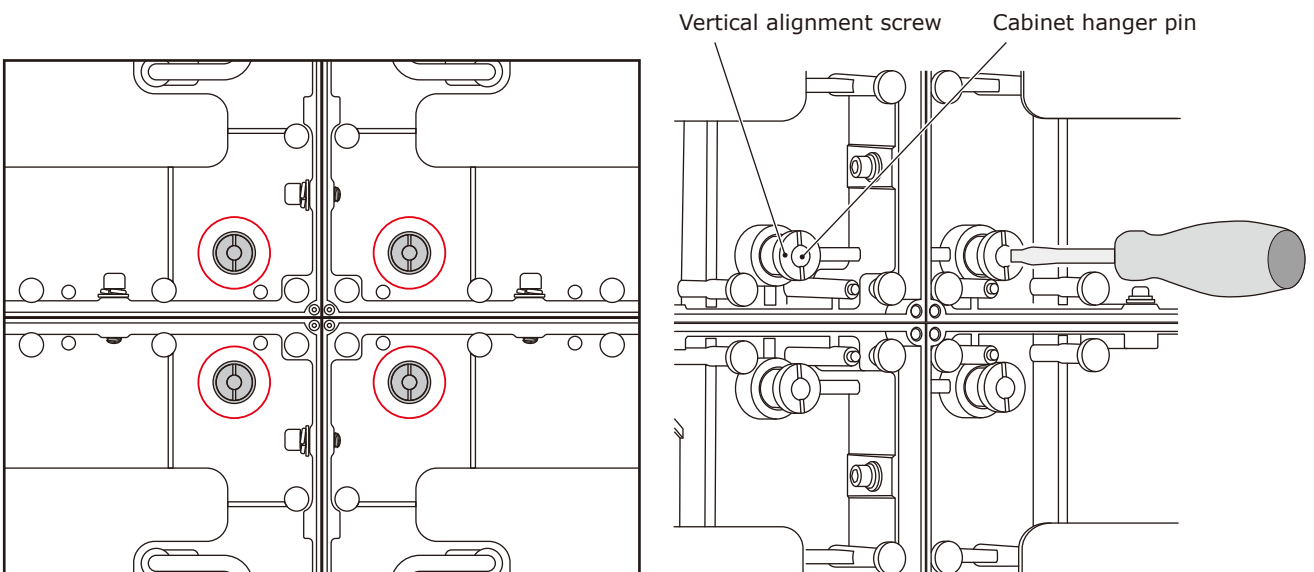
Hook the hanger pins of the cabinets of the second row to the mounting bars.
Secure the LED cabinets together using screws for connecting cabinets. Do not tighten the screws completely.



After you have installed two rows of cabinets, align the surfaces of the cabinets using the Adjustment plates.



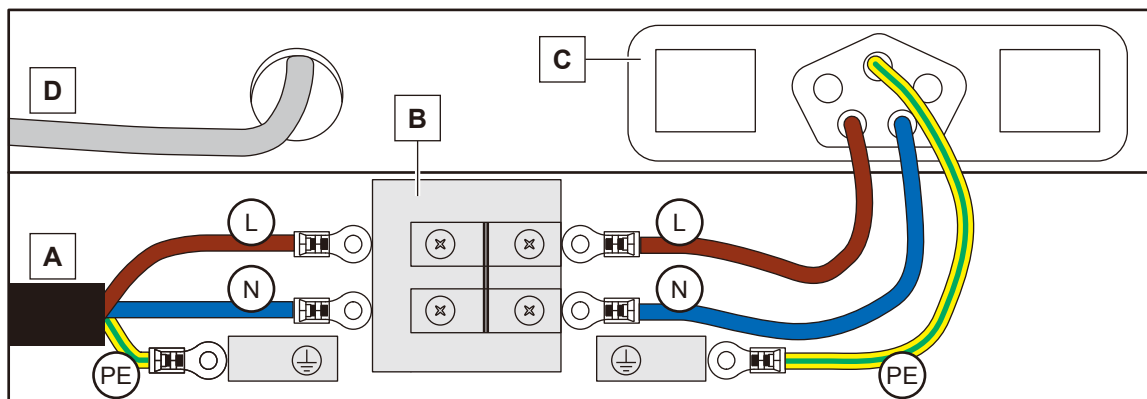
Adjust the position of the cabinet by turning the vertical alignment screw and the back in the center of the vertical alignment screw (cabinet hanger pin) with a flathead screwdriver.



When the cabinets' surfaces are aligned, securely tighten the cabinets of the first row to the power bar, the cabinets of the first row together, as well as the cabinets of the first row with the cabinets of the second row. Remove the Adjustment plates after the screws have been tightened. Follow the same procedure to install the next row of cabinets and align their surfaces.

Connect the power cord and the LAN cable from the opening at the back of the power bar.

How to connect the power cord



A	External power input
B	Terminal in Power bar
C	Power supply socket in Power bar
D	Data cable

⚠ WARNING

Pay attention to the wire colors of the power cord when connecting the cord. If the cables are not connected correctly, it may lead to a fire or an electrical shock.

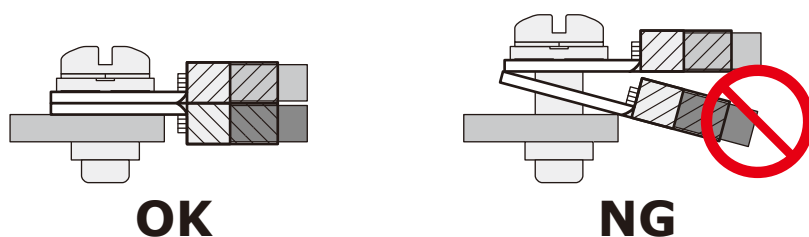
Blue (N)

Brown (L)

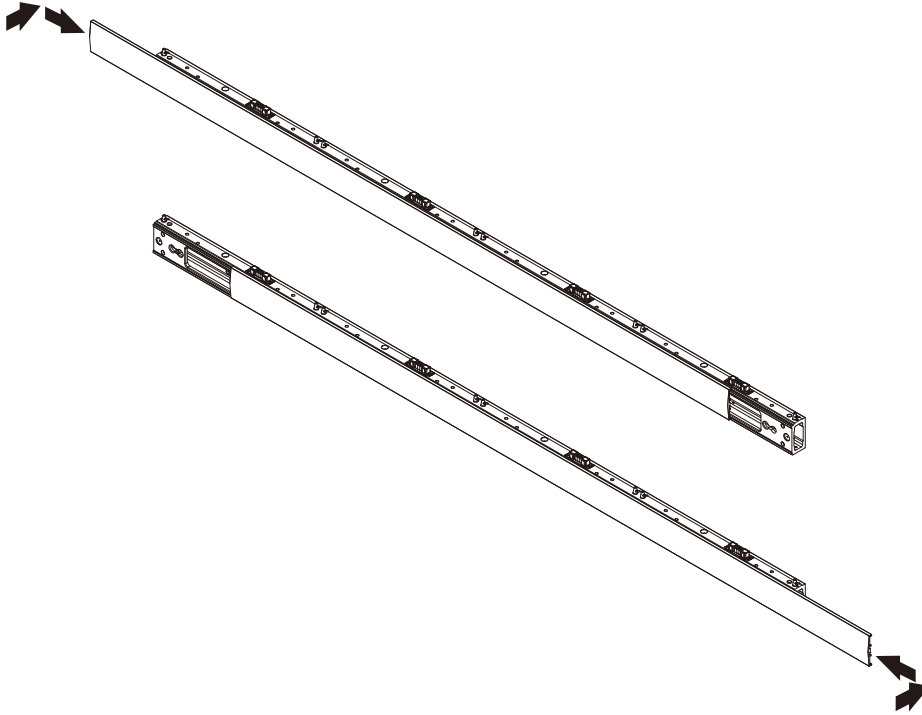
Yellow green (Ground)

⚠ CAUTION:

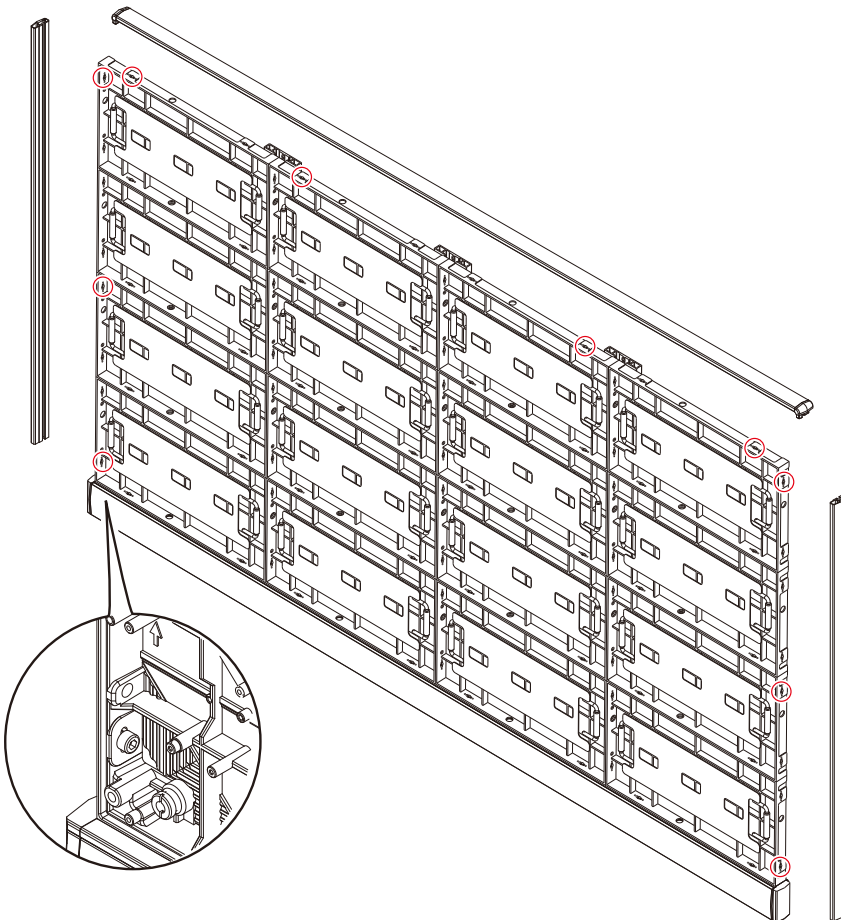
When attaching two cables with one screw, place the ring terminals of the cables back to back.



Install the power bar cover.

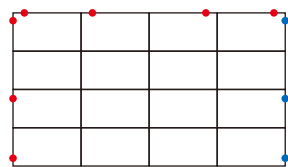


Insert the slot nut into the overframe and align it with the marking line and fix them with screw for overframe screws. Use overframe screws (M4 x 4) for the right side and overframe screws (M4 x 8) for the rest.

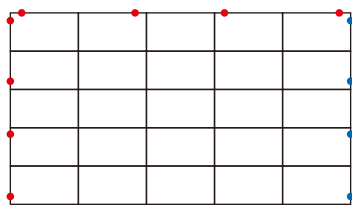


Install the corner parts to the corner frame top and install it on the top of the cabinets.

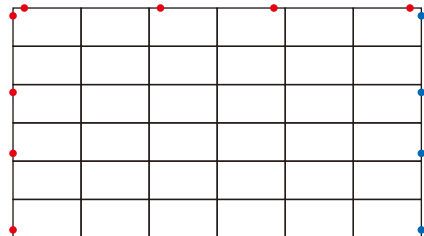
Slot nut installation locations



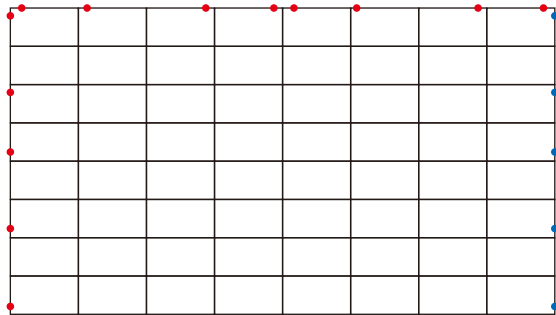
4 x 4 frame set



5 x 5 frame set



6 x 6 frame set

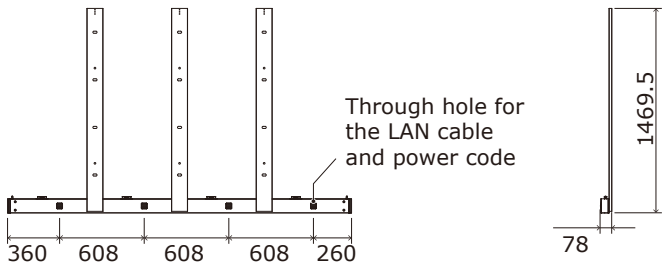
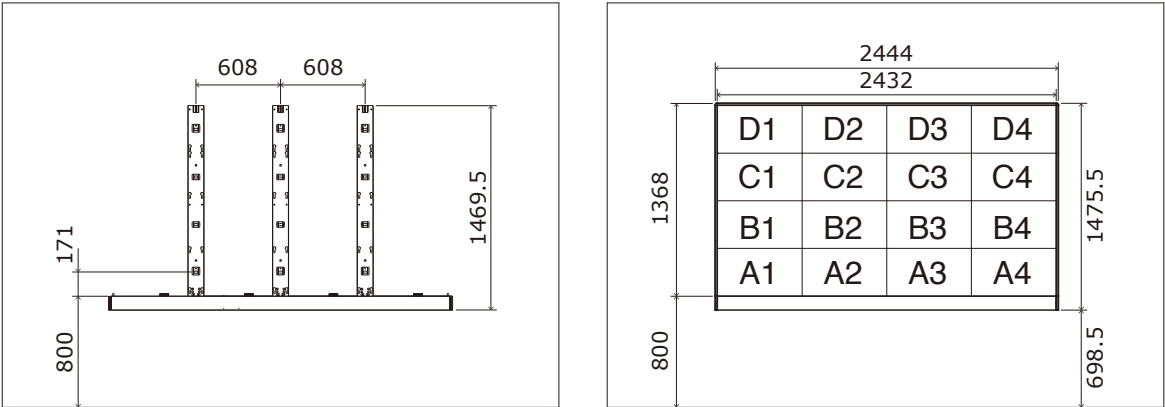


8 x 8 frame set

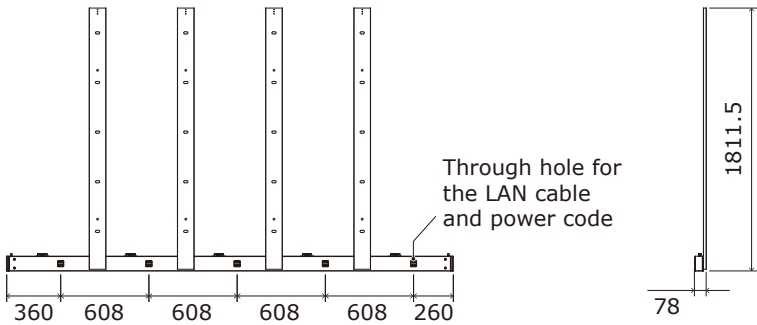
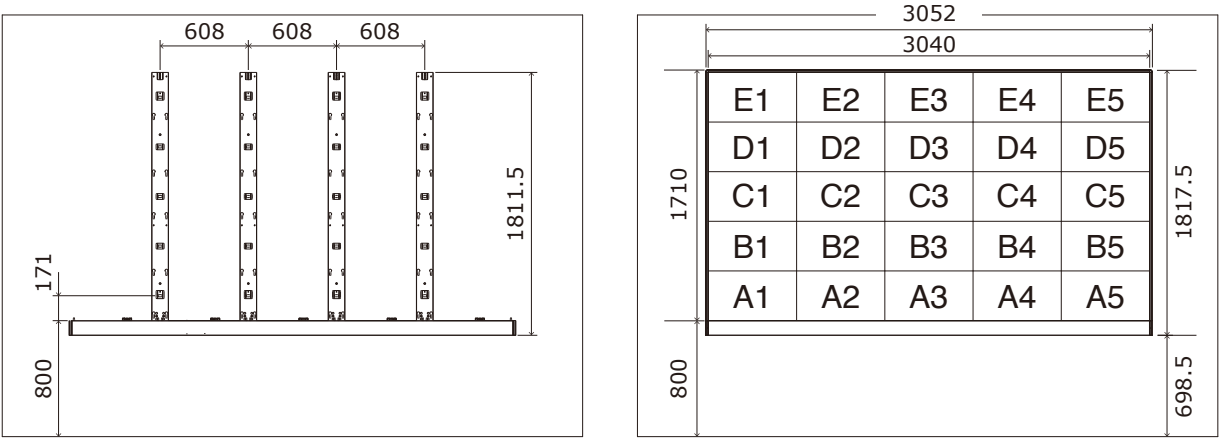
- Screw for overframe M4×4
- Screw for overframe M4×8

10. Assembly diagrams

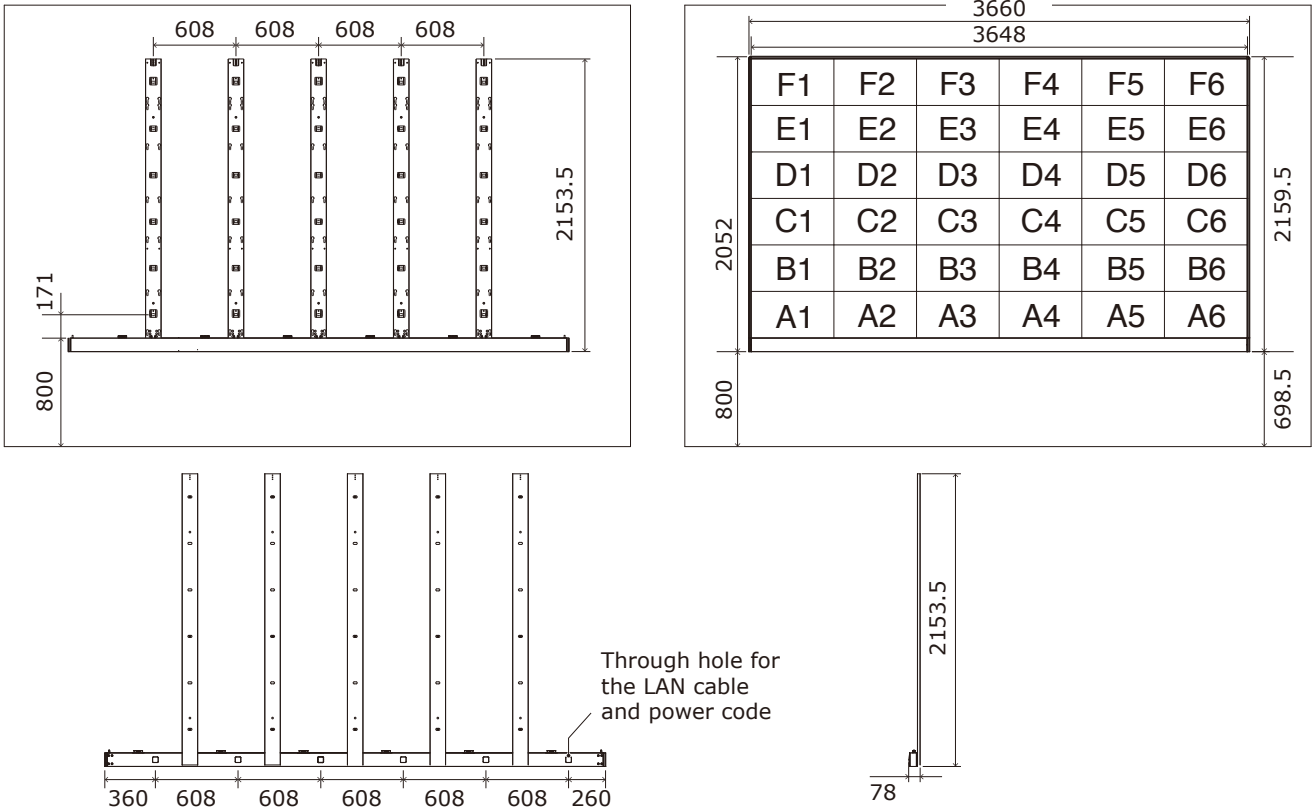
4 x 4 frame set



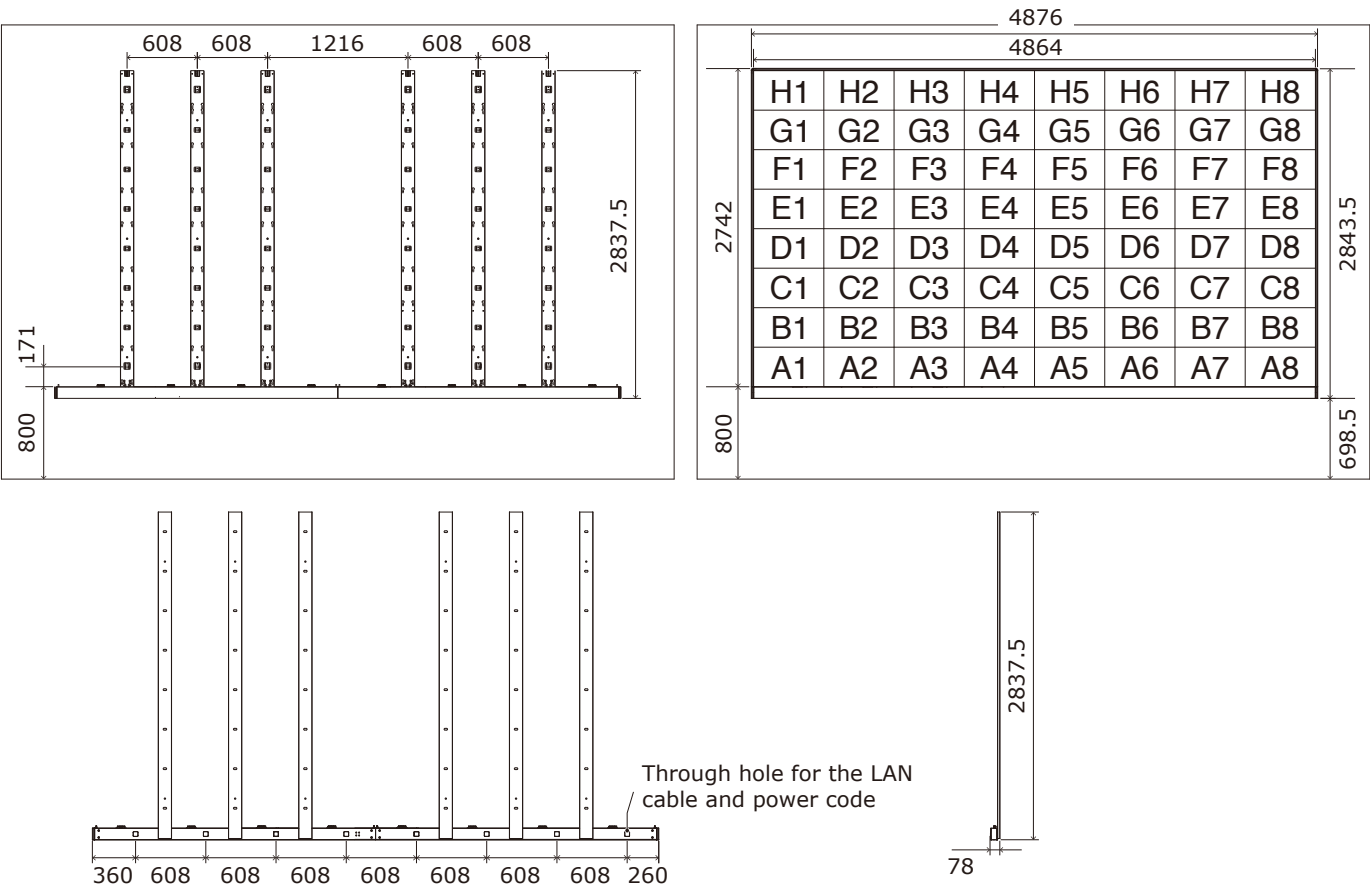
5 x 5 frame set



6 x 6 frame set



8 x 8 frame set

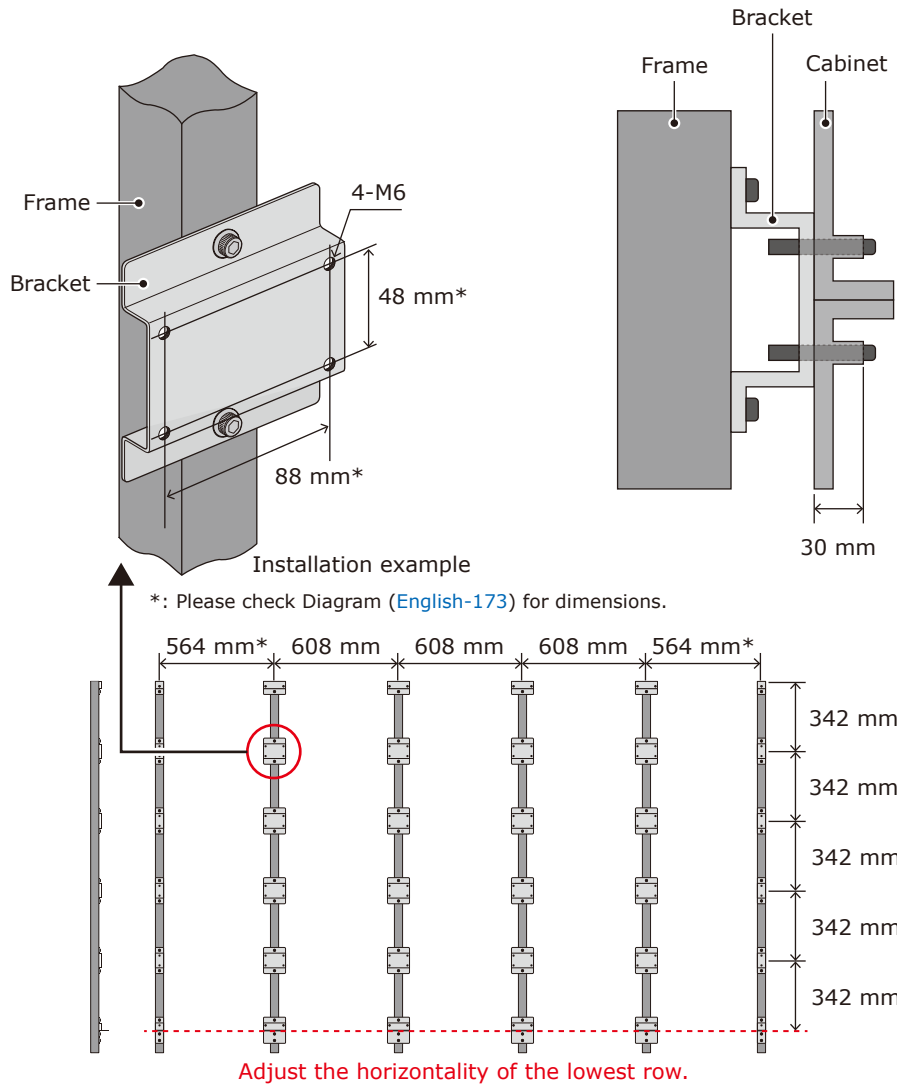


11. Installation without a frame set

An example of installation when using the brackets is shown below. Please prepare the bracket by yourself. Ask a technician or your retailer for the installation procedure when not using the brackets.

Install the brackets to the frame as shown in the figure below.

Use screws with a length adapted to the cabinet thickness (30 mm). Use also brackets with a sufficient thickness to hold the screws.



For installation, please refer to the "9. Install the cabinets".

12. Wiring

(1) Maximum number of signal connections

The maximum number of connections per LAN cable is shown below.

Product name	Maximum number of connections
LD-D091	2 displays
LD-D121	5 displays
LD-D151	7 displays

CAUTION

The maximum number of connections may differ depending on the connected LED controller. Therefore, check the specifications of the LED controller you are using.
Ask a technician or your retailer for more details.

(2) Maximum number of power connections

CAUTION

Exceeding the maximum capacity may generate smoke or cause a fire.
Check the voltage used and do not exceed the connection limits shown below.

Product name	100 - 120 V AC	200 - 240 V AC
LD-D091	20 displays	40 displays
LD-D121	20 displays	40 displays
LD-D151	20 displays	40 displays

		AC 100 V	AC 200 V
Inrush current 25°C Cold start Pulse width: 3ms	per 1 display	50 A	100 A

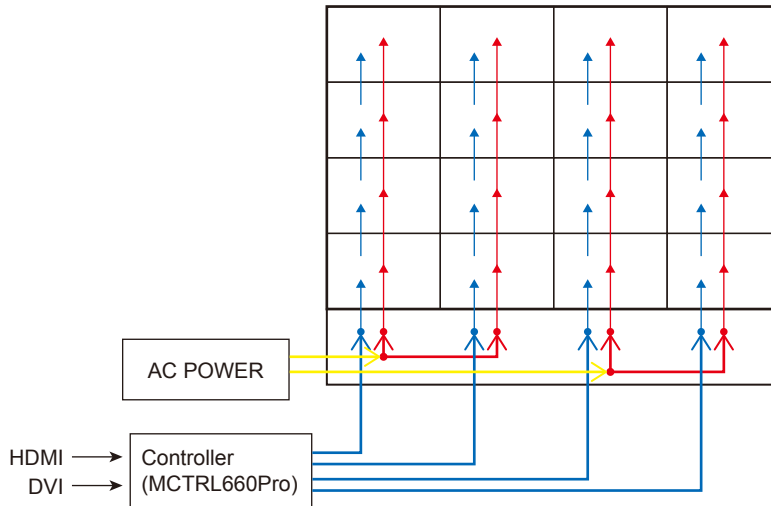
(3) Connection when using a wall-mount frame

This connection is an example of connection when using the maximum capacity.

The power cable corresponding to the yellow part needs to be prepared by the customer.

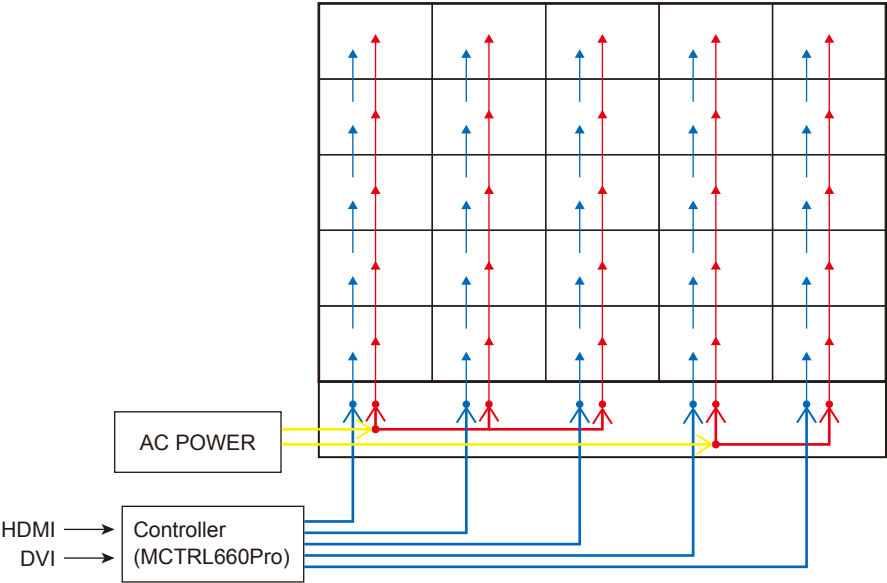
Please connect considering the capacity of the switchboard and the inrush current specification.

4 x 4 frame set



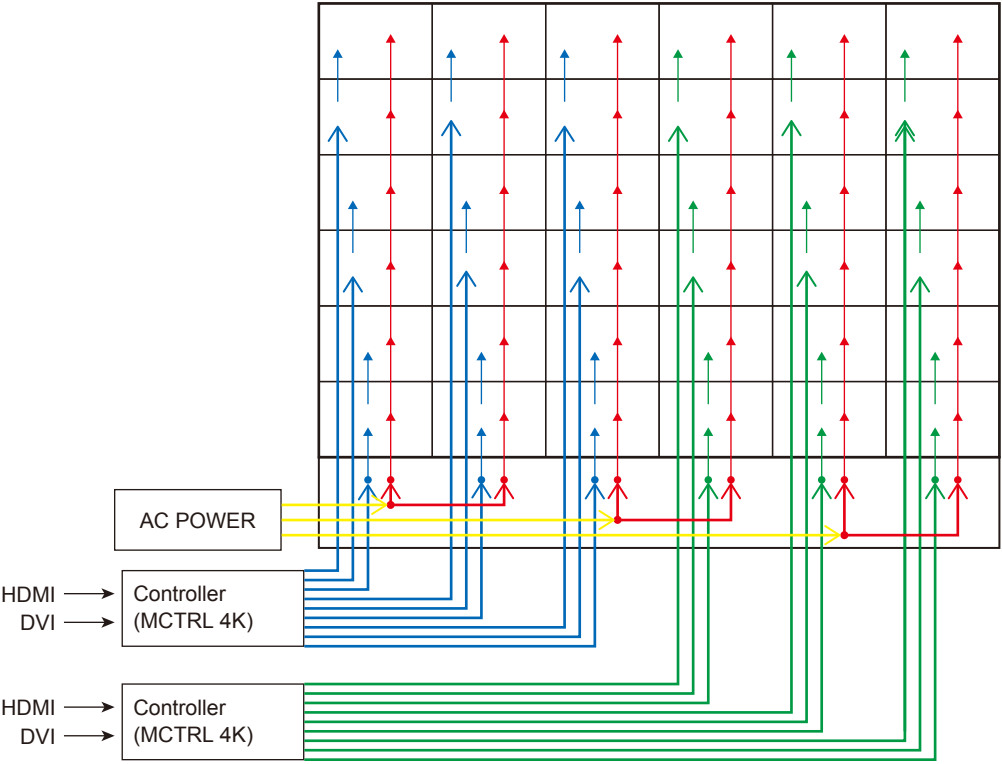
4×4 frame set		AC 100V	AC 200V
Number of power system		2	2
Current rating	per 1 display	1.0 A	0.5 A
	per power system	8.0 A (2 Systems)	4.0 A (2 Systems)
	per frame set	16.0 A	8.0 A
Inrush current 25°C Cold start Pulse width: 3ms	per 1 display	50 A	100 A
	per power system	400 A (2 Systems)	800 A (2 Systems)
	per frame set	800 A	1600 A

5 x 5 frame set



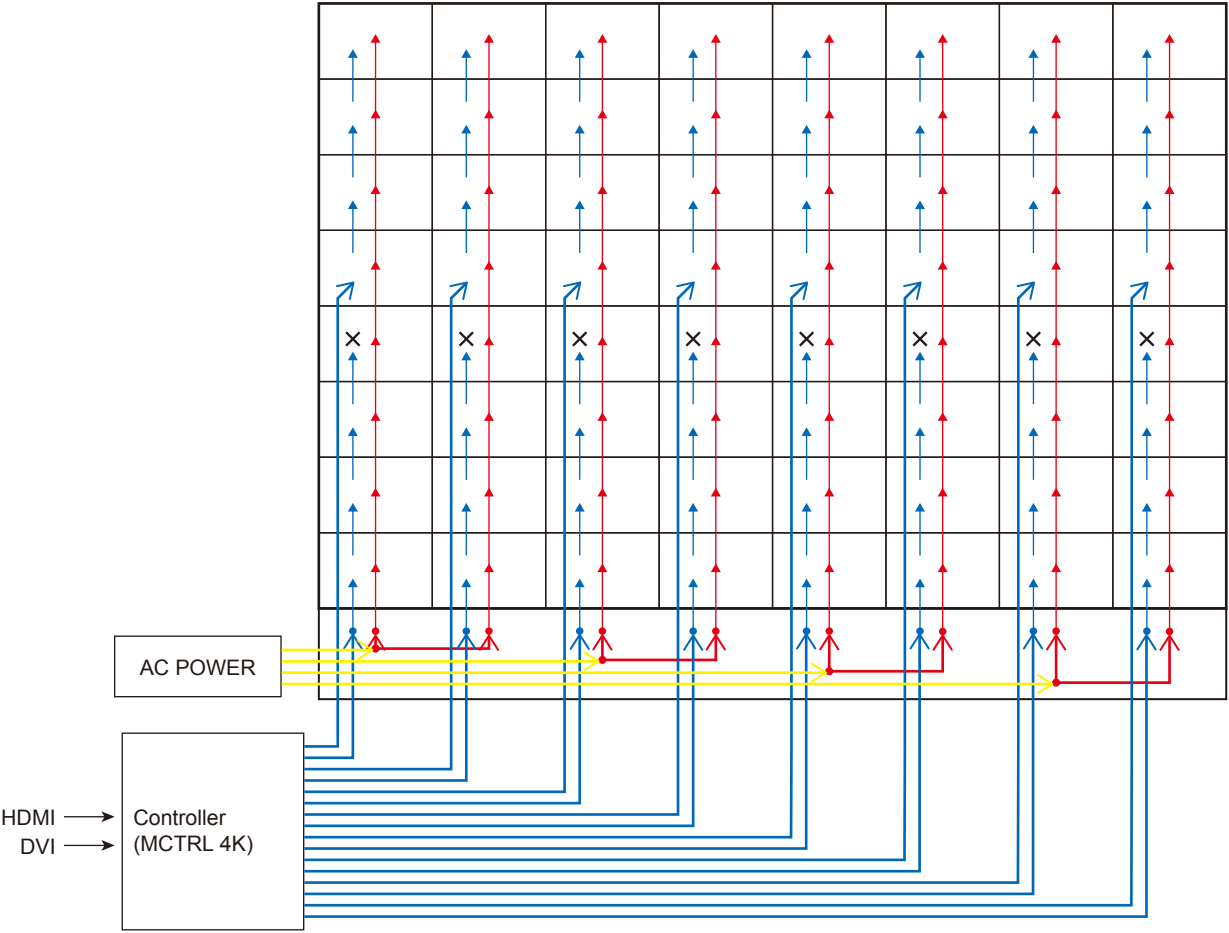
5 x 5 frame set		AC 100V	AC 200V
Number of power system		2	2
Current rating	per 1 display	1.0 A	0.5 A
	per power system	15.0 A (3 Systems) 10.0 A (2 Systems)	7.5 A (3 Systems) 5.0 A (2 Systems)
	per frame set	25.0 A	12.5 A
Inrush current 25°C Cold start Pulse width: 3ms	per 1 display	50 A	100 A
	per power system	750 A (3 Systems) 500 A (2 Systems)	1500 A (3 Systems) 1000 A (2 Systems)
	per frame set	1250 A	2500 A

6 x 6 frame set



6 x 6 frame set		AC 100V	AC 200V
Number of power system		3	3
Current rating	per 1 display	1.0 A	0.5 A
	per power system	12.0 A (2 Systems)	6.0 A (2 Systems)
	per frame set	36.0 A	18.0 A
Inrush current 25°C Cold start Pulse width: 3ms	per 1 display	50 A	100 A
	per power system	600 A (2 Systems)	1200 A (2 Systems)
	per frame set	1800 A	3600 A

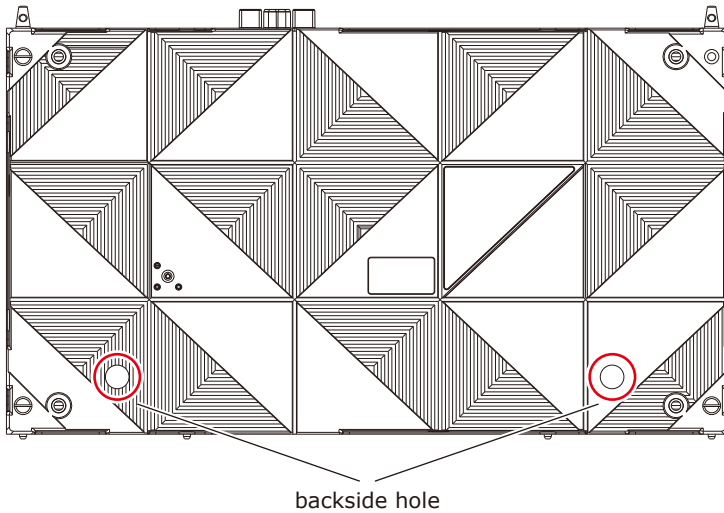
8 x 8 frame set



8 x 8 frame set		AC 100V	AC 200V
Number of power system		4	4
Current rating	per 1 display	1.0 A	0.5 A
	per power system	16.0 A (2 Systems)	8.0 A (2 Systems)
	per frame set	64.0 A	32.0 A
Inrush current 25°C Cold start Pulse width: 3ms	per 1 display	50 A	100 A
	per power system	800 A (2 Systems)	1600 A (2 Systems)
	per frame set	3200 A	6400 A

Backside hole cabinet

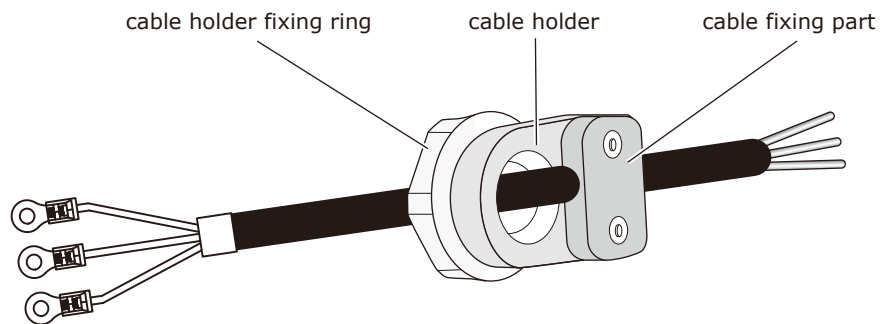
There are holes on the back of the cabinet for passing signal cables and power cords.



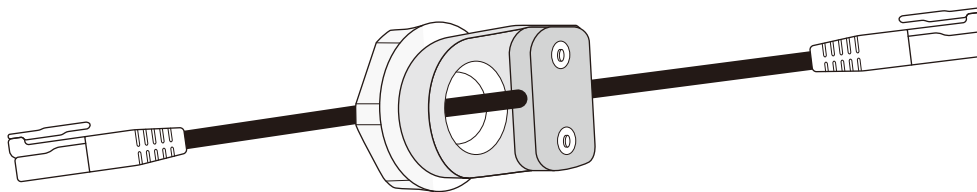
If the hole is not drilled, place a flathead screwdriver from inside the cabinet at the edge of the round recess and tap it lightly with a hammer to make a hole.

Cables for backside hole cabinet

Power cord



LAN cable



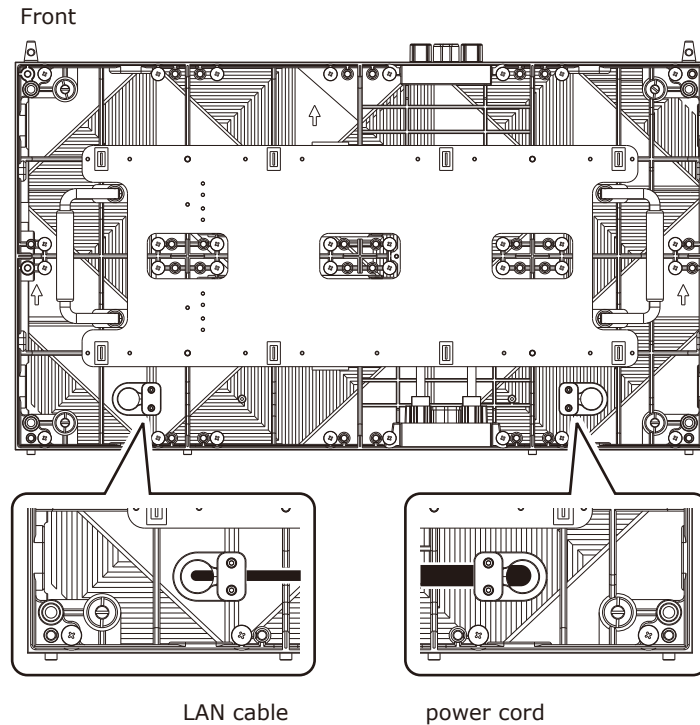
Remove the cable holder fixing ring attached to the LAN cable or power cord.

Remove the cable fixing part and move the cable holder to the end of the cable.

Attach the cable holder to the backside hole of the cabinet and attach the cable holder fixing ring from the outside of the cabinet.

Insert the cables.

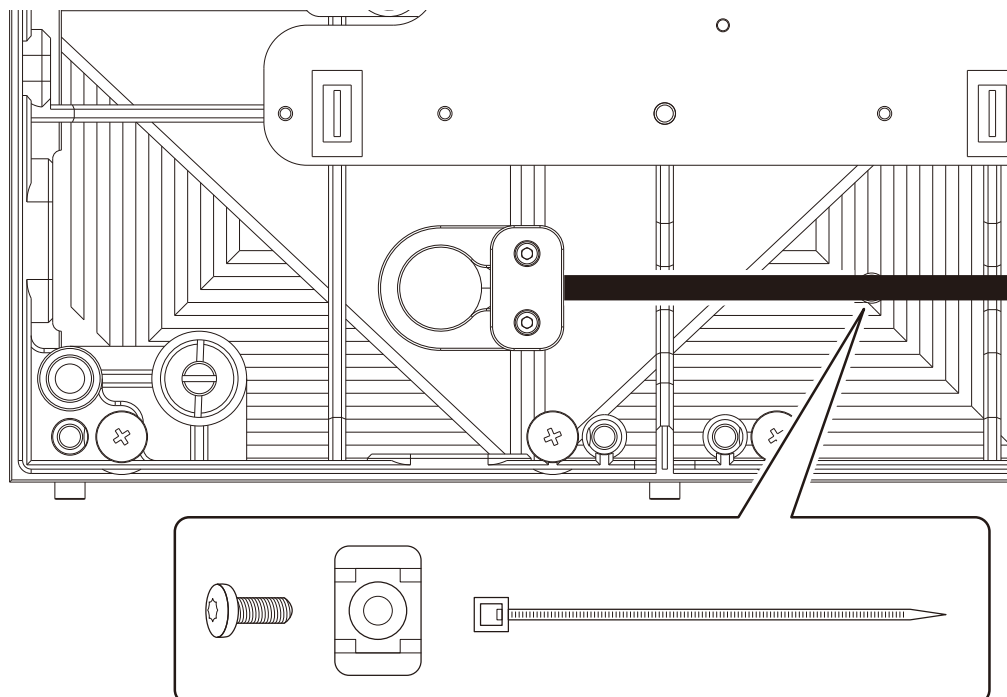
Pinch the cable with the cable fixing part and attach it to the cable holder.



[Info] For fixing the cable

Attache the buckle by screw.

Through the fastening tie lap and fix the cable to use fastening tie lap.



Connect the Power cable using WAGO.

Precautions on use of the power connector (WAGO)

When using the power cord connector (WAGO's product, WFR Series (WAGO 221), Models WFR-2 and WFR-3), respect the following precautions.

WAGO 221



* Visiting WAGO's homepage for more details is recommended.

WARNING

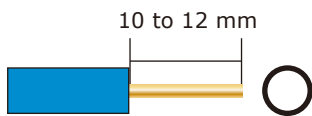
- Always use the connector indoors (in a location not affected by moisture).
- Use the connector by respecting the installation precautions. If the connector is not used correctly, it may lead to a fire or an electrical shock.

Installation precautions

- Wire sheath peeling

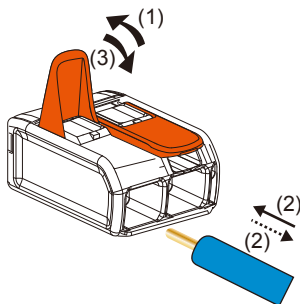
CAUTION

Be sure to peel off the wire sheath over the specified length.



CAUTION

Do not use the connector with the core wires being sinuous.



Lever operation is necessary even for connection of a solid core wire.

- Wire sizes

Wire sizes compatible with the power connector (WAGO) are as follows.

Solid core:	$\phi 1.6$ to 2.0 mm
IV 7-stranded core:	2.0 to 3.5 mm ²
Flexible stranded core:	2.0 to 3.5 mm ²

- When reconnecting a wire once disconnected, cut off the wire end and newly peel off the sheath.

CAUTION

- When reconnecting a wire once disconnected, cut off the wire end and newly peel off the sheath.
- If the disconnected wire is reconnected without this processing, it may heat up and burn out.

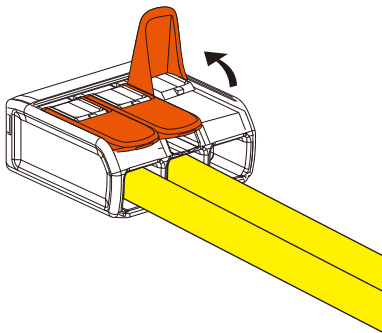
Newly peel off the sheath.

End of disconnected wire: More or less damaged.

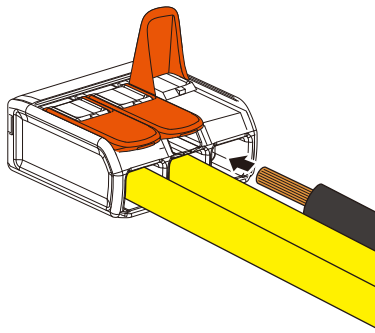


How to connect the power cord

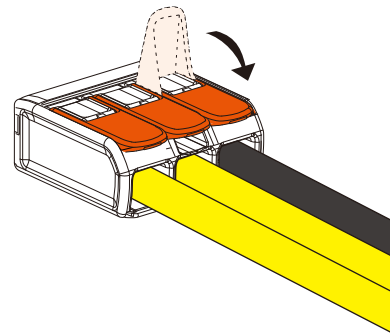
(1) Raise the lever.



(2) Insert the wire.



(3) Return the lever to its previous position.



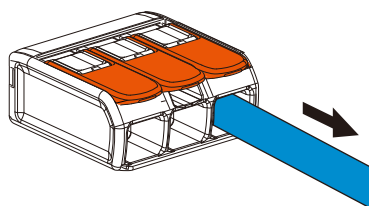
CAUTION

Insufficient insertion may cause poor electricity conduction and heat generation.

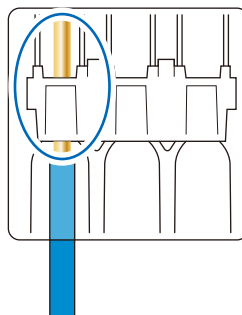
Power code connection checking

- Perform checking for correct and proper connection.

Lightly pull on the wires one by one to check that they will not be pulled out.



Check visually



WARNING

Pay attention to the wire colors of the power cord when connecting the cord. If the cables are not connected correctly, it may lead to a fire or an electrical shock.

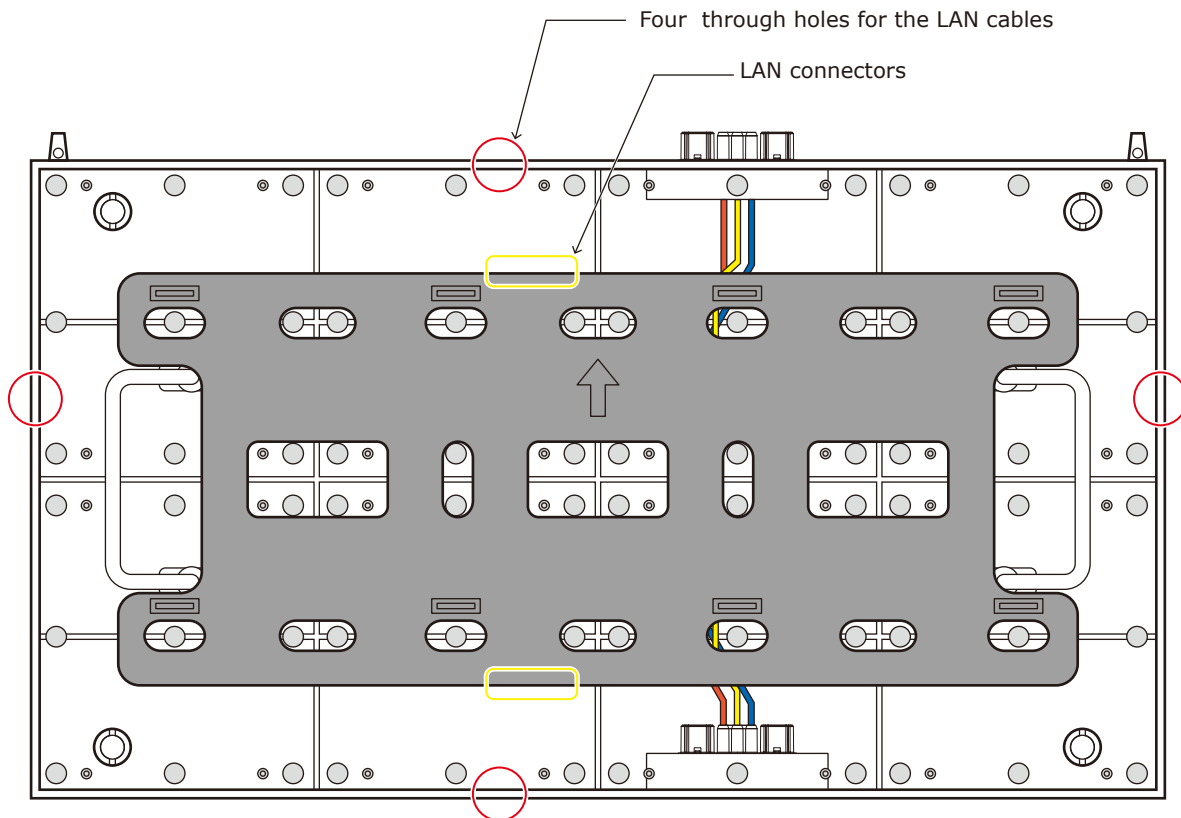
Blue (N)

Brown (L)

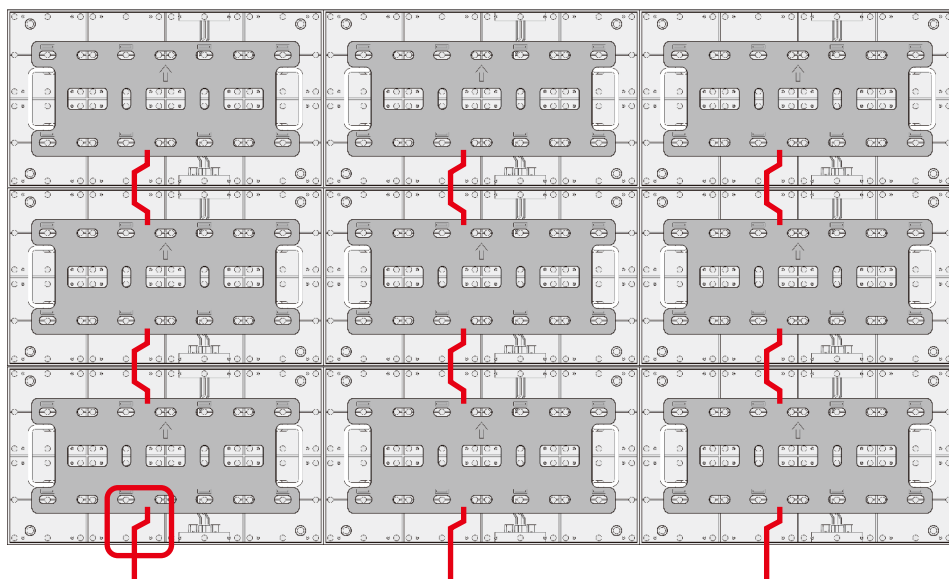
Yellow green (Ground)

(4) LAN cable connection

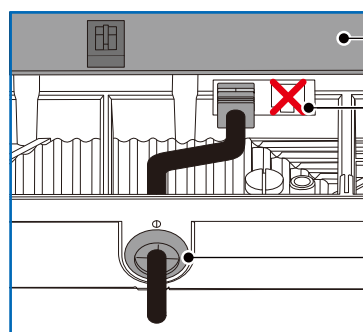
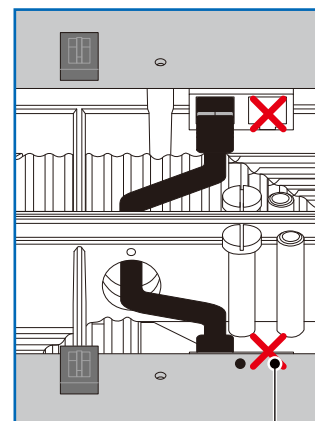
Connect the LAN cables for the signal between the LED displays. Use the through holes to pass the cables between the displays.



[Connection example] Connecting from bottom to top using multiple ports



LAN cable from the LED
controller



Hub board

Connect the cable to the LAN connector on
the left.
Do not use the LAN connector on the right.

Insert the LAN cable into the through hole and connect it to
the LAN connector on the left.

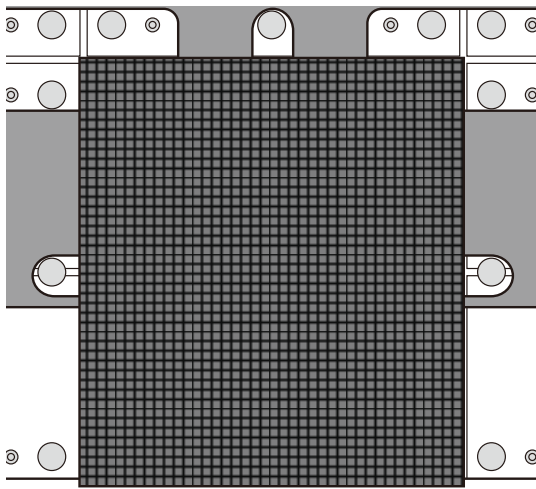
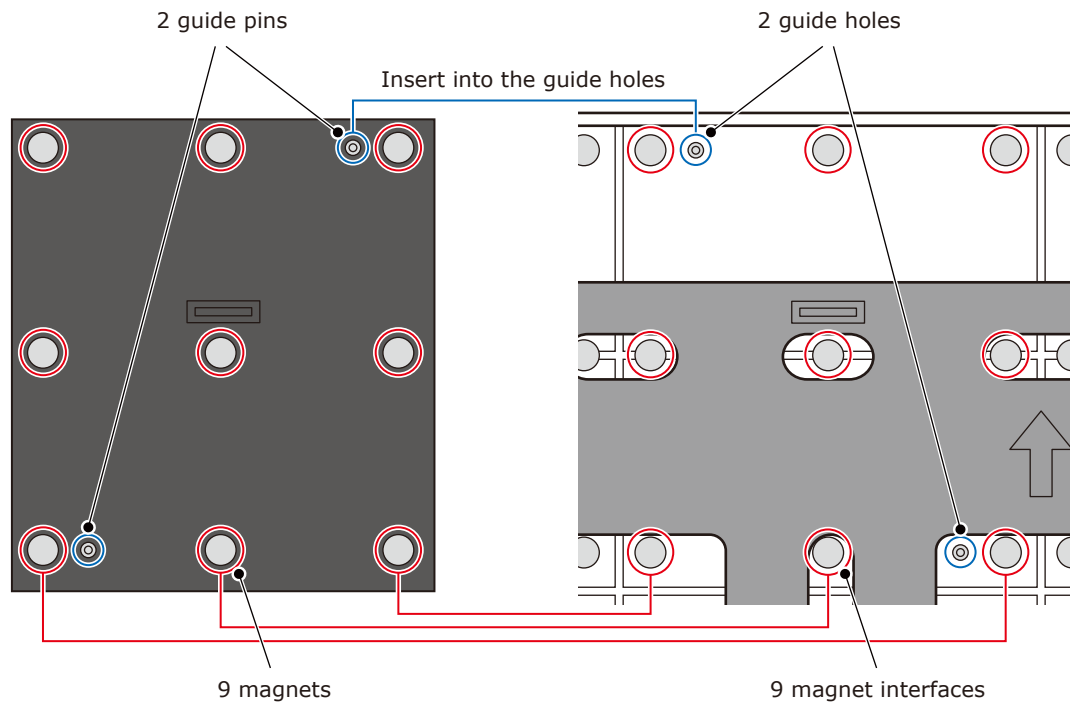
13. Installing the pixel card

CAUTION

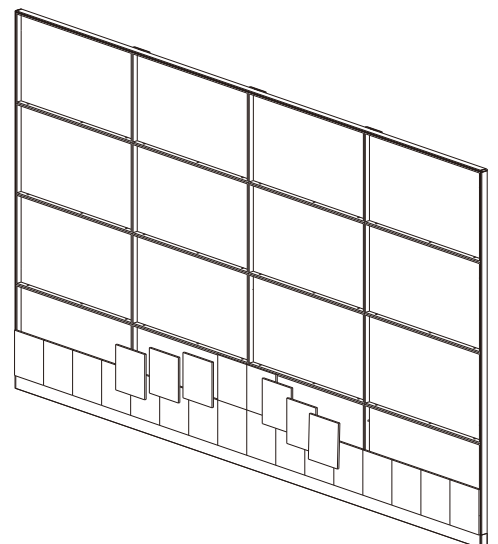
- The pixel cards contain powerful magnets. If magnetic cards come close to the pixel cards, the data contained within may be damaged. Therefore, do not carry any magnetic card when installing the pixel cards.
- When installing the pixel cards, pay attention not to damage them against the pixel cards already installed or other objects. Otherwise, the video may not be displayed properly.
- Take measures against static electricity when installing the pixel card. Do not touch the LED display areas and the back of the pixel card.
- Check that the power supply to the LED displays is cut before starting the work.
- Before installing or removing pixel cards, please ensure the wall has been powered off for 1 or 2 hours. Otherwise the thermal expansion of pixel cards increases the risk of damaging them during removal or insertion.
- Please install according to the order of the pixel cards in the attached "Precautions for installation".
- If installation is not successful, please use the maintenance tool. (see [English-73](#))

The arrows (↑) at the back of the pixel cards indicate the upper side.

Install the pixel card into the cabinet with the two guide holes of the pixel card aligned with the two guide pins of the cabinet (two pins for each pixel card). The pixel card is secured by the 9 magnets on each pixel card.

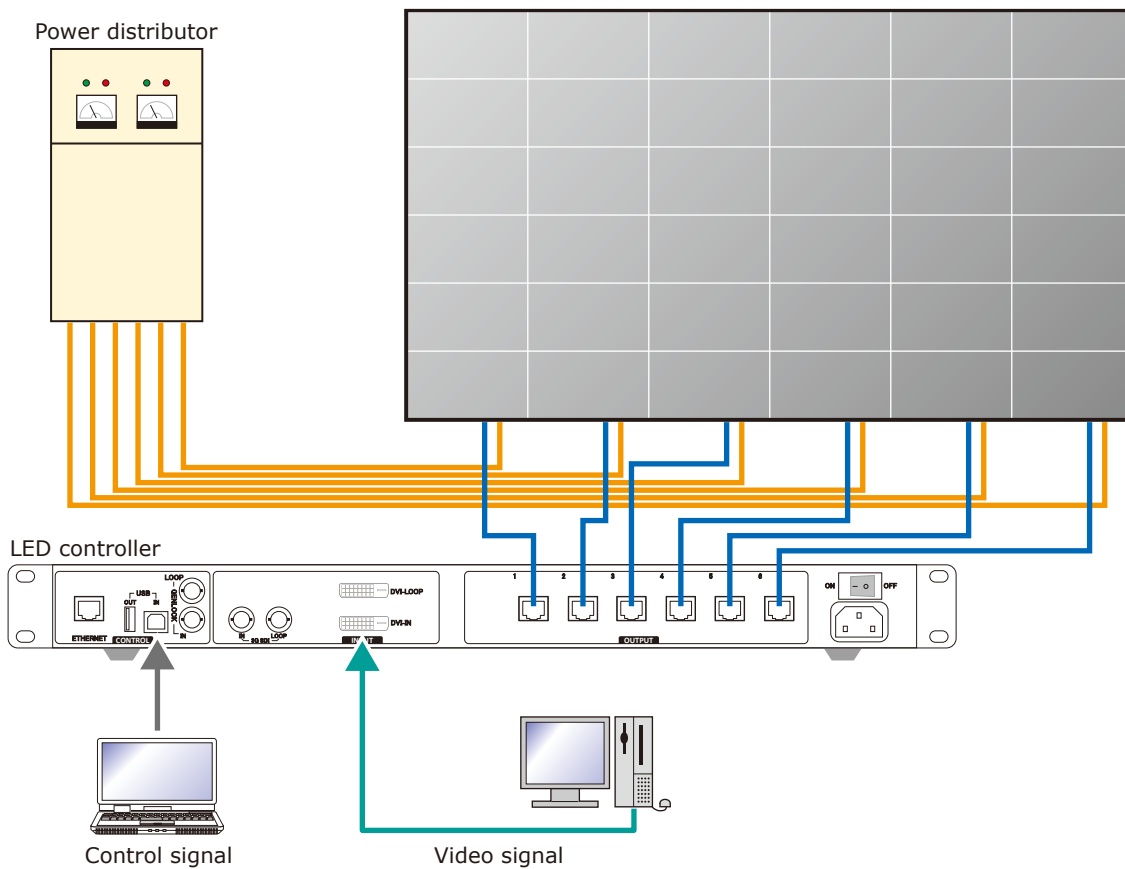


Install the pixel cards separately starting from the middle of the bottom row. If you install the pixel cards starting from the top row, the positions of the upper pixel cards may get misaligned due to their weight and it may be difficult to place the lower pixel cards.



Screen Configuration

Check that all the connections are completed, and then turn on the LED displays and the LED controller.



⚠ WARNING

Pay attention to the wire colors of the power cord when connecting the cord. If the cables are not connected correctly, it may lead to a fire or an electrical shock.

Blue (N)
Brown (L)
Yellow green (Ground)

⚠ CAUTION

When using LAN cables of 60 m to 100 m in length, the product may not operate correctly depending on the quality of the cables. In such a case, it is recommended to use optical-fiber cables. Ask a technician or your retailer for more details.

Preparing for using NovaLCT software

Perform the setting using the NovaLCT control software by Novastar.
Connect the supplied USB memory to the computer. Start NovaLCT*.exe.
After it has started, install it following the software instructions.
The NovaLCT preparation is complete.

CAUTION

For NovaLCT*.exe, be sure to use the file contained in the supplied USB drive.
Using a NovaLCT*.exe file different than the one in the supplied USB drive may lead to malfunction.
We cannot support for any features of NovaLCT that are not covered in this installation manual.

Important note regarding the operating environment

NovaLCT is designed to control the LED controller through LAN connection or USB, but this software may not operate properly due to the following factors.

Network settings: The communication may be blocked if the settings of the router or network switch are not appropriate (in the case of LAN connection).

Security measures: Firewalls and antivirus software may block NovaLCT communication.

Effect of other software: Other software programs that run at the same time may interfere with NovaLCT.

If NovaLCT does not operate properly, check the following.

Check the network settings: Check the settings of the router and network devices and reconfigure them if necessary.

Adjust the security settings: Check the settings of your firewall and security software and authorize NovaLCT communication.

Close unnecessary software programs: Close other software programs and try again.

To maximize performance, it is recommended to use NovaLCT in a clean environment, which is an environment with no particularly complex settings or additional software programs installed.

Log in with the administrator privileges.

Display the login screen as follows: User(U) → Advanced Synchronous System UserLogin(A).

Enter the password ("admin" by default) to log in with the administrator privileges.

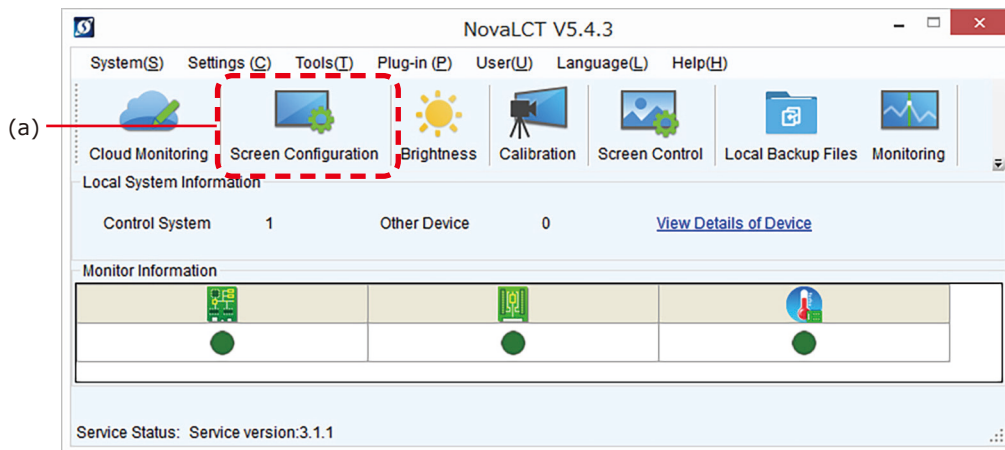
To change the password, go to User(U) → Change Password(U) with the administrator privileges.

CAUTION

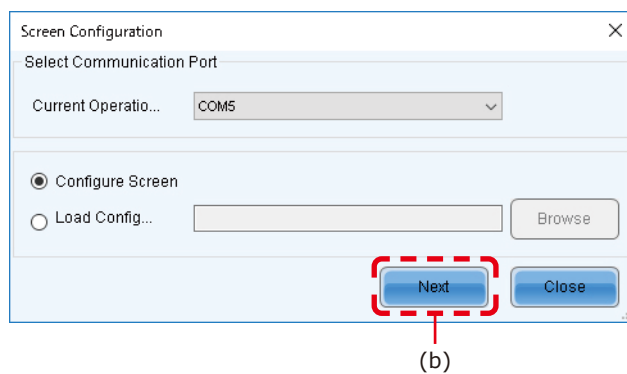
Do not forget the new password after it has been changed.

Enter the screen configuration menu

- (1) Click "Screen Configuration" (a).



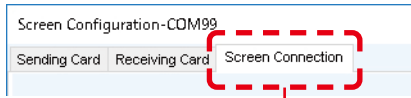
- (2) Check the port in "Select Communication Port", and then click the "Next" button (b).



Display connection settings

Start NovaLCT and log in with the administrator privileges.

In the Screen Configuration screen that is displayed, select the "Screen Connection" tab (a).



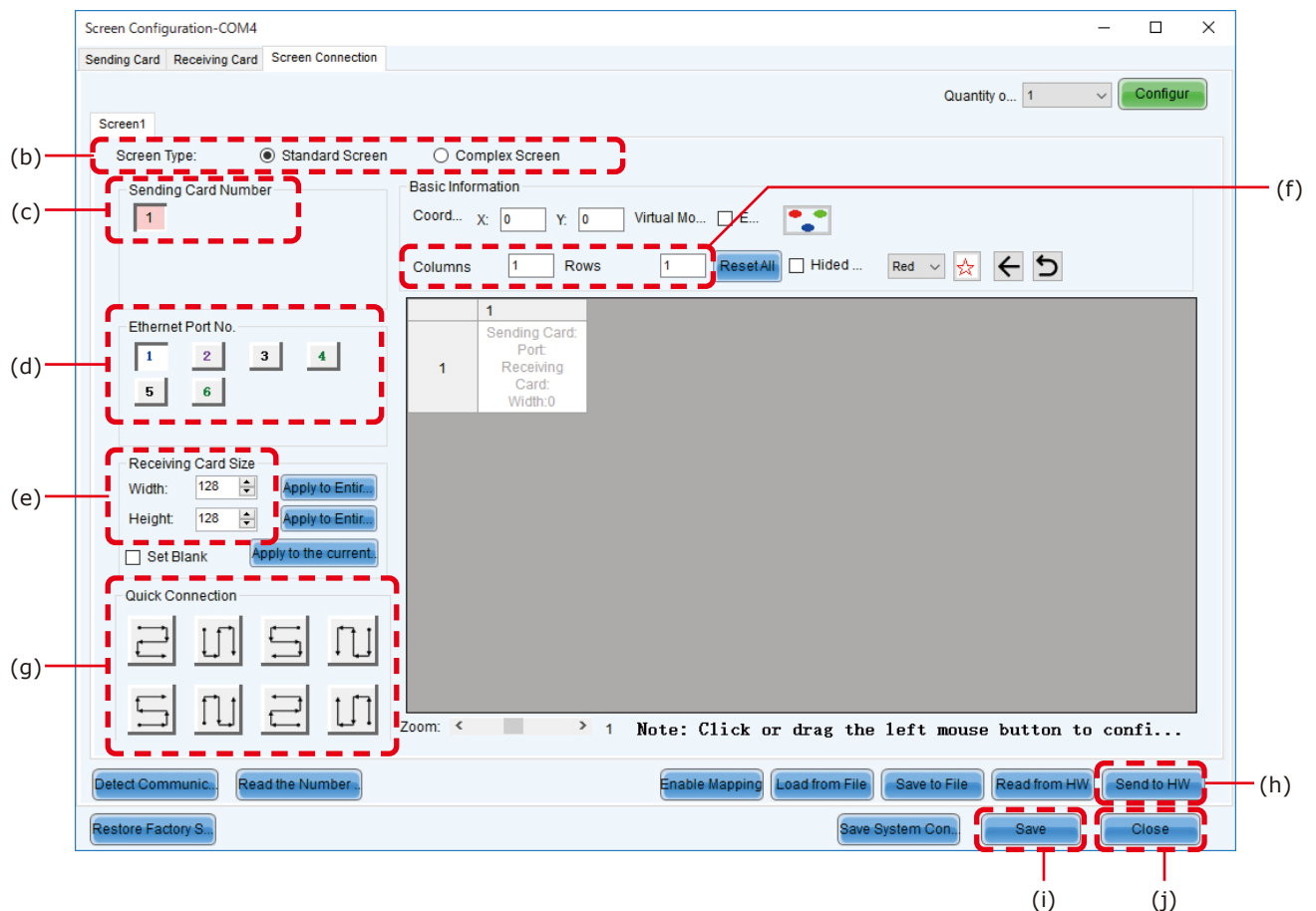
(a)

CAUTION

Do not change the settings in the "Receiving Card" tab. Otherwise, the video may not be displayed properly.

Select "Standard Screen" under "Screen Type" (b).

The settings in "Sending Card Number" (c) and "Ethernet Port No." (d) vary depending on the connected LED controller.



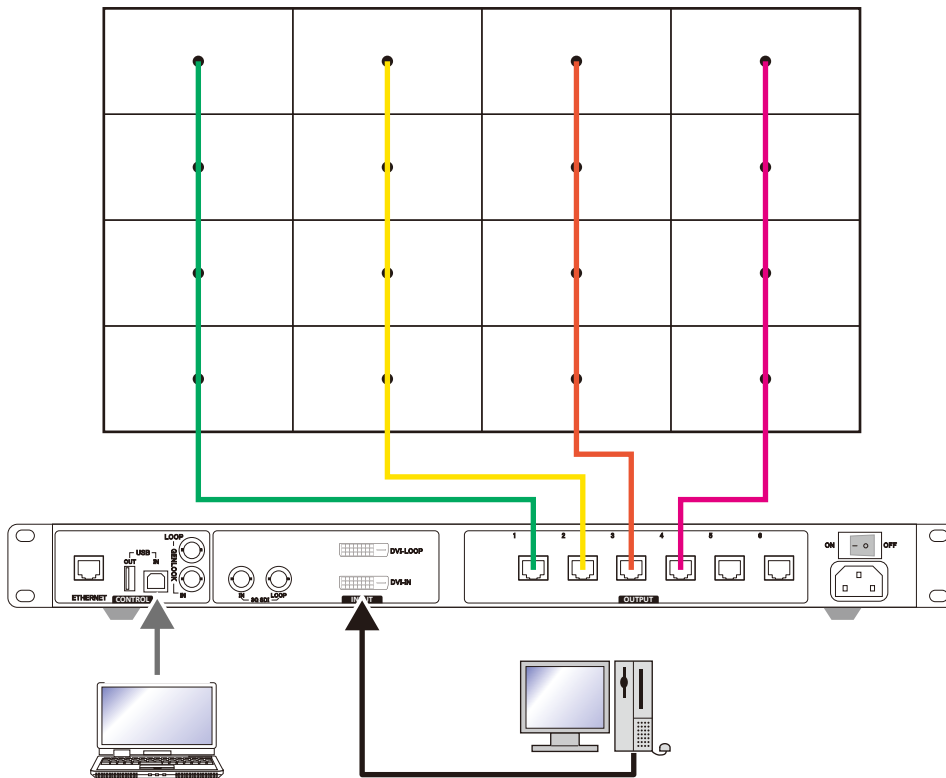
Enter the value in the table below under "Receiving Card Size" (e).

Product name	LD-D091	LD-D121	LD-D151
Pixel pitch	0.9 mm	1.2 mm	1.5 mm
Number of displayed pixels (resolution/display)	Width 640 Height 360	Width 480 Height 270	Width 384 Height 216

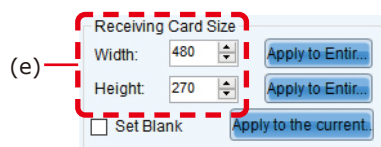
[Columns/Rows] Enter the number of installed screens under "Columns/Rows" (f) (the number of vertically installed screens in Columns, and the number of horizontally installed screens in Rows).

[Configuration example]

The setting values are given for the following example where 16 are installed in a 4 (columns) x 4 (rows) configuration connecting from bottom to top using multiple ports.



- (1) With a pixel pitch of 1.25 mm, enter Width=480 and Height=270 under "Receiver Card Size" (e). Do not use the buttons located next to the values.



- (2) Since the configuration is 4 (columns) x 4 (rows), enter Columns=4 and Rows=4. A 4 (columns) x 4 (rows) screen configuration is displayed.

- (3) If multiple LED controllers are used, select the number of the connected LED controllers.
Since only one controller is used in this example, it is not necessary to set "Sending Card Number" (c).

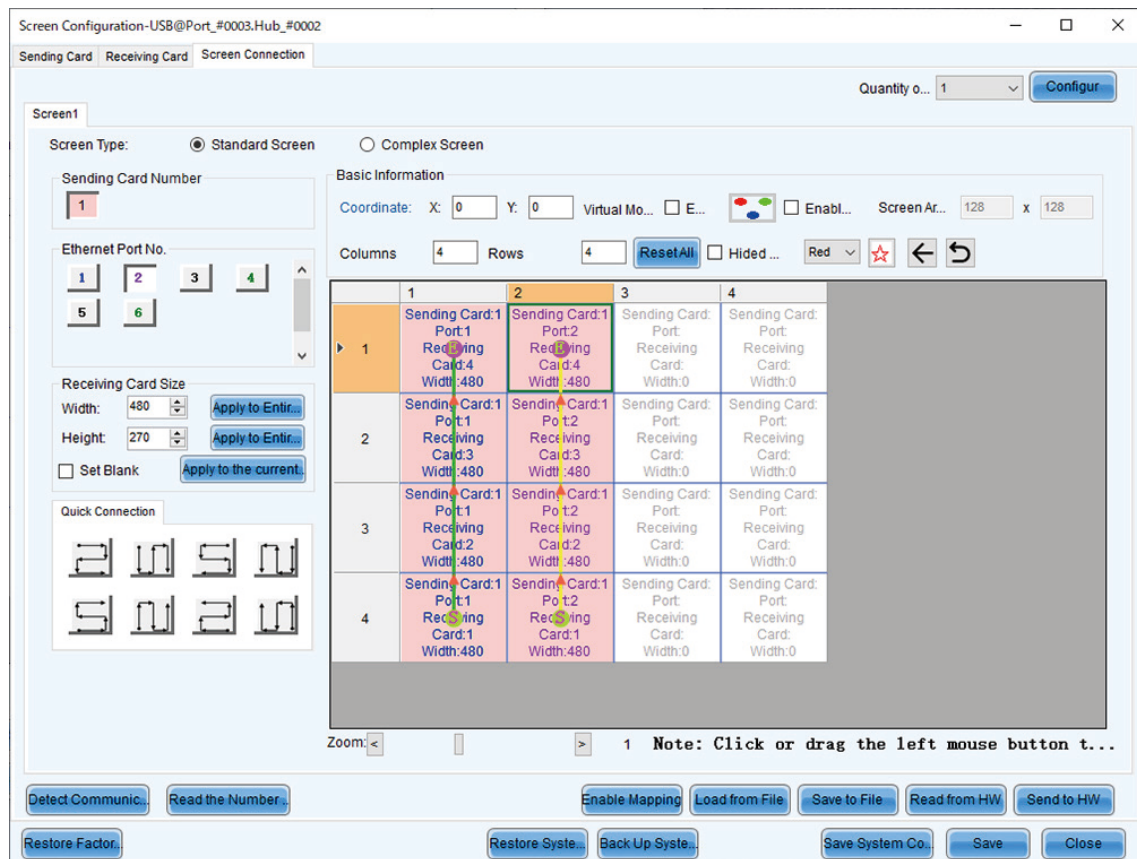
- (4) Configure the connection.

The system is connected to port 1 of the LED controller.

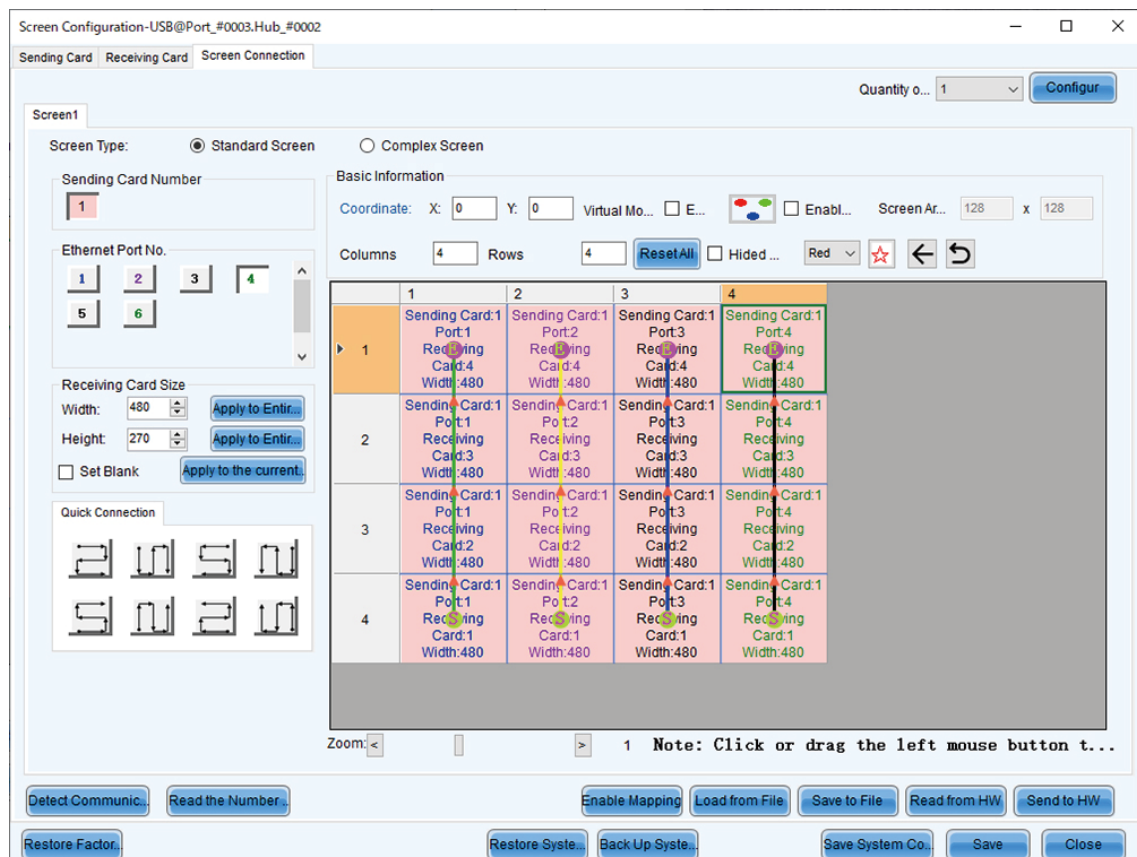
Select "1" (port 1) under "Ethernet Port No." (d).

Select the cabinet at the bottom left with the mouse, and then select the other cabinets up to the top cabinet.

Then select Port2 and select the cabinets from the bottom to the top as you did for Port1.



Follow the same procedure for Port3 and Port4.



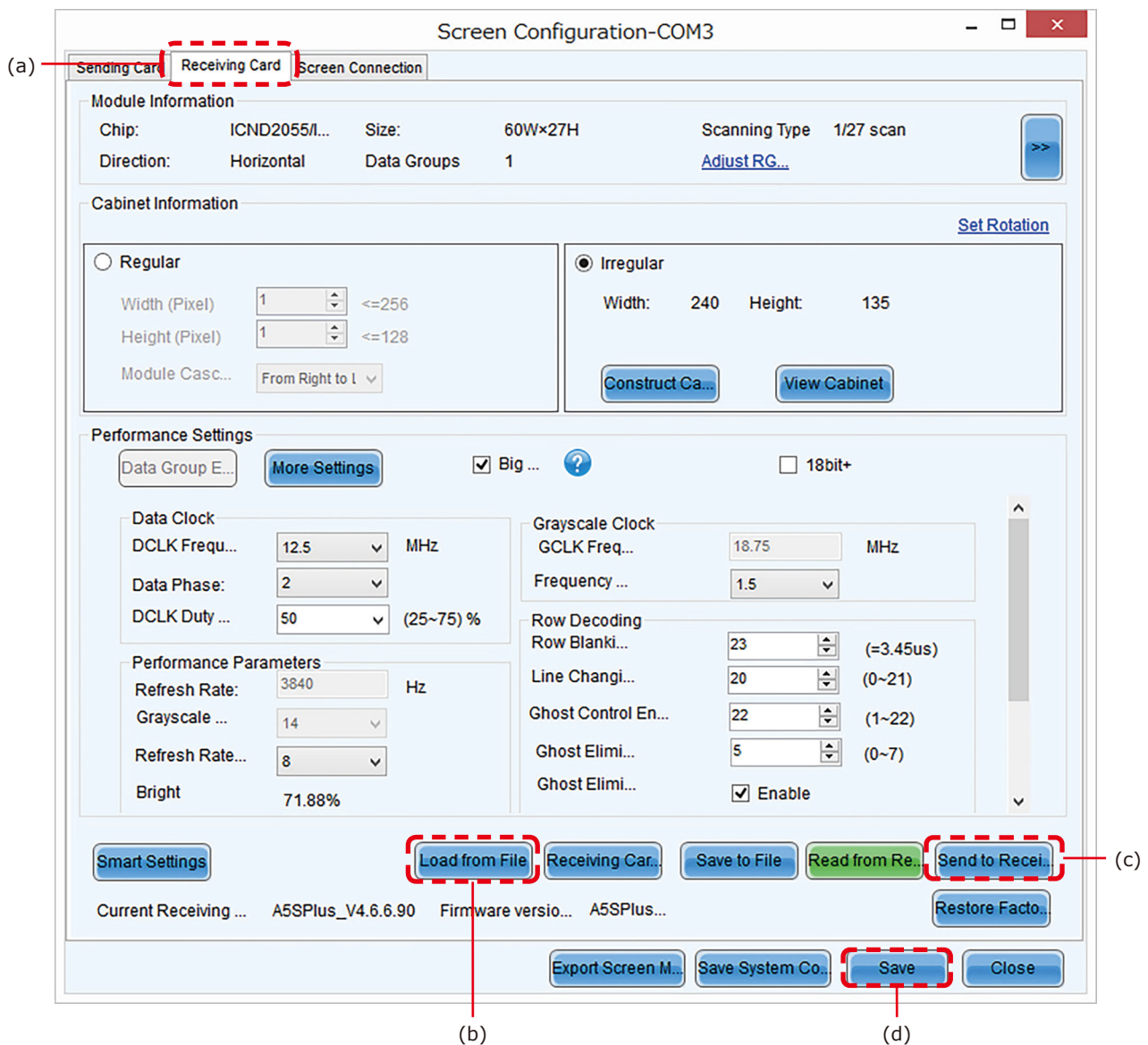
(5) Save the settings.

- (a) Click the "Send to HW" button (h). When the dialog box indicating that the process finished successfully is displayed, click OK.
- (b) Check that the image is correctly displayed, and then click the "Save" button (i). When the screen indicating that the process finished successfully is displayed, click OK.

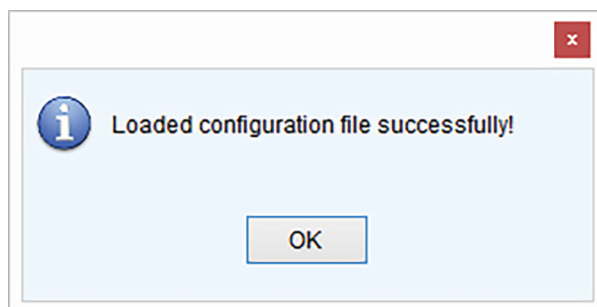
The setting of the screen configuration is complete. Click the "Close" button (j) to close the Screen Configuration screen.

Receiving card settings

- (1) The Screen Configuration screen is displayed. Select the "Receiving Card" tab (a).



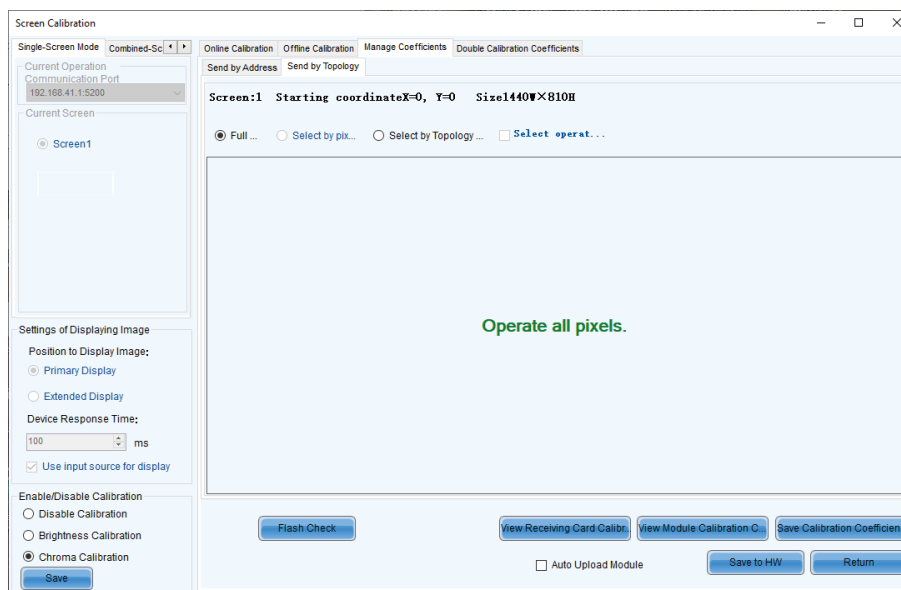
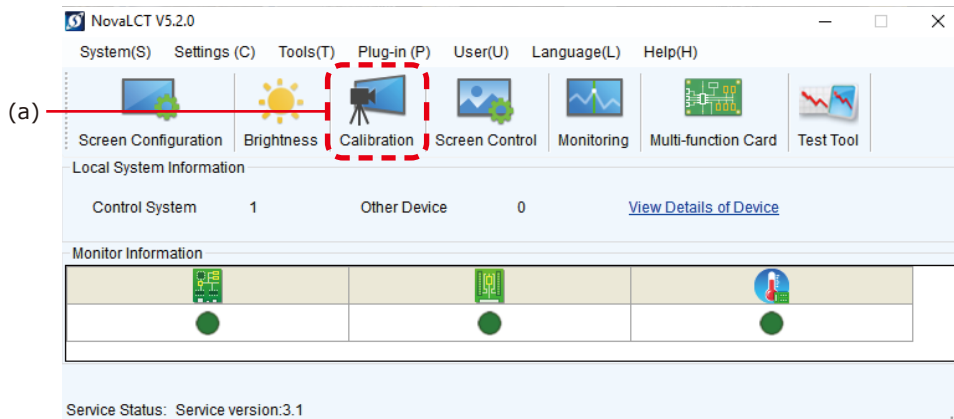
- (2) Click "Load from File" (b).
- (3) Select the configuration file (rcfgx file) you want to load to the receiving card.
A screen like the following appears when the loading process is complete.



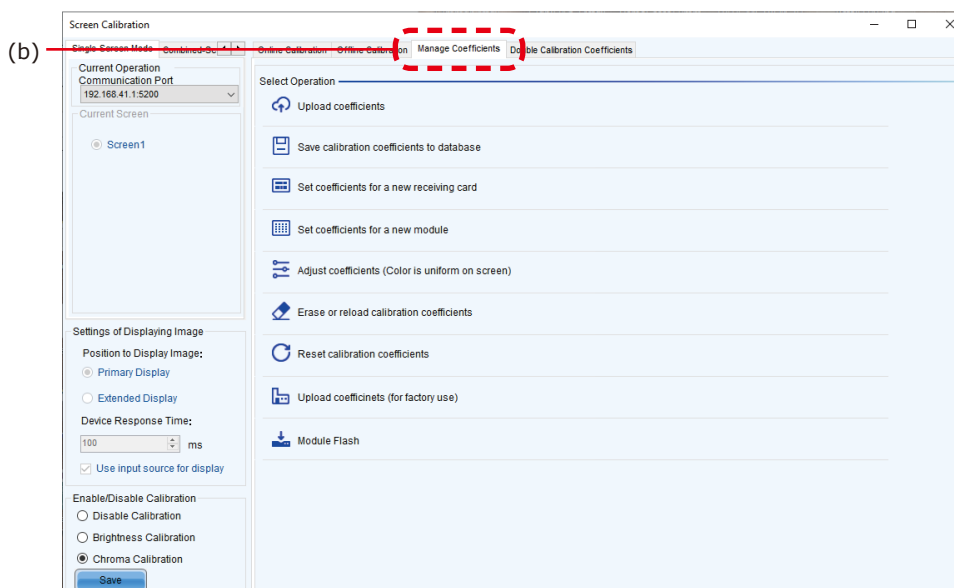
- (4) Click "Send to Receiving Card" (c).
- (5) Click "Save" (d).

Update the Calibration Data

- (1) Login as Advanced User.
- (2) Click the "Calibration" button (a). Start calibration menu.



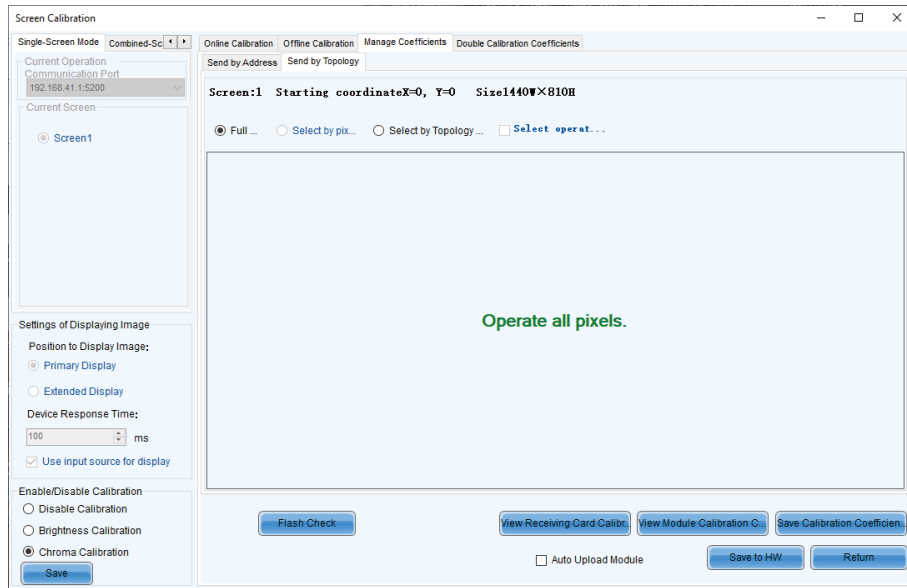
- (3) Select the "Screen1" radio button.
- (4) Click on the "Manage Coefficients" tab (b).



LD-D121 and LD-D151 only:

- (5) Click on “Module Flash”.

Result: The module flash options will appear.



Select whether you want the entire screen or individual displays.

Full screen:

Select this option when installing.

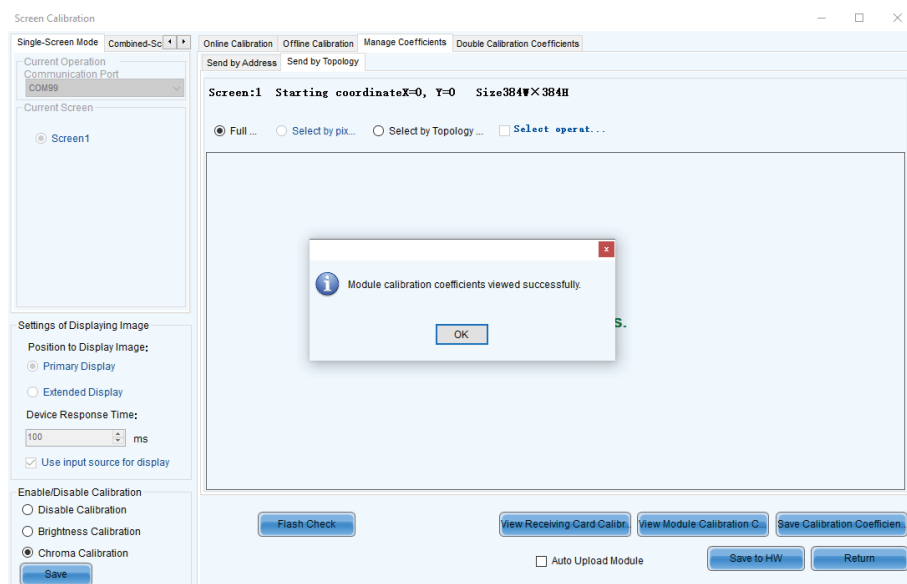
Module Flash (Select by Topology or list): Select this option when replacing pixel cards, etc.

Refer to “Display setting method when performing Module Flash for individual displays” ([English-58](#)) for the setting method of target displays.

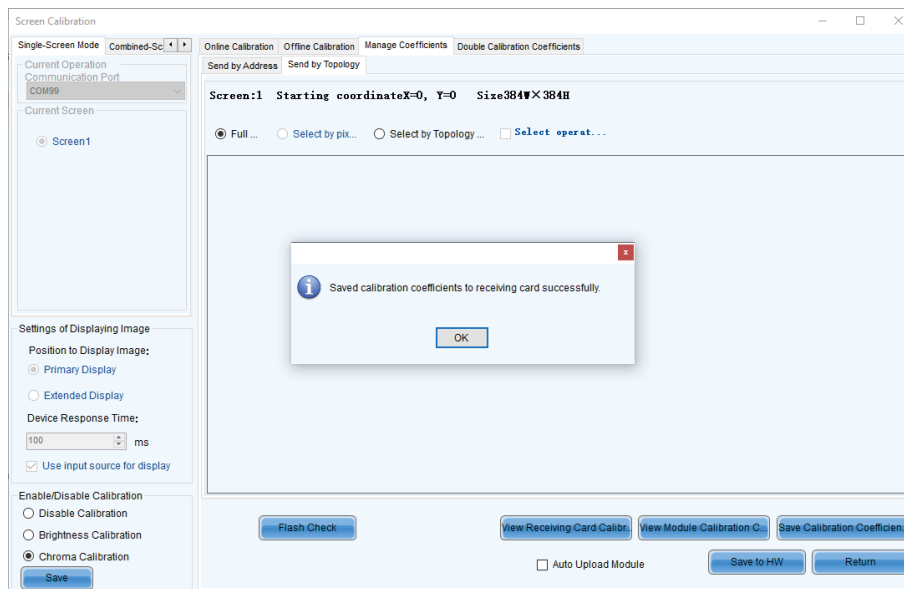
If “Adjusting the colors on a part of the screen” has been performed on the area set for Module Flash, perform it again after Module Flash.

- (6) Click the “View Module Calibration Coefficients” button.

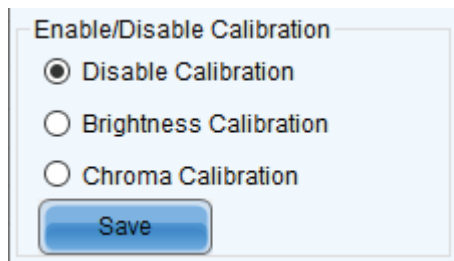
Result: Pop-up message opens.



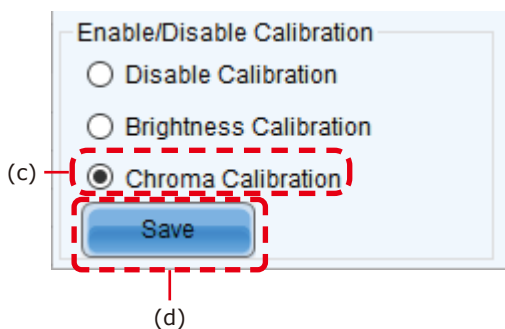
- (7) Click "Save Calibration Coefficients to Receiving Card".
The pop-up message, that the data has been successfully stored to the Receiving cards, will appear.
Result: The screen with the exchanged Pixel cards should look calibrated now.



- (8) Click on "Save to HW" button and go back to main window by clicking "OK" button.
(9) Check the calibration-state in the bottom left corner of Screen Calibration window: Enable/Disable Calibration.



- (10) If calibration-setting "Disable Calibration" is chosen, switch to "Chroma Calibration" (c) to enable calibration and click on the "Save" button (d).
Result: While switching you will already see calibration effect.

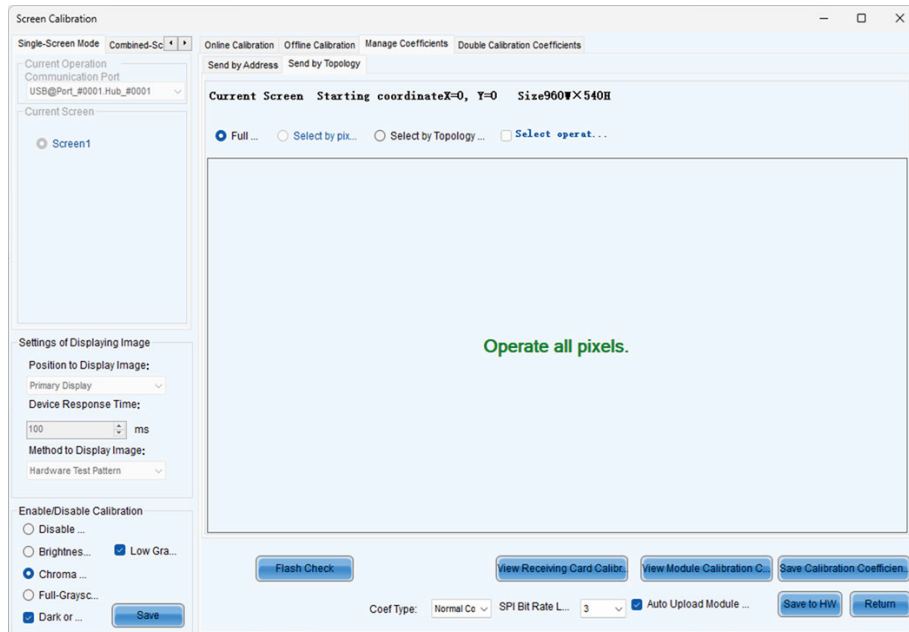


- (11) Close Screen Calibration windows by clicking on the "X".
Result: The calibration data update is complete.

LD-D091 only:

- (5) Click on "Module Flash".

Result: The module flash options will appear.



Select whether you want the entire screen or individual displays.

Full screen:

Select this option when installing.

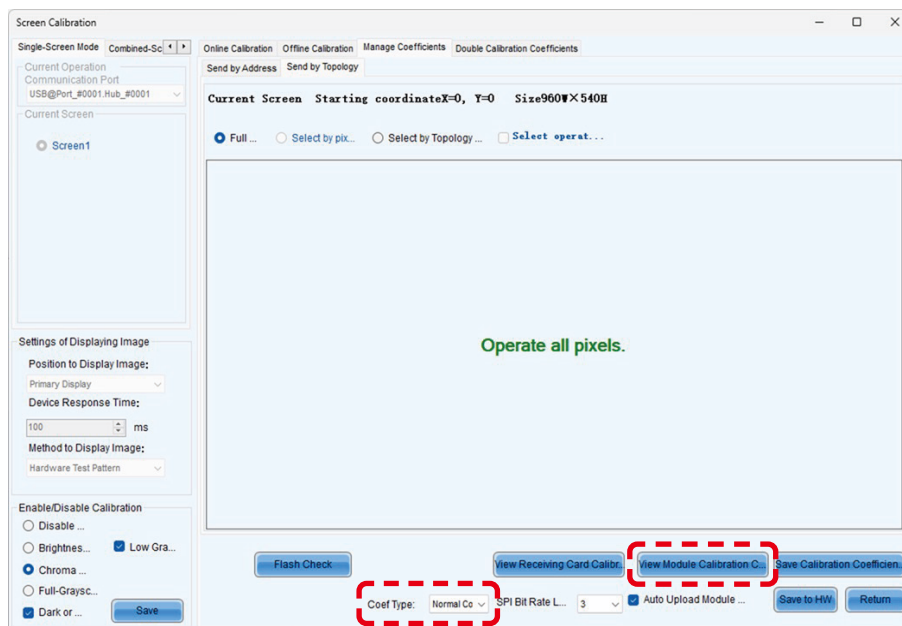
Module Flash (Select by Topology or list): Select this option when replacing pixel cards, etc.

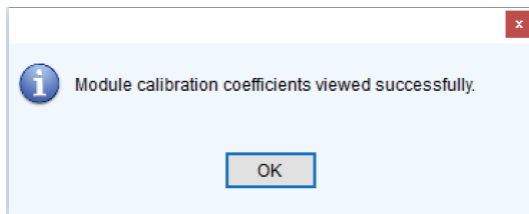
Refer to "Display setting method when performing Module Flash for individual displays" ([English-58](#)) for the setting method of target displays.

If "Adjusting the colors on a part of the screen" has been performed on the area set for Module Flash, perform it again after Module Flash.

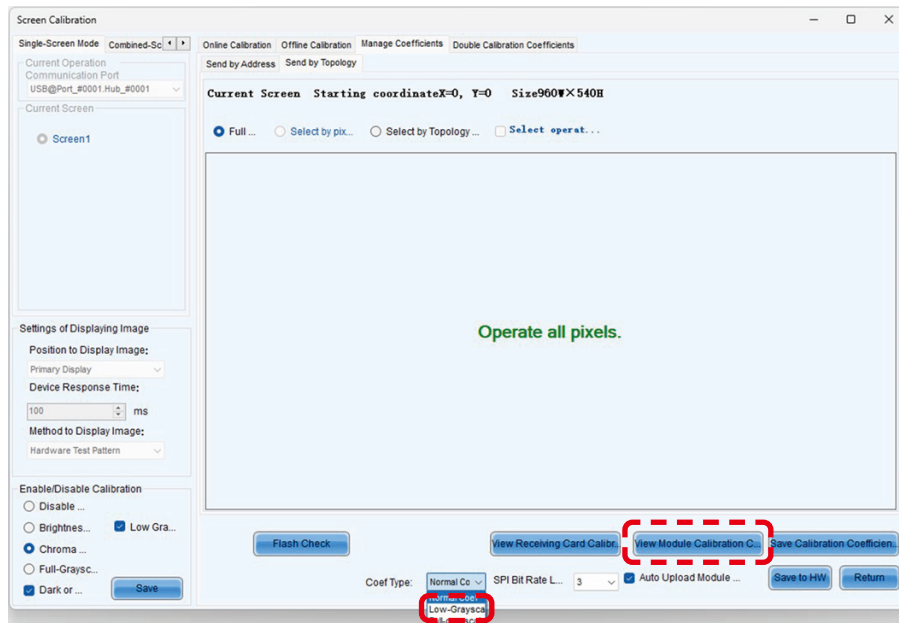
- (6) Click the "View Module Calibration Coefficients" button.

Result: Pop-up message opens.

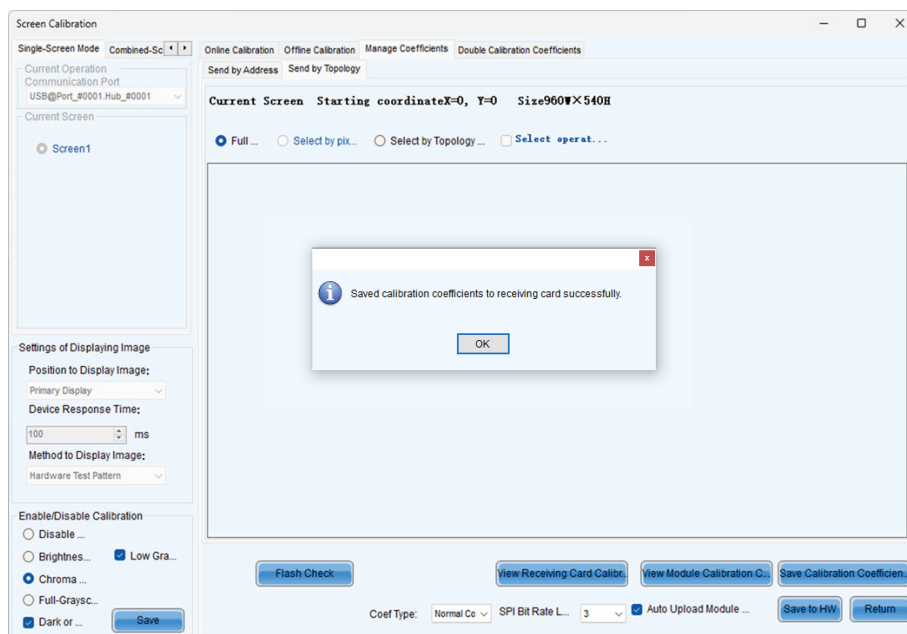




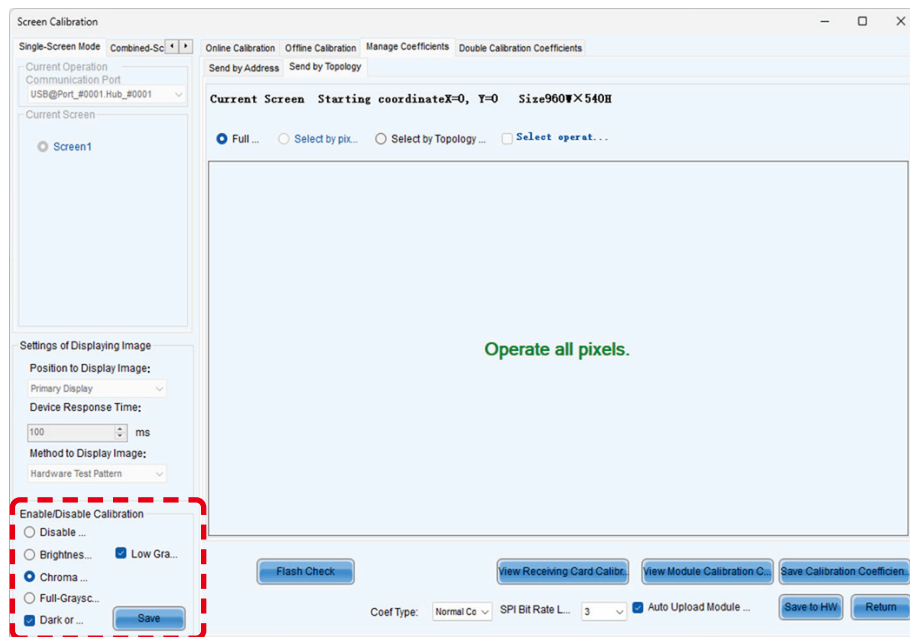
- (7) Set "Low-Gray..." under "Coef. Type", and then click the "View Module Calibration Coefficients" button.
Result: Pop-up message opens.



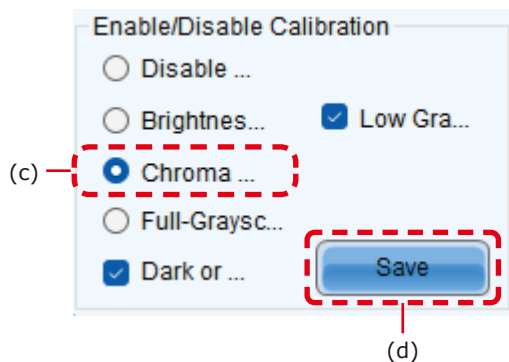
- (8) Click "Save Calibration Coefficients to Receiving Card".
The pop-up message, that the data has been successfully stored to the Receiving cards, will appear.
Result: The screen with the exchanged Pixel cards should look calibrated now.



- (9) Click on "Save to HW" button and go back to main window by clicking "OK" button.
- (10) Check the calibration-state in the bottom left corner of Screen Calibration window: Enable/Disable Calibration.



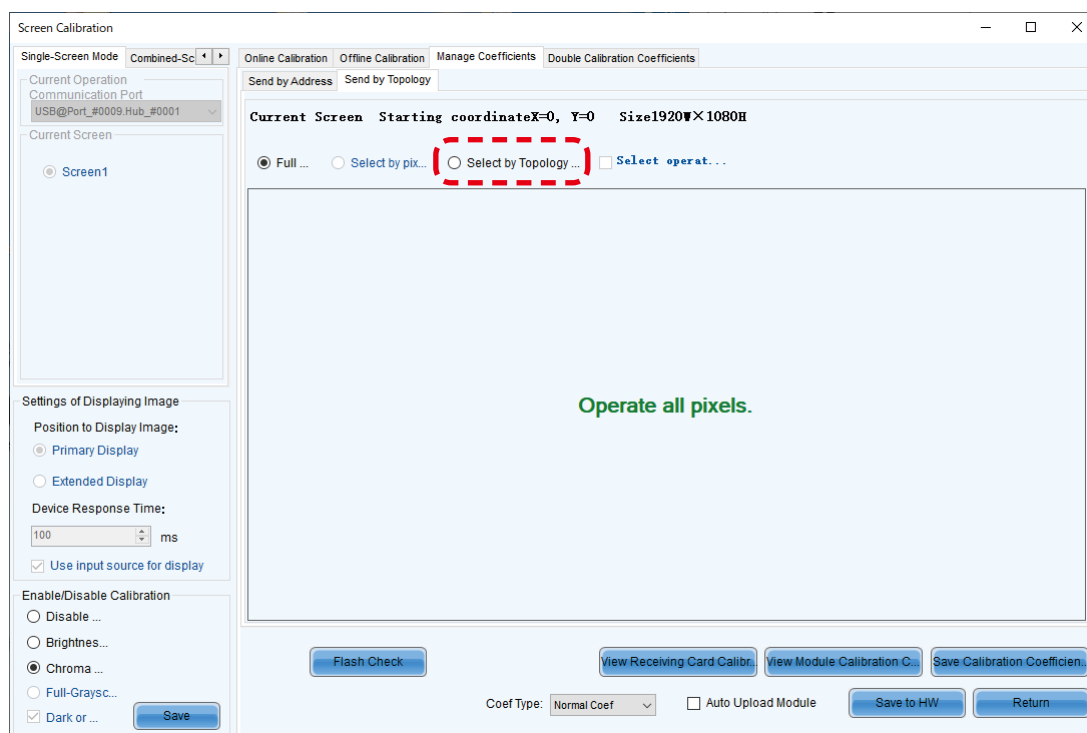
- (11) If "Disable Calibration" is chosen, switch to "Chroma Calibration" (c) to enable calibration, making sure that the "Low Gra..." and "Dark or ..." are checked and click on the "Save" button (d).
Result: While switching you will already see calibration effect.



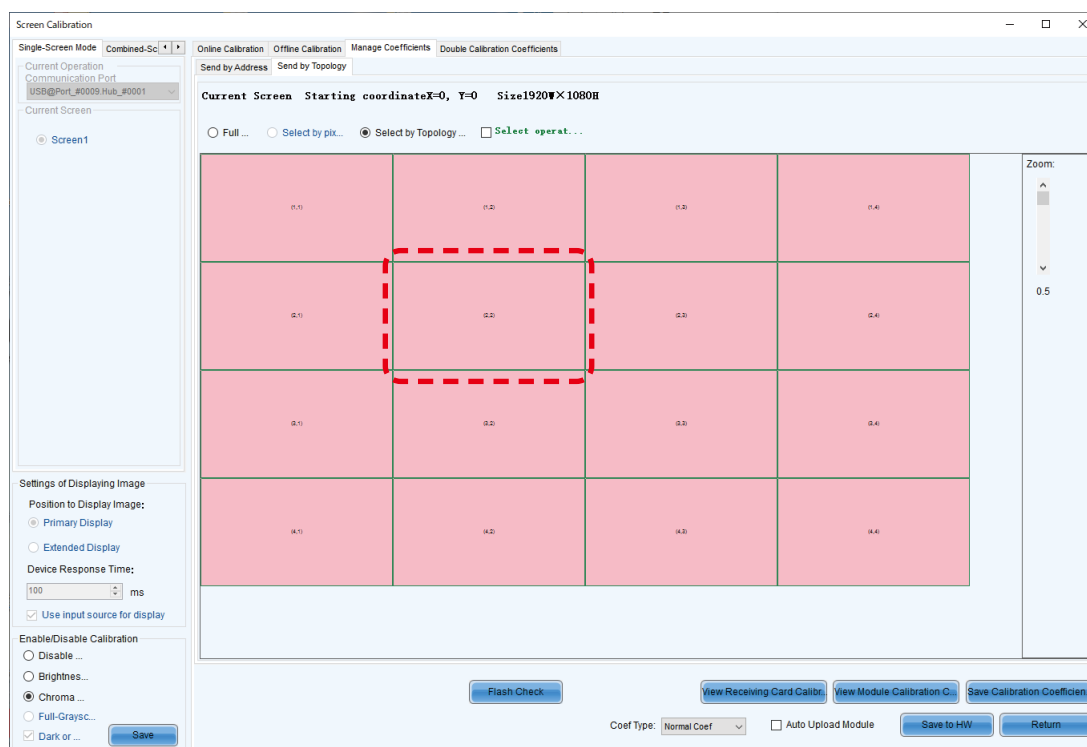
- (12) Close Screen Calibration windows by clicking on the "X".
Result: The calibration data update is complete.

Display setting method when performing Module Flash for individual displays

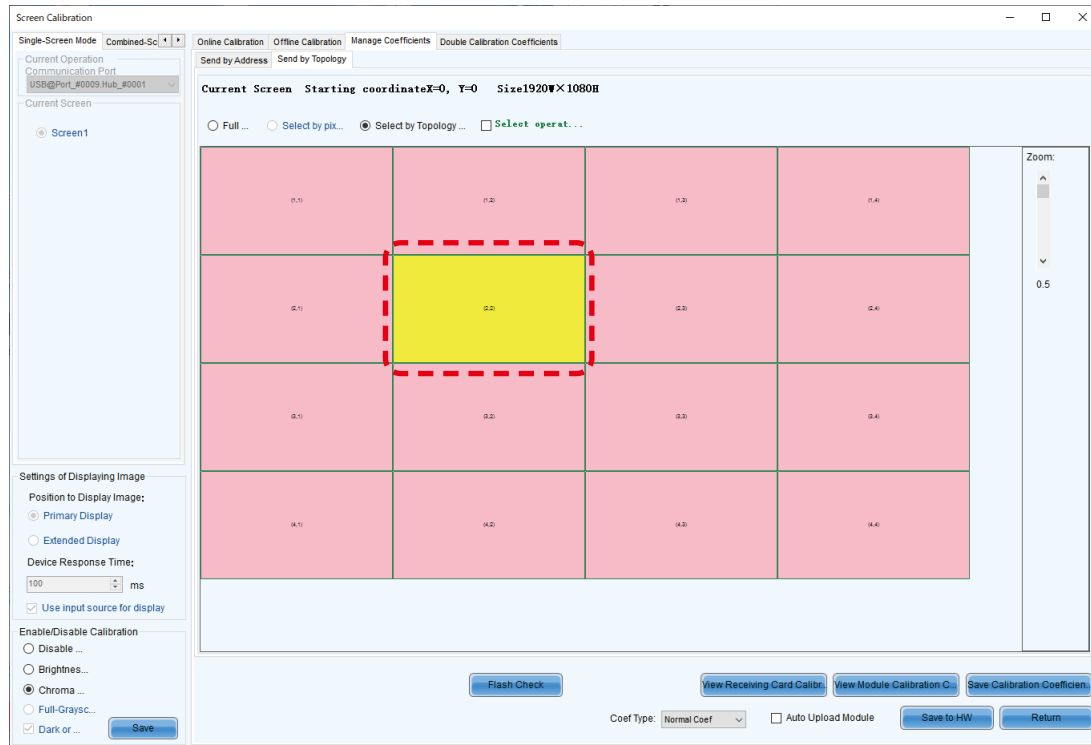
- (1) Select "Select by Topology or List".



- (2) Select the target display. Click inside the frame of the target display.



(3) The color of the selected display changes to yellow.



(4) Return to step (6) of "Update the Calibration Data".

What can be done with Auto Upload Module

When "Auto Upload Module" is set, if the power of the LED display is restarted after the pixel card replacement, the calibration data of all pixel cards in the display, including the pixel card that has been replaced, is automatically written to the receiving card, and the image is displayed according to this state.

Precautions related to the operation (Adjusting the colors on a part of the screen)

Set "Auto Upload Module" to off when performing "Adjusting the colors on a part of the screen".

(Uncheck "Auto Upload Module" and click "Save to HW".)

Since the calibration data adjusted with "Adjusting the colors on a part of the screen" is saved in the receiving card and used for the display, if "Auto Upload Module" is checked, the calibration data in all the pixels cards inside the display whose pixel card has been replaced is written to the receiving card when the power is turned on and the results of the adjustment performed with "Adjusting the colors on a part of the screen" is lost. Then, the calibration data in the pixel card is used to display the image.

Detailed procedure

To set Auto Update Module, it is necessary to set module IDs to each pixel card and to register these module IDs to the receiving card.

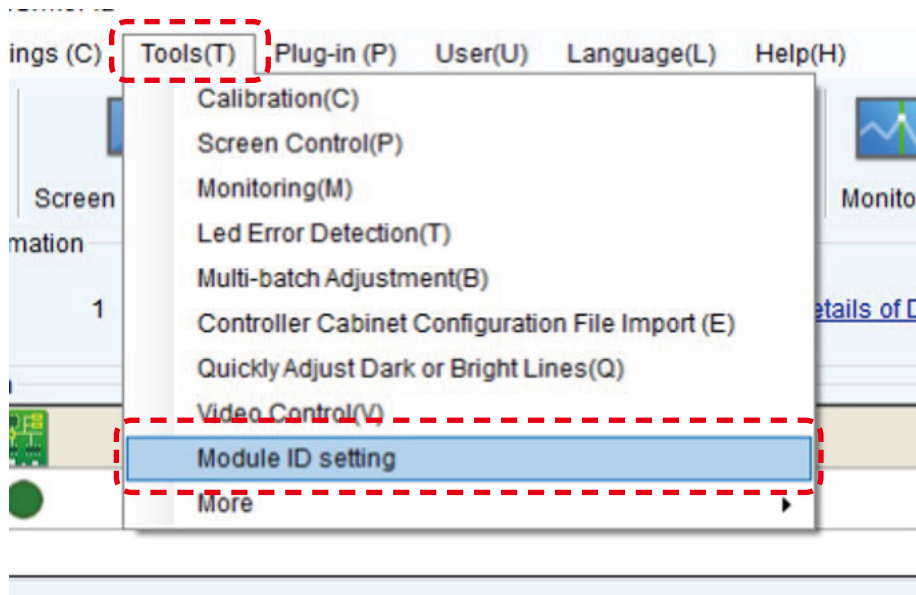
Once module IDs are set to the pixel cards, registration of the module IDs to the receiving card is performed with Module Flash.

Follow the procedure below to check that module IDs are set to the pixel cards.

You may also use the procedure below to set module IDs to the pixel cards if they are not already set.

Perform Module Flash again after setting module IDs to the pixel cards.

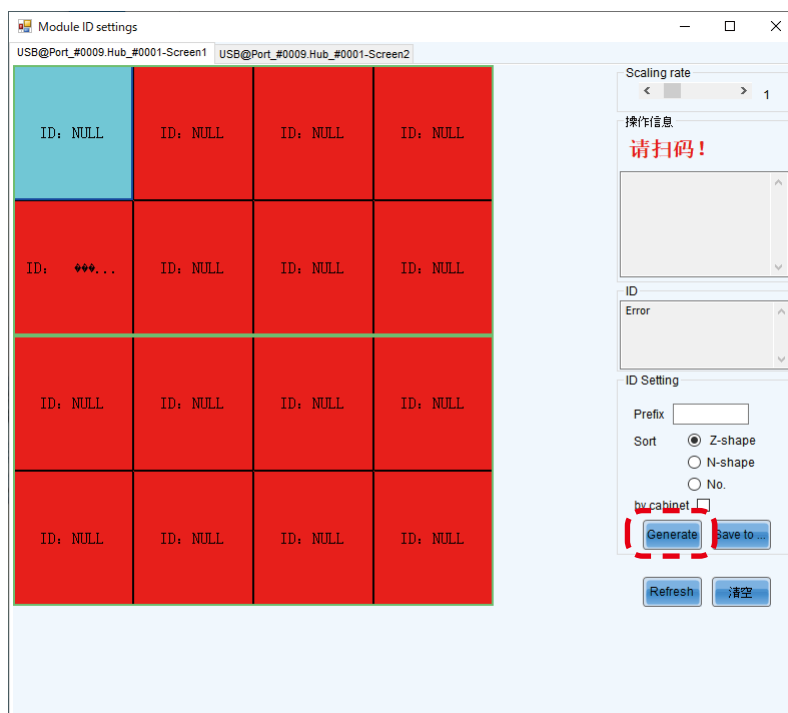
- (1) Log in with the administrator privileges and select "Tool" - "Module ID setting".



- (2) Click the “Refresh” button to check the module ID setting state.
Module IDs are not set if “ID: NULL” is displayed.



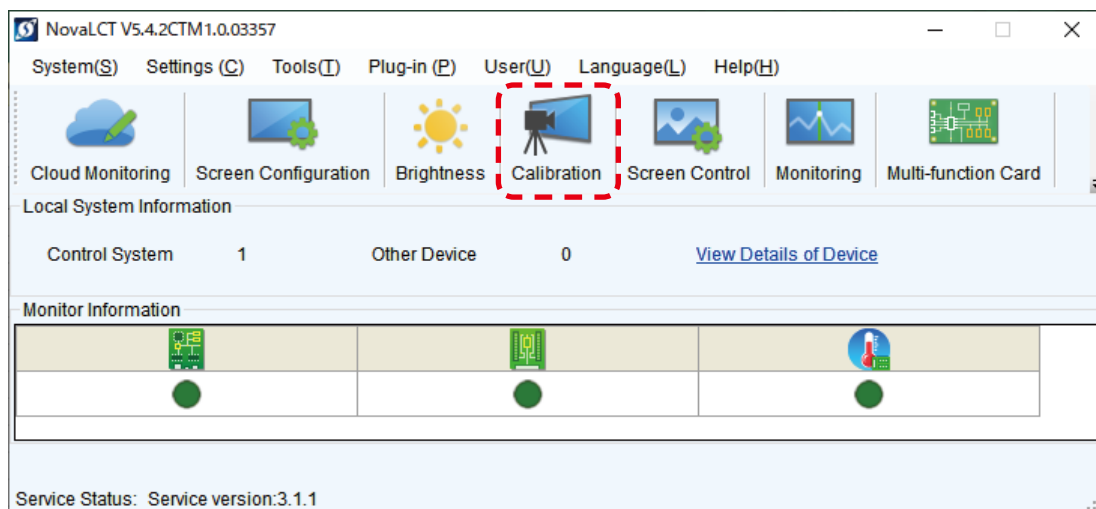
- (3) Click on the NovaLCT window and enter “admin”.
Click the “Generate” button.



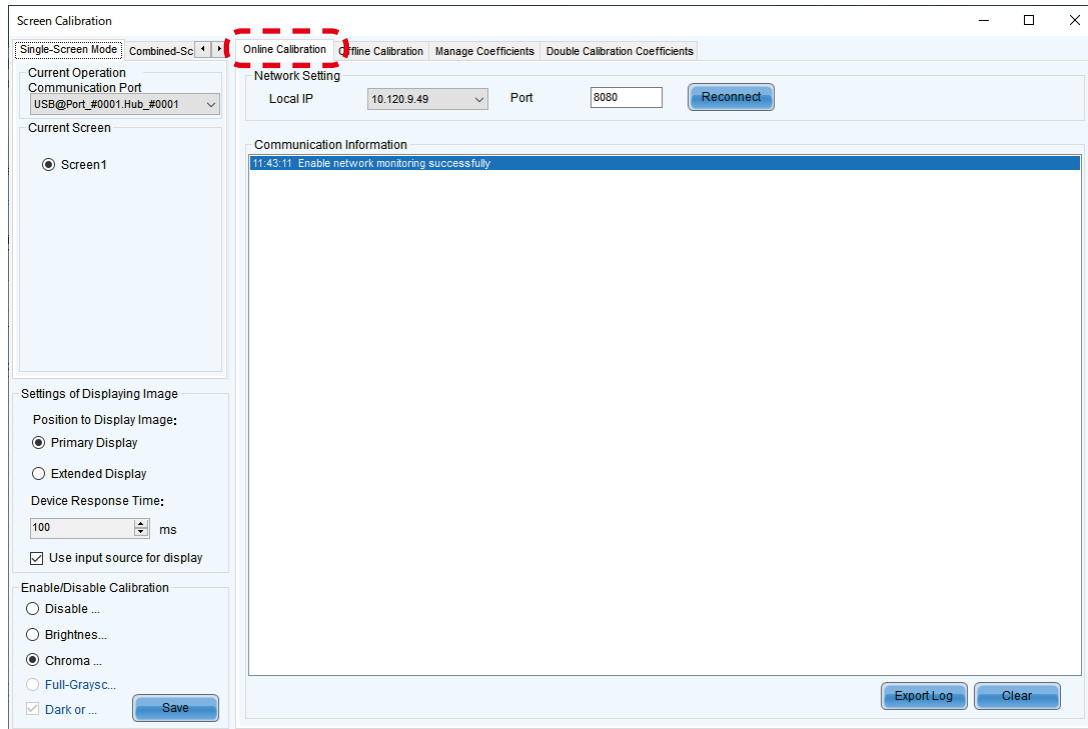
- (4) Module IDs are generated.
- (5) Click the "Save to H/W" button to save the module IDs to both the pixel cards and the receiving card. You may click the "Refresh" button to check the setting state.



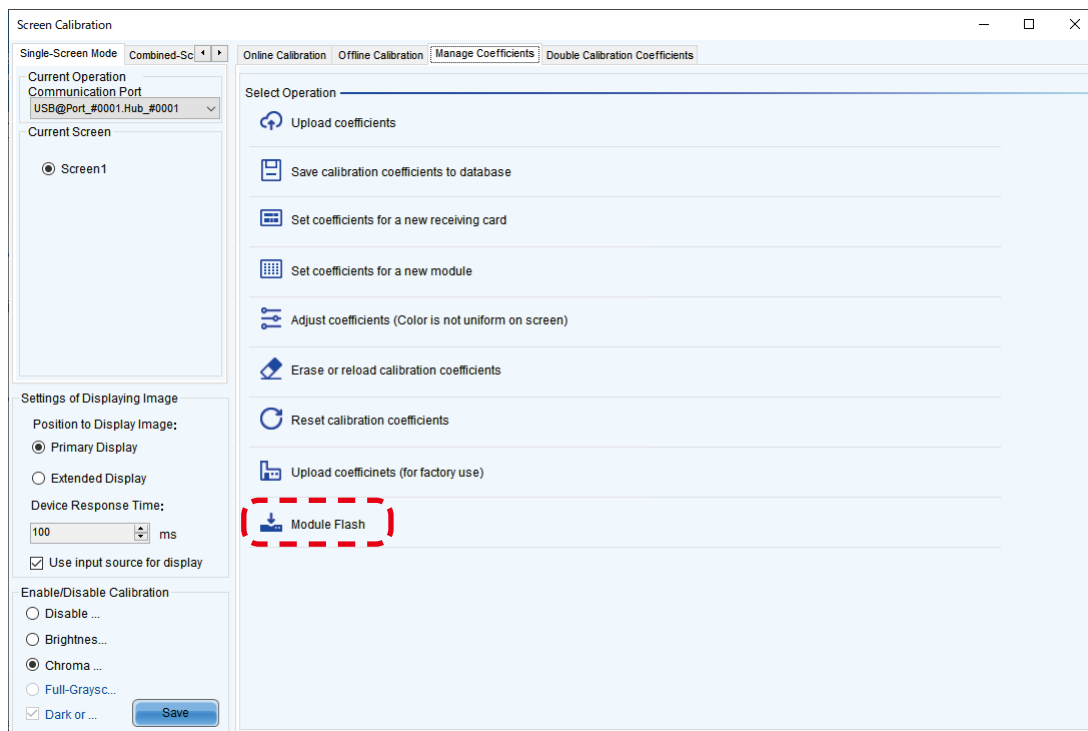
- (6) Select "Calibration".



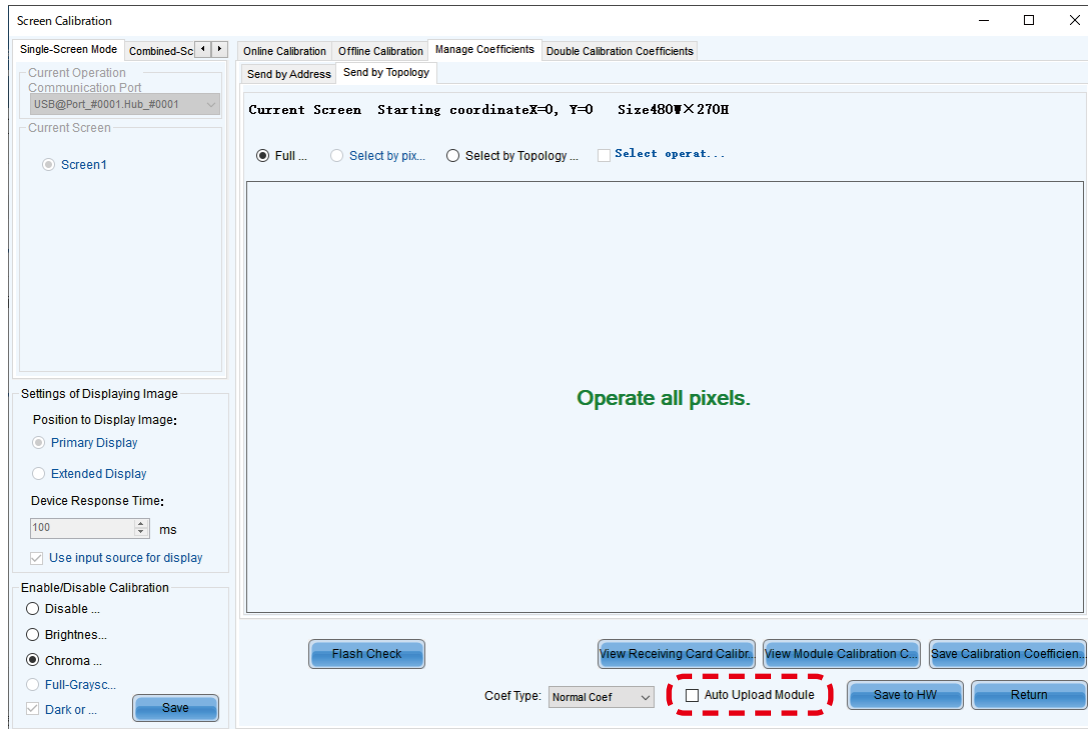
(7) Select the “Manage Coefficients” tab.



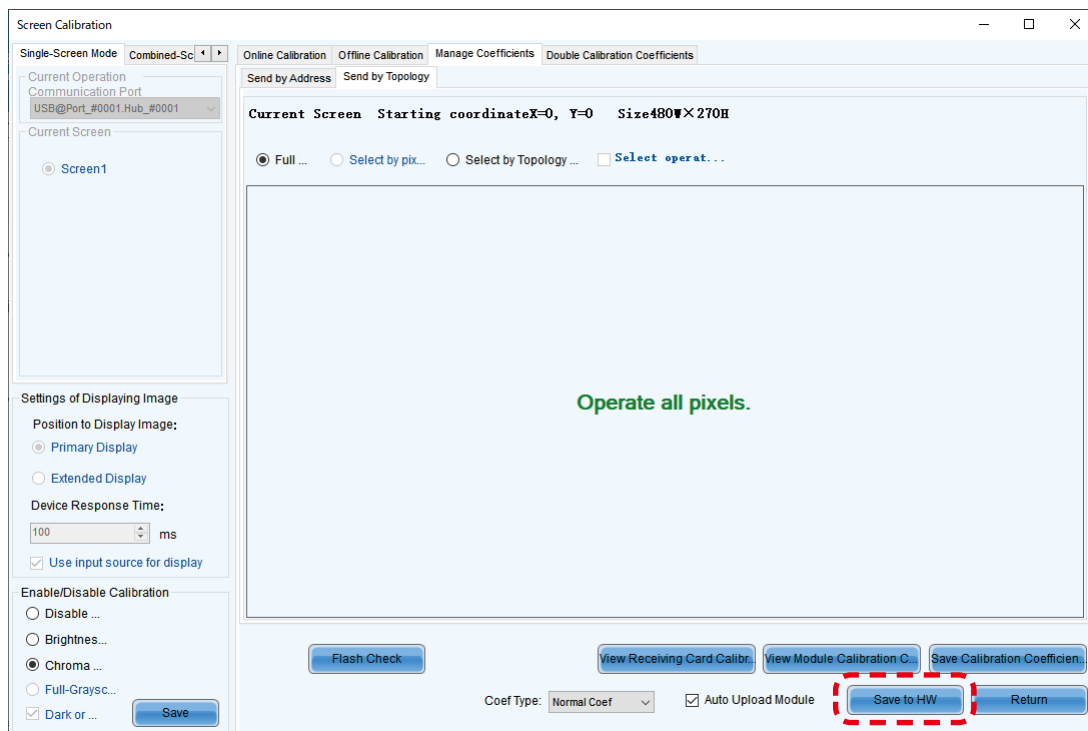
(8) Select “Module Flash”.



(9) Check the "Auto Upload Module" box.



(10) Click the "Save to HW" button.



(11) Click the "Return" button to return to the previous screen.

Click "Advanced Settings" (☒) (a) to expand the setting screen.

(1) Brightness

Set the brightness of the screen using the slider (b).

Increasing the value increases the brightness.

(2) Gamma correction

Set the gamma correction value using the slider (c).

Increasing the value makes the dark parts of the screen darker.

(3) Color temperature

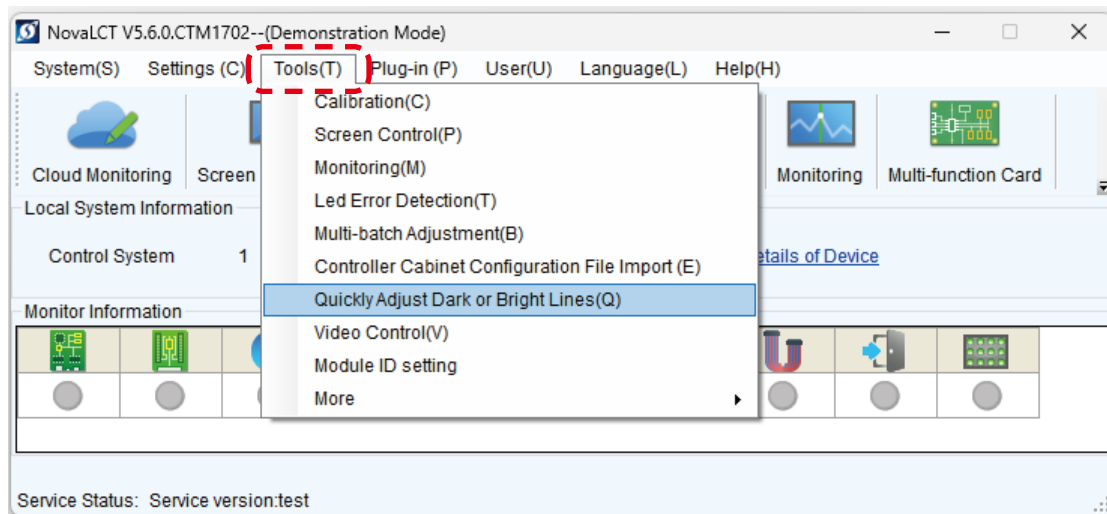
Set the color temperature using the slider (d).

Increasing the value makes the colors more bluish, while reducing the value makes the colors more reddish.

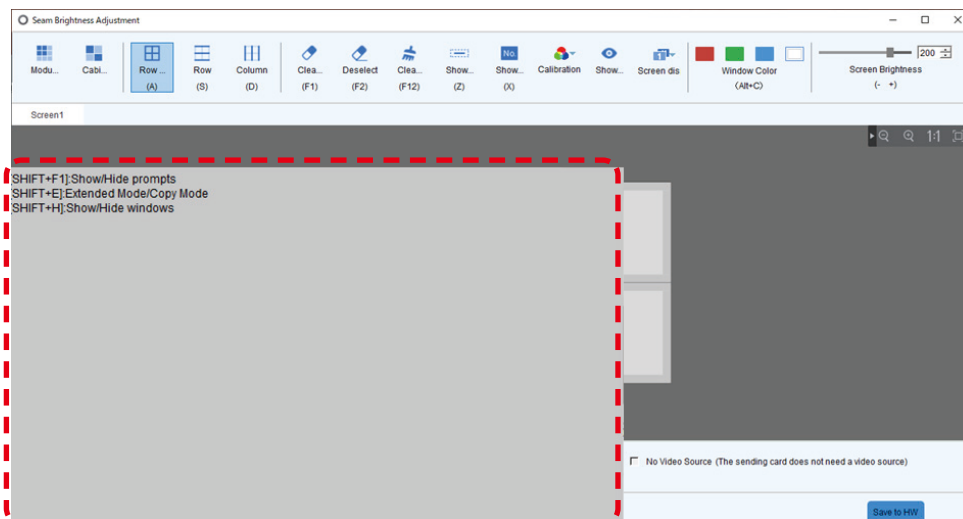
When the setting is complete, click the "Save to HW" button to save the settings.

Line calibration

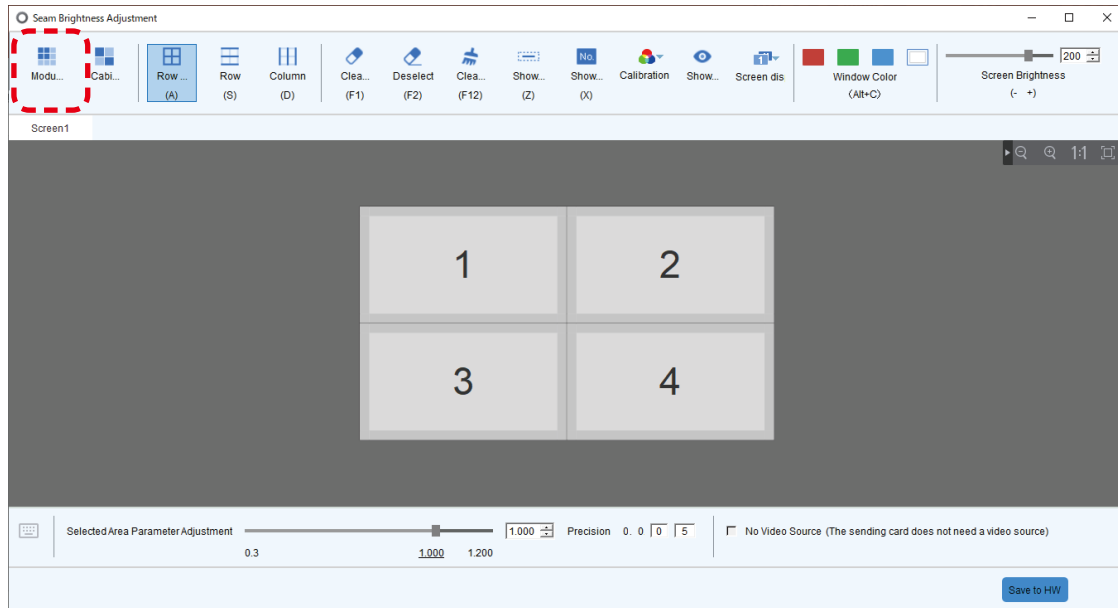
- (1) Log in with the administrator privileges ([English-44](#)).
- (2) On the tabs at the top of the window, click Tools > Quickly Adjust Dark or Bright Lines.



- (3) A screen like the figure below is displayed. Press the Shift + E keys. The gray window moves to the LED displays.



(4) Click “Module Mode” on the top left of the screen.

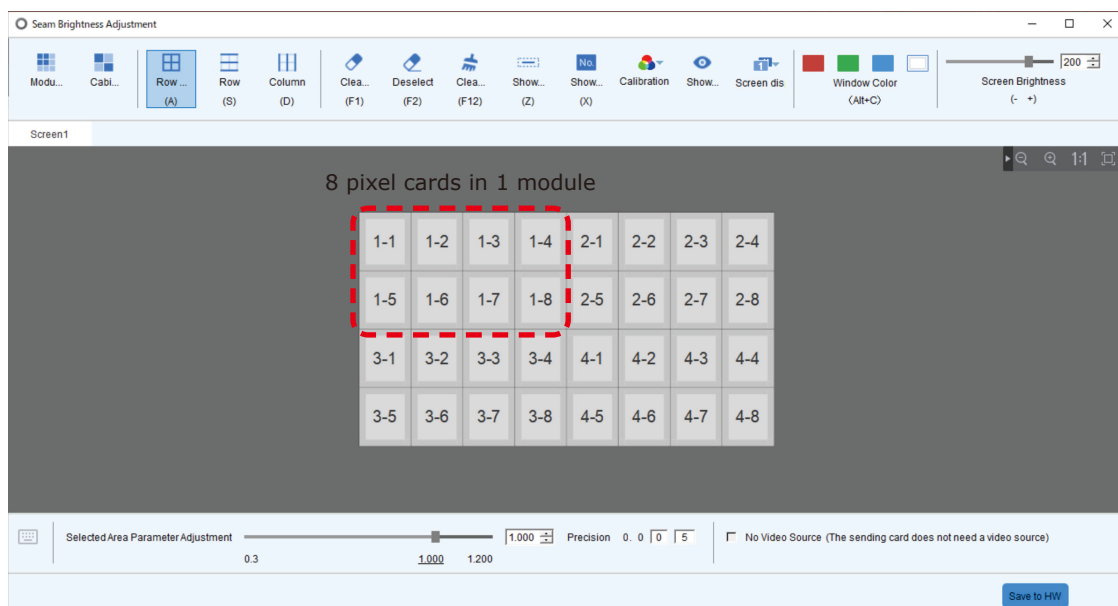


Enter the number of pixel cards inside one pixel card on the screen that pops up, and then click “OK”.

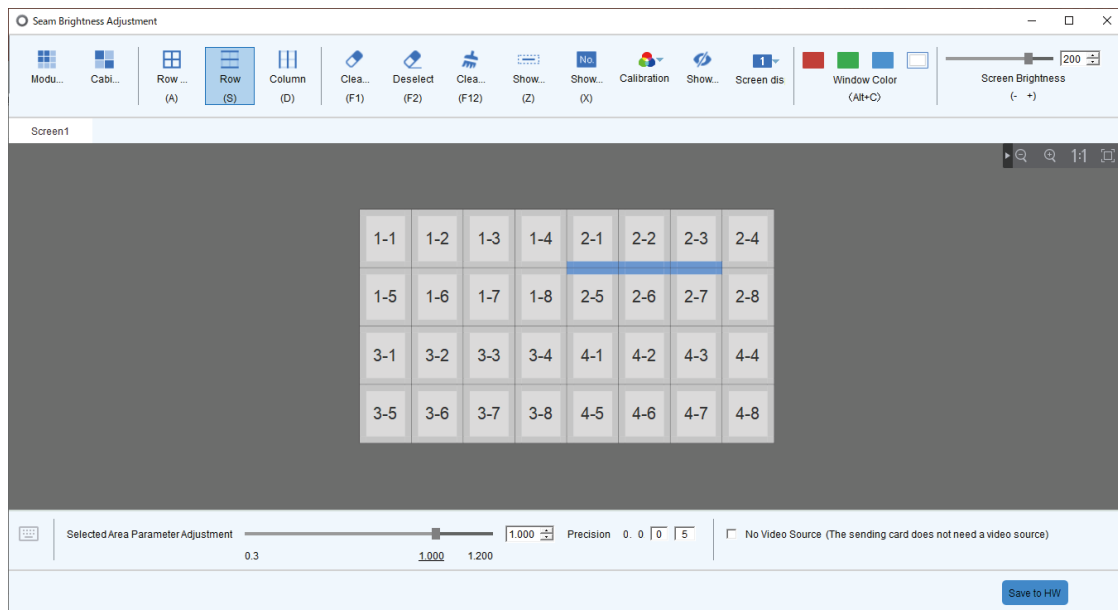


Product name	LD-D091	LD-D121	LD-D151
Number of displayed pixels (resolution/pixel card)	Width 160 Height 180	Width 120 Height 135	Width 96 Height 108

Lines separating each pixel card are displayed.



- (5) Specify the border between the pixel cards for which you want to perform line calibration by clicking on it or specifying a range. You may also adjust multiple locations at the same time.



< Tool icons used to select the adjustment range >



Clear effects: Resets the line calibration in the selected range.

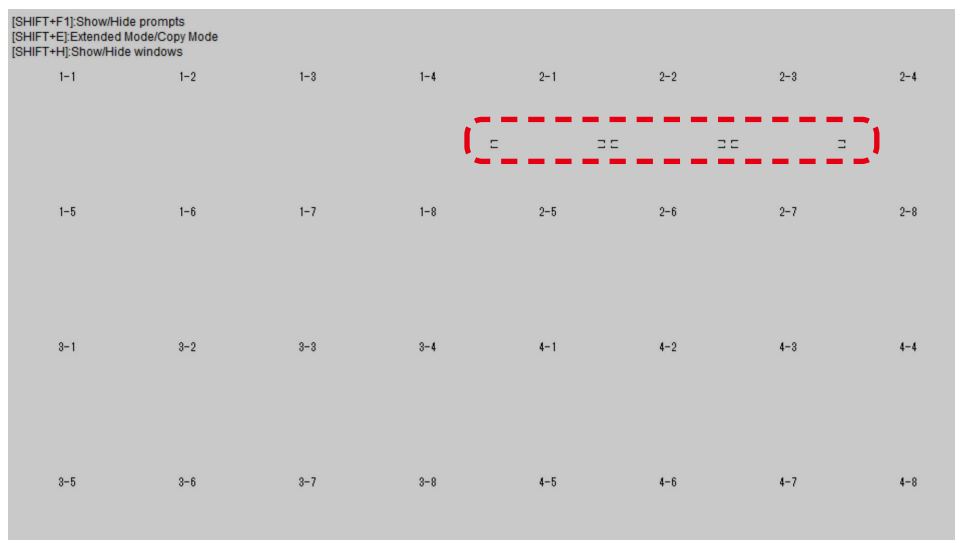


Deselect: Deselects the range currently selected.

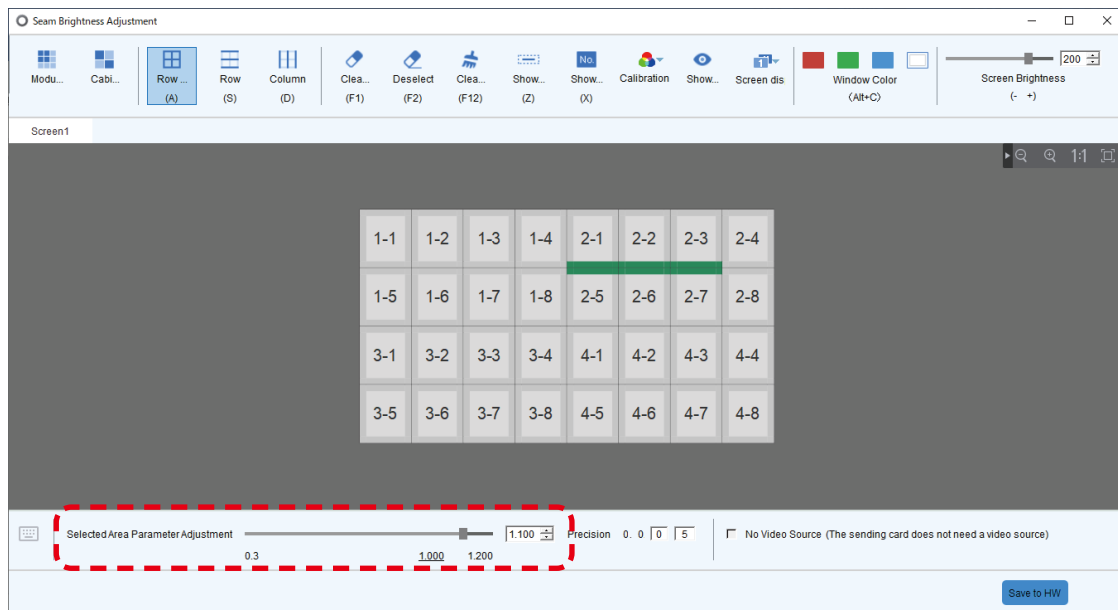


Clear all effects: Resets line calibration for all locations.

The selected adjustment range is also displayed on the LED displays.

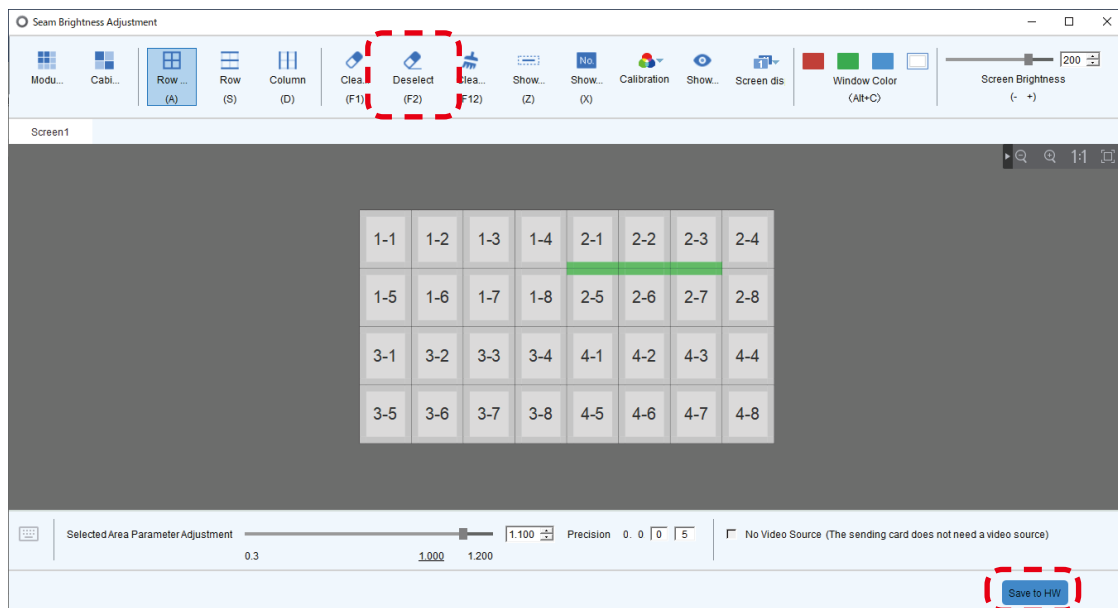


- (6) Click the upward and downward arrows next to the input box at the bottom of the window to adjust the brightness of the selected locations.

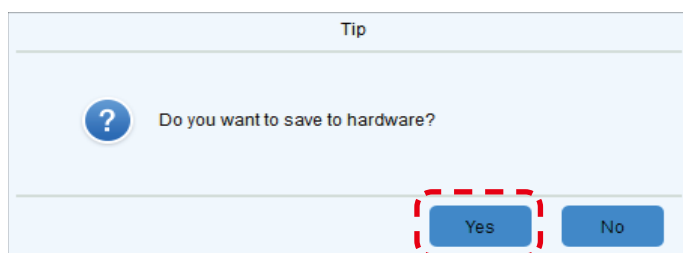


Upward arrow: Increases the brightness (makes the dark lines less noticeable)
Downward arrow: Decreases the brightness (makes the bright lines less noticeable)

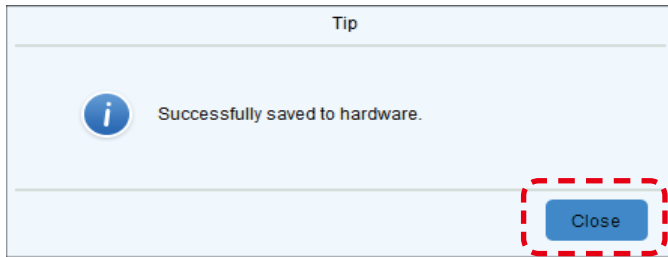
- (7) If you want to adjust other locations, click "Deselect" and specify again a range for the adjustment. When the adjustment is complete, click "Save to HW" at the bottom of the screen.



Click "Yes" on the screen that pops up.



(8) The adjustment is complete when the following screen is displayed. Click "Close" to finish.



Note

If the line calibration settings are not updated on the screen after reading the calibration data, restart the LED displays to update the line calibration settings.

Cleaning

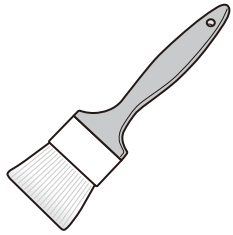
The screen brightness may decrease if dust or another foreign material is adhering to the surface of the pixel card.

The magnet used to install the pixel cards also attracts magnetic metal particles, such as iron powder.

Therefore, magnetic metal particles may adhere to areas near the magnet of the pixel card and the brightness homogeneity of the screen may decrease.

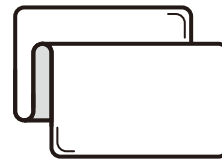
Cleaning should be performed regularly depending on the installation environment.

Required tools (example).



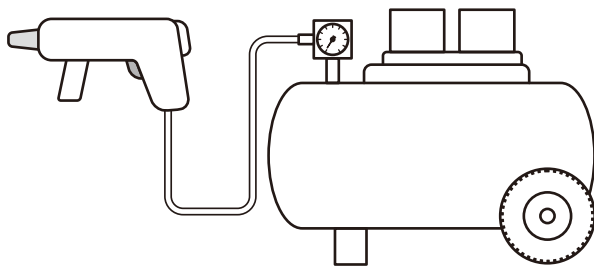
Soft brush

(animal hair brush to prevent static electricity)



Soft cloth

(that does not generate static electricity)



Air blower (compressor)

Cleaning method

- Turn the LED displays off.
- Use the soft brush to remove any dirt on the surface of the pixel card. If these parts are very dirty, use the air blower to remove the dirt.
- Use the soft cloth to remove the dirt on the screen surface.
- Repeat the steps (b) and (c) to remove all the dirt.

CAUTION

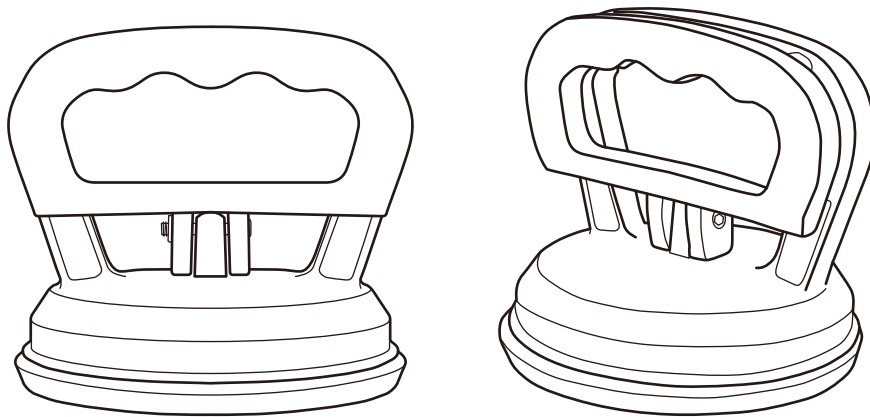
- Do not use water or any other liquid.
- Do not use a stiff brush.
- Pay attention not to damage the surface of the pixel card when using the soft brush, the air blower, or the soft cloth.

Maintenance

CAUTION

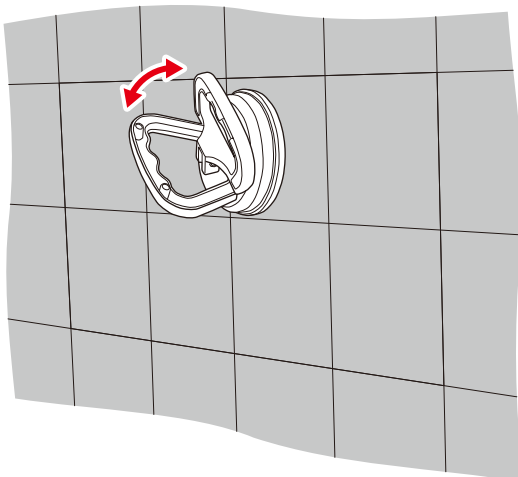
- Disconnect the power supply to the LED displays when performing the maintenance.
- Before installing or removing pixel cards, please ensure the wall has been powered off for 1 or 2 hours. Otherwise the thermal expansion of pixel cards increases the risk of damaging them during removal or insertion.
- Use the correct screwdriver for the shape of the screws when removing (loosening) or setting (tightening) the screws.
Pay attention not to drop the screws and the other parts you have removed.
Pay attention not to lose the removed screws since they will be reused.

Removing a pixel card

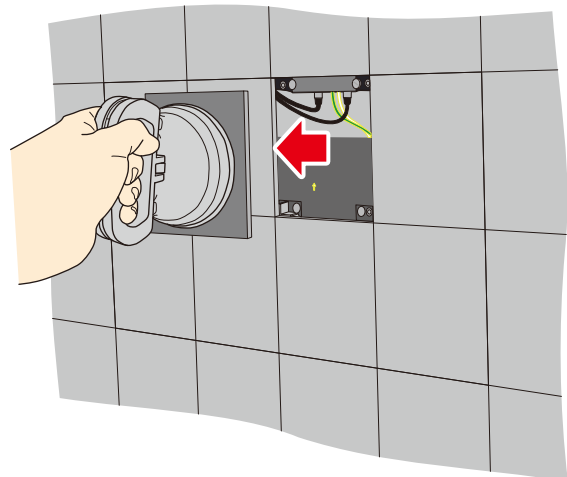


CAUTION:

Lightly hold the pixel card with your hand to prevent it from falling.



(1) Open the grips of the maintenance tool and push the maintenance tool against the pixel card. Close the grips of the maintenance tool and stick the pixel card.

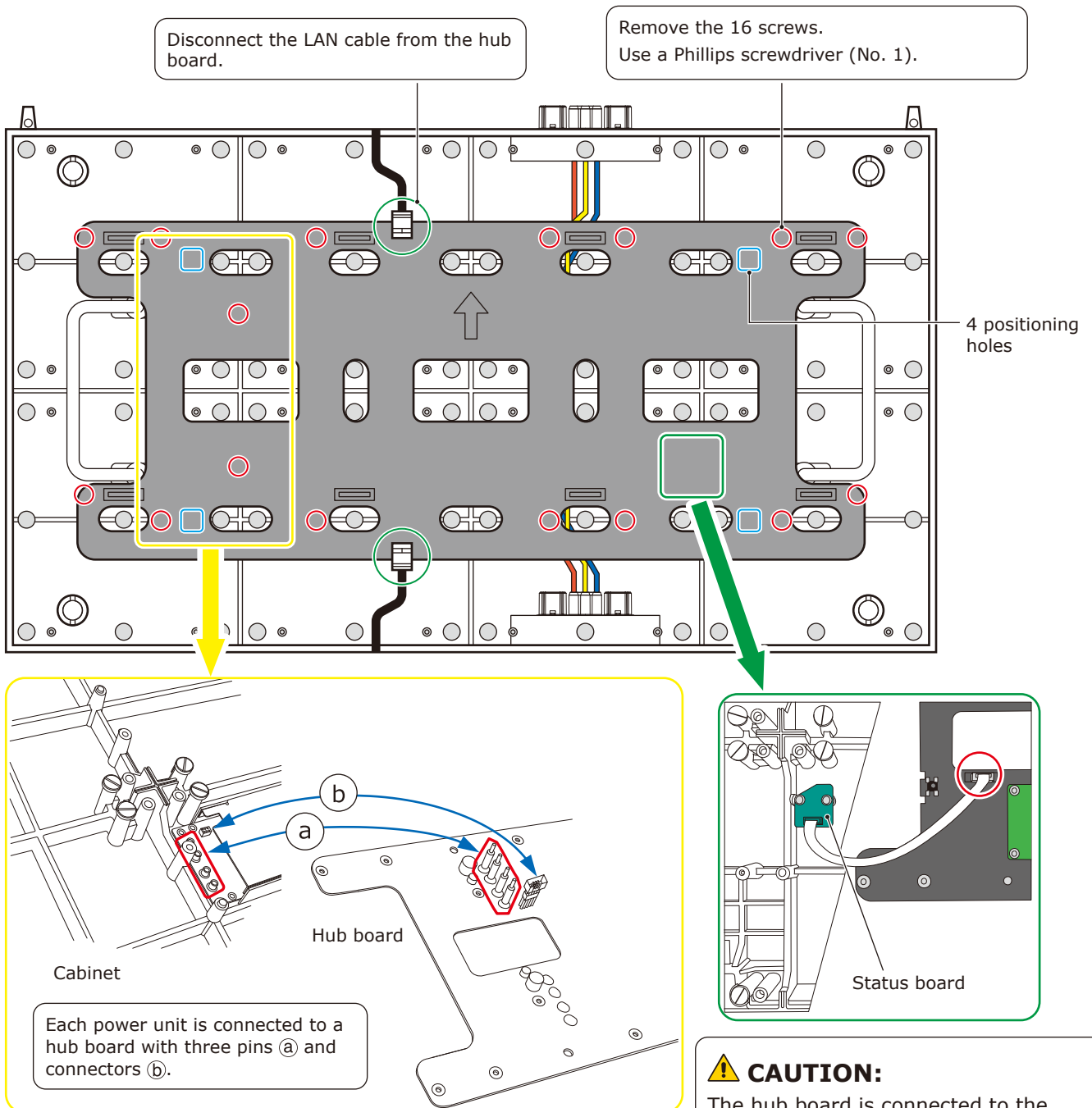


(2) Pull it straight toward you to remove the pixel card.

Be sure to perform "Update the Calibration Data" ([English-52](#)) after replacing a pixel card.

Removing and installing the hub board

- (1) Removing the hub board
 - (a) Disconnect the LAN cable from the hub board
 - (b) Remove the 16 screws securing the hub board with a Phillips screwdriver (No. 1).
 - (c) Since the hub board is connected to the power unit with pins and connectors, remove it by raising this part, as well as the part with the positioning holes. The status board and the hub board are connected with a cable. Pay attention not to pull the hub board.
 - (d) Disconnect the cable from the hub board, and then remove the hub board.



(2) Installing the hub board

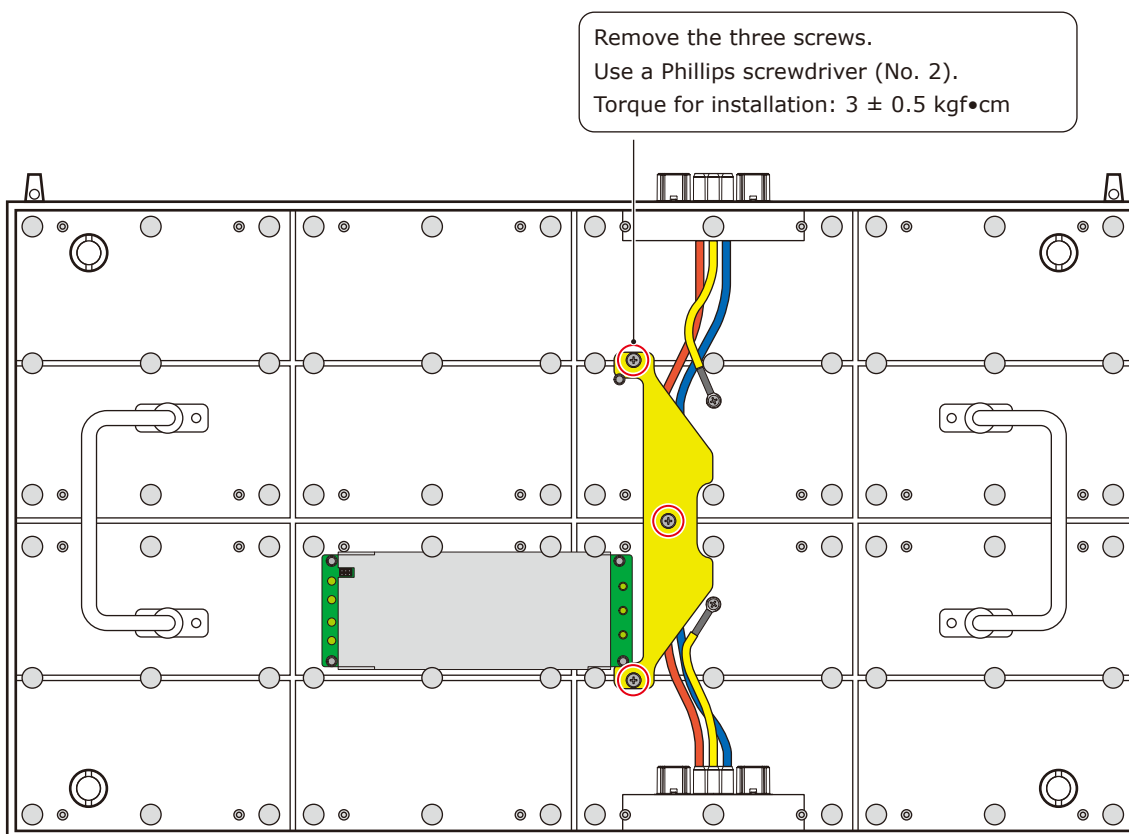
Install the hub board into the cabinet following the procedure below.

- (a) Connect the status board to the hub board using the cable.
- (b) Install the hub board into the cabinet. Install it with the power unit pins and connectors aligned. Insert the pins and connectors completely and check that the hub board is securely attached and not bent.
- (c) Tighten the 16 screws. Use a tightening torque of $3 \pm 0.5 \text{ kgf}\cdot\text{cm}$.
- (d) Connect the LAN cable.

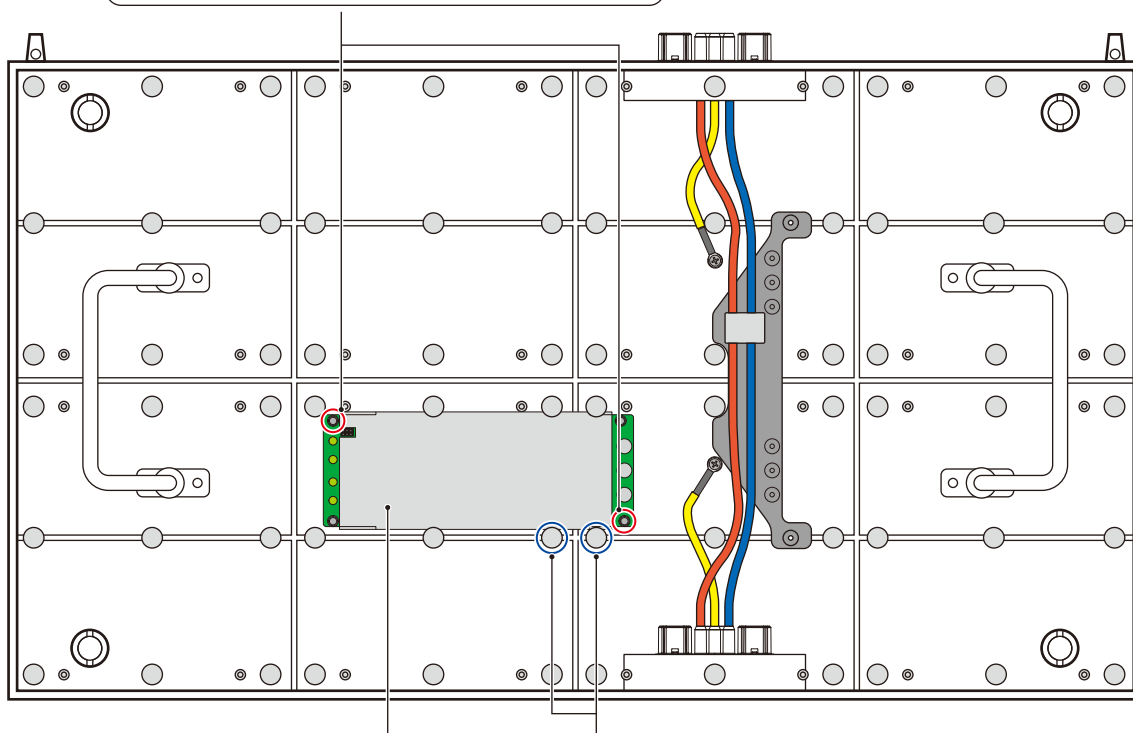
Replacing the power unit

The power unit dissipates heat through the cabinet. Apply some thermal paste on the back of the power unit to be replaced. Ask your retailer for more details on the types of thermal paste.

- (a) Remove the hub board following the "(1) Removing the hub board" procedure on the previous page.
- (b) Remove the three screws, and then remove the power hub board.
- (c) Remove the two magnet interfaces and the two screws securing the power unit, and then replace the power unit.
- (d) Install the power hub board, the protective sheet, and the hub board.
- (e) Install the hub board following the "(2) Installing the hub board" procedure on the previous page.



Remove the two screws securing the power unit.
Use a Phillips screwdriver (No. 2).



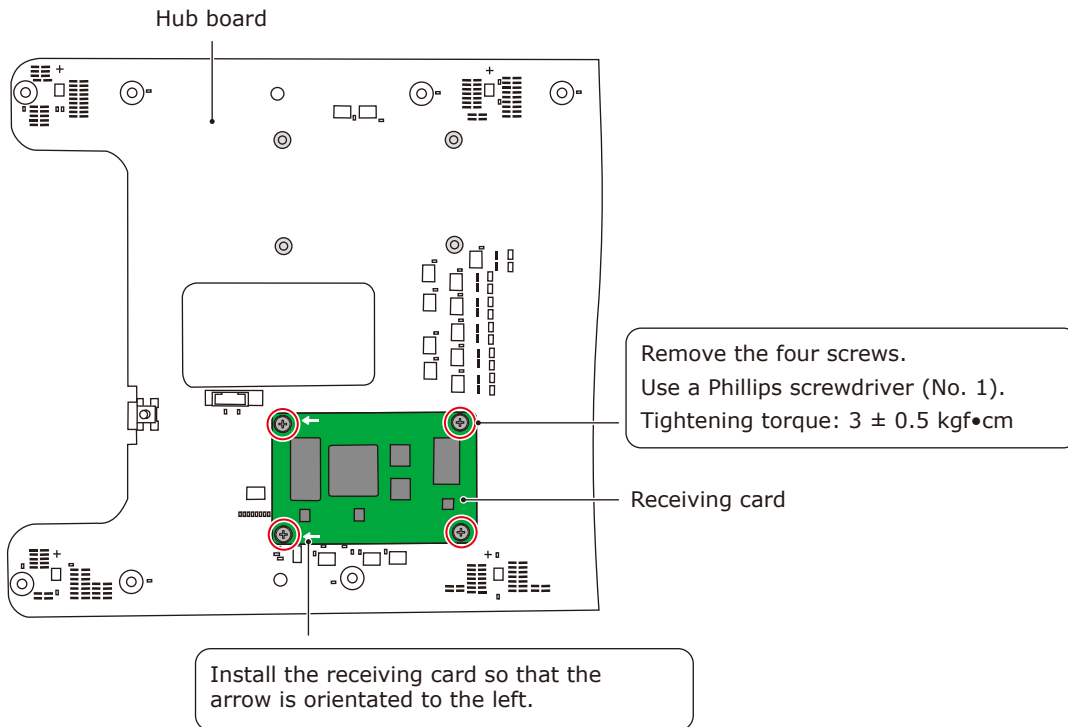
Use a pair of pliers to hold the two magnet
interfaces, rotate them, and remove them.

Replace the power unit.
Use the screws you have removed to secure the power unit.
Tightening torque: $3 \pm 0.5 \text{ kgf}\cdot\text{cm}$

Replacing the receiving card

Remove the receiving card from the hub board.

Remove the four screws securing the receiving card, and then remove the receiving card from the hub board.



Perform the following after replacing the receiving card.

Check the hardware program

While referring to "Updating the hardware program", check the version of the hardware program of the receiving card and update the hardware program if the version does not match the version of the displays whose receiving card has not been replaced.

Update the configuration data

While referring to "Saving the configuration data", read the configuration data from a display whose receiving card has not been replaced and save it as a file.

While referring to "Updating the hardware program", write the saved file of the configuration data to the receiving card that has been replaced.

Adjust the brightness, color temperature, and gamma

Perform "Image Setting" ([English-65](#))

Replace the LED controller

Before replacing the LED controller, check the version of the hardware program of the LED controller that will be replaced.

While referring to "Updating the LED controller hardware program", check the version of the hardware program of the controller.

Perform the following procedure after replacing the LED controller.

Check the hardware program

While referring to "Updating the LED controller hardware program", check the version of the hardware program of the LED controller after the replacement. If the version differs from the version of the hardware program of the LED controller before the replacement, update the hardware program.

Perform "Display connection settings" ([English-46](#)) again.

Adjust the brightness, color temperature, and gamma

Perform "Image Setting" ([English-65](#))

Replace the control PC

If the control PC has been replaced, install NovaLCT (Preparing for using NovaLCT software ([English-44](#))).

Troubleshooting

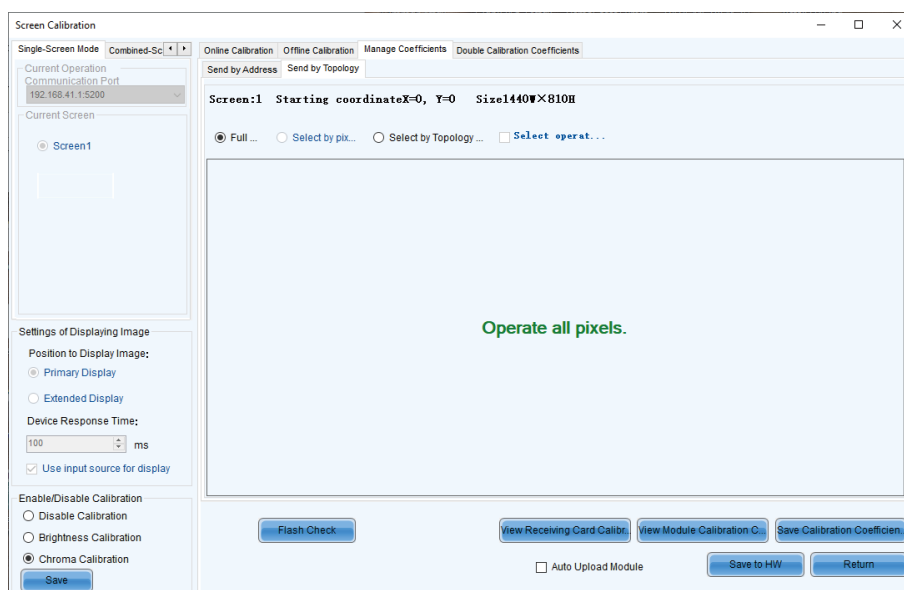
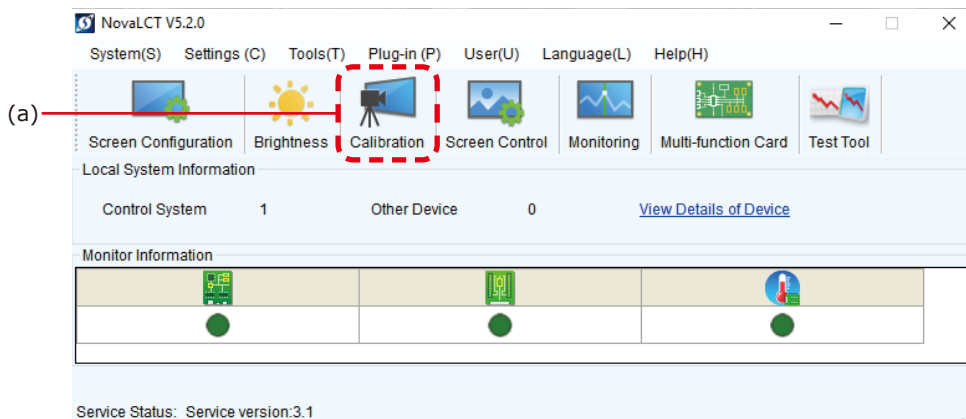
1. Display problems

Problem	Solution
Nothing is displayed on all the LED displays.	Check that power is being supplied to the LED displays.
	Check that the LED controller is turned on.
	Check that a video signal is being input to the LED controller.
	Check that a LAN cable is correctly connected between the LED controller and the LED display.
	Check that the brightness is not set to 0% (= not lit).
Nothing is displayed on one LED display.	Check that a LAN cable is correctly connected between the LED controller and the LED display.
	The receiving card inside the LED display may be broken. → Check the status of the LED display by following the procedure in "State monitoring using the software".
	The power unit inside the LED display may be broken. → Check the status of the LED display by following the procedure in "State monitoring using the software".
No image is displayed on one pixel card.	Check that the contacts of the pixel card are correct (contacts of the hub board).
	The pixel card may be broken. Replace it with a spare pixel card.
Control (communication) is not possible.	Check that the communication cable is correctly connected between the computer and the LED controller.
	Check that the LED controller is turned on.
	If the communication cable is a USB cable, check that the device driver runs correctly.
The colors differ on one pixel card.	Adjust the brightness, gamma correction value, and color temperature with the "Image Setting" procedure. Perform the "Adjusting the colors on a part of the screen" procedure. Select the adjustment range using "Select by Pixel Area" described in (5)-2.
I want to adjust the color tone of the entire screen.	Perform the "Adjusting the colors on a part of the screen" procedure. Select the adjustment range using "Screen" described in (5)-1.
Bright lines or dark lines are visible between the pixel cards or between the displays.	Perform the "Line calibration" procedure.
The dark parts are not completely black with HDMI connection.	Check the settings of the graphics card output on the computer. Step 1: Open the setting menu of the graphics card installed in your computer. Step 2: Select "Display" and select the output color format. It may be necessary to select "Adjust video color settings" after selecting "Display". Step 3: Set "Output color format" or the output setting to "Full". It may be necessary to first select "RGB". Step 4: Apply the new settings.

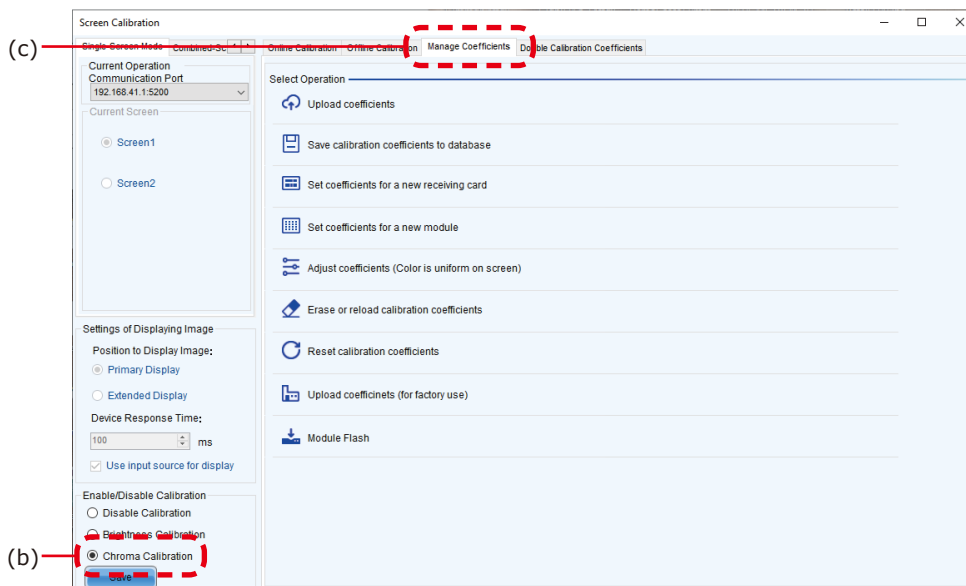
The brightness or colors of a pixel card that has been replaced differ from the surrounding pixel cards.	Adjust the colors in the following order until the brightness and colors are the same as the surrounding pixel cards. Perform "Update the Calibration Data" (English-52). ↓ Perform "Image Setting" (English-65). ↓ Save the configuration data of the LED displays displaying the image normally ("Saving the configuration data") and write the saved configuration file ("Updating the configuration data"). ↓ Perform "Image Setting" (English-65) again. ↓ Perform the "Adjusting the colors on a part of the screen" procedure.
---	---

2. Adjusting the colors on a part of the screen

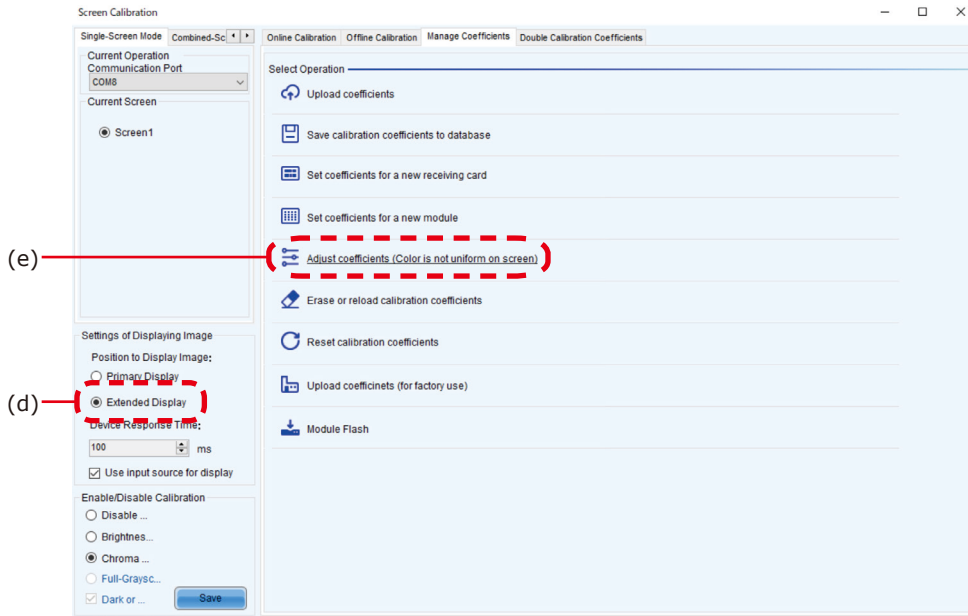
- (1) Log in with the administrator privileges (English-44).
- (2) Click "Calibration" (a). Start calibration menu.



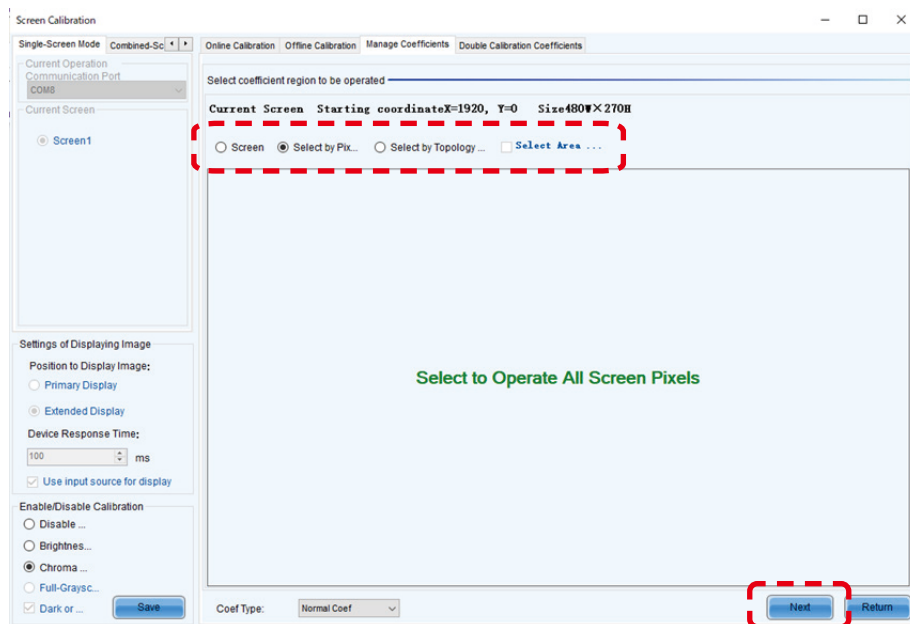
- (3) Check that "Chroma Calibration" (b) is selected and click the "Manage Coefficients" tab (c).



- (4) Set "Extended Display" (d) under "Setting of Displaying Image", and then click "Adjust coefficients" (e).



- (5) Select the range specification method from the three available methods depending on the calibration range. After setting the range, click "Next" to display the "Adjust Coefficients" screen.



(5)-1

Screen: Adjust the entire frame set.

The calibration settings reading starts after "Next" is clicked. A fair amount of time is required to read the data.

The "Adjust Coefficients" screen is displayed when the data has been read.

(5)-2

Select by Pixel Area: Adjust by pixels.

Column Number...	480
Row Number of ...	540
Width	120
Height	135

The screen used to specify the adjustment range is displayed.

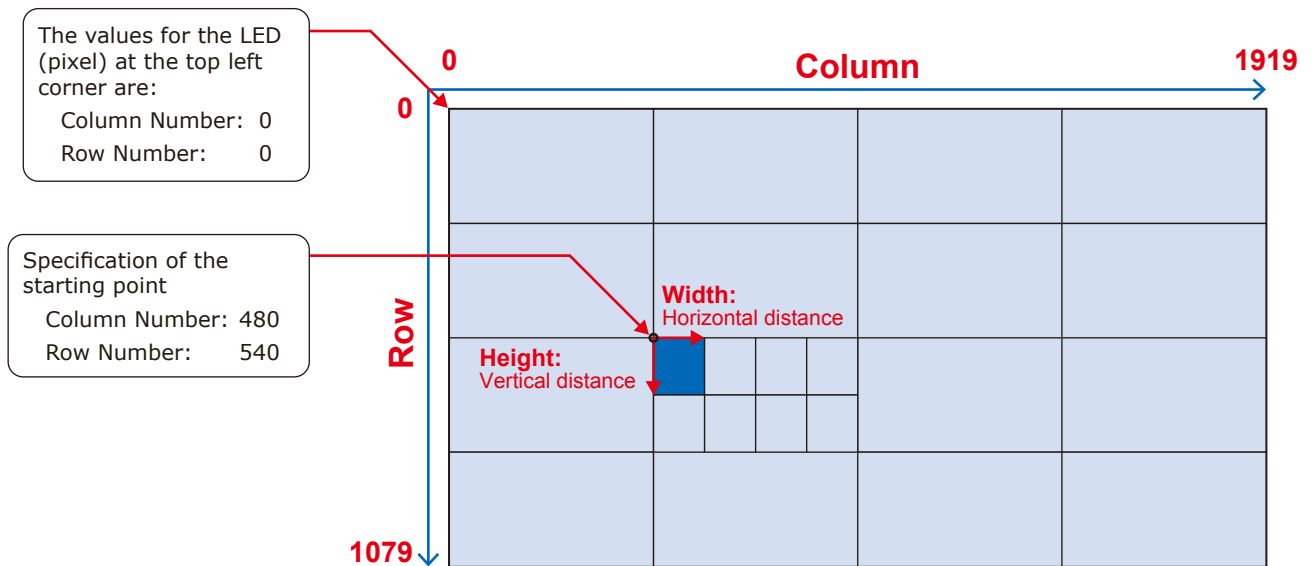
Column Number: The position (pixel) on the horizontal axis of the starting point (top left) of the selection range

Row Number: The position (pixel) on the vertical axis of the starting point (top left) of the selection range

Width: The horizontal distance from the points specified with "Column Number" and "Row Number"

Height: The vertical distance from the points specified with "Column Number" and "Row Number"

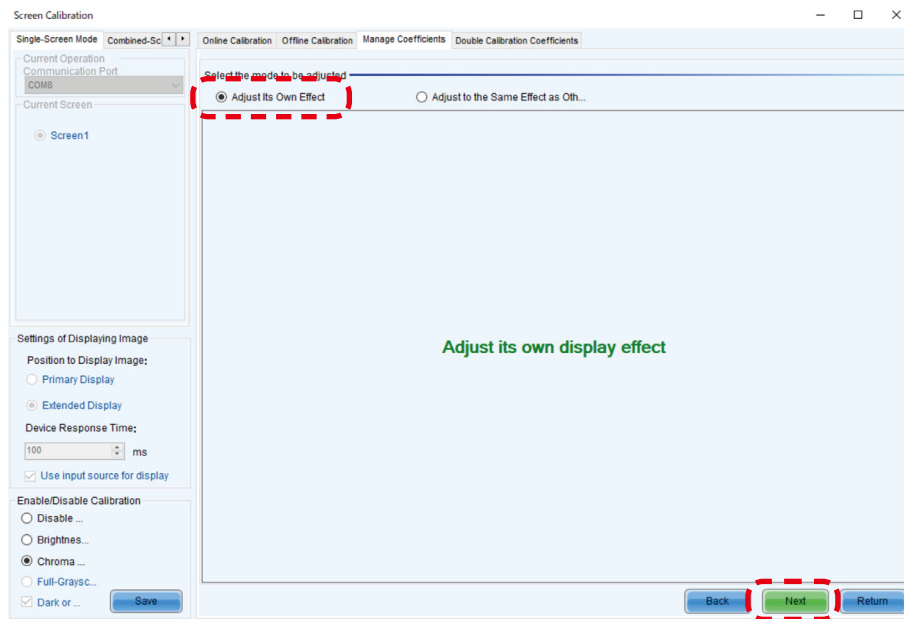
For reference: When specifying one pixel card



Product name	LD-D091	LD-D121	LD-D151
Pixel pitch	0.9 mm	1.2 mm	1.5 mm
Number of displayed pixels (resolution/display)	Width 640 Height 360	Width 480 Height 270	Width 384 Height 216
Number of displayed pixels (resolution/pixel card)	Width 160 Height 180	Width 120 Height 135	Width 96 Height 108

Check that "Adjust Its Own Effect" is selected and click "Next" to start the calibration settings reading process.

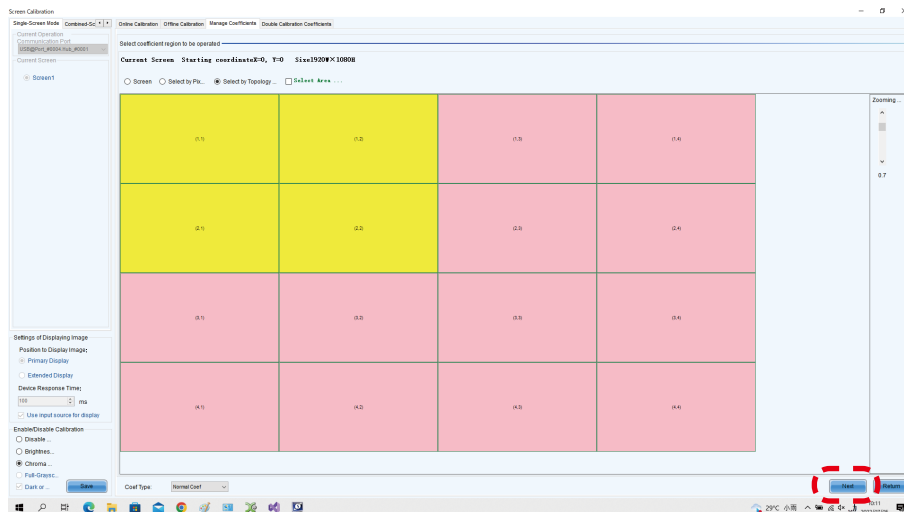
The "Adjust Coefficients" screen is displayed when the data has been read.



(5)-3

Select by Topology or List: Adjust multiple displays

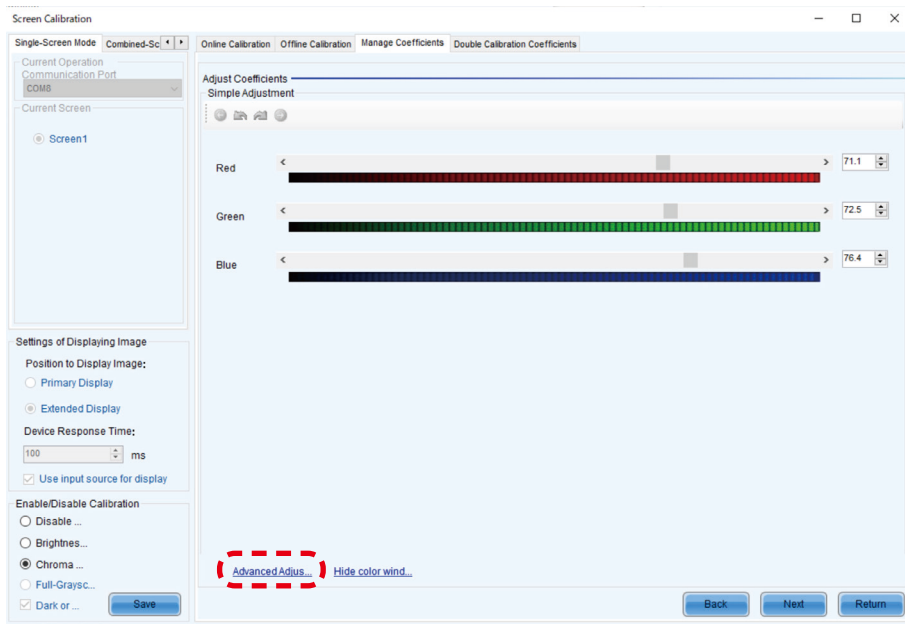
A screen with the display configuration is displayed. Specify the range of the displays you want to adjust.



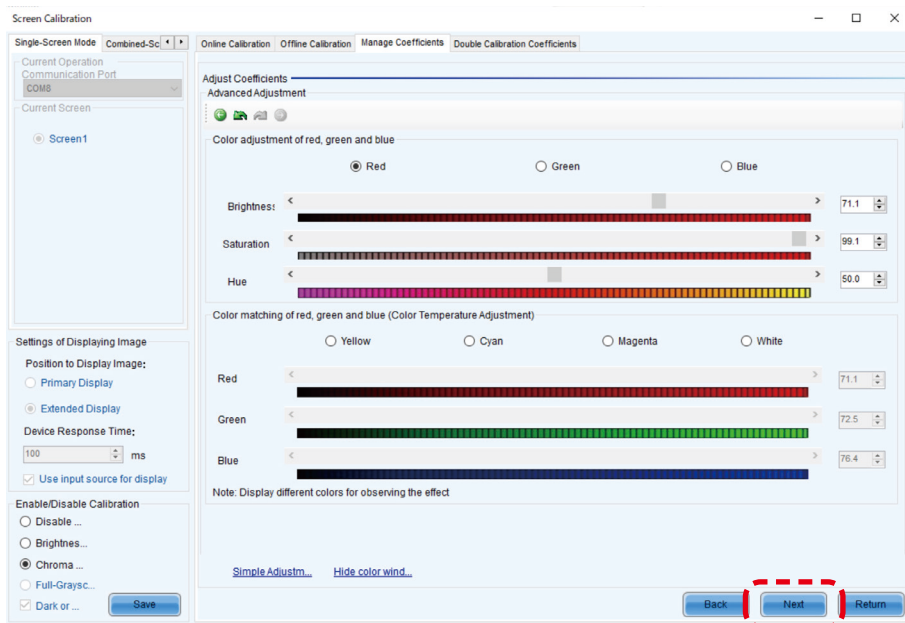
The calibration settings reading starts after "Next" is clicked.

The "Adjust Coefficients" screen is displayed when the data has been read.

- (6) Adjust Coefficients screen
Click "Advanced Adjustment".

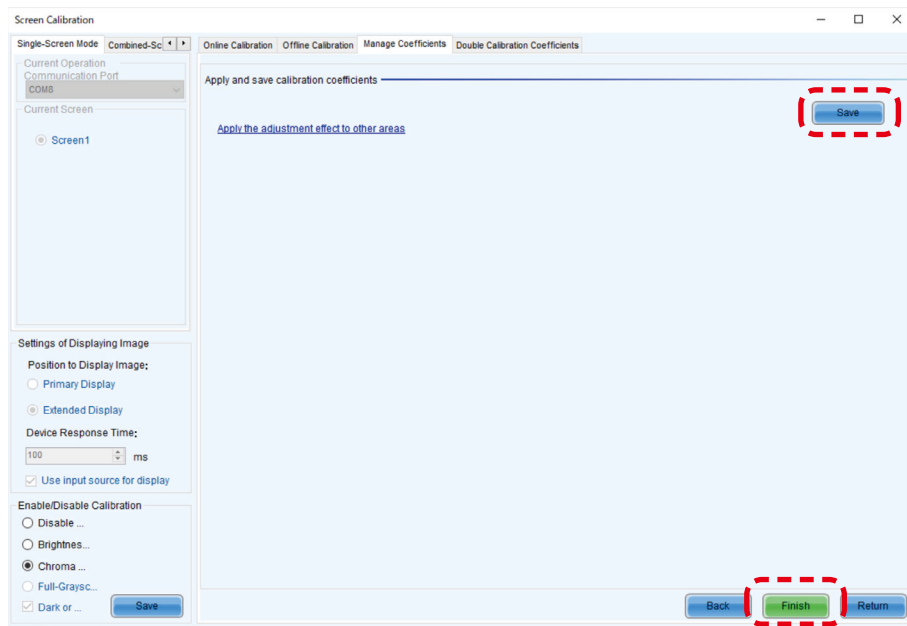


- (7) Adjust the "Color adjustment of red, green and blue" parameters, and then adjust the "Color matching of red, green and blue" parameters.



Click "Next" after you have finished the adjustment.

- (8) Click "Save" to save the calibration settings you have adjusted.
- (9) Click "Finish" to complete the procedure.



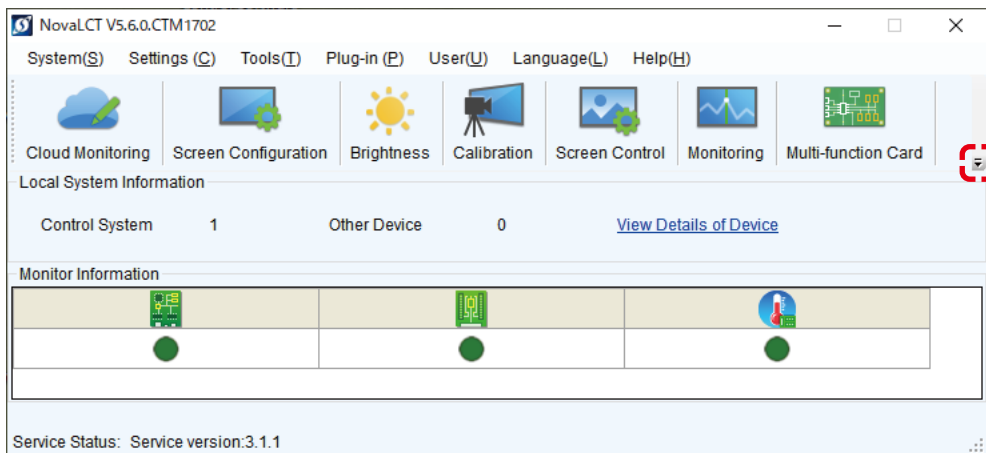
Note

- To return the calibration adjustment values to their default setting, perform the "Update the Calibration Data" procedure ([English-52](#)).
- The results of "Adjusting the colors on a part of the screen" are saved in the receiving card. They are not saved in the pixel card. When "Auto Upload Module" is on, the data adjusted with "Adjusting the colors on a part of the screen" and written in the receiving card is erased if the pixel card is replaced. Set "Auto Upload Module" to off when performing "Adjusting the colors on a part of the screen". Refer to "4. Writing the calibration data from the receiving card to the pixel card" ([English-138](#)) if you want to write the calibration data to the pixel card after performing "Adjusting the colors on a part of the screen".

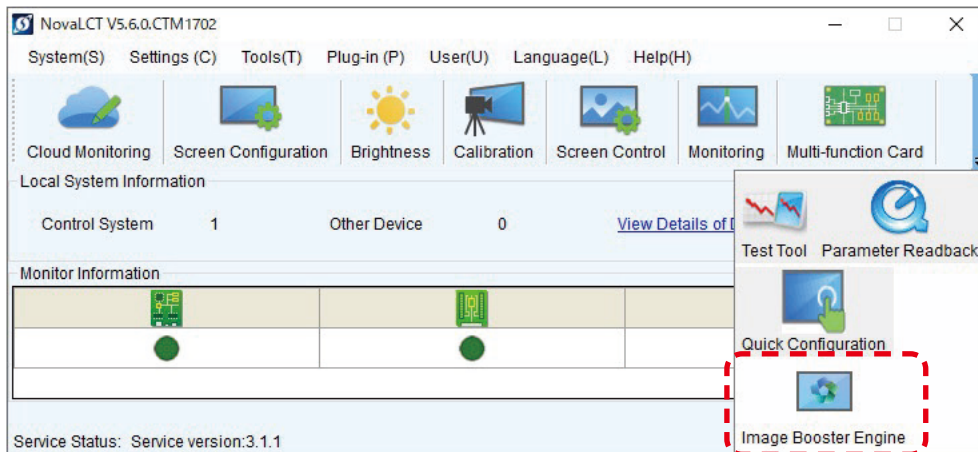
Image booster engine

By using the image booster engine, you will be able to improve the precision of the LED display colors and grayscale, and switch freely between display color gamuts.

The *.vglcx file used for the image booster engine is stored in the supplied USB memory key.

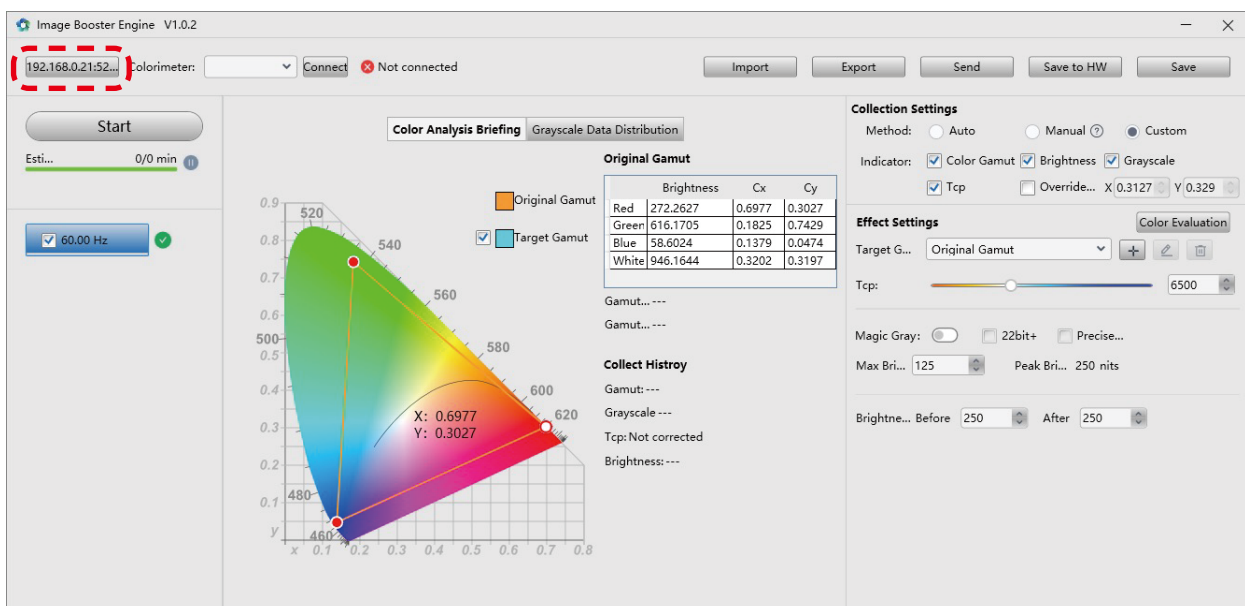


Click the "Image Booster Engine" button.

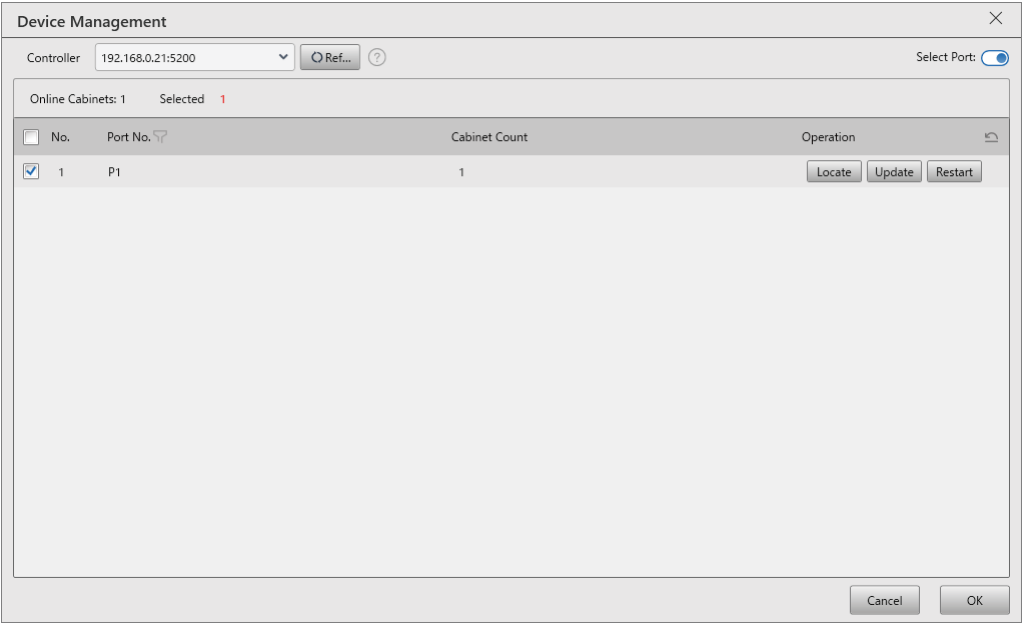


The "Image Booster Engine" screen is displayed.

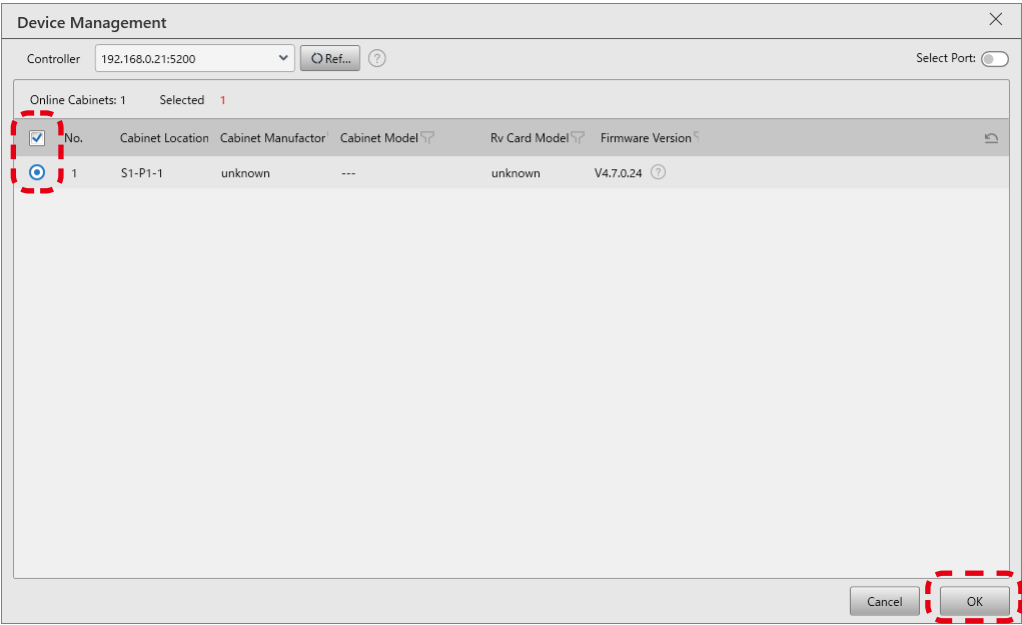
Click the "Device Management" button.



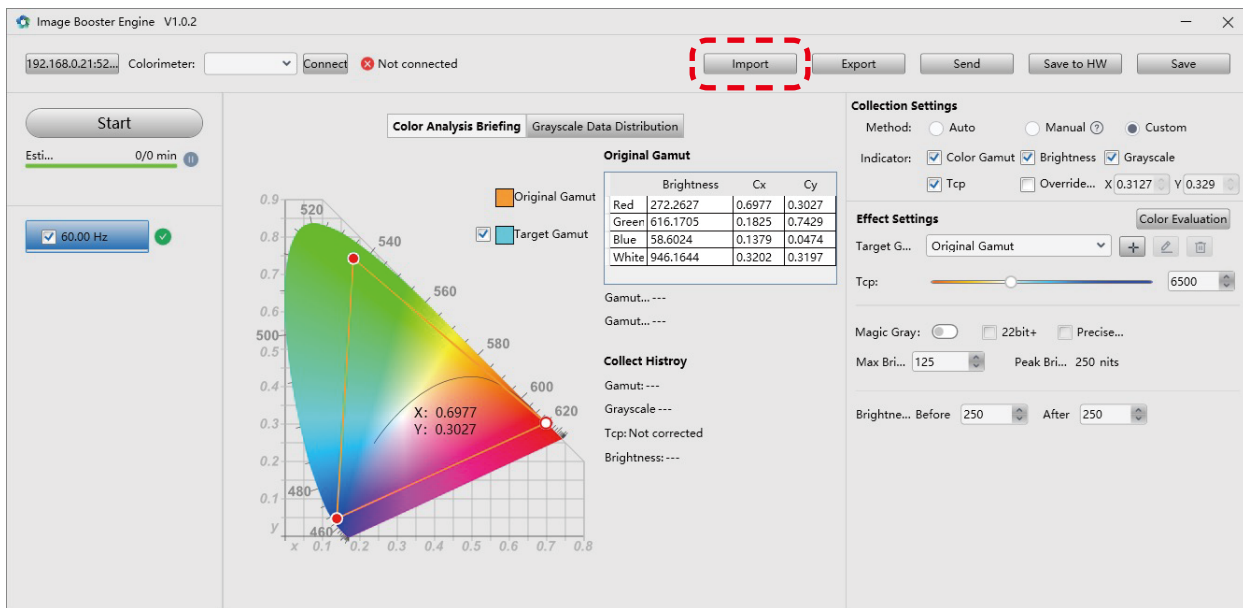
The Device Management window opens.



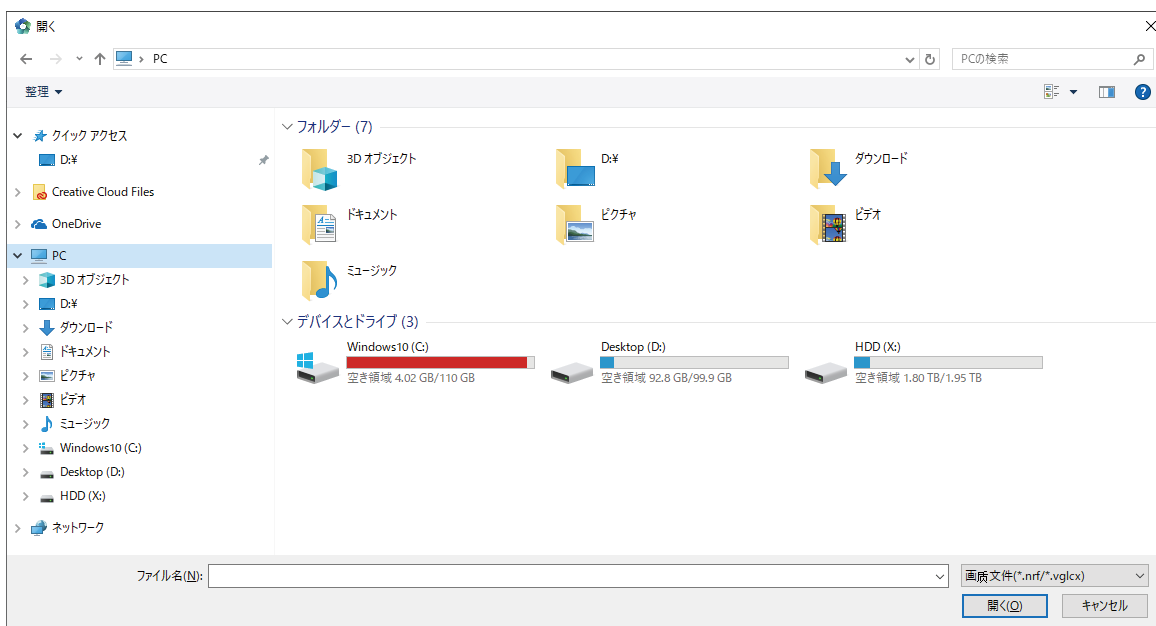
Select the operation target.
When the selection is made, click the “OK” button.



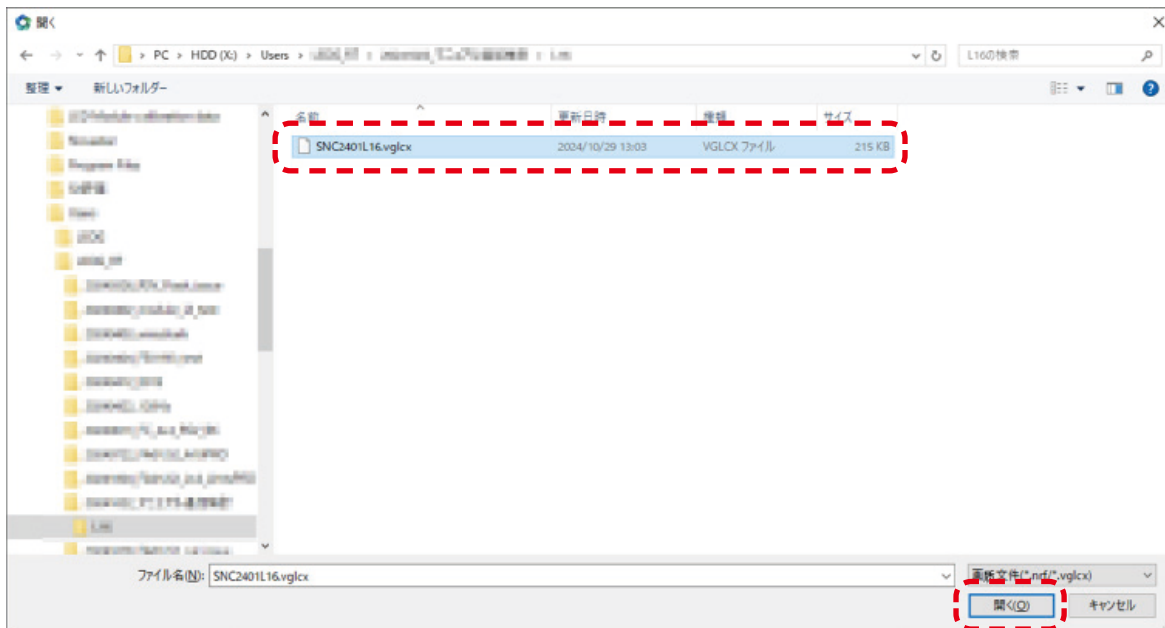
The display returns to the “Image Booster Engine” screen.
Click the “Import” button.



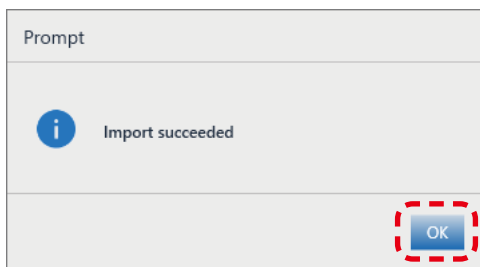
Select the *.vglcx file stored in the supplied USB memory key.



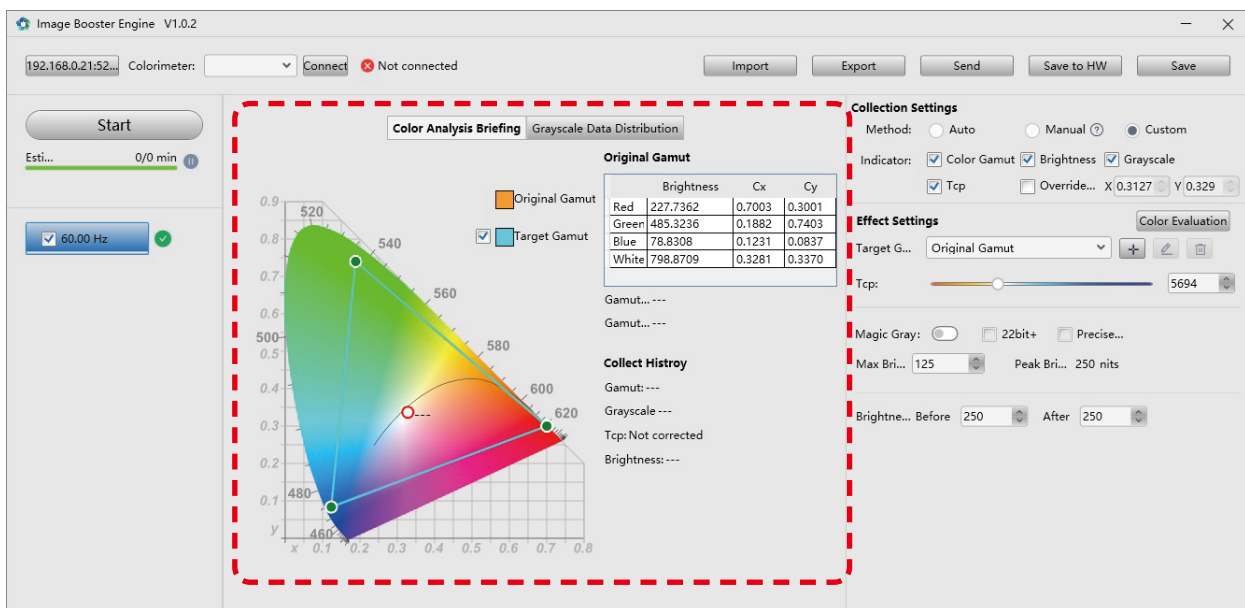
Click the “Open” button.



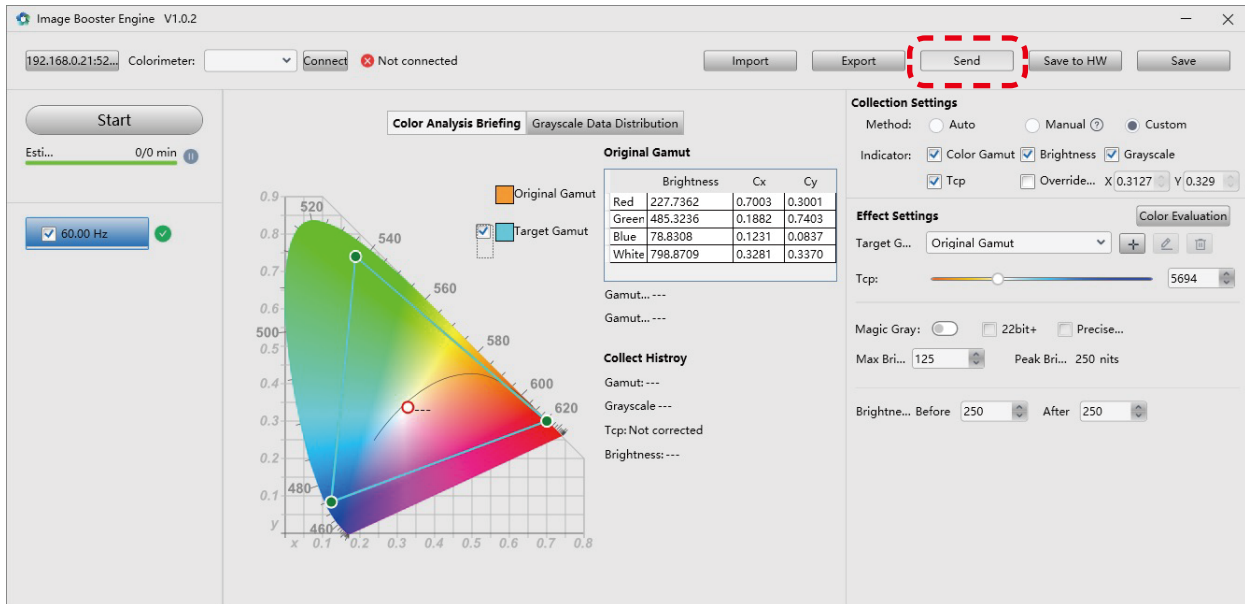
Check that “Import succeeded” is displayed and click the “OK” button.



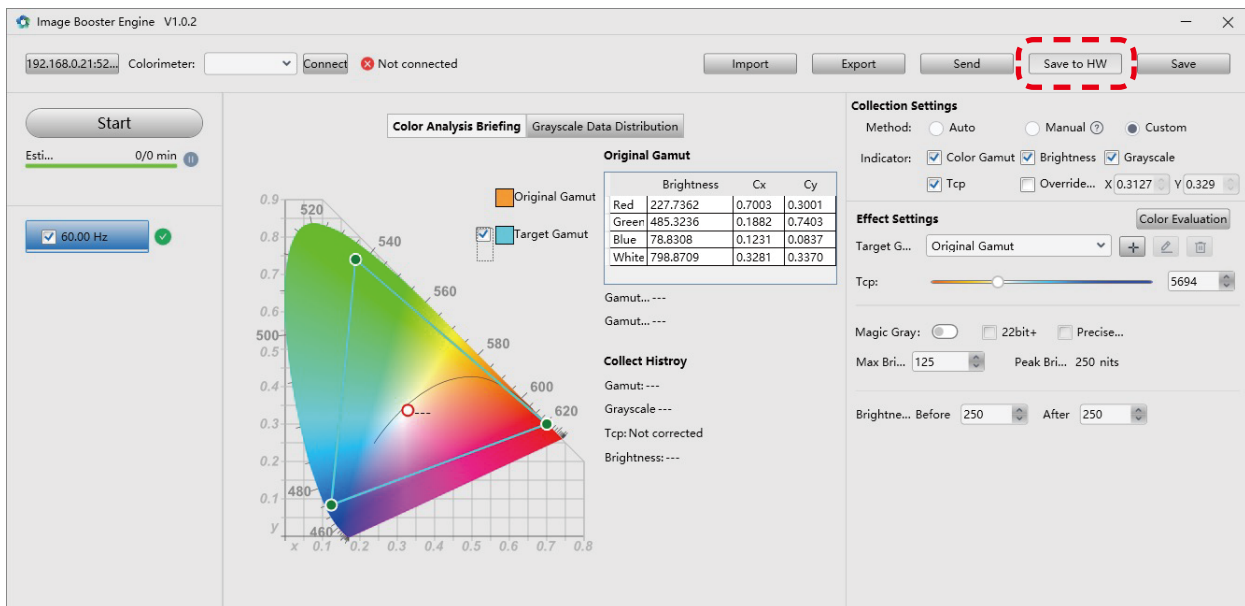
The content of the *.vglcx file that was loaded is displayed.



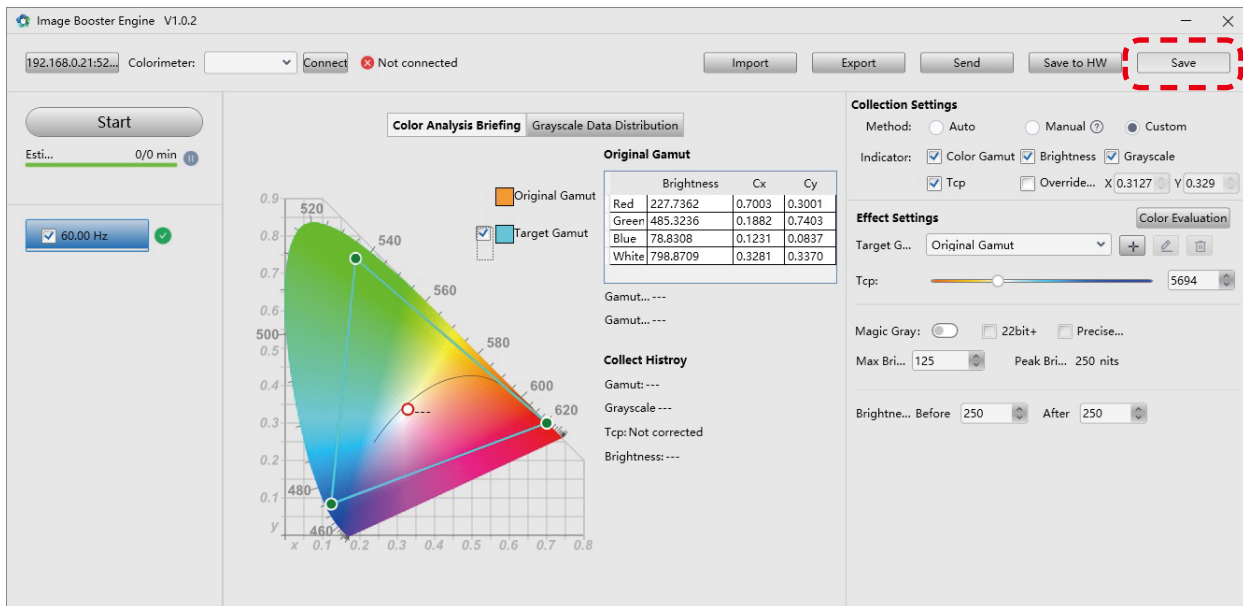
Click the "Send" button to send the settings to the hardware.



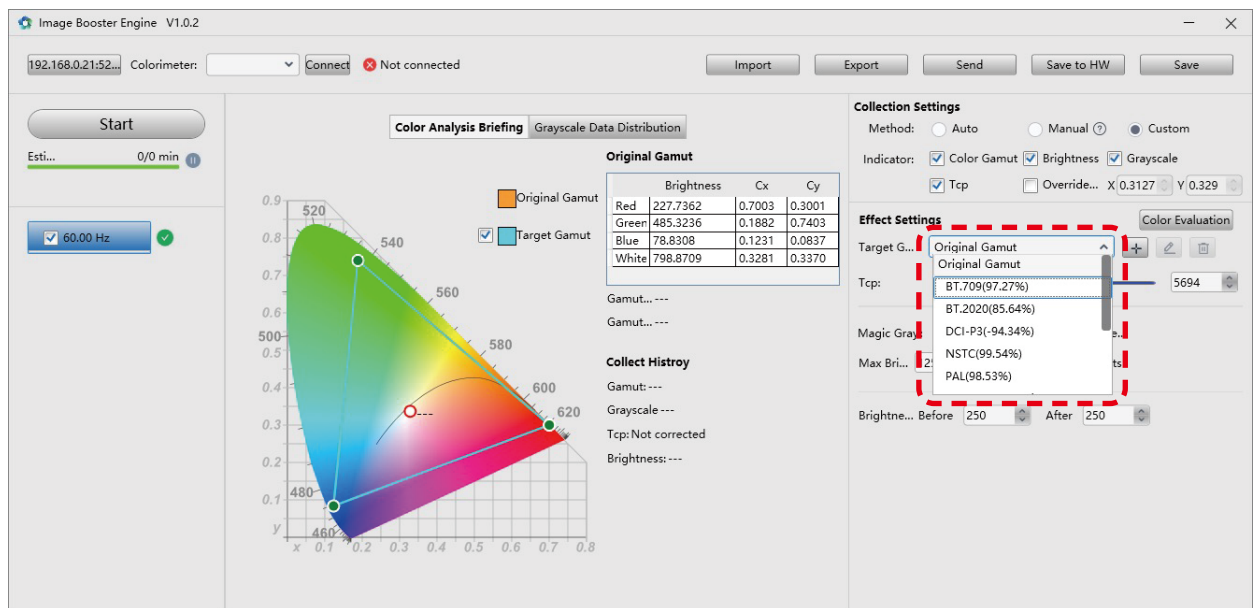
Save the "Save to HW" button to save the settings to the hardware.

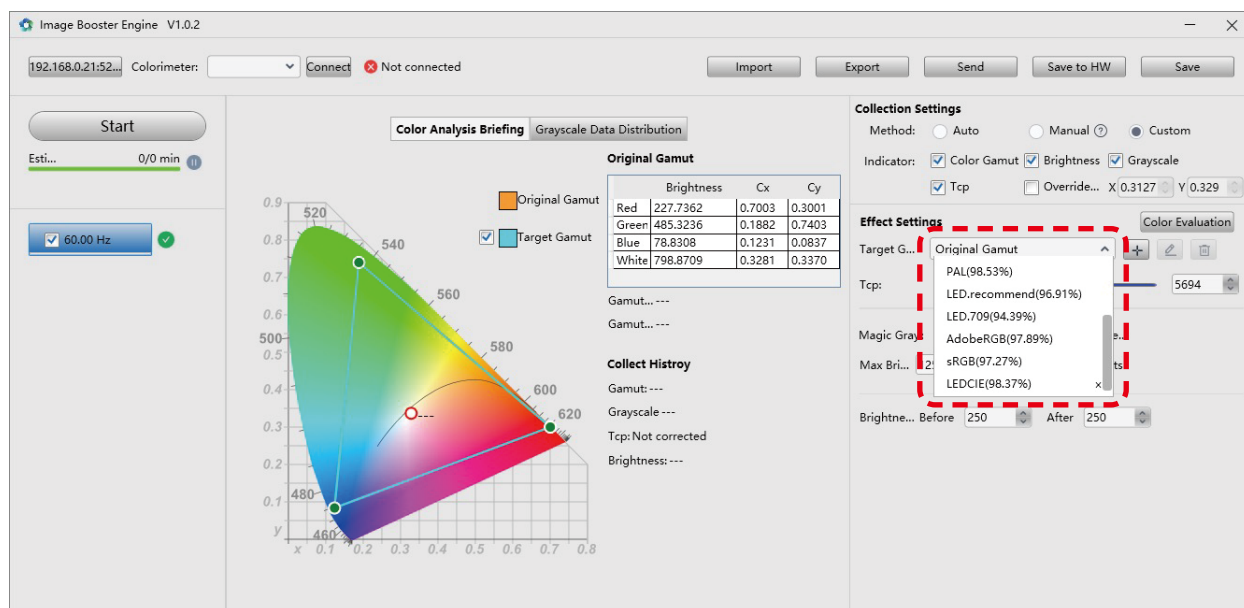


Click the "Save" button to save the current parameter settings to the software.

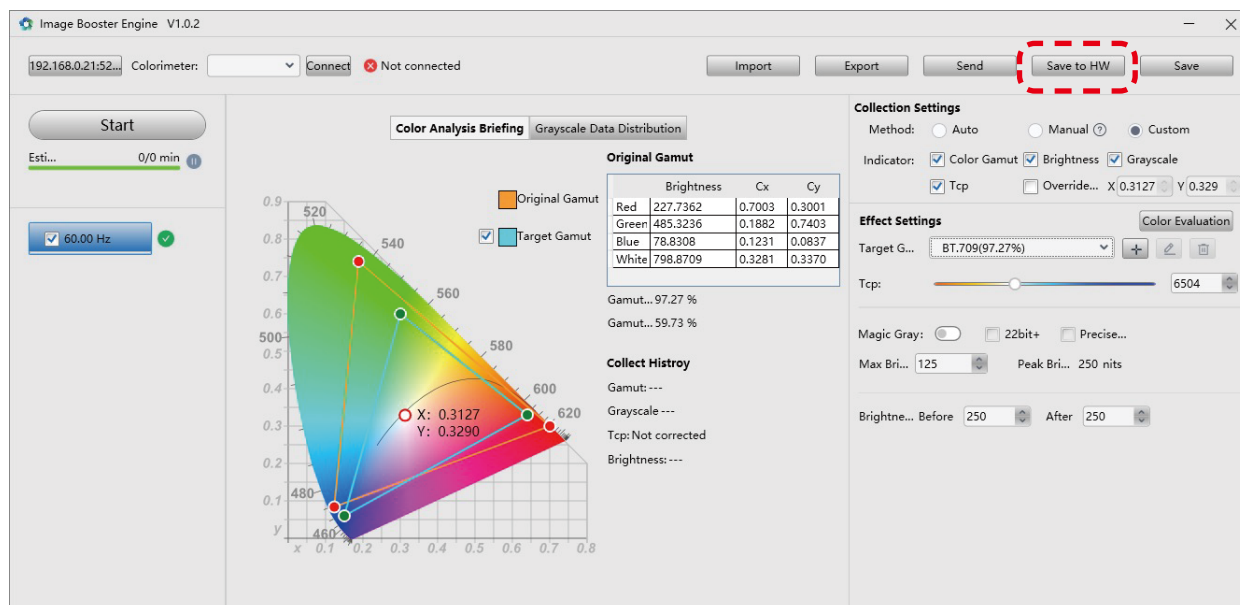


To set the gamut of the displayed image to the specified gamut:
Switch "Target Gamut" under "Effect Settings".

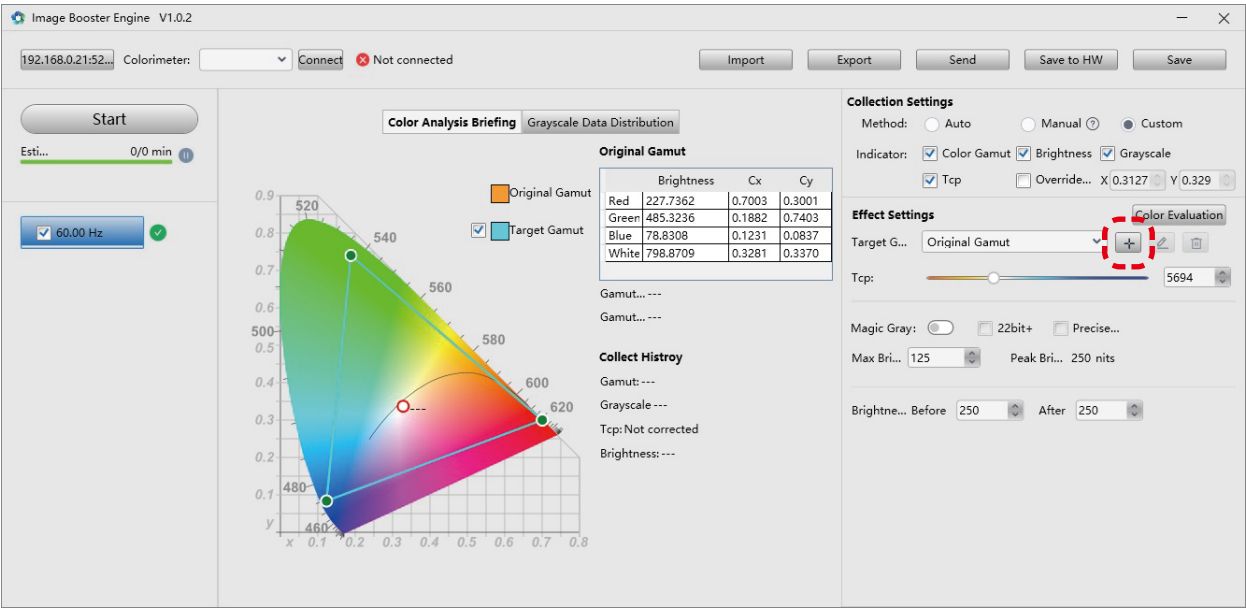




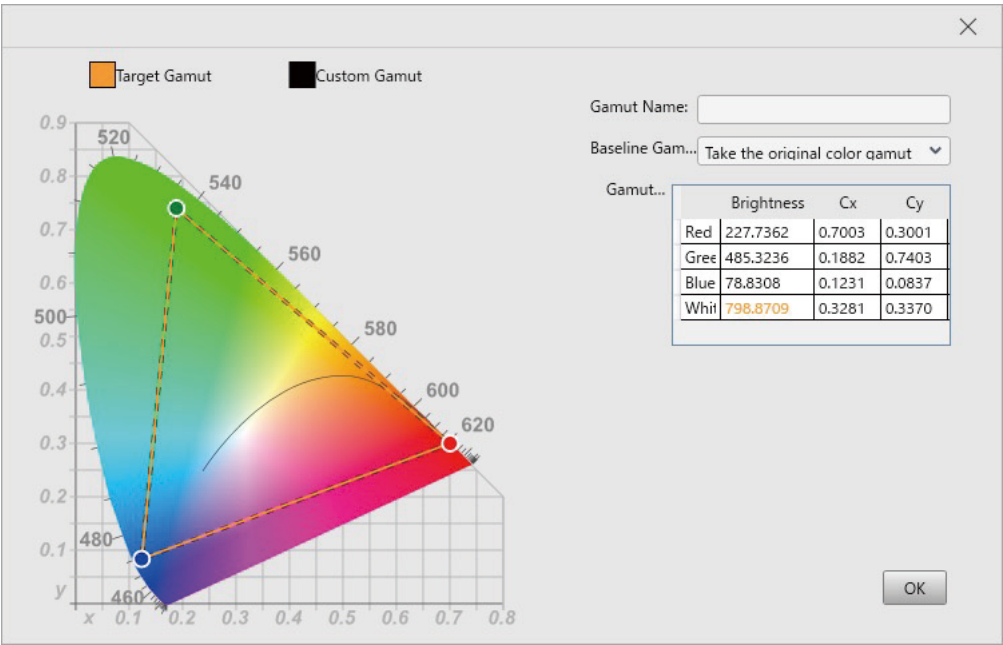
To save the settings, click the "Save to HW" button and save the setting to the hardware.



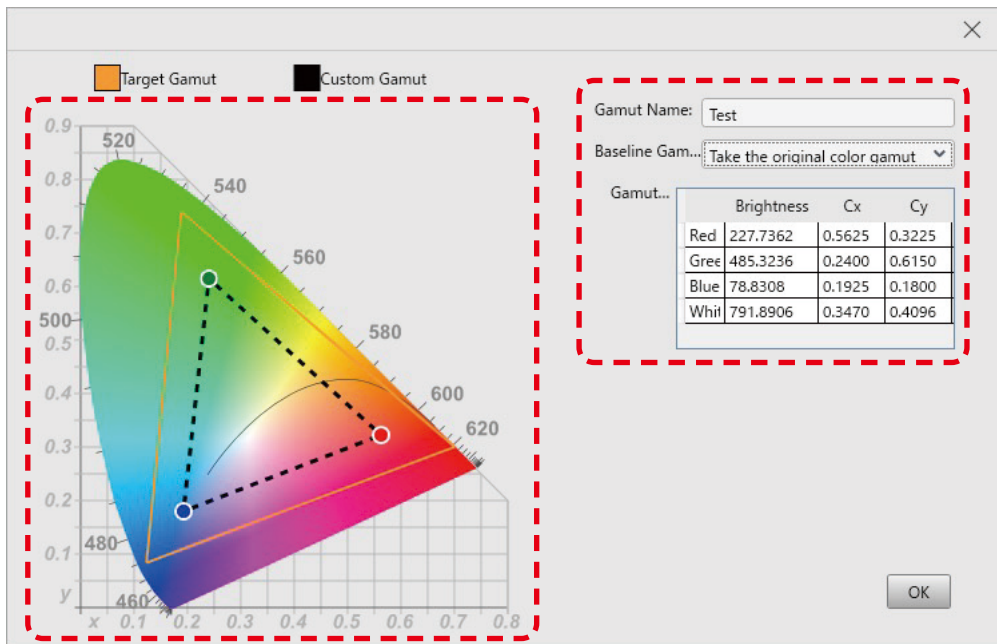
To set any gamut:
Click the “+” button next to “Target Gamut” under “Effect Settings”.



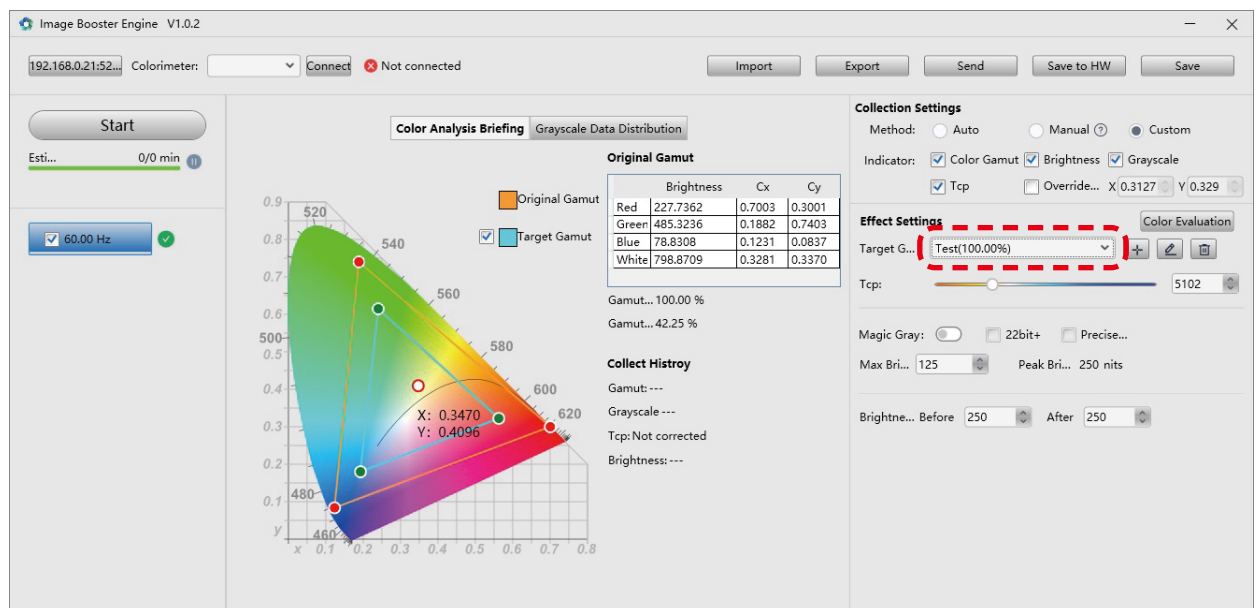
The setting screen opens.



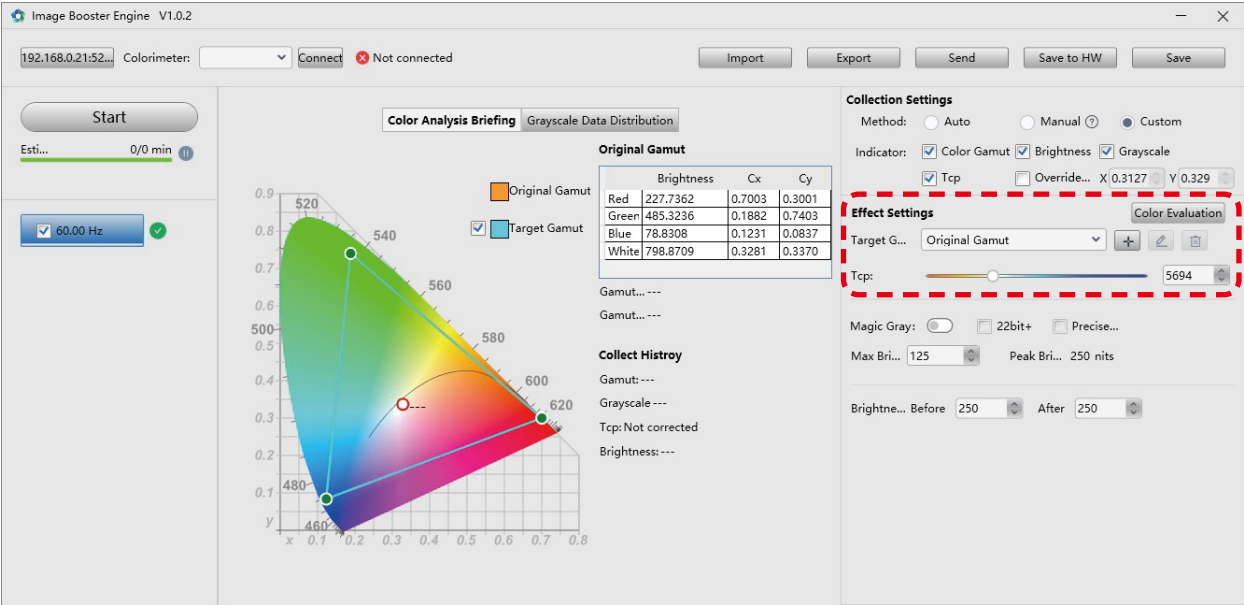
Enter a gamut name.
 Select the parameter in "Baseline Gamut".
 Set any values.
 Click the "OK" button to save the settings.



To set the gamut of the displayed image to the gamut that has been added:
 Switch "Target Gamut" under "Effect Settings".



Changes in the values under “Effect Settings” are reflected immediately after the operation to the screen displayed on the LED display.



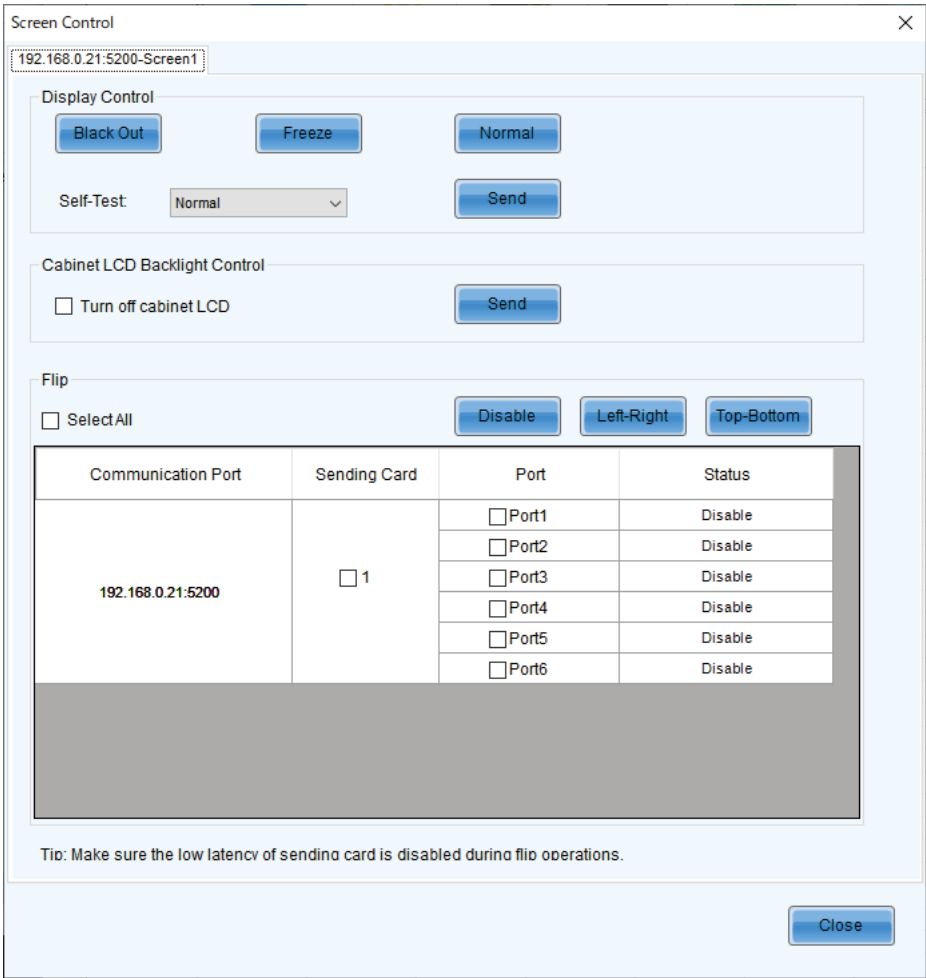
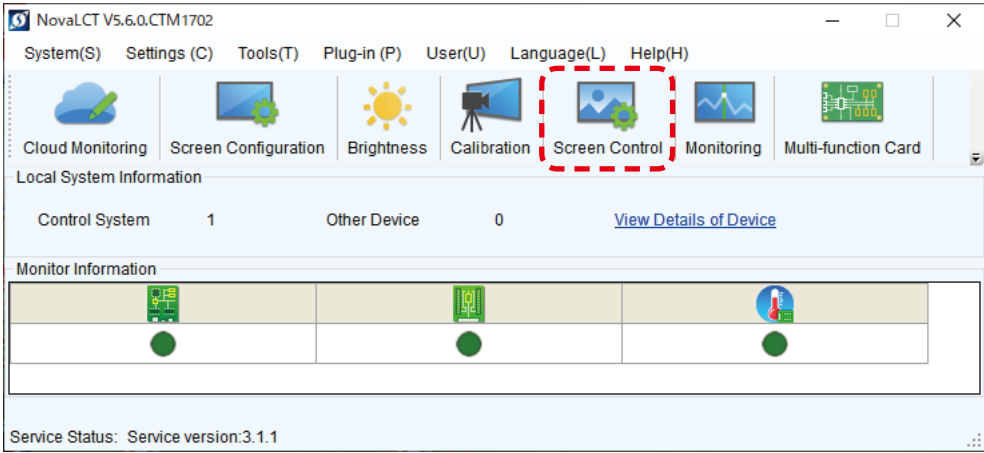
The settings of each series are as follows.

	LD-Q2	LD-E1	LD-FA2/FE2	LD-FE3/FH3	LD-FA3	LD-D1/D2
Image booster	Not Applicable		Default ON			
.vglcx file attached	No		Yes			
18 bit+	Default OFF					
22 bit+	No		Yes			
Magic gray	No		Default ON			

NOTE: Some models may not be available in some countries.

Screen Control (test pattern display)

- (1) Log in with the administrator privileges (English-44).
- (2) Click “Screen Control”.



Select any test pattern under “Self-Test” to display it.

Screen Control

192.168.0.21:5200-Screen1

Display Control

Black Out

Freeze

Normal

Self-Test:

Normal

Send

Cabinet LCD Background

Turn off cabinet LCD

Send

Flip

Select All

Disable

Left-Right

Top-Bottom

Communication Port	Sending Card	Port	Status
192.168.0.21:5200	☐ 1	☐ Port1	Disable
		☐ Port2	Disable
		☐ Port3	Disable
		☐ Port4	Disable
		☐ Port5	Disable
		☐ Port6	Disable

Tio: Make sure the low latency of sending card is disabled during flip operations.

Close

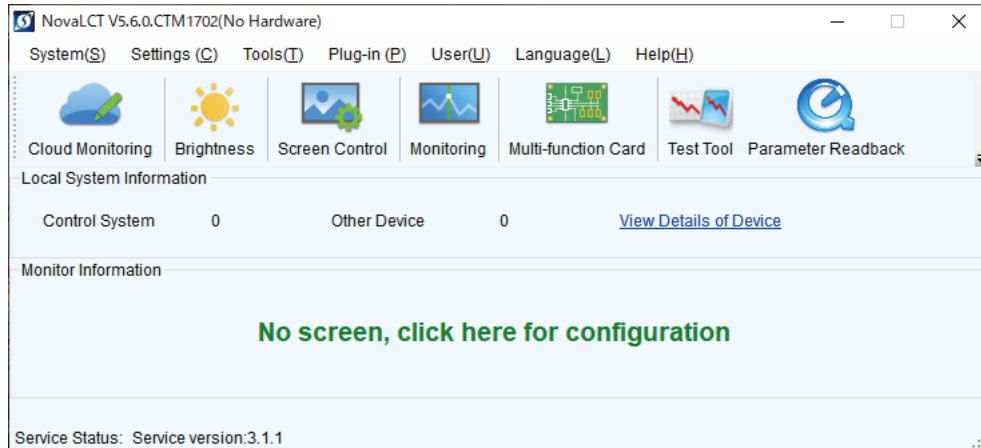
3. State monitoring using the software

In case of a problem, you will be able to determine the location where it occurred by monitoring the state of the system.

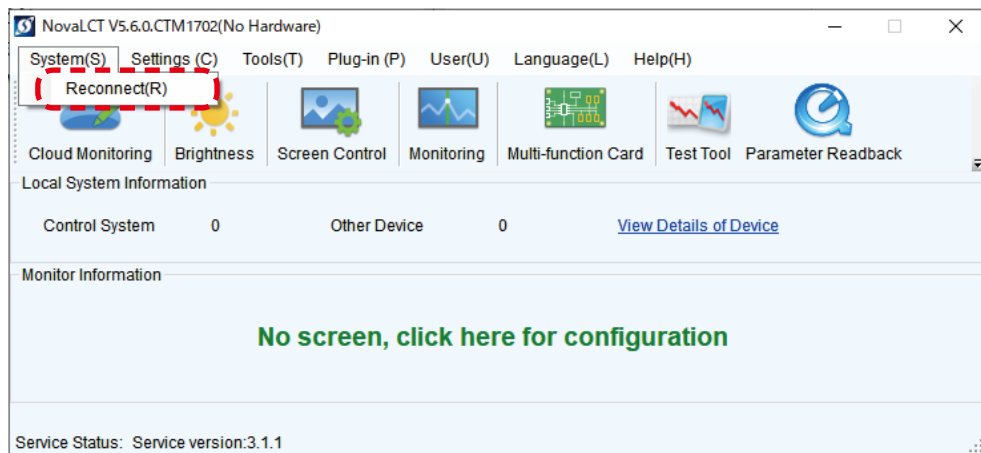
3-1 How to determine the state of the system

The state displayed in NovaLCT changes as follows.

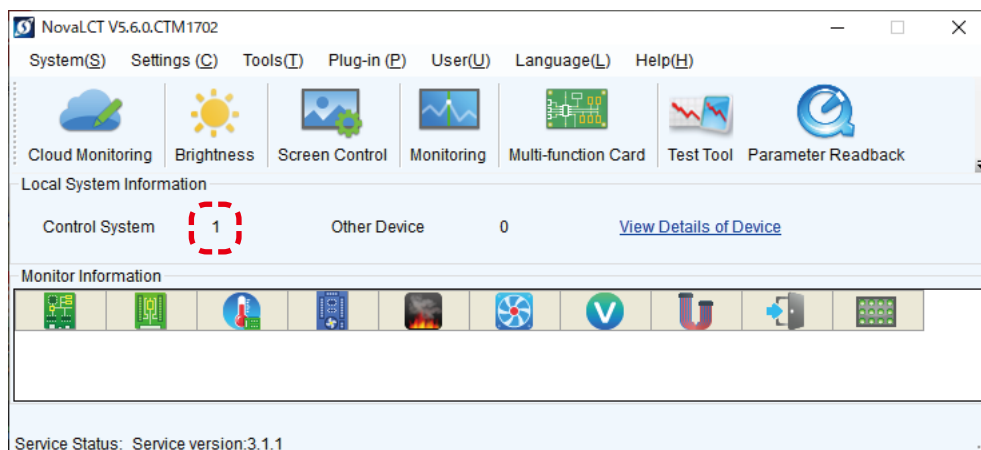
- (1) The control system is not connected.



If the connection is not established after a while, click "System(S)" - "Reconnect(R)".

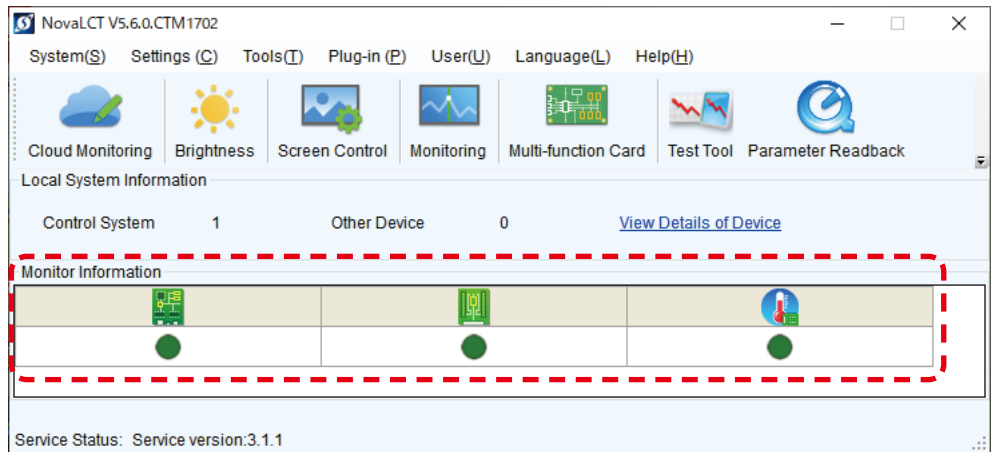


- (2) The control system is connected but the state is not determined.



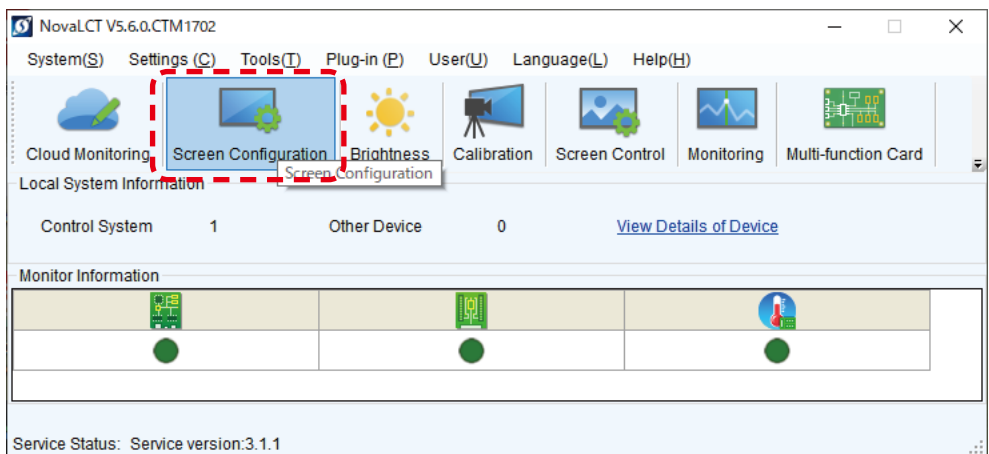
After a while, the normal state is displayed if the system is in the normal state. If there is a problem, one indicator (●) will be red.

Normal state

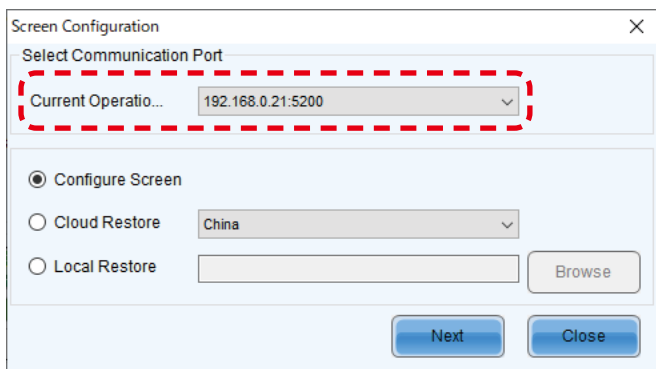


Preliminary confirmation

Confirm in advance that the control system is correctly recognized.
Click the "Screen Configuration" button.



Select the communication port to which the system you want to check is connected.



Screen Configuration-192.168.0.21:5200

Sending Card

Receiving Card

Screen Connection

Display Mode

Refresh

Current Display Mode

Sending Card ...

1920 x 1080(1080P)

Graphics Output R...

2560 x 1600

Select Input Source

Video Input

☐ Automati...

HDMI

Send

Source Configuration

Source:

DVI

Resolution:

1920 x 1080 px

☐ Custom...

2560

x

1600

Refresh Rate T...

60

Hz

Input Source Bit De...

8 Bit

Set

Source Backu...

Set

Hot Backup Verification

Verify

Working Mode

Set Working...

Redundancy

Set the Current Devi...

☐ Set as Primary

☐ Set as Backup

Set

Primary

Backup

Serial Number of Primary Sending Card	Serial Number of Primary Port	Serial Number of Backup Sending Card	Serial Number of Backup Port

Refresh

Send

Add

Edit

Delete

Restore Factor...

Restore System...

Back Up System...

Export Screen M...

Save System Co...

Save

Close

The screenshot displays the 'Screen Configuration' software interface, specifically the 'Screen Connection' tab, which is highlighted with a red dashed rectangle. The window title is 'Screen Configuration-192.168.0.21:5200'.

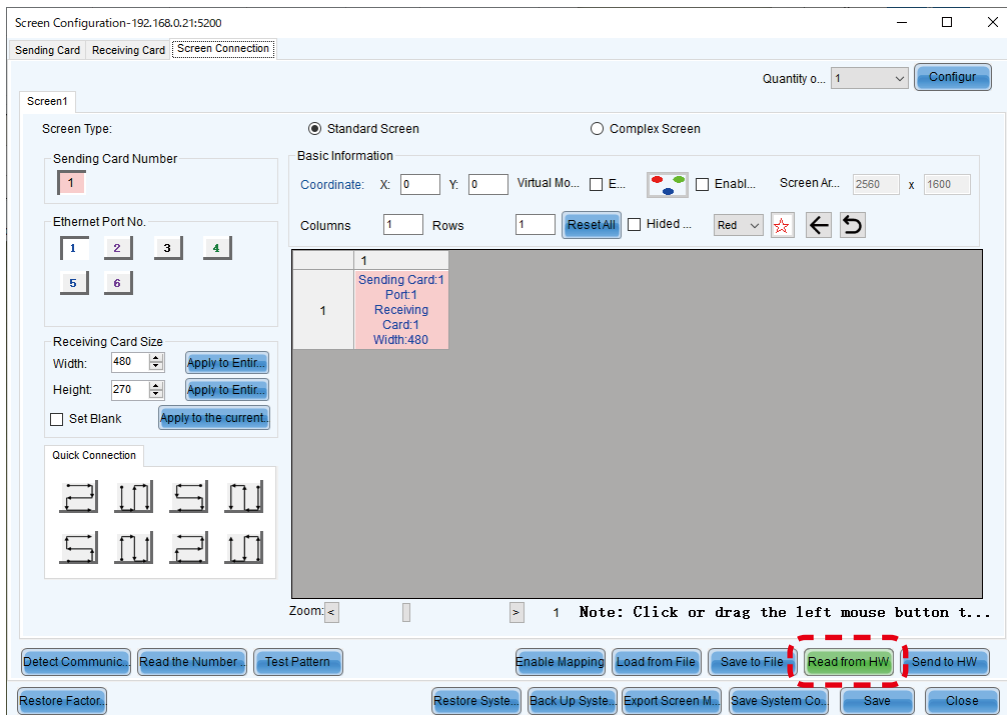
Top Bar: Contains tabs for 'Sending Card', 'Receiving Card', and 'Screen Connection'. On the right, there is a 'Quantity' dropdown set to '1' and a 'Configure' button.

Main Area:

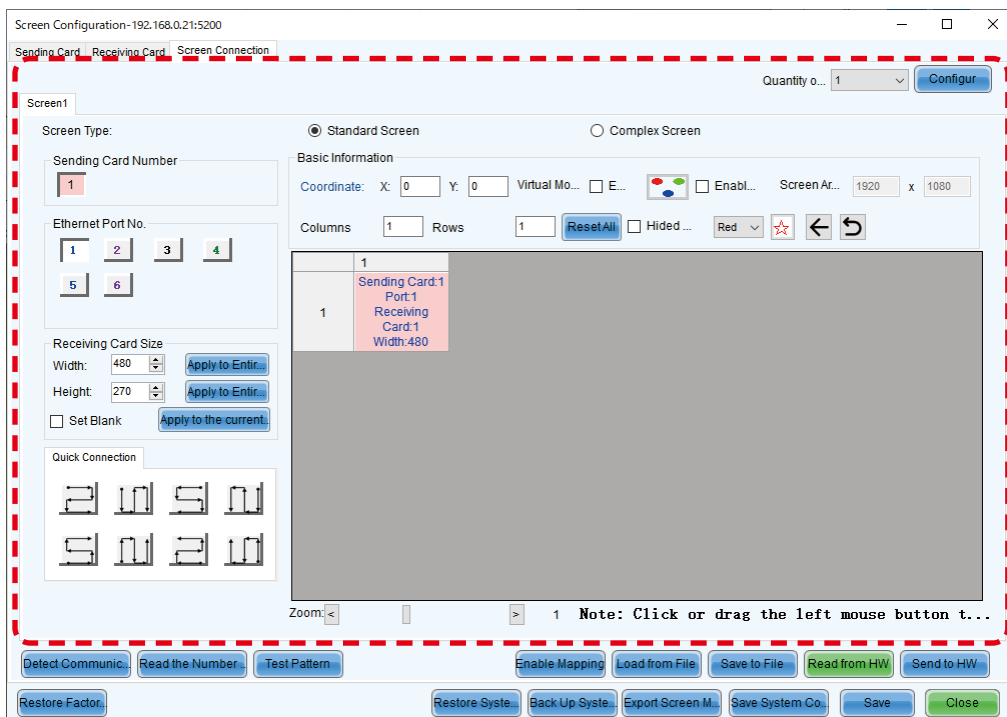
- Screen Type:** Two radio buttons are present: 'Standard Screen' (selected) and 'Complex Screen'.
- Basic Information:**
 - Coordinate:** X: 0, Y: 0, Virtual Mo... ☐ E... ☐ Enabl... Screen Ar... 2560 x 1600
 - Columns:** 1, Rows: 1, **Reset All** button, ☐ Hidden... Red ☐ Star
- Sending Card Number:** A dropdown menu showing '1'.
- Ethernet Port No.:** A grid of buttons labeled 1 through 4.
- Receiving Card Size:**
 - Width: 480, **Apply to Entr...**
 - Height: 270, **Apply to Entr...**
 - ☐ Set Blank, **Apply to the current.**
- Quick Connection:** A grid of icons representing different connection types.
- Preview Area:** A large gray rectangle showing a preview of the screen layout. It contains a small red box with the text: 'Sending Card:1', 'Port:1', 'Receiving Card:1', 'Width:480'.

Bottom Bar: A row of buttons including 'Detect Communic...', 'Read the Number...', 'Test Pattern', 'Enable Mapping', 'Load from File', 'Save to File', 'Read from HW', 'Send to HW', 'Restore Factor', 'Restore System', 'Back Up System', 'Export Screen M...', 'Save System Co.', 'Save', and 'Close'.

Click the "Read from HW" button.

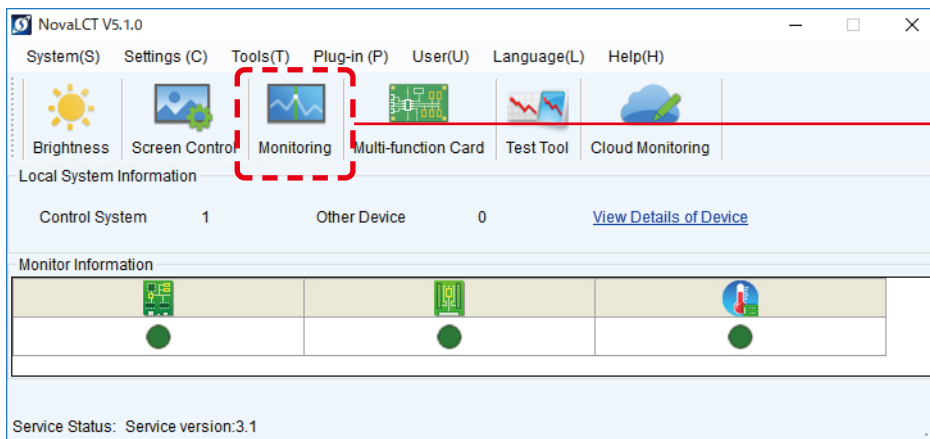


Check that the settings are correct.



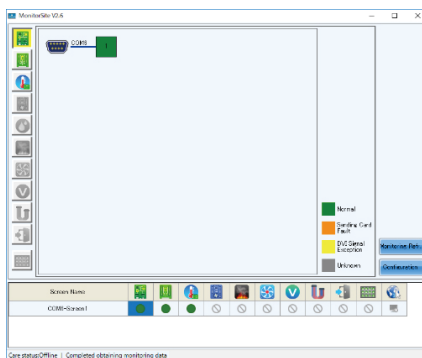
3-2 Display under normal conditions

The display is green under normal conditions.

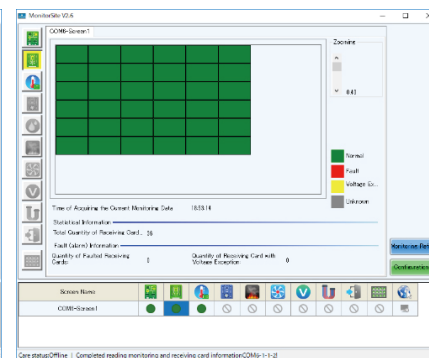


Click "Monitoring" to check

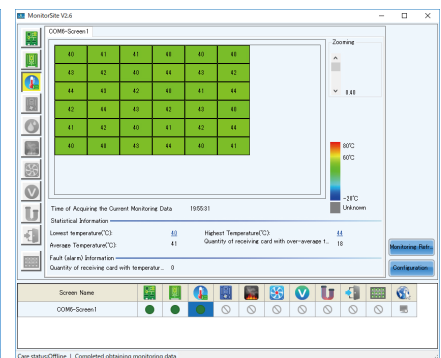
- the state of the LED controller
- the operating state of the LED displays
- the temperature of the LED displays



State of the LED controller



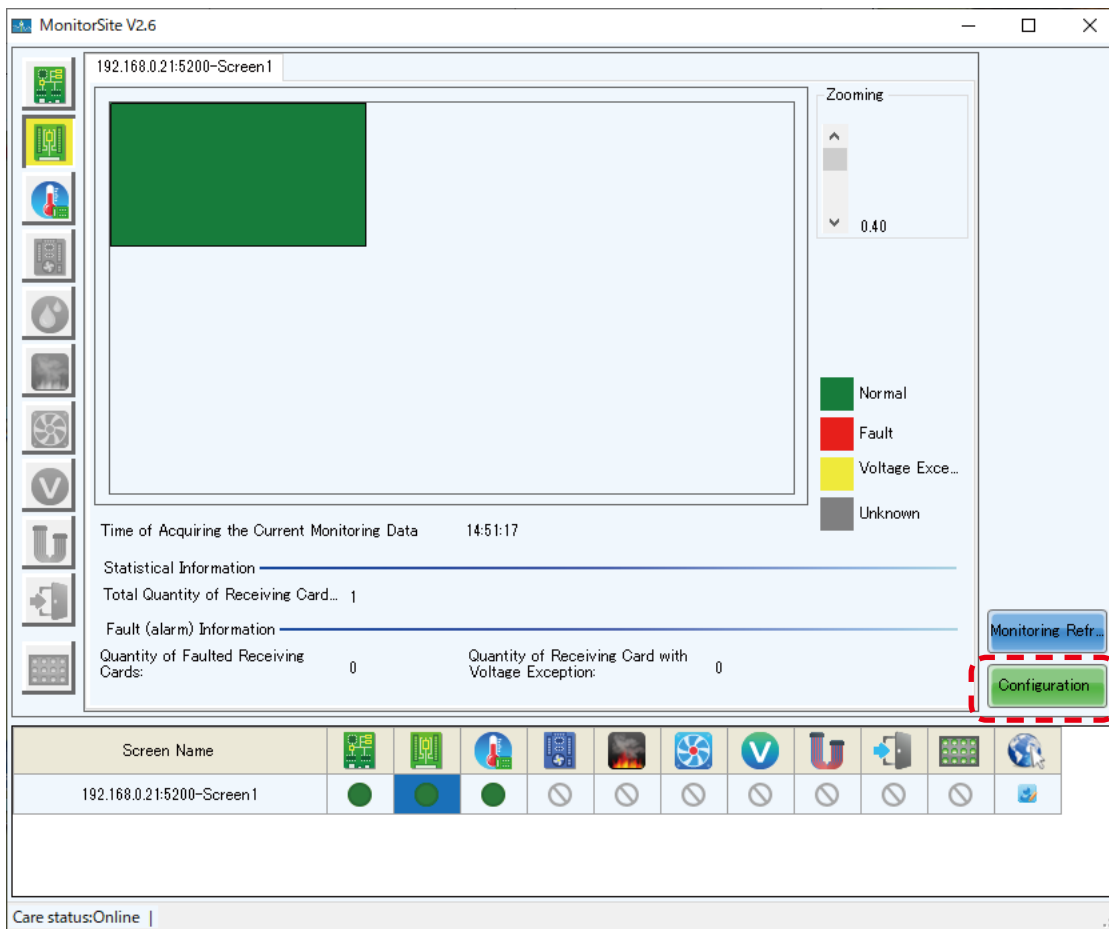
State of the LED displays



Temperature of the LED displays

3-3 Monitoring condition settings

Click the "Configuration" button on the "MonitorSite" screen.



Description of the setting items

Refresh Period:	Period of monitoring item checks	Monitoring is executed after each set period.
Set Rereading Times:	Number of checks when an error occurs	The number of checks when an error is detected.
Send E-mail when same fault:	Number of errors at which to send an e-mail.	Set whether or not to send an e-mail when the same error is detected multiple times during checks at the end of the monitoring period.

Click the "Refresh Period" button to set the refresh period.
Click the "Save" button to save the setting.

The screenshot shows the "MonitorSite - Settings" window with the "Refresh Period" tab selected. The left sidebar contains buttons for "Refresh Period", "Hardware Settings", "Alarm", "Monitoring Control", "Email", and "Email Log". The main content area is titled "Refresh Period" and contains the following settings:

- ☒ Automatic Refresh: Refresh Period: 180 S
- Set Rereading Times: When failing to read status, the software will read 3 Times
- Link to NovaiCare: ☐ Link to NovaiCare

A "Save" button is located at the bottom right of the window.

To receive information on the state of LED displays by e-mail, click the "Email" button and set the conditions to send e-mails.

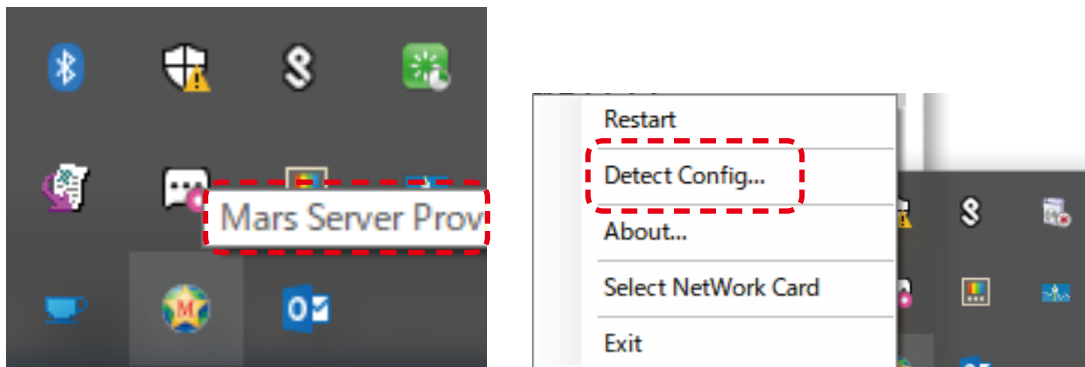
The screenshot shows the "MonitorSite - Settings" window with the "Email" tab selected. The left sidebar contains buttons for "Refresh Period", "Hardware Settings", "Alarm", "Monitoring Control", "Email", and "Email Log". The main content area is titled "Email" and contains the following settings:

- ☒ Enable Email Notification: Send email when same fault/alar... 3 Times sending em...
- ☐ Enable System Recovery Notification
- ☐ Enable Sending System Report Email: [Send system report email regularly](#)
- Email Sender: Email Address: novai@novai.com Port: 587 SMTP Server: smtp.novai.com SSL Encryption: ☒ Enable [Modify Sender](#) [Use Default](#)
- Recipient:

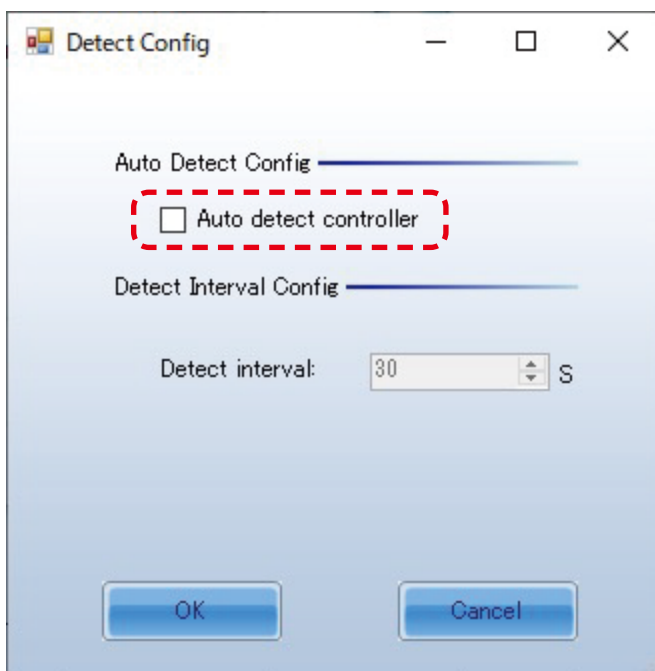
Name	Email address
Peng Takashi	peng.takashi@novai.com
- Email Information: Sending Email Fr... A-1 (eg.:Neighborhood A, Square B)

A "Save" button is located at the bottom right of the window.

Click the “^” icon in the taskbar, place the cursor on the Mars Server Provider icon, right-click, and then select “Detect Config”.

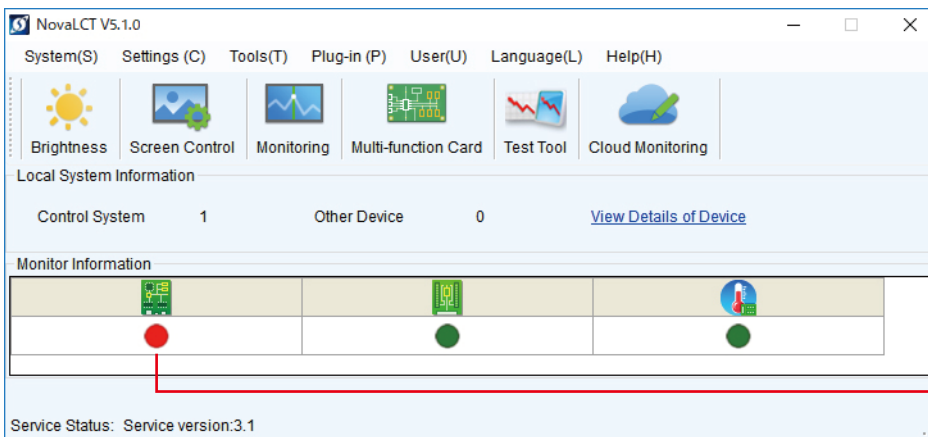


Clear the “Auto detect controller” checkbox.
(Note that the checkbox is checked by default.)



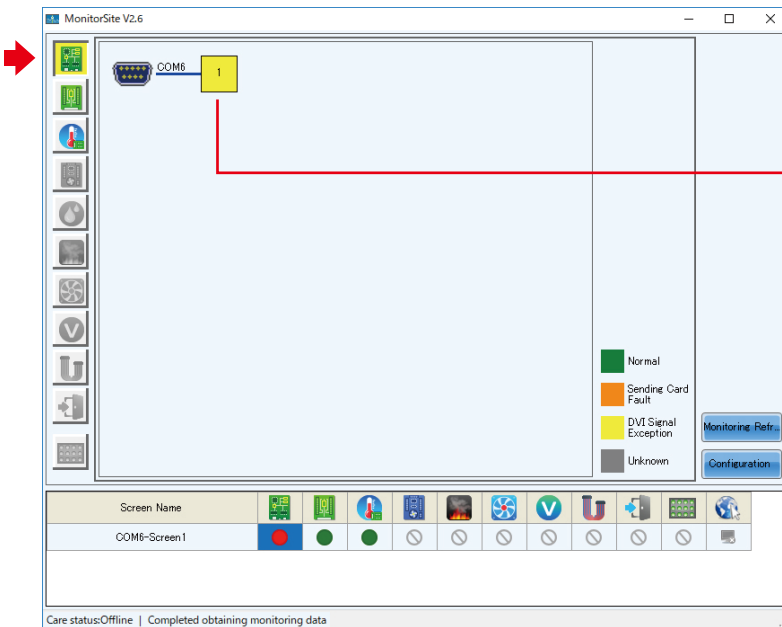
3-4 Display under abnormal conditions

(1) Problem with the input signal to the LED controller



When the display is red, there is a problem with the LED controller.

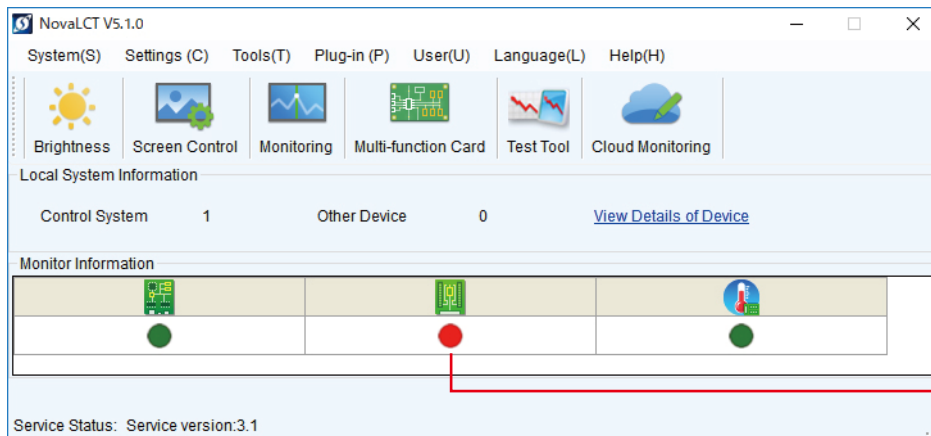
To display more details, click "Monitoring", and then click "Sending card" on the screen that is displayed.



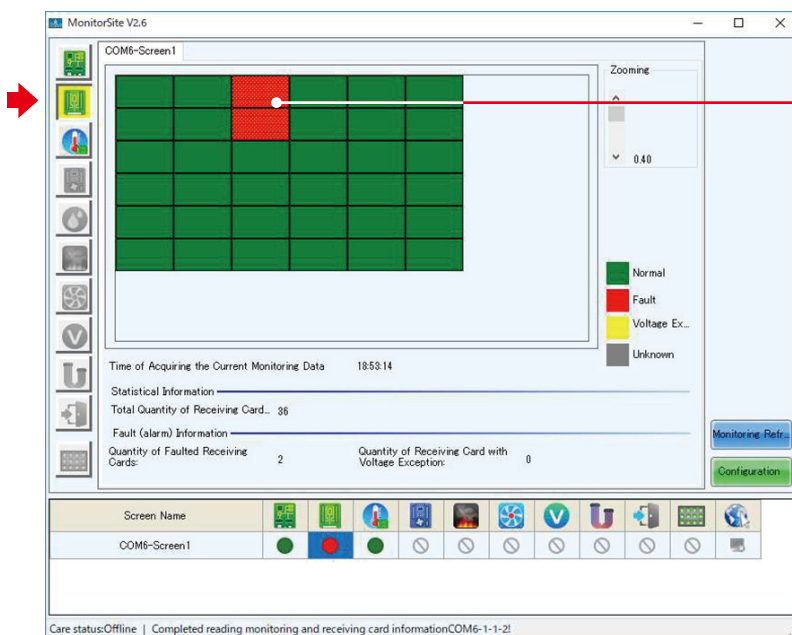
No video signal is being input to the LED controller.

- Check that the LAN cable is connected.
- Check that a video signal is being output from the video output equipment.
- If multiple signals are being input to the LED controller, check the input settings of the LED controller.

(2) Problem with the LED displays

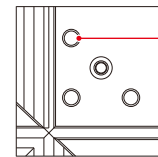


To display more details, click "Monitoring", and then click "Receiving card" on the screen that is displayed.



In the example shown on the left, the following problems must be considered.

- Signal loss between the screen of the 3rd row 3rd column and the screen of the 2nd row 3rd column
 - Check the internal LAN cable.
- Problem with both power units of the screen of the 2nd row 3rd column
 - Check the rear indicator (red) to see if it is lit.

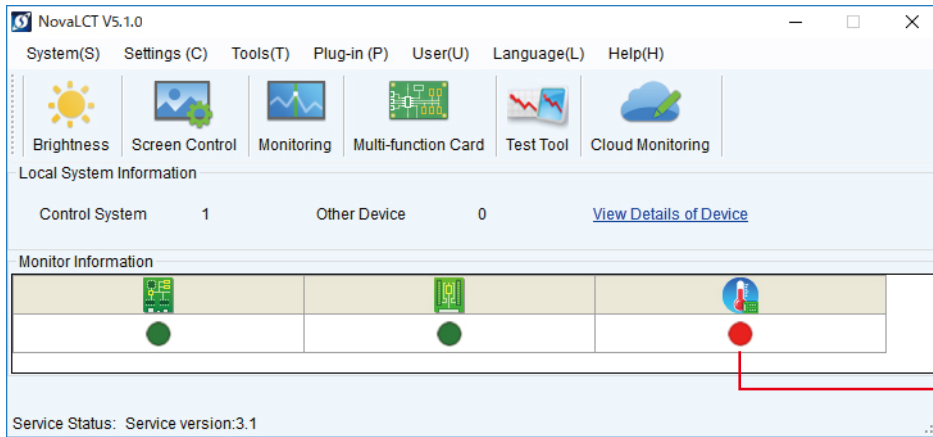


There is no problem if it is lit red.

If it is not lit, the power unit is probably broken. (Replacing the power unit)

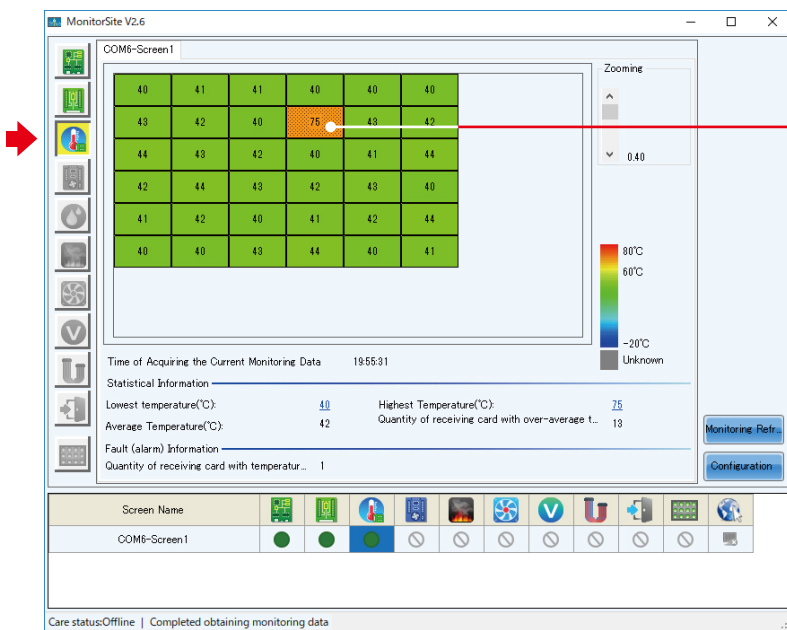
- Problem with the receiving card of the screen of the 2nd row 3rd column
 - Check that the receiving card is securely connected. If there are no connection problems, the receiving card may malfunction. (Replacing the receiving card)

(3) Problem with the internal temperature of the LED displays



There is a problem with the LED display operation.

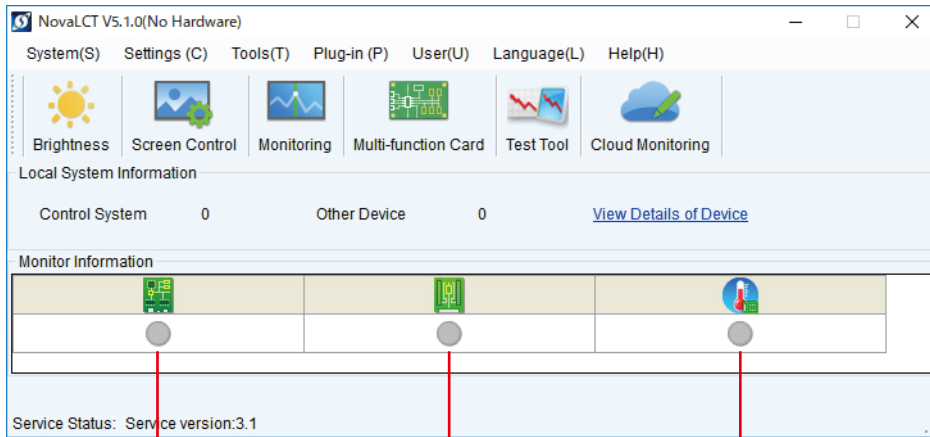
To display more details, click "Monitoring", and then click "Temperature" on the screen that is displayed.



The LED displays with a high temperature are displayed in warm colors.

Since the internal temperature is high, decrease the brightness setting.
If changing the brightness setting could not solve the problem, contact your retailer or the Customer Service.

(4) Communication problem



When the display is grey, the communication is not established.

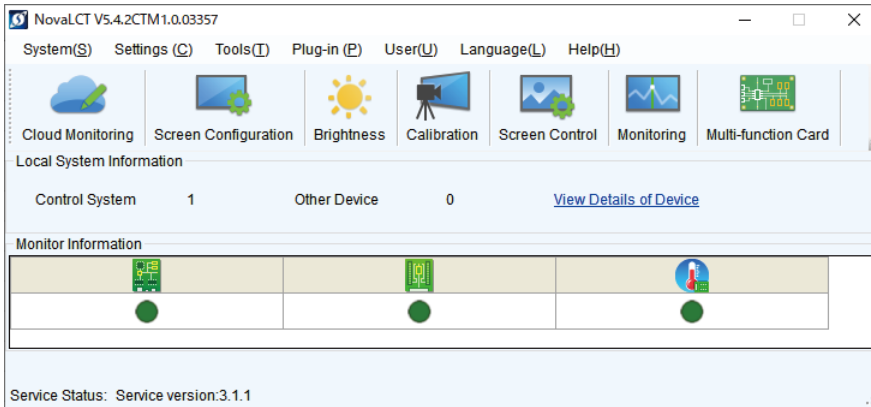
- Check that the USB cable is connected.
- Check that the LED controller is turned on.

Other Setting Procedures

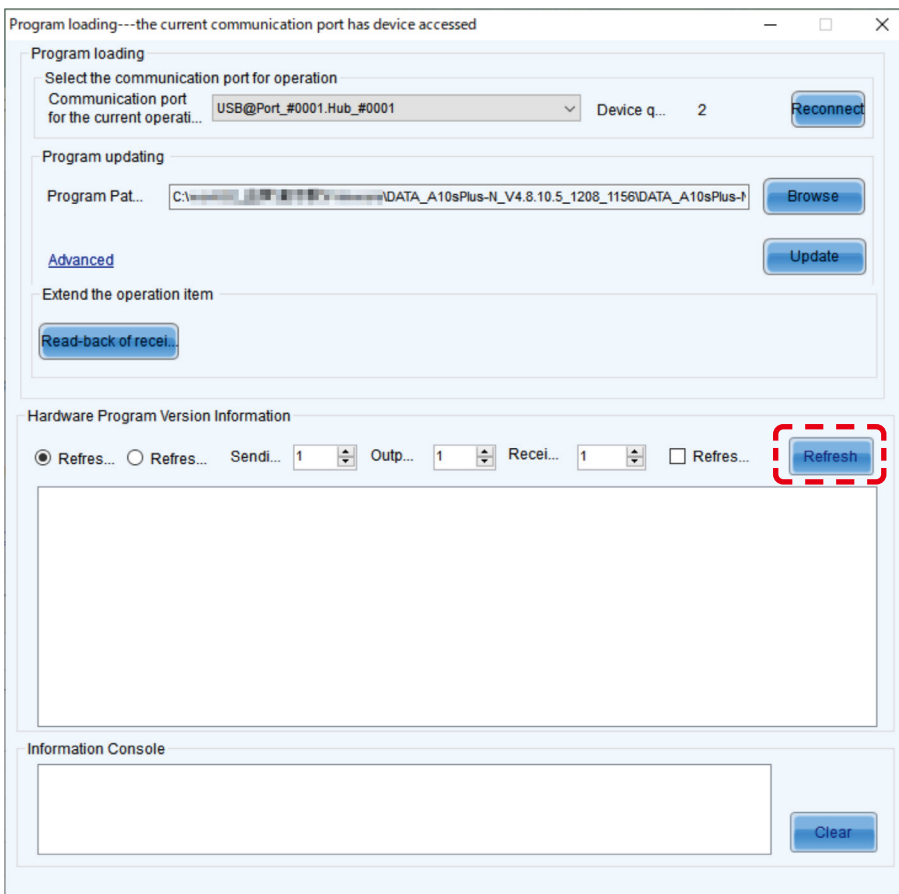
1. Updating the LED controller hardware program

Prepare the LED controller hardware program used for the update.

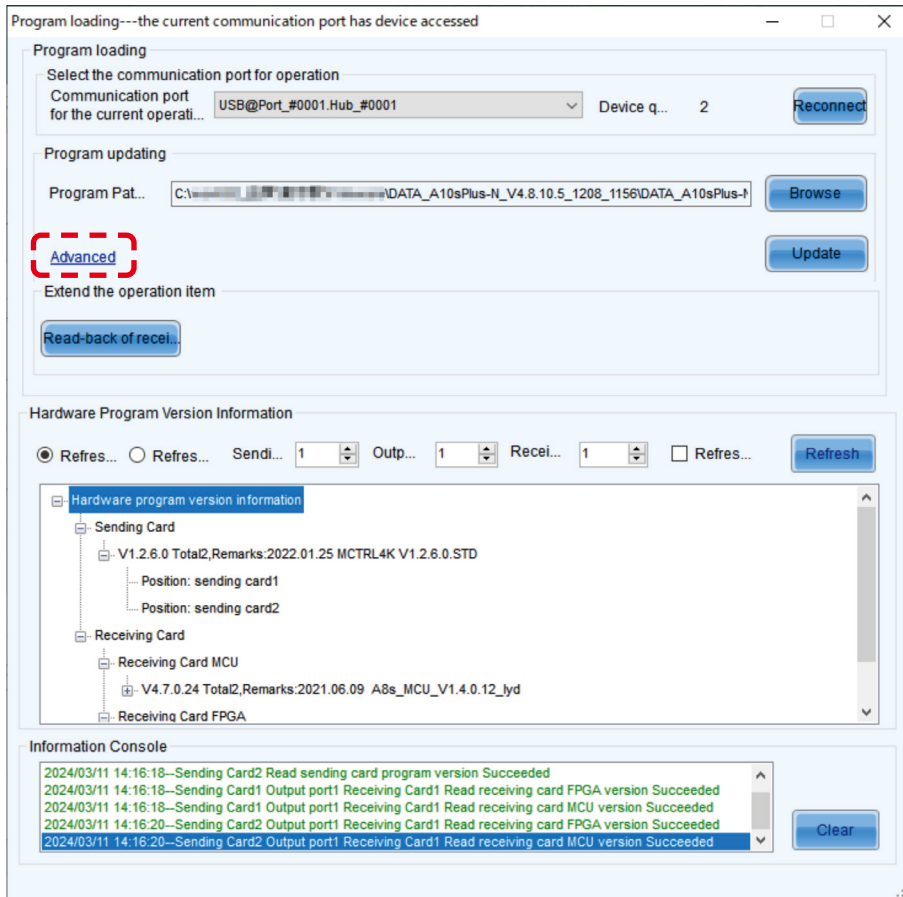
(1) Click on the NovaLCT window and enter "admin".



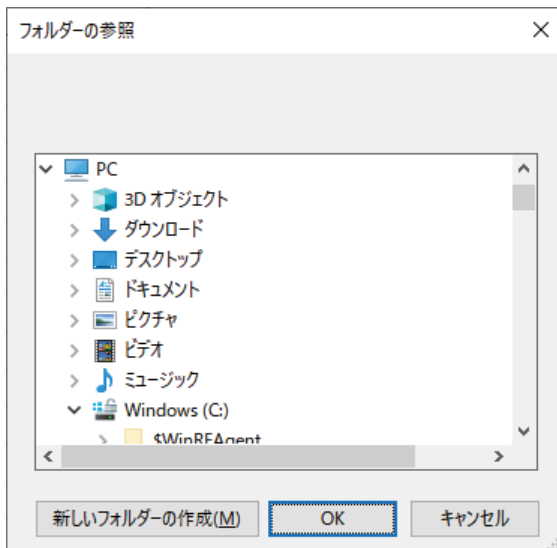
(2) Click the "Refresh" button and check the version of the controller hardware program.



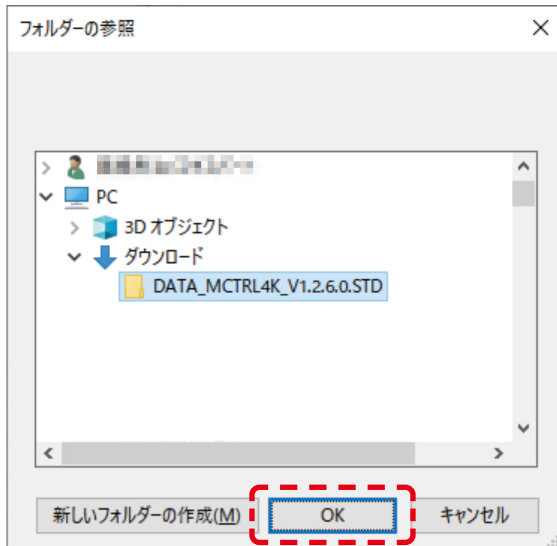
(3) Click the "Browse" button.



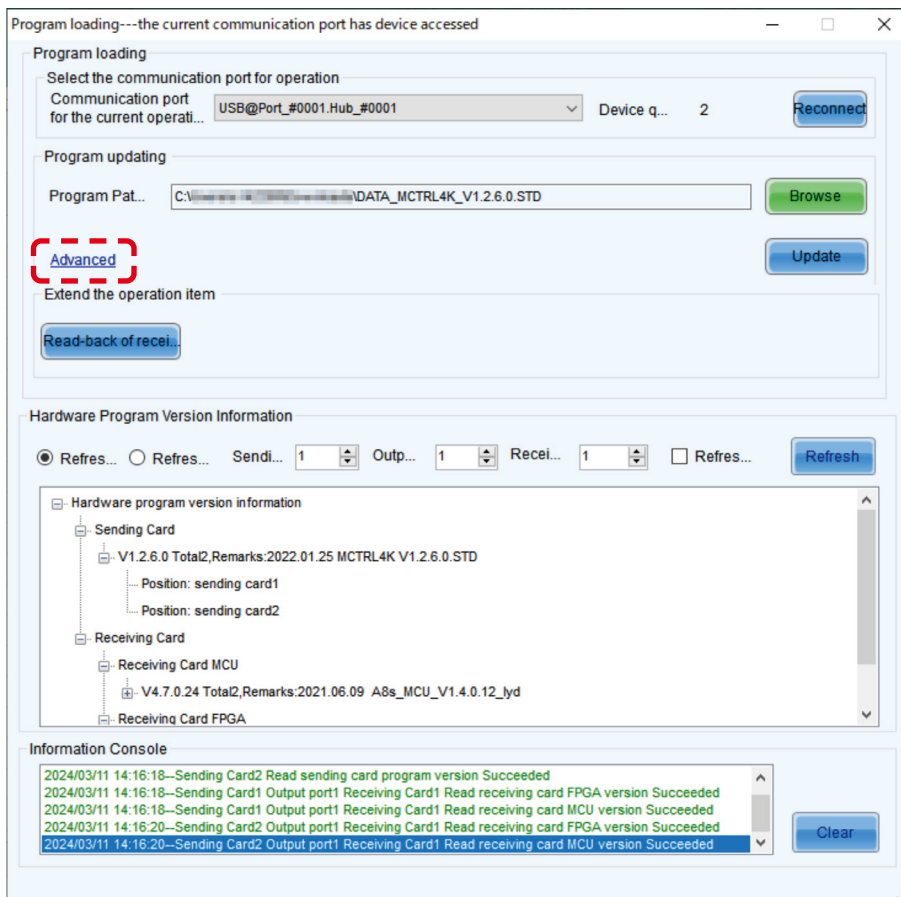
(4) Select the hardware program you have prepared for the update.



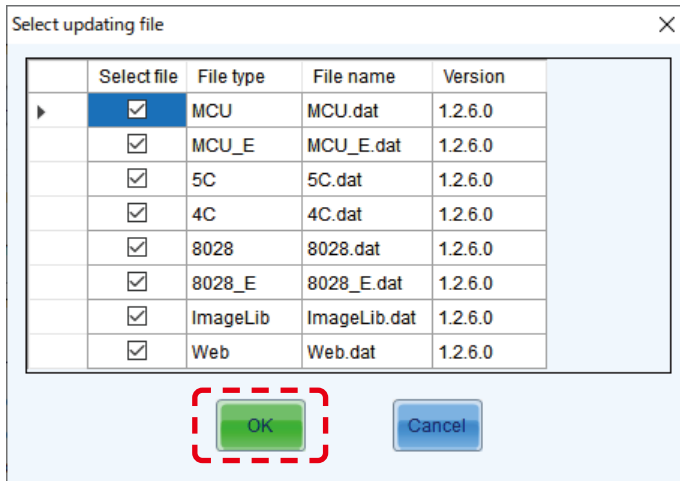
(5) Click the "OK" button.



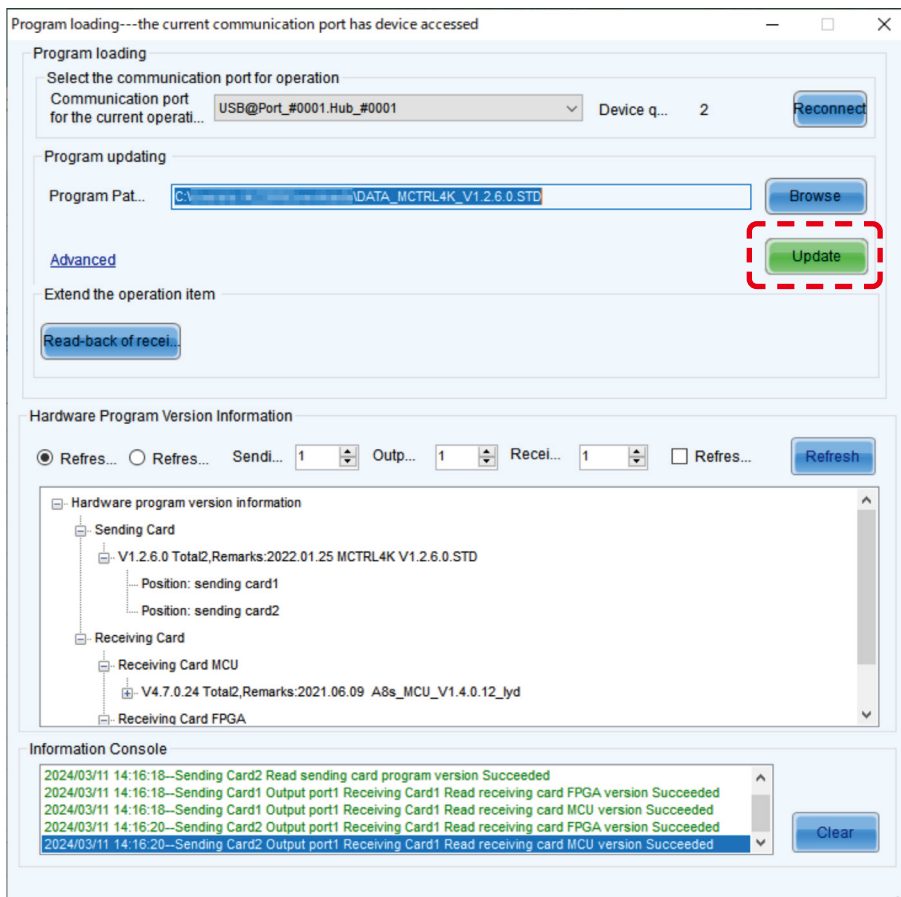
(6) Select "Advanced".



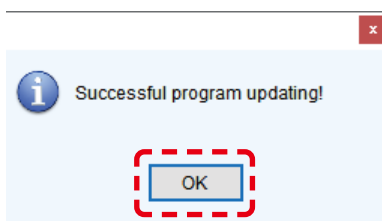
(7) Check that all files are selected.



(8) Click the "Update" button.

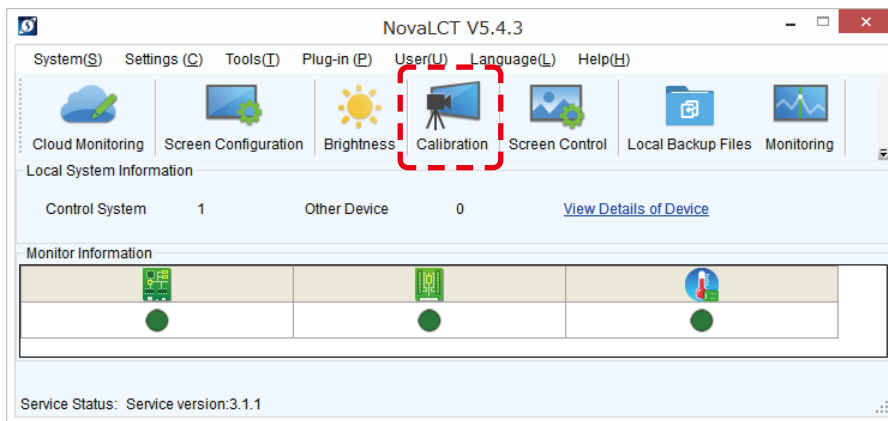


(9) Click the "OK" button.

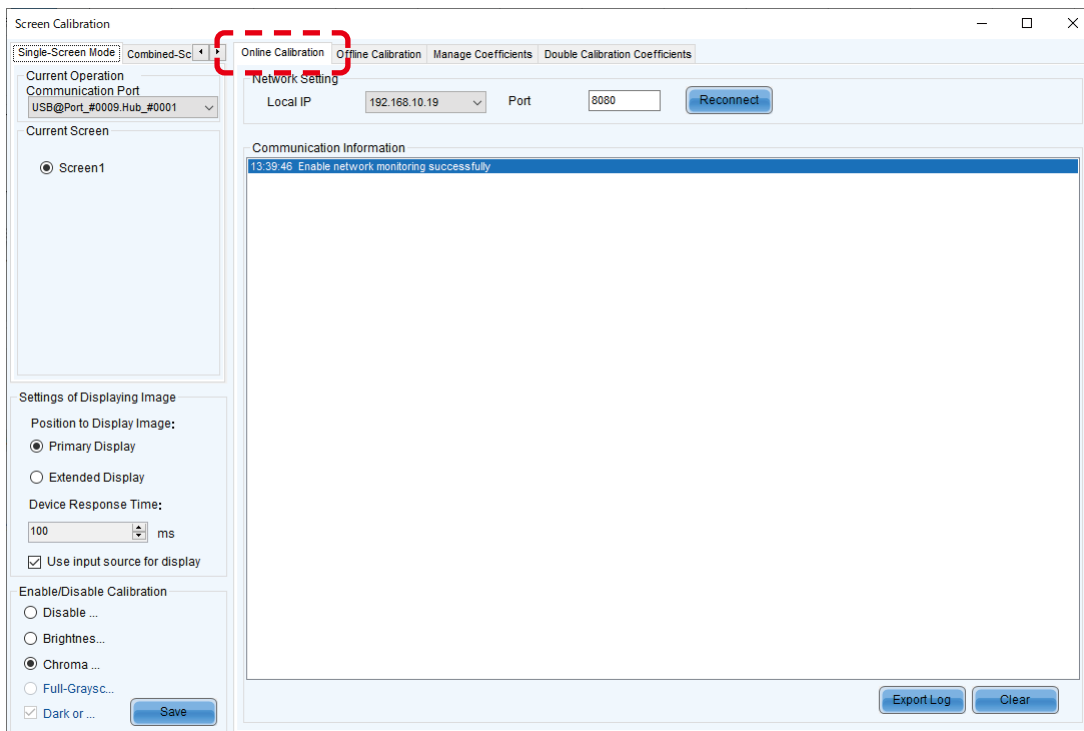


2. Saving the calibration data of the receiving card as a file

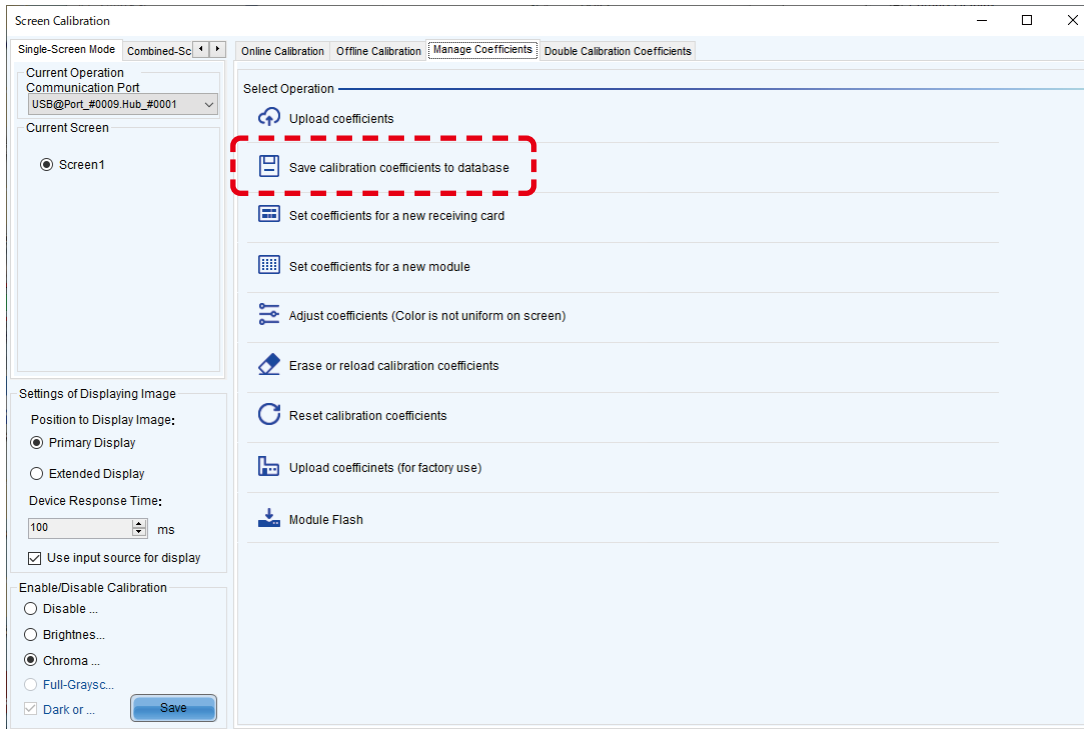
(1) Select "Calibration".



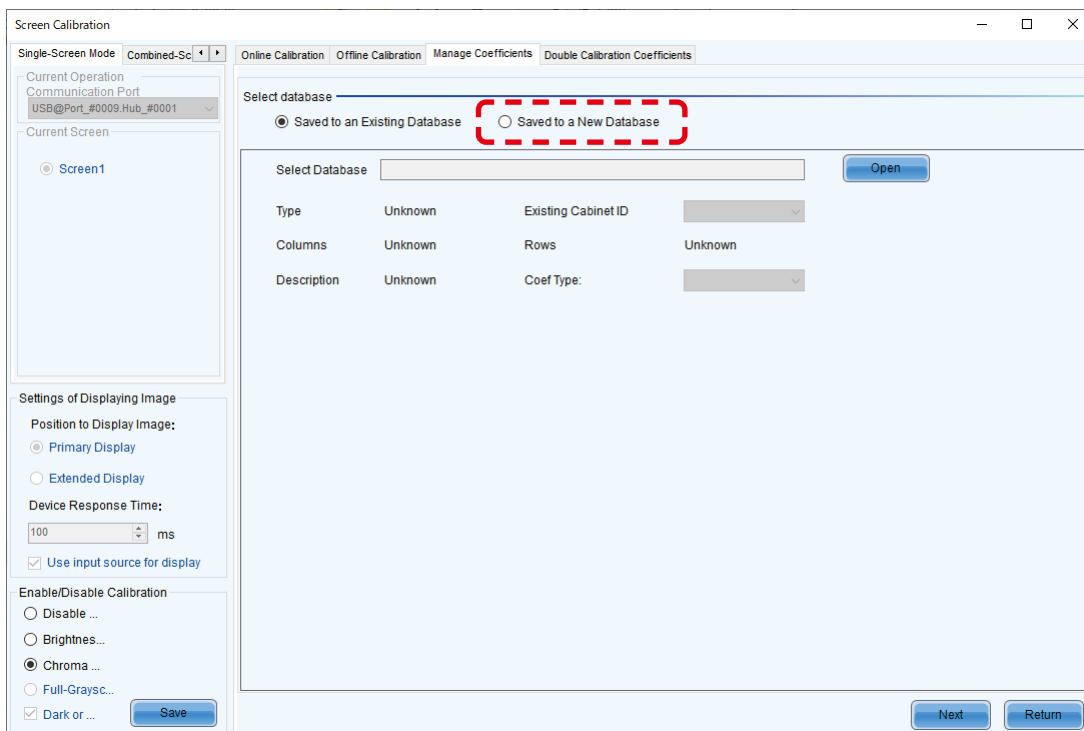
(2) Select "Manage Coefficients".



(3) Select "Save calibration coefficients to database".



(4) Select "Save to a New Database".



(5) Select "Cabinet-Database".

Screen Calibration

Single-Screen Mode Combined-Sc...

Current Operation
Communication Port
USB@Port_#0009.Hub_#0001

Current Screen
Screen1

Settings of Displaying Image
Position to Display Image:
Primary Display
Extended Display
Device Response Time:
100 ms
Use input source for display

Enable/Disable Calibration
Disable ...
Brightness...
Chroma ...
Full-Grayscale...
Dark or ...

Select database
Saved to an Existing Database
Saved to a New Database

New Database Type
Screen-Datab...
Cabinet-Datab...

Select Database
Create

Type Unknown Existing Cabinet ID
Columns Unknown Rows Unknown
Description Unknown Coef Type:

Next Return

(6) Click the "Create" button.

Screen Calibration

Single-Screen Mode Combined-Sc...

Current Operation
Communication Port
USB@Port_#0009.Hub_#0001

Current Screen
Screen1

Settings of Displaying Image
Position to Display Image:
Primary Display
Extended Display
Device Response Time:
100 ms
Use input source for display

Enable/Disable Calibration
Disable ...
Brightness...
Chroma ...
Full-Grayscale...
Dark or ...

Select database
Saved to an Existing Database
Saved to a New Database

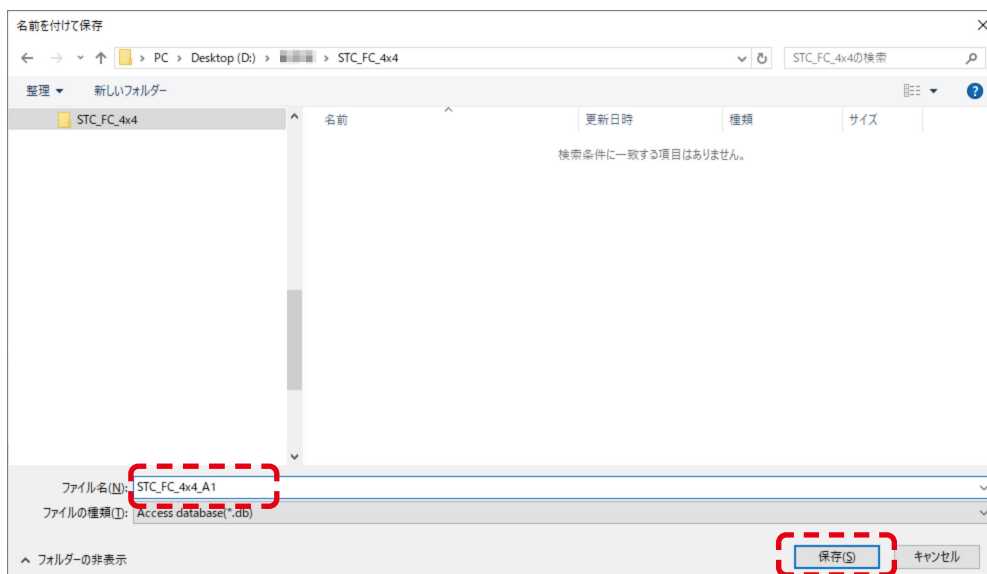
New Database Type
Screen-Datab...
Cabinet-Datab...

Select Database
Create

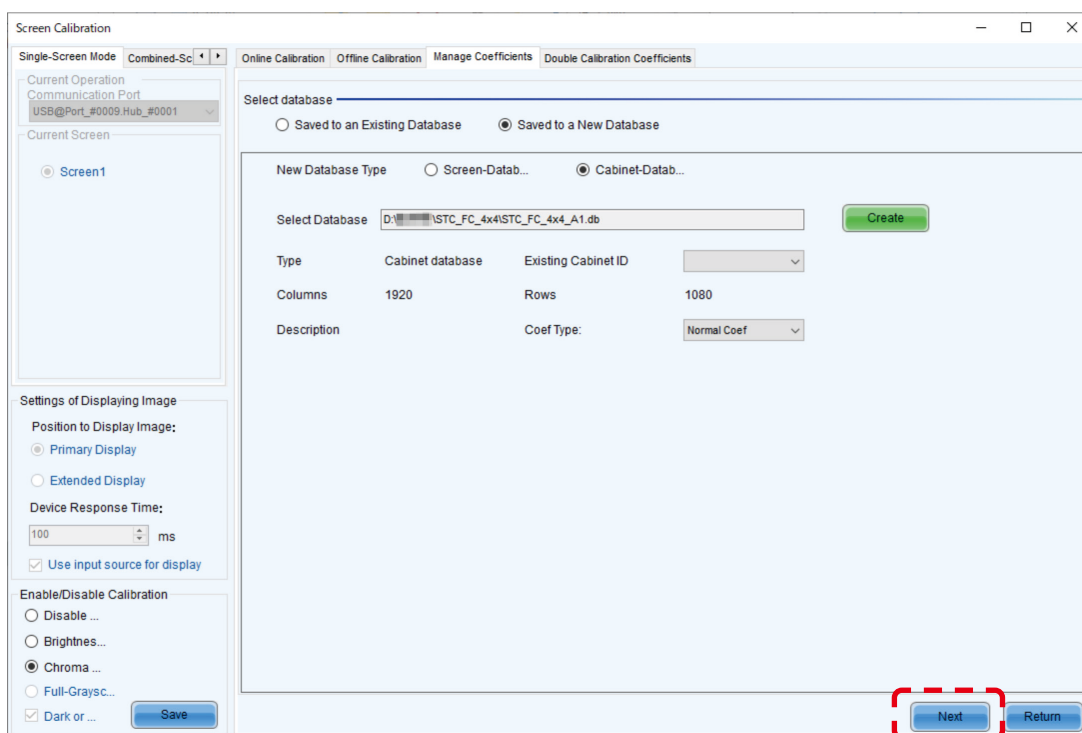
Type Unknown Existing Cabinet ID
Columns Unknown Rows Unknown
Description Unknown Coef Type:

Next Return

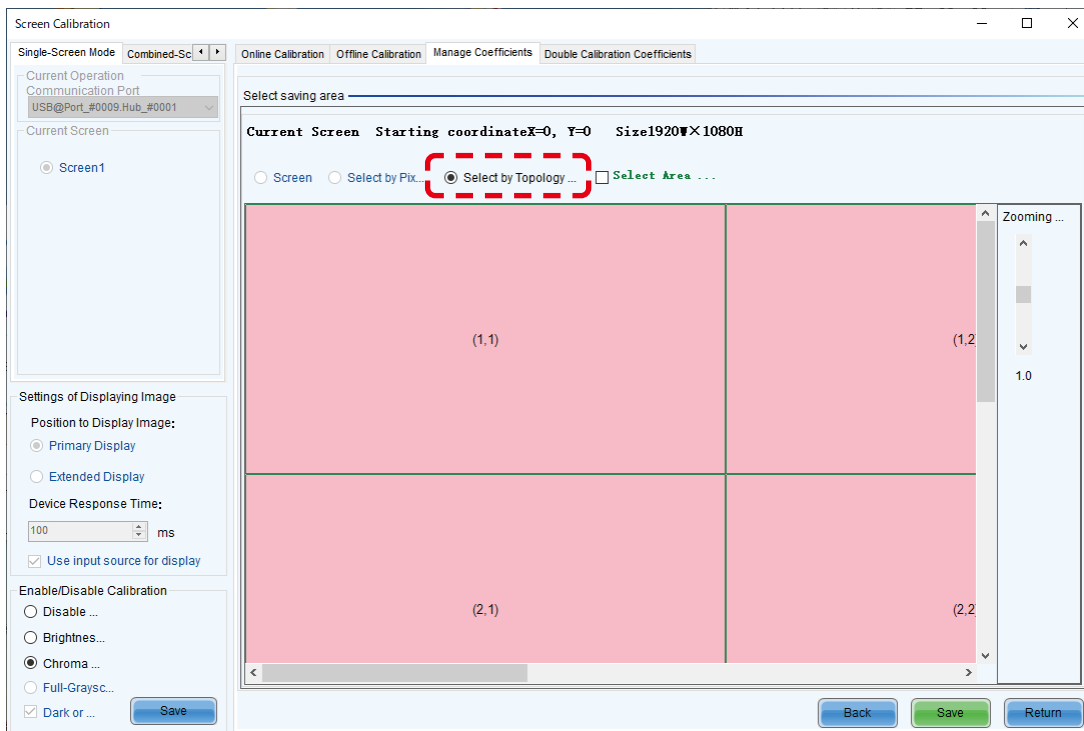
- (7) Choose any name and select any location to create the database to save the receiving card calibration data.



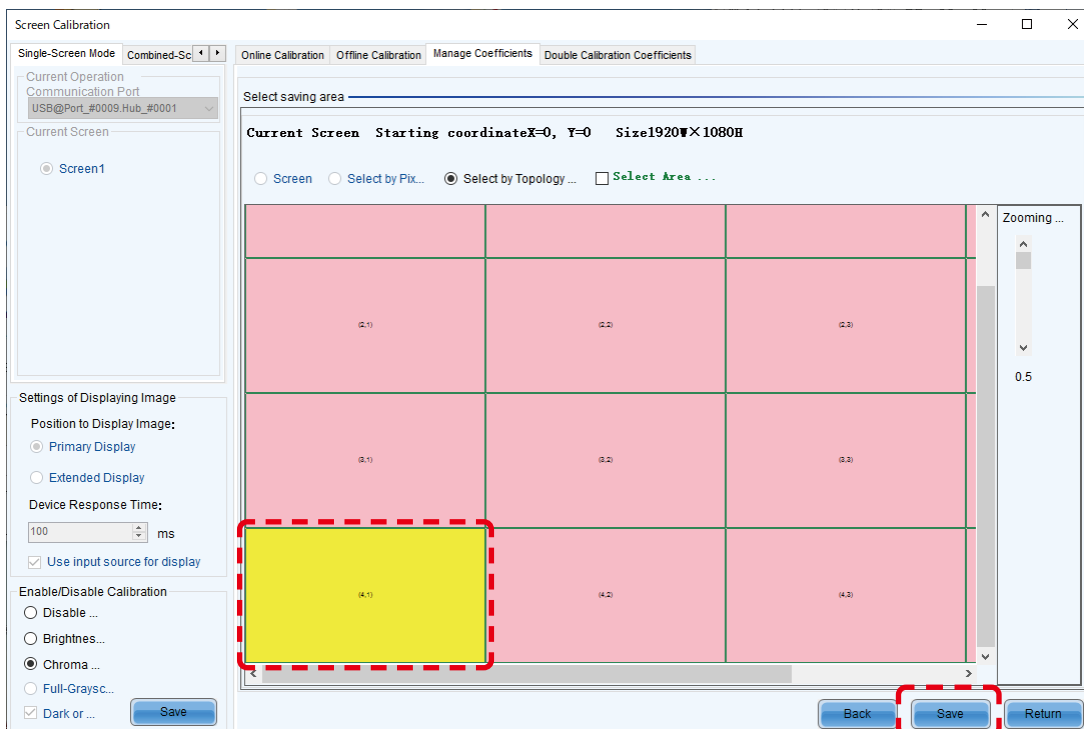
- (8) Click the “Next” button.



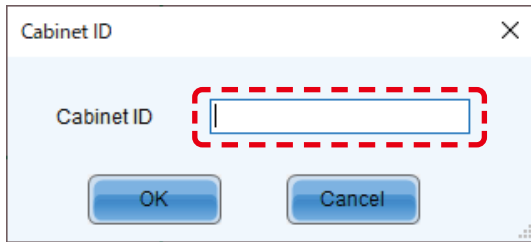
- (9) Check that "Select by Topology or List" is selected.
Select the display that uses the receiving card for which you want to save the calibration data.



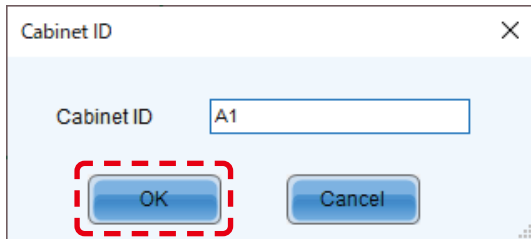
- (10) The color of the selected display changes to yellow.
Click the "Save" button.



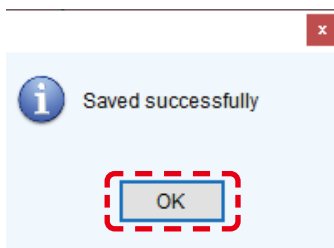
(11) Set any Cabinet ID for the calibration data that will be saved.



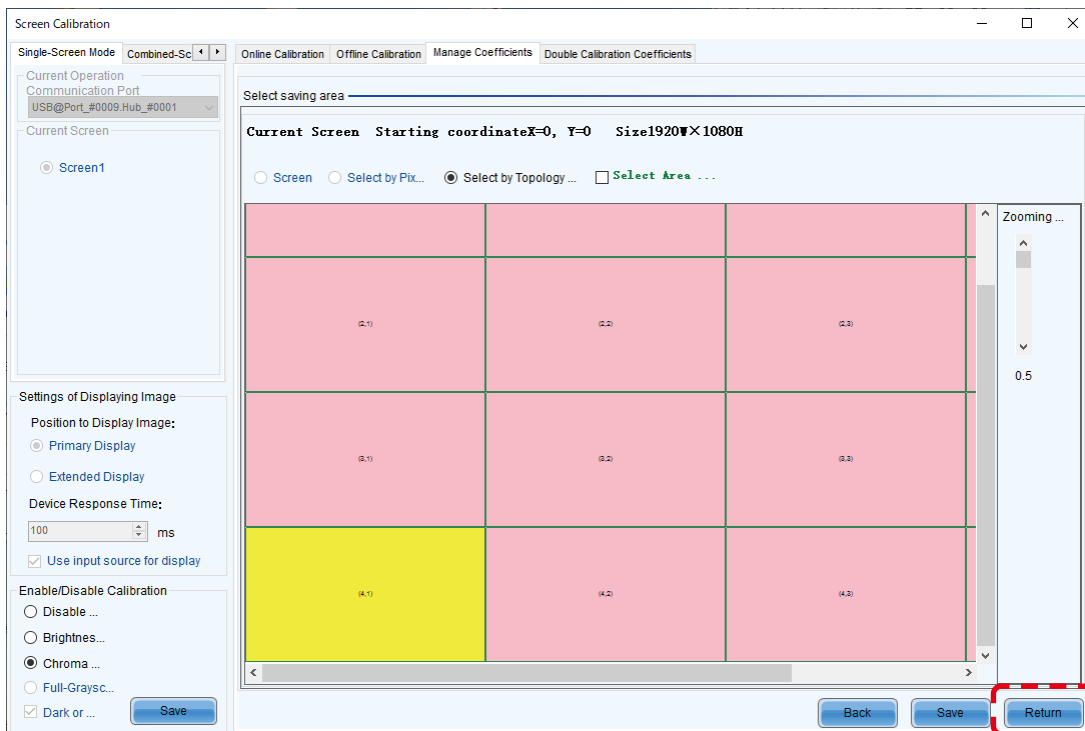
(12) Click the "OK" button.



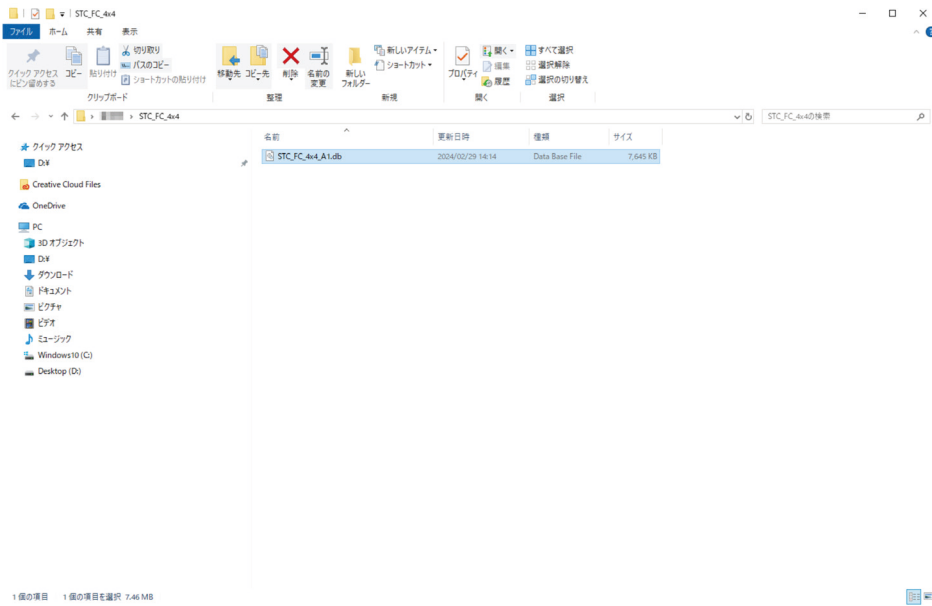
(13) Check the message and click the "OK" button.



(14) Click the "Return" button.



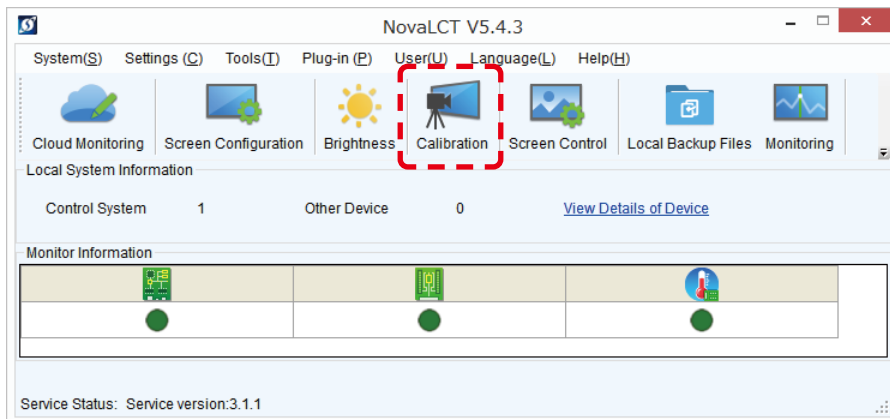
(15) Check that the file has been saved.



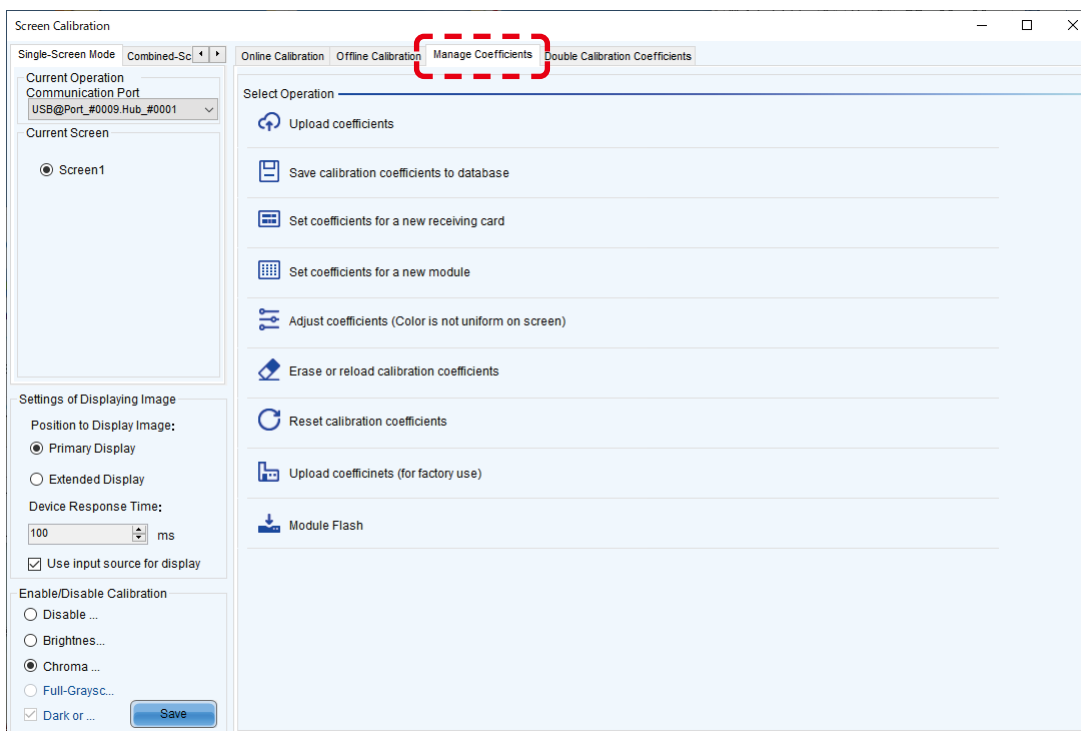
3. Writing the calibration data to the receiving card

3-1 Writing the calibration data saved in a file to the receiving card

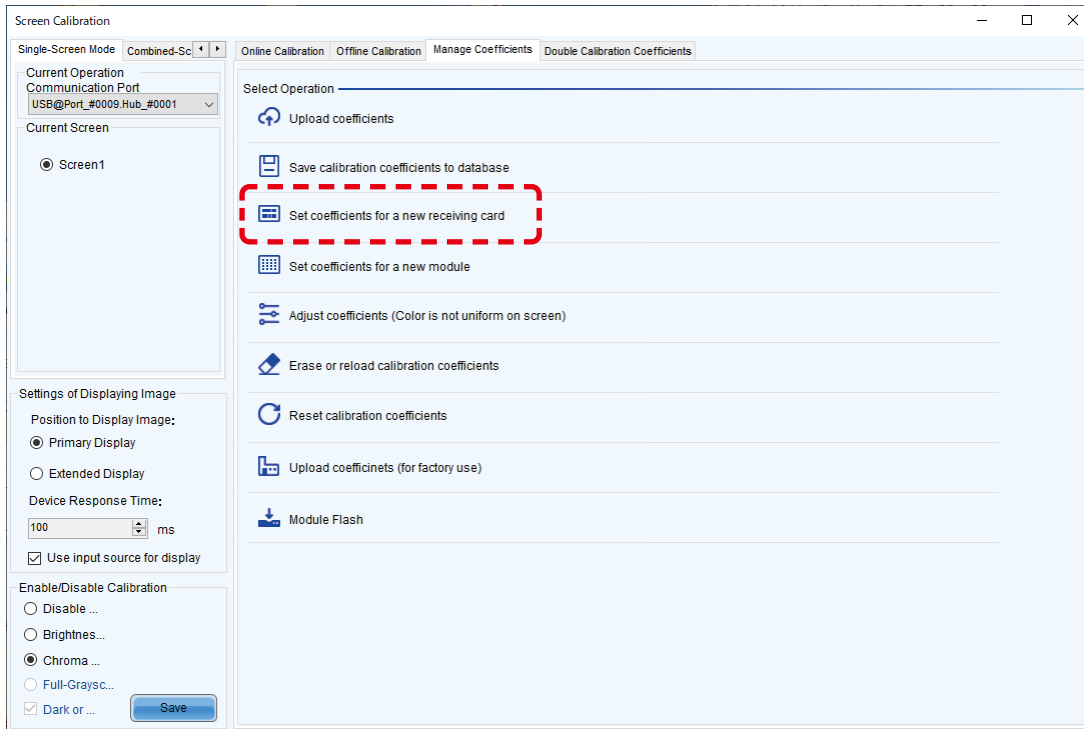
(1) Select "Calibration".



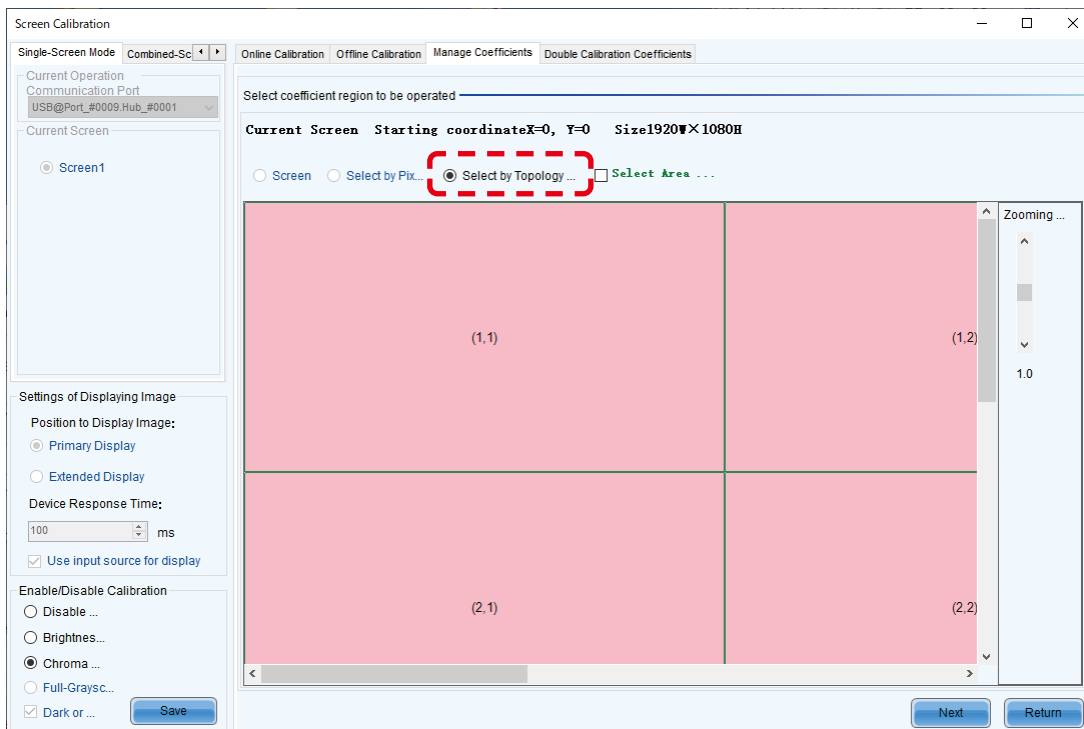
(2) Select "Manage Coefficients".



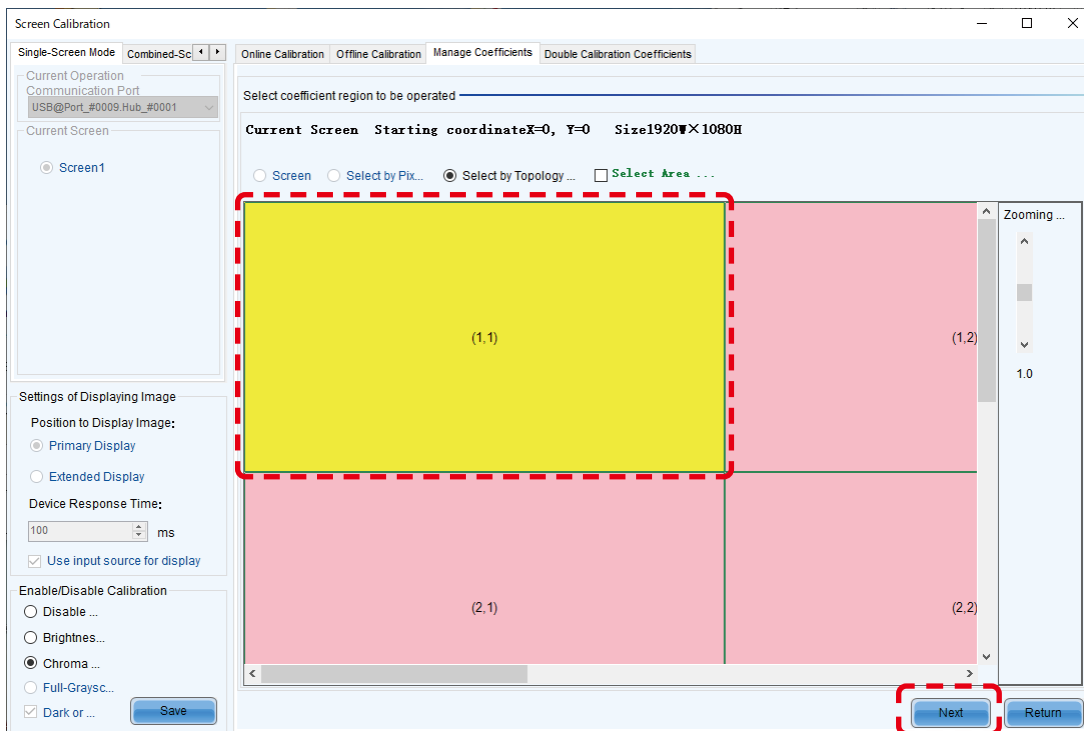
(3) Select "Set coefficients for a new receiving card".



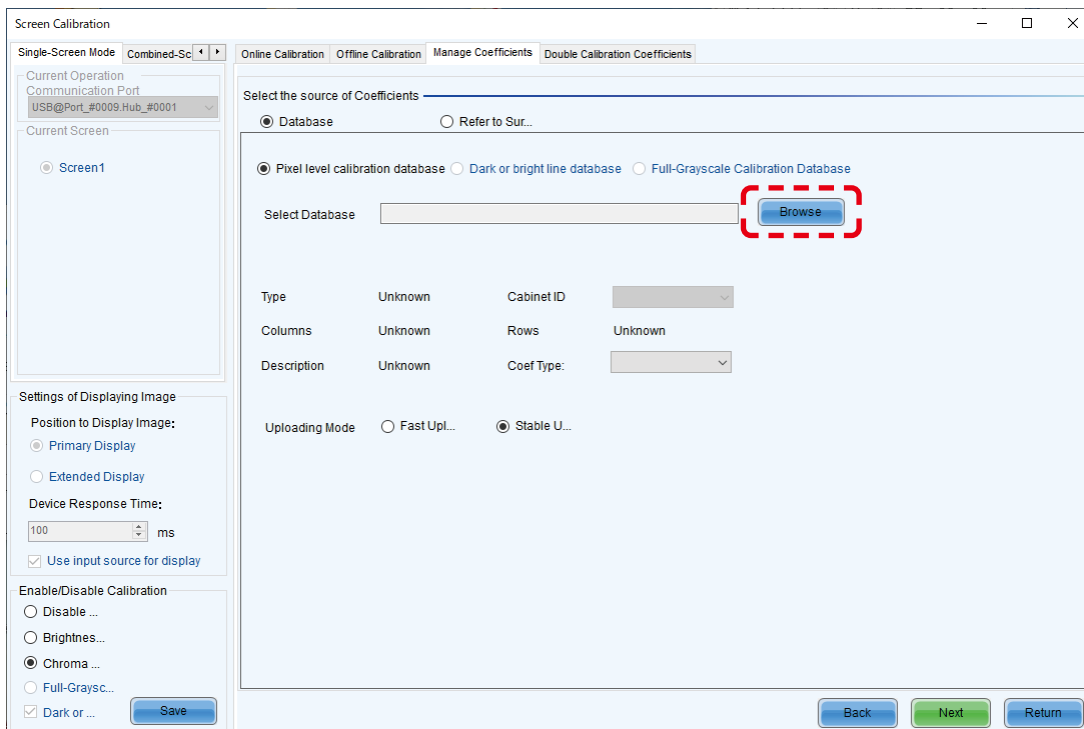
(4) Check that "Select by Topology or List" is selected.
Select the display that uses the receiving card to which you want to write the calibration data.



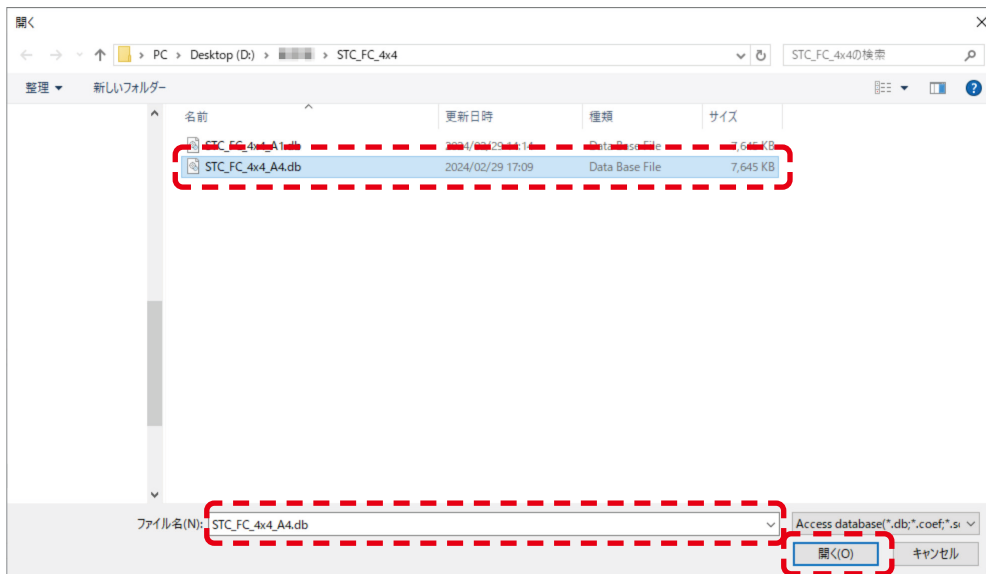
- (5) The color of the selected display changes to yellow.
Click the "Next" button.



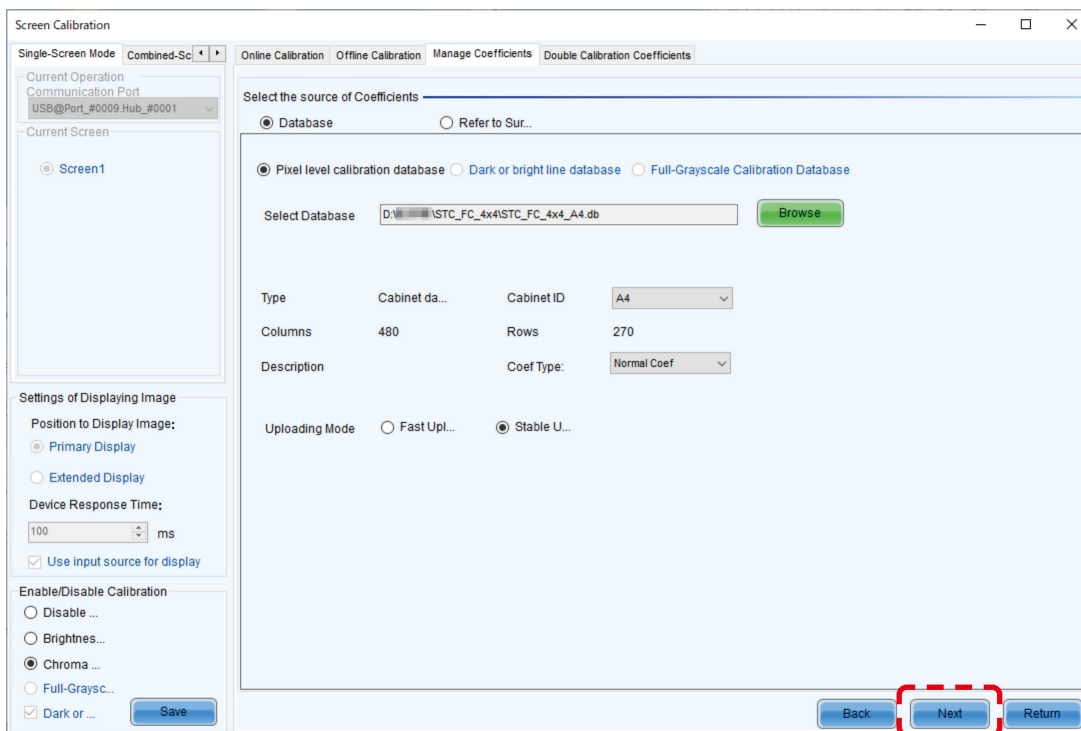
- (6) Click the "Browse" button.



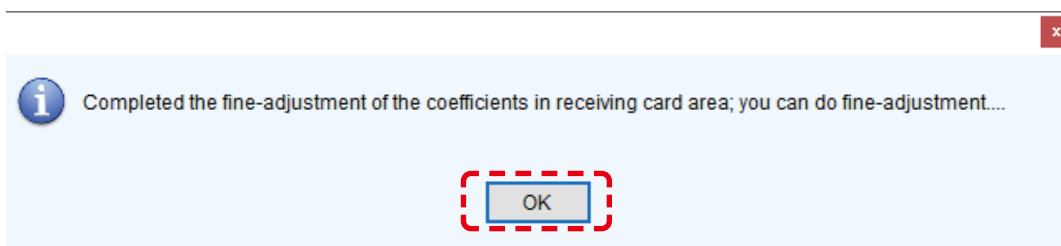
(7) Select the target file and click the “Open” button.



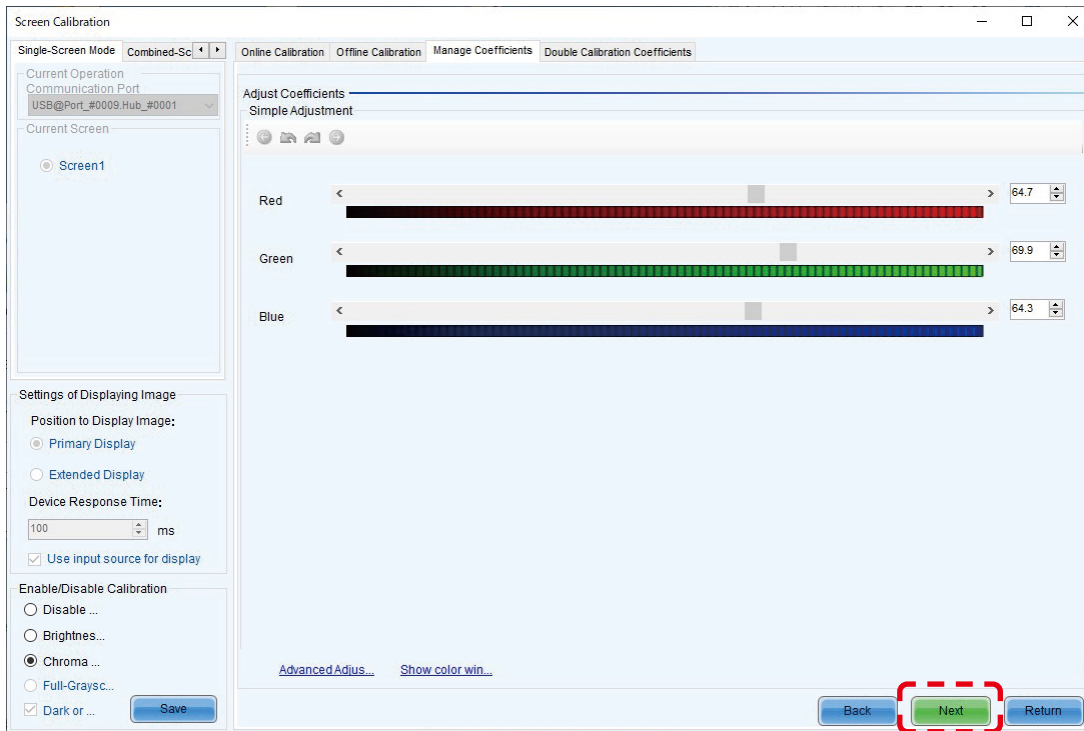
(8) Click the “Next” button.



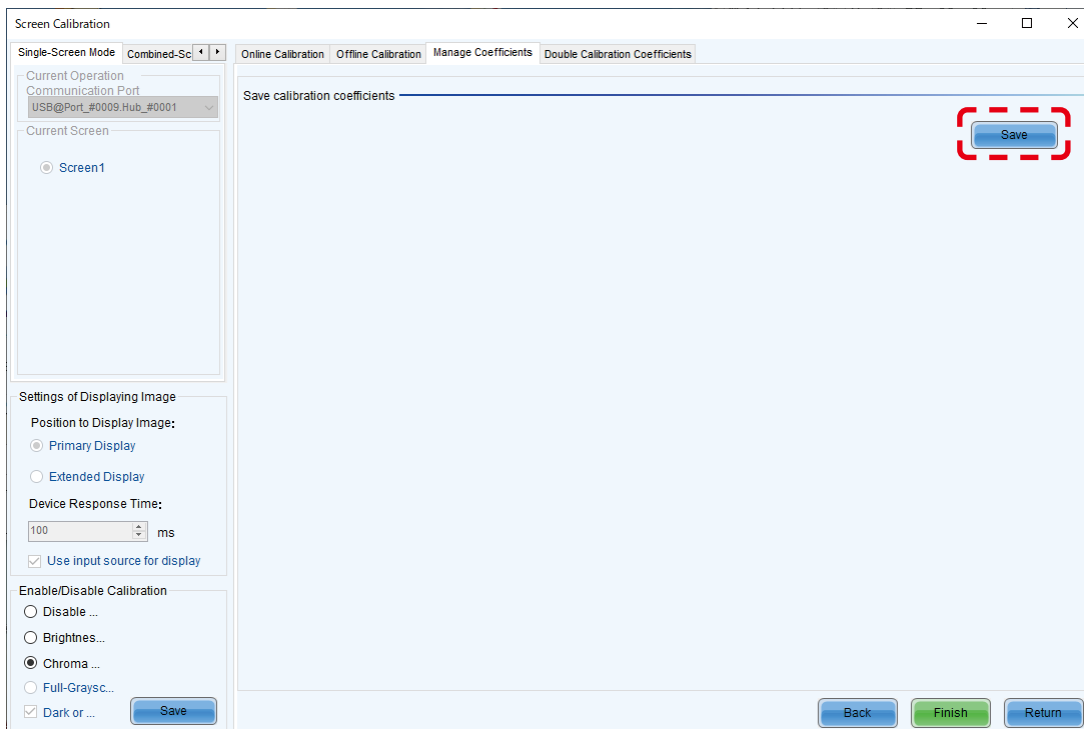
(9) Check the message and click the “OK” button.



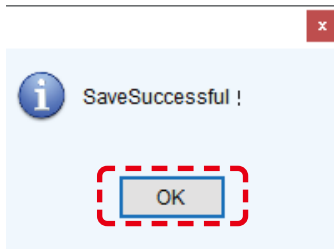
- (10) The white test pattern is displayed on the specified screen.
You may exit the test pattern using the “esc” key. (The test pattern can also be displayed using the display control of the controller.)
Adjust the brightness and colors as required.
Click the “Next” button.



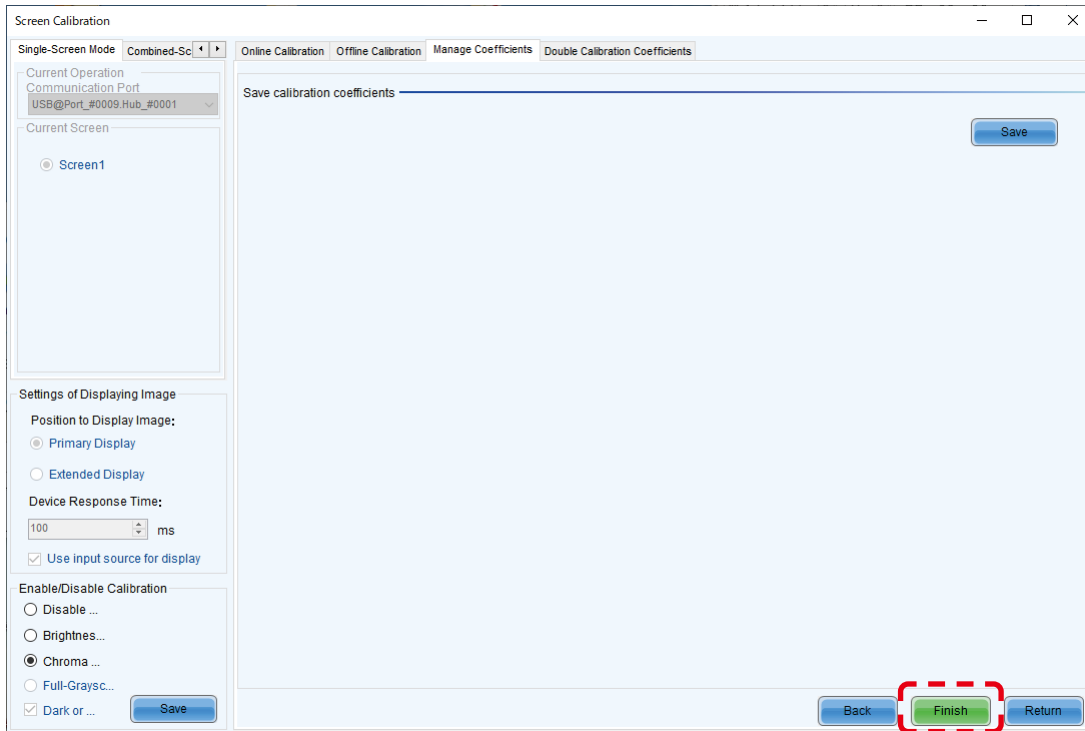
- (11) Click the “Save” button.



(12) Check the message and click the "OK" button.



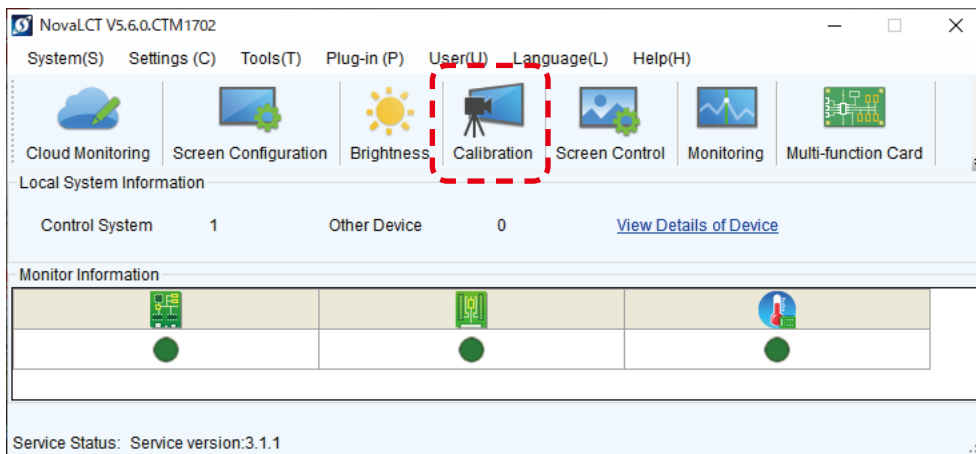
(13) Click the "Finish" button.



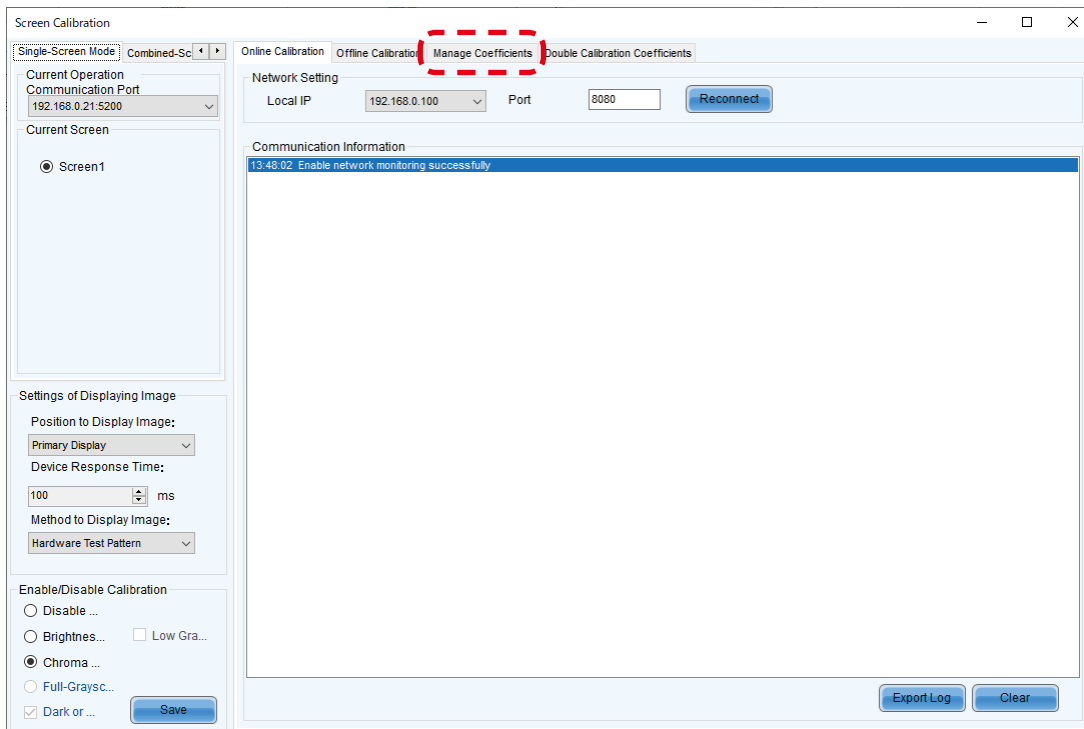
(14) Perform the "4. Writing the calibration data from the receiving card to the pixel card" ([English-138](#)) procedure.

3-2 Writing the calibration data stored in the supplied USB memory key to the receiving card

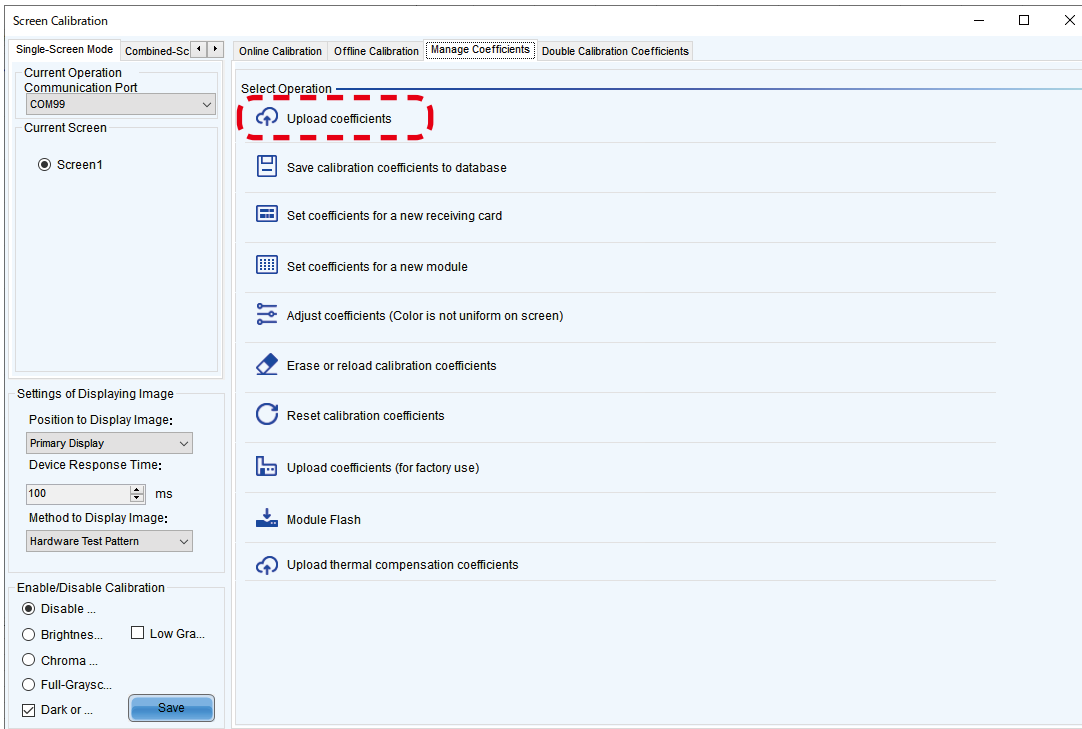
Click the “Calibration” button.



Select the “Manage Coefficients” tab.



Click the “Upload coefficients” button.



Select the database type.

The database type to select varies depending on the writing target. Select the type according to the information in the table below.

For models with two calibration modes, make the setting for “Low gray” first.

Check the calibration mode for each model, and then select the database corresponding to the calibration mode.

Calibration mode of each model

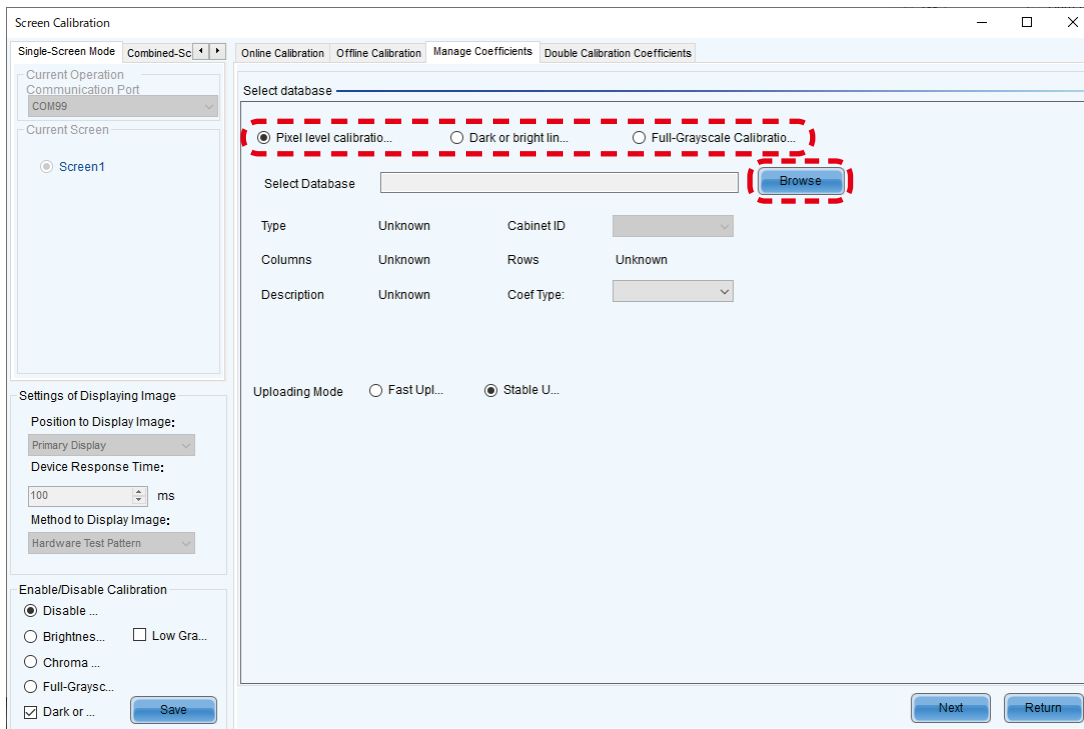
	LD-Q2	LD-E1	LD-FA2/FE2	LD-FE3/FH3	LD-FA3	LD-D1/D2	
Pitch	All	All	All	All	All	0.9 mm	1.2 / 1.5 mm
Calibration method	Screen calibration						
Calibration mode				Low gray	Low gray	Low gray	
	Chroma			Brightness and Chroma	Full gray	Brightness and Chroma	Brightness and Chroma

NOTE: Some models may not be available in some countries.

Correspondence between database and calibration modes

Select database	Calibration mode
Pixel level calibration database	
Normal coef	Chroma / Brightness and Chroma
Low-gray scale coef	Low gray
Full Gray scale Calibration database	Full gray
Dark and bright line database	- (Calibration mode independent)

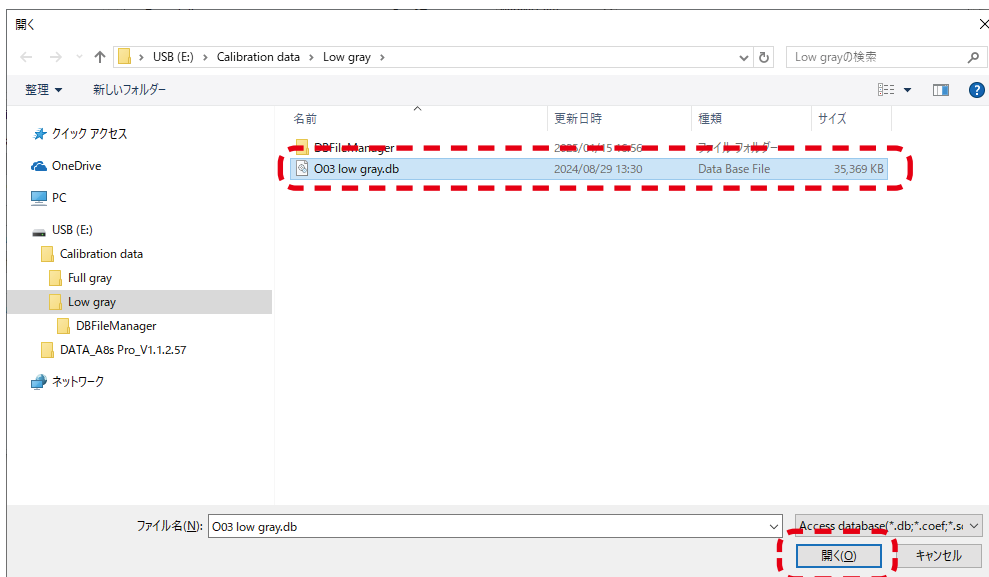
Click the "Browse" button.



Select the *.db file that contains the calibration data.

Example for Low gray:

The procedure is the same for Chroma / Brightness and Chroma.



The database is set.

For Pixel level calibration, select the parameter in "Coef Type" under "Description".

In the case of Low gray, select "Low-Grayscale Coef".

In the case of Chroma / Brightness and Chroma, select "Normal Coef".

Click the "Next" button to go to the target selection.

Screen Calibration

Single-Screen Mode Combined-Sc...

Current Operation
Communication Port
COM99

Current Screen
Screen1

Settings of Displaying Image
Position to Display Image:
Primary Display
Device Response Time:
100 ms
Method to Display Image:
Hardware Test Pattern

Enable/Disable Calibration
Disable ...
Brightness... Low Gra...
Chroma ...
Full-Grayscale...
Dark or ...

Online Calibration Offline Calibration Manage Coefficients Double Calibration Coefficients

Select database

Pixel level calibration... Dark or bright lin... Full-Grayscale Calibration...

Select Database X:\Users\LEDG_RT\20241028_FA01203_cal_issue校正数据\低灰系数10 Browse

Type Screen dat... Cabinet ID
Columns 480 Rows 1080
Description Coef Type:
Low-Grayscale Coe
Normal Coef
Low-Grayscale Coef

Uploading Mode Fast Up... Stable U...

Next Return

Example for Full gray:

開く

USB (E:) > Calibration data > Full gray

Full grayの検索

整理 新しいフォルダー

名前	更新日時	種類	サイズ
O03 full gray.db	2024/08/29 15:50	Data Base File	29,201 KB

ファイル名(N): O03 full gray.db Access database(*.db;*.cof;*.si)

開く(O) キャンセル

The database is set.

Click the "Next" button to go to the target selection.

Screen Calibration

Single-Screen Mode Combined-Sc...

Online Calibration Offline Calibration Manage Coefficients Double Calibration Coefficients

Current Operation
Communication Port
COM99

Current Screen
Screen1

Settings of Displaying Image
Position to Display Image:
Primary Display
Device Response Time:
100 ms
Method to Display Image:
Hardware Test Pattern

Enable/Disable Calibration
Disable ...
Brightness... Low Gra...
Chroma ...
Full-Grayscale...
Dark or ...

Select database

Pixel level calibration... Dark or bright lin... Full-Grayscale Calibration...

Select Database X:\Users\LEDG_RT\20241028_FA01203_cal_issue校正数据全灰系数IO Browse

Columns 480 Rows 1080

Uploading Mode Fast UpL... Stable U...

Next Return

Example for Chroma:

開く

USB (E:) > Calibration data > Chroma

Chromaの検索

名前 更新日時 種類 サイズ

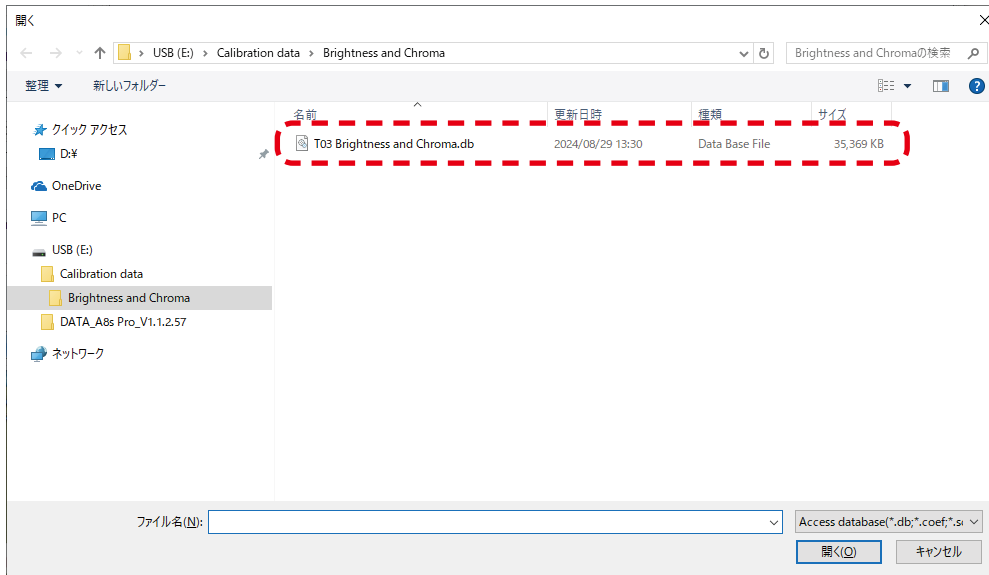
T03 Chroma.db 2024/08/29 13:30 Data Base File 35,369 KB

ファイル名(N): T03 Chroma.db

Access database(*.db;*.coef;*.si)

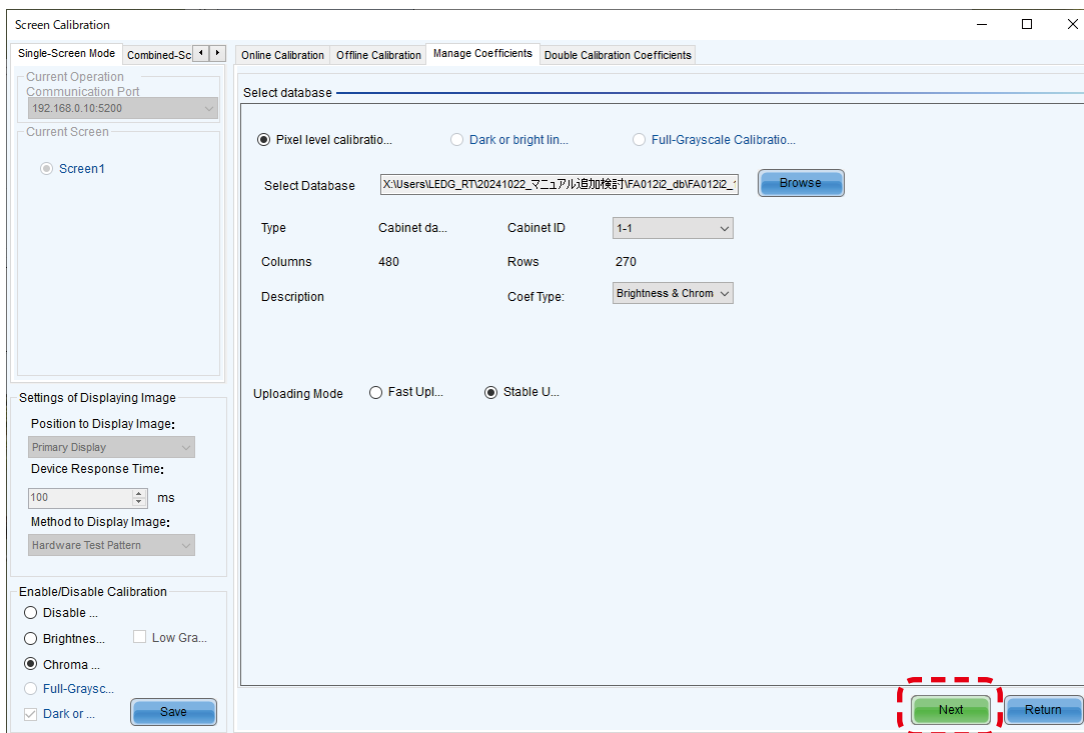
開く(O) キャンセル

Example for Brightness and Chroma:



The database is set.

Click the "Next" button to go to the target selection.



Target selection

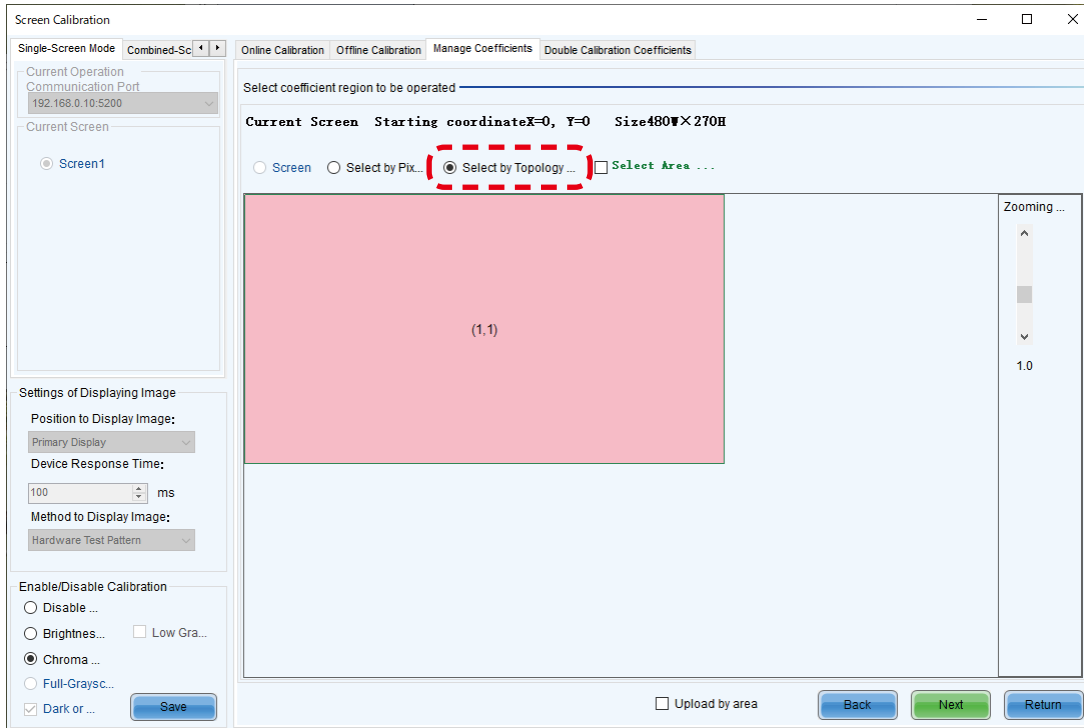
The target selection screen is displayed.

The procedure is explained taking Chroma / Brightness and Chroma as an example.

The selection procedure varies depending on the calibration data that is uploaded.

Here, explanations are given when selecting "Topology".

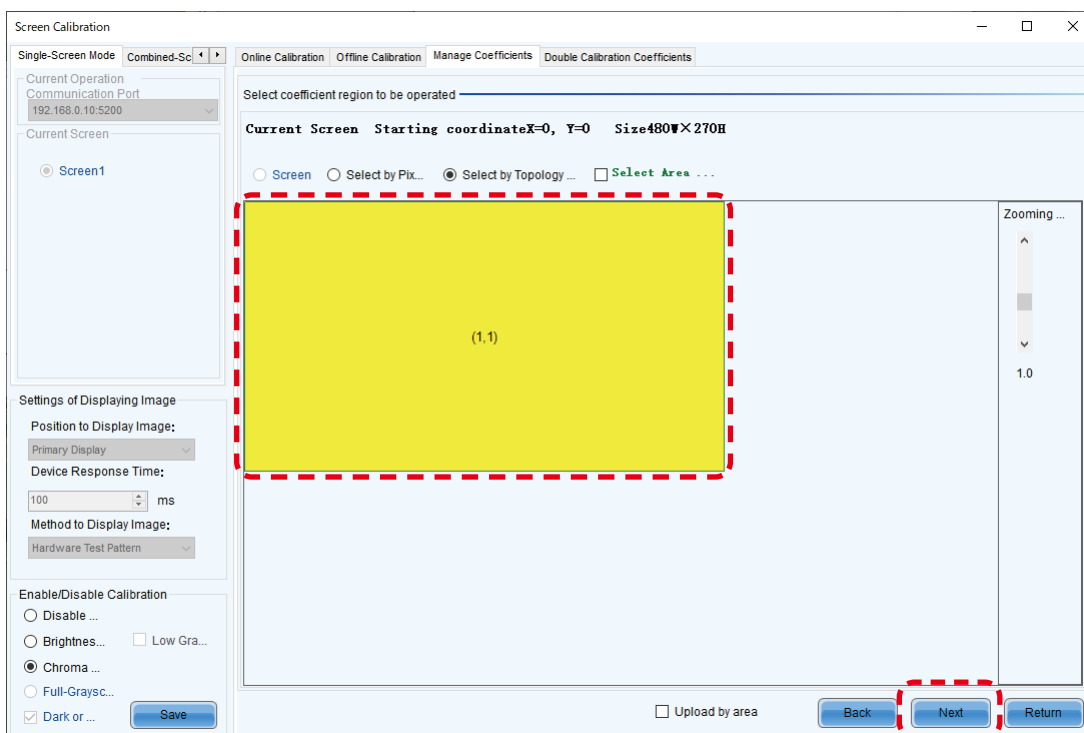
With Topology, the receiving card is selected individually (single LED display).



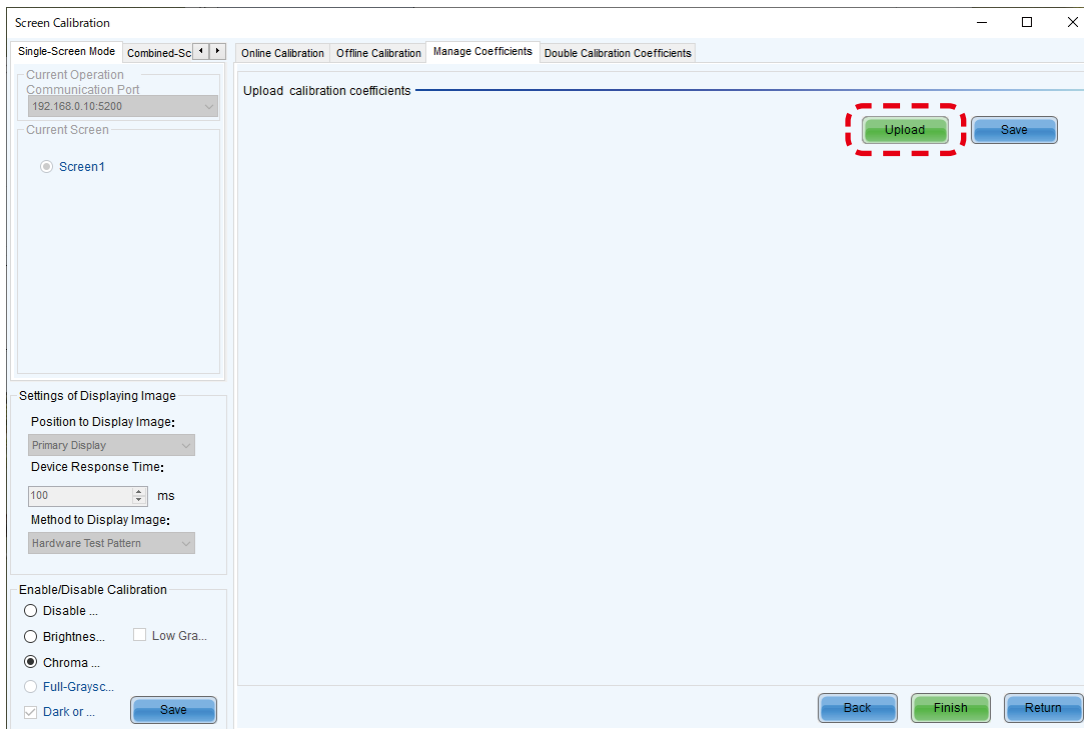
Click the upload target to select it.

The selected location is displayed yellow after the selection.

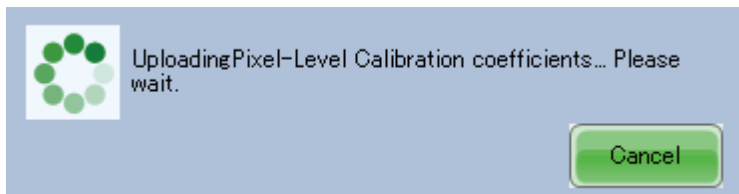
Click the "Next" button.



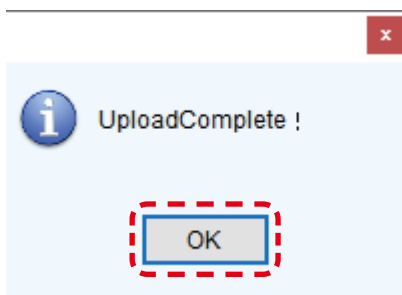
Click the "Upload" button.



Display during the upload.

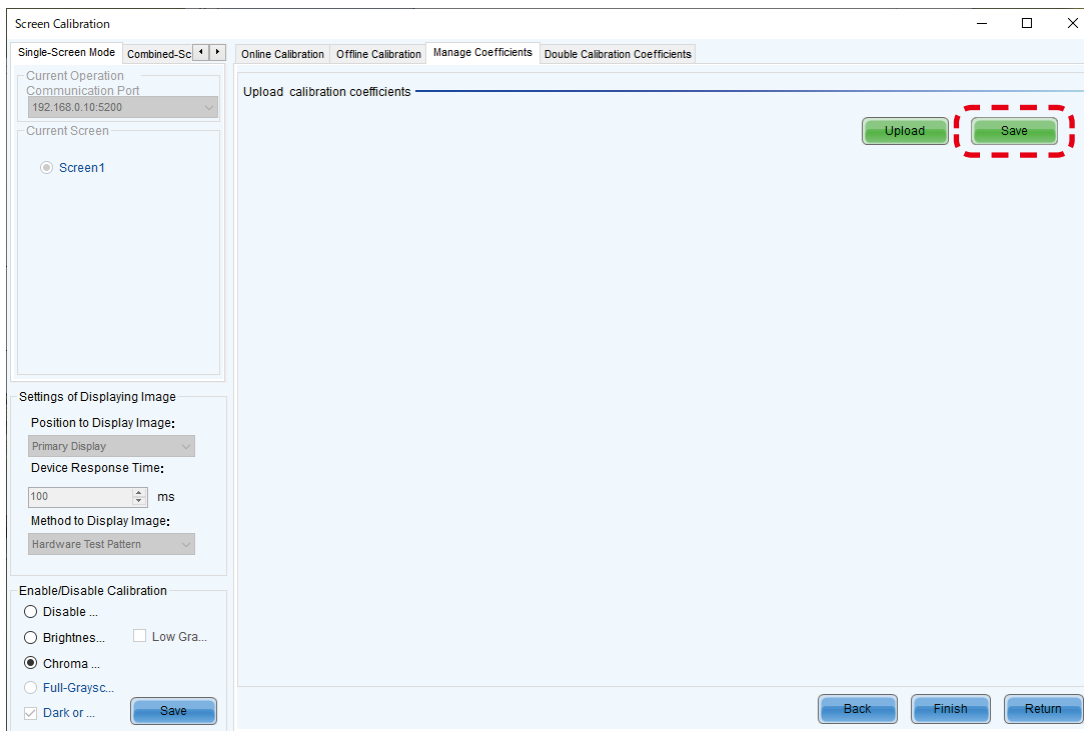


Click the "OK" button.

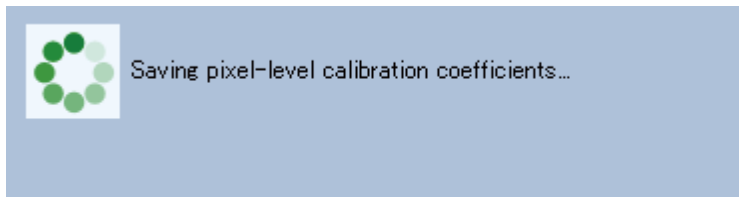


Check the state of the image at the upload location.

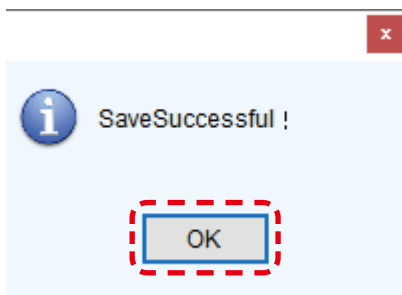
If calibration has been performed correctly, click the "Save" button to save the settings.



Display during the save process.



Click the "OK" button.



The data is written to the receiving card (not to the pixel card).

To write the data to the pixel card, execute the procedure in "4. Writing the calibration data from the receiving card to the pixel card" ([English-138](#)).

Click the "Finish" button.

Click the "Return" button to upload another file.

The screenshot shows the 'Screen Calibration' application window. The interface includes a left sidebar with settings and a main area for uploading calibration coefficients. The 'Finish' button at the bottom right is highlighted with a red dashed box.

Screen Calibration

Single-Screen Mode | Combined-Screen Mode

Online Calibration | Offline Calibration | Manage Coefficients | Double Calibration Coefficients

Current Operation: Communication Port: 192.168.0.10:5200

Current Screen: Screen1

Settings of Displaying Image:

- Position to Display Image: Primary Display
- Device Response Time: 100 ms
- Method to Display Image: Hardware Test Pattern

Enable/Disable Calibration:

- ☐ Disable ...
- ☐ Brightness... ☐ Low Gra...
- ☒ Chroma ...
- ☐ Full-Grayscale...
- ☒ Dark or ...

Upload calibration coefficients:

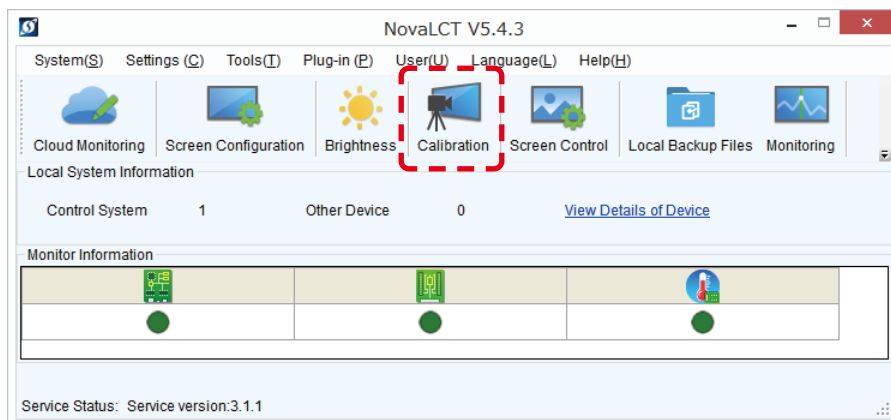
Upload Save

Back Finish Return

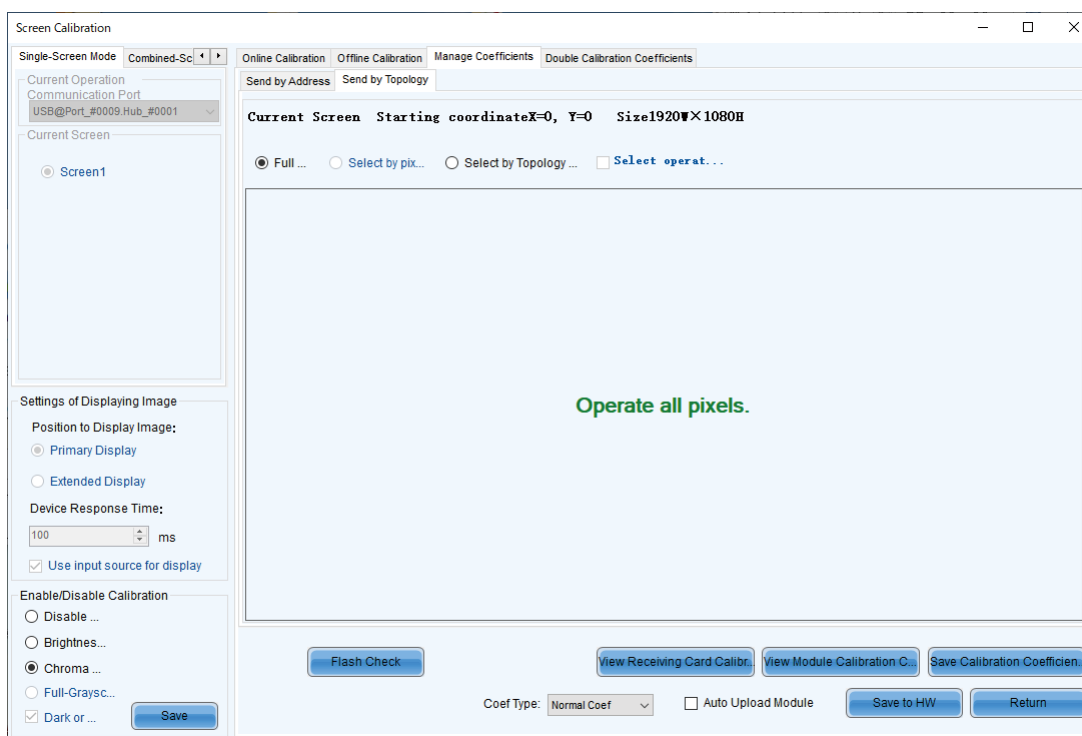
4. Writing the calibration data from the receiving card to the pixel card

The following assumes that the image is displayed with the calibration data saved in the receiving card.

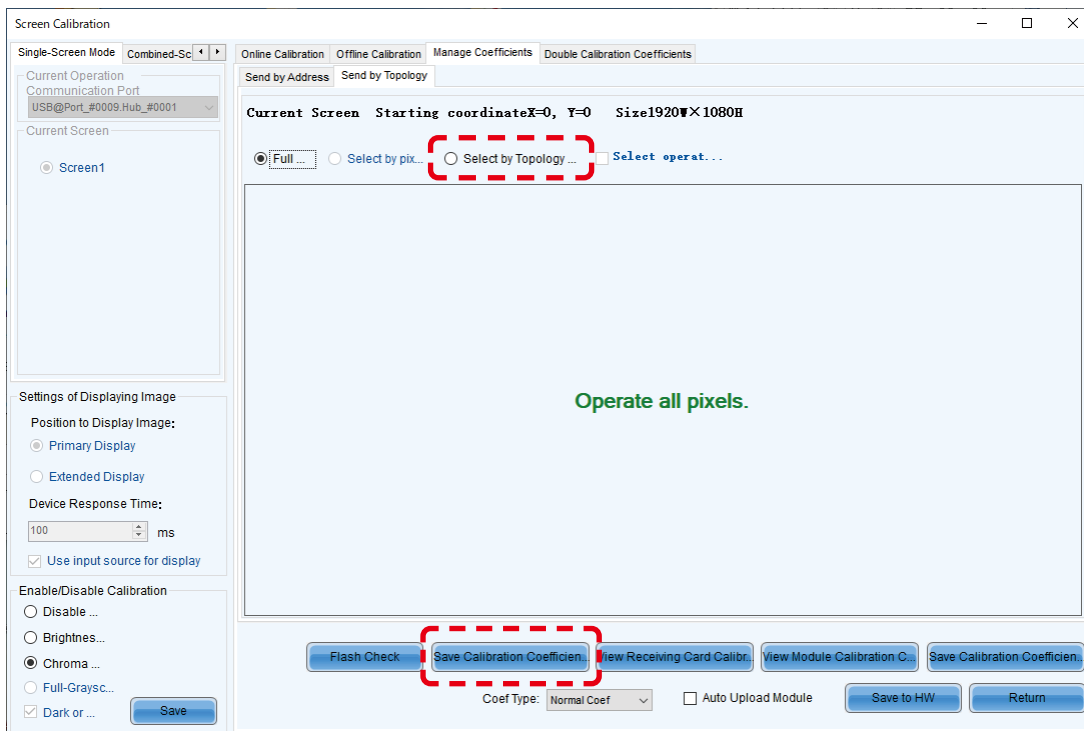
- (1) Select "Calibration".



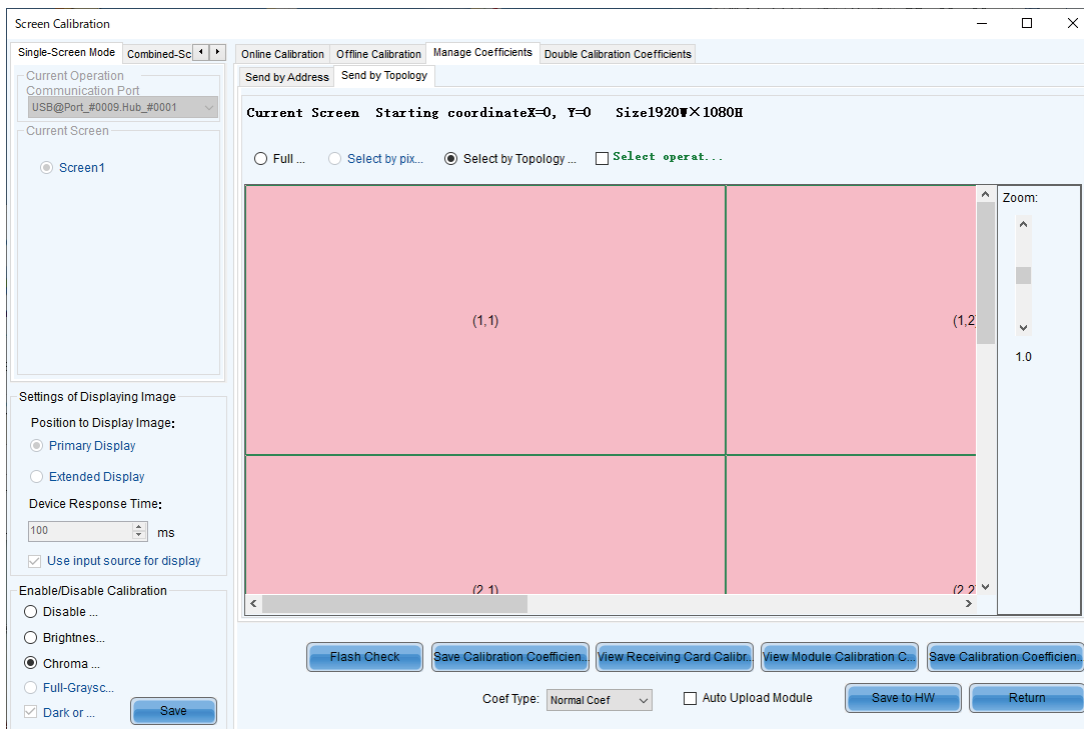
- (2) Click on the NovaLCT window and enter "admin".



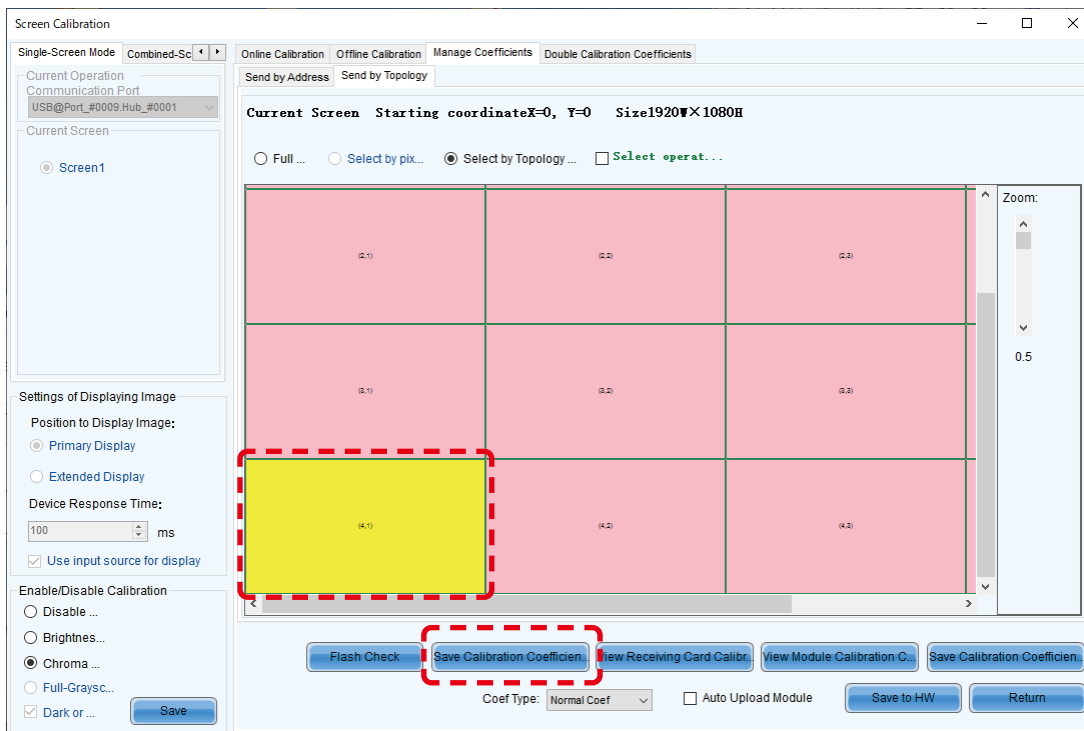
- (3) The "Save Calibration Coefficients to Module" button is displayed.
Select "Select by Topology".



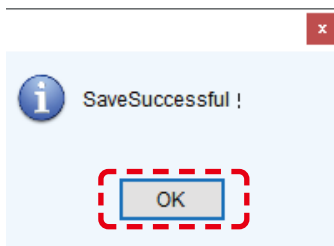
- (4) Select any save target.



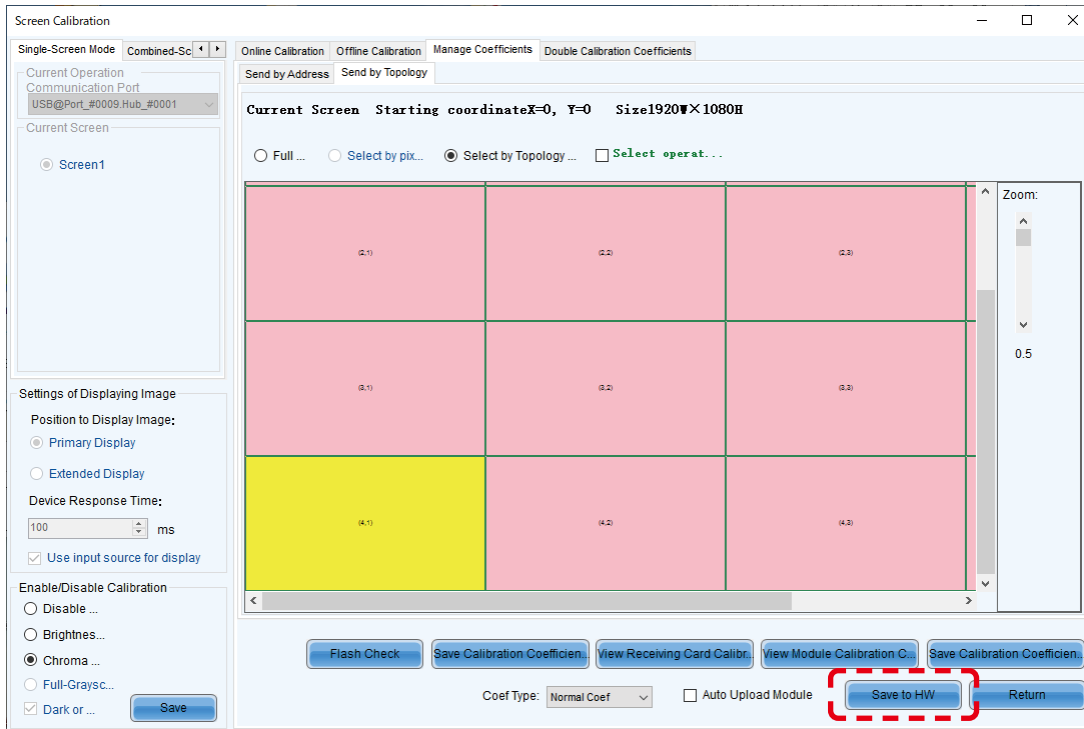
- (5) The color of the selected display changes to yellow.
Click the "Save Calibration Coefficients to Module" button.



- (6) Check the message and click the "OK" button.



(7) Click the "Save to HW" button.



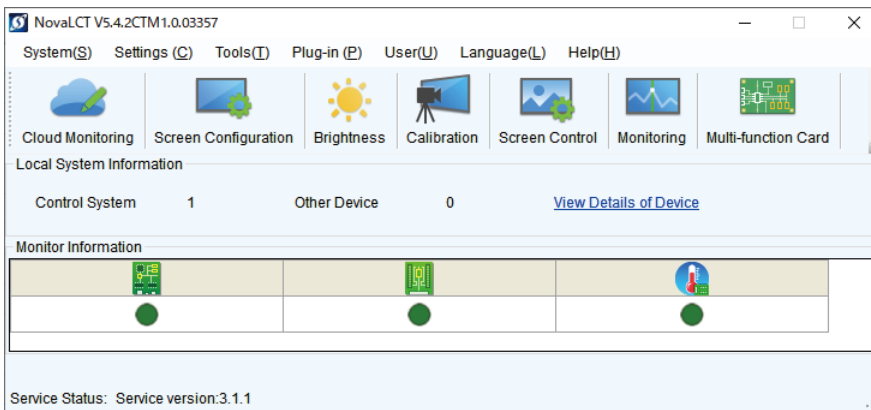
(8) Click the "Return" button.



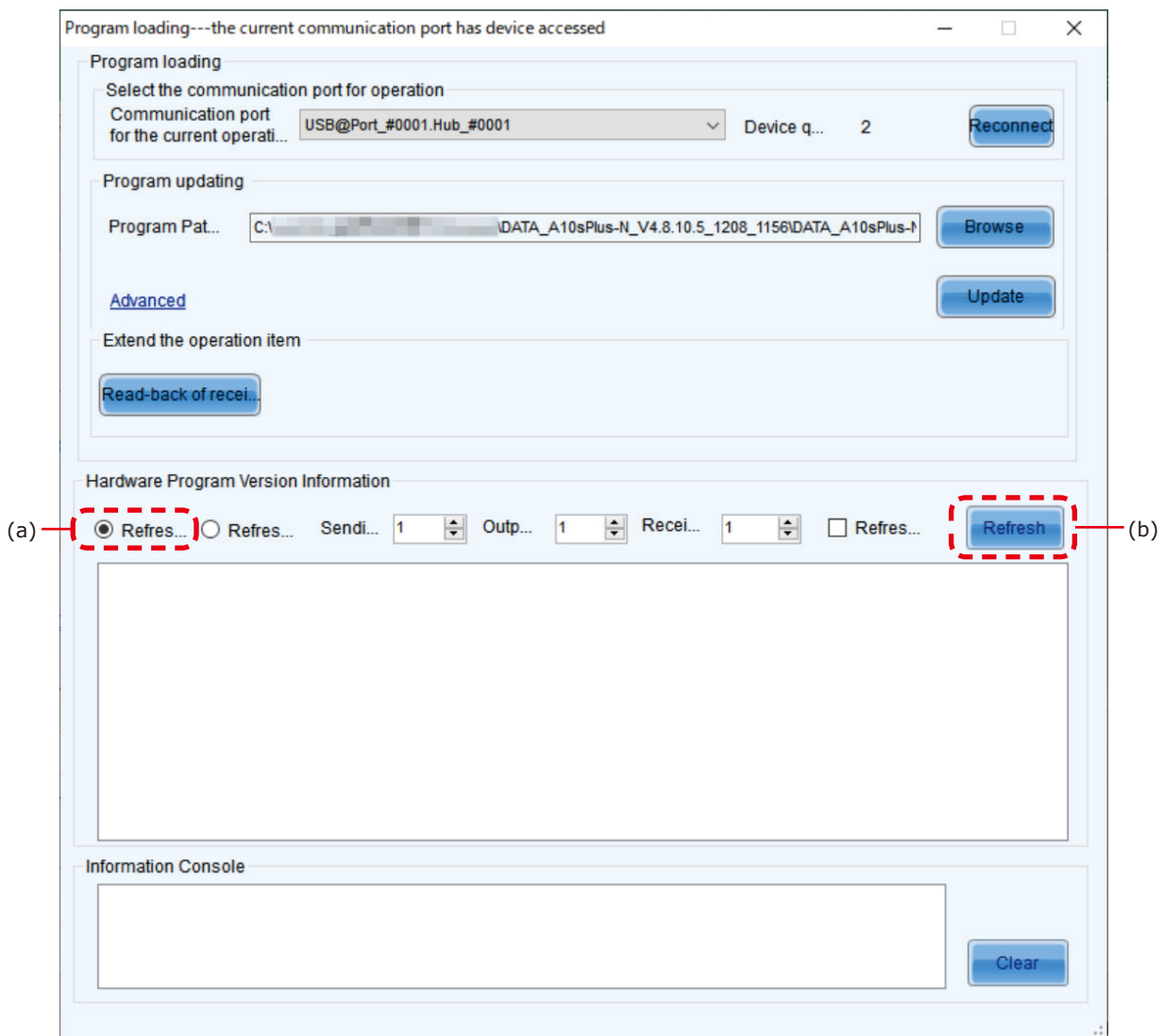
5. Updating the hardware program

Prepare the receiving card hardware program (DATA_*) that will be written to the receiving card. The firmware installed on the receiving card at the factory is stored in the USB memory that comes with the product.

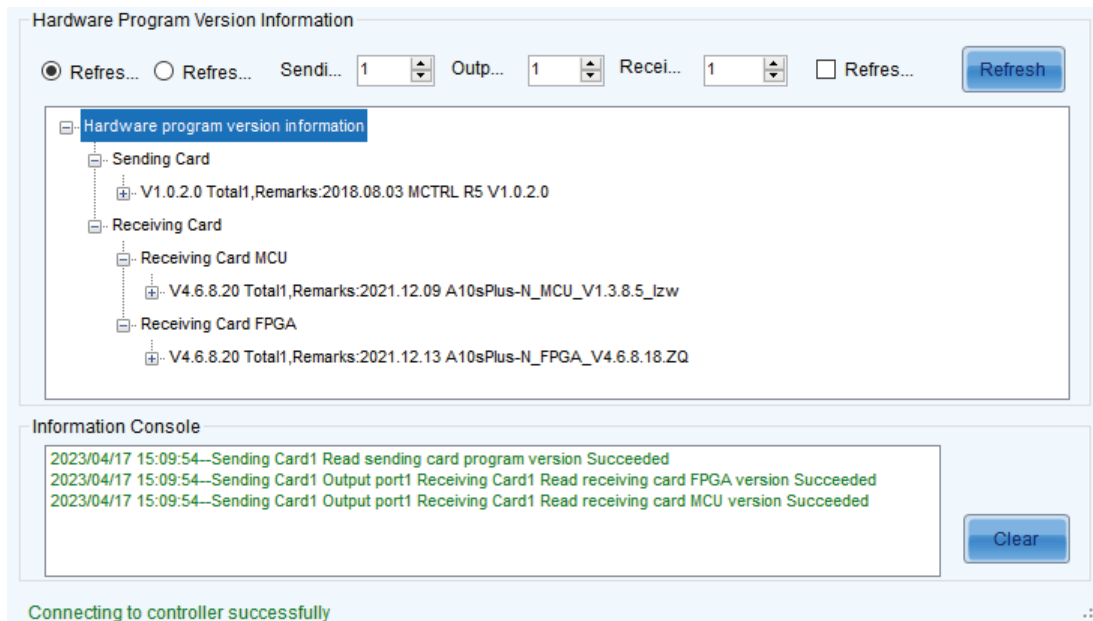
- (1) Start NovaLCT and log in with the administrator privileges ([English-44](#)).
- (2) Click on the NovaLCT window and enter "admin".



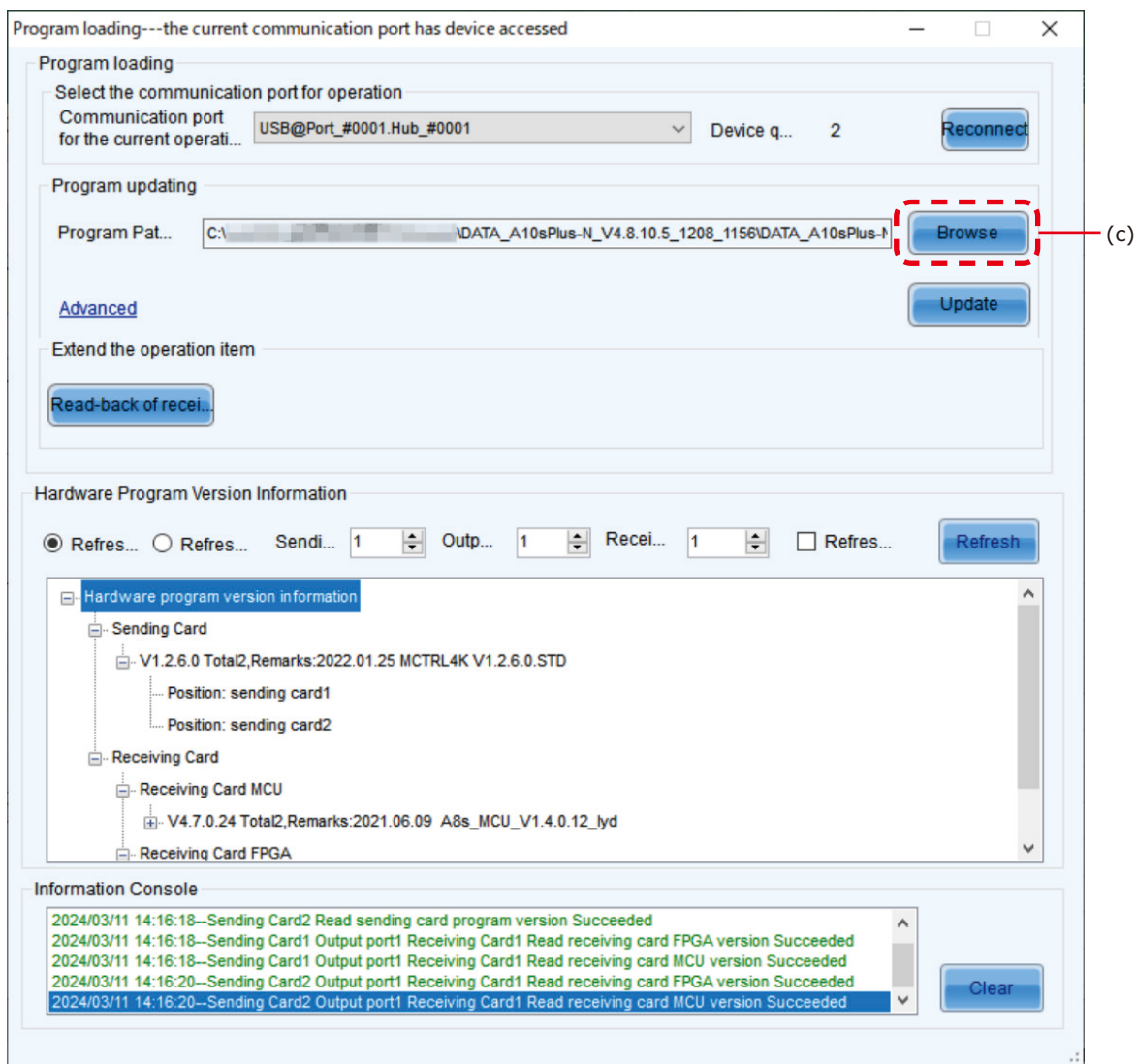
- (3) Select (a) and then click "Refresh" (b).



(4) The connection is established if a screen similar to the following is displayed.



(5) Click "Browse" (c).



- (6) Select the folder that contains the hardware program (for the receiving card) you want to write and click "OK".
- (7) The selected file is displayed in the field (d) below.

Program updating

Program Pat... C:\...DATA_A5sPlus_V4.6.7.56_0814 (d)

Advanced (e)

Extend the operation item

Read-back of recei...

Update (f)

- (8) Click "Advanced" (e).
A screen similar to the following is displayed. Check all files and click "OK".

Select updating file

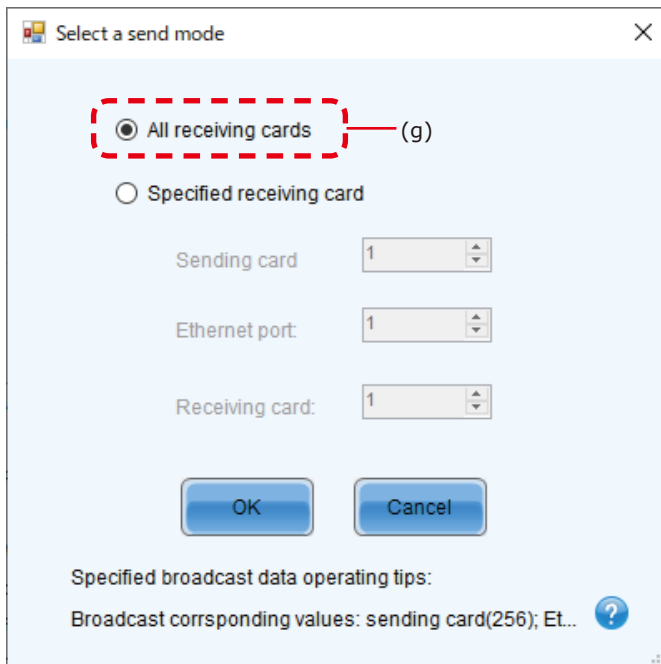
Select file	File type	File name	Version
☒	MCU	A5sPlus_MCU_V1.3.6.2_nda.dat	4.6.7.56
☒	FPGA	A5sPlus_FPGA_V4.6.7.9.dat	4.6.7.56
☒	Font	Font.dat	4.6.7.56
☒	Table	Table.dat	4.6.7.56

OK Cancel

(9) Click "Update" (f).

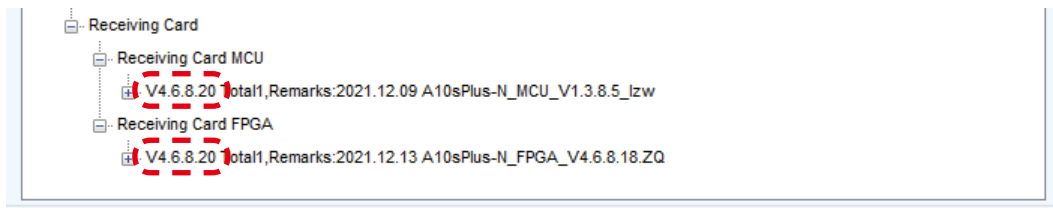
A screen similar to the following is displayed. Select the receiving card to which to write the hardware program.

To update all receiving cards, select "All receiving cards" (g) and click "OK".



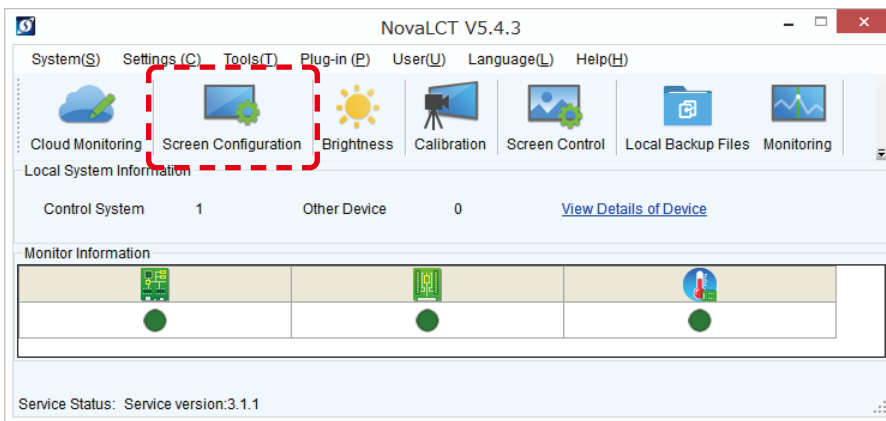
(10) The hardware program update is complete.

Click "Refresh" (b) and check that the version has been updated to the update version.

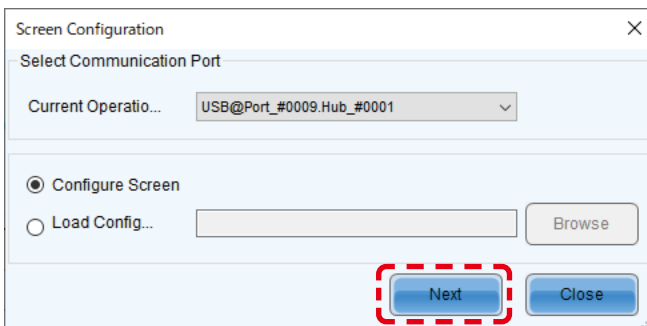


6. Saving the configuration data

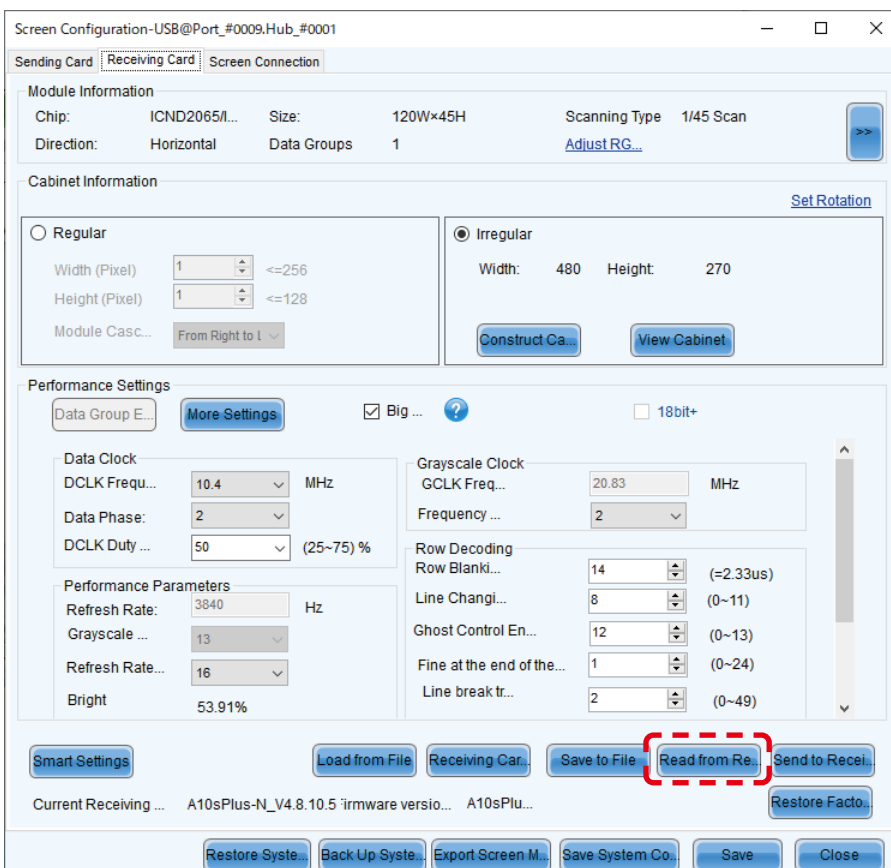
(1) Select "Screen Configuration".



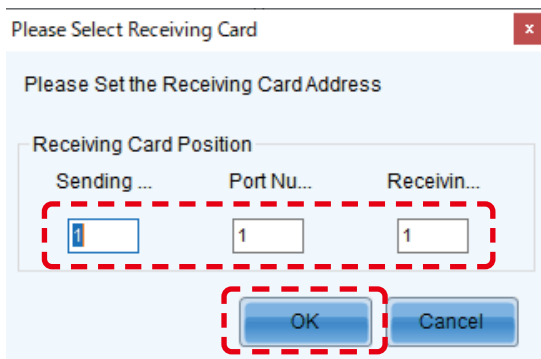
(2) Click the "Next" button.



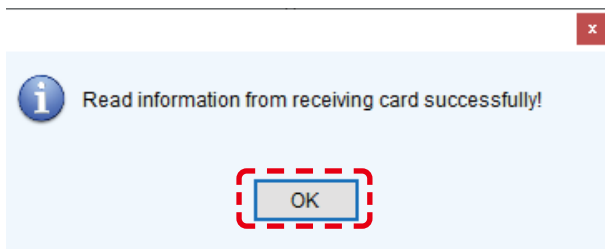
(3) Click the "Read from Receiving Card" button.



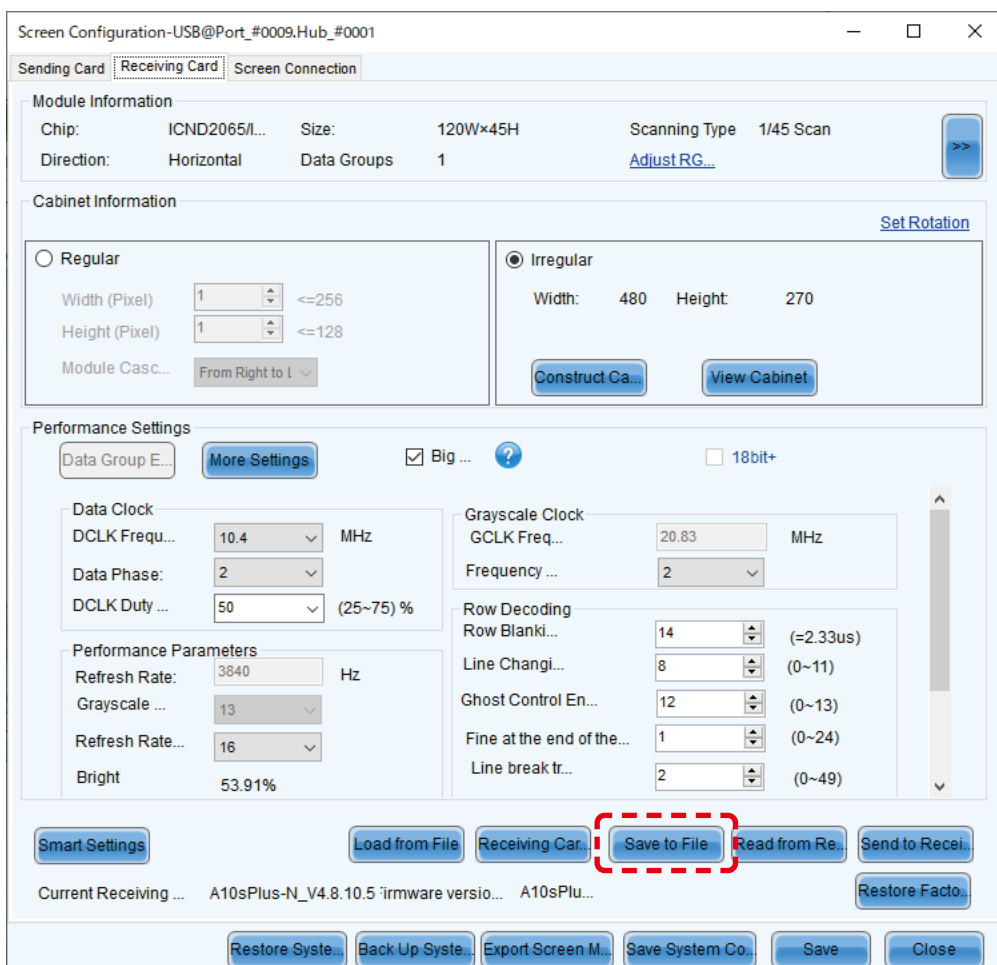
- (4) Set the "Sending Card", "Port Number", and "Receiving Card" values according to the position of the receiving card from which to read the data.
Click the "OK" button.



- (5) Check the message and click the "OK" button.



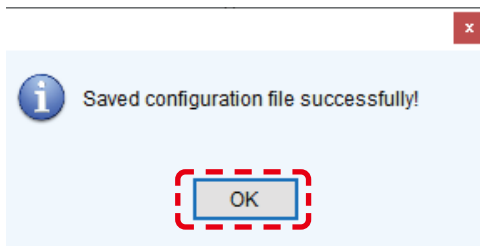
- (6) Click the "Save to File" button.



(7) Choose any name and save the file.



(8) Check the message and click the "OK" button.

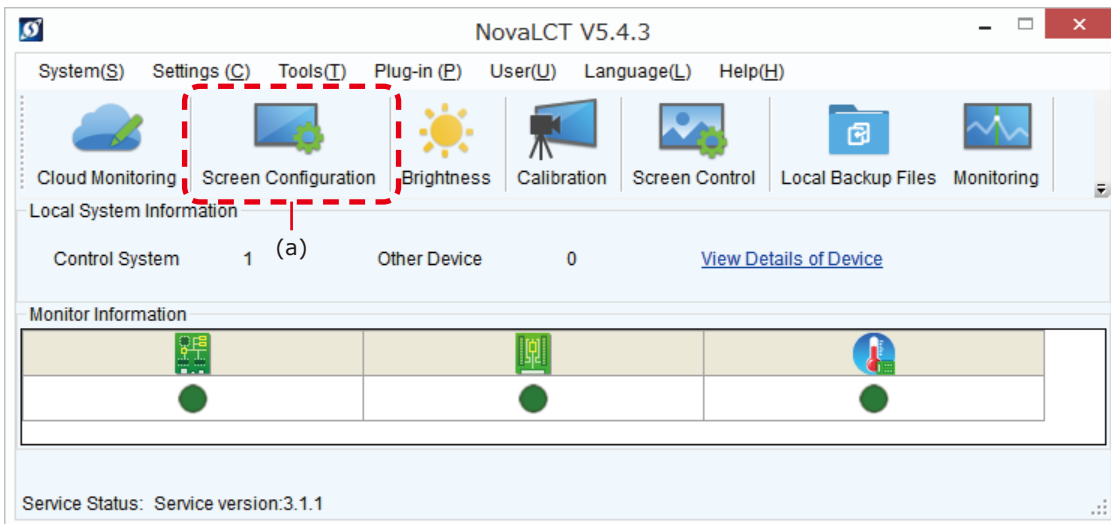


7. Updating the configuration data

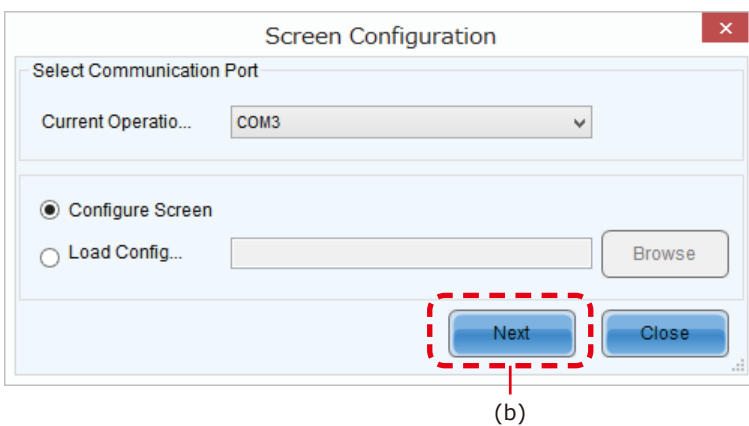
Prepare the configuration file (*.rcfgx) that will be written to the receiving card.

The configuration file (*.rcfgx) installed on the receiving card at the factory is stored in the USB memory that comes with the product.

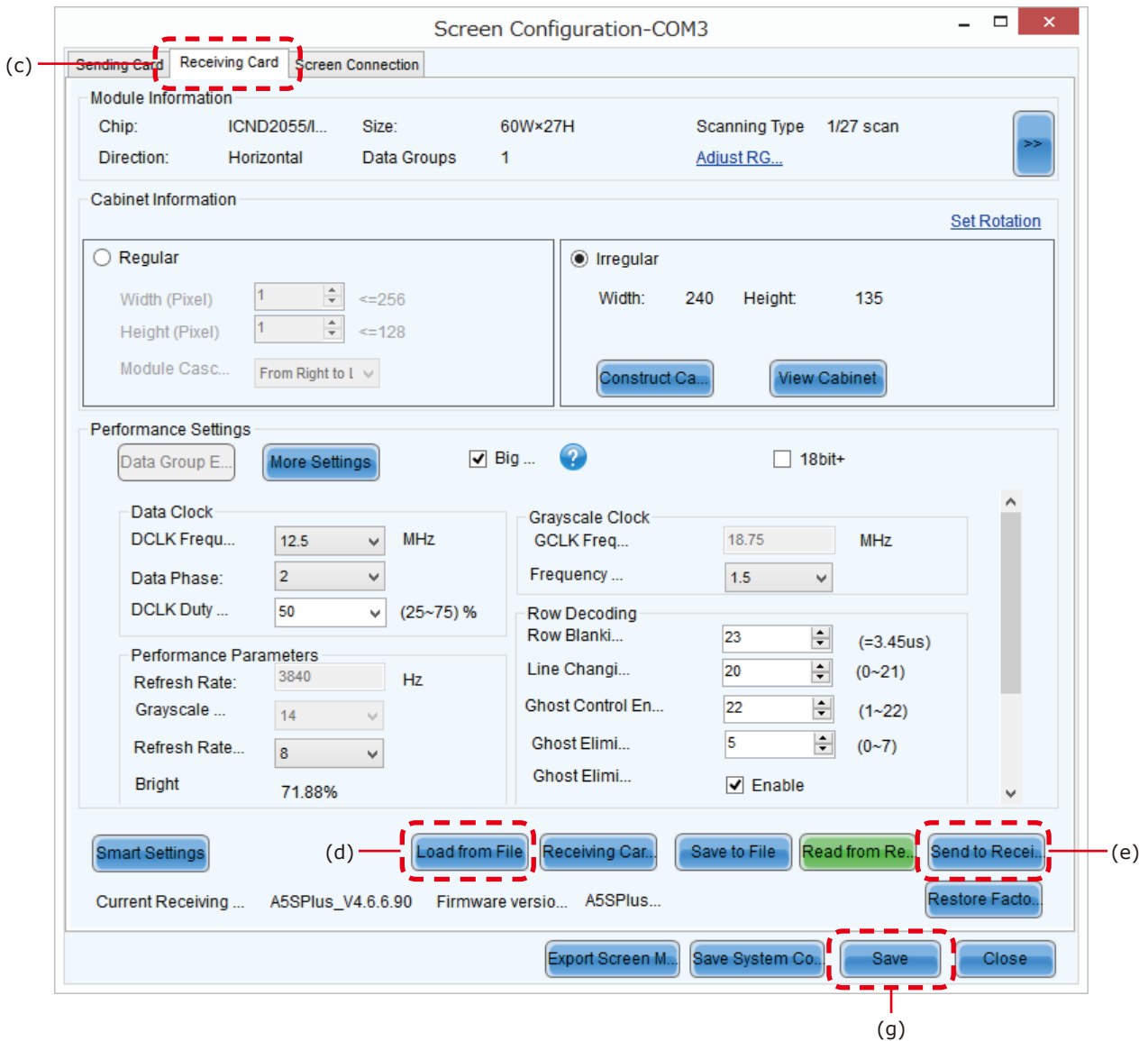
- (1) Start NovaLCT and log in with the administrator privileges ([English-44](#)).
- (2) Click "Screen Configuration" (a).



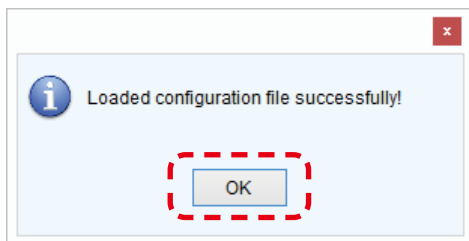
- (3) Click "Next" (b).



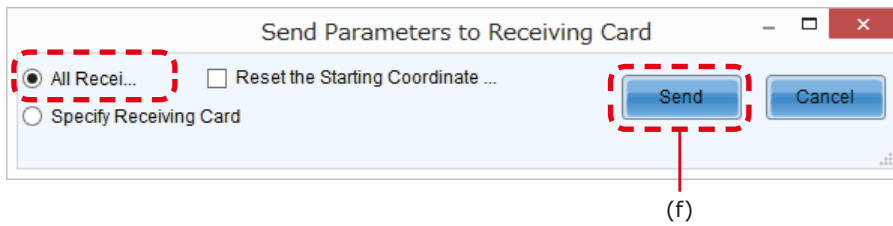
- (4) On the Screen Configuration screen that is displayed, select the "Receiving Card" tab (c).



- (5) Click "Load from File" (d).
 Select the configuration file (rcfgx file) you want to write to the receiving card.
 A screen similar to the following is displayed when the reading process is complete. Click "OK".



- (6) Click "Send to Receiving Card" (e).
A screen similar to the following is displayed. Select the receiving card to which you want to write the configuration file.
(Select "All Receiving Cards" if only the receiving card to which you want to write the data is connected.)



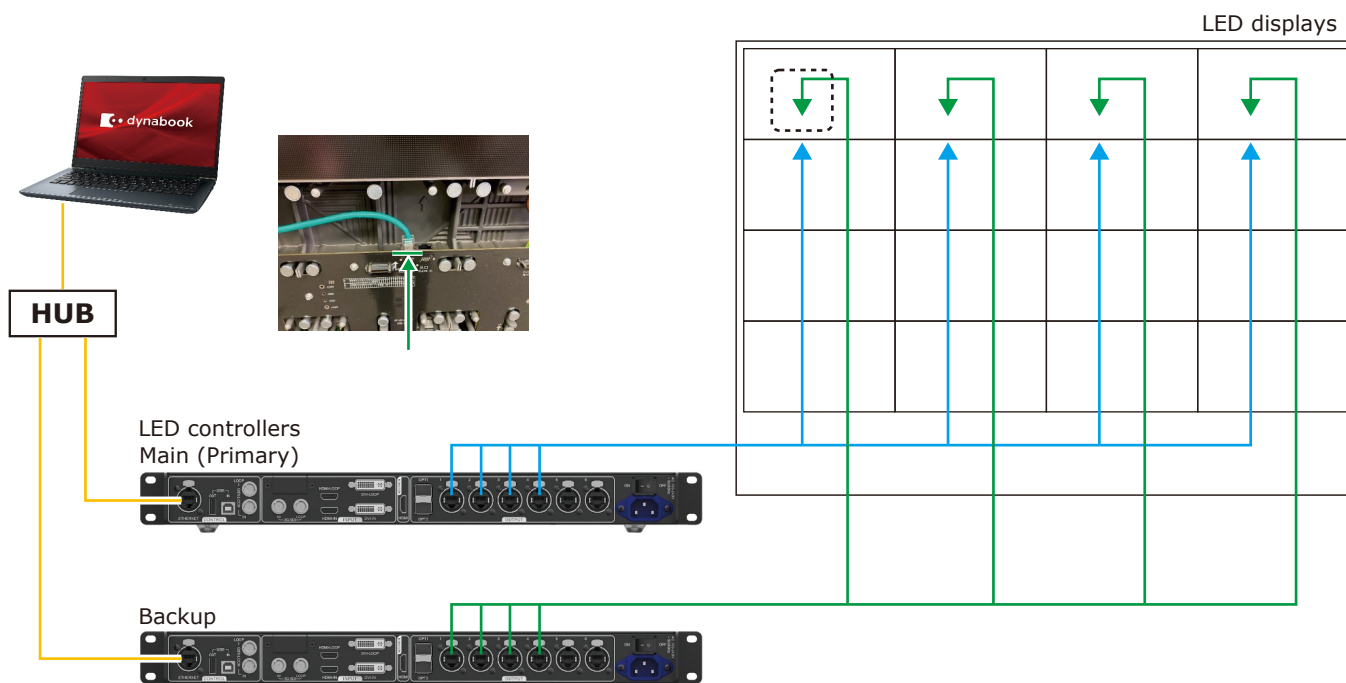
- (7) After selecting the receiving card, click "Send" (f).
Click "Save" (g).

8. Redundancy setting method

8.1 Configuring the settings with two LED controllers connected to the PC using LAN cables

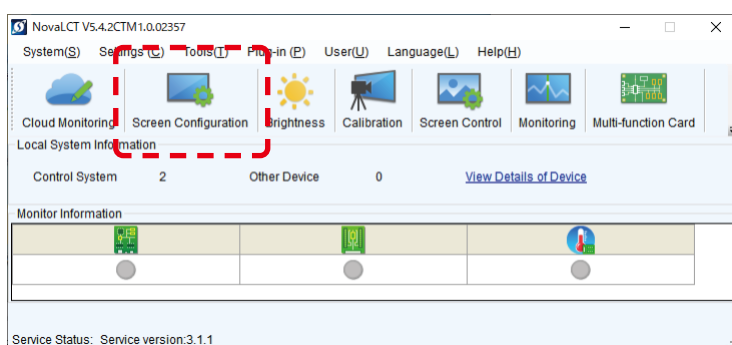
Connect the LED controllers and the LED displays with LAN cables.

Terminate the Backup system connection at the RJ-45 connector located top left on the last display in the daisy chain connection.



* For the MCTRL 4K LED controller, the way to make connections is similar to this example.

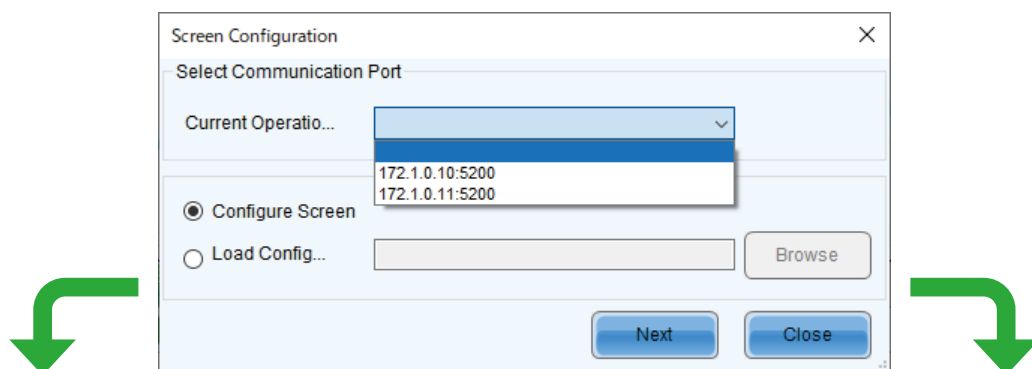
Start the control software NovaLCT and log in with the administrator privileges ([English-44](#)). Click "Screen Configuration".



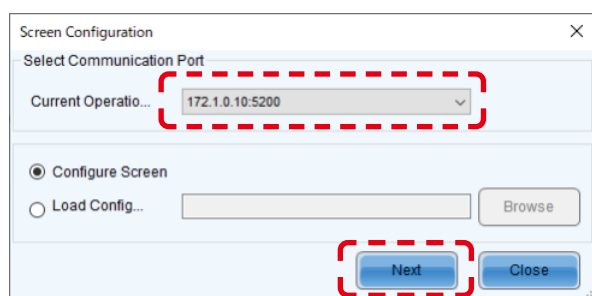
Communication Port	Device Type	Number of Devices	SN
172.1.0.10:5200	MCTRL4K	1	002CF7010000...
172.1.0.11:5200	MCTRL4K	1	002CFD010000...

Check the port in "Select Communication Port", select the Main (Primary) and Backup system LED controllers by their IP address, and then click "Next".

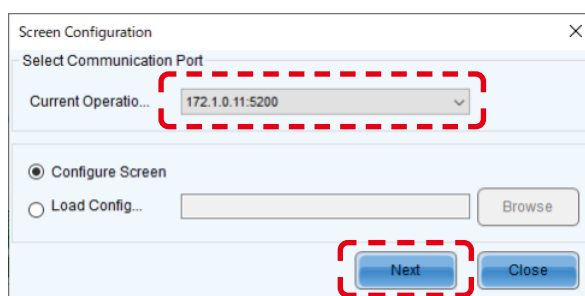
Configure the settings for the Main (Primary) controller and Backup controller separately.



Main (Primary)



Backup

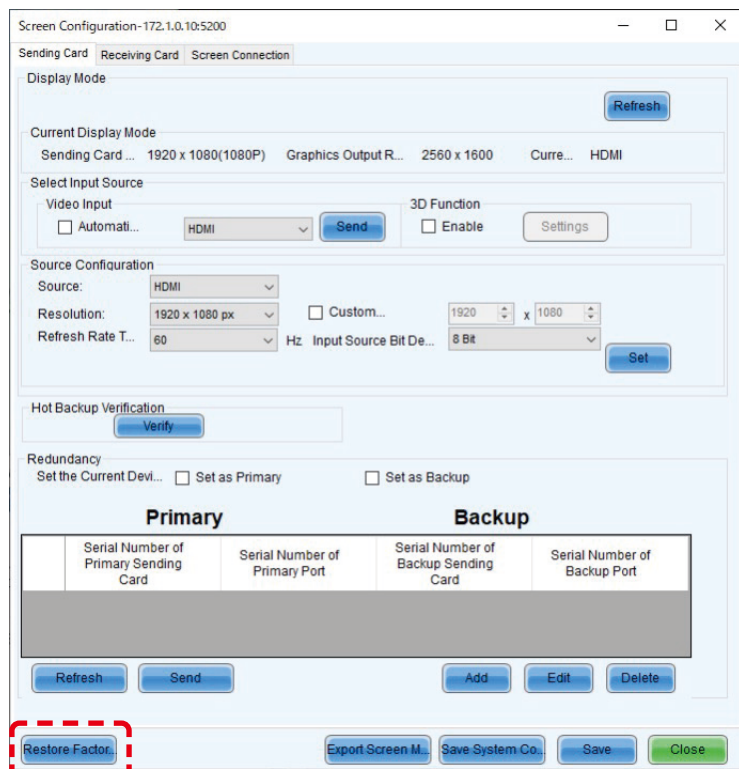


On the Main (Primary) side

Click the "Restore Factory Settings" button for initialization.

After initialization, configure the settings for "Select Input Source" and "Source Configuration".

If the factory setting is correctly configured and the device connection is the same as when the factory setting was configured, check the settings without performing initialization.



Main (Primary)

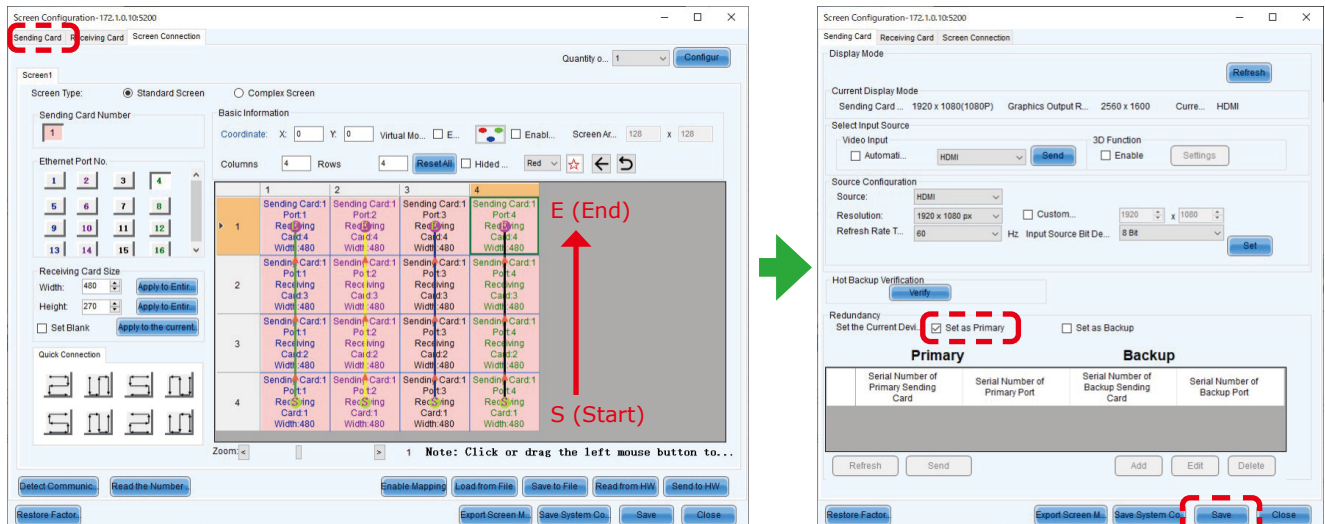
Select the Screen Connection tab.

Select/enter the value for "Screen Type", "Receiving Card Size", "Columns" and "Rows", and use "Ethernet Port No." and the screen configuration section to configure the connection.

* For details of the configuration procedure, refer to the User's Manual.

Next, select the Sending Card tab.

Go to "Redundancy", select the checkbox for "Set as Primary" and click "Save".

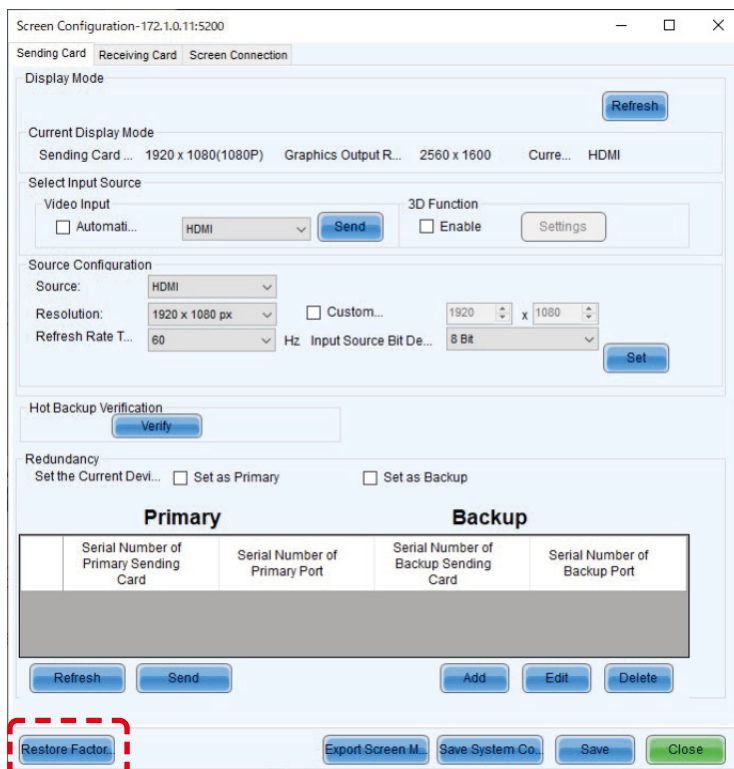


On the Backup side

Click the "Restore Factory Settings" button for initialization.

After initialization, configure the settings for "Select Input Source" and "Source Configuration".

If the factory setting is correctly configured and the device connection is the same as when the factory setting was configured, check the settings without performing initialization.



Backup

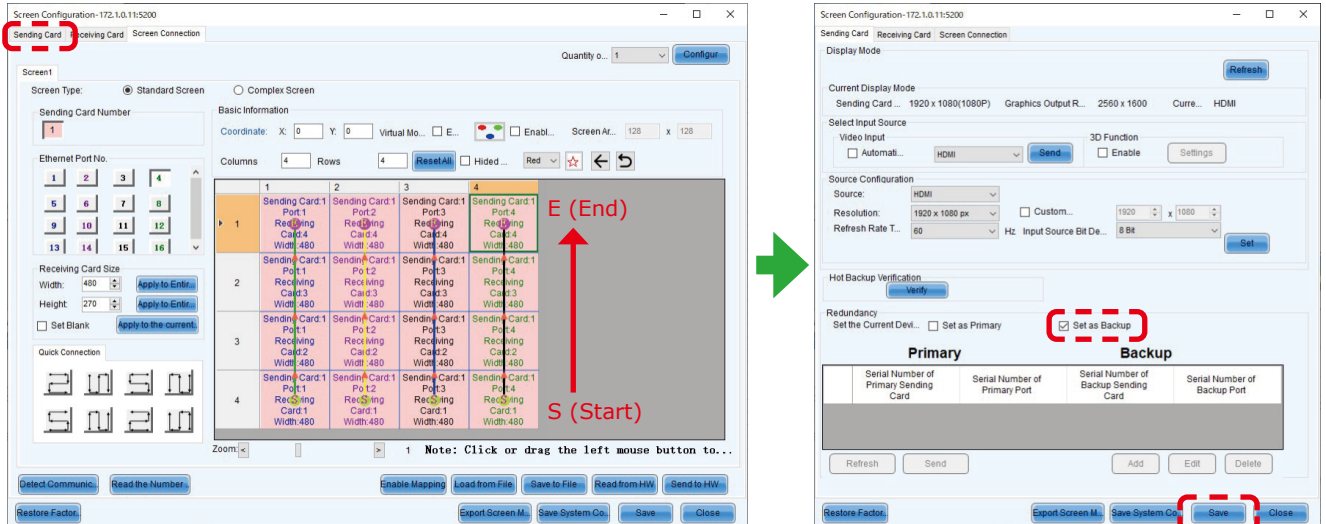
Select the Screen Connection tab.

Configure the connection in the same way as for Main (Primary).

* The direction of connection is the same as for Main (Primary).

Next, select the Sending Card tab.

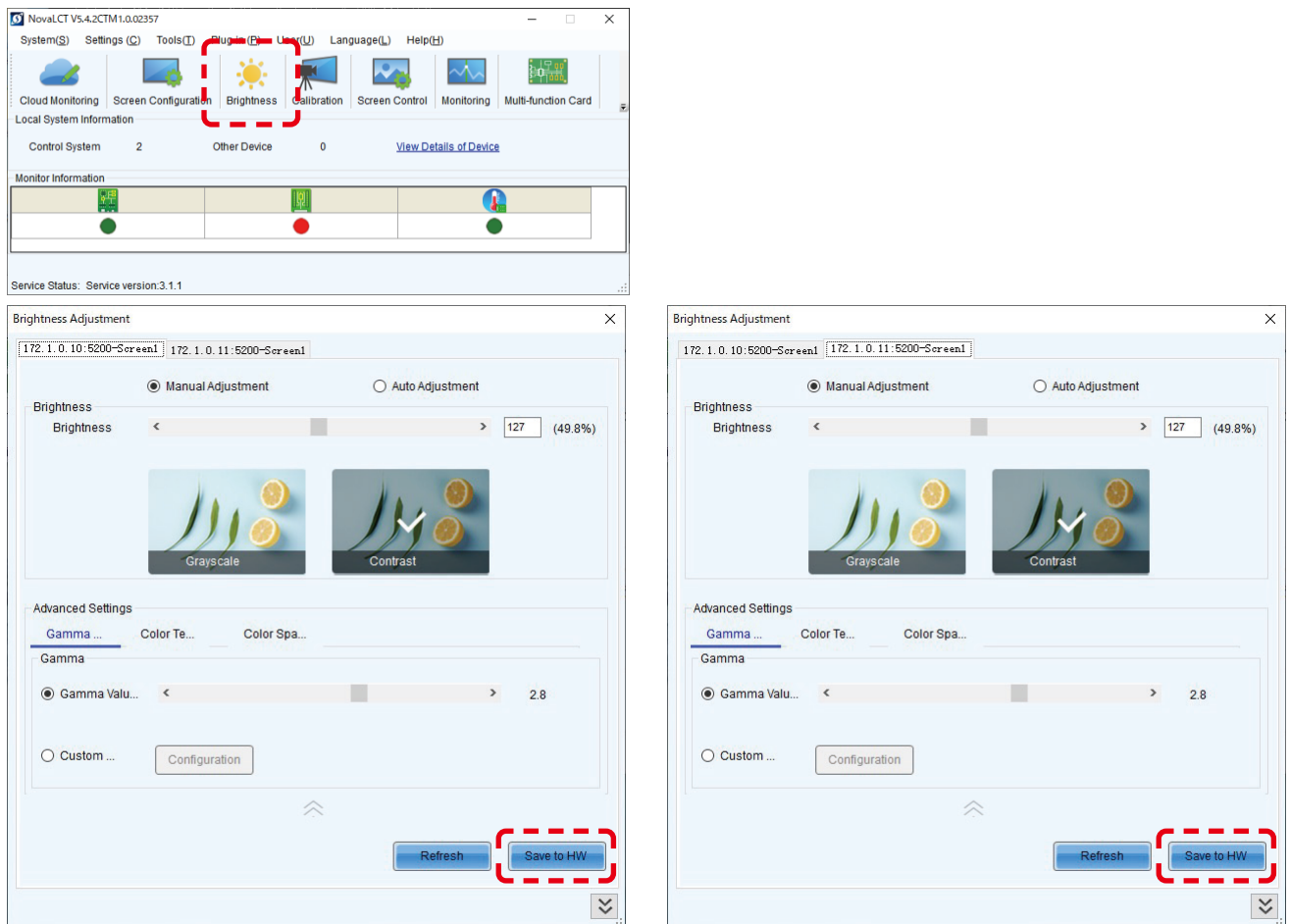
Go to "Redundancy", select the checkbox for "Set as Backup" and click "Save".



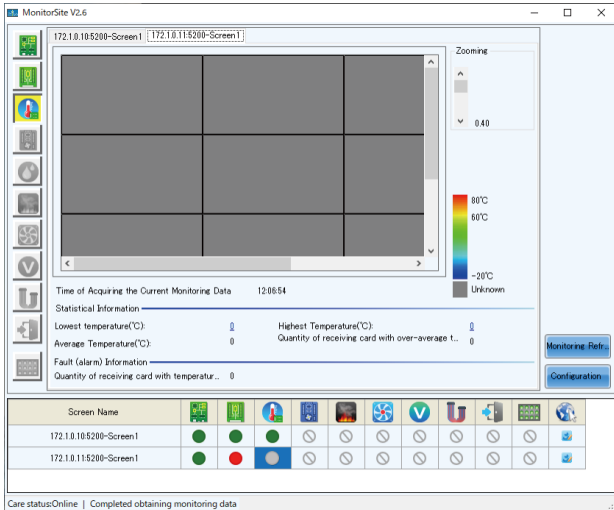
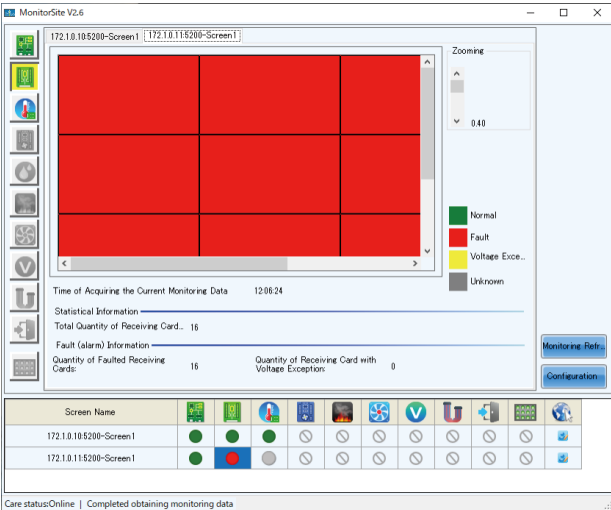
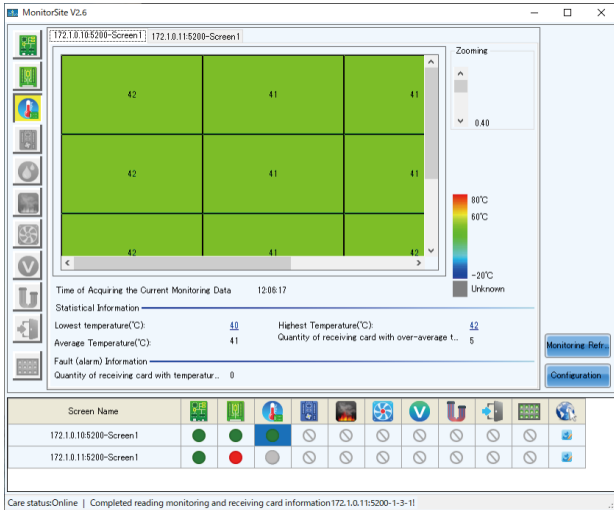
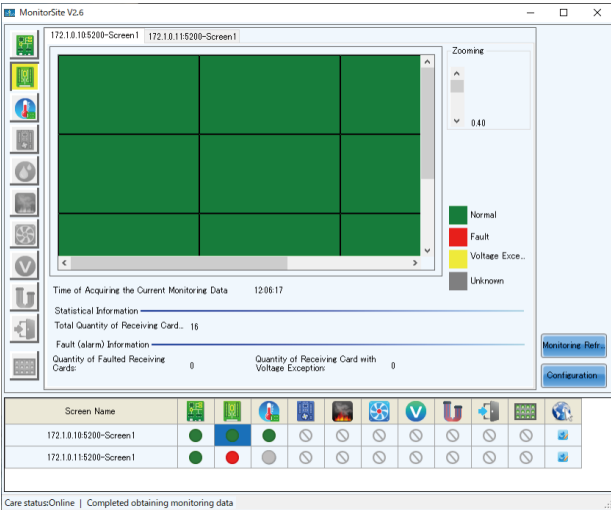
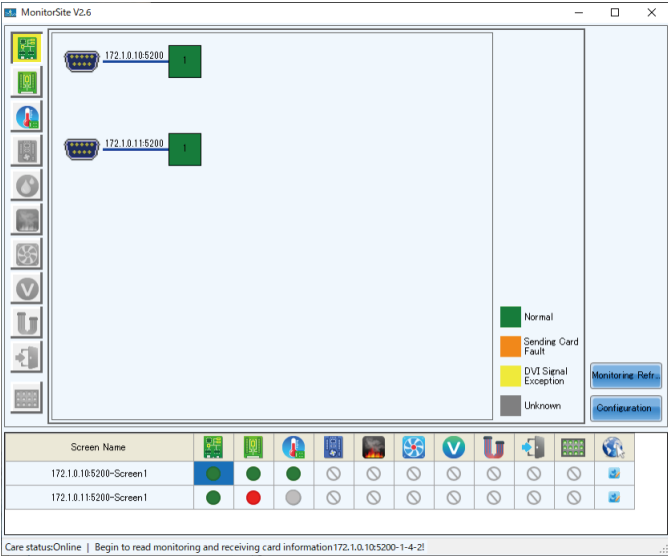
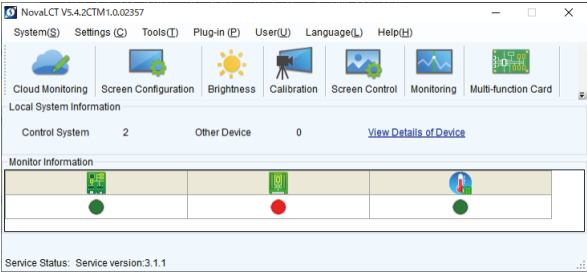
Check the current brightness setting.

Click the "Brightness" button.

In the Brightness Adjustment screen, set the desired brightness value and click the "Save to HW" button.



The monitoring screens appear like below.

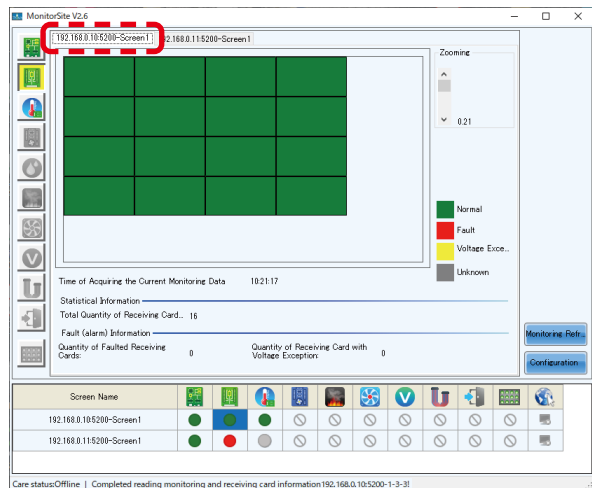


Note: On the monitoring screen, the LED displays configured as “Backup” are displayed in red color (this is not an indication of a fault).

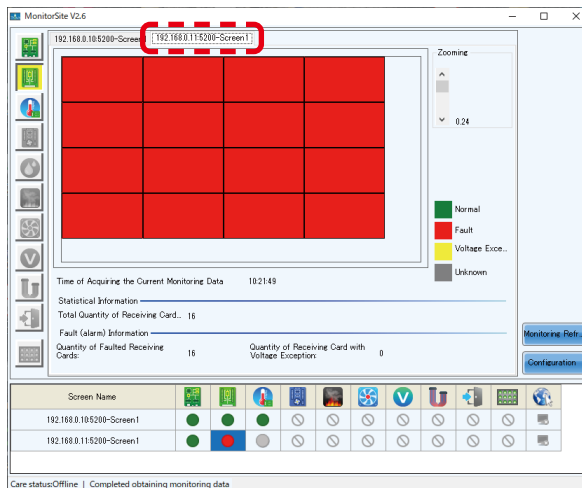
If a fault occurs on displays configured as “Main (Primary)”, “Backup” displays are displayed in green color, which is an indication of normal state.

“Main (Primary)” displays are operating normally

Main (Primary)

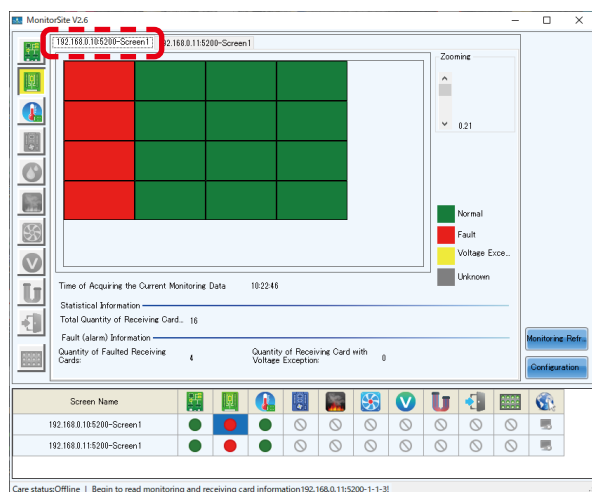


Backup

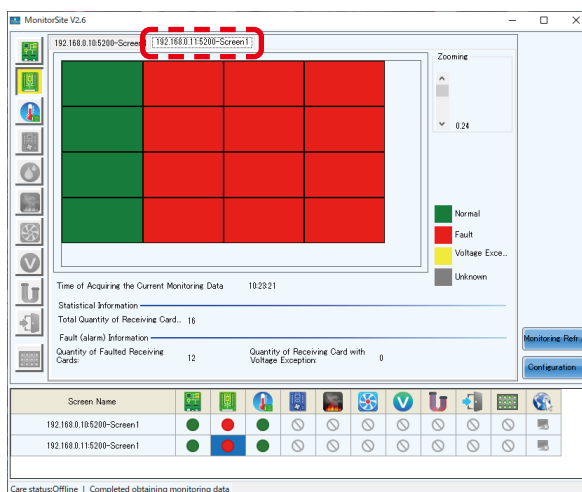


Displays connected to port 1 are operating as “Backup”.

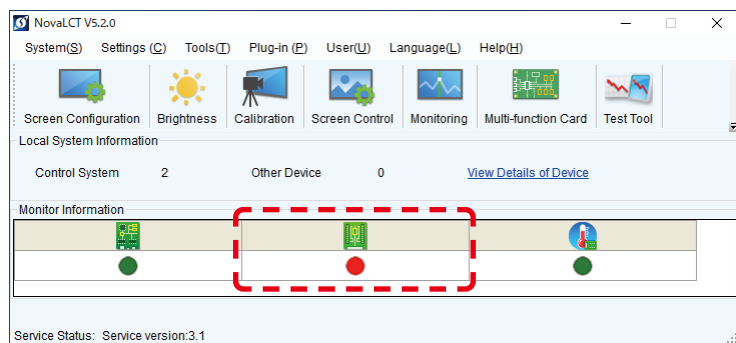
Main (Primary)



Backup



In the start-up screen of NovaLCT, the status indicator circle for “Monitor Information” receiving card becomes red in color.



In the case of MCTRL 4K, the display of the LED controllers is as follows.

(This example display is for the case of connection using four Ethernet cables.)

Upper: Backup

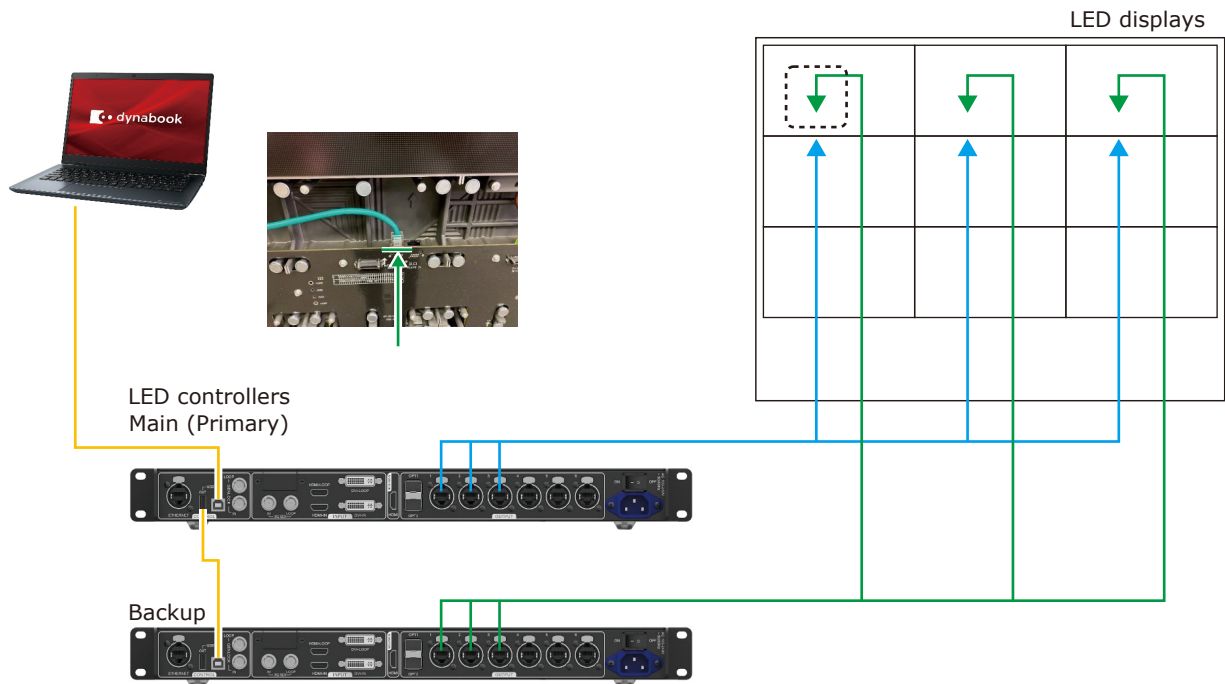
Lower: Main (Primary)



8.2 Configuring the settings with two LED controllers connected to the PC using USB cables

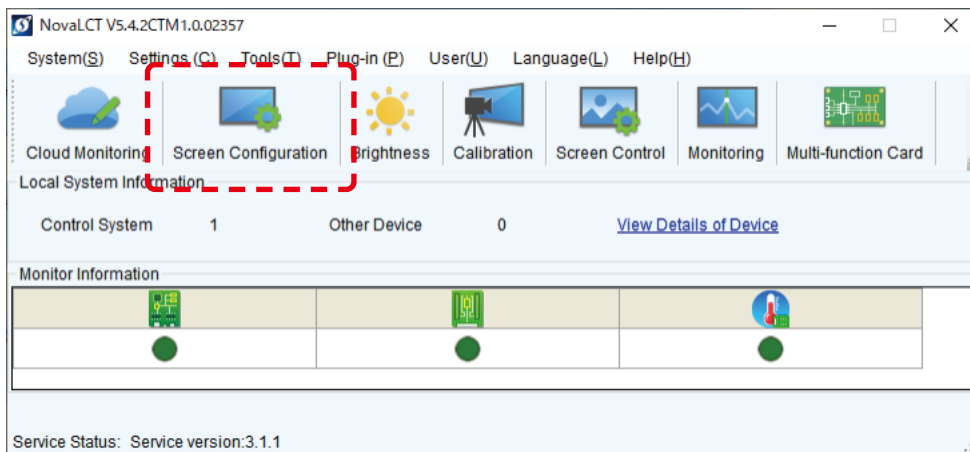
Connect the LED controllers and the LED displays with LAN cables.

Terminate the Backup system connection at the RJ-45 connector located top left on the last display in the daisy chain connection.

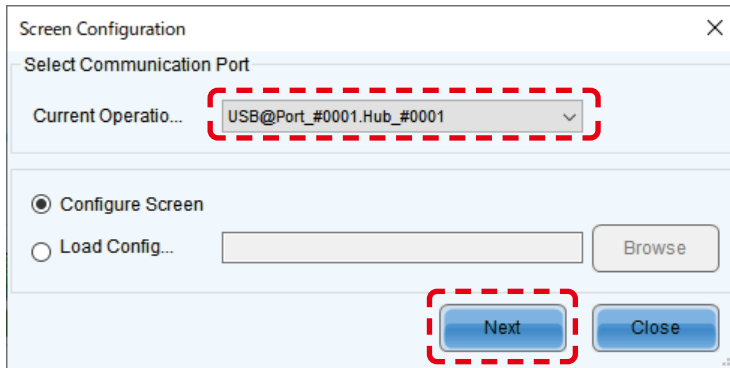


* For the MCTRL 4K LED controller, the way to make connections is similar to this example.

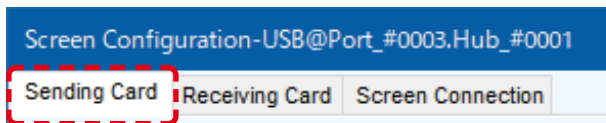
Start the control software NovaLCT and log in with the administrator privileges ([English-44](#)). Click "Screen Configuration".



Select the port in "Select Communication Port", and then click "Next".



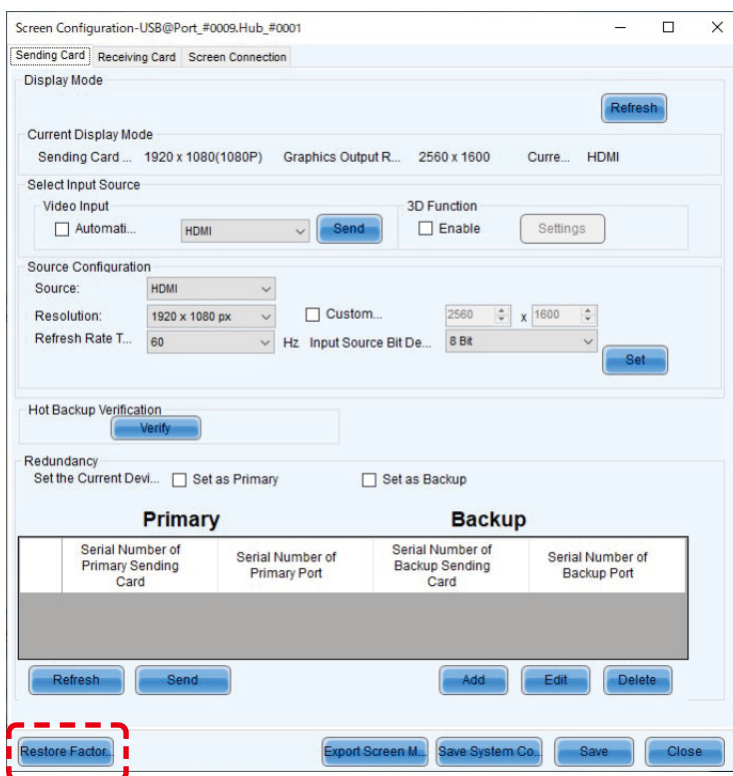
In the Screen Configuration screen that is displayed, select the "Sending Card" tab.



Click the "Restore Factory Settings" button for initialization.

After initialization, configure the settings for "Select Input Source" and "Source Configuration".

If the factory setting is correctly configured and the device connection is the same as when the factory setting was configured, check the settings without performing initialization.



Select the Screen Connection tab.

Select/enter the value for "Screen Type", "Receiving Card Size", "Columns" and "Rows", and use "Ethernet Port No." and the screen configuration section to configure the connection.

* For details of the configuration procedure, refer to the User's Manual.

Screen Configuration-USB@Port_#0009.Hub_#0001

Sending Card Receiving Card **Screen Connection**

Quantity 1 **Configure**

Screen1

Screen Type: ☒ Standard Screen ☐ Complex Screen

Sending Card Number: 1 2

Ethernet Port No.: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

Receiving Card Size: Width: 480 Height: 270

Quick Connection: [Icons]

Basic Information: Coordinate: X: 0 Y: 0 Virtual Mo... ☐ E... ☐ Enabl... Screen Ar... 2560 x 1600

Columns: 3 Rows: 3 **Reset All** ☐ Hided... Red ☐ ☐ ☐

Table:

	1	2	3
1	Sending Card:1 Port:1 Receiving Card:3 Width:480	Sending Card:1 Port:2 Receiving Card:3 Width:480	Sending Card:1 Port:3 Receiving Card:3 Width:480
2	Sending Card:1 Port:1 Receiving Card:2 Width:480	Sending Card:1 Port:2 Receiving Card:2 Width:480	Sending Card:1 Port:3 Receiving Card:2 Width:480
3	Sending Card:1 Port:1 Receiving Card:1 Width:480	Sending Card:1 Port:2 Receiving Card:1 Width:480	Sending Card:1 Port:3 Receiving Card:1 Width:480

Detect Communic... **Read the Number...** **Enable Mapping** **Load from File** **Save to File** **Read from HW** **Send to HW**

Restore Factor **Export Screen M...** **Save System Co...** **Save** **Close**

Notes on the setting operation:

Make sure that the value of "Quantity of Screens" is 1.

(To change a different value to 1, click the "Configure" button.)

It is not necessary to configure the settings for Sending Card 2.

When the settings configuration is complete, click the "Send to HW" button.

Select the Sending Card tab and click "Add".

The Redundancy Settings screen is displayed.

Screen Configuration-USB@Port_#0009.Hub_#0001

Sending Card Receiving Card Screen Connection

Display Mode: **Refresh**

Current Display Mode: Sending Card ... 1920 x 1080(1080P) Graphics Output R... 2560 x 1600 Curre... HDMI

Select Input Source: Video Input: ☐ Automati... HDMI **Send** 3D Function: ☐ Enable **Settings**

Source Configuration: Source: HDMI Resolution: 1920 x 1080 px ☐ Custom... 2560 x 1600 Refresh Rate T... 60 Hz Input Source Bit De... 8 Bit **Set**

Hot Backup Verification: **Verify**

Redundancy: Set the Current Dev... ☒ Set as Primary ☐ Set as Backup

Primary **Backup**

Serial Number of Primary Sending Card	Serial Number of Primary Port	Serial Number of Backup Sending Card	Serial Number of Backup Port

Refresh **Send** **Add** **Edit** **Delete**

Restore Factor **Export Screen M...** **Save System Co...** **Save** **Close**



Redundancy Settings

Serial Number of Primar... 1 Serial Number of Backu... 1

Serial Number of Primar... 1 Serial Number of Backu... 2

Add **Close**

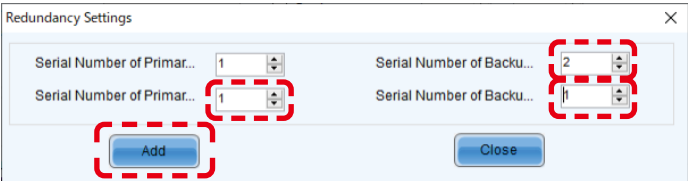
In the Redundancy Settings screen, set the Port number of the Backup side LED controller (Sending Card) that matches the Port number of the Primary side LED controller (Sending Card).
After entering the value, click the “Add” button.

In the LED configuration example ([English-159](#)), the settings are as follows.

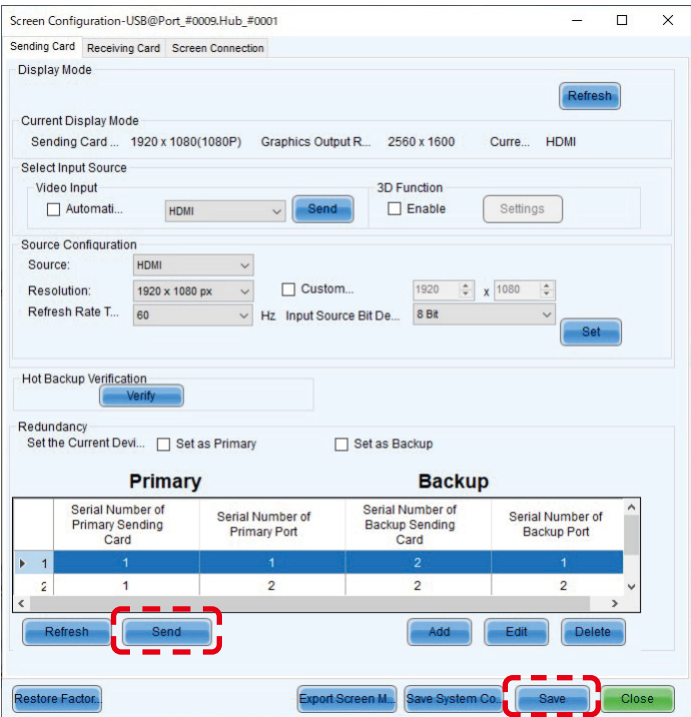
Serial Number of Primary Sending Card : 1
Serial Number of Primary Port : 1
Serial Number of Backup Sending Card : 2
Serial Number of Backup Port : 1

Serial Number of Primary Sending Card : 1
Serial Number of Primary Port : 2
Serial Number of Backup Sending Card : 2
Serial Number of Backup Port : 2

Serial Number of Primary Sending Card : 1
Serial Number of Primary Port : 3
Serial Number of Backup Sending Card : 2
Serial Number of Backup Port : 3



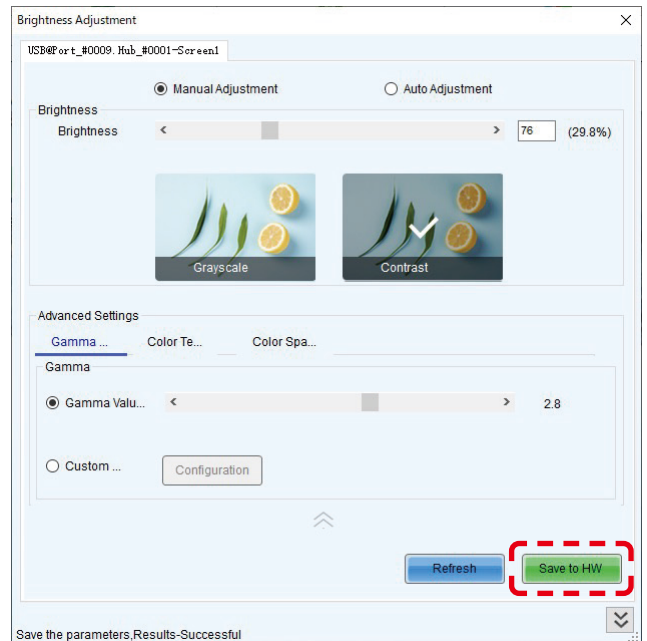
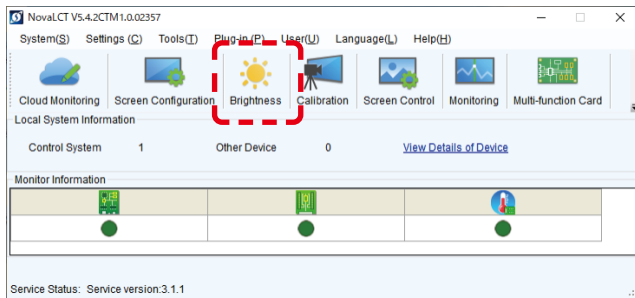
When the settings configuration is complete, the Sending Card tab appears like below.
Click the “Send” button.
Click the “Save” button.



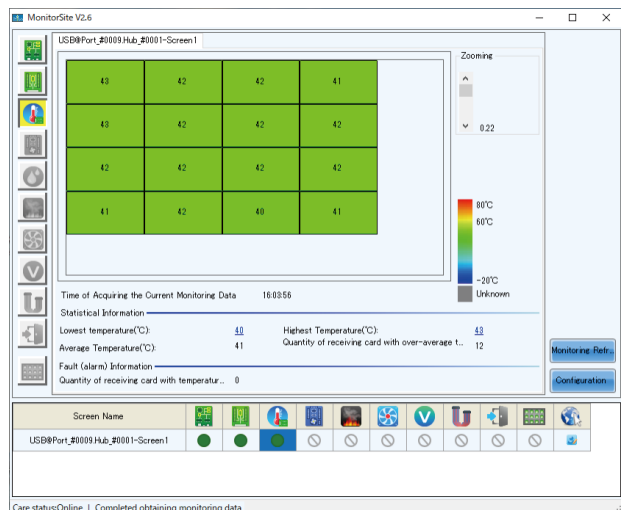
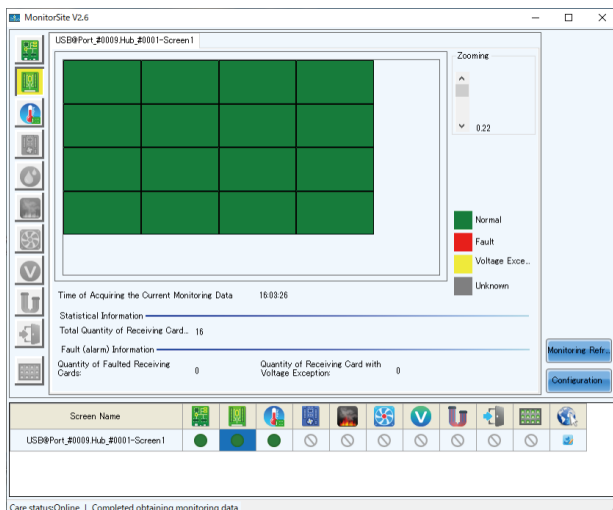
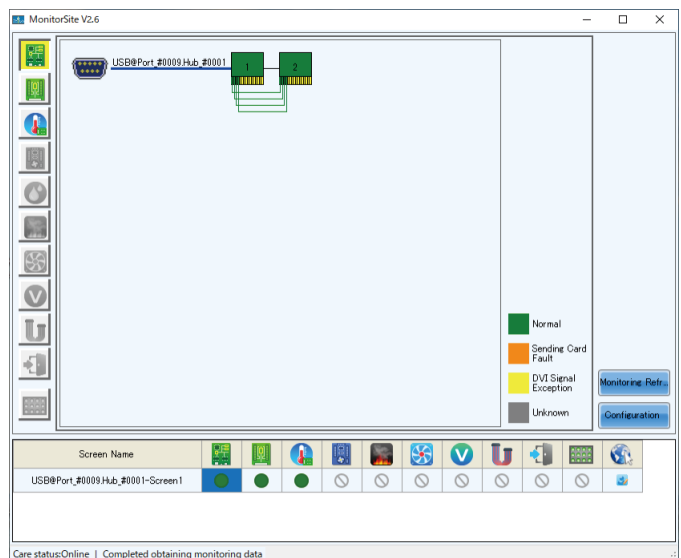
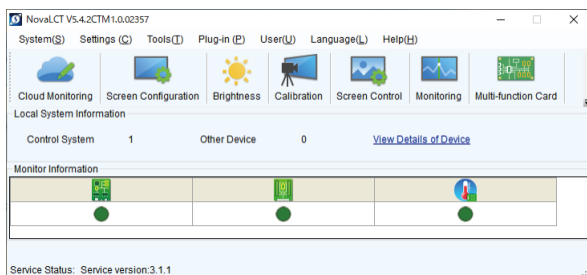
Check the current brightness setting.

Click the "Brightness" button.

In the Brightness Adjustment screen, set the desired brightness value and click the "Save to HW" button.



The monitoring screens appear like below.



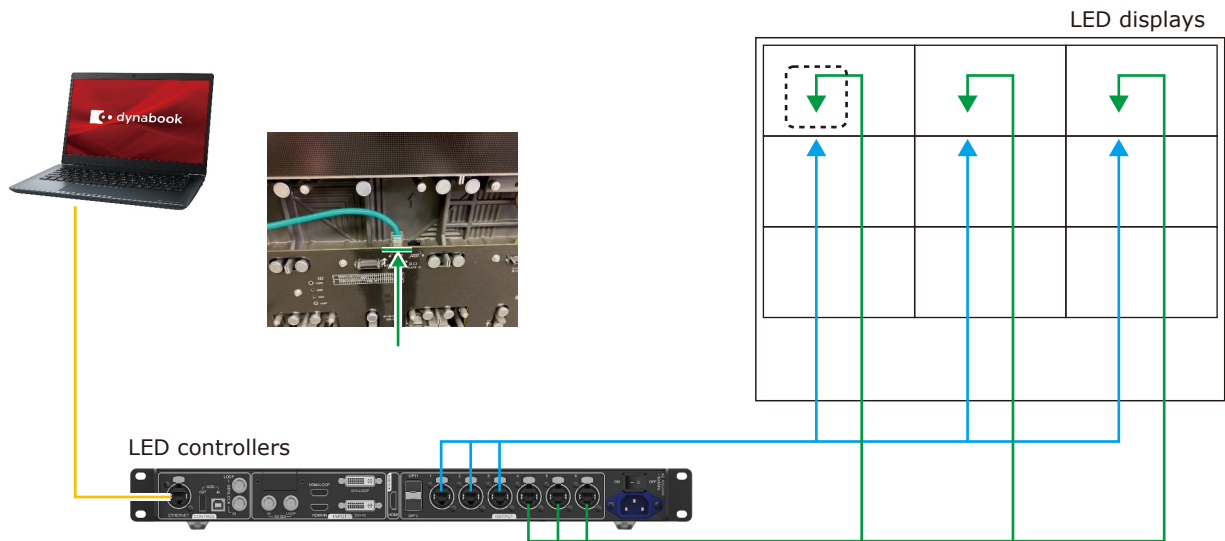
In the case of MCTRL 4K, the display of the LED controllers is as follows.
(This example display is for the case of connection using four Ethernet cables.)
Upper: Backup
Lower: Main (Primary)



8.3 Configuring the settings with one LED controller connected to the PC using a LAN cable

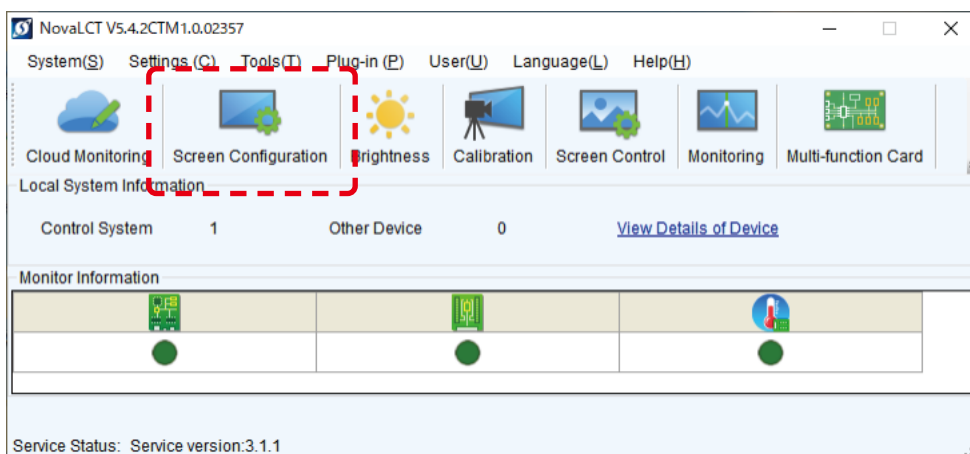
Connect the LED controllers and the LED displays with LAN cables.

Terminate the Backup system connection at the RJ-45 connector located top left on the last display in the daisy chain connection.



* For the MCTRL 4K LED controller, the way to make connections is similar to this example. Use the same method also when connecting the PC with a USB cable.

Start the control software NovaLCT and log in with the administrator privileges ([English-44](#)). Click "Screen Configuration".



Select the port in "Select Communication Port", and then click "Next".

Screen Configuration

Select Communication Port

Current Operatio... 192.168.11.10:5200

☒ Configure Screen

☐ Load Config... Browse

Next Close

Click the "Restore Factory Settings" button for initialization.

After initialization, configure the settings for "Select Input Source" and "Source Configuration".

If the factory setting is correctly configured and the device connection is the same as when the factory setting was configured, check the settings without performing initialization.

Screen Configuration-USB@Port_#0009.Hub_#0001

Sending Card | Receiving Card | Screen Connection

Display Mode

Refresh

Current Display Mode

Sending Card ... 1920 x 1080(1080P) Graphics Output R... 2560 x 1600 Curre... HDMI

Select Input Source

Video Input

☐ Automati... HDMI Send 3D Function ☐ Enable Settings

Source Configuration

Source: HDMI

Resolution: 1920 x 1080 px Custom... 2560 x 1600

Refresh Rate T... 60 Hz Input Source Bit De... 8 Bit Set

Hot Backup Verification

Verify

Redundancy

Set the Current Devi... ☐ Set as Primary ☐ Set as Backup

Primary		Backup	
Serial Number of Primary Sending Card	Serial Number of Primary Port	Serial Number of Backup Sending Card	Serial Number of Backup Port

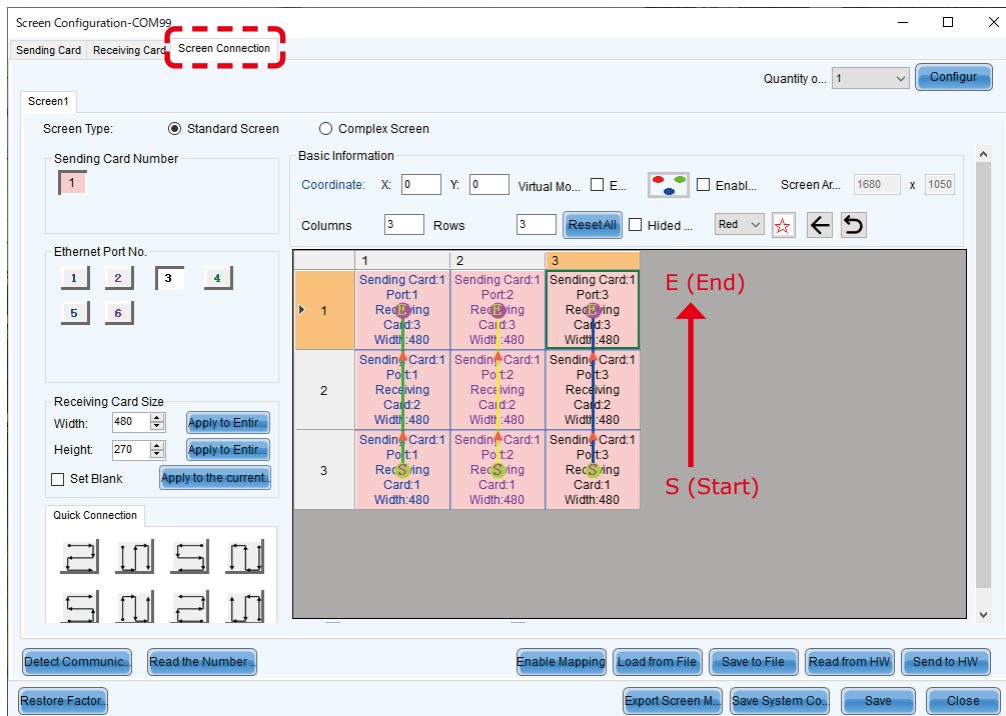
Refresh Send Add Edit Delete

Restore Factor... Export Screen M... Save System Co... Save Close

Select the Screen Connection tab.

Select/enter the value for "Screen Type", "Receiving Card Size", "Columns" and "Rows", and use "Ethernet Port No." and the screen configuration section to configure the connection.

* For details of the configuration procedure, refer to the User's Manual.



Notes on the setting operation:

Make sure that the value of "Quantity of Screens" is 1.

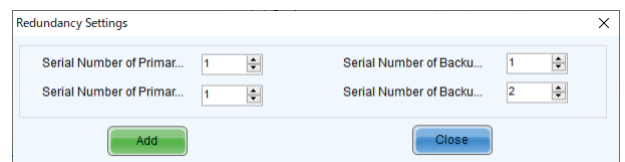
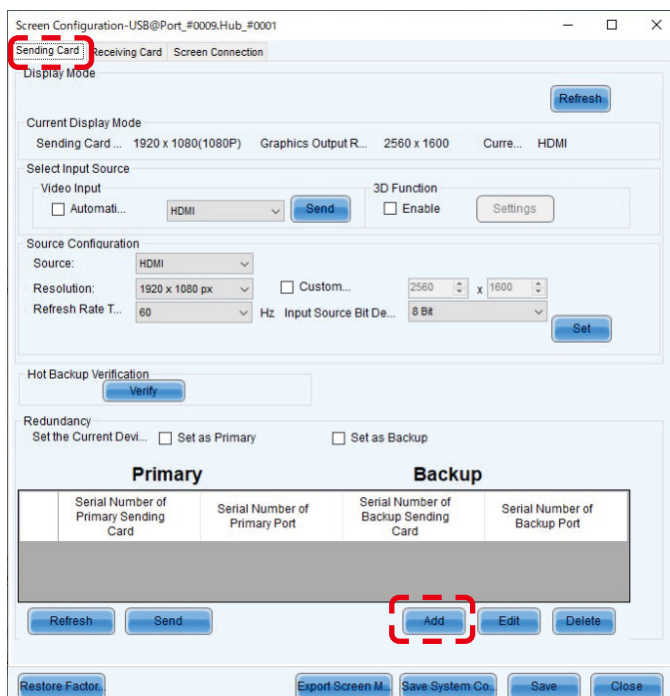
(To change a different value to 1, click the Configur" button.)

It is not necessary to configure the settings for Sending Card 2.

When the settings configuration is complete, click the "Send to HW" button.

Select the Sending Card tab and click "Add".

The Redundancy Settings screen is displayed.



In the Redundancy Settings screen, set the Port to use on the LED controller.

In the LED configuration example ([English-165](#)), the settings are as follows. After entering the value, click the "Add" button.

Serial Number of Primary Sending Card : 1
 Serial Number of Primary Port : 1
 Serial Number of Backup Sending Card : 1
 Serial Number of Backup Port : 4

Serial Number of Primary Sending Card : 1
 Serial Number of Primary Port : 2
 Serial Number of Backup Sending Card : 1
 Serial Number of Backup Port : 5

Serial Number of Primary Sending Card : 1
 Serial Number of Primary Port : 3
 Serial Number of Backup Sending Card : 1
 Serial Number of Backup Port : 6

When the settings configuration is complete, the Sending Card tab appears like below.

Click the "Send" button.

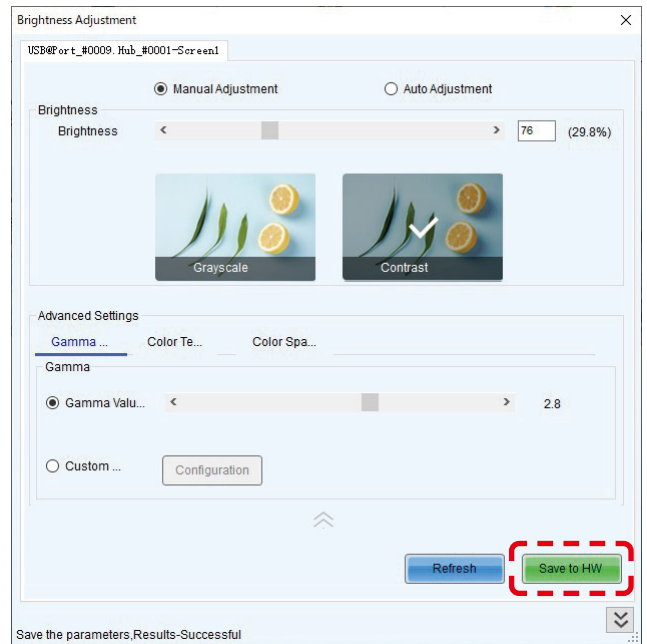
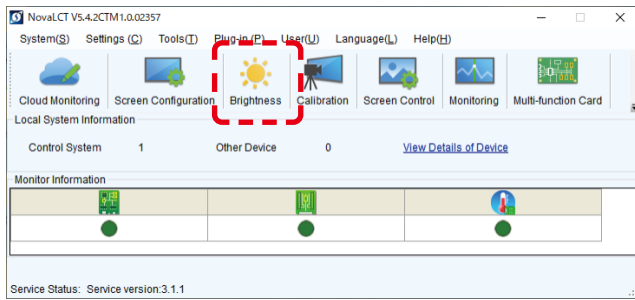
Click the "Save" button.

Primary		Backup	
Serial Number of Primary Sending Card	Serial Number of Primary Port	Serial Number of Backup Sending Card	Serial Number of Backup Port
1	1	1	5
2	2	1	6

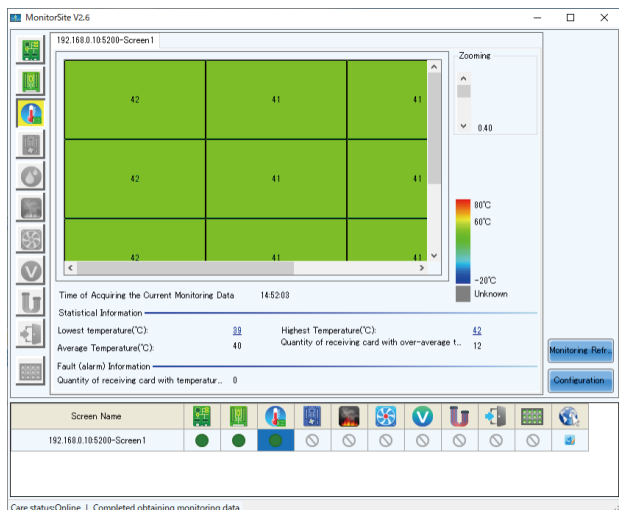
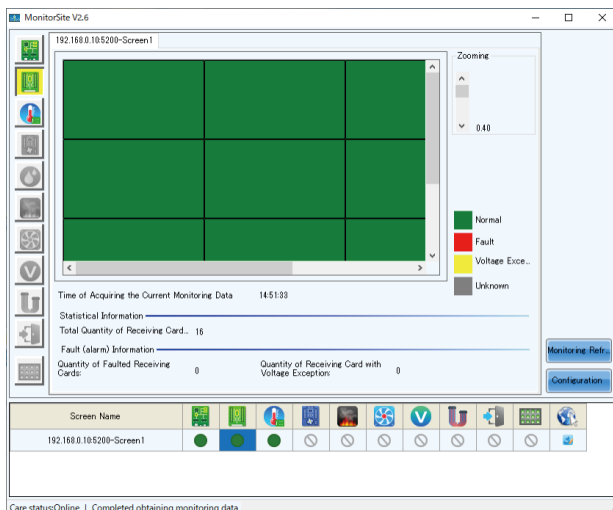
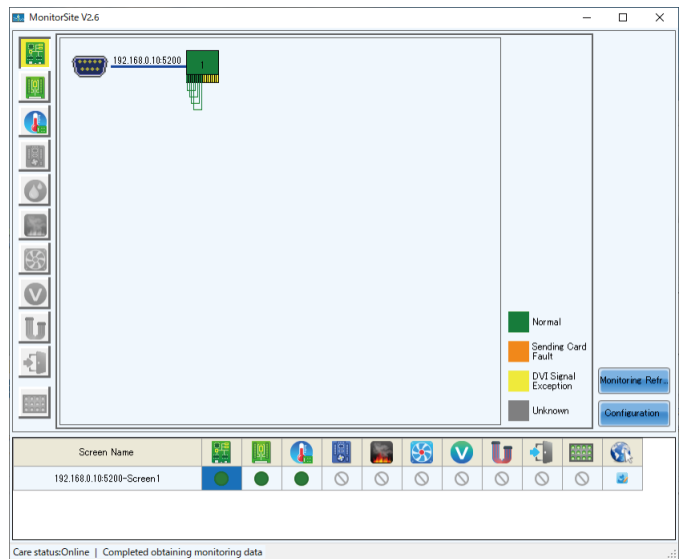
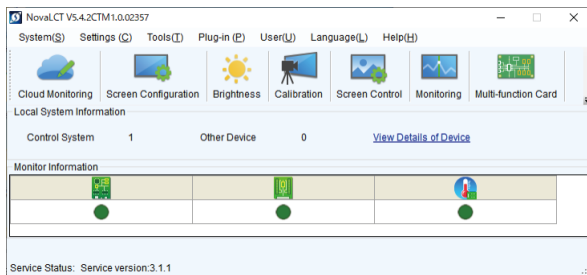
Check the current brightness setting.

Click the "Brightness" button.

In the Brightness Adjustment screen, set the desired brightness value and click the "Save to HW" button.



The monitoring screens appear like below.



In the case of MCTRL 4K, the display of the LED controllers is as follows.
(This example display is for the case of connection using one Ethernet cable.)
Port1: Main (Primary)
Port2: Backup



Specifications

Models for indoor use

		LD-D091	LD-D121	LD-D151
LED configuration		Flip chip COB (chip size : 4mil*8mil)		
Pixel pitch		0.95 mm	1.26 mm	1.58 mm
Number of displayed pixels (resolution/display)		640 × 340	480 × 270	384 × 216
Brightness		800 cd/m ²		
Contrast ratio		20000:1		
Brightness adjustment range		0 to 100% (256 increments)		
Gamma correction		1.0 to 4.0 (default setting: 2.8)		
Color temperature		3000 K to 9500 K (default setting: 6500 K)		
Viewing angle		Up 75°, Down 75°, Left 80°, Right 80°	Up 80°, Down 80°, Left 80°, Right 80°	
Signal interface	Signal input	1 × RJ-45		
	Signal output	1 × RJ-45		
Power supply		100 V AC to 240 V AC, 50 Hz/60 Hz		
Power consumption (all white, 100% brightness)		70 W		65 W
IP rating		Front IP40 / Rear IP20		
Maintenance		Front		
Dimensions		608 × 342 × 48.5 mm		
Weight		7.0 kg		
Operating environment	Temperature	-20 to 40°C		
	Humidity	10% to 80% (without condensation)		
	Altitude	No more than 5000 m		
Storage environment	Temperature	-20 to 45°C		
	Humidity	10% to 85% (without condensation)		

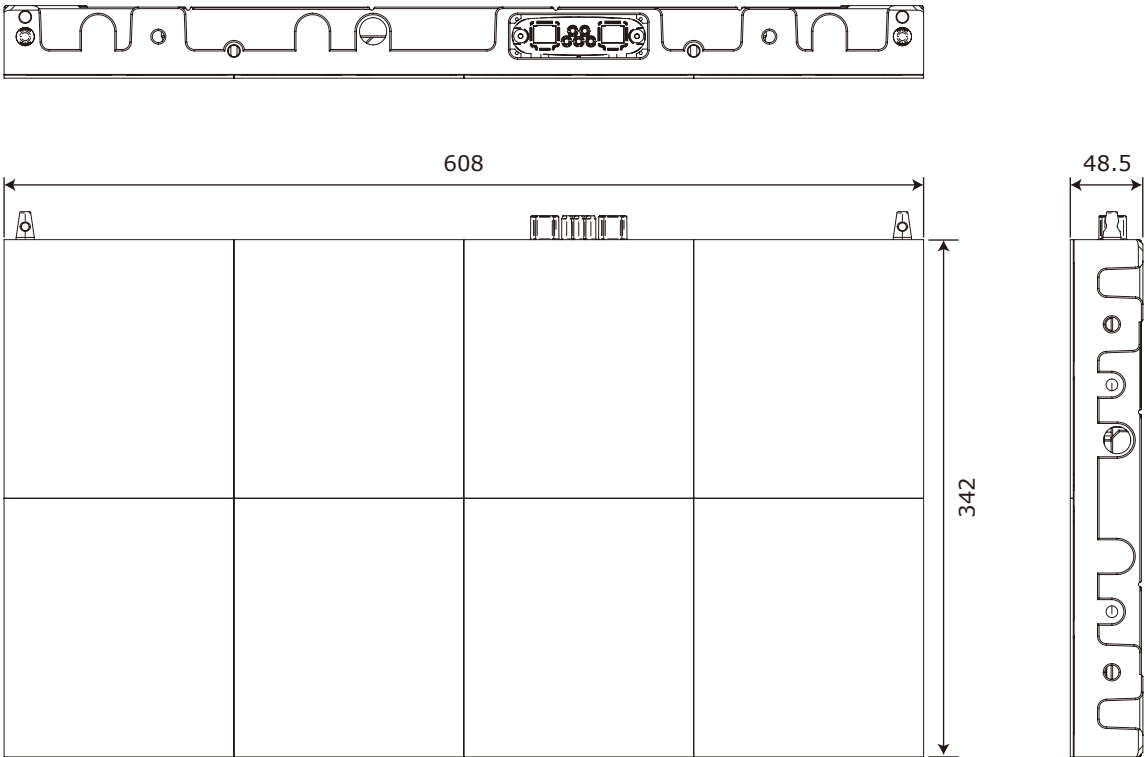
Specifications are subject to change without notice.

Models for indoor use

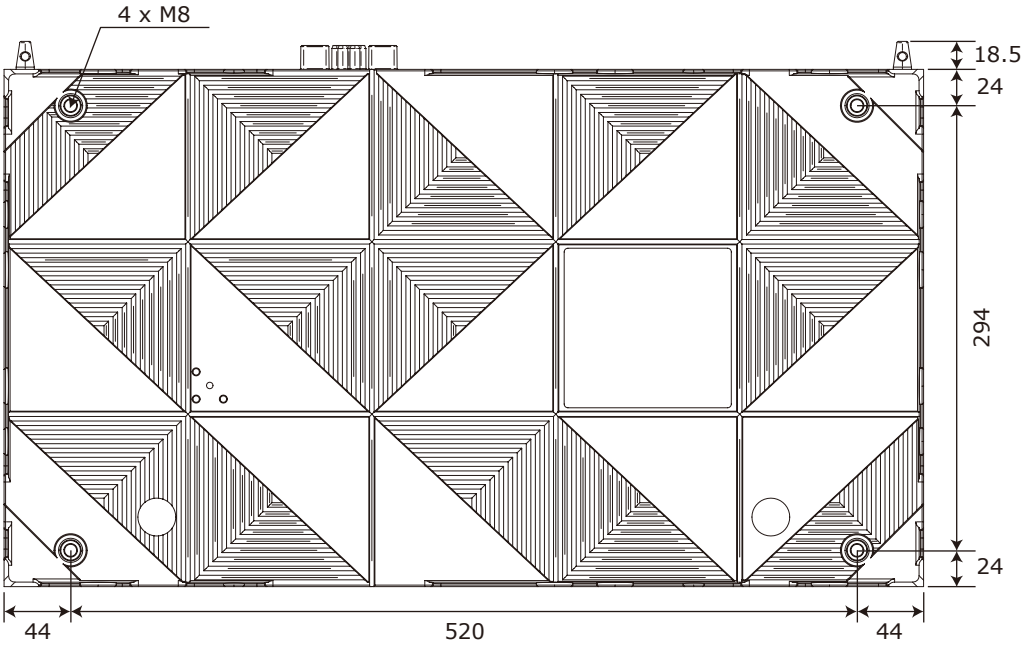
Display configuration		LD-D121 4 × 4	LD-D151 5 × 5	LD-D091 6 × 6	LD-D121 8 × 8
LED configuration		Flip chip COB (chip size : 4mil*8mil)			
Pixel pitch		1.26 mm	1.58 mm	0.95 mm	1.26 mm
Number of displayed pixels (resolution/display)		1920 × 1080	1920 × 1080	3840 × 2160	3840 × 2160
Brightness		800 cd/m ²			
Contrast ratio		20000:1			
Brightness adjustment range		0 to 100% (256 increments)			
Gamma correction		1.0 to 4.0 (default setting: 2.8)			
Color temperature		3000 K to 9500 K (default setting: 6500 K)			
Viewing angle		Up 80°, Down 80°, Left 80°, Right 80°		Up 75°, Down 75°, Left 80°, Right 80°	Up 80°, Down 80°, Left 80°, Right 80°
Signal interface	Signal input	1 × RJ-45			
	Signal output	1 × RJ-45			
Power supply		100 V AC to 240 V AC, 50 Hz/60 Hz			
Power consumption (all white, 100% brightness)		1120 W	1625 W	2520 W	4480 W
IP rating		Front IP40 / Rear IP20			
Maintenance		Front			
Dimensions		2444 × 1475.5 × 78 mm	3052 × 1817.5 × 78 mm	3660 × 2159.5 × 78 mm	4876 × 2843.5 × 78 mm
Weight		153 kg	234 kg	325 kg	543 kg
Operating environment	Temperature	-20 to 40°C			
	Humidity	10% to 80% (without condensation)			
	Altitude	No more than 5000 m			
Storage environment	Temperature	-20 to 45°C			
	Humidity	10% to 85% (without condensation)			

Specifications are subject to change without notice.

Diagram

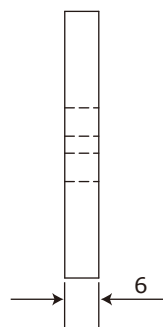
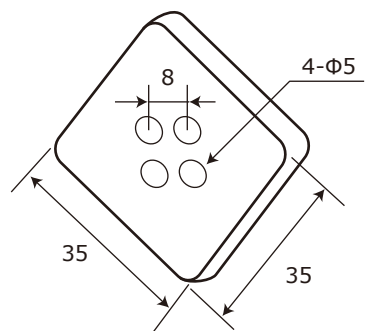


Rear



(Unit: mm)

Adjustment plate



(Unit: mm)