Upgrading the color sensor board

Learn how to replace the color sensor board (CSBD) version 6.0 with the new color sensor board 1.1 version C (CSBC).

Affected products

The following products are affected:

- D4K40-RGB
- Mirage 4K40-RGB

Required components

Before replacing components in the projector, ensure the following tools and parts are available:

- Color Sensor Board 1.1 Version C service kit (P/N: 003-114427-02)
- 2 mm hex driver or key
- 2.5 mm hex ball-drive
- 3 mm hex ball-driver
- Lint-free gloves
- Color meter (not provided)

Replacing the color sensor board

Remove the color sensor board (CSBD) version 6.0 and replace it with the new color sensor board 1.1 version C (CSBC).

1. To access the CSBD, flip the projector on either its top or sides.
   Alternatively, you can raise the leveling feet to their maximum position.
2. Remove the bottom cover.
3. Remove the three screws securing the CSBD and remove the board.
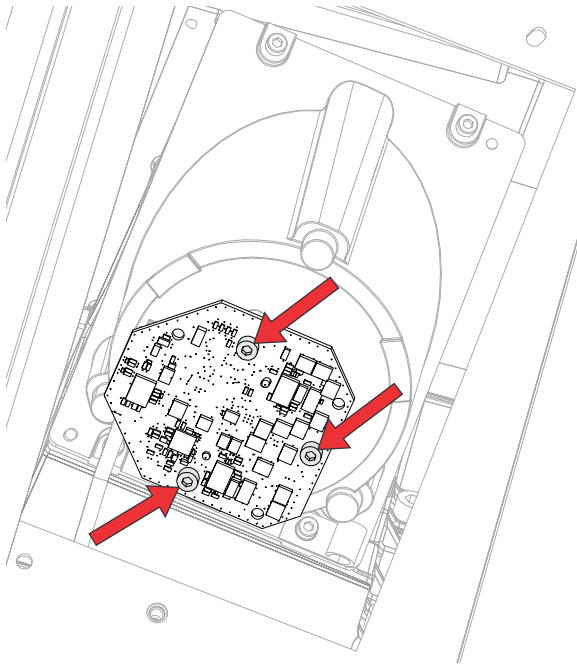
4. Disconnect the J29 harness.

5. To install the new CSBC, follow these steps in reverse order.

6. After installing the new CSBC board, *perform LiteLOC v1 calibration* (on page 3) and *calibrate the LiteLOC v2. feature* (on page 5).

Upgrading to software version 1.3.2

When a new version of the software is released, 4K40-RGB must be upgraded.

1. Download version 1.3.2 of the software from the Christie website. ()
   a) Go to *https://www.christiedigital.com/products/projectors/all-projectors/4K40-RGB-series/*.

   b) Select a projector model.

   c) Select **Downloads** > **Software Downloads** > **4K40-RGB software version 1.3.2**.

2. Turn off the lasers before proceeding with the upgrade.

3. If using the display panel to upgrade the software, insert a USB key that contains the software upgrade file.

   The USB flash drive must be formatted using the FAT 32 file system.

   The upgrade file must be located at the root of the USB key.

4. Select **MENU** > **Admin** > **Software** > **Upgrade**.

5. Select an upgrade file.

   • On the projector, select the upgrade file from the root of the USB and select **Enter**.

   • From the web interface, in the Open dialog, navigate to the file and select **Open**.

6. To automatically restart 4K40-RGB, select **Restart Now**.

If you decide restart 4K40-RGB at a later date (**Restart Later**), you cannot perform another upgrade until the 4K40-RGB is restarted.

Performing the LiteLOC™ version 1 calibration

Due to the manufacturing tolerance of the color sensor board and the LOS system, calibrate the LiteLOC version 1 response to the light intensity as the temperature of the laser devices changes.

1. Contact Christie Technical Support for a copy of the Horizon Factory Calibration Procedure spreadsheet.

2. On the projector, display a framing test pattern.

3. Setup the color meter in the same manner as used for creating laser and MCGD files.

4. Log into the projector with Installer access or higher.

5. Navigate to **Laser Settings** > **Laser Power/LiteLOC Setup**.

6. Set the following values:

   - **Display White Test Pattern** is enabled
   - **LiteLOC** is disabled
   - Maximum Expected Room Temperature: 35 degrees Celsius
   - Red power level: 78.3%
   - Green power level: 63.2%
   - Blue power level: 66.4%

7. Wait 15 minutes for the laser devices to acclimatize to the new values.

8. Adjust the blue and green power levels to achieve an applicable white point, as measured by the color meter.

   Do not adjust the red value.

   - For 4K40-RGB series projectors, the D65 white point is x=0.313, y=0.329.

   Wait a few minutes for the lasers to stabilize and ensure that the white point is not shifting between measurements.

9. Re-establish the connection to the photon controller using NetTerminal or Kore 10-bit Librarian, on port 5103.

10. Send the command `(RGB + MEAS?)` to the photon controller.

    The current color sense X, Y and Z values are returned, showing the temperature of the different devices. For example:

    - Red: Color sense X value
    - Green: Color sense y value
    - Blue: Color sense Z value
    - Purple: Red devices temperature * 100
    - Brown: Blue devices temperature * 100

21						
22	(RGB+MEAS?)					
23	(1) (RGB+MEAS! "4760012" 003 "4830868" 003 "4865024" 003 09739 07562 07590 "1, 02871,03251,02950,02808, 02871,03251,03187,02808")					
24						
25	Stored data so far:					
26	CSENSE X	CSENSE Y	CSENSE Z	RED TEMP	BLUE TEMP	
27	(1) 4760012	4830868	4865024	28.71	29.5	< note /100 for laser temperatures
28						

11. Enter the returned values into line 27 and line 63 of the spreadsheet.

   The temperature values reported in NetTerminal must be divided by 100 before being entered on line 27 and Line 63.

   All temperatures returned from serial commands are in degrees Celsius.

12. Use Kore Librarian to connect to the projector on port number 5000.

13. Login to the projector with Service access.

14. Switch to the Scripting tab.

15. To lower the fan speed and increases the internal temperature of the laser devices, use the script for the upgraded projector.

   Lowering the fan speed allows for another set of Color sensor measurements to be collected at a higher temperature without actually changing the room temperature.

   - **4K40-RGB series projectors**

      On 4K40-RGB series projectors, port 5103 is always opened in Core 4 Software and no password is required to run the commands required to change the projector fan speed.

      TrueLife accepts automation commands on port 3002.

```
sub main()
proj.sendstring( "(DGN 71 6 1 45 )" )
proj.sendstring( "(DGN 71 7 1 45 )" )
proj.sendstring( "(DGN 71 8 1 45 )" )
proj.sendstring( "(DGN 71 9 1 45 )" )
proj.sendstring( "(DGN 71 10 1 45 )" )
proj.sendstring( "(DGN 71 11 1 45 )" )
proj.sendstring( "(DGN 71 12 1 45 )" )
proj.sendstring( "(DGN 71 13 1 45 )" )
proj.sendstring( "(DGN 71 14 1 45 )" )
proj.sendstring( "(DGN 71 15 1 45 )" )
proj.sendstring( "(DGN 71 16 1 45 )" )
proj.sendstring( "(DGN 71 17 1 45 )" )
proj.sendstring( "(DGN 71 21 1 45 )" )
proj.sendstring( "(DGN 71 22 1 45 )" )
proj.sendstring( "(DGN 71 23 1 45 )" )
proj.sendstring( "(DGN 71 24 1 45 )" )
proj.sendstring( "(DGN 71 25 1 45 )" )
proj.sendstring( "(DGN 71 26 1 45 )" )
proj.sendstring( "(DGN 71 27 1 45 )" )
proj.sendstring( "(DGN 71 28 1 45 )" )
proj.sendstring( "(DGN 71 29 1 45 )" )
proj.sendstring( "(DGN 71 30 1 45 )" )
end sub
```

      On 4K40-RGB series projectors, to change the fan speed to 100% type the following command: `(DGN 71 <fan ID> 1 <speed>)`. For example, `(DGN 71 25 1 100)` sets fan 25 to run at 100%.

      To run the fan at the normal speed, send the command `(DGN 71 <fan ID> 0)`, or reboot the projector.

16. To execute the script, click the red arrow.

A confirmation that the command has been executed is displayed, and the projector noise level goes down.

17. In the projector software, set the following values:

    • **Display White Test Pattern** is enabled

    • **LiteLOC** is disabled

    • Maximum Expected Room Temperature: 35 degrees Celsius

    • Red power level: 78.3%

    • Green power level: 66.3%

    • Blue power level: 70%

18. Wait 15 minutes for the laser devices to acclimatize to the new values.

19. Re-establish the connection to the photon controller using NetTerminal or Kore Librarian, on port 5103.

20. Send the command `(RGB + MEAS?)` to the photon controller.

21. Compare the new blue temperature to the original value.

    If the difference is less than eight degrees wait for a few more minutes and take another reading until the blue temperature is at least eight degrees higher than the original reading. You may need to modify the actual room temperature to achieve the target blue temperature.

22. Adjust the blue and green power levels to achieve a DCI white point, as measured by the color meter. Do not adjust the red value.

23. Send the command `(RGB + MEAS?)` to the photon controller.

    The system retrieves the color sensor X, Y and Z values, and the blue and red devices temperatures.

24. Verify line 63 of the spreadsheet has the values identified in step 10.

25. Enter the values returned in step 23 into line 64 of the spreadsheet.

    The spreadsheet automatically calculates the calibration data and populates line 96 on the calculator.

    The temperature values reported in NetTerminal must be divided by 100 before being entered on line 27 and Line 63.

26. Type the command on line 96 of the spreadsheet into NetTerminal or Kore Librarian and send it to the photon controller.

    The calibration data is saved to the color sensor board.

27. To reset all fans to the normal operating speed, reboot the projector.

Calibrating the LiteLOC™ version 2.0 feature

Follow this procedure to generate the calibrated data.

1. Download the LiteLOC version 2.0 Calibration workbook from the Christie website.

   a) Go to URL: *https://www.christiedigital.com/products/projectors/all-projectors/*

   b) On the product page, select the series > model and switch to the **Downloads** > **Technical Reference** tab.

2. Ensure the projector is set up in representative ambient light.

3. Setup a spectroradiometer, such as the CR-250, on a tripod.

        If not using the CR-250 or better, Christie recommends placing the meter perpendicular to the screen to achieve accurate measurements.

4. Power on the projector.

5. From the display panel, select **MENU** > **Configuration** > **Light & Output Settings** > **LiteLOC**.

6. To disable LiteLOC, select **LiteLOC disabled**.

7. Set the red, green, and blue drive levels so the brightness and color are similar to what the application requires.

8. Allow the light source to stabilize.

   This can take approximately 10 minutes.

9. Establish a connection to the photon controller using Kore Librarian on port 5103.

10. In row 7 of the LiteLOC 2.0 Calibration workbook, enter the current settings for red, blue, and green.

    The drive percentages in columns A, B, C are calculated based on the current settings. The example values in the workbook are red=66.92%, green=58.81%, and blue=59.48%.

11. To set the laser drive levels for row 13 of the workbook, run the command from column K `(RGB +MODE 1 IR IG IB)` in Kore Librarian.

    For example, for row 13 run (RGB+MODE 1 6692 5881 5948) in Kore Librarian.

12. Perform the measurement using the spectroradiometer and record the returned values for X, Y, and Z in columns G, H, and I of the workbook.

    For example, `X=1022`, `Y=1045`, and `Z=1079`.

13. To obtain the color sensor values for the first set of drive percentage values in row 13, run the command from column K, row 25 `(RGB+MEAS?)` in Kore Librarian.

14. Record the returned values for SX, SY, and SZ in columns D, E, and F of the workbook.

    For example, `SX=3542528`, `SY=3389696`, and `SZ=2877952`.

15. Repeat steps 11 to 14 for rows 10 to 21.

16. From row 26 of the workbook, copy the highlighted command and run it in Kore Librarian.

    For example, copy `(RGB+CAL2 "3429" "405" "72" "0" "236" "2918" "152" "0" "-193" "-14" "2545" "0" "-2175" "-57636" "-96936" "1" "1660" 1 0)` to Kore Librarian and run the command.

17. Restart the projector.

18. From the display panel, select **MENU** > **Configuration** > **Light & Output Settings** > **LiteLOC**.

19. To enable LiteLOC, select **LiteLOC 2.0**.

Technical support

Technical support for Christie Enterprise products is available at:

- North and South America: +1-800-221-8025 or *Support.Americas@christiedigital.com*
- Europe, Middle East, and Africa: +44 (0) 1189 778111 or *Support.EMEA@christiedigital.com*
- Asia Pacific (*support.apac@christiedigital.com*):
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