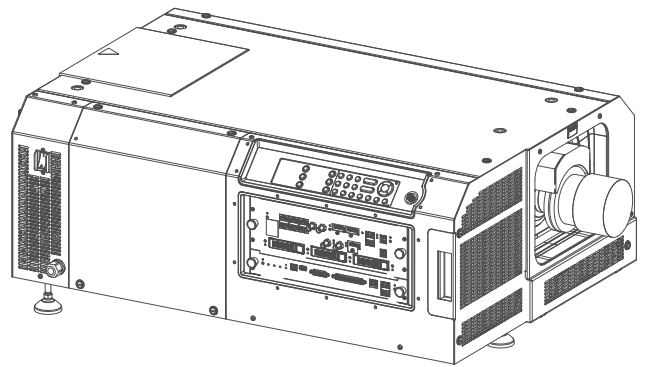


DP2K SLP Series



Service Manual

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Table of contents

1 Safety	11
1.1 Safety instructions.....	12
2 General	15
2.1 Convention projector orientation.....	16
2.2 Location of the main components of the projector.....	17
2.3 Projector Status.....	20
2.4 Spare parts for DP2K-SLP Series.....	21
2.5 Projector block diagrams.....	21
3 Preventative maintenance actions	25
3.1 1 month maintenance actions.....	26
3.2 3 month maintenance actions.....	26
3.3 1 year maintenance actions.....	27
3.4 4 year maintenance actions.....	29
4 Mains Input	31
4.1 Introduction DP2K-SLP Series Mains Input.....	32
4.2 Accessing the Mains Input compartment.....	33
4.3 Replacing the ON/OFF Switch.....	34
4.4 Replacing the Mains Filter.....	35
4.5 Replacing the Solid State relay.....	36
5 Switch Mode Power Supply (SMPS)	39
5.1 Introduction DP2K-SLP Series SMPS board.....	40
5.2 Removing the SMPS board.....	40
5.3 Installing the SMPS board.....	42
5.4 Replacing the fans of the SMPS compartment.....	43
6 Laser Driver Module (LDM)	45
6.1 Removing the LDM.....	46
6.2 Installing the LDM.....	47
6.3 Replacing a driver board in an LDM unit.....	48
6.4 Removing a fan from an LDM.....	51
6.5 Installing a new fan onto an LDM.....	53
6.6 Replacing a Laser Drive Module.....	56
7 Laser Phosphor Light Source	59
7.1 Overview.....	60
7.2 Removing the Light Source.....	61
7.3 Removal of the Controller assembly.....	62
7.4 Replacing the Laser Control Board (LCB).....	64

7.5	Replacing the Peltier Controller	64
7.6	Replacing the 24V Filter board	65
7.7	Mounting of the Controller assembly	66
7.8	Installing the Light Source	67
7.9	Replacing the Phosphor Wheel Interconnection Board	70
7.10	Replacing the Phosphor Wheel Monitoring Interconnection Board	72
7.11	Replacing the Light Source Fan Interconnection Board	72
7.12	Replacing the Light Sensor Interconnection Board	74
7.13	Replacing the Blue Laser Interconnection Board	75
7.14	Replacing a fan from the Light Source	75
7.15	Replacing the combiner of the Light Source	77
7.16	Replacing the phosphor wheel	82
7.17	Replacement of the Anode Fan	84
7.18	Replacement of the Cathode Fan	86
7.19	Replacement of the Cold Mirror fan	88
8	Liquid cooling circuit	91
8.1	Check cooling liquid level & cooling integrity	92
8.2	Cooling liquid refill	92
9	Light Processor	95
9.1	Introduction Light Processor	96
9.2	Diagnostic	96
9.3	Light Processor replacement process	97
9.4	Removing the Light Processor	97
9.5	Installing the Light Processor	100
9.6	Cleaning the Prism exit side	103
9.7	Replacement of the fan of the Light Processor compartment	104
9.8	Replacement of the fan of the Red channel	107
9.9	Replacement of the fan of the Green channel	109
9.10	Replacement of the fan of the Blue channel	110
9.11	Authorization to clear security warning on the projector	112
10	Light Pipe	113
10.1	Introduction Light Pipe	114
10.2	Removal of the Light Pipe	115
10.3	Removal of the Light Pipe cover plate	117
10.4	Replacing Light Pipe lens No1 (focus lens)	118
10.5	Replacing Light Pipe lens No2	119
10.6	Replacing Light Pipe lens No3 (zoom lens)	120
10.7	Replacing Light Pipe lens No4	121
10.8	Cleaning the Light Pipe lenses	122
10.9	Installing the Light Pipe cover plate	123
10.10	Installing the Light Pipe	123
10.11	Adjusting the Light Pipe lens No1 (focus lens)	125
10.12	Adjusting the Light Pipe lens No3 (zoom lens)	126
10.13	Replacing the Notch Filter	127
10.14	Adjusting the Notch Filter	128
10.15	Cleaning the Notch Filter	130
10.16	Replacing the Fold Mirror set	130
10.17	Adjusting the Fold Mirror	133
10.18	Cleaning the Fold Mirrors	134
10.19	Replacing the High Contrast plate	135
10.20	Replacing the Light Sensor module (CLO)	135
10.21	Replacement of the Light Pipe fan	136

11 Integration Rod	139
11.1 Introduction of the Integration Rod.....	140
11.2 Integration Rod diagnostic.....	140
11.3 Removal of the Mask plate and Rod heatsink.....	141
11.4 Replacing the Integration Rod.....	142
11.5 Installing the Mask plate and Rod heatsink.....	144
11.6 Adjusting the Integration Rod.....	145
12 Optical alignment	147
12.1 Aligning the optical path.....	148
13 Spatial Color Calibration (LUT-SCC)	151
13.1 Introduction to SCC file.....	152
13.2 Obtain the Serial Number of the installed Light Processor.....	152
13.3 Download the LUT-SCC file from the Barco website.....	153
13.4 Upload Spatial Color Calibration file.....	155
13.5 Activate Spatial Color Calibration file.....	156
14 Convergence	157
14.1 Convergence controls.....	158
14.2 Preparing for convergence adjustment.....	159
14.3 Converging the blue pattern onto the red pattern.....	161
14.4 Converging the green pattern onto the red pattern.....	162
14.5 Closing off the Light Processor compartment.....	163
15 Color calibration & Light measurements	165
15.1 Color calibration.....	166
15.1.1 Calibration process.....	166
15.1.2 White point calibration.....	166
15.1.3 Color gamut calibration.....	167
15.2 Light measurements for SmartCare contracts.....	169
15.2.1 Screen gain measuring.....	169
15.2.2 Measuring the light output.....	171
16 Lens Holder	173
16.1 Introduction Lens Holder.....	174
16.2 Available lenses.....	174
16.3 Lens selection.....	175
16.4 Lens installation.....	176
16.5 Lens removal.....	178
16.6 Lens shift, zoom & focus.....	178
16.7 Removal of the Lens Holder cover plate.....	180
16.8 Removal of the Lens Holder.....	181
16.9 Installing the Lens Holder.....	183
16.10 Installation of the Lens Holder cover plate.....	185
16.11 Replacement of the Vertical Shift stepper motor.....	186
16.12 Replacement of the Horizontal Shift stepper motor.....	188
16.13 Replacement of the motor assembly for 0.69" DC2K lenses (Type 'M').....	190
16.14 Replacement of the motor assembly for 0.69" DC2K lenses (Type 'F').....	192
16.15 Replacement of the motor assembly for 0.69" DC2K lenses (Type 'B').....	193
16.16 Replacement of the Inner Dust Rubber.....	195
17 Scheimpflug	199
17.1 Scheimpflug introduction.....	200
17.2 Scheimpflug adjustment.....	201

17.3	Fixation of the Lens Holder front plate	204
17.4	Back Focal Length adjustment.....	205
18	Card Cage	209
18.1	Introduction Card Cage	211
18.2	Integrated Cinema Processor (ICP)	211
18.3	Cinema Controller.....	212
18.4	Replacement of the ICP board	214
18.5	Replacement of the RTC battery of the ICP board	214
18.6	Replacement of the HDSDI board.....	216
18.7	Replacement of the Link Decryptor	217
18.8	Replacement of the Cinema Controller	217
18.9	Battery replacement on the Cinema Controller Board	218
18.10	Replacement of the Card Cage small fan	220
18.11	Replacement of the Card Cage large fan.....	221
18.12	Replacement of the ICP fan	222
18.13	Replacement of the Button Module	223
18.14	Signal Backplane replacement process.....	227
18.15	Removal of the Card Cage cover	228
18.16	Disconnecting the Card Cage wires	229
18.17	Removal of the Card Cage	232
18.18	Removal of the Signal Backplane.....	234
18.19	Installing the Signal Backplane	236
18.20	Installing the Card Cage	239
18.21	Connecting the Card Cage wires	241
18.22	Installation of the Card Cage cover	245
18.23	Removal of the Card Cage partition plate	246
18.24	Replacement of the Status Light	247
19	Software update via Communicator (DC update companion)	249
19.1	Software upgrade, launch DC update companion	250
19.2	Software upgrade, projector, ICMP or touch panel.....	252
19.3	ICP software upgrade.....	257
19.4	Link decryptor software update.....	259
19.5	Update logging	262
20	Exhaust system	263
20.1	Replacement of the Rear Exhaust	264
21	Board Diagnostic LED's	265
21.1	Power Board Diagnostic LEDs in the LDM Module	266
21.2	Laser Driver Board Diagnostic LEDs in the LDM Module	267
22	Removal and installation of the projector covers.....	271
22.1	Removal of the Light Source cover.....	272
22.2	Removal of the rear cover	272
22.3	Removal of the top cover.....	273
22.4	Removal of the left side cover.....	274
22.5	Removal of the top cover plate of the Light Processor compartment.....	275
22.6	Removal of the side cover plate of the Light Processor compartment	276
22.7	Installation of the side cover plate of the Light Processor compartment	277
22.8	Installation of the top cover plate of the Light Processor compartment.....	278
22.9	Installation of the left side cover	279
22.10	Installation of the top cover.....	280
22.11	Installation of the rear cover.....	281

22.12 Installation of the Light Source cover.....	281
23 Dust Filters	283
23.1 Check the large dust filter.....	284
23.2 Check the small dust filter	285
23.3 Vacuum cleaning of the dust filters	287
23.4 Washing and drying the dust filters.....	288
24 Maintenance procedures	291
24.1 Cleaning the lens	292
24.2 Cleaning the exterior of the projector.....	292
25 Troubleshooting	293
25.1 LDM	295
25.2 Troubleshooting checklist Cinema Control Board (CCB).....	296
25.3 Troubleshooting checklist Laser Control Board (LCB).....	345
25.4 Log files	378
26 Projector cleaning.....	383
26.1 Necessary tools, products and tips.....	384
26.2 General cleaning procedure for optical components	384
26.3 Cleaning process for the optical path	385
26.4 Cleaning procedures optical components.....	386
26.5 Cleaning procedures non optical components.....	392
A Appendix	395
A.1 Hazards	396
Index.....	397

Safety

1

About this chapter

Read this chapter attentively. It contains important information to prevent personal injury while installing and using your DP2K-SLP Series projector. Furthermore, it includes several cautions to prevent damage to your DP2K-SLP Series projector. Ensure that you understand and follow all safety guidelines, safety instructions and warnings mentioned in this chapter before installing and using the DP2K-SLP Series projector. After this chapter, additional “warnings” and “cautions” are given depending on the procedure. Read and follow these “warnings” and “cautions” as well.



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

Clarification of the term “DP2K-SLP Series” used in this document

When referring in this document to the term “DP2K-SLP Series” means that the content is applicable for following Barco products:

- DP2K-10SLP, DP2K-8SLP



Barco provides a guarantee relating to perfect manufacturing as part of the legally stipulated terms of guarantee. Observing the specification mentioned in this chapter is critical for projector performance. Neglecting this can result in loss of warranty.

Overview

- Safety instructions

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).

General

2

About this chapter

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

Overview

- Convention projector orientation
- Location of the main components of the projector
- Projector Status
- Spare parts for DP2K-SLP Series
- Projector block diagrams

2.1 Convention projector orientation

Convention

This manual refers to the left 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.

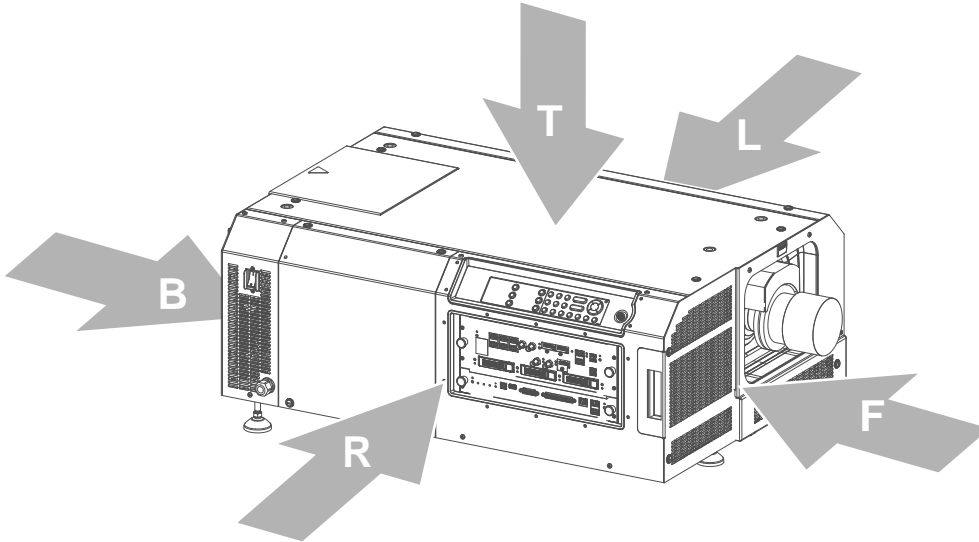


Image 2-1

- | | | | |
|----------|--|----------|---|
| T | Top of the projector. | R | Right side of the projector (Light Source side & Input side). |
| L | Left side of the projector (Light Processor side). | B | Back side of the projector. |
| F | Front of the projector. | | |

2.2 Location of the main components of the projector

Housing and air inlet filters

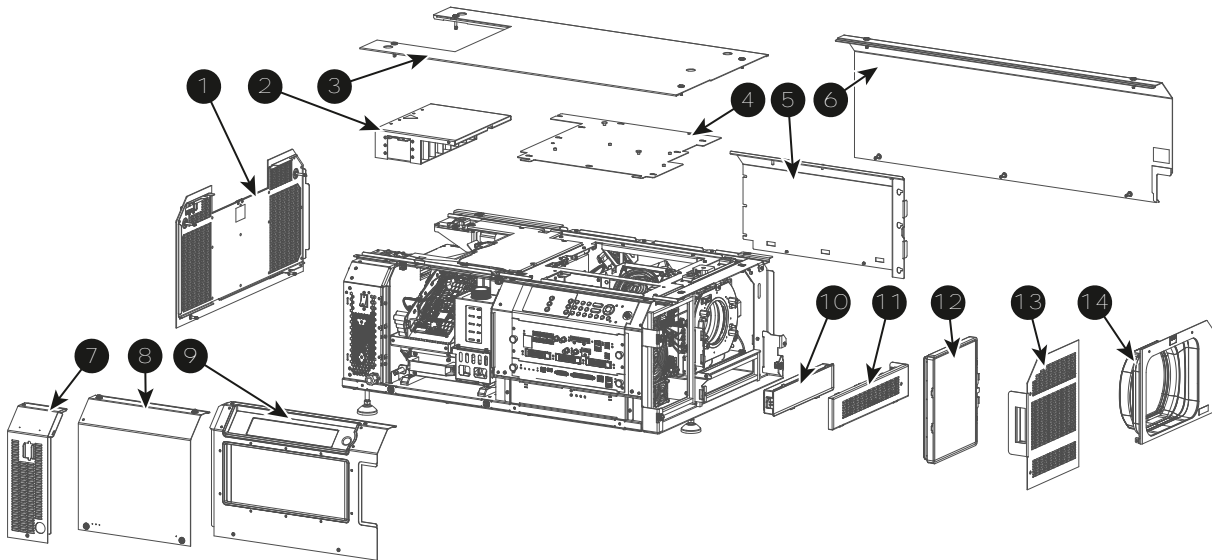


Image 2-2

- | | | | |
|----------|--|-----------|----------------------------------|
| 1 | Rear cover | 8 | Light Source cover |
| 2 | Rear Exhaust assembly | 9 | Card Cage cover |
| 3 | Top cover | 10 | Small dust filter. |
| 4 | Top cover plate Light Processor compartment | 11 | Small dust filter cover plate. |
| 5 | Side cover plate Light Processor compartment | 12 | Large dust filter. |
| 6 | Left side cover | 13 | Large dust filter cover plate. |
| 7 | ON/OFF cover | 14 | Front cover (Lens Holder cover). |

Main internal components

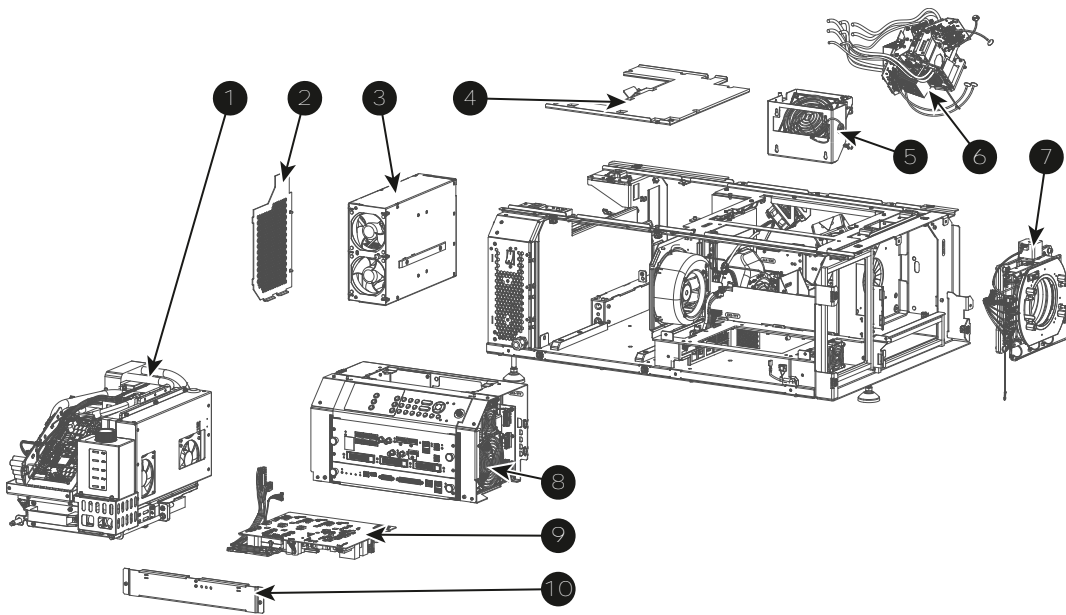


Image 2-3

- | | |
|--|---|
| <ul style="list-style-type: none"> 1 Laser Phosphor Light Source 2 Cover plate main AC compartment. 3 Laser Driver Module (LDM) 4 Cover plate of Light Source compartment. 5 Fan of Light Processor compartment. | <ul style="list-style-type: none"> 6 Light Processor. 7 Lens Holder. 8 Card Cage. 9 Switch Mode Power Supply (SMPS). 10 Cover plate SMPS compartment. |
|--|---|

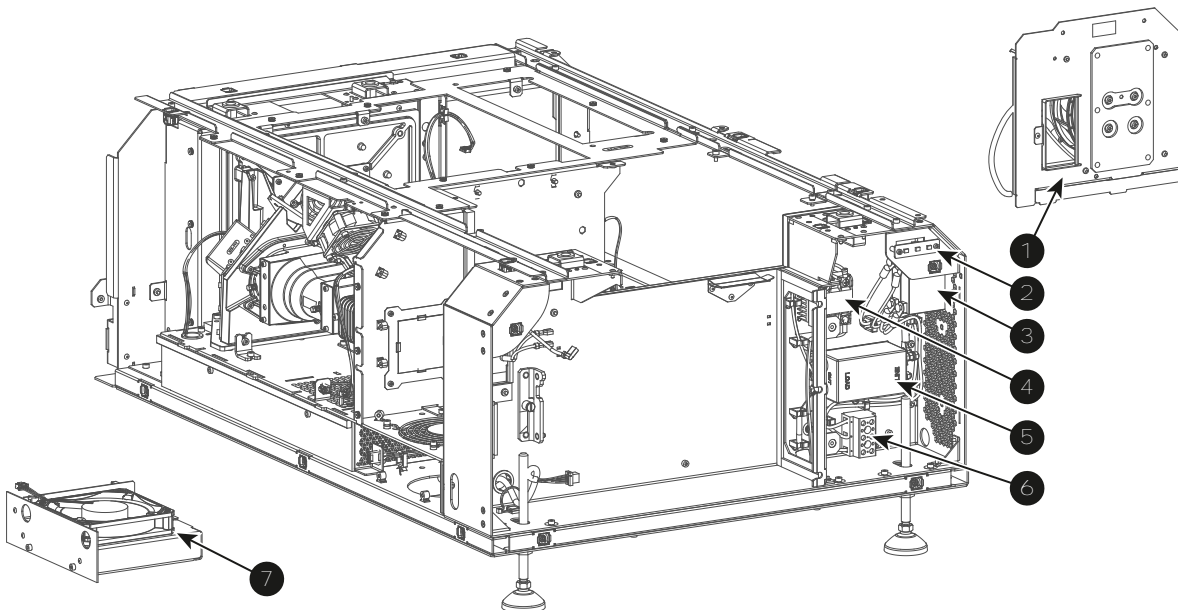


Image 2-4

- | | |
|--|---|
| <ul style="list-style-type: none"> 1 Cathode Fan assembly. 2 Projector Status Light. 3 ON/OFF switch. 4 Solid State Relay. | <ul style="list-style-type: none"> 5 Mains Input Filter. 6 3-slot terminal block. 7 Cold Mirror Fan assembly. |
|--|---|

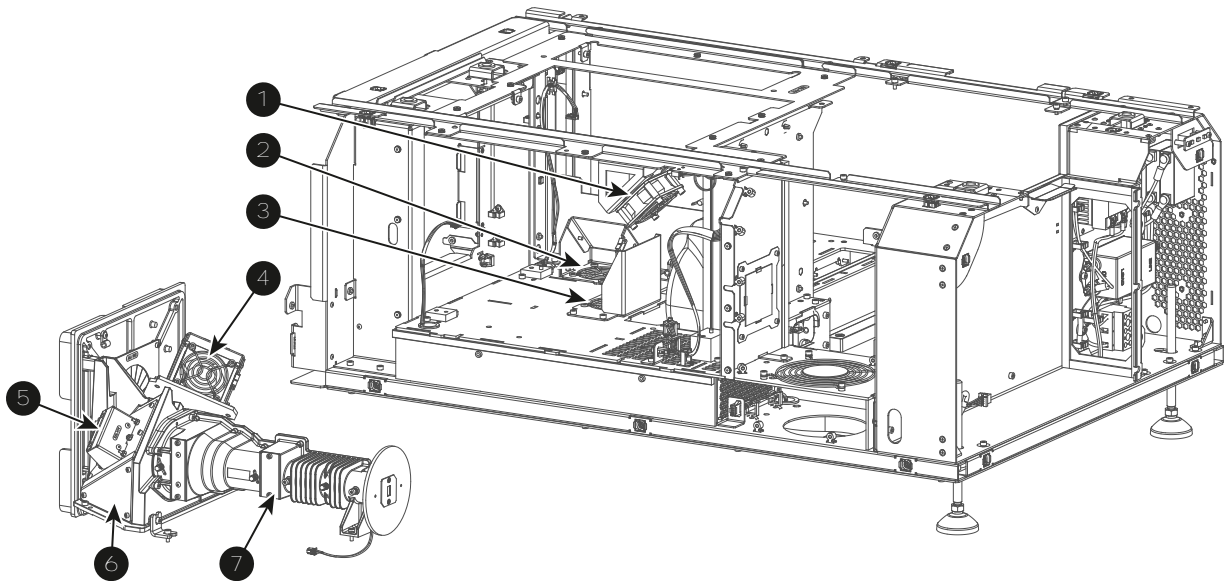


Image 2-5

- | | |
|--|---|
| <ul style="list-style-type: none"> 1 Fan Light Pipe entrance (Rod entrance). 2 Fan Red DMD. 3 Fan Green DMD. 4 Fan Blue DMD. | <ul style="list-style-type: none"> 5 Light Sensor Module (CLO functionality). 6 Light Pipe Corner Block (contains Fold Mirror). 7 Light Pipe (contains Light Pipe Lenses and Rod assembly). |
|--|---|

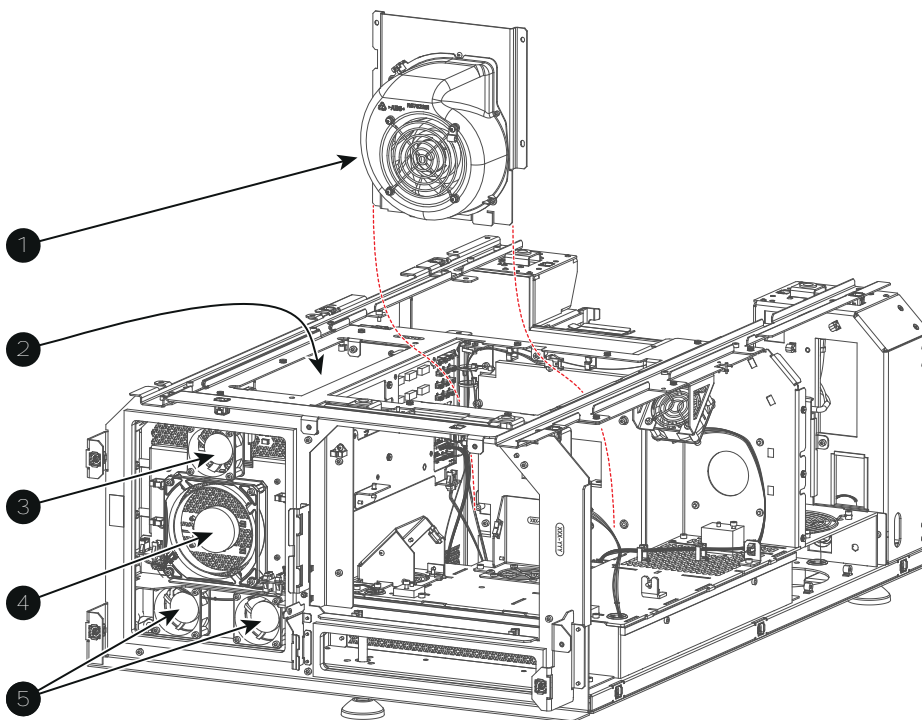


Image 2-6

- | | |
|--|--|
| <ul style="list-style-type: none"> 1 Anode Fan assembly. 2 Fan ICP top. 3 Fan ICP board. | <ul style="list-style-type: none"> 4 Fan Card Cage compartment. 5 Fans SMPS compartment. |
|--|--|

2.3 Projector Status

About the projector Status Light

The projector Status Light is located at the rear end of the projector (Tail Light). The projector Status Light is real time indicator of the projector condition.

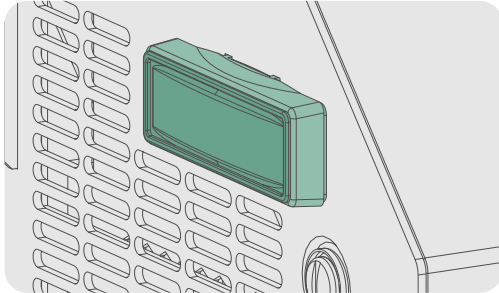


Image 2-7

Status overview

Depending on the condition of the projector the status light may have 4 colors: Green, Yellow, Red or Blue. Each color represent a different state:

Blinking Green

Projector is booting up. (Fully booted up when Test Pattern button is green as well)

Full Green

Projector is running normally.

Yellow

Projector is running with warnings. Event can go on, but a technical intervention will be needed to prevent a complete stop of the projector.

Red

Projector is in error state. Problem can prevent normal operation. Solve the problem before projector.

Blue

Projector runs in notification state. Maintenance action required.

Standby mode

In Standby mode the light source of the projector is turned OFF, but all the electronics of the projector remain fully operational. The projector is ready to start up the light source and project the image. The status light is not different between Standby mode and light source ON mode (fully operational).

Sleep mode

If the projector is in **Sleep** mode then the **status light flashes** every ten seconds. The color of the flash depends on the state of the projector. In other words, the color of the flash will be green in normal state (no warnings, no errors, no notifications).


In Sleep mode the total power consumption of the projector is less than 15 W. No fans are turning and the Light Source is switched OFF. Only the following functionalities of the projector remains active:

- Cinema Controller
- Local Keypad
- Router and external switch fully functional
- USB IN port type "B" (Virtual comport RS232)
- USB OUT port type "A" (To power handheld devices [500mA MAX]. No other functionality supported)
- GPIO port on the Cinema Controller

Pressing the Sleep button in Standby mode for 3 seconds puts the projector in Sleep mode. In case the projector is processing the after cooling cycle then the projector goes in Sleep mode after finishing the after cooling cycle.

Pressing the Sleep button in Sleep mode for 3 seconds will awake the projector. The status light will blink for a few seconds (booting up all inactive boards) and then lights up continuously.

Enter or leave Sleep mode can also be done via 2 dedicated projector command (USB/Ethernet), or via two predefined Macros (not editable) with GPIO of the Cinema Controller (not the GPIO of the ICMP), or via the Communicator.

 The projector always boots up in the same mode (E.g. Standby or Sleep) as it was switched OFF. The Sleep button is disabled if the Light Source is on.

2.4 Spare parts for DP2K-SLP Series

Up to date information regarding spare parts for DP2K-SLP Series

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.

2.5 Projector block diagrams

Signal Backplane diagram

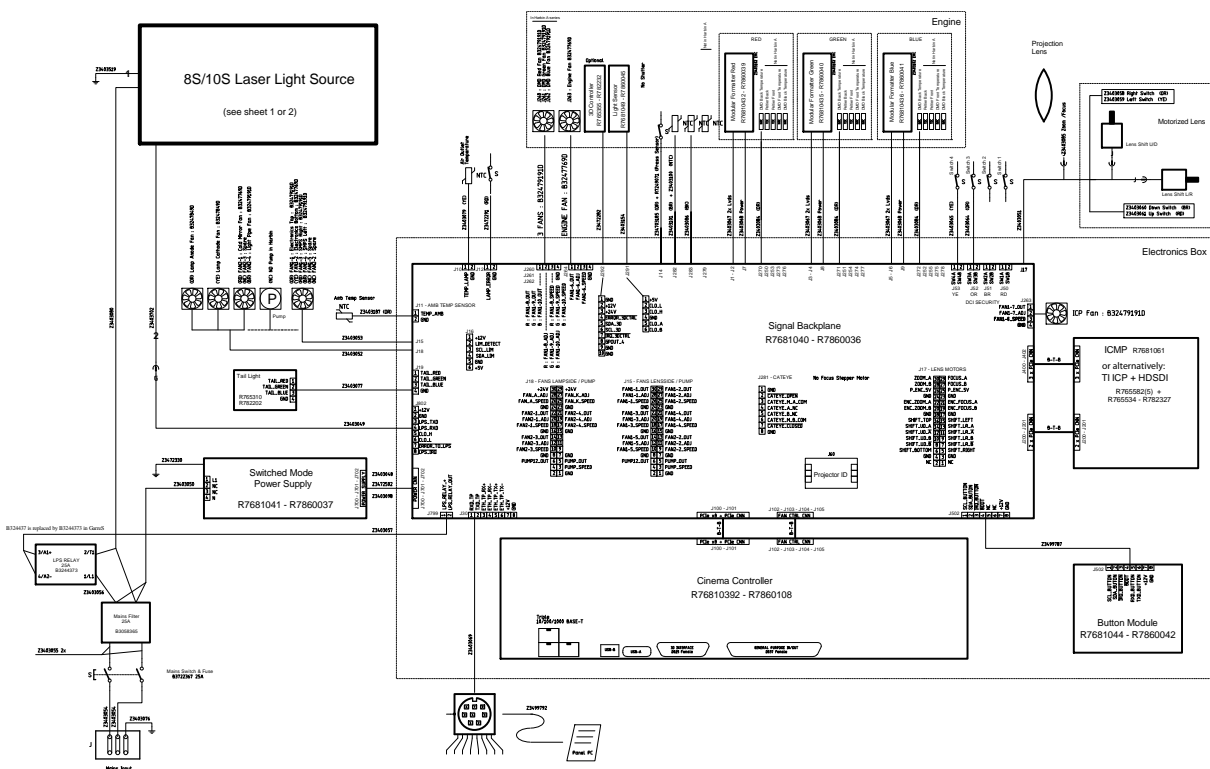


Image 2-8

Laser Control Board diagram 10SLP

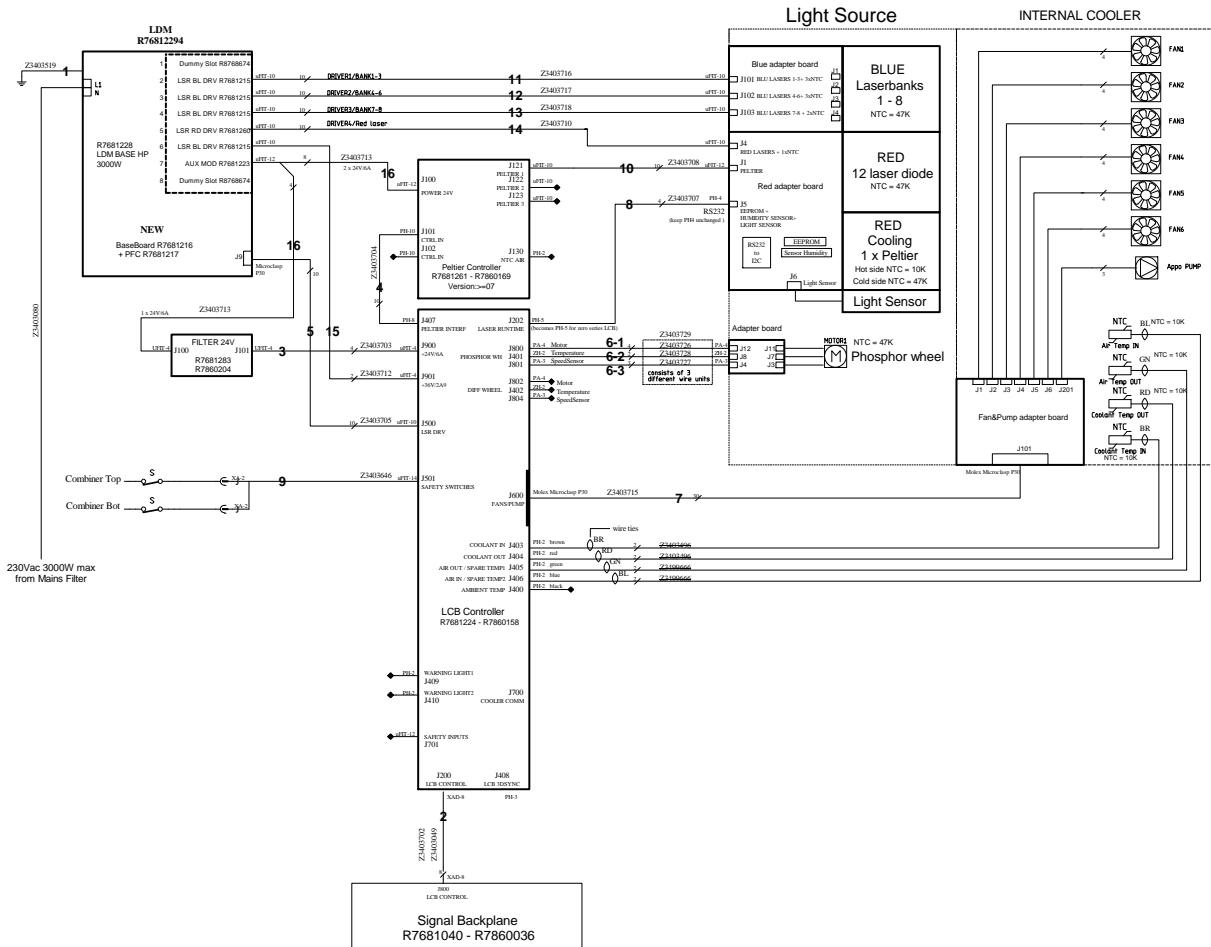


Image 2-9

Laser Control Board diagram 8SLP

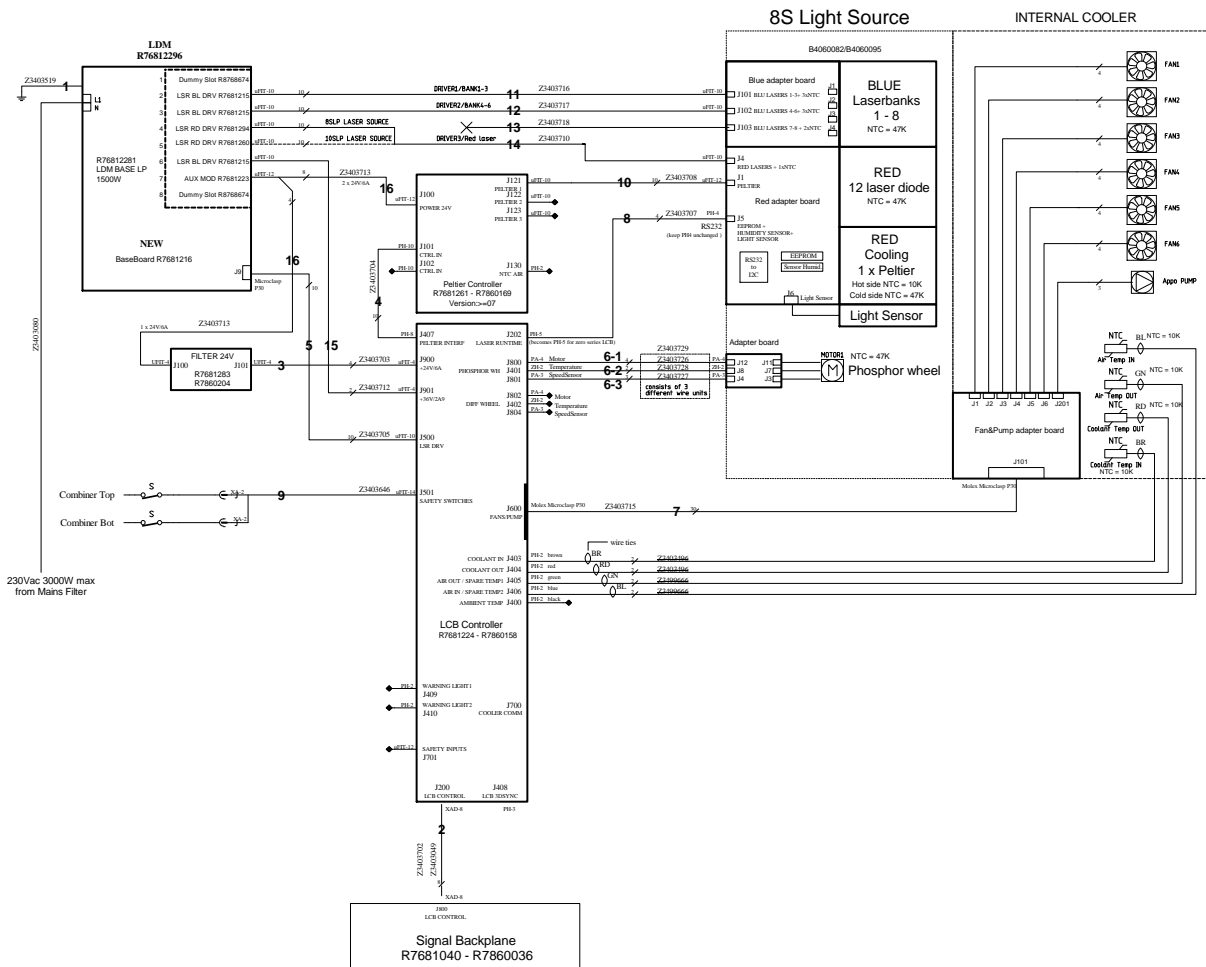


Image 2-10

Preventative maintenance actions

3

Maintenance program

The maintenance program is subdivided in time frames. The maintenance actions described in this chapter can be done by a trained projectionist. Note that there are also annually and 4 yearly maintenance actions (not included in this manual) which must be done by certified service personnel who are familiar with potential hazards of the product and all product safety checks. Contact your service partner for more information about maintenance services.

Overview

- 1 month maintenance actions
- 3 month maintenance actions
- 1 year maintenance actions
- 4 year maintenance actions

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	<p>Check both dust filters of the projector for dust and grease. 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.</p> <ul style="list-style-type: none"> If the filters are contaminated with dust than cleaning the filters with a vacuum cleaner should be sufficient. In case the filters feel greasy than the filters must be washed. <p>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.</p>	<p>Replace damaged filters immediately.</p> <p>See procedures "Check the large dust filter", page 284, and "Check the small dust filter", page 285.</p> <p>To speed-up drying, allow the filter(s) to dry at 50°C max in a well ventilated room.</p>
2	<p>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.</p>	<p>Clean the lens output side in case dust is clearly visible upon the surface.</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>
3	<p>Check the porthole (both sides) for dust.</p>	<p>Clean the porthole in case dust is clearly visible upon the surface. Use an optical cloth.</p>

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	<p>Clean the back/side air inlet vents of the Light Source.</p>	<p>Use a vacuum cleaner.</p>
2	<p>Clean the housing of your projector.</p>	<p>Removal overall dust accumulation on projector covers. See cleaning instructions in this manual.</p>
3	<p>Verify the internal clock of the ICMP with real time clock. Correct if needed.</p>	<p>ICMP version 1.2.1 is required. Communicator version 5.0 is required.</p> <p>See user guide of Communicator for detailed instructions.</p>

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.

N-o.	Component	Maintenance action	Remarks
1	Dust in general	Remove all dust inside the Light Source compartment.	Use a vacuum cleaner. Do NOT touch the Cold Mirror.
2	Dust in general	Check the glass plate between the Light Source and the Integration Rod for dust, burn damage, degradation, cracks, etc.	Only clean the glass plate in case dust is clearly visible upon the surface of the glass plate. Replace the glass plate in case of burn damage, degradation, cracks, etc.
3	Dust in general	Check the mask and the integrator entry for burn damage, degradation, cracks, etc. Remove the Lamp House and look at the mask and integrator entry via the Cold Mirror.	Replace the Integration Rod and mask in case of burn damage, degradation, cracks, etc. See service manual chapter "Replacing the Integration Rod", page 142.
4	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 "Cleaning the Prism exit side", page 103. Replace the complete Light Processor Unit in case of degradation, cracks, etc. See service manual chapter "Light Processor", page 95.
5	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.
6	Dust in general	Clean the projector exterior (housing).	Report on cleanliness of booth!
7	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 Integration Rod. See service manual chapter "Integration Rod diagnostic", page 140. Replace the Integration Rod In case the Integration Rod causes the artifacts. See service manual chapter "Replacing the Integration Rod", page 142. Replace the Light Processor Unit in case the prism causes the artifacts. See service manual chapter "Light Processor", page 95.
8	Diagnostics	Check actual diagnostics/self tests after 1 hour play with black image. See user guide of the Communicator software.	Note any irregularities and follow up. Take the necessary measurements if required.
9	Diagnostics	Check and save TI and projector log/history files. See user guide of the Communicator software.	Note any irregularities and follow up.
10	Diagnostics	Verify projector date and time and correct if required.	See Communicator software.

N-o.	Component	Maintenance action	Remarks
11	Software version	Check for the latest version of Barco and TI software. See user guide of the Communicator software. The latest software version can be downloaded from the secured Barco web site.	Upgrade the projector software with the latest version. See user guide of the projector toolset.
12	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.
13	Lens holder	Check the Lens Holder shift functionality (up/down & left/right).	Use the local keypad or the Communicator software to shift.
14	Lens holder	Check the positional integrity of motorized adjustments by switching Macro's.	Verify correct alignment on screen between flat and scope.
15	Lens holder	Check the focus uniformity.	Adjust the Lens Holder (Scheimpflug) ONLY if needed. See service manual chapter "Scheimpflug", page 199.
16	Lens	Check the optic surfaces of the lens input and output for dust.	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 292. 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.
17	Lens	Check the lens Zoom & Focus motors.	Use the local keypad and the Communicator software to Zoom and to Focus.
18	Convergence	Check convergence.	See chapter "Convergence", page 157.
19	Electronic boards	Check the general condition of the electronic boards in the Card Cage: Status LED's, dust, connections, etc.	Blow out dust.
20	Security	Check the Tamper Switch Activation Report and Security Logs for security infringements.	Report if intruded.
21	Cooling Light Source	Check the level of the Light Source cooling reservoir. Refill if necessary.	See chapter "Check cooling liquid level & cooling integrity", page 92.
22	Color calibration	Measure the color coordinates of the projected image and calibrated if necessary.	See user guide of the Communicator software.
23	Documentation	Check if the projector manuals are present and up-to-date.	Download latest version from www.barco.com .
24	Documentation	Update projector service docket.	List all maintenance actions and remarks.

3.4 4 year maintenance actions

MAINTENANCE TYPE D (perform every four years)



The 4 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.	Maintenance action	Remarks
1	Check all fans: vibrations, noise, speed, etc. (speeds: via diagnostics)	Replace if needed.

Mains Input

4

About this chapter

This chapter describes the several parts of the projector mains input.

Overview

- Introduction DP2K-SLP Series Mains Input
- Accessing the Mains Input compartment
- Replacing the ON/OFF Switch
- Replacing the Mains Filter
- Replacing the Solid State relay

4.1 Introduction DP2K-SLP Series Mains Input

Introduction

The Mains Input consist in a terminal block, an ON/OFF switch, a mains input filter and a solid state relay. The Mains Input compartment is located at the rear right side of the projector.

The purpose of the solid state relay is to switch off the Light Source when the projector is in Sleep mode.

Component identification Mains Input

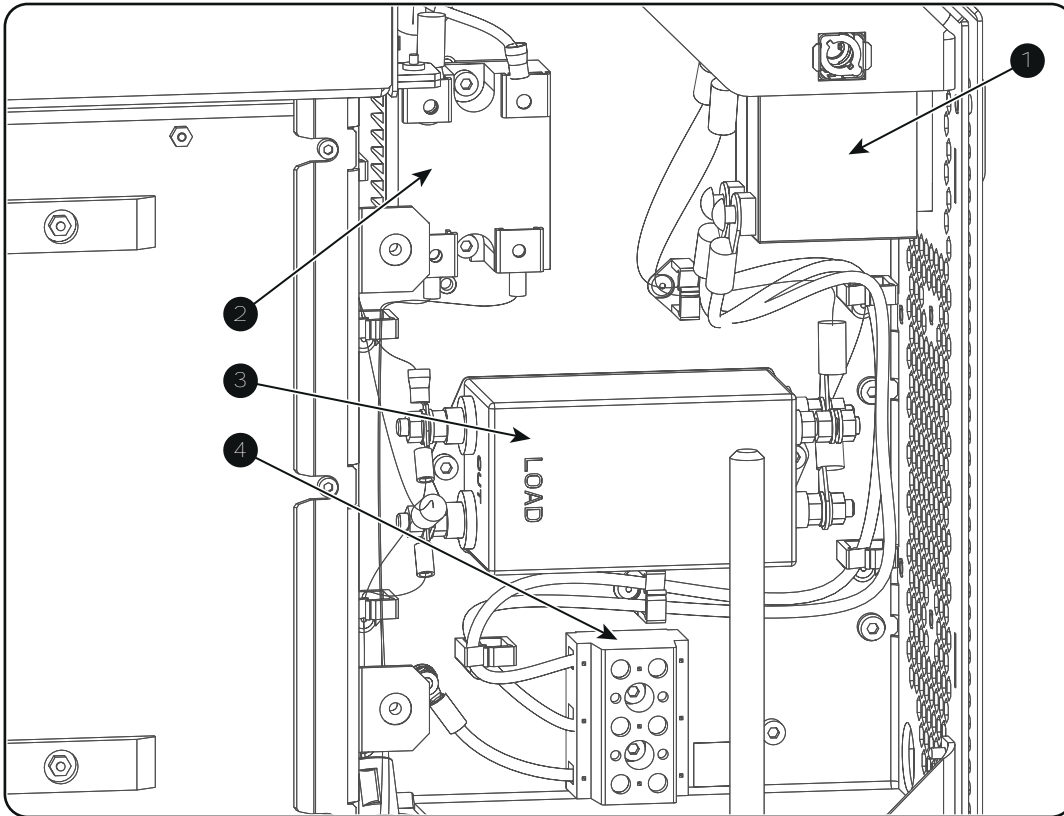


Image 4-1

- 1 ON/OFF switch.
- 2 Solid state relay.
- 3 Mains filter.
- 4 Terminal block.

Interconnection diagram Mains Input

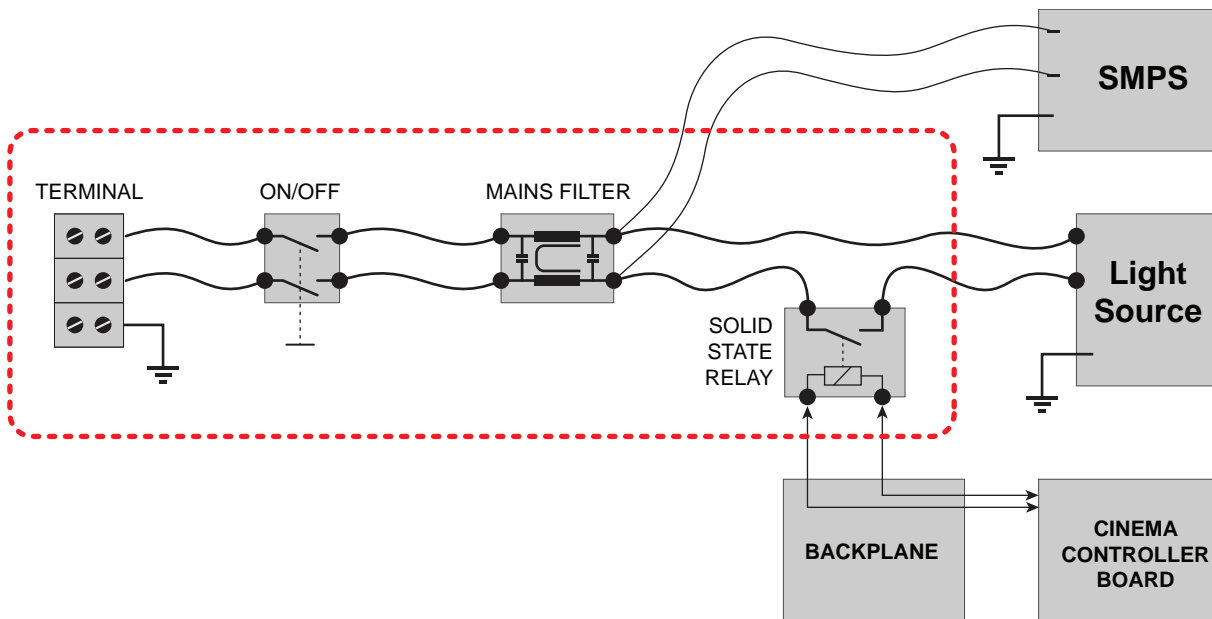


Image 4-2

4.2 Accessing the Mains Input compartment



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.

Required tools

Flat screwdriver 8 mm

How to access the compartment of the Mains Input?

1. Remove the rear cover of the projector. See procedure "Removal of the rear cover", page 272.
2. Remove the cover of the Mains Input compartment by releasing the two captive thumb screws (reference 1 Image 4-3) .

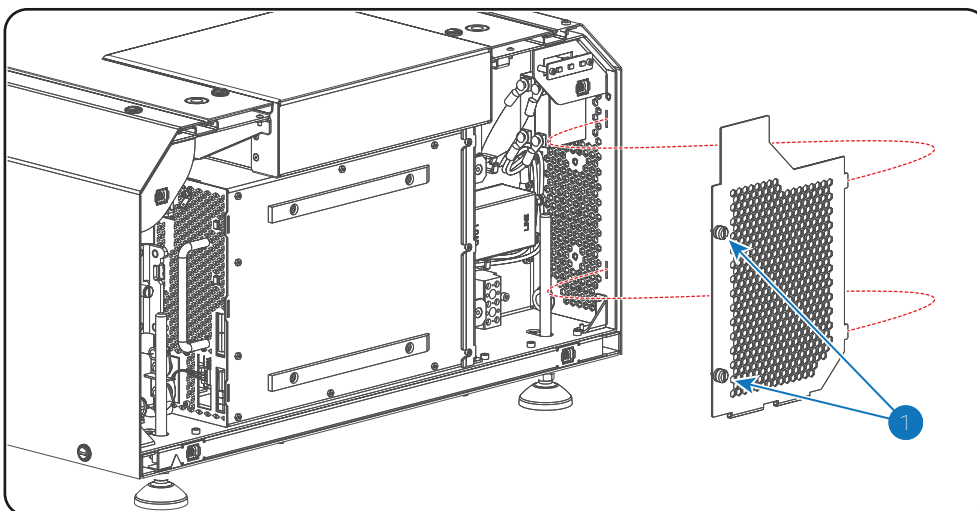


Image 4-3

How to close the Mains Input compartment?

1. Install the cover of the Mains Input compartment. Fasten the two captive thumb screws (reference 1 Image 4-4).

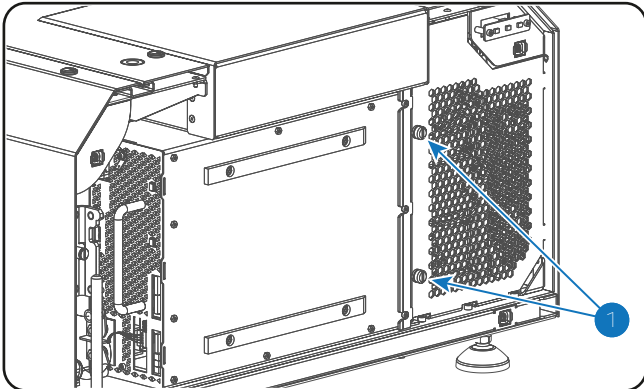


Image 4-4

2. Install the rear cover of the projector. See procedure “Installation of the rear cover”, page 281.

4.3 Replacing the ON/OFF Switch

Required tools

- 2.5mm Allen wrench.
- Medium size flat screw driver.
- Torque flat screw driver (medium size).

How to replace the ON/OFF Switch?

1. Switch off the projector and disconnect the power cord of the projector from the power net.
2. Remove the rear cover of the projector and open the Mains Input compartment. See procedure “Accessing the Mains Input compartment”, page 33.
3. Remove the ON/OFF switch from the projector chassis by loosening the two screws with reference 1 as illustrated in Image 4-5. Use a 2.5mm Allen wrench.
4. Disconnect the four electrical wires from the ON/OFF switch. Use a medium size flat screw driver.
5. Connect the **LOAD side** (reference 2 Image 4-5) of the new ON/OFF switch with the two loose wires from the **Input Filter**. Fasten the screws with a torque of **2.6Nm** (1.92 lbf*ft).
6. Connect the **LINE side** (reference 3 Image 4-5) of the new ON/OFF switch with the two loose wires from the **Terminal Block**. Fasten the screws with a torque of **2.6Nm** (1.92 lbf*ft).
7. Install the new ON/OFF switch into the Mains Input compartment. Use a 2.5mm Allen wrench to fasten the two screws (reference 1 Image 4-5) as illustrated.

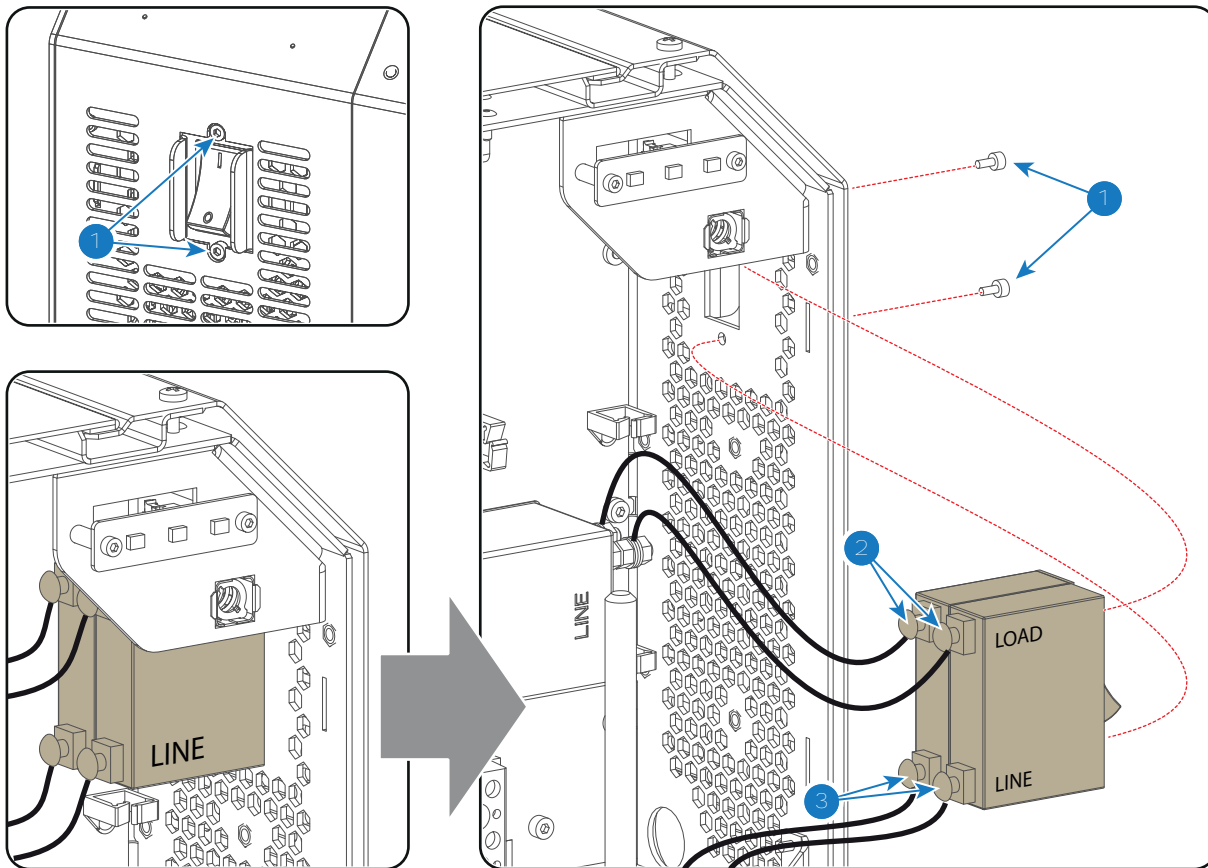


Image 4-5

8. Guide all wires in the cable clamps, close the Mains Input compartment and install the rear cover of the projector. See procedure “Accessing the Mains Input compartment”, page 33.

4.4 Replacing the Mains Filter

Required tools

- 3mm Allen wrench.
- 8mm open end wrench.
- Torque wrench with 8mm hexagon bit.


How to replace the Mains Filter?

1. Switch off the projector and disconnect the power cord of the projector from the power net.
2. Remove the rear cover of the projector and open the Mains Input compartment. See procedure “Accessing the Mains Input compartment”, page 33.
3. Remove the Mains Filter from the projector chassis by loosening the two nuts with reference 1 as illustrated in Image 4-6. Use a 3mm Allen wrench.
4. Disconnect the six electrical wires from the Mains Filter. Use a 8mm open end wrench.
5. Connect the **LINE side** (reference 2 Image 4-6) of the new Mains Filter with the two loose wires from the ON/OFF switch. Fasten the nuts with a torque of **2.7Nm** (2.0 lbf*ft).




Note: Respect the mounting order on the threaded rod of the connection pin: first a plain washer, then a nut, then the cable eye of the wire, then again a plain washer and finally the second nut.

6. Connect the gray wire (LPS) and thin white wire (SMPS) with the upper pin of the **LOAD side** (reference 3 Image 4-6) of the new Mains Filter. Fasten the nut with a torque of **2.7Nm** (2.0 lbf*ft).

 **Note:** Respect the mounting order on the threaded rod of the connection pin: first a plain washer, then a nut, then the cable eye of the two wires, then again a plain washer and finally the second nut.

7. Connect the black wire (Solid State relay) and thin red wire (SMPS) with the lower pin of the **LOAD side** (reference 4 Image 4-6) of the new Mains Filter. Fasten the nut with a torque of **2.7Nm** (2.0 lbf*ft).

 **Note:** Respect the mounting order on the threaded rod of the connection pin: first a plain washer, then a nut, then the cable eye of the two wires, then again a plain washer and finally the second nut.

8. Install the new Mains Filter into the Mains Input compartment. Use a 3mm Allen wrench to fasten the two screws (reference 1 Image 4-6) as illustrated.

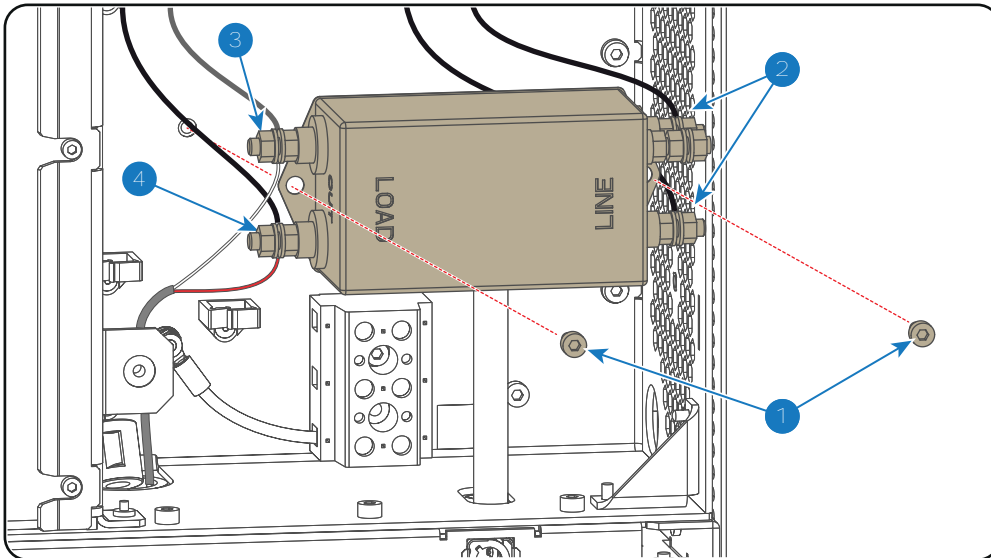


Image 4-6

9. Guide all wires in the cable clamps, close the Mains Input compartment and install the rear cover of the projector. See procedure “Accessing the Mains Input compartment”, page 33.


4.5 Replacing the Solid State relay

Required tools

- 3mm Allen wrench.
- Medium size flat screw driver or Phillips PH2 screw driver.
- Torque screw driver with PH2 socket.

How to replace the Solid State relay?

1. Switch off the projector and disconnect the power cord of the projector from the power net.
2. Remove the rear cover of the projector and open the Mains Input compartment. See procedure “Accessing the Mains Input compartment”, page 33.
3. Disconnect the four electrical wires (reference 1, 2, 3 & 4 Image 4-7) from the Solid State relay. Use a medium size flat screw driver or Phillips PH2 screw driver.
4. Remove the Solid State relay from the projector chassis by loosening the two screws with reference 5 as illustrated in Image 4-7. Use a 3mm Allen wrench.

 **Note:** An insulation sheet and heat sink (reference 7 & 8 Image 4-7) fits between the Solid State relay and the projector chassis. These two parts come loose together with the Solid State relay.

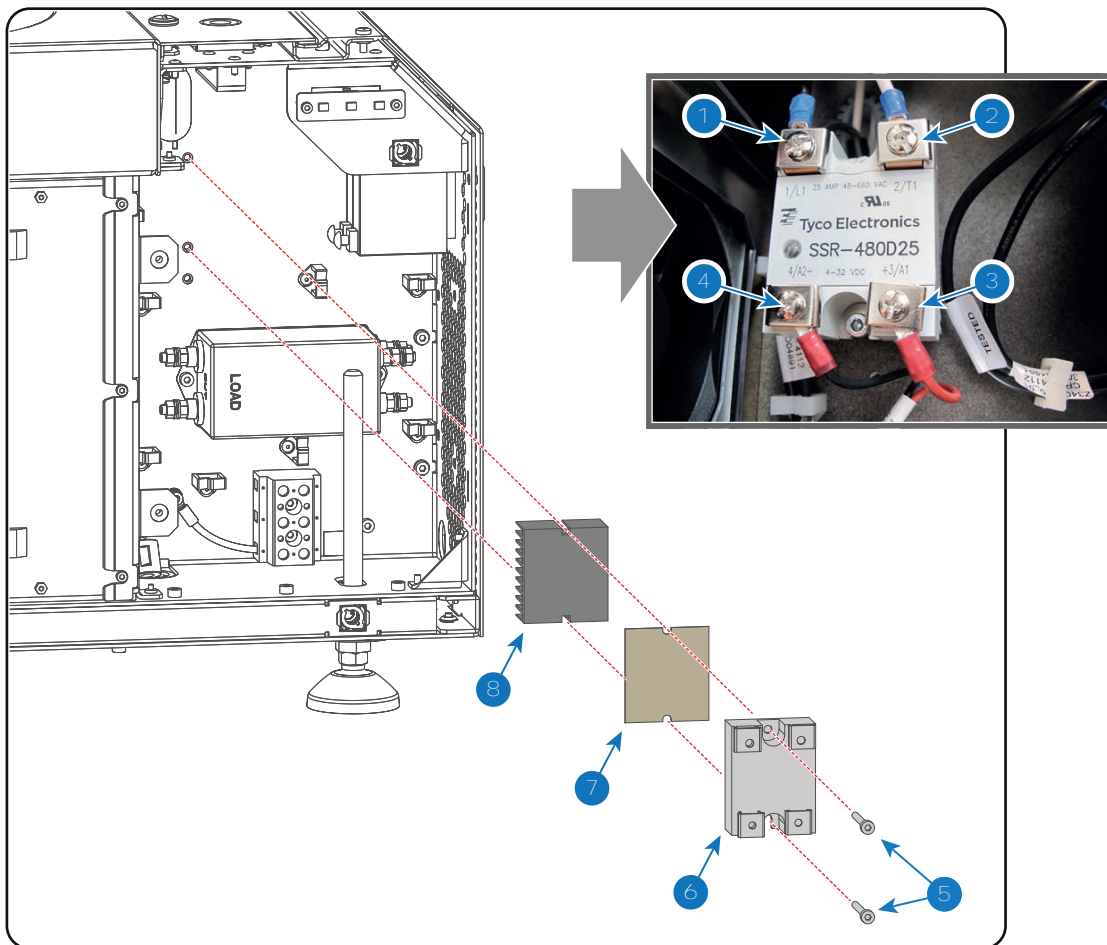


Image 4-7

5. Install the new Solid State relay. The load side (pin 1 & pin 2) of the Solid State relay should be at the top. Ensure to mount the heatsink and insulation sheet between the Solid State relay and projector chassis as illustrated in Image 4-7. Use a 3mm Allen wrench to fasten the two screws (reference 5 Image 4-7).
6. Connect the wires with the Solid State relay. Use a torque screw driver and apply a torque of **2.3Nm** (1.70 lbf*ft) upon the large screws (LOAD) and a torque of **1.1Nm** (0.81 lbf*ft) upon the small screws.
 - Connect the **black wire** from the LOAD side of the Mains Filter with **pin 1** of the Solid State relay (reference 1 Image 4-7).
 - Connect the **white wire** (LPS cable) with **pin 2** of the Solid State relay (reference 2 Image 4-7)
 - Connect the **thin red wire** with **pin 3** of the Solid State relay (reference 3 Image 4-7)
 - Connect the **thin black wire** with **pin 4** of the Solid State relay (reference 4 Image 4-7)
7. Close the Mains Input compartment and install the rear cover of the projector. See procedure "Accessing the Mains Input compartment", page 33.

Switch Mode Power Supply (SMPS)

5

About this chapter

This chapter briefly describes the Switch Mode Power Supply (SMPS) for the DP2K-SLP Series projector. More in detail is explained how to replace the SMPS.

Overview

- Introduction DP2K-SLP Series SMPS board
- Removing the SMPS board
- Installing the SMPS board
- Replacing the fans of the SMPS compartment

5.1 Introduction DP2K-SLP Series SMPS board

Introduction

The SMPS board has a separated compartment which is located below the Card Cage at the lower right side of the projector. The SMPS compartment is air cooled by two small fans located behind the large dust filter at the front side of the projector.

The SMPS board provides power to most of the electronic boards of the DP2K-SLP Series projector. The SMPS board has five connectors: one to connect the mains voltage coming from the mains filter, one to connect the PE wire, one to connect the control signals and two for the DC output voltages (connected with the Power Backplane).

Connections

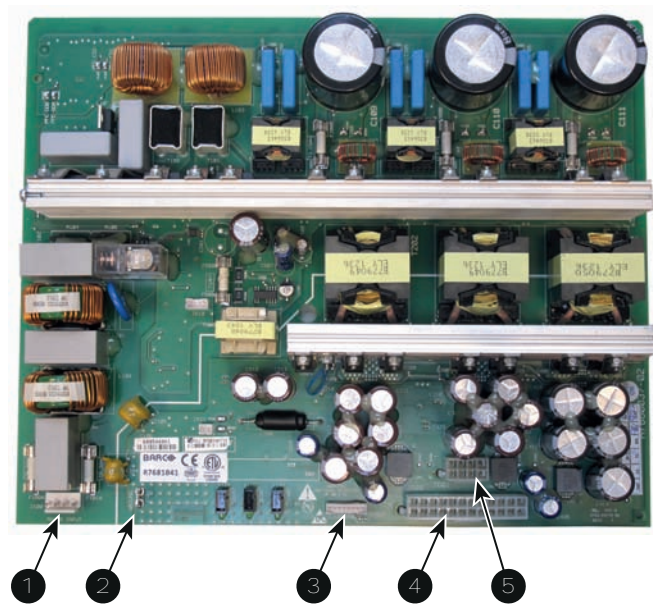


Image 5-1

- | | |
|-------------------------|--|
| 1 Mains Power. | 4 DC output voltages 2 (large socket). |
| 2 Protected Earth (PE). | 5 DC output voltages 1 (small socket). |
| 3 Control signals. | |

5.2 Removing the SMPS board



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.

Required tools

3mm Allen wrench.

How to remove the SMPS board from the projector?

1. Remove the cover of the SMPS compartment. Use a 3mm Allen wrench to loosen the two screws (reference 1 Image 5-2) of the cover.

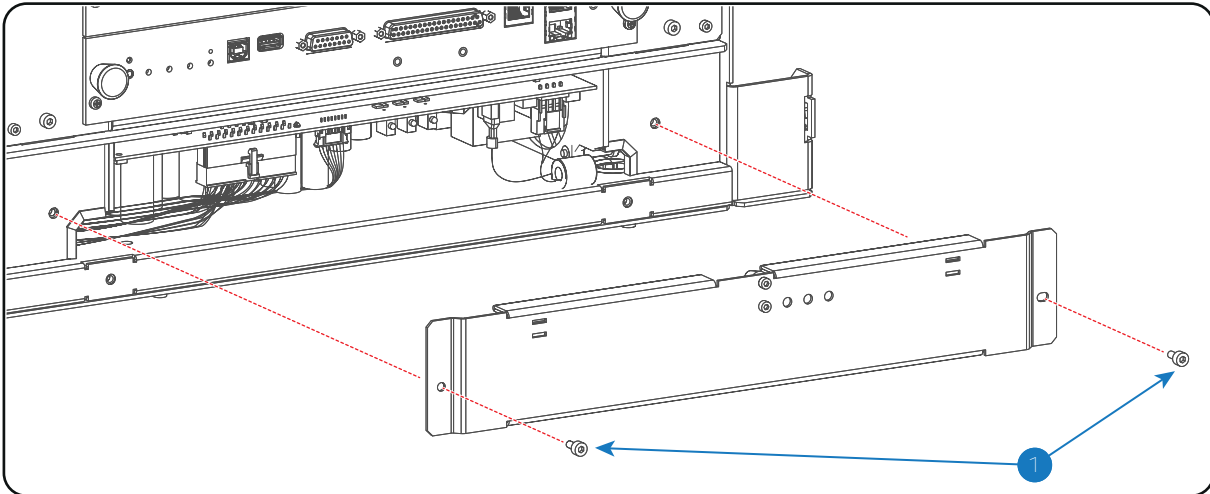


Image 5-2

2. Gently pull out the SMPS board 3 or 4 centimeters out of its compartment and disconnect the following connectors:
 - Power out connector 2 (reference 2 Image 5-3)
 - Power out connector 1 (reference 1 Image 5-3)
 - Control connector (reference 3 Image 5-3)
 - Ground wire (reference 4 Image 5-3)
 - Mains input (reference 5 Image 5-3)

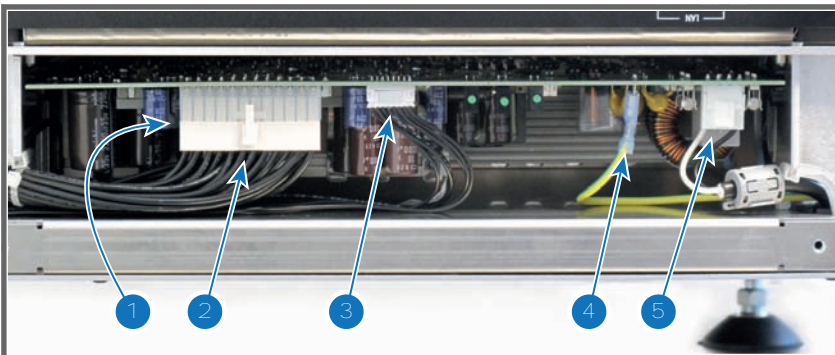


Image 5-3

3. Pull the SMPS board completely out of its compartment.

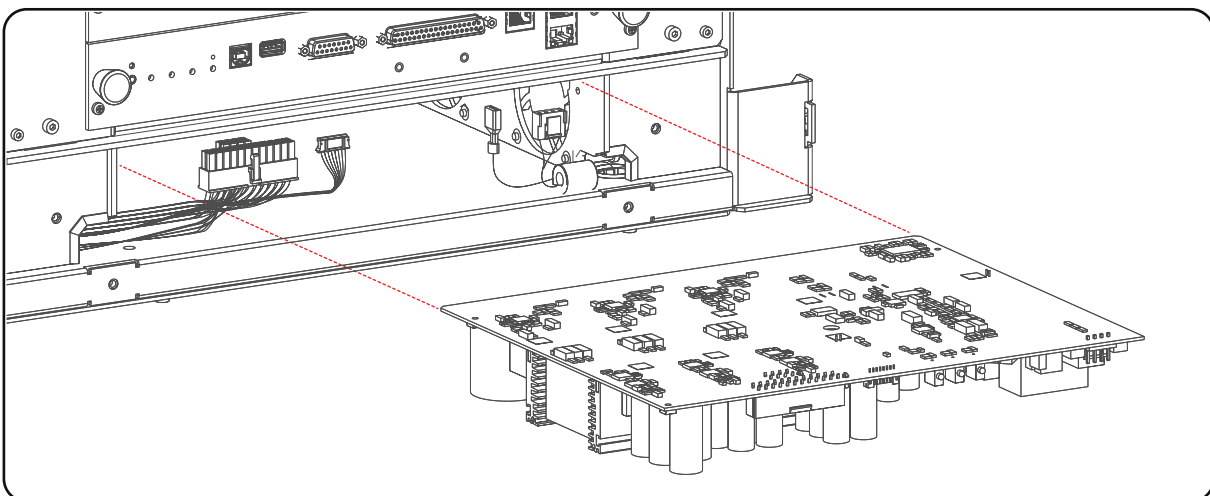


Image 5-4

5.3 Installing the SMPS board

Required tools

3mm Allen wrench.

How to install the SMPS board in its compartment?

1. Gently insert the SMPS board in the guides of the SMPS compartment as illustrated. Push it completely in.

! Caution: Do not damage the wires. Move the wires towards the sides of the opening of the SMPS compartment.

! Caution: Ensure that the both sides of the SMPS board are captured by the guides inside the SMPS compartment. See reference 1 of Image 5-5.

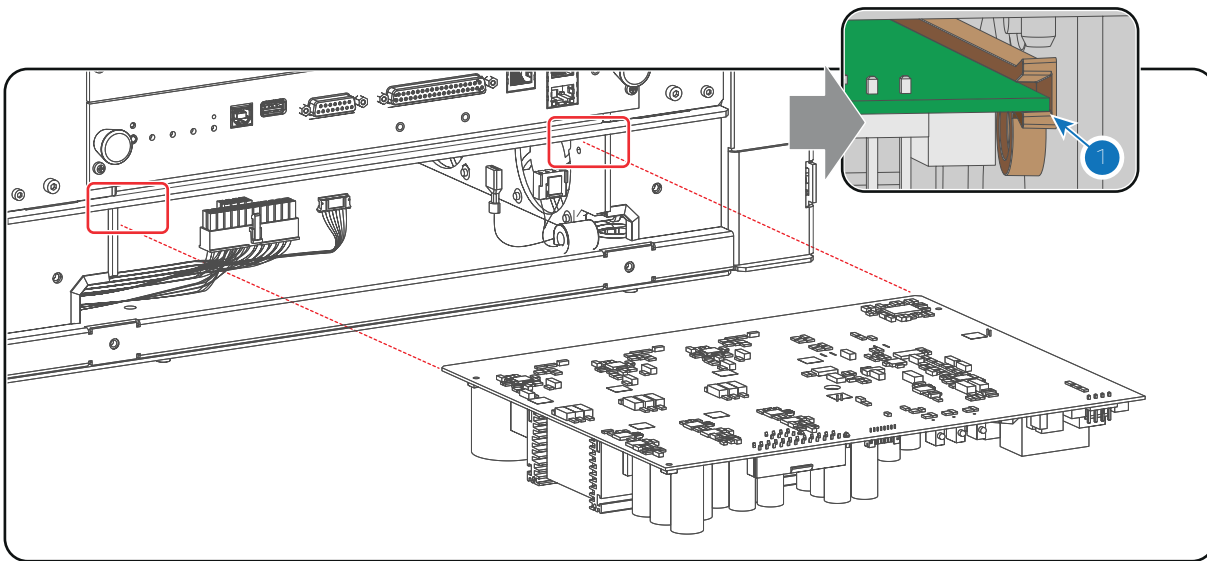


Image 5-5

2. Make the electrical connections:

- Power out connector 1 (reference 1 Image 5-6)
- Power out connector 2 (reference 2 Image 5-6)
- Control connector (reference 3 Image 5-6)
- Ground wire (reference 4 Image 5-6)
- Mains input (reference 5 Image 5-6)

! Caution: Support the SMPS board while plugging in the wires.

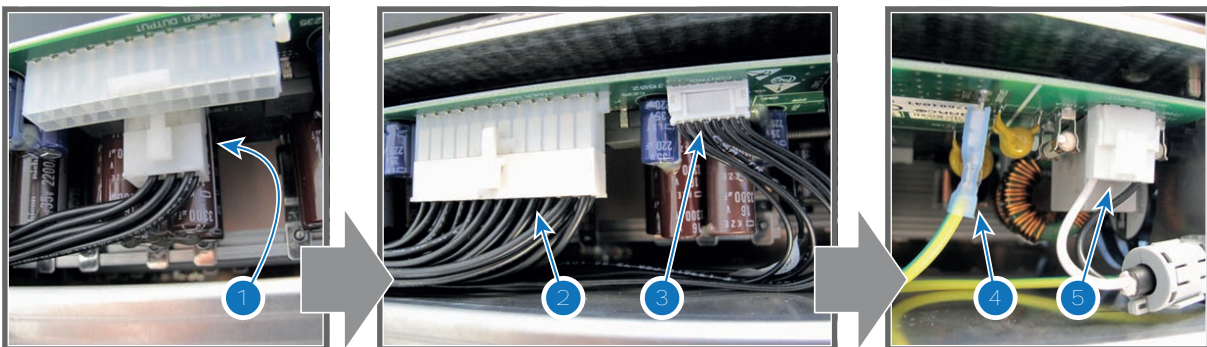


Image 5-6

3. Install the cover of the SMPS compartment. Use a 3mm Allen wrench to fasten the 2 screws (reference 1 Image 5-7) .

! **Caution:** Ensure no wires are pinched.

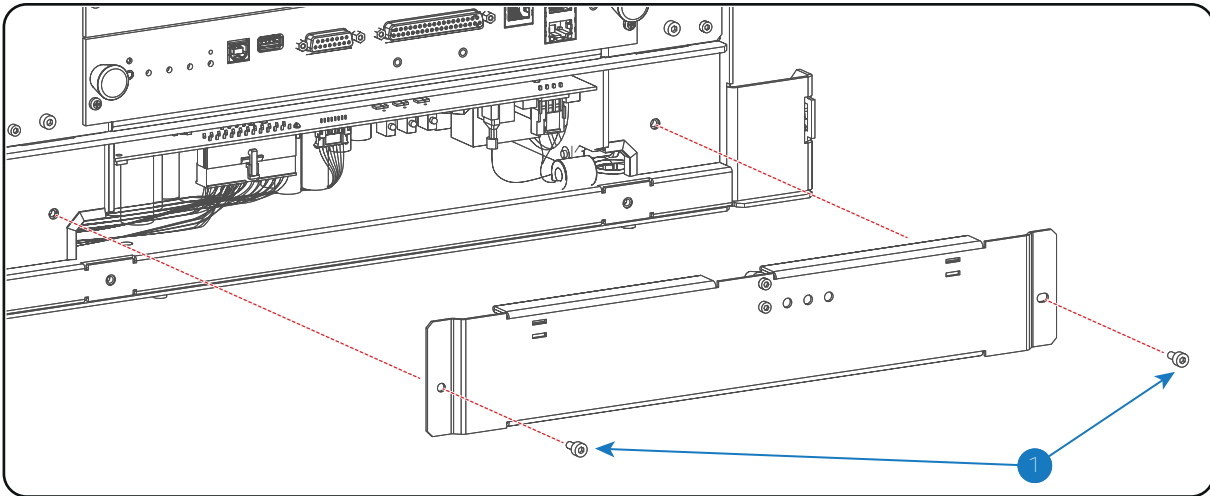


Image 5-7

5.4 Replacing the fans of the SMPS compartment

Where are the SMPS fans located?

The two SMPS fans are located at the right side of the SMPS compartment, behind the small dust filter of the projector.



To access the SMPS fans the projector small dust filter has to be removed. This procedure assumes that the projector small dust filter is already removed.

Required tools

2.5mm Allen wrench

How to replace the fans of the SMPS compartment?

1. Disconnect the wire of both SMPS fans (reference 1 & 2 Image 5-8).

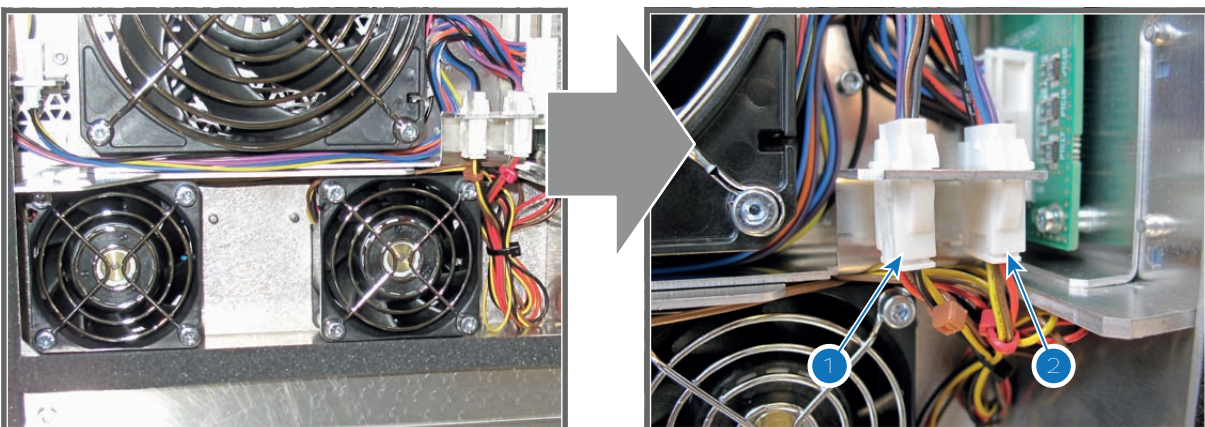


Image 5-8

2. Remove the fans from the projector chassis. Use a 2.5mm Allen wrench to loosen the screws (reference 3 Image 5-9) of the fans.

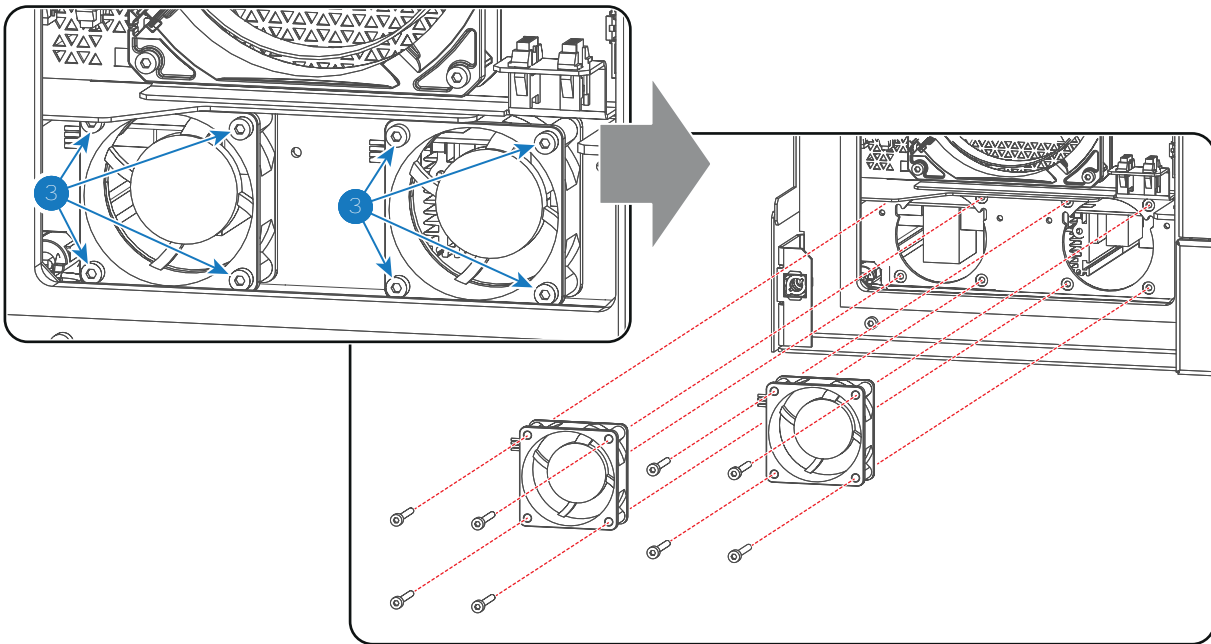


Image 5-9

3. Install two new SMPS fans. Guide the wires above the housing of the fans. Use a 2.5mm Allen wrench to fasten the screws (reference 3 Image 5-9) of the fans.

! *Caution:* Ensure that the airflow of the fans is towards the SMPS compartment.

4. Connect the wire of both fans with the projector:
 - The wire of the left fan with the left socket (reference 1 Image 5-8).
 - The wire of the right fan with the right socket (reference 2 Image 5-8).

Laser Driver Module (LDM)

6

About this chapter

This chapter briefly describes the DP2K-SLP Series Laser Driver Modules (LDM). This chapter gives an explanation on how to replace an LDM, its boards and its fans.

Functionality

To power each Laser bank, a Laser Driver Modules (LDM) has been provided to the projector. The LDM is located at the rear end of the projector.

Overview

- Removing the LDM
- Installing the LDM
- Replacing a driver board in an LDM unit
- Removing a fan from an LDM
- Installing a new fan onto an LDM
- Replacing a Laser Drive Module

6.1 Removing the LDM



WARNING: Disconnect the power cord from the projector and wait a few minutes (to discharge the capacitors) prior to start with this procedure.

Required tools

- Flat screwdriver 7 mm
- Nut driver or open end wrench 10 mm

How to remove the LDM from the projector?

1. Remove the rear cover and left side cover from the projector.
2. Disconnect the two **MAINS INPUT** wires (reference 1 Image 6-1) and the **PE** wire (reference 2) FROM the LDM.

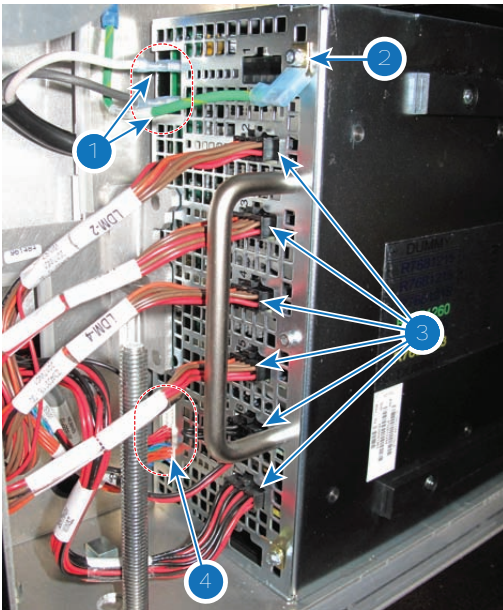


Image 6-1

3. Disconnect all other wire units from the LDM.
4. Remove the fixation bracket as illustrated. Use a flat screwdriver to loosen the captive screw (reference 7) of the fixation bracket.

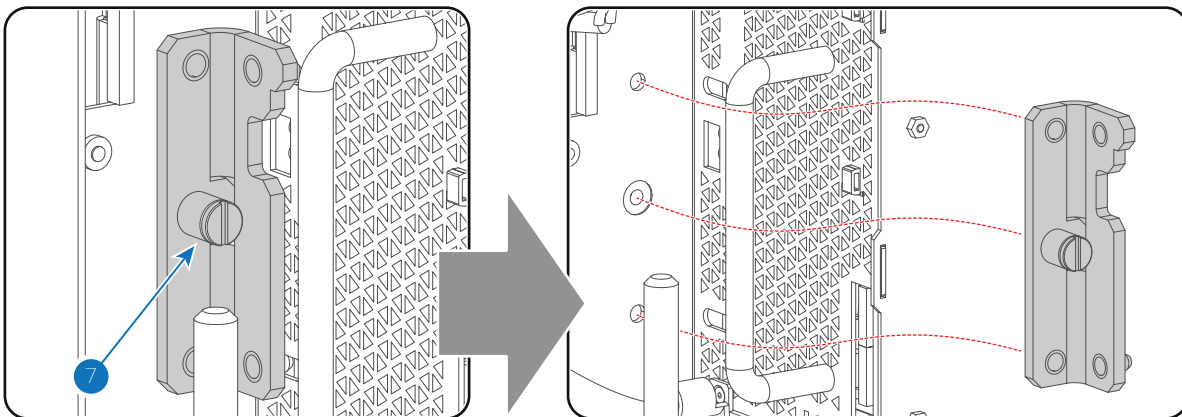


Image 6-2

5. Pull out the LDM from its compartment.

! **Caution:** Make sure not to damage any of the wire units while removing the LDM.

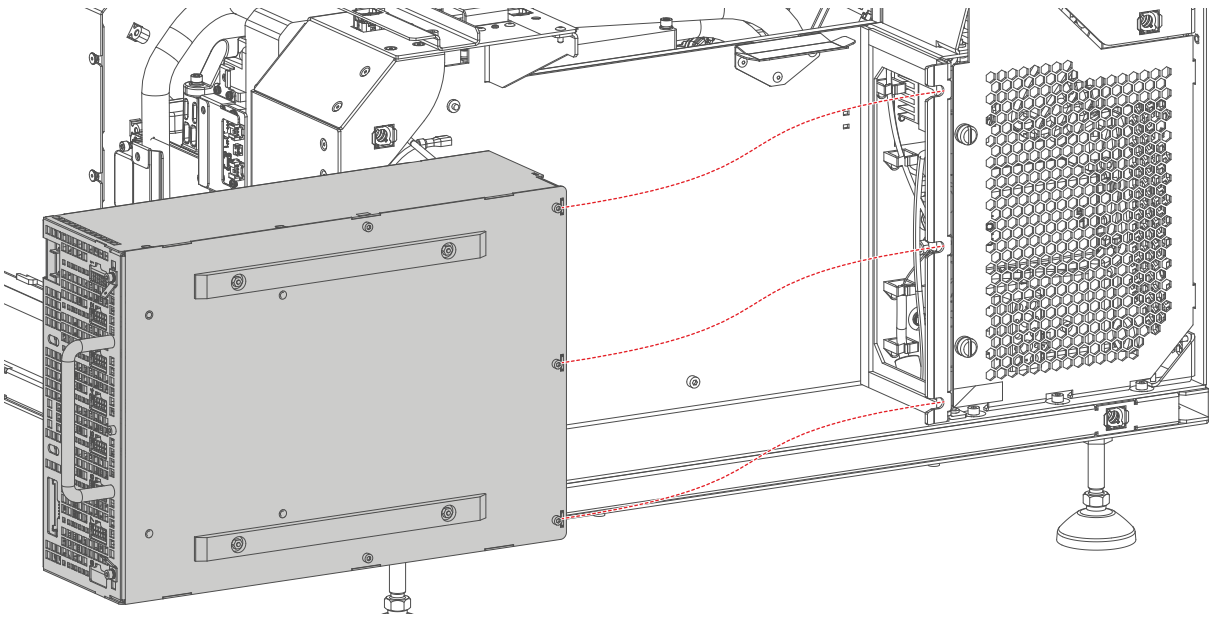


Image 6-3

6.2 Installing the LDM

How to install the LDM of the projector?

1. Gently slide the LDM in its compartment as illustrated.

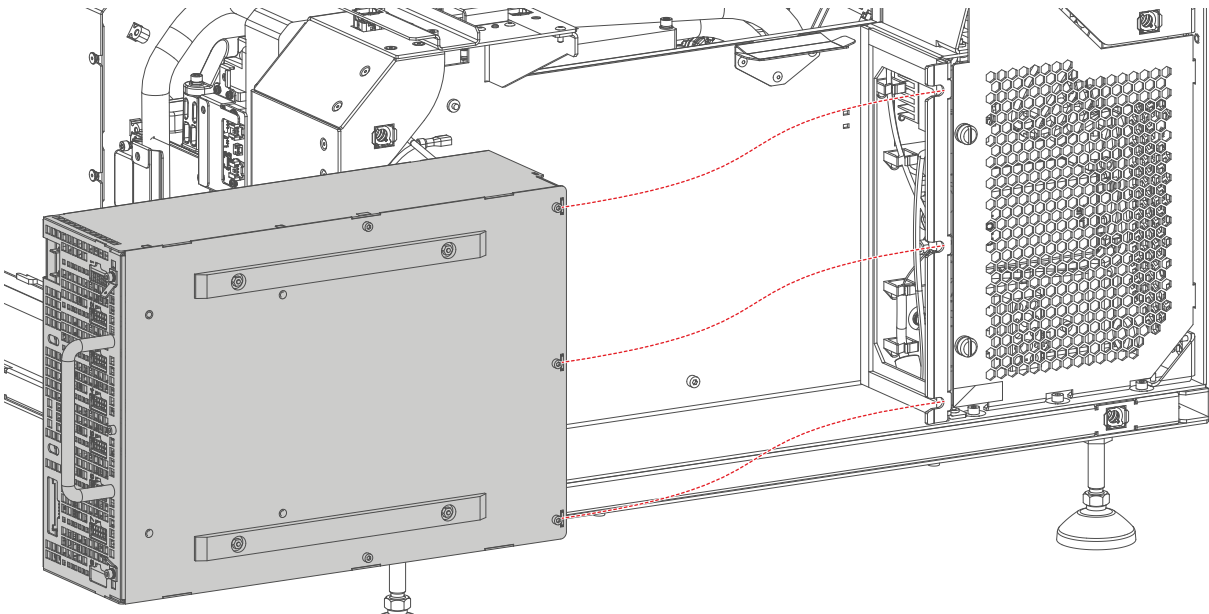


Image 6-4

2. Install the fixation bracket as illustrated. Use a Flat screwdriver to fasten the captive screw (reference 7) of the bracket.

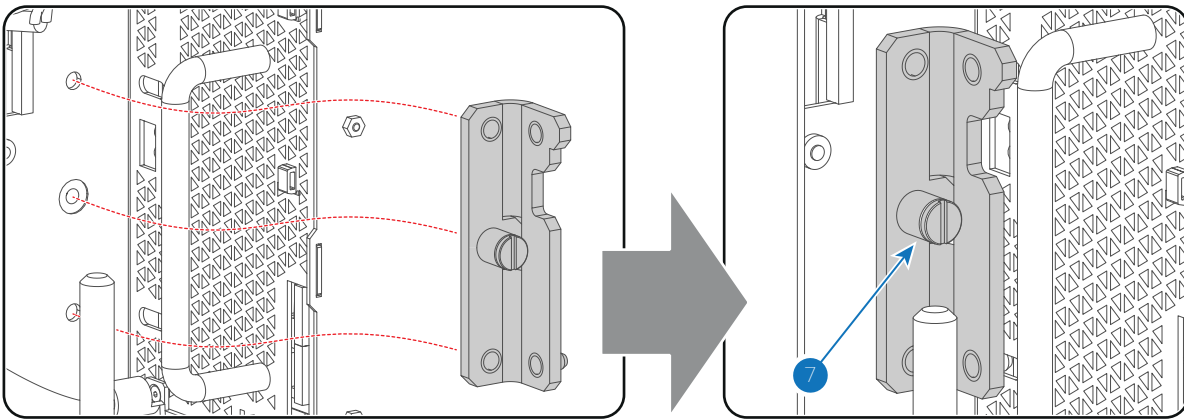


Image 6-5

3. Connect the two **MAINS INPUT** wires (reference 1 Image 6-6) and the **new PE** wire (Z3403519, reference 2) with the LDM.

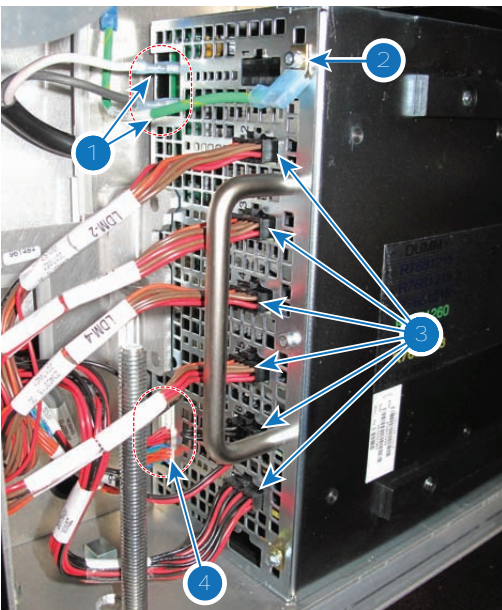


Image 6-6

4. Connect the LDM driver cables to the LDM (reference 3)
5. Connect the wire unit with the LDM (reference 4).
6. Install the rear cover and left side cover of the projector.

6.3 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

2.5 mm Allen wrench

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.

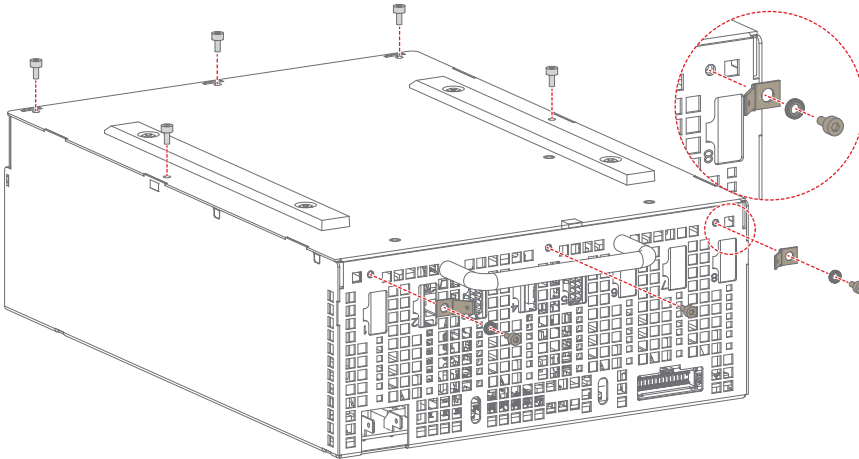


Image 6-7: Removing the screws, washers and tabs from an LDM

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

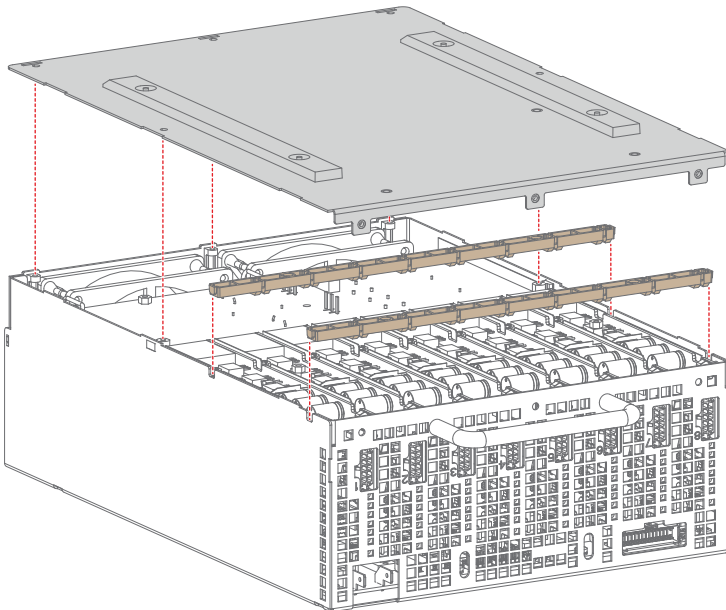


Image 6-8: Removing the bottom plate and rails

4. Unplug and remove the desired driver board.

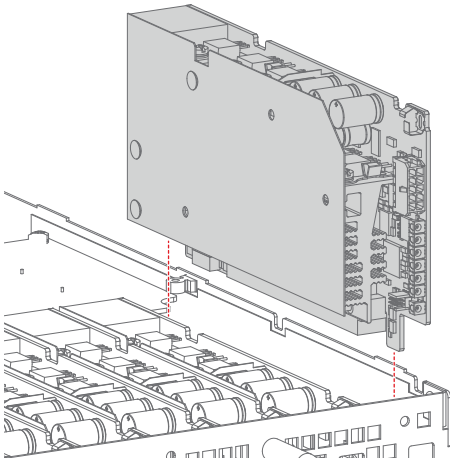


Image 6-9: Example of a removed driver board

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

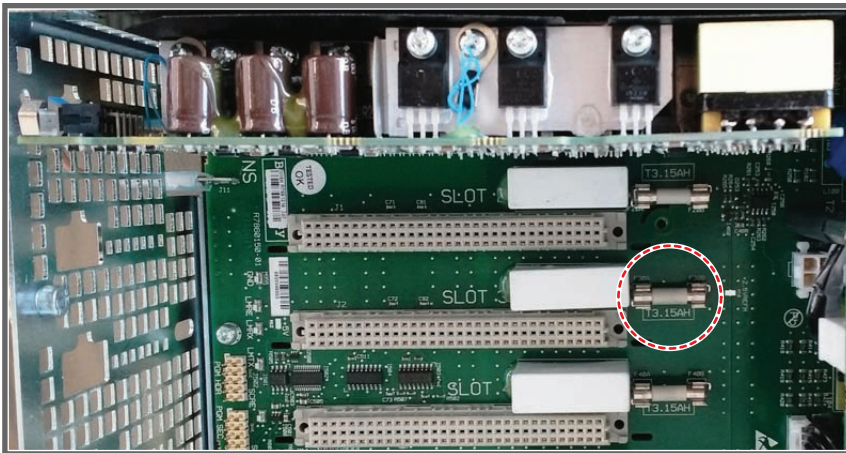


Image 6-10: Example of the location of the fuse

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.

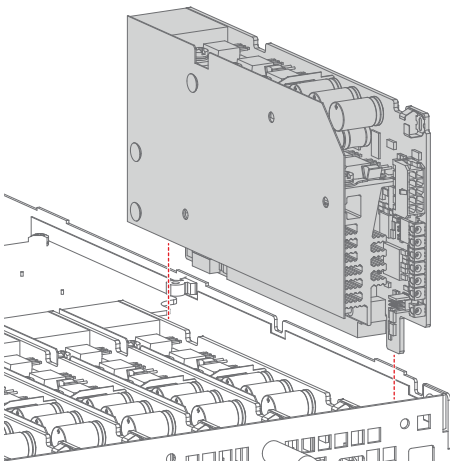


Image 6-11: Example of mounting a driver board

! **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.
6. 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 LDM.

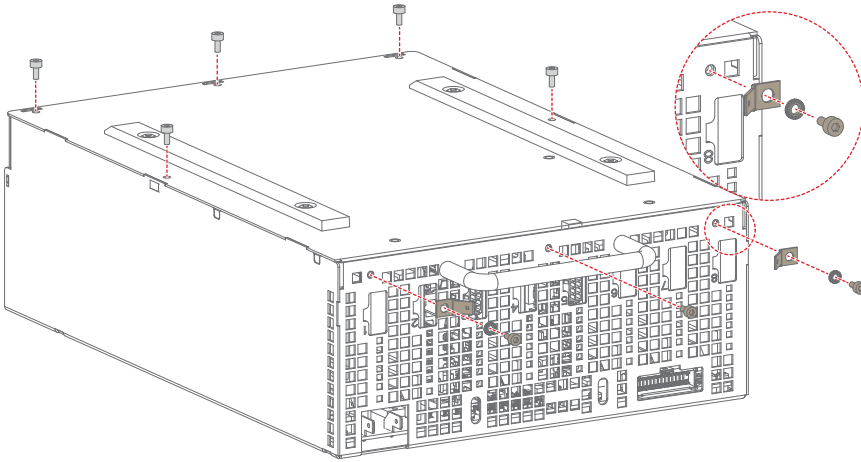


Image 6-12

6.4 Removing a fan from an LDM

Required tools

2.5 mm Allen wrench

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.

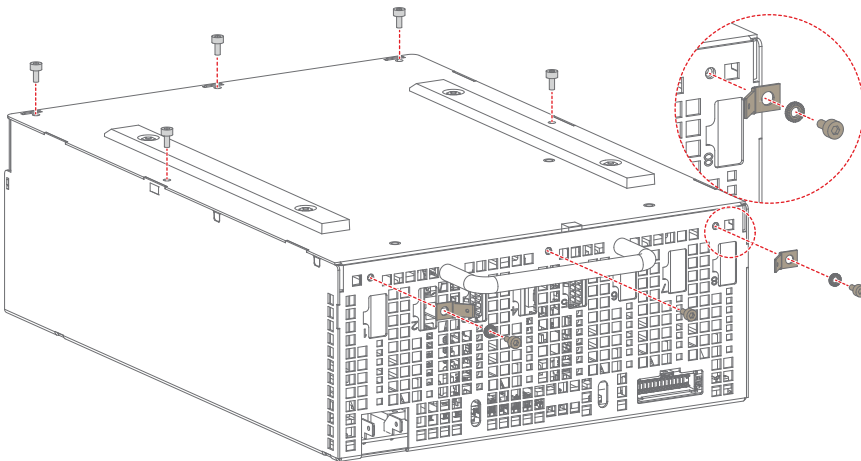


Image 6-13

3. Remove the bottom plate.

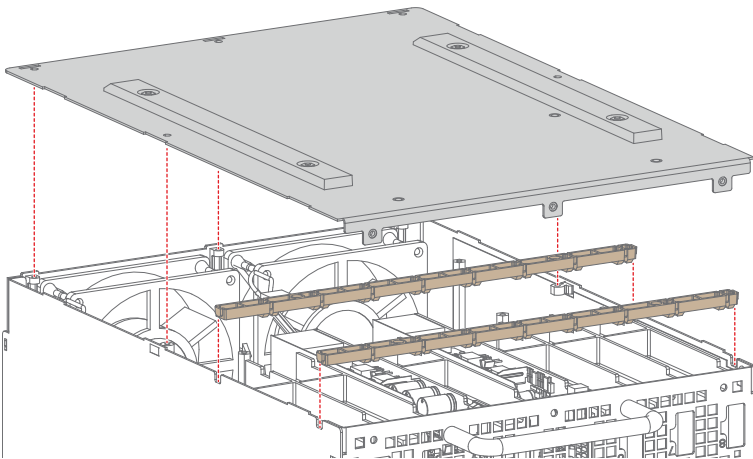


Image 6-14

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

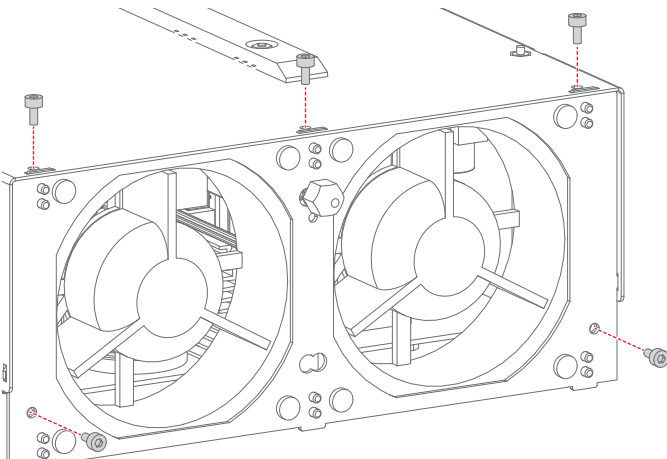


Image 6-15

5. Unplug the fan cable of the desired fan.

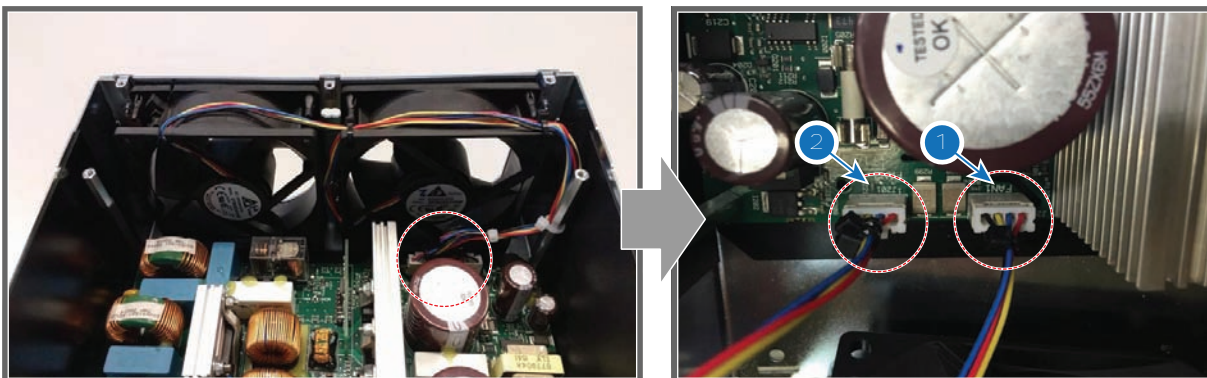


Image 6-16

- 1 Fan 1
- 2 Fan 2

6. Remove the fan assembly.

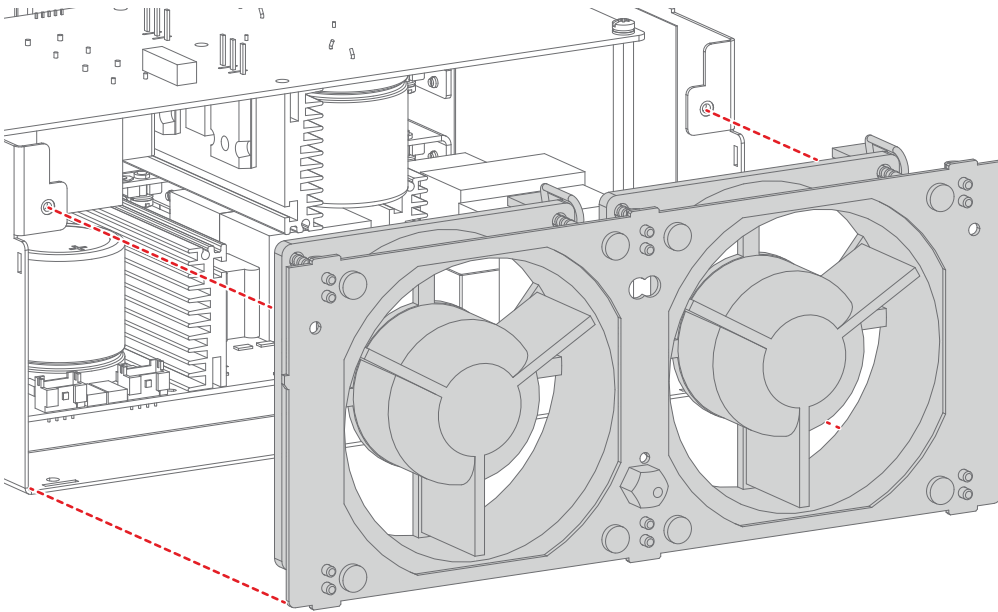


Image 6-17

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

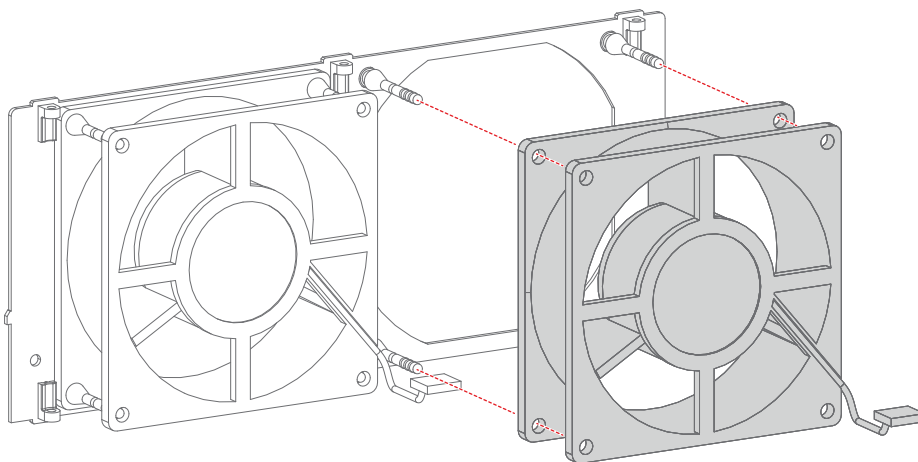


Image 6-18

6.5 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 51.

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.

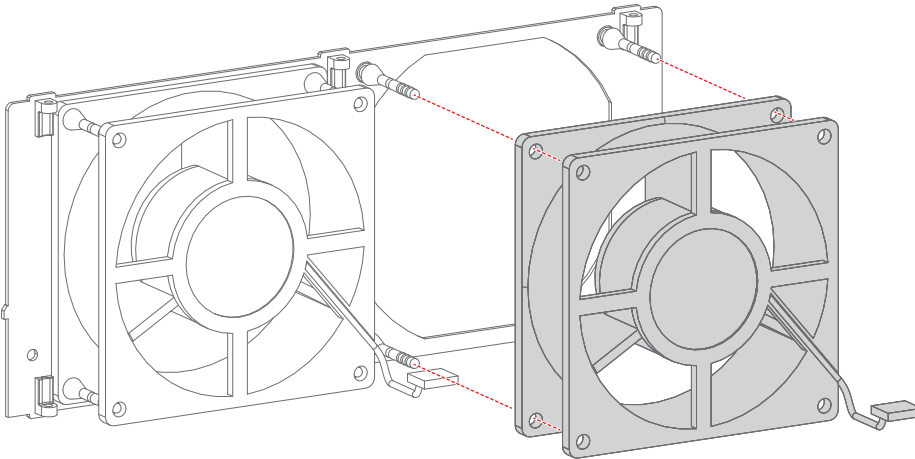


Image 6-19

2. Check if the mounting pin is set at its correct position.

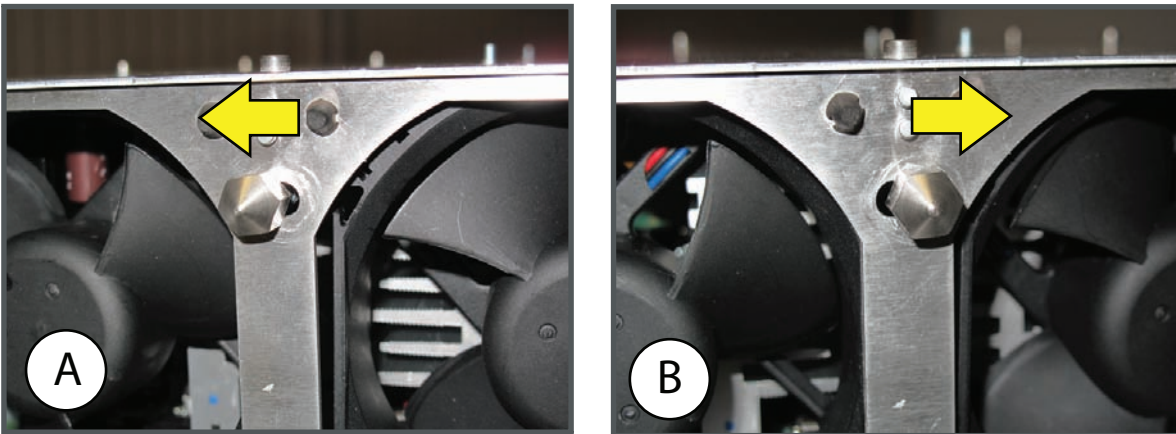


Image 6-20: Mounting pin

- A** Position for the Driver Module
- B** Position for the Power Module

3. Place the fan assembly back into the LDM.

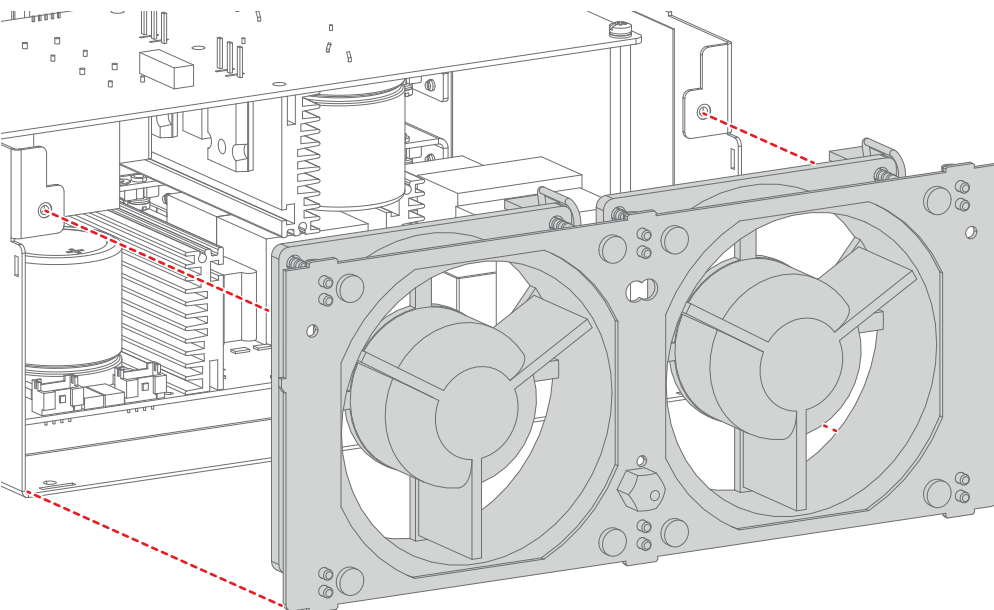


Image 6-21

4. Connect the fan cable of the new fan.

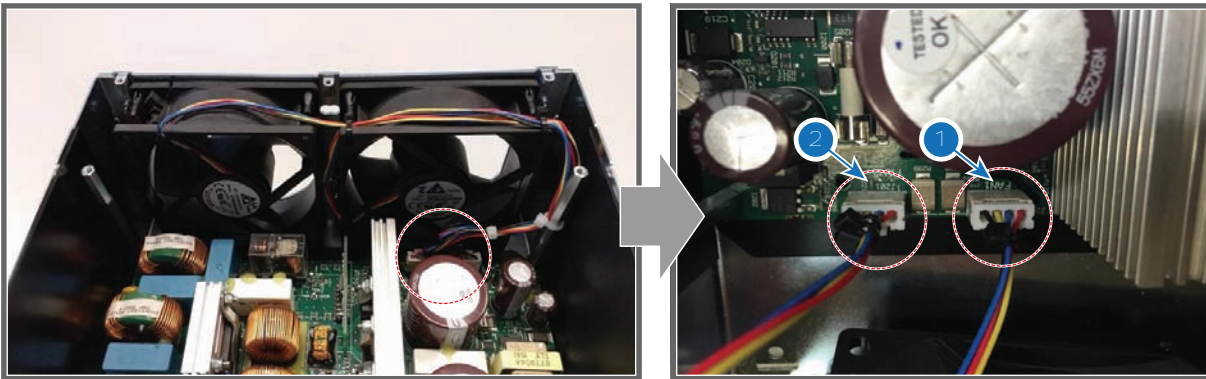



Image 6-22

- 1 Fan 1
2 Fan 2

5. 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.

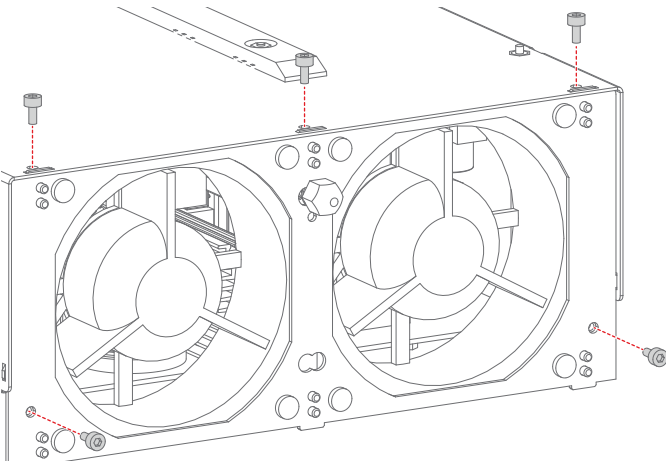


Image 6-23

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

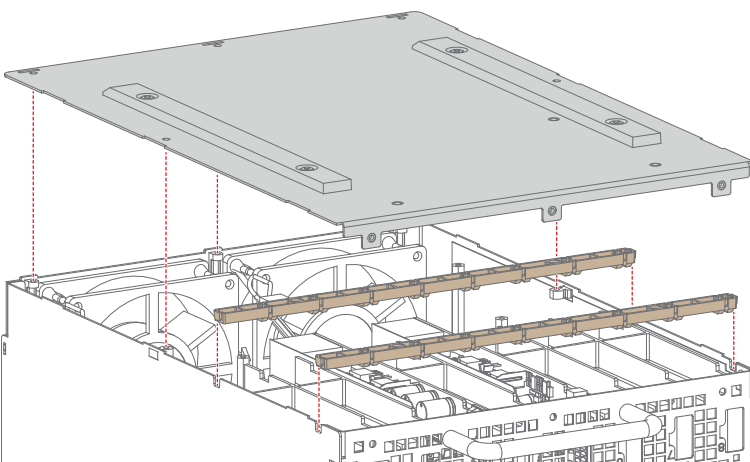



Image 6-24

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 LDM.

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

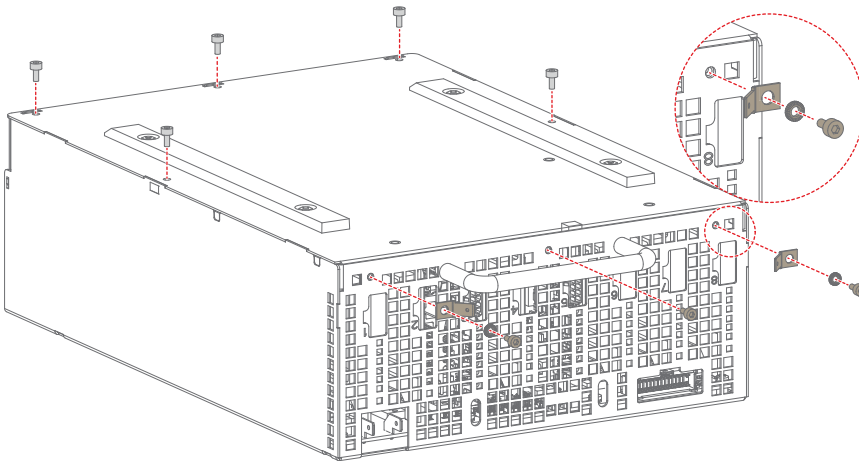


Image 6-25

6.6 Replacing a Laser Drive Module

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 48.
2. Remove all screws, washers and tabs holding the bottom plate to the module. Use a 2.5 mm Allen wrench.

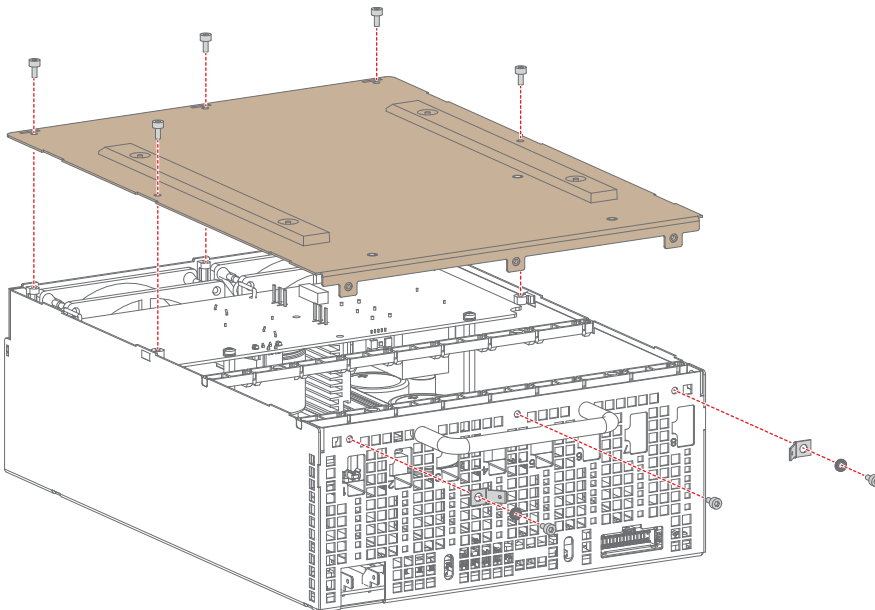


Image 6-26

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

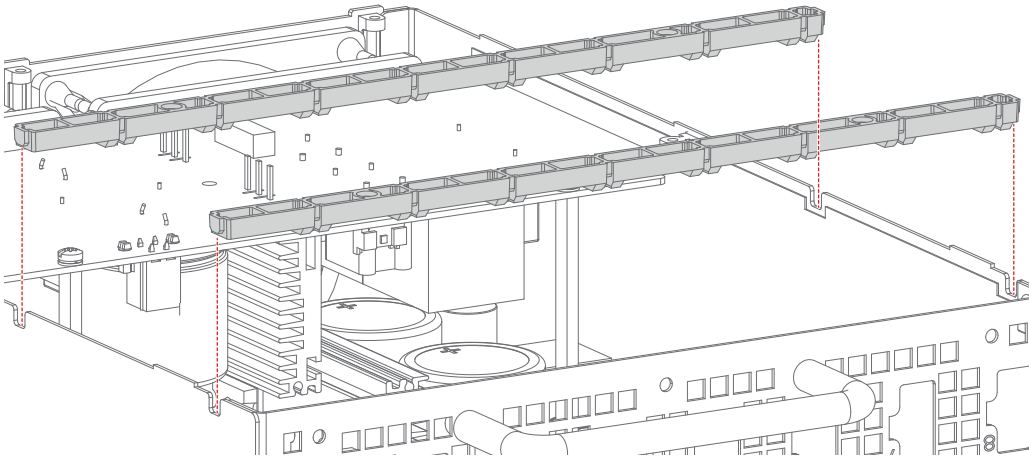


Image 6-27

4. Install all LDM boards into the new module.

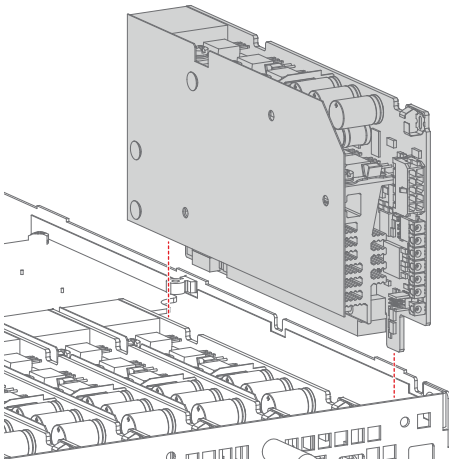


Image 6-28

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

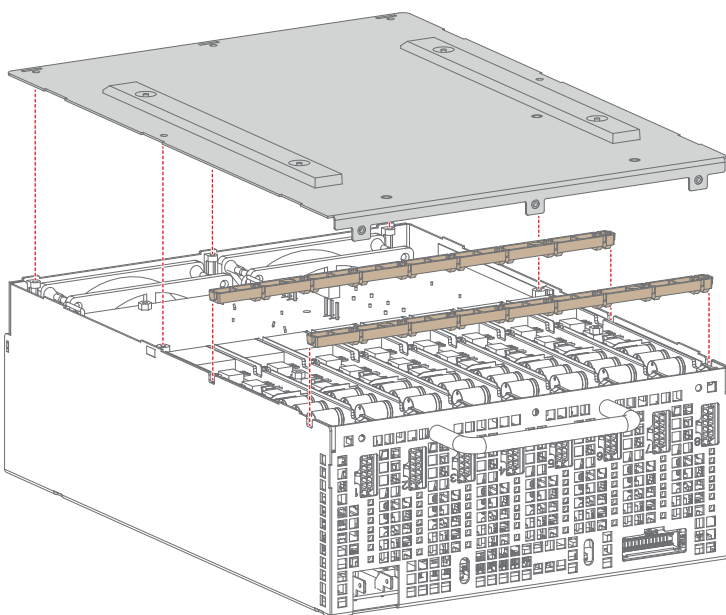


Image 6-29

Laser Driver Module (LDM)

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.

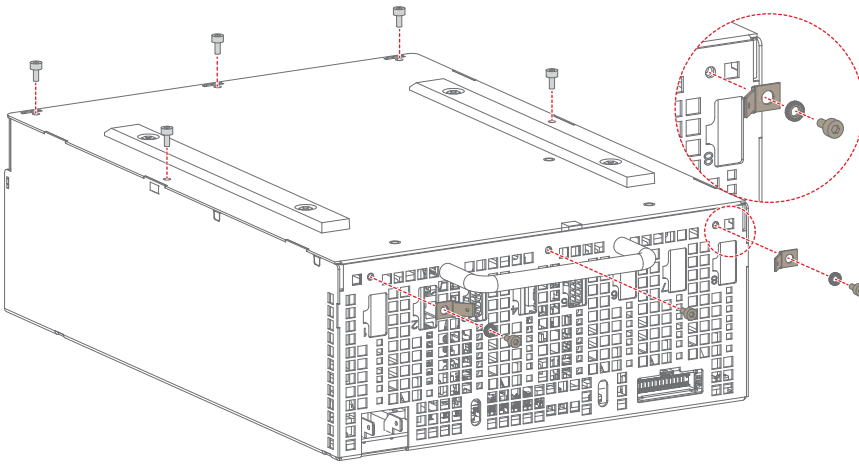


Image 6-30

Laser Phosphor Light Source

7



CAUTION: Before performing any service actions on this equipment as described in this chapter, please keep in mind that all the safety guidelines, safety instructions, warnings and cautions mentioned in the Safety manual should be adhered to.



After performing service actions on this equipment, the projector will perform a self-test to check for its own optical integrity (all lasers should follow the correct optical path in the system). After that is completed, make sure to perform an optical alignment. Do this to ensure maximum light output. For more info on the optical alignment, please refer to “Optical alignment”, page 147

Overview

- Overview
- Removing the Light Source
- Removal of the Controller assembly
- Replacing the Laser Control Board (LCB)
- Replacing the Peltier Controller
- Replacing the 24V Filter board
- Mounting of the Controller assembly
- Installing the Light Source
- Replacing the Phosphor Wheel Interconnection Board
- Replacing the Phosphor Wheel Monitoring Interconnection Board
- Replacing the Light Source Fan Interconnection Board
- Replacing the Light Sensor Interconnection Board
- Replacing the Blue Laser Interconnection Board
- Replacing a fan from the Light Source
- Replacing the combiner of the Light Source
- Replacing the phosphor wheel
- Replacement of the Anode Fan
- Replacement of the Cathode Fan
- Replacement of the Cold Mirror fan

7.1 Overview

Overview

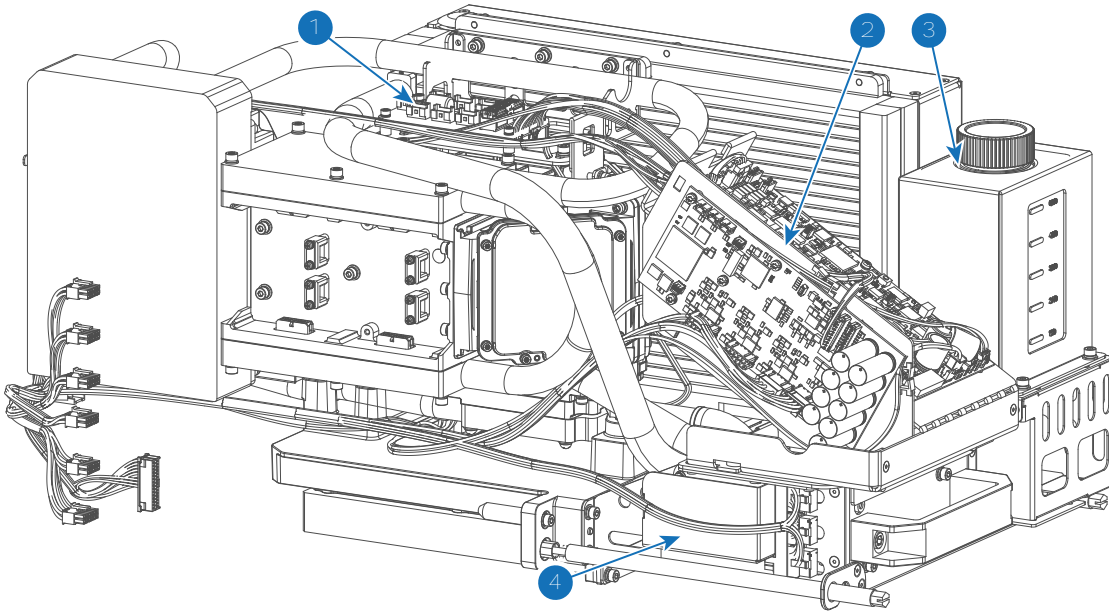


Image 7-1

- 1 Light Source Fan Interconnection Board
- 2 Controller Assembly
- 3 Cooling Liquid reservoir
- 4 Blue Laser Interconnection Board

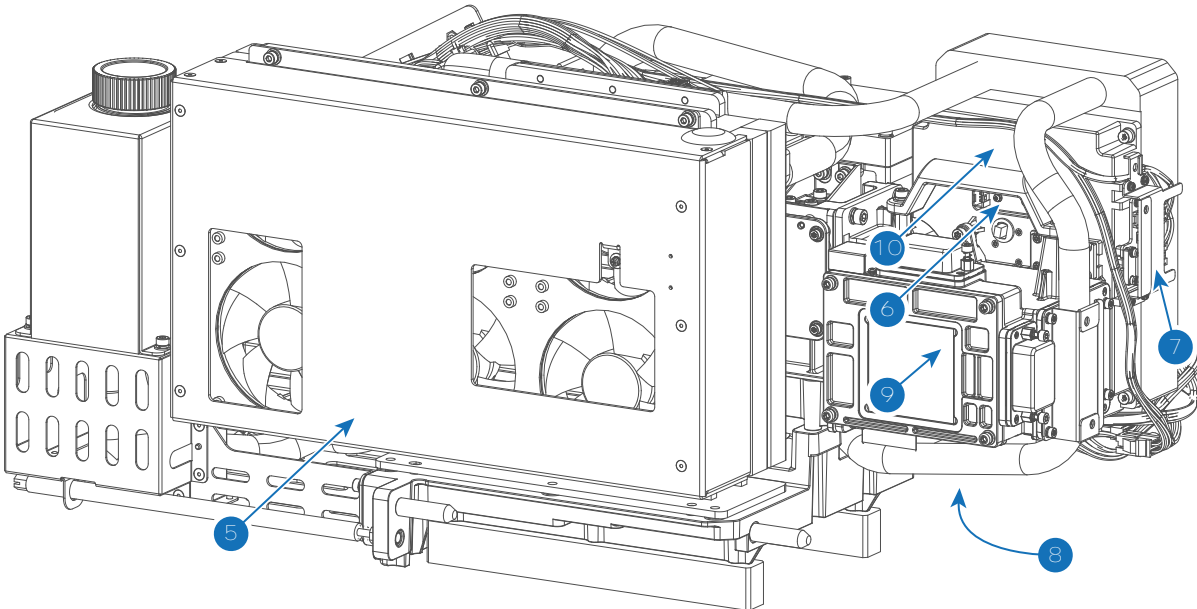


Image 7-2

- 5 Fan assembly
- 6 Phosphor Wheel Monitoring Interconnection Board
- 7 Phosphor Wheel Interconnection Board
- 8 Light Sensor Interconnection Board
- 9 Combiner unit
- 10 Phosphor wheel

7.2 Removing the Light Source

How to remove the Light Source assembly?

1. Remove the Right Side cover, back cover and Light Source Cover.
2. Release the LDM driver cables (reference 3, Image 7-3) and the data driver control cable (reference 4) from the LDM.

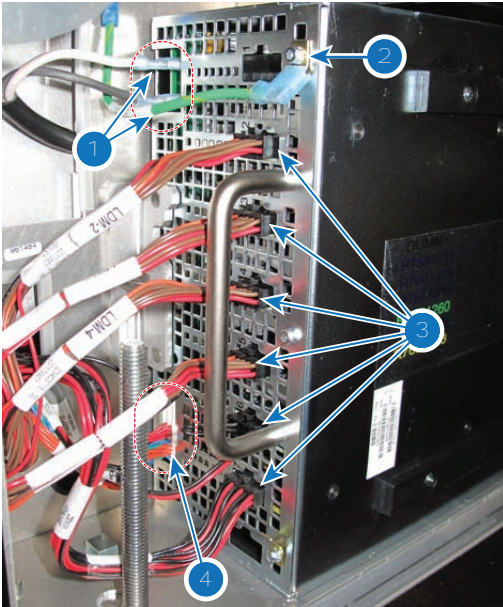


Image 7-3

3. Release the LCB Control cable connector (reference 5, Image 7-4), located on the Phosphor wheel side of the Light Source.

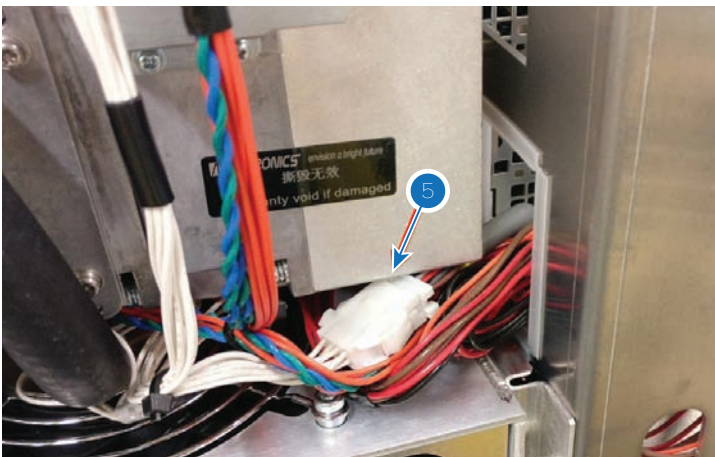


Image 7-4

4. Loosen the set screws, holding the Light Source onto the projector frame (reference 6, Image 7-5). Use a flat screwdriver to loosen the screws.

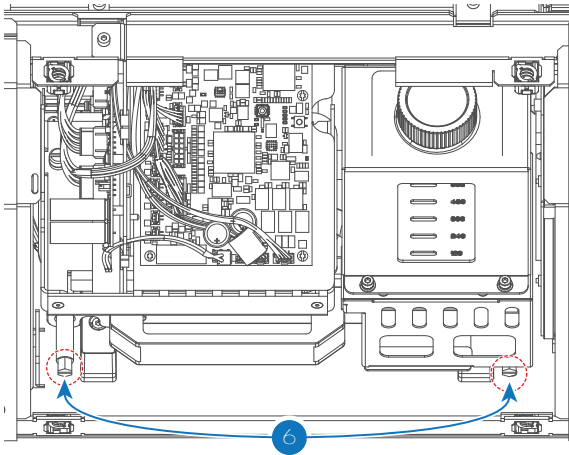


Image 7-5

5. Gently slide out the Light Source and remove it.

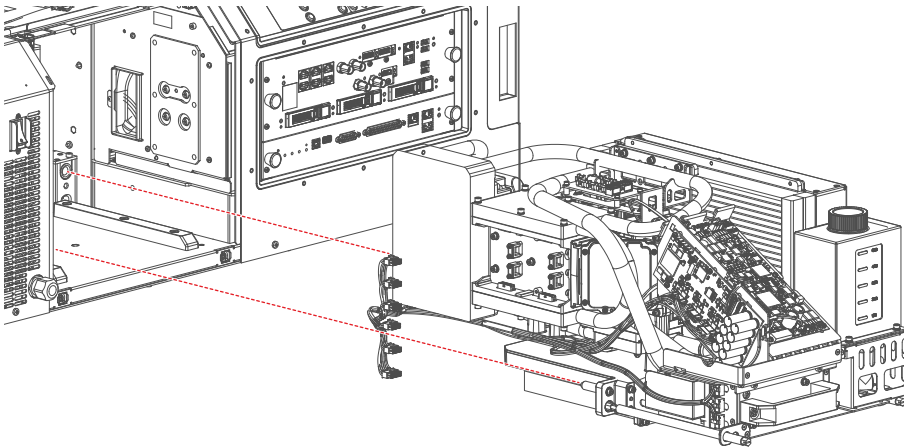


Image 7-6

7.3 Removal of the Controller assembly

Required tools

- Allen wrench 3 mm
- Flat screwdriver 7 mm
- Side cutter

How to remove the Controller assembly

1. Remove the Light Source Cover.
2. Cut the cable ties holding the Light Source wiring to the Controller assembly.

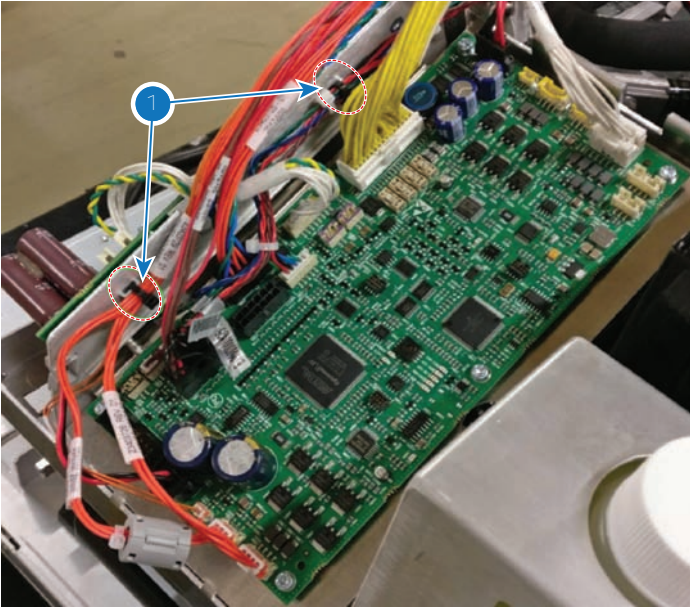


Image 7-7

3. Remove the wiring coming to the Controller assembly.



Tip: If you're not familiar with the wiring layout, take notes of the wiring to and from both the Laser Control Board (LCB) and Peltier Controller.

4. Loosen the 2 set screws, holding the Controller assembly onto the light source, but do not remove them (reference 1, Image 7-8).

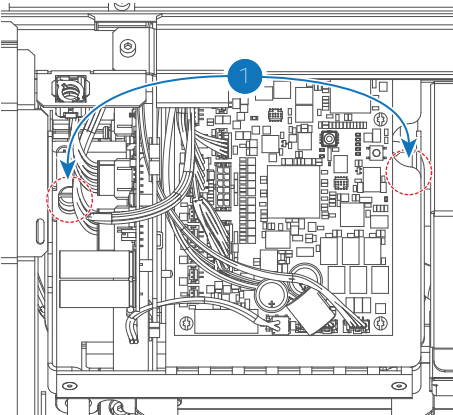


Image 7-8

5. Remove the Controller assembly from the light source as illustrated. Use a 3 mm Allen wrench to release the two hex screws (reference 2, Image 7-9).

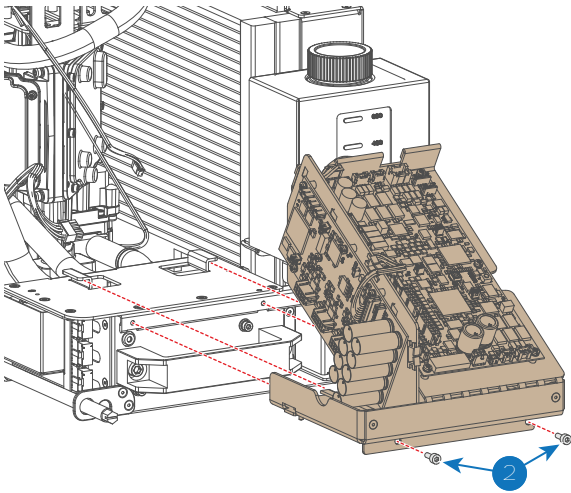


Image 7-9

7.4 Replacing the Laser Control Board (LCB)

How to replace the LCB?

1. Remove the Controller assembly from the projector. See “Removal of the Controller assembly”, page 62.
2. Release the wire unit between the LCB and Peltier Controller and the wire unit between the LCB and the Capacitor Board.
3. Replace the LCB as illustrated. Use a T10 Torx screwdriver to release the 6 Torx screws.

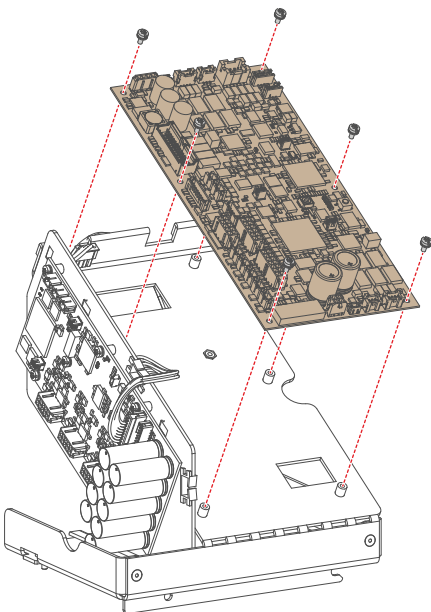


Image 7-10

4. Reconnect the wiring between LCB and Peltier Controller and between LCB and Capacitor Board.
5. Mount the Controller assembly back onto the Light Source.

7.5 Replacing the Peltier Controller

How to replace the Peltier Controller?

1. Remove the Controller assembly from the projector. See “Removal of the Controller assembly”, page 62.

2. Release the wire unit between the LCB and Peltier Controller.
3. Replace the Peltier Controller as illustrated. Use a T10 Torx screwdriver to release the 5 Torx screws.

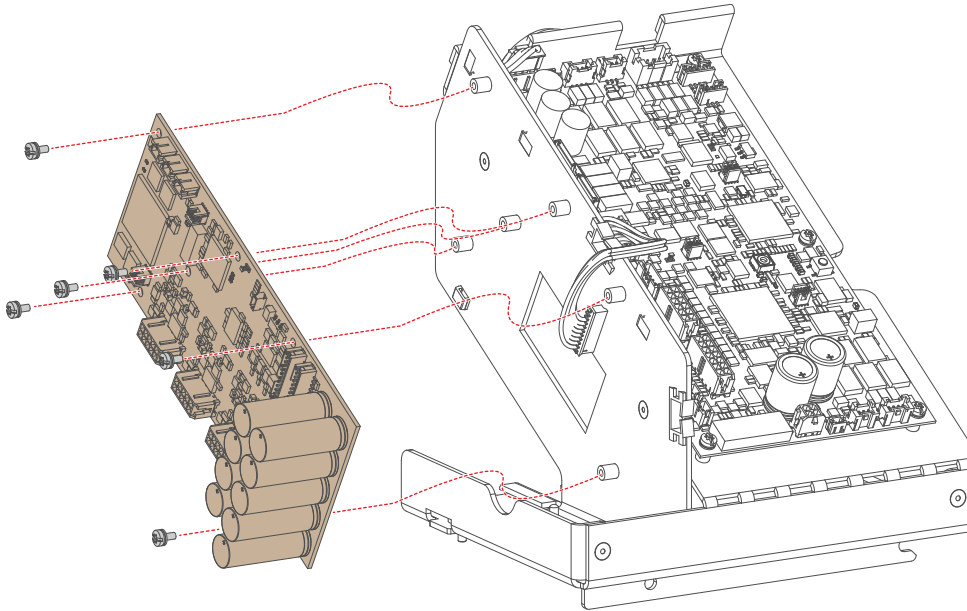


Image 7-11

4. Reconnect the wiring between LCB and Peltier Controller.
5. Mount the Controller assembly back onto the Light Source.

7.6 Replacing the 24V Filter board

How to replace the 24V Filter board

1. Remove the Controller assembly from the projector. See “Removal of the Controller assembly”, page 62.
2. Release the wire unit between the LCB and the Filter board.
3. Replace the Filter board as illustrated. Use a T10 Torx screwdriver to release the 2 Torx screws.

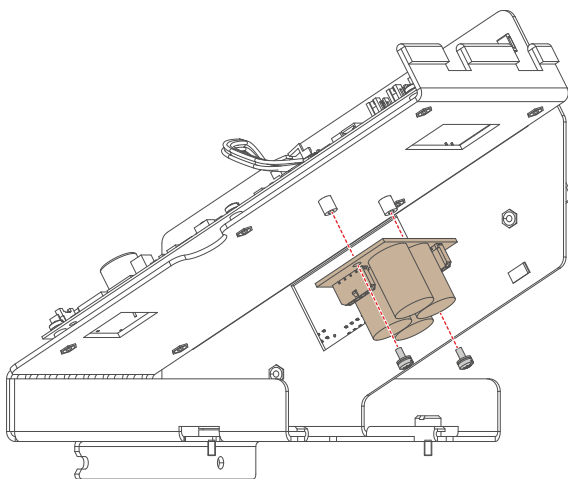


Image 7-12

4. Reconnect the wiring between LCB and the filter board.
5. Mount the Controller assembly back onto the Light Source.

7.7 Mounting of the Controller assembly

How to mount the Controller assembly?

1. Place the Controller assembly onto the Light Source as illustrated. Use a 3 mm Allen wrench to Tighten the two hex screws (reference 2, Image 7-13).

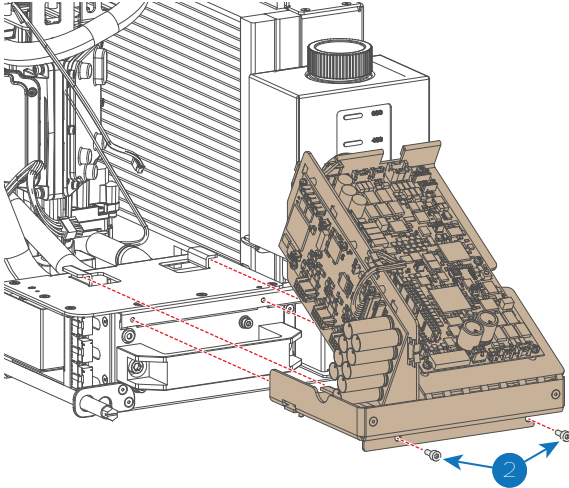


Image 7-13

2. Tighten the 2 set screws on the topside of the Controller assembly (reference 1, Image 7-14).

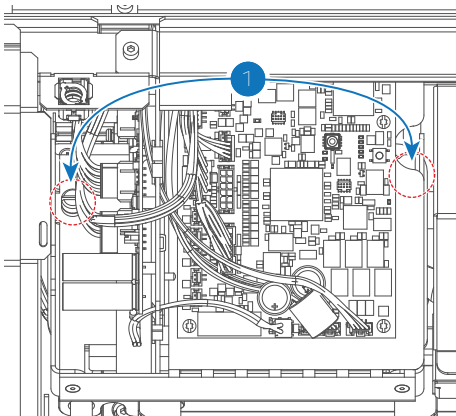


Image 7-14

3. Reconnect the wiring onto the Controller assembly.
4. Place cable binders to hold the light source wiring onto the controller assembly. Do this as illustrated (reference 1, Image 7-15).

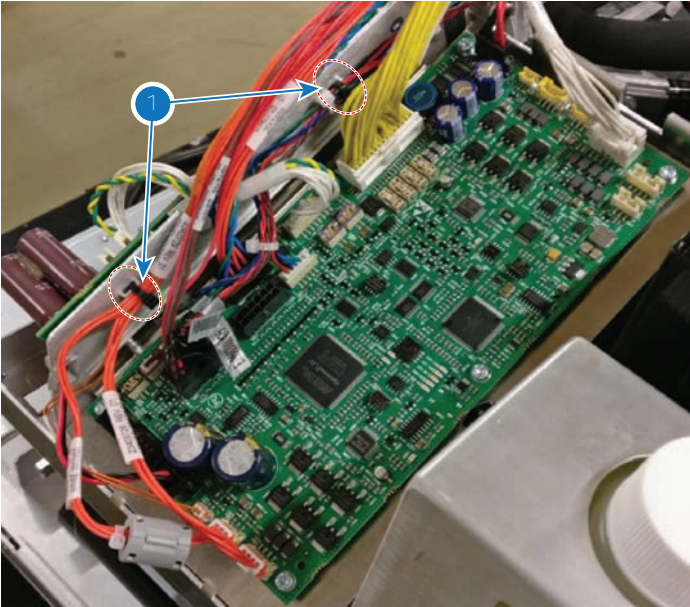


Image 7-15

5. Install the Light Source Cover.

7.8 Installing the Light Source

How to prepare the new Light source assembly

1. Mount the driver cables onto the Light Source LDM interconnection board (reference 1, Image 7-16). Make sure the cables marked “Blue 1”, “Blue 2” and “Blue 3” are mounted in the connector with the same name.

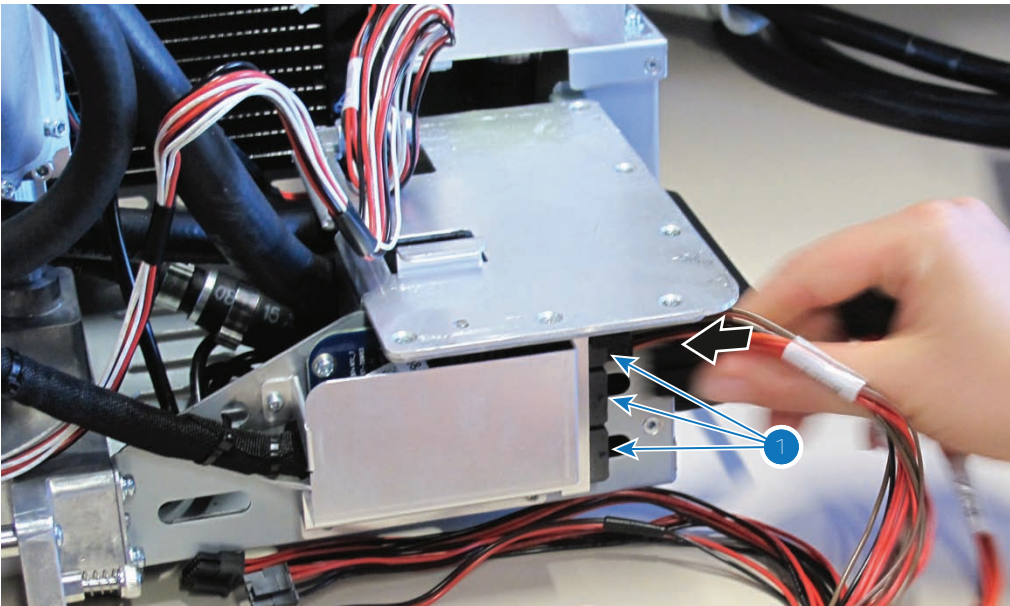


Image 7-16

2. Install the Controller assembly. See “Mounting of the Controller assembly”, page 66.
3. Tie together the LDM driver cables and other data cables with the light source tubing. Do this to make sure none of the cables get crushed or go missing when sliding in the light source.



Tip: Use tie binders or tape that can be easily removed after the light source has been mounted. Do not make it too difficult for yourself to release the cable trees after the light source has been mounted.



Image 7-17

How to install the Light Source assembly?

1. Carefully slide in the Light Source.

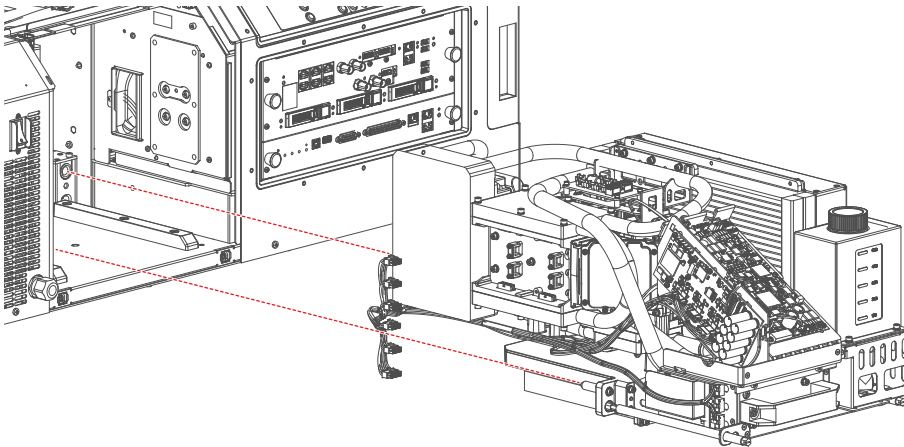


Image 7-18

! *Caution:* Make sure the position pins are correctly mounted into the projector frame.

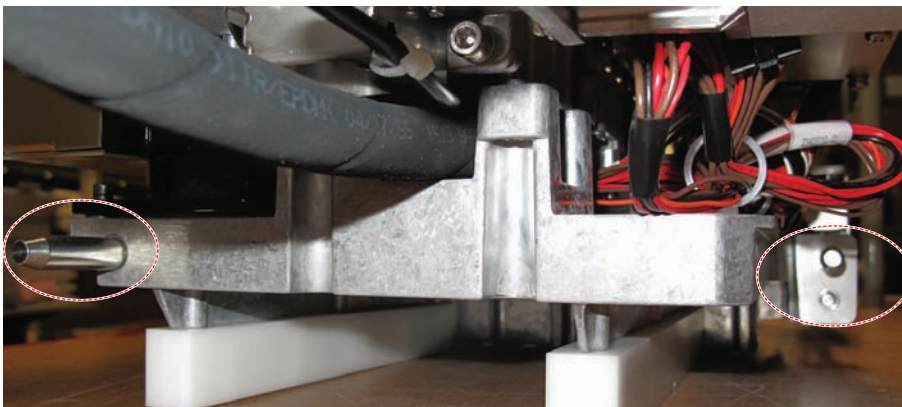


Image 7-19

2. Guide the group of tubing and wiring through the other side of the projector. After that, do the following:
 1. Cut the tie or tape that binds the tubing and other wiring together.
 2. Carefully move the tubing to the left side of the Light source, so that it's not touching either of the two mechanical brackets.
 3. Guide the Driver cables through the hole on the right, to the LDM compartment.

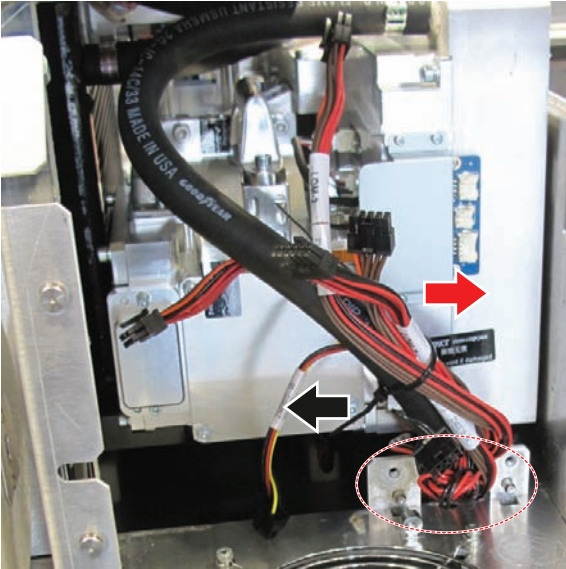


Image 7-20

3. Tighten the set screws, holding the Light Source onto the projector frame (reference 6, Image 7-21). Use a flat screwdriver.

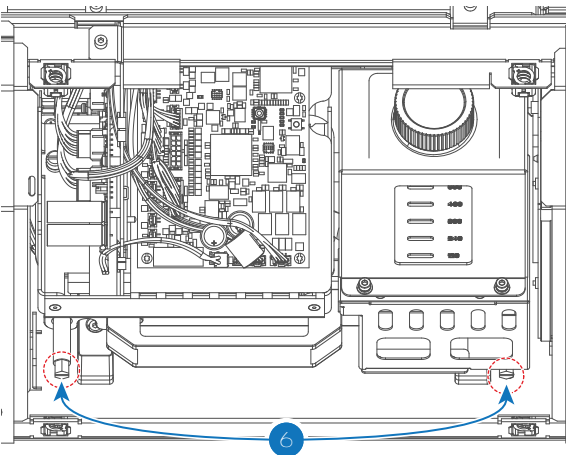


Image 7-21

4. Connect the LDM driver cables (reference 3, Image 7-22) and the data driver control cable (reference 4) from the LDM.

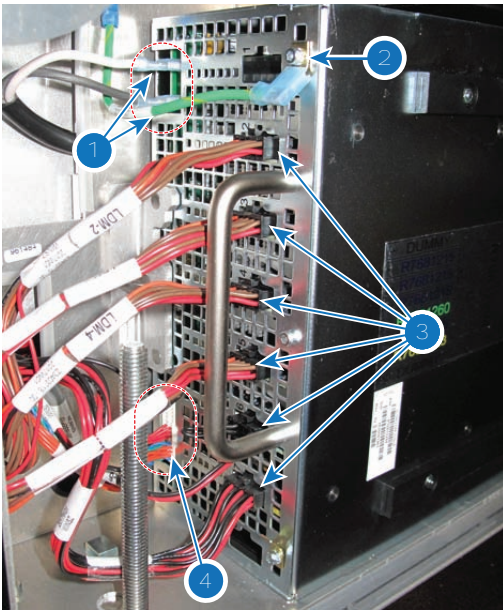


Image 7-22

5. Connect the LCB Control cable connector (reference 5, Image 7-23) with the cable in the LDM space. Once connected, place the connector in the Light Source compartment instead of the LDM compartment.

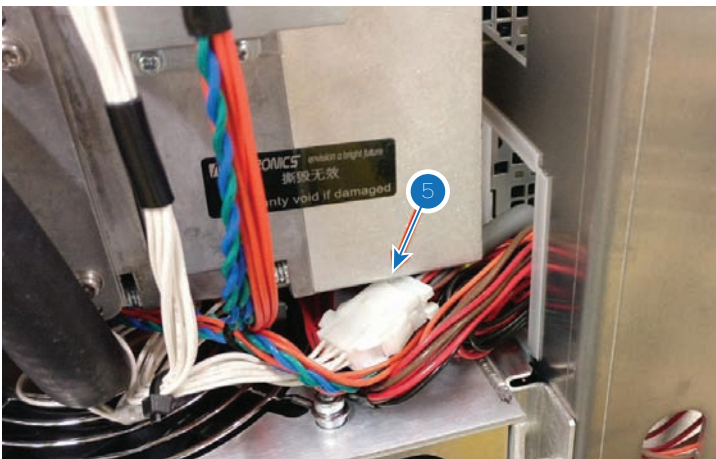


Image 7-23

6. Install the Right Side cover, back cover and Light Source Cover.

7.9 Replacing the Phosphor Wheel Interconnection Board

Required tools

- Phillips screwdriver PH1
- Side cutter

Required parts

- Phosphor Wheel Interconnection Board
- Cable binders

How to replace the Interconnection Board?

1. Remove the Left side cover.

2. Cut the cable ties holding the Light Source wiring to the Interconnection Board cover (reference 1, Image 7-24).

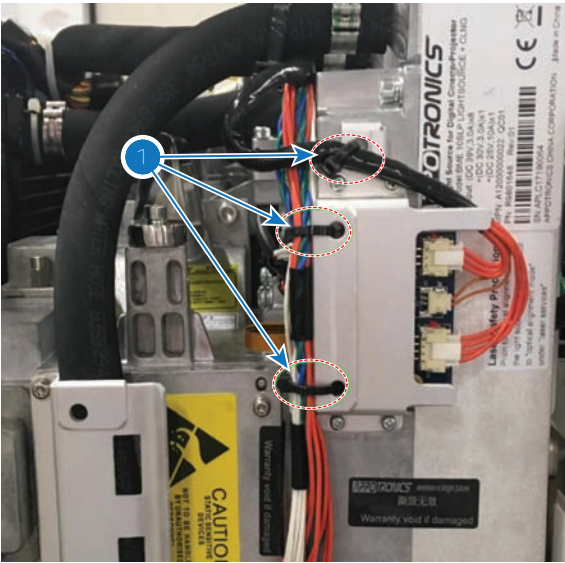


Image 7-24

3. Release the Phosphor Wheel Interconnection Board Cover. Use a PH1 Phillips screwdriver to loosen the 4 screws.

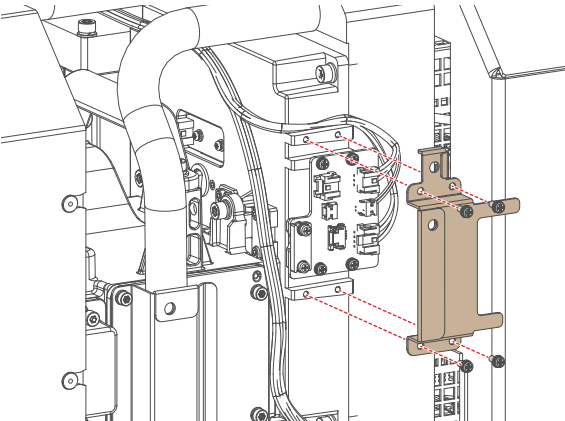


Image 7-25

4. Disconnect all wiring from the Interconnection Board.
5. Replace the Interconnection Board as illustrated. Use a PH1 Phillips screwdriver to loosen and tighten the screws.

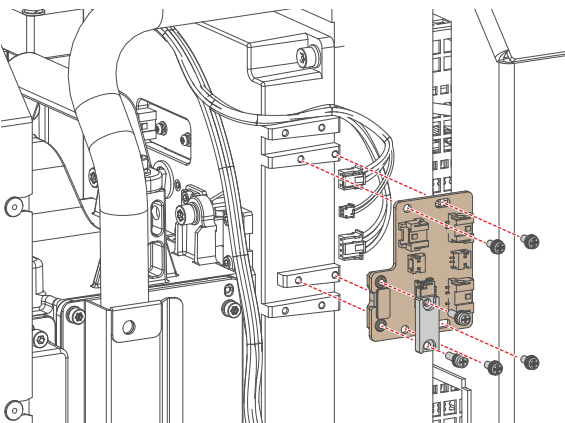


Image 7-26

6. Reconnect all wiring to the Interconnection Board.
7. Place the Interconnection Board Cover over the board and tighten it (see Image 7-25). Use a PH1 Phillips screwdriver.
8. Place new cable binders on the cable trees coming from the light source. Do this as illustrated in Image 7-24.
9. Install the left side cover

7.10 Replacing the Phosphor Wheel Monitoring Interconnection Board

How to replace the interconnection board?

1. Remove the Light Source from the projector frame. See “Removing the Light Source”, page 61.
2. Remove the wire unit connected to the interconnection board.
3. Spot and replace the light sensor Board as illustrated. Use a PH1 Phillips screwdriver to loosen and tighten the 2 screws.

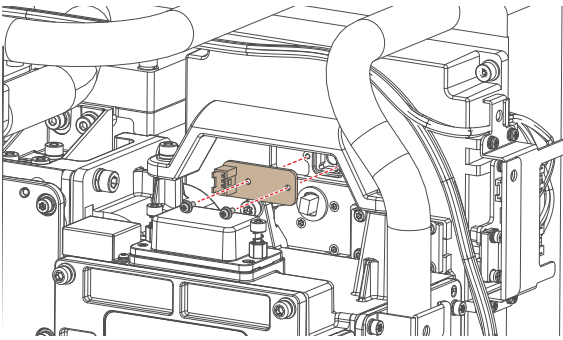


Image 7-27

4. Reconnect the wire unit to the Light Sensor Interconnection board.
5. Install the light source back into the projector. See “Installing the Light Source”, page 67.

7.11 Replacing the Light Source Fan Interconnection Board

Required tools

Allen wrench 2.5 mm

How to replace the interconnection board?

1. Remove the top cover and the Light Source top cover, so you can access the Fan Interconnection Board.
2. Remove the wire units connected to the interconnection board.

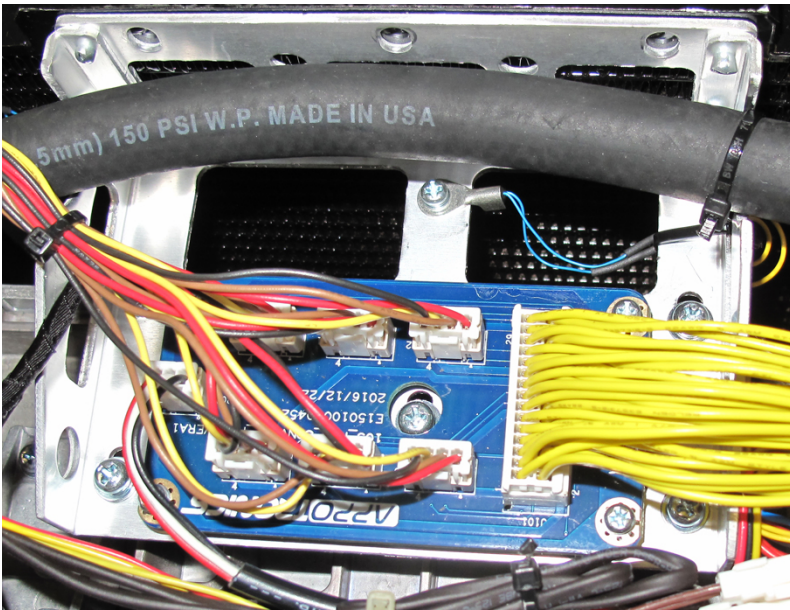


Image 7-28

3. Replace the Fan Interconnection Board as illustrated. Use a 2.5 mm Allen wrench to loosen and tighten the screws.

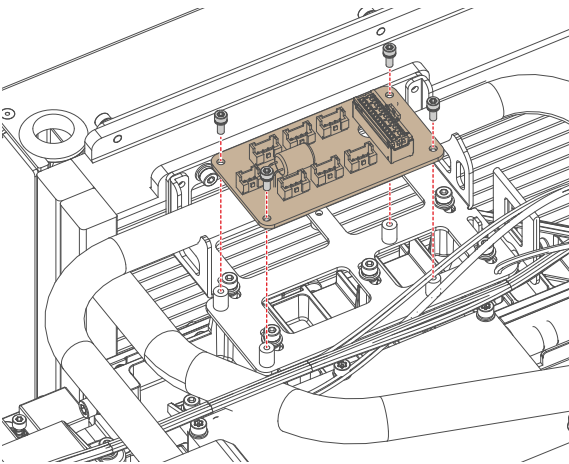


Image 7-29

4. Reconnect all wire units to the Fan Interconnection board as illustrated.

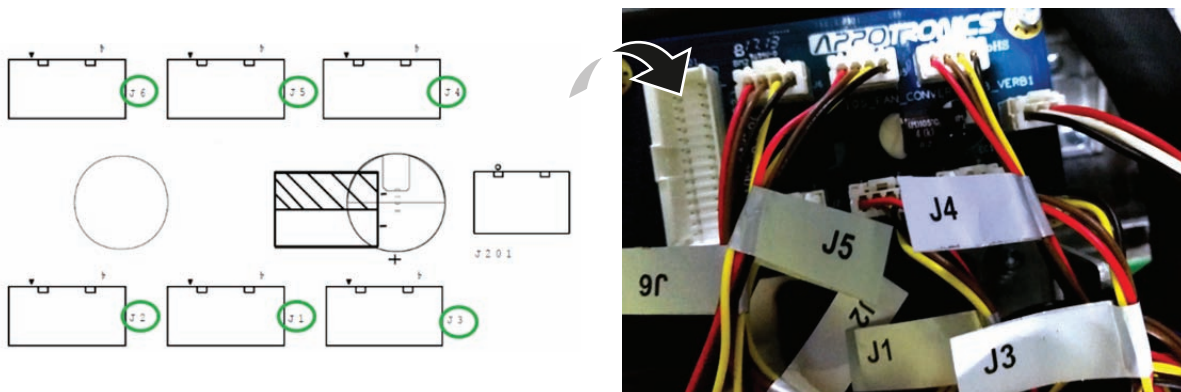


Image 7-30

⚠ Caution: Pay attention to the labels on the fan wires and the fan connector numbers.

5. Install the Light Source top cover and the projector top cover.

7.12 Replacing the Light Sensor Interconnection Board

Required tools

- Allen wrench 1.5 mm
- Phillips screwdriver PH1

How to replace the interconnection board?

1. Remove the Light Source from the projector frame. See “Removing the Light Source”, page 61.
2. Carefully flip the light source, so that the bottom side becomes visible. Focus on the bottom of the Phosphor Wheel.
3. Remove the protective cover over the interconnection board. Use a 1.5 mm Allen wrench to remove the two screws.

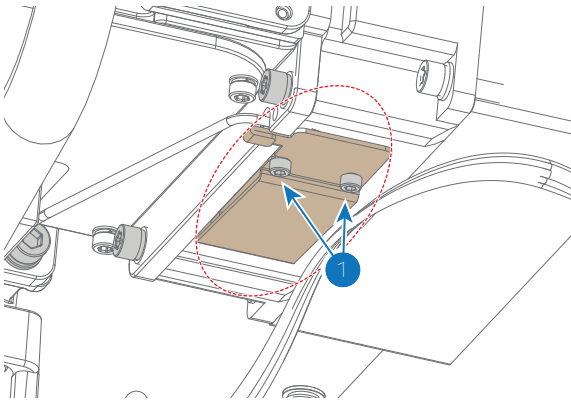


Image 7-31

4. Remove the wire unit connected to the interconnection board.
5. Replace the light sensor Board as illustrated. Use a PH1 Phillips screwdriver to loosen and tighten the screws.

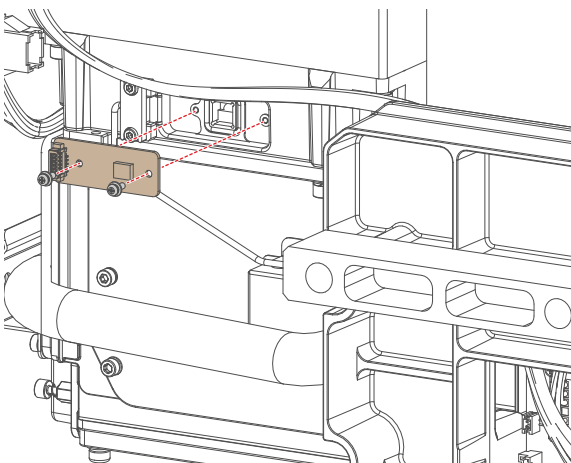


Image 7-32

6. Reconnect the wire unit to the Light Sensor Interconnection board.
7. Place the protective cover back over the interconnection board. Use a 1.5 mm Allen wrench to tighten the two hex screws.
8. Carefully flip the light source back in its original position.

9. Install the light source back into the projector. See “Installing the Light Source”, page 67.

7.13 Replacing the Blue Laser Interconnection Board

How to replace the interconnection board?

1. Remove the Light Source from the projector frame. See “Removing the Light Source”, page 61.
2. Release the protective cover of the Blue Laser interconnection board. Use a PH1 Phillips screwdriver to loosen the 3 screws.

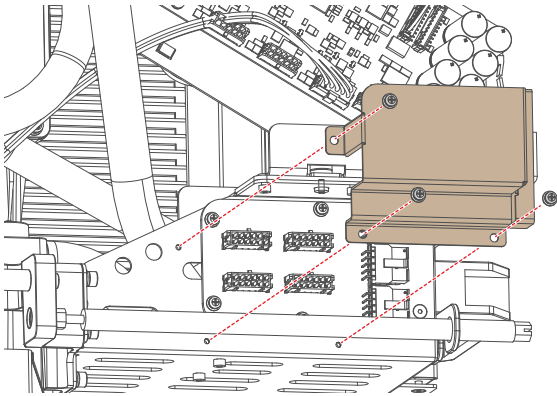


Image 7-33

3. Remove the wire units connected to the interconnection board.
4. Replace the Blue Laser Board as illustrated. Use a PH1 Phillips screwdriver to loosen and tighten the screws.

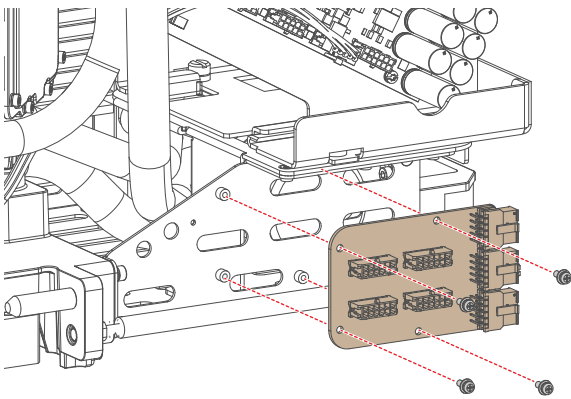


Image 7-34

5. Reconnect the wire unit to the Light Sensor Interconnection board.
6. Place the protective cover back over the Blue Laser Interconnection Board. Use a PH1 Phillips screwdriver to tighten the three screws.
7. Install the light source back into the projector. See “Installing the Light Source”, page 67.

7.14 Replacing a fan from the Light Source

Required tools

- Allen wrench 3 mm
- Phillips screwdriver PH1

- Side cutter

Required parts

- Spare fan
- Tie binders

How to replace a fan from the Light Source assembly?

1. Remove the Light Source from the projector frame. See “Removing the Light Source”, page 61.
2. Remove all fan wire units connected to the interconnection board.

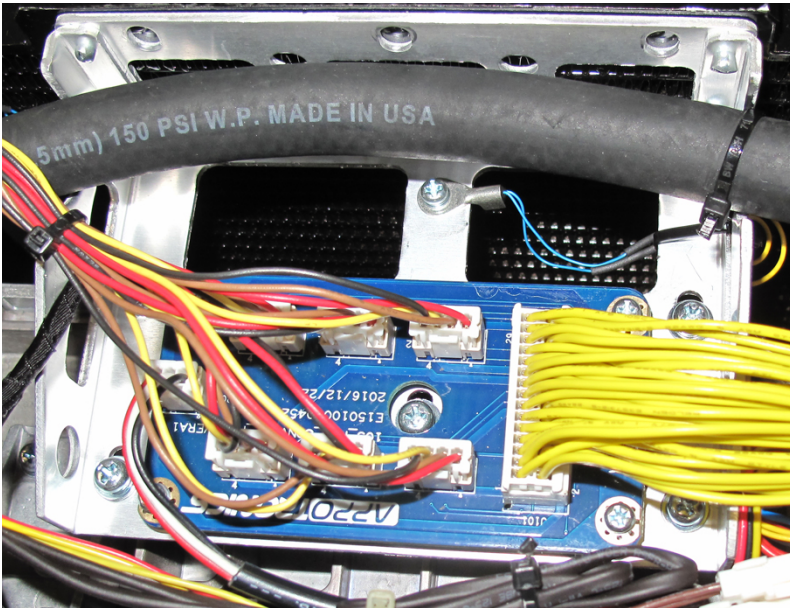


Image 7-35

3. Carefully cut the tie binders holding the fan cable tree to other wire units and tubing.
4. Remove the Fan assembly from the Light Source assembly. Use a 3 mm Allen wrench to loosen all six Allen screws.

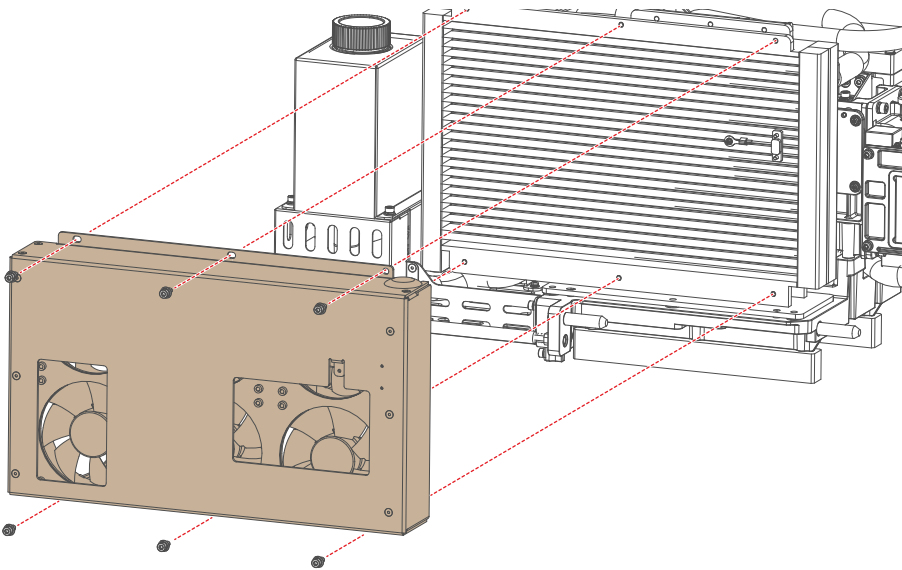


Image 7-36

5. Spot and remove the desired fan from the assembly as illustrated. Use a PH1 Phillips screwdriver to loosen / tighten the 4 screws.

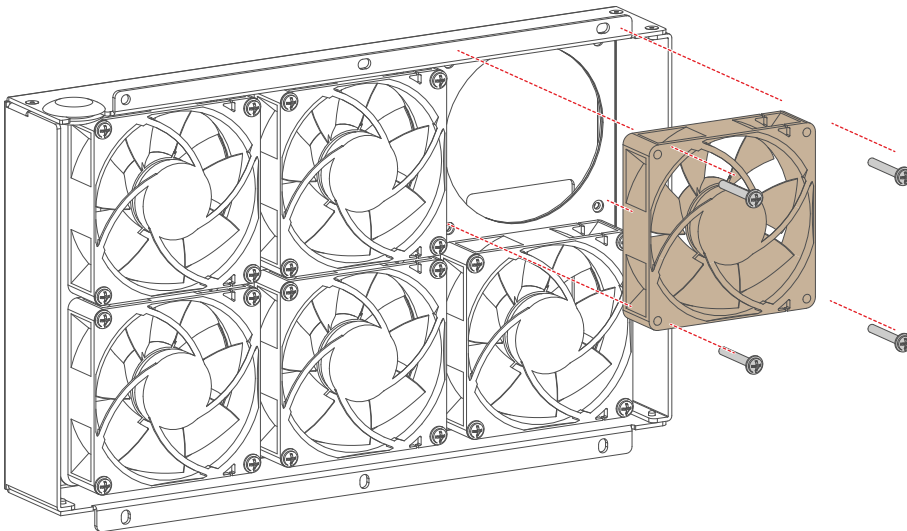


Image 7-37

6. Install the new fan into the fan assembly. Take into account the position of the wire unit and the airflow direction. Use a PH1 Phillips screwdriver to tighten the screws.
7. Place the Fan assembly back onto the Light Source assembly. Use a 3 mm Allen wrench to tighten the six Allen screws.
8. Use tie binders to properly assembly the fan wire units and properly direct them towards the Fan Interconnection board.
9. Reconnect all wire units to the Fan Interconnection board as illustrated.

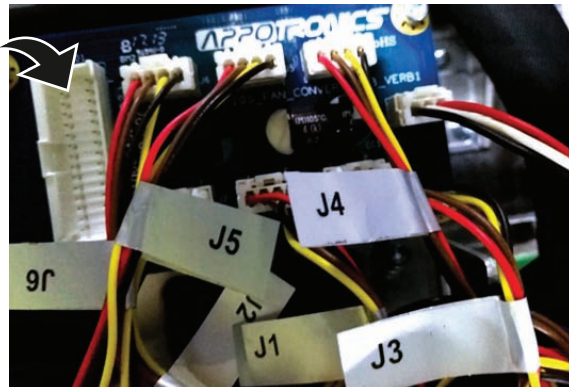
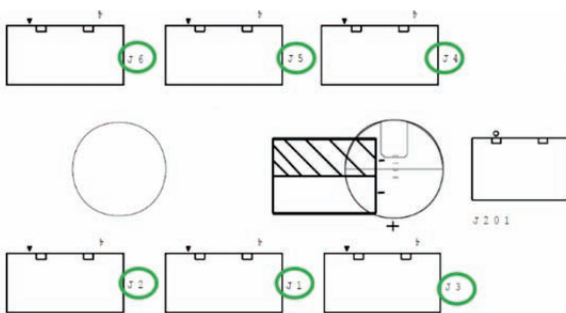


Image 7-38

⚠ Caution: Pay attention to the labels on the fan wires and the fan connector numbers.

10. Install the light source back into the projector. See “Installing the Light Source”, page 67.

7.15 Replacing the combiner of the Light Source



CAUTION: This procedure assumes the light source is already removed from the projector. For more info, see “Removing the Light Source”, page 61.

Required tools

- Allen wrench 1.5 mm
- Allen wrench 4 mm
- Torx screwdriver T20

- Wire cutter

Required parts

Cable ties

How to remove the light source combiner

1. Cut and remove all cable ties holding wiring and tubing to the combiner unit.
2. Remove the connectors from the Phosphor Wheel interconnection board (reference 1, Image 7-39).
3. Push the tubing away from the protective holder of the combiner unit (reference 2).

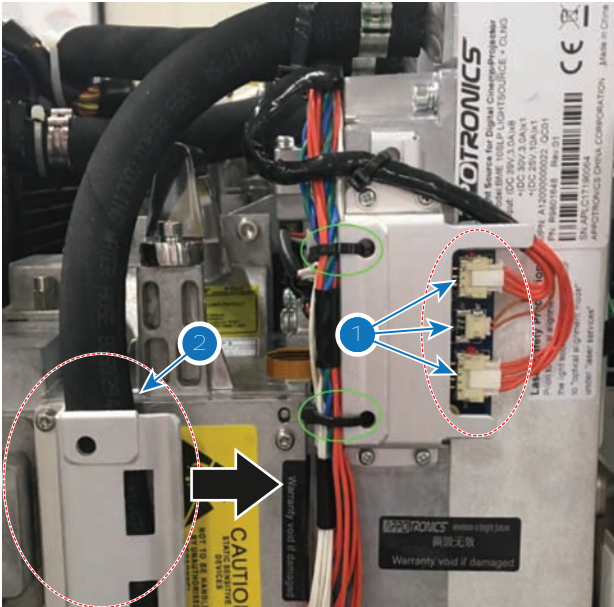


Image 7-39

4. Remove the wiring of the Light Sensor Interconnection board. For more info, see “Replacing the Light Sensor Interconnection Board”, page 74.
5. Remove the connectors of the two safety switches.
6. Remove the screws holding the Combiner to the rest of the light source. These are the following:
 - Four Torx screws holding the combiner to the phosphor wheel (reference 3). Use a T20 Torx screwdriver to loosen these screws.
 - Four hex screws holding the combiner to the rest of the light source unit (reference 4). Use a 4 mm Allen wrench to loosen these screws.

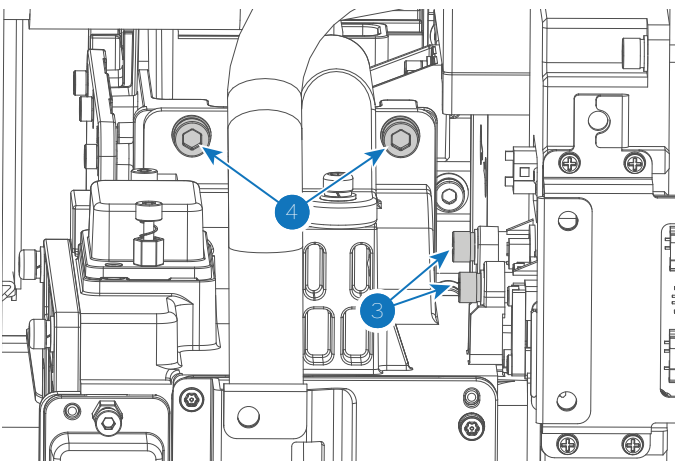


Image 7-40

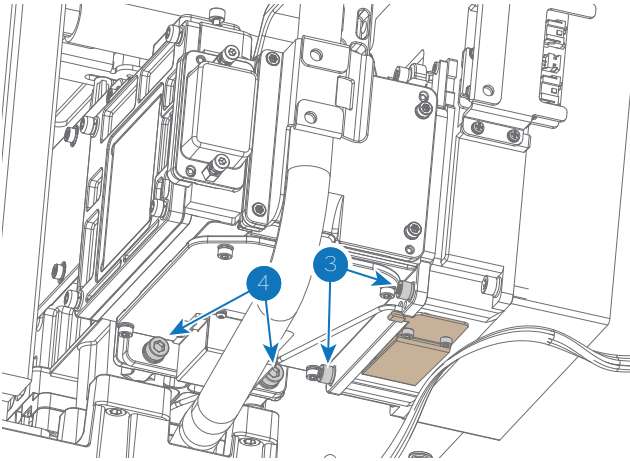


Image 7-41

7. Carefully move away the combiner from the rest of the light source.

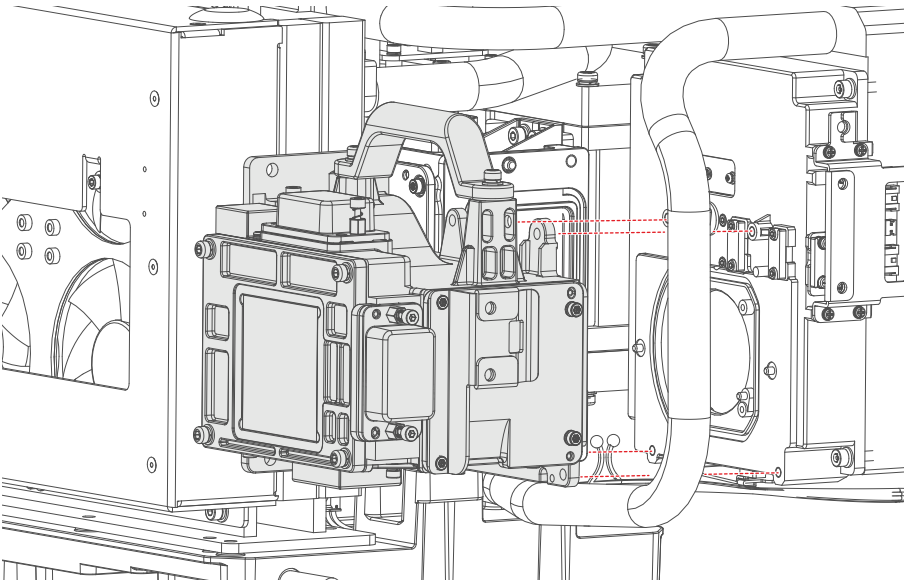


Image 7-42

How to install the new combiner unit

1. Check the status of the O-rings on the light source and the phosphor wheel.
2. Remove the protective covers from the new combiner unit.

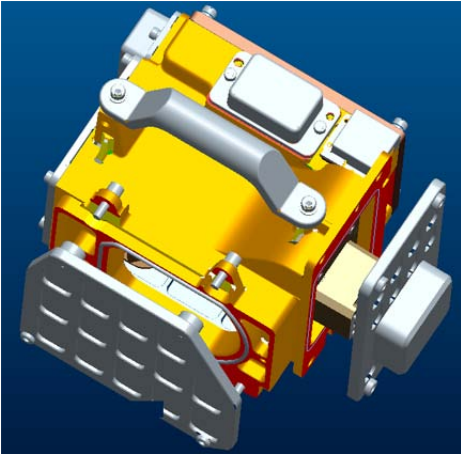


Image 7-43

3. Carefully place the combiner onto the light source. Make sure the O-rings properly fit the openings in the combiner unit.

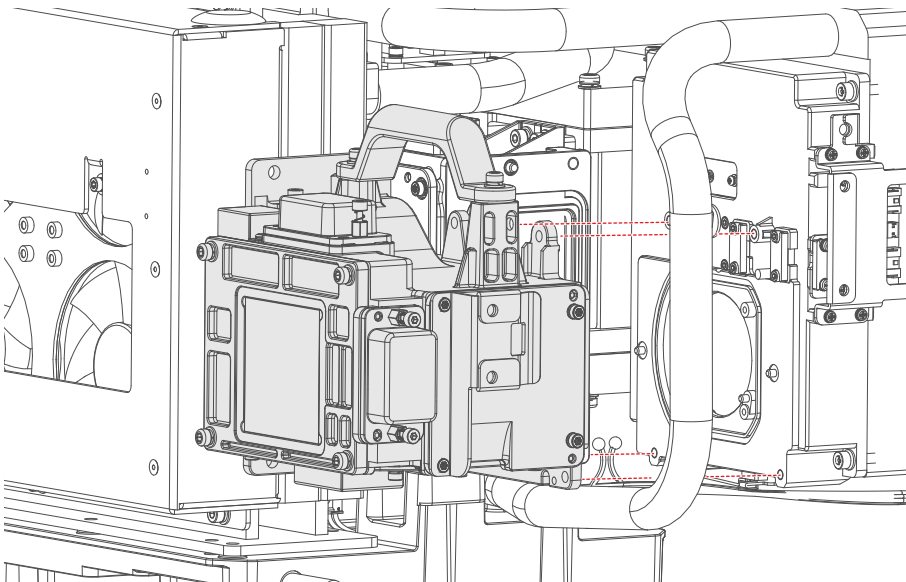


Image 7-44

4. Lock the combiner onto the light source. Use the following screws:
 - Four Torx screws that will lock the combiner to the phosphor wheel (reference 3). Use a T20 Torx screwdriver to tighten these screws.
 - Four hex screws that will lock the combiner to the rest of the light source unit (reference 4). Use a 4 mm Allen wrench to tighten these screws.

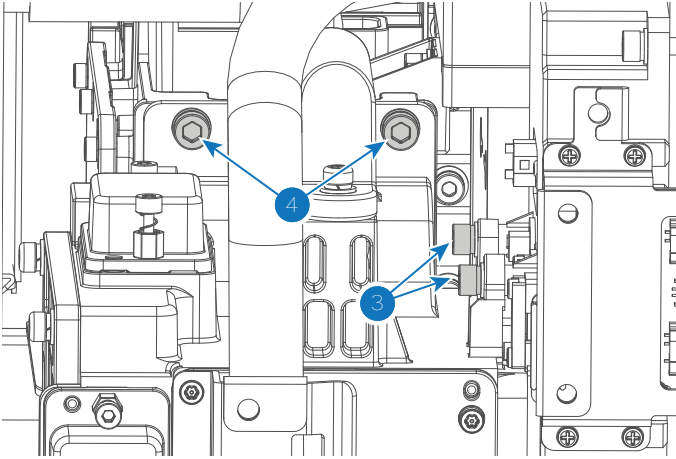


Image 7-45

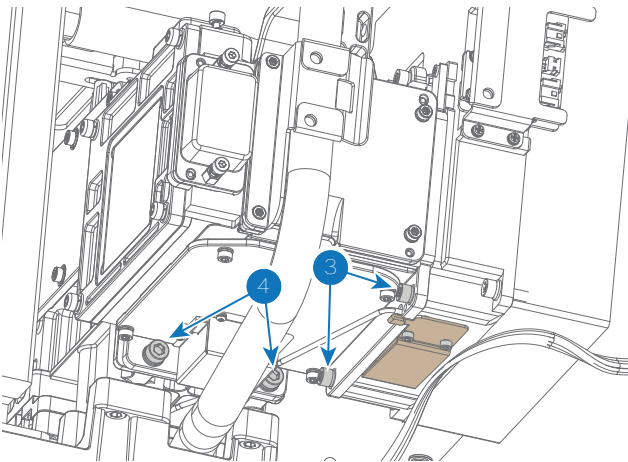


Image 7-46

5. Reconnect the loose wiring to the safety switches.
6. Reconnect the wiring back to the Light Source interconnection board. For more info, see “Replacing the Light Sensor Interconnection Board”, page 74.
7. Place the tubing into the protective holder of the combiner unit (reference 2).

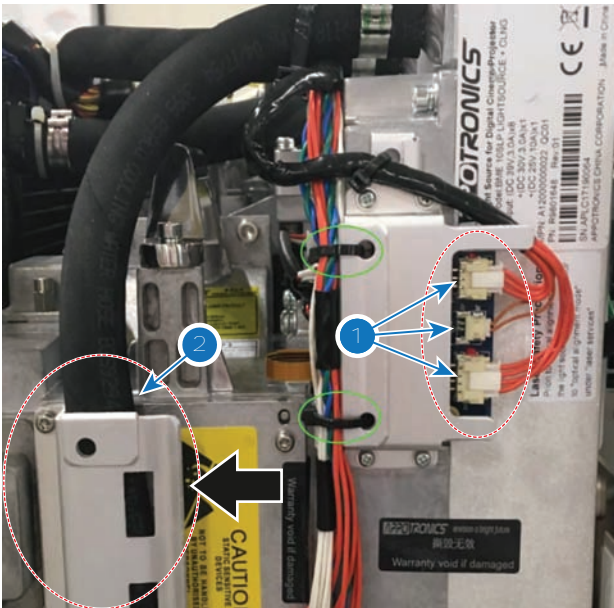


Image 7-47

8. Reconnect all wiring to the Phosphor Wheel interconnection board (reference 1).
9. Use the necessary amount of cable ties to lock the wiring and tubing in its place.

7.16 Replacing the phosphor wheel



CAUTION: You cannot replace the phosphor wheel without also removing the combiner unit. Please first read and complete the combiner unit replacement procedure before attempting this procedure. For more info, see “Replacing the combiner of the Light Source”, page 77.

Required tools

- Allen wrench 4 mm
- Torx screwdriver T20

How to remove the phosphor wheel

1. Remove the combiner unit. See “Replacing the combiner of the Light Source”, page 77.
2. Remove the four hex screws, holding the phosphor wheel onto the rest of the light source. Use a 4 mm Allen wrench.

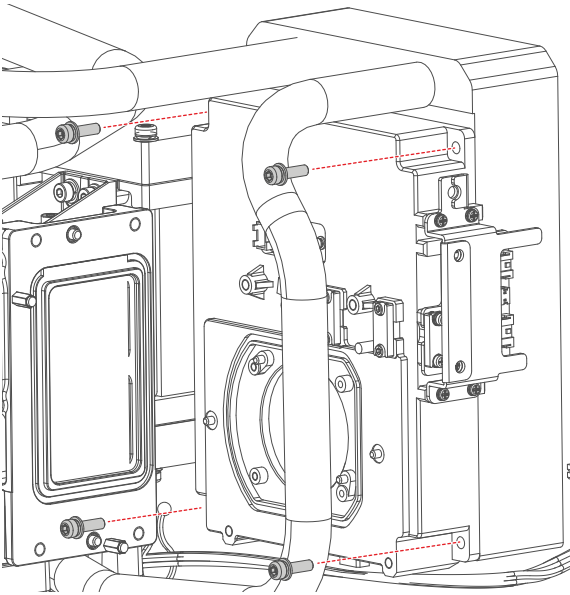


Image 7-48

3. Remove the old phosphor wheel as illustrated.

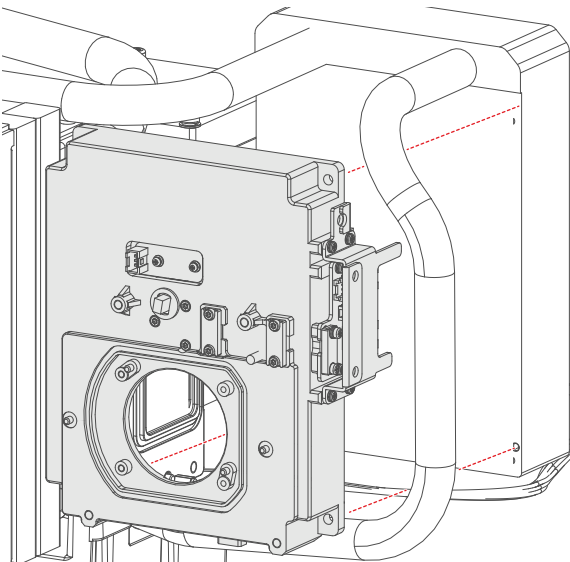


Image 7-49

4. Carefully remove the protective covers from the new phosphor wheel. Use a T20 Torx screwdriver to loosen the screws of the protective covers.

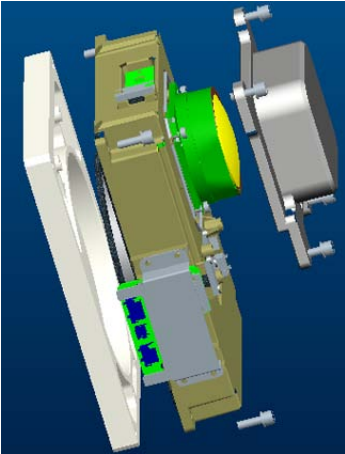


Image 7-50

5. Check the status of the O-rings of the new phosphor wheel.
6. Carefully mount the new phosphor wheel onto the rest of the light source as illustrated (refImage 7-49). Use a 4 mm Allen wrench to tighten the four screws.
7. Mount the combiner unit onto the new phosphor wheel. See “Replacing the combiner of the Light Source”, page 77.

7.17 Replacement of the Anode Fan



To replace the Anode Fan, the projector top cover and top cover plate must be removed first. This procedure assumes these covers are already removed.

Required tools

- 2.5mm Allen wrench.
- 3mm Allen wrench.

How to replace the Anode Fan?

1. Disconnect the wire of the Anode Fan (reference 1 Image 7-51) and remove the wire from the wire clamp (reference 2 Image 7-51).
2. Remove the Convergence flex cable from the cable clamp (reference 3 Image 7-51) which is attached to the Anode Fan assembly.

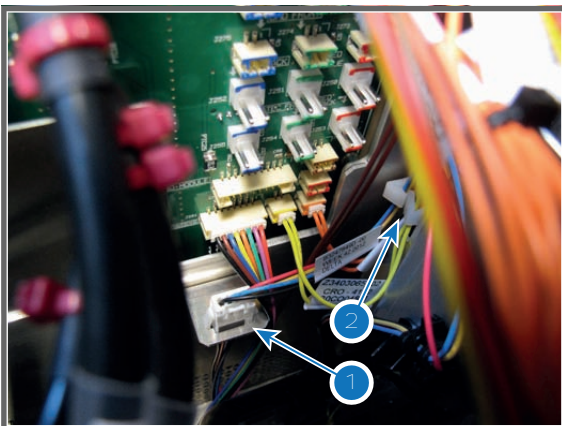
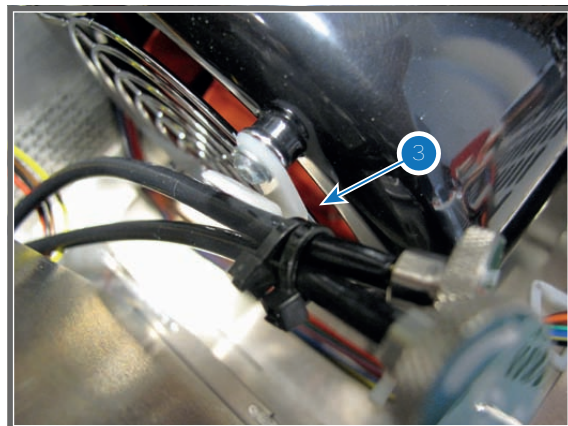


Image 7-51



3. Remove the two fixation screws at the top of the Anode Fan assembly (reference 4 Image 7-52). Use a 3mm Allen wrench.
4. Gently remove the Anode Fan assembly out of the Light Processor compartment.

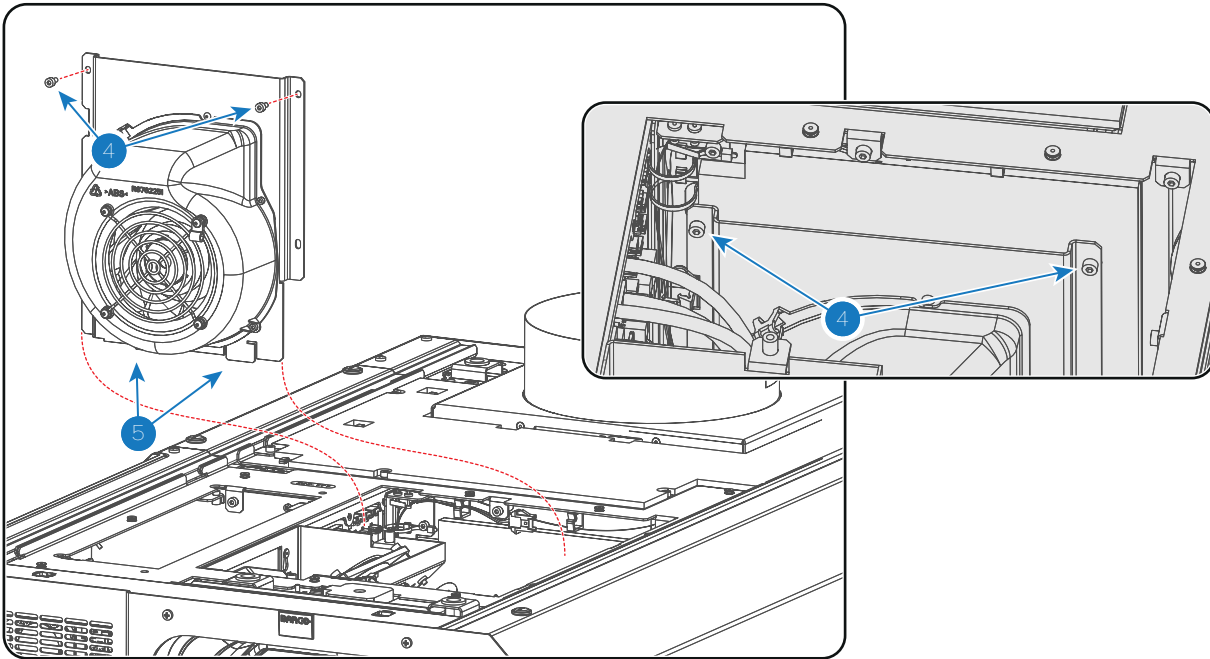


Image 7-52

5. Remove the cover of the Anode Fan by loosening the four screws (reference 6 Image 7-53) as illustrated. Use a 2.5mm Allen wrench.
6. Remove the mounting plate from the Anode Fan by loosening the four screws (reference 7 Image 7-53) as illustrated. Use a 3mm Allen wrench.

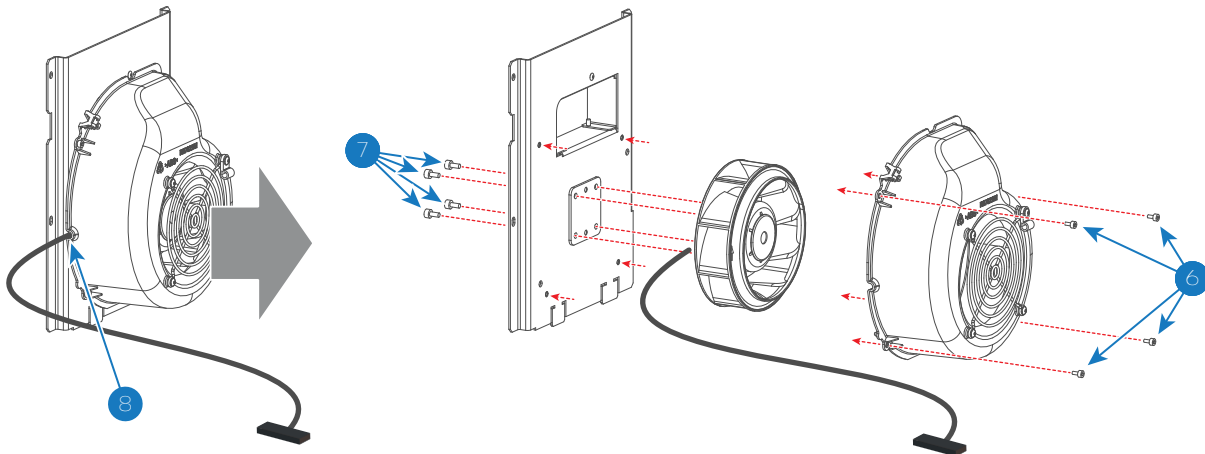




Image 7-53

7. Install a new Anode Fan onto the mounting plate. Fasten the Anode Fan with four screws (reference 7 Image 7-53). Use a 3mm Allen wrench.
 -  **Note:** Ensure that the wire of the Anode Fan is oriented as illustrated. So, it will match with the cut out in the cover (reference 8 Image 7-53)
8. Install the cover of the Anode Fan. Fasten the cover with four screws (reference 6 Image 7-53). Use a 2.5mm Allen wrench.
 -  **Note:** Ensure that the wire of the Anode Fan fits in the cut out of the cover (reference 8 Image 7-53)

9. Install the Anode Fan assembly into the projector. Ensure that both teeth (reference 5 Image 7-52) at the bottom of the Anode Fan assembly are engaged in the foreseen slots in the projector chassis.



Caution: Take care that no electrical wires get pinched between the Anode Fan assembly and the projector chassis.

10. Secure the Anode Fan assembly with two screws (reference 4 Image 7-52). Use a 3mm Allen wrench.

11. Reconnect the wire of the Anode Fan (reference 1 Image 7-51) and guide the wire into the wire clamp (reference 2 Image 7-51).

12. Insert the convergence flex cable into the cable clamp (reference 3 Image 7-51) which is attached to the Anode Fan assembly.



Note: One flex cable is engaged into the cable clamp, while the other is retained by the cable tie which should be located between knob and cable clamp.

13. Install the top cover plate of the Light Processor compartment and the projector top cover.

7.18 Replacement of the Cathode Fan



To replace the Cathode Fan the Light Source has to be removed first. This procedure assumes that Light Source is already removed.

Required tools

- Allen wrench 2.5 mm
- Allen wrench 3 mm

How to replace the Cathode Fan?

1. Remove the two fixation screws at the top of the Cathode Fan assembly (reference 1 Image 7-54). Use a 3 mm Allen wrench.
2. Gently remove the Cathode Fan assembly from the projector chassis.



Note: The Cathode Fan assembly is still connected with its wire.

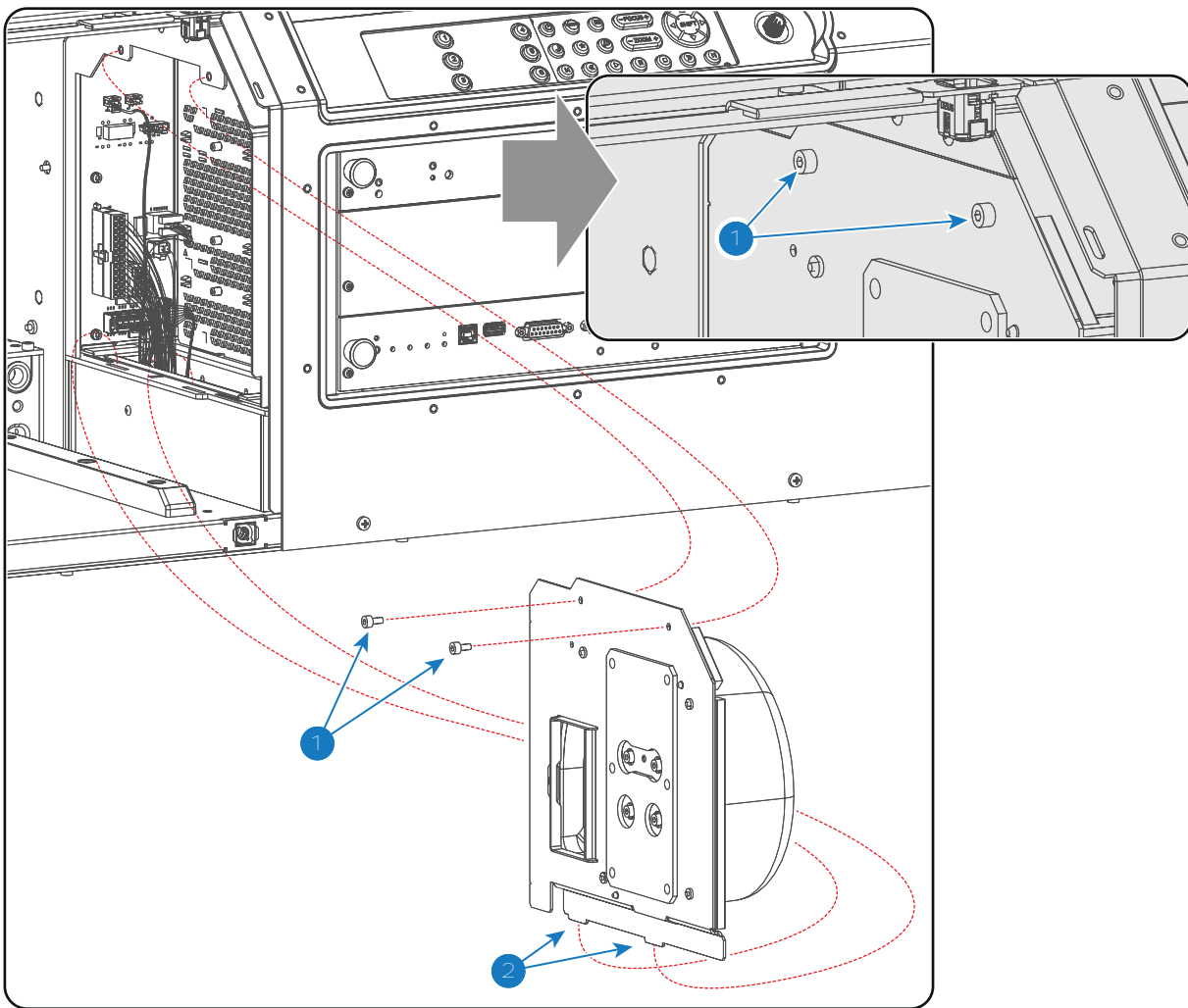


Image 7-54

3. Disconnected the wire of the Cathode Fan (reference 3 Image 7-55).

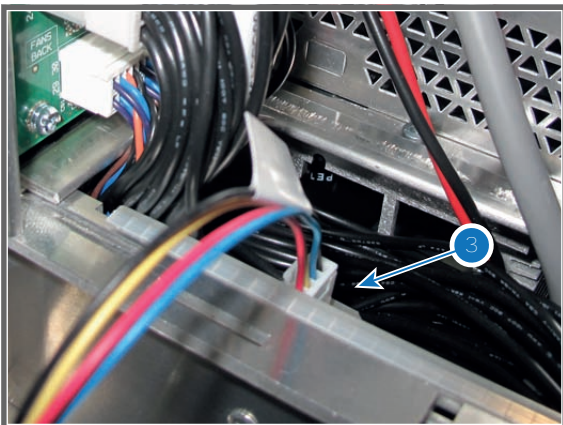



Image 7-55

4. Remove the cover of the Cathode Fan by loosening the four screws (reference 4 Image 7-56) as illustrated. Use a 2.5mm Allen wrench.
5. Remove the mounting plate from the Cathode Fan by loosening the four screws (reference 5 Image 7-56) as illustrated. Use a 3mm Allen wrench.
6. Install a new Cathode Fan on the mounting plate. Fasten the Cathode Fan with four screws (reference 5 Image 7-56). Use a 3mm Allen wrench.

 **Note:** Ensure that the wire of the Cathode Fan is oriented as illustrated to match it with the cut out in the cover. (reference 6 Image 7-56)

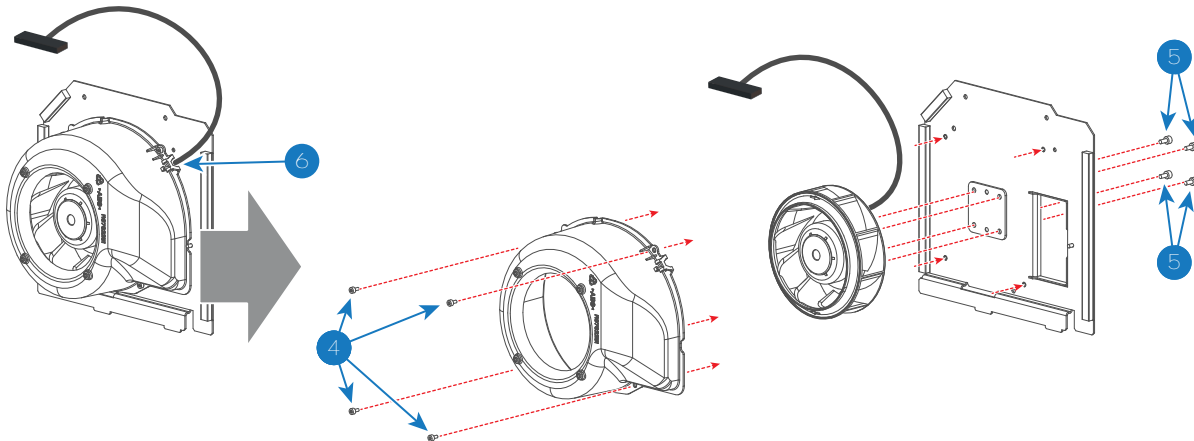


Image 7-56

7. Install the cover of the Cathode Fan. Fasten the cover with four screws (reference 4 Image 7-56). Use a 2.5 mm Allen wrench.

 **Note:** Ensure that the wire of the Cathode Fan fits in the cut out of the cover (reference 6 Image 7-56)

8. Reconnect the wire of the Cathode Fan (reference 3 Image 7-55).
9. Install the Cathode Fan assembly in the projector. Ensure that both teeth (reference 2 Image 7-54) at the bottom of the Cathode Fan assembly are engaged in the foreseen slots in the projector chassis.
10. Secure the Cathode Fan assembly with two screws (reference 1 Image 7-54). Use a 3 mm Allen wrench.

7.19 Replacement of the Cold Mirror fan



To access the Cold Mirror fan assembly the projector left cover has to be removed. This procedure assumes that the projector left cover is already removed.

Required tools

2.5mm Allen wrench

How to replace the Cold Mirror fan?

1. Remove the two fixation screws (reference 1 Image 7-57) of the Cold Mirror fan assembly. Use a 2.5mm Allen wrench.
2. Pull the Cold Mirror fan assembly a few centimeters out of its compartment.
3. Disconnect the wire (reference 2 Image 7-57) of the Cold Mirror fan.
4. Remove the Cold Mirror fan assembly completely from the projector.

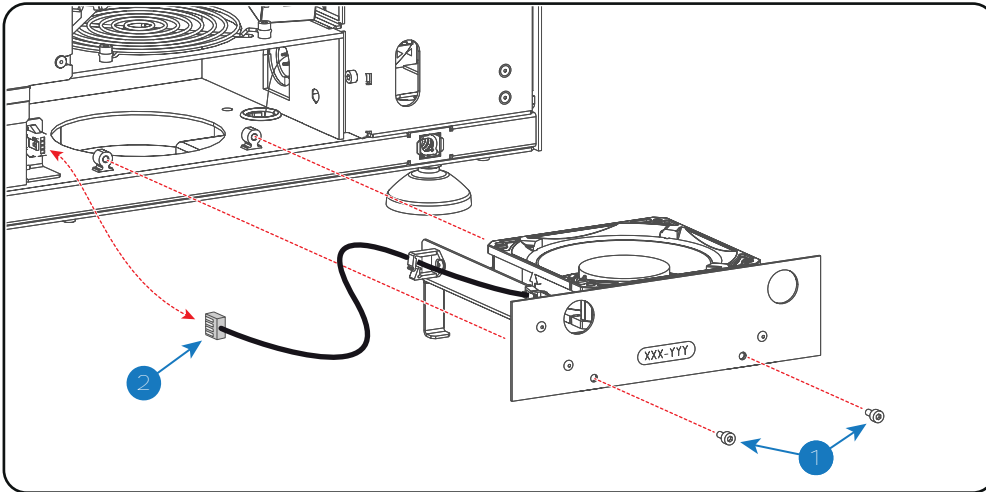


Image 7-57

5. Remove the Cold Mirror fan from the mounting plate. Use a 2.5mm Allen wrench to Loosen the four screws (reference 3 Image 7-58).
6. Install a new Cold Mirror fan onto the mounting plate and guide the wire through the two cable clamps.

! *Caution:* Ensure that the airflow of the fan is upwards oriented.

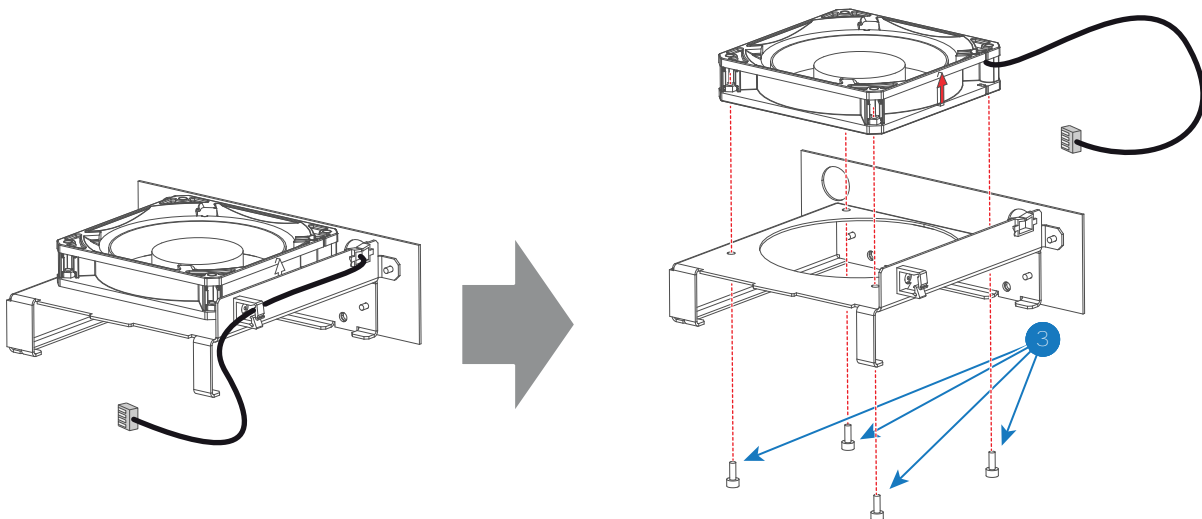


Image 7-58

7. Place the Cold Mirror fan assembly halfway in its compartment.
8. Connect the wire (reference 2 Image 7-57) of the Cold Mirror fan.
9. Insert the Cold Mirror fan assembly completely in its compartment.
10. Fixate the Cold Mirror fan assembly with two screws (reference 1 Image 7-57). Use a 2.5mm Allen wrench.

Liquid cooling circuit

8

About this chapter

This chapter describes how to maintain the liquid cooling circuit of the projector.



WARNING: All actions performed on the Liquid Cooling Circuit should occur in normal ambient conditions (approximately 25 °C). The projector should have sufficiently cooled down (minimum 2 hours).



WARNING: Hazardous product: Blue antifreeze diluted 1,2 ethanediol (1/3 ethanediol – 2/3 Demi water).
Not for household use. Keep out of reach of children. Harmful by oral intake. Avoid exposure to pregnant women. Avoid contact with eyes, skin and clothing. Avoid inhalation of the noxious fumes.



WARNING: Only use Barco approved cooling liquid to refill the liquid cooling circuit of the projector. Neglecting this may lead to irreversible damage of the projector.

Handling the cooling liquid

- Avoid contact of the liquid with Eyes, Skin and Clothing.
- Avoid inhaling of the 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 (Butylrubber, PVC....) and Goggles.
- Wear suitable protection clothing.

Overview

- Check cooling liquid level & cooling integrity
- Cooling liquid refill

8.1 Check cooling liquid level & cooling integrity

What should be done ?

The Light Source is liquid cooled. Running with a low liquid cooling level may damage the cooling circulation pump. Moreover, the cooling capacity may be strongly reduced which can result in higher temperatures inside the projector. These higher temperatures may cause an interruption of your film projection as the light source can be switched off by the software as a precaution.

To avoid this problem, we strongly advise to check the cooling liquid level at least once every 12 months.



WARNING: Due to the closed system, the cooling liquid level should not decrease, or only decrease in small amounts over time. Dramatic loss of cooling liquid may indicate a potential leakage in the system. Check the light source compartment on both the front and back ends of the light source for visual signs of leakage (dried cooling liquid turns into a crystallized white powder). Since servicing of the light source cooling system is not supported, if a leakage occurs, the cooling pump is damaged or similar damage occurs to the cooling system, the entire light source will need to be replaced.

How to check the liquid level?

1. Remove the side cover on the light processor side, "Removal and installation of the projector covers", page 271.
2. Look through at the cooling reservoir on the light source and check the liquid cooling level in the light source.

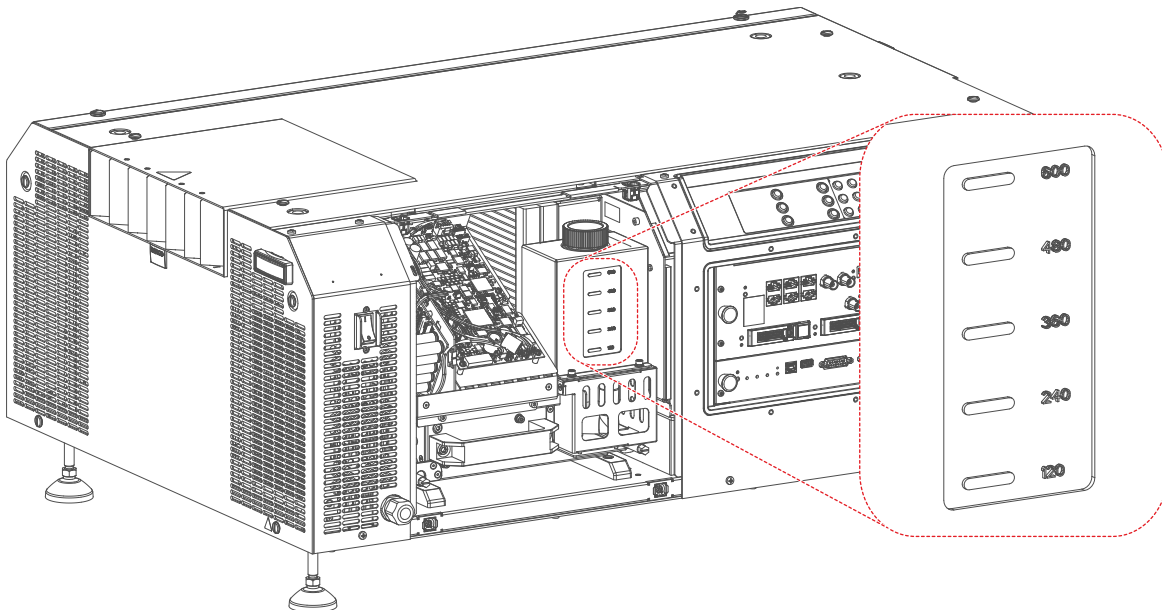


Image 8-1: Cooling liquid check

If the current liquid cooling level is somewhere between **120** and **600**, then no action should be taken.

If the current liquid cooling level is lower than **120**, start the refill procedure.

8.2 Cooling liquid refill



WARNING: This procedure may only be performed by qualified technical service personnel.



CAUTION: Be careful when refilling the reservoir. Make sure not to spill any cooling liquid on the control boards located next to the reservoir. If any liquid is spilled, make sure to clean it up immediately by using a dry cloth.

Required parts

- Cooling liquid provided by Barco
- A clean funnel
- Dry cloth

How to refill

1. Remove all side covers and back cover.
2. Loosen the set screws, holding the Light Source onto the projector frame (reference 1, Image 8-2). Use a flat screwdriver to loosen the screws.

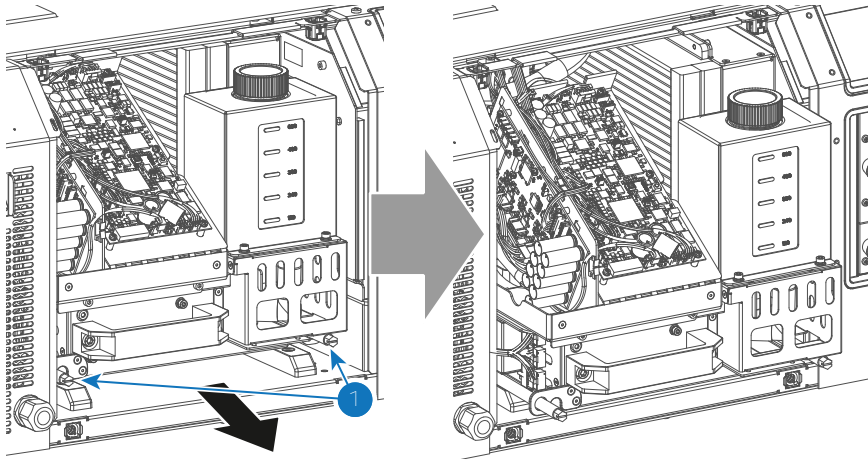


Image 8-2

3. Carefully remove the light source until the reservoir cap is fully accessible.



Caution: Make sure the LDM wiring does not get damaged by removing the light source. Take a look at the wiring on the backside of the light source while removing the light source. If the wiring gets too tight, remove the LDM wiring.

4. Open filler cap by turning it anti clockwise.

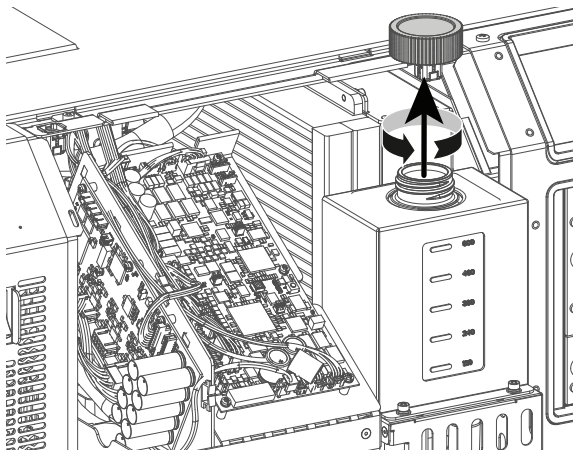


Image 8-3

5. Place a clean funnel in the reservoir.
6. Fill the reservoir with cooling liquid until the level is equal with the **600** indication on the reservoir.
7. Remove the funnel and close the reservoir. Turn the filler cap clockwise to close the reservoir.
8. Push the light source back inwards and tighten the two set screws.
9. If removed, reinstall all LDM wiring again.

Liquid cooling circuit

10. Reinstall all covers.

Light Processor

9

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. The convergence adjustment procedure and the service information about the Integration Rod is grouped in a separate chapters in this manual, see chapter “Convergence”, page 157, and “Integration Rod”, page 139.



WARNING: The procedures below may only be performed by Barco trained and qualified technicians.



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.



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.

Overview

- Introduction Light Processor
- Diagnostic
- Light Processor replacement process
- Removing the Light Processor
- Installing the Light Processor
- Cleaning the Prism exit side
- Replacement of the fan of the Light Processor compartment
- Replacement of the fan of the Red channel
- Replacement of the fan of the Green channel
- Replacement of the fan of the Blue channel
- Authorization to clear security warning on the projector

9.1 Introduction Light Processor

Light Processor

The Light Processor is the heart of the projector. The prism of the Light Processor splits homogeneous white light coming from the Light Pipe into red, green and blue light. The video information on the three DMD's is converted to 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 lens onto the screen.

Each DMD has its own formatting board (satellite board) which drives the micro mirrors to convert the video signal into the light beam. Heat is produced during the integration of the video information. To protect the DMD's from overheating the Light Processor is cooled by several fans and four temperature sensors. Each channel is equipped with its own dedicated fan, heatsink and temperature sensor to protect the Light Processor for overheating.

Both the blue and the green channel DMD are equipped with three convergence adjustment knobs each. The red channel DMD is fixed and serves as the reference channel for convergence alignment. Two of the three adjustment knobs per channel (red/green) are extended for easier access.

All critical air-gaps are sealed. The DMD are also sealed.

At the bottom of the prism exit a "touch" sensor is mounted to protect the prism against accidental lens movements.

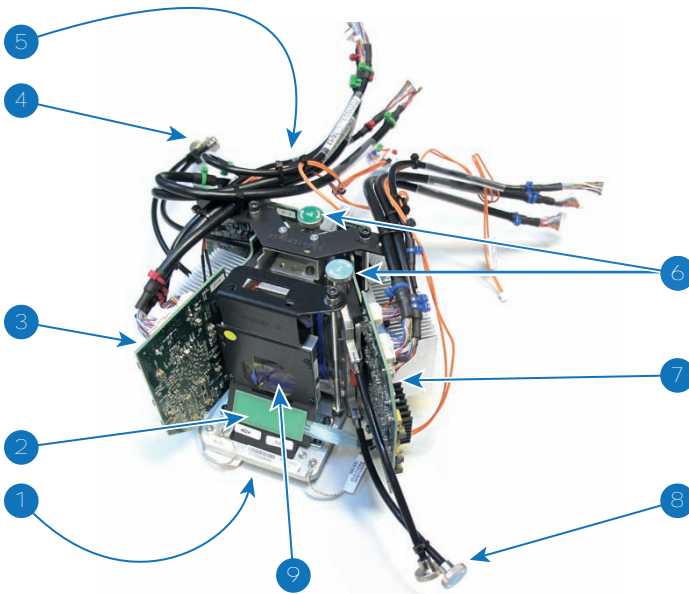


Image 9-1

- | | | | |
|---|--------------------------------|---|--------------------------------|
| 1 | Prism entrance. | 6 | Convergence adjustment knobs . |
| 2 | Prism sensor. | 7 | Satellite board Blue channel. |
| 3 | Satellite board Red channel. | 8 | Convergence adjustment knobs . |
| 4 | Convergence adjustment knobs . | 9 | Prism exit. |
| 5 | Satellite board Green channel. | | |



CAUTION: Misalignment of the light path can rapidly damage the sealing between the prism and DMD.

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 Light Processor replacement process

Process overview:

1. Remove the malfunction Light Processor. See detailed procedure “Removing the Light Processor”, page 97.
2. Install the new Light Processor. See detailed procedure “Installing the Light Processor”, page 100.
3. Obtain serial number of the installed Light Processor. See included procedure on page 152.
4. Check on the secured Barco website if a LUT-SCC file exists for the installed Light Processor serial.
 - a) If file exists:
 - Download the Light Processor specific LUT-SCC file from the secured Barco website. See included procedure on page 153.
 - Upload the LUT-SCC file into the projector file system. (e.g. 1110351581.LUT-SCC). See included procedure on page 155.
 - Activate the LUT-SCC file. See included procedure on page 156.
 - b) If file does NOT exist: activate the default LUT-SCC file which is already installed on the ICP board.
 - For 2K projectors use the default LUT-SCC file: “ones2K_LE”
 - For 4K projectors use the default LUT-SCC file: “ones4K_LE”
5. Backup projector files (including the LUT-SCC file). See Communicator User Guide chapter “Installation” where 'cloning' is explained.

9.4 Removing the Light Processor



WARNING: Disconnect the power cord from the projector and wait a few minutes (to discharge the capacitors) prior to start with this procedure.



To remove the Light Processor from the projector the lens, the top cover, left side cover, top cover plate and side cover plate have to be removed first. This procedure assumes that the lens and covers are already been removed.



CAUTION: Ensure that the lens is removed from the projector prior to remove the Light Processor.

Required tools

- 7mm flat screwdriver.
- 3mm Allen wrench.

How to remove the Light Processor from the projector?

1. Remove top fan of the Light Processor and place it on top of the Card Cage. No need to disconnect the wire of the fan. See Image 9-2.

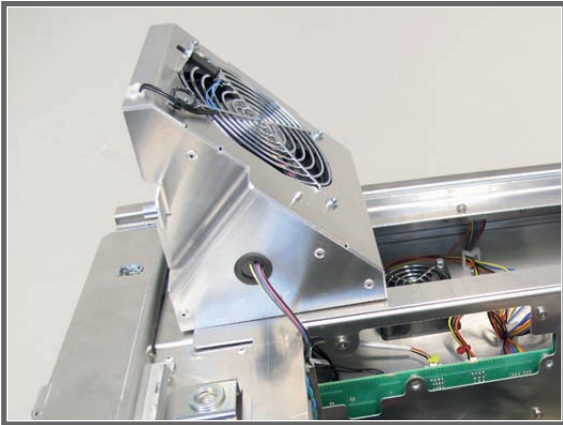


Image 9-2

2. Disengage the Convergence flex cables from the cable clamp on the Anode Fan assembly (green channel, reference 1 Image 9-3) and the cable clamp on the projector chassis (blue channel, reference 2 Image 9-3).

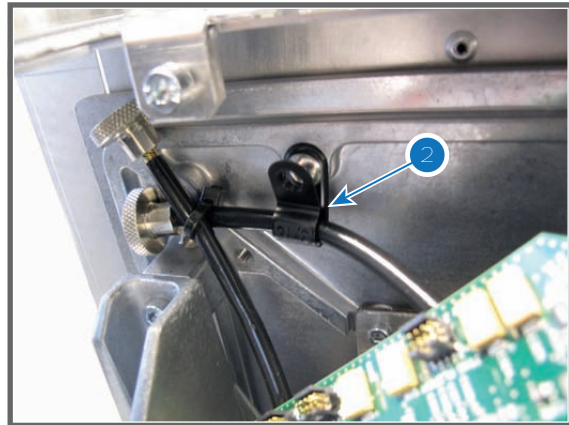
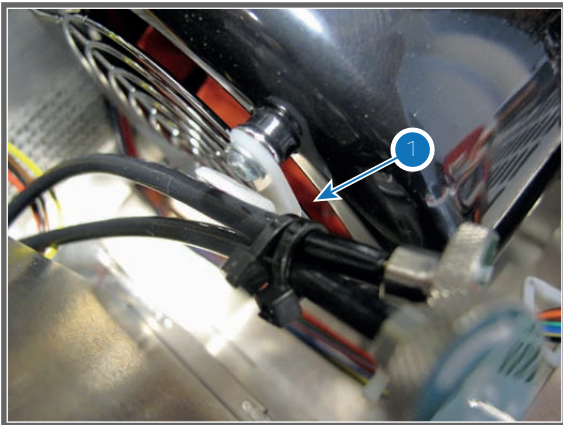


Image 9-3

3. Disconnect the nine RGB connectors (reference 3 Image 9-4) from the Signal Distribution board. Push the little tab (reference 4 Image 9-4) down with your fingernail and then pull the connector gently out of its socket. The connector should come out easily from its socket.

Caution: Always push-in the little tab of the connector to remove the connector from its socket. Neglecting this will result in irreversible damage of the socket.

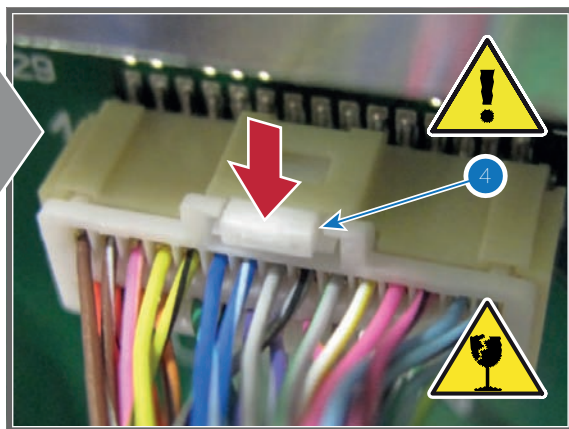
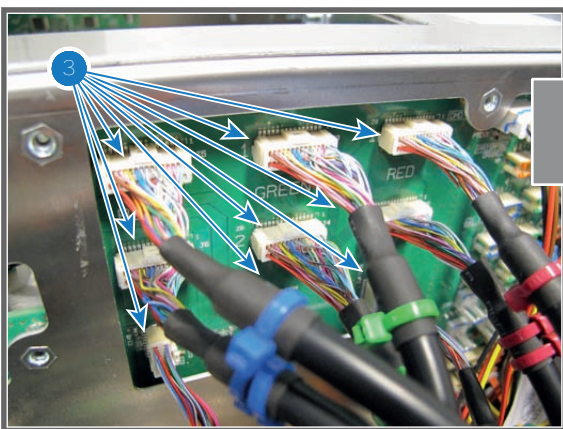


Image 9-4

4. Disconnect the other four orange wires of the Light Processor from the Signal Distribution board (reference 5, 6, 7 & 8 of Image 9-5).

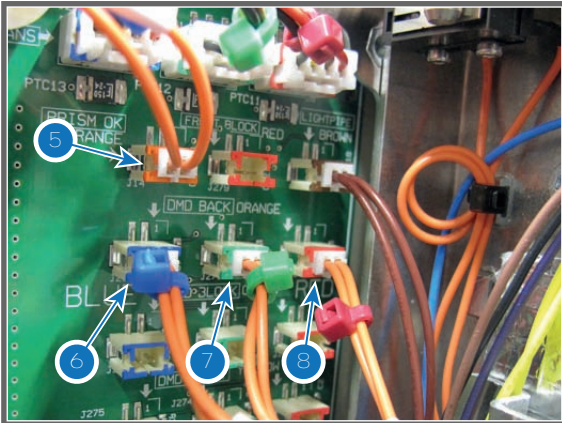


Image 9-5

- Loosen the three captive screws (reference 9 Image 9-6) of the Light Processor by a few turns until you feel that the screws can bob up-and-down. Use a 3mm Allen wrench.

! *Caution:* Do not keep turning the captive screws as this will dismantle the screws' captive system.

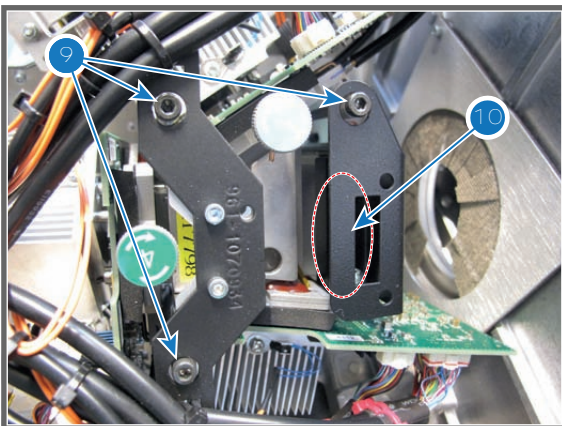


Image 9-6

- Gently remove the Light Processor from the projector chassis. Take the Light Processor by the black bracket (reference 10 Image 9-6) which serves as a handle.

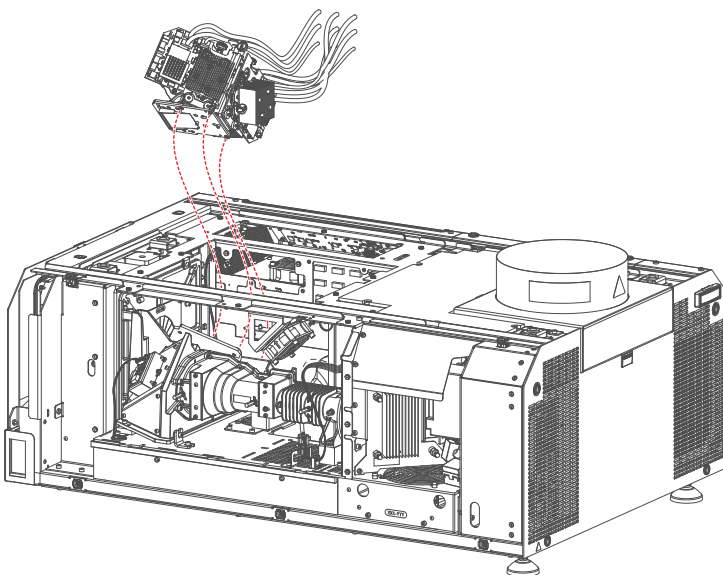



Image 9-7

7. Place the Light Processor on a clean flat surface with the prism entrance (reference 1 Image 9-8) facing down. (Remove screws or such from the table that could roll under the Light Processor while putting it down)

 **Caution:** Do not place the Light Processor upon one of its heat sinks.

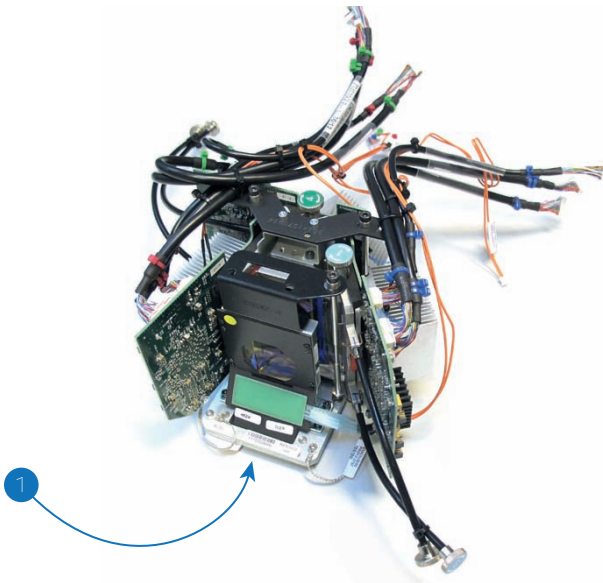


Image 9-8

9.5 Installing the Light Processor



The Light Processor and the Notch Filter are matched with each other. For that when replacing the Light Processor the Notch Filter has to be replaced as well. The Light Processor spare part kit contains a matched Notch filter for the Light Processor.



After installing a new Light Processor, the LUT-SCC file of the new Light Processor has to be installed and activated. See chapter “Spatial Color Calibration (LUT-SCC)”, page 151.

Required tools

- 7mm flat screwdriver.
- 3mm Allen wrench.

How to install the Light Processor in the projector?

1. Gently place the Light Processor in its place on the optical base of the projector as illustrated. Ensure that the positioning pins (reference 12 Image 9-9) of the Light Processor matches the positioning holes (reference 13 Image 9-9) in the optical base.

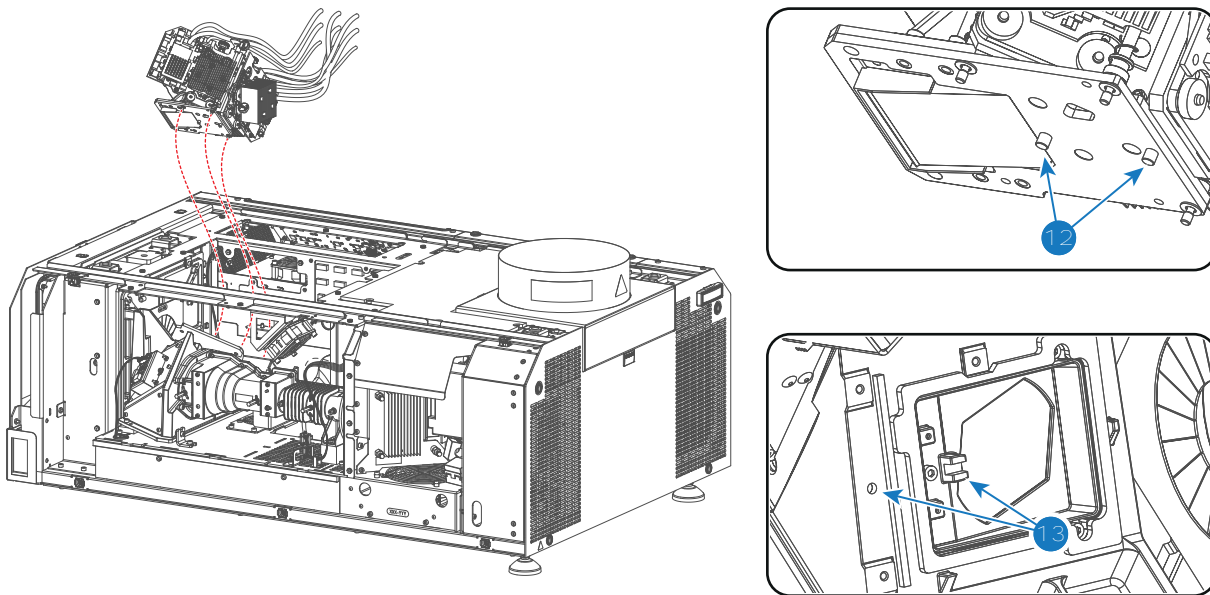


Image 9-9

2. Fasten the three captive screws (reference 9 Image 9-10) of the Light Processor assembly as illustrated. Use a 3mm Allen wrench.

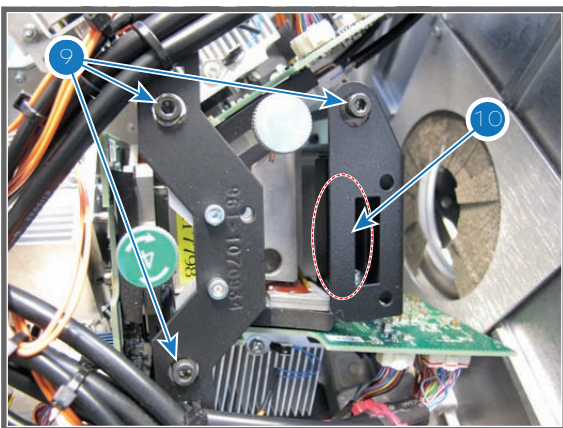


Image 9-10

3. Connect the nine RGB connectors (reference 1 to 9 of Image 9-11) with the Signal Distribution board as illustrated.
 - Reference 1 - small connector with blue cable tie.
 - Reference 2 - small connector with green cable tie.
 - Reference 3 - small connector with red cable tie.
 - Reference 4 - connector with two blue cable tie.
 - Reference 5 - connector with two green cable tie.
 - Reference 6 - connector with two red cable tie.
 - Reference 7 - connector with one blue cable tie.
 - Reference 8 - connector with one green cable tie.
 - Reference 9 - connector with one red cable tie.

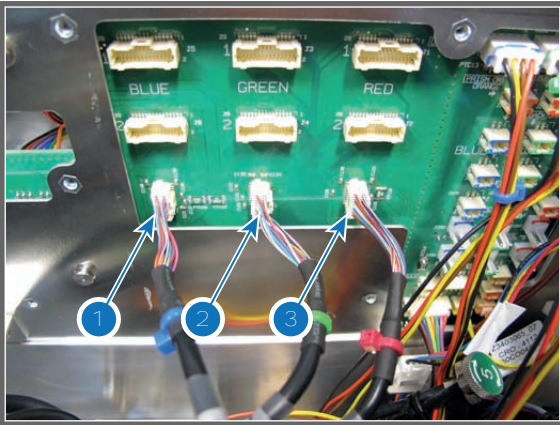
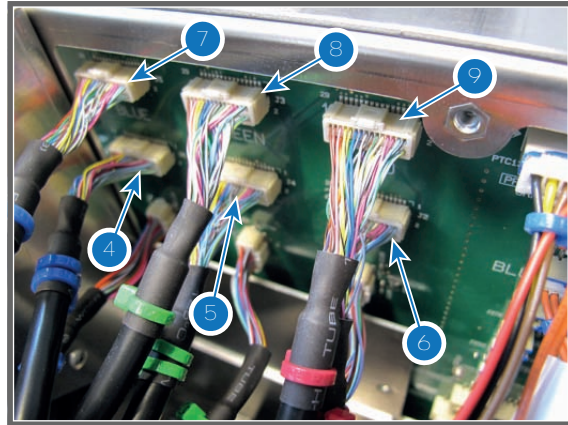


Image 9-11



4. Connect the four orange wires of the Light Processor with the Signal Distribution board as illustrated in Image 9-12.

- Reference 5 - Prism Sensor: orange wire without cable tie.
- Reference 6 - Temperature Sensor DMD Blue Channel: orange wire with blue cable tie.
- Reference 7 - Temperature Sensor DMD Green Channel: orange wire with green cable tie.
- Reference 8 - Temperature Sensor DMD Red Channel: orange wire with red cable tie.

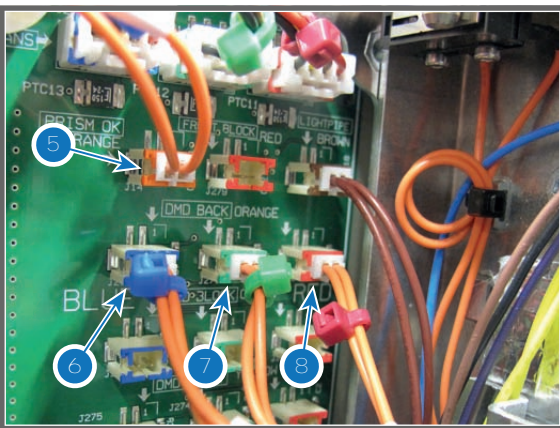


Image 9-12

5. Gently insert the Convergence flex cables into the corresponding cable clamp on the Anode Fan assembly and the cable clamp on the projector chassis (reference 1 & 2 Image 9-13).

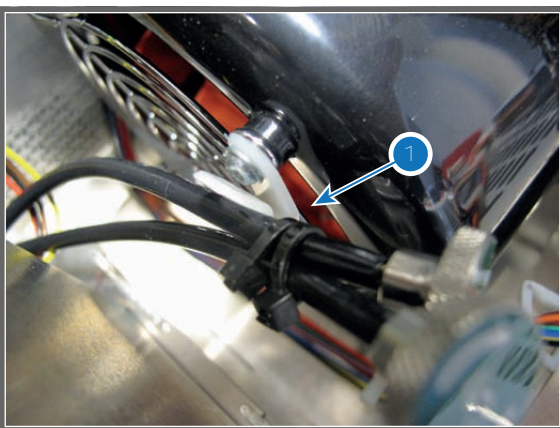
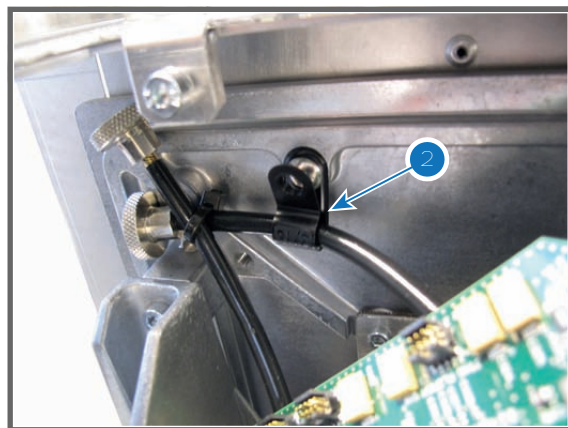


Image 9-13



6. Place the top fan of the Light Processor in the lower position. Ensure that the four mounting pins (reference 1 Image 9-14) of the fan assembly are engaged.

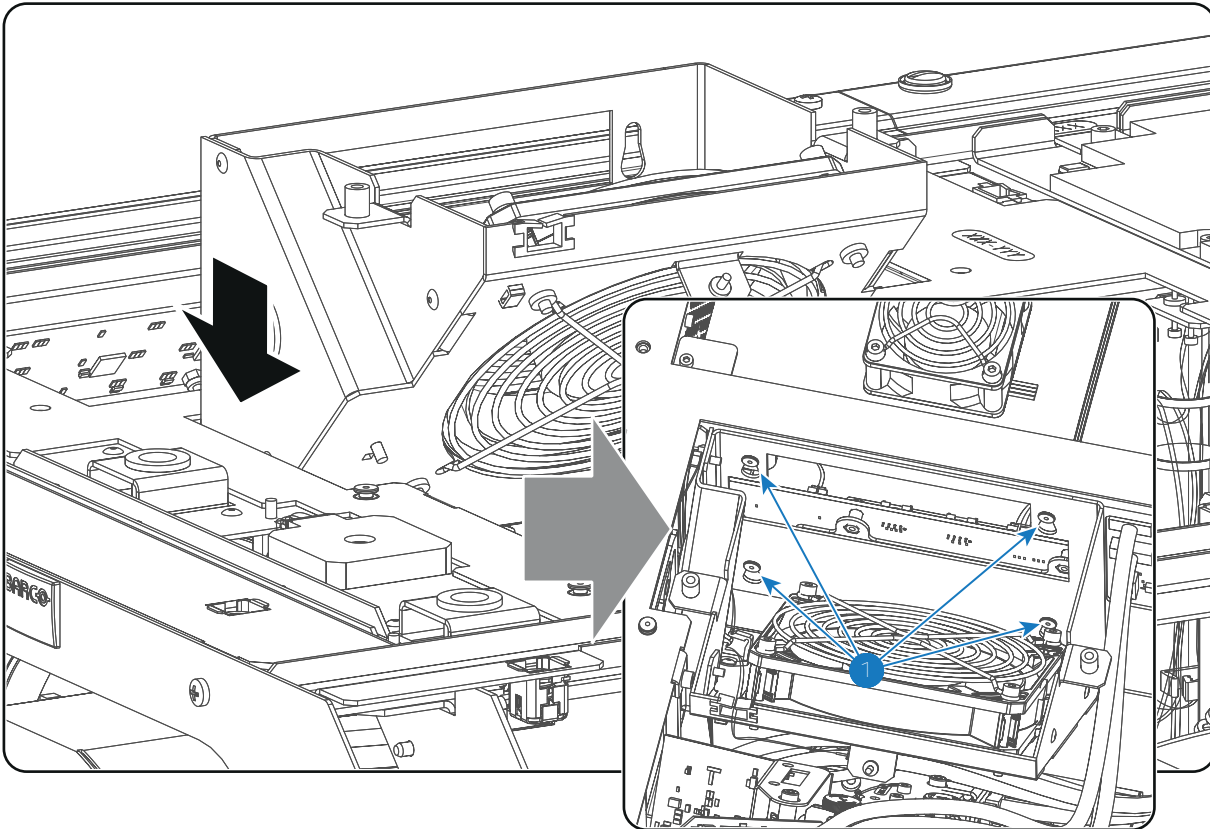


Image 9-14

7. Is the Light Processor replaced by a new spare Light Processor?
 - ▶ If yes,
 1. replace the Notch Filter in the Light Pipe with the new Notch Filter included in spare part kit of the Light Processor. See procedure “Replacing the Notch Filter”, page 127.
 2. after finishing this procedure, proceed with installing and activating the LUT-SCC file of the new Light Processor. See chapter “Spatial Color Calibration (LUT-SCC)”, page 151.
8. Close off the Light Processor compartment:
 - Install the top cover plate.
 - Install the side cover plate.
 - Install the top cover of the projector.
 - Install the left side cover of the projector.

9.6 Cleaning the Prism exit side

When should one clean the Prism exit side?

Clean the Prism exit on a regular basis to maintain light output level.



This procedure requires that the lens is removed from the projector.


Required tools

- Compressed air.
- Clean Toraysee® cloth or any micro fiber lens cleaning cloth.

Required parts

Lens cleaner (e.g. Carl Zeiss lens cleaner or Purasol® or any water based lens cleaner)

How to clean the Prism exit side?

1. Wipe off the dust of the Prism exit. Use for that a dry and clean Lens cleaning cloth.
 -  *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.
2. Is all dust removed from the Prism exit?
 - ▶ **If yes**, stop this cleaning procedure.
 - ▶ **If no**, wipe off the dust of the Prism exit with lens cleaner and a clean lens cleaning cloth. Polish again with a dry one.

9.7 Replacement of the fan of the Light Processor compartment



To access the fan of the Light Processor compartment the top cover and the top cover plate have to be removed from the projector. This procedure assumes that the top cover and top cover plate are already removed from the projector.

Required tools

3mm Allen wrench.

How to replace the fan of the Light Processor compartment?

1. Disconnect the wire of the fan (reference 5 Image 9-16) and the wire of the temperature sensor (reference 6 Image 9-16) from the Signal Backplane.
2. Remove the fan assembly from the projector chassis. Note that the fan assembly is engaged with four mounting pins (reference 8 Image 9-15).. Pull the fan assembly a few mm upwards and then away from the projector chassis.

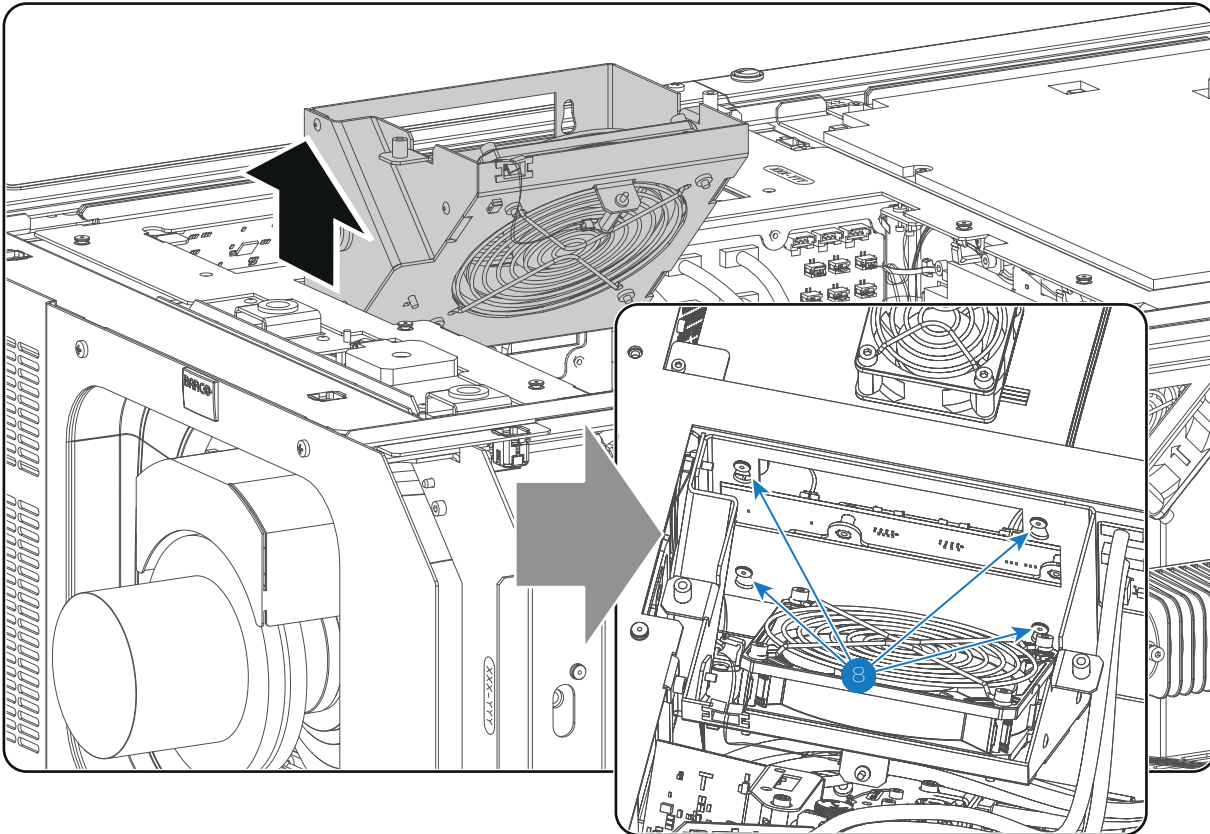


Image 9-15

3. Release both wires from the cable clamp at the side (reference 7 Image 9-16).

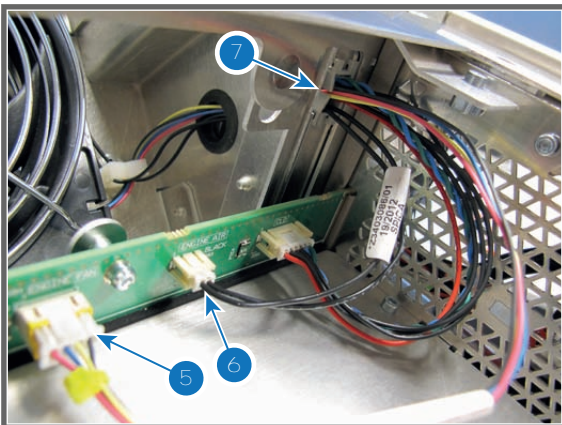


Image 9-16

4. Remove the fan from the assembly. Use a 3mm Allen wrench to release the four screws (reference 3 Image 9-17). While remove the fan guide the wire through the grommet (reference 4 Image 9-17).

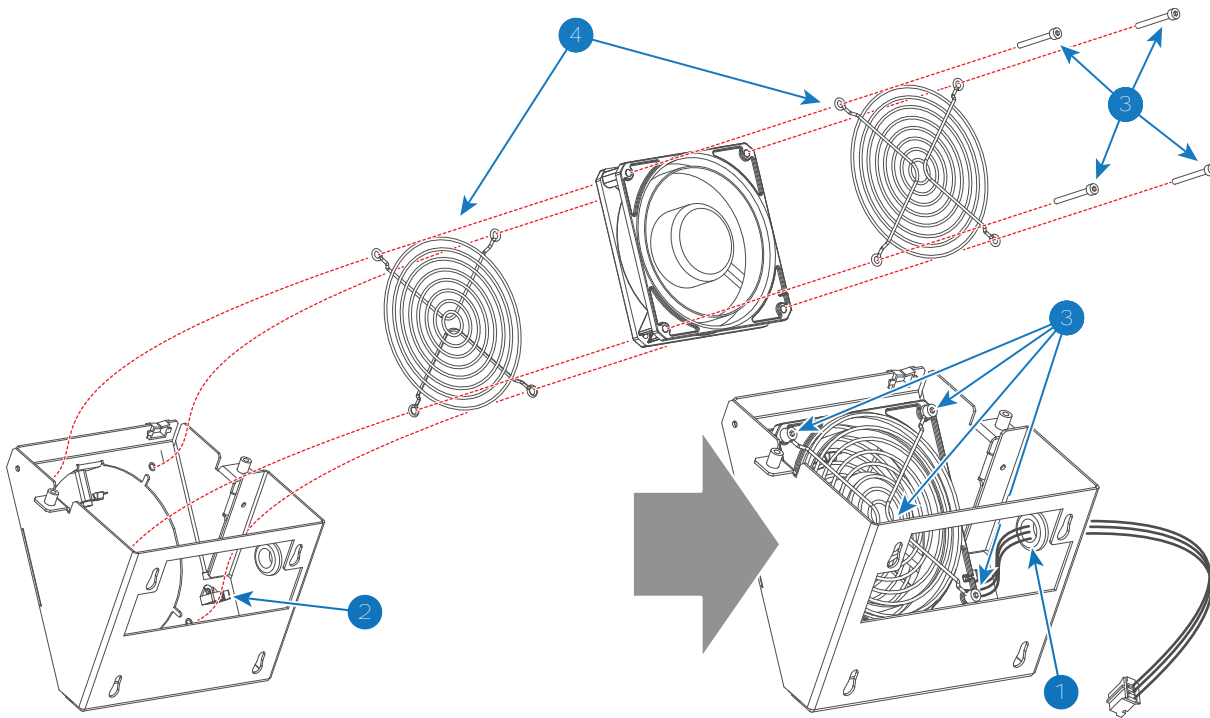


Image 9-17

5. Install the new fan. Guide the wire of the new fan through the grommet (reference 4 Image 9-17) and ensure that the wire is inserted in the cable clamp (reference 2 Image 9-17). Use a 3mm Allen wrench to fasten the four screws (reference 3 Image 9-17).

! *Caution:* Ensure that the airflow of the fan is towards the Light Processor.

6. Place the wire of the fan and the wire of the temperature sensor in the cable clamp (reference 7 Image 9-16).
7. Install the fan assembly. Ensure that the four mounting pins (reference 1 Image 9-18) of the fan assembly are engaged.

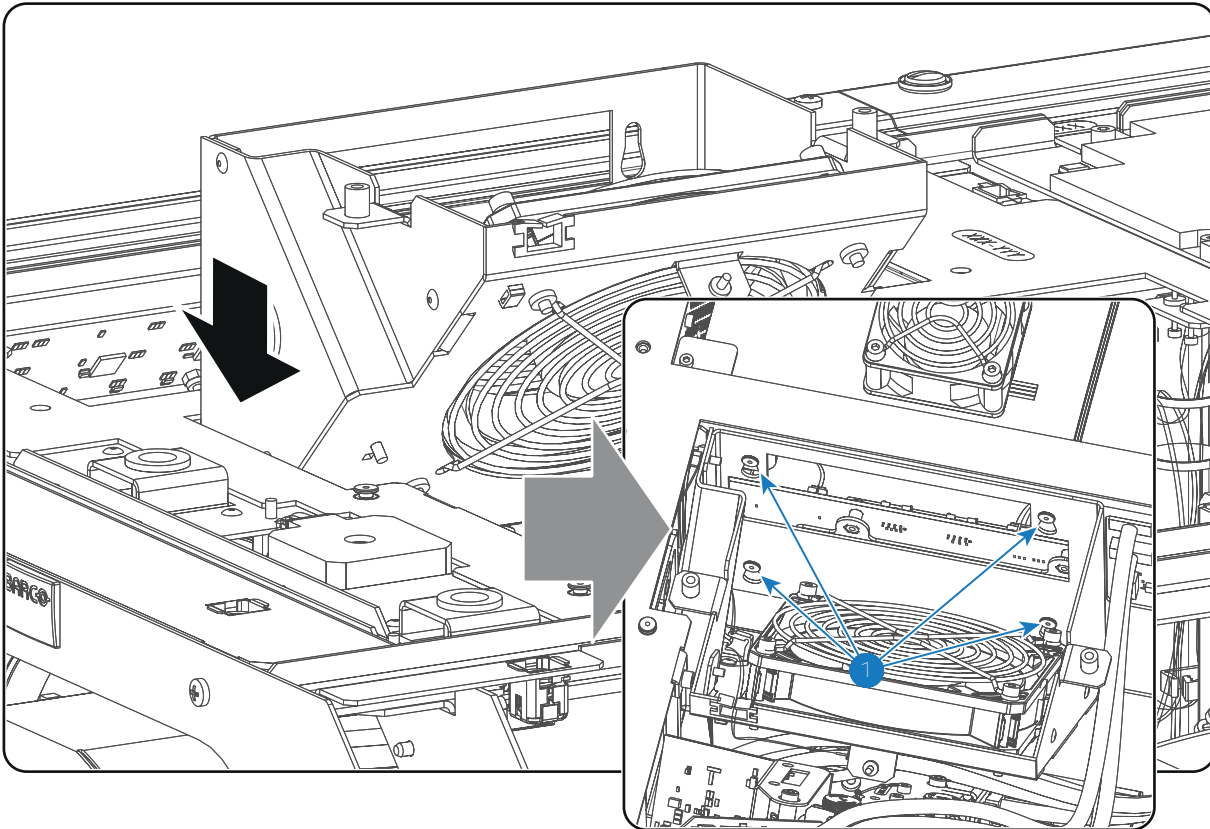


Image 9-18

8. Connect the wire of the fan (reference 5 Image 9-16) and the wire of the temperature sensor (reference 6 Image 9-16) with the Signal Backplane.
9. Close up the projector.

9.8 Replacement of the fan of the Red channel



To access the fan of the Red channel in the Light Processor compartment the Light Processor unit has to be removed from the projector. This procedure assumes that the Light Processor unit is already removed from the projector.

Required tools

3mm Allen wrench.

How to replace the fan of the Red channel?

1. Disconnect the wire (reference 3 Image 9-19) of the fan from the Signal Backplane.

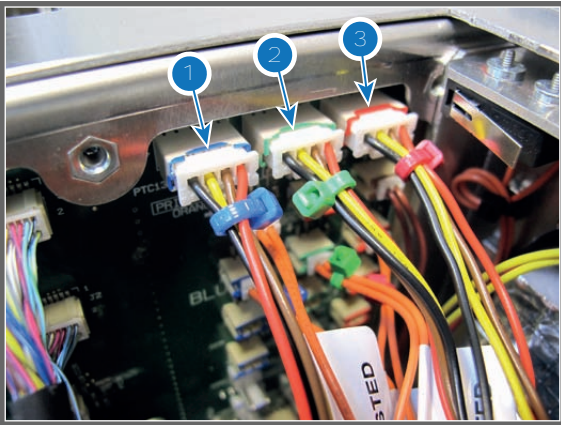


Image 9-19

2. Remove the fan assembly from the chassis. Use a 3mm Allen wrench to loosen the three fixation screws of the assembly (reference 4 Image 9-20).

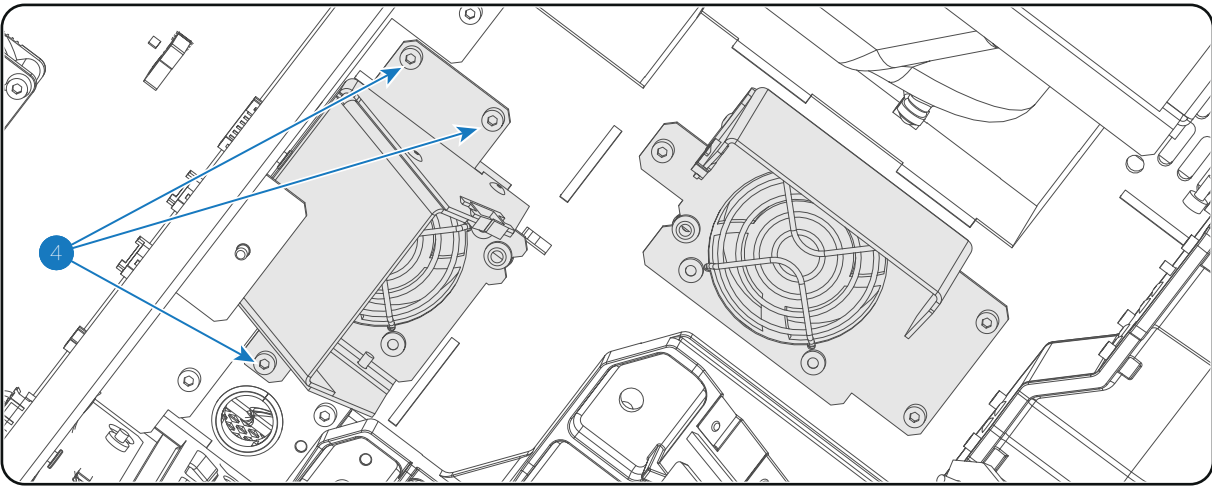


Image 9-20

3. Remove the fan from the assembly. Use a 3mm Allen wrench to loosen the four screws (reference 5 Image 9-21) as illustrated.

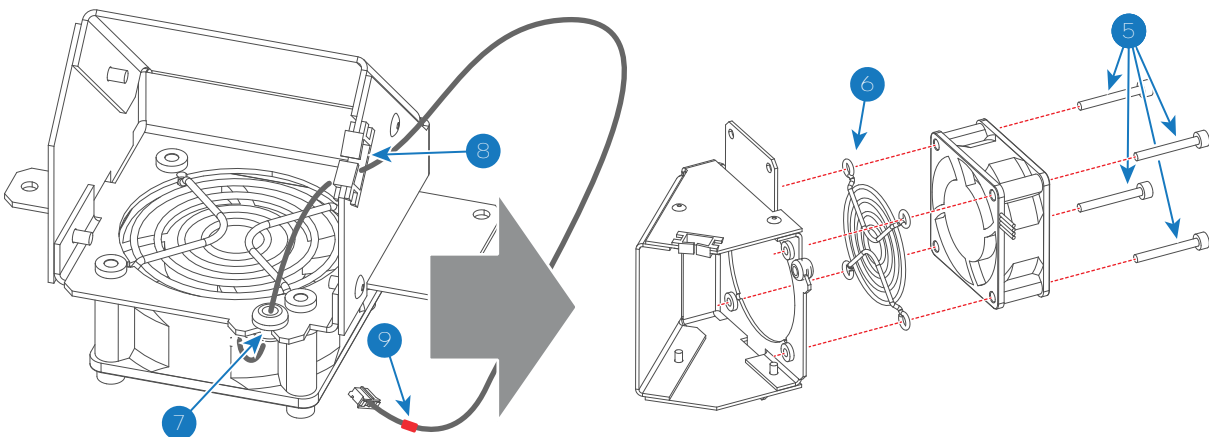



Image 9-21

4. Mount the new fan on the assembly as illustrated. Place the fan guard (reference 6 Image 9-21) between the fan and mounting plate. Fixate fan and fan guard with four long screws (reference 5 Image 9-21) using a 3mm Allen wrench.

 **Caution:** Ensure that the airflow of the fan is towards the heatsink of the Red channel.

5. Guide the wire of the fan through the rubber grommet (reference 7 Image 9-21) and cable clamp (reference 8 Image 9-21) and mark the wire by attaching a red colored cable tie two centimeters from the plug (reference 9 Image 9-21).
6. Install the fan assembly onto the projector chassis. Use a 3mm Allen wrench to fasten the three screws (reference 4 Image 9-20).
7. Connect the wire of the fan with the Signal Backplane. (reference 3 Image 9-19)

9.9 Replacement of the fan of the Green channel



To access the fan of the Green channel in the Light Processor compartment the Light Processor unit has to be removed from the projector. This procedure assumes that the Light Processor unit is already removed from the projector.

Required tools

3mm Allen wrench.

How to replace the fan of the Green channel?

1. Disconnect the wire (reference 2 Image 9-22) of the fan from the Signal Backplane.

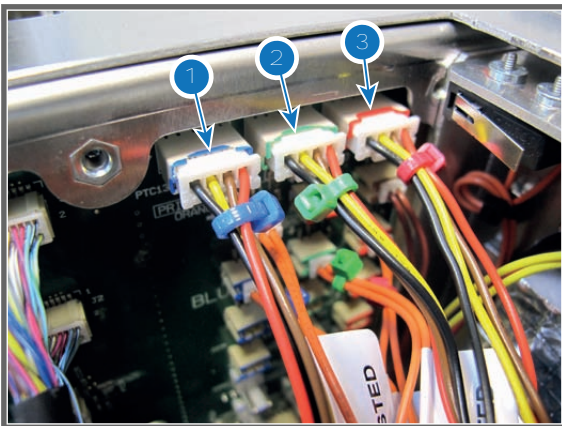


Image 9-22

2. Remove the fan assembly from the chassis. Use a 3mm Allen wrench to loosen the three fixation screws of the assembly (reference 4 Image 9-23).

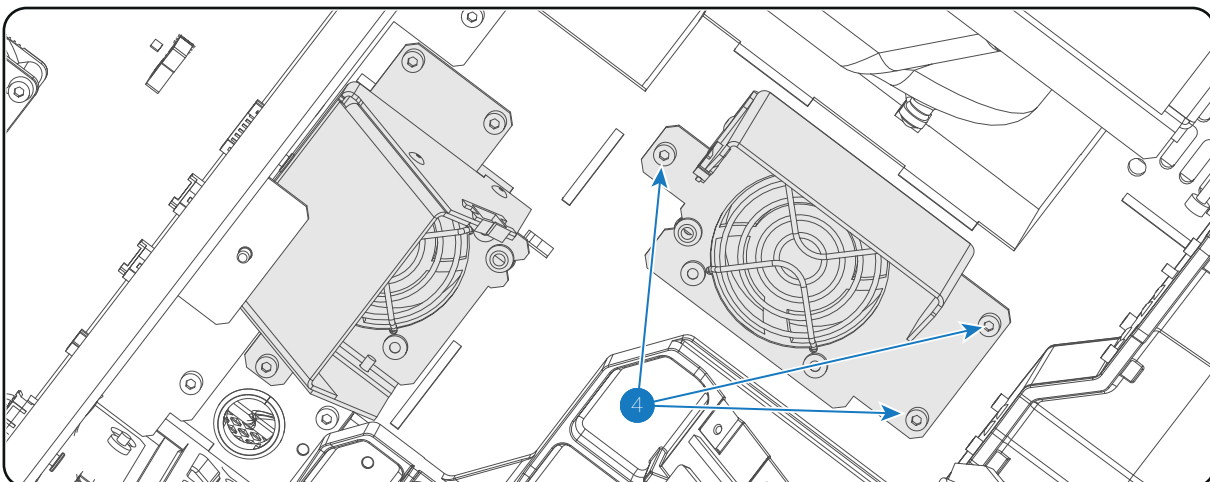


Image 9-23

3. Remove the fan from the assembly. Use a 3mm Allen wrench to loosen the four screws (reference 5 Image 9-24) as illustrated.

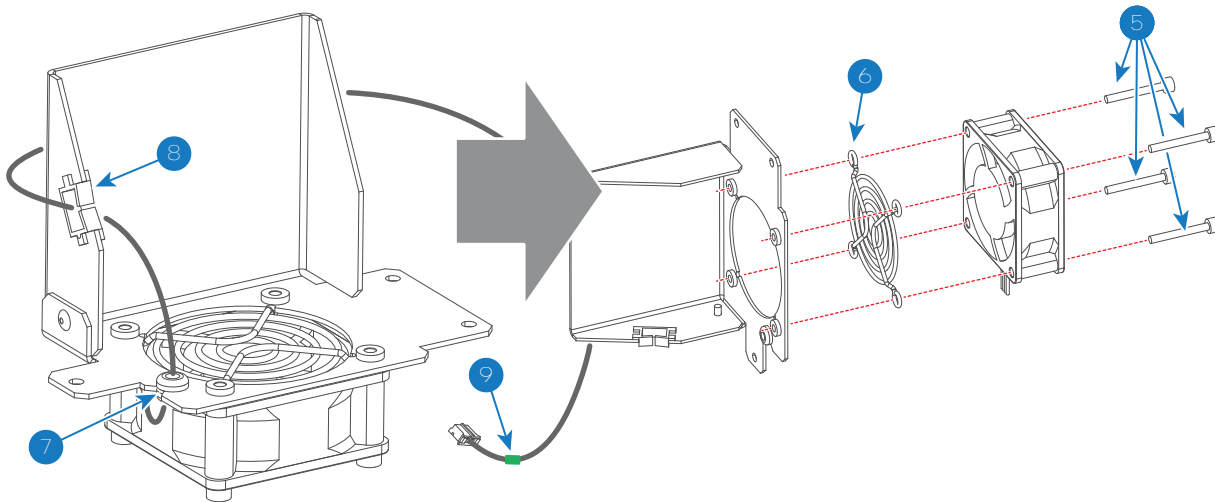


Image 9-24

4. Mount the new fan on the assembly as illustrated. Place the fan guard (reference 6 Image 9-24) between the fan and mounting plate. Fixate fan and fan guard with four long screws (reference 5 Image 9-24) using a 3mm Allen wrench.

! Caution: Ensure that the airflow of the fan is towards the heatsink of the Green channel.

5. Guide the wire of the fan through the rubber grommet (reference 7 Image 9-24) and cable clamp (reference 8 Image 9-24) and mark the wire by attaching a green colored cable tie two centimeters from the plug (reference 9 Image 9-24).
6. Install the fan assembly onto the projector chassis. Use a 3mm Allen wrench to fasten the three screws (reference 4 Image 9-23).
7. Connect the wire of the fan with the Signal Backplane. (reference 2 Image 9-22)

9.10 Replacement of the fan of the Blue channel



To access the fan of the Blue channel in the Light Processor compartment the top cover and the top cover plate have to be removed from the projector. This procedure assumes that the top cover and top cover plate are already removed from the projector.

Required tools

3mm Allen wrench.

How to replace the fan of the Blue channel?

1. Disconnect the wire (reference 1 Image 9-25) of the fan from the Signal Backplane.

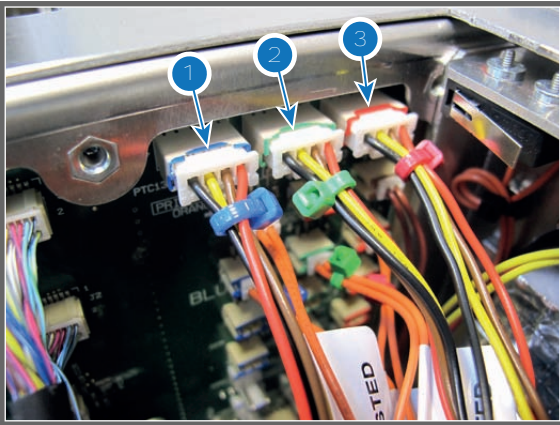


Image 9-25

2. Remove the fan assembly from the chassis. Use a 3mm Allen wrench to loosen the two fixation screws of the assembly (reference 4 Image 9-26).

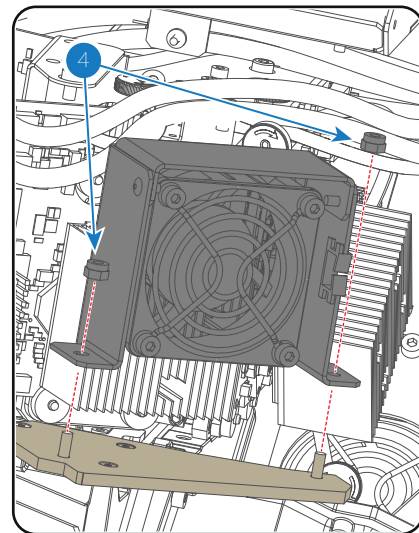
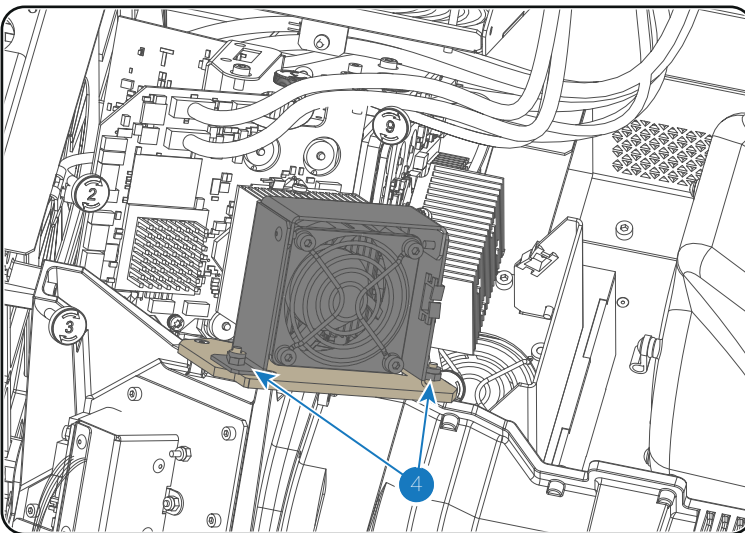


Image 9-26

3. Remove the fan from the assembly. Use a 3mm Allen wrench to loosen the four screws (reference 5 Image 9-27) as illustrated.

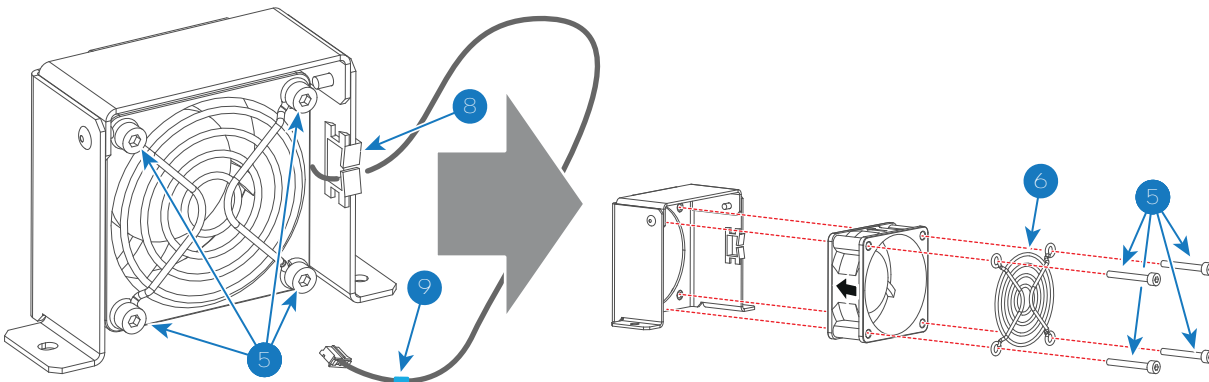


Image 9-27

4. Mount the new fan on the assembly as illustrated. Place the fan guard (reference 6 Image 9-27) on top of the fan and fixate fan and fan guard with four long screws (reference 5 Image 9-27) using a 3mm Allen wrench.

! **Caution:** Ensure that the airflow of the fan is towards the heatsink of the Blue channel.

5. Guide the wire of the fan through the cable clamp (reference 8 Image 9-27) and mark the wire by attaching a blue colored cable tie two centimeters from the plug (reference 9 Image 9-27).
6. Install the fan assembly onto the projector chassis. Use a 3mm Allen wrench to fasten the two screws (reference 4 Image 9-26).
7. Connect the wire of the fan with the blue marked socket on the Signal Backplane. (reference 1 Image 9-25)

9.11 Authorization to clear security warning on the projector

When is an authorization required to clear the security warning?

If a module has been removed or if the sealed compartment has been opened, an authorization will be required to clear the security warning.

Required tools

Authorization pin code.

Authorization procedure to clear security warning

1. Ensure that all modules are properly installed.
2. Start up the projector (Standby mode).
3. Initiate authorization by pushing the Key button on the Local Keypad:



The color of the backlight of the Numeric keys 1 to 6 of the Local Keypad changes from blue to yellow.

4. Enter pin code within 5 seconds.
 - In case no keys are pressed, the color of the backlight of the Numeric keys 1 to 6 changes back to blue.
 - In case of an **incorrect code** entry, the color of the backlight of the Numeric keys changes to **red** for 1 second and then back to **blue**.
 - In case of a **correct code** entry, the color of the backlight of the Numeric keys 1 to 6 changes to **green** for 1 second and then back to **blue**.



Each attempt to clear the security warning and its result (successfully or unsuccessfully) is logged inside the projector.

Light Pipe

10

About this chapter

This chapter gives a brief introduction of the Light Pipe and its components. Furthermore, this chapter includes the replacement procedure of the Fold Mirror, High Contrast Plate, Light Sensor, Notch Filter, and Light Pipe Lenses No1-2-3-4. Note that the service information about the Integration Rod is grouped in a separate chapter in this manual, see chapter “Integration Rod”, page 139.

Overview

- Introduction Light Pipe
- Removal of the Light Pipe
- Removal of the Light Pipe cover plate
- Replacing Light Pipe lens No1 (focus lens)
- Replacing Light Pipe lens No2
- Replacing Light Pipe lens No3 (zoom lens)
- Replacing Light Pipe lens No4
- Cleaning the Light Pipe lenses
- Installing the Light Pipe cover plate
- Installing the Light Pipe
- Adjusting the Light Pipe lens No1 (focus lens)
- Adjusting the Light Pipe lens No3 (zoom lens)
- Replacing the Notch Filter
- Adjusting the Notch Filter
- Cleaning the Notch Filter
- Replacing the Fold Mirror set
- Adjusting the Fold Mirror
- Cleaning the Fold Mirrors
- Replacing the High Contrast plate
- Replacing the Light Sensor module (CLO)
- Replacement of the Light Pipe fan

10.1 Introduction Light Pipe

Light Pipe

The Light Pipe transforms the light emitted by the light source into a homogeneous light beam and focuses this beam precisely on the active surface of the DMD's. The Light Pipe is mounted onto the Corner Block.

The Light Pipe itself contains the Integration Rod at the Light Pipe entrance, the Light Pipe lenses No1-2-3, the Notch Filter, and the High Contrast Plate. The Light Pipe can easily be removed from the Corner Block for servicing.

The Corner Block contains the Fold Mirrors which are folding up the light path of the projector to make the projector more compact, the Light Pipe lens No4, and the Light Sensor Module which ensures a Constant Light Output (CLO) of the projector. Note that the Light Processor and Lens Holder are directly mounted onto the Corner Block. This ensures a precise mounting with minimum tolerance of all optical components in the light path which results in perfect optical performance.

Location of optical components in the Light Pipe

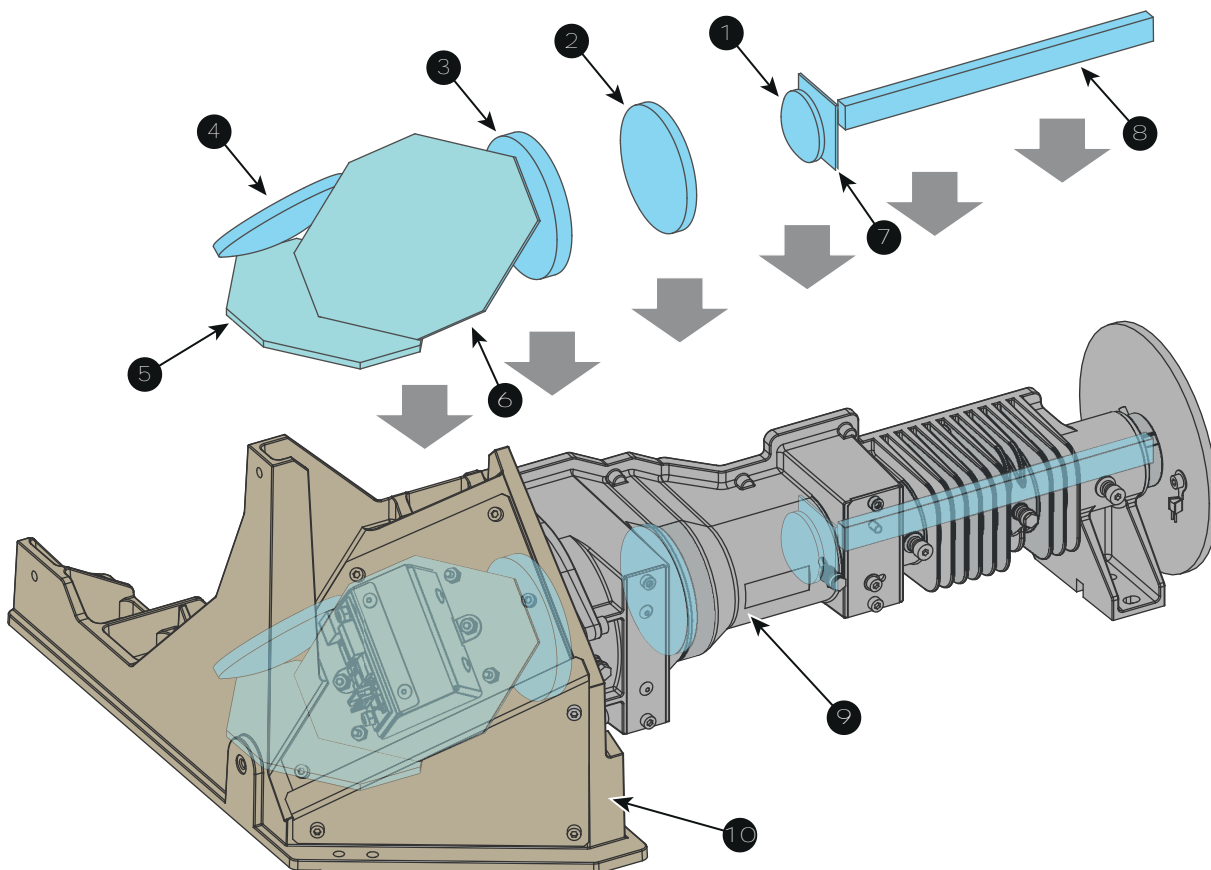


Image 10-1

- | | |
|--|--|
| 1 Lens No1 (Light Pipe focus lens). | 6 Adjustable Fold Mirror. |
| 2 Lens No2 (diverging fixed lens). | 7 Notch Filter. |
| 3 Lens No3 (Light Pipe zoom lens). | 8 Integration Rod. |
| 4 Lens No4 (converging fixed lens). | 9 Light Pipe housing (removable). |
| 5 Fixed Fold Mirror. | 10 Corner Block housing. |

Light Pipe and Corner Block parts

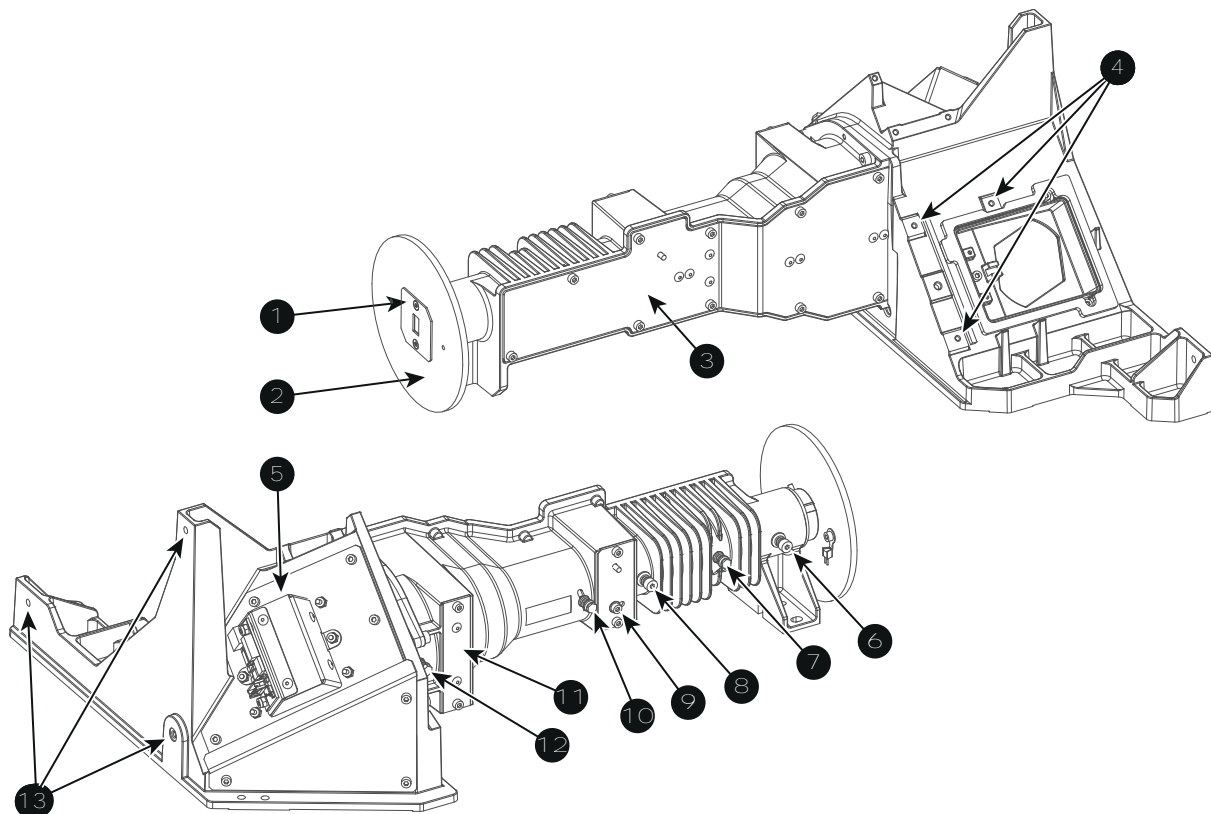


Image 10-2

- | | |
|---|--|
| 1 Mask plate. | 8 Integration Rod fixation screw. |
| 2 Heatsink (Rod entrance). | 9 Notch Filter adjustment screw. |
| 3 Cover plate of Light Pipe. | 10 Light Pipe focus adjustment screw. |
| 4 Fixation points for Light Processor. | 11 High contrast plate. |
| 5 Light sensor module. | 12 Light Pipe zoom adjustment screw. |
| 6 Integration Rod fixation screw. | 13 Fixation points for Lens Holder. |
| 7 Integration Rod rotation adjustment screw. | |

10.2 Removal of the Light Pipe



To remove the Light Pipe from the corner block the left side cover of the projector and the side cover plate of the Light Processor compartment has to be removed. This procedure assumes that the cover and plate are already removed.

Required tools

3mm Allen wrench.

How to remove the Light Pipe from the corner block?

1. Disconnect the wire (reference 1 Image 10-3) of the temperature sensor on the Light Pipe heatsink and release it from the cable clamp.

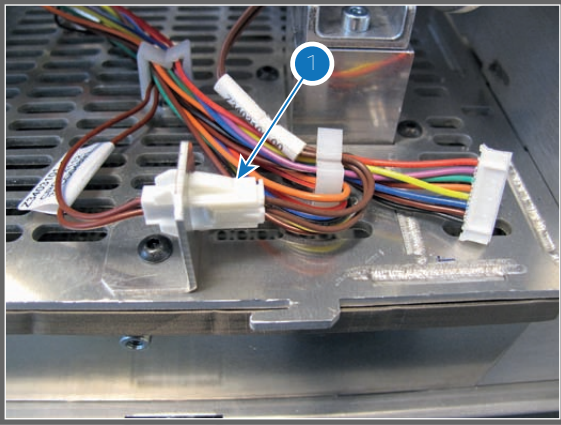


Image 10-3

2. Remove the five fixation screws (reference 2 Image 10-4) of the Light Pipe. Use a 3mm Allen wrench.

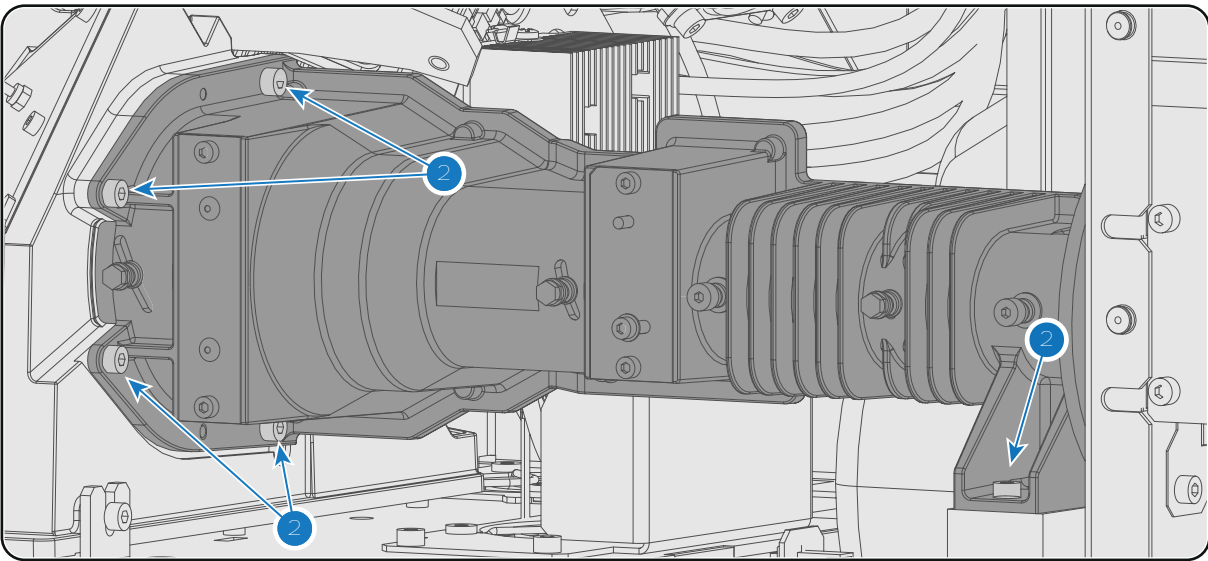



Image 10-4

3. Carefully move the Light Pipe one centimeter to the right and then move it gently away from the projector. Place the Light Pipe on a clean surface.

 **Caution:** Do not bump (accidentally) with the lens (reference 3) of the Light Pipe against the projector chassis.

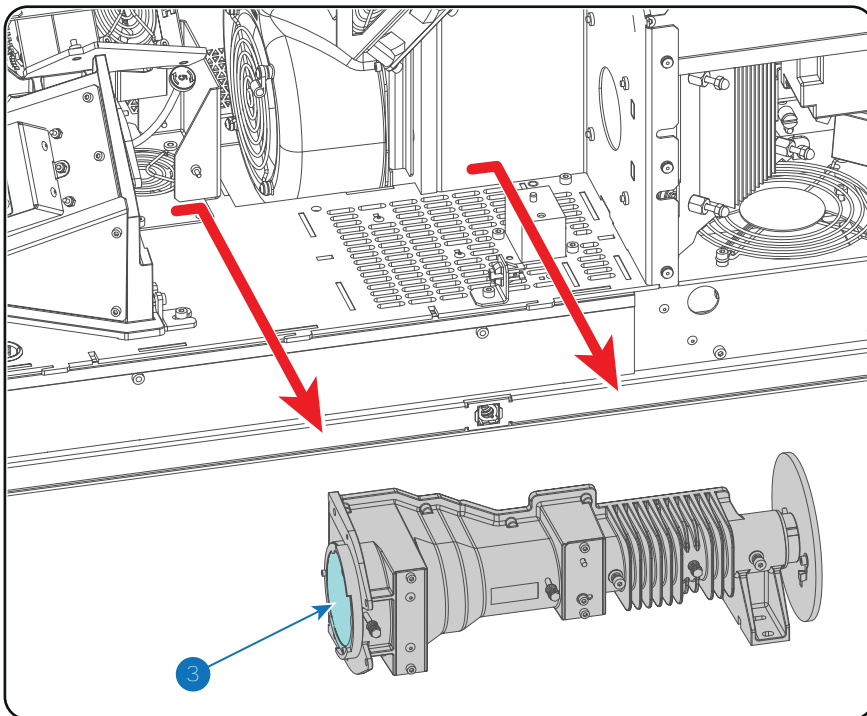


Image 10-5

10.3 Removal of the Light Pipe cover plate



This procedure assumes that the Light Pipe is removed from the Corner Block.



CAUTION: All servicing to the Light Pipe components must be done in a dust free area. While a strict cleanroom environment is not required, do make sure dust is removed from the servicing area as much as possible.

Required tools

2.5mm Allen wrench.

How to remove the cover plate of the Light Pipe?

1. Remove the 10 screws (reference 1 Image 10-6) from the cover plate. Use a 2.5mm Allen wrench.
2. Remove the cover plate from the Light Pipe housing.

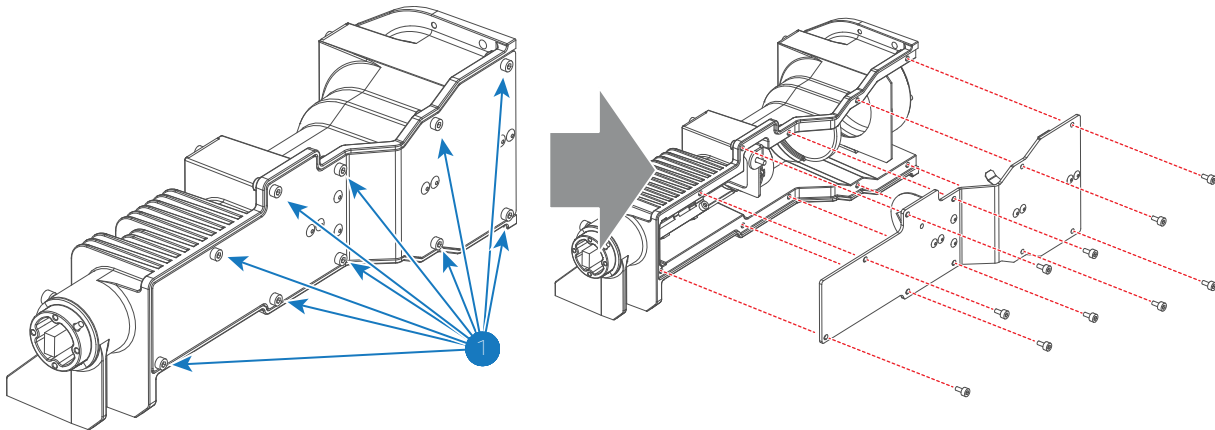


Image 10-6

10.4 Replacing Light Pipe lens No1 (focus lens)



To replace the Light Pipe lens No1 the Light Pipe has to be removed from the Corner Block. This procedure assumes that the Light Pipe is already removed.

Required tools

- Cotton gloves. (never use gloves that leave particles on the surfaces)
- 5.5mm nut driver.
- 1.5mm Allen wrench.

How to replace the Light Pipe focus lens?

1. Open the Light Pipe housing. See procedure “Removal of the Light Pipe cover plate”, page 117.
2. Remove the adjustment screw (reference 2 Image 10-7) of the Light Pipe focus lens. Note that a spring and plain washer (reference 3 & 4 Image 10-7) comes loose together with the adjustment screw. Use a 5.5mm nut driver.
3. Remove the lens container from the Light Pipe (reference 5 Image 10-7).

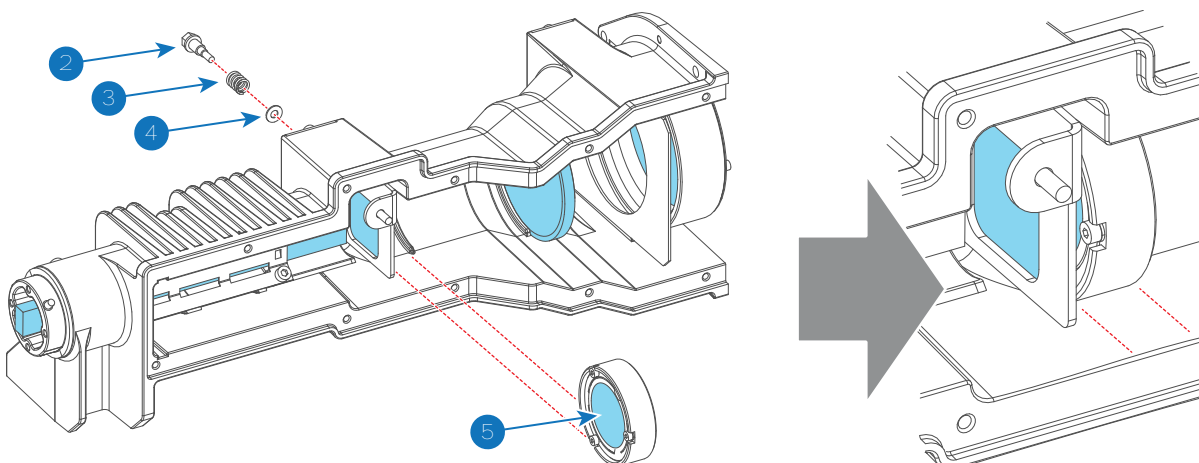



Image 10-7

4. Replace the focus lens (reference 7 Image 10-7) from the container (reference 8 Image 10-7) as illustrated. Use a 1.5mm Allen wrench. Ensure that the concave side of the lens faces the Integration Rod (convex side towards Folding Mirror).



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

-  **Note:** Light Pipe lens No1 (focus lens) is the smallest lens of the four Light Pipe lenses. Lens No1 has a diameter of 30mm.

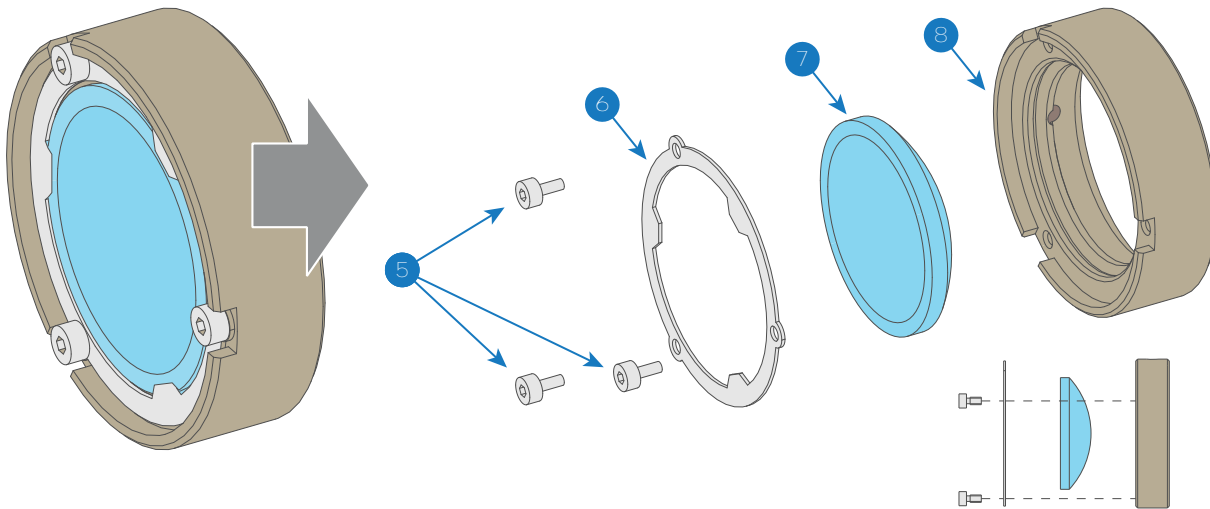


Image 10-8

5. Place the lens container back in the Light Pipe (reference 5 Image 10-7). Ensure that the concave side of the lens faces the Integration Rod (convex side towards Folding Mirror).
6. Secure the lens container with the adjustment screw (reference 2 Image 10-7). Place a spring and a plain washer (reference 3 & 4 Image 10-7) on the adjustment screw. Use a 5.5mm nut driver.
7. Close the Light Pipe housing. See procedure “Installing the Light Pipe cover plate”, page 123.



The Light Pipe focus lens needs readjustment after replacement. See procedure “Adjusting the Light Pipe lens No1 (focus lens)”, page 125.

10.5 Replacing Light Pipe lens No2



To replace the Light Pipe lens No2 the Light Pipe has to be removed from the Corner Block. This procedure assumes that the Light Pipe is already removed.

Required tools

Cotton gloves. (never use gloves that leave particles on the surfaces)

How to replace the Light Pipe lens No2?

1. Open the Light Pipe housing. See procedure “Removal of the Light Pipe cover plate”, page 117.
2. Replace the Light Pipe lens No2 as illustrated (reference 2 Image 10-9). Ensure that the flat side of the lens faces the Integration Rod (convex side towards Folding Mirror).



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



Note: Light Pipe lens No2 is larger than lens No1 but smaller than Lens No3 and lens No4. . Lens No2 has a diameter of 54mm.

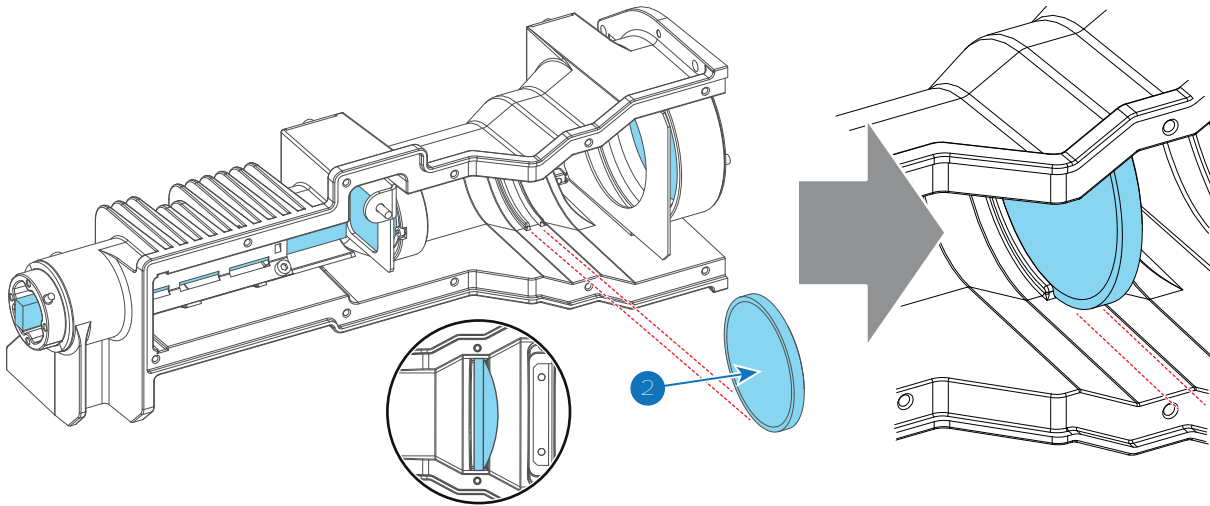


Image 10-9

3. Close the Light Pipe housing. See procedure “Installing the Light Pipe cover plate”, page 123.

10.6 Replacing Light Pipe lens No3 (zoom lens)



To replace the Light Pipe lens No3 the Light Pipe has to be removed from the Corner Block. This procedure assumes that the Light Pipe is already removed.

Required tools

- Cotton gloves. (never use gloves that leave particles on the surfaces)
- 5.5mm nut driver.
- 1.5mm Allen wrench.

How to replace the Light Pipe zoom lens?

1. Open the Light Pipe housing. See procedure “Removal of the Light Pipe cover plate”, page 117.
2. Remove the adjustment screw (reference 5 Image 10-10) of the Light Pipe zoom lens. Note that a spring and plain washer (reference 4 & 3 Image 10-10) comes loose together with the adjustment screw. Use a 5.5mm nut driver.
3. Remove the lens container from the Light Pipe (reference 5 Image 10-10).

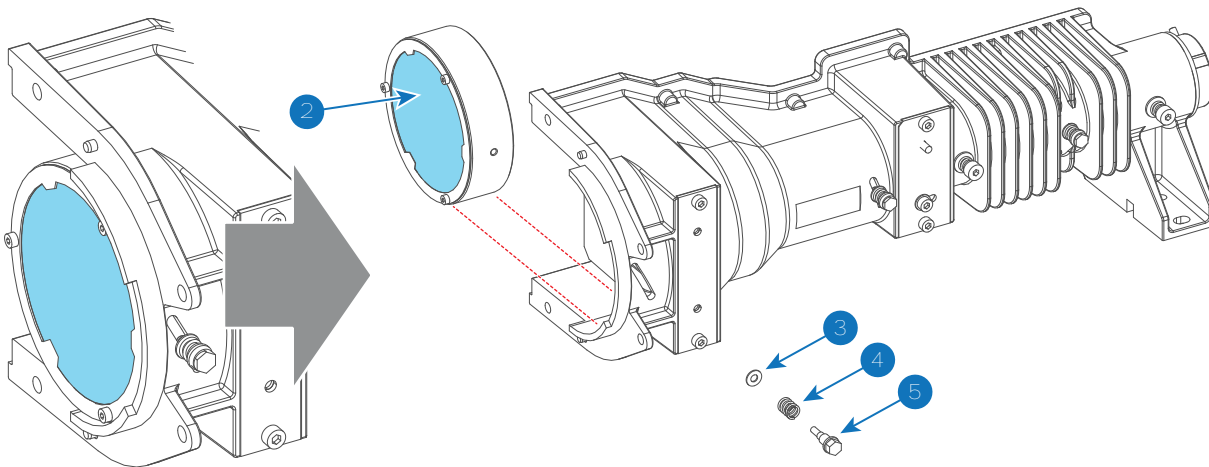


Image 10-10

- Replace the zoom lens (reference 7 Image 10-11) from the container (reference 8 Image 10-11) as illustrated. Use a 1.5mm Allen wrench. Ensure that the flat side of the lens faces the Integration Rod (convex side towards Folding Mirror).

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



Note: Light Pipe lens No3 (zoom lens) and lens No4 are the biggest Light Pipe lenses. Lens No3 and Lens No4 have a diameter of 60mm. But lens No3 has an edge thickness of 7mm, while lens No4 has an edge thickness of 5mm.

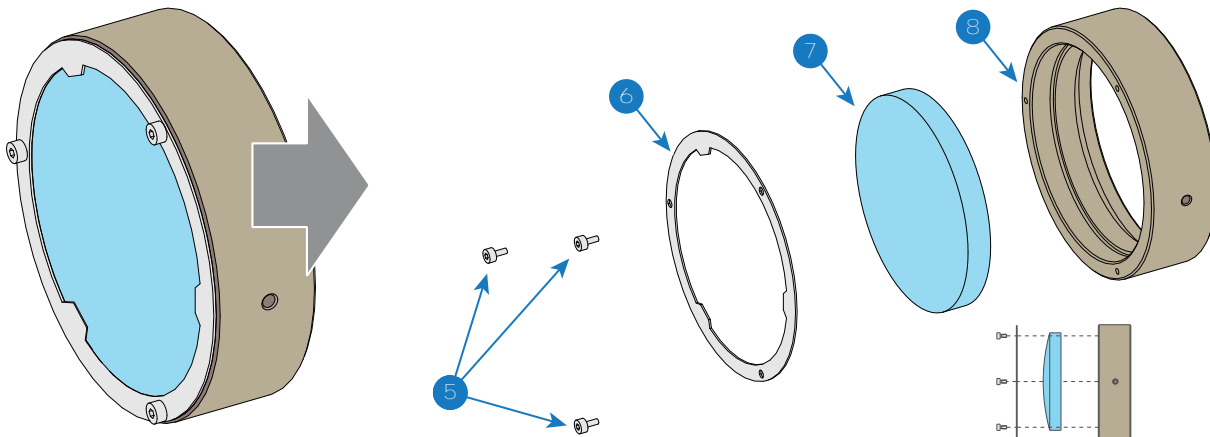


Image 10-11

- Place the lens container back in the Light Pipe (reference 2 Image 10-10). Ensure that the flat side of the lens faces the Integration Rod (convex side towards Folding Mirror).
- Secure the lens container with the adjustment screw (reference 5 Image 10-10). Place a spring and a plain washer (reference 4 & 3 Image 10-10) on the adjustment screw. Use a 5.5mm nut driver.
- Close the Light Pipe housing. See procedure “Installing the Light Pipe cover plate”, page 123.



The Light Pipe zoom lens needs readjustment after replacement. See procedure “Adjusting the Light Pipe lens No3 (zoom lens)”, page 126

10.7 Replacing Light Pipe lens No4



To replace the Light Pipe lens No4 the Light Processor has to be removed. This procedure assumes that the Light Processor is already removed.

Required tools

- Cotton gloves. (never use gloves that leave particles on the surfaces)
- 2.5mm Allen wrench.
- 1.5mm Allen wrench.

How to replace the Light Pipe lens No4?

- Remove the three fixation screws (reference 1 Image 10-12) of the lens container. Use a 2.5mm Allen wrench.
- Remove the lens container from the Corner Block as illustrated in Image 10-12.

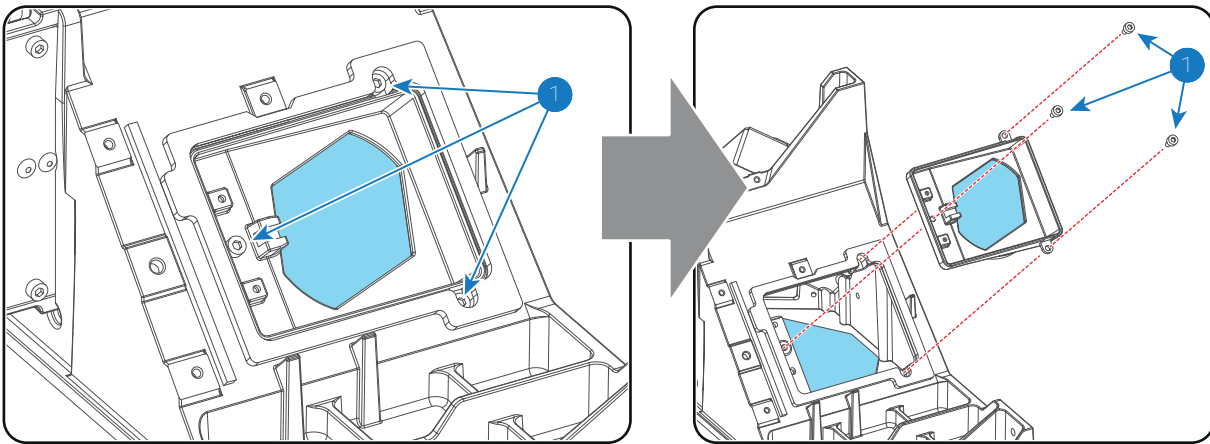


Image 10-12

3. Remove the lens (reference 4 Image 10-13) from the container (reference 5 Image 10-13) as illustrated. Use a 1.5mm Allen wrench to loosen the four lens fixation screws (reference 2 Image 10-13).

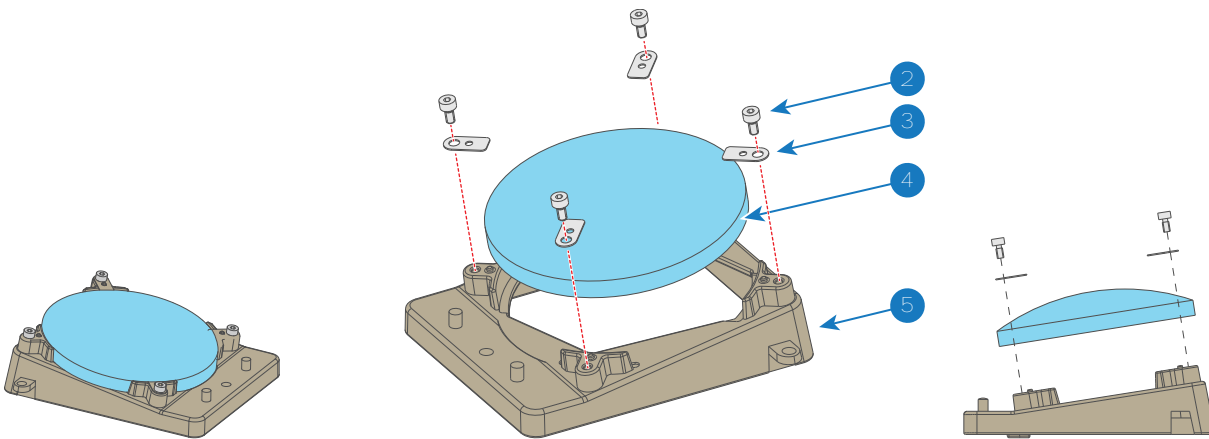


Image 10-13

4. Install the new lens No4 (reference 4 Image 10-13) in the container (reference 5 Image 10-13) as illustrated. Secure the lens with small brackets and four screws (reference 3 & 2 Image 10-13) as illustrated. Use a 1.5mm Allen wrench. Ensure that the flat side of the lens faces towards the Light Processor (convex side towards the Folding Mirror)

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

📄 Note: Light Pipe lens No3 (zoom lens) and lens No4 are the biggest Light Pipe lenses. Lens No3 and Lens No4 have a diameter of 60mm. But lens No3 has an edge thickness of 7mm, while lens No4 has an edge thickness of 5mm.

5. Place the lens container back in the Corner Block as illustrated in Image 10-12.
6. Fasten the lens container with three fixation screws (reference 1 Image 10-12). Use a 2.5mm Allen wrench.

10.8 Cleaning the Light Pipe lenses

When cleaning 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 Toraysee® cloth or any micro fiber lens cleaning cloth.
- Clean cotton cloth.
- Cotton gloves (never use gloves that leave particles on the surfaces).

Required parts

Lens cleaner (e.g. Carl Zeiss lens cleaner or Purasol® or any waterbased lens cleaner)

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.

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.

10.9 Installing the Light Pipe cover plate

Required tools

2.5mm Allen wrench.

How to install the cover plate of the Light Pipe?

1. Place the cover plate on the Light Pipe housing.
2. Fasten the cover plate with 10 screws (reference 1 Image 10-14) as illustrated. Use a 2.5mm Allen wrench.

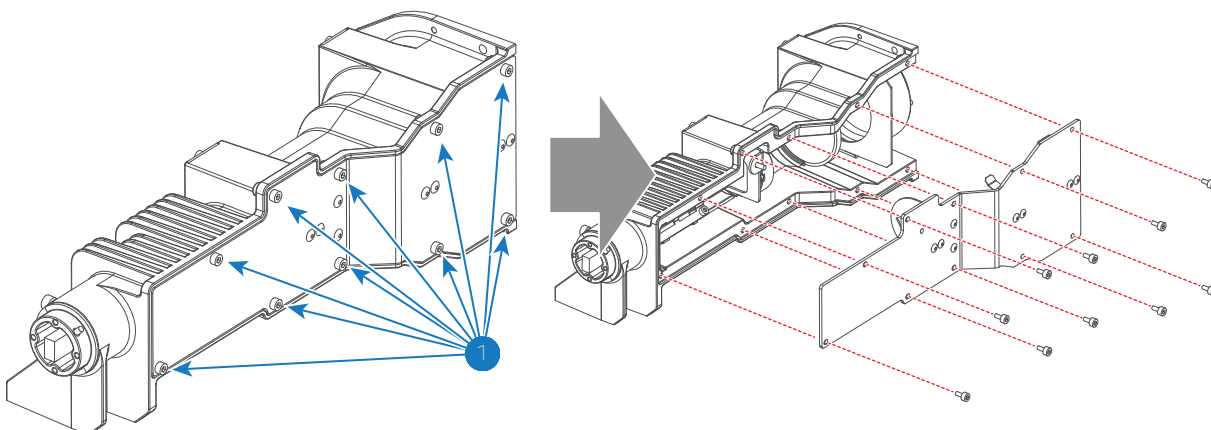


Image 10-14

10.10 Installing the Light Pipe

Required tools

3mm Allen wrench.

How to install the Light Pipe onto the corner block?

1. Carefully insert the Light Pipe into the compartment and engage the Light Pipe in the corner block.

! *Caution:* Do not bump (accidentally) with the lens (reference 3 Image 10-15) of the Light Pipe against the projector chassis.

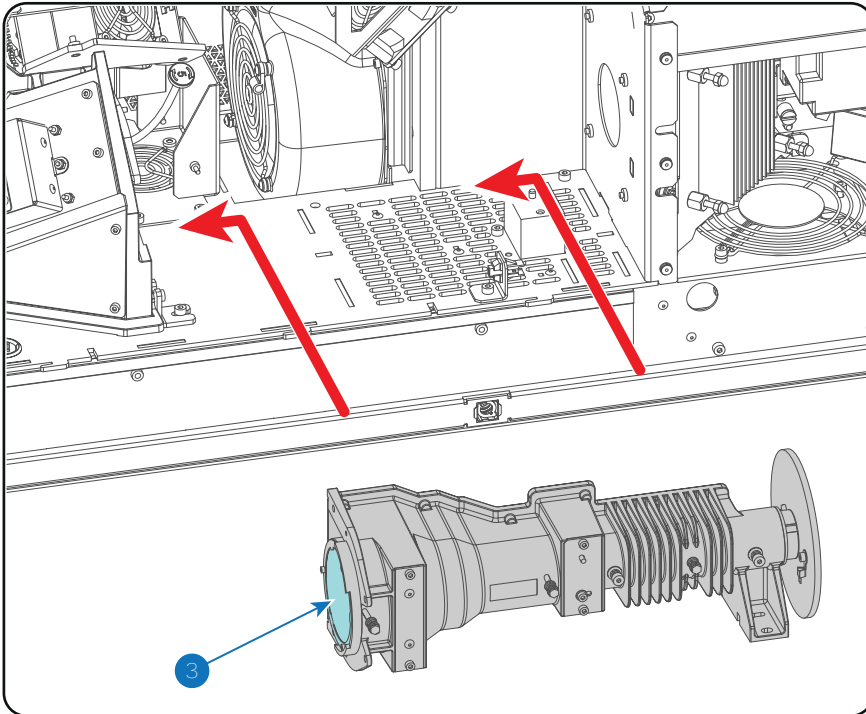


Image 10-15

2. Fixate the Light Pipe with five screws (reference 2 Image 10-16). Use a 3mm Allen wrench.

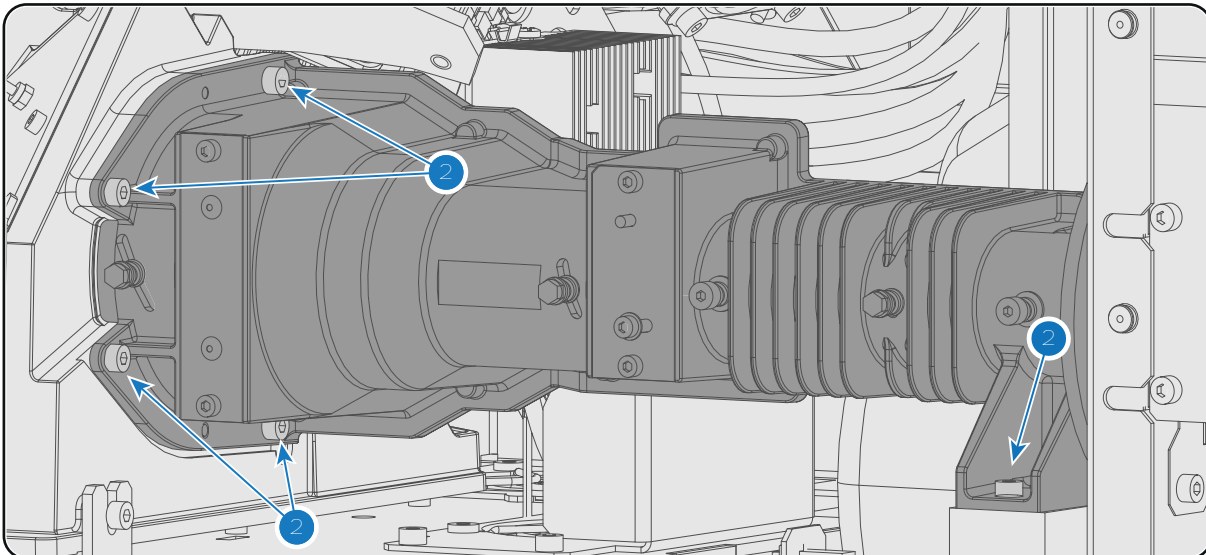


Image 10-16

3. Connect the wire (reference 1 Image 10-17) of the temperature sensor.

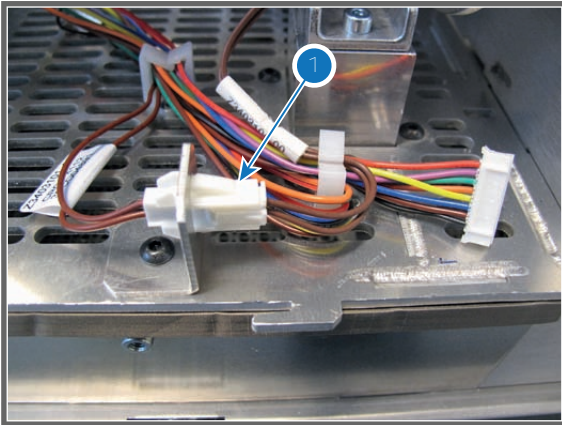


Image 10-17

10.11 Adjusting the Light Pipe lens No1 (focus lens)



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



To adjust the Light Pipe focus lens the left cover of the projector and the side cover plate of the Light Processor compartment have to be removed.

Required tools

Nut driver 5.5 mm

How to adjust the Light Pipe focus lens?

1. Loosen the adjustment screw of the focus lens (reference 2 Image 10-18) a few turns. Use a 5.5 mm nut driver. Do not remove the adjustment screw.
2. Start up the projector but do not activate the light source yet.
3. Set up the projector to display a **full white internal pattern** with a maximum contrast and a **maximum dimming**, without activating the light source. Make sure that you have a 5.5 mm nut driver within reach for the next steps.
4. Activate the light source and zoom the projector lens in or out until the projected image is focused.



Note: Dialog windows must be displayed sharp instead of blurry. This is independent of the focus of the light beam.

5. Gently move the adjustment screw (reference 2 Image 10-18) of the Light Pipe focus lens **UP** or **DOWN** into a position which projects the sharpest possible edges on the screen (**FOCUS**). Use a 5.5 mm nut driver as an extension bar of the adjustment screw. This allows a more precise adjustment.



Warning: The adjustment screw of the Light Pipe focus lens is hot. To prevent burn injuries use 5.5mm nut driver for moving the Integration Rod.

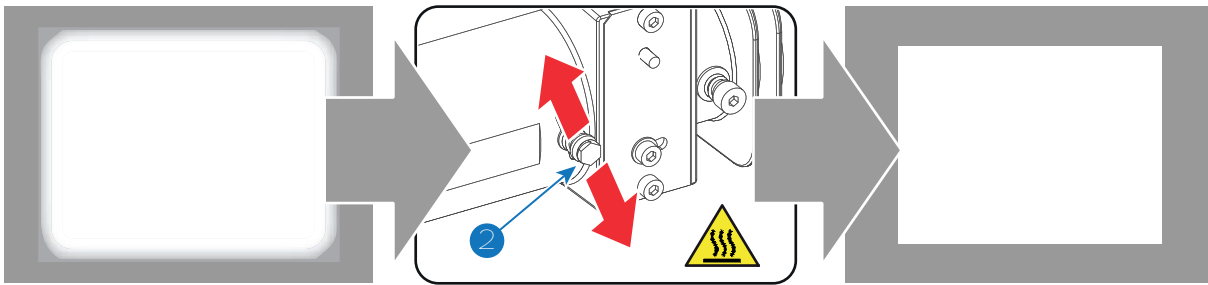


Image 10-18

- Fasten the adjustment screw (reference 1 Image 11-9) which you released in step 1. Use a 5.5 mm nut driver.



When you are familiar with this adjustment procedure you can optimize the focus position by first rotate the Integration Rod until you clearly see the sloped edges on the screen and then focusing these edges as sharp as possible. Then rotate the Integration Rod back until the projected light beam matches the projected outline of the DMD's. This way of focusing has to be done quickly. Otherwise, the sealing between the DMD's and the prism will be damaged

10.12 Adjusting the Light Pipe lens No3 (zoom lens)

Purpose of the Light Pipe zoom lens

The Light Pipe zoom lens is located inside the Light Pipe between the Integration Rod and the Fold Mirror. The light spot upon the DMDs can be reduced or enlarged with the Light Pipe zoom lens to fit with the outline of the DMDs.



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



To adjust the Light Pipe focus lens the left cover of the projector and the side cover plate of the Light Processor compartment have to be removed.

Required tools

Nut driver 5.5 mm

How to adjust the Light Pipe zoom lens?

- Loosen the adjustment screw of the Light Pipe zoom lens (reference 5 Image 10-18) a few turns. Use a 5.5 mm nut driver. Do not remove the adjustment screw.
- Start up the projector but do not activate the light source yet.
 - Caution:** Projecting a light spot which is larger than the DMD outline for more than 10 seconds may cause irreversible damage to the Sealed Light Processor. Therefore, it is important to maximum dim the light output and adjust the light spot as quickly as possible.
- 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 5.5 mm nut driver within reach for the next steps.
- Activate the light source and zoom the projector lens in or out until the projected image is focused.
 - Note:** Dialog windows must be displayed sharp instead of blurry. This is independent of the focus of the light beam.
- Adjust the position of the Light Pipe zoom lens by moving the adjustment screw (reference 5) **UP** or **DOWN** into a position where the light spot (reference 2) matches the projected outline (reference 3) of the DMDs upon

the screen (reference 4). Use a 5.5 mm nut driver as an extension bar of the adjustment screw. This allows a more precise adjustment.

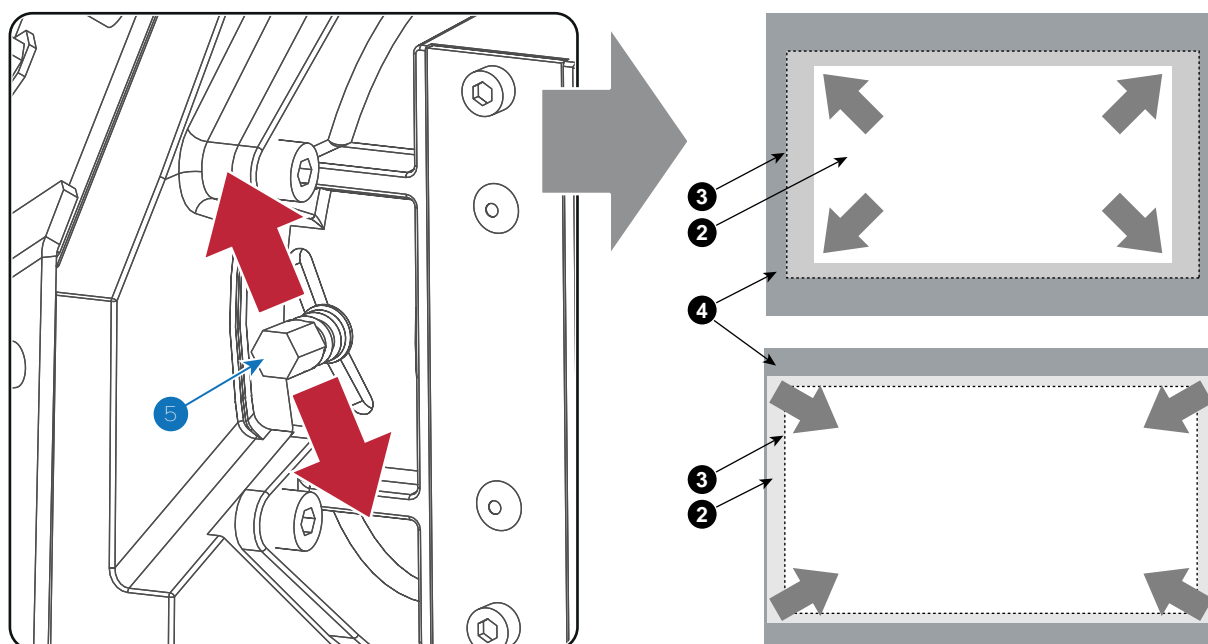


Image 10-19

Warning: The adjustment screw of the Light Pipe focus lens is hot. To prevent burn injuries use 5.5mm nut driver for moving the Integration Rod.

- Fasten the adjustment screw (reference 5 Image 11-9) which you released in step 1. Use a 5.5 mm Allen wrench.

10.13 Replacing the Notch Filter



The Light Processor and the Notch Filter are matched. When replacing the Light Processor the Notch Filter needs to be replaced as well. The Light Processor spare part kit contains the matched Notch filter.



To access the old Notch Filter, installed inside the projector, the left side cover and side cover plate has to be removed from the projector. This procedure assumes that the left side cover and side cover plate are already removed from the projector.

Matching Notch Filter

On the front side of the Light Processor either a Green, Red, Yellow or no colored dot is applied. (green, red or yellow). The Notch Filter has only a Green or a Red colored dot.

Light Processor	→	Matching Notch Filter
● GREEN	→	● GREEN
● RED	→	● RED
● YELLOW	→	● GREEN or ● RED
No colored dot.	→	● GREEN

Required tools

2.5mm Allen wrench.

How to replace the Notch Filter?

1. Remove the old Notch Filter from the Light Pipe by releasing the two hexagon head cap screws (reference 1 Image 10-20) as illustrated. Use for that a 2.5mm Allen wrench.

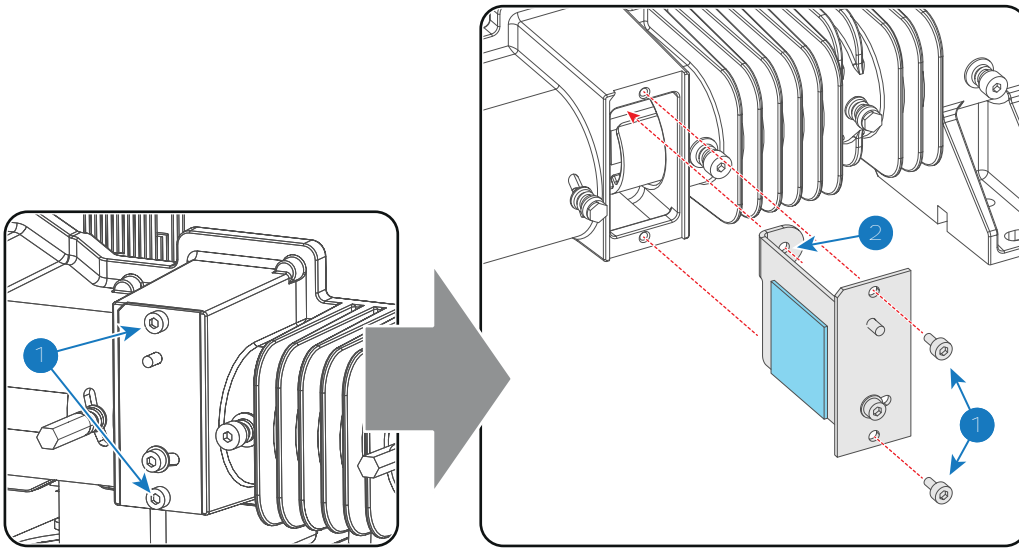


Image 10-20

2. Insert a new Notch Filter. Note that the Notch Filter has a mounting hole (reference 2 Image 10-20) which must match the mounting pin inside the Light Pipe.

Caution: Do not touch the Notch Filter with bare fingers. To clean the Notch Filter see procedure “Cleaning the Notch Filter”, page 130.

Caution: Ensure that the colored dot on the Notch Filter matches with the colored dot on the front side of the Light Processor.

3. Fasten the Notch Filter with two hexagon head cap screws (reference 1 Image 10-20). Use for that a 2.5mm Allen wrench.
4. Readjust the Notch Filter. See procedure “Adjusting the Notch Filter”, page 128.

10.14 Adjusting the Notch Filter

Purpose of the Notch Filter

The Notch Filter is a coated glass plate located in the middle of the Light Pipe assembly. The Notch Filter applies some small color corrections of the light coming out of the Light Pipe, which is emitted by the light source of the projector. This is done to achieve an optimal color calibration of the native colors. The Notch Filter can slightly turn, with respect to the light path, which allows a small adjustment of the native colors. Note that, next to the pure optical color calibration by the Notch Filter there is also a software color calibration.

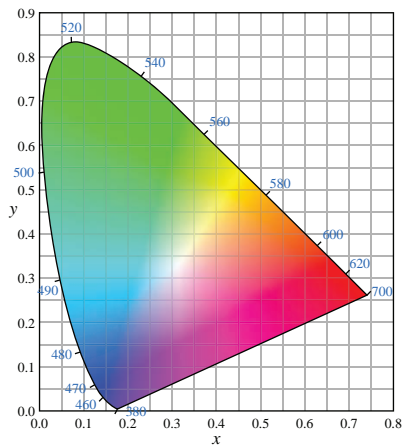


Image 10-21: Color triangle.

Target range for x, y Chroma values

- **Uncorrected GREEN:** (changes together with red)
 - x : 0.245 – 0.285
 - y : 0.67 – 0.71
- **Uncorrected RED:** (changes together with green)
 - x : 0.67 – 0.69
 - y : 0.31 – 0.33
- **Uncorrected BLUE:** (no impact)
 - x : 0.12 – 0.16
 - y : 0.02 – 0.8



To access the Notch Filter the left side cover and the side cover plate have to be removed from the projector. This procedure assumes that the left side cover and side cover plate are already removed from the projector.

Required tools

- 2.5mm Allen wrench.
- Colorimeter (e.g. CS-200 chroma meter from Konica Minolta or the PR-650 SpectraScan® from Photo Research)

How to adjust the Notch Filter?

1. Release the adjustment screw (reference 2 Image 10-22) of the Notch Filter a few turns. Use for that a 2.5mm Allen wrench.

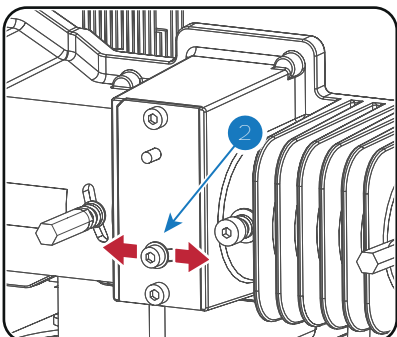


Image 10-22

2. Start up the projector.
3. Display an uncorrected RED test pattern.



Tip: See user guide of the Communicator software for detail instructions about color calibration

4. Measure the x and y values of the projected RED test pattern. Use for that a colorimeter. Make sure that the RED test pattern is uncorrected.
5. Slightly move the adjustment screw (reference 2 Image 10-22) of the Notch Filter to a position until the measured x and y values for RED are within the required specs (see above).
6. Display an uncorrected GREEN test pattern.
7. Measure the x and y values of the projected GREEN test pattern. Use for that a colorimeter. Make sure that the GREEN test pattern is uncorrected.
8. Slightly move the adjustment screw (reference 2 Image 10-22) of the Notch Filter to a position until the measured x and y values for GREEN are within the required specs (see above).
9. Repeat from step 3 until no adjustment is required and all measured x and y values for RED and GREEN are within the required specs (see above).
10. Fasten the adjustment screws (reference 2 Image 10-22) to secure the position of the Notch Filter. Use for that a 2.5mm Allen wrench. Make sure that the position of the Notch Filter remains unchanged while fastening the screw.

10.15 Cleaning the Notch Filter

When should one clean the Notch Filter?

Only clean the Notch Filter in case it is really necessary. This means in case dust is clearly visible upon the surface of the Notch Filter.



This procedure requires removal of the Notch Filter.

Required tools

- Compressed air.
- Clean Toraysee® cloth or any micro fiber lens cleaning cloth.
- Clean cotton cloth.

Required parts

Lens cleaner (e.g. Carl Zeiss lens cleaner or Purasol® or any waterbased lens cleaner)

How to clean the Notch Filter?

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.

10.16 Replacing the Fold Mirror set



This procedure assumes that the Light Processor and the Light Pipe lens No4 are already removed.

Required tools

- 2.5mm Allen wrench.
- 5.5mm nut driver.
- Caliper.
- Clean cotton gloves.

How to replace the fixed Fold Mirror and the adjustable Fold Mirror?

1. Disconnect the wire unit (reference 1 Image 10-23 or Image 10-24) of the Light Sensor module.

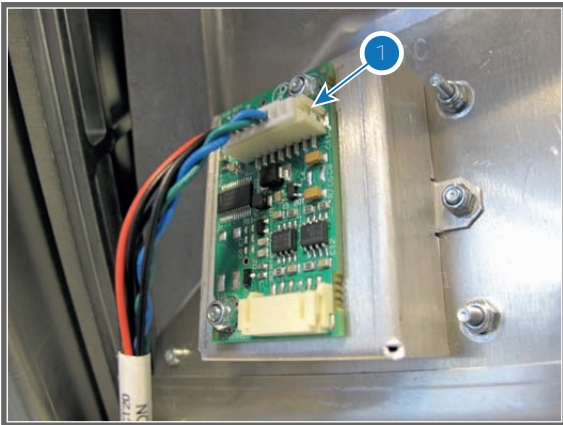


Image 10-23: Type "A" Light Sensor.

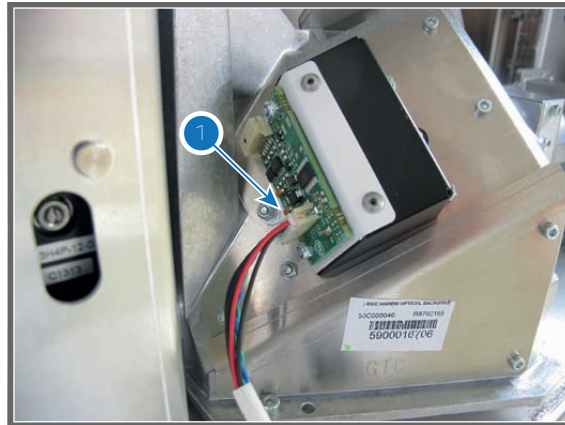


Image 10-24: Type "B" Light Sensor.

2. Remove the side cover plate from the Corner Block. Use a 2.5mm Allen wrench to loosen the three screws (reference 1 Image 10-25).

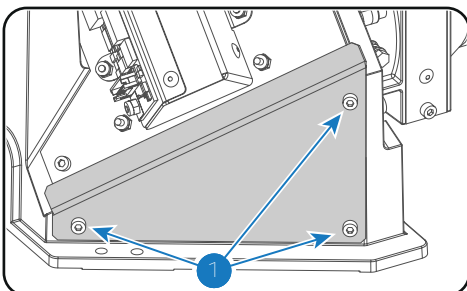
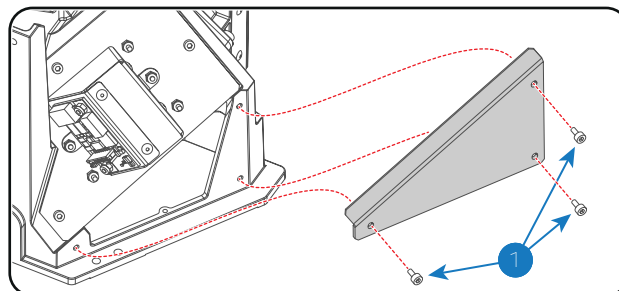


Image 10-25



3. Carefully remove the Light Sensor assembly from the Corner Block. Use a 2.5mm Allen wrench to loosen the four screws (reference 2 Image 10-26).



Caution: The adjustable Fold Mirror is attached on the bottom side of the assembly.

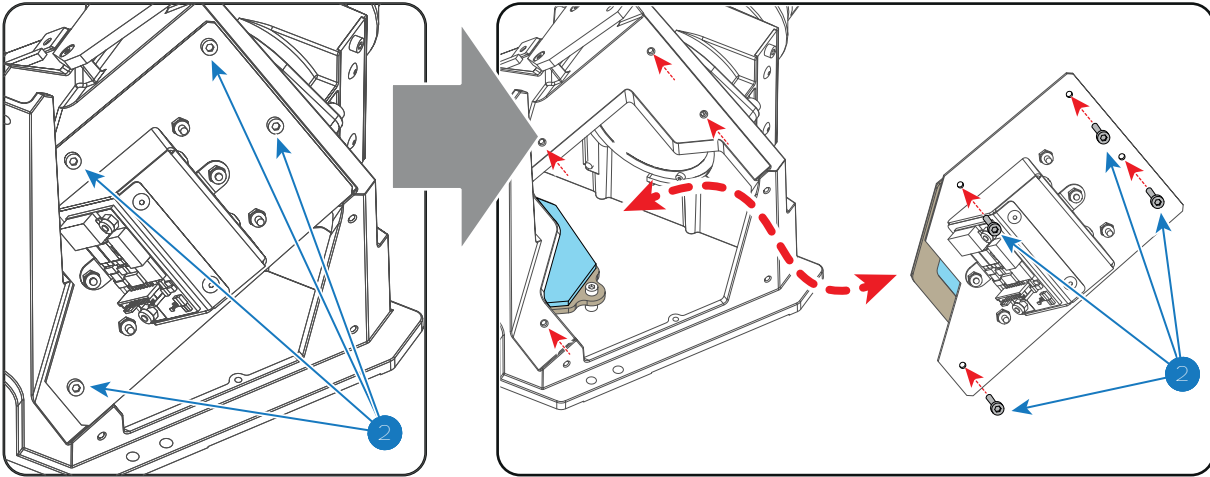




Image 10-26

4. Replace the fixed Fold Mirror at the base of the Corner Block. Use a 2.5mm Allen wrench to loosen the three fixation screws (reference 3 & 4 Image 10-27).

 **Note:** To access the two fixation screws with reference 3 in Image 10-27 the Light Processor and the Light Pipe lens No4 have to be removed. This procedure assumes that these components are already removed.

 **Caution:** Do not touch the surface of the Fold Mirror. Use cotton gloves to handle the Fold Mirror. Ensure that the Fold Mirror remains clean.

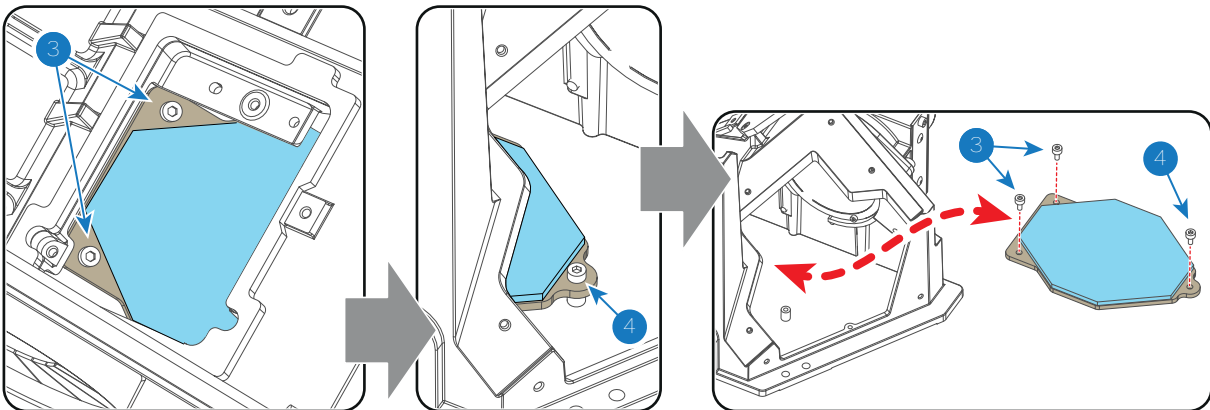



Image 10-27

5. Replace the adjustable Fold Mirror at the bottom of the Light Sensor assembly as illustrated. Use a 5.5mm nut driver to loosen the three adjustment nuts (reference 5 Image 10-28). Reuse the three springs (reference 7 Image 10-28) and the three plain washers (reference 6 Image 10-28) on the threaded rods of the new adjustable Fold Mirror.

 **Caution:** Do not touch the surface of the Fold Mirror. Use cotton gloves to handle the Fold Mirror. Ensure that the Fold Mirror remains clean.

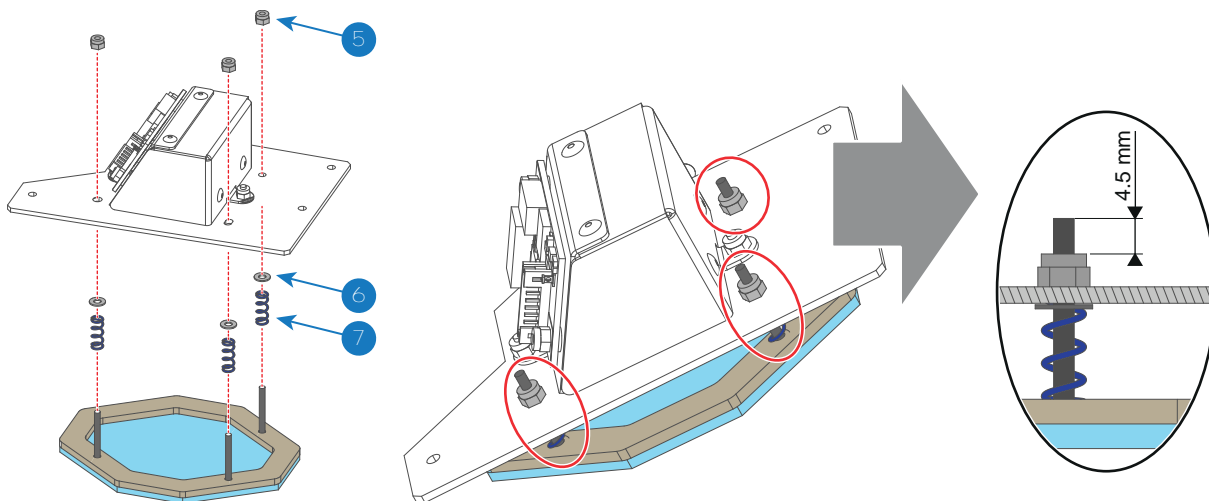


Image 10-28

6. Adjust the Fold Mirror for **nominal position**. Do this by turning each adjustment nut in or out until the threaded rod **4.5mm** sticks out above the adjustment nut. See detail in Image 10-28.
7. Carefully install the Light Sensor assembly on the Corner Block. Use a 2.5mm Allen wrench to fasten the four screws (reference 2 Image 10-26).
8. Install the side cover plate of the Corner Block. Use a 2.5mm Allen wrench to fasten the three screws (reference 1 Image 10-25).
9. Connect the wire of the Light Sensor module.



The adjustable Fold Mirror has to be readjusted after replacement!

10.17 Adjusting the Fold Mirror

Purpose of the Fold Mirror

The Fold Mirror is folding up the light path of the projector to make the projector more compact. The Fold Mirror is located at the left side of the Light Pipe and reflects the light, which entrance the Light Pipe via the Integration Rod, upon the prism of the Light Processor. The position of the light spot upon the DMD's can be adjusted with the Fold Mirror.



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.



To access all three adjustment screws of the Fold Mirror the left side projector cover and the side plate of the Light Processor compartment have to be removed. This adjustment procedure assumes that these components are already removed.

Required tools

5.5 mm nut driver.

How to adjust the Fold Mirror of the projector?

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

Caution: Projecting a misaligned spot for more than 10 seconds may cause irreversible damage to the Light Processor. Always apply maximum dimming to the light output, and adjust the light spot as quickly as possible.

2. Turn the adjustment screws A, B or C in or out until the light spot (5) matches with the outline of the DMDs (4). Use a 5.5mm nut driver. The illustration below shows the movements of the light spot (5) upon the screen (6) for each adjustment screw.

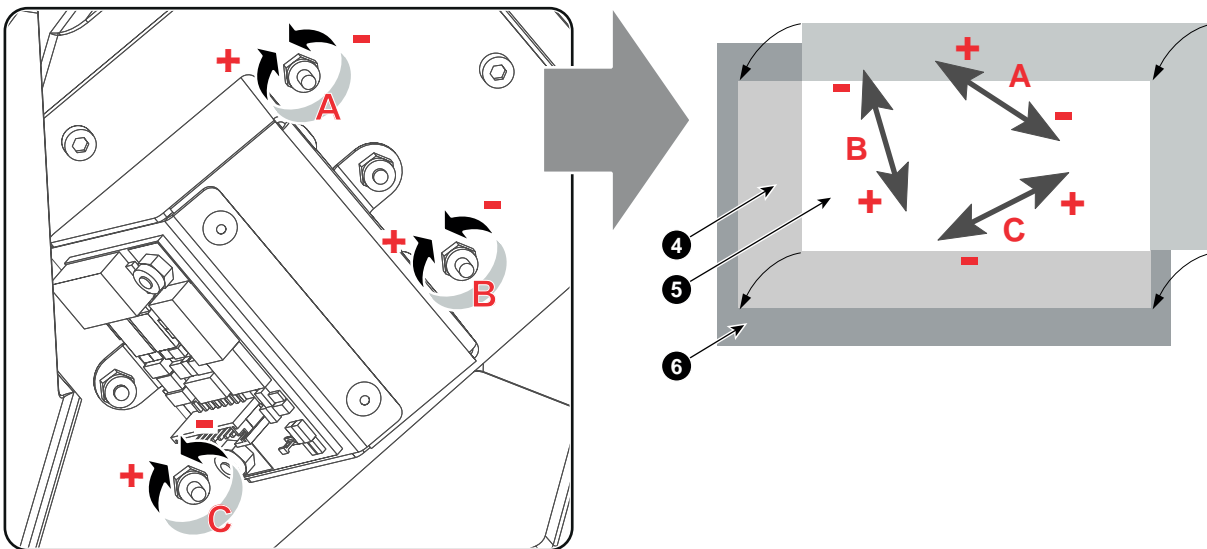


Image 10-29



Turn the three adjustment screws of the Fold Mirror equally bit by bit clockwise 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.

10.18 Cleaning the Fold Mirrors

When should one clean the Fold Mirror?

Only clean the Fold Mirror in case it is really necessary. This means in case dust is clearly visible upon the surface of the Fold Mirror.



This procedure requires removal of the adjustable Fold Mirror. The fixed Fold Mirror at the bottom of the Corner Block is accessible when the adjustable Fold Mirror is removed.

Required tools

- Compressed air.
- Clean Toraysee® cloth or any micro fiber lens cleaning cloth.
- Clean cotton cloth.

Required parts

Lens cleaner (e.g. Carl Zeiss lens cleaner or Purasol® or any waterbased lens cleaner)

How to clean the 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.

10.19 Replacing the High Contrast plate

Required tools

2.5mm Allen wrench.

How to replace the High Contrast plate?

1. Remove the two fixation screws of the High Contrast plate (reference 1 Image 10-30). Use a 2.5mm Allen wrench.
2. Remove the High Contrast plate and insert the new one.
3. Fasten the High Contrast plate with two screws (reference 1 Image 10-30). Use a 2.5mm Allen wrench.

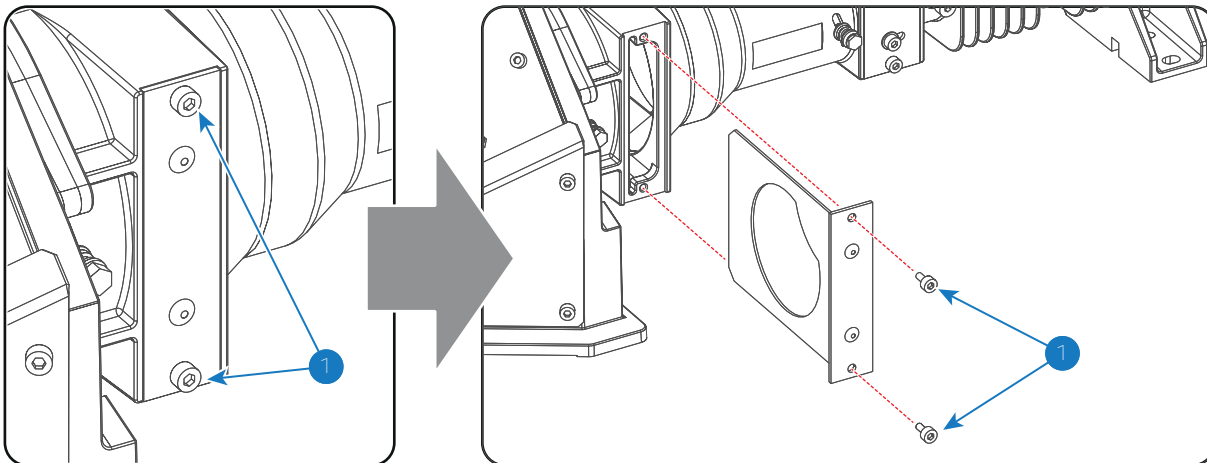


Image 10-30

10.20 Replacing the Light Sensor module (CLO)



WARNING: Disconnect the power cord from the projector and wait a few minutes (to discharge the capacitors) prior to start with this procedure.



This procedure assumes that the left side projector cover and the side plate of the Light Processor compartment are already removed.

Required tools

- 5.5mm nut driver.
- 5.5mm open-end wrench.

How to replace the Light Sensor of the Light Pipe?

1. Disconnect the wire unit (reference 1 Image 10-31 or Image 10-32) of the Light Sensor module.

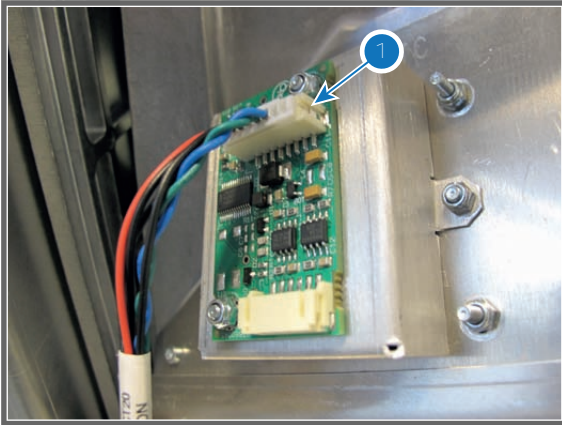


Image 10-31: Type "A" Light Sensor.



Image 10-32: Type "B" Light Sensor.

2. Remove the Light Sensor module by loosening the two nuts (reference 2 Image 10-33).



Note: There exist two types of Light Sensors: type "A" (Image 10-31) and type "B" (Image 10-32). In case of type "B" the fixation nuts (reference 2 Image 10-33) are not accessible with a 5.5mm nut driver. Either use 5.5mm open end wrench or first remove the Light Sensor housing from the Light Pipe.

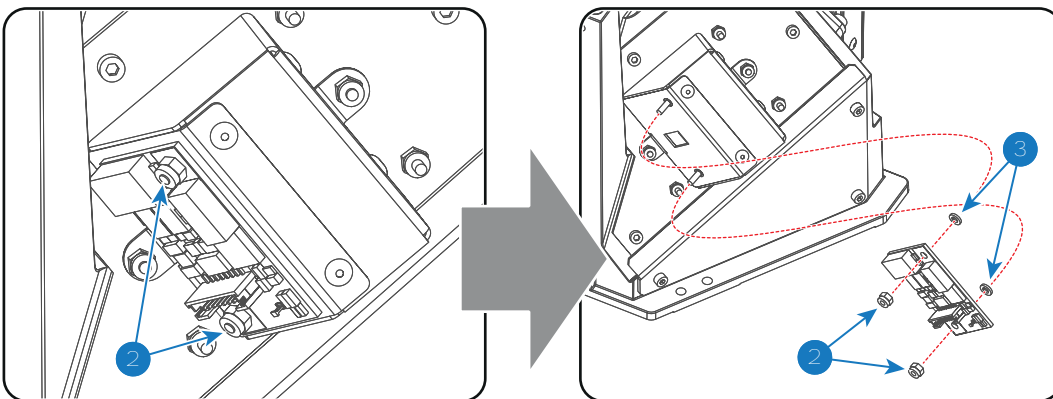


Image 10-33

3. Install the new Light Sensor. Use 5.5mm open end wrench to fasten the two nuts (reference 2 Image 10-33).



Note: There must be a plastic spacer (reference 3 Image 10-33) between the Light Sensor board and chassis. Normally the plastic spacers remained seated on the threaded rods when the Light Sensor board was removed.

4. Connect the wire unit of the Light Sensor module.
5. Install the side plate of the Light Processor compartment and the left side projector cover.
6. Connect the power cord and switch on the projector.
7. Create a new Light Sensor Calibration file (LSC file). See Communicator User Guide.

10.21 Replacement of the Light Pipe fan



To access the fan of the Light Pipe in the Light Processor compartment the left side projector cover and the side cover plate of the Light Processor compartment has to be removed. This procedure assumes that these components are already removed from the projector.

Required tools

3mm Allen wrench.

How to replace the fan of the Light Pipe?

1. Disconnect the wire (reference 1 Image 10-34) of the fan.

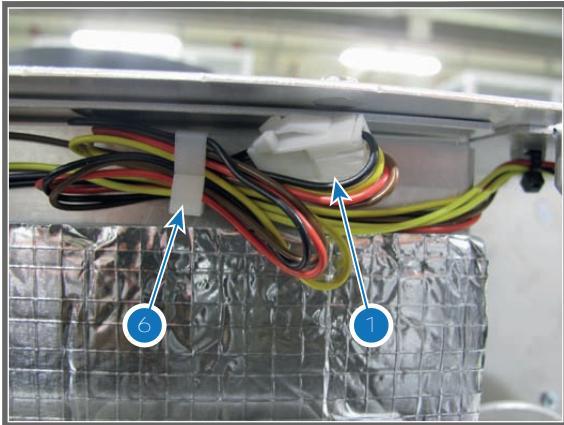


Image 10-34

2. Remove the fan from the chassis. Use a 3mm Allen wrench to loosen the four fixation screws of the fan (reference 3 Image 10-35).
3. Install the new fan as illustrated. Place a fan guard (reference 4 Image 10-35) at both sides of the fan (reference 5 Image 10-35) . Fixate fan and fan guards with four long screws (reference 3 Image 10-35) using a 3mm Allen wrench.

! **Caution:** Ensure that the airflow of the fan is towards the Light Pipe.

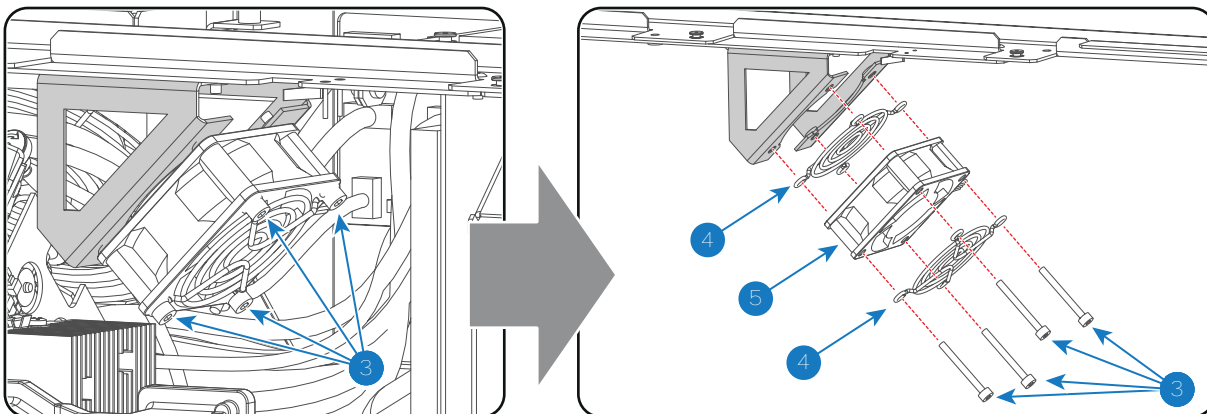


Image 10-35

4. Connect the wire of the fan. (reference 1 Image 10-34)
5. Guide wire of the fan through the cable clamp (reference 6 Image 10-34).

Integration Rod

11

About this chapter

This chapter describes briefly the functionality of the Integration Rod, how to diagnose the Integration Rod, how to replace the Integration Rod and how to adjust the Integration Rod.

Overview

- Introduction of the Integration Rod
- Integration Rod diagnostic
- Removal of the Mask plate and Rod heatsink
- Replacing the Integration Rod
- Installing the Mask plate and Rod heatsink
- Adjusting the Integration Rod

11.1 Introduction of the Integration Rod

Functionality of the Integration Rod

The Integration Rod is made of fused silica and is approximately 14 centimeter long. The cross-section of the rod has the same aspect ratio as the active surface of the DMD's used in the Light Processor. The function of the Integration Rod is to match the shape of the light path to the shape of the DMD's and to neutralize the hot spot effect caused by the light source.

The Integration Rod is located at the entrance of the Light Pipe. The light emitted by the light source is reflected via the Cold Mirror into the rod, which integrates the incoming light into a homogeneous rectangle shaped beam of light.

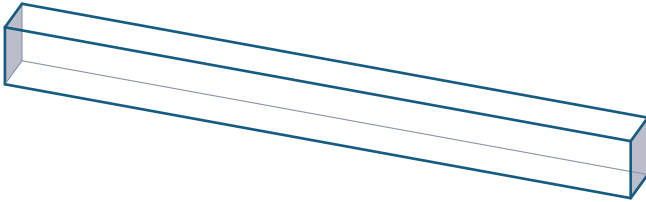


Image 11-1

The entrance and exit side of the Integration Rod are coated to achieve optimal performance. Clearly the rod may never be contaminated with grease, dirt, liquid or the such. For optimal protection the rod is mounted on an aluminium rod holder, which requires replacing together with the rod. The Integration Rod and the aluminium rod holder together form the "Integration Rod assembly".

Parts Integration Rod assembly

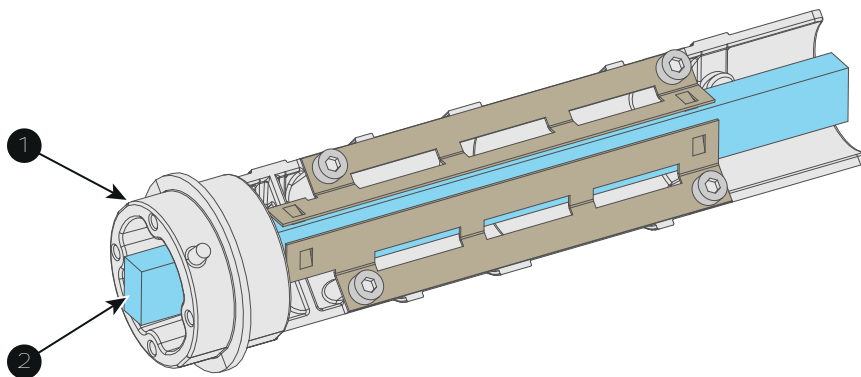


Image 11-2

- 1 Integration Rod housing.
- 2 Integration Rod (entrance side).



CAUTION: Never touch the entrance or exit of the Integration Rod assembly. Greasy fingerprints or other dirt on the Integration Rod entrance or exit will burn into the rod and cause permanent damage.

11.2 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 a damages to the rod please diagnose the rod as described in the following procedure.


Required tools


- 7mm flat screw driver.

- 3mm Allen wrench.
- 5.5mm nut driver.

How to diagnose the Integration Rod of the projector?

1. Remove the left cover of the projector and the side cover plate of the Light Processor compartment.
2. Switch on the projector and project a white test pattern. See user manual of the projector to do so. Make sure that the projected white test pattern is focused.
3. Loosen the adjustment screw (reference 1 Image 11-3) a few turns. Use a 5.5mm nut driver. Do not remove the adjustment screw.
4. Gently move the adjustment screw of the Integration Rod assembly up and down while watching the projected image.

 **Warning:** The adjustment screw of the Integration Rod is hot. To prevent burn injuries use 5.5mm nut driver for moving the Integration Rod.

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

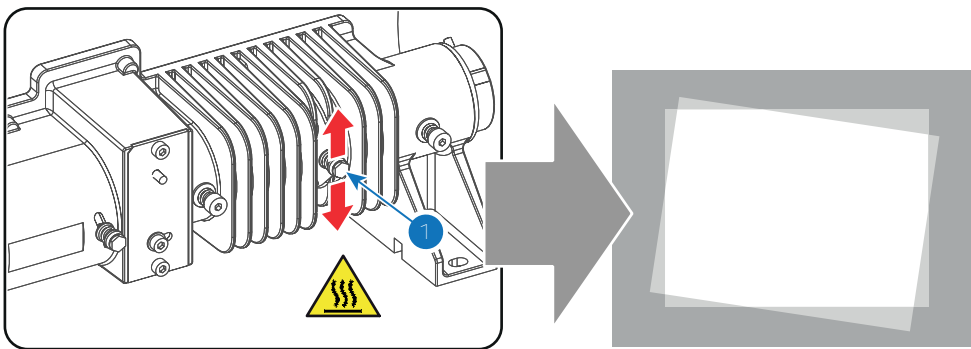


Image 11-3

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**, Integration Rod is OK. Re-adjust and secure the Integration Rod and reinstall the side cover plate and projector cover.

11.3 Removal of the Mask plate and Rod heatsink



This procedure assumes that the Light Pipe is removed from the projector.




CAUTION: Take into account that the Mask plate and Rod heatsink are mounted very close to the Rod entrance. The Rod is extremely fragile! Avoid touching the Rod at all times. A minor collision is sufficient to cause irreversible damage to the Rod.

Required tools

- TX10 Torx driver.
- Cotton gloves.
- 2.5mm Allen wrench.


How to remove the Mask plate and Rod heatsink from the Light Pipe entrance?

1. Remove the two fixation screws (reference 4 Image 11-4) of the Mask plate (reference 5 Image 11-4). Hold the Mask plate into position. Use a TX10 Torx driver.


 **Note:** The Mask plate of the DP2K-SLP Series has to be reused when installing the 3D color wheel.

 **Tip:** Wear cotton gloves to prevent fingerprints on the Mask plate.


2. Remove the Mask plate (reference 5 Image 11-4).

 **Caution:** Ensure that the Mask plate does NOT touches the Rod!

3. Remove the two fixation screws (reference 6 Image 11-4) of the Rod heatsink (reference 7 Image 11-4). Use a TX10 Torx driver.

 **Caution:** Ensure that the Rod heatsink does NOT touches the Rod!

4. Remove the Rod heatsink (reference 7 Image 11-4).

 **Note:** The temperature sensor mounted on the Rod heatsink has to be reused when installing the 3D color wheel. Use a 2.5mm Allen wrench to remove the temperature sensor from the Rod heatsink.

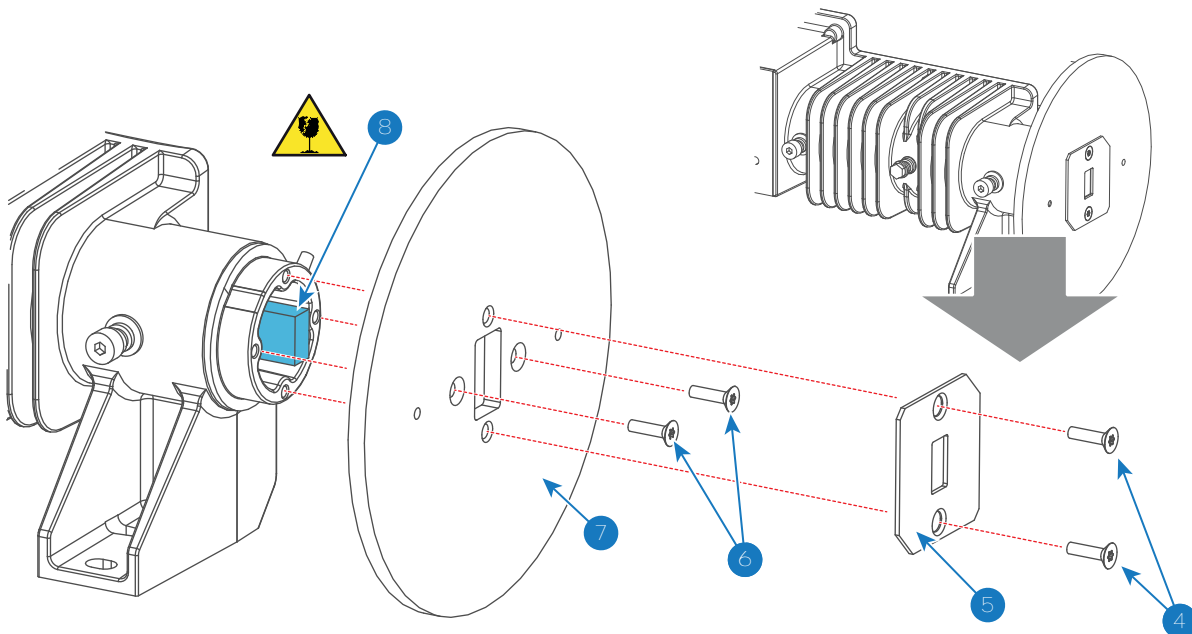


Image 11-4

11.4 Replacing the Integration Rod



To replace the Integration Rod the Light Pipe has to be removed from the Corner Block. This procedure assumes that the Light Pipe is already removed.

Required tools

- Cotton gloves.
- 2.5mm Allen wrench.
- 5.5mm nut driver.

How to replace the Integration Rod?

1. Remove the Mask plate and Rod heatsink. See procedure “Removal of the Mask plate and Rod heatsink”, page 141.

2. Remove the two fixation screws (reference 1 Image 11-5) of the Integration Rod. Note that a plain washer and spring (reference 2 & 3 Image 11-5) comes loose together with the fixation screw. Use a 2.5mm Allen wrench.
3. Remove the adjustment screw (reference 4 Image 11-5) of the Integration Rod. Note that a plain washer and spring (reference 5 & 6 Image 11-5) comes loose together with the adjustment screw. Use a 5.5mm nut driver.
4. Carefully slide the Integration Rod assembly (reference 7 Image 11-5) out of the Light Pipe.

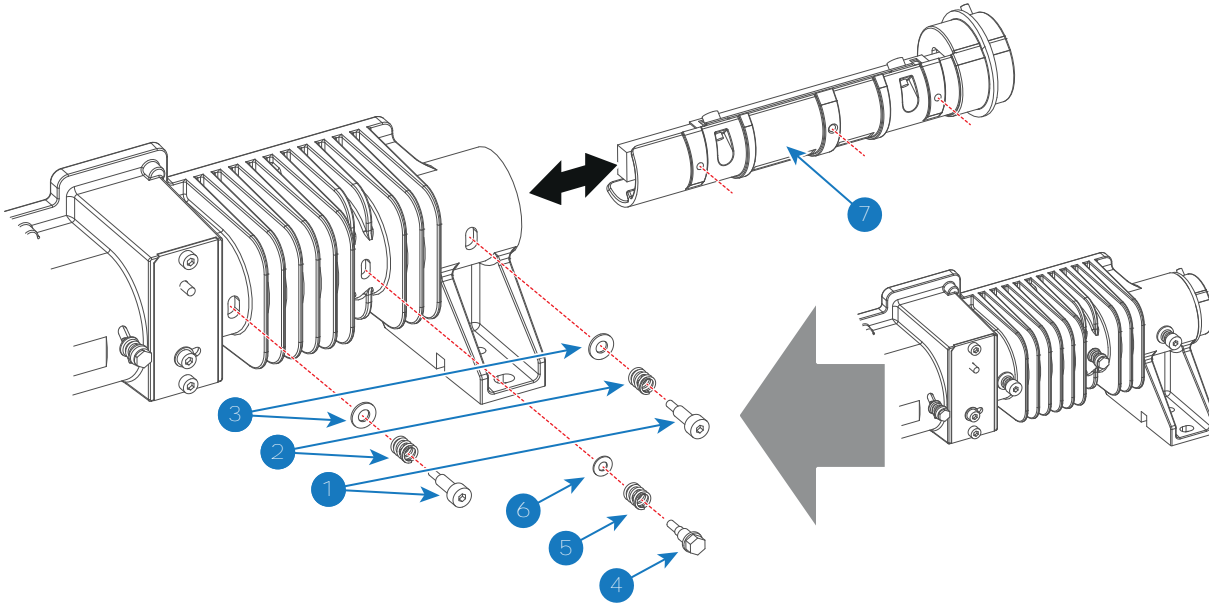


Image 11-5

5. Carefully slide the new Integration Rod assembly in the Light Pipe. Ensure that the three mounting holes of the Integration Rod assembly are oriented towards the three holes in the Light Pipe housing to insert the screws.



Caution: Wear cotton gloves and do not touch the glass of the Integration Rod. Furthermore, ensure that nothing hits accidentally the glass of the Integration Rod.



Note: The spare part Integration Rod assembly comes with a protective cap mounted on the Rod entrance side (reference 9 Image 11-6). This protective cap remains until the Integration Rod assembly is fully installed.

6. Insert the two fixation screws (reference 1 Image 11-5) of the Integration Rod as illustrated. Place a spring and a plain washer (reference 2 & 3 Image 11-5) on each fixation screw. Use a 2.5mm Allen wrench.
7. Insert the adjustment screw (reference 4 Image 11-5) of the Integration Rod. Place a spring and a plain washer (reference 5 & 6 Image 11-5) on the adjustment screw. Use a 5.5mm nut driver.
8. Carefully remove the protective cap from the Integration Rod entrance. Use a 2.5mm Allen wrench.

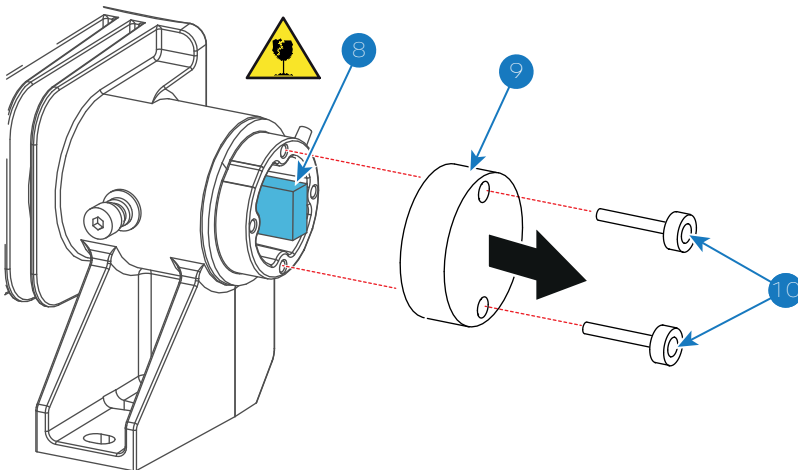


Image 11-6

9. Install the Mask plate and Rod heatsink. See procedure “Installing the Mask plate and Rod heatsink”, page 144.



The Integration Rod has to be readjusted after replacement.

11.5 Installing the Mask plate and Rod heatsink



CAUTION: Take into account that the Mask plate and Rod heatsink are mounted very close to the Rod entrance. The Rod is extremely fragile! Avoid touching the Rod at all times. An minor collision is sufficient to cause irreversible damage to the Rod.

Required tools

- TX10 Torx driver.
- Cotton gloves.
- 3mm Allen wrench.

How to install the Mask plate and Rod heatsink onto the Light Pipe entrance?

1. Install the Rod heatsink as illustrated (reference 7 Image 11-7). Fasten the Rod heatsink with two Torx **countersunk** head screws (reference 6 Image 11-7). Use a TX10 Torx driver.



Note: The Rod heatsink is provided with a temperature sensor (reference 1). This temperature sensor must facing the Light Pipe as illustrated in Image 11-8.



Caution: Ensure that the Rod heatsink does NOT touches the Rod!



Caution: Any contact with the integration rod may cause damage.

2. Install the Mask plate (reference 5 Image 11-7) with the **shiny side facing outwards** as illustrated. Use the Mask plate with engraved number **R8761960**.. Fasten with two Torx **countersunk** head screws (reference 6 Image 11-7). Use a TX10 Torx driver.



Caution: Ensure that the Mask plate does NOT touches the Rod!



Tip: Wear cotton gloves to prevent fingerprints on the Mask plate.

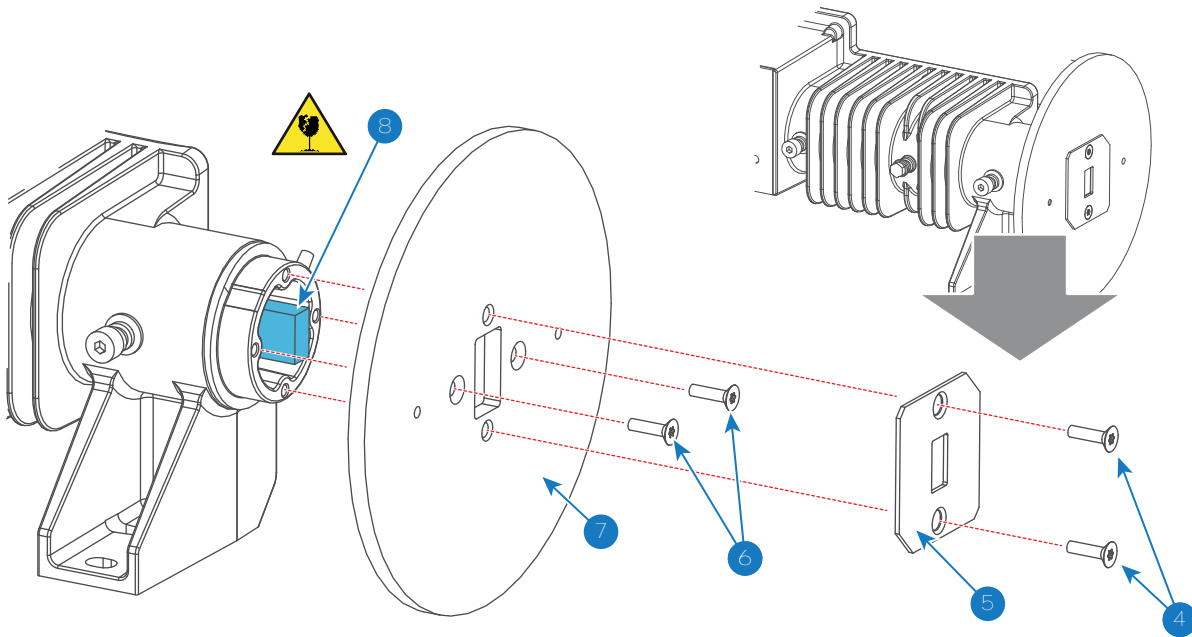


Image 11-7

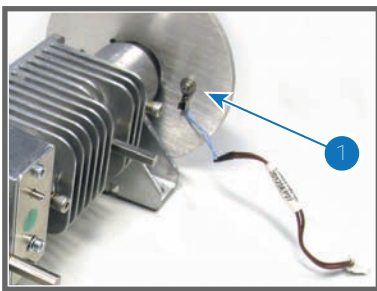


Image 11-8

11.6 Adjusting the Integration Rod



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




To adjust the Integration Rod the left cover of the projector and the side cover plate of the Light Processor compartment have to be removed.

Required tools


5.5mm nut driver.

How to adjust the Integration Rod of the projector?


1. Loosen the adjustment screw (reference 1 Image 11-9) a few turns. Use a 5.5 mm nut driver. Do not remove the adjustment screw.
2. Start up the projector but do not activate the light source yet.
3. 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 5.5 mm nut driver 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.


4. Activate the light source and zoom the projector lens in or out until the projected image is focused.

 **Note:** Dialog windows must be displayed sharp instead of blurry. This is independent of the focus of the light beam.

5. Gently move the adjustment screw (reference 1 Image 11-9) of the Integration Rod **UP** or **DOWN** until the projected light beam matches the projected outline of the DMD's (**ROTATION**). Use a 5.5 mm nut driver as an extension bar of the adjustment screw. This allows a more precise adjustment.

 **Warning:** The adjustment screw of the Integration Rod is hot. To prevent burn injuries use 5.5mm nut driver for moving the Integration Rod.

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 indicates that the exit side of the Integration Rod is contaminated with dust.

 If this is the case, remove the Notch Filter and try to blow away the dust.

If this doesn't help replace the Integration Rod.

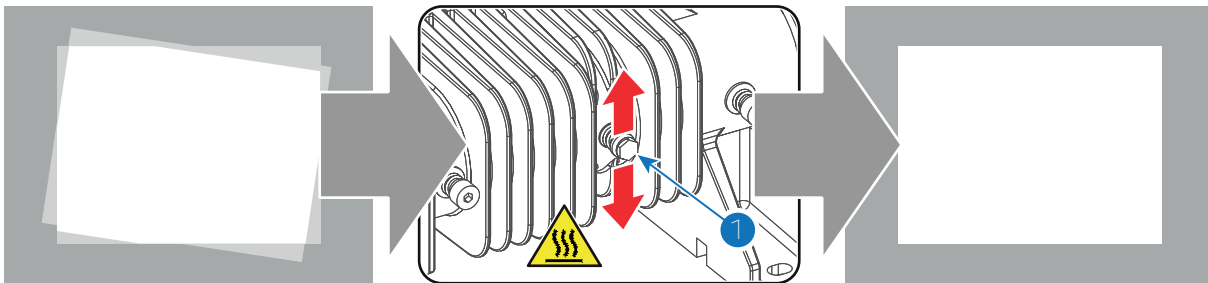



Image 11-9

6. Fasten the adjustment screw (reference 1 Image 11-9) which you released in step 1. Use a 5.5 mm Allen wrench.

 It's recommended to check the Light Pipe focus (Lens No1) and the Light Pipe zoom (Lens No3) after adjusting the Integration Rod.

Optical alignment

12

12.1 Aligning the optical path



This procedure assumes that the projector is powered on and Communicator is active on your PC.

Required tools

- Allen wrench 3 mm
- Small flat screwdriver
- Photometer

How to align the optical path

1. In Communicator, under *Laser Services*, activate **Optical alignment**. For more info, refer to the user manual for Communicator.
2. Set up the projector to display a **full white pattern**.
3. Use the photometer to measure the current light output.
4. Loosen the four fixation screws and remove the two cover plates (reference 1).

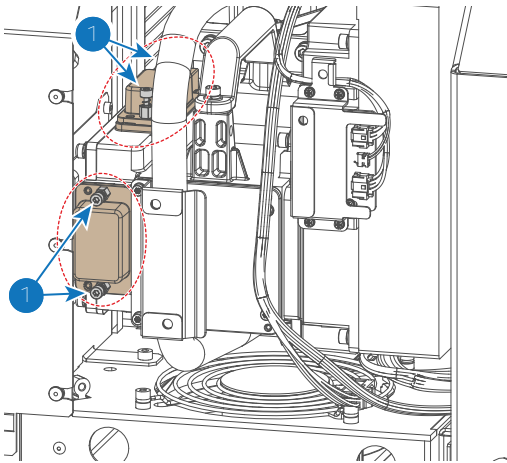


Image 12-1

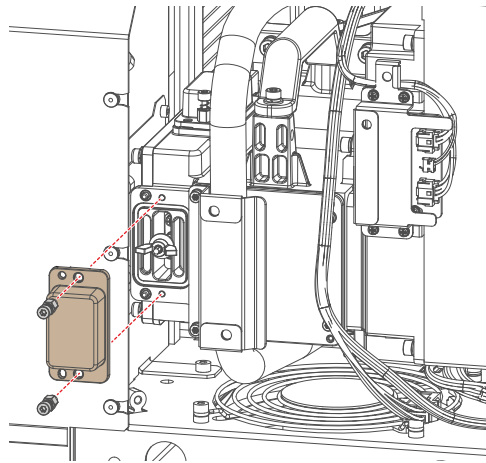


Image 12-2

5. Loosen the two wing nuts (reference 2), but do not remove them.

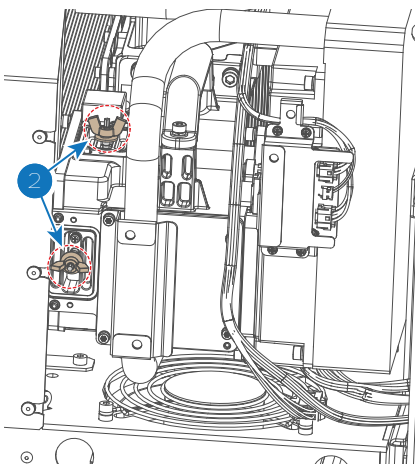


Image 12-3

6. Manipulate the phosphor wheel to maximize the light output. Use a small flat screwdriver to turn the two position screws either clockwise or counterclockwise.



Tip: Each small manipulation of these two screws will have an impact on the light output. Keep an eye on the photometer to spot the point where the light output is the highest. Ignore the direction arrows underneath each screw. These arrows only reflect internal mechanics and do not reflect the impact on the projected image.

Spatial Color Calibration (LUT- SCC)

13

About this chapter

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.

Overview

- Introduction to SCC file
- Obtain the Serial Number of the installed Light Processor
- Download the LUT-SCC file from the Barco website
- Upload Spatial Color Calibration file
- Activate Spatial Color Calibration file

13.1 Introduction to SCC file

Introduction

Barco has introduced the Spatial Color Calibration (SCC) file on the DP2K-SLP Series digital projectors. The SCC file contains information to improve the color uniformity of the image. The uniformity is measured in the factory and stored in a LUT-SCC file on the ICP board. This LUT-SCC file is activated on the projector at factory.

Impact on service

As the LUT-SCC file is Light Processor specific, when replacing the **Light Processor** of the projector a **new LUT-SCC file** has to be uploaded and set as active file. As the LUT-SCC file is stored on the Integrated Cinema Processor (located on the **ICMP or ICP** board) the **LUT-SCC file** should be uploaded and activated after replacement of the ICMP or ICP board.

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.



Communicator version **4.7.8** ⁽¹⁾ or later is required to activate LUT-SCC files.

13.2 Obtain the Serial Number of the installed Light Processor



The Serial Number of the installed Light Processor can be obtained in two different ways. Either by reading it from the label on site or by reading it remotely using the Communicator software.

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

1. Start up the Communicator software version **4.7.9** ⁽²⁾ or later.



Note: The **DP2K/DP4K software package** version **1.11** ⁽³⁾ or later must be installed to read out the Light Processor serial via the Communicator.

2. Create a Diagnostic Package of the projector. For detailed instructions see User Guide of the Communicator chapter "Diagnostic Package".
3. Open the Diagnostic Package using Windows Explorer or the 'Diagnostic Package Reader' included in the PC version of the Communicator software.
4. Look in the file/section "Hardware Info" for the serial number of the Light Processor.



Note: Only for recent Light Processors the serial number will be available in the Diagnostic Package. For older Light Processors the serial number has to be read from the label (see below).

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

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 13-1) is visible through the Lens Holder opening. The label is located at the front base of the Light Processor.

1: For DP4K-P and DP2K-S the SCC functionality is already incorporate in the Communicator version 4.7.3

3: For DP4K-P and DP2K-S the SCC functionality is already incorporate in the DP2K/DP4K software package version 1.09.104

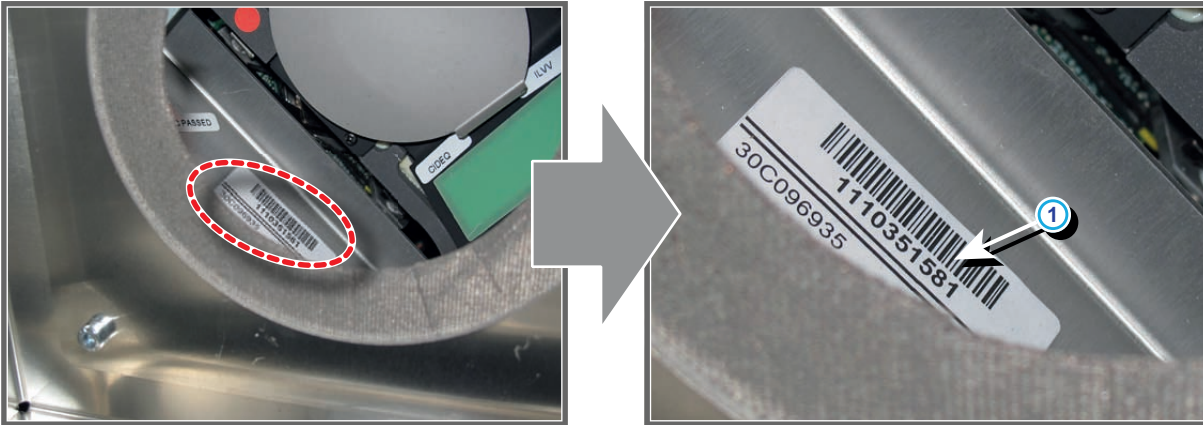


Image 13-1: Location label with Serial Number of the Light Processor of a DP4K-P projector.



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.

13.3 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 13-2

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

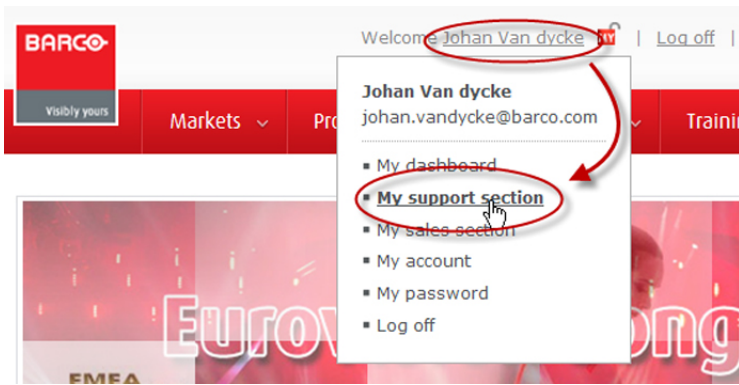


Image 13-3

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.

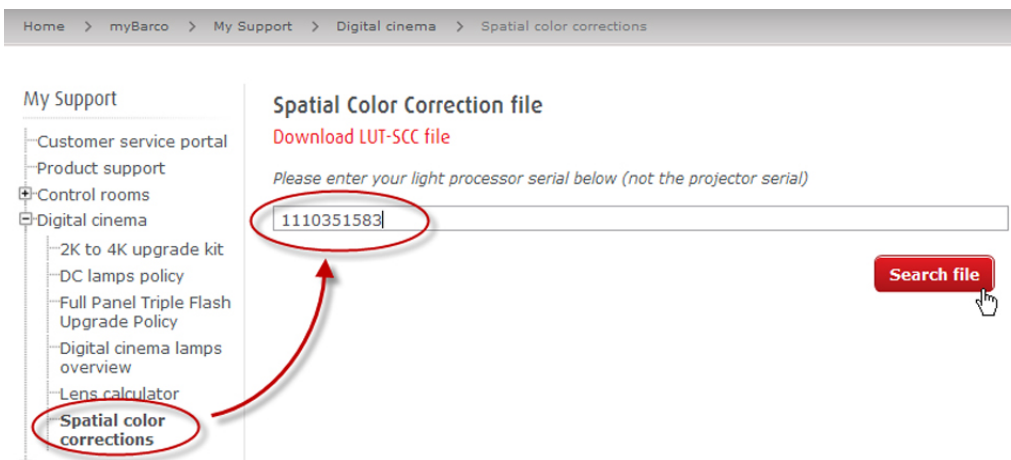


Image 13-4

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 ICP board. For 2K projectors this is “ones2K_LE”, for 4K projectors this is “ones4K_LE”.

6. 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 13-5

13.4 Upload Spatial Color Calibration file



When replacing the Light Processor a new LUT-SCC file should be downloaded from the secured Barco website.

When replacing the ICP board the LUT-SCC file should be available if the projector files were backed up properly. If not, the LUT-SCC file can also be downloaded from the secured Barco website using the serial number of the installed Light Processor.

For detailed instructions see procedures “Obtain the Serial Number of the installed Light Processor”, page 152, and “Download the LUT-SCC file from the Barco website”, page 153.

Required tools

Communicator software version 4.7.9 (or later)

Required parts

- Serial Number of the installed Light Processor.
- LUT-SCC file available on the PC of the Communicator or on USB-stick when using the Communicator Touch Panel.

How to upload the LUT-SCC file into the projector?

1. Start up the projector and the Communicator (version **4.7.9** ⁽⁴⁾ or later).
2. Ensure that the projector is connected with the Communicator. Either via a direct connection or via network. For detailed instructions see User Guide of the Communicator (manual version 07).
3. Go to the File manager of the Communicator.
4. Click on the drop down box in *Local files* (1) and browse to the LUT-SCC file to be uploaded (2).

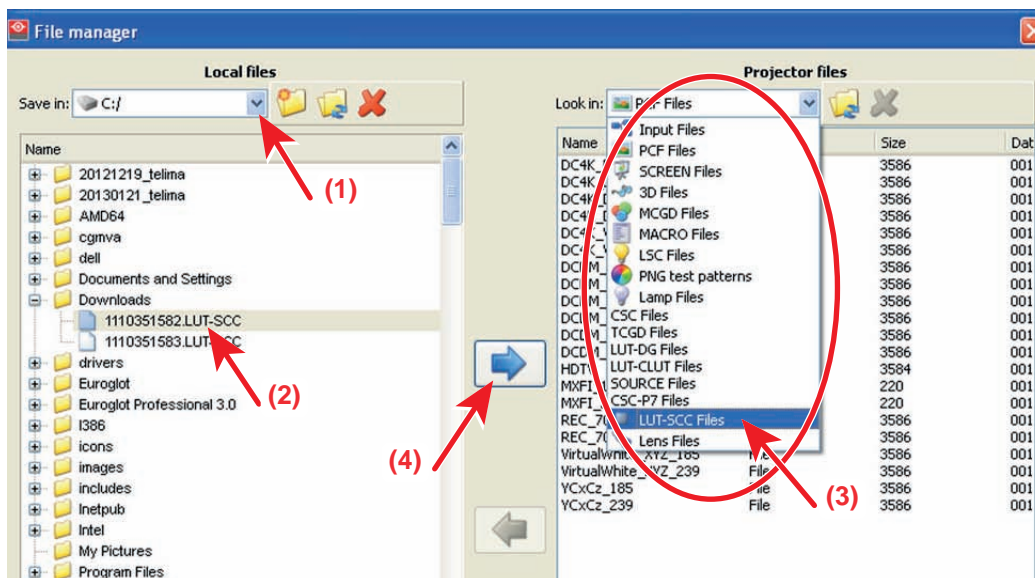


Image 13-6

5. Click on the drop down box in *Projector files* and select the file type LUT-SCC (3).
6. Click on the arrow pointing to the right (4).

The file is uploaded from its original location to the projector file system.

4: For DP4K-P and DP2K-S the SCC functionality is already incorporate in the Communicator version 4.7.3

13.5 Activate Spatial Color Calibration file

Required tools

Communicator software version 4.7.9 (or later)

How to activate the LUT-SCC file

1. While *File manager* is selected, click on the drop down box (1) next to *Look in* and select *LUT-SCC files* (2).

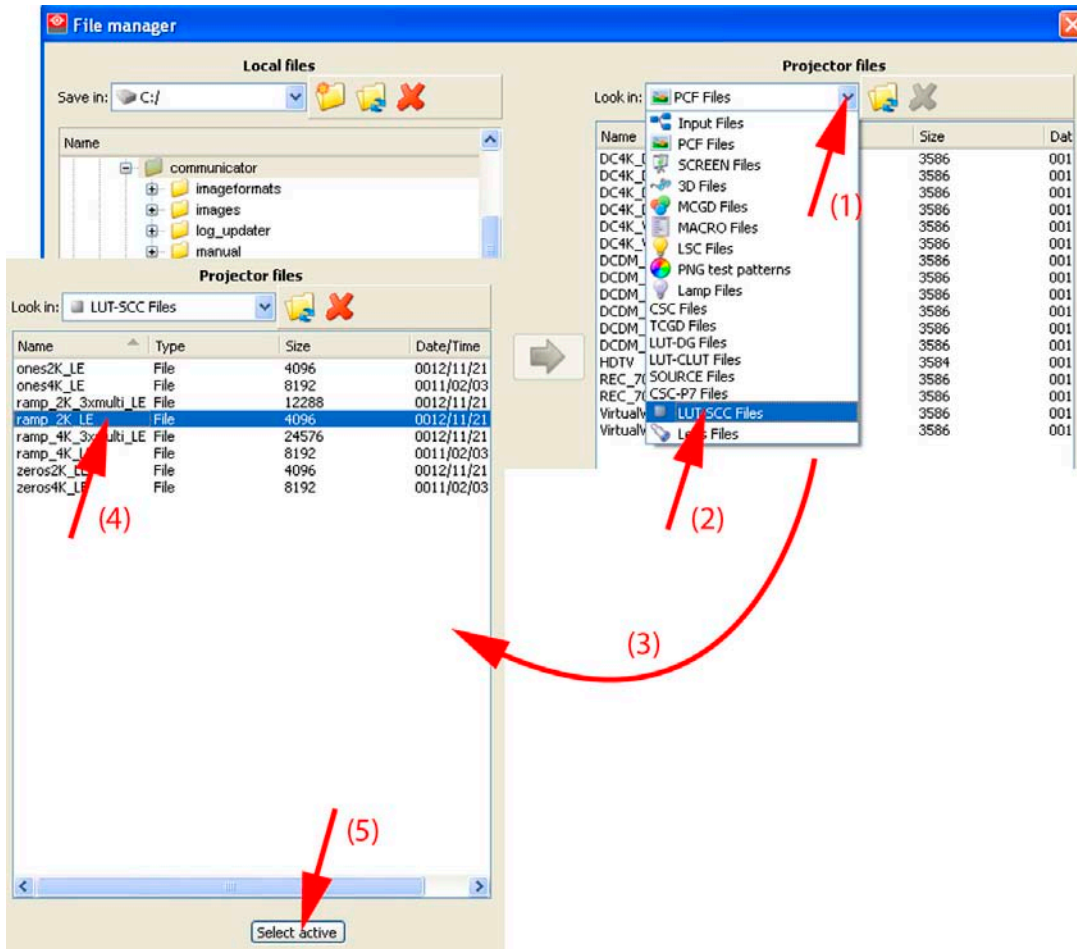


Image 13-7: Activate LUT-SCC file

2. Select the desired file (4).
3. Click **Select active** (5).



In case no Light Processor serial LUT-SCC file is available use the default LUT-SCC file which is factory installed on the ICP board and thus displayed in the list. For 2K projectors this is “ones2K_LE”, for 4K projectors this is “ones4K_LE”.

Convergence

14

About this chapter

This chapter describes how to prepare your DP2K-SLP Series for convergence adjustment and how to adjust the convergence.

Overview

- Convergence controls
- Preparing for convergence adjustment
- Converging the blue pattern onto the red pattern
- Converging the green pattern onto the red pattern
- Closing off the Light Processor compartment

14.1 Convergence controls

Extended control knobs

As the DMD of the red channel is not accessible in the projector, it remains fixed. Therefore the image of this DMD will be taken as reference. Blue and green may be aligned onto red when a small convergence drift is recognized. The blue and green channels have pivot plates equipped with three control knobs for convergence adjustment, two of which are extended (reference 2, 3, 5 and 6 of Image 14-1). 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 and the top cover plate and side cover plate of the Light Processor compartment have to be removed. For easy access to control knobs No1 and No4, we advise locating the Light Processor top fan unit in its upper position, hereby still providing the necessary cooling to the unit.

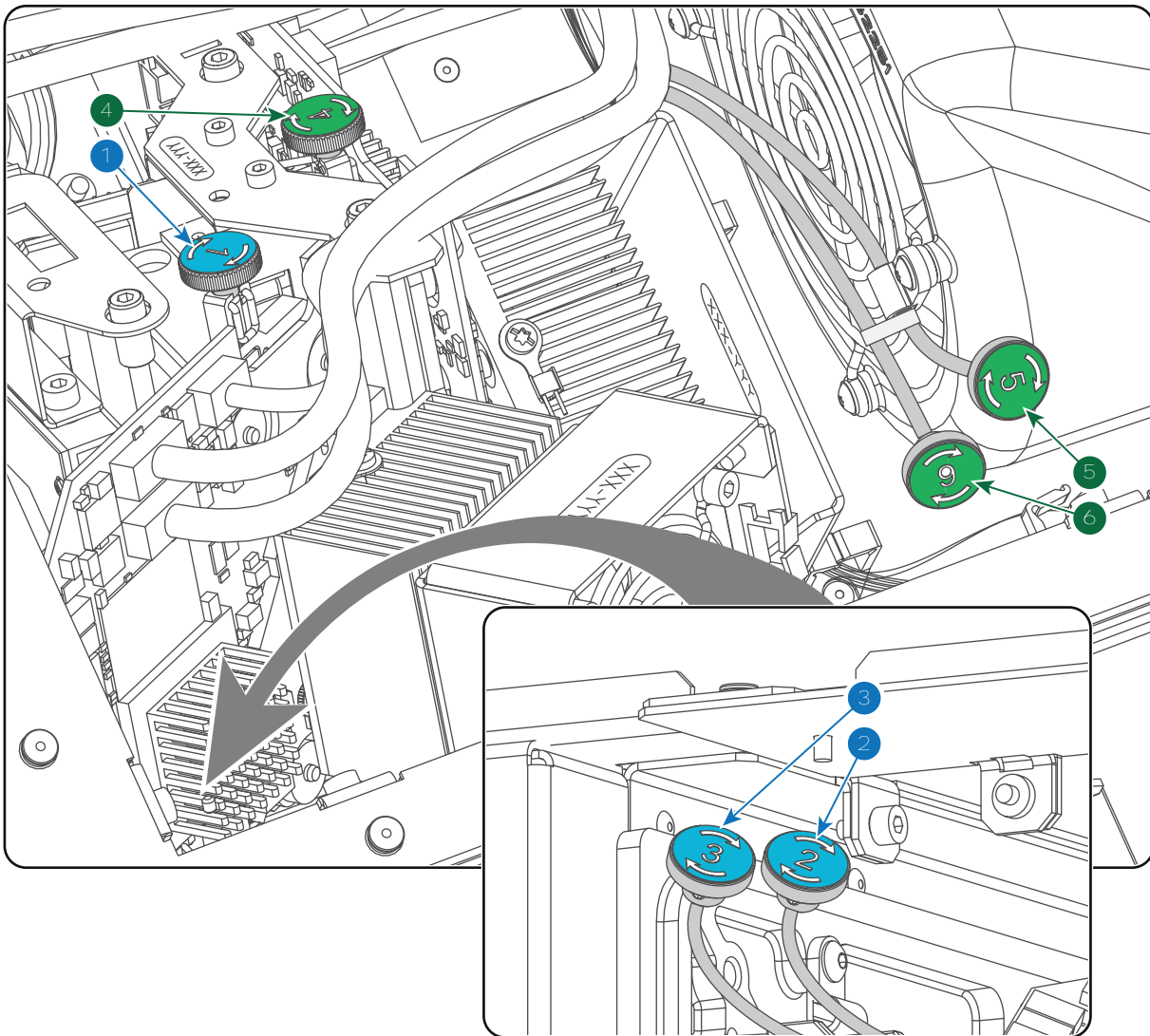


Image 14-1

- 1 Blue channel, knob number 1.
- 2 Blue channel, knob number 2.
- 3 Blue channel, knob number 3.

- 4 Green channel, knob number 4.
- 5 Green channel, knob number 5.
- 6 Green channel, knob number 6.

Convergence test pattern

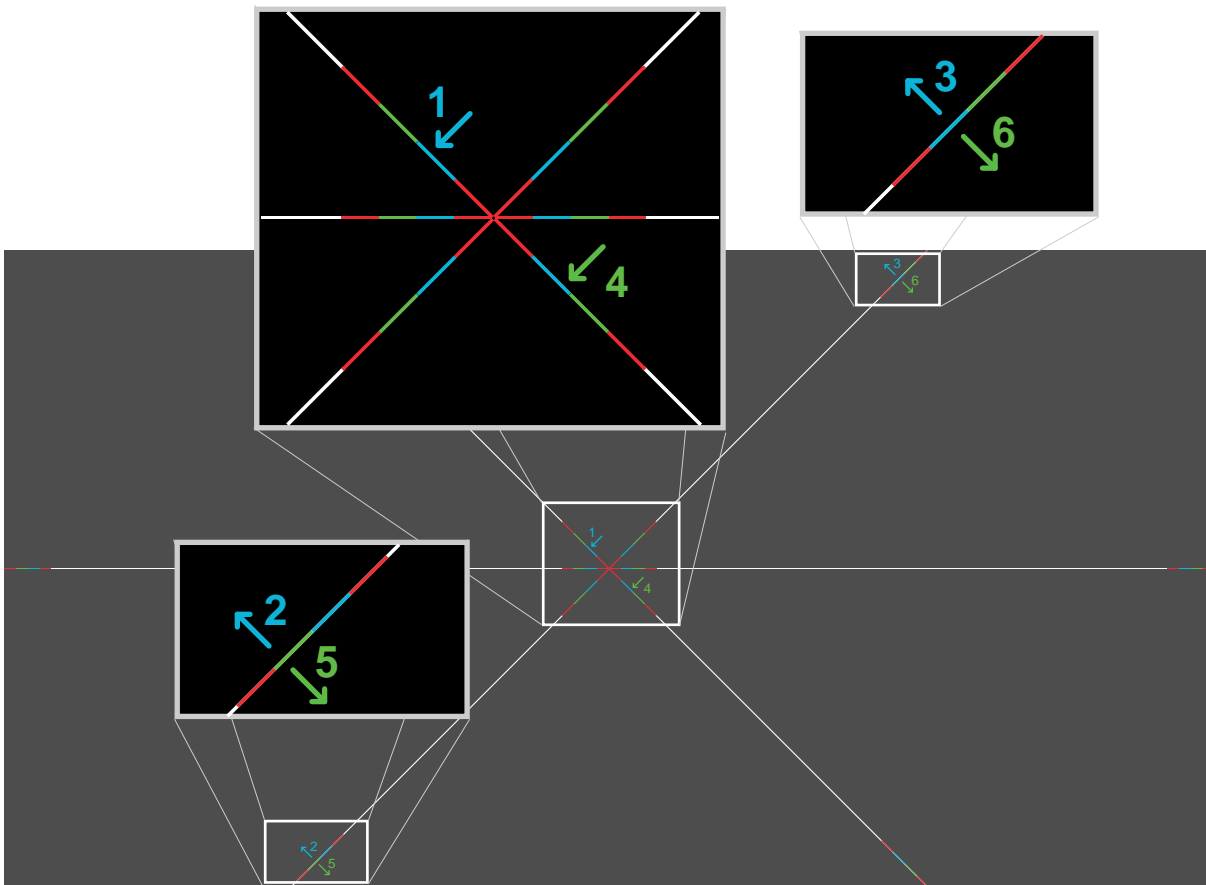


Image 14-2

The test pattern illustrated above is specifically designed for convergence purposes. The test pattern has three blue arrows numbered from 1 to 3 and three green 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.

Adjustment Range

Prevent damage to the system 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 10 pixels is possible.



CAUTION: The system does not have an end of travel in either direction, but using excessive force may cause damage. Please handle gently.

Troubleshooting 'dead zone' of control knob

In the rare event that a knob is loose in the perfect convergence position, it is preferable to continue translating the image away for approximately 20 to 30 pixels (max 1 revolution of the knob(s)). Note that this is the only time we allow for extreme adjustment. Thereafter, return the image back immediately to the correct position. The knob should now have become tighter in the final position and therefore resists turning due to vibrations and such. Repeat the procedure if you feel the knob is still loose.

14.2 Preparing for convergence adjustment

Required tools

- 7mm flat screwdriver.

- 3mm Allen wrench.

How to set up the projector for convergence adjustment?

1. Remove the top cover from of the projector.
2. Remove the left side cover from of the projector.
3. Remove the top cover plate of the Light Processor compartment.
4. Remove the left cover plate of the Light Processor compartment.
5. Place the fan on top of the Light Processor in the upper position as illustrated. Do this by engaging the two lower slots (reference 2 Image 14-3) into the upper mounting pins as illustrated. The two upper slots (reference 3 Image 14-3) remain free.

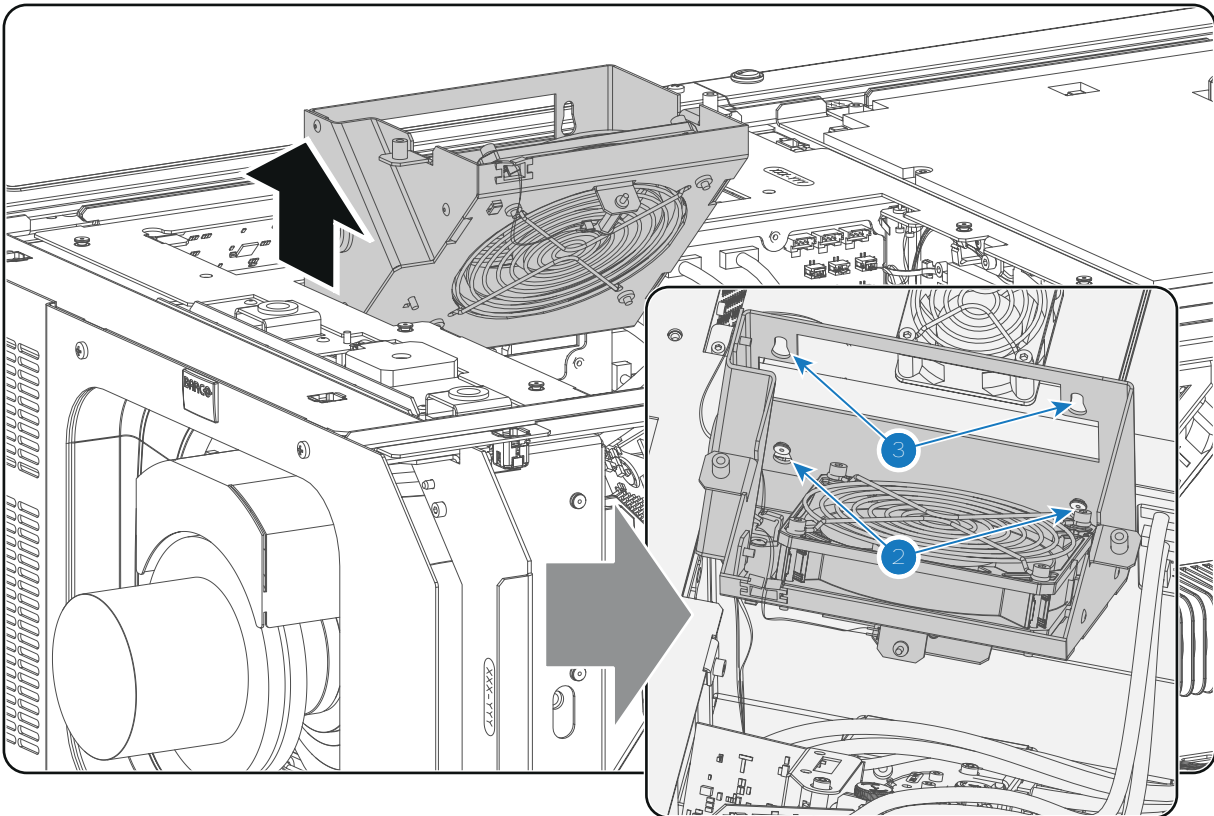


Image 14-3

6. Switch on the projector, activate the light source and open the dower.
7. Select the convergence test pattern, which is illustrated below (Image 14-4). Use the communicator to activate the convergence test pattern.



Note: The convergence test pattern can NOT be activated via the **PATTERN** button on the Local Keypad.

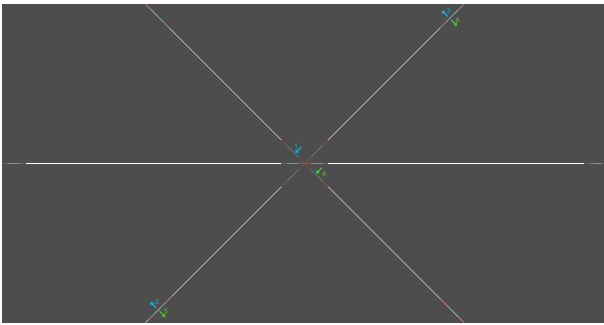


Image 14-4

14.3 Converging the blue pattern onto the red pattern



This adjustment procedure assumes that the projector is prepared for convergence adjustment.

Required tools

No tools required.

How to converge the blue pattern onto the red pattern?

1. Slightly turn the blue colored control knob number 1 until the blue pattern in the **center** of the projected image converges with the red pattern. Note that a turn of a few degrees corresponds with one full pixel. The direction on the control knob corresponds to the direction of the arrow of the test pattern.

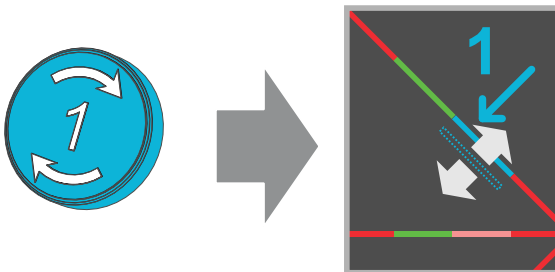


Image 14-5

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

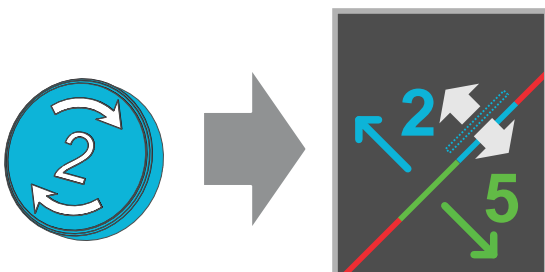


Image 14-6

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

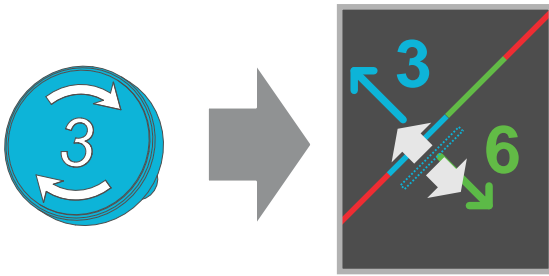


Image 14-7

4. Repeat step 2 and 3 until **coincidence** is obtained of the blue pattern in the **lower left** and **upper right** of the projected image.
5. Repeat from step 1 until **full coincidence** is obtained of the blue pattern in the **center**, **lower left** and **upper right** of the projected image.
6. Continue with the procedure: “Converging the green pattern onto the red pattern”, page 162.

14.4 Converging the green pattern onto the red pattern



This adjustment procedure assumes that the projector is prepared for convergence adjustment.

Required tools

No tools required.

How to converge the green pattern onto the red pattern?

1. Slightly turn the green colored control knob number 4 until the green pattern in the **center** of the projected image converges with the red pattern. Note that a turn of a few degrees corresponds with one full pixel. The direction on the control knob corresponds to the direction of the arrow of the test pattern.

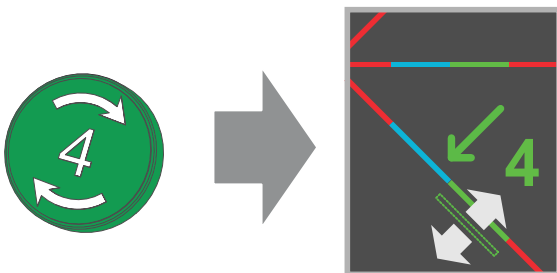


Image 14-8

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

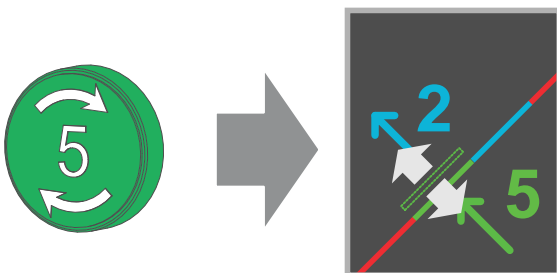


Image 14-9

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

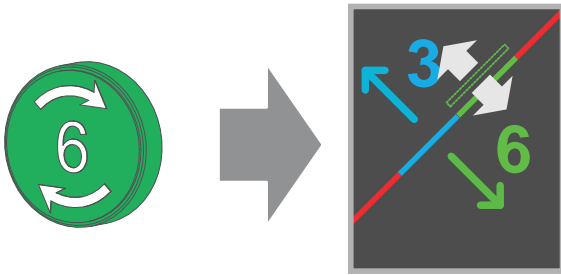


Image 14-10

- Repeat step 2 and 3 until **coincidence** is obtained of the green pattern in the **lower left** and **upper right** of the projected image.
- Repeat from step 1 until **full coincidence** is obtained of the green pattern in the **center, lower left** and **upper right** of the projected image.
- Switch off the projector.
- Continue with the procedure **Closing off the Light Processor compartment**.

14.5 Closing off the Light Processor compartment

Required tools

- 7mm flat screwdriver.
- 3mm Allen wrench.

How to close off the Light Processor compartment?

- Place the fan on top of the Light Processor in the lower position . Ensure that the four mounting pins (reference 1 Image 14-11) of the fan assembly are engaged.

 **Caution:** Take care of the wire.

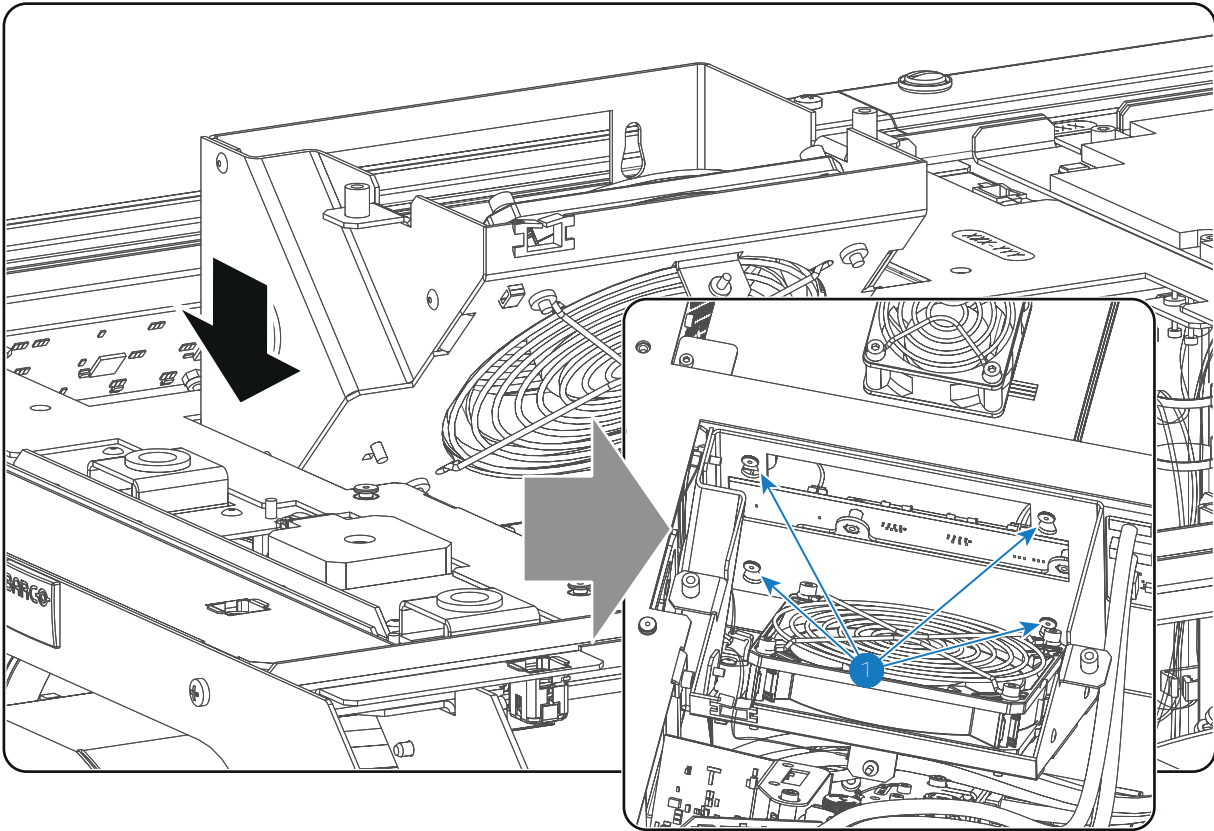


Image 14-11

2. Install the top cover plate of the Light Processor compartment.
3. Install the side cover plate of the Light Processor compartment.
4. Install the top cover of the projector.
5. Install the left side cover of the projector.
6. Switch on the projector.
7. Clear the security warning. See procedure page 112.

Color calibration & Light measurements

15

Overview

- Color calibration
- Light measurements for SmartCare contracts

15.1 Color calibration

About this chapter

This chapter describes the luminance and color calibration process for the DP2K-SLP Series. Where applicable references are made to the user guide of the Communicator for detailed menu navigation instructions. The first chapter describes the complete calibration process in chronological order.



Color calibration should be executed during the installation of the projector and also after some service actions as mentioned in the service manual.

Overview

- Calibration process
- White point calibration
- Color gamut calibration

15.1.1 Calibration process

Overview

1. Select the desired aspect ratio by activating the correct lens file.
 - **SCOPE** format
 - **FLAT** format
2. **Laser white point calibration.**
3. The Communicator contains a wizard for white point calibration. See user guide of the Communicator for detailed menu navigation instructions.
4. **Color gamut calibration.** (electronic P7 correction). Measured values are saved in the Measured Color Gamut Data (MCGD) file. Needs to be done per format and per projection mode.
 - 2D
 - External 3D
5. **Select target colors.** The target colors are stored in the Target Color Gamut Data (TCGD) file. Several TCGD files are already available in the file system of the projector.
6. For more info about color gamut calibration see “Color gamut calibration”, page 167. The Communicator software contains a wizard for color gamut calibration. See user guide of the Communicator for detailed menu navigation instructions.
7. **Verify corrected colors.**
8. For detailed instructions on how to verify corrected colors see user guide of Communicator.
9. **Arrange calibration files in 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. For detailed instructions on how to create a macro see Communicator's user guide.

15.1.2 White point calibration


About white point calibration

White point calibration should be executed to correct a color shift during dimming. The white point will be stabilized over the full dimming range.

Required tools

- Spectroradiometer.
- Communicator software.

Preparations

1. **Setup the ambient light conditions** as it should be during the play out of the movie. (e.g. only the stairs and emergency exit lighting is switched on).
 -  *Note:* In an optimal setup less than 1% of light from any other source than the light from the projector should illuminate the screen.
2. Configure the desired aspect ratio: e.g. FLAT or SCOPE (use most common aspect ratio). Do this by activating the correct LENS file.
3. Position the spectrometer perpendicular to the screen and measure in the center of the screen.
4. Start up Communicator and follow the laser white point calibration wizard.



After white point calibration proceed immediately with color gamut calibration.

15.1.3 Color gamut calibration

Color Gamut

Color Gamut is the entire range of reproducible colors by a particular device such as a projector. The entire range of reproducible colors are typically defined so that horizontal and vertical directions describe saturation and luminance changes, respectively. When a color is "out of gamut," it is not possible to reach that color by the device.

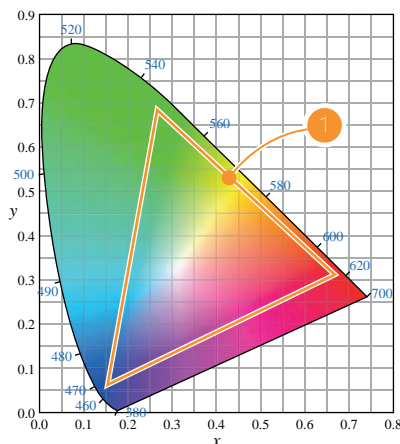


Image 15-1: Sample Chromaticity Diagram with Color Gamut of target device (1).

Why apply color correction?

During the post-production process of a film, a specific color space is applied. This color space is the Target Color Gamut Data (TCGD). All movie content operates under that gamut. To ensure that in the cinema theater the film is projected within the same color space as intended by the film industry, the color space of the projector has to be corrected accordingly.

What has to be done?

The color coordinates for the projected primary colors must be measured on the screen. The values can be different than those originally inside the projector due to reflection on the screen or due to the influence of the glass between the projection booth and the theatre and even the projected colors are different from setup to setup.

These measured color coordinates are references for the projector and will be entered so that the projector knows how its colors are projected on the screen. This reference measurement (MCGD), together with the delivered gamut file (TCGD) of the film will introduce a color correction so that the film will be projected with the desired color target.

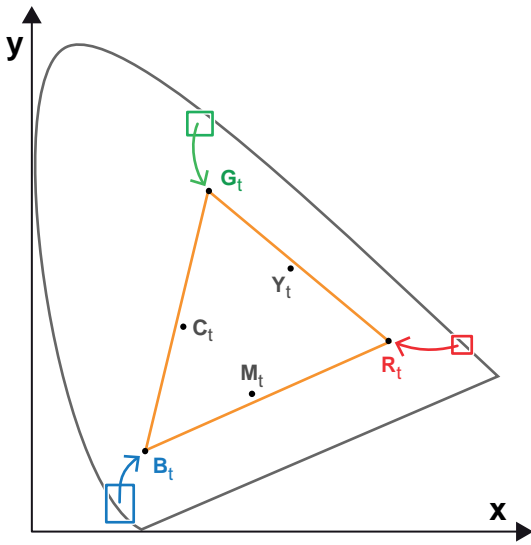


Image 15-2: Correction of native color gamut towards desired color gamut (electronic correction)

Electronic correction

The electronic correction adapts the native color gamut towards the desired (target) color gamut (e.g. DC28_DCI_Xenon.TCGD). This correction is introduced by the DMD drivers and is also called 'P7 correction'. The electronic correction takes place once the MCGD file of the projector is mapped with the TCGD file of the film.


Influence of aspect ratio

The aspect ratio of the projected image could have a small influence upon the measured xy coordinates. Therefore, it's recommended to save the xy coordinates per aspect ratio in separate MCGD files.



CAUTION: Prior to start with color gamut calibration ensure that the white point calibration is finalized successfully. See "White point calibration", page 166.

Color gamut calibration procedure

1. Check if the white point calibration is done. If not see "White point calibration", page 166.
2. **Setup the ambient light conditions** as it should be during the play out of the movie. (e.g. only the stairs and emergency exit lighting is switched on).
 -  **Note:** In an optimal setup less than 1% of light from any other source than the light from the projector should illuminate the screen.
3. **Sequentially measure and enter the xy coordinates** of the three primary colors (red, green, blue) and full white. Use therefore the Communicator. Go to *Installation > Color calibration > Measure native colors*. For detailed instructions see user guide of the Communicator.



Caution: Ensure that the correct projection mode is selected: 2D or External 3D.



Caution: In case of 3D, measure the xy coordinates once through the left eye glass of the 3D goggles and once through the right eye glass.



Tip: When using the wizard for white point calibration you can immediately proceed with the electronic correction.

4. Once all xy coordinates are measured and entered proceed by saving all measured values into a MCGD file.



Tip: Put in the MCGD file name the type of projection mode (2D or External 3D) and the aspect ratio (FLAT, SCOPE).

5. Map the MCGD file with the TCGD file. Use for that the Communicator. Go to *Installation > Color calibration > Select target colors*. For detailed instructions see user guide of the Communicator.
6. In addition you can check if the corrected colors comply. Use therefore the Communicator. Go to *Installation > Color calibration > Verify corrected colors*. For detailed instructions see user guide of the Communicator.

15.2 Light measurements for SmartCare contracts

15.2.1 Screen gain measuring

About screen gain

Fig. A and B illustrate the concept of gain.

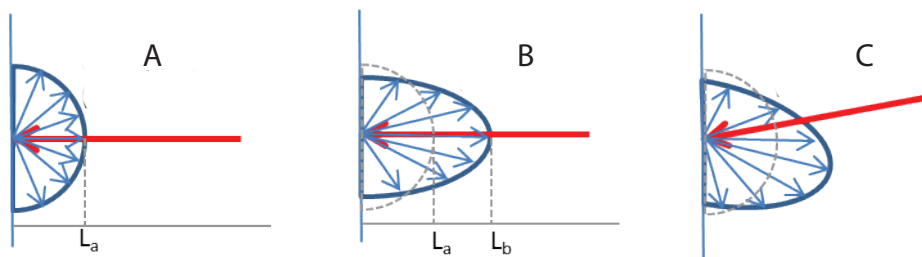


Image 15-3

- A** Gain 1 (perfect diffuse)
- B** Higher gain screen (e.g. 1.8)
- C** Higher gain screen (e.g. 1.8)

In Image 15-3, reference **A**, the incident light beam (red arrow) diffuses from a gain 1 screen uniformly in all directions. The resulting screen brightness (in fL or cd/m²) is L_a .

In Image 15-3, reference **B**, the screen reflects a higher portion of the light in the direction of the incident light, at the expense of the light under angles. The resulting screen brightness in the perpendicular direction is L_b .

Screen gain is defined as the ratio of the reflected luminance produced by a projector beam of white light falling onto the screen surface, compared with the reflected luminance of a reference standard with gain of 1.0. The screen gain of the second screen is L_b/L_a .

Image 15-3, reference **C** illustrates the case when the incident light on a gain screen is not perpendicular. In that case, most of the light is reflected in the opposite direction – similar to what a mirror would do.

Typically the reference standard for gain measurement is a tile of magnesium carbonate (gain 1.0) which can be obtained from screen manufacturers. For convenience, white cartridge paper can be used as a reference standard. It has a gain value of approximately 0.9. Realistic white screens have a gain value of around 0.95.

About Hotspot

Higher gain screens typically experience an effect called 'hotspot'. The hotspot is not localized, as it depends on the viewer position versus the projector, so it typically 'follows the viewer' as people walk around. Every viewer has his or her own hotspot position. In Image 15-4 reference B you see the impression of the hotspot if you have moved to the left of the center.

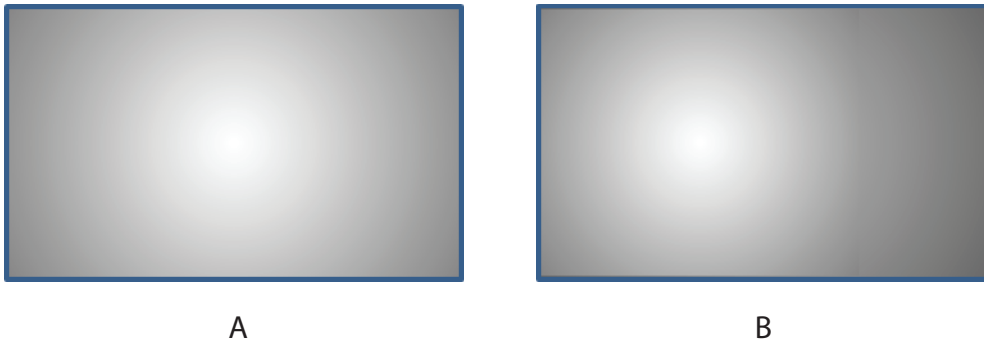


Image 15-4

Important note

It is important that you always measure in the hotspot. Since the hotspot ‘follows’ the viewer, if you measure from high up in the auditorium, the hotspot will also move up and might not be reachable if you want to measure with a hand-held reference white sheet. Therefore it is important that the light meter is positioned sufficiently low and close to the screen. It is recommended to first look for a position in which the hotspot is seen to be sufficiently low and in a reachable position, and then position the meter at that viewing position.

Required tools

- Tripod
- Light meter (acceptance angle not greater than 2°)
- White cartridge paper mounted on hard surface (or other calibrated reference standard)

How to measure

1. Measure the luminance at the vertical center line of the screen.

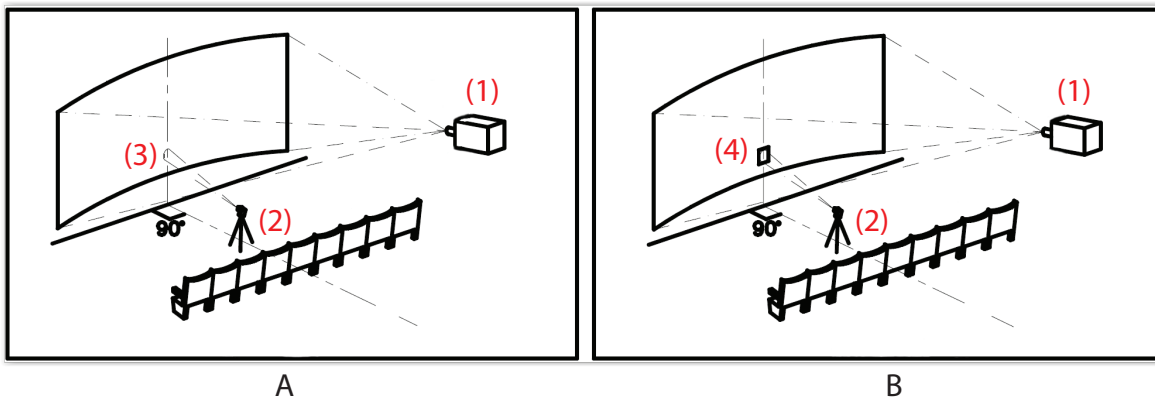


Image 15-5

2. Place the light meter (2) mounted on a tripod low and close to the screen in front of the vertical line, at a height of around the screen bottom picture line.
3. Adjust the vertical angle of the light meter until a peak luminance reading (3) (L1) is measured from the screen (orient the light meter visually towards the hotspot, and then perform consecutive measurements up and down from that position to find the exact location with the maximum reading).
4. Fix the light meter to that position.
5. Hold a piece of white cartridge paper (4) or other reference white sheet against the screen at that exact position. Ensure that the sheet is not bended or wrinkled.
6. Take a luminance reading (L2) from the reference white sheet.
7. Calculate the Screen Reflectance Gain = $(L1 \times \text{Reference Gain})/L2$.

 *Note: Reference Gain is that of the white cartridge paper (if not mentioned, take 0.9).*

15.2.2 Measuring the light output

Introduction

Typically the screen luminance is measured in the screen center, from a location in the auditorium closest to the geometric center of the screen. However with high gain screens, the center measurement may not produce the highest luminance value.

Gain screens have a 'hotspot', i.e. a location on the screen where the luminance is the highest.

The location of the hotspot on the screen however is not fixed. It depends on the relative position of the viewer and projector, projector tilt, screen tilt and curvature etc.

All calculations we use predict the brightness in the hotspot of the screen (and not the screen center), so it is important to measure in the screen hotspot, rather in the screen center.

Required tools

- Tripod
- Light meter
- Communicator software

Full power white luminance in 2D mode

1. Make sure that the necessary color calibration has been done for the projector (white point color calibration as well as regular color calibration). For more information about the correct procedure, consult the Communicator manual, chapter "Color calibration for Laser Phosphor based projectors".
2. In Communicator software, switch on the light source (go to Controls and switch on lasers)
3. Browse to *Installation* → *Illumination* and click on *Light output*.
 - Set light output to *Normal Mode*
 - Set dimming value to 100%
4. Put the projector in 2D mode (in Communicator, select *Configuration* → *3D* → *Activate 3D file* and select **No3D**).
5. Switch on the uncorrected white test pattern (RGB-12bit-FullScreenWhite – uncorrected) and let the projector warm up for at least 5 minutes (in Communicator, select *Control* → *Test Patterns* → *Change pattern* and select the correct pattern).
6. During this time, look for a reference measurement position in the center of the auditorium (typically in the half, or upper half of the seating area). Place the light meter mounted on a tripod on that position. Write down that position for later measurements.
7. Visually look for the hotspot on the screen and point the light meter towards that spot by moving along the vertical line. While moving the light meter, execute consecutive measurements to find the position with the maximum luminance reading.
8. Fix the light meter to that position. This will be the reference position for all measurements.
9. Making sure that the light source is still at maximum and that uncorrected white pattern is selected. Measure the foot-Lamberts (fL) on screen to obtain the *Full Power Native White Luminance* value. Enter it directly in the SmartCare user interface.
10. Select the corrected white test pattern (RGB-12bit-FullScreenWhite) (in Communicator, select *Control* → *Test Patterns* → *Change pattern* and select the correct pattern).
11. Without changing the light meter position, measure the foot-Lamberts (fL) on screen to obtain the *Full Power Calibrated White* value. Enter this value in the SmartCare user interface.

Target luminance 2D scope

1. While running a corrected white test pattern, measure the light output while reducing the dimming to obtain *Target luminance 2D scope*. Enter the dimming value in the SmartCare user interface.

Full power white luminance in 3D mode and Target luminance 3D scope

The procedure is similar to one for 2D mode except the following points:

- The projector must be set in 3D mode (in Communicator, select *Configuration* → *3D* → *Activate 3D file* and select the corresponding 3D file for your 3D system).
- All measurements must be done with a light meter looking through a 3D glass towards the screen.

Lens Holder

16

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. Note that the motors for the shift functionality are built into the Lens Holder. The motors for zoom and focus functionality are built into the Lens. Lens cleaning procedure is also included in this chapter. Not included in this chapter are the adjustment procedures for the Lens Holder (Scheimpflug and Back Focal Length), for that see chapter “Scheimpflug”, page 199.



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.

Overview

- Introduction Lens Holder
- Available lenses
- Lens selection
- Lens installation
- Lens removal
- Lens shift, zoom & focus
- Removal of the Lens Holder cover plate
- Removal of the Lens Holder
- Installing the Lens Holder
- Installation of the Lens Holder cover plate
- Replacement of the Vertical Shift stepper motor
- Replacement of the Horizontal Shift stepper motor
- Replacement of the motor assembly for 0.69" DC2K lenses (Type 'M')
- Replacement of the motor assembly for 0.69" DC2K lenses (Type 'F')
- Replacement of the motor assembly for 0.69" DC2K lenses (Type 'B')
- Replacement of the Inner Dust Rubber

16.1 Introduction Lens Holder

Lenses and Lens Holder

Next to securing the Lens, the Lens Holder makes 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 aligned with the screen. The motors required for horizontal and vertical shift are built-in in the Lens Holder. The Lens Holder has an electrical socket for the zoom and focus functionality of the motorized Lens.

Parts identification of the Lens Holder

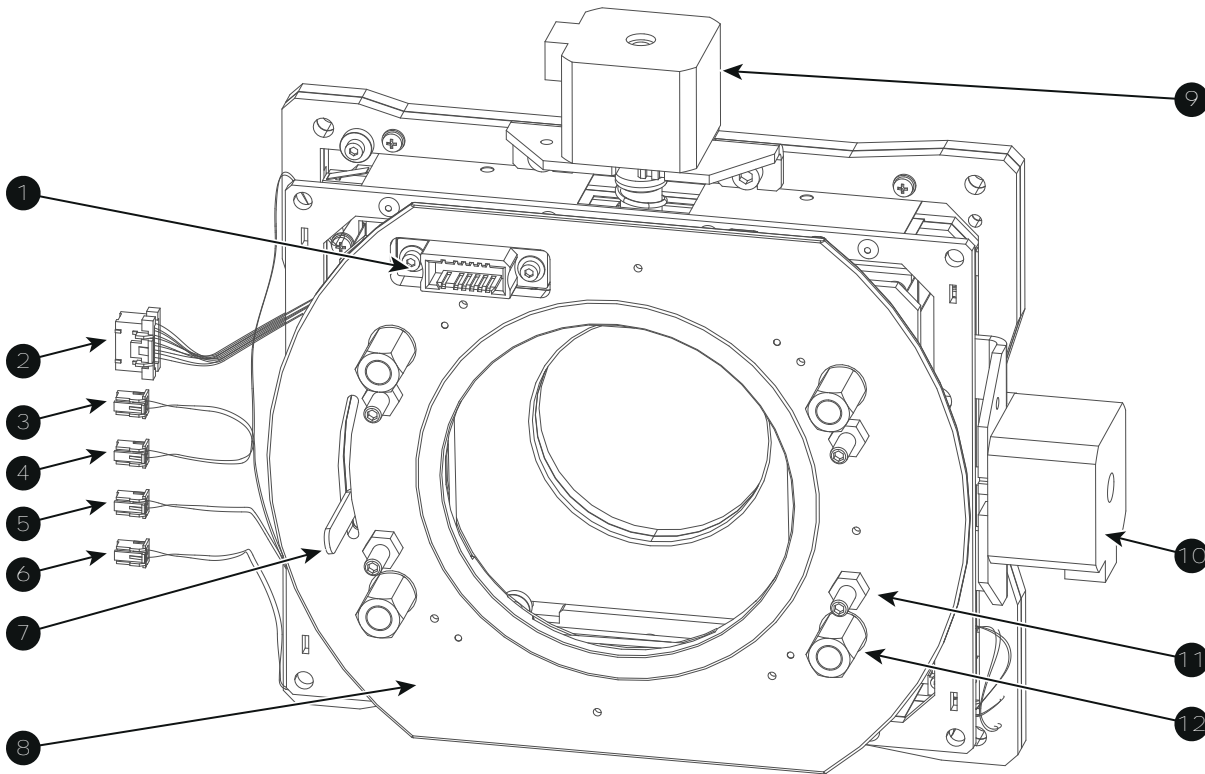


Image 16-1

- | | |
|---|--|
| <ul style="list-style-type: none"> 1 Electrical socket lens connection. 2 Wire lens connection (zoom & focus) (orange wires). 3 Horizontal-Left end loop wires (yellow/black). 4 Vertical-Top end loop wires (red/black). 5 Vertical-Bottom end loop wires (brown/black). 6 Horizontal-Right end loop wires (orange/black). | <ul style="list-style-type: none"> 7 Lens lock handle. 8 Lens Holder front plate. 9 Lens Holder Vertical Shift motor. 10 Lens Holder Horizontal Shift motor. 11 Scheimpflug set screw + lock nut. 12 Scheimpflug adjustment nut. |
|---|--|

16.2 Available lenses

Which lenses are available?

For the DP2K-SLP Series the **0.69" DC2K** lens family is used.



The table below is subject to changes and was last updated on 09 January 2018. Consult <https://my.barco.com> for the most recent information about available lenses for the DP2K-SLP Series.

0.69" DC2K zoom lenses			
Product Number	2K zoom range	Image	Motor Block type
R9856520	1.2 - 1.7	Image 16-2	M
R98565201	1.2 - 1.7		B
R9856521	1.34 - 1.9	Image 16-3	M
R9856522	1.5 - 2.15	Image 16-4	M
R9856523	1.7 - 2.55	Image 16-5	M
R9856524	2 - 3.9	Image 16-6	M
R98565241	2.09 - 3.9		F



Image 16-2: 0.69" DC2K zoom lens 1.2 - 1.7 (R9856520)



Image 16-3: 0.69" DC2K zoom lens 1.34 - 1.9 (R9856521)



Image 16-4: 0.69" DC2K zoom lens 1.5 - 2.15 (R9856522)



Image 16-5: 0.69" DC2K zoom lens 1.7 - 2.55 (R9856523)



Image 16-6: 0.69" DC2K zoom lens 2 - 3.9 (R9856524)

16.3 Lens selection

Which lens do I need?

1. Go to Barco's website on www.barco.com and click on myBarco
2. Login on.

If you are not yet registered create a login and password. With the created login and password, it is possible to enter myBarco.

When your login is correct, the start page is displayed.

3. Click the **Support** tab, then **Digital cinema calculator** (on the left of the screen) and select the appropriate lens calculator.

The lens calculator (see screenshot, Image 16-7) will be displayed.

The lens calculator allows you to have an overview of which lenses are suitable for your specific projector setup. Just make your selection of parameters and all possible configurations are displayed.

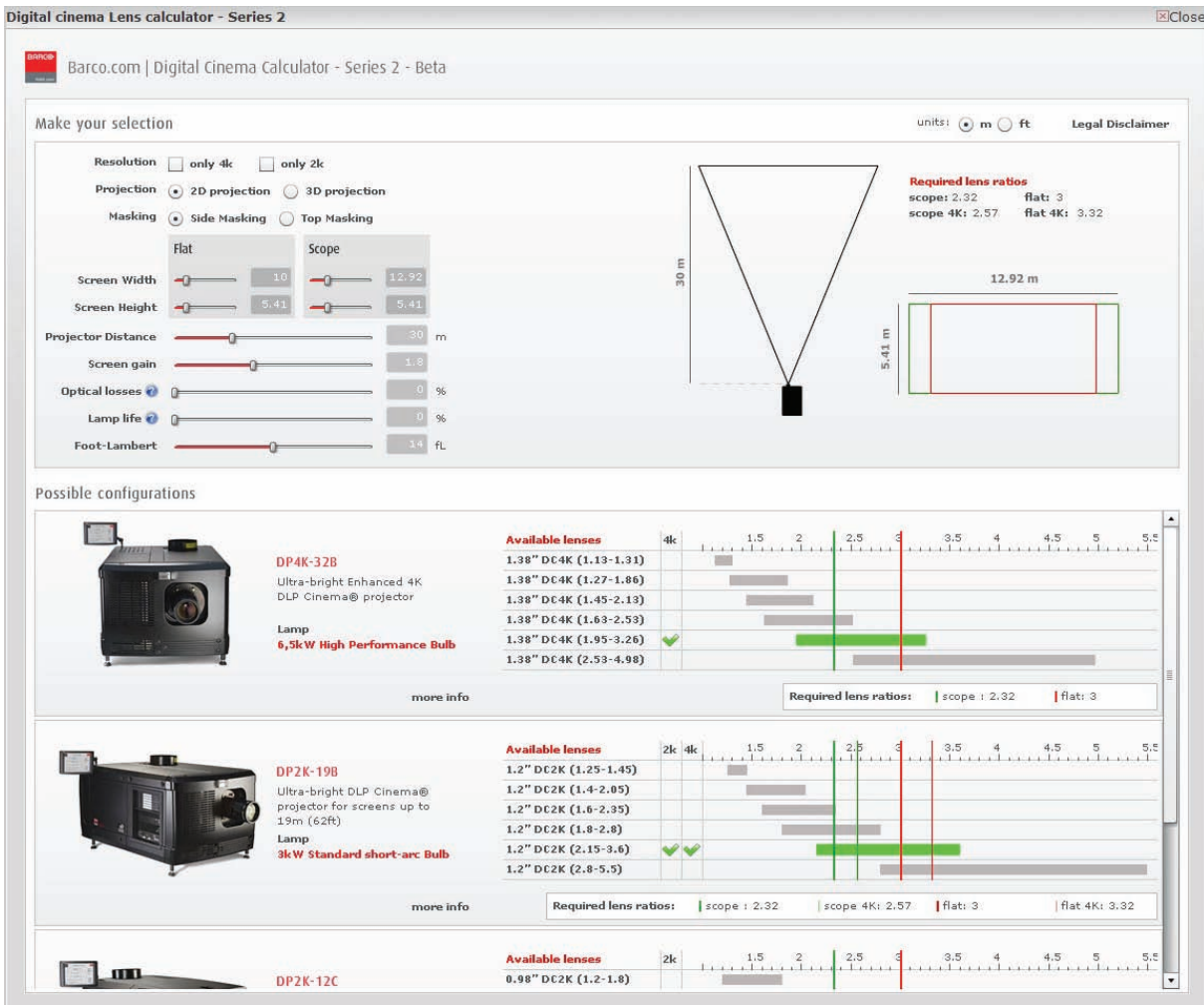


Image 16-7: Digital cinema lens calculator



Take into account that when the projector is **tilted** the **Screen Width** you have to fill in should be **larger** than the physical screen width due to the keystone distortion of the projected image. How much larger depends on the amount of tilt.



Due to production tolerances the real distances can differ by 2% from the calculated values. For critical situations (fixed installs that use the lens at one of its extreme zoom positions) this should be taken into account.

16.4 Lens installation

How to install a lens into the Lens Holder?

1. Remove the foam rubber in the opening of the Lens Holder if not removed yet.
2. Take the lens assembly out of its packing material and remove the lens caps on both sides.
 - ⚠ **Caution:** Do not touch the glass of the lens!
3. Ensure that the Lens Holder stands in the On-Axis position (horizontal and vertical mid position).
4. Place the Lens Holder in the **"locked"** position by moving the lens lock handle (reference 1 Image 16-8) downwards, away from the lens power supply socket (reference 2 Image 16-8).

- Gently insert the lens in such a way that the lens connector matches the socket. To prevent collision of the lens with the critical electronics inside the projector, ensure you centre the lens and keep it on-axis while approaching.

! Caution: Do not accidentally bump with the lens against the electronic boards inside the Lens Holder.

! Warning: Do not release the Lens yet, as the Lens may fall out of the Lens Holder.

- Push** the lens completely against the Lens Holder front plate. An **audible click** should be noticed. Once seated, there may be no airgap between lens flange and Lens Holder front plate.

! Caution: Ensure that the lock handle remains in the “locked” position.

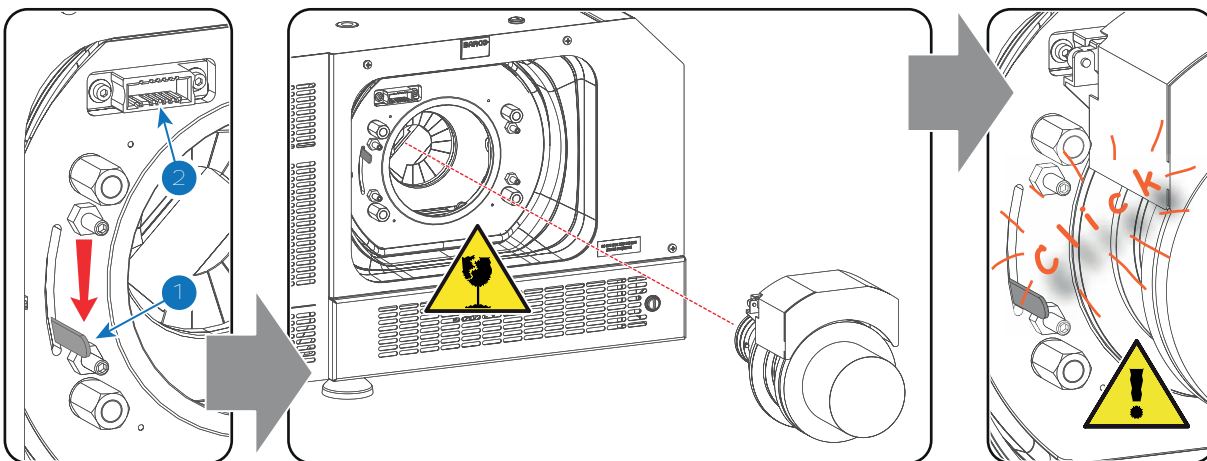


Image 16-8

Note: For frequent installation and removal of the lens it is recommended to install the lens while the lock handle is in “open” position (upwards) and put the lock handle in “locked” position once the lens is inserted. Then check if the lens is properly installed by trying to pull the lens out of the Lens Holder. (this alternative procedure result in less wear of the Lens Holder)

- Check if the lens is really secured by trying to pull the lens out of the Lens Holder.
- Activate the corresponding lens parameters for the installed lens. (See user guide of the “Communicator” chapter *Installation > Advanced > Lens parameters*)

! Caution: Not using the correct lens parameters could result in lens damage.

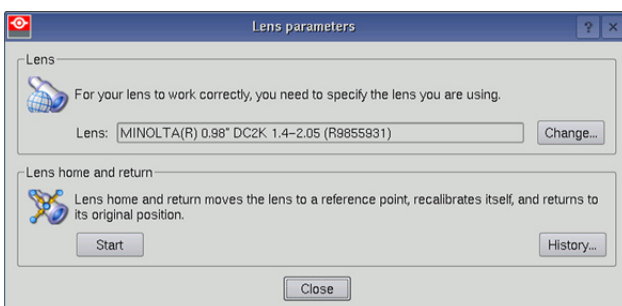


Image 16-9

- Perform a lens **HOME & RETURN** operation. (See user guide of the “Communicator” chapter *Installation > Advanced > Lens parameters*)

Note: The HOME & RETURN operation enables the projector to determine the reference positions of the motorized ZOOM and FOCUS barrels of the installed lens.



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.

16.5 Lens removal

How to remove a lens from the Lens Holder?

1. Support the lens with one hand while you unlock the lens holder by sliding the lock handle (reference 1 Image 16-10) towards the “unlocked” position as illustrated.
2. Gently pull the lens out of the lens holder, maintaining its coaxial direction.



Caution: Do not accidentally bump with the lens against the electronic boards inside the Lens Holder.

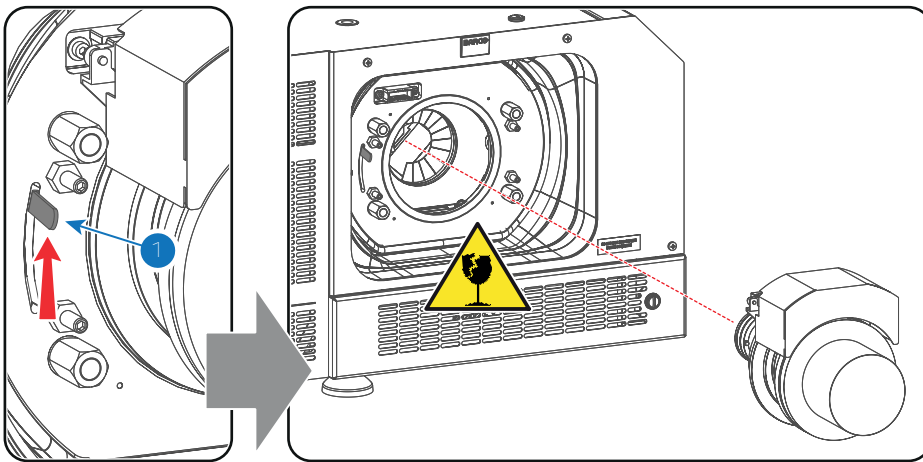


Image 16-10



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 foam rubber of the original projector packaging, back into the Lens opening to prevent intrusion of dust. Note that this foam rubber is packed in a plastic bag to prevent the dust, emitted by the foam, from entering the projector.

16.6 Lens shift, zoom & focus

Motorized lens adjustment

The DP2K-SLP Series is equipped with a motorized lens shift and zoom & focus functionality.

Maximum 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 centre point of the projected image is shifted by half the screen size. In other words, the centre 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.

All lenses have a shift range of 50% up, 50% down, 30% left, and 30% right. This range is valid for all throw ratios. Within these shift ranges the projector and lens perform excellently. Configuring the projector outside these shift ranges will result in a slight decline of image quality.

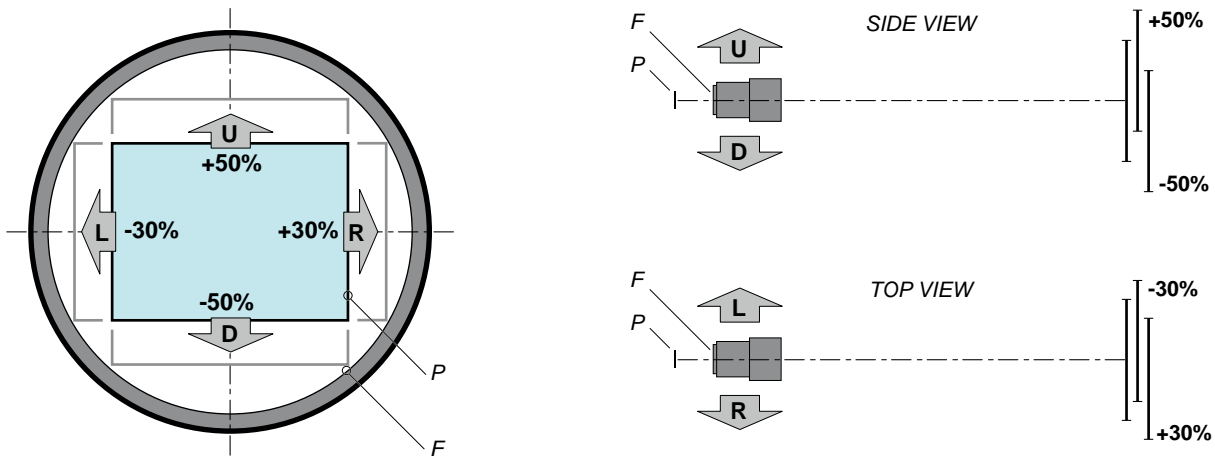



Image 16-11

- P** DMD.
- F** Field of view.

 It's mechanical possible to shift outside the recommended field of view ($\pm 90\%$ UP/DOWN and $\pm 50\%$ LEFT/RIGHT), but this will result in a decline of image quality depending on the used lens and the zoom position of the used lens. Furthermore, shifting too much in both directions will result in a blurred image corner.

How to shift the lens of the DP2K-SLP Series ?

1. Use the **up and down** arrow buttons on the Local Keypad to shift the lens **vertically** and use the **left and right** arrow buttons on the Local Keypad to shift the lens **horizontally**.

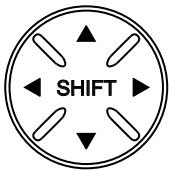


Image 16-12

How to zoom in or out?

1. Use the “+” and “-” **zoom buttons** on the Local Keypad to zoom in or out.




Image 16-13

How to focus?

1. Use the “+” and “-” **focus buttons** on the Local Keypad to focus the image on the screen.



Image 16-14

 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.

Button backlight colors

- **BLUE** : The default backlight color of the Shift, Zoom and Focus buttons is blue which indicates that the button is enabled.

- **PURPLE** : When pushing the Shift, Zoom or Focus button the backlight color is purple of the part of the button that is pushed. This indicates that the requested action is ongoing.
- **RED** : The backlight color of the Shift, Zoom and Focus buttons is red in case of end of range.

16.7 Removal of the Lens Holder cover plate



To remove the Lens Holder cover plate the large dust filter at the projector front has to be removed first. This procedure assumes that this component is already removed.

Required tools

Phillips screwdriver PH2.

How to remove the cover plate of the Lens Holder?

1. Remove the lens from the projector. See chapter “Lens removal”, page 178.
2. Remove the large dust filter from the projector. See chapter “Check the large dust filter”, page 284.
3. Remove the rubber dust ring from the Lens Holder front plate.

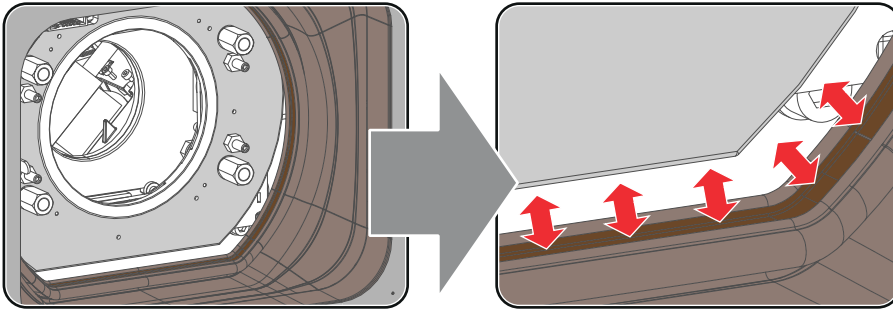


Image 16-15

4. Remove the screw (reference 1 Image 16-16) at the lower left side of the cover plate (seen from the front of the projector). Use a Phillips screwdriver PH2.
5. Remove the three screws (reference 2 Image 16-16) of the cover plate. Use a Phillips screwdriver PH2.
6. Remove the Lens Holder cover plate from the projector.

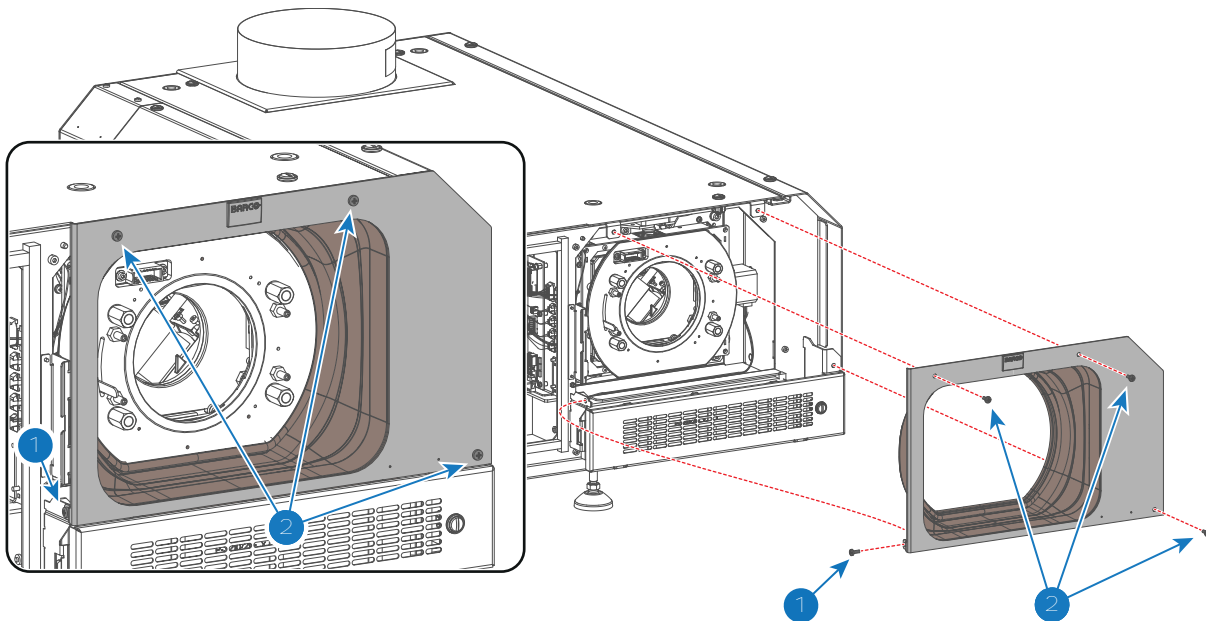


Image 16-16

16.8 Removal of the Lens Holder



WARNING: Disconnect the power cord from the projector and wait a few minutes (to discharge the capacitors) prior to start with this procedure.



To remove the Lens Holder the Lens and the cover plate of the Lens Holder have to be removed. This procedure assumes that these components are already removed.

Required tools

- 5mm Allen wrench.
- 5.5mm nut driver.

How to remove the Lens Holder from the projector?

1. Disconnect the wire unit (reference 3 Image 16-17) of the vertical shift motor and the wire unit (reference 4 Image 16-17) of the horizontal shift motor.

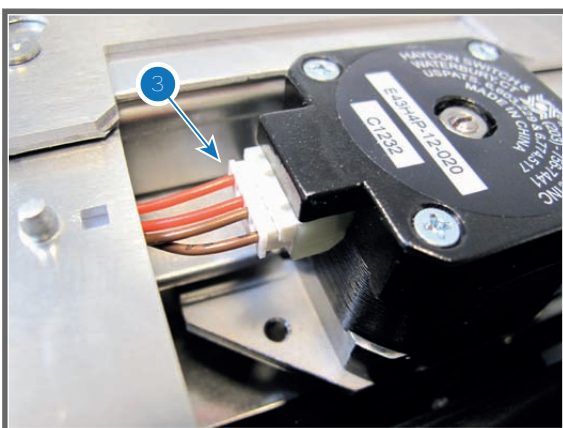
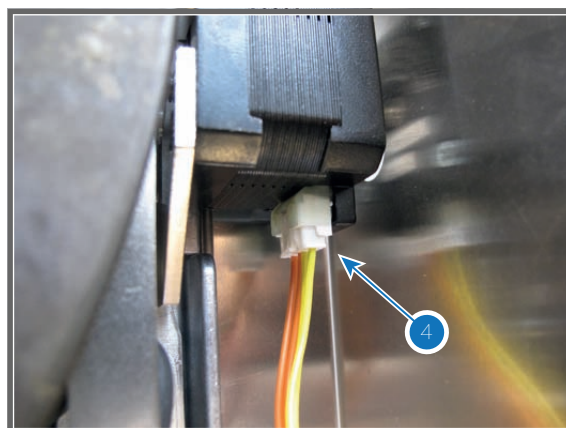


Image 16-17



2. Disconnect the 5 wires (reference 5, 6, 7, 8 & 9 Image 16-18) at the left side from the Lens Holder.

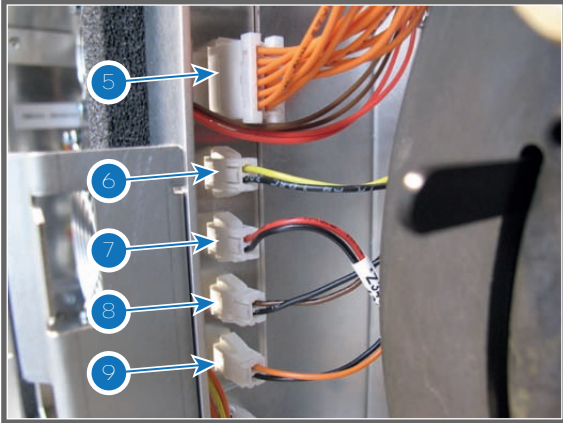


Image 16-18

3. Disconnect the EMC wire (reference 10 Image 16-19) from the projector chassis. Use a 5.5mm nut driver.

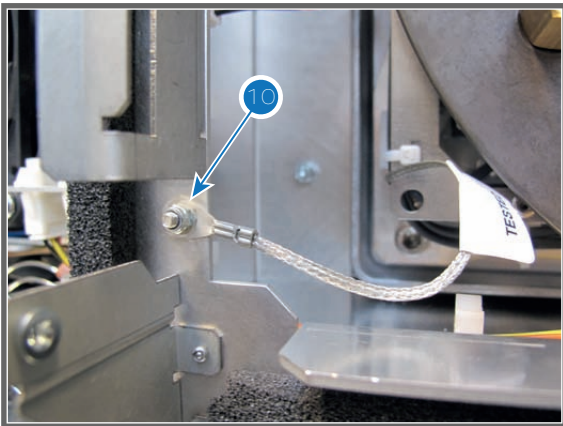


Image 16-19

4. Remove the Lens Holder from the projector chassis by loosening the 4 screws (reference 1 Image 16-20) as illustrated. Use a 5mm Allen wrench. Note that each screws contains a plain washer (reference 2 Image 16-20).

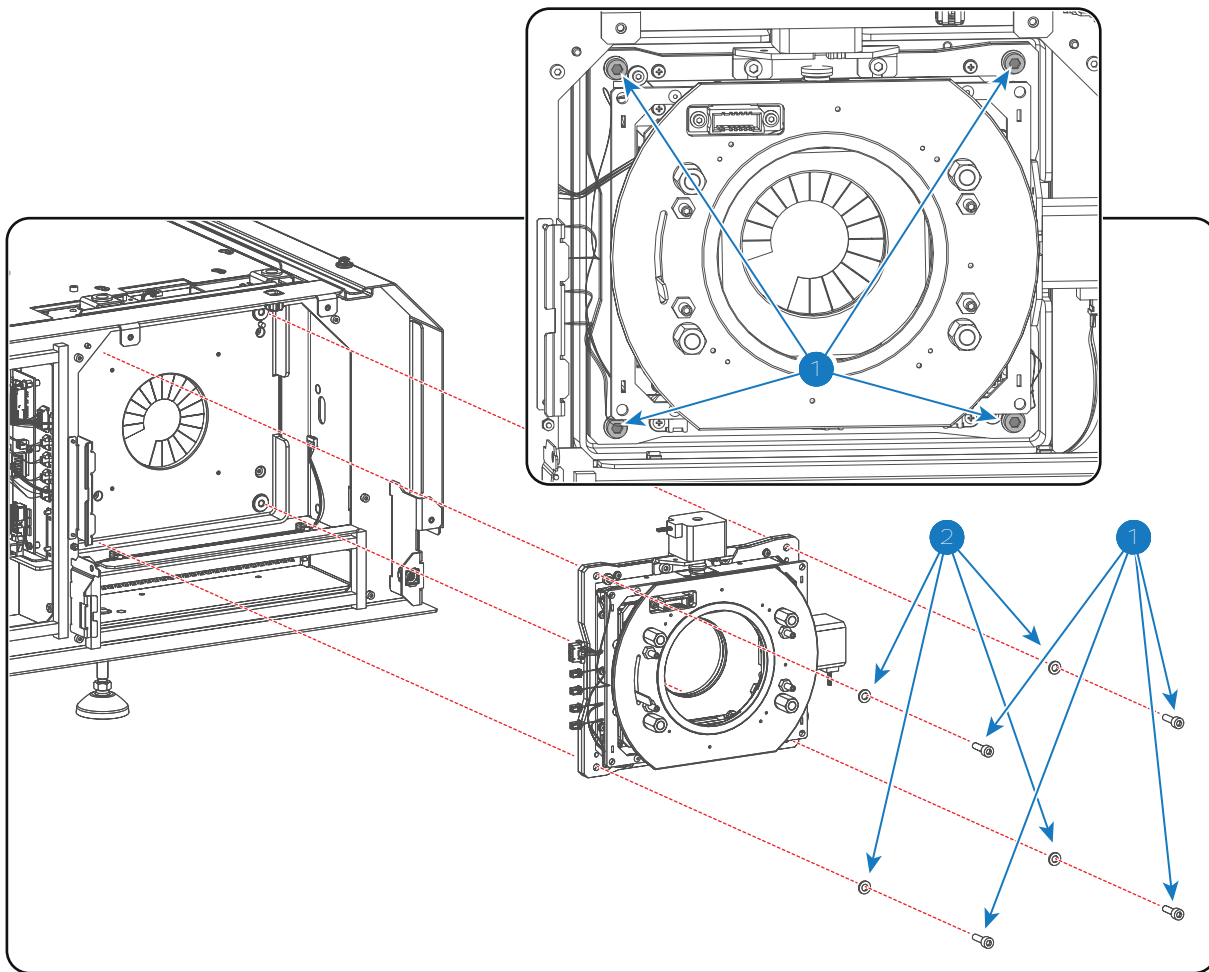


Image 16-20

16.9 Installing the Lens Holder

Required tools

- 5mm Allen wrench.
- 5.5mm nut driver.

How to install the Lens Holder?

1. Place the Lens Holder on the projector chassis as illustrated and fasten with the 4 screws (reference 1 Image 16-21). Use a 5mm Allen wrench. Ensure to place a plain washer onto each screws (reference 2 Image 16-21).

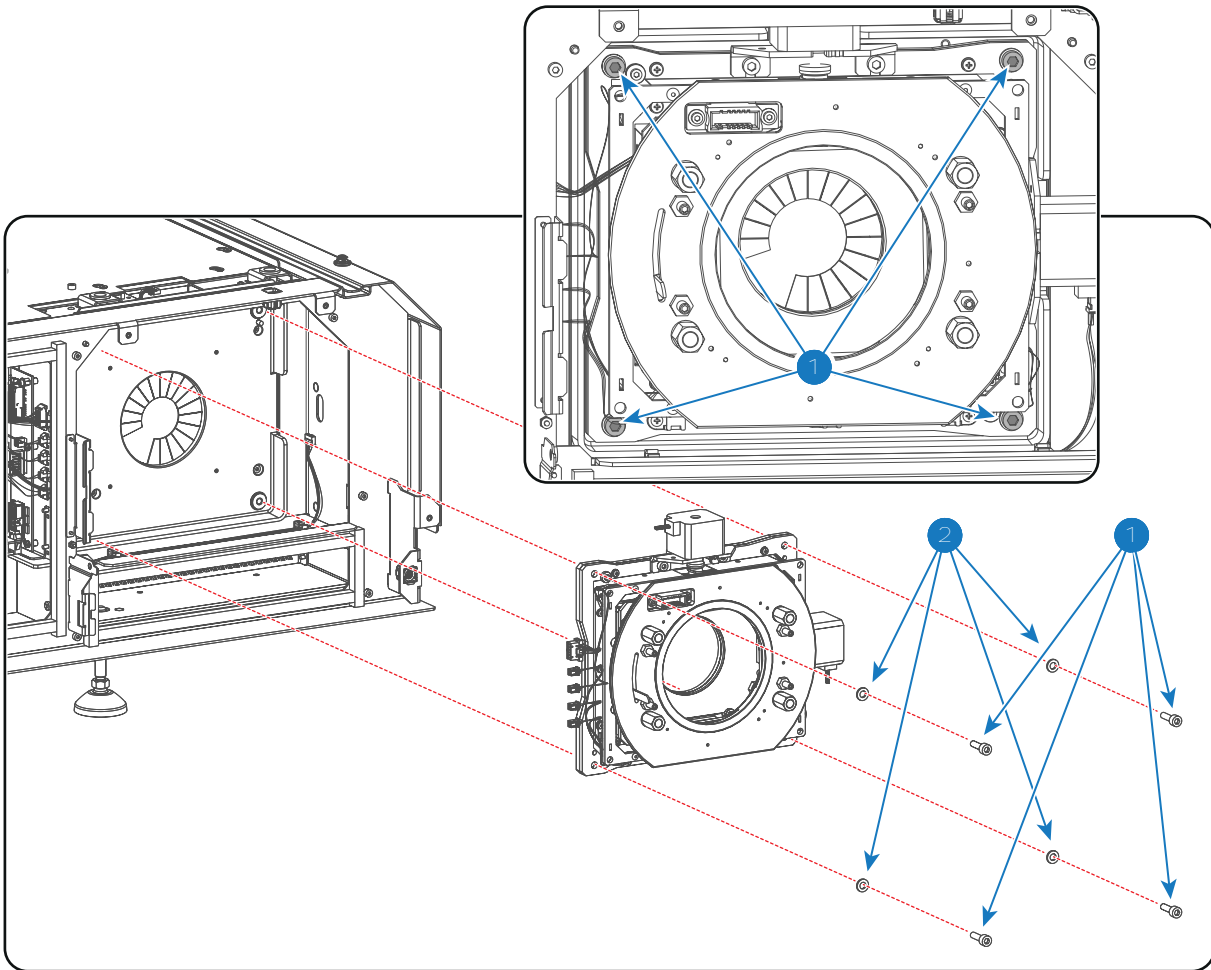


Image 16-21

2. Connect the wire unit of the vertical shift motor (reference 3 Image 16-22) and the wire unit of the horizontal shift motor (reference 4 Image 16-22).

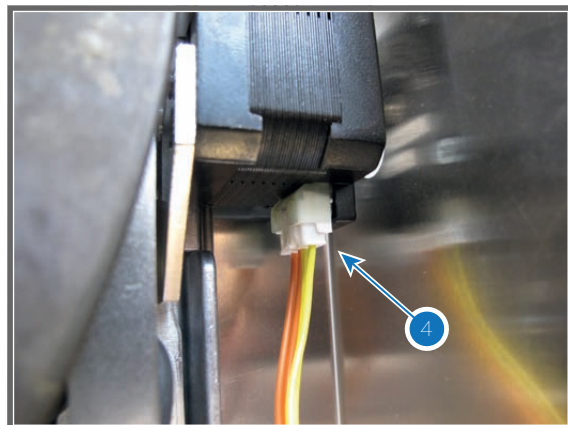
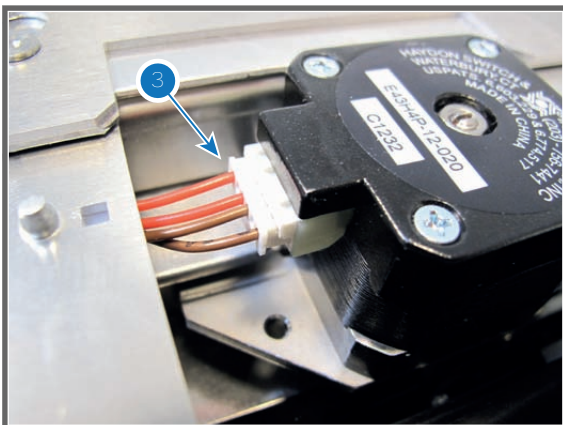


Image 16-22

3. Connect the 5 wires at the left side from the Lens Holder as illustrated:
 - reference 5 in Image 16-23: Lens wires (zoom & focus) (**orange wires**).
 - reference 6 in Image 16-23: Horizontal-Left end loop wires (**yellow/black**).
 - reference 7 in Image 16-23: Vertical-Top end loop wires (**red/black**).
 - reference 8 in Image 16-23: Vertical-Bottom end loop wires (**brown/black**).
 - reference 9 in Image 16-23: Horizontal-Right end loop wires (**orange/black**).

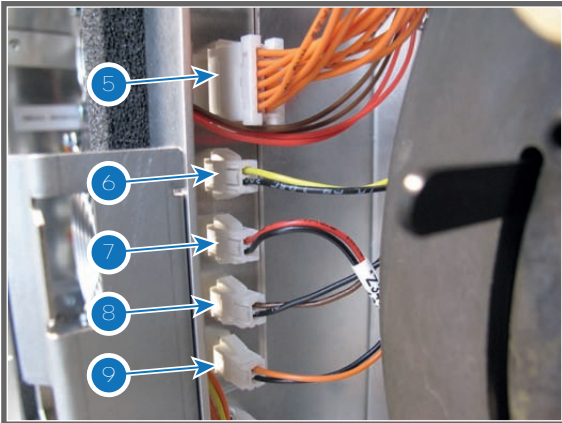


Image 16-23

4. Connect the EMC wire (reference 10 Image 16-24) with the projector chassis as illustrated. Use a 5.5mm nut driver.

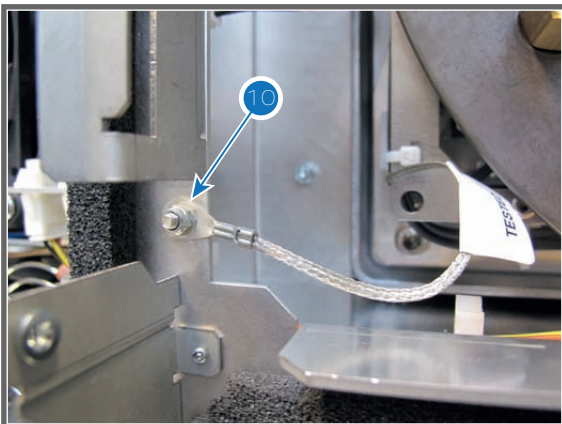


Image 16-24

5. Install all projector covers and lens.
6. Check for Scheimpflug misalignments and adjust if necessary. See “Scheimpflug”, page 199.

16.10 Installation of the Lens Holder cover plate

Required tools

Phillips screwdriver PH2.

How to install the cover plate of the Lens Holder?

1. Place the cover plate of the Lens Holder in its place.
2. Fasten the cover plate with three screws (reference 2 Image 16-25). Use a Phillips screwdriver PH2.
3. Insert the screw (reference 1 Image 16-25) at the lower left side of the cover plate (seen from the front of the projector). Use a Phillips screwdriver PH2.

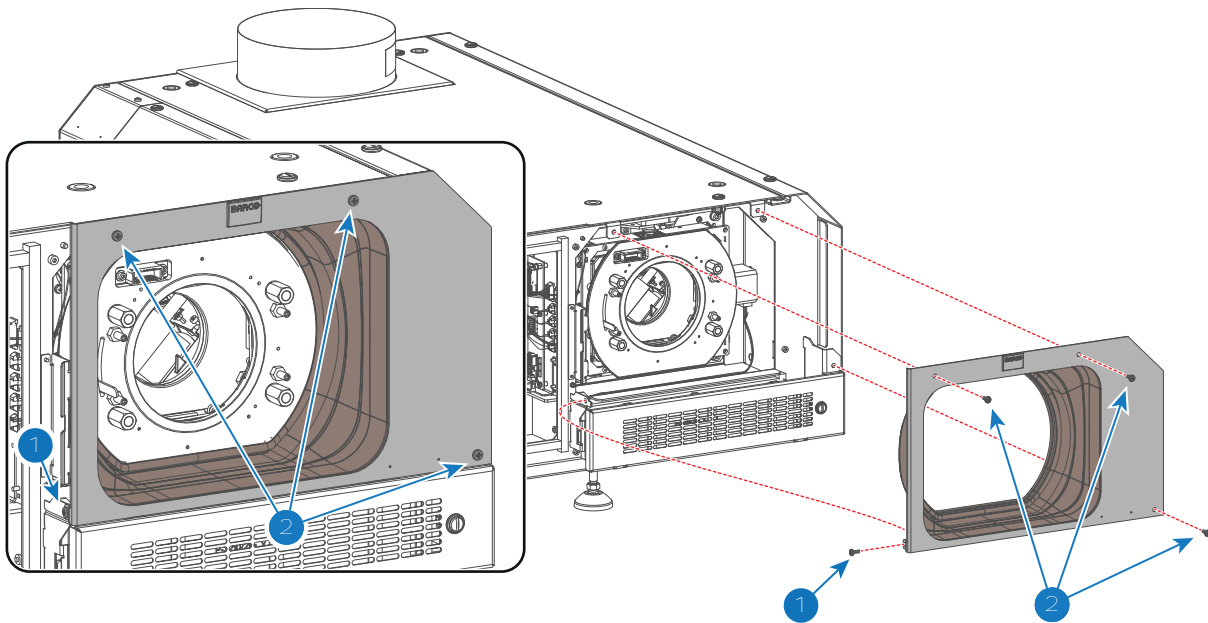


Image 16-25

4. Install the rubber dust ring around the Lens Holder front plate.

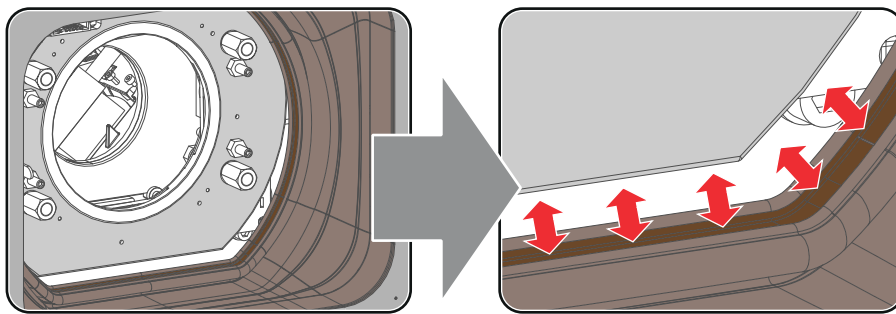


Image 16-26

16.11 Replacement of the Vertical Shift stepper motor



This procedure assumes that the Lens Holder is removed from the projector. See “Removal of the Lens Holder”, page 181.

Required tools

- 4mm Allen wrench.
- 3mm Allen wrench.
- T10 Torx driver.
- 13mm nut driver.
- 10mm open end wrench.

How to replace the Vertical Shift stepper motor of the Lens Holder?

1. Remove the front plate from the Lens Holder. Use a 13mm nut driver to loosen the four Scheimpflug nuts (reference 3 Image 16-27) as illustrated. It's not necessary to disconnect the ground wire from the front plate. Just turn the front plate away for accessing the stepper motor.
 - Caution:** Do not loose the three large springs of the Scheimpflug adjustment mechanism (reference 4 Image 16-27).

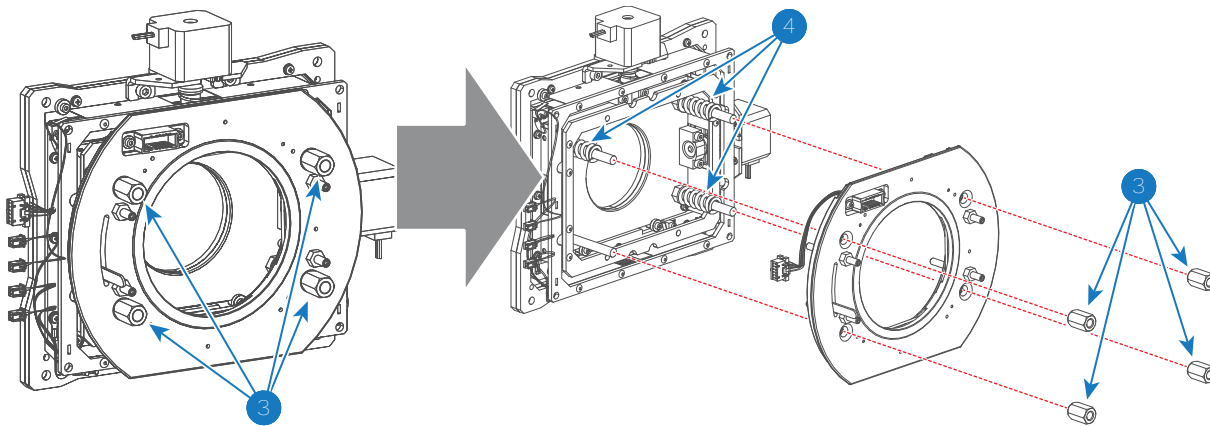


Image 16-27

2. Remove the Vertical Shift stepper motor from the assembly by loosening the four screws (reference 5 Image 16-28) as indicated. Use a 3mm and 4mm Allen wrench.

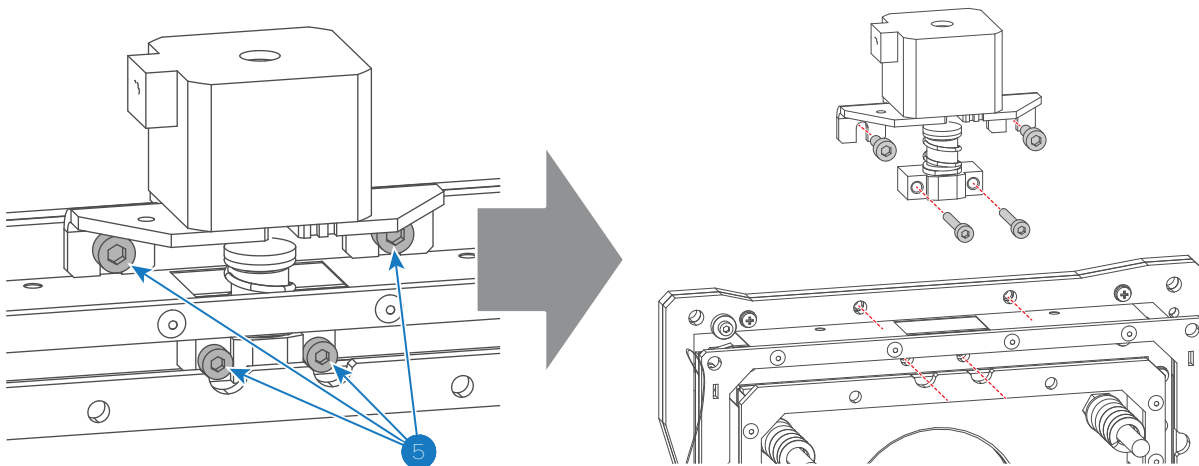


Image 16-28

3. Remove the big bracket (reference 6 Image 16-29) and the small bracket (reference 8 Image 16-29) from the old stepper motor and install these parts on the new stepper motor as illustrated. Use a T10 Torx driver for the four screws (reference 7 Image 16-29) and a 10mm open end wrench for the small bracket (reference 9 Image 16-29).



Note: The big bracket (reference 6 Image 16-29) used with the Vertical Shift stepper motor has two cuts (reference 10 Image 16-29).

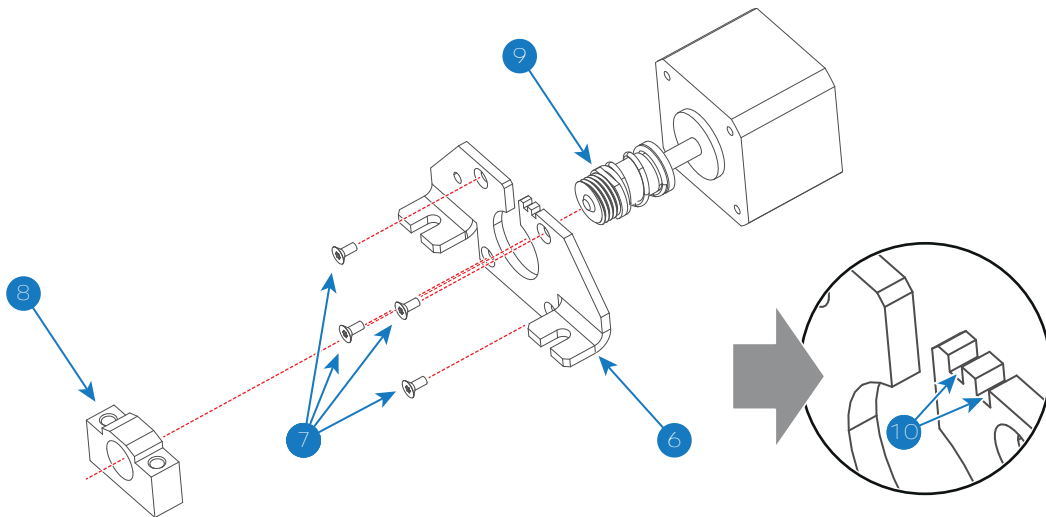


Image 16-29

4. Reinstall the stepper motor on the assembly as illustrated in Image 16-28. Fasten the four screws (reference 5 Image 16-28) with a 3mm and 4mm Allen wrench.
5. Reinstall the front plate from the Lens Holder. Use a 13mm open end wrench to fasten the four Scheimpflug nuts (reference 3 Image 16-27). Fasten the big nuts crosswise bit by bit. Ensure that the upper two rods and the lower left rod contain a big spring (reference 4 Image 16-27).



Proceed with reinstalling the Lens Holder. See procedure “Installation of the Lens Holder cover plate”, page 185.



The Lens Holder has to be adjusted after installation. See chapter “Scheimpflug”, page 199.

16.12 Replacement of the Horizontal Shift stepper motor




This procedure assumes that the Lens Holder is removed from the projector. See “Removal of the Lens Holder”, page 181.

Required tools

- 4mm Allen wrench.
- 3mm Allen wrench.
- T10 Torx driver.
- 13mm nut driver.
- 10mm open end wrench.

How to replace the Horizontal Shift stepper motor of the Lens Holder?

1. Remove the front plate from the Lens Holder. Use a 13mm nut driver to loosen the four Scheimpflug nuts (reference 3 Image 16-30) as illustrated. It's not necessary to disconnect the ground wire from the front plate. Just turn the front plate away for accessing the stepper motor.
 -  **Caution:** Do not loosen the three big springs of the Scheimpflug adjustment mechanism (reference 4 Image 16-30).

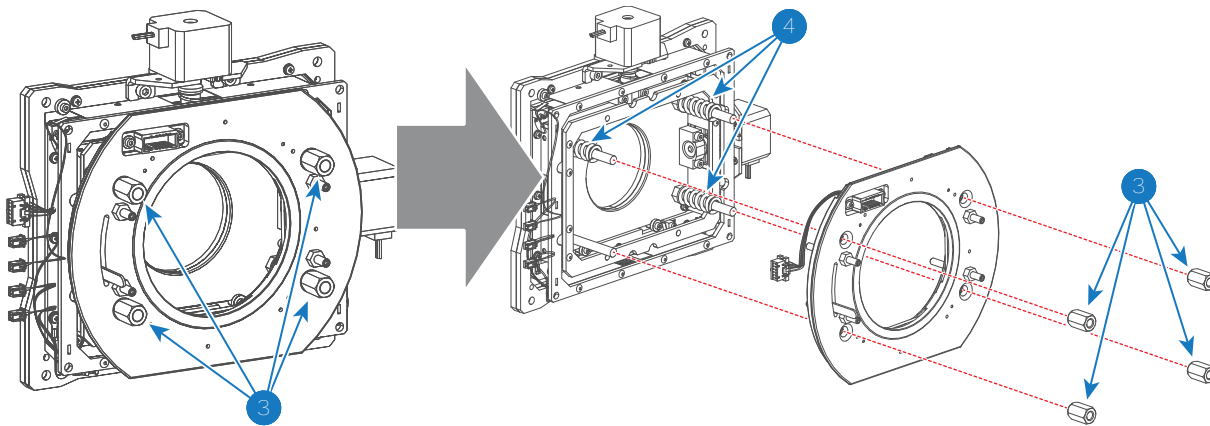


Image 16-30

2. Remove the Horizontal Shift stepper motor from the assembly by loosening the four screws (reference 5 Image 16-31) as indicated. Use a 3mm and 4mm Allen wrench.

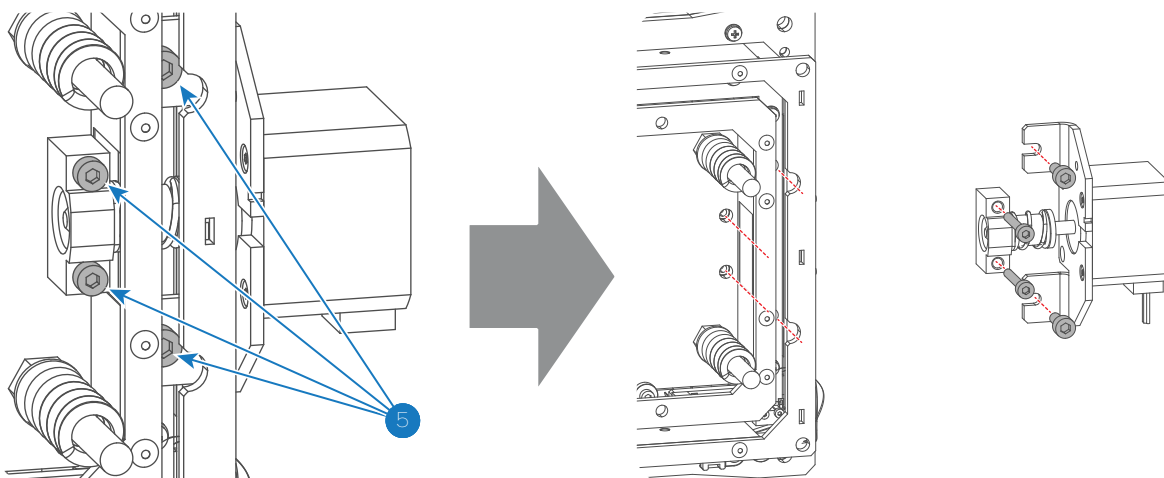



Image 16-31

3. Remove the big bracket (reference 6 Image 16-32) and the small bracket (reference 8 Image 16-32) from the old stepper motor and install these parts on the new stepper motor as illustrated. Use a T10 Torx driver for the four screws (reference 7 Image 16-32) and a 10mm open end wrench for the small bracket (reference 9 Image 16-32).

 **Note:** The big bracket (reference 6 Image 16-32) used with the Horizontal Shift stepper motor has one cut (reference 11 Image 16-32).

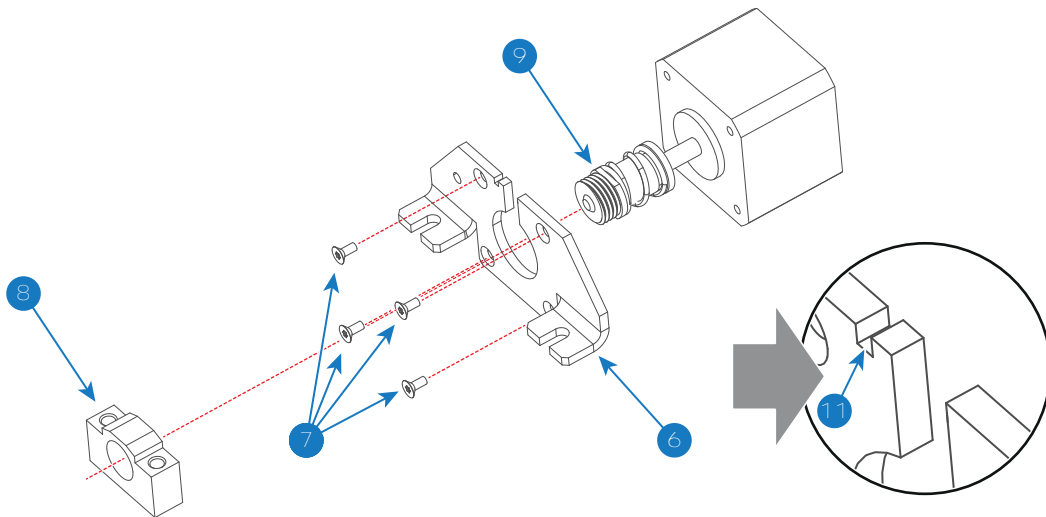


Image 16-32

4. Reinstall the stepper motor on the assembly as illustrated in Image 16-31. Fasten the four screws (reference 5 Image 16-31) with a 3mm and 4mm Allen wrench.
5. Reinstall the front plate from the Lens Holder. Use a 13mm open end wrench to fasten the four Scheimpflug nuts (reference 3 Image 16-30). Fasten the big nuts crosswise bit by bit. Ensure that the upper two rods and the lower left rod contain a big spring (reference 4 Image 16-30).



Proceed with reinstalling the Lens Holder. See procedure “Installation of the Lens Holder cover plate”, page 185.



The Lens Holder has to be adjusted after installation. See chapter “Scheimpflug”, page 199.

16.13 Replacement of the motor assembly for 0.69" DC2K lenses (Type 'M')



To know which type of lens motor assembly is mounted on the projection lens see chapter “Available lenses”, page 174.

Required tools

- 2.5mm Allen wrench with ball end.
- Adhesive (anti-loosening agent for hex socket screws).

Required parts

- One motor assembly.
- One connector plate.
- One motor assembly cover.
- Two hex socket screw M3x3.
- Two hex socket screw M3x8.

How to replace the lens motor assembly?

1. Remove the lens from the projector.
2. Release the connector plate from the lens by loosening the two screws (reference 1 Image 16-33). Use 2.5mm Allen wrench.

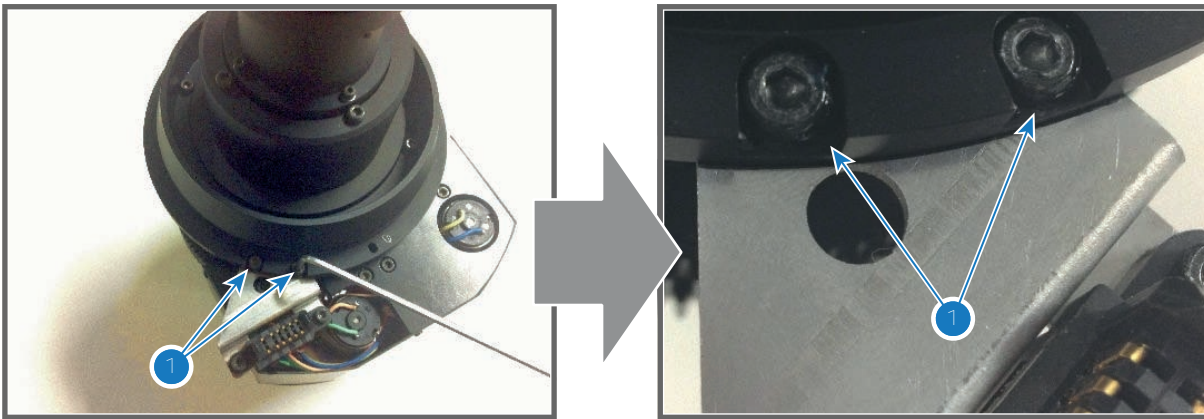


Image 16-33

3. Remove the motor unit from the lens by loosening the two screws (reference 2 Image 16-34) of the motor unit. Use 2.5mm Allen wrench.



Image 16-34

4. Place the new motor unit into position and fasten **loosely** it with 2 hex socket screws M3x8 (reference 2 Image 16-34) . Use a 2.5mm Allen wrench with ball end.

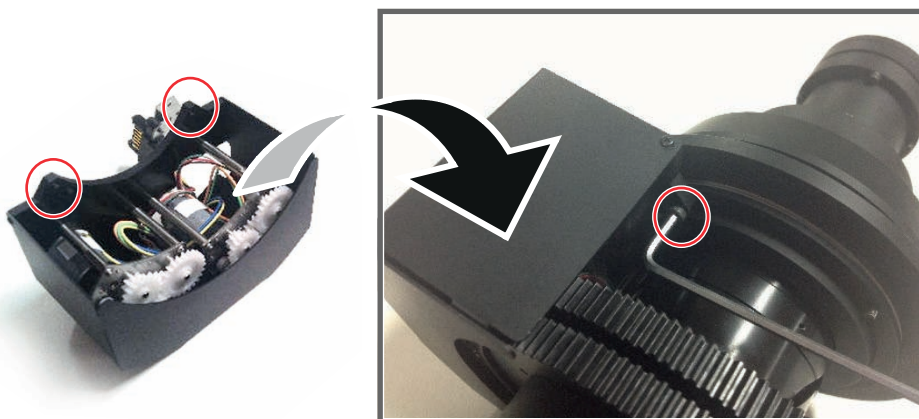




Image 16-35

5. Adjust the meshes between motor gear and lens gear to ensure that the Motor Unit will drive properly.
 -  **Note:** DO NOT set the lens gears at the terminal position (Focus and Zoom lens gears, respectively)
 -  **Tip:** Because of limited accessibility, it is recommendable to use the 2.5mm Allen wrench with ball end. Ball end for fastening easily screws and another end for securing tightly screws.

6. Secure **tightly** the motor unit using a 2.5mm Allen wrench as indicated in Image 16-35. Bond the head of screws not to loosen those.
7. Attach the connector plate to the lens mount and secure it **tightly** with 2 hex socket screw M3x3 (reference 1 Image 16-36). Use a 2.5mm Allen wrench. While securing adjust position of the connector plate along the black line drawn on the plate as indicated with reference 3 in Image 16-36. Bond the head of screws not to loosen those.

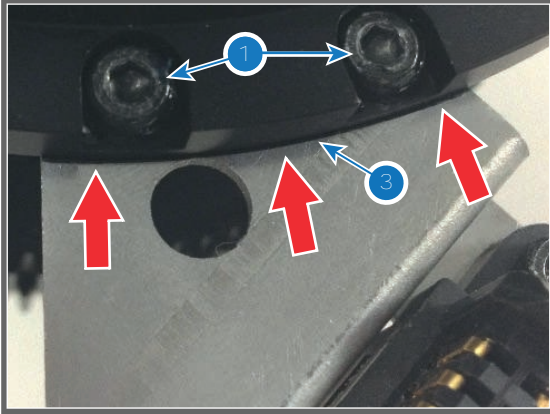


Image 16-36

16.14 Replacement of the motor assembly for 0.69" DC2K lenses (Type 'F')



To know which type of lens motor assembly is mounted on the projection lens see chapter "Available lenses", page 174.

How to replace the lens motor assembly?

1. Remove the lens from the projector.
2. Remove the front cover (reference 2 Image 16-37) of the lens motor assembly by releasing the three screws (reference 1 Image 16-37) as illustrated.
3. Remove the top cover (reference 4 Image 16-37) of the lens motor assembly by releasing the two screws (reference 3 Image 16-37) as illustrated.

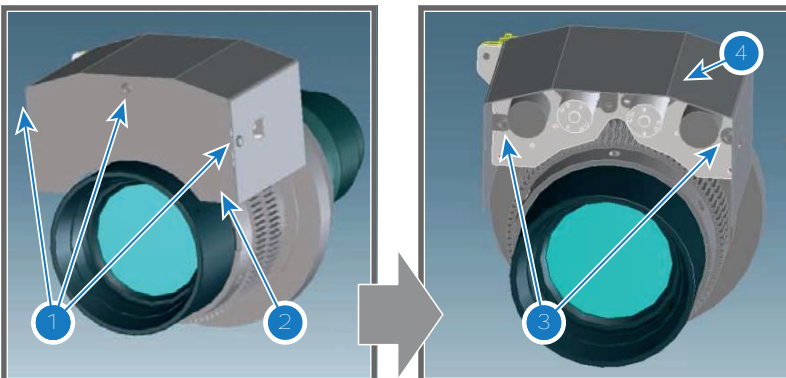


Image 16-37

4. Detach the lens motor assembly from the projection lens by releasing the three screws (reference 5 Image 16-38) as illustrated.

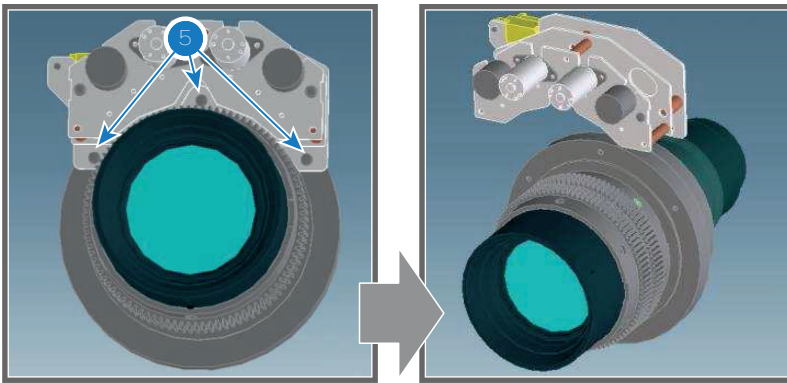


Image 16-38

5. Remove the connection plate from the lens motor assembly by releasing the five screws (reference 6 and 7 Image 16-39) as illustrated.

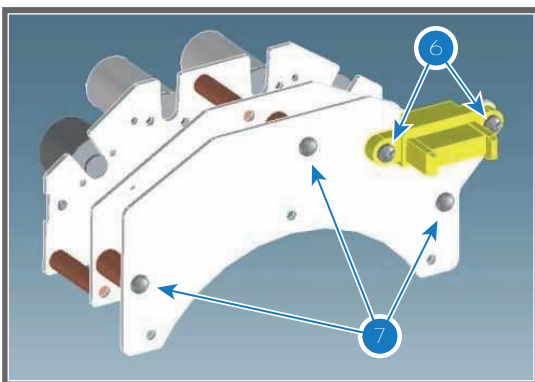


Image 16-39

6. Install the new lens motor assembly onto the connection plate. See Image 16-39.
7. Mount the lens motor assembly onto the projection lens. See Image 16-38.
8. Install the top cover and front cover of the lens motor assembly. See Image 16-37.

16.15 Replacement of the motor assembly for 0.69" DC2K lenses (Type 'B')



To know which type of lens motor assembly is mounted on the projection lens see chapter "Available lenses", page 174.

How to replace the lens motor assembly?

1. Remove the lens from the projector.
2. Place the lens in vertical position as illustrated and remove the cover of the motor block. Use an Allen wrench to loosen the three screws (reference 1 Image 16-40).

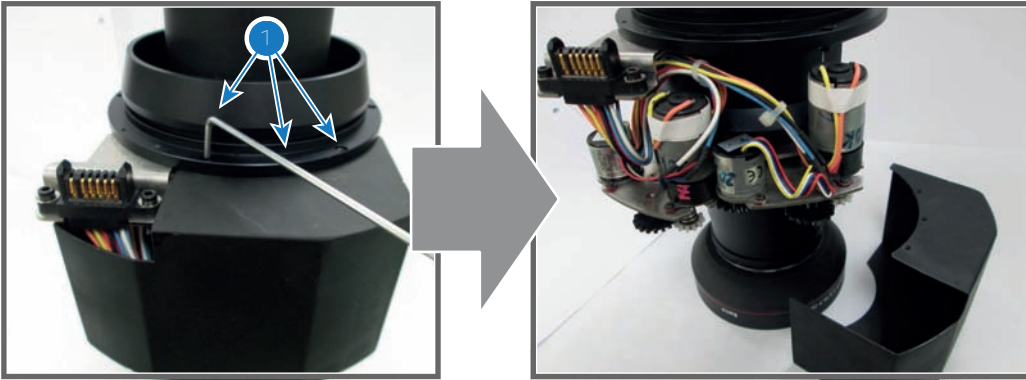


Image 16-40

3. Remove the electrical socket from the lens chassis. Use an Allen wrench to loosen the two screws (reference 2 Image 16-41).

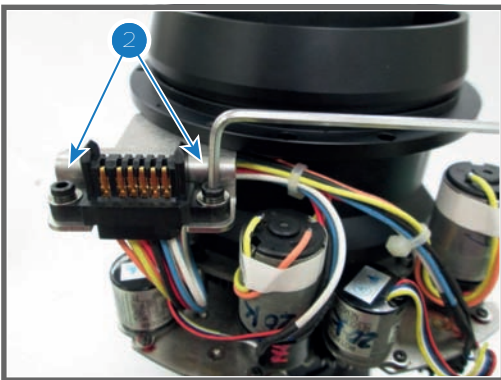


Image 16-41

4. Inverse the lens position and remove the motor block from the lens chassis. Use an Allen wrench to loosen the two screws (reference 3 Image 16-42) of the motor block.

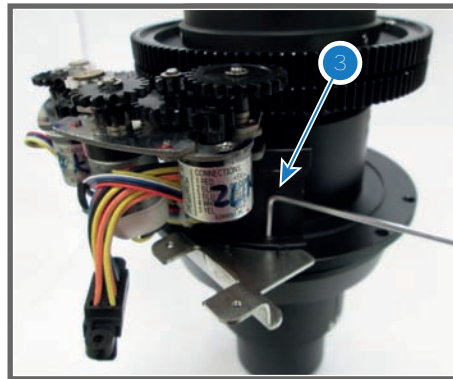
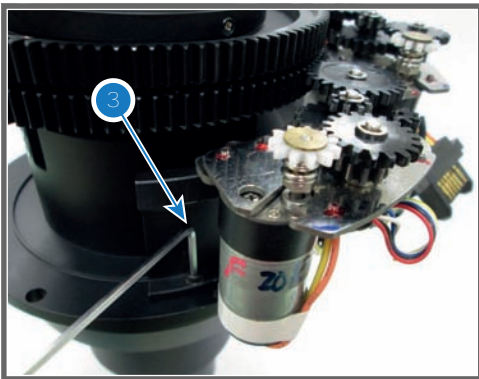


Image 16-42

5. Place the new motor block into position and secure with two screws (reference 3 Use an Allen wrench to fasten the two screws (reference 1 Image 16-42).

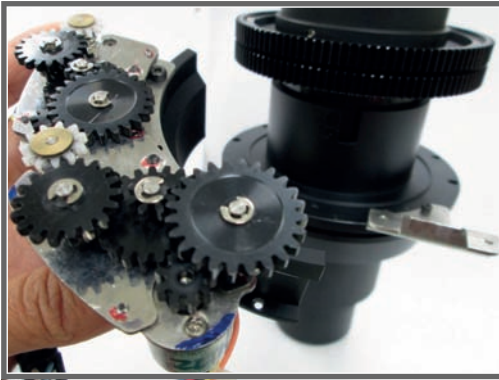


Image 16-43

6. Mount the electrical socket. Use an Allen wrench to fasten the two screws.

! **Caution:** Ensure to orient the electrical socket as illustrated.

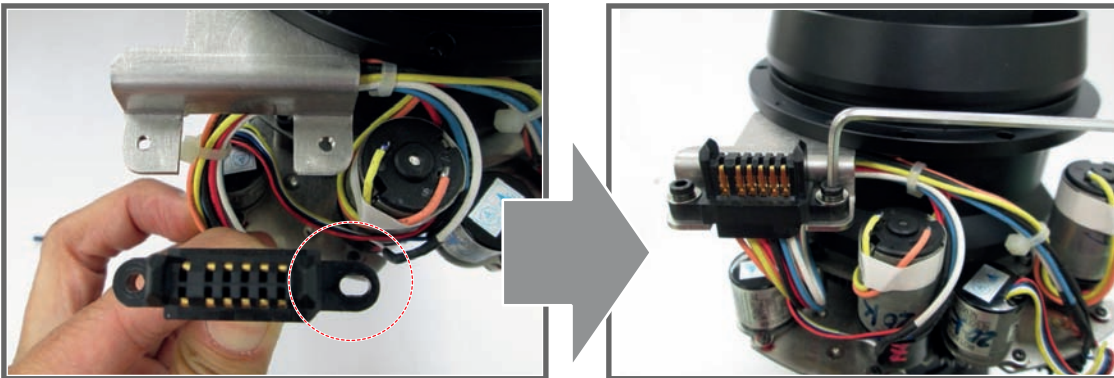


Image 16-44

7. Install the cover of the motor block. Use an Allen wrench to fasten the three screws (reference 1 Image 16-40).

16.16 Replacement of the Inner Dust Rubber



This procedure assumes that the Lens Holder is removed from the projector. See procedure "Removal of the Lens Holder", page 181.



CAUTION: Be careful as not to damage the inner dust rubber while executing this procedure.

Required tools

- 13 mm nut driver or open-end wrench
- 5.5 mm nut driver or box-end wrench
- PH1 Phillips screwdriver

Required parts

- Lens holder cover
- Dust rubber frame
- Inner dust rubber
- 6 M3 hex nuts

How to replace the Inner Dust Rubber

1. Remove the front plate from the Lens Holder. Use a 13 mm nut driver to loosen the four Scheimpflug nuts (reference 3 Image 16-45) as illustrated. It's not necessary to disconnect the ground wire from the front plate. Just turn the front plate away for accessing the stepper motor.

! *Caution:* Do not loosen the three big springs of the Scheimpflug adjustment mechanism (reference 4).

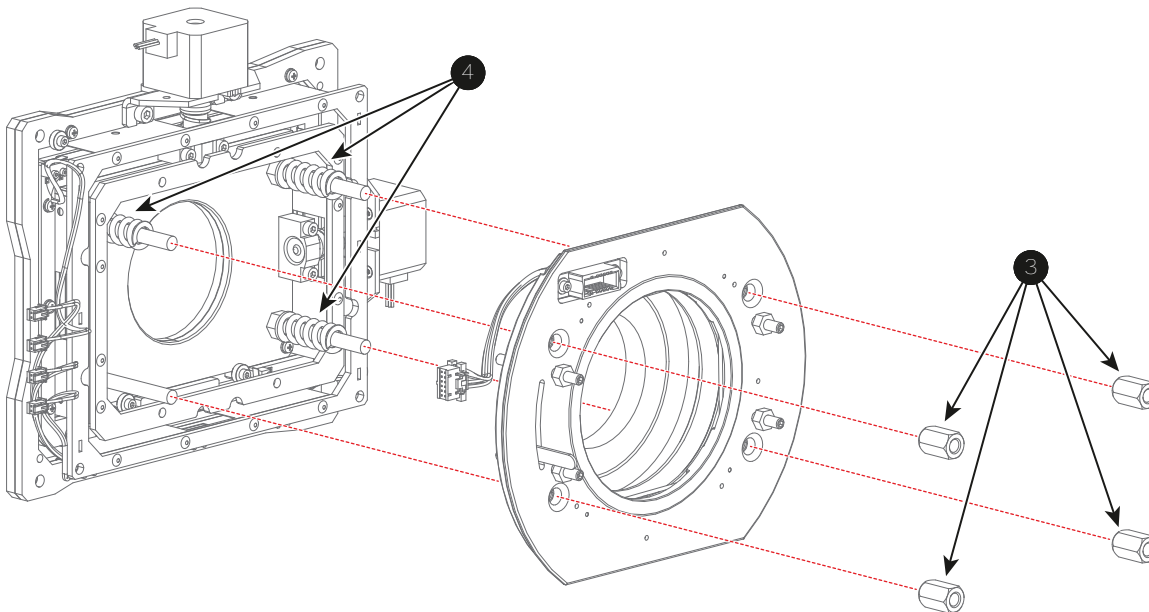


Image 16-45

2. Remove the old Lens Holder cover and inner dust rubber. Use a PH1 Phillips screwdriver to loosen the seven screws (reference 5 Image 16-46) as illustrated. By doing this, you will also release the ground cable (reference 6).

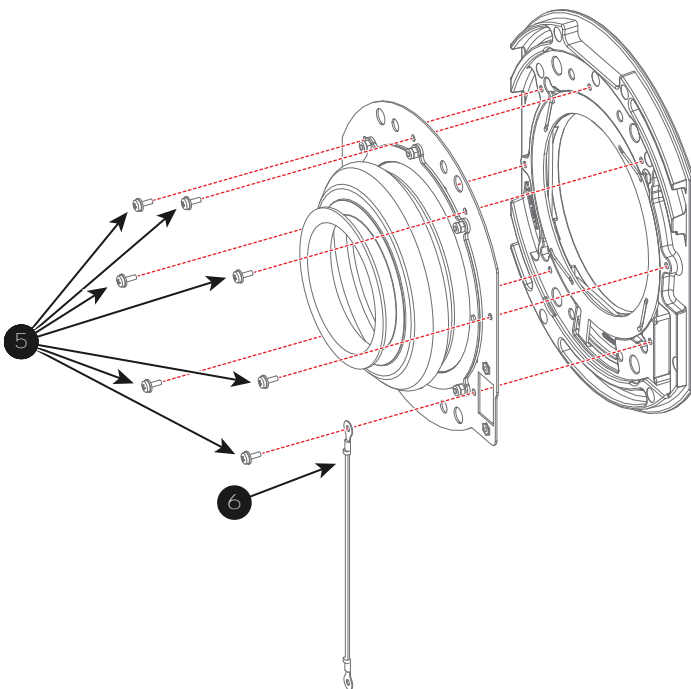


Image 16-46

3. Place the inner dust rubber (reference 9 Image 16-47) over the pins of the new cover. Carefully place the dust rubber frame (reference 8) over the top of the inner dust rubber and over the pins of the new cover. Then use a 5.5 mm nut driver to tighten the dust rubber and seal with the six nuts (reference 7).

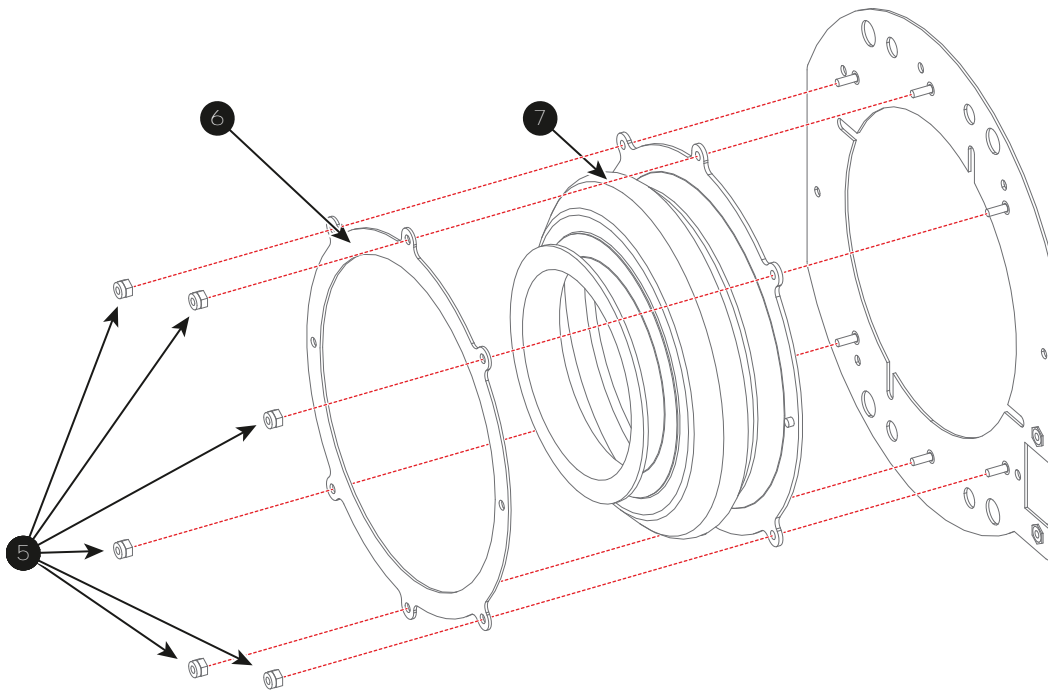


Image 16-47

4. Install the new Lens Holder Cover assembly onto the front plate. Use a PH1 Phillips screwdriver to tighten the seven original screws (reference 5 Image 16-46. Make sure you tighten the earth wire (reference 6) back to its original place.
5. Carefully reinstall the front plate from the Lens Holder. Help the rubber through the lens Holder onto the other side.

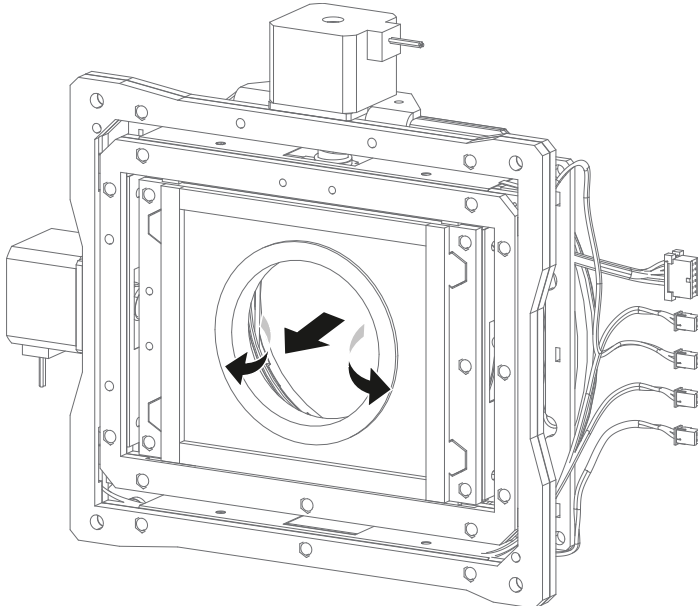


Image 16-48

6. Carefully reinstall the front plate from the Lens Holder. Use a 13 mm nut driver to fasten the four Scheimpflug nuts (reference 3 Image 16-45). Fasten the big nuts crosswise bit by bit. Ensure that the upper two rods and the lower left rod contain a big spring (reference 4).



Proceed with reinstalling the Lens Holder. See procedure "Installation of the Lens Holder cover plate", page 185.



The Lens Holder has to be adjusted after installation. See chapter “Scheimpflug”, page 199.

Scheimpflug

17

About this chapter

This chapter explains the Scheimpflug principle and when to apply Scheimpflug correction upon your DP2K-SLP Series. In addition to the procedure for Scheimpflug adjustment the procedure to adjust the Back Focal Length is also included in this chapter.

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.

Overview

- Scheimpflug introduction
- Scheimpflug adjustment
- Fixation of the Lens Holder front plate
- Back Focal Length adjustment

17.1 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→Fp2). This is achieved by changing the distance between the DMD plane and the lens plane (Lp1→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→Lp4).

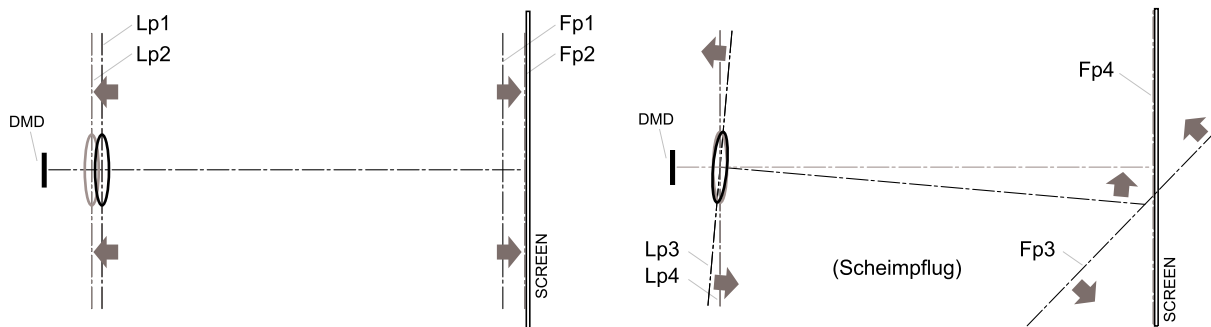


Image 17-1: Scheimpflug principle

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

The front plate of the Lens holder is equipped with four bronze (Scheimpflug) nuts and four set screws with lock nut. These screws and nuts are used for Scheimpflug adjustment.

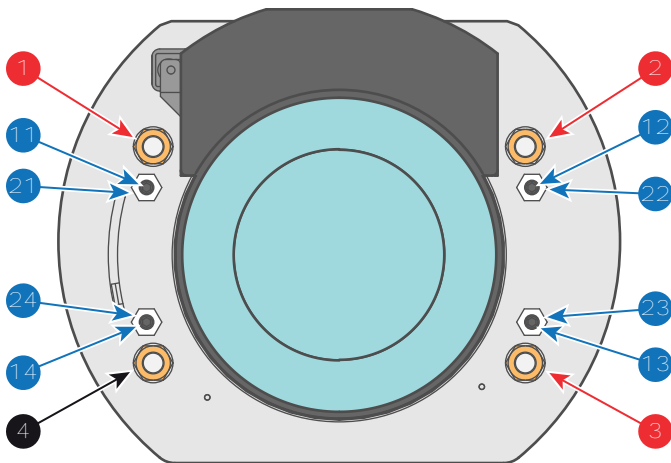


Image 17-2

- | | |
|--|---|
| <p>1 Scheimpflug adjustment nuts No1: Influences the sharp focus plane in the lower left corner of the projected image.</p> <p>2 Scheimpflug adjustment nuts No2: Influences the sharp focus plane in the lower right corner of the projected image.</p> <p>3 Scheimpflug adjustment nuts No3: Influences the sharp focus plane in the upper right corner of the projected image.</p> <p>4 Scheimpflug nut No 4: without adjustment functionality.</p> <p>11 Set screw for nut No1.</p> <p>12 Set screw for nut No2.</p> | <p>13 Set screw for nut No3.</p> <p>14 Set screw for nut No4.</p> <p>21 Lock nut.</p> <p>22 Lock nut.</p> <p>23 Lock nut.</p> <p>24 Lock nut.</p> |
|--|---|



Reference 1, 2 and 3 are adjustment points. Reference 4 is a locking point and NOT used during Scheimpflug adjustment.

When to apply Scheimpflug?

Only apply a Scheimpflug correction in case the overall focus of the projected image is not equally sharp (can be caused if the projector is **NOT in parallel** with the screen or a previous misaligned Scheimpflug) . Take into account that the consequence of applying Scheimpflug correction upon a screen not in parallel with the projector is that the projected image differs from the rectangle shaped image. In other words “**distortion**” of the projected image occurs. **Masking** will be required to solve the distortion.

The disadvantage of Masking is loss of content. Therefore it is strongly **recommended** to place the projector **in parallel** with the projection screen and use the **SHIFT** functionality of the Lens Holder to match the projected image with the projection screen. In case the SHIFT range is not sufficient then the projector can be tilted and Scheimpflug can be applied.


17.2 Scheimpflug adjustment

Required tools

- 3mm Allen wrench.
- 13mm nut driver.
- 10mm nut driver.

Preparation steps:

1. Ensure that the throw ratio of the installed lens matches the requirements of the application (projection distance and screen size).
2. Ensure that the correct lens parameters are activated. (See user guide of the “*Communicator*” chapter *Installation > Advanced > Lens parameters*)

 **Note:** Selecting the wrong lens parameters will result in an unexpected behavior of the lens when using macros for switching between FLAT and SCOPE (change in picture size and focus).

3. Perform a lens **HOME & RETURN** operation. (See user guide of the “Communicator” chapter *Installation > Advanced > Lens parameters*)
4. Project the green focus test pattern.

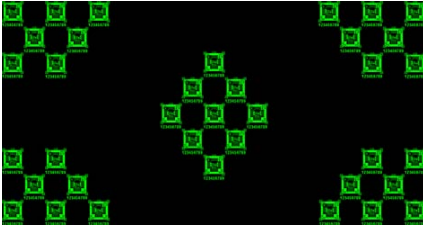


Image 17-3

5. Zoom the lens for maximum image on the screen (**WIDE**).
6. Is it possible to focus the center of the projected image?
 - ▶ **If yes**, the Back Focal Length is OK. Proceed with the next step.
 - ▶ **If no**, the Back Focal Length needs realignment. Proceed with the procedure “Back Focal Length adjustment”, page 205.
7. Unlock and turn out the 4 set screws (reference 11 Image 17-4) of the Lens Holder by 1 centimeter. Use a 10mm nut driver for the lock nuts (reference 21 Image 17-4) and use a 3mm Allen wrench for the set screws.

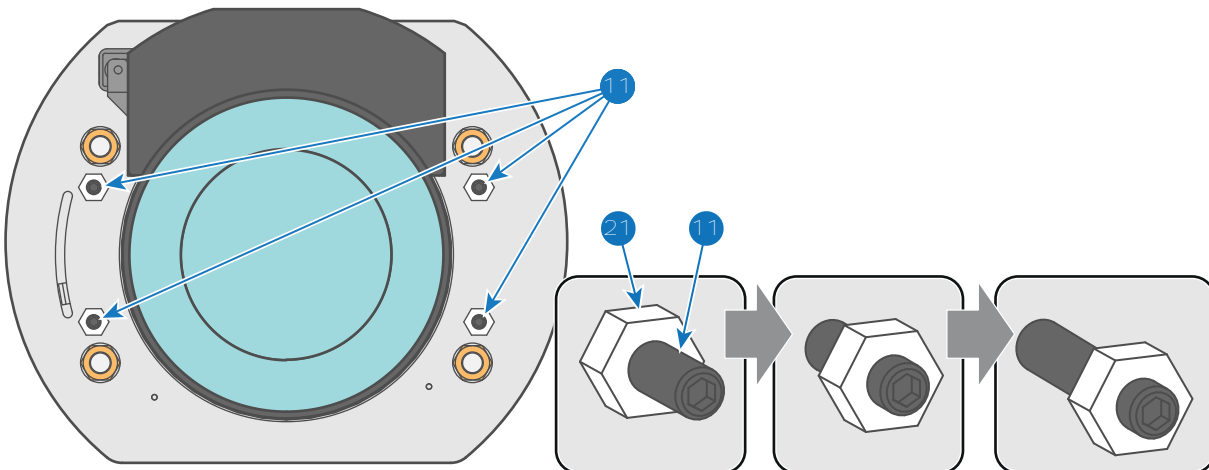


Image 17-4

8. Fully loosen the Scheimpflug nut at the lower left of the Lens Holder (reference 4 Image 17-5). Use a 13mm nut driver.
9. Optimize the focus of the projected image in the center of the screen (F) using the motorized focus control (Local Keypad).

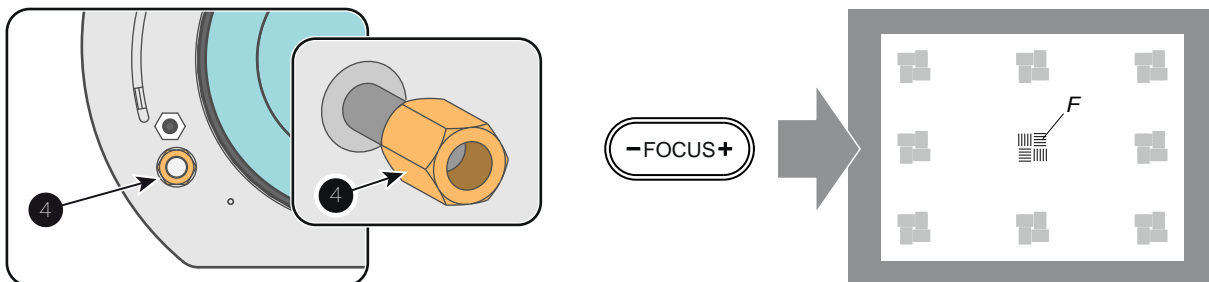


Image 17-5

Scheimpflug adjustment steps:

1. Sharpen the image at the bottom left corner of the screen by turning the upper left Scheimpflug adjustment nut (reference 1 Image 17-6). As a result the focus in the center will fade a bit but that's normal.

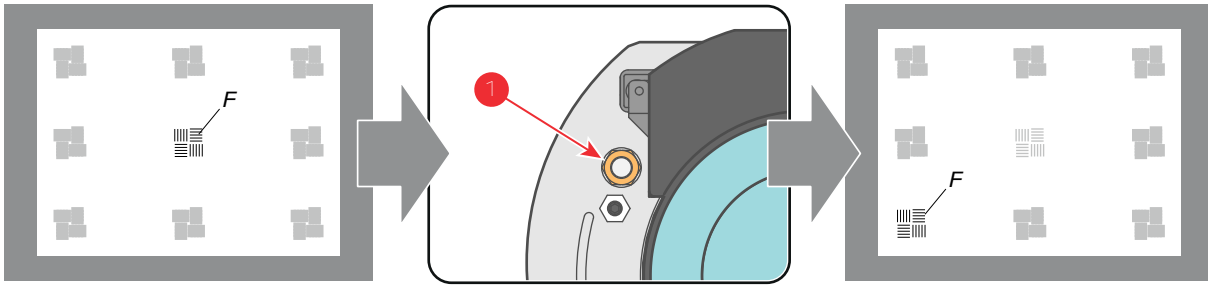


Image 17-6

2. Sharpen the image at the top right corner of the screen by turning the lower right Scheimpflug adjustment nut (reference 3 Image 17-7).

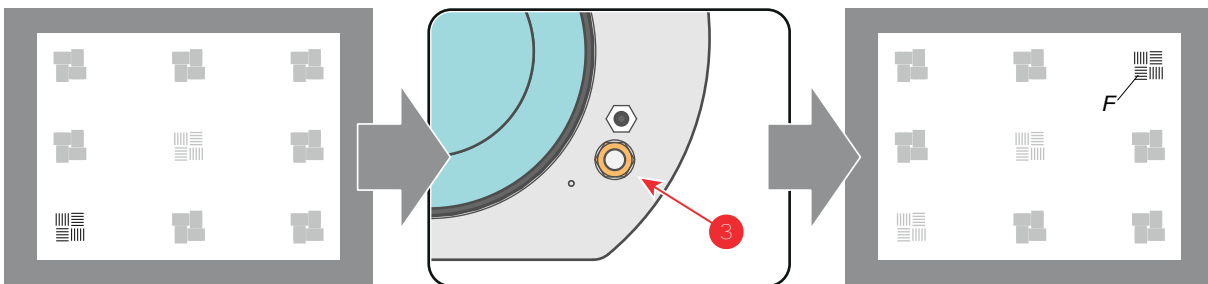


Image 17-7

3. Sharpen the image at the bottom right corner of the screen by turning the upper right Scheimpflug adjustment nut (reference 2 Image 17-7).

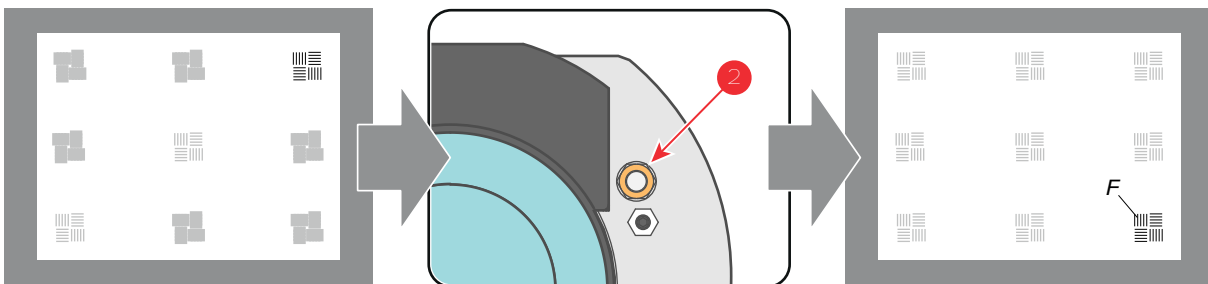


Image 17-8

4. Optimize the focus of the projected image in the center of the screen using the motorized focus control (Local Keypad).

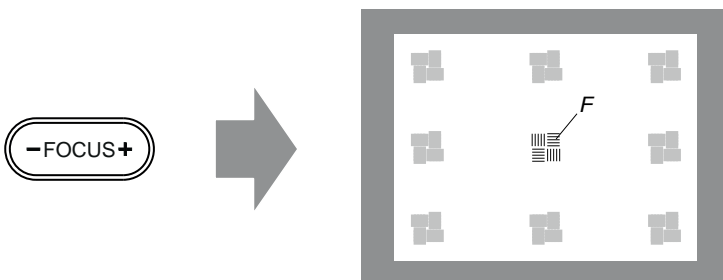


Image 17-9

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. Proceed with the procedure “Fixation of the Lens Holder front plate”, page 204.

17.3 Fixation of the Lens Holder front plate

When fixing the Lens Holder front plate

After performing the procedure for Scheimpflug adjustment or Back Focal Length adjustment the Lens Holder front plate must be secured in such a way that it doesn't disturb the result of the adjustment.

Required tools

- 10mm nut driver.
- 3mm Allen wrench.
- 13mm nut driver.

How to fix the Lens Holder front plate?

Start the fixation as follows (steps must be followed strictly) :

1. Project the framing test pattern for FLAT & SCOPE.
2. Zoom the projected image until the edges of the projected test pattern matches with the edges of the projection screen.

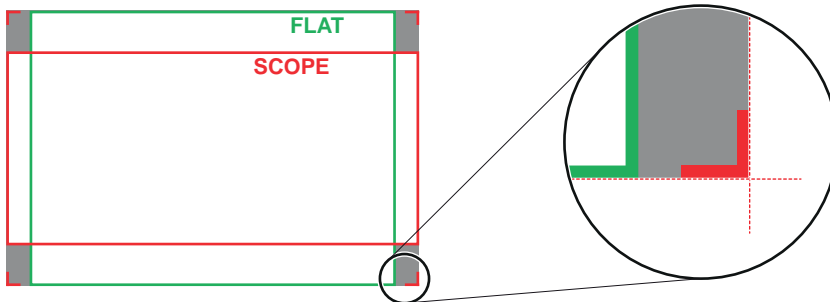



Image 17-10

3. Turn in the three set screws indicated with reference 11 Image 17-11 without disturbing the projected image. Tighten lightly . Do not turn in the set screw at the lower left of the Lens Holder!

 **Note:** Ensure that the edges of the projected test pattern remain in place on the screen. Any movement of the image will affect the Scheimpflug adjustment.

4. Fasten the lock nut (reference 21 Image 17-11) of the three set screws. Use a 10mm nut driver. Ensure the image doesn't move.

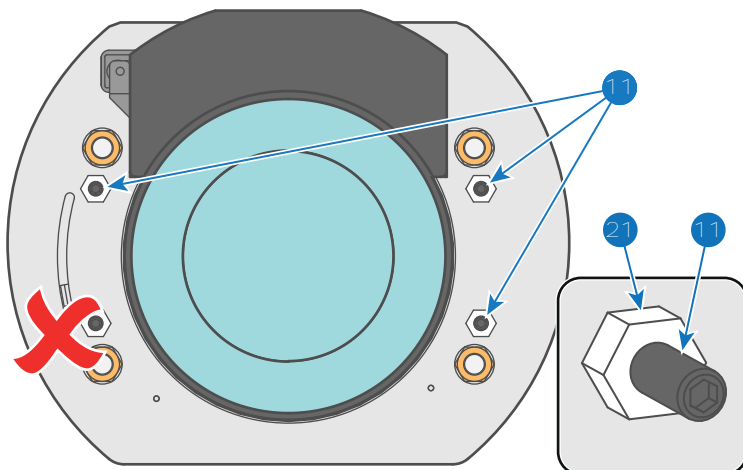




Image 17-11

5. Gently turn (by hand) the Scheimpflug adjustment nut at the lower left of the Lens Holder (reference 4 Image 17-12) against the Lens Holder front plate without disturbing the projected image.
6. Turn in the set screw at the lower left of the Lens Holder (reference 14 Image 17-12) without disturbing the projected image. Use a 3mm Allen wrench.

-  **Note:** Ensure that the edges of the projected test pattern remain in place on the screen. Any movement of the image will affect the Scheimpflug adjustment.
-  **Tip:** Fasten the set screw and the Scheimpflug nut alternately, without disturbing the projected image, until the Scheimpflug nut and set screw are completely tightened.

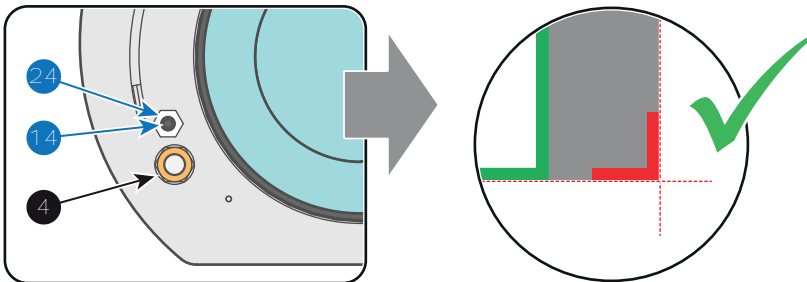


Image 17-12

7. Fasten the lock nut at the lower left of the Lens Holder. Use a 10mm nut driver.

17.4 Back Focal Length adjustment

When to adjust the Back Focal Length?

If a lens is used with a throw ratio suited for the application, (lens selection depends on projection distance and screen size) typically one would NEVER need to adjust the Back Focal Length of the projector.

A Back Focal Length adjustment is only required in case the Focus range of the installed lens does not capture the projection screen either for FLAT and/or for SCOPE. In other words, when it is impossible to focus the image on the screen for FLAT and/or for SCOPE. Note that the lenses for the DP2K-SLP Series projector are varifocal. So, switching between FLAT and SCOPE (zoom action) requires a readjustment of the focus.

What is Back Focal Length adjustment?

Back Focal Length adjustment means moving the lens plane (Lp), thus the Lens Holder front plate, closer to or further from the DMD plane. The closer the lens plane to the DMD plane the further the focus range (Fr) of the lens will be.

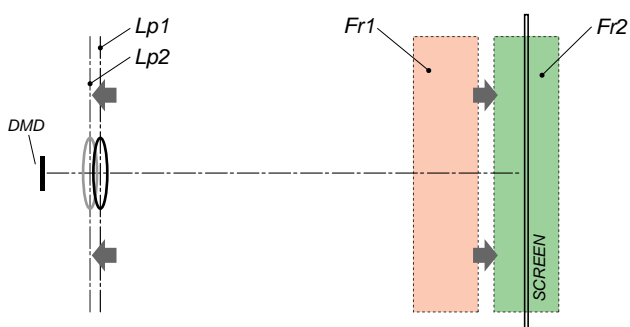


Image 17-13



Do not abuse the Back Focal Length adjustment of the Lens Holder. Neglecting this will result in loss of image quality because of the lens design. Cases requiring Back Focal Length adjustment normally indicate incorrect lens choice (throw ratio).

Required tools

- 10mm nut driver.
- 3mm Allen wrench.
- 13mm nut driver.

How to check the Back Focal Length?

1. Ensure that the throw ratio of the installed lens matches with the requirements of the application (projection distance and screen size).
2. Ensure that the correct lens parameters are activated. (See user guide of the “Communicator” chapter *Installation > Advanced > Lens parameters*)

! **Caution:** Not using the correct lens parameters could result in lens damage.

3. Perform a lens **HOME & RETURN** operation. (See user guide of the “Communicator” chapter *Installation > Advanced > Lens parameters*)
4. Project the green focus test pattern. (screen file “no masking” or “no “crop”)

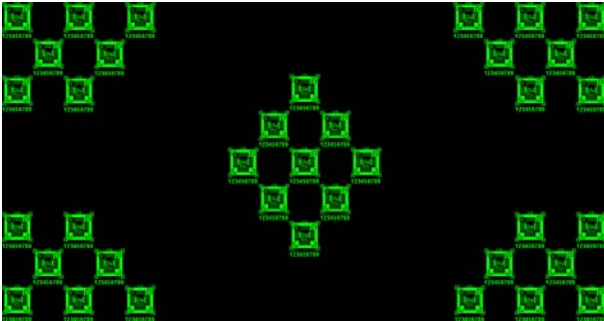


Image 17-14

5. Zoom the lens for maximum image on the screen (**WIDE**).
6. Is it possible to focus the center of the projected image?
 - ▶ **If yes**, the Back Focal Length is OK.
 - ▶ **If no**, the Back Focal Length needs realignment. Proceed with the next procedure.

How to adjust the Back Focal Length?

1. Unlock and loosen the 4 set screws (reference 11 Image 17-15) of the Lens Holder by 1 centimeter. Use a 10mm nut driver for the lock nuts (reference 21 Image 17-15) and use a 3mm Allen wrench for the set screws.

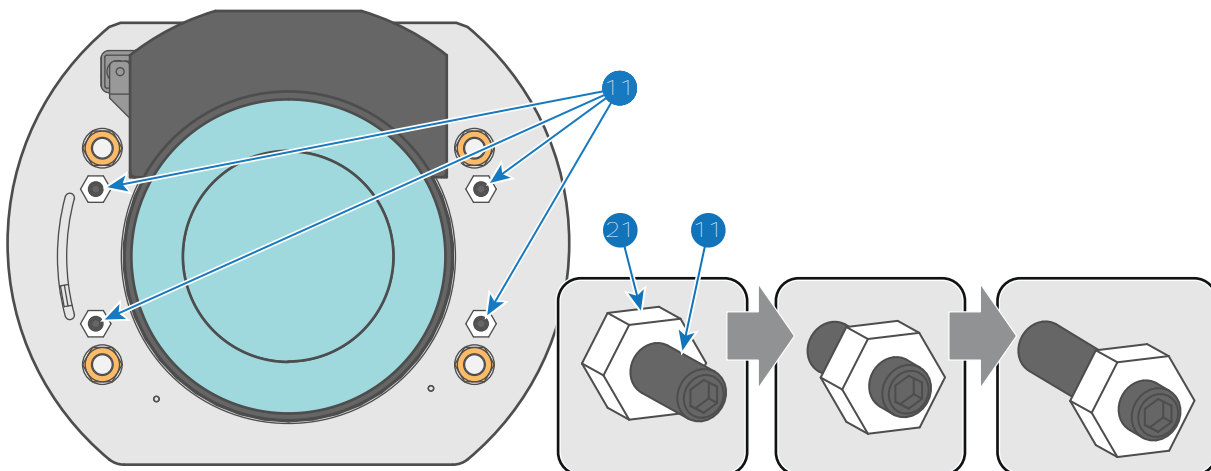


Image 17-15

2. Fully loosen the Scheimpflug nut at the lower left of the Lens Holder (reference 4 Image 17-16). Use a 13mm nut driver.

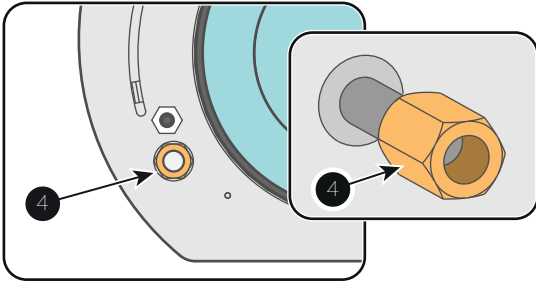



Image 17-16

3. Turn the three Scheimpflug adjustment nuts, reference 1, 2 and 3 Image 17-17, until the front of the nut (reference 5 Image 17-17) is equally aligned with the front of the threaded rod (reference 6 Image 17-17). Use a 13mm nut driver.

 **Note:** This is the nominal position of the Lens Holder.

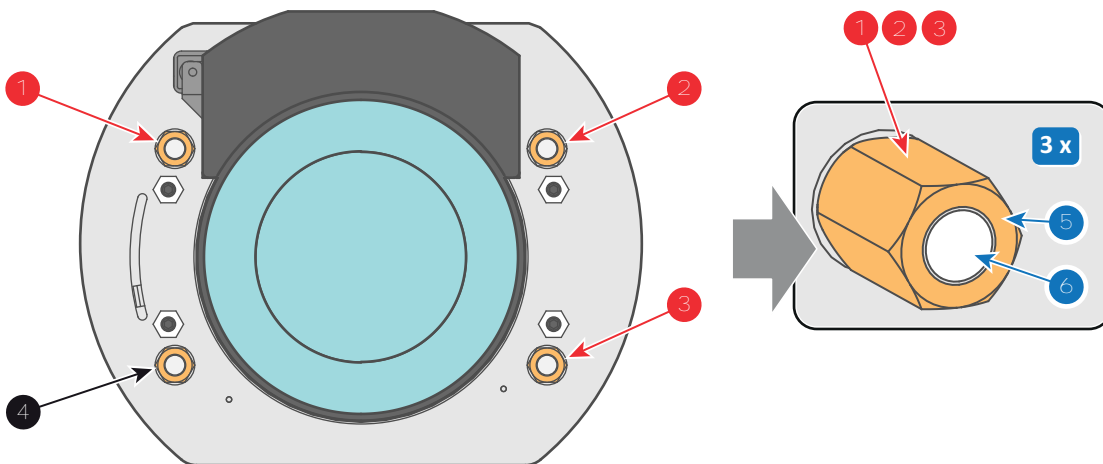


Image 17-17

4. Zoom the lens for maximum image on the screen (**WIDE**) and focus the center of the projected image using the motorized focus control (Local Keypad).

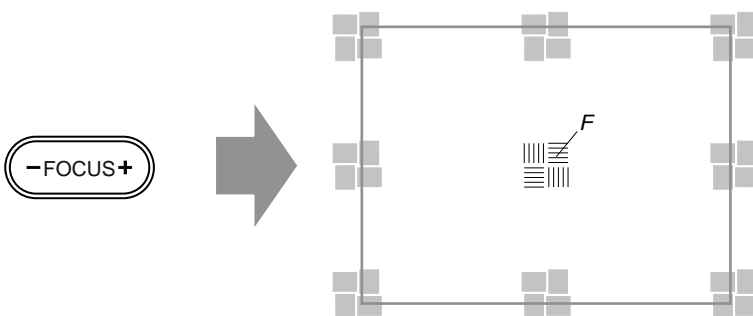


Image 17-18

5. Is it possible to focus the center of the projected image using the motorized focus control (Local Keypad) ? Ensure that the lens is zoomed for maximum image on the screen (**WIDE**).
- ▶ **If yes**, nominal position is good for sharp focus in the middle of the projected image. Proceed with step 6.
 - ▶ **If no**, obtain the best possible focus in the center of the projected image using the motorized focus control and then turn the three Scheimpflug adjustment nuts, reference 1, 2 and 3 Image 17-19, equally in or out until the center of the projected image is sharp. **Attention:** Keep in mind the turning direction of the Scheimpflug adjustment nuts for further adjustment instructions in this procedure.

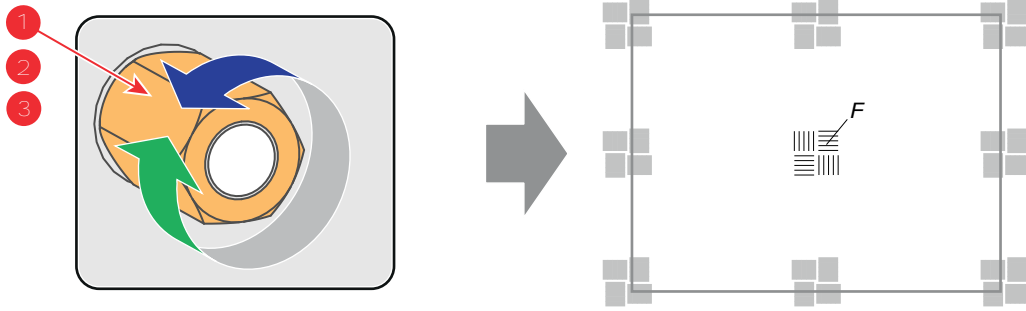


Image 17-19

6. Zoom the lens for minimum image on the screen (**TELE**) and focus the center of the projected image using the motorized focus control (Local Keypad).

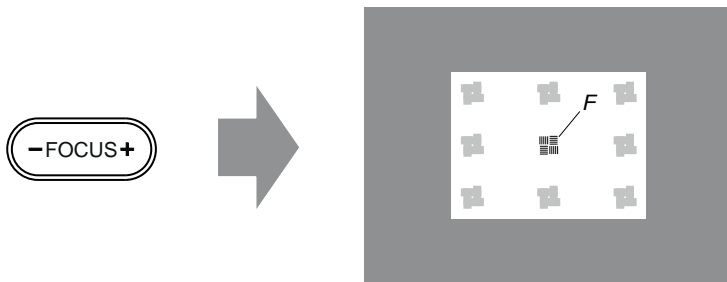


Image 17-20

7. Is it possible to focus the center of the projected image using the motorized focus control (Local Keypad) ? Ensure that the lens is zoomed for minimum image on the screen (**TELE**).
 - ▶ If yes, no further adjustment actions required. Proceed with step 8.
 - ▶ If no, obtain the best possible focus in the center of the projected image using the motorized focus control and then turn the three Scheimpflug adjustment nuts, reference 1, 2 and 3 Image 17-21, equally in or out until the center of the projected image is sharp. **Note:** the same turning direction as in step 4 is applicable.

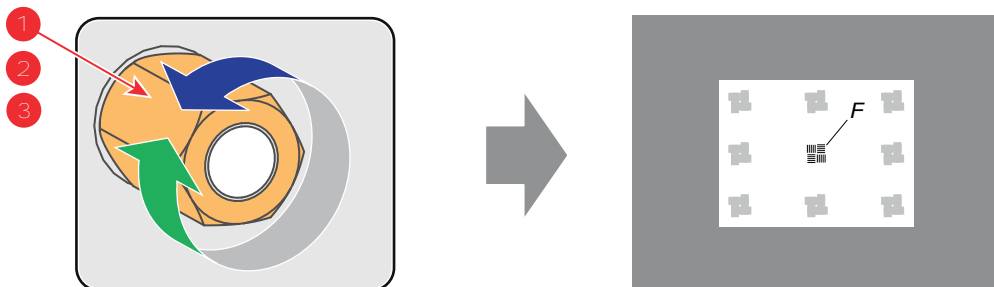


Image 17-21

8. Check if it is possible to focus the center of the projected image using the motorized focus control (Local Keypad) for **WIDE** and for **TELE**.
 - ▶ If yes, the Back Focal Length is correctly adjusted.
 - ▶ If no, repeat with step 4.
9. Is the projected image in the corners as sharp as in the middle?
 - ▶ If yes, proceed with the procedure "Fixation of the Lens Holder front plate", page 204.
 - ▶ If no, Scheimpflug adjustment is required. See procedure "Scheimpflug adjustment", page 201, prior to fixate the Lens Holder front plate. **CAUTION:** Skip the action, in the Scheimpflug adjustment procedure, to turn the three Scheimpflug adjustment nuts until the front of the nut is equally aligned with the front of the threaded rod!

Card Cage

18

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. Furthermore, the board replacement and fan replacement procedures are included as well.



WARNING: The procedures below may only be performed by Barco trained and qualified technicians.



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.



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

Overview

- Introduction Card Cage
- Integrated Cinema Processor (ICP)
- Cinema Controller
- Replacement of the ICP board
- Replacement of the RTC battery of the ICP board
- Replacement of the HDSDI board
- Replacement of the Link Decryptor
- Replacement of the Cinema Controller
- Battery replacement on the Cinema Controller Board
- Replacement of the Card Cage small fan
- Replacement of the Card Cage large fan
- Replacement of the ICP fan
- Replacement of the Button Module
- Signal Backplane replacement process
- Removal of the Card Cage cover
- Disconnecting the Card Cage wires
- Removal of the Card Cage
- Removal of the Signal Backplane
- Installing the Signal Backplane
- Installing the Card Cage

Card Cage

- Connecting the Card Cage wires
- Installation of the Card Cage cover
- Removal of the Card Cage partition plate
- Replacement of the Status Light

18.1 Introduction Card Cage

Card Cage

The Card Cage is located at the right side of the projector. The upper compartment of the Card Cage contains the Button Interface and below this there are three slots wherein the Barco Cinema Controller board can fit, together with either the ICMP board, or the ICP board + the IMB or IMS board.

The Card Cage can be removed from the projector chassis as a whole.

Card Cage parts

18.2 Integrated Cinema Processor (ICP)



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

LEDs and ports on the Integrated Cinema Processor

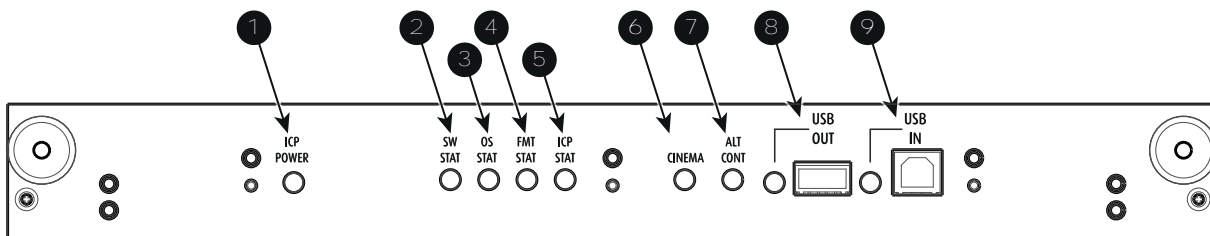


Image 18-1

- | | |
|--|--|
| <p>1 ICP is powered.</p> <p>2 ICP software state, normal operation is green blinking.</p> <p>3 ICP operating system state, normally full green .</p> <p>4 ICP FMT configuration state, normally full green.</p> <p>5 ICP MAIN configuration state, normally full green.</p> | <p>6 CINEMA port selected. When on, LED 7 will be out.</p> <p>7 ALTERNATIVE port selection. When on, LED 6 will be out. (note that this function is disabled. Led never lights up)</p> <p>8 USB, for future use.</p> <p>9 USB, for future use.</p> |
|--|--|

LED diagnostic

State description	Normal operation	Error state
Software state (LED reference 2)	flashing green	red or orange
Operating System state (LED reference 3)	green	off, red or yellow
FMT FPGA state (LED reference 4)	green	red : unable to configure the FPGA yellow : FPGA is loaded with the Boot application
ICP FPGA state (LED reference 5)	green	red : unable to configure the FPGA yellow : FPGA is loaded with the Boot application

ICP functions:

- Stores all projector files. When board is replaced; clone package must be reloaded.
- Stores and generates test patterns.
- Scaling to native resolution, re-sizing, masking, line-insertion de-interlacing, subtitle overlay, color space conversion, de-gamma, color correction
- Source Selection between alternative content and cinema content.
- Stores a Certificate and Private Key needed for Playback validation

- Contains a real time clock, which must be synchronized with the GMT/UTC time stored in the link decryptor module or Integrated Media Block (see Communicator software)
- Handles unpacking of special video formats



The ICP board spare part kit is not default programmed for a DP2K-SLP Series projector. When using this board in a DP2K-SLP Series projector the software must be re-installed after installation of the board.



When installing a new ICP board in a DP2K-SLP Series 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 !

18.3 Cinema Controller

Location of the communication ports

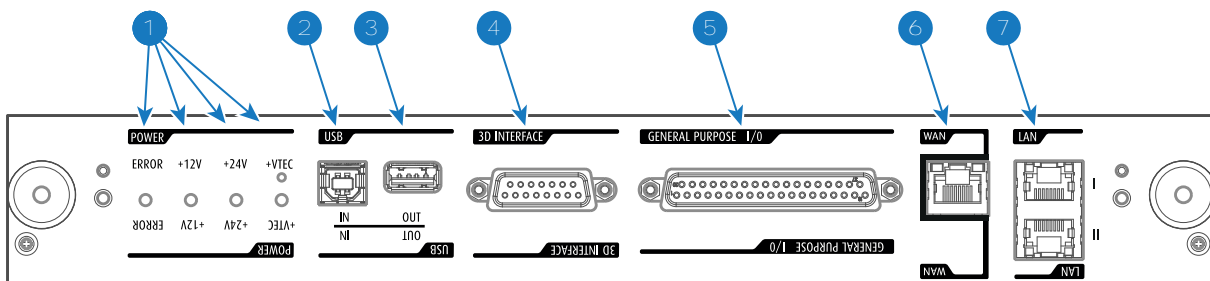


Image 18-2

Functionality

1 Diagnostic LEDs

The front plate of the Cinema Controller contains 4 diagnostic LEDs to display the status of the power supply:

- +VTEC supply (not used on DP2K-S series projector).
- +24V supply.
- +12V supply.
- general power supply (ERROR).

2 USB IN port

The Cinema Controller is equipped with a USB port, type “B” connector to connect upstream devices (E. g. PC). This USB port is used to communicate with the projector via RS232 commands (Virtual comport).

3 USB OUT port

The Cinema Controller is equipped with a USB port, type “A” connector which can be used to power handheld devices within USB spec (MAX 500mA/5V]. No other functionality supported (Future expansion).

4 3D INTERFACE

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.

5 GENERAL PURPOSE INPUT/OUTPUT (GPIO)

This 37 pin connector can be used to send or receive trigger signals from other devices. These input/output pins can be programmed by macros created with the Communicator software. See user's guide of the Communicator, section Macro editor, for more information about this functionality. Note that the General Purpose Inputs accept 24 volt maximum. If the factory predefined macro to wake up the projector is assigned to one of the free GPI input pins the projector can be awakened via GPIO.

6 Wide Area Network (WAN)

Wide Area Network (WAN: 10/100/1000 base-T). Use this Ethernet port (reference 6 image 7-8) to connect the network which contains the DHCP server.

Once connected to the WAN, users can access the projector from any location, inside or outside (if allowed) their company network using the 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.

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

Local Area Network (LAN: 10/100/1000 base-T) with built-in Ethernet switch (port I and port II). Use for projector control and automation. E.g. Touch Panel, 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.

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).



The connectors used for all 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).

Virtual comport (RS232 serial communication)

The USB-IN port of the communication interface supports RS232 serial communication. You can use the RS232 input port to connect a local PC to the projector. This way you can configure and control the projector from your local PC.



Do not forget to set the projector's baud rate (default = 115200) to match that of the computer.

Advantages of using RS232 serial communication:

- easy adjustment of the projector via PC (or MAC).
- wide range of control possibilities.
- sending data to the projector (update).
- copying data from the projector (backup).



RS232

An Electronic Industries Association (EIA) serial digital interface standard specifying the characteristics of the communication path between two devices using either D-SUB 9 pins or D-SUB 25 pins connectors. This standard is used for relatively short-range communications and does not specify balanced control lines. RS-232 is a serial control standard with a set number of conductors, data rate, word length and type of connector to be used. The standard specifies component connection standards with regard to computer interface. It is also called RS-232-C, which is the third version of the RS-232 standard, and is functionally identical to the CCITT V.24 standard. Logical '0' is > + 3V, Logical '1' is < - 3V. The range between -3V and +3V is the transition zone.

18.4 Replacement of the ICP board



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.



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

Required tools

PH2 Phillips screwdriver.

How to replace the ICP board of the projector?

1. Release the two retaining screws (reference 1) at the front of the ICP board. Use a PH2 Phillips screwdriver.
2. Pull the ICP board out of its compartment.
3. Gently insert the ICP board in the guides of the ICP compartment as illustrated. Push it completely in.



Caution: Ensure that the both sides of the ICP board are captured by the guides inside the ICP compartment.

4. Fasten the two screws at the front side of the ICP board (reference 1). Use a PH2 Phillips screwdriver.
5. Reconnect the power cord and switch on the projector.
6. Check if the latest firmware of the ICP board is installed. If not, upgrade to the latest version. See Communicator User Guide.
7. Is there a full backup clone or backup including the TI specific files available?
 1. If available:
 - Reinstall the clone file. See Communicator User Guide chapter “Installation” where 'cloning' is explained.
 - Upload the LUT-SCC file into the projector file system. (e.g. 1110351581.LUT-SCC). See procedure on page 155.
 - Activate the LUT-SCC file. See procedure on page 156.
 2. If NOT available: perform the same additional actions as for a new Light Processor (see “Light Processor replacement process”, page 97).

18.5 Replacement of the RTC battery of the ICP board

Required tools

Phillips screw driver

Required parts

All parts are included in kit R8766526K (battery cover, coin cell battery BR2330 and a pair of gloves).

How to replace

1. Put on the gloves.
2. Remove the ICP board from the card cage. See chapter “Removing a board in the card cage”.
3. Carefully put the ICP board on a table.

4. Place the battery cover over battery 'B2' of the ICP board to protect this battery while replacing the RTC battery 'B1' which is seated in the battery holder.

 **Note:** The battery cover can be left on the board.

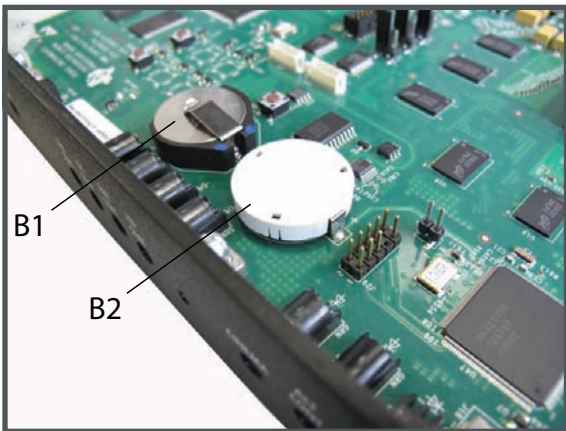


Image 18-3

5. Remove the RTC battery 'B1' from the battery holder and insert the new battery in the battery holder.

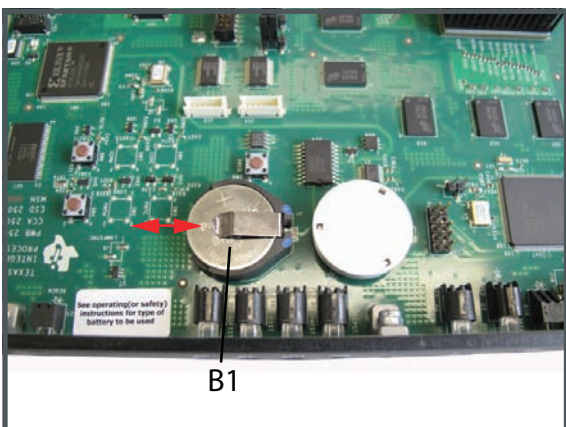


Image 18-4

6. Insert and fixate the ICP board back in the card cage. See chapter "Inserting a board in the card cage".
7. Power on the projector.
8. Clear the projector error 5800 "ti-icp - system status = fail" with error message "ICP real time clock error" by configuring the RTC (Real Time Clock) of the ICP. See user manual Communicator chapter "Set up of the ICP clock", choose the option UTC/GMT time calculated from current PC time as current time.

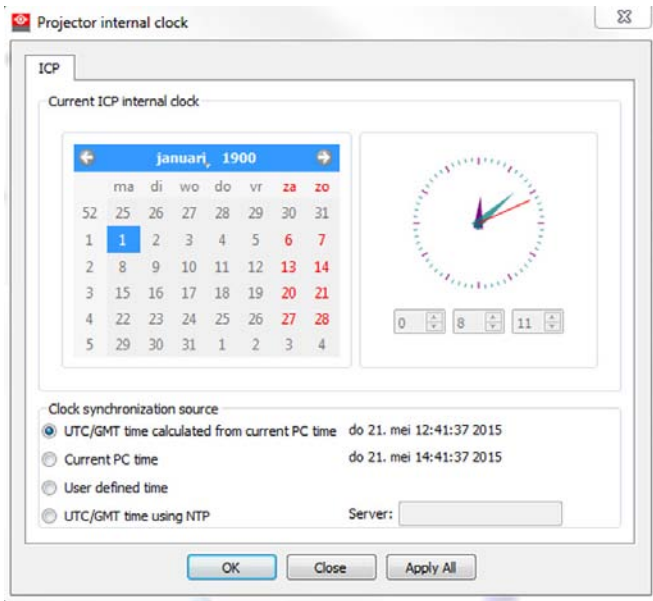


Image 18-5

9. Clear the projector error 5834 “physical marriage tamper event” by remarrying the projector. See service manual chapter "Authorization to clear security warning on the projector".

18.6 Replacement of the HDSDI board



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.




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

Required tools

PH2 Phillips screwdriver.

How to replace the HDSDI board of the projector?

1. Release the two retaining screws (reference 1) at the front of the HDSDI board. Use a PH2 Phillips screwdriver.
2. Pull the HDSDI board out of its compartment.
3. Gently insert the HDSDI board in the guides of the HDSDI compartment as illustrated. Push it completely in.
 -  **Caution:** Ensure that the both sides of the HDSDI board are captured by the guides inside the HDSDI compartment.
4. Fasten the two screws at the front side of the HDSDI board (reference 1). Use a PH2 Phillips screwdriver.
5. Reconnect the power cord and switch on the projector.
6. Clear the tamper event. See procedure “Authorization to clear security warning on the projector”, page 112.

18.7 Replacement of the Link Decryptor



The Link Decryptor board is mounted on the HDSDI board. This procedure assumes that the HDSDI board is already removed from the Card Cage.

Required tools

T10 Torx screwdriver.

How to replace the Link Decryptor?

1. Remove the HDSDI board from the Card Cage. See “Replacement of the HDSDI board”, page 216.
2. Loosen the four screws (reference 1 Image 18-6) of the Link Decryptor board. Use a T10 Torx screwdriver.

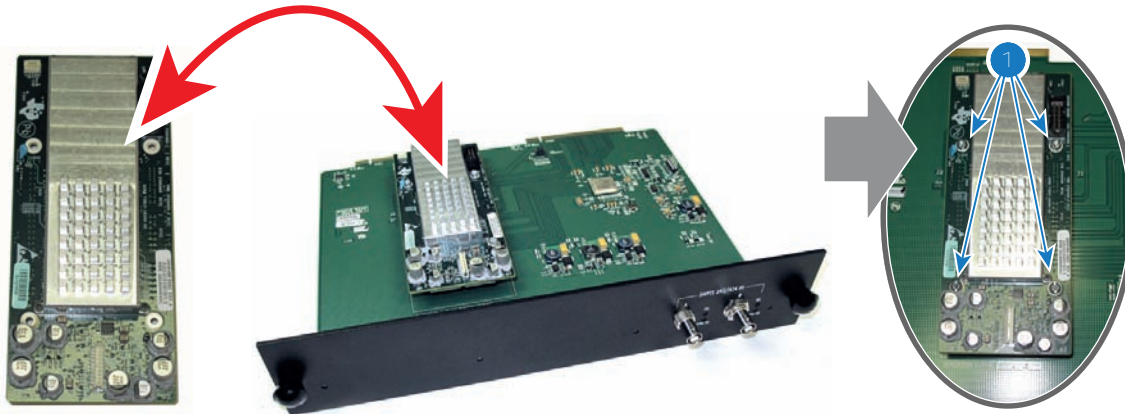


Image 18-6

3. Pull off the current mounted Link Decryptor board.
4. Unpack the new Link Decryptor board and plug it into both board-connectors on the HDSDI board at the same time. Ensure the Link Decryptor board is correctly oriented: see illustration.
5. Fasten the four screws of the Link Decryptor.
6. Install the HDSDI board in the Card Cage. See “Replacement of the HDSDI board”, page 216.



A marriage between the new Link Decryptor and the ICP board must be realized. See procedure “Authorization to clear security warning on the projector”, page 112.



After installation of a new Link Decryptor check for latest software version. See user guide of the Communicator.

18.8 Replacement of the Cinema Controller



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.




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

Required tools

PH2 Phillips screwdriver.

How to replace the Cinema Controller of the projector

1. Loosen the two screws (reference 1) at the front of the Cinema Controller. Use a PH2 Phillips screwdriver.
2. Pull the Cinema Controller out of its compartment.
3. Gently insert the new Cinema Controller in the guides of the Cinema Controller as illustrated. Push it completely in.
 -  **Caution:** Ensure that the both sides of the Cinema Controller are captured by the guides inside the Cinema Controller compartment, as shown in the detail of the illustration.
4. Fasten the two screws at the front side of the Cinema Controller (reference 1). Use a PH2 Phillips screwdriver.

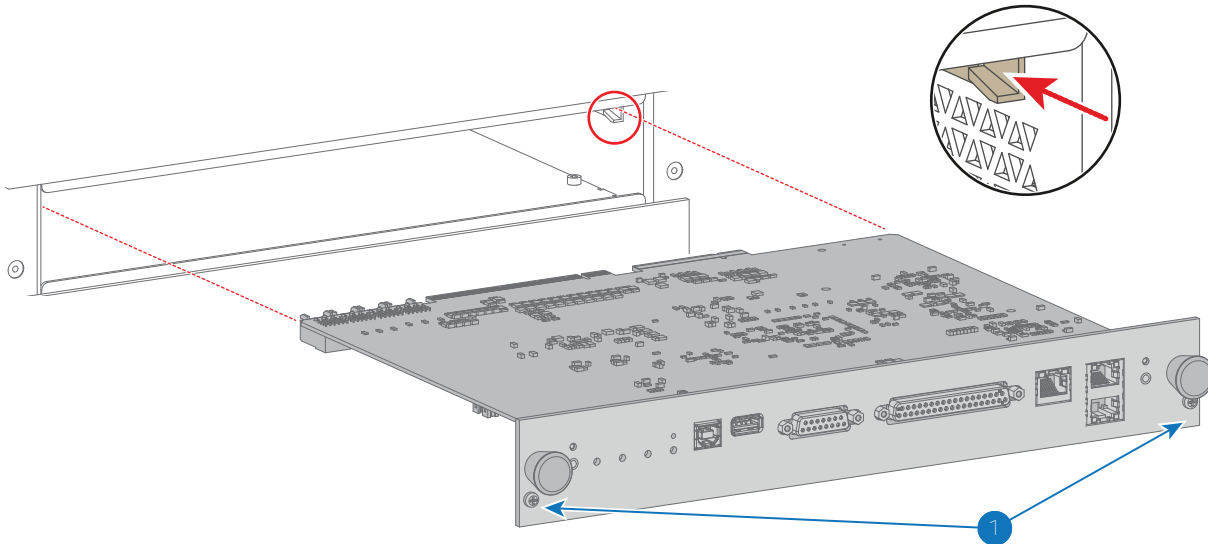


Image 18-7

5. Reconnect the power cord and switch on the projector.
6. Check if the latest firmware of the Cinema Controller is installed. If not, upgrade to the latest version. See Communicator User Guide.
7. Is there a full backup clone or backup including the Cinema Controller specific files available?
 1. If available reinstall the clone file. See Communicator User Guide chapter "Installation" where 'cloning' is explained.
 2. If NOT available install the base clone package for DP2K-SLP Series and modify the Cinema Controller configuration files as desired. The base clone package can be downloaded from the secured Barco website. Make a projector clone package (full backup) after the files are modified and saved. See Communicator User Guide.

18.9 Battery replacement on the Cinema Controller Board

About an empty battery

There is no error indication in 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 tools


PH2 Phillips screwdriver.

Required parts

Battery CR1220

How to replace

1. Loosen the two screws (reference 1) at the front of the Cinema Controller.
2. Pull the Cinema Controller out of its compartment.
3. Pull out the empty battery and insert a new CR1220 battery with the flat side of the battery facing to the top.

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

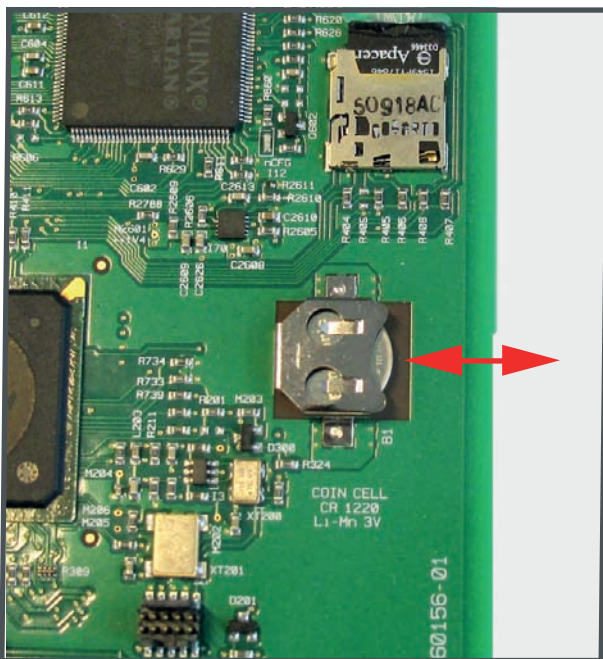



Image 18-8: Battery replacement

4. Gently insert the Cinema Controller in the guides of the Cinema Controller compartment as illustrated. Push it completely in.
 -  **Caution:** Ensure that the both sides of the Cinema Controller are captured by the guides inside the Cinema Controller compartment, as shown in the detail of the illustration.
5. Fasten the two screws at the front side of the Cinema Controller (reference 1).

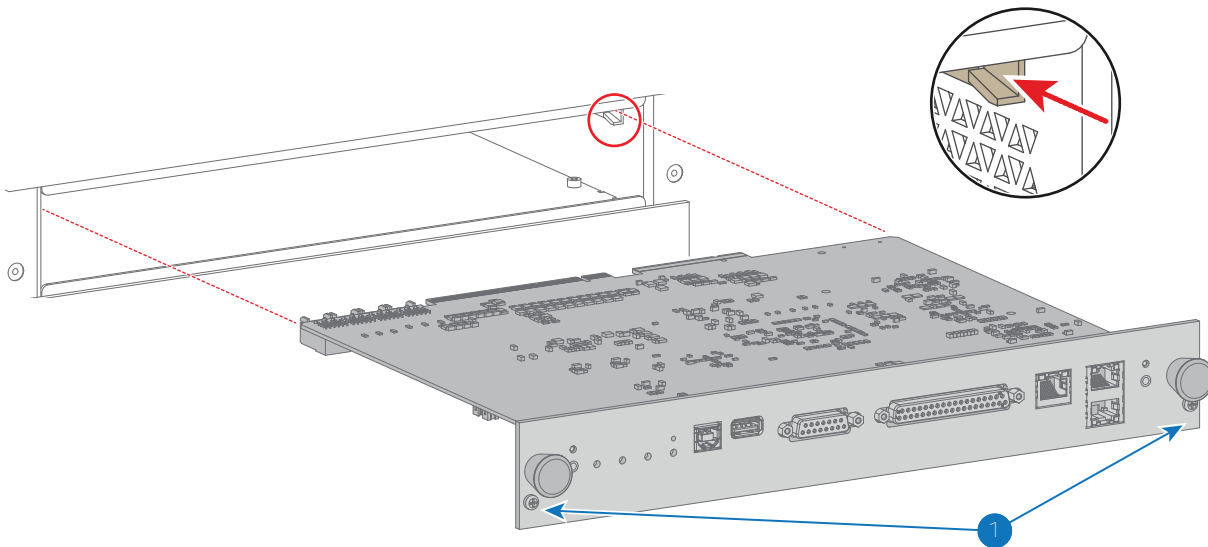


Image 18-9

18.10 Replacement of the Card Cage small fan



This procedure assumes that the large dust filter is removed from the projector. See procedure “Check the large dust filter”, page 284

Required tools

3mm Allen wrench.

How to replace the small fan of the Card Cage?

1. Disconnect the wire with the orange cable tie (reference 3 Image 18-10) of the small fan (reference 1 Image 18-10) and release the wire from the cable clamps.

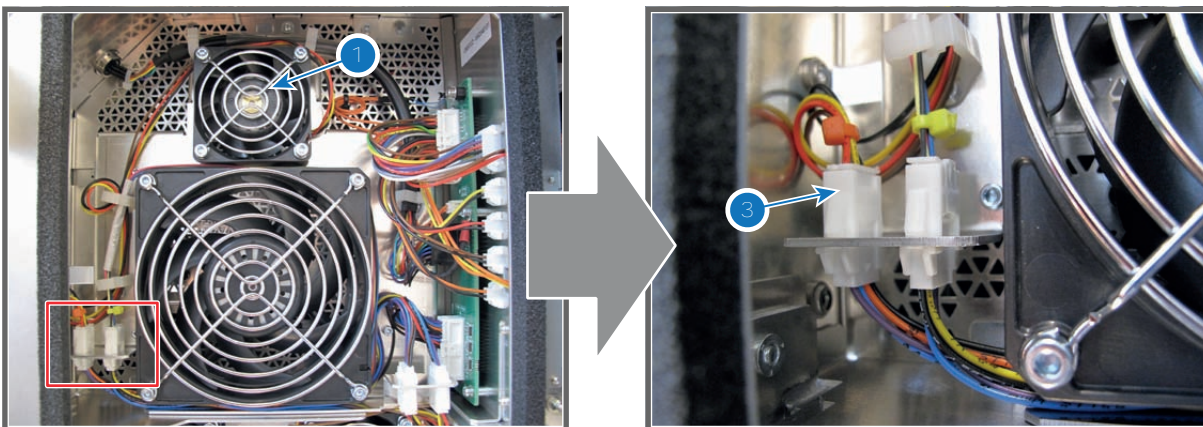


Image 18-10

2. Replace the small fan as illustrated. Use a 3mm Allen wrench to loosen/fasten the four fixation screws (reference 5 Image 18-11).



Caution: Ensure to place the fan guard in front of the fan and that the airflow of the fan is towards the Card Cage.

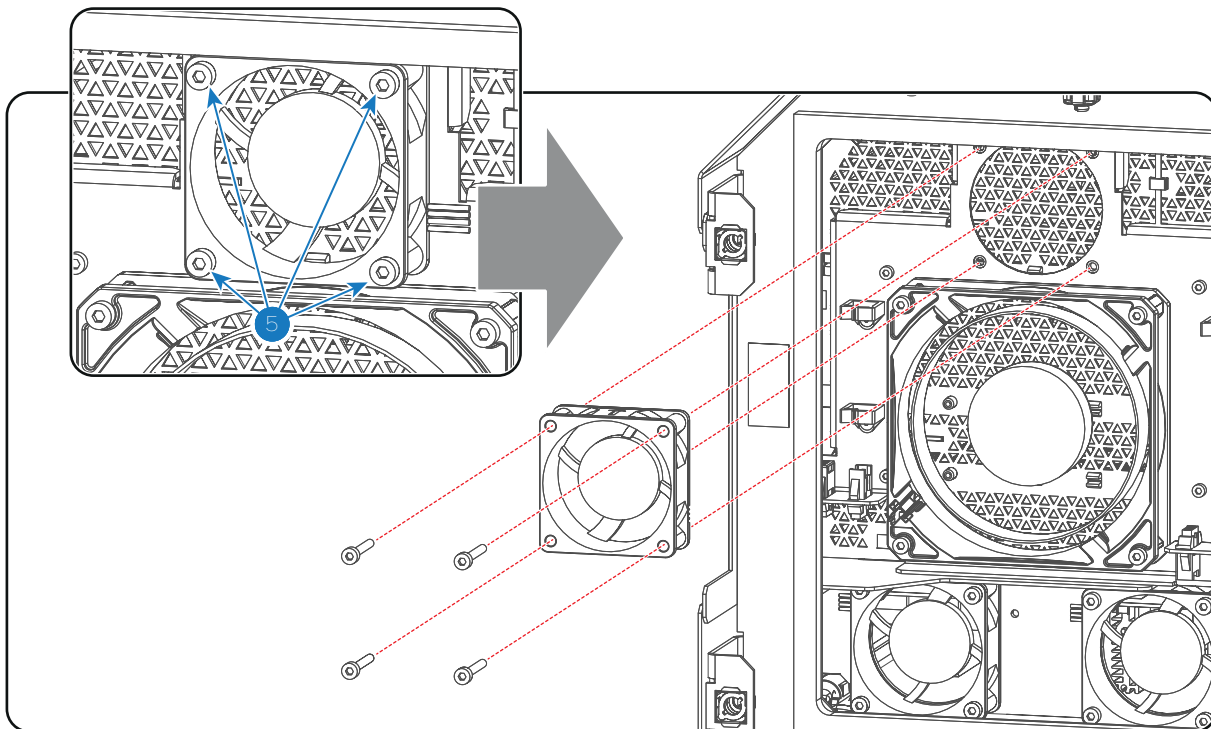


Image 18-11

3. Connect the wire of the new fan with the left socket (reference 3 Image 18-10) and engage the wire in the cable clamps.

18.11 Replacement of the Card Cage large fan



This procedure assumes that the large dust filter is removed from the projector.

Required tools

3mm Allen wrench.

How to replace the large fan of the Card Cage?

1. Disconnect the wire with the yellow cable tie (reference 4 Image 18-12) of the large fan (reference 2 Image 18-12) and release the wire from the cable clamps.

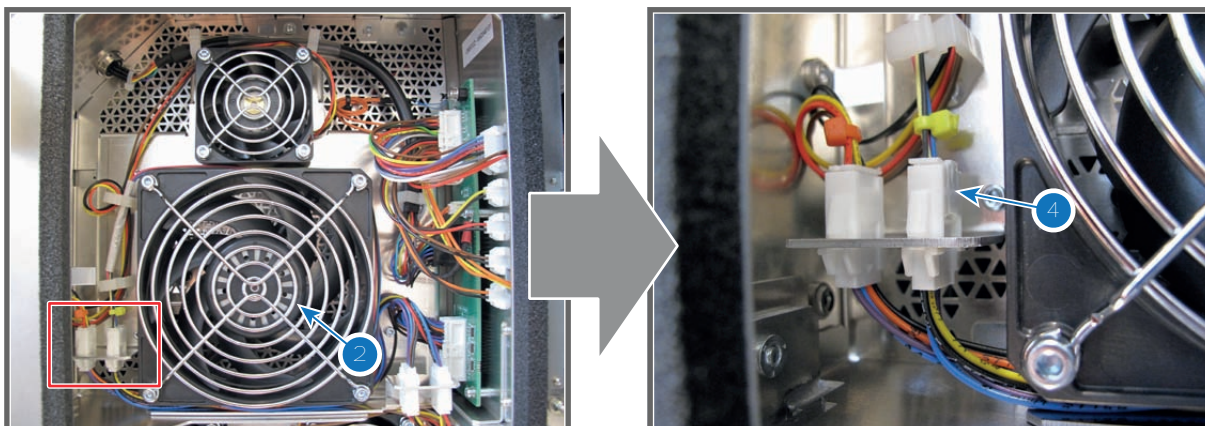


Image 18-12

2. Replace the large fan as illustrated. Use a 3mm Allen wrench to loosen/fasten the four fixation screws (reference 6 Image 18-13).

! *Caution:* Ensure to place the fan guard in front of the fan and that the airflow of the fan is towards the Card Cage.

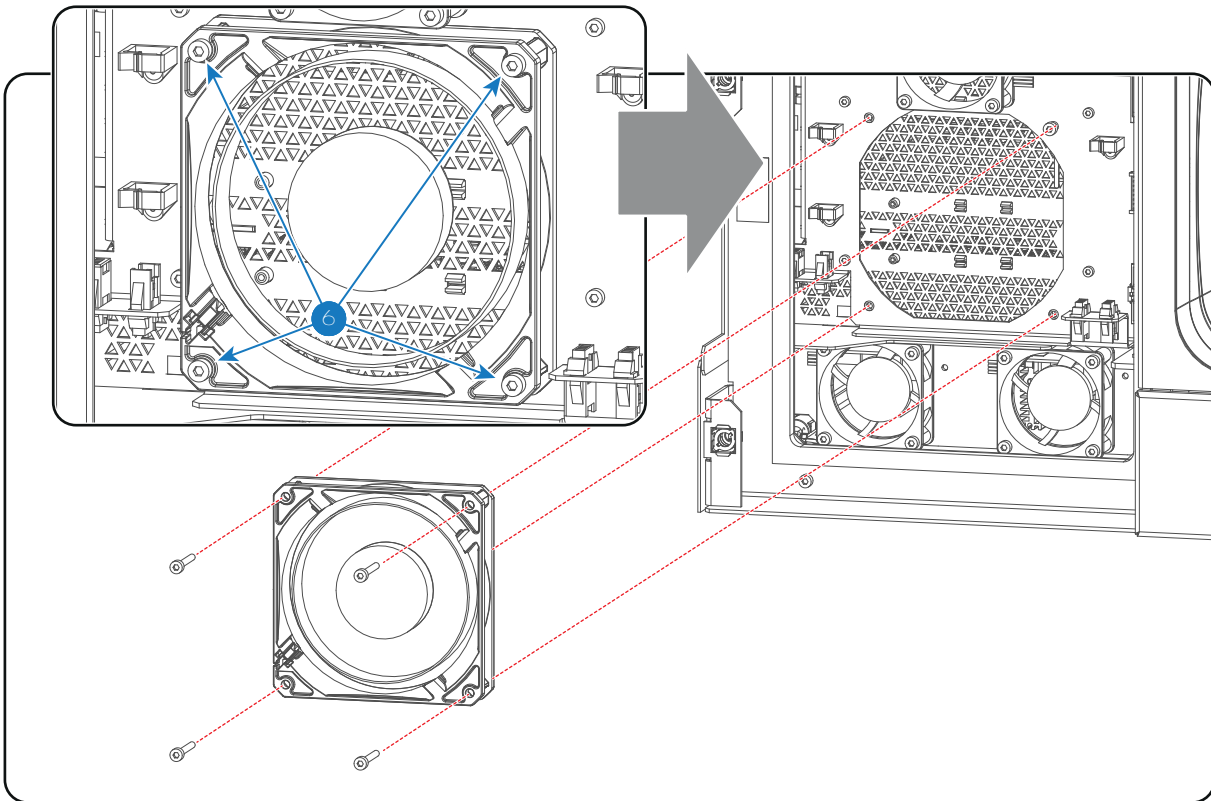


Image 18-13

3. Connect the wire of the new fan with the right socket (reference 4 Image 18-12) and engage the wire in the cable clamps.

18.12 Replacement of the ICP fan



This procedure assumes that the projector top cover and top cover plate are removed from the projector.

Required tools

3mm Allen wrench.

How to replace the ICP fan of the Card Cage?

1. Disconnect the wire with the red cable tie (reference 1 Image 18-14) from the Signal Backplane and release the wire from the cable clamp (reference 2 Image 18-14).

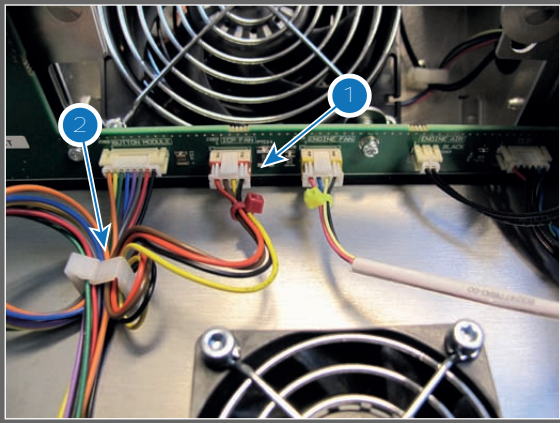


Image 18-14

2. Replace the ICP fan as illustrated. Use a 3mm Allen wrench to loosen/fasten the four fixation screws (reference 3 Image 18-15).

⚠ Caution: Ensure to place the fan guard on top of the ICP fan and that the airflow of the fan is towards the Card Cage.

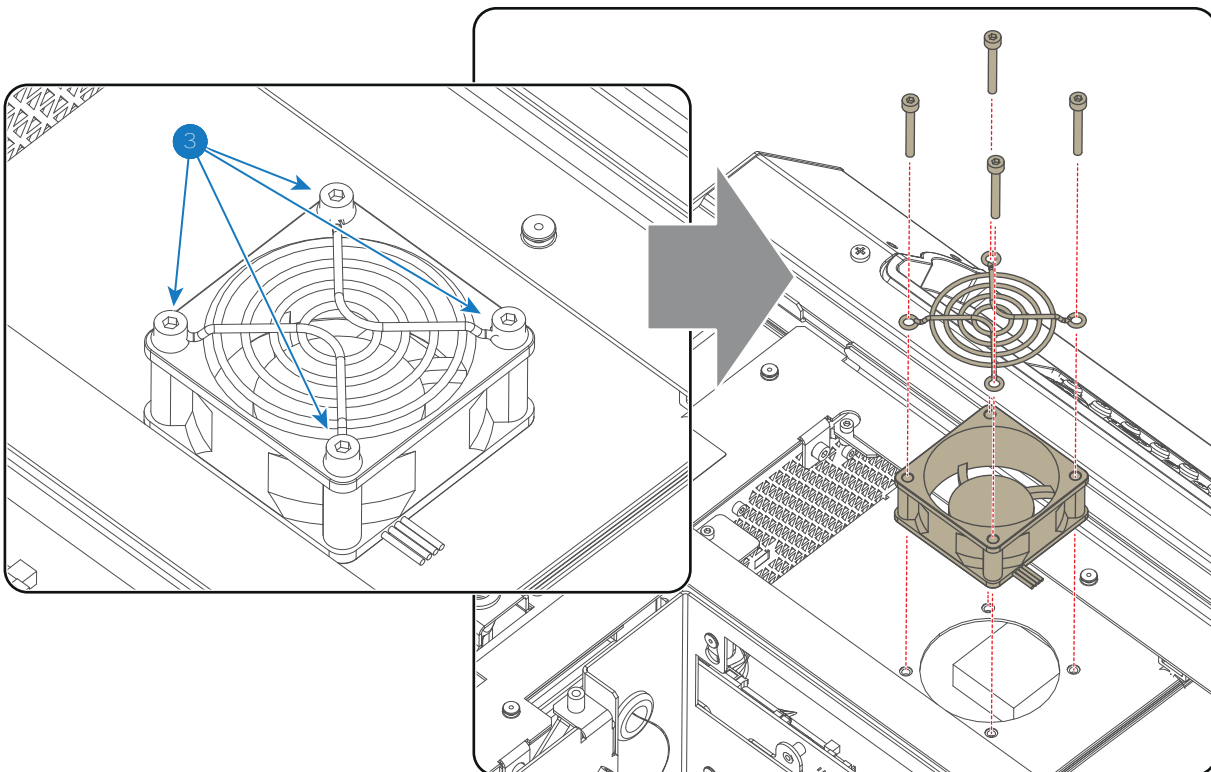


Image 18-15

3. Connect the wire of the new fan with the Signal Backplane (reference 1 Image 18-14) and engage the wire in the cable clamp (reference 2 Image 18-14).

18.13 Replacement of the Button Module



This procedure assumes that the Card Cage cover, projector top cover, (top) fan of the Light Processor compartment, and top cover plate are already removed from the projector.

Required tools

- 3mm Allen wrench.
- 2.5mm Allen wrench.
- 15mm nut driver.

How to replace the Button Module of the projector?

1. Remove the rail from the top of the projector. Use a 3mm Allen wrench to loosen the 5 screws (reference 4 Image 18-16).

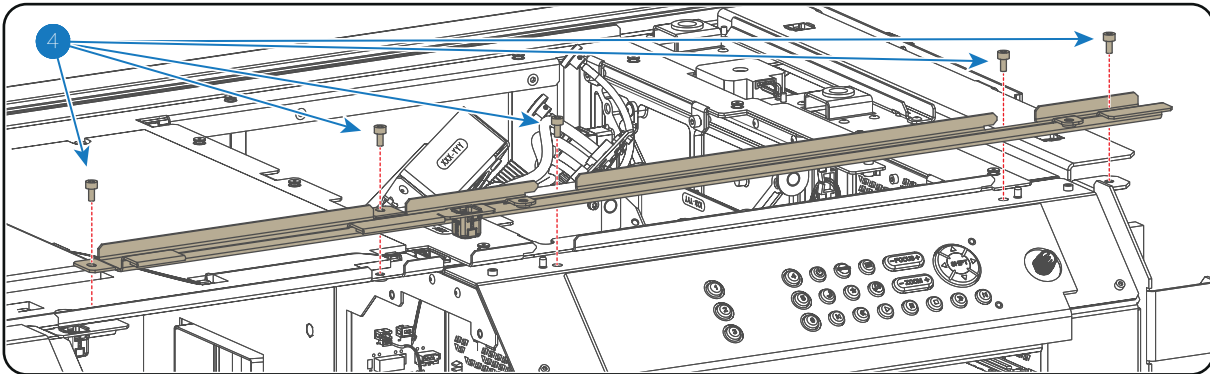


Image 18-16

2. Remove the 6 fixation screws (reference 3 Image 18-17) of the projector top frame. Use a 3mm Allen wrench.

! *Caution:* Take care not to drop the screws inside the projector.

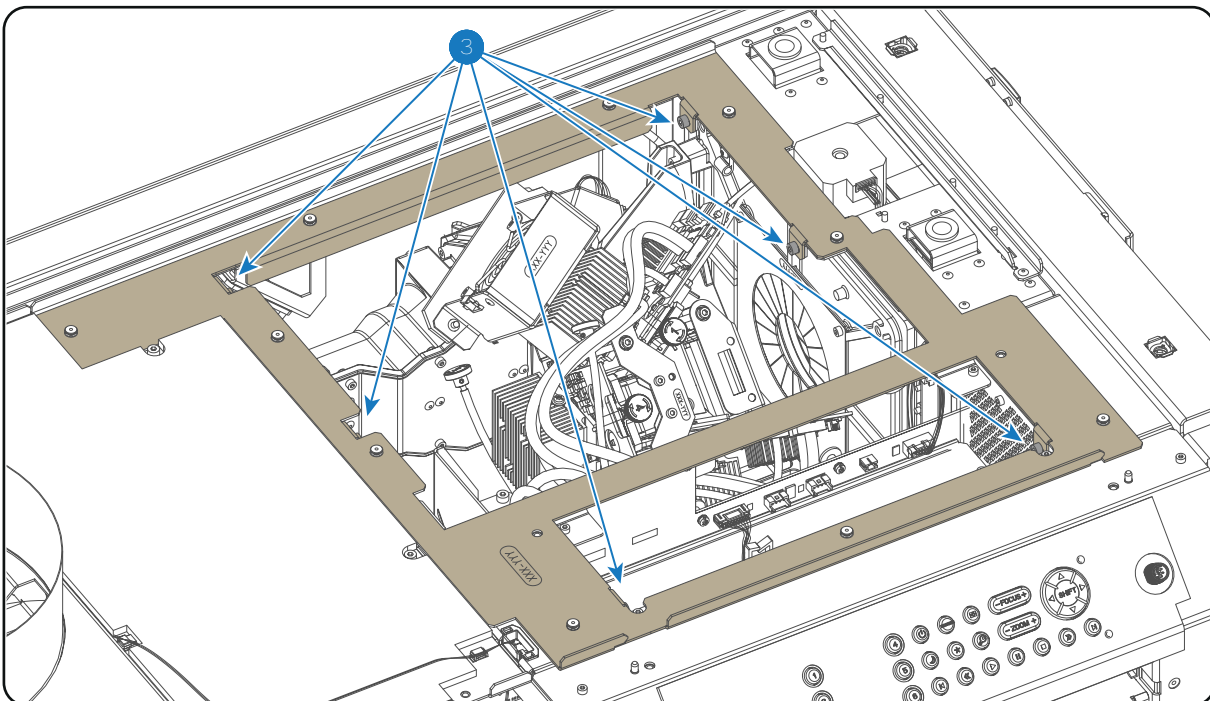


Image 18-17

3. Remove the top frame from the projector chassis.

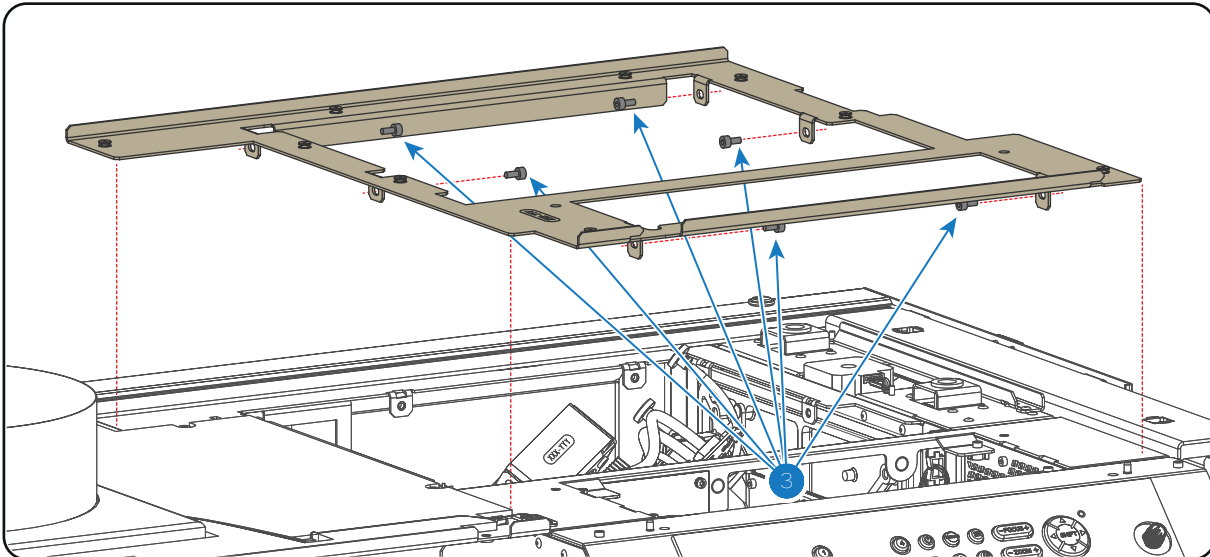


Image 18-18

4. Disconnect the wire of the Button Module (reference 2 Image 18-19).



Note: If it is too difficult to disconnect the wire then release the wire from the two cable clamps (reference 1 Image 18-19) and disconnect the wire unit in a later phase (step 6) when the Button Module is detached from the projector chassis.

5. Remove the nut (reference 3 Image 18-19) from the circular connector (reference 4 Image 18-19) . Use a 15mm nut driver.

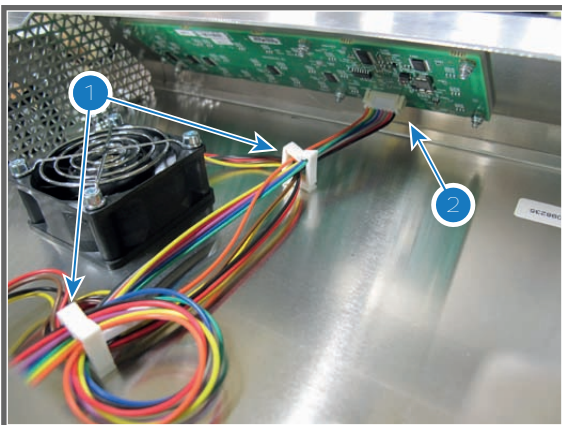
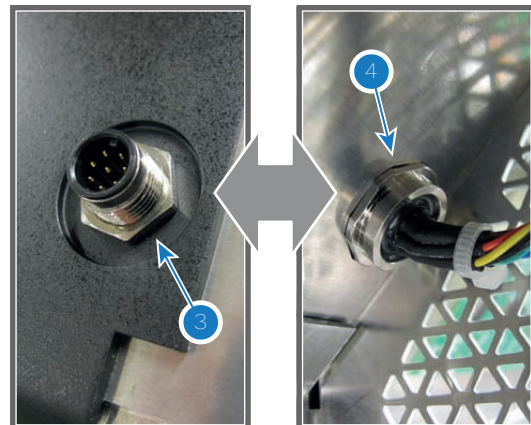


Image 18-19



6. Replace the Button Module. Use a 2.5mm Allen wrench to loosen/fasten the four screws (reference 5 Image 18-20).

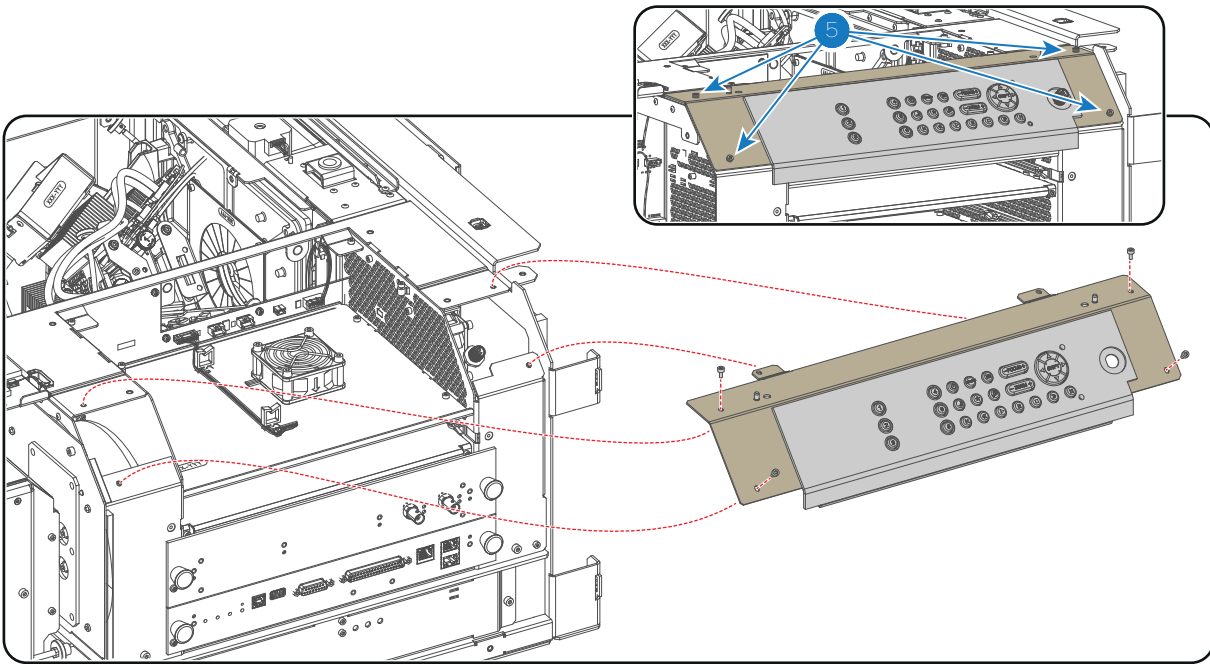


Image 18-20

7. Reconnect the wire (reference 2 Image 18-19) with the Button Module and engage the wire into the two cable clamps (reference 1 Image 18-19).
8. Install the circular connector (reference 4 Image 18-19) and fasten the nut (reference 3 Image 18-19).
9. Place the top frame in its position on top of the projector.

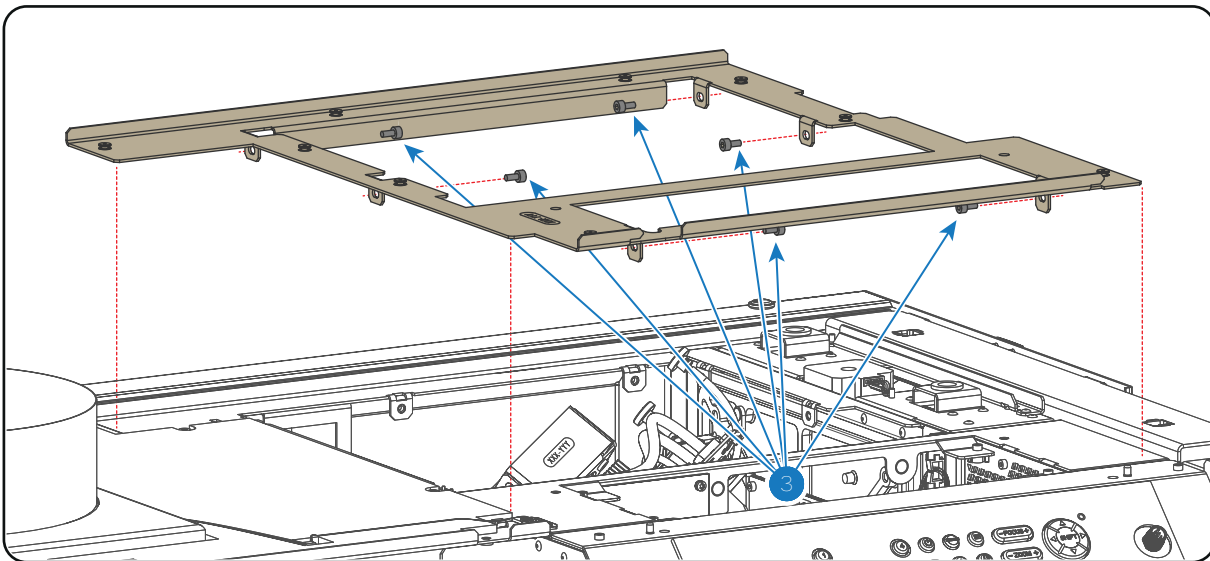


Image 18-21

10. Secure the top frame with 6 fixation screws (reference 3 Image 18-22) as illustrated. Use a 3mm Allen wrench.

! *Caution:* Take care not to drop the screws inside the projector.

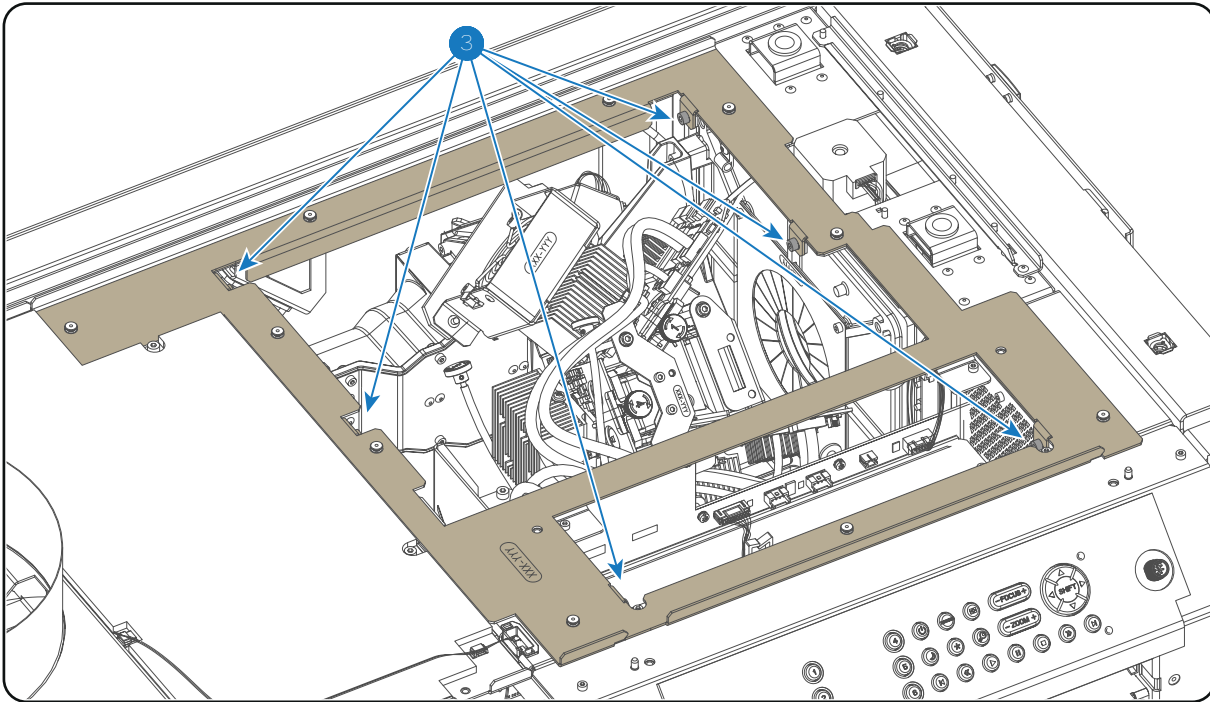


Image 18-22

11. Install the rail on the top of the projector as illustrated. Use a 3mm Allen wrench to fasten the 5 screws (reference 4 Image 18-23).

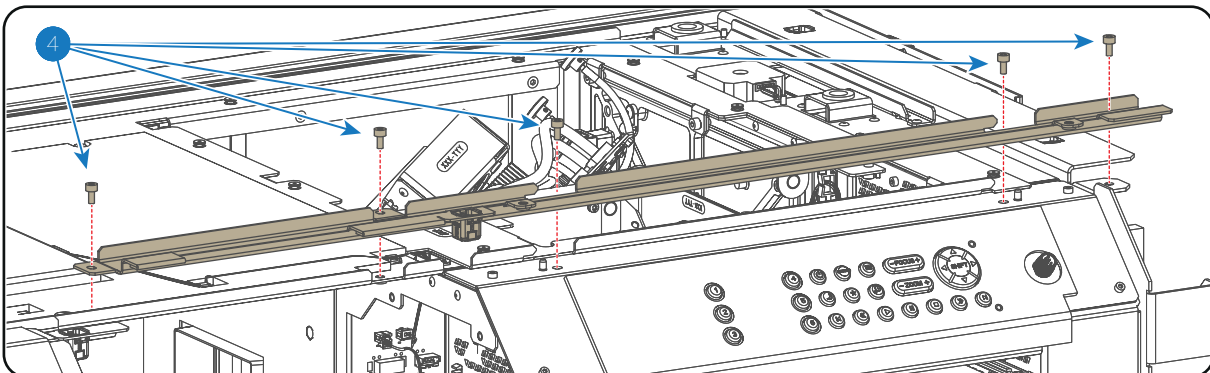


Image 18-23

12. Install all projector covers.

18.14 Signal Backplane replacement process



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. Switch off the projector and disconnect the power cord of the projector from the power net. Wait a few minutes (to discharge the capacitors) prior to proceed with the next stage of this process.
2. Remove the large dust filter from the projector front. See page 284.

3. Remove the projector top cover. See page 273.
4. Remove the top cover plate. See page 275.
5. Remove the Light Source cover. See page 272.
6. Remove the Light Source. See “Removing the Light Source”, page 61.
7. Remove the Cathode Fan. See “Replacement of the Cathode Fan”, page 86.
8. Remove the Card Cage cover. See page 228.
9. Disconnect the Card Cage wires. See page 229.
10. Remove the Card Cage from the projector. See page 232.
11. Remove the Signal Backplane from the Card Cage. See page 234.
12. Install the new Signal Backplane into the Card Cage. See page 236.



Note: Ensure to install the SIM card, containing the projector ID, from the old Signal Backplane into the new Signal Backplane.

13. Install the Card Cage into the projector. See page 239.
14. Connect the Card Cage wires. See page 241.
15. Install the Card Cage cover. See page 245.
16. Install the Cathode Fan. See “Replacement of the Cathode Fan”, page 86.
17. Install the Light Source. See “Installing the Light Source”, page 67.
18. Install the Light Source cover. See page 281.
19. Install the top cover plate. See page 278.
20. Install the projector top cover. See page 280.
21. Install the large dust filter from the projector front. See page 284.
22. Connect the power cord of the projector with the power net and switch on the projector.

18.15 Removal of the Card Cage cover



This procedure assumes that Light Source cover and large dust filter are removed from the projector.

Required tools

Phillips screwdriver PH2

How to remove the Card Cage cover from the projector?

1. Remove the four fixation screws (reference 1 Image 18-24) of the Card Cage cover as illustrated. Use a PH2 Phillips screwdriver.
2. Remove the Card Cage cover from the projector.

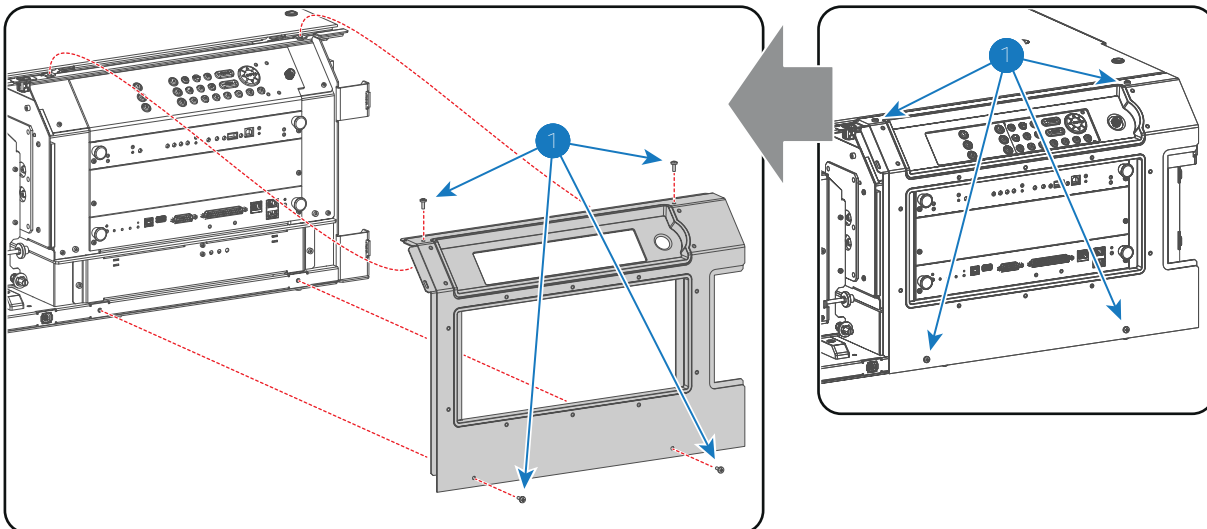


Image 18-24

18.16 Disconnecting the Card Cage wires



This procedure assumes that the top cover, top cover plate, large dust filter, Light Source cover, Light Source, cathode fan, Light Processor top fan and all Card Cage boards are removed from the projector.

Disconnecting the Card Cage wires

1. Disconnect the wire of both SMPS fans (reference 1 & 2 Image 18-25).

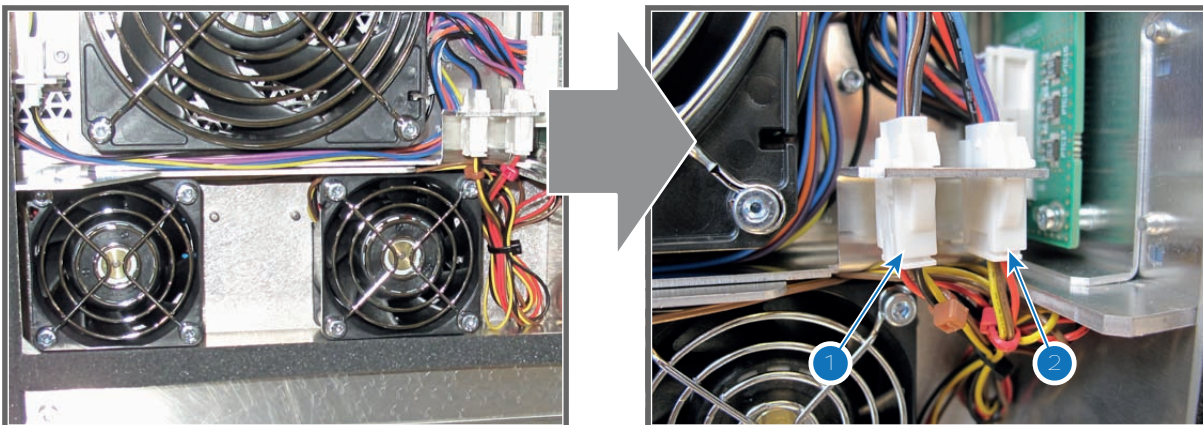


Image 18-25

2. Disconnect the 5 wires of the lens motors (reference 5, 6, 7, 8 & 9 Image 18-26) from the sockets at the left side of the Lens Holder compartment.

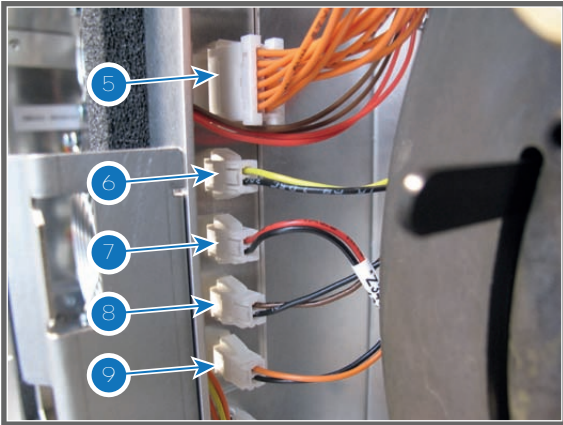


Image 18-26

3. Disconnect the big wire plug (reference 3 Image 18-27) of the lens motors from the Signal Backplane and disengage the five wire sockets (reference 4 Image 18-27) from the projector chassis as illustrated.

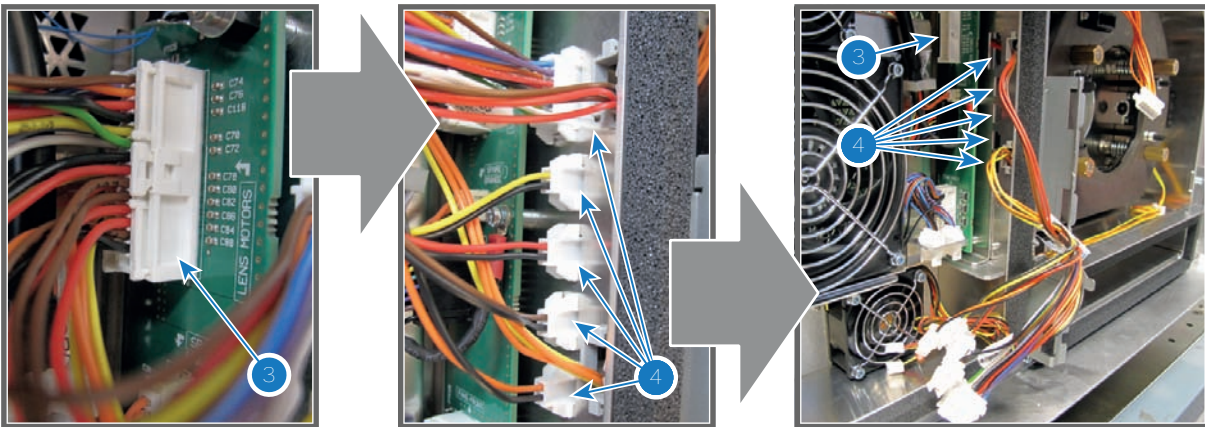


Image 18-27

4. Disconnect all seven wires from the left side of the Signal Backplane.

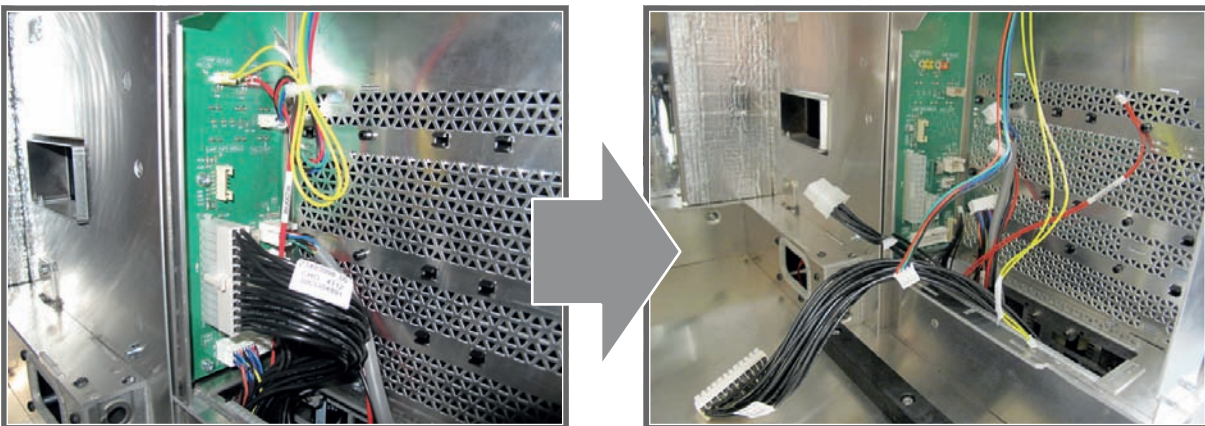


Image 18-28

5. Disconnect the CLO wire (reference 10 Image 18-29) from the Signal Backplane.

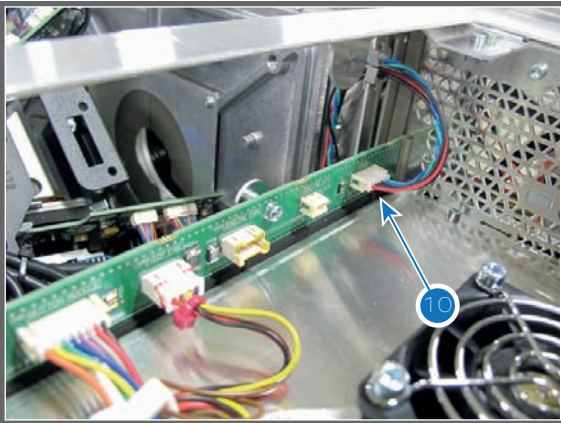


Image 18-29

6. Disconnect the nine RGB connectors (reference 3 Image 18-30) from the Signal Distribution board. Push the little tab (reference 4 Image 18-30) down with your fingernail and then pull the connector gently out of its socket. The connector should come out easily from its socket.

Caution: Always push-in the little tab of the connector to remove the connector from its socket. Neglecting this will result in irreversible damage of the socket.

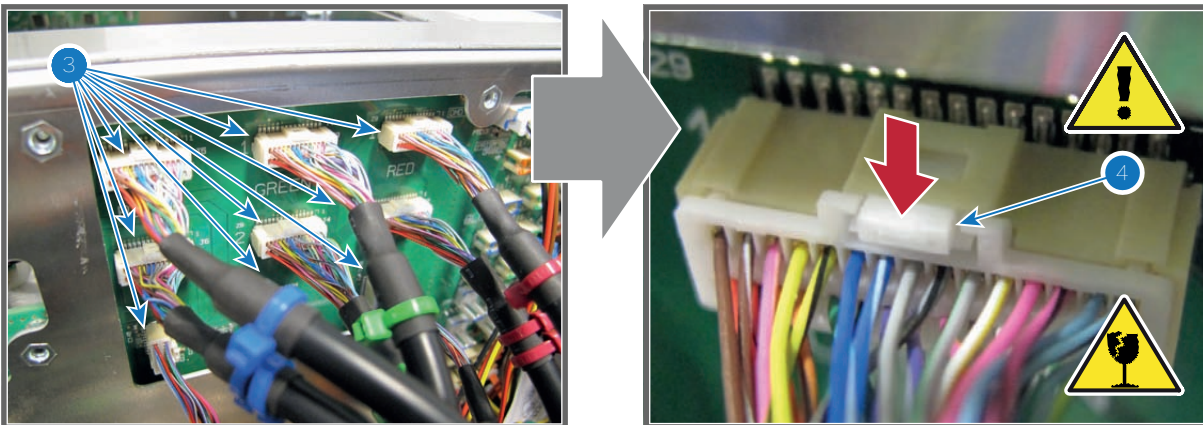


Image 18-30

7. Disconnect all other wires from the rear side of the Signal Backplane.
- Start with the three wires at the top (reference 1, 2 & 3),
 - then the brown wire and the four orange wires in the middle (reference 4, 5, 6, 7 and 8),
 - and finally the three remaining wires at the bottom (reference 9, 10 & 11).

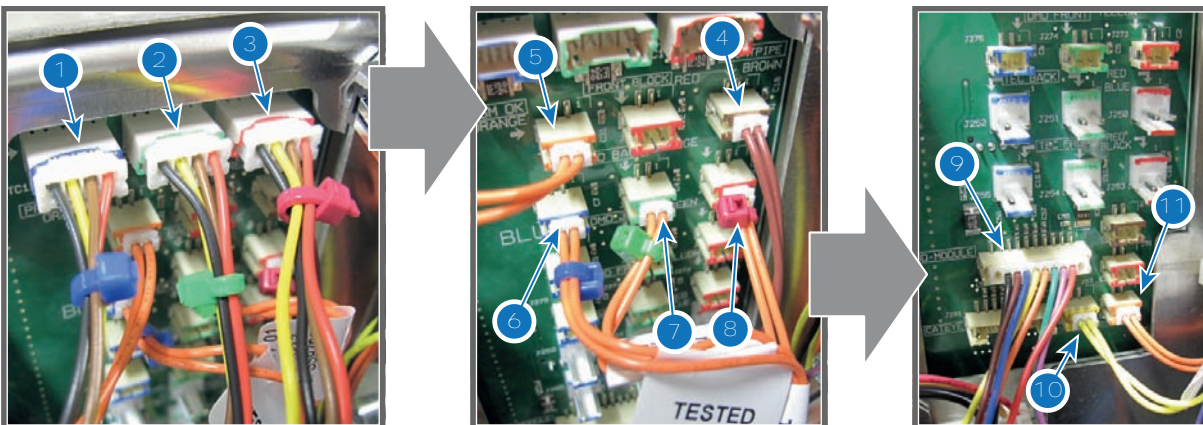


Image 18-31

18.17 Removal of the Card Cage



This procedure assumes that all wires of the Card Cage are disconnected. See procedure “Disconnecting the Card Cage wires”, page 229.

Required tools

3mm Allen wrench.

How to remove the Card Cage from the projector?

1. Remove the rail from the top of the projector. Use a 3mm Allen wrench to loosen the 5 screws (reference 4 Image 18-32).

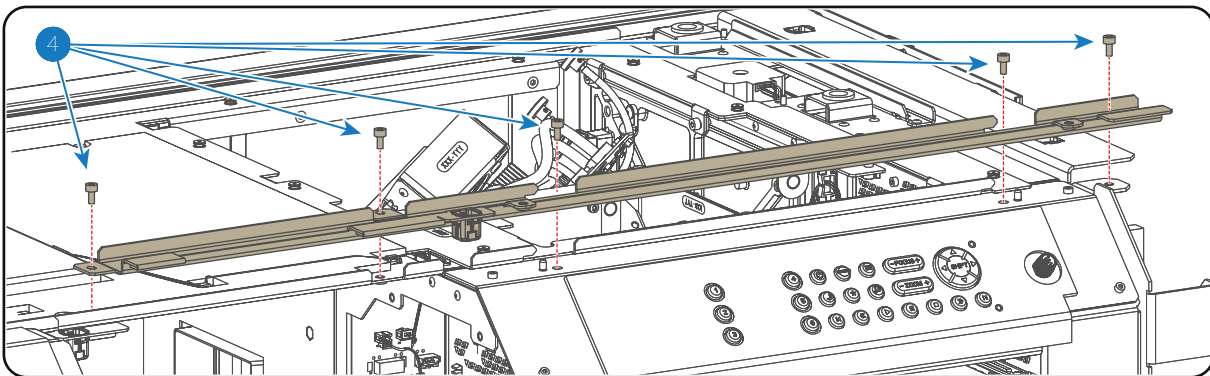


Image 18-32

2. Remove the 6 fixation screws (reference 3 Image 18-33) of the projector top frame. Use a 3mm Allen wrench.



Caution: Take care not to drop the screws inside the projector.

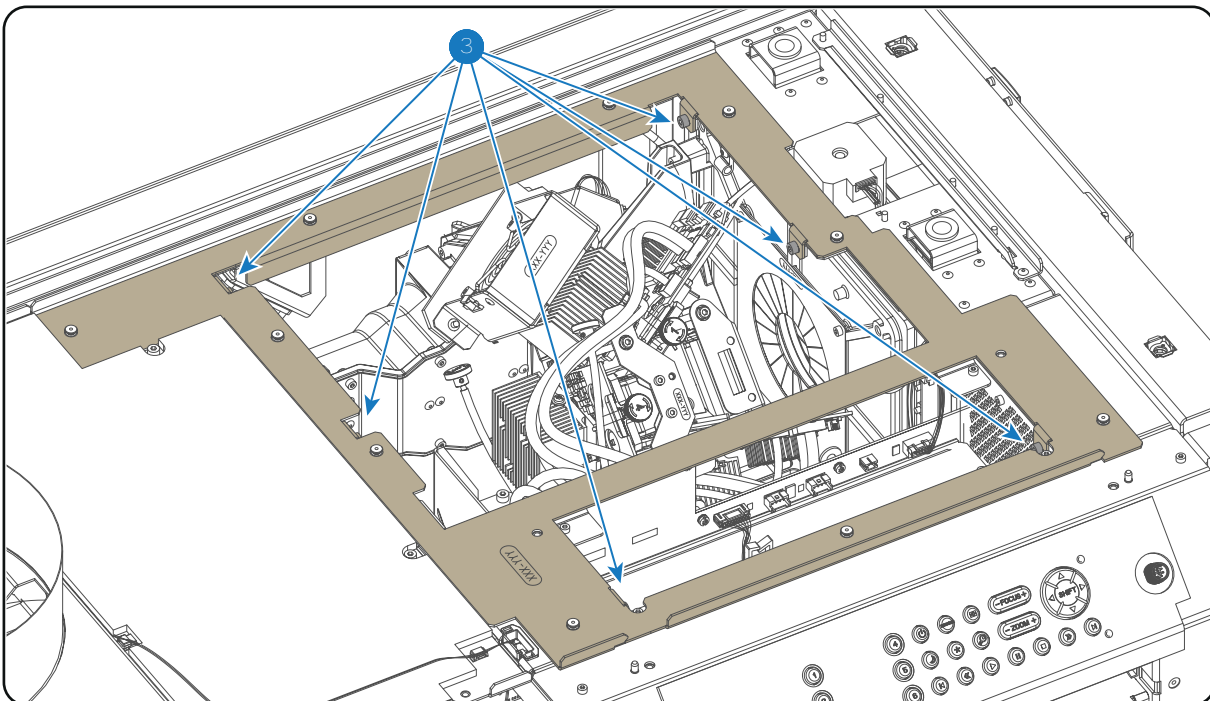


Image 18-33

3. Remove the top frame from the projector chassis.

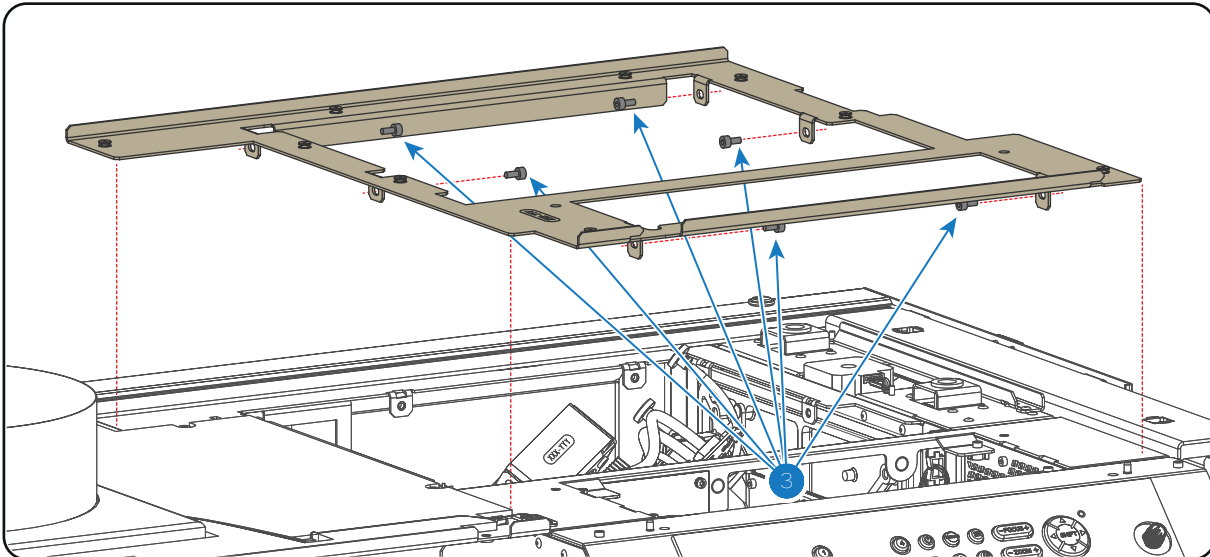


Image 18-34

4. Remove the two fixation screws (reference 2 Image 18-35) from the base of the Card Cage.
5. Remove the Card Cage from the projector chassis. Do this by first pulling the Card Cage a few mm forward and then lifting the Card Cage out of its compartment.



Note: The rear bottom of the Card Cage is engaged into the projector chassis with three horizontal slots (reference A1 and A2 Image 18-35). The front bottom of the Card Cage is engaged into the projector chassis with two vertical slots (reference B1 and B2 Image 18-35).

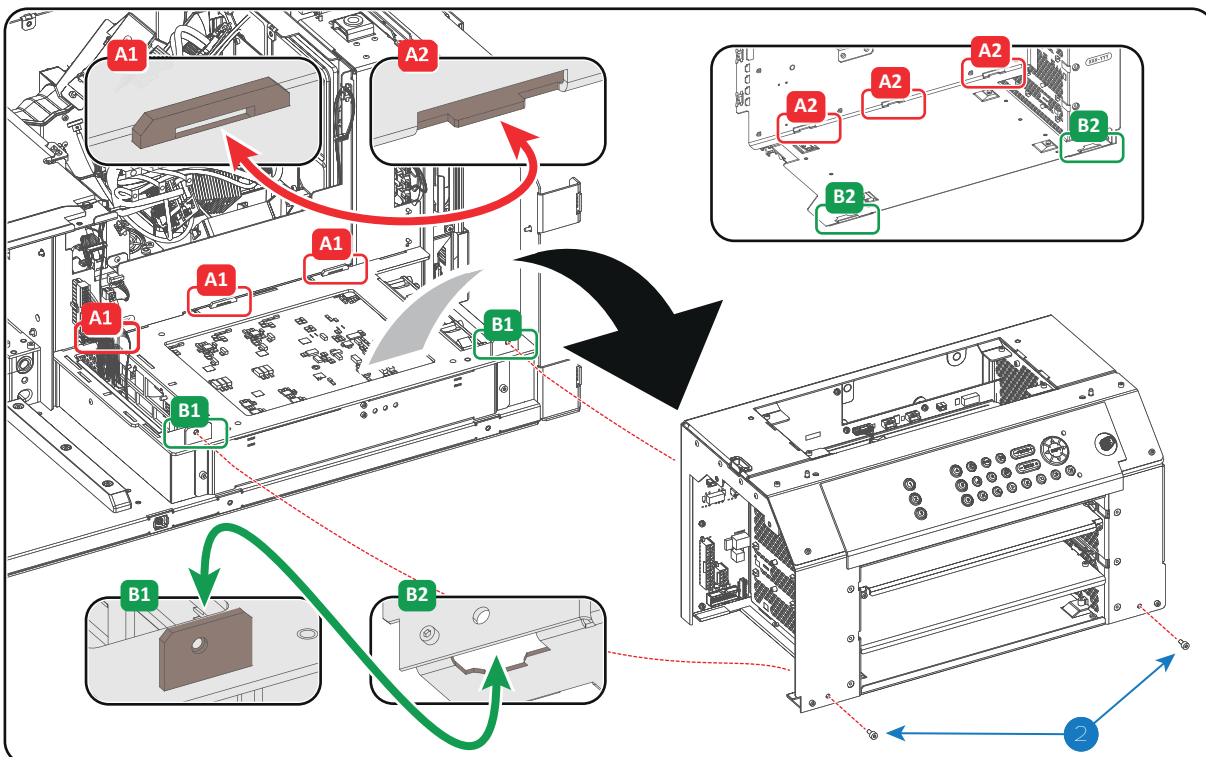


Image 18-35



Caution: The right side of the Card Cage contains two cable clamps (reference 1 Image 18-36) which capture two wires from the Lens Holder. First remove the Card Cage a few centimeters and release the wires from the clamps prior to remove the Card Cage completely away from the projector chassis.

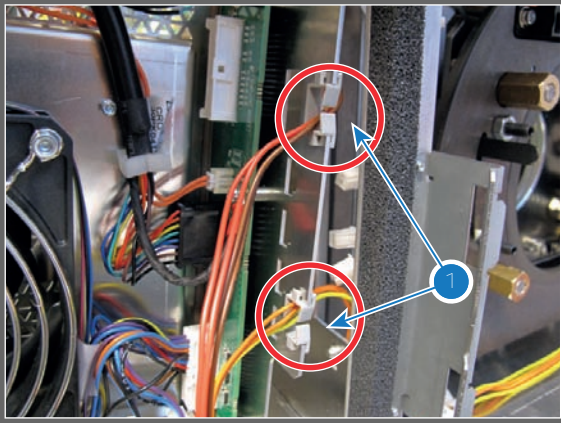


Image 18-36

18.18 Removal of the Signal Backplane



This procedure assumes that the Card Cage as a whole is removed from the projector chassis.

Required tools

- 2.5mm Allen wrench.
- TX10 Torx screwdriver.
- 5.5mm nut driver.

How to remove the Signal Backplane board from the Card Cage?

1. Disconnect the wire of the Button Module (reference 10 Image 18-37), the wire of the ICP fan (reference 11 Image 18-37), the wire of the Engine Fan (reference 12), the wire of the Engine Blower (reference 13) and the wire of the CLO (reference 14) from the Signal Backplane.
2. Remove the temperature sensor (reference 12) from the Signal Backplane. Use a 2.5mm Allen wrench to release the screw.

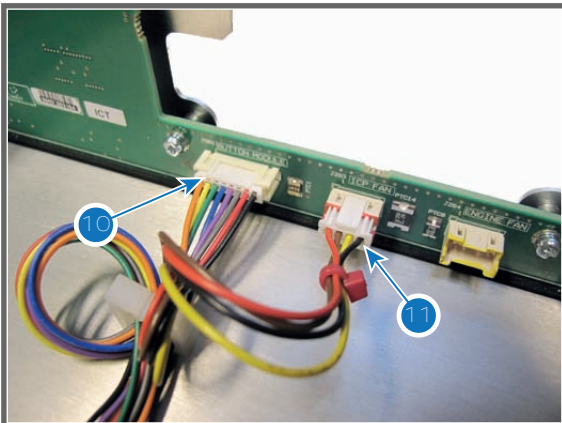
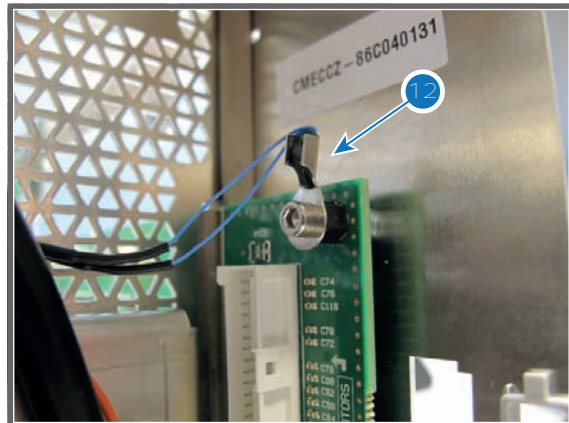


Image 18-37



3. Disconnect the touch panel wire (reference 13 Image 18-38) and the orange wire (reference 14 Image 18-38) from the Signal Backplane.
4. Disconnect the black PE wire (reference 15 Image 18-38) from the Signal Backplane. Use a T10 Torx screw driver.
5. Disconnect the wire plug of the front fans (reference 16 Image 18-38) from the Signal Backplane.

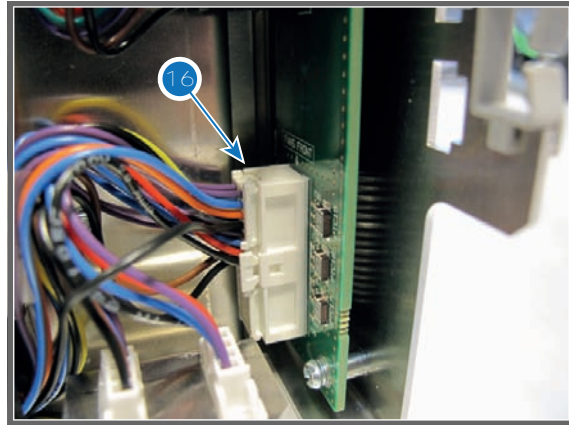
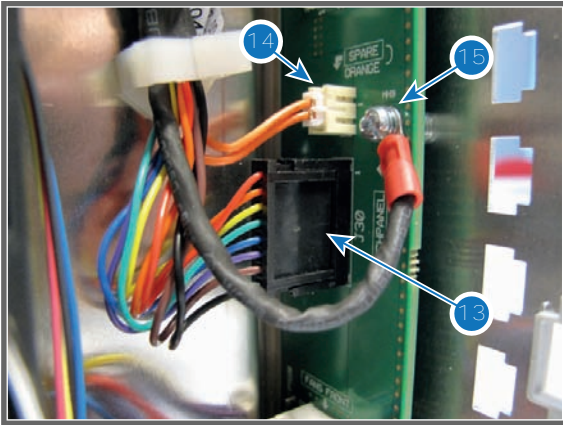


Image 18-38

6. Remove the rear sub-assembly from the Card Cage as illustrated. Use a 2.5mm Allen wrench to loosen all twelve screws (reference 1, 2, 3, 4 and 5 Image 18-39) as indicated on the drawing.

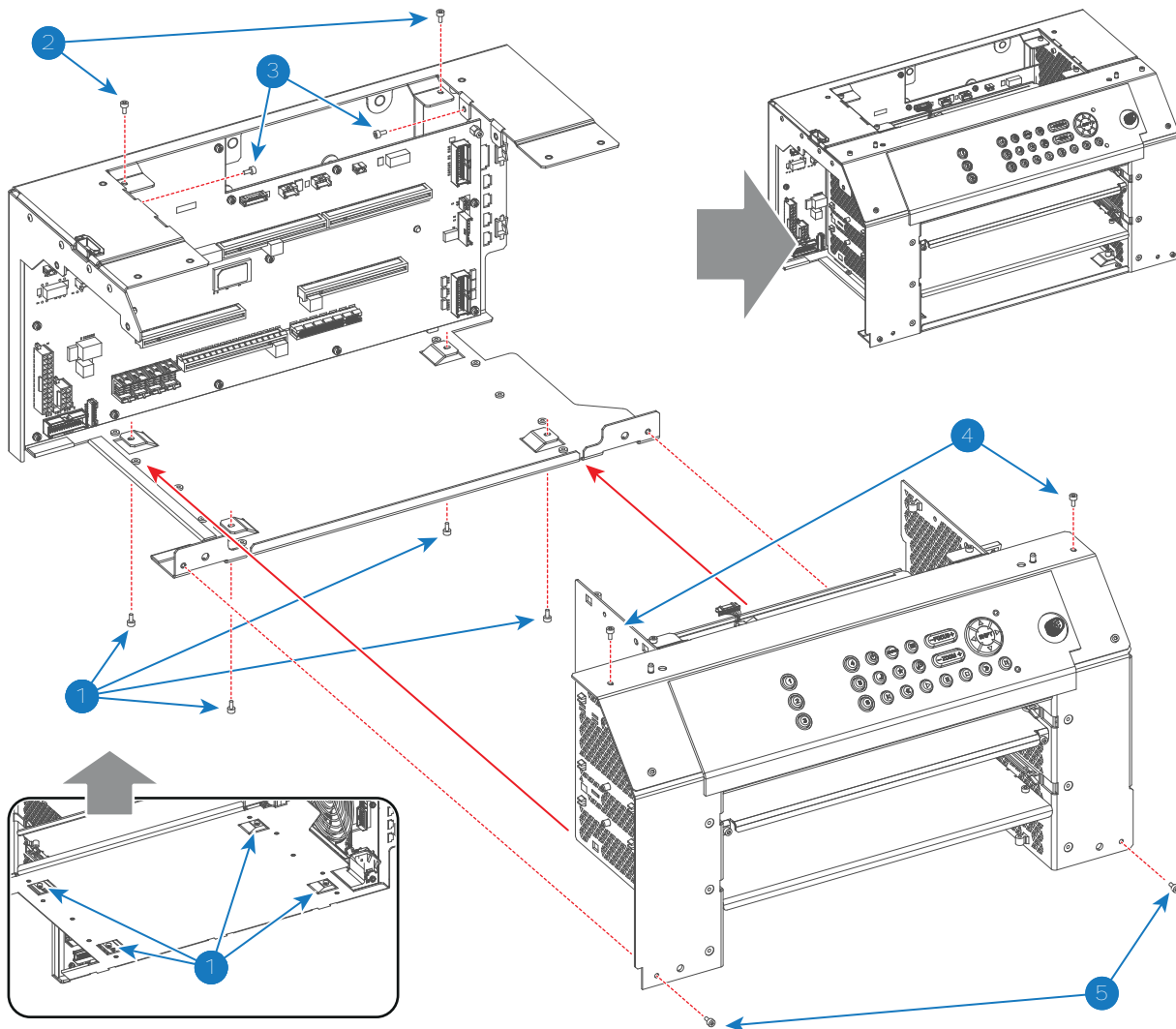


Image 18-39

7. Remove the Signal Backplane board from the sub-assembly. Use a T10 Torx driver to loosen the 14 screws (reference 6 Image 18-40) and use a 5.5 mm nut driver to loosen the plastic spacer (reference 7 Image 18-40)

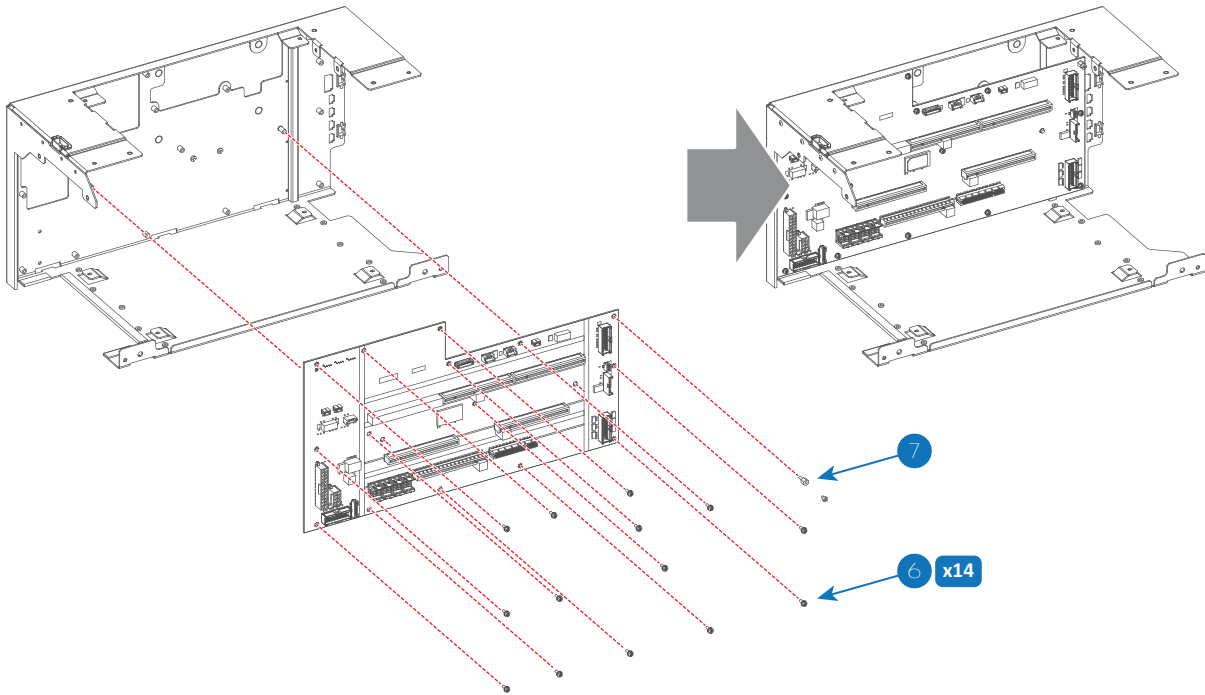


Image 18-40

- Remove the SIM card (reference 8 Image 18-41) from the Signal Backplane.



Note: The Projector ID is stored on the SIM card. For that, the SIM card has to be reused and inserted into the new Signal Backplane.

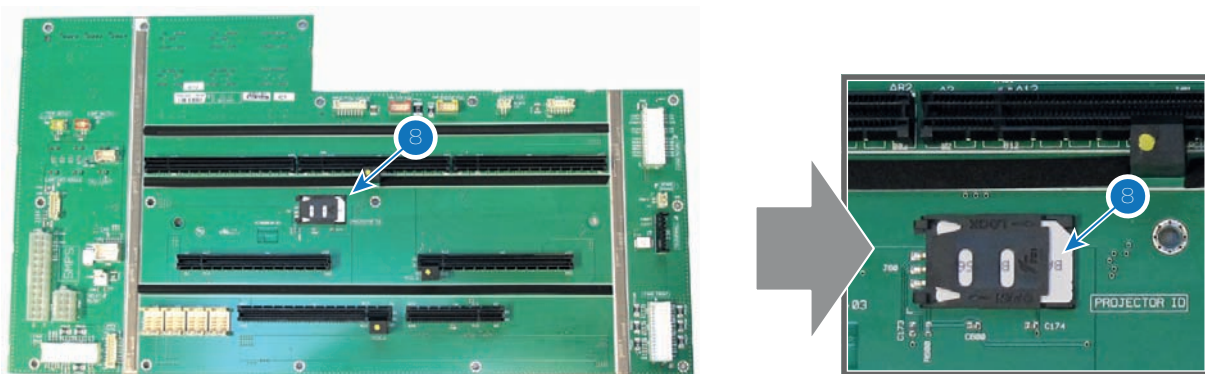


Image 18-41

18.19 Installing the Signal Backplane

Required tools

- 2.5mm Allen wrench.
- TX10 Torx screwdriver.
- 5.5mm nut driver.

How to install the Signal Backplane board into the Card Cage?

- Install the SIM card (reference 8 Image 18-42) in SIM card socket on the Signal Backplane.



Note: The Projector ID is stored on the SIM card. For that, the SIM card has to be reused and inserted into the new Signal Backplane.

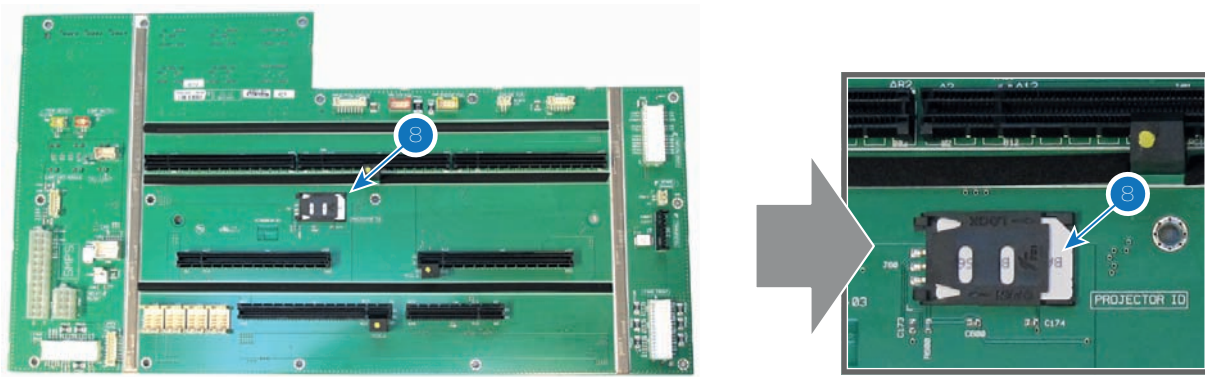



Image 18-42

2. Install the Signal Backplane board onto the sub-assembly. Use a T10 Torx driver to fasten the 14 screws (reference 6 Image 18-43) and use a 5.5 mm nut driver to fasten the plastic spacer (reference 7 Image 18-43)

 **Note:** The plastic spacer is needed at the upper right corner of the Signal Backplane to mount the temperature sensor afterwards.

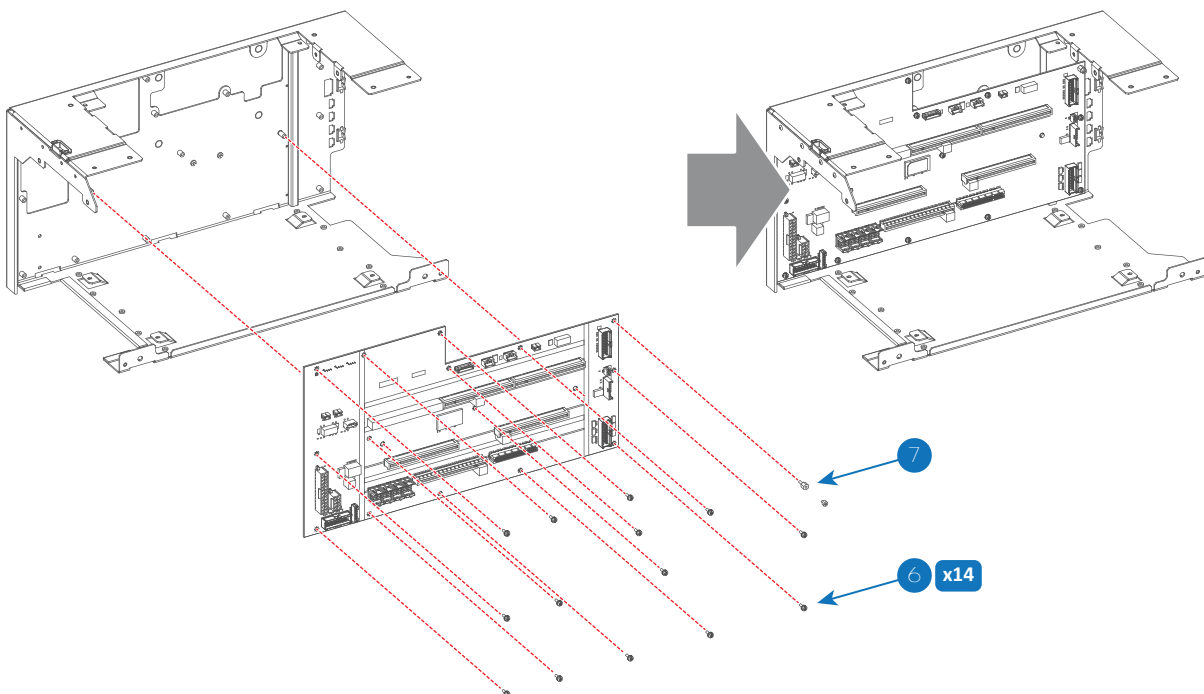


Image 18-43

3. Assemble the Card Cage as illustrated. Use a 2.5mm Allen wrench to fasten all twelve screws (reference 1, 2, 3, 4 and 5 Image 18-44) as indicated on the drawing.

Card Cage

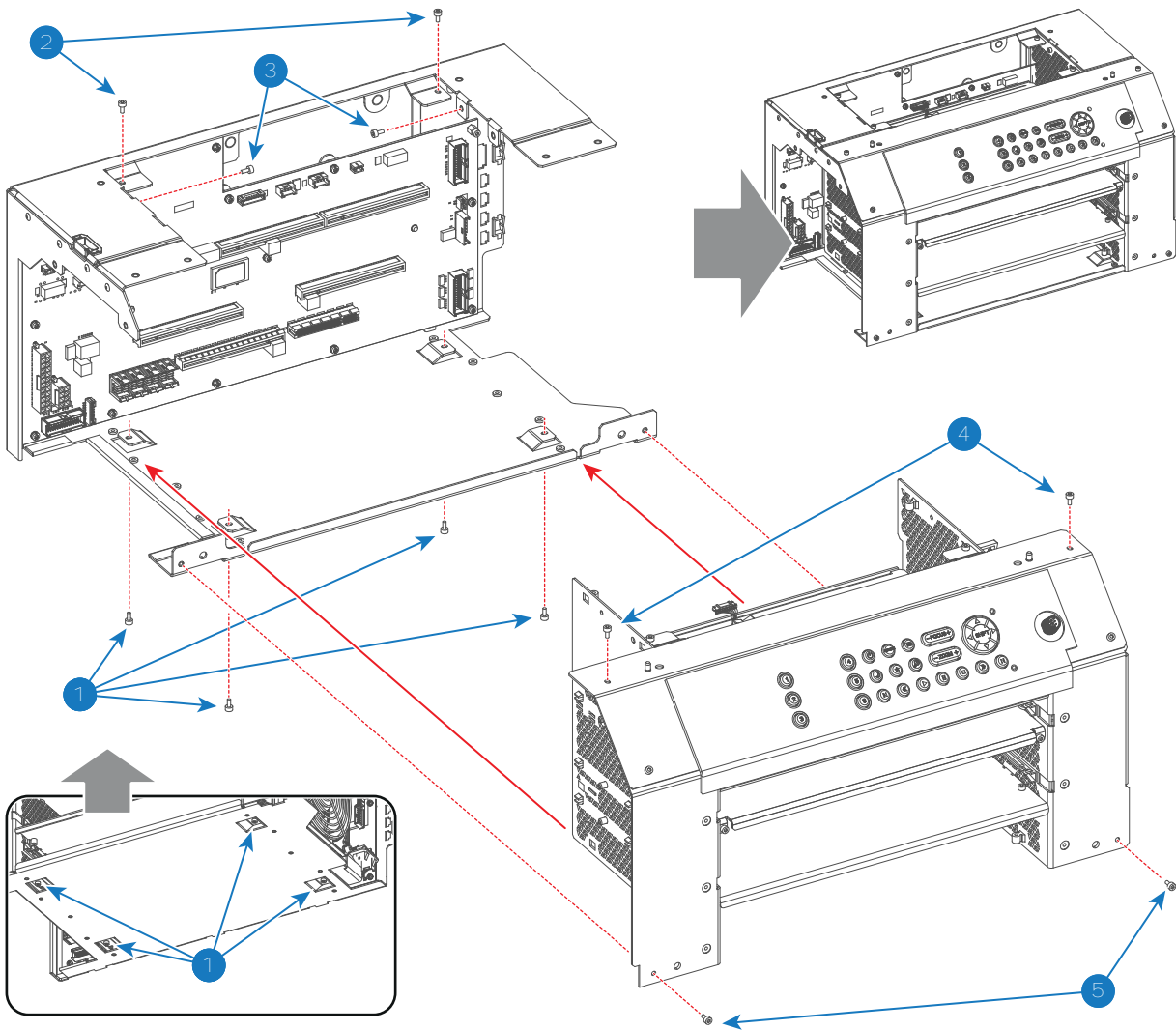


Image 18-44

4. Connect the touch panel wire (reference 13 Image 18-45) and the orange wire (reference 14 Image 18-45) with the Signal Backplane.
5. Connect the black PE wire (reference 15 Image 18-45) with the Signal Backplane as illustrated. Use a T10 Torx screw driver.
6. Connect the wire plug of the front fans (reference 16 Image 18-45) with the Signal Backplane.

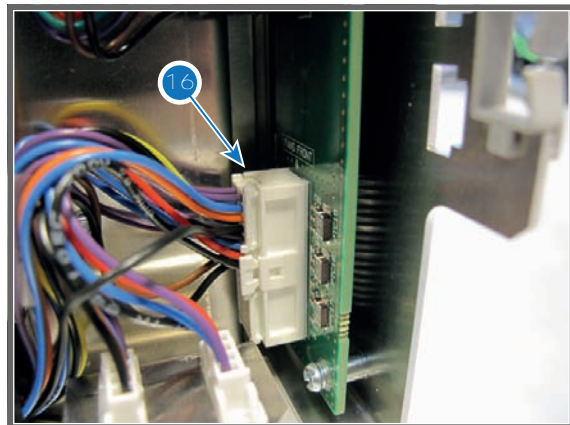
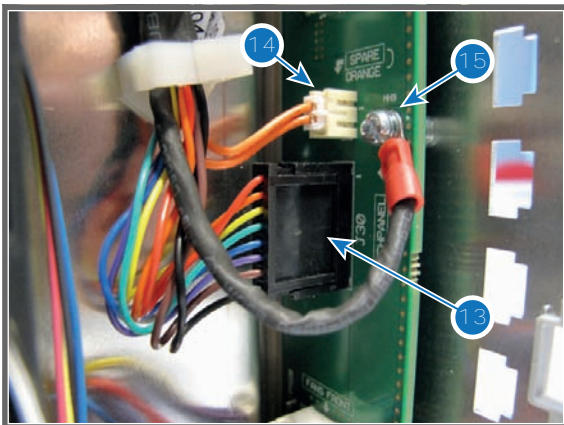


Image 18-45

7. Connect the wire of the Button Module (reference 10 Image 18-46) and the wire of the ICP fan (reference 11 Image 18-46) with the Signal Backplane.
8. Install the temperature sensor (reference 12 Image 18-46) onto the plastic spacer at the upper right corner of the Signal Backplane. Use a 2.5mm Allen wrench to fasten the screw.

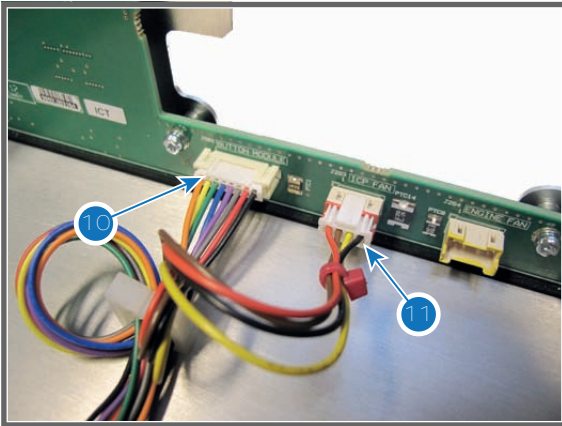
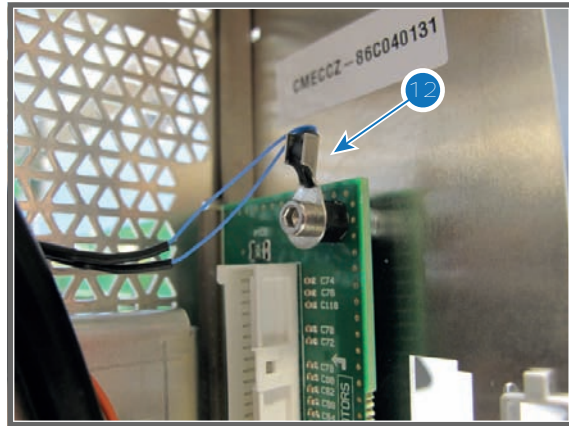


Image 18-46



18.20 Installing the Card Cage

Required tools

3mm Allen wrench.

How to install the Card Cage into the projector?

1. The right side of the Card Cage contains two cable clamps (reference 1 Image 18-47) which must capture the two wires from the Lens Holder. Bring the Card Cage near by its final position on the projector chassis and guide the orange wire through the upper cable clamp and the yellow wire through the lower cable clamp.

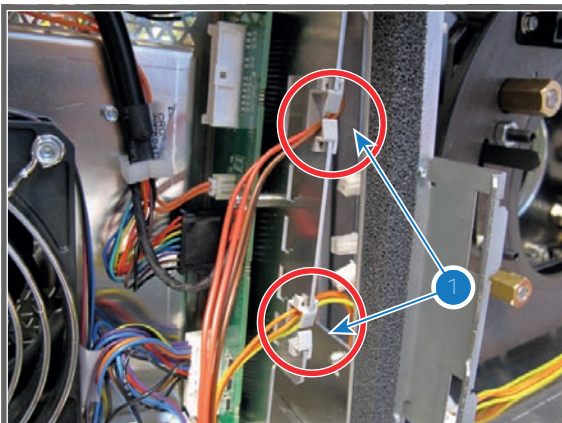


Image 18-47

2. Place the Card Cage in its final position on the projector chassis. Approach the final location from above, leave a few mm between the rear side of the Card Cage and the projector chassis, lower the Card Cage completely, ensure that both front slots (B1) are engaged. Then push the Card Cage with its rear side against the projector chassis to engage the three slots at the bottom rear (A1).

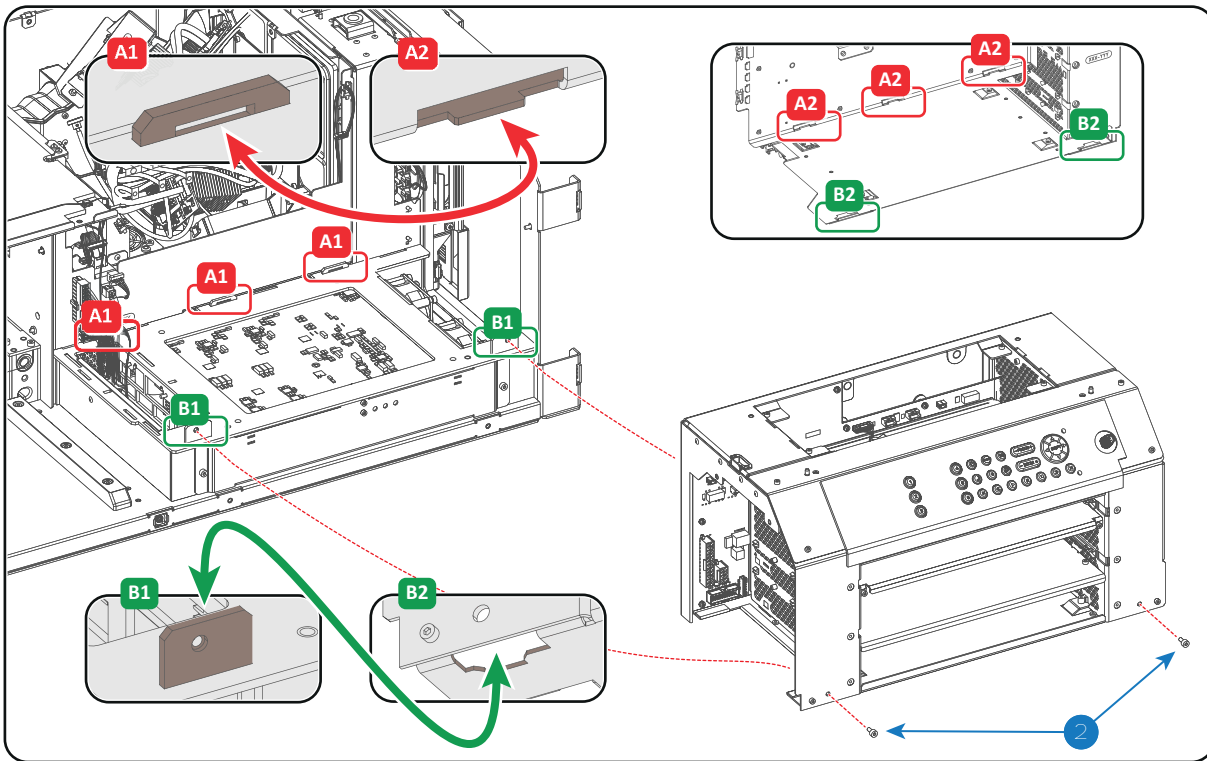


Image 18-48



Note: The rear bottom of the Card Cage is engaged into the projector chassis with three horizontal slots (reference A1 and A2 Image 18-48). The front bottom of the Card Cage is engaged into the projector chassis with two vertical slots (reference B1 and B2 Image 18-48).

3. Secure the Card Cage with two screws at the base of the Card Cage (reference 2 Image 18-48). Use 3mm Allen wrench.
4. Place the top frame in its position on top of the projector.

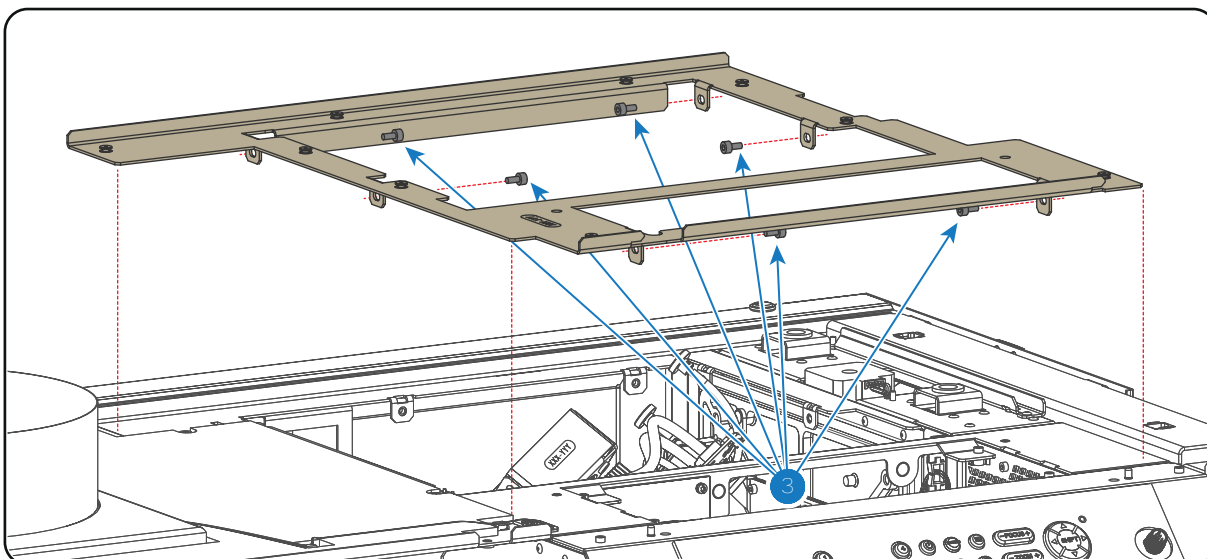


Image 18-49

5. Secure the top frame with 6 fixation screws (reference 3 Image 18-50) as illustrated. Use a 3mm Allen wrench.



Caution: Take care not to drop the screws inside the projector.

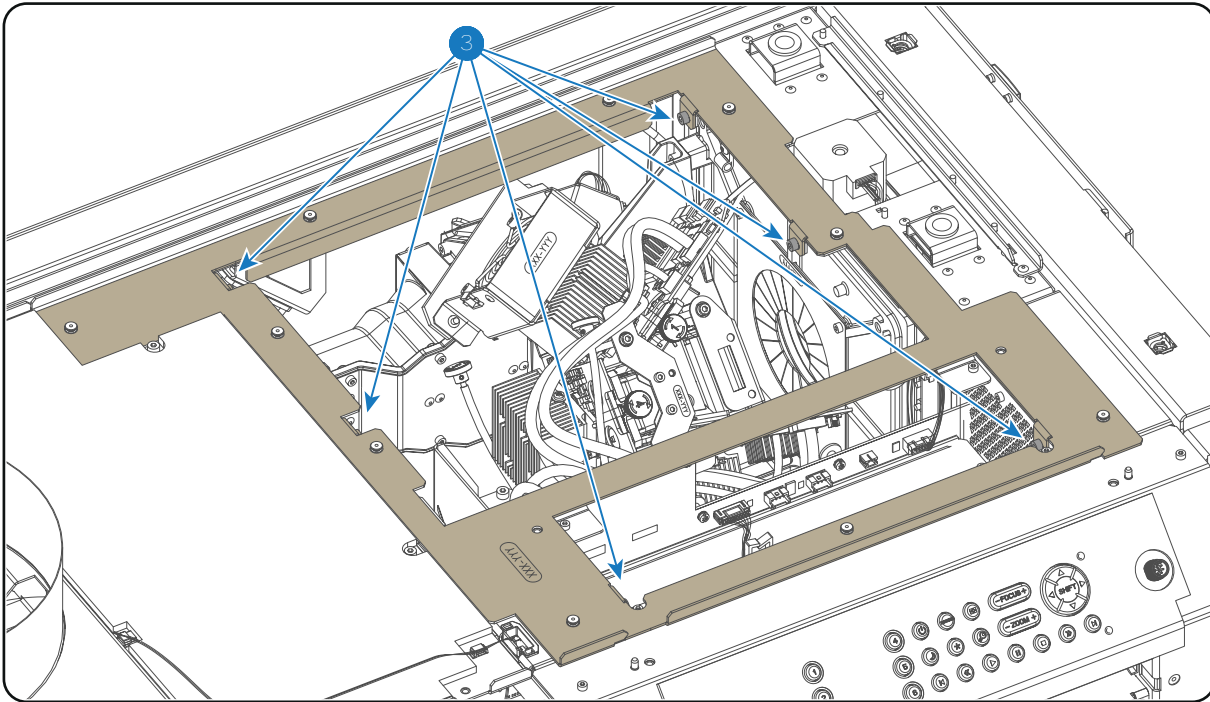


Image 18-50

6. Install the rail on the top of the projector as illustrated. Use a 3mm Allen wrench to fasten the 5 screws (reference 4 Image 18-51).

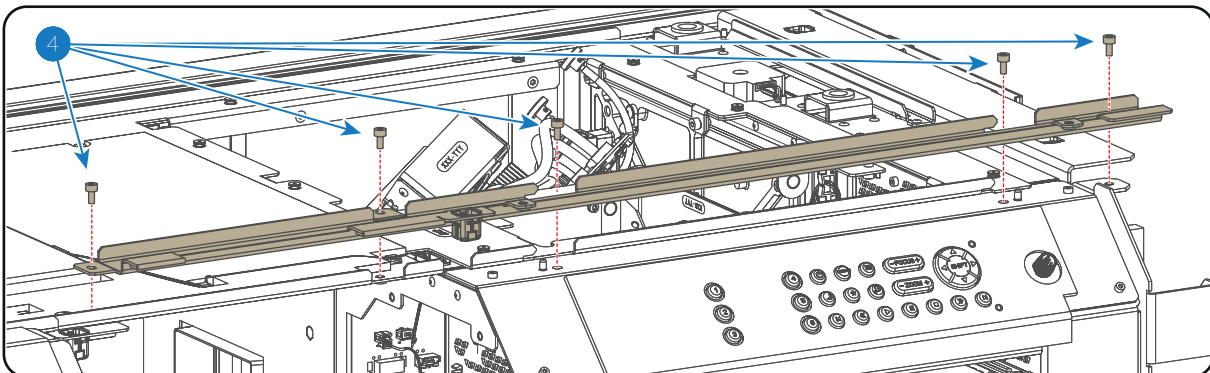


Image 18-51



After the Card Cage is installed the electrical connections between Card Cage and other projector components has to be established. See procedure "Connecting the Card Cage wires", page 241.

18.21 Connecting the Card Cage wires

Connecting the Card Cage wires

1. Connect the three wires (reference 9, 10 and 11 Image 18-52) with the rear-base side of the Signal Backplane.
 - Reference 11 - two pins plug with orange wires from security switch.
 - Reference 10 - two pins plug with yellow wires from security switch.
 - Reference 9 - ten pins plug with 8 wires from 3D-module.
2. Connect the four orange wires of the Light Processor and the brown wire with the Signal Distribution board as illustrated in Image 18-52.
 - Reference 8 - two pins plug with orange wires and red cable tie from temperature sensor red channel.
 - Reference 7 - two pins plug with orange wires and green cable tie from temperature sensor green channel.

- Reference 6 - two pins plug with orange wires and blue cable tie from temperature sensor blue channel.
 - Reference 5 - two pins plug with orange wires from Prism Sensor.
 - Reference 4 - two pins plug with brown wires from Temperature Sensor Light Pipe.
3. Connect the three wires (reference 1, 2 and 3 Image 18-52) of the DMD fans with the Signal Backplane.
- Reference 3 - four pins plug with red cable tie from fan DMD Red channel.
 - Reference 2 - four pins plug with green cable tie from fan DMD Green channel.
 - Reference 1 - four pins plug with blue cable tie from fan DMD Blue channel.

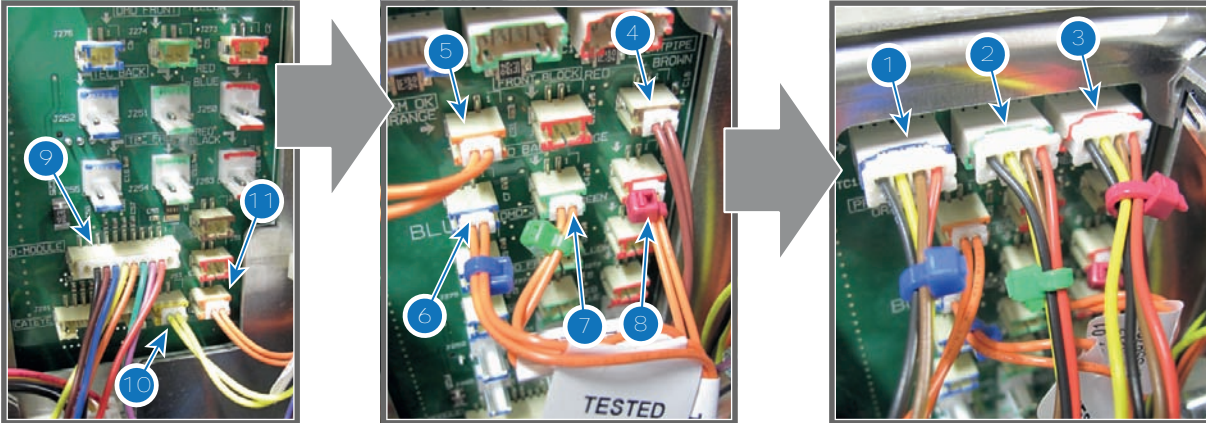


Image 18-52

4. Connect the nine RGB connectors (reference 1 to 9 of Image 18-53) with the Signal Backplane as illustrated.
- Reference 1 - small connector with blue cable tie.
 - Reference 2 - small connector with green cable tie.
 - Reference 3 - small connector with red cable tie.
 - Reference 4 - connector with two blue cable ties.
 - Reference 5 - connector with two green cable ties.
 - Reference 6 - connector with two red cable ties.
 - Reference 7 - connector with one blue cable tie.
 - Reference 8 - connector with one green cable tie.
 - Reference 9 - connector with one red cable tie.

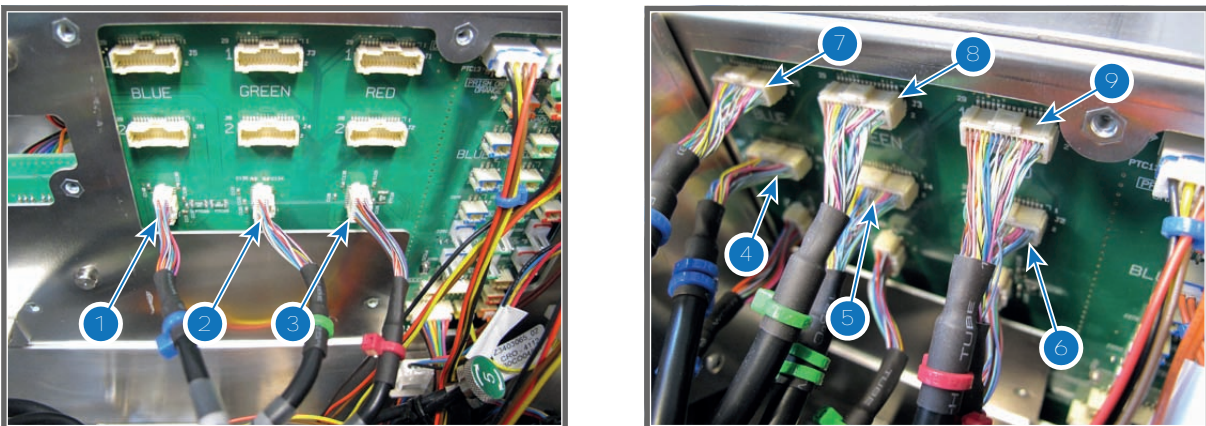


Image 18-53

5. Connect the CLO wire (reference 10) with the Signal Backplane.

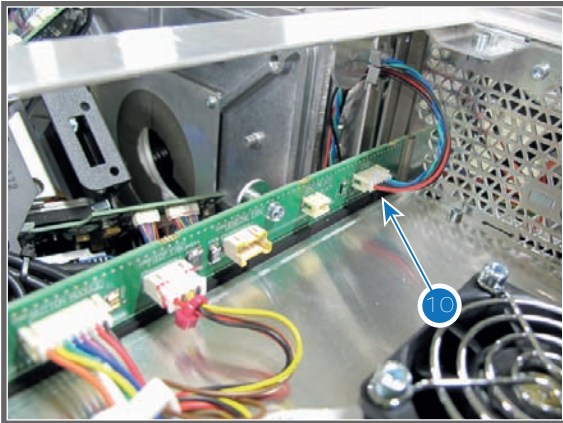


Image 18-54

6. Connect the four wires (reference 1, 2, 3 and 4 Image 18-55) with Signal Backplane at the lower left side of the Card Cage as illustrated:
 - Reference 1 - SMPS CTRL plug (10 pins, black wires)
 - Reference 2 - FANS BACK plug (multi pins, different colored wires)
 - Reference 3 - Power plug RELAY (2 pins, red/black wire)
 - Reference 4 - ULCB plug (8 pins, different colored wires)
7. Connect the two SMPS plugs with black wires with the Signal Backplane. First insert the small plug (reference 5 Image 18-55) then insert the larger plug (reference 6 Image 18-55).

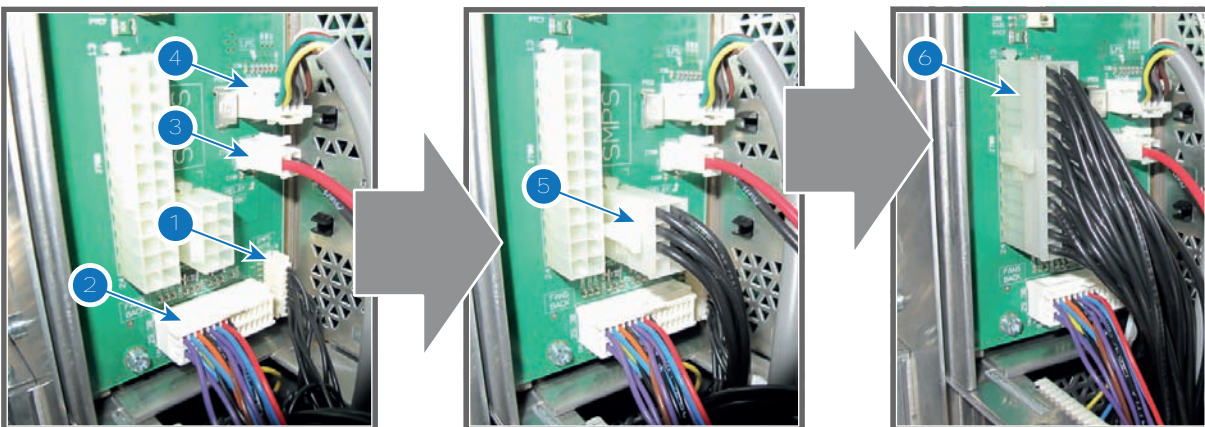


Image 18-55

8. Connect the three wires (reference 7, 8 and 9 Image 18-55) with Signal Backplane at the upper left side of the Card Cage as illustrated:
 - Reference 7 - TAIL LIGHT plug (4 pins, different colored wires)
 - Reference 8 - LIGHT SOURCE SWITCH plug (2 pins, red wires)
 - Reference 9 - TEMP OUTLET plug (2 pins, yellow wires)

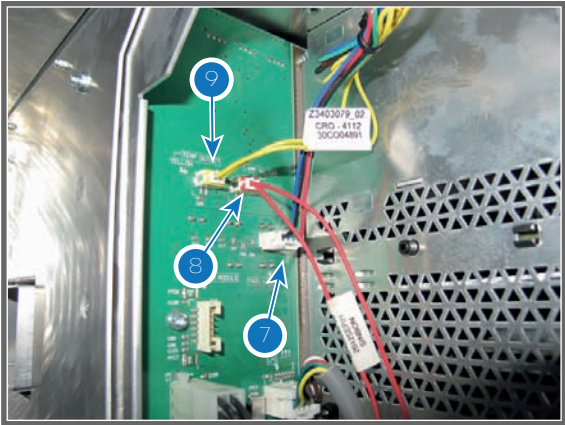


Image 18-56

9. Connect the big wire plug (reference 3 Image 18-57) of the lens motors with the Signal Backplane.
10. Engage the five wire sockets (reference 5, 6, 7, 8 and 9 Image 18-57) into the projector chassis as illustrated. The sockets must be ordered from top to bottom as follows:
 - Reference 5 - Lens wires (zoom & focus) (**orange wires**).
 - Reference 6 - Horizontal-Left end loop wires (**yellow/black**).
 - Reference 7 - Vertical-Top end loop wires (**red/black**).
 - Reference 8 - Vertical-Bottom end loop wires (**brown/black**).
 - Reference 9 - Horizontal-Right end loop wires (**orange/black**).

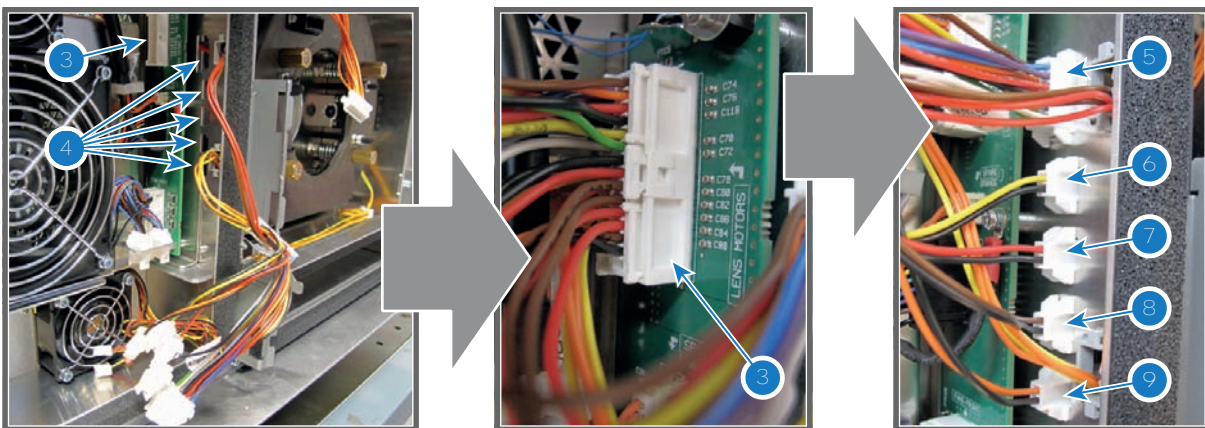


Image 18-57

11. Connect the 5 wires (reference 5, 6, 7, 8 and 9 Image 18-58) with the sockets in the chassis at the left side from the Lens Holder as illustrated. The plugs must be ordered from top to bottom as follows:
 - Reference 5 - Lens wires (zoom & focus) (**orange wires**).
 - Reference 6 - Horizontal-Left end loop wires (**yellow/black**).
 - Reference 7 - Vertical-Top end loop wires (**red/black**).
 - Reference 8 - Vertical-Bottom end loop wires (**brown/black**).
 - Reference 9 - Horizontal-Right end loop wires (**orange/black**).

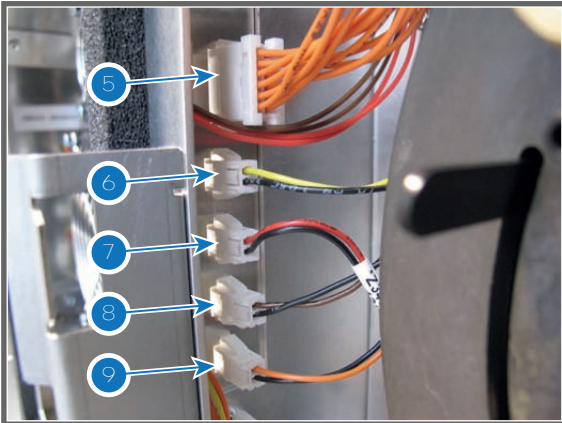


Image 18-58

12. Connect the wire of both SMPS fans (reference 1 & 2 Image 18-59).

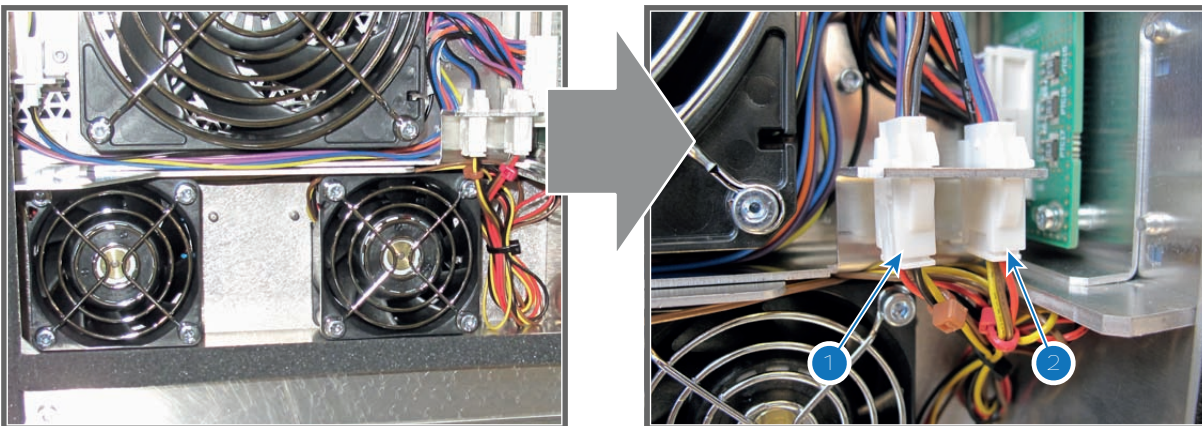


Image 18-59



Once that all wires are connected with the Signal Backplane, all components that were removed can be reinstalled such as : Card Cage cover, Anode Fan, Light Source and cover, top cover plate of the Light Processor compartment, large dust filter, and finally the projector top cover.

18.22 Installation of the Card Cage cover



This procedure assumes that Light Source cover and large dust filter are removed from the projector.

Required tools

Phillips screwdriver PH2

How to Install the Card Cage cover onto the projector?

1. Place the Card Cage cover in its place.
2. Fasten the four fixation screws (reference 1 Image 18-60) of the Card Cage cover as illustrated. Use a PH2 Phillips screwdriver.

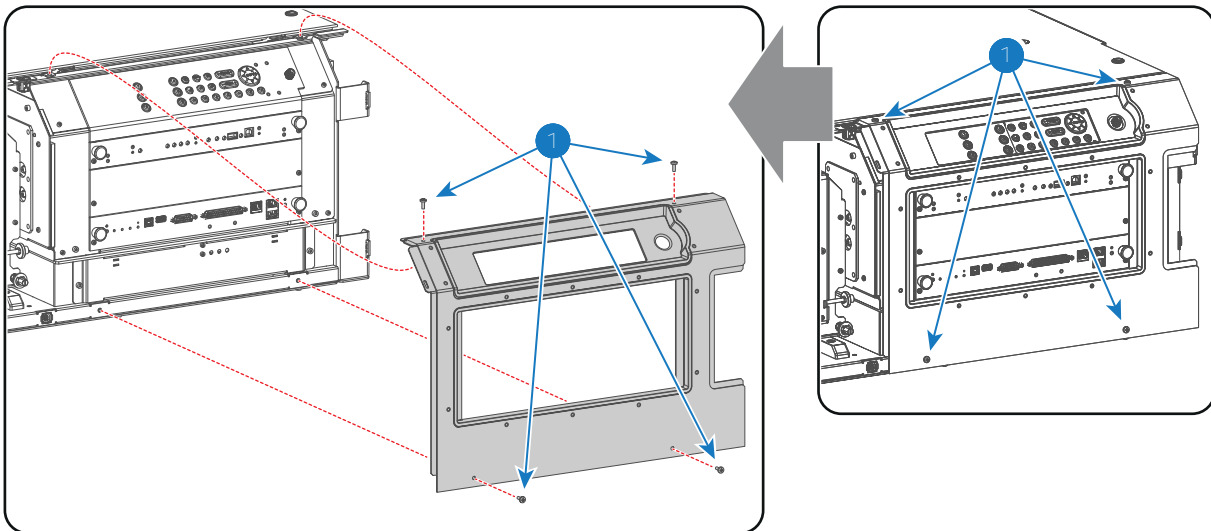


Image 18-60

18.23 Removal of the Card Cage partition plate

When removing the Card Cage partition plate?

The Card Cage partition plate is located inside the Card Cage just under the ICP board. This partition plate needs to be removed in case the projector has to be upgraded with the Barco ICMP module.



This procedure assumes that the ICP board and the board below the ICP board (IMB board, IMS board, HDSDI board or others) are removed from the Card Cage.

Required tools

2.5mm Allen wrench.

How to remove the partition plate from the Card Cage?

1. Release the two screws (reference 1 Image 18-61) as illustrated. Use a 2.5mm Allen wrench.

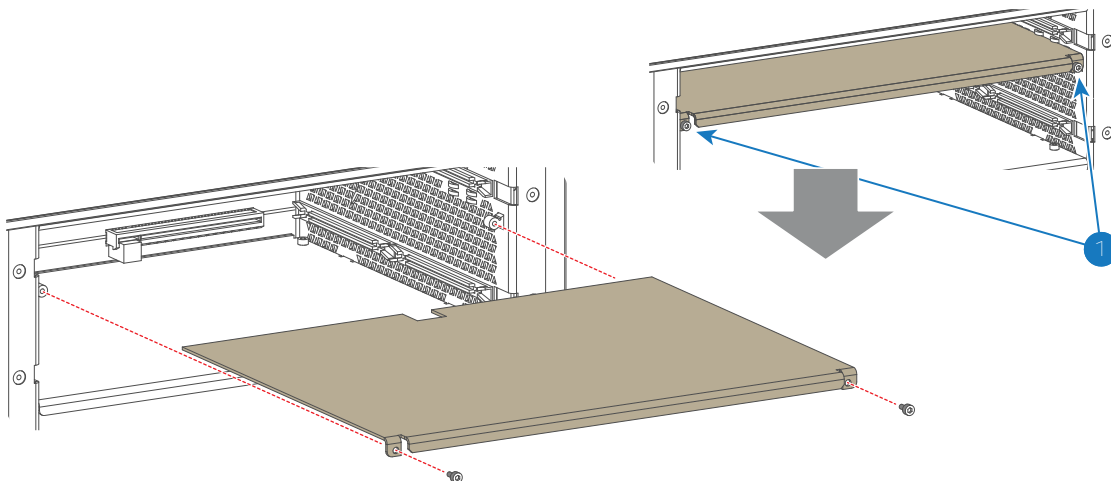


Image 18-61

2. Pull the partition plate out of the Card Cage.

18.24 Replacement of the Status Light



This procedure assumes that the projector rear cover is removed.

Required tools

2.5mm Allen wrench.

How to replace the Status Light of the projector?

1. Disconnect the wire (reference 1 Image 18-62) from the Status Light board.

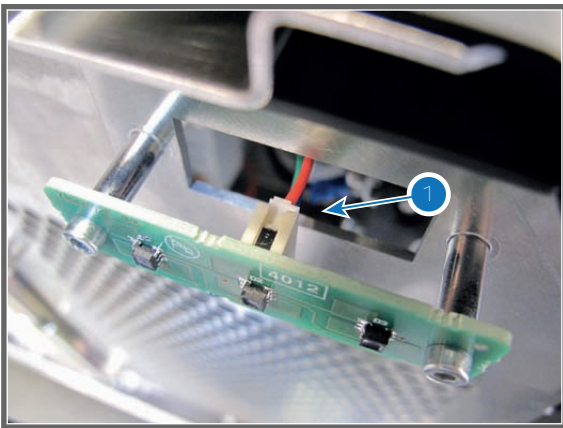


Image 18-62

2. Replace the Status Light board. Use a 2.5mm Allen wrench to release/fasten the two screws (reference 2 Image 18-63).

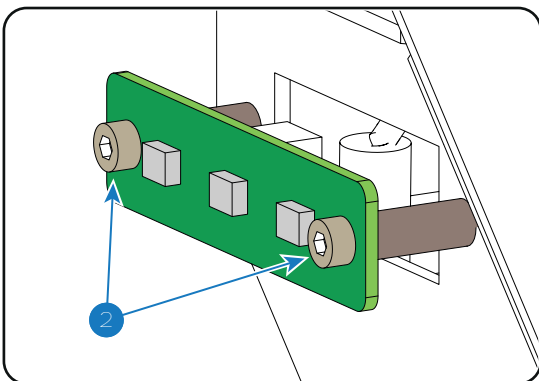
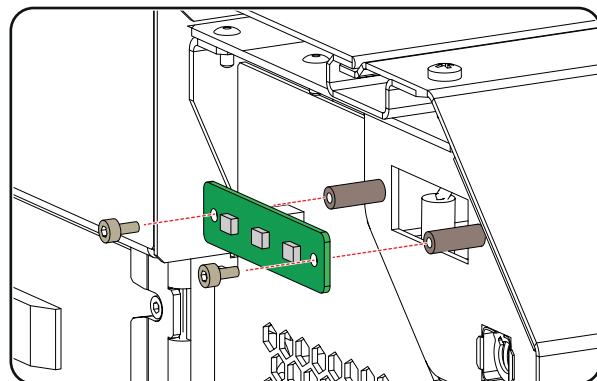


Image 18-63



Software update via Communicator (DC update companion)

19

Overview

- Software upgrade, launch DC update companion
- Software upgrade, projector, ICMP or touch panel
- ICP software upgrade
- Link decryptor software update
- Update logging



During an upgrade, certificate (code 5815) and key errors (code 5816) are possible. Restarting the projector will resolve these errors. If these errors remain after a restart, replace the ICP board.

19.1 Software upgrade, launch DC update companion

What can now be done ?

The following updates of the software are possible with (DC update companion)

- Barco DC package update:
 - Projector software
 - Touch panel software
- Enigma link decryptor software
- Integrated Cinema Processor (ICP) software
- ICMP software

Download the corresponding update package from Barco's web site, <http://www.barco.com> on your PC. Select via the product name.

For Enigma link decryptor and ICP update package, unzip the package file into a new directory.

For the projector software, ICMP and the touch panel software package, unzipping is not possible. the file can be used as is.

The ICP and Linkdecryptor package file contains at least

- a zipped version of the update program which contains a *setup.exe* file to install the program. Can also be unzipped.
- a release file with the new software.
- a release note (pdf document)
- a Software Manifest for ICP Production Release (pdf document)

Name	Size	Type	Date Modified
icp_enigma_control_program.zip	15,192 KB	Compressed (zip...)	17/05/2010 14:04
Install.msi	837 KB	Windows Install...	6/05/2010 16:31
InstMsiA.Exe	1,668 KB	Application	25/09/2001 14:05
InstMsiW.Exe	1,779 KB	Application	11/09/2001 17:04
Prod1.4.131.release	10,983 KB	RELEASE File	10/05/2010 8:45
R33023401_01_V01_04_flash.zip	26,208 KB	Compressed (zip...)	8/07/2010 10:33
ReleaseNotesProd1_4.pdf	21 KB	Adobe Acrobat D...	6/05/2010 10:30
Setup.Exe	108 KB	Application	19/03/2003 0:03
Setup.Ini	1 KB	Configuration Se...	6/05/2010 16:31
SoftwareManifest1.4.pdf	41 KB	Adobe Acrobat D...	28/04/2010 17:42

Image 19-1: Content ICP update package



DC Update Companion can also be started as a separate application. The start up button is located next to the Communicator start button in the start programs tree.

How to launch

1. While in the *Maintenance* tab page, click on **Software update** (1).

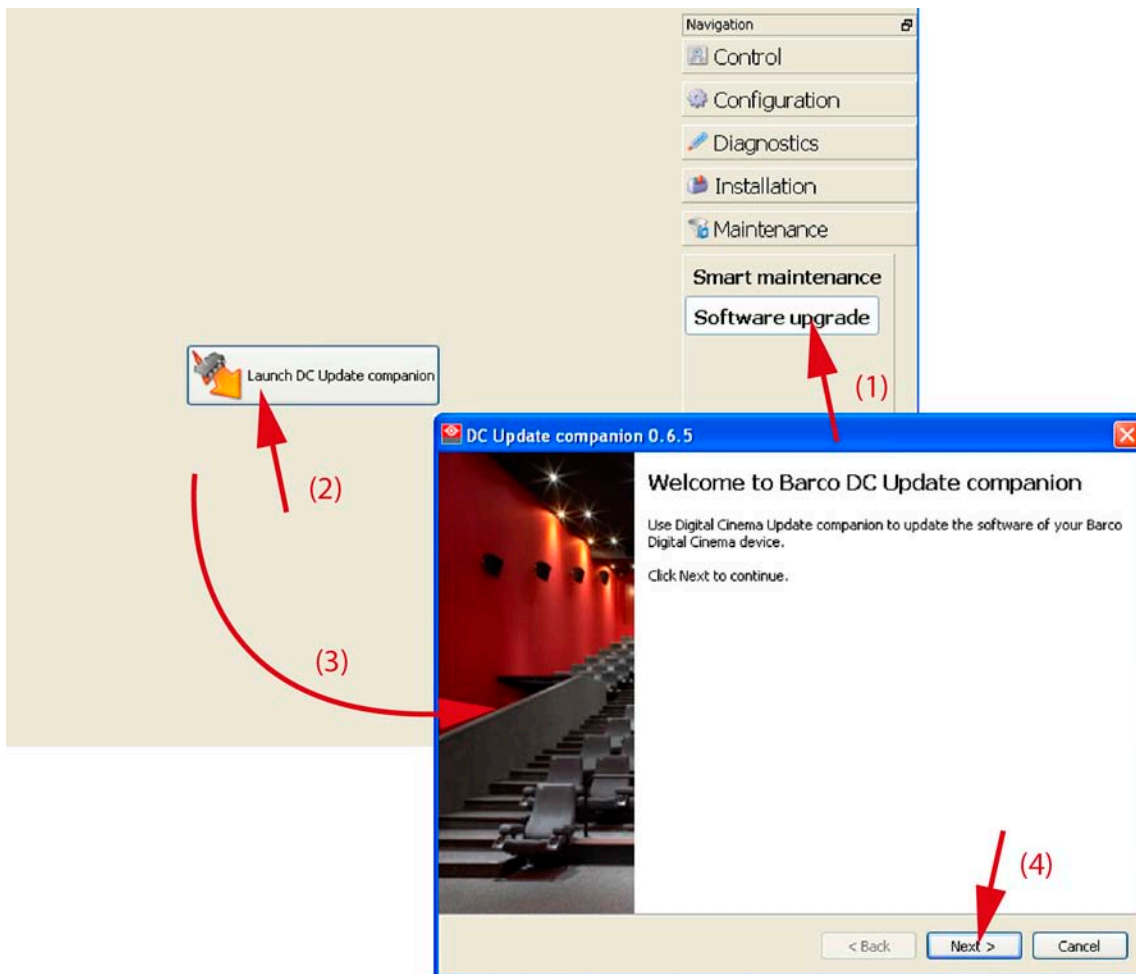


Image 19-2: Launch DC update companion

2. Click on **Launch DC update companion** (2).
The *DC update companion* window starts up (3).
3. Click **Next** to continue (4).
4. Read the licence agreement and check accept. Click **Next** to continue.

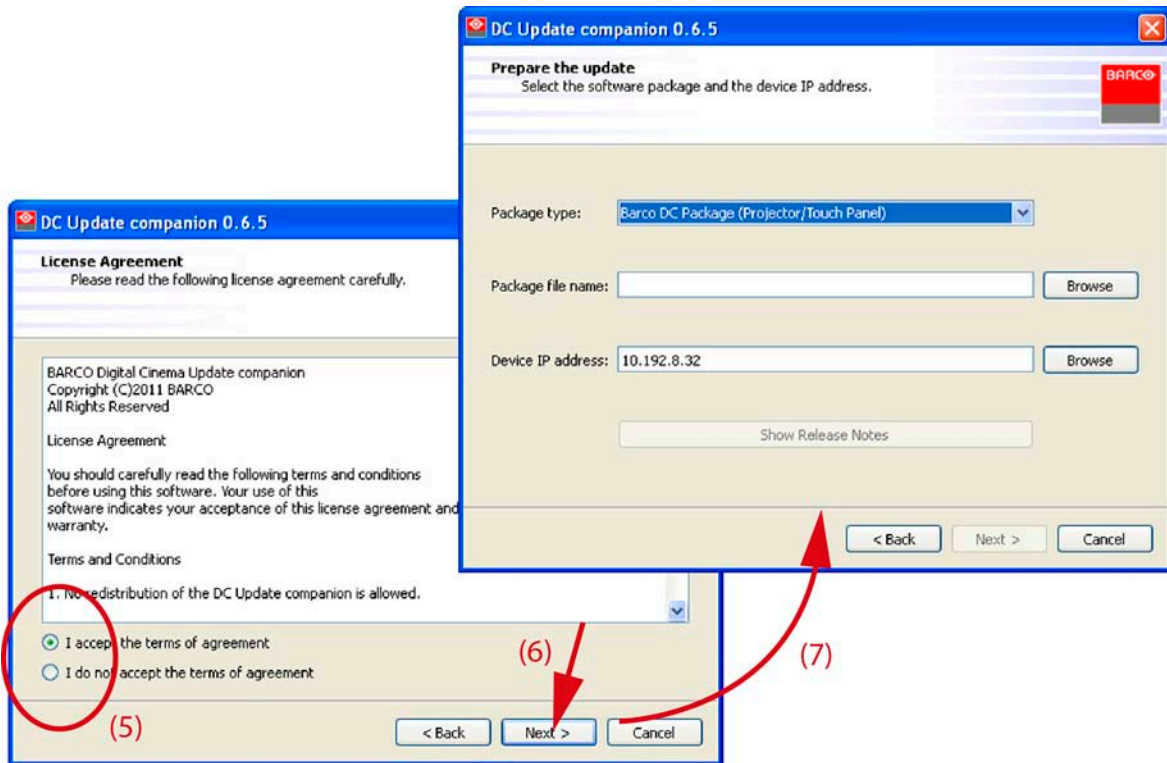


Image 19-3: Start up selection window

5. Continue with the specific procedure for each type of package.

19.2 Software upgrade, projector, ICMP or touch panel

How to update

1. Launch the *DC Update Companion* as described in “Software upgrade, launch DC update companion”, page 250.
2. Select package type. Click on the drop down box (1) and select Barco DC Package (for projector or touch panel update) or ICMP package (for ICMP update).

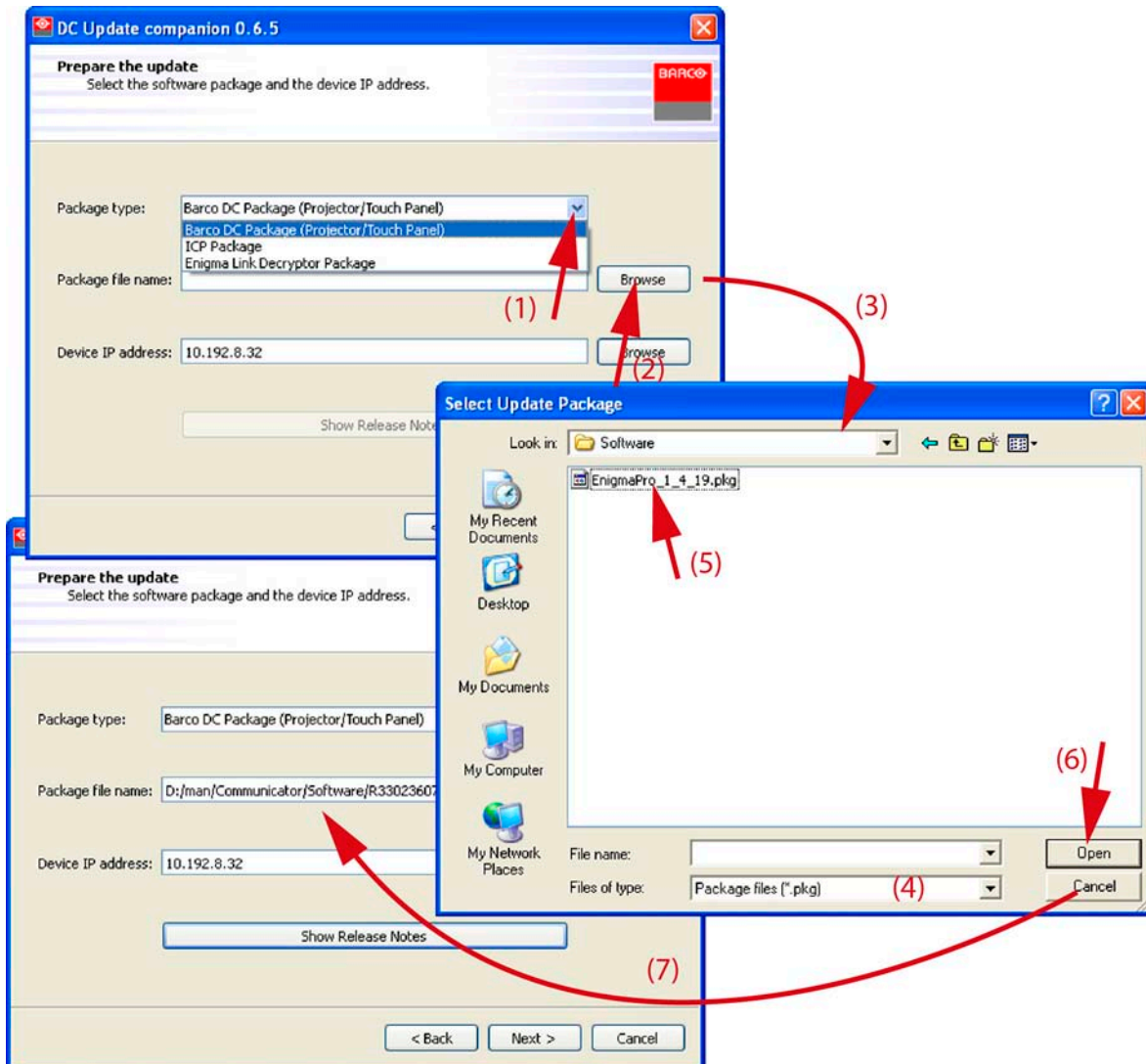


Image 19-4: Package file selection

3. Browse the package file name. Click on **Browse** (2) to open the Browser window (3).
The correct file type is already filled out (4).
4. Browse for the desired file (5), select the file and click on **Open** (6).
The Package file name line is filled out (7).
5. To read the release notes, click on **Show Release Notes** (8).

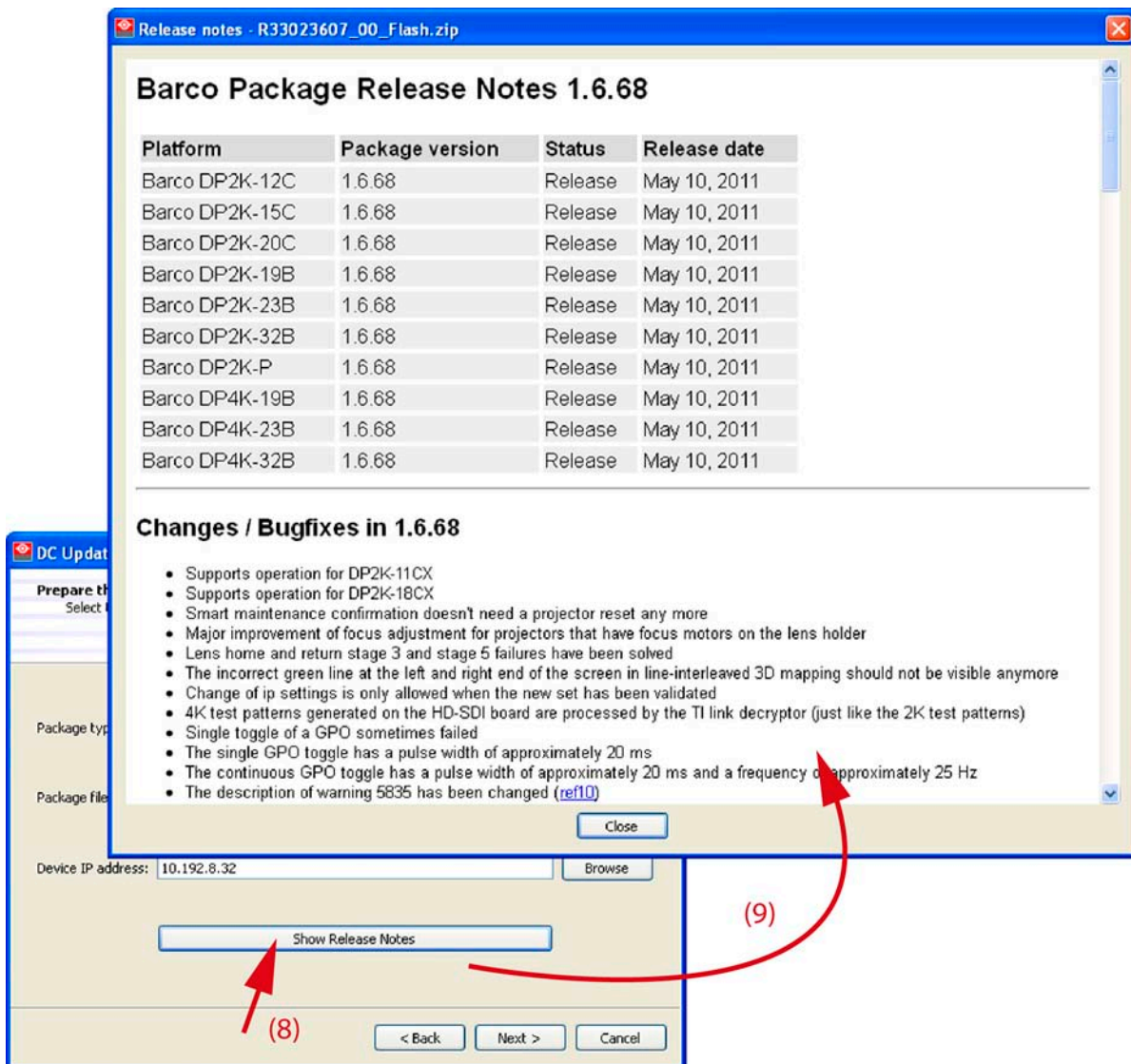



Image 19-5: Barco release notes

6. Enter the device IP address (10) or click on **Browse** to open a device selection window (11).

 **Note:** The IP of the connected projector is already filled out. When using the DC Update Companion as stand alone program, then this field is blank.

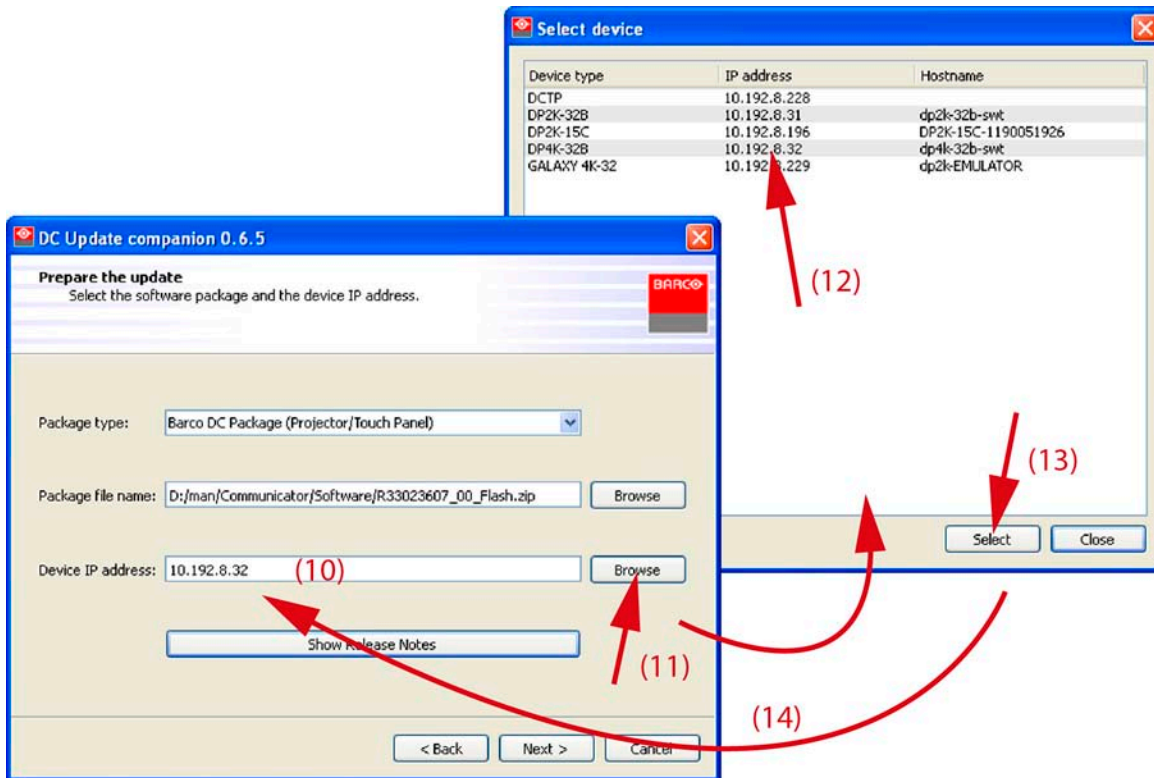


Image 19-6: IP selection

7. Select the desired IP address (12) and click **Select** (13).
The selected IP address is filled out next to *Device IP address*.
8. Click **Next** to continue.
The necessary information is gathered.
The current installed version is shown next to the package version (15).

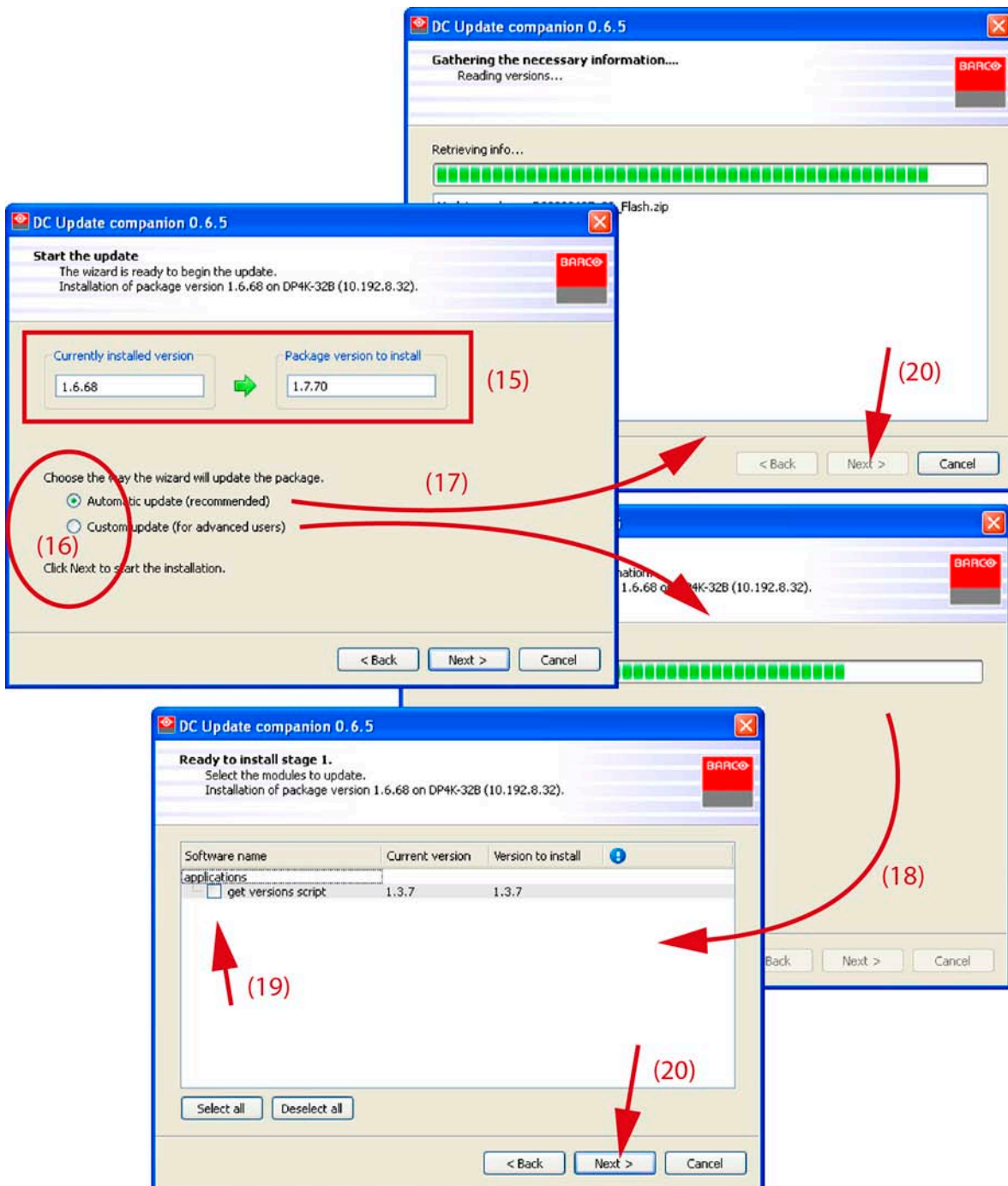


Image 19-7: Projector software update

9. Select the way the wizard will update the package. Check the desired radio button (16).
10. If automatically is selected the wizard gathered the information (17). Then click **Next** to start the update (20).
If custom update (for advanced users) is selected, the wizard starts collecting the information (17) of the different software modules.
11. Select the modules to update (19) and click **Next** to start the update (20).



The update can take a lot of time. Make sure not to interrupt the power during the update process. At the end, an update status will be displayed.

19.3 ICP software upgrade

About updating ICP board

The ICP board contains 2 slots to store software before this software can be installed. Therefore it is recommended to store the previous version of the software in a location and the current version in the other. When an new update becomes available, overwrite always the oldest version.

These 2 loaded versions make it possible to switch on an easy way between the current version and the previous one.

How to upgrade

1. Launch the *DC Update Companion* as described in “Software upgrade, launch DC update companion”, page 250.
2. Select package type. Click on the drop down box (1) and select *ICP Package* .

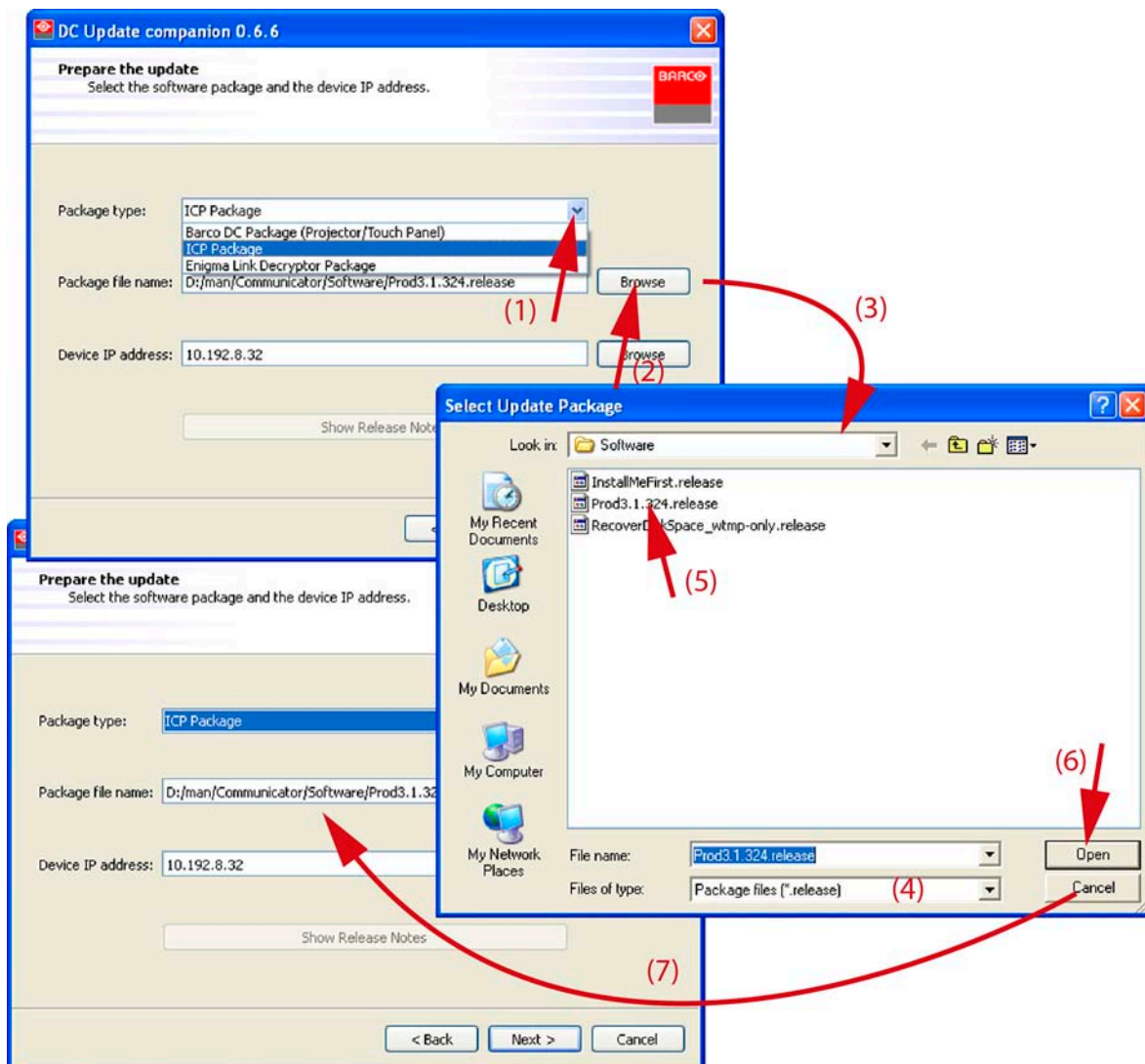



Image 19-8


3. Browse the package file name. Click on **Browse** (2) to open the Browser window (3).

 *Note:* File has extension *release*.

The correct file type is already filled out (4).

4. Browse for the desired file (5), select the file and click on **Open** (6).
The Package file name line is filled out (7).

5. Enter the device IP address (10) or click on **Browse** to open a device selection window (11).

 **Note:** The IP of the connected projector is already filled out. When using the DC Update Companion as stand alone program, then this field is blank.

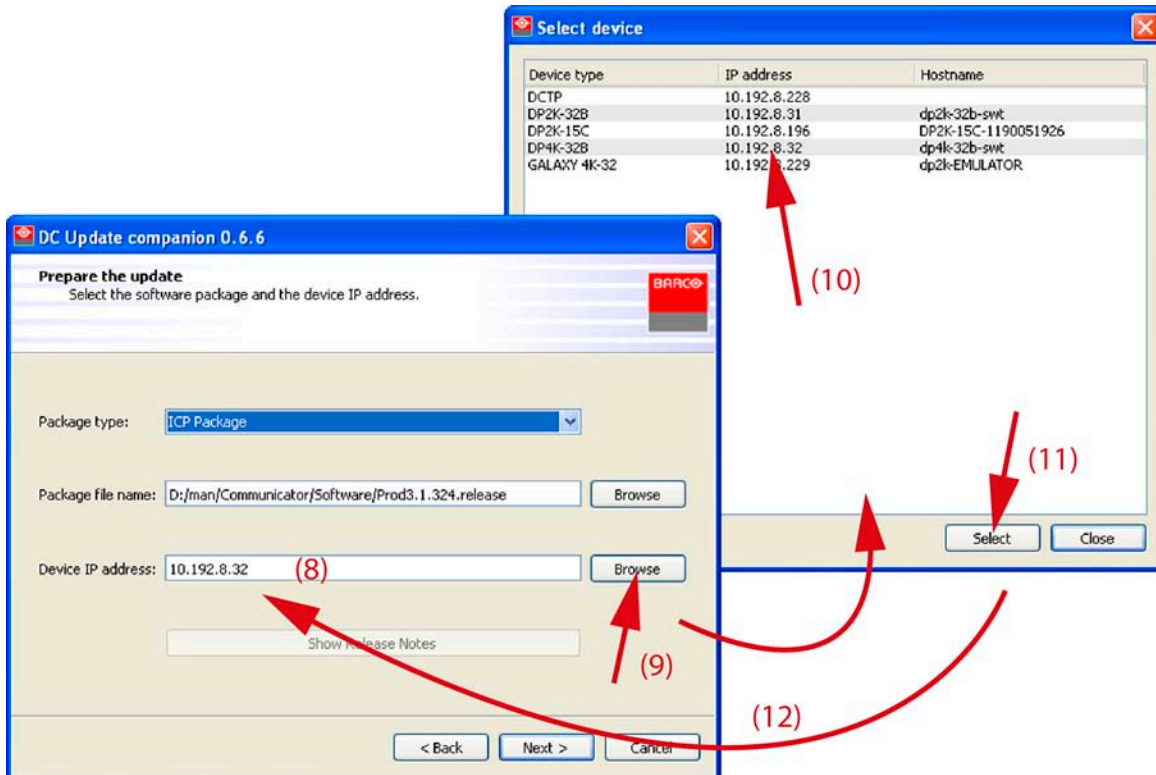


Image 19-9: IP selection

6. Click **Next** to continue.
The necessary information is gathered.
The current installed version is shown next to the package version (13).

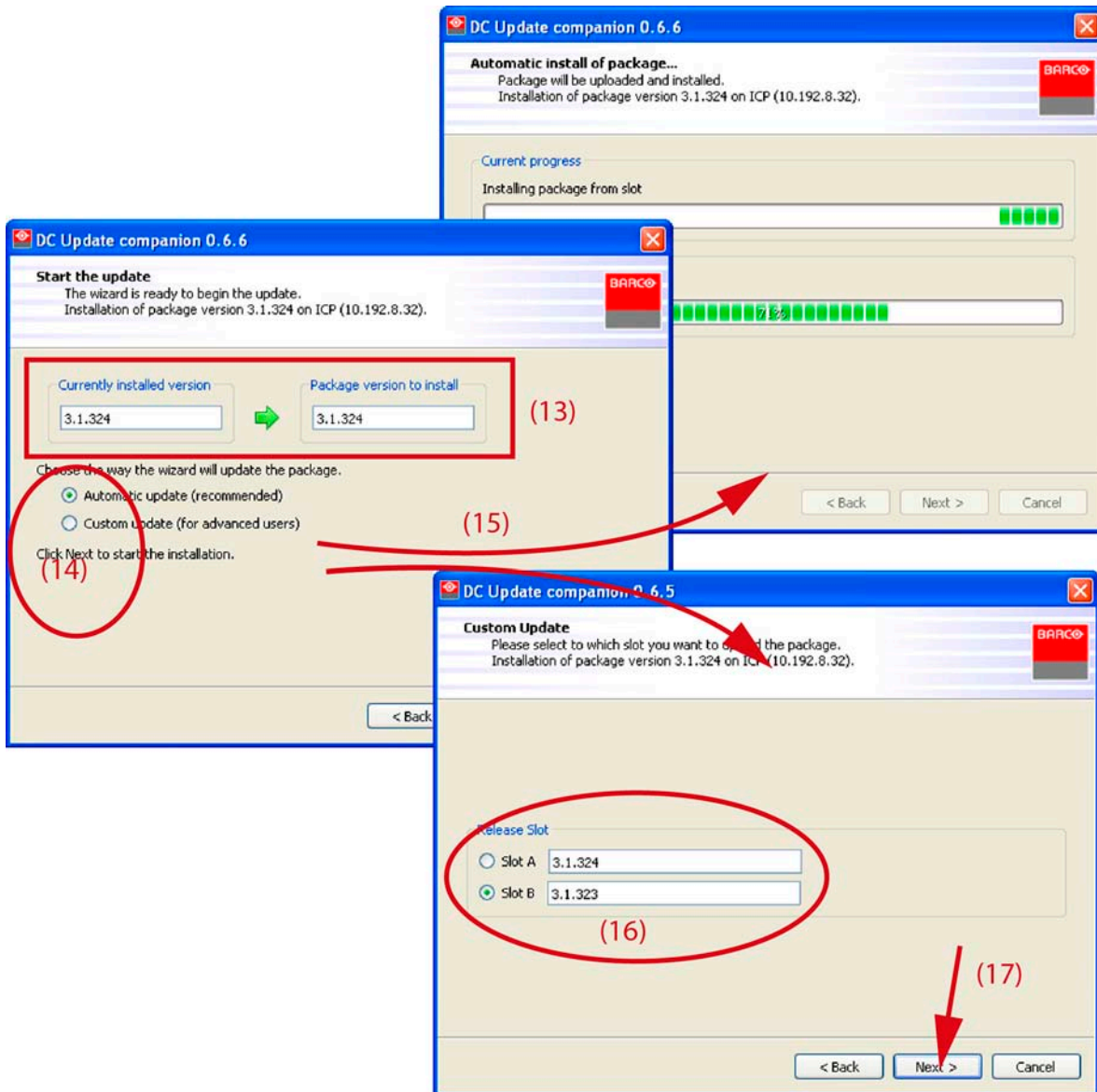


Image 19-10: Load and install software

7. Select the way the wizard will update the package. Check the desired radio button (14).
8. If automatically is selected the wizard will load the software in the oldest slot and install the software immediately (15).

If custom update (for advanced users) is selected, the wizard displays the selection for slot A or slot B (16). Check the radio button of your choice and press **Next** (17).

The software will be loaded to the selected slot and will be installed immediately

When the update is finished, an status window is displayed.

19.4 Link decryptor software update

How to update

1. Launch the *DC Update Companion* as described in “Software upgrade, launch DC update companion”, page 250.
2. Select package type. Click on the drop down box (1) and select *Enigma Link Decryptor Package* .

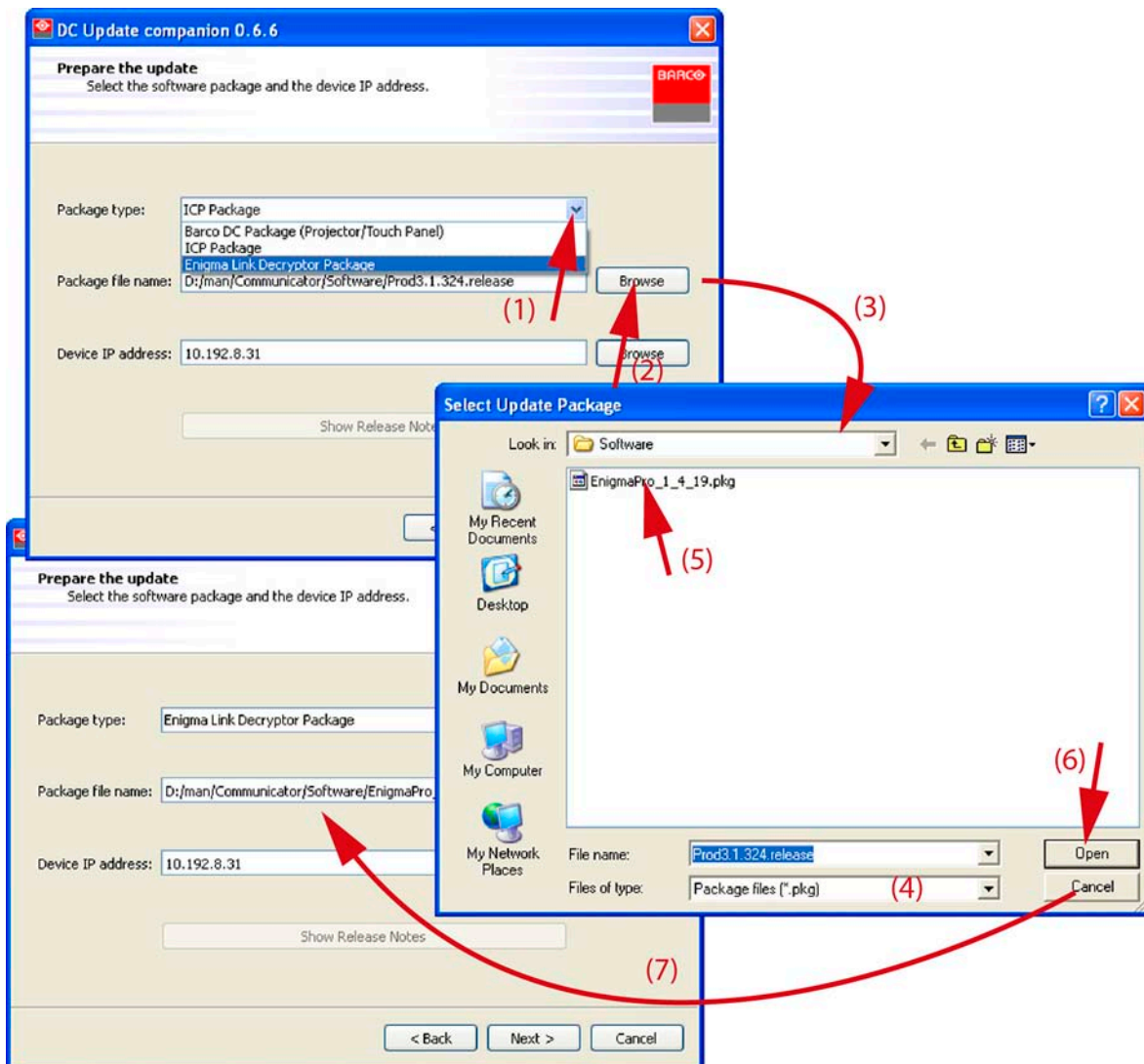



Image 19-11


3. Browse the package file name. Click on **Browse** (2) to open the Browser window (3).
The correct file type is already filled out (4).

4. Browse for the desired file (5), select the file and click on **Open** (6).

 *Note:* File has extension *pkg*.

The Package file name line is filled out (7).

5. Enter the device IP address (10) or click on **Browse** to open a device selection window (11).

 *Note:* The IP of the connected projector is already filled out. When using the DC Update Companion as stand alone program, then this field is blank.

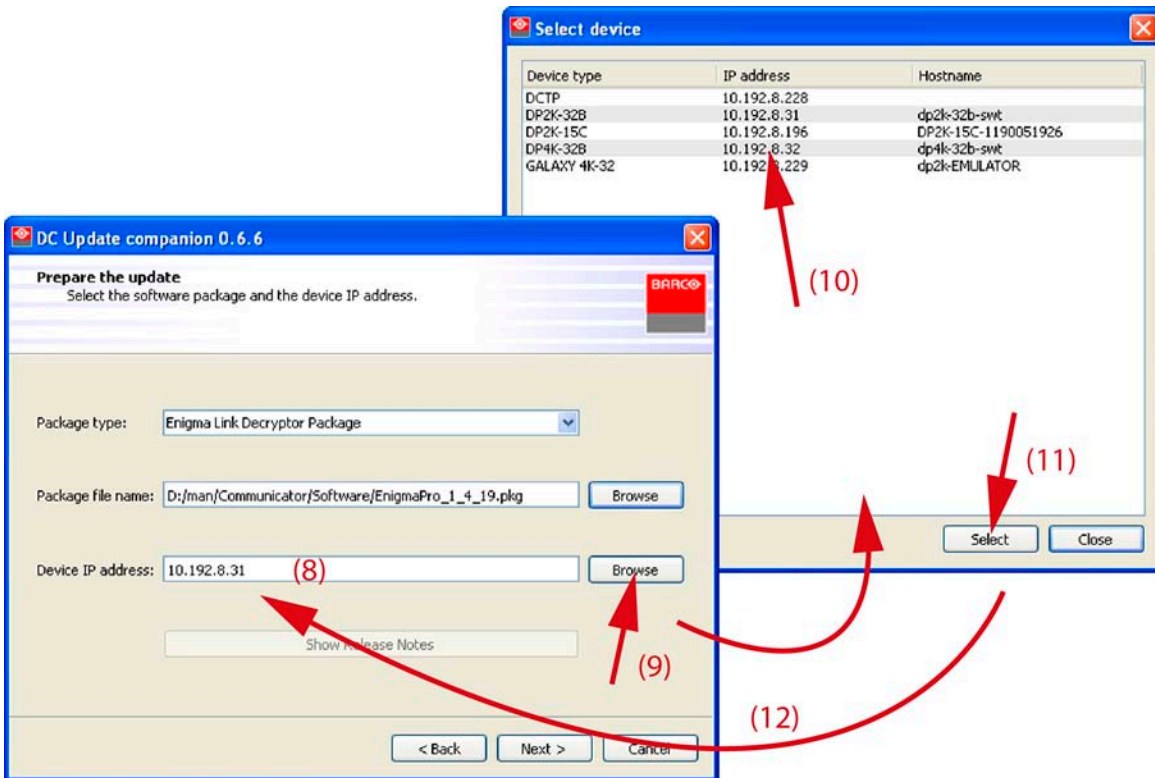


Image 19-12: IP selection

6. Click **Next** to continue.

The necessary information is gathered.

The current installed version is shown next to the package version (13).

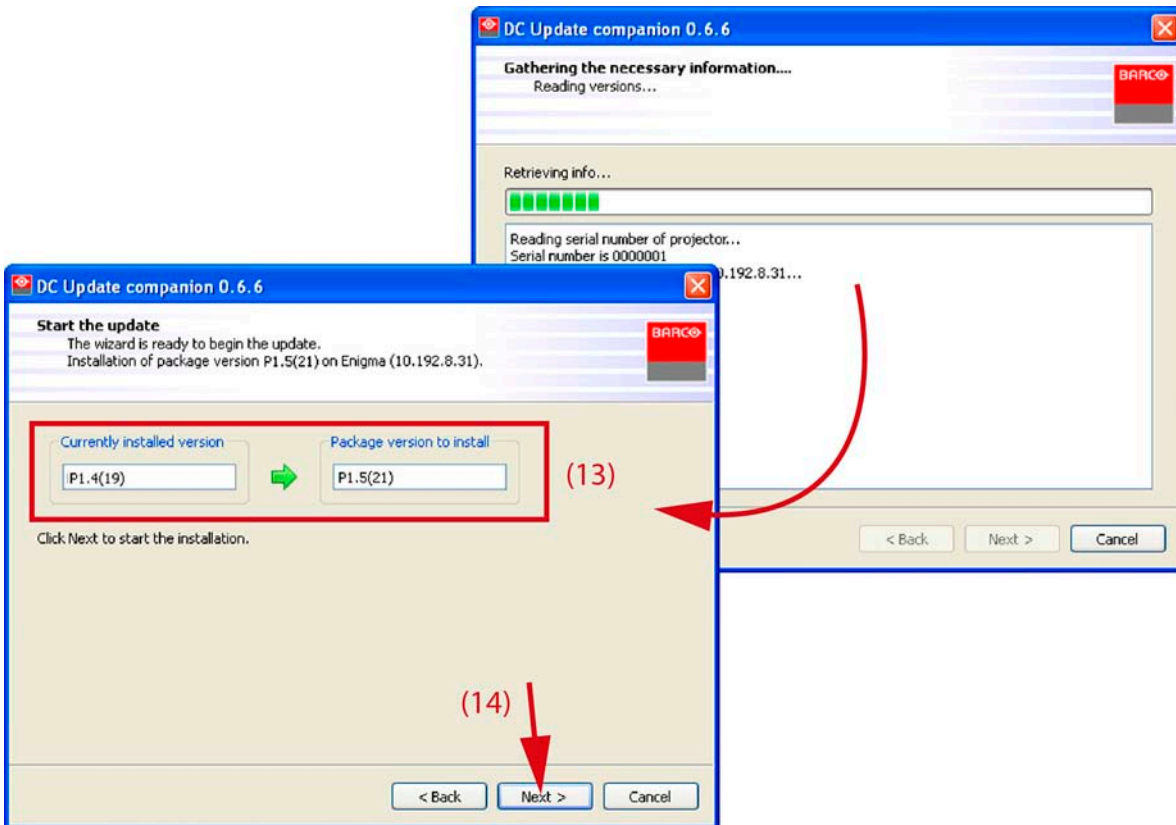


Image 19-13

7. Click **Next** to start the software update (14).
When the update is finished, an status window is displayed.

19.5 Update logging

Installation logging

When the software update is finished, a status window is displayed. This window is almost equal for all possible updates.

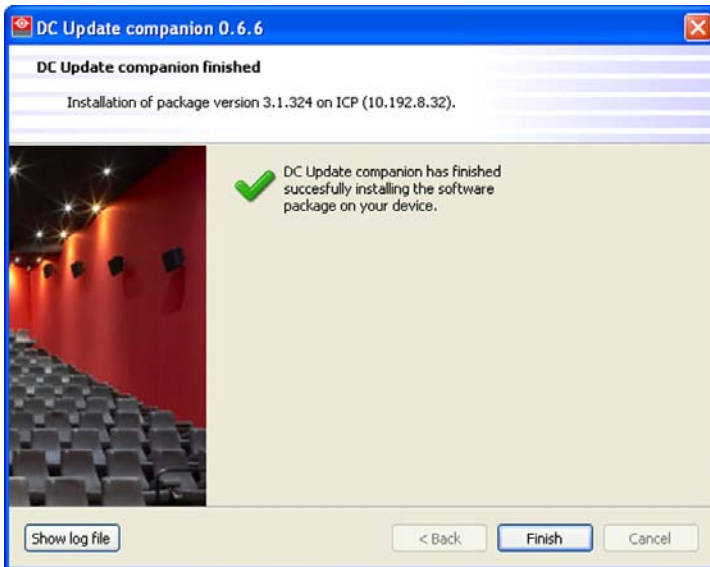


Image 19-14: Status window.

To show the log file, click on **Show log file**.

All information about the update process is logged in this log file.

Exhaust system

20

20.1 Replacement of the Rear Exhaust

Required tools

- Flat screwdriver
- Allen wrench 3 mm

How to replace the Rear Exhaust?

1. Remove the top cover of the projector.
2. Replace the rear exhaust as illustrated. Use a 3 mm Allen wrench to release or tighten the four screws (reference 2 Image 20-1).

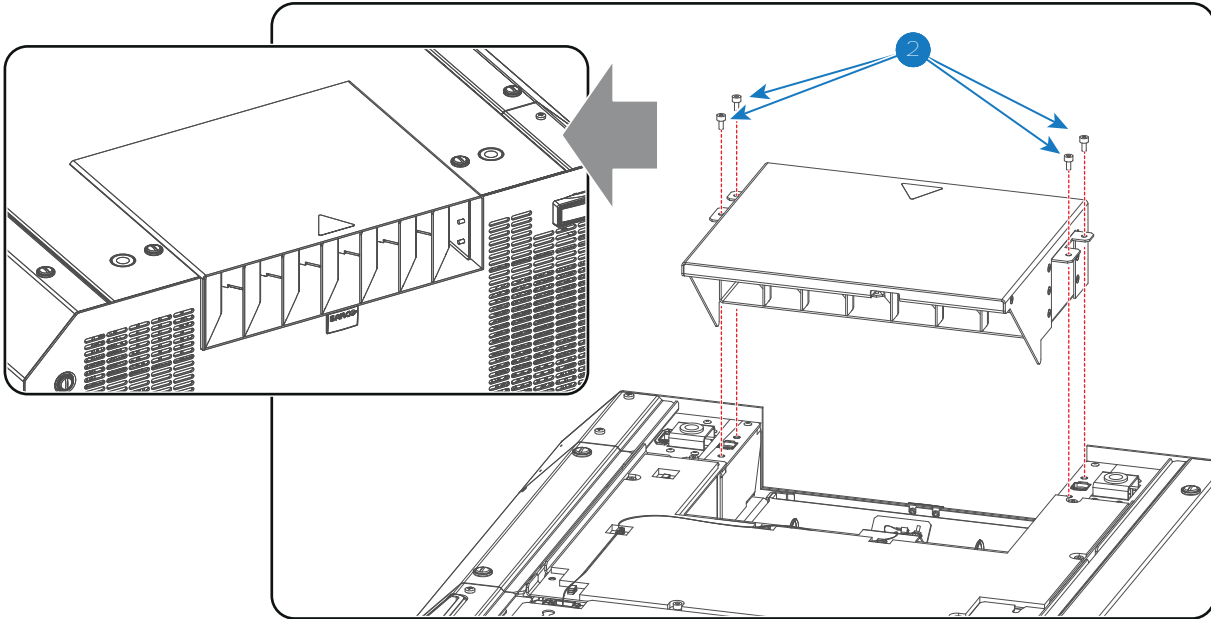


Image 20-1

3. Install the top cover of the projector.

Board Diagnostic LED's

21

21.1 Power Board Diagnostic LEDs in the LDM Module

Status LED's on the Power Board

Power boards are installed in the Laser Driver Module, at the rear of the projector.

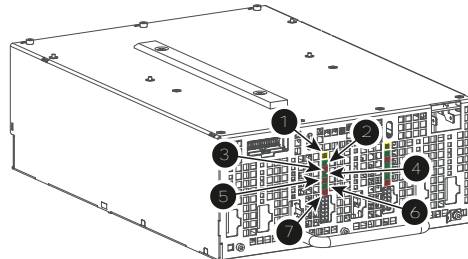


Image 21-2

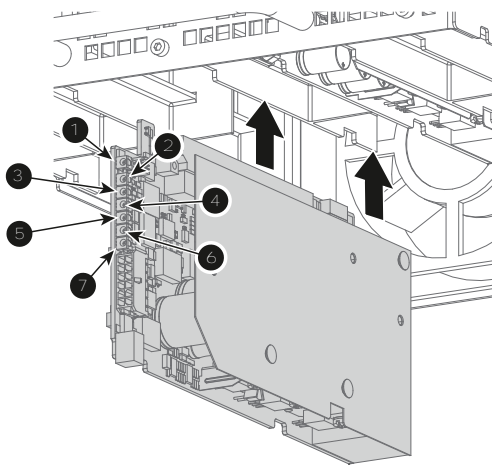


Image 21-1

- | | |
|--|--|
| <p>1 Diagnostic LED "LDM 24V PWR HEARTBEAT" (yellow)</p> <p>2 Diagnostic LED "LDM 24V PWR Bank 3 ON" (green)</p> <p>3 Diagnostic LED "LDM 24V PWR Bank 3 warning or error" (red)</p> <p>4 Diagnostic LED "LDM 24V PWR Bank 2 ON" (green)</p> | <p>5 Diagnostic LED "LDM 24V PWR Bank 2 warning or error" (red)</p> <p>6 Diagnostic LED "LDM 24V PWR Bank 1 ON" (green)</p> <p>7 Diagnostic LED "LDM 24V PWR Bank 1 warning or error" (red)</p> |
|--|--|

Diagnostic

Ref	Description (LED color)	LED Ref.	Comment
1	Heartbeat (yellow)	D493	0,5s on / 1,5s off when software has detected a valid hardware configuration
2	24V supply 3 ON (green)	D481	Lit up when 24V supply 3 is running
3	24V supply 3 warning or error (red) <ul style="list-style-type: none"> • warning: red led on, 24V supply is still on (green led on) • error: red led on, 24V supply is turned off (green led off) 	D478	This red led is on when 1 of following parameters is out of range: <ul style="list-style-type: none"> • 24V supply voltage 3 red Leds are on when : <ul style="list-style-type: none"> • temperature of heatsink rectifier is high
4	24V supply 2 ON (green)	D480	Lit up when 24V supply 2 is running

Ref.	Description (LED color)	LED Ref.	Comment
5	24V supply 2 warning or error (red) <ul style="list-style-type: none"> • warning: red led on, 24V supply is still on (green led on) • error: red led on, 24V supply is turned off (green led off) 	D479	This red led is on when 1 of following parameters is out of range: <ul style="list-style-type: none"> • 24V supply voltage 3 red Leds are on when : <ul style="list-style-type: none"> • temperature of heatsink rectifier is high
6	24V supply 1 ON (green)	D477	Lit up when 24V supply 1 is running
7	24V supply 1 warning or error (red) <ul style="list-style-type: none"> • warning: red led on, 24V supply is still on (green led on) • error: red led on, 24V supply is turned off (green led off) 	D476	This red led is on when 1 of following parameters is out of range: <ul style="list-style-type: none"> • 24V supply voltage 3 red Leds are on when : <ul style="list-style-type: none"> • temperature of heatsink rectifier is high

21.2 Laser Driver Board Diagnostic LEDs in the LDM Module

Status LED's on the Laser Driver Board

Laser driver boards are installed in the Laser Driver Module, at the rear of the projector.

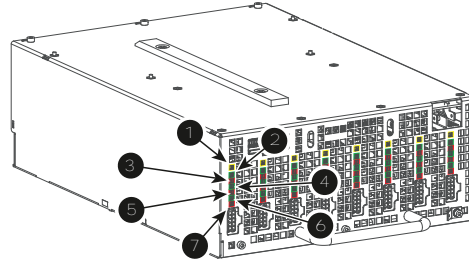


Image 21-4

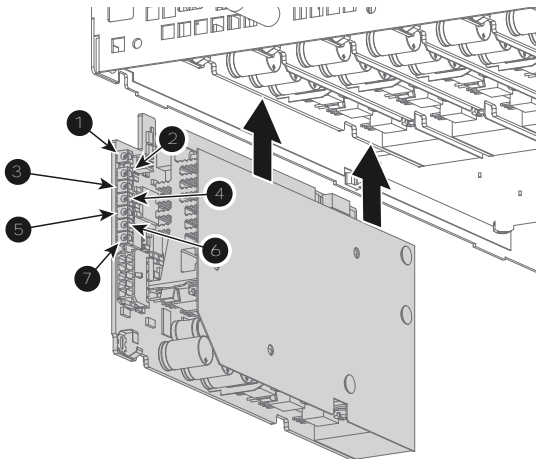


Image 21-3

- | | |
|--|---|
| <p>1 Diagnostic LED "LDM 3DRV HEARTBEAT" (yellow)</p> <p>2 Diagnostic LED "LDM 3DRV Bank 3 ON" (green)</p> <p>3 Diagnostic LED "LDM 3DRV Bank 3 warning or error" (red)</p> <p>4 Diagnostic LED "LDM 3DRV Bank 2 ON" (green)</p> | <p>5 Diagnostic LED "LDM 3DRV Bank 2 warning or error" (red)</p> <p>6 Diagnostic LED "LDM 3DRV Bank 1 ON" (green)</p> <p>7 Diagnostic LED "LDM 3DRV Bank 1 warning or error" (red)</p> |
|--|---|

Diagnostic

LED Ref.	Description (LED color)	LED Ref.	Comment
1	Heartbeat (yellow)	D487	0,5s on / 1,5s off when software has detected a valid hardware configuration
2	Bank 3 ON (green)	D481	Lit up when laser driver 3 is running
3	Bank 3 warning or error (red) <ul style="list-style-type: none"> • warning: red led on, bank is still on (green led on) • error: red led on, bank is turned off (green led off) 	D478	This red led is on when 1 of following parameters is out of range: <ul style="list-style-type: none"> • Temperature of laserbank 3 is high • Rectifier current overload of bank 3... • Laserbank voltage • Rectifier voltage of laserbank 3 • Drain voltage of bank 3 • Drain power overload of bank 3 • Drain current overload of bank 3 3 red Leds are on when : <ul style="list-style-type: none"> • enable line is low (from Laser Control Board) • temperature of heatsink drain is high • temperature of heatsink rectifier is high
4	Bank 2 ON (green)	D480	Lit up when laser driver 2 is running
5	Bank 2 warning or error (red) <ul style="list-style-type: none"> • warning: red led on, bank is still on (green led on) • error: red led on, bank is turned off (green led off) 	D479	This red led is on when 1 of following parameters is out of range: <ul style="list-style-type: none"> • Temperature of laserbank 2 is high • Rectifier current overload of bank 2... • Laserbank voltage • Rectifier voltage of laserbank 2 • Drain voltage of bank 2 • Drain power overload of bank 2

Ref.	Description (LED color)	LED Ref.	Comment
			<ul style="list-style-type: none"> • Drain current overload of bank 2
			3 red Leds are on when :
			<ul style="list-style-type: none"> • enable line is low (from Laser Control Board) • temperature of heatsink drain is high • temperature of heatsink rectifier is high
6	Bank 1 ON (green)	D477	Lit up when laser driver 1 is running
7	Bank 1 warning or error (red)	D476	This red led is on when 1 of following parameters is out of range:
	<ul style="list-style-type: none"> • warning: red led on, bank is still on (green led on) • error: red led on, bank is turned off (green led off) 		<ul style="list-style-type: none"> • Temperature of laserbank 1 is high • Rectifier current overload of bank 1...) • Laserbank voltage • Rectifier voltage of laserbank 1 • Drain voltage of bank 1 • Drain power overload of bank 1 • Drain current overload of bank 1
			3 red Leds are on when :
			<ul style="list-style-type: none"> • enable line is low (from Laser Control Board) • temperature of heatsink drain is high • temperature of heatsink rectifier is high

Removal and installation of the projector covers

22

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.

Overview

- Removal of the Light Source cover
- Removal of the rear cover
- Removal of the top cover
- Removal of the left side cover
- Removal of the top cover plate of the Light Processor compartment
- Removal of the side cover plate of the Light Processor compartment
- Installation of the side cover plate of the Light Processor compartment
- Installation of the top cover plate of the Light Processor compartment
- Installation of the left side cover
- Installation of the top cover
- Installation of the rear cover
- Installation of the Light Source cover

22.1 Removal of the Light Source cover



WARNING: Switch off the projector prior to start with this procedure, unless otherwise specified in the procedure.

Required tools

Flat screwdriver 7 mm

How to remove the Light Source House cover?

1. Loosen the four captive screws (reference 1 Image 22-1) of the Light Source cover using a 7 mm flat screwdriver.
2. Remove the Light Source cover from the projector.

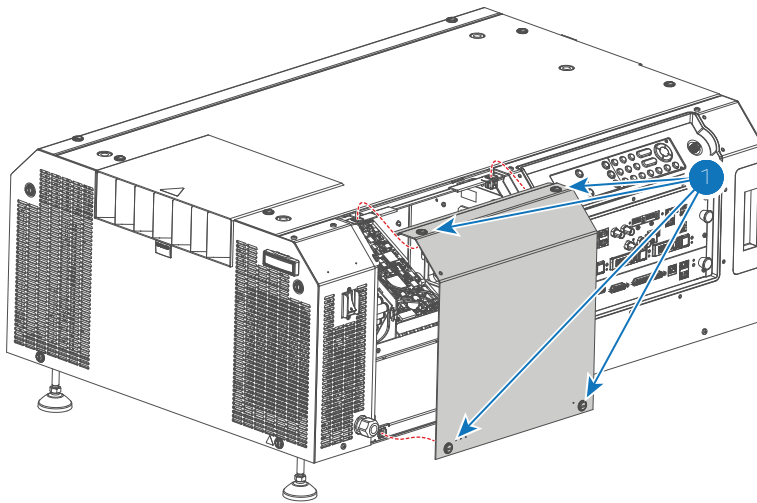


Image 22-1

22.2 Removal of the rear cover



WARNING: Switch off the projector prior to start with this procedure, unless otherwise specified in the procedure.

Required tools

Flat screwdriver 7 mm

How to remove the rear cover?

1. Loosen the four captive screws (reference 1 Image 22-2) of the rear cover using a 7 mm flat screwdriver.
2. Remove the rear cover from the projector.

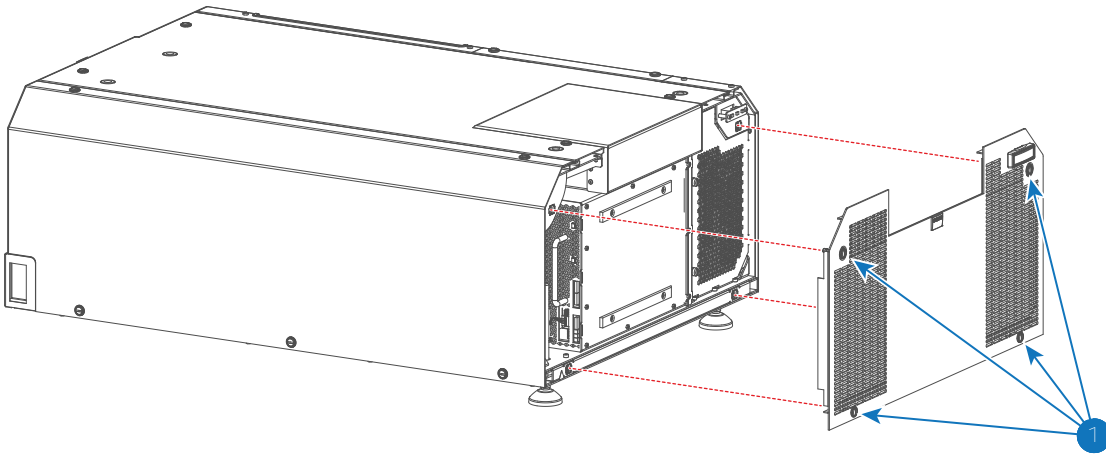


Image 22-2

22.3 Removal of the top cover



WARNING: Switch off the projector prior to start with this procedure, unless otherwise specified in the procedure.



To remove the top cover from the projector the Communicator Touch Panel must be removed first if installed on top of the projector. This procedure assumes that the Communicator Touch Panel is not installed on top of the projector.

Required tools

Flat screwdriver 7 mm

How to remove the top cover?

1. Loosen the four captive screws (reference 1 Image 22-3) of the top cover using a 7 mm flat screwdriver.
2. Remove the top cover from the projector.

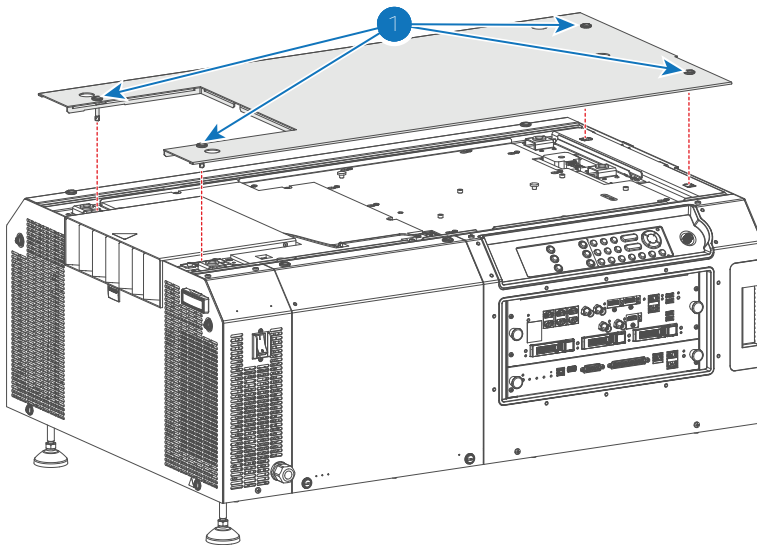


Image 22-3

22.4 Removal of the left side cover



WARNING: Switch off the projector prior to starting with this procedure, unless otherwise specified in the procedure.

Required tools

Flat screwdriver 7 mm

How to remove the left side cover?

1. Release the small dust filter assembly from the front side of the projector. Use 7 mm flat screw driver to loosen the captive screw (reference 1 Image 22-4) of the small dust filter assembly.



Note: The left side cover is partial captured by the sheet metal of the small filter assembly. For that, this filter has to be (partially) removed first.

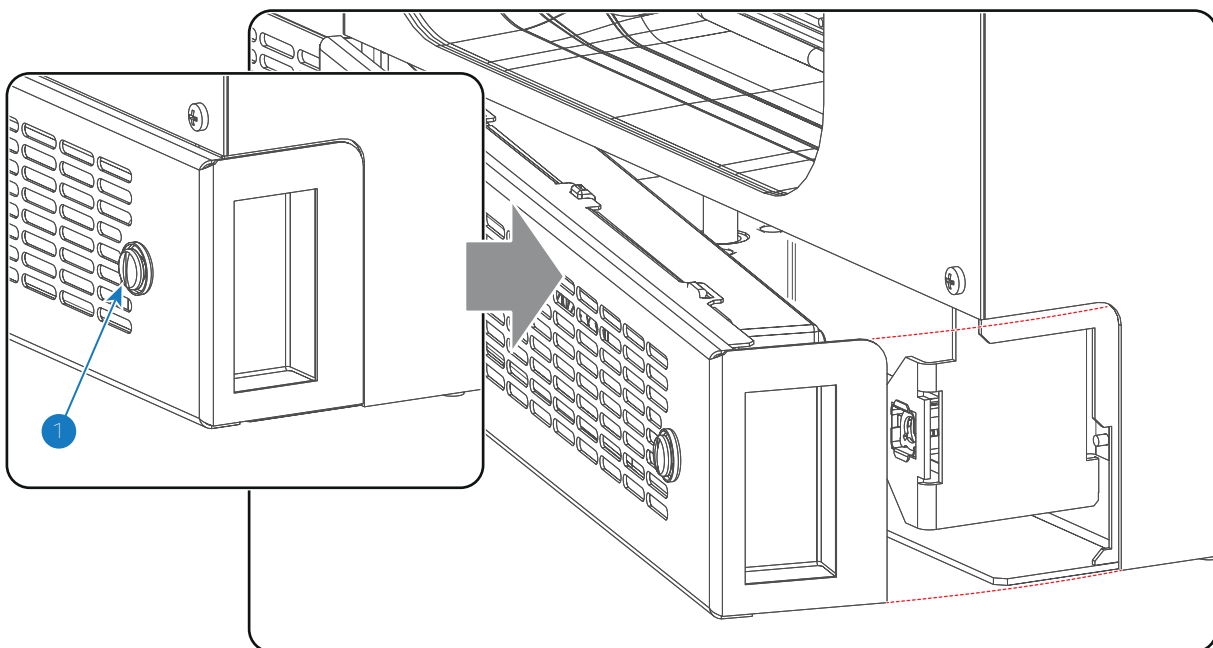


Image 22-4

2. Loosen the five captive screws (reference 2 Image 22-5) of the left side cover using a 7 mm flat screwdriver.
3. Remove the left side cover from the projector.

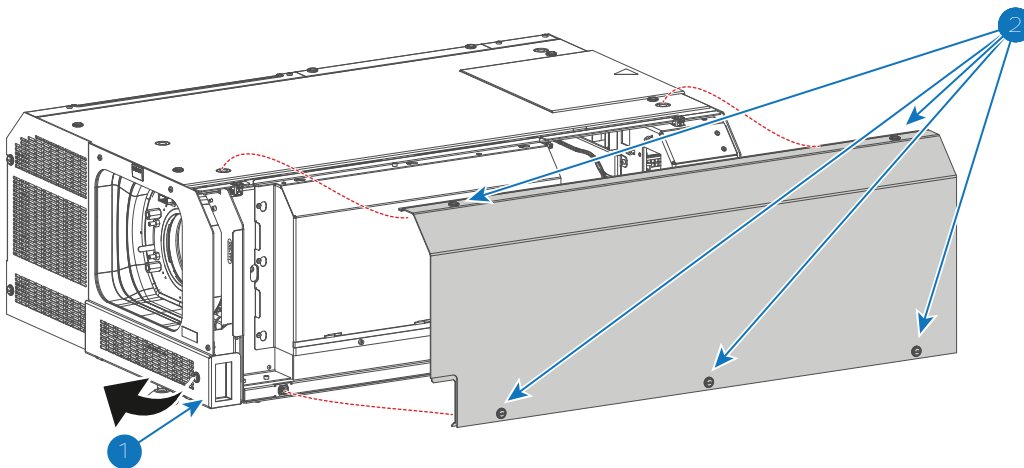


Image 22-5

22.5 Removal of the top cover plate of the Light Processor compartment



To access the top cover plate of the Light Processor compartment the projector top cover has to be removed first. This procedure assumes that the projector top cover is already removed.



CAUTION: Opening the Light Processor compartment by removing the top cover plate or side cover plate will result in a tamper event. An authorization to clear the security warning on the projector, after closing off the Light Processor compartment, will be needed!

Required tools

Allen wrench 3 mm

How to remove the top cover plate from the Light Processor compartment?

1. Remove the four screws (reference 1 Image 22-6) at the top of the cover plate. Use a 3 mm Allen wrench.

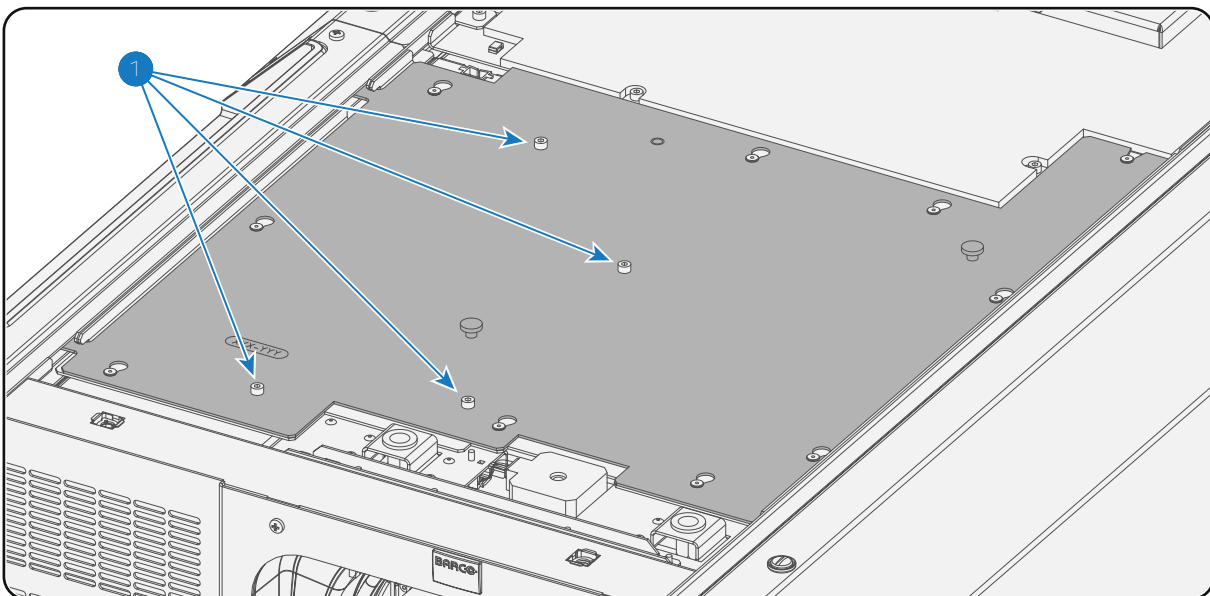


Image 22-6

2. Remove the top cover plate as follows:
 1. Grab the top cover plate by the two handles (reference 2 Image 22-7) and slide it towards the front side (lens side) of the projector. All latches (reference 3 Image 22-7) must become free.
 2. Tilt the top cover plate as illustrated.
 3. Move the top cover plate away from the projector.

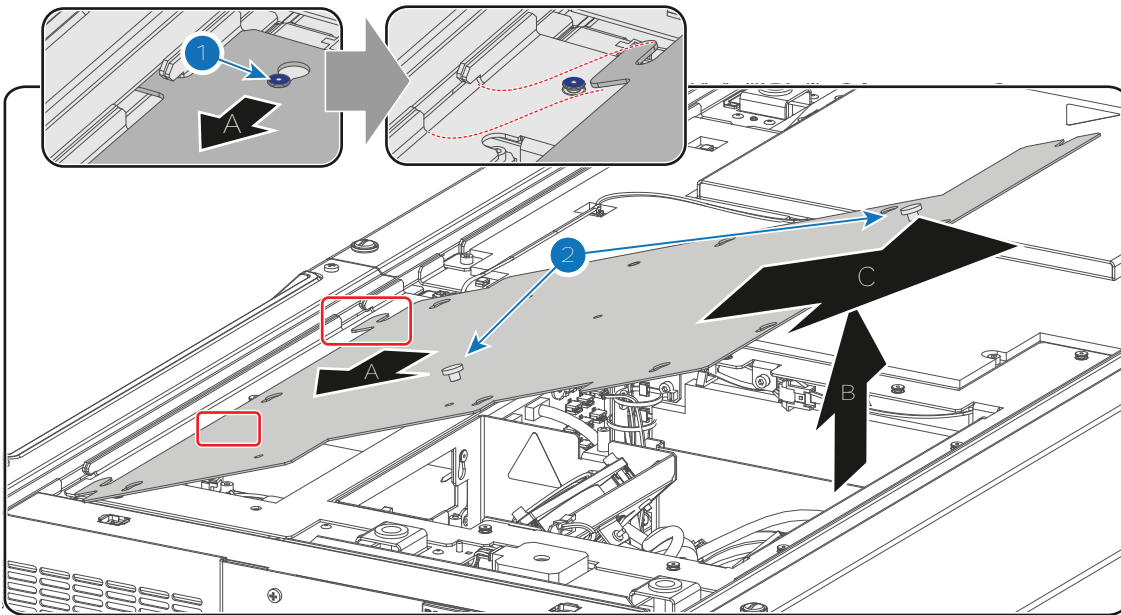


Image 22-7

22.6 Removal of the side cover plate of the Light Processor compartment



To access the side cover plate of the Light Processor compartment, the projector left side cover has to be removed first. This procedure assumes that the projector left side cover is already removed.



CAUTION: Opening the Light Processor compartment by removing the top cover plate or side cover plate will result in a tamper event. An authorization to clear the security warning on the projector, after closing off the Light Processor compartment, will be needed!

Required tools

3mm Allen wrench.

How to remove the side cover plate from the Light Processor compartment?

1. Remove the screw at the top of the cover plate (reference 1 Image 22-8) and the two screws at the bottom of the cover plate (reference 2 Image 22-8). Use a 3mm Allen wrench.
2. Remove the side cover plate left (A) then up (B) then away (C).

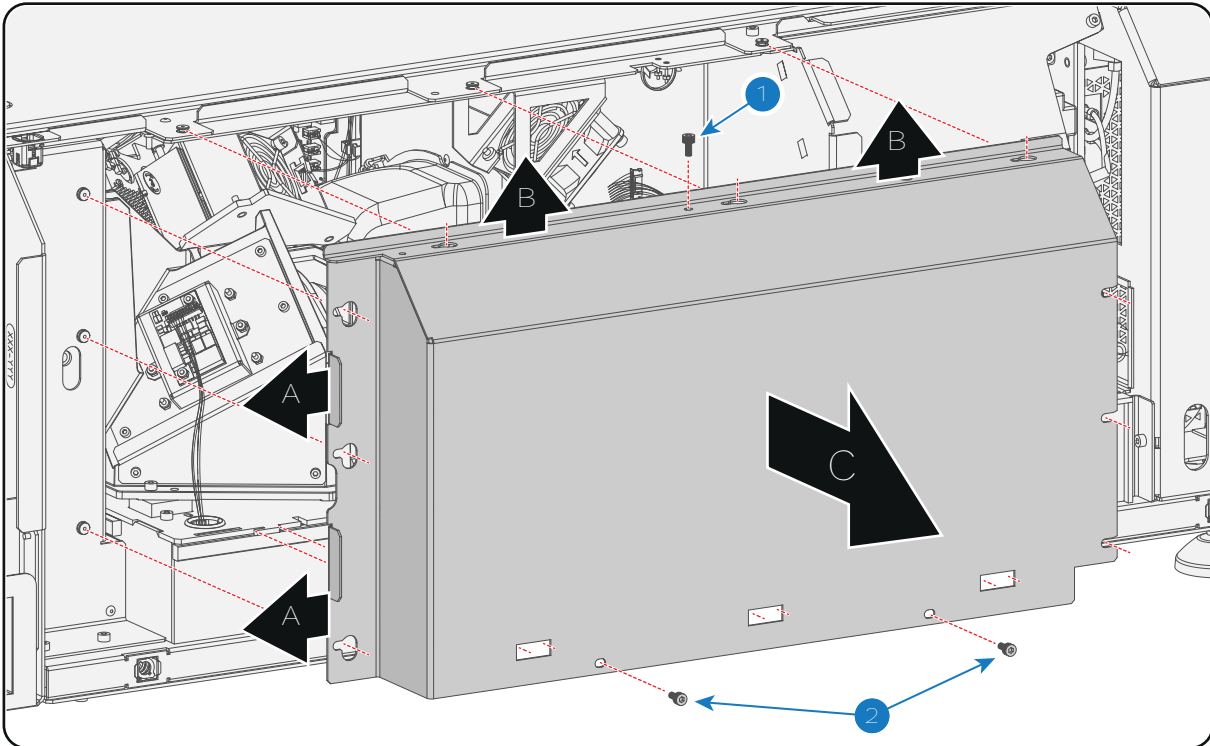


Image 22-8

22.7 Installation of the side cover plate of the Light Processor compartment

Required tools

3mm Allen wrench.

How to install the side cover plate from the Light Processor compartment?

1. Place the side cover plate into position as illustrated. Ensure that all 12 slots of the side cover plate are engaged (three at each side).

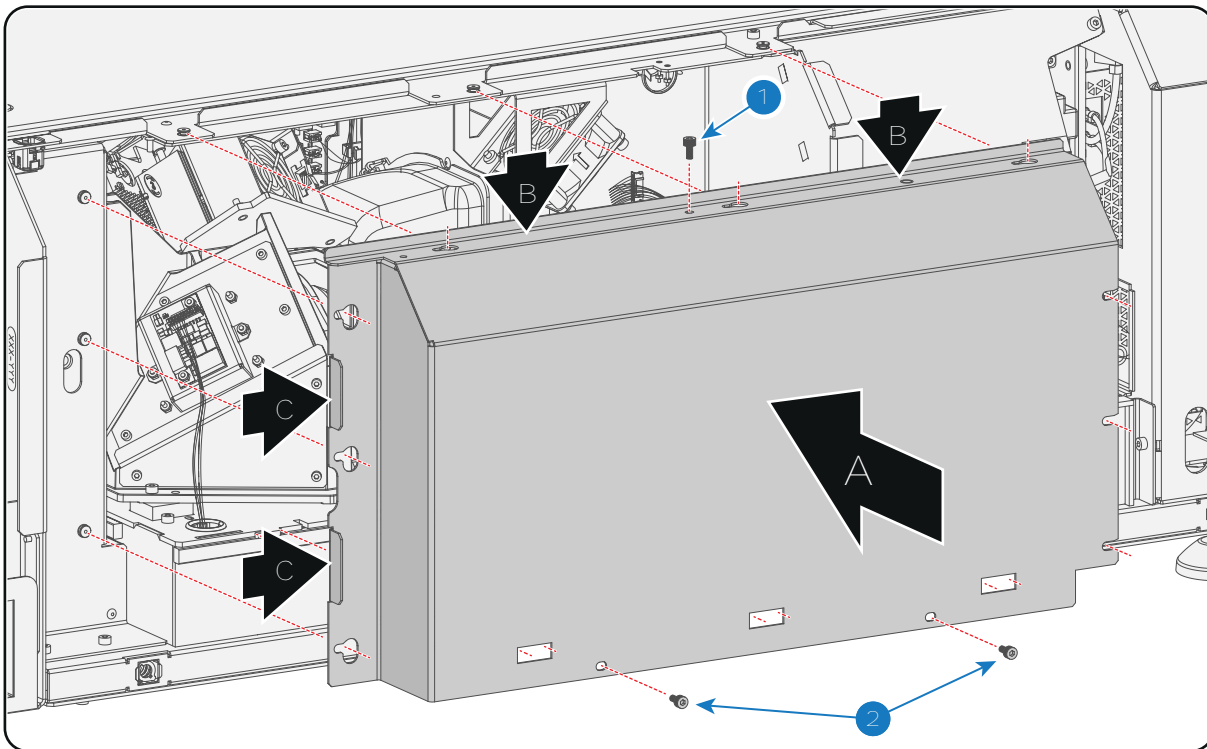


Image 22-9

2. Fasten the side cover plate with a screw at the top (reference 1 Image 22-9) and the two screws at the bottom (reference 2 Image 22-9). Use a 3mm Allen wrench.



CAUTION: Opening the Light Processor compartment by removing the top cover plate or side cover plate will result in a tamper event. An authorization to clear the security warning on the projector, after closing off the Light Processor compartment, will be needed!

22.8 Installation of the top cover plate of the Light Processor compartment

Required tools

Allen wrench 3 mm

How to install the top cover plate from the Light Processor compartment?

1. Install the top cover plate as follows:
 1. Approach the projector with the top cover plate tilted as illustrated and insert the two hooks of the top cover plate into the projector chassis (see detailed illustration Image 22-10).
 2. Lower the top cover plate completely.
 3. Grip the two knobs (reference 2 Image 22-10) , slide the top cover plate to the rear side of the projector and ensure that all slots (reference 1 Image 22-10) of the top cover plate are engaged.

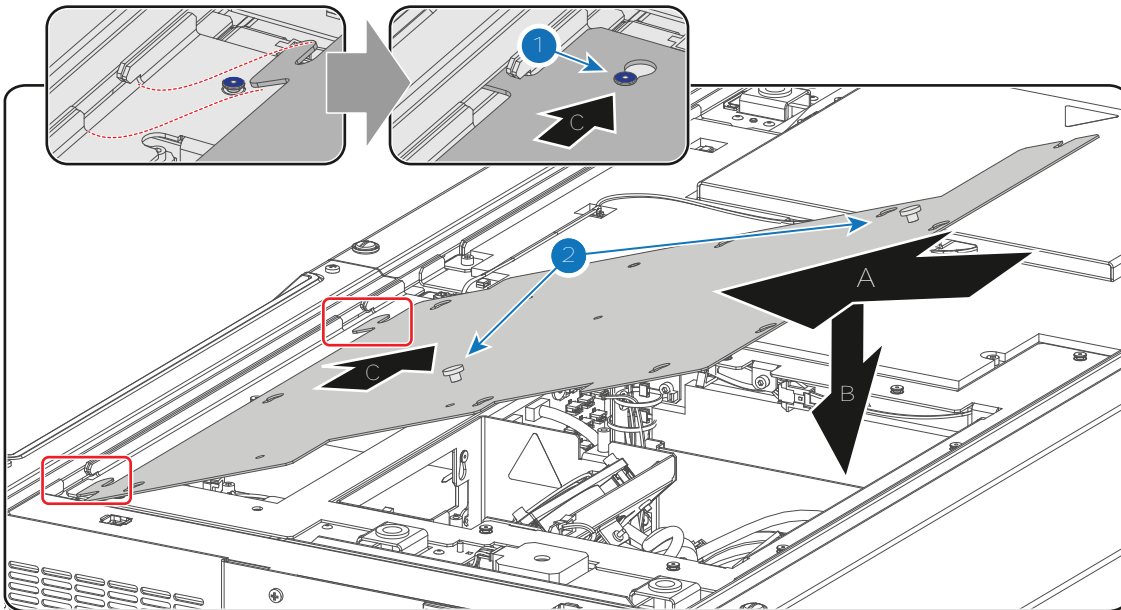


Image 22-10

2. Fasten the top cover plate with four screws (reference 1 Image 22-11). Use a 3 mm Allen wrench.

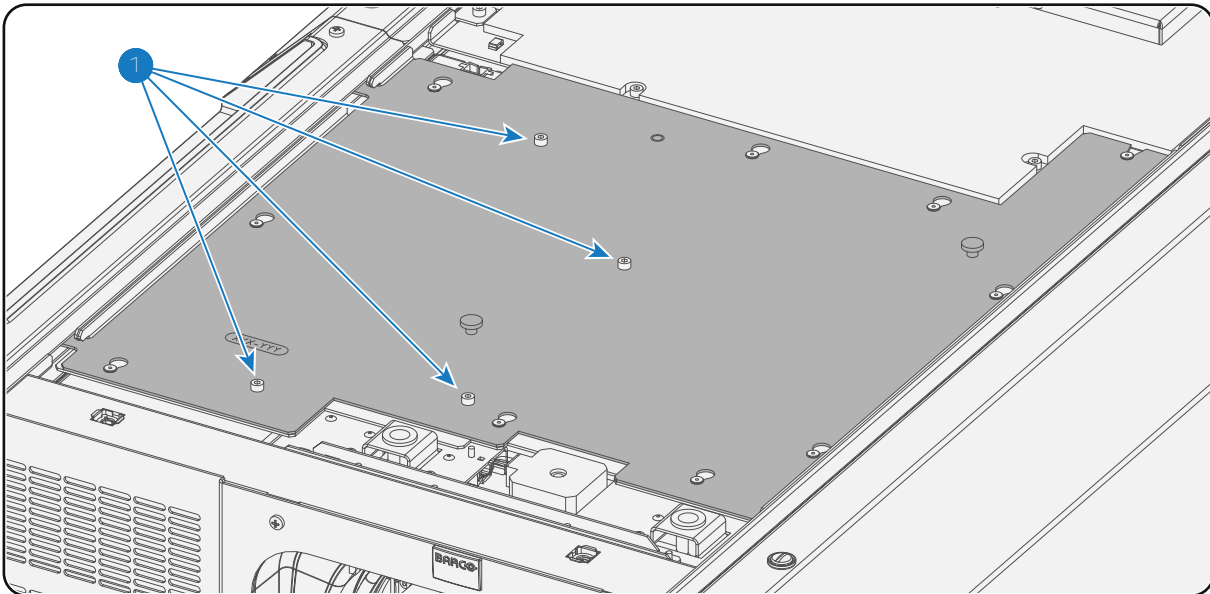


Image 22-11



CAUTION: Opening the Light Processor compartment by removing the top cover plate or side cover plate will result in a tamper event. An authorization to clear the security warning on the projector, after closing off the Light Processor compartment, will be needed!

22.9 Installation of the left side cover

Required tools

Flat screwdriver 7 mm

How to install the left side cover?

1. Place the left side cover on the projector.
2. Fasten the five captive screws (reference 1 Image 22-12) of the left side cover using a 7 mm flat screwdriver.



Note: The left side cover is partially captured by the sheet metal of the small filter assembly. For that, this filter is partially removed for the removal of the side cover.

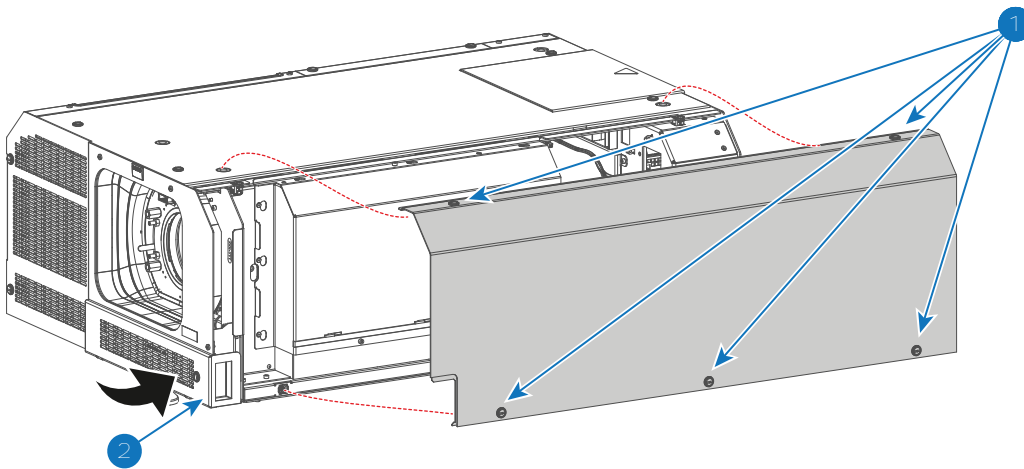


Image 22-12

3. Install the small dust filter at the front side of the projector. Use a 7 mm flat screw driver to fasten the captive screw (reference 2 Image 22-13) of the small dust filter assembly.

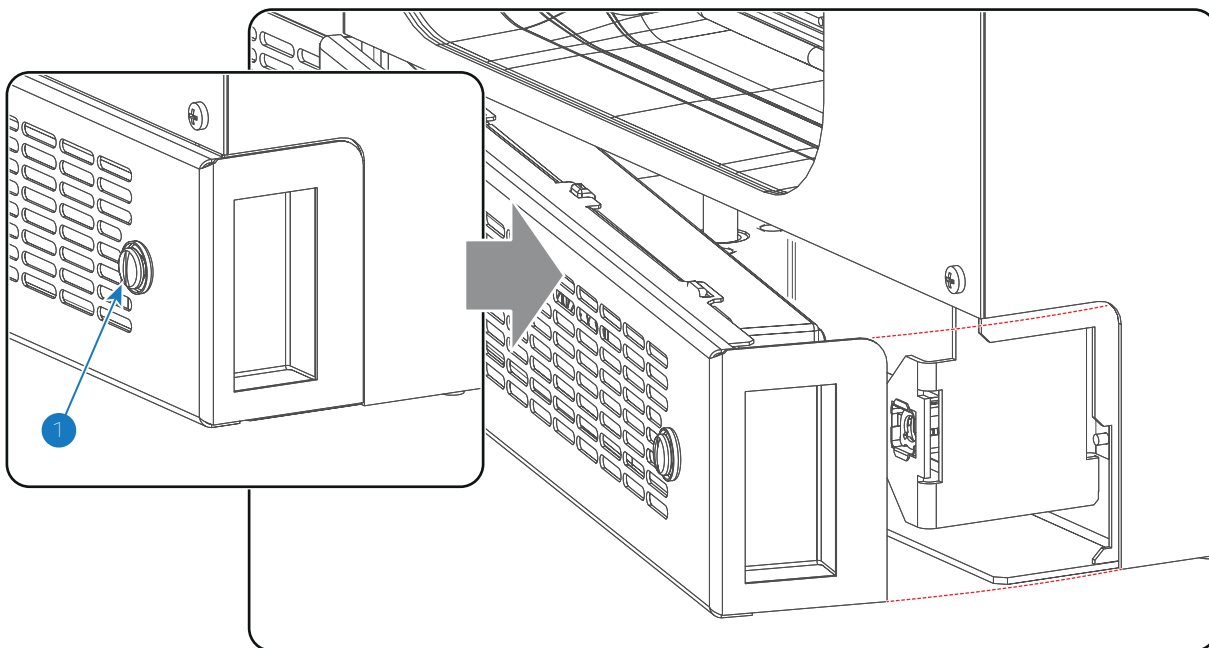


Image 22-13

22.10 Installation of the top cover

Required tools

Flat screwdriver 7 mm

How to install the top cover?

1. Install the top cover on the projector.
2. Fasten the four captive screws (reference 1 Image 22-14) of the top cover using a 7 mm flat screwdriver.

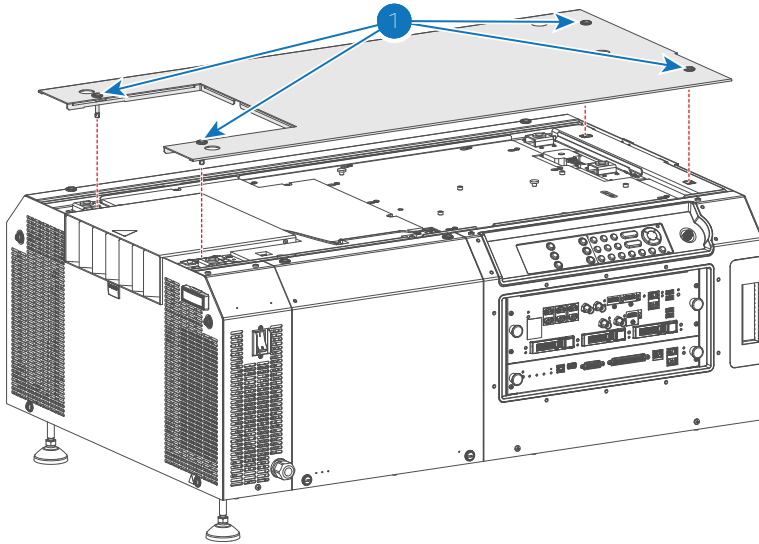


Image 22-14

22.11 Installation of the rear cover

Required tools

Flat screwdriver 7 mm

How to install the rear cover?

1. Install the rear cover on the projector.
2. Fasten the four captive screws (reference 1 Image 22-15) of the rear cover using a 7 mm flat screwdriver.

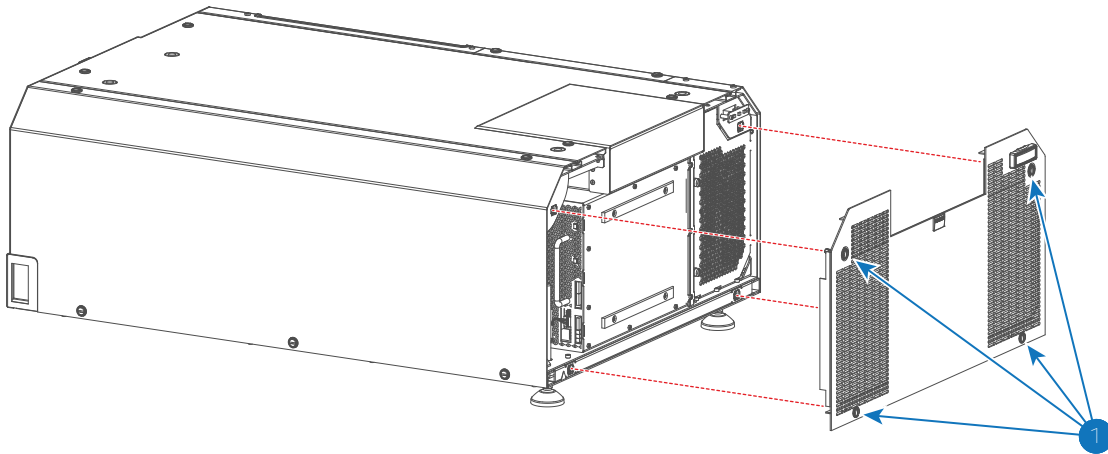


Image 22-15

22.12 Installation of the Light Source cover

Required tools

Flat screwdriver 7 mm

How to install the Light Source cover?

1. Install the Light Source cover on the projector.

Removal and installation of the projector covers

2. Fasten the four captive screws (reference 1 Image 22-16) of the Light Source cover using a 7 mm flat screwdriver.

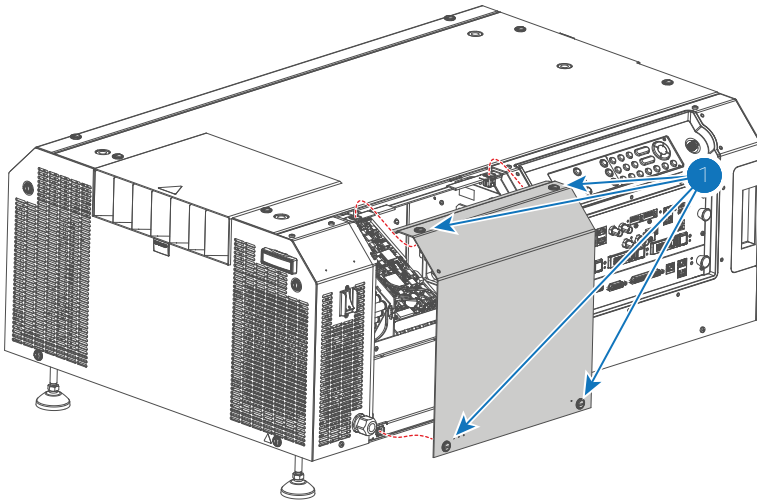


Image 22-16

Dust Filters

23

About this chapter

This chapter describes how to check, clean, and replace the dust filters of the projector.

Overview

- Check the large dust filter
- Check the small dust filter
- Vacuum cleaning of the dust filters
- Washing and drying the dust filters

23.1 Check the large dust filter

Required tools

7mm flat screwdriver.

How to check the large dust filter?

1. Loosen the two captive screws (reference 1 Image 23-1) of the large dust filter assembly using a 7mm flat screwdriver.
2. Remove the dust filter assembly from the projector by pivoting the assembly away from the projector as illustrated. Note that the other side of the assembly contains two mounting lips (reference 2 Image 23-1) which are engaged in the projector chassis.

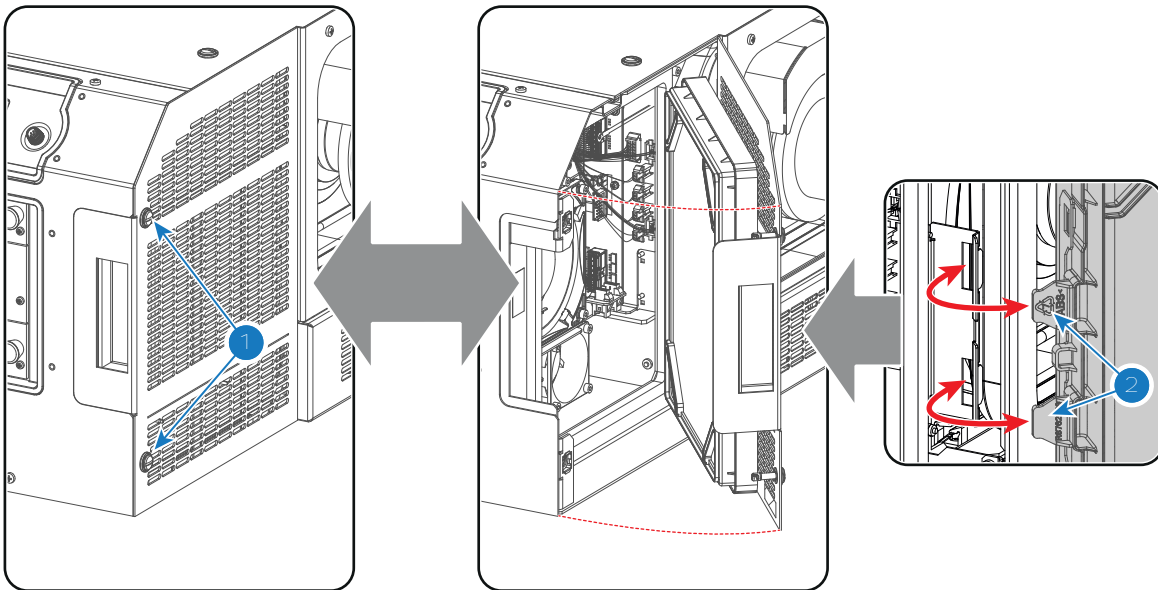


Image 23-1

3. Detach the dust filter from the cover plate. Do this by pushing the two latches (reference 3 Image 23-2) of the dust filter inwards.
4. **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 288.

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 287.



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. Attach a clean dust filter to the cover plate. Ensure that both latches and both mounting lips (reference 4 Image 23-2) of the dust filter are engaged.



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.

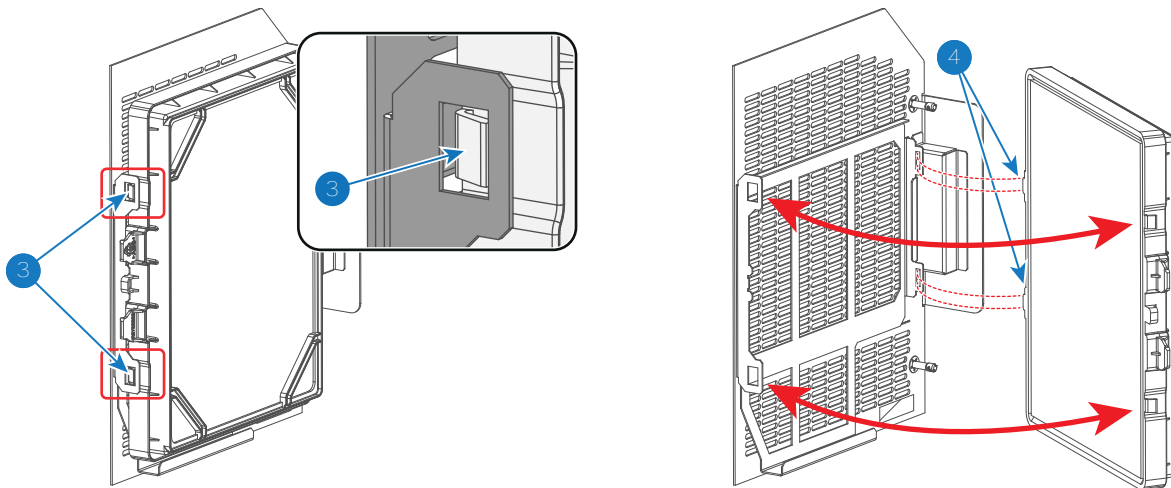


Image 23-2

6. Install the dust filter assembly back at the front side of the projector. Use a 7mm flat screwdriver to fasten the two captive screws. Ensure that the two mounting lips (reference 2 Image 23-1) of the assembly are engaged in the projector chassis.



The dust filter is cleanable. See cleaning procedure for correct cleaning and drying instructions.

23.2 Check the small dust filter

Required tools

7mm flat screwdriver.

How to check the small dust filter?

1. Loosen the captive screw (reference 1 Image 23-3) of the small dust filter assembly using a 7mm flat screwdriver.
2. Remove the dust filter assembly from the projector by pivoting the assembly away from the projector as illustrated. Note that the other side of the assembly contains a mounting lip (reference 2 Image 23-3) which is engaged in the projector chassis.

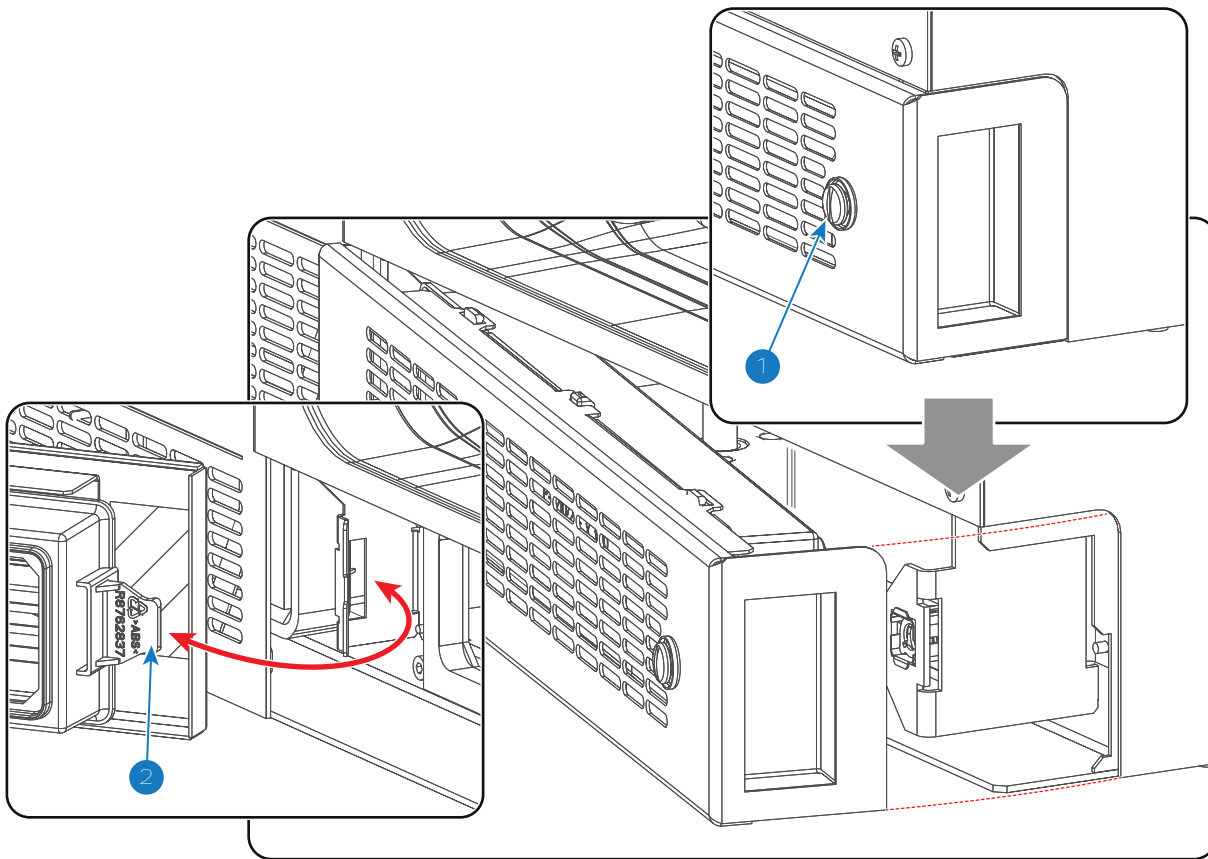



Image 23-3

3. Detach the dust filter from the cover plate. Do this by pushing the two latches (reference 3 Image 23-4) of the dust filter inwards.

4. **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 288.

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 287.

 **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. Attach a clean dust filter to the cover plate. Ensure that both latches (reference 4 Image 23-4) of the dust filter are engaged.

 **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.

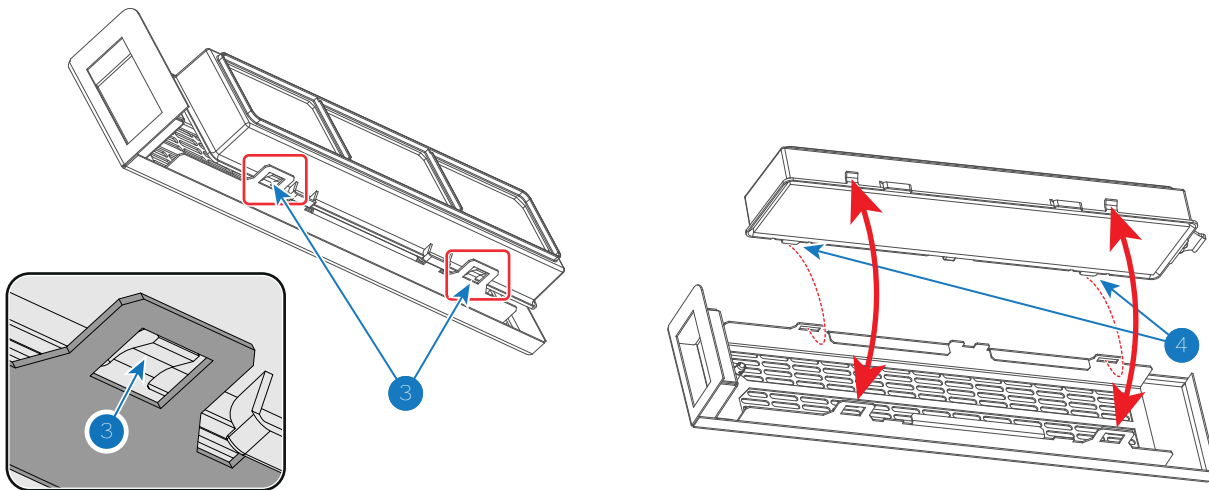


Image 23-4

6. Install the dust filter assembly back at the front side of the projector. Use a 7mm flat screwdriver to fasten the captive screw.



The dust filter is cleanable. See cleaning procedure for correct cleaning and drying instructions.

23.3 Vacuum cleaning of the dust filters

When vacuum the dust filters?

The dust filters should be checked every month. 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 288.



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.

23.4 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 "Hazards", page 396.

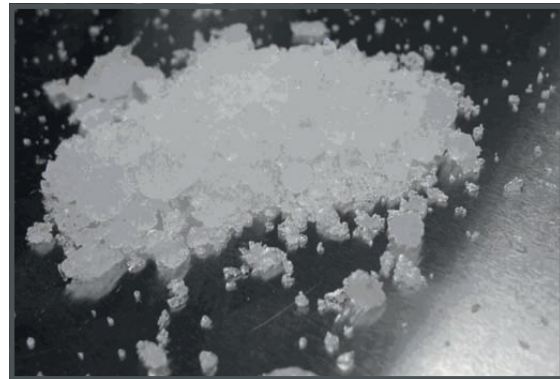


Image 23-5: Sodium carbonate crystals.



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.

Maintenance procedures

24



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 DP2K-SLP Series projector.

Overview

- Cleaning the lens
- Cleaning the exterior of the projector

24.1 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 Toraysee® cloth or any micro fiber lens cleaning cloth.
- Clean cotton cloth.

Required parts

Lens cleaner (e.g. Carl Zeiss lens cleaner or Purasol® or any water-based lens cleaner)

How to clean the lens?

1. Blow off dust with clean compressed air (or pressurized air cans⁵).
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.

24.2 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.

⁵: Pressurized air cans are not efficient if there is too much dust on the surface, the pressure is too low

Troubleshooting

25

About the error codes

This chapter enumerates the error/warning codes generated by the Laser Control Board (LCB) and Cinema Control Board (CCB).

All possible error codes can appear on the Touch Panel display of the cinema projector or in the projector log files. 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 remains to operate. Nevertheless, it is recommended to solve the problem which causing the “warning” as soon as possible otherwise, the “warning” state may turn into an “error” state.



Keep in mind that the module that reports the error isn't necessarily the root cause of the problem. Search through the error log for the error messages that are most likely the root cause for the projector shutting down. For example: if you spot a “temperature too high” message, but there are other similar error messages, it is safe to assume that the “high temperature” is a general problem instead of a component-specific problem.

The codes are grouped in two sub-chapters; one for the codes generated by the CCB and one for the codes generated by the LCB. In each chapter, the codes are placed in ascending order to make it easier to look up the code and find an appropriate solution.

Each error code also has a prefix, in order to help indicate where the root cause of the error is. Here are a few examples:

Example error code

Code 20004: “LCB - Board temperature shorted”

Code 20062: “LLS — Safety switch 1 (orange) open”

Code 20188: “LCM1 - Air drawn in temperature sensor open”

Code 20240: “LDM1 - 15vm voltage too low”

Code 20359: “LDM1-1 - LLS bank 1 temperature too high”

Code 20413: “LDM 1-7 - Not configured (no communication)”

Code 21352: “LPT 1 - 24V input 2 voltage too high”

Most probable location of the error

Problem located on the Laser Control Board (LCB)

Problem located on the Laser Light Source (LLS)

Problem located on the Cooling parts (Laser Cooler Module), which is assembled on the Laser Light Source

Problem located on the Laser Driver Module (LDM) case.

Problem located on one specific Lader Driver Module Board (located in LDM1, slot 1 in this example).

Problem located on the +24V module (located in slot 7)

Problem located on the Laser Peltier Controller Board (LPT).



For every triggered warning and/or error: highlight all modules, cables etc in the chain of possible causes together with the module generating the warning or error. Use the block diagram to help visualize this.

This visualization may help in setting up a final list of troubleshooting actions and may help in ordering them in a sequential order in which they have to be executed.

25.1 LDM

LDM driver boards mapping

In each 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.

Since there are different types of boards used, the following images should help you identify which board is located where.

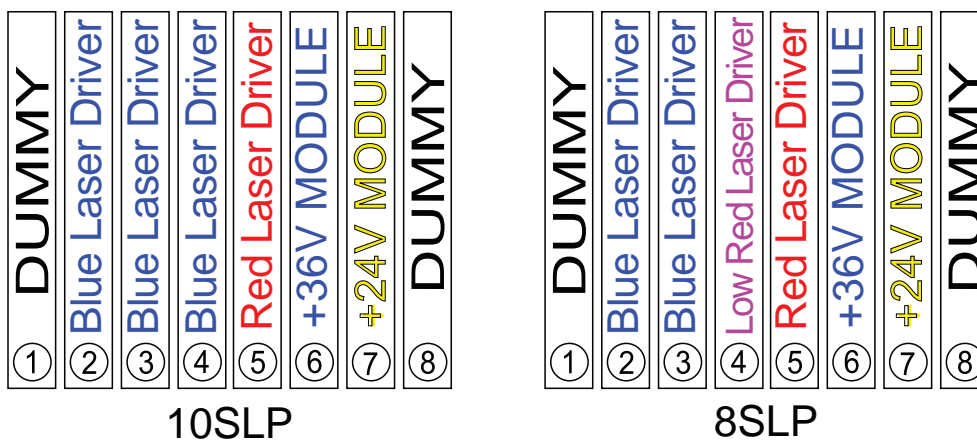


Image 25-1



The Blue laser driver board can be swapped with the +36V module and vice versa. None of the other driver boards can be swapped, except with a board that serves the same function.

LDM Vs Laser Banks Mapping

Each Laser Driver Board powers a certain amount of laser banks. Use the following table to figure out which LDM board drives which laser bank:

Laser Bank	Powered by
1	LDM 1-2
2	LDM 1-2
3	LDM 1-2
4	LDM 1-3
5	LDM 1-3
6	LDM 1-3
7	LDM 1-4
8	LDM 1-4
9	LDM 1-5

25.2 Troubleshooting checklist Cinema Control Board (CCB)

Code 5003: “Light sensor - no communication”

Situation	Solution
No communication with the Light Sensor Module (CLO).	<ol style="list-style-type: none"> 1. Reboot the projector: <ol style="list-style-type: none"> a) Turn off the Light Source and cool down the Light Source for at least 1 minute if hot. b) Switch off the power of the unit and wait for at least 15 seconds. c) Switch on the power of the unit and respect normal startup procedure. 2. Check if the wire is connected with the CLO module (reference 1 of Image 25-2) and with the Signal Backplane (reference 10 of Image 25-2). <p>Note: To access the Signal Backplane the top cover plate of the Light Processor compartment has to be removed. Removing the top cover plate will lead to an authorization request upon startup.</p> 3. If the problem remains, replace the CLO module. See service manual chapter “Replacing the Light Sensor module (CLO)”, page 135.

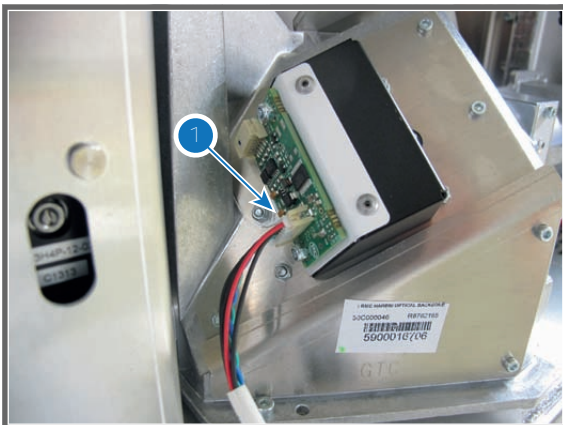


Image 25-2

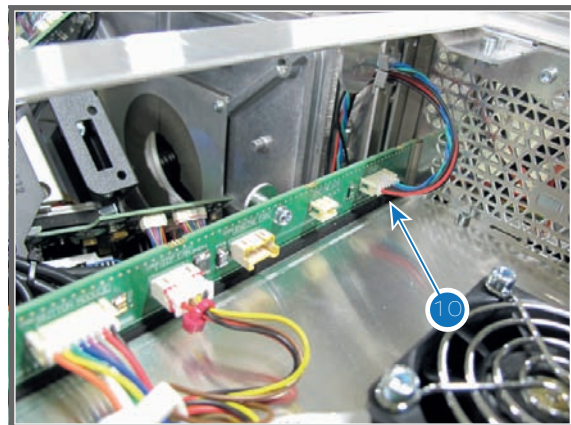


Image 25-3

Code 5020: “System - read projector identification failed”

Situation	Solution
Cinema Controller failure.	Re-seat/replace the Cinema Controller board.
Projector ID card not well inserted in SIM slot.	Check if the Projector ID card is well inserted in the SIM card socket on the Signal Backplane (reference 8 of Image 25-4). To access the SIM card socket the two upper boards in the Card Cage and the partition plate have to be removed. See procedure “Removal of the Card Cage partition plate”, page 246.
Corrupt or invalid Projector ID card.	Contact Barco for further actions.

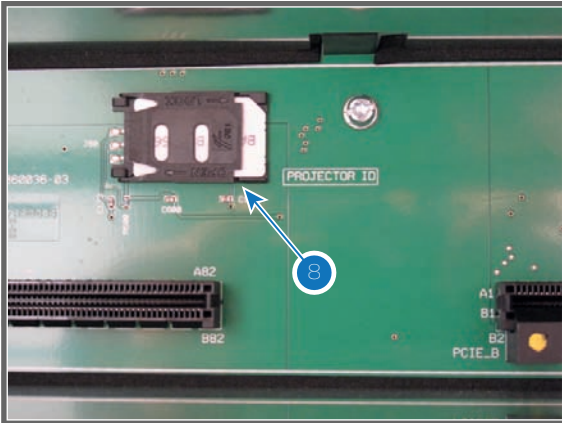


Image 25-4

Code 5042: “Cold mirror fan - speed too low”

Situation	Solution
The wire of the Cold Mirror fan is disconnected from the socket inside the fan compartment.	Remove the left cover of the projector, pull out the Cold Mirror fan assembly and check the connection of the wire at the left side of the fan (reference 1 Image 25-5).
Plug of the rear fan units is disconnected from the Signal Backplane.	Remove the Light Source and Cathode Fan assembly. Check if the plug of the rear fan units is connected with the Signal Backplane (reference 2 Image 25-6).
Blocked fan	Unblock the fan. Ensure that the fan can turn freely (reference 3 Image 25-7).
Damaged wire	Check if the wire of the fan is not damaged (reference 4 Image 25-8). Repair if possible, otherwise replace with new one. See service manual chapter “Replacement of the Cold Mirror fan”, page 88.
Fan end of life	Replace the fan. See service manual chapter “Replacement of the Cold Mirror fan”, page 88.
Malfunction Cinema Controller	Replace the Cinema Control board. See service manual chapter “Replacement of the Cinema Controller”, page 217.

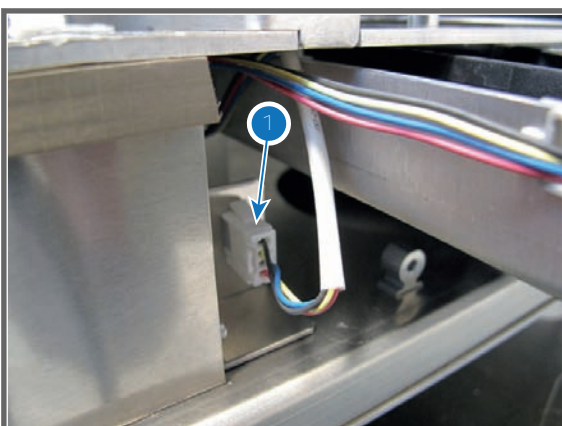


Image 25-5

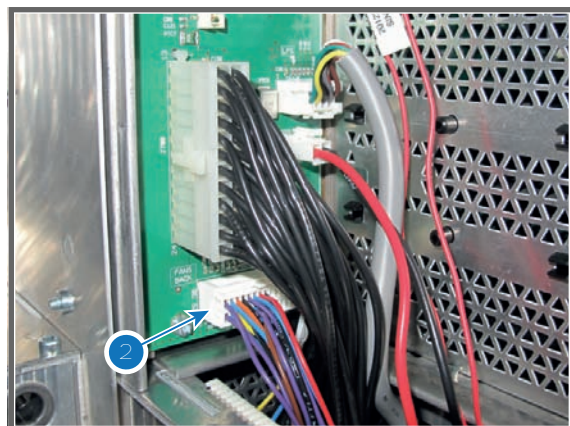


Image 25-6

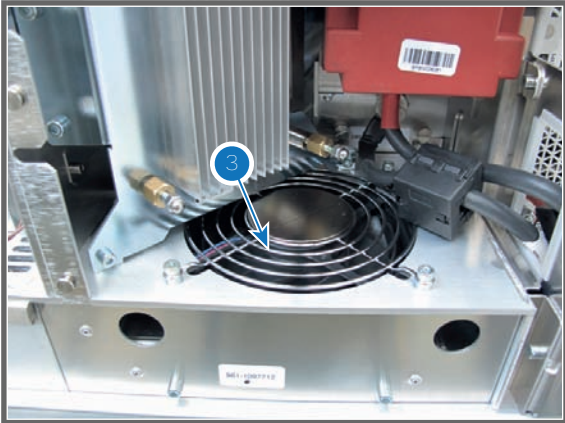


Image 25-7

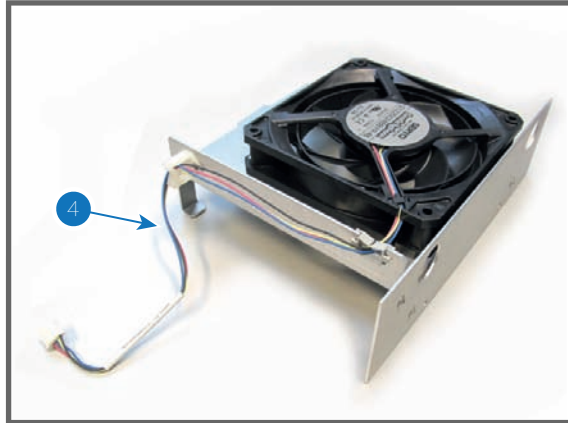


Image 25-8

Code 5043: “Cold mirror fan - speed low”

Situation	Solution
Blocked fan	Unblock the fan. Ensure that the fan can turn freely (reference 3 Image 25-9).
Damaged wire	Check if the wire of the fan is not damaged. Repair if possible, otherwise replace with new one (reference 4 Image 25-10).
Fan end of life	Replace the fan. See service manual chapter “Replacement of the Cold Mirror fan”, page 88.
Malfuction Cinema Controller	Replace the Cinema Control board. See service manual chapter “Replacement of the Cinema Controller”, page 217.

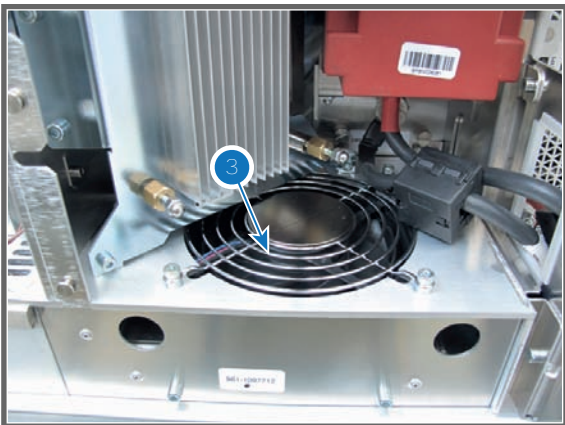


Image 25-9

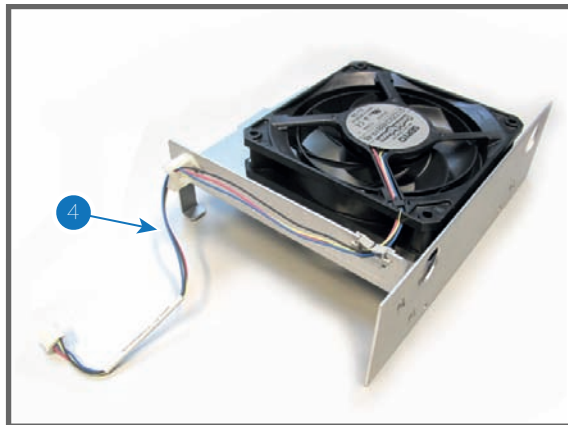


Image 25-10

Code 5053: “Engine fan - speed low ”

Situation	Solution
Blocked fan of the Light Processor compartment.	Unblock the fan. Ensure that the fan can turn freely (reference 1 Image 25-11).
Damaged wire of the fan of the Light Processor compartment.	Check if the wire unit of the fan is not damaged. Repair if possible, otherwise replace with new one (reference 5 Image 25-12).

Situation	Solution
Fan end of life	Replace the fan. See service manual chapter “Replacement of the fan of the Light Processor compartment”, page 104.
Malfunction Cinema Controller.	Replace the Cinema Control board. See service manual chapter “Replacement of the Cinema Controller”, page 217.

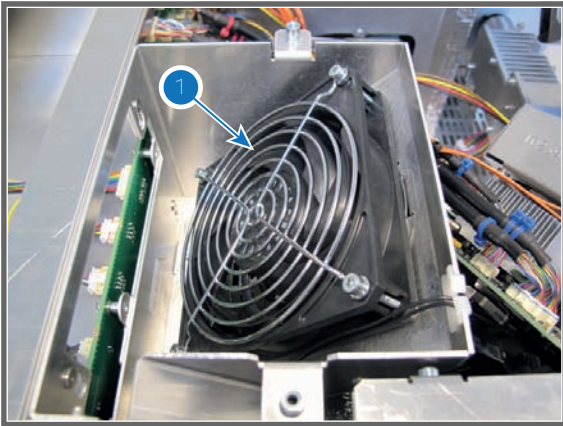


Image 25-11

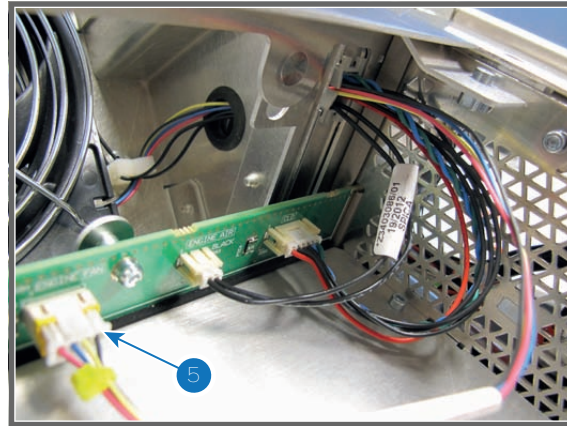


Image 25-12

Code 5072: “Anode fan - speed too low”

Situation	Solution
Wire of the Anode Fan is disconnected.	Remove the projector top cover and the top cover plate of the Light Processor compartment and check the connection of the Lamp Anode Fan (reference 1 Image 25-13).
Wire of the rear fan units is disconnected from the Signal Backplane.	Remove the Light Source and Cathode fan and check if the wire unit (reference 2 Image 25-14) is inserted in the Signal Backplane.
Blocked Anode Fan	Check if the Anode Fan is not blocked. Ensure that the Anode Fan can turn freely. (reference 3 Image 25-15).
Damaged wire	Check if the wire of the Anode Fan is not damaged. Repair if possible, otherwise replace with new one.
Anode Fan end of life	Replace the Anode Fan. See service manual chapter “Replacement of the Anode Fan”, page 84.
Malfunction Cinema Controller.	Replace the Cinema Control board. See service manual chapter “Replacement of the Cinema Controller”, page 217.

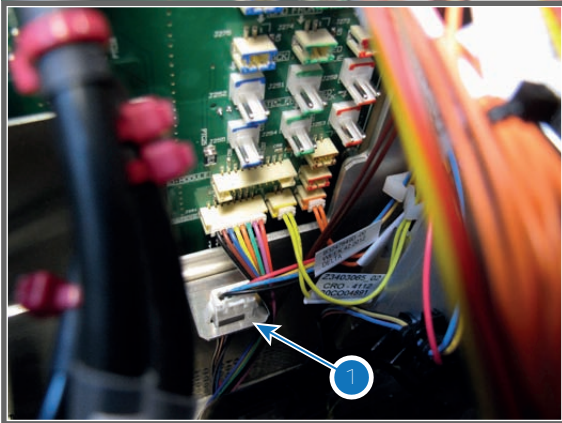


Image 25-13

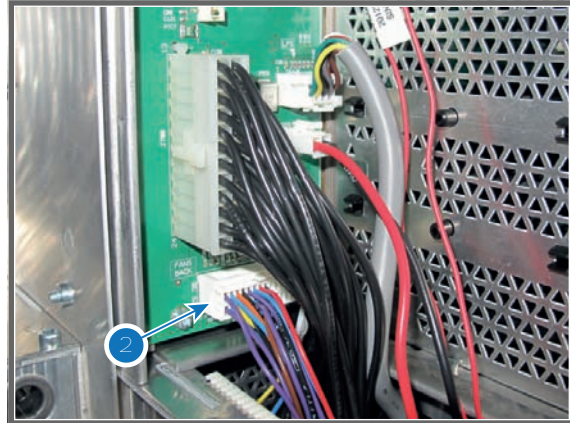


Image 25-14

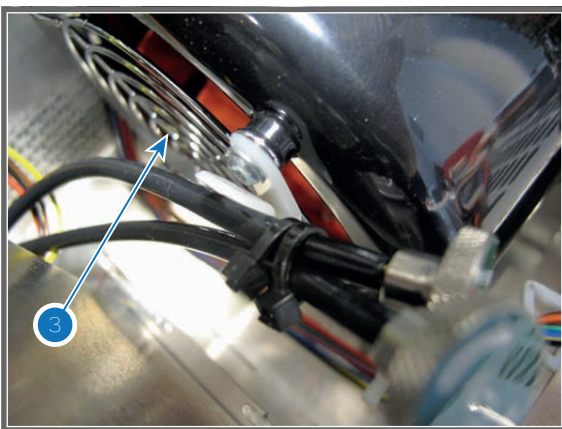


Image 25-15

Code 5073: “Anode fan - speed low”

Situation	Solution
Blocked Anode Fan	Check if the Anode Fan is not blocked. Ensure that the Anode Fan can turn freely. (reference 3 Image 25-15).
Damaged wire	Check if the wire of the Anode Fan is not damaged. Repair if possible, otherwise replace with new one.
Anode Fan end of life	Replace the Anode Fan. See service manual chapter “Replacement of the Anode Fan”, page 84.
Malfunction Cinema Controller	Replace the Cinema Control board. See service manual chapter “Replacement of the Cinema Controller”, page 217.

Code 5082: “Cathode fan - speed too low”

Situation	Solution
Wire of the Cathode Fan is disconnected.	Remove the Light Source and Cathode fan (reference 1 Image 25-16) and check the connection of the Cathode Fan (reference 3 Image 25-16).
Wire of the rear fan units is disconnected from the Signal Backplane.	Remove the Light Source and Cathode fan and check if the wire unit (reference 2 Image 25-17) is inserted in the Signal Backplane.

Situation	Solution
Blocked Cathode Fan	Check if the Cathode Fan is not blocked. Ensure that the Cathode Fan can turn freely (reference 1 Image 25-18).
Damaged wire	Check if the wire of the Cathode Fan is not damaged. Repair if possible, otherwise replace with new one.
Cathode Fan end of life	Replace the Cathode Fan. See service manual chapter “Replacement of the Anode Fan”, page 84.
Malfunction Cinema Controller	Replace the Cinema Control board. See service manual chapter “Replacement of the Cinema Controller”, page 217.

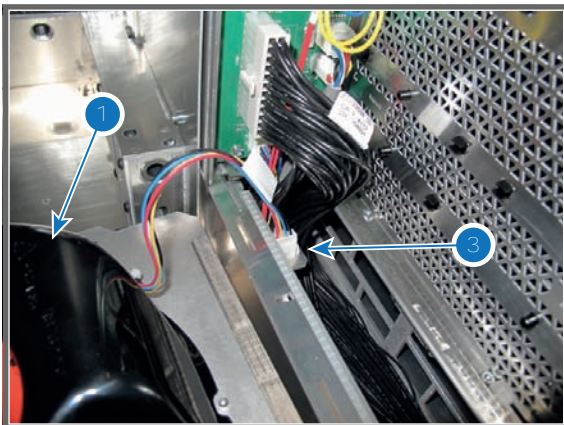


Image 25-16

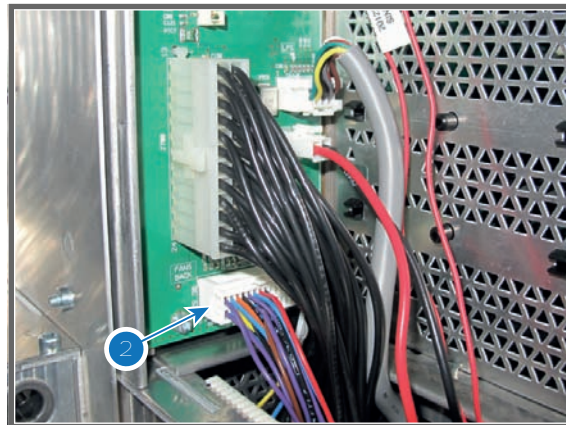


Image 25-17



Image 25-18

Code 5083: “Cathode fan - speed low”

Situation	Solution
Blocked Cathode Fan	Remove the Light Source and check if the Cathode Fan is not blocked. Ensure that the Cathode Fan can turn freely (reference 1 Image 25-19).
Damaged wire	Remove the Cathode Fan assembly and check if the wire of the Cathode Fan is not damaged. Repair if possible, otherwise replace with new one (reference 3Image 25-20).
Cathode Fan end of life	Replace the Cathode Fan. See service manual chapter “Replacement of the Anode Fan”, page 84.
Malfunction Cinema Controller	Replace the Cinema Control board. See service manual chapter “Replacement of the Cinema Controller”, page 217.

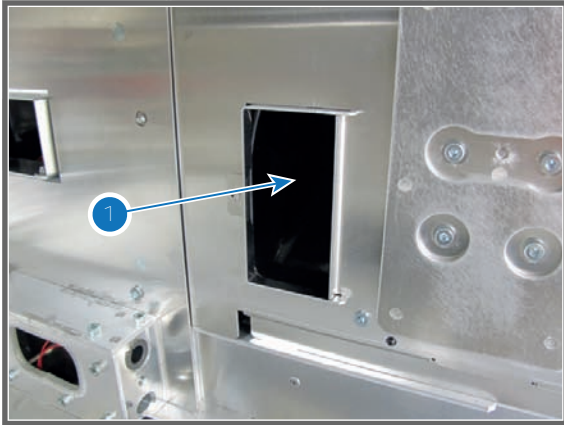


Image 25-19

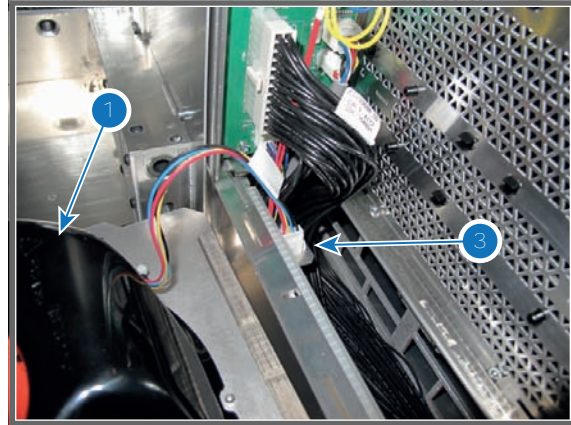


Image 25-20

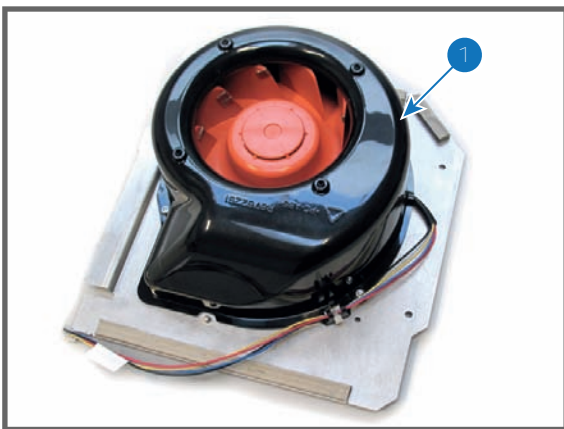


Image 25-21

Code 5103: “SMPS fan 1 (left side) - speed low”

Situation	Solution
Blocked fan	Unblock the fan. Ensure that the fan can turn freely (reference 3 of Image 25-22).
Damaged wire	Remove the large dust filter from the projector and check if the wire of the left fan of the SMPS compartment is not damaged. Repair if possible, otherwise replace with new one. Note: SMPS fan 1 is the fan which wire is marked with a brown cable tie (reference 1 of Image 25-23). SMPS fan 2 is the fan which wire is marked with a red cable tie (reference 2 of Image 25-23).
Fan end of life	Replace both fans of the SMPS compartment. See service manual chapter “Replacing the fans of the SMPS compartment”, page 43. Note: If one fan of the SMPS compartment is end of life the other fan will probably also (nearly) end of live. For that, it's better to replace both fans at once.
Malfunction Cinema Controller	Replace the Cinema Control board. See service manual chapter “Replacement of the Cinema Controller”, page 217.

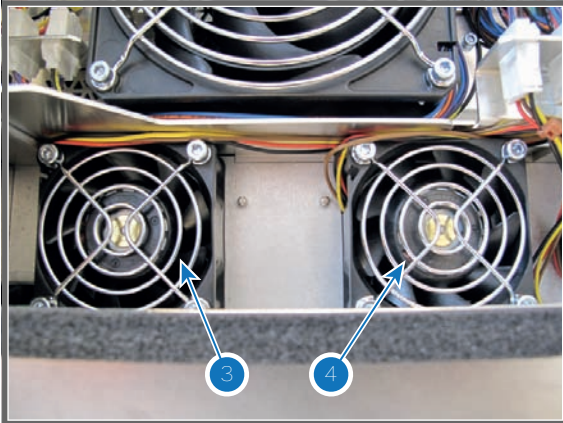


Image 25-22

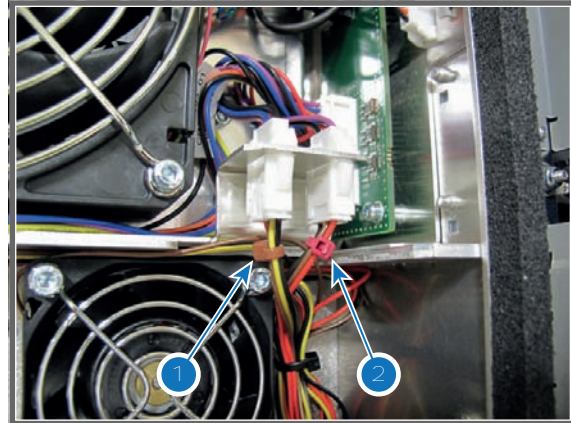


Image 25-23

Code 5113: “SMPS fan 2 (right side) - speed low”

Situation	Solution
Blocked fan.	Unblock the fan. Ensure that the fan can turn freely (reference 4 of Image 25-24).
Damaged wire.	Remove the large dust filter from the projector and check if the wire of the left fan of the SMPS compartment is not damaged. Repair if possible, otherwise replace with new one. Note: SMPS fan 1 is the fan which wire is marked with a brown cable tie (reference 1 of Image 25-25). SMPS fan 2 is the fan which wire is marked with a red cable tie (reference 2 of Image 25-25).
Fan end of life.	Replace both fans of the SMPS compartment. See service manual chapter “Replacing the fans of the SMPS compartment”, page 43. Note: If one fan of the SMPS compartment is end of life the other fan will probably also (nearly) end of live. For that, it's better to replace both fans at once.
Malfunction Cinema Controller.	Replace the Cinema Control board. See service manual chapter “Replacement of the Cinema Controller”, page 217.

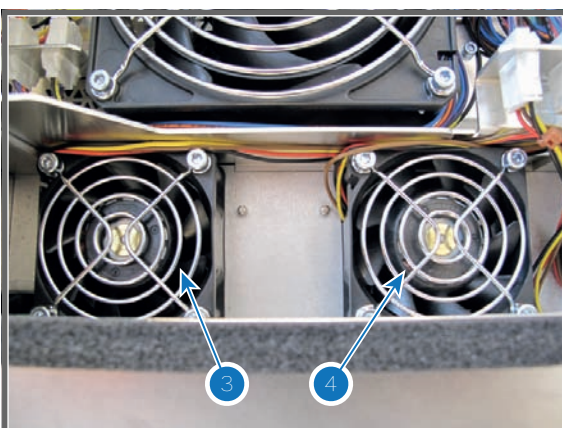


Image 25-24

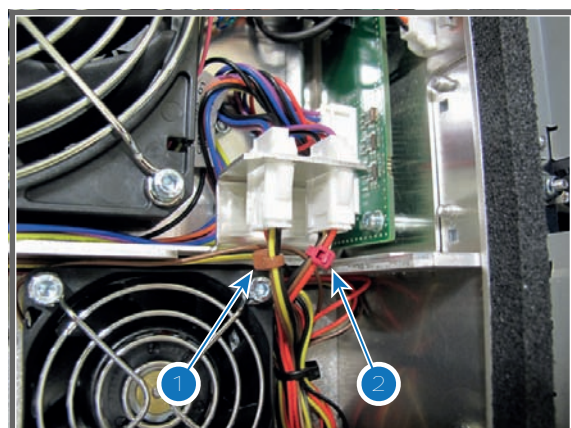


Image 25-25

Code 5143: “Electronics fan 1 (top side) - speed low”

Situation	Solution
Blocked fan	Remove the large dust filter from the projector and check if the small fan can turn freely (reference 1 of Image 25-26).
Damaged wire	Remove the large dust filter from the projector and check if the wire of the Card Cage small fan is not damaged. Repair if possible, otherwise replace with new one. Note: Electronics fan 1 (Card Cage small fan) is the fan which wire is marked with a yellow cable tie (reference 3 of Image 25-27). Electronics fan 2 (Card Cage large fan) is the fan which wire is marked with an orange cable tie (reference 4 of Image 25-27).
Fan end of life	Replace the Card Cage small fan. See service manual chapter “Replacement of the Card Cage small fan”, page 220.
Malfunction Cinema Controller	Replace the Cinema Control board. See service manual chapter “Replacement of the Cinema Controller”, page 217.

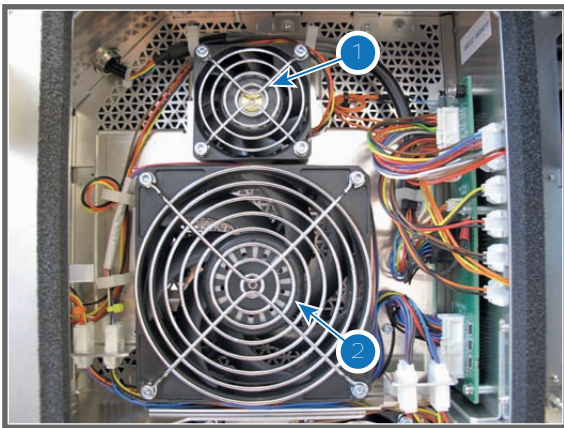


Image 25-26

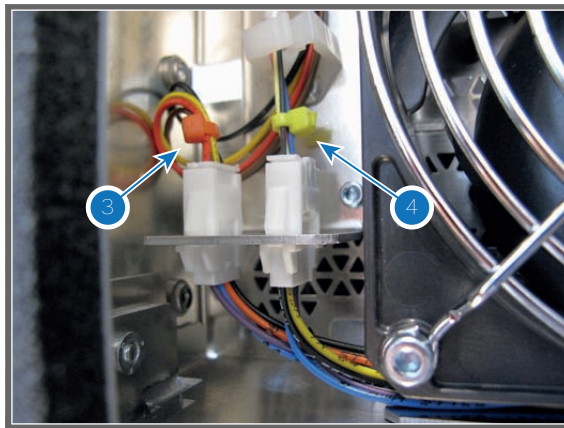


Image 25-27

Code 5153: “Electronics fan 2 (bottom side) - speed low”

Situation	Solution
Blocked fan	Remove the large dust filter from the projector and check if the large fan can turn freely (reference 2 of Image 25-28).
Damaged wire	Remove the large dust filter from the projector and check if the wire of the Card Cage large fan is not damaged. Repair if possible, otherwise replace with new one. Note: Electronics fan 1 (Card Cage small fan) is the fan which wire is marked with a yellow cable tie (reference 3 of Image 25-29). Electronics fan 2 (Card Cage large fan) is the fan which wire is marked with an orange cable tie (reference 4 of Image 25-29).
Fan end of life	Replace the Card Cage large fan. See service manual chapter “Replacement of the Card Cage large fan”, page 221.
Malfunction Cinema Controller	Replace the Cinema Control board. See service manual chapter “Replacement of the Cinema Controller”, page 217.

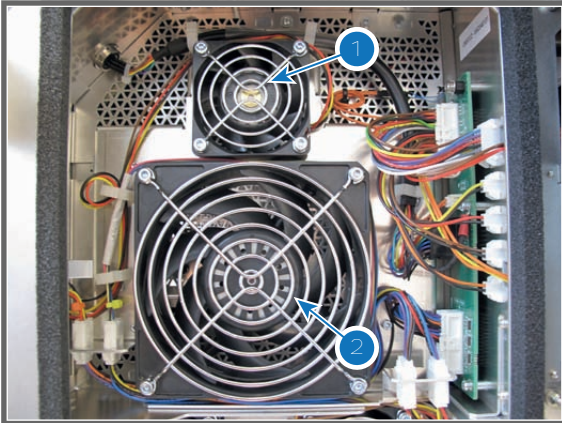


Image 25-28

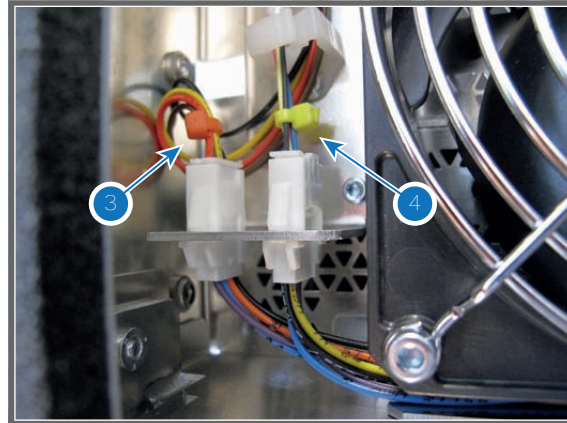


Image 25-29

Code 5180: “light source - not connected”

Situation	Solution
The light source is not correctly installed.	Check if the light source is properly installed. Ensure that the fixation bolts of the diffuser are properly mounted onto the light unit.
Safety switch damaged	Check Light Source Safety switches for damage. Replace if damaged.
Safety switch disconnected	Check connection of safety switch at the LCB. If connections are OK, then measure switch cable for continuity. Replace the cable if necessary.

Code 5191: “Prism switch - warning (lens probably touches prism)”

Situation	Solution
Lens is touching the sensor on the prism. Maximum lens shift position reached.	Shift the lens upwards and/or to the left.
Defect prism sensor.	Remove lens and reboot projector, if warning appears again then the prism sensor is defective and needs to be replaced (reference 1 of Image 25-30). Caution: after replacement of the prism sensor ensure that the wire of the prism sensor is connected with the Signal Backplane! (reference 2 of Image 25-31 and reference 5 of Image 25-32)

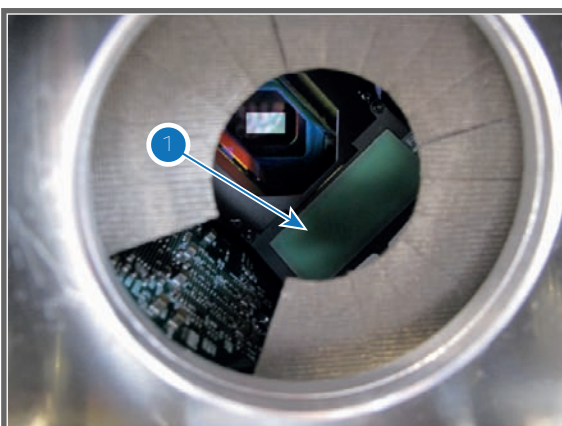


Image 25-30

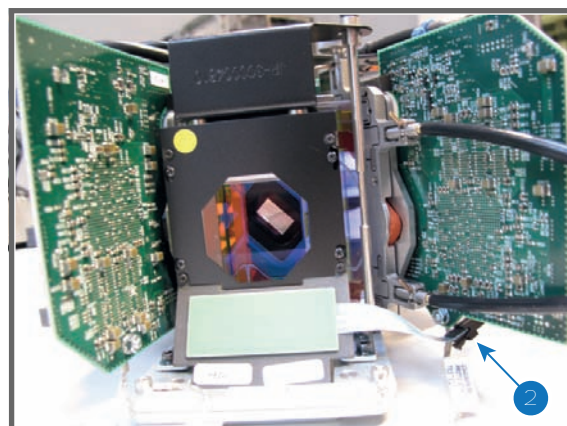


Image 25-31

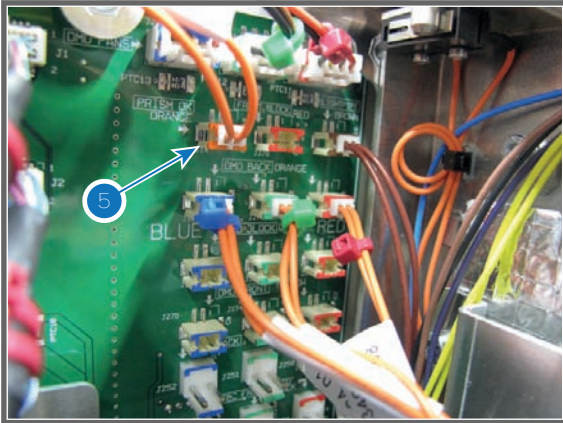


Image 25-32

Code 5230: “Lens zoom position - Requested target not reached”

Situation	Solution
Manual lens installed.	Replace the manual lens with a motorized lens.
Lens not correctly installed.	Check if the lens is correctly installed. See service manual chapter “Lens installation”, page 176.
The activated lens file does not correspond with the lens mounted on the projector.	Activate a lens file which does correspond with the mounted lens or mount another lens which corresponds with the lens file you want to activate.
Corrupt lens file.	Delete the lens file and program correct lens type into communicator under Advanced/lens parameters and recreate a new lens file. Tip: Perform a “Lens Homing” before creating a new lens file. Otherwise, if the lens is removed the existing lens file becomes useless. 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.
The final lens position lays very close to the mechanical limits which disable the motorized lens position.	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 which range is more suitable. Tip: 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. Program correct lens type into communicator under Advanced/lens parameters and recreate the lens files.
Disconnected wire of the zoom and focus motors of the motorized lens.	Remove the Lens Holder cover of the projector and check if the orange wire at the left side of the Lens Holder is connected (reference 5 Image 25-33)
Disconnected wire, of the lens motors, from the Signal Backplane.	Remove the large dust filter from the projector and check if the wire (reference 3 Image 25-34) is inserted in the Signal Backplane.
Broken or damaged electrical socket of the Lens Holder.	Check if the electrical socket (reference 1 Image 25-35) on the Lens Holder front plate is not damaged. If damaged replace the socket. See service manual chapter “Lens Holder”, page 173.
Malfunction Cinema Control board.	Replace the Cinema Control board. See service manual chapter “Replacement of the Cinema Controller”, page 217.

Situation	Solution
Malfunction zoom motor of the lens.	Use the local keypad to zoom the image on the screen. If unsuccessful, replace the motorized lens or replace the motor assembly of the lens. See service procedure “Replacement of the motor assembly for 0.69” DC2K lenses (Type 'M')”, page 190.
Malfunction Signal Backplane (bad connection).	Replace the Signal Backplane. See service procedure “Card Cage”, page 209.

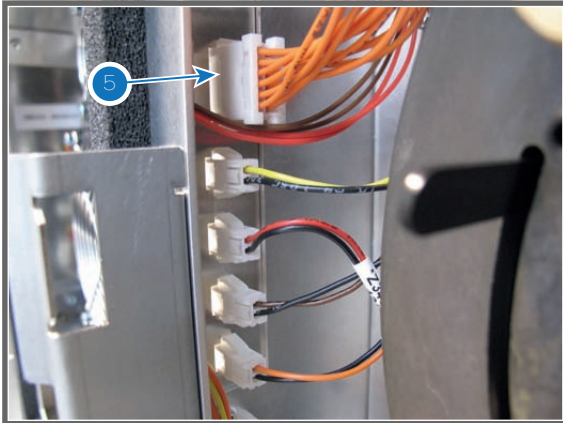


Image 25-33

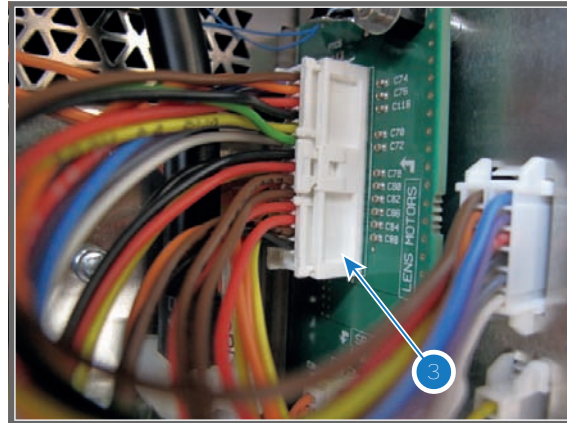


Image 25-34

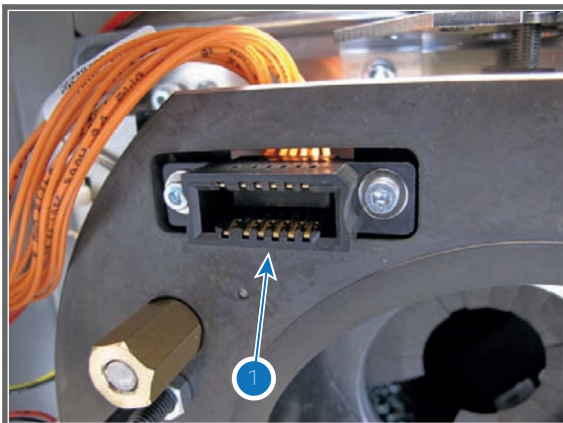


Image 25-35

Code 5231: “Lens focus position - Requested target not reached”

Situation	Solution
Manual lens installed.	Replace the manual lens with a motorized lens.
Lens not correctly installed.	Check if the lens is correctly installed. See service manual chapter “Lens installation”, page 176.
The activated lens file does not correspond with the lens mounted on the projector.	Activate a lens file which corresponds with the mounted lens or mount another lens which corresponds with the lens file you want to activate.
Corrupt lens file.	Delete the lens file and program correct lens type into communicator under Advanced/lens parameters and recreate a new lens file. Tip: perform a “Lens Homing” before creating a new lens file. Otherwise, if the lens is removed the existing lens file becomes useless. Setup all new lens files away from the maximum limitation of the lens zoom. It is possible

Situation	Solution
	that the lens file was originally created at the maximum or minimum zoom capabilities of the lens zoom.
The final lens position lays very close to the mechanical limits which disable the motorized lens position.	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 which range is more suitable. Tip: 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. Program correct lens type into communicator under Advanced/lens parameters and recreate the lens files.
Disconnected wire of the zoom and focus motors of the motorized lens.	Remove the Lens Holder cover of the projector and check if the orange wire at the left side of the Lens Holder is connected (reference 5 Image 25-36)
Disconnected wire, of the lens motors, from the Signal Backplane.	Remove the large dust filter from the projector and check if the wire (reference 3 Image 25-37) is inserted in the Signal Backplane.
Broken or damaged electrical socket of the Lens Holder.	Check if the electrical socket (reference 1 Image 25-38) on the Lens Holder front plate is not damaged. If damaged replace the socket. See service manual chapter "Lens Holder", page 173.
Malfunction Cinema Control board.	Replace the Cinema Control board. See service manual chapter "Replacement of the Cinema Controller", page 217.
Malfunction zoom motor of the lens.	Use the local keypad to zoom the image on the screen. If unsuccessful, replace the motorized lens or replace the motor assembly of the lens. See service procedure "Replacement of the motor assembly for 0.69" DC2K lenses (Type 'M')", page 190.
Malfunction Signal Backplane (bad connection).	Replace the Signal Backplane. See service procedure "Card Cage", page 209.

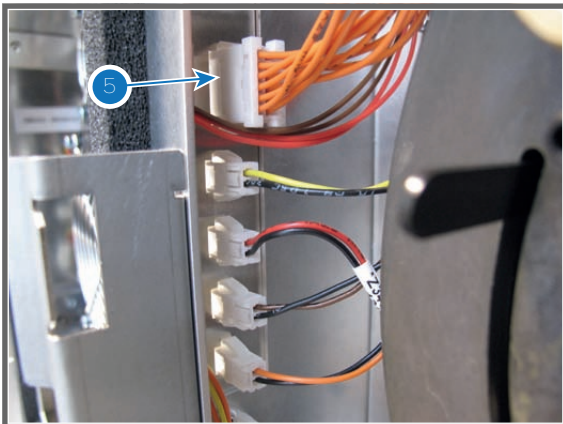


Image 25-36

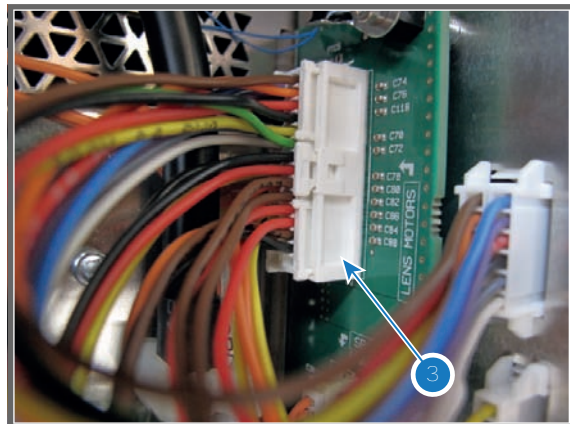


Image 25-37

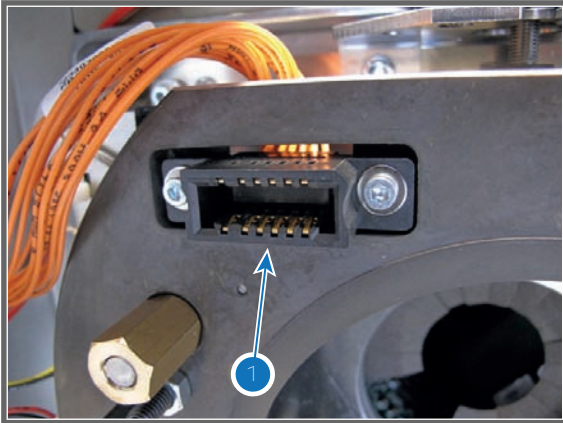


Image 25-38

Code 5232: “Lens horizontal shift position - Requested target not reached”

Situation	Solution
The activated lens file does not correspond with the lens mounted on the projector.	Activate a lens file which does correspond with the mounted lens or mount an other lens which correspond with the lens file you want to activate.
Corrupt lens file.	Delete the lens file and program correct lens type into communicator under Advanced/lens parameters and recreate a new lens file. Tip: Perform a “Lens Homing” before creating a new lens file. Otherwise, if the lens is removed the existing lens file becomes useless. Setup all new lens files away from the maximum limitation of the lens zoom.
The final lens position lays very close to the mechanical limits which disable the motorized lens position.	Reposition the projector (closer to on axis) so that the lens position lays further away from the mechanical limits, or try to use another lens which range is more suitable. Tip: Setup all new lens files away from the maximum limitation of the lens shift. It is possible that lens file was originally created at the maximum shift capabilities. Program correct lens type into communicator under Advanced/lens parameters and recreate the lens files.
Disconnected wire of the Lens Holder horizontal shift motor	Remove the Lens Holder cover from the projector and check if the yellow/ orange wire (reference 4 Image 25-40) is connected with the horizontal shift motor which is located at the right side of the Lens Holder.
Disconnected wires of the limit switches for horizontal shift.	Remove the Lens Holder cover from the projector and check if the yellow/ black and orange/black wires (reference 6 & 9 Image 25-39) are connected with the sockets at the right side of the Lens Holder compartment.
Wire of the lens motors is disconnected from the Signal Backplane.	Remove the large dust filter from the projector and check if the wire (reference 3 Image 25-41) is inserted in the Signal Backplane.
Malfunction Cinema Control board.	Replace the Cinema Control board. See service manual chapter “Replacement of the Cinema Controller”, page 217.
Malfunction horizontal shift motor of the Lens Holder.	Use the local keypad to shift the image horizontally on the screen. If unsuccessful, replace the horizontal shift motor of the Lens Holder. See service manual chapter “Replacement of the Horizontal Shift stepper motor”, page 188.
Malfunction Signal Backplane (bad connection).	Replace the Signal Backplane. See service manual chapter “Card Cage”, page 209.

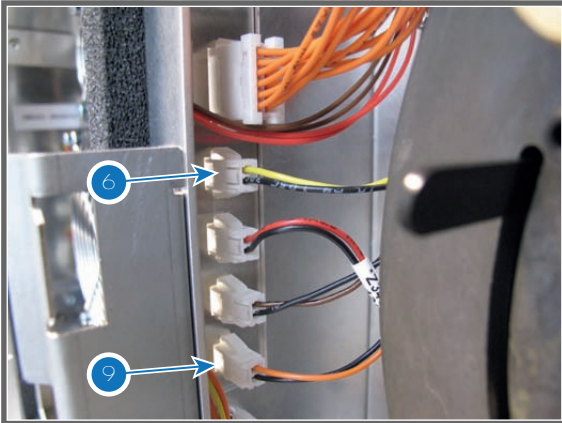


Image 25-39

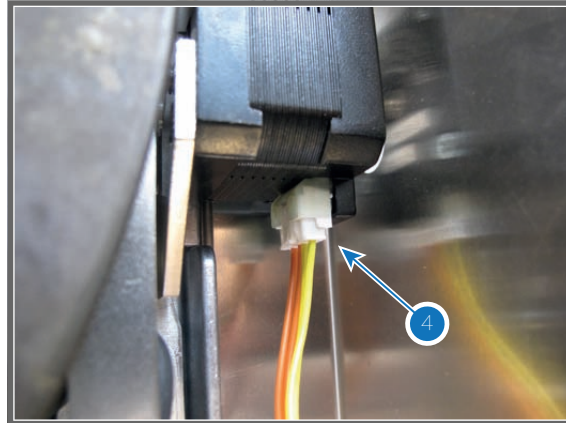


Image 25-40

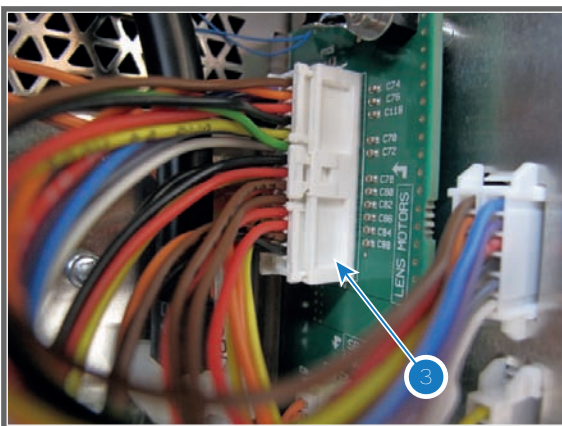


Image 25-41

Code 5233: “Lens vertical shift position - Requested target not reached”

Situation	Solution
The activated lens file does not correspond with the lens mounted on the projector.	Activate a lens file which does correspond with the mounted lens or mount an other lens which correspond with the lens file you want to activate.
Corrupt lens file.	Delete the lens file and program correct lens type into communicator under Advanced/lens parameters and recreate a new lens file. Tip: Perform a “Lens Homing” before creating a new lens file. Otherwise, if the lens is removed the existing lens file becomes useless. Setup all new lens files away from the maximum limitation of the lens zoom.
The final lens position lays very close to the mechanical limits which disable the motorized lens position.	Reposition the projector (closer to on axis) so that the lens position lays further away from the mechanical limits, or try to use another lens which range is more suitable. Tip: Setup all new lens files away from the maximum limitation of the lens shift. It is possible that lens file was originally created at the maximum shift capabilities. Program correct lens type into communicator under Advanced/lens parameters and recreate the lens files.
Disconnected wire of the Lens Holder vertical shift motor	Remove the projector top cover and check if the brown/orange wire (reference 2 Image 25-42) is connected with the vertical shift motor which is located at the top of the Lens Holder.
Disconnected wires of the limit switches for vertical shift.	Remove the Lens Holder cover from the projector and check if the red/black and brown/black wires (reference 7 & 8 Image 25-43) are connected with the sockets at the right side of the Lens Holder compartment.

Situation	Solution
Wire of the lens motors is disconnected from the Signal Backplane.	Remove the large dust filter from the projector and check if the wire (reference 3 Image 25-44) is inserted in the Signal Backplane.
Malfunction Cinema Control board.	Replace the Cinema Control board. See service manual chapter "Replacement of the Cinema Controller", page 217.
Malfunction vertical shift motor of the Lens Holder.	Use the local keypad to shift the image horizontally on the screen. If unsuccessful, replace the horizontal shift motor of the Lens Holder. See service manual chapter "Replacement of the Horizontal Shift stepper motor", page 188.
Malfunction Signal Backplane (bad connection).	Replace the Signal Backplane. See service manual chapter "Card Cage", page 209.

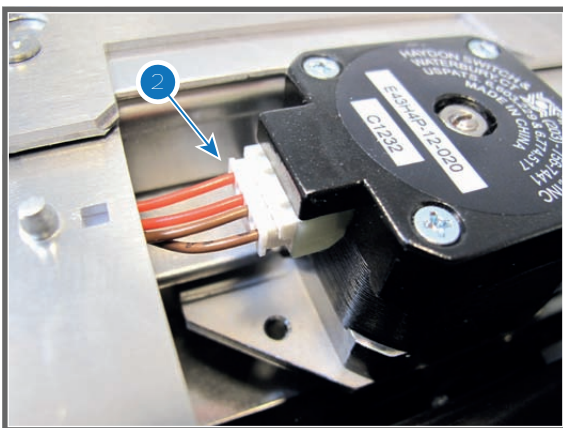


Image 25-42

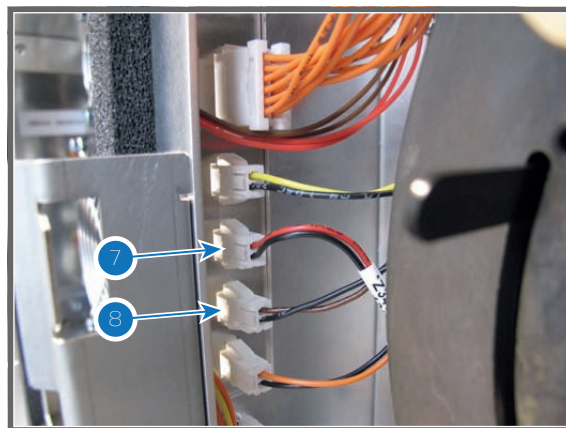


Image 25-43

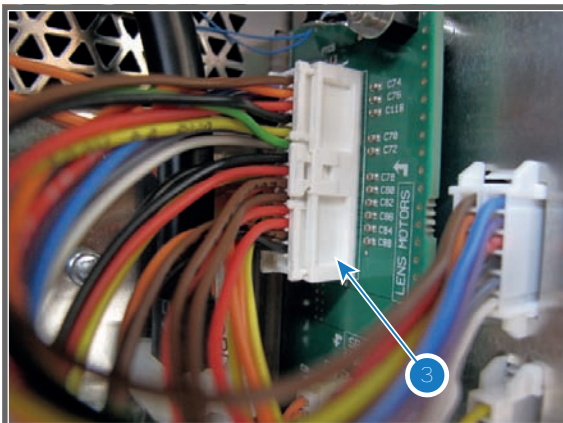


Image 25-44

Code 5253: "DMD red fan - Speed low"

Situation	Solution
Wire of the fan is disconnected.	Check if the wiring of the fan is connected with the signal backplane. See reference 3 Image 25-45.
Blocked fan.	Unblock the fan. Ensure that the fan can turn freely. The DMD fan of the Red channel is located underneath the Light Processor. See reference 13 Image 25-46. Light Processor has to be removed to access the fan.

Situation	Solution
Damaged wire unit.	Check if the wire unit of the fan is not damaged. Repair if possible, otherwise replace with new one.
Fan end of life.	Replace the fan. See service manual chapter “Replacement of the fan of the Red channel”, page 107.
Malfunction Cinema Control board.	Replace the Cinema Control board. See service manual chapter “Replacement of the Cinema Controller”, page 217.
Other fans are also not spinning.	Replace the SMPS Board. See service manual chapter “Switch Mode Power Supply (SMPS)”, page 39.
Defect Signal Backplane	Replace the Signal Backplane. See service manual chapter “Card Cage”, page 209.

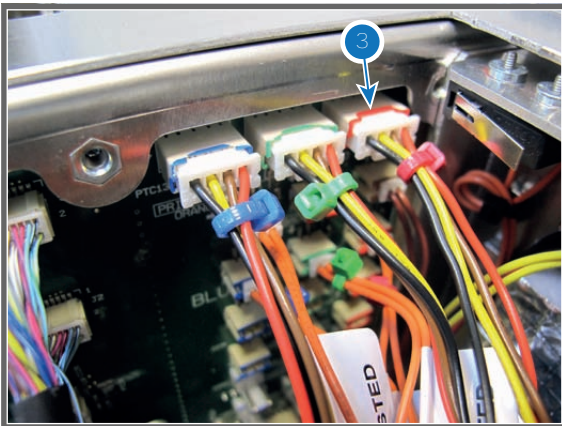


Image 25-45

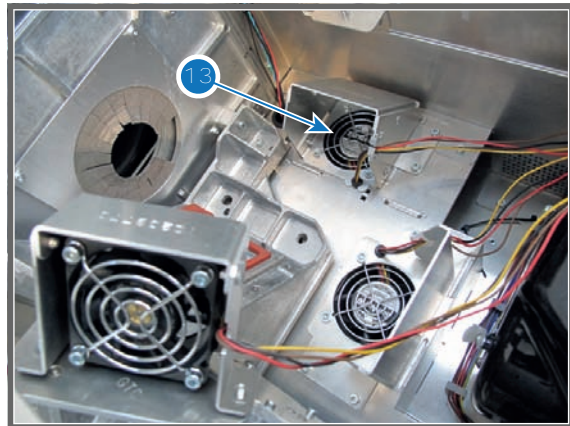


Image 25-46

Code 5263: “DMD green fan - Speed low”

Situation	Solution
Wire of the fan is disconnected	Check if the wiring of the fan is connected with the signal backplane. See reference 2 Image 25-47.
Blocked fan	Unblock the fan. Ensure that the fan can turn freely. The DMD fan of the Green channel is located underneath the Light Processor. See reference 12 Image 25-48. Light Processor has to be removed to access the fan.
Damaged wire unit	Check if the wire unit of the fan is not damaged. Repair if possible, otherwise replace with new one.
Fan end of life	Replace the fan. See service manual chapter “Replacement of the fan of the Red channel”, page 107.
Malfunction Cinema Control board	Replace the Cinema Control board. See service manual chapter “Replacement of the Cinema Controller”, page 217.
Other fans are also not spinning	Replace the SMPS Board. See service manual chapter “Switch Mode Power Supply (SMPS)”, page 39.
Defect Signal Backplane	Replace the Signal Backplane. See service manual chapter “Card Cage”, page 209.

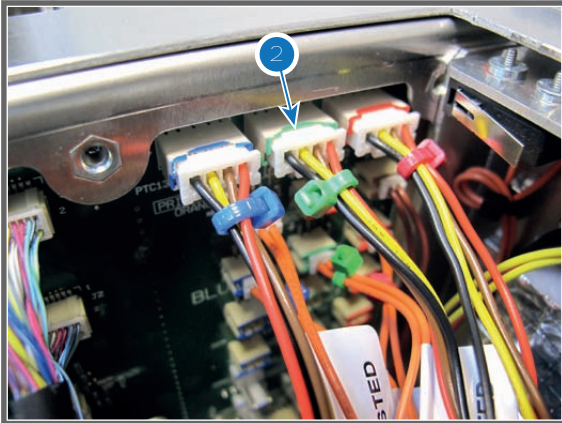


Image 25-47

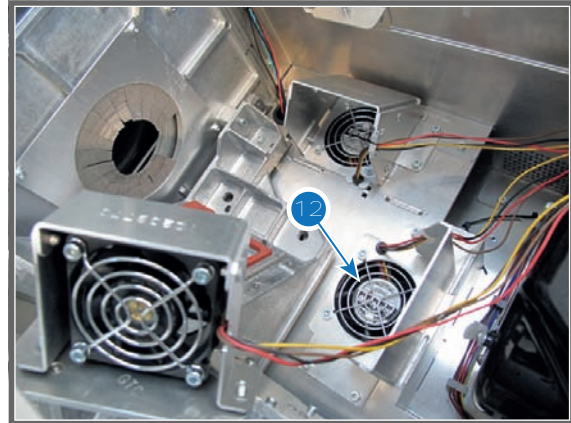


Image 25-48

Code 5273: “DMD blue fan - Speed low”

Situation	Solution
Wire of the fan is disconnected.	Check if the wiring of the fan is connected with the signal backplane. See reference 1 Image 25-49.
Blocked fan.	Unblock the fan. Ensure that the fan can turn freely. The DMD fan of the Blue channel is located above the Light Processor and Light Pipe. See reference 11 Image 25-50. No need to remove the Light Processor to access the fan.
Damaged wire unit.	Check if the wire unit of the fan is not damaged. Repair if possible, otherwise replace with new one.
Fan end of life.	Replace the fan. See service manual chapter “Replacement of the fan of the Red channel”, page 107.
Malfunction Cinema Control board.	Replace the Cinema Control board. See service manual chapter “Replacement of the Cinema Controller”, page 217.
Other fans are also not spinning.	Replace the SMPS Board. See service manual chapter “Switch Mode Power Supply (SMPS)”, page 39.
Defect Signal Backplane	Replace the Signal Backplane. See service manual chapter “Card Cage”, page 209.

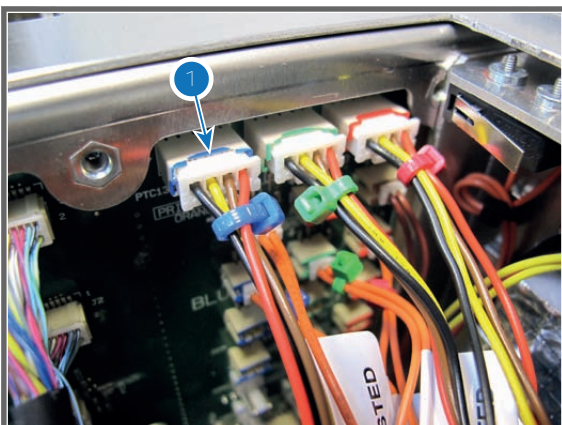


Image 25-49

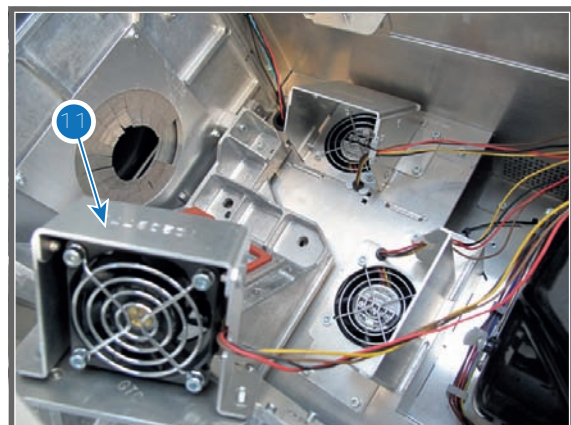


Image 25-50

Code 5280: “Ambient - Temperature too high”

This error code is probably preceded by the warning code: ambient - temperature high”. The same troubleshooting table can be applied to.

Code 5281: “Ambient - Temperature high”

Situation	Solution
Ambient temperature too high.	Check the ambient temperature at the air inlets of the projector. Make sure that the ambient temperature does not exceed 35°C (95°F).
Blocked dust filter.	Clean the large dust filter or replace with new one. See service manual chapter “Check the large dust filter”, page 284.
Malfunction air extraction system.	Check the condition of the air extraction system. The air extraction system must be capable of removing minimum 4 m ³ /min (140 CFM) per installed DP2K-SLP Series digital projector. Note: limit the amount of extraction to a maximum of 5m ³ /min (180 CFM). Excessive air extraction can dramatically speed-up contamination of the projector air inlet filters, hence requiring more regular filter cleaning interventions.
Defect temperature sensor.	Replace the ambient temperature sensor (reference 12 Image 25-51).
Malfunction Cinema Control board.	Replace the Cinema Control board. See service manual chapter “Replacement of the Cinema Controller”, page 217.

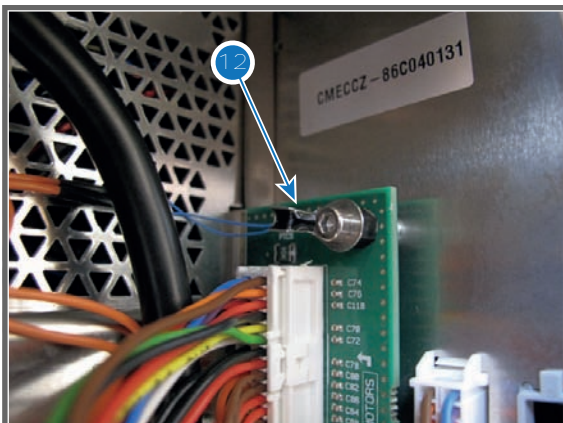


Image 25-51

Code 5284: “Ambient - Temperature sensor open”

Situation	Solution
Temperature sensor disconnected.	Check if wire (reference 14 Image 25-52) of the ambient temperature sensor (NTC) is connected with the Signal Backplane.
Defect temperature sensor.	Replace the ambient temperature sensor (reference 12 Image 25-53).
Malfunction Cinema Control board.	Replace the Cinema Control board. See service manual chapter “Replacement of the Cinema Controller”, page 217.
Malfunction Signal Backplane.	Replace the Signal Backplane. See service manual chapter “Card Cage”, page 209.

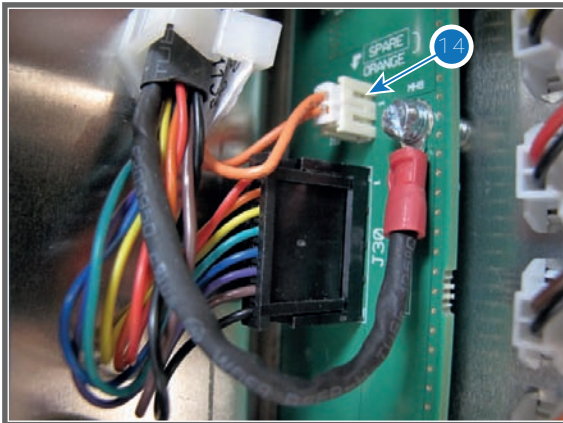


Image 25-52

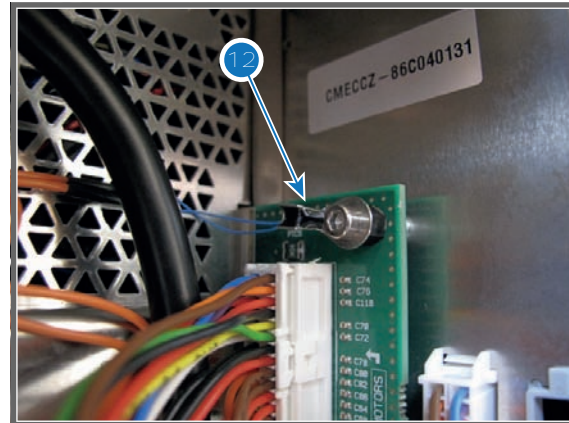


Image 25-53

Code 5285: “Ambient - Temperature sensor short”

Situation	Solution
<p>Damaged wire insulation of the temperature sensor which measures the ambient temperature. When disconnecting the wire of the temperature sensor from the Signal Backplane (reference 14 Image 25-52) the error code is changed to “ambient - temperature sensor open”.</p>	<ol style="list-style-type: none"> 1. Repair the insulation of the of the temperature sensor which measures the heat sink temperature of the blue channel (reference 12 Image 25-53). 2. If not repairable, replace the temperature sensor and wiring.
<p>Defect temperature sensor (reference 12 Image 25-53) which measures the ambient temperature. When disconnecting the wire of the temperature sensor from the Signal Backplane (reference 14 Image 25-52) the error code is changed to “ambient - temperature sensor open”.</p>	<p>Replace the temperature sensor (reference 12 Image 25-53) which measures the heat sink temperature of the blue channel.</p>

Code 5290: “DMD blue - Temperature too high”

This error code is probably preceded by the warning code 5291: “dmd blue - temperature high”. The same troubleshooting table can be applied to.

Code 5291: “DMD blue - Temperature high”

Situation	Solution
<p>Blocked large dust filter.</p>	<p>Clean the large dust filter or replace with new one. See service manual chapter “Check the large dust filter”, page 284.</p>
<p>Blocked small dust filter.</p>	<p>Clean the small dust filter or replace with new one. See service manual chapter “Check the small dust filter”, page 285.</p>
<p>Ambient temperature too high.</p>	<p>Check the ambient temperature at the air inlets of the projector. Make sure that the ambient temperature does not exceed 35°C (95°F).</p>
<p>Malfunction air extraction system.</p>	<p>Check the condition of the air extraction system. The air extraction system must be capable of removing minimum 4 m³/min (140 CFM) per installed DP2K-SLP Series digital projector.</p>

Situation	Solution
	Note: limit the amount of extraction to a maximum of 5m ³ /min (180 CFM). Excessive air extraction can dramatically speed-up contamination of the projector air inlet filters, hence requiring more regular filter cleaning interventions.
Defect temperature sensor.	Replace the temperature sensor (reference 16 Image 25-54) which measures the heat sink temperature of the DMD of the blue channel.
Malfunction Cinema Control board.	Replace the Cinema Control board. See service manual chapter "Replacement of the Cinema Controller", page 217.
Malfunction Light Processor.	Replace the whole Light Processor Unit. See service manual chapter "Light Processor replacement process", page 97. Contact Barco for further instructions to repair the malfunction Light Processor Unit.

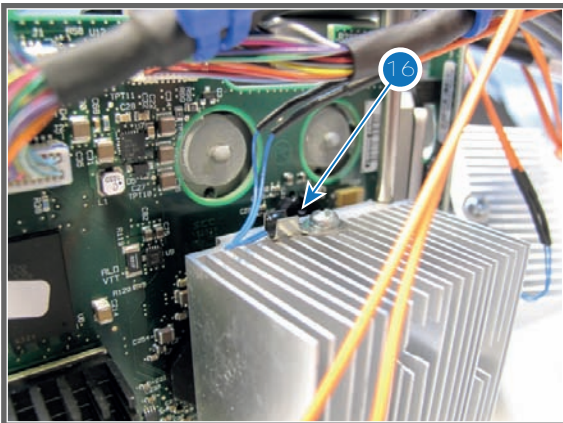


Image 25-54

Code 5293: "DMD blue - Temperature low"

Situation	Solution
The electronics of the Light Processor remains off due to a low DMD temperature.	Make sure that the ambient temperature is within specs (higher than 10° C (50°F)). Let the projector acclimate. Do not ignite the lamp, otherwise there is a risk for condensation.
Defect temperature sensor.	Replace the temperature sensor (reference 16 Image 25-54) which measures the heat sink temperature of the blue channel.

Code 5294: "DMD blue - Temperature sensor open"

Situation	Solution
Disconnected wire of the temperature sensor.	Check if the wire (reference 6 Image 25-55) of the temperature sensor is plugged into its socket on the Signal Backplane.
Damaged wire of the temperature sensor.	<ol style="list-style-type: none"> 1. Repair the wire of the temperature sensor which measures the heat sink temperature of the blue channel (reference 16 Image 25-56) . 2. If not repairable, replace the temperature sensor.
Defect temperature sensor.	Replace the temperature sensor (reference 16 Image 25-56) which measures the heat sink temperature of the blue channel.

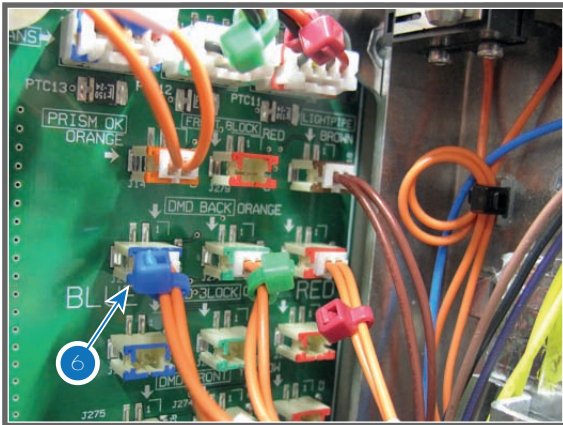


Image 25-55

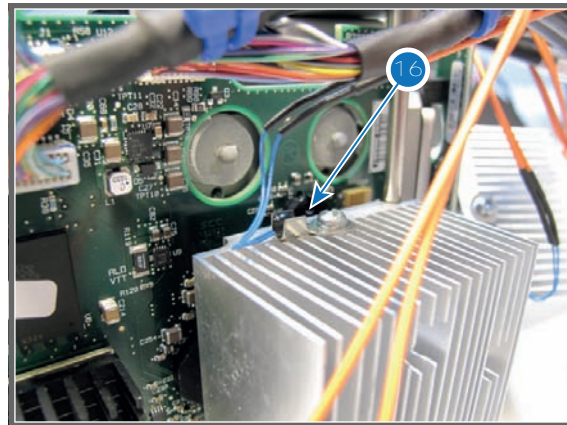


Image 25-56

Code 5295: “DMD blue - Temperature sensor short”

Situation	Solution
<p>Damaged wire insulation of the temperature sensor which measures the heat sink temperature of the blue channel. When disconnecting the wire of the temperature sensor from the Signal Backplane (reference 6 Image 25-55) the error code is changed to “dmd blue - temperature sensor open”.</p>	<ol style="list-style-type: none"> 1. Repair the insulation of the of the temperature sensor which measures the heat sink temperature of the blue channel (reference 16 Image 25-56). 2. If not repairable, replace the temperature sensor and wiring.
<p>Defect temperature sensor (reference 16 Image 25-56) which measures the heat sink temperature of the blue channel. When disconnecting the wire unit of the temperature sensor from the Signal Backplane (reference 6 Image 25-55) the error code is changed to “dmd blue - temperature sensor open”.</p>	<p>Replace the temperature sensor (reference 16 Image 25-56) which measures the heat sink temperature of the blue channel.</p>

Code 5300: “DMD green - Temperature too high”

This error code is probably preceded by the warning code 5301: “dmd green - temperature high”. The same troubleshooting table can be applied to.

Code 5301: “DMD green - Temperature high”

Situation	Solution
<p>Blocked large dust filter.</p>	<p>Clean the large dust filter or replace with new one. See service manual chapter “Check the large dust filter”, page 284.</p>
<p>Blocked small dust filter.</p>	<p>Clean the small dust filter or replace with new one. See service manual chapter “Check the small dust filter”, page 285.</p>
<p>Ambient temperature too high.</p>	<p>Check the ambient temperature at the air inlets of the projector. Make sure that the ambient temperature does not exceed 35°C (95°F).</p>

Situation	Solution
Malfunction air extraction system.	Check the condition of the air extraction system. The air extraction system must be capable of removing minimum 4 m ³ /min (140 CFM) per installed DP2K-SLP Series digital projector. Note: limit the amount of extraction to a maximum of 5m ³ /min (180 CFM). Excessive air extraction can dramatically speed-up contamination of the projector air inlet filters, hence requiring more regular filter cleaning interventions.
Defect temperature sensor.	Replace the temperature sensor (reference 17 Image 25-57) which measures the heat sink temperature of the DMD of the green channel.
Malfunction Cinema Control board.	Replace the Cinema Control board. See service manual chapter "Replacement of the Cinema Controller", page 217.
Malfunction Light Processor.	Replace the whole Light Processor Unit. See service manual chapter "Light Processor replacement process", page 97. Contact Barco for further instructions to repair the malfunction Light Processor Unit.

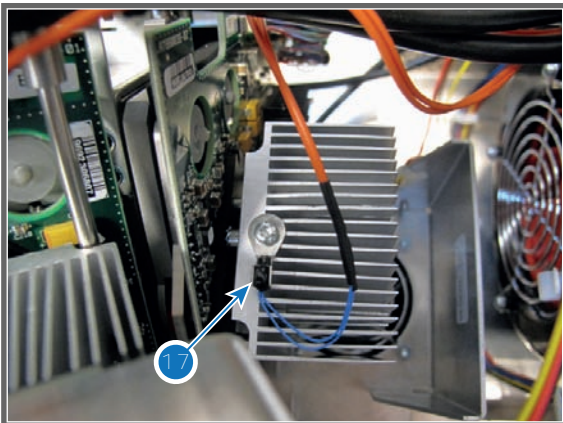


Image 25-57

Code 5303: "DMD green - Temperature low"

Situation	Solution
The electronics of the Light Processor remains off due to a low DMD temperature.	Make sure that the ambient temperature is within specs (higher than 10° C (50°F)). Let the projector acclimate. Do not ignite the lamp, otherwise there is a risk for condensation.
Defect temperature sensor.	Replace the temperature sensor (reference 17 Image 25-57) which measures the heat sink temperature of the blue channel.

Code 5304: "DMD green - Temperature sensor open"

Situation	Solution
Disconnected wire of the temperature sensor.	Check if the wire (reference 7 Image 25-58) of the temperature sensor is plugged into its socket on the Signal Backplane.
Damaged wire of the temperature sensor.	<ol style="list-style-type: none"> 1. Repair the wire of the temperature sensor which measures the heat sink temperature of the green channel (reference 17 Image 25-59) . 2. If not repairable, replace the temperature sensor.
Defect temperature sensor.	Replace the temperature sensor (reference 17 Image 25-59) which measures the heat sink temperature of the green channel.

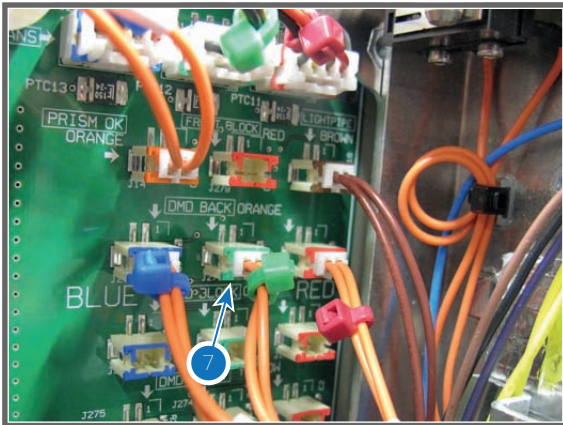


Image 25-58

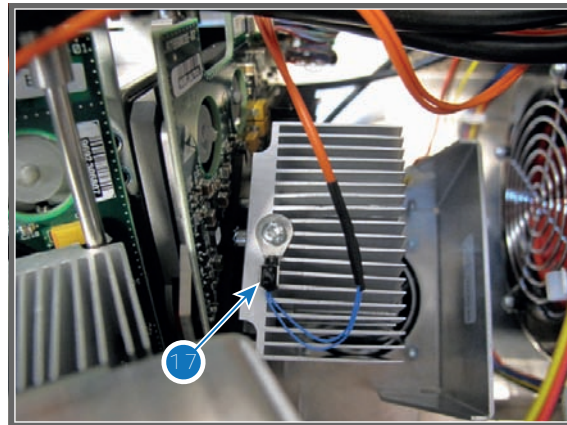


Image 25-59

Code 5305: “DMD green - Temperature sensor short”

Situation	Solution
<p>Damaged wire insulation of the temperature sensor which measures the heat sink temperature of the green channel. When disconnecting the wire of the temperature sensor from the Signal Backplane (reference 7 Image 25-58) the error code is changed to “dmd green - temperature sensor open”.</p>	<ol style="list-style-type: none"> 1. Repair the insulation of the of the temperature sensor which measures the heat sink temperature of the green channel (reference 17 Image 25-59) . 2. If not repairable, replace the temperature sensor and wiring.
<p>Defect temperature sensor (reference 17 Image 25-59) which measures the heat sink temperature of the green channel. When disconnecting the wire unit of the temperature sensor from the Signal Backplane (reference 7 Image 25-58) the error code is changed to “dmd green - temperature sensor open”.</p>	<p>Replace the temperature sensor (reference 17 Image 25-59) which measures the heat sink temperature of the green channel.</p>

Code 5310: “LLS ambient - temperature too high” (Error)

This error code is probably preceded by the warning code 5311 : “lls ambient- temperature high”. The same troubleshooting table can be applied.

Code 5311: “LLS ambient - temperature high” (Warning)

Situation	Solution
<p>Ambient temperature too high.</p>	<p>Check the ambient temperature at the air inlets of the projector. Make sure that the ambient temperature does not exceed 35°C (95°F).</p>
<p>Blocked filters.</p>	<p>Check the projector filters. Clean filthy filters or replace with new ones.</p>

Situation	Solution
Cooler module isn't cooling properly.	<ul style="list-style-type: none"> • Check the cooling liquid reservoir. Fill it up if necessary. • If error persists, replace the Light Source. See "Laser Phosphor Light Source", page 59.
Malfunction anode fan or cathode fan.	Check the speed and voltage of the anode and cathode fan. Replace any malfunctioning fan.

Code 5314: "LLS ambient - temperature sensor open" (Error)

Situation	Solution
Connector of the temperature sensor is disconnected	Plug the connector of the temperature sensor into its socket on the Signal Backplane.
Disconnected wiring between Signal Backplane and temperature sensor in the air outlet channel of the projector.	Check the connection between the wire units. The connection is made behind the back cover.
Damaged wiring of the temperature sensor.	<ol style="list-style-type: none"> 1. Repair the wiring. 2. If not repairable, replace the whole wire unit and temperature sensor.
Defect temperature sensor.	Replace the temperature sensor. Temperature sensor is visible through the air outlet on top of the projector.

Code 5315: "LLS ambient - temperature sensor short " (Error)

Situation	Solution
Damaged insulation of the wiring of the temperature sensor which measures the temperature in the channel of the air outlet.	<ol style="list-style-type: none"> 1. Repair the insulation of the wire unit using shrink sleeve. 2. If not repairable, replace the whole wire unit and temperature sensor.
Defect temperature sensor, which measures the temperature in the channel of the air outlet.	Replace the temperature sensor.



Ignore any "temperature sensor open" errors that are triggered when disconnecting the temperature sensor connector from the signal backplane.

Code 5320: "LCB - force light off"

Situation	Solution
The Fan Control & Motor board forces to switch off the Laser Power Module due to an Error.	<p>Look for other errors in the log files and try to solve them first. This can be due to:</p> <ul style="list-style-type: none"> • Temperature too high • light unit not connected. • Light processor is not connected.
Malfunction Cinema Control board.	Replace the Cinema Control board. See service manual chapter "Replacement of the Cinema Controller", page 217.

Code 5340: "dmd red - temperature too high" (Error)

This error code is probably preceded by the warning code 5341: "dmd red - temperature high". The same troubleshooting table can be applied to.

Code 5341: “dmd red - temperature high” (Warning)

Situation	Solution
Blocked large dust filter.	Clean the large dust filter or replace with new one. See service manual chapter “Check the large dust filter”, page 284.
Blocked small dust filter.	Clean the small dust filter or replace with new one. See service manual chapter “Check the small dust filter”, page 285.
Ambient temperature too high.	Check the ambient temperature at the air inlets of the projector. Make sure that the ambient temperature does not exceed 35°C (95°F).
Malfunction air extraction system.	Check the condition of the air extraction system. The air extraction system must be capable of removing minimum 4 m ³ /min (140 CFM) per installed DP2K-SLP Series digital projector. Note: limit the amount of extraction to a maximum of 5m ³ /min (180 CFM). Excessive air extraction can dramatically speed-up contamination of the projector air inlet filters, hence requiring more regular filter cleaning interventions.
Defect temperature sensor.	Replace the temperature sensor (reference 18 Image 25-60) which measures the heat sink temperature of the DMD of the red channel.
Malfunction Cinema Control board.	Replace the Cinema Control board. See service manual chapter “Replacement of the Cinema Controller”, page 217.
Malfunction Light Processor.	Replace the whole Light Processor Unit. See service manual chapter “Light Processor replacement process”, page 97. Contact Barco for further instructions to repair the malfunction Light Processor Unit.

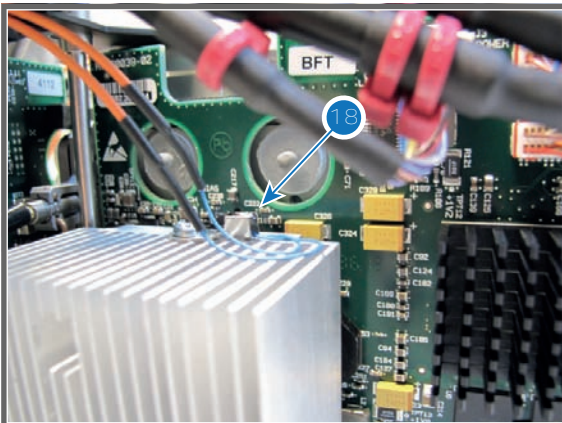


Image 25-60

Code 5343: “dmd red - temperature low” (Warning)

Situation	Solution
The electronics of the Light Processor remains off due to a low DMD temperature.	Make sure that the ambient temperature is within specs (higher than 10° C (50°F)). Let the projector acclimate. Do not ignite the lamp, otherwise there is a risk for condensation.
Defect temperature sensor.	Replace the temperature sensor (reference 18 Image 25-60) which measures the heat sink temperature of the red channel.

Code 5344: “dmd red - temperature sensor open” (Error)

Situation	Solution
Disconnected wire of the temperature sensor.	Check if the wire (reference 8 Image 25-61) of the temperature sensor is plugged into its socket on the Signal Backplane.
Damaged wire of the temperature sensor.	<ol style="list-style-type: none"> 1. Repair the wire of the temperature sensor which measures the heat sink temperature of the red channel (reference 18 Image 25-62) . 2. If not repairable, replace the temperature sensor.
Defect temperature sensor.	Replace the temperature sensor (reference 18 Image 25-62) which measures the heat sink temperature of the red channel.

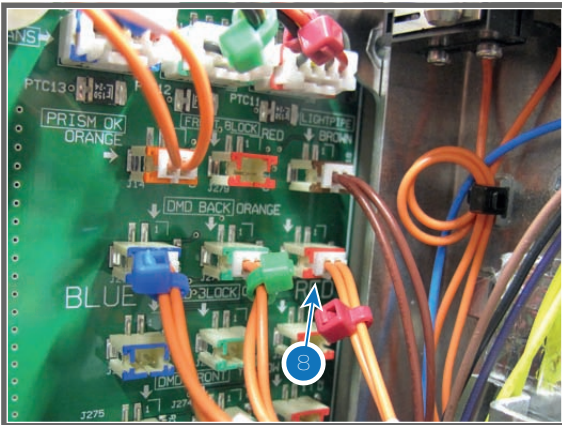


Image 25-61

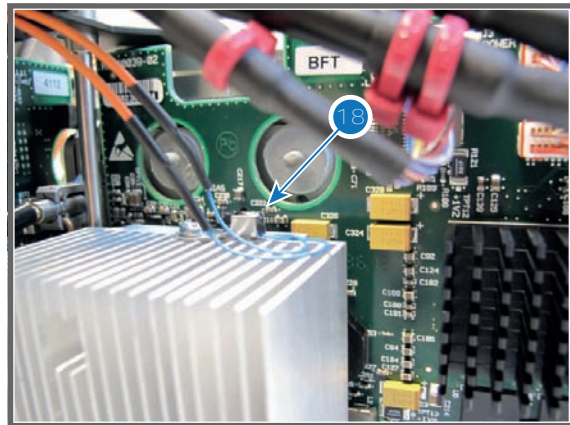


Image 25-62

Code 5345: “dmd red - temperature sensor short” (Error)

Situation	Solution
Damaged wire insulation of the temperature sensor which measures the heat sink temperature of the red channel. When disconnecting the wire of the temperature sensor from the Signal Backplane (reference 8 Image 25-61) the error code is changed to “dmd red - temperature sensor open”.	<ol style="list-style-type: none"> 1. Repair the insulation of the of the temperature sensor which measures the heat sink temperature of the red channel (reference 18 Image 25-62). 2. If not repairable, replace the temperature sensor and wiring.
Defect temperature sensor (reference 18 Image 25-62) which measures the heat sink temperature of the red channel. When disconnecting the wire unit of the temperature sensor from the Signal Backplane (reference 8 Image 25-75) the error code is changed to “dmd red - temperature sensor open”.	Replace the temperature sensor (reference 18 Image 25-62) which measures the heat sink temperature of the red channel.

Code 5351: “smps primary heatsink - temperature high” (Warning)

Situation	Solution
Ambient temperature too high.	Check the ambient temperature at the air inlets of the projector. Make sure that the ambient temperature does not exceed 35°C (95°F).
Blocked large dust filter.	Clean the large dust filter or replace with new one. See service manual chapter “Check the large dust filter”, page 284.
Malfunction air extraction system.	Check the condition of the air extraction system. The air extraction system must be capable of removing minimum 4 m ³ /min (140 CFM) per installed DP2K-SLP Series digital projector. Note: limit the amount of extraction to a maximum of 5m ³ /min (180 CFM). Excessive air extraction can dramatically speed-up contamination of the projector air inlet filters, hence requiring more regular filter cleaning interventions.
Malfunction SMPS board.	Replace the SMPS module. See service manual chapter “Switch Mode Power Supply (SMPS)”, page 39.
Malfunction Cinema Control board.	Replace the Cinema Control board. See service manual chapter “Replacement of the Cinema Controller”, page 217.

Code 5361: “smps secondary heatsink - temperature high” (Warning)

Situation	Solution
Ambient temperature too high.	Check the ambient temperature at the air inlets of the projector. Make sure that the ambient temperature does not exceed 35°C (95°F).
Blocked large dust filter.	Clean the large dust filter or replace with new one. See service manual chapter “Check the large dust filter”, page 284.
Malfunction air extraction system.	Check the condition of the air extraction system. The air extraction system must be capable of removing minimum 4 m ³ /min (140 CFM) per installed DP2K-SLP Series digital projector. Note: limit the amount of extraction to a maximum of 5m ³ /min (180 CFM). Excessive air extraction can dramatically speed-up contamination of the projector air inlet filters, hence requiring more regular filter cleaning interventions.
Malfunction SMPS board.	Replace the SMPS module. See service manual chapter “Switch Mode Power Supply (SMPS)”, page 39.
Malfunction Cinema Control board.	Replace the Cinema Control board. See service manual chapter “Replacement of the Cinema Controller”, page 217.

Code 5364: “smps secondary heatsink - temperature sensor open ” (Error)

Situation	Solution
Malfunction SMPS board.	Replace the SMPS module. See service manual chapter “Switch Mode Power Supply (SMPS)”, page 39.

Code 5365: “smps secondary heatsink - temperature sensor short” (Error)

Situation	Solution
Malfunction SMPS board.	Replace the SMPS board. See service manual chapter “Switch Mode Power Supply (SMPS)”, page 39.

Code 5641: “light source - light is on, but SMPS is off” (Error)

Situation	Solution
This error alone, or with other SMPS errors: Malfunction SMPS module	Replace the SMPS module. See “Switch Mode Power Supply (SMPS)”, page 39.
This error alone: Defect Signal Backplane	Replace the Signal Backplane. See “Card Cage”, page 209.
In combination with other errors	Check the projector log files for other listed errors and solve these errors first.

Code 5646: “light source - Switching on the light source failed” (Error)

Situation	Solution
The light source goes out immediately after powering it, or does not go on at all.	Check the projector log files for other listed errors and solve these errors first.

Code 5647: “light source - The light source was switched off due to an error” (Error)

Situation	Solution
The light source was triggered to switch off the lasers due to an error.	Check the projector log files for other listed errors and solve these errors first.

Code 5800: “TI-boards - system status = fail”

This is a generic TI error. Use the Communicator to make a detailed analysis. Go to Diagnostics > Actual > Cinema Front End Status > Detailed status > Error Messages. Possible error messages are:

Situation	Solution
Malfunction software.	Reboot the projector.
ICP board is not correctly seated.	Reseat the ICP board. See service manual chapter “Replacement of the ICP board”, page 214.
ICP self test - ICP frame memory test failed	Replace the ICP board. See service manual chapter “Replacement of the ICP board”, page 214.
ICP self test - ICP data path signature test failed	Check the connections to the Formatter boards on the Light Processor. Replace the ICP board. See service manual chapter “Replacement of the ICP board”, page 214.
ICP Normal Configuration Error	Replace the ICP board. See service manual chapter “Replacement of the ICP board”, page 214.
ICP Boot Configuration Error	Replace the ICP board. See service manual chapter “Replacement of the ICP board”, page 214.
FMT Normal Configuration Error	Replace the ICP board. See service manual chapter “Replacement of the ICP board”, page 214.
FMT Boot Configuration Error	Replace the ICP board. See service manual chapter “Replacement of the ICP board”, page 214.
FMT Satellite Configuration Error	Replace the ICP board. See service manual chapter “Replacement of the ICP board”, page 214.
1.20V Supply out of range	Replace the ICP board. See service manual chapter “Replacement of the ICP board”, page 214.

Situation	Solution
1.80V Supply out of range	Replace the ICP board. See service manual chapter “Replacement of the ICP board”, page 214.
2.50V Supply out of range	Replace the ICP board. See service manual chapter “Replacement of the ICP board”, page 214.
3.30V Supply out of range	Replace the ICP board. See service manual chapter “Replacement of the ICP board”, page 214.
ICP FPGA Temperature out of range	<p>Temperature on ICP is too high. Current active fans have errors. Solve the fan problem first.</p> <p>For a correct airflow, check if all covers are closed.</p> <p>Ambient temperature is too high. Reduce the ambient temperature.</p>
ICP FMT FPGA Temperature out of range	<p>Temperature on ICP is too high. Current active fans have errors. Solve the fan problem first.</p> <p>For a correct airflow, check if all covers are closed.</p> <p>Ambient temperature is too high. Reduce the ambient temperature.</p>
ICP Flash Update Error	Replace the ICP board. See service manual chapter “Replacement of the ICP board”, page 214.
ICP real time clock error	<ol style="list-style-type: none"> 1. Clear the error by configuring the RTC (Real Time Clock) of the ICP. See user manual Communicator chapter “Set up of the ICP clock”, choose the option UTC/GMT time calculated from current PC time current time. • If the error stays: <ul style="list-style-type: none"> • replace the RTC (Real Time Clock) battery of the ICP board. See “Replacement of the RTC battery of the ICP board”, page 214. • Clear the projector error 5800 “ti-icp - system status = fail” with error message “ICP real time clock error” by configuring the RTC (Real Time Clock) of the ICP. See user manual Communicator chapter “Set up of the ICP clock”, choose the option UTC/GMT time calculated from current PC time current time. • Clear the projector error 5834 “physical marriage tamper event” by remarrying the projector. See service manual chapter "Authorization to clear security warning on the projector". 2. If problem remains, replace the ICP board. See “Replacement of the ICP board”, page 214
Satellite Hardware Mismatch	Replace the Light Processor assembly. See service manual chapter “Light Processor replacement process”, page 97.

Other possible causes of this error code:

Situation	Solution
<p>The TI system status failure is caused by the projector which is too cold. The DMD's should not be operated at a temperature lower than 10°C (50°F). The projector has some protections for that. Below that temperature, the engine is switched of, and the result is a TI system status failure.</p> <p>This situation can occurs when the projector is recently installed and did not had the time to acclimate to the normal room temperature. There is also a message that the temperatures are too low. See log files.</p>	<p>Make sure that the ambient temperature is within specs. Let the projector acclimate to the normal room temperature which should be higher then 10° C (50°F) and lower then 35°C (95°F). Do not ignite the lamp, otherwise there is a risk for condensation.</p>

Code 5801: “TI-link-decryptor - service door tamper event ”

Situation	Solution
<p>The top cover plate and or the side cover plate of the Light Processor compartment has been removed.</p>	<p>Clear the security warning. See service manual chapter “Authorization to clear security warning on the projector”, page 112. Brief procedure to clear the security warning:</p> <ol style="list-style-type: none"> 1. Ensure the top cover plate of the Light Processor compartment is properly installed. 2. Ensure the side cover plate of the Light Processor compartment is properly installed. 3. Ensure that all modules are properly installed into the Card Cage. 4. Start up the projector. 5. Initiate authorization by pushing the Key button on the Local Keypad. 6. Enter the pin code within 5 seconds.
<p>Defect security switches.</p>	<p>Replace DCI security switches of the Light Processor compartment (reference 1 Image 25-63 & 2 Image 25-64)</p>
<p>Malfunction Signal Backplane</p>	<p>If switch replacement cures nothing then replace Signal Backplane. See service manual chapter “Card Cage”, page 209.</p>

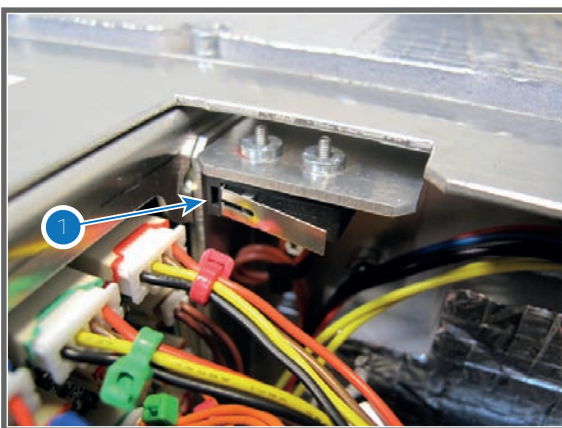


Image 25-63

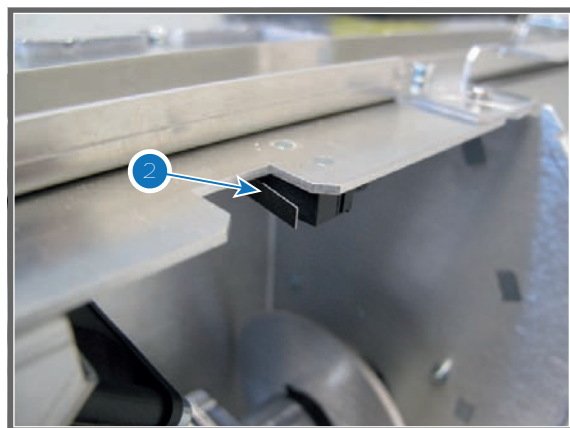


Image 25-64

Code 5807: “TI-ICP - read system status failed”

The Barco controller can not read the status of the ICP.

Situation	Solution
Malfunction software.	Reboot the projector.
ICP board is not correctly seated.	Reseat the ICP board. See service manual chapter “Replacement of the ICP board”, page 214.
ICP board is not correctly inserted	Insert the ICP board properly. See service manual chapter “Replacement of the ICP board”, page 214.
ICP crash. The most left LED is not blinking	Restart the projector.
ICP is being upgrading	Wait until projector reset after the upgrade.

Code 5812: “TI-ICP - read satellite info failed”

Situation	Solution
Malfunction software.	Reboot the projector.
ICP board is not correctly seated.	Reseat the ICP board. See service manual chapter “Replacement of the ICP board”, page 214.
One of the wire units of the Satellite boards on the Light Processor is not correctly connected with the Signal Backplane.	Check if all data wires of the Satellite boards are connected with the Signal Backplane (reference 3 Image 25-65). For detail instructions see service manual chapter “Installing the Light Processor”, page 100.
One or more of the data wires are disconnected from the Satellite boards of the Light Processor.	<p>Check the data connections on the Satellite boards of the Light Processor. See Image 25-66 for the Satellite board of the RED channel. See Image 25-67 for the Satellite board of the GREEN channel. See Image 25-68 for the Satellite board of the BLUE channel.</p> <p>Note: The wires are marked with cable ties in the same color as the channel color. The wires with reference 4, 5 & 6 are marked with two cable ties.</p> <p>Note: To access the three wires on the RED Satellite board the Light Processor has to be removed from the projector.</p>

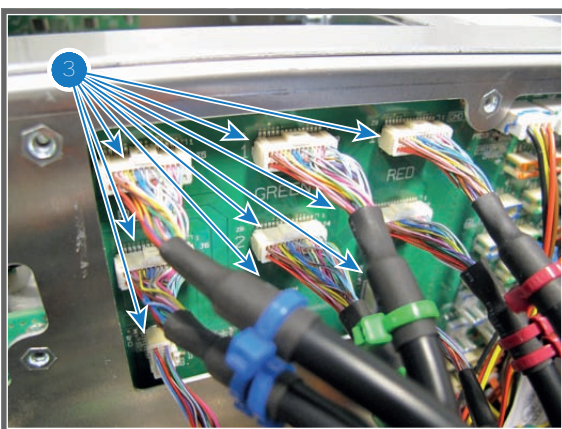


Image 25-65

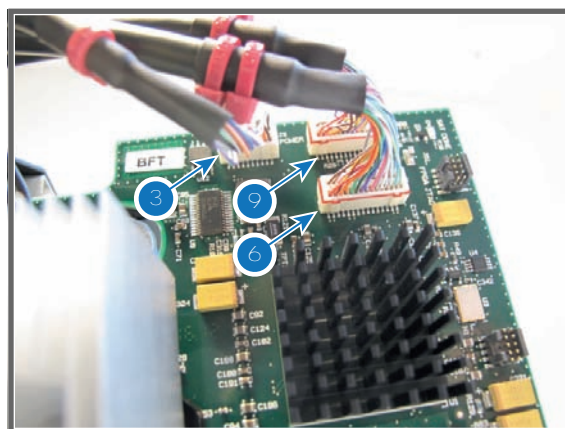


Image 25-66

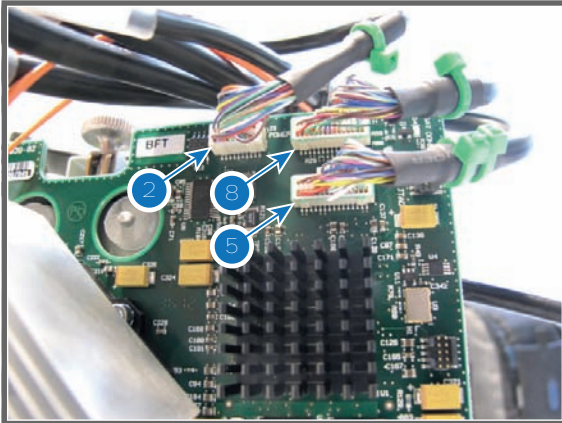


Image 25-67

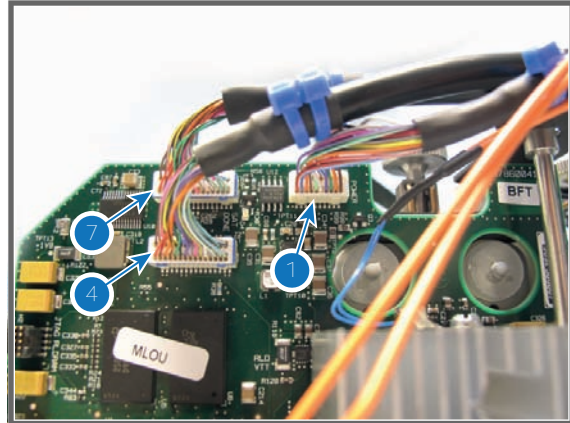


Image 25-68

Code 5813: “TI-ICP - satellite firmware mismatch”

This error can occur when you move ICP boards between projectors which have a different DMD configuration. (E.g. switching an ICP between a 1.2 and 0.98 inch system)

Situation	Solution
Malfunction software.	Reboot the projector.
ICP board is not correctly seated.	Reseat the ICP board. See service manual chapter “Replacement of the ICP board”, page 214.
Installed firmware for the DMDs on the ICP board is not correct for the current DMD configuration.	Reinstall the ICP software. Use the “DC Update Companion”. See user guide of the Communicator software. Note: First upload the ICP package to a slot, then install from slot.

Code 5814: “TI-ICP - self test = fail”

Situation	Solution
Malfunction software.	Reboot the projector.
ICP board is not correctly seated.	Reseat the ICP board. See service manual chapter “Replacement of the ICP board”, page 214.
One of the wire units of the Satellite boards on the Light Processor is not correctly connected with the Signal Backplane.	Check if all data wires of the Satellite boards are connected with the Signal Backplane (reference 3 Image 25-65). For detail instructions see service manual chapter “Installing the Light Processor”, page 100.
One or more of the data wires are disconnected from the Satellite boards of the Light Processor.	Check the data connections on the Satellite boards of the Light Processor. See Image 25-66 for the Satellite board of the RED channel. See Image 25-67 for the Satellite board of the GREEN channel. See Image 25-68 for the Satellite board of the BLUE channel. Note: The wires are marked with cable ties in the same color as the channel color. The wires with reference 4, 5 & 6 are marked with two cable ties. Note: To access the three wires on the RED Satellite board the Light Processor has to be removed from the projector.

Code 5815: “TI-ICP - certificate error”

Situation	Solution
New ICP software version installed but no reboot of projector has happen.	Reboot the projector.
Malfunction software.	Reboot the projector.
ICP board is not correctly seated.	Reseat the ICP board. See service manual chapter “Replacement of the ICP board”, page 214.
Error remains occurring after different boot cycles.	Replace ICP board. See service manual chapter “Replacement of the ICP board”, page 214.

Code 5816: “TI-ICP - key error”

Situation	Solution
New ICP software version installed but no reboot of projector has happen.	Reboot the projector.
Malfunction software.	Reboot the projector.
ICP board is not correctly seated.	Reseat the ICP board. See service manual chapter “Replacement of the ICP board”, page 214.
Error remains occurring after different boot cycles.	Replace ICP board. See service manual chapter “Replacement of the ICP board”, page 214.

Code 5817: “TI-ICP - icp board not detected”

Situation	Solution
Malfunction software.	Reboot the projector.
There is no ICP board installed.	Install an ICP board. See service manual chapter “Replacement of the ICP board”, page 214.
ICP board is not correctly seated.	Reseat the ICP board. See service manual chapter “Replacement of the ICP board”, page 214.
ICP board not correctly inserted.	Re-install the ICP board. See service manual chapter “Replacement of the ICP board”, page 214.

Code 5830: “TI-link-decryptor - no communication”

Situation	Solution
Exceptional software failure.	Reboot the projector.
Link decryptor is not correctly seated.	Reseat the link decryptor. See service manual chapter “Replacement of the Link Decryptor”, page 217. If problem remains, replace the link decryptor.

Code 5831: “TI-link-decryptor - system error”

With the Communicator, go to *Diagnostics* → *Actual* → *Link Decryptor status* → *Error messages*

The following errors can occur:

Error	Solution
Link decryptor - User loader integrity error	Replace link decryptor. See service manual chapter “Replacement of the Link Decryptor”, page 217.
Link decryptor - Main application integrity error	Replace link decryptor. See service manual chapter “Replacement of the Link Decryptor”, page 217.
Link decryptor - RNG hardware integrity error	Replace link decryptor. See service manual chapter “Replacement of the Link Decryptor”, page 217.
Link decryptor - DRNG hardware integrity error	Replace link decryptor. See service manual chapter “Replacement of the Link Decryptor”, page 217.
Link decryptor - RSA algorithm integrity error	Replace link decryptor. See service manual chapter “Replacement of the Link Decryptor”, page 217.
Link decryptor - AES algorithm integrity error	Replace link decryptor. See service manual chapter “Replacement of the Link Decryptor”, page 217.
Link decryptor - HMAC algorithm integrity error	Replace link decryptor. See service manual chapter “Replacement of the Link Decryptor”, page 217.
Link decryptor - SHA algorithm integrity error	Replace link decryptor. See service manual chapter “Replacement of the Link Decryptor”, page 217.
Link decryptor - TLS integrity error	Replace link decryptor. See service manual chapter “Replacement of the Link Decryptor”, page 217.
Link decryptor - FPGA configuration integrity error	Replace link decryptor. See service manual chapter “Replacement of the Link Decryptor”, page 217.
Link decryptor - FPGA cinelink 2 decryption integrity error	Replace link decryptor. See service manual chapter “Replacement of the Link Decryptor”, page 217.
Link decryptor - Real time clock error	Replace link decryptor. See service manual chapter “Replacement of the Link Decryptor”, page 217.
Link decryptor - FPGA configuration error	Replace link decryptor. See service manual chapter “Replacement of the Link Decryptor”, page 217.
Link decryptor - FPGA temperature out of range	Temperature on the link decryptor is too high. Check for other fan or temperature error messages. Check if the front cover of the HDSDI module is closed.
Link decryptor - RNG Hardware duplicate output error	Replace link decryptor. See service manual chapter “Replacement of the Link Decryptor”, page 217.
Link decryptor - DRNG Hardware duplicate output error	Replace link decryptor. See service manual chapter “Replacement of the Link Decryptor”, page 217.
Link decryptor - 1.20V supply out of range	Replace SMPS. See service manual chapter “Switch Mode Power Supply (SMPS)”, page 39. Replace Signal backplane. See service manual chapter “Card Cage”, page 209. Replace link decryptor. See service manual chapter “Replacement of the Link Decryptor”, page 217.
Link decryptor - 1.80V supply out of range	Replace SMPS. See service manual chapter “Switch Mode Power Supply (SMPS)”, page 39. Replace Signal backplane. See service manual chapter “Card Cage”, page 209. Replace link decryptor. See service manual chapter “Replacement of the Link Decryptor”, page 217.

Error	Solution
Link decryptor - 2.50V supply out of range	<p>Replace SMPS. See service manual chapter “Switch Mode Power Supply (SMPS)”, page 39.</p> <p>Replace Signal backplane. See service manual chapter “Card Cage”, page 209.</p> <p>Replace link decryptor. See service manual chapter “Replacement of the Link Decryptor”, page 217.</p>
Link decryptor - 3.30V regulator out of range	<p>Replace SMPS. See service manual chapter “Switch Mode Power Supply (SMPS)”, page 39.</p> <p>Replace Signal backplane. See service manual chapter “Card Cage”, page 209.</p> <p>Replace link decryptor. See service manual chapter “Replacement of the Link Decryptor”, page 217.</p>
Link decryptor - Security tamper	The link decryptor has been tampered. Replace link decryptor. See service manual chapter “Replacement of the Link Decryptor”, page 217.
Link decryptor - Top side security enclosure open	The top side enclosure has been tampered. Replace link decryptor. See service manual chapter “Replacement of the Link Decryptor”, page 217.
Link decryptor - Bottom side security enclosure open	The bottom side enclosure has been tampered. Replace link decryptor. See service manual chapter “Replacement of the Link Decryptor”, page 217.
Link decryptor - Software command Zeroization	Replace link decryptor. See service manual chapter “Replacement of the Link Decryptor”, page 217.
Link decryptor - Physical marriage tamper	The ICP and/or link decryptor have been removed and inserted again. You need to remarry both. Start the clear security warning procedure. See service manual chapter “Authorization to clear security warning on the projector”, page 112.
Link decryptor - Logical marriage tamper	The ICP and link decryptor are not a couple. This means one of both has been replaced. You need to marry both. Start the clear security warning procedure. See service manual chapter “Authorization to clear security warning on the projector”, page 112.
Link decryptor - Service door tamper	<p>The Card Cage cover has been removed. Clear the security warning. See service manual chapter “Authorization to clear security warning on the projector”, page 112.</p> <p>The cover plate of the Light Processor compartment has been removed. Clear the security warning. See service manual chapter “Authorization to clear security warning on the projector”, page 112.</p> <p>Defect security switches. If all compartments and devices are installed and security error will not authorize, replace DCI security switches.</p> <p>Malfunction Signal Backplane. If switch replacement is not the solution, then replace Signal Backplane.</p>
Link decryptor - Service log error	<p>The Security Log Error indicates that there is no more room to write log entries in the link decryptor log file.</p> <p>When this error is active, the DCI compliant Server needs to extract the log data (via ASM/TLS session) from the link decryptor Security Log. Reads of the security log by any other entity/means will not impact this error. This error will remain active until the Server reads enough log entries to create room for 512 log entries. This can take some time. Playback will be prohibited (black image) as long as this error is active.</p>

Error	Solution
Link decryptor - Security battery low warning	The battery of the link-decryptor is low. Leave the projector on for some time to recharge the battery.
Link decryptor - Security log warning	<p>The security log warning indicates that there are less than 512 log entry locations available in the link decryptor log before the log is full. The attached server needs to read the log which will clear the log of the projector.</p> <p>When this warning is active, the DCI compliant server needs to extract the log data (via ASM/TLS session) from the link decryptor Security Log. This can take some time. Reads of the security log by any other entity/means will not impact this warning.</p>

Code 5832: “TI-link-decryptor - security tamper event”

Situation	Solution
The link decryptor has been tampered.	Replace link decryptor. See service manual chapter “Replacement of the Link Decryptor”, page 217.

Code 5833: “TI-link-decryptor - logical marriage tamper event”

Situation	Solution
The ICP and Link Decryptor are not a couple.	<p>This means one of both has been replaced. You need to marry both. Start the clear security warning procedure. See service manual chapter “Authorization to clear security warning on the projector”, page 112.</p> <p>Together with this error you will always have an error “<i>ti-link-decryptor physical marriage tamper event</i>”.</p> <p>Brief procedure to clear the security warning:</p> <ol style="list-style-type: none"> 1. Ensure the top cover plate of the Light Processor compartment is properly installed. 2. Ensure the side cover plate of the Light Processor compartment is properly installed. 3. Ensure that all modules are properly installed into the Card Cage. 4. Start up the projector. 5. Initiate authorization by pushing the Key button on the Local Keypad. 6. Enter the pin code within 5 seconds.

Code 5834: “ti-link-decryptor - physical marriage tamper event”

Situation	Solution
The ICP and/or link decryptor have been removed and inserted again.	<p>You need to marry both. Start the clear security warning procedure. See service manual chapter “Authorization to clear security warning on the projector”, page 112.</p> <p>Brief procedure to clear the security warning:</p> <ol style="list-style-type: none"> 1. Ensure the top cover plate of the Light Processor compartment is properly installed. 2. Ensure the side cover plate of the Light Processor compartment is properly installed. 3. Ensure that all modules are properly installed into the Card Cage. 4. Start up the projector. 5. Initiate authorization by pushing the Key button on the Local Keypad. 6. Enter the pin code within 5 seconds.

Code 5835: “ti-link-decryptor - security log is almost full”

Situation	Solution
<p>The security log is almost full indicates that there are less than 512 log entry locations available in the Link Decryptor log before the log is full.</p> <p>The attached server needs to read the log which will clear the log of the projector.</p>	<p>When this warning is active, the DCI compliant server needs to extract the log data (via ASM/TLS session) from the Link Decryptor Security Log. This can take some time. Reads of the security log by any other entity/means will not impact this warning.</p>

Code 5836: “ti-link-decryptor - security log is full”

Situation	Solution
<p>The Security Log Error indicates that there is no more room to write log entries in the Link Decryptor log file.</p>	<p>When this error is active, the DCI compliant Server needs to extract the log data (via ASM/TLS session) from the link decryptor Security Log. Reads of the security log by any other entity/means will not impact this error. This error will remain active until the Server reads enough log entries to create room for 512 log entries. This can take some time. Playback will be prohibited (black image) as long as this error is active.</p>

Code 5837: “ti-link-decryptor - read system status failed ”

Situation	Solution
<p>Link Decryptor is not correctly seated.</p>	<p>Reseat the Link Decryptor. See service manual chapter “Replacement of the Link Decryptor”, page 217.</p> <p>If problem remains, replace Link Decryptor.</p>

Code 5850: “imb - no communication”

Situation	Solution
<p>Exceptional software failure.</p>	<p>Reboot the projector.</p>
<p>No communication with media block</p>	<p>Check if the media block is well seated.</p> <p>Replace the media block.</p>

Code 5851: “IMB - service door tamper event”

Situation	Solution
The top cover plate and or the side cover plate of the Light Processor compartment has been removed.	Clear the security warning. See service manual chapter “Authorization to clear security warning on the projector”, page 112. Brief procedure to clear the security warning: <ol style="list-style-type: none"> 1. Ensure the top cover plate of the Light Processor compartment is properly installed. 2. Ensure the side cover plate of the Light Processor compartment is properly installed. 3. Ensure that all modules are properly installed into the Card Cage. 4. Start up the projector. 5. Initiate authorization by pushing the Key button on the Local Keypad. 6. Enter the pin code within 5 seconds.
Defect security switches.	Replace DCI security switches of the Light Processor compartment (reference 1 Image 25-69 & 2 Image 25-70)
Malfunction Signal Backplane	If switch replacement cures nothing then replace Signal Backplane. See service manual chapter “Card Cage”, page 209.

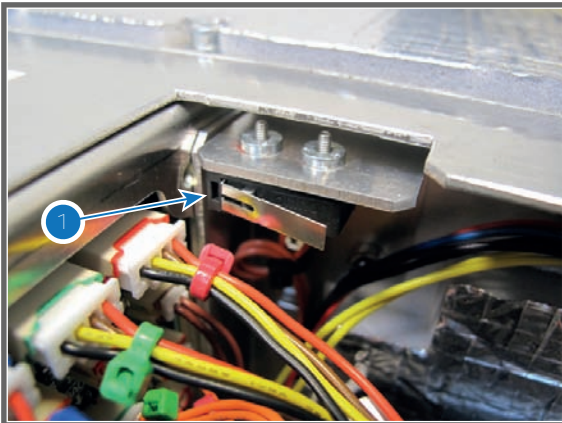


Image 25-69

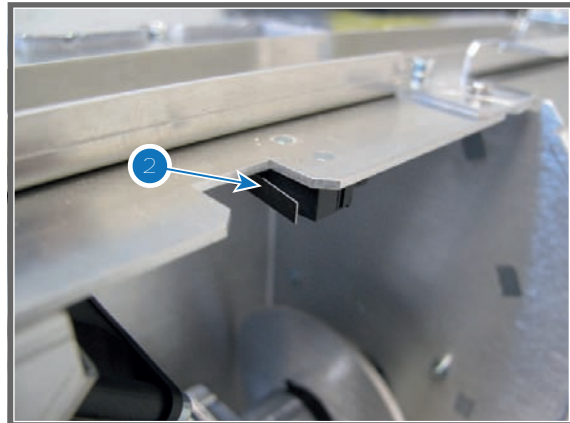


Image 25-70

Code 5853: “imb - logical marriage tamper event”

Situation	Solution
The ICP and Mediablock are not a couple.	This means one of both has been replaced. You need to marry both. Start the clear security warning procedure. See service manual chapter “Authorization to clear security warning on the projector”, page 112. Together with this error you will always have an error “ <i>imb - physical marriage tamper event</i> ”. Brief procedure to clear the security warning: <ol style="list-style-type: none"> 1. Ensure the top cover plate of the Light Processor compartment is properly installed. 2. Ensure the side cover plate of the Light Processor compartment is properly installed. 3. Ensure that all modules are properly installed into the Card Cage. 4. Start up the projector. 5. Initiate authorization by pushing the Key button on the Local Keypad. 6. Enter the pin code within 5 seconds.

Code 5854: “imb - physical marriage tamper event”

Situation	Solution
The ICP and/or Mediablock have been removed and inserted again.	<p>You need to marry both. Start the clear security warning procedure. See service manual chapter “Authorization to clear security warning on the projector”, page 112.</p> <p>Brief procedure to clear the security warning:</p> <ol style="list-style-type: none"> 1. Ensure the top cover plate of the Light Processor compartment is properly installed. 2. Ensure the side cover plate of the Light Processor compartment is properly installed. 3. Ensure that all modules are properly installed into the Card Cage. 4. Start up the projector. 5. Initiate authorization by pushing the Key button on the Local Keypad. 6. Enter the pin code within 5 seconds.

Code 5960: “light pipe - temperature too high”

This error code is probably preceded by the warning code 5961: “light pipe - temperature high”. The same troubleshooting table can be applied to.

Code 5961: “light pipe - temperature high”

Situation	Solution
Ambient temperature too high.	Check the ambient temperature at the air inlets of the projector. Make sure that the ambient temperature does not exceed 35°C (95°F).
Blocked large dust filter.	Clean the large dust filter or replace with new one. See service manual chapter “Check the large dust filter”, page 284.
Blocked small dust filter.	Clean the small dust filter or replace with new one. See service manual chapter “Check the small dust filter”, page 285.
Malfunction air extraction system.	<p>Check the condition of the air extraction system. The air extraction system must be capable of removing minimum 4 m³/min (140 CFM) per installed DP2K-SLP Series digital projector.</p> <p>Note: limit the amount of extraction to a maximum of 5m³/min (180 CFM). Excessive air extraction can dramatically speed-up contamination of the projector air inlet filters, hence requiring more regular filter cleaning interventions.</p>
Defect temperature sensor.	Replace the temperature sensor (reference 3 Image 25-71) on the heatsink of the Light Pipe entrance.

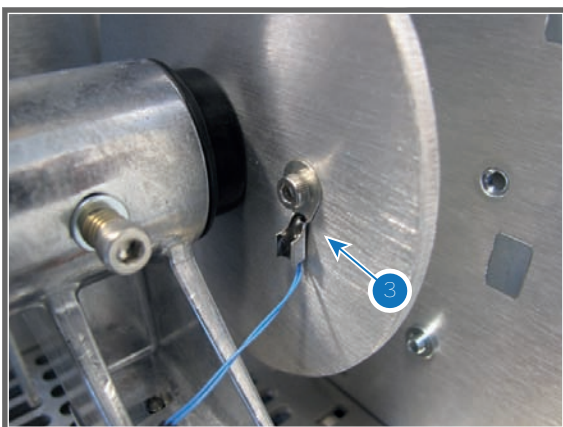


Image 25-71

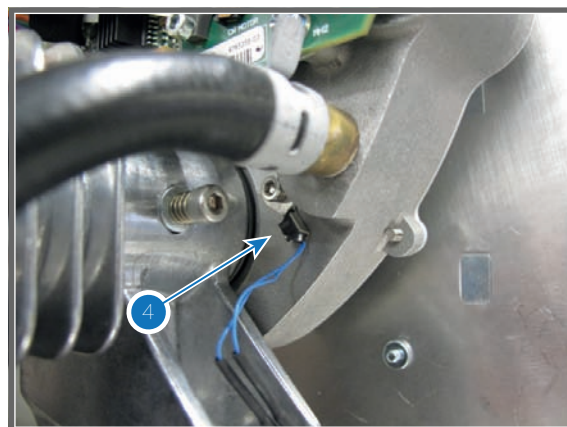


Image 25-72

Code 5964: "light pipe - temperature sensor open"

Situation	Solution
Disconnected wire of the temperature sensor.	<ol style="list-style-type: none"> 1. Check if the wire (reference 1 Image 25-73) of the temperature sensor is plugged into its socket. 2. Check if the wire (reference 2 Image 25-74) is plugged into its socket on the Signal Backplane.
Damaged wire of the temperature sensor.	<ol style="list-style-type: none"> 1. Repair the wire of the temperature sensor which measures the heat sink temperature of the Light Pipe (reference 3 Image 25-71). 2. If not repairable, replace the temperature sensor.
Defect temperature sensor.	Replace the temperature sensor which measures the heat sink temperature of the Light Pipe (reference 3 Image 25-71).
Malfunction Cinema Control board.	Replace the Cinema Control board. See service manual chapter "Replacement of the Cinema Controller", page 217.

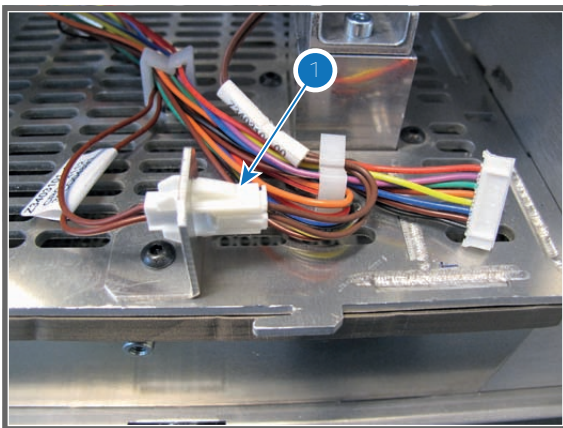


Image 25-73

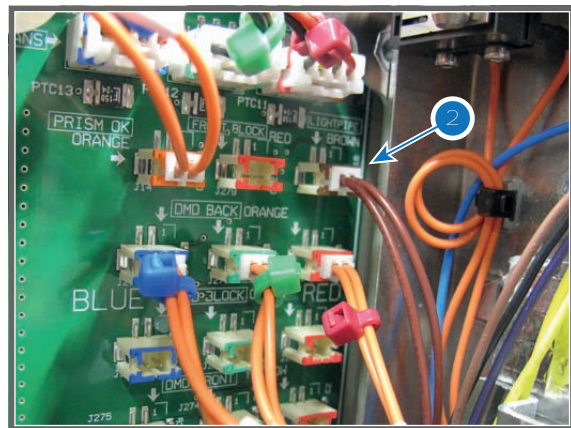


Image 25-74

Code 5965: "light pipe - temperature sensor short"

Situation	Solution
<p>Damaged wire insulation of the temperature sensor which measures the temperature at the Light Pipe entrance. When disconnecting the wire of the temperature sensor from its socket (reference 1 Image 25-73) or from the Signal Backplane (reference 2 Image 25-74) the error code is changed to "light pipe - temperature sensor open".</p>	<ol style="list-style-type: none"> 1. Repair the insulation of the of the temperature sensor which measures the temperature of Light Pipe entrance (reference 3 Image 25-76. 2. If not repairable, replace the temperature sensor and wiring.
<p>Defect temperature sensor (reference 18 Image 25-62) which measures the heat sink temperature of the red channel. When disconnecting the wire unit of the temperature sensor from the Signal Backplane (reference 8 Image 25-75) the error code is changed to "light pipe - temperature sensor open".</p>	<p>Replace the temperature sensor which measures the temperature of Light Pipe entrance (reference 3 Image 25-76.</p>

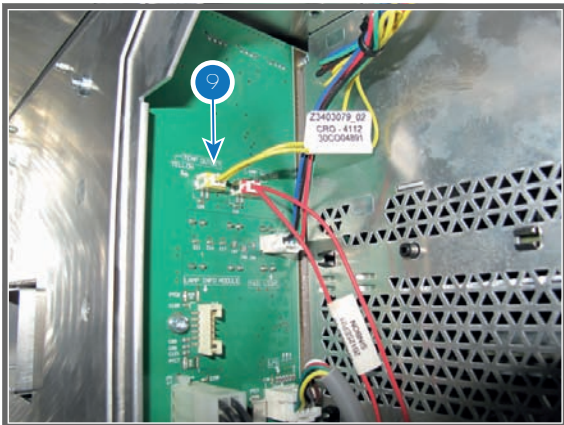


Image 25-75

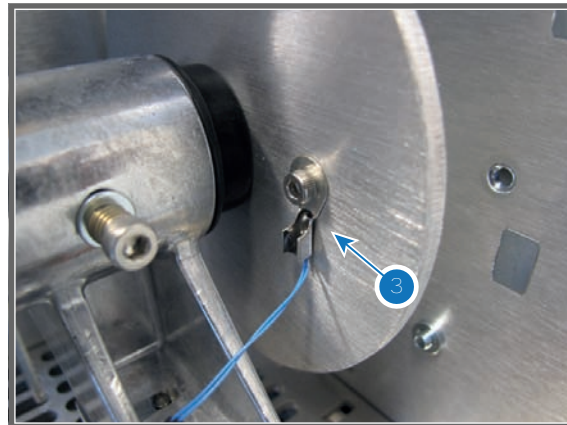


Image 25-76

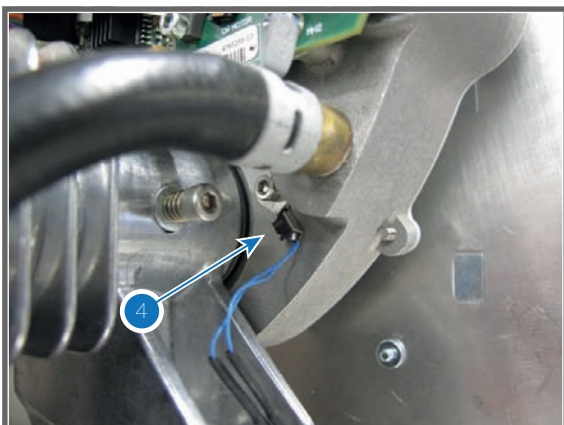


Image 25-77

Code 6040: “engine air - temperature too high”

This error code is probably preceded by the warning code 6041: “engine air - temperature high”. The same troubleshooting table can be applied.

Code 6041: “engine air - temperature high”

Situation	Solution
Blocked large dust filter.	Clean the large dust filter or replace with new one. See service manual chapter “Check the large dust filter”, page 284.
Blocked small dust filter.	Clean the small dust filter or replace with new one. See service manual chapter “Check the small dust filter”, page 285.
Ambient temperature too high.	Check the ambient temperature at the air inlets of the projector. Make sure that the ambient temperature does not exceed 35°C (95°F).
Malfunction air extraction system.	Check the condition of the air extraction system. The air extraction system must be capable of removing minimum 4 m ³ /min (140 CFM) per installed DP2K-SLP Series digital projector. Note: limit the amount of extraction to a maximum of 5m ³ /min (180 CFM). Excessive air extraction can dramatically speed-up contamination of the projector air inlet filters, hence requiring more regular filter cleaning interventions.
Defect temperature sensor.	Replace the temperature sensor (reference 16 Image 25-78) which measures the ambient temperature inside the Light Processor compartment.
Malfunction Cinema Control board.	Replace the Cinema Control board. See service manual chapter “Replacement of the Cinema Controller”, page 217.



Image 25-78

Code 6044: “engine air - temperature sensor open”

Situation	Solution
Disconnected wire of the temperature sensor.	Check if the wire (reference 6 Image 25-79) of the temperature sensor is plugged into its socket on the Signal Backplane.
Damaged wire of the temperature sensor.	<ol style="list-style-type: none"> 1. Repair the wire of the temperature sensor which measures the temperature inside the compartment of the Light Processor Unit. (reference 16 Image 25-78). 2. If not repairable, replace the temperature sensor.
Defect temperature sensor.	Replace the temperature sensor (reference 16 Image 25-78) which measures the ambient temperature inside the Light Processor compartment.

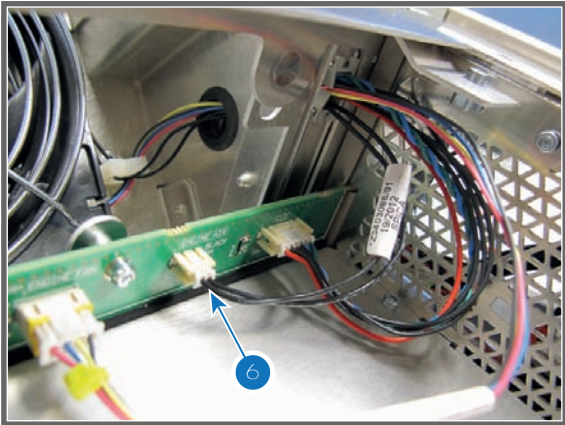


Image 25-79

Code 6045: “engine air - temperature sensor short”

Situation	Solution
<p>Damaged wire insulation of the temperature sensor which measures the ambient temperature of the Light Processor compartment. When disconnecting the wire of the temperature sensor from the Signal Backplane (reference 6 Image 25-80) the error code is changed to “engine air - temperature sensor open”.</p>	<ol style="list-style-type: none"> 1. Repair the insulation of the of the temperature sensor which measures the ambient temperature of the Light Processor compartment (reference 16 Image 25-81). 2. If not repairable, replace the temperature sensor and wiring.
<p>Defect temperature sensor (reference 16 Image 25-81) which measures the ambient temperature of the Light Processor compartment. When disconnecting the wire unit of the temperature sensor from the Signal Backplane (reference 6 Image 25-80) the error code is changed to “engine air - temperature sensor open”.</p>	<p>Replace the temperature sensor (reference 16 Image 25-81) which measures the ambient temperature of the Light Processor compartment.</p>

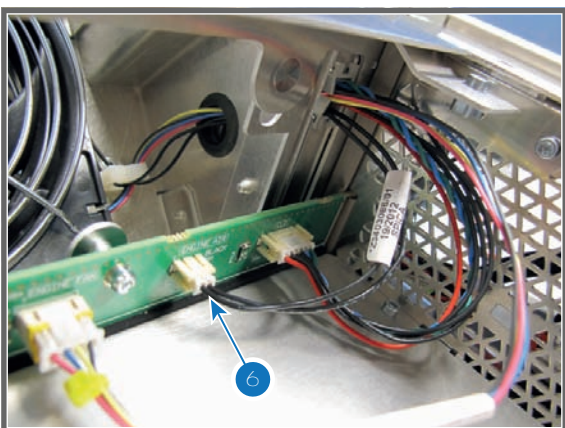


Image 25-80

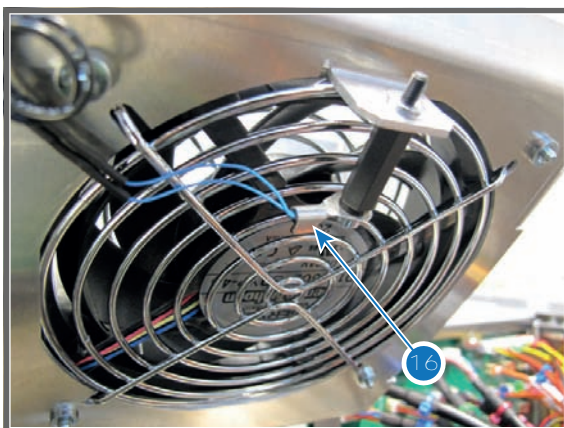


Image 25-81

Code 6050: “dmd - temperature hardware protection warning”

Situation	Solution
DMD temperature low.	Make sure that the ambient temperature is within specs. Let the projector acclimate to the normal room temperature which should be higher than 10° C (50°F) and lower than 35°C (95°F). Do not ignite the lamp, otherwise there is a risk for condensation.
DMD temperature high.	Check all cooling systems: small dust filter, large dust filter, air extraction system, etc.

Code 6061: “+24v - voltage high”

Situation	Solution
Malfunction Cinema Control board or SMPS board.	<p>Put the projector in Stand-By mode, remove the Light Source and the Cathode Fan assembly to access the Signal Backplane connections with the SMPS wires (reference 6 Image 25-82). Then, measure on the Signal Backplane the +24V voltage on pin 9, 10, 11 or 12 of the connector with the black wires coming from the SMPS board. See Image 25-82.</p> <p>If the measured voltage is about 24V then replace the Cinema Control board. See service manual chapter “Replacement of the Cinema Controller”, page 217. Otherwise replace the SMPS board. See service manual chapter “Switch Mode Power Supply (SMPS)”, page 39.</p> <p>Note: To remove the Light Source see service manual chapter “Laser Phosphor Light Source”, page 59. To remove the Anode Fan assembly see service manual chapter “Replacement of the Anode Fan”, page 84.</p> <p>Note: The projector must be in Stand-By mode otherwise no voltages are generated by the SMPS board.</p>

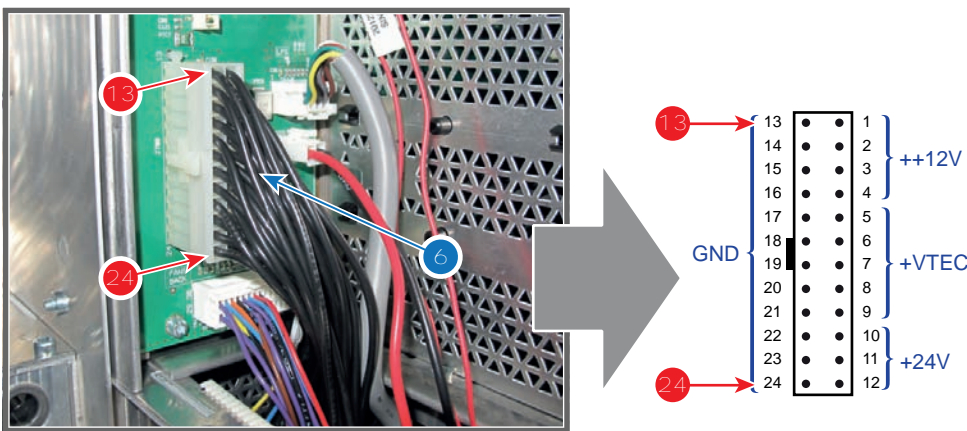


Image 25-82

Code 6062: “+24v - voltage too low”

This error code is probably preceded by the warning code 6063: “+24v - voltage low”. The same troubleshooting table can be applied.

Code 6063: “+24v - voltage low”

Situation	Solution
<p>Malfunction Fan Control board or SMPS board.</p>	<p>Put the projector in Stand-By mode, remove the Light Source and the Cathode Fan assembly to access the Signal Backplane connections with the SMPS wires (reference 6 Image 25-82). Then, measure on the Signal Backplane the +24V voltage on pin 9, 10, 11 or 12 of the connector with the black wires coming from the SMPS board. See Image 25-82.</p> <p>If the measured voltage is about 24V then replace the Cinema Control board. See service manual chapter “Replacement of the Cinema Controller”, page 217. Otherwise replace the SMPS board. See service manual chapter “Switch Mode Power Supply (SMPS)”, page 39.</p> <p>Note: To remove the Light Source House see service manual chapter “Laser Phosphor Light Source”, page 59. To remove the Lamp Anode Fan assembly see service manual chapter “Replacement of the Anode Fan”, page 84.</p> <p>Note: The projector must be in Stand-By mode otherwise no voltages are generated by the SMPS board.</p>
<p>Short circuit or bad connection.</p>	<ol style="list-style-type: none"> 1. Check the Signal Backplane for bad connections. Ensure that all wires are well connected (reference 6 Image 25-82). (Note that the +24V supply is generated on the SMPS board and enters the Cinema Control board via the Signal Backplane) 2. Check the wiring (reference 1 Image 25-83) of the Anode Fan for short circuits. 3. Check the wiring (reference 3 Image 25-84) of the Cathode Fan for short circuits. <p>Note: To access the SMPS connections with the Signal Backplane the Lamp House and Lamp Cathode Fan assembly (reference 1 Image 25-84) has to be removed from the projector.</p>

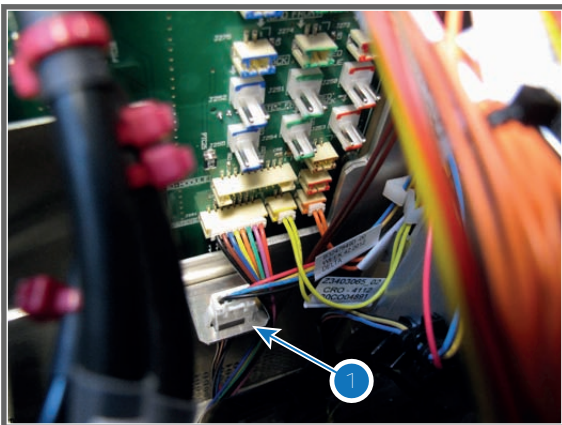


Image 25-83

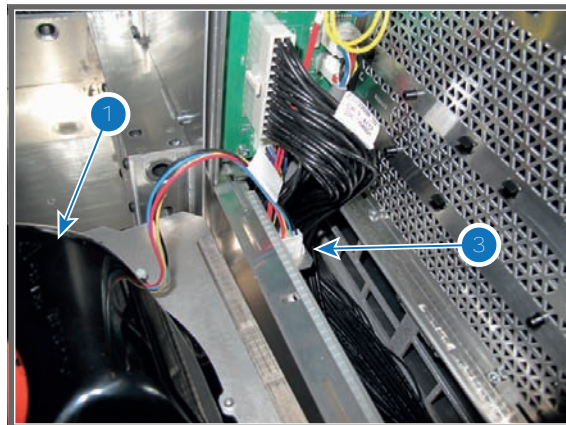


Image 25-84

Code 6071: “++12v - voltage high”

Situation	Solution
Malfunction Cinema Control board or SMPS board.	<p>Put the projector in Stand-By mode, remove the Lamp House and the Lamp Cathode Fan assembly to access the Signal Backplane connections with the SMPS wires (reference 6 Image 25-85). Then, measure on the Signal Backplane the ++12V voltage on pin 1, 2 or 3 of the connector with the black wires coming from the SMPS board. See Image 25-85.</p> <p>If the measured voltage is about 12V then replace the Cinema Control board. See service manual chapter “Replacement of the Cinema Controller”, page 217. Otherwise replace the SMPS board. See service manual chapter “Switch Mode Power Supply (SMPS)”, page 39.</p> <p>Note: To remove the Light Source, see service manual chapter “Laser Phosphor Light Source”, page 59. To remove the Anode Fan assembly see service manual chapter “Replacement of the Anode Fan”, page 84.</p> <p>Note: The projector must be in Stand-By mode otherwise no voltages are generated by the SMPS board.</p>

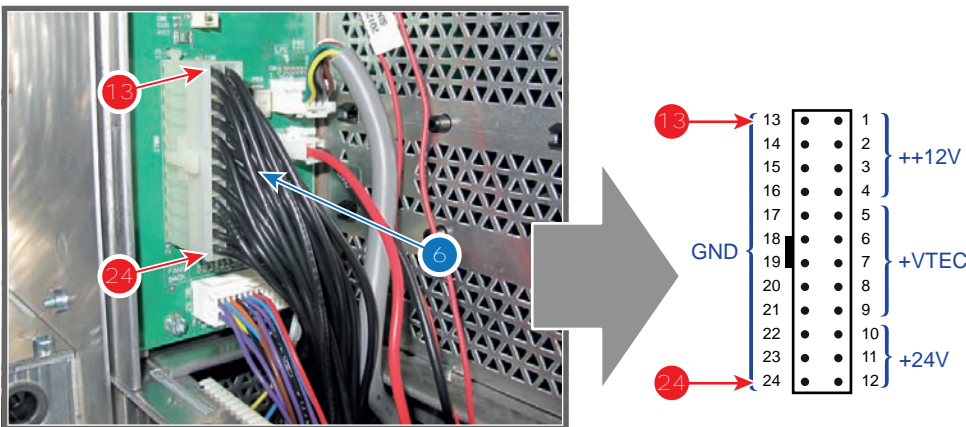


Image 25-85

Code 6073: “++12v - voltage low”

Situation	Solution
Malfunction Fan Control board or SMPS board.	<p>Put the projector in Stand-By mode, remove the Light Source and the Cathode Fan assembly to access the Signal Backplane connections with the SMPS wires (reference 6 Image 25-85). Then, measure on the Signal Backplane the ++12V voltage on pin 1, 2 or 3 of the connector with the black wires coming from the SMPS board. See Image 25-85.</p> <p>If the measured voltage is about 12V then replace the Cinema Control board. See service manual chapter “Replacement of the Cinema Controller”, page 217. Otherwise replace the SMPS board. See service manual chapter “Switch Mode Power Supply (SMPS)”, page 39.</p> <p>Note: To remove the Light Source, see service manual chapter “Laser Phosphor Light Source”, page 59. To remove the Lamp Anode Fan assembly see service manual chapter “Replacement of the Anode Fan”, page 84.</p> <p>Note: The projector must be in Stand-By mode otherwise no voltages are generated by the SMPS board.</p>
Short circuit or bad connection.	<p>Check the Signal Backplane for bad connections.</p> <p>Note: To access the SMPS connections with the Signal Backplane the Lamp House and Lamp Cathode Fan assembly (reference 1 Image 25-84) has to be removed from the projector.</p>

Code 6082: "Lens motors - voltage too low"

Situation	Solution
<p>The supply voltage for the lens motors is below its minimum.</p>	<p>Put the projector in Stand-By mode, remove the Light Source and the Cathode Fan assembly to access the Signal Backplane connections with the SMPS wires (reference 6 Image 25-86). Then, measure on the Signal Backplane the +24V voltage on pin 9, 10, 11 or 12 of the connector with the black wires coming from the SMPS board. See Image 25-86.</p> <p>(The supply voltage for the lens motors is derived from the +24V on the Cinema Controller board. The +24V supply is generated on the SMPS board and enters the Cinema Control board via the Signal Backplane.)</p> <p>If the measured voltage is about 24V then:</p> <ol style="list-style-type: none"> 1. reseat the Cinema Control board. See "Replacement of the Cinema Controller", page 217. 2. if the problem remains, replace the Cinema Controller board. <p>If the measured voltage is not OK then:</p> <ol style="list-style-type: none"> 1. Check the Signal Backplane for bad connections. Ensure that all wires are well connected. 2. Check the wiring (reference 1 Image 25-83) of the Anode Fan for short circuits. 3. Check the wiring (reference 3 Image 25-84) of the Cathode Fan for short circuits. 4. replace the SMPS board. See service manual chapter "Switch Mode Power Supply (SMPS)", page 39. <p>Note: To remove the Light Source, see service manual chapter "Laser Phosphor Light Source", page 59. To remove the Anode Fan assembly see service manual chapter "Replacement of the Anode Fan", page 84.</p> <p>Note: The projector must be in Stand-By mode otherwise no voltages are generated by the SMPS board.</p>

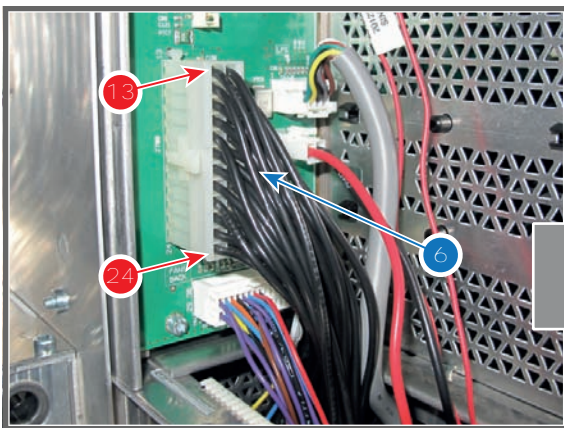
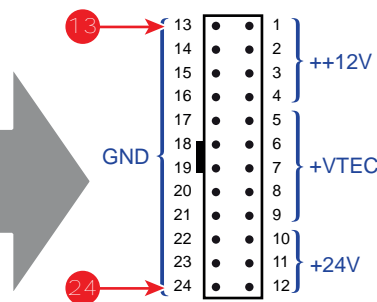


Image 25-86



Code 6123: "ICP fan - speed low"

Situation	Solution
<p>Wire of the ICP fan disconnected from the Signal Backplane.</p>	<p>Remove the projector top cover and top cover plate. Look inside the compartment above the Card Cage to check if the wire unit (reference 1 Image 25-87) is inserted in the Signal Backplane.</p>
<p>Blocked ICP fan.</p>	<p>Remove the projector top cover and top cover plate. Look inside the compartment above the Card Cage to check if the ICP fan is not blocked (reference 2 Image 25-87). Unblock the fan. Ensure that the fan can turn freely.</p>

Situation	Solution
Damaged wire.	Remove the projector top cover and top cover plate. Look inside the compartment above the Card Cage to check the wire of the ICP fan. Repair if possible, otherwise replace with new one. See service manual chapter "Replacement of the ICP fan", page 222.
Malfuction Cinema Control board.	Replace the Cinema Control board. See service manual chapter "Replacement of the Cinema Controller", page 217.
Fan end of life.	Replace the ICP fan. See service manual chapter "Replacement of the ICP fan", page 222.

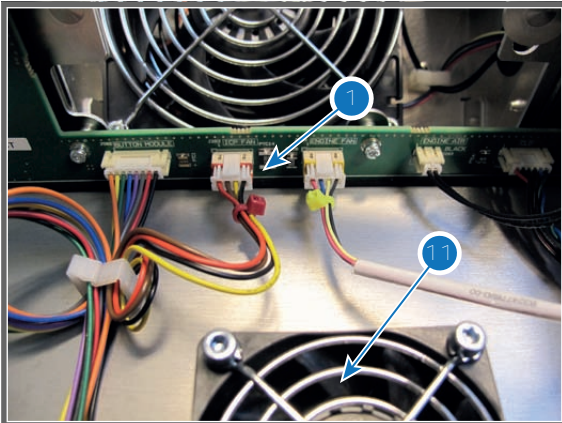


Image 25-87

Code 6200: "maintenance - maintenance required" (Notification)

Situation	Solution
Projector requires maintenance.	Go to the menu "Maintenance → Smart maintenance" in the Communicator software. See also maintenance program of the projector (included in the service manual).

Code 6210: "lens - no lens parameter file has been activated" (Warning)

Situation	Solution
No lens parameter file has been activated.	Select a suitable lens parameter file for the installed lens using the Communicator software. >Installation >Advanced >Lens parameters >Select

Code 6233: "light pipe fan - speed low" (Warning)

Situation	Solution
Blocked fan.	Unblock the fan. Ensure that the fan can turn freely (reference 2Image 25-88).
Damaged wire.	Check the wire (reference 1Image 25-89) of the fan. Repair if possible, otherwise replace with new one. See service manual chapter "Replacement of the Light Pipe fan", page 136.
Fan end of life.	Replace the fan. See service manual chapter "Replacement of the Light Pipe fan", page 136.
Malfuction Cinema Control board.	Replace the Cinema Control board. See service manual chapter "Replacement of the Cinema Controller", page 217.



Image 25-88

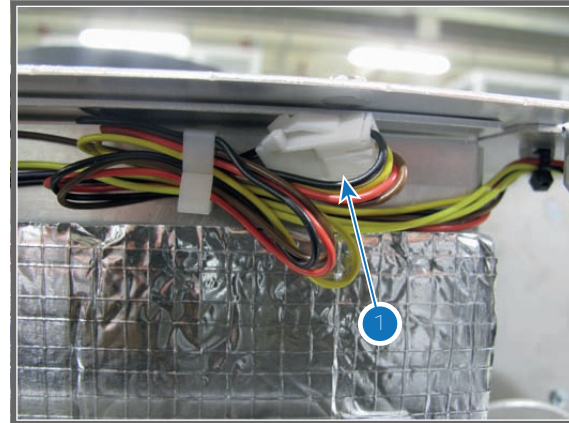


Image 25-89

25.3 Troubleshooting checklist Laser Control Board (LCB)

Code 20003: “LCB – Board temperature too high”

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 64.

Code 20004: “LCB – Board temperature sensor shorted”

Situation	Solution
Malfunction temperature sensor on LCB.	Replace the LCB. See service procedure “Replacing the Laser Control Board (LCB)”, page 64.

Group 20005: “LCB – Board temperature sensor open”

Situation	Solution
Malfunction temperature sensor on LCB.	Replace the LCB. See service procedure “Replacing the Laser Control Board (LCB)”, page 64.

Code 20009: “LLS – Phosphor wheel motor temperature too high”

Situation	Solution
Ambient temperature too high.	Ensure that the ambient temperature of the projector is within spec.
Insufficient cooling of phosphor wheel motor	<ul style="list-style-type: none"> • Check the Cooling fluid level. Add in cooling fluid to the light source if the level is too low. See procedure “Liquid cooling circuit”, page 91. • Clean the front filter or replace with new one. See “Maintenance procedures”, page 291. • If error persists, replace the light source. See “Laser Phosphor Light Source”, page 59.

Situation	Solution
Malfunction temperature sensor.	Replace the LCB. See service procedure “Replacing the Laser Control Board (LCB)”, page 64.
Malfunction LCB	Replace the LCB. See service procedure “Replacing the Laser Control Board (LCB)”, page 64.

Code 20010: “LLS – Phosphor wheel motor temperature sensor shorted”

Situation	Solution
Bad wiring connection	Check the small orange connector J401 on the LCB and on the phosphor wheel PCB. Make sure the cable is properly seated. Replace if necessary.
Malfunction LCB	Replace the LCB. See service procedure “Replacing the Laser Control Board (LCB)”, page 64.

Group 20011: “LLS – Phosphor wheel motor temperature sensor open”

Situation	Solution
Bad wiring connection	Check the small orange connector J401 on the LCB and on the phosphor wheel PCB. Make sure the cable is properly seated. Replace if necessary.
Malfunction LCB	Replace the LCB. See service procedure “Replacing the Laser Control Board (LCB)”, page 64.

Code 20019: “LCB – Air pressure low”

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 64.

Code 20026: “LCB – +24 V (fans) too low”

Situation	Solution
Bad wiring connection	Check connector J900 on the LCB and the LPM. Make sure the cable is properly seated. If problem persists, replace the cable.
Defective +24V module LDM	Replace the +24V module in the LDM (LDM slot 7). See service procedure “Replacing a Laser Drive Module”, page 56.
Malfunction LCB.	Replace the Laser Control Board (LCB). See service procedure “Replacing the Laser Control Board (LCB)”, page 64.

Code 20029: “LCB – +24 V (fans) too high”

Situation	Solution
In combination with other +24V errors: Defective +24V module LDM	Replace the +24V module in the LDM (LDM slot 7). See service procedure “Replacing a Laser Drive Module”, page 56.
This error alone: Malfunction LCB.	Replace the Laser Control Board (LCB). See service procedure “Replacing the Laser Control Board (LCB)”, page 64.

Code 20030: “LCB – +36 V (phosphor wheel) too low”

Situation	Solution
Bad wiring connection	Check connector J901 on the LCB and the LDM, slot 6. Make sure the cable is properly seated. If problem persists, replace the cable.
Defective +36V module LDM	Replace the +36V module in the LDM (LDM slot 6). See service procedure “Replacing a Laser Drive Module”, page 56.
Malfunction LCB.	Replace the Laser Control Board (LCB). See service procedure “Replacing the Laser Control Board (LCB)”, page 64.

Code 20033: “LCB – +36 V (phosphor wheel) too high”

Situation	Solution
Malfunction LCB.	Replace the Laser Control Board (LCB). See service procedure “Replacing the Laser Control Board (LCB)”, page 64.

Code 20046: “LLS – Phosphor wheel motor speed too low”

Situation	Solution
Wrong motor settings	Upgrade the software to the latest version. See procedure “Software update via Communicator (DC update companion)”, page 249.
Bad wiring connection	Check connectors J800 and J801 on the LCB and the phosphor wheel motor and speed sensor. Make sure the cable is properly seated. If problem persists, replace the cable.
Error appears together with +36V errors: Problem with +36V module in the LDM.	See error handling of +36V module errors.
Malfunction LCB.	Replace the Laser Control Board (LCB). See service procedure “Replacing the Laser Control Board (LCB)”, page 64.
Defective or blocked phosphor wheel	Replace the light source. See “Laser Phosphor Light Source”, page 59.

Code 20070: “LCB – FCB forces lasers off”

Situation	Solution
Error triggered by Fan Control Board related errors	This error will never appear alone. See FCB related errors.

Code 20101: “LLS – Bank 1 is off”



While this warning message appears, the projector can keep on playing with a noticeable color/brightness difference. However: If no timely actions are taken, this warning will eventually increase in severity and the light source can shut down (if more laser banks start to fail).

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-x – LLS bank y [error name]”. Resolve these errors first.
Laser bank didn't switch on because of failing self-test	While the projector is in service mode, go to Communicator and go to Diagnostics >> actual >> Currents. Check the current of the laser bank. <ol style="list-style-type: none"> 1. No current: Check / reseal the cabling between LDM module and light source laser bank. Check / reseal the cabling between Light source and Light source PCB. 2. Current \leq 630 mA: 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 LLS and LDM board	Check / reseal the cabling between the LDM board and LLS. Check the connector on the laser subassembly PCB.
Error appears on 3 consecutive laser banks, controlled by the same LDM board: Defective laser driver	Temporary swap 2 Laser driver boards of the same type in the LDM 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 48. 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 25-90). If it has blown, replace it. • Replace the cable between LDM board and light source. • Replace the entire LDM. See service procedure “Replacing a Laser Drive Module”, page 56. • If problem persists after replacing the LDM, the laser banks are defective. 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 light source. See service procedure “Laser Phosphor Light Source”, page 59.

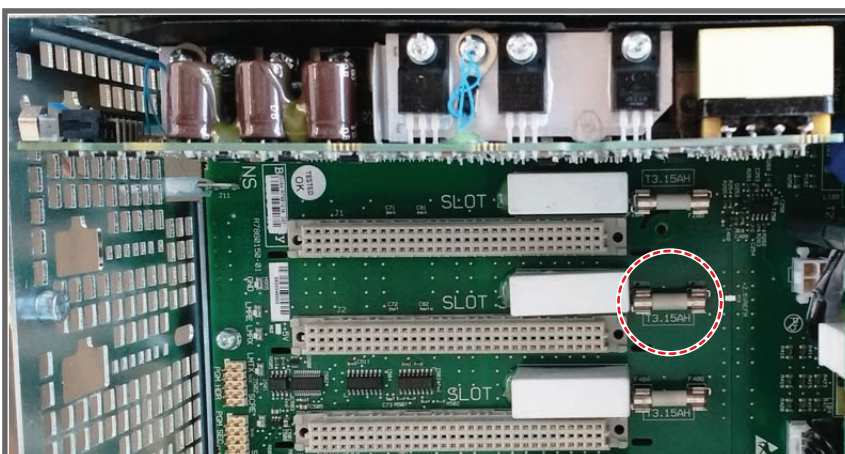


Image 25-90: Location of the Fuse.

Code 20102: “LLS – Bank 2 is off”

For this error the same troubleshooting table can be applied to as for code **20101: “LLS – Bank 1 is off”**.

Code 20103: “LLS – Bank 3 is off”

For this error the same troubleshooting table can be applied to as for code **20101: “LLS – Bank 1 is off”**.

Code 20104: “LLS – Bank 4 is off”

For this error the same troubleshooting table can be applied to as for code **20101: “LLS – Bank 1 is off”**.

Code 20105: “LLS – Bank 5 is off”

For this error the same troubleshooting table can be applied to as for code **20101: “LLS – Bank 1 is off”**.

Code 20106: “LLS – Bank 6 is off”

For this error the same troubleshooting table can be applied to as for code **20101: “LLS – Bank 1 is off”**.

Code 20107: “LLS – Bank 7 is off”

For this error the same troubleshooting table can be applied to as for code **20101: “LLS – Bank 1 is off”**.

Code 20108: “LLS – Bank 8 is off”

For this error the same troubleshooting table can be applied to as for code **20101: “LLS – Bank 1 is off”**.

Code 20109: “LLS – Bank 9 is off”

For this error the same troubleshooting table can be applied to as for code **20101: “LLS – Bank 1 is off”**.

Code 20128: “LCB – FCB forces lasers off at start-up”

For this error the same troubleshooting table can be applied to as for code **20070: “LCB – FCB forces lasers off”**.

Code 20129: “LLS – Phosphor wheel motor speed too low at start-up”

For this error the same troubleshooting table can be applied to as for code **20046: “LCB – Phosphor wheel motor speed too low”**.

Code 20131: “LCB – Turn-on LCM 1 failed”

Situation	Solution
Light Source cooling could not be switched on during startup sequence	<ul style="list-style-type: none"> • Check / reseal the communication cable between the LCB (J600) and the light source fan interconnection board (J101). • Upgrade the software to the latest version. See procedure “Software update via Communicator (DC update companion)”, page 249. • If problem persists, replace the fan interconnection board. See service procedure “Replacing the Light Source Fan Interconnection Board”, page 72.

Code 20133: “LCB – Turn-on PFC LDM 1 failed”

Situation	Solution
PFC (+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 to the LDM. • If problem persists, replace the LDM. See service procedure “Replacing a Laser Drive Module”, page 56.

Code 20135: “LCB – Turn-on PFC LDM 1–6 failed”

Situation	Solution
Cable or connection +36 V shorted.	Check / reseat the cable between LDM 1–6 and LCB connector J601.
Defective +36 V module	Replace the +36V module in the LDM (LDM slot 6). See service procedure “Replacing a Laser Drive Module”, page 56.
Defective LCB	Replace the Laser Control Board (LCB). See service procedure “Replacing the Laser Control Board (LCB)”, page 64.

Code 20136: “LCB – Turn-on PFC LDM 1–7 failed”

Situation	Solution
PFC (+380 VM / VMA) could not be switched on during the startup process of the projector.	Replace the +24 V module in the LDM (LDM slot 1–7). See procedure “Replacing a Laser Drive Module”, page 56.

Code 20137: “LCB – LDM power configuration mismatch”

Situation	Solution
Difference in firmware version.	Upgrade the software to the latest version. See procedure “Software update via Communicator (DC update companion)”, page 249.
The LDM did not switch on or not all power parts are detected.	Check if the +36 V and +24 V modules are in their correct slot (1–6 and 1–7 respectively). Correct their positions if necessary. See procedure “Replacing a Laser Drive Module”, page 56. See
Bad wiring connection	Check / reseat the cables between the LDM2 and the LCB.

Code 20142: “LCM 1 – Fan 1 speed too low”

Situation	Solution
Fan speed too low due to wiring issue.	Check/reseat the wire connections on the fan interconnection board.
Fan speed too low due to fan damage.	Remove the Light Source from the projector and do the following: <ol style="list-style-type: none"> 1. Remove the fan from the Light Source assembly and check if this numbered fan is not blocked. 2. If not blocked, replace the fan. For removing the Light Source, see service procedures in “Laser Phosphor Light Source”, page 59. For removing and replacing the fan, see procedure “Replacing a fan from the Light Source”, page 75.
Defective Cooler Control Board.	<ol style="list-style-type: none"> 1. Replace the Light Source Fan Interconnection board. See procedure “Replacing the Light Source Fan Interconnection Board”, page 72. 2. If problem persists, replace the entire Light Source. See procedure “Laser Phosphor Light Source”, page 59.

Code 20146: “LCM 1 – Fan 2 speed too low”

For this error the same troubleshooting table can be applied to as for code **20142: “LCM1 – Fan 1 speed too low”**.

Code 20150: “LCM 1 – Pump speed too low”

Situation	Solution
Cable / connection issue	Check/reat the wire connections on the fan interconnection board (J201).
Defective Fan Interconnection Board	<ol style="list-style-type: none"> 1. Replace the Light Source fan Interconnection board. See procedure “Replacing the Light Source Fan Interconnection Board”, page 72. 2. If problem persists, replace the entire light source. See procedure “Laser Phosphor Light Source”, page 59.
Damaged cooling pump	Replace the Light Source. See procedure “Laser Phosphor Light Source”, page 59.

Code 20153: “LCM 1 – Pump speed too high”

Situation	Solution
Defective fan interconnection board	<ol style="list-style-type: none"> 1. Replace the Light Source fan Interconnection board. See procedure “Replacing the Light Source Fan Interconnection Board”, page 72. 2. If problem persists, replace the entire Light Source. See procedure “Laser Phosphor Light Source”, page 59.
Damaged cooling pump	Replace the Light Source. See procedure “Laser Phosphor Light Source”, page 59.

Code 20164: “LCM 1 – Coolant liquid out temperature too low”

Situation	Solution
Environmental conditions of the chiller are not within spec	<p>Check environmental conditions. Ensure that the environmental conditions comply with the installation specifications. See installation manual for detailed installation requirements.</p> <p>In case of a new installed Light Source, let the complete system acclimatize.</p>
Light Source power cut	Switch off Light Source and wait a few hours.
Defective LCB	Replace the Laser Control Board (LCB). See service procedure “Replacing the Laser Control Board (LCB)”, page 64.
Malfunction temperature sensor	Replace the Light Source. See procedure “Laser Phosphor Light Source”, page 59.

Code 20167: “LCM 1 – Coolant liquid out temperature too high”

Situation	Solution
Delta temperature coolant in-out becomes too high	Check the level of the cooling liquid. Add more cooling liquid if necessary. See procedure “Liquid cooling circuit”, page 91.
Defective LCB	Replace the Laser Control Board (LCB). See service procedure “Replacing the Laser Control Board (LCB)”, page 64.
Malfunction temperature sensor	Replace the Light Source. See procedure “Laser Phosphor Light Source”, page 59.

Code 20168: “LCM 1 – Coolant liquid out temperature sensor short”

Situation	Solution
Malfunctioning temperature sensor	Replace the Light Source. See procedure “Laser Phosphor Light Source”, page 59.

Code 20169: “LCM 1 – Coolant liquid out temperature sensor open”

Situation	Solution
Temperature sensor unplugged	Check / reseat temperature cable on the LCB (J404).
Defective LCB	Replace the Laser Control Board (LCB). See service procedure “Replacing the Laser Control Board (LCB)”, page 64.
Malfunctioning temperature sensor	Replace the Light Source. See procedure “Laser Phosphor Light Source”, page 59.

Code 20170: “LCM 1 – Coolant liquid in temperature too low”

Situation	Solution
Environmental conditions are not within spec	Check environmental conditions. Ensure that the environmental conditions comply with the installation specifications. See installation manual for detailed installation requirements. In case of a new installed Light Source, let the complete system acclimatize.
Light Source power cut	Switch off the Light Source and wait a few hours.
Defective LCB	Replace the Laser Control Board (LCB). See service procedure “Replacing the Laser Control Board (LCB)”, page 64.
Malfunction temperature sensor	Replace the Light Source. See procedure “Laser Phosphor Light Source”, page 59.

Code 20173: “LCM 1 – Coolant liquid in temperature too high”

Situation	Solution
Delta temperature coolant in-out becomes too high	Check the level of the cooling liquid. Add liquid if necessary. See procedure “Liquid cooling circuit”, page 91.
Defective LCB	Replace the Laser Control Board (LCB). See service procedure “Replacing the Laser Control Board (LCB)”, page 64.
Malfunction temperature sensor	Replace the entire Light Source. See procedure “Laser Phosphor Light Source”, page 59.

Code 20174: “LCM 1 – Coolant liquid in temperature sensor short”

For this error the same troubleshooting table can be applied to as for code 20168: “LCM1 – Coolant liquid out temperature short”.

Code 20175: “LCM 1 – Coolant liquid in temperature sensor open”

Situation	Solution
Temperature sensor unplugged	Check / reseat temperature cable on the LCB (J403).
Defective LCB	Replace the Laser Control Board (LCB). See service procedure “Replacing the Laser Control Board (LCB)”, page 64.
Malfunctioning temperature sensor	Replace the Light Source. See procedure “Laser Phosphor Light Source”, page 59.

Code 20180: “LCM 1 – Air blown out temperature short”

For this error the same troubleshooting table can be applied to as for code **20168: “LCM1 – Coolant liquid out temperature short”**.

Code 20181: “LCM 1 – Air blown out temperature open”

Situation	Solution
Temperature sensor unplugged	Check / reseat temperature cable on the LCB (J405).
Defective LCB	Replace the Laser Control Board (LCB). See service procedure “Replacing the Laser Control Board (LCB)”, page 64.
Malfunctioning temperature sensor	Replace the Light Source. See procedure “Laser Phosphor Light Source”, page 59.

Code 20182: “LCM 1 – Air drawn in temperature too low”

Situation	Solution
Environmental conditions are not within spec	Check environmental conditions. Ensure that the environmental conditions comply with the installation specifications. See projector installation manual for detailed installation requirements. In case of a new installed Light Source, let the complete system acclimatize.

Code 20185: “LCM 1 – Air drawn in temperature too high”

Situation	Solution
Environmental conditions are not within spec	Check environmental conditions. Ensure that the environmental conditions comply with the installation specifications. See projector installation manual for detailed installation requirements. In case of a new installed Light Source, let the complete system acclimatize.
Blocked air inlet	Clean the front filter or replace with new one. See “Maintenance procedures”, page 291.

Code 20186: “LCM 1 – Air drawn in temperature sensor short”

For this error the same troubleshooting table can be applied to as for code **20168: “LCM1 – Coolant liquid out temperature short”**.

Group 20187: “LCM 1 – Air drawn in temperature sensor open”

Situation	Solution
Temperature sensor unplugged	Check / reseat temperature cable on the LCB (J406).
Defective LCB	Replace the Laser Control Board (LCB). See service procedure “Replacing the Laser Control Board (LCB)”, page 64.
Malfunctioning temperature sensor	Replace the Light Source. See procedure “Laser Phosphor Light Source”, page 59.

Code 20240: “LDM 1 – 15 vm voltage too low”

Situation	Solution
Malfunction Laser Driver Module	Replace the LDM. See service procedure “Replacing a Laser Drive Module”, page 56.

Code 20243: “LDM 1 – 15 VM voltage too high”

Situation	Solution
Malfunction Laser Driver Module	Replace the LDM. See service procedure “Replacing a Laser Drive Module”, page 56.

Code 20244: “LDM 1 – 380 vm voltage too low”

Situation	Solution
Malfunction Laser Driver Module	Replace the LDM. See service procedure “Replacing a Laser Drive Module”, page 56.

Code 20247: “LDM 1 – 380 vm voltage too high”

Situation	Solution
Malfunction Laser Driver Module	Replace the LDM. See service procedure “Replacing a Laser Drive Module”, page 56.

Code 20248: “LDM 1 – 380 vma voltage too low”

Situation	Solution
Malfunction Laser Driver Module	Replace the LDM. See service procedure “Replacing a Laser Drive Module”, page 56.

Code 20251: “LDM 1 – 380 vma voltage too high”

Situation	Solution
Malfunction Laser Driver Module	Replace the LDM. See service procedure “Replacing a Laser Drive Module”, page 56.

Code 20252: “LDM 1 – Mains voltage too low”

Situation	Solution
Wiring issue	Check wiring between LDM and the mains. Replace the power cable if necessary.
Malfunction mains voltage	See Mains voltage errors.

Code 20255: “LDM 1 – mains voltage too high”

For this error the same troubleshooting table can be applied to as for code 20252: “LDM 1 — Mains voltage too low”.

Code 20259: “LDM 1 – Heatsink PFC temperature too high”

Situation	Solution
Problem with cooling of the LDM	Check the projector filters. Clean or replace them if necessary. Check the LDM fans. Replace them if necessary. See service procedure “Removing a fan from an LDM”, page 51.
Malfunction Laser Driver Module	Replace the LDM. See service procedure “Replacing a Laser Drive Module”, page 56.

Code 20260: “LDM 1 – heatsink PFC temperature sensor short”

Situation	Solution
Malfunction Laser Driver Module	Replace the LDM. See service procedure “Replacing a Laser Drive Module”, page 56.

Code 20261: “LDM 1 – heatsink PFC temperature sensor open”

Situation	Solution
Malfunction Laser Driver Module	Replace the LDM. See service procedure “Replacing a Laser Drive Module”, page 56.

Code 20265: “LDM 1 – heatsink pfc aux temperature too high”

For this error the same troubleshooting table can be applied to as for code 20259: “LDM 1 — heatsink pfc temperature too high”.

Code 20266: “LDM 1 – heatsink pfc aux temperature sensor short”

For this error the same troubleshooting table can be applied to as for code 20260: “LDM 1 — heatsink pfc temperature sensor short”.

Code 20267: “LDM 1 – heatsink pfc aux temperature sensor open”

For this error the same troubleshooting table can be applied to as for code 20261: “LDM 1 — heatsink pfc temperature sensor open”.

Code 20271: “LDM 1 – heatsink rectifier temperature too high”

For this error the same troubleshooting table can be applied to as for code 20259: “LDM 1 — heatsink pfc temperature too high”.

Code 20272: “LDM 1 – heatsink rectifier temperature sensor short”

For this error the same troubleshooting table can be applied to as for code 20260: “LDM 1 — heatsink pfc temperature sensor short”.

Code 20273: “LDM 1 – heatsink rectifier temperature sensor open”

For this error the same troubleshooting table can be applied to as for code 20261: “LDM 1 — heatsink pfc temperature sensor open”.

Code 20274: “LDM 1 – Bad Communication”

Situation	Solution
Difference in software packages between LCB and LDM.	Upgrade the software. See procedure “Software update via Communicator (DC update companion)”, page 249.
Only the 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 communication wiring between 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 procedure “Replacing a Laser Drive Module”, page 56.
There are other communication errors: Malfunction LCB	Replace the LCB. See service procedure “Replacing the Laser Control Board (LCB)”, page 64.

Code 20275: “LDM 1 – No Communication”

Situation	Solution
First install of Laser Driver Module	Upgrade the software. See procedure “Software update via Communicator (DC update companion)”, page 249.
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 other LDM communication errors: Malfunction LCB	<ol style="list-style-type: none"> 1. Check if the communication wire between the LDM, LPM and Laser Control board (Z3403440) is properly inserted on all ends. 2. If problem persists, replace the LCB. See service procedure “Replacing the Laser Control Board (LCB)”, page 64.

Code 20276: “LDM 1 – Not configured (invalid module type)”

Situation	Solution
Older or unsupported software on Laser Driver Module	Upgrade the software. See procedure “Software update via Communicator (DC update companion)”, page 249.
LDM type not supported.	Replace the LDM. See service procedure “Replacing a Laser Drive Module”, page 56.

Code 20278: “LDM 1 – Not configured (initialization failure)”

Situation	Solution
Older or unsupported software on Laser Driver Module	Upgrade the software. See procedure “Software update via Communicator (DC update companion)”, page 249.
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.

Code 20279: “LDM 1 – Not configured (initialization failure)”

Situation	Solution
Older or unsupported software on Laser Driver Module	Upgrade the software. See procedure “Software update via Communicator (DC update companion)”, page 249.
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.

Code 20280: “LDM 1 – Fan 1 speed too low”

Situation	Solution
Fan speed too low of one fan of the Laser Driver Module	<ol style="list-style-type: none"> 1. Check fan wire connection on the Controller Board of the LDM (reference 1, Image 25-91). 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 51.</p>
Error on both fans of the LDM. Malfunction Control Board of LDM.	Replace the LDM. See service procedure “Replacing a Laser Drive Module”, page 56.

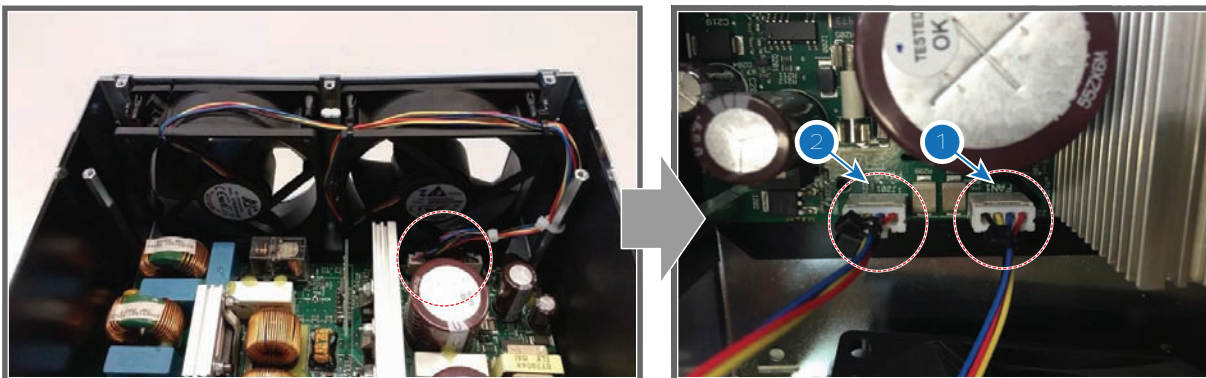


Image 25-91

- 1 Fan 1
- 2 Fan 2

Code 20283: “LDM 1 – Fan 1 speed too high”

Situation	Solution
Fan speed too high of one fan of the LDM	<ol style="list-style-type: none"> 1. Malfunctioning fan. Replacement needed. Remove the fan from the LDM and replace the fan. See service procedure “Removing a fan from an LDM”, page 51. 2. If problem persist replace the LDM. See service procedure “Replacing a Laser Drive Module”, page 56.
Fan speed error on both fans of the LDM. Malfunction LDM.	Replace the LDM. See service procedure “Replacing a Laser Drive Module”, page 56.

Code 20284: “LDM 1 – Fan 2 speed too low”

Situation	Solution
Fan speed too low of one fan of the Laser Driver Module	<ol style="list-style-type: none"> 1. Check fan wire connection on the Controller Board of the LDM (reference 2, Image 25-91). 2. Remove the fan assembly. 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 51.</p>
Error on both fans of the LDM. Malfunction Control Board of LDM.	Replace the LDM. See service procedure “Replacing a Laser Drive Module”, page 56.

Code 20287: “LDM 1 – Fan 2 speed too high”

Situation	Solution
Fan speed too high of one fan of the LDM	<ol style="list-style-type: none"> 1. Malfunctioning fan. Replacement needed. Remove the fan from the LDM and replace the fan. See service procedure “Removing a fan from an LDM”, page 51. 2. If problem persist replace the LDM. See service procedure “Replacing a Laser Drive Module”, page 56.
Fan speed error on both fans of the LDM. Malfunction LDM.	Replace the LDM. See service procedure “Replacing a Laser Drive Module”, page 56.

Code 20288: “LDM 1 – +12V voltage too low”

Situation	Solution
Faulty LDM board	Check which LDM board is faulty. Remove one or multiple boards to see which board triggers the +12 V error. See service procedure “Replacing a Laser Drive Module”, page 56.

Code 20291: “LDM 1 – +12V voltage too high”

Situation	Solution
Malfunction LDM	Replace the LDM. See service procedure “Replacing a Laser Drive Module”, page 56.

Code 20292: “LDM 1 – +24V voltage too low”

Situation	Solution
Malfunction LDM fan(s)	<ol style="list-style-type: none"> 1. Check fan wire connection on the Controller Board of the LDM (reference 1, Image 25-91). 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 51.</p>

Code 20295: “LDM 1 – +24V voltage too high”

Situation	Solution
Malfunction LDM	Replace the LDM. See service procedure “Replacing a Laser Drive Module”, page 56.

Code 20299: “LDM 1 – board temperature too high”

Situation	Solution
Ambient temperature too high.	Check the ambient temperature at the air inlets of the projector. Make sure that the ambient temperature does not exceed 35°C (95°F).
Blocked filter at the front side of the projector.	Clean the front filter or replace with new one. See “Maintenance procedures”, page 291

Code 20302: “LDM 1 – Bad Communication”

For this error the same troubleshooting table can be applied to as for code **20274: “LDM 1 – Bad Communication”**.

Code 20303: “LDM 1 – No Communication”

For this error the same troubleshooting table can be applied to as for code **20275: “LDM 1 – No Communication”**.

Code 20305: “LDM 1 – Not configured (invalid module type)”

For this error the same troubleshooting table can be applied to as for code **20278: “LDM 1 – Not configured (invalid module type)”**.

Code 20306: “LDM 1 – Not configured (initialization failure)”

For this error the same troubleshooting table can be applied to as for code **20279: “LDM 1 – Not configured (initialization failure)”**.

Code 20323: “LDM 1-2 – LLS bank 1 drain voltage too high”

Situation	Solution
This error occurred on a single laser bank: Defective laser bank	<p>This error will appear together with a blue taillight on the projector. There will be an impact on the performance, although not noticeable. In order to bring the projector back to DCI color spec, perform the following actions:</p> <ul style="list-style-type: none"> • Use Communicator to block the bad laser bank(s). • Perform a full color calibration. <p>For more info, see Communicator User manual.</p>
Error appears on 3 consecutive laser banks, controlled by the same laser driver board: Defective laser driver board	<p>This error will appear together with a yellow or even red taillight on the projector (depending on laser driver board type). Temporary swap 2 LDM boards and check for the “bank x is off” or “bank x drain voltage too high” messages. Ignore any other new messages triggered by this swapping.</p> <p>If the warning changes to other laser banks, replace the driver board. See service procedure “Replacing a driver board in an LDM unit”, page 48.</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"> • Replace the cable between LDM board and light source. • Replace the entire LDM. See service procedure “Replacing a Laser Drive Module”, page 56. • If problem persists after replacing the LDM, the laser banks are defective. 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>

Situation	Solution
Error appears on up to 4 laser driver boards in the same LDM: Defective LDM main board.	This error will appear alongside with a yellow or even red taillight on the projector. Replace the entire LDM. See service procedure “Replacing a Laser Drive Module”, page 56.
Error appears on every laser driver board that is physically present in the LDM: Projector is operating out of spec	This error will appear alongside with a yellow or red taillight on the projector. The projector’s is operating on a power higher than prescribed in the spec and on the safety label. Make sure the supplied power is within spec. If the problem persists, perform a test on your electrical circuit and check for recurring voltage spikes. Make the necessary adjustments to your electrical circuit to remove or filter out these spikes.

Code 20327: “LDM 1-2 – LLS bank 2 drain voltage too high”

For this error the same troubleshooting table can be applied to as for code **20323: “LDM 1-3 – LLS bank 1 drain voltage too high”**.

Code 20331: “LDM 1-3 – LLS bank 3 drain voltage too high”

For this error the same troubleshooting table can be applied to as for code **20323: “LDM 1-3 – LLS bank 1 drain voltage too high”**.

Code 20335: “LDM 1-2 – LLS bank 1 current too high”

Situation	Solution
Malfunction LDM board	Replace LDM board. See service procedure “Replacing a Laser Drive Module”, page 56.

Code 20339: “LDM 1-2 – LLS bank 2 current too high”

For this error the same troubleshooting table can be applied to as for code **20335: “LDM 1-2 – LLS bank 1 current too high”**.

Code 20343: “LDM 1-2 – LLS bank 3 current too high”

For this error the same troubleshooting table can be applied to as for code **20335: “LDM 1-2 – LLS bank 1 current too high”**.

Code 20359: “LDM 1-2 – LLS bank 1 temperature too high”

Situation	Solution
This error appears alone: Insufficient cooling of light source	<ul style="list-style-type: none"> • Check the Cooling fluid level. Add in cooling fluid to the light source if the level is too low. • Clean the front filter or replace with new one. See “Maintenance procedures”, page 291.
Error appears alongside other cooling related errors	Resolve cooling related errors first.

Code 20360: “LDM 1-2 – LLS bank 1 temperature sensor shorted”

Situation	Solution
Wiring issue	Check / reseal the cable between the LDM board and the LLS. If problem persists, replace the cable.

Code 20361: “LDM 1-2 – LLS bank 1 temperature sensor open”

Situation	Solution
Wiring issue	Check / reseal the cable between the LDM board and the LLS. If problem persists, replace the cable.
Faulty LDM board	Temporary swap two LDM boards and search for “LLS bank x temperature sensor open” errors. <ul style="list-style-type: none"> • If the error has swapped to a laser bank driven by the swapped LDM board, replace the LDM board. See service procedure “Replacing a driver board in an LDM unit”, page 48. • If the error remains on the same laser bank, the problem is with the LLS or LLS connection.
Malfunction LLS	Replace the Light source. See service procedure “Laser Phosphor Light Source”, page 59.

Code 20365: “LDM 1-2 – LLS bank 2 temperature too high”

For this error the same troubleshooting table can be applied to as for code **20359: “LDM 1–2 – LLS bank 1 temperature too high”**.

Code 20366: “LDM 1-2 – LLS bank 2 temperature sensor shorted”

For this error the same troubleshooting table can be applied to as for code **20360: “LDM 1–2 – LLS bank 1 temperature sensor shorted”**.

Code 20367: “LDM 1-2 – LLS bank 2 temperature sensor open”

For this error the same troubleshooting table can be applied to as for code **20361: “LDM 1–2 – LLS bank 1 temperature sensor open”**.

Code 20371: “LDM 1-2 – LLS bank 3 temperature too high”

For this error the same troubleshooting table can be applied to as for code **20359: “LDM 1–2 – LLS bank 1 temperature too high”**.

Code 20372: “LDM 1-2 – LLS bank 3 temperature sensor shorted”

For this error the same troubleshooting table can be applied to as for code **20360: “LDM 1–2 – LLS bank 1 temperature sensor shorted”**.

Code 20373: “LDM 1-2 – LLS bank 3 temperature sensor open”

For this error the same troubleshooting table can be applied to as for code **20361: “LDM 1–2 – LLS bank 1 temperature sensor open”**.

Code 20377: “LDM 1-2 – Heatsink rectifier temperature too high”

Situation	Solution
Problem with cooling of the LDMs	Check the projector filters. Clean or replace them if necessary. Check the LDM fans. Replace them if necessary. See service procedure “Removing a fan from an LDM”, page 51.
Malfunction LDM board	Replace the LDM board. See service procedure “Replacing a driver board in an LDM unit”, page 48.

Code 20378: “LDM 1-2 – heatsink rectifier temperature sensor short”

Situation	Solution
Malfunction LDM board	Replace the LDM board. See service procedure “Replacing a driver board in an LDM unit”, page 48.

Code 20379: “LDM 1-2 – heatsink rectifier temperature sensor open”

Situation	Solution
Malfunction LDM board	Replace the LDM board. See service procedure “Replacing a driver board in an LDM unit”, page 48.

Code 20383: “LDM 1-2 – Heatsink drain temperature too high”

For this error the same troubleshooting table can be applied to as for code **20377: “LDM 1-2 – Heatsink rectifier temperature too high”**.

Code 20384: “LDM 1-2 – Heatsink drain temperature sensor shorted”

For this error the same troubleshooting table can be applied to as for code **20378: “LDM 1-2 – Heatsink rectifier temperature sensor shorted”**.

Code 20385: “LDM 1-2 – Heatsink drain temperature sensor open”

For this error the same troubleshooting table can be applied to as for code **20379: “LDM 1-2 – Heatsink rectifier temperature sensor open”**.

Code 20386: “LDM 1-2 – Bad Communication”

Situation	Solution
Difference in software packages.	Upgrade the software. See procedure “Software update via Communicator (DC update companion)”, page 249.
There are other communication errors, including LDM 1 communication errors.	Solve LDM 1 communication errors first.
There are several LDM 1-x communication errors	<ul style="list-style-type: none"> • Make sure that all LDM boards are properly seated in the LDM case. • If problem persists, replace the LDM. See service procedure “Replacing a Laser Drive Module”, page 56.

Code 20387: “LDM 1-2 – No Communication”

Situation	Solution
First install of Laser Driver Module	Upgrade the software. See procedure “Software update via Communicator (DC update companion)”, page 249.
There are other communication errors, including LDM 1 communication errors.	Solve LDM 1 communication errors first.
There are several LDM 1-x communication errors	<ul style="list-style-type: none"> • Make sure that all LDM boards are properly seated in the LDM case. • If problem persists, replace the LDM. See service procedure “Replacing a Laser Drive Module”, page 56.

Code 20391: “LDM 1-2 – Bad Communication”

For this error the same troubleshooting table can be applied to as for code **20386: “LDM 1 – Bad Communication”**.

Code 20392: “LDM 1-2 – No Communication”

For this error the same troubleshooting table can be applied to as for code **20387: “LDM 1 – No Communication”**.

Code 20394: “LCB – 36V phosphor wheel voltage too low”

Situation	Solution
Bad wiring connection	Check connector J901 on the LCB and the LPM. Make sure the cable is properly seated. If problem persists, replace the cable.
Defective +36V module LPM	Replace the +36V module in the LDM (slot 6). See service procedure “Replacing a Laser Drive Module”, page 56.
Malfunction LCB.	Replace the Laser Control Board (LCB). See service procedure “Replacing the Laser Control Board (LCB)”, page 64.

Code 20397: “LCB – 36V phosphor wheel voltage too high”

Situation	Solution
Malfunction LCB.	Replace the Laser Control Board (LCB). See service procedure “Replacing the Laser Control Board (LCB)”, page 64.

Code 20401: “LDM 1-6 – Heatsink rectifier temperature too high”

For this error the same troubleshooting table can be applied to as for code **20377: “LDM 1-2 – Heatsink rectifier temperature too high”**.

Code 20402: “LDM 1-6 – Heatsink rectifier temperature sensor shorted”

For this error the same troubleshooting table can be applied to as for code **20378: “LDM 1-2 – Heatsink rectifier temperature sensor shorted”**.

Code 20403: “LDM 1-6 – Heatsink rectifier temperature sensor open”

For this error the same troubleshooting table can be applied to as for code **20379: “LDM 1-2 – Heatsink rectifier temperature sensor open”**.

Code 20407: “LDM 1-6 – Heatsink drain temperature too high”

For this error the same troubleshooting table can be applied to as for code **20377: “LDM 1-2 – Heatsink rectifier temperature too high”**.

Code 20408: “LDM 1-6 – Heatsink drain temperature sensor shorted”

For this error the same troubleshooting table can be applied to as for code **20378: “LDM 1-2 – Heatsink rectifier temperature sensor shorted”**.

Code 20409: “LDM 1-6 – Heatsink drain temperature sensor open”

For this error the same troubleshooting table can be applied to as for code **20379: “LDM 1-2 – Heatsink rectifier temperature sensor open”**.

Code 20412: “LDM 1-6 – Not configured (invalid module type)”

For this error the same troubleshooting table can be applied to as for code **20278: “LDM 1 – Not configured (invalid module type)”**.

Code 20413: “LDM 1-6 – Not configured (no communication)”

Situation	Solution
Mismatch in Laser Power Modules	Check if the +36 V module is in the correct slot (LDM slot 6).

Code 20414: “LDM 1-6 – Not configured (initialization failure)”

For this error the same troubleshooting table can be applied to as for code **20279: “LDM 1 – Not configured (initialization failure)”**.

Code 20425: “LDM 1-7 – 24V LCB voltage low”

Situation	Solution
Wiring issue	Check the cable between LCB and the 24V filter board on the one end, and the cable between the filter board and the +24V module of the LDM (LDM slot 7). Replace if necessary.
Malfunction 24V filter board.	Replace the 24V filter board. See service procedure “Replacing the 24V Filter board”, page 65.

Code 20426: “LDM 1-7 – 24V LCB voltage high”

For this error the same troubleshooting table can be applied to as for code **20425: “LDM 1-7 – 24 V LCB voltage low”**.

Code 20431: “LDM 1-7 – Heatsink rectifier temperature too high”

For this error the same troubleshooting table can be applied to as for code **20377: “LDM 1-2 – Heatsink rectifier temperature too high”**.

Code 20432: “LDM 1-7 – Heatsink rectifier temperature sensor shorted”

For this error the same troubleshooting table can be applied to as for code **20378: “LDM 1-2 – Heatsink rectifier temperature sensor shorted”**.

Code 20433: “LDM 1-7 – Heatsink rectifier temperature sensor open”

For this error the same troubleshooting table can be applied to as for code **20379: “LDM 1-2 – Heatsink rectifier temperature sensor open”**.

Code 20436: “LDM 1-7 – Not configured (invalid module type)”

For this error the same troubleshooting table can be applied to as for code **20278: “LDM 1 – Not configured (invalid module type)”**.

Code 20437: “LDM 1-7 – Not configured (no communication)”

Situation	Solution
Mismatch in driver boards mounted in the LDM	Check if the +24 V module is in the correct slot (LDM 1-7).

Code 20438: “LDM 1-7 – Not configured (initialization failure)”

For this error the same troubleshooting table can be applied to as for code **20279: “LDM 1 – Not configured (initialization failure)”**.

Code 20523: “LDM 1-3 – LLS bank 4 drain voltage too high”

For this error the same troubleshooting table can be applied to as for code **20323: “LDM 1 – LLS bank 1 drain voltage too high”**.

Code 20527: “LDM 1-3 – LLS bank 5 drain voltage too high”

For this error the same troubleshooting table can be applied to as for code **20323: “LDM 1 – LLS bank 1 drain voltage too high”**.

Code 20531: “LDM 1-3 – LLS bank 6 drain voltage too high”

For this error the same troubleshooting table can be applied to as for code 20323: “LDM 1 – LLS bank 1 drain voltage too high”.

Code 20535: “LDM 1-3 – LLS bank 4 current too high”

For this error the same troubleshooting table can be applied to as for code 20335: “LDM 1-2 – LLS bank 1 current too high”.

Code 20539: “LDM 1-3 – LLS bank 5 current too high”

For this error the same troubleshooting table can be applied to as for code 20335: “LDM 1-2 – LLS bank 1 current too high”.

Code 20543: “LDM 1-3 – LLS bank 6 current too high”

For this error the same troubleshooting table can be applied to as for code 20335: “LDM 1-2 – LLS bank 1 current too high”.

Code 20559: “LDM 1-3 – LLS bank 4 temperature too high”

For this error the same troubleshooting table can be applied to as for code 20359: “LDM 1-2 – LLS bank 1 temperature too high”.

Code 20560: “LDM 1-3 – LLS bank 4 temperature sensor shorted”

For this error the same troubleshooting table can be applied to as for code 20360: “LDM 1-2 – LLS bank 1 temperature sensor shorted”.

Code 20561: “LDM 1-3 – LLS bank 4 temperature sensor open”

For this error the same troubleshooting table can be applied to as for code 20361: “LDM 1-2 – LLS bank 1 temperature sensor open”.

Code 20565: “LDM 1-3 – LLS bank 5 temperature too high”

For this error the same troubleshooting table can be applied to as for code 20359: “LDM 1-2 – LLS bank 1 temperature too high”.

Code 20566: “LDM 1-3 – LLS bank 5 temperature sensor shorted”

For this error the same troubleshooting table can be applied to as for code 20360: “LDM 1-2 – LLS bank 1 temperature sensor shorted”.

Code 20567: “LDM 1-3 – LLS bank 5 temperature sensor open”

For this error the same troubleshooting table can be applied to as for code 20361: “LDM 1-2 – LLS bank 1 temperature sensor open”.

Code 20571: “LDM 1-3 – LLS bank 6 temperature too high”

For this error the same troubleshooting table can be applied to as for code 20359: “LDM 1-2 – LLS bank 1 temperature too high”.

Code 20572: “LDM 1-3 – LLS bank 6 temperature sensor shorted”

For this error the same troubleshooting table can be applied to as for code 20360: “LDM 1-2 – LLS bank 1 temperature sensor shorted”.

Code 20573: “LDM 1-3 – LLS bank 6 temperature sensor open”

For this error the same troubleshooting table can be applied to as for code 20361: “LDM 1 – LLS bank 1 temperature sensor open”.

Code 20577: “LDM 1-3 – Heatsink rectifier temperature too high”

For this error the same troubleshooting table can be applied to as for code 20377: “LDM 1-2 – Heatsink rectifier temperature too high”.

Code 20578: “LDM 1-3 – Heatsink rectifier temperature sensor shorted”

For this error the same troubleshooting table can be applied to as for code 20378: “LDM 1-2 – Heatsink rectifier temperature sensor shorted”.

Code 20579: “LDM 1-3 – Heatsink rectifier temperature sensor open”

For this error the same troubleshooting table can be applied to as for code 20379: “LDM 1-2 – Heatsink rectifier temperature sensor open”.

Code 20583: “LDM 1-3 – Heatsink drain temperature too high”

For this error the same troubleshooting table can be applied to as for code 20377: “LDM 1-2 – Heatsink rectifier temperature too high”.

Code 20584: “LDM 1-3 – Heatsink drain temperature sensor shorted”

For this error the same troubleshooting table can be applied to as for code 20378: “LDM 1-2 – Heatsink rectifier temperature sensor shorted”.

Code 20585: “LDM 1-3 – Heatsink drain temperature sensor open”

For this error the same troubleshooting table can be applied to as for code 20379: “LDM 1-2 – Heatsink rectifier temperature sensor open”.

Code 20609: “LDM 1-4 – LLS bank 7 drain voltage too high”

For this error the same troubleshooting table can be applied to as for code 20323: “LDM 1-2 – LLS bank 1 drain voltage too high”.

Code 20613: “LDM 1-4 – LLS bank 8 drain voltage too high”

For this error the same troubleshooting table can be applied to as for code 20323: “LDM 1-2 – LLS bank 1 drain voltage too high”.

Code 20621: “LDM 1-4 – LLS bank 7 current too high”

For this error the same troubleshooting table can be applied to as for code 20335: “LDM 1-2 – LLS bank 1 current too high”.

Code 20625: “LDM 1-4 – LLS bank 8 current too high”

For this error the same troubleshooting table can be applied to as for code 20335: “LDM 1-2 – LLS bank 1 current too high”.

Code 20645: “LDM 1-4 – LLS bank 7 temperature too high”

For this error the same troubleshooting table can be applied to as for code 20359: “LDM 1-2 – LLS bank 1 temperature too high”.

Code 20646: “LDM 1-4 – LLS bank 7 temperature sensor shorted”

For this error the same troubleshooting table can be applied to as for code 20360: “LDM 1-2 – LLS bank 1 temperature sensor shorted”.

Code 20647: “LDM 1-4 – LLS bank 7 temperature sensor open”

For this error the same troubleshooting table can be applied to as for code 20361: “LDM 1-2 – LLS bank 1 temperature sensor open”.

Code 20651: “LDM 1-4 – LLS bank 8 temperature too high”

For this error the same troubleshooting table can be applied to as for code 20359: “LDM 1-2 – LLS bank 1 temperature too high”.

Code 20652: “LDM 1-4 – LLS bank 8 temperature sensor shorted”

For this error the same troubleshooting table can be applied to as for code 20360: “LDM 1-2 – LLS bank 1 temperature sensor shorted”.

Code 20653: “LDM 1-4 – LLS bank 8 temperature sensor open”

For this error the same troubleshooting table can be applied to as for code 20361: “LDM 1-2 – LLS bank 1 temperature sensor open”.

Code 20663: “LDM 1-4 – Heatsink rectifier temperature too high”

For this error the same troubleshooting table can be applied to as for code 20377: “LDM 1-2 – Heatsink rectifier temperature too high”.

Code 20664: “LDM 1-4 – Heatsink rectifier temperature sensor shorted”

For this error the same troubleshooting table can be applied to as for code 20378: “LDM 1-2 – Heatsink rectifier temperature sensor shorted”.

Code 20665: “LDM 1-4 – Heatsink rectifier temperature sensor open”

For this error the same troubleshooting table can be applied to as for code 20379: “LDM 1-2 – Heatsink rectifier temperature sensor open”.

Code 20669: “LDM 1-4 – Heatsink drain temperature too high”

For this error the same troubleshooting table can be applied to as for code 20377: “LDM 1-2 – Heatsink rectifier temperature too high”.

Code 20670: “LDM 1-4 – Heatsink drain temperature sensor shorted”

For this error the same troubleshooting table can be applied to as for code 20378: “LDM 1-2 – Heatsink rectifier temperature sensor shorted”.

Code 20671: “LDM 1-4 – Heatsink drain temperature sensor open”

For this error the same troubleshooting table can be applied to as for code 20379: “LDM 1-2 – Heatsink rectifier temperature sensor open”.

Code 21113: “LDM 1-2 – LLS bank 1 drain power too high”

Situation	Solution
This error appears together with a blue taillight on the projector.	There will be an impact on the performance, although not noticeable. In order to bring the projector back to DCI color spec, perform the following actions: <ul style="list-style-type: none"> • Use Communicator to block all bad laser banks. • Perform a full color calibration. For more info, see Communicator User manual.
This error appears together with a yellow taillight on the projector.	There will be a noticeable impact on color performance and/or brightness. The projector will still play, but will probably no longer play within the DCI specifications. Replace the light source. See service procedure “Laser Phosphor Light Source”, page 59.
This error appears together with a red taillight on the projector	Projector will shut down / no longer start up, until sufficient service actions have been taken. Replace the light source. See service procedure “Laser Phosphor Light Source”, page 59.

Code 21117: “LDM 1-2 – LLS bank 2 drain power too high”

For this error the same troubleshooting table can be applied to as for code 21113: “LDM 1-2 – LLS bank 1 drain power too high”.

Code 21121: “LDM 1-2 – LLS bank 3 drain power too high”

For this error the same troubleshooting table can be applied to as for code 21113: “LDM 1-2 – LLS bank 1 drain power too high”.

Code 21125: “LDM 1-3 – LLS bank 4 drain power too high”

For this error the same troubleshooting table can be applied to as for code 21113: “LDM 1-2 – LLS bank 1 drain power too high”.

Code 21129: “LDM 1-3 – lls bank 5 drain power too high”

Situation	Solution
Problem on mixed laser bank. Laser bank will shut down	Replace the light source. See service procedure “Laser Phosphor Light Source”, page 59.

Code 21133: “LDM 1-3 – lls bank 6 drain power too high”

Situation	Solution
Problem on blue laser bank. Laser bank will shut down	Replace the light source. See service procedure “Laser Phosphor Light Source”, page 59.

Code 21137: “LDM 1-4 – LLS bank 7 drain power too high”

For this error the same troubleshooting table can be applied to as for code 21133: “LDM 1-3 – LLS bank 6 drain power too high”.

Code 21141: “LDM 1-4 – LLS bank 8 drain power too high”

For this error the same troubleshooting table can be applied to as for code 21129: “LDM 1-3 – LLS bank 5 drain power too high”.

Code 21210: “LCB – LDM initialization failed (safety switch open)”

Situation	Solution
Light source will not start due to one or more safety switch(es) being open.	See error handling for the specific safety switch(es).

Code 21220: “LLS – Bank 1 is off”



These messages will be accompanied with the blue tail light of the projector. This message may have an impact on the performance, although not noticeable.

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-x – LLS bank y [error name]”. Resolve these errors first.
Laser bank didn't switch on because of failing self-test	While the projector is in service mode, go to Communicator and go to Diagnostics >> actual >> Currents. Check the current of the laser bank. <ol style="list-style-type: none"> 1. No current: Check / reseal the cabling between LDM module and light source laser bank. Check / reseal the cabling between Light source and Light source PCB. 2. Current \leq 630 mA: 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 LLS and LDM board	check / reseal the cabling between the LDM board and LLS. Check the connector on the laser subassembly PCB.
Error appears on 3 consecutive laser banks, controlled by the same LDM board: Defective laser driver	Temporary swap 2 Laser driver boards of the same type in the LDM 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 48. 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 25-90). If it has blown, replace it. • Replace the cable between LDM board and light source. • Replace the entire LDM. See service procedure “Replacing a Laser Drive Module”, page 56. • If problem persists after replacing the LDM, the laser banks are defective. 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	Block this laser bank using Communicator and perform a full color calibration. For more info, see the communicator user manual. Note that blocking the laser bank in Communicator will prevent this message from appearing. But it does not “fix” the defective laser bank. If too many laser banks are defective, a higher severity message will be triggered, together with the yellow or red taillight.

Code 21221: “LLS – Bank 2 is off”

For this error the same troubleshooting table can be applied to as for code 21220: “LLS – Bank 1 is off”.

Code 21222: “LLS – Bank 3 is off”

For this error the same troubleshooting table can be applied to as for code **21220: “LLS – Bank 1 is off”**.

Code 21223: “LLS – Bank 4 is off”

For this error the same troubleshooting table can be applied to as for code **21220: “LLS – Bank 1 is off”**.

Code 21224: “LLS – Bank 5 is off”

For this error the same troubleshooting table can be applied to as for code **21220: “LLS – Bank 1 is off”**.

Code 21225: “LLS – Bank 6 is off”

For this error the same troubleshooting table can be applied to as for code **21220: “LLS – Bank 1 is off”**.

Code 21226: “LLS – Bank 7 is off”

For this error the same troubleshooting table can be applied to as for code **21220: “LLS – Bank 1 is off”**.

Code 21227: “LLS – Bank 8 is off”

For this error the same troubleshooting table can be applied to as for code **21220: “LLS – Bank 1 is off”**.

Code 21228: “LLS – Bank 9 is off”

For this error the same troubleshooting table can be applied to as for code **21220: “LLS – Bank 1 is off”**.

Code 21244: “LLS – Bank 1 is off”



This message will be accompanied with the red tail light of the projector. 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 “LDM1-x – LLS bank y [error name]”. Resolve these errors first.
Laser bank didn't switch on because of failing self-test	While the projector is in service mode, go to Communicator and go to Diagnostics >> actual >> Currents. Check the current of the laser bank. <ol style="list-style-type: none"> 1. No current: Check / reseal the cabling between LDM module and light source laser bank. Check / reseal the cabling between Light source and Light source PCB. 2. Current \leq 630 mA: 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 LLS and LDM board	Check / reseal the cabling between the LDM board and LLS. Check the connector on the laser subassembly PCB.

Situation	Solution
Error appears on 3 consecutive laser banks, controlled by the same LDM board: Defective laser driver	Temporary swap 2 LDM boards 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 board. See service procedure “Replacing a driver board in an LDM unit”, page 48. 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 25-90). If it has blown, replace it. • Replace the cable between LDM board and light source. • Replace the entire LDM. See service procedure “Replacing a Laser Drive Module”, page 56. • If problem persists after replacing the LDM, the laser banks are defective. Replace the light source. Do not forget to place the swapped LDM boards back in their original position after the check has been completed.
Defective laser bank	Replace the light source. See service procedure “Laser Phosphor Light Source”, page 59.

Code 21245: “LLS – Bank 2 is off”

For this error the same troubleshooting table can be applied to as for code **21244: “LLS – Bank 1 is off”**.

Code 21246: “LLS – Bank 3 is off”

For this error the same troubleshooting table can be applied to as for code **21244: “LLS – Bank 1 is off”**.

Code 21247: “LLS – Bank 4 is off”

For this error the same troubleshooting table can be applied to as for code **21244: “LLS – Bank 1 is off”**.

Code 21248: “LLS – Bank 5 is off”

For this error the same troubleshooting table can be applied to as for code **21244: “LLS – Bank 1 is off”**.

Code 21249: “LLS – Bank 6 is off”

For this error the same troubleshooting table can be applied to as for code **21244: “LLS – Bank 1 is off”**.

Code 21250: “LLS – Bank 7 is off”

For this error the same troubleshooting table can be applied to as for code **21244: “LLS – Bank 1 is off”**.

Code 21251: “LLS – Bank 8 is off”

For this error the same troubleshooting table can be applied to as for code **21244: “LLS – Bank 1 is off”**.

Code 21252: “LLS – Bank 9 is off”

For this error the same troubleshooting table can be applied to as for code **21244: “LLS – Bank 1 is off”**.

Code 21268: “LDM 1 – 380 vm pfc voltage too low”

Situation	Solution
Bad wiring connection	Check the power cable between the LDM and the Mains power. Make sure the cable is properly seated. Replace if necessary.

Code 21269: “LDM 1 – 380 vma pfc voltage too low”

Situation	Solution
Bad internal wiring	Check all connections inside of the LDM. Make sure all LDM boards and connections are properly seated.
Malfunction Laser Driver Module	Replace the entire module. See service procedure “Replacing a Laser Drive Module”, page 56.

Code 21272: “LLS – Identification failure”

Situation	Solution
Difference in firmware version	Upgrade the software to the latest version. See procedure “Software update via Communicator (DC update companion)”, page 249.
Wiring issue	Check / reseal the cable between LLS interconnection board J25 to LCB connector J202.
Malfunction LCB	Replace the LCB. See service procedure “Replacing the Laser Control Board (LCB)”, page 64.
This error alone: Corrupt or non-programmed data on LLS interconnection board.	Replace the Light source. See service procedure “Laser Phosphor Light Source”, page 59.

Code 21282: “LDM 1–7 – Not configured (not initialized)”

Situation	Solution
Module lost its initialization after the Power Module failure or module reset	Upgrade the software to the latest version. See procedure “Software update via Communicator (DC update companion)”, page 249.

Code 21283: “LLS – Too many laser banks are off”

Situation	Solution
Several Laser bank are off, causing the projector to shut down or no longer start up.	Look in the projector log files for error entries for “Laser Bank x is off” related messages before the projector was turned off (other than this error).

Code 21284: “LLS Memory Storage Device– No communication”

Situation	Solution
Wiring issue	Check / reseal the cable between LLS interconnection board J25 to LCB connector J202.
Malfunction LCB	Replace the LCB. See service procedure “Replacing the Laser Control Board (LCB)”, page 64.
Malfunctioning Light source	Replace the Light source. See service procedure “Laser Phosphor Light Source”, page 59.

Code 21309: “LDM 1-2 – lls bank 1 not white point calibrated”

Situation	Solution
laser bank white point not calibrated	Perform the color calibration as instructed in the installation and user manual.

Code 21310: “LDM 1-2 – IIs bank 2 not white point calibrated”

For this error the same troubleshooting table can be applied to as for code 21309: “LDM 1-2 – IIs bank 1 not white point calibrated”.

Code 21311: “LDM 1-2 – IIs bank 3 not white point calibrated”

For this error the same troubleshooting table can be applied to as for code 21309: “LDM 1-2 – IIs bank 1 not white point calibrated”.

Code 21312: “LDM 1-3 – IIs bank 4 not white point calibrated”

For this error the same troubleshooting table can be applied to as for code 21309: “LDM 1-2 – IIs bank 1 not white point calibrated”.

Code 21313: “LDM 1-3 – IIs bank 5 not white point calibrated”

For this error the same troubleshooting table can be applied to as for code 21309: “LDM 1-2 – IIs bank 1 not white point calibrated”.

Code 21314: “LDM 1-3 – IIs bank 6 not white point calibrated”

For this error the same troubleshooting table can be applied to as for code 21309: “LDM 1-2 – IIs bank 1 not white point calibrated”.

Code 21315: “LDM 1-4 – IIs bank 7 not white point calibrated”

For this error the same troubleshooting table can be applied to as for code 21309: “LDM 1-2 – IIs bank 1 not white point calibrated”.

Code 21316: “LDM 1-4 – IIs bank 8 not white point calibrated”

For this error the same troubleshooting table can be applied to as for code 21309: “LDM 1-2 – IIs bank 1 not white point calibrated”.

Code 21335: “LPT 1 - IIs bank 9 cold side temperature too high”

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 filters at the air inlets of the projector.	Clean the front filter or replace with new one. See “Maintenance procedures”, page 291.
Wiring issue.	Check / reseat the wiring between the Peltier Control Board and the small interconnection boards of the Light Source. Replace the wiring if necessary.
Insufficient cooling of light source	Check the tube connections between both the Light Source cooler and the light source. Make sure the tubes are properly connected.
Malfunction Peltier Control Board	Replace the Peltier Control Board. See “Replacing the Peltier Controller”, page 64.
Malfunction Light Source	Replace the light source. See service procedure “Laser Phosphor Light Source”, page 59.

Code 21336: “Ipt 1 - IIs bank 9 cold side temperature sensor shorted”

Situation	Solution
Malfunction temperature sensor on Peltier Control Board.	Replace the Peltier Control Board. See “Replacing the Peltier Controller”, page 64.

Code 21337: “Ipt 1 - IIs bank 9 cold side temperature sensor open”

Situation	Solution
Malfunction temperature sensor on Peltier Control Board.	Replace the Peltier Control Board. See “Replacing the Peltier Controller”, page 64.

Code 21342: “Ipt 1 - IIs bank 9 hot side temperature too high”

For this error the same troubleshooting table can be applied to as for code 21335: “Ipt 1 - IIs bank 9 cold side temperature too high”.

Code 21343: “Ipt 1 - IIs bank 9 hot side temperature sensor shorted”

For this error the same troubleshooting table can be applied to as for code 21336: “Ipt 1 - IIs bank 9 cold side temperature sensor shorted”.

Code 21344: “Ipt 1 - IIs bank 9 hot side temperature sensor open”

For this error the same troubleshooting table can be applied to as for code 21337: “Ipt 1 - IIs bank 9 cold side temperature sensor open”.

Code 21345: “Ipt 1 – 24V input 1 voltage too low”

Situation	Solution
Cable / connection issue	Check and reseal the wire unit between the LDM (1-7) and the Peltier Control Board (J100). Replace if necessary.
malfunction +24V module	Replace the +24V module in the LDM (LDM slot 7). See service procedure “Replacing a driver board in an LDM unit”, page 48. If problem persists, replace the LDM. See service procedure “Laser Driver Module (LDM)”, page 45.
malfunction Peltier Control Board	Replace the Peltier Control Board. See “Replacing the Peltier Controller”, page 64.

Code 21348: “Ipt 1 – 24V input 1 voltage too high”

Situation	Solution
malfunction Peltier Control Board	Replace the Peltier Control Board. See “Replacing the Peltier Controller”, page 64.

Code 21349: “Ipt 1 - 24V input 2 voltage too low”

Situation	Solution
Cable / connection issue	Check and reseal the wire unit between the LCB (J407) and the Peltier Control Board (J101). Replace if necessary.
malfunction Peltier Control Board	Replace the Peltier Control Board. See “Replacing the Peltier Controller”, page 64.
malfunction LCB	Replace the Laser Control Board (LCB). See service procedure “Replacing the Laser Control Board (LCB)”, page 64

Code 21352: “Ipt 1 - 24V input 2 voltage too high”

Situation	Solution
malfunction Peltier Control Board	Replace the Peltier Control Board. See “Replacing the Peltier Controller”, page 64.

Code 21353: “lpt 1 - lls bank 9 avg voltage too low”

Situation	Solution
Wiring issue.	Check / reseat the wiring between the Peltier Control Board and the small interconnection boards of the Light Source. Replace the wiring if necessary.
malfunction Peltier Control Board	Replace the Peltier Control Board. See “Replacing the Peltier Controller”, page 64.
Malfunction Light Source PCB	Replace the light source. See service procedure “Laser Phosphor Light Source”, page 59.

Code 21356: “lpt 1 - lls bank 9 avg voltage too high”

Situation	Solution
malfunction Peltier Control Board	Replace the Peltier Control Board. See “Replacing the Peltier Controller”, page 64.

Code 21357: “lpt 1 - lls bank 9 current too low”

For this error the same troubleshooting table can be applied to as for code **20335: “LDM 1-2 – bank 1 current too high”**.

Code 21360: “lpt 1 - lls bank 9 current too high”

For this error the same troubleshooting table can be applied to as for code **20335: “LDM 1-2 – bank 1 current too high”**.

Code 21361: “LDM 1 – Not configured (not initialized)”

For this error the same troubleshooting table can be applied to as for code **20279: “LDM 1 – Not configured (initialization failure)”**.

Code 21362: “LDM 1 – Not configured (not initialized)”

For this error the same troubleshooting table can be applied to as for code **20279: “LDM 1 – Not configured (initialization failure)”**.

Code 21365: “LCM1 – Not configured (invalid module type)”

Situation	Solution
Invalid module type detected.	<ol style="list-style-type: none"> 1. Upgrade the software. See procedure “Software update via Communicator (DC update companion)”, page 249. 2. Malfunction Controller board of the Light Source Fan Interconnection Board. Replace Controller board. See service procedure “Replacing the Light Source Fan Interconnection Board”, page 72.

Code 21366: “LCM1 – Not configured (no communication)”

Situation	Solution
No connection with Fan Interconnection Board	Check / reseat all the wiring of the Light Source Fan Interconnection Board on top of the light source.
First install of Light Source	Upgrade the software. See procedure “Software update via Communicator (DC update companion)”, page 249.

Situation	Solution
Malfunction Light Source Fan interconnection Board	Replace Controller board. See service procedure “Replacing the Light Source Fan Interconnection Board”, page 72.
Malfunction LCB	Replace the Laser Control Board (LCB). See service procedure “Replacing the Laser Control Board (LCB)”, page 64

Code 21371: “LLS light sensor – No Communication”

Situation	Solution
Wiring issue Light Sensor cable	Check / reseat the Light sensor cable on the bottom of the light source. Check/reseat the wire unit on the Light Sensor Interconnection Board (Image 25-92) and on connector J6 on the Light source interconnection board (reference 2, Image 25-93). To access both interconnection boards, remove the light source as seen in service procedure “Laser Phosphor Light Source”, page 59. If problem persists, replace the Light Sensor Interconnection Board. See procedure “Replacing the Light Sensor Interconnection Board”, page 74.
Wiring issue light source interconnection board	Check / reseat the cable between connector J5 on the light source interconnection board on the bottom of the light source (reference 1, Image 25-93) and connector J202 on the LCB. To access the interconnection board, remove the light source as seen in service procedure “Laser Phosphor Light Source”, page 59.
Malfunction LCB	Replace the Laser Control Board (LCB). See service procedure “Replacing the Laser Control Board (LCB)”, page 64
Malfunction light source interconnection board	Replace the light source. See service procedure “Laser Phosphor Light Source”, page 59.

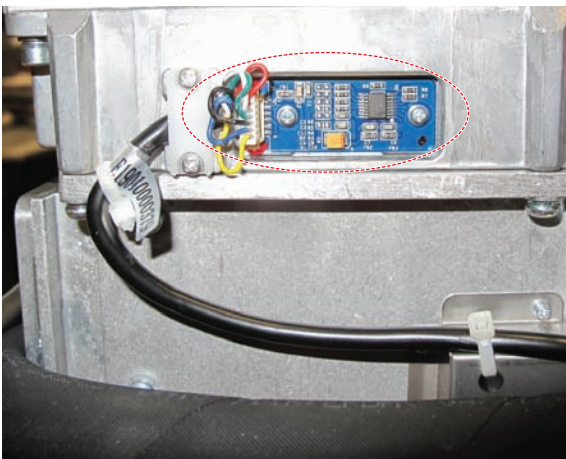


Image 25-92

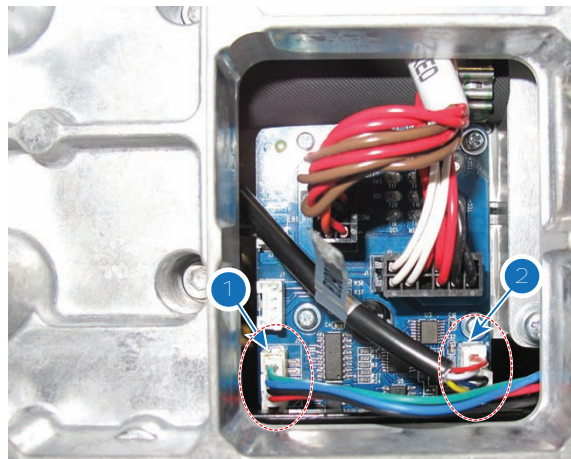


Image 25-93

Code 21372: “lpt 1 - 36V phosphor wheel overcurrent”

Situation	Solution
Overcurrent detected on wiring	Check and reseat wiring between Peltier Control Board and the Light Source. If problem persists, replace the wiring
malfunction Peltier Control Board	Replace the Peltier Control Board. See “Replacing the Peltier Controller”, page 64.

Code 21373: “LCB – +12v too low”

Situation	Solution
In combination with +24V errors: Bad wiring connection	Check connector J900 on the LCB and the LDM (slot 7). Make sure the cable is properly seated. If problem persists, replace the cable.
In combination with +24V errors: Defective +24V module	Replace the +24V module in the LDM (slot 7). See service procedure “Replacing a driver board in an LDM unit”, page 48.
This error alone, or in combination with other LCB-related errors: Malfunction LCB.	Replace the Laser Control Board (LCB). See service procedure “Replacing the Laser Control Board (LCB)”, page 64

Code 21376: “LCB – +12v too high”

Situation	Solution
Malfunction LCB.	Replace the Laser Control Board (LCB). See service procedure “Replacing the Laser Control Board (LCB)”, page 64

Code 21380: “LLS – Combiner bottom safety switch (brown) open”

Situation	Solution
The Light Source is not correctly installed	Check if the Light Source is properly installed. Make sure that the fixation screws are fastened. If problem persists, carefully remove the Light source up and install it again. Make sure the light source is properly mounted this time. For instructions on how to remove and install the light source, see service chapter “Laser Phosphor Light Source”, page 59.
Safety switches disconnected	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 64

Code 21384: “LLS – combiner top safety switch (red) open”

Situation	Solution
The Light Source is not correctly installed	Check if the Light Source is properly installed. Make sure that the fixation screws are fastened. If problem persists, carefully remove the Light source up and install it again. Make sure the light source is properly mounted this time. For instructions on how to remove and install the light source, see service chapter “Laser Phosphor Light Source”, page 59.
Safety switches disconnected	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 64

Code 21385: “LCM 1 – Fan 3 speed too low”

For this error the same troubleshooting table can be applied to as for code **20142: “LCM1 – Fan 1 speed too low”**.

Code 21389: “LCM 1 – Fan 4 speed too low”

For this error the same troubleshooting table can be applied to as for code **20142: “LCM1 – Fan 1 speed too low”**.

Code 21393: “LCM 1 – Fan 5 speed too low”

For this error the same troubleshooting table can be applied to as for code **20142: “LCM1 – Fan 1 speed too low”**.

Code 21397: “LCM 1 – Fan 6 speed too low”

For this error the same troubleshooting table can be applied to as for code **20142: “LCM1 – Fan 1 speed too low”**.

25.4 Log files

Creating and downloading log files

A diagnostic package can be created with the Communicator software. Start up the software and go to *Diagnostics* → *Package*. A zip file will be created with the following information:

- ICP log file
- Security log file
- Projector log

These log files can be read with the Diagnostic package reader which was delivered as separate program together with the Communicator software. For more information about the use of this Diagnostic package reader, consult the User Guide of the Communicator software.

ICP Log File

Records events listed below:

- Handshakes with server
- TI system initialization
- Reading of TI board status
- Opening of TCP connection
- Failure of TI boards

Security Log File

Records events listed below:

- Monitoring of security switches
- Monitoring of key exchange
- Authorizing of Dallas key

Projector Log

Records events listed below:

- Lamp control commands
- Booting of Barco software
- Detection of TI boards
- Log on details of users
- Detection of Barco modules (LPS, FCB, etc.)

DP2K Log file analysis

Example of log file content

```
Dec 31 17:00:17 localhost local0.info license-manager[221]: main - starting ...
Dec 31 17:00:17 localhost local0.info router[224]: main - starting ...
Dec 31 17:00:17 localhost local0.info router[231]: network - wan ip-address ...
Dec 31 17:00:18 localhost local0.info dp60[233]: main - starting application ...
```

```
Dec 31 17:00:18 localhost local0.info dp60[233]: main - projector type is ...
Dec 31 17:00:21 localhost local0.info dp60[233]: ti-icp - wait until ready
Dec 31 17:00:34 localhost local0.info dp60[233]: system - synchronize date to ...
Apr 6 12:49:25 localhost local0.info dp60[233]: system - ti-link-decryptor ...
Apr 6 12:49:41 localhost local0.info dp60[233]: system - ti-link-decryptor ...
Apr 6 12:49:41 localhost local0.info dp60[233]: system - load lens encoder file ...
Apr 6 12:49:41 localhost local0.info dp60[233]: command (port = internal) - ...
...
```

Format :

'Time' localhost 'facility code' .' severity code' 'component name' ['pid']: 'message'

Where :

- 'Time' = the time when the event occurred
- 'facility code' = component level that generates a log message
- 'severity code' = the severity can be : info – debug – warning – alert – err.
- 'component name' = component name that generates a log message.
 - dp60 = main process
 - kernel = Linux kernel
 - router = component which manages the router
 - TI_marriage = component which handles the marriage
 - clo = component which handles Light Sensor logic
 - license-manager = internal license manager
 - crypto memory = process which handles communication with crypto memory module (ID card)
- 'pid' = Process identifier. The internal process identifier, of the component generating the log message.
- 'message' = The actual error message.

The Barco controller inserts every hour an unique entry in the Barco log file and in the TI log file. This is done to be able to synchronize events in both log files, when the clocks are not aligned. It will also be used for a tool, that is still to be implemented, that will merge both log files, to make better analysis.

Example of such an entry :

```
Feb 3 02:41:16 localhost local0.info dp60[233]: log mark - 0000003c1b84 - 8
```

Each Barco entry into a TI log is proceeded with a B.

What does the id means (as in the example) :

- 0000003c
 - the first 4 bytes give a hex interpretation of how many time the system has been booted.
 - 3c hex is 60 in decimal. It means that this system has been booted 60 times. Every boot cycle increases the timer with 1.
- 1b84 = the last two bytes, are random unique 2 bytes.
- 8 = the last digit indicates the number of hours passed in this boot cycle (in a decimal value). Every boot cycle resets this number to 0.

Ethernet connection messages in log file (some examples).

```
Apr 6 14:05:19 localhost local0.info dp60 [233]: main - closing connection of
150.158.197.64:43680 (keep-alive time expired)
```

→ after 15 minutes of inactivity projector will close connection.

```
Apr 6 14:08:55 localhost local0.info dp60 [233]: main - accepted connection from
150.158.192.133:43680
```

→ connection from communicator, from pc with ip address 150.158.192.133

```
Apr 6 14:08:58 localhost local0.info dp60 [233]: log (port = 150.158.192.133:43680:1e)
- logon-phmt-barco-default
```

→ communicator inserts in log file, who logged on to projector

```
Apr 6 14:09:07 localhost local0.info dp60 [233]: command (port =
150.158.192.133:43680:1e) - set lamp on
```

→ Command messages also indicate originator.

```
Apr 6 14:09:07 localhost local0.info dp60[233]: system - load fcb file "lamp-on"
```

→ on fan controller board, lamp-on state is set.

External commands received by the Barco controller are preceded with the command (port = xxx) string

Where xxx can be :

- /dev/ttyS0:0 = Command comes from the serial connection labeled ("RS232 IN"). That can be from a touch panel which is connected through a RS232 cable, or from a communicator which is connected serially.
- /dev/ttyS2:0 = Command comes from a touch panel attached with a dedicated cable to the back of the projector (touch panel input).
- /dev/ttyS3:0 = Command comes from the TI board. This is typically a command that is part of a macro stored on that board.
- 10.36.62.17:43680 = Command comes from a remote machine with indicated IP address, followed by the local of the remote machine that send this command internal. The command is initiated internally, due to an internal reason.
- button = button is triggered from the keypad, attached to the projector.

Some examples :

- command (port = /dev/ttyS2:0) - set network ip-address to 10.140.162.141 (dhcp off) = From the touch panel, the IP address of the projector was set to 10.140.162.141
- command (port = 10.36.62.17:43680) - set network ip-address to 10.36.62.62 (dhcp off) = From a device with IP address 10.36.63.17, the IP address of the projector was changed to 10.36.63.17
- command (port = /dev/ttyS0:0) - set dowser open. = From a touch panel or PC, connected serially (connector labeled "Touch panel"), the dowser was set to open.
- command (port = /dev/ttyS0:0) - set lamp off = From a touch panel or PC, connected serially (connector labeled "Touch panel"), the lamp was powered off.
- command (port = internal) - set lamp off = For an internal reason the state of the lamp was set to off.
- command (port = button) - set dowser closed = The dowser was closed from the keypad.

The error messages are explained in the troubleshooting list - code 5831

ICP log files

Example of log file content :

```
2010/04/06 09:02:40.964797 I ICP application 1.2(126) init [ ] Shows the ICP package
2010/04/06 09:02:40.980964 I successfully initialized the LoginLevelProtection mutex
2010/04/06 09:02:41.039022 I Autotiming initialized
2010/04/06 09:02:41.049829 I Autotiming using VSyncs
2010/04/06 09:02:41.051245 I Started Autotiming Port threads
2010/04/06 09:02:41.051755 I Autotiming started
2010/04/06 09:02:41.052149 I Port thread running
2010/04/06 09:02:41.052897 I Port thread running
2010/04/06 09:02:43.632304 I Started Autotiming Main thread
2010/04/06 09:02:43.633017 D Autotiming thread running
2010/04/06 09:02:43.633476 D Autotiming: blank the image
2010/04/06 09:02:43.792939 D Autotiming: unblank the image
...
```

Format

```
'Date Time' 'Severity' 'message'
```

Where :

- 'Date Time' = the time when the event occurred.
- 'Severity' = One character severity indication can be : "D" (Debug) – "E" (Error) – "I" (Informational) - "U" (User).
- 'message' = The actual error message.

Example :

24.03.2010 17:17:12.185 TPPL = 2848, APPL = 2048, TLPF = 4095, ALPF = 128

This line is entered when the auto timing on the ICP computes values that are not within valid ranges.

Where :

- TPPL = Total Pixels Per Line
- APPL = Active Pixels Per Line
- TLPF = Total Lines Per Frame
- ALPF = Active Lines Per Frame
- $512 \leq APPL \leq TPPL \leq 8191$
- $288 \leq ALPF \leq TLPF \leq 4095$

In this example ALPF = 128 which is less than the minimum of 288. When this happens, auto timing will attempt to blank the image.

Projector cleaning

26

About this chapter

This chapter describes in chronological order the overall cleaning process of the projector. Starting with the light source, following the light path up to the porthole of the installation booth. Furthermore, the airflow channels and compartments (non optical parts) are also taken into account. Extra attention is paid to critical and/or fragile components which need special treatment.

To access the components for cleaning, several parts of the projector have to be disassembled. For detailed disassembly and assembly instructions this chapter refers where relevant to other chapters in this service manual.

Purpose of projector cleaning

Projectors are not used in 100% ideal circumstances and due to that they might get contaminated by particles in the environment air. Due to this contamination the light output can be reduced or overheating may occur which may also lead to a projector shutdown during operation.

To keep the projector in a good shape, it is advised to clean the projector as suggested in the preventative maintenance section. Dust filter cleaning, cover cleaning and projection lens cleaning can be done by the operator of the projector. **The inside cleaning of the light path must be done by a trained and certified service engineer.**

Overview

- Necessary tools, products and tips
- General cleaning procedure for optical components
- Cleaning process for the optical path
- Cleaning procedures optical components
- Cleaning procedures non optical components

26.1 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. Carl Zeiss cleaner or Purasol® Optical or any water based lens cleaner)

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.

26.2 General cleaning procedure for optical components



This procedure describes the general steps to clean optical components.

Required tools

- Compressed air (spray).
- Lens cleaner (e.g. Carl Zeiss cleaner or Purasol® Optical or any water based lens cleaner)
- 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 cans⁶).
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.

⁶: Pressurized air cans is not efficient if there is too much dust on the surface, the pressure is too low

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.

26.3 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.

Optical path cleaning order

1. **Light Source:**
 - a) Outside of the Light Source assembly
 - b) Light source exit lens
2. **Light Source compartment:**
 - a) Compartment interior
 - b) Compartment window (Light Source side)
3. **Light Pipe:**
 - a) Compartment interior
 - b) Compartment window (Light Pipe side)
 - c) Rod inlet
 - d) Notch Filter
 - e) Light Pipe Lenses No1, No2 and No3
 - f) Light Pipe Fold Mirrors
4. **Light Processor:**
 - a) Compartment interior
 - b) Light Pipe Lenses No4
 - c) Prism inlet and outlet
5. **Projection lens and porthole:**
 - a) Projection lens inlet
 - b) Projection lens outlet
 - c) Porthole (boot side)
 - d) Porthole (audience side)



Normally the optics of the Light Pipe (3) and Light Processor (4) require less frequent cleaning than the optics of the Light Source (1), Light Source compartment (2), Projection lens and porthole (5). Take this into account to avoid unnecessary opening of the Light Pipe and removing of the Light Processor.



It is advised to measure the light output in every step; such as after cleaning the compartment window, the rod inlet, etc. Ensure to at least measure the light output before you start and after you end the cleaning procedure.

26.4 Cleaning procedures optical components

Light Source outside cabinet

1. Remove the Light Source out of its compartment. See “Removing the Light Source”, page 61.
2. Remove contamination from the outside of the Light Source assembly with a vacuum cleaner and a brush.

Light Source exit lens

1. Remove the Light Source out of its compartment. See “Removing the Light Source”, page 61.
2. Clean the exit lens of the Light Source. Follow the general cleaning procedure for optical parts, see “General cleaning procedure for optical components”, page 384.

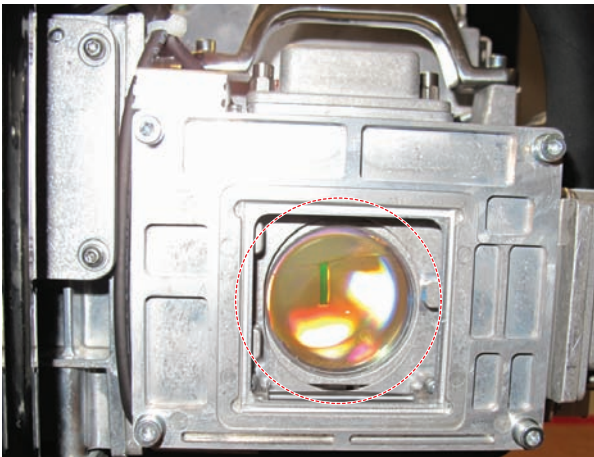


Image 26-1

Light Source compartment interior

1. Remove all dust from the complete compartment with a vacuum cleaner and a brush.

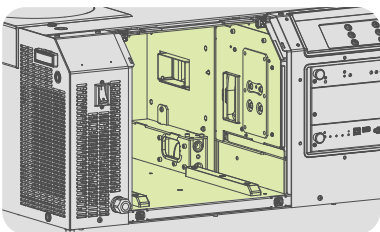


Image 26-2

Compartment window (Light Source side)

1. Follow the general cleaning procedure for optical parts, see “General cleaning procedure for optical components”, page 384.

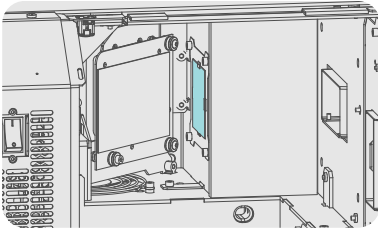


Image 26-3

Light Pipe compartment interior

1. Remove all dust from the complete compartment with a vacuum cleaner and a brush.

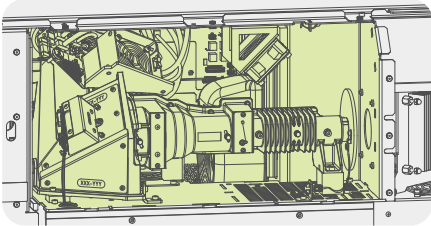


Image 26-4

CAUTION: Light Pipe cleaning



Light Pipe cleaning is a critical action and should only be done when absolutely necessary. Try first to clean all other optical parts and measure the result. If the light output does not meet the official DC specifications at this point swap the light source. If the improvement is not enough then try to improve the light output by cleaning the Light Pipe (see the following procedures). Opening and cleaning the Light Pipe may only be done by a trained service engineer may only be done in a clean room environment

Compartment window (Light Pipe side)

1. Remove the Light Pipe from the projector to access the compartment window. See “Removal of the Light Pipe”, page 115.
2. Follow the general cleaning procedure for optical parts, see “General cleaning procedure for optical components”, page 384.

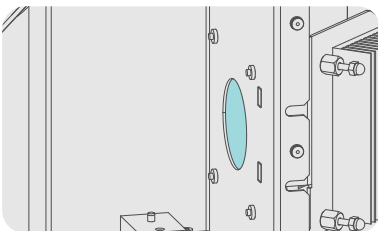


Image 26-5

Rod inlet

1. Remove the Light Pipe, if not removed yet, from the projector. See “Removal of the Light Pipe”, page 115.
2. Follow the general cleaning procedure for optical parts, see “General cleaning procedure for optical components”, page 384.



Caution: Be careful not to push too hard on the Rod inlet as this is a very fragile glass. Especially the edges of the Rod inlet.

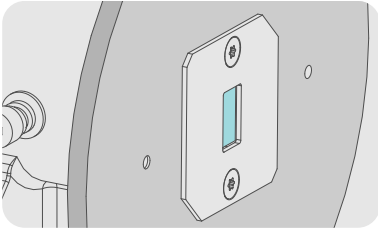


Image 26-6

3. In case a 3D color wheel is installed the color wheel has to be retracted (away from the mask plate) to access the Rod inlet.

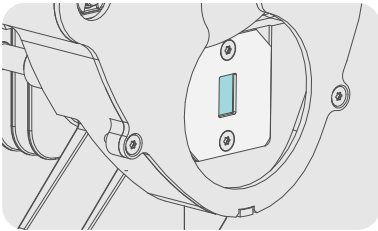


Image 26-7

Notch Filter

1. Remove the Notch Filter from the Light Pipe. See “Replacing the Notch Filter”, page 127.
2. Follow the general cleaning procedure for optical parts, see “General cleaning procedure for optical components”, page 384, or see “Cleaning the Notch Filter”, page 130.



Caution: Do not push too hard to avoid that the mirror comes loose.

3. Install the clean Notch Filter. See “Replacing the Notch Filter”, page 127.



Note: Take into account that the Notch Filter needs to be realignment after finishing the projector cleaning process. See “Adjusting the Notch Filter”, page 128.

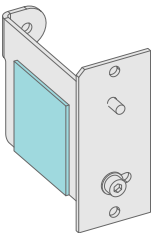


Image 26-8

Light Pipe Lenses No1, No2 and No3

1. Remove the Light Pipe from the projector, if not removed yet. See “Removal of the Light Pipe”, page 115.
2. Remove contamination from the outside of the Light Pipe with a vacuum cleaner and a brush or with compressed air.



Caution: Do not touch the Rod inlet and Lens No3 outlet of the Light Pipe.


3. Remove the cover from the Light Pipe. See “Removal of the Light Pipe cover plate”, page 117.




Caution: Opening and cleaning the Light Pipe may only be done by a trained service engineer and in a clean room.

4. Remove the Light Pipe Lenses No1, No2 and No3 from the Light Pipe. See procedures:
 - “Replacing Light Pipe lens No1 (focus lens)”, page 118.

- “Replacing Light Pipe lens No2”, page 119.
- “Replacing Light Pipe lens No3 (zoom lens)”, page 120.

 **Note:** No need to remove lens No1 and No3 from its container.

 **Caution:** Do not remove the Rod. The Rod is a very sensitive part and the risk to break off small parts is very high.

5. Blow dust off from the inner side of the Light Pipe with compressed air.
6. Clean the Light Pipe Lenses No1, No2 and No3. Follow the general cleaning procedure for optical parts, see “General cleaning procedure for optical components”, page 384.
7. Install the Light Pipe Lenses No1, No2 and No3 into the Light Pipe. See procedures:
 - “Replacing Light Pipe lens No1 (focus lens)”, page 118.
 - “Replacing Light Pipe lens No2”, page 119.
 - “Replacing Light Pipe lens No3 (zoom lens)”, page 120.

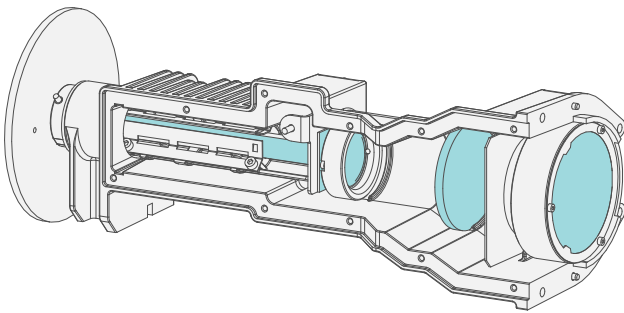




Image 26-9


8. Install the cover of the Light Pipe. See “Installing the Light Pipe cover plate”, page 123.
9. Install the Light Pipe. See “Installing the Light Pipe”, page 123.

 **Note:** Take into account that the Light Pipe lens No1 and No3 needs to be realignment after finishing the projector cleaning process. See “Adjusting the Light Pipe lens No1 (focus lens)”, page 125 and “Adjusting the Light Pipe lens No3 (zoom lens)”, page 126.

Light Pipe Fold Mirrors

1. Remove the side cover plate and the Light Sensor assembly from the Corner Block. See “Replacing the Fold Mirror set”, page 130.
2. Follow the general cleaning procedure for optical parts, see “General cleaning procedure for optical components”, page 384, or see “Cleaning the Fold Mirrors”, page 134.

 **Note:** There are two Fold Mirrors: one fixed inside the corner block and one adjustable on the rear side of the Light Sensor assembly.

 **Caution:** Do not push too hard to avoid a crack of the Folding Mirror.

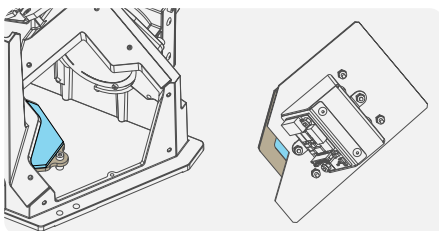


Image 26-10

3. Install the Light Sensor assembly and the side cover plate onto the Corner Block. See “Replacing the Fold Mirror set”, page 130.



CAUTION: Light Processor cleaning

Light Processor cleaning is a critical action and should only be done when really necessary. First try to clean all other optical parts and measure the result. If the light output is not meeting the official DC specifications at this point swap the light source. If the improvement is not enough then try to improve the light output by cleaning the Light Processor (see next procedures). Removing and cleaning the Light Processor may only be done by a trained service engineer and may only be done in a clean room environment.

Light Processor compartment interior

1. Remove the lens from the projector. See “Lens removal”, page 178.
2. Remove the Light Processor from the projector. See “Removing the Light Processor”, page 97.
3. Remove all dust from the complete compartment with a vacuum cleaner and a brush. Ensure the lamp anode fan grid, the Light Processor compartment fan grid, and the DMD fan grids are dust free.

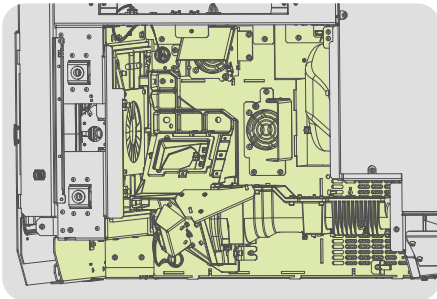


Image 26-11

Light Pipe Lense No4

1. Remove the Light Pipe Lens No4 from the corner block. See “Replacing Light Pipe lens No4”, page 121.
2. Clean the Light Pipe Lens No4 according the general cleaning procedure for optical parts, see “General cleaning procedure for optical components”, page 384.



Note: No need to remove lens No4 from its container.

3. Install the Light Pipe Lens No4. See “Replacing Light Pipe lens No4”, page 121.

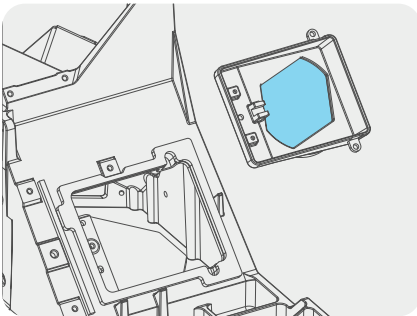


Image 26-12

Light Processor Prism inlet and outlet

1. Remove overall dust from the outside of the Light Processor with compressed air.



Image 26-13

2. Clean the Prism inlet according the general cleaning procedure for optical parts, see “General cleaning procedure for optical components”, page 384.

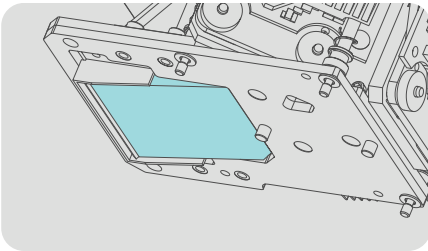


Image 26-14

3. Clean the Prism outlet according the general cleaning procedure for optical parts, see “General cleaning procedure for optical components”, page 384.

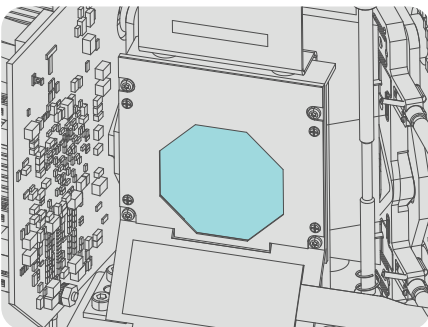


Image 26-15

4. Install the Light Processor. See “Installing the Light Processor”, page 100.

Projection lens inlet

1. Remove the lens from the projector, if not removed yet. See “Lens removal”, page 178.
2. Follow the general cleaning procedure for optical parts to clean the lens inlet, see “General cleaning procedure for optical components”, page 384, or see “Cleaning the lens”, page 292.
3. Install the lens. See “Lens installation”, page 176.

Projection lens outlet

1. Follow the general cleaning procedure for optical parts to clean the lens outlet, see “General cleaning procedure for optical components”, page 384, or see “Cleaning the lens”, page 292.

Porthole

1. Follow the general cleaning procedure for optical parts, see “General cleaning procedure for optical components”, page 384.



Tip: Ensure to clean both sides (booth side and audience side) of the Porthole.


26.5 Cleaning procedures non optical components

Components to clean

1. Anode Fan air intake side.
2. Card Cage air intake side.
3. Card Cage interior.
4. SMPS compartment.
5. Laser Driver Module (LDM).
6. Projector external covers.
7. Projector dust filters.


Anode Fan air intake side

1. Remove the small dust filter from the projector. For removal instructions see “Check the small dust filter”, page 285.
2. Clean the air inlet with a vacuum cleaner and a brush.

 **Caution:** Do not blow with compressed air to avoid dust distribution inside the projector.


Card Cage air intake side

1. Remove the large dust filter from the projector. For removal instructions see “Check the large dust filter”, page 284.
2. Clean the metal mesh grid of the card cage fans and the fans itself with a vacuum cleaner and brush.

 **Caution:** Do not blow with compressed air to avoid dust distribution inside the Card Cage.

Card Cage interior

1. Remove the projector top cover and top cover plate. See “Removal of the top cover”, page 273, and “Removal of the top cover plate of the Light Processor compartment”, page 275.
2. Remove all boards out of the Card Cage.

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

3. Clean the ICP fan on top of the Card Cage with a vacuum cleaner and brush.
4. Clean the mesh grid and fan grid inside the card cage with a vacuum cleaner and brush.
5. Clean the boards with compressed air, but be careful not to damage components.
6. Install all boards.
7. Install the top cover plate. See “Installation of the top cover plate of the Light Processor compartment”, page 278.

SMPS compartment

1. Remove the Card Cage cover. See “Removal of the Card Cage cover”, page 228.
2. Remove the cover of the SMPS compartment and the SMPS board. See “Removing the SMPS board”, page 40.
3. Clean the mesh grid and fan grid inside the SMPS compartment with a vacuum cleaner and brush.
4. Install the SMPS board and the cover of the SMPS compartment. See “Installing the SMPS board”, page 42.
5. Install the Card Cage cover. See “Installation of the Card Cage cover”, page 245.

LDM

1. Remove the LDM unit. See “Removing the LDM”, page 46.
2. Remove the cover of the Mains Input compartment. See “Accessing the Mains Input compartment”, page 33.
3. Clean the LDM compartment and Mains Input compartment with a vacuum cleaner and brush.



Warning: Ensure that the projector is disconnected from the power net.

4. Clean the fans and the cabinet of the LDM unit with a vacuum cleaner and brush.
5. Install the cover of the Mains Input compartment. See “Accessing the Mains Input compartment”, page 33.
6. Install the LDM unit. See “Installing the LDM”, page 47.

Projector external covers

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.

Projector dust filters

1. Clean the small and large dust filters as described in the chapter “Dust Filters”, page 283.

Appendix

A

Overview

- Hazards

A.1 Hazards

Safety notice Sodium Carbonate (Na_2CO_3)

According to the Material Safety Data Sheet (MSDS), Sodium Carbonate could cause the following hazards:

- Potential Acute Health Effects: Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation (lung irritant).
- Potential Chronic Health Effects: Slightly hazardous in case of skin contact (sensitizer). The substance may be toxic to upper respiratory tract, skin, eyes. Repeated or prolonged exposure to the substance can produce target organ damage.

Index

Numbers/Symbols

24V Filter board
Replace 65

A

Access
Mains Input 33
Activate
LUT-SCC file 151
Adjust
Convergence
Blue 161
Green 162
Fold Mirror 133
Integration Rod 145
Lens No1 125
Lens No3 126
Light Pipe focus lens 125
Light Pipe zoom lens 126
Notch Filter 128
Anode Fan
Replace 84
Appendix 395
Authorization
Security warning
Clear 112
Awake 20

B

Back Focal Length 199
Adjustment 205
Backlight
Color 179
Block diagrams 21
Blue channel
Fan 107, 110
Blue Laser
Interconnection Board
Replace 75
Board Diagnostic LED's 265
Button Module
Card Cage 223

C

Calibration
Color 167
Capacitor board
Replace 65
Card cage
ICP 211
Card Cage 209
Button Module 223
Cinema Controller 217
Connect 241
Disconnect 229
HDSDI board 216
ICP board 214
ICP fan 222
Install 239
Introduction 211
Large fan 221
Link Decryptor 217
Partition plate 246
Remove 232
Small fan 220
Card Cage cover
Install 245
Remove 228
Cathode Fan
Replace 86
Check
Dust filter 284–285
Cinema Controller
Battery
Replacement 218
Card Cage 217
Introduction 212
Clean
Fold Mirror 134
Light Pipe lens 122
Notch Filter 130
Prism 103
Cleaning
Compartment window 386–387
Exterior 292
Filters 287
Filters (wet) 288
Lens 292
Light Pipe

- Compartment 387
 - Light Source
 - Exit lens 386
 - Outside cabinet 386
 - Light Source compartment 386
 - Optical path
 - Cleaning order 385
 - Procedures
 - Non optical 392
 - Optical components 386
 - Optical path 386
 - Products 384
 - Projector
 - Optical components 384
 - Optical path 385
 - Purpose 383
 - Rod inlet 387
 - Tips 384
 - Tools 384
 - CLO
 - Install 135
 - Remove 135
 - Closing off
 - Light Processor compartment 163
 - Cold Mirror
 - Fan 88
 - Cold Mirror fan
 - Replace 88
 - Color
 - Backlight 179
 - Calibration 167
 - Color calibration 165
 - Color calibration 166
 - Process 166
 - White point 166
 - Compartment
 - Light Processor 163
 - Connect
 - Card Cage 241
 - Contrast plate
 - Install 135
 - Remove 135
 - Controller assembly
 - Mounting 66
 - Controller Assembly
 - Remove 62
 - Convention
 - Orientation 16
 - Convergence 157
 - Blue onto red 161
 - Control knobs 158
 - Controls
 - Extenders 158
 - Green onto red 162
 - Prepare 159
 - Test pattern 159
 - Cooling liquid
 - Integrity
 - Check 92
 - Level
 - Check 92
 - Refill 92
 - Cover
 - Left side 274, 279
 - Light Source 272, 281
 - Rear 272, 281
 - Top 273, 280
 - Cover plate
 - Left side 276–277
 - Lens Holder 180, 185
 - Top side 275, 278
- ## D
- DC update companion
 - Launch 250
 - Diagnostic
 - Integration Rod 140
 - Light Processor 96
 - Diagnostic LED 265
 - Laser Driver Board 267
 - Power Board 266
 - Disconnect
 - Card Cage 229
 - Download
 - LUT-SCC file 153
 - Drying
 - Filters 288
 - Dust filter
 - Large
 - Replace 284
 - Small
 - Replace 285
 - Dust Filters 283
- ## E
- Error code
 - 20019 346
 - 20022 346
 - 20029 346
 - 20030 347
 - 20033 347
 - 20046 347
 - 20070 347
 - 20101 347
 - 20102 348
 - 20103 349
 - 20104 349
 - 20105 349
 - 20106 349
 - 20107 349
 - 20108 349
 - 20109 349
 - 20128 349
 - 20129 349
 - 20131 349
 - 20133 349
 - 20135 350
 - 20136 350
 - 20137 350
 - 20142 350
 - 20146 350
 - 20150 351
 - 20153 351
 - 20164 351

20167	351	20379	362
20168	352	20383	362
20169	352	20384	362
20170	352	20385	362, 377
20173	352	20386	362
20174	352	20387	362
20175	353	20389	378
20180	353	20391	362
20181	353	20392	362
20182	353	20393	378
20185	353	20394	363
20186	353	20397	363, 378
20240	354	20401	363
20243	354	20402	363
20244	354	20403	363
20247	354	20407	363
20248	354	20408	363
20251	354	20409	363
20252	355	20412	363
20255	355	20413	363
20259	355	20414	364
20260	355	20425	364
20261	355	20426	364
20265	355	20431	364
20266	355	20432	364
20267	355	20433	364
20271	355	20436	364
20272	355	20437	364
20273	356	20438	364
20274	356	20523	364
20275	356	20527	364
20276	356	20531	365
20278	356	20535	365
20279	357	20539	365
20280	357	20543	365
20283	357	20559	365
20284	358	20560	365
20287	358	20561	365
20288	358	20565	365
20291	358	20566	365
20292	358	20567	365
20295	358	20571	365
20299	359	20572	365
20302	359	20573	365
20303	359	20577	366
20305	359	20578	366
20306	359	20579	366
20323	359	20583	366
20327	360	20584	366
20331	360	20585	366
20335	360	20609	366
20339	360	20613	366
20343	360	20621	366
20359	360	20625	366
20360	360	20645	366
20361	361	20646	366
20365	361	20647	366
20366	361	20651	367
20367	361	20652	367
20371	361	20653	367
20372	361	20663	367
20373	361	20664	367
20377	361	20665	367
20378	361	20669	367

20670	367	
20671	367	
21113	368	
21117	368	
21121	368	
21125	368	
21129	368	
21133	368	
21137	368	
21141	368	
21210	369	
21220	369	
21221	369	
21222	370	
21223	370	
21224	370	
21225	370	
21226	370	
21227	370	
21228	370	
21244	370	
21245	371	
21246	371	
21247	371	
21248	371	
21249	371	
21250	371	
21251	371	
21252	371	
21268	371	
21269	372	
21272	372	
21282	372	
21283	372	
21284	372	
21309	372	
21310	373	
21311	373	
21312	373	
21313	373	
21314	373	
21315	373	
21316	373	
21335	373	
21342	374	
21345	374	
21348	374	
21349	374	
21352	374	
21353	375	
21356	375	
21357	375	
21360	375	
21361	375	
21362	375	
21365	375	
21366	375	
21371	376	
21372	376	
21373	377	
21376	377	
21380	377	
21384	377	
error code name		
LCB – ldm initialization failed (safety switch open)	369	
ldm 1 – 15vm voltage too high	354	
ldm 1 – 15vm voltage too low	354	
ldm 1 – 380vm pfc voltage too high	372	
ldm 1 – 380vm pfc voltage too low	371	
ldm 1 – 380vm voltage too high	354	
ldm 1 – 380vm voltage too low	354	
ldm 1 – 380vma voltage too high	354	
ldm 1 – 380vma voltage too low	354	
ldm 1 – heatsink pfc temperature sensor open	355	
ldm 1 – heatsink pfc temperature sensor short	355	
ldm 1 – heatsink pfc temperature too high	355	
ldm 1 – mains voltage too low	355	
ldm 1-2 – heatsink rectifier temperature sensor open	362	
ldm 1-2 – heatsink rectifier temperature sensor short	361	
ldm 1-2 – heatsink rectifier temperature too high	361	
ldm 1-6 – not configured (no communication)	363	
ldm 1-7 – not configured (no communication)	364	
ldm 1-7 – not configured (not initialized)	372	
lIs – too many laser banks are off	372	
lpt 1 - lIs bank 9 hot side temperature too high	374	
lpt 1 - temperature cold side bank 9 high.	373	
Error code name		
++12v - voltage high	342	
++12v - voltage low	342	
+24v - voltage high	340	
+24v - voltage low	341	
+24v - voltage too low	340	
5043	298	
ambient - temperature high	314	
ambient - temperature sensor open	314	
ambient - temperature sensor short	315	
ambient - temperature too high	314	
anode fan - speed low	300	
anode fan - speed too low	299	
cathode fan - speed low	301	
cathode fan - speed too low	300	
cold mirror fan - speed too low	297	
dmd - temperature hardware protection warning	340	
dmd blue - temperature high	315	
dmd blue - temperature low	316	
dmd blue - temperature sensor open	316	
dmd blue - temperature sensor short	317	
dmd blue - temperature too high	315	
dmd green - temperature high	317	
dmd green - temperature low	318	
dmd green - temperature sensor open	318	
dmd green - temperature sensor short	319	
dmd green - temperature too high	317	
dmd red - temperature high	321	
dmd red - temperature low	321	
dmd red - temperature sensor open	322	
dmd red - temperature sensor short	322	

- dmd red - temperature too high 320
- dmd red fan - speed low 311–313
- electronics fan 1 (top side) - speed low 304
- electronics fan 2 (bottom side) - speed low 304
- engine air - temperature high 338
- engine air - temperature sensor open 338
- engine air - temperature sensor short 339
- engine air - temperature too high 338
- engine fan - speed low 298
- icp fan - speed low 343
- imb - logical marriage tamper event 334
- imb - no communication 333
- imb - physical marriage tamper event 335
- imb - service door tamper event 334
- LCB - force light off 320
- lcb - +12v too high 377
- lcb - +12v too low 377
- lcb - +24v (fans) too high 346
- lcb - +24v (fans) too low 346
- lcb - +36v (diffusor wheel) too high 347
- lcb - +36v (diffusor wheel) too low 347
- lcb - 36v phosphor wheel voltage too high 363
- lcb - 36v phosphor wheel voltage too low 363
- lcb - air pressure too low 346
- LCB - Board temperature sensor open 345
- LCB - Board temperature sensor shorted 345
- lcb - Board temperature too high 345
- lcb - fcb forces lasers off 347
- lcb - fcb forces lasers off at start-up 349
- lcb - ldm power configuration mismatch 350
- lcb - turn-on lcm 1 failed 349
- lcb - turn-on pfc ldm 1 failed 349
- lcb - turn-on pfc ldm 1–6 failed 350
- lcb - turn-on pfc ldm 1–7 failed 350
- lcm 1 - air blown out temperature open 353
- lcm 1 - air blown out temperature short 353
- lcm 1 - air drawn in temperature sensor open 354
- lcm 1 - air drawn in temperature sensor short 353
- lcm 1 - air drawn in temperature too high 353
- lcm 1 - air drawn in temperature too low 353
- lcm 1 - coolant liquid in temperature too high 352–353
- lcm 1 - coolant liquid in temperature too low 352
- lcm 1 - coolant liquid out temperature too high 351–352
- lcm 1 - coolant liquid out temperature too low 351
- lcm 1 - fan 2 speed too low 350
- lcm 1 - fan 3 speed too low 377
- lcm 1 - fan 4 speed too low 378
- lcm 1 - fan 5 speed too low 378
- lcm 1 - fan 6 speed too low 378
- lcm 1 - not configured (invalid module type) 375
- lcm 1 - not configured (no communication) 375
- lcm 1 - pump speed too high 351
- lcm 1 - pump speed too low 351
- lcm 1 - fan 1 speed too low 350
- ldm 1 - heatsink pfc aux temperature sensor open 355
- ldm 1 - heatsink pfc aux temperature sensor short 355
- ldm 1 - heatsink pfc aux temperature too high 355
- ldm 1 - heatsink rectifier temperature sensor open 356
- ldm 1 - heatsink rectifier temperature sensor short 355
- ldm 1 - heatsink rectifier temperature too high 355
- ldm 1 - mains voltage too high 355
- ldm 1 - +12v voltage too high) 358
- ldm 1 - +12v voltage too low) 358
- ldm 1 - +24v voltage too high) 358
- ldm 1 - +24v voltage too low) 358
- ldm 1 - bad communication 356, 359
- ldm 1 - board temperature too high) 359
- ldm 1 - fan 1 speed too high 357
- ldm 1 - fan 1 speed too low 357
- ldm 1 - fan 2 speed too high 358
- ldm 1 - fan 2 speed too low 358
- ldm 1 - no communication 356, 359
- ldm 1 - not configured (initialization failed) 356–357
- ldm 1 - not configured (initialization failure) 359
- ldm 1 - not configured (invalid module type) 356, 359
- ldm 1 - not configured (not initialized) 375
- ldm 1-2 - lls bank 1 not white point calibrated 372
- ldm 1-2 - lls bank 2 not white point calibrated 373
- ldm 1-2 - lls bank 3 not white point calibrated 373
- ldm 1-2 - bad communication 362
- ldm 1-2 - heatsink drain temperature sensor open 362
- ldm 1-2 - heatsink drain temperature sensor shorted 362
- ldm 1-2 - heatsink drain temperature too high 362
- ldm 1-2 - lls bank 1 current too high) 360
- ldm 1-2 - lls bank 1 drain voltage too high) 359, 368
- ldm 1-2 - lls bank 1 temperature sensor open) 361
- ldm 1-2 - lls bank 1 temperature sensor shorted) 360
- ldm 1-2 - lls bank 1 temperature too high) 360
- ldm 1-2 - lls bank 2 current too high 360
- ldm 1-2 - lls bank 2 drain power too high 368
- ldm 1-2 - lls bank 2 drain voltage too high 360
- ldm 1-2 - lls bank 2 temperature sensor open 361
- ldm 1-2 - lls bank 2 temperature sensor shorted 361
- ldm 1-2 - lls bank 2 temperature too high 361
- ldm 1-2 - lls bank 3 current too high 360
- ldm 1-2 - lls bank 3 drain power too high 368
- ldm 1-2 - lls bank 3 drain voltage too high 360
- ldm 1-2 - lls bank 3 temperature sensor open 361
- ldm 1-2 - lls bank 3 temperature sensor shorted 361
- ldm 1-2 - lls bank 3 temperature too high 361
- ldm 1-2 - no communication 362
- ldm 1-3 - lls bank 4 not white point calibrated 373
- ldm 1-3 - lls bank 5 not white point calibrated 373

- ldm 1-3 - lls bank 6 not white point calibrated 373
- ldm 1-3 – heatsink drain temperature sensor open 366
- ldm 1-3 – heatsink drain temperature sensor shorted 366
- ldm 1-3 – heatsink drain temperature too high 366
- ldm 1-3 – heatsink rectifier temperature sensor open 366
- ldm 1-3 – heatsink rectifier temperature sensor shorted 366
- ldm 1-3 – heatsink rectifier temperature too high 366
- ldm 1-3 – lls bank 4 current too high 365
- ldm 1-3 – lls bank 4 drain power too high 368
- ldm 1-3 – lls bank 4 drain voltage too high 364
- ldm 1-3 – lls bank 4 temperature sensor open 365
- ldm 1-3 – lls bank 4 temperature sensor shorted 365
- ldm 1-3 – lls bank 4 temperature too high 365
- ldm 1-3 – lls bank 5 current too high 365
- ldm 1-3 – lls bank 5 drain power too high) 368
- ldm 1-3 – lls bank 5 drain voltage too high 364
- ldm 1-3 – lls bank 5 temperature sensor open 365
- ldm 1-3 – lls bank 5 temperature sensor shorted 365
- ldm 1-3 – lls bank 5 temperature too high 365
- ldm 1-3 – lls bank 6 current too high 365
- ldm 1-3 – lls bank 6 drain power too high) 368
- ldm 1-3 – lls bank 6 drain voltage too high 365
- ldm 1-3 – lls bank 6 temperature sensor open 365
- ldm 1-3 – lls bank 6 temperature sensor shorted 365
- ldm 1-3 – lls bank 6 temperature too high 365
- ldm 1-4 - lls bank 7 not white point calibrated 373
- ldm 1-4 - lls bank 8 not white point calibrated 373
- ldm 1-4 – heatsink drain temperature sensor open 367
- ldm 1-4 – heatsink drain temperature sensor shorted 367
- ldm 1-4 – heatsink drain temperature too high 367
- ldm 1-4 – heatsink rectifier temperature sensor open 367
- ldm 1-4 – heatsink rectifier temperature sensor shorted 367
- ldm 1-4 – heatsink rectifier temperature too high 367
- ldm 1-4 – lls bank 7 current too high 366
- ldm 1-4 – lls bank 7 drain power too high 368
- ldm 1-4 – lls bank 7 drain voltage too high 366
- ldm 1-4 – lls bank 7 temperature sensor open 366
- ldm 1-4 – lls bank 7 temperature sensor shorted 366
- ldm 1-4 – lls bank 7 temperature too high 366
- ldm 1-4 – lls bank 8 current too high 366
- ldm 1-4 – lls bank 8 drain power too high 368
- ldm 1-4 – lls bank 8 drain voltage too high 366
- ldm 1-4 – lls bank 8 temperature sensor open 367
- ldm 1-4 – lls bank 8 temperature sensor shorted 367
- ldm 1-4 – lls bank 8 temperature too high 367
- ldm 1-6 – heatsink drain temperature sensor open 363
- ldm 1-6 – heatsink drain temperature sensor shorted 363
- ldm 1-6 – heatsink drain temperature too high 363
- ldm 1-6 – heatsink rectifier temperature sensor open 363
- ldm 1-6 – heatsink rectifier temperature sensor shorted 363
- ldm 1-6 – heatsink rectifier temperature too high 363
- ldm 1-6 – not configured (initialization failure) 364
- ldm 1-7 – 24v lcb voltage high 364
- ldm 1-7 – heatsink rectifier temperature sensor open 364
- ldm 1-7 – heatsink rectifier temperature sensor shorted 364
- ldm 1-7 – heatsink rectifier temperature too high 364
- ldm 1-6 – not configured (invalid module type) 363
- ldm 1-7 – 24v LCB voltage low 364
- ldm 1-7 – not configured (initialization failure) 364
- ldm 1-7 – not configured (invalid module type) 364
- lens - no lens parameter file has been activated 344
- lens focus position - requested target not reached 307
- lens horizontal shift position - requested target not reached 309
- lens motors - voltage too low 343
- lens vertical shift position - requested target not reached 310
- lens zoom position - requested target not reached 306
- light pipe - temperature high 335
- light pipe - temperature sensor open 336
- light pipe - temperature sensor short 337
- light pipe - temperature too high 335
- light pipe fan - speed low 344
- light sensor - no communication 296
- light source - light is on, but smps is off 324
- light source - not connected 305
- light source - switching on the light source failed 324
- light source — the light source was switched off due to an error 324
- lls – bank 1 is off 347, 369–370
- lls – bank 2 is off 348, 369, 371
- lls – bank 3 is off 349, 370–371
- lls – bank 4 is off 349, 370–371
- lls – bank 5 is off 349, 370–371
- lls – bank 6 is off 349, 370–371
- lls – bank 7 is off 349, 370–371
- lls – bank 8 is off 349, 370–371

lls – bank 9 is off	349, 370–371
lls – Combiner bottom safety switch (brown) open	377
lls – combiner top safety switch (red) open	377
lls – identification failure	372
lls – phosphor wheel motor speed too low	347
lls – phosphor wheel motor speed too low at start-up	349
lls – phosphor wheel motor temperature sensor open	346
LLS – phosphor wheel motor temperature sensor shorted	346
lls – phosphor wheel motor temperature too high	345
lls ambient - temperature high	319
lls ambient - temperature sensor open	320
lls ambient - temperature sensor short	320
lls ambient - temperature too high	319
LLS light sensor – No Communication	376
lls memory storage device - no communication	372
lpt 1 - 24V input 1 voltage too high	374
lpt 1 - 24V input 1 voltage too low	374
lpt 1 - 24V input 2 voltage too high	374
lpt 1 - 24V input 2 voltage too low	374
lpt 1 - 36v phosphor wheel overcurrent	376
lpt 1 - lls bank 9 avg voltage too high	375
lpt 1 - lls bank 9 avg voltage too low	375
lpt 1 - lls bank 9 cold side temperature sensor open	374
lpt 1 - lls bank 9 cold side temperature sensor shorted	373
lpt 1 - lls bank 9 current too low	375
lpt 1 - lls bank 9 hot side temperature sensor open	374
lpt 1 - lls bank 9 hot side temperature sensor shorted	374
lpt 1- lls bank 9 current too high	375
maintenance - maintenance required	344
prism switch - warning (lens probably touches prism)	305
smmps fan 1 (left side) - speed low	302
smmps fan 2(right side) - speed low	303
smmps primary heatsink - temperature high	323
smmps secondary heatsink - temperature high	323
smmps secondary heatsink - temperature sensor open	323
smmps secondary heatsink - temperature sensor short	323
system - read projector identification failed	296
ti-boards - system status = fail	324
ti-icp - certificate error	329
ti-icp - icp board not detected	329
ti-icp - key error	329
ti-icp - read satellite info failed	327
ti-icp - read system status failed	327
ti-icp - satellite firmware mismatch	328
ti-icp - self test = fail	328
ti-link-decryptor - logical marriage tamper event	332
ti-link-decryptor - no communication	329
ti-link-decryptor - physical marriage tamper event	332
ti-link-decryptor - read system status failed	333
ti-link-decryptor - security log is almost full	333
ti-link-decryptor - security log is full	333
ti-link-decryptor - security tamper event	332
ti-link-decryptor - service door tamper event	326
ti-link-decryptor - system error	329
Error code number	
20003	345
20004	345
20005	345
20009	345
20010	346
20011	346
20187	354
21336	373
21337	374
21343	374
21344	374
5003	296
5020	296
5042	297
5053	298
5072	299
5073	300
5082	300
5083	301
5103	302
5113	303
5143	304
5153	304
5180	305
5191	305
5230	306
5231	307
5232	309
5233	310
5253	311
5263	312
5273	313
5280	314
5281	314
5284	314
5285	315
5290	315
5291	315
5293	316
5294	316
5295	317
5300	317
5301	317
5303	318
5304	318
5305	319
5310	319
5311	319
5314	320
5315	320
5320	320
5340	320
5341	321
5343	321
5344	322
5345	322
5351	323

- 5361 323
 - 5364 323
 - 5365 323
 - 5641 324
 - 5646 324
 - 5647 324
 - 5800 324
 - 5801 326
 - 5807 327
 - 5812 327
 - 5813 328
 - 5814 328
 - 5815 329
 - 5816 329
 - 5817 329
 - 5830 329
 - 5831 329
 - 5832 332
 - 5833 332
 - 5834 332
 - 5835 333
 - 5836 333
 - 5837 333
 - 5850 333
 - 5851 334
 - 5853 334
 - 5854 335
 - 5960 335
 - 5961 335
 - 5964 336
 - 5965 337
 - 6040 338
 - 6041 338
 - 6044 338
 - 6045 339
 - 6050 340
 - 6061 340
 - 6062 340
 - 6063 341
 - 6071 342
 - 6073 342
 - 6082 343
 - 6123 343
 - 6200 344
 - 6210 344
 - 6233 344
 - cold mirror fan - speed low 298
 - Exhaust system
 - Rear exhaust 263–264
 - Top exhaust 263
 - Exterior
 - Cleaning 292
- F**
- Fan
 - Blue channel 110
 - Cold Mirror 88
 - Green channel 109
 - Install
 - LDM 53
 - Light Pipe 136
 - Light Processor compartment 104
 - Red channel 107
 - SMPS 43
 - File manager
 - Activate
 - LUT-SCC file 156
 - File upload 155
 - Filters 17
 - Cleaning 287
 - Cleaning (wet) 288
 - Fixate
 - Lens Holder front plate 204
 - Focus 178
 - Fold Mirror
 - Adjust 133
 - Clean 134
 - Install 130
 - Remove 130
- G**
- General 15
 - Green channel
 - Fan 109
- H**
- Hazards 396
 - HDSDI board
 - Card Cage 216
 - Horizontal Shift
 - Stepper motor
 - Replace 188
 - Housing 17
- I**
- ICMP software update 252
 - ICP board 211
 - Card Cage 214
 - ICP fan
 - Card Cage 222
 - ICP software update 257
 - Inlet filters 17
 - Install
 - Anode Fan 84
 - Card Cage 239
 - Card Cage cover 245
 - Cathode Fan 86
 - CLO 135
 - Contrast plate 135
 - Covers 271
 - Fan
 - Blue channel 110
 - Green channel 109
 - LDM 53
 - Light Pipe 136
 - Light Processor compartment 104
 - Red channel 107
 - Fold Mirror 130
 - Integration Rod 142
 - Laser Driver Module 47
 - LDM 47

- Left side cover 279
 - Lens 176
 - Lens Holder cover plate 185
 - Lens motor assembly 190, 192–193
 - Lens No1 118
 - Lens No2 119–120
 - Lens No4 121
 - Light Pipe 123
 - Light Pipe converging fixed lens 121
 - Light Pipe cover 123
 - Light Pipe diverging fixed lens 119
 - Light Pipe focus lens 118
 - Light Pipe zoom lens 120
 - Light Processor 100
 - Light Sensor 135
 - Light Source cover 281
 - Mask plate 144
 - Rear exhaust 264
 - Rod heatsink 144
 - Side cover plate 277
 - Signal Backplane 236
 - Top cover 280
 - Top cover plate 278
 - Intall
 - Rear cover 281
 - Integrated Cinema Processor 211
 - Integration Rod 139
 - Adjust 145
 - Diagnostic 140
 - Introduction 140
 - Replace 142
 - Introduction
 - Card Cage 211
 - Cinema Controller 212
 - Integration Rod 140
 - Lens 174
 - Lens Holder 174
 - Light Pipe 114
 - Light Processor 96
 - Mains Input 32
 - SCC file 152
 - SMPS board 40
- K**
- Keypad
 - Backlight
 - Color 179
- L**
- Large dust filter
 - Replace 284
 - Large fan
 - Card Cage 221
 - Laser Control Board
 - Remove 64
 - Laser Driver Board
 - Diagnostic LED 267
 - Laser Driver Module 45
 - Install 47
 - Remove 46
 - Laser Phosphor Light Source 59
 - LCB
 - Remove 64
 - LDM 45
 - Fan
 - Replacement 51
 - Install 47
 - Remove 46
 - Left side cover
 - Install 279
 - Remove 274
 - Lens 174
 - Cleaning 292
 - Focus 178
 - Installation 176
 - Motor assembly 190, 192–193
 - Removal 178
 - Scheimpflug 200–201
 - Shift 178
 - Zoom 178
 - Lens Holder 18, 173–174
 - Cover plate 180, 185
 - Front plate 204
 - Lens Rubber
 - kit 195
 - Remove 181, 183
 - Lens Holder cover plate
 - Install 185
 - Remove 180
 - Lens Rubber
 - kit 195
 - Lens Holder 195
 - lens selection 175
 - Lenses
 - Available 174
 - Light measurements 165, 169
 - Light output
 - Measuring 171
 - Light Pipe 113
 - Converging fixed lens 121
 - Diverging fixed lens 119
 - Fan 136
 - Focus lens 118, 125
 - Install 123
 - Introduction 114
 - Lens No1 118, 125
 - Lens No2 119–120
 - Lens No3 126
 - Lens No4 121
 - Mask plate 141, 144
 - Remove 115
 - Rod heatsink 141, 144
 - Zoom lens 120, 126
 - Light Pipe cover
 - Install 123
 - Remove 117
 - Light Pipe lens
 - Clean 122
 - Light Processor 18, 95
 - Diagnostic 96
 - Install 100
 - Introduction 96
 - Remove 97

- Replacement 97
- Side cover plate 276–277
- Top cover plate 275, 278
- Light Processor compartment
 - Closing off 163
 - Fan 104
- Light Sensor
 - Install 135
 - Interconnection Board
 - Replace 74
 - Remove 135
- Light Source 18
 - Combiner
 - Replace 77
 - Install 67
 - Overview 60
 - Phosphor Wheel
 - Replace 82
 - Remove 61
- Light Source cover
 - Install 281
 - Remove 272
- Light Source Fans
 - Interconnection Board
 - Replace 72
 - Replace 75
- Link Decryptor
 - Card Cage 217
- Link decryptor software update 259
- Liquid cooling circuit 91
- Location
 - Main components 17
- LUT-SCC file
 - Activate 151
 - Download 153

M

- Main components 17
- Mains Filter
 - Replace 35
- Mains Input 31
 - Access 33
 - Introduction 32
- Maintenance
 - 1 year 27
 - 3 month 26
 - 4 year 29
 - Software upgrade
 - ICMP software 252
 - ICP software 257
 - Launch DC update companion 250
 - Link decryptor 259
 - Log file 262
 - Projector software 252
 - Touch panel software 252
- Maintenance procedures 291
- Maintenance program 25
 - 1 Month 26
- Mask plate
 - Install 144
 - Remove 141
- Motor assembly

- Lens 190, 192–193
- Mounting
 - Controller assembly 66

N

- Non optical components
 - Cleaning procedures 392
- Notch Filter
 - Adjust 128
 - Clean 130
 - Replace 127

O

- Obtain
 - Serial Number 152
- ON/OFF switch
 - Replace 34
- Optical alignment 147–148
- Optical components
 - Cleaning 384
 - Cleaning procedures 386
- Optical path
 - Cleaning procedures 386
 - Cleaning process 385
- Orientation
 - Convention 16

P

- Partition plate
 - Card Cage 246
- Peltier Controller
 - Replace 64
- Phosphor Wheel
 - Interconnection Board
 - Replace 70
- Phosphor Wheel Monitoring
 - Interconnection Board
 - Replace 72
- Power Board
 - Diagnostic LED 266
- Power Module
 - Fan
 - Replacement 51
- Power Supply 39
- Prism
 - Clean 103
- Process
 - Light Processor 97
- Projector
 - Cleaning 383
- Projector software update 252
- Projector status 20

R

- Rear cover
 - Install 281
 - Remove 272

- Rear exhaust 263
 - Install 264
- Remove
 - Anode Fan 84
 - Card Cage 232
 - Card Cage cover 228
 - Cathode Fan 86
 - CLO 135
 - Contrast plate 135
 - Controller Assembly 62
 - Covers 271
 - Fan
 - Blue channel 110
 - Green channel 109
 - Light Pipe 136
 - Light Processor compartment 104
 - Red channel 107
 - Fold Mirror 130
 - Integration Rod 142
 - Laser Driver Module 46
 - LDM 46
 - Left side cover 274
 - Lens 178
 - Lens Holder 181, 183
 - Lens Holder cover plate 180
 - Lens motor assembly 190, 192–193
 - Lens No1 118
 - Lens No2 119–120
 - Lens No4 121
 - Light Pipe 115
 - Light Pipe converging fixed lens 121
 - Light Pipe cover 117
 - Light Pipe diverging fixed lens 119
 - Light Pipe focus lens 118
 - Light Pipe zoom lens 120
 - Light Processor 97
 - Light Sensor 135
 - Light Source cover 272
 - Mask plate 141
 - Partition plate
 - Card Cage 246
 - Rear cover 272
 - Rod heatsink 141
 - Side cover plate 276
 - Signal Backplane 234
 - SMPS 40, 42
 - Top cover 273
 - Top cover plate 275
- Replace
 - 24V Filter board 65
 - Anode Fan 84
 - Battery
 - Cinema Controller 218
 - Blue Laser Interconnection Board 75
 - Button Module
 - Card Cage 223
 - Capacitor board 65
 - Cathode Fan 86
 - Cinema Controller
 - Card Cage 217
 - Cold Mirror fan 88
 - Combiner 77
 - Contrast plate 135
 - Dust filter
 - Large 284
 - Small 285
 - Fan
 - Blue channel 110
 - Green channel 109
 - Laser Driver Module 51
 - LDM 51
 - Light Pipe 136
 - Light Processor compartment 104
 - Power Module 51
 - Red channel 107
 - Fold Mirror 130
 - HDSDI board
 - Card Cage 216
 - Horizontal Shift
 - Stepper motor 188
 - ICP board
 - Card Cage 214
 - ICP fan
 - Card Cage 222
 - Integration Rod 142
 - Large fan
 - Card Cage 221
 - Laser Control Board 64
 - Laser Drive Module 56
 - LCB 64
 - LDM 56
 - Driver board 48
 - Lens motor assembly 190, 192–193
 - Lens No1 118
 - Lens No2 119–120
 - Lens No4 121
 - Light Pipe converging fixed lens 121
 - Light Pipe diverging fixed lens 119
 - Light Pipe focus lens 118
 - Light Pipe zoom lens 120
 - Light Sensor Interconnection Board 74
 - Light Source Fan Interconnection Board 72
 - Light Source Fans 75
 - Link Decryptor
 - Card Cage 217
 - Mains Filter 35
 - ON/OFF switch 34
 - Peltier Controller 64
 - Phosphor Wheel Interconnection Board 70
 - Phosphor Wheel Monitoring Interconnection Board 72
 - RTC battery
 - ICMP board 214
 - Signal Backplane 227
 - Small fan
 - Card Cage 220
 - SMPS fan 43
 - Solid State relay 36
 - Status Light 247
 - Vertical Shift
 - Stepper motor 186
- Replace Notch Filter 127
- Rod
 - Adjust 145
 - Diagnostic 140
 - Rod heatsink
 - Install 144
 - Remove 141

Rod inlet
Cleaning 387

S

Safety 11
Instructions 12
SCC file
Introduction 152
Scheimpflug 199–201
Adjustment points 200
Scheimpflug's law 200
Screen gain
Measure 169
Shift 178
Side cover plate
Install 277
Remove 276
Signal Backplane
Install 236
Remove 234
Replace 227
Sleep mode 20
Small dust filter
Replace 285
Small fan
Card Cage 220
SMPS
Remove 40, 42
SMPS board
Introduction 40
SMPS fan
Replace 43
Software update
DC update companion 249
ICMP software 252
ICP software 257
Link decryptor 259
Log file 262
Projector software 252
Touch panel software 252
Via Communicator 249
Software upgrade
DC update companion
Launch 250
Solid State relay
Replace 36
Spare parts 21
SPG 18
Status light 20
Status Light
Replace 247
Stepper motor
Horizontal Shift
Replace 188
Vertical Shift
Replace 186
Switch Mode 39

T

Tail light 20

Test Pattern
Convergence 159
Top cover
Install 280
Remove 273
Top cover plate
Install 278
Remove 275
Touch panel software update 252
Troubleshooting 293
Checklist 296, 345
LDM Mapping 295
Log files 378

V

Vacuum
Filters 287
Vertical Shift
Stepper motor
Replace 186

W

Washing
Filters 288

Z

Zoom 178

