

SP4K-C



Service Manual

Product revision

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Table of contents

1	Safety	9
1.1	Safety instructions	10
1.2	Safety precautions Hazardous Chemicals	12
2	General	15
2.1	Convention projector orientation	16
2.2	Location of the main projector components	17
2.3	Projector block diagram.....	19
2.4	Software update.....	22
2.5	Spare parts for SP4K-C.....	25
3	Preventative maintenance actions	27
3.1	1 month maintenance actions	28
3.2	3 month maintenance actions	29
3.3	1 year maintenance actions	30
3.4	3 year maintenance actions	32
4	Mains Input	33
4.1	About the mains board	34
4.2	Accessing the mains board	35
4.3	Power input configuration of the projector	36
4.4	Connecting the projector with the power net	38
4.5	Connecting a UPS with the projector electronics	40
4.6	Replacing the Mains board	42
5	Laser Driver Modules	45
5.1	About the Laser Driver Modules	46
5.2	LDM driver board location and mapping	47
5.3	Removing an LDM.....	50
5.4	Replacing a driver board in an LDM unit.....	52
5.5	Removing a fan from an LDM	55
5.6	Installing a new fan onto an LDM	58
5.7	Replacing an LDM	61
5.8	Installing an LDM	64
6	Cooling circuit.....	67
6.1	Introduction cooling circuit	68

6.2	Removing a light source cooler module	70
6.3	Replacing a fan from a laser cooler assembly	73
6.4	Replacing the main pump assembly	76
6.5	Mounting a laser cooler module	80
6.6	Removing the DMD cooling assembly	83
6.7	Replacement of the Air filter sensor board	86
6.8	Replacing a fan of the DMD cooling	88
6.9	Mounting the DMD cooling assembly	90
7	Light Source	93
7.1	Introduction Light Source	94
7.2	Removing the light source	96
7.3	Replacing the Light Source board	98
7.4	Replacing the Light Source fan	100
7.5	Replacement process of a red laser plate and / or peltier element	101
7.6	Removing a Red laser plate and peltier element	103
7.7	Installing a Red laser plate and/or peltier element	107
7.8	Removing a Green or Blue laser plate	111
7.9	Installing a Blue or Green laser plate	113
7.10	Perform the laser plate cooling self test	115
7.11	Replacing the Laser Control Board (LCB)	116
7.12	Mounting the light source	118
8	Light Pipe	121
8.1	Introduction light pipe	122
8.2	Replacing the Light Sensor	123
8.3	Accessing the Light Pipe components	124
8.4	Replacing the Fold mirrors	126
8.5	Cleaning the folding mirrors	128
8.6	Adjusting the fold mirrors	129
8.7	Replacing the light pipe front lenses	131
8.8	Replacing the Lens Barrel	133
8.9	Replacing the pre-rod assembly	134
8.10	Replacing the light source safety switch	135
8.11	Replacing the pre-rod assembly safety switch	136
8.12	Cleaning the light pipe lenses	137
8.13	Integration Rod diagnostic	138
8.14	Removing the Integration Rod	139
8.15	Installing the integration rod	141
8.16	Adjusting the integration rod and lenses	143
9	Light Processor	145
9.1	Introduction Light Processor	146
9.2	Diagnostic	147
9.3	Opening the sealed compartment	148
9.4	Removing the Light Processor	150
9.5	Replacing a Formatter board fan	153
9.6	Removing the light processor fan	154
9.7	Replacing the light processor fan	156
9.8	Replacing the Light Processor interconnection board	158
9.9	Unpacking a new light processor	159
9.10	Mounting the Light Processor	161
9.11	Packing the defective light processor	163
9.12	Closing the sealed compartment	167

9.13	Convergence controls	169
9.14	Red on Green convergence	171
9.15	Blue on Green convergence	173
10	Color calibration	175
10.1	Calibration process overview	176
10.2	Light source – White Point calibration	177
10.2.1	About the light source white point calibration menu	177
10.2.2	White point calibration	178
10.3	Projector color	182
10.3.1	About Color calibration	182
10.3.2	Creating a new MCGD file	182
10.3.3	Editing an active MCGD file	184
10.3.4	Exporting and importing MCGD files	185
10.3.5	Deleting several MCGD files	186
10.4	Verifying the corrected colors	187
10.4.1	About Verifying the corrected colors	187
10.4.2	Verifying the colors after correction	187
11	Spatial color calibration (LUT-SCC)	189
11.1	Installation process of the Spatial Color Calibration (LUT-SCC)	190
11.2	Obtain the Serial Number of the installed Light Processor	191
11.3	Download the LUT-SCC file from the Barco Website	192
11.4	Activate Spatial Color Calibration file	194
12	Lens Holder	197
12.1	Introduction	198
12.2	Installation of a lens on a C-Lens Holder	200
12.3	Removal of a lens on a C-Lens holder	202
12.4	Installation of a lens on a B-Lens holder	204
12.5	Removal of a lens from a B-lens holder	209
12.6	Lens shift, zoom & focus	211
12.7	Scheimpflug introduction	214
12.8	Scheimpflug adjustment	215
12.9	Resetting the scheimpflug adjustment screws to nominal position	217
12.10	Removal of the C-Lens Holder	220
12.11	Installation of the C-Lens Holder	222
12.12	Removal of the B-Lens Holder	224
12.13	Installation of the B-Lens Holder	227
13	Card cage	229
13.1	Card cage introduction	230
13.2	Cinema controller of the projector	231
13.3	ICP-D (Integrated Cinema Processor – Direct)	233
13.4	ICMP-X introduction	235
13.5	ICMP-X HDD	237
13.6	ICMP-X communication and input ports	239
13.7	Switched Mode Power Supply	241
13.8	Replacement of the cinema controller board	242
13.9	Battery replacement on the cinema controller board	243
13.10	Replacement of the projector ID card	244
13.11	Replacement of the Switched Mode Power Supply (SMPS)	246
13.12	Replacement of the ICMP-X board	248
13.13	Removing a HDD from the ICMP-X	249

13.14	Installing a HDD into the ICMP-X.....	250
13.15	What are the possible HDD swaps	252
13.16	Replacement of the Touch display	254
13.17	Replacement of the Fan and Motor Control Board (FMCB).....	256
13.18	Replacing a card cage fan	259
13.19	Replacement process of the signal backplane.....	261
13.20	Preparing the backplane removal.....	262
13.21	Replacing the backplane from the card cage	264
13.22	Preparing the card cage to mount back the boards.....	266
13.23	ICMP-X status LEDs	269
13.24	ICMP-X HDD status LEDs	270
14	Projector covers	273
14.1	Removal of the front cover.....	274
14.2	Removal of the rear cover.....	275
14.3	Removal of the operator side cover.....	276
14.4	Removal of the light source side cover	277
14.5	Removal of the top cover	278
14.6	Mounting the top cover	279
14.7	Mounting the light source side cover	280
14.8	Mounting the operator side cover	281
14.9	Mounting the rear cover	283
14.10	Mounting the front cover	284
15	Maintenance procedures	285
15.1	Necessary tools, products and tips	286
15.2	General cleaning procedure for optical components	287
15.3	Checking the front filters	288
15.4	Checking the rear dust filters.....	290
15.5	Checking the LDM dust filter.....	291
15.6	Vacuum cleaning of the dust filters	292
15.7	Washing and drying the dust filters	293
15.8	Cleaning the lens	295
15.9	Cleaning the exterior of the projector.....	296
15.10	Cleaning process for the optical path	297
15.11	Authorization to clear a security warning on the projector	298
16	Troubleshooting	301
16.1	Helping to understand notification message masking.....	302
16.2	Laser plate diagnostic	303
16.3	Using the Web Analysis tool to help decipher the diagnostic package	304
16.4	Troubleshooting checklist.....	306
A	Technical specifications.....	383
A.1	Position of the optical adapter for B-Series lenses	384
	Glossary	387
	List of tools	389
	Index	391

Safety

1

1.1	Safety instructions	10
1.2	Safety precautions Hazardous Chemicals	12

About this chapter

Read this chapter attentively. It contains important information to prevent personal injury while installing and using your SP4K-C projector. Furthermore, it includes several cautions to prevent damage to your SP4K-C projector. Ensure that you understand and follow all safety guidelines, safety instructions and warnings mentioned in this chapter before installing and using the SP4K-C projector. After this chapter, additional “warnings” and “cautions” are given depending on the procedure. Read and follow these “warnings” and “cautions” as well.

About this manual

This service manual provides procedures to perform maintenance and servicing on projectors of the SP4K-C series and its High-end Residential derivatives (Freya, Freya MKII, Freya +). Some procedures could be adapted depending the model.



WARNING: This manual is only intended for qualified service personnel.

1.1 Safety instructions



WARNING: Before removing/replacing any projector components, disconnect the power to the unit mains terminals.

Safety Instructions

1. Before returning an instrument to the customer, always make a safety check of the entire instrument, including, but not limited to, the following items:
 - a) Be sure that no built-in protective devices are defective and/or have been defeated during servicing. (1) Protective shields are provided on this chassis to protect both the technician and the customer. Correctly replace all missing protective shields, including any removed for servicing convenience. (2) When reinstalling the chassis and/or other assembly in the cabinet, be sure to put back in place all protective devices, including, but not limited to, insulating materials, barriers, covers/shields, and isolation resistor/capacitor networks. Do not operate this instrument or permit it to be operated without all protective devices correctly installed and functioning. Service people who defeat safety features or fail to perform safety checks may be liable for any resulting damage.
 - b) Be sure that there are no cabinet openings through which an adult or child might be able to insert their fingers and contact a hazardous voltage. Such openings include, but are not limited to, (1) excessively wide cabinet ventilation slots, and (2) an improperly fitted and/or incorrectly secured cover panels.
 - c) After service, all the protective devices such as insulation barriers, shields, covers and earthing (grounding) connections must be properly installed. Before closing the cabinet cover, thoroughly inspect the inside of the cabinet to see that no stray parts or tools have been left inside and all electrical wires and liquid tubing are properly positioned and tied according to the instructions. Before returning any projector to the customer, the service personnel must be sure it is completely safe to operate without danger of electric shock.
2. Read and comply with all caution and safety-related notes on or inside the projector cabinet or on the projector chassis, or on the picture tube.
3. Design Alteration Warning - Do not alter or add to the mechanical or electrical design of this apparatus. Design alterations and additions, including, but not limited to, circuit modifications and the addition of items such as auxiliary audio and/or video output connections, might alter the safety characteristics of this apparatus and create a hazard to the user. Any design alterations or additions may void the manufacturer's warranty and may make you, the servicer responsible for personal injury or property damage resulting therefrom.
4. Hot Chassis Warning - This projector chassis has two ground systems: the primary ground system is formed by the negative voltage of the rectified mains (power) and is only used as a reference in primary circuits; the secondary ground system is connected to earth ground via the earth conductor in the mains (power) lead. Separation between primary and secondary circuits is performed by the safety isolation transformers. Components bridging these transformers are also safety components and must never be defeated or altered. All user-accessible conductive parts must be connected to earth ground, or are kept at SELV (Safety Extra Low Voltage).
5. Observe original lead dress. Always inspect in all areas for pinched, out-of-face, or frayed wiring. Do not change spacing between components, and between components and the printed-circuit board. Check AC power cord for damage. Take extra care to assure correct lead dress in the following areas:
 - a) near sharp edges
 - b) near thermally hot parts - be sure that leads and components do not touch thermally hot parts
 - c) the AC supply
 - d) high voltage
6. Components, parts, and/or wiring that appear to have overheated or are otherwise damaged should be replaced with components, parts, or wiring that meet original specifications. Additionally, determine the cause of overheating and/or damage and, if necessary, take corrective action to remove any potential safety hazard.
7. PRODUCT SAFETY NOTICE - Many electrical and mechanical parts have special safety-related characteristics some of which are often not evident from visual inspection, nor can the protection they give necessarily be obtained by replacing them with components rated for higher voltage, wattage, etc. Use of a substitute replacement that does not have the same safety characteristics as the recommended replacement part in BARCO service data parts list might create shock, fire, and/or other hazards. Product Safety is under review continuously and new instructions are issued whenever appropriate. For the latest information, always consult the appropriate current BARCO service literature.
8. Do not spray chemical on or near this instrument or any of its assemblies.

9. **Electrostatically Sensitive (ES) Devices** Some semiconductor (solid state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive (ES) Devices. Examples of typical ES devices are integrated circuits and some field-effect transistors and semiconductor "chip" components. The following techniques should be used to help reduce the incidence of component damage caused by static electricity:
- a) Immediately before handling any semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Wear a commercially available high impedance discharging wrist strap device.
 - b) After removing an electrical assembly equipped with ES devices, place the assembly on a static dissipative surface such as a 3M No 8210 table mat, to prevent electrostatic charge buildup or exposure of the assembly.
 - c) Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ES devices.
 - d) Do not remove a replacement ES device from its protective package until immediately before you are ready to install it (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminium foil or comparable conductive material).
 - e) Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.
CAUTION: Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.
 - f) Minimize bodily motions when handling unpacked replacement ES devices (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES device).

1.2 Safety precautions Hazardous Chemicals

Cooling liquid: Pale yellow antifreeze Antifrogen® N



Handling the cooling liquid:

- Not for household use.
- Keep out of reach of children.
- Harmful by oral intake.
- Avoid exposure to pregnant women.
- Avoid contact of the liquid with Eyes, Skin and Clothing.
- Avoid inhaling noxious fumes.
- Conserve the product in the original package and in a well ventilated room.

Personal protection rules:

- Handle the cooling liquid in a well ventilated room.
- Under no circumstances eat, drink and smoke while handling the liquid.
- Wear gloves (Butyl rubber, PVC....) and goggles.
- Wear suitable protection clothing.

Cleansing agent: sodium carbonate crystals (Na_2CO_3)



Handling the cleansing agent:

- Conserve the product in the original container in a cool, well ventilated place.
- Keep away from Incompatible materials: sources of ignition, direct sunlight.
- Keep container closed when not in use.
- After handling: Wash hands and other exposed areas with mild soap and water.

Personal protection rules:

- Handle the cleansing agent in a well ventilated area.
- Do not eat, drink or smoke during use.
- Wear gloves (Butyl rubber, PVC....) and goggles.
- Wear suitable protection clothing.

TIM paste: Loctite TCP 4000 D



Handling the TIM paste:

- Avoid open flame
- After handling: Wash hands and other exposed areas with running water and soap.

Personal protection rules:

- Handle the cleansing agent in a well ventilated area.
- Do not eat, drink or smoke during use.
- Wear chemical-resistant gloves (nitrile-rubber).



WARNING: Before handling Hazardous Chemicals ensure that you have read and understood the safety instructions provided by the supplier of the chemical in the Safety Data Sheet.

Safety Data Sheets for Hazardous Chemicals

For safe handling information on chemical products, consult the Safety Data Sheet (SDS). SDSs are available upon request via safetydatasheets@barco.com.

General

2

2.1	Convention projector orientation	16
2.2	Location of the main projector components	17
2.3	Projector block diagram	19
2.4	Software update	22
2.5	Spare parts for SP4K-C.....	25

About this chapter

This chapter contains some general information on projector level such as the location of the main components, projector status, laser status, reference to spare parts list, etc.

2.1 Convention projector orientation

Convention

This manual refers to the light source side of the projector as the side at your left hand when standing behind the projector and looking at the projection screen in front of the projector.

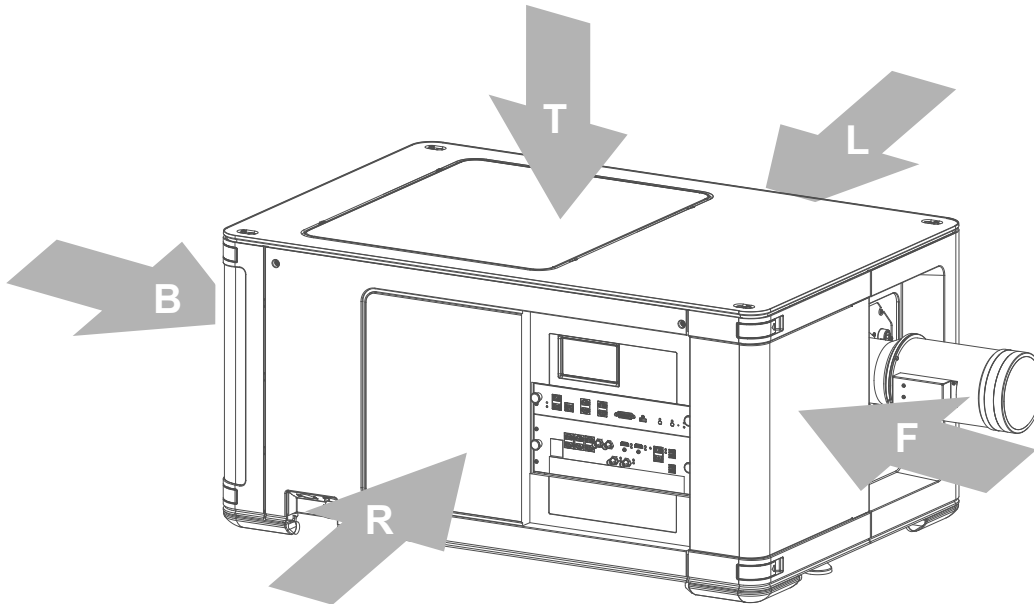


Image 2-1

- T** Top of the projector.
- L** Left side of the projector (Light source side).
- F** Front of the projector.

- R** Right side of the projector (User input side).
- B** Back side of the projector.

2.2 Location of the main projector components

Housing and air inlet filters

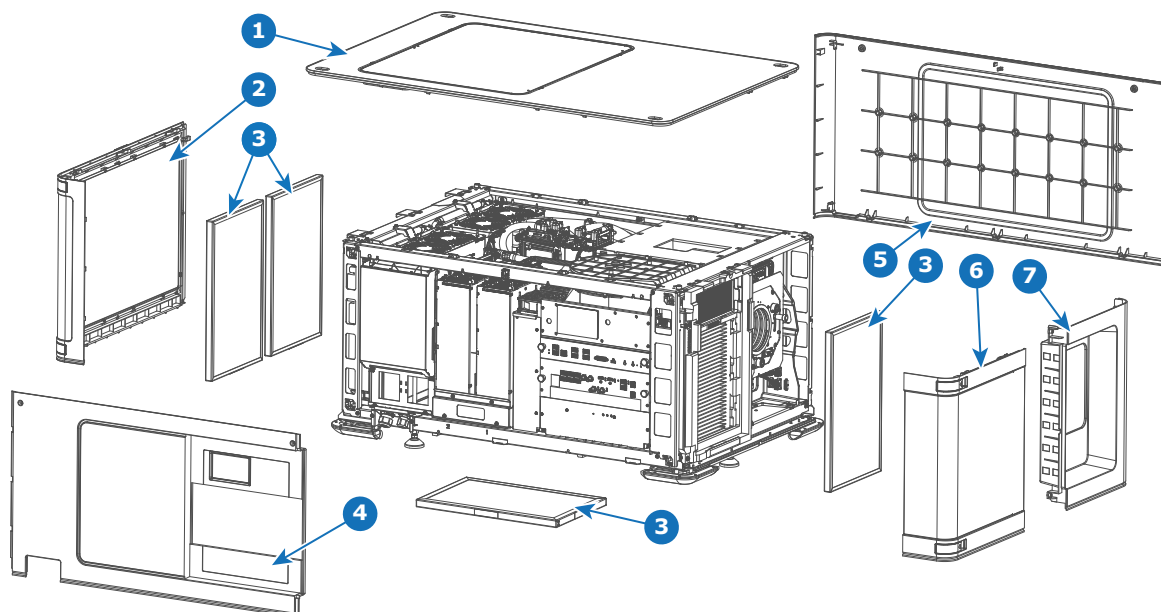


Image 2-2

- | | | | |
|----------|-------------------|----------|-------------------|
| 1 | Top cover | 5 | Left cover |
| 2 | Rear cover | 6 | Front cover |
| 3 | Air inlet filters | 7 | Lens holder cover |
| 4 | Right cover | | |

Inner cover plates and filters

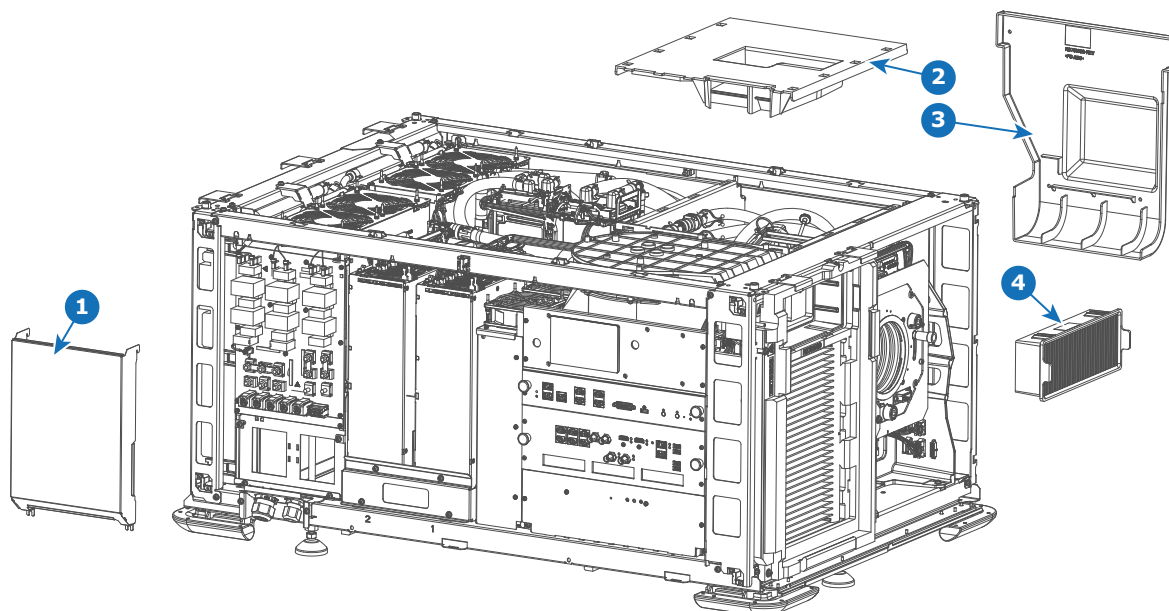


Image 2-3

- | | |
|----------|-------------------------------|
| 1 | Mains input cover |
| 2 | Sealed compartment top cover |
| 3 | Sealed compartment side cover |
| 4 | DMD cooling filter |

Main assemblies

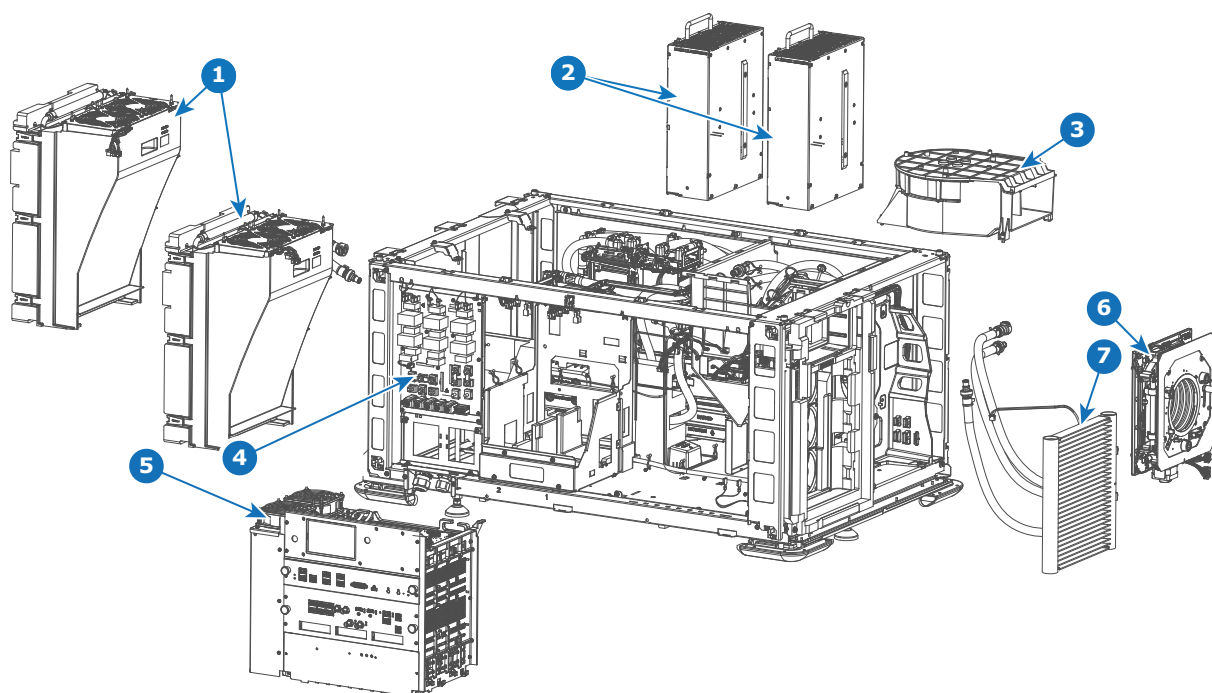


Image 2–4

- | | | | |
|---|-----------------------------|---|-------------|
| 1 | Light Source cooling | 5 | Card Cage |
| 2 | Laser Driver Modules (LDMs) | 6 | Lens Holder |
| 3 | Light Processor fan | 7 | DMD Cooling |
| 4 | Mains connection PCB | | |

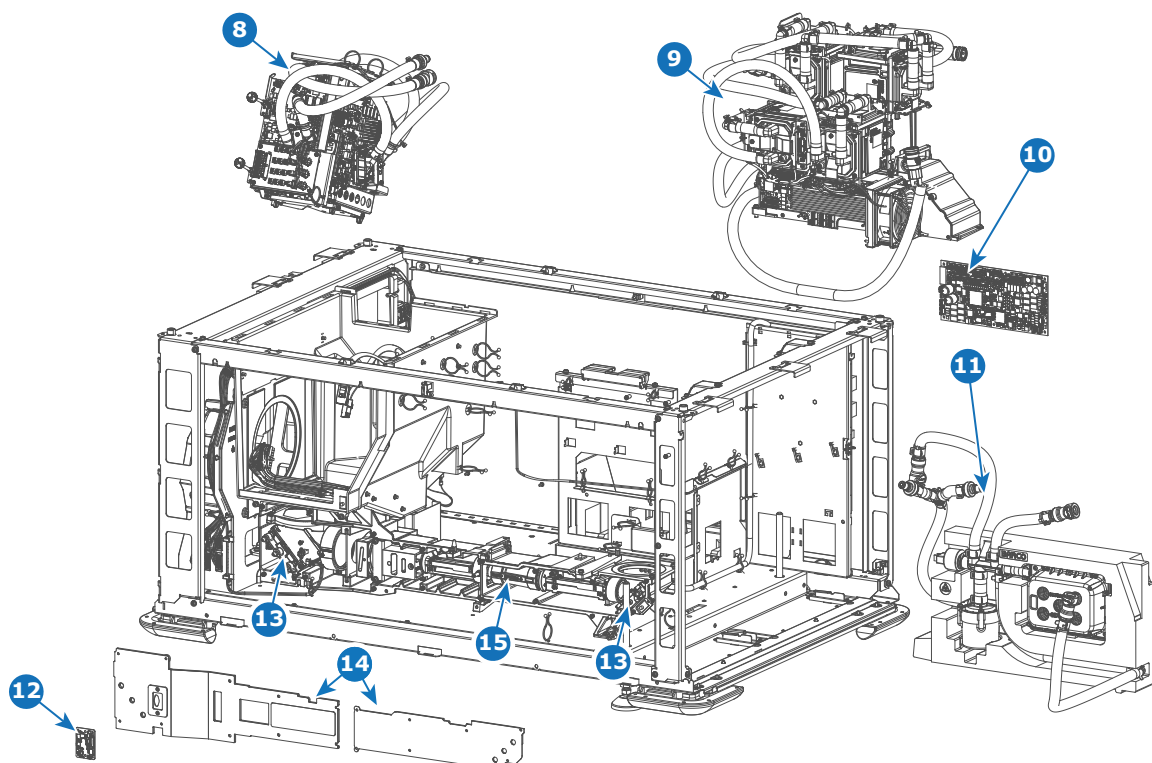


Image 2–5

- | | | | |
|----|---------------------------|----|--------------------|
| 8 | Light Processor | 12 | Light Sensor board |
| 9 | Light Source | 13 | Fold Mirrors |
| 10 | Laser Control Board (LCB) | 14 | Light Pipe covers |
| 11 | Laser Pump module | 15 | Rod & rod holder |

2.3 Projector block diagram

General overview

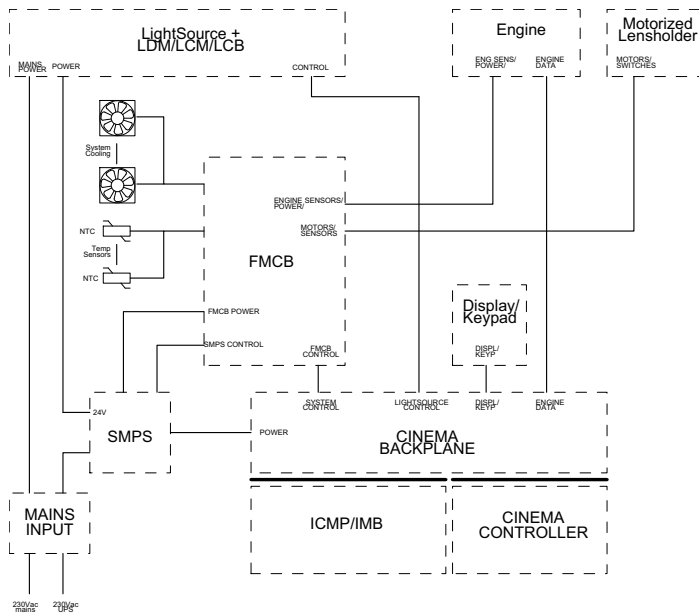
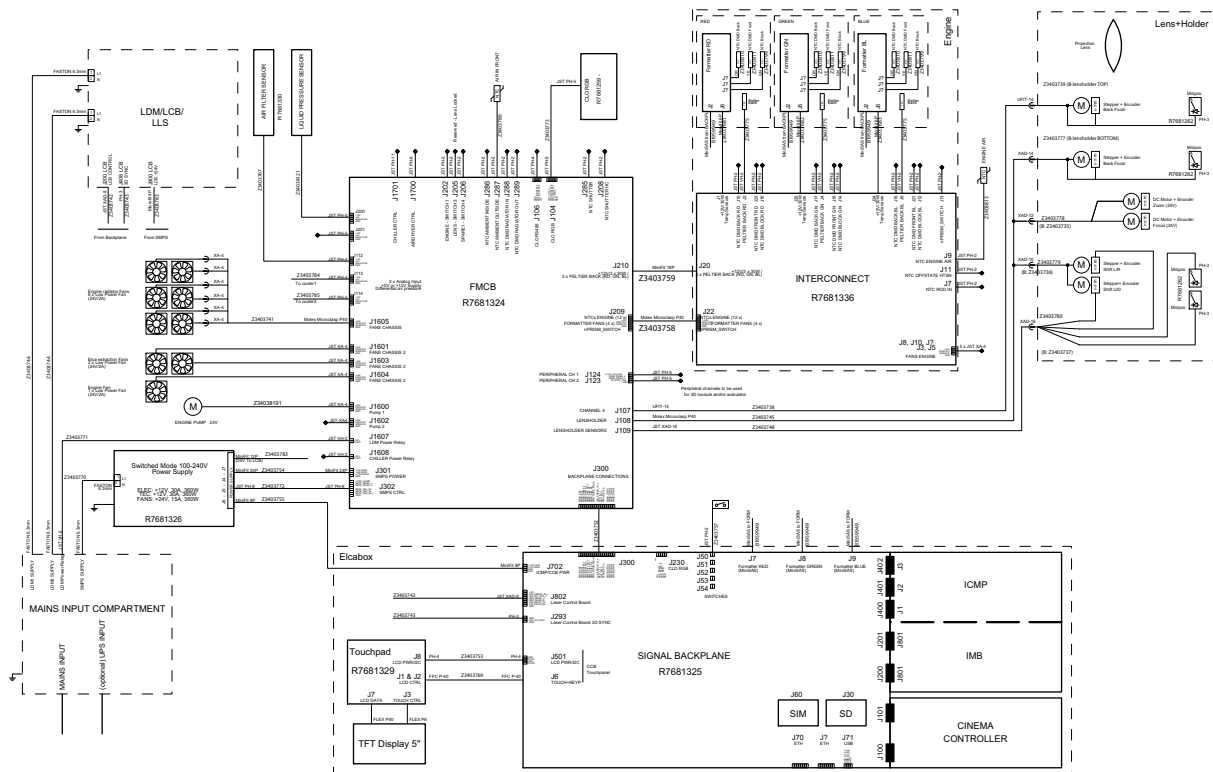


Image 2-6

Detailed overview



Light Source control for 25k projector models

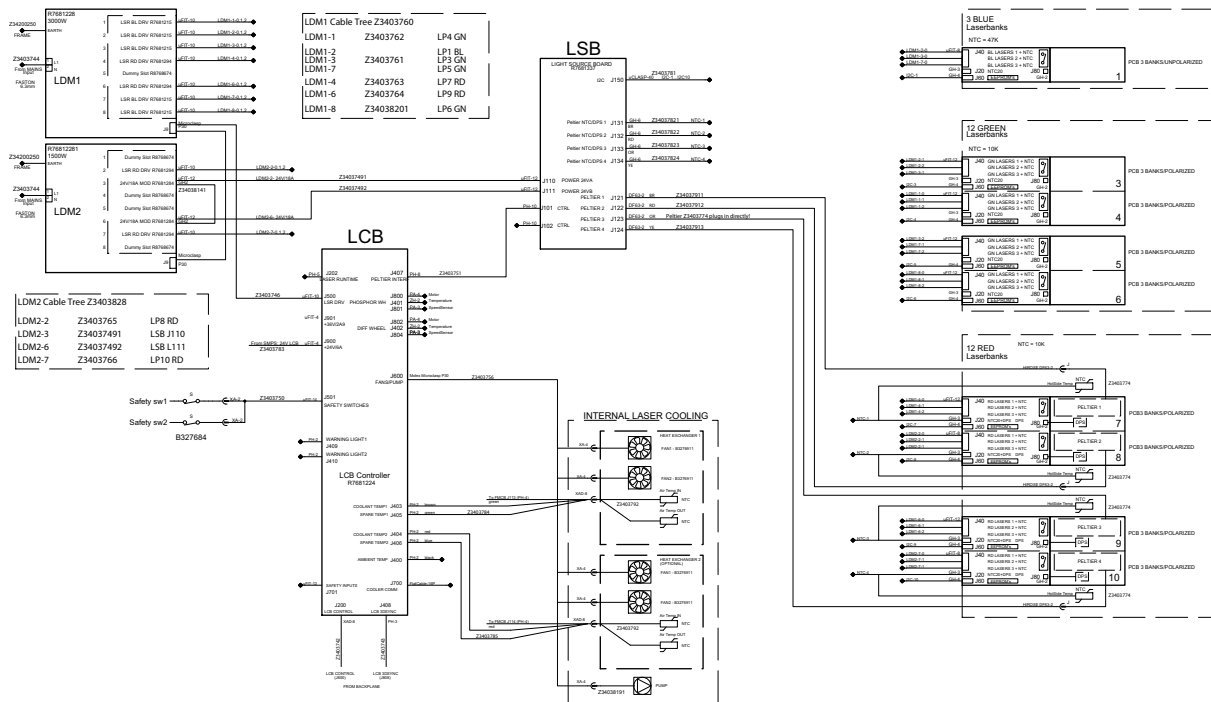


Image 2-8

Light Source control for 20k projector models

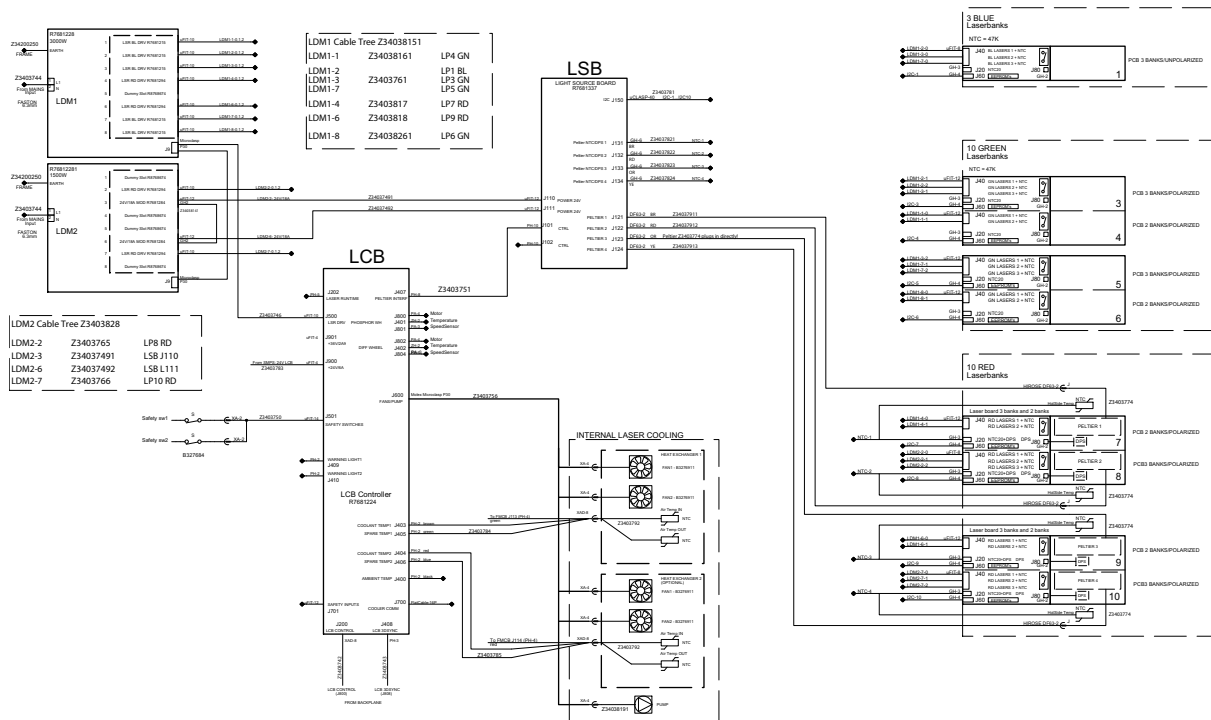


Image 2-9

Light Source control for 15k projector models

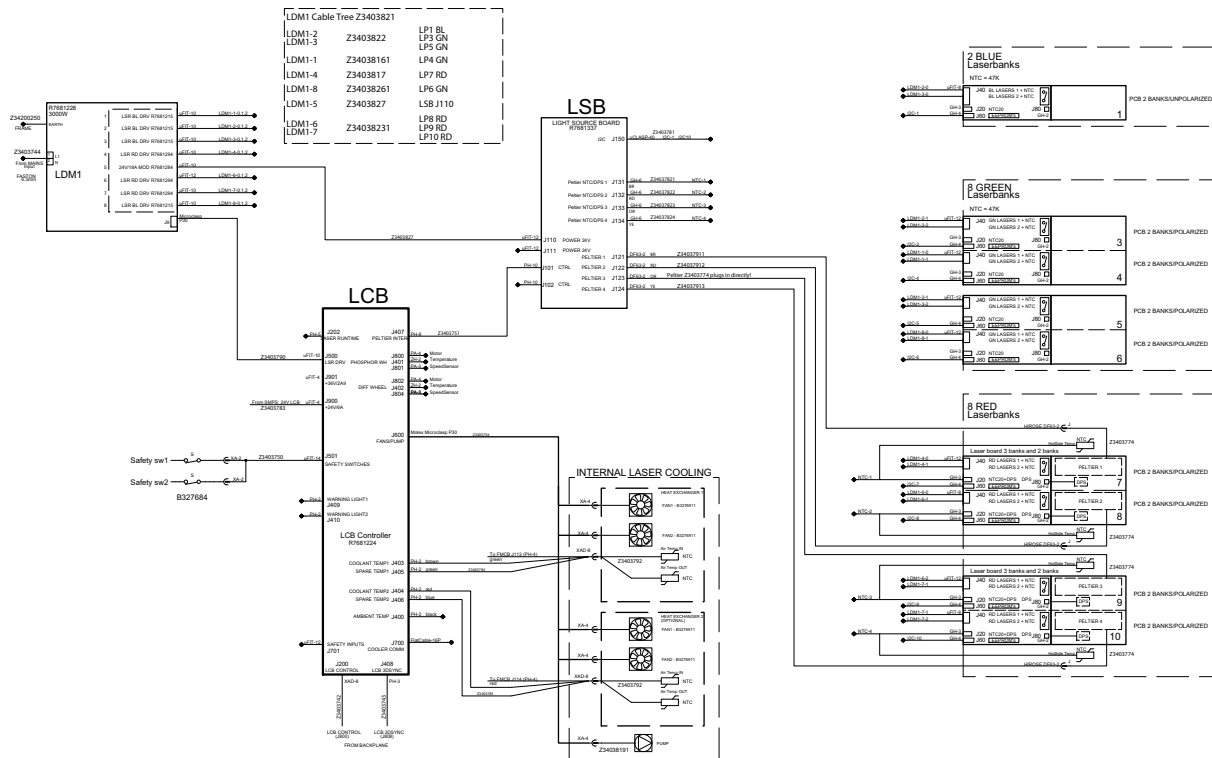


Image 2-10

Light Source control for 10k projector models

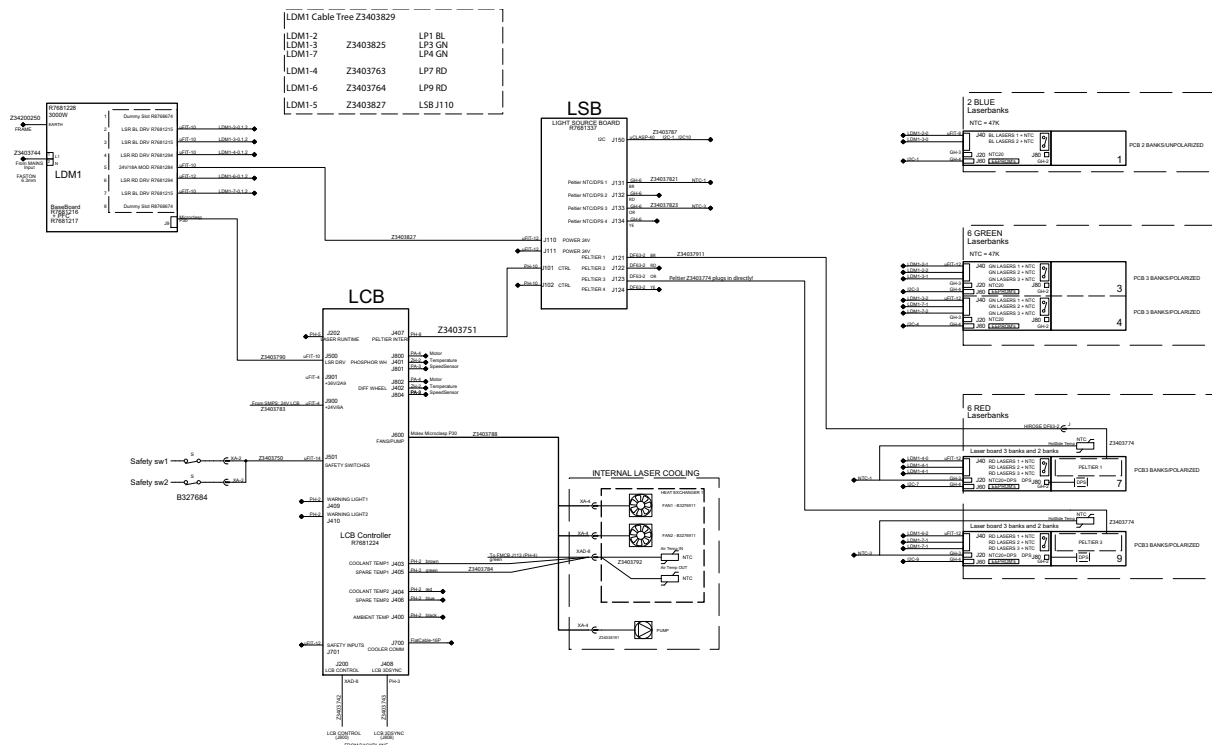



Image 2-11

2.4 Software update

How to update the software

1. Download the latest firmware from the Barco website. Click on *myBarco* and login to get access to secured information. Registration is necessary.

If you are not yet registered, click on *New to myBarco* and follow the instructions. With the created login and password, it is possible to login where you can download the software.

 **Note:** Keep in mind to unzip the package. Only *.fw files can be selected for software updates.

2. Make sure the projector is powered on and is in READY mode.
3. Browse to the Web Communicator application and log in as administrator.
4. Click on tab **Maintenance** and select **Software update**.
5. In the Software Update menu, click *Browse for a package to install*.
An *Open* browse window is prompted.

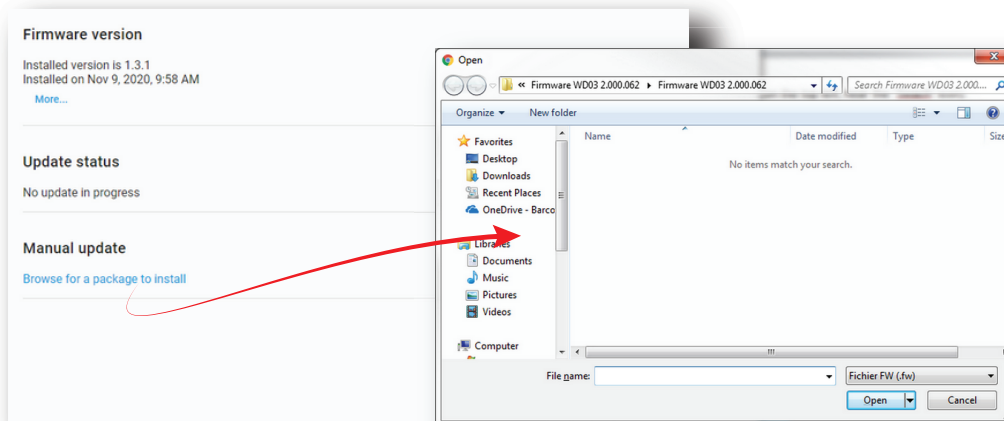


Image 2–12

6. Select the file downloaded from the Barco website.
The selected file will be mentioned under *Manual update*.

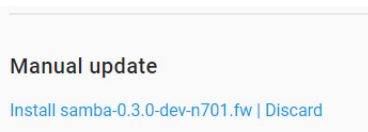


Image 2–13 Example of an update package

7. Click Install and confirm.
The software update will start.


How to update the software via USB device

1. Download the latest firmware from the Barco website. Click on *myBarco* and login to get access to secured information. Registration is necessary.

If you are not yet registered, click on *New to myBarco* and follow the instructions. With the created login and password, it is possible to login where you can download the software.

 **Note:** Keep in mind to unzip the package. Only *.fw files can be selected for software updates.

2. Make sure the projector is powered on and is in READY mode.

3. Browse to the Web Communicator application and log in as administrator.
4. Click on tab **Maintenance** and select **Software update**.
5. Plug a USB device with the downloaded file into the USB port of the Cinema Controller.
 -  **Note:** The USB device should be formatted in FAT-32. It may only contain the firmware file in the root level of the device.

The USB device will be detected and a window will prompt in the Web Communicator.

6. Click Proceed to have the image added in the Manual update section of the page.

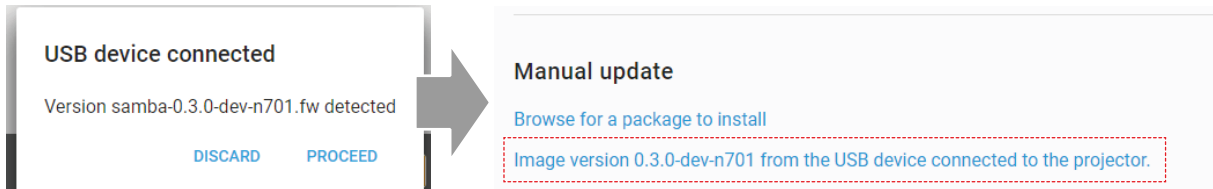


Image 2-14 Example of a software package inserted via USB device

7. Click *"Image [name] from the USB device connected to the projector"* and confirm.
The software update will start.

Update progress

The update will proceed as follows:

1. The software package will be installed on the projector.

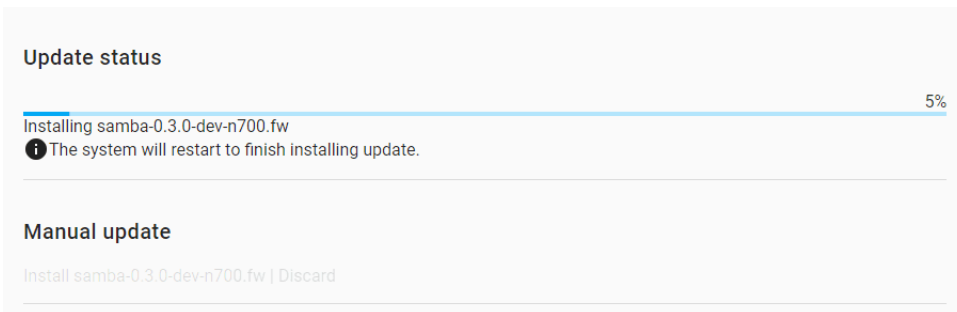


Image 2-15 Example of an update in progress

2. Once the software package has been installed, the following message will be prompted and the projector will reboot.

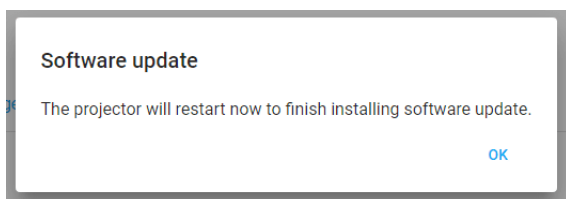


Image 2-16 Example of the prompted reboot message

3. **Take note:** While rebooting, you will lose connection to the projector.
4. Once rebooted, every projector component will be updated to the version included in the software package. Take into account that it might take a while until all components have been updated.

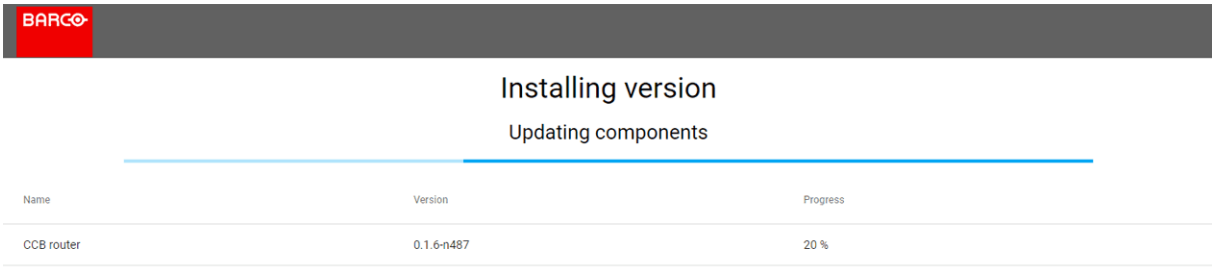


Image 2–17 Example of the components update page.

- 5. Once every component has been updated, you will be redirected to the Web Communicator login page.

2.5 Spare parts for SP4K-C

Up to date information regarding spare parts for SP4K-C

Barco continuously improves its service procedures for the customer. Managing spare parts is one of the key processes. The spare parts list is subject to change. No spare parts list is included in this manual to ensure that no spare parts are ordered based upon outdated information. Up to date information regarding spare parts, and much more, is available on Barco's web site <http://www.barco.com>. Go to *myBarco log in* and enter your credentials. Select your market and product and click on the product page on *Technical support*. The *Spare parts* tab becomes available.

Preventative maintenance actions

3

3.1	1 month maintenance actions	28
3.2	3 month maintenance actions	29
3.3	1 year maintenance actions	30
3.4	3 year maintenance actions	32

Maintenance program

The maintenance program is subdivided in time frames going from monthly maintenance actions which can be done by a trained projectionist to annually and 3 yearly maintenance actions which must be done by certified service personnel who are familiar with potential hazards of the product and all product safety checks.

3.1 1 month maintenance actions

MAINTENANCE TYPE A (perform every month)



The 1 month maintenance actions, listed below, may be performed by a trained projectionist who is familiar with potential hazards associated with the product.

No.	Maintenance action	Remarks
1	Check the surface of the lens output side for dust. (it is not needed to remove the lens from the projector). Only clean if necessary.	Clean the lens output side in case dust is clearly visible upon the surface. Note: if the lens was removed from the projector, a manual "Lens Home & Return" action must be executed to calibrate the position of the lens in relation to the Lens Holder. This way the references of the existing 'lens files' remain valid. See user guide for more information.
2	Check the porthole (both sides) for dust.	Clean the porthole in case dust is clearly visible upon the surface. Use an optical cloth.

3.2 3 month maintenance actions

MAINTENANCE TYPE B (perform every three months)



The 3 month maintenance actions, listed below, may be performed by a trained projectionist who is familiar with potential hazards associated with the product.

No.	Maintenance action	Remarks
1	Clean the front/back/side air inlet vents.	Use a vacuum cleaner.
2	Clean the housing of your projector.	Removal overall dust accumulation on projector covers. See cleaning instructions in this manual.
3	<p>Verify the clock of the ICMP-X with a real time clock. Correct the internal clock if it has drifted.</p> <p>Note: This action is not required if NTP has been configured on the ICMP-X. In this case NTP will automatically correct the internal clock.</p>	See user guide for detailed instructions on NTP and clock correction.

3.3 1 year maintenance actions

MAINTENANCE TYPE C (perform every year)



The 1 year maintenance actions, listed below, may **ONLY** be performed by **certified service personnel** who are familiar with potential hazards of the product and all product safety checks.

No.	Component	Maintenance action	Remarks
1	Dust in general	Check the prism exit side for dust, discoloration, damage, degradation, cracks, etc.	Only clean the prism exit side in case dust is clearly visible upon the surface of prism. See service manual chapter "Maintenance procedures" , page 285. Replace the complete Light Processor Unit in case of degradation, cracks, etc. See service manual chapter "Light Processor" , page 145.
2	Dust in general	Check the porthole (both sides) for dust.	Only clean the porthole in case dust is clearly visible upon the surface. Use an optical cloth.
3	Dust in general	Clean the projector exterior (housing).	Report on cleanliness of booth!
4	Dust in general	Check the condition (hot state) of the Light Pipe and prism by looking for artifacts in the projected full white and full black patterns.	If artifacts are visible diagnose the Rod and Pre-Rod. See service manual chapter "Light Pipe" , page 121. Replace the Rod or Pre-Rod In case these causes the artifacts. Replace the Light Processor Unit in case the prism causes the artifacts.
5	Air extraction	Check air extraction system	Check booth air extraction system for adequate extraction.
6	Diagnostics	Check actual diagnostics/self tests after 1 hour play with black image. See user guide.	Note any irregularities and follow up. Take the necessary measurements if required.
7	Diagnostics	Check and save TI and projector log/history files. See user guide.	Note any irregularities and follow up.
8	Diagnostics	Verify projector date and time and correct if required.	See projector user guide.
9	Software version	Check for the latest version of projector and ICMP software. See projector user guide. The latest software version can be downloaded from the secured Barco website.	Upgrade the projector software with the latest version. See projector user guide.
10	Info-T's	Check if all Info-T's are implemented. Note that the Info-T's are listed on the secured Barco web site.	If not, implement all Info-T's and update the projector service docket.
11	Lens holder	Check the Lens Holder shift functionality (up/down & left/right).	Use the touch display or the Web Communicator software to shift.
12	Lens holder	Check the positional integrity of motorized adjustments by switching Macro's.	Verify correct alignment on screen between flat and scope.
13	Lens holder	Check the focus uniformity.	Adjust the Lens Holder (Scheimpflug) ONLY if needed. See service manual chapter "Lens Holder" , page 197.

No.	Component	Maintenance action	Remarks
14	Lens	Check the optic surfaces of the lens input and output for dust.	<p>Only clean the input and/or output side in case dust is clearly visible upon the surfaces. Use an optical cloth. See service manual chapter “Cleaning the lens”, page 295.</p> <p>In case of a B-series lens holder, be sure to remove and clean the optical adapter as well. Use an optical cloth to clean both sides of the adapter. To remove/mount the adapter, see service manual chapter “Lens Holder”, page 197</p> <p>Note: if the lens was removed from the projector, a manual “Lens Home & Return” action must be executed to calibrate the position of the lens in relation to the Lens Holder. This way the references of the existing 'lens files' remain valid. See user guide of the Communicator software.</p>
15	Lens	Check the lens Zoom & Focus motors.	Use touch display and / or the Web Communicator software to Zoom and to Focus. See user guide for more info.
16	Convergence	Check convergence.	See chapter “ Light Processor ”, page 145
17	Electronic boards	Check the general condition of the electronic boards in the Card Cage: Status LED's, dust, connections, etc.	Blow out dust.
18	Security	Check the Tamper Switch Activation Report and Security Logs for security infringements.	Report if intruded.
19	Color calibration	Measure the color coordinates of the projected image and calibrated if necessary.	See projector user guide.
20	Documentation	Check if the projector manuals are present and up-to-date.	Download current manual version from https://My.Barco.com .
21	Documentation	Update projector service docket.	List all maintenance actions and remarks.

3.4 3 year maintenance actions

MAINTENANCE TYPE D (perform every three years)



The 3 year maintenance actions, listed below, may **ONLY** be performed by **certified service personnel** who are familiar with potential hazards of the product and all product safety checks.

No.	Component	Maintenance action	Remarks
1	Projector	Check all fans: vibrations, noise, speed, etc. (speeds: via diagnostics)	Replace if needed.

4

Mains Input

4.1	About the mains board	34
4.2	Accessing the mains board.....	35
4.3	Power input configuration of the projector	36
4.4	Connecting the projector with the power net.....	38
4.5	Connecting a UPS with the projector electronics	40
4.6	Replacing the Mains board	42

About this chapter

This chapter briefly describes the mains input. This chapter gives an explanation on how to replace the mains board and how to (dis)connect the mains and UPS wiring.

4.1 About the mains board

Introduction

The mains input of the projector is located on the right side of the projector, near the rear side of the projector. The electrical connection with the local power net is fixed wired. The local power net is connected with a built-in 5-terminal strip. The power is applied to the mains board and split in several circuits (one for LDM 1, one for LDM 2 (if available) and one for the SMPS). There is also a connector (J10) that is connected to the Main board of the Card Cage.

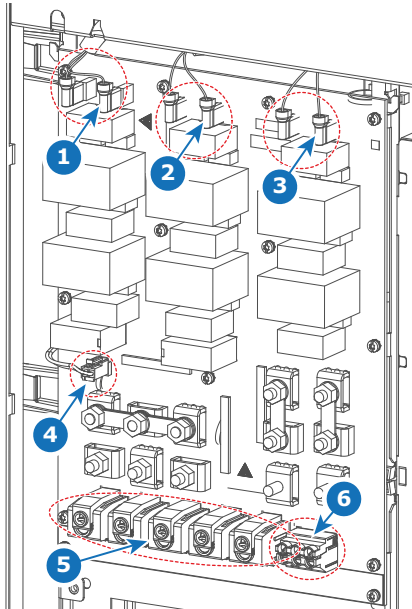


Image 4-1

- | | |
|---|---|
| <p>1 Connection to LDM 2 (if available)</p> <p>2 Connection to LDM 1</p> <p>3 Connection to SMPS</p> | <p>4 Connection to Main board of Card Cage</p> <p>5 5-terminal strip</p> <p>6 3-terminal strip for UPS</p> |
|---|---|

4.2 Accessing the mains board

Required tools

Torx screwdriver T20

How to access

1. Remove the right cover. For more info, see [“Removal of the operator side cover”, page 276](#).
2. Remove the two screws on the bottom of the net input cover (reference 1, [Image 4–2](#)). Use a T20 Torx screwdriver.
3. Lift the net input cover up and away from the projector.

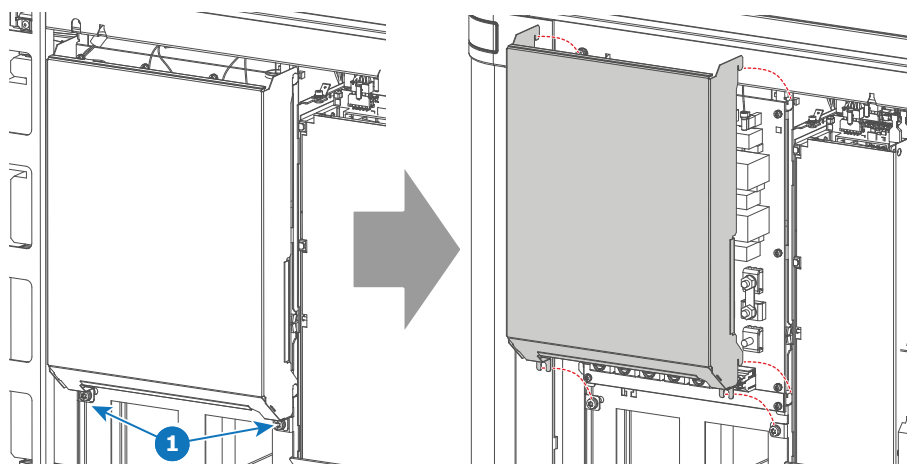


Image 4–2 Removal of the net input cover

4.3 Power input configuration of the projector

About the power input.

The power input of the projector can be configured in one of three different configurations, depending on the local power supply:

- In a **Y configuration** (3W+N+PE) for a three phase power supply of 200-240 V / 346-415 V. In this configuration, 346-415 V is measured between the lines while 200-240V is measured between the lines and the neutral.
- In a **Δ configuration** (3W+PE) for a three phase power supply of 200-240 V. In this configuration, 200-240 V is measured between the lines.
- In a **mono phase configuration** (L1+N+PE) for a mono phase power supply of 200-240 V. In this configuration, 200-240 V is measured between L1 and the neutral (N) or L2.

Before operating the projector, place the links in the correct position depending on the local power supply.

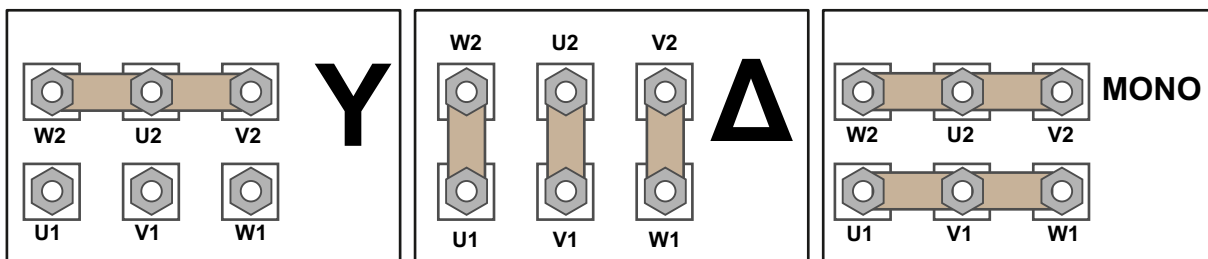


Image 4-3 From left to right: Y configuration, Δ configuration and mono phase configuration

Required tools

- Nut driver 10 mm
- Torque wrench with 10 mm hexagon socket

How to switch configurations

1. Loosen the top nuts on all the Y / Δ / mono configuration pins. (U1, U2, V1, V2, W1 and W2). Use a 10 mm nut driver.

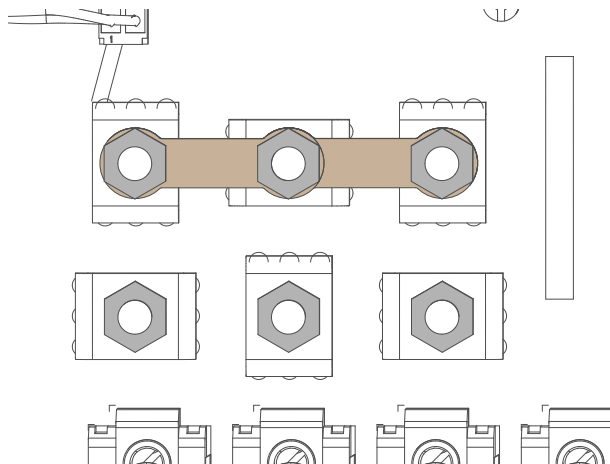


Image 4-4

2. Take off the four mounted links (A, B, C and D).
3. Mount the links as illustrated, depending on the configuration:
 1. **Y configuration:** Connect the upper pins with each other. Place two links between each pin (do not remove them).

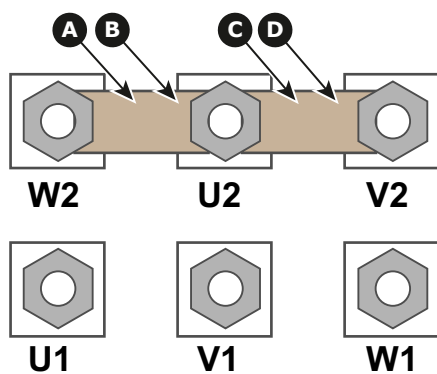


Image 4–5 Y configuration

2. **Δ configuration:** Connect the upper pins with the bottom pins as illustrated. Place two links between pin W2 and U1 (A and B).

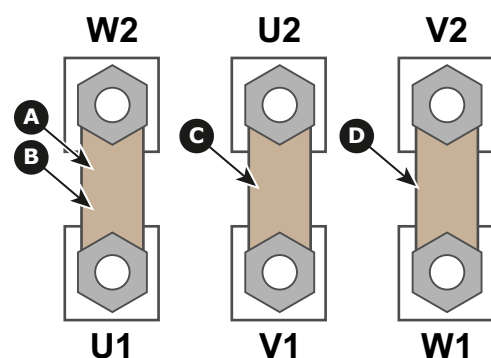


Image 4–6 Δ configuration

3. **Mono phase configuration:** Spread the four links over the six pins as illustrated. Make sure both the upper and lower pins are connected with each other.

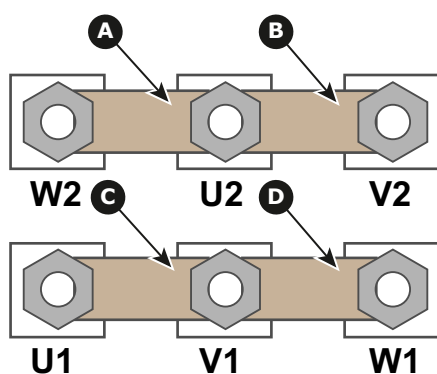


Image 4–7 Mono phase configuration

4. Turn a nut on each pin and secure with a torque wrench set to **3.5 Nm**.

4.4 Connecting the projector with the power net



WARNING: The total electrical installation should be protected by an appropriate rated and readily accessible disconnect switch, circuit breakers and ground fault current interrupters. The installation shall be done according to the local electrical installation codes.



CAUTION: ALL POWER CONNECTIONS to the SP4K-C projector are made to the five-terminal strip located on the mains board behind the operator side cover and mains cover of the projector.



CAUTION: The cross-sectional area of the conductors in the Power Supply Cord shall be not less than 4 mm² or AWG 10.

Required tools

- Flat screwdriver
- Open-end wrench 30 mm
- Torx screwdriver T20

Required parts

- Certified AC power supply cord 4 mm², 10 AWG, min. 300 V (in case of mono phase or Δ configuration)
- Certified AC power supply cord 4 mm², 10 AWG, min. 500 V (in case of Y configuration)

How to connect the main AC power with the projector

1. Make sure the net input cover has been removed. For more info, see [“Accessing the mains board”, page 35](#).
2. Guide the AC power cord (reference 2) through the cable gland (reference 3).
3. Connect the wires (references 4 and 5) to the 5-terminal strip (reference 6) as illustrated. Use a torque screwdriver to fasten the screws of the 5-terminal strip with a torque of **3.3 Nm**.



Warning: Always connect the PE wire (reference 4) first, then the other wires.

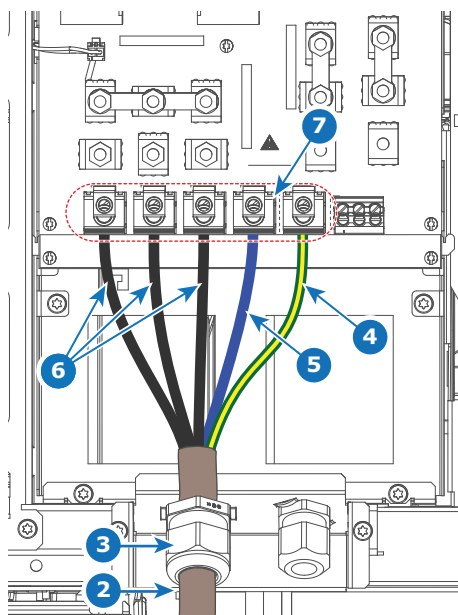


Image 4–8

- 2 AC Power cord
- 3 Cable gland
- 4 Protected Earth (PE) wire

- 5 Neutral (N) wire
- 5 Phases wiring (L1–L3)
- 6 5-terminal strip



Tip: Check for good fixation by pulling on each wire.

4. Secure the AC power cord by fastening the cable gland (reference 3). Use a 30 mm open-end wrench.
5. Place the net input cover back and seal it. Tighten the two screws (reference 1), using a T20 Torx screwdriver.

4.5 Connecting a UPS with the projector electronics



WARNING: Only use UPS units which are suitable for the SP4K-C series projector. See chapter *Installation requirements*, for more information about the requirements of the UPS.



CAUTION: The electrical connection with the UPS INLET socket of the projector must be done with a certified AC power supply cord (minimum 1.50 mm² or 14 AWG and minimum 300V)



The projector is configured by default for use without UPS.

Required tools

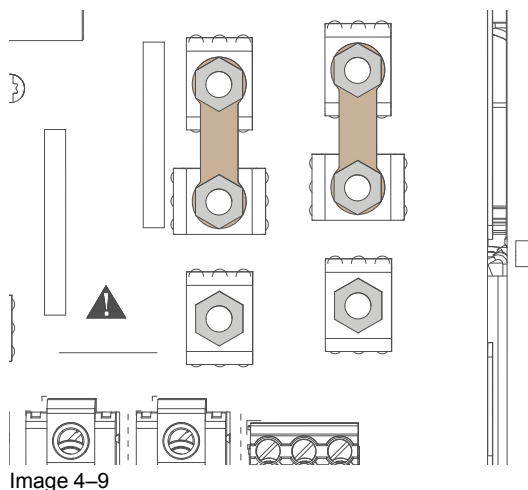
- Torx screwdriver T20
- Flat screwdriver
- Open-end wrench 24 mm
- Nut driver 10 mm
- Torque wrench with 10 mm hexagon socket

Required parts

Certified AC power supply cord 1.5 mm², 14 AWG, min 300 V

How to connect a UPS unit with the projector electronics?

1. Make sure the net input cover has been removed. For more info, see [“Accessing the mains board”, page 35](#).
2. Loosen the top nuts on the six UPS configuration pins. Use a 10 mm nut driver.



3. Replace the links as illustrated.

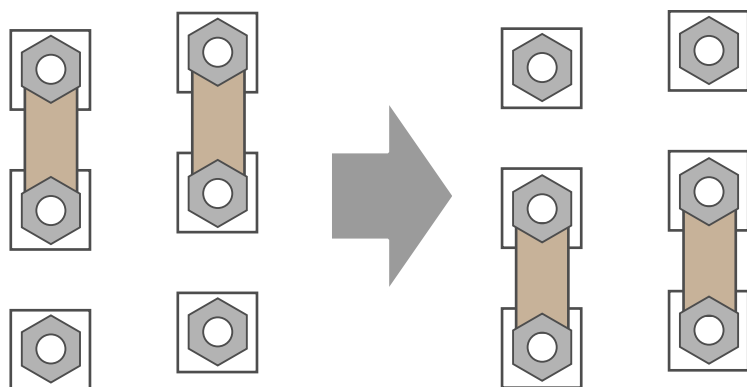


Image 4–10

4. Guide the AC power cord (reference 2) through the cable gland (reference 3). Connect the wires (references 4 and 5) to the 3-terminal strip (reference 6) as illustrated. Use a torque screwdriver to fasten the screws of the 3-terminal strip with a torque of **1.7Nm** (1.25 lbf*ft).



Warning: Always connect the PE wire (reference 4) first, then the other wires.

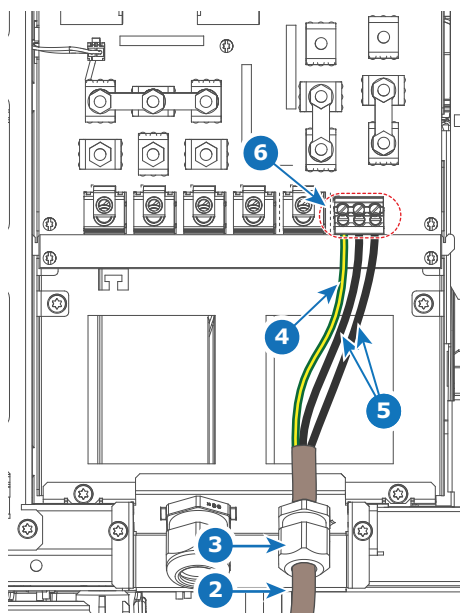


Image 4–11

- 2 UPS Power cord
- 3 Cable gland
- 4 PE wire

- 5 Other power wires
- 6 3-terminal strip



Tip: Check for good fixation by pulling on each wire.

5. Secure the AC power cord by fastening the cable gland (reference 3). Use a 24 mm open-end wrench.
6. Place the net input cover back and seal it. Tighten the two screws (reference 1), using a T20 Torx screwdriver.

4.6 Replacing the Mains board

Required tools

Torx screwdriver T20

How to replace

1. Remove the Mains Input cover. For more info, see [“Accessing the mains board”, page 35](#).
2. Remove the power wiring from the 5–terminal strip (reference 5) or UPS wiring from the 3–terminal strip (reference 6).
3. Disconnect all connectors on the board. This includes the power connectors on top (references 1, 2 and 3), and the connector in the middle of the board (reference 4).

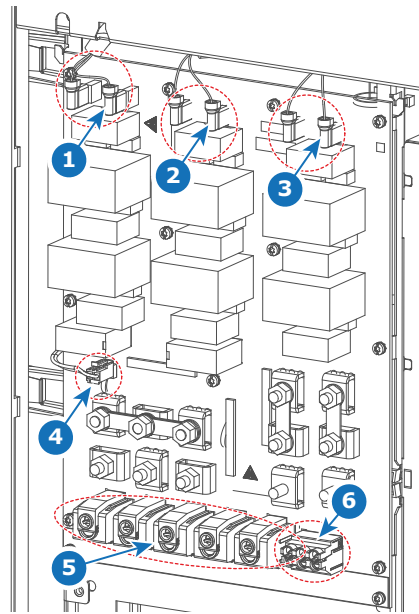


Image 4–12

- 1 Connection to LDM 2 (if available)
- 2 Connection to LDM 1
- 3 Connection to SMPS

- 4 Connection to Main board of Card Cage
- 5 5–terminal strip
- 6 3–terminal strip for UPS

4. Remove all 13 Torx screws, holding the mains board onto the projector. Use a T20 Torx screwdriver to loosen the screws.
5. Replace the mains board as illustrated.

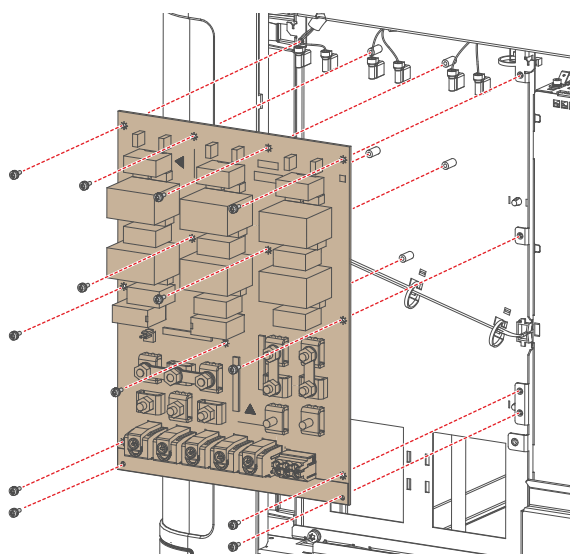


Image 4–13 Replacing the mains board

6. Tighten the new mains board in the same location, using the 13 screws. Use a T20 Torx screwdriver to tighten the screws.
7. Reconnect the power connectors on top for the SMPS, LDM 1 and LDM 2 (if used) (references 3, 2 and 1 respectively, [Image 4–12](#)), as well as the connection to the card cage main board (reference 4).
8. Reconnect the power wiring or UPS wiring. For more information on the power wiring, see [“Connecting the projector with the power net”, page 38](#). For more information on the UPS wiring, see [“Connecting a UPS with the projector electronics”, page 40](#).
9. Mount the mains cover. Use a T20 screwdriver to tighten the two screws.

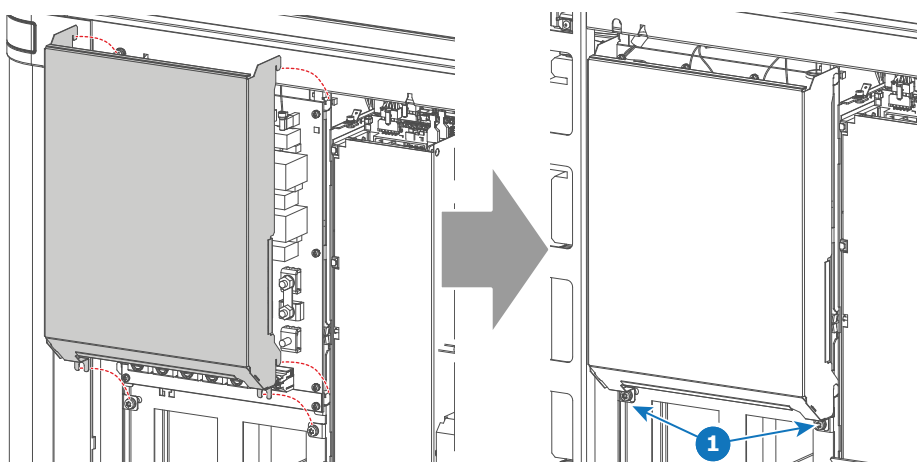


Image 4–14

10. Mount the right side cover. For more info, see [“Mounting the operator side cover”, page 281](#)..

Laser Driver Modules

5

5.1	About the Laser Driver Modules	46
5.2	LDM driver board location and mapping	47
5.3	Removing an LDM	50
5.4	Replacing a driver board in an LDM unit	52
5.5	Removing a fan from an LDM	55
5.6	Installing a new fan onto an LDM	58
5.7	Replacing an LDM	61
5.8	Installing an LDM	64

About this chapter

This chapter briefly describes the SP4K-C Laser Driver Modules (LDM). This chapter gives an explanation on how to replace an LDM, its boards and its fans.

5.1 About the Laser Driver Modules

LDM location

To power each Laser bank, one or two Laser Driver Modules (LDMs) have been provided to the projector. The LDMs are located on the right side of the projector and the number depends on the projector type. The 10k and 15k projectors have only one LDM (LDM1). The other variants have two LDMs (LDM1 and LDM2).

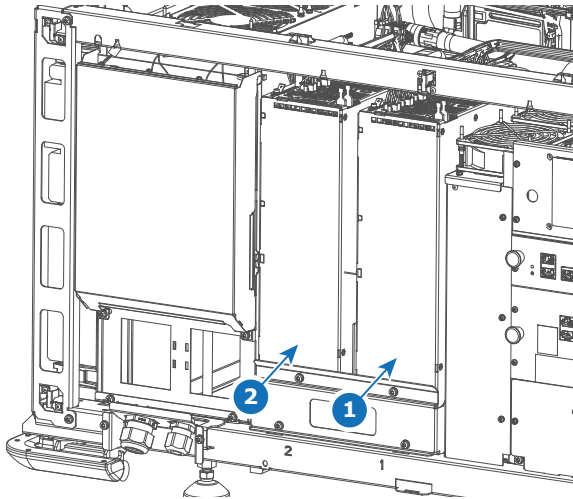


Image 5-1

- 1 LDM 1 location
- 2 LDM 2 location



CAUTION: Make sure to not mix up driver boards with other types. The driver boards have different power and current specs. Placing the wrong driver board in a slot could generate errors and could potentially damage the projector electronics. For the correct position of each driver board, see [“LDM driver board location and mapping”, page 47](#)

5.2 LDM driver board location and mapping

LDM driver board location

In each SP4K-C projector there is at least one Laser Driver Module, with several driver boards mounted in them. Take the following into account:

- Blue Laser driver boards can be swapped with other Blue Laser drivers boards
- Red Laser driver boards can be swapped with other Red Laser driver boards from SP4K-C series projectors. They however can NOT be swapped with Red Laser driver boards from other projectors.
- Blue Laser drivers can NOT be swapped with Red Laser drivers and vice versa.
- The +24V module can NOT be swapped with any of the other boards.

Since there are different types of driver boards used in an LDM, the following images should help you identify which board is located in which position:

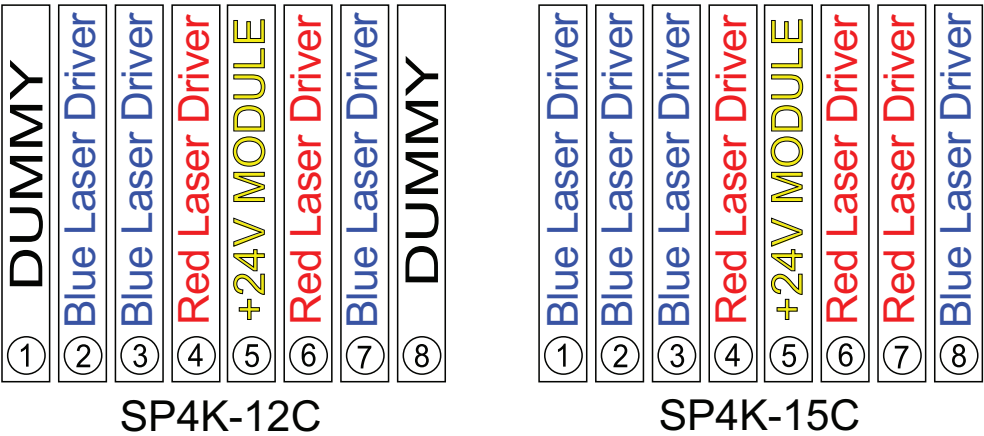


Image 5–2 LDM mapping of the 12C and 15C

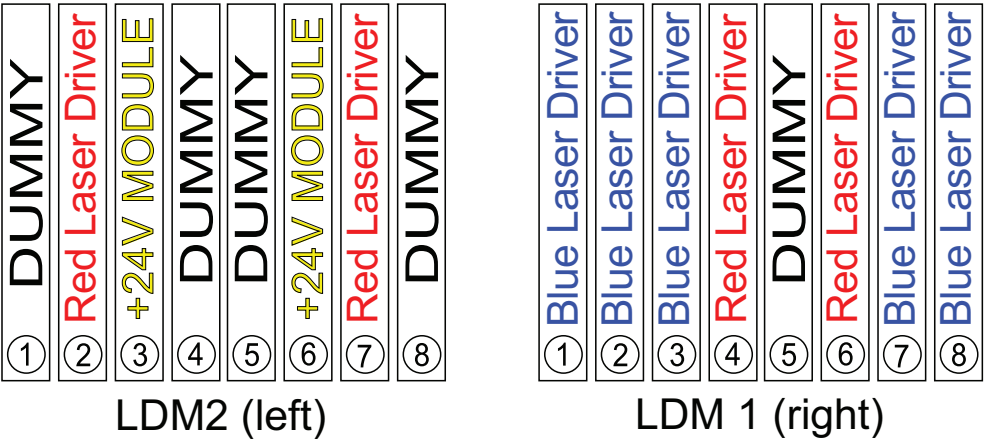


Image 5–3 LDM mapping of both the 20C and the 25C



CAUTION: Make sure to not mix up driver boards with other types. The driver boards have different power and current specs. Placing the wrong driver board in a slot could generate errors and could potentially damage the projector electronics.

LDM driver board vs laser bank mapping

The laser plates of the projector are powered by a certain laser driver board. Use the following tables to figure out which LDM driver board drives which laser plate.

Mapping for **SP4K-12C**:

Laser Plate – Laser bank	LDM – Driver Board	Laser Plate – Laser bank	LDM – Driver Board
Plate 1 (Blue) — Bank 1	LDM 1 – 2	Plate 4 (Green) – Bank 3	LDM 1 – 7
Plate 1 (Blue) — Bank 2	LDM 1 – 3	Plate 7 (Red) – Bank 1	LDM 1 – 4
Plate 3 (Green) – Bank 1	LDM 1 – 2	Plate 7 (Red) – Bank 2	LDM 1 – 4
Plate 3 (Green) – Bank 2	LDM 1 – 2	Plate 7 (Red) – Bank 3	LDM 1 – 4
Plate 3 (Green) – Bank 3	LDM 1 – 3	Plate 9 (Red) – Bank 1	LDM 1 – 6
Plate 4 (Green) – Bank 1	LDM 1 – 3	Plate 9 (Red) – Bank 2	LDM 1 – 6
Plate 4 (Green) – Bank 2	LDM 1 – 7	Plate 9 (Red) – Bank 3	LDM 1 – 6

Mapping for **SP4K-15C**:

Laser Plate – Laser bank	LDM – Driver Board	Laser Plate – Laser bank	LDM – Driver Board
Plate 1 (Blue) — Bank 1	LDM 1 – 2	Plate 6 (Green) – Bank 2	LDM 1 – 8
Plate 1 (Blue) — Bank 2	LDM 1 – 3	Plate 7 (Red) – Bank 1	LDM 1 – 4
Plate 3 (Green) – Bank 1	LDM 1 – 2	Plate 7 (Red) – Bank 2	LDM 1 – 4
Plate 3 (Green) – Bank 2	LDM 1 – 2	Plate 8 (Red) – Bank 1	LDM 1 – 6
Plate 4 (Green) – Bank 1	LDM 1 – 1	Plate 8 (Red) – Bank 2	LDM 1 – 6
Plate 4 (Green) – Bank 2	LDM 1 – 1	Plate 9 (Red) – Bank 1	LDM 1 – 6
Plate 5 (Green) – Bank 1	LDM 1 – 3	Plate 9 (Red) – Bank 2	LDM 1 – 7
Plate 5 (Green) – Bank 2	LDM 1 – 3	Plate 10 (Red) – Bank 1	LDM 1 – 7
Plate 6 (Green) – Bank 1	LDM 1 – 8	Plate 10 (Red) – Bank 2	LDM 1 – 7

Mapping for **SP4K-20C**:

Laser Plate – Laser bank	LDM – Driver Board	Laser Plate – Laser bank	LDM – Driver Board
Plate 1 (Blue) — Bank 1	LDM 1 – 2	Plate 6 (Green) – Bank 1	LDM 1 – 8
Plate 1 (Blue) — Bank 2	LDM 1 – 3	Plate 6 (Green) – Bank 2	LDM 1 – 8
Plate 1 (Blue) — Bank 3	LDM 1 – 7	Plate 7 (Red) – Bank 1	LDM 1 – 4
Plate 3 (Green) – Bank 1	LDM 1 – 2	Plate 7 (Red) – Bank 2	LDM 1 – 4
Plate 3 (Green) – Bank 2	LDM 1 – 2	Plate 8 (Red) – Bank 1	LDM 2 – 2
Plate 3 (Green) – Bank 3	LDM 1 – 3	Plate 8 (Red) – Bank 2	LDM 2 – 2
Plate 4 (Green) – Bank 1	LDM 1 – 1	Plate 8 (Red) – Bank 3	LDM 2 – 2
Plate 4 (Green) – Bank 2	LDM 1 – 1	Plate 9 (Red) – Bank 1	LDM 1 – 6
Plate 5 (Green) – Bank 1	LDM 1 – 3	Plate 9 (Red) – Bank 2	LDM 1 – 6
Plate 5 (Green) – Bank 2	LDM 1 – 7	Plate 10 (Red) – Bank 1	LDM 2 – 7
Plate 5 (Green) – Bank 3	LDM 1 – 7	Plate 10 (Red) – Bank 2	LDM 2 – 7
		Plate 10 (Red) – Bank 3	LDM 2 – 7

Mapping for **SP4K-25C**:

Laser Plate – Laser bank	LDM – Driver Board	Laser Plate – Laser bank	LDM – Driver Board
Plate 1 (Blue) — Bank 1	LDM 1 – 2	Plate 6 (Green) – Bank 3	LDM 1 – 8
Plate 1 (Blue) — Bank 2	LDM 1 – 3	Plate 7 (Red) – Bank 1	LDM 1 – 4

Laser Plate – Laser bank	LDM – Driver Board	Laser Plate – Laser bank	LDM – Driver Board
Plate 1 (Blue) — Bank 3	LDM 1 – 7	Plate 7 (Red) – Bank 2	LDM 1 – 4
Plate 3 (Green) – Bank 1	LDM 1 – 2	Plate 7 (Red) – Bank 3	LDM 1 – 4
Plate 3 (Green) – Bank 2	LDM 1 – 2	Plate 8 (Red) – Bank 1	LDM 2 – 2
Plate 3 (Green) – Bank 3	LDM 1 – 3	Plate 8 (Red) – Bank 2	LDM 2 – 2
Plate 4 (Green) – Bank 1	LDM 1 – 1	Plate 8 (Red) – Bank 3	LDM 2 – 2
Plate 4 (Green) – Bank 2	LDM 1 – 1	Plate 9 (Red) – Bank 1	LDM 1 – 6
Plate 4 (Green) – Bank 3	LDM 1 – 1	Plate 9 (Red) – Bank 2	LDM 1 – 6
Plate 5 (Green) – Bank 1	LDM 1 – 3	Plate 9 (Red) – Bank 3	LDM 1 – 6
Plate 5 (Green) – Bank 2	LDM 1 – 7	Plate 10 (Red) – Bank 1	LDM 2 – 7
Plate 5 (Green) – Bank 3	LDM 1 – 7	Plate 10 (Red) – Bank 2	LDM 2 – 7
Plate 6 (Green) – Bank 1	LDM 1 – 8	Plate 10 (Red) – Bank 3	LDM 2 – 7
Plate 6 (Green) – Bank 2	LDM 1 – 8		

5.3 Removing an LDM

Required tools

Torx screwdriver T20

How to remove an LDM

1. Remove the top cover and operator side cover.
2. Remove the LDM bracket as illustrated. Use a T20 Torx screwdriver to loosen the screw.

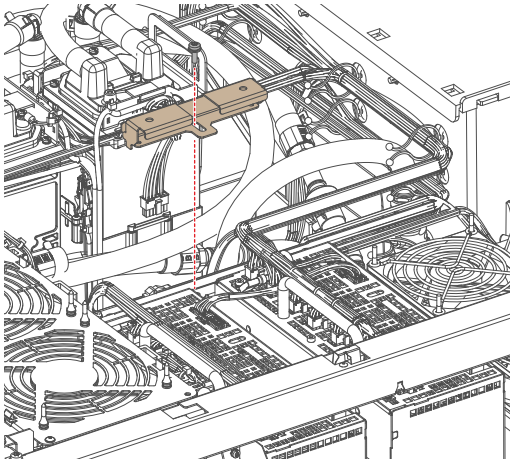


Image 5-4

3. Remove the fixation screw on the bottom of the projector. Use a T20 Torx screwdriver.

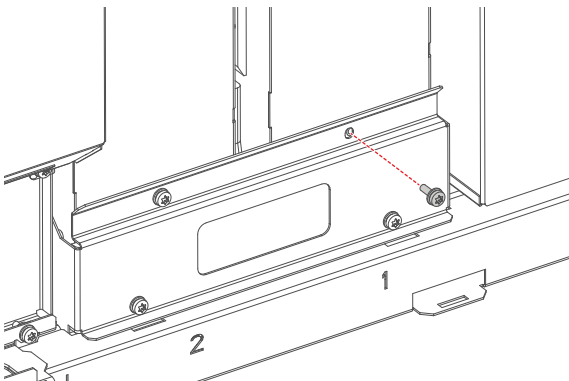


Image 5-5 Removing the captive screw of LDM 1

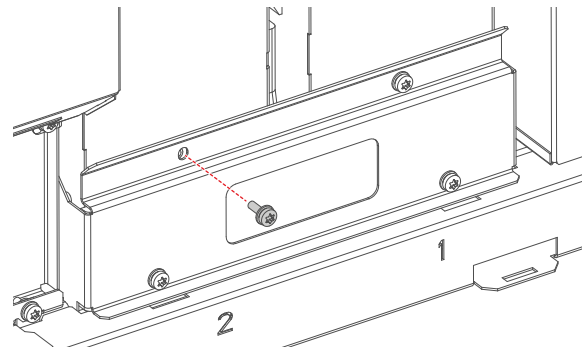


Image 5-6 Removing the captive screw of LDM 2

4. Disconnect all wiring to the LDM.
5. Carefully lift up the LDM and remove it from the projector.

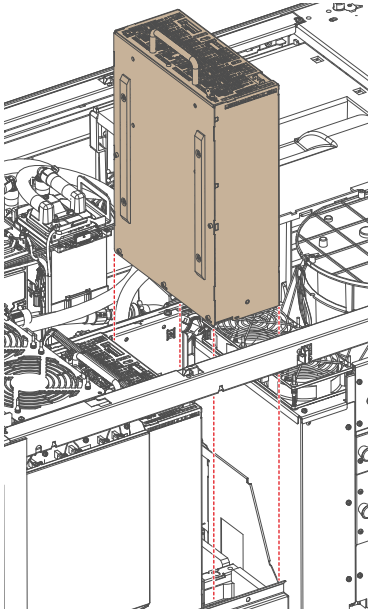


Image 5-7 Removing LDM 1

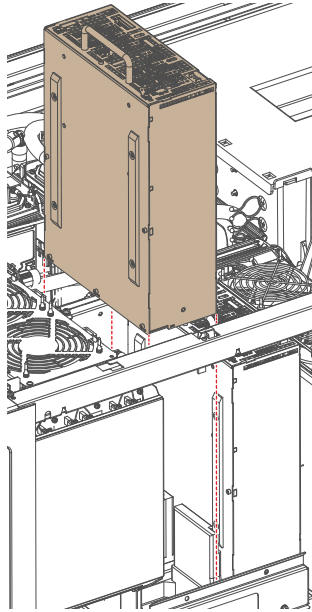


Image 5-8 Removing LDM 2



Tip: If there's insufficient space above the projector to lift the LDM upwards, you can also tilt the LDM and remove it from the user input side.

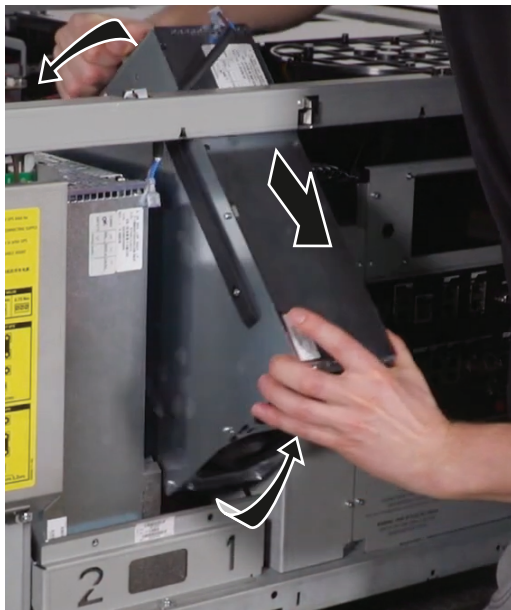


Image 5-9

5.4 Replacing a driver board in an LDM unit



CAUTION: This procedure assumes the Laser Driver Module is removed from the projector chassis.



This procedure follows the example of one specific driver board. This procedure is identical for every other driver board and power module in both LDM units.

Required tools

Allen wrench 2.5 mm

Required parts

- Spare driver board
- Spare fuse

How to remove a laser driver board

1. Flip the module upside down.
2. Remove all screws, washers and tabs holding the bottom plate to the module. Use a 2.5 mm Allen wrench.

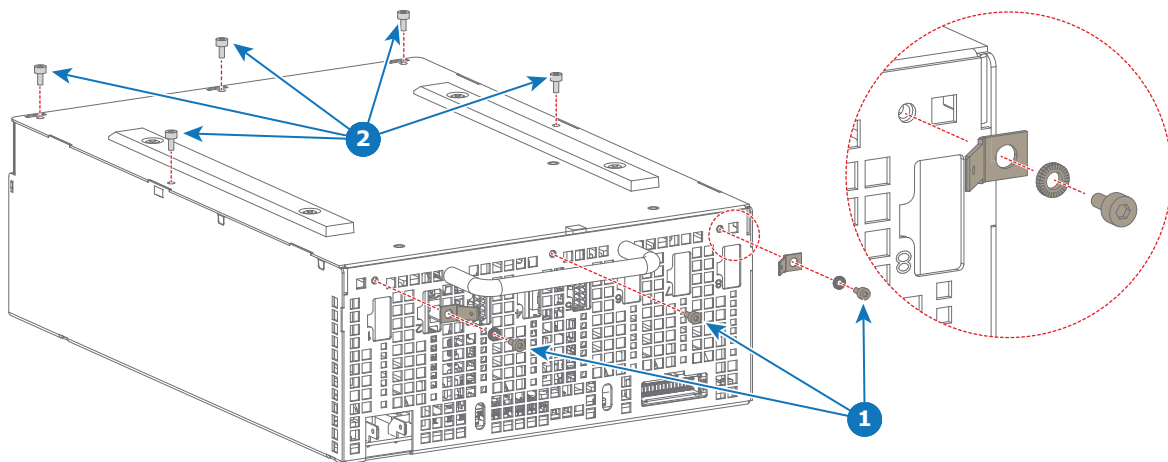


Image 5–10 Removing the screws, washers and tabs from an LDM

3. Remove the bottom plate, insulation and the fixation rails as illustrated.

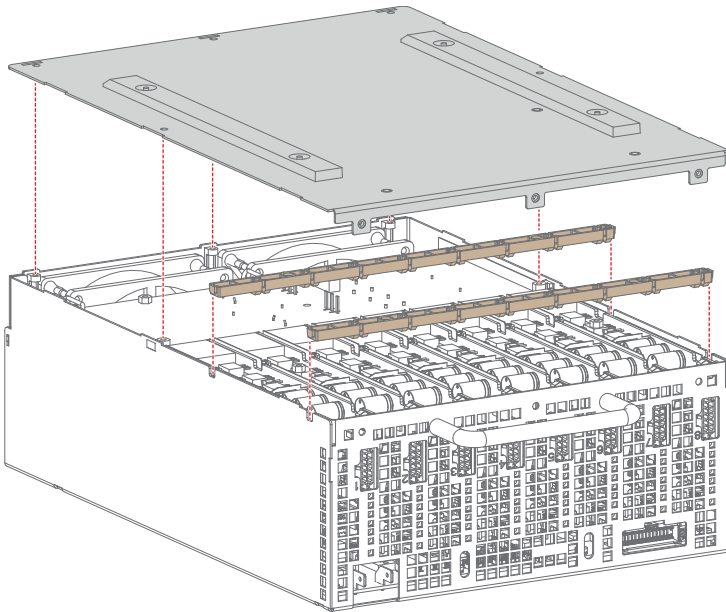


Image 5–11 Removing the bottom plate and rails

4. Unplug and remove the desired driver board.

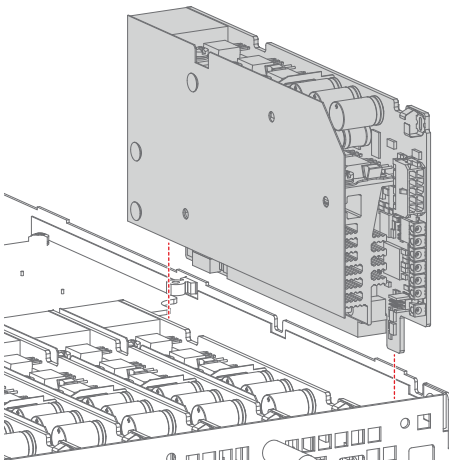


Image 5–12 Example of a removed driver board

5. Measure the fuse behind the board plug. If the fuse has blown, remove it as well.

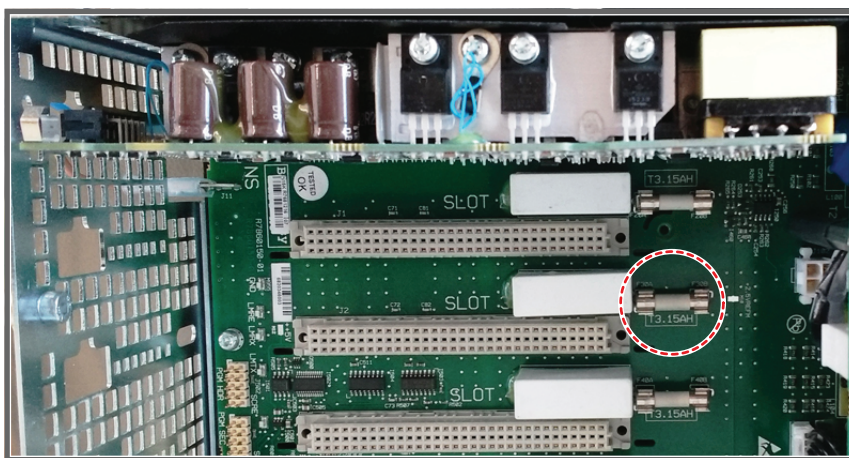


Image 5–13 Example of the location of the fuse

How to install a new driver board

1. If the old fuse has been removed, replace it with a new one, provided in the spare part kit of the driver board.
2. Plug in the new laser driver board as illustrated.

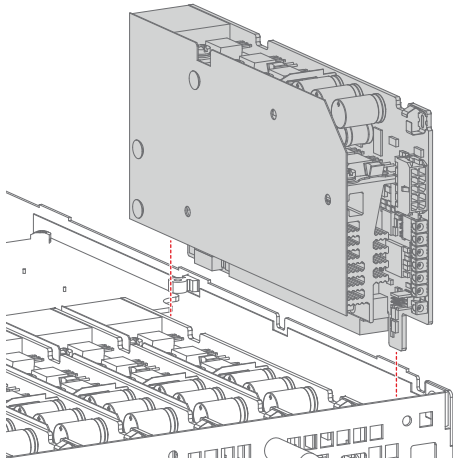


Image 5–14 Example of mounting a driver board

! **Caution:** Make sure the new Laser Driver Board is properly clicked in the board connection.

3. Place both fixation rails back on top of the laser driver boards.
4. Place the insulation and bottom plate back on the LDM.
5. Tighten all five screws back onto the top of the bottom plate (reference 1, [Image 5–15](#)).
6. Tighten all three screws back on the front side of the LDM (reference 2, [Image 5–15](#)).

! **Caution:** Make sure not to forget the two washers and rivet mounts on the outer side of the LDM.

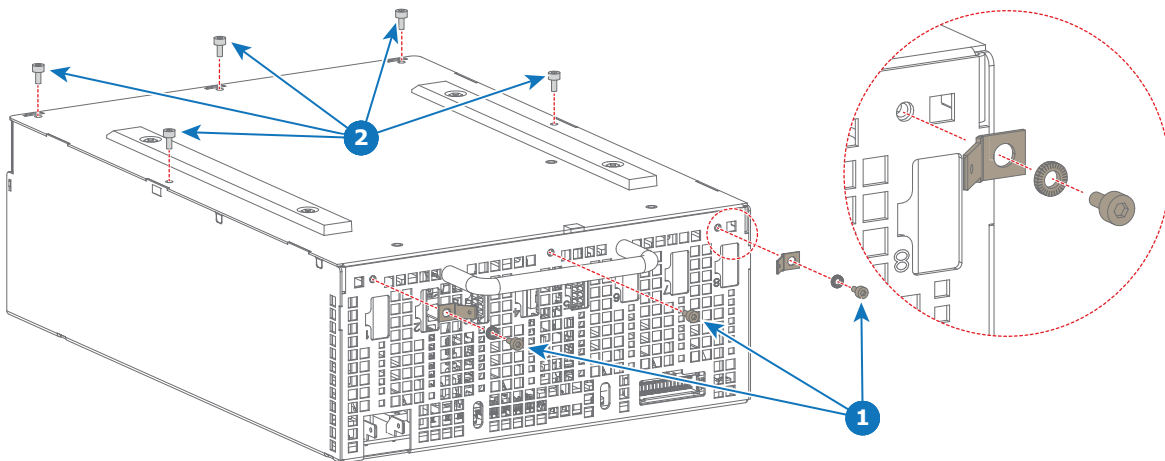


Image 5–15 Mounting back the screws on the LDM

5.5 Removing a fan from an LDM

Required tools

Allen wrench 2.5 mm

How to replace a fan from an LDM

1. Flip the Module upside down.
2. Remove all screws, washers and tabs holding the bottom plate to the module. Use a 2.5 mm Allen wrench.

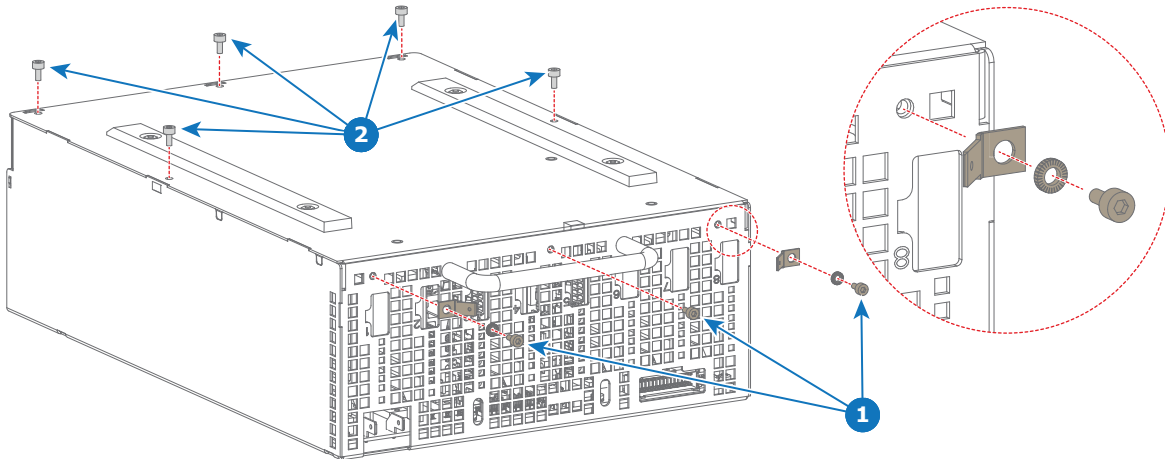


Image 5–16

3. Remove the bottom plate.

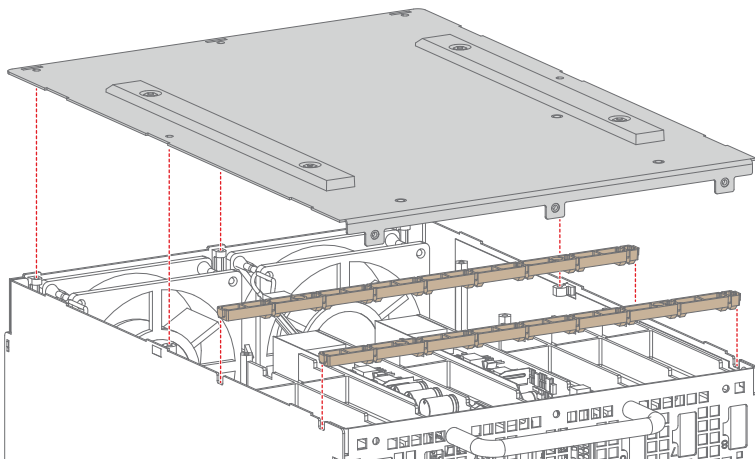


Image 5–17

4. Remove the five screws, holding the fan assembly onto the module. Use a 2.5 mm Allen wrench.

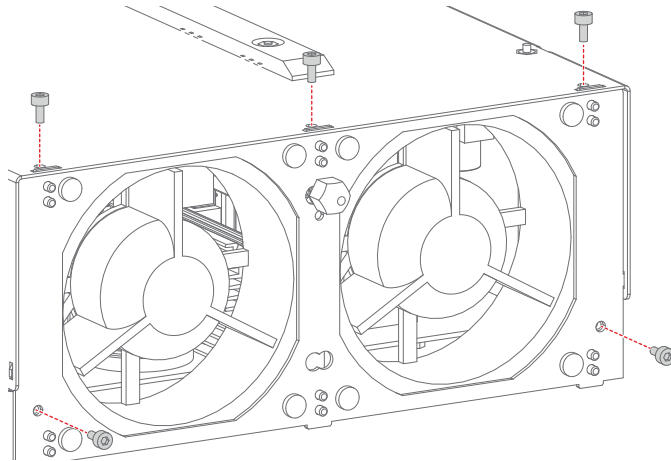


Image 5-18

5. Unplug the fan cable of the desired fan.

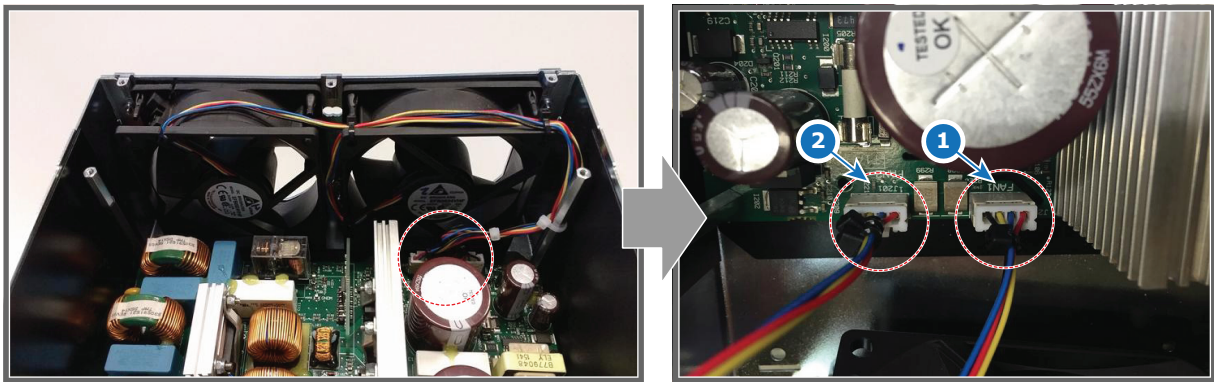


Image 5-19

- 1 Fan 1
- 2 Fan 2

6. Remove the fan assembly.

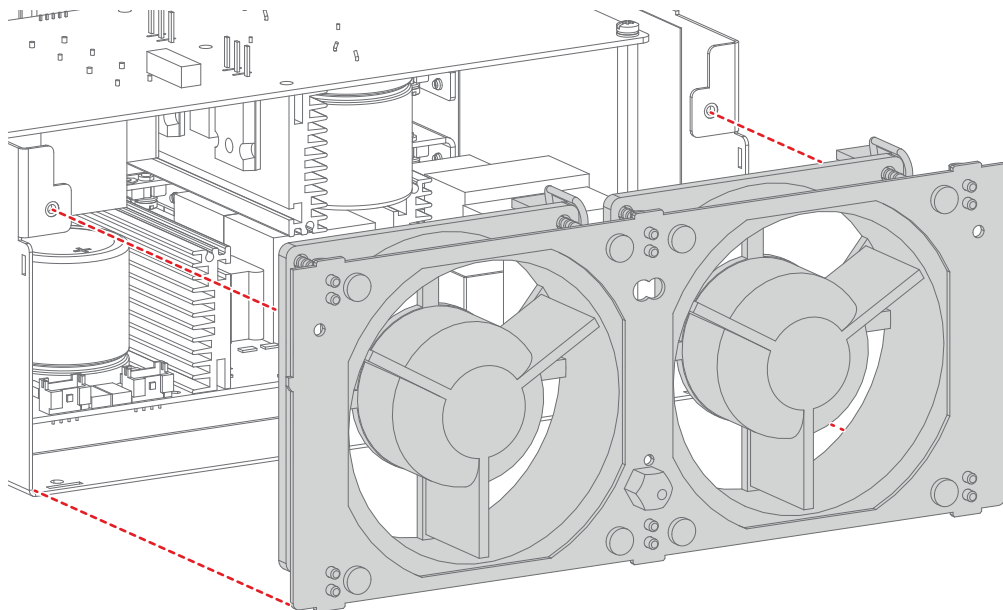


Image 5-20

7. Unplug the desired fan from the fan assembly as illustrated.

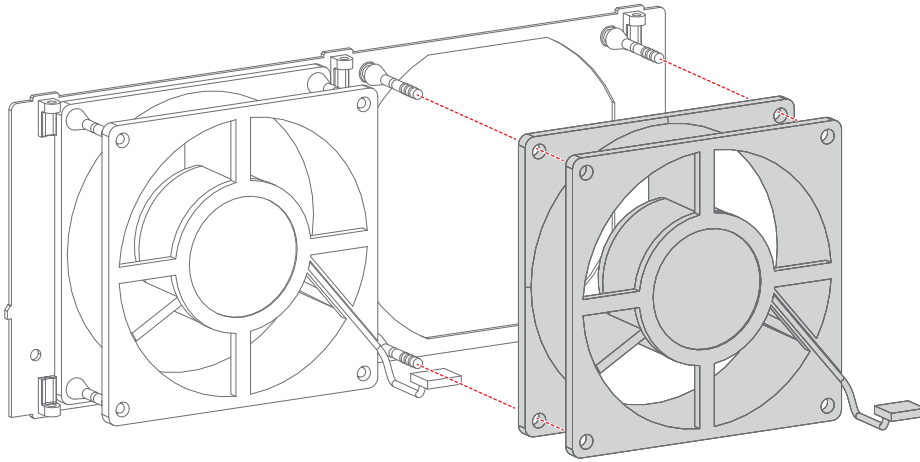


Image 5-21

5.6 Installing a new fan onto an LDM



CAUTION: This procedure assumes that the fan assembly has been disassembled from the LDM. Refer to [“Removing a fan from an LDM”, page 55](#).

Required tools

Allen wrench 2.5 mm

How to install a new fan onto the LDM

1. Plug the new fan onto the snap rivets of the fan assembly as illustrated.

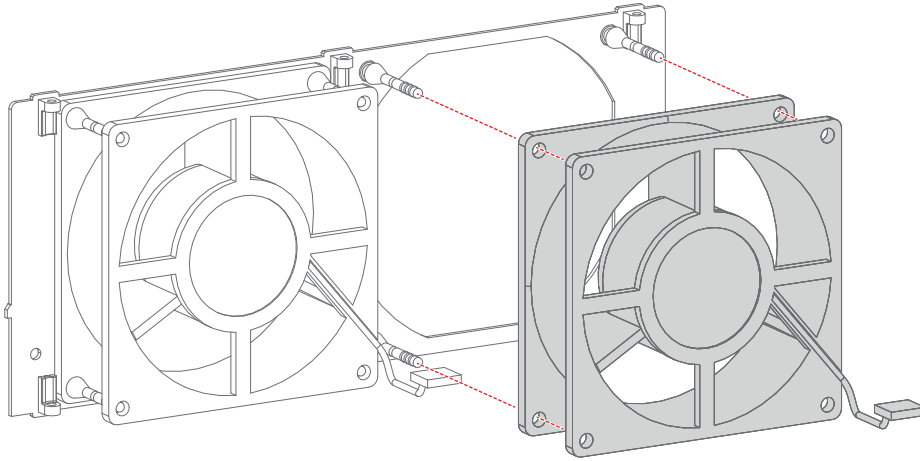


Image 5–22

2. Place the fan assembly back into the LDM.

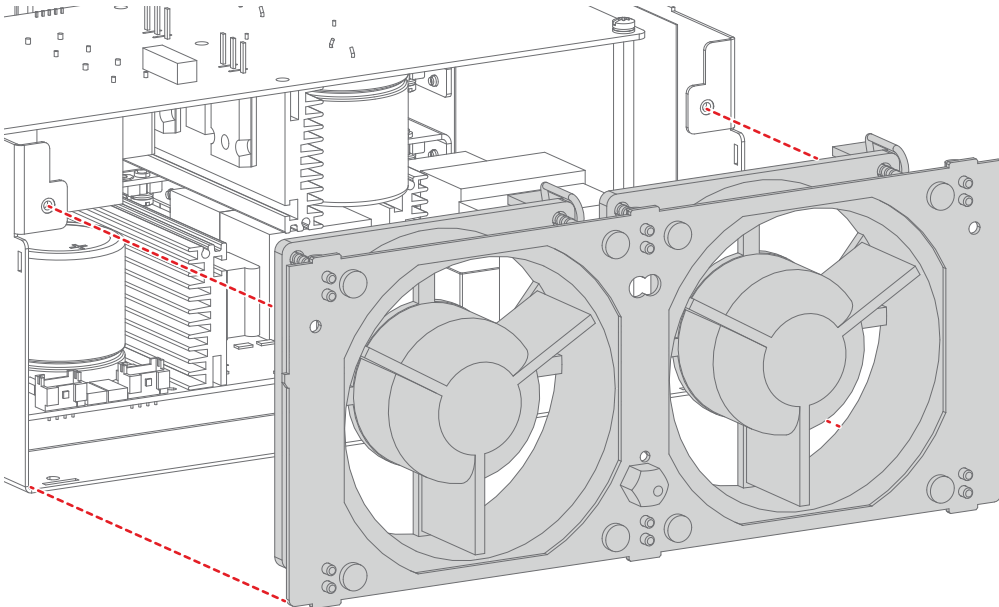


Image 5–23

3. Connect the fan cable of the new fan.

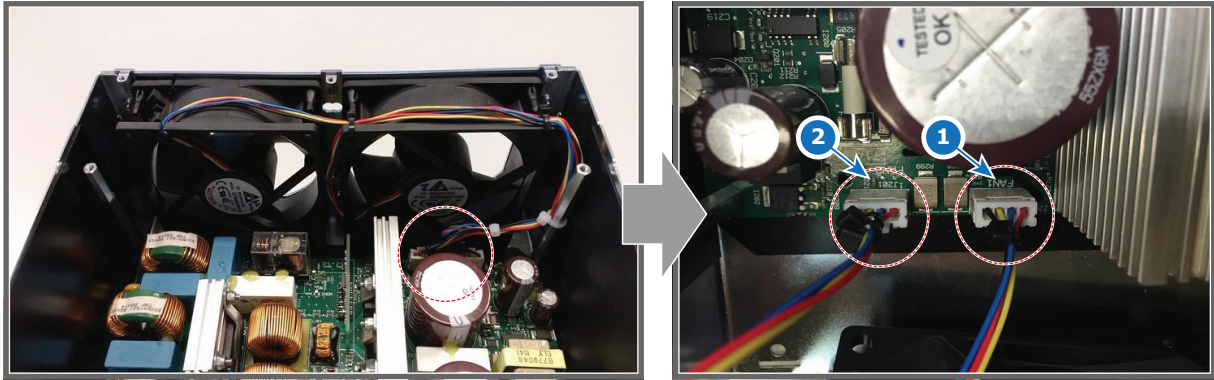


Image 5-24

- 1 Fan 1
- 2 Fan 2

4. Install the five screws, holding the fan assembly onto the module. Use a 2.5 mm Allen wrench.



Tip: There are three screws on the top plate and two screws on the back plate.

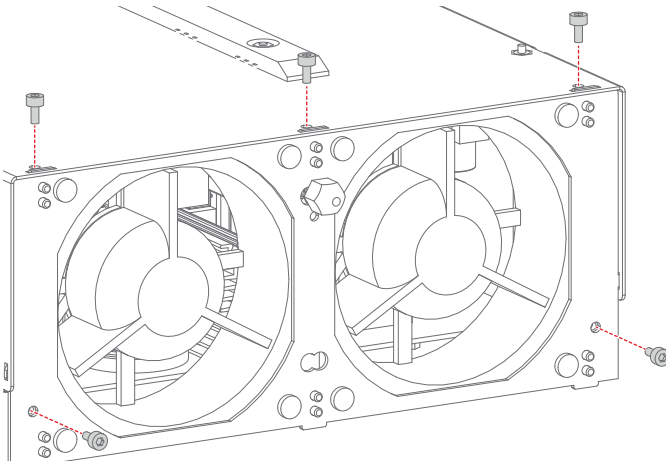


Image 5-25

5. Flip the module and place the bottom plate back in its place.

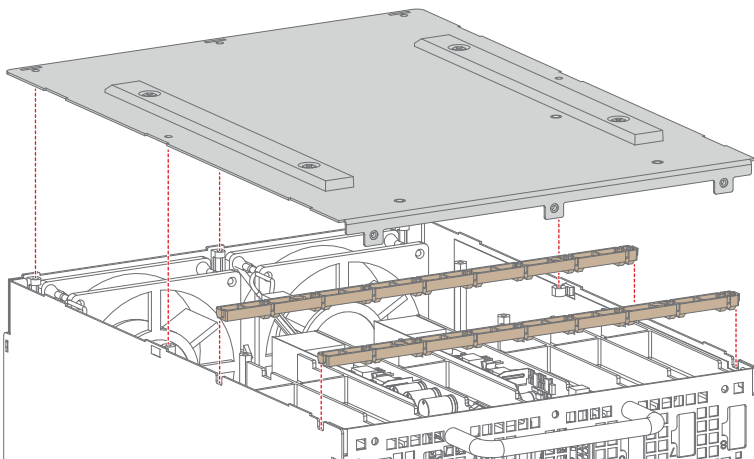


Image 5-26

6. Tighten all five screws back onto the top of the bottom plate.
7. Tighten all three screws back on the front side of the LDM.



Caution: Make sure not to forget the two washers and rivet mounts on the outer side of the Module.

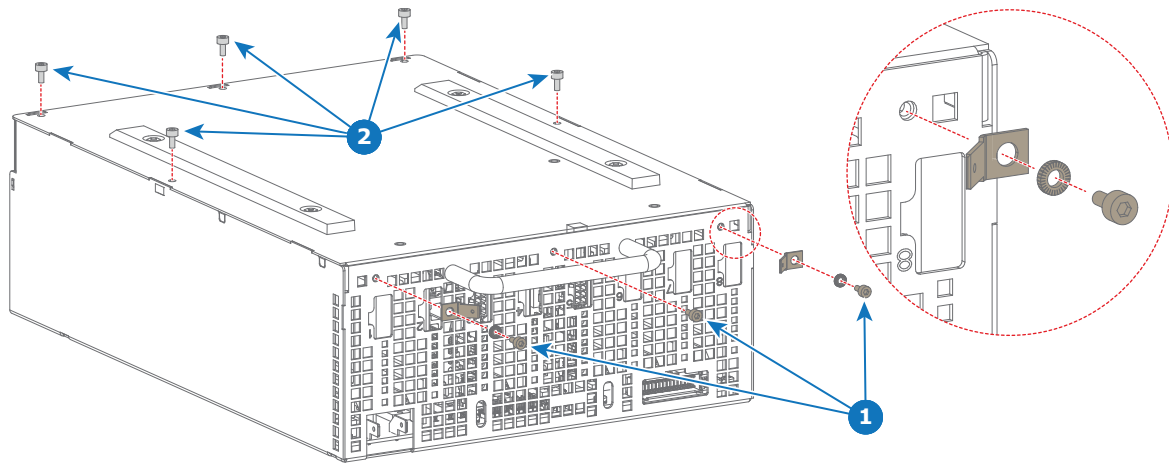


Image 5-27

5.7 Replacing an LDM

Required tools

Allen wrench 2.5 mm

How to replace the module of the LDM

1. Remove all LDM boards from the old Laser Drive Module. Refer to “[Replacing a driver board in an LDM unit](#)”, page 52.
2. Remove all screws, washers and tabs holding the bottom plate to the module. Use a 2.5 mm Allen wrench.

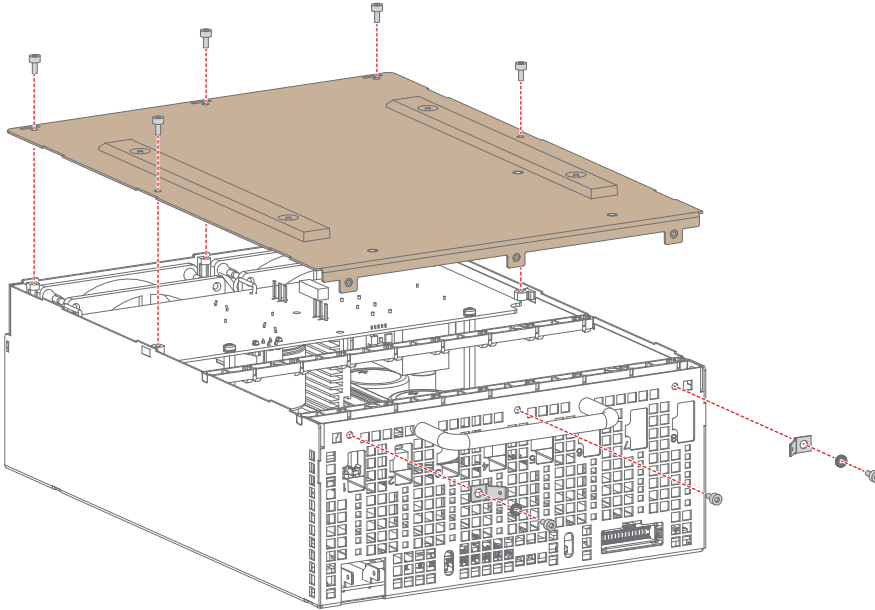


Image 5–28

3. Remove the bottom plate and the fixation rails as illustrated.

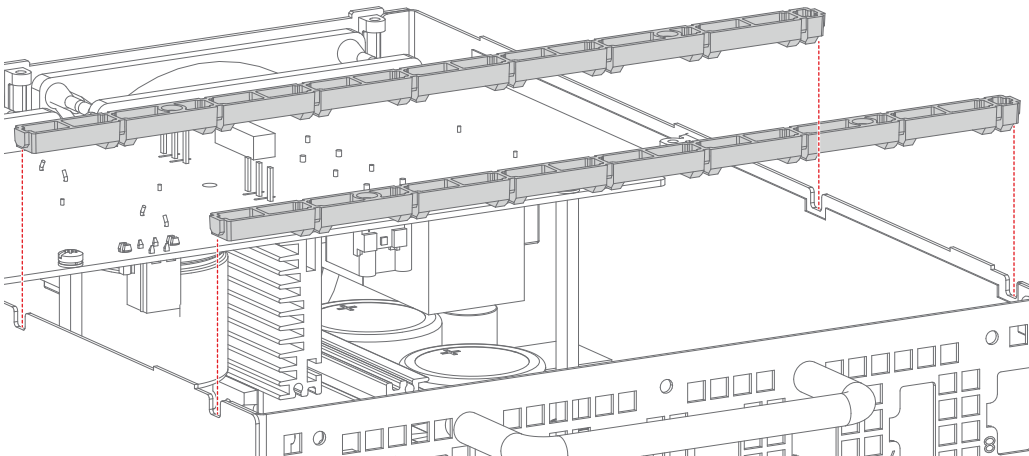


Image 5–29

4. Mount all LDM boards into the new module.

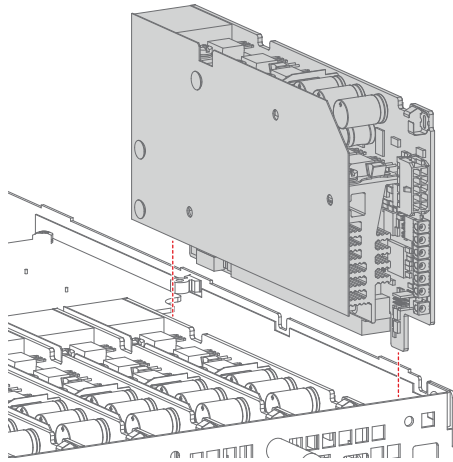


Image 5-30

5. Place both fixation rails back on top of the Laser Driver Boards.
6. Place the bottom plate back on the Module.

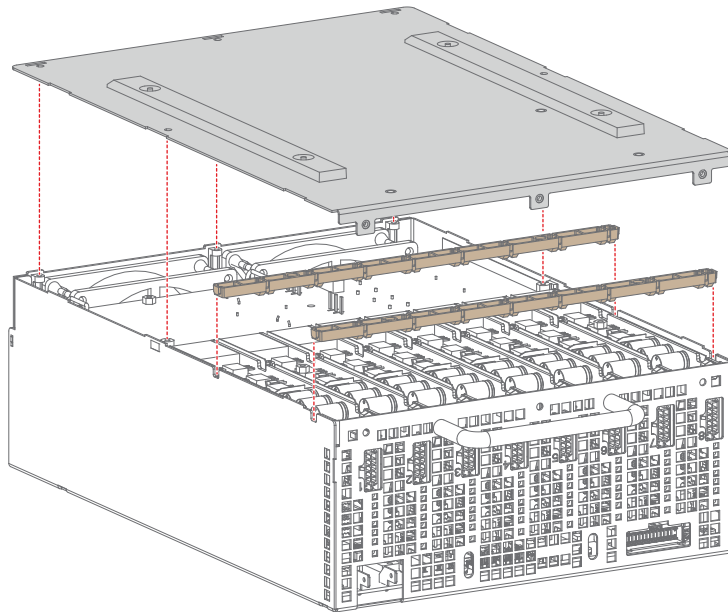


Image 5-31

7. Tighten all five screws back onto the top of the bottom plate.
8. Tighten all three screws back on the front side of the Module.



Caution: Make sure not to forget the two washers and rivet mounts on the outer side of the Module.

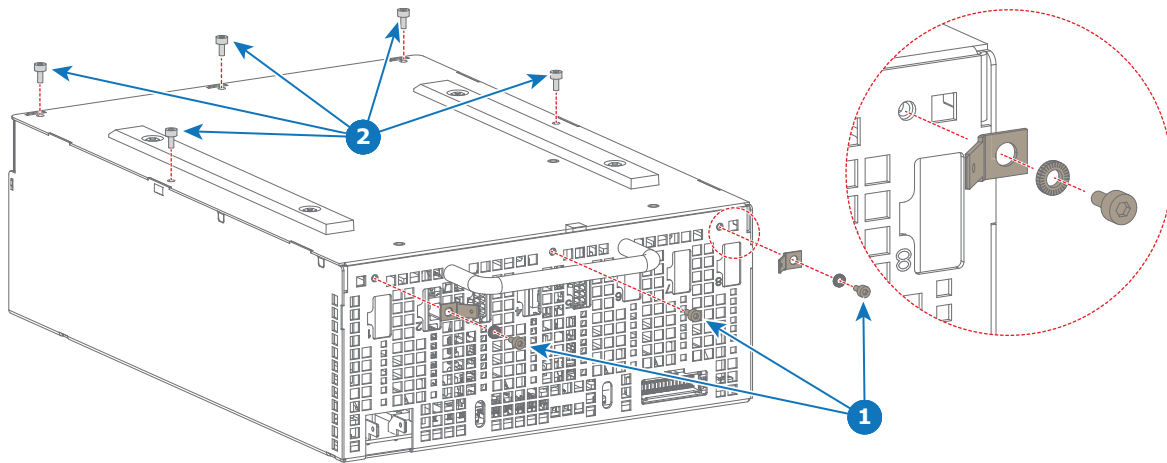


Image 5-32

5.8 Installing an LDM

Required tools

Torx screwdriver T20

How to install an LDM

1. Carefully slide the removed module into the projector. Take note of the position of the LDMs
 - LDM1 must be installed on the right-hand side.
 - LDM2 must be installed on the left-hand side.

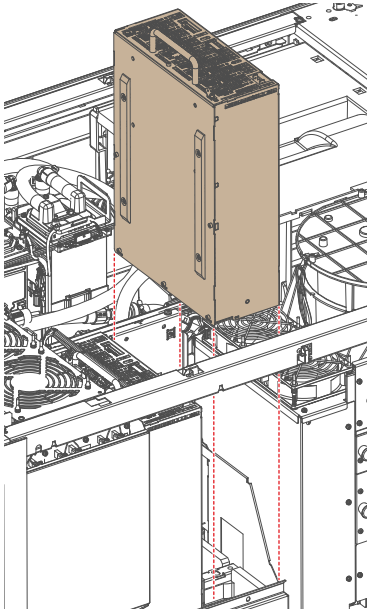


Image 5-33 Sliding in LDM 1

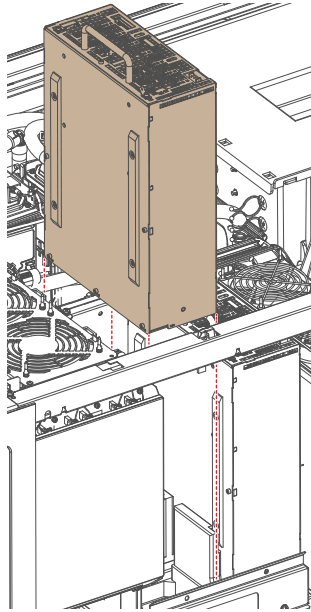


Image 5-34 Sliding in LDM 2

2. Fixate the Torx screw into the LDM and LDM holder. Use a T20 Torx screwdriver to tighten the screw.

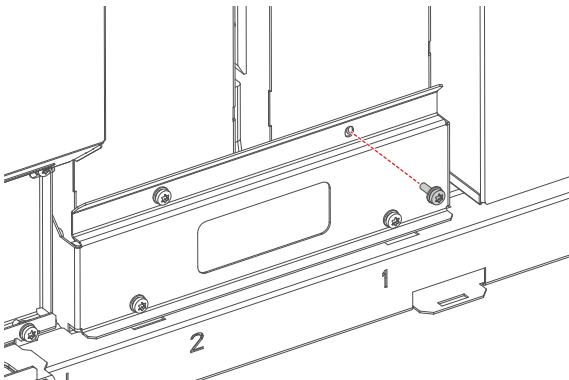


Image 5-35

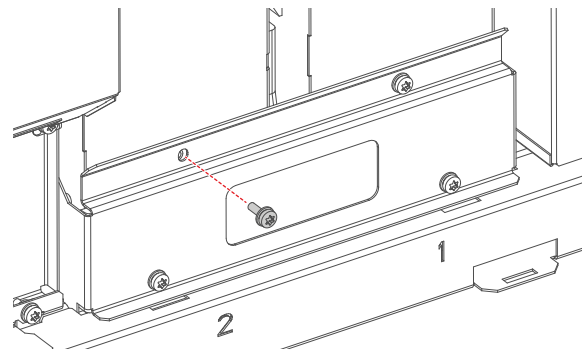


Image 5-36

3. Remove the LDM fixation bracket as illustrated. Use a T20 Torx screwdriver to tighten the screw.

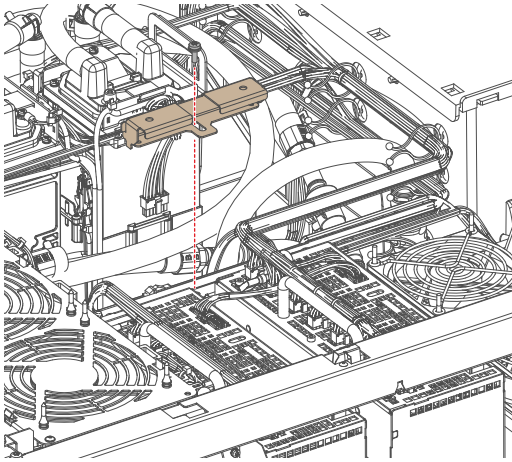


Image 5-37

4. Connect the ground wiring to the LDM.

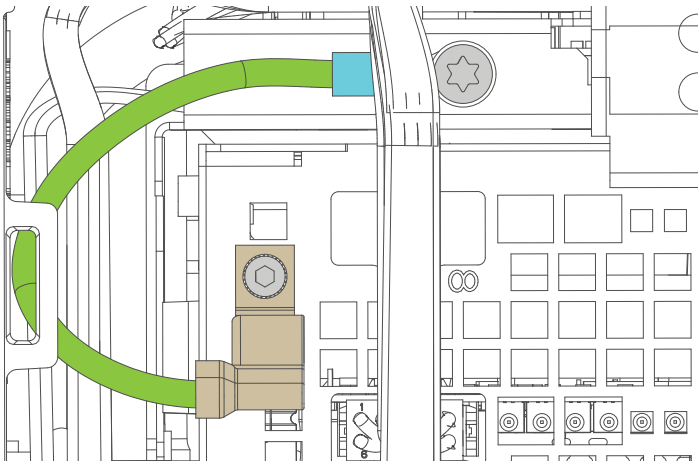


Image 5-38

5. Connect the power wiring to the LDM.

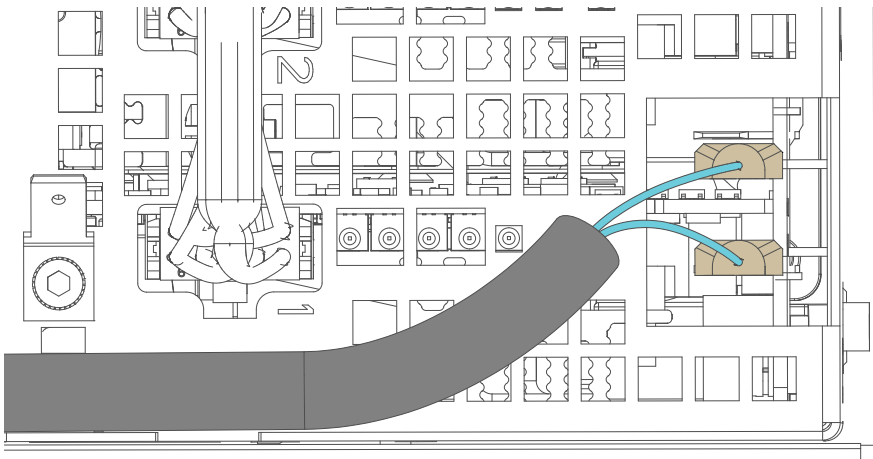


Image 5-39

6. Connect the cables to the correct LDM slot, using the labels as an indicator.

6

Cooling circuit

6.1	Introduction cooling circuit	68
6.2	Removing a light source cooler module	70
6.3	Replacing a fan from a laser cooler assembly	73
6.4	Replacing the main pump assembly	76
6.5	Mounting a laser cooler module	80
6.6	Removing the DMD cooling assembly	83
6.7	Replacement of the Air filter sensor board	86
6.8	Replacing a fan of the DMD cooling	88
6.9	Mounting the DMD cooling assembly	90

About this chapter

This chapter describes how to diagnoses and maintain the cooling of the projector.



WARNING: All procedures in this chapter may only be performed by “qualified service technicians” .

6.1 Introduction cooling circuit

Light source cooling circuit

Much heat has to be extracted from the Light Source during operation of the projector. The cooling circuit takes care of this. The cooling circuit is a closed loop of flexible tubing between the front and back of the projector, consisting of two pumps (front and center) and two or three heat exchangers (front and back). The cooling liquid inside the circuit absorbs the heat of the cooling block. Via the pump, the heated-up liquid is transported to the heat exchanger, which in turn cools down the liquid.

Parts of the cooling circuit – The cooler module(s)

Each projector consists of one or two Cooler modules (depending on projector type). The module is designed in a modular fashion, which makes it easy to remove and mount back into the projector.

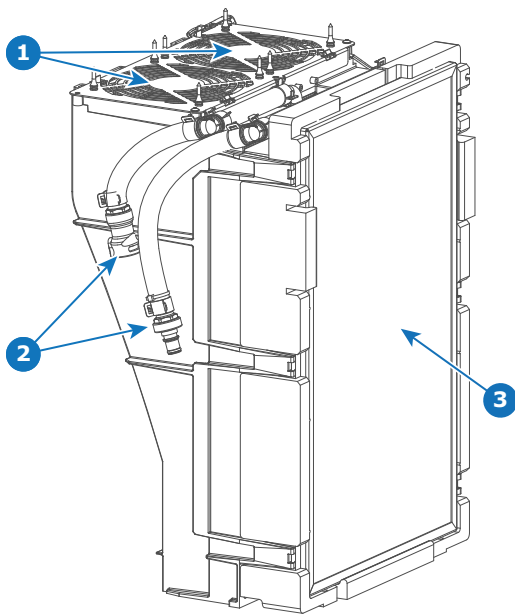


Image 6-1

- 1 Cooler module fans
- 2 Cooling circuit towards/from the main pump and light source
- 3 Cooling circuit radiator (here with filter in front of it)

Parts of the cooling circuit – The main pump

In the dead center of the projector is the heart of the cooling circuit: the main pump. The pump regulates the cooling liquid between the front and back of the projector, between the Light Processor and the Light source. It consists of the main pump itself, as well as a compensator that regulates liquid pressure between the front and back half of the projector.

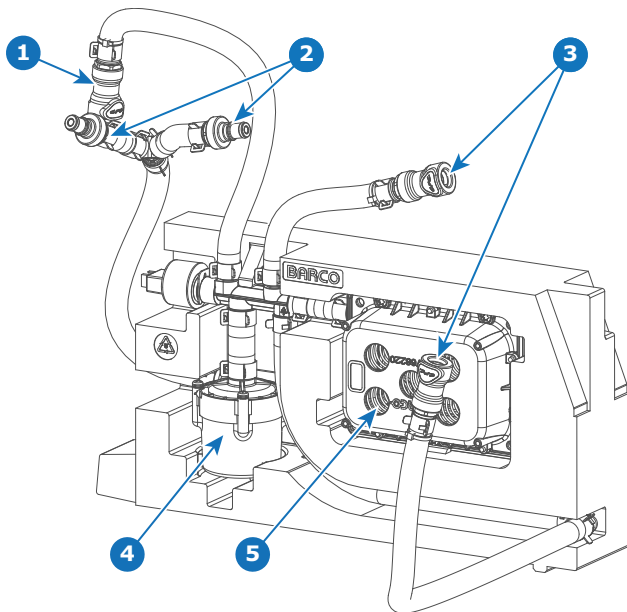


Image 6–2

- | | | | |
|---|--|---|----------------------------|
| 1 | Cooling connection with DMD circuit | 4 | Main pump |
| 2 | Cooling connections with the light source | 5 | Cooling liquid compensator |
| 3 | Cooling connection with the cooler module(s) | | |

Parts of the cooling circuit – The DMD cooling assembly

The DMDs of the Light Processor require cooling, which is the main function of the DMD cooling assembly. Fresh air is being imported into the projector from the front side of the projector by use of the fan assembly. This fresh air is what is being used to cool down the heated water coming from the Light Processor.

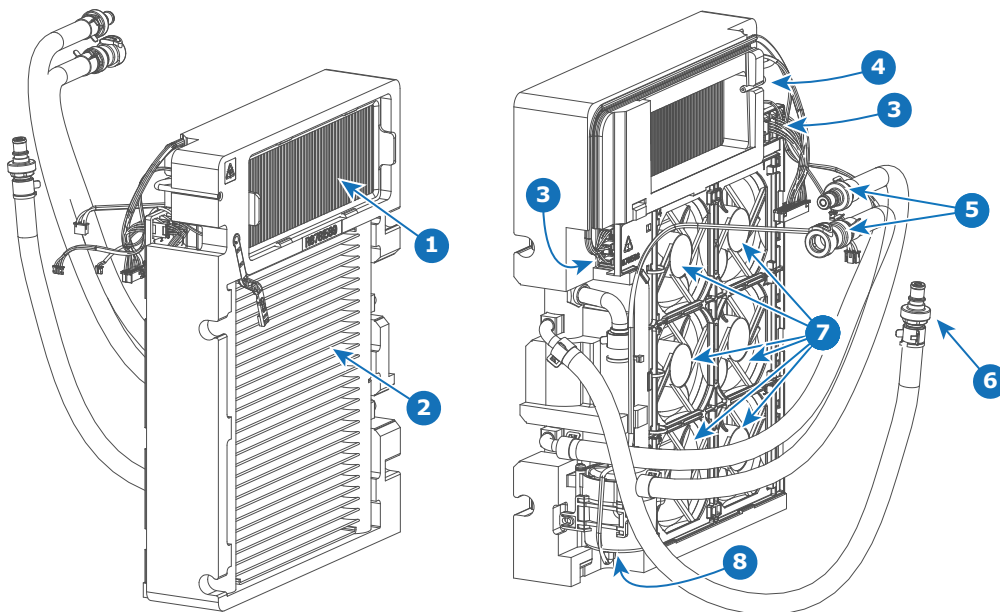


Image 6–3

- | | | | |
|---|----------------------------|---|---------------------------------------|
| 1 | DMD filter | 5 | Cooling circuit towards/from the DMDs |
| 2 | Cooling circuit radiator | 6 | Cooling connection with the main pump |
| 3 | Fan interconnection boards | 7 | DMD fans (1–6) |
| 4 | Air filter sensor PCB | 8 | DMD cooling pump |

6.2 Removing a light source cooler module

Required tools

Torx screwdriver T20

How to remove a light source cooler

1. Remove the top cover and side cover adjacent to the cooler module to be removed.
2. Remove the cooler top fixation. Use a T20 Torx screwdriver to remove the two screws holding the fixation to the projector.

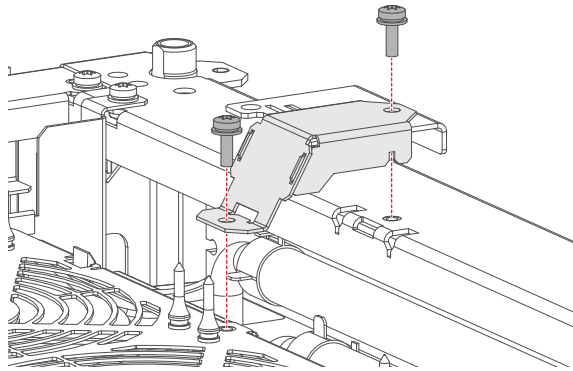


Image 6-4 Top fixation on the models with 1 cooler module

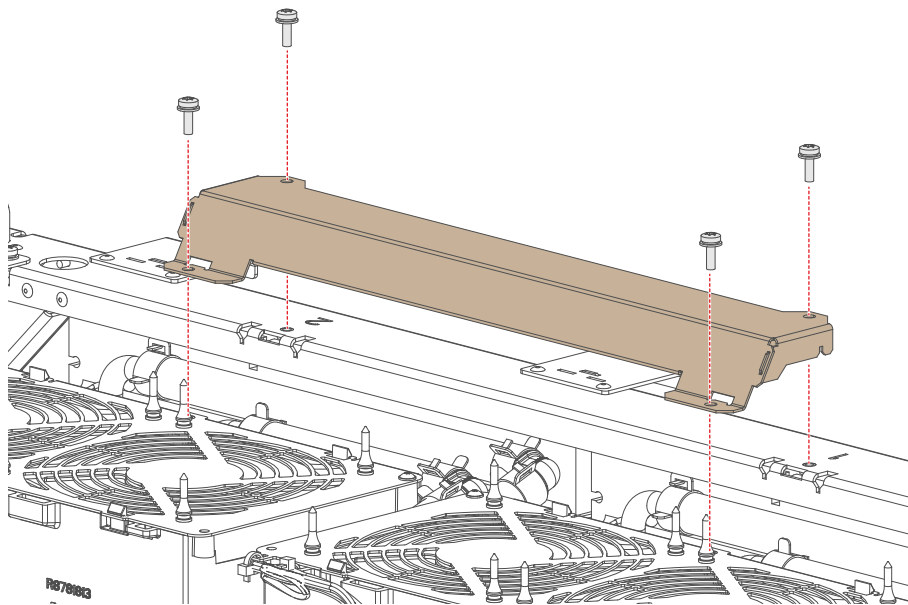


Image 6-5 Top fixation on the models with 2 cooler modules

3. Disconnect the fan connectors (reference 1) and electrical connector (reference 2).

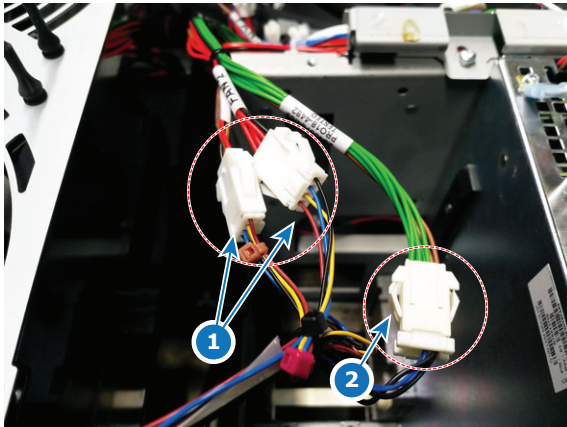


Image 6-6 Connectors cooler module 1

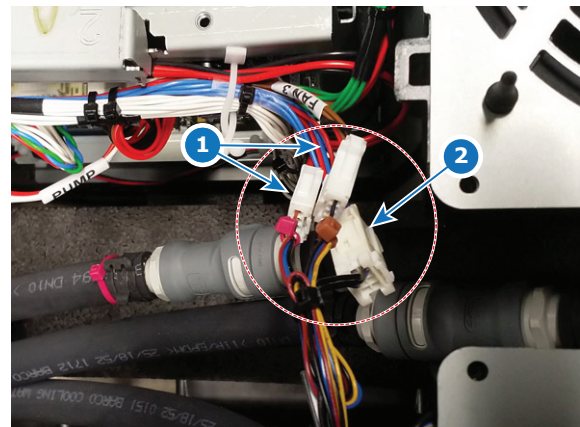


Image 6-7 Cooler connectors cooler module 2

4. Disconnect the tubing.

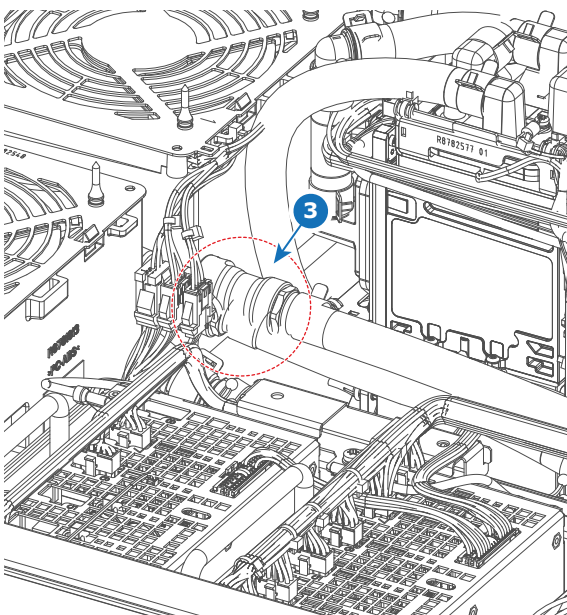


Image 6-8 Tubing cooler module 1

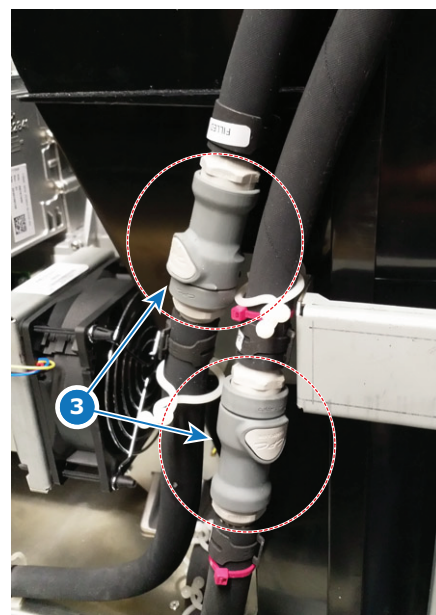


Image 6-9 Tubing cooler module 2

5. Pull down the pin of the cooler and keep it pulled down.

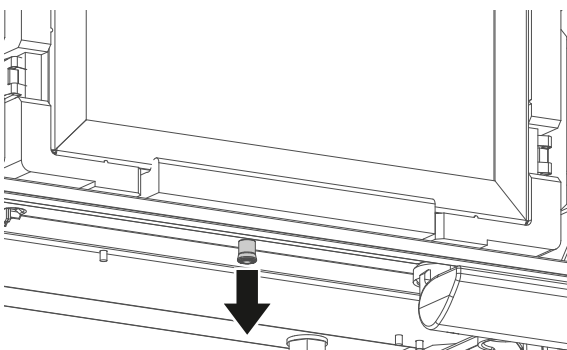


Image 6-10 Lever pin cooler module 1

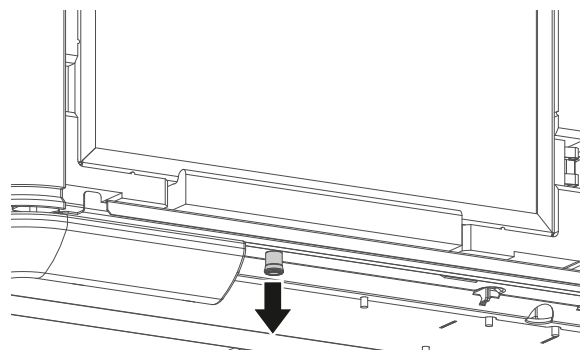


Image 6-11 Lever pin cooler module 2

6. Pull out the cooler module.

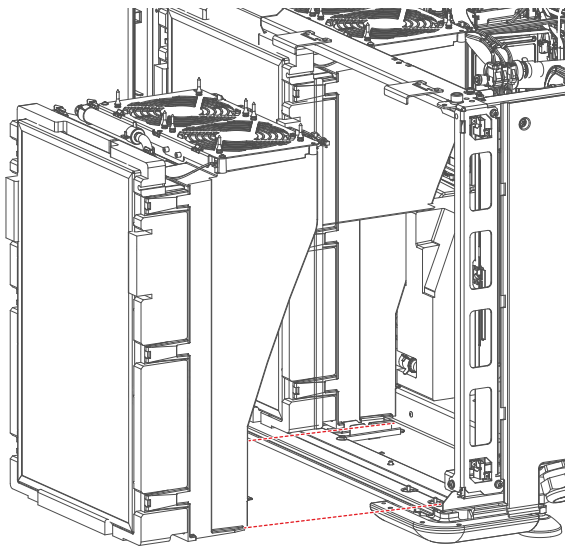


Image 6-12 Remove cooler module 1

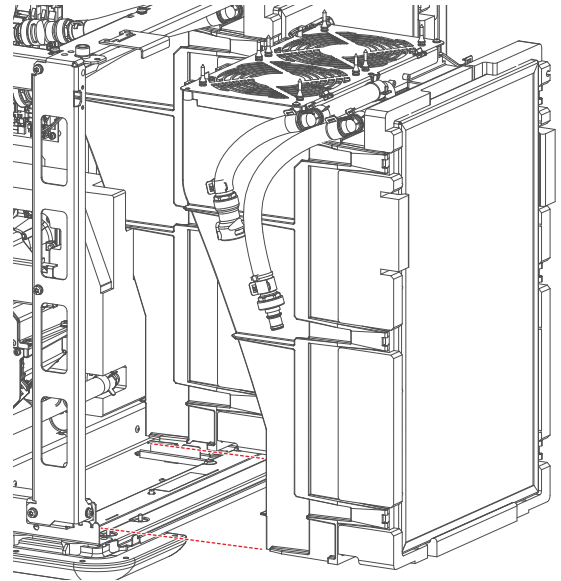


Image 6-13 Remove cooler module 2

6.3 Replacing a fan from a laser cooler assembly

Required tools

- Torx screwdriver T10
- Side cutter

Required parts

- Spare fan
- Rubber pull-through screws
- Cable ties (2 black, 1 red or brown)

How to replace

1. Cut the black cable ties holding the fan assembly to the cooler (reference 1, [Image 6–14](#)) and holding the cooler wiring to the cooler (reference 2).

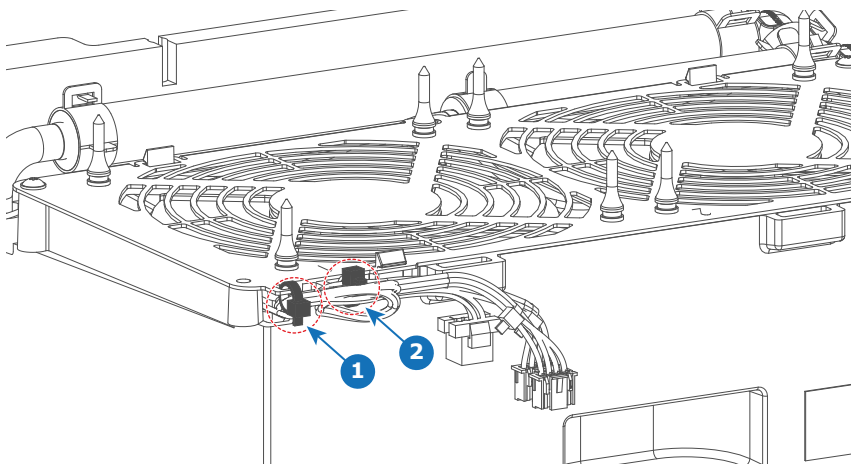


Image 6–14 Fan wiring cable ties

2. Loosen the two screws holding the fan assembly onto the laser cooler assembly (reference 1, [Image 6–15](#)). Use a T10 Torx screwdriver.
3. Gently push the two plastic clamps (reference 2) inwards to loosen the fan assembly. Lift the assembly up from the cooler and remove it.

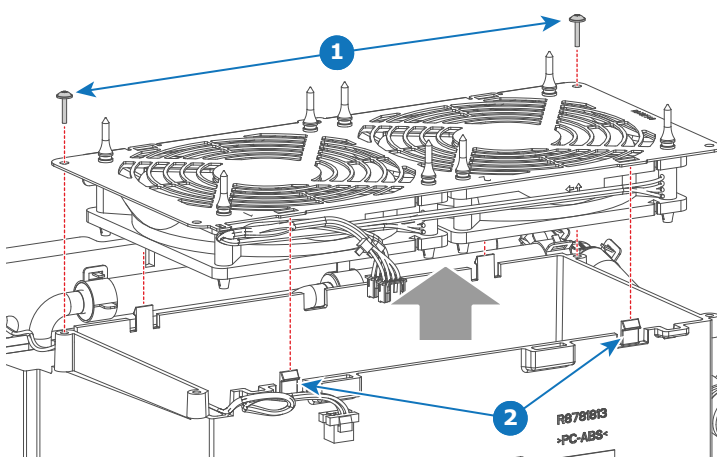


Image 6–15 Removing the fan assembly

4. Remove the old fan as illustrated.

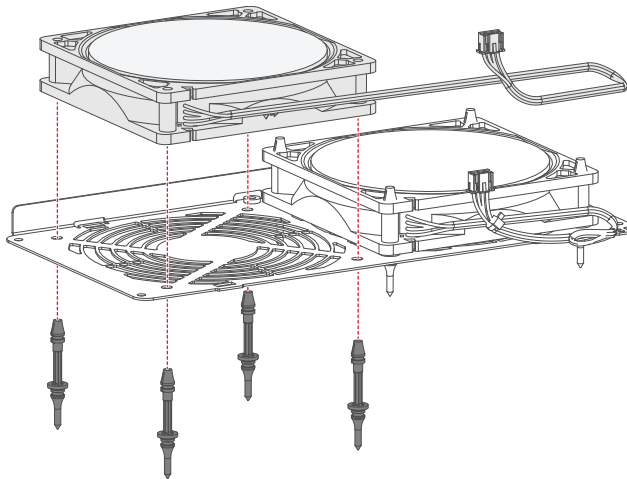


Image 6–16 Removing a fan

5. Place 4 rubber pull-through screws in the new fan as illustrated. Enter the screws from the side with the fan label (reference 1, [Image 6–17](#)).

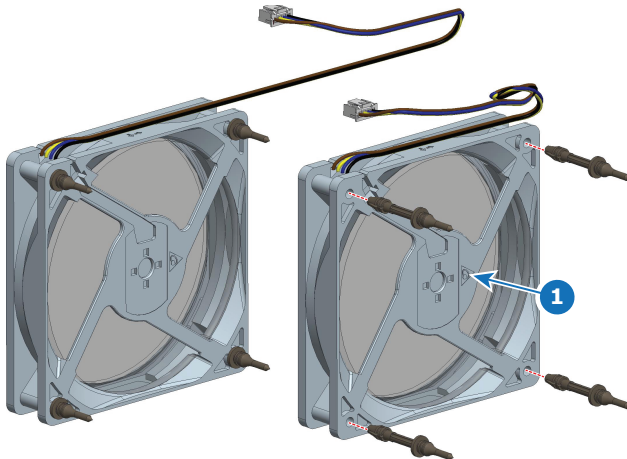


Image 6–17 Mounting rubber pull-through screws

6. Mount the fan onto the fan assembly as illustrated.

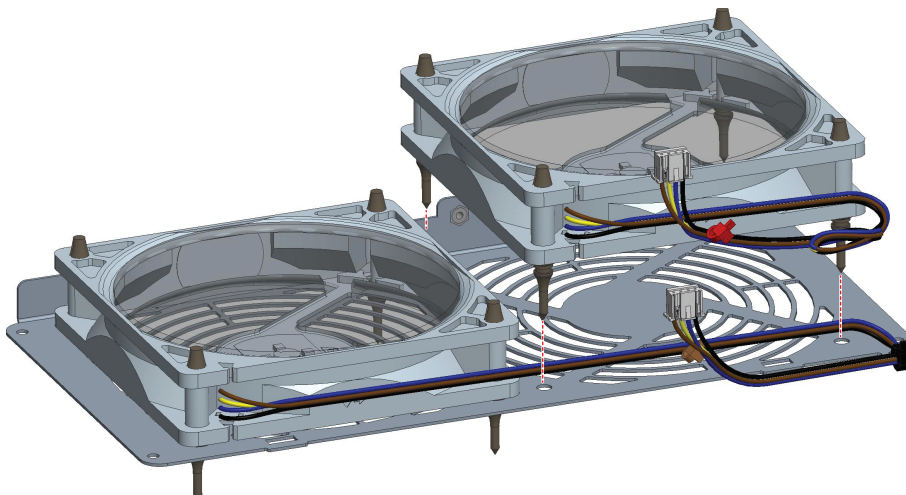


Image 6–18 Mounting the fan onto the fan assembly



Note: Pay attention to the location of the wiring. Make sure the wiring is placed on the side the more open side of the cover.

7. Mount the fan assembly back onto the cooler assembly and click it in its place. Use a T10 Torx screwdriver to mount the two screws (reference 1) back in its place.

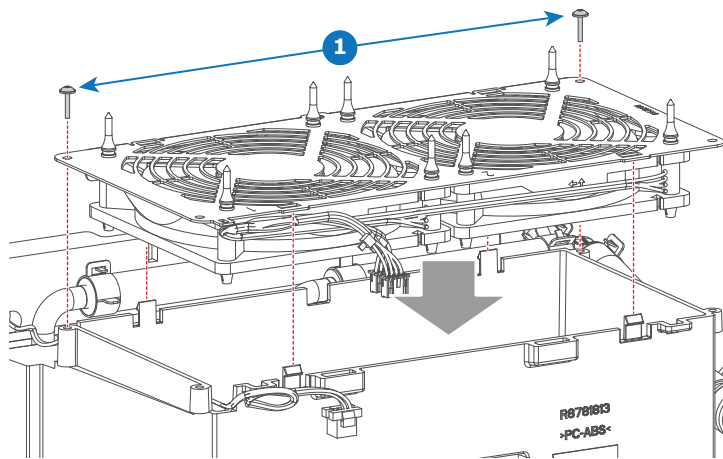


Image 6–19



Tip: Make sure not to cut or block any wiring when mounting the fan assembly onto the cooler assembly. The sensor wiring on the radiator side and the fan wiring on the front should be placed in the openings correctly.



Image 6–20 Sensor wiring backside

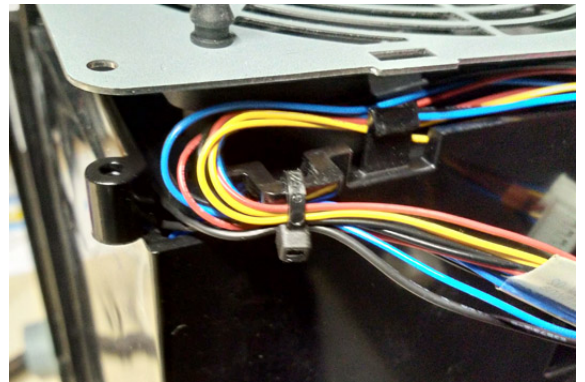


Image 6–21 Fan wiring front side

8. Place new cable ties to replace the ones you cut in this procedure.

6.4 Replacing the main pump assembly



If you are unfamiliar with the cooling circuit lay-out, take pictures or notes of all tubing connections before removing the coolers and pump assembly. It will help you when re-assembling the cooling circuit.

Required tools

Side cutter

How to remove

1. Remove both light source cooler modules. To do so, refer to [“Removing a light source cooler module”](#), page 70.



Tip: Technically it is possible to remove the pump with only 1 cooler module removed. But it will be easier with both modules removed

2. Disconnect the tubing between the DMD cooling and the pump (reference 1).

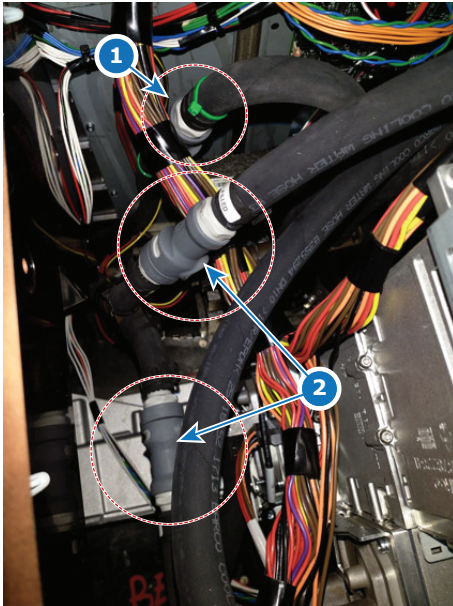


Image 6-22 Location of tubing connections between light source, DMD cooling and pump

3. Disconnect the tubing between Light source and pump (reference 2).
4. Remove the Light Processor Fan to access the pump connector.
5. Disconnect the pump connector (reference 2).

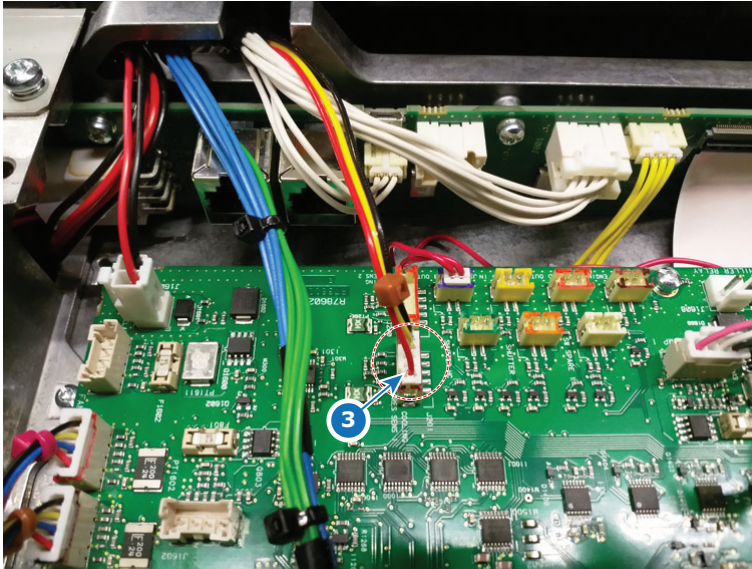


Image 6-23 Location of the pump connector

6. Cut all wire straps, holding the pump wiring onto the projector.
7. Carefully remove the pump assembly from the projector.

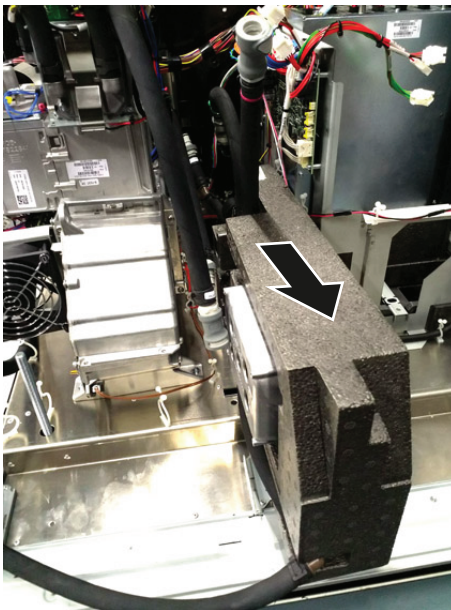


Image 6-24 Sliding out the pump assembly

How to mount

1. Carefully slide in the new pump assembly from the back of the projector.

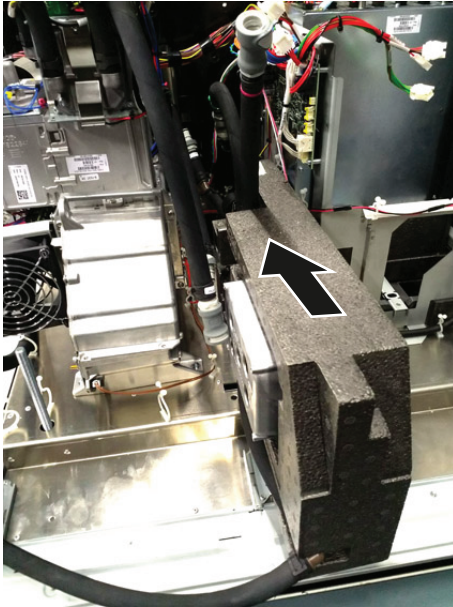


Image 6-25 Sliding in the pump assembly

2. Reconnect the DMD tubing (reference 1) and light source tubing (reference 2) to the light source.

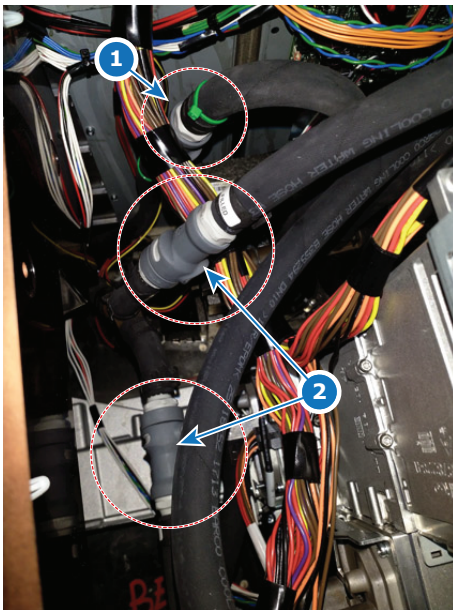


Image 6-26 Location of tubing connections between light source, DMD cooling and pump

3. Reconnect the pump connector onto the Fan and motor control board (reference 2).

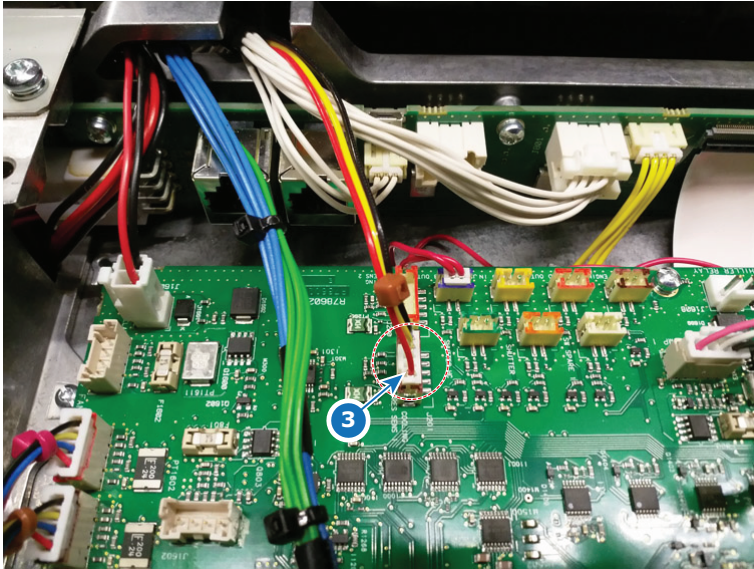


Image 6–27 Location of the pump connector

4. Place the tubing and wiring into the clamps and attach new wire straps on the wiring.
5. Mount the cooler module(s). For more info, refer to [“Mounting a laser cooler module”, page 80](#).

6.5 Mounting a laser cooler module

Required tools

Torx screwdriver T20

How to mount a light source cooler

1. Gently slide the cooler module into its original place. Once you hear the click of the pin on the base plate into the cooler module, the module is in its correct position.

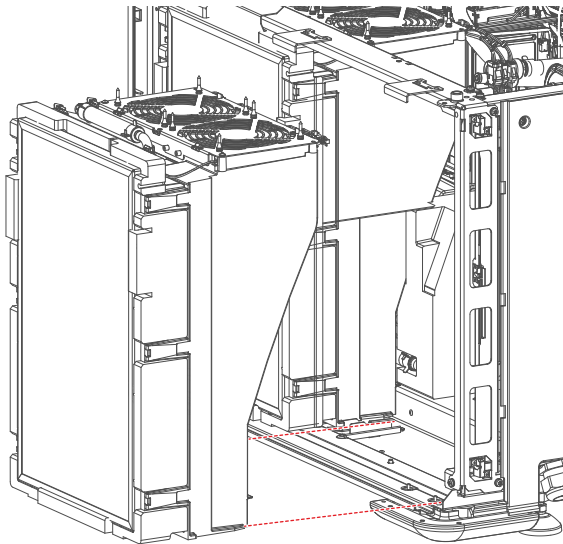


Image 6–28 Sliding in cooler module 1

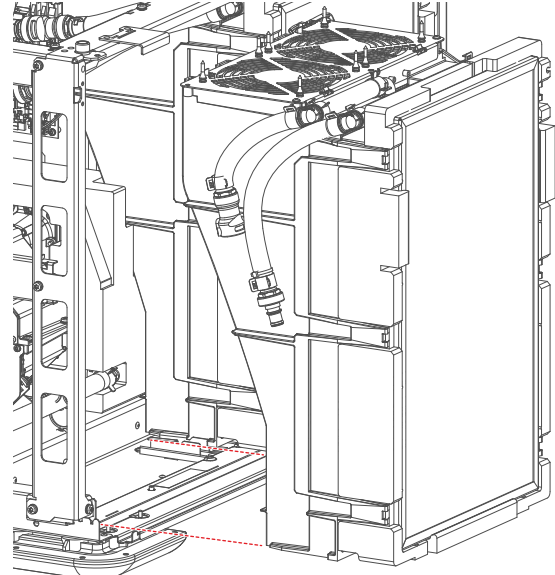


Image 6–29 Sliding in cooler module 2

2. Mount the cooler top fixation. Use a T20 Torx screwdriver to drive in the two screws holding the fixation to the projector.

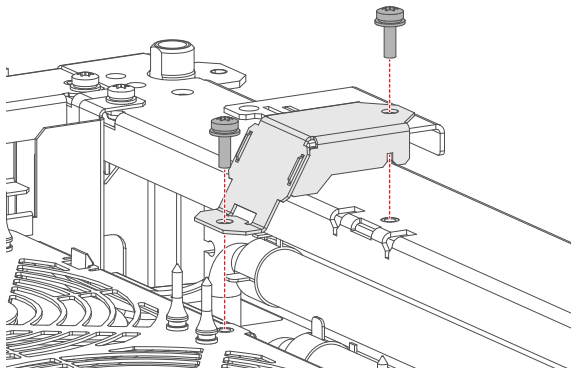


Image 6–30 Top fixation of the model with 1 cooler module

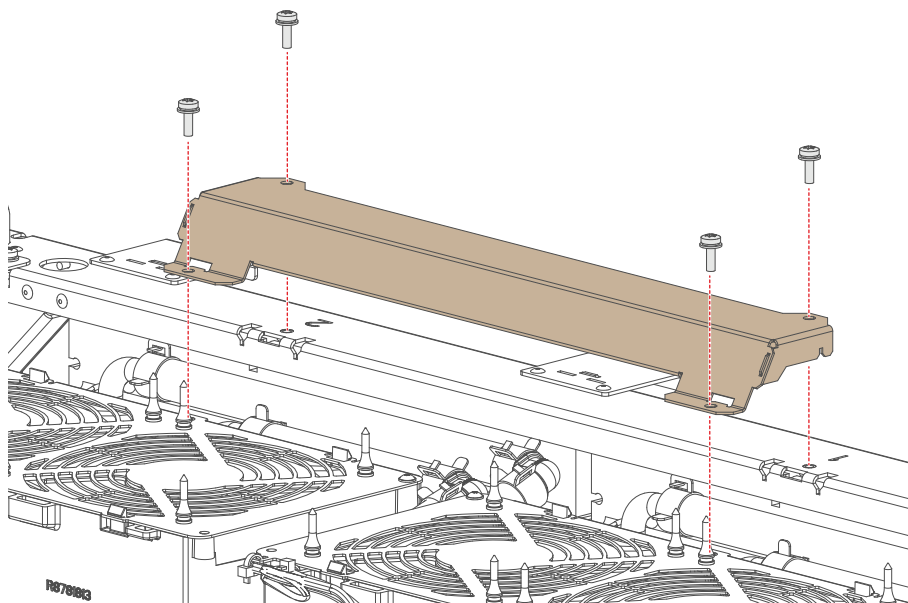


Image 6-31 Top fixation on the models with 2 cooler modules

3. Reconnect the fan connectors (reference 1) and electrical connector (reference 2).



Tip: The fan connectors for module 1 in the projector are marked as FAN 1 and FAN 2. The fan connectors for module 2 in the projector are marked as FAN 3 and FAN 4.

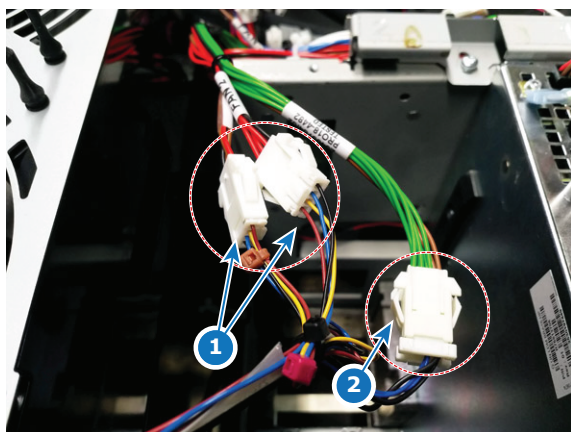


Image 6-32 Connectors cooler module 1

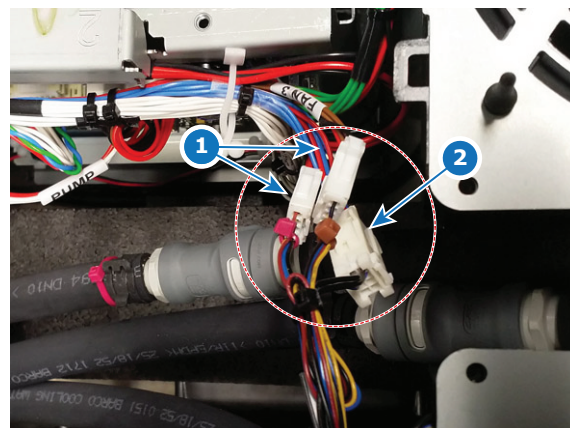


Image 6-33 Connectors cooler module 2

4. Reconnect the tubing.

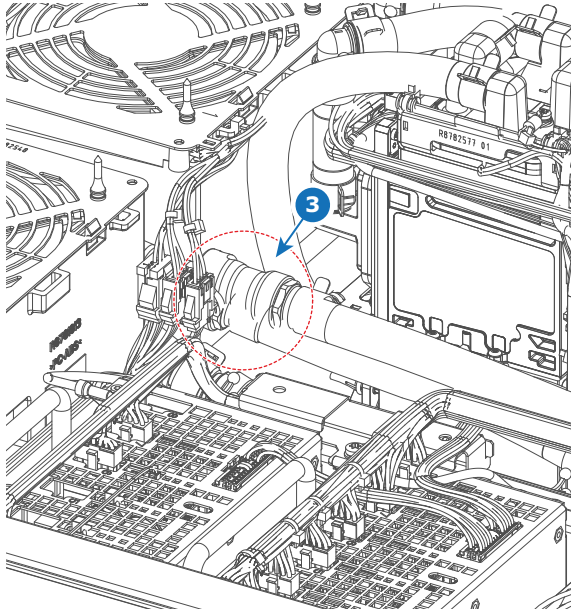


Image 6–34 Tubing cooler module 1

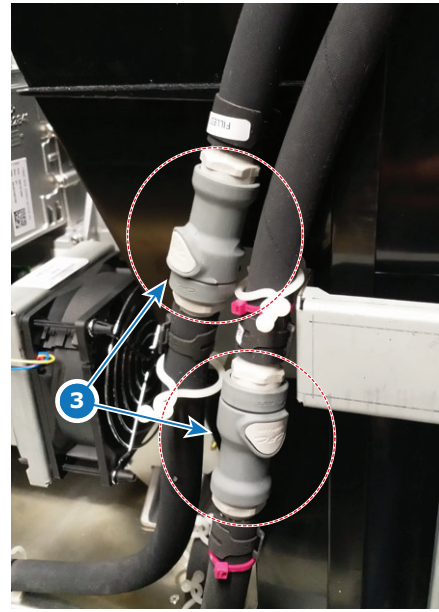


Image 6–35 Tubing cooler module 2

6.6 Removing the DMD cooling assembly

How to prepare the removal

1. Remove the top, front, user input side and light source side covers.
2. Open the sealed compartment. For more info, see [“Opening the sealed compartment”](#), page 148.
3. Remove the Light Processor fan. For more info, see [“Removing the light processor fan”](#), page 154.

How to remove

1. Disconnect the tubing on the Light Processor side.



Image 6-36 Cooling tubing of the Light Processor

2. Disconnect the tubing connected to the pump (reference 1, [Image 6-37](#)).

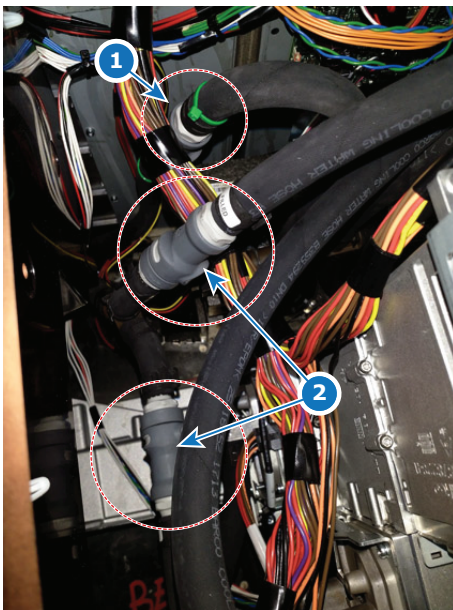


Image 6-37 Location of tubing connections between DMD cooling and pump

3. Disconnect the following wiring on the FMCB:

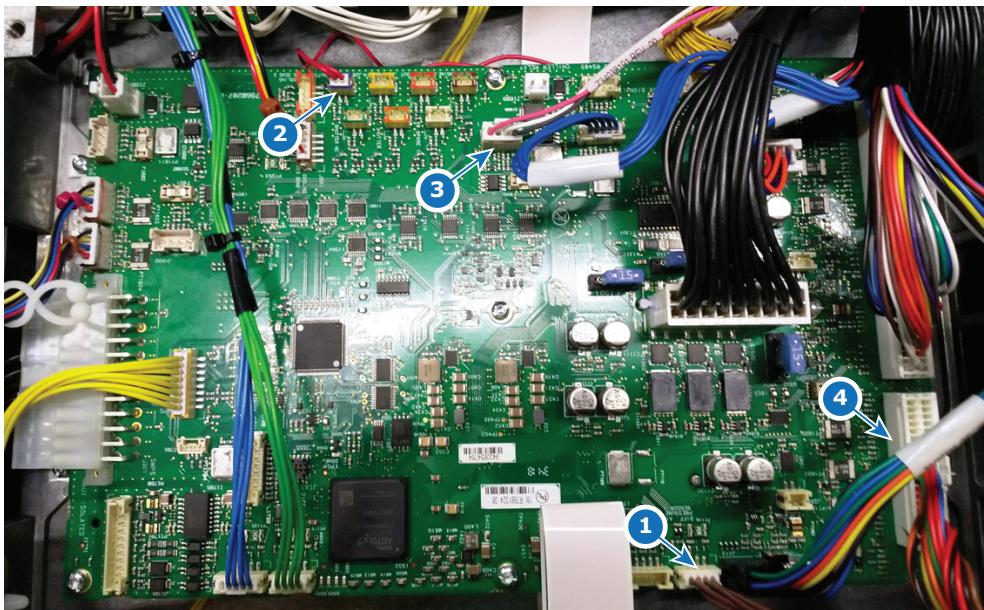


Image 6-38

- 1 Air filter sensor (J112)
- 2 Air inlet sensor (J287)
- 3 Light Processor pump (J1600)
- 4 Radiator fan assembly (J1605)

4. Remove the five screws and washers, holding the radiator assembly onto the projector frame. Use a T20 Torx screwdriver to loosen the screws.
5. Slide out the radiator foam and the filter (if not yet removed).

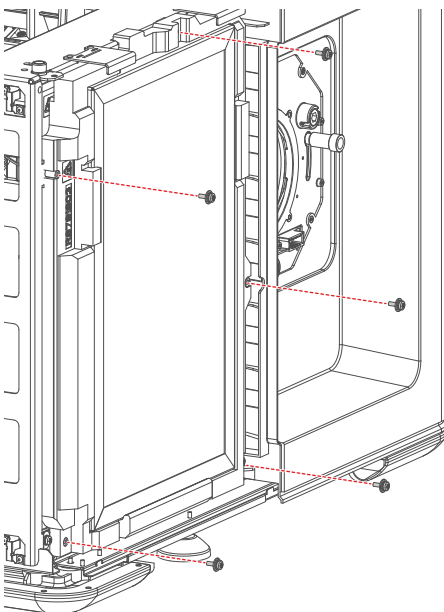


Image 6-39 Removing the screws

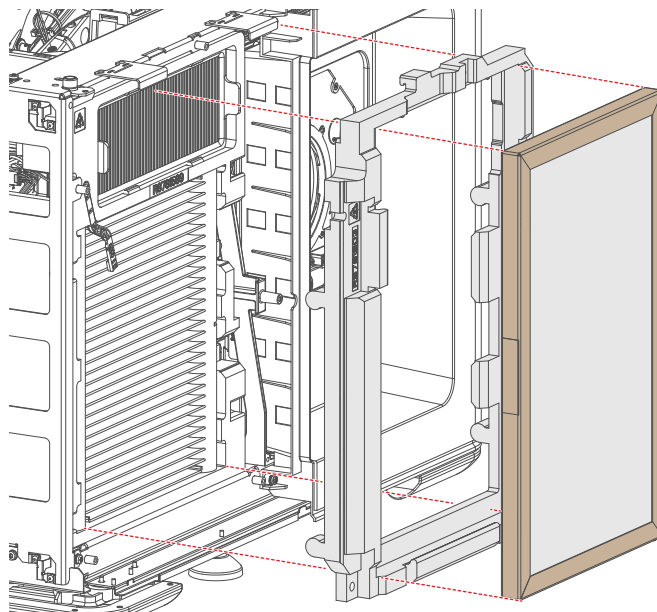


Image 6-40 Removing the front filter and foam

6. Carefully slide out the cooling assembly. Carefully glide the tubing and wiring towards the opening in front while removing the assembly.

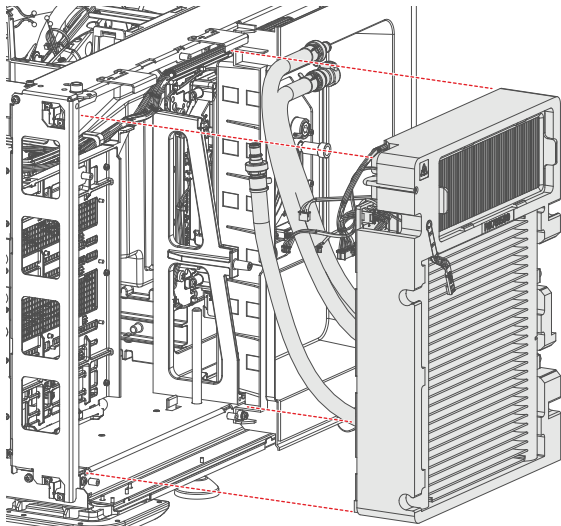


Image 6-41 Removing the DMD cooling assembly



Note: Take into account all the loose wiring and tubing while removing the radiator. Be sure not to damage anything.

6.7 Replacement of the Air filter sensor board



While located on the DMD cooling assembly, the sensor has been placed on an easily accessible location (the upper corner between front and user input side). This way, only the Light Processor fan has to be removed in order to replace this board.

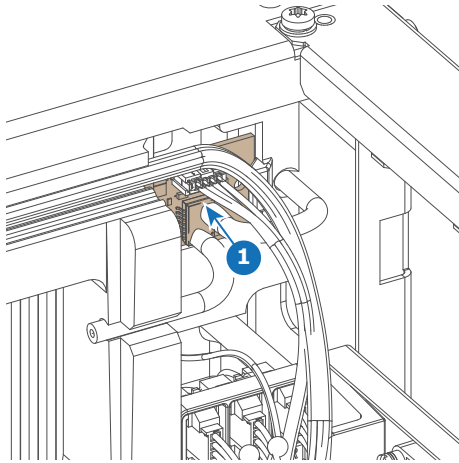


Image 6-42

How to replace

1. Remove the Light Processor fan. For more info, see [“Removing the light processor fan”](#), page 154.
2. Disconnect the sensor tubing on the board, as well as the connector (references 1–3).

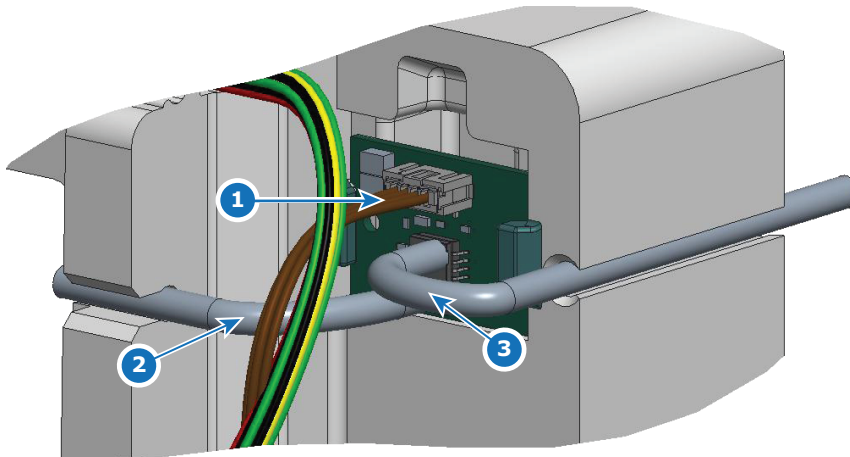


Image 6-43 Wiring and tubing on the sensor

3. Replace the sensor board as illustrated.

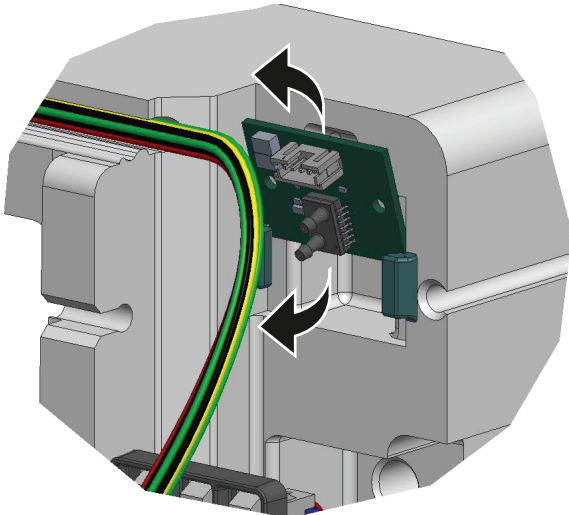


Image 6–44 Removing and mounting the sensor board

4. Reconnect the wiring (reference 1).
5. Reconnect the tubing of the air inlet sensor (reference 2).
6. Reconnect the tubing of the air filter sensor (reference 3).



Note: For correct sensor measurement, make sure to connect the correct tubing on the correct connector.

6.8 Replacing a fan of the DMD cooling



This procedure assumes the DMD cooling assembly has been removed from the projector. For more info, see [“Removing the DMD cooling assembly”, page 83](#)

Required tools

Side cutter

Required parts

Cable ties

How to replace

1. Click out the fan assembly from the DMD cooling assembly and remove it.

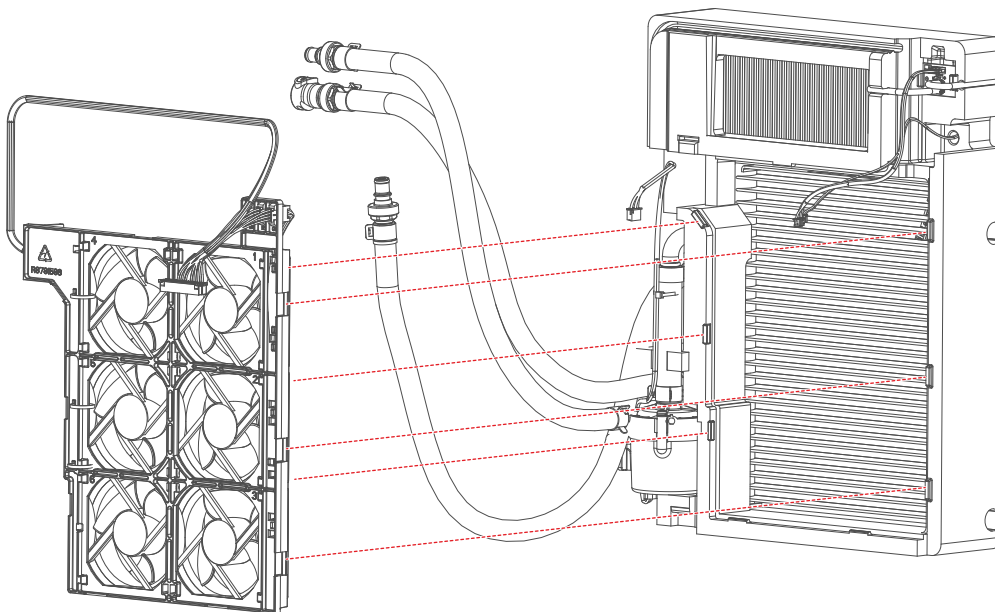


Image 6–45 Removing the fan assembly.

2. Spot the fan to replace. They are numbered on the fan assembly from 1–6.
3. Replace the desired fan as illustrated. Cut (and replace) any cable tie holding the wiring onto the fan assembly.

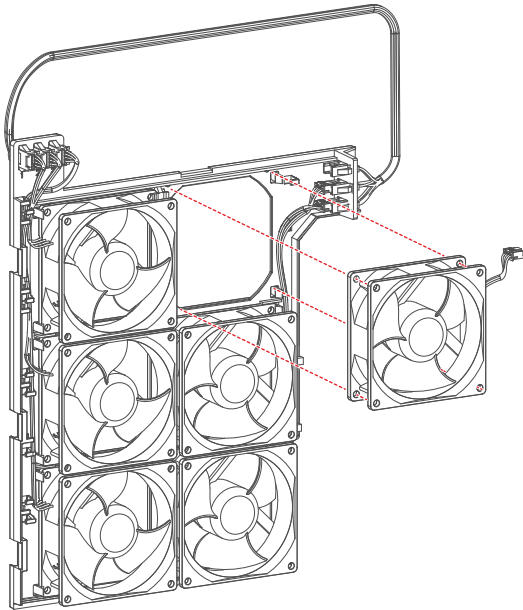


Image 6–46 Example of replacing a fan (here fan nr 4)

4. Use the fan assembly tray to route the wiring of the replaced fan. Make sure all wiring is nicely placed in the fan assembly, so that no wiring gets crushed when mounting the assembly back onto the radiator. See the following illustration for an example of how to properly place the wiring.

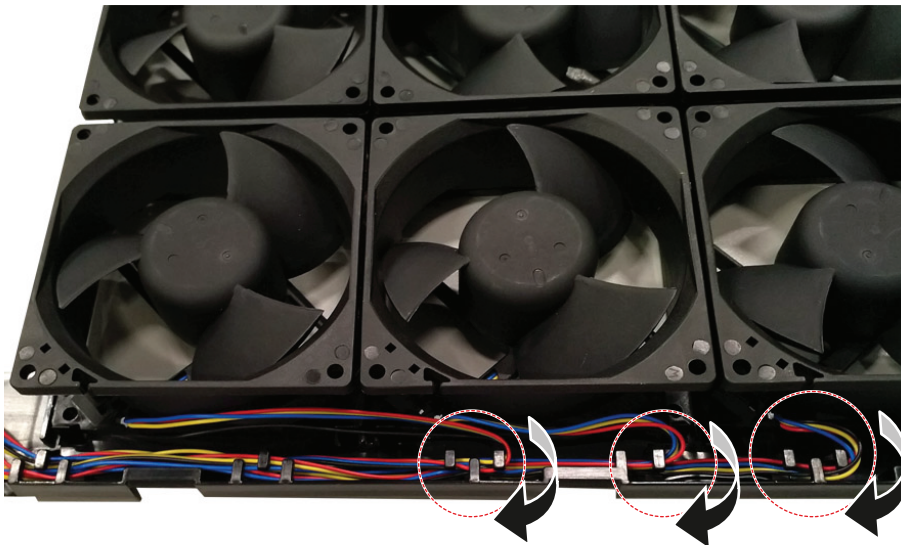


Image 6–47 Example of routing the wiring of the fan assembly

5. Carefully place the fan assembly back onto the DMD cooling assembly and click it in its place



Log which fan has been replaced. If the same fan needs to be replaced multiple times over time, there might be a different issue.

6.9 Mounting the DMD cooling assembly

How to mount

1. Carefully slide in the cooling assembly.

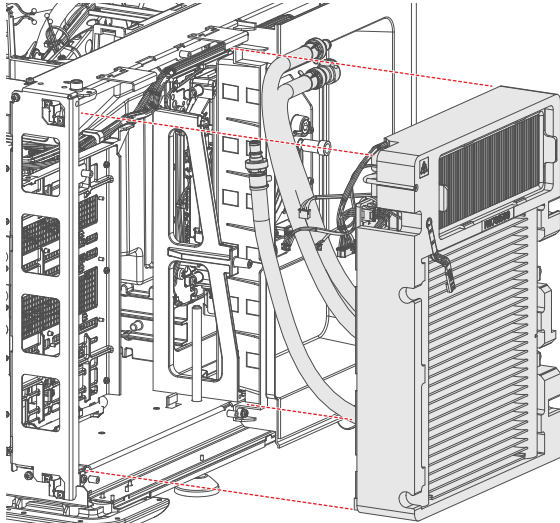


Image 6-48 Removing the DMD cooling assembly

2. While sliding in the cooling assembly, try to guide where the tubing and wiring needs to go:
 - Guide the DMD tubing towards the Light processor.
 - Guide the third tube towards the main pump.
 - Guide the wiring towards the FMCB.
3. Connect the tubing on the Light Processor side.



Image 6-49 Cooling tubing of the Light Processor

4. Connect the tubing connected to the pump (reference 1).

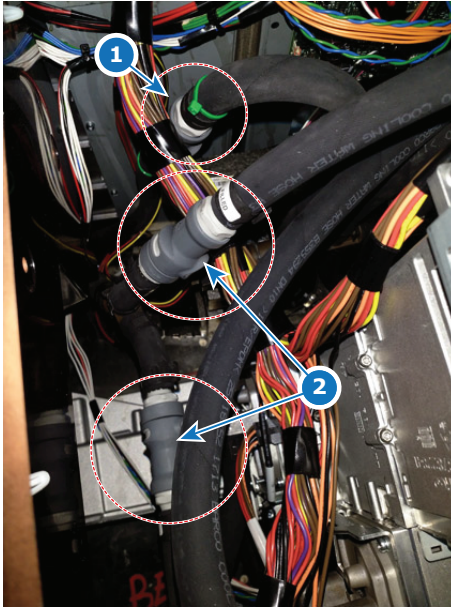


Image 6-50 Location of tubing connections between DMD cooling and pump

5. Connect the following wiring on the FMCB:

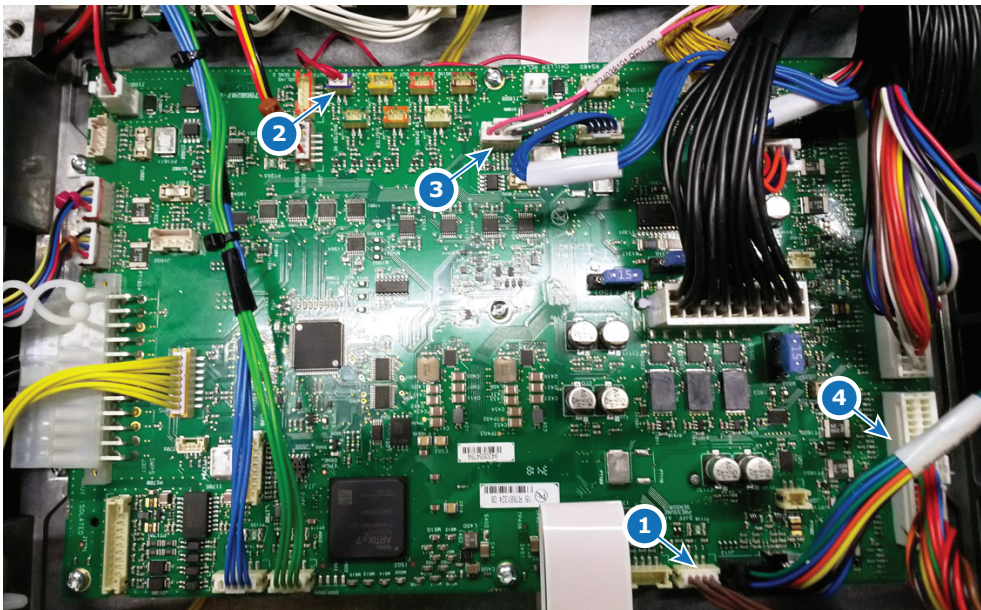


Image 6-51

- 1 Air filter sensor (J112)
- 2 Air inlet sensor (J287)
- 3 Light Processor pump (J1600)
- 4 Radiator fan assembly (J1605)

6. Place the foam back in its original place, as well as the filter.
7. Mount the five screws and washers, holding the radiator assembly onto the projector frame. Use a T20 Torx screwdriver to drive in the screws.

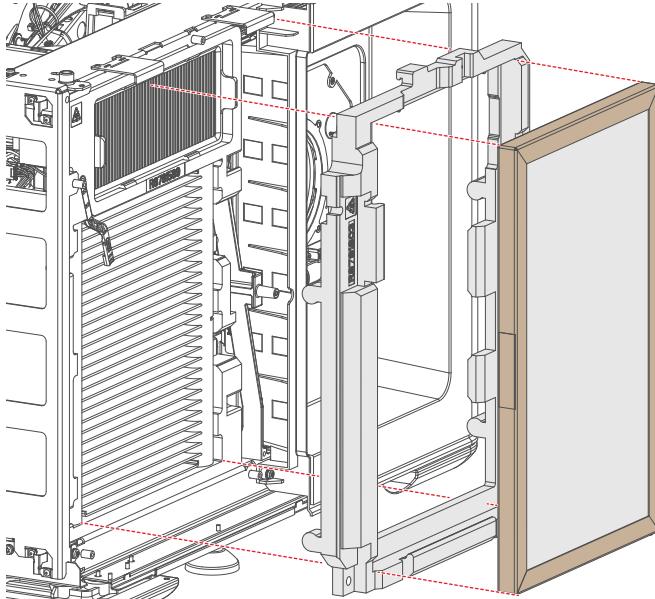


Image 6-52 Mounting the foam and front filter

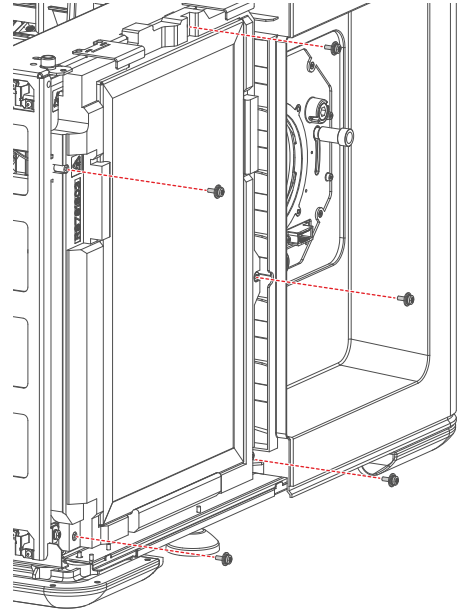


Image 6-53 Mounting the screws

How to finish installation

1. Mount the Light processor fan. For more info, see [“Removing the light processor fan”](#), page 154.
2. Close the sealed compartment. For more info, see [“Closing the sealed compartment”](#), page 167.
3. Mount the top, front, user input side and light source side covers.

Light Source

7.1	Introduction Light Source	94
7.2	Removing the light source	96
7.3	Replacing the Light Source board	98
7.4	Replacing the Light Source fan	100
7.5	Replacement process of a red laser plate and / or peltier element.....	101
7.6	Removing a Red laser plate and peltier element.....	103
7.7	Installing a Red laser plate and/or peltier element.....	107
7.8	Removing a Green or Blue laser plate	111
7.9	Installing a Blue or Green laser plate	113
7.10	Perform the laser plate cooling self test	115
7.11	Replacing the Laser Control Board (LCB)	116
7.12	Mounting the light source	118

About this chapter

This chapter gives a brief introduction of the Light source and its components, as well as the difference between the large and the small light source. Furthermore, this chapter includes the replacement procedure of the light source, its components and the Laser Control Board (the LCB).

7.1 Introduction Light Source

Light Source components

The Light source is located on the Light Source side of the projector and is fixated on the bottom plate. It is connected to the main pump and cooler modules with tubing. Control of the Light Source happens by using the Laser Control Board (LCB – located behind the Light Source), as well as the Light Source Board (LSB – located on the light source). Furthermore, a small fan is installed near the Light Source board, to make sure it is sufficiently cooled.

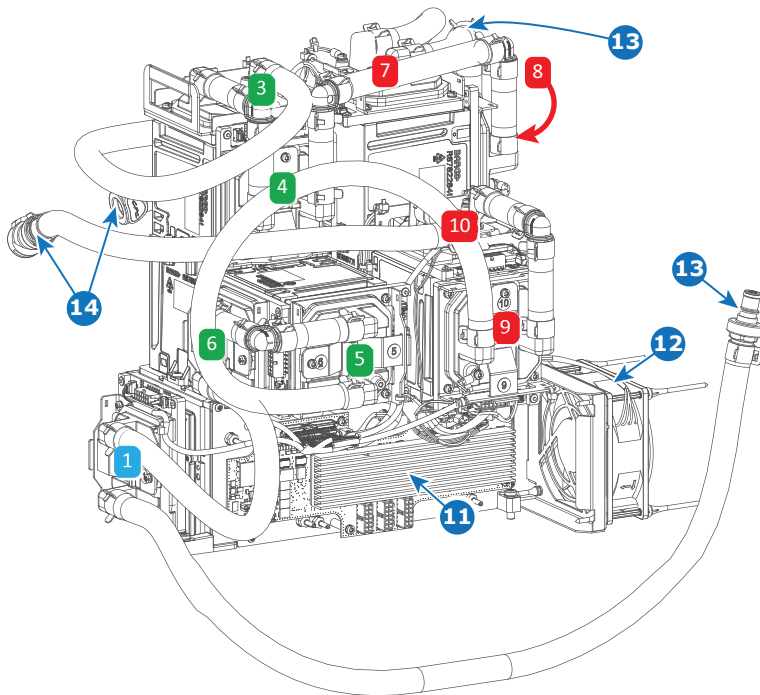


Image 7–1 Light Source of the 25k, 20k and 15k lumens projectors

- | | | | |
|---|-------------------------------|----|--|
| 1 | Laser plates for blue lasers | 9 | Laser plates for red lasers |
| 3 | Laser plates for green lasers | 10 | Laser plates for red lasers |
| 4 | Laser plates for green lasers | 11 | Light Source Board |
| 5 | Laser plates for green lasers | 12 | Light Source Board fan |
| 6 | Laser plates for green lasers | 13 | Tubing cooling liquid towards cooler modules |
| 7 | Laser plates for red lasers | 14 | Tubing cooling liquid from main pump |
| 8 | Laser plates for red lasers | | |

Difference between light source variants

The Light source of the 15k, 20k and 25k lumens variants of the projector visually look identical. The main difference between each light source is in how many laser banks each of the laser plates has. This results in the different light outputs.

The 12k lumens variant projector has the least amount of laser banks and as a consequence thus requires less laser plates. This results in an overall smaller Light Source.

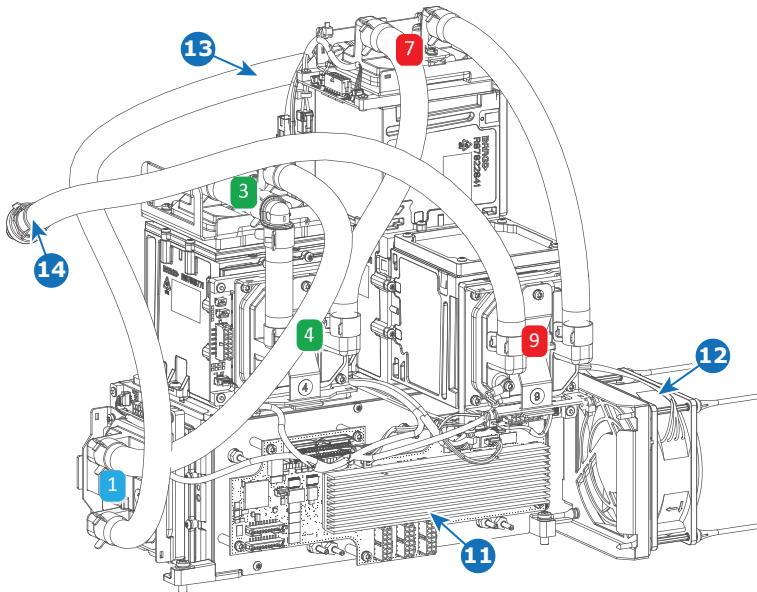


Image 7-2 Light Source of the 12k lumens projector

- | | | | |
|----------|-------------------------------|-----------|---|
| 1 | Laser plates for blue lasers | 11 | Light Source Board |
| 3 | Laser plates for green lasers | 12 | Light Source Board fan |
| 4 | Laser plates for green lasers | 13 | Tubing cooling liquid towards cooler module |
| 7 | Laser plates for red lasers | 14 | Tubing cooling liquid from main pump |
| 9 | Laser plates for red lasers | | |

7.2 Removing the light source

Required tools

Torx screwdriver T20

How to remove

1. Remove the top, rear and light source side cover.
2. Remove Cooler Module 2. For more info, see [“Removing a light source cooler module”](#), page 70.
or
Remove the metal plate if cooler module 2 is not available (e.g. the 12k lumens projector variant).
3. Disconnect the wiring on the LSB. For more info, see [“Replacing the Light Source board”](#), page 98.
4. Disconnect the LDM wiring on the Light Source.
5. Disconnect all tubing connectors of the Light source.

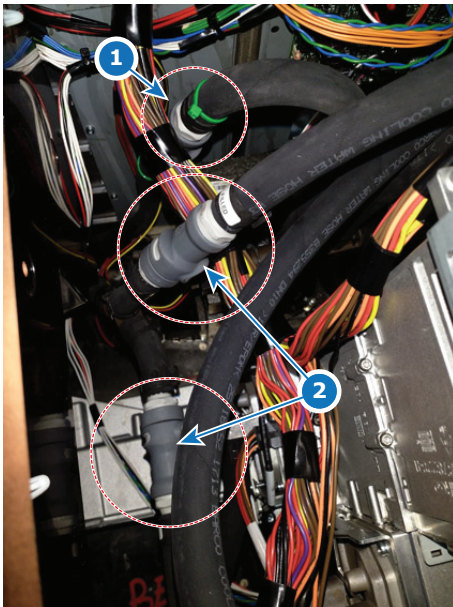


Image 7-3 Location of tubing connections between light source, DMD cooling and pump

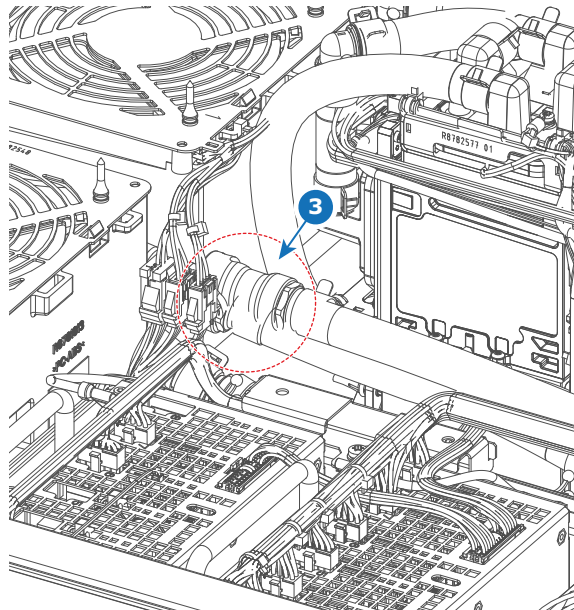


Image 7-4 Tubing between Light source and cooler module 1

6. Loosen the four set screws and remove the two extra screws on the backside of the light source. Use a T20 Torx screwdriver to loosen the screws.

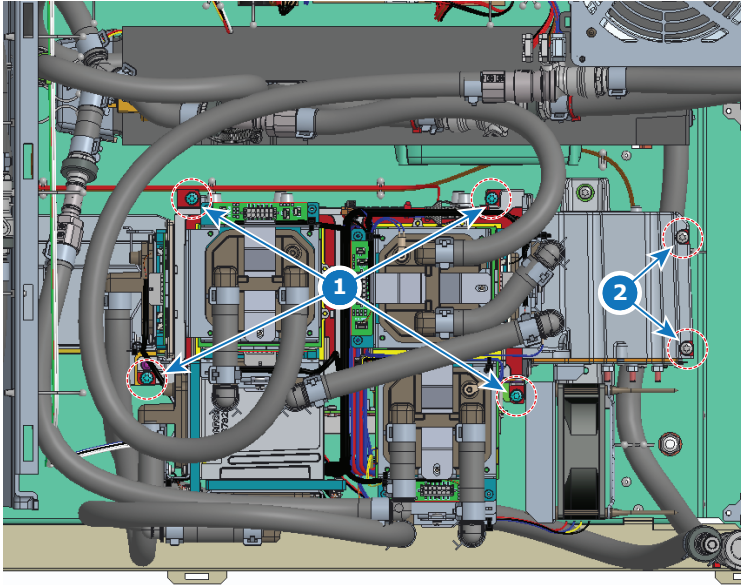


Image 7-5 Location of the set screws and extra screws on the light source

- 1 Set screws location
- 2 Extra screws location

7. Carefully lift up the light source and remove it from the projector.

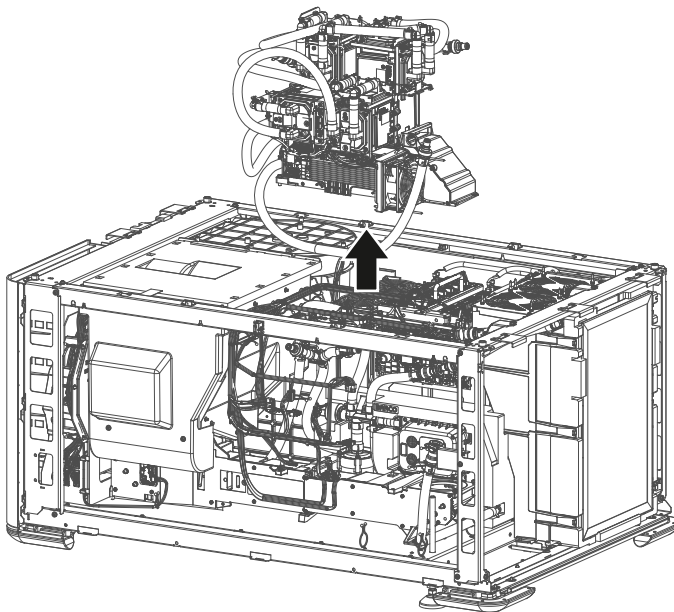


Image 7-6 Lifting up the light source

7.3 Replacing the Light Source board

Required tools

Torx screwdriver T10

How to replace

1. Remove the Light source side cover. For more info, see [“Removal of the light source side cover”](#), page 277.

2. Disconnect all connectors on the Light Source Board.



Tip: Take notes or pictures if you're unfamiliar with the wiring lay-out of the LSB. It will help you when reconnecting.

3. Replace the board as illustrated. Use a T10 Torx screwdriver to remove and drive in the screws.

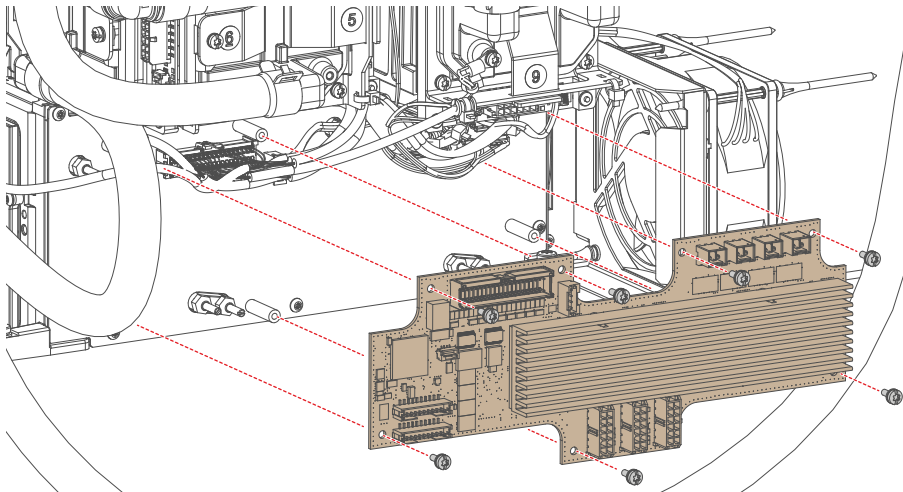


Image 7-7 Replacing the Light Source Board

4. Reconnect the wiring to the LSB as follows:

- Connect the LCB connector on the bottom left, in plug J101 (reference 1).
- Connect the I²C connector on the top left, in plug J150 (reference 2).
- Connect the fan connector in connector J20 (reference 3).
- Connect the LDM wiring on the bottom connectors J110 (brown-black) and J111 (red-black) (reference 4).¹
- Connect the rest of the wiring on the top right. Fit the connector with the right color (brown-red-orange-yellow) onto the fitting plugs (J121–J134).

1. In the 12k and 15k lumens projectors, only the red-black connector is available).

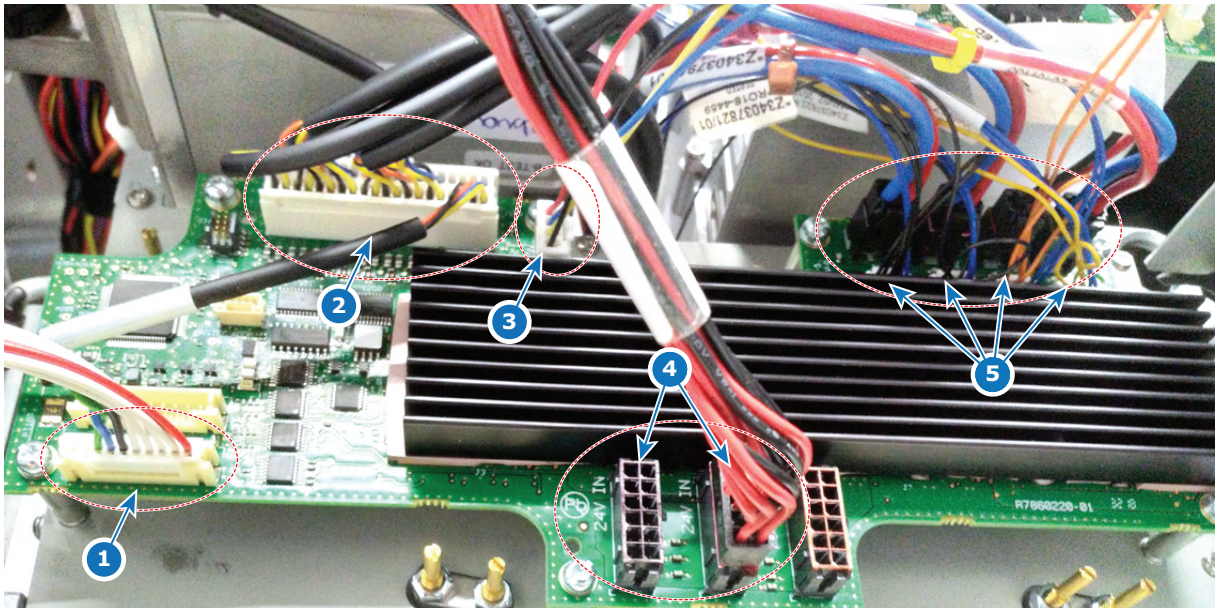


Image 7–8 Example of the LSB wiring, on a 15k lumens projector

5. Mount the Light Source side cover. For more info, see [“Mounting the light source side cover”](#), page 280.

7.4 Replacing the Light Source fan

How to replace

1. Remove the top, light source side and rear covers.
2. Remove Cooler Module 2. For more info, see [“Removing a light source cooler module”, page 70.](#)
or
Remove the metal plate if cooler module 2 is not available (e.g. the 12k lumens projector variant).
3. Disconnect the fan connector on the LSB (connector J20).
4. Remove the Light Source fan and metal guard as illustrated. Pull them from the rubber pull-through screws.

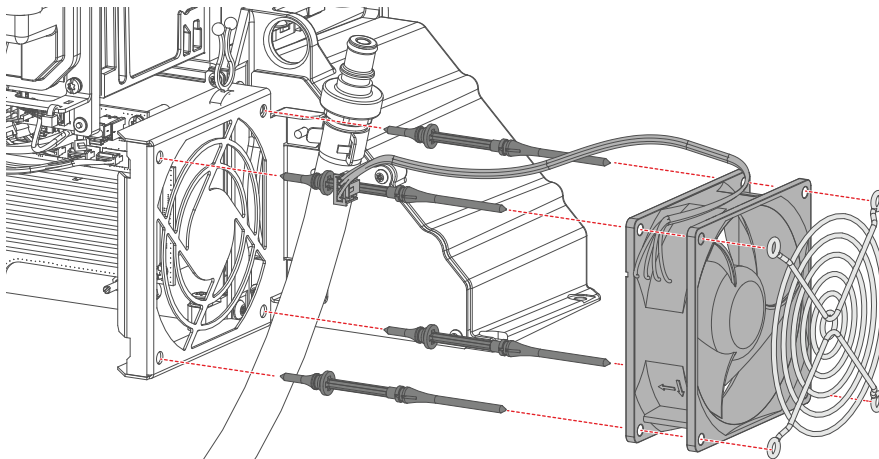


Image 7–9 Replacing the fan

5. Mount the new fan and metal guard on the fan plate. Use new rubber pull-through screws if the old ones are damaged.
6. Reconnect the fan connector onto the LSB in plug J20.
7. Mount the Cooler module or metal plate. For more info, see [“Mounting a laser cooler module”, page 80.](#)

7.5 Replacement process of a red laser plate and / or peltier element



When an error related to laser plate is triggered it does not necessarily mean that the laser plate is defective and should be replaced. For further details see [“Laser plate diagnostic”, page 303](#).

Understanding the peltier element, TIM heating and TIM curing

Red lasers are notoriously harder to control in terms of temperature when compared to Green or Blue lasers. For this reason, an extra peltier element is added between the red laser plate and the cold plate of the laser cooling circuit. This peltier element helps regulate the temperature of the red laser bank.

Both sides of this peltier element have been coated in a thin layer of TIM paste (Thermal Interface Material) as a thermal adhesive.

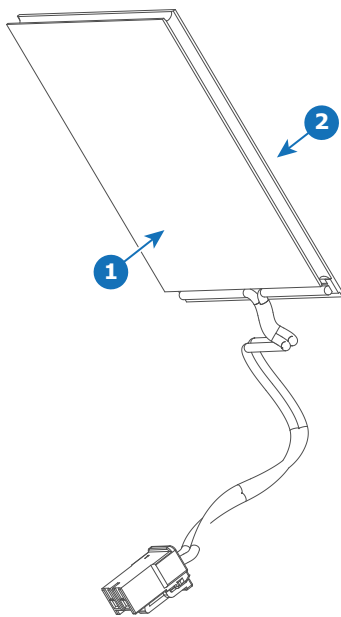


Image 7-10

- 1 TIM paste on the front side (cold side) of the peltier element
- 2 TIM paste on the back side (hot side) of the peltier element


This TIM paste will need to heat up in order to both remove the peltier element from the laser plate, as well when trying to attach the peltier element to said laser plate. This is done via the following processes, when using Web Communicator:

- **TIM heating:** This process assumes that either the peltier element or laser plate is malfunctioning and thus cannot heat up the TIM paste. The rest of the cooling circuit is used to heat up the peltier element. Since we cannot rely on the red laser itself to heat up the TIM, it can take a while before the peltier element and the paste has the desired temperature. This process can take up to 10 minutes, depending on the environmental conditions.
- **TIM curing:** Once the laser plate and/or peltier element has been replaced, the peltier element will need to be heated up, in order to spread the TIM paste over the laser plate and cold plate. The TIM curing will use both the laser plate and the cooling circuit to properly heat up the TIM paste.
- **Laser plate cooling self test:** Once the TIM curing was done, Laser plate cooling self test could be done to check if the TIM paste was correctly applied on laser plates. The lasers will be turned on at full power to check that TIM was correctly applied and that laser plate cooling is optimal. This test will take several minutes to run, but it can be aborted if necessary.


Do take into account that once the TIM heating has been completed, the projector will shut down. Once this has happened, the projector and its components will slowly cool down again (depending on environmental conditions). Because of this, it is essential to proceed with the removal part of this process as efficiently as possible.

Process overview

1. Make sure you know the location of the desired laser plate and/or the peltier elements. For the exact location of the laser plates, see ["Introduction Light Source", page 94](#).
2. Make sure the projector is in Ready mode (not ON).
3. Make sure all needed tools and spare parts are unpacked and located near the projector.



Tip: Do this to avoid any wasted time when removing a red laser plate with Peltier element. Once heated, the Peltier element will become "easier" to remove. This because the heating process turns the solid TIM paste into a more fluid state. Once the heating process has ended, the Peltier element and TIM paste will slowly cool down, returning the TIM to its solid state and become harder to remove.
4. Remove the top and light source side cover.
5. If Laser plate 8 and/or its peltier element has to be removed, remove the rear cover as well.
6. If Laser plate 8 and/or its peltier element has to be removed, prepare the removal of Cooler Module 2. For more info, see ["Removing a light source cooler module", page 70](#). Remove the cooler as much as possible from the projector. But make sure the wiring and tubing is still connected.



Tip: If the wiring and tubing is disconnected, notification messages will prompt and the TIM heating will not be able to start.
7. Start the TIM heating process.
8. Remove the laser plate and/or peltier element. For more info, see ["Removing a Red laser plate and peltier element", page 103](#).
9. Mount the new laser plate and/or peltier element. For more info, see ["Installing a Red laser plate and/or peltier element", page 107](#).
10. If Cooler Module 2 was removed, mount it back. For more info, see ["Mounting a laser cooler module", page 80](#).
11. Start the projector and check for any triggered notifications. Resolve any message triggered because of this replacement before starting the TIM curing.
12. Mount all removed projector covers.
13. Log into Web Communicator as service technician and start the TIM curing process.
14. Check if the TIM past is correctly applied by running the Laser plate cooling self test. For more info, see .

7.6 Removing a Red laser plate and peltier element



CAUTION: This procedure assumes you are following the Red laser plate and/or peltier element removal process. If not, first refer to [“Replacement process of a red laser plate and / or peltier element”](#), page 101.



This procedure follows the replacement of laser plate 9. The procedure is identical for every other Red laser plate and peltier element.



When an error related to laser plate is triggered it does not necessarily mean that the laser plate is defective and should be replaced. For further details see [“Laser plate diagnostic”](#), page 303.

Required tools

- Torx screwdriver T10
- Side cutter
- chemical-resistant gloves (nitrile rubber)

How to perform the TIM heating procedure

1. In Web Communicator, navigate to *Maintenance > Service mode*.
The Service menu will be displayed.
2. Under *Laser plate TIM heating*, click **Start** and confirm.

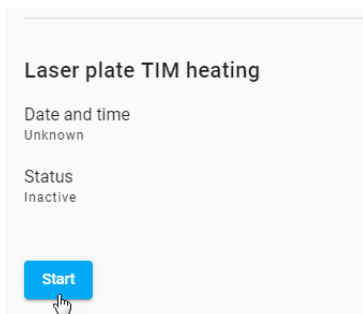


Image 7–11 TIM heating



Caution: Make sure to click start under Laser plate TIM heating and not TIM curing. These two processes are completely different.

3. Wait until the laser plate heating process has been completed. This may take up to 10 minutes, depending on environmental conditions.
4. Once the heating process is completed, the projector will shut down. Immediately start with the removal procedure.

How to remove

1. Remove the clamp from the laser plate. Use a T10 Torx screwdriver.

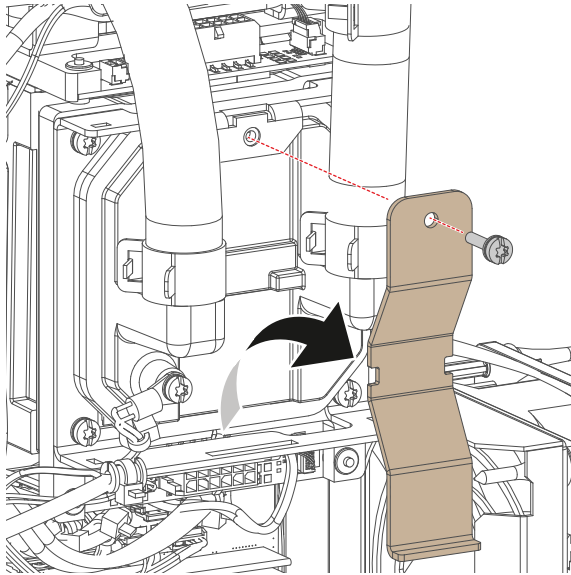


Image 7-12 Removing the clamp

2. Remove the temperature sensor. Use a T10 Torx screwdriver to remove the screw holding the sensor to the laser plate.

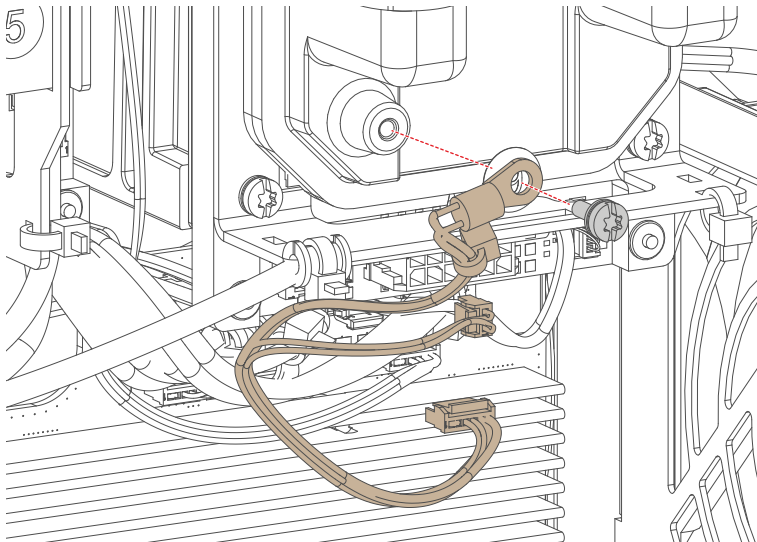


Image 7-13 Removing the temperature sensor

3. Use the clamp as a lever to peel loose the cold plate from the laser plate.

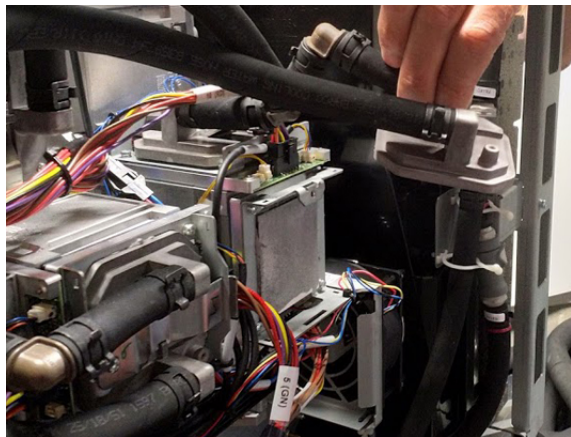


Image 7-14 Example of removing a cold plate from a laser plate

4. Disconnect the peltier element from the Light Source Board.

5. Remove the laser plate bracket. Use a T10 Torx screwdriver to release the screw.

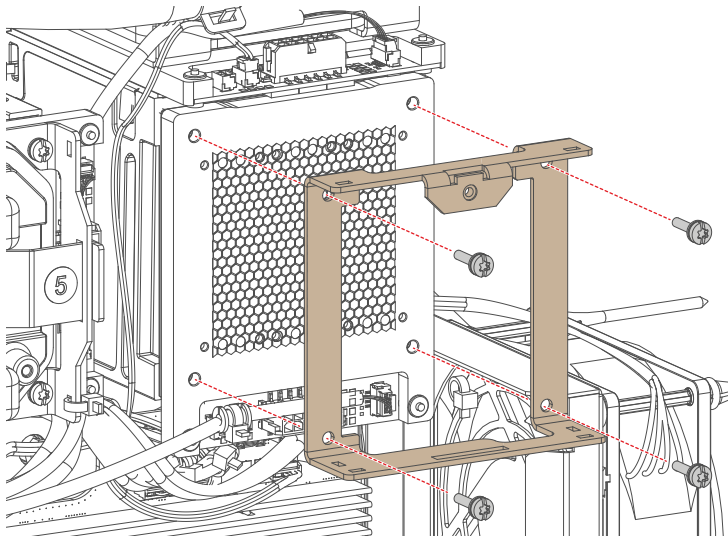


Image 7-15 Removing the laser plate bracket

6. Peel loose the peltier element and remove it. You can tilt the peltier element around a bit to help loosen it up.



Caution: The Peltier element is coated with Loctite TCP 4000 D. You cannot avoid having it leave some residue when removing or mounting it from/onto the laser plate. Use Chemical-resistant gloves(e.g. nitrile rubber) to avoid your hands from getting dirty.

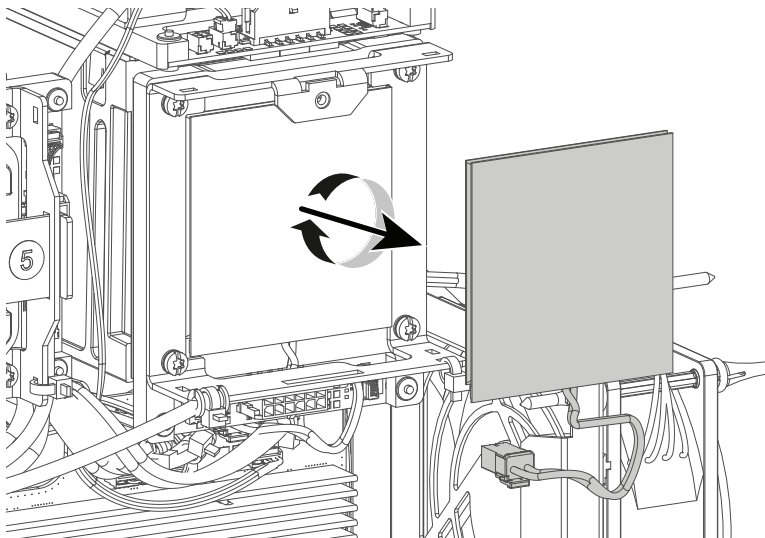


Image 7-16 Removing the peltier element.

7. If the laser plate itself also needs to be removed, disconnect the wiring of the interconnection board of the laser plate. Cut any cable ties if necessary with a side cutter.
8. If the laser plate needs to be removed, remove it as illustrated.

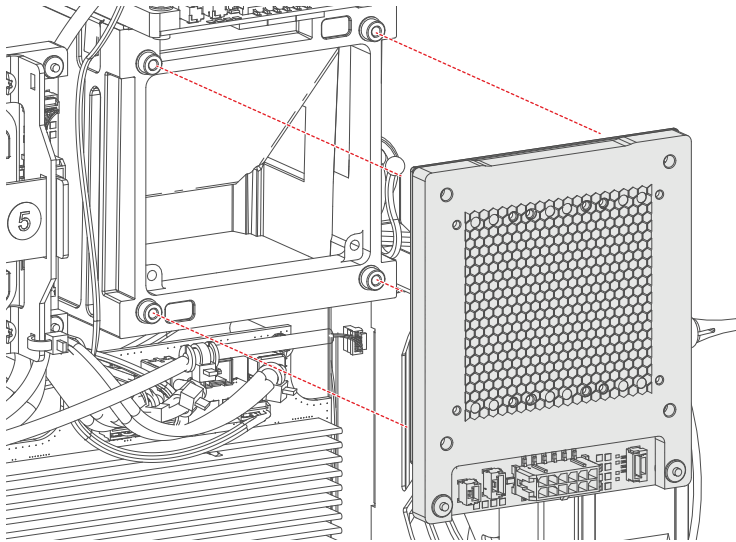


Image 7-17 Removing the laser plate

7.7 Installing a Red laser plate and/or peltier element



This procedure follows the replacement of laser plate 9. The procedure is identical for every other Red laser plate and peltier element.

Required tools

- Torx screwdriver T10
- chemical-resistant gloves (nitrile rubber)

Required parts

- Cable ties
- Red laser plate
- Peltier element

How to mount

1. If the laser plate was removed, carefully mount it back as illustrated. Take into account the designated position of each laser plate on the light source.

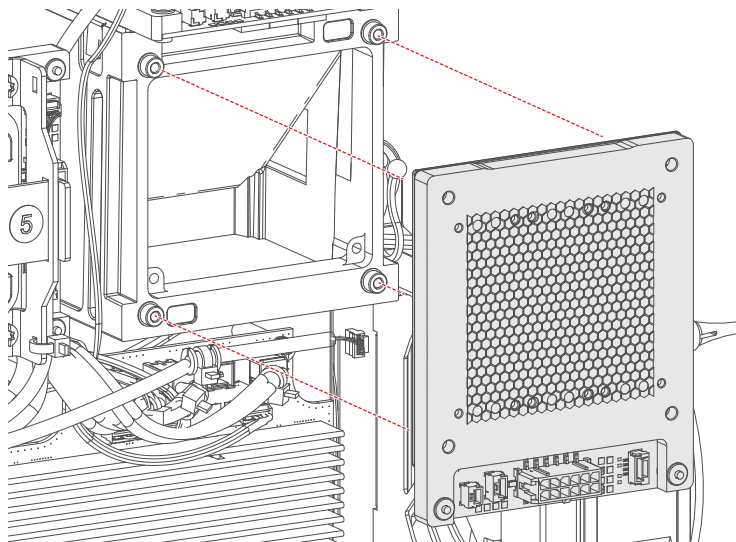


Image 7–18 Mounting the laser plate



Note: Take into account the designated position of each laser plate on the light source.

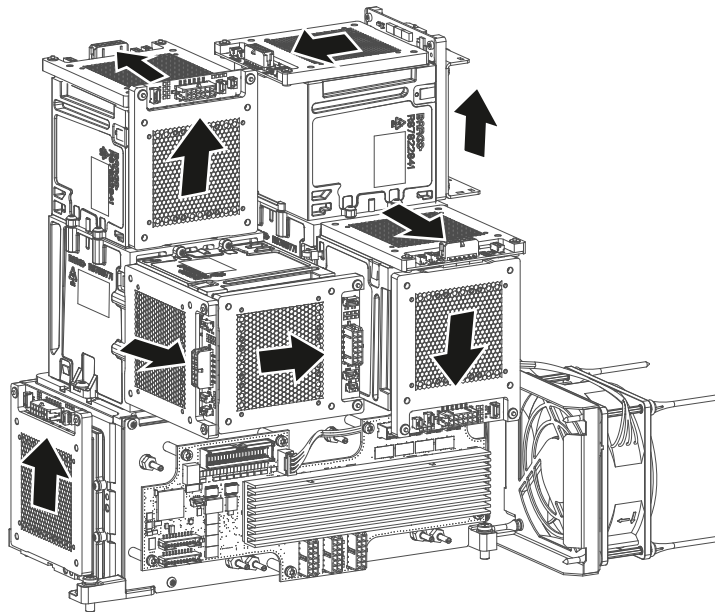


Image 7-19 The arrow indicates the location of the small PCB of each laser plate when mounted on the light source

2. Place back the laser plate bracket. Use a T10 Torx screwdriver to drive in the four screws.

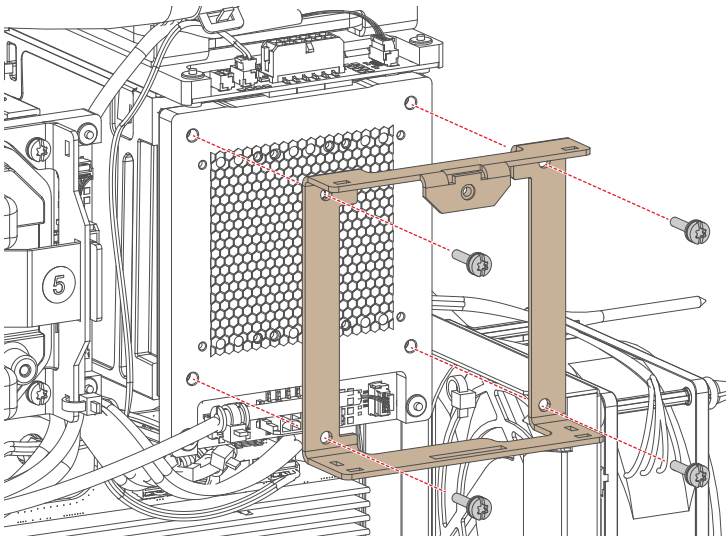


Image 7-20 Mounting the laser plate bracket

3. Carefully place the new peltier element onto the laser plate. Make sure the front side (reference 1, with visible wiring on the bottom) is placed on the laser plate itself and the backside (reference 2) is facing outwards.



Caution: The Peltier element is coated with Loctite TCP 4000 D. You cannot avoid having it leave some residue when removing or mounting it from/onto the laser plate. Use Chemical-resistant gloves(e.g. nitrile rubber) to avoid your hands from getting dirty. If the Loctite does touch your skin, rinse it with running water and soap. Obtain medical attention if any irritation would occur and persist.

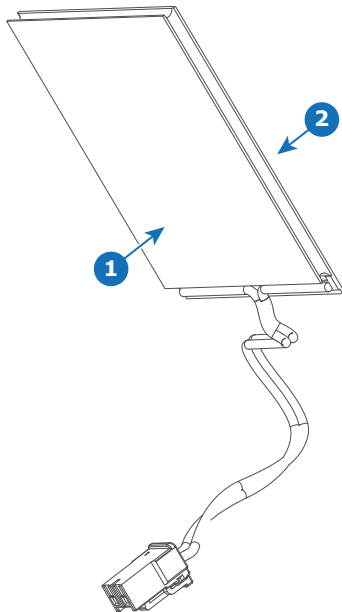


Image 7–21

- 1 TIM paste on the front (cold) side of the peltier element
- 2 TIM paste on the back (hot) side of the peltier element

4. Connect all removed wiring back onto the Light Source Board (LSB) and laser plate interconnection board. To know what wiring goes where on the LSB, see .
5. Mount the cooling circuit cold plate onto the laser plate. Make sure the Peltier element is placed correctly.
6. Mount the clamp from the laser plate. Use a T10 Torx screwdriver.

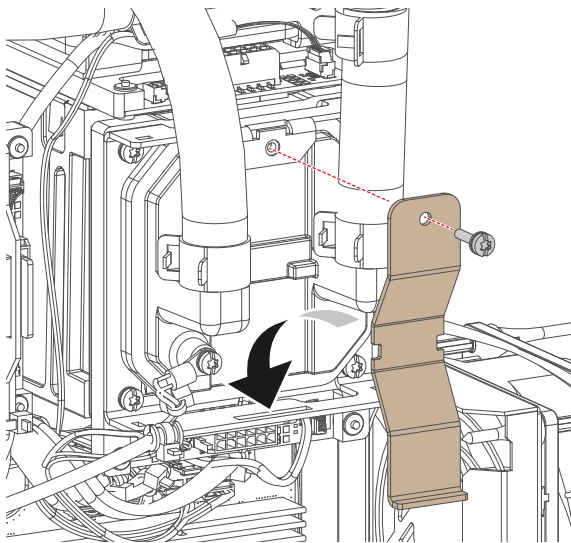


Image 7–22 Mounting back the clamp

7. Mount the temperature sensor onto the laser plate and light source board. Use a T10 Torx screwdriver to remove the screw holding the sensor to the laser plate.

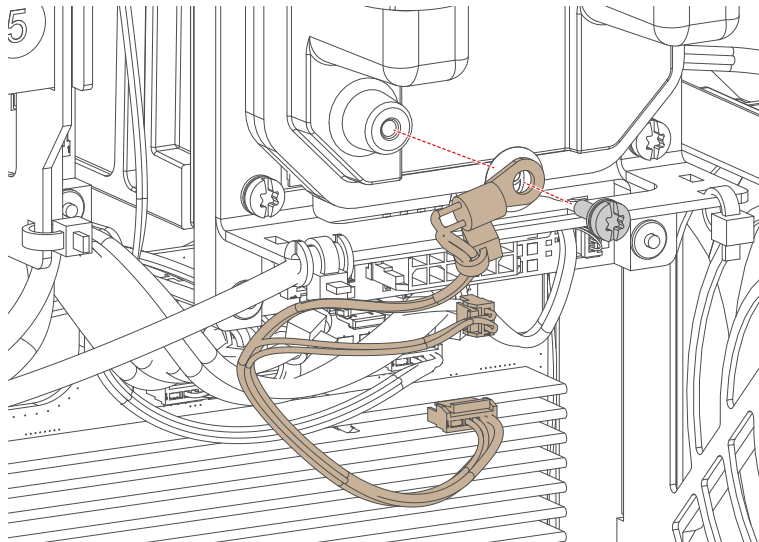


Image 7–23 Mounting the temperature sensor

How to perform the TIM curing process

1. Once everything has been put back into place (including cooler module if necessary), start up the projector.
2. Once completely start up, browse to the Web Communicator and log in.
3. In Web Communicator, navigate to *Maintenance > Service mode*.
The Service menu will be displayed.
4. Under *Laser plate TIM curing*, click **Start** and confirm.

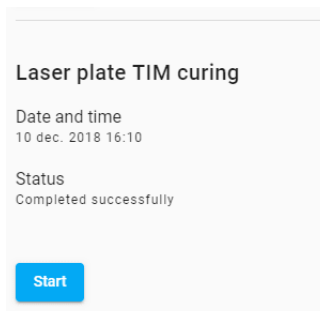


Image 7–24 The TIM curing process in Web Communicator



Caution: Make sure to click start under Laser plate TIM curing and not TIM heating. These two processes are completely different.

5. Wait until the laser plate TIM curing process has been completed. This may take up to 5 minutes, depending on environmental conditions.

7.8 Removing a Green or Blue laser plate



When an error related to laser plate is triggered it does not necessarily mean that the laser plate is defective and should be replaced. For further details see [“Laser plate diagnostic”, page 303](#).



CAUTION: Unlike with the red laser plate removal process, there is no TIM heating process necessary in this replacement procedure, due to the absence of the peltier element. So make sure the projector is disconnected from the power net before starting this replacement procedure.



The following procedure follows the replacement process of laser plate 5. However, this procedure is identical for every other green and blue laser plate.



Technically it is possible to replace every laser plate while the light source remains in the projector (which is preferred). However, if the removal of laser plate 1 (the plate facing the sealed compartment) proves to be too difficult, you can remove the light source from the projector. For more info on this, refer to [“Removing the light source”, page 96](#).

Required tools

- Torx screwdriver T10
- Side cutter

How to remove

1. Remove the top and light source side cover.
2. Remove the clamp from the laser plate. Use a T10 Torx screwdriver to remove the screw.

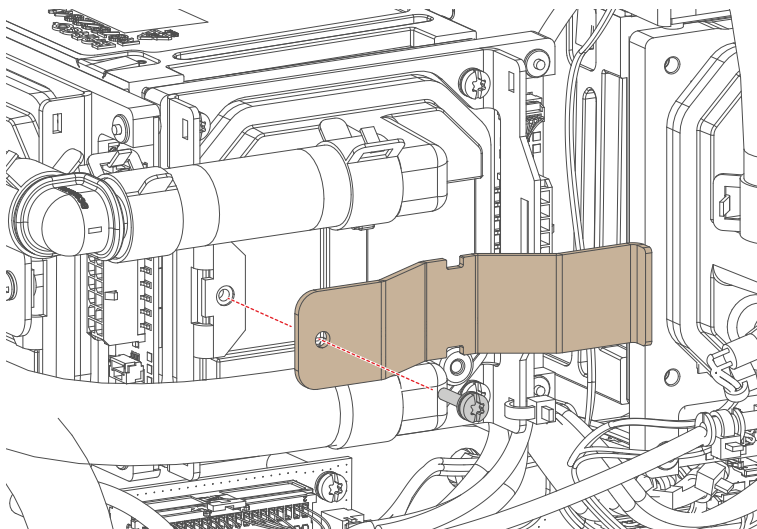


Image 7-25 Removing the clamp

3. Remove the cold plate from the laser plate. Use the clamp as a lever to aid the removal process.

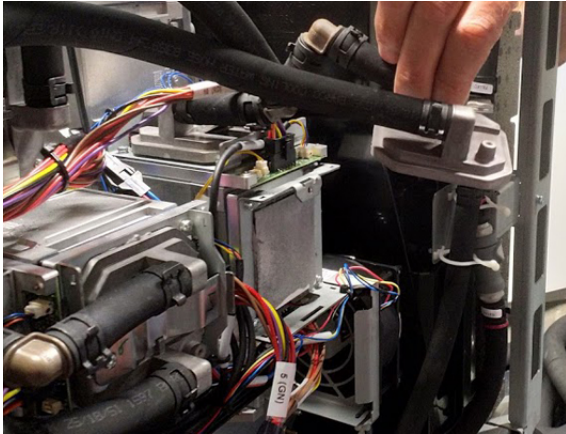


Image 7–26 Example of removing a cold plate from a laser plate

4. Remove the laser plate bracket. Use a T10 Torx screwdriver to release the screws.

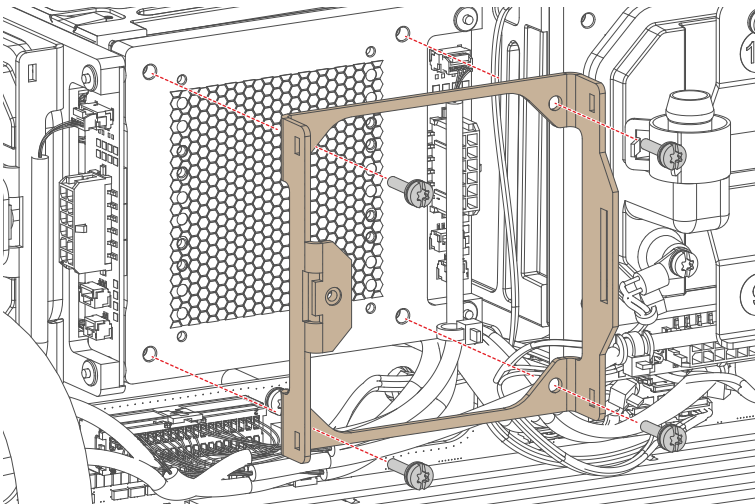


Image 7–27 Removing the laser plate bracket

5. Disconnect the wiring of the interconnection board of the laser plate. Cut any cable ties if necessary with a side cutter.
6. Carefully remove the laser plate as illustrated.

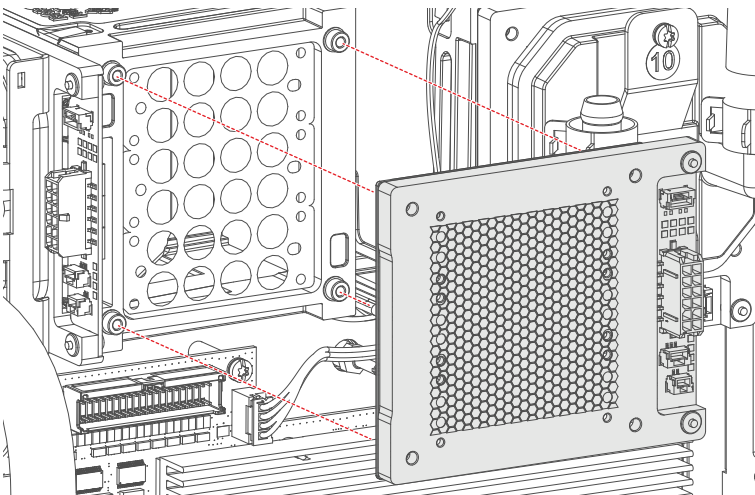


Image 7–28 Removing the laser plate

7.9 Installing a Blue or Green laser plate



The following procedure follows the replacement process of laser plate 5. However, this procedure is identical for every other green and blue laser plate.

Required tools

Torx screwdriver T10

Required parts

Cable ties

How to install

1. Carefully mount the laser plate as illustrated.

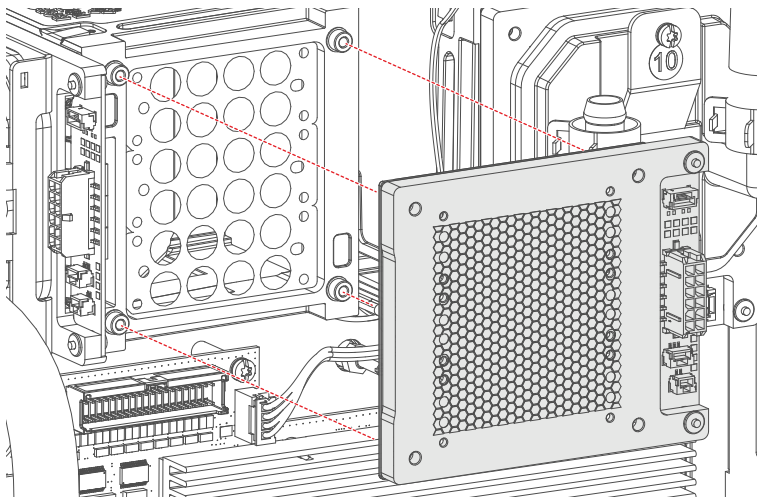


Image 7-29 Mounting the laser plate



Note: Take into account the designated position of each laser plate on the light source.

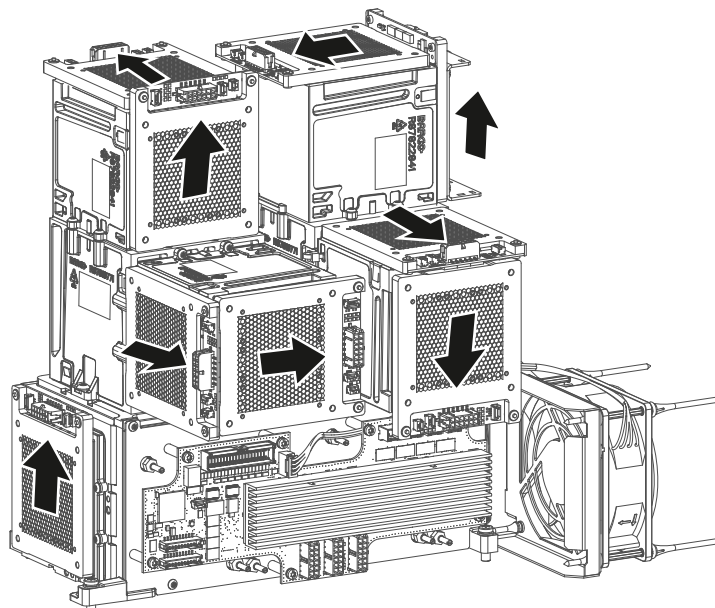


Image 7-30 The arrow indicates the location of the small PCB of each laser plate when mounted on the light source

2. Reconnect the wiring of the interconnection board of the laser plate.

3. Mount the laser plate bracket. Use a T10 Torx screwdriver to tighten the screws.

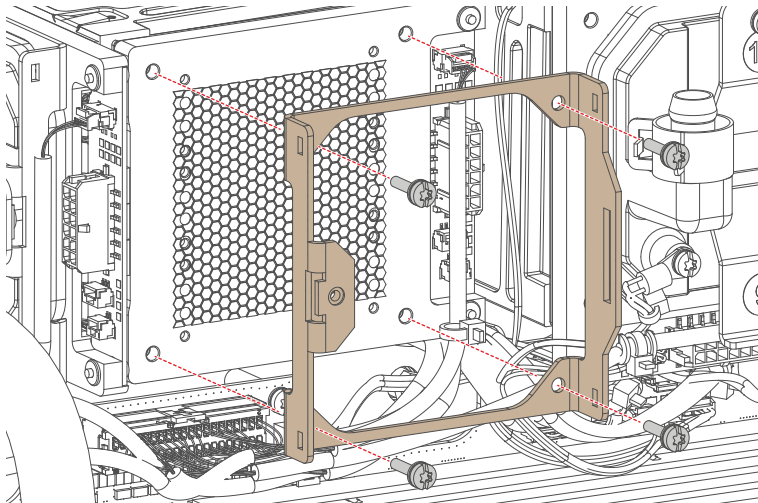


Image 7-31 Mounting the laser plate bracket

4. Carefully mount the cold plate onto the laser plate.
5. Hook in and install the clamp onto the laser plate. Use a T10 Torx screwdriver to tighten the screw.

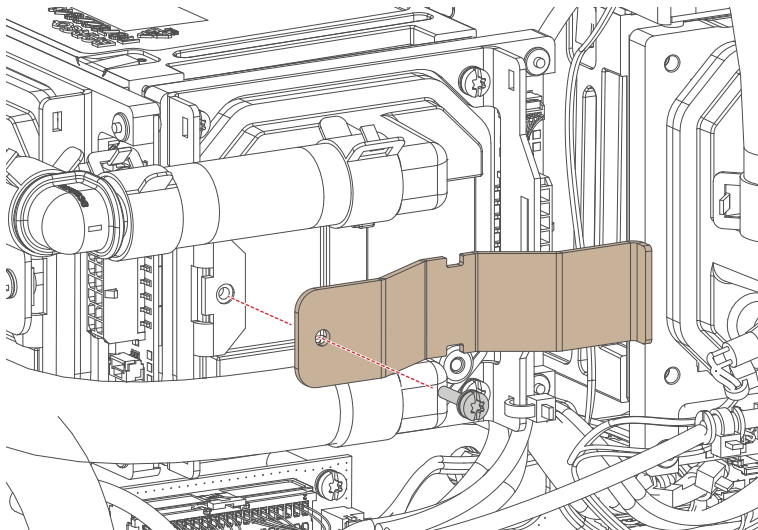


Image 7-32 Mounting the clamp

6. Mount the top and light source side cover.
7. If the light source was removed for the replacement process, make sure to install it back into the projector. For more info, see ["Mounting the light source", page 118](#).

7.10 Perform the laser plate cooling self test

How to perform the test

1. In Web Communicator, navigate to *Maintenance > Service mode*.
The Service menu will be displayed.
2. Under *Laser plate cooling self test*, click **Start** and confirm.

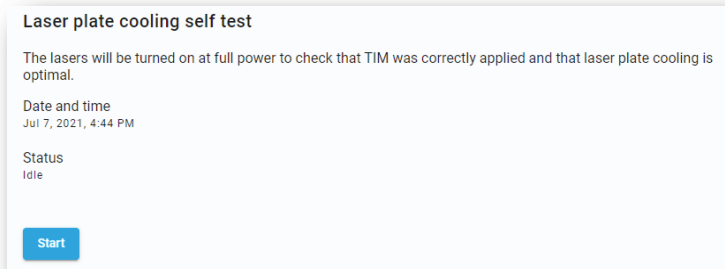


Image 7–33 *Laser plate cooling self test*

The lasers is turned on at full power.

3. During few minutes, the system check if the laser plate cooling is optimal.

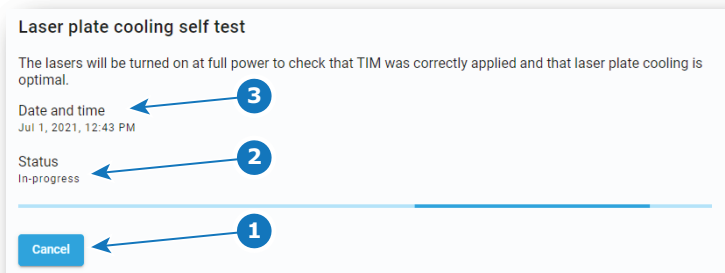



Image 7–34

 **Note:** The test can be interrupted at any time by pressing cancel (reference 1).

4. Once the test is completed, the status (reference 2) and the date of the last execution of the test (reference 3) are updated.

7.11 Replacing the Laser Control Board (LCB)



Take pictures or notes of the LCB layout if you're not familiar with it. It will help you when reconnecting the wiring.

Required tools

- Side cutter
- Torx screwdriver T10

Required parts

Cable ties

How to replace

1. Remove the top cover. For more info, see [“Removal of the top cover”](#), page 278.
2. Remove the wiring from the cable clamps and cut any cable ties that would hinder you in removing the LCB.
3. Remove all wiring from the LCB.
4. Remove the three screws from the LCB. Use a T10 Torx screwdriver to remove the three screws (reference 1) holding the LCB to the LDM cage.
5. Replace the LCB as illustrated. When placing the new LCB, make sure to click the left top spacing in the LCB into the spacer on the LDM cage (reference 2).



Tip: When mounting the LCB, take into account the orientation of the LCB. Make sure the two big condensers are oriented to the front side of the projector, while the three smaller ones are oriented to the rear side of the projector.

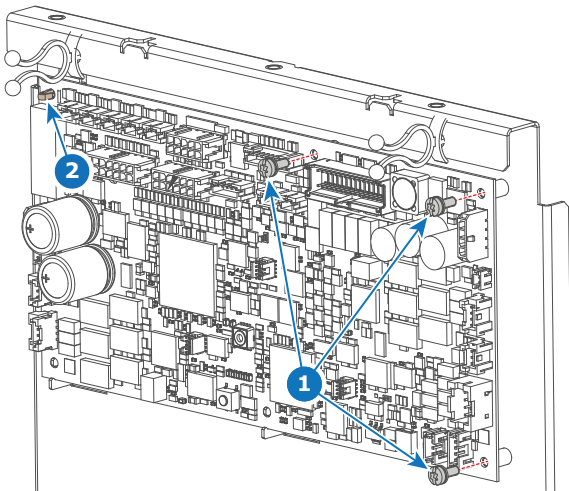


Image 7–35

6. Drive in the three screws into the LCB. Use a T10 Torx screwdriver to tighten the screws.
7. Reconnect the LCB wiring.

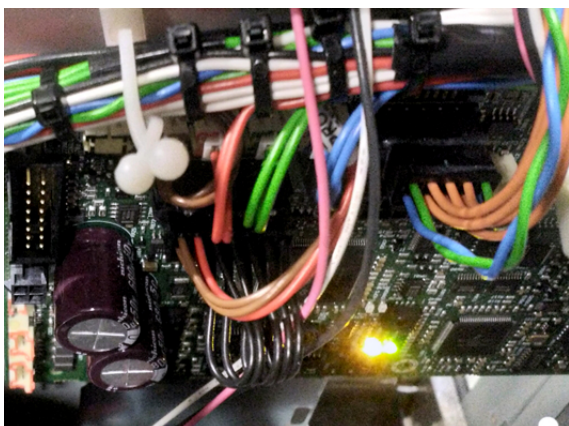


Image 7-36 Example of the LCB wiring (left-hand side)

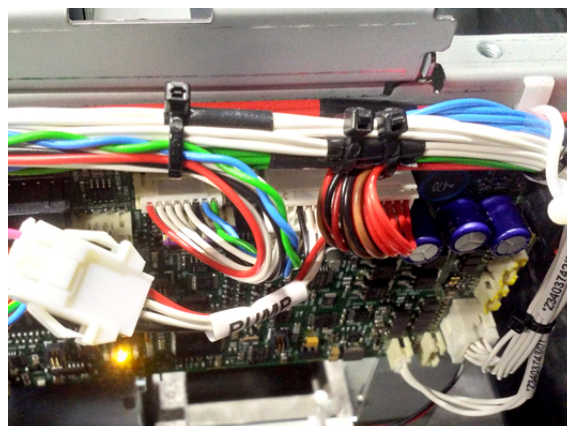


Image 7-37 Example of the LCB wiring (right-hand side)

8. Place the wiring back into the cable clamps. Use cable ties to tie the cables back into “cable trees”.
9. Mount the top cover. For more info, see [“Mounting the top cover”, page 279](#).

Wiring of the LCB

The following is a table to help connect all wiring onto the LCB after replacing this board. For easier spotting of the connectors, the table will split the LCB in four quadrants:

- Upper left quadrant
- Upper right quadrant
- Lower left quadrant
- Lower right quadrant

Connector on LCB	Location connector on LCB ²	Wiring nr	Connected device
J200	Bottom right quadrant (right edge)	Z3403742	Backplane LCB Control
J403	Top left quadrant (upper edge)	Z3403784 (brown)	Cooler Module 1
J404	Top left quadrant (upper edge)	Z3403785 (red)	Cooler Module 2 (if used)
J405	Top left quadrant (upper edge)	Z3403784 (green)	Cooler Module 1
J406	Top left quadrant (upper edge)	Z3403785 (blue)	Cooler Module 2 (if used)
J407	Upper half, in the middle	Z3403751	Light Source Board
J408	Bottom right quadrant (lower edge)	Z3403743	Card cage backplane (3D sync)
J500	Top left quadrant	Z3403746	LDM Data connector (only used on 20k and 25k variants of the projector).
J501	Top left quadrant	Z3403750	Safety Switches (SW1 and SW2)
J600	Top right quadrant (upper edge)	Z3403788 (12k variant only) Z3403756 (all other variants)	Cooler Module fans
J701	Top left quadrant	Z3403790	LDM Data connector (only used on 12k and 15k variants of the projector).
J900	Top right quadrant (right edge)	Z3403783	SMPS

2. From a point of view of the Light source side of the projector

7.12 Mounting the light source

Required tools

Torx screwdriver T20

How to mount

1. Carefully place the light source into the projector.

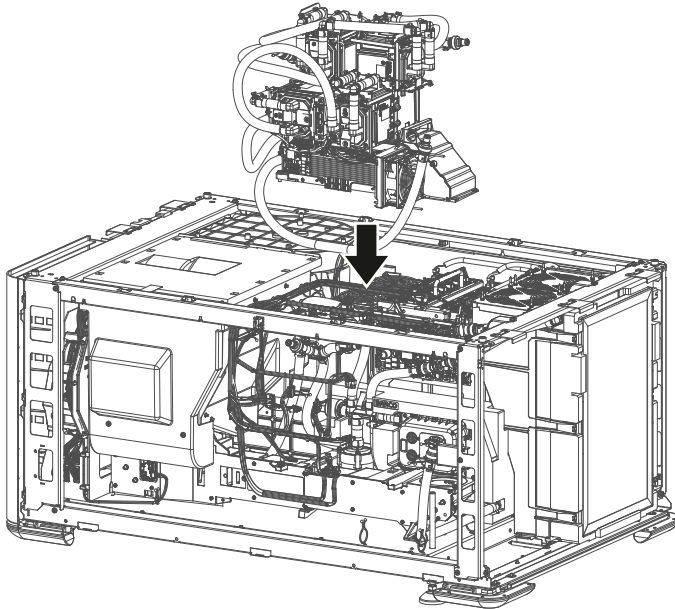


Image 7–38

2. Tighten the four set screws and drive in the two extra screws on the backside of the light source. Use a T20 Torx screwdriver to tighten the screws.

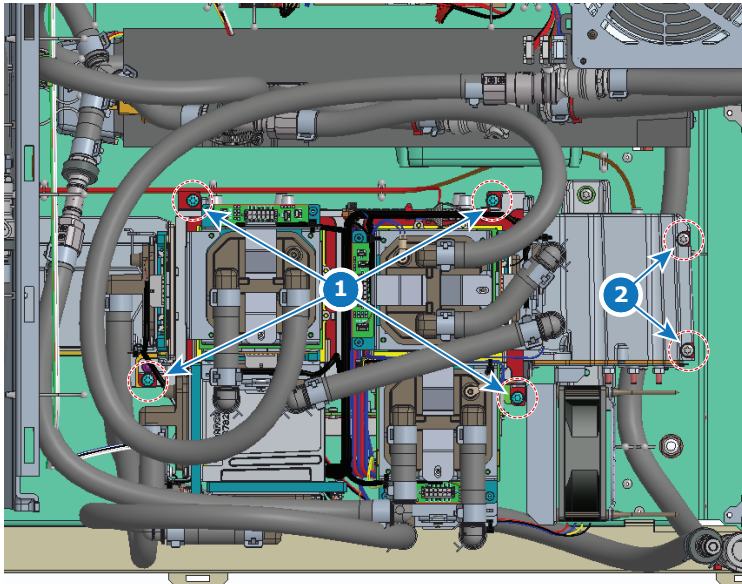


Image 7–39 Location of the set screws and extra screws on the light source

- 1 Set screws location
- 2 Extra screws location

3. Make sure to route and connect the tubings as illustrated:
 - Connect the tubing from laser plate 7 and 10 (both red) to the main pump (reference 1).
 - Connect the tubing from laser plate 3 (green) to Cooler module 1 (reference 2).

- Connect the tubing from laser plate 1 (blue) to Cooler module 2 (reference 3).

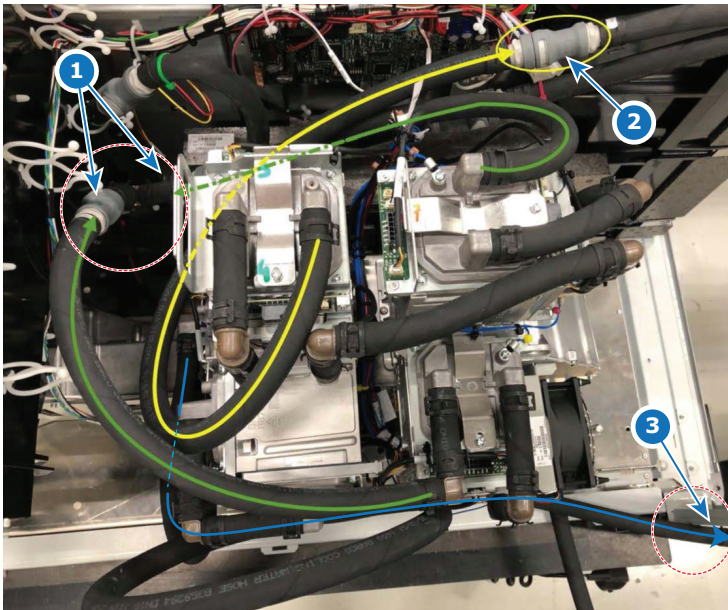


Image 7-40 Routing the tubing of the light source

or

If you have a 12k lumens projector, connect the tubings as follows:

- Connect the tubing from laser plate 9 (red) to the main pump.
- Connect the tubing from laser plate 1 (blue) to the cooler module.

4. Connect the cable trees from the LDM to their respective laser plate. Make sure to match the numbers between the label on the wiring and the marking on the laser plate.

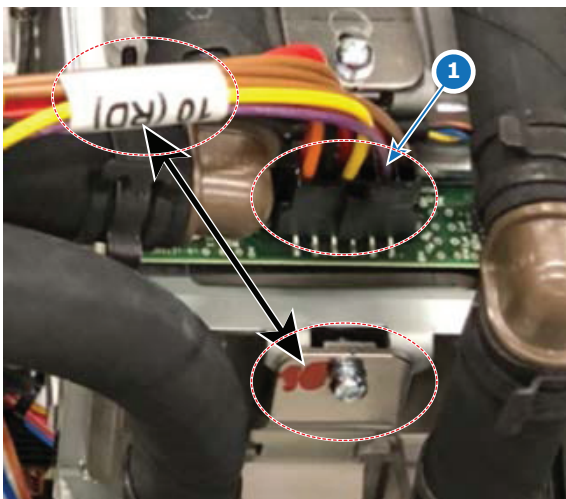


Image 7-41 Example of connecting the LDM wiring (reference 1) to a laser plate (here laser plate 10)

5. Connect the wiring on the LSB. For more info, see [“Replacing the Light Source board”](#), page 98.
6. Mount Cooler Module 2. For more info, see [“Mounting a laser cooler module”](#), page 80.

or

Mount the metal plate if cooler module 2 is not available (e.g. the 12k lumens projector variant).

7. Mount the top, rear and light source side cover.

Light Pipe

8.1	Introduction light pipe	122
8.2	Replacing the Light Sensor	123
8.3	Accessing the Light Pipe components	124
8.4	Replacing the Fold mirrors	126
8.5	Cleaning the folding mirrors	128
8.6	Adjusting the fold mirrors	129
8.7	Replacing the light pipe front lenses	131
8.8	Replacing the Lens Barrel	133
8.9	Replacing the pre-rod assembly	134
8.10	Replacing the light source safety switch	135
8.11	Replacing the pre-rod assembly safety switch	136
8.12	Cleaning the light pipe lenses	137
8.13	Integration Rod diagnostic	138
8.14	Removing the Integration Rod	139
8.15	Installing the integration rod	141
8.16	Adjusting the integration rod and lenses	143

About this chapter

This chapter gives a brief introduction of the Light Pipe and its components. Furthermore, this chapter includes the replacement procedure and, if applicable, the adjustment procedure of several optical parts of the Light Pipe.

8.1 Introduction light pipe

Light pipe

The light pipe transforms the light emitted by the red, green and blue lasers into a homogeneous light beam and focuses this beam precisely on the active surface of the DMD's. The light pipe is divided in two compartment. The front compartment contains lenses, a fold mirror and the integration rod. The rear compartment contains lenses, a fold mirror and the pre-rod assembly.



The light pipe is fully sealed in order to protect the optical integrity of the projector over its lifetime. Under normal foreseeable operating and maintenance/service conditions no interventions are needed that require to open the light pipe compartment.

How to access the light pipe

In order to access the light pipe and perform service or maintenance actions, you will need to remove the Left side cover. For more info, see ["Removal of the light source side cover", page 277](#).

If service actions are required to be performed on the front half of the Light Pipe, the sealed compartment cover will also need to be removed. For more info, see ["Opening the sealed compartment", page 148](#).

Light pipe components

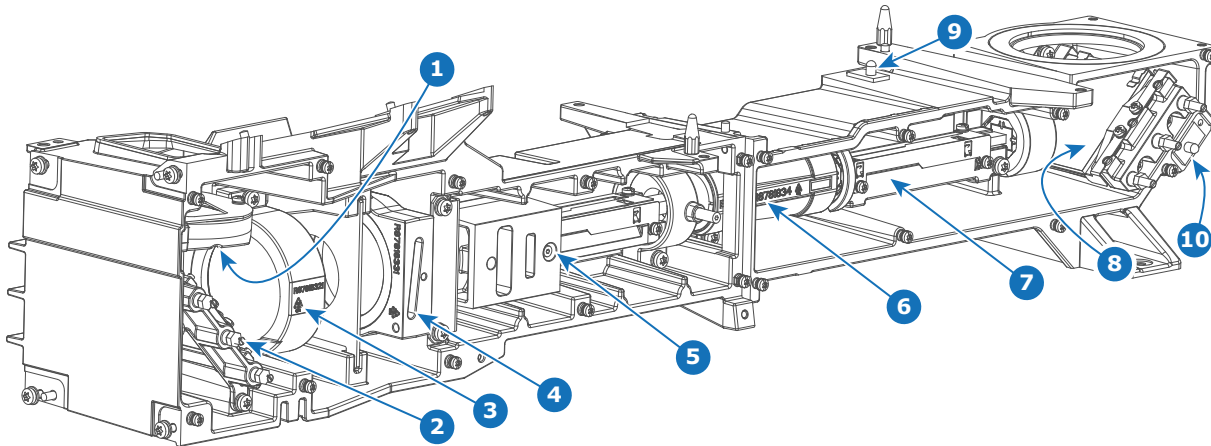


Image 8-1

- | | | | |
|----------|--|-----------|---|
| 1 | Lens nr 5 | 6 | Lens Barrel (3 lenses) |
| 2 | Fold Mirror 1 | 7 | Pre-Rod assembly (lens, pre-rod and diffuser) |
| 3 | Lens nrs 3 and 4 (doublet) | 8 | Fold Mirror 2 |
| 4 | Lens nr 2 | 9 | Safety Switch Light Source |
| 5 | Light Pipe Integration Rod, with lens nr 1 | 10 | Safety Switch pre-rod assembly |

8.2 Replacing the Light Sensor

Required tools

Torx screwdriver T10

How to replace

1. Remove the connector of the Light sensor (reference 1).

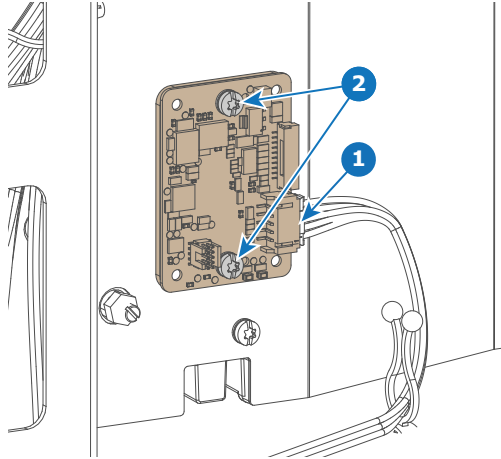


Image 8-2

2. Loosen The two screws (reference 2), holding the light sensor to the light pipe cover as illustrated. Use a T10 Torx screwdriver.
3. Replace the Light Sensor as illustrated.

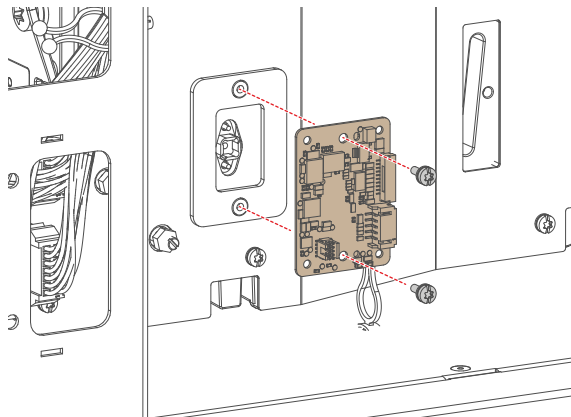


Image 8-3

4. Tighten the screws. Use a T10 Torx screwdriver.
5. Reconnect the connector of the Light sensor (reference 1).

8.3 Accessing the Light Pipe components

Required tools

Torx screwdriver T20

How to access the front half of the Light Pipe

1. Make sure the side cover of the Sealed compartment has been removed. For more info, see [“Opening the sealed compartment”, page 148.](#)
2. Remove the connector of the Light sensor (reference 1).

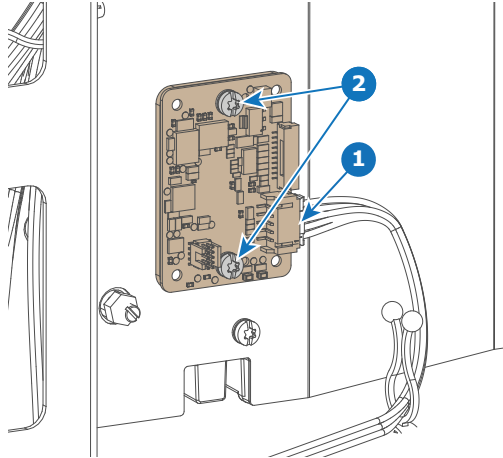


Image 8-4

3. Loosen the 10 Torx screws of the front half of the light pipe cover. Use a T20 Torx screwdriver.
4. Carefully remove the cover.

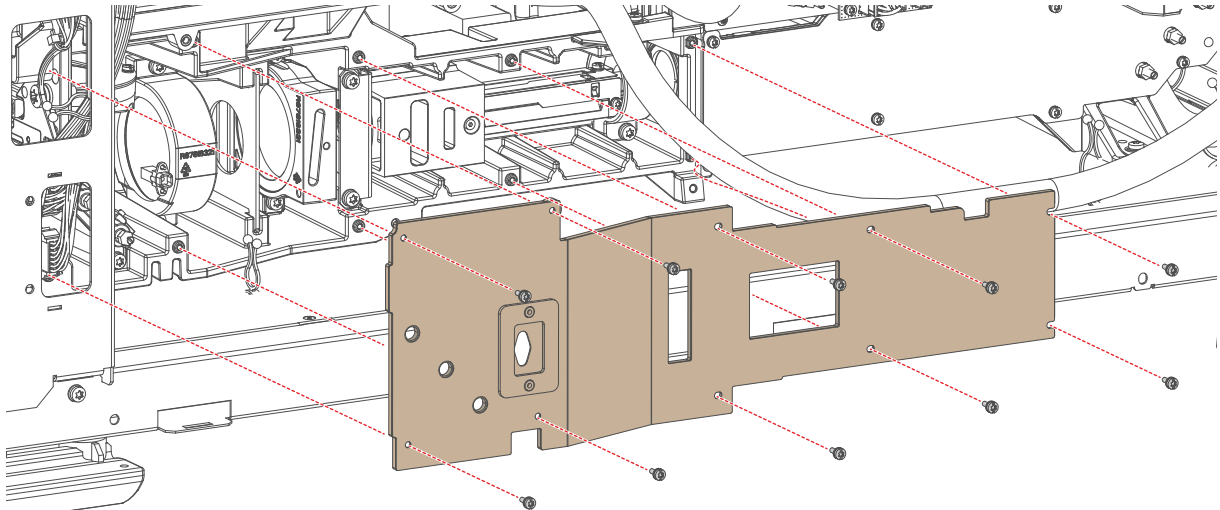


Image 8-5 Removing the front half of the Light pipe cover.

How to access the rear half of the Light Pipe

1. Loosen the 8 Torx screws of the front half of the light pipe cover. Use a T20 Torx screwdriver.
2. Carefully remove the cover.

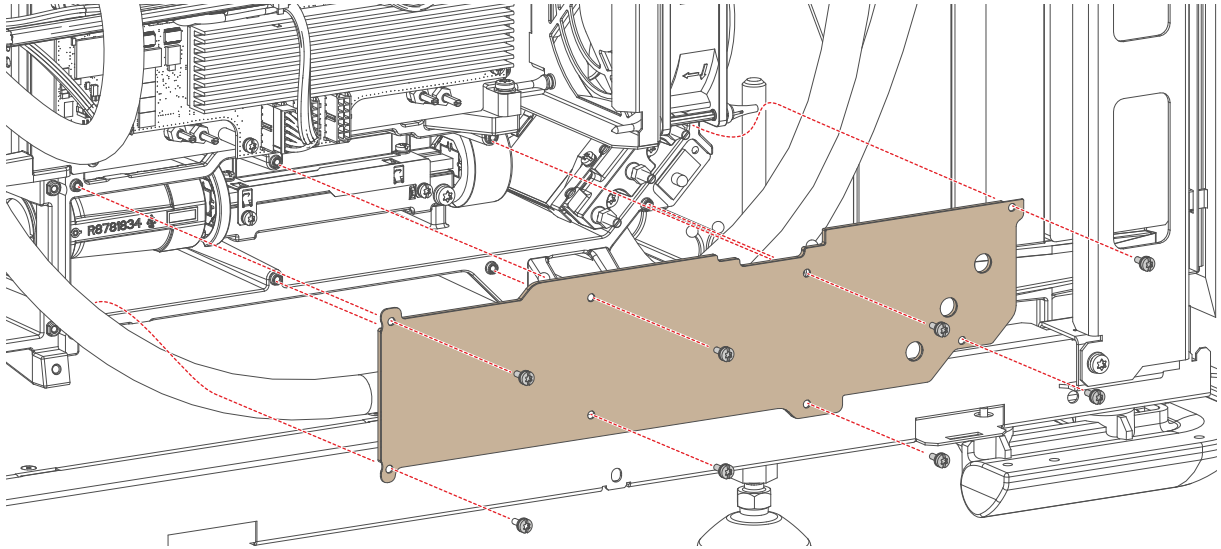


Image 8-6

8.4 Replacing the Fold mirrors

About the Fold Mirrors

The Fold Mirrors reflect the visible light coming from the light source, sends it through the light pipe and into the Light Processor. Each Fold Mirror has three adjustment screws to modify their position, so that the centre of the light spot is precisely reflected in the centre of the Integration Rod entrance or the Light Processor entrance for optimal performance.

Diagnostic

The Fold Mirrors can only be checked by removing the Light Pipe Cover. When removed, the Fold Mirrors becomes visible. In case a Fold Mirror is not damaged but dirt is clearly visible upon the surface of the mirror, it is recommended to clean the Mirror surface. Always replace a Fold Mirror with a new one in case the Mirror is damaged. Possible damages are:

- Mirror is broken.
- Coating peels off.
- Mirror is cracked.



CAUTION: All servicing to the Light Pipe components has to be done in a dust free area. Use compressed air to blow away all dust on the outside of the Light Processor and Light Pipe before entering the projector into the dust free area.

Required tools

- Torx screwdriver T20
- Cotton gloves

How to replace fold mirror 1

1. Remove the front Light Pipe cover.
2. Replace the fold mirror as illustrated. Use a T20 Torx screwdriver.

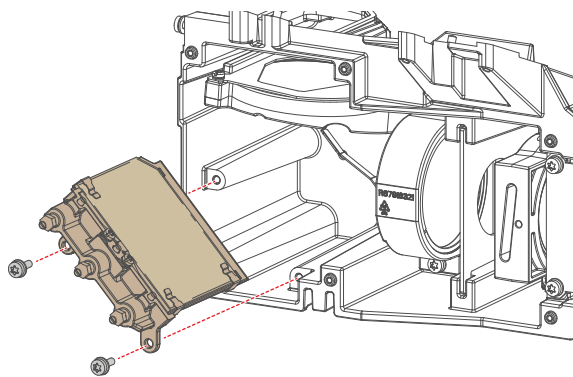


Image 8-7

3. Install the light pipe cover.

How to replace fold mirror 2

1. Remove the rear Light Pipe cover.
2. Replace the fold mirror as illustrated. Use a T20 Torx screwdriver.

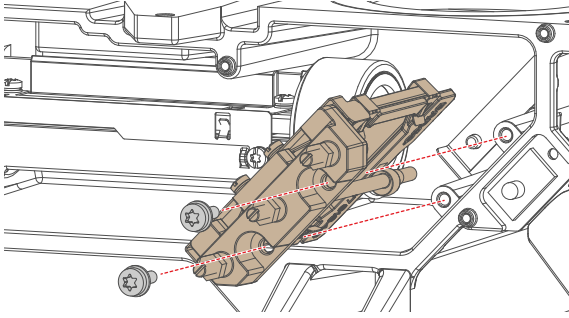


Image 8-8

3. Install the light pipe cover.

8.5 Cleaning the folding mirrors

When to clean a fold mirror

Only clean the fold mirrors in case it is really necessary. This means in case dust is clearly visible upon the surface of the fold mirror.



This procedure requires that the Light Pipe covers are removed from the projector.

Required tools

- Compressed air
- Clean micro fiber lens cleaning cloth (e.g. Toraysee® cloth(s))
- Clean cotton cloth
- Lens cleaner (e.g. ZEISS lens cleaner, Purosol™ or other water based lens cleaner products)

How to clean a fold mirror

1. Blow off dust with clean compressed air (or pressurized air cans).
2. Clean with lens cleaner together with a clean lens cleaning cloth to remove the dust and contamination. Use big wipes.
3. Use a dry lens cleaning cloth to remove left liquid or stripes. Polish with small circles.
4. If there are still fingerprints on the surface, wipe them off with lens cleaner together with a clean lens cleaning cloth. Polish again with a dry one.

8.6 Adjusting the fold mirrors



CAUTION: Normally the Fold Mirror should never be readjusted in the field. In case a readjustment is required follow the instructions in this chapter precisely. Only qualified technicians who have experience with adjusting the Fold Mirror may adjust the Fold Mirror. A misaligned Fold Mirror may cause irreversible damage to other parts of the projector!

When starting the readjustment procedure

When dark parts (small dark bars) or yellow lines are visible in one of the corners of the projected image.

Start by adjusting the folding mirror. In most cases that will be sufficient to eliminate these small misalignments. If not, continue with the adjustment of the integration rod.

Required tools

- Open-end wrench 7 mm (2 pieces)
- Flat screwdriver 4 mm
- Projected Light meters (Lux meter)
- Loctite 242

How to adjust Fold Mirror 1

1. Start up the projector and display a white test pattern with maximum dimming.



Caution: Projecting a misaligned light spot for more than 10 seconds may cause irreversible damage to the Light Processor. Therefore, it is important to maximum dim the light output and adjust the light spot as quickly as possible.

2. Loosen the three outer captive screws, but do not remove them. Use a 7 mm open-end wrench.
3. Turn the (inner) adjustment screws A, B or C in or out until the light spot (5) matches with the outline of the DMDs (4). Use a 7 mm open-end wrench. The illustration below shows the movements of the light spot (5) upon the screen (6) for each adjustment screw.

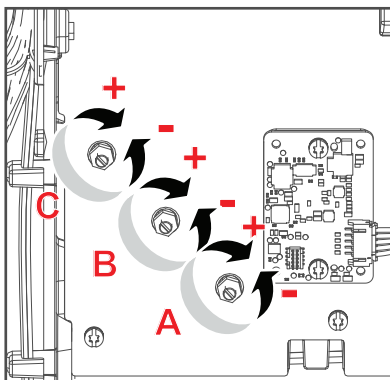
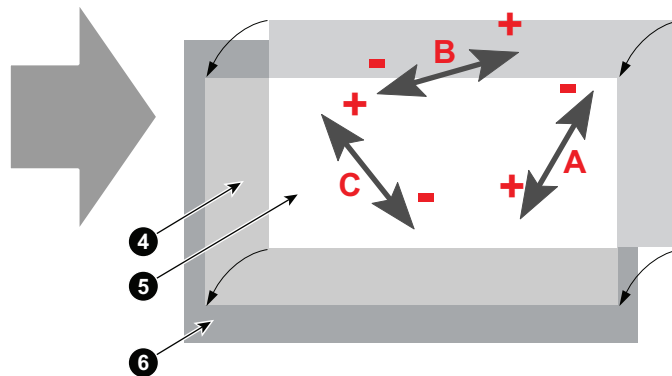


Image 8-9



Tip: Turn the three adjustment screws of the Fold Mirror equally counterclockwise to achieve a higher contrast of the projected image. Then, readjust the adjustment screws individual until the light spot matches with the outline of the DMDs. Take into account that a higher contrast is at the expense of brightness.

4. Hold the adjustment screws in position with one open-end wrench, while tightening the captive screws with a second open-end wrench. Make sure the position of the adjustment screws does not change while tightening the captive screws.

How to adjust Fold Mirror 2

1. Start the projector and put on the full white internal test pattern.

2. Place light sensors in the following position of the projected image and measure the brightness:
 - left and right end positions for horizontal uniformity.
 - Upper and lower end positions for vertical uniformity.
3. Loosen the three nuts of the Light Pipe Mirror, but do not remove them. Use a 7 mm open-end wrench.

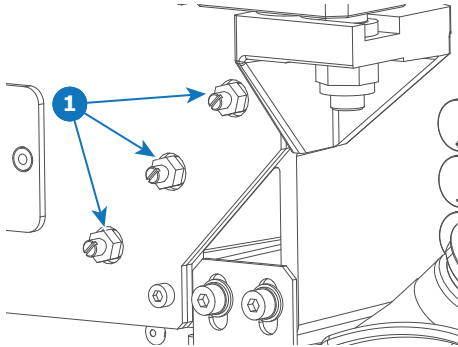



Image 8–10

4. Adjust the three screws for brightness conformity. Use a 4 mm flat screwdriver.
 - Turn the upper and lower adjustment screws **clockwise** in case the **right side is less bright** then the left side.
 - Turn the upper and lower adjustment screw **counterclockwise** in case the **left side is less bright** then the right side.
 - Turn the middle adjustment screw **clockwise** in case the **lower side is less bright** then the upper side.
 - Turn the middle adjustment screw **counterclockwise** in case the **upper side is less bright** then the lower side.

 **Caution:** Do not twist the adjustment screws too hard. One complete turn of the screw is the complete adjustment range.
5. Tighten the three nuts with the open-end wrench while holding the adjustment screws with the flat screwdriver.
6. Seal the position of the nuts. Use Loctite threadlocker 242.

8.7 Replacing the light pipe front lenses

Required tools

Torx screwdriver T20

How to replace Lens Nr 2

1. Remove the front Light Pipe cover.
2. Replace the lens as illustrated. Use a T20 Torx screwdriver.

! **Caution:** Wear cotton gloves. Do not touch the glass with bare hands. Furthermore, ensure that the lens remains clean.

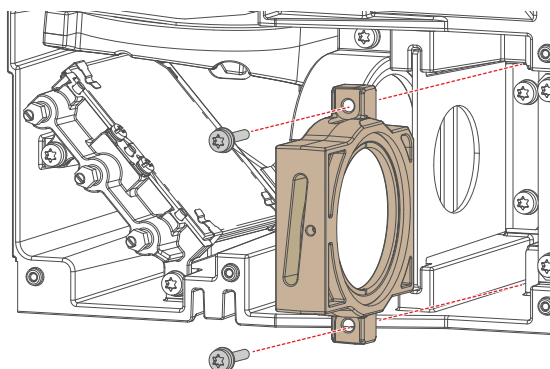


Image 8–11 Replacing Lens Nr 2

3. Install the Light Pipe cover and the left projector cover.

How to replace Lenses Nrs 3 and 4 (doublet)

1. Remove the front Light Pipe cover.
2. Replace the doublet lens as illustrated. Use a T20 Torx screwdriver.

! **Caution:** Wear cotton gloves. Do not touch the glass with bare hands. Furthermore, ensure that the lens remains clean.

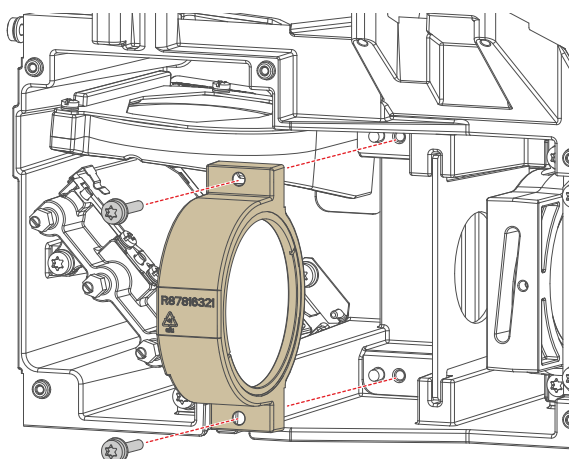


Image 8–12 The doublet containing Lens numbers 3 and 4

3. Install the Light Pipe cover and the left projector cover.

How to replace Lens Nr 5

1. Remove the front Light Pipe cover.
2. Replace the lens as illustrated. Use a T20 Torx screwdriver.



Caution: Wear cotton gloves. Do not touch the glass with bare hands. Furthermore, ensure that the lens remains clean.

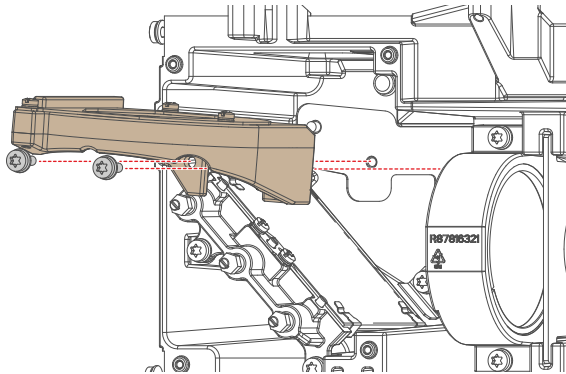


Image 8–13

3. Install the light pipe cover and left projector cover.

8.8 Replacing the Lens Barrel

Required tools

Torx screwdriver T20

How to replace

1. Remove the rear Light Pipe cover.
2. Replace the lens barrel. Use a T20 Torx screwdriver.



Caution: Wear cotton gloves. Do not touch the glass with bare hands. Furthermore, ensure that the lens remains clean.

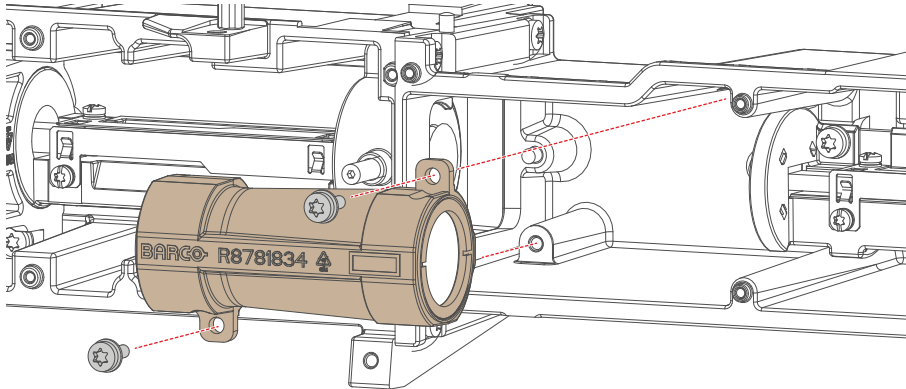


Image 8–14


3. Install the light pipe cover and left projector cover.

8.9 Replacing the pre-rod assembly

Required tools

Torx screwdriver T20

How to replace

1. Remove the rear Light Pipe cover.
2. Replace the pre-rod assembly. Use a T20 Torx screwdriver.
 **Caution:** Wear cotton gloves. Do not touch the glass with bare hands. Furthermore, ensure that the lens remains clean.

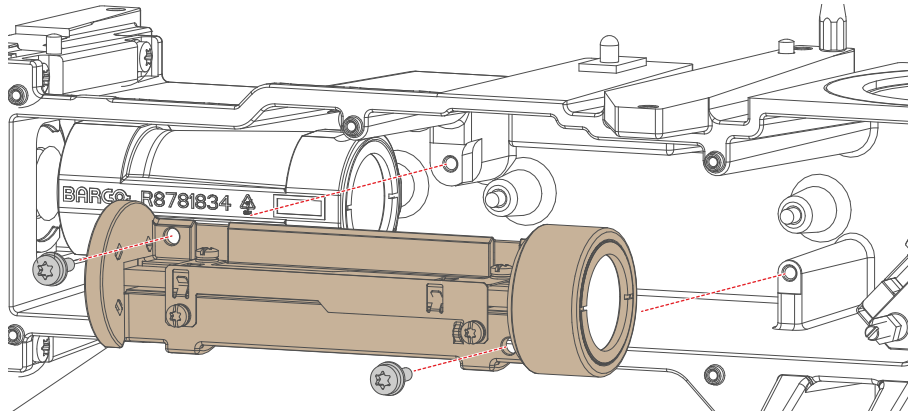


Image 8–15

3. Install the light pipe cover and left projector cover.

8.10 Replacing the light source safety switch

How to replace

1. Remove the light source. For more info, see [“Removing the light source”](#), page 96.
2. Remove the rear Light Pipe cover.
3. Disconnect the wiring on the safety switch.
4. Replace the safety switch as illustrated.

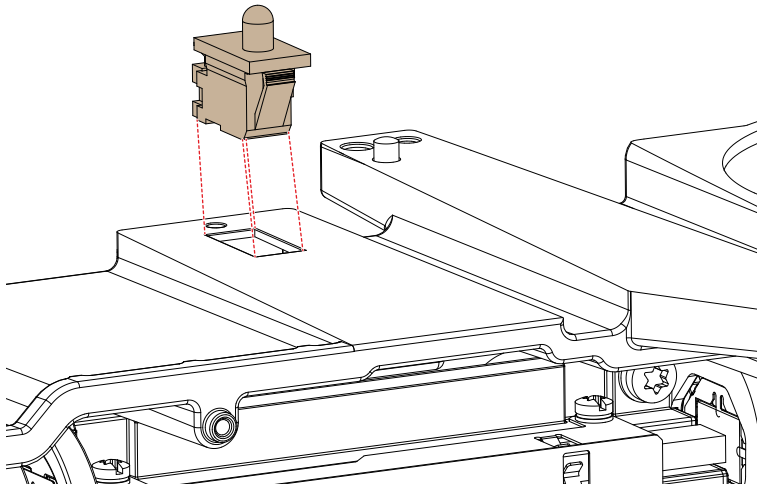


Image 8–16 Replacing the safety switch

5. Reconnect the wiring to the safety switch.
6. Mount the light pipe cover back.
7. Mount back the light source. For more info, see [“Mounting the light source”](#), page 118.

8.11 Replacing the pre-rod assembly safety switch

How to replace

1. Remove the light pipe cover.
2. Disconnect the wiring of the safety switch.
3. Replace the safety switch as illustrated.

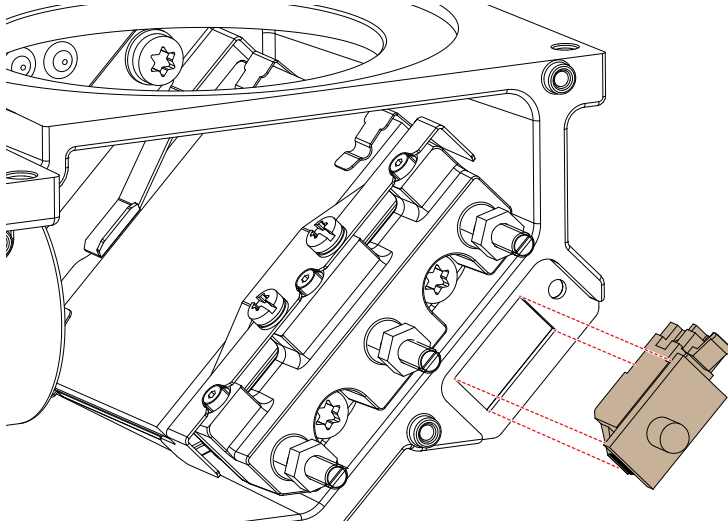


Image 8–17 Replacing the safety switch

8.12 Cleaning the light pipe lenses

When to clean the light pipe lenses

Only clean the light pipe lenses in case it is really necessary. This means in case dust is clearly visible upon the surface of the light pipe lenses.



This procedure requires that the light pipe lenses are removed from the light pipe.

Required tools

- Compressed air
- Clean micro fiber lens cleaning cloth (e.g. Toraysee® cloth(s))
- Clean cotton cloth
- Cotton gloves
- Lens cleaner (e.g. ZEISS lens cleaner, Purosol™ or other water based lens cleaner products)

How to clean the light pipe lenses

1. Blow off dust with clean compressed air (or pressurized air cans).



Tip: Wear cotton gloves to handle the light pipe lenses. Never use gloves that leave particles on the surfaces.

2. Clean with lens cleaner together with a clean lens cleaning cloth to remove the dust and contamination. Use big wipes.
3. Use a dry lens cleaning cloth to remove left liquid or stripes. Polish with small circles.
4. If there are still fingerprints on the surface, wipe them off with lens cleaner together with a clean lens cleaning cloth. Polish again with a dry one.

8.13 Integration Rod diagnostic

General

Due to bad environmental conditions the Integration Rod may become contaminated with grease, dust, dirt or other particles, which will burn into the rod and cause permanent damage. As a result spots may become visible in the projected image on the screen. To confirm that these spots are caused by damage to the rod, diagnose the rod as described in the following procedure.

Required tools

- Allen wrench 2 mm
- Allen wrench 2.5 mm

How to diagnose the Integration Rod of the projector

1. Remove the left cover of the projector.
2. Start up the projector and display a white test pattern with maximum dimming. Make sure that the projected white test pattern is focused.
 Caution: Projecting a misaligned light spot for more than 10 seconds may cause irreversible damage to the Light Processor. Therefore, it is important to maximum dim the light output and adjust the light spot as quickly as possible.

3. Loosen the set screws (reference 1 and 4, [Image 8–18](#)) a few turns. Use a 2 mm Allen wrench. Do not remove the set screw.

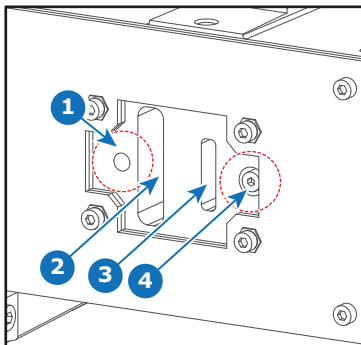


Image 8–18

- 1 Set screw Lens 1
- 2 Pivot points Lens 1
- 3 Pivot point Integration Rod
- 4 Set screw Integration Rod rotation

4. Gently rotate the pivot points the Integration Rod (reference 3 [Image 8–18](#)) up and down while watching the projected image.
5. Do you see spots in the projected image rotate along with the movements of the Integration Rod?
 - **If yes**, these spots are caused by damages to the Integration Rod. Replace the Integration Rod assembly.
 - **If no**, then the Integration Rod is OK. Re adjust and secure the Integration Rod and reinstall the left cover of the projector.



Caution: Make sure to not keep the Integration Rod tilted for too long, in order to prevent damage to the Light Processor.

8.14 Removing the Integration Rod

Required tools

- Allen wrench 3 mm
- Allen wrench 4 mm
- Torx screwdriver T20

How to remove

1. Remove the Light Pipe cover.
2. Remove the four Torx screws, holding the integration rod onto the light pipe. Use a T20 Torx screwdriver.
3. Carefully remove the integration rod as illustrated.

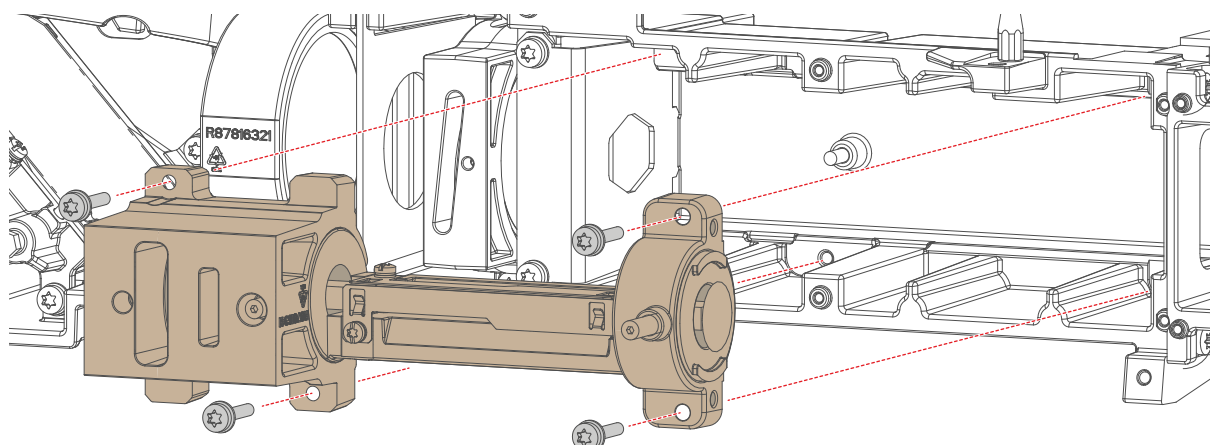


Image 8–19

4. Remove the two spring nuts (reference 1, [Image 8–20](#)) and the set screw (reference 2). Use a 4 mm Allen wrench for the spring nuts and a 3 mm Allen wrench for the Set screw.

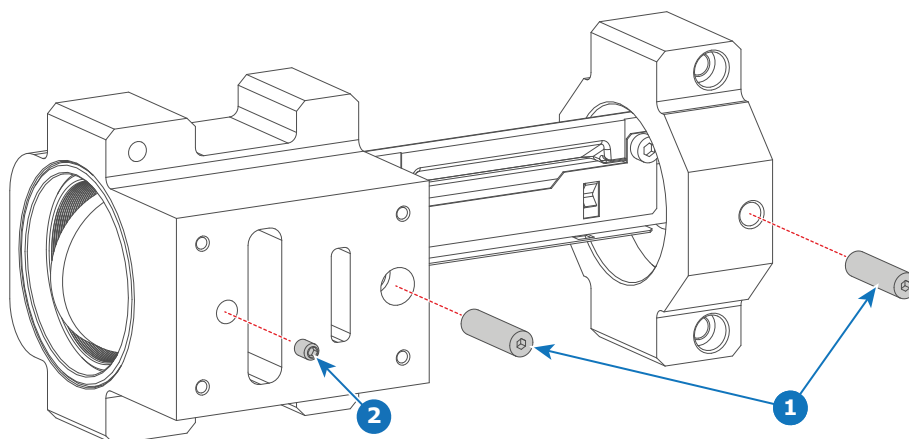


Image 8–20

5. Remove the two rod fixations to free the Integration Rod.

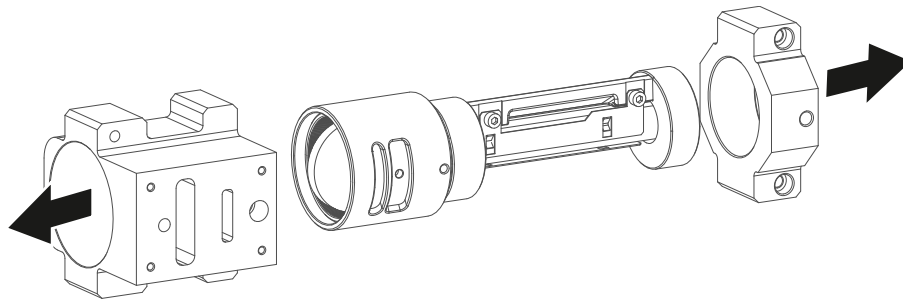


Image 8-21

8.15 Installing the integration rod

Required tools

- Allen wrench 3 mm
- Allen wrench 4 mm
- Torx screwdriver T20

How to install the integration rod

1. Place the two rod fixations over the Integration Rod. Place the large fixation over the lens side and the small fixation over the input side.

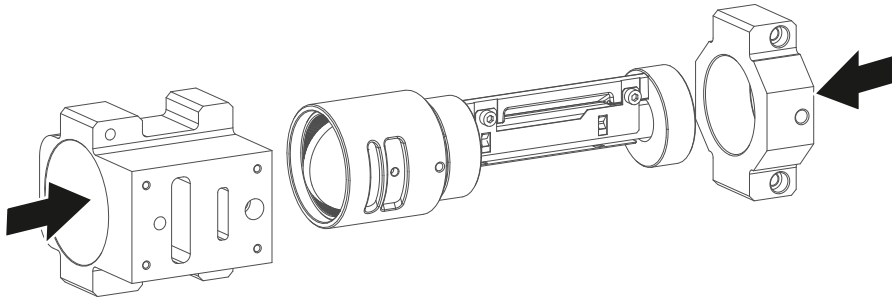


Image 8-22

2. Place the two spring nuts (reference 1, [Image 8-23](#)) in such a way that the rod fixations are fixated to the Integration rod. Use a 4 mm Allen wrench to fixate them.

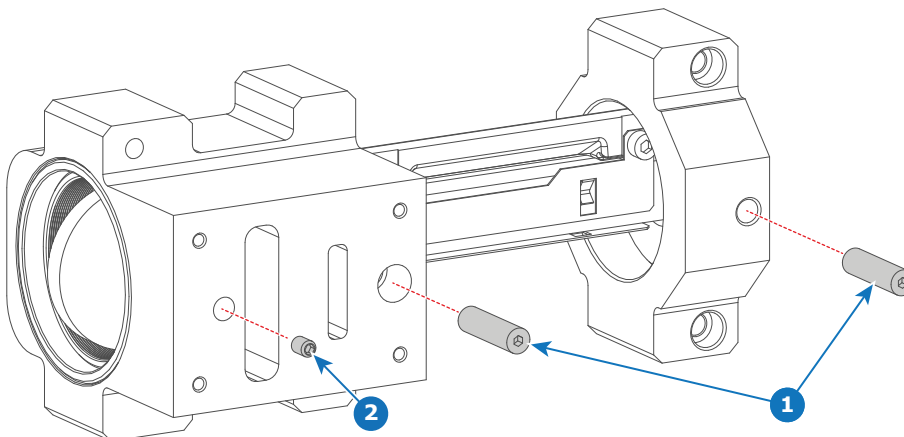


Image 8-23

3. Place the set screw in the integration rod, to prevent it from moving. Use a 3 mm Allen wrench to tighten it.
4. Place the integration rod in the light pipe as illustrated. Use a T20 Torx screwdriver to tighten the four screws.

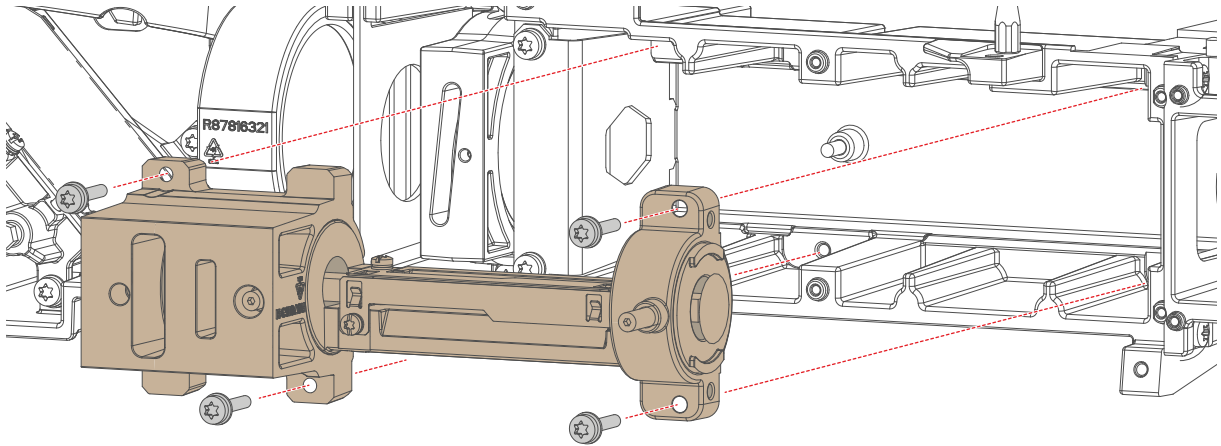


Image 8-24

5. Install the Light Pipe cover.
6. Adjust the Integration Rod. See [“Adjusting the integration rod and lenses”, page 143.](#)

8.16 Adjusting the integration rod and lenses



CAUTION: Only qualified and authorized personnel may perform this procedure.

Required tools

- Allen wrench 2 mm
- Allen wrench 2.5 mm

How to adjust the Integration Rod

1. Loosen the three set screws of the Integration Rod (references 1, 2 & 3, [Image 8–25](#)). Use a 2 mm Allen wrench. Do not remove the set screws.

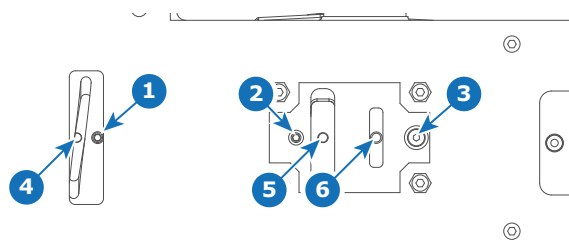


Image 8–25

- | | |
|--|---------------------------------------|
| 1 Set screw Lens 2 (zoom) | 4 Pivot point Lens 2 (zoom) |
| 2 Set screw Lens 1 (focus) and Integration Rod | 5 Pivot point for Lens 1 |
| 3 Set screw Integration rod rotation | 6 Pivot point for the Integration Rod |

2. Set up the projector to display a **full white internal pattern** with a maximum contrast and a **maximum dimming**. Do not activate the light source yet. Make sure that you have a 2.5 mm Allen wrench within reach for the next steps.



Caution: Maximum ten (10) seconds are allowed of minimum light output on a non-adjusted Integration Rod. Otherwise, the DMD's may be damaged.

3. Activate the light source.
4. Gently move the pivot point of Lens 2 up or down (reference 4, [Image 8–25](#)) until the projected image slight overshoot (**ZOOM**). Use a 2.5 mm Allen wrench as an extension bar of the handle. This allows a more precise adjustment.

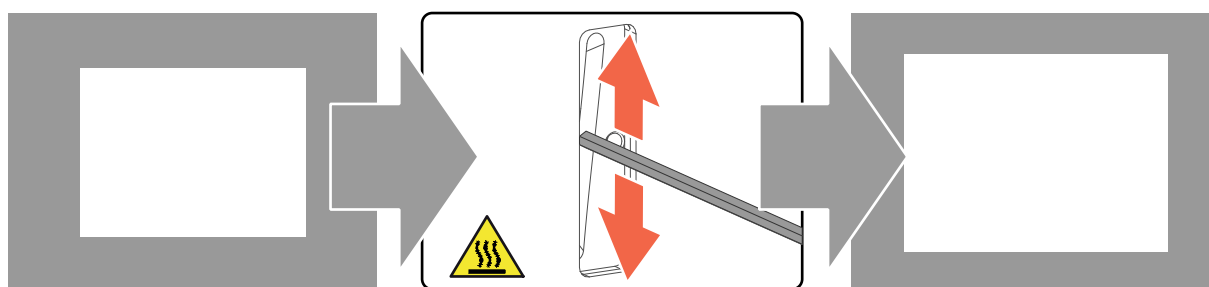


Image 8–26

5. Gently move the pivot point of the Integration Rod (reference 6, [Image 8–25](#)) up or down until the projected light beam matches the projected outline of the DMD's (**ROTATION**). Use a 2.5 mm Allen wrench as an extension bar of the internal pivot point .
 - Note: No spots in the projected image may move along with the movements of the Integration Rod. Spots which move with the movements of the Integration Rod indicate that the exit side of the Integration Rod is contaminated with dust. If this is the case, remove the Integration Rod and try to blow away the dust. If this doesn't help replace the Integration Rod.

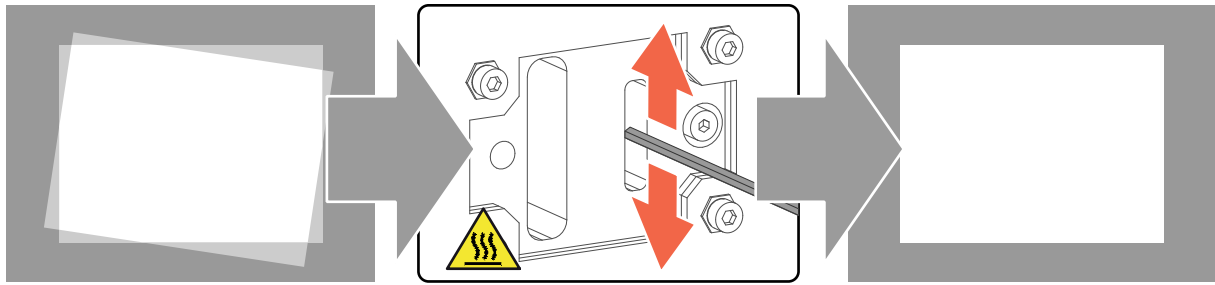


Image 8–27

6. Fixate the set screw for the Integration rod (reference 3, [Image 8–25](#)).



Tip: Make sure the position of the Integration Rod itself is fixated before adjusting the focus. If not, the integration rod may rotate along with Lens 1.

7. Gently move the pivot point of Lens 1 (reference 5, [Image 8–25](#)) up or down into a position which projects the sharpest possible edges on the screen (**FOCUS**). Use a 2.5 mm Allen wrench as an extension bar of the handle.



Tip: The focus step can be done a bit easier if the integration rod is slightly tilted. This way you can easier spot the overlap section between white image and dark border. However, make sure the time the integration rod is tilted is kept to a minimum.

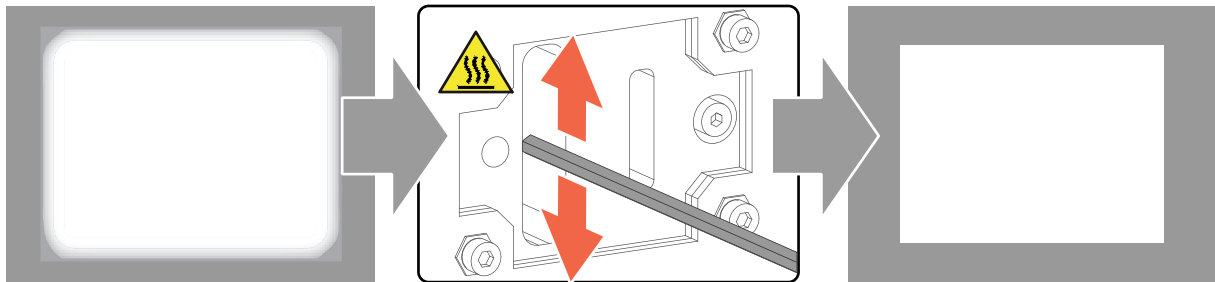


Image 8–28

8. Fixate all set screws.

Light Processor

9.1	Introduction Light Processor	146
9.2	Diagnostic.....	147
9.3	Opening the sealed compartment	148
9.4	Removing the Light Processor	150
9.5	Replacing a Formatter board fan.....	153
9.6	Removing the light processor fan	154
9.7	Replacing the light processor fan	156
9.8	Replacing the Light Processor interconnection board	158
9.9	Unpacking a new light processor.....	159
9.10	Mounting the Light Processor	161
9.11	Packing the defective light processor	163
9.12	Closing the sealed compartment.....	167
9.13	Convergence controls	169
9.14	Red on Green convergence.....	171
9.15	Blue on Green convergence	173

About this chapter

This chapter gives a brief introduction of the Light Processor assembly. Furthermore, this chapter includes the replacement procedure of the whole Light Processor or sub assemblies. The convergence adjustment procedure is also included in this chapter.



WARNING: Disconnect the power to the projector mains terminals and unplug the power cord at UPS INLET for removal of all power from the projector.



CAUTION: Wear a wrist band which is connected to the ground while handling the electrostatic discharge sensitive parts.



CAUTION: Remove the light processor of the projector only in a clean and dust free area. Never remove the side cover in an area which is subject to airborne contaminants such as that produced by smoke machines or similar.



CAUTION: Remove the projector lens before removing the Light Processor.

9.1 Introduction Light Processor

Light Processor

The Light Processor is the heart of the projector. The prism of the Light Processor splits up the homogeneous white light coming from the Light Pipe into red, green and blue light. The video information on the three DMDs is integrated with these red green and blue light beams. The prism merges the three integrated light beams back in to one full color video image, which is projected via the projection lens onto the screen.

Each DMD has its own formatting board (satellite board) which drives the micro mirrors to integrate the video signal into the light beam. A lot of heat is produced during the integration of the video information. To protect the DMDs for overheating the Light Processor is equipped with a cooling circuit. Each channel has its own cooling block.

The Light Processor is equipped with 4 temperature sensors. Each channel has one temperature sensor on its cooling block. These temperature sensors help to protect the Light Processor for overheating.

The red and blue channel are equipped with three extended adjustment knobs to converge the DMD with the DMD of the green channel which is the reference channel for convergence alignment.

The air gap between the prism and DMD is sealed to protect the DMDs for dust. It is important to know that a misaligned light path which reflects upon the sealing will damage the sealing very rapidly. At the bottom of the prism exit a "touch" sensor is mounted to protect the prism against excessive lens movements.

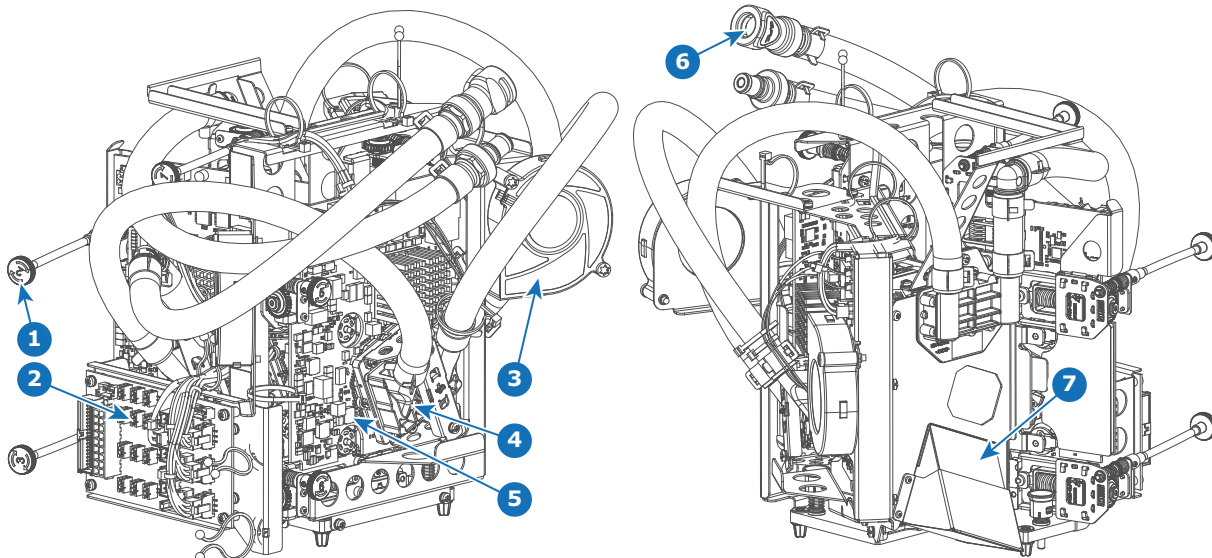


Image 9-1 Light Processor unit

- 1 Convergence adjustment knob
- 2 Light Processor interconnection board
- 3 Light processor fan
- 4 Cooling block cooling circuit

- 5 Satellite board
- 6 Liquid cooling circuit
- 7 Prism sensor

9.2 Diagnostic

Troubleshooting of the Light Processor

There are several potential reasons why removal or replacing of the Light Processor could be required. Nevertheless, try to avoid unnecessary removal of the Light Processor. The list below gives an overview of the most common problems which require removal or replacement of the Light Processor. Check this list to ensure the problem is caused by the Light Processor.

- Artifacts in the projected image. These artifacts are also visible on the internal service patterns of the Satellite boards.
- Abnormal convergence fault which one is not able to correct. This could indicate prism damage (E.g. crack in prism).
- Unable to focus the projected image.

9.3 Opening the sealed compartment



This procedure assumes that the side and top cover have been removed.



CAUTION: This procedure may only be done by a qualified and trained service technician.

Required tools

Torx screwdriver T20

How to open the sealed compartment

1. Remove the four screws holding the side cover (reference 1). Use a T20 Torx screwdriver.

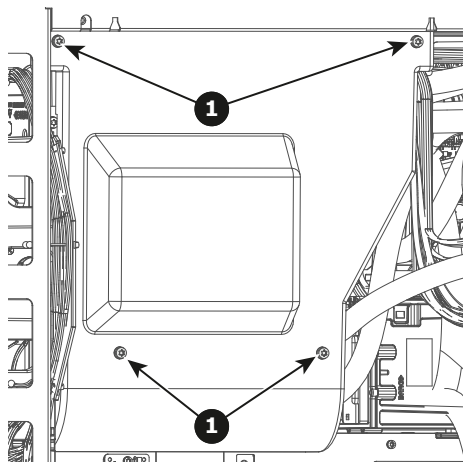


Image 9-2 Sealed cover fixation

2. Lift the cover up slightly using both lips. Then remove the cover by taking it away from the projector.

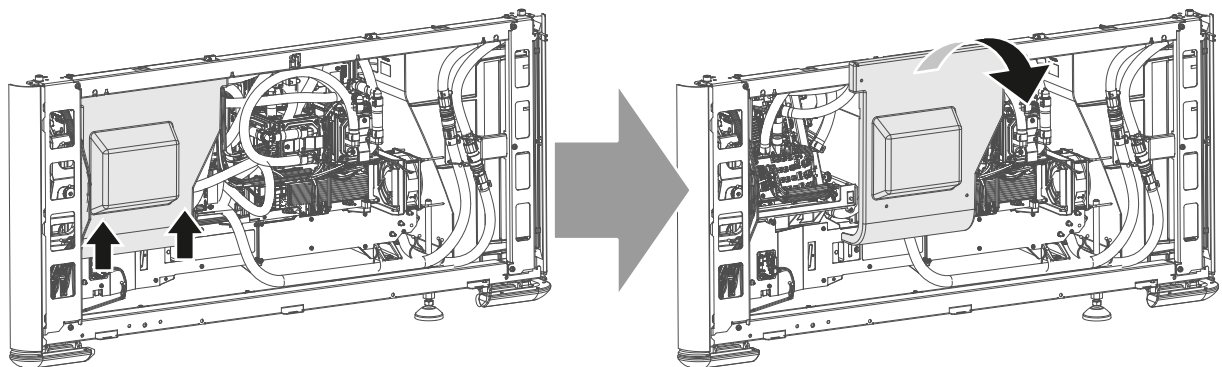


Image 9-3 Sealed side cover, remove

3. Slightly slide the top cover a bit outwards. Then lift it up and remove it.

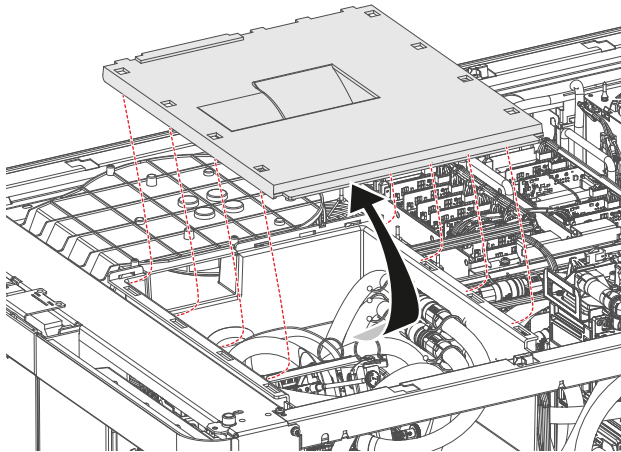


Image 9-4 Sealed top cover, remove

9.4 Removing the Light Processor



This procedure assumes that the side and top cover have been removed.

Required tools

Torx screwdriver T20 x 300

How to remove

1. Make sure the sealed compartment covers have been removed. For more info, see [“Opening the sealed compartment”, page 148.](#)
2. Remove the three high-speed data cables (reference 1, [Image 9–5](#)) that are connected to the Elca box.

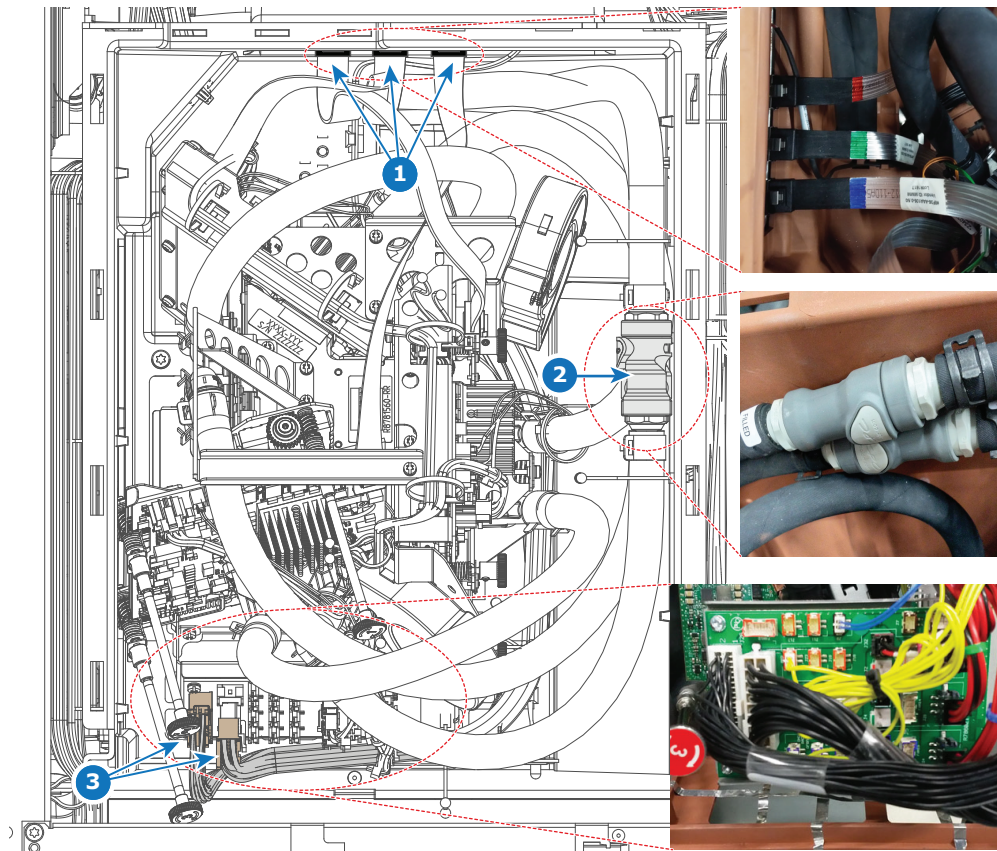


Image 9–5 Overview of the Light Processor connections

3. Disconnect the tubing (reference 2).
4. Disconnect the two big data connectors on the Light processor interconnection board (reference 3).
5. Loosen the three captive screws, holding the light processor onto the projector frame. Use a T20 Torx screwdriver with a long handle (e.g. 30 cm) to loosen the screws.

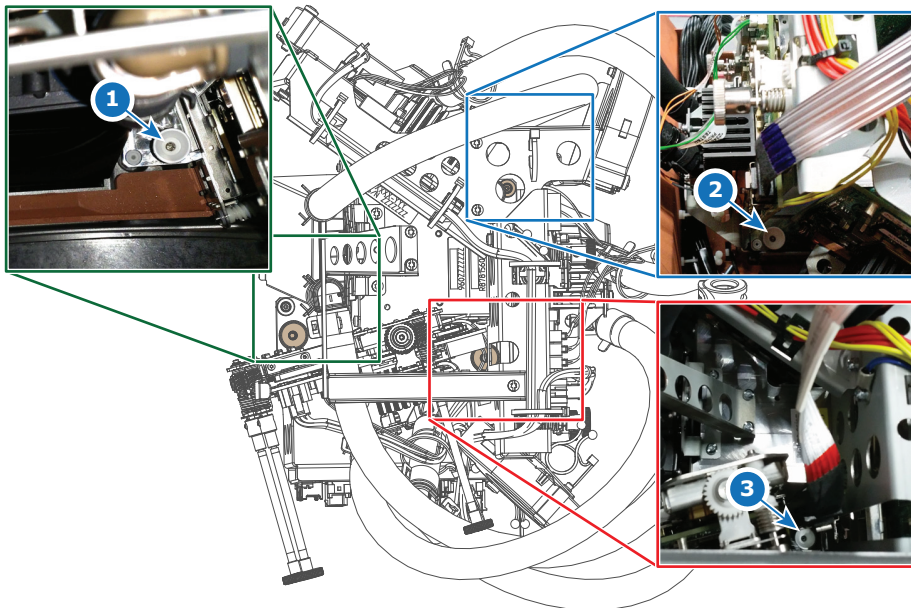


Image 9-6 Location of the three captive screws on the Light Processor



Tip: The captive screws can be recognized by their white “collar”.

Screw 1 is the easiest to spot from the front side of the projector and is located at the backside of the Red formatter board.

Screw 2 is the easiest to spot from the operator side of the projector and is located near the Blue High-speed cable.

Screw 3 is the easiest to spot from the light source side of the projector and is located near the Red High-speed cable..

6. Carefully lift up and remove the Light Processor, using the handle on top of the light processor (reference 1, [Image 9-7](#)).

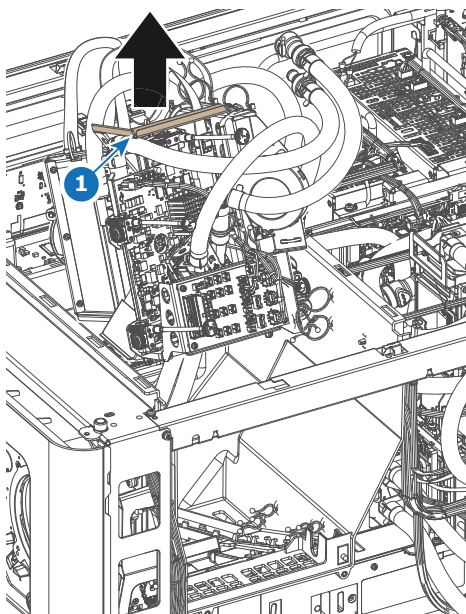


Image 9-7 Lifting up the Light Processor



Caution: In order to prevent damage to the Light Processor, **only** lift the light processor up using the handle on top of the light processor.

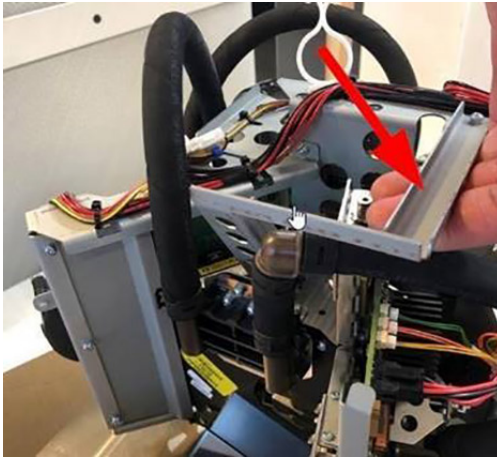


Image 9–8 Location of the handle to grab

7. Place the Light Processor on a clean flat surface with the prism entrance side facing down.

9.5 Replacing a Formatter board fan



This procedure assumes the Light Processor has been removed from the sealed compartment.



This procedure will explain how to replace one of the three fans of the Light Processor. The procedure is identical for all three fans.

Required tools

Torx screwdriver T20

How to replace

1. Spot the desired of the three fans.
2. Replace the fan as illustrated. Use a T20 Torx screwdriver to loosen and tighten the two screws.

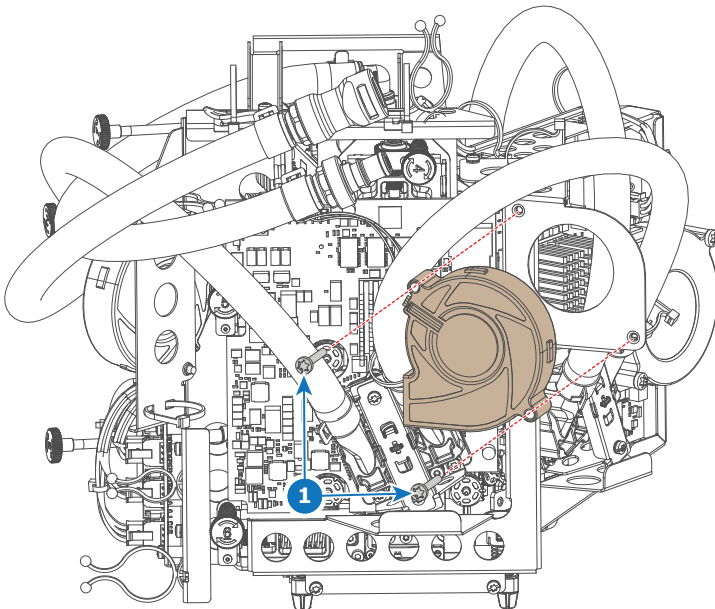


Image 9–9

9.6 Removing the light processor fan

Required tools

Torx screwdriver T20

How to remove

1. Remove the top cover.
2. Loosen the three screws holding the light processor fan to the card cage (reference 1). Use a T 20 Torx screwdriver.

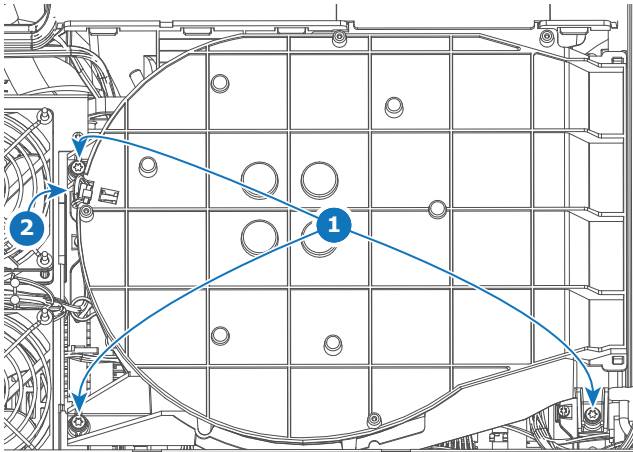


Image 9–10 Top view of the light processor fan

3. Disconnect the fan connector (reference 2).

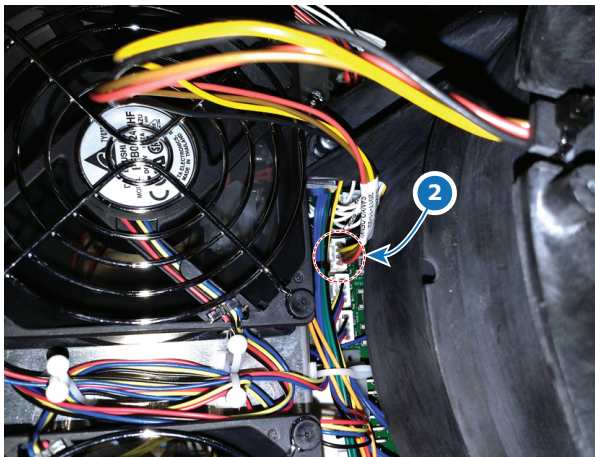


Image 9–11 Location of the light processor fan connector

4. Lift up and remove the fan assembly from the projector.

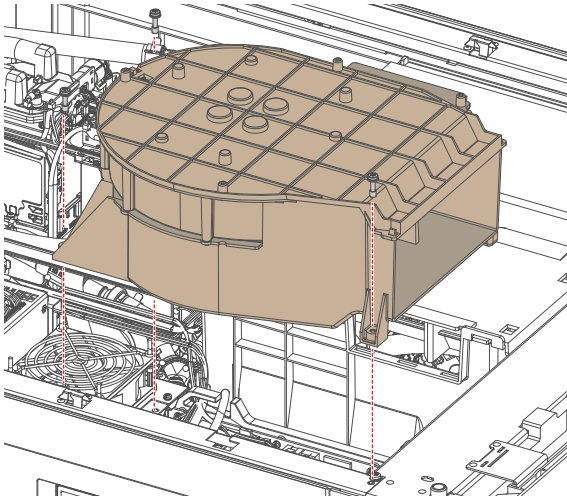


Image 9-12 Removing the light processor fan

9.7 Replacing the light processor fan

Required tools

- Torx screwdriver T20
- Side cutter

Required parts

Cable tie

How to replace

1. Remove the fan assembly from the projector. See [“Removing the light processor fan”, page 154.](#)
2. Cut the cable tie of the fan wiring.

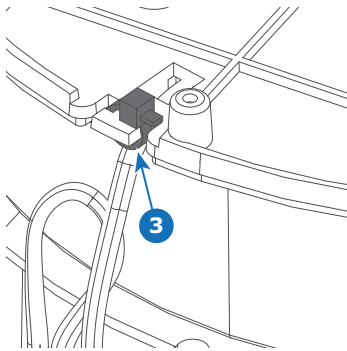


Image 9–13 Cable tie on the light processor fan cover

3. Flip the fan assembly upside down.
4. Remove the fan assembly cover. Use a T20 Torx screwdriver to loosen the four screws.

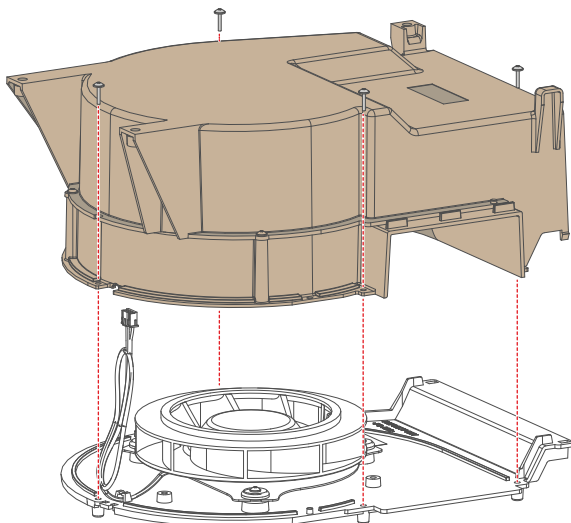


Image 9–14 Removing the fan assembly cover

5. Remove the fan plate from the bottom cover. Use a T20 Torx screwdriver to loosen the screws.

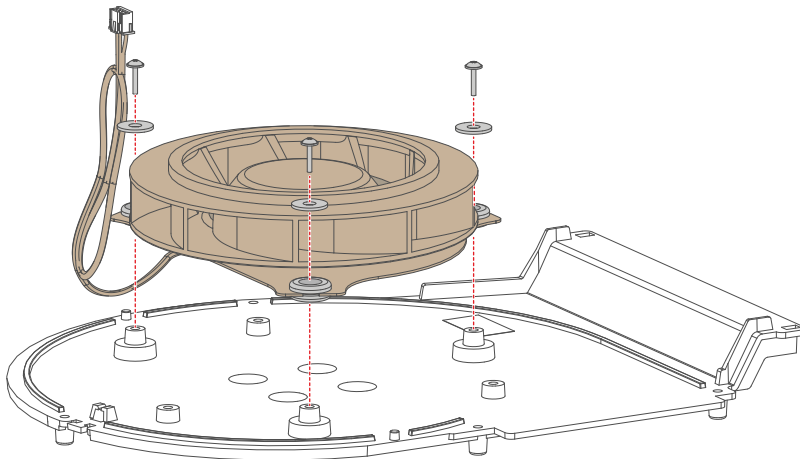


Image 9–15 Removing the fan from the bottom plate

6. Replace the fan as illustrated. Use a T20 Torx screwdriver.

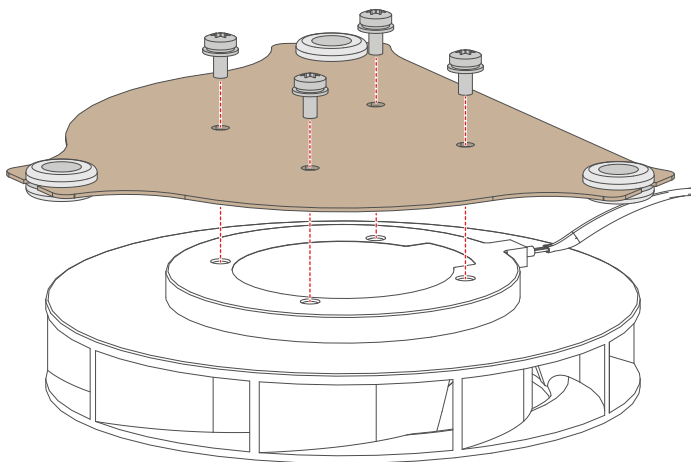


Image 9–16 Replacing the fan

7. Mount the fan plate back onto the bottom cover. Use a T20 Torx screwdriver to tighten the screws.
8. Mount the fan assembly cover back onto the bottom plate. Use a T20 Torx screwdriver to tighten the screws.
9. Use a cable tie to tie the fan cable to the fan cover (reference 3, [Image 9–13](#)).

9.8 Replacing the Light Processor interconnection board

Required tools

Torx screwdriver T10

How to replace

1. Make sure the sealed compartment covers have been removed. For more info, see [“Opening the sealed compartment”, page 148.](#)
2. Remove the connectors of the interconnection board.
3. Replace the interconnection board as illustrated. Use a T10 Torx screwdriver to release and tighten the screws.

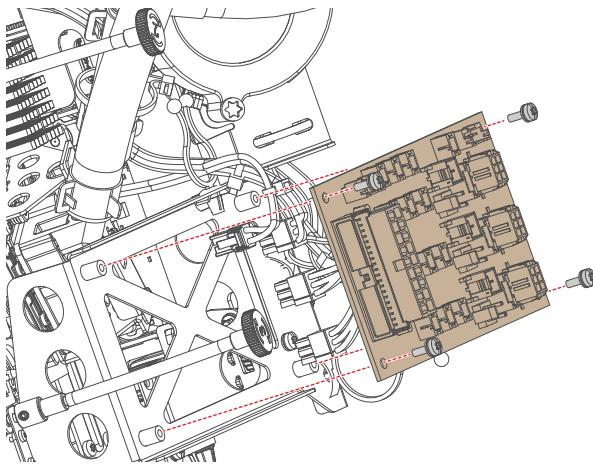


Image 9–17 Replacing the interconnection board

4. Mount all connectors back onto the interconnection board.

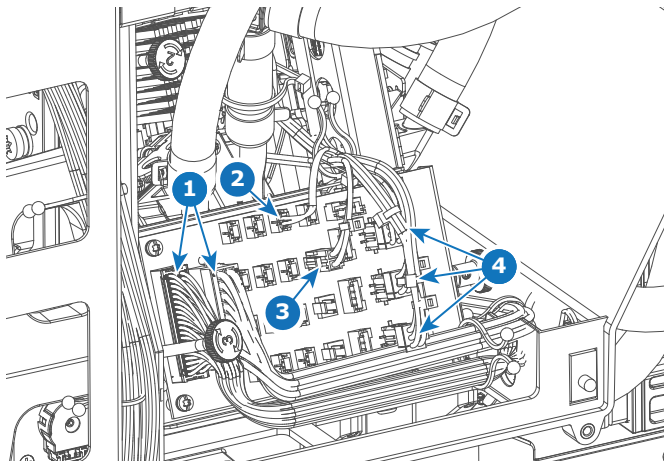


Image 9–18 Light Processor interconnection board connectors

- 1 Light processor control (small and big FMCB connectors)
 - 2 Air sensor sealed compartment (plug J9)
 - 3 Peltier control red lasers (plug J2)
 - 4 Temperature sensors red, green and blue (top to bottom)
5. Close the sealed compartment. For more info, see [“Closing the sealed compartment”, page 167.](#)

9.9 Unpacking a new light processor

Required tools

- Side cutter
- Knife
- T20 Torx screwdriver with a long handle (e.g. 30 cm).

How to unpack a new light processor?

1. Remove the strapping bands from the packaging. Use a cutting tool (e.g. side cutter, knife, etc.) to carefully cut the straps.

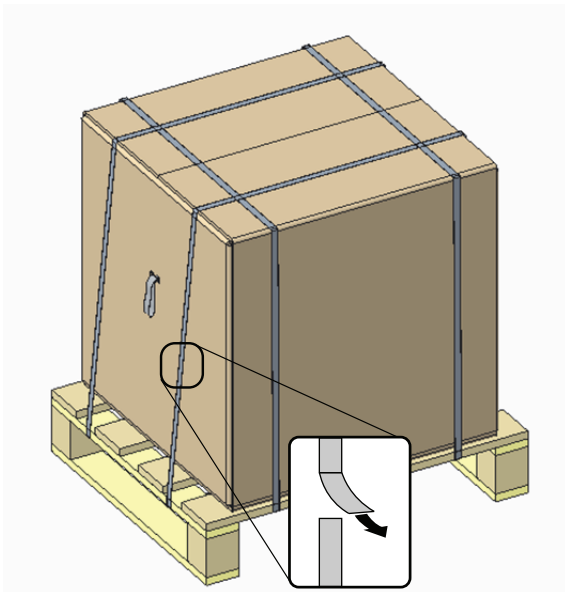


Image 9–19

2. Carefully cut open the tape of the box and open it.
3. Carefully lift up the upper foam piece and the smaller box containing the light processor from the packaging.

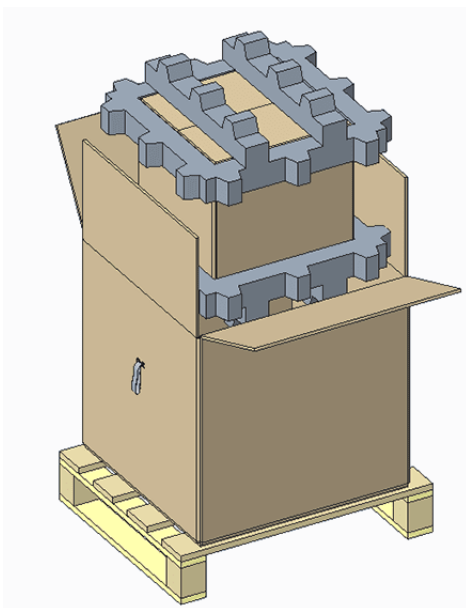


Image 9–20

4. Carefully cut open the tape of the smaller box and open it.

5. Remove the inner cardboard from this box.
6. Carefully remove the light processor from the box and remove it from the ESD bag.
7. Cut any cable ties that holds the light processor to the plate and packaging. Use a side cutter to cut all cable ties.

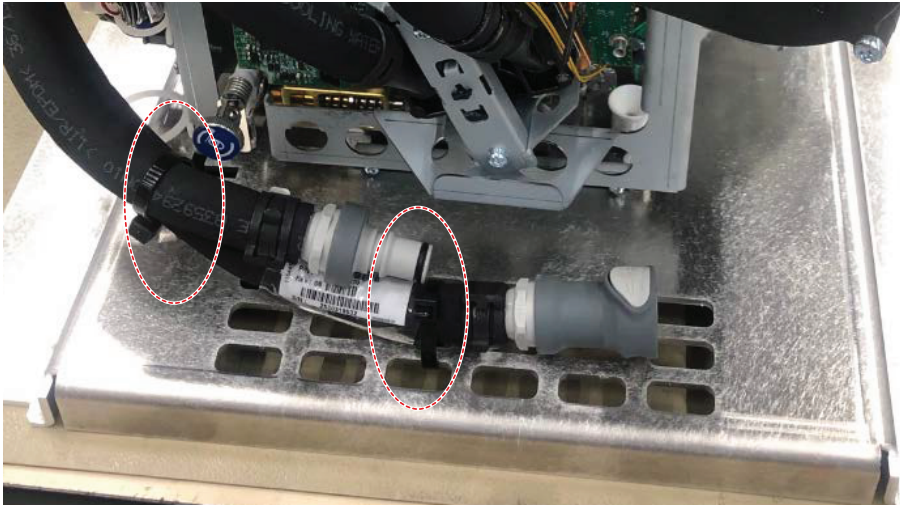


Image 9-21

8. Release the light processor from the plate by releasing the three captive screws. Use a T20 Torx screwdriver with a long handle (e.g. 30 cm).

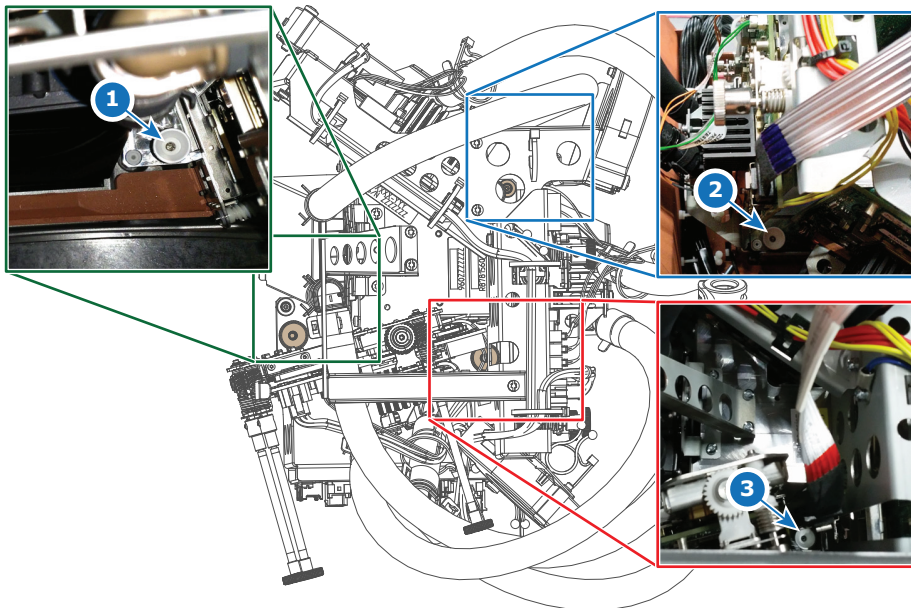


Image 9-22 Location of the three captive screws on the Light Processor



CAUTION: Do not throw away the packaging. Use the packaging of the new light processor to ship the defective one back to Barco. For more info, see also [“Packing the defective light processor”](#), page 163.

9.10 Mounting the Light Processor

Required tools

Torx screwdriver T20 x 300

How to mount

1. Carefully place the Light Processor in the protective compartment. Place it as illustrated, while keeping in mind the position of the 3 inserts (reference 1, [Image 9–23](#)) and 2 dowel pins (reference 2).

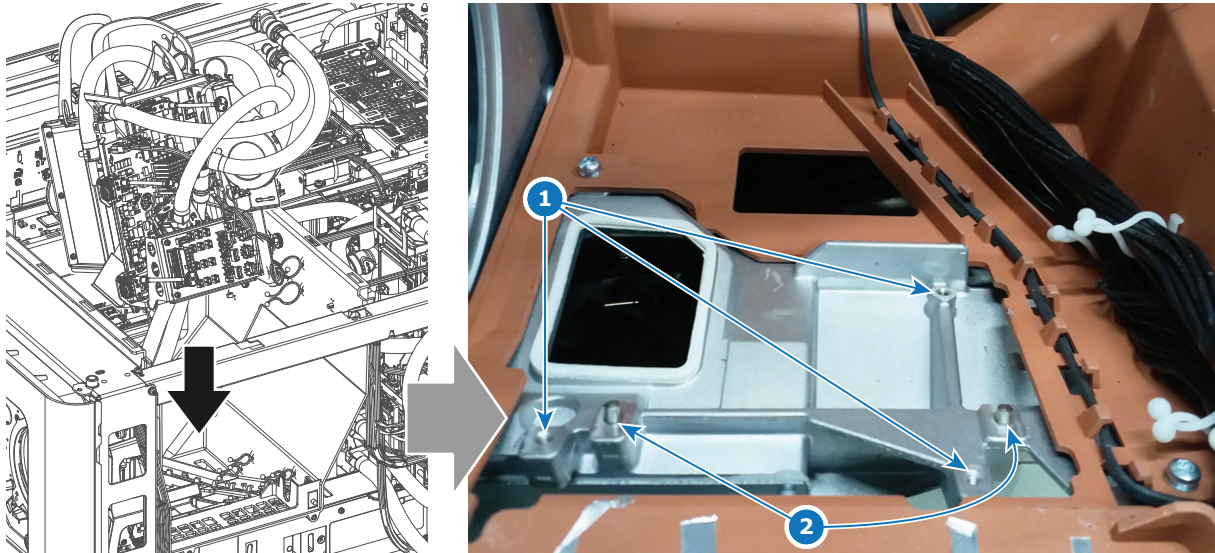


Image 9–23 Mounting the Light Processor in the sealed compartment

2. Tighten the three captive screws. Use a T20 Torx screwdriver with a long handle (e.g. 30 cm).

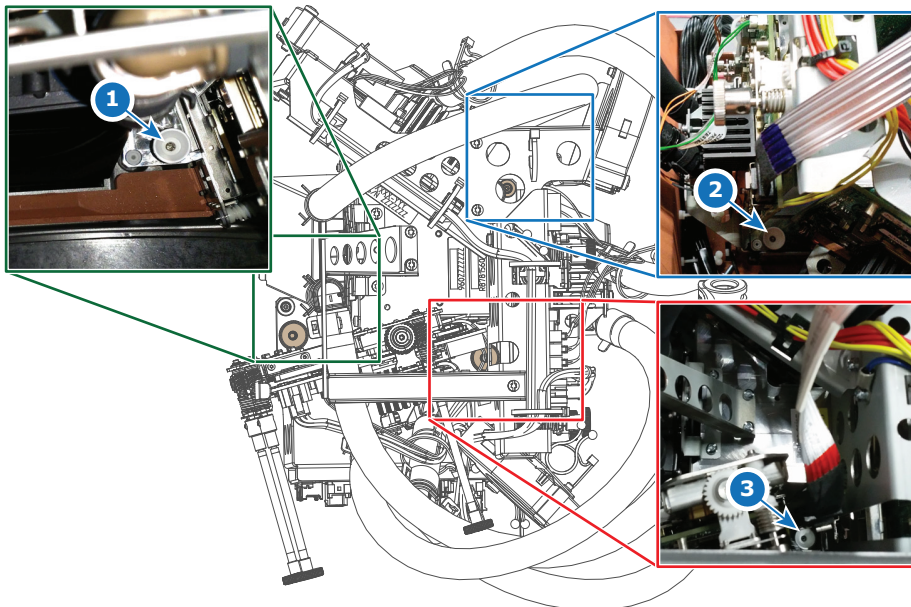


Image 9–24 Location of the three captive screws on the Light Processor



Tip: The captive screws can be recognized by their white “collar”.

Screw 1 is the easiest to spot from the front side of the projector and is located at the backside of the Red formatter board.

Screw 2 is the easiest to spot from the operator side of the projector and is located near the Blue High-speed cable.

Screw 3 is the easiest to spot from the light source side of the projector and is located near the Red High-speed cable..

3. Connect the three high-speed data cables (reference 1, [Image 9–25](#)) to the elca box.

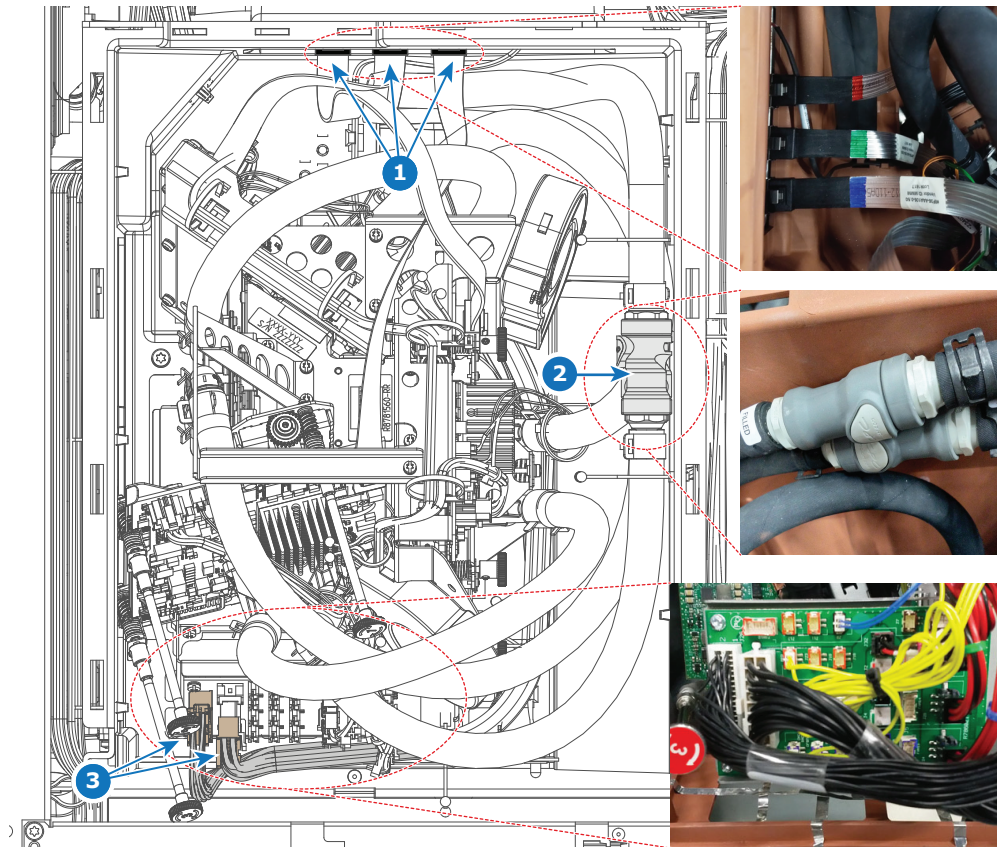


Image 9–25 Overview of the Light Processor connections

4. Reconnect the tubing (reference 2).
5. Reconnect the two big data connectors on the Light processor interconnection board (reference 3).
6. Close the sealed compartment. For more info, see [“Closing the sealed compartment”, page 167](#).

⚠ Caution: Make sure that both the cooling tubes (reference 2) and the big data connectors (reference 3) are fully kept within the borders of the sealed compartment before you close it. The big data wires may “bend” or get crushed if handled poorly. Similarly, the cooling tubes may “push” on the light processor and cause slight unwanted alterations in the projected light.

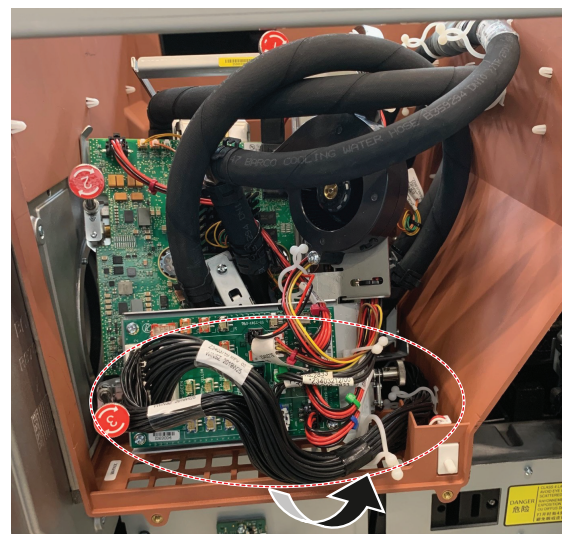
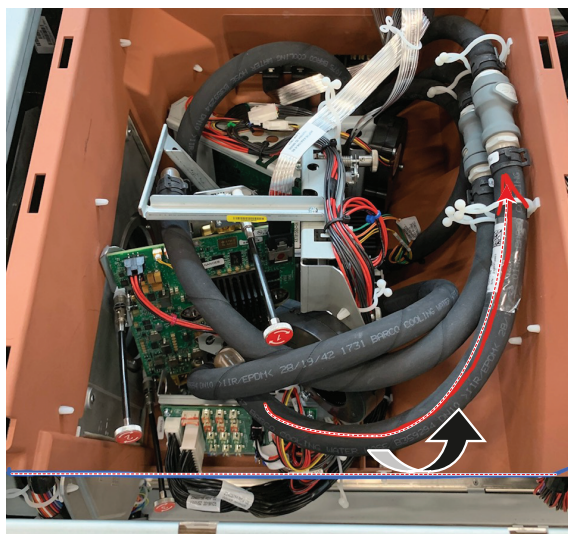


Image 9–26

9.11 Packing the defective light processor

Required tools

- Torque wrench with T30 Torx bit
- Cordstrap spanner

Required parts

- Packaging material from new light processor
- Cable ties
- Tape
- Cordstrap

How to pack the defective light processor?

1. Place the light processor on the mounting plate. Make sure the set screws are properly placed onto the correct openings in the plate.

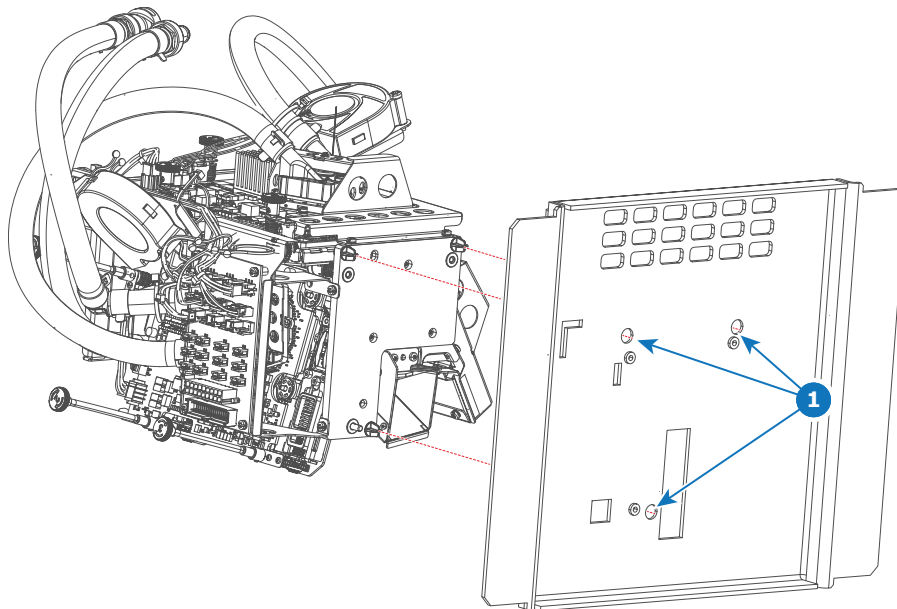


Image 9–27

2. Use a torque wrench with T30 Torx bit to drive in the 3 set screws of the light processor. Use a force of 2 Nm.



Image 9–28 Location of one of the 3 set screws

3. Use cable ties to bind the tubing onto the grate part of the plate.

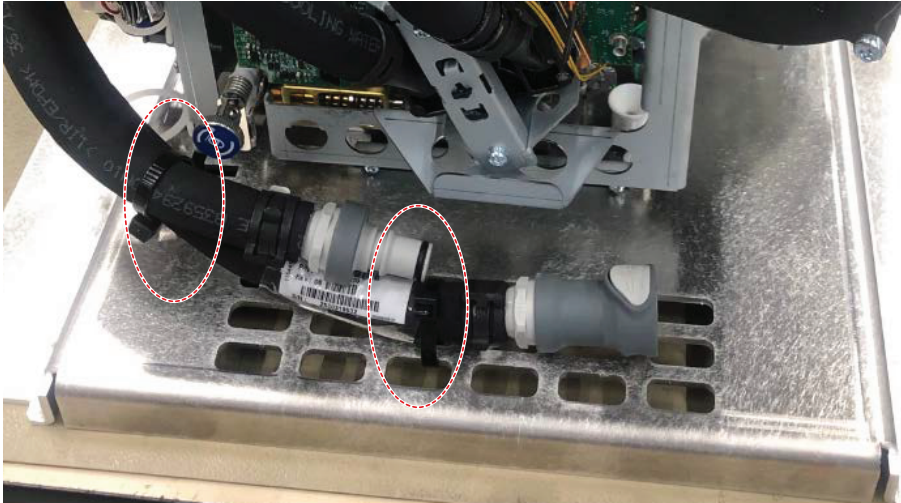


Image 9-29 Example of binding the tubing to the metal plate

4. Prepare the packaging as follows:
 1. Place the big cardboard box on the wooden pallet.
 2. Place the bottom buffer on the bottom of the cardboard box as illustrated.
 3. Place the smaller box in the open space of the buffer.
 4. Place the ESD bag inside of the smaller box as illustrated.



Image 9-30

5. Place the light processor in the bag, with the plate facing the bottom. Close the bag and seal it with tape.
6. Place the cardboard “sleeve” in the space between the small box and the light processor.



Image 9-31 Example of the "sleeve" between the small box and the bag with light processor



Caution: Pay attention to the orientation of the bottom plate and the sleeve.

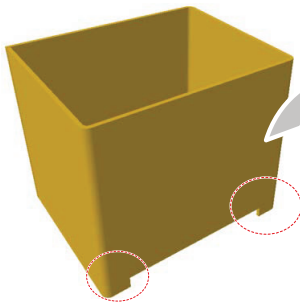
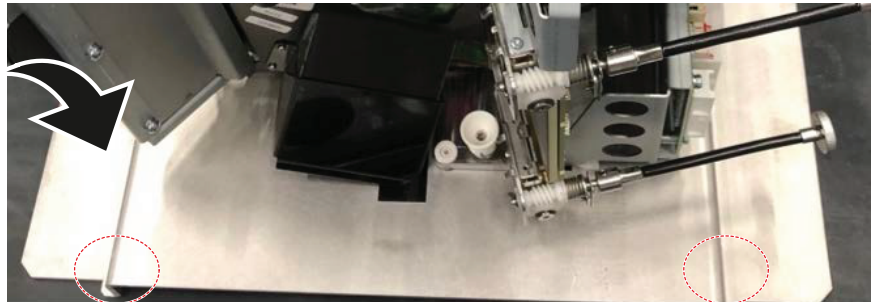


Image 9-32



7. Finish up the package as follows:

1. Close the small box and seal it with tape.
2. Place the second buffer piece on top of the small box.
3. Close the big box and seal it with tape.
4. Use cordstrap to seal the box onto the pallet. Use a cordstrap spanner to provide the proper sealing.



Image 9-33 Example of the second buffer on top of the small, closed box



Image 9-34 Example of the end result

8. Send the box back to Barco.

9.12 Closing the sealed compartment

Required tools

Torx screwdriver T20

How to close the sealed compartment

1. Place the top cover on the light processor compartment as illustrated.

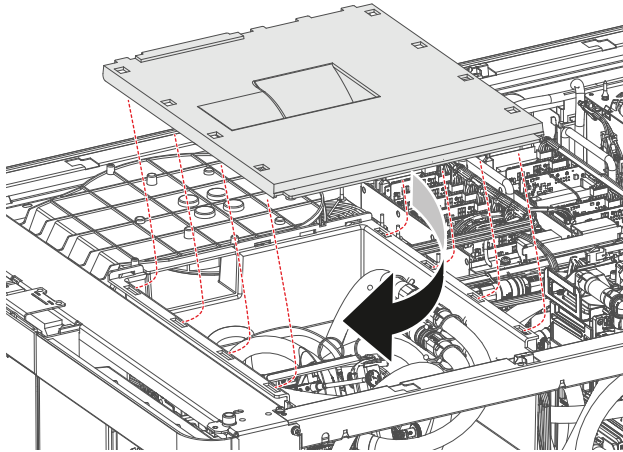


Image 9-35 Sealed top cover, mount

2. Slide the top cover wards on the lips until it is in its correct position..
3. Hook the cover plate onto the studs.
4. Slide the cover downwards on both lips until it is in its correct position.

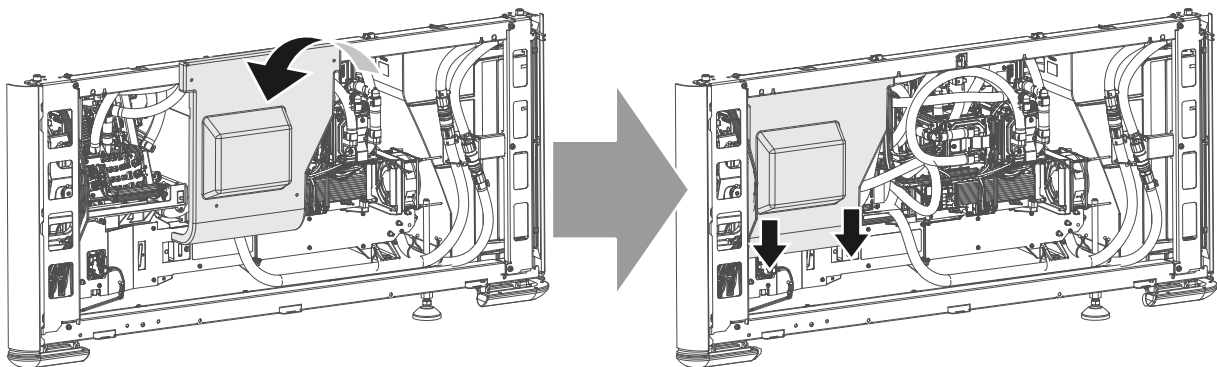


Image 9-36 Sealed side cover, mount

5. Tighten the four screws of the side cover (reference 1). Use a T20 Torx screwdriver.

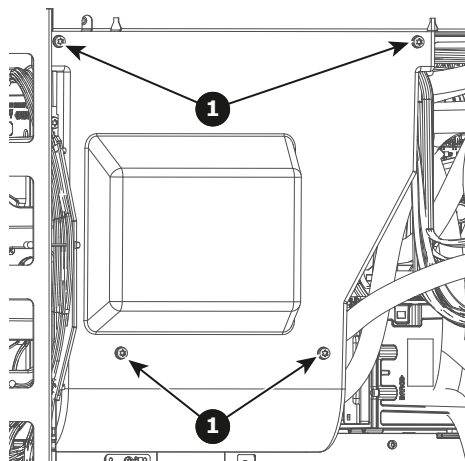


Image 9-37 Sealed cover fixation

9.13 Convergence controls

Control knobs

As the DMD of the green channel is not accessible in the projector, it remains fixed. Therefore the image of this DMD will be taken as reference. Red and Blue will be aligned onto green when a small convergence drift is recognized. The red and blue channels have pivot plates equipped with three control knobs for convergence adjustment, of which the red ones are extended. The adjustment knobs are numbered from 1 to 6 and have the same color as the channel which they affect.

To access the control knobs, the top cover and left side cover of the projector must be removed, as well as the top cover plate and side cover plate of the Light Processor compartment.

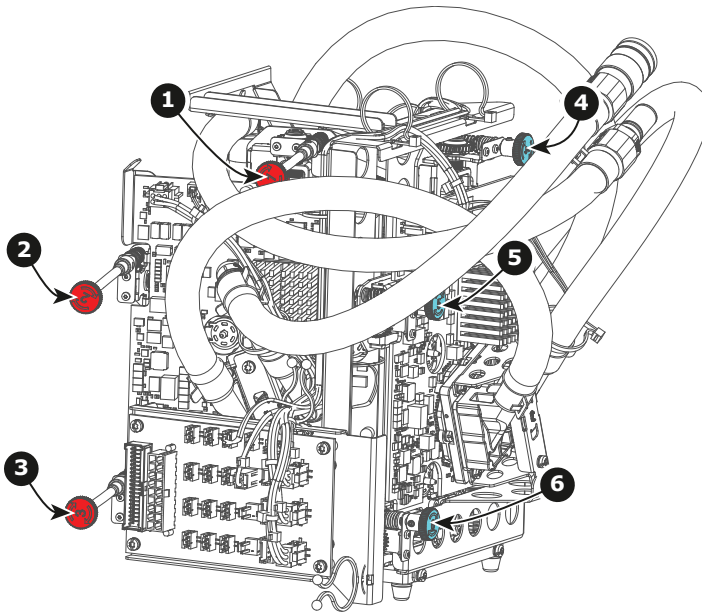


Image 9–38

- | | | | |
|----------|---|----------|-----------------------------|
| 1 | Red channel, knob number 1 ³ | 4 | Blue channel, knob number 4 |
| 2 | Red channel, knob number 2 ³ | 5 | Blue channel, knob number 5 |
| 3 | Red channel, knob number 3 ³ | 6 | Blue channel, knob number 6 |

Convergence test pattern

For the manual correction of the DMD convergence a typical convergence test pattern is generated. Select the 4k test pattern labeled **4096x2160_sp4k_xxC**.

3. Exact position of the knobs can differ slightly

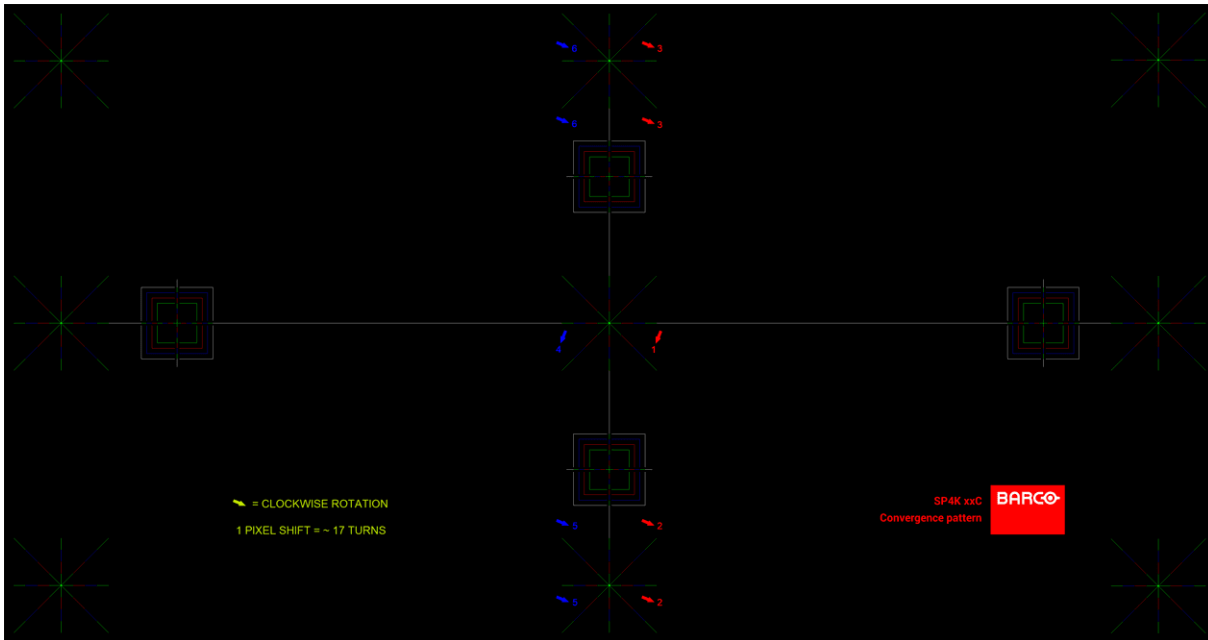


Image 9–39

The previously illustrated test pattern is specifically designed for convergence purposes on this projector. The test pattern has three red arrows numbered from 1 to 3 and three blue arrows numbered from 4 to 6. These numbers and colors correspond to those of the control knobs. Each knob is marked with an arrow which corresponds to the direction indicated on the screen.

Basic instructions

Keep into account the following:

- BLUE and RED DMD's are to be adjusted with reference to the GREEN DMD.
- Each adjustment allows for 6–8 pixels maximum displacement to either side of the nominal GREEN position.
- Rotation is limited to 2–3 pixels on the left and on the right screen flank.
- 1 pixel displacement on the screen relates to 17 full turns of an adjustment screw.
- Before starting to adjust the convergence, let the projector warm up for at least 1 hour, while projecting the convergence test pattern and while using the correct brightness level.

Adjustment Range

Avoid slipping of the torque limiter clutch by limiting the amount/number of adjustment(s) made. Typically the convergence adjustments serve to correct a convergence fault of a few pixels at the most. Any convergence fault beyond this is considered grossly abnormal and likely indicates abuse or rough handling. However, in extreme cases correction of up to five pixels is possible.



CAUTION: The system does have an end of travel in either direction, but using excessive force may cause damage. Please handle gently.

9.14 Red on Green convergence



This procedure can only be executed when all preparations are taken to converge the image.

Required tools

No tools required.

How to converge

1. Slightly turn the red colored control knob number 1 until the red pattern in the center of the projected image converges with the green pattern. Note that 17 turns of the knob corresponds with one full pixel.



Note: When start turning the knob, a little resistance can be felt. This resistance is part of the internal locking mechanism of the adjustment.

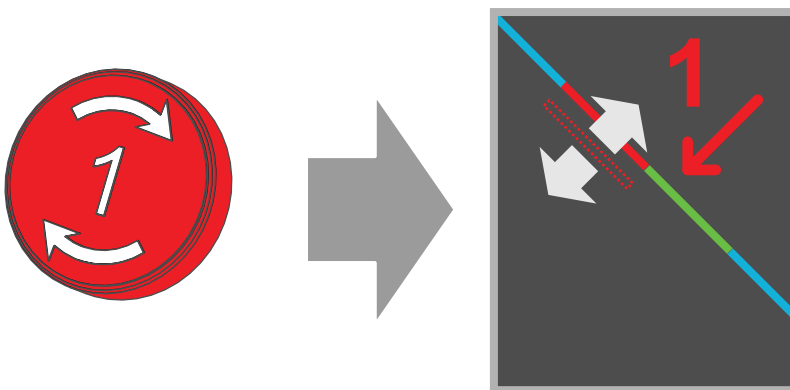


Image 9–40 Clockwise turning will move line downwards

2. Slightly turn the red colored control knob number 2 until the red pattern in the lower left of the projected image converges with the green pattern.

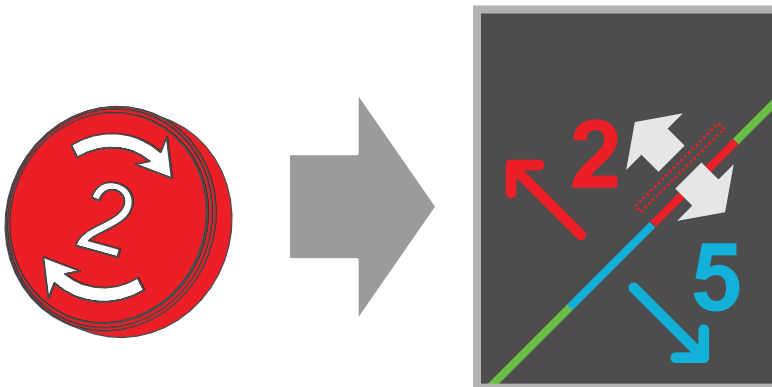


Image 9–41 Clockwise turning will move line upwards

3. Slightly turn the red colored control knob number 3 until the red pattern in the upper right of the projected image converges with the green pattern.

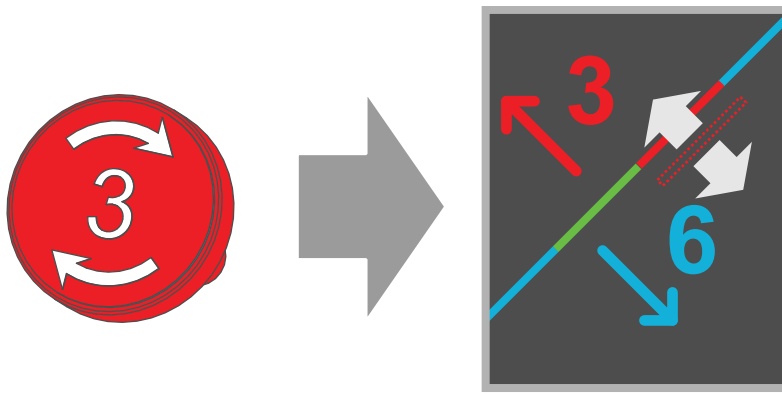


Image 9—42 Clockwise turning will move line upwards.

4. Repeat go to step 2 and go to step 3 until the red pattern in the **lower left** and **upper right** of the projected image coincide.
5. Repeat from go to step 1 until the red pattern in **the center, the lower left** and **the upper right** of the projected image coincide.

9.15 Blue on Green convergence



This procedure can only be executed when all preparations are taken to converge the image.

Required tools

No tools required.

How to converge

1. Slightly turn the blue colored control knob number 4 until the blue pattern in the center of the projected image converges with the green pattern. Note that 17 turns of the knob corresponds with one full pixel.



Note: When start turning the knob, a little resistance can be felt. This resistance is part of the internal locking mechanism of the adjustment.

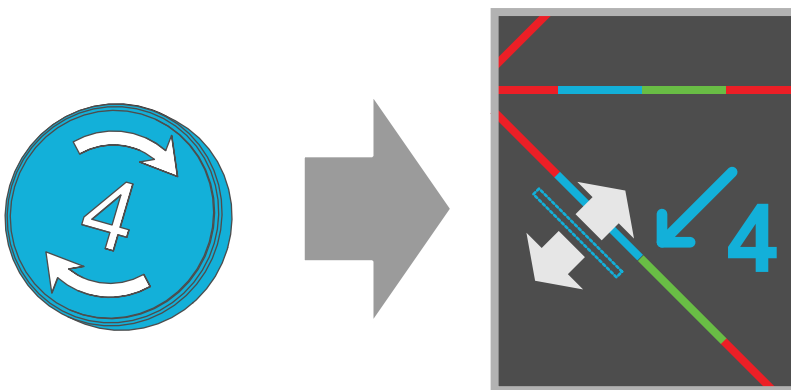


Image 9–43 Clockwise turning will move the line downwards.

2. Slightly turn the blue colored control knob number 5 until the blue pattern in the lower left of the projected image converges with the green pattern.

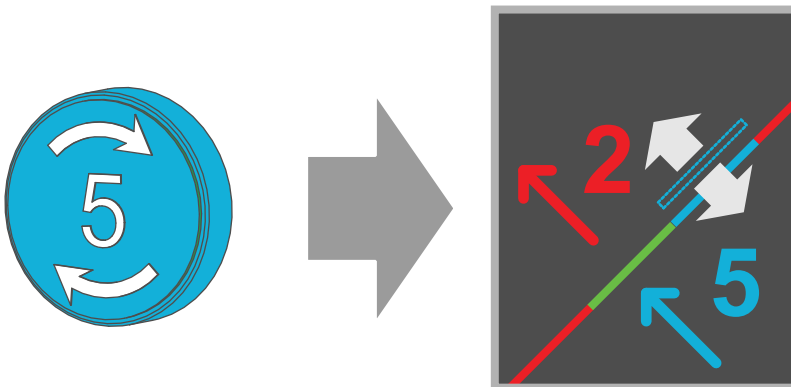


Image 9–44 Clockwise turning will move the line upwards.

3. Slightly turn the blue colored control knob number 6 until the blue pattern in the upper right of the projected image converges with the green pattern.

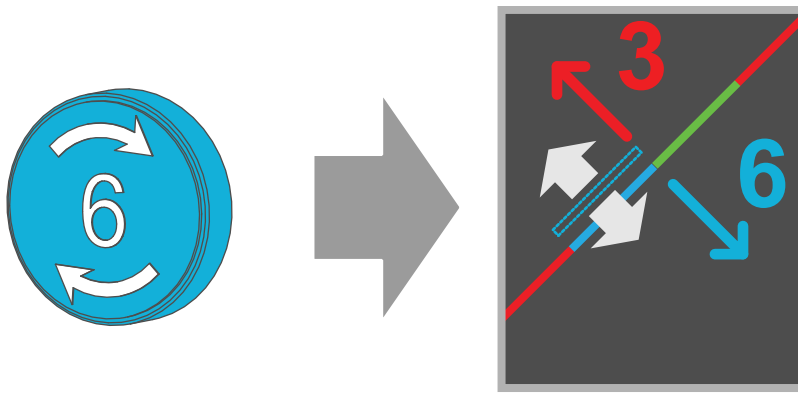


Image 9–45 Clockwise turning will move the line upwards.

4. Repeat go to step 2 and go to step 3 until the blue pattern in the **lower left** and **upper right** of the projected image coincide.
5. Repeat from go to step 1 until the blue pattern in **the center, the lower left** and **the upper right** of the projected image coincide.
6. Close the sealed compartment and reinstall all covers of the projector.

Color calibration

10

10.1	Calibration process overview	176
10.2	Light source – White Point calibration	177
10.3	Projector color	182
10.4	Verifying the corrected colors	187

About color calibration

Color calibration has to be done for each projector laser mode and aspect ratio and starts with the white point calibration.

During this white point calibration, the color coordinates are measured and uploaded. At the same time the option exists to save these coordinates can be saved in an MCGD file.

When saving the coordinates in an MCGD file, the color gamut calibration can be skipped. When the coordinates are not saved, then you have to proceed with color gamut calibration.

These procedures for 2D and 3D are equal for all projectors.

10.1 Calibration process overview



This process overview is an abbreviated version of the color calibration. For each step individually without a reference, you can find more information in the projector user guide.

Process overview

1. Create **Lens position files for FLAT and SCOPE**.
2. If applicable for your projector: **create the necessary amount of 3D files**.
3. Calibrate the light source, using **white point calibration**. For more info, see also "[Light source – White Point calibration](#)", page 177.
4. For the light sensor calibration, select the desired aspect ratio by activating the correct lens file.
 - **SCOPE** format
 - **FLAT** format
5. **Perform Light sensor calibration** and **create LSC files for Flat, Scope and 3D** (if applicable for your projector).
6. Prepare for color calibration in 2D. Set up the correct LSC file and the desired white point target.
7. **Color gamut calibration** (electronic P7 correction). Measured values are saved in the **Measured Color Gamut Data (MCGD) file**. This calibration needs to be repeated for each used format (FLAT/SCOPE) and for each used projection mode (2D/3D).
For more info about MCGD files and color gamut calibration, see "[Projector color](#)", page 182.
8. **Verify the corrected colors by comparing to select target colors**. The target colors are stored in **Target Color Gamut Data (TCGD) files**. Several TCGD files are already available in the file system of the projector.
For more info about TCGD files and verifying colors, see "[Verifying the corrected colors](#)", page 187.
9. **Arrange calibration files in a macro**. To apply correct color calibration it is important that the MCGD file (s) and matching TCGD file(s) are activated after that the INPUT file and PCF file are activated. For that it is recommended to create a macro where the files are loaded one by one in the right order:
 1. First activate the **INPUT** file.
 2. then activate the **PCF** file (PCF already contains plane 1 information),
 3. then activate the **MCGD** and **TCGD** files.

10.2 Light source – White Point calibration

10.2.1 About the light source white point calibration menu

Location & access

Menu: Configuration > Color calibration > Light source

Level: Administrator, Service technician

About white point calibration

The projector uncorrected white point (W_n) has to be shifted towards the DCI white point (W_t). The coordinates of the DCI white point ($x_w=0.314$; $y_w=0.351$) are embedded in the projector software and cannot be changed. The coordinates of the projector uncorrected white point has to be measured and entered.

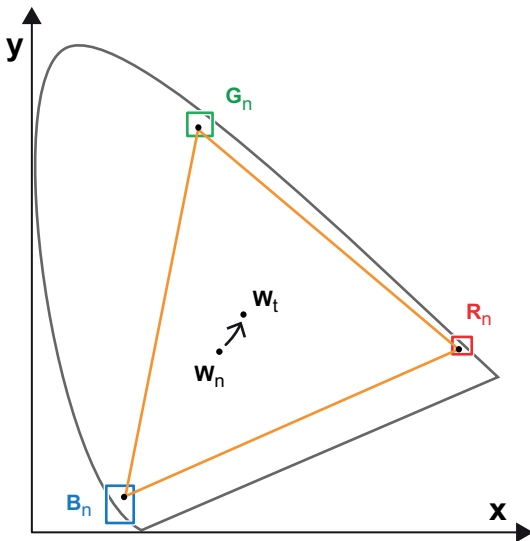


Image 10–1 Shifting projector 'white point' towards desired white point (laser power calibration)

The projector uncorrected white point can be defined by measuring the xy coordinates of the uncorrected primary colors (red, green, blue) and uncorrected full white separately.

The initial set of xy values stored in the projector for the uncorrected white point are the same as for DCI white point. After white point calibration, the initial values are overwritten with the measured values.

Based on the measured values the projector can balance the Red, Green, and Blue light to move the projector uncorrected white point towards the desired white point. This adjustment is called 'Laser RGB correction' or "Light Source calibration".

The projector uncorrected white point is different for 2D projection and 3D projection. Therefore, the projector uncorrected white point has to be measured and entered for each projection mode separately. Per projection mode one set of measured values are stored. Depending on the projection mode, the corresponding set is used for white point correction.

In case of 3D projection, the xy coordinates of uncorrected white has to be measured for each 3D file separately.

Overview

This menu allows you to perform a white point calibration.

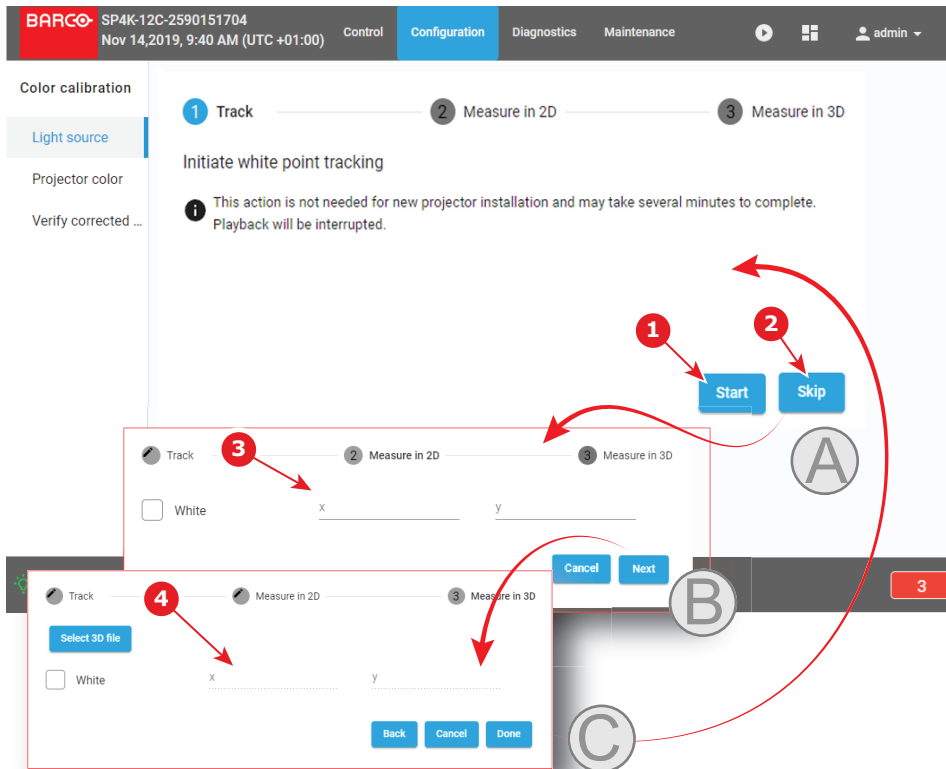


Image 10–2 White point calibration menu

Clicking on **Start** (reference 1) will start a new white point tracking procedure. By clicking **Skip** (reference 2) you will be able to enter successively the point coordinates for 2D (reference 3) and for 3D (reference 4).

Lower part of this menu is dedicated to display of the results.

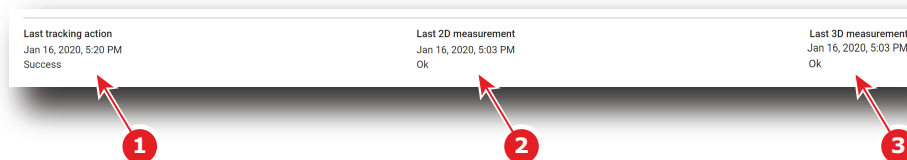


Image 10–3

If a previous white point tracking procedure has been done, results and status for each step are displayed here:

- Left column (reference 1) indicates the date and status of the last white point tracking.
- Middle column (reference 2) indicates if the 2D measurement was done and at which date.
- If 3D projection is required, the right column (reference 3) indicates if the 3D measurement was done and at which date.

10.2.2 White point calibration

Location & access

Menu: Configuration > Color calibration > Light source

Level: Administrator, Service technician

Required tools


Spectroradiometer

Preparations

1. Place a spectroradiometer in the auditorium. Position it in such a way it meets the following requirements.
 - Perpendicular to the screen.
 - In the auditorium sweet spot.
 - In such a way it can measure the reflected light from the center of the screen.
2. Set up the ambient light conditions as it should be during the play-out of the movie (e.g. only the stairs and emergency exit lighting are switched on).
3. Project a full white test pattern with the desired aspect ratio (flat or scope).

How to calibrate

1. In the Light Source menu, perform White Point tracking. To do so, click **Start** (reference 1) to do so.

 **Note:** This action may take several minutes to complete. Playback will be interrupted.

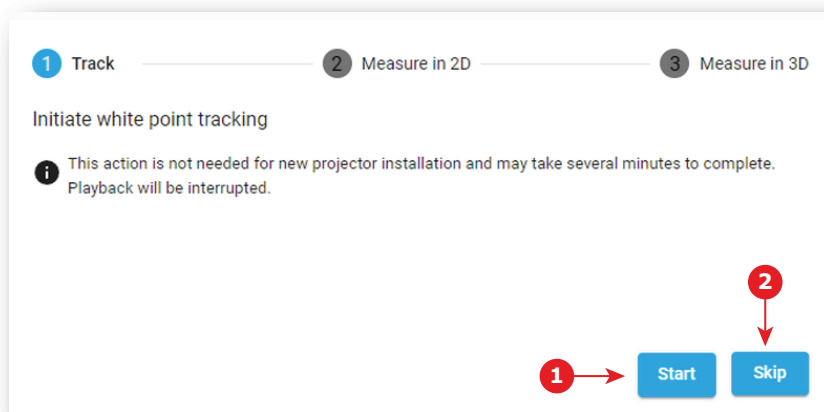


Image 10–4 White Point Calibration – White Point Tracking

The laser white point calibration will be reset. The default settings are programmed.

2. Click **Skip** (reference 2) to access the 2D measurement.



Image 10–5 White Point calibration - 2D measurement

3. Measure the white coordinates (x, y) with spectrometer and enter in the x and y fields respectively (reference 3).
4. If 3D projection is required, click **Next** (reference 4) to access the 3D measurement. If not, press **cancel** to exit.

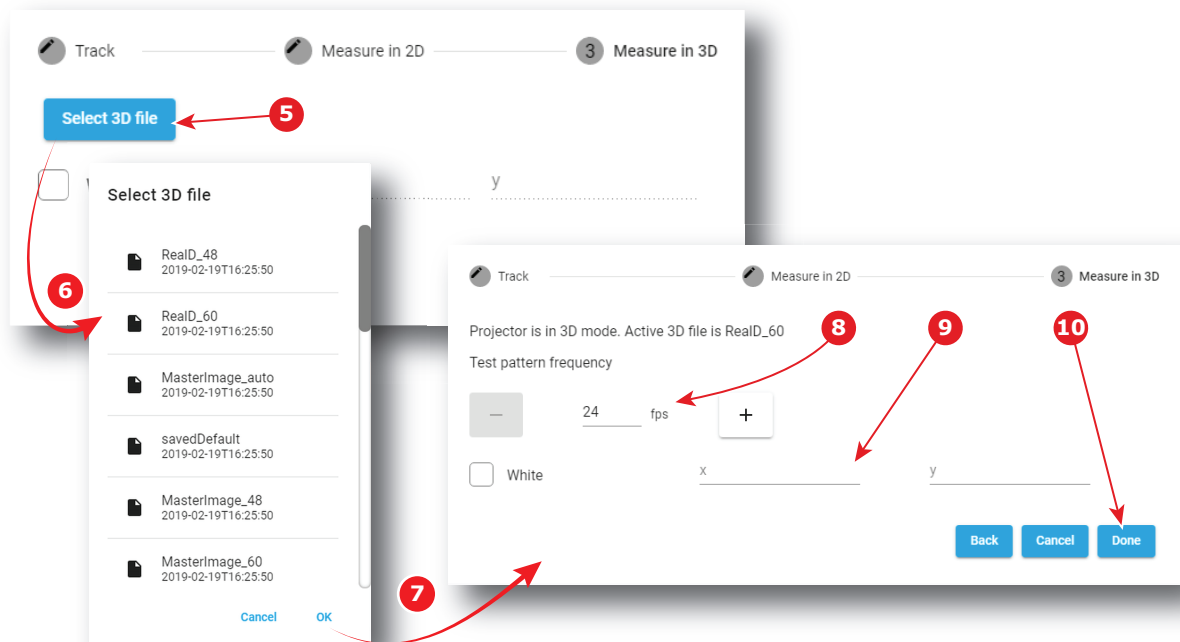


Image 10-6 White Point Calibration – 3D Measurement

5. Click **Select 3D file** (reference 5).
6. Select the desired 3D file from the prompted list (reference 6) and confirm with OK (reference 7).
The selected 3D file is implemented in the menu, alongside a *test pattern frequency* slider (reference 8) .
7. Enter the desired frequency in frames per second (fps), or use the + and - keys to change the frequency..
8. Measure the white coordinates (x, y) with spectrometer and enter in the wizard (reference 9).
9. Click **Done** (reference 10) to complete the wizard.
A window allowing to choose one of the recently updated calibration files is displayed.
10. Select a new calibration file (e.g. 2D or 3D) according to the type of MCGD you want to adjust in the next steps, then click **OK** to activate it.

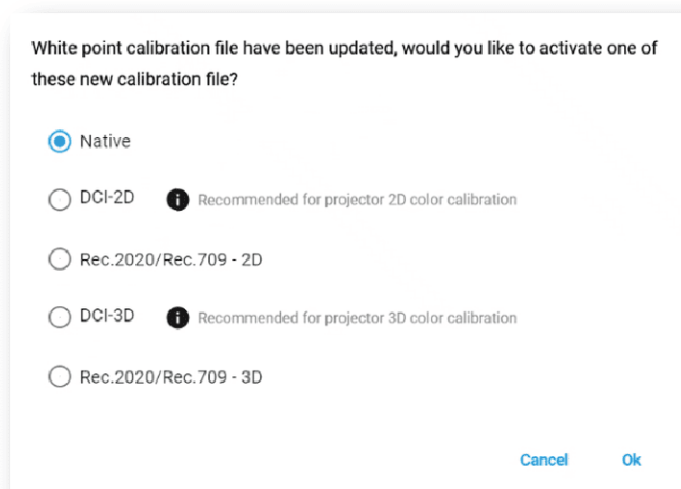


Image 10-7

or

Click **Cancel** to close the window without modifying the calibration file currently selected.

10.3 Projector color

10.3.1 About Color calibration

Location & access

Menu: Configuration > Color Calibration > Projector Color

Level: Administrator, Service technician

About MCGD files

MCGD files contain the measured color gamut data (color reference values) for a specific projector installation. This type of file can be created in the Projector Color menu.

Overview

The following menu displays the list of MCGD files and allows you to create and manage new MCGD files.

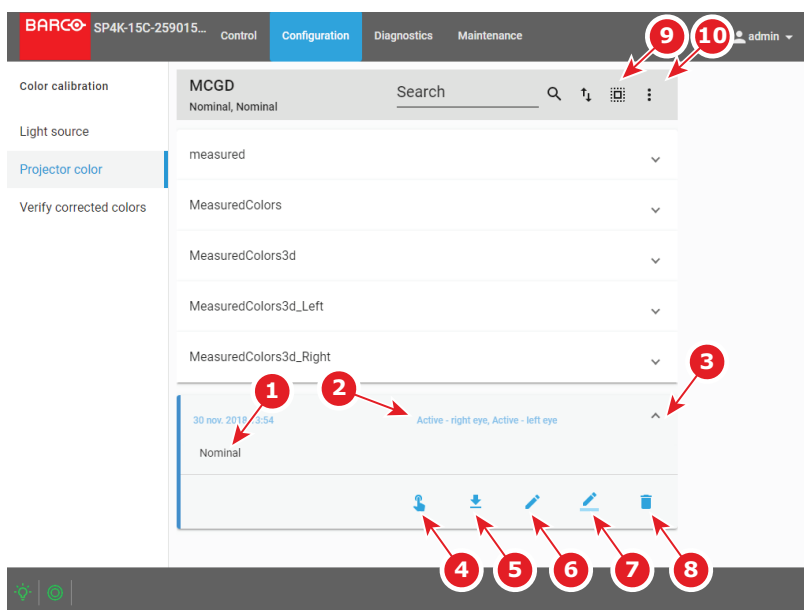


Image 10–8 Projector Color menu

Each MCGD file displayed here has a name (reference 1) and a status (reference 2).

An **expand** button (reference 3) is located to the right of each MCGD file if it has been activated. This button shows the MCGD file in its expanded form and displays a list of actions.

- **Activate** (reference 4): Activates the current MCGD file.
- **Export** (reference 5): Allows you to download the selected MCGD file.
- **Edit** (reference 6): Allows you to edit the selected MCGD file.
- **Rename** (reference 7): Allows you to rename the selected MCGD file.
- **Delete** (reference 8): Deletes the selected MCGD file, after confirmation.

In the menu bar, there is an option to **select all MCGD files** (reference 9) and a **menu** (reference 10), with the following possible actions.

- **New**: Creates a new MCGD file.
- **Import**: Imports a previously downloaded MCGD file.
- **Export**: Exports the currently selected MCGD file(s).
- **Delete**: Allows to remove several MCGD files selected in the list.

10.3.2 Creating a new MCGD file

Required tools

Photospectrometer

How to measure

1. In the MCGD menu, create a new **MCGD file**. To do so, select the **Menu** button and click *New*.
A new untitled MCGD is displayed, with the following active projector settings displayed:
 - Projector mode (2D/3D)
 - The desired white point target.
 - The current Light output mode

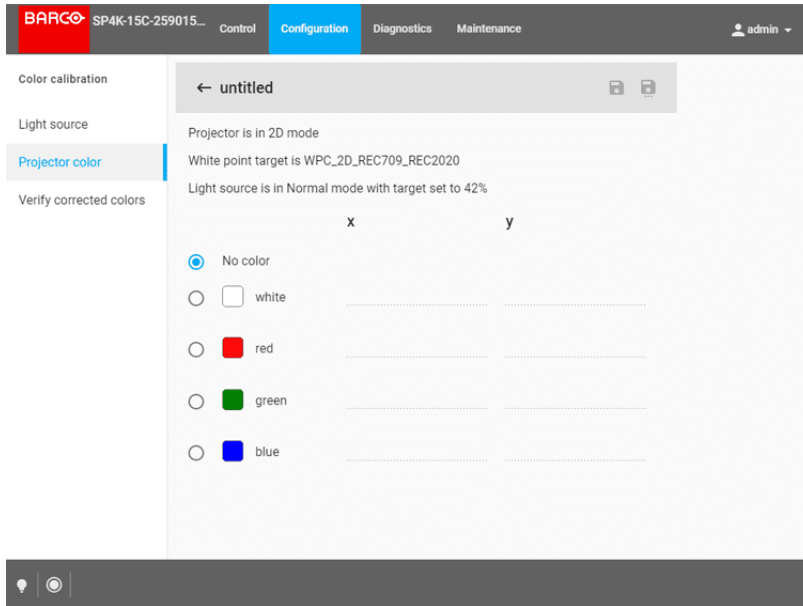


Image 10–9 Creating a new MCGD file

2. Select the desired color (e.g. white).
3. Measure the color coordinates for that specific color and enter the x and y coordinates in the appropriate fields.
4. Repeat this procedure for all other colors.
5. Click **Save** or **Save as** to save the MCGD file.

10.3.3 Editing an active MCGD file

Required tools

Photospectrometer

How to edit

1. In the MCGD menu, select one of the active MCGD files and click Edit.



Note: You can only edit an active MCGD file.

The edit window is displayed.

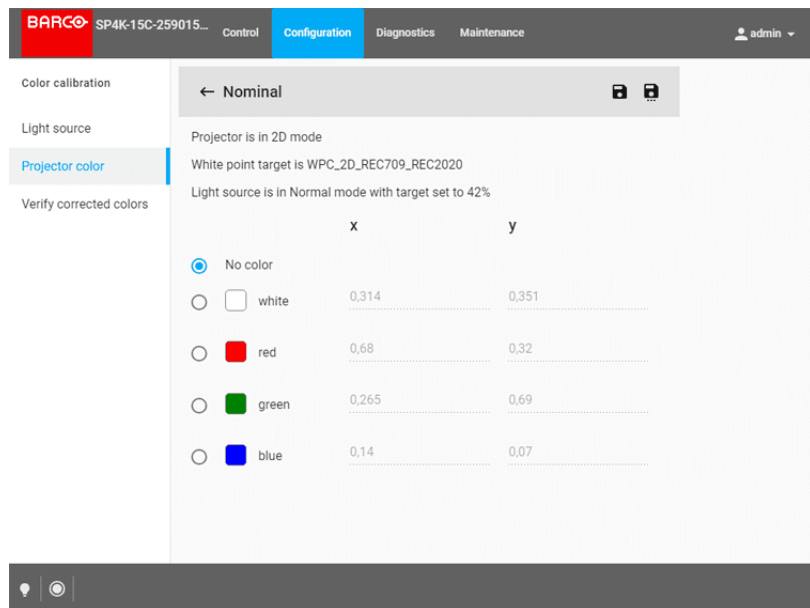


Image 10–10 Example of editing an MCGD file

2. Select the desired color (e.g. white).
 3. Measure the color coordinates for that specific color and enter the x and y coordinates in the appropriate fields.
 4. Repeat this procedure for all other colors.
 5. Click **Save** to save the current MCGD file.
- or
- click **Save as** to save the MCGD file under a new name.

10.3.4 Exporting and importing MCGD files

How to export a single MCGD file

1. In the MCGD menu, select the desired MCGD file and click the **download** icon.
2. Save the MCGD file as a .tar file on your device.

How to export multiple or all MCGD files

1. In the MCGD menu, click the **Select all MCGD files** icon.
All MCGD files are selected, and selection boxes will become visible.

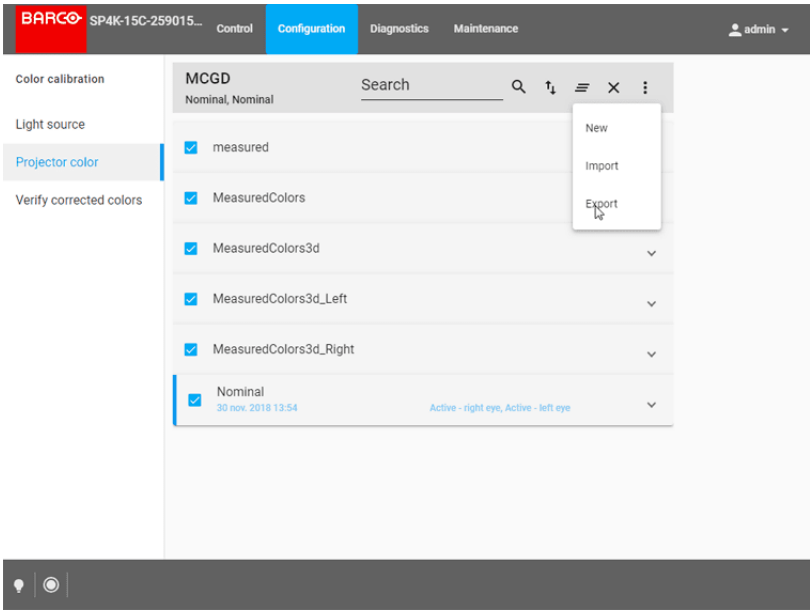


Image 10–11 Example of all MCGD files being selected.

2. If there are any undesired TCGD files selected, deselect the undesired file.
3. In the menu, click **export**.
4. Save the MCGD files as a combined .tar file.

Importing MCGD files

1. In the MCGD menu, click **Import**.
2. Browse to the desired file in .tar format and confirm.

If the MCGD files are supported by this projector, they will be included in the MCGD files list.



If a file has the same name as a file already present, a confirmation will be required before overwriting.

10.3.5 Deleting several MCGD files

What is possible

Several MCGD files could be deleted in a single action.

Location & access

Menu: Configuration > Color Calibration > Projector Color

Level: Administrator, Service technician

How to delete several MCGD files

1. While in *Configuration > Color Calibration > Projector Color*, click **Select All** (reference 1) and use the check boxes (reference 2) located at right of the MCGD files in order to select/deselect the files you want to delete.

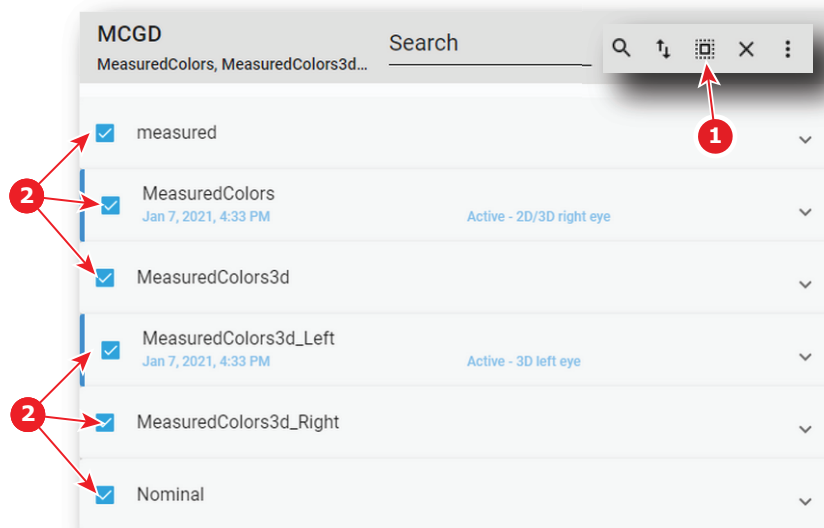


Image 10-12

2. Click on the macro general menu located on the top right of the list, then select **Delete** and confirm with **OK**.

The macro files selected are definitively removed from the list.

10.4 Verifying the corrected colors



Verifying the corrected colors to TCG files is optional.

10.4.1 About Verifying the corrected colors

Location & access

Menu: Configuration > Color Calibration > Verify Corrected Colors

Level: Administrator, Service technician

Overview

This panel allows you to compare the corrected colors after calibrations to certain color standards (e.g. Rec. 2020, SMPTE C, etc)..

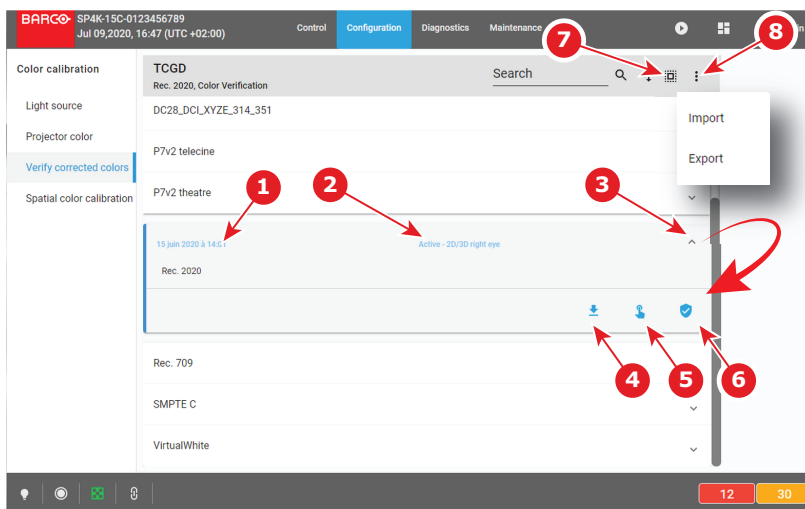


Image 10–13 Verify corrected colors menu

Each TCGD file displayed here has a name (reference 1) and a status (reference 2).

An **expand** button (reference 3) is located to the right of each TCGD file if it has been activated. This button shows the TCGD file in its expanded form and displays both the activate button (reference 4) and the verify button (reference 5).

10.4.2 Verifying the colors after correction

Location & access

Menu: Configuration > Color Calibration > Verify Corrected Colors

Level: Administrator, Service technician

Required tools

Colorimeter

How to verify

1. In the TCGD menu, click on the activate icon of the desired TCGD file you want to compare to.
2. Once activated, click on the expand button and on the verify button.
The detail window of the TCGD file is displayed.

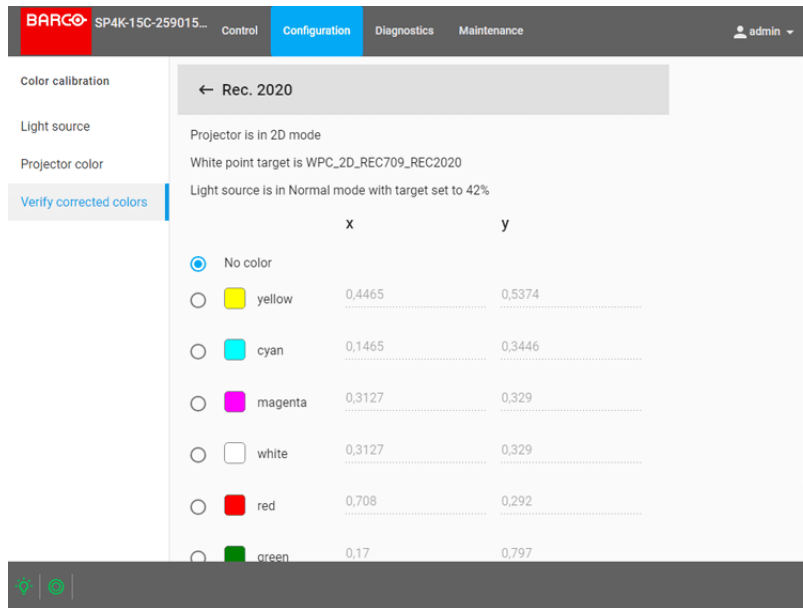


Image 10–14 Example of a detail window of a TCGD file

3. Select the desired color to compare.
The selected color is displayed on the screen **with color correction**.
4. Measure the coordinates with a colorimeter on the screen and check with the values next to the selected color.
5. Repeat this procedure for every other color in this TCGD file.

Spatial color calibration (LUT-SCC)

11

11.1	Installation process of the Spatial Color Calibration (LUT-SCC)	190
11.2	Obtain the Serial Number of the installed Light Processor	191
11.3	Download the LUT-SCC file from the Barco Website	192
11.4	Activate Spatial Color Calibration file	194

About this procedure


This chapter explains how to obtain the correct LUT-SCC file and how to install it after having replaced the Light Processor or ICMP/ICP board.

11.1 Installation process of the Spatial Color Calibration (LUT-SCC)

Introduction

This process will explain how to obtain the LUT-SCC file and how to activate it on your projector.

Installation process

1. Obtain the serial number of the light processor installed on your projector. For more info, see [“Obtain the Serial Number of the installed Light Processor”](#), page 191.
2. Download the LUT-SCC file for your light processor from the Barco website. For more info, see [“Download the LUT-SCC file from the Barco Website”](#), page 192.
3. Browse to the Web Communicator application and log in as administrator.
4. Update the projector to software update 1.3.1 (or higher). For more info, see [“Software update”](#), page 22.
 *Note:* LUT-SCC files are supported from software version 1.3.1 onwards. An update to this (or a higher) version is necessary to activate the LUT-SCC files. If your installed software is already on version 1.3.1 or higher, you can skip this step.
5. Activate the LUT-SCC file. For more info, see [“Activate Spatial Color Calibration file”](#), page 194.

11.2 Obtain the Serial Number of the installed Light Processor

How to obtain the Serial Number of the installed Light Processor?

1. Remove the Lens from the projector.
2. Write down the Serial Number of the Light Processor. The label with Serial Number of the Light Processor (reference 1, [Image 11-1](#)) is visible through the Lens Holder opening. The label is located at the front base of the Light Processor.



Image 11-1 Location of the label with the serial number of the light processor of an SPxK-series projector.



The position of the label with Serial Number of the Light Processor may be slightly different. However, it will always be located at the front base of the Light Processor.

11.3 Download the LUT-SCC file from the Barco Website



A logon ID is required to access the secured zone **myBarco** on the Barco website <https://www.barco.com>. A logon ID for the secured zone can be requested at the portal page of the Barco website.

Required parts

Serial Number of the installed Light Processor.

How to download the Spatial Color Calibration file (LUT-SCC) from the secured Barco website?

1. Open the url: <https://www.barco.com> in a web browser.
2. Log in into the secured Barco website.

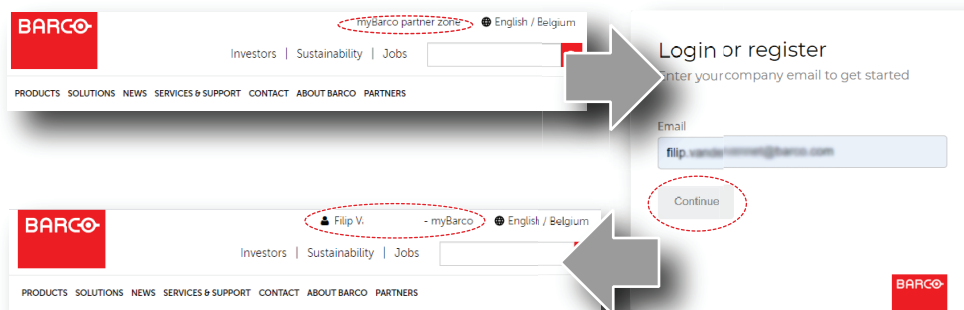


Image 11-2

3. Hover over your login name and select “My support”.

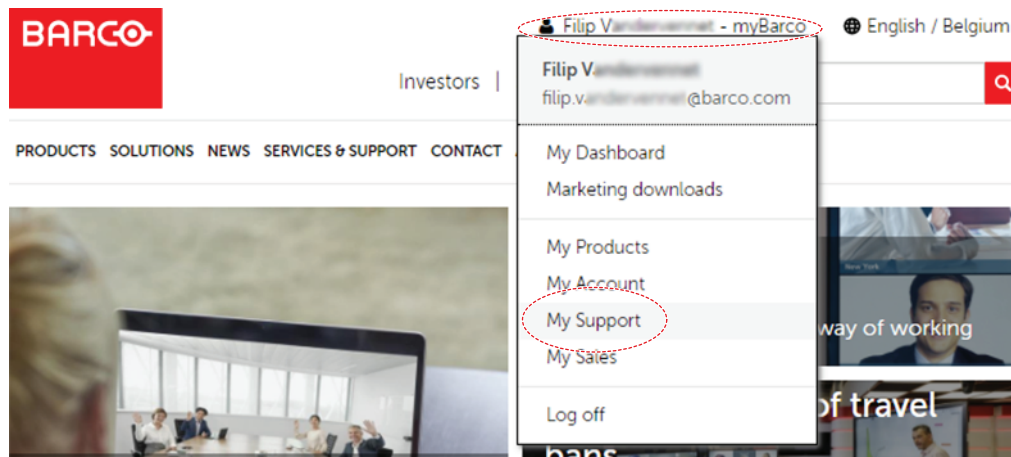


Image 11-3

4. Navigate in the **My Support** tool at the left-hand pane to **Digital Cinema > Spatial color corrections**.
5. Fill in the Serial Number of the Light Processor and press the “**Search file**” button.

My Support

- All products
- Corporate AV
- Digital cinema
 - 2K to 4K upgrade kit
 - Lamps policy
 - Lamps overview
 - Cinema calculator
 - Lens calculator
 - Web Analyzer
 - Search warranty information
 - Spatial color corrections**
 - Search support files
 - Alphabetic product list
 - Contact support
- Rental & staging
- Retail & Advertising

Go to [Sales & marketing download center](#) to find marketing kits, battle cards, pictures & presentations about your products.

Spatial Color Correction file

Download LUT-SCC file

Please enter your light processor serial below (not the projector serial)

1110351583

Search file

Image 11-4

If a LUT-SCC files is found, a download link will appear. Proceed with the next step.

In case no LUT-SCC file is found end this procedure and use the default LUT-SCC file which is already installed on the ICMP-X/ICP-D board. For 2K projectors this is "ones2K_LE", for 4K projectors this is "ones4K_LE".

- Click on the download link to download the LUT-SCC file.

Color file overview

Serial number	1110351583
Last time modified	06/02/2013
Download file	1110351583.LUT-SCC

Image 11-5

11.4 Activate Spatial Color Calibration file

How to activate the LUT-SCC file

1. Browse to the Web Communicator application and log in as administrator.
2. Click on the **Configuration** tab and select **Spatial color calibration**.
The Spatial color calibration menu is displayed.

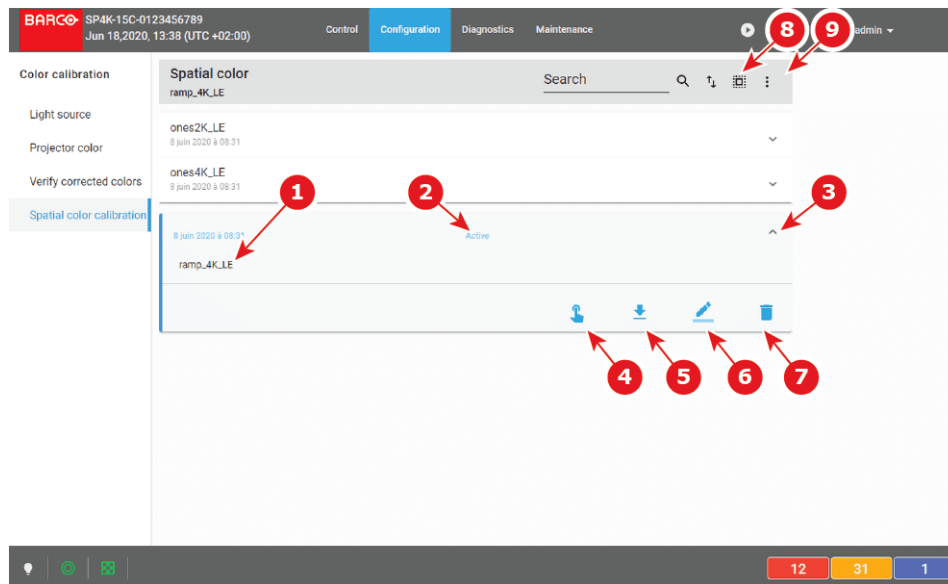


Image 11–6 Example of the Spatial color calibration menu

- | | |
|---------------------------------------|-------------------|
| 1 LUT-SCC file | 5 Export icon |
| 2 Status of the selected LUT-SCC file | 6 Rename icon |
| 3 Expand / collapse icon | 7 Select all icon |
| 4 Activate icon | 8 Menu icon |
3. In the Spatial color calibration menu, click on the menu icon (reference 8) and select **Import**.
The *Open* dialog box is prompted.
 4. Locate and select the desired SCC file (file with .LUT-SCC extension) and confirm your choice with **Open**.
If the selected file is supported by this projector, it will be included in the SCC files list.
 5. In the spatial color Calibration menu, click on the expand/collapse icon of the desired SCC file.



Image 11–7 Example of a LUT-SCC file

The spatial color calibration file is displayed in its expanded form with icons.

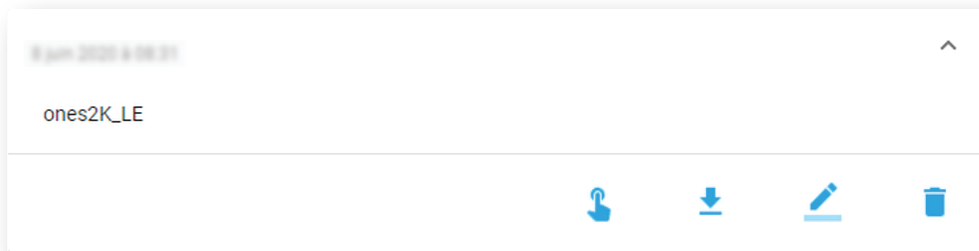



Image 11–8 Example of a LUT-SCC file in its expanded form

6. Click the **Activate** icon (reference 4). 

The LUT-SCC file is now activated. The name of the spatial color calibration file is now active (reference 2) and is displayed at the top of the SCC file list.

Lens Holder

12

12.1	Introduction	198
12.2	Installation of a lens on a C-Lens Holder	200
12.3	Removal of a lens on a C-Lens holder	202
12.4	Installation of a lens on a B-Lens holder	204
12.5	Removal of a lens from a B-lens holder	209
12.6	Lens shift, zoom & focus	211
12.7	Scheimpflug introduction	214
12.8	Scheimpflug adjustment	215
12.9	Resetting the scheimpflug adjustment screws to nominal position	217
12.10	Removal of the C-Lens Holder	220
12.11	Installation of the C-Lens Holder	222
12.12	Removal of the B-Lens Holder	224
12.13	Installation of the B-Lens Holder	227

About this chapter

This chapter describes how to replace the complete Lens Holder or single parts of the Lens Holder like the motors for lens shift and focus. The motor for the zoom functionality is built into the Lens. Lens cleaning procedure is also included in this chapter.



CAUTION: Never transport the projector with a lens mounted in the lens holder. Always remove the lens before transporting the projector. Neglecting this can damage the lens holder and prism.



CAUTION: Caution when removing or installing the lens! Fragile parts at the inner side of the lens holder.



Each time a lens is manipulated (e.g. removed and installed in a projector), it needs to be homed and returned.



A Spatial Color Calibration (SCC) has to be execute in case of a first install or in case a high brightness lens is swapped with a high contrast lens or vice versa.

12.1 Introduction

Lenses and Lens Holders

Next to securing the Lens, the Lens Holders make it possible to shift, tilt and swing the lens plane with respect to the DMD plane of the projector. This adjustment mechanism ensures that the projected image can be perfectly focused on the screen. The motors required for lens shift are built-in in the Lens Holder. The Lens Holder always has an electrical socket for the zoom and focus functionality of the motorized Lens.

There are two different Lens Holders available for the SP4K-C projectors in order to re-use previous generation lenses as much as possible. The default lens holder (the C-Lens holder) can be used in combination with previous generation C-Series lenses, while the larger lens holder (the B-Lens Holder) can be used in combination with previous generation B-Series lenses and has the option to use High Contrast lenses.



Take into account that once a lens holder type is chosen for your projector (upon initial purchase), you cannot switch between lens holder types afterwards.

Parts of the C-Lens Holder

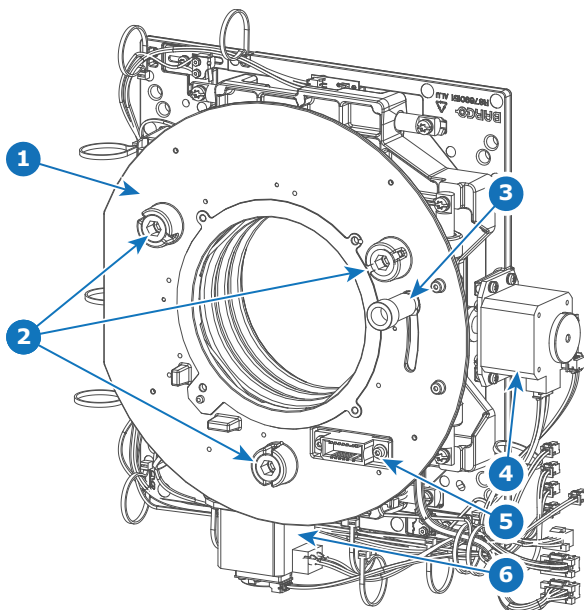


Image 12-1 C-Lens Holder

- | | |
|---|---|
| <p>1 Lens Holder front plate</p> <p>2 Adjustment screws lens (Scheimpflug)</p> <p>3 Lens Lock handle</p> | <p>4 Lens Holder horizontal (X-axis) shift motor</p> <p>5 Electrical socket lens connection</p> <p>6 Lens Holder vertical (Y-axis) shift motor</p> |
|---|---|

Parts of the B-Lens Holder

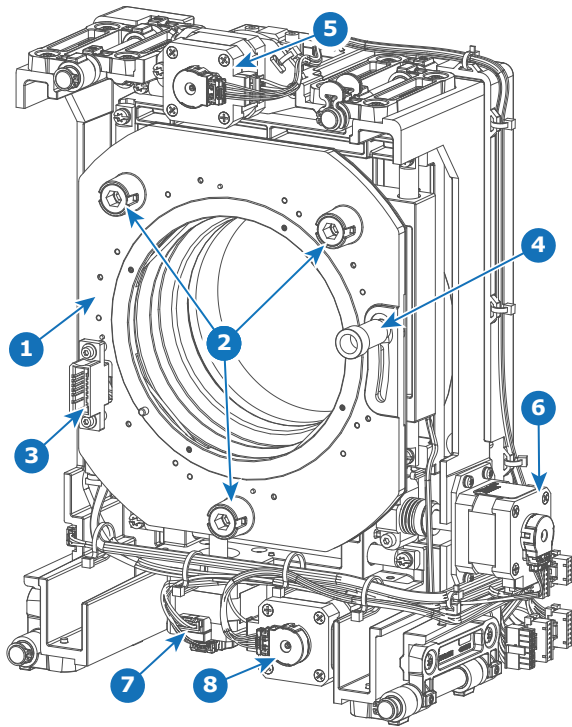


Image 12-2 B-Lens Holder

- | | |
|--|---|
| <ul style="list-style-type: none"> 1 Lens Holder front plate 2 Adjustment screws lens (Scheimpflug) 3 Electrical socket Lens connection 4 Lens Lock handle | <ul style="list-style-type: none"> 5 Lens Holder upper Z-axis shift motor 6 Lens Holder X-axis shift motor 7 Lens Holder Y-axis shift motor 8 Lens Holder bottom Z-axis shift motor |
|--|---|

12.2 Installation of a lens on a C-Lens Holder



Take into account that you can only install a limited range of lenses on an SP4K-C projector with a C-lens holder. For the full list of available lenses, refer to the installation manual.

How to install a lens into the C-lens holder

1. Place the lens holder in the “unlocked” position. Do this by pulling the lens lock handle (reference 1, [Image 12–3](#)) outward and then towards the lens power supply socket (reference 2) as illustrated.

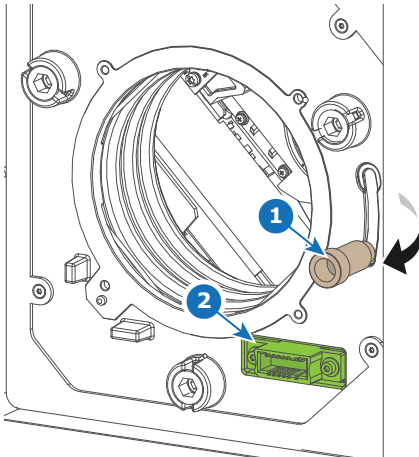


Image 12–3 Lens installation, preparation

2. Remove the dust cover from the lens opening.

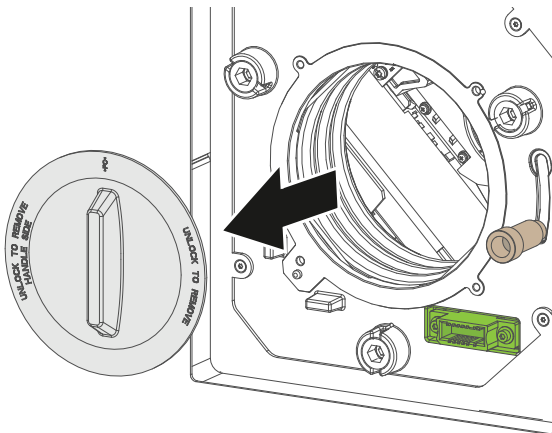


Image 12–4



Tip: While not placed in the projector, place the dust cover in a lockable plastic bag to prevent dust from gathering on the cover.

3. Take the lens assembly out of its packing material and remove the lens caps on both sides.
4. Gently insert the lens in such a way that the lens connector matches the socket (reference 2).

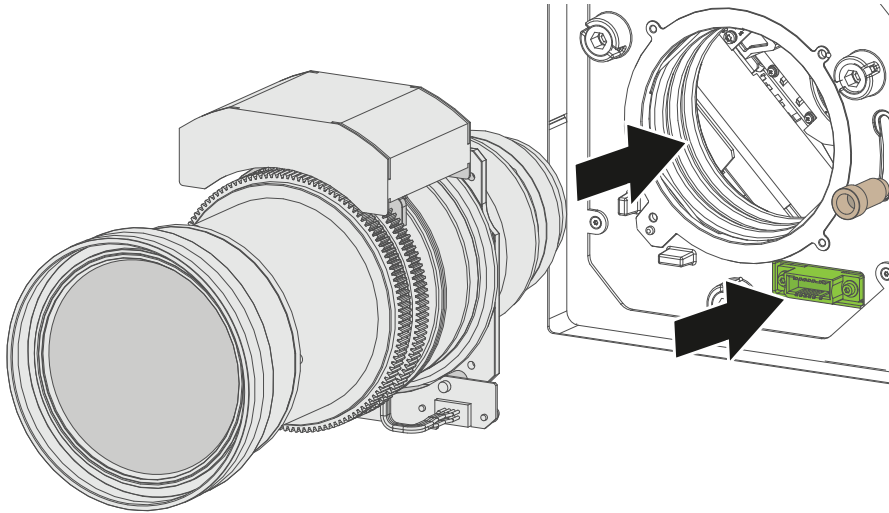


Image 12-5 Lens installation

5. Insert the lens until the connector seats into the socket.



Warning: Do not release the lens yet, as the lens may fall out of the lens holder.

6. Secure the lens in the lens holder by sliding the primary lens lock handle into the “locked” position (to the top of the projector). Ensure the lens touches the front plate of the lens holder.

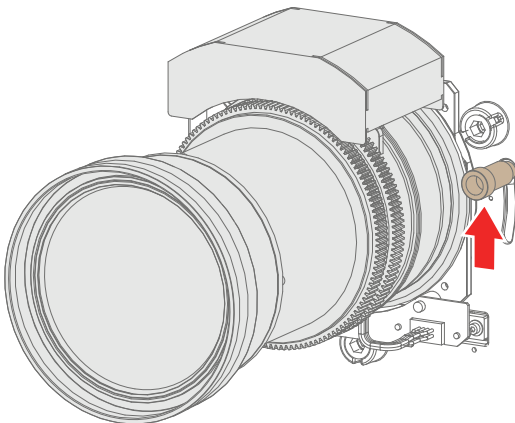


Image 12-6 Lock lens

7. Check if the lens is really secured by trying to pull the lens out of the lens holder.

12.3 Removal of a lens on a C-Lens holder

How to remove a lens from the C-lens holder

1. Support the lens with one hand while you unlock the lens holder by sliding the lock handle outwards and then towards the “unlocked” position as illustrated ([Image 12-7](#)).

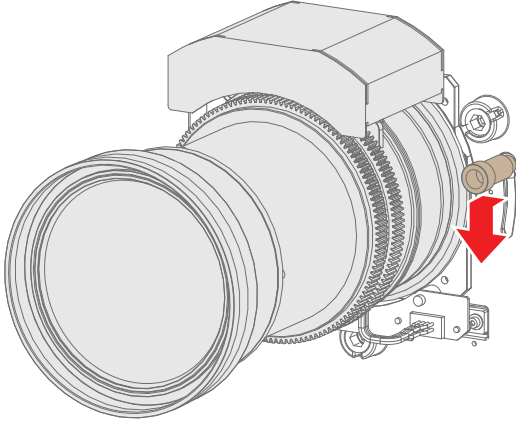


Image 12-7 Unlock the lens

2. Gently pull the lens out of the lens holder.

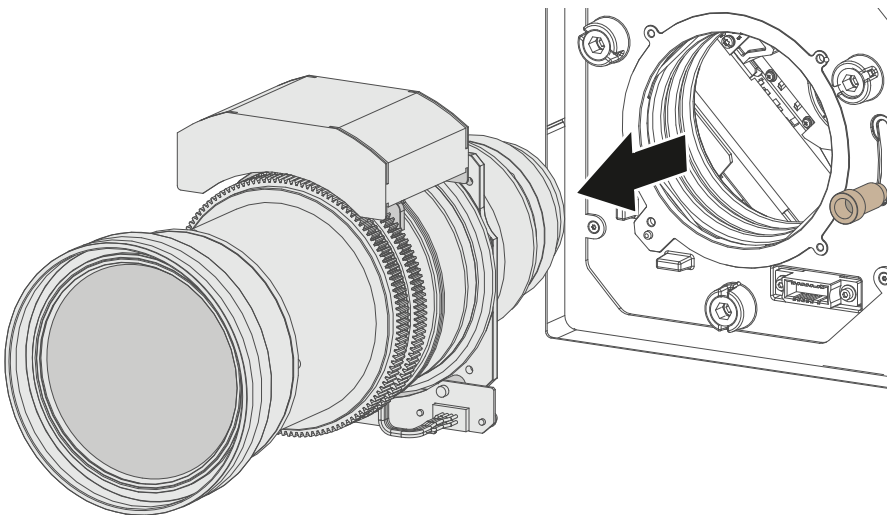


Image 12-8 Lens removal



It's recommended to place the lens caps of the original lens packaging back on both sides of the removed lens to protect the optics of the lens.



It's recommended to place the dust cover of the original projector packaging back into the lens opening to prevent intrusion of dust.

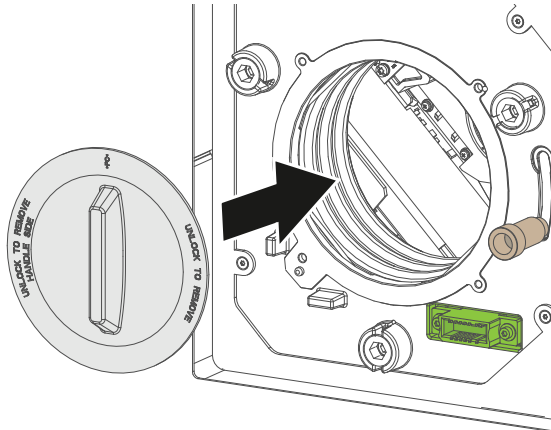


Image 12-9

12.4 Installation of a lens on a B-Lens holder



Take into account that when using an SP4K-C projector with a B-lens holder, you will also need the optical adapter for the B-lens holder, which is provided with the projector. If the optical adapter is not used, it will not be possible to achieve a perfect focus on your projected image.



Take into account the limited range of available lenses for an SP4K-C projector with a B-lens holder. For the full list of available lenses, refer to the installation manual.

Why use the optical adapter?

In order to reuse as many older lenses as possible on this new generation of projectors, a secondary lens holder has been created for the SP4K-C projector. This B-Lens holder has been designed to reuse lenses from the legacy B-Series cinema projectors. But in order to do obtain a correctly focused image, you will also require an optical adapter. This adapter is included with all projectors with B-Lens holder.

While the adapter does not lock onto the lens barrel, it is held in place by tightening the screw of the clamping ring.



CAUTION: Make sure you have removed the lens cap from the lens before mounting the optical adapter.

Required tools

Torque wrench with hex bits

Required parts

- Optical adapter for B-Lens holder
- Ring 1 or 2 for the optical adapter (depending on the used lens)
- 3 M3 Screw inserts (in case ring 1 is used)
- 3 M3x5 hex screw (in case ring 1 is used)
- 3 M4 screw inserts (in case ring 2 is used)
- 3 M4x8 hex screws (in case ring 2 is used)

Preparing a B-series lens for installation on a B-lens holder

1. Check the list of the position of the optical adapter for B-Series lenses to see which adapter ring to use for your lens. For more info, see [“Position of the optical adapter for B-Series lenses”, page 384](#).
2. Place the appropriate adapter ring (ring 1 or ring 2) on the back of the lens.



Tip: Pay attention to the orientation of the ring while mounting it. Make sure the bottom of the printed number and the pins point outwards (reference 1, [Image 12–10](#)). Also pay attention to the lips of the adapter ring (reference 2, [Image 12–10](#)). They need to snap in place and will prevent the ring from falling off. Be careful not to break these while mounting the ring.

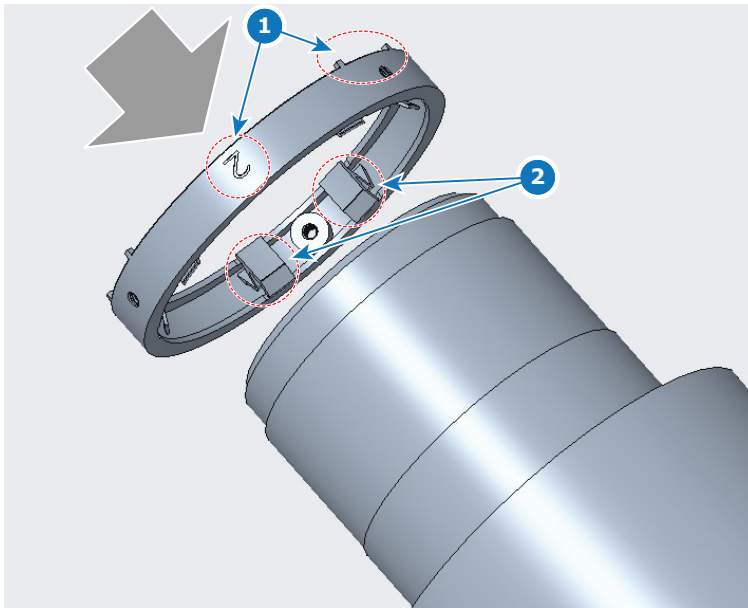


Image 12-10 Mounting the adapter ring

3. Place the optical adapter over the ring onto the back of the lens.

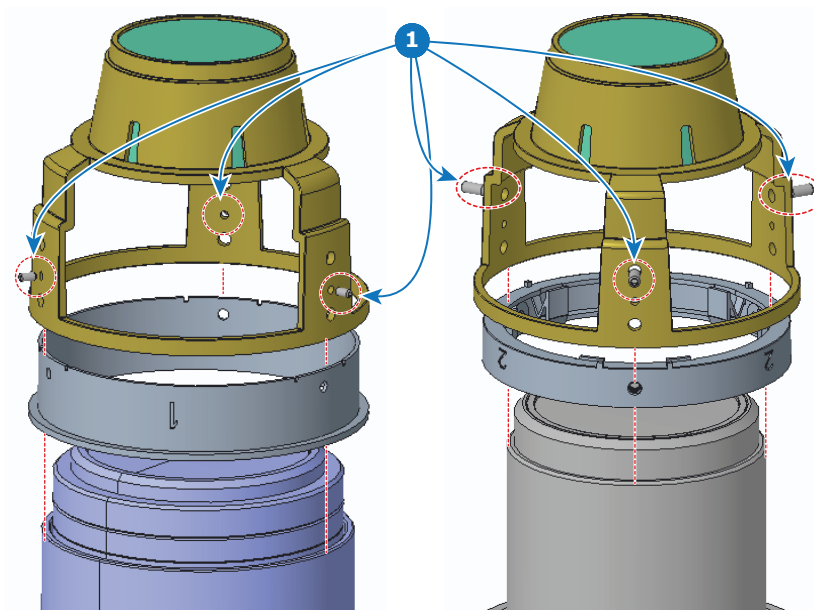


Image 12-11 Two examples of mounting the optical adapter. One with lens ring 1 (left) or lens ring 2 on the end position (right)

4. Mount the correct screw inserts in the appropriate openings of the optical adapter (reference 1, [Image 12-11](#)).



Tip: Use the M3 screw inserts with ring 1, use the M4 screw inserts with ring 2.

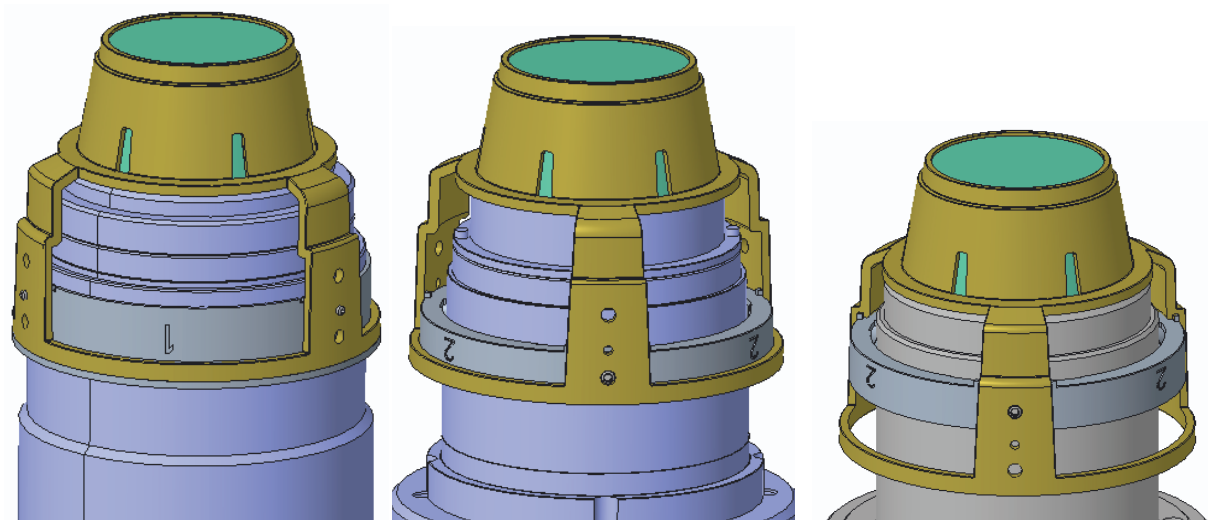


Image 12-12 Example of all three mounting positions of the optical adapter on a B-lens.

5. Drive in the three hex screws into the screw inserts. Use a torque wrench with hex bit to tighten the screws with a gentle force of 0.1 Nm. Fasten the three screws alternately and evenly.



Tip: Use the M3 screws with ring 1, use the M4 screws with ring 2.



Caution: Only a force of 0.1 Nm is necessary. Driving in the screws with too much force may end up breaking the plastic ring instead.

6. Test if the lens adapter is held tightly enough onto the lens. Use gentle force to try to remove it. If you cannot remove the adapter this way, the adapter is mounted correctly. However, if you can remove the adapter this way, retry this procedure.



Note: Use gentle force. If you use brute force, the adapter WILL come lose and be removed. This is normal behavior.



Keep the packaging of the optical adapter aside. If you remove the lens, it is advised to keep the optical adapter in its original packaging to prevent it from getting damaged.

How to install a lens into the B-lens holder, while using the optical adapter

1. Place the lens holder in the “unlocked” position. Do this by pulling the lens lock handle (reference 1, [Image 12-3](#)) outward and then towards the lens power supply socket (reference 2) as illustrated.

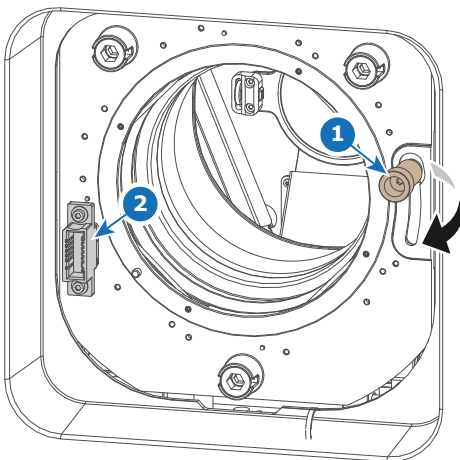


Image 12-13 Lens installation, preparing the lens holder

2. Remove the dust cover from the lens opening.

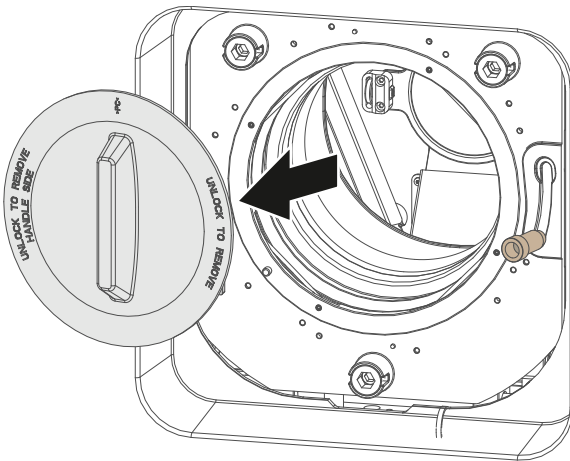


Image 12-14



Tip: While not placed in the projector, place the dust cover in a lockable plastic bag to prevent dust from gathering on the cover.

3. Take the lens assembly out of its packing material and remove the lens caps on both sides.
4. Gently insert the lens in such a way that the lens connector matches the socket (reference 2).

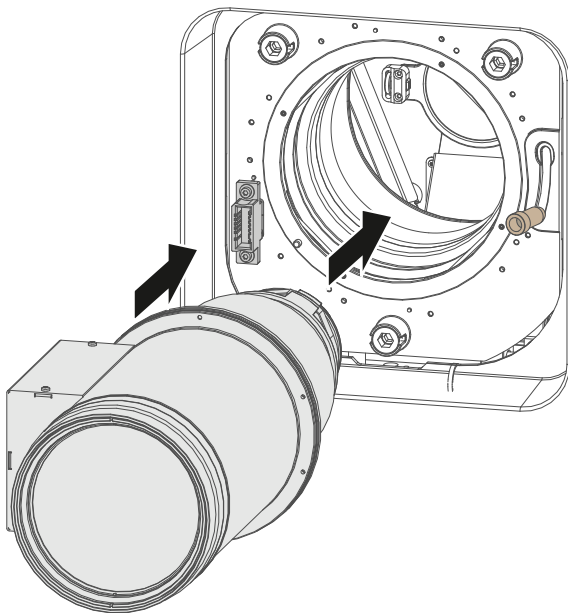



Image 12-15 Lens installation

5. Insert the lens until the connector seats into the socket.
 **Warning:** Do not release the lens yet, as the lens may fall out of the lens holder.
6. Secure the lens in the lens holder by sliding the primary lens lock handle into the “locked” position (to the top of the projector). Ensure the lens touches the front plate of the lens holder.

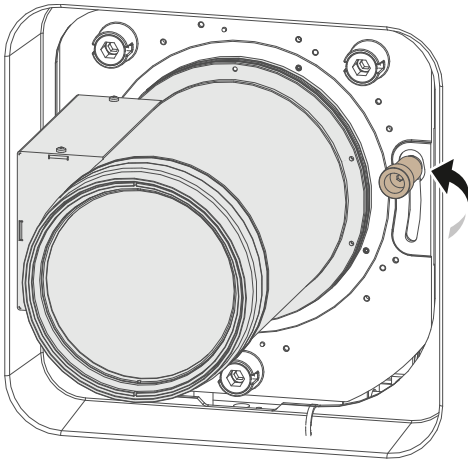


Image 12-16 Locking the lens

7. Check if the lens is really secured by trying to pull the lens out of the lens holder.

12.5 Removal of a lens from a B-lens holder

Required tools

- Allen wrench 1.5 mm
- Allen wrench 2 mm

How to remove

1. Support the lens with one hand while you unlock the lens holder by sliding the lock handle outwards and then towards the “unlocked” position as illustrated ([Image 12–17](#)).

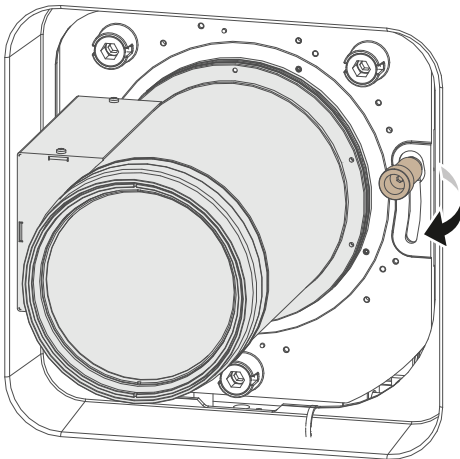


Image 12–17 Unlock the lens

2. Gently pull the lens out of the lens holder.

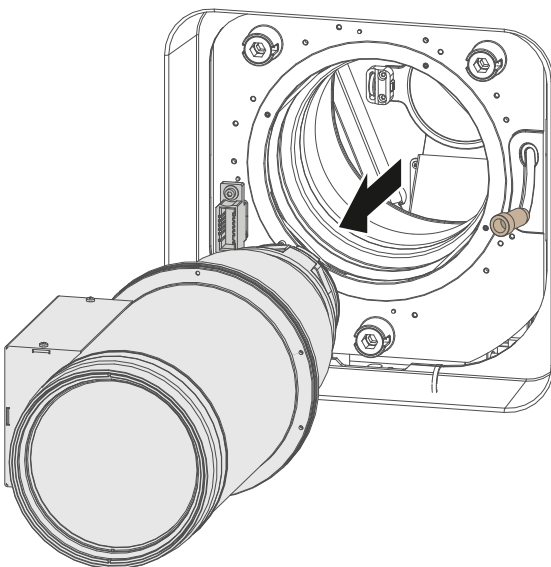


Image 12–18 Lens removal

3. Remove the lens adapter from the lens and place it back in its original packaging. Use an Allen wrench 1.5 mm or 2 mm (depending on lens ring used) to loosen the screws on the adapter.



It's recommended to place the lens caps of the original lens packaging back on both sides of the removed lens to protect the optics of the lens.



It is recommended to place the dust cover of the original projector packaging back into the lens opening to prevent intrusion of dust.

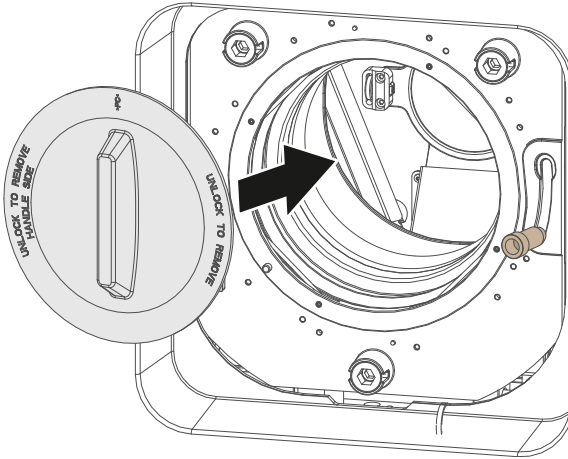


Image 12-19

12.6 Lens shift, zoom & focus

Motorized lens adjustment

The SP4K-C projector is equipped with a motorized lens shift functionality and a motorized zoom & focus functionality.

About the shift range

The lens can be shifted with respect to the internal optics of the projector (DMD) which results in a shifted image on the screen (Off-Axis). A 100% shift means that the center point of the projected image is shifted by half the screen size. In other words, the center point of the projected image falls together with the outline of the image in an On-Axis projection. Due to mechanical and optical limitations the shift range is limited as well.



The maximum shift range for the SP4K-C projector depends on the type of lens holder chosen.



Take into account that when using Scheimpflug to adjust the lens holder, the shift range will become asymmetrical as a direct consequence. An up/down shift range of 30%/70% could (for example) become 25%/75% instead after Scheimpflug adjustment.

For this reason it is advised to perform Scheimpflug adjustment **after** you have reached the sharpest possible image using lens shift, zoom and focus.

Maximum shift range C-Lens holder

All lenses have a shift range of 30% up, 70% down, 15% left, and 15% right. This range is valid for all throw ratios. Within these shift ranges the projector and lens will perform excellently. Configuring the projector outside these shift ranges will result in a slight decline of image quality.

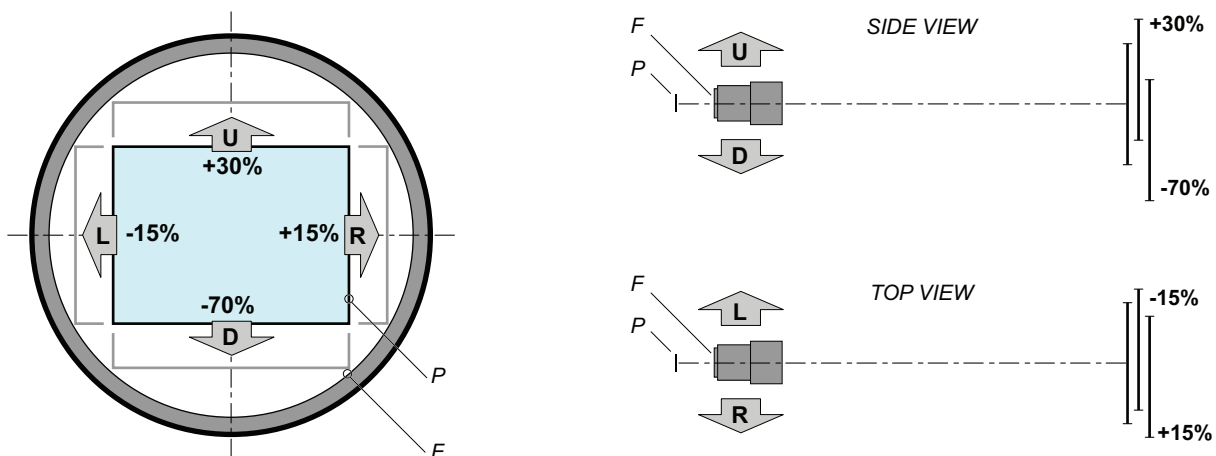


Image 12-20 Shift range for an SP4K-C projector with C-Lens holder

P DMD.
F Field of view.

Maximum shift range B-Lens holder

All lenses have a shift range of 110% up, 110% down, 60% left, and 60% right. This range is valid for all throw ratios. Within these shift ranges the projector and lens will perform excellently.



These are the mechanical limits of the B-Lens holder. It is not possible to configure the projector outside of these shift ranges.

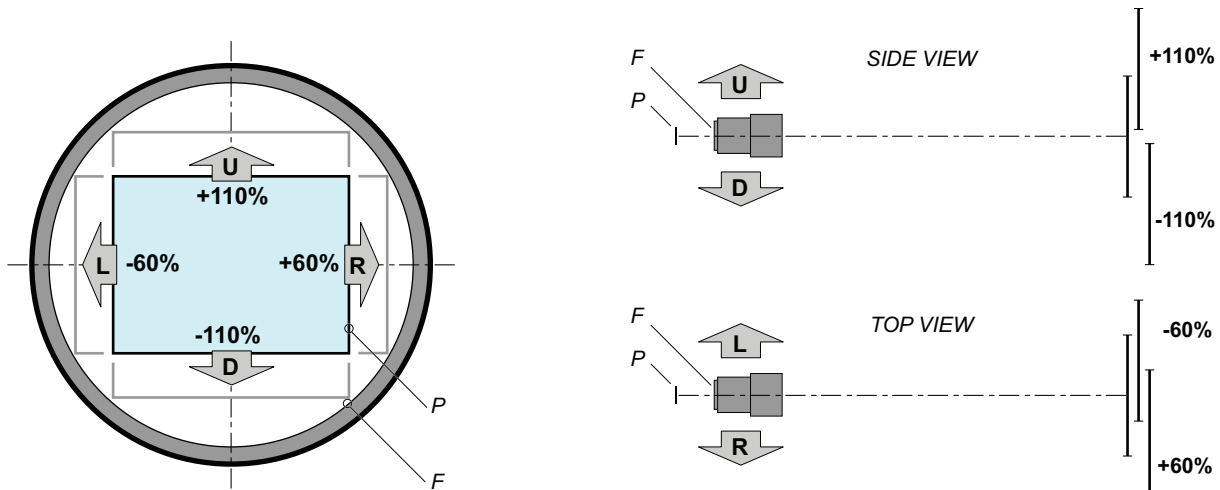


Image 12-21 Shift range for an SP4K-C projector with B-Lens holder

P DMD.
F Field of view.

How to shift the lens of the SP4K-C projector?

1. In the *Configuration – Lens Selection* menu, Select the correct lens file and the calibrate the selected lens with a **Calibrate & return to mid position** action.
2. Use the **up and down** arrow keys in the *Light, dower, lens* menu to shift the lens **vertically** and use the **left and right** arrow keys to shift the lens **horizontally**.



Image 12-22

How to zoom in or out?

1. Is the lens equipped with a motorized zoom & focus?
 - If **yes**, Use the **–** and **+ Zoom keys** in the *Light, dower, lens* menu to zoom the lens in or out.

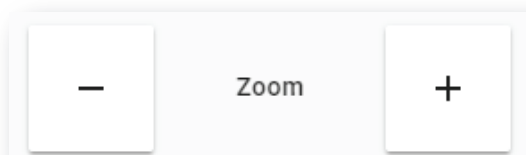


Image 12-23

- If **no**, Use the **zoom barrel** on the lens to zoom in or out.

How to focus?

1. Is the lens equipped with a motorized zoom & focus?

► If **yes**, use the **–** and **+** **Focus keys** in the *Light, dower, lens* menu to focus the image on the screen.

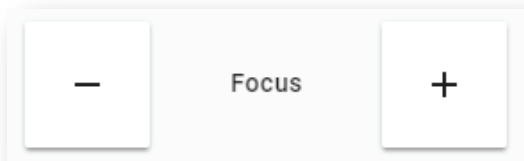


Image 12–24

► If **no**, use the **focus barrel** on the lens to focus the image on the screen.



Take into account that the lens focus may slightly drift while the lens is warming up from cold to operation temperature. This is a typical phenomenon for projection lenses used with high brightness projectors. The operation temperature of the lens is reached after approximately 30 minutes projection of average video.



When using a B-series lens on the B-Lens holder, make sure the optical adapter is mounted on the lens. Otherwise you will not be able to focus the image correctly. For more info, see [“Installation of a lens on a B-Lens holder”](#), page 204.



If it becomes impossible to focus the image, perform a Scheimpflug adjustment. For more info on this, refer to [“Scheimpflug adjustment”](#), page 215.

12.7 Scheimpflug introduction

What is Scheimpflug?

The lens holder has to be adjusted so that the "sharp focus plane" of the projected image falls together with the plane of the screen ($Fp1 \rightarrow Fp2$). This is achieved by changing the distance between the DMD plane and the lens plane ($Lp1 \rightarrow Lp2$). The closer the lens plane comes to the DMD plane the further the sharp focus plane will be. It can occur that you won't be able to get a complete focused image on the screen due to a tilt (or swing) of the lens plane with respect to the DMD plane. This is also known as Scheimpflug's law. To solve this the lens plane must be placed parallel with the DMD plane. This can be achieved by turning the lens holder to remove the tilt (or swing) between lens plane and DMD plane ($Lp3 \rightarrow Lp4$).

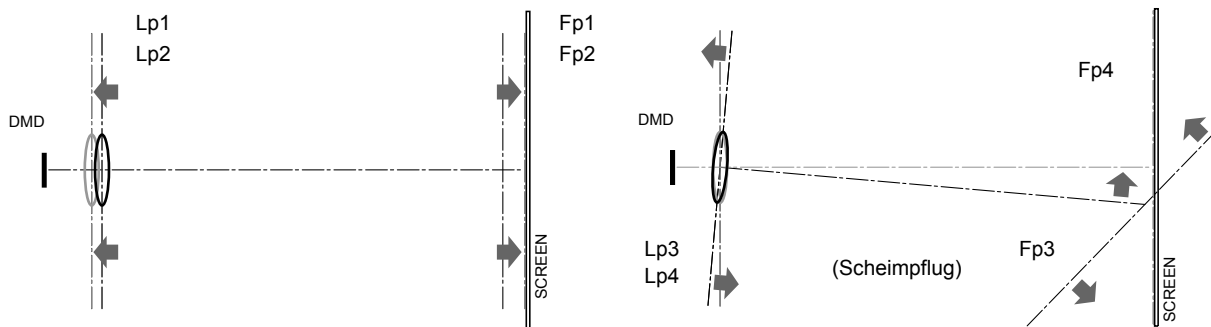


Image 12-25 Scheimpflug principle

Scheimpflug principle



The "plane of sharp focus" can be changed so that any plane can be brought into sharp focus. When the DMD plane and lens plane are parallel, the plane of sharp focus will also be parallel to these two planes. If, however, the lens plane is tilted with respect to the DMD plane, the plane of sharp focus will also be tilted according to geometrical and optical properties. The DMD plane, the principal lens plane and the sharp focus plane will intersect in a line below the projector for downward lens tilt.

Scheimpflug adjustment points

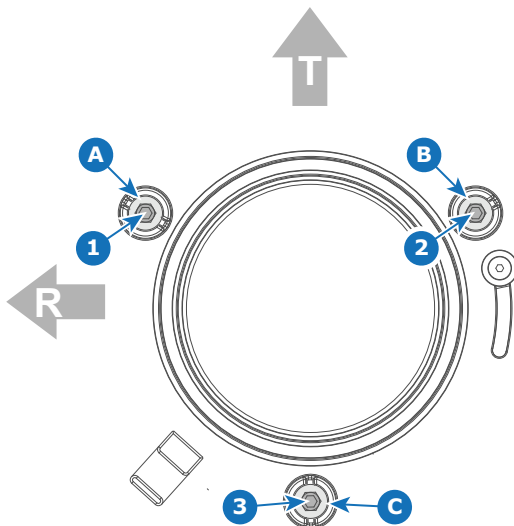


Image 12-26 Scheimpflug adjustments points on Lens holder - Projector front view. (Shape of the lens may vary with the model)

- | | | | |
|---|------------------------------|---|----------------------|
| 1 | Scheimpflug adjustment screw | B | Lock screw |
| 2 | Scheimpflug adjustment screw | C | Lock screw |
| 3 | Scheimpflug adjustment screw | T | Projector top side |
| A | Lock screw | R | Projector Right side |

12.8 Scheimpflug adjustment

Required tools

- Allen wrench 5 mm
- Allen wrench 8 mm
- Torque wrench with 8 mm hex socket



This procedure will not go into detail on menu functionality of Web Communicator. For more info on all menu actions, please refer to the projector User Guide.




CAUTION: When using the B-Lens holder and B-series lenses, make sure to have the optical adapter installed correctly on your lens. You will otherwise not be able to obtain a focused image, no matter what you try.



For the best possible result, place the projector on a flat and level surface and project perpendicular to the screen

Preparation steps

1. Browse to the IP address of the projector and log into Web Communicator.
2. In the *Configuration – Lens Selection* menu, Select the correct lens file and the calibrate the selected lens with a **Calibrate & return to mid position** action.
3. Make sure you have performed a lens shift, zoom and focus action to obtain the sharpest possible picture.

 *Tip:* Do not perform a Scheimpflug adjustment until you have optimized lens shift, zoom and focus, as well as having calibrated the lens.
4. In the *Control – Light, Dowsers, Lens* menu, click a number of times on the *Test pattern* button until you see the **FocusGreen** test pattern.

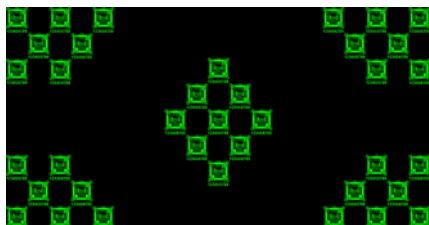


Image 12-27 Example of the Green focus test pattern.

5. Loose half turn of the lock screws (reference A, B and C,) of the Lens Holder . Use a 8 mm Allen wrench for the lock screws.
6. Optimize the focus of the projected image in the center of the screen (F) using the focus buttons in the “Control – Light, Dowsers, Lens menu”.

Scheimpflug adjustment steps

1. Sharpen the image at the bottom right corner of the screen by turning the upper left Scheimpflug adjustment screw either clockwise or counterclockwise (reference 1). Use a 5 mm Allen wrench.
As a result of this action, the focus in the center will fade a bit. This is expected behavior.
2. Sharpen the image at the lower left corner of the screen by turning the upper right Scheimpflug adjustment screw (reference 2).
3. Sharpen the image at the top center of the screen by turning the lower Scheimpflug adjustment screw (reference 3).
4. Optimize the focus of the projected image in the center of the screen using the focus buttons in the “Control – Light, Dowsers, Lens menu”.

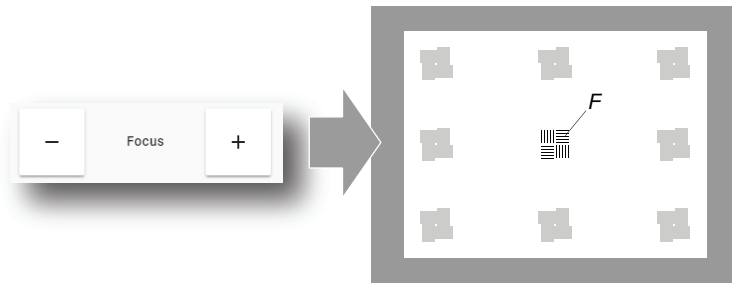


Image 12-28

5. Repeat from step 1 until the projected focus pattern is as sharp as possible in the center, left, right, top and bottom of the screen.
6. Fasten all three lock screws again. Use a torque wrench with a torque of 8.4 Nm.



Tip: While a stronger torque can be applied, take into account that the maximum allowed torque is 10 Nm.

What to do when no sharp image can be obtained?

If you are unable to obtain a sharp image, even after performing all previously mentioned lens adjustment procedures, you may have messed up the Scheimpflug procedure. This can be fixed by adjusting the adjustment points in such a way the lens holder is returned to its nominal position. For more info, see [“Resetting the scheimpflug adjustment screws to nominal position”](#), page 217.

12.9 Resetting the scheimpflug adjustment screws to nominal position

When to reset the adjustment screws?

In most cases, the amount of adjustment needed to the scheimpflug screws is limited to the moment of installation. The lens holder is also designed to a point where any adjustment to the adjustment screws should be fairly limited in general.. But rushed adjustment jobs or inexperienced technicians may accidentally turn the adjustment screws to a point where a focused image is no longer possible.

Required tools

- Torx screwdriver T10
- Torx screwdriver T20
- A caliper

How to reset the adjustment screws

1. Remove the lens from the projector.
2. Remove the front cover to access the two screws of the Lens Holder cover
3. Remove the Lens Holder cover as illustrated. Use a T20 Torx screwdriver to remove the two screws holding the cover.

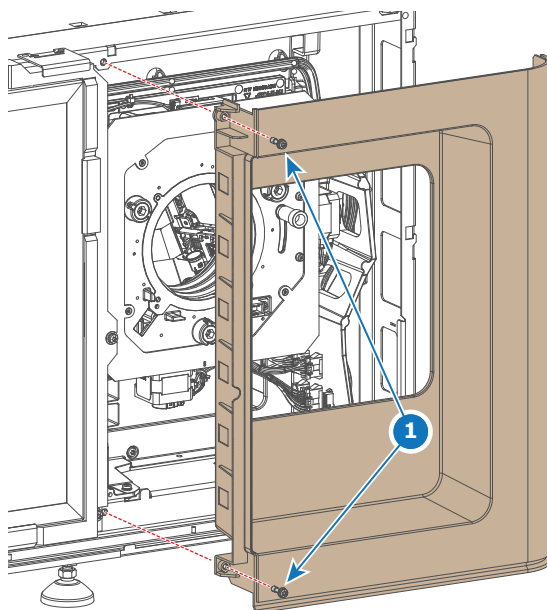


Image 12-29 Removing the Lens Holder cover

4. Remove the Lens Holder cover plate. Use a T10 Torx screwdriver to remove the four screws

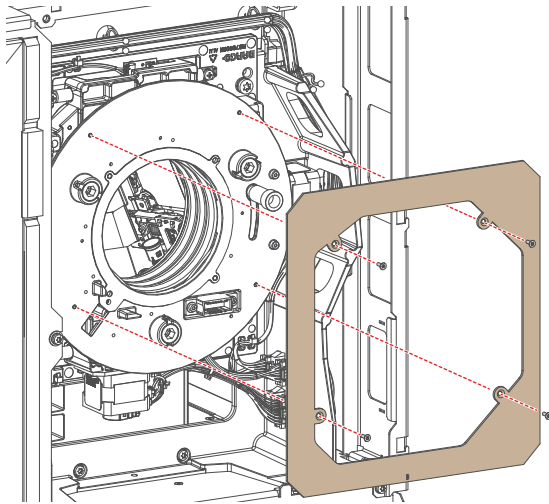


Image 12-30 Removal of the Lens Holder cover plate

5. Unlock and turn out the lock screws (reference A, B and C, [Image 12-31](#)) of the Lens Holder . Use an 8 mm Allen wrench for the lock screws.

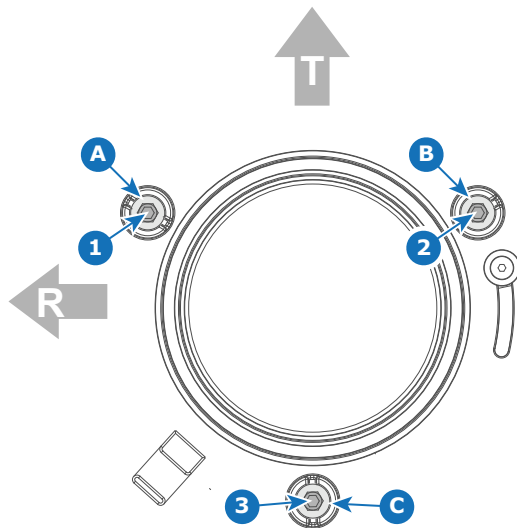


Image 12-31 Scheimpflug adjustment and lock screws

6. Use a caliper to measure the distance between the lens holder back focal plate and the front of the lens mounting plate. Do this near all three adjustment screws. The distance should be the same as reference N:
 - B-Lens Holder: 52 mm.
 - C-Lens Holder: 49 mm.

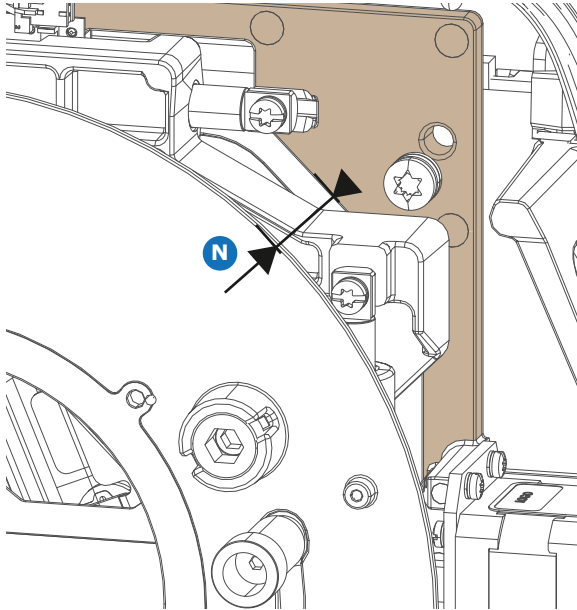


Image 12-32 Distance on C-lens holder

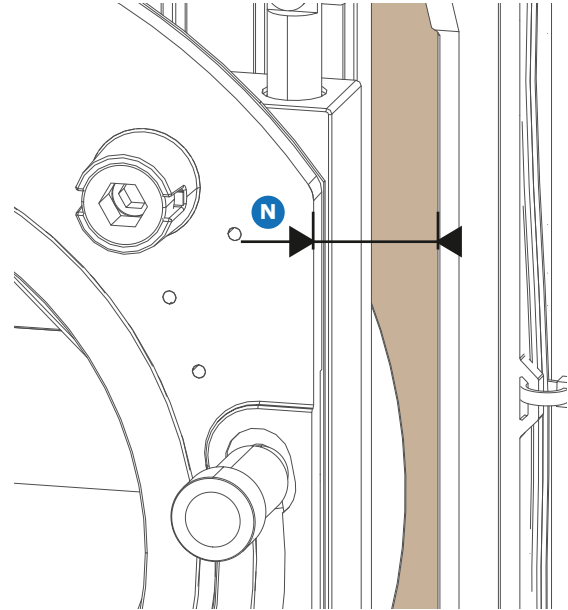



Image 12-33 distance on B-lens holder

7. Rotate the adjustment screws (1, 2 and 3) clockwise or counterclockwise, until the specified nominal distance is reached. Use a 5 mm Allen wrench to do so.
8. Fasten all three lock screws again. Use a torque wrench with a torque of 8.4 Nm.
 *Tip:* While a stronger torque can be applied, take into account that the maximum allowed torque is 10 Nm.
9. Mount the covers back onto the lens holder.

12.10 Removal of the C-Lens Holder

Required tools

- Torx screwdriver T10
- Torx screwdriver T20
- Torx screwdriver T30

How to remove

1. Switch off the projector.
2. Remove the lens from the projector.
3. Remove the front cover to access the two screws of the Lens Holder cover
4. Remove the Lens Holder cover as illustrated. Use a T20 Torx screwdriver to remove the two screws holding the cover.

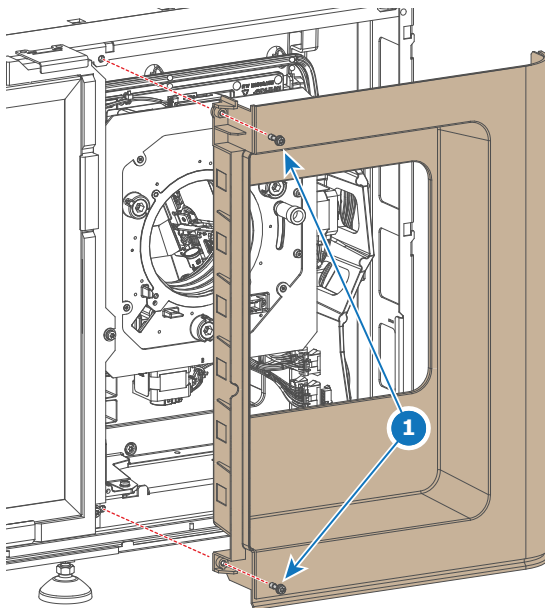


Image 12-34 Removing the Lens Holder cover

5. Remove the Lens Holder cover plate. Use a T10 Torx screwdriver to remove the four screws

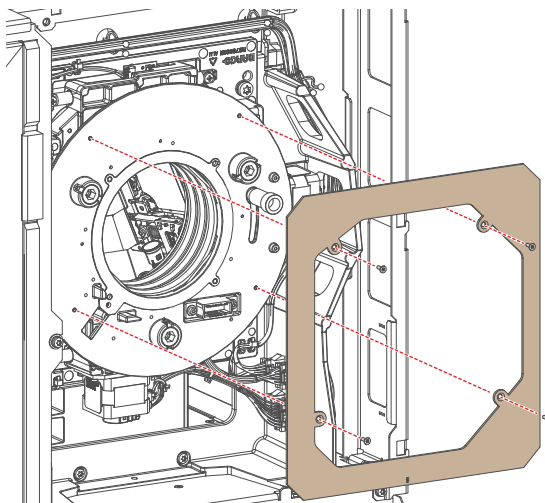


Image 12-35 Removal of the Lens Holder cover plate

6. Remove the 3 lens motor connectors.

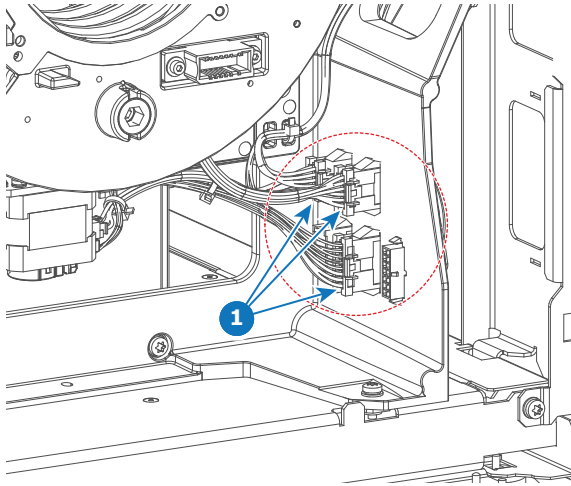


Image 12-36 Lens motor connectors.

7. Remove the Lens Holder from the projector chassis. Use a T30 Torx screwdriver to remove the four screws.

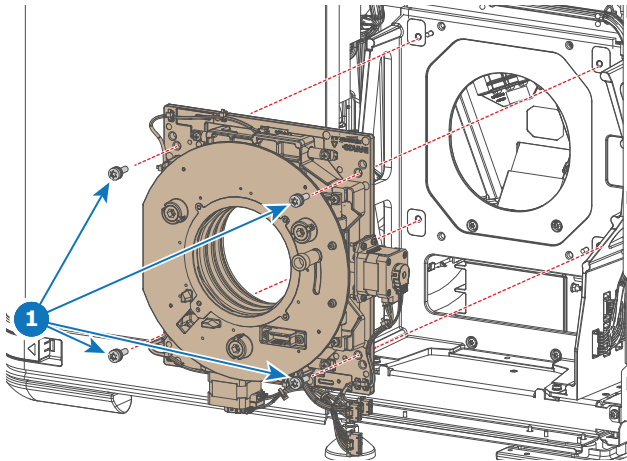


Image 12-37 Removing the Lens Holder

12.11 Installation of the C-Lens Holder

Required tools

- Torx screwdriver T10
- Torx screwdriver T20
- Torx screwdriver T30

How to install

1. Mount the C-Lens Holder onto the projector chassis as illustrated. Use a T30 Torx screwdriver to fixate the Lens Holder with four screws (reference 1, [Image 12-38](#)).

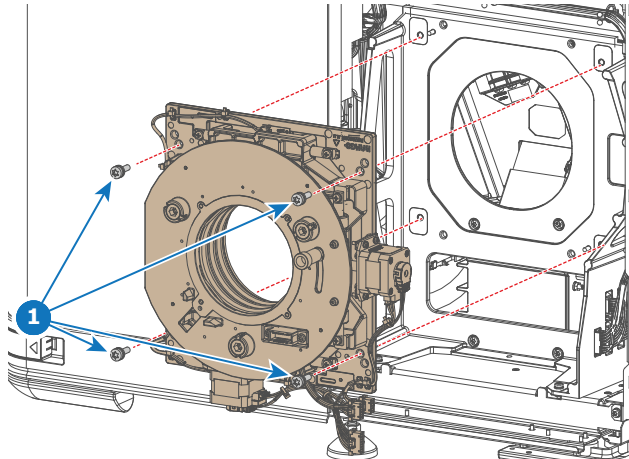


Image 12-38 Mounting the Lens Holder

2. Reconnect the 3 connectors of the Lens Holder.

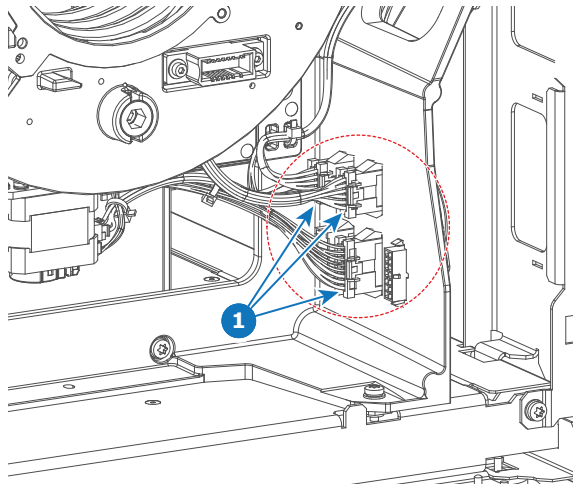


Image 12-39 Lens motor connectors.

3. Mount the Lens Holder cover plate. Use a T10 Torx screwdriver to fixate the cover plate.

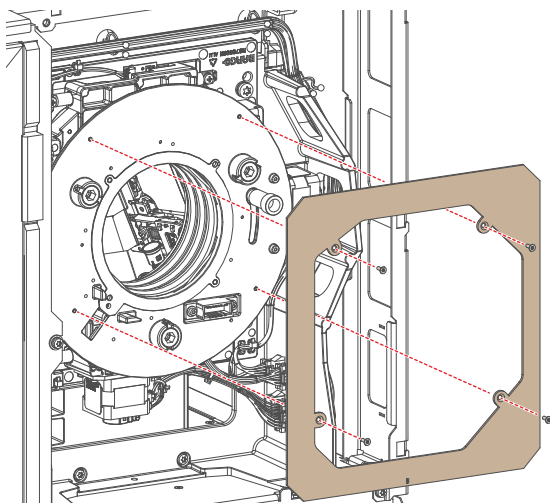


Image 12-40 Mounting the Lens Holder cover plate

4. Mount the Lens Holder cover. Use a T20 Torx screwdriver to fixate the cover.

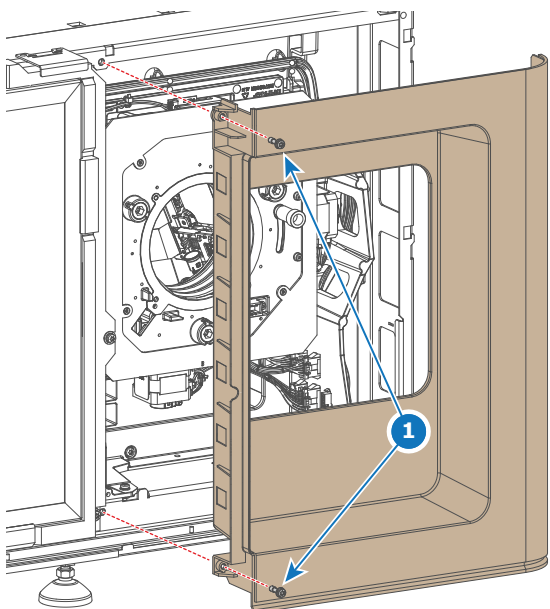


Image 12-41 Mounting the Lens Holder cover

5. Mount the front cover.

12.12 Removal of the B-Lens Holder



It is advised to remove the B-Lens holder with two people. One person should hold up the lens holder after the screws have been removed, while the other has to disconnect the five electrical connectors.

Required tools

- Torx screwdriver T20
- Torx screwdriver T30

How to remove

1. Switch off the projector.
2. Remove the lens from the projector.
3. Remove the front cover to access the two screws of the Lens Holder cover
4. Remove the Lens Holder cover as illustrated. Use a T20 Torx screwdriver to remove the two screws holding the cover.

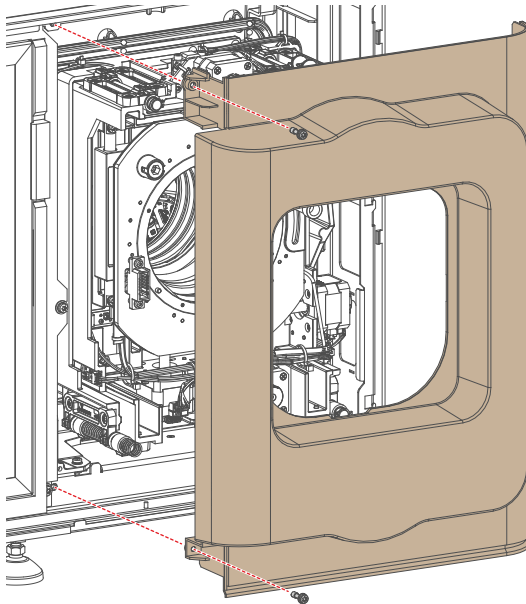


Image 12-42 Removing the Lens Holder cover

5. Loosen the five screws of the Lens Holder (reference 1, [Image 12-43](#)). Use a T30 Torx screw driver.
6. Slightly move the Lens Holder forward so that you can access the 5 electrical connectors.



Tip: Let one person hold the Lens Holder up while the other person disconnect the connectors.

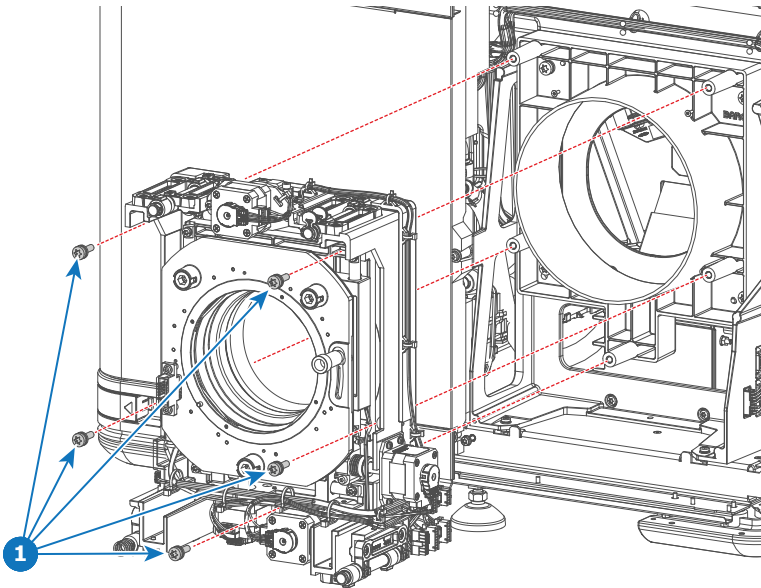


Image 12-43 Removing the screws and B-Lens Holder

7. Disconnect the five Lens Holder Connectors.

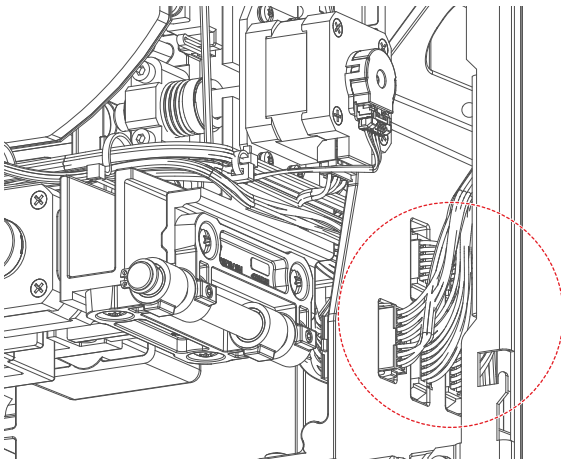


Image 12-44 Location of the five Lens Holder connectors

8. Fully remove the Lens Holder.

9. Extra step if the B-Lens Holder needs to be replaced with a C-Lens Holder: Remove the B-Lens Holder adapter. Use a T30 Torx screwdriver to remove the four screws.



Note: This step is not necessary if you keep using the same B-Lens holder.

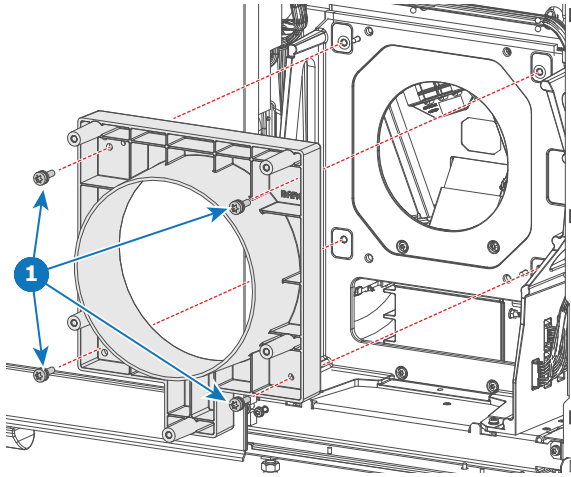


Image 12-45 Removing the B-Lens Holder adapter

12.13 Installation of the B-Lens Holder



It is advised to mount the B-Lens holder with two people. One person should hold up the lens holder, while the other has to connect the five electrical connectors and drives in the 5 screws.

Required tools

- Torx screwdriver T20
- Torx screwdriver T30

How to install

1. If not yet installed, mount the B-Lens Holder adapter as illustrated. Use a T30 Torx screwdriver to tighten the four screws.



Note: Pay attention to how the adapter is mounted. Do this according to the following illustration.

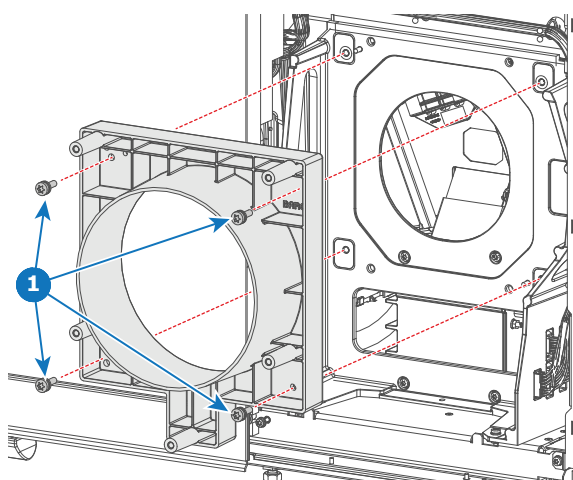


Image 12-46 Mounting the B-Lens Holder adapter

2. Keep the Lens Holder in front of the adapter.



Tip: Let one person hold up the lens holder while the other person connects the Lens Holder connectors and drives in the five screws.

3. Connect the five Lens Holder Connectors.



Tip: each of the five connectors is unique. One connector can only fit one type of socket.

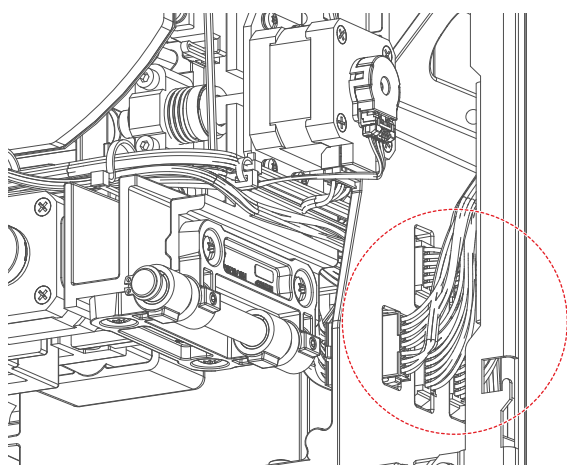


Image 12-47 Location of the five Lens Holder connectors

4. Drive in the five screws of the Lens Holder. Use a T30 Torx screwdriver.

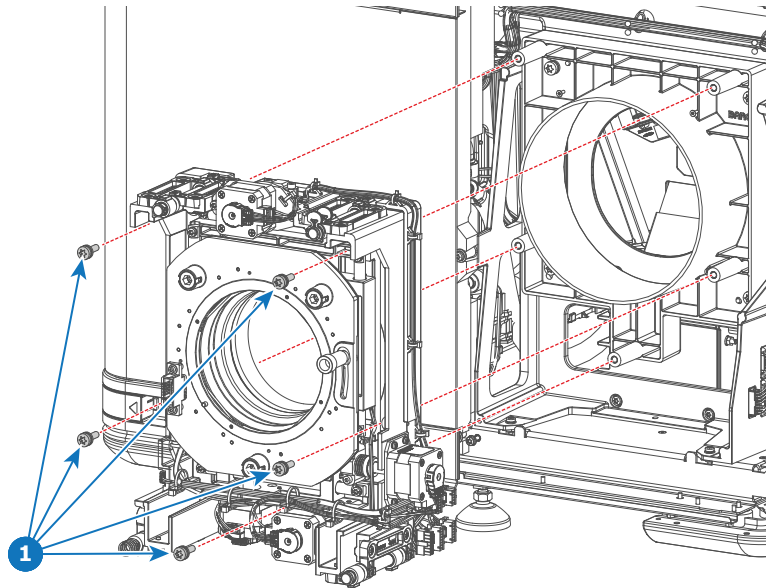


Image 12-48 Mounting the screws and B-Lens Holder

5. Mount the cover over the lens holder. Use a T20 Torx screwdriver to drive in the two screws.

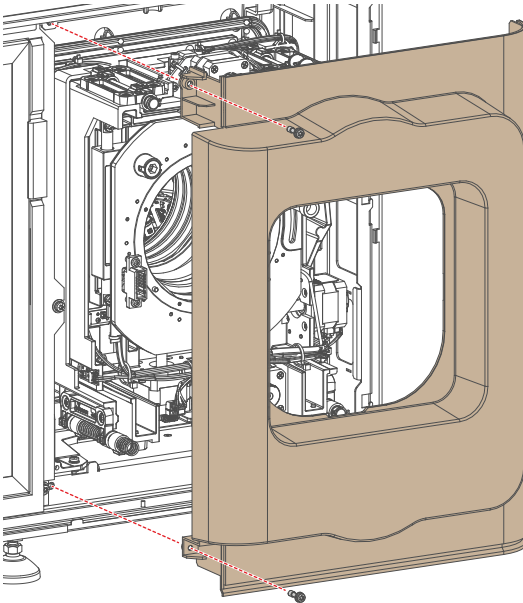


Image 12-49 Mounting the Lens Holder cover

Card cage

13

13.1	Card cage introduction	230
13.2	Cinema controller of the projector	231
13.3	ICP-D (Integrated Cinema Processor – Direct)	233
13.4	ICMP-X introduction.....	235
13.5	ICMP-X HDD.....	237
13.6	ICMP-X communication and input ports.....	239
13.7	Switched Mode Power Supply	241
13.8	Replacement of the cinema controller board	242
13.9	Battery replacement on the cinema controller board	243
13.10	Replacement of the projector ID card	244
13.11	Replacement of the Switched Mode Power Supply (SMPS)	246
13.12	Replacement of the ICMP-X board.....	248
13.13	Removing a HDD from the ICMP-X	249
13.14	Installing a HDD into the ICMP-X	250
13.15	What are the possible HDD swaps	252
13.16	Replacement of the Touch display.....	254
13.17	Replacement of the Fan and Motor Control Board (FMCB)	256
13.18	Replacing a card cage fan	259
13.19	Replacement process of the signal backplane.....	261
13.20	Preparing the backplane removal.....	262
13.21	Replacing the backplane from the card cage.....	264
13.22	Preparing the card cage to mount back the boards	266
13.23	ICMP-X status LEDs	269
13.24	ICMP-X HDD status LEDs	270

About this chapter

This chapter gives a brief introduction of the Card Cage, the different boards inside the Card Cage, and how to access the Card Case and these boards. The diagnostic LEDs of each board are described in this chapter as well. Furthermore, the board replacement procedures are included.

13.1 Card cage introduction

Introduction of the card cage

The card cage is located at the user input side of the projector. The upper compartment of the card cage is sealed with the top cover and light processor fan.

The upper compartment of the card cage contains the touch display (if applicable) and the fan & motor control board. Below this module, there are the slots wherein the ICMP-X board, the cinema controller and the SMPS are located.

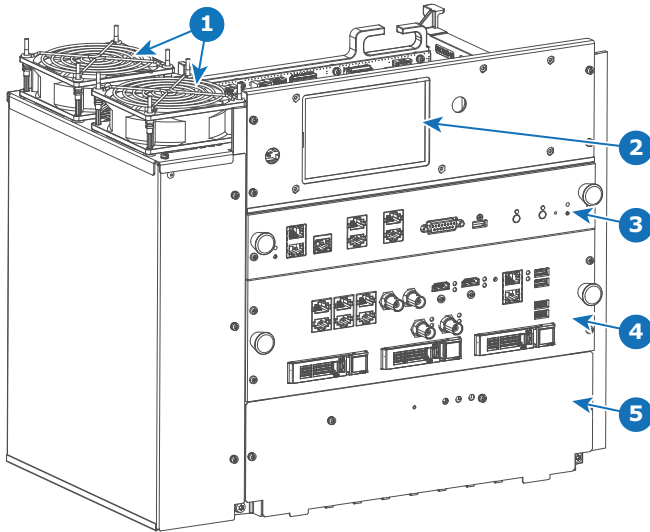


Image 13-1 Card cage of the SP4K-C projector

- | | | | |
|---|--------------------------|---|--------|
| 1 | Card cage fans | 4 | ICMP-X |
| 2 | Touch display (optional) | 5 | SMPS |
| 3 | Cinema controller | | |

13.2 Cinema controller of the projector

Control panel

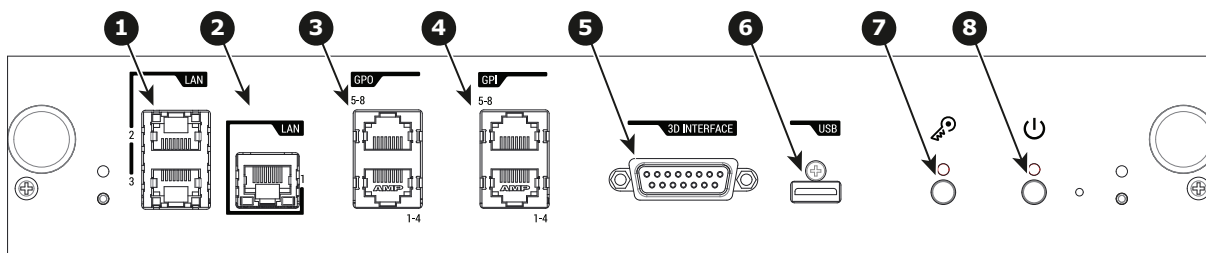


Image 13-2

- | | | | |
|---|------------------------------------|---|--------------|
| 1 | LAN ports | 5 | 3D Interface |
| 2 | Wide Area Network (WAN) port | 6 | USB port |
| 3 | General Purpose Output (GPO) ports | 7 | Key button |
| 4 | General Purpose Input (GPI) ports | 8 | Power button |

Local Area Network (LAN: 10/100/1000 base-T) ports

The Cinema Controller has two Local Area Network (LAN: 10/100/1000 base-T) ports with a built-in Ethernet switch (port 1 and port 2). Use for projector control and automation. E.g. Touch display, content server, ... (not for content streaming!)

As there is a need to daisy chain projectors when they are on an Ethernet network, an Ethernet switch is built in. the incoming network is hereby available for the internal PC and for the next device in the chain. In this way a 'star' network interconnection can be avoided. The switch used is a stand alone 10/100/1000Mbit Ethernet switch. This assures no influence on the network speed. Furthermore, this Ethernet switch remains operational when the projector is in Standby mode.

The connectors used for these Ethernet ports are of the type RJ45, which is compatible with standard RJ45 cable connector. Straight (most common) as well as cross linked network cables can be used. The 2 ports are functionally identical. Both ports are connected via the projector switch (Auto sensing enabled).

Wide Area Network (WAN) port

The Cinema Controller has a Wide Area Network (WAN: 10/100/1000 base-T) port. Use this Ethernet port (reference 2 [Image 13-2](#)) to connect the network which contains the DHCP server.

The SP4K-C can be connected to a WAN (Wide area network) (reference 2 [Image 13-2](#)). Once connected to the WAN, users can access the projector from any location, inside or outside (if allowed) their company network using the Web Communicator software. This software locates the projector on the network if there is a DHCP server or the user can insert the correct IP-address to access the projector. Once accessed, it is possible to check and manipulate all the projector settings. Remote diagnostics, control and monitoring of the projector can then become a daily and very simple operation. The network connectivity allows detection of potential errors and consequently improves service time.

General Purpose Input / Output (GPI & GPO) ports

These ports can be used to send or receive trigger signals from other devices. These input/output ports can be programmed by macros created with the Web Communicator application. For more info, refer to the Web Communicator user guide, section Macro editor.

The GPI ports remains operational when the projector is in Standby mode. So if the factory predefined macro to wake up the projector is assigned to one of the free GPI port numbers the projector can be awakened via GPI.



The GPI ports accept a power input of maximum +18V.

3D Interface port

The 3D interface port can be used to connect external 3D devices to the projector. All signals necessary for 3D projection can be provided via this connector.



The 3D interface port is disabled if the projector is in ECO mode.

USB port

The Cinema Controller is equipped with a master USB port, type “A” connector. This USB port will simplify the service procedures for firmware updates or for downloading the log files without a network connection.

If the only file on the USB device is the firmware file (a “*.fw” file), the projector will automatically start one of the following processes.

- **samba<version nr>.fw**: The projector will upgrade or downgrade, depending on the version number.



Make sure that any used USB-stick is FAT32 compatible and contains no other files or folders.

13.3 ICP-D (Integrated Cinema Processor – Direct)



In case the projector is equipped with a Barco ICMP-X no ICP-D board is inserted. All ICP-D functionality is integrated in the Barco ICMP-X.

Introduction

Depending on the projector configuration, the projector card cage is either equipped with an ICP-D or ICMP-X. In case an ICP-D is installed, then a third-party IMB or IMS can be inserted into the slot below the ICP-D.

ICP-D functions

- Stores a part of the projector files (screen files, MCGD files, ...).
- Stores the license files related to HDMI inputs.
Note: the License file related to the use of ICP-D with a third party Integrated Media Block (IMB) is not stored here.
- Stores and generates test patterns.
- Scaling to native resolution, re-sizing, masking, line-insertion de-interlacing, color space conversion, de-gamma, color correction.
- Source Selection between alternative content and cinema content.
- Contains a real time clock, which must be synchronized with the GMT/UTC time stored in Integrated Media Block.
- Handles unpacking of special video formats.

License

On Series 4 projectors, a license based on the projector serial number and the brand of the IMB is needed. This means a new license is required in case you change projector or IMB brand.

On Series 2 projectors, no license is needed in order to use ICP-D together with an third party IMB.

Supported IMBs from ICP-D software version 1.2.0.5 (included in the Series 4 software 1.4.0) onwards:

- Dolby ShowVault/IMB: From software version 2.8.25 onward
- Dolby IMS3000: From software version 3.3.26 onward
- Dolby IMS2000: From software version 2.8.25 onward
- GDC SX4000: From software version 10.00 (build 103) onward
- GDC SR1000: From software version 17.20 (build 201) onward
- QSC CMS-5000: From software version 1.1.01818+ onward
- Qube Xi: From software version 3.0.1.40 onward
- CMC CineCloud: From software version 1.2.2 onward (Series 2 only)

On series 2 projectors, starting from ICP-D software version 1.2.0.10, HD-SDI + Enigma as well as Quad 3G/SDI + Enigma are now supported. All media server that connect to the HD-SDI + Enigma board and that don't require CineCanvas are now supported.



This list is subject to change. Please contact Barco service to obtain the updated list of supported IMB brands (models, minimum software version, etc).

Contact the supplier of your IMB to acquire a valid license.

Grace period

Series 4 projectors equipped with an ICP-D are delivered from the factory with a grace period of 200 hours. This means that the projector can be used (in "On" mode) with a third party IMB for 200hrs. During this period the projector trigger a *Warning* (orange notification) with the time remaining in the description. The projector will go into *Error* status (red notification) if no valid license is installed within the specified timeframe. In this case the media server can no longer be selected.

LEDs and inputs on the ICP-D

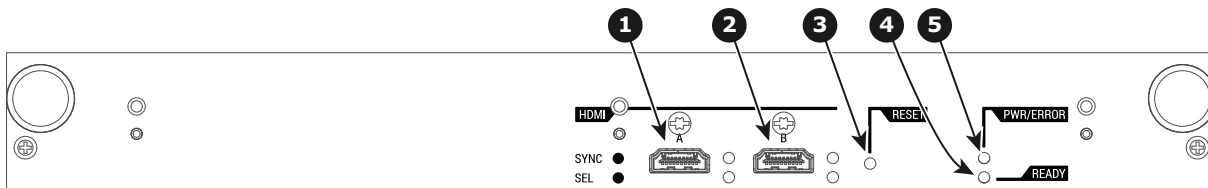


Image 13-3

- | | |
|---|--|
| 1 HDMI Input A
2 HDMI Input B
3 Reset button | 4 Ready LED
5 Power & Error LED |
|---|--|

For the specifications on the HDMI ports, please refer to the appendices of the ICP-D installation manual.

ICP-D LEDs

Status overview PWR/ERROR and READY LEDs:

PWR/ERROR	READY	ICP-D Status
Off	Off	Turned off
Red	Off	Board reset or security error
Blinking Green	Off	Boot loader
Blinking Green	Blinking Orange	Operating System start up
Blinking Green	Orange	Security Manager - Image Integrity tests
Blinking Green	Blinking Yellow	Security Manager - Self Test
Green	Blinking Green	Starting Applications
Green	Green	Applications started in normal mode
Green	Orange	Applications started in degraded mode
Blinking Red	Off	Security error
Green	Blinking Orange	Update ongoing
Orange	Orange	Update done



When installing a new ICP board in a SP4K-C projector the Spatial Color Calibration file must be reloaded and activated.



CAUTION: Make sure not to short circuit the battery on the board. That will destroy the board completely !

13.4 ICMP-X introduction

About ICMP-X

The ICMP is a removable electronic assembly situated in the Card Cage of the projector. The ICMP-X stores, decrypts and decodes DCI cinema content and delivers it to the projector in a playable format, all integrated into a single assembly placed directly in the projector. ICMP-X is a fully integrated assembly so expected by the operators to facilitate their daily business.

The standard Integrated Cinema Processor functionality from Texas Instruments® is fully integrated into the ICMP-X. So, the ICMP-X replaces the ICP board as well.

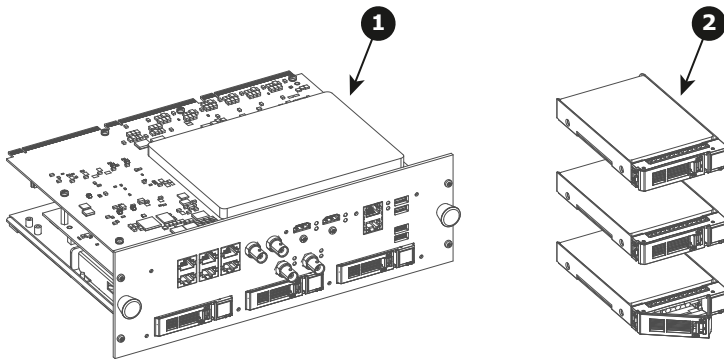


Image 13-4

- 1 ICMP-X
- 2 HDDs for ICMP-X

As an integrated component of the projector, installation and maintenance of the ICMP-X requires the same skills and the same precautions as an intervention on the projector itself.

For order info see www.barco.com.

Front plate of the ICMP-X

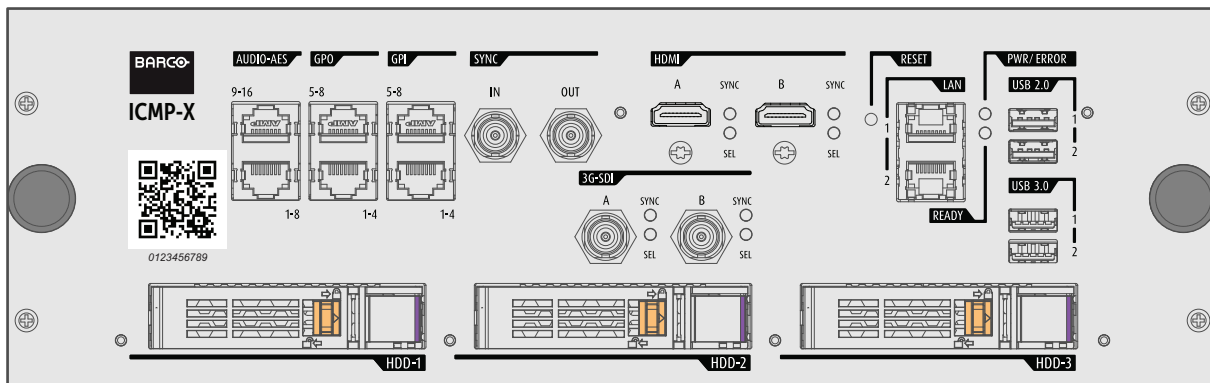


Image 13-5 Front plate ICMP-X

GEN1 and GEN2 storage controller

The ICMP-X is equipped with a GEN2 storage controller while the legacy ICMP has an GEN1 storage controller.

The GEN2 storage controller supports SSD and uses another disk initialization type. This implies that HDDs initialized for the legacy ICMP (with GEN1 storage controller) are not interchangeable with the ICMP-X without re-initialization. Note that a re-initialization process result in lost of content. See [“What are the possible HDD swaps”, page 252](#).

It's possible to upgrade an ICMP with a GEN2 storage controller. For more info about the upgrade kit and instructions see Barco website.

How to recognize an ICMP-X

At the first glance ICMP-X is very similar to ICMP (the previous generation device) however both devices are not fully compatible and not interchangeable. This is the reason why it is very important to ensure that you use correct model.

Unlike the previous version the name of ICMP-X appears on the upper left side of the front face (under the Barco logo).

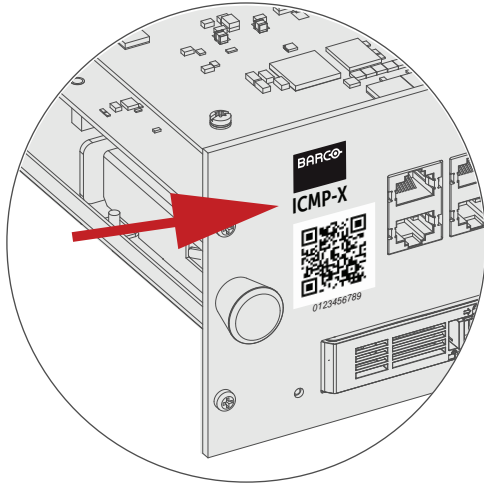


Image 13-6

Location in the Card Cage

The Card Cage can be different depending the projector type but it generally consists of a button module and several removable units, which include the ICMP-X (reference 1) and the Barco Cinema Controller (reference 2).

ICMP-X location in the Card Cage of an SP4K and SP2K series projector.

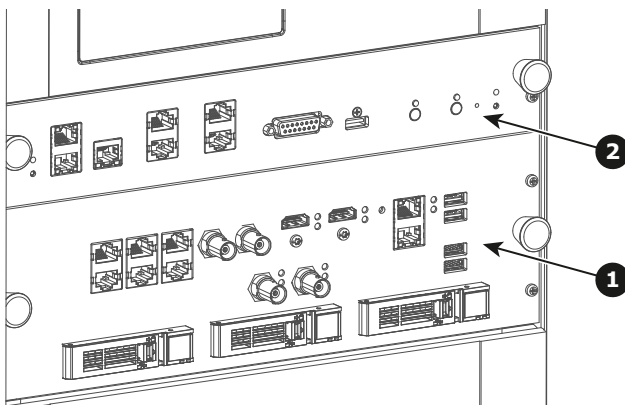


Image 13-7

13.5 ICMP-X HDD

About ICMP-X HDD

The three HDDs (local storage) in the ICMP-X, are set up in a RAID 5 configuration. This storage technique, that combines multiple HDD components into a logical unit, manages enough redundancy information to continue to operate properly after the loss of one HDD.

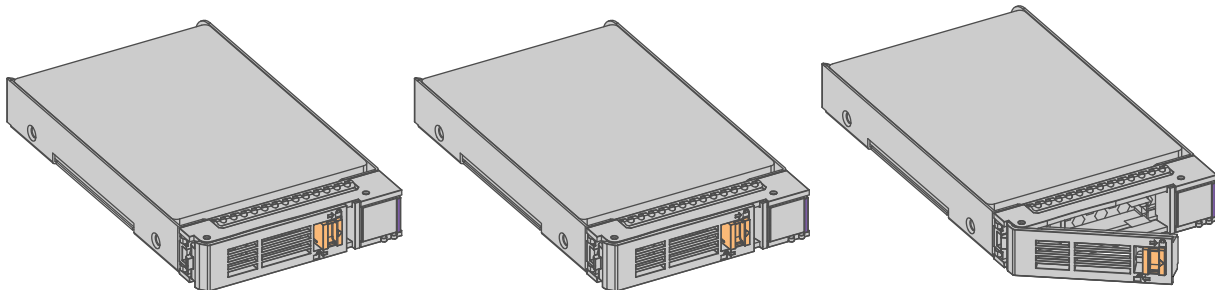


Image 13-8



CAUTION: A RAID 5 configuration with three HDDs allows a maximum loss of one disk. With the simultaneous loss of more than one HDDs, data is lost and the RAID must be completely initialized again after replacement of the defect HDDs with new HDDs!

About degraded mode

When a RAID array experiences the failure of one disk, it enters in degraded mode. Content storage and playback remains available on the ICMP-X.



CAUTION: The loss of one disk causes no serious consequences on the ICMP-X. But action must be taken quickly because the loss of a second disk will make the RAID system broken. The main cause of the total loss of RAID is due in most cases to the loss of the second disk while the first has not been rebuilt!



A failed drive should be replaced as soon as possible.

About “RAID recovery” process

The restoration from degraded to normal condition of the RAID 5 system is done automatically. When the RAID controller detects a new HDD to replace the failed disk the recovery procedure starts automatically.



CAUTION: The automatic process does not work if more than one disk is lost. In that case the RAID must be completely initialized again!

About RAID broken

When more than one HDD is out of order, the RAID is considered as 'broken' and the content is lost. The failed HDDs must be changed and a new RAID must be created.

Exchange or re-use of a disk set

It's possible to have several sets of disks with one ICMP or to reuse a complete set of disks coming from another projector with ICMP.

How to exchange:

- **Exchange of HDD set between two ICMP-Xs with the same storage controller:**
It is sufficient to insert the three HDDs, from a valid RAID array, and let the system explore the new RAID. The mounting order of the HDDs and the HDD slots do not matter. Of course, when using HDDs from another ICMP-X it is necessary to retrieve from the content distributor the KDMs corresponding to the content and the new ICMP-X.
- **Exchange of HDD set between two ICMP-Xs with a different storage controller:**

After inserting the three HDDs it is necessary to perform a manual RAID initialization with (Web) Communicator, the Barco projectors configuration software. The *RAID initialization* command (e.g. in Web Communicator: *Maintenance > Raid Storage*) erases any data present on the HDDs and the old content will be lost. This will only take a short while and after this process, the projector will reboot. You can start immediately after booting with the ingest of your content.



The problem of non-compatibility between the two generations of storage controllers is also encountered when installing a new set of hard drives on an ICMP-X. The HDD spare part kits provided by Barco are configured by default to work with a GEN1 storage controller and it is necessary to perform a manual RAID initialization when they are deployed on a GEN2 storage controller.



Label the HDDs with the initialization type (GEN1 or GEN2) to make it visible for which type of storage controller the disks can be used without requiring a re-initialization and lost of content

HDD storage capacity

Make sure that all HDDs in the ICMP-X HDD set have the same storage capacity. See label on top of the HDD to know the storage capacity.

HDD storage

The maximum recommended storage period for the drive in a non-operational environment is 90 days. Drives should be stored in the original unopened shipping packaging whenever possible. Once the drive is removed from the original packaging the recommended maximum period between drive operation cycles is 30 days. During any storage period the drive non-operational temperature, humidity, wet bulb, atmospheric conditions, shock, vibration, magnetic and electrical field specifications should be followed.

HDD models validated by Barco

Only the original HDD spare parts provided by Barco or models validated by Barco (see list 4 below) can be used in the ICMP-X. All deviations from this rule void warranty.

HDD model	ICMP-X	ICMP
1TB: HGST – Western Digital (order code: HCC541010A9E630 or HCC541010B9E660)	Yes	Yes
1TB: Western Digital black drives (order code: WD10JQLX-22JFGT0)	Yes	Yes
1TB: Seagate (order code : ST1000NX0313)	Yes	Yes
2TB: Seagate (order code : ST2000NX0253)	Yes	Yes
4TB: Seagate SSD (order code: XA3840ME10063)	Yes	Yes, only if the GEN1 storage controller is replaced by a GEN2 storage controller. Software version 1.4.2 or higher is needed.
3.84TB: Intel D3-S4610, SSD SATA 2.5 (order code: SSDSC2KG038T801)	Yes	Yes, only if the GEN1 storage controller is replaced by a GEN2 storage controller. Software version 1.4.2 or higher is needed.

4. This list only takes into account supported HDD models validated by Barco at the moment this manual was published. The most update list is available in the installation manual of the ICMP-X

13.6 ICMP-X communication and input ports

Location of the ports

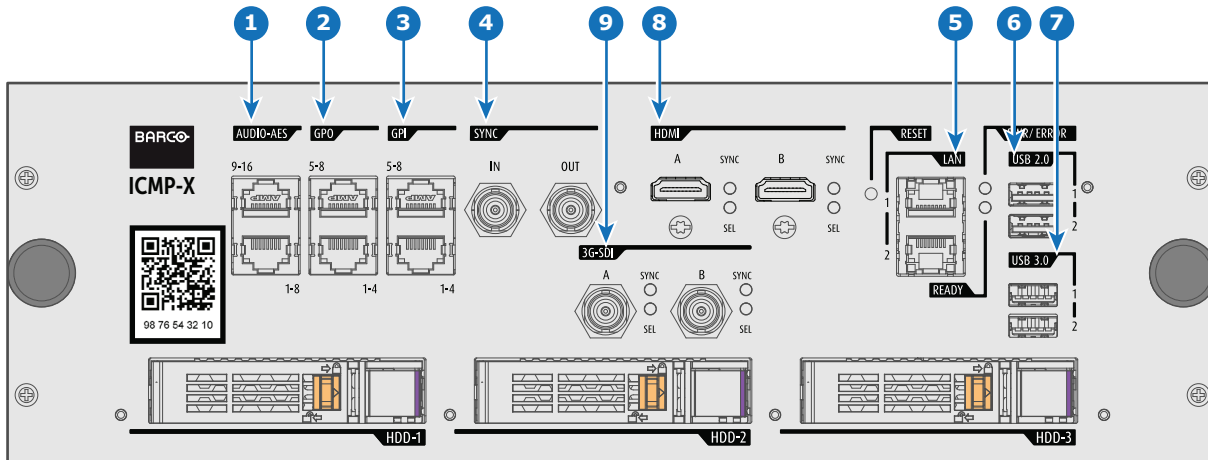


Image 13-9

Functionality

1 AUDIO-AES 1-8 & 9-16

ICMP-X outputs sixteen audio signals equitably distributed over these two RJ45 connectors, which can be configured independently. The mapping of audio channels (content) on each audio output (AES outputs of the ICMP-X) is performed by configuring the ICMP-X via the Web Communicator software. Please refer to the Web Communicator user guide for further information.

2 GPO 1-4 & 5-8

These RJ45 connectors can be used to send trigger signals to other devices. The mapping of user Cues (output Cues) on each General Purpose Output (GPO) is configured via the Web Communicator software. Please refer to the Web Communicator user guide for further information.

3 GPI 1-4 & 5-8

These RJ45 connectors can be used to receive trigger signals from other devices. The mapping of the General Purpose Input cues (GPI) on each input cue is configured via the Web Communicator software. Please refer to the Web Communicator user guide for further information.

4 SYNC IN / OUT

Synchronization signal IN and OUT: Reserved for multiple-projector projection. Use a coaxial cable of 50Ω to connect the sync signal from projector to projector.

5 LAN (2 ports)

The ICMP-X can be connected to a LAN (local area network) using one of the Ethernet ports. These LAN port are used for content transfer.

NOTE: It is strongly recommended to use a dedicated Data network connected to the ICMP-X LAN to optimize the data transfer. Using the projector LAN (Cinema controller Board - CCB) in order transfer a large amount of data significantly increases the transfer times (x 20). Furthermore, response times between devices connected to this network will be greatly expanded during these data transfers.

6 USB 2.0 (2 ports)

The ICMP-X can be connected to a USB 2.0 media device to load content. The USB port can be used to load content (DCP) or keys (KDM).

NOTE: It is recommended to use the USB 3.0 ports for faster ingest. In addition, USB 3.0 ports supply more power than USB 2.0 ports to an external device when, for example, the content is ingested from devices that do not have their own power supply.

7 USB 3.0 (2 ports)

The ICMP-X can be connected to a USB 3.0 media device to load content. The USB port can be used to load content (DCP), keys (KDM) or software updates.

TIP: USB 3.0 ports are recommended for fast ingest when connected to an appropriate USB 3.0 source. In addition, USB 3.0 ports supply more power than USB 2.0 ports to an external device when, for example, the content is ingested from devices that do not have their own power supply.

8 HDMI A / B

HDMI 2.0 connector to connect a video source.

9 3G-SDI A / B

SDI connector to connect a video source.

13.7 Switched Mode Power Supply

SMPS overview

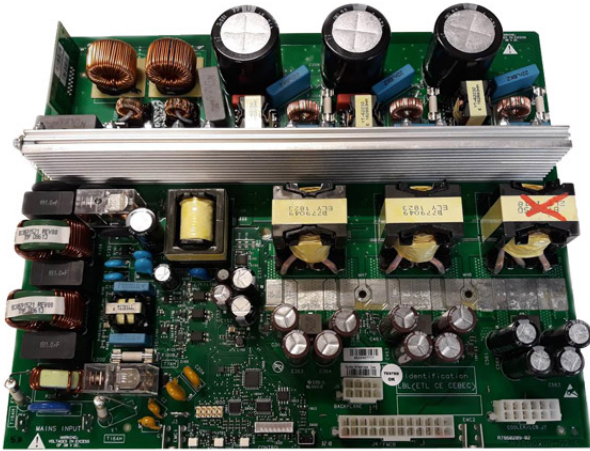


Image 13–10 SMPS

Status LEDs

Note that the user input cover must be removed to see the status LEDs.

Nr	LED	Meaning
1	+12 V	Indicates that the supply voltage of +12 V is present for the electronics.
2	+ VTEC	Indicates that the voltage to drive the Peltier elements (TEC), which are mounted on the Light Processor unit, is present.
3	+24 V	Indicates that the supply voltage +24 V is present.

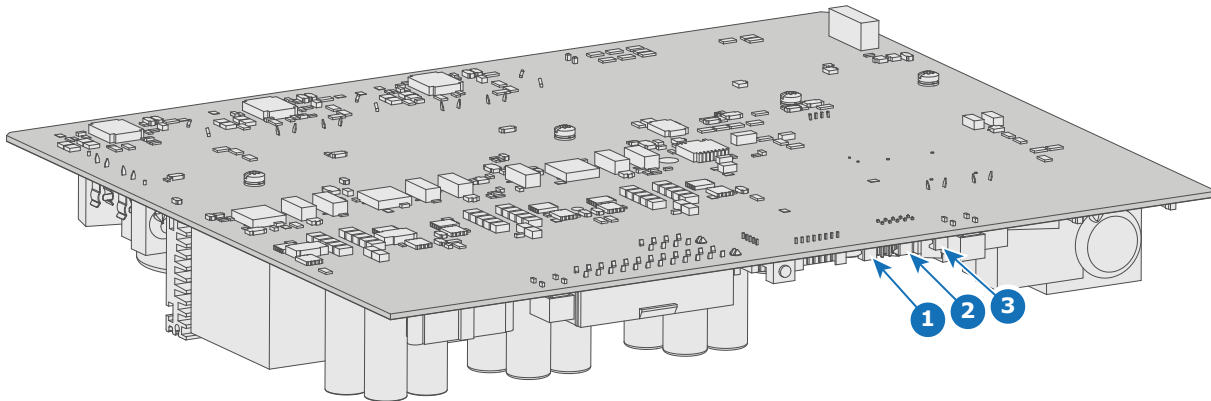


Image 13–11 Location of the status LEDs

13.8 Replacement of the cinema controller board

Required tools

- Phillips screwdriver PH1
- Torx screwdriver TX10

How to replace the cinema controller?

1. Loosen the two fixation screws (reference 1).
2. Take the board by both handles and pull it out.

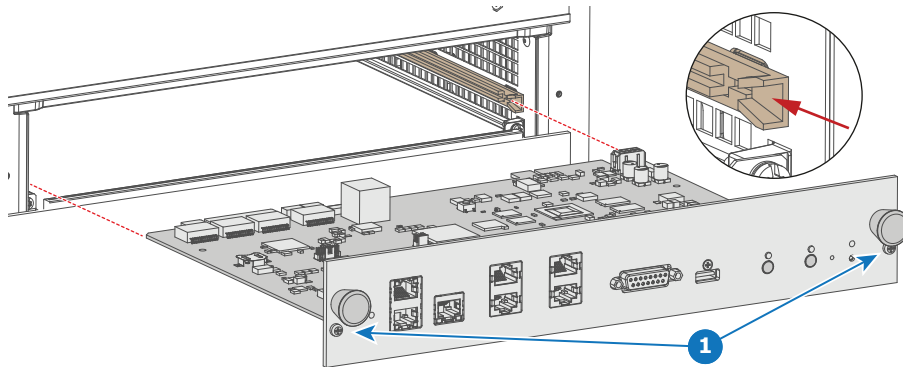


Image 13-12

3. Slide in the new board using the grooves.
4. Push on both handles until the board is fully inserted and the connection is made with the back plane.
5. Secure the board by turning in both fixation screws.
6. Once you have restarted the projector, Web Communicator will prompt you with the request to restore the internal backup. Choose "Restore all data" and click apply.
 - Note: While other options are available, the "restore all data" option is recommended. Only choose other options in situations specifically requested by Barco support.
Until a backup is restored, you will not be able to use the LCD touch screen (if available).
7. Perform a software update, to make sure the Cinema Controller is updated to the latest version. For more information, see ["Software update", page 22](#).

13.9 Battery replacement on the cinema controller board

How to notice an empty battery

There is no error notification in Web Communicator when the battery is almost empty. Only when opening the error logging after powering on the projector, you will see that some time stamps in the beginning of the list are missing or that these time stamps are still old timings. That is due to an empty battery on the Cinema Controller Board.



There is no battery kit available. The customer has to buy a new battery himself.
Battery type used : CR1220 (3V, 0.03AH, Li)

Required parts

Battery CR1220

How to replace

1. Remove the cinema controller from the projector. For more info, see [“Replacement of the cinema controller board”, page 242.](#)
2. Pull out the empty battery and insert a new CR1220 battery with the flat side of the battery facing the top.



Note: No battery kit available as spare part. Buy a new one in a dedicated shop.

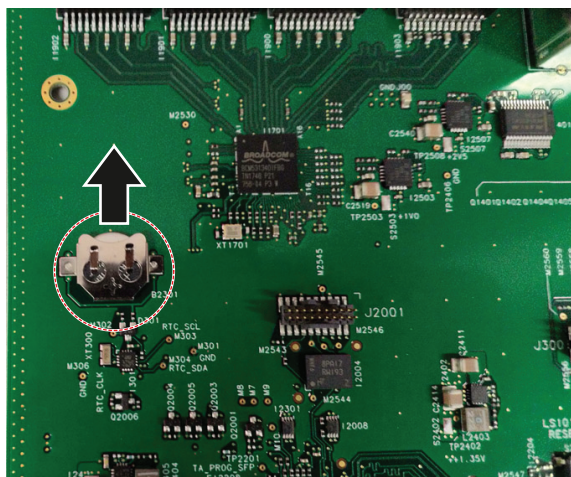


Image 13–13 Location of the battery on the Cinema Controller

3. Mount the cinema controller back into the projector. For more info, see [“Replacement of the cinema controller board”, page 242.](#)

13.10 Replacement of the projector ID card



This procedure assumes the Cinema Controller has been removed from the card cage. For more info, see [“Cinema controller of the projector”, page 231](#)



While it is technically possible to replace the projector ID card with only the Cinema Controller removed, it is more practical to replace the card when the Signal backplane has been removed. For more info, see [“Replacement process of the signal backplane”, page 261](#).

How to replace the projector ID card

1. Locate the projector ID card on the signal backplane.

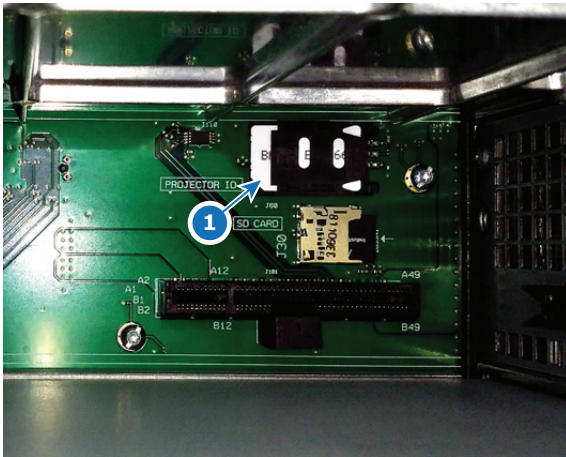


Image 13-14 Location of the ID card on the signal backplane

2. Remove the old Projector ID Card as follows:
 - Push (1) the card holder a few millimeters to the left until the lock opens.
 - Turn it over (2) and slide out (3) the Projector ID Card.

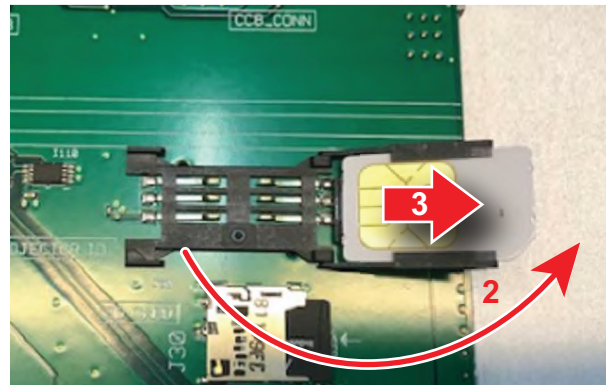


Image 13-15 Removing the projector ID card

3. Insert the new Projector ID Card as follows:
 - Insert the new Projector ID Card with the chip upwards (1) the card holder a few millimeters to the left until the lock opens.
 - Turn the holder back (2), push it a little bit down while sliding it to the right until it locks (3).

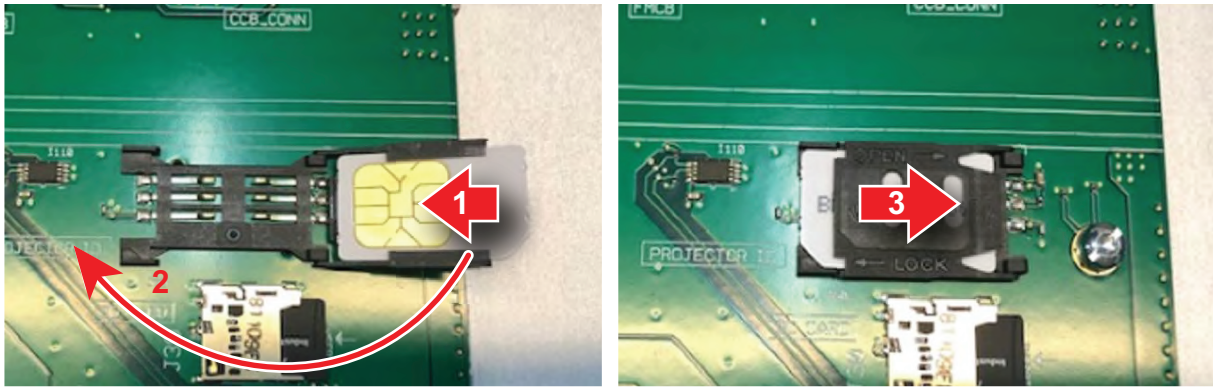


Image 13-16 Inserting the ID card

13.11 Replacement of the Switched Mode Power Supply (SMPS)



WARNING: Disconnect the power cord of the projector from the power net and wait 4 hours prior to starting this procedure (to discharge the capacitors). This wait time is necessary due to slow discharge speed of the capacitors.

Tip: Unplug the projector in the evening and keep it untouched until the next morning. This so you can immediately start the replacement procedure in the morning without any risk of any electrical discharges.

Required tools

Torx screwdriver T10

How to replace

1. Remove the User input cover.
2. Remove the SMPS cover. Use a T10 Torx screwdriver to loosen the four screws.

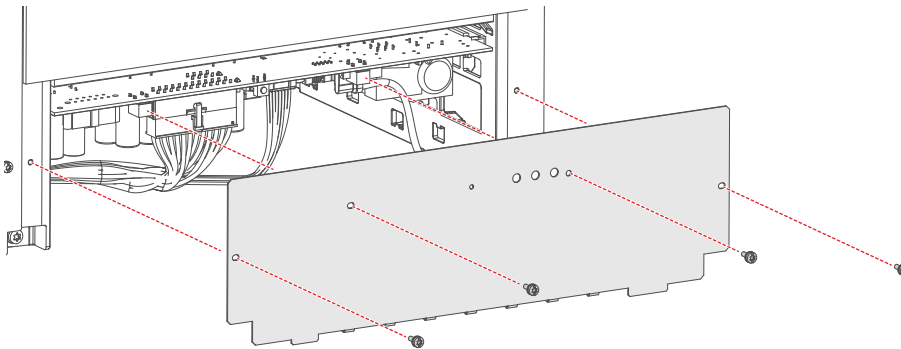


Image 13–17 Removing the screws of the SMPS cover

3. Disconnect all wiring to the SMPS.
4. Carefully slide out the SMPS by grabbing the large Power out connector on the left-hand side (reference 2, [Image 13–19](#)). Slide the SMPS outward in a straight line to avoid it from tipping over.
5. Mount the new SMPS board as illustrated. Slide in the new board using the grooves.

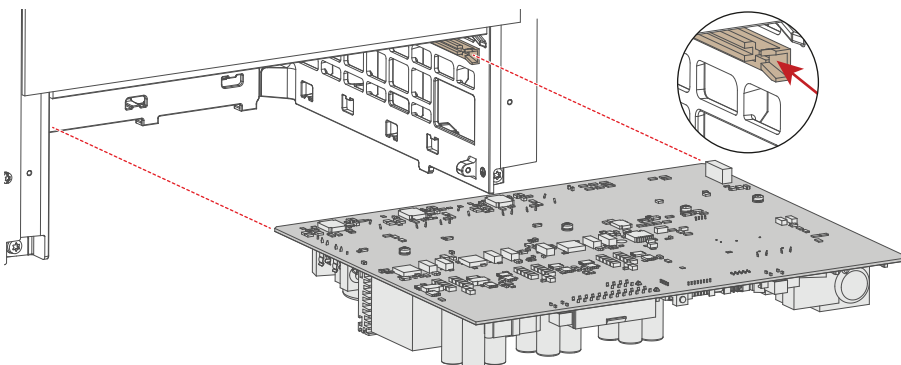


Image 13–18 Replacing the SMPS board

6. Reconnect all wiring to the SMPS board.

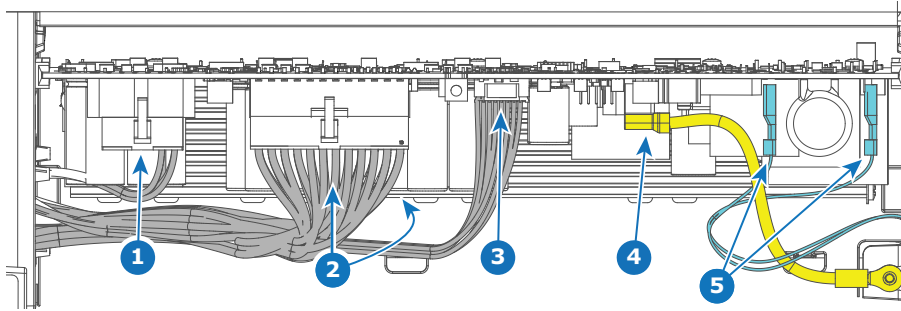


Image 13–19 SMPS wiring

- | | |
|---------------------------------------|----------------------|
| 1 Projector cooling | 4 Ground wire |
| 2 Power out connectors 1 and 2 | 5 Mains input |
| 3 Projector control | |

- 7.** Mount the cover plate. Use a T10 Torx screwdriver to drive in the four screws.

13.12 Replacement of the ICMP-X board

Required tools

- Phillips screwdriver PH1
- Torx screwdriver T10

How to replace the ICMP board?

1. Remove the User input cover.
2. Use a screwdriver⁵ to loose the four retaining screws of the ICMP-X (references 1 to 4 [Image 13–20](#)).
3. Carefully pull the ICMP-X board out of its compartment.
4. Gently insert the new ICMP-X board into the compartment, making sure that the board enters the plastic guides on the side as illustrated in the detail view. Push the board in completely.
5. Use a screwdriver⁵ to drive in the four retaining screws (reference 1 to 4 [Image 13–20](#)).

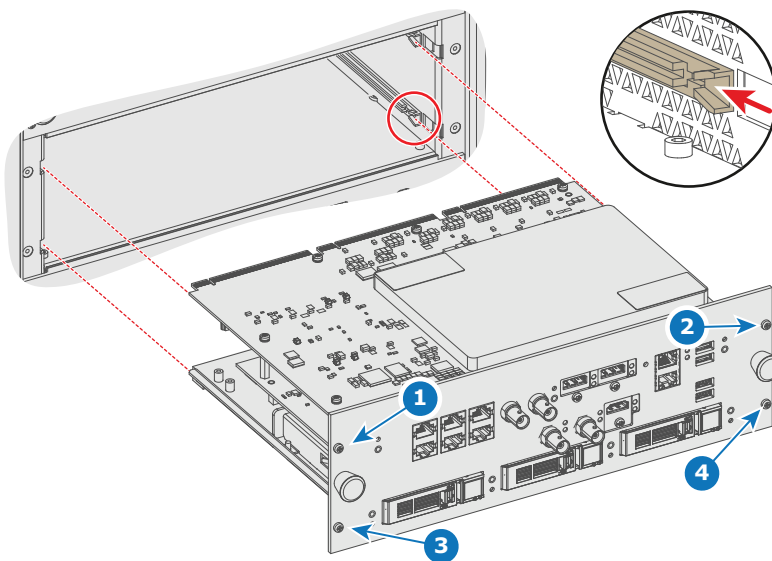


Image 13–20 Replacing the ICMP-X



Note: In order to distribute the tightening forces, please take care to follow a cross coupling when screwing: first screw in the upper left screw (ref 1) and the lower right screw (ref 4), then screw in the upper right screw (ref 2) and the lower left screw (ref 3).

5. By default a Torx screwdriver must be used, but there are still devices with older pattern screws that require the use of a Phillips screwdriver.

13.13 Removing a HDD from the ICMP-X



In case the ICMP-X has to be returned to factory (e.g. for repair) the non defective HDDs should be removed and kept.

How to remove a HDD ?

1. Switch off the projector.
2. Moving the latch towards the left.

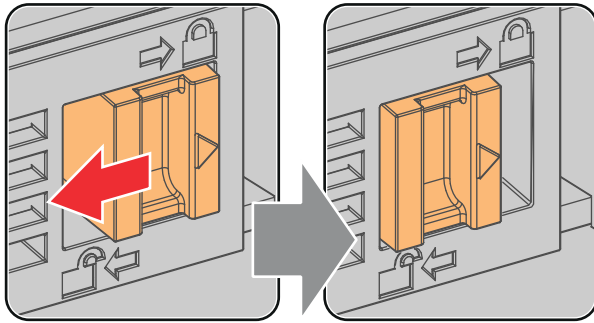


Image 13-21

3. Push the unlock button to open the handle.

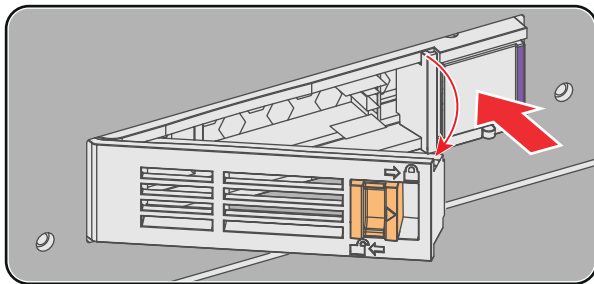


Image 13-22

4. Pull the HDD out of its slot.

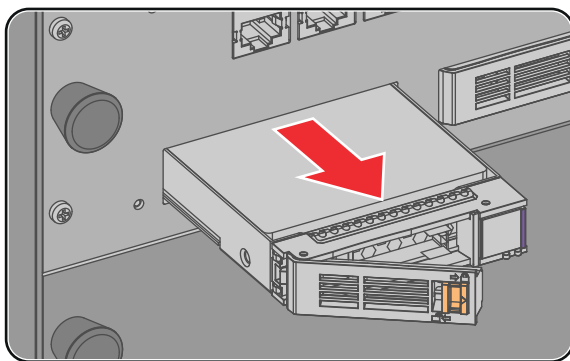


Image 13-23



To install an HDD, see the following procedure: [“Installing a HDD into the ICMP-X”, page 250.](#)

13.14 Installing a HDD into the ICMP-X



This procedure assumes that the HDD slot of the ICMP-X is empty. If not, see procedure [“Removing a HDD from the ICMP-X”, page 249](#).



CAUTION: Always use a new empty spare part HDD approved by Barco to replace a malfunction HDD. Do not use a HDD from another ICMP-X HDD set.



CAUTION: Always make sure that all HDDs in the ICMP-X HDD set have the same storage capacity. See label on top of the HDD to know the storage capacity.

Re-initialization or rebuild of RAID

Installing or exchange one or several HDDs into ICMP-X has an impact on data presents on the already inserted drives. RAID integrity depends on the type of HDD swap. Refer to the chapter [“What are the possible HDD swaps”, page 252](#).

How to install a HDD ?

1. Ensure that the projector is switched off.
2. Prepare the HDD for insertion by moving the latch towards the left and push the unlock button to open the handle.

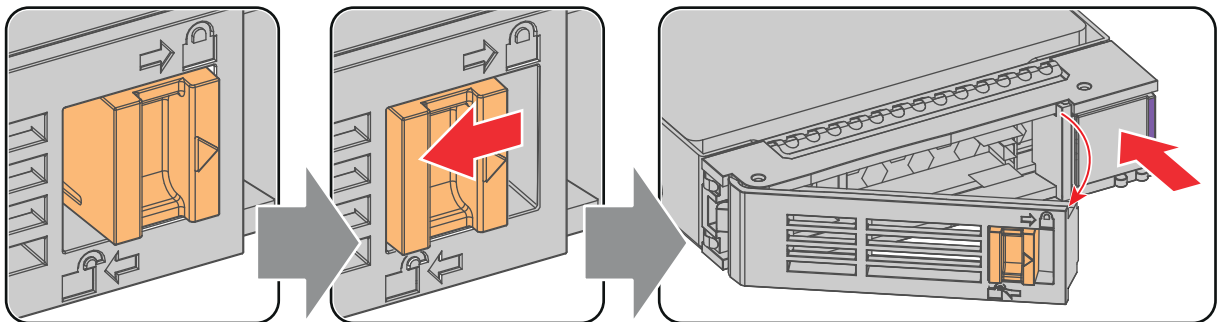


Image 13-24

3. Insert the HDD into the HDD slot. Ensure that the handle is sufficiently open so that the hook (reference 1) of the handle can pass the front plate of the ICMP-X.

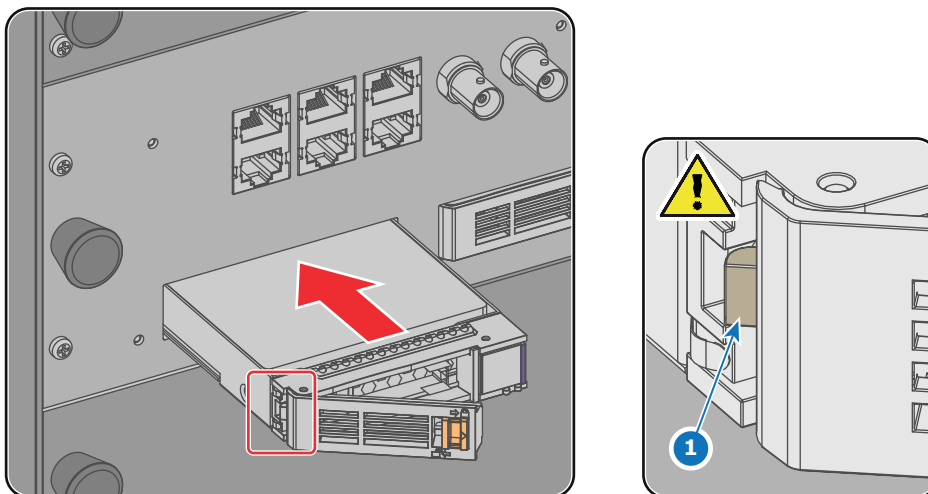


Image 13-25

4. Push the HDD completely and firmly inside its slot, close the handle, and move the latch towards the right.

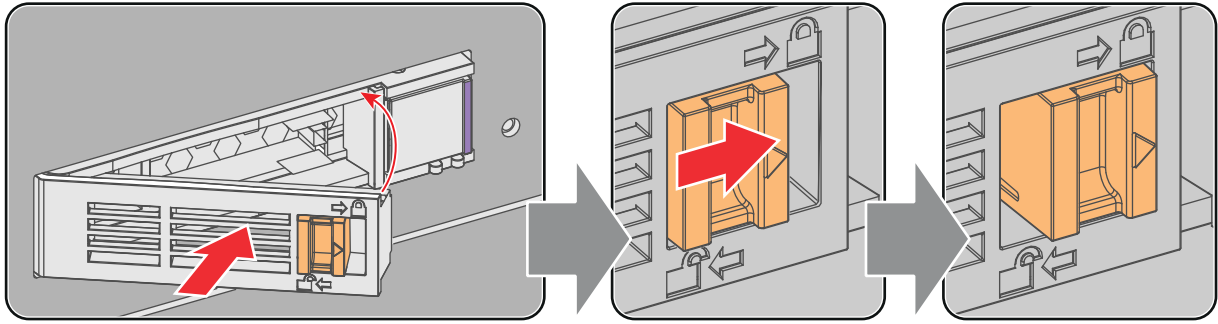


Image 13-26

5. Switch on the projector.



In case you replace one HDD (e.g. degraded mode) the ICMP-X automatically starts with the RAID recovery process. The red LED of the HDD which has to be rebuilt is blinking. This process takes about 200 GB per hour. Once the RAID is completed the red LED turns off.



CAUTION: It's strongly recommended to complete the RAID recovery process prior to starting a show. This to ensure that the content integrity is preserved and that the show is not interrupted.

13.15 What are the possible HDD swaps

General

There are several possible scenarios for replacing (exchange) hard drives on the ICMP-X. The situation is different depending on the device type (ICMP or ICMP-X) and whether to replace one or more disks.

Continuity of data present on the disks is also impacted depending on the type of exchange. Degraded operation or RAID initialization may be required.

List of available actions

The following table exposes all possible swaps available concerning HDDs on ICMP-X:



Replacing drives should always be done while the power is off.

Type of HDD swap	On ICMP	On ICMP-X
1 HDD replaced.	<ul style="list-style-type: none"> Content is preserved. ICMP automatically starts rebuild. Process takes about 3-4 hours for 1TB HDD and could takes about 13-14 hours for 4TB HDD. 	<ul style="list-style-type: none"> Content is preserved. ICMP-X automatically starts rebuild. Process takes about 3-4 hours for 1TB HDD and could takes about 13-14 hours for 4TB HDD.
3 HDDs replaced separately (previous kit of one disk used three times).	<ul style="list-style-type: none"> All content will be lost. RAID initialization need to be perform with Communicator. immediately usable after RAID initialization + restart (content can be ingested). 	<ul style="list-style-type: none"> All content will be lost. RAID initialization need to be perform with Web Communicator. immediately usable after RAID initialization + restart (content can be ingested).
Barco HDD replacement kit without S4 ready sticker (Spare part kit provided by Barco with a set of 3 hard disks configured to GEN1 storage controller).	<p>On an ICMP with GEN1 storage Controller:</p> <ul style="list-style-type: none"> RAID initialization does not need to be performed. Content can be ingested immediately. <p>On an ICMP with GEN2 storage Controller:</p> <ul style="list-style-type: none"> Only usable after RAID initialization + restart. Content can be ingested immediately after restart. 	<ul style="list-style-type: none"> RAID initialization needs to be perform with Web Communicator. immediately usable after RAID initialization + restart (content can be ingested).
Barco HDD replacement kit with S4 ready sticker (New Spare part kit provided by Barco with a set of 3 hard disks configured to GEN2 storage controller).	<p>On an ICMP with GEN1 storage Controller:</p> <ul style="list-style-type: none"> Only usable after RAID initialization with Communicator + restart (content can then be ingested immediately). <p>On an ICMP with GEN2 storage Controller:</p> <ul style="list-style-type: none"> RAID initialization does not need to be performed. Content can be ingested immediately after restart. 	<ul style="list-style-type: none"> RAID initialization does not need to be performed. Content can be ingested immediately.

Type of HDD swap	On ICMP	On ICMP-X
Set of 3 HDDs with content reused from an ICMP with GEN1 storage controller.	<p>On an ICMP with GEN1 storage controller:</p> <ul style="list-style-type: none"> Content is preserved but certificates (KDM) need to be re-ingested. <p>On an ICMP with GEN2 storage controller:</p> <ul style="list-style-type: none"> All content will be lost. Only usable after RAID initialization + restart (content can then be ingested immediately). 	<ul style="list-style-type: none"> All content will be lost. Only usable after RAID initialization + restart (content can then be ingested immediately).
Set of 3 HDDs with content reused from an ICMP-X.	<ol style="list-style-type: none"> Unit is equipped with an GEN1 storage controller (default configuration): <ul style="list-style-type: none"> All content will be lost. RAID initialization needs to be performed with Communicator. Unit has been upgraded with a GEN2 storage controller (+ ICMP software 1.4.2 or higher is installed): <ul style="list-style-type: none"> Content is preserved but certificates (KDM) need to be re-ingested. 	<ul style="list-style-type: none"> Content is preserved but certificates (KDM) need to be re-ingested.

13.16 Replacement of the Touch display



This procedure can be used to both replace an existing Touch display, as well as upgrading a front plate without touch display to a plate with touch display.

Required tools

Torx screwdriver T10

How to replace

1. Remove the User input cover.
2. Remove the four screws of the touch display cover plate. Use a T10 Torx screwdriver.

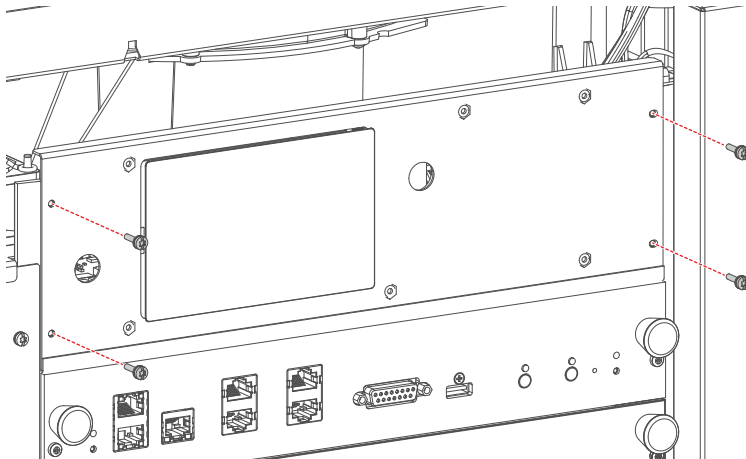


Image 13-27 Removing the cover plate screws

3. Flip over the cover so that the wiring becomes visible.

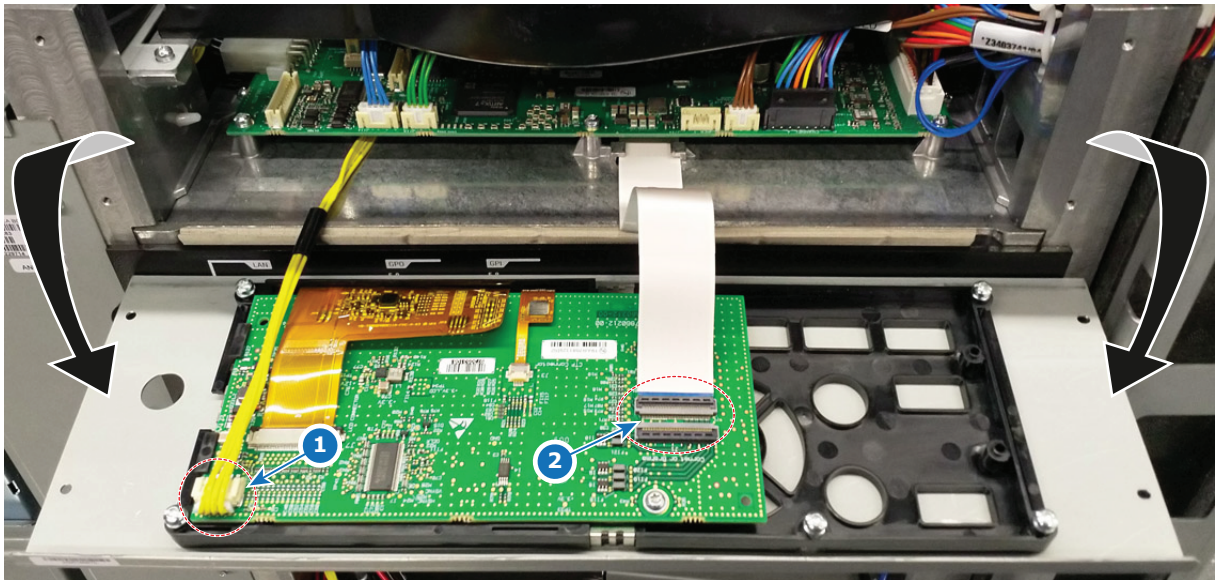


Image 13-28 Flipping over the touch display front plate.

4. Remove the two connectors (references 1 and 2).
5. Replace the cover with touch display. Connect these two connectors on the new touch display on the same location.



Tip: The board mounted on the cover is included in the touch display kit. This does not need to be removed.

6. Flip up the cover and place it properly onto the card cage.

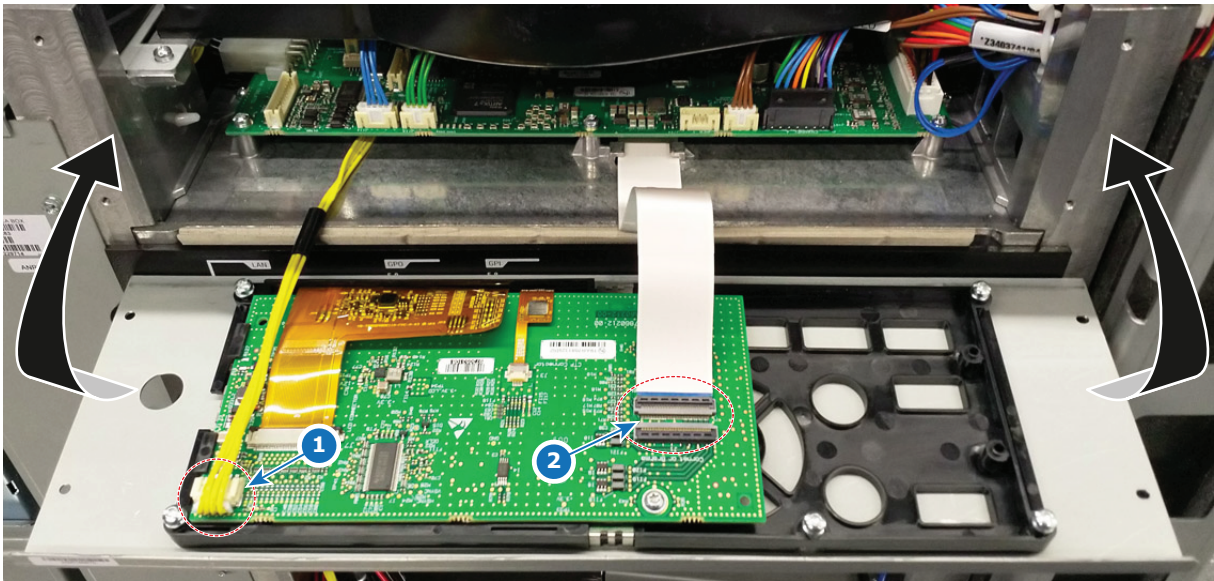



Image 13-29 Flipping up the touch display front plate.

7. Drive in the four screws to tighten the touch display onto the card cage. Use a T10 Torx screwdriver.

13.17 Replacement of the Fan and Motor Control Board (FMCB)

How to replace

1. Remove the Light processor fan. For more info, see [“Removing the light processor fan”](#), page 154.
2. Disconnect all connectors to the FMCB.
 **Tip:** If you are unfamiliar with the FMCB layout, take notes or pictures **before** removing all connectors. This will help you when reconnecting all wiring later in this procedure.
3. Loosen all 8 screws of the FMCB. Use a T10 Torx screwdriver.

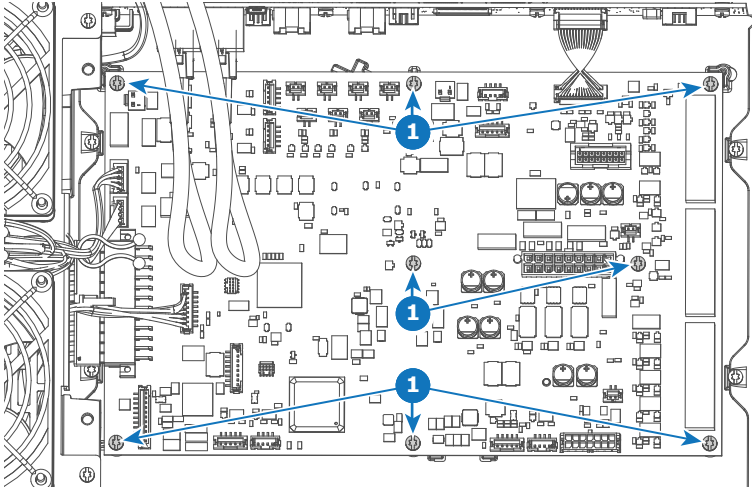


Image 13-30

4. Replace the Fan and motor control board as illustrated.

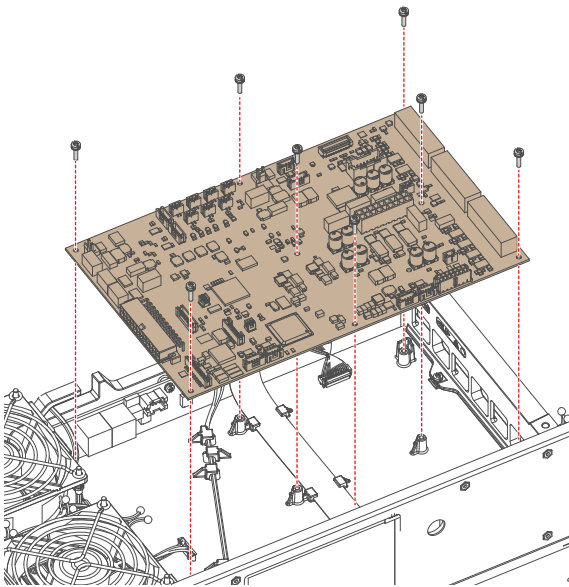


Image 13-31

5. Drive in the 8 screws. Use a T10 Torx screwdriver.
6. Reconnect all wiring.

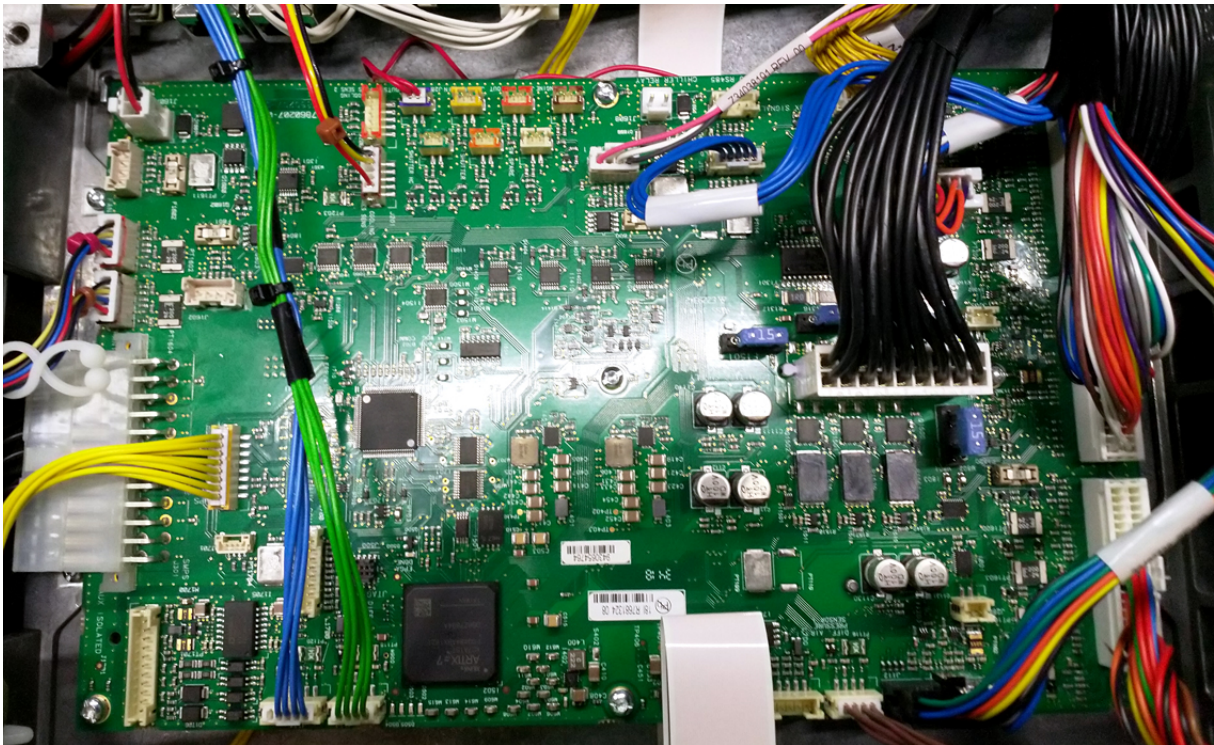


Image 13–32 Wiring of the FMCB

7. Mount the Light processor fan.

Wiring of the FMCB

The following is a table to help connect all wiring onto the FMCB after replacing the FMCB or the entire backplane. For easier spotting of the connectors, the table will split the FMCB in four quadrants:

- Upper left quadrant
- Upper right quadrant
- Lower left quadrant
- Lower right quadrant

Connector on FMCB	Location connector on FMCB ⁶	Wiring nr	Connected device
J104	Upper right quadrant	Z3403773	RGB sensor
J107	Lower right quadrant (lower edge)	Z3403738	Lens holder shutter
J108	Right side edge, in the middle	Z3403745	Lens holder motors
J109	Upper right quadrant	Z3403748	Lens holder sensors
J112	Lower right quadrant (lower edge)	Z3403767	Air filter sensor
J113	Lower left quadrant (lower edge)	Z3403784	Cooler module 1
J114	Lower left quadrant (lower edge)	Z3403785	Cooler module 2 (if applicable)
J200	Upper left quadrant	Z34038121	Pressure sensor cooling liquid
J209	Upper right quadrant (right edge)	Z3403758	Light processor Interconnection board (small connector)
J210	Right side, in the middle	Z3403759	Light processor Interconnection board (large connector)

6. From a point of view of the User Input side of the projector

Connector on FMCB	Location connector on FMCB ⁷	Wiring nr	Connected device
J287	Upper left quadrant (upper edge)	Z3403786	Air inlet sensor front
J300	Upper right quadrant (upper edge)	Z3403752	Card cage backplane
J301	Lower left quadrant (left edge)	Z3403754	SMPS (SMPS power)
J302	Lower left quadrant	Z3403772	SMPS (SMPS control)
J1600	Upper half, in the middle	Z34038191	Light Processor pump
J1601	Upper left quadrant (left edge)	N.A. (dedicated fan cable)	Card Cage fan (brown cable tie)
J1603	Upper left quadrant (left edge)	N.A. (dedicated fan cable)	Card Cage fan (red cable tie)
J1604	Upper left quadrant (left edge)	N.A. (dedicated fan cable)	Light Processor fan
J1605	Lower right quadrant (right edge)	Z3403741	Front radiator Fan assembly
J1607	Upper left quadrant (corner)	Z3403771	Mains board (LDM power relay)

7. From a point of view of the User Input side of the projector

13.18 Replacing a card cage fan

Required tools

- Torx screwdriver T10
- Side cutter

Required parts

- Colored cable tie (red or brown, depending on the replaced fan)
- Pull-through screws (4 pieces per fan)

How to replace

1. Remove the light processor fan. For more info, see [“Removing the light processor fan”, page 154.](#)



Tip: While you can technically remove the fan connectors without

2. Remove the fan assembly as illustrated. Use a T10 Torx screwdriver to release the 4 screws.

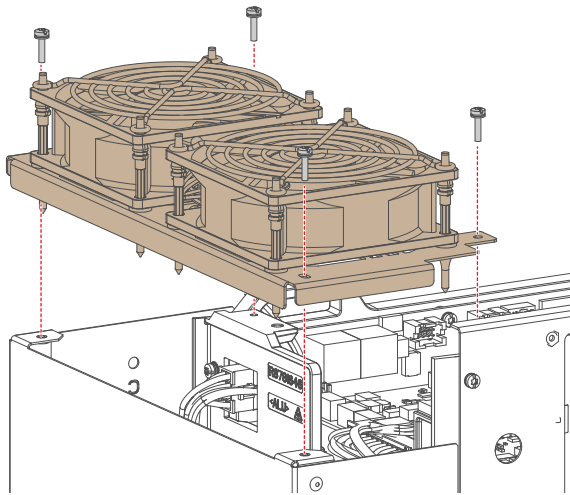


Image 13–33 Removing the fan assembly from the card cage

3. Replace the fan and grating from the assembly as illustrated. Make sure to add a colored cable tie on the wiring, similar to the replaced fan.

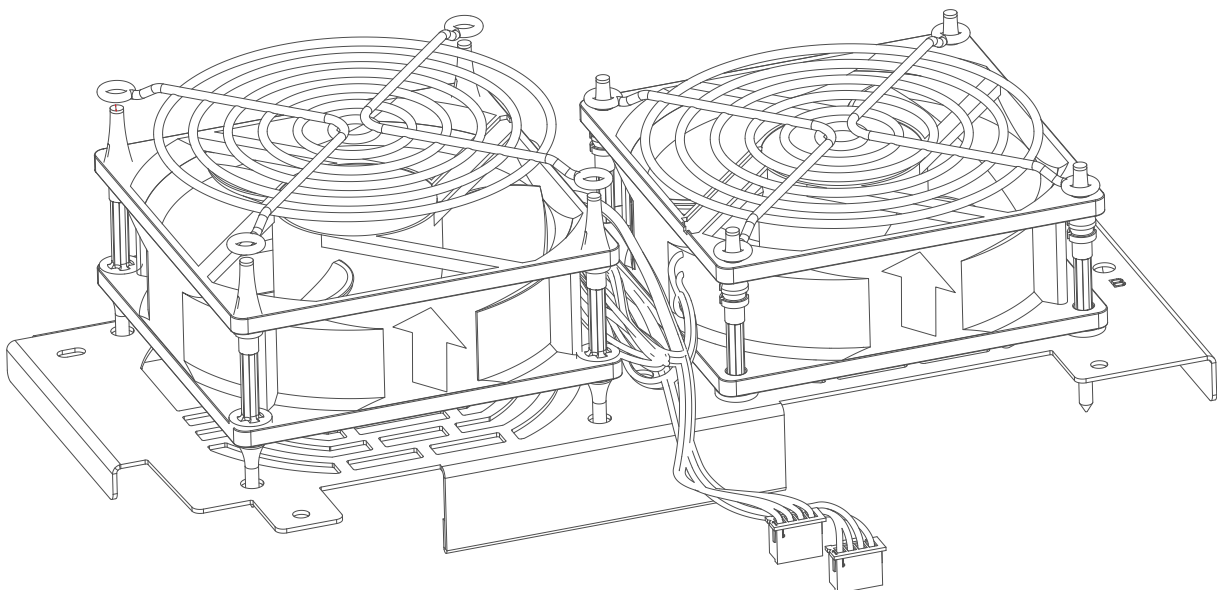



Image 13–34 Removing a fan from the fan assembly

 **Note:** Take into account the orientation of the fan. Also take into account the location of the wiring. Make sure the wiring is placed towards the center of the fan assembly.


 **Tip:** Place the new pull-through screws through the fan as illustrated.



Image 13-35

4. Cut off the top of the new pull-through screws.
5. Place the fan assembly back onto the card cage. Use a T10 Torx screwdriver to drive in the four screws.
6. Plug in the two fan connectors back onto the fan and motor control board in connectors J1601 (brown) and J1603 (red).
7. Place back the light processor fan.

13.19 Replacement process of the signal backplane



The process described below is a high level process for the replacement of the Signal Backplane. Most stages refer to a detailed step-by-step procedure included in this document.



WARNING: Disconnect the power cord of the projector from the power net and wait a few minutes (to discharge the capacitors) prior to starting this procedure.

Replacement process

1. Remove the top and front cover, as well as both side covers.
2. Open the sealed compartment. For more info, see [“Opening the sealed compartment”, page 148.](#)
3. Remove the light processor fan. For more info, see [“Removing the light processor fan”, page 154.](#)
4. Disconnect the FMCB wiring. For more info, see [“Replacement of the Fan and Motor Control Board \(FMCB\)”, page 256.](#)
5. Remove the touch panel assembly. For more info, see [“Replacement of the Touch display”, page 254.](#)
6. Remove the cinema controller. For more info, see [“Replacement of the cinema controller board”, page 242.](#)
7. Remove the ICMP-X. For more info, see [“Replacement of the ICMP-X board”, page 248.](#)
8. Prepare the backplane removal by removing all wiring and boards connected to it. For more info, see [“Preparing the backplane removal”, page 262.](#)
9. Remove the projector ID card. For more info on removing the ID card, see [“Replacement of the projector ID card”, page 244.](#)
10. Replace the backplane. For more info, see [“Replacing the backplane from the card cage”, page 264.](#)
11. Place the projector ID card into the new backplane.
12. Prepare the card cage for mounting the boards and wiring. For more info, see [“Preparing the card cage to mount back the boards”, page 266.](#)
13. Mount back the ICMP-X and Cinema Controller.
14. Mount back the touch panel assembly.
15. Mount back the FMCB wiring. For an overview of the correct FMCB wiring, see [“Replacement of the Fan and Motor Control Board \(FMCB\)”, page 256..](#)
16. Mount back the light processor fan.
17. Close the sealed compartment. For more info, see [“Closing the sealed compartment”, page 167.](#)
18. Mount back the covers of the projector.

13.20 Preparing the backplane removal

Required tools

Torx screwdriver T10

How to prepare the card cage for backplane replacement?

1. Disconnect the high-speed data cables that are connected to the backside of the backplane (in the sealed compartment).

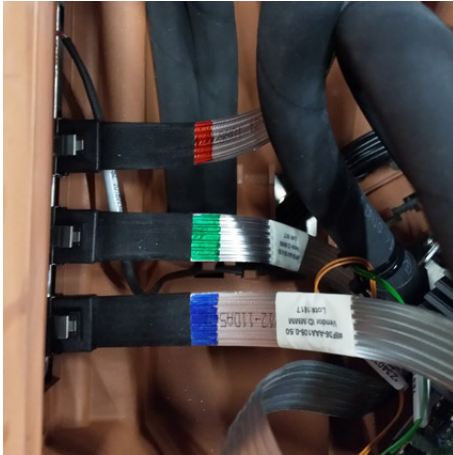


Image 13-36 Location of the high-speed cables

2. Disconnect all wiring still connected to the backplane (e.g. the wiring between backplane and FMCB).
3. Remove the four screws holding the FMCB partition plate onto the card cage. Use a T10 Torx screwdriver.

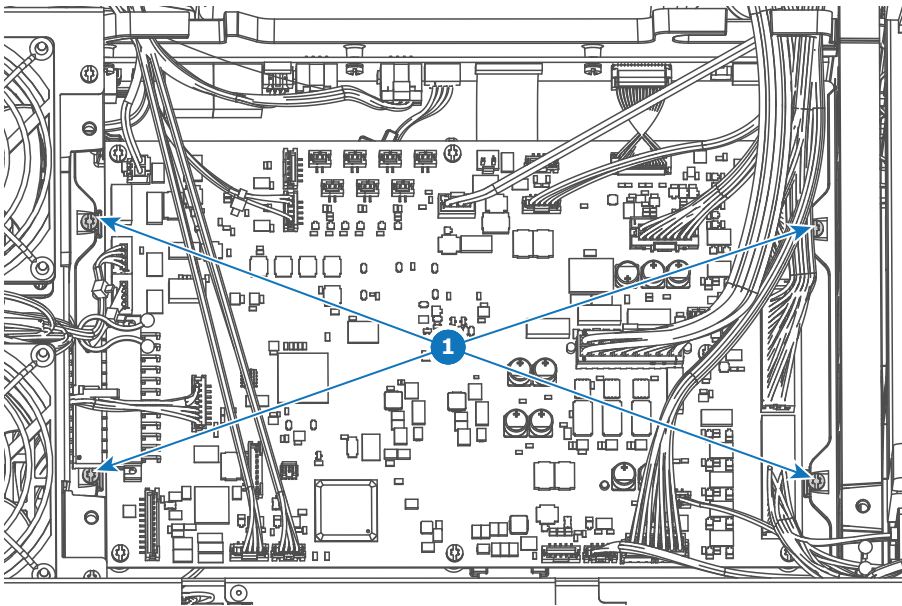


Image 13-37 Location of the 4 screws of the FMCB plate.

4. Slide out the FMCB plate (with the FMCB).

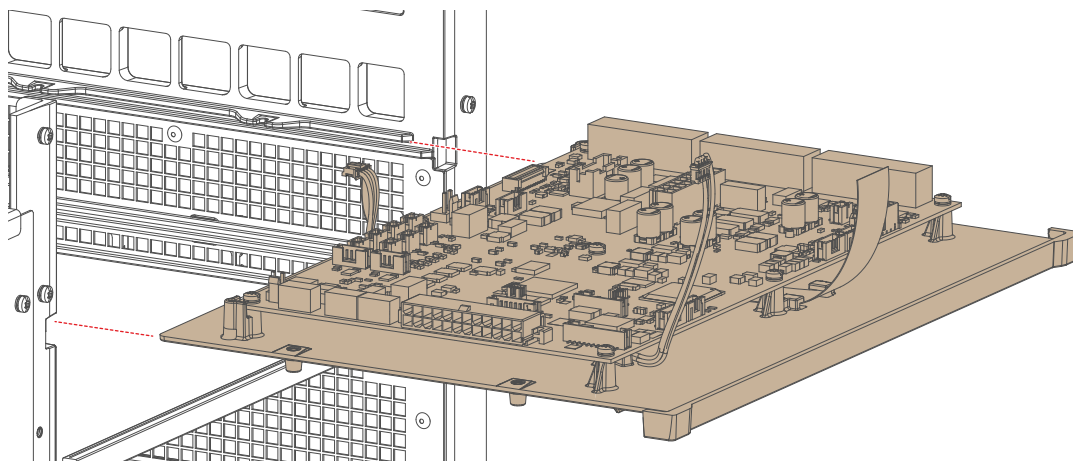


Image 13–38



Tip: It is not necessary to remove the FMCB from the plate it is mounted on. You can simply remove the plate with the FMCB.

5. Remove the partition plate from the card cage as illustrated. Use a T10 Torx screwdriver to remove the two screws.

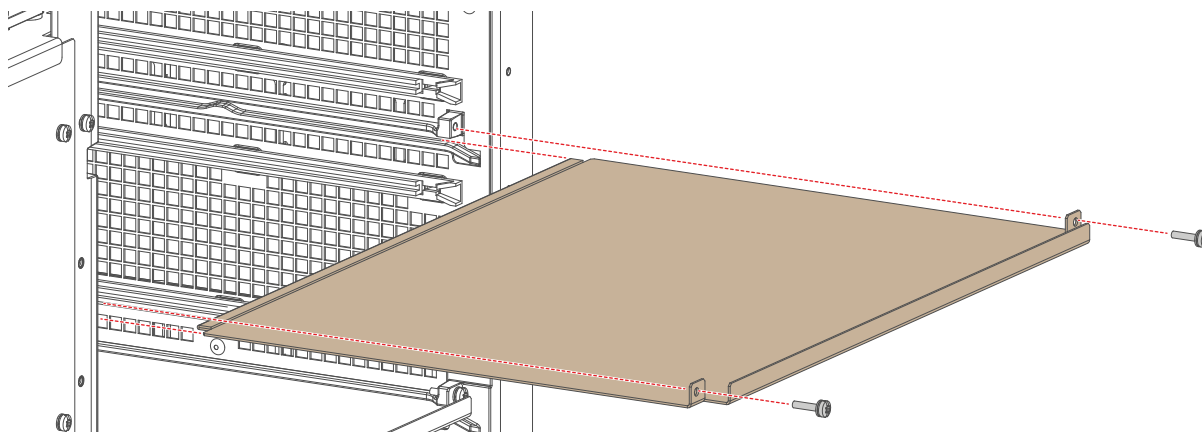


Image 13–39

6. Continue with the replacement process. For more info, refer to [“Replacement process of the signal backplane”](#), page 261.

13.21 Replacing the backplane from the card cage



CAUTION: This procedure assumes that you are following the backplane replacement process and all preparations for the replacement have been fulfilled. For more info, refer to “[Replacement process of the signal backplane](#)”, page 261.

Required tools

Torx screwdriver T10

How to replace

1. Spot and remove all 15 screws, holding the backplane to the card cage. Use a T10 Torx screwdriver to loosen the screws.

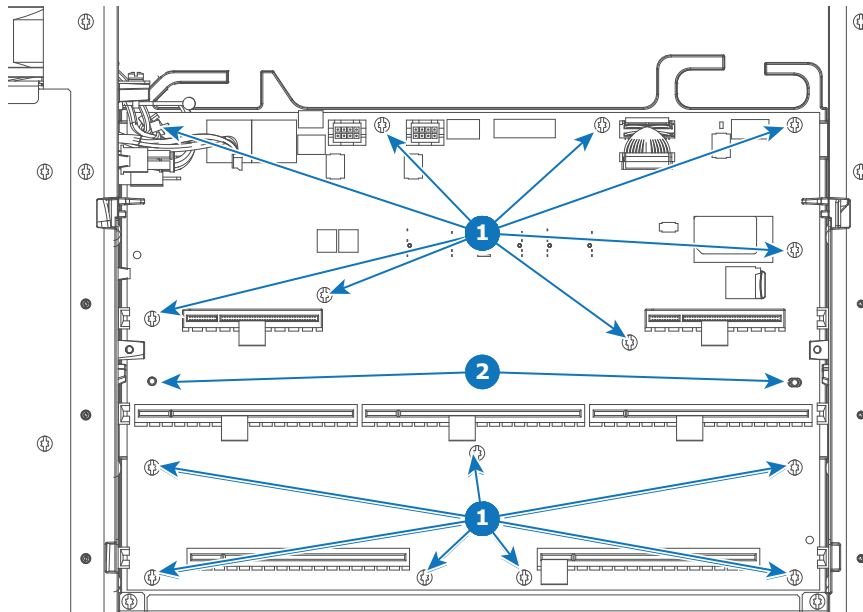


Image 13-40 Location of all backplane screws and position pins

- 1 Backplane screw
- 2 Card cage position pins

2. Remove the backplane as illustrated.

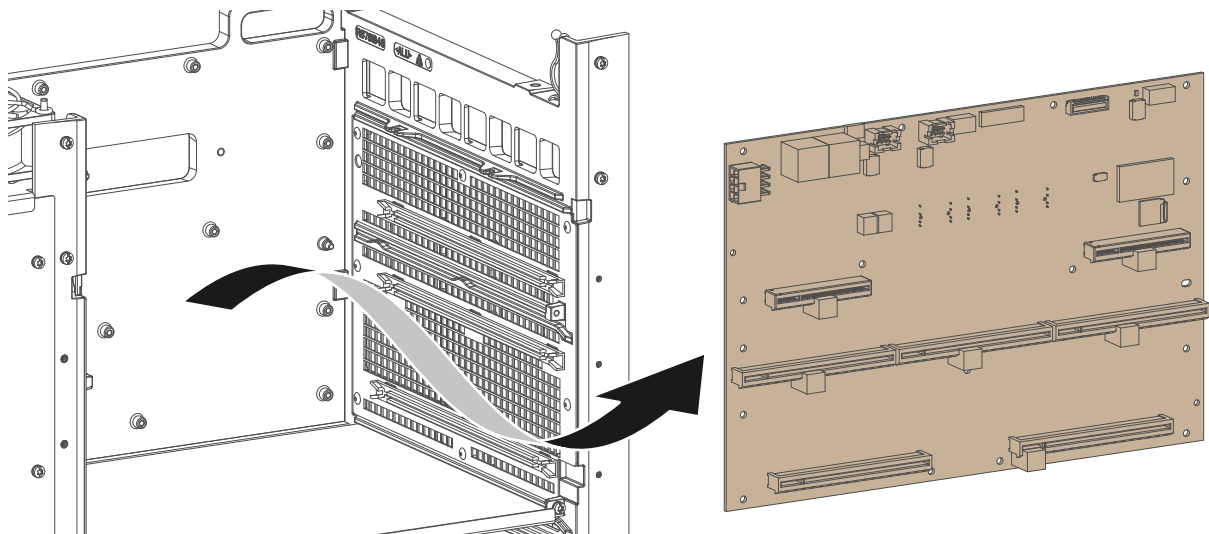


Image 13-41 Removing the backplane from the card cage



Tip: Tilt the board a little sideways when removing or mounting the backplane. Do this in order to avoid collision with the gliders on both sides of the card cage.

3. Mount the new backplane in a similar fashion. Use the position pins to hold the board in its place.

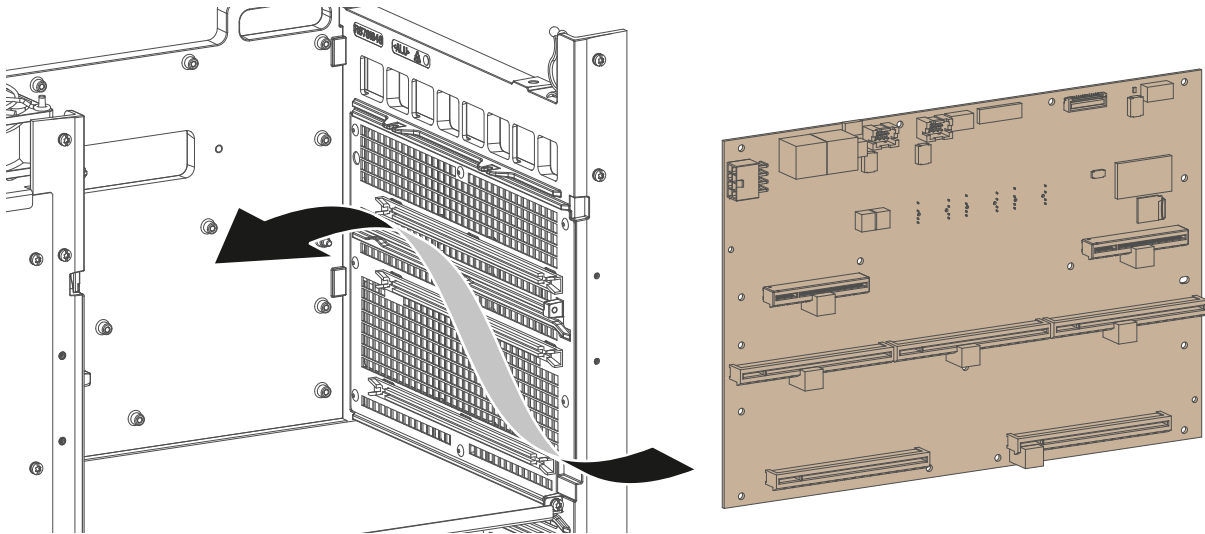


Image 13-42 Mounting the backplane into the card cage



Note: Take into account the orientation of the backplane and the location of the position pins on the (reference 2, [Image 13-40](#)).

4. Drive in all 15 screws into the backplane. Use a T10 Torx screwdriver to tighten all screws.
5. Continue with the replacement process. For more info, refer to [“Replacement process of the signal backplane”, page 261](#).

13.22 Preparing the card cage to mount back the boards



CAUTION: This procedure assumes that you are following the backplane replacement process and all preparations for the replacement have been fulfilled. For more info, refer to [“Replacement process of the signal backplane”, page 261](#).

Required tools

Torx screwdriver T10

How to proceed

1. Mount the partition plate in the card cage as illustrated. Use a T10 Torx screwdriver to drive in both screws.

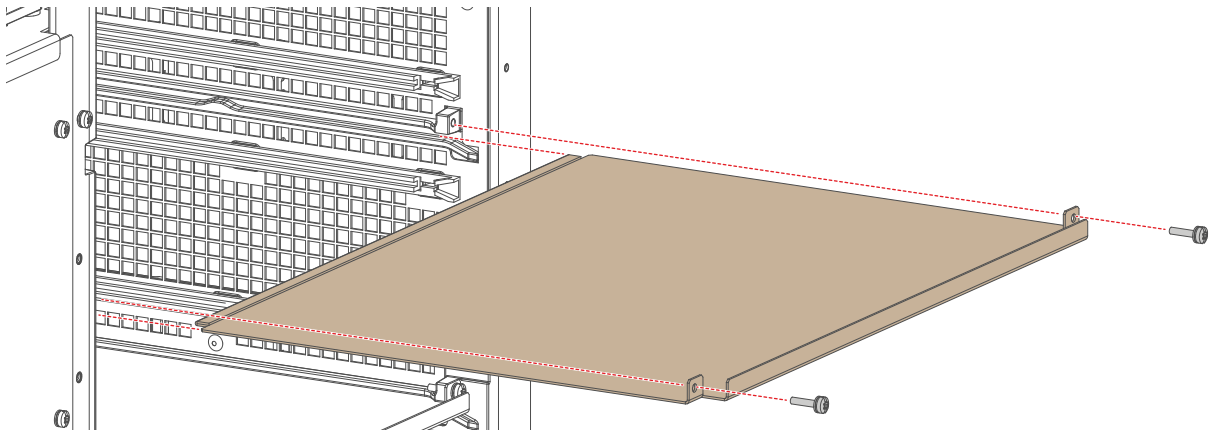


Image 13-43



Tip: Make sure to have mounted back the projector ID card before placing this partition plate. For more info, see [“Replacement of the projector ID card”, page 244](#).

2. Slide in the FMCB plate (with the FMCB).

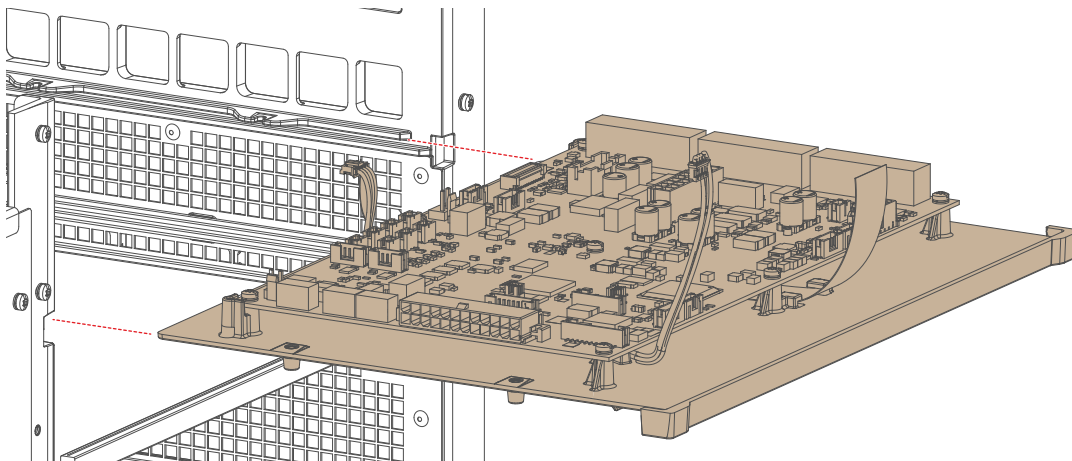


Image 13-44

3. Drive in the four screws holding the FMCB partition plate onto the card cage. Use a T10 Torx screwdriver.

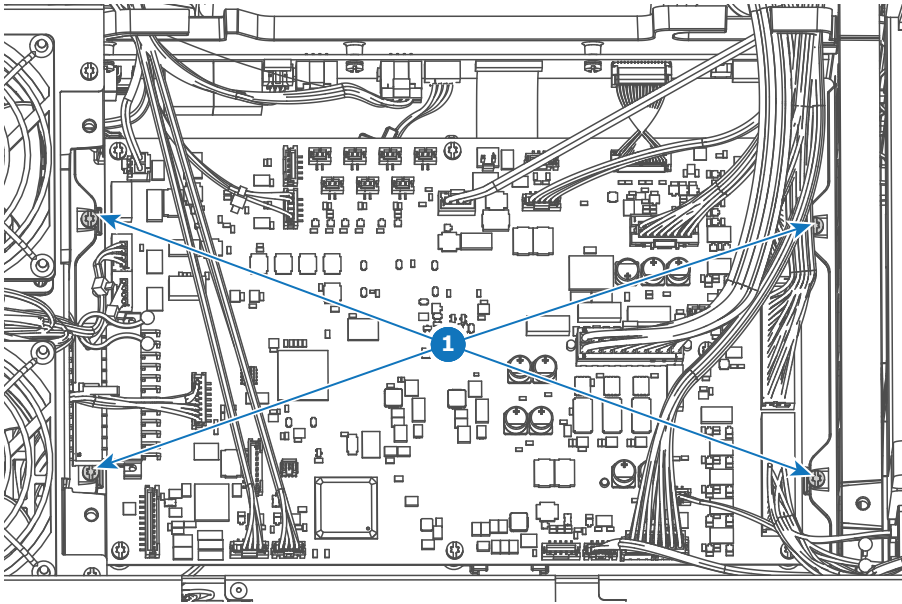


Image 13–45 Location of the 4 screws of the FMCB plate.

4. Connect the wiring from the FMCB board and plate onto the top of the backplane.



Image 13–46 backplane connectors

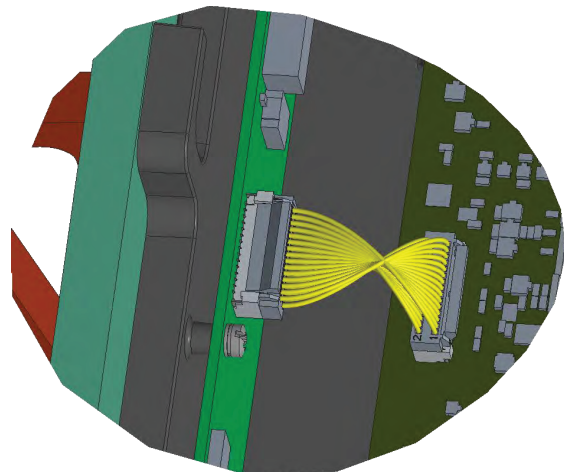



Image 13–47 FMCB interconnection wiring

 **Note:** The white connector with yellow wiring can fit both in socket J801 and J802 (which are located right next to each other on the top of the backplane). Make sure it is connected in socket J801.

5. Connect the high-speed data cables that are connected to the backside of the backplane (in the sealed compartment). Connect them as illustrated in the following picture.

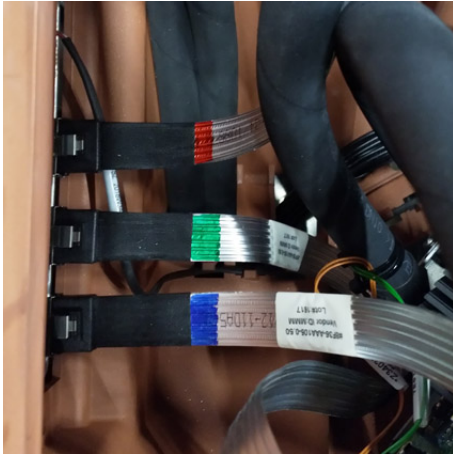


Image 13–48 Location of the three high-speed cables as seen from the front side of the projector

6. Continue with the replacement process. For more info, refer to [“Replacement process of the signal backplane”, page 261](#).

13.23 ICMP-X status LEDs

ICMP-X status LEDs and Reset button

LEDs on ICMP-X front panel give information on the status of the device.

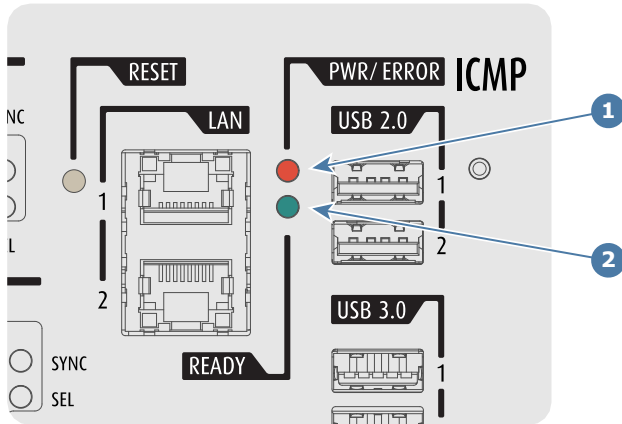


Image 13-49

- 1 Power / Error LED
- 2 Ready LED

Status overview PWR/ERROR and READY LEDs:

PWR/ERROR	READY	ICMP-X Status
Off	Off	Turned off
Red	Off	Board reset or FIPS error
Blinking Green	Off	Boot loader
Blinking Green	Blinking Orange	Operating System start up
Blinking Green	Orange	Security Manager - Image Integrity tests
Blinking Green	Blinking Yellow	Security Manager - Self Test
Blinking Green	Yellow	Security Manager - FPGA self-test
Green	Blinking Green	Starting Applications
Green	Green	Applications started in normal mode
Green	Orange	Applications started in degraded mode
Blinking Red	Off	FIPS error
Green	Blinking Orange	Update ongoing
Orange	Orange	Update done

13.24 ICMP-X HDD status LEDs

ICMP-X HDD status LEDs

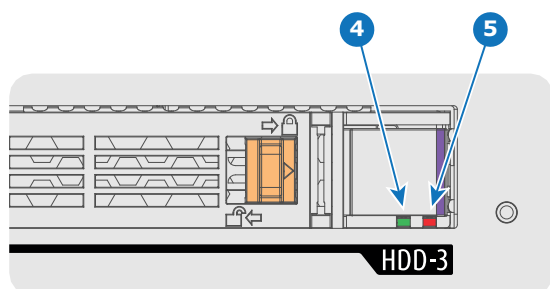


Image 13-50

- 4 HDD I/O LED
5 RAID LED

Status overview HDD I/O and RAID LEDs:

HDD I/O	RAID	ICMP-X HDD Status
Off	Off	HDD idle / disk in RAID OK.
Blinking green	Off	HDD I/O activity / disk in RAID OK.
Blinking green	Slow blinking red	HDD disks not (yet) initialized.
Blinking green	Fast blinking red	HDD I/O activity / RAID rebuilding.
Off	Red	HDD idle / Disk error. Consult the following troubleshooting table for curative actions.



When entering a new HDD in an ICMP-X, the HDD RAID LED will be full red for a short time. This is not an error, the HDD has not yet been “recognized” by the projector and ICMP-X. Once the HDD has been accepted by the ICMP-X, the full red LED will start blinking in accordance with the previous status table. If the LED remains full red, an error has occurred. In this case, consult the following troubleshooting table for curative actions.

Troubleshooting

Situation	Solution
One disk failed (red LED) + RAID degraded . The ongoing event is not interrupted. Note: The disk status (RAID degraded) can be retrieved via the (Web) Commander. See user guide of the (Web) Commander.	<ol style="list-style-type: none"> Switch off the power. Replace the defect HDD with approved model of the same storage capacity. See procedure “Removing a HDD from the ICMP-X”, page 249, and “Installing a HDD into the ICMP-X”, page 250. Ensure to insert the HDD firmly. Switch on the power. <p>Result: As soon the new HDD is detected by the ICMP-X the rebuild of the RAID is started (Blinking red LED).</p>
One disk failed (red LED) + Error 10580 “local storage not available” . Note: The disk status (Error code) can be retrieved via the (Web) Commander. See user guide of the (Web) Commander.	<ol style="list-style-type: none"> Switch off the power. Replace the defect HDD with approved model of the same storage capacity. See procedure “Removing a HDD from the ICMP-X”, page 249, and “Installing a HDD into the ICMP-X”, page 250. Ensure to insert the HDD firmly. Switch on the power.

Situation	Solution
	Result: As soon the new HDD is detected by the ICMP-X the rebuild of the RAID is started (Blinking red LED).
<p>Multiple disks failed (multiple red LEDs) + Error 10573 "The RAID is broken".</p> <p>Note: The disk status (RAID broken) can be retrieved via the (Web) Commander. See user guide of the (Web) Commander.</p>	<ol style="list-style-type: none"> 1. Switch off the power. 2. Replace all defect HDDs with approved models of the same storage capacity. See procedure "Removing a HDD from the ICMP-X", page 249, and "Installing a HDD into the ICMP-X", page 250. Ensure to insert the HDDs firmly. 3. Switch on the power. 4. Start "RAID Initialize". See user guide of the (Web) Communicator. <p>Result: a new empty RAID is created.</p>
<p>All HDD LEDs remain off + Error 10580 "local storage not available".</p> <p>Note: The disk status (Error code) can be retrieved via the (Web) Commander. See user guide of the (Web) Commander.</p>	<ol style="list-style-type: none"> 1. Switch off the power. 2. Reseat all HDDs. See procedure "Removing a HDD from the ICMP-X", page 249, and "Installing a HDD into the ICMP-X", page 250. Ensure to insert the HDDs firmly. 3. If problem remains try "RAID Initialize". See user guide of the (Web) Communicator. Note that all content will be lost! 4. If problem remains contact Service for further instructions.



In case the ICMP-X has to be returned to factory (e.g. for repair) the non defective HDDs should be removed and kept.

Projector covers

14

14.1	Removal of the front cover	274
14.2	Removal of the rear cover	275
14.3	Removal of the operator side cover	276
14.4	Removal of the light source side cover	277
14.5	Removal of the top cover	278
14.6	Mounting the top cover	279
14.7	Mounting the light source side cover	280
14.8	Mounting the operator side cover	281
14.9	Mounting the rear cover	283
14.10	Mounting the front cover	284

About this chapter

Most installation, maintenance and service procedures demand removing one or more of the projector covers to gain access to the parts to maintain or to service. To avoid redundancy, all procedures about cover removing or installing are grouped together in this chapter. The maintenance and servicing procedures also refer to this chapter if required. The procedures in this chapter describe, with detailed step by step actions and illustrations, how to remove or install the projector covers. Note that the covers may only be removed by qualified service personnel.



WARNING: All procedures described in this chapter may only be performed by TRAINED PROJECTIONISTS or qualified SERVICE PERSONNEL.



WARNING: Always switch off the projector and unplug the power cord before removing one of the covers, unless otherwise stated.

14.1 Removal of the front cover



If the front cover is the only cover you need to remove (e.g. when checking / replacing the filter), there is no need to turn off the projector.

Required tools

No tools required.

How to remove

1. Slide the front cover to the side of the Input & Communication Unit and remove it.



Note: The handles do not click open. They are fixed into the cover.

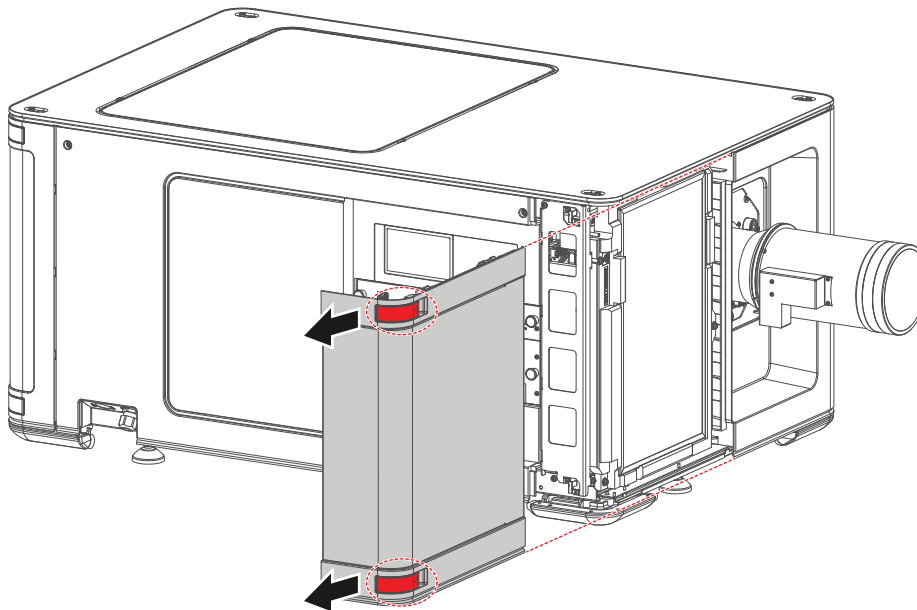


Image 14–1 Sliding the front cover away from the projector

14.2 Removal of the rear cover



If the rear cover is the only cover you need to remove (e.g. when checking / replacing the filter), there is no need to turn off the projector.

Required tools

No tools required.

How to remove

1. Slide the rear cover to the side of the Input & Communication unit and remove it.



Note: The handles do not click open. They are fixed into the cover.

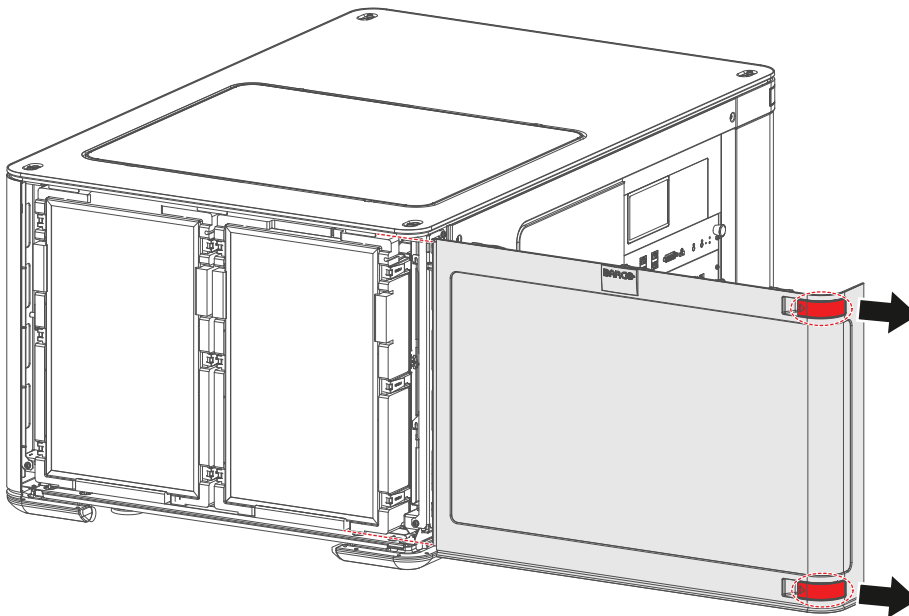


Image 14-2 Sliding the rear cover away from the projector

14.3 Removal of the operator side cover

Required tools

Torx screwdriver T20

How to remove

1. Remove the front and rear cover of the projector.
2. Remove the two screws at the top of the side cover. Use a T20 Torx screwdriver.
3. Slightly turn over the top side of the cover.

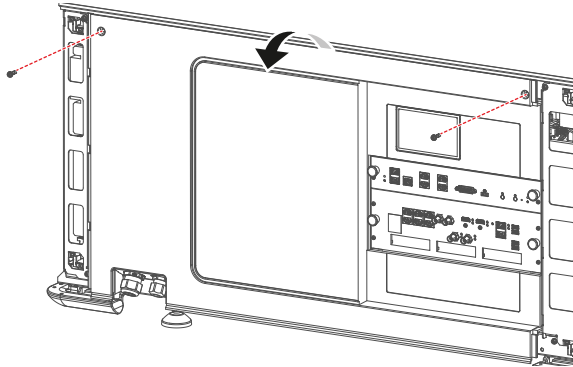


Image 14-3 Removing the screws of the right side cover

4. Lift up the operator side cover and remove it.

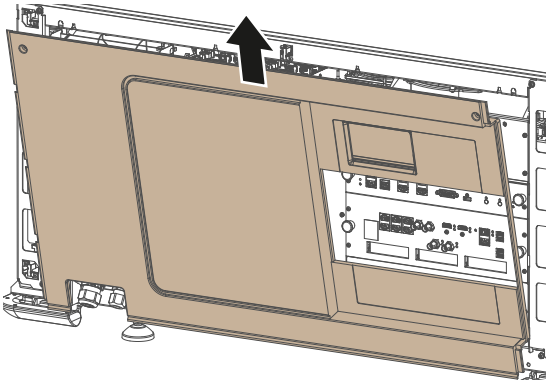


Image 14-4 Removing the side cover

14.4 Removal of the light source side cover

Required tools

Torx screwdriver T20

How to remove

1. Remove the two screws at the top of the side cover. Use a T20 Torx screwdriver.
2. Slightly turn over the top side of the cover.

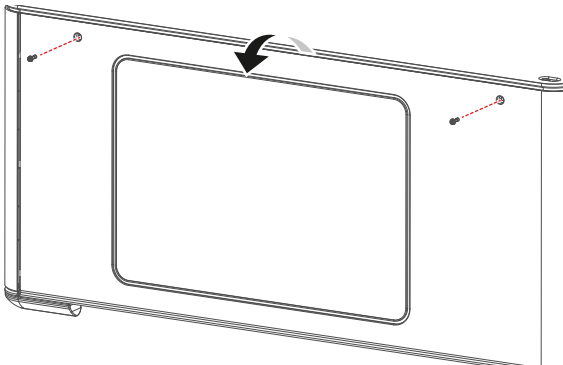


Image 14–5 Removing the screws of the side cover

3. Lift up the side cover and remove it.

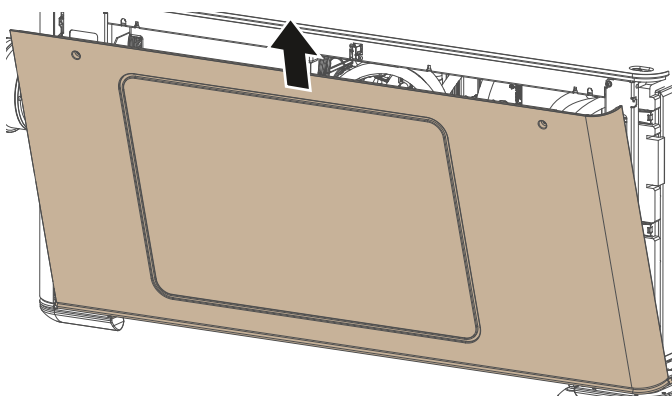


Image 14–6 Removing the side cover

14.5 Removal of the top cover

Required tools

Torx screwdriver T20

How to remove

1. Remove the four screws of the top cover. Use a T20 Torx screwdriver.
2. Lift the top cover up and remove it.

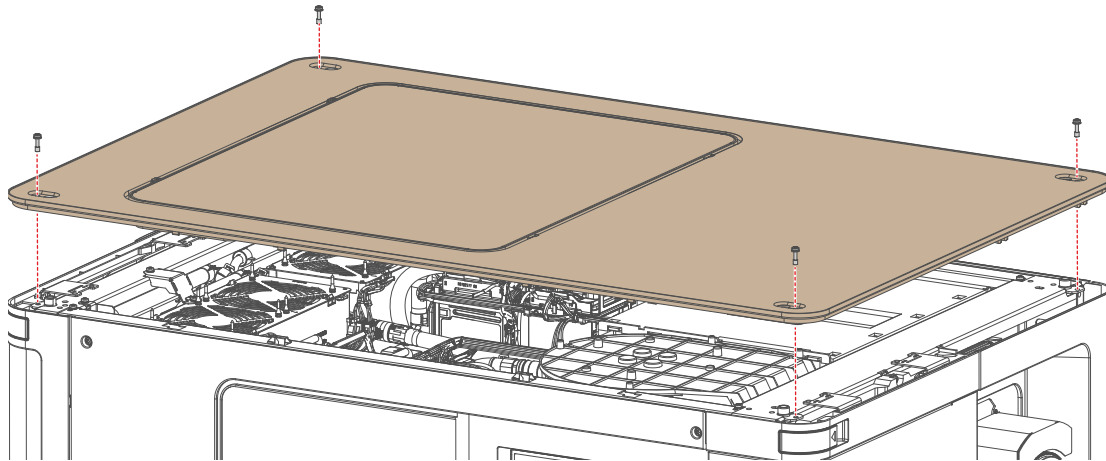


Image 14-7 Removing the top cover

14.6 Mounting the top cover

Required tools

Torx screwdriver T20

How to mount

1. Place the top cover on top of the projector.



Tip: The top cover has been designed it can be mounted in only one way.

2. Fasten the top cover with the four screws. Use a T20 Torx screwdriver.

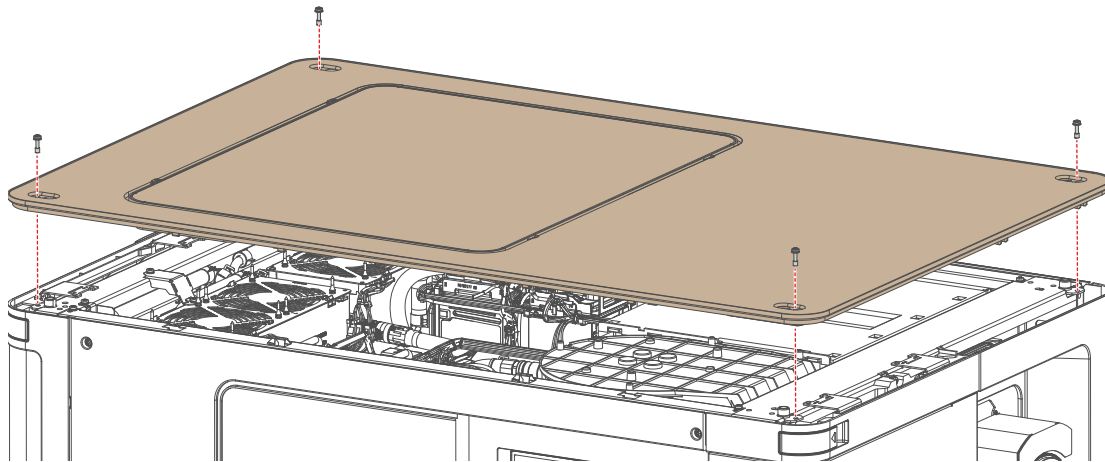


Image 14–8 Mounting the top cover

14.7 Mounting the light source side cover

Required tools

Torx screwdriver T20

How to mount

1. Carefully place the side cover onto the four cover hooks (reference 1, [Image 14–9](#)), located on the bottom frame of the projector.

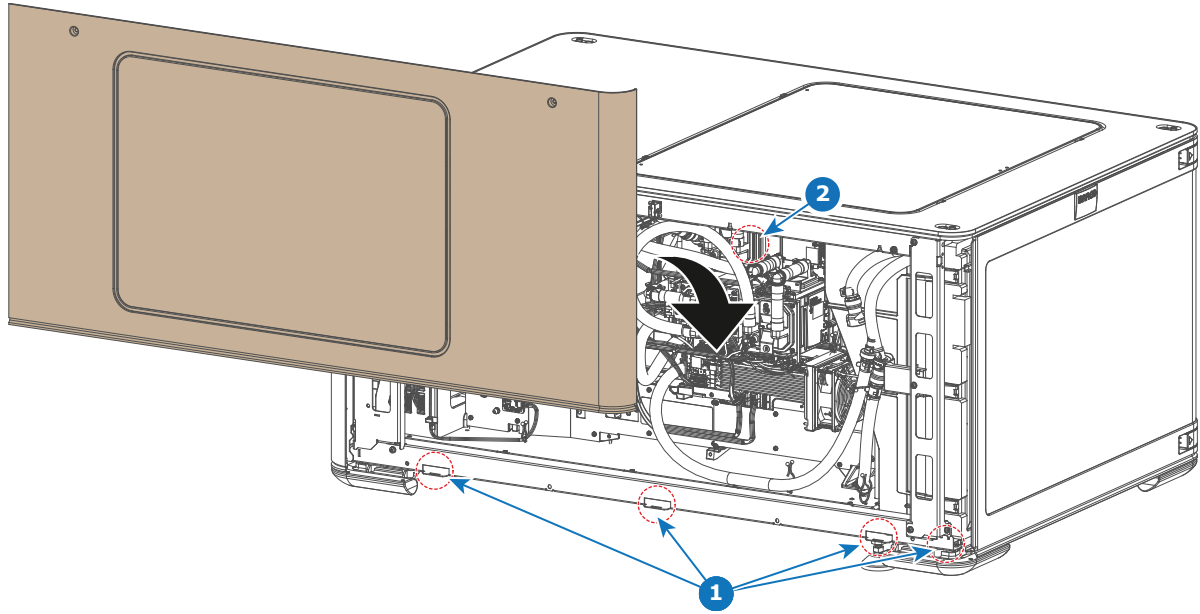


Image 14–9 Mounting the side cover

2. Click the cover onto the cover receiver of the top frame (reference 2).
3. Fasten the side cover with the two top screws. Use a T20 Torx screwdriver.

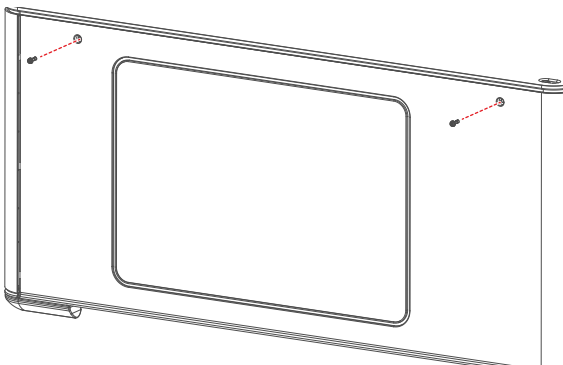


Image 14–10 Tightening the screws of the side cover

14.8 Mounting the operator side cover




The right side cover can only be mounted when the front and rear cover are removed. This procedure assumes these two covers have been removed.

Required tools

Torx screwdriver T20

How to mount

1. Carefully place the side cover onto the three cover hooks, located on the bottom frame of the projector.
 *Tip:* Place the cover in a slightly tilted angle so you can clearly see the hooks while mounting the cover.

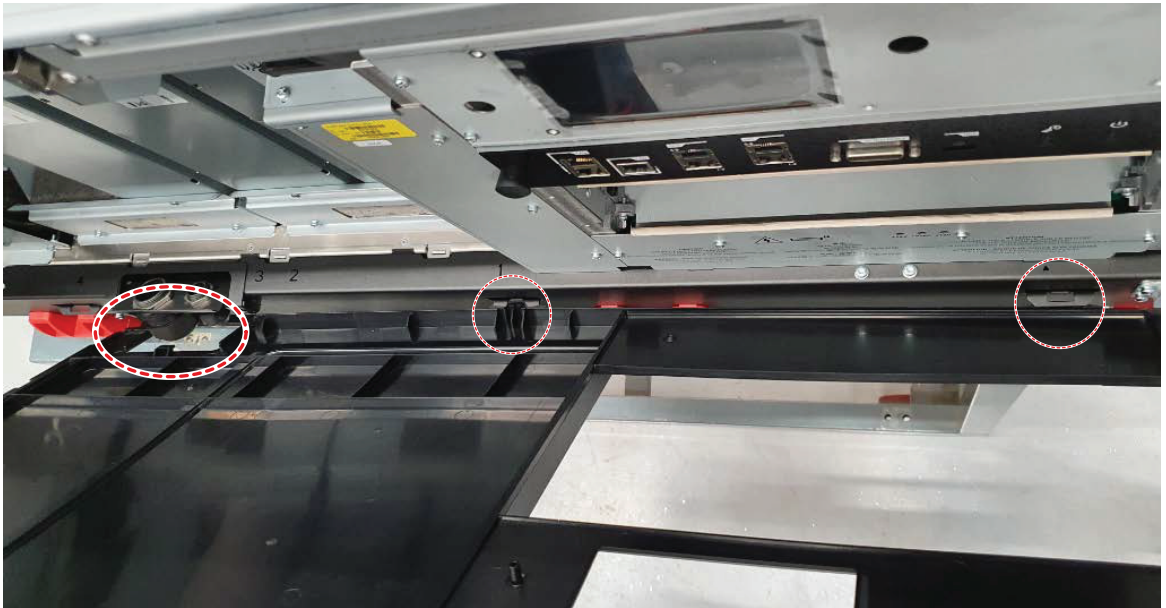


Image 14-11

2. Push the upper side of the cover towards the projector to close it.

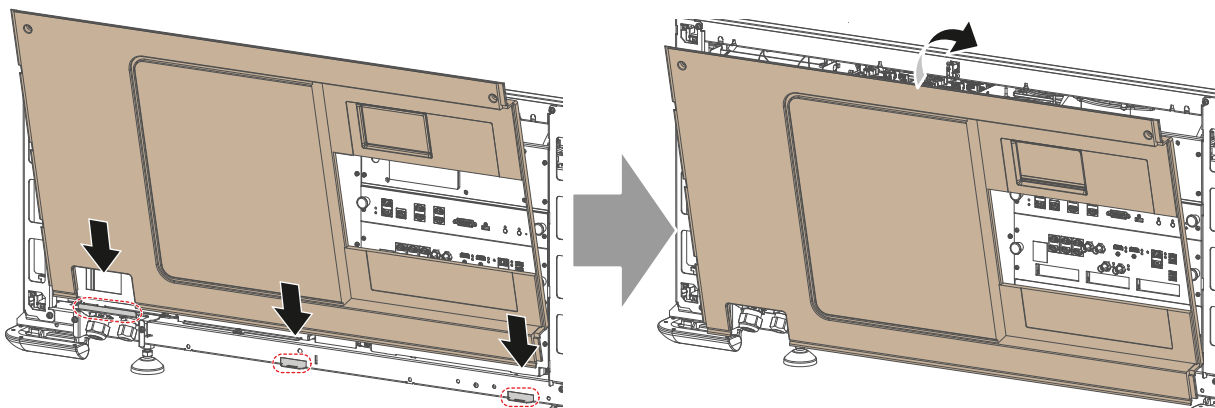


Image 14-12 Mounting the side cover

3. Fasten the side cover with the two top screws. Use a T20 Torx screwdriver.

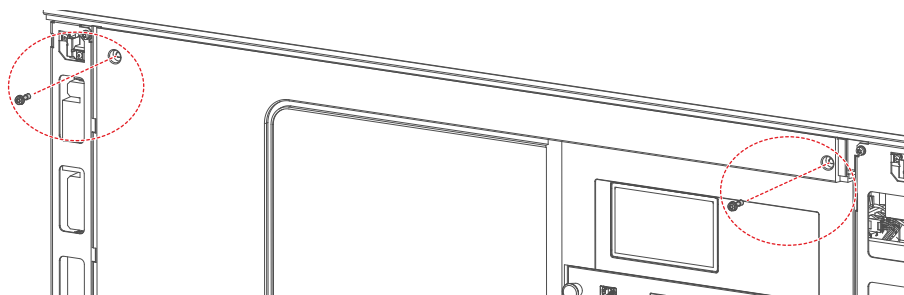


Image 14-13 Tightening the screws of the side cover

14.9 Mounting the rear cover

Required tools

No tools required.

How to mount

1. Place the cover over the cover hook on the bottom of the projector frame (reference 1).
2. Slide the clips in the rear cover over the cover hooks in the top of the frame (reference 2).

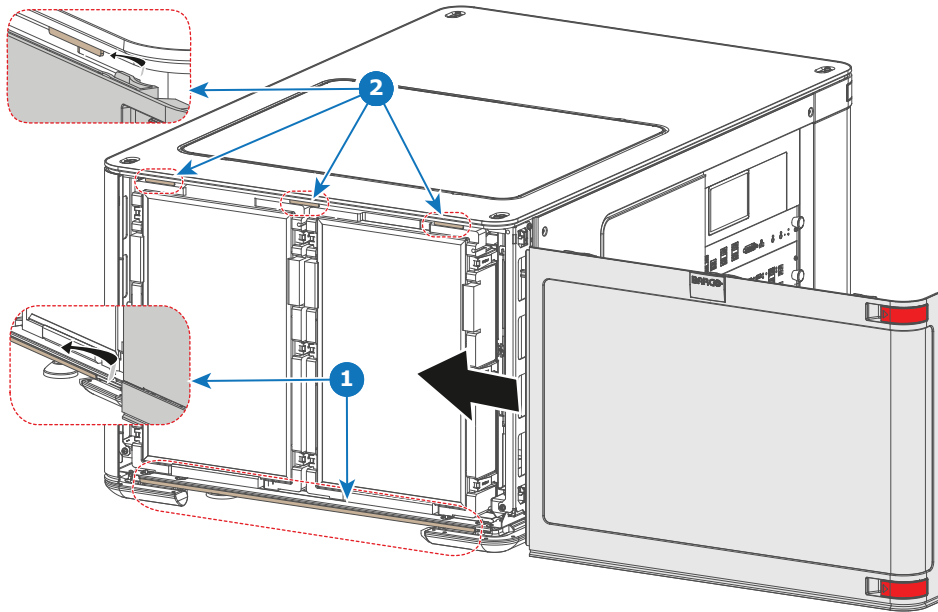


Image 14–14 Sliding in the rear cover

14.10 Mounting the front cover

Required tools

No tools required.

How to mount

1. Place the cover over the cover hook on the bottom of the projector frame (reference 1).
2. Slide the clips in the front cover over the cover hooks in the top of the frame (reference 2).

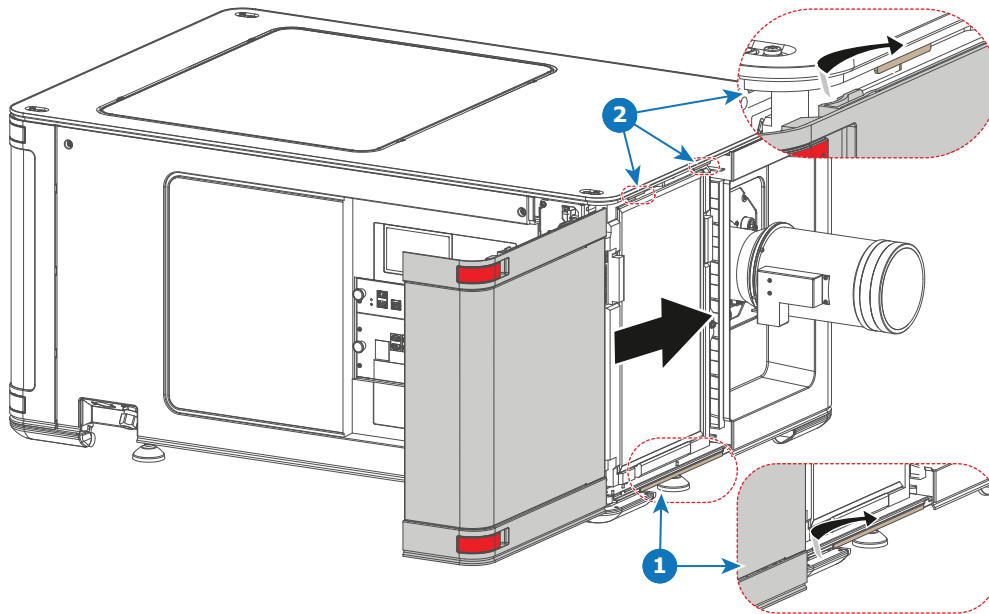


Image 14–15 Sliding in the front cover

Maintenance procedures

15

15.1	Necessary tools, products and tips	286
15.2	General cleaning procedure for optical components	287
15.3	Checking the front filters.....	288
15.4	Checking the rear dust filters	290
15.5	Checking the LDM dust filter	291
15.6	Vacuum cleaning of the dust filters	292
15.7	Washing and drying the dust filters	293
15.8	Cleaning the lens	295
15.9	Cleaning the exterior of the projector	296
15.10	Cleaning process for the optical path.....	297
15.11	Authorization to clear a security warning on the projector	298



WARNING: All procedures described in this chapter may only be performed by TRAINED PROJECTIONISTS or qualified SERVICE PERSONNEL.

About this chapter

This chapter describes several maintenance procedures for your SP4K-C projector.

15.1 Necessary tools, products and tips

Tools

Only the tools necessary to clean the projector are indicated here. Tools needed to disassemble or to get access are listed in the replacement procedures which are included in the projector's service manual.

- Any micro fiber lens cleaning cloth (e.g. Toraysee® cloth(s) (R379058))
- Vacuum cleaner
- Brush
- Clean cloth(s) (never use cloths that leave particles on the surfaces)

Products

- Compressed air (spray)
- Lens cleaner (e.g. ZEISS lens cleaner, Purosol™ or other water based lens cleaner products)

Tips

Ensure there is sufficient light in the cleaning environment. If necessary, add extra lights.

To protect the optical coatings, limit the number of wipe movements. It is better to wipe off the dust with one good wipe movement than with 10 soft wipe movements.

It is advised to use a lens cleaner in combination with a micro fiber lens cleaning cloth. A lens cleaner breaks the molecular bonds that dust, dirt and grime have to the surface, so that cleaning is much easier. A lens cleaner can also remove fingerprints without streaks.

Always use a clean cloth! If smears occur when cleaning optics, replace the cloth. Smears are the first indication of a dirty cloth.

Clean the light processor and light pipe in a dust free environment (best will be a clean room).

Make sure your booth environment corresponds with the environment specifications given in the projector's user and installation manual.

15.2 General cleaning procedure for optical components




This procedure describes the general steps to clean optical components.

Required tools

- Compressed air
- Lens cleaner (e.g. ZEISS lens cleaner, Purosol™ or other water based lens cleaner products)
- Clean micro fiber lens cleaning cloth (e.g. Toraysee® cloth(s))

General cleaning procedure

1. Blow off dust with **clean** compressed air (or pressurized air cans⁸).
2. Clean with lens cleaner liquid together with a clean micro fiber lens cleaning cloth to remove the dust and contamination.
 *Tip:* Limit the number of wipe movements. This to protect the optical coating. It is better to wipe off the dust with one good wipe movement than with 10 soft wipe movements.
3. Use a dry micro fiber lens cleaning cloth to remove left liquid or stripes. Polish using small circles.
4. If there are still fingerprints on the surface, wipe them off with lens cleaner together with a clean lens cleaning cloth. Polish again with a dry one.



CAUTION: If there is a difference in cleaning a specific part, it is mentioned in the description of that specific part.

8. Pressurized air cans is not efficient if there is too much dust on the surface, the pressure is too low

15.3 Checking the front filters

Required tools

No tools required.

How to check the front dust filters

1. Remove the front cover. For more info, refer to [“Removal of the front cover”, page 274.](#)
2. Detach the dust filter from the holder.

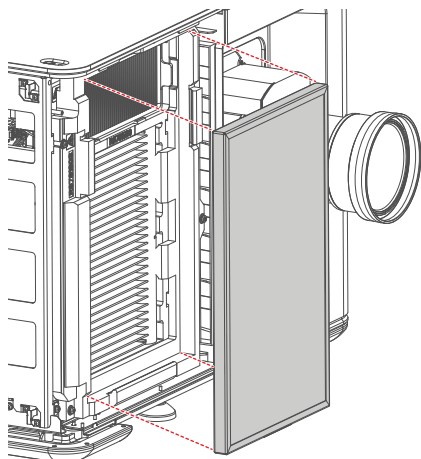


Image 15-1

The DMD filter becomes visible.

3. Detach the DMD filter from its holder.

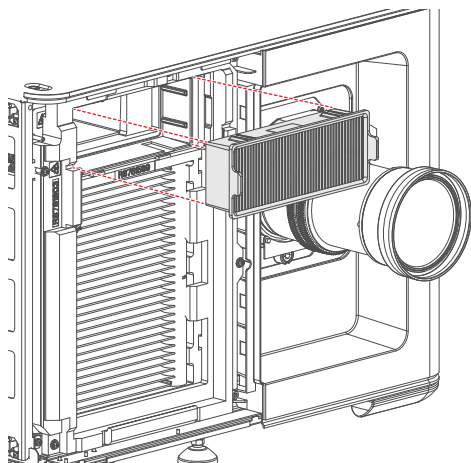


Image 15-2

4. Check the “air in” side of the dust filters for **dust** and/or **grease**.

In case the filter is contaminated with grease wash and dry the dust filter. See cleaning procedure [“Washing and drying the dust filters”, page 293.](#)

In case the filter contains dust but doesn't feel greasy then vacuum clean the dust filter. See procedure [“Vacuum cleaning of the dust filters”, page 292.](#)



Note: Grease on the filter can build up after several months in an environment contaminated with greasy air. Note that areas where popcorn is consumed are subject to greasy air.



Tip: Take into account that the time needed to dry the dust filters may be 24 hours or more. For that, it's recommended to have a second set of dust filters which can be used while cleaning the first set.

5. Place clean dust filters in the filter holder. Make sure the filters are fully inserted and respect the airflow of the filter, which should be pointed inwards.



Caution: UNDER NO CIRCUMSTANCES SHOULD WET FILTERS BE INSTALLED BACK INTO THE PROJECTOR. THIS CAN HAVE SERIOUS SAFETY CONSEQUENCES AS WELL AS JEOPARDIZE THE INTERNAL OPTICS OF THE SYSTEM.

6. Mount the front cover. For more info, refer to [“Mounting the front cover”](#), page 284.

15.4 Checking the rear dust filters

Required tools

No tools required.

How to check the rear dust filters

1. Remove the rear cover. For more info, refer to [“Removal of the rear cover”, page 275](#).
2. Detach the desired dust filter (left, right or both) from the holder.

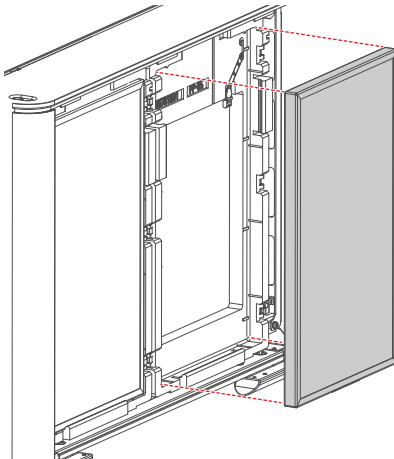


Image 15-3

3. **Check** the “air in” side of the dust filter for **dust** and/or **grease**.

In case the filter is contaminated with grease wash and dry the dust filter. See cleaning procedure [“Washing and drying the dust filters”, page 293](#).

In case the filter contains dust but doesn't feel greasy then vacuum clean the dust filter. See procedure [“Vacuum cleaning of the dust filters”, page 292](#).



Note: Grease on the filter can build up after several months in an environment contaminated with greasy air. Note that areas where popcorn is consumed are subject to greasy air.



Tip: Take into account that the time needed to dry the dust filters may be 24 hours or more. For that, it's recommended to have a second set of dust filters which can be used while cleaning the first set.

4. Place a clean dust filter in the filter holder. Make sure the filter is fully inserted and respect the airflow of the filter, which should be pointed inwards.



Caution: UNDER NO CIRCUMSTANCES SHOULD WET FILTERS BE INSTALLED BACK INTO THE PROJECTOR. THIS CAN HAVE SERIOUS SAFETY CONSEQUENCES AS WELL AS JEOPARDIZE THE INTERNAL OPTICS OF THE SYSTEM.

5. Mount the front cover. For more info, refer to [“Mounting the rear cover”, page 283](#).

15.5 Checking the LDM dust filter

Required tools

No tools required.

How to check the LDM dust filters

1. Check the exact location of the LDM dust filter. It is located on the operator side, underneath the LDM and the elca box.
2. Detach the dust filter from the holder and slide it out.

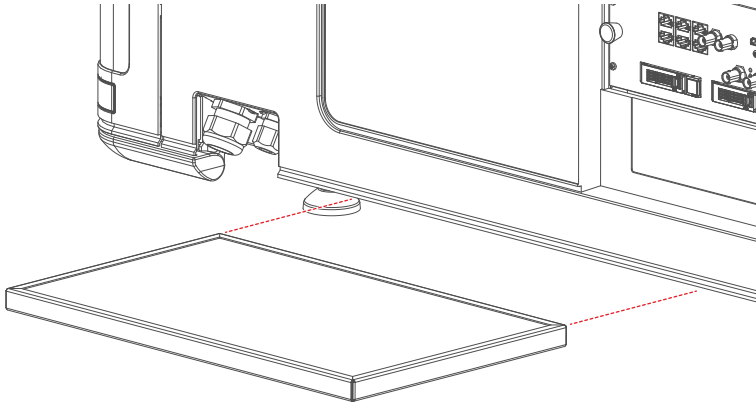


Image 15-4

3. **Check** the “air in” side of the dust filter for **dust** and/or **grease**.

In case the filter is contaminated with grease wash and dry the dust filter. See cleaning procedure “[Washing and drying the dust filters](#)”, page 293.

In case the filter contains dust but doesn't feel greasy then vacuum clean the dust filter. See procedure “[Vacuum cleaning of the dust filters](#)”, page 292.



Note: Grease on the filter can build up after several months in an environment contaminated with greasy air. Note that areas where popcorn is consumed are subject to greasy air.



Tip: Take into account that the time needed to dry the dust filters may be 24 hours or more. For that, it's recommended to have a second set of dust filters which can be used while cleaning the first set.

4. Place a clean dust filter in the filter holder. Make sure the filter is fully inserted and respect the airflow of the filter, which should be pointed inwards.



Caution: UNDER NO CIRCUMSTANCES SHOULD WET FILTERS BE INSTALLED BACK INTO THE PROJECTOR. THIS CAN HAVE SERIOUS SAFETY CONSEQUENCES AS WELL AS JEOPARDIZE THE INTERNAL OPTICS OF THE SYSTEM.

15.6 Vacuum cleaning of the dust filters

When vacuum the dust filters?

If the filters are contaminated with dust then cleaning the filters with a vacuum cleaner should be sufficient. In case the filters feel greasy these must be washed. See cleaning procedure "[Washing and drying the dust filters](#)", page 293.



Grease on the filter can build up after several months in an environment contaminated with greasy air. Note that areas where popcorn is consumed are subject to greasy air.



This procedure assumes that the dust filters are removed from their slots.

Required tools

Vacuum cleaner with soft brush suction nuzzle.

How to vacuum-clean the dust filter?

1. Carefully vacuum the air inlet side of the dust filter. Use a vacuum cleaner with a soft brush suction nuzzle. The air inlet side of the dust filter is the side which is surrounded with a glue edge.



Tip: Lightly tap the filter on its dusty side to expel heavy dust contamination.



Tip: Compressed air is also permitted to clean the filters but take care not to damage them.



Caution: Do not damage the dust filter. Replace damaged dust filters immediately.

15.7 Washing and drying the dust filters

About filter washing and drying

For environments where popcorn grease and such can contaminate the filters, Barco advises the client to purchase one extra set of filters to cover drying time, as well as taking following extra precautions and instructions pertaining to filter cleaning and drying.

Cleansing agent

To clean sticky, greasy dust filters we suggest usage of **Sodium carbonate** crystals (Na_2CO_3). Sodium carbonate (Often called **washing soda**, **soda crystals**, or **sal soda** in the detergent section of stores) is widely used to effectively remove oil, grease, alcohol stains ... The product itself is relatively safe, sodium carbonate is used in toothpastes and as a food additive (E500). Potential Hazards are described in the section "[Safety precautions Hazardous Chemicals](#)", page 12.

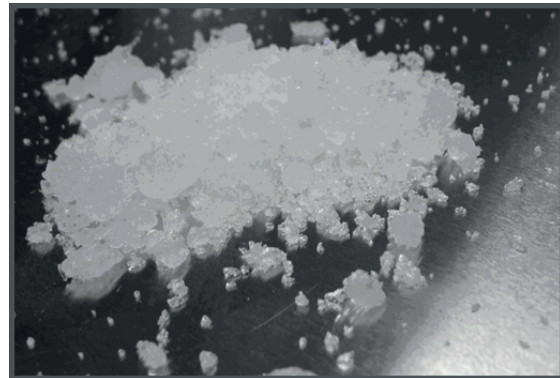


Image 15–5 Sodium carbonate crystals.



This cleaning procedure assumes that the filters are already removed from their slots.



Take into account that the time needed to dry the dust filters may be 24 hours or more. For that, it's recommended to have a second set of dust filters which can be used while cleaning the first set.

Required tools

- Bucket with hot water
- Sodium carbonate, 30 gram (handful) per liter hot water

How to wash and dry the dust filters?

1. Make a solution with a ratio of 30 gram (a handful) sodium carbonate to 1 liter **hot water**.
2. Soak the dust filters in the solution for **30 to 60 minutes**. The grease should be dissolved after 1 hour.
3. If the dust filter is still clogged repeat this procedure from step 1.
4. Rinse the dust filters with clean water to flush all grease residue away.
5. Shake out all excess liquid by repeatedly swinging the filter to-and-fro in a centrifugal action.
6. Then allow the filters to **dry thoroughly**.



Note: Drying time of the dust filters can be up to 24h or more. Drying time can be shorter when being done in a well-ventilated area.



Tip: To speed-up drying, allow the filter(s) to dry at 50°C max in a well ventilated room.



CAUTION: UNDER NO CIRCUMSTANCES SHOULD WET FILTERS BE INSTALLED BACK INTO THE PROJECTOR. THIS CAN HAVE SERIOUS SAFETY CONSEQUENCES AS WELL AS JEOPARDIZE THE INTERNAL OPTICS OF THE SYSTEM.



CAUTION: Do not install/use damaged dust filters. Replace damaged dust filters immediately with new dust filters of the same type. See <https://my.barco.com> for the correct replacement part.

15.8 Cleaning the lens




To minimize the possibility of damage to optical coatings, or scratches to lens surfaces follow the cleaning procedure as described here precisely.

Required tools

- Compressed air
- Clean micro fiber lens cleaning cloth (e.g. Toraysee® cloth(s))
- Clean cotton cloth
- Lens cleaner (e.g. ZEISS lens cleaner, Purosol™ or other water based lens cleaner products)

How to clean the lens?

1. Blow off dust with clean compressed air (or pressurized air cans⁹).
2. Clean with lens cleaner together with a clean lens cleaning cloth to remove the dust and contamination. Use big wipes in one single direction.
 **Warning:** Do not wipe back and forwards across the lens surface as this tends to grind dirt into the coating.
3. Use a dry lens cleaning cloth to remove left liquid or stripes. Polish with small circles.
4. If there are still fingerprints on the surface, wipe them off with lens cleaner together with a clean lens cleaning cloth. Polish again with a dry one.



If smears occur when cleaning lenses, replace the cloth. Smears are the first indication of a dirty cloth.

9. Pressurized air cans are not efficient if there is too much dust on the surface, the pressure is too low

15.9 Cleaning the exterior of the projector

How to clean the exterior of the projector ?

1. Switch off the projector and unplug the projector from the mains power net.
2. Clean the housing of the projector with a damp cloth. Stubborn stains may be removed with a cloth lightly dampened with a mild detergent solution.

15.10 Cleaning process for the optical path

General steps

1. Optimize the optical alignment for highest light output.
2. Measure the light output of your projector before starting the cleaning procedure.
3. Clean the complete optical path.
4. Measure the light output again when the cleaning procedure is finished.

Write down all your results, remarks and time of measurement.

Always measure in the same environmental conditions. Put your measuring device on a fixed position and always measure from this position.

Do these measurements every time you perform an optical cleaning. Over time you will have an overview and you will be able to compare with previous measurements.

Consult the projector's service manual to see how to remove/access any optical part.

Before starting with the cleaning of the optical parts, first clean the outside covers of the projector.

Clean the optical path in chronological order as listed here below.

Cleaning order

1. Outside of the Light source
2. Light source output lens
3. Light source compartment
4. Rod inlet
5. Prism outlet
6. Light processor sealed compartment
7. Projection lens
8. Port hole

15.11 Authorization to clear a security warning on the projector

When is an authorization required to clear the security warning?

A media player security warning is triggered in the following cases:

- If a board is removed from or inserted into the card cage.
- If the link between ICP and IMB/IMS is removed.
- If the sealed compartment has been opened.

An authorization will be required to clear the security warning. Using the Web Communicator as a show manager, you can create an authorization pin code in case one of these security warnings is triggered.

Required tools

- Authorization pin code
- Web Communicator

Authorization procedure to clear security warning

1. Ensure that all modules and boards are properly installed.
2. Start up the projector (READY or ON mode).
3. Log onto the projector using Web Communicator.
4. In the notifications menu (both in Web Communicator or on the touch display), spot the error that can be cleared and press **Clear**.

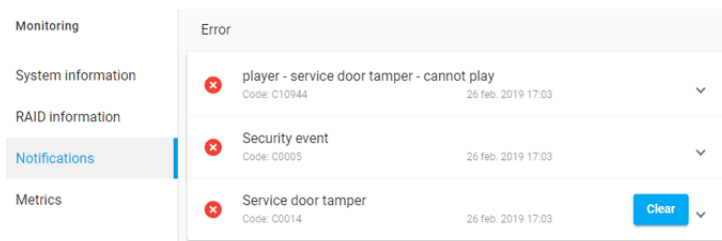


Image 15–6

A pop-up window will be prompted with input field and numeric display.

5. Enter the authorization pin code and confirm by pressing Start.

A pop-up window will be prompted with a countdown timer and instructions to press the key button within the time limit.

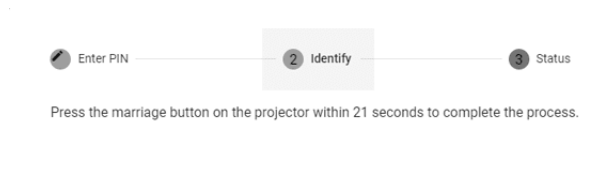


Image 15–7

6. Press the key button on the Cinema Controller (reference 1, [Image 15–8](#)).

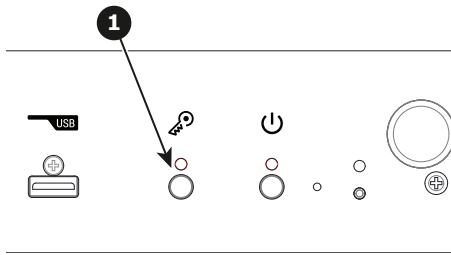


Image 15–8 Location of the key button



Each attempt to clear the security warning and its result (both successfully and unsuccessfully) is logged inside the projector.

Troubleshooting

16

16.1	Helping to understand notification message masking.....	302
16.2	Laser plate diagnostic.....	303
16.3	Using the Web Analysis tool to help decipher the diagnostic package	304
16.4	Troubleshooting checklist.....	306

About this chapter

This chapter enumerates error and warning codes initiated by the cinema controller which can appear on the touch display of the projector, Web Communicator, Web Analyzer or in the projector log files.



The error/warning codes initiated by the ICMP(-X) (starting with prefix “CX”) or ICP-D (starting with prefix “CD”) are NOT included in this chapter. Refer to the service manual of the ICMP(-X) and ICP-D for the troubleshooting tables of these error/warning codes.



In the Web Analyzer you can immediately download the troubleshooting table per error/warning code from the cloud.

About notifications, warnings and errors

Note that some codes have a warning and an error state. Some only have an error state, others have only a warning state.

In case of a “warning” the projector will continue to operate. But depending on the situation, there might be a decreased light output or color degradation visible. It is recommended to solve the problem which causes the “warning” as soon as possible by planning in a servicing moment. Otherwise the “warning” state may turn into an “error” state, which will switch off the projector consequently.

All codes are placed in ascending order to make it easier to look up the code and find an appropriate solution.

16.1 Helping to understand notification message masking

About LDM messages

In each laser and laser phosphor projector, there is at least one Laser Driver Module (LDM), with several different driver boards mounted in them. An LDM can generate two types of errors:

- An error that indicates a problem on the entire LDM case (LDM 1 – [error message]). This may vary from wiring going to the LDM to a faulty fan or the printed boards malfunctioning. Error handling involving the LDM errors mostly involve checking/replacing the wiring, replacing the fan, or swapping the entire LDM
- An error that indicates a problem on one of the LDM driver boards (LDM 1–x – [error message]). This may vary from the wiring connected to the LDM board to the board being faulty. Error handling involves either checking/replacing the wiring connected to the LDM board, or swapping this one board with a board that serves the same function.

To reduce the number of identical messages, the notification messages concerning the LDM and their driver boards will be grouped together using a mask (e.g. "LDM x", or "LDM x, slot y"). In order to understand which type of board fits where in which LDM, please refer to: ["Laser Driver Modules", page 45](#).

About laser plate and laser bank messages

Each SP4K-C projector has a number of laser plates, each filled with a number of laser banks. The number of plates and banks varies, depending on the projector variant you have.

To reduce the number of identical messages, the notification messages concerning laser plates and laser banks will be grouped together using a mask (e.g. "laser plate x", or "laser bank x of laser plate y"). In order to understand which laser plate is located where on the light source, please refer to: ["Introduction Light Source", page 94](#).

16.2 Laser plate diagnostic

When is a laser plate defective?

When a warning or error is triggered mentioning a laser plate or laser bank, this does not necessarily mean that the laser plate or entire light source is defective and should be replaced. Proceed as follows:

- Check the status screen of the projector. If the screen is **green**, the warning/error was only temporarily and may be ignored. However, it can be handy to keep an eye on the status of the projector, if the warning or error recurs at a certain frequency.
- If the status screen is **yellow**, one or more warning messages has been triggered. While the projector is still playing, it is advised to plan in a servicing moment. Compare the triggered messages with the troubleshooting table in this manual and try to find possible root causes. The table in the manual will list them from cheapest and most likely to occur (e.g. poorly connected wire unit) to most expensive / least likely to occur (e.g. replacing a laser bank or the LCB).
- If the status screen is **red**, one or more error messages have been triggered and the projector will shut down and will no longer start up properly until the issue is fixed. A servicing moment should be executed as soon as possible, using the same method as with the yellow status screen — comparing messages and going from cheapest and most probably solution to the most expensive and least likely solution.

As a general rule of thumb it is advised to only replace laser plates when all other options have been exhausted or when an analysis of all notification messages point to one or more laser banks being defective.

16.3 Using the Web Analysis tool to help decipher the diagnostic package

About Web Analyzer

Barco has created a cloud application to read out the content of a diagnostic package from your projector. This may help you and Barco to help figure out what is wrong with the projector.

How to use Web Analyzer?

1. In Web Communicator, navigate to *Diagnostics > Analysis > Diagnostic package*.
2. Click on the **Download** button to download a zip file with all diagnostic files.

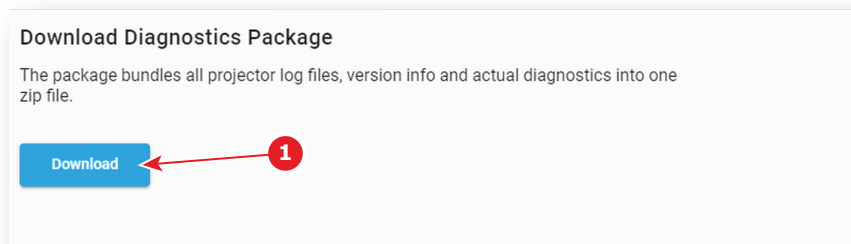


Image 16–1

3. Go to **myBarco** and log in with your mybarco credentials.
4. Navigate to *My Support > Digital Cinema > Web Analyzer* and click on **Go to Web Analyzer**. The *Web Analyzer* main page will be displayed.

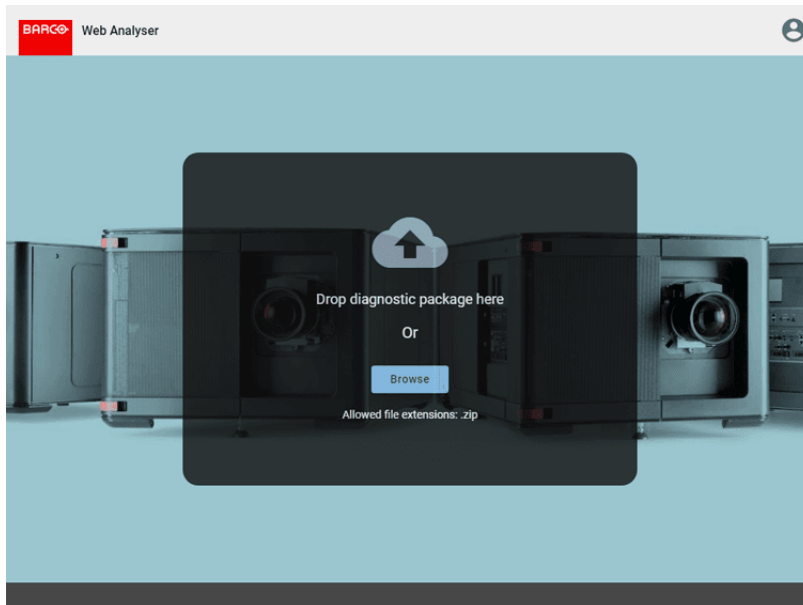


Image 16–2 Example main page of the Web Analyzer

5. Drop your created diagnostic package in the designated area.
or
click on browse and browse to the diagnostic package.
The package will be analyzed and a presentation will be opened in the *Web Analyzer* tool.

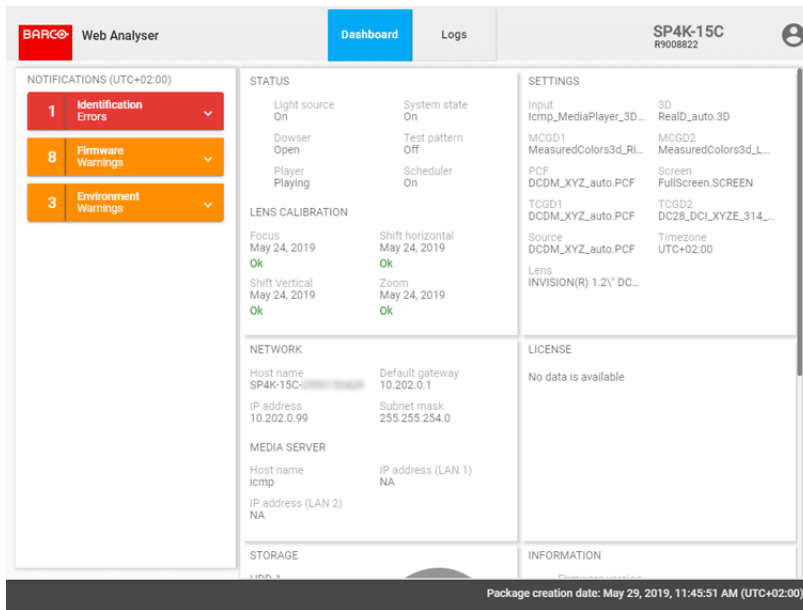


Image 16-3 Example of a diagnostic package analysis

6. You can expand the notifications in the left-hand pane to see more details, or click on *Logs* to see all logs made by the projector.

16.4 Troubleshooting checklist

Code DOC-B00000: “Invalid [board_name] detected in the system.” (warning)



board_name is a variable, with the actual board being named in this message.

Situation	Solution
Only one of these errors appear: Wiring issue	Check and reseal the wiring to the board that triggers this warning. If the wiring appears damaged, replace the wiring. If the warning persists, replace the board itself. Check for the proper replacement procedure, depending on the board name.
Multiple of the same errors appear with different board names: Bad wiring between LCB and card cage backplane	Check and reseal the wiring between the LCB (connector J200) and card cage backplane (connector J801).

Code DOC-B00004: “SD card [location] not detected.” (warning)

Situation	Solution
If location = Cinema Controller: Poorly seated or missing SD card in Cinema Controller	Remove the Cinema Controller from the card cage and check / reseal the SD card of the Cinema controller (Image 16–4). If problem persists, replace the SD card. For more information on removing the Cinema controller, see procedure “ Replacement of the cinema controller board ”, page 242.
If location = Cinema Controller: Malfunction Cinema Controller	Replace the Cinema Controller. See procedure “ Replacement of the cinema controller board ”, page 242.
If location = backplane: Poorly seated or missing SD card in signal backplane	Remove the Cinema controller from the card cage and check / reseal the SD card of the signal backplane. If problem persists, replace the SD card. For checking / replacing the SD card from the signal backplane, see procedure “ Replacement of the projector ID card ”, page 244.
If location = backplane: Malfunction signal backplane	Replace the signal backplane. See replacement process described in “ Card cage ”, page 229.

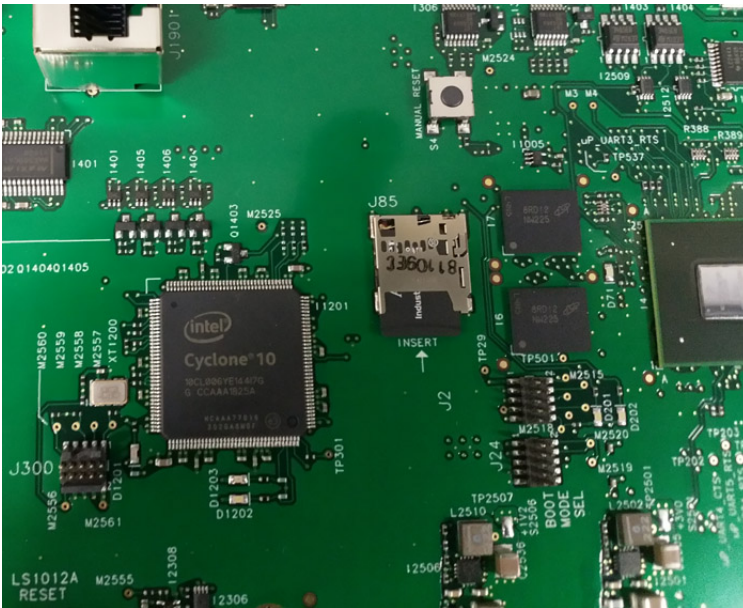


Image 16-4 Location of the SD card on the Cinema controller

Code DOC-B00005: “SD card [location] not mounted.” (warning)

Situation	Solution
SD card is corrupt or malfunctioning	<p>Perform the following actions:</p> <ul style="list-style-type: none"> Remove the SD card from the designated location. <ul style="list-style-type: none"> If location = Cinema controller: remove the Cinema Controller and place the card in the following location on the cinema controller (see Image 16-4). For more info on removing the Cinema controller, see procedure “Replacement of the cinema controller board”, page 242. If location = signal backplane: Replace a micro SD card in the signal backplane. For more info, see procedure “Replacement of the projector ID card”, page 244. Format the SD card in ext4 format. Insert the formatted SD card in the designated location. Reboot the projector. If problem persists, replace the SD card with a new one (after formatting it in the ext4 format). <p>Note: The default formatting for any SD card is FAT32. If an SD card is inserted with this formatting, the projector will automatically re-format it to the desired format (ext4). But be aware that this may take time and certain notifications may be triggered during this time frame.</p>
Malfunction Cinema Controller (if location is CCB)	Replace the Cinema Controller. See procedure “Replacement of the cinema controller board” , page 242.
Malfunction signal backplane (if location is signal backplane)	Replace the signal backplane. See replacement process described in “Card cage” , page 229.

Code DOC-BA00101: “Backup mechanism could not be activated.” (warning)

Situation	Solution
If message prompts alongside warning “SD card not detected”: No SD card in signal backplane.	Place an SD card in the signal backplane. For more info, see procedure “Replacement of the projector ID card”, page 244.
If message prompts alongside warning “SD card cannot be mounted”: Corrupt or malfunctioning SD card in signal backplane.	<p>Perform the following actions:</p> <ul style="list-style-type: none"> • Remove the SD card from the designated location. • Format the SD card in ext4 format. • Insert the formatted SD card in the designated location. • Reboot the projector. • If problem persists, replace the SD card with a new one (after formatting it in the ext4 format). <p>For more info on removing/mounting the SD card, see procedure “Replacement of the cinema controller board”, page 242.</p> <p>Note: The default formatting for any SD card is FAT32. If an SD card is inserted with this formatting, the projector will automatically re-format it to the desired format (ext4). But be aware that this may take time and certain notifications may be triggered during this time frame.</p>
If message prompts with multiple other errors and/or warnings: malfunction signal backplane.	Replace the backplane. See service procedure “Replacement process of the signal backplane”, page 261.

Code DOC-BA00110: “Valid backup detected.” (warning)

Situation	Solution
New Cinema controller or signal backplane mounted	<p>This message will prompt after a hardware replacement of the Cinema Controller or signal backplane.</p> <p>The Web Communicator will prompt you to restore the backup from the SD card. It is advised to do so.</p>

Code DOC-BA00113: “Backup postponed.” (warning)

Situation	Solution
You actively decided to NOT restore a backup to your projector.	<p>When prompted to restore a backup on your projector, you decided not to do so. This request will pop up again once you restart the projector.</p> <p>This should only be done when you temporarily swap two equal Cinema controllers for testing reasons.</p> <p>Note: Keep the time you do not restore a backup as limited as possible. Avoid having your projector and the backup version from drifting away from each other.</p>

Code DOC-BA10020: “Creation of backup package [package_name] failed.” (warning)

Situation	Solution
The backup procedure could not be finished because of other warnings or errors.	Check for active warnings and errors as to what could have caused this. Resolve any warnings and errors and try again.

Code DOC-BA10021: “Restoring backup package [package_name] failed.” (warning)

Situation	Solution
Backup package does not match projector type	Make sure you place the backup package on the corresponding projector.
The restoration procedure failed because of other warnings or errors.	Check for active warnings and errors as to what could have caused this. Resolve any warnings and errors and try again.

Code DOC-C0000: “Selftest failed.” (error)

Situation	Solution
Third party IMB self-test failed	Reboot your media server. If problem persists, check the service manual for your media server device. Repair or replace if necessary.

Code DOC-C0001: “System error.” (error)

Situation	Solution
Third party IMB has a system error	Check the service manual for your media server device. Repair or replace if necessary.

Code DOC-C0002: “ICP communication error during the logical marriage verification.” (error)

Situation	Solution
All boards are mounted, but communication between ICP-D and the third party IMB is broken.	Reboot your media server. If problem persists, check the service manual for your media server device. Repair or replace if necessary. If all problems have been removed, clear this security notification. For more info, see “Authorization to clear a security warning on the projector” , page 298.

Code DOC-C0003: “Failsave active.” (warning)

Situation	Solution
An error on your third party IMB has caused it to go into fail-save mode.	Check the service manual for your media server device. Repair or replace if necessary.

Code DOC-C0004: “Certificate or key error.” (error)

Situation	Solution
A serious error has occurred on your third party IMB, causing an error with the certificate or key.	Replace the IMB. Check the service manual for your media server device for replacement instructions. Alternatively, this may be the moment to contact Barco in order to obtain the ICMP-X.

Code DOC-C0005: “Security event.” (error)

Situation	Solution
A security related event has occurred.	This error will be displayed, alongside the actual tamper or security event. Resolving and clearing all tamper / security related events will automatically resolve this error as well.

Code DOC-C0010: “Enclosure not armed.” (error)

Situation	Solution
IMB is not armed	Check the service manual for your media server device for servicing instructions.

Code DOC-C0011: “Battery event.” (error)

Situation	Solution
Battery of IMB is dead	<p>Replace the battery of the IMB as soon as possible. Check the service manual for your media server device for replacement instructions.</p> <p>If the IMB operates without battery, it runs a great chance of losing all of its licensing keys. If this has occurred, the IMB has become useless and must be replaced.</p>

Code DOC-C0012: “Security tamper.” (error)

Situation	Solution
IMB has been tampered with and can no longer be used.	<p>Replace the IMB. Check the service manual for your media server device for replacement instructions.</p> <p>Alternatively, this may be the moment to contact Barco in order to obtain the ICMP-X.</p>

Code DOC-C0013: “Battery low.” (warning)

Situation	Solution
Battery of the IMB is running low	<p>Replace the battery of your media server. Check the service manual for your media server device for replacement instructions.</p> <p>Note: Replace the battery before it is completely dead. Once the IMB would fall without its internal battery, it may lose the license keys required to operate alongside the projector. In that case, the IMB will become useless.</p>

Code DOC-C0014: “Service door tamper.” (error)

Situation	Solution
The sealed compartment of the projector has been opened.	<p>The sealed compartment of the projector needs to be opened to perform several types of servicing actions. However, since this may also be an indication that tampering might have occurred, this is treated as a security error. You will not be able to play content until this security notification has been cleared.</p> <p>Proceed as follows:</p> <ul style="list-style-type: none"> • Make sure the sealed compartment is correctly closed. For more info, see “Closing the sealed compartment”, page 167. • Clear this security notification. For more info, see “Authorization to clear a security warning on the projector”, page 298.
The ICMP-X has been removed from the projector	<p>Servicing actions on the ICMP-X include removing it from the projector. However, since this may also be an indication that tampering may have occurred, this is treated as a security error. You will not be able to play content until this security notification has been cleared.</p> <p>Proceed as follows:</p> <ul style="list-style-type: none"> • Make sure the ICMP-X is correctly mounted. For more info, see “Replacement of the ICMP-X board”, page 248. • Clear this security notification. For more info, see “Authorization to clear a security warning on the projector”, page 298.

Code DOC-C0015: “Marriage not active.” (error)

Situation	Solution
Security / tamper event between ICP and third party IMB has been resolved, but marriage was not completed (successfully).	You will not be able to play content until the marriage function has been activated. In order to do so, clear every security-related event which contains a “clear” button; For more info, see “Authorization to clear a security warning on the projector” , page 298.

Code DOC-C0016: “Marriage logical tamper.” (error)

Situation	Solution
All boards are mounted, but communication between ICP-D and the third party IMB is broken.	Check the service manual for your media server device. Repair or replace if necessary. If all problems have been removed, clear this security notification. For more info, see “Authorization to clear a security warning on the projector” , page 298.

Code DOC-C0017: “Marriage physical tamper.” (error)

Situation	Solution
A physical tampering occurred.	Make sure the ICP-D and third party IMB are correctly seated. After confirmed all boards are correctly seated, clear this security notification. For more info, see “Authorization to clear a security warning on the projector” , page 298.

Code DOC-C0022: “Unit is running for a long period in light on mode. Please turn off the light for two minutes when possible to preserve lifetime.” (warning)

Situation	Solution
The projector detected that the light has been on for a long period of time.	Try to find a moment to turn the light source off for a while to preserve the lifetime of the light source.

Code DOC-C0030: “ICMP/ICP-D not detected.” (error)

Situation	Solution
ICMP-X or ICP-D not (correctly) mounted	You started the projector without an ICMP-X or ICP-D. Mount or re-seat the board.
Malfunctioning ICP-D or ICMP-X	<ul style="list-style-type: none"> In case of ICP-D: Replace the ICP-D. In case of ICMP-X: Replace the ICMP-X. For more info, see “Replacement of the ICMP-X board”, page 248.
Malfunction signal backplane	Replace the signal backplane. See replacement process in “Card cage” , page 229.

Code DOC-C0032: "ICMP/ICP-D not ready." (error)

Situation	Solution
Projector is fully booted, but ICMP-X or ICP-D is not yet ready.	<p>In rare cases the ICMP-X or ICP-D may start up a bit slower than the rest of the projector. When you try to start playing/injecting content when the ICMP-X or ICP-D is not yet fully started up, this error will be prompted instead.</p> <p>In this case, it's better to wait a bit until the ICMP-X / ICP-D is fully ready before performing any actions with it.</p> <p>If the ICMP-X or ICP-D stops being responsive all together, it may be advised to reboot the projector or ICMP-X.</p> <p>If problem persists, even after a few reboots, the ICMP-X or ICP-D may be malfunctioning instead.</p>
Malfunctioning ICP-D or ICMP-X	<ul style="list-style-type: none"> In case of ICP-D: Replace the ICP-D. In case of ICMP-X: Replace the ICMP-X. For more info, see "Replacement of the ICMP-X board", page 248.
Malfunction signal backplane	Replace the signal backplane. See replacement process in "Card cage", page 229 .

Code DOC-C0033: "ICMP/ICP-D connection loss." (error)

Situation	Solution
Reboot of the ICMP-X	If this message is triggered because you are rebooting the ICMP-X without rebooting the projector itself, this notification can be safely ignored.
ICMP-X or ICP-D started up correctly, but connection with it was lost afterwards.	Reboot the ICMP-X or the entire projector.
Malfunctioning ICP-D or ICMP-X	<ul style="list-style-type: none"> In case of ICP-D: Replace the ICP-D. In case of ICMP-X: Replace the ICMP-X. For more info, see "Replacement of the ICMP-X board", page 248.
Malfunction signal backplane	Replace the signal backplane. See replacement process in "Card cage", page 229 .

Code DOC-C0034: "Media server connection loss." (error)

Situation	Solution
Reboot of the ICMP-X, IMS or IMB	If this message is triggered because you are rebooting your media server without rebooting the projector itself, this notification can be safely ignored.
ICMP-X, IMS or IMB started up correctly, but connection with it was lost afterwards.	Reboot the connected media server, or reboot the entire projector.
Malfunctioning ICMP-X, IMB or IMS	<p>Replace your media server.</p> <ul style="list-style-type: none"> In case of the ICMP-X, replace the ICMP-X. For more info, see "Replacement of the ICMP-X board", page 248. In case of an IMB or IMS, consult the service manual for your media server for more information.
Malfunction signal backplane	Replace the signal backplane. See replacement process in "Card cage", page 229 .

Code DOC-C0035: “Media server not supported.” (error)

Situation	Solution
A third party media server is mounted that is not supported.	Contact Barco in order to obtain the list of supported third party media servers.

Code DOC-C0036: “Media server login failed.” (error)

Situation	Solution
Logging in to the third party media server failed.	Consult the user manual of the third party media server in order to fix this issue.

Code DOC-C0037: “Media secure server login failed.” (error)

Situation	Solution
Logging in to the third party media secure server failed.	Consult the user manual of the third party media server in order to fix this issue.

Code DOC-C0038: “Media server license is missing; grace period expires in [time].” (warning)

Situation	Solution
The license required to play the content is missing or has expired.	Contact the content provider to request a valid license before the designated time (days, hours and/or minutes) has passed.

Code DOC-C0039: “Media server license is missing; grace period has expired.” (Error)

Situation	Solution
The license required to play the content is missing or has expired.	Contact the content provider to request a valid license.

Code DOC-C0040: “Media server license applied; restart of projector needed.” (warning)

Situation	Solution
A new license has been applied to your third party media server.	Restart the projector.

Code DOC-C0041: “Media server license is not covering the media server; grace period expires in [time].” (warning)

Situation	Solution
The license for your third party media server cannot be added because it is incorrect or incomplete.	Report the error and request a new license before the designated time (days, hours and/or minutes) has passed.

Code DOC-C0042: “Media server license is not covering the media server; grace period has expired.” (Error)

Situation	Solution
The license for your third party media server cannot be added because it is incorrect or incomplete.	Report the error and request a new license.

Code DOC-C0043: “Media server license present but unable to identify the media server; grace period expires in [time].” (warning)

Situation	Solution
The license for your third party media server cannot be added because it does not match the detected media server type.	Report the error and request a new license before the designated time (days, hours and/or minutes) has passed.

Code DOC-C0044: “Media server license present but unable to identify the media server; grace period has expired.” (Error)

Situation	Solution
The license for your third party media server cannot be added because it does not match the detected media server type.	Report the error and request a new license.

Code DOC-C0045: “ICMP/ICP-D DLP engine error.” (Error)

Situation	Solution
An error has triggered related to the light processor. The light source will remain off.	This message will be triggered alongside other errors and/or warnings. Resolve these other messages first.

Code DOC-C0046: “This product is not compatible with the current hardware configuration.” (Error)



This error code is embedded in the software that runs on all Series 4 cinema projectors and variants for other markets. However, in practice this error code should only occur on the variant models configured to only run with ICP-D and no media server.

Situation	Solution
The projector doesn't detect the ICP-D.	Install an ICP-D.
The projector detects a third party media server while none should be present.	Remove the third party media server then reboot.

Situation	Solution
The projector detects an ICMP-X where none should be present.	Remove the ICMP-X and replace with an ICP-D
An update with an incorrect software package was performed.	This error can occur if the software package for a different type of projector has been installed compared to what you actually have, or if an illegitimate software was installed. Make sure you have downloaded the correct software package for your projector and perform a software update with it. See procedure “Software update” , page 22.

Code DOC-C0050: “Software configuration is not compatible with the Hardware version.” (Error)

Situation	Solution
This error appears alongside other software version related errors (e.g. software version mismatch detected for [specific] board).	Resolve those messages first.
This error appears alone. A board started up in wrong mode.	Reboot the projector (2 times at most). The projector system (CCB) will force the concerned board to start in correct mode. If problem persists, contact Barco.

Code DOC-D0013: “Diagnostic Selftest requires 'ready' state.” (warning)

Situation	Solution
The Diagnostic self-test could not be completed because the projector is not in “Ready” state.	Make sure the projector is in Ready state and try again.

Code DOC-EN0000002: “Mainboard CPU temperature value 'x' is equal or lower than threshold 'y'” (warning)

Situation	Solution
Ambient temperature too low.	Check the ambient temperature at the front air inlets of the projector. Make sure the projector operates within specs.

Code DOC-EN0000008: “Mainboard CPU temperature value 'x' is equal or higher than threshold 'y'” (error)

Situation	Solution
Ambient temperature too high.	Check the ambient temperature at the front air inlets of the projector. Make sure the projector operates within specs.
Blocked filter at the front side of the projector.	Replace the front filter. See “Checking the front filters” , page 288
Malfunction card cage fans.	Check the status of the fans of the card cage. Replace if necessary. See service procedure “Replacing a card cage fan” , page 259.

Situation	Solution
Malfunction Cinema Controller	Replace the Cinema Controller. See service procedure “Replacement of the cinema controller board” , page 242.
Malfunction card cage backplane	Replace the backplane. See service procedure “Replacement process of the signal backplane” , page 261.

This troubleshooting table applies to the following Error code numbers: EN0000004, EN0000008.

Code DOC-EN0000080: “Failed reading CPU temperature.” (error)

Situation	Solution
Malfunction Cinema Controller	Replace the Cinema Controller. See service procedure “Replacement of the cinema controller board” , page 242.
Malfunction card cage backplane	Replace the backplane. See service procedure “Replacement process of the signal backplane” , page 261.

Code DOC-EN1100308: “High voltage measured on linear output stage [1–3] of LDM x slot [1–8] connected to laser bank [1–3] of laser plate y ([color]).” (error)

Situation	Solution
This notification appears on one or a limited amount of laser banks	There may be an impact on the color performance and / or brightness. Perform the following actions may fix the issue. <ul style="list-style-type: none"> • Use Web Communicator to check the status of the last white point calibration and white point selection. A new white point calibration may fix this issue. For more info, see the projector user manual. • Replace the LDM driver board. See service procedure “Replacing a driver board in an LDM unit”, page 52. • Replace the affected laser plate. See service procedures in: “Light Source”, page 93.
This notification appears on up to three consecutive output stages of the same LDM slot: Power Circuit down within LDM driver board.	Replace the LDM driver board. See service procedure “Replacing a driver board in an LDM unit” , page 52. If error persists, replace the LDM. See service procedures in “Laser Driver Modules” , page 45.
This notification appears alongside temperature related warnings or errors on the red laser banks	Resolve the temperature related errors first. Resolving them may fix this error.
This notification appears on many laser banks.	Projector will shut down and will no longer start up until sufficient servicing actions have been taken. Replace the laser plates with bad laser banks. See service procedures in: “Light Source” , page 93.

This troubleshooting table applies to the following Error code numbers: EN1100308, EN1100408, EN1100508, EN1200308, EN1200408, EN1200508, EN1300308, EN1300408, EN1300508, EN1400308, EN1400408, EN1400508, EN1600308, EN1600408, EN1600508, EN1700308, EN1700408, EN1700508, EN1800308, EN1800408, EN1800508, EN2100308, EN2100408, EN2100508, EN2200308, EN2200408, EN2200508, EN2300408, EN2300508, EN2400308, EN2400408, EN2400508, EN2600408, EN2600508, EN2700308, EN2700408, EN2700508, EN2800308, EN2800408, EN2800508, ENd100308, ENd300408, ENd300508, ENd400308, ENd400408, ENd400508, ENd600308, ENd600408, ENd600508, ENd600508, ENd700308, ENd700408, ENd700508, ENd800308, ENd800408, ENd800508.

Code DOC-EN1100604: “High current measured on output [1–3] of LDM x slot [1–8] connected to laser bank [1–3] of laser plate y ([color]).” (warning)

Situation	Solution
Bad white point calibration	Use Web Communicator to check the status of the last white point calibration and white point selection. A new white point calibration may fix this issue. For more info, see the projector user manual.
Malfunction LDM driver board	Replace the LDM driver board. See service procedure “Replacing a driver board in an LDM unit” , page 52.

This troubleshooting table applies to the following Error code numbers: EN1100604, EN1100608, EN1100704, EN1100708, EN1100804, EN1100808, EN1200604, EN1200608, EN1200704, EN1200708, EN1200804, EN1200808, EN1300604, EN1300608, EN1300704, EN1300708, EN1300804, EN1300808, EN1400604, EN1400608, EN1400704, EN1400708, EN1400804, EN1400808, EN1600604, EN1600608, EN1600704, EN1600708, EN1600804, EN1600808, EN1700604, EN1700608, EN1700704, EN1700708, EN1700804, EN1700808, EN1800604, EN1800608, EN1800704, EN1800708, EN1800804, EN1800808, EN2100604, EN2100608, EN2100704, EN2100708, EN2100804, EN2100808, EN2200604, EN2200608, EN2200704, EN2200708, EN2200804, EN2200808, EN2300604, EN2300608, EN2300704, EN2300708, EN2300804, EN2300808, EN2400604, EN2400608, EN2400704, EN2400708, EN2400804, EN2400808, EN2500604, EN2500608, EN2500704, EN2500708, EN2500804, EN2500808, EN2600604, EN2600608, EN2600704, EN2600708, EN2600804, EN2600808, EN2700604, EN2700608, EN2700704, EN2700708, EN2700804, EN2700808, EN2800604, EN2800608, EN2800704, EN2800708, EN2800804, EN2800808, ENd100604, ENd100608, ENd100704, ENd100708, ENd100804, ENd100808, ENd200604, ENd200608, ENd200704, ENd200708, ENd200804, ENd200808, ENd300604, ENd300608, ENd300704, ENd300708, ENd300804, ENd300808, ENd400604, ENd400608, ENd400704, ENd400708, ENd400804, ENd400808, ENd600604, ENd600608, ENd600704, ENd600708, ENd600804, ENd600808, ENd700604, ENd700608, ENd700704, ENd700708, ENd700804, ENd700808, ENd800604, ENd800608, ENd800704, ENd800708, ENd800804, ENd800808.

Code DOC-EN1100c04: “High temperature measured on laser bank [1–3] of laser plate x ([color]).” (warning)

Situation	Solution
This error appears on multiple laser banks of a single laser plate: Cold plate is mounted incorrectly.	Remove and reseal the cold plate of the affected laser plate. Follow the procedures for removing and mounting laser plates to adjust the cold plate. For more info, see procedures in “Cooling circuit” , page 67.
There are multiple temperature related messages on a red laser plate: malfunction peltier element.	Check / reseal the wiring of the peltier element on the Light Source Board. Check the position of the peltier element on the laser plate. Make sure the peltier element is mounted correctly. In this case, make sure the peltier element is mounted correctly. If the problem persists, or if the peltier element is mounted correctly, the peltier element may malfunction. In this case, replace it. For checking and replacing the peltier element, see procedures in “Cooling circuit” , page 67.
This type of error appears over multiple laser plates: insufficient cooling of the light source	<ul style="list-style-type: none"> Check the tube connections between both the cooler module(s) and the light source. Make sure the tubes are properly connected. Check the LDM filter and cooler module dust filters. Clean or replace them if necessary. For more info, see “Maintenance procedures”, page 285.
Error appears alongside other cooler module related errors	Resolve cooler module related errors first.

This troubleshooting table applies to the following Error code numbers: EN1100c04, EN1100c08, EN1100d04, EN1100d08, EN1100e04, EN1100e08, EN1200c04, EN1200c08, EN1200d04, EN1200d08, EN1200e04, EN1200e08, EN1300c04, EN1300c08, EN1300d04, EN1300d08, EN1300e04, EN1300e08, EN1400c04, EN1400c08, EN1400d04, EN1400d08, EN1400e04, EN1400e08, EN1600c04, EN1600c08, EN1600d04, EN1600d08, EN1600e04, EN1600e08, EN1700c04, EN1700c08, EN1700d04, EN1700d08, EN1700e04,

EN1700e08, EN1800c04, EN1800c08, EN1800d04, EN1800d08, EN1800e04, EN1800e08, EN2100c04, EN2100c08, EN2100d04, EN2100d08, EN2100e04, EN2100e08, EN2200c04, EN2200c08, EN2200d04, EN2200d08, EN2200e04, EN2200e08, EN2300c04, EN2300c08, EN2300d04, EN2300d08, EN2300e04, EN2300e08, EN2400c04, EN2400c08, EN2400d04, EN2400d08, EN2400e04, EN2400e08, EN2500c04, EN2500c08, EN2500d04, EN2500d08, EN2500e04, EN2500e08, EN2600c04, EN2600c08, EN2600d04, EN2600d08, EN2600e04, EN2600e08, EN2700c04, EN2700c08, EN2700d04, EN2700d08, EN2700e04, EN2800c04, EN2800c08, EN2800d04, EN2800d08, EN2800e04, EN2800e08, ENd100c04, ENd100c08, ENd100d04, ENd100d08, ENd100e04, ENd100e08, ENd200c04, ENd200c08, ENd200d04, ENd200d08, ENd200e04, ENd200e08, ENd300c04, ENd300c08, ENd300d04, ENd300d08, ENd300e04, ENd300e08, ENd400c04, ENd400c08, ENd400d04, ENd400d08, ENd400e04, ENd400e08, ENd600c04, ENd600c08, ENd600d04, ENd600d08, ENd600e04, ENd600e08, ENd700c04, ENd700c08, ENd700d04, ENd700d08, ENd700e04, ENd700e08, ENd800c04, ENd800c08, ENd800d04, ENd800d08, ENd800e04, ENd800e08.

Code DOC-EN1100c20: “Open safety switch detected on laser plate x ([color]).” (warning)

Situation	Solution
The laser plate is not correctly installed	Check if the laser plate is properly installed. Make sure to respect the orientation of all laser plates and make sure that all screws of the plate are all correctly fastened. If problem persists, replace the laser plate instead. For instructions on how to remove and mount the laser plates, as well as the laser plate orientation, see procedures in “Light Source”, page 93 .
Malfunction safety switch	Replace the laser plate. For more info, see replacement process in “Light Source”, page 93 .
Malfunction Light Source board	Replace the Light Source Board. See service procedure .

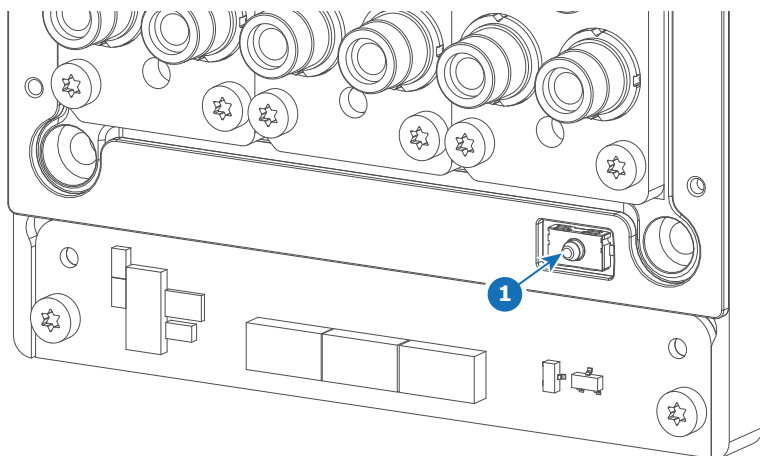


Image 16–5 Location of the safety switch on a laser plate

This troubleshooting table applies to the following Error code numbers: EN1100c20, EN1100d20, EN1100e20, EN1200c20, EN1200d20, EN1200e20, EN1300c20, EN1300d20, EN1300e20, EN1400c20, EN1400d20, EN1400e20, EN1500c20, EN1500d20, EN1500e20, EN1600c20, EN1600d20, EN1600e20, EN1700c20, EN1700d20, EN1700e20, EN1800c20, EN1800d20, EN1800e20, EN2100c20, EN2100d20, EN2100e20, EN2200c20, EN2200d20, EN2200e20, EN2300c20, EN2300d20, EN2300e20, EN2400c20, EN2400d20, EN2400e20, EN2500c20, EN2500d20, EN2500e20, EN2600c20, EN2600d20, EN2600e20, EN2700c20, EN2700d20, EN2700e20, EN2800c20, EN2800d20, EN2800e20, ENd100c20, ENd100d20, ENd100e20, ENd200c20, ENd200d20, ENd200e20, ENd300c20, ENd300d20, ENd300e20, ENd400c20, ENd400d20, ENd400e20, ENd500c20, ENd500d20, ENd500e20, ENd600c20, ENd600d20, ENd600e20, ENd700c20, ENd700d20, ENd700e20, ENd800c20, ENd800d20, ENd800e20.

Code DOC-EN1100c40: “Short circuit detected on output [1–3] of LDM x slot [1–8] connected to the temperature sensor on laser bank [1–3] of laser plate y ([color]).” (warning)

Situation	Solution
Wiring issue	Check / reseal the wiring between the LDM and the interconnection board of the affected laser plate. Replace if necessary.
Malfunction LDM driver board.	Replace the LDM driver board. See service procedure “Replacing a driver board in an LDM unit”, page 52.
Malfunction laser plate interconnection board	Replace the laser plate. See procedures in “Cooling circuit”, page 67.

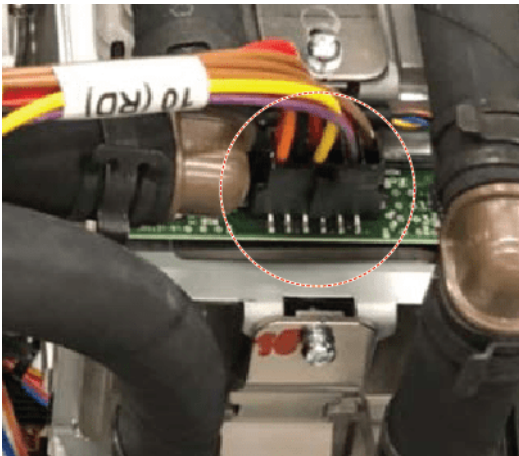


Image 16-6 Example of wiring connection between an LDM and a laser plate interconnection board

This troubleshooting table applies to the following Error code numbers: EN1100c40, EN1100d40, EN1100e40, EN1200c40, EN1200d40, EN1200e40, EN1300c40, EN1300d40, EN1300e40, EN1400c40, EN1400d40, EN1400e40, EN1600c40, EN1600d40, EN1600e40, EN1700c40, EN1700d40, EN1700e40, EN1800c40, EN1800d40, EN1800e40, EN2100c40, EN2100d40, EN2100e40, EN2200c40, EN2200d40, EN2200e40, EN2300c40, EN2300d40, EN2300e40, EN2400c40, EN2400d40, EN2400e40, EN2500c40, EN2500d40, EN2500e40, EN2600c40, EN2600d40, EN2600e40, EN2700c40, EN2700d40, EN2700e40, EN2800c40, EN2800d40, EN2800e40, ENd100c40, ENd100d40, ENd100e40, ENd200c40, ENd200d40, ENd200e40, ENd300c40, ENd300d40, ENd300e40, ENd400c40, ENd400d40, ENd400e40, ENd600c40, ENd600d40, ENd600e40, ENd700c40, ENd700d40, ENd700e40, ENd800c40, ENd800d40, ENd800e40.

Code DOC-EN1100c80: “Open circuit detected on output [1–3] of LDM x slot [1–8] connected to the temperature sensor on laser bank [1–3] of laser plate y ([color]).” (warning)

Situation	Solution
Wiring issue	Check / reseal the wiring between the LDM and the interconnection board of the affected laser plate. Replace if necessary.
Malfunction LDM driver board	Temporary swap two identical LDM driver boards. Restart the projector and search for new messages mentioning “Open circuit detected on the temperature sensor on laser bank x”. <ul style="list-style-type: none"> If the message now mentions a different laser bank, the driver board is malfunctioning. Replace the driver board. See service procedure “Replacing a driver board in an LDM unit”, page 52. If the message still mentions the same laser bank(s), there is a problem with the laser plate or the wiring between LDM and light source.
Malfunction laser plate interconnection board	Replace the laser plate. See procedures in “Cooling circuit”, page 67.



When swapping LDM boards, make sure to **only** swap boards with an identical number. Also make sure to swap the boards and NOT the wiring.
If you neglect this, you may risk damaging the device connected to the LDM driver boards.

This troubleshooting table applies to the following Error code numbers: EN1100c80, EN1100d80, EN1100e80, EN1200c80, EN1200d80, EN1200e80, EN1300c80, EN1300d80, EN1300e80, EN1400c80, EN1400d80, EN1400e80, EN1600c80, EN1600d80, EN1600e80, EN1700c80, EN1700d80, EN1700e80, EN1800c80, EN1800d80, EN1800e80, EN2100c80, EN2100d80, EN2100e80, EN2200c80, EN2200d80, EN2200e80, EN2300c80, EN2300d80, EN2300e80, EN2400c80, EN2400d80, EN2400e80, EN2600c80, EN2600d80, EN2600e80, EN2700c80, EN2700d80, EN2700e80, EN2800c80, EN2800d80, EN2800e80, ENd100c80, ENd100d80, ENd100e80, ENd200c80, ENd200d80, ENd200e80, ENd300c80, ENd300d80, ENd300e80, ENd400c80, ENd400d80, ENd400e80, ENd600c80, ENd600d80, ENd600e80, ENd700c80, ENd700d80, ENd700e80, ENd800c80, ENd800d80, ENd800e80.

Code DOC-EN1100f04: “High temperature measured on the [heatsink type] heatsink of LDM [1–2] slot [1–8].” (warning)

Situation	Solution
Operational temperature too high	Make sure the projector operates within specs.
Problem with cooling of the LDMs	Check the LDM filter. Clean or replace them if necessary. For more info, see “Checking the LDM dust filter”, page 291 . Check the LDM fans. Replace them if necessary. See service procedure “Removing a fan from an LDM”, page 55 .
Multiple notifications appear surrounding this LDM slot and the laser banks connected to this LDM slot: Malfunction LDM driver board	Replace the LDM driver board. See service procedure “Replacing a driver board in an LDM unit”, page 52 . If error persists, replace the entire LDM. See service procedures in “Laser Driver Modules”, page 45 .

This troubleshooting table applies to the following Error code numbers: EN1100f04, EN1100f08, EN1101004, EN1101008, EN1200f04, EN1200f08, EN1201004, EN1201008, EN1300f04, EN1300f08, EN1301004, EN1301008, EN1400f04, EN1400f08, EN1401004, EN1401008, EN1600f04, EN1600f08, EN1601004, EN1601008, EN1700f04, EN1700f08, EN1701004, EN1701008, EN1800f04, EN1800f08, EN1801004, EN1801008, EN2100f04, EN2100f08, EN2101004, EN2101008, EN2200f04, EN2200f08, EN2201004, EN2201008, EN2300f04, EN2300f08, EN2301004, EN2301008, EN2400f04, EN2400f08, EN2401004, EN2401008, EN2500f04, EN2500f08, EN2501004, EN2501008, EN2600f04, EN2600f08, EN2601004, EN2601008, EN2700f04, EN2700f08, EN2701004, EN2701008, EN2800f04, EN2800f08, EN2801004, EN2801008, ENd100f04, ENd100f08, ENd101004, ENd101008, ENd200f04, ENd200f08, ENd201004, ENd201008, ENd300f04, ENd300f08, ENd301004, ENd301008, ENd400f04, ENd400f08, ENd401004, ENd401008, ENd600f04, ENd600f08, ENd601004, ENd601008, ENd700f04, ENd700f08, ENd701004, ENd701008, ENd800f04, ENd800f08, ENd801004, ENd801008, EN1500304, EN1500704, EN2200304, EN2200704, EN2300304, EN2300704, EN2500304, EN2500704, EN2600304, EN2600704, EN2700304 and EN2700704.

Code DOC-EN1100f40: “Short circuit detected on the temperature sensor on the [heatsink_type] heatsink of LDM x slot [1–8].” (warning)

Situation	Solution
Malfunction LDM driver board.	Replace the LDM driver board. See service procedure “Laser Driver Modules”, page 45 . If problem persists, replace the entire LDM. See service procedures in “Removing an LDM”, page 50 and “Installing an LDM”, page 64 .

This troubleshooting table applies to the following Error code numbers: EN1100f40, EN1101040, EN1200f40, EN1201040, EN1300f40, EN1301040, EN1400f40, EN1401040, EN1600f40, EN1601040, EN1700f40, EN1701040, EN1800f40, EN1801040, EN2100f40, EN2101040, EN2200f40, EN2201040, EN2300f40, EN2301040, EN2400f40, EN2401040, EN2500f40, EN2501040, EN2600f40, EN2601040, EN2700f40,

EN2701040, EN2800f40, EN2801040, ENd100f40, ENd101040, ENd200f40, ENd201040, ENd300f40, ENd301040, ENd400f40, ENd401040, ENd600f40, ENd601040, ENd700f40, ENd701040, ENd800f40 and ENd801040.

Code DOC-EN1100f80: “Open circuit detected on the temperature sensor on the [heatsink_type] heatsink of LDM x slot [1–8].” (warning)

Situation	Solution
Malfunction LDM driver board	<p>Temporary swap two identical LDM driver boards. Restart the projector and search for new messages mentioning “Open circuit detected on the temperature sensor”.</p> <ul style="list-style-type: none"> If the message now mentions a different LDM slot, the driver board is malfunctioning. Replace the driver board. See service procedure “Laser Driver Modules”, page 45. If the message still mentions the same driver slot, there is a problem with the LDM itself. In this case, replace the entire LDM. See service procedures in “Removing an LDM”, page 50 and “Installing an LDM”, page 64.

This troubleshooting table applies to the following Error code numbers: EN1100f80, EN1101080, EN1200f80, EN1201080, EN1300f80, EN1301080, EN1400f80, EN1401080, EN1600f80, EN1601080, EN1700f80, EN1701080, EN1800f80, EN1801080, EN2100f80, EN2101080, EN2200f80, EN2201080, EN2300f80, EN2301080, EN2400f80, EN2401080, EN2500f80, EN2501080, EN2600f80, EN2601080, EN2700f80, EN2701080, EN2800f80, EN2801080, ENd100f80, ENd101080, ENd200f80, ENd201080, ENd300f80, ENd301080, ENd400f80, ENd401080, ENd600f80, ENd601080, ENd700f80, ENd701080, ENd800f80 and ENd801080.

Code DOC-EN1101101: “Overcurrent detected on output [1–3] of LDM x slot [1–3] connected to laser bank [1–3] of laser plate y ([color]).” (warning)

Situation	Solution
Overcurrent detected on wiring	<p>Check and reseal wiring between the LDM and the Light Source interconnection board.</p> <p>If problem persists, replace the wiring.</p>
Malfunction LDM board	<p>Replace LDM board. See service procedure “Replacing a driver board in an LDM unit”, page 52.</p>
malfunction laser plate interconnection board.	<p>Replace the laser plate. See service procedures in: “Light Source”, page 93.</p>

This troubleshooting table applies to the following Error code numbers: EN1101101, EN1101102, EN1101104, EN1101108, EN1101201, EN1101202, EN1101204, EN1101208, EN1101301, EN1101302, EN1101304, EN1101308, EN1201101, EN1201102, EN1201104, EN1201108, EN1201201, EN1201202, EN1201204, EN1201208, EN1201301, EN1201302, EN1201304, EN1201308, EN1301101, EN1301102, EN1301104, EN1301108, EN1301201, EN1301202, EN1301204, EN1301208, EN1301301, EN1301302, EN1301304, EN1301308, EN1401101, EN1401102, EN1401104, EN1401108, EN1401201, EN1401202, EN1401204, EN1401208, EN1401301, EN1401302, EN1401304, EN1401308, EN1601101, EN1601102, EN1601104, EN1601108, EN1601201, EN1601202, EN1601204, EN1601208, EN1601301, EN1601302, EN1601304, EN1601308, EN1701101, EN1701102, EN1701104, EN1701108, EN1701201, EN1701202, EN1701204, EN1701208, EN1701301, EN1701302, EN1701304, EN1701308, EN1801101, EN1801102, EN1801104, EN1801108, EN1801201, EN1801202, EN1801204, EN1801208, EN1801301, EN1801302, EN1801304, EN1801308, EN2101101, EN2101102, EN2101104, EN2101108, EN2101201, EN2101202, EN2101204, EN2101208, EN2101301, EN2101302, EN2101304, EN2101308, EN2201101, EN2201102, EN2201104, EN2201108, EN2201201, EN2201202, EN2201204, EN2201208, EN2201301, EN2201302, EN2201304, EN2201308, EN2301101, EN2301102, EN2301104, EN2301108, EN2301201, EN2301202, EN2301204, EN2301208, EN2301301, EN2301302, EN2301304, EN2301308, EN2401101, EN2401102, EN2401104, EN2401108, EN2401201, EN2401202, EN2401204, EN2401208, EN2401301, EN2401302, EN2401304, EN2401308, EN2501101, EN2501102, EN2501104, EN2501108, EN2501201, EN2501202, EN2501204, EN2501208, EN2501301, EN2501302, EN2501304, EN2501308, EN2601101, EN2601102, EN2601104, EN2601108, EN2601201, EN2601202, EN2601204, EN2601208, EN2601301, EN2601302, EN2601304,

EN2601308, EN2701101, EN2701102, EN2701104, EN2701108, EN2701201, EN2701202, EN2701204, EN2701208, EN2701301, EN2701302, EN2701304, EN2701308, EN2801101, EN2801102, EN2801104, EN2801108, EN2801201, EN2801202, EN2801204, EN2801208, EN2801301, EN2801302, EN2801304, EN2801308, ENd101101, ENd101102, ENd101104, ENd101108, ENd101201, ENd101202, ENd101204, ENd101208, ENd101301, ENd101302, ENd101304, ENd101308, ENd201101, ENd201102, ENd201104, ENd201108, ENd201201, ENd201202, ENd201204, ENd201208, ENd201301, ENd201302, ENd201304, ENd201308, ENd301101, ENd301102, ENd301104, ENd301108, ENd301201, ENd301202, ENd301204, ENd301208, ENd301301, ENd301302, ENd301304, ENd301308, ENd401101, ENd401102, ENd401104, ENd401108, ENd401201, ENd401202, ENd401204, ENd401208, ENd401301, ENd401302, ENd401304, ENd401308, ENd501101, ENd501102, ENd501104, ENd501108, ENd501201, ENd501202, ENd501204, ENd501208, ENd501301, ENd501302, ENd501304, ENd501308, ENd601101, ENd601102, ENd601104, ENd601108, ENd601201, ENd601202, ENd601204, ENd601208, ENd601301, ENd601302, ENd601304, ENd601308, ENd701101, ENd701102, ENd701104, ENd701108, ENd701201, ENd701202, ENd701204, ENd701208, ENd701301, ENd701302, ENd701304, ENd701308, ENd801101, ENd801102, ENd801104, ENd801108, ENd801201, ENd801202, ENd801204, ENd801208, ENd801301, ENd801302, ENd801304, ENd801308.

Code DOC-EN1101608: “High power measured on linear output stage [1–3] of LDM x slot [1–8] connected to laser bank [1–3] of laser plate y ([color]).” (warning)

Situation	Solution
Faulty white point calibration and/or white point selection	Use Web Communicator to check / redo the white point calibration and white point selection. See projector user guide for more information.
This notification appears on up to three consecutive power stages of the same LDM slot: Power circuit down within LDM driver board.	Replace the LDM driver board. See service procedure “Replacing a driver board in an LDM unit” , page 52. If error persists, replace the LDM. See service procedures in “Laser Driver Modules” , page 45.
This notification appears alongside other notifications surrounding this LDM slot: Malfunction LDM driver board.	Replace the LDM driver board. See service procedure “Replacing a driver board in an LDM unit” , page 52. If error persists, replace the LDM. See service procedures in “Laser Driver Modules” , page 45.
This notification appear alongside temperature related notifications on one or more red laser banks	Resolve the temperature related errors first.
Malfunction laser bank	Replace the laser plate on which the malfunctioning laser bank is mounted. For more info on replacing a laser plate, see service procedures in: “Light Source” , page 93.

This troubleshooting table applies to the following Error code numbers: EN1101608, EN1101708, EN1101808, EN1201608, EN1201708, EN1201808, EN1301608, EN1301708, EN1301808, EN1401608, EN1401708, EN1401808, EN1601608, EN1601708, EN1601808, EN1701608, EN1701708, EN1701808, EN1801608, EN1801708, EN1801808, EN2101608, EN2101708, EN2101808, EN2201608, EN2201708, EN2201808, EN2301608, EN2301708, EN2301808, EN2401608, EN2401708, EN2401808, EN2501608, EN2501708, EN2501808, EN2601608, EN2601708, EN2601808, EN2701608, EN2701708, EN2701808, EN2801608, EN2801708, EN2801808, ENd101608, ENd101708, ENd101808, ENd201608, ENd201708, ENd201808, ENd301608, ENd301708, ENd301808, ENd401608, ENd401708, ENd401808, ENd501608, ENd501708, ENd501808, ENd601608, ENd601708, ENd601808, ENd701608, ENd701708, ENd701808, ENd801608, ENd801708, ENd801808.

Code DOC-EN110d001: “Bad communication detected between LCB and LDM x slot [1–8].” (warning)

Situation	Solution
Difference in software packages.	Upgrade the software. See procedure “Software update”, page 22.
Malfunction LDM driver board	Replace the LDM driver board. See service procedure “Replacing a driver board in an LDM unit”, page 52. If error persists, replace the LDM. See service procedures in “Laser Driver Modules”, page 45.
There are other communication errors, including “between LCB and LDM [1–2]” communication errors.	Solve the communication errors between LCB and the entire LDM first.
There are several “between LCB and LDM [1–2] slot [1–8]” communication errors	<ul style="list-style-type: none"> • Check and reseat the data wiring between the LCB and all LDM devices. Replace if necessary. • Make sure that all LDM boards are properly seated in the LDM case. • If problem persists, replace the LDM. See service procedures in “Laser Driver Modules”, page 45.

This troubleshooting table applies to the following Error code numbers: EN110d001, EN120d001, EN130d001, EN140d001, EN150d001, EN160d001, EN170d001, EN180d001, EN210d001, EN220d001, EN230d001, EN240d001, EN250d001, EN260d001, EN270d001, EN280d001, ENd10d001, ENd20d001, ENd30d001, ENd40d001, ENd50d001, ENd60d001, ENd70d001, ENd80d001.

Code DOC-EN110d002: “No communication detected between LCB and LDM x slot [1–8].” (warning)

Situation	Solution
First install of a Laser Driver Module or driver board.	Upgrade the software. See procedure “Software update”, page 22.
Malfunction LDM driver board	Replace the LDM driver board. See service procedure “Replacing a driver board in an LDM unit”, page 52. If error persists, replace the LDM. See service procedures in “Laser Driver Modules”, page 45.
There are other communication errors, including “between LCB and LDM x” communication errors.	Solve the communication errors between LCB and the entire LDM first.
There are several “between LCB and LDM x slot [1–8]” communication errors	<ul style="list-style-type: none"> • Check and reseat the data wiring between LCB and all LDM devices. Replace if necessary. • Make sure that all LDM boards are properly seated in the LDM case. • If problem persists, replace the LDM. See service procedures in “Laser Driver Modules”, page 45.

This troubleshooting table applies to the following Error code numbers: EN110d002, EN120d002, EN130d002, EN140d002, EN150d002, EN160d002, EN170d002, EN180d002, EN210d002, EN220d002, EN230d002, EN240d002, EN250d002, EN260d002, EN270d002, EN280d002, ENd10d002, ENd20d002, ENd30d002, ENd40d002, ENd50d002, ENd60d002, ENd70d002, ENd80d002.

Code DOC-EN110d101: “Invalid module detected in LDM x slot [1–8] by the LCB.” (warning)

Situation	Solution
Older or unsupported software on Laser Driver Module	Upgrade the software. See procedure “Software update”, page 22.
This warning appears alone, or with one or more similar messages: LDM driver boards are inserted in the wrong slot.	Open the LDM and check if every LDM driver board is inserted in the correct slot.
Malfunction LDM driver board	Replace the LDM driver board. See service procedure “Replacing a driver board in an LDM unit”, page 52. If error persists, replace the LDM. See service procedures in “Laser Driver Modules”, page 45.
Multiple of these messages appear, including “Invalid LDM [1–2] detected by the LCB”.	Replace the LDM. See service procedures in “Laser Driver Modules”, page 45.

This troubleshooting table applies to the following Error code numbers: EN110d101, EN120d101, EN130d101, EN140d101, EN160d101, EN170d101, EN180d101, EN210d101, EN220d101, EN230d101, EN240d101, EN250d101, EN260d101, EN270d101, EN280d101, ENd10d101, ENd20d101, ENd30d101, ENd40d101, ENd60d101, ENd70d101, ENd80d101.

Code DOC-EN110d103: “The LCB could not initialize LDM x slot [1–8].” (warning)

Situation	Solution
LDM board lost its initialization due to LDM power failure or reset	Upgrade the software. See procedure “Software update”, page 22. Then restart the projector.

This troubleshooting table applies to the following Error code numbers: EN110d103, EN120d103, EN130d103, EN140d103, EN150d103, EN160d103, EN170d103, EN180d103, EN210d103, EN220d103, EN230d103, EN240d103, EN250d103, EN260d103, EN270d103, EN280d103, ENd10d103, ENd20d103, ENd30d103, ENd40d103, ENd50d103, ENd60d103, ENd70d103, ENd80d103.

Code DOC-EN110d104: “Module in LDM x slot [1–8] was reset unexpectedly.” (warning)

Situation	Solution
LDM controller was reset and lost its initialization.	Reboot the projector and switch on the light source.
Wiring issue on LDM	Check the wiring on all LDM boards and LDM devices. Make sure the cables are properly seated on both ends. If the problem persists, replace the wiring.
Wiring issue on LCB	Check and reseal the wiring on the LCB, especially the wiring on connector J501.

This troubleshooting table applies to the following Error code numbers: EN110d104, EN120d104, EN130d104, EN140d104, EN150d104, EN160d104, EN170d104, EN180d104, EN210d104, EN220d104, EN230d104, EN240d104, EN250d104, EN260d104, EN270d104, EN280d104, ENd10d104, ENd20d104, ENd30d104, ENd40d104, ENd50d104, ENd60d104, ENd70d104, ENd80d104.

Code DOC-EN1500308: “High temperature measured on the [heatsink type] heatsink of LDM x slot [1–8].” (error)

Situation	Solution
Operational temperature too high	Make sure the projector operates within specs.
Problem with cooling of the LDMs	Check the LDM dust filter. Clean it or replace it if necessary. For more info, see “Checking the LDM dust filter”, page 291 . Check the LDM fans. Replace them if necessary. See service procedure “Removing a fan from an LDM”, page 55 .
This error alone: Malfunction +24V module	Replace the +24V module. See service procedure “Replacing a driver board in an LDM unit”, page 52 . If error persists, replace the LDM. See service procedures in “Laser Driver Modules”, page 45 .

This troubleshooting table applies to the following Error code numbers: EN1500308, EN1500708, EN2200308, EN2200708, EN2300308, EN2300708, EN2500308, EN2500708, EN2600308, EN2600708, EN2700308 and EN2700708.

Code DOC-EN150f001: “Bad communication detected between LCB and LDM [1–2] slot [1–8].” (error)

Situation	Solution
Difference in software packages.	Upgrade the software. See procedure “Software update”, page 22 .
There are other communication errors, including “between LCB and LDM [1–2]” communication errors.	Solve the “LDM [1–2]” communication errors first.
Malfunction +24V module	Replace the +24V module. See service procedure “Replacing a driver board in an LDM unit”, page 52 . If error persists, replace the LDM. See service procedures in “Laser Driver Modules”, page 45 .
There are several “between LCB and LDM [1–2] slot [1–8]” communication errors	<ul style="list-style-type: none"> • Check and reseat the data wiring to both LDM devices. Replace if necessary. • Make sure that all LDM boards are properly seated in the LDM case. • If problem persists, replace the LDM. See service procedures in “Laser Driver Modules”, page 45.

This troubleshooting table applies to the following Error code numbers: EN150f001, EN230f001 and EN260f001.

Code DOC-EN150f002: “No communication detected between LCB and LDM [1–2] slot [1–8].” (error)

Situation	Solution
First install of a Laser Driver Module or driver board.	Upgrade the software. See procedure “Software update”, page 22 .
There are other communication notifications, including “communication between LCB and LDM [1–2]” errors.	Solve the “LDM x” communication errors first.

Situation	Solution
Malfunction +24V module	Replace the +24V module. See service procedure “Replacing a driver board in an LDM unit”, page 52. If error persists, replace the LDM. See service procedures in “Laser Driver Modules”, page 45 .
There are several “communication between LCB and LDM [1–2] slot [1–8]” notification messages.	<ul style="list-style-type: none"> • Check and reseat the wiring to both LDM devices. Replace if necessary. • Make sure that all LDM boards and 24V modules are properly seated in the LDM case. • If problem persists, replace the LDM. See service procedures in “Laser Driver Modules”, page 45.

This troubleshooting table applies to the following Error code numbers: EN150f002, EN230f002 and EN260f002.

Code DOC-EN150f101: “Invalid module detected in LDM x slot [1–8] by the LCB.” (error)

Situation	Solution
Older or unsupported software on Laser Driver Module	Upgrade the software. See procedure “Software update”, page 22.
There are other communication errors, including “between LCB and LDM x” communication errors.	Solve the “LDM x” communication errors first.
Malfunction +24V module	Replace the +24V module. See service procedure “Replacing a driver board in an LDM unit”, page 52. If error persists, replace the LDM. See service procedures in “Laser Driver Modules”, page 45 .
There are several “between LCB and LDM x slot [1–8]” communication errors	<ul style="list-style-type: none"> • Check and reseat the data wiring to both LDM devices. Replace if necessary. • Make sure that all LDM boards and 24V modules are properly seated in the LDM case. • If problem persists, replace the LDM. See service procedures in “Laser Driver Modules”, page 45.

This troubleshooting table applies to the following Error code numbers: EN150f101, EN220f101, EN230f101, EN250f101, EN260f101 and EN270f101.

Code DOC-EN150f103: “The LCB could not initialize LDM x slot [1–8].” (error)

Situation	Solution
+24V module lost its initialization due to LDM power failure or reset	Upgrade the software to the latest version. See procedure “Software update”, page 22. Then restart the projector.

This troubleshooting table applies to the following Error code numbers: EN150f103, EN220f103, EN230f103, EN250f103, EN260f103 and EN270f103.

Code DOC-EN150f104: “Module in LDM x slot [1–8] was reset unexpectedly.” (error)

Situation	Solution
LDM controller was reset and lost its initialization.	Reboot the projector and switch on the lasers.
Wiring issue on LDM	Check the wiring on all boards and LDM devices. Make sure the cables are properly seated on both ends. If the problem persists, replace the wiring.
Wiring issue on LCB	Check and reseal the wiring on the LCB, especially the wiring on connector J501.

This troubleshooting table applies to the following Error code numbers: EN150f104, EN220f104, EN230f104, EN250f104, EN260f104 and EN270f104.

Code DOC-EN1500002: “Low voltage measured on the 24V output of LDM x slot [1–8].” (warning)

Situation	Solution
Cable / connection issue	Check / reseal the wire unit between the LDM slot and the Light Source Board (connectors J110 or J111).
Malfunction +24V module	Replace the +24V module in the LDM slot. See service procedure “Replacing a driver board in an LDM unit”, page 52. If problem persists, replace the entire LDM. See service procedures in “Laser Driver Modules”, page 45 .
Malfunction Light Source Board	Replace the Light Source Board. See service procedure “Replacing the Light Source board”, page 98.

This troubleshooting table applies to the following Error code numbers: EN1500002, EN2200002, EN2300002, EN2500002, EN2600002 and EN2700002.

Code DOC-EN1500004: “High voltage measured on the 24V output of LDM x slot [1–8].” (error)

Situation	Solution
Malfunction +24V module	Replace the +24V module in the LDM slot. See service procedure “Replacing a driver board in an LDM unit”, page 52. If problem persists, replace the entire LDM. See service procedures in “Laser Driver Modules”, page 45 .

This troubleshooting table applies to the following Error code numbers: EN1500004, EN2200004, EN2300004, EN2500004, EN2600004 and EN2700004.

Code DOC-EN1a00001: “Low voltage measured on the 15VM of LDM x.” (error)

Situation	Solution
Malfunction Laser Driver Module base board.	Replace the LDM. See service procedures in “Laser Driver Modules”, page 45 .

This troubleshooting table applies to the following Error code numbers: EN1a00001, EN2a00001, ENda00001.

Code DOC-EN1a00008: “High voltage measured on the 15VM of LDM x.” (error)

Situation	Solution
Malfunction Laser Driver Module base board.	Replace the LDM. See service procedures in “ Laser Driver Modules ”, page 45 .

This troubleshooting table applies to the following Error code numbers: EN1a00008, EN2a00008, ENda00008.

Code DOC-EN1a00101: “Low voltage measured on the 380VM of LDM x.” (error)

Situation	Solution
Malfunction Laser Driver Module – PFC function is not working.	Replace the LDM. See service procedures in “ Laser Driver Modules ”, page 45 .

This troubleshooting table applies to the following Error code numbers: EN1a00101, EN2a00101, ENda00101.

Code DOC-EN1a00108: “High voltage measured on the 380VM of LDM x.” (error)

Situation	Solution
Malfunction Laser Driver Module – PFC function is not working.	Replace the LDM. See service procedures in “ Laser Driver Modules ”, page 45 .

This troubleshooting table applies to the following Error code numbers: EN1a00108, EN2a00108, ENda00108.

Code DOC-EN1a00201: “Low voltage measured on the 380VMA of LDM x.” (error)

Situation	Solution
Malfunction Laser Driver Module – PFC Aux is not working.	Replace the LDM. See service procedures in “ Laser Driver Modules ”, page 45 .

This troubleshooting table applies to the following Error code numbers: EN1a00201, EN2a00201, ENda00201.

Code DOC-EN1a00208: “High voltage measured on the 380VMA of LDM x.” (error)

Situation	Solution
Malfunction Laser Driver Module – PFC Aux is not working.	Replace the LDM. See service procedures in “ Laser Driver Modules ”, page 45 .

This troubleshooting table applies to the following Error code numbers: EN1a00208, EN2a00208, ENda00208.

Code DOC-EN1a00301: “Low voltage measured on the mains input of LDM x.” (error)

Situation	Solution
Wiring issue	Check wiring between the LDM and the mains. Replace the power cable if necessary.
Malfunction mains voltage	See Mains voltage errors.

This troubleshooting table applies to the following Error code numbers: EN1a00301, EN2a00301, ENda00301, EN1a00302, EN2a00302, ENda00302.

Code DOC-EN1a00308: “High voltage measured on the mains input of LDM x.” (error)

Situation	Solution
Wiring issue	Check wiring between LDM and the mains. Replace the power cable if necessary.
Malfunction mains voltage	See Mains voltage errors.

This troubleshooting table applies to the following Error code numbers: EN1a00308, EN2a00308, ENda00308;

Code DOC-EN1a00408: “High temperature measured on the [heatsink type] of LDM x.” (error)

Situation	Solution
Operational temperature too high	Make sure the projector operates within specs.
Problem with cooling of the LDMs	Check the LDM dust filter. Clean it or replace it if necessary. For more info, see “Checking the LDM dust filter”, page 291 . Check the LDM fans. Replace them if necessary. See service procedure “Removing a fan from an LDM”, page 55 .
Malfunction Laser Driver Module	Replace the LDM. See service procedures in “Laser Driver Modules”, page 45 .

This troubleshooting table applies to the following Error code numbers: EN1a00408, EN1a00508, EN1a00608, EN2a00408, EN2a00508, EN2a00608, ENda00408, ENda00508 and ENda00608.

Code DOC-EN1a0f801: “Low voltage detected by the LCB on the 380VM of LDM x.” (error)

Situation	Solution
+380VM PFC voltage temporarily dropped below 360V.	This message is a hard-coded check for safety reason and is usually preceded by the warning message EN1a00102, EN2a00102 or ENda00102 (low voltage measured). The warnings may have disappeared and the projector will probably continue playing. But it is necessary to keep an eye on this LDM and this type of notifications. If this type of message appears on a frequent basis, the +380VM PFC function of the LDM is not working correctly. In this case, replace the LDM. See service procedures in “Laser Driver Modules”, page 45 .

This troubleshooting table applies to the following Error code numbers: EN1a0f801, EN2a0f801, ENda0f801.

Code DOC-EN1a0f802: “Low voltage detected by the LCB on the 380VMA of LDM x.” (error)

Situation	Solution
+380VMA PFC voltage temporarily dropped below 360V.	<p>This message is hard-coded check for safety reason and is usually preceded by the warning message EN1a00202, EN2a00202 or ENda00202 (low voltage measured).</p> <p>The warning may have gone away and the projector will probably continue playing, but it is necessary to keep an eye on this LDM and this type of notifications. If this type of message appears on a frequent basis, the +380VMA PFC function is not working correctly. In this case, replace the LDM. See service procedures in “Laser Driver Modules”, page 45.</p>

This troubleshooting table applies to the following Error code numbers: EN1a0f802, EN2a0f802, ENda0f802.

Code DOC-EN1a0f001: “Bad communication detected between LCB and LDM x.” (error)

Situation	Solution
Difference in software packages between LCB and LDM.	Upgrade the software to the latest version. See procedure “Software update”, page 22 .
Only this Laser Driver Module has a communication error	<ol style="list-style-type: none"> 1. Check if the LDM is powered. Ensure that the LDM is correctly wired. 2. Check if the wire unit between the LDM and Laser Control Board (connector J500) properly inserted. If problem persists, replace the communication cable. 3. If problem persists, replace the LDM. See service procedures in “Laser Driver Modules”, page 45.
There are communication errors with other devices: Malfunction LCB	Replace the LCB. See service procedure “Replacing the Laser Control Board (LCB)”, page 116 .

This troubleshooting table applies to the following Error code numbers: EN1a0f001, EN1b0f001, EN2a0f001, EN2b0f001, ENda0f001, ENdb0f001.

Code DOC-EN1a0f002: “No communication detected between LCB and LDM x.” (error)

Situation	Solution
First install of Laser Driver Module	Upgrade the software to the latest version. See procedure “Software update”, page 22 .
LDM has no power	Ensure the LDM is powered. Make sure it is correctly wired.
Cable issues between LDM and LCB	<ol style="list-style-type: none"> 1. Check communication wiring between LDM and Laser Control Board (connector J500). Make sure it is properly inserted. 2. If problem persists, replace the communication cable.
There are communication errors with other devices: Malfunction LCB	Replace the LCB. See service procedure “Replacing the Laser Control Board (LCB)”, page 116 .

This troubleshooting table applies to the following Error code numbers: EN1a0f002, EN1b0f002, EN2b0f001, EN2b0f002, ENdb0f001, ENdb0f002.

Code DOC-EN1a0f101: “Invalid LDM x detected by the LCB.” (error)

Situation	Solution
Older or unsupported software on Laser Driver Module	Upgrade the software to the latest version. See procedure “Software update”, page 22.
Wrong LDM type is inserted.	Replace the LDM. See service procedures in “Laser Driver Modules”, page 45.

This troubleshooting table applies to the following Error code numbers: EN1a0f101, EN1b0f101, EN2a0f101, EN2b0f101, ENda0f101, ENdb0f101.

Code DOC-EN1a0f103: “The LCB could not initialize LDM x.” (error)

Situation	Solution
Older or unsupported software on Laser Driver Module	Upgrade the software to the latest version. See procedure “Software update”, page 22.
Wiring issue	<ol style="list-style-type: none"> 1. Check communication wiring between LDM and Laser Control Board (connector J500). Make sure it is properly inserted. 2. If problem persists, replace the communication cable.

This troubleshooting table applies to the following Error code numbers: EN1a0f103, EN1b0f103, EN2a0f103, EN2b0f103, ENda0f103, ENdb0f103.

Code DOC-EN1a0f104: “LDM x was reset unexpectedly.” (error)

Situation	Solution
LDM controller was reset and lost its initialization.	Reboot the projector and switch on the lasers.
Wiring issue on LDM	<p>Check the mains connection to the LDM. Make sure the cable is properly seated on both ends.</p> <p>If the problem persists, replace the power cable.</p>
Wiring issue on LCB	Check and reseal the wiring on the LCB, especially the wiring on connector J501.

This troubleshooting table applies to the following Error code numbers: EN1a0f104, EN1b0f104, EN2a0f104, EN2b0f104, ENda0f104, ENdb0f104.

Code DOC-EN1b00001: “Low speed measured on fan [1–2] of LDM x.” (error)

Situation	Solution
Error on one fan of the Laser Driver Module	<ol style="list-style-type: none"> 1. Check fan wire connection on the base board of the LDM (reference 1, Image 16–7). 2. Check if the fan is not blocked. 3. Malfunctioning fan. Replacement needed. <p>For removing and replacing the fan, see procedure “Removing a fan from an LDM”, page 55.</p>
Error on both fans of the LDM. Malfunction base board of LDM.	Replace the LDM. See service procedures in “Laser Driver Modules”, page 45.

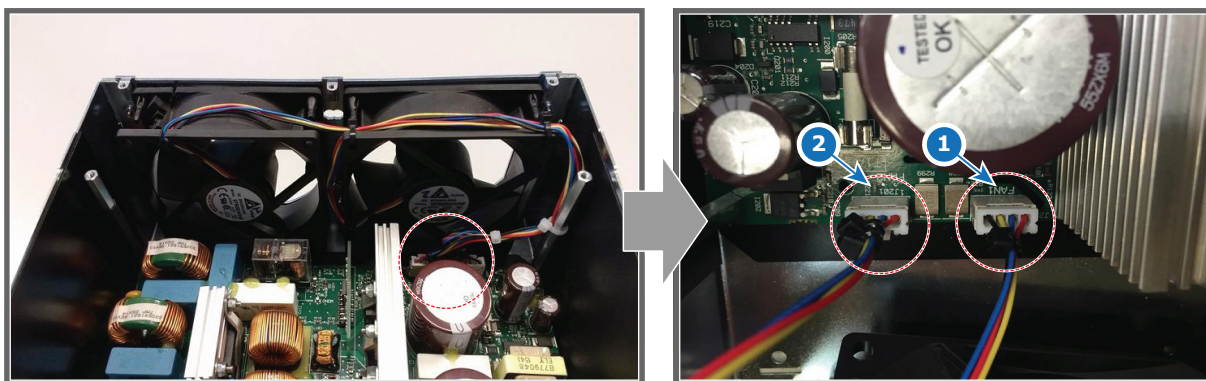


Image 16-7 Location of the LDM fan wiring connectors

- 1 Fan 1
- 2 Fan 2

This troubleshooting table applies to the following Error code numbers: EN1b00001, EN1b00101, EN2b00001, EN2b00101, ENdb00001, ENdb00101.

Code DOC-EN1b00201: “Low voltage measured on the 12V of LDM x.” (error)

Situation	Solution
Faulty LDM driver board	Check which LDM driver board is faulty. Remove one or multiple driver boards to see which board triggers the +12V error. See service procedure “Replacing a driver board in an LDM unit”, page 52.

This troubleshooting table applies to the following Error code numbers: EN1b00201, EN2b00201, ENdb00201.

Code DOC-EN1b00208: “High voltage measured on the 12V of LDM x.” (error)

Situation	Solution
Malfunction LDM	Replace the LDM. See service procedures in “Laser Driver Modules”, page 45.

This troubleshooting table applies to the following Error code numbers: EN1b00208, EN2b00208, ENdb00208.

Code DOC-EN1b00301: “Low voltage measured on the 24V of LDM x.” (error)

Situation	Solution
Malfunction LDM fan(s)	<ol style="list-style-type: none"> 1. Check fan wire connection on the base board of the LDM (reference 1, Image 16-7). 2. Check if the fan is not blocked . 3. Malfunctioning fan. Replacement needed. <p>For removing and replacing the fan, see procedure “Removing a fan from an LDM”, page 55.</p>

This troubleshooting table applies to the following Error code numbers: EN1b00301, EN2b00301, ENdb00301.

Code DOC-EN1b00308: “High voltage measured on the 24V of LDM x.” (error)

Situation	Solution
Malfunction LDM	Replace the LDM. See service procedures in “Laser Driver Modules”, page 45 ..

This troubleshooting table applies to the following Error code numbers: EN1b00308, EN2b00308, ENdb00308.

Code DOC-EN1b00408: “High temperature measured on the main board of LDM x.” (error)

Situation	Solution
Ambient temperature too high.	Check the ambient temperature at the air inlet at the bottom of the projector. Make sure the projector operates within specs.
Blocked air inlet.	Check the bottom plate of the projector. Make sure the air inlet that towards the LDM fans is free of blockage.

This troubleshooting table applies to the following Error code numbers: EN1b00408, EN2b00408, ENdb00408.

Code DOC-EN3000004: “High temperature measured on the LCB.” (warning)

Situation	Solution
Ambient temperature too high.	Ensure that the ambient temperature of the projector is within spec.
Malfunction temperature sensor on LCB.	Replace the LCB. See service procedure “Replacing the Laser Control Board (LCB)” , page 116.

Code DOC-EN3000040: “Defective temperature sensor detected on the LCB.” (error)

Situation	Solution
Malfunction temperature sensor on LCB.	Replace the LCB. See service procedure “Replacing the Laser Control Board (LCB)” , page 116.

This troubleshooting table applies to the following Error code numbers: EN3000040, EN3000080.

Code DOC-EN3000404: “High temperature measured at the inlet of the light source cooling assembly [1–2].” (warning)

Situation	Solution
This error appears alongside other temperature errors.	Resolve the temperature related errors first.
This error appears alongside internal liquid cooler fan errors	Resolve the fan-related errors first.
Delta temperature coolant liquid in Vs. out becomes too high	Make sure the air inputs of the projector are not covered. Check the Metal filters of the projectors. Clean or replace them if necessary. See service procedures in “Maintenance procedures” , page 285.
Malfunction LCB	Replace the LCB. See service procedure “Replacing the Laser Control Board (LCB)” , page 116.

This troubleshooting table applies to the following Error code numbers: EN3000404, EN3000504.

Code DOC-EN3000440: “Short circuit detected on the temperature sensor at the [inlet/outlet] of the light source cooling assembly [1–2].” (error)

Situation	Solution
Malfunction temperature sensor	<p>Switch the connectors J403 and J405 on the LCB with connectors J404 and J406 respectively and check if the error message switches as well (see Image 16–8).</p> <p>If the errors switch from light source cooling assembly 1 to 2 (or vice versa), there is a malfunction on the temperature sensor. In this case, replace the cooler module. See procedures in “Cooling circuit”, page 67.</p> <p>If the errors remain on the same cooling assembly, the LCB is malfunctioning instead.</p>
Malfunction LCB	<p>Replace the LCB. See service procedure “Replacing the Laser Control Board (LCB)”, page 116.</p>

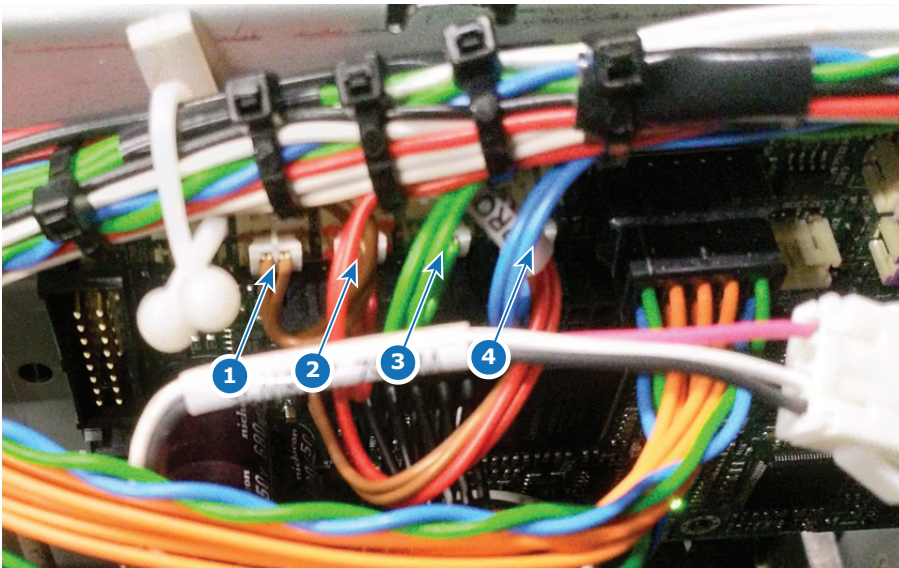


Image 16–8 Location of the temperature sensor connectors on the LCB

- 1 Connector J403 (brown wiring)
- 2 Connector J404 (red wiring)
- 3 Connector J405 (green wiring)
- 4 Connector J406 (blue wiring)

This troubleshooting table applies to the following Error code numbers: EN3000440, EN3000540, EN3000640 and EN3000740.

Code DOC-EN3000480: “Open circuit detected on the temperature sensor at the [inlet/outlet] of the light source cooling assembly [1–2].” (error)

Situation	Solution
Wiring issue	Check / reseat the wiring on the LCB connectors J403–J406 (see Image 16–8). If the problem persists, replace the cooling assembly. See procedures in “Cooling circuit” , page 67.
Malfunction temperature sensor	Switch the connectors J403 and J405 on the LCB with connectors J404 and J406 respectively and check if the error message switches as well (see Image 16–8). If the errors switch from light source cooling assembly 1 to 2 (or vice versa), there is a malfunction on the temperature sensor. In this case, replace the cooler module. See procedures in “Cooling circuit” , page 67. If the errors remain on the same cooling assembly, the LCB is malfunctioning instead.
Malfunction LCB	Replace the LCB. See service procedure “Replacing the Laser Control Board (LCB)” , page 116.

This troubleshooting table applies to the following Error code numbers: EN3000480, EN3000580, EN3000680 and EN3000780.

Code DOC-EN3000604: “High temperature measured at the outlet of the light source cooling assembly [1–2].” (warning)

Situation	Solution
Delta temperature coolant in-out becomes too high	Check the Metal filters of the projectors. Clean or replace them if necessary. See service procedures in “Maintenance procedures” , page 285.
Malfunction temperature sensor	Replace the LCB. See service procedure “Replacing the Laser Control Board (LCB)” , page 116.

This troubleshooting table applies to the following Error code numbers: EN3000604 and EN3000704.

Code DOC-EN3000802: “Low air pressure measured.” (warning)

Situation	Solution
Altitude of projector installation is too high.	Ensure that environmental conditions comply with the operation requirements of the projector. See installation manual of the projector for detailed installation requirements.
Malfunction air pressure sensor on LCB.	Replace the Laser Control Board (LCB). See service procedure “Replacing the Laser Control Board (LCB)” , page 116.

Code DOC-EN3000a02: “Low voltage measured on the 24V input of the LCB.” (warning)

Situation	Solution
Bad wiring connection	Check the wiring between the SMPS and LCB connector J900 . Make sure the cable is properly seated. If problem persists, replace the cable.
Malfunction SMPS	Replace the SMPS. For more info, see “Replacement of the Switched Mode Power Supply (SMPS)” , page 246.
Malfunction LCB.	Replace the Laser Control Board (LCB). See service procedure “Replacing the Laser Control Board (LCB)” , page 116.

Code DOC-EN3000a04: “High voltage measured on the 24V input of the LCB.” (warning)

Situation	Solution
In combination with other +24V errors: malfunction SMPS	Replace the SMPS. For more info, see “Replacement of the Switched Mode Power Supply (SMPS)” , page 246.
This error alone: Malfunction LCB.	Replace the Laser Control Board (LCB). See service procedure “Replacing the Laser Control Board (LCB)” , page 116.

Code DOC-EN3000c02: “Low speed measured on fan [1–2] of the light source cooling assembly [1–2].” (warning)

Situation	Solution
Wiring issue	Check / reseal the cooling assembly wiring connectors (reference 1 on both Image 16–9 and Image 16–10) and the Fan connector on the LCB (J600).
Damaged fan	<ol style="list-style-type: none"> 1. Remove the fan from the cooler module and check if the fan is not blocked. Remove any blockage. 2. If not blocked, replace the fan. <p>For more info on removing the cooling module and replacing the fan, see “Replacing a fan from a laser cooler assembly”, page 73.</p>
Malfunction LCB	Replace the Laser Control Board (LCB). See service procedure “Replacing the Laser Control Board (LCB)” , page 116.

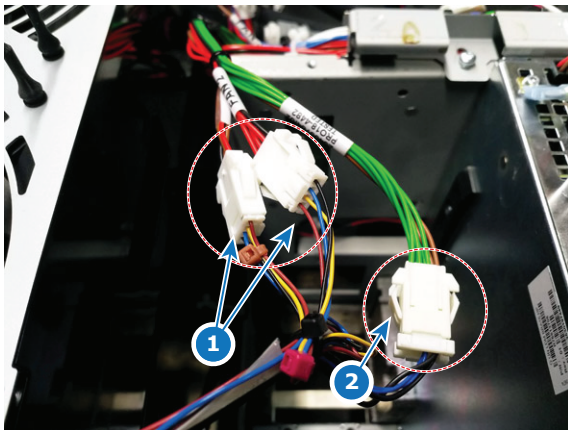


Image 16–9 Connectors cooler module 1

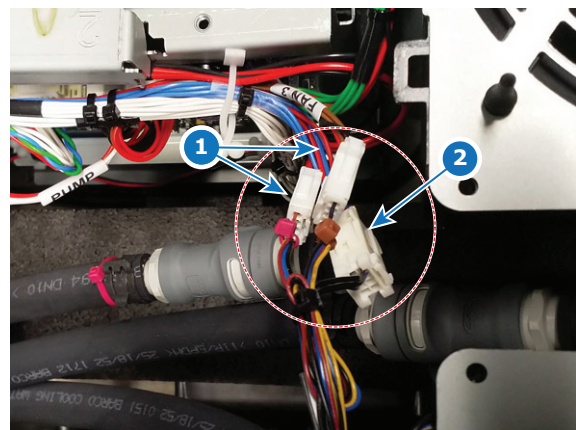


Image 16–10 Connectors cooler module 2

This troubleshooting table applies to the following Error code numbers: **EN3000c02**, **EN3000d02**, **EN3000e02** and **EN3000f02**.

Code DOC-EN3001101: “Low speed measured on the pump of the light source pump assembly.” (error)

Situation	Solution
Wiring issue	Check wire unit connection between the pump assembly and the LCB (reference 3, Image 16–11). Make sure the wiring is properly connected.
Damaged pump	Replace the pump assembly. See procedures in “Replacing the main pump assembly” , page 76.
Malfunction LCB	Replace the Laser Control Board (LCB). See service procedure “Replacing the Laser Control Board (LCB)” , page 116.

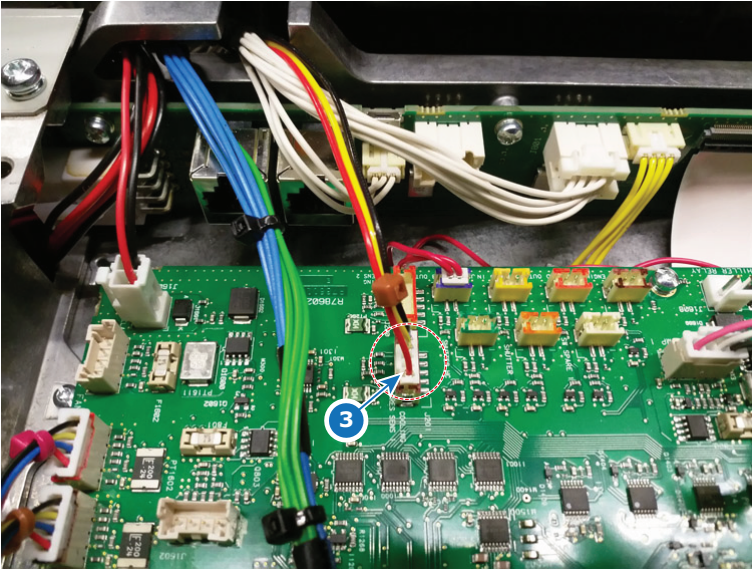


Image 16-11 Location of the main pump connector

Code DOC-EN3001401: “Open safety switch detected on the light source.” (error)

Situation	Solution
The Light Source is not correctly installed	Check if the Light Source is properly installed. Make sure that all fixation screws are all fastened (references 1 and 2, Image 16-12). If problem persists, carefully lift the Light source up and mount it again. Make sure the light source is properly mounted this time. For instructions on how to properly lift the light source up and down, see service chapter “ Light Source ”, page 93 .
Safety switch disconnected	Check / Reseat the Safety Switches connector on the Laser Control Board (connector J501). If problem persists, replace the wire unit.
Malfunction safety switch	Replace the safety switch. For more info, see “ Light Source ”, page 93 .
Malfunction LCB	Replace the Laser Control Board (LCB). See service procedure “ Replacing the Laser Control Board (LCB) ”, page 116 .

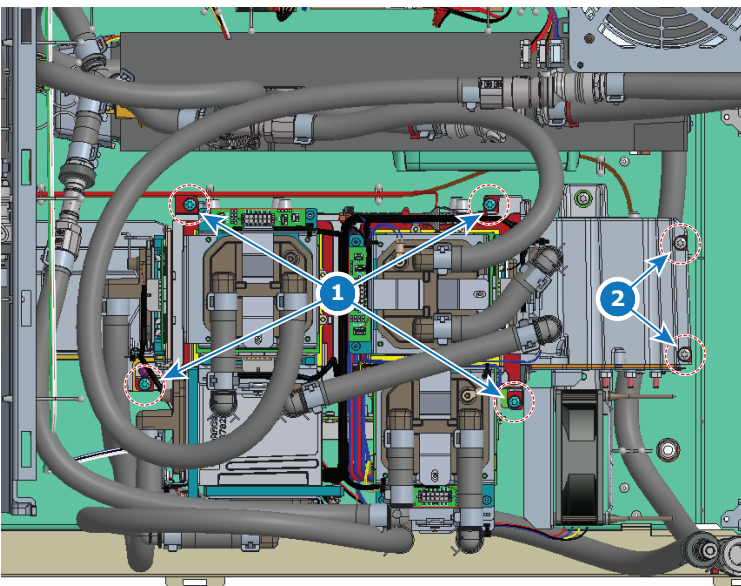


Image 16-12 Location of the set screws and extra screws on the light source

- 1 Set screws location
- 2 Extra screws location

This troubleshooting table applies to the following Error code numbers: EN3001401, EN3001402, EN3001404 and EN3001408.

Code DOC-EN3001501: “Open safety switch detected on the pre-rod switch.” (error)

Situation	Solution
The Light pipe cover is not correctly mounted	Check if the Light Pipe covers are correctly installed. If problem persists, remove and mount the covers again. For more info, see “Accessing the Light Pipe components”, page 124.
Safety switch disconnected	Check / Reseat the Safety Switches connector on the Laser Control Board (connector J501). If problem persists, replace the wire unit.
Malfunction safety switch	Replace the safety switch. For more info, see “Replacing the pre-rod assembly safety switch”, page 136.
Malfunction LCB	Replace the Laser Control Board (LCB). See service procedure “Replacing the Laser Control Board (LCB)”, page 116.

This troubleshooting table applies to the following Error code numbers: **EN3001501, EN3001502, EN3001504 and EN3001508.**

Code DOC-EN3001601: “Open safety wire loop detected on the LCB: connector J501 - pin x / pin y.” (error)

Situation	Solution
Safety Switches connector not properly connected.	Check / Reseat the Safety Switches connector on the Laser Control Board (connector J501). If problem persists, replace the wire unit.
Malfunction LCB	Replace the Laser Control Board (LCB). See service procedure “Replacing the Laser Control Board (LCB)”, page 116.

This troubleshooting table applies to the following Error code numbers: **EN3001601, EN3001602, EN3001604, EN3001608, EN3001701, EN3001702, EN3001704, EN3001708, EN3001801, EN3001802, EN3001804, EN3001808, EN3001901, EN3001902, EN3001904 and EN3001908.**

Code DOC-EN3001a01: “Light source forced off on demand of the FMCB.” (error)

Situation	Solution
Light Source switched off due to an error detected by the Fan and Motor Control Board.	This error will appear together with other error or warning messages related to a component connected to the FMCB (e.g. SMPS, light processor, fans, cooling, etc). Resolve those messages first.

This troubleshooting table applies to the following Error code numbers: EN3001a01, EN3001a02, EN3001a04, EN3001a08.

Code DOC-EN3001b04: “High humidity measured on the LCB.” (warning)

Situation	Solution
Ambient humidity is high	Ensure that the ambient humidity of the projector is within spec.
Malfunction humidity sensor on LCB.	Replace the LCB. See service procedure “Replacing the Laser Control Board (LCB)”, page 116.

Code DOC-EN300c001: “Laser plate x temperature above or below target.” (warning)

Situation	Solution
Temperature related issue detected on one or more of the laser plates	This error will appear together with other error or warning messages related to a component connected to the laser plates (e.g. LDM, LSB, laser banks, cooling, etc). Resolve those messages first.

This troubleshooting table applies to the following Error code numbers: EN300c001, EN300c002, EN300c003, EN300c004, EN300c005, EN300c006, EN300c007, EN300c008, EN300c009, EN300c00a, EN300c00b, EN300c00c, EN300c00d, EN300c00e, EN300c00f, EN300c010, EN300c011, EN300c012, EN300c013, EN300c014.

Code DOC-EN300d301: “Laser bank [1–3] of laser plate [1–10] is off unexpectedly.” (warning)

This warning message will be accompanied with a yellow status screen on the touch display. The projector will remain on, but a notable color difference will be visible.

Situation	Solution
Laser bank is off due to other laser bank related errors.	Look in the projector log files for error entries for this specific laser bank before it was turned off (other than this error). These errors are of the format “LDM [1–2] slot [1–8] connected to laser bank [1–3] of laser plate [1–10]”. Resolve these errors first.
Laser bank didn't switch on because of failing self-test	Using Web Communicator, make sure the projector is in Optical alignment mode. Try to turn on all lasers at minimum power. 1. No current: Check / reseal the cabling between LDM driver module and laser plate interconnection board. Check / reseal the cabling between laser plate and Light Source Board. 2. Current more than 0A: Check the light sensor functionality, the cabling and the mounting (check for errors mentioning one of these). Also check the optical alignment to maximize light output.
Bad / No connection between light source and LDM board	Check / reseal the wiring between the applicable LDM board and light source.
Error appears on 3 consecutive laser banks, controlled by the same LDM driver board: malfunction laser driver board	Temporary swap 2 LDM driver boards of the same type and check for the “bank x is off” messages. Ignore any other new messages triggered by this swapping. If the warning changes to other laser banks, replace the LDM driver board. See service procedure “Replacing a driver board in an LDM unit”, page 52 . If the warning remains on the same laser bank(s), do the following in order and check if the error has disappeared after each action. <ul style="list-style-type: none"> • Check/measure the fuse behind the LDM driver board (Image 16–13). If it has blown, replace it. • Replace the cable between LDM board and light source. • Replace the entire LDM. See service procedure “Replacing an LDM”, page 61. • If problem persists after replacing the entire LDM, the laser banks malfunction. Replace the light source. <p>Note: Do not forget to place the swapped LDM boards back in their original position after the check has been completed.</p>
malfunction laser bank	Replace the laser plate with the affected laser bank. See service procedures in “Light Source”, page 93 .



When swapping LDM boards, make sure to **only** swap boards with an identical number. Also make sure to swap the boards and NOT the wiring.
If you neglect this, you may risk damaging the device connected to the LDM driver boards.



It can be handy to completely restart the projector after performing any action to remove this message.

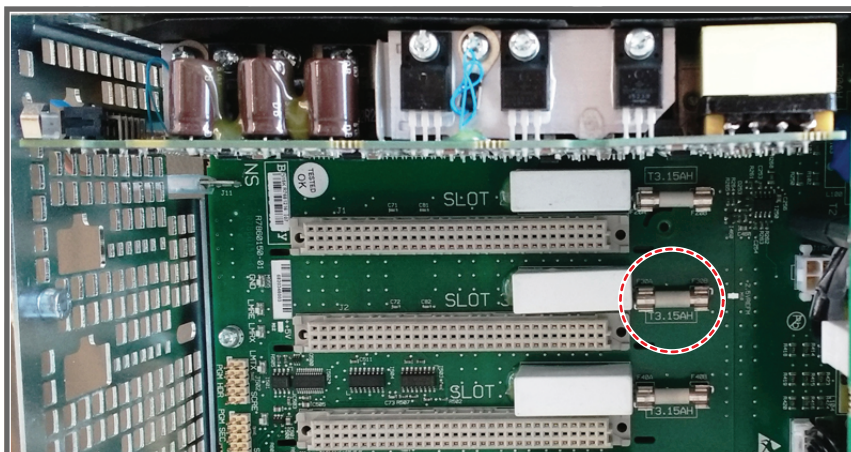


Image 16–13 Location of the Fuse.

This troubleshooting table applies to the following Error code numbers: EN300d301, EN300d302, EN300d303, EN300d304, EN300d305, EN300d306, EN300d307, EN300d308, EN300d309, EN300d30a, EN300d30b, EN300d30c, EN300d30d, EN300d30e, EN300d30f, EN300d310, EN300d311, EN300d312, EN300d313, EN300d314, EN300d315, EN300d316, EN300d317, EN300d318, EN300d319, EN300d31a, EN300d31b, EN300d31c, EN300d31d, EN300d31e, EN300d31f, EN300d320, EN300d321, EN300d322, EN300d323, EN300d324, EN300d325, EN300d326, EN300d327, EN300d328, EN300d329, EN300d32a, EN300d32b.

Code DOC-EN300da00: “Light source forced at reduced power of [0–99] %.” (warning)

Situation	Solution
Light source power is reduced as a preventive measure to protect the light source and the projector electronics	This warning is triggered alongside other notification messages. Search through the other notification messages for possible causes and resolve them.

This troubleshooting table applies to the following Error code numbers: EN300da00, EN300da01, EN300da02, EN300da03, EN300da04, EN300da05, EN300da06, EN300da07, EN300da08, EN300da09, EN300da0a, EN300da0b, EN300da0c, EN300da0d, EN300da0e, EN300da0f, EN300da10, EN300da11, EN300da12, EN300da13, EN300da14, EN300da15, EN300da16, EN300da17, EN300da18, EN300da19, EN300da1a, EN300da1b, EN300da1c, EN300da1d, EN300da1e, EN300da1f, EN300da20, EN300da21, EN300da22, EN300da23, EN300da24, EN300da25, EN300da26, EN300da27, EN300da28, EN300da29, EN300da2a, EN300da2b, EN300da2c, EN300da2d, EN300da2e, EN300da2f, EN300da30, EN300da31, EN300da32, EN300da33, EN300da34, EN300da35, EN300da36, EN300da37, EN300da38, EN300da39, EN300da3a, EN300da3b, EN300da3c, EN300da3d, EN300da3e, EN300da3f, EN300da40, EN300da41, EN300da42, EN300da43, EN300da44, EN300da45, EN300da46, EN300da47, EN300da48, EN300da49, EN300da4a, EN300da4b, EN300da4c, EN300da4d, EN300da4e, EN300da4f, EN300da50, EN300da51, EN300da52, EN300da53, EN300da54, EN300da55, EN300da56, EN300da57, EN300da58, EN300da59, EN300da5a, EN300da5b, EN300da5c, EN300da5d, EN300da5e, EN300da5f, EN300da60, EN300da61, EN300da62, EN300da63.

Code DOC-EN300db01: “Unable to read the identification data of laser plate x.” (warning)

Situation	Solution
Wiring issue	Check / reseat the wiring between the Light Source Board and the small interconnection boards of the laser plates. Replace the wiring if necessary.
Malfunction laser plate	Replace the laser plate. For more info, see procedures in “Light Source”, page 93 .
Malfunction Light Source Board	Replace the LSB. For more info, see “Replacing the Laser Control Board (LCB)”, page 116 .

This troubleshooting table applies to the following Error code numbers: EN300db01, EN300db02, EN300db03, EN300db04, EN300db05, EN300db06, EN300db07, EN300db08, EN300db09, EN300db0a, EN300db0b, EN300db0c, EN300db0d, EN300db0e, EN300db0f, EN300db10, EN300db11, EN300db12, EN300db13, EN300db14.

Code DOC-EN300dc01: “Invalid identification data detected on laser plate x.” (warning)

Situation	Solution
Laser plate has been swapped with a non-Barco branded spare part.	Only use spare parts that originate from Barco. Contact Barco on how to further handle this situation.
Identification data on laser plate has been tampered with.	Do not tamper with data on laser plates. Contact Barco on how to further handle this situation.

This troubleshooting table applies to the following Error code numbers: EN300dc01, EN300dc02, EN300dc03, EN300dc04, EN300dc05, EN300dc06, EN300dc07, EN300dc08, EN300dc09, EN300dc0a, EN300dc0b, EN300dc0c, EN300dc0d, EN300dc0e, EN300dc0f, EN300dc10, EN300dc11, EN300dc12, EN300dc13, EN300dc14.

Code DOC-EN300dd01: “Invalid runtime device detected on laser plate x.” (warning)

Situation	Solution
Laser plate has been swapped with a non-Barco branded spare part.	Only use spare parts that originate from Barco. Contact Barco on how to further handle this situation.
Runtime data on laser plate has been tampered with.	Do not tamper with data on laser plates. Contact Barco on how to further handle this situation.

This troubleshooting table applies to the following Error code numbers: EN300dd01, EN300dd02, EN300dd03, EN300dd04, EN300dd05, EN300dd06, EN300dd07, EN300dd08, EN300dd09, EN300dd0a, EN300dd0b, EN300dd0c, EN300dd0d, EN300dd0e, EN300dd0f, EN300dd10, EN300dd11, EN300dd12, EN300dd13, EN300dd14.

Code DOC-EN300de01: “Corrupted runtime data detected on laser plate x.” (warning)

Situation	Solution
Laser plate has been swapped with a non-Barco branded spare part.	Only use spare parts that originate from Barco. Contact Barco on how to further handle this situation.
Runtime data on laser plate has been tampered with.	Do not tamper with data on laser plates. Contact Barco on how to further handle this situation.
Malfunction laser plate electronics	Replace the laser plate. For more info, see procedures in “Light Source”, page 93 .

This troubleshooting table applies to the following Error code numbers: EN300de01, EN300de02, EN300de03, EN300de04, EN300de05, EN300de06, EN300de07, EN300de08, EN300de09, EN300de0a, EN300de0b, EN300de0c, EN300de0d, EN300de0e, EN300de0f, EN300de10, EN300de11, EN300de12, EN300de13, EN300de14.

Code DOC-EN300df01: “Invalid runtime current reference detected on laser plate x.” (warning)

Situation	Solution
Laser plate has been swapped with a non-Barco branded spare part.	Only use spare parts that originate from Barco. Contact Barco on how to further handle this situation.
Wrong type of laser plate installed	When replacing a laser plate, you may have installed the wrong type of laser plate. Make sure all laser plates are installed on the correct location on the light source. To know what type of laser plate goes where, please refer to procedures in “Light Source”, page 93 .
Malfunction laser plate electronics	Replace the laser plate. For more info, see procedures in “Light Source”, page 93 .

This troubleshooting table applies to the following Error code numbers: EN300df01, EN300df02, EN300df03, EN300df04, EN300df05, EN300df06, EN300df07, EN300df08, EN300df09, EN300df0a, EN300df0b, EN300df0c, EN300df0d, EN300df0e, EN300df0f, EN300df10, EN300df11, EN300df12, EN300df13, EN300df14.

Code DOC-EN300f301: “Laser bank [1–3] of laser plate [1–10] is off unexpectedly.” (error)



This error message will be accompanied with a red status screen on the touch display. The light source will shut down.

Situation	Solution
Laser bank is off due to other laser bank related errors.	Look in the projector log files for error entries for this specific laser bank before it was turned off (other than this error). These errors are of the format “LDM [1–2] slot [1–8] connected to laser bank [1–3] of laser plate [1–10]”. Resolve these errors first.
Laser bank didn't switch on because of failing self-test	Using Web Communicator, make sure the projector is in Optical alignment mode. Try to turn on all lasers at minimum power. 1. No current: Check / reseal the cabling between LDM driver module and laser plate interconnection board. Check / reseal the cabling between laser plate and Light Source Board. 2. Current more than 0A: Check the light sensor functionality, the cabling and the mounting (check for errors mentioning one of these). Also check the optical alignment to maximize light output.

Situation	Solution
Bad / No connection between light source and LDM board	Check / reseal the wiring between the applicable LDM board and light source.
Error appears on 3 consecutive laser banks, controlled by the same LDM board: Defective LDM board	<p>Temporary swap 2 LDM driver boards of the same type and check for the “bank x is off” messages. Ignore any other new messages triggered by this swapping.</p> <p>If the warning changes to other laser banks, replace the LDM driver board. See service procedure “Replacing a driver board in an LDM unit”, page 52.</p> <p>If the warning remains on the same laser bank(s), do the following in order and check if the error has disappeared after each action.</p> <ul style="list-style-type: none"> • Check/measure the fuse behind the LDM driver board (Image 16–13). If it has blown, replace it. • Replace the cable between LDM board and light source. • Replace the entire LDM. See service procedure “Replacing an LDM”, page 61. • If problem persists after replacing the entire LDM, the laser banks malfunction. Replace the light source. <p>Note: Do not forget to place the swapped LDM boards back in their original position after the check has been completed.</p>
Defective laser bank	Replace the laser plate with the affected laser bank. See service procedures in “Light Source”, page 93 .



When swapping LDM boards, make sure to **only** swap boards with an identical number. Also make sure to swap the boards and NOT the wiring. If you neglect this, you may risk damaging the device connected to the LDM driver boards.



It can be handy to completely restart the projector after performing any action to remove this message.

This troubleshooting table applies to the following Error code numbers: EN300f301, EN300f302, EN300f303, EN300f304, EN300f305, EN300f306, EN300f307, EN300f308, EN300f309, EN300f30a, EN300f30b, EN300f30c, EN300f30d, EN300f30e, EN300f30f, EN300f310, EN300f311, EN300f312, EN300f313, EN300f314, EN300f315, EN300f316, EN300f317, EN300f318, EN300f319, EN300f31a, EN300f31b, EN300f31c, EN300f31d, EN300f31e, EN300f31f, EN300f320, EN300f321, EN300f322, EN300f323, EN300f324, EN300f325, EN300f326, EN300f327, EN300f328, EN300f329, EN300f32a and EN300f32b.

Code DOC-EN300f406: “Light source startup aborted on demand of the FMCB.” (error)

Situation	Solution
The light source will not start up due to an error related to anything connected to the FMCB.	Check the error logs for other error and warning messages that were triggered at the same time. Resolve those errors and warnings first.
Wiring issue between FMCB and LCB	Check / reseal the wire unit between the Fan and Motor Control Board and the LCB. Replace the wiring if necessary.

Code DOC-EN300f408: “Light source shutdown due to open laser plate safety switch.” (error)

Situation	Solution
The light source has shut down due to an error related to safety switches	Check the error logs for other error and warning messages that were triggered at the same time. Resolve those errors and warnings first.

Code DOC-EN300f43b: “Light source startup aborted due to a light source peltier cooling error on the LSB.” (error)

Situation	Solution
Wiring issue between LCB and Light Source Board	Check / reseal the wiring between the LCB and the Peltier Interconnection Board. Replace the wiring if necessary.
Wiring issue between laser plate interconnection board and Light Source Board	Check / reseal the wiring between the laser plate interconnection Board and the LSB. Replace the wiring if necessary.
This warning appears with other “laser plate” notifications	Resolve the other notifications first.
Malfunction laser plate interconnection board.	Replace the affected laser plate. See service procedures in “Light Source”, page 93 .
Malfunction Light Source Board	Replace the LSB. See service procedure “Replacing the Light Source board”, page 98 .

Code DOC-EN300f440: “Light source startup aborted due to a power factor corrector error on LDM x.” (error)

Situation	Solution
The Power Factor Corrector (+380 VM / VMA) could not be switched on during the startup process of the projector.	<ul style="list-style-type: none"> Check / reseal the power connection between the mains board and the affected LDM. If problem persists, replace the LDM. See service procedure “Replacing an LDM”, page 61.

This troubleshooting table applies to the following Error code numbers: EN300f440, EN300f441, EN300f442.

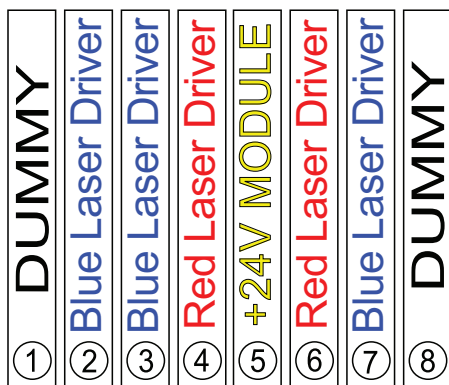
Code DOC-EN300f480: “Light source startup aborted due to a 24V module error on LDM [1-2] slot [1-8].” (error)

Situation	Solution
Fuse of +24V module has blown	Check/measure the fuse behind the affected +24V module slot (see Image 16–13). If it has blown, replace it.
malfunction +24V module	Replace this +24V module in the LDM. See procedure “Replacing a driver board in an LDM unit”, page 52 .
malfunction LCB	Replace the Laser Control Board (LCB). See service procedure See service procedure “Replacing the Laser Control Board (LCB)”, page 116 .

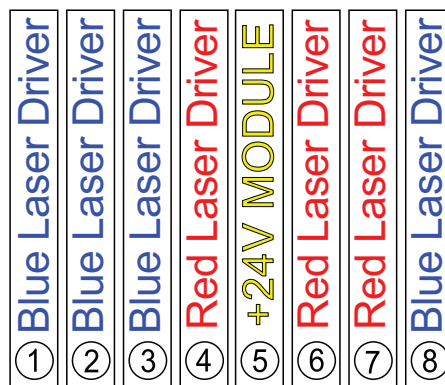
This troubleshooting table applies to the following Error code numbers: EN300f480, EN300f481.

Code DOC-EN300f4b1: “LDM power configuration mismatch.” (error)

Situation	Solution
Wiring issue	Check / reseal the wiring on all LDM driver boards and +24V modules.
One or more boards are inserted in the wrong slots of the LDM.	<p>Make sure the LDM driver boards and +24V modules are mounted in the correct LDM slots. For more info on which LDM board goes where, refer to Image 16–14 and Image 16–15.</p> <p>To swap any misplaced boards, see procedure “Replacing a driver board in an LDM unit”, page 52.</p> <p>Caution: Only swap boards with identical part numbers mentioned on the LDM label. Do not re-use driver boards from non-SP4K-C projectors. While other types of driver boards may fit in the LDM, the power generated from the boards may differ and cause damage to the projector.</p>

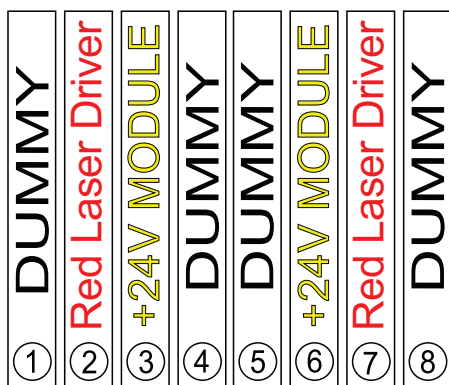


SP4K-12C

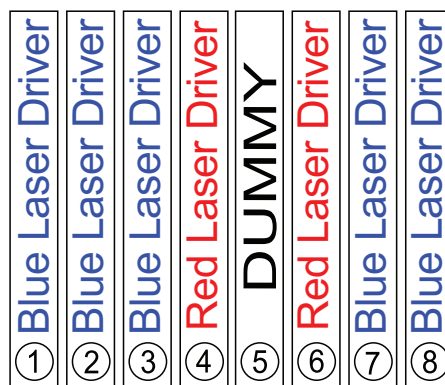


SP4K-15C

Image 16–14 LDM mapping of the 12C and 15C



LDM2 (left)



LDM 1 (right)

Image 16–15 LDM mapping of both the 20C and the 25C

Code DOC-EN4100004: “High temperature measured on the [location] of the red DMD.” (warning)

Situation	Solution
Blocked filter at the front side of the projector.	Check / replace both front filters. See “ Checking the front filters ”, page 288.
The liquid cooling circuit of the Light Processor is mistakenly excluded from the main liquid cooling circuit. Most likely the	Check if the cooling circuit of the Light Processor is connected with the rest of the cooling circuit.

Situation	Solution
other DMD temperatures are too high as well.	
Wiring issue Peltier element of the red channel.	Check / reseal the wire unit (reference 4, Image 16–16) of the Peltier element of the red channel on the Light Processor interconnection board.
Wiring issue temperature sensors of the red channel.	Check / reseal the wire unit (reference 7, Image 16–16) of the temperature sensors of the red channel on the Light Processor interconnection board.
The wire units of two Peltier elements or their respective temperature sensors have been swapped. While the temperature of one DMD is too high, the other will most likely be too low.	Check if the wire units of all Peltier elements and all temperature sensors are plugged in there respective connector sockets on the Signal Backplane (Image 16–16). From top to bottom, all wiring is respectively: Red – Green – Blue.
Malfunction FMCB or SMPS board. The LED “+VTEC” on SMPS remains off.	Measure on the Signal Backplane the +VTEC voltage on pin 4, 5, 6, 7 or 8 of the connector of the black wire unit which comes from the SMPS board. See Image 16–17 . If the +VTEC voltage is <6 V then replace the FMCB. See “ Replacement of the Fan and Motor Control Board (FMCB) ”, page 256. Otherwise replace the SMPS board. See “ Switched Mode Power Supply ”, page 241.
Malfunction Peltier element of the involved DMD.	Use the “diode test” of a multi-meter to check out the Peltier. Polarity doesn’t matter. The Peltier is not OK in case the measured value is higher then 0,01 volt. If this occurs, replace the Light Processor. See service procedure chapter “ Light Processor ”, page 145.
Poor assembly of DMD or Peltier + cooler block.	Replace the Light Processor. See service procedure chapter “ Light Processor ”, page 145.
Defect temperature sensor.	Replace the Light Processor. See service procedure chapter “ Light Processor ”, page 145.

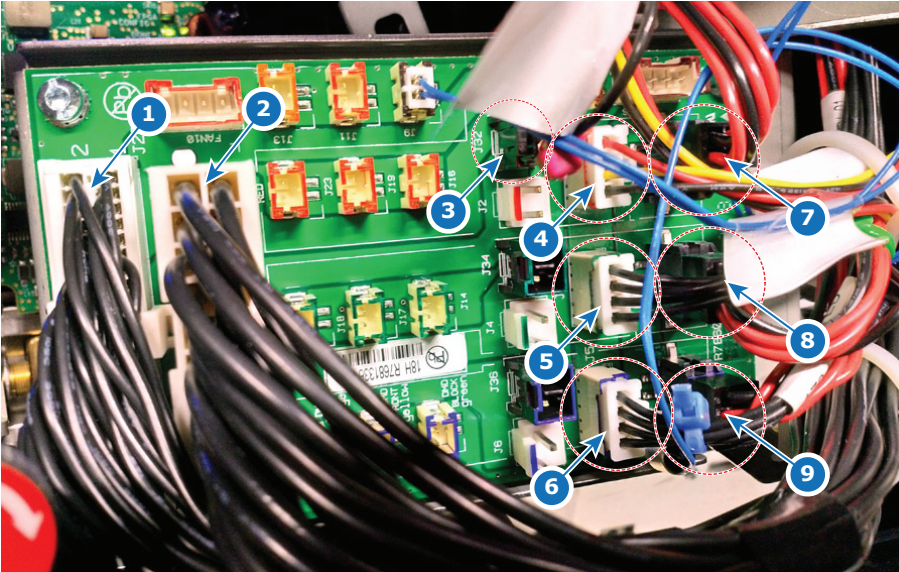


Image 16-16 Light Processor Interconnection board wiring

- | | |
|---|-----------------------------------|
| 1 FMCB 40 pins connector (J22) | 5 Fan Blue (J5) |
| 2 FMCB 18 pins connector (Peltier elements) (J20) | 6 Temperature sensors Red (J1) |
| 3 Peltier Back Red (J32) | 7 Temperature sensors Green (J25) |
| 3 Fan Red (J3) | 8 Temperature sensors Blue (J24) |
| 4 Fan Green (J8) | |

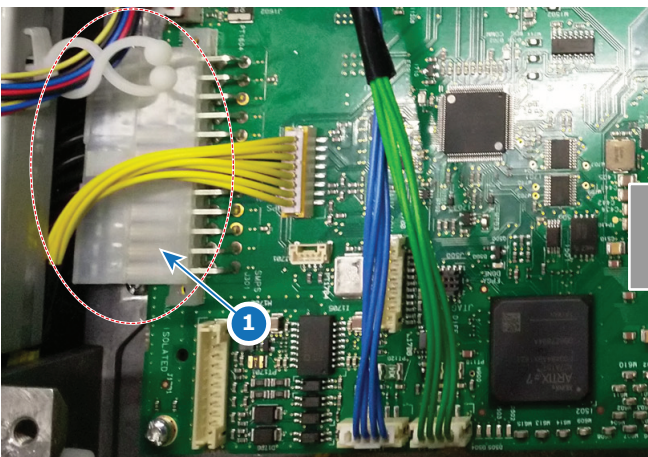


Image 16-17 SMPS location on the FMCB and wiring details of the connector

This troubleshooting table applies to the following Error code numbers: **EN4100004**, **EN4100104** and **EN4100204**.

Code DOC-EN4100040: “Short circuit detected on the temperature sensor on the [location] of the [color] DMD.” (error)

Situation	Solution
Wiring issue	Check / reseal all wiring on the Light Processor Interconnection Board. If problem persists, replace the Interconnection Board. See “Replacing the Light Processor interconnection board” , page 158.
Damaged temperature sensor or temperature sensor wire unit.	Replace the Light Processor. See service procedure chapter “Light Processor” , page 145.

This troubleshooting table applies to the following Error code numbers: **EN4100040**, **EN4100140**, **EN4100240**, **EN4100340**, **EN4100440**, **EN4100540**, **EN4100640**, **EN4100740** and **EN4100840**.

Code DOC-EN4100080: “Open circuit detected on the temperature sensor on the [location] of the [color] DMD.” (error)

Situation	Solution
One or more wire units of the temperature sensors are disconnected from FMCB	Check / reseal all wire units of the temperature sensors on the Light Processor Interconnection board (Image 16–16) . If problem persists, replace the interconnection board. See “ Replacing the Light Processor interconnection board ”, page 158.
Damaged temperature sensor or temperature sensor wire unit.	Replace the Light Processor. See service procedure chapter “ Light Processor ”, page 145.

This troubleshooting table applies to the following Error code numbers: **EN4100080**, **EN4100180**, **EN4100280**, **EN4100380**, **EN4100480**, **EN4100580**, **EN4100680**, **EN4100780** and **EN4100880**.

Code DOC-EN4100304: “High temperature measured on the [location] of the green DMD.” (warning)

Situation	Solution
Blocked filter at the front side of the projector.	Check / replace both front filters. See “ Checking the front filters ”, page 288.
The liquid cooling circuit of the Light Processor is mistakenly excluded from the main liquid cooling circuit. Most likely the other DMD temperatures are too high as well.	Check if the cooling circuit of the Light Processor is connected with the rest of the cooling circuit.
Wiring issue temperature sensors of the green channel.	Check / reseal the wire unit (reference 8, Image 16–16) of the temperature sensors of the green channel on the Light Processor interconnection board.
The wire units of two Peltier elements or their respective temperature sensors have been swapped. While the temperature of one DMD is too high, the other will most likely be too low.	Check if the wire units of all Peltier elements and all temperature sensors are plugged in there respective connector sockets on the Signal Backplane (Image 16–16). From top to bottom, all wiring is respectively: Red – Green – Blue.
Malfunction FMCB or SMPS board. The LED “+VTEC” on SMPS remains off.	Measure on the Signal Backplane the +VTEC voltage on pin 4, 5, 6, 7 or 8 of the connector of the black wire unit which comes from the SMPS board. See Image 16–17 . If the +VTEC voltage is <6 V then replace the FMCB. See “ Replacement of the Fan and Motor Control Board (FMCB) ”, page 256. Otherwise replace the SMPS board. See “ Switched Mode Power Supply ”, page 241.
Malfunction Peltier element of the involved DMD.	Use the “diode test” of a multi-meter to check out the Peltier. Polarity doesn’t matter. The Peltier is not OK in case the measured value is higher then 0,01 volt. If this occurs, replace the Light Processor. See service procedure chapter “ Light Processor ”, page 145.
Poor assembly of DMD or Peltier + cooler block.	Replace the Light Processor. See service procedure chapter “ Light Processor ”, page 145.
Defect temperature sensor.	Replace the Light Processor. See service procedure chapter “ Light Processor ”, page 145.

This troubleshooting table applies to the following Error code numbers: **EN4100304**, **EN4100404** and **EN4100504**.

Code DOC-EN4100604: “High temperature measured on the [location] of the blue DMD.” (warning)

Situation	Solution
Blocked filter at the front side of the projector.	Check / replace both front filters. See “Checking the front filters”, page 288 .
The liquid cooling circuit of the Light Processor is mistakenly excluded from the main liquid cooling circuit. Most likely the other DMD temperatures are too high as well.	Check if the cooling circuit of the Light Processor is connected with the rest of the cooling circuit.
Wiring issue temperature sensors of the blue channel.	Check / reseal the wire unit (reference 9, Image 16–16) of the temperature sensors of the blue channel on the Light Processor interconnection board.
The wire units of two Peltier elements or their respective temperature sensors have been swapped. While the temperature of one DMD is too high, the other will most likely be too low.	Check if the wire units of all Peltier elements and all temperature sensors are plugged in there respective connector sockets on the Signal Backplane (Image 16–16). From top to bottom, all wiring is respectively: Red – Green – Blue.
Malfunction FMCB or SMPS board. The LED “+VTEC” on SMPS remains off.	Measure on the Signal Backplane the +VTEC voltage on pin 4, 5, 6, 7 or 8 of the connector of the black wire unit which comes from the SMPS board. See Image 16–17 . If the +VTEC voltage is <6 V then replace the FMCB. See “Replacement of the Fan and Motor Control Board (FMCB)”, page 256 . Otherwise replace the SMPS board. See “Switched Mode Power Supply”, page 241 .
Malfunction Peltier element of the involved DMD.	Use the “diode test” of a multi-meter to check out the Peltier. Polarity doesn’t matter. The Peltier is not OK in case the measured value is higher than 0,01 volt. If this occurs, replace the Light Processor. See service procedure chapter “Light Processor”, page 145 .
Poor assembly of DMD or Peltier + cooler block.	Replace the Light Processor. See service procedure chapter “Light Processor”, page 145 .
Defect temperature sensor.	Replace the Light Processor. See service procedure chapter “Light Processor”, page 145 .

This troubleshooting table applies to the following Error code numbers: **EN4100604**, **EN4100704** and **EN4100804**.

Code DOC-EN4100a02: “Low air temperature measured at the front air inlet.” (warning)

Situation	Solution
Ambient temperature too low.	Check the ambient temperature at the front air inlets of the projector. Make sure the projector operates within specs.

Code DOC-EN4100a04: “High air temperature measured at the front air inlet.” (warning)



This code is probably preceded by other temperature related error or warning messages”.

Situation	Solution
Ambient temperature too high.	Check the ambient temperature at the front air inlets of the projector. Make sure the projector operates within specs.
Blocked filter at the front side of the projector.	Replace the front filter. See “Checking the front filters”, page 288.
Malfunction FMCB.	Replace the FMCB. See “Replacement of the Fan and Motor Control Board (FMCB)”, page 256.

Code DOC-EN4100a40: “Short circuit detected on the air temperature sensor at the front air inlet.” (error)

Situation	Solution
Malfunction FMCB.	Replace the FMCB. See “Replacement of the Fan and Motor Control Board (FMCB)”, page 256.

Code DOC-EN4100a80: “Open circuit detected on the air temperature sensor at the front air inlet.” (error)

Situation	Solution
Malfunction FMCB.	Replace the FMCB. See “Replacement of the Fan and Motor Control Board (FMCB)”, page 256.

Code DOC-EN4100b08: “High air temperature measured inside the light processor compartment.” (error)

Situation	Solution
Ambient temperature too high.	Check the ambient temperature at the front air inlets of the projector. Make sure the projector operates within specs.
Blocked filter at the front side of the projector.	Check / replace both front filters. See “Checking the front filters”, page 288.
Wiring issue	Check / reseal the wiring on the Light Processor interconnection board (connector J9, Image 16–18).
Malfunction Light Processor interconnection board.	Replace the interconnection board. See “Replacing the Light Processor interconnection board”, page 158. If problem persists, replace the entire light processor. See service procedure chapter “Light Processor”, page 145.

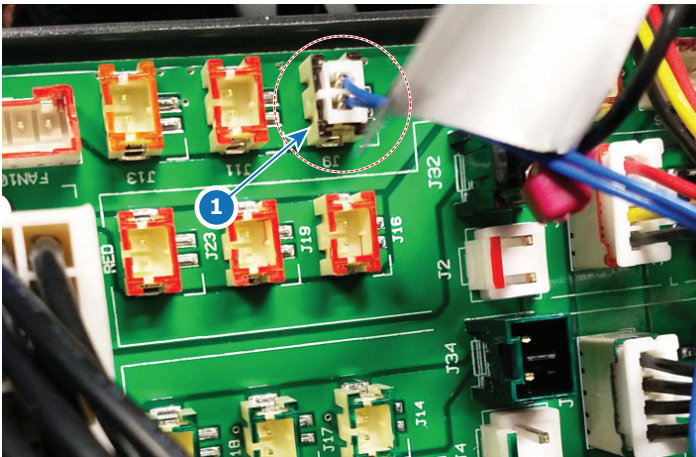


Image 16–18 Location of the temperature sensor on the Light Processor ICB

Code DOC-EN4100b40: “Short circuit detected on the air temperature sensor inside the light processor compartment.” (error)

Situation	Solution
Malfunction Light Processor interconnection board.	<p>Replace the interconnection board. See “Replacing the Light Processor interconnection board”, page 158.</p> <p>If problem persists, replace the entire light processor. See service procedure chapter “Light Processor”, page 145.</p>

Code DOC-EN4100b80: “Open circuit detected on the air temperature sensor inside the light processor compartment.” (error)

Situation	Solution
Malfunction Light Processor interconnection board.	<p>Replace the interconnection board. See “Replacing the Light Processor interconnection board”, page 158.</p> <p>If problem persists, replace the entire light processor. See service procedure chapter “Light Processor”, page 145.</p>

Code DOC-EN4101402: “Low voltage measured on the 12V input of the FMCB.” (warning)

Situation	Solution
Malfunction Fan and Motor Control board or SMPS board.	<p>Measure on the FMCB the ++12V voltage on pin 1, 2 or 3 of the connector of the black wire unit which comes from the SMPS board. See Image 16–17.</p> <p>If the measured voltage is $\pm 12V$ then replace the FMCB. See “Replacement of the Fan and Motor Control Board (FMCB)”, page 256.</p> <p>Otherwise replace the SMPS board. See “Switched Mode Power Supply”, page 241.</p>
Short circuit or bad connection.	Check the FMCB for bad connections. Ensure that all wire units are well connected.

Code DOC-EN4101404: “High voltage measured on the 12V input of the FMCB.” (warning)

Situation	Solution
Malfunction Fan and Motor Control board or SMPS board.	<p>Measure on the FMCB the ++12V voltage on pin 1, 2 or 3 of the connector of the black wire unit which comes from the SMPS board. See Image 16–17.</p> <p>If the measured voltage is $\pm 12V$ then replace the FMCB. See “Replacement of the Fan and Motor Control Board (FMCB)”, page 256.</p> <p>Otherwise replace the SMPS board. See “Switched Mode Power Supply”, page 241.</p>

Code DOC-EN4101502: “Low voltage measured on the 24V input of the FMCB.” (warning)

Situation	Solution
Malfunction Fan and Motor Control board or SMPS board.	<p>Measure on the Signal Backplane the +24V voltage on pin 9, 10, 11 or 12 of the connector of the black wire unit which comes from the SMPS board. See Image 16–17.</p> <p>If the measured voltage is $\pm 24V$ then replace the FMCB. See “Replacement of the Fan and Motor Control Board (FMCB)”, page 256.</p> <p>Otherwise replace the SMPS board. See “Switched Mode Power Supply”, page 241.</p>
Short circuit or bad connection.	Check the FMCB for bad connections. Ensure that all wire units are well connected.

Code DOC-EN4101504: “High voltage measured on the 24V input of the FMCB. (warning)”

Situation	Solution
Malfunction Fan and Motor Control board or SMPS board.	<p>Measure on the Signal Backplane the +24V voltage on pin 9, 10, 11 or 12 of the connector of the black wire unit which comes from the SMPS board. See Image 16–17.</p> <p>If the measured voltage is $\pm 24V$ then replace the FMCB. See “Replacement of the Fan and Motor Control Board (FMCB)”, page 256.</p> <p>Otherwise replace the SMPS board. See “Switched Mode Power Supply”, page 241.</p>

Code DOC-EN4101702: “Low voltage measured on the VTEC input of the FMCB.” (warning)

Situation	Solution
Malfunction Fan and Motor Control board or SMPS board. The LED “+VTEC” on the Power Distributor board remains off.	<p>Measure on the Signal Backplane the +VTEC voltage on pin 4, 5, 6, 7 or 8 of the connector of the black wire unit which comes from the SMPS board. See Image 16–17.</p> <p>If the +VTEC voltage is $\pm 16V$ then replace the FMCB. See “Replacement of the Fan and Motor Control Board (FMCB)”, page 256. Otherwise replace the SMPS board. See “Switched Mode Power Supply”, page 241.</p>
Short circuit or bad connection.	Check the FMCB. Ensure that all wire units are well connected.

Code DOC-EN4101704: “High voltage measured on the VTEC input of the FMCB.” (warning)

Situation	Solution
Malfunction Fan and Motor Control board or SMPS board. The LED “+VTEC” on the SMPS remains off.	Measure on the Signal Backplane the +VTEC voltage on pin 4, 5, 6, 7 or 8 of the connector of the black wire unit which comes from the SMPS board. See Image 16–17 . If the +VTEC voltage is $\pm 16V$ then replace the FMCB. See “ Replacement of the Fan and Motor Control Board (FMCB) ”, page 256. Otherwise replace the SMPS board. See “ Switched Mode Power Supply ”, page 241.

Code DOC-EN4102702: “Air inlet filter not present or not inserted well.” (warning)

Situation	Solution
One or more filters are missing or are mounted incorrectly.	Check and reseal all filters of the projector. Make sure to respect the airflow of the filters when mounting them. If problem persists, replace the filters. For more info on cleaning and replacing the filters, see “ Maintenance procedures ”, page 285.

Code DOC-EN4102704: “High contamination measured on the air inlet filters.” (warning)

Situation	Solution
One or more filters require cleaning	Check and clean all filters of the projector. Replace them if necessary. For more info on cleaning and replacing the filters, see “ Maintenance procedures ”, page 285.

Code DOC-EN4110001: “Low speed measured on the pump of the light processor cooling assembly.” (error)

Situation	Solution
Wiring issue	DMD Pump assembly not properly connected. Check and reseal the wiring on the FMCB (reference 3, Image 6–38).
Malfunction pump of the light processor DMD cooling	Replace the DMD Cooling assembly. For the procedures on how to remove and mount this assembly, see “ Cooling circuit ”, page 67.

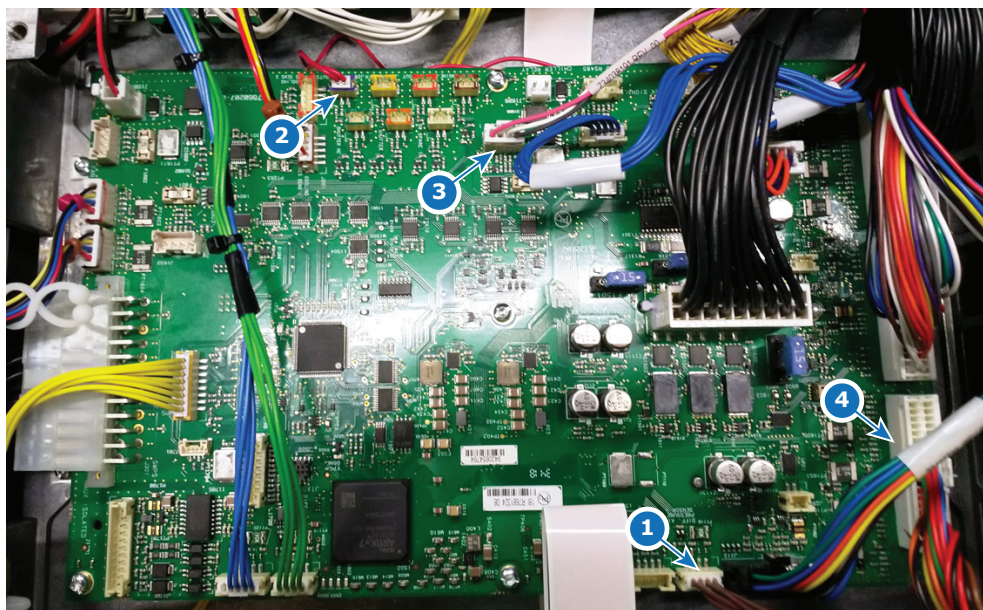


Image 16–19 DMD Cooling assembly connectors on the FMCB

- 1 Air filter sensor (J112)
- 2 Air inlet sensor (J287)
- 3 Light Processor pump (J1600)
- 4 Radiator fan assembly (J1605)

This troubleshooting table applies to both the warning and error message with codes: **EN4110001** and **EN4110002**.

Code DOC-EN4110004: “High speed measured on the pump of the light processor cooling assembly.” (warning)

Situation	Solution
Malfunction pump of the light processor DMD cooling	Replace the DMD Cooling assembly. For the procedures on how to remove and mount this assembly, see “Cooling circuit”, page 67 .

Code DOC-EN4110201: “Low speed measured on fan [1–6] of the card cage inlet.” (error)

Situation	Solution
Fan speed too low due to wiring issue.	Check / reseat the fan wiring on the FMCB (Image 16–20). If this does not help check/reseat the individual fan wiring on the fan assembly of the DMD cooling assembly (Image 16–21). For removing the DMD cooling and accessing the fan assembly, see “Replacing a fan of the DMD cooling”, page 88 .
Fan speed too low due to fan damage.	1. Remove the fan from the front Cooling assembly and check if the fan is not blocked. 2. If not blocked, replace the fan. For removing the DMD cooling and replacing the fan, see “Replacing a fan of the DMD cooling”, page 88 .
Malfunction Fan and Motor Control Board	Replace the FMCB. See “Replacement of the Fan and Motor Control Board (FMCB)”, page 256 .

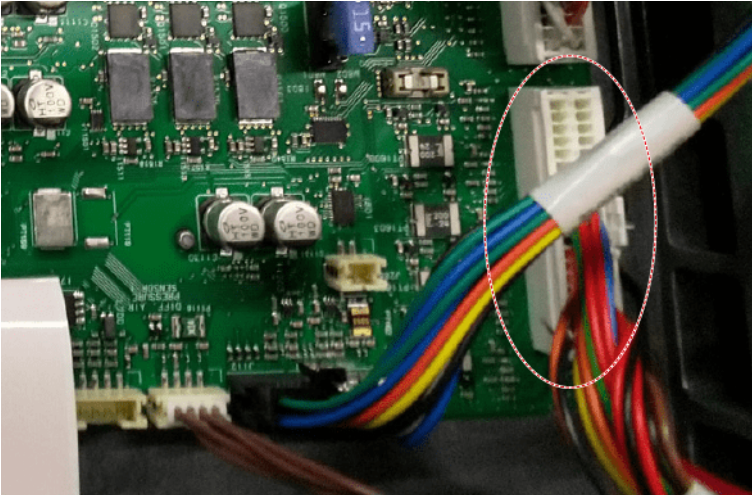


Image 16-20 Fan connector on the FMCB

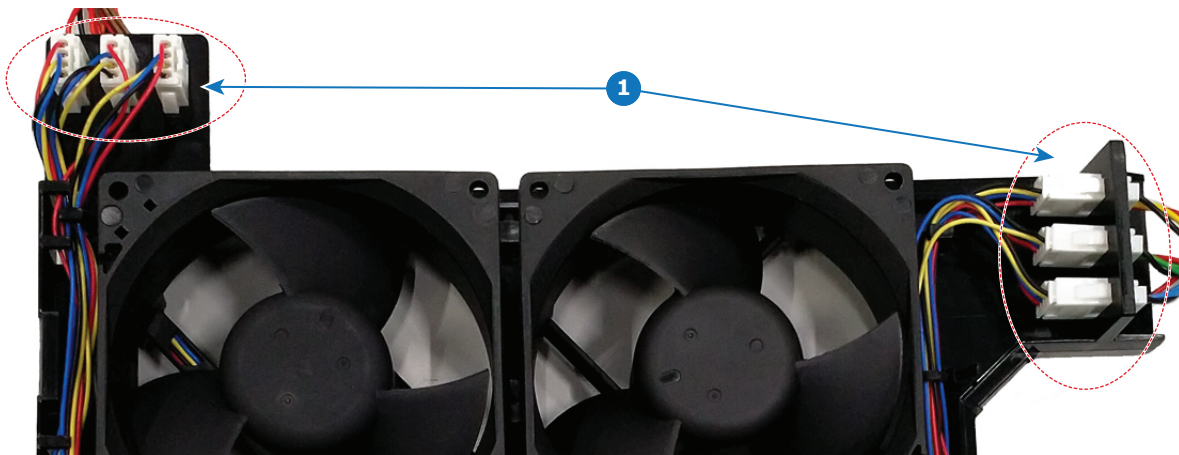


Image 16-21 Individual fan connectors on the fan assembly

This troubleshooting table applies to the following error and warning codes: EN4110201, EN4110202, EN4110301, EN4110302, EN4110401, EN4110402, EN4110501, EN4110502, EN4110601, EN4110602, EN4110701, EN4110702.

Code DOC-EN4110c01: “Low speed measured on fan [1–2] of the card cage outlet.” (error)

Situation	Solution
Fan speed too low due to wiring issue.	Check / reseal the fan wire connection on the FMCB (Image 16-22). Make sure the wire unit is properly connected.
Fan speed too low due to fan damage.	<ol style="list-style-type: none"> 1. Remove the fan assembly from the projector and check if the fan is not blocked. 2. If not blocked, replace the fan. <p>For removing the card cage fan assembly and replacing the fan, see procedures in “Replacing a card cage fan”, page 259.</p>
Malfunction Fan and Motor Control Board	Replace the FMCB. See “ Replacement of the Fan and Motor Control Board (FMCB) ”, page 256 .

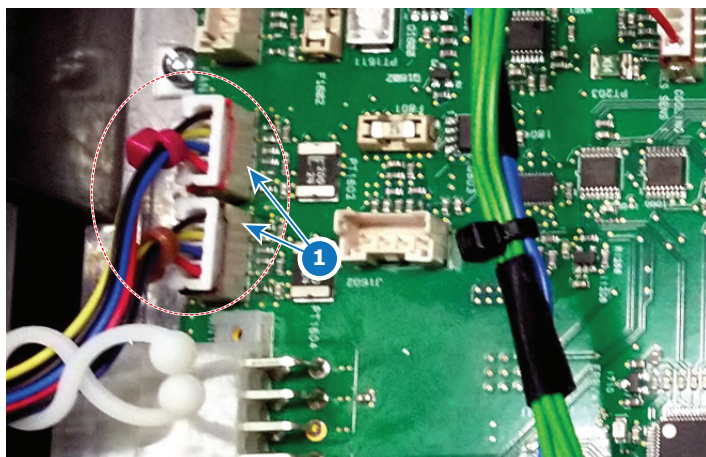


Image 16-22 Location of the card cage fan connectors on the FMCB

This troubleshooting table applies to the following error and warning codes: EN4110c01, EN4110d01, EN4110c02 and EN4110d02.

Code DOC-EN4110e02: “Low speed measured on the [color] formatter fan.” (error)

Situation	Solution
Beta device	If you were part of the dedicated testing group of the SP4K-C projectors, you will have a beta device where the light processor did not yet have formatter fans. If this is the case, you can safely ignore these warnings.
Fan speed too low due to wiring issue.	Check / reseat the fan wire connection on the Light Processor interconnection board (J3, J5 and J8). Make sure the wire units are properly connected.
Fan speed too low due to fan damage.	<ol style="list-style-type: none"> 1. Remove the light processor from the projector and check if the fan is not blocked. 2. If not blocked, replace the fan. <p>For removing the light processor and replacing one of the light processor fans, see procedures in “Light Processor”, page 145.</p>
Malfunction Light Processor interconnection board.	<p>Replace the interconnection board. See “Replacing the Light Processor interconnection board”, page 158.</p> <p>If problem persists, replace the entire light processor. See service procedure chapter “Light Processor”, page 145.</p>

This troubleshooting table applies to the following error and warning codes: **EN4110e02**, **EN4110f02** and **EN4111002**.

Code DOC-EN4111102: “Low speed measured on the light processor fan.” (warning)

Situation	Solution
Fan speed too low due to wiring issue.	Check / reseat the fan wire connection on the FMCB (Image 16-23). Make sure the wire unit is properly connected.
Fan speed too low due to fan damage.	<ol style="list-style-type: none"> 1. Remove the fan assembly from the projector and check if the fan is not blocked. 2. If not blocked, replace the fan. <p>For removing the light processor fan assembly and replacing the fan, see procedures in “Light Processor”, page 145.</p>
Malfunction Fan and Motor Control Board	Replace the FMCB. See “Replacement of the Fan and Motor Control Board (FMCB)”, page 256 .

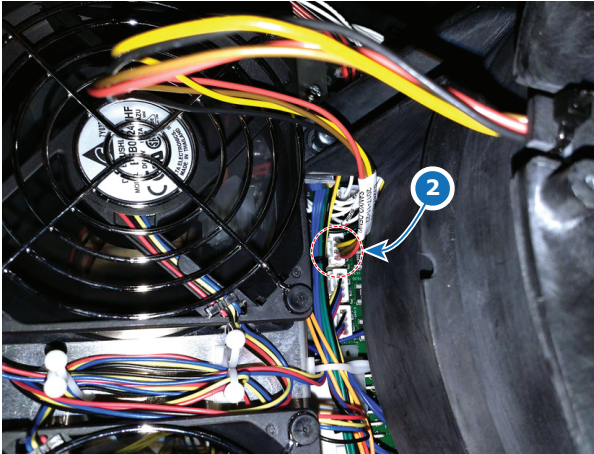


Image 16-23 Location of the Light Processor fan connector

Code DOC-EN41191: “Setting fans to maximum because a critical sensor has hit the warning threshold.”

Situation	Solution
This warning will be triggered alongside other temperature-related warnings and/or errors.	Resolve the other warnings and errors first.

Code DOC-EN41192: “Setting fans to maximum because a high altitude has been detected.”

Situation	Solution
Projector is installed on high altitude	As long as the projector operates within the given specifications, you can safely ignore this warning.
Projector is mounted beyond what the specifications allow.	Make sure the projector operates within specifications.

Code DOC-EN41195: “External cooler not available, maximum power is reduced to {0}%.” (warning)

Situation	Solution
Light output reduced to 75%	<p>Check the cable connection between the cooler interface board on the projector and the external cooler.</p> <p>Check the cable connection between the LCB and the cooler interface board.</p> <p>Check the connection between the cable input on the external cooler and the external cooler board.</p> <p>Check the cooling tube connection between the cooling interface and the external cooler.</p>

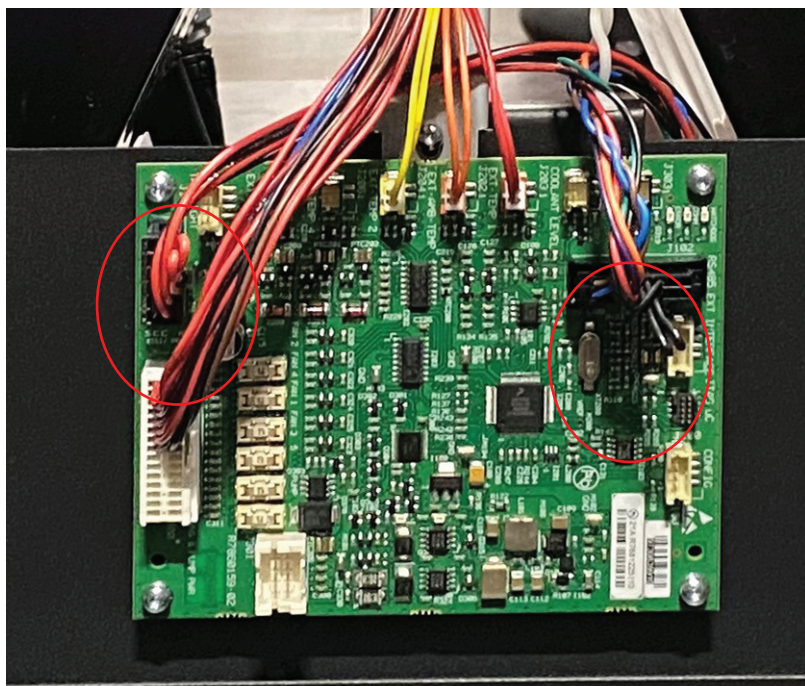


Image 16–24

Code DOC-EN411f408: “FMCB communication error.”

Situation	Solution
Difference in software packages between FMCB and LCB.	Upgrade the software to the latest version. See procedure “Software update” , page 22.
Only the FMCB has a communication error: malfunction FMCB	Replace the FMCB. For more info, see “Replacement of the Fan and Motor Control Board (FMCB)” , page 256.
There are communication errors with other devices: Malfunction LCB	Replace the LCB. See service procedure “Replacing the Laser Control Board (LCB)” , page 116.

Code DOC-EN413e804: “Fan table [fan_table_name] upgraded.”

Situation	Solution
Projector has upgraded the fan tables on the Fan and Motor Control Board (FMCB).	A change has occurred on the FMCB (e.g. a board connected to the FMCB has been replaced). No further action is required.

This troubleshooting table applies to the following Error code numbers: EN403e804, EN413e904, EN413ea04, EN413eb04, EN413ed04.

Code DOC-EN413e808: “Failed to upgrade fan table [fan_table_name].”

Situation	Solution
Upgrade of fan tables on Fan and Motor Control Board (FMCB) has failed.	Check / reseat all wiring on the FMCB and restart the projector. If the error sustains, reinstall the software. For more info on installing software, see “Software update” , page 22. If re-installing the software does not work, replace the FMCB. See “Replacement of the Fan and Motor Control Board (FMCB)” , page 256.

This troubleshooting table applies to the following Error code numbers: EN403e808, EN403e908, EN403ea08, EN403eb08, EN403ed08.

Code DOC- EN55003: “Laser plate cooling self test failed on plate {0}.” (warning)

Situation	Solution
Temperature is out of range during laser plate cooling self test.	Verify that the TIM paste (Thermal Interface Material) have been correctly applied on the laser plate. See service procedures in “Replacement process of a red laser plate and / or peltier element” , page 101.

Code DOC-EN6000004: “High temperature measured on the laser plate [7–10] (red).” (warning)

Situation	Solution
Ambient temperature too high.	Check the ambient temperature at the air inlets of the projector. Make sure the projector operates within specs.
Blocked metal filters at the air inlets of the projector.	Check the Metal filters of the projectors. Clean or replace them if necessary. See service procedures in “Maintenance procedures” , page 285.
Wiring issue	Check / reseal the wiring between the Light Source Board and the small interconnection boards of the laser plates. Replace the wiring if necessary.
Insufficient cooling of light source	Check the tube connections between both the Light Source cooler modules and the light source. Make sure the tubes are properly connected.
Malfunction Light Source Board	Replace the Light Source Board. See “Replacing the Light Source board” , page 98.
Malfunction laser plate interconnection board	Replace the laser plate. See procedures in “Light Source” , page 93.
Malfunction light source	Replace the light source. See procedures in “Light Source” , page 93.

This troubleshooting table applies to the following Error code numbers: **EN6000004**, **EN6000008**, **EN6000104**, **EN6000108**, **EN6000204**, **EN6000208**, **EN6000304** and **EN6000308**.

Code DOC-EN6000040: “Short circuit detected on the temperature sensor on laser plate x (red).” (error)

Situation	Solution
Malfunction temperature sensor on laser plate interconnection board	Replace the laser plate. See procedures in “Light Source” , page 93.

This troubleshooting table applies to the following Error code numbers: EN6000040, EN6000140, EN6000240, EN6000340, EN6100040, EN6100140, EN6100240 and EN6100340.

Code DOC-EN6000080: “Open circuit detected on the temperature sensor on laser plate x (red).” (error)

Situation	Solution
Wiring issue	Check / reseal the wiring between the Light Source Board and the laser plate interconnection board. Replace the wiring if necessary.
Malfunction temperature sensor on laser plate interconnection board	Replace the laser plate. See procedures in “Light Source” , page 93.

This troubleshooting table applies to the following Error code numbers: EN6000080, EN6000180, EN6000280, EN6000380, EN6000080, EN6000180, EN6000280 and EN6000380.

Code DOC-EN6000404: “High temperature measured on the liquid cold plate x (red).” (warning)

Situation	Solution
Cold plate is mounted incorrectly.	Remove and reseal the cold plate of the affected laser plate. Follow the procedures for removing and mounting laser plates to adjust the cold plate. For more info, see procedures in “Cooling circuit”, page 67 .
There are multiple temperature related messages on the same laser plate: malfunction peltier element.	Check / reseal the wiring of the peltier element on the Light Source Board. Check the position of the peltier element on the laser plate. Make sure the peltier element is mounted correctly. In this case, make sure the peltier element is mounted correctly. Make sure the shorter (hot) side is placed to face the light source and the longer (cold) side is facing the cooling cold plate. If the problem persists, or if the peltier element is mounted correctly, the peltier element may malfunction. In this case, replace it. For checking and replacing the peltier element, see procedures in “Cooling circuit”, page 67 .
Temperature errors and warnings appear over multiple laser plates: insufficient cooling of the light source	<ul style="list-style-type: none"> • Check the tube connections between both the cooler module(s) and the light source. Make sure the tubes are properly connected. • Check the LDM filter and cooler module dust filters. Clean or replace them if necessary. For more info, see “Maintenance procedures”, page 285.
Error appears alongside other cooler module related errors	Resolve cooler module related errors first.

This troubleshooting table applies to the following Error code numbers: EN6000404, EN6000408, EN6000504, EN6000508, EN6000604, EN6000608, EN6000704, EN6000708, EN6100404, EN6100408, EN6100504, EN6100508, EN6100604, EN6100608, EN6100704 and EN6100708.

Code DOC-EN6000440: “Short circuit detected on the temperature sensor at liquid cold plate x (red).” (error)

Situation	Solution
Bad wiring connection temperature sensor	Check / reseal the wiring of the temperature sensor on the LSB.
Bad wiring connection between LSB and LCB	Check / reseal the wiring on LCB (J407, Image 16–25) and the applicable LSB (J101, Image 16–26).

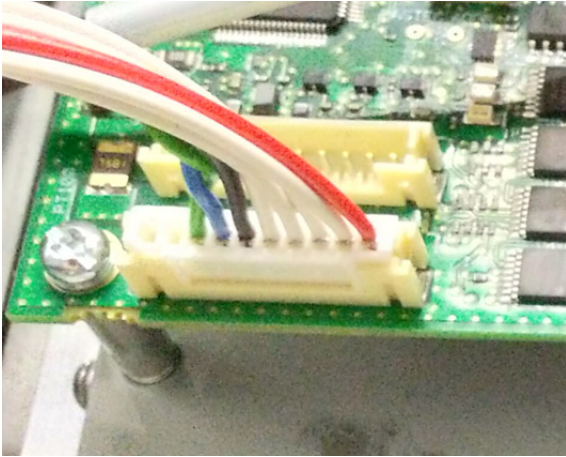


Image 16-25 Connector J101 on the LSB.

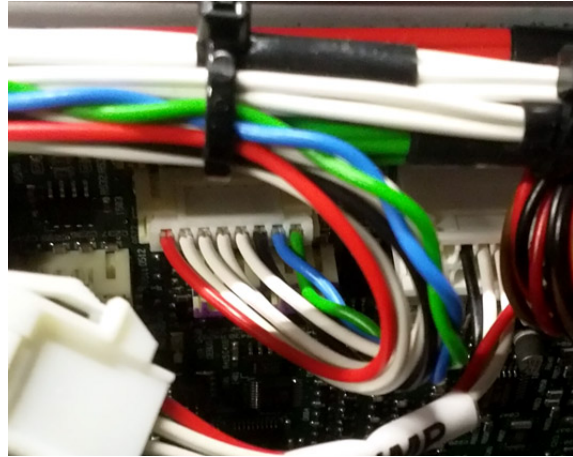


Image 16-26 Connector J407 on the LCB

This troubleshooting table applies to the following Error code numbers: EN6000440, EN6000540, EN6000640, EN6000740, EN6100440, EN6100540, EN6100640 and EN6100740.

Code DOC-EN6000480: “Open circuit detected on the temperature sensor at liquid cold plate x (red).” (error)

Situation	Solution
Bad wiring connection temperature sensor	Check / reseal the wiring of the temperature sensor on the LSB.
Bad wiring connection between LSB and LCB	Check / reseal the wiring on LCB (J407, Image 16-25) and the applicable LSB (J101, Image 16-26).
Malfunction LSB	Replace the Light Source Board. See service procedure “ Replacing the Light Source board ”, page 98 .

This troubleshooting table applies to the following Error code numbers: EN6000480, EN6000580, EN6000680, EN6000780, EN6100480, EN6100580, EN6100680 and EN6100780.

Code DOC-EN6000804: “High temperature measured on the LSB peltier power stage [1–4] of laser plate [7–10] (red).” (warning)

Situation	Solution
Ambient temperature too high.	Check the ambient temperature at the air inlets of the projector. Make sure the projector operates within specs.
Bottom air filter blocked.	Clean / replace the bottom metal filter. See procedures in “ Maintenance procedures ”, page 285 .
This notification appears alongside LSB fan related messages: malfunction LSB fan.	Replace the LSB fan. For more info, see “ Replacing the Light Source fan ”, page 100 .
Malfunction LSB	Replace the Light Source Board. See service procedure “ Replacing the Light Source board ”, page 98 .

This troubleshooting table applies to the following Error code numbers: **EN6000804**, **EN6000904**, **EN6000a04** and **EN6000b04**.

Code DOC-EN6000840: “Defective temperature sensor detected on LSB peltier power stage [1–4] of laser plate [7–10] (red).” (error)

Situation	Solution
Malfunction LSB	Replace the Light Source Board. See service procedure “Replacing the Light Source board”, page 98.

This troubleshooting table applies to the following Error code numbers: **EN6000840**, **EN6000940**, **EN6000a40**, **EN6000b40**, **EN6000880**, **EN6000980**, **EN6000a80** and **EN6000b80**.

Code DOC-EN6000c02: “Low voltage measured on the 24V input of the LSB.” (warning)

Situation	Solution
Cable / connection issue	In case of a 12k or 15k lumens projector: Check and reseal the wire unit between the LDM 1–5 and the Light Source Board (J110). Replace if necessary. In case of a 20k or 25k lumens projector: Check and reseal the wire unit between the LDMs (LDM 2–3 and 2–6) and the Light Source Board (J110 and J111). Replace if necessary.
malfunction one or more +24V modules	In case of a 12k or 15k lumens projector: Replace the +24V module in the LDM (slot 1-5). In case of a 20k or 25k lumens projector: Check and replace one of the two +24V modules in the LDMs (LDM 2–3 or 2–6). For more info on replacing a driver board, see service procedure “Replacing a driver board in an LDM unit”, page 52. If problem persists, or if multiple other LDM related messages are prompted, replace the entire LDM. See service procedure “Laser Driver Modules”, page 45.
malfunction Light Source Board	Replace the Light Source Board. See “Replacing the Light Source board”, page 98.

Code DOC-EN6000c04: “High voltage measured on the 24V input of the LSB.” (warning)

Situation	Solution
malfunction Light Source Board	Replace the Light Source Board. See “Replacing the Light Source board”, page 98.

Code DOC-EN6002102: “Low speed measured on the LSB fan.” (warning)

Situation	Solution
Fan speed too low due to wiring issue.	Check / reseal the fan wire connection on the Light Source Board (Reference 3, Image 16–27). Make sure the wire unit is properly connected.
Fan speed too low due to fan damage.	1. Remove the fan assembly from the projector and check if the fan is not blocked. 2. If not blocked, replace the fan. For replacing the fan, see “Replacing the Light Source fan”, page 100.
Malfunction Light Source Board	Replace the Light Source Board. See “Replacing the Light Source board”, page 98.

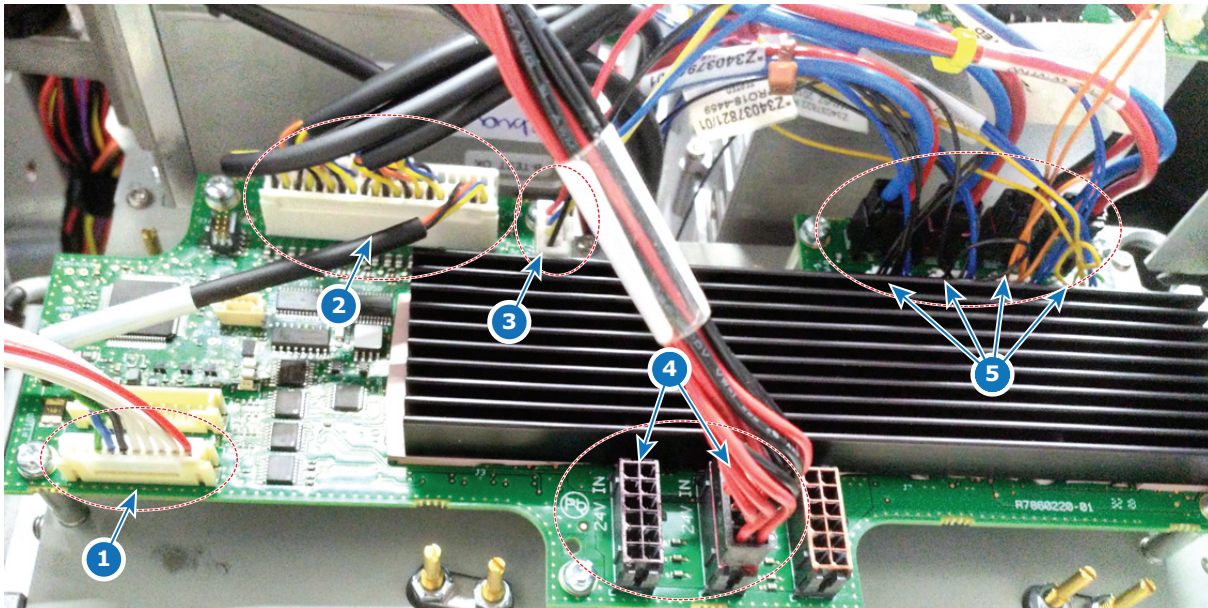


Image 16-27 Light source board lay-out.

Code DOC-EN600f001: “Bad communication detected between LCB and LSB.” (error)

Situation	Solution
Difference in software packages between LSB and LDM.	Upgrade the software to the latest version. See procedure “ Software update ”, page 22.
Only the LSB has a communication error: malfunction LSB	Replace the Light Source Board. See “ Replacing the Laser Control Board (LCB) ”, page 116.
There are communication errors with other devices: Malfunction LCB	Replace the LCB. See service procedure “ Replacing the Laser Control Board (LCB) ”, page 116.

Code DOC-EN600f002: “No communication detected between LCB and LSB.” (error)

Situation	Solution
First install of Light Source Board	Upgrade the software to the latest version. See procedure “ Software update ”, page 22.
Cable issues between LSB and LCB	<ol style="list-style-type: none"> 1. Check communication wiring between LCB (J407) and Light Source Board (reference 1, Image 16-27). Make sure it is properly inserted. 2. If problem persists, replace the communication cable.
There are communication errors with other devices: Malfunction LCB	Replace the LCB. See service procedure “ Replacing the Laser Control Board (LCB) ”, page 116.

Code DOC-EN600f101: “Invalid LSB detected by the LCB.” (error)

Situation	Solution
Older or unsupported software on LSB	Upgrade the software to the latest version. See procedure “ Software update ”, page 22.
Malfunction LSB	Replace the Light Source Board. See “ Replacing the Light Source board ”, page 98.

Code DOC-EN600f103: “The LCB could not initialize the LSB.” (error)

Situation	Solution
Older or unsupported software on LSB	Upgrade the software to the latest version. See procedure “Software update” , page 22.
Wiring issue	<ol style="list-style-type: none"> 1. Check communication wiring between LCB (J407) and Light Source Board (reference 1, “Replacing the Light Source board”, page 98). Make sure it is properly inserted. 2. If problem persists, replace the communication cable.

Code DOC-EN600f104: “The LSB was reset unexpectedly.” (error)

Situation	Solution
LSB was reset and lost its initialization.	Reboot the projector and switch on the light source.
Wiring issue on LSB	<p>Check the wiring between LDM and LSB. Make sure all wiring is properly seated on both ends.</p> <p>If the problem persists, replace the cable.</p>
Wiring issue on LCB	Check and reseat the wiring on the LCB, especially the wiring on connector 407.

Code DOC-EN9000001: “Low voltage measured on +12V of the SMPS.” (error)

Situation	Solution
This error appears alongside notifications concerning the CCB: Malfunction Cinema Controller.	<p>Replace the Cinema controller if installed. For more info, see “Replacement of the cinema controller board”, page 242.</p> <p>If problem persists, the signal backplane or SMPS is malfunctioning.</p>
This error appears alongside notification messages concerning the ICMP-X: Malfunction ICMP-X.	<p>Replace the ICMP-X if installed. For more info, see “Replacement of the ICMP-X board”, page 248.</p> <p>If problem persists, the signal backplane or SMPS is malfunctioning.</p>
This error appears alongside notification messages concerning the ICP-D: Malfunction ICP-D.	<p>Replace the ICP-D. For more info, see “ICP-D (Integrated Cinema Processor – Direct)”, page 233.</p> <p>If problem persists, the signal backplane or SMPS is malfunctioning.</p>
This error appears alongside notifications concerning all devices powered by the signal backplane (CCB, ICP-D and/ or ICMP-X and the touch display is not working properly: Malfunction signal backplane.	<p>Replace the signal backplane (mainboard). See the replacement process in “Replacement process of the signal backplane”, page 261.</p> <p>If problem persists, the SMPS is malfunctioning.</p>
This message appears alongside notifications concerning the FMCB: Malfunction FMCB.	<p>Replace the Fan and Motor Control Board (FMCB). For more info, see “Replacement of the Fan and Motor Control Board (FMCB)”, page 256.</p> <p>If problem persists, the SMPS is malfunctioning.</p>
This error appears alongside all or multiple of the above: Malfunction SMPS	Replace the SMPS board. For more info, see “Replacement of the Switched Mode Power Supply (SMPS)” , page 246.

This troubleshooting table applies to the following error and warning code numbers: EN9000001, EN9000002.

Code DOC-EN9000008: “High voltage measured on [output_name] of the SMPS.” (error)

Situation	Solution
Malfunction SMPS	Replace the SMPS board. For more info, see “Replacement of the Switched Mode Power Supply (SMPS)”, page 246.

This troubleshooting table applies to the following error and warning code numbers: EN9000004, EN9000008, EN9000104, EN9000108, EN9000204, EN9000208, EN9000304, EN9000308.

Code DOC-EN9000101: “Low voltage measured on +VTEC of the SMPS.” (error)

Situation	Solution
This message appears alongside notifications concerning the FMCB: Malfunction FMCB.	Replace the Fan and Motor Control Board (FMCB). For more info, see “Replacement of the Fan and Motor Control Board (FMCB)”, page 256. If problem persists, the SMPS is malfunctioning.
Malfunction SMPS	Replace the SMPS board. For more info, see “Replacement of the Switched Mode Power Supply (SMPS)”, page 246.

This troubleshooting table applies to the following error and warning code numbers: EN9000101, EN9000102.

Code DOC-EN9000201: “Low voltage measured on +24V of the SMPS.” (error)

Situation	Solution
This message appears alongside notifications concerning the FMCB or devices powered by the FMCB: Malfunction FMCB.	Replace the Fan and Motor Control Board (FMCB). For more info, see “Replacement of the Fan and Motor Control Board (FMCB)”, page 256. If problem persists, the SMPS is malfunctioning.
This message appears alongside notifications concerning the LCB or devices powered by the LCB: Malfunction LCB.	Replace the Laser Control Board (LCB). For more info, see “Replacing the Laser Control Board (LCB)”, page 116. If problem persists, the SMPS is malfunctioning.
This error appears alongside all or multiple of the above: Malfunction SMPS	Replace the SMPS board. For more info, see “Replacement of the Switched Mode Power Supply (SMPS)”, page 246.

This troubleshooting table applies to the following error and warning code numbers: EN9000201, EN9000202.

Code DOC-EN9000301: “Low voltage measured on ++12V of the SMPS.” (error)

Situation	Solution
This error appears alongside notifications concerning the CCB: Malfunction Cinema Controller.	Replace the Cinema controller if installed. For more info, see “Replacement of the cinema controller board”, page 242. If problem persists, the SMPS is malfunctioning.
Malfunction SMPS	Replace the SMPS board. For more info, see “Replacement of the Switched Mode Power Supply (SMPS)”, page 246.

This troubleshooting table applies to the following error and warning code numbers: EN9000301, EN9000302.

Code DOC-EN9000404: “High temperature measured on [location] of the SMPS.” (warning)

Situation	Solution
Ambient temperature too high.	Check the ambient temperature at the air inlets of the projector. Make sure the projector operates within specs.
Front and/or bottom air filter blocked.	Clean / replace the air filters. See procedures in “Maintenance procedures”, page 285 .
This notification is triggered alongside fan-related notifications: malfunction one or more fans.	Resolve the fan-related notifications first.
Wiring issue	Check / reseat the wiring between SMPS (J5) and LCB (J302).
This notification appears alongside other SMPS-related notifications: Malfunction SMPS	Replace the SMPS board. For more info, see “Replacement of the Switched Mode Power Supply (SMPS)”, page 246 .
Malfunction LCB	Replace the LCB. For more info, see “Replacing the Laser Control Board (LCB)”, page 116 .

This troubleshooting table applies to the following error and warning code numbers: EN9000404, EN9000504, EN9000604, EN9000704.

Code DOC-ENf000004: “Light sensor temperature value 'x' is equal or higher than threshold 'y'.” (warning)

Situation	Solution
This warning is triggered alongside other temperature-related messages.	Resolve the other temperature-related messages first.
The light source has been on for a long period of time at maximum power.	Make sure to protect your light source. Plan in moments of downtime for your projector.
Light sensor overheated due to poorly aligned fold mirrors (e.g. after light source replacement action).	<ul style="list-style-type: none"> If the light source has been replaced or removed for a service action, make sure you have mounted the light source back correctly. For more info, see “Light Source”, page 93. Align the fold mirrors correctly. For more info, see “Adjusting the fold mirrors”, page 129.

Code DOC-F0000: “Update of [board_name] to version x failed.” (warning)

Situation	Solution
Update of the projector on this board has failed.	Reboot the projector to try again (2 times at most). If problem persists, replace the board.

Code DOC-F0001: “Software version mismatch detected for [board_name] (actual: y, expected x).” (warning)

Situation	Solution
A board has been detected with a different software version compared to the rest of the projector.	Reboot the projector to try again (2 times at most). If problem persists, replace the board.

Code DOC-F0002: “Unable to read software version for [board_name].” (warning)

Situation	Solution
Problem in communication with this board.	Check / reseat the connectors on this board. Then reboot the projector to re-install the software. If problem persists, replace the board.

Code DOC-F000c: “Firmware update failed.” (warning)

Situation	Solution
Update of the projector has failed.	Reboot the projector to try again (2 times at most). If problem persists, contact Barco.

Code DOC-F000d: “Firmware update to version x failed.” (warning)

Situation	Solution
Update of the projector has failed.	Reboot the projector to try again (2 times at most). If problem persists, contact Barco.

This troubleshooting table applies to the following Error code numbers: F000d, F000e.

Code DOC-F0100: “Firmware End User License Agreement has not been accepted.” (warning)

Situation	Solution
EULA has not been accepted yet.	Usability of the projector is limited until the EULA is accepted. If the EULA has been accepted, but the message still is prompted, contact Barco.

Code DOC-ID00001: “Projector activation license almost expired - only [time] left.” (warning)

Situation	Solution
The license for playing a type of content is nearing its expiration date.	Contact Barco in order to purchase a new applicable license before the designated time (days, hours and/or minutes) has passed. Use Web Communicator and navigate to <i>Configuration > Manage licenses</i> to upload the new license to your projector. See projector user guide for more info on managing licenses.

Code DOC-ID00002: “Projector activation license expired.” (error)

Situation	Solution
The license for playing content has expired.	Contact Barco in order to purchase a new applicable license. Use Web Communicator and navigate to <i>Configuration > Manage licenses</i> to upload the new license to your projector. See projector user guide for more info on managing licenses.

Code DOC-IOT00002: “Certificate does not match the serial number of this device.” (warning)

Situation	Solution
Software version is 1.4 or older: Projector identification certificate backup failed.	Something went wrong during the backup restoration process causing the projector identification certificate to be lost. In this case, contact the Barco helpdesk in order to request a new applicable certificate. Once the certificate has been restored, make sure your projector runs on the latest software. For more information on how to update your software, see “Software update”, page 22 . For more information on how to renew the projector identification certificate, see the projector user guide - section “Managing certificates”.
Software version is 1.5 or newer: Should not occur	From this software version onward this issue can no longer occur. If this somehow still occurs, contact the Barco helpdesk for further actions.

Code DOC-IOT00003: “HTTPS {0} certificate will expire on {1}.” (warning)

Situation	Solution
HTTPS (SSL) certificate used to establish a secure connection with the Web Communicator will expire soon (life period limited to 3 years max).	In case of self signed certificate, use the button Renew in the <i>Configuration > Licenses and certificates > Manage certificates</i> page of Web communicator to generate a new certificate, then download it and install it in the user Web browser. In case of custom certificate, first download a new CSR, then get it signed by a certificate authority (CA), and finally upload it in web communicator. See Web communicator user guide for more details.

Code DOC-L80000: “Light source was switched off due to severe error.” (error)

Situation	Solution
Light Source switched off due to other Light Source related errors.	This error will appear together with other error or warning messages. Resolve those messages first.

Code DOC-L80001: “Light source communication error.” (error)

Situation	Solution
Communication error with the light source or one of its linked components	This error will appear together with other communication errors. Resolve those errors first.

Code DOC-L80003: “Autodimming: Set maximum illumination power limit for source [lightsource_type] to x%.” (warning)

Situation	Solution
An error has caused the Light Source to be dimmed to its minimum output	This warning will appear together with other errors. Resolve those errors first.

Code DOC-L0004: “Shutter failure: reduced output power.” (warning)

Situation	Solution
The shutter feature did not activate when requested. Software issue.	Press the shutter icon again and see if it activates this time. If still not responsive, try to reboot the projector (maximum two times). If problem persists, update the projector software. For more info, see .



There is no mechanical shutter present in this projector. If this warning triggers it is a software-related issue, not a mechanical issue.

Code DOC-L80006: “Illumination switched off due to expiration of the projector activation license.” (error)

Situation	Solution
Light source has switched off because the license of the played content type has expired.	Contact Barco in order to purchase a new applicable license. Use Web Communicator and navigate to <i>Configuration > Manage licenses</i> to upload the new license to your projector. See projector user guide for more info on managing licenses.

Code DOC-L80007: “Communication issues with color sensor during laser selftest.” (warning)

Situation	Solution
Wiring issue	Check / reseal the wiring between the FMCB (J104) and the light sensor.
Difference in software packages between Light sensor and FMCB.	Upgrade the software to the latest version. See procedure “ Software update ”, page 22.
Only the Light sensor has a communication error: malfunction light sensor.	Replace the light sensor board. For more info, see “ Replacing the Light Sensor ”, page 123.
Only the FMCB has a communication error: malfunction FMCB	Replace the FMCB. For more info, see “ Replacement of the Fan and Motor Control Board (FMCB) ”, page 256.

Code DOC-L8000a: “Illumination CLO unable to maintain desired light output.” (warning)

Situation	Solution
The light output slider of the Illumination menu is pushed above what the light source can produce.	Navigate to the Light output mode menu in Web Communicator. Reduce either the desired light output, or disable CLO.
Chosen Constant Light Output (CLO) can no longer be reached due to ageing of the light source.	Navigate to the Light output mode menu in Web Communicator. Reduce either the desired light output, or disable CLO. If the available light output is too low compared to what is required (due to ageing of the light source), replace the light source with a new one. See service procedures in “Light Source”, page 93 .

Code DOC-L8000d: “Illumination CLO light measurement failed.” (warning)

Situation	Solution
During light measurement the light output slider of the Illumination menu is pushed above what the light source can produce.	Reduce either the desired light output, or disable Constant Light Output (CLO).
Chosen CLO value can not be reached due to ageing of the light source.	Reduce either the desired light output, or disable CLO. If the available light output is too low compared to what is required (due to ageing of the light source), replace the light source with a new one. See service procedure “Light Source”, page 93 .
Human error occurred during light sensor calibration procedure	Make sure you have followed the calibration process of the projector correctly. For more info on the calibration process, see “Color calibration”, page 175 and the projector user guide.
Wiring issue RGB light sensor	Check / reseal the wiring between FMCB (connector J104) and the RGB Light Sensor.
Malfunction Light Sensor	Replace the light sensor. For more info, see “Replacing the Light Sensor”, page 123 .

Code DOC-L8000f: “Laser TIM curing failed due to cancellation.” (warning)

Situation	Solution
The TIM curing process has stopped because you cancelled it.	The TIM curing process has not been completed. This message will remain visible until you manually start the TIM curing process again. For more info on the TIM curing process, see procedures in “Light Source”, page 93 .
The TIM curing process has stopped because the projector powered down.	The TIM curing process has not been completed. This message will remain visible until you restart the projector and start the TIM curing process again. For more info on the TIM curing process, see procedures in “Light Source”, page 93 .

Code DOC-L80010: “Laser TIM curing failed due to laser self test.” (warning)

Situation	Solution
The TIM curing could not complete because of a failed laser self test.	<p>This warning will prompt alongside other warnings and errors, which may indicate the reason why the laser self-test failed.</p> <p>Fix the issues and try the TIM curing process again. This message will remain visible until you manually start the TIM curing process again.</p> <p>For more info on the TIM curing process, see procedures in “Light Source”, page 93.</p>

Code DOC-L80011: “Laser TIM curing failed on plates 'x'.” (warning)

Situation	Solution
TIM curing failed on one or more specific laser plates.	<p>This warning will prompt alongside other warnings and errors, which may indicate the reason why the laser self-test failed.</p> <p>Fix the issues and try the TIM curing process again. This message will remain visible until you manually start the TIM curing process again.</p> <p>For more info on the TIM curing process, see procedures in “Light Source”, page 93.</p>

Code DOC-L80016: “White point tracking failed, loading last valid tracking curve.” (info)

Situation	Solution
Communication with LCB results in an error	Check / reseal the wiring between FMCB (J800) and LCB (J200).
Communication with Light sensor results in an error	Check / reseal the wiring between FMCB (connector J104) and the RGB Light Sensor.
Malfunction Light Sensor	Replace the light sensor. For more info, see “Replacing the Light Sensor”, page 123 .
This warning appears alongside warnings mentioning “invalid runtime”, “corrupted runtime” or “identification data”: Laser plates have been tampered with	Only use spare parts that originate from Barco and do not tamper with the laser plates data. Contact Barco on how to further handle this situation.
This warning is triggered alongside warning “white point tracking failed for laser bank x of laser plate y”: malfunction laser bank.	See troubleshooting table for warning L80023: “White point tracking failed for laser bank [1–3] of laser plate [1–10].”
Malfunction Light Source Board (LSB)	Replace the LSB. For more info, see “Replacing the Light Source board”, page 98 .



After consideration, the severity of this issue has been decreased to info. If this message triggered as a warning on your device, please update your software

Code DOC-L80017: “White point tracking failed for laser bank [1–3] of laser plate x.” (info)

Situation	Solution
Wiring issue	Check / reseat all wiring connected to the affected laser plate and the RGB light sensor.
Warning appears alongside other notifications regarding this laser bank and/or the LDM driving the affected laser plate: Malfunction LDM driver board.	See the troubleshooting tables for the LDM related notifications. Resolve those messages and retry the white point tracking.
White point tracking fails for one or more laser banks on a single laser plate: Malfunction laser bank or laser plate.	Restart the projector and try again. If white point tracking keeps failing, the laser bank or plate is malfunctioning. Replace the laser plate with the malfunctioning laser bank. For more info, see replacement process in “Light Source”, page 93 .
White point tracking fails on multiple laser plates: Malfunction RGB Light Sensor	Restart the projector and try again. If white point tracking keeps failing on multiple laser plates, the light sensor might be malfunctioning. In this case, replace the light sensor. For more info, see “Replacing the Light Sensor”, page 123 .



After consideration, the severity of this issue has been decreased to info. If this message triggered as a warning on your device, please update your software

Code DOC-L80019: “Laser TIM heating failed due to cancellation.” (warning)

Situation	Solution
The TIM heating process has stopped because you cancelled it.	The TIM heating process has not been completed. This message will remain visible until you manually start the TIM heating process again. For more info on the TIM heating process, see procedures in “Light Source”, page 93 .
The TIM heating process has stopped because the projector powered down.	The TIM heating process has not been completed. This message will remain visible until you restart the projector and start the TIM heating process again. For more info on the TIM heating process, see procedures in “Light Source”, page 93 .

Code DOC-L8001a: “Laser TIM heating failed due to laser self test.” (warning)

Situation	Solution
The TIM heating could not complete because of a failed laser self test.	This warning will prompt alongside other warnings and errors, which may indicate the reason why the laser self-test failed. Fix the issues and try the TIM heating process again. This message will remain visible until you manually start the TIM heating process again. For more info on the TIM heating process, see procedures in “Light Source”, page 93 .

Code DOC-L8001b: “Laser TIM heating failed.” (warning)

Situation	Solution
TIM heating process failed.	<p>This warning will prompt alongside other warnings and errors, which may indicate the reason why the laser self-test failed.</p> <p>Fix the issues and try the TIM heating process again. This message will remain visible until you manually start the TIM heating process again.</p> <p>For more info on the TIM heating process, see procedures in “Light Source”, page 93.</p>

Code DOC-L8001e: “Switched off because light lease license has expired.” (error)

Situation	Solution
Light source has switched off because the license of the played content type has expired.	<p>Contact Barco in order to purchase a new applicable license.</p> <p>Use Web Communicator and navigate to <i>Configuration > Manage licenses</i> to upload the new license to your projector. See projector user guide for more info on managing licenses.</p>

Code DOC-L8001f: “Bad communication detected between CCB and LCB.” (error)

Situation	Solution
Wiring issue	<p>Check / reseat the wiring between the signal backplane (J801) and the LCB (J200).</p> <p>Check for other communication errors to see which part is faulty.</p>
Multiple warnings and errors related to the CCB: Cinema Control Board poorly mounted.	Check / reseat the Cinema control board. For more info, see “Replacement of the cinema controller board”, page 242 .
Multiple warnings and/or errors related to the LCB: Malfunction LCB.	Check / reseat all wiring of the LCB. If problem persists, replace the LCB. For more info, see “Replacing the Laser Control Board (LCB)”, page 116 .

Code DOC-L80020: “Failed to turn on the lightsource.” (error)

Situation	Solution
Light Source remains off due to other Light Source related errors.	<p>This error will appear together with other error or warning messages.</p> <p>Resolve those messages first.</p>

Code DOC-L80021: “Failed to close the shutter.” (error)

Situation	Solution
Software issue related to shutter feature.	<p>Retry (press the shutter icon again) and see if the shutter reacts this time. If still not responsive, try to reboot the projector (maximum two times). If problem persists, update the projector software.</p>

Code DOC-L80022: “Failed to open the shutter.” (warning)

Situation	Solution
Software issue related to shutter feature.	<p>Retry (press the shutter icon again) and see if the shutter reacts this time. If still not responsive, try to reboot the projector (maximum two times). If problem persists, update the projector software.</p>



After consideration, the severity of this issue has been decreased to warning. If this message triggered as an error on your device, please upgrade your software.

Code DOC-L8003c: “Illumination power limited to 20 % due to light sensor overheating.” (error)

Situation	Solution
The light source has been on for a long period of time at maximum power.	Make sure to protect your light source. Plan in moments of downtime for your projector.
Light sensor overheated due to poorly aligned fold mirrors (e.g. after light source replacement action).	<ul style="list-style-type: none"> If the light source has been replaced or removed for a service action, make sure you have mounted the light source back correctly. For more info, see “Light Source”, page 93. Align the fold mirrors correctly. For more info, see “Adjusting the fold mirrors”, page 129.

Code DOC-L80051: “Illumination CLO is being controlled by more than one master projector, adjust the linked CLO configuration at one of these projectors: [projector_names].” (warning)

Situation	Solution
“Slave” projector in multi-projector has multiple “master” projectors.	Adjust the linked clo settings of the named projectors. For more information on multi-projector setup and linked CLO, see the projector user guide.

Code DOC-L80060: “Max output power back to normal.” (warning)

Situation	Solution
The light source is playing at normal power again.	If this is the first time you see this, you can safely ignore this message. If the messages relates to “max output power” trigger on a somewhat regular basis, pay attention to what other warning or error messages trigger alongside it to find the root cause.

Code DOC-L80061: “Max output power reduced.” (warning)

Situation	Solution
The power of the light source is reduced.	Try to find the root cause in other warning and or error messages that will be triggered alongside this.

Code DOC-L80062: “Max output power reduced due to lens protection.” (warning)

Situation	Solution
The light source has been on for a long period of time at maximum power.	Make sure to protect your light source and lens. Plan in moments of downtime for your projector.
This message is triggered alongside other illumination and light sensor related messages: malfunction light sensor board.	Replace the light sensor. For more info, see “Replacing the Light Sensor”, page 123 .

This troubleshooting table applies to the following error and warning code numbers: L80062 and O00001.

Code DOC-M00000: “The (lens) motor [motor_type] has reached the end of its operational range.” (warning)

Situation	Solution
One of the lens shift motor has reached the end of its operational range.	Use lens shift to move the lens back in the opposite direction. Physically move the projector if the desired projection could not be achieved from the current position.
The zoom motor(s) has/have reached the end of its operations range.	Zoom the lens in the other direction. Physically move the projector if the desired projection could not be achieved from the current position.

Code DOC-M101000: “Motor [motor_type]: Target not reached.” (error)

Situation	Solution
Manual lens installed	Replace the manual lens with a motorized lens.
The activated lens position file does not correspond with the lens mounted on the projector	Activate a lens position file which does correspond with the mounted lens or mount a lens which correspond with the lens position file you want to activate.
Corrupt lens position file	<p>Delete the lens position file and create a correct lens position file using Web Communicator, using the correct lens parameters. See projector user guide for more info on creating lens position files.</p> <p>Tip: Perform a “Calibrate and return to mid position” before creating a new lens file. Otherwise, if the lens is removed the existing lens file will become useless.</p> <p>Setup all new lens files away from the maximum limitation of the lens zoom. It is possible that the lens file was originally created at the maximum or minimum zoom capabilities of the lens zoom.</p>
The final lens position lays very close to the mechanical limits. This disables the motorized lens position.	<ul style="list-style-type: none"> Position the lens manually, or reposition the projector so that the lens position lays further away from the mechanical limits, or try to use another lens of which the range is more suitable for your setup. <p>Setup all new lens files away from the maximum limitation of the lens zoom. It is possible that lens file was originally created at the maximum or minimum zoom capabilities of the lens zoom.</p> <p>Select the correct lens and create a new lens position file in Web Communicator. See projector user guide for more information.</p>
This error appears alongside the notification “Motor [motor_type]: timeout”: Wiring issue lens holder motor	<p>Check / reseal the wiring of the lens holder on the FMCB (connector J108, Image 16–28).</p> <p>If problem persists, the lens motor is malfunctioning. For more info on replacing lens motor and lens holder, see procedures in “Lens Holder”, page 197.</p>
Malfunction lens motor.	<p>Use the touch display or Web Communicator to zoom/shift the image on the screen. If unsuccessful, replace the lens holder motor.</p> <p>If problem persists, replace the entire lens holder.</p> <p>For more info on replacing lens motor and lens holder, see procedures in “Lens Holder”, page 197.</p>
Malfunction Cinema Control board.	Replace the Cinema Control board. See service manual chapter “ Replacement of the cinema controller board ”, page 242 .
Malfunction Fan and Motor Control Board	Replace the FMCB. See “ Replacement of the Fan and Motor Control Board (FMCB) ”, page 256 .



Image 16–28 Lens holder motors connector on FMCB

This troubleshooting table applies to the following Error code numbers: M101000, M103000, M104000, M105000, M107000.

Code DOC-M20400: “Motor [motor_type]: end of hardware range while moving in [x/y/z] direction.” (error)

Situation	Solution
One of the lens shift motors has reached the end of its operational range.	Use lens shift to move the lens back in the opposite direction. Physically move the projector if the desired projection could not be achieved from the current position.
The zoom motor(s) has/have reached the end of its operations range.	Zoom the lens in the other direction. Physically move the projector if the desired projection could not be achieved from the current position.

This troubleshooting table applies to the following Error code numbers: M20400, M20401, M20500, M20501, M20700, M20701.

Code DOC-MA003: “Execution of macro '[macro_name]' failed : Command at sequence number [sequence_nr] returned '[fault_condition]'.” (warning)

Situation	Solution
Macro cannot be completed, because of an error in one of the sequences	Analyze the returned fault condition and fix the issue. Take into account any other notification message that may have been triggered at the same moment as this one. For an example of this type of notification, refer to Image 16–29 .



Image 16–29 Example of a failed Macro notification. In this specific example, playing content via HDMI failed because the user forgot to calibrate the projector for the correct color spectrum.

Code DOC-MA004: “Created macro '[macro_name]’ has invalid data.” (warning)

Situation	Solution
Invalid values were entered in your newly created macro	Review and edit the macro to correct the invalid data. If unsure what went wrong, delete the macro and re-create it. For more info on creating and editing macro's, see projector user guide. Note: In theory this warning should not occur. It is programmed none the less as a safety catch.

Code DOC-MA005: “Executing macro '[macro_name]’ time out.” (warning)

Situation	Solution
macro sequence addressed the media server, but the ICMP-X, IMB or IMS is rebooting.	Wait until the media server has fully started up and try again.
A macro action timed out because the desired sequence is currently not possible.	Check the sequences of the macro and double-check if every sequence can actually occur on the affected projector. Edit/correct the macro where necessary. For more info on editing macro's, see projector user guide.
Macro timed out because a sequence addressed a malfunctioning component.	Check where the macro failed and what part of the projector did not respond correctly. Take into account any other notification message that may have been triggered around the same time as this one. Repair or replace the affected projector part and try again.

Code DOC-MA006: “Executing macro '[macro_name]’ general failure.” (warning)

Situation	Solution
Macro failed because you forgot to “clear” one or more security related events.	You will not be able to play content or perform specific sequences related to the ICMP-X as long as you do not correctly clear all security-related events. For more info, see “Authorization to clear a security warning on the projector”, page 298.
Macro failed because of an active security related event.	This warning should be triggered alongside errors concerning tamper events (e.g. opening sealed compartment, tampering with the media server, etc). Resolve the tamper related events and clear the security warning on the projector. For more info, see “Authorization to clear a security warning on the projector”, page 298.

Code DOC-N00000: “IP address [IP_address] is reserved for internal usage.” (warning)

Situation	Solution
The custom entered IP address is already in use by the projector for internal usage.	Enter a different custom IP address. Try to avoid IP addresses typically associated with internal processes (e.g. the range of 192.168.x.x).

Code DOC-N10004: “Connection to member [projector_name] failed due to authentication problems.” (warning)

Situation	Solution
In a multi-projector setup, you did not yet verify the “master” projector on your “slave” projector.	Verify the “master” projector on your “slave” projector. For more information on multi-projector setups, see the projector user guide.
“Master” projector in multi-projector setup cannot connect with “slave” projector due to certification issues.	Check the status of your device certificates on the projectors in this multi-projector setup.

Code DOC-N10005: “Connection to member [projector_name] failed due to compatibility problems.” (warning)

Situation	Solution
One of the projectors in the multi-projector setup does not yet support linked services.	Upgrade the software of all projectors in the multi-projector setup to the latest version. See procedure “Software update”, page 22 .

Code DOC-O00006: “Lens supports positional features, a calibration is required before positional features can be utilized.” (warning)

Situation	Solution
May be triggered when a new motorized lens is mounted.	Perform a lens calibration.

Code DOC-O10130: “Failed to execute calibration on [lensholder_motor] motor.” (warning)

Situation	Solution
Manual lens installed	Replace the manual lens with a motorized lens.
The activated lens position file does not correspond with the lens mounted on the projector	Activate a lens position file which does correspond with the mounted lens or mount a lens which correspond with the lens position file you want to activate.
Software issue	Reboot the projector and try again. If the calibration keeps fails three times or more, there may be an electronic or mechanical issue with the lens holder or FMCB.
Wiring issue lens holder motor	Check / reseal the wiring of the lens holder on the FMCB (connector J108, Image 16–28 , and also J107 in case of a B-Lens holder).
Malfunction lens motor.	Use the touch display or Web Communicator to zoom/shift the image on the screen. If unsuccessful, replace the lens holder motor. If problem persists, replace the entire lens holder. For more info on replacing lens motor and lens holder, see procedures in “Lens Holder”, page 197 .
Malfunction Fan and Motor Control Board	Replace the FMCB. See “Replacement of the Fan and Motor Control Board (FMCB)”, page 256 .

This troubleshooting table applies to the following Error code numbers: O10130, O10330, O10430, O10530.

Code DOC-O10131: “Failed to execute calibration and return on [lensholder_motor] motor.” (warning)

Situation	Solution
Manual lens installed	Replace the manual lens with a motorized lens.
The activated lens position file does not correspond with the lens mounted on the projector	Activate a lens position file which does correspond with the mounted lens or mount a lens which correspond with the lens position file you want to activate.
Software issue	Reboot the projector and try again. If the calibration keeps fails three times or more, there may be an electronic or mechanical issue with the lens holder or FMCB.
Wiring issue lens holder motor	Check / reseal the wiring of the lens holder on the FMCB (connector J108, Image 16–28 , and also J107 in case of a B-Lens holder).
Malfunction lens motor.	Use the touch display or Web Communicator to zoom/shift the image on the screen. If unsuccessful, replace the lens holder motor. If problem persists, replace the entire lens holder. For more info on replacing lens motor and lens holder, see procedures in “ Lens Holder ”, page 197 .
Malfunction Fan and Motor Control Board	Replace the FMCB. See “ Replacement of the Fan and Motor Control Board (FMCB) ”, page 256 .

This troubleshooting table applies to the following Error code numbers: O10131, O10331, O10431, O10531.

Code DOC-O20100: “Motor [motor_type]: end of hardware range while moving in [x/y/z] direction.” (warning)

Situation	Solution
Manual manipulation has occurred with the lens, causing the lens position file to be inaccurate	Calibrate the lens and create a new lens position file.
One of the lens shift motors has reached the end of its operational range.	Use lens shift to move the lens back in the opposite direction. Physically move the projector if the desired projection could not be achieved from the current position.
The zoom motor(s) has/have reached the end of its operations range.	Zoom the lens in the other direction. Physically move the projector if the desired projection could not be achieved from the current position.

This troubleshooting table applies to the following Error code numbers: O20100, O20101, O20300, O20301, O20400, O20401, O20500, O20501, O20600, O20601.

Code DOC-O30003: “Failed applying lens position file '[lens_filename]'.” (error)

Situation	Solution
The activated lens position file does not correspond with the lens mounted on the projector	Activate a lens position file which does correspond with the mounted lens or mount a lens which correspond with the lens position file you want to activate.
A lens calibration or manual lens manipulation was done after creation of the lens position file.	It is advised to first manipulate the lens to the desired position and to calibrate the lens BEFORE creating the applicable lens position file. If problem persists, it is best to consider the lens position file corrupt and create a new one.

Situation	Solution
Corrupt lens position file	<p>Delete the lens position file and create a correct lens position file using Web Communicator, using the correct lens parameters. See projector user guide for more info on creating lens position files.</p> <p>Tip: Perform a “Calibrate and return to mid position” before creating a new lens file. Otherwise, if the lens is removed the existing lens file will become useless.</p> <p>Setup all new lens files away from the maximum limitation of the lens zoom. It is possible that the lens file was originally created at the maximum or minimum zoom capabilities of the lens zoom.</p>
Wiring issue one of the lens holder motors	Check / reseal the wiring of the lens holder on the FMCB (connector J108 and J109, and also J107 in case of a B-lensholder).
Malfunction Fan and Motor Control Board	Replace the FMCB. See “Replacement of the Fan and Motor Control Board (FMCB)”, page 256.
Malfunction lens motor.	<p>Use the touch display or Web Communicator to zoom/shift the image on the screen. If unsuccessful, replace the lens holder motor.</p> <p>If problem persists, replace the entire lens holder.</p> <p>For more info on replacing lens motor and lens holder, see procedures in “Lens Holder”, page 197.</p>

Code DOC-PR000002: “Couldn’t activate, profile [profile name] does not exist.” (warning)

Situation	Solution
Occurs when trying to activate a non-existing profile, while using the rest API.	Call an existing profile.

Code DOC-PR000003: “Failed to activate [profile_setting] for profile [profile_name].” (warning)

Situation	Solution
Occurs when there is a failure in one of the systems affected by the chosen profile.	<p>This warning will appear alongside other warning or error messages. Check the other messages to determine the root cause.</p>

Code DOC-PR000012: “Creating profile [profile_name] failed.” (warning)

Situation	Solution
Occurs when creating a profile with one or more settings outside of the projector specs, while using the rest API.	Make sure you are aware of the projector specs while creating a profile using the rest API. Stay within the specs.

Code DOC-PR000013: “Couldn’t create profile [profile_name] with invalid domain [domain_name].” (warning)

Situation	Solution
Occurs when trying to create a new profile with a nonexistent domain while using the rest API (e.g. a typo in the code).	Make sure the rest API code is valid.

Code DOC-PR000014: “Couldn’t create duplicate profile [profile_name].” (warning)

Situation	Solution
The chosen profile name already exists	Choose a different profile name.

Code DOC-PR000015: “Couldn’t create profile [profile_name]. An error occurred loading data for domain [domain_name].” (warning)

Situation	Solution
A failure has occurred in one of the domains used by the chosen profile.	This warning will appear alongside other warning or error messages. Check the other messages to determine the root cause.

Code DOC-S000b0: “Input voltage in low range.” (info)

Situation	Solution
Connecting issue.	<ul style="list-style-type: none"> Check the cross-sectional area of the conductors used as Power Supply Cord. Check installation requirements in the projector installation manual. Check if the wires are correctly connected to the terminal strip (power connections). Check that the conductors used as Power Supply Cord is not damaged by bending, twisting, pulling, heating, heavy load or any other types of damage.
Malfunction mains voltage.	See Mains voltage errors.

Code DOC-S00110: “Projector ID card is not available.” (warning)

Situation	Solution
ID card not properly mounted	Check / reseat the projector ID card. For the location of the card, see procedure “Replacement of the projector ID card”, page 244.
Wiring issue	Check / reseat the wiring between the signal backplane (J801) and the LCB (J200).

Code DOC-S00111: “Projector ID card data is not valid.” (warning)

Situation	Solution
ID card not properly mounted	Check / reseat the projector ID card. For the location of the card, see procedure “Replacement of the projector ID card”, page 244.
Wiring issue	Check / reseat the wiring between the signal backplane (J801) and the LCB (J200).

Code DOC-S00200: “Initiating autonomous projector shutdown due to a persistent error that is active for more than 10 minutes.” (warning)

Situation	Solution
This message will be triggered when one or more errors have been active for a long time.	Resolve all error messages.

Code NODOC: “Error or warning code not documented.”

Situation	Solution
Triggered message is an info, notification or caution message.	Messages with a severity lower than warning are not documented by default.
Triggered message is a warning or error.	This code is not yet documented. Contact Barco if this code was triggered on your device and you want more information.

Technical specifications

A

A.1	Position of the optical adapter for B-Series lenses	384
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A.1 Position of the optical adapter for B-Series lenses

Position of the optical adapter when used on B-Series lenses

The following table lists all lenses that have been tested for usage on the SP4K-C projector with B-lens holder, the appropriate adapter ring to use alongside the optical adapter as well as the screws used for this adapter ring.

There are other lenses from previous generation projectors that can technically be re-used on the SP4K-C projector with B-lens holder. However, these lenses have not been tested in our R&D environment. However, we have determined what adapter ring and screws to use alongside these lenses. If your lens does not appear in the following list of lenses, check the Barco website for the full list of applicable lenses and adapter ring compatibility.

Lens nr	Type	Throw range on SP4K-C	Adapter ring	Position	Screws used
R9856504	High Brightness	1.59 – 2.42	Ring 2	End position	M4x10 (3x)
R98565042	High Contrast	1.59 – 2.42	Ring 2	End position	M4x10 (3x)
R9856506	High Brightness	1.59 – 2.42	Ring 2	End position	M4x10 (3x)
R98565062	High Contrast	1.59 – 2.42	Ring 2	End position	M4x10 (3x)
R9856525	High Brightness	1.59 – 2.42	Ring 2	End position	M4x10 (3x)
R98565252	High Contrast	1.59 – 2.42	Ring 2	End position	M4x10 (3x)
R9856294	High Brightness	1.90 – 2.62	Ring 2	End position	M4x10 (3x)
R98562942	High Contrast	1.90 – 2.62	Ring 2	End position	M4x10 (3x)
R9856526	High Brightness	1.90 – 2.62	Ring 2	End position	M4x10 (3x)
R98565262	High Contrast	1.90 – 2.62	Ring 2	End position	M4x10 (3x)
R9856297	High Brightness	2.06 – 2.96	Ring 2	End position	M4x10 (3x)
R98562972	High Contrast	2.06 – 2.96	Ring 2	End position	M4x10 (3x)
R9856527	High Brightness	2.06 – 2.96	Ring 2	End position	M4x10 (3x)
R98565272	High Contrast	2.06 – 2.96	Ring 2	End position	M4x10 (3x)
R9856300	High Brightness	2.32 – 3.66	Ring 2	End position	M4x10 (3x)
R98563002	High Contrast	2.32 – 3.66	Ring 2	End position	M4x10 (3x)
R9856528	High Brightness	2.32 – 3.66	Ring 2	End position	M4x10 (3x)
R98565282	High Contrast	2.32 – 3.66	Ring 2	End position	M4x10 (3x)
R9856303	High Brightness	2.82 – 4.72	Ring 2	End position	M4x10 (3x)
R98563032	High Contrast	2.82 – 4.72	Ring 2	End position	M4x10 (3x)
R9856529	High Brightness	2.82 – 4.72	Ring 2	End position	M4x10 (3x)
R98565292	High Contrast	2.82 – 4.72	Ring 2	End position	M4x10 (3x)
R9855947	High Brightness	3,56 – 7,01	Ring 2	End position	M4x10 (3x)

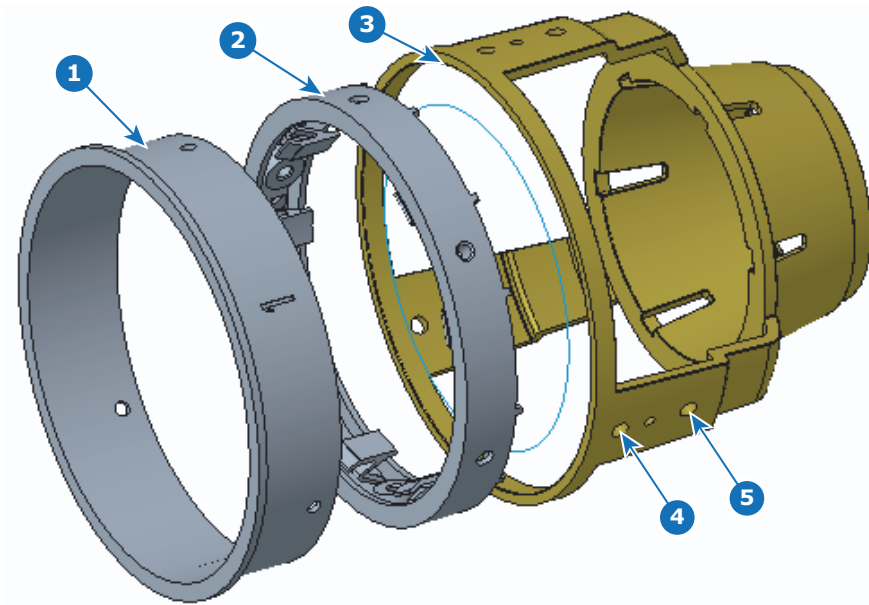


Image A-1 Optical adapter with adapter rings

- 1 Adapter ring 1
- 2 Adapter ring 2
- 3 Optical adapter

- 4 Front position to mount ring 2
- 5 End position to mount ring 2

Glossary

Scheimpflug principle

The "plane of sharp focus" can be changed so that any plane can be brought into sharp focus. When the DMD plane and lens plane are parallel, the plane of sharp focus will also be parallel to these two planes. If, however, the lens plane is tilted with respect to the DMD plane, the plane of sharp focus will also be tilted according to geometrical and optical properties. The DMD plane, the principal lens plane and the sharp focus plane will intersect in a line below the projector for downward lens tilt.

List of tools

A caliper
 Allen wrench 1.5 mm
 Allen wrench 2 mm
 Allen wrench 2.5 mm
 Allen wrench 3 mm
 Allen wrench 4 mm
 Allen wrench 5 mm
 Allen wrench 8 mm
 Authorization pin code
 Bucket with hot water
 chemical-resistant gloves (nitrile rubber)
 Clean cotton cloth
 Clean micro fiber lens cleaning cloth (e.g. Toraysee® cloth(s))
 Colorimeter
 Compressed air
 Cordstrap spanner
 Cotton gloves
 Flat screwdriver
 Flat screwdriver 4 mm
 Knife
 Lens cleaner (e.g. ZEISS lens cleaner, Purosol™ or other water based lens cleaner products)
 Loctite 242
 Nut driver 10 mm
 Open-end wrench 24 mm
 Open-end wrench 30 mm
 Open-end wrench 7 mm (2 pieces)
 Phillips screwdriver PH1
 Photospectrometer
 Projected Light meters (Lux meter)
 Side cutter
 Sodium carbonate, 30 gram (handful) per liter hot water
 Spectroradiometer
 T20 Torx screwdriver with a long handle (e.g. 30 cm).
 Torque wrench with 10 mm hexagon socket
 Torque wrench with 8 mm hex socket
 Torque wrench with hex bits
 Torque wrench with T30 Torx bit
 Torx screwdriver T10
 Torx screwdriver T20
 Torx screwdriver T20 x 300
 Torx screwdriver T30
 Torx screwdriver TX10
 Vacuum cleaner with soft brush suction nuzzle.
 Web Communicator

Index

Numbers/Symbols

3D Interface port 231
3G-SDI 240

A

Access
 Mains board 35
Activate
 LUT-SCC file 189
Adjust
 Fold Mirror 129
Air filter sensor
 Replacement 86
AUDIO-AES 239
Authorization
 Security warning
 Clear 298

B

B-lens holder
 Lens
 installation 204
 Removal 209
B00000 306
B00004 306
B00005 307
BA00101 308
BA00110 308
BA00113 308
BA10020 308
BA10021 309
Block diagrams 19

C

C-lens holder
 Lens
 installation 200

Removal 202
C0000 309
C0001 309
C0002 309
C0003 309
C0004 309
C0005 309
C0010 310
C0011 310
C0012 310
C0013 310
C0014 310
C0015 311
C0016 311
C0017 311
C0022 311
C0030 311
C0032 312
C0033 312
C0034 312
C0035 313
C0036 313
C0037 313
C0038 313
C0039 313
C0040 313
C0041 313
C0042 314
C0043 314
C0044 314
C0045 314
C0046 314
C0050 315
card cage
 fan
 replace 259
Card cage
 Backplane
 replace 264
 backplane removal
 Preparation 262
CCB
 Replace 242

- Cinema controller board
 - Replace 242
 - ICP-D 233
 - Introduction 230
 - Mounting preparation 266
 - signal backplane
 - Replacement process 261
 - SMPS 241
 - Touch display
 - Replace 254
 - Card Cage 229
 - ICMP 248
 - Check
 - Dust filter 288, 290–291
 - Cinema controller
 - battery
 - replacement 243
 - Communication ports 231
 - Input ports 231
 - Clean
 - Light pipe lens 137
 - Light Pipe Mirror 128
 - Cleaning
 - Exterior 296
 - Filters 292
 - Filters (wet) 293
 - Lens 295
 - Products 286
 - Projector
 - Optical components 287
 - Optical path 297
 - Tips 286
 - Tools 286
 - Color calibration 175
 - about 182
 - Light source 177
 - White point calibration 177
 - Process overview 176
 - Verify corrected colors
 - TCGD files 187
 - White Point 178
 - White point calibration 177
 - Communication
 - 3D Interface port 231
 - AUDIO-AES 239
 - GPI 239
 - GPI port 231
 - GPO 239
 - GPO port 231
 - LAN 239
 - LAN port 231
 - SYNC 239
 - USB 2.0 239
 - USB 3.0 239
 - USB port 232
 - WAN port 231
 - Communication ports
 - ICMP-X 239
 - Configuration
 - Color calibration
 - Light source 177
 - Verify corrected colors 187
 - Projector color 182
 - Connect
 - Main AC 38
 - Convention
 - Orientation 16
 - convergence
 - Red on Green 171
 - Convergence 173
 - Controls 169
 - Cooling 67
 - Introduction 68
 - pump
 - Replacement 76
 - Cooling liquid
 - Safety precautions 12
 - Corrected Colors
 - Verify 187
- ## D
- D0013 315
 - Delta (Δ) configuration 36
 - Diagnostic
 - Integration Rod 138
 - Light Processor 147
 - Diagnostics
 - Analysis
 - Diagnostic package 304
 - DMD cooling
 - Fan
 - Replacement 88
 - DMD Cooling 67
 - Install 90
 - Remove 83
 - Documentation tag
 - DOC-EN3000c02 336
 - DOC-EN3001101 336
 - DOC-EN3001501 338
 - DOC-EN3001601 338
 - DOC-EN300f4b1 345
 - DOC-EN4100004 345
 - DOC-EN4100040 347
 - DOC-EN4100080 348
 - DOC-EN4100304 348
 - DOC-EN4100604 349
 - DOC-EN4110001 353
 - DOC-EN4110e02 356
 - DOC-EN4111102 356
 - DOC-EN6000004 359
 - DOC-EN6000804 361
 - DOC-EN6000840 362
 - DOC-EN6000c02 362
 - DOC-EN6000c04 362
 - DOC-EN6002102 362
 - DOC-EN600f002 363
 - Download
 - LUT-SCC file 192
 - Drying
 - Filters 293
 - Dust filter
 - Front
 - Replace 288
 - LDM
 - Replace 291
 - Rear

Replace 290

E

EN0000002	315	EN1200604	317
EN0000004	315	EN1200608	317
EN0000008	315	EN1200704	317
EN0000080	316	EN1200708	317
EN1100308	316	EN1200804	317
EN1100408	316	EN1200808	317
EN1100508	316	EN1200c04	317
EN1100604	317	EN1200c08	317
EN1100608	317	EN1200c20	318
EN1100704	317	EN1200c40	319
EN1100708	317	EN1200c80	319
EN1100804	317	EN1200d04	317
EN1100808	317	EN1200d08	317
EN1100c04	317	EN1200d20	318
EN1100c08	317	EN1200d40	319
EN1100c20	318	EN1200d80	319
EN1100c40	319	EN1200e04	317
EN1100c80	319	EN1200e08	317
EN1100d04	317	EN1200e20	318
EN1100d08	317	EN1200e40	319
EN1100d20	318	EN1200e80	319
EN1100d40	319	EN1200f04	320
EN1100d80	319	EN1200f08	320
EN1100e04	317	EN1200f40	320
EN1100e08	317	EN1200f80	321
EN1100e20	318	EN1201004	320
EN1100e40	319	EN1201008	320
EN1100e80	319	EN1201040	320
EN1100f04	320	EN1201080	321
EN1100f08	320	EN1201101	321
EN1100f40	320	EN1201102	321
EN1100f80	321	EN1201104	321
EN1101004	320	EN1201108	321
EN1101008	320	EN1201201	321
EN1101040	320	EN1201202	321
EN1101080	321	EN1201204	321
EN1101101	321	EN1201208	321
EN1101102	321	EN1201301	321
EN1101104	321	EN1201302	321
EN1101108	321	EN1201304	321
EN1101201	321	EN1201308	321
EN1101202	321	EN1201608	322
EN1101204	321	EN1201708	322
EN1101208	321	EN1201808	322
EN1101301	321	EN120d001	323
EN1101302	321	EN120d002	323
EN1101304	321	EN120d101	324
EN1101308	321	EN120d103	324
EN1101608	322	EN120d104	324
EN1101708	322	EN1300308	316
EN1101808	322	EN1300408	316
EN110d001	323	EN1300508	316
EN110d002	323	EN1300604	317
EN110d101	324	EN1300608	317
EN110d103	324	EN1300704	317
EN110d104	324	EN1300708	317
EN1200308	316	EN1300804	317
EN1200408	316	EN1300808	317
EN1200508	316	EN1300c04	317
		EN1300c08	317
		EN1300c20	318
		EN1300c40	319
		EN1300c80	319
		EN1300d04	317

EN1300d08	317	EN1400f80	321
EN1300d20	318	EN1401004	320
EN1300d40	319	EN1401008	320
EN1300d80	319	EN1401040	320
EN1300e04	317	EN1401080	321
EN1300e08	317	EN1401101	321
EN1300e20	318	EN1401102	321
EN1300e40	319	EN1401104	321
EN1300e80	319	EN1401108	321
EN1300f04	320	EN1401201	321
EN1300f08	320	EN1401202	321
EN1300f40	320	EN1401204	321
EN1300f80	321	EN1401208	321
EN1301004	320	EN1401301	321
EN1301008	320	EN1401302	321
EN1301040	320	EN1401304	321
EN1301080	321	EN1401308	321
EN1301101	321	EN1401608	322
EN1301102	321	EN1401708	322
EN1301104	321	EN1401808	322
EN1301108	321	EN140d001	323
EN1301201	321	EN140d002	323
EN1301202	321	EN140d101	324
EN1301204	321	EN140d103	324
EN1301208	321	EN140d104	324
EN1301301	321	EN1500002	327
EN1301302	321	EN1500004	327
EN1301304	321	EN1500304	320
EN1301308	321	EN1500308	325
EN1301608	322	EN1500704	320
EN1301708	322	EN1500708	325
EN1301808	322	EN1500c20	318
EN130d001	323	EN1500c80	319
EN130d002	323	EN1500d20	318
EN130d101	324	EN1500d80	319
EN130d103	324	EN1500e20	318
EN130d104	324	EN1500e80	319
EN1400308	316	EN150d001	323
EN1400408	316	EN150d002	323
EN1400508	316	EN150d103	324
EN1400604	317	EN150d104	324
EN1400608	317	EN150f001	325
EN1400704	317	EN150f002	325
EN1400708	317	EN150f101	326
EN1400804	317	EN150f103	326
EN1400808	317	EN150f104	327
EN1400c04	317	EN1600308	316
EN1400c08	317	EN1600408	316
EN1400c20	318	EN1600508	316
EN1400c40	319	EN1600c04	317
EN1400c80	319	EN1600c08	317
EN1400d04	317	EN1600c20	318
EN1400d08	317	EN1600c40	319
EN1400d20	318	EN1600c80	319
EN1400d40	319	EN1600d04	317
EN1400d80	319	EN1600d08	317
EN1400e04	317	EN1600d20	318
EN1400e08	317	EN1600d40	319
EN1400e20	318	EN1600d80	319
EN1400e40	319	EN1600e04	317
EN1400e80	319	EN1600e08	317
EN1400f04	320	EN1600e20	318
EN1400f08	320	EN1600e40	319
EN1400f40	320	EN1600e80	319

EN1600f04	320	EN1701201	321
EN1600f08	320	EN1701202	321
EN1600f40	320	EN1701204	321
EN1600f80	321	EN1701208	321
EN1601004	320	EN1701301	321
EN1601008	320	EN1701302	321
EN1601040	320	EN1701304	321
EN1601080	321	EN1701308	321
EN1601101	321	EN1701608	322
EN1601102	321	EN1701708	322
EN1601104	321	EN1701808	322
EN1601108	321	EN170d001	323
EN1601201	321	EN170d002	323
EN1601202	321	EN170d101	324
EN1601204	321	EN170d103	324
EN1601208	321	EN170d104	324
EN1601301	321	EN1800308	316
EN1601302	321	EN1800408	316
EN1601304	321	EN1800508	316
EN1601308	321	EN1800604	317
EN1601608	322	EN1800608	317
EN1601708	322	EN1800704	317
EN1601808	322	EN1800708	317
EN160d001	323	EN1800804	317
EN160d002	323	EN1800808	317
EN160d101	324	EN1800c04	317
EN160d103	324	EN1800c08	317
EN160d104	324	EN1800c20	318
EN1700308	316	EN1800c40	319
EN1700408	316	EN1800c80	319
EN1700508	316	EN1800d04	317
EN1700604	317	EN1800d08	317
EN1700608	317	EN1800d20	318
EN1700704	317	EN1800d40	319
EN1700708	317	EN1800d80	319
EN1700804	317	EN1800e04	317
EN1700808	317	EN1800e08	317
EN1700c04	317	EN1800e20	318
EN1700c08	317	EN1800e40	319
EN1700c20	318	EN1800e80	319
EN1700c40	319	EN1800f04	320
EN1700c80	319	EN1800f08	320
EN1700d04	317	EN1800f40	320
EN1700d08	317	EN1800f80	321
EN1700d20	318	EN1801004	320
EN1700d40	319	EN1801008	320
EN1700d80	319	EN1801040	320
EN1700e04	317	EN1801080	321
EN1700e08	317	EN1801101	321
EN1700e20	318	EN1801102	321
EN1700e40	319	EN1801104	321
EN1700e80	319	EN1801108	321
EN1700f04	320	EN1801201	321
EN1700f08	320	EN1801202	321
EN1700f40	320	EN1801204	321
EN1700f80	321	EN1801208	321
EN1701004	320	EN1801301	321
EN1701008	320	EN1801302	321
EN1701040	320	EN1801304	321
EN1701080	321	EN1801308	321
EN1701101	321	EN1801608	322
EN1701102	321	EN1801708	322
EN1701104	321	EN1801808	322
EN1701108	321	EN180d001	323

EN180d002	323	EN2101040	320
EN180d101	324	EN2101080	321
EN180d103	324	EN2101101	321
EN180d104	324	EN2101102	321
EN1a00001	327	EN2101104	321
EN1a00008	328	EN2101108	321
EN1a00101	328	EN2101201	321
EN1a00108	328	EN2101202	321
EN1a00201	328	EN2101204	321
EN1a00208	328	EN2101208	321
EN1a00301	328	EN2101301	321
EN1a00308	329	EN2101302	321
EN1a00408	329	EN2101304	321
EN1a00508	329	EN2101308	321
EN1a00608	329	EN2101608	322
EN1a0f001	330	EN2101708	322
EN1a0f002	330	EN2101808	322
EN1a0f101	331	EN210d001	323
EN1a0f103	331	EN210d002	323
EN1a0f104	331	EN210d101	324
EN1a0f801	329	EN210d103	324
EN1a0f802	330	EN210d104	324
EN1b00001	331	EN2200002	327
EN1b00101	331	EN2200004	327
EN1b00201	332	EN2200304	320
EN1b00208	332	EN2200308	316, 325
EN1b00301	332	EN2200408	316
EN1b00308	332	EN2200508	316
EN1b00408	333	EN2200604	317
EN1b0f001	330	EN2200608	317
EN1b0f002	330	EN2200704	317, 320
EN1b0f101	331	EN2200708	317, 325
EN1b0f103	331	EN2200804	317
EN1b0f104	331	EN2200808	317
EN2100308	316	EN2200c04	317
EN2100408	316	EN2200c08	317
EN2100508	316	EN2200c20	318
EN2100604	317	EN2200c40	319
EN2100608	317	EN2200c80	319
EN2100704	317	EN2200d04	317
EN2100708	317	EN2200d08	317
EN2100804	317	EN2200d20	318
EN2100808	317	EN2200d40	319
EN2100c04	317	EN2200d80	319
EN2100c08	317	EN2200e04	317
EN2100c20	318	EN2200e08	317
EN2100c40	319	EN2200e20	318
EN2100c80	319	EN2200e40	319
EN2100d04	317	EN2200e80	319
EN2100d08	317	EN2200f04	320
EN2100d20	318	EN2200f08	320
EN2100d40	319	EN2200f40	320
EN2100d80	319	EN2200f80	321
EN2100e04	317	EN2201004	320
EN2100e08	317	EN2201008	320
EN2100e20	318	EN2201040	320
EN2100e40	319	EN2201080	321
EN2100e80	319	EN2201101	321
EN2100f04	320	EN2201102	321
EN2100f08	320	EN2201104	321
EN2100f40	320	EN2201108	321
EN2100f80	321	EN2201201	321
EN2101004	320	EN2201202	321
EN2101008	320	EN2201204	321

EN2201208	321	EN2301708	322
EN2201301	321	EN2301808	322
EN2201302	321	EN230d001	323
EN2201304	321	EN230d002	323
EN2201308	321	EN230d101	324
EN2201608	322	EN230d103	324
EN2201708	322	EN230d104	324
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EN220d001	323	EN230f002	325
EN220d002	323	EN230f101	326
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EN220f101	326	EN2400408	316
EN220f103	326	EN2400508	316
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EN2300002	327	EN2400608	317
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EN2300508	316	EN2400c04	317
EN2300604	317	EN2400c08	317
EN2300608	317	EN2400c20	318
EN2300704	317, 320	EN2400c40	319
EN2300708	317, 325	EN2400c80	319
EN2300804	317	EN2400d04	317
EN2300808	317	EN2400d08	317
EN2300c04	317	EN2400d20	318
EN2300c08	317	EN2400d40	319
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EN2300c40	319	EN2400e04	317
EN2300c80	319	EN2400e08	317
EN2300d04	317	EN2400e20	318
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EN2300d20	318	EN2400e80	319
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EN2301304	321	EN240d101	324
EN2301308	321	EN240d103	324
EN2301608	322	EN240d104	324

EN2500002	327	EN2600708	317, 325
EN2500004	327	EN2600804	317
EN2500304	320	EN2600808	317
EN2500308	316, 325	EN2600c04	317
EN2500408	316	EN2600c08	317
EN2500508	316	EN2600c20	318
EN2500604	317	EN2600c40	319
EN2500608	317	EN2600c80	319
EN2500704	317, 320	EN2600d04	317
EN2500708	317, 325	EN2600d08	317
EN2500804	317	EN2600d20	318
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EN250d104	324	EN2700002	327
EN250f101	326	EN2700004	327
EN250f103	326	EN2700304	320
EN250f104	327	EN2700308	316, 325
EN2600002	327	EN2700408	316
EN2600004	327	EN2700508	316
EN2600304	320	EN2700604	317
EN2600308	325	EN2700608	317
EN2600408	316	EN2700704	317, 320
EN2600508	316	EN2700708	317, 325
EN2600604	317	EN2700804	317
EN2600608	317	EN2700808	317
EN2600704	317, 320	EN2700c04	317

EN2700c08	317	EN2800e04	317
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EN2701202	321	EN2801808	322
EN2701204	321	EN280d001	323
EN2701208	321	EN280d002	323
EN2701301	321	EN280d101	324
EN2701302	321	EN280d103	324
EN2701304	321	EN280d104	324
EN2701308	321	EN2a00001	327
EN2701608	322	EN2a00008	328
EN2701708	322	EN2a00101	328
EN2701808	322	EN2a00108	328
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EN2800c08	317	EN2b00301	332
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EN2800d20	318	EN2b0f103	331
EN2800d40	319	EN2b0f104	331
EN2800d80	319	EN3000004	333

EN3000040	333	EN300d313	339
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EN3000680	335	EN300d31d	339
EN3000704	335	EN300d31e	339
EN3000740	334	EN300d31f	339
EN3000780	335	EN300d320	339
EN3000802	335	EN300d321	339
EN3000a02	335	EN300d322	339
EN3000a04	336	EN300d323	339
EN3001401	337	EN300d324	339
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EN3001a01	338	EN300d328	339
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EN3001a08	338	EN300d32b	339
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EN300da3d	340	EN300dc06	341
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EN300de09	342	EN300f321	342
EN300de0a	342	EN300f322	342
EN300de0b	342	EN300f323	342
EN300de0c	342	EN300f324	342
EN300de0d	342	EN300f325	342
EN300de0e	342	EN300f326	342
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EN300de10	342	EN300f328	342
EN300de11	342	EN300f329	342
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EN300de13	342	EN300f32b	342
EN300de14	342	EN300f406	343
EN300df01	342	EN300f408	343
EN300df02	342	EN300f43b	344
EN300df03	342	EN300f440	344
EN300df04	342	EN300f441	344
EN300df05	342	EN300f442	344
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EN300df07	342	EN300f481	344
EN300df08	342	EN4100a02	349
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EN300df0d	342	EN4100b40	351
EN300df0e	342	EN4100b80	351
EN300df0f	342	EN4101402	351
EN300df10	342	EN4101404	352
EN300df11	342	EN4101502	352
EN300df12	342	EN4101504	352
EN300df13	342	EN4101702	352
EN300df14	342	EN4101704	353
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EN300f302	342	EN4102704	353
EN300f303	342	EN4110004	354
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EN300f307	342	EN4110302	354
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EN300f309	342	EN4110402	354
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EN300f30d	342	EN4110602	354
EN300f30e	342	EN4110701	354
EN300f30f	342	EN4110702	354
EN300f310	342	EN4110c01	355
EN300f311	342	EN4110c02	355
EN300f312	342	EN4110d01	355
EN300f313	342	EN4110d02	355
EN300f314	342	EN41191	357
EN300f315	342	EN41192	357
EN300f316	342	EN41195	357
EN300f317	342	EN411f408	358
EN300f318	342	EN413e804	358
EN300f319	342	EN413e808	358
EN300f31a	342	EN413e904	358
EN300f31b	342	EN413e908	358
EN300f31c	342	EN413ea04	358
EN300f31d	342	EN413ea08	358
EN300f31e	342	EN413eb04	358
EN300f31f	342	EN413eb08	358

EN413ed04	358	EN9000208	365
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EN6000180	359	EN9000504	366
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EN6000340	359	EN9000704	366
EN6000380	359	ENd100308	316
EN6000404	360	ENd100408	316
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EN6000780	361	ENd100d40	319
EN600f001	363	ENd100e04	317
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EN600f104	364	ENd100e40	319
EN6100040	359	ENd100f04	320
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EN6100540	360	ENd101202	321
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EN9000001	364	ENd10d001	323
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EN9000008	365	ENd10d103	324
EN9000101	365	ENd10d104	324
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EN9000108	365	ENd200408	316
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ENd501101	321	ENd60d103	324
ENd501102	321	ENd60d104	324
ENd501104	321	ENd700308	316
ENd501108	321	ENd700408	316
ENd501201	321	ENd700508	316
ENd501202	321	ENd700604	317
ENd501204	321	ENd700608	317
ENd501208	321	ENd700704	317
ENd501301	321	ENd700708	317
ENd501302	321	ENd700804	317
ENd501304	321	ENd700808	317
ENd501308	321	ENd700c04	317
ENd501608	322	ENd700c08	317
ENd501708	322	ENd700c20	318
ENd501808	322	ENd700c40	319
ENd50d001	323	ENd700d04	317
ENd50d002	323	ENd700d08	317
ENd50d103	324	ENd700d20	318
ENd50d104	324	ENd700d40	319
ENd600308	316	ENd700e04	317
ENd600408	316	ENd700e08	317
ENd600508	316	ENd700e20	318
ENd600604	317	ENd700e40	319
ENd600608	317	ENd700f04	320
ENd600704	317	ENd700f08	320
ENd600708	317	ENd700f40	320
ENd600808	317	ENd700f80	321
ENd600c04	317	ENd701004	320
ENd600c08	317	ENd701008	320
ENd600c20	318	ENd701040	320
ENd600c40	319	ENd701080	321
ENd600d04	317	ENd701101	321
ENd600d08	317	ENd701102	321
ENd600d20	318	ENd701104	321
ENd600d40	319	ENd701108	321
ENd600e04	317	ENd701201	321
ENd600e08	317	ENd701202	321
ENd600e20	318	ENd701204	321
ENd600e40	319	ENd701208	321
ENd600f04	320	ENd701301	321
ENd600f40	320	ENd701302	321
ENd600f80	321	ENd701304	321
ENd601004	320	ENd701308	321
ENd601008	320	ENd701608	322
ENd601040	320	ENd701708	322
ENd601080	321	ENd701808	322
ENd601101	321	ENd70d001	323
ENd601102	321	ENd70d002	323
ENd601104	321	ENd70d101	324

ENd70d103	324	ENda0f101	331
ENd70d104	324	ENda0f103	331
ENd800308	316	ENda0f104	331
ENd800408	316	ENda0f801	329
ENd800508	316	ENda0f802	330
ENd800604	317	ENdb00001	331
ENd800608	317	ENdb00101	331
ENd800704	317	ENdb00201	332
ENd800708	317	ENdb00208	332
ENd800804	317	ENdb00301	332
ENd800808	317	ENdb00308	332
ENd800c04	317	ENdb00408	333
ENd800c08	317	ENdb0f001	330
ENd800c20	318	ENdb0f002	330
ENd800c40	319	ENdb0f101	331
ENd800d04	317	ENdb0f103	331
ENd800d08	317	ENdb0f104	331
ENd800d20	318	ENf000004	366
ENd800d40	319	Error code name	
ENd800e04	317	Defective temperature sensor detected on LSB	
ENd800e08	317	peltier power stage [1–4] of laser plate [7–10]	
ENd800e20	318	(red). 362	
ENd800e40	319	High temperature measured on the [location] of	
ENd800f04	320	the blue DMD. 349	
ENd800f08	320	High temperature measured on the [location] of	
ENd800f40	320	the green DMD. 348	
ENd800f80	321	High temperature measured on the [location] of	
ENd801004	320	the red DMD. 345	
ENd801008	320	High temperature measured on the laser plate [7–	
ENd801040	320	10] (red). 359	
ENd801080	321	High temperature measured on the LSB peltier	
ENd801101	321	power stage [1–4] of laser plate [7–10]	
ENd801102	321	(red). 361	
ENd801104	321	High voltage measured on the 24V input of the	
ENd801108	321	LSB. 362	
ENd801201	321	LDM power configuration mismatch. 345	
ENd801202	321	Low speed measured on fan [1–2] of the light	
ENd801204	321	source cooling assembly [1–2]. 336	
ENd801208	321	Low speed measured on the [color] formatter	
ENd801301	321	fan. 356	
ENd801302	321	Low speed measured on the light processor	
ENd801304	321	fan. 356	
ENd801308	321	Low speed measured on the LSB fan. 362	
ENd801608	322	Low speed measured on the pump of the light	
ENd801708	322	processor cooling assembly. 353	
ENd801808	322	Low speed measured on the pump of the light	
ENd80d001	323	source pump assembly. 336	
ENd80d002	323	Low voltage measured on the 24V input of the	
ENd80d101	324	LSB. 362	
ENd80d103	324	No communication detected between LCB and	
ENd80d104	324	LSB. 363	
ENda00001	327	Open circuit detected on the temperature sensor	
ENda00008	328	on the [location]] of the [color] DMD. 348	
ENda00101	328	Open safety switch detected on the pre-rod	
ENda00108	328	switch. 338	
ENda00201	328	Open safety wire loop detected on the LCB:	
ENda00208	328	connector J501 - pin x / pin y. 338	
ENda00301	328	Short circuit detected on the temperature sensor	
ENda00308	329	on the [location] of the [color] DMD. 347	
ENda00408	329	Error code number	
ENda00508	329	EN3000c02 336	
ENda00608	329	EN3000d02 336	
ENda0f001	330	EN3000e02 336	
ENda0f002	330	EN3000f02 336	

EN3001101 336
 EN3001501 338
 EN3001502 338
 EN3001504 338
 EN3001508 338
 EN3001601 338
 EN3001602 338
 EN3001604 338
 EN3001608 338
 EN3001701 338
 EN3001702 338
 EN3001704 338
 EN3001708 338
 EN3001801 338
 EN3001802 338
 EN3001804 338
 EN3001808 338
 EN3001901 338
 EN3001902 338
 EN3001904 338
 EN3001908 338
 EN300f4b1 345
 EN4100004 345
 EN4100040 347
 EN4100080 348
 EN4100104 345
 EN4100140 347
 EN4100180 348
 EN4100204 345
 EN4100240 347
 EN4100280 348
 EN4100304 348
 EN4100340 347
 EN4100380 348
 EN4100404 348
 EN4100440 347
 EN4100480 348
 EN4100504 348
 EN4100540 347
 EN4100580 348
 EN4100604 349
 EN4100640 347
 EN4100680 348
 EN4100704 349
 EN4100740 347
 EN4100780 348
 EN4100804 349
 EN4100840 347
 EN4100880 348
 EN4110001 353
 EN4110e02 356
 EN4110f02 356
 EN4111002 356
 EN4111102 356
 EN6000004 359
 EN6000008 359
 EN6000104 359
 EN6000108 359
 EN6000204 359
 EN6000208 359
 EN6000304 359
 EN6000308 359
 EN6000804 361
 EN6000840 362

EN6000880 362
 EN6000904 361
 EN6000940 362
 EN6000980 362
 EN6000a04 361
 EN6000a40 362
 EN6000a80 362
 EN6000b04 361
 EN6000b40 362
 EN6000b80 362
 EN6000c02 362
 EN6000c04 362
 EN6002102 362
 EN600f002 363

Exterior
 Cleaning 296

F

F0000 366
 F0001 367
 F0002 367
 F000c 367
 F000d 367
 F000e 367
 F0100 367
 Fan
 DMD Cooling
 Replace 88
 Install
 LDM 58
 Replacement
 Laser Driver Module 55
 LDM 55
 Power Module 55
 Fan and Motor Control Board
 Replace 256
 Filters
 Cleaning 292
 Cleaning (wet) 293
 FMCB
 Replace 256
 Focus 211
 Fold Mirror
 Adjust 129
 Fold mirror 1
 Replace 126
 Fold mirror 2 126
 Front cover
 Mounting 284
 Removal 274
 Front dust filter
 Replace 288

G

General 15
 GPI 239
 GPI port 231
 GPO 239
 GPO port 231

H

Hazardous Chemicals 13
 HDD 237
 About 237
 Degraded mode 237
 RAID broken 237
 RAID recovery 237
 Remove 249–250
 Storage 238
 Storage capacity 238
 Validated list 238
 HDMI 2.0 240

I

ICMP
 Replace 248
 ICMP-X
 Communication ports 239
 Input ports 239
 ICMP-X HDD
 Status LEDs 270
 Troubleshooting 270
 ICMP-X introduction 235
 ICP-D board 233
 ID00001 367
 ID00002 368
 Input & communication
 Communication ports 231
 Input ports 231
 Input ports
 ICMP-X 239
 Install
 Fan
 LDM 58
 Laser Driver Module 64
 LDM 64
 Lens 200, 204
 Installation
 Power input configuration 36
 Installation process
 LUT-SCC file 190
 Integrated Cinema Processor - Direct 233
 Integration Rod
 Adjusting 143
 Diagnostic 138
 Installation 141
 Removal 139
 Introduction
 Card cage 230
 DMD cooling 68
 Lens 198
 Lens holder 198
 Light Pipe 122
 Light Processor 146
 Light source cooling 68
 Main pump 68
 IOT00002 368
 IOT00003 368

L

L0004 369
 L80000 368
 L80001 368
 L80003 369
 L80006 369
 L80007 369
 L8000a 370
 L8000d 370
 L8000f 370
 L80010 371
 L80011 371
 L80016 371
 L80017 372
 L80019 372
 L8001a 372
 L8001b 373
 L8001e 373
 L8001f 373
 L80020 373
 L80021 373
 L80022 373
 L8003c 374
 L80051 374
 L80060 374
 L80061 374
 L80062 374
 LAN 239
 LAN port 231
 Laser Control Board
 Replace 116
 Laser Driver Module 45
 Introduction 46
 Laser plate diagnostic 303
 Laser Plates
 LDM mapping 47
 LCB
 Replace 116
 LDM 45
 driver board
 Location 47
 Driver board
 Replace 52
 Fan
 Replacement 55
 Introduction 46
 LDM Mapping
 Laser plates 47
 Remove 50
 LDM dust filter
 Replace 291
 Lens 198
 Cleaning 295
 Focus 211
 Installation
 B-lens holder 204
 C-lens holder 200
 Removal
 B-lens holder 209
 C-lens holder 202
 Scheimpflug 215
 Shift 211
 Zoom 211

- Lens assembly 131
- Lens barrel
 - Replace 133
- Lens Holder 197
 - B-Lens Holder
 - Installation 227
 - Removal 224
 - C-Lens Holder
 - Installation 222
 - Removal 220
 - Introduction 198
- License 233
- Light pipe
 - pre-rod assembly
 - safety switch 136
- Light Pipe 121
 - Components 124
 - Introduction 122
 - Light Sensor
 - Replace 123
- Light pipe lens
 - Clean 137
- Light Pipe Mirror
 - Clean 128
- Light processor
 - Formatter board
 - Fan 153
 - Fan Replacement 153
 - Remove 150
 - replacement process
 - unpacking 159, 163
 - unpack 159, 163
- Light Processor 145
 - Diagnostic 147
 - Install 161
 - Interconnection board
 - Replace 158
 - Introduction 146
- Light processor fan
 - Remove 154
 - Replace 156
- Light source
 - Color calibration 178
 - Laser plate
 - Replacement process 101
 - Safety switch
 - Replace 135
 - White point calibration 177
- Light Source 93
 - Blue Laser plate
 - Install 113
 - Remove 111
 - Fan
 - Replace 100
 - Green Laser plate
 - Install 113
 - Remove 111
 - Introduction 94
 - Laser plate
 - Self test 115
 - Light Source Board
 - Replace 98
- LSB

- Replace 98
- Mounting 118
- Red laser plate
 - Install 107
- Red Laser plate
 - Remove 103
- Remove 96
- Light source cooling 67
 - Fan replacement 73
- Mounting 80
- Removal 70
- Light source side cover
 - Mounting 280
 - Remove 277
- LUT-SCC file
 - Activate 189, 194
 - Download 192

M

- M00000 375
- M101000 375
- M103000 375
- M104000 375
- M105000 375
- M107000 375
- M20400 376
- M20401 376
- M20500 376
- M20501 376
- M20700 376
- M20701 376
- MA003 376
- MA004 377
- MA005 377
- MA006 377
- Main components 17
- Mains board
 - Introduction 34
 - Replacement 42
- Mains Input 33
- Maintenance 285
 - 1 year 30
 - 3 month 29
 - 3 year 32
- Maintenance program 27
 - 1 Month 28
- MCGD files 182
- Mono phase
 - Configuration 36

N

- N00000 377
- N10004 378
- N10005 378
- NODOC 382

O

- O00001 374
- O00006 378

- O10130 378
- O10131 379
- O10330 378
- O10331 379
- O10430 378
- O10431 379
- O10530 378
- O10531 379
- O20100 379
- O20101 379
- O20300 379
- O20301 379
- O20400 379
- O20401 379
- O20500 379
- O20501 379
- O20600 379
- O20601 379
- O30003 379
- Obtain
 - Serial Number 191
- Operator side cover
 - Mounting 281
 - Remove 276
- Optical adapter
 - Position 384
- Optical components
 - Cleaning 287
- Optical path
 - Cleaning process 297
- Orientation
 - Convention 16

P

- Power
 - Use of UPS 40
- Power input setup 36
- PR000002 380
- PR000003 380
- PR000012 380
- PR000013 380
- PR000014 381
- PR000015 381
- Pre-Rod
 - Replace 134
- Projector
 - Main components 17
- Projector color
 - MCGD file
 - Create 182
 - Delete 186
 - Edit 184
 - Export 185
 - Import 185
- Projector Color
 - Color calibration 182
- Projector covers
 - Installation 273
 - Removal 273

R

- Rear cover
 - Mounting 283
 - Remove 275
- Rear dust filter
 - Replace 290
- Removal
 - Front cover 274
 - Projector covers 273
- Remove
 - HDD 249–250
 - Laser Driver Module 50
 - LDM 50
- Replace
 - battery
 - cinema controller 243
 - Dust filter
 - Front 288
 - LDM 291
 - Rear 290
 - fan
 - card cage 259
 - Fan and Motor Control Board 256
 - FMCB 256
 - ICMP 248
 - ID card 244
 - Laser Drive Module 61
 - LDM 61
 - Touch display 254
- Rod
 - Diagnostic 138

S

- S000b0 381
- S00110 381
- S00111 381
- S00200 381
- Safety 9
 - Hazardous Chemicals 13
 - Instructions 10
 - Safety Data Sheet (SDS) 13
- Safety Data Sheet (SDS) 13
- Safety precautions
 - Cooling liquid 12
- Safety switch
 - Light pipe
 - pre-rod assembly 136
 - Light source
 - Replace 135
- Scheimpflug 214
 - Adjustment 217
 - Introduction 214
- Scheimpflug's law 214
- Sealed compartment
 - Close 167
 - Open 148
- Shift 211
- SMPS 241
 - Replacement 246
- Software update 22
- Source input

- 3G-SDI 240
- HDMI 2.0 240
- Spare parts 25
- Star (Y) configuration 36
- Status LEDs 269
 - ICMP-X HDD 270
- Switched mode power supply
 - Replacement 246
- SYNC 239

T

- TCGD files 187
- Technical specifications 383
- Three phase
 - Configuration 36
- Top cover
 - Mounting 279
 - Remove 278
- Touch display
 - Replace 254
- Troubleshooting 301
 - Checklist 306
 - Laser plate
 - Diagnostic 303
 - Notification messages
 - About 302
 - Web Analyser 304
 - Web Analyzer 304

U

- UPS
 - Electronics 40
- USB 2.0 239
- USB 3.0 239
- USB port 232

V

- Vacuum
 - Filters 292
- Verify
 - Corrected Colors 187

W

- WAN port 231
- Washing
 - Filters 293
- What are the possible HDD swaps 252
- White point calibration
 - White point tracking 177
- White point Calibration 178

Z

- Zoom 211

