SERVICE MANUAL
MAC Aura XB

Revision A, 05-15-2017

Martin® by HARMAN

Table of contents

General information

This service manual contains information about how to service MAC Aura XB.

Safety instructions

Before you carry out service work, read this document. Installation and service work must comply with local regulations and accepted codes of good practice.

Observe the safety instructions in the user manual for the product.

Figure 1: Safety instructions

Tools

Make sure that the tools below are available before you start working on the product:

- Torx 9
- Torx 10
- Torx 20
- Small flatheaded screwdriver
- 5.5 mm hex socket screwdriver
- 7 mm hex socket screwdriver
- Gloves
- ESD mat and wristband.

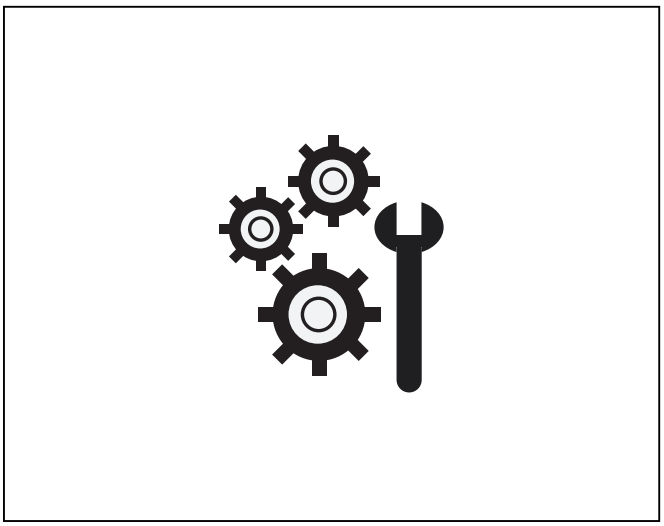

Figure 2: Tools

Take the necessary precautions to prevent static electricity from damaging the product during modification or repair.

Figure 3: ESD mat and wristband

Spare parts

For an overview of the spare parts and spare part numbers of MAC Aura XB, refer to martin.com.

1. Login with your user login details.
2. Search for “MAC Aura XB”.
3. Clik “Partfinder: Layered” (1).

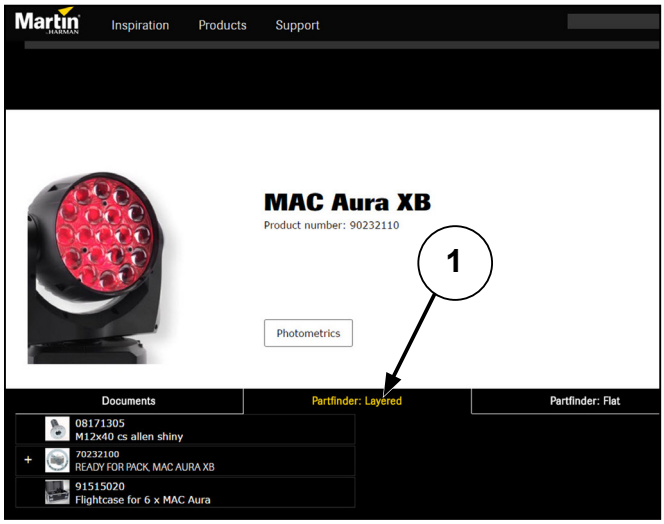

Figure 4: PartFinder: Layered

Product information

Before you start servicing the product, notice that the yoke covers have great impact on the strength and stability of the yoke and head construction.

Once you have removed the yoke cover, we recommend that you pay special attention to the forces that the yoke bracket is exposed to.

Figure 5: Yoke and head construction

We highly recommend that you place the fixture with the lens pointing towards the table. To avoid scratching the lens, we recommend that you place a soft cloth under the head of the fixture.

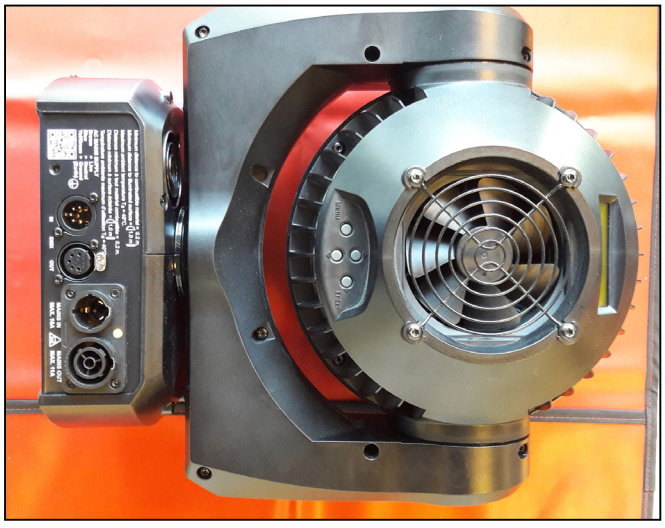

Figure 6: Lens pointing towards the table

Most of the wires that are connected to the mainboard are small. Use a small flatheaded screwdriver to loosen the connectors.

NOTE! Never disconnect the connectors by pulling the wires.

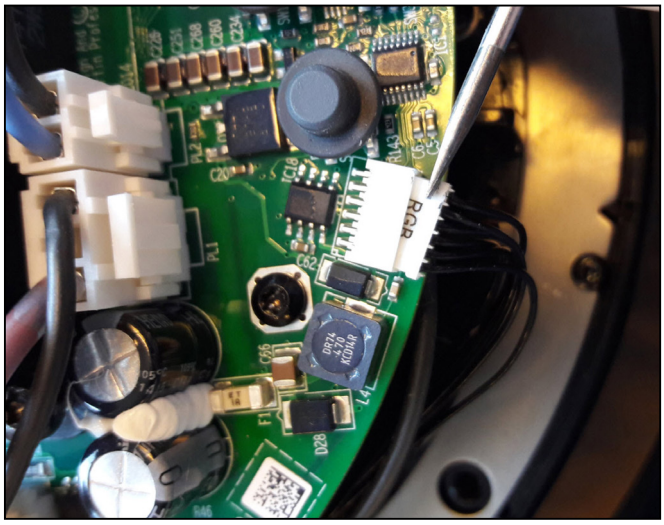

Figure 7: Loosening the connectors

Troubleshooting

Overview of error codes

Error message	Symptom	Cause	Remedy
MAIN TMP SEN ERR	The LEDs cannot be turned on.	The main PCB is too hot.	Replace the fan.
		The communication wire between the main PCB and LED PCBs is faulty.	Replace the wire harness (P/N 11860396). The wire harness goes from connector PL16 to PL39 on the LED PCB. See figure 8.
		The main PCB is faulty	Replace the main PCB.
BEAM TMP SEN ERR	The Beam LEDs cannot be turned on.	The communication wire from the main PCB to the Beam LED PCB is faulty	Replace the wire harness (P/N 11860396). The wire harness goes from connector PL16 to PL39 on the LED PCB. See figure 8.
		The Beam LED PCB is too hot.	Replace the Beam LED PCB.
		The main PCB is faulty.	Replace the main PCB.
AURA TMP CUT OFF	The LEDs cannot be turned on.	The communication wire from the main PCB to the Aura LED PCB is faulty.	Replace the wire harness (P/N 11860396). The wire harness goes from connector PL16 to PL39 on the LED PCB side.
		The Aura LED PCB is too hot.	Replace the Aura LED PCB.
		The main PCB is faulty.	Replace the main PCB.
Pan Sensor Error	The fixture fails the reset sequence. The reset sounds wrong. The pan position is faulty.	The absolute position is not found.	Check the sensor (figure 30, PR), the wiring and replace the sensor, if necessary.
		The belt is worn out or is not properly tightened.	Tighten the belt, or replace it, if necessary.
		The motor is faulty.	Check the motor and the motor cable, replace them if necessary. Replace the main PCB.
Tilt Sensor Error.	The fixture fails the reset sequence. The reset sounds wrong. The tilt position is faulty.	The absolute position is not found.	Check the sensor (figure 30, TR), the wiring and replace the sensor, if necessary.
		The belt is worn out or is not properly tightened.	Tighten the belt, or replace it, if necessary.
		The motor is faulty.	Check the motor and the motor cable, replace them if necessary. Replace the main PCB.
FBEP or FBET	The fixture fails the reset sequence. Pan or tilt continue to move until timeout. The reset sounds wrong. The pan or tilt position is faulty.	The screw on the tacho wheel is not tight.	Tighten the screw.
		The teeth of the tacho wheel are damaged.	Replace the tacho wheel.
		The wire is faulty.	Replace the wire.
		The sensor is faulty.	Replace the sensor.
		The main PCB is faulty.	Replace the main PCB.
		The belt is damaged or not tightend properly.	Tighten the belt and replace it, if necessary.
Voltage error	Reset is OK but an error is displayed. The Aura LEDs are OK but the beam LEDs will not turn on.	The thermal switch in the LED heat sink is open circuit.	Check the thermal switch (figure 15) and replace it, if necessary.
		+88 VDC is not supplied to the main PCB.	Check the +88 VDC wire. Replace the wire harness (P/N 11860395), if necessary. See figure 8.
EFFECTS TOO COLD		The ambient temperature is too low.	Leave the fixture powered on to warm it up or move the fixture to a more warm location. Update the firmware.
Fan error	The fan does not work. The LEDs will not turn on.	The fan is faulty.	Replace the fan.
		The fan driver is faulty.	Replace the main PCB.
BEAM CALIB ERR	The fixture reset is OK. The LEDs work. The Beam colors do not match other products.	Calibration values cannot be read from the Beam LED PCB.	Check the communication wires from the mainboard to the Beam LED PCB and replace the Beam LED PCB, if necessary.
AURA CALIB ERR	The fixture reset is OK. The LEDs work The Aura colors do not match other products.	Calibration values cannot be read from the Aura LED PCB.	Check the communication wires from the Beam LED PCB to the Aura LED PCB and replace the Aura LED PCB, if necessary.
	The fixture is not working The fixture does not power up or reset	The fuse is blown.	Replace the fuse.
		The PSU is faulty.	Replace the PSU.
		The main PCB is faulty.	Replace the main PCB.
	LED issue	The LED pixel PCB or the main PCB is faulty.	Replace the LED pixel PCB or the main PCB.
	The fixture does not show the correct color/ have the same intensity.		
	The fixture does not show the correct color.		
	The fixture does not have the same intensity.		
	The fixture does not have the same intensity.		
	The fixture does not show the correct color.		

Error message	Symptom	Cause	Remedy
	DMX issue The fixture does not function according to the DMX channels	XLR sockets are faulty.	Replace the XLR socket.
		The wire set is faulty.	Replace the wire set.
		The TX/RX chip is faulty.	Replace the TX/RX chip.
		The main PCB is faulty.	Replace the main PCB.
	Color differences The fixture does show the same colors as other fixtures.	The mode is incorrect - RGB, EXTENDED or RAW	Change the mode.
		The calibration values on one of the boards are corrupt or missing.	Replace the pixel board.
		The main PCB is defective.	Replace the main PCB.
	Display issues The display is not active or some pixels are missing.	The ribbon cable connection is faulty.	Replace the ribbon cable.
		The display is faulty.	Replace the display.
		The main PCB is faulty	Replace the main PCB.
	Zoom issues The beam angle is not the same as the other fixtures'.	One or more of the three zoom motors are faulty.	Replace the motor.
		The wire connection is faulty.	Replace the wire set.
		The main PCB is faulty.	Replace the main PCB.

Wiring diagram

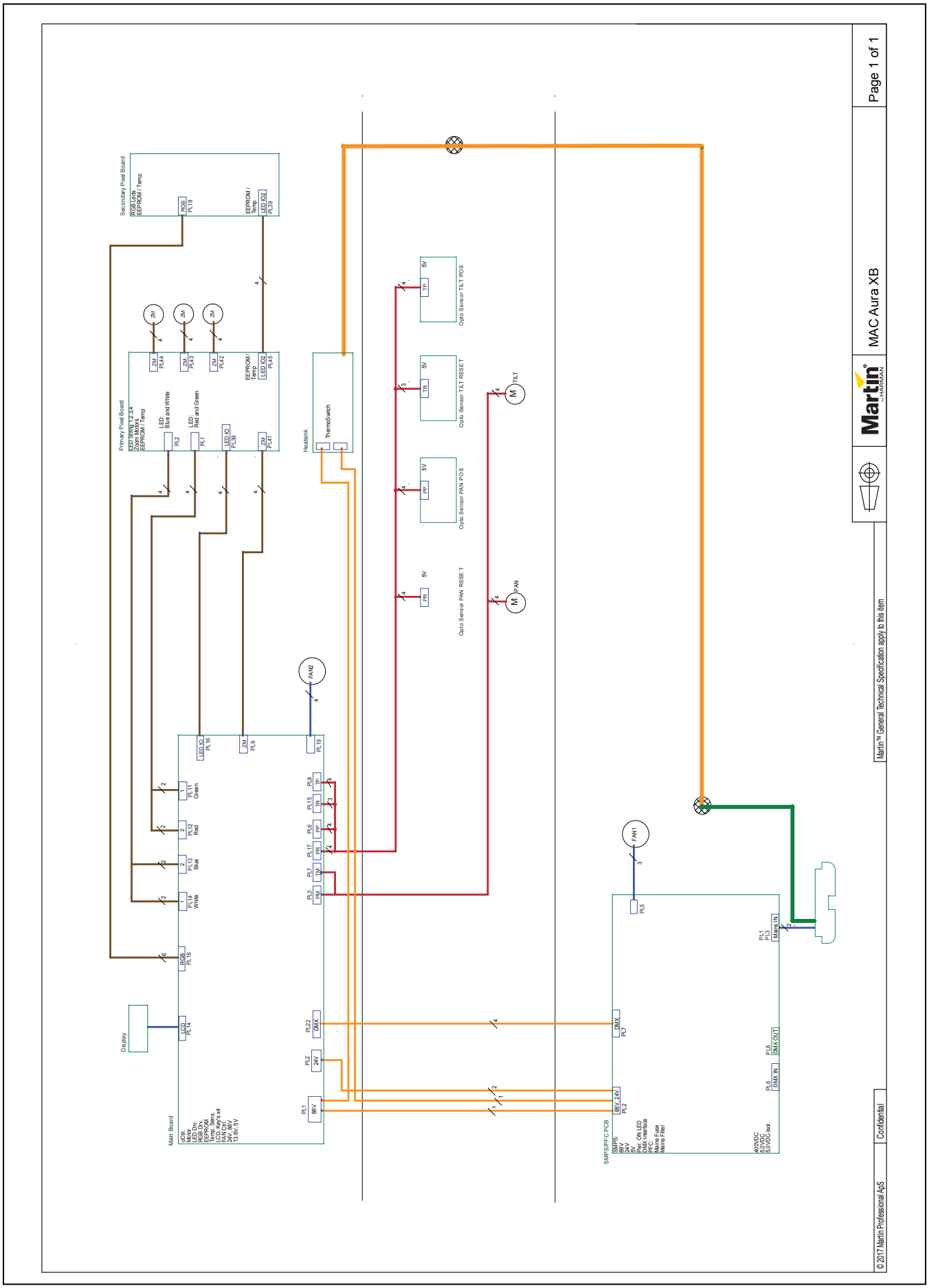

Figure 8: Wiring diagram, MAC Aura XB Hybrid

Repair and maintenance

Head

Replacing the head fan

1. Remove the four TX20 screws (1) that hold the rear cover.
2. Remove the rear head cover.

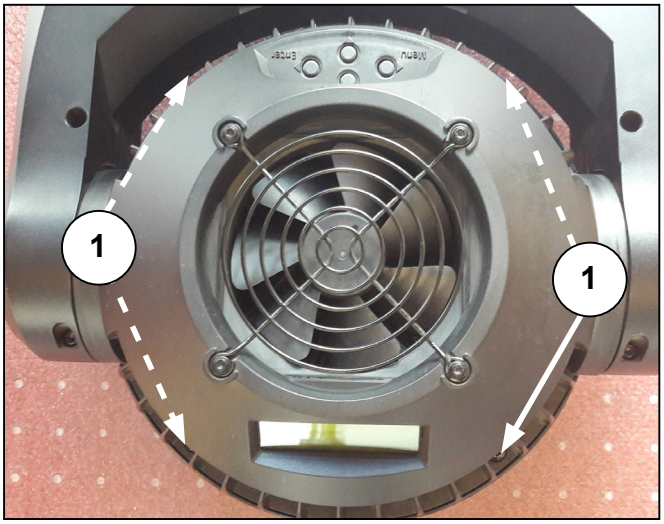

Figure 9: Remove rear cover

3. Remove the four TX20 screws (2) that hold the fan.
4. Remove the fan.
5. To replace the fan, follow the procedure in reverse order.

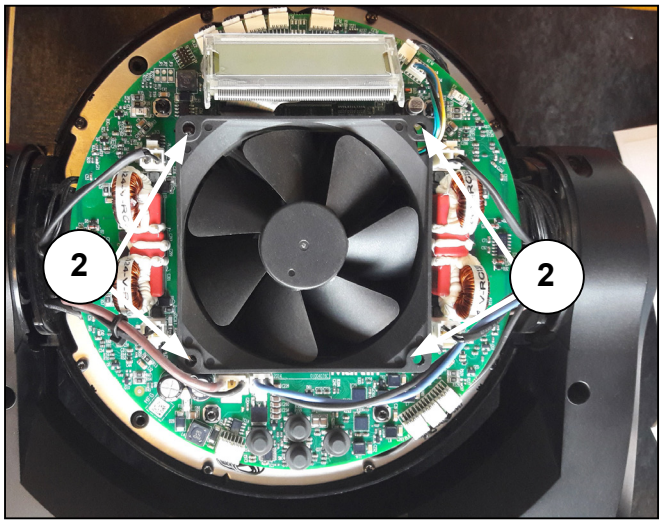

Figure 10: Removing the screws

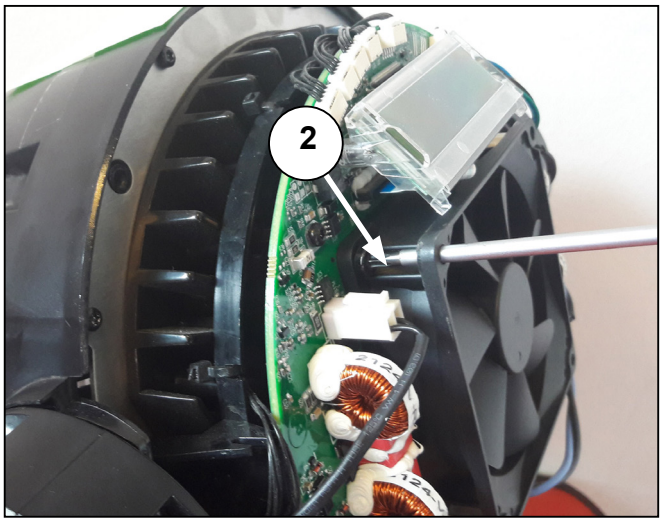

Figure 11: Removing the screws

Replacing the main LCD display

1. Remove the rear head cover and the fan. See “Replacing the head fan” on page 9.
2. Remove all connectors and cable ties around the wires.
3. Remove the four TX10 screws that hold the main PCB.

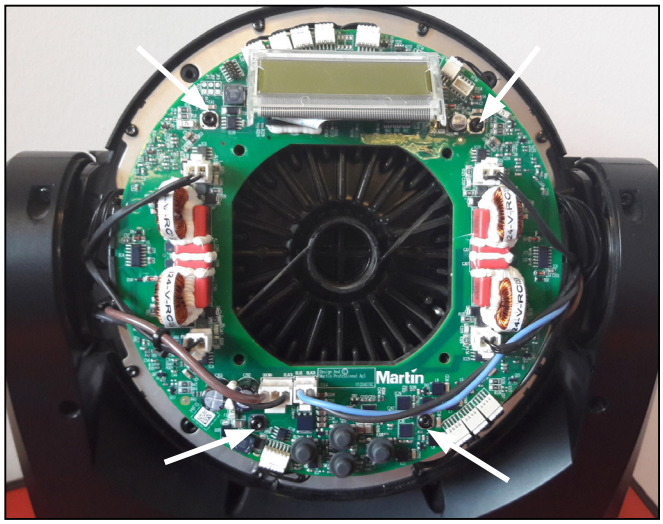

Figure 12: Removing the main PCB

4. Use a small screwdriver to lift up and free the main PCB from the plastic taps (1) of the air guide.
   NOTE! Air guides without plastic taps are avaiable on my.martin (P/N 19800520).

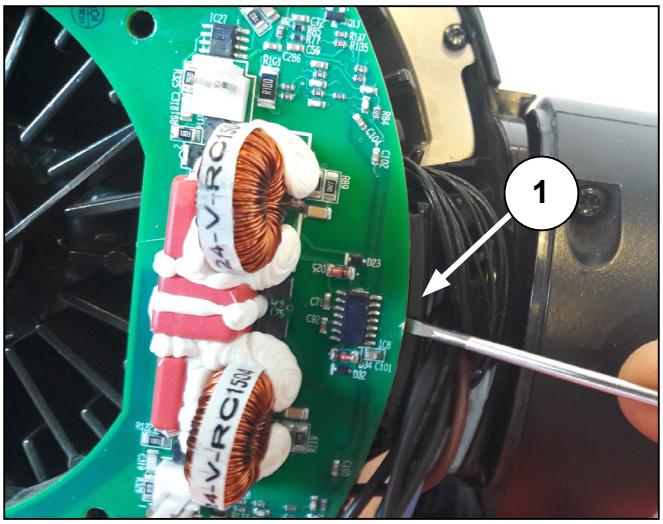

Figure 13: Air guide plastic taps

5. Remove the ribbon cable (2) from the connector.
6. The LCD display is fastened by two TX10 screws (3) below the main PCB. Remove the screws to loosen the LCD display.
7. To install the new display, follow the procedure in reverse order.

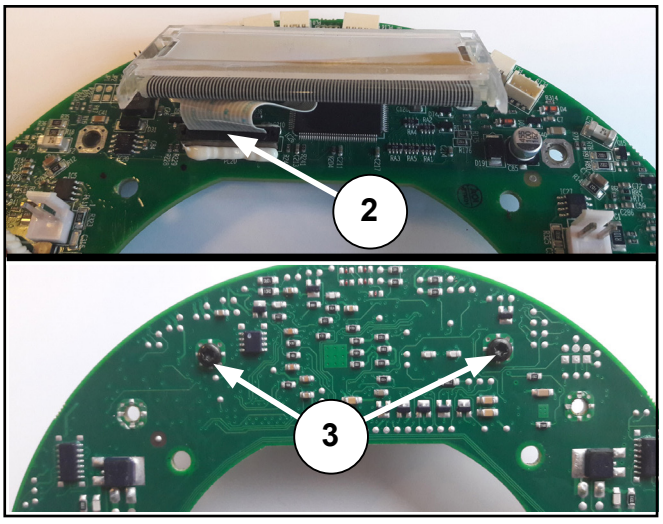

Figure 14: LCD display, ribbon cable and screws

8. Reconnect all connections according to the table below.

PCB connections	Wire
PL22	DMX
PL17	PR
PL6	PP
PL8	TP
PL16	LED10
PL15	TR
PL19	Fan
PL13	2
PL14	1
PL3	PM
PL7	TM
PL9	ZM
PL18	RGB
PL2	GND
PL1	24V 88V
PL12	2
PL11	1

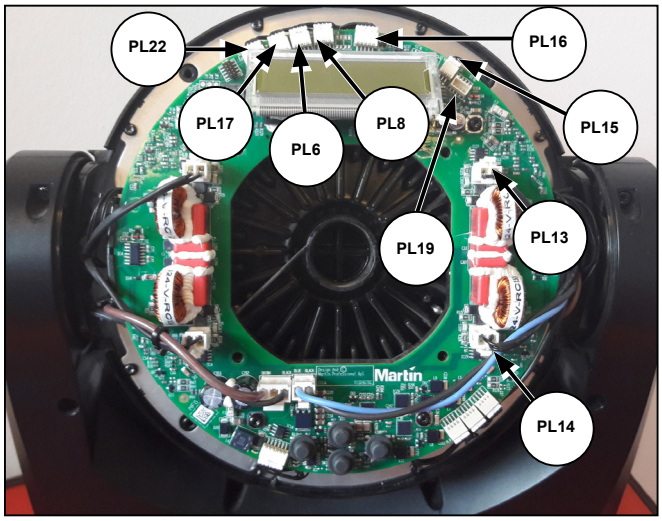

Figure 15: Connectors

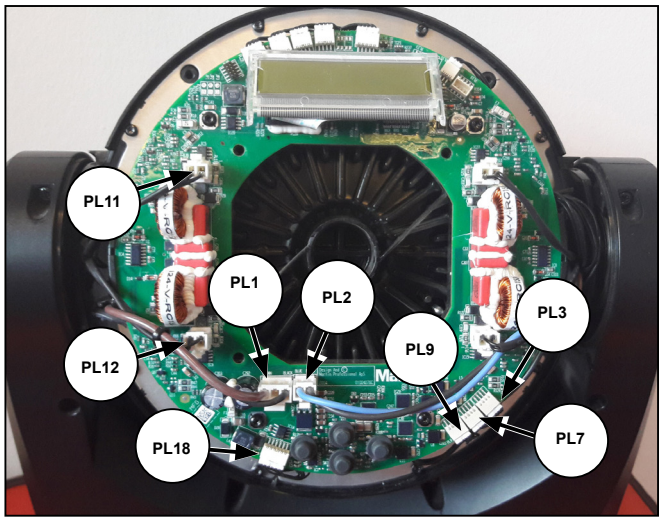

Figure 16: Connectors

Replacing the thermo switch

The thermo switch is used for heat protection. If the local temperature exceeds a given degree, the switch cuts off the main 88V supply to the main PCB.

1. Remove the main PCB. See “Replacing the main LCD display” on page 10.
2. Remove the wires (1).

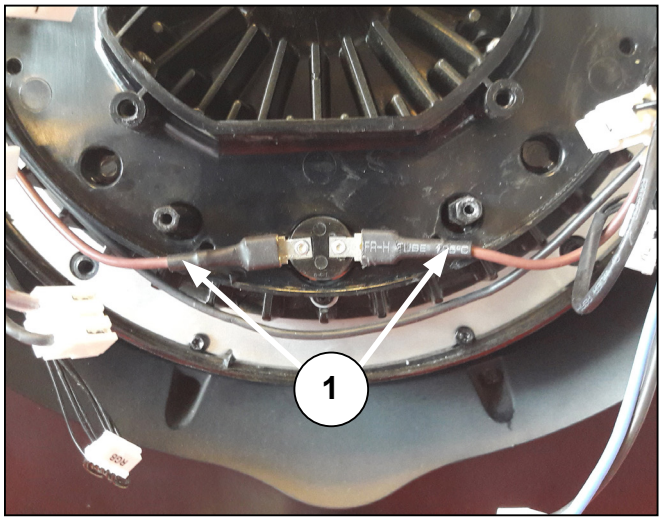

Figure 17: Thermo switch

3. Remove the two TX10 screws (2) that hold the thermo switch.

4. To install a new thermo switch, follow the procedure in reverse order.

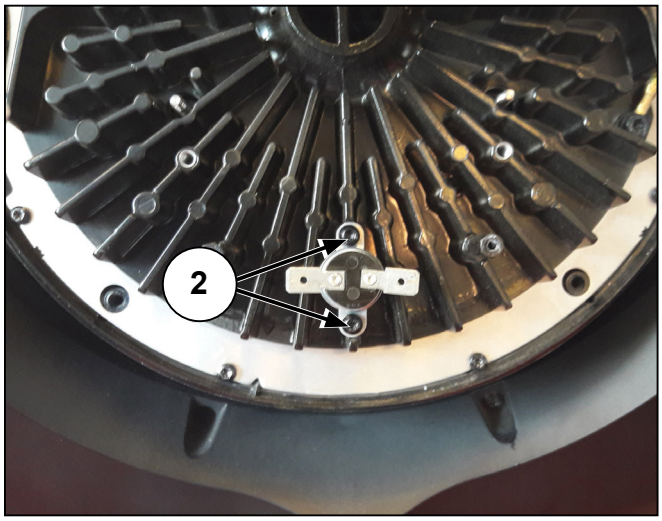

Figure 18: Thermo switch

Replacing the front lens

The lens, pixel boards, heat sink, mainboard and fan are assembled in a complete assembly. Disconnect all the wires to this assembly and place them on the table before you begin.

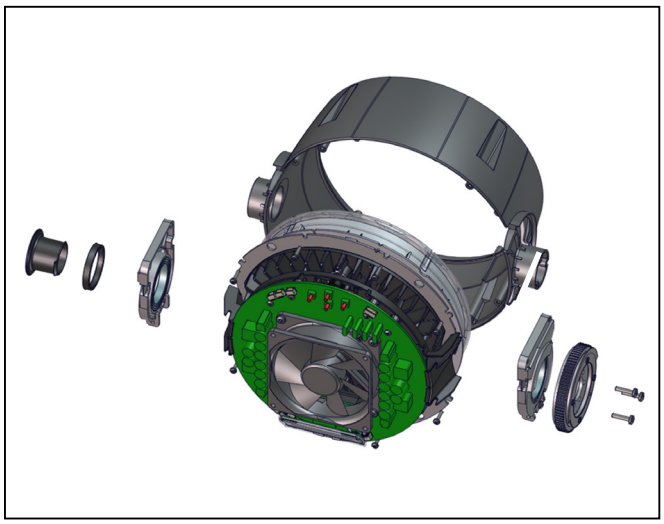

Figure 19: Front lens

	Part
1	Front lens array
2	Diffuser 5 degrees
3	Diffuser plate
4	Pixelboard secondary
5	Insulation paper
6	Enclosure plate
7	Light rod assembly
8	Zoom motors
9	Pixelboard primary
10	Thermal pad
11	Heatsink
12	Thermo switch
13	Air guide
14	Mainboard
15	LCD display
16	Fan

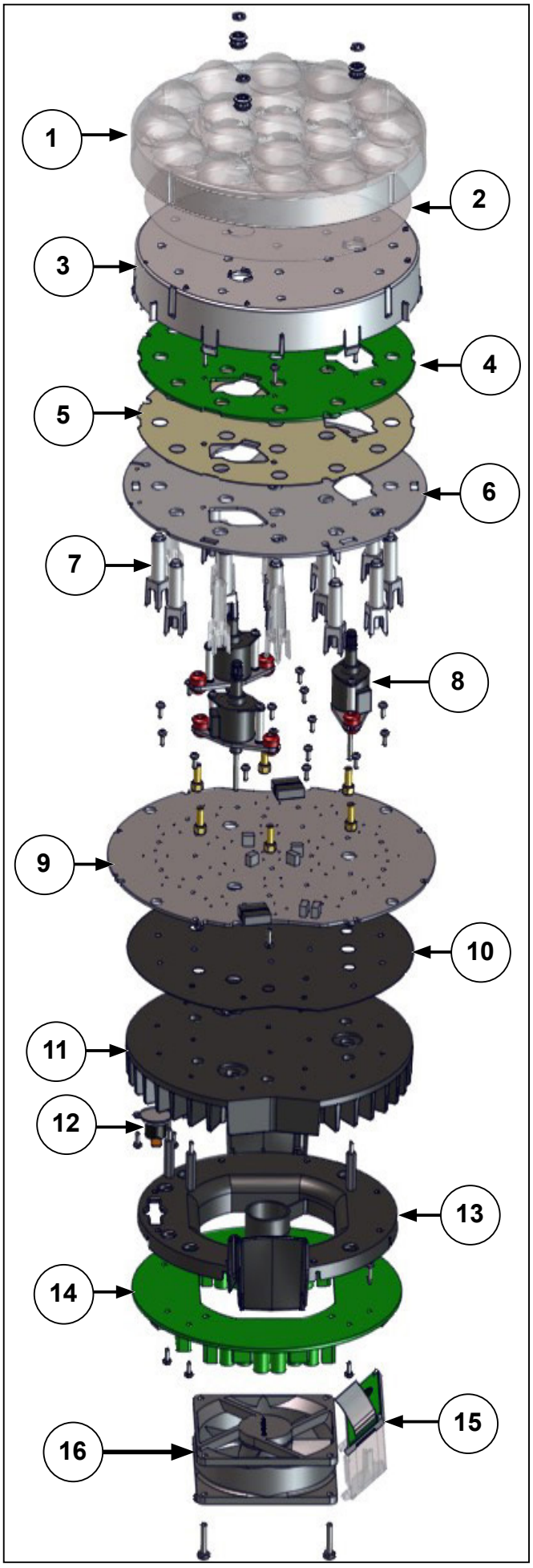

Figure 20: Exploded view of head assembly

1. Remove the three Ø4 clips (1) that attach the front lens to the zoom motor shafts.

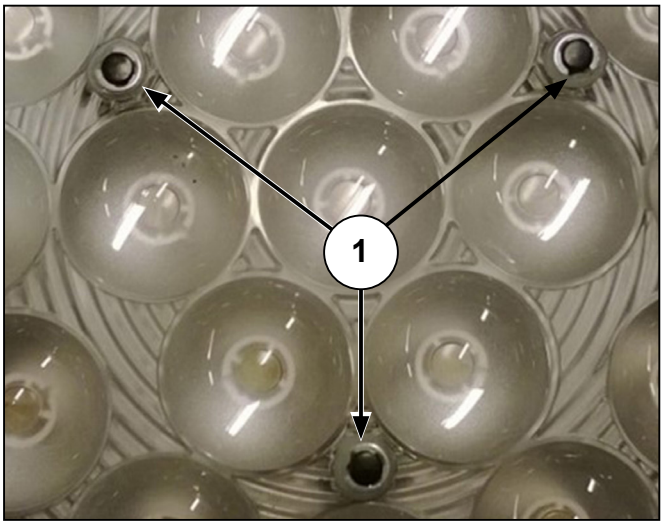

Figure 21: Lens clips

2. Remove the front lens from the zoom motor shafts.
3. To install the new front lens, follow the procedure in reverse order.
   NOTE! Make sure to align the front lens according to the alignment markers (2).

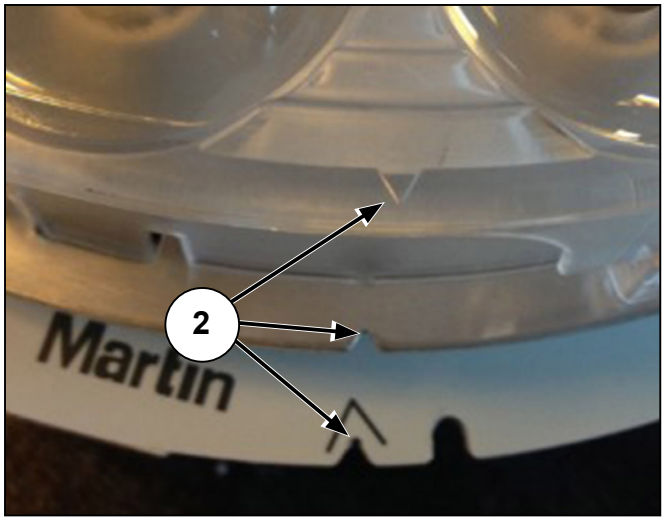

Figure 22: Alignment markers

Replacing the diffuser plate

The purpose of the diffuser plate is to diffuse the backlight that gives the fixture its special aura effect. You can access the diffuser plate when you have removed the front lens. The diffuser plate is attached to the secondary pixel board with six taps.

1. Press the six taps (1), one by one, inward toward the center of the pixel board to loosen the diffuser plate.
2. Remove the diffuser plate.
3. To install the new diffuser plate, follow the procedure in reverse order.
   NOTE! Make sure to align the diffuser plate according to the alignment markers.

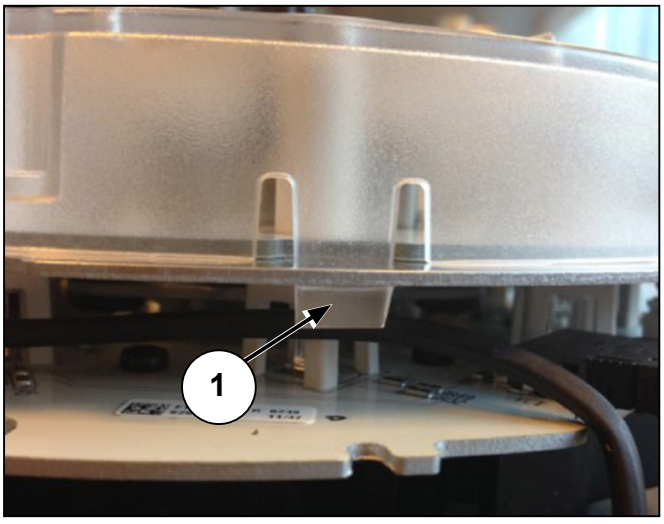

Figure 23: Diffuser plate taps

Replacing the secondary pixel board

The secondary pixel board is placed behind the diffuser plate. See “Replacing the diffuser plate” on page 14.

1. Remove the six TX10 screws.
2. Disconnect the wires.
3. Remove the secondary pixel board.
4. Connect the wires according to the table below.

PCB connections	Wire
PL19	RGB
PL39	LED102

5. To install the new secondary pixel board, follow the procedure in reverse order.
   NOTE! Make sure to add Loctite 243 to the screws and to align the secondary pixel board according to the alignment markers. See the arrows in figure 24.

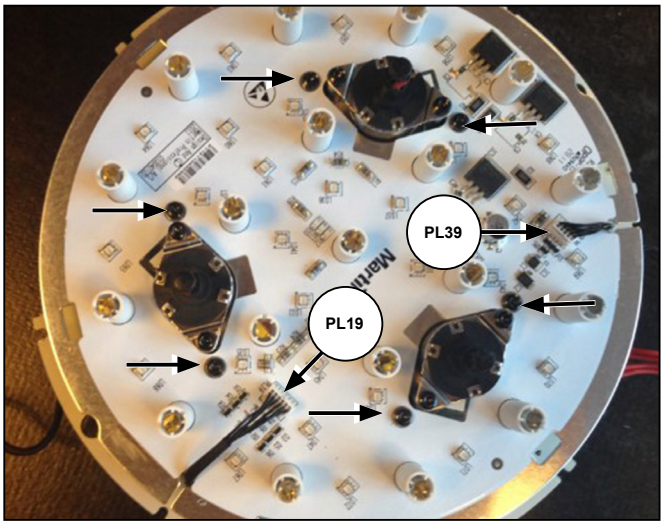

Figure 24: Secondary pixel board

Replacing the zoom motors

The zoom motor is fastened by two TX10 screws each and is connected to the primary pixel board with four pin connectors. See the arrows in figure 25.

1. Remove the secondary pixel board. See “Replacing the secondary pixel board” on page 15
2. Remove the insulation paper.
3. Remove the enclosure plate.
4. Remove and replace the zoom motors.

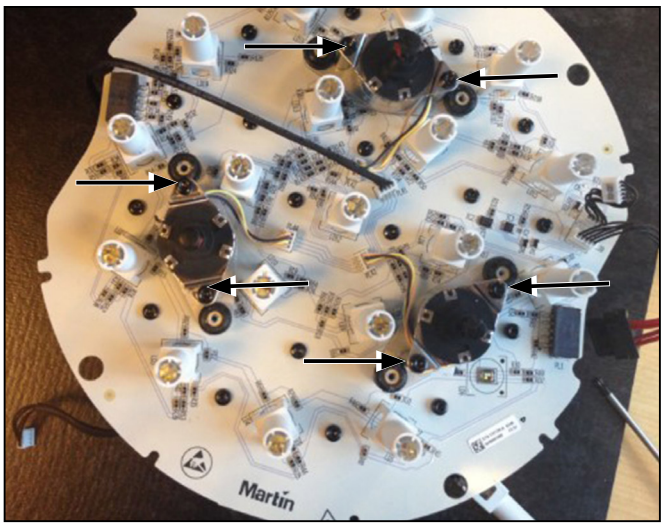

Figure 25: Zoom motor

Replacing the light rods

You get access to the light rods from the same layer as the zoom motors. See “Replacing the zoom motors” on page 15. The plastic light rod is fastened to the primary pixel board with four taps.

1. Gently remove the light rods (1) to prevent the taps (2) from breaking.
2. To mount a new light rod, follow the procedure in reverse order.
   NOTE! Remember to wear gloves when you replace the light rods to avoid leaving grease and residue on them.

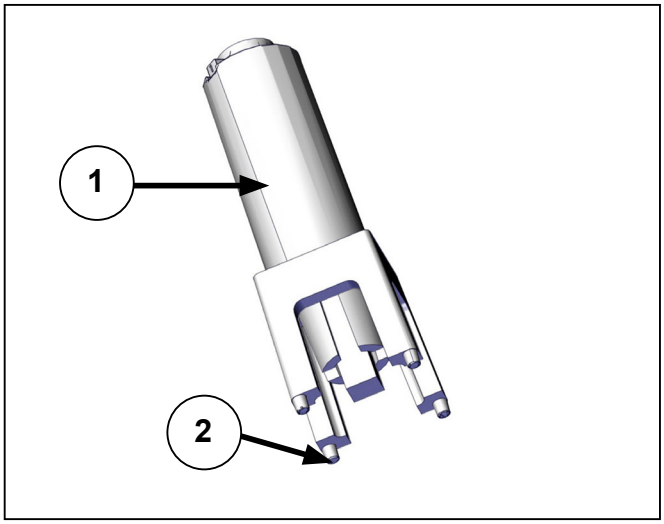

Figure 26: Light rod

Replacing the primary pixel board

The primary pixel board is fastened by 18 TX10 screws to the heatsink via the thermal pad to ensure a good heat transfer.

1. Remove the secondary pixel board.
2. Remove the insulation paper.
3. Remove the enclosure plate.
4. Remove the zoom motors.
5. Remove the light rods.
6. Remove the 18 TX10 screws
7. Disconnect the wires.
8. Connect the wires according to the table below.

PCB connection	Wire
PL45	LED 10
PL39	LED 102
PL1	5-pin connector
PL43	Zoom M2
PL44	Zoom M3
PL42	Zoom M1
PL41	ZM
PL2	5-pin connector

9. To install the new primary pixel board, follow the procedure in reverse order.
   NOTE! Make sure to add Loctite 243 to the screws before fastening them.

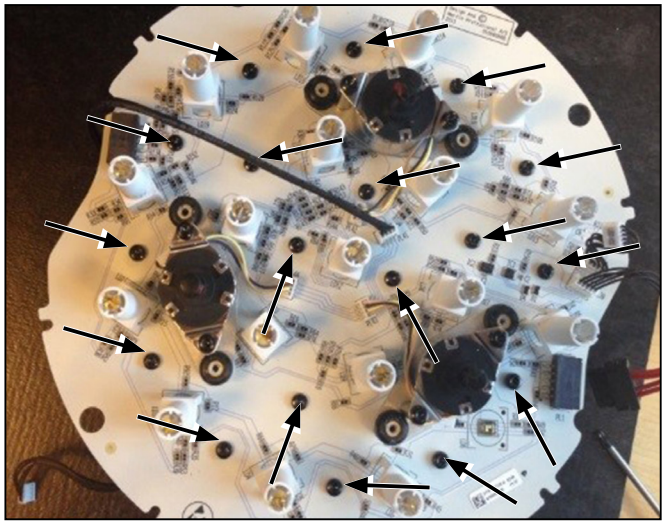

Figure 27: Replacing the primary pixel board

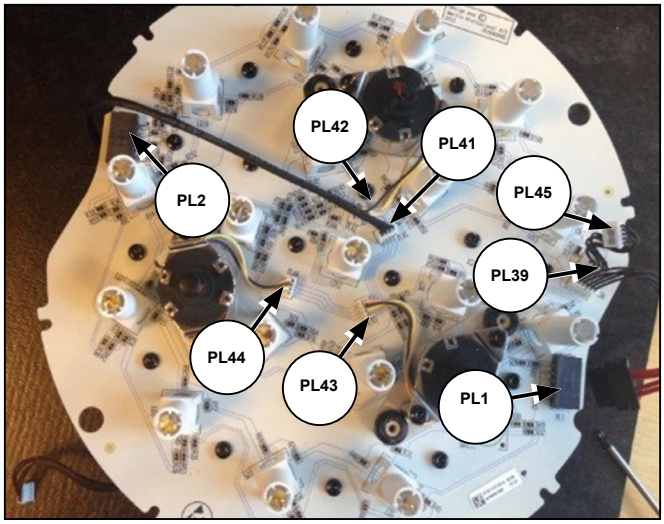

Figure 28: PCB connections

Yoke

Removing the yoke cover

The yoke cover consists of two parts that ensure the stability of the yoke assembly. The covers are fastened to the yoke frame with four fine thread TX20 screws. Each cover is fastened with four TX20 screws for PVC.

1. Remove the eight fine thread TX20 screws (1). There are four screws on each side of the yoke cover.
2. Remove the four TX20 screws for PVC (2). There are two screws on each side of the yoke cover
3. Remove the yoke.

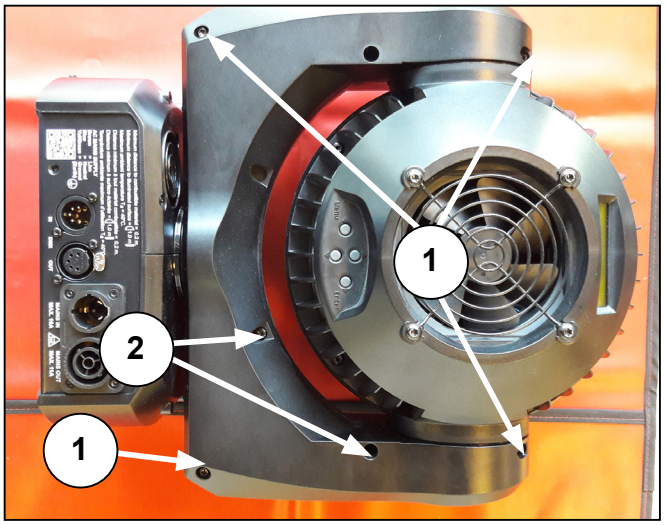

Figure 29: Removing the yoke covers

There are four optical sensors and two stepper motors on the product. Each function is driven by a timing belt and is controlled by one reset sensor and one positioning sensor.

Pos.	Yoke assembly	Wire
3	Tilt reset sensor	TR
4	Tilt positioning sensor	TP
5	Pan reset sensor	PR
6	Pan positioning sensor	PP
7	Pan motor	PM
8	Tilt motor	TM

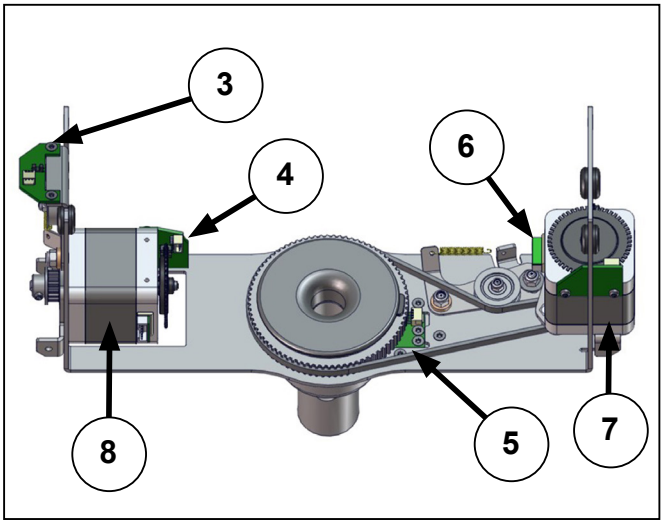

Figure 30: Yoke assembly

Replacing the tilt sensor PCB

1. Remove the yoke covers. See “Removing the yoke cover” on page 17.
2. Loosen the two M4 nuts (1) that secure the belt tensioner.
3. Remove the timing belt (2).
4. Remove the two TX20 screws (3).
5. Disconnect the sensor connector.
6. Push the timing wheel upwards to access the sensor PCB.
7. Remove the two TX10 screws (4).
8. Remove the tilt sensor PCB.
9. To install the new tilt sensor PCB, follow the procedure in reverse order.

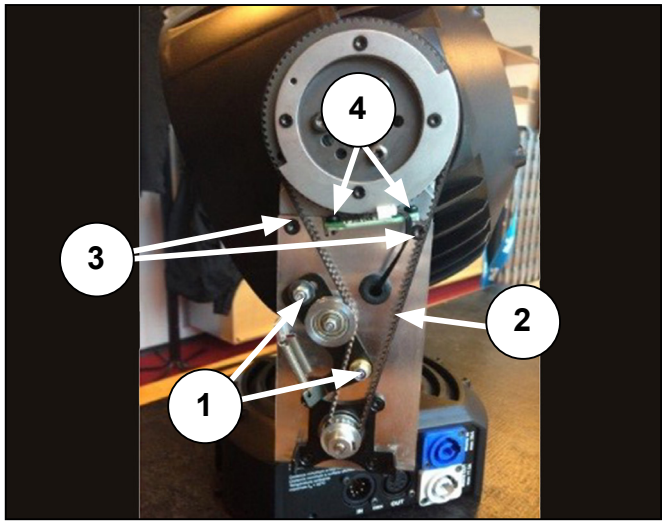

Figure 31: Tilt sensor and belt tensioner

Adjusting the tilt timing belt

Make sure to adjust and tension the timing belt correctly after replacement.

1. Remove the yoke covers. See “Removing the yoke cover” on page 17.
2. Turn the head back and forth through the tilt range to settle the timing belt. Do this a couple of times.
3. Tighten the two M4 nuts (1) to fix the timing belt.

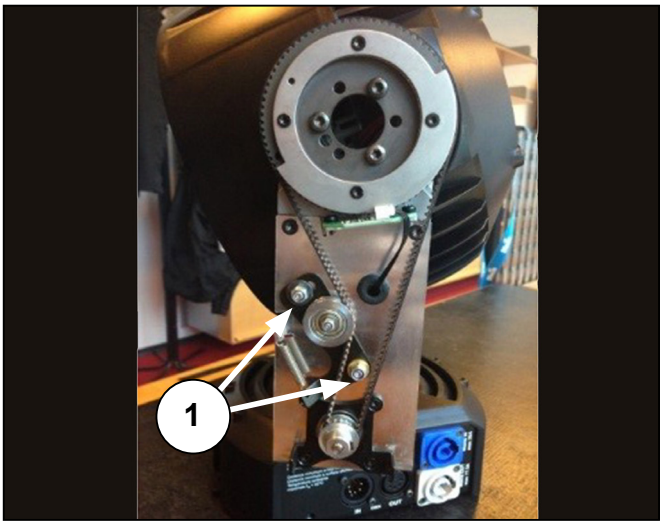

Figure 32: Adjusting the tilt timing belt

Replacing the tilt positioning sensor PCB

The tilt positioning sensor is placed on the tilt motor.

1. Remove the yoke covers. See “Removing the yoke cover” on page 17.
2. Remove the two TX10 screws (1).
3. Remove the sensor PCB (2).
4. To install a new tilt positioning sensor PCB, follow the procedure in reverse order.

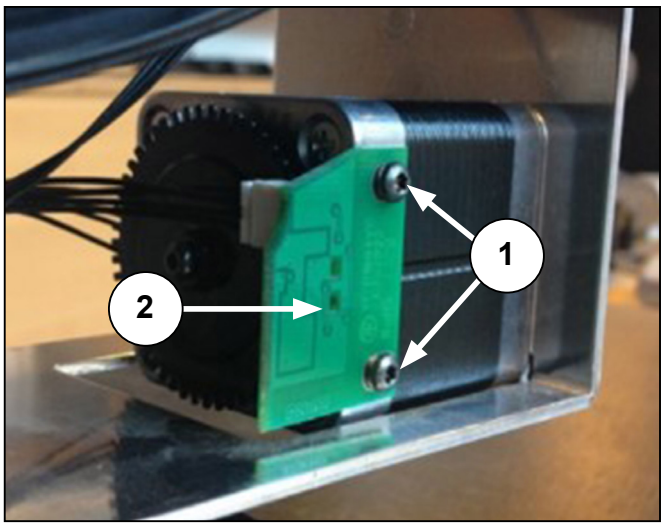

Figure 33: Replacing the tilt positioning sensor PCB

Replacing the pan reset sensor PCB

The pan reset sensor PCB is placed underneath the pan timing wheel.

1. Remove the yoke covers. See “Removing the yoke cover” on page 17.
2. Disconnect the PCB connector
3. Remove the two TX10 screws (1).
4. Remove the pan reset sensor PCB (2).
5. To install a new pan reset sensor PCB, follow the procedure in reverse order.

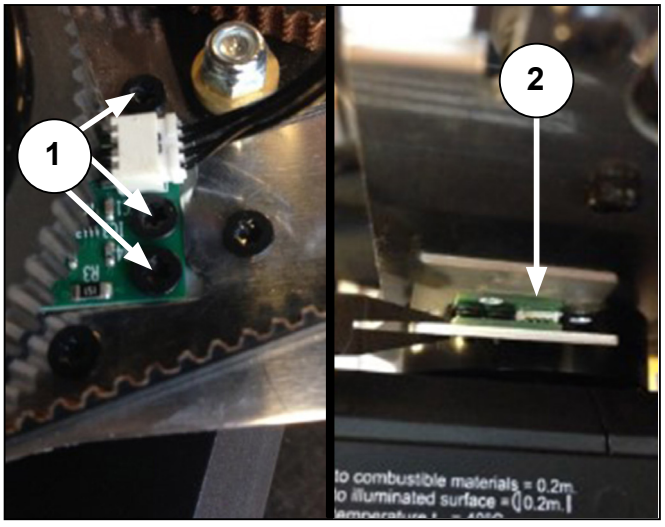

Figure 34: Replacing the pan reset sensor PCB

Replacing the pan positioning sensor PCB

1. Remove the yoke cover. See “Removing the yoke cover” on page 17.
2. Remove the two TX10 screws (1).
3. Remove the pan positioning sensor PCB (2).
4. To install a new pan positioning sensor PCB, follow the procedure in reverse order.

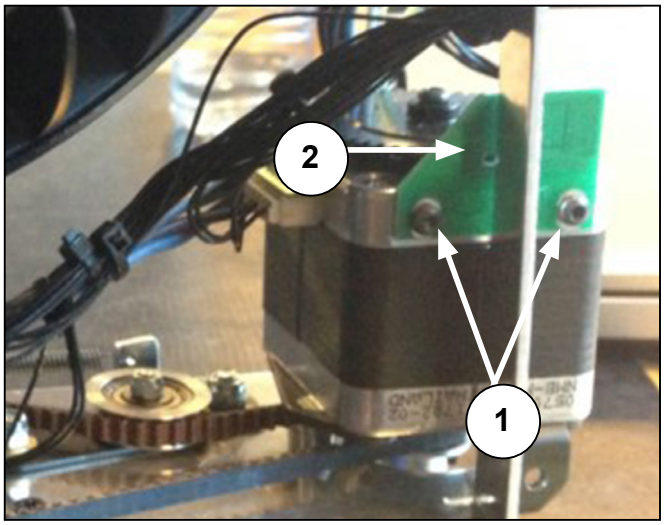

Figure 35: Replacing pan positioning sensor

Replacing the yoke bracket

1. Remove the base covers. See “Replacing the base fan” on page 21.
2. Remove the yoke covers. See “Removing the yoke cover” on page 17.
3. Disconnect PL1, PL2 and PL22 from the mainboard and drag them all the way back through the yoke shaft. See figure 8.
4. Disconnect the connectors on the thermo switch and drag them all the way back through the yoke shaft. See figure 17.
5. Remove all wires from the two motors and the four sensors.
6. Cut all cable ties on the wires.
7. Loosen the two M4 nuts (1) that secure the belt tensioner.
8. Remove the TX20 screw (2) that fastens the ground wire.
9. Remove the four countersunk TX20 (3) that hold the head to the yoke bracket to be able to remove the head assembly.
10. Remove the head assembly away from the yoke and base.
11. Remove the pan belt tensioner (4) and the belt (5).
12. Remove the pan shaft wire guide (6) which is mounted on the timing wheel (7).
13. Remove all the parts attached to the yoke bracket, such as pan motor, tilt motor, belt tensioners, rubber grommets and the two sensors.

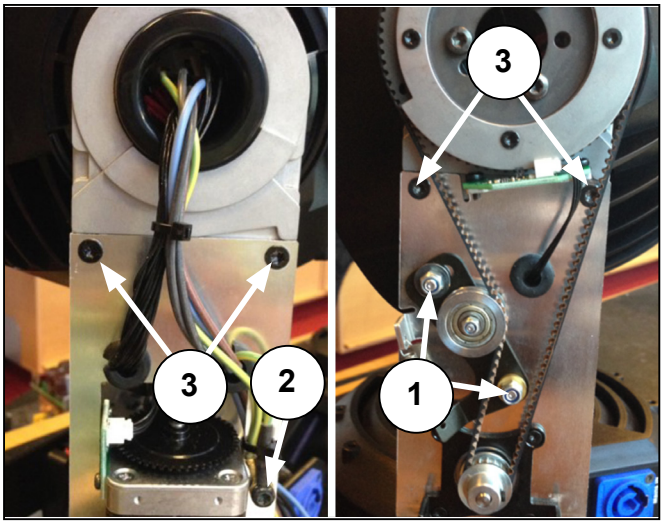

Figure 36: Yoke/head connection

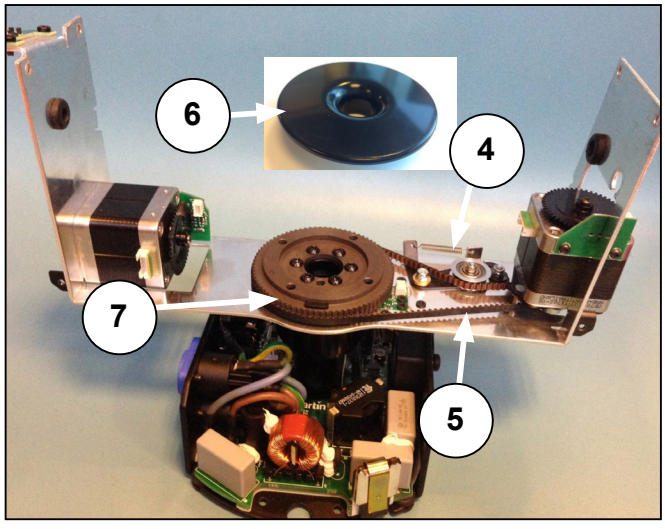

Figure 37: Yoke

14. Turn the yoke as shown in figure 37.
15. Remove the six TX20 screws (8) that hold the timing wheel.

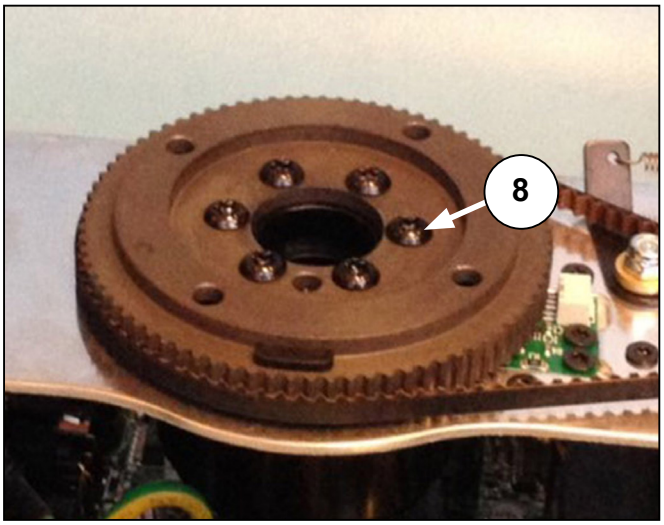

Figure 38: Removing the screws

16. Remember how the pan stop ring (16) is positioned.
17. Remove the five countersunk screws (17) and the M5x10 Allen black screw (18).
18. Do not turn the pan bearing retainer (19). Keep it in position while you remove the yoke bracket.
19. Remove the yoke bracket.
20. To install the new yoke bracket, follow the procedure in reverse order.

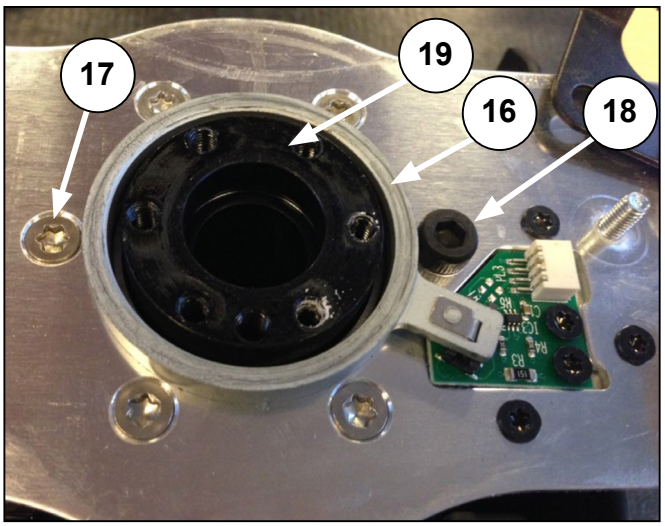

Figure 39: Replacing the gobo rotation belt

Base

Replacing the base fan

1. Remove the four TX20 screws (1) underneath the base and remove the base cover.

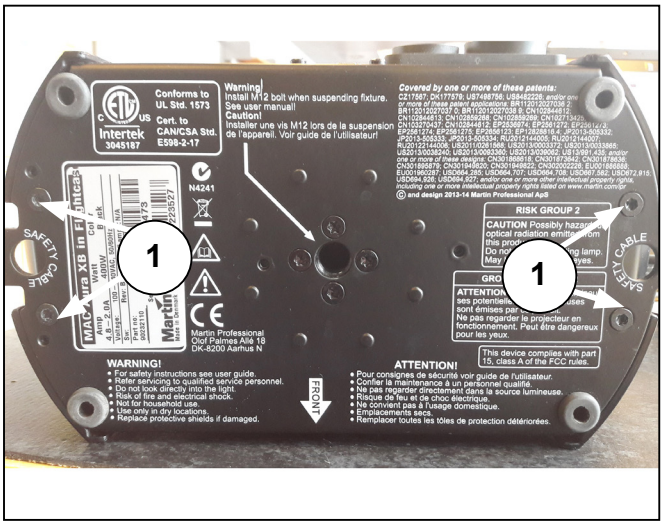

Figure 40: Removing the base cover

2. Lift the two covers a little bit and draw them gently away from each other.

Figure 41: Lifting the covers

3. Be careful when you pull the two cover parts from each other as the connector for the fan wire is connected to the PSU PCB (3).
4. Disconnect the connector (4) before you pull away the cover.

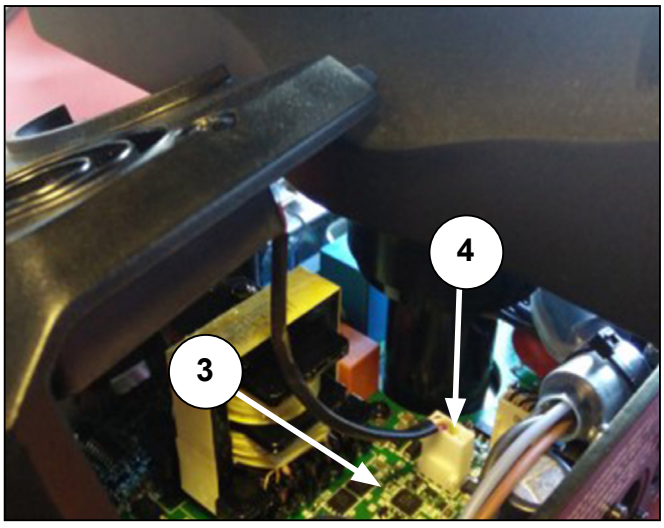

Figure 42: Connector for the fan wire

5. Remove the two black PH screws (5) that hold the base fan.
6. Remove the base fan (6).
7. To install a new base fan, follow the procedure in reverse order.

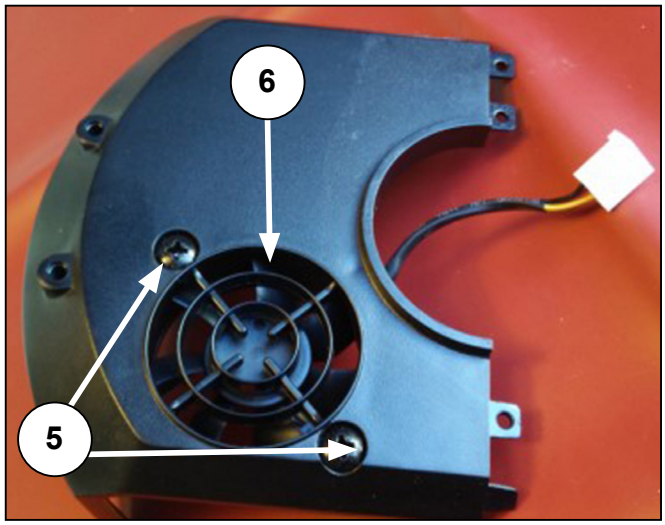

Figure 43: Replacing the base fan

Replacing the PSU

1. Remove the base cover. See “Replacing the base fan” on page 21.
2. Remove the four TX20 screws (1) that hold the yoke assembly.
   NOTE! The hole on the pan main shaft is facing towards the DMX connection.

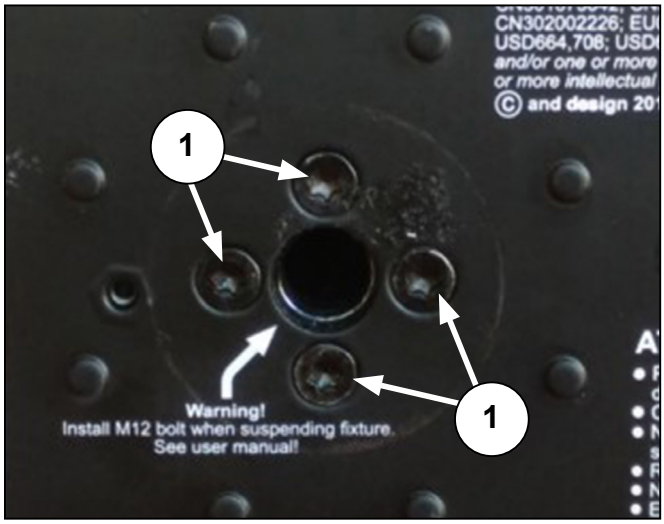

Figure 44: Removing the base assembly

3. Note how the wires are routed and fastened for later use.
4. Disconnect the 6-pin 24V 88V connector (2) from the PSU board.
5. Disconnect the white DMX connector (3) from the PSU board.
6. Remove the M4 (4) nut that holds the ground connection.

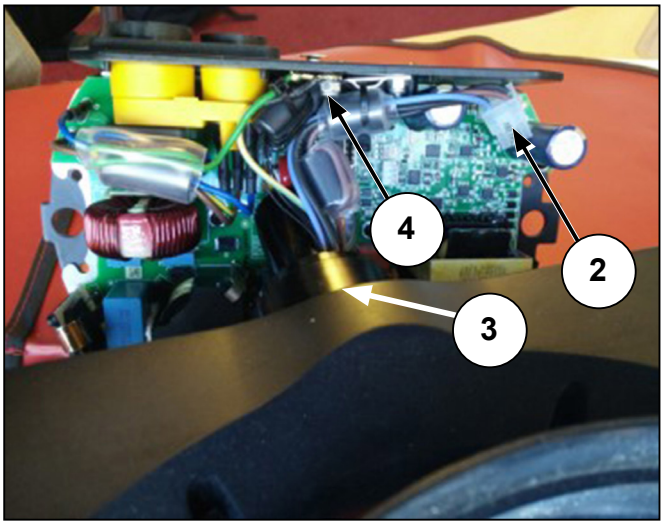

Figure 45: Disconnecting the connectors

7. Remove the four TX10 screws (5) that hold the PSU.

8. Remove the clip for the bridge rectifier (6).

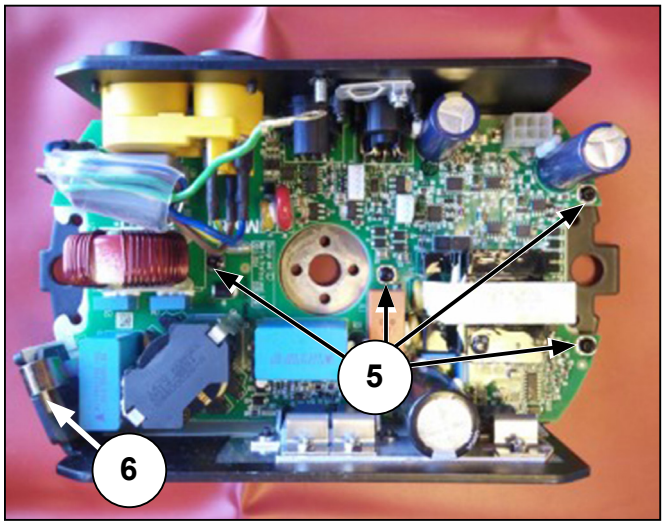

Figure 46: Removing screws and clip

9. Remove the eight TX10 screws that hold the base connectors.

Figure 47: Removing screws

10. Disconnect the blue and brown wires (7) from the PSU board.

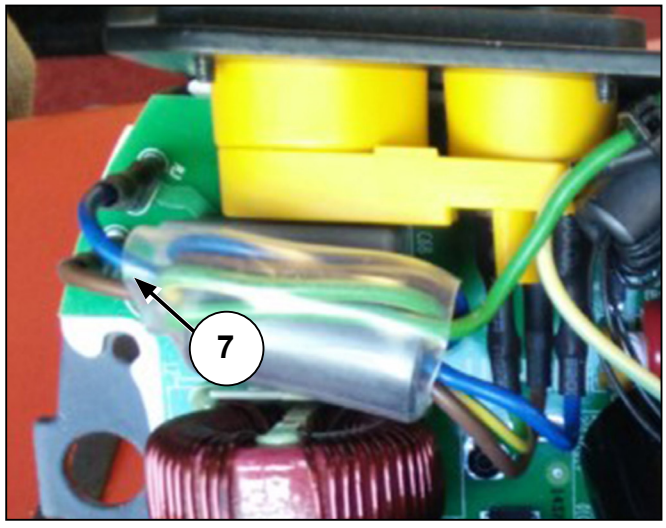

Figure 48: Mains wires

11. Be careful not to damage the cooling pad (8) of the bridge rectifier (figure 46, 6)

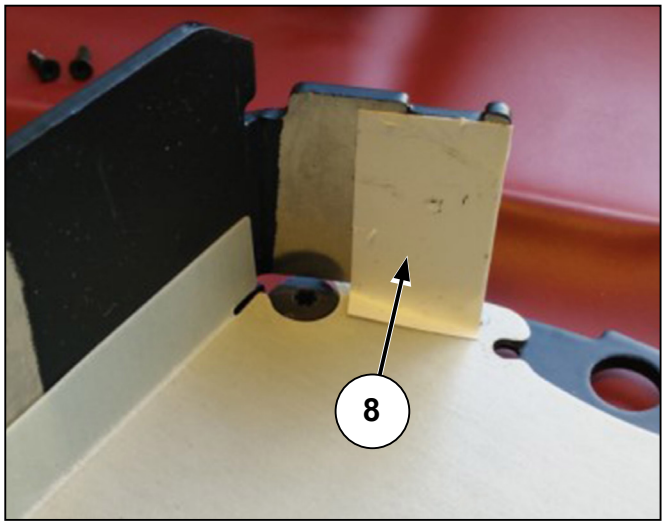

Figure 49: Cooling pad

12. Remove the three TX10 screws (9) that fasten the FET to the heat sink to the base frame.
13. Remove the PSU.
14. To install a new PSU, follow the procedure in reverse order.

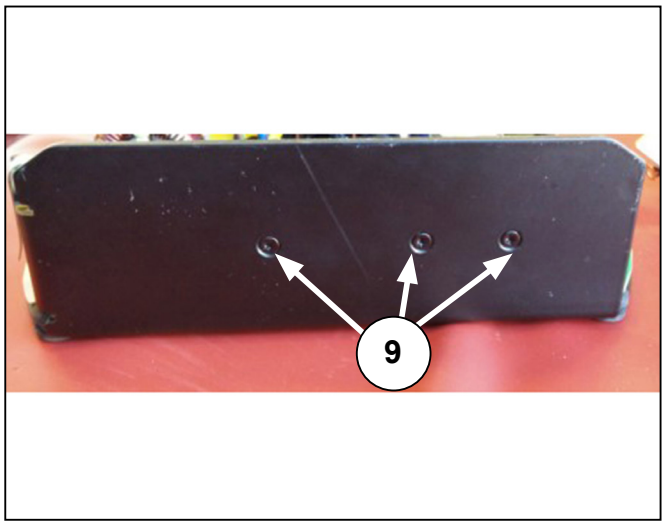

Figure 50: Screws holding the FET

Maintenance

Read the user manual before performing service or maintenance on the product.

Failure to respect service and maintenance schedules may cause damage that is not covered by product warranties.

Cleaning the product

Regular cleaning is very important for fixture life and performance. Buildup of dust, dirt, smoke particles, fog fluid residures, etc. degrades the fixture's light output and cooling ability. Cleaning schedules for lighting fixtures can vary greatly depending on the operating environment. Cooling fans suck in airborne dust and smoke particles, and in extreme cases fixtures may require cleaning after surprisingly few hours of operation.

Environmental factors that may result in a need for frequent cleaning include:

- Use of smoke or fog machines.
- High airflow rates (near air conditionning vents, for example)
- Presence of cigarette smoke. Airborne dust (from stage effects, building struktures and fittings or the natural environment at outdoor events, for example)

If one or more of these factors is present, inspect fixtures within their first few hours of operation to see whether cleaning is necessary. Check again at frequent intervals. This procedure will allow you to assess cleaning requirements in your particular situation. If in doubt, consult your Martin™ by Harman dealer about a suitable maintenance schedule.

Work in a clean, well lit area. Use gentle pressure only when cleaning. Do not use any product that contains abrasives. Use care when cleaning optical components: the coated surfaces are fragile and easily scratched.

Conditions

Procedures in the cells marked with red must be carried out by certified Martin™ by Harman technicians only. Otherwise, you may cause damage to the product that is not covered by your product warranty.

Ambient temperature:
Minimum: 5° C (41° F).
Maximum: 40° C (104° F)

Voltage and frequency: Nominel +/- 10%.

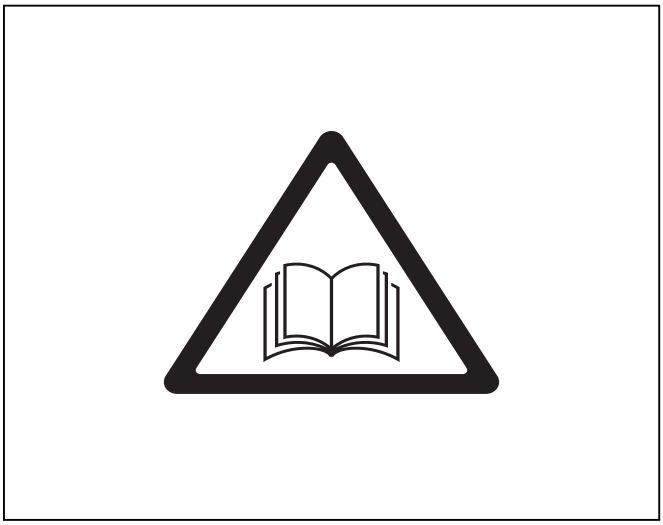

Figure 51: Read the user manual

I	**Inspect**
R	**Replace**
C	**Clean**
L	**Lubricate**
A	**Adjust**
U	**Update**
	Martin™ by Harman

Figure 52: Code, maintenance schedule

Maintenance schedule

Part	Total unit hours																			
	750	1500	2250	3000	3750	4500	5250	6000	6750	7500	8250	9000	9750	10500	11250	12000	12750	13500	14250	15000	15750	16500	17250	18000
Head - general		C		C		C		C		C		C		C		C		C		C		C		C
Fan		C		I/C		C		I/C		C		R		C		I/C		C		I/C		C		R
Effect module		C		C		C		C		C		C		C		C		C		C		C		C
Zoom lens		C		C		C		C		C		C		C		C		C		C		C		C
Yoke - general				C				C				C				C				C				C
Pan belt												I/R												R
Tilt belt												I/R												R
Tilt feedback sensor/tacho wheel												I/C												I/C
Pan feedback sensor/tacho wheel												I/C												I/C
Main PCB												I												I
Base - general				C				C				C				C				C				C
SMPS				C				C				C				C				C				C
Fixture software		I/U		I/U		I/U		I/U		I/U		I/U		I/U		I/U		I/U		I/U		I/U		U

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