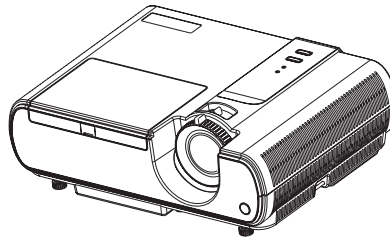


DLP™ PROJECTOR



MODEL
**XD221U/
XD221U -G**

(Pb) Solder, (Pb) Joints, (Pb) PCA

This product uses lead-free solder on the circuit boards. For repairing circuit boards, see "Precautions for resoldering" in this Service Manual.

These models are RoHS-compliant. Provide servicing referring to "NOTES FOR SERVICING RoHS-COMPLIANT PRODUCTS" described in the service manual.

CAUTION

Before servicing this chassis, it is important that the service person reads the "PRODUCT SAFETY NOTICE" in this service manual.

SPECIFICATIONS

- **Rated power supply** : 100-240 V AC, 50/60 Hz
- **Rated input** : 2.7A
- **Display technology**: 0.55 inch Single chip
- Digital Micromirror Device (DMD)
- **Pixels** : 1,024x768= 786,432 pixels
- **Colors** : 16,770,000 colors
- **Projection lens** : F2.5-2.7, f=19.9-23.9 mm
- **Light source lamp** : 180 W
- **Picture Size** : 40-300 inch, aspect ratio rate 4:3
- **PC compatibility** : 640 x 400 (Expand) - 1,024 x 768 (Real) - 1,280 x 1,024 (Compress)
Sync on Green available
- **Video compatibility**: NTSC / NTSC 4.43 / PAL (including PAL-M, N) / SECAM / PAL-60 / Component Video (DVD/HDTV) (480i/p, 576i/p, 720p, 1080i)
- **Speaker** : 10W mono round type
- **S-Video input** : Luminance signal: 1.0 Vp-p 75Ω (negative sync)
Chroma signal: 0.286 Vp-p 75Ω (burst signal)
- **Video input** : 1.0 Vp-P 75Ω(negative sync)
- **Audio input** : 350 mVrms, 10 kΩ or more
- **Analog RGB input** : RGB: 0.7 Vp-p 75Ω(negative sync)
YPbPr/YCbCr: Y-> 1.0 Vp-p (negative sync)
PbPr/CbCr-> 0.7 Vp-p
HD/CS: TTL level(positive or negative)
VD: TTL level(positive or negative)
- **Control connector** : Serial terminal(RS-232C) (Mini-Din)
- **Outside dimensions** : 302 x 104 x 236mm (width x height x depth)
- **Weight** : Approx. 3.2kg
- **Temperature, humidity** : +41°F (+5°C) - +95°F (+35°C), 30-90% (performance guaranteed)

- Weight and dimensions shown are approximate.
- Design and specifications are subject to change without notice.

NOTES FOR SERVICING RoHS-COMPLIANT PRODUCTS

Follow the notes and instructions below when servicing RoHS-compliant products.

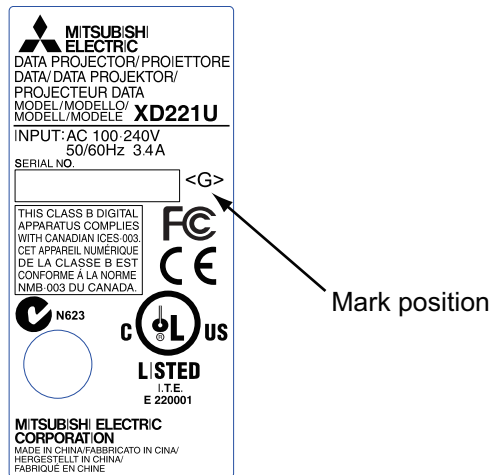
1. For RoHS-compliant products, be sure to use RoHS-compliant service parts.
2. Check the presence of <G> marking on the rating plate to distinguish RoHS-compliant product from non-RoHS-compliant product.

<G> marking

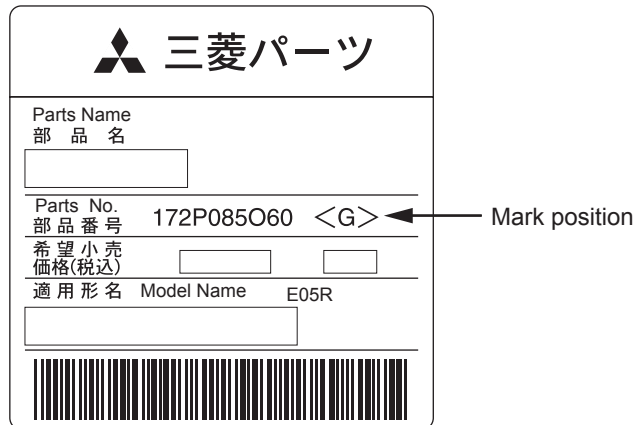
With <G> marking: RoHS-compliant product

Without <G> marking: Non-RoHS-compliant product

<Sample>



3. Labels of RoHS-compliant service parts bear <G> marking for identification purpose.



<Sample>

4. Don't use non-RoHS-compliant parts with RoHS-compliant products.
5. Service parts for RoHS-compliant products are listed in the parts catalog contained in the service manual.

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TRADEMARK, REGISTERED TRADEMARK

DLP™ (Digital Light Processing) and DMD (Digital Micromirror Device) are trademarks of Texas Instruments Incorporated. Other brand or product names are trademarks or registered trademarks of their respective holders.

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in the projector have special safety related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, etc. Replacement parts which have these special safety characteristics are identified in this service manual. Electrical components having such features are identified by shading on the schematic diagram and the parts list of this service manual and by the supplementary sheet for this chassis to be issued subsequently.

SAFETY PRECAUTIONS

North america

NOTICE: Observe all cautions and safety related notes located inside the cabinet and on the chassis.

Warning

1. Operation of this projector outside the cabinet or with the cover removed presents a shock hazard from the projector power supplies.
2. When a short-circuit has occurred, replace those components that indicate evidence of overheating.
3. Grounding circuit continuity is vital for safe operation of equipment. Do not remove ground connection while the power cord is still connected to the supply. Disconnect supply before servicing.

Leakage current check

Before returning the projector to the customer, it is recommended that leakage current be measured according to the following methods.

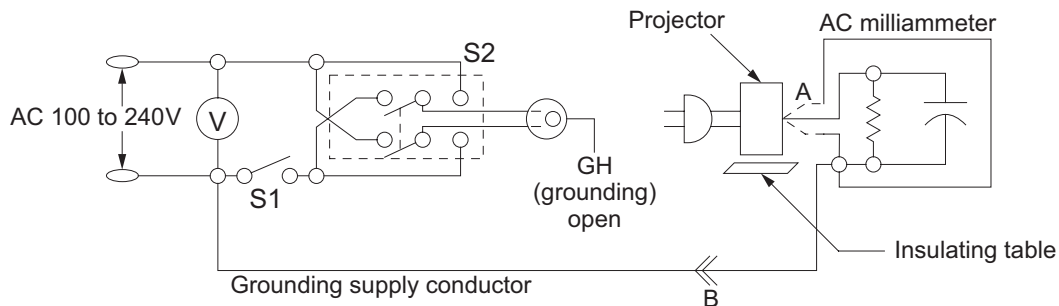
1. Cold check

With the AC plug removed from the AC 100 to 240 V, place a jumper across the two AC plug prongs. Turn the projector AC switch on. Using an ohm-meter, connect one lead to the AC plug and touch the other lead to each exposed metal part (metal cabinet, screwheads, metal overlays, etc.), particularly any exposed metal part having a return path to the chassis. Exposed metal parts having a return path to the chassis should have a minimum resistance reading of 1 megohm. Any resistance below this value indicates an abnormality which requires corrective action. Exposed metal parts not having a return path to the chassis will indicate an open circuit.

2. Hot check

Use the circuit in figure to perform this test.

- (1) With switch S1 open, connect the projector to the measuring circuit. Immediately after connection, measure the leakage current using both positions of switch S2, and with the switching devices in the projector in all of their operating positions.
- (2) Switch S1 is then closed, energizing the projector. Immediately after closing the switch, measure the leakage current using both positions of switch S2, and with the switching devices in the projector in all of their operating positions. Current measurements of items (1) and (2) are to be repeated after the projector has reached thermal stabilization. The leakage current must not be more than 0.5 milliampere.



Figure

Europe, other than USA

NOTICE: Observe all cautions and safety related notes located inside the cabinet and on the chassis.

Warning

1. An isolation transformer should be used between the projector and the AC supply point before any test/service is performed on a LIVE chassis projector.
2. Operation of this projector outside the cabinet or with the cover removed, involves a shock hazard from the projector power supplies. Work on the projector should not be attempted by anyone who is not thoroughly familiar with precautions necessary when working on high voltage equipment.
3. When service is required, observe the original lead dressing. Extra precaution should be given to assure correct lead dressing in the high voltage area. Where a short-circuit has occurred, replace those components that indicate evidence of overheating.

Leakage current cold check

Before returning the projector to the customer, it is recommended that leakage current be measured according to the following methods.

With the AC plug removed from the AC source, place a jumper across the two AC plug prongs. Turn the projector AC switch on. Using an 500 V D.C. Insulation Tester, connect one lead to the jumpered AC plug and touch the other lead to each exposed metal part (screwheads, etc.), particularly any exposed metal part having a return path to the chassis. Exposed metal parts having a return path to the chassis should have a minimum resistance reading of 4 megohm. Any resistance below this value indicates an abnormality which requires corrective action.

PRECAUTIONS FOR RESOLDERING

Lead-free solder is handled in a different way from eutectic solder. See below for details.

How to distinguish circuit boards using lead-free solder from those using eutectic solder

Circuit boards using lead-free solder

A mark of **(Pb) Solder**, **(Pb) Joints**, **(Pb) PCA** or **LFS** (for limited marking space) is printed near the board assembly number on the component side.

Circuit boards using eutectic solder

Circuit boards using eutectic solder are divided into two groups.

- Boards having no mark of **(Pb) Solder**, **(Pb) Joints**, **(Pb) PCA** or **LFS** (for limited marking space) near the board assembly number.
- Boards having a mark of **(Pb) Solder**, **(Pb) Joints**, **(Pb) PCA** or **LFS** (for limited marking space) that is painted out by a felt-pen near the board assembly number.
- * Only when there is a limited marking space on the board, **(Pb) Solder** may be indicated as **(Pb) S**, **(Pb) Joints** as **(Pb) J**, and **(Pb) PCA** as **(Pb) P**.
- * Circuit boards using lead-free solder and those using eutectic solder may be used together in the same product.

Instructions for resoldering

- For circuit boards using lead-free solder, use lead-free solder.
- For circuit boards using eutectic solder, use eutectic solder.
- Separate the soldering iron for lead-free solder from that for eutectic solder completely for use.
(It is prohibited to use a same soldering iron for lead-free solder and eutectic solder.)
- For lead-free solder, it is advisable to use a soldering iron of at least 40 W because lead-free solder has a melting point approx. 35°C higher than that of eutectic solder as conventionally used. For wire solder, use M705ESC made by Senju Metal Industry Co., Ltd.
- To remove solder, you can use desoldering wires for eutectic solder as conventionally used.

EXPOSED VIEW

DLP ASSY

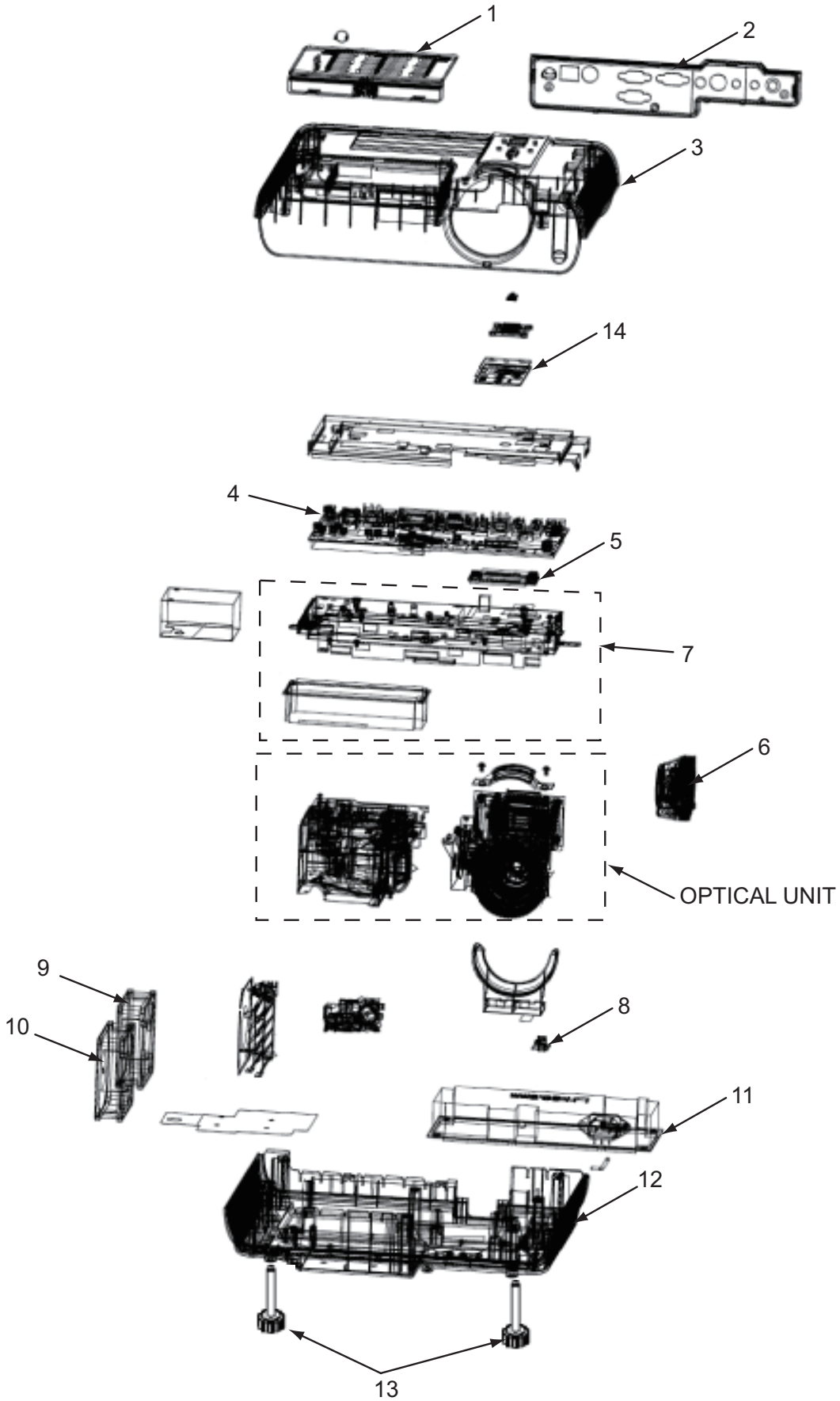


Fig.1-1

Parts list : See page 2 of PARTS LIST

Item No.	Part name
1	LAMP COVER
2	IO COVER
3	TOP COVER
4	MAIN PCB ASSY
5	AUDIO PCB ASSY
6	SPEAKER
7	LAMP POWER UNIT
8	IR(F) PCB ASSY
9	FAN MOTOR (POWER)
10	FAN MOTOR (EXHAUST)
11	POWER PCB ASSY
12	BOTTOM COVER
13	ADJUSTER
14	KEY PCB ASSY

Table 1-1

Optical unit

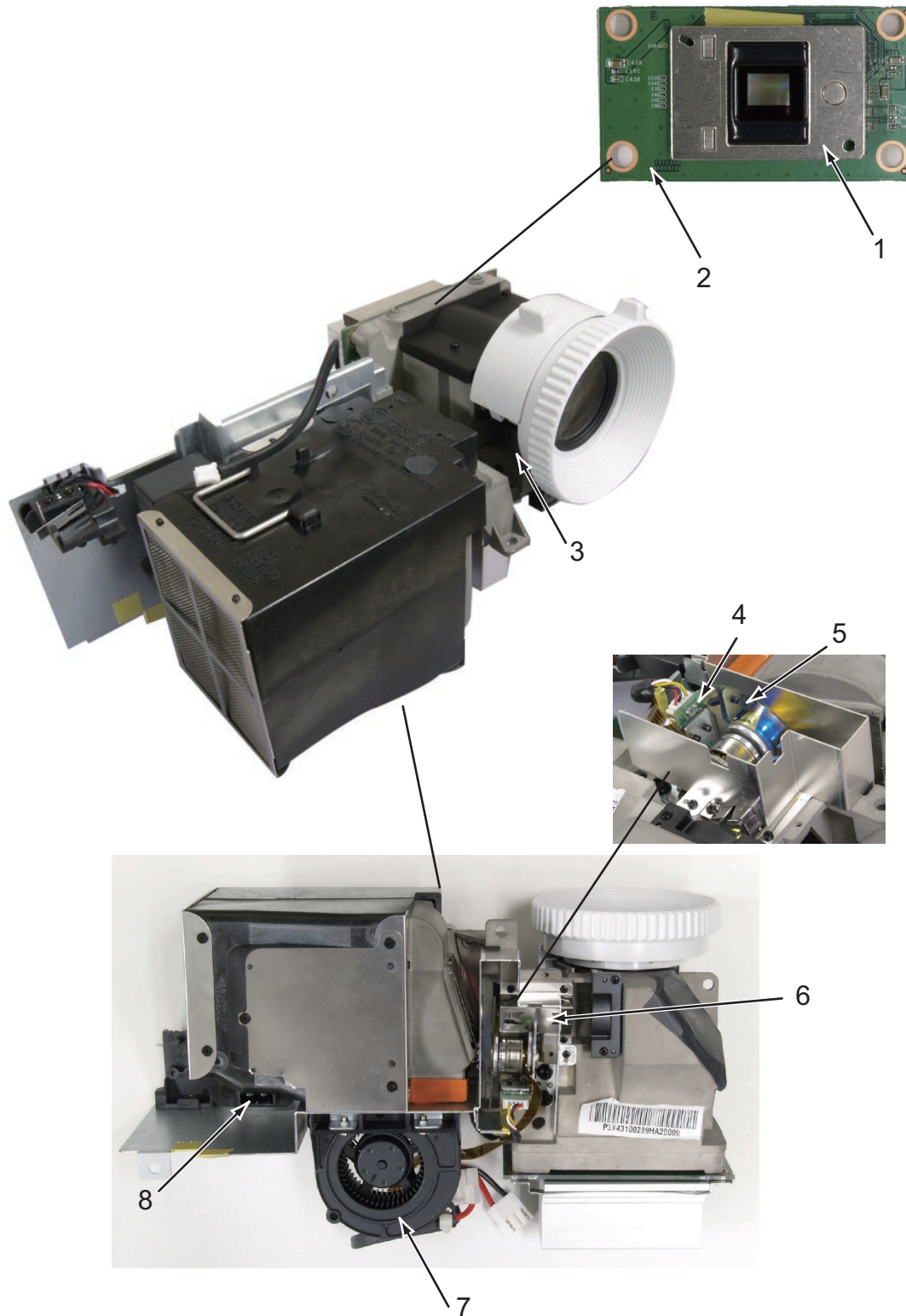


Fig.1-2

Parts list : See page 3 of PARTS LIST

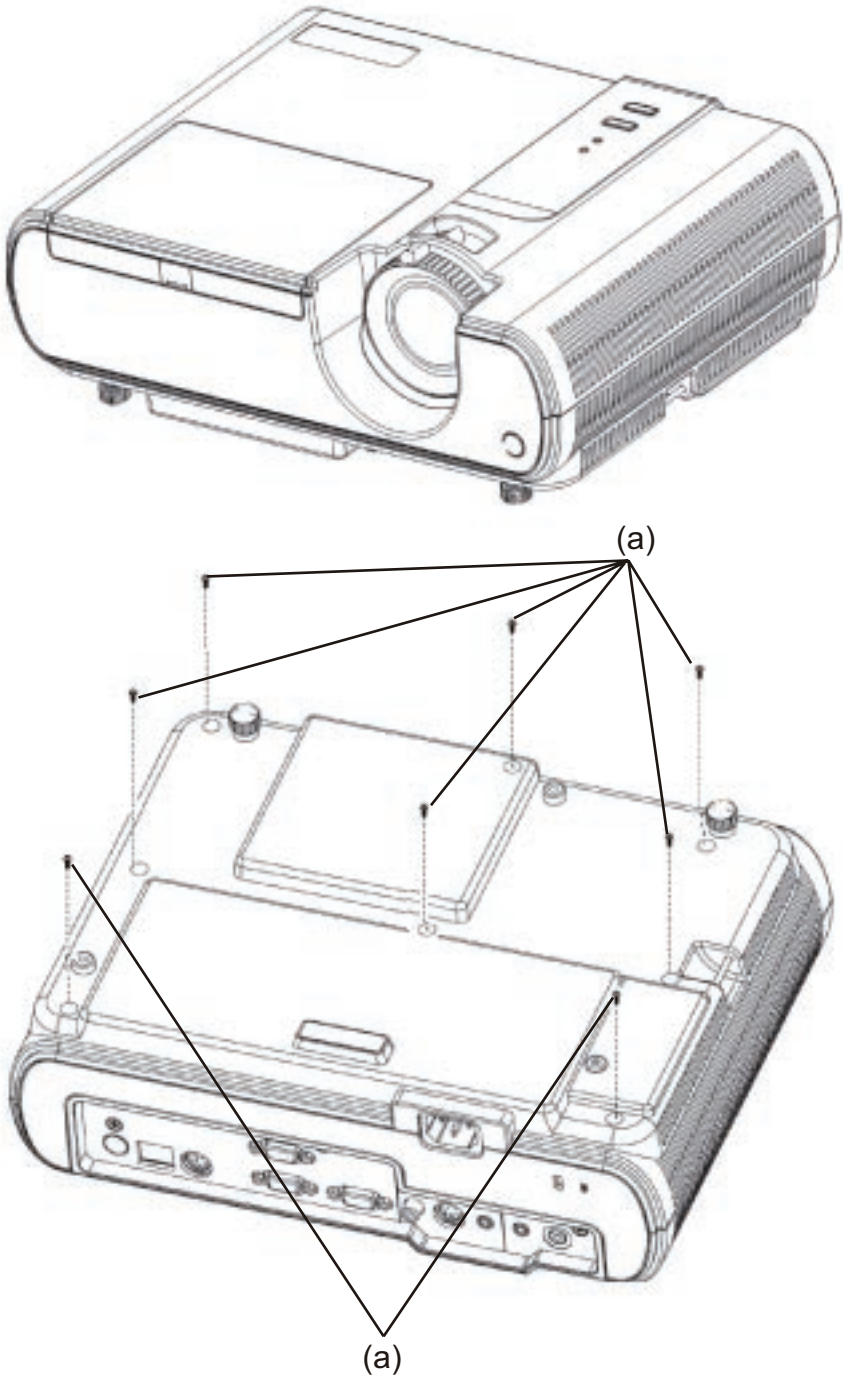
Item No.	Part name
1	DMD-CHIP
2	DMD PCB ASSY
3	LENS UNIT
4	COLOR WHEEL PCB ASSY
5	COLOR WHEEL
6	LIGHT PIPE
7	FAN MOTOR (LAMP)
8	LAMP CONNECTOR

Table 1-2

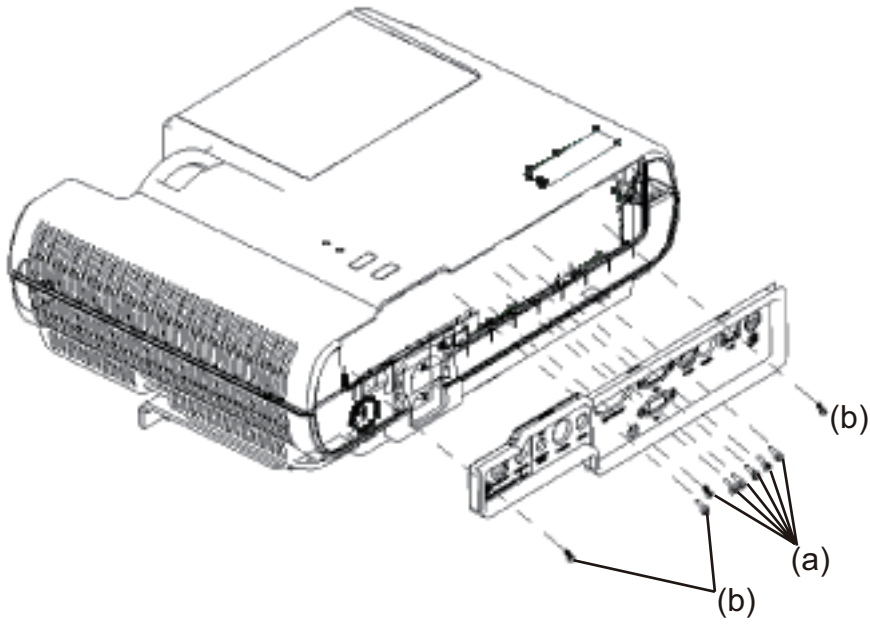
DISASSEMBLY

1

Unscrew the 8 screws (a) from the bottom cover.

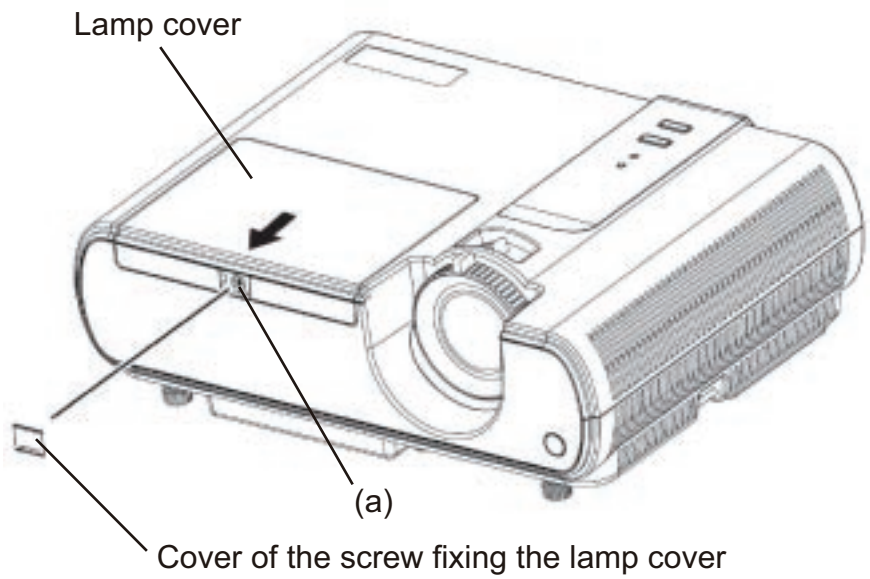


2



Unscrew the 6 screws (a) and unscrew the 3 screws (b), then take off the IO COVER.

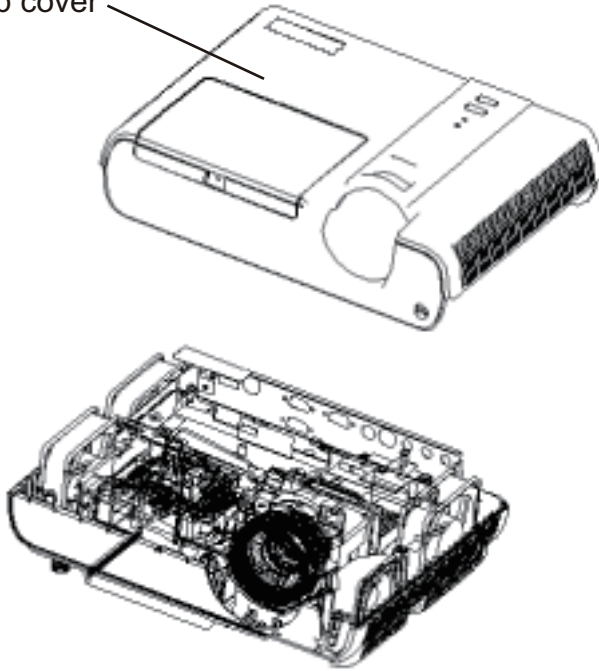
3



Remove the cover of the screw fixing the lamp cover with a fingernail. Remove the screw (a) and slide the lamp cover for removal.

4

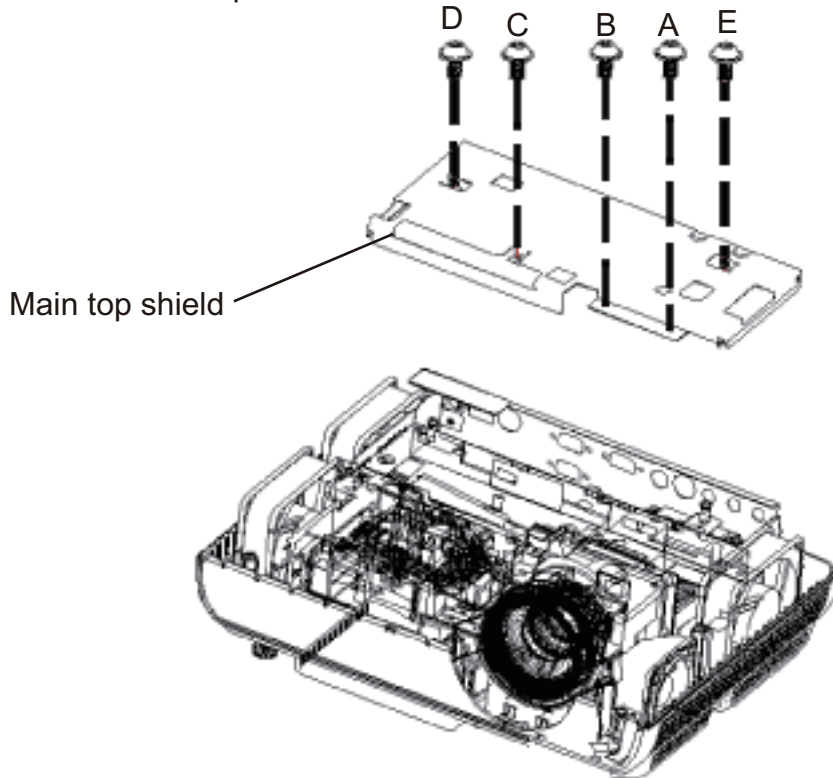
Top cover



Make sure zoom ring and focus ring back inside. Then take the top cover off gently.
Note: Please disconnect the FFC cable connected with MAIN PCB ASSY first before take the top cover off.

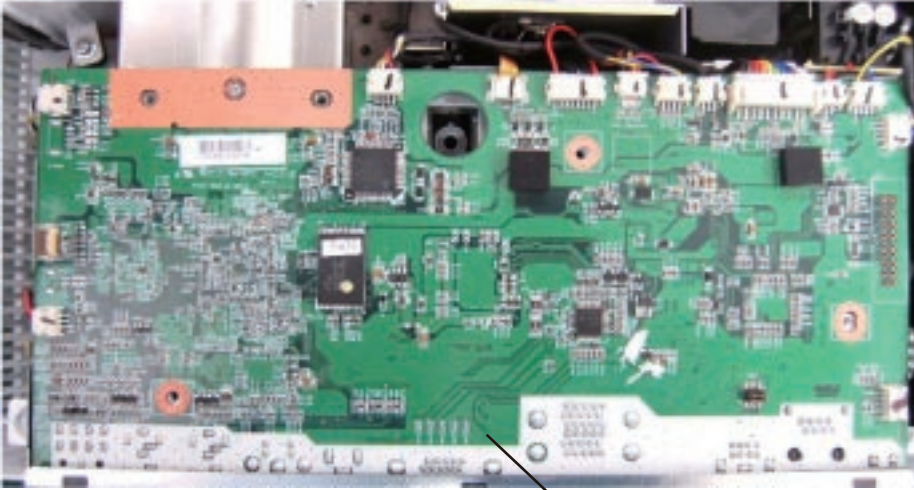
5

Unscrew sequence : E-D-C-B-A



Unscrew the 5 screws and then remove main top shield.

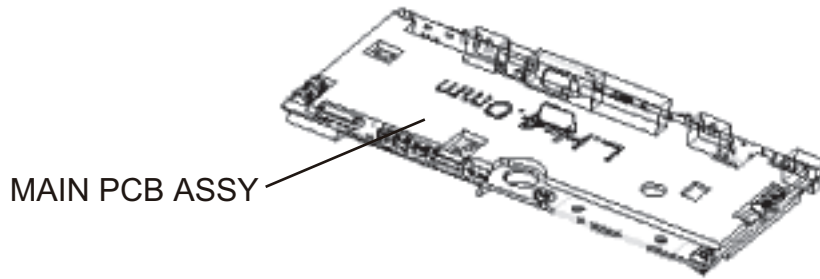
Note



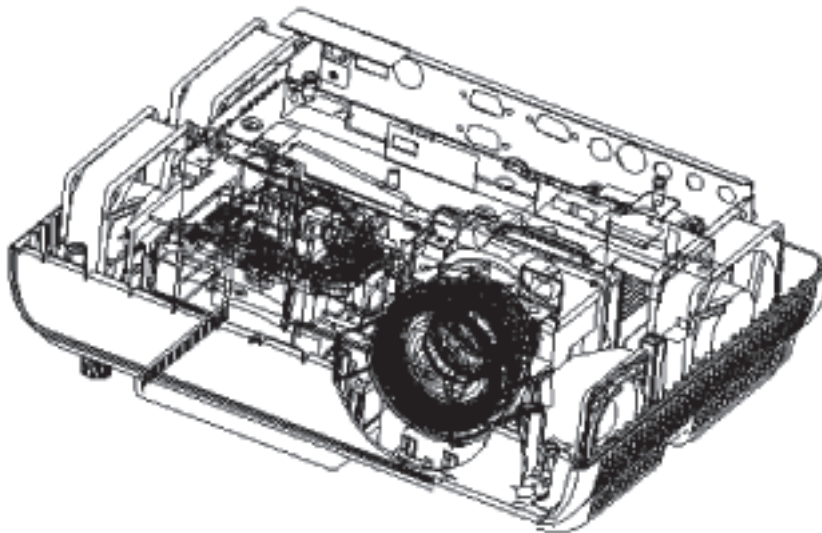
MAIN PCB ASSY

1. Show you what the connector should be.
2. Disconnect all lines gently.

6

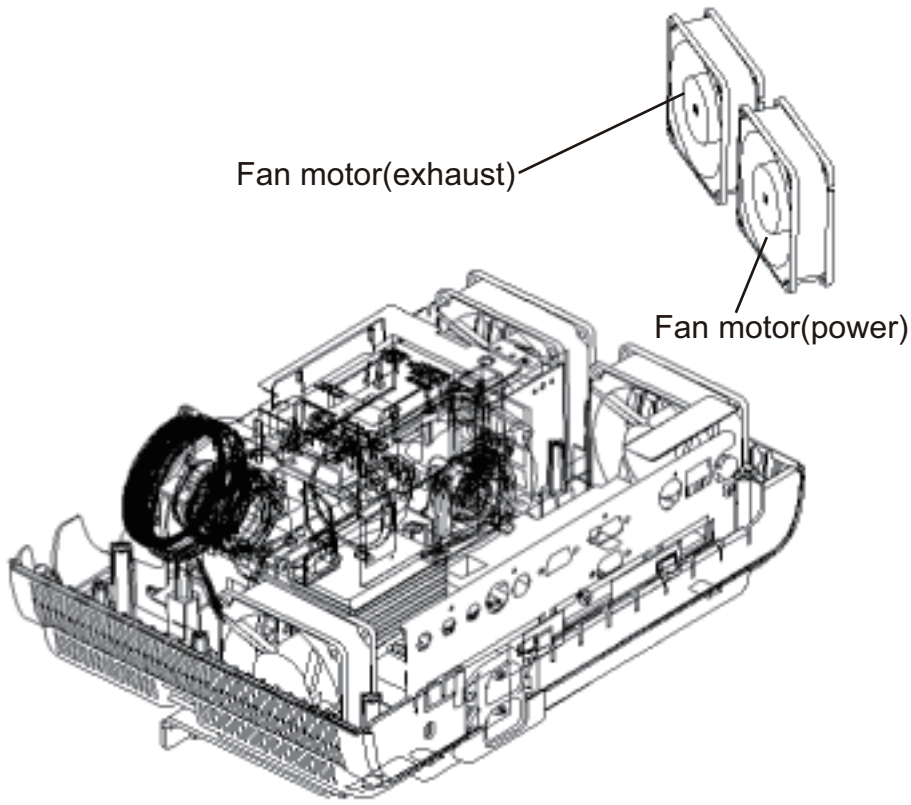


MAIN PCB ASSY



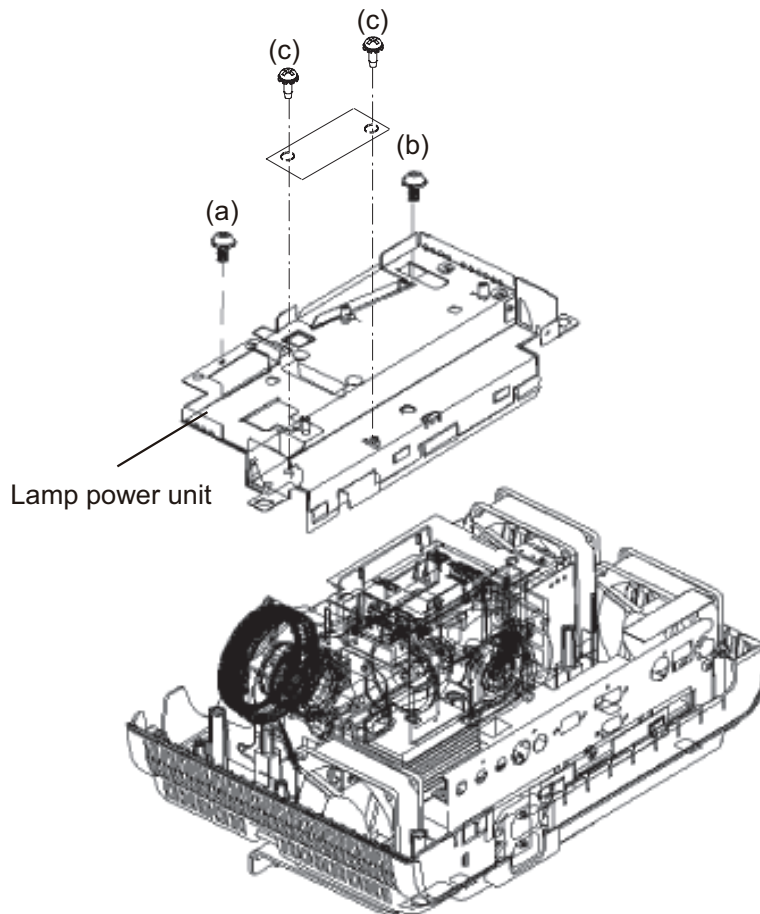
Remove the MAIN PCB ASSY.

7



Remove the two fan motor.

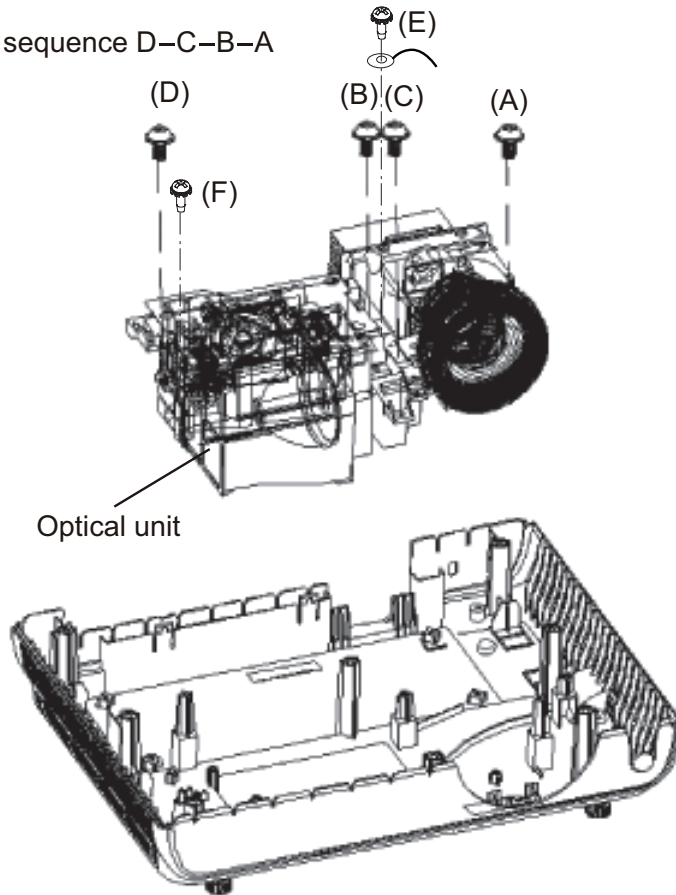
8



Unscrew 1 screw (a) and 1 screw(b).
Then take out the lamp power unit.
Unscrew 2 screw (c).
Then take out the AUDIO PCB ASSY.

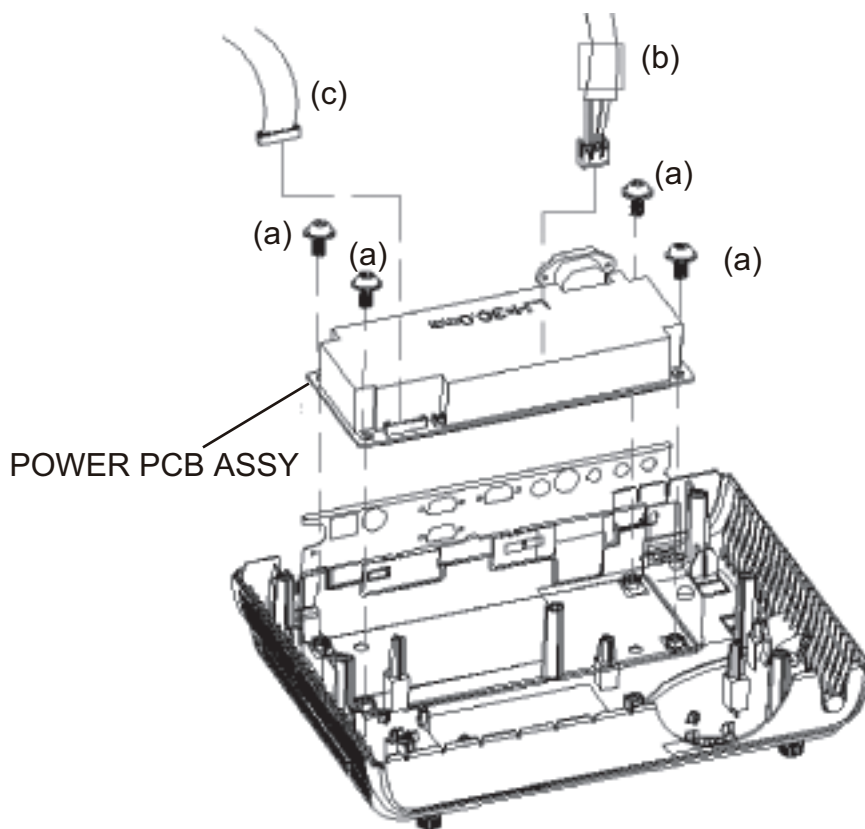
9

Unscrew sequence D-C-B-A



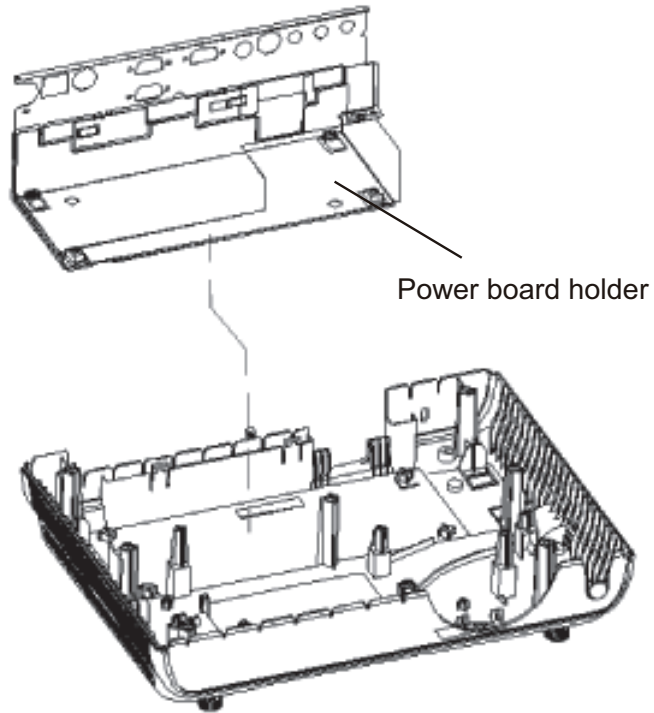
Unscrew the 6 screws.
Then take out the optical
unit gently.

10



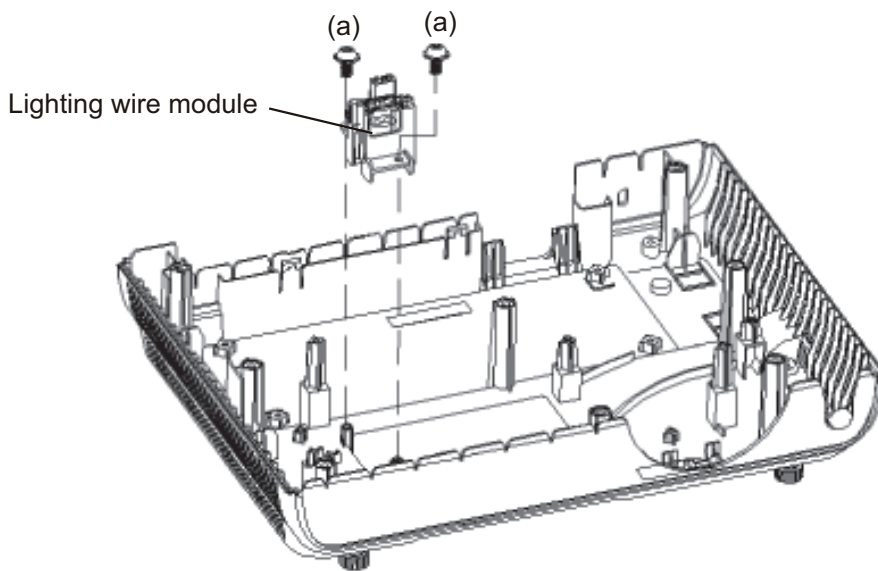
Unscrew the 4 screws(a),
disconnect (b) and (c)
then take off POWER PCB
ASSY.

11



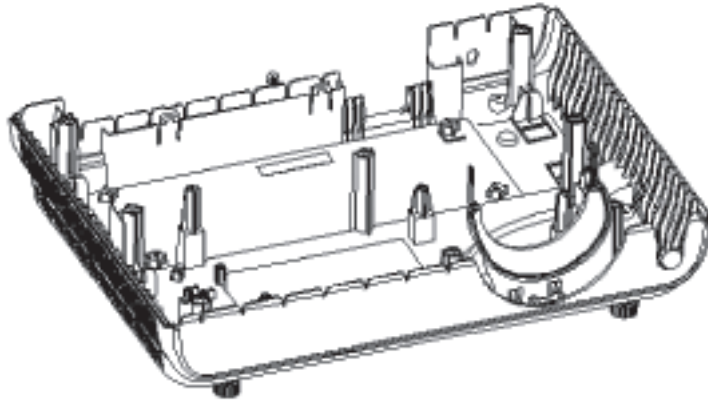
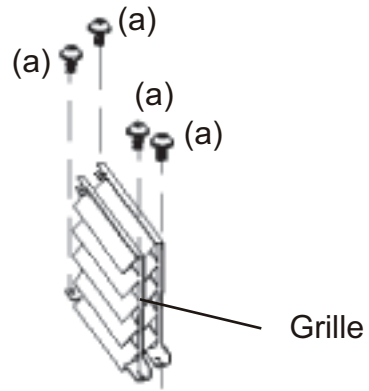
Take off the power board holder.

12



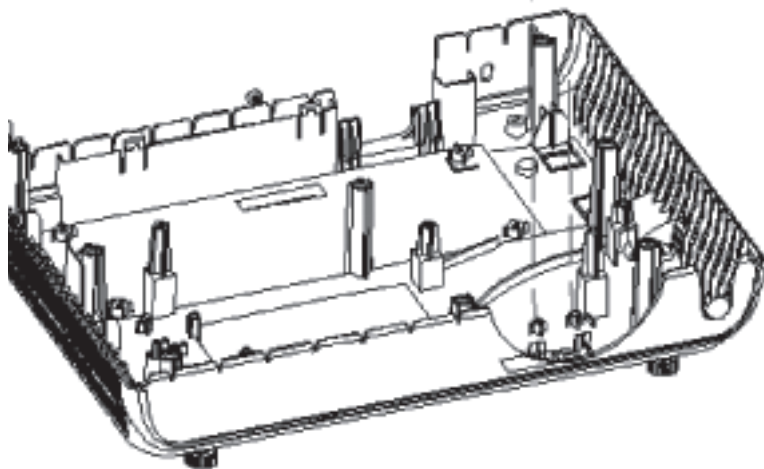
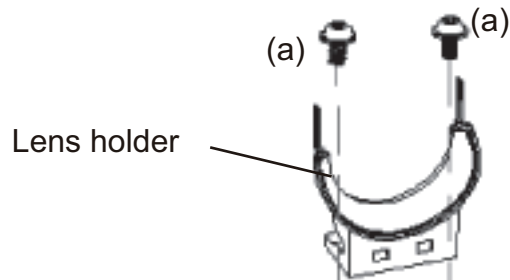
Unscrew 2 screw (a).
Then take off the lighting wire module.

13



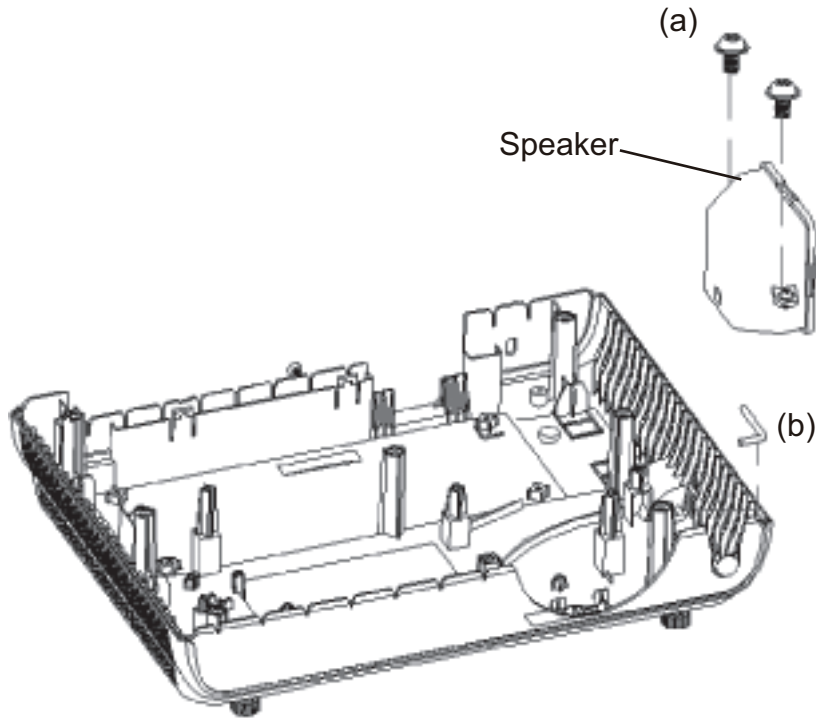
Unscrew the 4 screws (a) take off grille.

14



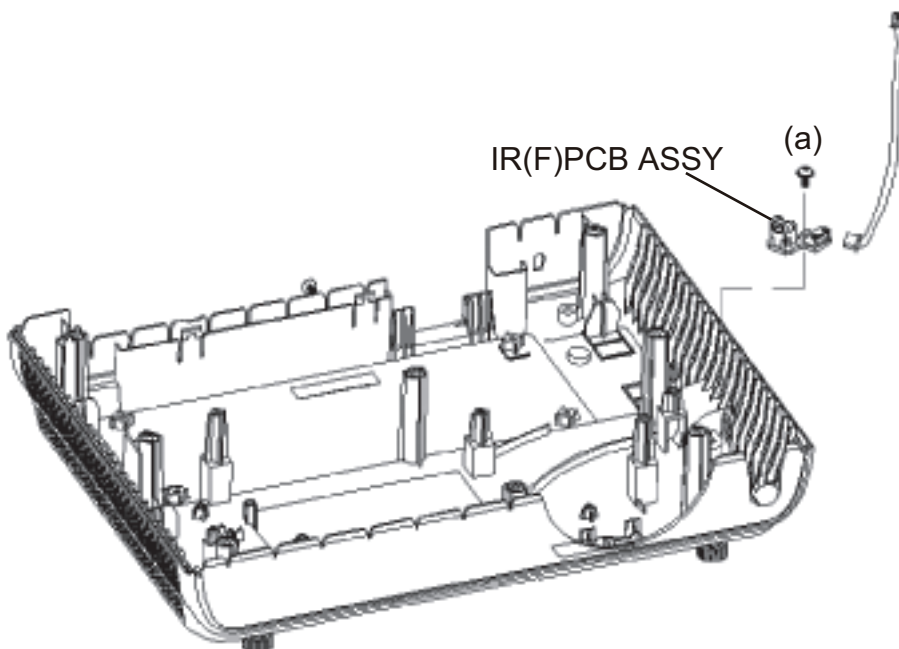
Unscrew the 2 screws (a) take off lens holder.

15



Unscrew the 2 screws (a) take off speaker module and (b).

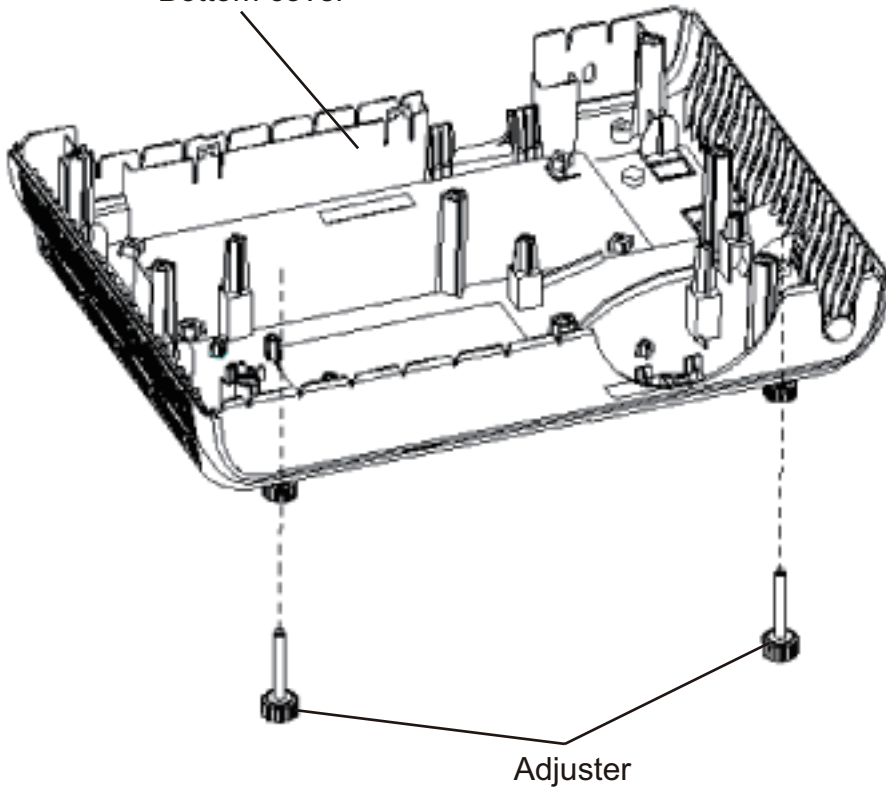
16



Unscrew 1 screw (a) and take off the IR(F)PCB ASSY.

17

Bottom cover



Remove adjuster from the bottom cover.

PACKING

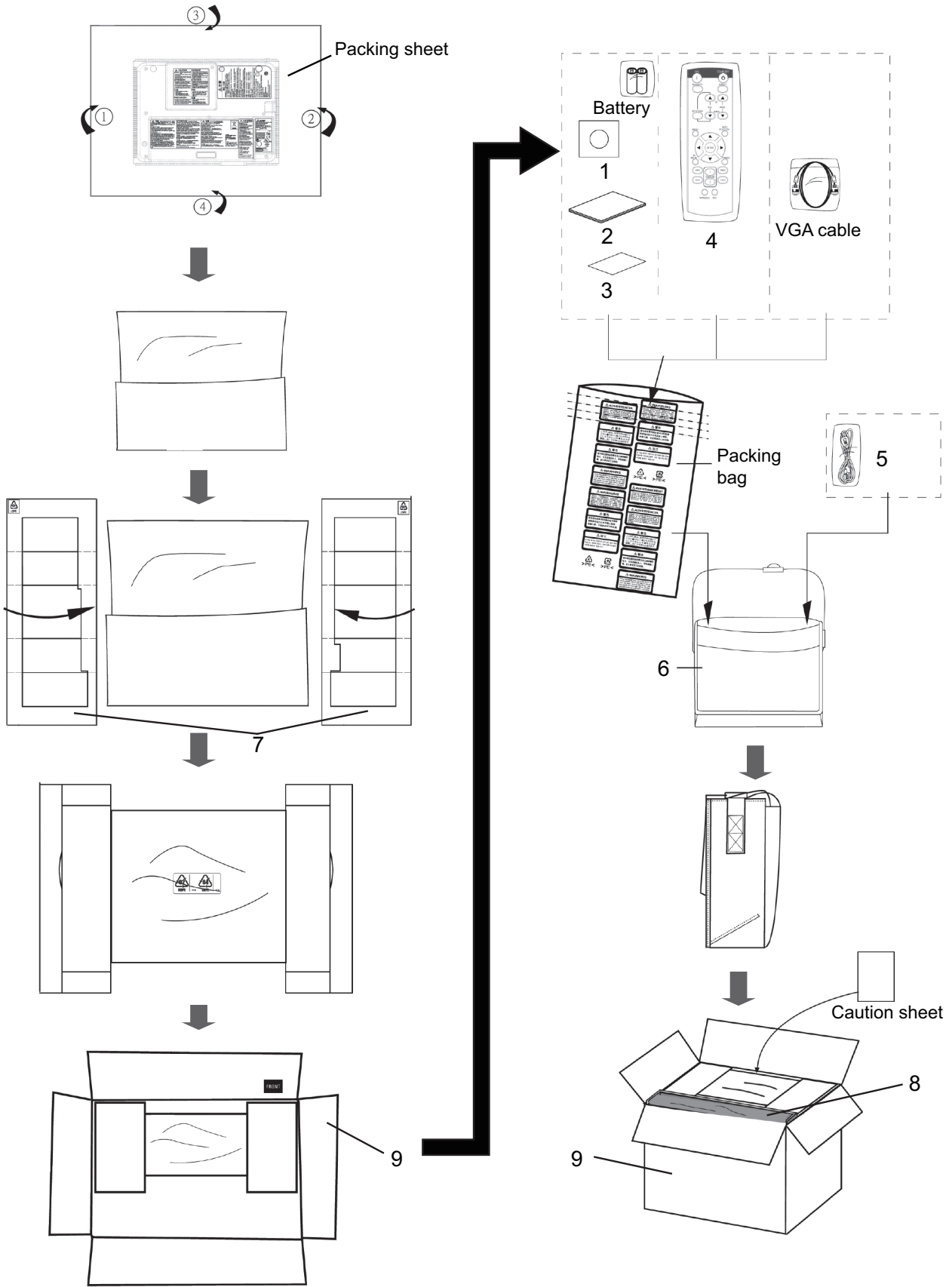


Fig.1-3

Parts list : See page 4 of PARTS LIST

Item No.	Part name
1	CD ROM IB
2	SAFETY MANUAL
3	CAUTION SHEET
4	REMOTE CONTROL
5	AC POWER CORD
6	SOFT CASE
7	PACKING CUSHION
8	PACKING CUSHION (PAD)
9	PACKING CASE

Table 1-3

REPLACING THE LAMP

This projector is equipped with a lamp to project images. This lamp is a consumable. It may burn out or its brightness may decrease during use. In such cases, replace the lamp with a new one as soon as possible. Be sure to replace the lamp with a new lamp separately sold that is exclusive to this projector. Contact your dealer for purchase of the lamp.

Replace the spare lamp using the lamp attachment unit that is equipped with the spare lamp (separately sold) designed specifically for this projector.

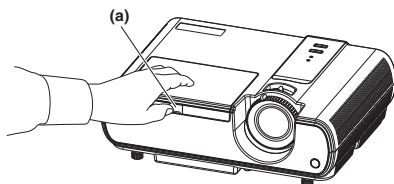
Spare lamp for XD221U/XD221U-G: VLT-XD221LP

Caution:

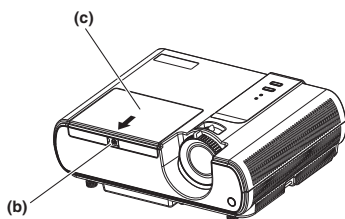
- Do not remove the lamp immediately after using the projector. You may get burned because the lamp is very hot after use.
- Before replacing the lamp, press the POWER button to turn off the lamp and wait for two minutes for lamp to cool down. Unplug the power cord from wall outlet and wait one hour for the lamp to cool down completely.
- Do not remove the lamp except for replacement. Careless handling can cause injury or fire.
- Do not touch the lamp directly. It may break and cause injury or burn.
- Be sure not to drop the lamp lid screw into the projector. Also be sure not to put metal or any flammable objects inside because it may cause fire or electric shock. If any objects should fall inside, unplug and contact your dealer.
- Install the lamp securely to prevent failure and fire.
- If the lamp should break, small glass fragments may fall out through the grilles and some may remain inside of the projector or the lamp box. When taking the lamp box out, be sure to turn over the projector and hold the handle of the lamp box to avoid injury due to the glass fragments.
- If the lamp should break, never shake the lamp box or hold it in front of your face after removing it. The glass fragments may fall out and cause injury to your eyes.
- Be sure to use the lamp dedicated to this projector, VLT-XD221LP for XD221U/XD221U-G. Use of other lamps may cause a failure of the projector.
- Do not use any other tools for replacing the spare lamp, and be sure to use the lamp attachment unit that is equipped with the spare lamp (separately sold) designed specifically for this projector. Use of other tools may cause a failure of the projector.

Make sure that the projector is securely held in place.

1. Remove the cover (a) of the screw fixing the lamp cover with a fingernail. If it is difficult to remove it with a fingernail, use a fine-tipped tool such as flathead screwdriver.



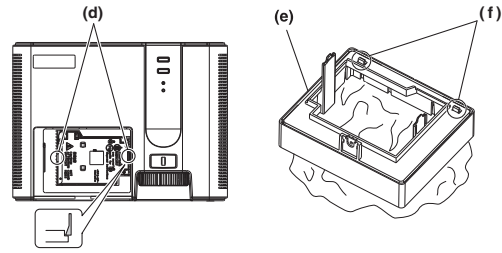
2. Remove the screw (b) and slide the lamp cover (c) for removal.



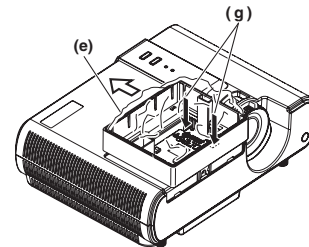
The lamp unit is fixed in position with two retaining claws (d) inside so the lamp attachment unit (e) designed specifically for this projector is required to replace the lamp.

Do not pull out the lamp forcibly. The lamp unit may be irretrievably damaged.

A new lamp unit can be installed without the lamp attachment unit.



3. Loosen the two screws (g) indicated as arrows (→) in figure, and mount the lamp attachment unit (e). Slide the lamp attachment unit in the direction indicated by a white arrow after the installation of it, and hook the claw (f) into the hole of the device to fix the lamp attachment unit. If not hooking the claw, the lamp attachment unit will be lifted without being fixed in the precise position.

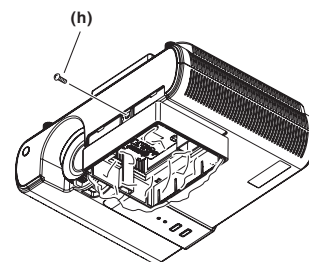


(Caution)

When replacing the lamp, do not remove the screws other than those in the above picture. If do, it might cause the failure of product.

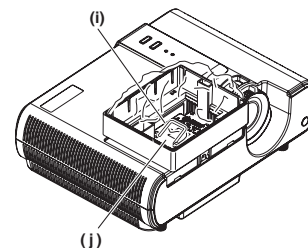
When the projector is mounted to the ceiling:

Secure the lamp attachment unit and the projector with the screw (h) that come with the lamp attachment unit. Otherwise, the lamp unit may fall from the inside and cause injuries.

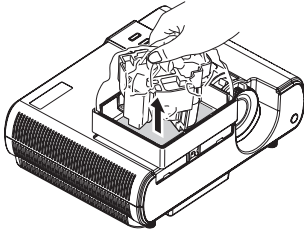


- Contact your dealer when replacing the lamp unit with the projector mounted to the ceiling.

4. Pull up the handle (i), and then pull out the lamp unit (j) by the handle.



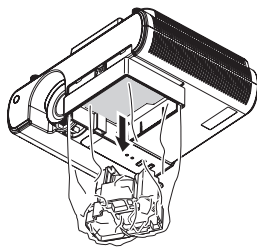
- Remove the lamp attachment unit.



- Pull the lamp unit out of the projector slowly. If it is pulled out quickly, the lamp may break, scattering glass fragments.
- Do not spill liquid on the removed lamp unit or do not place it near any flammable object or where children can reach to prevent injuries or fire.

When the projector is mounted to the ceiling:

Confirm that the lamp unit (j) is securely held inside the lamp disposable bag of the lamp attachment unit. And then loosen the screw (h) that come with the lamp attachment unit. Then remove the lamp attachment unit.



- Load a new lamp unit securely into the projector in the right orientation.
- Secure the lamp cover (c) with screws (b) back again, and mount the cover (a).
 - Make sure that the lamp cover is secured firmly. Otherwise, the POWER indicator flashes red and green, disallowing the projector to be powered on.

Reset of the lamp operation time

- Connect with the Power cord, and turn the power on.
- Display DETAIL MENU. (See page 16.)
- Select LAMP TIME RESET in INSTALLATION menu, and press ENTER button to reset lamp operation time.

Important:

- The projector doesn't turn on if the lamp cover isn't attached securely.
- Be sure to reset the lamp operation time whenever you replace the lamp.
- Do not reset the lamp operation time unless you replace the lamp.

Caution:

- The lamp is fragile. If it is broken, be careful not to cut yourself with glass fragments.
- Contact your dealer for a new lamp.

Interval of lamp replacement

When the lamp lifetime notice is issued, the lamp replacement is recommended even if the lamp is lit normally. Decrease in luminescence and/or color brightness indicates that the lamp needs to be replaced. When the lamp operation time exceeds the time elapsed until the lamp lifetime notice^{*1} is issued, the indicator will blink alternately green and red while the lamp is lit (while the lamp is not lit, the indicator will blink red only) and the lamp replacement message will appear on the screen for one minute every time the lamp is turned on. When the lamp operation time exceeds the time elapsed until the lamp lifetime warning^{*2} is issued, the replacement message (LAMP EXCHANGE) will appear on the screen for one minute at fixed intervals^{*4} thereafter.

When the lamp operation time exceeds the time elapsed until the lamp lifetime^{*3}, the projector keeps on issuing the warning, shuts off automatically after ten minutes, and then enters the standby state.

XD221U/XD221U-G
*1 3000 Hours
*2 3800 Hours
*3 4000 Hours ^{*5}

The times above are when LAMP MODE of the INSTALLATION menu is set to LOW. When it is set to STANDARD, this duration will be shortened.

^{*4} These intervals vary depending on the lamp mode setting.

^{*5} When LAMP MODE is set to STANDARD, the time elapsed until the lamp lifetime will be shortened to 3000 hours.

Important:

- Do not open the lamp cover when the projector is set at a ceiling or a high place. Lamp fragments may fall from the inside if the lamp were broken.
Please contact your dealer when you need to replace the lamp with a new one.

Caution:

- This projector uses a lamp that contains mercury. Disposal of the lamp or the projector with the lamp may be regulated due to environmental considerations. For disposal or recycling information, please contact your local authorities or the Electronic Industries Alliance: www.eiae.org. (For US only).

MAINTENANCE

Maintenance

Warning:

Do not use flammable solvents (benzene, thinner, etc.) and flammable aerosols when cleaning the projector body and lens. Flammable substances may ignite causing fire or breakdown while the lamp is illuminating.

Caution:

Be sure to turn off the lamp and unplug the power cord from the wall outlet before you perform any maintenance on the projector.

Cleaning of the projector and the ventilation slots

Use a soft cloth to clean the projector and the ventilation grilles. When the grilles become dirty, wipe them with a soft cloth dampened with diluted mild detergent, and then wipe them with a dry cloth.

To protect the surface of the projector from fading or deteriorating:

- Do not spray insecticide on or inside the projector.
- Do not use benzine or thinner to clean it.
- Do not let rubber or plastic materials contact with projector.

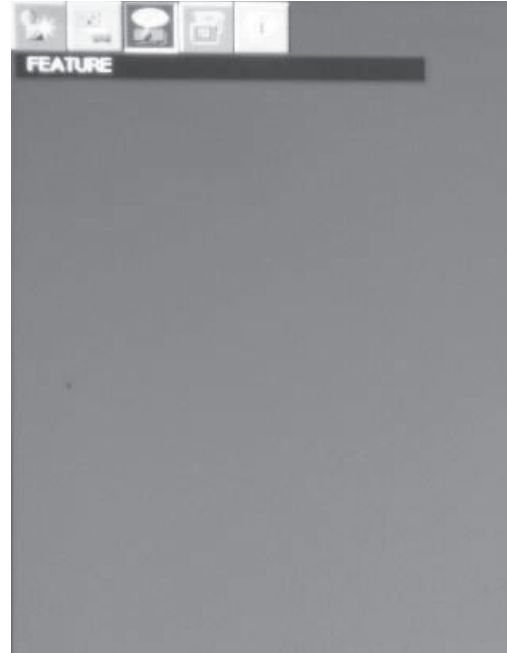
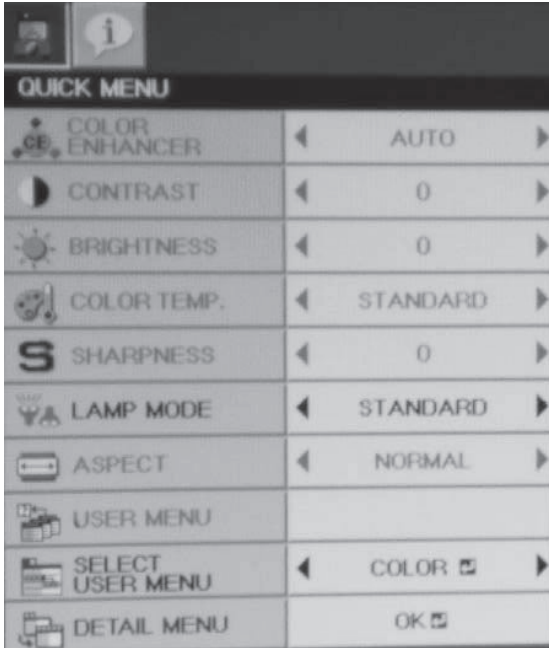
Cleaning of the lens

Use a standard lens-cleaning brush or a piece of lens tissue dampened with lens cleaning fluid. The lens surface is fragile. Use only recommended, nonabrasive lens-cleaning materials. Do not touch the lens with your fingers.

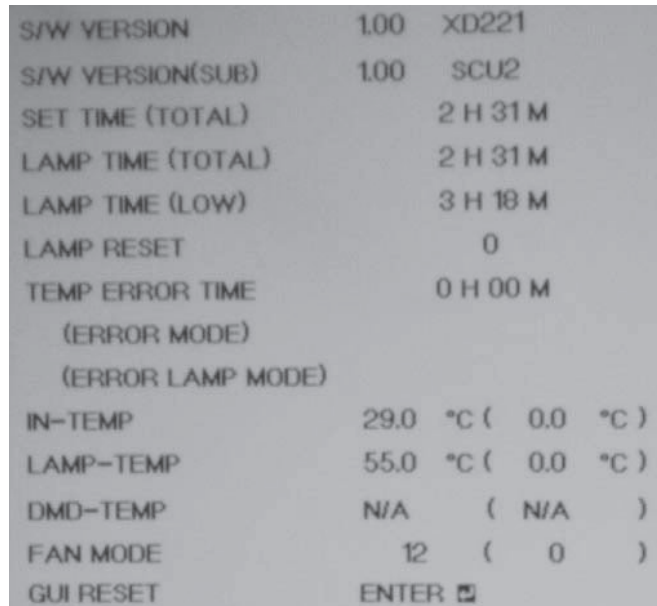
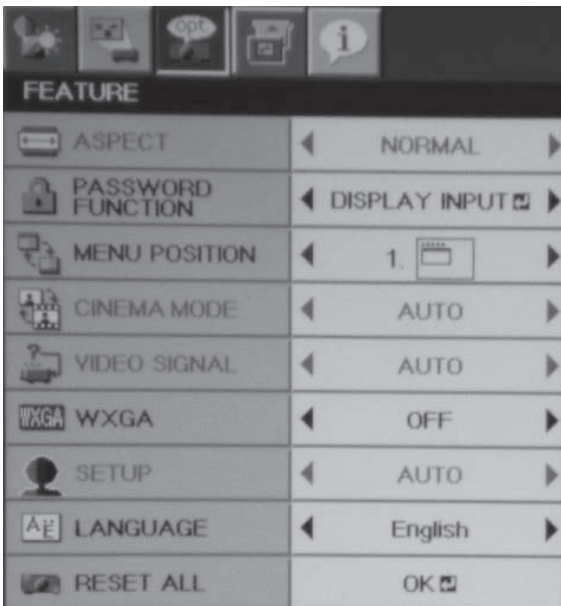
ENGINEERING MODE

How to access Engineering Mode

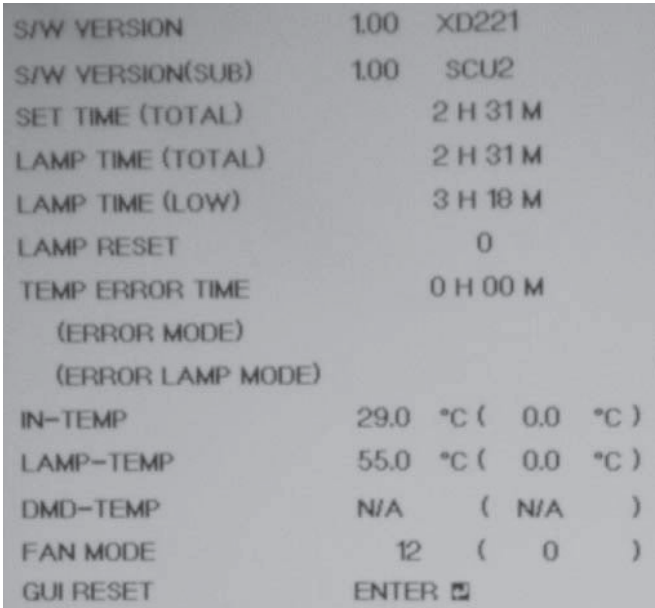
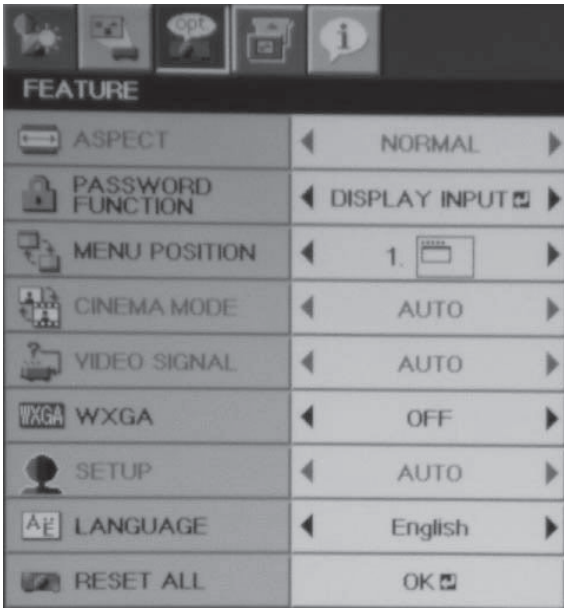
1. Turn on projector, Press "Menu" button on the remote control to open the QUICK MENU. Move the color bar to "DETAIL MENU" press "ENTER" into "DETAIL MENU";



2. Press the right direction keypad to select "FEATURE", press "ENTER" into "FEATURE" menu. Move the color bar to "MENU POSITION" press "AUTO POSITION- ENTER-AUTO POSITION" on the remote control to access the Engineering Mode.



3. At “FEATURE” screen, move the color bar to “LANGUAGE” press “AUTO POSITIONENTER-AUTO POSITION” on the remote control to access the Function Mode.



Message in the Engineering Mode

This section presents the meaning of each item in the engineering mode .

Item	Explanation
S/W VERSION	Software version in this machine.
SET TIME	How many hours this machine works?
LAMP TIME	How many hours this lamp works?
LAMP RESET	How many times lamp reset in this machine?
LAMP ERROR TIME	When does this machine occur lamp error?
IN - TEMP	The thermal sensor has detected the temperature from IN - TEMP thermal.
LAMP - TEMP	The thermal sensor has detected the temperature from LAMP – TEMP thermal.
DMD - TEMP	The thermal sensor has detected the temperature from DMD – TEMP thermal.
FAN MODE	The thermal sensor has detected the temperature from FAN - MODE thermal.

LIFE TIME OF THE CONSUMABLE PARTS

Following are the reference of the life times of the consumable parts.

- LampMax. 4,000 hours (When LAMP MODE is LOW.)
- Color wheelApprox. 8,000 hours
- Cooling fan (power)Approx. 10,000 hours
- Cooling fan (exhaust).....Approx. 5,000 hours
- Cooling fan (lamp)Approx. 10,000 hours

DEFECT STANDARD OF DMD PIXEL (REFERENCE)

Note:

This defect standard is intended to define the factory shipping criteria, not to guarantee the product.

Measurement conditions

- Projection condition : 40 +/- 0.5 inches and wide edges
- Projection distance : About 1.3 m.
- Inspection signal : 100% white (internal or outside), 100% black (internal or outside), and 50% gray
100% black is not used to judge Bremish.
- Measurement point : at any point of the screens
- Picture quality menu : Contrast: 0 and bright: 0
- Measurement time : Two minutes after it lights
- Set posture : Measure it by the floor putting and horizontal +/- 5deg.
- Environmental illuminance : 5(lx) or less at the measurement point
- Measuring instrument : Measure it by vertical posture.
- Others : Parts that influence brightness such as the projection lenses must include neither dust nor dirt, etc.

Standard value

Bremish	4 or less
Dark pixel	4 or less
Bright pixel	0 (display pixel) 1 (outside display pixel)
Unstable pixel	0
Adjacent pixel	0 (It is calculated besides the bright pixelts or dark pixels)

Definition

Bremish : Defect like misty bright (or misty dark) due to foreign body or scratch, etc. on optical path.

Bremish doesn't focus the image on the state of pictures just focus.

Dark pixel : Pixel defect where DMD mirror is off fixed.

Bright pixel : Pixel defect where DMD mirror is on fixed.

Unstable pixel : The pixel defect that the DMD mirror works regardless of the input image signal.

Blinking bright point is included in this.

Adjacent pixel : Pixel defect that does operation as which two adjoining DMD mirrors or more are the same.

DOWNLOAD OF THE FIRMWARE

Outline

Download the firmware to the ROM of the projector by the program.

Operating conditions

Microsoft® Windows® Me/2000/XP shall operate correctly. (The program doesn't run on Windows® 95/98.)

A display device supporting VGA (640 x 480) or above is required.

Necessary files

The following files are necessary to run the program.

- Data folder : Firmware data

Model	Data folder name
XD221U/XD221U-G	XD221v***

(*** indicates the version.)

- [DLP Composer (TM) Lite 7.2] : Program for download
- [XD221_Flash_v***.img] : Firmware data (***) indicates the version.)

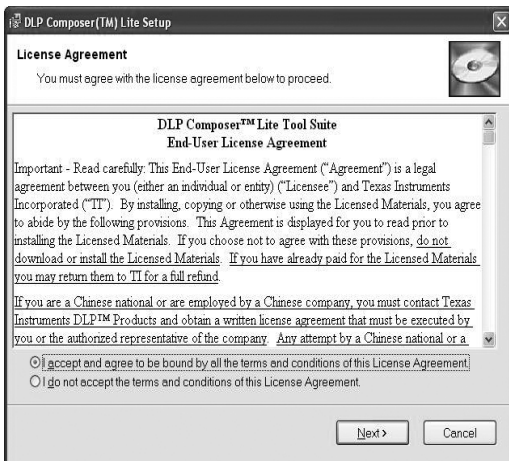
Necessary parts

The following files are necessary for download of the firmware.

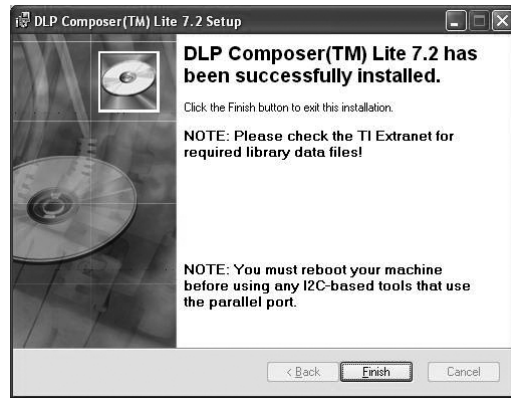
- JIG-DOWNLOAD-FW (859C749010)
 - Jumper
 - RS232C cable (MD 8P - USB 4P)
- AC power cord

Installing [DLP Composer (TM) Lite]

- Double-click the [DLP Composer Lite v7.2 Setup.exe].
- As installation starts, click [Next] to continue the installation process.



- On the [License Agreement] screen, move the scroll bar on the right to the bottom, select [I accept and agree to be bound by all the terms and conditions of this License Agreement], and click Next to continue the installation process.



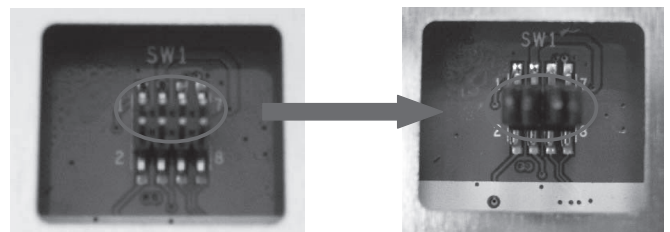
- When the installation is finished, click [Finish] and reboot the PC. (A shortcut to DLP Composer (TM) Lite is created on the desktop.)

Preparation before starting the program

- Copy the data folder on the desk-top of the Windows® .
- Disconnect the power cord from the projector.
- After installing the [DLP Composer(TM) Lite 7.2], overwrite the [dlpproc.inf] file in the holder of [C:¥Program Files¥DLP Composer Lite 7.2] by the attached [dlpproc.inf] file. And copy the attached [Flash Device Parameter.txt] to the holder of [C:¥ ProgramFiles¥ DLP Composer Lite 7.2].
- Choose the eye-con of [Install DLP Processor USB Driver] in the pull down menu of [DLP Composer(TM) Lite 7.2] which comes out on a program menu. (USB support is installed.)



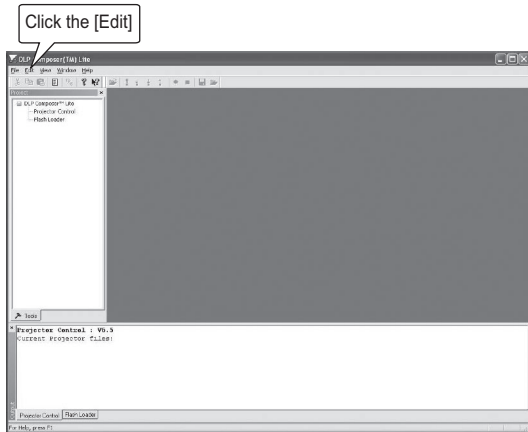
- The display of "Press some keys for continuing" should be comes out to a screen, then press some keys to a keyboard and wait to complete installation.
- Remove the top cover of projector.
- The jump is attached to the parallel port of the connection terminal of the main board. when update FW process starts, it doesn't work if the jump isn't attached.



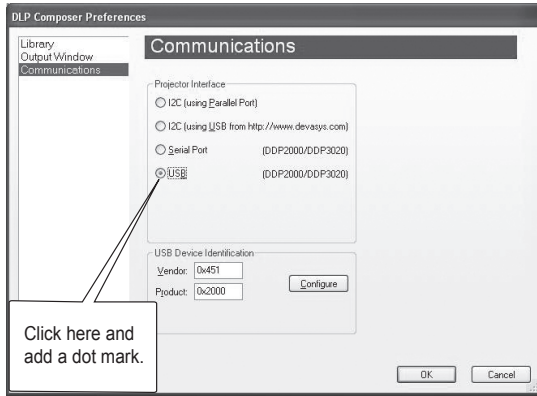
Attached the jumps

Operating procedure

- 1) Double-click [DLP Composer (TM) Lite 7.2].
The following screen will appear.



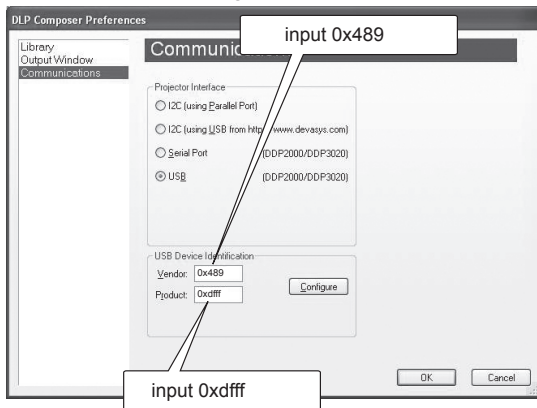
- 2) Chose the Edit/Preferences from the menus of DLP Composer (TM) ,and select the "USB Port" (DDP2000/DDP3020) in the item of Communications.



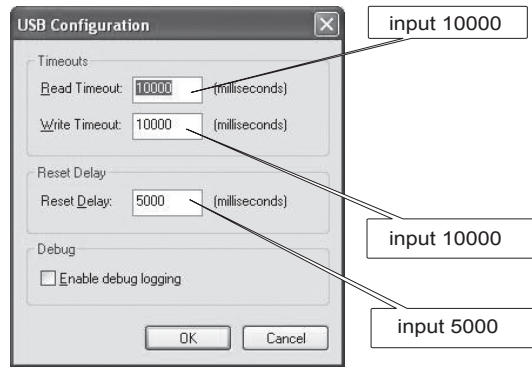
And setup the USB Device Identification under that, as follows
Vendor : 0x489

Product : 0xdfff

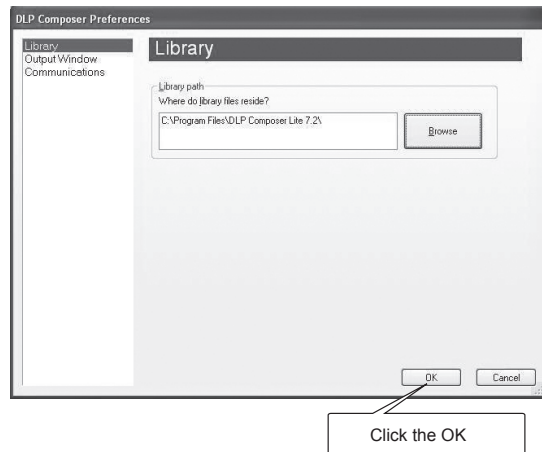
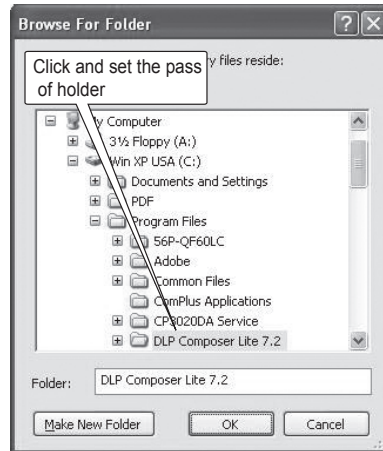
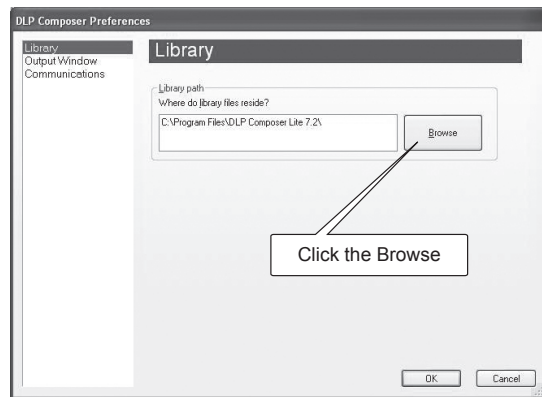
And next, click the [Configure], and set the numbers in the window of USB Configuration as follows



Read Timeout : 10000mSec
Write Timeout : 10000mSec
Reset Delay : 5000mSec

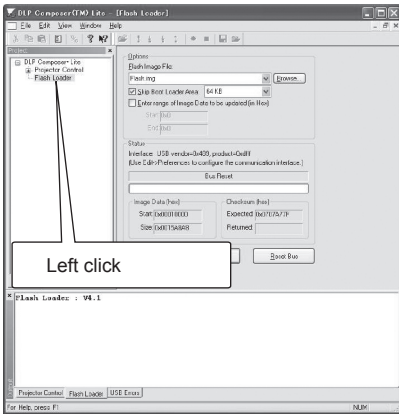


Further, in the place of Library, select the Browse and set the pass of folder which contains the "Flash Device Parameters .txt" for DDP2230.



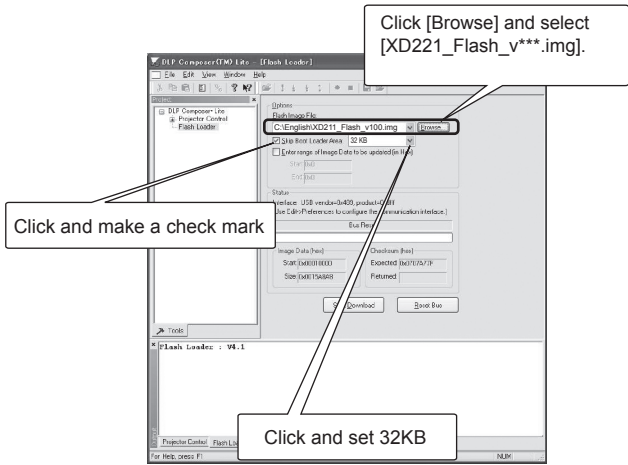
After set up is completed, push "O.K." in a DLP Composer Preferences window . And then, close this program temporary, and start again .

- 3) Unite the cursor to the Flash Loader in the Project window, which is displayed on the left-hand side in a DLP Composer (TM) Lite window , and left-click.



- 4) Then the window of Flash Loader displayed, at the Options Flash Image File, "Browse....." chose the File "XD221_Flash_v***.img" for download. (***: Version name) << important! >>: "Skip Boot Loader Area" should be sure to keep a check mark put in. Moreover, please set a setup of a dialog portion as "32KB." For 2), 3), and 4) , once it sets up, DLP Composer (TM) Lite memorizes a setting value, it is not necessary to re-set up for every download.

- 5) Within the state where the main power supply was turned

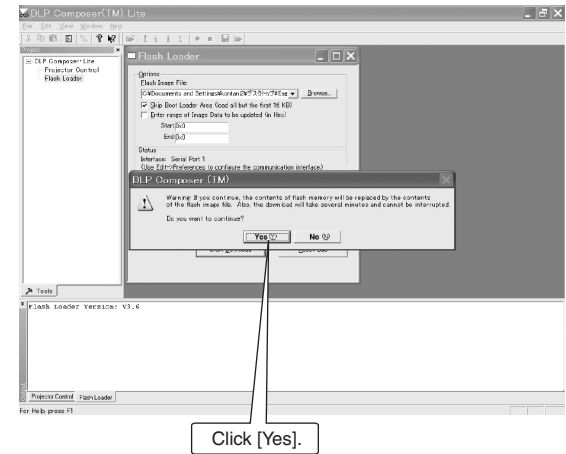
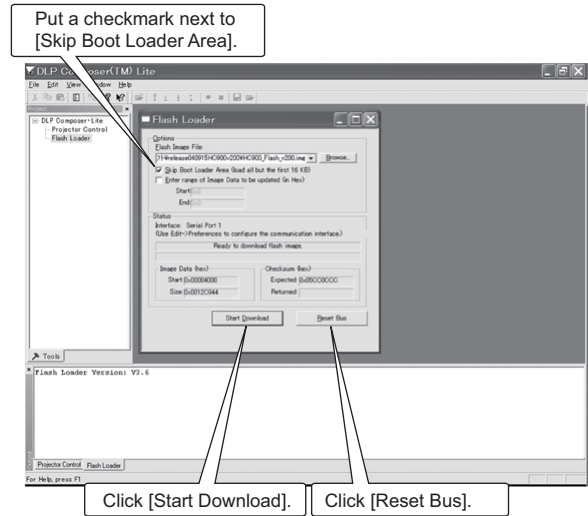


off, connect a projector main part to the personal computer for adjustment with the USB cable, .

- 6) While holding down the SOURCE button, plug in the power

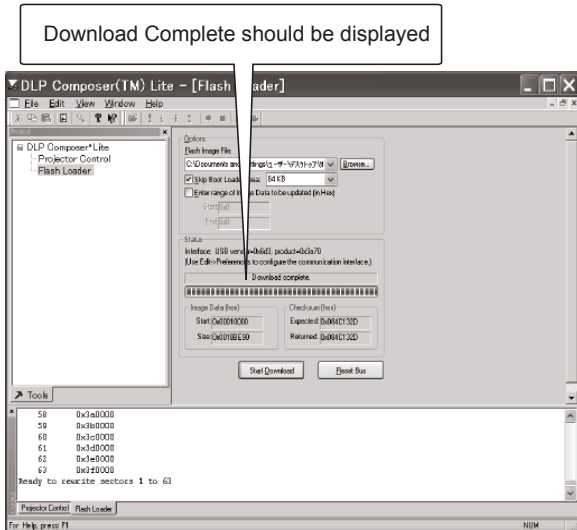
cord and then keep the button down for about 4 seconds. The STATUS LED on the projector illuminates green for about 5 seconds. While the LED is illuminating green, click [Reset Bus] on the [Flash Loader] screen and then click [Start Download].

When the dialog box is displayed, click [Yes]. When the DDP2230 faction projector is connected for the first time, the beginning screen of the retrieval wizard of new hardware is displayed. Select [Following] one by one, installs normally, and then reactivate the computer. When the retrieval wizard of new hardware should select the driver, put the check mark in [Display an already-known driver of this device and select it from the list], and select [Next]. When the list of hardware is displayed, select the [JUNGO] among that and select [Next] . Confirm that the [Windriver] is selected, and then select [Next].



Note: When it passes 5 seconds or longer without any operation after the power cord is connected to the projector, the STATUS LED goes off, the POWER LED blinks alternately red and green, and download becomes impossible. In such a case, connect the power cord to the projector again and retry download.

7) When download is completed (about 3 minutes and 30 seconds), it will be displayed on the portion of Status as "Download Complete." Since initialization is automatically begun here when EEPROM is a new article, don't shut off the main power supply. STATUS LED lights up in red during initialization of EEPROM. Initialization of EEPROM will be completed if "POWER" LED carries out red / green mutual blink.



8) Turn OFF the main power supply and extract a USB cable.

- note 1) When the main power supply is OFF, carry out cable removal of USB.
- note 2) Do not ON/OFF the main power supply during communication. Please reboot a personal computer, when communication is interrupted. It hangs-up.
- note 3) At the time of the write error to FLASH ROM, an error occurs on a personal computer.
- note 4) When a write error carries out continuation generating, reboot a personal computer once and repeat from 1 again.

DLP™ Projector
XD221U

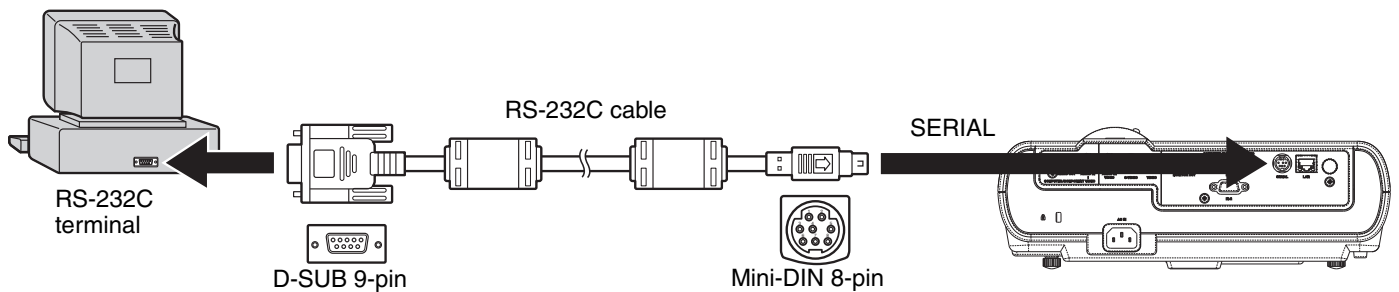
Controlling the projector using a personal computer

This projector can be controlled by connecting a personal computer with RS-232C terminal.

PC-controllable functions:

- Turning the power ON or OFF
- Changing input signals
- Inputting commands by pressing the buttons on the control panel and remote control
- Menu setting

Connection



Important:

- Connect the computer with the projector on a one-to-one basis.
- Make sure that your computer and projector are turned off before connection.
- Boot up the computer first, and then plug the power cord of the projector.
(If you do not follow this instruction, the Com port may not function.)
- Adapters may be necessary depending on the PC connected to this projector. Contact your dealer for details.

1. Interface

1.1 Pin assignment of SERIAL terminal (Mini-DIN 8-pin)

Pin No.	Name	I/O
1	RXD	IN
2	OPEN	
3	OPEN	
4	GND	
5	OPEN	
6	OPEN	
7	TXD	OUT
8	OPEN	

1.2 Communications format

PROTOCOL	RS-232C
BAUD RATE	9600 [bps]
DATA LENGTH	8 [bits]
PARITY BIT	NONE
STOP BIT	1 [bit]
FLOW CONTROL	NONE

This projector uses RXD, TXD and GND lines for RS-232C control.
For RS-232C cable, the supplied cable (crossover cable) should be used.

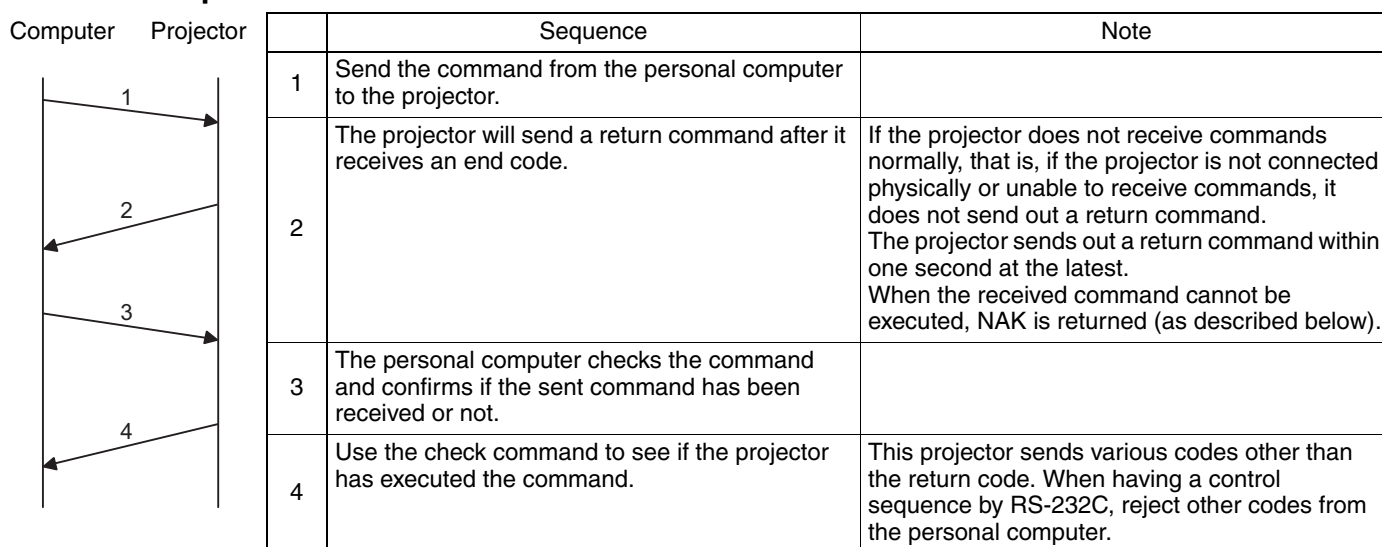
2. Control command configuration

The command consists of the address code, function code, data code, ACK/NAK, and end code. The length of the command varies among the functions.

	Address code	Function code	Data code	ACK/NAK	End code
ASCII	'30h' '30h'	Function	Data	'3Ah' '4Eh'	'0Dh'
Character	00	Function	Data	:N	↵



- [Address code] Fixed to 00. ('30h' '30h' in the ASCII code)
- [Function code] Code unique to each control operation.
- [Data code] Data (value) unique to each control operation (Not always indicated.)
- [ACK/NAK] Code indicating the NAK return as described below
Fixed to :N ('3Ah' '4Eh' in the ASCII code. Not added to ACK.)
- [End code] Fixed to ↵. ('0Dh' in the ASCII code)

3. Control sequence





- NAK return
In the following cases, the projector returns the command with “:N” added.
 - (1) Though the command sent from the computer is received by the projector successfully, it cannot be executed because the projector is in the operation prohibition state.
 - (2) The data length of the sent command is incorrect or the command is invalid.
- When a command is sent out during the following operations, it may not be executed.
 - (1) During signal switching
 - (2) In the process of the auto position
 - (3) After the power is turned on.
The projector receives no commands for about 20 seconds (or for 2 minutes at the longest if the lamp does not light up promptly as the life is expiring). In this case, the projector returns the received command with NAK added.
- The return command is sent out within 1 second at the latest.
- When sending commands successively, wait to receive the return command of the current command before sending a next command.
- The projector may not receive a command when the splash screen is being displayed immediately after turning on the power. Use command “00r10” to cancel the splash screen.
- While using the LAN terminals, the LAN functions take precedence.
- For the LAN terminals, the same commands as those for connecting with the TCP/IP (port number 63007) are available. Note, however, that the response becomes slightly slower than when using the RS-232C terminals.

[Example 1] Turning ON the power. (Values enclosed in quotation marks are ASCII codes.):

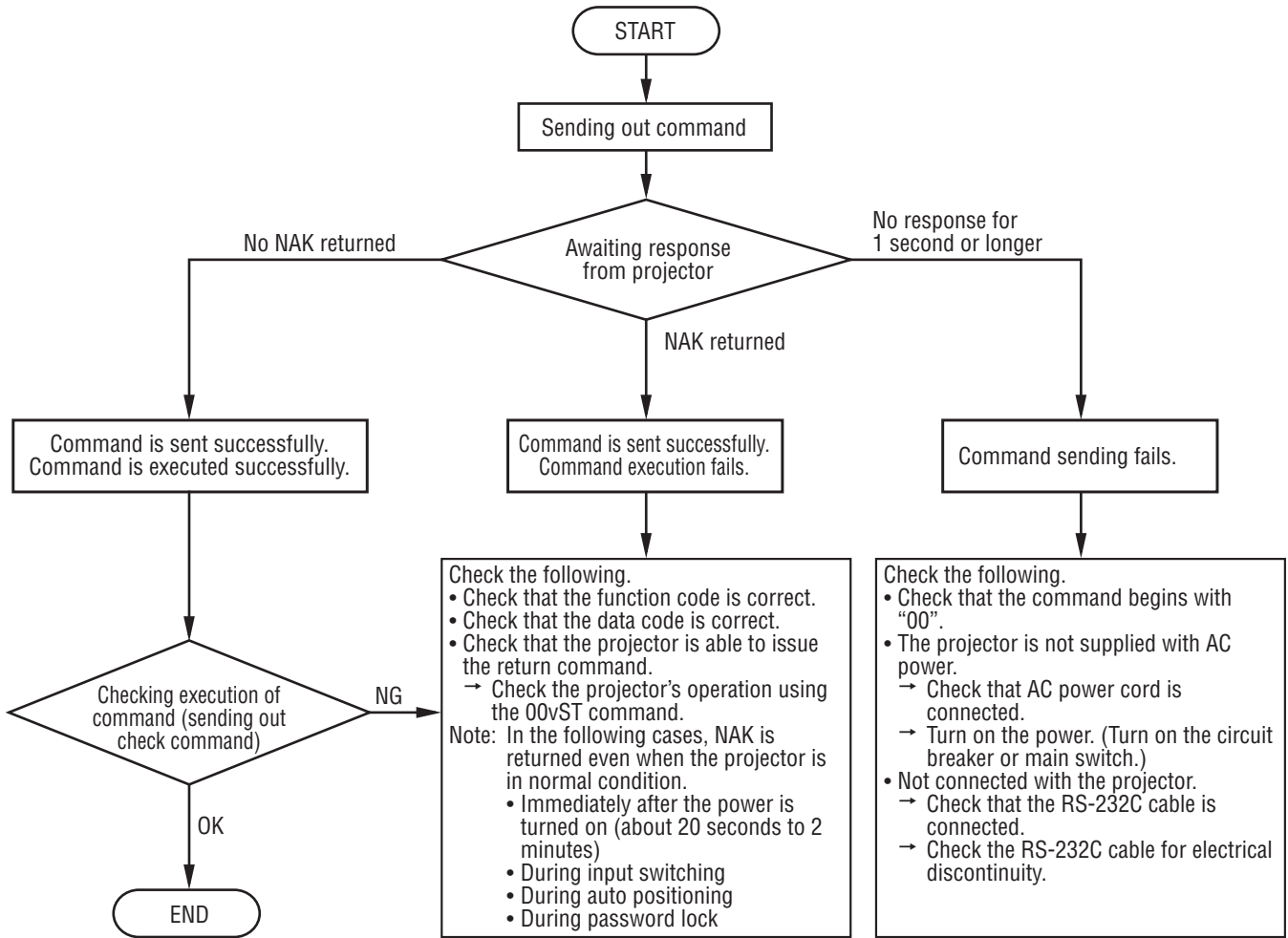
Command sent from the PC	Status code returned from the projector	Description
'30' '30' '21' '0D' 00! 		Command for POWER ON
	'30' '30' '21' '0D' 00! 	Command receipt confirmation (Command echo back)

[Example 2] Selecting VIDEO as the input signal during auto positioning (Values enclosed in quotation marks are ASCII codes.):

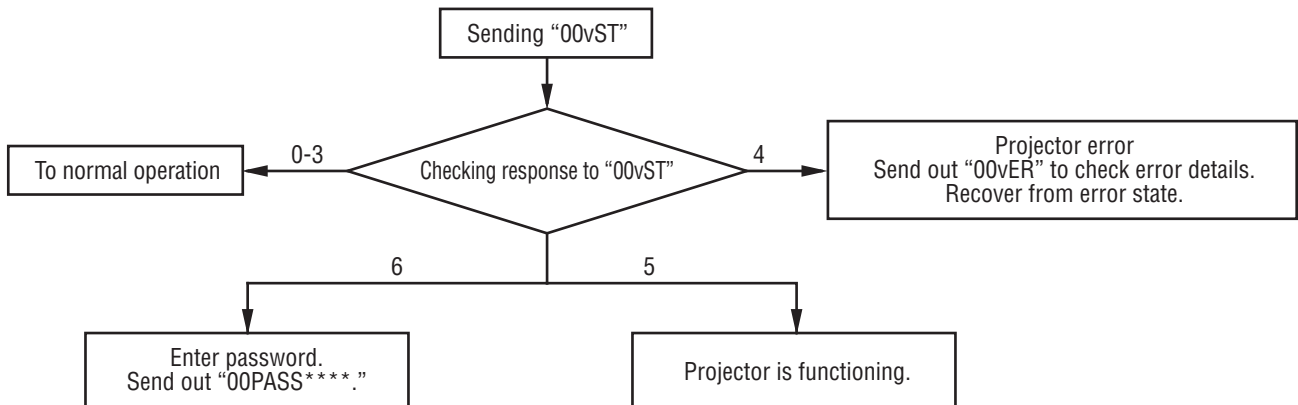
Command sent from the PC	Status code returned from the projector	Description
'30' '30' '5F' '76' '31' 00_V1 		(During auto positioning) Command for selecting VIDEO as the input signal is sent out.
	'30' '30' '5F' '76' '31' '3A' '4E' 00_v1:N 	The command is received by the projector but cannot be executed. (NAK return)

- The flowchart on the next page shows the recommended operating sequence for your reference to create a program.

[RS-232C control flowchart]



[Method of checking state of projector]



[Compatibility with the former models]

To use the RS-232C commands designed for the former models of Mitsubishi projector, by inputting "00COMMAND0", the projector responds in the same way as the former models. (No NAK is returned.)
 (For the recommended procedure to use the former command systems, see "Controlling the projector using a personal computer" for FL7000U.)

ITEM	Function		Data
	Character	ASCII	
Changing the RS-232C command system	COMMAND	43h 4Fh 4Dh 4Dh 41h 4Eh 44h	0 (Former command system), 1 (New command system)

4. Command list

4.1 Operation commands

The operation commands are used for the basic operation setting of this projector. They may not be executed while the signals are changed. The operation commands have no data codes. (When the commands for input select are sent while the splash screen is being displayed, the splash screen is only canceled.)

ITEM	Function		Note
	Character	ASCII	
POWER ON	!	21h	This command is invalid for 1 minute after the power is turned off.
POWER OFF	"	22h	This command is invalid for 1 minute after the power is turned on.
INPUT COMPUTER 1	_r1	5Fh 72h 31h	This command will not be executed in Stand-by mode or when the MUTE is executed.
INPUT COMPUTER 2	_r2	5Fh 72h 32h	This command will not be executed in Stand-by mode or when the MUTE is executed.
INPUT VIDEO	_v1	5Fh 76h 31h	This command will not be executed in Stand-by mode or when the MUTE is executed.
INPUT S-VIDEO	_v2	5Fh 76h 32h	This command will not be executed in Stand-by mode or when the MUTE is executed.

[Example] When setting the input signal to COMPUTER 1. (Values enclosed in quotation marks are ASCII codes.):

Command sent from the PC, etc.	Status code returned from the projector	Description
'30' '30' '5F' '72' '31' '0D' 00_r1 ↵		Command for setting the input signal to COMPUTER 1
	'30' '30' '5F' '72' '31' '0D' 00_r1 ↵	Command receipt confirmation (Command echo back)

4.2 Reading command diagram

The projectors operating status, such as POWER-ON/OFF and the currently selected input terminal, etc. can be monitored.

ITEM	Character		ASCII	
	Function	Data (Receive)	Function	Data (Receive)
POWER ON	vP	1	76h 50h	31h
POWER OFF	vP	0	76h 50h	30h
INPUT COMPUTER 1	vl	r1	76h 49h	72h 31h
INPUT COMPUTER 2	vl	r2	76h 49h	72h 32h
INPUT VIDEO	vl	v1	76h 49h	76h 31h
INPUT S-VIDEO	vl	v2	76h 49h	76h 32h
POWER ON/OFF IMPOSSIBLE	vPK	0	76h 50h 4Bh	30h
POWER ON/OFF POSSIBLE	vPK	1	76h 50h 4Bh	31h
NO SIGNAL SUPPLIED	vSM	0	76h 53h 4Dh	30h
SIGNAL SUPPLIED	vSM	1	76h 53h 4Dh	31h

Use the following commands to obtain the values of the items in the INFORMATION menu.

ITEM	Function		Data (Receive)
	Character	ASCII	
LAMP TIME (LOW)	vLE	76h 4Ch 45h	hhhhmm
RESOLUTION	vRESO	76h 52h 45h 53h 4Fh	HHHHxVVVV
VERTICAL FREQUENCY	vVFREQ	76h 56h 46h 52h 45h 51h	***.**
HORIZONTAL FREQUENCY	vHFREQ	76h 48h 46h 52h 45h 51h	***.**
SYNC. TYPE	vSYNCT	76h 53h 59h 4Eh 43h 54h	0 (NO SIGNAL), 1 (Invalid), 3 (3wire), 4 (4wire), 5 (5wire), 6 (SCART)

“hhhh” and “mm” represent hours and minutes respectively.

“HHHH” and “VVVV” represent the horizontal and vertical resolutions respectively.

“***.**” represents the vertical frequency (in Hz) or the horizontal frequency (in kHz).

Use the following commands to obtain other information.

ITEM	Function		Data (Receive)
	Character	ASCII	
Model name	vMDL	76h 4Dh 44h 4Ch	***** (within 16 characters)
Input source	vSOURCE	76h 53h 4Fh 55h 43h 45h	r1 r2 v1 v2
Projector status	vST	76h 53h 54h	0 (Stand-by mode), 1 (Within 1 minute after POWER-ON (warm-up mode)), 2 (POWER-ON mode (including state of warning)), 3 (Cooling mode), 4 (Abnormal state (including shutdown due to an error)), 5 (State of functioning (menu display, dialog display, AV MUTE, MAGNIFY, FREEZE, etc.)), 6 (Awaiting password entry)
Error status	vER	76h 45h 52h	Reading out error data (3 digits, hexadecimal numbers, total 9 bits) (MSB) xb1, xb2... xb8, xb9, 0, 0, 0 (LSB) xb1: Fan error xb2: Lamp error (The lamp goes out or does not light.) xb3: Lamp warning 1 (The lamp life has expired.) xb4: Lamp warning 2 (The lamp life is expiring.) xb5: Temperature error xb6: The temperature warning is being indicated. xb7: Lamp cover open error xb8: Fixed to 0. xb9: States of other component abnormality

The PC sends the command without attaching the data code to it. On the other hand, the projector attaches to the received command its current operating status as the data code and send it back to the PC.

[Example] When checking the currently selected input terminal (when the INPUT VIDEO is being selected).
(Values enclosed in quotation marks are ASCII codes.):

Command sent from the PC, etc.	Status code returned from the projector	Description
'30' '30' '76' '49' '0D' 00vl ↵		Command for checking the input terminal
	'30' '30' '76' '49' '76' '31' '0D' 00vlv1 ↵	Check result (VIDEO)

4.3 Remote commands (Not executable in stand-by mode. When the remote commands are sent while the splash screen is being displayed, the splash screen is only canceled.)

The remote commands allow the computer to control the projector in the same way as by the remote control. (Some operations cannot be controlled.) The remote commands have no data codes.

Button's name on remote	Function	
	Character	ASCII
+ / VOLUME	r06	72h 30h 36h
- / VOLUME	r07	72h 30h 37h
KEYSTONE	r43	72h 34h 33h
MAGNIFY	r02	72h 30h 32h
AV MUTE	ra6	72h 61h 36h
▲	r53	72h 35h 33h
▼	r2b	72h 32h 62h
←	r4f	72h 34h 66h
→	r59	72h 35h 39h
MENU	r54	72h 35h 34h
ENTER	r10	72h 31h 30h
AUTO POSITION	r09	72h 30h 39h
FREEZE	ra4	72h 61h 34h
ASPECT	re2	72h 65h 32h

[Example] When displaying the MENU selection bar. (Values enclosed in quotation marks are ASCII codes.):

Command sent from the PC, etc.	Status code returned from the projector	Description
'30' '30' '72' '35' '34' '0D' 00r54 ↵		Command operating the same as the MENU button
	'30' '30' '72' '35' '34' '0D' 00r54 ↵	Command receipt confirmation (Command echo back)

4.4 Direct commands (Not executable in stand-by mode. Possible only to read during muting.)

The direct commands are used to numerically adjust the volume and keystone.

When the computer sends the command without adding the setting value, the projector returns the received command with the current setting value added as a data code.

ITEM	Function		Data
	Character	ASCII	
VOLUME	VL	56h 4Ch	00-21
KEystone (vertical)	KS	4Bh 53h	±20

How to set the value

Use the character or ASCII code as shown below to set the value.

Character	+	-	0	1	2	3	4	5	6	7	8	9
ASCII	'2Bh'	'2Dh'	'30h'	'31h'	'32h'	'33h'	'34h'	'35h'	'36h'	'37h'	'38h'	'39h'

[Example] When setting the volume to 15. (Values enclosed in quotation marks are ASCII codes.):

Command sent from the PC, etc.	Status code returned from the projector	Description
'30' '30' '56' '4C' '31' '35' '0D' 00VL15 ↵		Command for setting the volume
	'30' '30' '56' '4C' '31' '35' '0D' 00VL15 ↵	Command receipt confirmation (Command echo back)

4.5 Function commands (Not executable in stand-by mode. When the mute commands are sent while the splash screen is being displayed, the splash screen is only canceled.)

The mute commands are used for the mute setting of this projector with the 0 (HEX: 30h) and 1 (HEX: 31h).

ITEM	Function		Data
	Character	ASCII	
AV MUTE	MUTE	4Dh 55h 54h 45h	0 (OFF), 1 (ON)

4.6 Menu setting commands (Not executable in stand-by mode. Possible only to read during muting.)

The menu setting commands are used for the menu setting of this projector. If the personal computer sends the command without attaching the data code, the projector attaches to the received command its current setting value as the data code and send it back to the PC.

ITEM	Function		Data
	Character	ASCII	
COLOR ENHANCER	CE	43h 45h	0 (AUTO), 1 (PRESENTATION), 2 (STANDARD), 3 (THEATER), 4 (USER)
COLOR ENHANCER-USER-GAMMA MODE	CEU1GS	43h 45h 55h 31h 47h 53h	0 (DYNAMIC), 1 (NATURAL), 2 (DETAIL)
COLOR ENHANCER-USER-Brilliant Color	CEU1B	43h 45h 55h 31h 42h	00-10
COLOR ENHANCER-USER-RGB-COLOR	CEU1C	43h 45h 55h 31h 43h	±10
COLOR ENHANCER-USER-RGB-TINT	CEU1T	43h 45h 55h 31h 54h	±10
CONTRAST	PP	50h 50h	±30
BRIGHTNESS	QQ	51h 51h	±30
COLOR TEMP.	A	41h	1 (STANDARD), 2 (HIGH), 3 (LOW), 4 (USER)
COLOR TEMP.-USER (CONTRAST)	P	50h	±30 ±30 ±30 (R, G, B)

ITEM	Function		Data
	Character	ASCII	
COLOR TEMP-USER (BRIGHTNESS)	Q	51h	±30 ±30 ±30 (R, G, B)
COLOR	T	54h	±10
TINT	S	53h	±10
SHARPNESS	R	52h	±05
NOISE REDUCTION	NR	4Eh 52h	0 (OFF), 1 (ON)
CTI	CTI	43h 54h 49h	0 (OFF), 1 (ON)
INPUT LEVEL	IPL	49h 50h 4Ch	±5,
CLOSED CAPTION	CC	43h 43h	0 (OFF), 1 (CC1), 2 (CC2)
WALL SCREEN	WS	57h 53h	0 (OFF), 1 (BEIGE), 2 (LIGHT BLUE), 3 (LIGHT GREEN), 4 (PINK), 5 (BLACK BOARD), 6 (WHITE BOARD)
WALL SCREEN (BEIGE)	WSY	57h 53h 59h	1-5
WALL SCREEN (LIGHT BLUE)	WSB	57h 53h 42h	1-5
WALL SCREEN (LIGHT GREEN)	WSG	57h 53h 47h	1-5
WALL SCREEN (PINK)	WSP	57h 53h 50h	1-5
LAMP MODE	LM	4Ch 4Dh	0 (STANDARD), 1 (LOW)
STANDBY MODE	STBY	53h 54h 42h 59h	0 (STANDARD), 1 (LOW)
AUDIO INPUT	AUDIO	41h 55h 44h 49h 4Fh	0 (AUTO), 1 (IN1), 2 (IN2), 3 (MIX)
AUTO POWER ON	APON	41h 50h 4Fh 4Eh	0 (OFF), 1 (ON)
AUTO POWER OFF	APOF	41h 50h 4Fh 46h	00 (OFF), 05, 10, 15, 30, 60
SPLASH SCREEN	SS	53h 53h	0 (OFF), 1 (ON)
BACK COLOR	BB	42h 42h	0 (BLACK), 1 (BLUE)
IMAGE REVERSE	IR	49h 52h	0 (OFF), 1 (MIRROR), 2 (INVERT), 3 (MIRROR INVERT)
ASPECT	SC	53h 43h	0 (NORMAL), 1 (16:9), 2 (FULL)
ASPECT-16:9 (Display position)	SCP	53h 43h 50h	0 (CENTER), 1 (UPPER), 2 (LOWER)
PASSWORD FUNCTION	PSLOCK	50h 53h 4Ch 4Fh 43h 4Bh	0**** (UNLOCK), 1**** (DISPLAY INPUT), 2**** (MENU ACCESS), **** is a 4 to 8-digit password comprised of any figures 1 to 4.
MENU POSITION	MP	4Dh 50h	0 (Upper left), 1 (Lower right)
CINEMA MODE	CINE	43h 49h 4Eh 45h	0 (OFF), 1 (AUTO)
VIDEO SIGNAL (VIDEO only)	VS	56h 53h	0 (AUTO), 1 (NTSC), 2 (PAL), 3 (SECAM), 4 (4.43NTSC), 5 (PAL-M), 6 (PAL-N), 7 (PAL-60)
WXGA	WXGA	57h 58h 47h 41h	0 (OFF), 1 (AUTO), 2 (1280×768), 3 (1280×768RB), 4 (1360×768), 5 (1366×768)
SET UP	STU	53h 54h 55h	0 (AUTO), 1 (OFF), 2 (3.75%), 3 (7.5%)
LANGUAGE	LG	4Ch 47h	00 (日本語), 01 (English), 02 (Español), 03 (Deutsch), 04 (Français), 05 (Italiano), 06 (中文), 07 (한국어), 08 (РУССКИЙ), 09 (PORTUGUÊS), 11 (SVENSKA), 12 (POLSKI)
RESET ALL	RSTALL	52h 53h 54h 41h 4Ch 4Ch	
HORIZ.POSITION	HP	48h 50h	+ (increment), - (decrement)*1
VERT. POSITION	VP	56h 50h	+ (increment), - (decrement)*1
FINE SYNC.	FN	46h 4Eh	00-31
TRACKING	TRK	54h 52h 4Bh	+ (increment), - (decrement)*1
COMPUTER INPUT	CIN	43h 49h 4Eh	0 (RGB), 1 (YCbCr/YPbPr), 2 (AUTO)
OVER SCAN	VOS	56h 4Fh 53h	00 (90%) - 10 (100%)
HOLD	HLD	48h 4Ch 44h	0 (OFF), 1 (ON)
HOLD BEGIN	HLB	48h 4Ch 42h	00-99
HOLD END	HLE	48h 4Ch 45h	00-99
CLAMP POSITION	CLP	43h 4Ch 50h	001-255
CLAMP WIDTH	CLW	43h 4Ch 57h	01-63
VERT. SYNC	VSC	56h 53h 43h	0 (AUTO), 1 (OFF)

ITEM	Function		Data
	Character	ASCII	
LPF	LPF	4Ch 50h 46h	0 (OFF), 1 (ON)
SHUTTER(U)	SHU	53h 48h 55h	00-20
SHUTTER(L)	SHL	53h 48h 4Ch	00-20
SHUTTER(LS)	SHLS	53h 48h 4Ch 53h	00-20
SHUTTER(RS)	SHRS	53h 48h 52h 53h	00-20

*1) Setting range differs depending on the input signals.

- Some commands are not executed depending on the input signal. The operational restrictions same as those on the menu setting are applied. Refer to "Menu operation" in the User Manual for more details.

How to set the value

Use the character or ASCII code as shown below to set the value.

Character	+	-	0	1	2	3	4	5	6	7	8	9
ASCII	'2Bh'	'2Dh'	'30h'	'31h'	'32h'	'33h'	'34h'	'35h'	'36h'	'37h'	'38h'	'39h'

[Example 1] When setting the AUTO POWER ON to ON. (Values enclosed in quotation marks are ASCII codes.):

Command sent from the PC, etc.	Status code returned from the projector	Description
'30' '30' '41' '50' '4F' '4E' '31' '0D' 00APON1 ↵		Command for setting the AUTO POWER ON to ON
	'30' '30' '41' '50' '4F' '4E' '31' '0D' 00APON1 ↵	Command receipt confirmation (Command echo back)

[Example 2] When setting the CONTRAST R of the COLOR TEMP.-USER to +10, the CONTRAST G to 0, and the CONTRAST B to -5. (Values enclosed in quotation marks are ASCII codes.):

Command sent from the PC, etc.	Status code returned from the projector	Description
'30' '30' '50' '2B' '31' '30' '2B' '30' '30' '2D' '30' '35' '0D' 00P+10+00-05 ↵		Command for setting the picture control
	'30' '30' '50' '2B' '31' '30' '2B' '30' '30' '2D' '30' '35' '0D' 00P+10+00-05 ↵	Command receipt confirmation (Command echo back)

[Example 3] When checking the TINT setting (when the TINT is set to +10). (Values enclosed in quotation marks are ASCII codes.):

Command sent from the PC, etc.	Status code returned from the projector	Description
'30' '30' '53' '0D' 00S ↵		Command for checking the TINT setting
	'30' '30' '53' '2B' '31' '30' '0D' 00S+10 ↵	Check result (+10)

[Example 4] When setting the GAMMA MODE of the COLOR ENHANCER-USER to DETAIL. (Values enclosed in quotation marks are ASCII codes.):

Command sent from the PC, etc.	Status code returned from the projector	Description
'30' '30' '43' '45' '55' '31' '47' '53' '32' '0D' 00CEU1GS2 ↵		Command for setting the picture control
	'30' '30' '43' '45' '55' '31' '47' '53' '32' '0D' 00CEU1GS2 ↵	Command receipt confirmation (Command echo back)



4.7 Password lock commands

The password lock commands control the password lock. The password lock enabling or disabling command is sent with a 4 to 8-digit password comprised of any figures 1 to 4 added to the end of the data code. When the password lock is enabled or disabled successfully, the projector sends a return command comprising the data code, password, and "1" at the end. When enabling or disabling the password lock fails, it sends a return command with "0" at the end. There is no reconfirmation of the password. The password input command is for enabling projection of image when password lock has been set to DISPLAY INPUT. The password input command is sent with a 4 to 8-digit password comprised of any figures 1 to 4 at the end.

ITEM	Function		Data
	Character	ASCII	
Password lock enabling/ disabling	PSLOCK	50h 53h 4Ch 4Fh 43h 4Bh	0**** (Disabling), 1**** (DISPLAY INPUT), 2**** (MENU ACCESS)
Password input	PASS	50h 41h 53h 53h	****

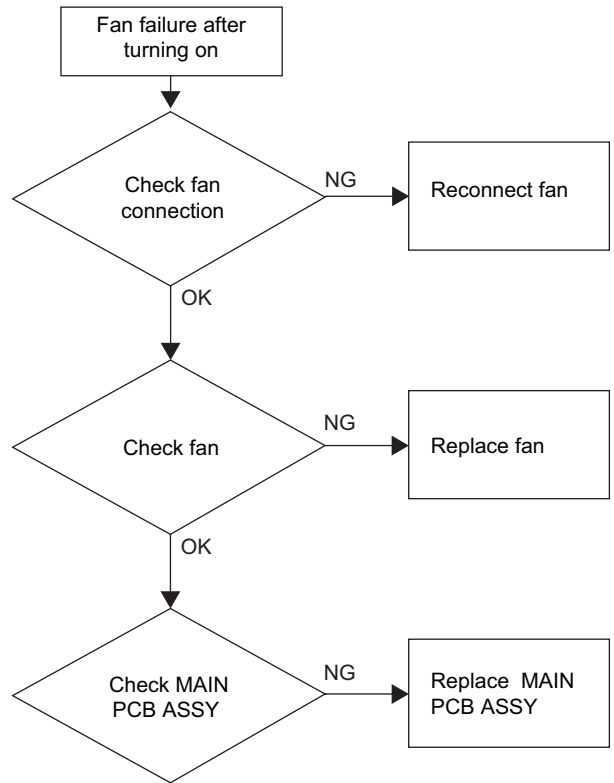
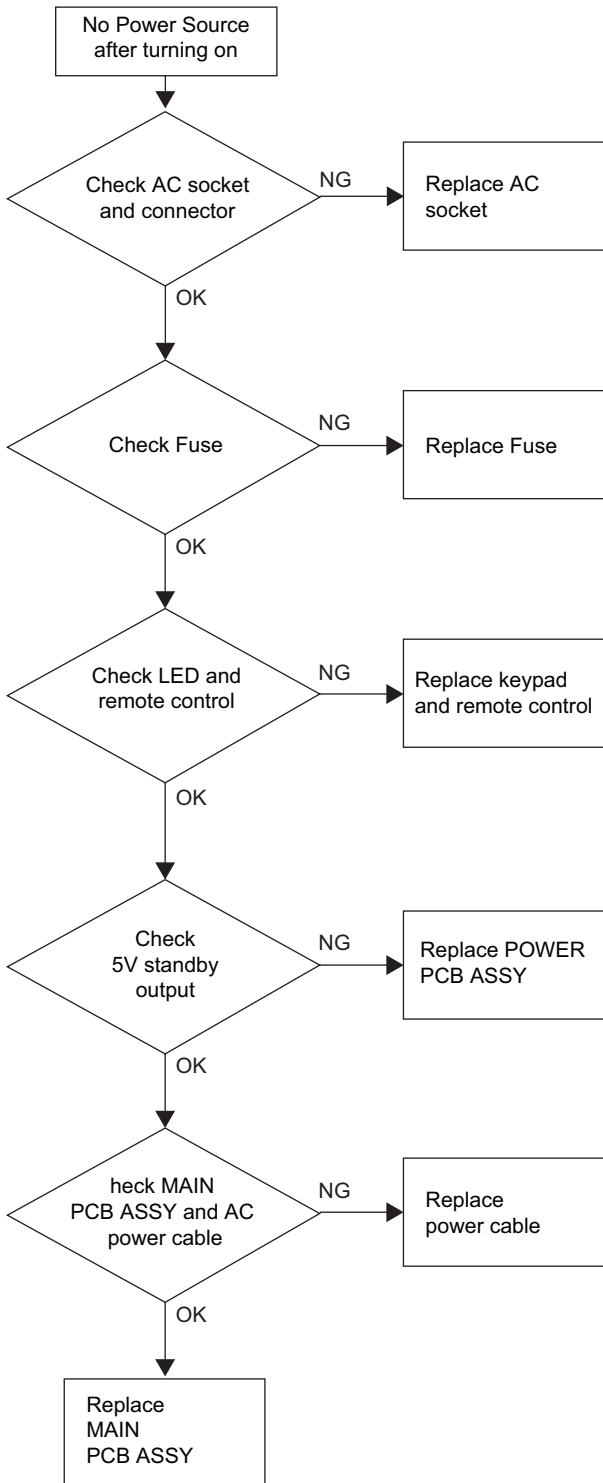
**** is a 4 to 8-digit password comprised of any figures 1 to 4.

[Example] When enabling the password lock of DISPLAY INPUT (in the case that the password is 123412):

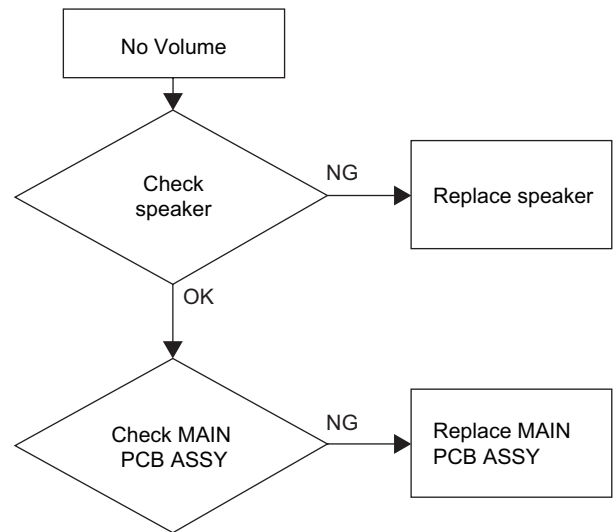
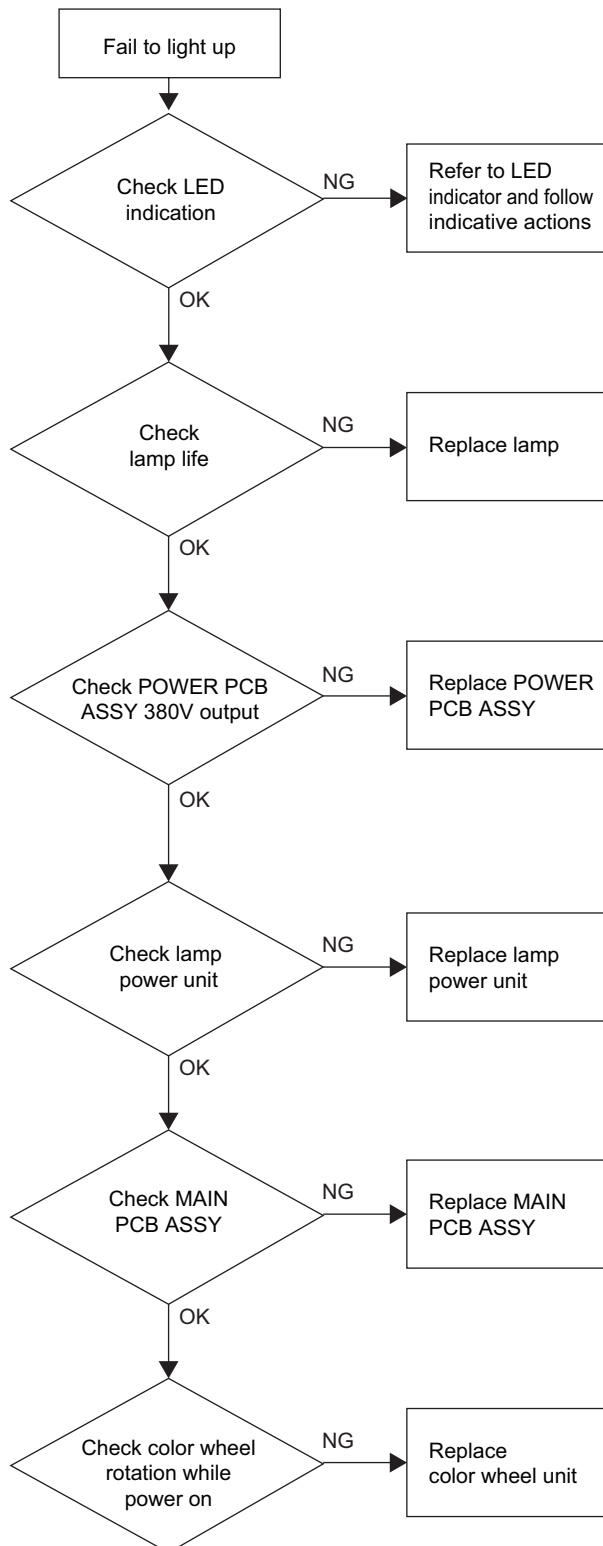
Command sent from the PC, etc.	Status code returned from the projector	Description
'30' '30' '50' '53' '4C' '4F' '43' '4B' '31' '31' '32' '33' '34' '31' '32' '0D' 00PSLOCK1123412 		Command for enabling the password lock of DISPLAY INPUT
	'30' '30' '50' '53' '4C' '4F' '43' '4B' '31' '31' '32' '33' '34' '31' '32' '31' '0D' 00PSLOCK11234121 	Response informing that the projector succeeded in enabling the password lock of DISPLAY INPUT

TROUBLESHOOTING

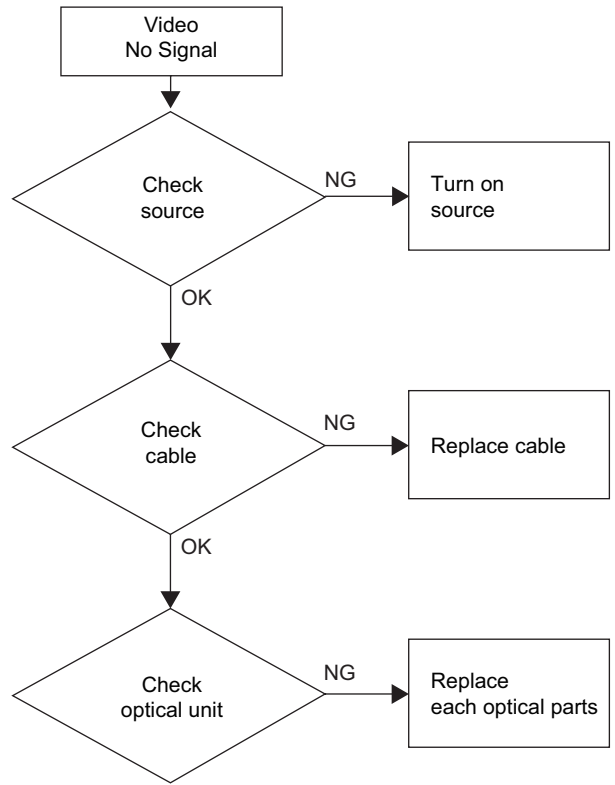
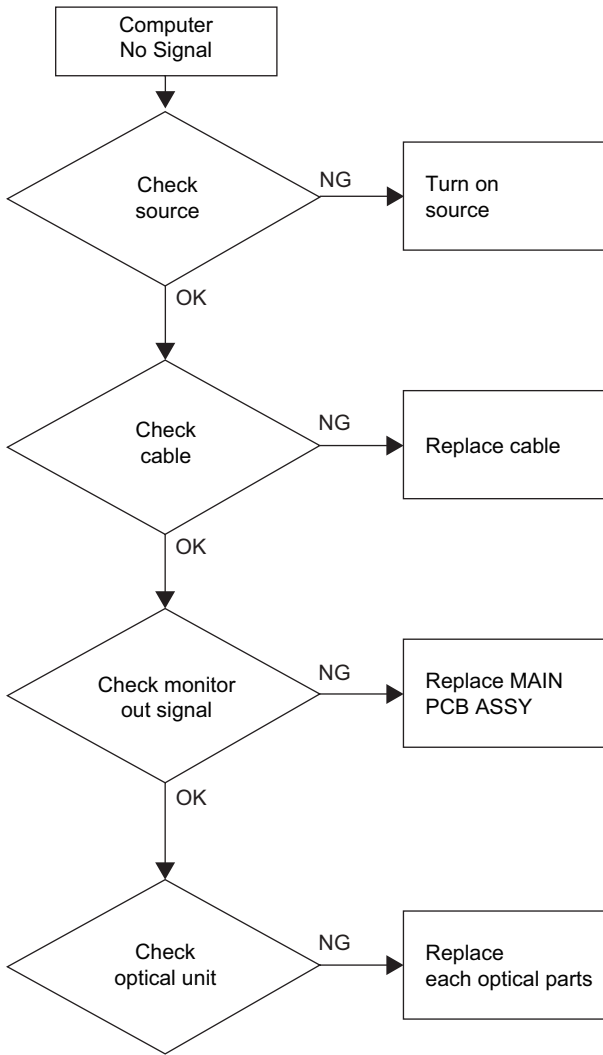
Power source 1



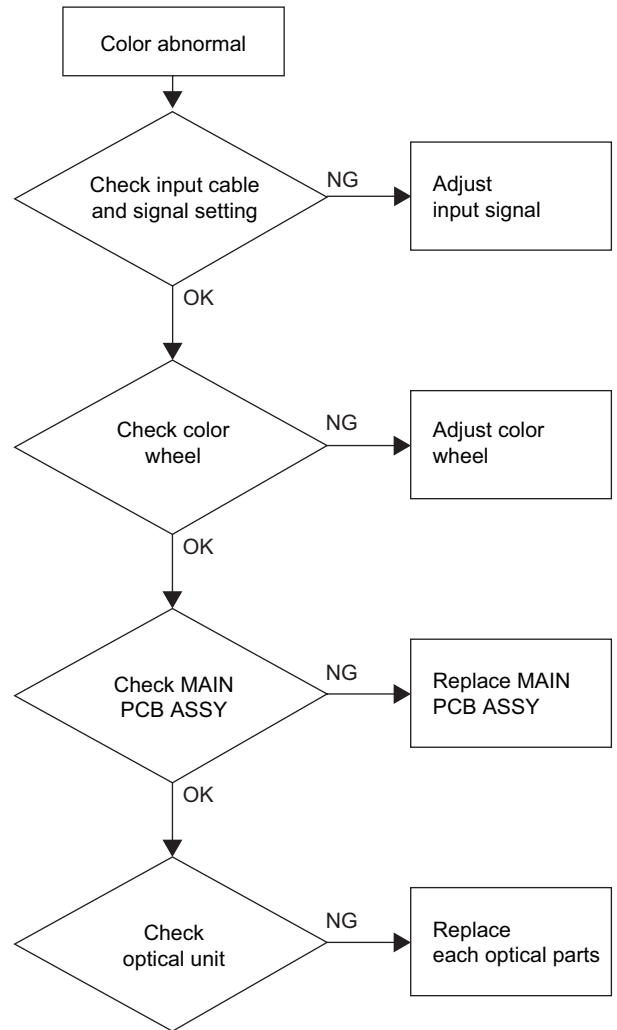
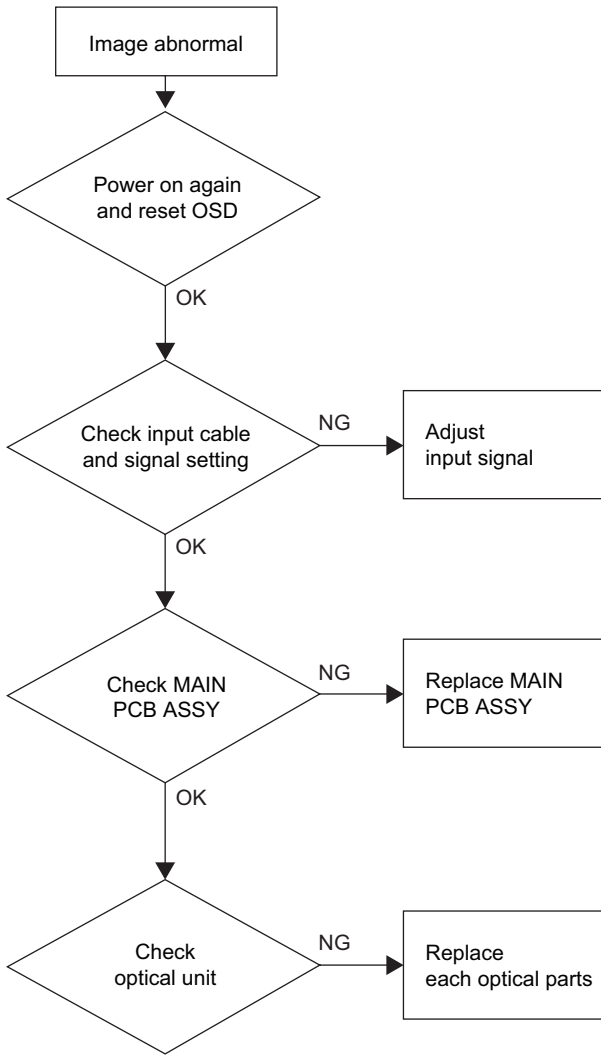
Power source 2



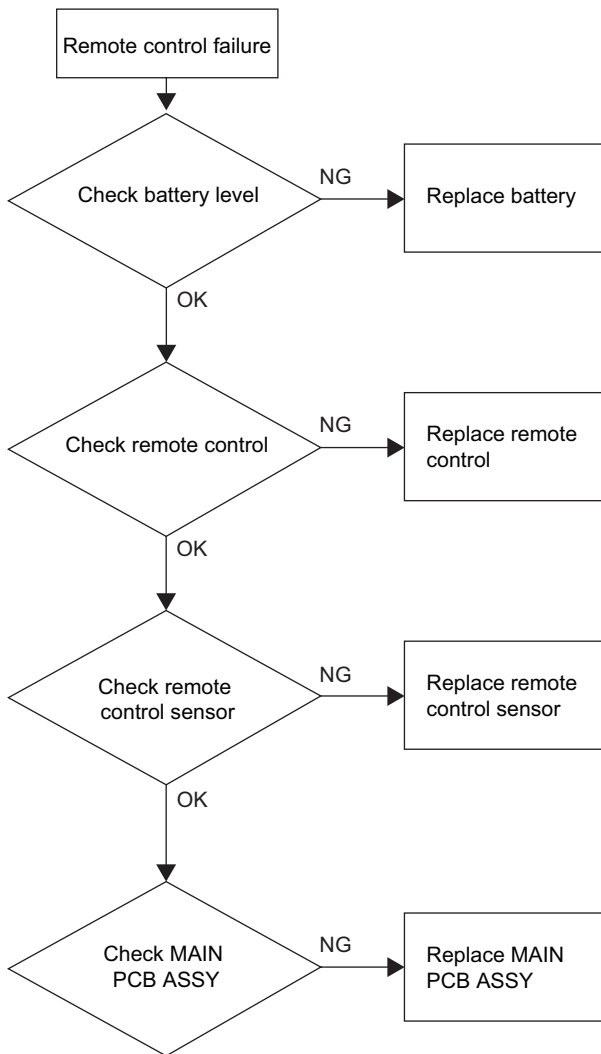
Video signal 1



Video signal 2



Operation function



DIAGNOSIS INFORMATION

This chapter provides technicians with electronic background how to maintain the product. Moreover, you can get the appropriate operation to solve some complicated problems of component repairing and professional problems.

Troubleshooting

Warning

- Do not directly look into the lens to avoid eyesight damages.
- The projector is equipped with ventilation holes (intake) and ventilation holes (exhaust). Do not block or place anything near these slots, or internal heat build-up may occur, causing picture degradation or damage to the projector.

Confirm Software and hardware

- (1) Confirm FW version and lamp using hours
- (2) Confirm LED indicator

Projector Status	LED				Meaning
	Power LED		Status LED		
	Color	Status	Color	Status	
Standby	Red	Solid	-	-	The projector is powered and ready.
Lamp Standby	Green	Solid	Green	Blinking	About 1 minute.
Power On	Green	Solid	Green	Solid	The projector is powered.
Lamp failure	-	-	Green	Blinking	To replace lamp and reset the lamp hour.
Fan failure	Green	Blinking	Green	Solid	To check if the fan is clogged with dust or dirt and lean it.
Lamp life warning	-	-	Amber	Solid	The lamp has reached its end of life and must be changed soon. The lamp will continue to operate until it fails.
Power off	-	-	Green	Flashing	The projector is shutting down. The fans motor is cooling the lamp for shutdown. Do not unplug the power cord or turn the power switch off before the lamp LED turns off. The fan motor will turn off when the lamp has cooled.
Over temperature	Green	Solid	Red	Solid	The projector believes the temperature is too high. The lamp will turn off.

- (3) Confirm cable connection well.
- (4) Confirm Main board version

SPECIFICATION OF RGB SIGNALS IN EACH COMPUTER MODE OF THE PROJECTOR

Signal mode	resolution (H x V)	horizontal frequency (kHz)	vertical frequency (Hz)	XD221U/XD221U-G (H x V)	
TV60, 480i (525i)	-	15.73	59.94	1024 x 768	*2
TV50, 576i (625i)	-	15.63	50.00	1024 x 768	*2
1080i 60 (1125i 60)	-	33.75	60.00	1024 x 576	*2
1080i 50 (1125i 50)	-	28.13	50.00	1024 x 576	*2
480p (525p)	-	31.47	59.94	1024 x 768	*2
576p (625p)	-	31.25	50.00	1024 x 768	*2
720p 60 (750p 60)	-	45.00	60.00	1024 x 576	*2
720p 50 (750p 50)	-	37.50	50.00	1024 x 576	*2
CGA84	640 x 400	37.86	84.13	1024 x 640	
CGA85	640 x 400	37.86	85.08	1024 x 640	
VGA60	640 x 480	31.47	59.94	1024 x 768	
VGA72	640 x 480	37.86	72.81	1024 x 768	
VGA75	640 x 480	37.50	75.00	1024 x 768	
VGA85	640 x 480	43.27	85.01	1024 x 768	
SVGA56	800 x 600	35.16	56.25	1024 x 768	
SVGA60	800 x 600	37.88	60.32	1024 x 768	
SVGA72	800 x 600	48.08	72.19	1024 x 768	
SVGA75	800 x 600	46.88	75.00	1024 x 768	
SVGA85	800 x 600	53.67	85.06	1024 x 768	
XGA60	1024 x 768	48.36	60.00	1024 x 768	
XGA70	1024 x 768	56.48	70.07	1024 x 768	
XGA75	1024 x 768	60.02	75.03	1024 x 768	
XGA85	1024 x 768	68.68	85.00	1024 x 768	
SXGA70a	1152 x 864	63.85	70.01	1024 x 768	
SXGA75a	1152 x 864	67.50	75.00	1024 x 768	
WXGA60	1280 x 768	47.77	59.87	1024 x 614	*1
WXGA60a	1280 x 800	49.70	59.81	1024 x 640	*1
WXGA60b	1360 x 768	47.71	60.01	1024 x 578	*1
WXGA60c	1366 x 768	47.50	59.75	1024 x 575	*1 *2
SXGA60b	1280 x 960	60.00	60.00	1024 x 768	
SXGA60	1280 x 1024	63.98	60.02	960 x 768	
MAC13	640 x 480	35.00	66.67	1024 x 768	
MAC16	832 x 624	49.72	74.55	1024 x 768	
MAC19	1024 x 768	60.24	75.02	1016 x 768	
HP75	1024 x 768	62.94	74.92	1024 x 768	
SUN66a	1152 x 900	61.85	66.00	984 x 768	
SUN76a	1152 x 900	71.81	76.64	984 x 768	

*1 When you input the signals WXGA60, WXGA60a, WXGA60b,, or WXGA60c, select the supported image size from WXGA of the FEATURE menu.

*2 The partial enlargement feature is not supported.

Important:

- Some computers aren't compatible with the projector.
- The projector's maximum resolution is 1024 x 768 pixels. It may not display images of higher resolutions than 1024 x 768 correctly.
- Images with SYNC on G (Green) signal may jitter.
- Images with SYNC on G (Green) signal may be tinged with green.
- If the resolution and frequency of your computer aren't shown on the table, find the compatible resolution and frequency by changing the resolution of your computer.
- Set COMPUTER INPUT in the SIGNAL menu to RGB when inputting the HDTV signal as RGB signal.

- TV60 and TV50 are equivalent to 480i and 576i respectively. When these signals are supplied to the VIDEO or S-VIDEO signal, the signal mode is indicated as TV60 or TV50. When they are supplied to the COMPONENT terminal, the signal mode is indicated as 480i or 576i.

PARTS LIST

MODEL : XD221U / XD221U-G

Purpose of this parts list : To expedite delivery of replacement parts ordered.

Please specify :

1. Model number/serial number
2. Part number and its description
3. Quantity

Unless all the required information is supplied, the delivery of your order may be delayed.

 : Critical components

MARK	B	C	D	F	G	J	K
TOLERANCE (%)	±0.1	±0.25	±0.5	±1	±2	±5	±10

MARK	M	N	V	X	Z	P	Q
TOLERANCE (%)	±20	±30	±10	+40 -20	+80 -20	+100 0	+30 -10

MARK	B	C	D	F	G
TOLERANCE (pF)	±0.1	±0.25	±0.5	±1	±2

(RoHS-compliant model)

- Parts listed below are all RoHS-compliant.
- When servicing this model, use RoHS-compliant parts only.

The parts on this page correspond to those on page 4 in the EXPOSED file.

ITEM NO.	PART NO.	PART NAME	DESCRIPTION
EXPOSED VIEW			
DLP ASSY (Fig. 1-1)			
⚠ 1	750D036O80	LAMP COVER	
2	750D036O90	IO COVER	
⚠ 3	750D021O90	TOP COVER	
⚠ 4	934D054O30	MAIN PCB ASSY	
⚠ 5	934D054O60	AUDIO PCB ASSY	
⚠ 6	480D044O60	SPEAKER	
⚠ 7	934D054O50	LAMP POWER UNIT	
⚠ 8	934D080O10	IR(F) PCB ASSY	
⚠ 9	288D072O30	FAN MOTOR (POWER)	
⚠ 10	288D072O40	FAN MOTOR (EXHAUST)	
⚠ 11	934D054O40	POWER PCB ASSY	
⚠ 12	750D036O70	BOTTOM COVER	
13	771D125O30	ADJUSTER	
⚠ 14	934D054O70	KEY PCB ASSY	

(RoHS-compliant model)

- Parts listed below are all RoHS-compliant.
- When servicing this model, use RoHS-compliant parts only.

The parts on this page correspond to those on page 6 in the EXPOSED file.

ITEM NO.	PART NO.	PART NAME	DESCRIPTION
EXPOSED VIEW			
Optical unit (Fig. 1-2)			
1	276P543O10	DMD-CHIP	
⚠ 2	934D054O80	DMD PCB ASSY	
3	499D137O60	LENS UNIT	
⚠ 4	934D054O90	COLOR WHEEL PCB ASSY	
5	499D137O10	COLOR WHEEL	
6	499D137O20	LIGHT PIPE	
7	288D072O50	FAN MOTOR (LAMP)	
8	499D137O30	LAMP CONNECTOR	

(RoHS-compliant model)

- Parts listed below are all RoHS-compliant.
- When servicing this model, use RoHS-compliant parts only.

The parts on this page correspond to those on page 19 in the EXPOSED file.

ITEM NO.	PART NO.	PART NAME	DESCRIPTION
PACKING (Fig. 1-3)			
1	871D548O10	CD ROM IB	(XD221U)
1	871D548O20	CD ROM IB	(XD221U-G)
2	871D548O40	SAFETY MANUAL	(XD221U)
2	871D548O50	SAFETY MANUAL	(XD221U-G)
3	859D229O30	CAUTION SHEET	
⚠ 4	939D279O40	REMOTE CONTROL	
⚠ 5	246C359O10	AC POWER CORD	(XD221U)
⚠ 5	246C383O20	AC POWER CORD	(XD221U)
⚠ 5	246C483O10	AC POWER CORD	
6	772D052O30	SOFT CASE	
7	813C022O10	PACKING CUSHION	
8	856D592O30	PACKING CUSHION (PAD)	
9	801C656O10	PACKING CASE	(XD221U-G)
9	801D142O20	PACKING CASE	(XD221U)

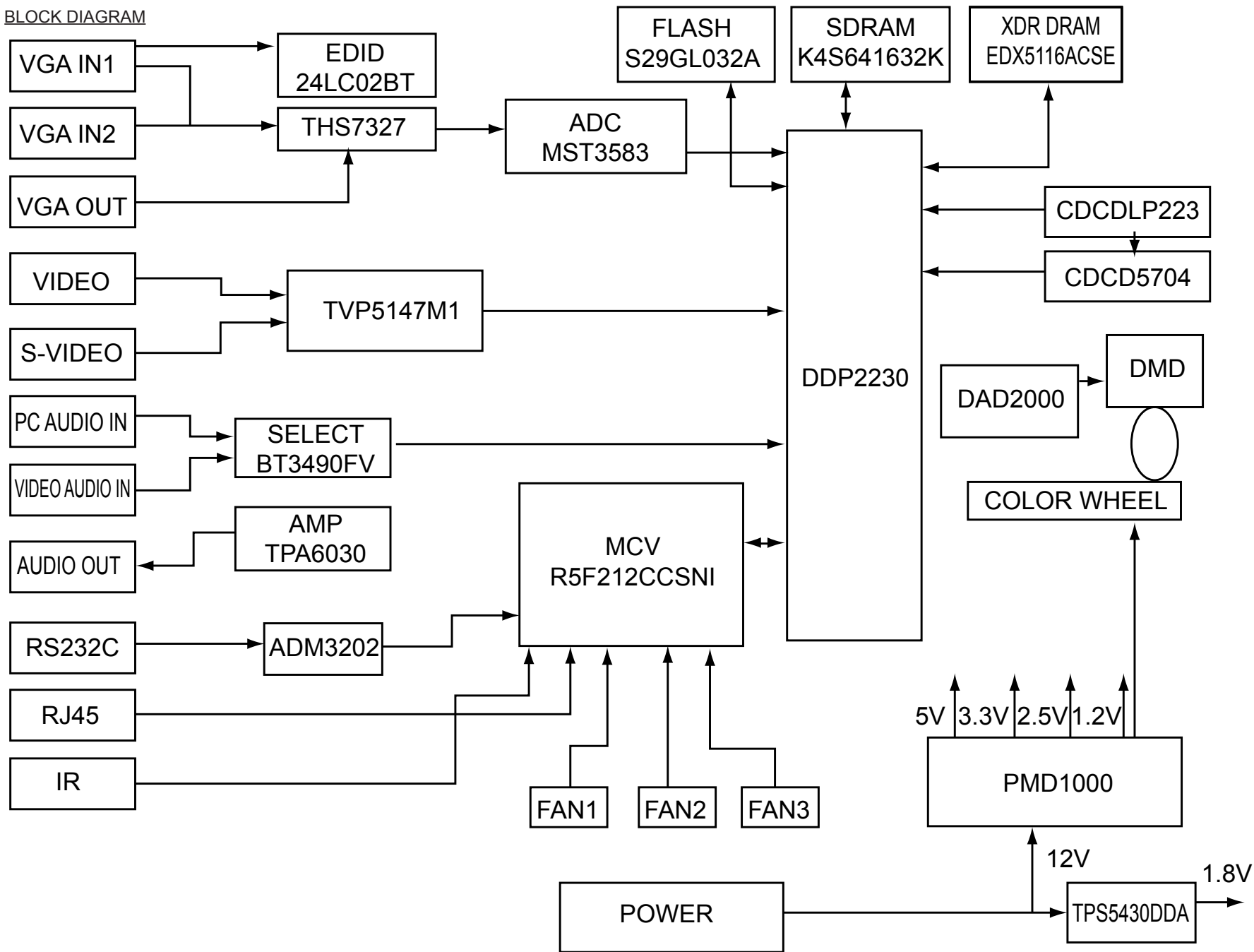
ELECTRICAL PARTS AND OTHERS

(RoHS-compliant model)

- Parts listed below are all RoHS-compliant.
- When servicing this model, use RoHS-compliant parts only.

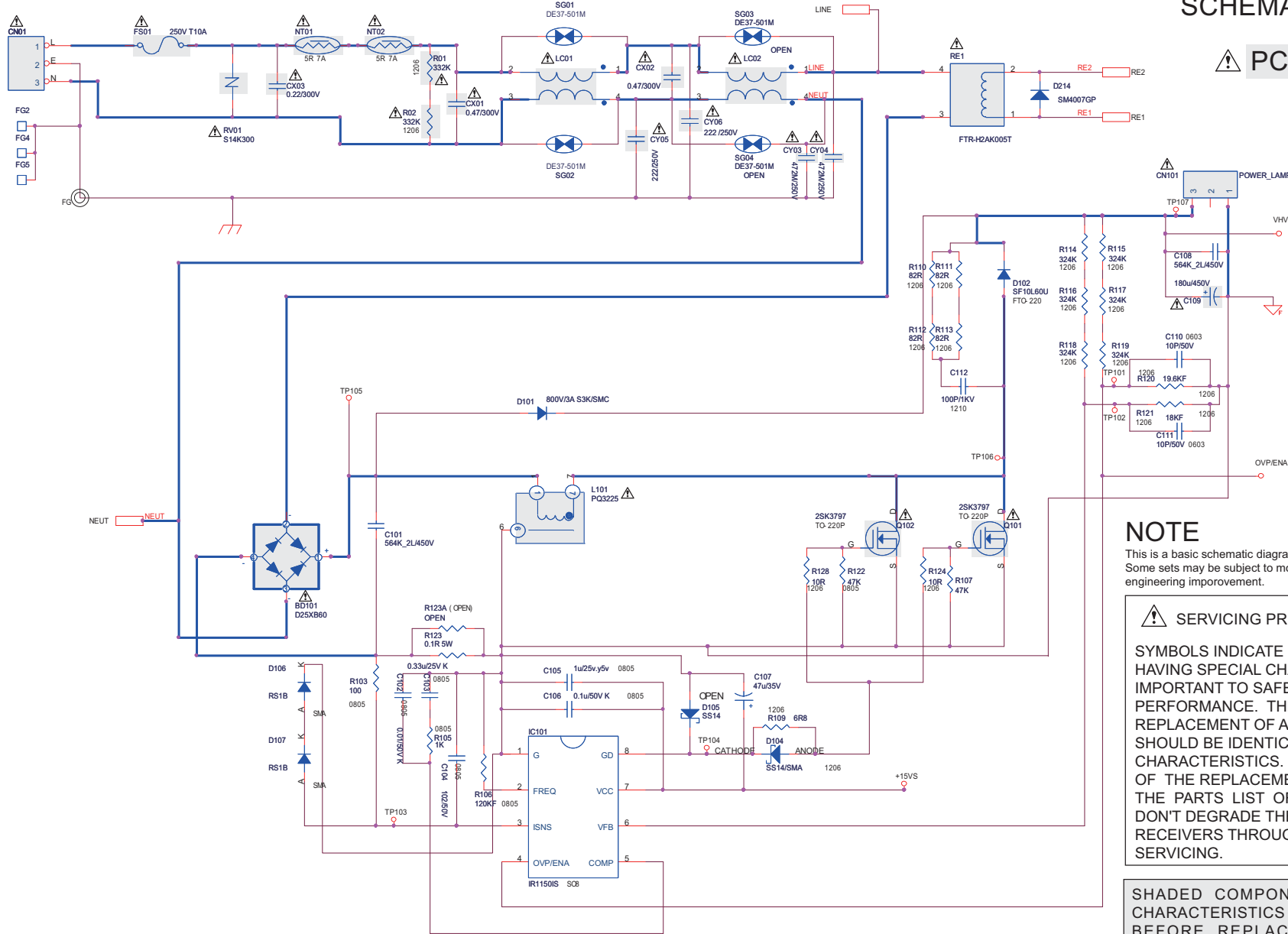
SYMBOL No.	PART No.	PART NAME	DESCRIPTION	SYMBOL No.	PART No.	PART NAME	DESCRIPTION
OTHER SEMICONDUCTORS				JIGS			
⚠	499D137050	THERMISTOR		859C749010	JIG	DOWNLOAD-FW	
MISCELLANEOUS				OTHER CRITICAL COMPONENTS			
	276P543010	DMD-CHIP	1076-6318W	⚠ CY03	----	CAPACITOR	MAX.4700pF
⚠	288D072030	FAN MOTOR(POWER)		⚠ CY04	----	CAPACITOR	MAX.4700pF
⚠	288D072040	FAN MOTOR(EXHAUST)		⚠ CY05	----	CAPACITOR	MAX.2200pF
⚠	288D072050	FAN MOTOR(LAMP)		⚠ CY06	----	CAPACITOR	MAX.2200pF
⚠	480D044060	SPEAKER		⚠ CY201	----	CAPACITOR	MAX.4700pF
	499D137040	THERMAL FUSE		⚠ CY202	----	CAPACITOR	MAX.4700pF
PRINTED CIRCUIT BOARD ASSY'S				⚠ IC203	----	OPTOCOUPLER	
⚠	934D054060	AUDIO PCB ASSY		⚠ IC204	----	OPTOCOUPLER	
⚠	934D054090	COLOR WHEEL PCB ASSY		⚠ IC210	----	OPTOCOUPLER	
⚠	934D054080	DMD PCB ASSY		⚠ T201	----	TRANSFORMER	
⚠	934D080010	IR (F) PCB ASSY		⚠ T101	----	TRANSFORMER	
⚠	934D054070	KEY PCB ASSY		⚠ Q101	----	MOSFET	
⚠	934D054050	LAMP POWER UNIT		⚠ Q102	----	MOSFET	
⚠	934D054030	MAIN PCB ASSY		⚠ IC102	----	PWM IC	
⚠	934D054040	POWER PCB ASSY		⚠ C113	----	STORAGE CAPACITOR	4.7μF 400V min.
MECHANICAL PARTS				⚠ BD102	----	BRIDGE DIODE	
	499D137030	LAMP CONNECTOR		⚠ CN101	----	LAMP DRIVER CONNECTOR	
	499D137060	LENS UNIT		⚠ C109	----	STORAGE CAPACITOR	180-270μF 450V min.
COSMETIC PARTS				⚠ L101	----	PFC CHOKE	
⚠	750D036070	BOTTOM COVER		⚠ BD101	----	BRIDGE DIODE	
	499D137010	COLOR WHEEL		⚠ RE1	----	RELAY	
	750D036090	IO COVER		⚠ LC01	----	CHOKE	
⚠	750D036080	LAMP COVER		⚠ LC02	----	CHOKE	
	499D137020	LIGHT PIPE		⚠ CX01	----	X-CAPACITOR	MAX. 0.47μF 300V min.
	771D125030	ADJUSTER		⚠ CX02	----	X-CAPACITOR	MAX. 0.47μF 300V min.
⚠	750D021090	TOP COVER		⚠ R01	----	BLEEDER RESISTOR	1/4W 330kΩ
PACKING PARTS AND ACCESSORY				⚠ R02	----	BLEEDER RESISTOR	
⚠	246C359010	AC POWER CORD	[XD221U]	⚠ NT01	----	THERMISTOR	5Ω
⚠	246C383020	AC POWER CORD	[XD221U]	⚠ NT02	----	THERMISTOR	5Ω
⚠	246C483010	AC POWER CORD		⚠ CX03	----	X-CAPACITOR	MAX. 0.22μF 300V min.
	246D058010	CONTROL CABLE		⚠ RV01	----	VARISTOR	
	813C022010	PACKING CUSHION		⚠ FS01	----	FUSE	T10AH 250Vac
	871D548010	CD-ROM IB	[XD221U]	⚠ CN01	----	APPLIANCE INLET	10A 250V
	871D548020	CD-ROM IB	[XD221U-G]	⚠	----	THERMOSTAT	16A 240V
	801C656010	PACKING CASE	[XD221U-G]	⚠	----	STEPPING MOTOR	
	801D142020	PACKING CASE	[XD221U]	⚠	----	INTERLOCK SWITCH	
⚠	939D279040	REMOTE CONTROL		⚠	----	HV WIRE FOR LAMP DRIVER	
	772D052030	SOFT CASE		⚠	----	LAMP	180W
	859D229030	CAUTION SHEET					
	856D592030	PACKING CUSHION(PAD)					
	871D548040	SAFETY MANUAL	[XD221U]				
	871D548050	SAFETY MANUAL	[XD221U-G]				

BLOCK DIAGRAM



SCHEMATIC DIAGRAM

PCB-POWER (1/2)



NOTE

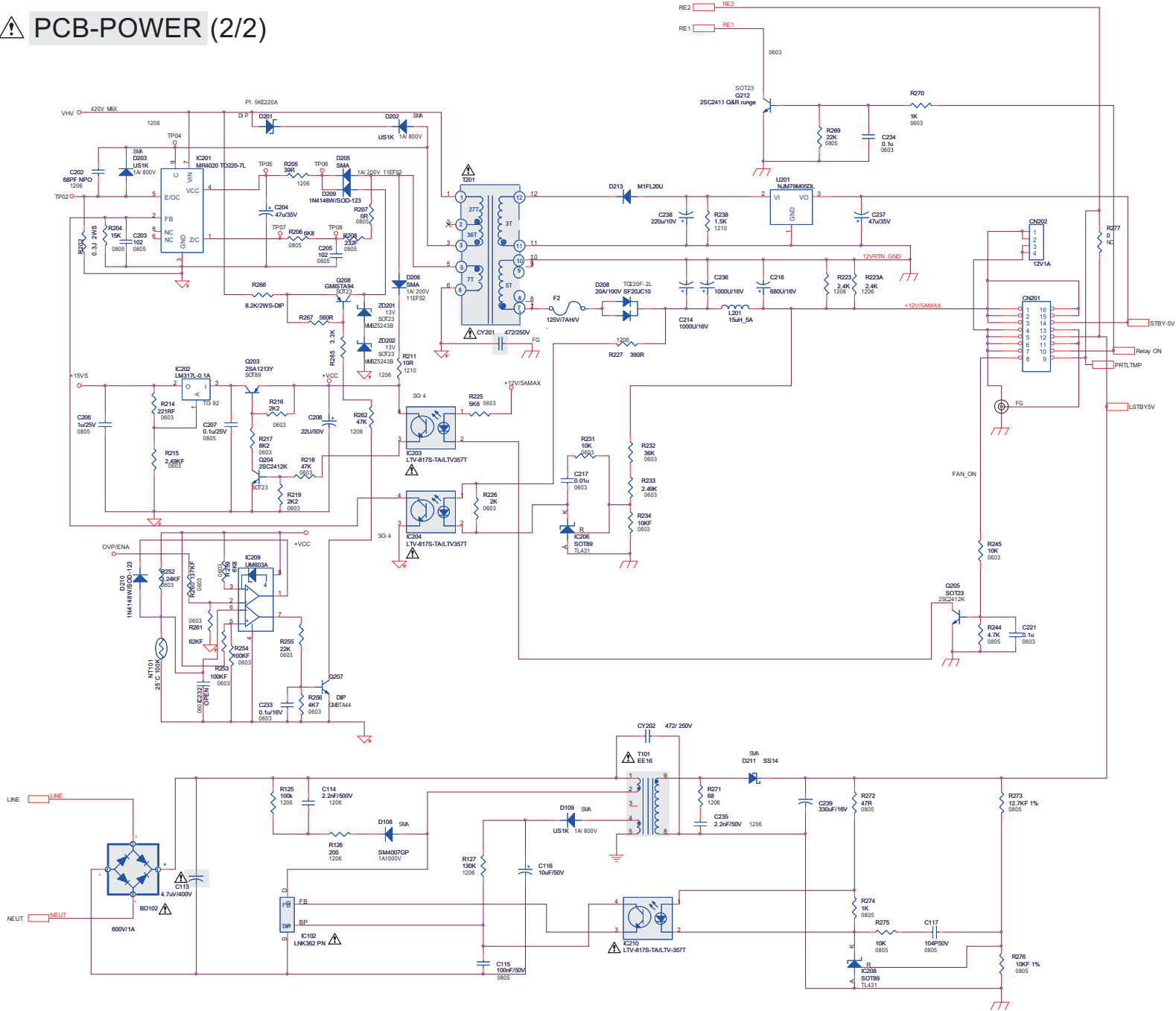
This is a basic schematic diagram. Some sets may be subject to modify according to engineering improvement.

⚠️ SERVICING PRECAUTION

SYMBOLS INDICATE COMPONENTS HAVING SPECIAL CHARACTERISTICS IMPORTANT TO SAFETY AND PERFORMANCE. THEREFORE REPLACEMENT OF ANY SAFETY PARTS SHOULD BE IDENTICAL IN VALUE AND CHARACTERISTICS. FOR ACCURACY OF THE REPLACEMENT REFER TO THE PARTS LIST OF SERVICE MANUAL. DON'T DEGRADE THE SAFETY OF THE RECEIVERS THROUGH IMPROPER SERVICING.

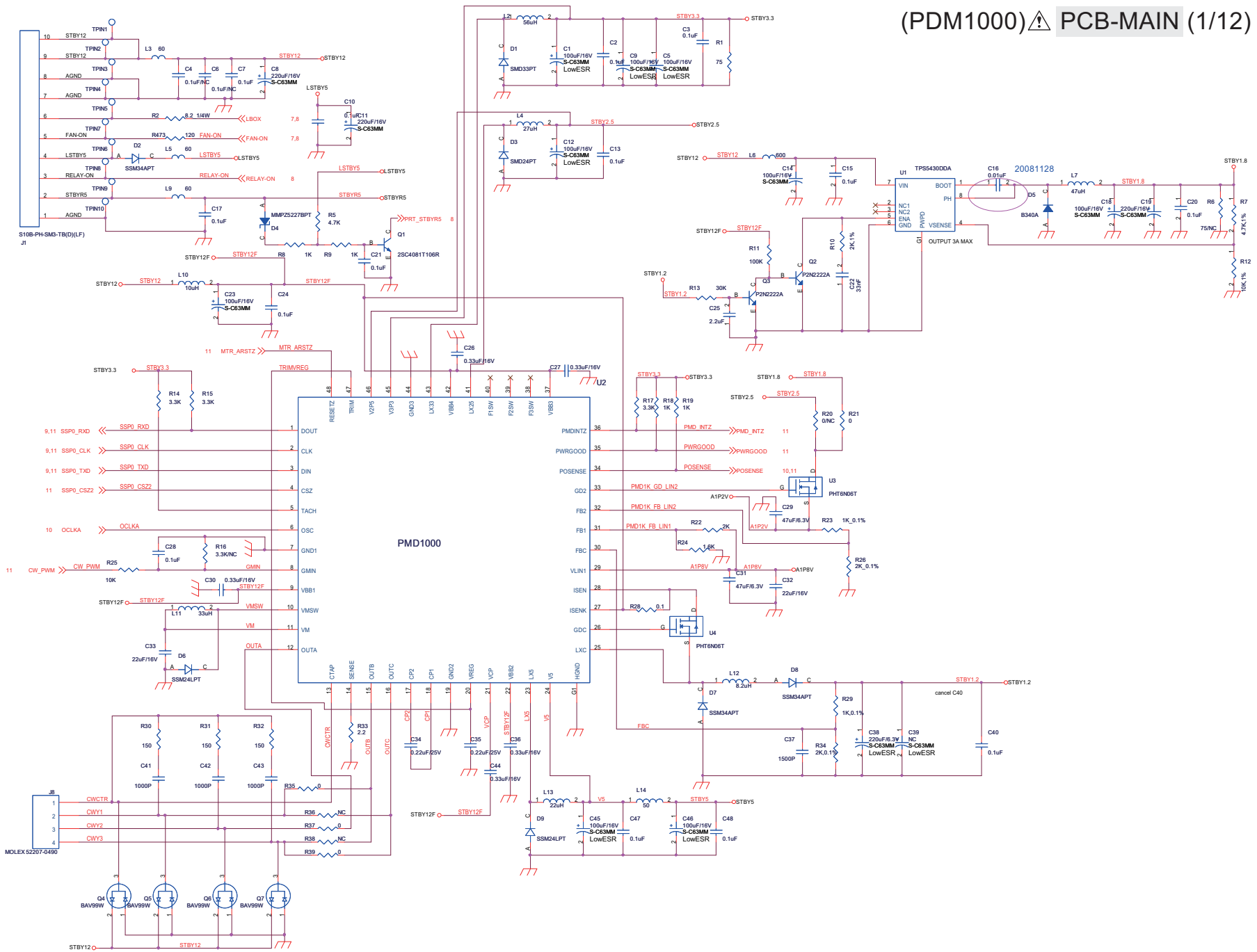
SHADED COMPONENTS HAVE SPECIAL CHARACTERISTICS IMPORTANT TO SAFETY. BEFORE REPLACING ANY OF THESE COMPONENTS, READ CAREFULLY THE PRODUCT SAFETY NOTICE IN THE SERVICE MANUAL. DON'T DEGRADE THE SAFETY OF THE RECEIVERS THROUGH IMPROPER SERVICING.

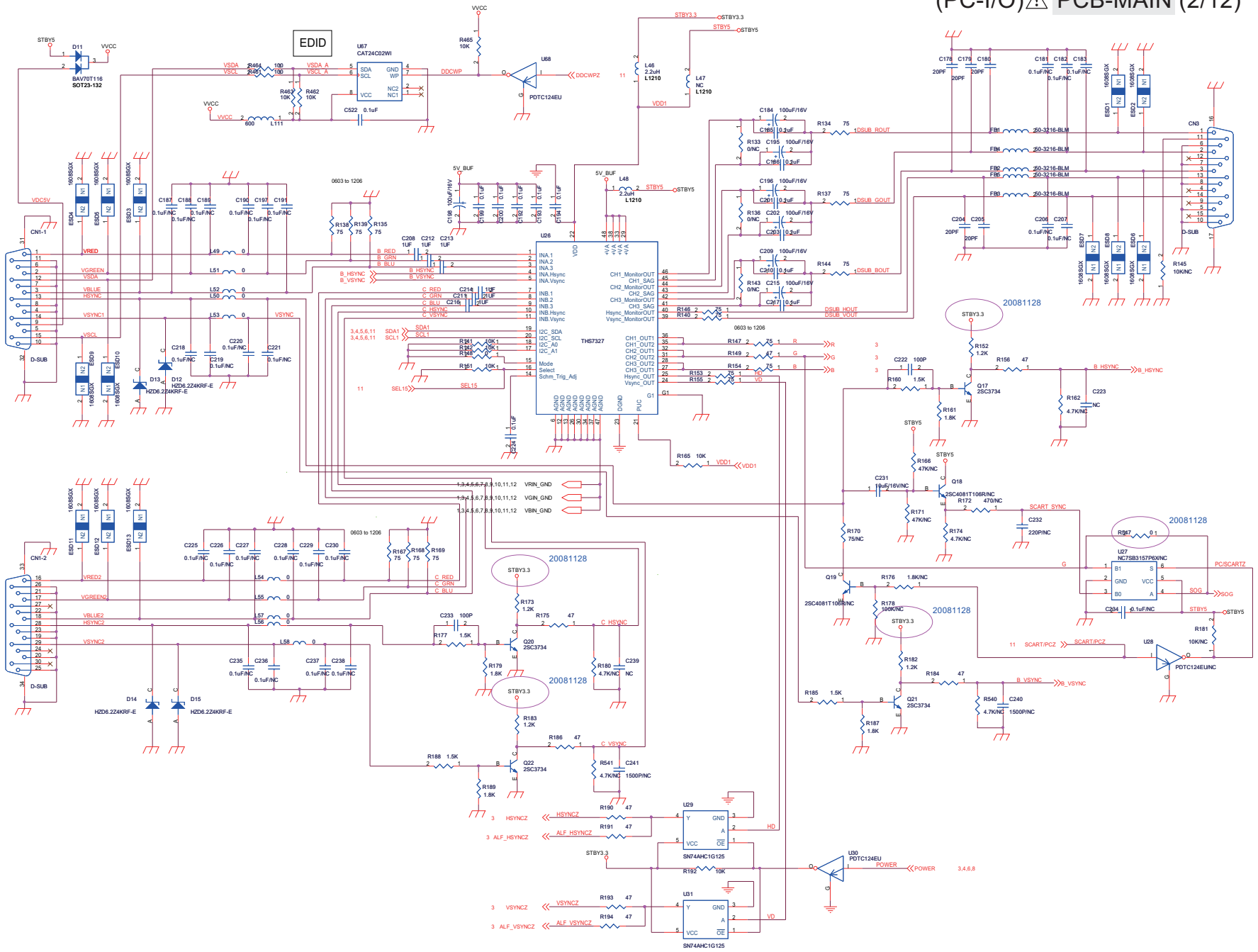
⚠ PCB-POWER (2/2)



C-2

C3

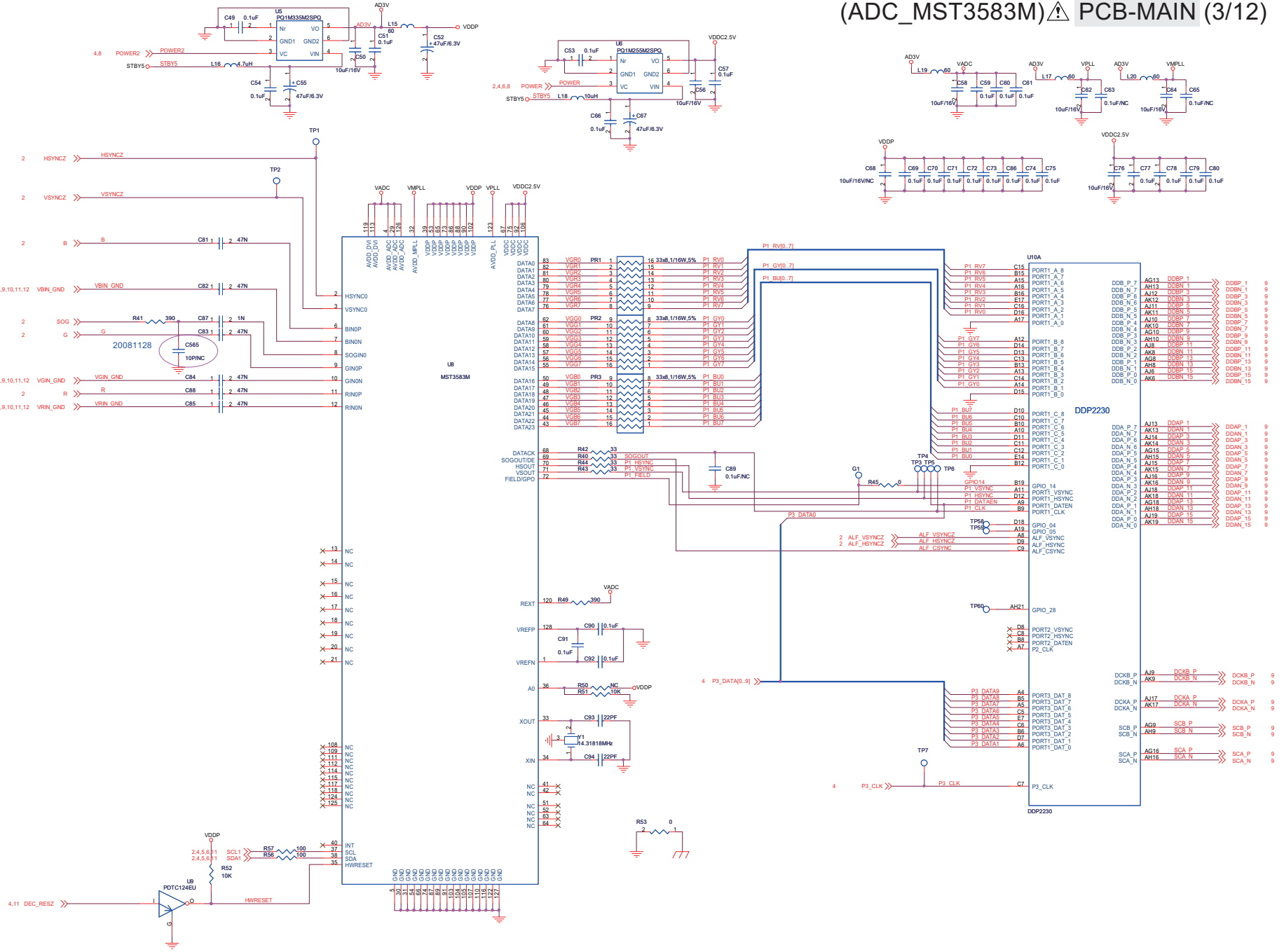




C-4

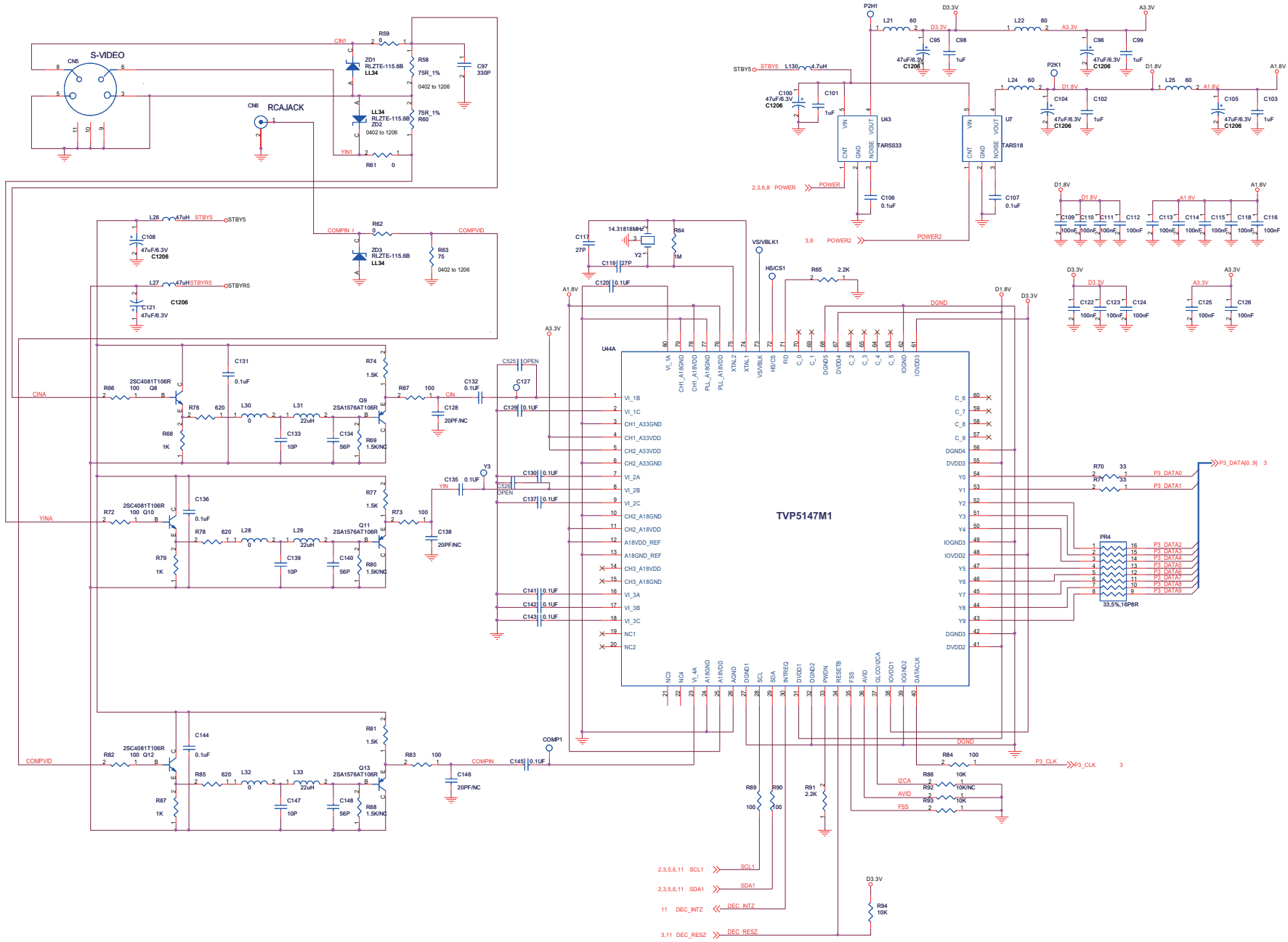
(ADC_MST3583M) PCB-MAIN (3/12)

C-5



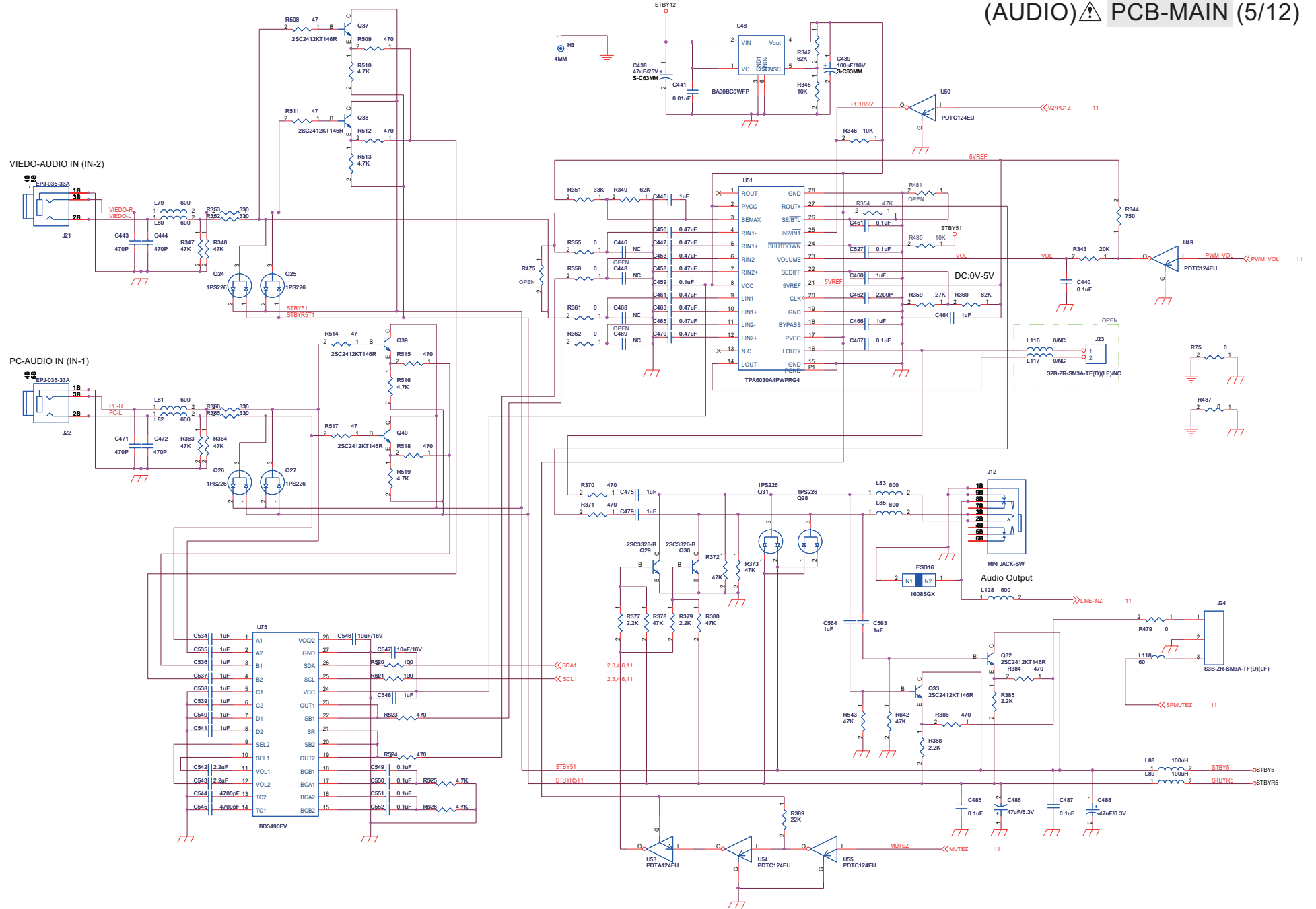
(TLV5147M1) PCB-MAIN (4/12)

C-6

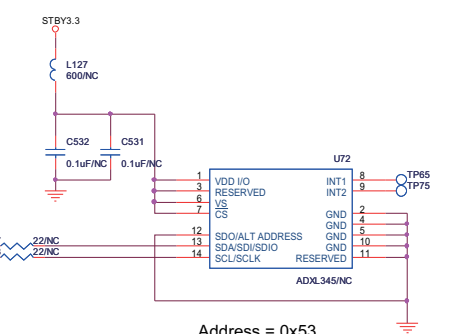
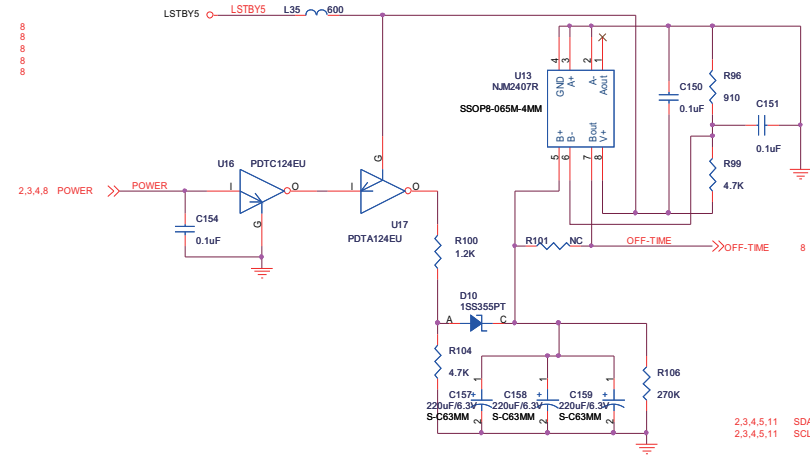
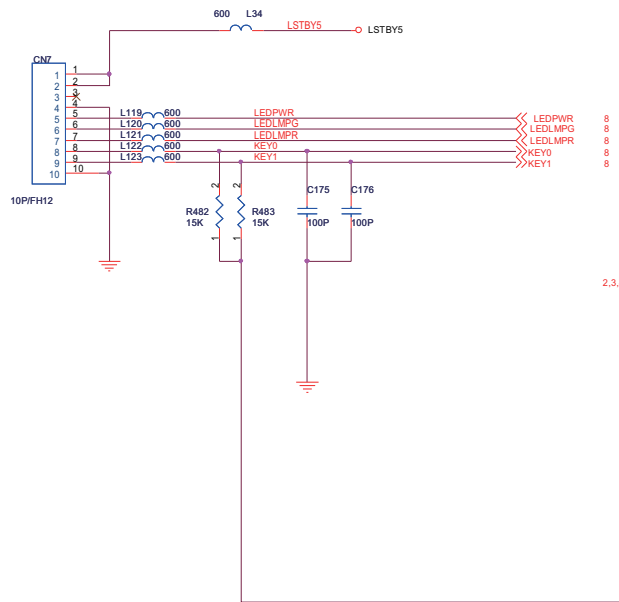


(AUDIO) PCB-MAIN (5/12)

C-7



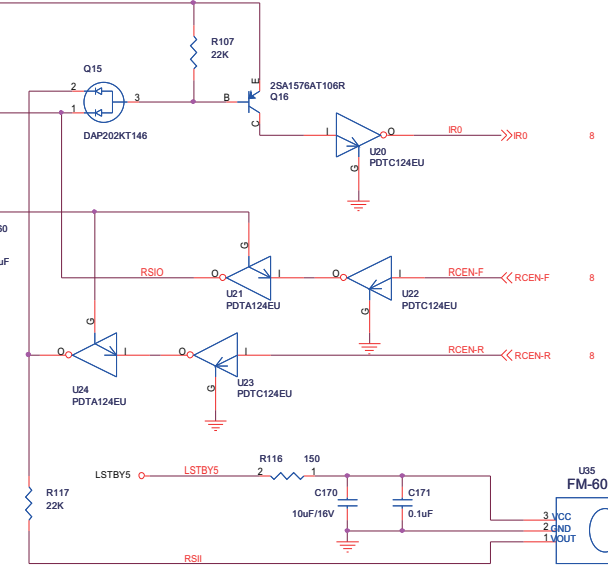
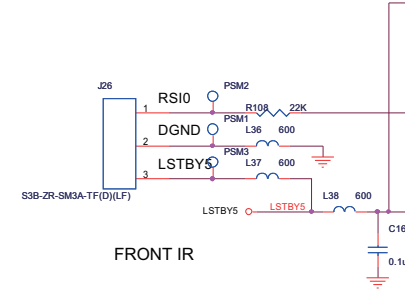
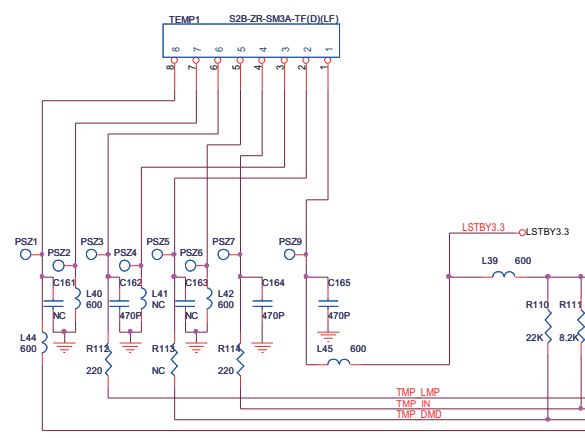
(IR_AUTO_KEystone) PCB-MAIN (6/12)



Address = 0x53

C-8

- 2,3 THERMISTOR(DMD Temperature)
- 4,5 THERMISTOR(Air Temperature)
- 6,7 THERMISTOR(Lamp Housing)
- 1,,8 THERMOSTAT(Lamp Housing)

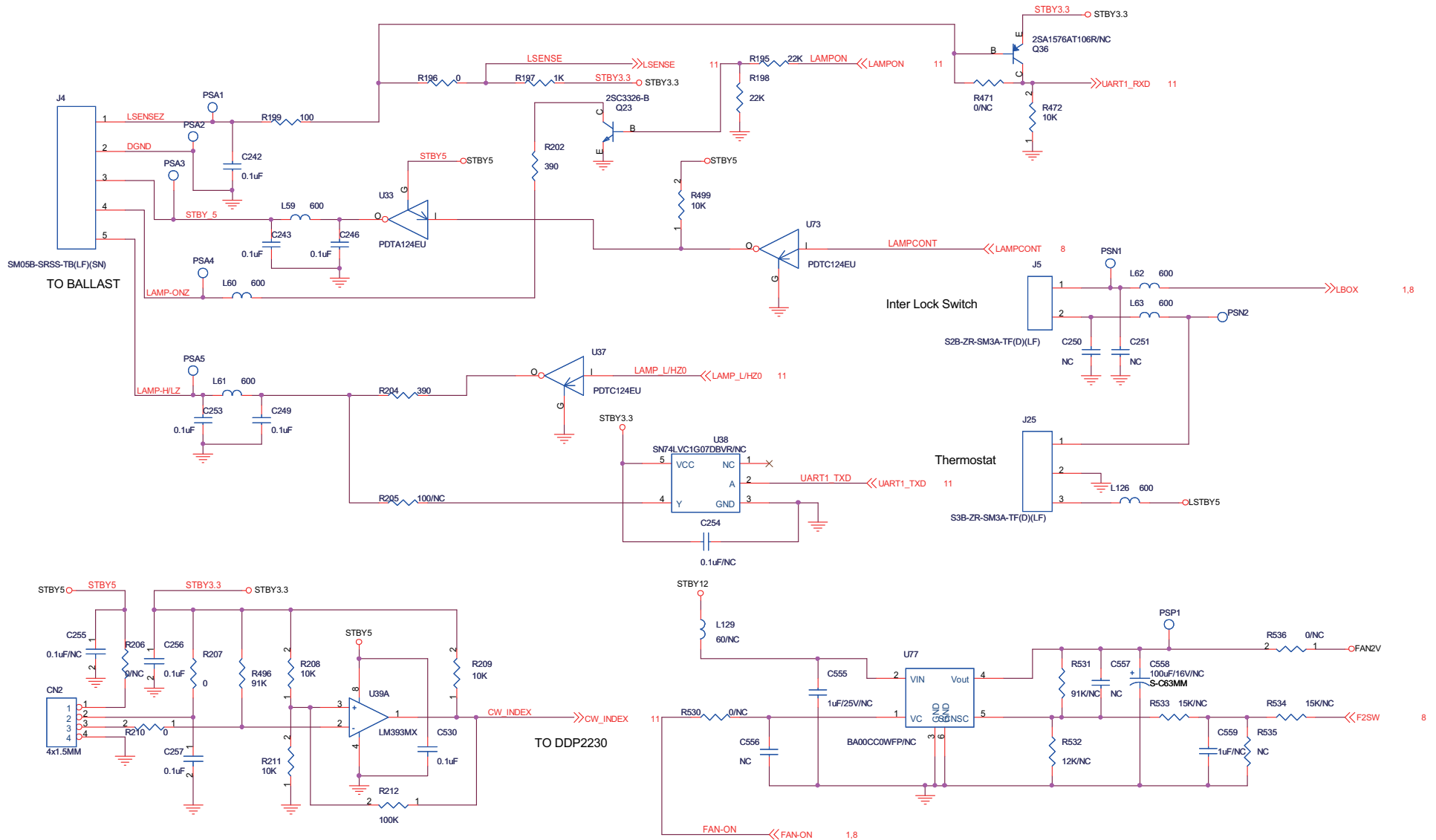


BACK IR



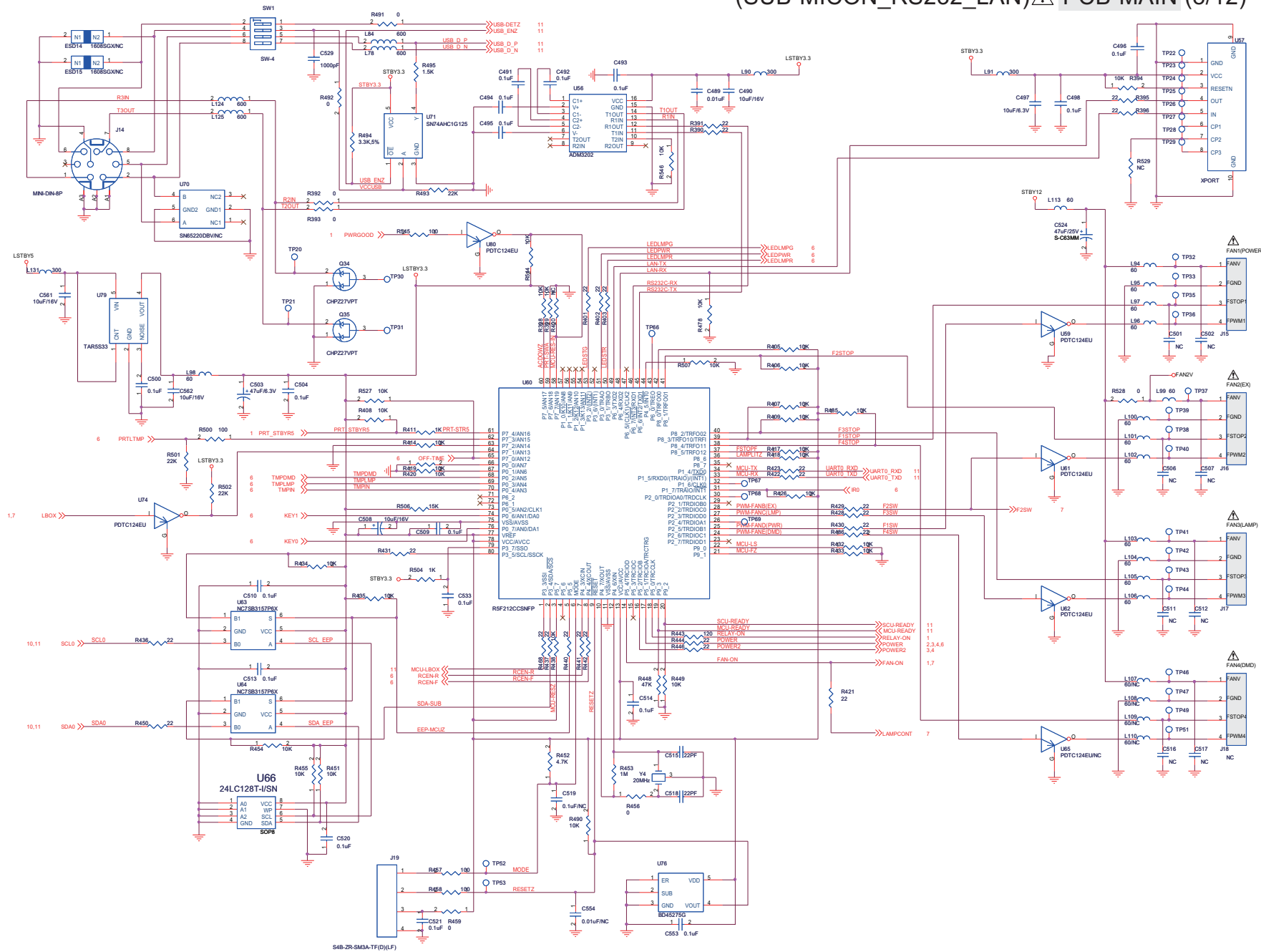
(BALLAST) PCB-MAIN (7/12)

C-9



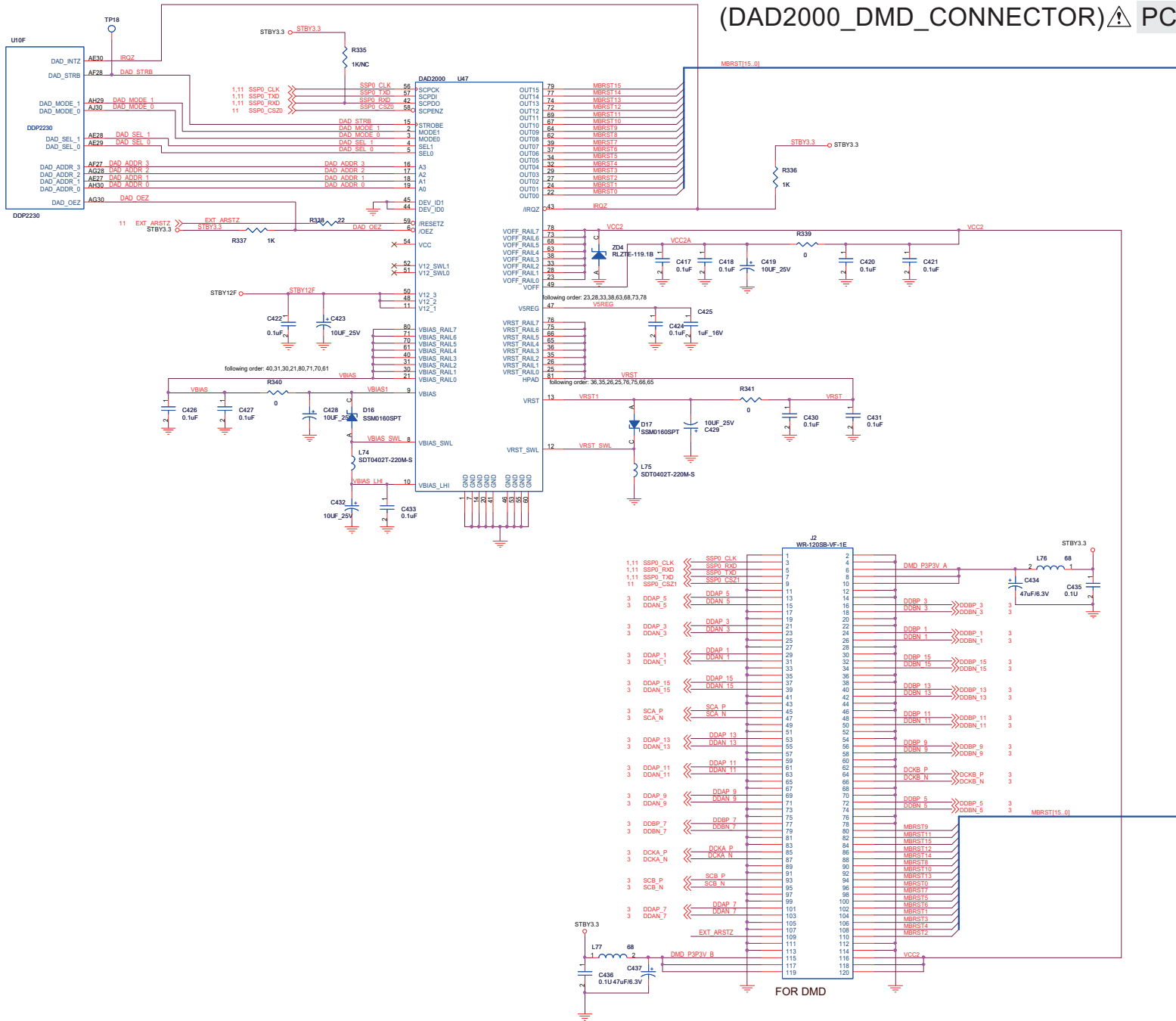
(SUB-MICON_RS232_LAN) PCB-MAIN (8/12)

C-10



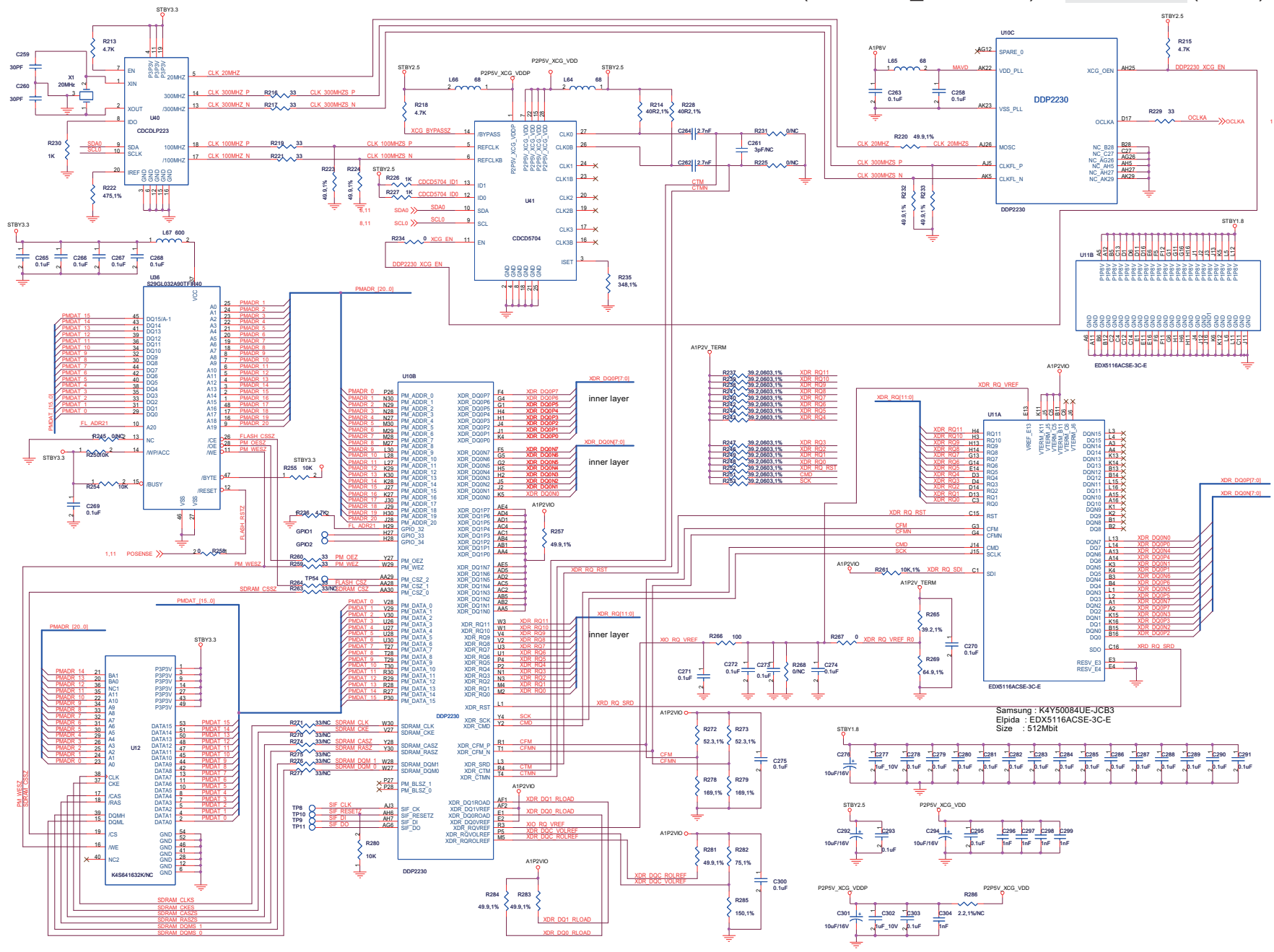
S4B-ZR-SM3A-TF(D)(LF)

(DAD2000_DMD_CONNECTOR) PCB-MAIN (9/12)



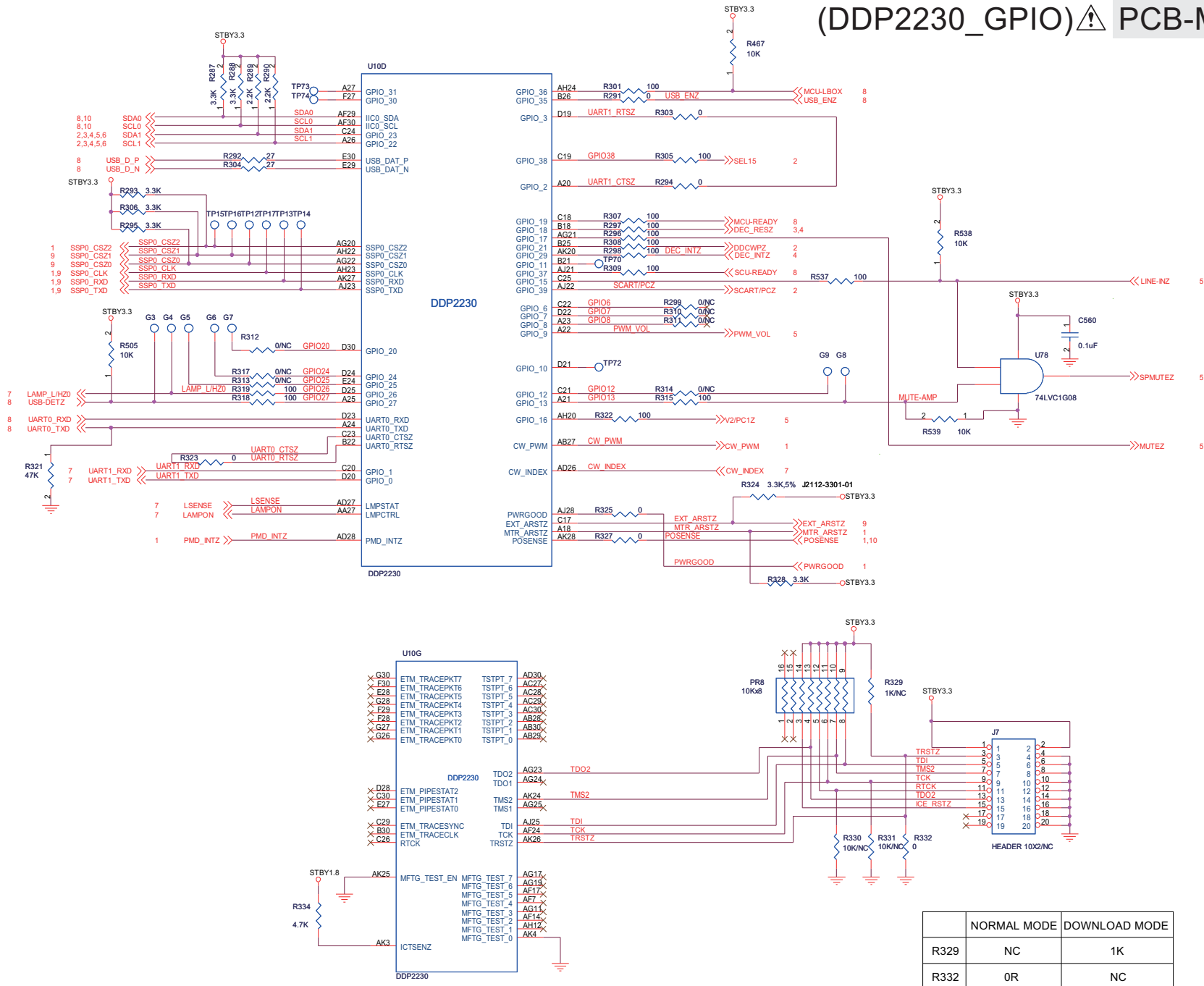
(DDP2230_MEMORY) PCB-MAIN (10/12)

C-12



(DDP2230_GPIO) PCB-MAIN (11/12)

C-13



	NORMAL MODE	DOWNLOAD MODE
R329	NC	1K
R332	0R	NC

(DDP2230_POWER) PCB-MAIN (12/12)

C-14

