Capella-PJ1

RICOH PJ WXL5670/WUL5670/LW5000/LU5000/ LX550

Machine Codes: Y0AW/Y0AX/Y0B4/Y0B5/Y0B7

Field Service Manual

August, 2016

Important Safety Notices

Important Safety Notices

Prevention of physical injury

1. Before disassembling or assembling parts of the main machine and peripherals, make sure that the power cord of the main machine is unplugged.
2. The wall outlet should be near the machine and easily accessible.
3. If any adjustment or operation check has to be made with exterior covers off or open while the main switch is turned on, keep hands away from electrified or mechanically driven components.

⚠WARNING

- To prevent a fire or explosion, keep the machine away from flammable liquids, gases, and aerosols.

Health safety conditions

This machine, which uses a high voltage power source, can generate ozone gas. High ozone density is harmful to human health. Therefore, the machine must be installed in a well-ventilated room.

Observance of electrical safety standards

This machine and its peripherals must be serviced by a customer service representative who has completed the training course on those models.

Safety and Ecological Notes for Disposal

Dispose of replaced parts in accordance with local regulations.

Laser Safety Information

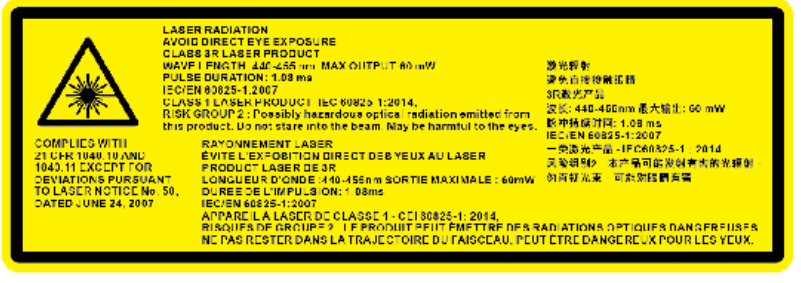
Read through this document in its entirety and understand all warnings and precautions before attempting to operate the projector.

Important Laser Notice

- This product is classified as Class 3R of IEC60825-1 : 2007 and also complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007.

  IEC 60825-1:2014: CLASS 1 LASER PRODUCT - RISK GROUP 2

- The explanatory label shows all information related to laser power.



Y097m0012

- CLASS 3R LASER PRODUCT-AVOID DIRECT EYE EXPOSURE.
- The laser aperture is from the projection lens, DO NOT LOOK INTO THE LENS.

Y097m0013

- This projector has a built-in Class 4 laser module.
- Before disassembling the product, be sure to turn off the power and unplug the power cord. Except for the case when adjustment is needed, do not turn on the power while the external parts are removed from the product.
- Do not perform any disassembly or adjustment not stated in this manual because a leak of the laser light may result. Especially, never disassemble the Optical Engine and Laser Banks.
- If it is necessary to replace the Laser Bank, replace the entire optical engine and base unit. For details, see page 42 "Optical Engine".
- Any operation or adjustment not specifically instructed by the service manual creates the risk of hazardous laser radiation exposure.

- Do not stare into the beam when the projector is on. The bright light may result in permanent eye damage.
- When turning on the projector, make sure no one within projection range is looking at the lens.
- Not following the control, adjustment or operation procedure may cause damage by exposure to laser radiation.
- Adequate instructions for assembly, operation, and maintenance, including clear warnings concerning precautions to avoid possible exposure to laser and collateral radiation in excess of the accessible emission limits are defined by Class 3R.

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1. Product Information

Overview/Specifications

Refer to the user manual.

Before Handling the Unit

Important

- **About the handling of this machine, follow the contents with reference to Safety Information in the user manual.**

Installation

The user must set this projector up.

Precautions

Please follow all warnings, precautions and maintenance as recommended in this manual.

⚠WARNING

- Do not stare into the beam when the projector is ON. The bright light may result in permanent eye damage.
- To reduce the risk of fire or electric shock, do not expose this projector to rain or moisture.
- When switching the projector OFF, please ensure the cooling cycle has been completed before disconnecting power. Allow 60 seconds for the projector to cool down.
- Do not use the lens cap when the projector is in operation.
- Do not look into or point the laser pointer on your remote control into your or someone's eyes. Laser pointers can cause permanent damage to eyesight.
- Do not transport the projector with any lens installed.

Do

- Turn OFF and unplug the power plug from the AC outlet before cleaning the product.
- Use a soft dry cloth with mild detergent to clean the display housing.
- Disconnect the power plug from AC outlet if the product is not being used for a long period of time.

Do not

- Block the slots and openings on the unit provided for ventilation.
- Use abrasive cleaners, waxes or solvents to clean the unit.
- Use under the following conditions:

- In extremely hot, cold or humid environments.
    - Ensure that the ambient room temperature is within 5°C to 40°C
    - Relative humidity is 10% to 85%
- In areas susceptible to excessive dust and dirt.
- Near any appliance generating a strong magnetic field.
- In direct sunlight.

2. Replacement

Special Tools

Make sure that engineers are equipped with the following tools, which will be necessary in order to update the firmware, and to perform adjustments that are necessary after replacing the optical engine (page 42 "Optical Engine") or main board (page 28 "Main Board Unit (with I/O Board and RS-232C Connector)").

- RS-232C cable (straight, 9pin - 9pin)
- USB cable (Type A to Mini B)
- USB storage device
- Laptop PC (for updating firmware)

Equipment Needed

1. Screw bit (+): 105
2. Screw bit (+): 107
3. Screw bit (-): 107
4. Hex sleeves 5 mm
5. Needle-nose pliers
6. Projector

Part Replacement

Important

- The laser safety level is class I. Appropriate laser safety eyewear must be worn if practicable while removing the top cover to do adjustment procedures.

Top Cover (with Keypad Board and Keypad Buttons)

1. Place the main unit upside down, and remove the long screw [A], which fixes the top cover, from the base unit (x1).

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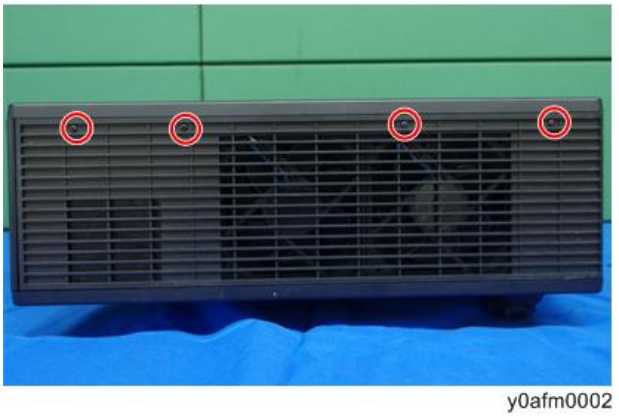
2. Remove 3 screws on the back cover (x3).

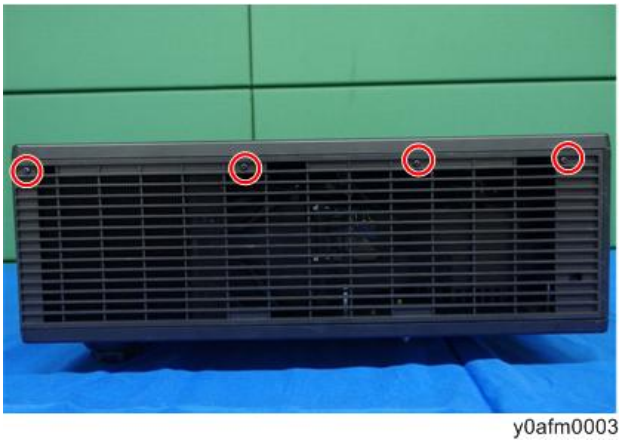
y0afm0001

3. **Remove 4 screws on the right cover (x4).**



y0afm0002

4. **Remove 4 screws on the left cover (x4).**

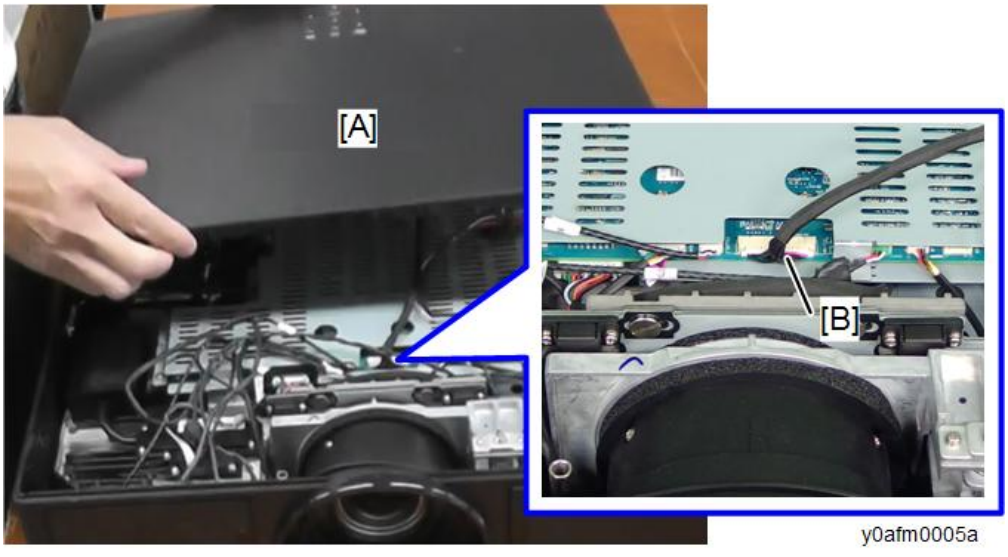


y0afm0003

5. **Open the door [A] on the right side of front cover, and remove 1 screw (x1).**

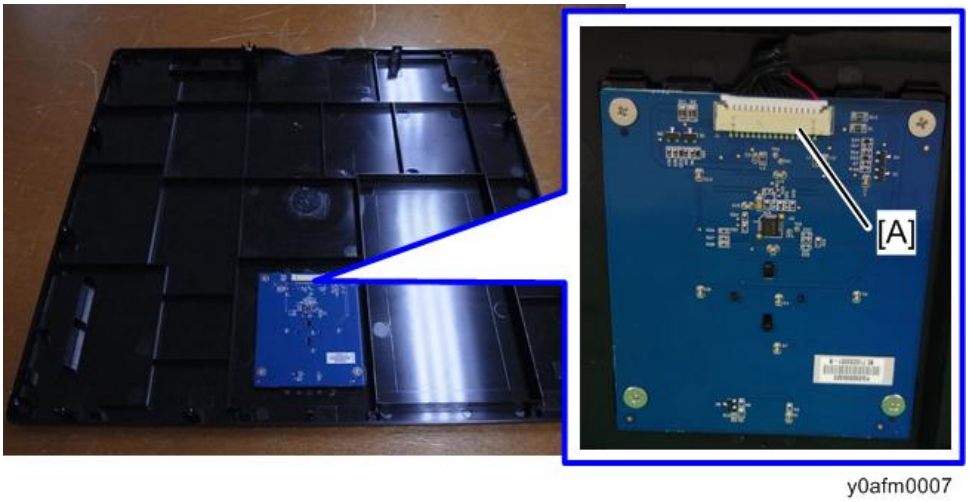
y0afm0004

6. Open the top cover [A], and disconnect the connector [B] on the main board unit (x1).



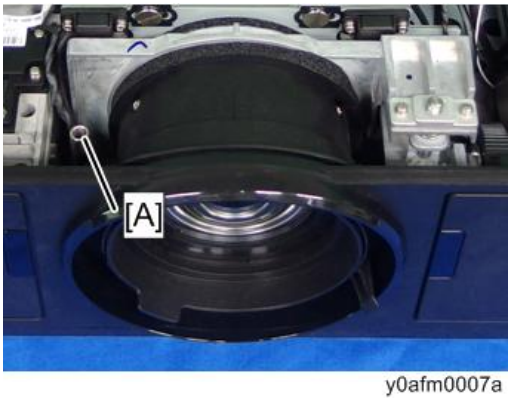
y0afm0005a

7. Place the top cover upside down, and remove the harness [A] (x1).



y0afm0007

8. Remove the guide tube for long screw [A].



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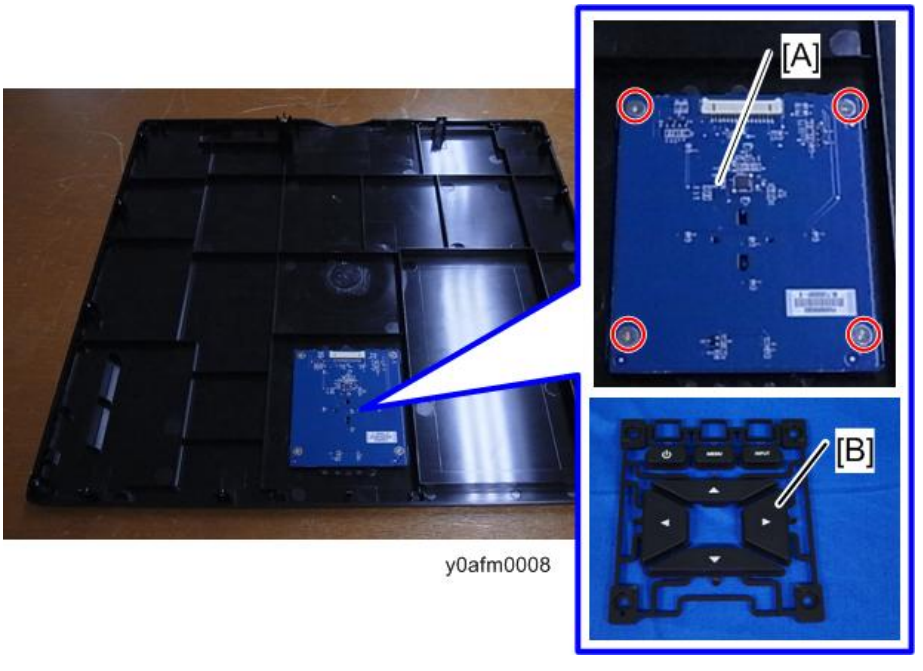
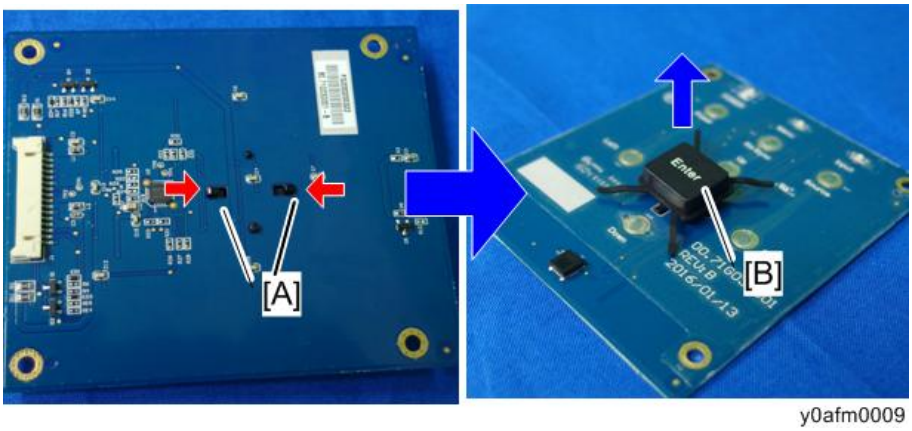
Keypad Board and Keypad Buttons

1. Remove the keypad board [A] and keypad [B] (x4).



y0afm0008

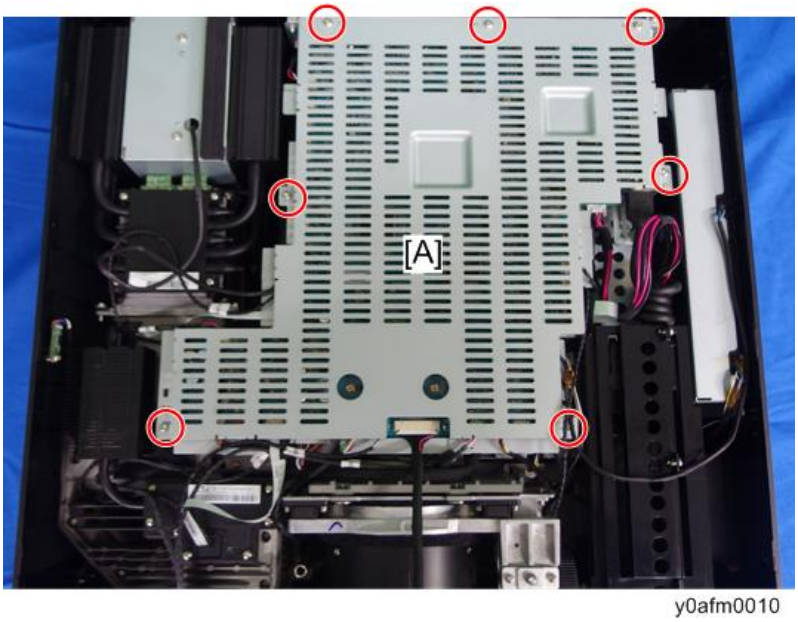
2. Turn over the keypad board, release 2 hooks [A] on the back side of the keypad board, and remove the "Enter" key [B].



y0afm0009

Left Cover (with Thermal Sensor and Filter Sensor)

1. Remove the top cover (page 13 "Top Cover (with Keypad Board and Keypad Buttons)").
2. Remove the top shielding [A] (x7)

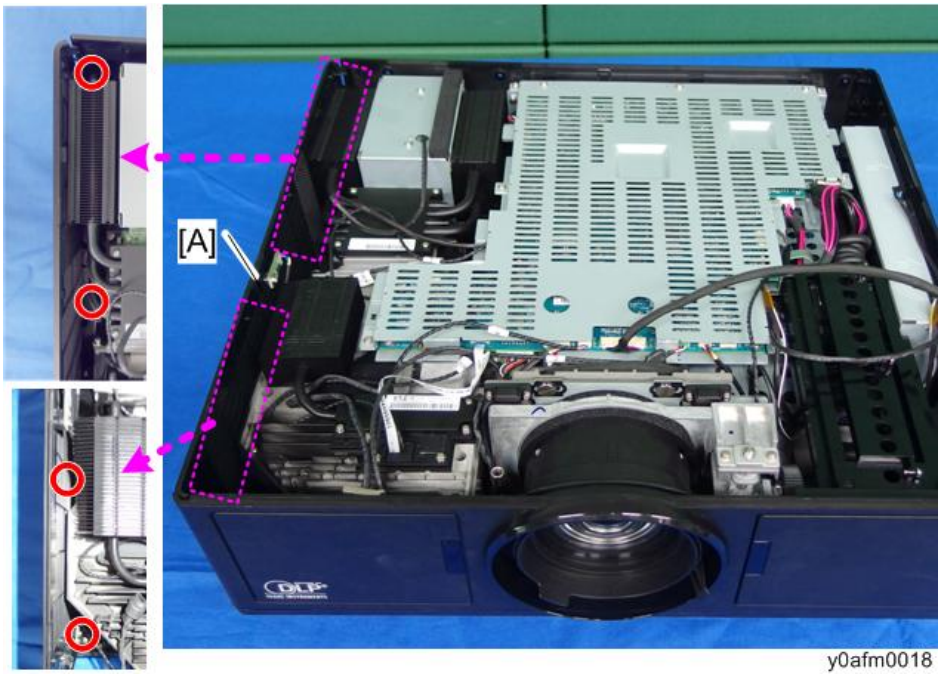


y0afm0010

3. **Disconnect 2 connectors (x2).**

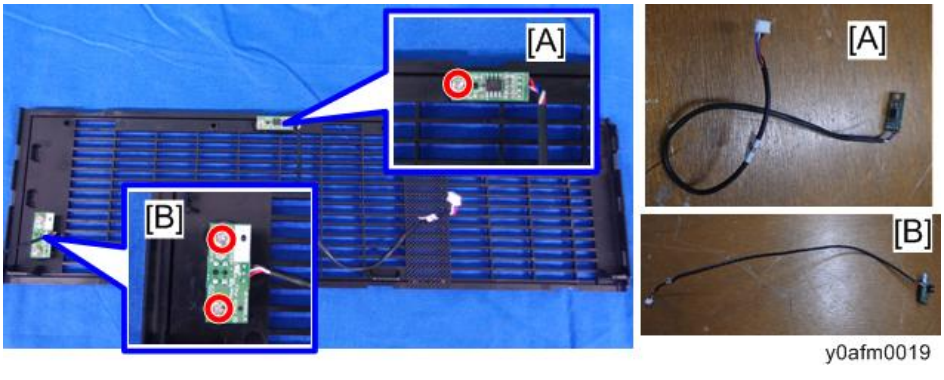
y0afm0013a

4. Remove the left cover [A] (x4).



Thermal Sensor and Filter Sensor

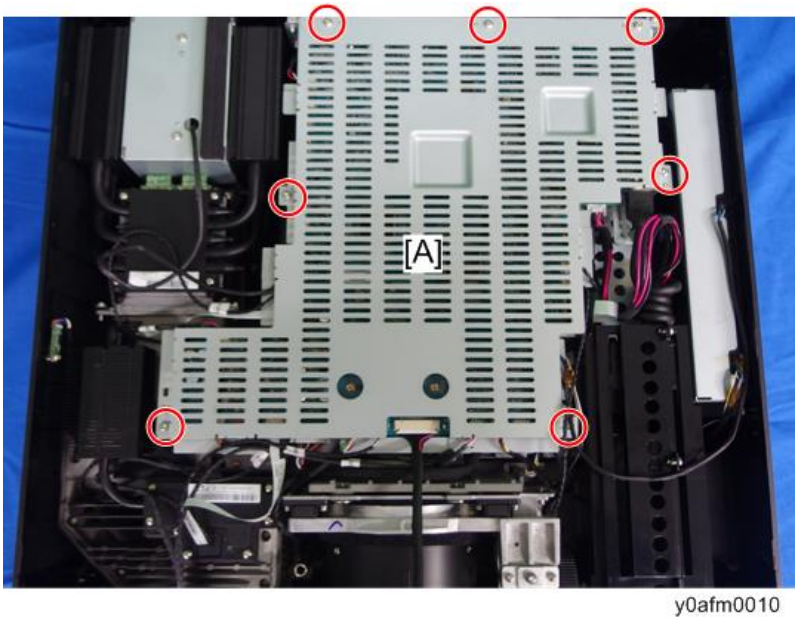
1. Remove the thermal sensor [A] and filter sensor [B] (x3).



Right Cover (with Fan 2/Fan 3)

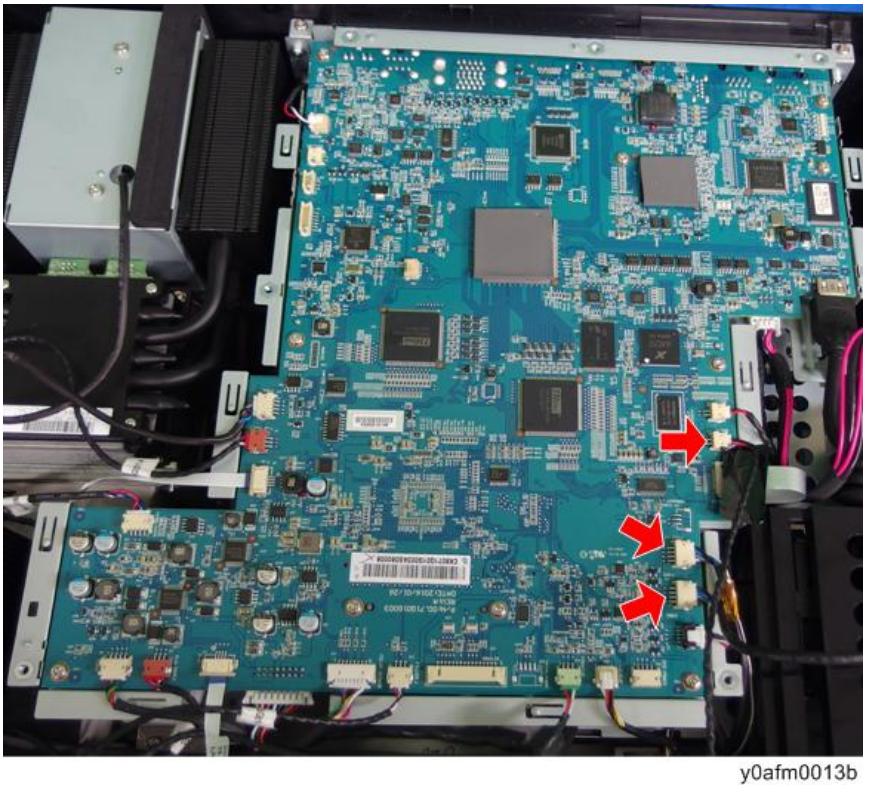
1. Remove the top cover (page 13 "Top Cover (with Keypad Board and Keypad Buttons)").

2. **Remove the top shielding [A] (x7).**



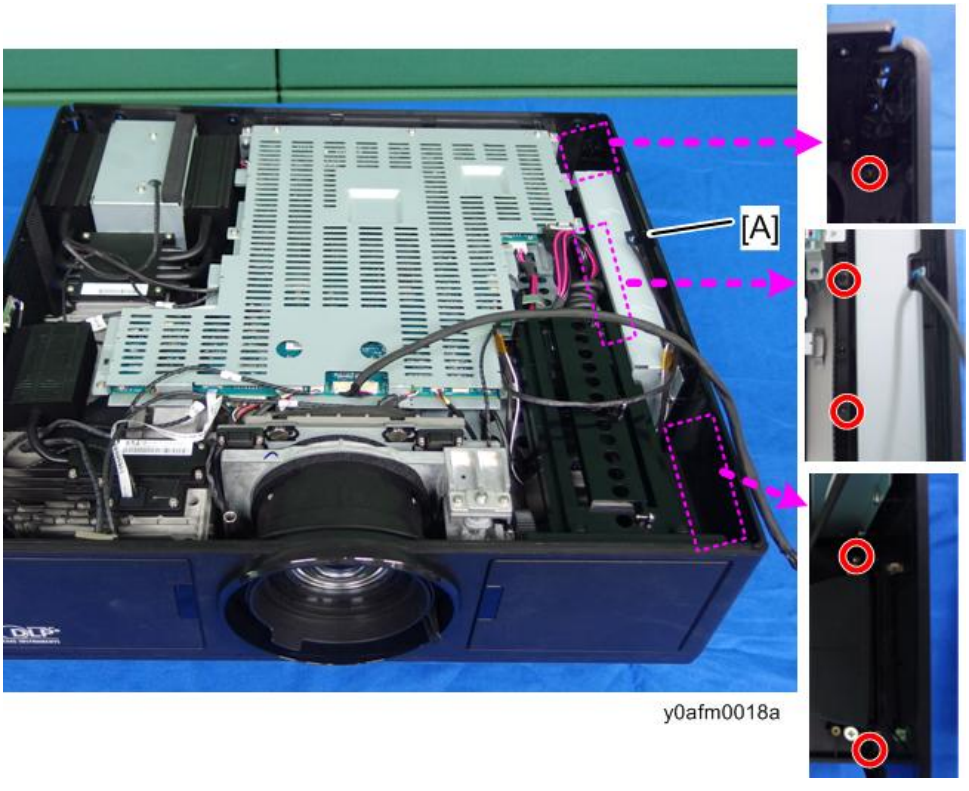
y0afm0010

3. **Disconnect 3 connectors (x3).**



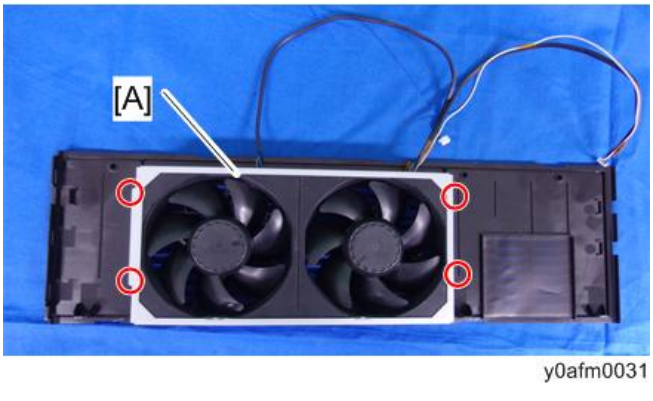
y0afm0013b

4. Remove the right cover [A] (x5).

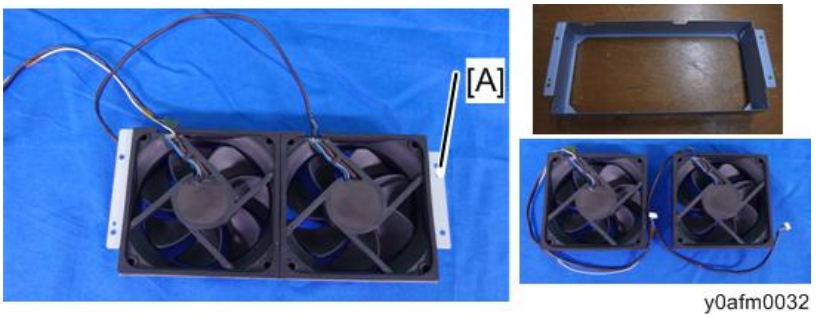


Fan Unit (Fan 2 and Fan 3)

1. Remove the fan unit [A] (x4).

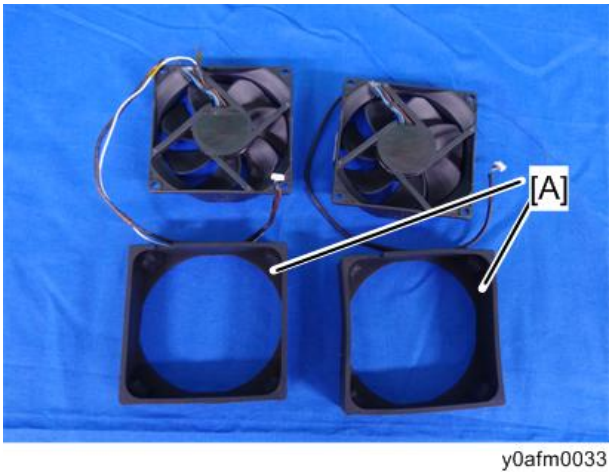


2. Remove the fan 2 and 3 from the fan bracket [A].



y0afm0032

3. Remove the anti-vibration rubber [A] from each fan.

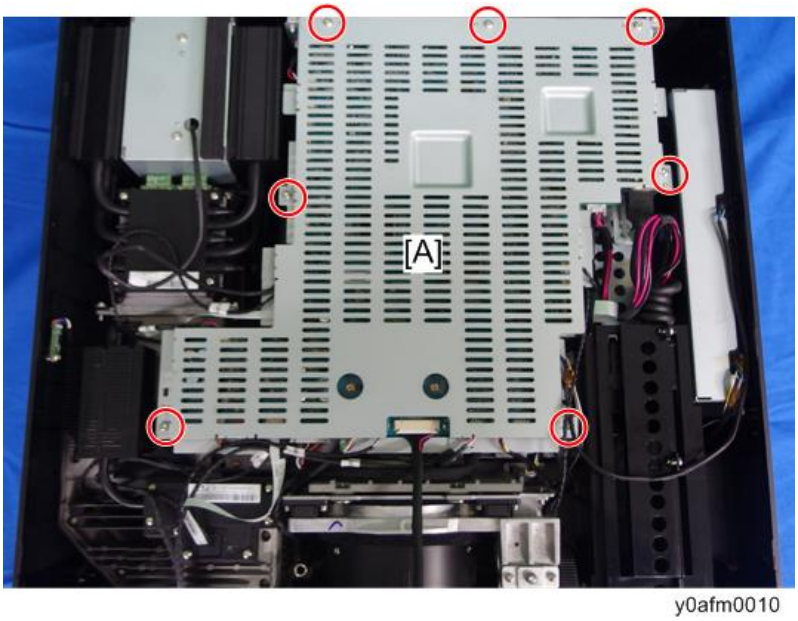


y0afm0033

Front Cover (with Front IR Sensor and USB Dongle Holder Unit)

1. Remove the top cover (page 13 "Top Cover (with Keypad Board and Keypad Buttons)").

2. Remove the top shielding [A] (x7).



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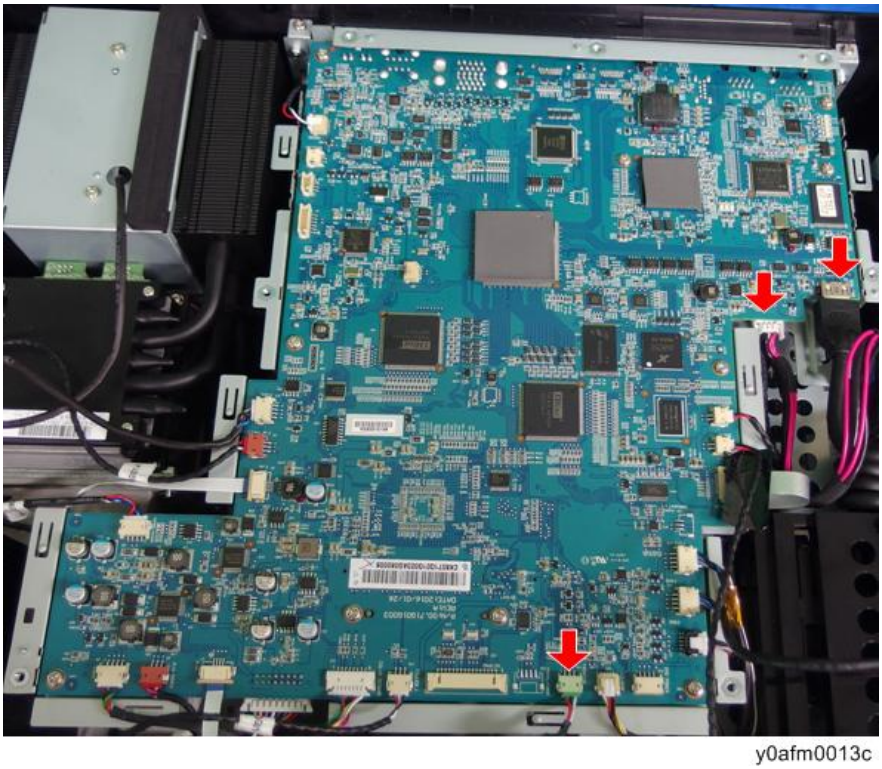
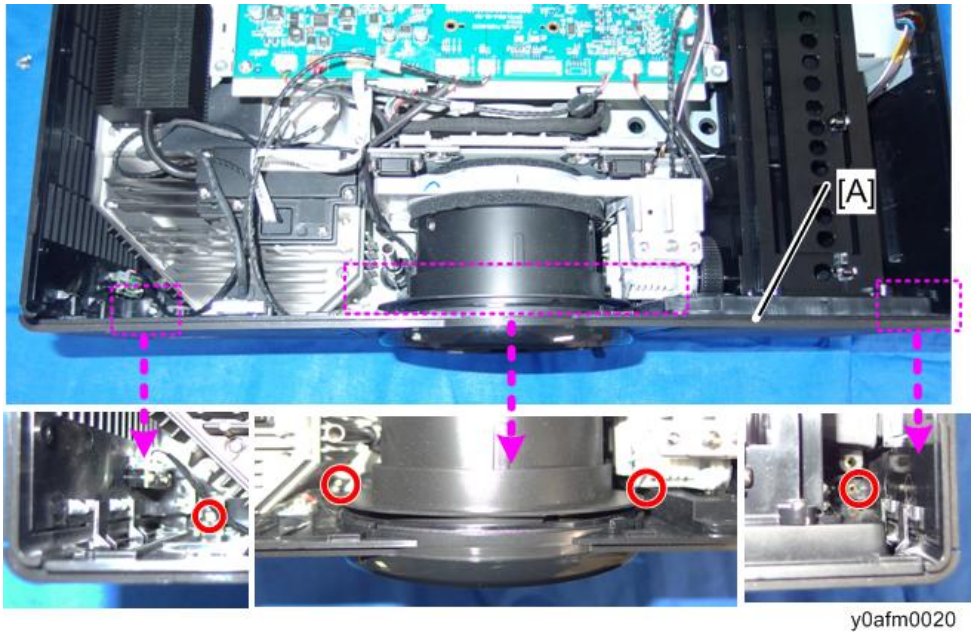
3. Disconnect 3 connectors (x3).



y0afm0013c

4. **Remove the front cover [A] (x4).**



y0afm0020

5. **Remove the safety interlock switch [A] from the front cover (x1).**

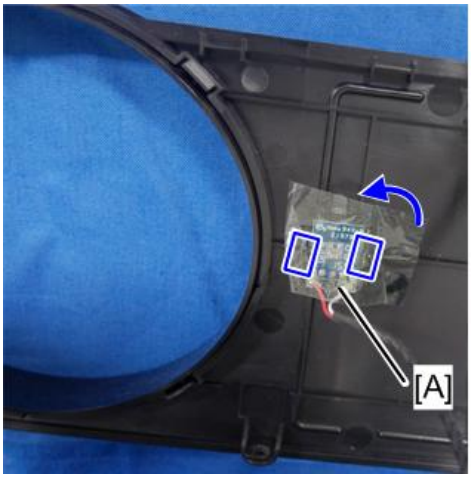
y0afm0021

Note

- If the safety interlock switch needs to be replaced, connector for the switch on the PSU board also needs to be disconnected. For details about replacing safety interlock switch, see page 39 "Safety Interlock Switch".

Front IR Sensor

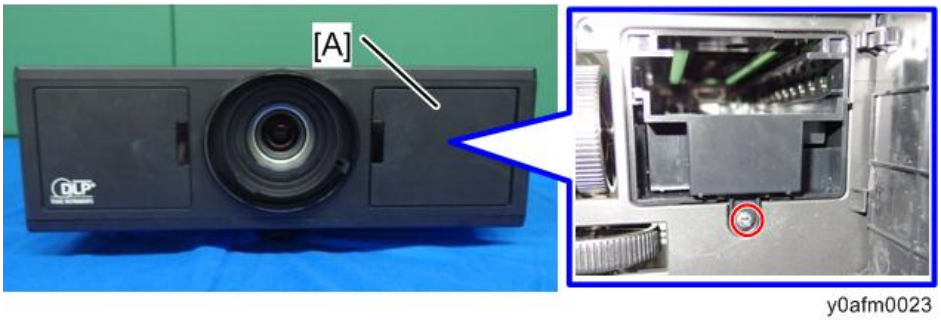
1. Peel off the fixing tape, and remove the front IR sensor [A] (hook x2).



y0afm0022

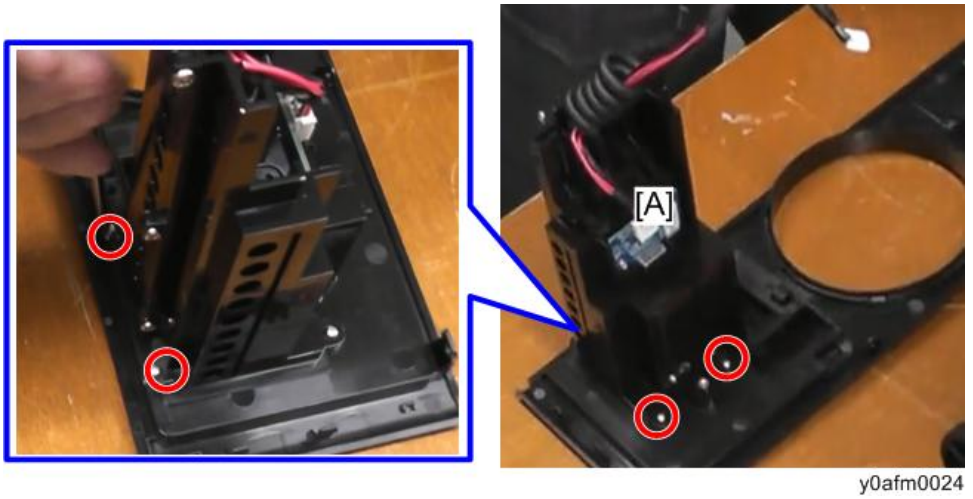
USB Dongle Holder Unit

1. Open the door [A] on the right side of front cover, and remove 1 screw (x1).

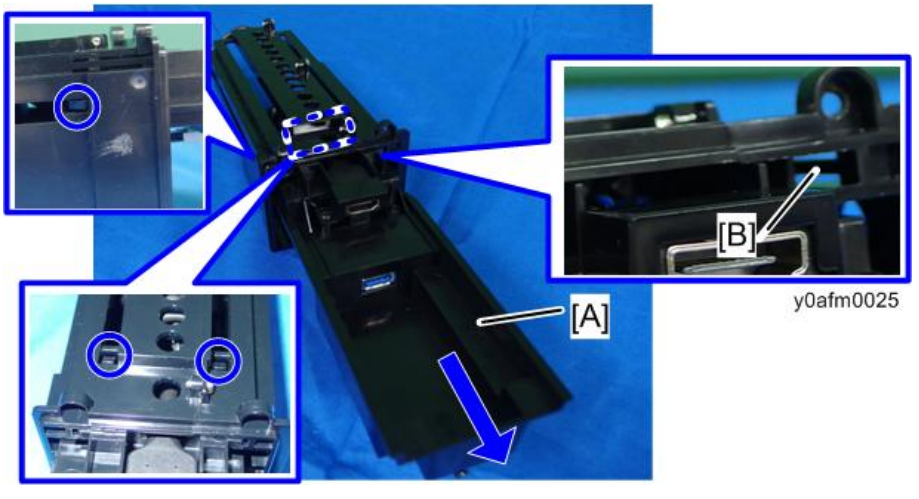


y0afm0023

2. Remove the USB dongle holder unit [A] (x4).



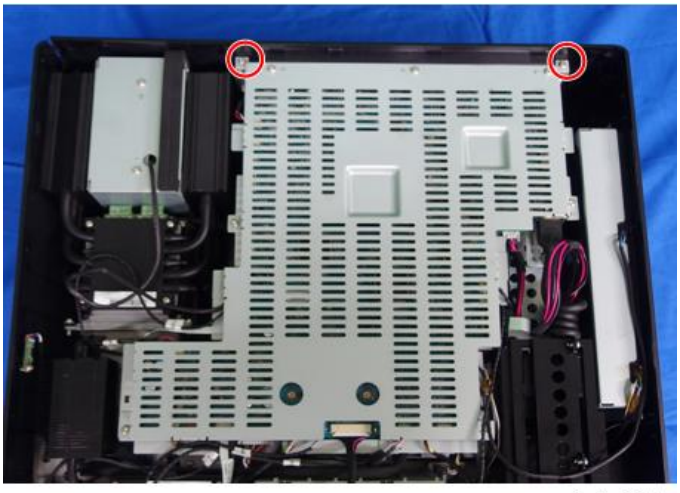
3. Using a flathead screwdriver, push the pressing plate [B] on the right side of the unit from the inner side so that the plate is raised, and pull out the tray [A] (hook x3).



Rear Cover

1. Remove the top cover (page 13 "Top Cover (with Keypad Board and Keypad Buttons)").

2. **Remove 2 screws on the upper side (x2).**

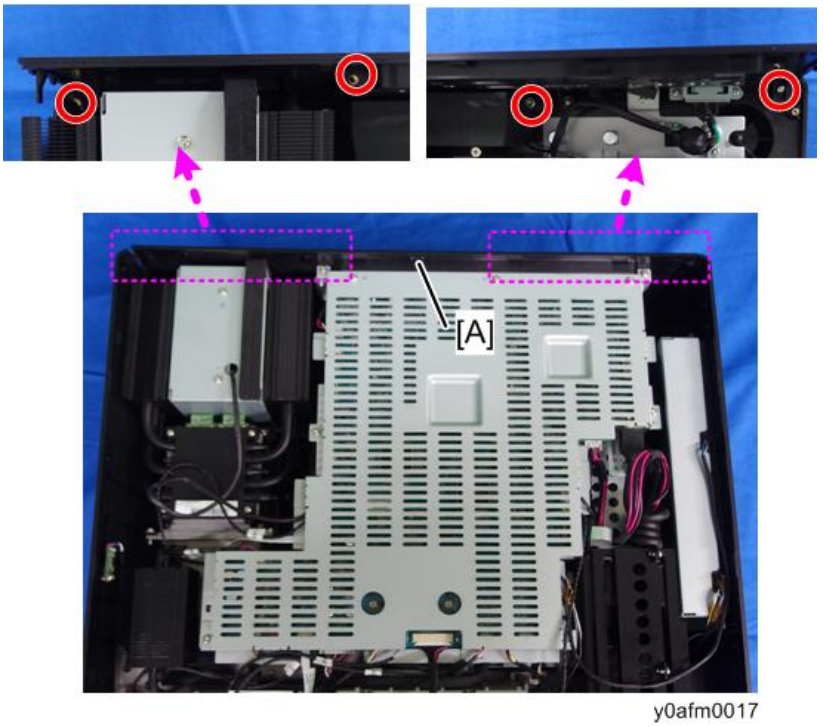


y0afm0011

3. **Remove 4 hex screws on the back side (hex screw x4).**

y0afm0012

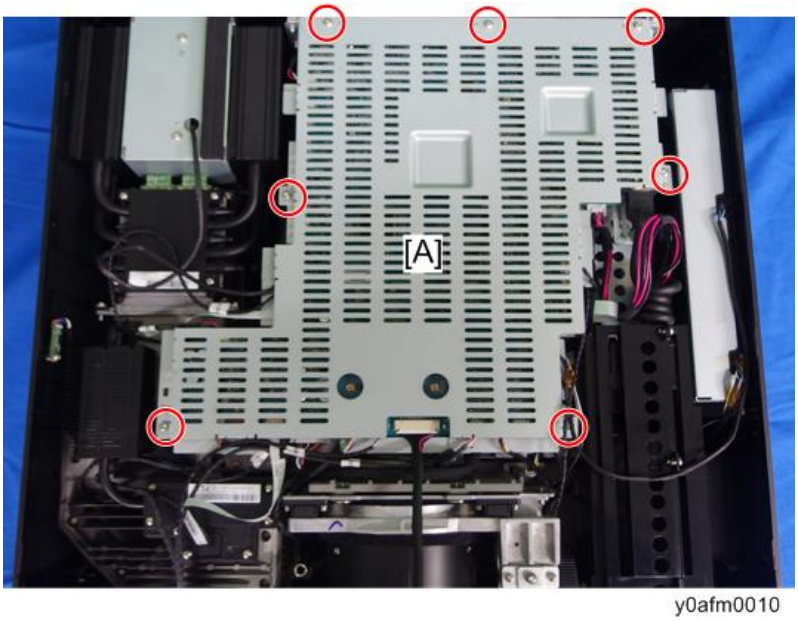
4. Remove the rear cover [A] (x4).



Main Board Unit (with I/O Board and RS-232C Connector)

1. Remove the top cover (page 13 "Top Cover (with Keypad Board and Keypad Buttons)").
2. Remove the rear cover (page 26 "Rear Cover").

3. **Remove the top shielding [A] (x7).**

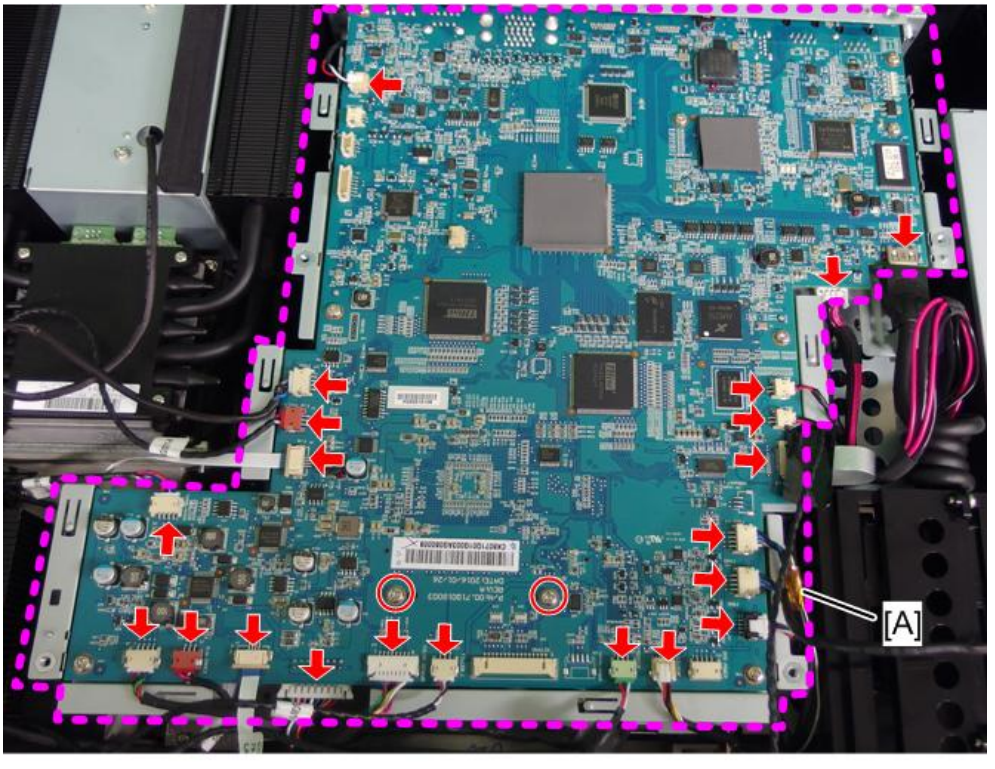


y0afm0010

4. **Remove the main board unit [A] (x2, all connectors).**

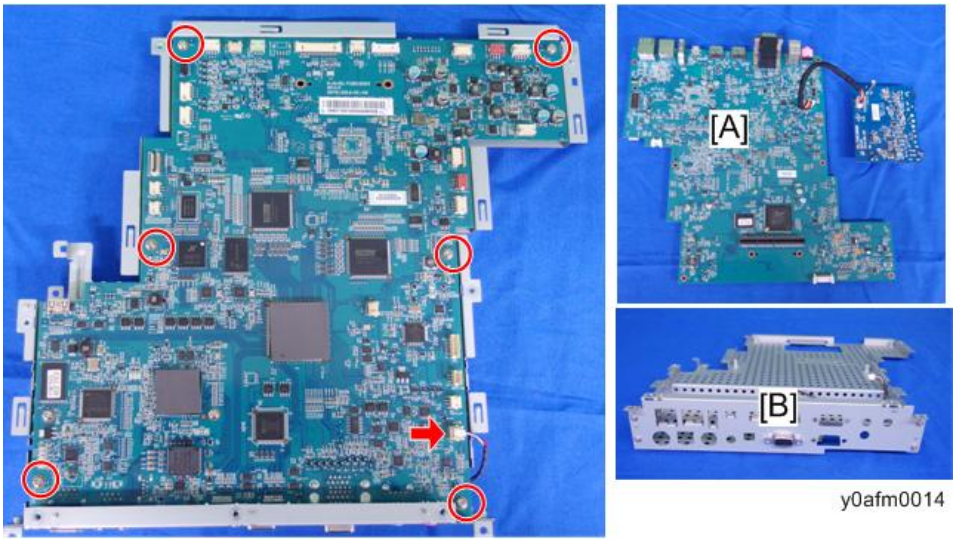
Note

- Take account of unused connectors on reconnection. For details of connectors used and units to be connected, see page 31 "Details of Each Connector and FFC on the Main Board".



y0afm0013

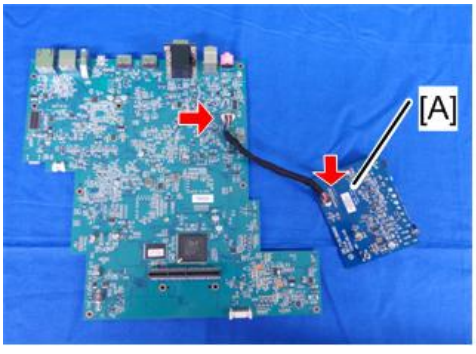
5. Separate the main board [A] from the bracket [B] (x6, x1).



y0afm0014

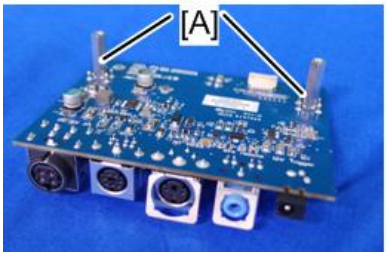
I/O Board and RS-232C Connector

1. Place the main board upside down, and then remove the I/O board [A] (x2).



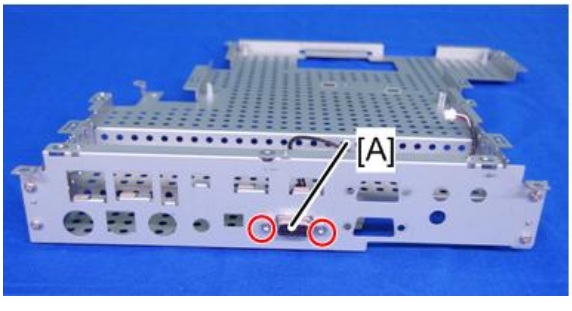
y0afm0015

2. Remove 2 hexagon posts [A] on the I/O board (hexagon post x2).



y0afm0015a

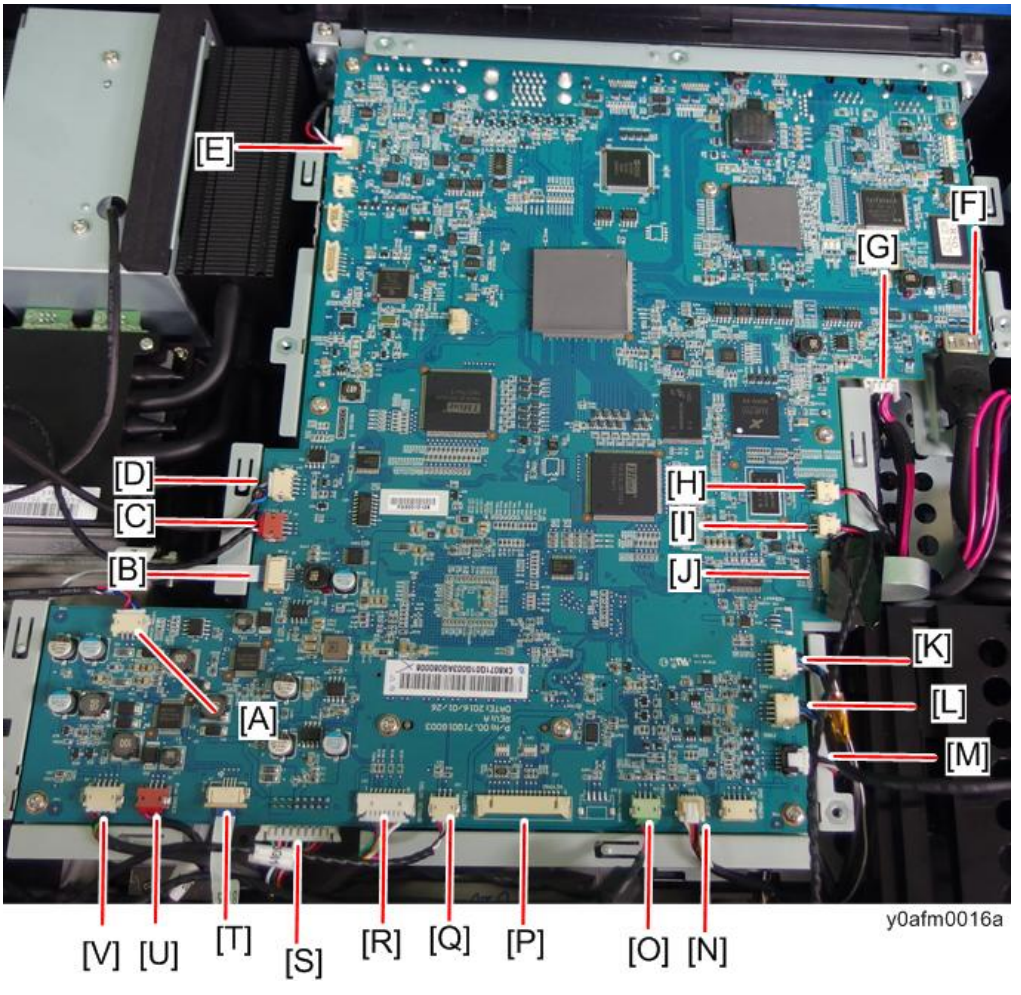
3. Remove the RS-232C connector [A] from the bracket (hex screw x2).



y0afm0016

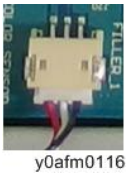
Details of Each Connector and FFC on the Main Board

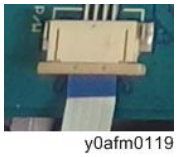
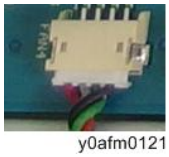
Make sure cables plug into the correct ports when assembling the unit.



Item	Name on board (or connection destination)	Connector feature	Figure
A	THERMAL/SENSOR	Red/Black/White/Blue wire, white connector (4 pins)	 y0afm0101
B	F/W (Filter wheel)	FFC	 y0afm0102

Item	Name on board (or connection destination)	Connector feature	Figure
C	F/W INDEX (Filter wheel)	Black wire tube composed of Red/ Black/White wire, red connector (3 pins)	 y0afm0103
D	FAN5	Black wire tube composed of Brown/ Gray/Blue/Black wire, white connector (4 pins)	 y0afm0104
E	RS232C	Black wire tube composed of Red/ White/Black wire, white connector (5 pins)	 y0afm0105
F	(USB dongle holder)	Black wire tube	 y0afm0106
G	(USB dongle holder)	Black wire tube composed of Red / White/Black wire, white connector (3 pins)	 y0afm0107
H	SPK/L (Speaker (Rear))	Black wire tube composed of Red/Black wire, white connector (2 pins)	 y0afm0108
I	SPK/R (Speaker (Right))	Black wire tube composed of Red/Black wire, white connector (2 pins)	 y0afm0109
J	(LD Driver board)	FFC (covered with black tape)	 Y0afm0109a

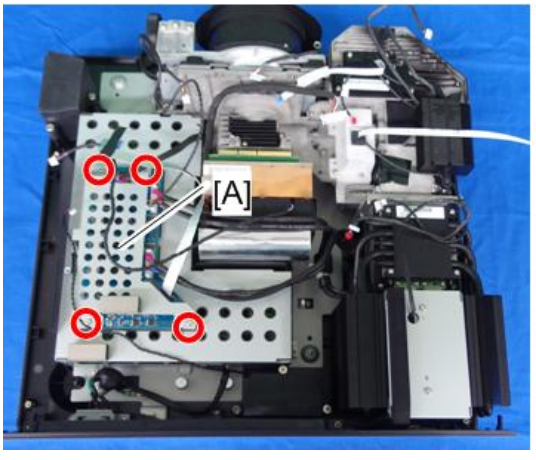
Item	Name on board (or connection destination)	Connector feature	Figure
K	FAN3	Black wire tube composed of Black / Blue/Gray/white wire, white connector (4 pins)	 y0afm0110
L	FAN2	Black wire tube composed of Black / Blue/Gray/white/Brown wire, white connector (4 pins)	 y0afm0111
M	FAN1	Black wire tube composed of Black / Blue/Gray/Red wire, white connector (4 pins)	 Y0afm0112
N	LS/SUR (Optical engine)	Black wire tube composed of White/ Yellow/Red/Black /Brown wire, white connector (5 pins)	 y0afm0113
O	FRONT IR	Black wire tube composed of Red/ Black /White wire, green connector (3 pins)	 y0afm0114
P	KEYPAD	Black wire tube composed of Red/ Black wires, white connector (16 pins)	 y0afm0115
Q	FILTER_1	Black wire tube composed of Red/ White /Black wire, white connector (3 pins)	 y0afm0116

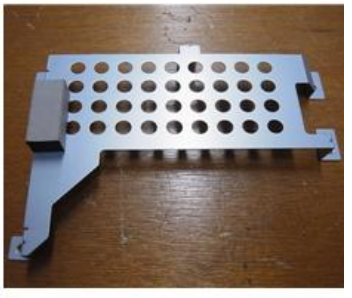
Item	Name on board (or connection destination)	Connector feature	Figure
R	COLOR SENSOR (Optical engine)	Black wire tube composed of Blue/ Green/Orange/Brown/Black/Red/ Yellow/White wires, white connector (8 pins)	 y0afm0117
S	(PSU)	Black wire tube composed of many color wires, white connector (16 pins)	 y0afm0118
T	P/W (Optical engine)	FFC	 y0afm0119
U	P/W INDEX (Optical engine)	Black wire tube composed of Red/ Black /White wire, red connector (3 pins)	 y0afm0120
V	FAN4	Black wire tube composed of Red/ White /Green/Black wire, white connector (4 pins)	 y0afm0121

LD Driver Board and Thermal Pad

1. Remove the top cover (page 13 "Top Cover (with Keypad Board and Keypad Buttons)").
2. Remove the rear cover (page 26 "Rear Cover").
3. Remove the main board unit (page 28 "Main Board Unit (with I/O Board and RS-232C Connector)").

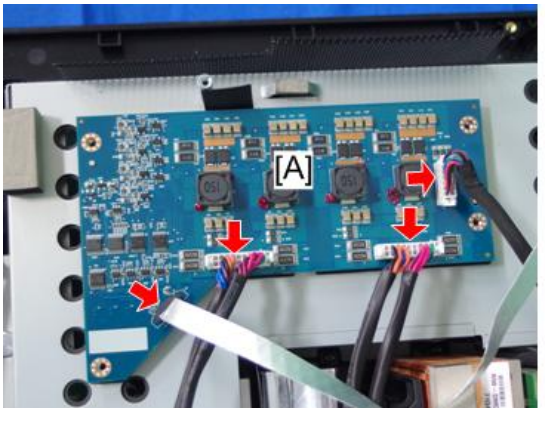
4. **Remove the shielding [A] (x4).**





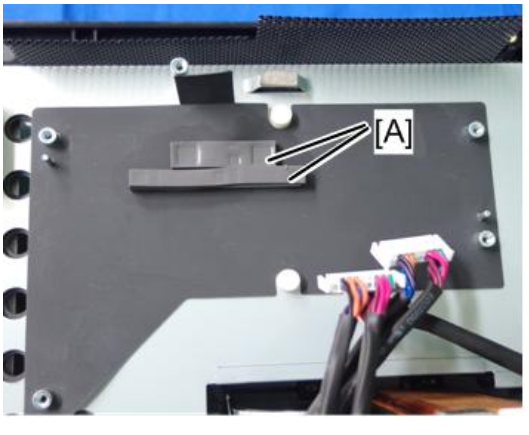
y0afm0044

5. **Remove the LD driver board [A] (x3, FFC x1).**



y0afm0045

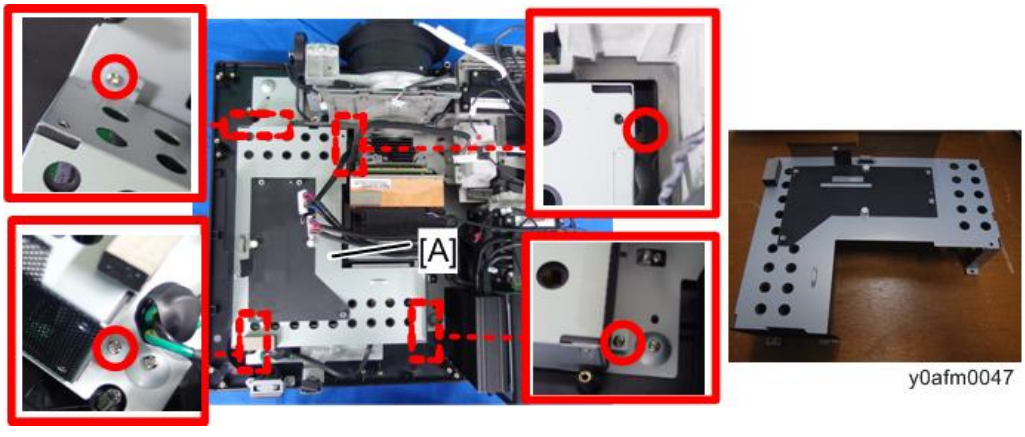
6. **Remove 2 thermal Pads [A].**



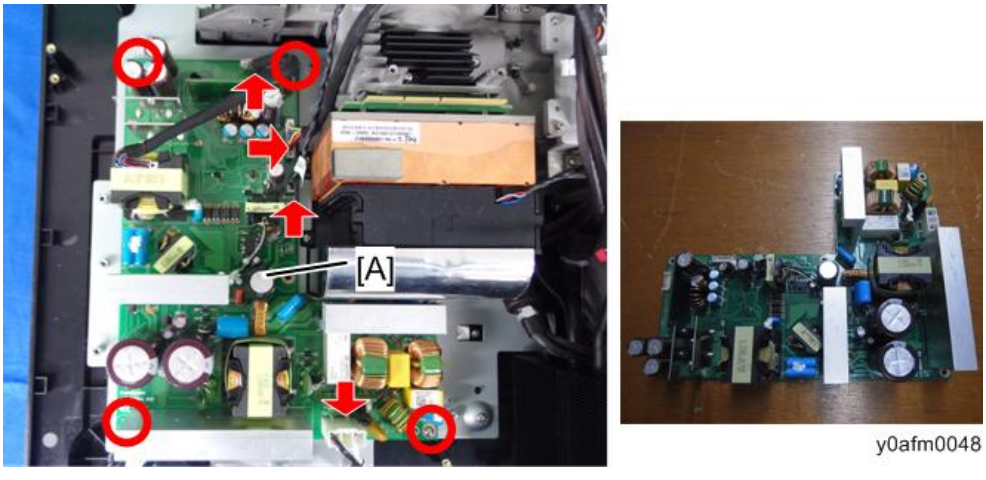
y0afm0046

PSU and Power Connector

1. Remove the top cover (page 13 "Top Cover (with Keypad Board and Keypad Buttons)").
2. Remove the rear cover (page 26 "Rear Cover").
3. Remove the main board unit (page 28 "Main Board Unit (with I/O Board and RS-232C Connector)").
4. Remove the LD driver board (page 35 "LD Driver Board and Thermal Pad").
5. Remove the shielding [A] (x4).



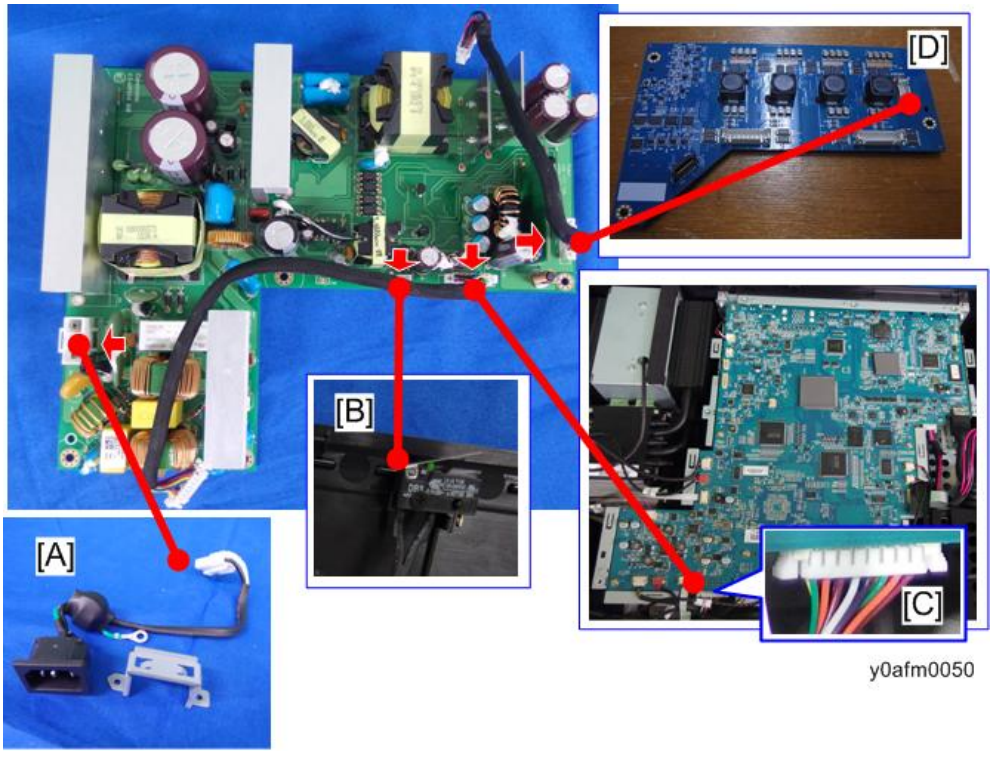
6. Remove the PSU board [A] (x4, x4).



7. **Remove the Power connector (x3).**

Notes for Installation of PSU

Connect the PSU connector properly so as to prevent connection failure or misconnection.



A: To power connector

B: To safety interlock switch

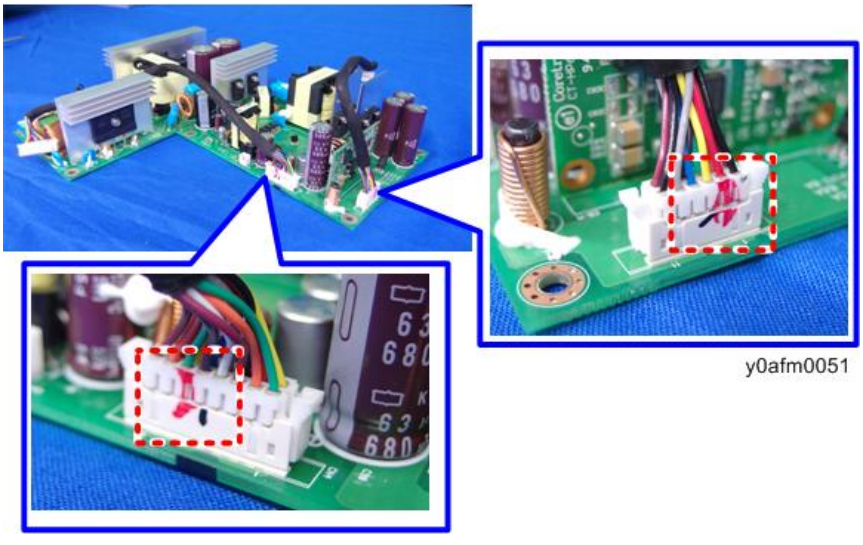
- The safety interlock switch [B] is attached to the front cover. Since the exterior covers are to be attached at the last step, be careful not to forget to connect the interlock switch connector when replacing the PSU.

C: To main board "LVPS" connector

D: To LD driver board

Note

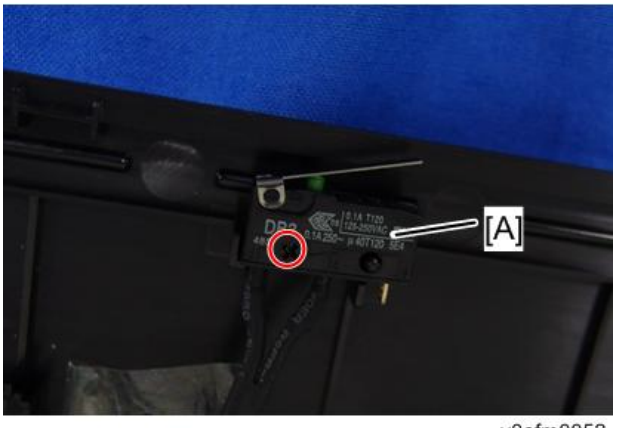
- Each end connector of the harness linking the LVPS and PSU, or LD driver board and PSU, must be connected to the matching board. After disconnecting the harness, if you connect LVPS or LD driver board to the PSU, the power will fail to turn on. Mark the connectors and boards as shown in the red frame so as to indicate the matching pairs of connectors and boards.



Safety Interlock Switch

1. **Remove the top cover (page 13 "Top Cover (with Keypad Board and Keypad Buttons)").**
2. **Remove the front cover (page 22 "Front Cover (with Front IR Sensor and USB Dongle Holder Unit)").**

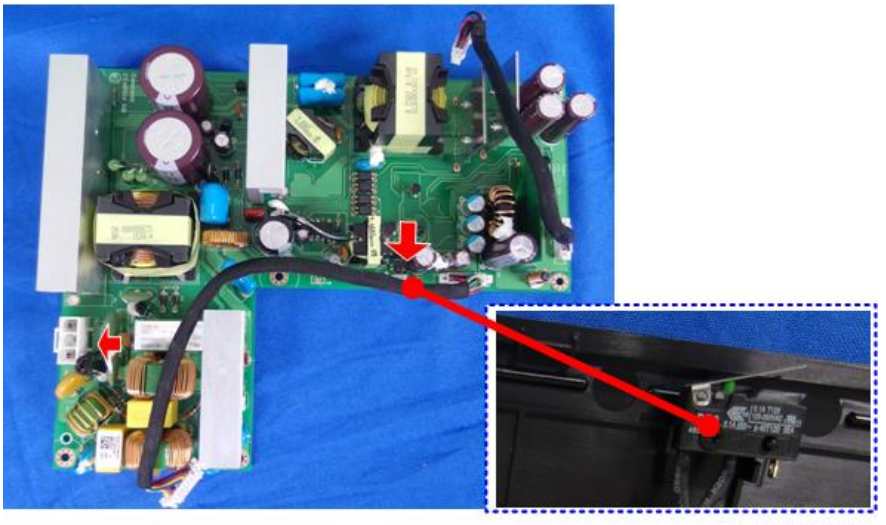
3. **Remove the safety interlock switch [A] from the front cover (x1).**



y0afm0052

4. **Disconnect the connector for safety interlock switch from the PSU board.**

   For details about how to access the PSU board, refer to page 37 "PSU and Power Connector".

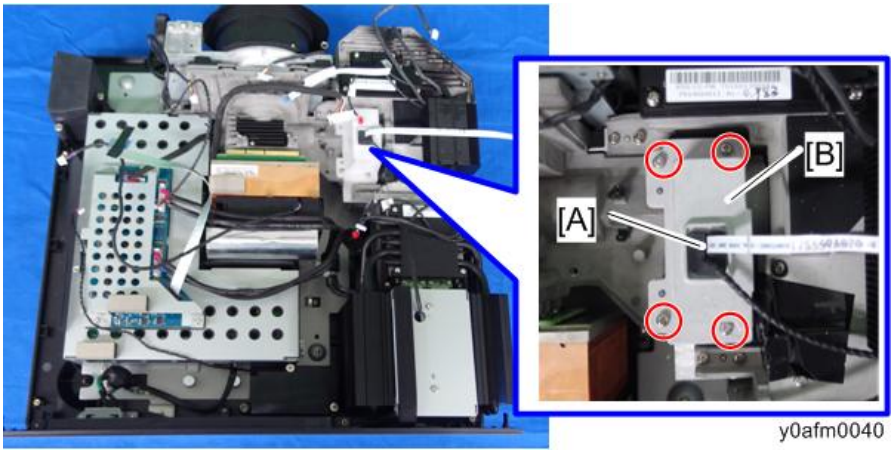


y0afm0052a

Filter Wheel

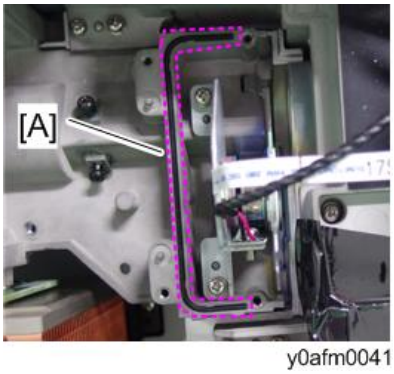
1. **Remove the top cover (page 13 "Top Cover (with Keypad Board and Keypad Buttons)").**
2. **Remove the rear cover (page 26 "Rear Cover").**
3. **Remove the main board unit (page 28 "Main Board Unit (with I/O Board and RS-232C Connector)").**

4. **Remove the sealing rubber [A] on the cable outlet, and then remove the filter wheel cover [B] (x4).**



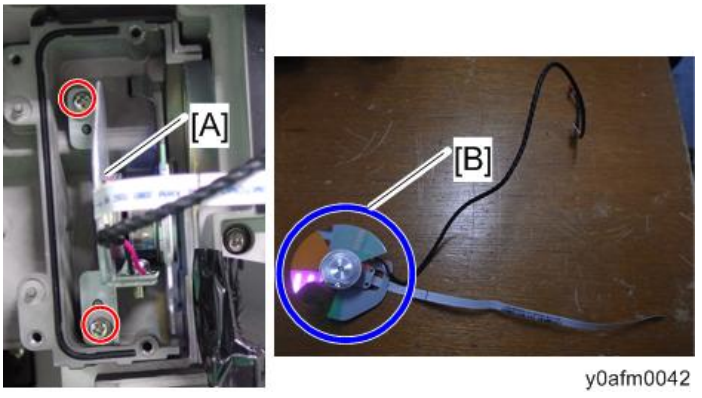
Note

- If the sealing rubber [A] on the contact area of the filter wheel cover comes off, place it back in the groove on the contact area.



5. **Remove the filter wheel [A] (x2).**

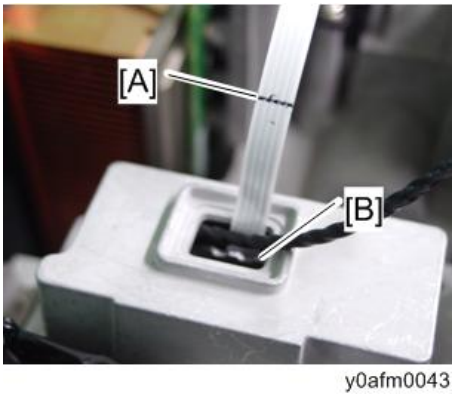
   Do not touch the wheel part [B]. Be careful not to bump the wheel against anything when you replace it, because it breaks easily.



y0afm0042

Note

- After the replacement of the filter wheel, pull the flat cable to a point where the position indicating line on the cable [A] is located above the cable outlet of the filter wheel cover [B], to prevent the flat cable from being entangled in the filter wheel inside the cover.

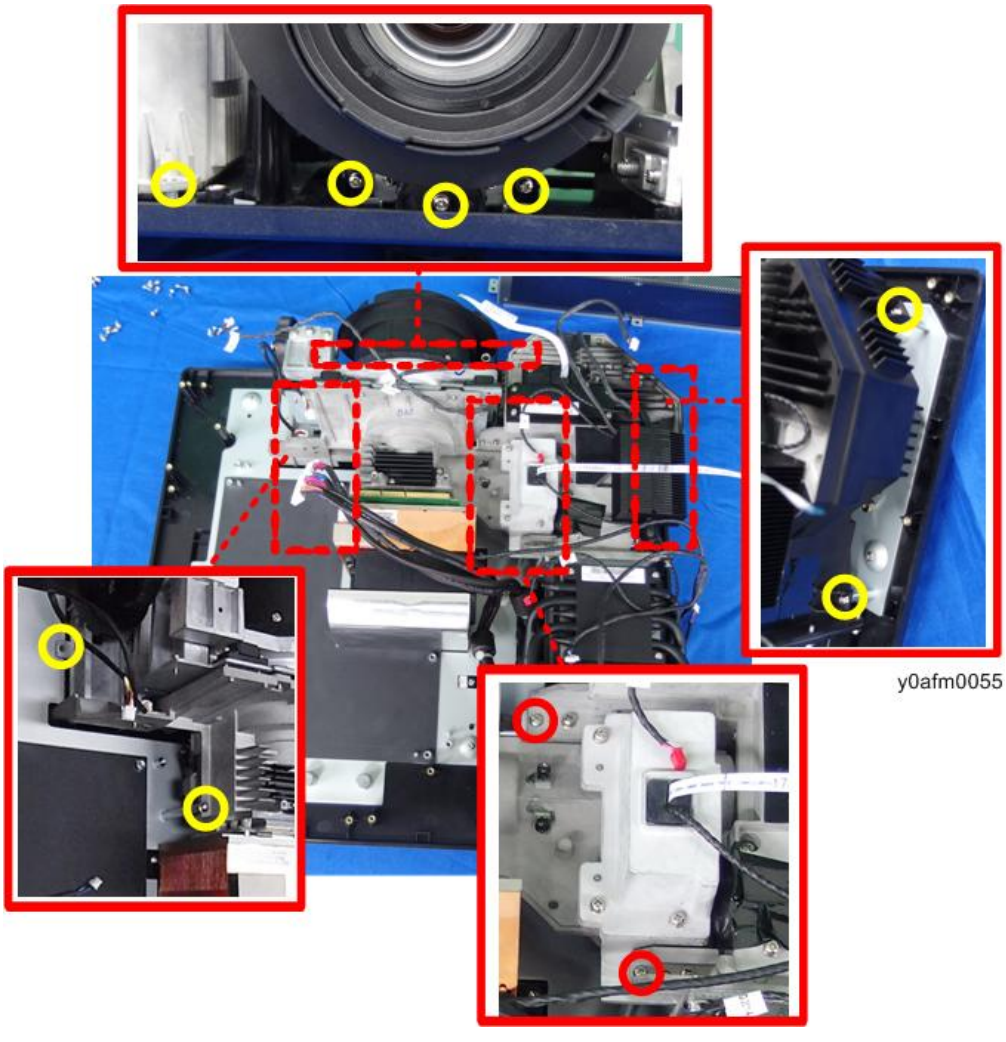


y0afm0043

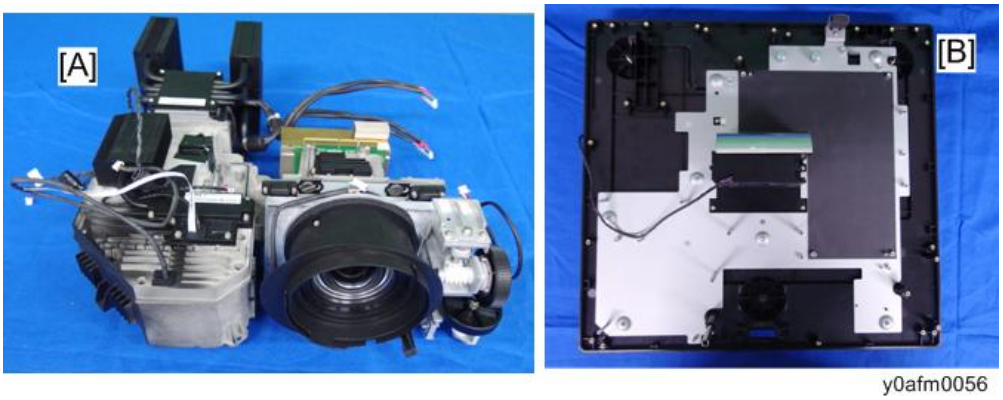
Optical Engine

1. Remove the top cover (page 13 "Top Cover (with Keypad Board and Keypad Buttons)").
2. Remove the rear cover (page 26 "Rear Cover").
3. Remove the main board unit (page 28 "Main Board Unit (with I/O Board and RS-232C Connector)").
4. Remove the front cover (page 22 "Front Cover (with Front IR Sensor and USB Dongle Holder Unit)").
5. Remove the left cover (page 17 "Left Cover (with Thermal Sensor and Filter Sensor)").
6. Remove the LD driver board (page 35 "LD Driver Board and Thermal Pad").
7. Remove the PSU (page 37 "PSU and Power Connector").
8. Remove the filter wheel (page 40 "Filter Wheel").

9. **Remove the optical engine [A] from the base unit [B] (washer faced screw x8(yellow circle), x2(red circle)).**



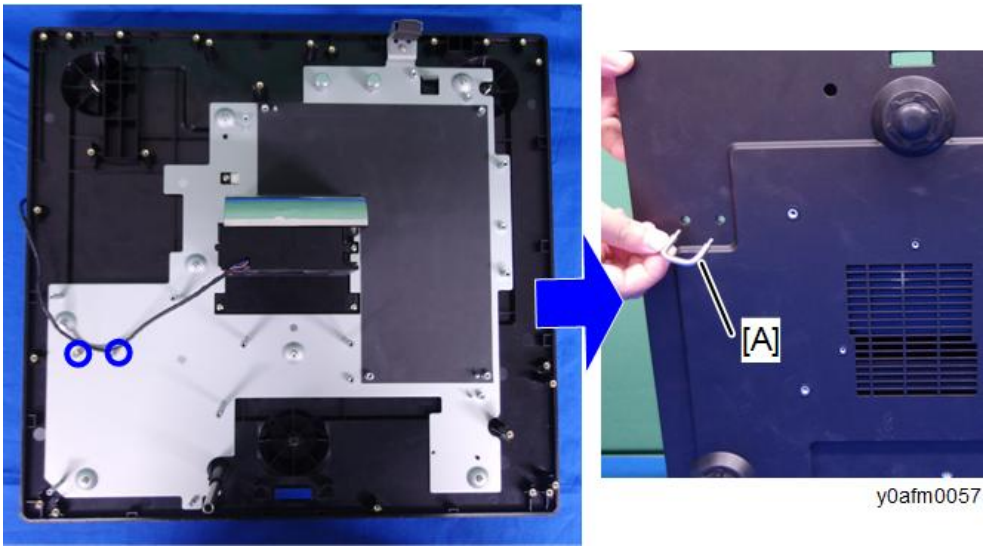
y0afm0055



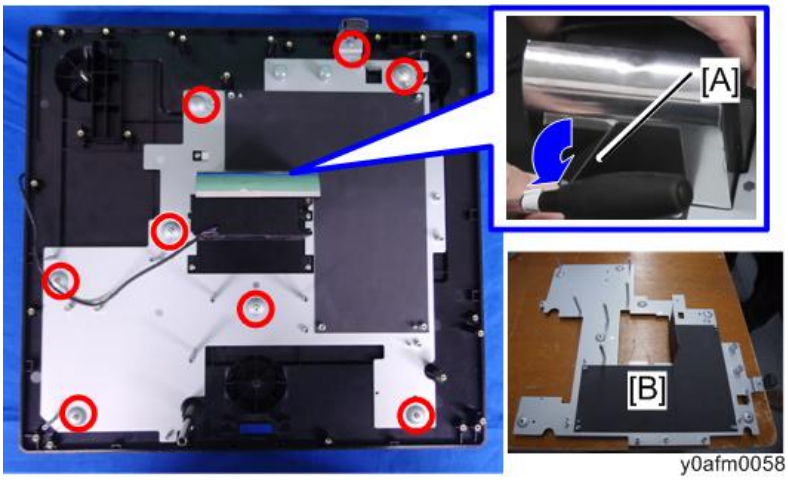
y0afm0056

Base Unit (with Bottom Shielding and Duct for Fan 1)

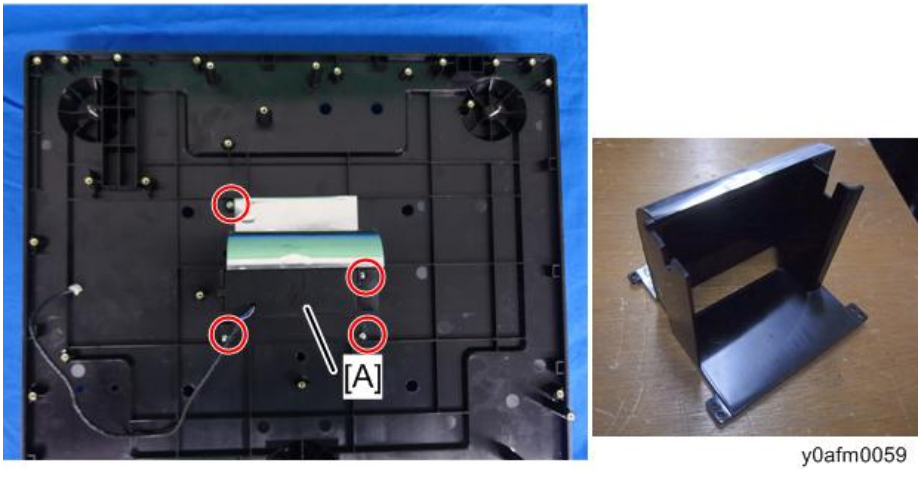
1. Remove the top cover (page 13 "Top Cover (with Keypad Board and Keypad Buttons)").
2. Remove the rear cover (page 26 "Rear Cover").
3. Remove the main board unit (page 28 "Main Board Unit (with I/O Board and RS-232C Connector)").
4. Remove the front cover (page 22 "Front Cover (with Front IR Sensor and USB Dongle Holder Unit)").
5. Remove the left cover (page 17 "Left Cover (with Thermal Sensor and Filter Sensor)").
6. Remove the LD driver board (page 35 "LD Driver Board and Thermal Pad").
7. Remove the PSU (page 37 "PSU and Power Connector").
8. Remove the filter wheel (page 40 "Filter Wheel").
9. Remove the optical engine (page 42 "Optical Engine").
10. Remove the U-bolt [A] from the base unit. (U-bolt x1, hexagon nut x 2).



11. Peel off the adhesive face [A] of the insulation sheet stuck to the duct for fan 1 as much as needed, and remove the bottom shielding [B] (x8).



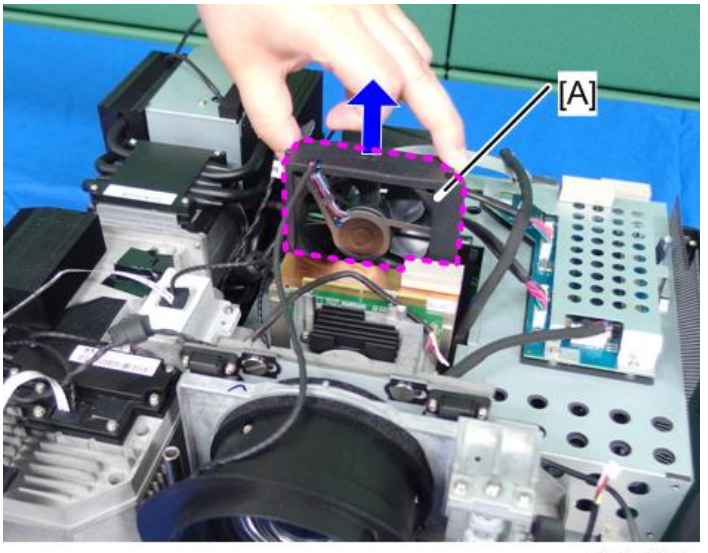
12. Remove the duct for fan 1 [A] (x4).



Fan 1

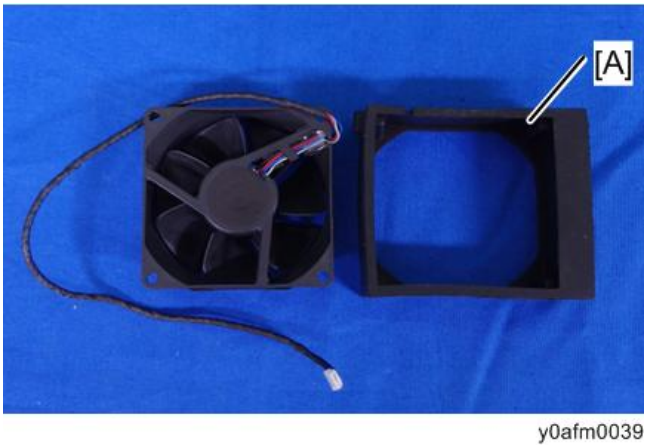
1. Remove the top cover (page 13 "Top Cover (with Keypad Board and Keypad Buttons)").
2. Remove the rear cover (page 26 "Rear Cover").
3. Remove the main board unit (page 28 "Main Board Unit (with I/O Board and RS-232C Connector)").

4. **Remove the fan 1 [A].**



y0afm0038

5. **Remove the anti-vibration rubber [A] from the fan 1.**



y0afm0039

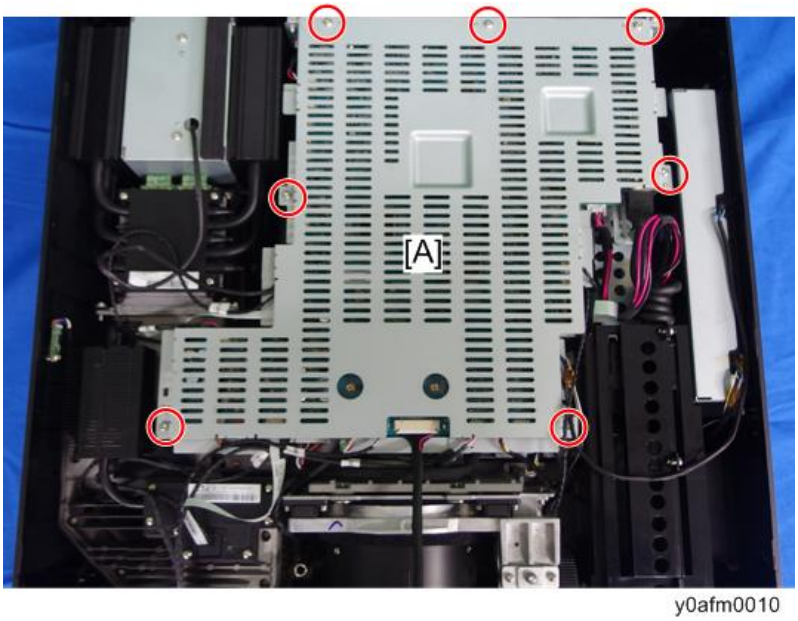
Note

- If the duct for fan 1 needs to be removed, see page 44 "Base Unit (with Bottom Shielding and Duct for Fan 1)".

Fan 5

1. **Remove the top cover (page 13 "Top Cover (with Keypad Board and Keypad Buttons)").**

2. Remove the top shielding [A] (x7).



y0afm0010

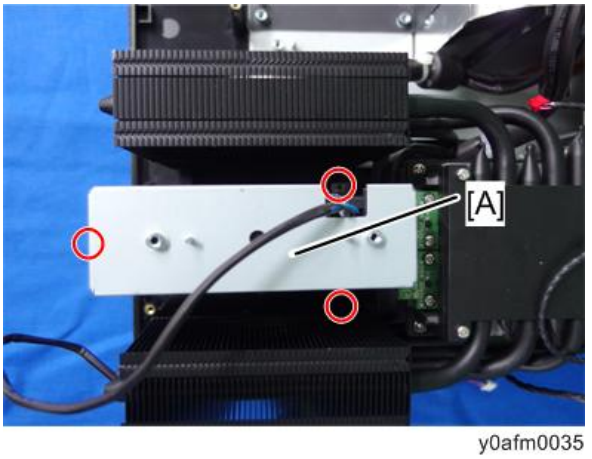
3. Disconnect a connector (x1).

y0afm0013d

4. **Remove the fan cover [A] (☞ x2).**

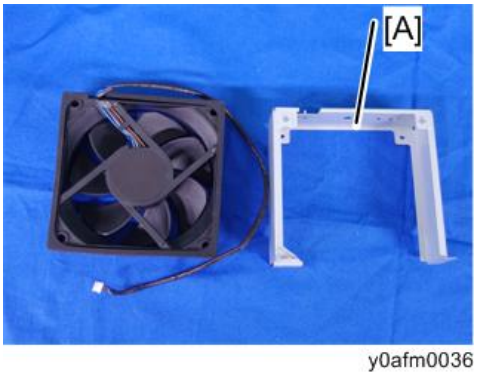
y0afm0034

5. **Remove the fan unit [A] (☞ x3).**



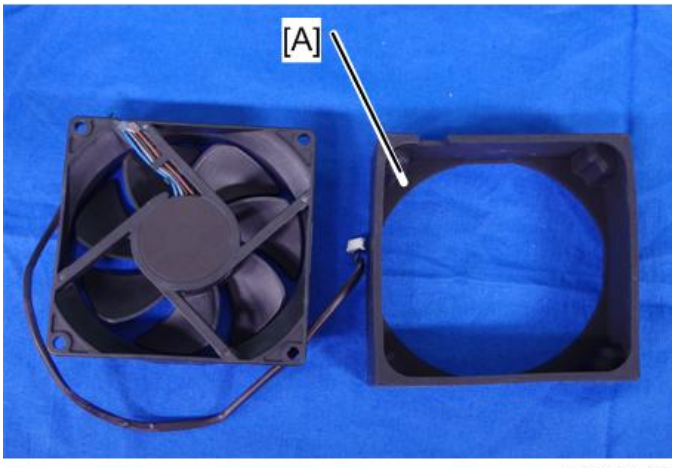
y0afm0035

6. **Separate the fan bracket [A] from the fan.**



y0afm0036

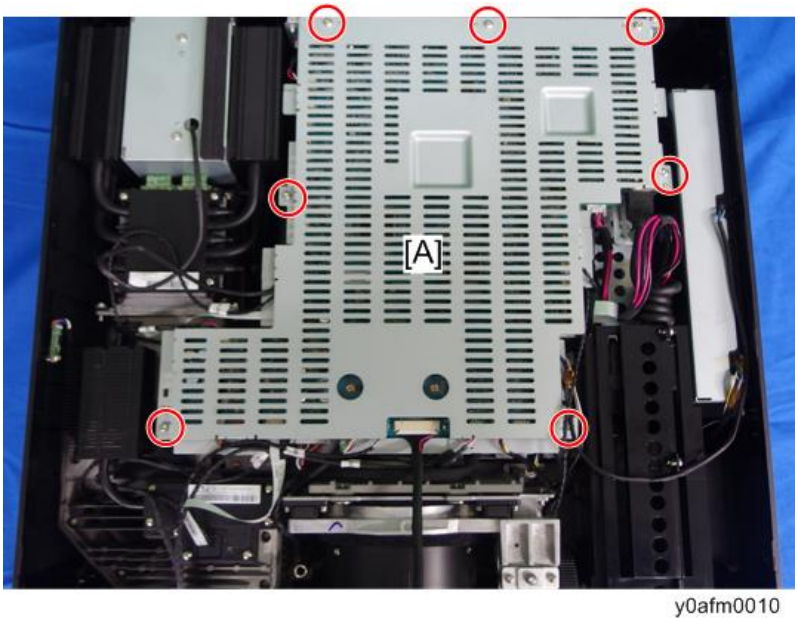
7. Remove the anti-vibration rubber [A] from the fan.



y0afm0037

Speaker (Right Side)

1. Remove the top cover (page 13 "Top Cover (with Keypad Board and Keypad Buttons)").
2. Remove the front cover (page 22 "Front Cover (with Front IR Sensor and USB Dongle Holder Unit)").
3. Remove the top shielding [A] (x7).

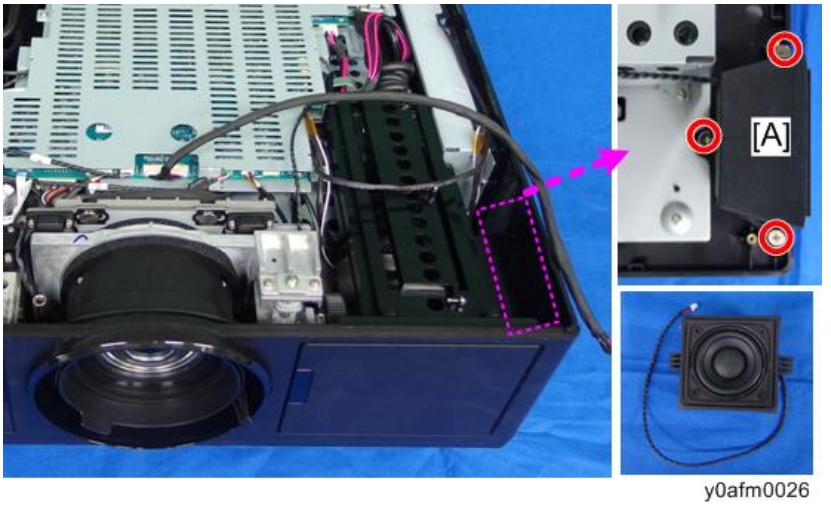


y0afm0010

4. **Disconnect a connector (x1).**

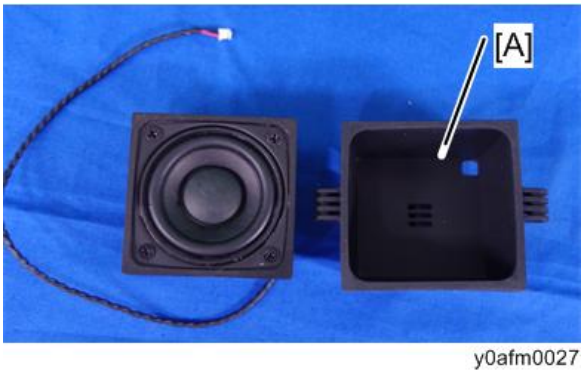
y0afm0013e

5. **Remove the speaker (x3).**



y0afm0026

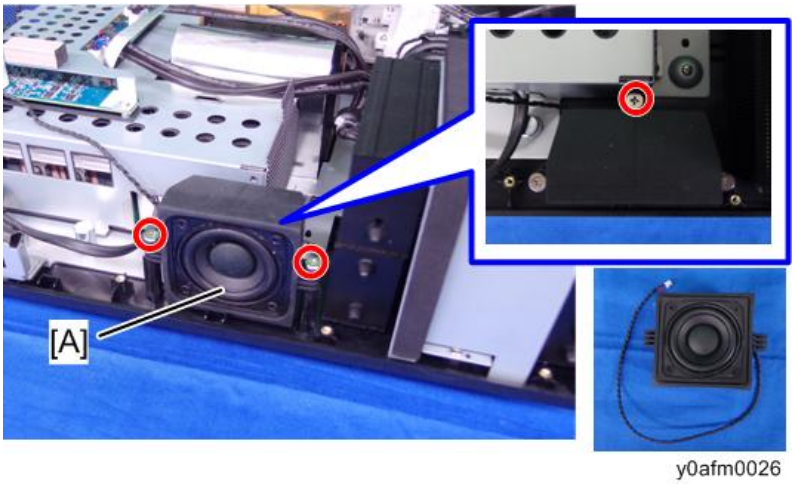
6. Remove the anti-vibration rubber [A] from the speaker.



y0afm0027

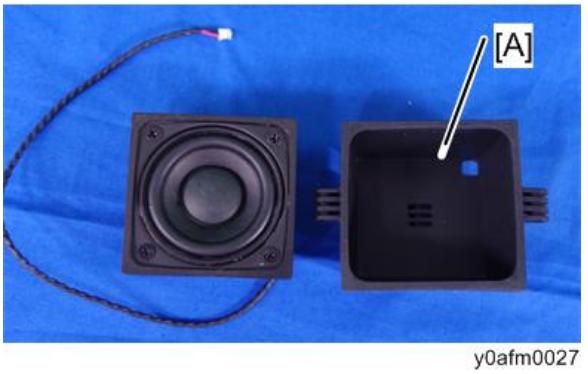
Speaker (Rear)

1. Remove the top cover (page 13 "Top Cover (with Keypad Board and Keypad Buttons)").
2. Remove the rear cover (page 26 "Rear Cover").
3. Remove the main board unit (page 28 "Main Board Unit (with I/O Board and RS-232C Connector)").
4. Remove the speaker (x3).



y0afm0026

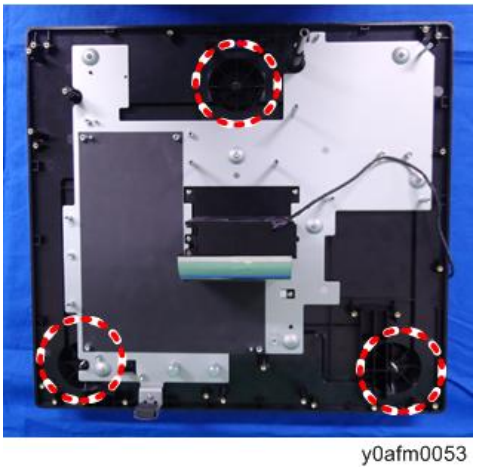
5. **Remove the anti-vibration rubber [A] from the speaker.**



y0afm0027

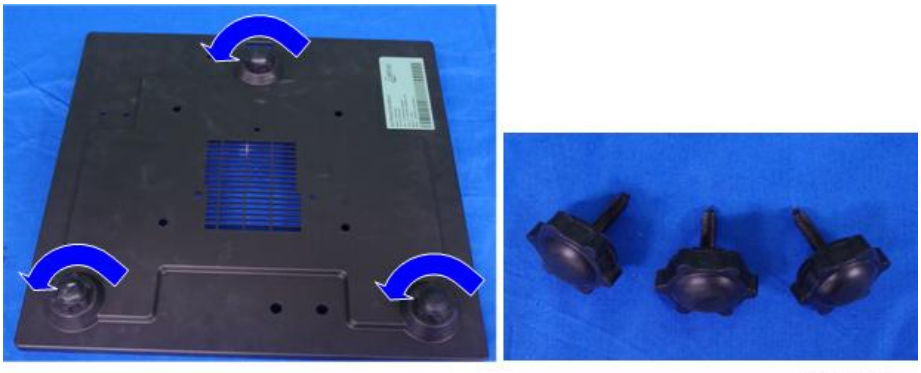
Adjustable Foot

There are three adjustable feet; 1 on the front and 2 on the rear.



y0afm0053

1. **Rotate the adjustable foot counterclockwise and remove it.**



y0afm0054

3. Adjustment

Required Action after Replacing Parts

After replacing parts, execute the related items shown in the table below.

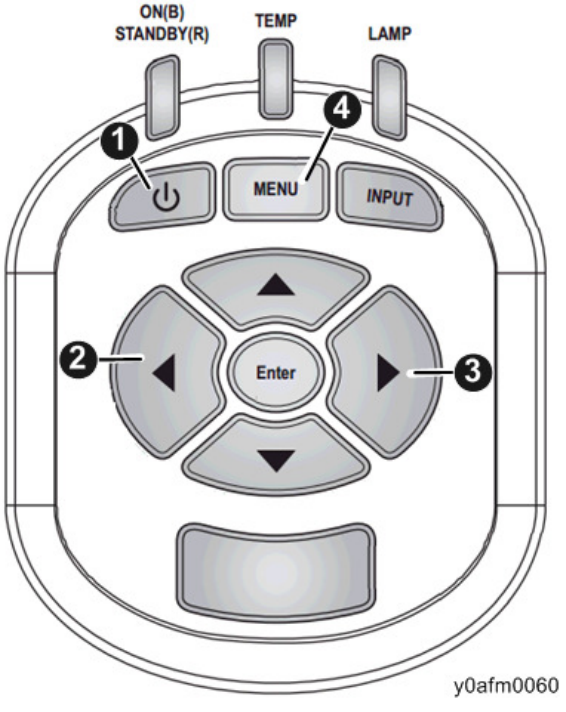
Action after repair	Changed parts					Description page
	Main board	Combiner module	Filter wheel	Engine Module	Firmware	
Firmware update	✓				✓	page 83 "DDP442x FW Update" page 86 "MCU FW Update" page 90 "MST9813 FW Update"
Filter wheel index	✓	✓	✓	✓		page 59 "Filter Wheel Index Adjustment"
OSD reset	✓					page 63 "Factory Reset"
ADC calibration	✓				✓	page 61 "ADC Calibration"

Service Mode

How to Enter the Service Mode

1. **Press Power -> Left -> Right -> MENU key.**

   The service mode menu appears.



Note

- To exit from the service mode or return to the previous menu, press the "Power" key.

Service Mode Settings

Setting Item	Description
Factory Reset	Use this to reset all the settings in the OSD menu (except for the service mode and network settings).
Filter Wheel Index	Use this to adjust the filter wheel index.
Phosphor Wheel Index	Use this to adjust the phosphor wheel index.

Setting Item	Description
Error Log	Records the times when power for the projector failed to turn on, such as due to excessive temperature, lamp failure or fan lock.
Mode Adjustment	Use this to adjust the projected image position and record the coordinates after adjustment. (Up to 19 coordinates can be recorded.)
Reset Projector Hours	Use this to reset the machine's cumulative operation time.
Light Sensor (ABP) Calibration	During light sensor (ABP) calibration, the color balance of the projected light is adjusted using a sensor in the optical engine.
ADC Calibration	Use this to calibrate the analog-to-digital converter (ADC). Black level adjustment: Adjust the analog black level (0 V) to the digital 0 level. White level adjustment: Adjust the analog white level (0.7 V) to the digital 1,024 level.
G Sensor Calibration	Use this to calibrate the sensor that detects the projector's orientation.

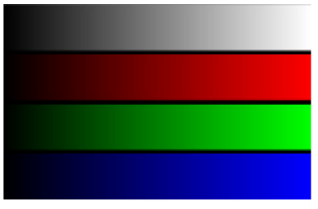
Adjustment

Phosphor Wheel Index Adjustment

After replacing the main board or optical engine, the Phosphor Wheel Index Adjustment should be done.

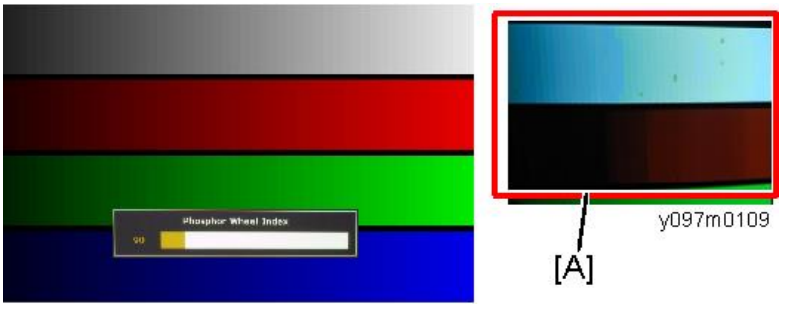
Environment

- Test equipment: Video generator
- Test signal: 1920 x 1200@60Hz, 1280 x 800@60Hz
- Test pattern: 64 gray RGBW



y097m0528

1. **Get into Service mode (page 56 "How to Enter the Service Mode").**
2. **Select [Phosphor Wheel Index].**
3. **Using the [Left] or [Right] key, adjust the R/G/B and gray gradations until they are even.**



[A]: Not good

Inspection item

- Check if each color level is correct.
- Color saturation.

Criteria

- Screen appears satisfactory. There should be no unusual conditions, such as lines on the screen.
- Color levels should be sufficient and satisfactory.

- Blue level should not have unusual color or heavy lines.

Filter Wheel Index Adjustment

After replacing the main board, optical engine, or filter wheel, the Filter Wheel Index Adjustment should be done.

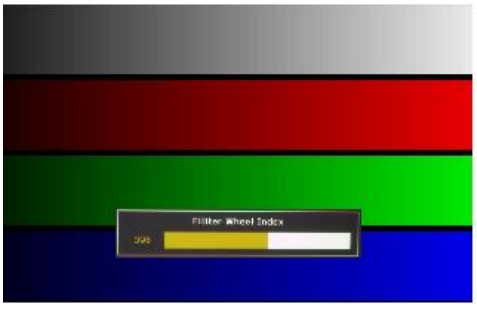
Environment

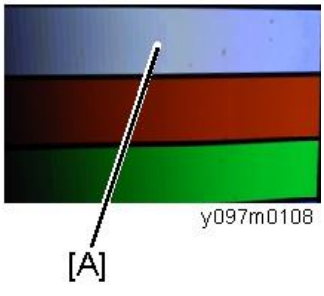
- Test equipment: Video generator
- Test signal 1920 x 1200@60Hz, 1280 x 800@60Hz
- Test Pattern: 256 gray RGBW

y097m0528

1. **Get into Service mode (page 56 "How to Enter the Service Mode").**
2. **Select [Filter Wheel Index].**

   Using the [Left] or [Right] key, adjust the gray gradations until they are even.





y097m0108

[A]: Not good

Inspection item

- Check if each color level is correct.
- Color saturation.

Criteria

- Screen appears satisfactory. There should be no unusual conditions, such as lines on the screen.
- Color levels should be sufficient and satisfactory.

- Gray level should not have unusual color or heavy lines.

Calibration

Light Sensor (ABP) Calibration

After replacing the main board, optical engine, or filter wheel, Light Sensor (ABP) Calibration must be done.

During light sensor (ABP) calibration, the color balance of the projected light is adjusted using a sensor in the optical engine.

The laser light source separately creates RGB (and other) light beams. This function is used to adjust the light emission balance.

The change in the white balance due to deterioration over time varies between each color. Therefore, color balance adjustment is required periodically.

1. **Put the projector on a horizontal surface.**
2. **Get into service mode (page 56 "How to Enter the Service Mode").**
3. **Select "Light Sensor (ABP) Calibration".**
4. **Press the "Enter" key.**

   Light sensor (ABP) calibration starts. During the calibration, a progress bar appears. The calibration is complete once the progress bar has reached 100%.

y097m0100

ADC Calibration

If the abnormal image appears after replacing the main boar, this calibration must be done.

If noises appear on the screen, the product is considered as failure condition.

There should be unusual conditions, such as lines on the screen.

Check if the projection is same as PC monitor displayed.

WXGA signals require ADC calibration.

RGB Calibration

Environment

- Test equipment: Video generator
- Test signal: 1280 x 800 @60Hz

- Test pattern: Grays 16

- Input the signal from the VGA IN port

1. **Connect the video source and wait for the screen display.**
2. **Get into service mode (page 56 "How to Enter the Service Mode").**
3. **Select "Analog Settings" -> "ADC Calibration", and then press the "Enter" key.**
4. **SOP will show up on screen.**
5. **Press the "Auto" key, and the process will start.**

   The screen will flash during calibration processing.

   When calibration is completed, "OK" appears on the screen.
6. **After the process is done, press the "Enter" key to refresh the SOP.**
7. **Check the calibration result.**
8. **Compare the results with the default values.**

   Default Values: R: 802, G: 802, B: 802

   If the result are the same as the default values, the calibration has failed.

   When the calibration failed, check the video source and redo the ADC calibration.

G Sensor Calibration

After replacing the main board, this calibration must be done.

1. **Put the projector on a horizontal surface.**
2. **Get into service mode (page 56 "How to Enter the Service Mode").**
3. **Select "G Sensor Calibration", and then press the "Enter" key.**

   When the calibration has finished, a message appears.

Factory Reset

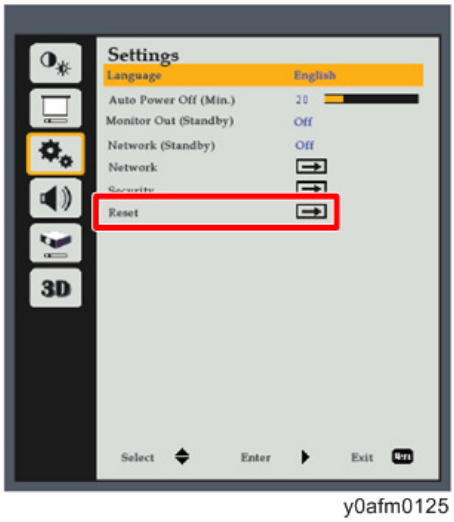
Factory Reset allows you to erase all OSD menu settings and restore the default setting (except the service mode and network settings).

There are two ways to do Factory Reset. Either way, the settings to be reset are the same.

After replacing the main board, Factory Reset must be done.

Factory Reset Procedure (1)

1. **Press the "MENU" key to enter the OSD menu.**
2. **Select "Settings" -> "Reset".**



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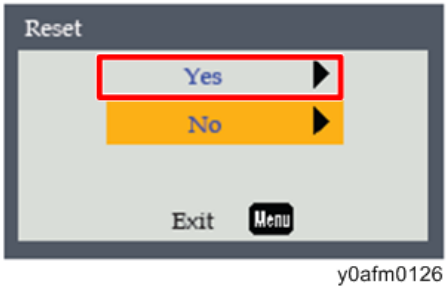
3. **Select "Yes", and then press the "Enter" key.**



y0afm0126

Factory Reset Procedure (2)

1. **Get into service mode. (page 56 "How to Enter the Service Mode")**

2. Select "Factory Reset".
3. Select "Yes", and then press the "Enter" key.

4. Troubleshooting

LED Indicators

Message	ON(B)/STANDBY(R) LED		TEMP LED	LAMP LED
	Red	Blue	Red	Red
Standby State (Input Power cord)	ON	-	-	-
Power on	-	ON	-	-
Standby Lan on	ON	ON	-	-
Burn-in ON	Flash	Flash	-	-
Burn-in OFF	Flash	Flash	-	-
Warning Up Status	Flash	-	-	-
Fan Lock	-	-	Flash slow: 3s	-
CW breakdown	-	-	Flash fast: 500ms	-
Overheat	-	-	ON	-
LD Overheat	-	-	ON	-
LD Voltage Error	-	-	-	ON

Message	ON(B)/STANDBY(R) LED		TEMP LED	LAMP LED
	Red	Blue	Red	Red
Power Good NG			ON	ON

Troubleshooting

First, check the items below.

- Make sure you have connected the projector properly to the peripheral equipment.
- Make sure all equipment is connected to an AC outlet and the power is turned on.
- If the projector does not project an image while being operated with a computer, restart the computer.

No.	Symptom	Procedure
1	No power	• Ensure the power cord and AC power outlet are securely connected. • Ensure all connectors are securely connected and aren't broken. • Check keypad board. • Check LVPS. • Check main board.
2	Auto Shut Down	• Ensure the projector is under operation temperature. • Check LED status. a. TEMP LED flashes red:3S - Check Fan. - Check Main Board. b. TEMP LED lit red. - Clean the dust and replace filter module. - Check fan. - Check main board.

No.	Symptom	Procedure
3	No Light On	• Ensure all connectors are securely connected and aren't broken. • Check LED status. a. TEMP LED lit red, LAMP LED lit red. - Check LVPS and main board. b.TEMP LED flashing red: 500ms - Check LVPS. - Check filter wheel module. - Check photo sensor board. - Check combiner module. - Check main board c. LAMP LED lit red. - Check LD driver board. - Check combiner module. - Check main board.
4	No Image	• Ensure the signal cable and source work (If you connect multiple sources at the same time, use the appropriate "Source" button switch). • Ensure all connectors are securely connected and aren't broken. • Check main board. • Check combiner module. • Check DMD board. • Check engine module.
5	Mechanical Noise	• Check fan. • Check filter wheel module. • Check combiner module.
6	Line Bar/Line Defect	• Check whether the main board and DMD board are assembled properly. • Check main board. • Check DMD board.

No.	Symptom	Procedure
7	Image Flicker	• Do "Reset" of the OSD menu. • Ensure that the signal cables and source are work as well. • Execute LD calibration. • Check main board. • Check photo sensor board and filter wheel module. • Check combiner module.
8	Color Abnormality	• Do "Reset" of the OSD Menu. • Execute LD calibration. • Adjust wheel index. • Check main board. • Check filter wheel module. • Check combiner module.
9	Poor Uniformity/ Shadow	• Ensure the projection screen without dirt. • Ensure the projection lens is clean. • Ensure the Brightness is within spec. • Check engine module. • Check photo sensor and filter wheel.
10	Dead Pixel/Dust (Out of spec.)	• Ensure the projection screen without dirt. • Ensure the projection lens is clean. • Check DMD chip • Check engine module. • Check combiner module
11	Garbage Image	• Ensure that the signal cables and source work as well. • Check main board.

No.	Symptom	Procedure
12	Remote Controller/Control Panel Failed	• Remote Control: a. Check battery. b. Check remote controller. c. Check IR sensor board. d. Check main board. • Control Panel: a. Check keypad cable. b. Check keypad. c. Check main board.
13	Function Abnormal	• Do "Reset" of the OSD menu. • Check main board.
14	Audio Abnormal	• Ensure that the signal cables and source are work as well. • Ensure that your projector is not in "Mute" mode. • Check main board. • Check speaker.
15	3D Image Abnormal	• Ensure the using 3D glasses is good and you must face the projection. • Ensure the signal source is 3D format. • Ensure the 3D function of projector OSD is on and 3D sync invert is on. • Check main board.

Failure Log Troubleshooting

Checking the Failure Log (Service Mode Menu)

1. Get into Service mode. (page 56 "How to Enter the Service Mode")
2. Select [Failure Log].
3. Check the error log information.

Error Codes/Messages and Actions

Code	Messages	Description	Actions
0	No Error	No Error recorded	None
1	Lamp Ignite Fail	Laser failed to ignite	Check laser banks, and replace Optical Engine + base unit if necessary
5	Format Board Power On Fail	Main board failed to power on and projector auto shutdown	Replace main board.
6	Color Wheel Unexpected Stop	Filter wheel unexpected stop and projector auto shutdown	Check filter wheel, and replace it if necessary.
7	Over Temperature	System over temperature and projector auto shutdown	Check intake vent
8	FAN 1 Lock	Fan 1 failure and projector auto shutdown	Check fan 1 and replace it if necessary.
9	FAN 2 Lock	Fan 2 failure and projector auto shutdown	Check fan 2 and replace it if necessary.
10	FAN 3 Lock	Fan 3 failure and projector auto shutdown	Check fan 3 and replace it if necessary.
11	FAN 4 Lock	Fan 4 failure and projector auto shutdown	Check fan 4 and replace it if necessary.
12	FAN 5 Lock	Fan 5 failure and projector auto shutdown	Check fan 5 and replace it if necessary.
26	LD lower than 60%	Filter wheel or Optical Engine is defective	Replace Filter wheel or Optical Engine + base unit

Code	Messages	Description	Actions
28	LD NTC (1) Over Temperature	Laser bank 1 over temperature and projector auto shutdown	Check fans or intake vent. Replace fans if necessary.
30	LD NTC (2) Over Temperature	Laser bank 2 over temperature and projector auto shutdown	Check fans or intake vent. Replace fans if necessary.
31	High Ambient Temperature	High ambient temperature and projector auto dim to protect laser	Check fans or intake vent. Replace fans if necessary.
32	Portrait mode shut down	Not supported portrait mode	Change the projector orientation.

5. Test & Inspection

Test Equipment and Conditions

Test Equipment Needed

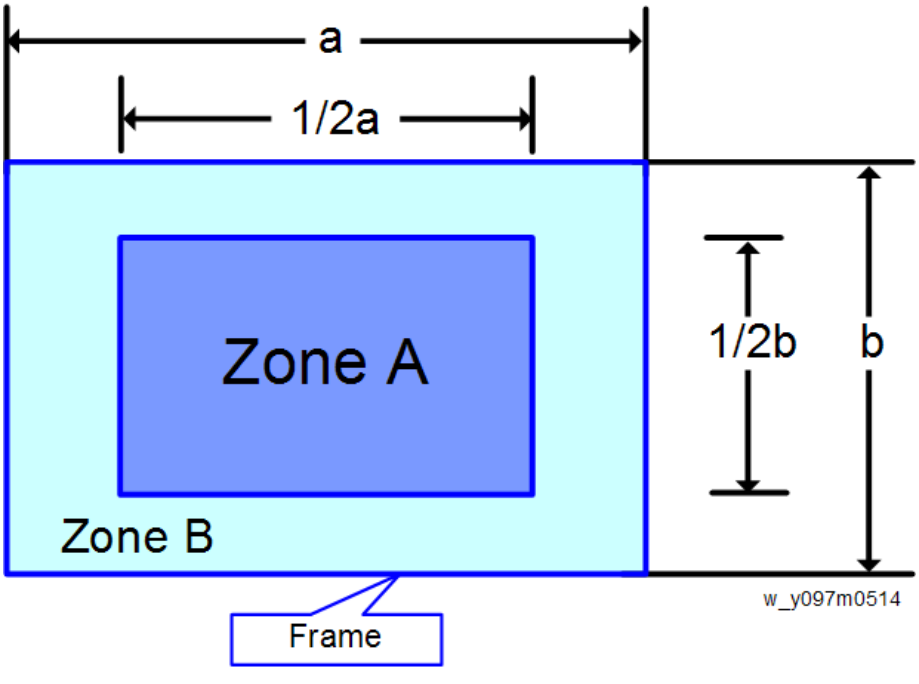
- PC
- DVD player with multi-system, equipped with "Component" and "HDMI".
- HDTV source (480P, 720P, 1080P)*

  * You can also use a computer with an HDMI port.

Recommended Test Condition

- Ambient brightness: Dark room less than 2 lux.
- Screen size: 60 inches diagonal.

Zone Definition



- Zone A: The blue area in the center of the image
- Zone B: The outside of the image

- Definition, Active area = Zone A + Zone B

Test Inspection Procedure

Function Inspection

General

All OSD functions must be checked for functionality. When the OSD menu is displayed, there shall be no visible peaking, ringing, streaking, or smearing artifacts on the screen.

Factory Default

The factory settings (with appropriate centering, size, geometry distortion, etc.) must be displayed when "Reset" is selected. (page 63 "Factory Reset")

Display Size

All preset modes must expand to full screen size using OSD Horizontal and Vertical Size controls.

Acoustics

High-pitched sound from the cooling fan and filter wheel is unacceptable.

Check points

Check item	Check point
Text & Pattern	Missing letters & pattern or blurry prints are unacceptable.
Exterior	Dirt, scratches, water ripples and uneven color are unacceptable.
Focus and Zoom	Focus and Zoom functions work well.
Logo	Missing logo, missing prints and blurred prints are unacceptable
Screw	All screws should be fixed and of the right type.
Adjustable foot	Working correctly
Plastic Parts	Plastic parts must not be broken or damaged.
Safety or warning label	All safety and warning labels should be visible, including all contents.
Connector	All interface connectors should be complete and working.

Network Test

Connection Test

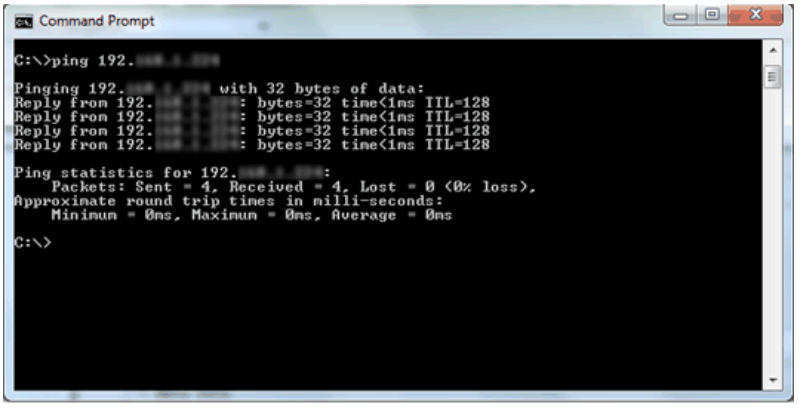
1. **Connect one end of the LAN cable to the LAN connector on the projector and the other end to the network.**
2. **Connect the computer to the network.**

   For how to connect the client PC to the projector, see page 77, page 78, and page 79.
3. **Open the Windows Command Prompt.**
4. **Enter the ping command as follows, and then press the Enter key to execute it.**

   ping xxx.xxx.xxx.xxx

   The "xxx" fields represent the projector's IP address.

   Example: ping 192.168.0.100



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5. **Check the communication result.**

If communication succeeds

The message "Reply from xxx.xxx.xxx.xxx: bytes=xxx time=xxms TTL=xxx" appears. (The "xxx" fields vary according to the operating environment.)

If communication fails

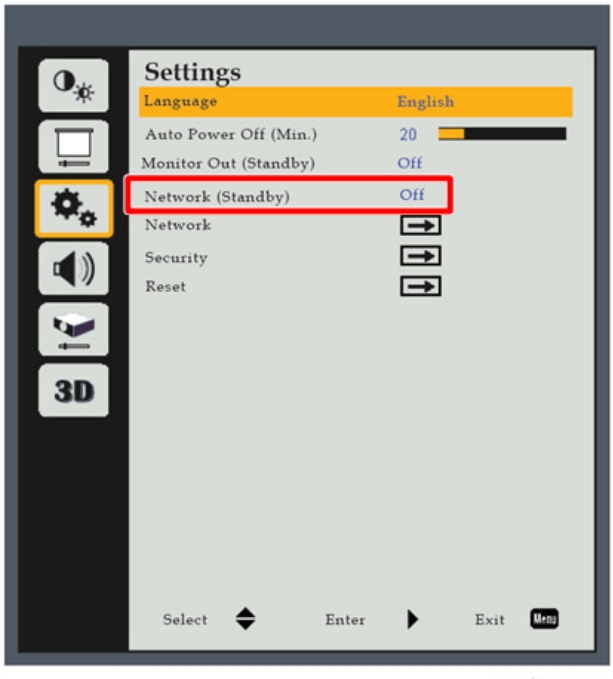
The message "Request timed out." or "Destination Host Unreachable." appears. If this happens, check the following:

- Check whether the projector's LAN cable is connected properly.

- Press the projector's MENU key and select "Setting" -> "Network" -> "Status" in the OSD menu to check whether the network settings have been configured correctly.

Connecting the Projector & Checking the LAN Setting

1. Plug the LAN cable into the projector.
2. Turn ON the projector, then press the "MENU" key to access the OSD menu.
3. Set "Setting" -> "Network (Standby)" to "On".



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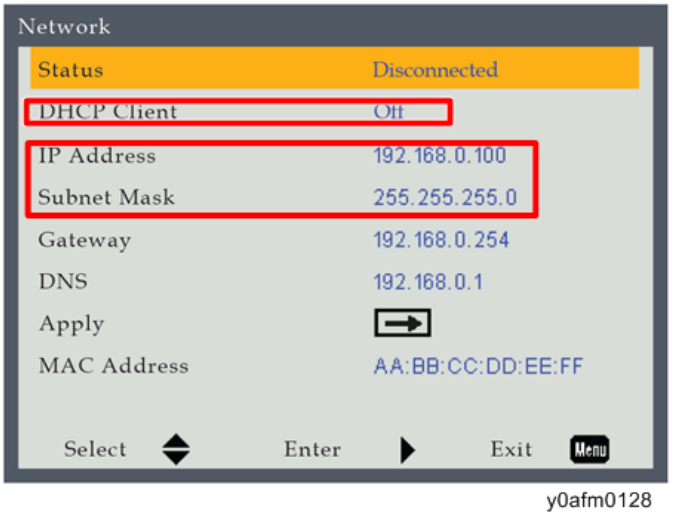
4. Select "Setting" -> "Network".
5. Make sure that "DHCP Client" is "Off".

6. **Write down the "IP Address" and "Subnet Mask": 192.168.0.100 and 255.255.255.0, in this example.**



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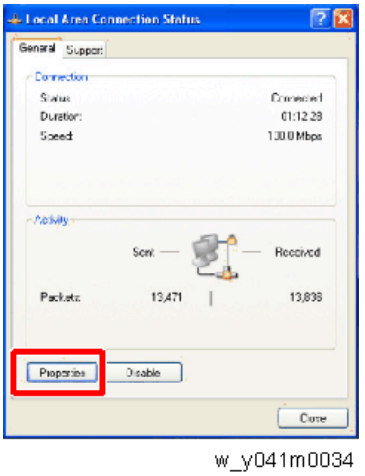
PC Network Setting

1. **Double click "Local area connection", then choose "Properties".**



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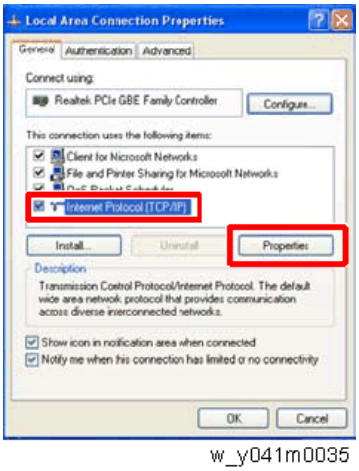
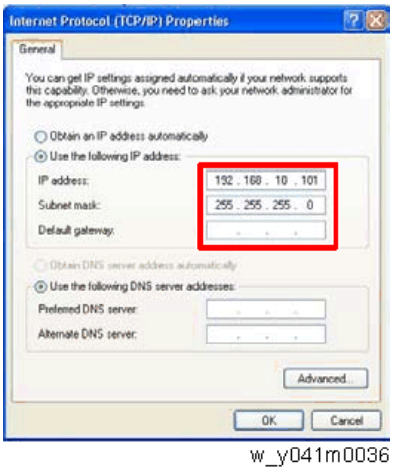
2. **Select "Internet protocol (TCP/IP)", and then click "Properties".**



w_y041m0035

3. **Modify the IP address to 192.168.0.101, and modify the subnet mask to 255.255.255.0.**



w_y041m0036

The subnet mask of the PC must be the same as the projector. The HOST ID or IP address (192.168.0.XXX) of the PC must be different from the projector IP address written down earlier.

4. **Click "OK".**
5. **Click "Close" to quit the setting screen.**

Proxy Setting

This section uses "Internet Explorer" as an example.

1. **Execute "Internet Explorer", and then choose "Tools -> Internet Options".**

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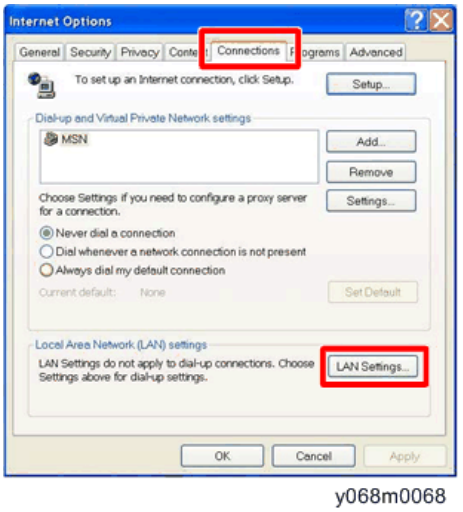
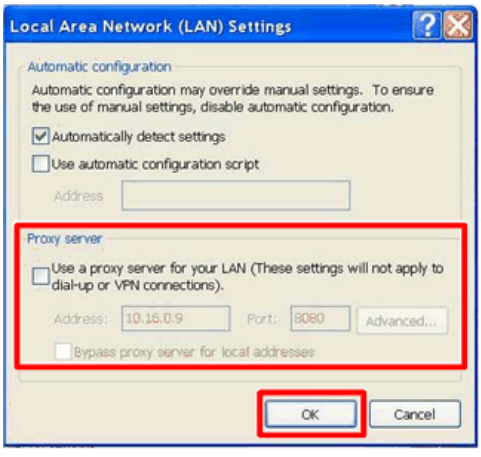
2. **Select "Connections ", and then click "LAN Settings...".**



y068m0068

3. Cancel selection of the proxy server as shown below, and then click "OK".



y068m0069

6. Firmware Update

DDP442x FW Update

DDP442x is the main firmware for the projector.

Equipment Needed

Software

1. Firmware (FW) update file
2. DDP442X Firmware Downloader.

Hardware

1. Projector
2. Power cord
3. USB cable (A to B)
4. PC

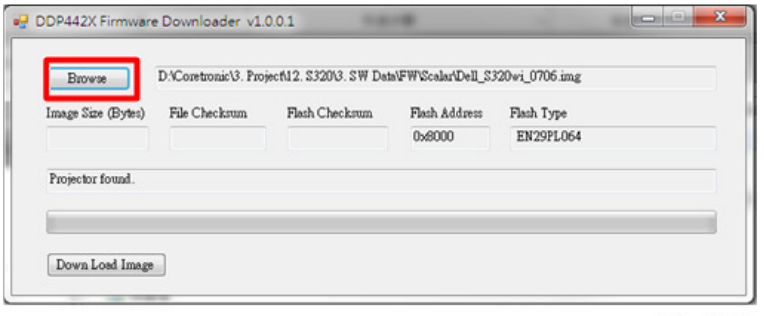
Firmware Update Procedure

Preparation

1. **Plug in AC power cord.**
2. **Press and hold "Power" key on the keypad.**
3. **Press "Enter" key on the remote controller until all LEDs bright.**
4. **Connect the projector with PC by USB cable.**

Downloading DDP442X Firmware

1. **Download and unzip "DDP442X Firmware Downloader".**
2. **Execute "DDP442X Firmware Downloader".**
3. **Click "Browse" to select image file for DDP442x.**



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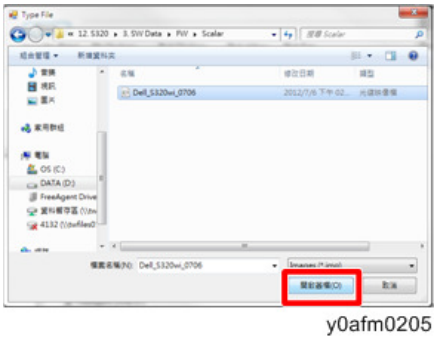
4. **Select the image file and click "Open".**
   - For WUL5670/LU5000: WUXGA
   - For: WXL5670/LU5000: WXGA

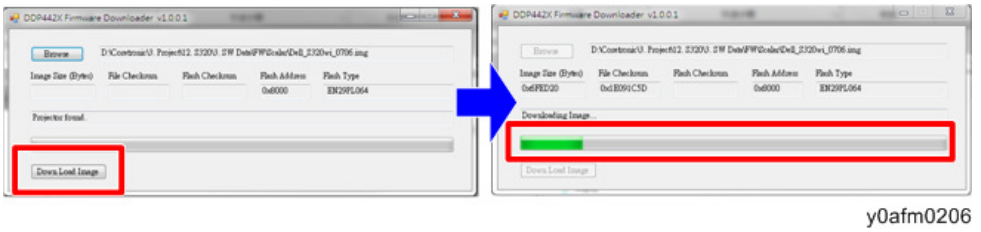


y0afm0205

5. **Click "Down Load Image" to start download.**

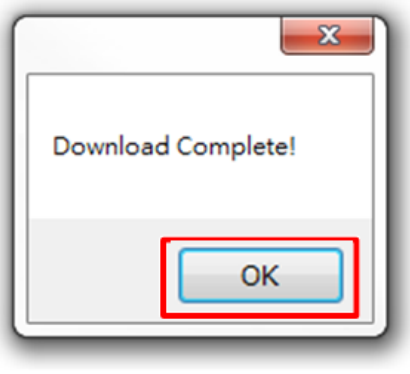
   Download starts and progress bar appears on the screen.

   When download is completed, "Download Complete!" appears on the screen.



y0afm0206

6. Click "OK" to finish the download procedure.



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MCU FW Update

Equipment Needed

Software

1. Firmware (FW) update file
2. PIC_NXP_Downloader.

Hardware

1. Projector
2. Power cord
3. Female to female RS232 cable (straight, 9pin - 9pin)
4. PC

Firmware Update Procedure

Preparation

1. **Connect the projector to PC with RS-232C cable (straight cable).**

2. **Plug in AC power cord while holding down "Power" key on the keypad.**

   The projector will enter into MCU FW update mode.

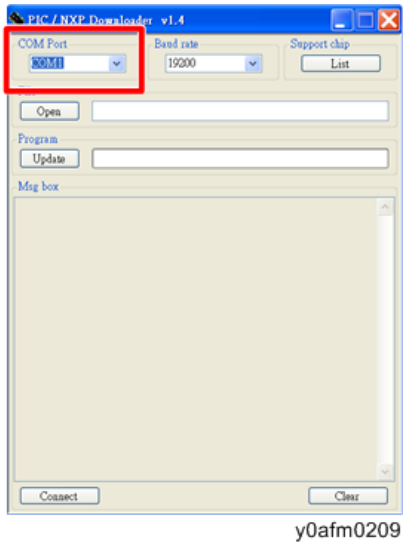
   (ON(B)/STANDBY(R) LED: Blue + Amber, LAMP LED: Amber flashing)

Updating MCU Firmware

1. **Download "PIC_NXP_Downloader" to the PC and unzip it.**
2. **Execute "PIC_NXP_Downloader.exe".**

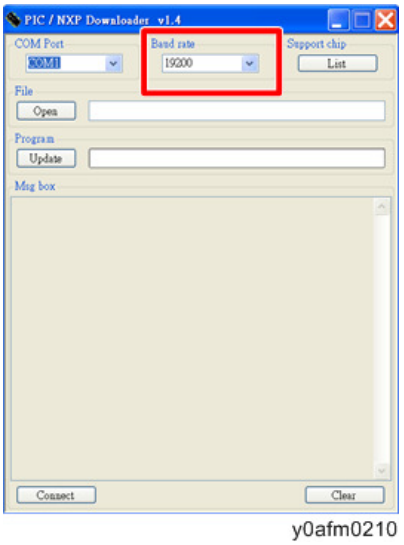
y0afm0208

3. **Select "COM Port" which you connect the RS-232C cable.**



y0afm0209

4. **Set "Baud rate" to "19200".**



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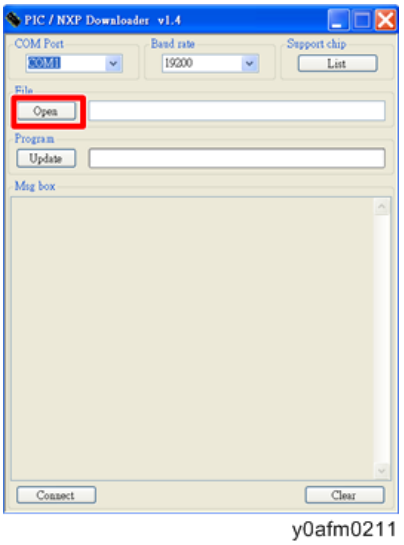
5. **Click "Open" and select the FW file to update.**

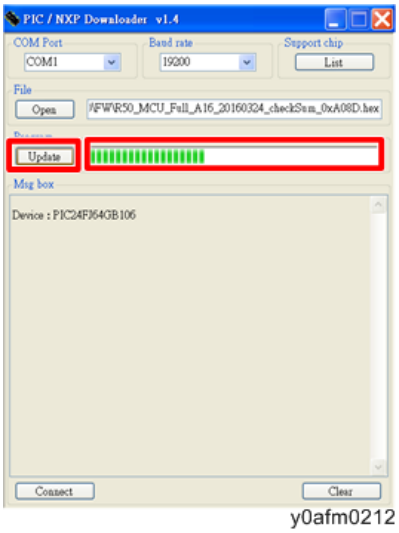


y0afm0211

6. **Click "Update".**

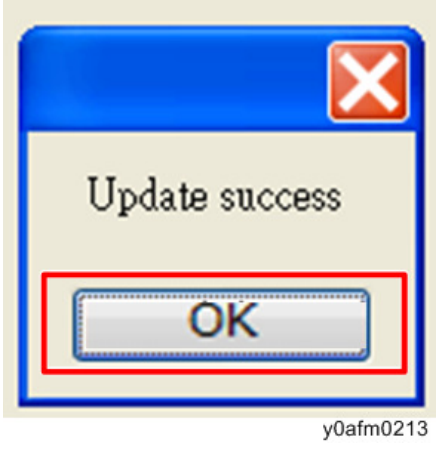
   Update starts and progress bar appears on the window.

   When update is completed, "upload success" appears on the screen.



y0afm0212

7. Click "OK" to finish the update procedure.



y0afm0213

MST9813 FW Update

Equipment Needed

Software

1. Firmware (FW) update file

Hardware

1. Projector
2. Power cord
3. USB storage device
4. PC

Firmware Update Procedure

Preparation

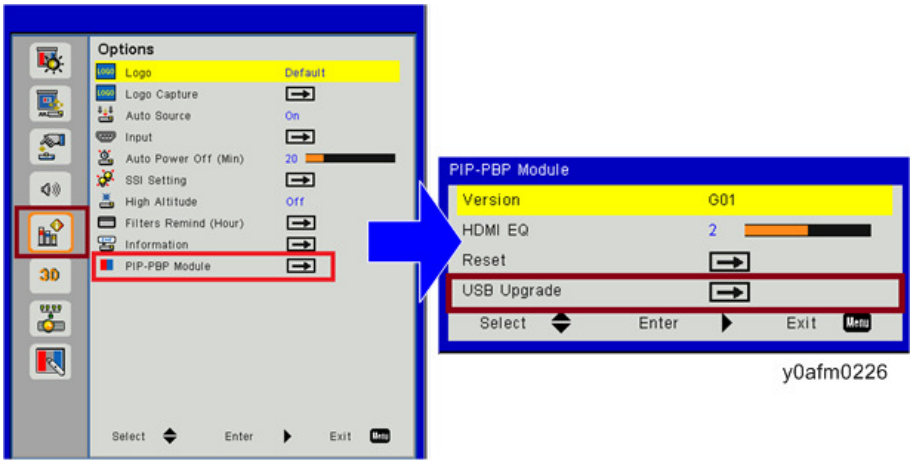
1. **Unzip the "MST9813_G54_0x3357.zip".**
2. **Copy the unzipped file to the ROOT directory of USB storage device, and change the file name to "merge.bin".**
3. **Plug in AC power cord.**

Updating MST9813 Firmware

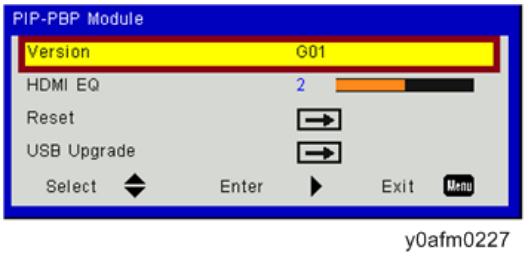
1. **Plug the USB storage device into the USB 5V/1.5A terminal of the projector.**

2. **Turn ON the projector, then press the "MENU" key to access the OSD menu.**
3. **Select "Options" -> "PIP-PBP Module" -> "USB Upgrade".**

   The projector shuts down and starts rebooting. Wait about 30 seconds until the reboot is completed.



4. **After rebooting the projector, press the "MENU" key to access the OSD menu.**
5. **Select "Options" -> "PIP-PBP Module" -> "USB Upgrade" -> "Version" to check if the version up of FW is correctly finished.**



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