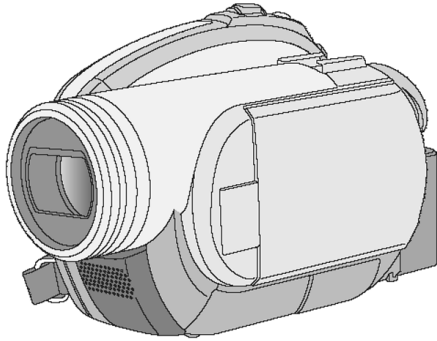


Service Manual

Digital Video Camcorder



PbF
Solder Lead free

VDR-D220E VDR-D220EB
VDR-D220EE VDR-D220EF
VDR-D220EG VDR-D220EP
VDR-D220GC VDR-D220GCS
VDR-D220GN VDR-D220SG
VDR-D228GK VDR-D230EE

Vol. 1

Colours

(S).....Silver Type

⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

Panasonic

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1 Safety Precautions

1.1. General Guidelines

1. IMPORTANT SAFETY NOTICE

There are special components used in this equipment which are important for safety. These parts are marked by  in the Schematic Diagrams, Circuit Board Layout, Exploded Views and Replacement Parts List. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent shock, fire, or other hazards. Do not modify the original design without permission of manufacturer.

2. An Isolation Transformer should always be used during the servicing of AC Adaptor whose chassis is not isolated from the AC power line. Use a transformer of adequate power rating as this protects the technician from accidents resulting in personal injury from electrical shocks. It will also protect AC Adaptor from being damaged by accidental shorting that may occur during servicing.
3. When servicing, observe the original lead dress. If a short circuit is found, replace all parts which have been overheated or damaged by the short circuit.
4. After servicing, see to it that all the protective devices such as insulation barriers, insulation papers shields are properly installed.
5. After servicing, make the following leakage current checks to prevent the customer from being exposed to shock hazards.

2 Warning

2.1. Prevention of Electro Static Discharge (ESD) to Electrostatically Sensitive (ES) Devices

Some semiconductor (solid state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive (ES) Devices. Examples of typical ES devices are integrated circuits and some field-effect transistors and semiconductor "chip" components. The following techniques should be used to help reduce the incidence of component damage caused by electro static discharge (ESD).

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any ESD on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging ESD wrist strap, which should be removed for potential shock reasons prior to applying power to the unit under test.
2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
3. Use only a grounded-tip soldering iron to solder or unsolder ES devices.
4. Use only an antistatic solder removal device. Some solder removal devices not classified as "antistatic (ESD protected)" can generate electrical charge sufficient to damage ES devices.
5. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ES devices.
6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive material).
7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.

CAUTION :

Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.

8. Minimize bodily motions when handling unpackaged replacement ES devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity (ESD) sufficient to damage an ES device).

2.2. Caution for AC Cord (VJA0940 type)

2.2.1. Information for your safety

IMPORTANT

Your attention is drawn to the fact that recording of pre-recorded tapes or discs or other published or broadcast material may infringe copyright laws.

WARNING

To reduce the risk of fire or shock hazard, do not expose this equipment to rain or moisture.

CAUTION

To reduce the risk of fire or shock hazard and annoying interference, use the recommended accessories only.

FOR YOUR SAFETY

DO NOT REMOVE THE OUTER COVER

To prevent electric shock, do not remove the cover. No user serviceable parts inside. Refer servicing to qualified service personnel.

2.2.2. Caution for AC Mains Lead

For your safety, please read the following text carefully.

This appliance is supplied with a moulded three-pin mains plug for your safety and convenience.

A 5-ampere fuse is fitted in this plug.

Should the fuse need to be replaced please ensure that the replacement fuse has a rating of 5 amperes and it is approved by ASTA or BSI to BS1362.

Check for the ASRA mark or the BSI mark on the body of the fuse.



If the plug contains a removable fuse cover you must ensure that it is refitted when the fuse is replaced.

If you lose the fuse cover, the plug must not be used until a replacement cover is obtained.

A replacement fuse cover can be purchased from your local Panasonic Dealer.

If the fitted moulded plug is unsuitable for the socket outlet in your home then the fuse should be removed and the plug cut off and disposed of safely.

There is a danger of severe electrical shock if the cut off plug is inserted into any 13-ampere socket.

If a new plug is to be fitted please observe the wiring code as shown below.

If in any doubt, please consult a qualified electrician.

2.2.2.1. Important

The wires in this mains lead are coloured in accordance with the following code:

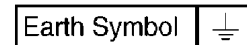
Blue	Neutral
Brown	Live

As the colours of the wires in the mains lead of this appliance may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows:

The wire which is coloured BLUE must be connected to the terminal in the plug which is marked with the letter N or coloured BLACK.

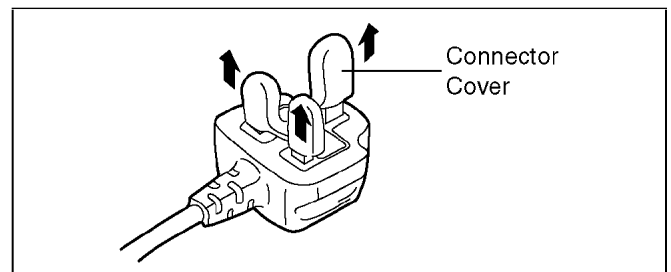
The wire which is coloured BROWN must be connected to the terminal in the plug which is marked with the letter L or coloured RED.

Under no circumstances should either of these wires be connected to the earth terminal of the three pin plug, marked with the letter E or the Earth Symbol.



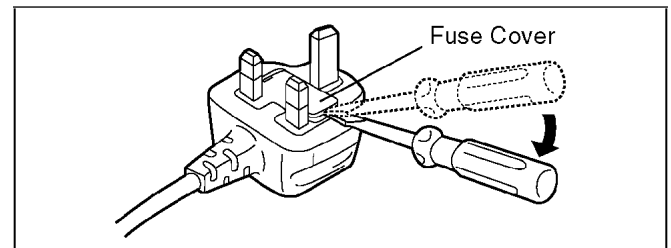
2.2.2.2. Before use

Remove the Connector Cover as follows.

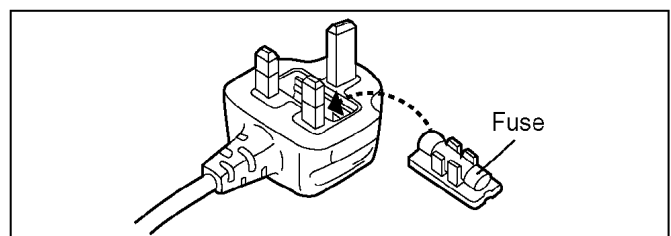


2.2.2.3. How to replace the Fuse

1. Remove the Fuse Cover with a screwdriver.

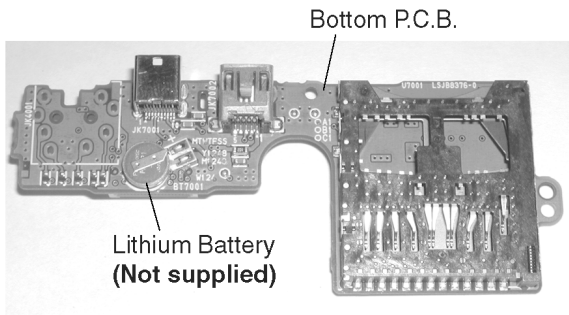


2. Replace the fuse and attach the Fuse cover.



2.3. How to Replace the Lithium Battery

The lithium battery (CGR-F/202AW) is not supplied as a service part and must be replaced as part of the Bottom P.C.B. (Refer to "Disassembly and Assembly Instructions.")



Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivalent type.

CAUTION - The battery used in this device may present a risk of fire or chemical burn if mistreated.

Do not recharge, disassemble, heat above 100 °C (212 °F), or incinerate.

Replace battery with Panasonic part number ML-621S/F9D only.

Use of another battery may present a risk of fire or explosion.

Dispose of used battery promptly. Keep away from children.

Do not disassemble and do not dispose of in fire.

NOTE:

This Lithium battery is a critical component. (Type No.: CGR-F/202AW Manufactured by Panasonic.) **(Not supplied)**

It must never be subjected to excessive heat or discharge.

It must therefore only be fitted in equipment designed specifically for its use.

Replacement batteries must be of the same type and manufacture.

They must be fitted in the same manner and location as the original battery, with the correct polarity contacts observed.

Do not attempt to re-charge the old battery or re-use it for any other purpose.

It should be disposed of in waste products destined for burial rather than incineration.

CAUTION

Danger of explosion if battery is incorrectly replaced.

Replace only with the same or equivalent type recommended by the equipment manufacturer.

Discard used batteries according to manufacturer's instructions.

PRECAUTION

Le fait de remplacer incorrectement la pile peut présenter des risques d'explosion.

Remplacer la pile uniquement par une pile identique ou de type équivalent recommandée par le fabricant. Se débarrasser des piles usagées conformément aux instructions du fabricant.

VORSICHT

Bei einer falsch eingesetzten Batterie besteht Explosionsgefahr. Nur mit einer vom Hersteller empfohlenen Batterie vom gleichen Typ ersetzen.

Verbrauchte Batterien beim Fachhändler oder einer Sammelstelle für Sonderstoffe abliefern.

VARNING

Explosionsfara vid felaktigt batteribyte.

Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren.

Kassera använt batteri enligt fabrikantens instruktion.

ADVARSEL!

Lithiumbatteri-Eksplosionsfare ved fejlagtig håndtering.

Udskiftning må kun ske med batteri af samme fabrikat og type.

Levér det brugte batteri tilbage til leverandøren.

VAROITUS

Paristo voi räjähtää, jos se on virheellisesti asennettu.

Vaihda paristo ainoastaan laitevalmistajan suositteluun tyyppiin.

Hävittä käytetty paristo valmistajan ohjeiden mukaisesti.

3 Service Navigation

3.1. Introduction

This service manual contains technical information which will allow service personnel's to understand and service this model. Please place orders using the parts list and not the drawing reference numbers.

If the circuit is changed or modified, this information will be followed by supplement service manual to be filed with original service manual.

Note 1:

1. VSK0561 is indicated on the AC Adaptor used in the following model:

VDR-D228GK.

However, the AC Adaptor replacement part number is DE-974HC which should be used when ordering.

2. VSK0561 is indicated on AC Adaptor used in the following models:

VDR-D220E, VDR-D220EB, VDR-D220EE, VDR-D220EF, VDR-D220EG, VDR-D220EP, VDR-D220GC, VDR-D220GCS, VDR-D220GN, VDR-D220SG, and VDR-D230EE-K.

However, the AC Adaptor replacement part number is DE-974GB which should be used when ordering.

Note 2:

1. This service manual does not contain the following information, because of the impossibility of servicing at component level.

a. Schematic Diagram, Block Diagram and P.C.B. layout of Main P.C.B.

b. Parts List for individual parts of Main P.C.B.

2. The following category are recycle module parts. Please send it to Central Repair Center.

a. *Main P.C.B. (LSEP8374P1/ LSEP8374Q1/LSEP8374R1)

When a part replacement is required for repairing Main P.C.B., replace the assembly parts.

3.2. About Lead Free Solder (PbF)

Distinction of PbF PCB:

PCBs (manufactured) using lead free solder will have a PbF stamp on the PCB.

Caution:

- Pb free solder has a higher melting point than standard solder; Typically the melting point is 50-70°F (30-40°C) higher. Please use a high temperature soldering iron. In case of the soldering iron with temperature control, please set it to 700±20°F (370±10°C).
- Pb free solder will tend to splash when heated too high (about 1100°F/600°C).

When soldering or unsoldering, please completely remove all of the solder on the pins or solder area, and be sure to heat the soldering points with the Pb free solder until it melts enough.

4 Specifications

ITEM	SPECIFICATION
Power	DVD Video Camera: Power Source: DC 7.9/7.2 V Power Consumption: 6.0 W (Recording) AC Adaptor: Power Source: AC 110-240 V, 50/60 Hz Power Consumption: 19 W DC Output: DC 7.9 V, 1.4 A (Unit Operation) DC 8.4 V, 0.65 A (Battery Charging)
Signal System	CCIR: 625 lines, 50 fields PAL colour signal
Recording Format	DVD Video Recording format (DVD-RAM, DVD-RW) DVD-Video format (DVD-RW, DVD-R, DVD-R DL)
Image Sensor	1/6-inch CCD Image Sensor Total: 680 K Effective pixels: Moving picture: 340 K (4:3), 460 K (16:9)/Still picture: 350 K (4:3), 460 K (16:9)
Lens	Auto Iris, F1.8 to F3.7 Focal length: 2.3 mm - 73.6 mm Macro (Full Range AF)
Filter Diameter	37 mm
Zoom	32× optical zoom, 50/1000× digital zoom
Monitor	2.7-inch wide LCD monitor (approx. 123 K pixels)
Viewfinder	Color Electronic Viewfinder (approx. 113 K pixels)
Microphone	Stereo (with a zoom function)
Speaker	1 round speaker Ø 20 mm
Standard Illumination	1,400 lx
Minimum Required Illumination	12 lx (Low light Mode : 1/60) approx. 2 lx (with the MagicPix function)
Output Level	Video Output Level: 1.0 Vp-p, 75 Ω S Video Output Level: Y: 1.0 Vp-p, 75 Ω, C: 0.300 Vp-p, 75 Ω Audio Output Level (Line): 316 mV, 600 Ω
USB	Card reader/writer function (No copyright protection support) Hi-Speed USB (USB 2.0) compliant PictBridge-compliant
Motion pictures	Recording media: 8 cm (3-inch) DVD-RAM Ver. 2.1 8 cm (3-inch) DVD-RW Ver. 1.1/2X-SPEED (2X/1X) 8 cm (3-inch) DVD-R for General Ver. 2.0 8 cm (3-inch) DVD-R for DL Ver. 3.0 Compression: MPEG2 Recording mode and transfer rate: XP: 10 Mbps (VBR) (Approx. 18 min recordable time on a single-sided DVD-RAM) SP: 5 Mbps (VBR) (Approx. 37 min recordable time on a single-sided DVD-RAM) LP: 2.5 Mbps (VBR) (Approx. 75 min recordable time on a single-sided DVD-RAM) Audio compression: Dolby Digital, 16 bit (48 kHz/2 ch)
Still Pictures	Recording Media: SD Memory Card (8 MB/16 MB/32 MB/64 MB/128 MB/256 MB/512 MB/1 GB /2 GB) (FAT12 and FAT16 format corresponding) SDHC Memory Card (4 GB) (FAT32 format corresponding) Compression: JPEG (Design rule for Camera File system, based on Exif 2.2 standard), DPOF corresponding Picture Size: 640 × 480, 640 × 360 (16:9)
Operating Condition	0 °C-40 °C (32 °F -104 °F) (0 °C-30 °C (32 °F-86 °F) when connected to the computer) (Temperature) 10 %-80 % (Humidity)
Weight	DVD Video Camera: 510 g (1.12 lbs.) AC Adaptor: 110 g (0.24 lbs.)
Dimensions	DVD Video Camera: 66.7 mm × 91.1 mm × 142.7 mm (W × H × D) (2.62 inch × 3.59 inch × 5.62 inch) (W × H × D) AC Adaptor: 61 mm × 32 mm × 91 mm (W × H × D) (2.40 inch × 1.26 inch × 3.58 inch) (W × H × D)
Solder	This model uses lead free solder (PbF).

Design and Specifications are subject to change without notice.
Weight and Dimensions shown are approximate.

5 Service Mode

5.1. Error Display

"PUSH THE RESET SWITCH" is displayed automatically on the EVF or the LCD Monitor when an undesirable condition has occurred.

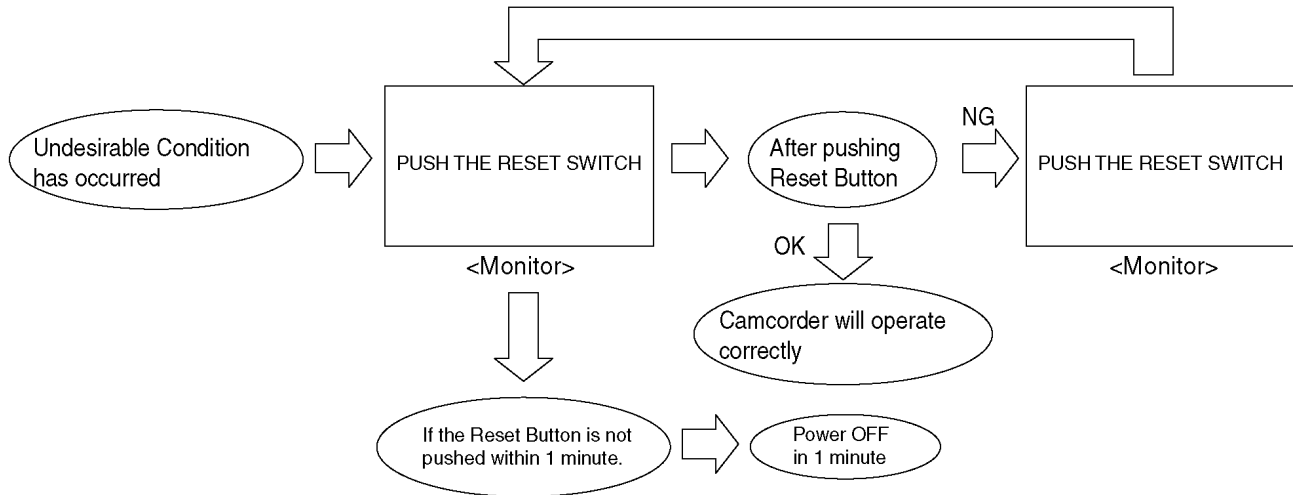


Fig. 1

Note:

When "PUSH THE RESET SWITCH" is displayed repeatedly, service is required. Check the Error Code which is listed in the Service Menu.

5.2. Service Menu

When abnormal detection contents are confirmed, do the following operation. Automatic diagnosis code will be displayed. (Service Menu)

To enter the Service Menu

Push the [DELETE], [JOYSTICK CONTROL LEFT] and [RECORDING START/STOP] simultaneously for 3 seconds (with no SD Card inserted).

Note:

If a Disc or SD Card is inserted, the above operation will not work.

This operation displays the following Service Menu items.

ARM version	CAM version	ROM correction version	EEPROM version	Drive firm version	Page
9.4.0.B	9.2.1.7	0.0	1.8	WS1.6	1 / 3
1				NO	
2				NO	
3				NO	
4				NO	
5				NO	
9.4.0.B	9.4.0.B	0.00500001	0.00040000		

IPL/NLDR version BLDR/VERUP version IPPLIB version μCODE version

<Service Menu 1/3>

Item	Value	Page
6	NO	2 / 3
7	NO	
8	NO	
9	NO	
10	NO	
940E	940E	00050001 00040000

<Service Menu 2/3>

Item	Value	Page
11	NO	3 / 3
12	NO	
13	NO	
14	NO	
15	NO	
940E	940E	00050001 00040000

<Service Menu 3/3>

Item [1]: Drive information
 Item [2]: Reset the total elapsed CCD time
 Item [3]: Drive temperature information
 Item [4]: Camera lock code/Elapsed time
 Item [5]: Not used } ignore

Item [6]: Not used
 Item [7]: Not used
 Item [8]: Not used } ignore
 Item [9]: Lock record clear
 Item [10]: Not used } ignore

Item [11]: Not used
 Item [12]: Not used
 Item [13]: Not used
 Item [14]: Not used
 Item [15]: Not used } ignore

Fig. 2-1

Note:

Only perform items 1, 3, and 4 in the Service Menu.

To select the Item

1. Set to Service Menu.
2. Press [JOYSTICK CONTROL UP/DOWN] to select item [1], [3], or [4].
3. Press [JOYSTICK CONTROL RIGHT] to display [YES/NO] screen.
4. Press [JOYSTICK CONTROL UP/DOWN] to select [YES].
5. Press [JOYSTICK CONTROL CENTER] to end.

<pre> DRIVE Information 1.F/W Ver. RS18 2.Serial CA00012E 3.BER 00000000 4.ERR Code 00/00/00 5.LASER I/T 000 / 030 6.Function Pass 7.Region 02 8.TMEP. AB </pre>	<ol style="list-style-type: none"> ← 1. Drive firmware version ← 2. Drive Serial No. ← 3. Bit error rate ← 4. Drive Error record ← 5. Laser current/LD temperature ← 6. Factory test result ← 7. Region code ← 8. Number of times of shut down due to high temperature
--	--

<pre> 4.ERR Code 00/01/02 </pre>	<table border="1" style="border-collapse: collapse; width: 100%;"> <tr> <td style="padding: 2px;">Replace the DVD Drive Unit</td> <td style="padding: 2px;">04/40/00 04/09/03 04/93/00</td> </tr> <tr> <td style="padding: 2px;">Replace the Disc Cover Lock Unit</td> <td style="padding: 2px;">04/53/00 02/3A/02</td> </tr> </table>	Replace the DVD Drive Unit	04/40/00 04/09/03 04/93/00	Replace the Disc Cover Lock Unit	04/53/00 02/3A/02
Replace the DVD Drive Unit	04/40/00 04/09/03 04/93/00				
Replace the Disc Cover Lock Unit	04/53/00 02/3A/02				

<ltme [1] screen>

<pre> RATE: **. **Mbps TEMP: ***/** </pre>	<ol style="list-style-type: none"> ← Recording bit rate ← Drive temperature (current)/Drive temperature (MAX)
--	---

<ltme [3] screen>

<pre> [HourMeter] PWR: 0123h45m EE : 0000h00m CAM : 51 52 00 </pre>	<ol style="list-style-type: none"> ← Total elapsed power on time ← ignore ← The number before previous ← Previous number ← Latest number
---	---

Camera Error code record in hexidecimal

<ltme [4] screen>

Display	Explanation of cause
00	No error
51	Focus Motor Lock
52	Zoom Motor Lock
53	OIS Drive Error
33	Communication error between CAMERA and ARM

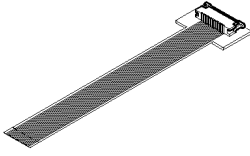
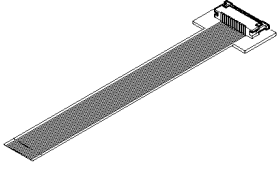
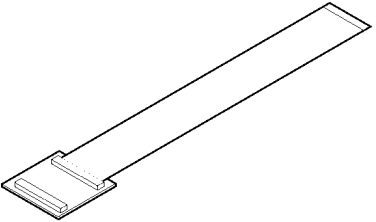
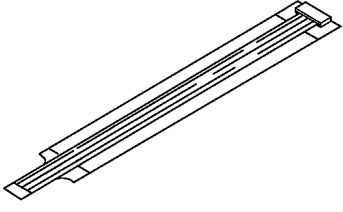
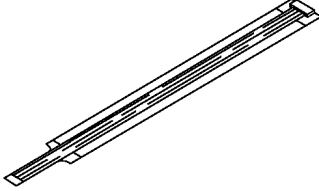
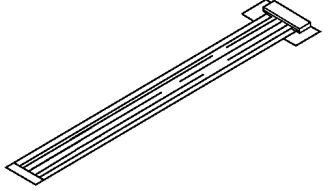
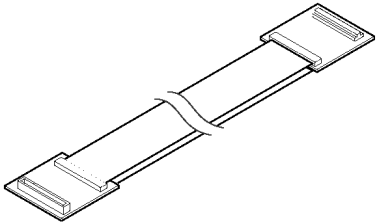

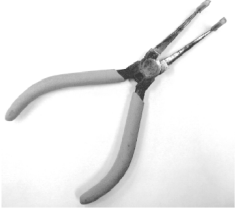
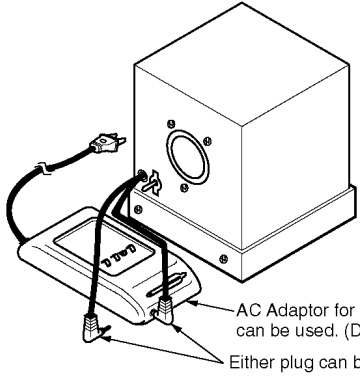
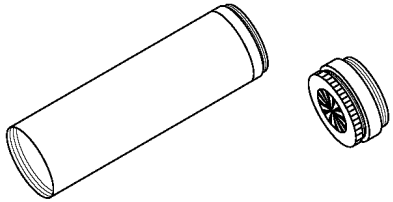
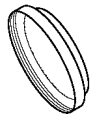
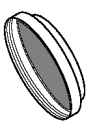
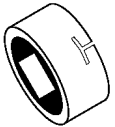
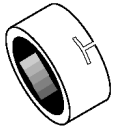

Fig. 2-2

To exit the Service Menu

Unplug the AC Cord.

6 Service Fixture & Tools

6.1. Service Fixture and Tools

<p>Extension Cable 18P LSUA0017</p> 	<p>Extension Cable 24P LSUA0018</p> 	<p>Extension Cable 32P LSUA0028</p> 		
<p>Extension Cable 14P VFKW0124A</p> 	<p>Extension Cable 12P VUVS0007</p> 	<p>Extension Cable 22P (2 pcs) VUVS0012</p> 		
<p>Extension Cable 60P LSUA0061</p> 	<p>Grease LSUQ0050</p> 	<p>Plier for Non ZIF Connector LSVQ0028</p> 		
<p>Light Box and AC Adaptor VFK1164LBX1</p>  <p>AC Adaptor for C-Movie can be used. (DC +6V) Either plug can be used.</p> <p>(AC Adaptor is not supplied)</p>	<p>Infinity Lens (with Focus Chart) VFK1164TCM02</p> 	<p>27mm Ring VFK1164TAR27</p> 	<p>Color Conversion Filter (C14) VFK1164TFCT2</p> 	
<p>White Chart VFK1164TFWC2</p> 			<p>Color Bar Chart VFK1164TFCB2</p> 	<p>Gray Scale Chart VFK1164TFGS2</p> 

6.2. Service Position

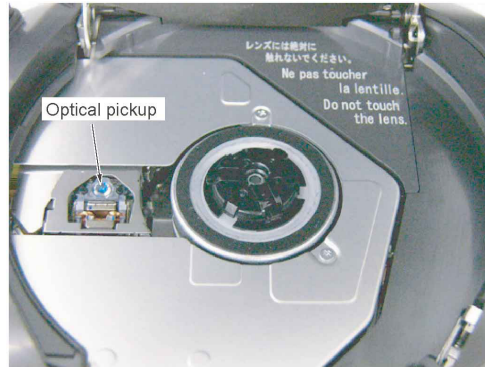
Caution



Laser light striking the eye may cause your eyesight to be lost: For safety, be sure to remove any power supply (AC adaptor/charger, battery, etc.) from the DVD video camera/recorder before starting work.

<CSA requirement>

CAUTION: VISIBLE LASER RADIATION DO NOT STARE INTO THE BEAM OR VIEW DIRECTLY WITH OPTICAL INSTRUMENTS CLASS 2M



6.2.1. Extension Cables for Service Position

Using the following Extension Cables, place the unit as shown for check and service.

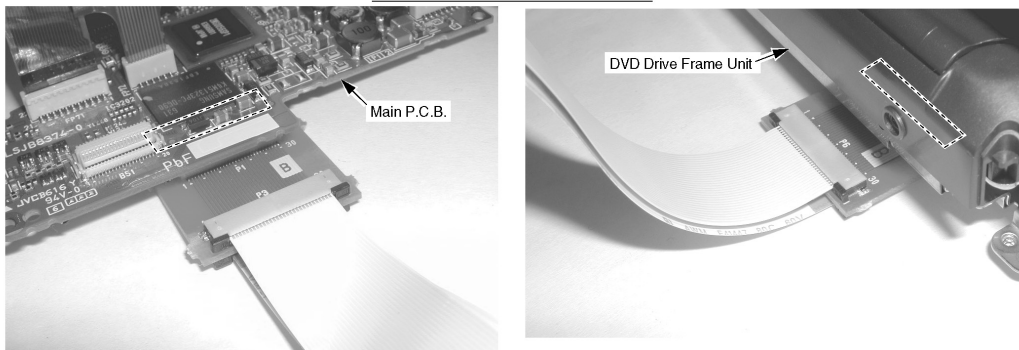
NO.	PART NUMBER	PART NAME	CONNECTION
①	LSUA0028	32Pin Extension Cable	FP81 on Main P.C.B. ~ Side R F.P.C. of Side R P.C.B.
②	LSUA0017	18Pin Extension Cable	FP91 on Main P.C.B. ~ EVF F.P.C. on EVF Unit
③	LSUA0018	24Pin Extension Cable	FP61 on Main P.C.B. ~ Side L F.P.C. of Side L/Disc Unit
④	LSUA0061	60Pin Extension Cable	B21 on Main P.C.B. ~ Connector of DVD Drive Frame Unit
⑤	VUVS0012	22Pin Extension Cable	LCD Shaft F.P.C. ~ FP8101 on LCD Backlight P.C.B.
⑥	VUVS0012	22Pin Extension Cable	FP71 on Main P.C.B. ~ Lens F.P.C. on Lens Unit
⑦	VFKW0124A	14Pin Extension Cable	FP31 on Main P.C.B. ~ CCD F.P.C. on CCD P.C.B.
⑧	VUVS0007	12Pin Extension Cable	FP72 on Main P.C.B. ~ OIS F.P.C. on Lens Unit

Note :

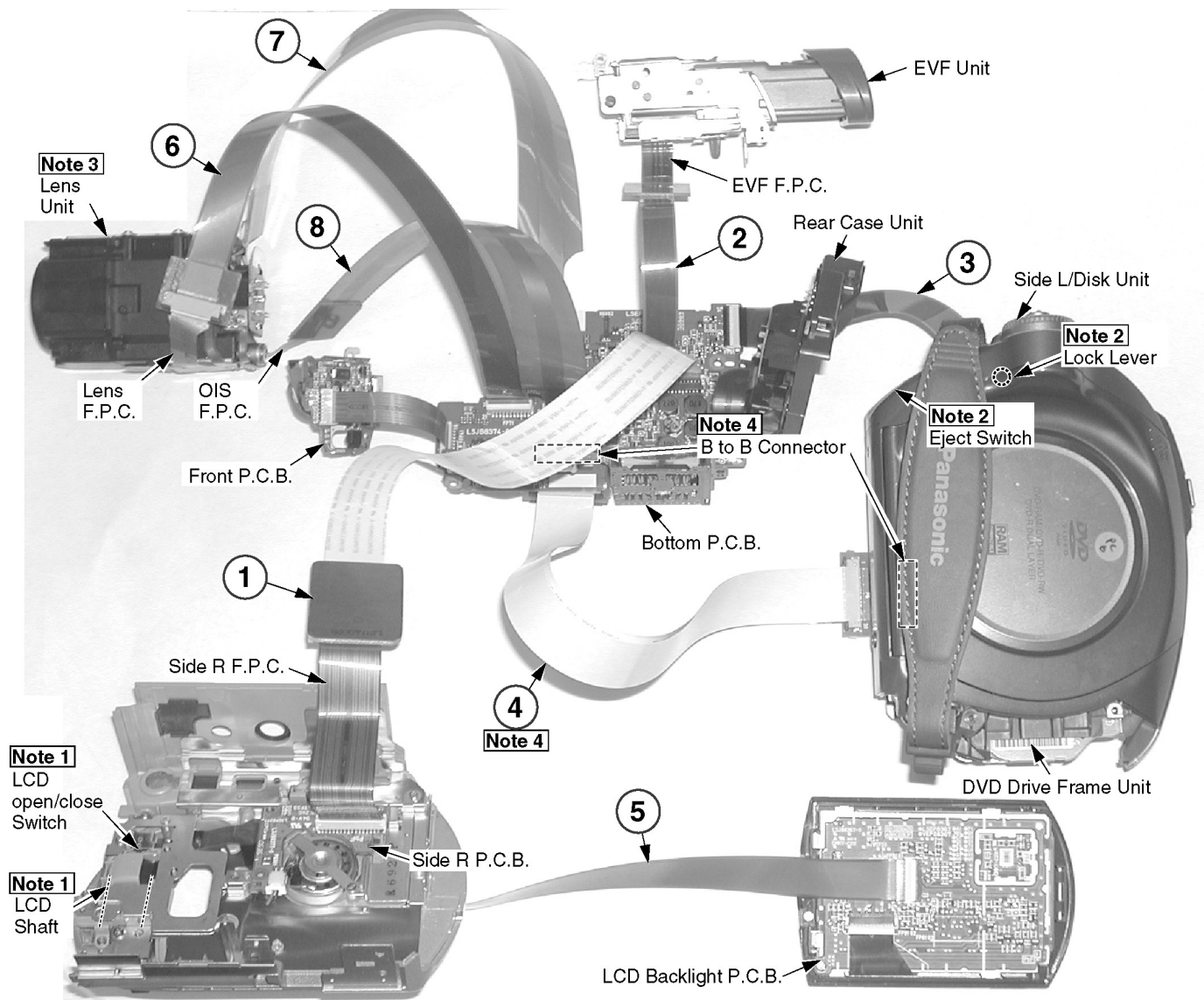
1. The LCD open/close Switch is for changing between LCD Display or EVF Display. When turning on EVF Display, close the LCD Shaft or place some paper or tape, etc. on LCD open/close Switch so that LCD open/close Switch stays ON.
2. To eject the DVD manually, slide the Lock lever on the Disc Cover Lock Unit for a short time or slide the EJECT switch.
3. Use a grounded ESD wrist strap while disassembling the Lens portion.
4. Connect the F.P.C.s to the connectors, verifying the direction of F.P.C.s.

The Main P.C.B. or a chip part will be damaged if the 60 Pin Extension Cable (LSUA0061) is misconnected.

Connections of 60 Pin Extension Cable



5. Use extreme care when plugging in or unplugging connectors.



Non ZIF connectors are on the Main P.C.B. as shown in gray.

Direction of F.P.C.s connection

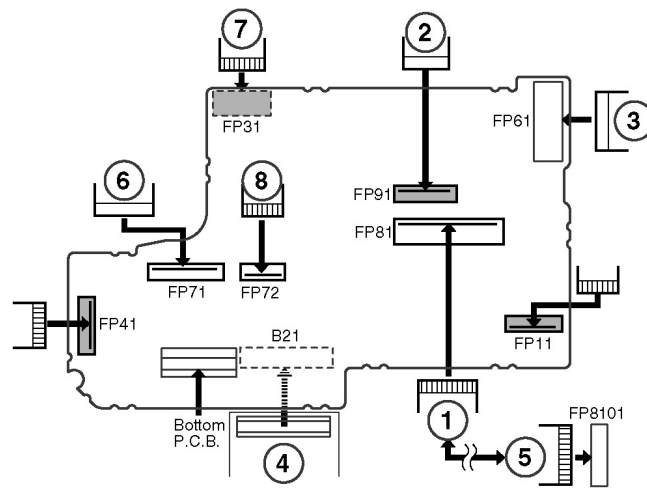


Fig. 3

6.3. Removal/Installation of F.P.C. From Non ZIF (Zero Insertion Force) Connector

Removal/Installation of F.P.C. from the Non ZIF (Zero Insertion Force) connector:

1. The Non ZIF connectors and the ZIF connectors are used on the unit. And there are 2 types (Type A, Type B) of Non ZIF connectors.
2. To remove the F.P.C. from the Non ZIF connector, use the Plier for Non ZIF Connector (LSVQ0028) to pull out the F.P.C. as shown. The same Plier for Non ZIF Connector (LSVQ0028) should also be used to install the F.P.C. to the Non ZIF Connector.

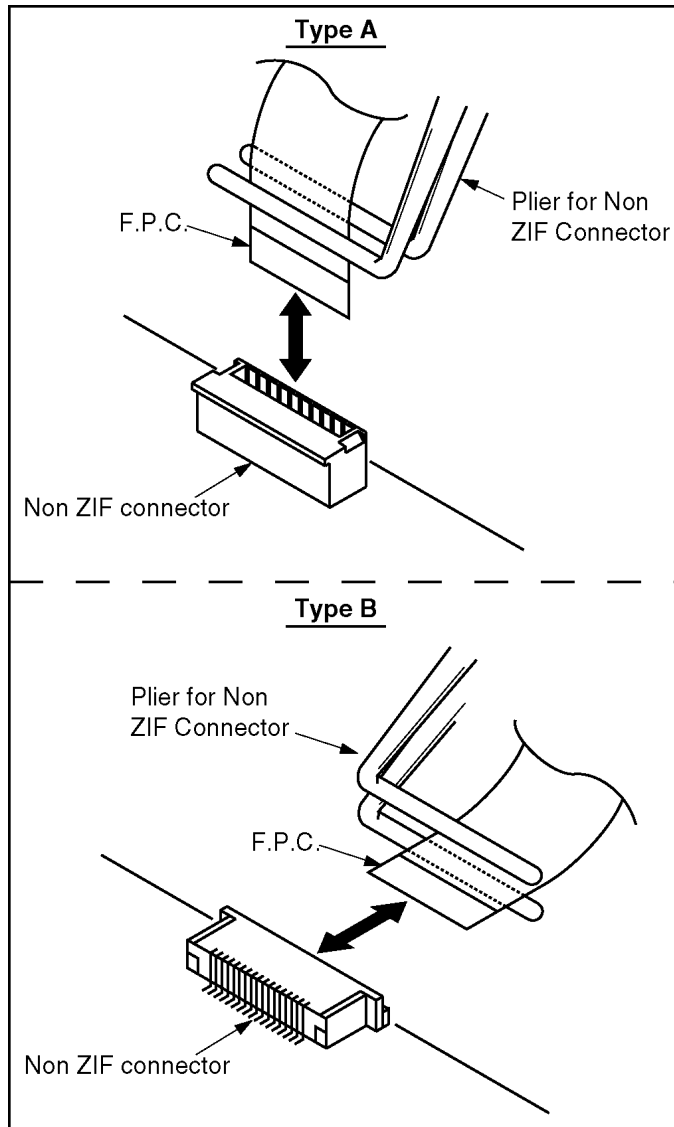


Fig. 4-1

3. Connect the F.P.C.s to the Non ZIF connectors, verifying the direction of F.P.C as shown.

Non ZIF connectors are on the Main P.C.B. as shown in gray.

Direction of F.P.C.s connection

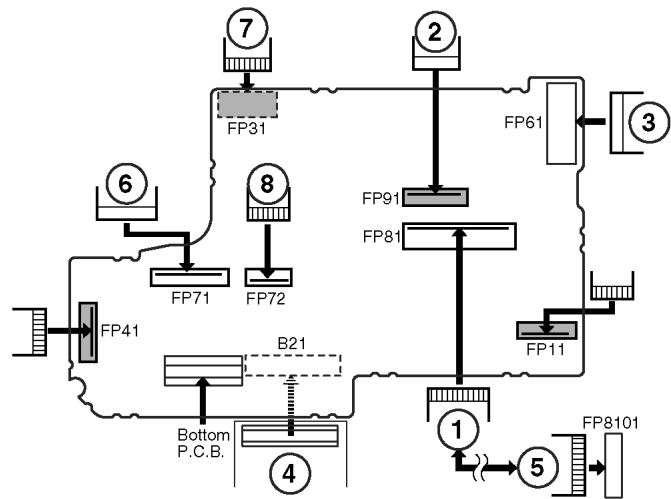


Fig. 4-2

6.4. Method for Ejecting the DVD Tray Manually

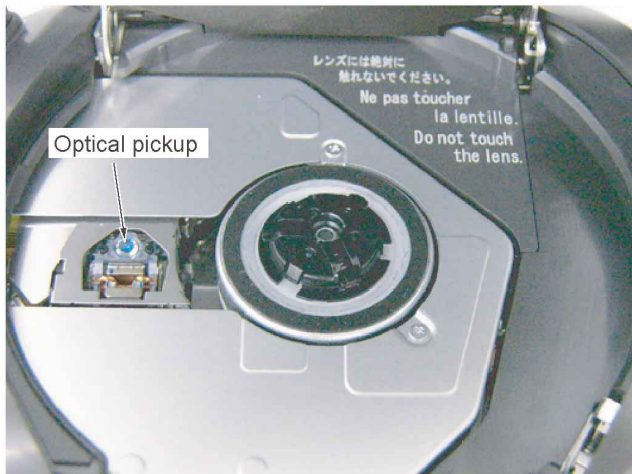
Caution



Laser light striking the eye may cause your eyesight to be lost: For safety, be sure to remove any power supply (AC adaptor/charger, battery, etc.) from the DVD video camera/recorder before starting work.

<CSA requirement>

CAUTION: VISIBLE LASER RADIATION DO NOT STARE INTO THE BEAM OR VIEW DIRECTLY WITH OPTICAL INSTRUMENTS CLASS 2M



Perform the following procedures;

1. Remove the Disc Eject Cover by removing the screw.
2. Slide the Lock Lever with a screwdriver, etc., to open the Disc Cover.
3. Remove the Disc from the Tray.

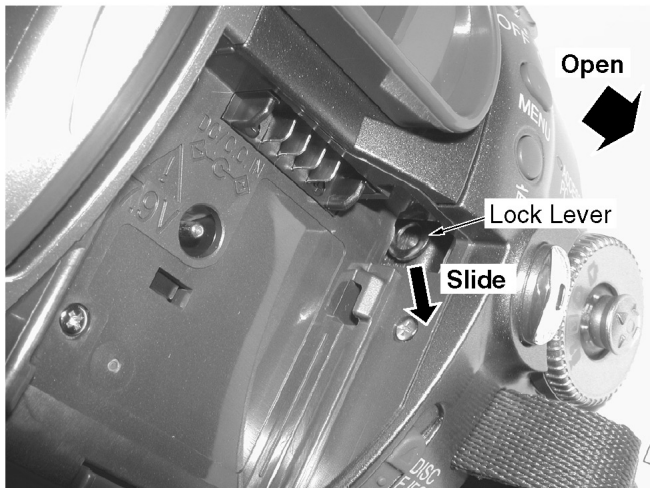
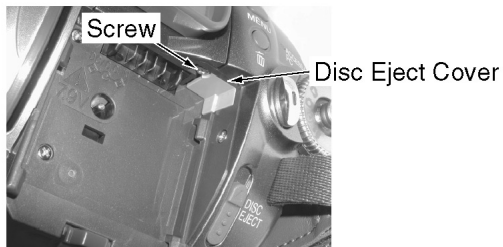


Fig. 5

6.5. EEPROM Data

CAUTION:

Be sure to save the EEPROM data using PC-EVR Adjustment Program before service and adjustment in order to make sure to avoid an accidental data loss, etc. using PC-EVR Adjustment Program by first.

EEPROM IC

C.B.A.	EEPROM IC Ref. No.
Main C.B.A.	IC6004

6.6. Special Note

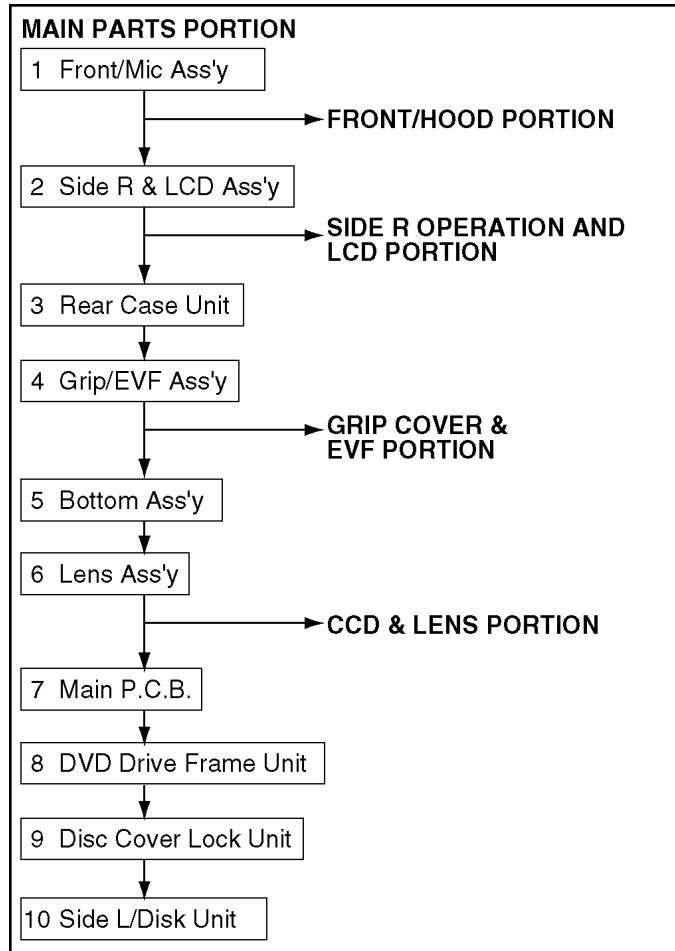
All integrated circuits and many other semiconductor devices are electrostatically sensitive and therefore require the special handling techniques described under the "ELECTROSTATICALLY SENSITIVE (ES) DEVICES" section of this service manual.

7 Disassembly and Assembly Instructions

7.1. Cabinet Section

7.1.1. DISASSEMBLY FLOWCHART

This flow chart indicates the disassembly steps of the cabinet parts and the P.C.Boards in order to gain access to item (s) to be serviced. When reassembling, perform the step (s) in the reverse order. Bend, route and dress the wires as they were originally.



Note :

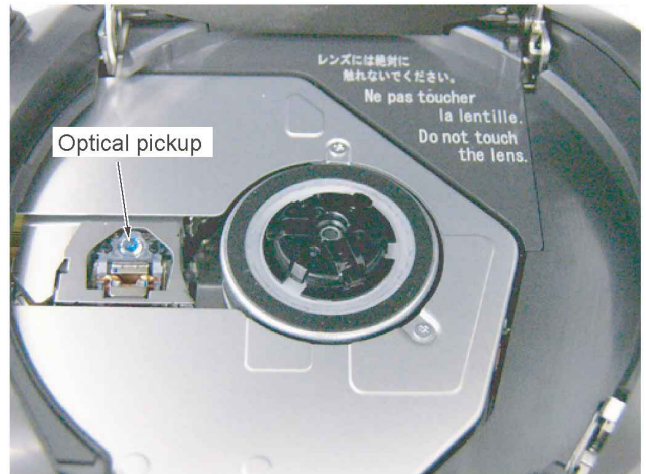
1. When removing the cabinet, work with care so as not to break the Locking Tabs.
2. Place a cloth or some other soft material under the P.C. Boards or Unit to prevent damage.
3. When reinstalling, ensure that the connectors are connected and electrical components have not been damaged.
4. Do not supply power to the unit during disassembly and reassembly.



Caution
Laser light striking the eye may cause your eyesight to be lost: For safety, be sure to remove any power supply (AC adaptor/charger, battery, etc.) from the DVD video camera/recorder before starting work.

<CSA requirement>

CAUTION: VISIBLE LASER RADIATION DO NOT STARE INTO THE BEAM OR VIEW DIRECTLY WITH OPTICAL INSTRUMENTS CLASS 2M



7.1.2. Disassembly Method

MAIN PARTS PORTION

STEP No.	Ref. No.	PART	Section No.	REMOVE	NOTE
1	-	Front/Mic Ass'y	①	(518), (537), 2(519), 2(533), FP6501, Hand Strap	1
2	-	Side R & LCD Ass'y	①	2(518), 4(519), (537), FP81, 2(L-1), (Shoe)	2
3	②⑦	Rear Case Unit	①	(537), (16) (519), FP11	3
4	-	Grip/EVF Ass'y	①	2(519), (537), FP91	4
5	-	Bottom Ass'y	①	3(519), B51	5
6	-	Lens Ass'y	①	(456), FP31, FP71, FP72	6
7	⑩	Main P.C.B.	①	3(519), FP61, B21	7
8	②	DVD Drive Frame Unit	①	2(540), (28) 4(537), (6), Connector	8
9	③	Disc Cover Lock Unit	①	2(537)	8
10	①	Side L Operation Unit	①	-----	-


↑ A ↑ B ↑ C ↑ D ↑ E ↑ F

How to read chart shown above:


- A: Order of Procedure steps.
When reassembling, perform steps(s) in reverse order.
- B: Ref No.
- C: Part to be removed or installed.
- D: Section No.
- E: Identification of part to be removed, unhooked, unlocked, released, unplugged, unclamped, or unsoldered.
3(404)= 3 Screws (404), 2(L-1) = 2 Looking Tabs (L-1)
- F: Refer to "Notes in chart."

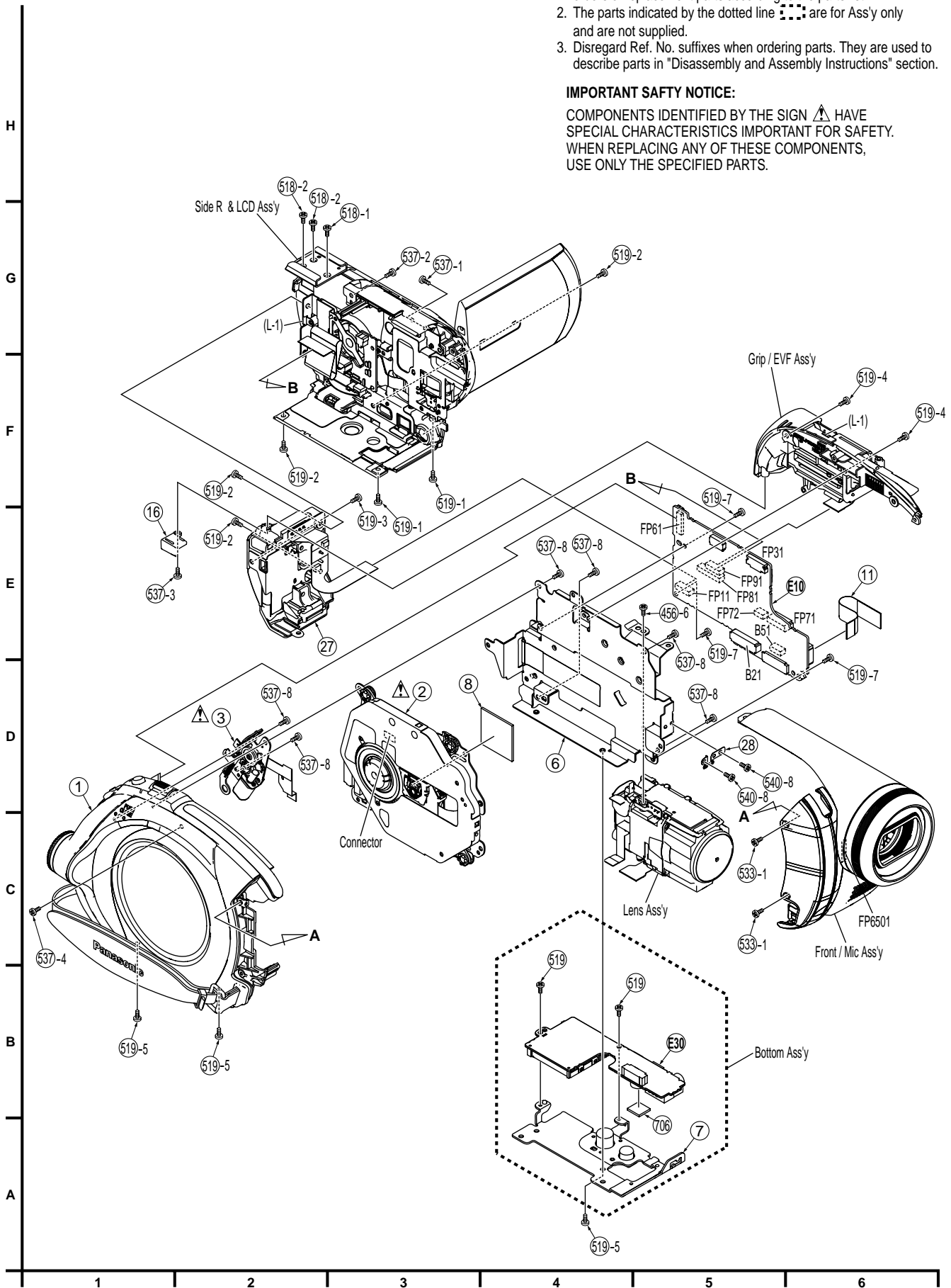
1 MAIN PARTS SECTION

Note:

1. Parts with no Ref. No. in "EXPLODED VIEW" are not supplied. And some Ref. No. will be skipped. Be sure to make your orders of replacement parts according to the parts list.
2. The parts indicated by the dotted line  are for Assy only and are not supplied.
3. Disregard Ref. No. suffixes when ordering parts. They are used to describe parts in "Disassembly and Assembly Instructions" section.

IMPORTANT SAFTY NOTICE:

COMPONENTS IDENTIFIED BY THE SIGN  HAVE SPECIAL CHARACTERISTICS IMPORTANT FOR SAFETY. WHEN REPLACING ANY OF THESE COMPONENTS, USE ONLY THE SPECIFIED PARTS.



FRONT/HOOD PORTION

STEP No.	Ref. No.	PART	Section No.	REMOVE	NOTE
1	⑤②①	Front P.C.B.	②	3(537), FP6502	9
2	⑤③	(For models with Light) LED Light F.P.C.	②	2(537), (54)	9
3	⑤②	(For models with Light) LED Light Lens	②	-----	9
4	⑤①	Front/Hood Unit	②	-----	9

↑ A ↑ B ↑ C ↑ D ↑ E ↑ F

How to read chart shown above:

A: Order of Procedure steps.

When reassembling, perform steps(s) in reverse order.

B: Ref No.

C: Part to be removed or installed.

D: Section No.


E: Identification of part to be removed, unhooked, unlocked, released, unplugged, unclamped, or unsoldered.

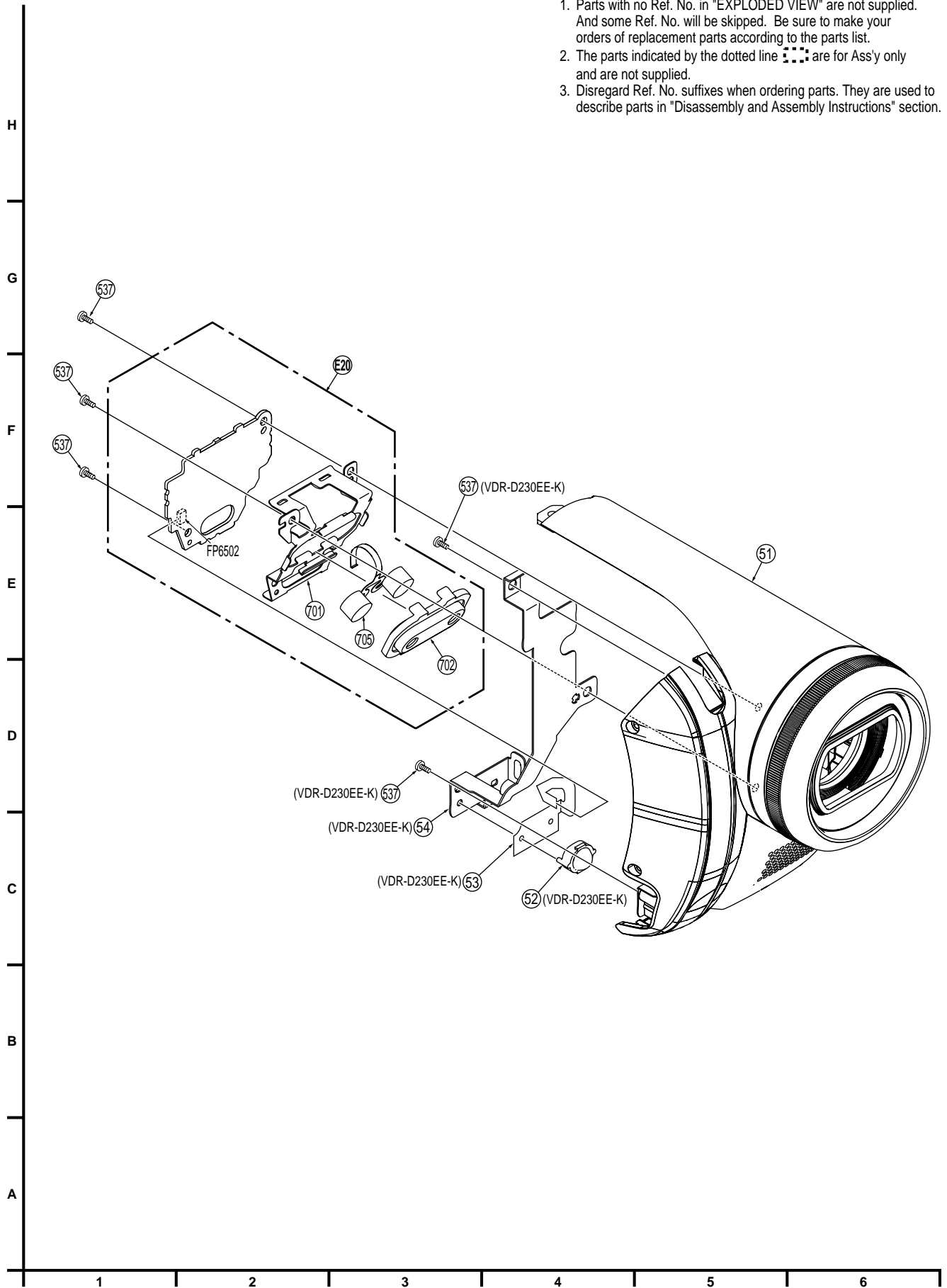
3(404)= 3 Screws (404), 2(L-1) = 2 Looking Tabs (L-1)

F: Refer to "Notes in chart."

② FRONT HOOD AND FRONT P.C.B. SECTION

Note:

1. Parts with no Ref. No. in "EXPLODED VIEW" are not supplied. And some Ref. No. will be skipped. Be sure to make your orders of replacement parts according to the parts list.
2. The parts indicated by the dotted line  are for Ass'y only and are not supplied.
3. Disregard Ref. No. suffixes when ordering parts. They are used to describe parts in "Disassembly and Assembly Instructions" section.



SIDE R OPERATION PORTION

STEP No.	Ref. No.	PART	Section No.	REMOVE	NOTE
1	Ⓔ	Side R P.C.B.	③	2(537), P6301	10

↑ A ↑ B ↑ C ↑ D ↑ E ↑ F

How to read chart shown above:

- A: Order of Procedure steps.
 When reassembling, perform steps(s) in reverse order.
- B: Ref No.
- C: Part to be removed or installed.
- D: Section No.
- E: Identification of part to be removed, unhooked, unlocked, released, unplugged, unclamped, or unsoldered.
 3(404)= 3 Screws (404), 2(L-1) = 2 Looking Tabs (L-1)
- F: Refer to "Notes in chart."

LCD PORTION

STEP No.	Ref. No.	PART	Section No.	REMOVE	NOTE
1	⑤	LCD Protector	③	(533)	11
2	③③	LCD Case A Unit	③	2(519), 8(L-1)	11
3	④④	LCD Case B Unit	③	FP8101	11
4	Ⓔ④	LCD Backlight P.C.B.	③	(533), 3(L-3), FP8102	12
5	③④	LCD Case B	③	3(L-2)	12
6	-	LCD Panel Ass'y	③	3(L-4)	12
	③⑤	LCD Shield Case			

↑ A ↑ B ↑ C ↑ D ↑ E ↑ F

STEP No.	Ref. No.	PART	Section No.	REMOVE	NOTE
1	④②	LCD Panel	③	-----	13
2	③⑨	Reflect Sheet	③	-----	13
3	③⑦	Lead Light Panel	③	-----	13
4	③⑧	Diffusion Sheet	③	-----	13
5	④①	BEF Sheet	③	-----	13
6	④①	BEF Sheet A	③	-----	13
7	③⑥	Panel Holder Unit	③	-----	13

↑ A ↑ B ↑ C ↑ D ↑ E ↑ F

How to read chart shown above:

- A: Order of Procedure steps.
 When reassembling, perform steps(s) in reverse order.
- B: Ref No.
- C: Part to be removed or installed.
- D: Section No.
- E: Identification of part to be removed, unhooked, unlocked, released, unplugged, unclamped, or unsoldered.
 3(404)= 3 Screws (404), 2(L-1) = 2 Looking Tabs (L-1)
- F: Refer to "Notes in chart."

CCD & LENS PORTION

STEP No.	Ref. No.	PART	Section No.	REMOVE	NOTE
1	Ⓔ50	CCD P.C.B.	4	2(536)	14
2	Ⓔ64	Filter Rubber	4	-----	14
3	Ⓔ63	Optical Filter	4	-----	14

↑ A ↑ B ↑ C ↑ D ↑ E ↑ F

STEP No.	Ref. No.	PART	Section No.	REMOVE	NOTE
1	Ⓔ65	Zoom Motor Unit	4	2(538), Unsolder	15
2	Ⓔ66	Focus Motor Unit	4	2(538), Unsolder	15

↑ A ↑ B ↑ C ↑ D ↑ E ↑ F

How to read chart shown above:

A: Order of Procedure steps.

When reassembling, perform steps(s) in reverse order.

B: Ref No.

C: Part to be removed or installed.

D: Section No.

E: Identification of part to be removed, unhooked, unlocked, released, unplugged, unclamped, or unsoldered.

3(404)= 3 Screws (404), 2(L-1) = 2 Looking Tabs (L-1)

F: Refer to "Notes in chart."

4 CCD AND LENS SECTION

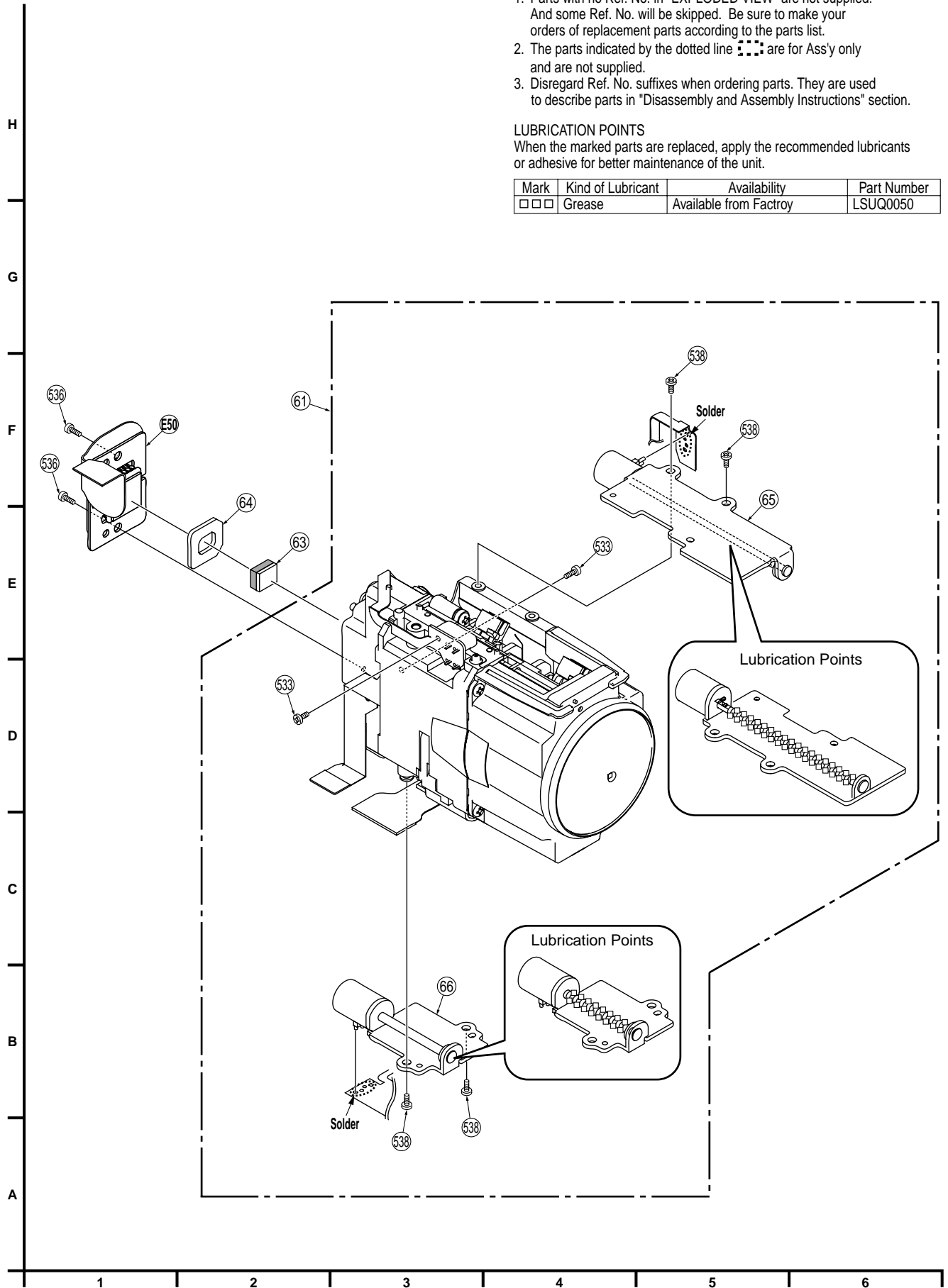
Note:

1. Parts with no Ref. No. in "EXPLODED VIEW" are not supplied. And some Ref. No. will be skipped. Be sure to make your orders of replacement parts according to the parts list.
2. The parts indicated by the dotted line are for Ass'y only and are not supplied.
3. Disregard Ref. No. suffixes when ordering parts. They are used to describe parts in "Disassembly and Assembly Instructions" section.

LUBRICATION POINTS

When the marked parts are replaced, apply the recommended lubricants or adhesive for better maintenance of the unit.

Mark	Kind of Lubricant	Availability	Part Number
<input type="checkbox"/> <input type="checkbox"/>	Grease	Available from Factory	LSUQ0050



GRIP COVER & EVF PORTION

STEP No.	Ref. No.	PART	Section No.	REMOVE	NOTE
1	⑫	EVF Angle Unit	⑤	2(537), (L-1)	16
2	⑲	Grip Cover Unit	⑤	-----	16

↑ A ↑ B ↑ C ↑ D ↑ E ↑ F

STEP No.	Ref. No.	PART	Section No.	REMOVE	NOTE
1	⑮	Shoe Angle	⑤	(533)	17
2	⑬	EVF Slide Base	⑤	FP8901	17
3	⑭	EVF Lock Plate	⑤	(L-2)	17
4	⑰	EVF F.P.C.	⑤	-----	17

↑ A ↑ B ↑ C ↑ D ↑ E ↑ F

STEP No.	Ref. No.	PART	Section No.	REMOVE	NOTE
1	⑱	Eye Cap	⑤	2(533)	18
2	⑳	EVF Lens Unit	⑤	-----	19
3	㉒	Eye Sight Lever	⑤	-----	19

↑ A ↑ B ↑ C ↑ D ↑ E ↑ F

How to read chart shown above:

A: Order of Procedure steps.

When reassembling, perform steps(s) in reverse order.

B: Ref No.

C: Part to be removed or installed.

D: Section No.


E: Identification of part to be removed, unhooked, unlocked, released, unplugged, unclamped, or unsoldered.

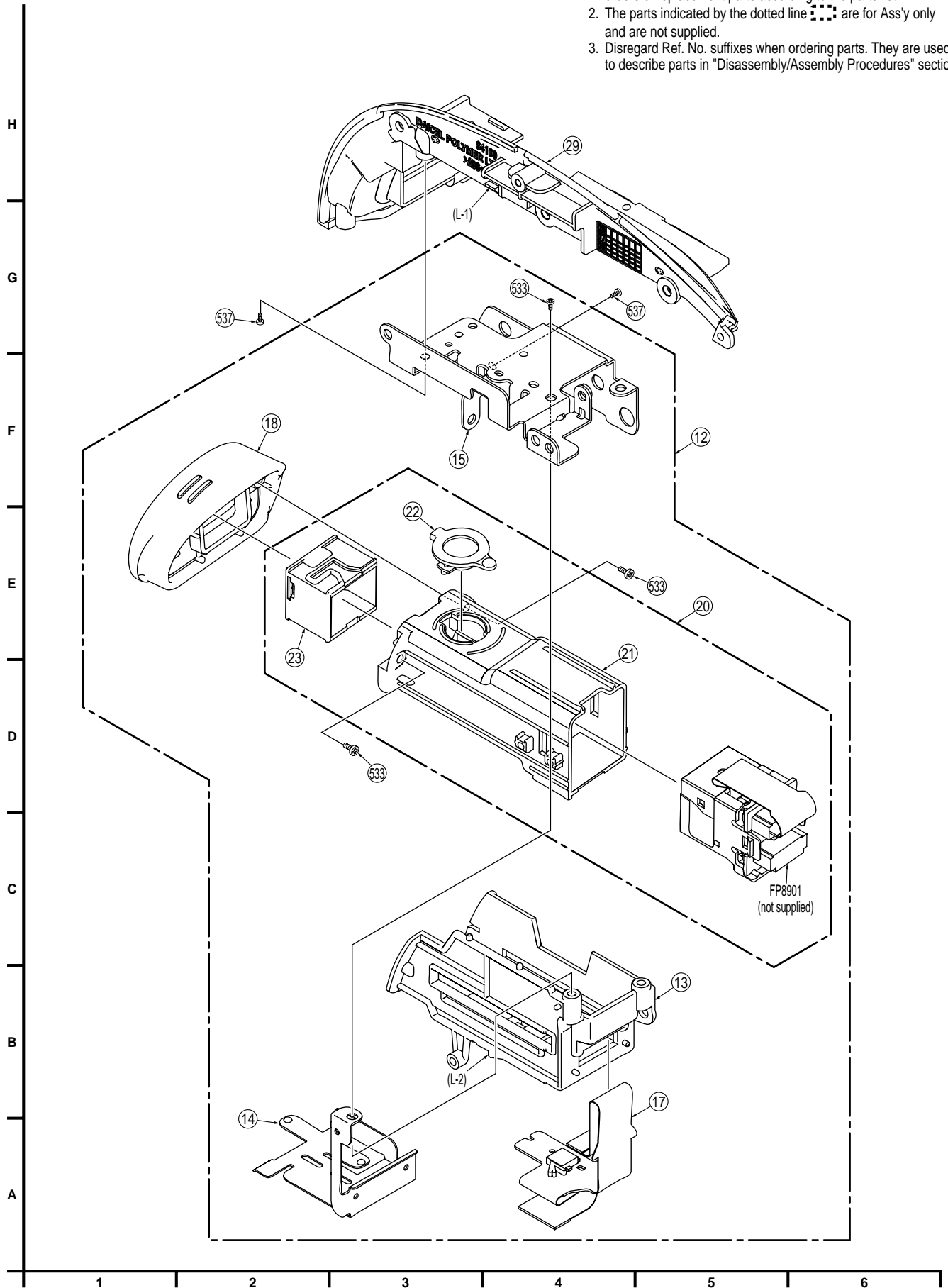
3(404)= 3 Screws (404), 2(L-1) = 2 Looking Tabs (L-1)

F: Refer to "Notes in chart."

5 GRIP COVER AND EVF SECTION

Note:

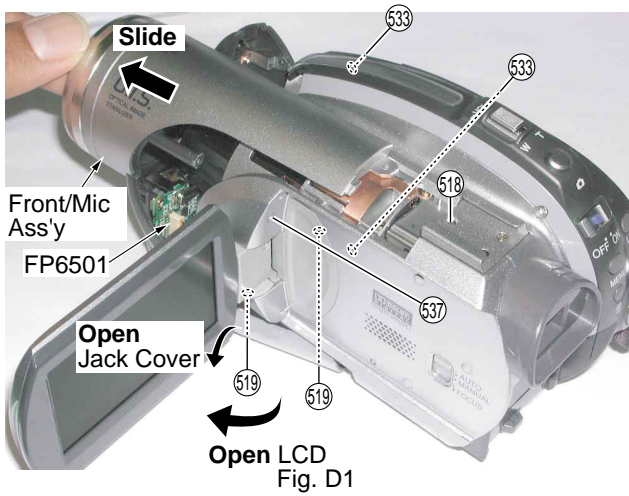
1. Parts with no Ref. No. in "EXPLODED VIEW" are not supplied. And some Ref. No. will be skipped. Be sure to make your orders of replacement parts according to the parts list.
2. The parts indicated by the dotted line  are for Ass'y only and are not supplied.
3. Disregard Ref. No. suffixes when ordering parts. They are used to describe parts in "Disassembly/Assembly Procedures" section.



Notes in chart

1. Removal of Top Cover Unit

- 1) Open the LCD and Jack Cover to remove the 6 Screws (518, 519, 533, 537).
- 2) Pull and slide carefully the Top Cover Unit.
- 3) Disconnect the F.P.C. from Connector FP6501.



2. Removal of Side R & LCD Ass'y

- 1) Remove the 7 Screws (518, 519, 537), and remove the Shoe.
- 2) Remove the Side R & LCD Ass'y while releasing the 2 Locking Tabs (L-1).
- 3) Disconnect the Front F.P.C. from Connector FP81.

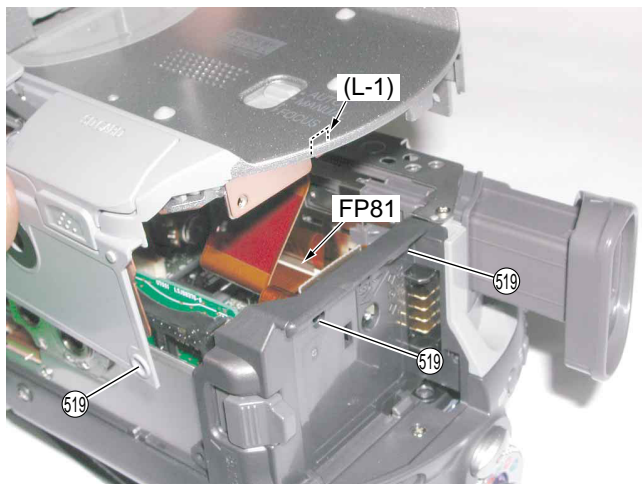
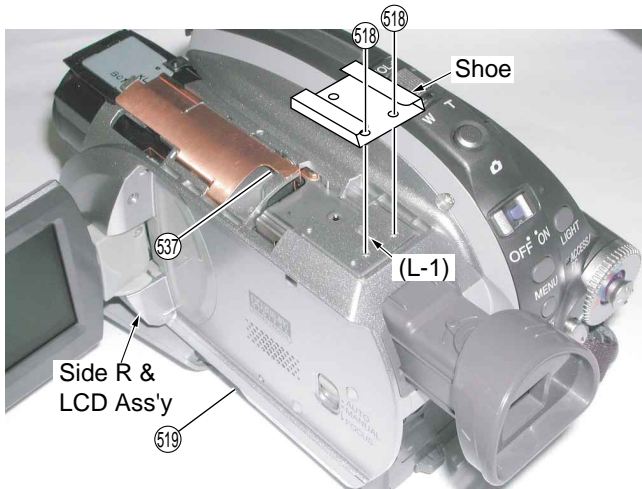


Fig. D2

3. Removal of Rear Case Unit

- 1) Remove the Screw (537) and remove the Disc Eject Cover.
- 2) Remove the Screw (519) and disconnect the F.P.C. from Connector FP11.

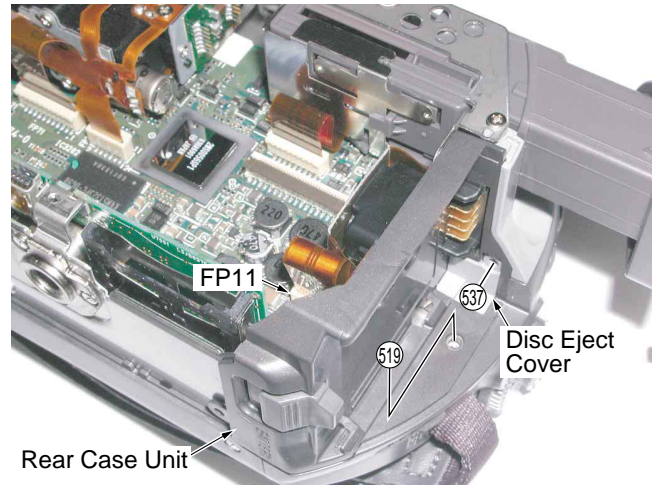
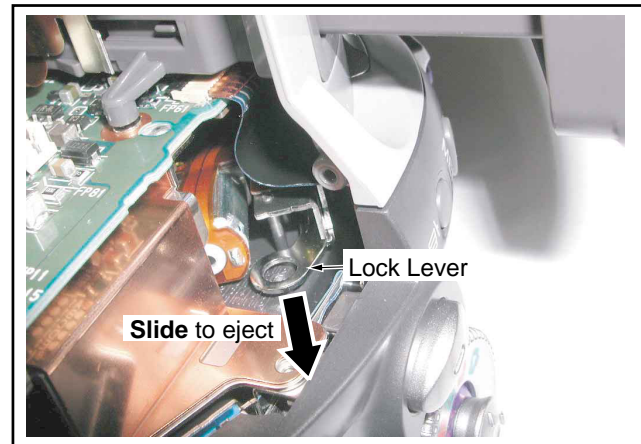


Fig. D3

4. Removal of Grip/EVF Ass'y

- 1) To access the screw, open the Disc Cover to slide the Lock Lever with a screwdriver, etc.
- 2) Remove the 3 Screws (519, 537).
- 3) Disconnect the EVF F.P.C. from Connector FP91.



Open Disc Cover

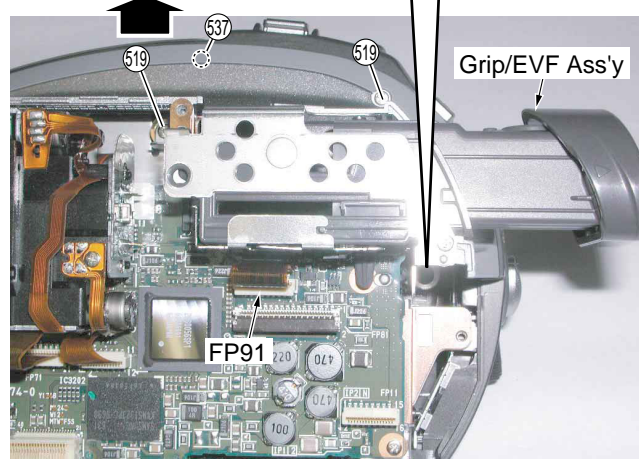


Fig. D4

5. Removal of Bottom Ass'y

- 1) Remove the 3 Screws (519).
- 2) Remove the Bottom Ass'y to disconnect Connector B51 (B to B Connector).

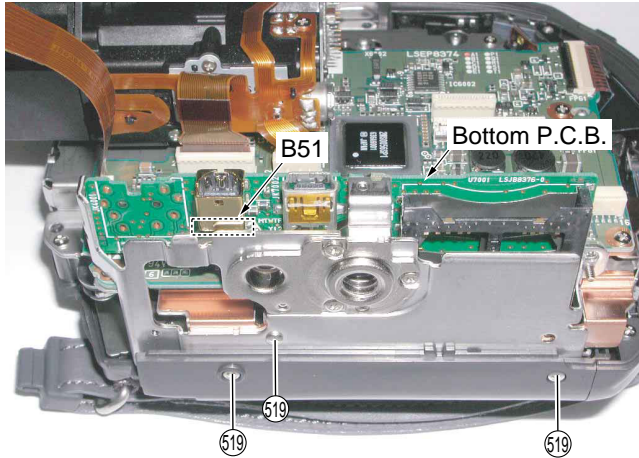


Fig. D5

6. Installation of Lens Ass'y

Take care not to damage the motor leads and the F.P.C.s.

- 1) Install the Lens Ass'y with the 2 pins, and tighten the Screw (456).
- 2) Connect the F.P.C.s to Connectors FP31, FP71, and FP72.

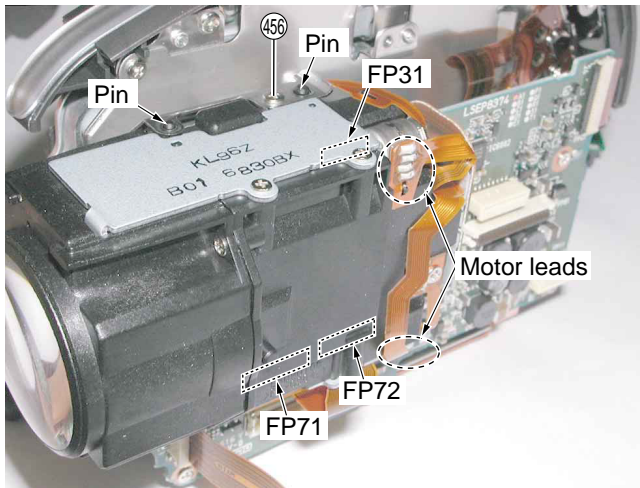


Fig. D6

7. Removal of Main P.C.B.

- 1) Remove the 3 Screws (519).
- 2) Disconnect the Zoom Switch F.P.C. from Connector FP61.
- 3) Remove the Main P.C.B. to disconnect Connector B21 (B to B Connector).

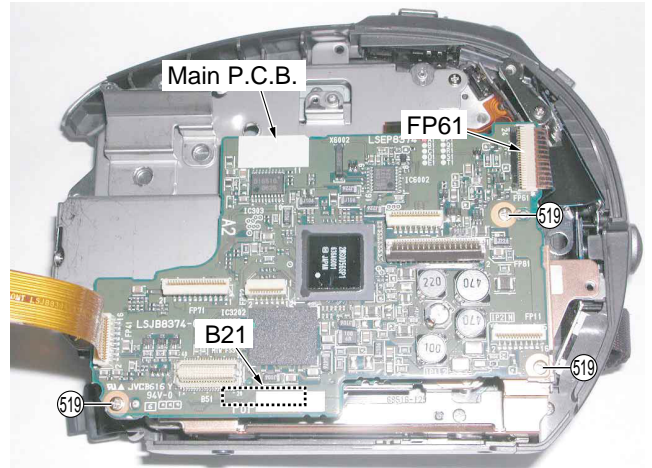


Fig. D7

8. DVD Drive Frame Unit Caution

Caution



Laser light striking the eye may cause your eyesight to be lost: For safety, be sure to remove any power supply (AC adaptor/charger, battery, etc.) from the DVD video camera/recorder before starting work.

<CSA requirement>

CAUTION: VISIBLE LASER RADIATION DO NOT STARE INTO THE BEAM OR VIEW DIRECTLY WITH OPTICAL INSTRUMENTS CLASS 2M

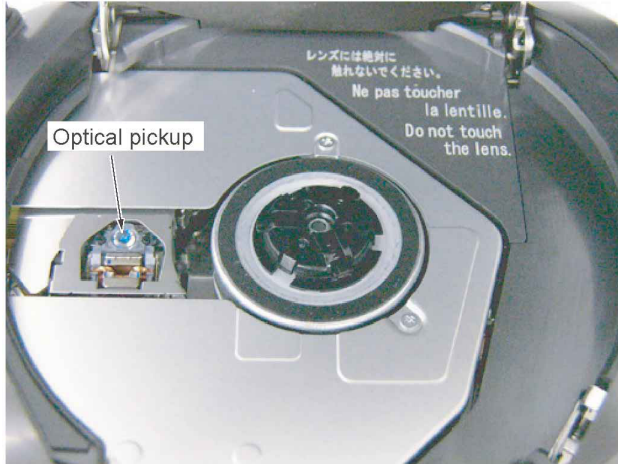
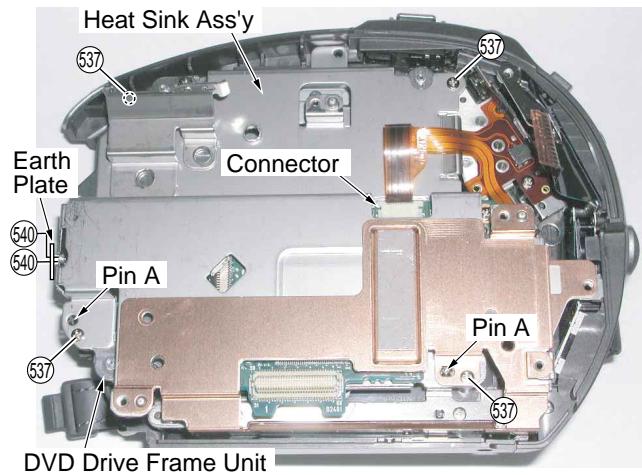


Fig. D8-1

Removal of DVD Drive Frame Unit & Disc Cover Lock Unit

- 1) Remove the 2 Screws (540) and remove the Earth Plate.
- 2) Remove the 4 Screws (537) and remove the Heat Sink Ass'y.
- 3) Disconnect the F.P.C. from the connector on the DVD Drive Frame Unit.
- 4) Remove the DVD Drive Frame Unit from the 2 Pins A.
- 5) Open the Disc Cover to slide the Lock Lever with a screwdriver, etc.
- 6) Remove the 2 Screws (537), and remove the Disc Cover Lock Unit from the 2 Pins B so as not to damage the 2 Switches.



DVD Drive Frame Unit

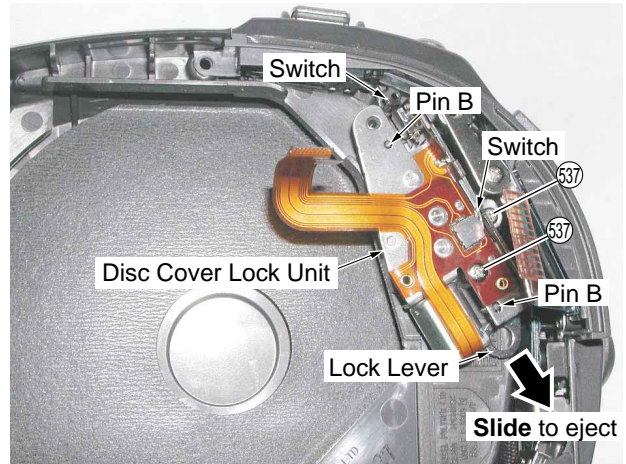
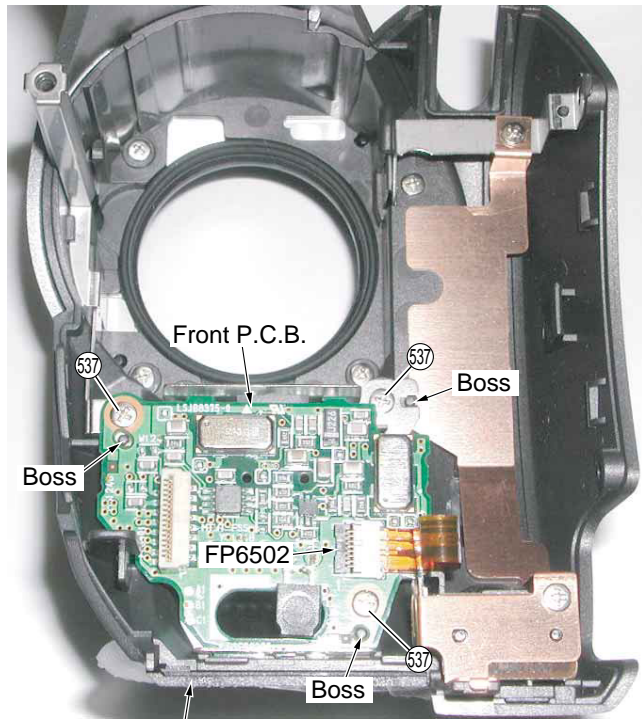


Fig. D8-2

9. Installation of Front P.C.B.

- 1) Install the Front P.C.B. with the 3 bosses, and tighten the 3 Screws (537).
- 2) **(For models with Light)**
Connect the F.P.C. to Connector FP6502.



Front /Hood Unit
Fig. D9

(For models with Light)

Installation of LED Light F.P.C. and LED Light Lens

- 1) Install the LED Light Lens into the Front/Hood Unit.
- 2) Install the LED Light F.P.C. with the 2 bosses of the LED Light Lens.
- 3) Install the Heat Sink Plate with the 2 Screws (537).

10. Removal of Side R P.C.B.

- 1) Remove the 2 Screws (537).
- 2) Disconnect connector lead from Connectors P6301.

Installation of Side R P.C.B.

Make sure the tab is set into the slot.

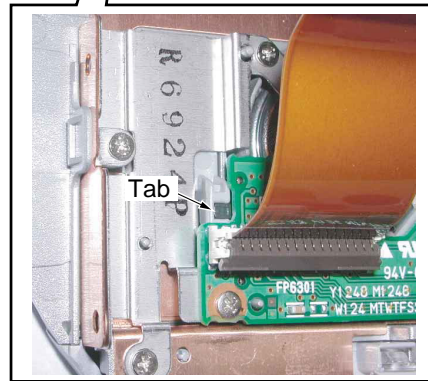
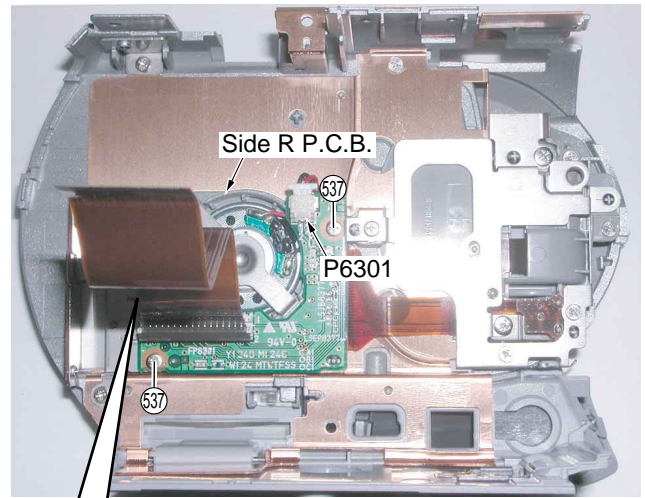


Fig. D10

11. Removal of LCD Case B Unit, LCD Case A Unit

Take care not to damage the F.P.C.

- 1) Remove the Screw (533).
- 2) Open the LCD and push to remove the LCD Protector.
- 3) Rotate the LCD (Ass'y) to access the 2 Screws (519).
- 4) Release the 8 Locking Tabs (L-1) and remove the LCD Case A Unit.
- 5) Disconnect the F.P.C. from Connector FP8101.
- 6) Remove the LCD Case B Unit.

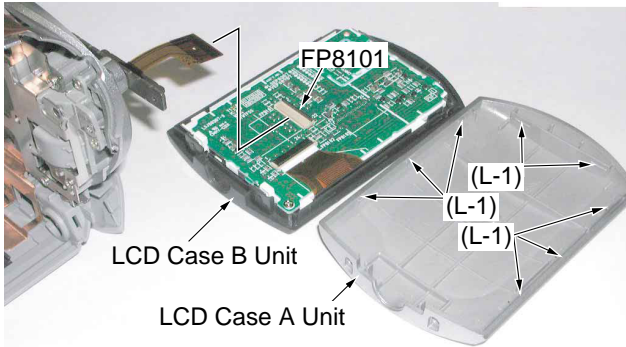
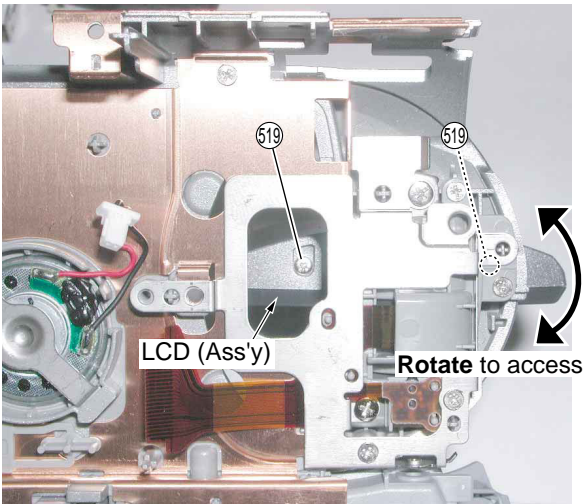
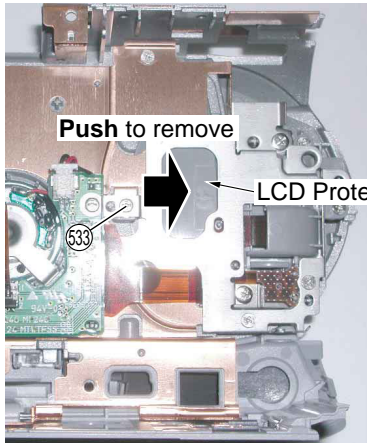


Fig. D11

12. Installation of LCD Backlight P.C.B., LCD Panel Ass'y, LCD Shield Case and LCD Case B

Use extreme care regarding LEDs when handling the LCD Backlight P.C.B.

Install in order shown below.

- 1) Install the LCD Panel Ass'y onto the LCD Shield Case with the 3 Locking Tabs (L-4) while carefully bending the LCD F.P.C. at its base so as not to damage it.
- 2) Install the LCD Backlight P.C.B. onto the LCD Panel Ass'y with the 3 Locking Tabs (L-3).
- 3) Install the LCD Case B with the 3 Locking Tabs (L-2).
- 4) Tighten the Screw (533) while keeping the LCD Backlight P.C.B. pressed toward the left. Then, connect the F.P.C. to Connector FP8102.

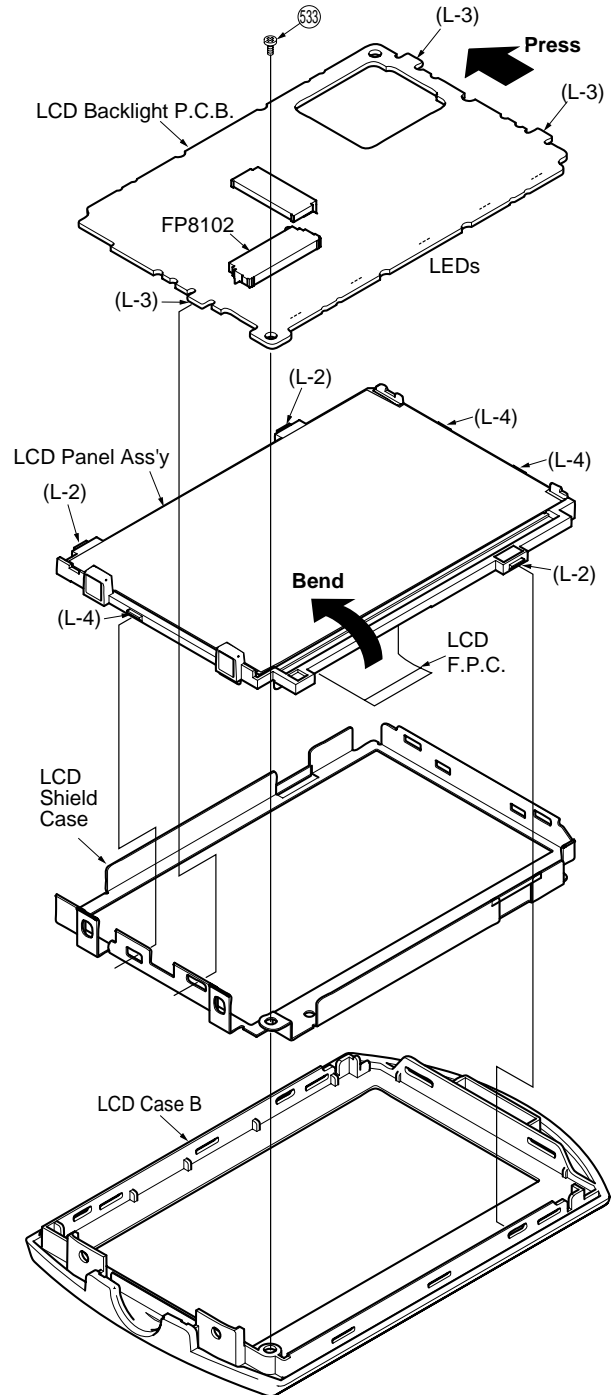


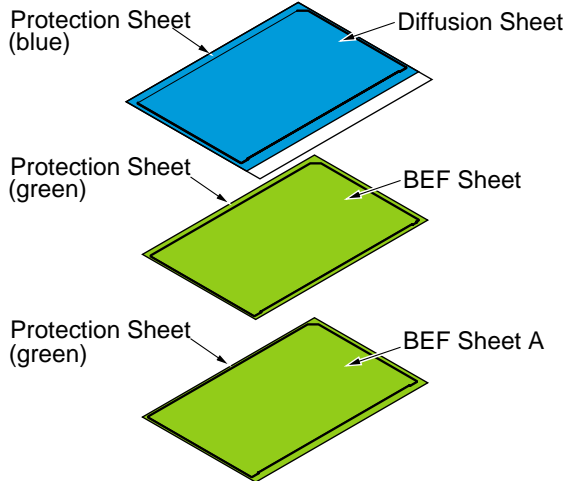
Fig. D12

13. Installation of LCD Panel, Reflect Sheet, Lead Light Panel, Diffusion Sheet, BEF Sheet, BEF Sheet A and Panel Holder Unit

a. When replacing the LCD Panel, the Diffusion Sheet, the BEF Sheet and the BEF Sheet A, make sure to remove the Protection Sheets.

To distinguish Sheets from attached Protection Sheet:

- A blue Protection Sheet is affixed to both faces of the Diffusion Sheet.
- A green Protection Sheet is affixed to both faces of the BEF Sheet.
- A green Protection Sheet is affixed to both faces of the BEF Sheet A.



b. Use extreme care when handling the LCD Panel, the Reflect Sheet, the Lead Light Panel, the Diffusion Sheet, the BEF Sheet and the BEF Sheet A to avoid damage, dust, and spots (especially fingerprints, etc.)

Install in order shown below.

- 1) Install in order: the BEF Sheet A, BEF Sheet and Diffusion Sheet while fitting the corners of each sheet into the corners of the Panel Holder Unit.
- 2) Install the Lead Light Panel while fitting the corners into the corners of the Panel Holder Unit.
- 3) Place the Reflect Sheet so it is aligned with Portion A of the Panel Holder Unit, then install it using the adhesive tape portions of the Reflect Sheet.

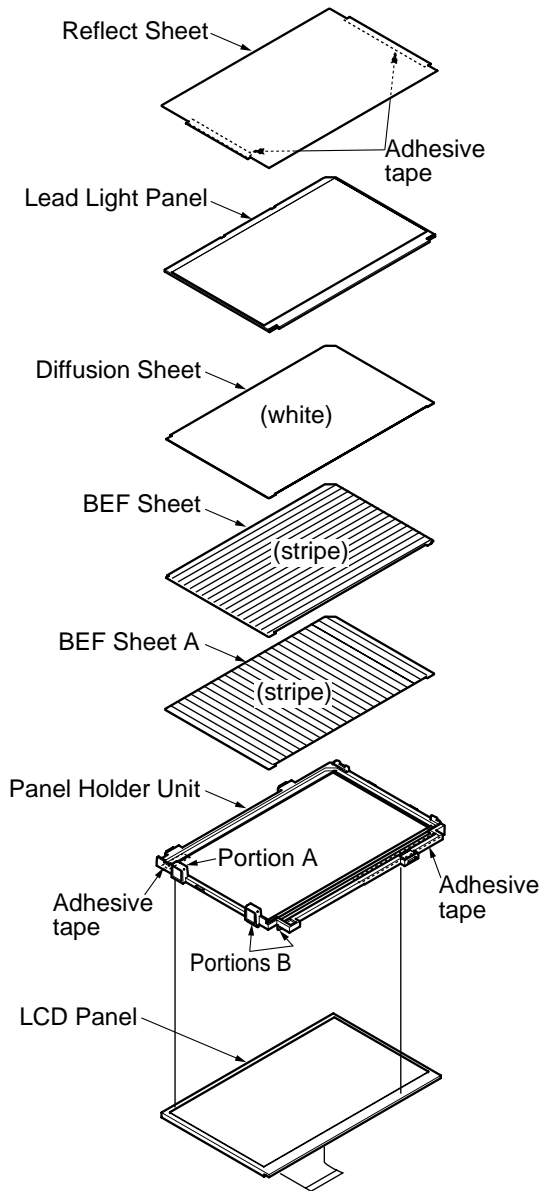


Fig. D13-2

Do not touch
the surface of
Lead Light Panel.

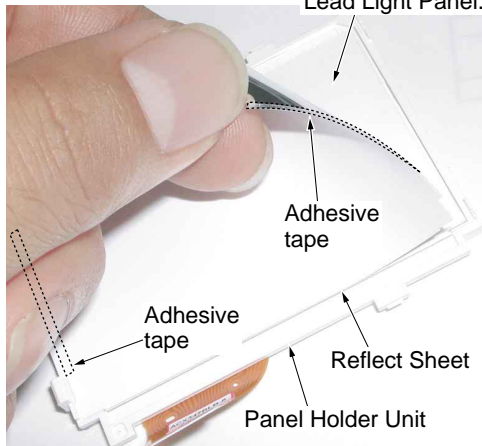


Fig. D13-1

- 4) Install the LCD Panel with adhesive tape so it is aligned with Portions B of the Panel Holder Unit.

14. Removal of CCD P.C.B., Filter Rubber and Optical Filter

CAUTION:

- 1) When removing the CCD P.C.B., take care that the Optical Filter does not fall out.
- 2) Use extreme caution when removing the CCD P.C.B. as it is easily damaged by static electricity. Use a Wrist Strap while removing and installing.
- 3) Do not touch the CCD window surface.

Installation of CCD P.C.B., Filter Rubber and Optical Filter

Install in order shown below.

- 1) Install the Optical Filter, taking care the direction is correct.

Note: Make sure that no dust gets on the Optical Filter or in the Lens Unit. Clean the Optical Filter with lens cleaning paper dampened with lens cleaner if necessary.

- 2) Install the Filter Rubber on the Optical Filter, taking care the direction is correct.

Note: Make sure that no dust gets on the Filter Rubber.

- 3) Install the CCD P.C.B. into the Lens Unit. Then, tighten the 2 Screws (536).

Note: Do not touch the Lens Surface. Clean the surface with lens cleaning paper dampened with lens cleaner if necessary.

16. Installation of Grip Cover Unit

- 1) Install the Grip Cover Unit with the 3 pins.
- 2) Tighten the 2 Screws (537).

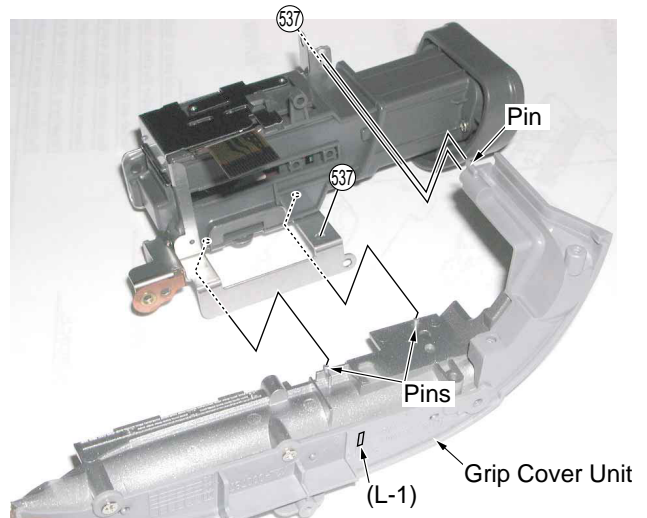


Fig. D15

15. Installation of Zoom Motor Unit/Focus Motor Unit

Install the Zoom Motor Unit/Focus Motor Unit so that the Shaft of the Zoom Motor Unit/Focus Motor Unit is set in the Holder.

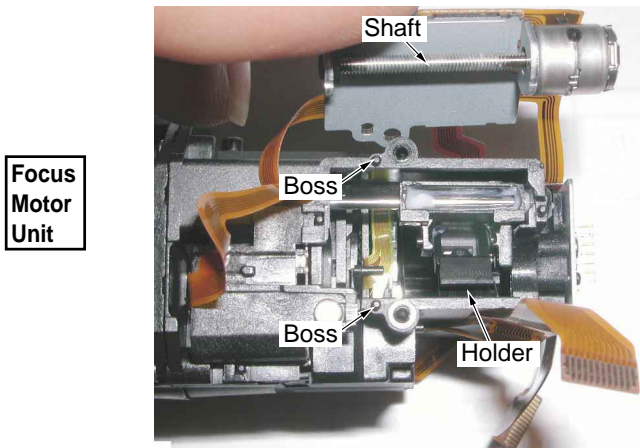
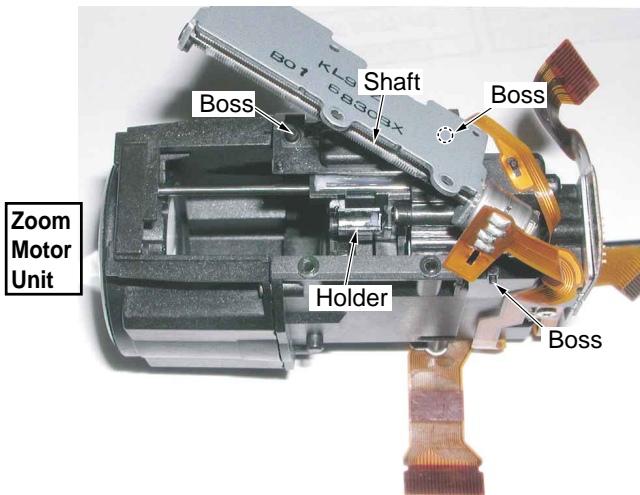


Fig. D14

17. Installation of EVF F.P.C., EVF Lock Plate, EVF Slide Base and Shoe Angle

Take care not to damage the F.P.C. and the Switch.

- 1) Insert the EVF F.P.C. into the slot and secure it with the 2 pins. Then, pass it through the hole.
- 2) Install the EVF Lock Plate with the Locking Tab (L-2).
- 3) Connect the EVF F.P.C. to Connector FP8901, and install the EVF Slide Base so that the ribs are inserted into the slots.
- 4) Install the Shoe Angle with the 2 pins. Then, tighten the Screw (533).
- 5) After installing, verify the EVF moves correctly.

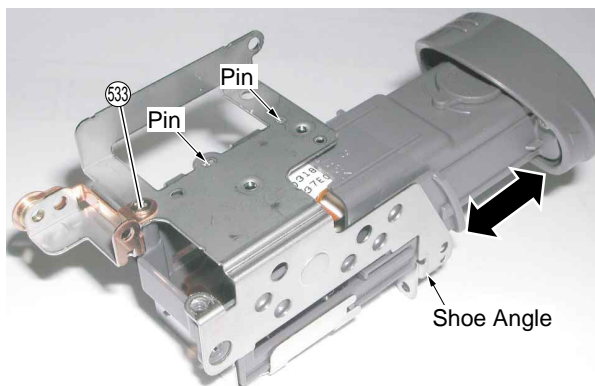
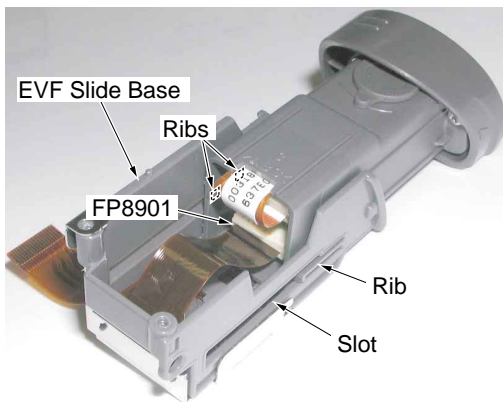
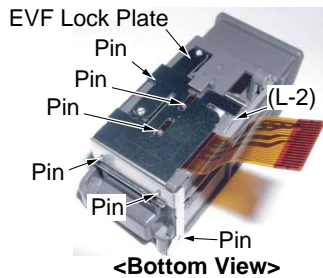
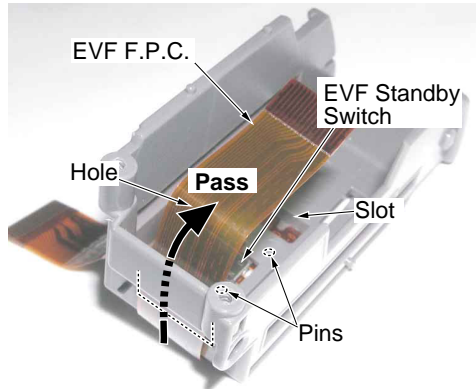


Fig. D16

18. Removal of Eye Cap

Remove the Eye Cap after removing the 2 Screws (533).

19. Handling cautions of EVF Lens Unit

Use extreme care when handling the EVF Lens Unit to avoid damage, dust, and spots (especially fingerprints, etc.)

Installation of EVF Lens Unit, Eye Sight Lever

- 1) Install the Eye Sight Lever into the EVF Case hole in the direction shown.
- 2) Install the EVF Lens Unit into the EVF Case.
- 3) After installing, verify the Eye Sight Lever and the EVF Lens Unit work together correctly.

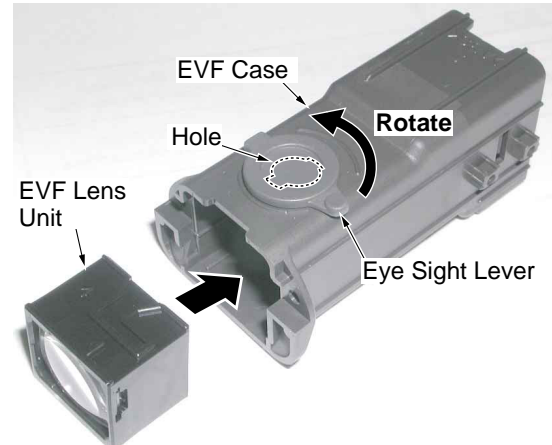


Fig. D17

8 Measurements and Adjustments

8.1. Electrical Adjustment

8.1.1. Initial Guideline

The table below shows which adjustments are necessary according to the unit parts and individual parts to be replaced. Make sure to perform these adjustments shown below as necessary.

Adjustment Item		Replacement Parts							
		MAIN P.C.B.	IC302 (CAMERA SIGNAL PROCESS)	IC701 (FOCUS/ZOOM MOTOR DRIVE & OIS/IRIS/HALL AMP CONTROL)	IC3001 (CAMERA DIGITAL SIGNAL PROCESS/SHUFFLING)	IC3301 (VIDEO/AUDIO SIGNAL PROCESS)	IC6001 (SYSTEM MICROCONTROLLER)	IC6004 (EEPROM)	CCD P.C.B.
Camera	CAM hall amplifier and Iris PWM	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	CAM Zoom Tracking and De-focus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	CAM WB rough	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	CAM AWB 3100	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	CAM AWB 5100	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	CAM Revision CCD scratch	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Video	Luminance level	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Note: : Adjustment Item

8.1.2. Installation of USB-SERIAL driver

Execute the "Setup.exe" file in "ComMass" folder by double clicking to install the USB-SERIAL driver.

8.1.3. COM Mode

If a Disc or SD Card is inserted, remove before operation.

To enter the PC connection (COM) mode, push the [DELETE], [RECORDING START/STOP] and [JOYSTICK CONTROL UP] simultaneously for 3 seconds with the USB Cable disconnected.

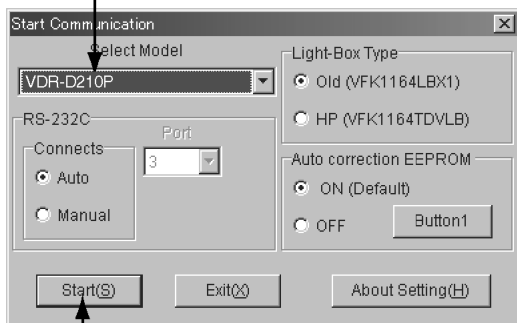


<LCD Monitor>

8.1.4. Set up of PC-EVR Adjustment Program

1. Turn on the PC and install the PC-EVR Adjustment Program into the PC.
2. Execute the "kdr2007.exe" file by double clicking to start up the PC-EVR Adjustment Program.
The main menu will be displayed.
3. Select the appropriate model.
4. Turn on the camcorder and set to PC connection (COM) mode. Then click "Start".

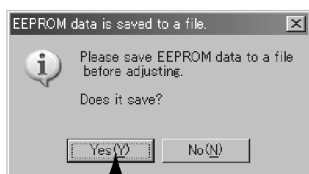
① Select the appropriate model.



② Click to start.

5. When the communication is complete, the dialog will appear.

Click "Yes," and "Save" to save the EEPROM data.



③ Click.

Fig. E2-2

6. When EEPROM data has been saved, the menu will appear.

To perform each adjustment, display the adjustment menu by selecting from "Camera Adjust" or "Video Adjust" and select each adjustment item.

④ Select the desired menu.

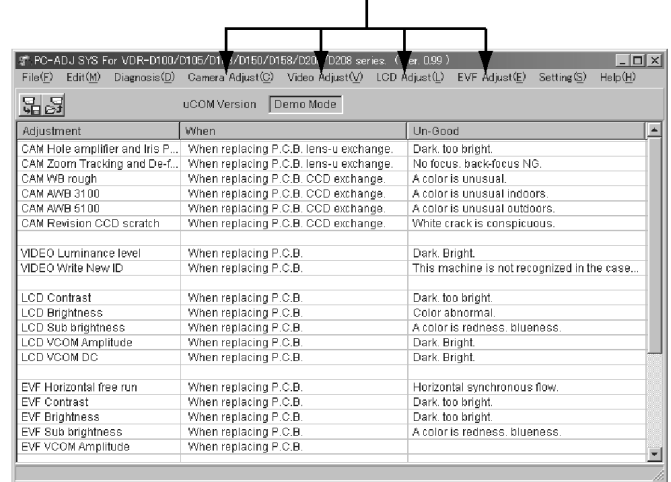


Fig. E2-3

Note:

The adjusted data is stored in the EEPROM IC after each adjustment.

7. After adjustment, to close the software, select "Exit" in the File menu or close the window.

⑤ Select "Exit" or close the window.

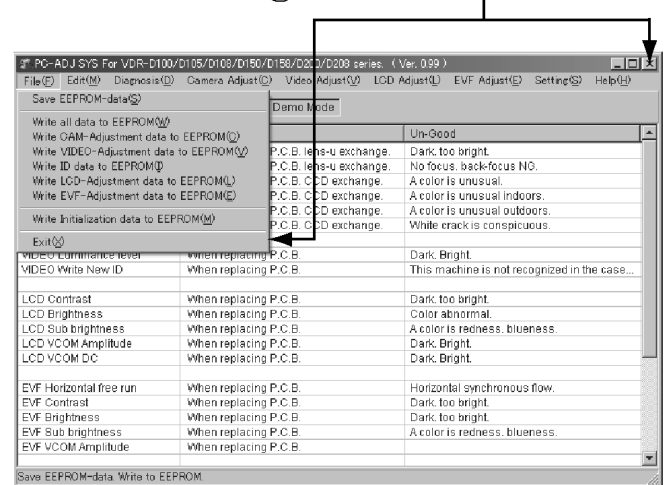


Fig. E2-4

8. To release the PC connection (COM) mode, push the [DELETE], [RECORDING START/STOP] and [JOYSTICK CONTROL UP] simultaneously for 3 seconds with the USB Cable disconnected.

9 Maintenance

9.1. Cleaning Lens, Viewfinder and LCD Panel

Do not touch the surface of the lens, Viewfinder and LCD Panel with your hand.

When cleaning the lens, use air-blower to blow off the dust.

When cleaning the LCD Panel, dampen the lens cleaning paper with lens cleaner, and gently wipe the surface.

Note:

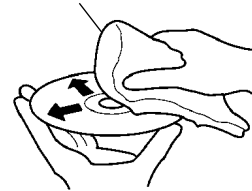
Lens cleaning paper and lens cleaner are available at camera shops, etc.

9.2. Cleaning disc and optical pickup

(1) Cleaning disc

- 1) Use the provided disc cleaning cloth, or a soft, dry cloth to lightly clean the disc from the inner to outer edges in axial direction.
- 2) If the dirt cannot be removed with the above procedure, put a few droplets of absolute alcohol in a soft, dry cloth, and use it to lightly clean the disc from the inner to outer edges in axial direction.

Disc cleaning cloth provided or soft and dry cloth



Cleaning Disc

(2) Cleaning optical pickup

Note:

Do not clean the optical pickup needlessly. The optical pickup is a precision component. Repeated cleaning could cause a fault.

- 1) Attach the AC adapter/charger or battery (power supply), and then slide the DISC EJECT switch to open the disc insertion block.
- 2) Remove the AC adapter/charger or battery (power supply).

Caution:

Laser light striking the eye may cause your eyesight to be lost: For safety, be sure to remove any power supply (AC adaptor/charger, battery, etc.) from the DVD video camera/recorder before starting work.

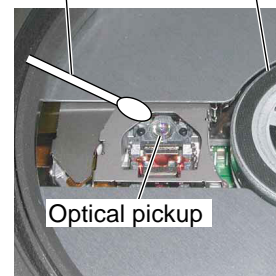
<CSA requirement>

CAUTION: VISIBLE LASER RADIATION DO NOT STARE INTO THE BEAM OR VIEW DIRECTLY WITH OPTICAL INSTRUMENTS CLASS 2M

- 3) Check to see whether the optical pickup is dirty. If it is not dirty, use the following procedure to clean it:
 - a) Apply one drop of absolute alcohol on a clean cotton swab (*1). Lens cleaner liquid for CD/DVD (generally available) may be substituted for absolute alcohol.
 - b) Lightly swab the optical pickup to clean it.
Using too much force during cleaning may cause a fault to occur.

*1: Always use a fresh cotton swab free from any additive or chemical.

Cotton swab Turntable



Cleaning Optical Pickup

Do not spray insecticides or volatile chemicals onto the unit.

- If the unit is sprayed with such chemicals, its body may be marred and the surface finish may peel off.
- Do not leave rubber or plastic products in contact with the unit for a long time.

When you use the unit in a sandy or dusty place such as a beach, do not let sand or fine dust get into the body and terminals of the unit.

Also, keep the unit away from sea water.

- Sand or dust may damage the unit. (Care should be taken when inserting and removing a disc or a card.)
- If sea water splashes onto the unit, wipe off the water with a well wrung cloth. Then wipe the unit again with a dry cloth.

When carrying the unit, do not drop or bump it.

- A strong impact can break the unit's casing, causing it to malfunction.

Do not use benzine, paint thinner or alcohol for cleaning the unit.

- Before cleaning, detach the battery or pull out the AC cable from the AC outlet.
- The camera body may be discolored and the surface finish may peel off.
- Wipe the unit with a soft dry cloth to remove dust and fingerprints. To remove stubborn stains, thoroughly wring a cloth that has been soaked in a neutral detergent diluted with water and wipe the unit with it. Afterwards, wipe it with a dry cloth.
- When you use a chemical dust cloth, follow the instructions that came with the cloth.

Do not touch the laser pickup lens.

- If you touch the laser pickup lens directly it may cause malfunctions.

Do not use any other lens cleaners except a commercial available 8 cm (3") DVD video camera lens cleaner.

- Using any other lens cleaners except the one for 8 cm (3") DVD video camera could cause this unit to malfunction.

Do not use the unit for surveillance purposes or other business uses.

- If you use the unit for a long time, heat will build up inside it and this may cause a malfunction.

- This unit is not intended for industrial use.

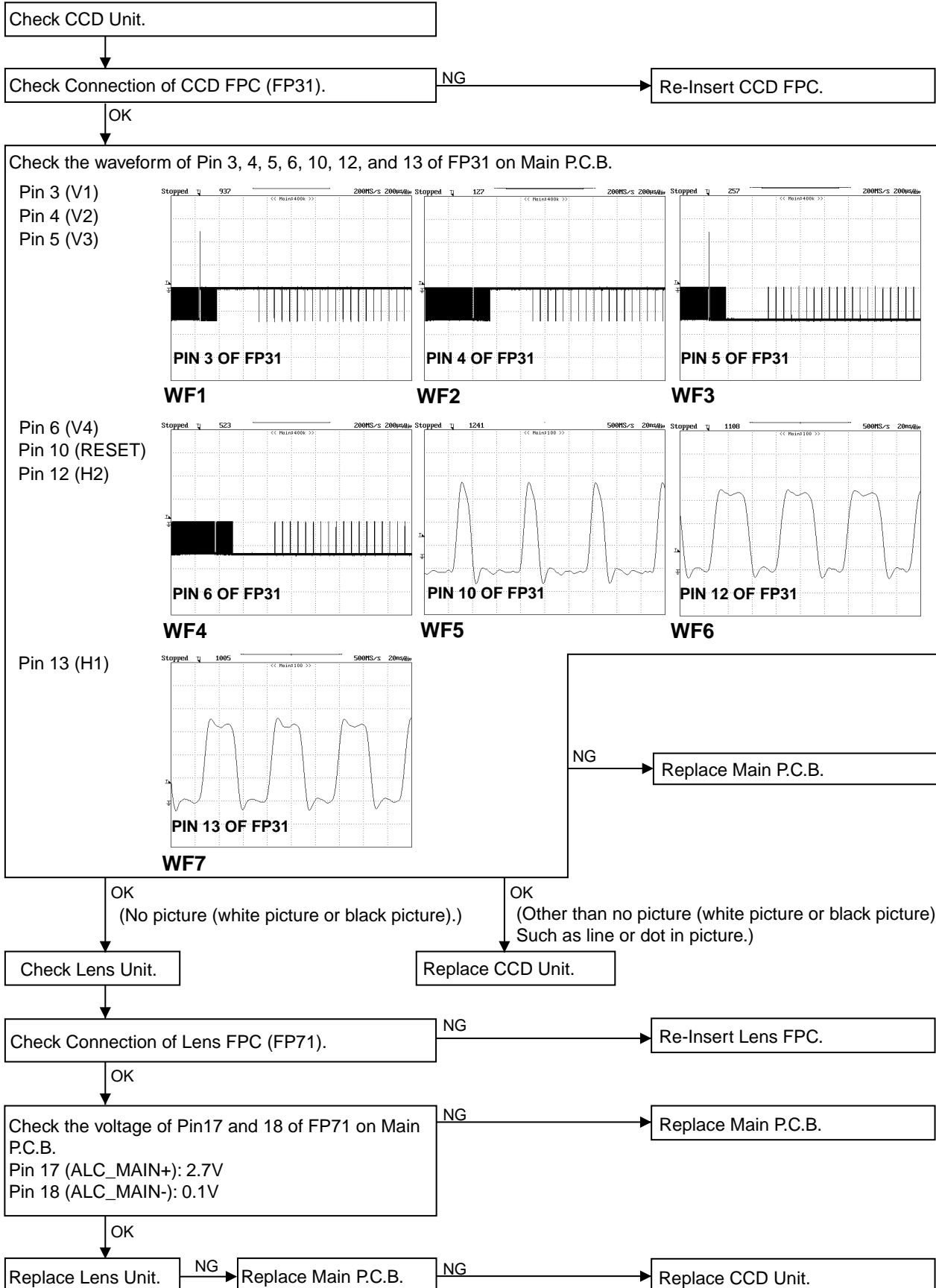
When you are not going to use the unit for an extended time

- When storing the unit in a cupboard or cabinet, it is recommended that you place a desiccant (silica gel) in with it.

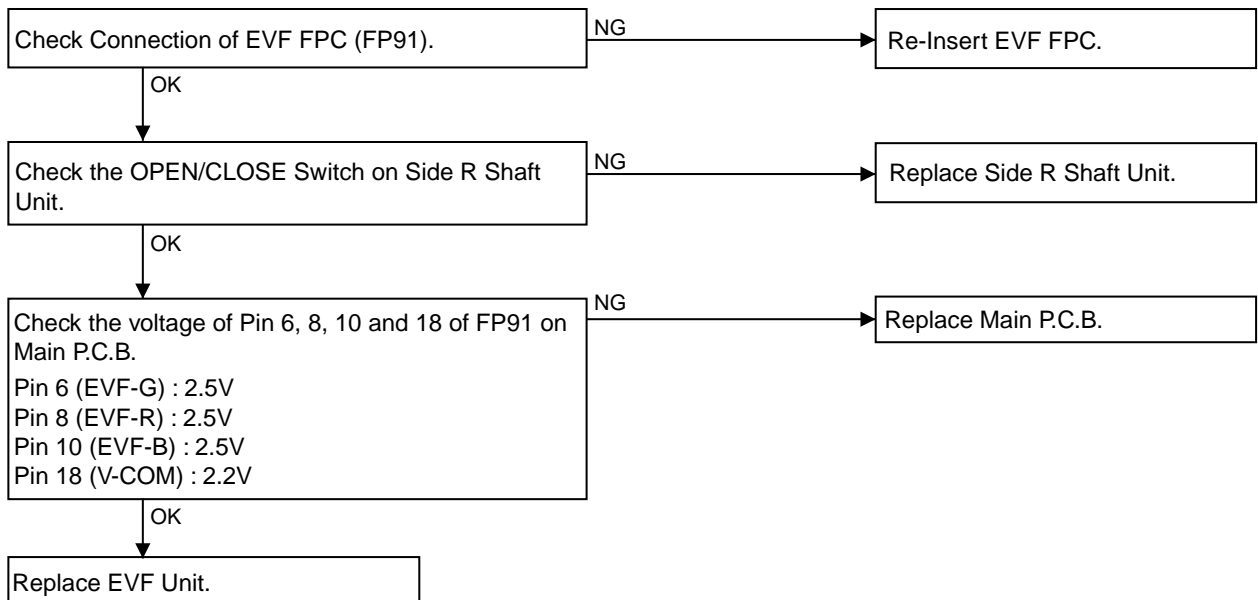
10 Troubleshooting

VIDEO

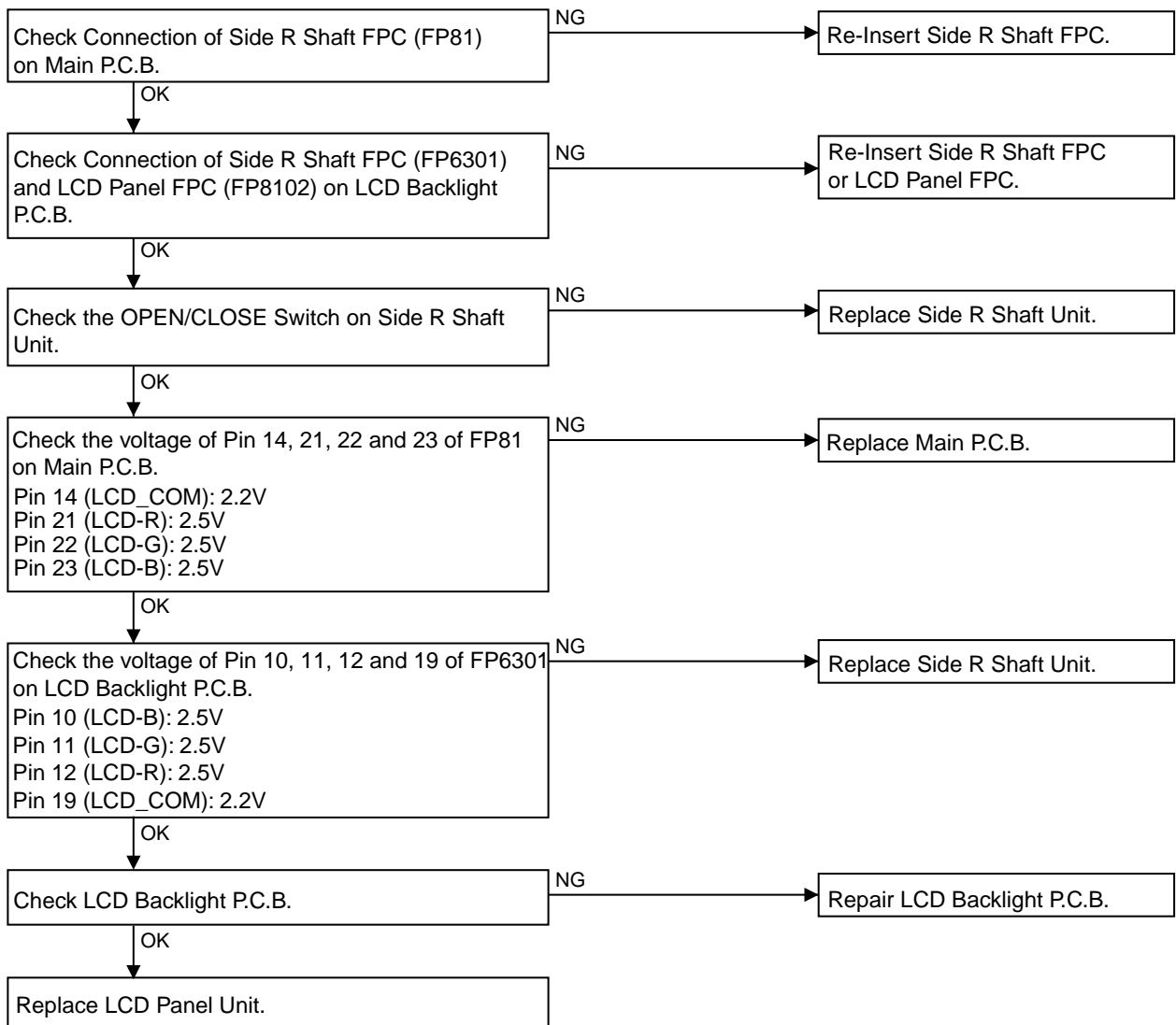
No picture on both EVF and LCD in Camera Mode



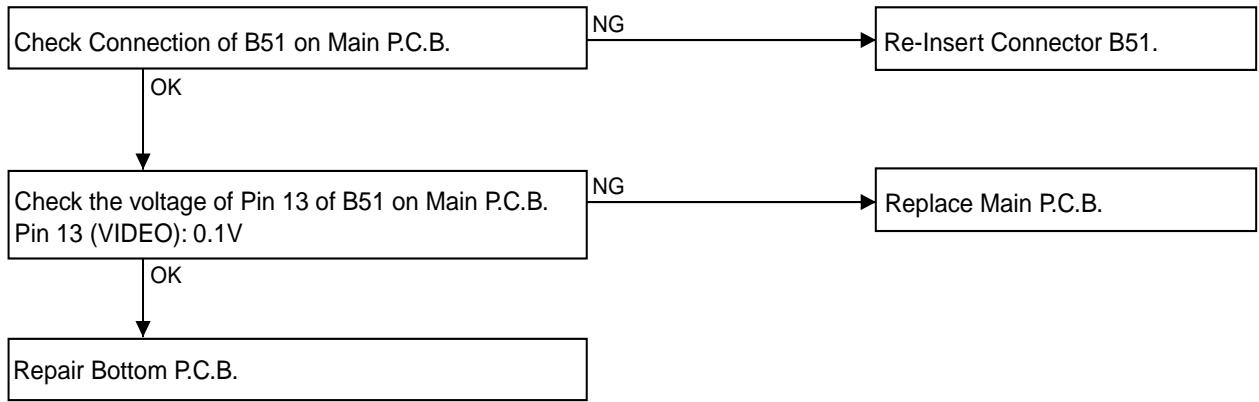
No picture on EVF but LCD is normal



No picture on LCD but EVF is normal

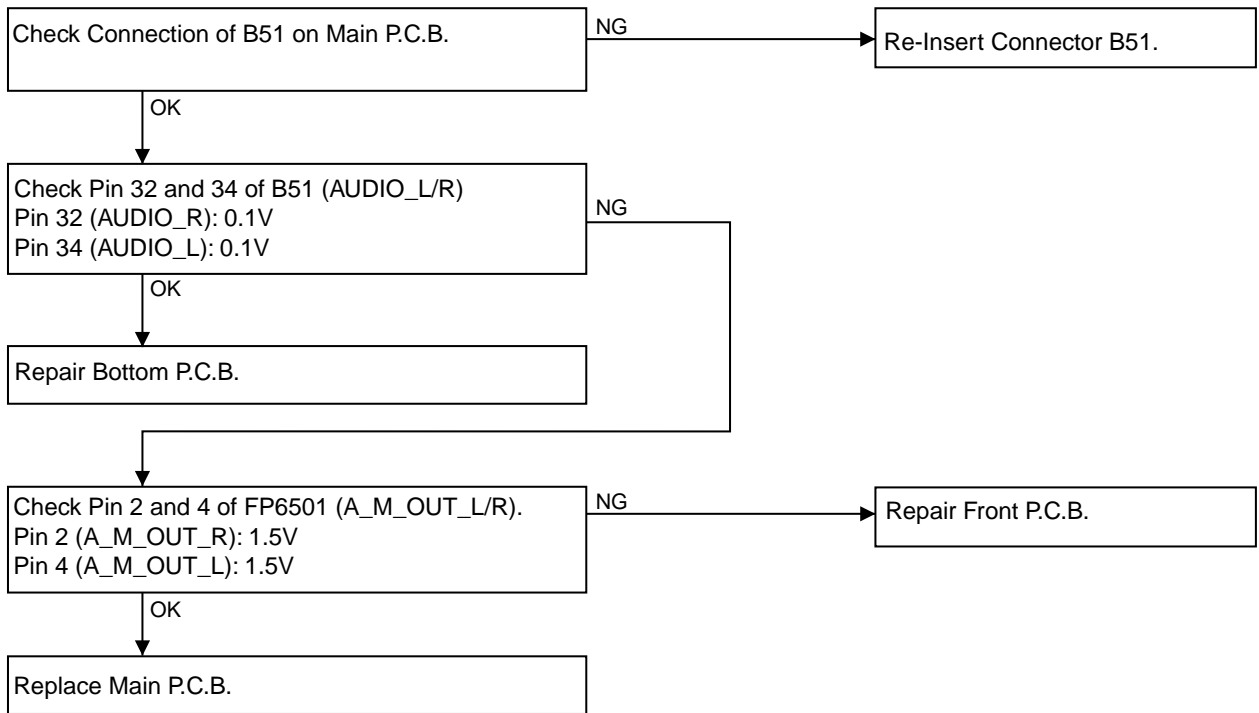


No picture on Video Output Jack

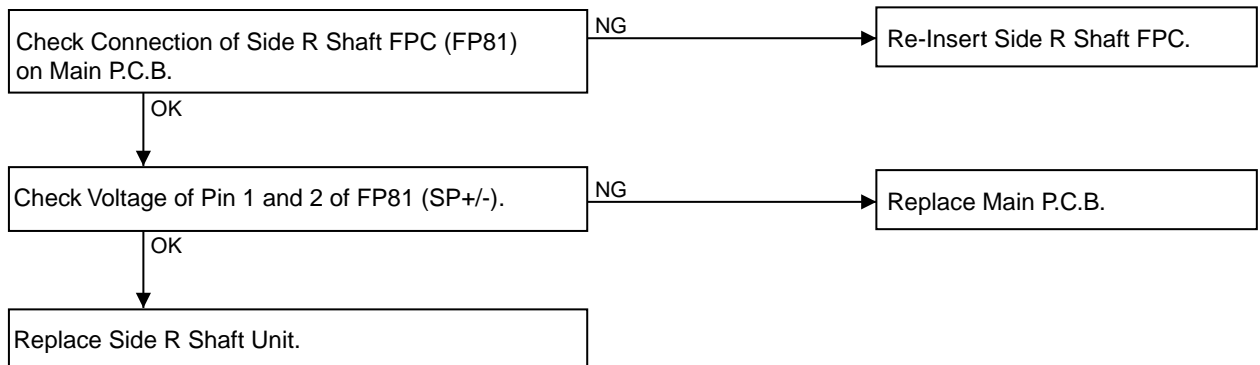


AUDIO

No Audio in Camera Mode

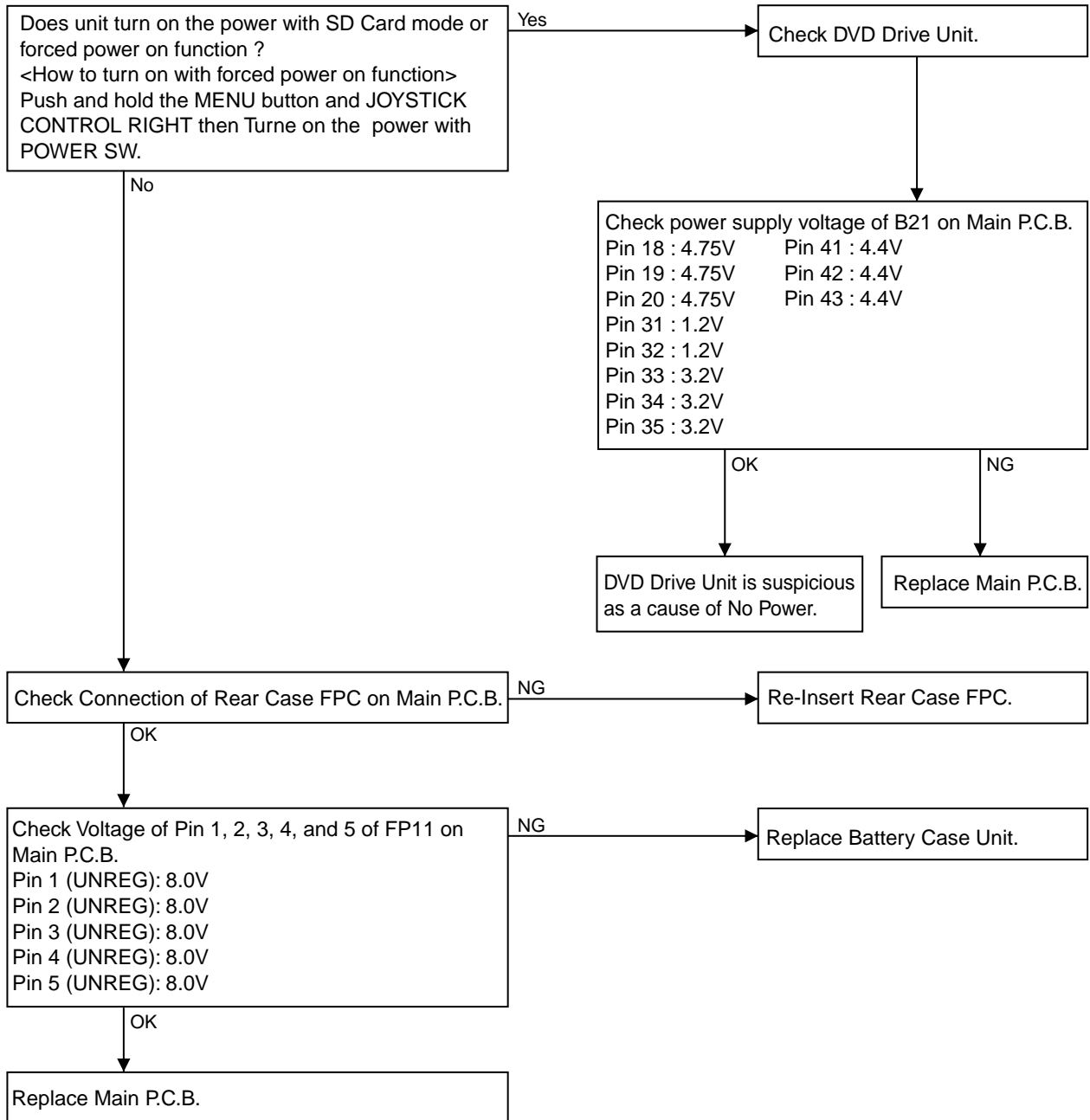


No Audio from Speaker (When AV Jack is normal)



POWER

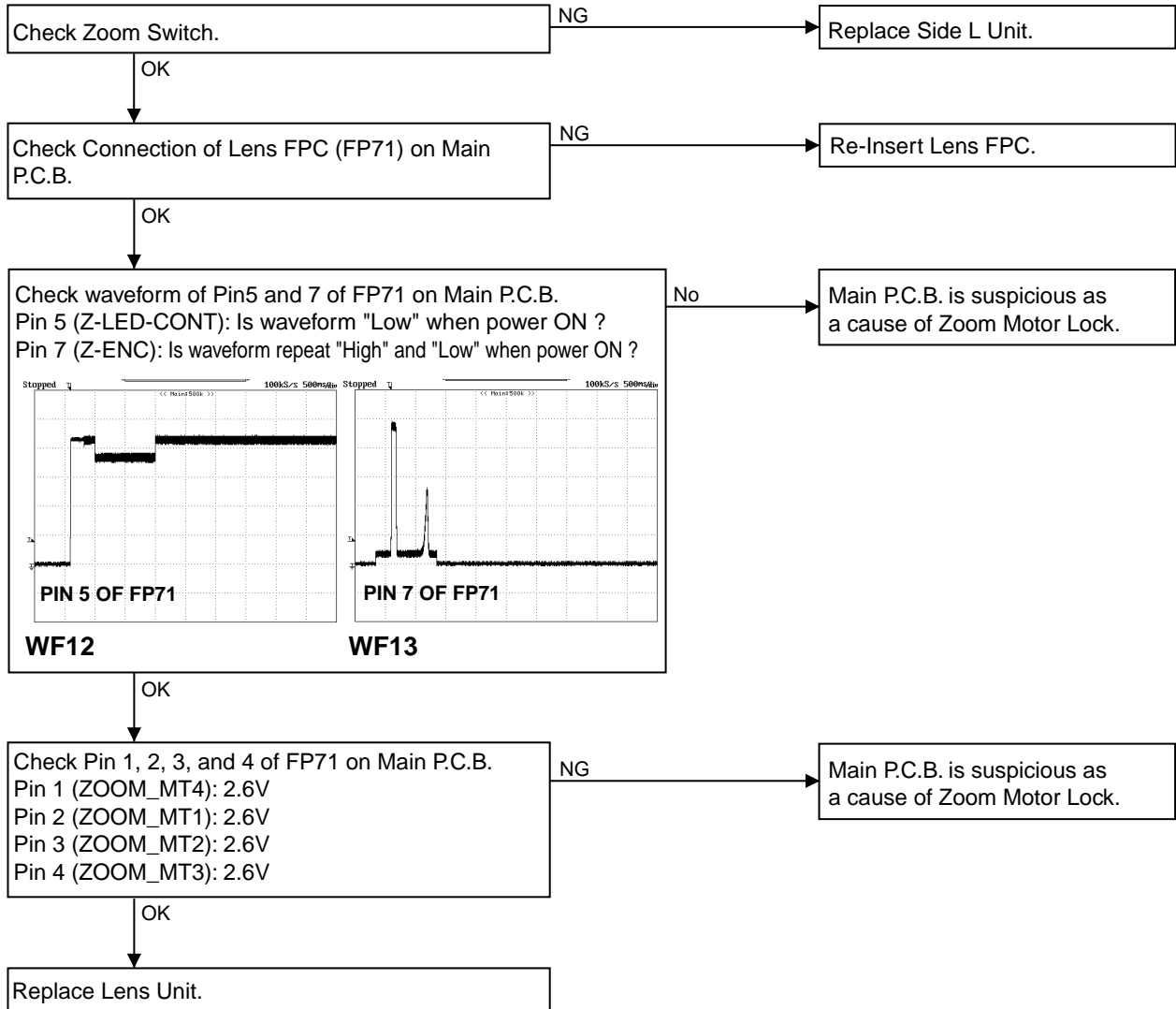
No power



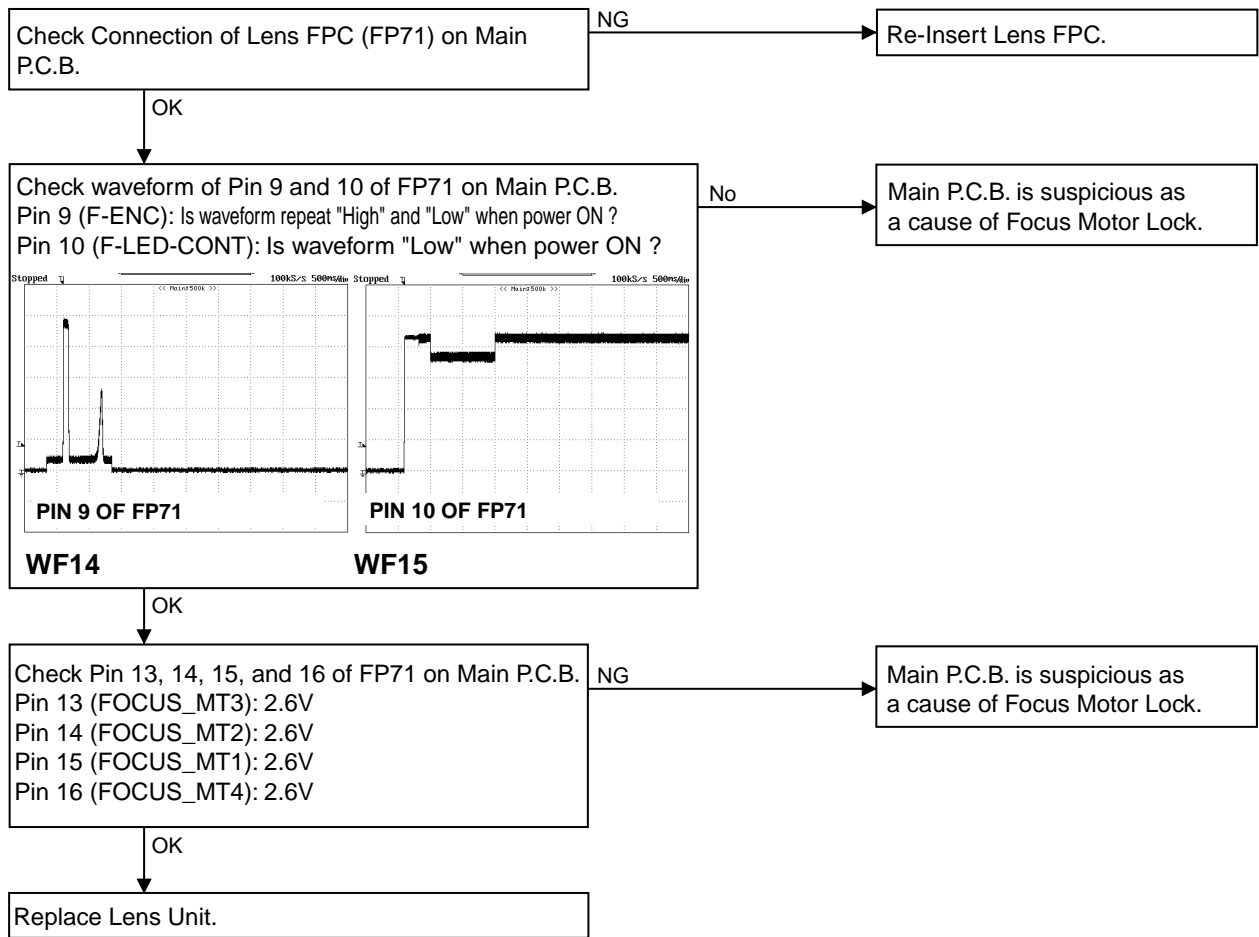
SYSCON

Mechanism & Lens Motor lock code is displayed in Service Menu
 (Refer to "Service Menu.")

Zoom Motor Lock (Zoom does not work)



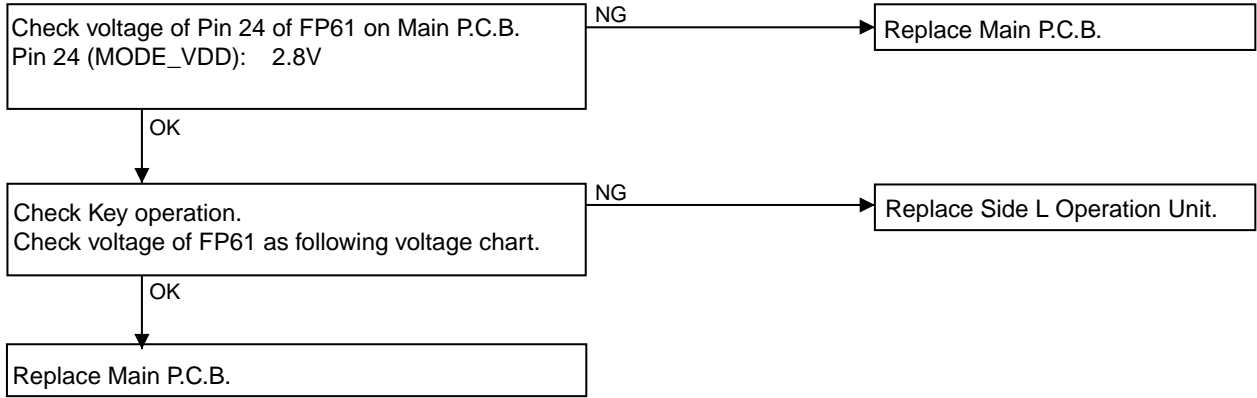
Focus Motor Lock (Focus does not work)



Communication error between CAMERA and ARM

Replace Main P.C.B.

Operation Key does not work



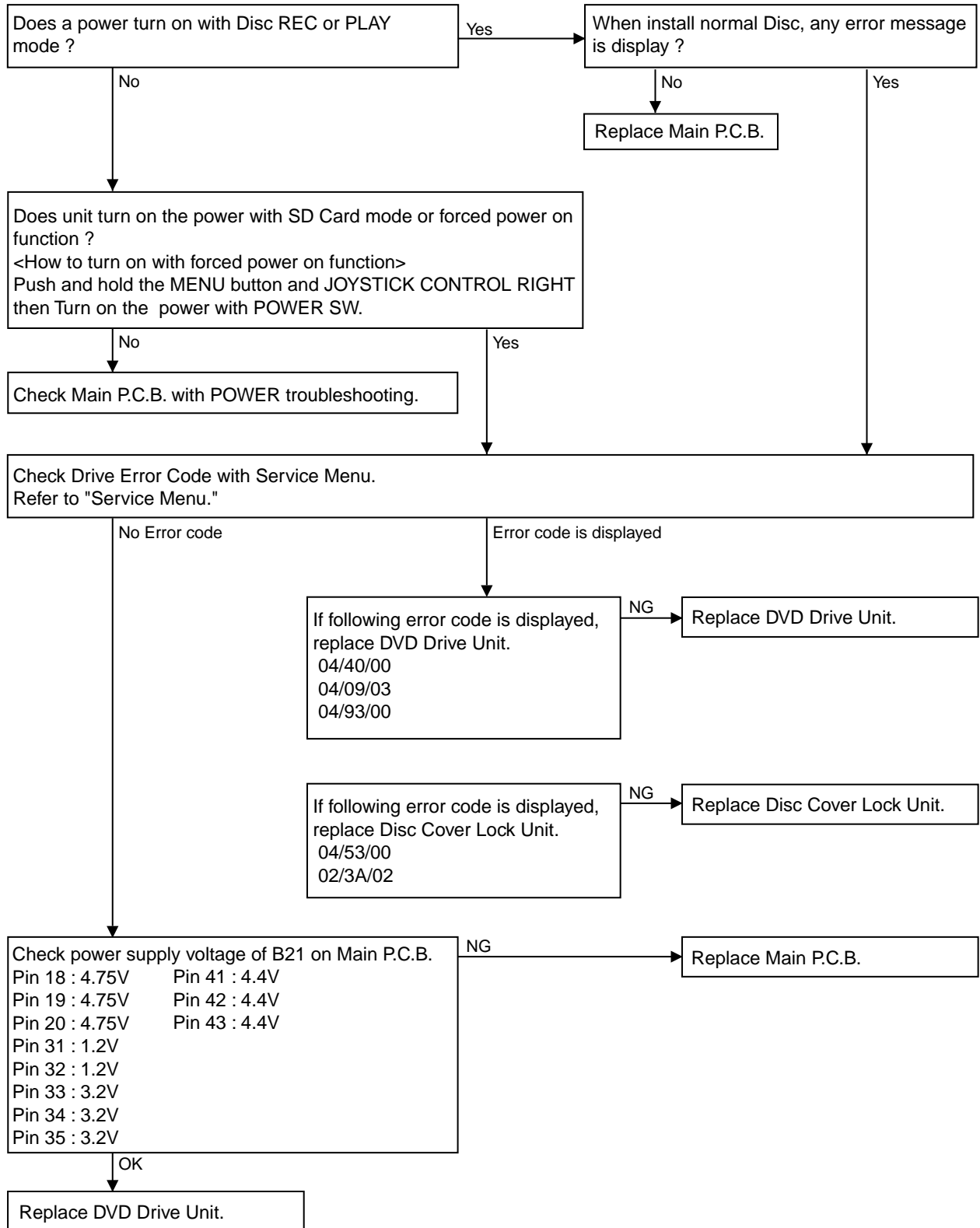
Operation Key	Pin No. of FP61	When push or select
START/STOP	Pin 1	0V
EJECT	Pin 3	0V
MODE DIAL (DISK REC)	Pin 5	2.8V
MODE DIAL (DISK PLAY)	Pin 5	1.9V
MODE DIAL (CARD REC)	Pin 5	1V
MODE DIAL (CARD PLAY)	Pin 5	0V
JOYSTICK (DOWN)	Pin11	0V
JOYSTICK (RIGHT)	Pin11	0.6V
JOYSTICK (LEFT)	Pin11	1.3V
JOYSTICK (UP)	Pin11	2V
DELETE	Pin12	0V
LIGHT	Pin12	0.6V
MENU	Pin12	1.3V
ENTER	Pin12	2V
POWER ON	Pin 14	0V
PHOTO	Pin 18	0V
ZOOM (TELE)	Pin 20	2.8V
ZOOM (WIDE)	Pin 20	0V

USB Jack, DV Jack, SD Card problem

If there are any problem in USB Jack and DV Jack communication or SD Card operation, replace the Main P.C.B.

DVD DRIVE UNIT

How to confirm which there is malfunction in Main P.C.B. or DVD Drive Unit.



11 Voltage Chart of Connectors on Main P.C.B.

MAIN P.C.B.

MODE PIN NO.	REC
B21	
1	2.9
2	0
3	0.6
4	2.2
5	0.6
6	0.6
7	2.0
8	0.9
9	1.0
10	2.0
11	0
12	3.3
13	0
14	3.3
15	3.3
16	0
17	3.3
18	4.8
19	4.8
20	4.8
21	0
22	0
23	0
24	0
25	0
26	0
27	0
28	0
29	0
30	0
31	1.2
32	1.2
33	3.3
34	3.3
35	3.3
36	3.3
37	3.3
38	0
39	0
40	0
41	4.5
42	4.5
43	4.5
44	0
45	3.3
46	0
47	3.3
48	0
49	0
50	0.5
51	0.5
52	0.5
53	0.5

MODE PIN NO.	REC
54	1.0
55	0.5
56	0.5
57	0
58	0
59	2.9
60	0
B51	
1	---
2	0
3	---
4	---
5	0
6	3.2
7	0
8	0
9	0
10	0
11	0
12	2.8
13	0
14	0
15	0
16	3.3
17	3.3
18	3.3
19	0
20	0
21	3.3
22	3.3
23	3.3
24	3.3
25	3.3
26	0
27	0
28	0
29	0.7
30	0.7
31	0
32	0.1
33	0
34	0.1
35	0
36	0
37	---
38	---
39	0
40	---
FP11	
1	8.0
2	8.0
3	8.0
4	8.0
5	8.0

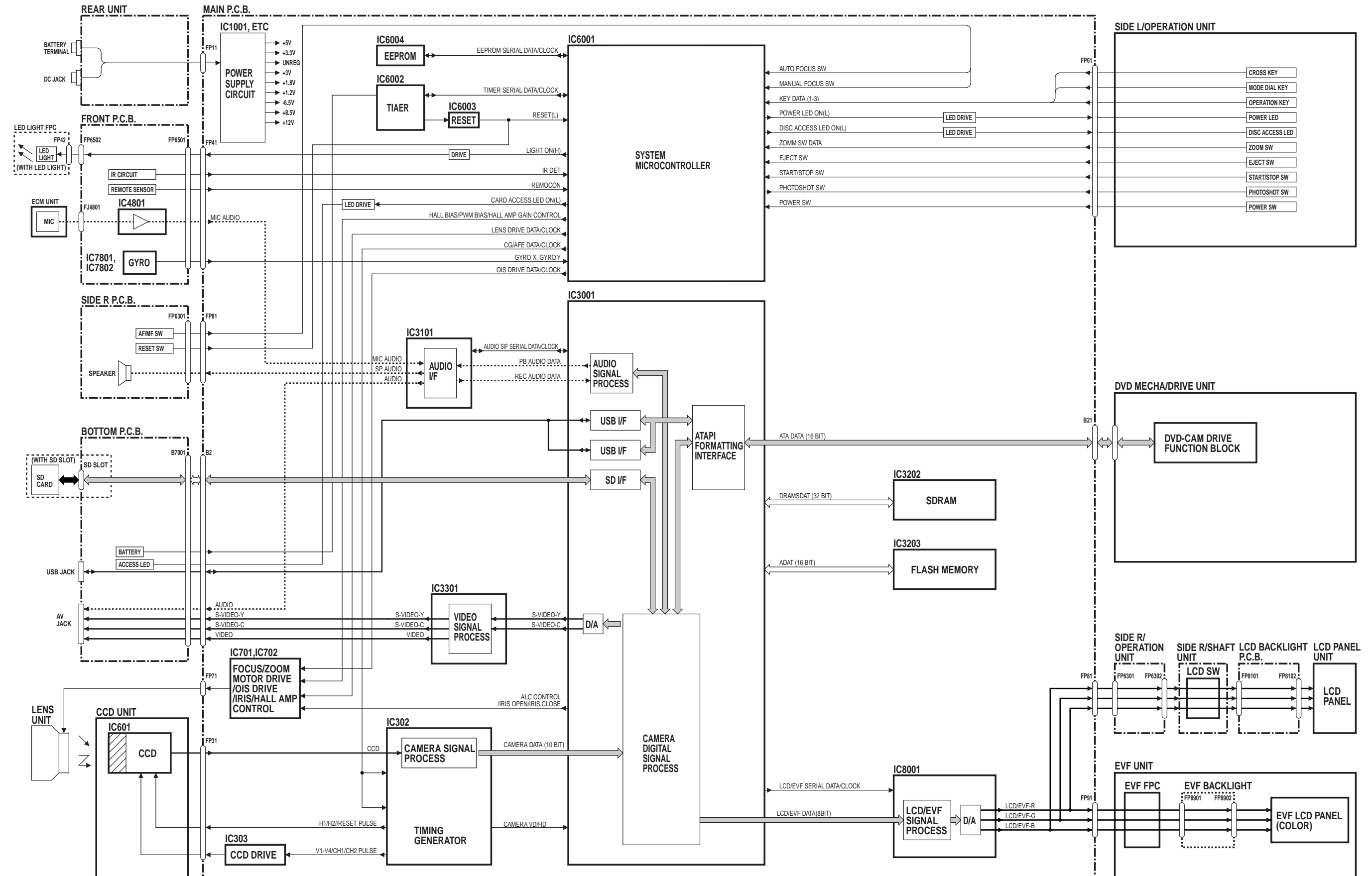
MODE PIN NO.	REC
6	8.0
7	---
8	2.9
9	2.9
10	---
11	0
12	0
13	0
14	0
15	0
16	0
FP31	
1	8.3
2	0
3	-0.2
4	-0.2
5	-6.0
6	-6.0
7	0
8	0
9	12.0
10	6.1
11	-6.4
12	1.3
13	1.7
14	6.6
FP41	
1	4.8
2	2.5
3	0.4
4	1.1
5	0
6	0
7	1.4
8	1.5
9	0
10	2.6
11	0
12	0
13	1.5
14	0
15	1.5
16	4.8
FP61	
1	2.8
2	---
3	0
4	---
5	2.9
6	---
7	0
8	---
9	0
10	---

MODE PIN NO.	REC
11	2.9
12	2.9
13	---
14	0
15	---
16	1.7
17	---
18	2.8
19	---
20	1.5
21	---
22	0
23	---
24	2.9
FP71	
1	1.5
2	1.5
3	1.5
4	1.5
5	4.2
6	4.8
7	0
8	4.8
9	0
10	4.1
11	1.3
12	0
13	1.5
14	1.5
15	1.5
16	1.5
17	0.5
18	0
19	2.0
20	1.5
21	0.9
22	1.5
FP72	
1	1.5
2	1.4
3	1.4
4	1.5
5	1.1
6	1.5
7	1.9
8	1.5
9	1.9
10	1.5
11	1.1
12	1.5
FP81	
1	0.9
2	0.5
3	2.8

MODE PIN NO.	REC
4	2.9
5	---
6	0
7	2.9
8	0
9	0
10	0
11	1.4
12	4.8
13	4.8
14	2.3
15	0
16	1.2
17	2.2
18	2.9
19	0
20	2.6
21	2.6
22	2.6
23	2.6
24	0
25	0
26	2.9
27	8.6
28	0
29	1.4
30	1.4
31	0
32	0
FP91	
1	2.9
2	0
3	0
4	0
5	0
6	2.6
7	-0.7
8	2.6
9	8.6
10	2.6
11	0.2
12	2.6
13	2.2
14	0
15	1.3
16	1.4
17	1.4
18	2.3

12 Block Diagrams

OVERALL BLOCK DIAGRAM




OVERALL BLOCK DIAGRAM
VDR-D220EG/EF/E/EP/EB/GC/GCS/SG/EE/GN, VDR-D228GK, VDR-D230EE

13 Schematic Diagrams

13.1. SCHEMATIC DIAGRAM & CIRCUIT BOARD LAYOUT NOTES

1. Important safety notice

Components identified by the sign  have special characteristics important for safety. When replacing any of these components, use only the specified parts.

2. Do not use the part numbers shown on these drawings for ordering.

The correct part number and part value is shown in the parts list, and may be slightly different or amended since this drawing was prepared.


3. Use only original replacement parts:

To maintain original function and reliability of repaired units, use only original replacement parts which are listed with their part numbers in the parts list section of the service manual.

4. Parts different in shape or size may be used.

However, only interchangeable parts will be supplied as service replacement parts.

5. Test point information

 : Test point with no test pin.

Schematic Diagram Notes

1. Indication for Zener Voltage of Zener Diodes

The Zener Voltages of Zener Diodes are indicated as such on Schematic Diagrams.

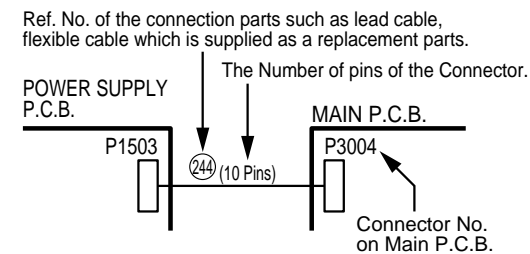
Example:
(6.2V).....Zener Voltage

2. How to identify Connectors

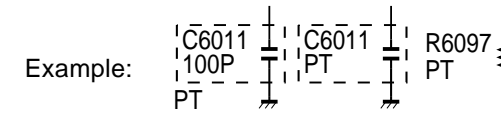
Each connector is labeled with a Connector No. and Pin No. Indicating what it is connected to (its counter part). Use the interconnection schematic diagram to find the connection between associated connectors.

Example:

The connections between two P.C.B.s are shown below.

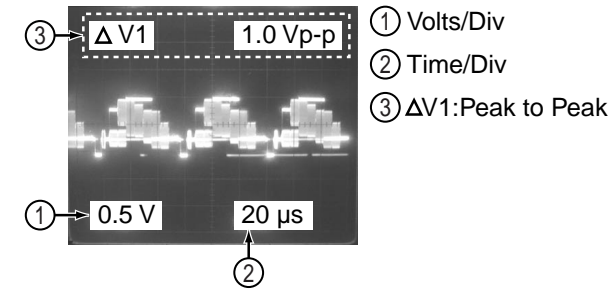


3. Parts marked "PT" are not used in any models included in this service model.



Signal Waveform Note

How to read Signal Waveform



Voltage Chart Note

Voltage Measurement

- a. Color bar signal in SP mode.
- b. ---:Unmeasurable or not necessary to measure.

Circuit Board Layout Note

Circuit Board Layouts show components installed for various models.

For proper parts content for the model you are servicing, please refer to the schematic diagram and parts list.

NOTE:

Circuit Board Layouts include components which are not used.

Model Number Indication

Model numbers are indicated without "VDR-D."

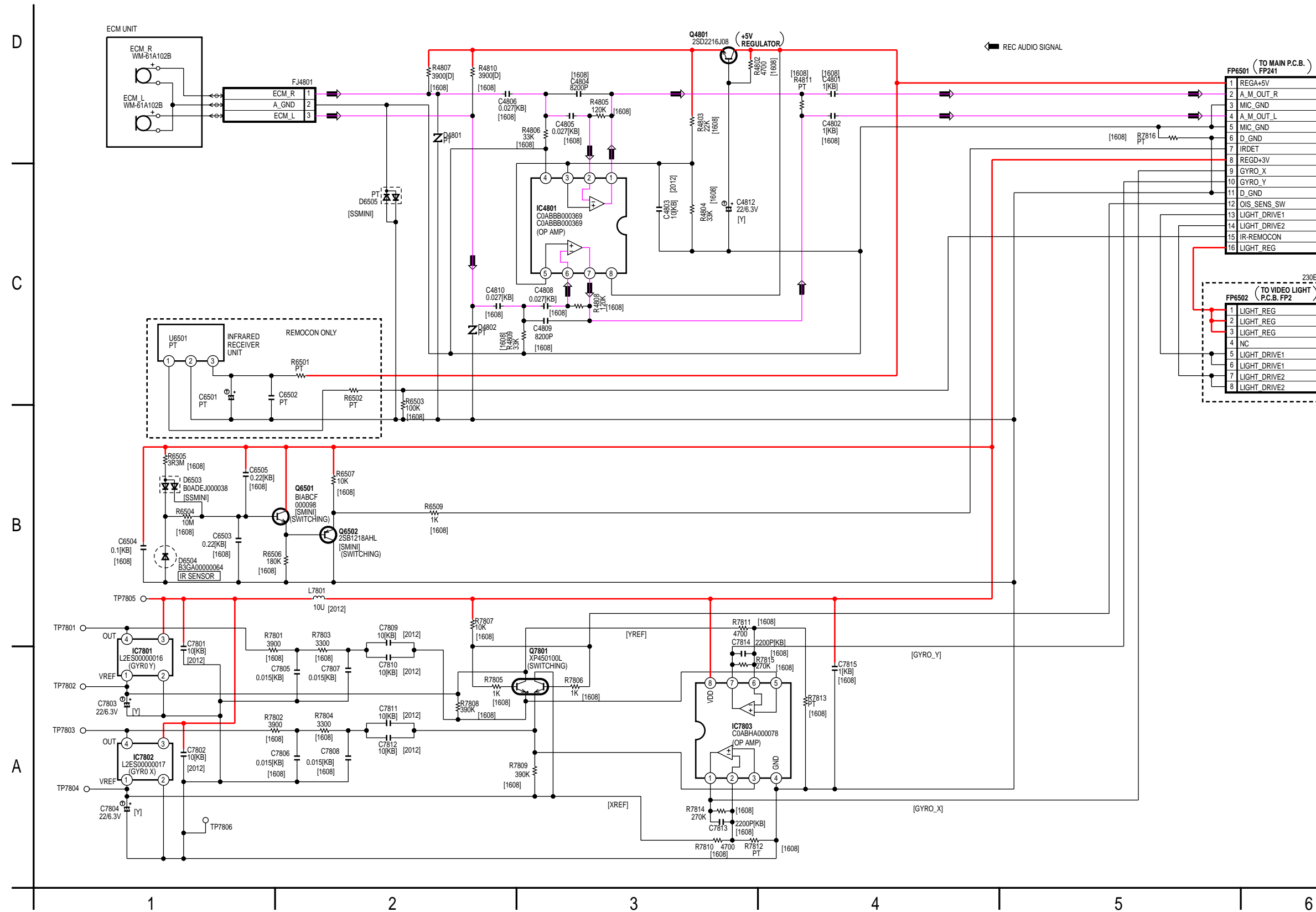
13.2. FRONT SCHEMATIC DIAGRAM

FRONT SCHEMATIC DIAGRAM

NOTE: For placing a purchase order of the parts, be sure to use the part number listed in the parts list. Do not use the part number on this diagram.

NOTE: PARTS MARKED "PT" ARE NOT USED.

NOTE: FOR SCHEMATIC DIAGRAM AND CIRCUIT BOARD LAYOUT NOTES, REFER TO BEGINNING OF SCHEMATIC SECTION.



FP6501 (TO MAIN P.C.B.)
FP241


1	REGA+5V
2	A_M_OUT_R
3	MIC_GND
4	A_M_OUT_L
5	MIC_GND
6	D_GND
7	IRDET
8	REGD+3V
9	GYRO_X
10	GYRO_Y
11	D_GND
12	OIS_SENS_SW
13	LIGHT_DRIVE1
14	LIGHT_DRIVE2
15	IR-REMOCON
16	LIGHT_REG

230EE
FP6502 (TO VIDEO LIGHT P.C.B. FP2)
230EE

1	LIGHT_REG
2	LIGHT_REG
3	LIGHT_REG
4	NC
5	LIGHT_DRIVE1
6	LIGHT_DRIVE1
7	LIGHT_DRIVE2
8	LIGHT_DRIVE2

13.3. BOTTOM SCHEMATIC DIAGRAM

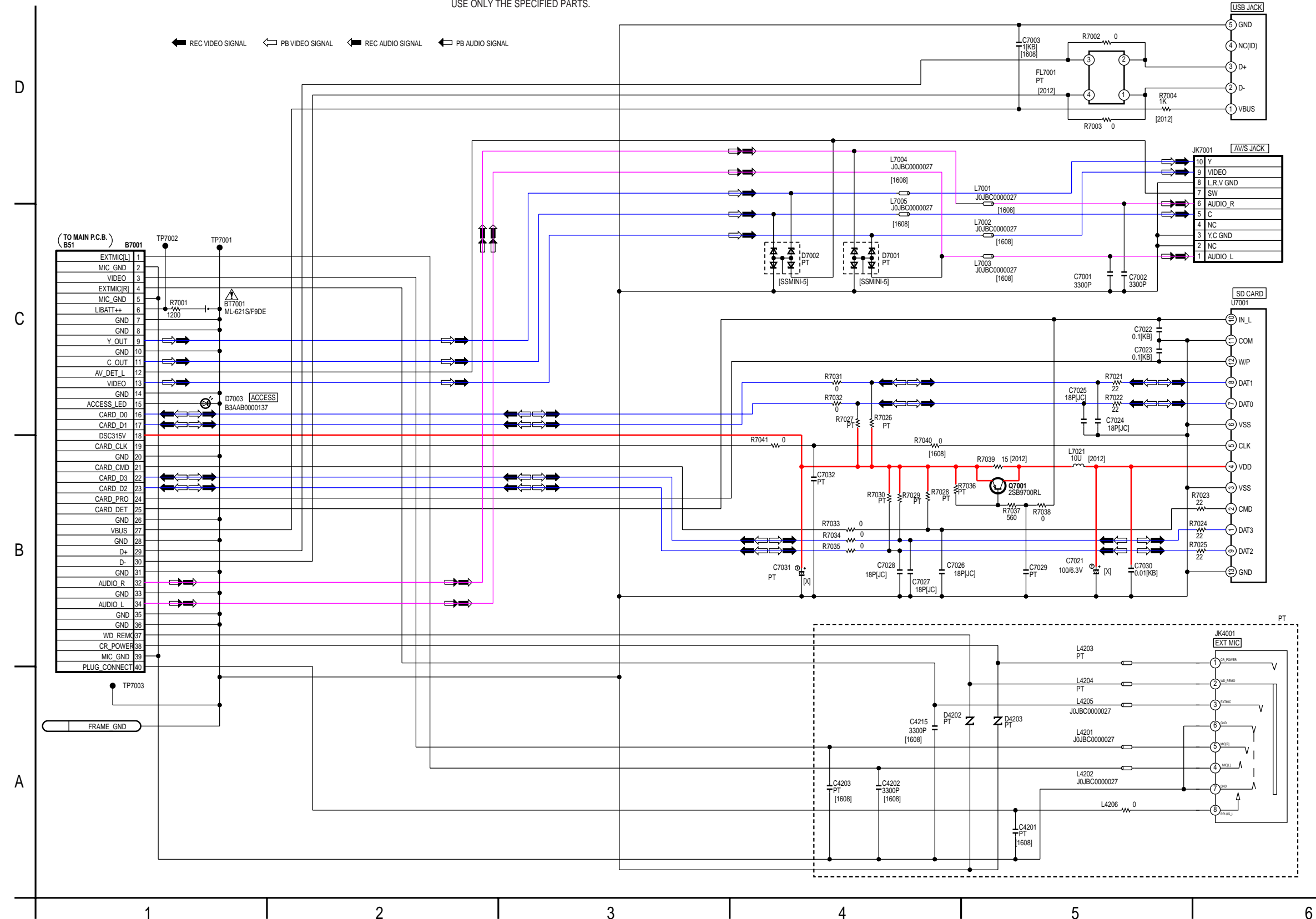
BOTTOM SCHEMATIC DIAGRAM

IMPORTANT SAFETY NOTICE:
COMPONENTS IDENTIFIED BY THE SIGN  HAVE SPECIAL CHARACTERISTICS IMPORTANT FOR SAFETY. WHEN REPLACING ANY OF THESE COMPONENTS, USE ONLY THE SPECIFIED PARTS.

NOTE: For placing a purchase order of the parts, be sure to use the part number listed in the parts list. Do not use the part number on this diagram.

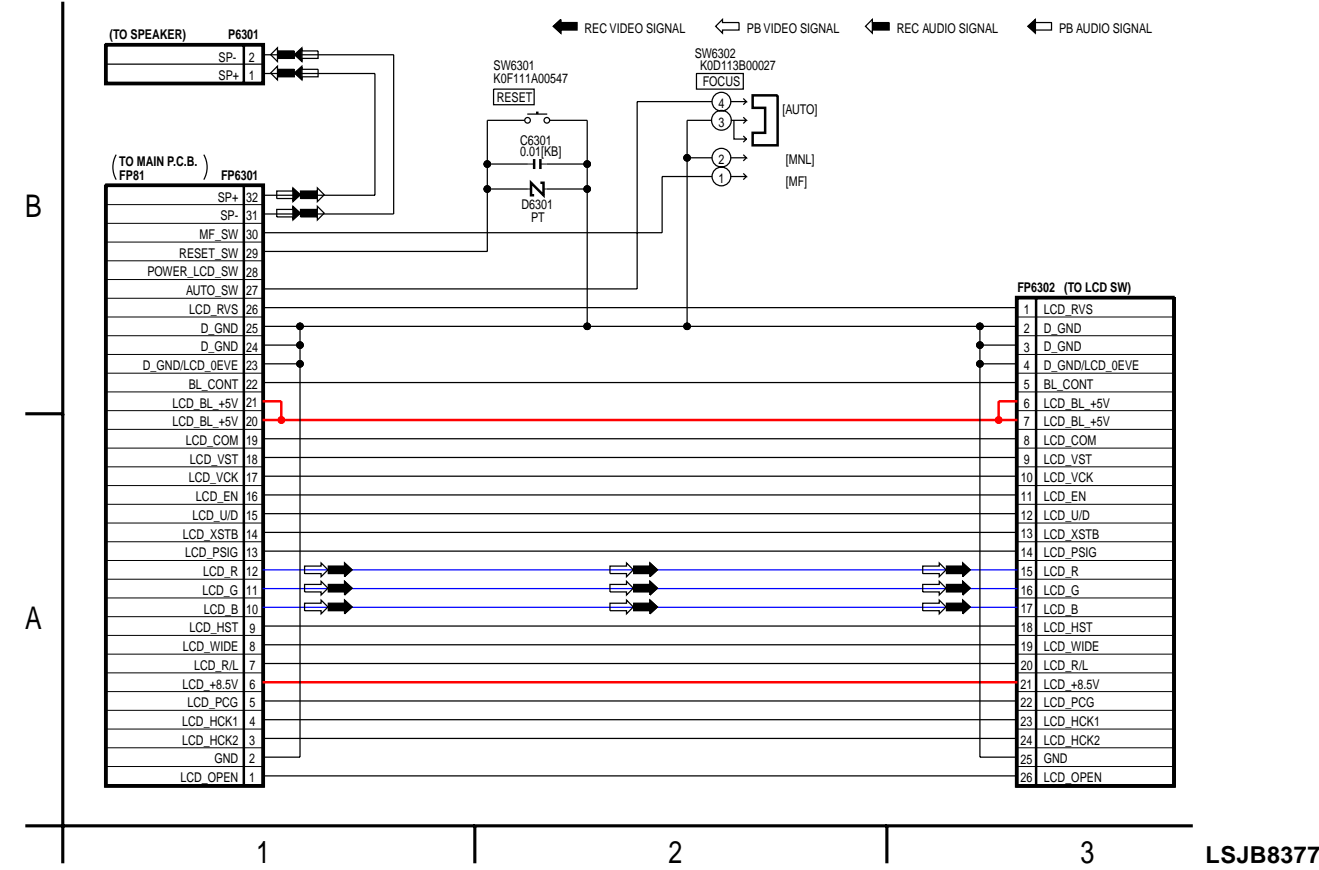
NOTE: PARTS MARKED "PT" ARE NOT USED.

NOTE: FOR SCHEMATIC DIAGRAM AND CIRCUIT BOARD LAYOUT NOTES, REFER TO BEGINNING OF SCHEMATIC SECTION.



13.5. SIDE R / EVF FPC / EVF BACKLIGHT SCHEMATIC DIAGRAMS

SIDE R SCHEMATIC DIAGRAM

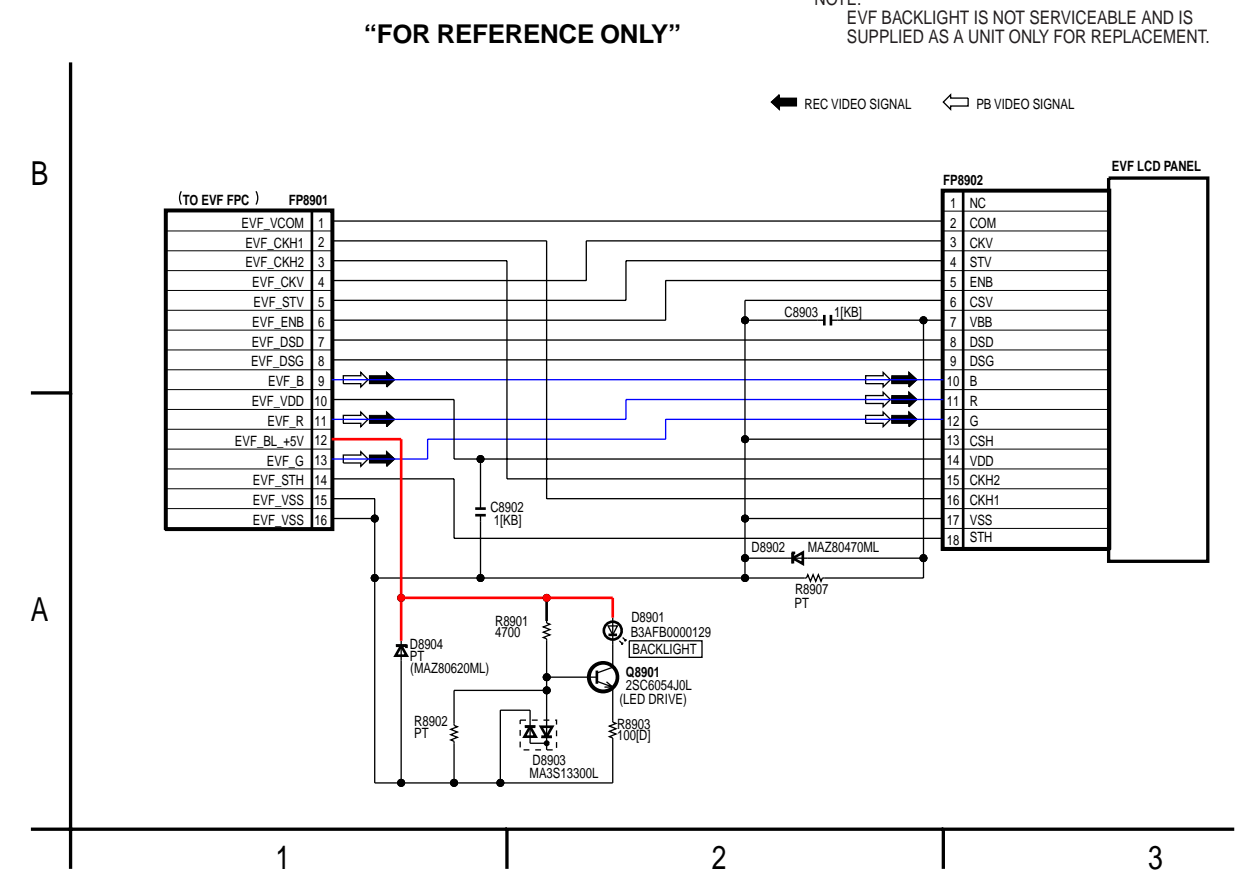


NOTE: For placing a purchase order of the parts, be sure to use the part number listed in the parts list. Do not use the part number on this diagram.

NOTE: PARTS MARKED "PT" ARE NOT USED.

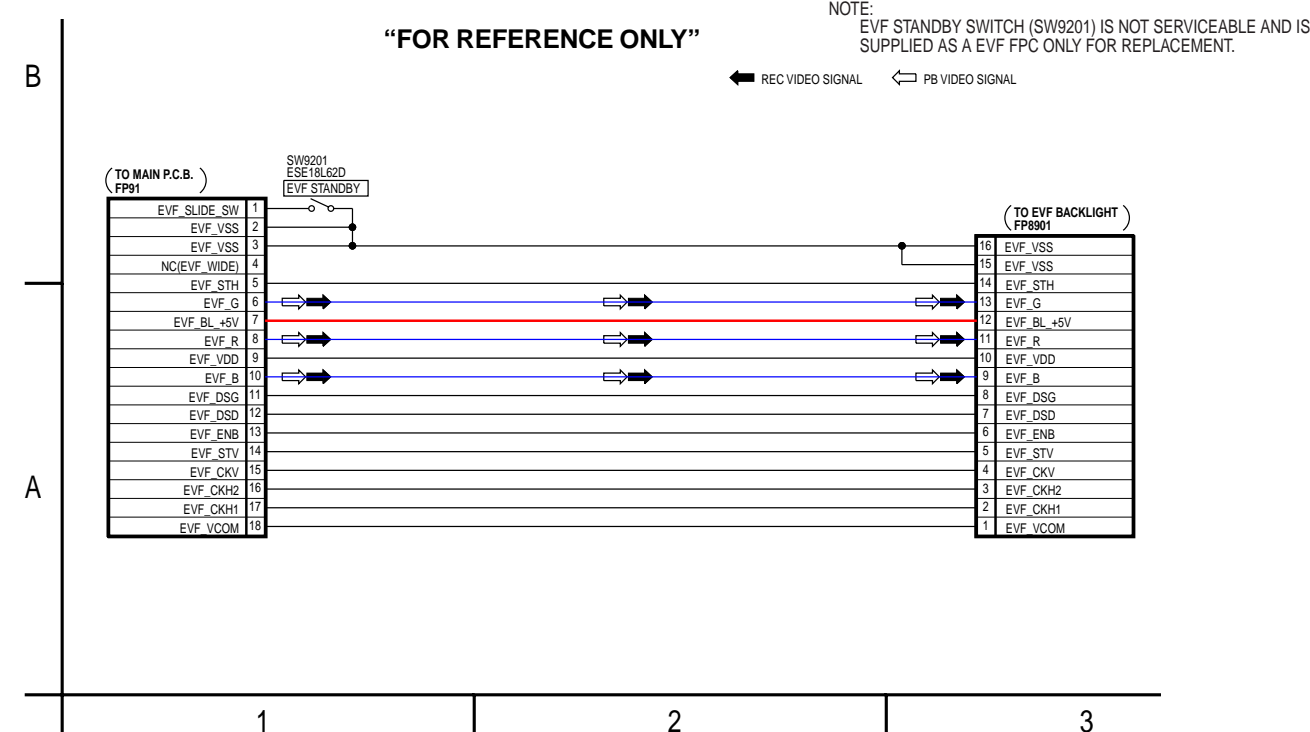
NOTE: FOR SCHEMATIC DIAGRAM AND CIRCUIT BOARD LAYOUT NOTES, REFER TO BEGINNING OF SCHEMATIC SECTION.

EVF BACKLIGHT SCHEMATIC DIAGRAM

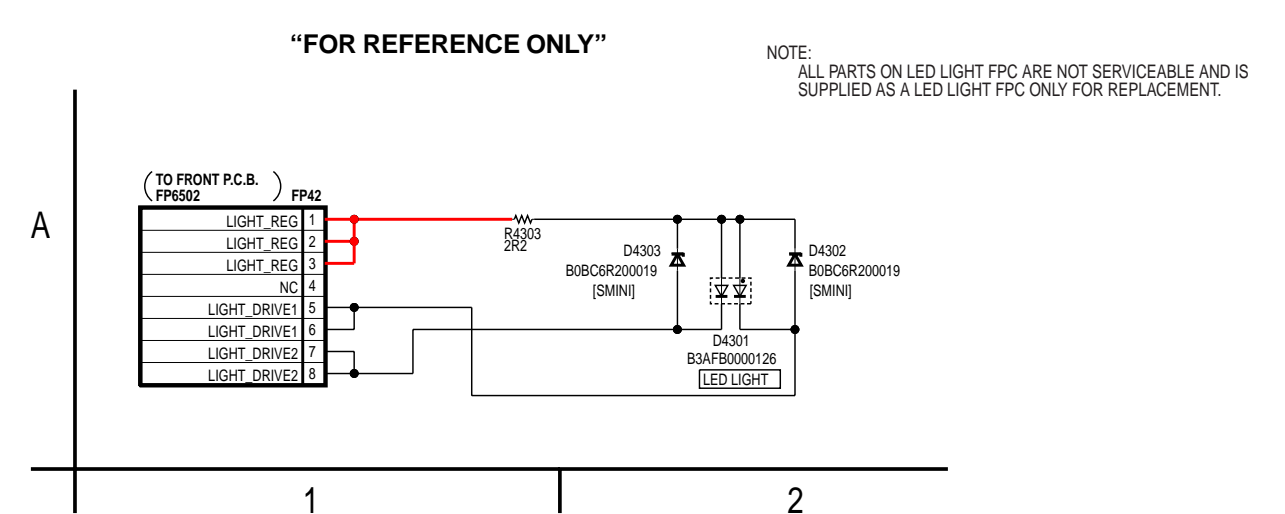


NOTE: EVF BACKLIGHT IS NOT SERVICEABLE AND IS SUPPLIED AS A UNIT ONLY FOR REPLACEMENT.

EVF FPC SCHEMATIC DIAGRAM



LED LIGHT SCHEMATIC DIAGRAM VDR-D230EE



NOTE: ALL PARTS ON LED LIGHT FPC ARE NOT SERVICEABLE AND IS SUPPLIED AS A LED LIGHT FPC ONLY FOR REPLACEMENT.

SIDE R SCHEMATIC DIAGRAM
 EVF FPC SCHEMATIC DIAGRAM
 EVF BACKLIGHT SCHEMATIC DIAGRAM
 LED LIGHT SCHEMATIC DIAGRAM
 VDR-D220EG/EF/E/EP/EB/GC/GCS/SG/EE/GN, VDR-D228GK, VDR-D230EE

13.6. CCD / REAR CASE / LCD SW SCHEMATIC DIAGRAMS

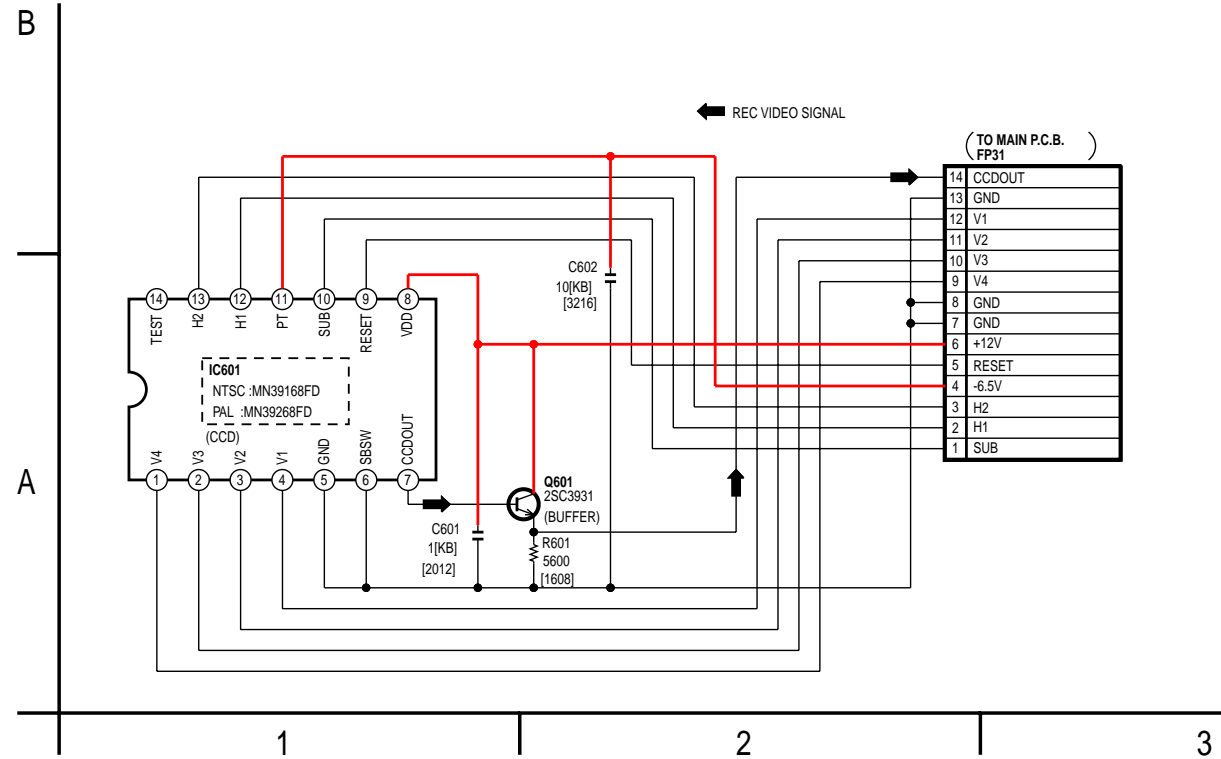
NOTE: For placing a purchase order of the parts, be sure to use the part number listed in the parts list. Do not use the part number on this diagram.

NOTE: PARTS MARKED "PT" ARE NOT USED.

NOTE: FOR SCHEMATIC DIAGRAM AND CIRCUIT BOARD LAYOUT NOTES, REFER TO BEGINNING OF SCHEMATIC SECTION.

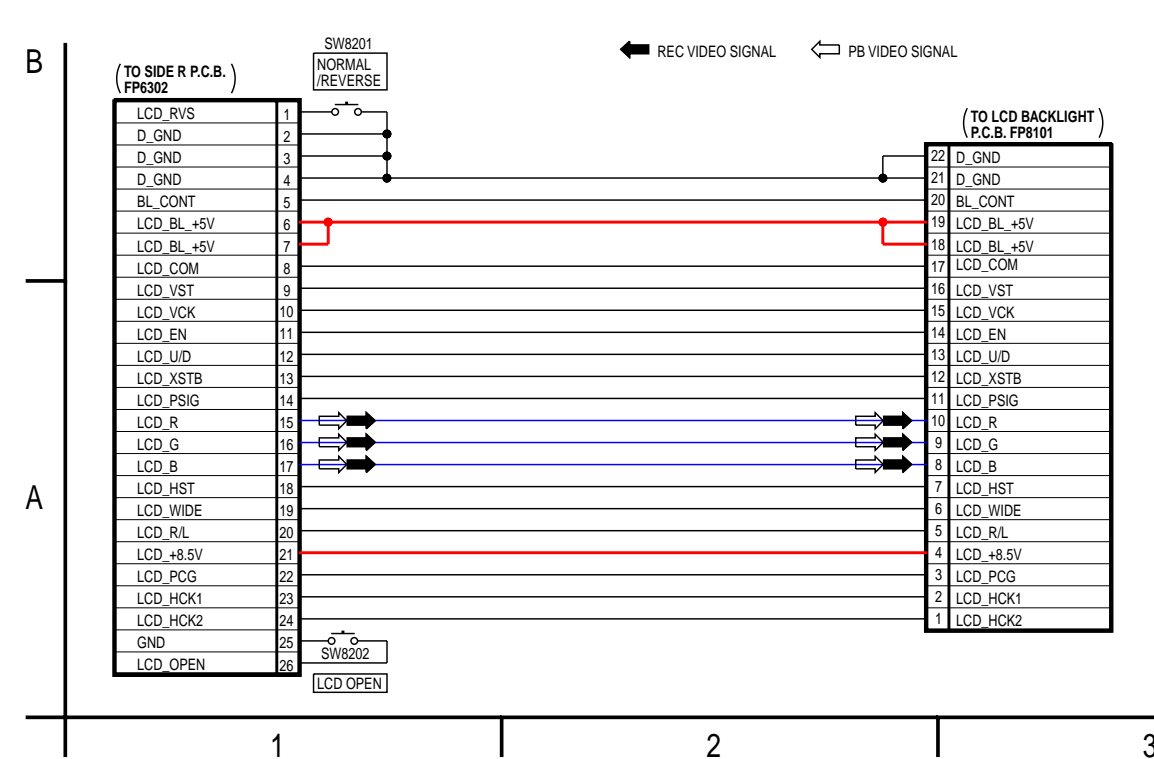
CCD SCHEMATIC DIAGRAM "FOR REFERENCE ONLY"

NOTE: CCD P.C.B. IS NOT SERVICEABLE AND IS SUPPLIED AS A UNIT ONLY FOR REPLACEMENT.



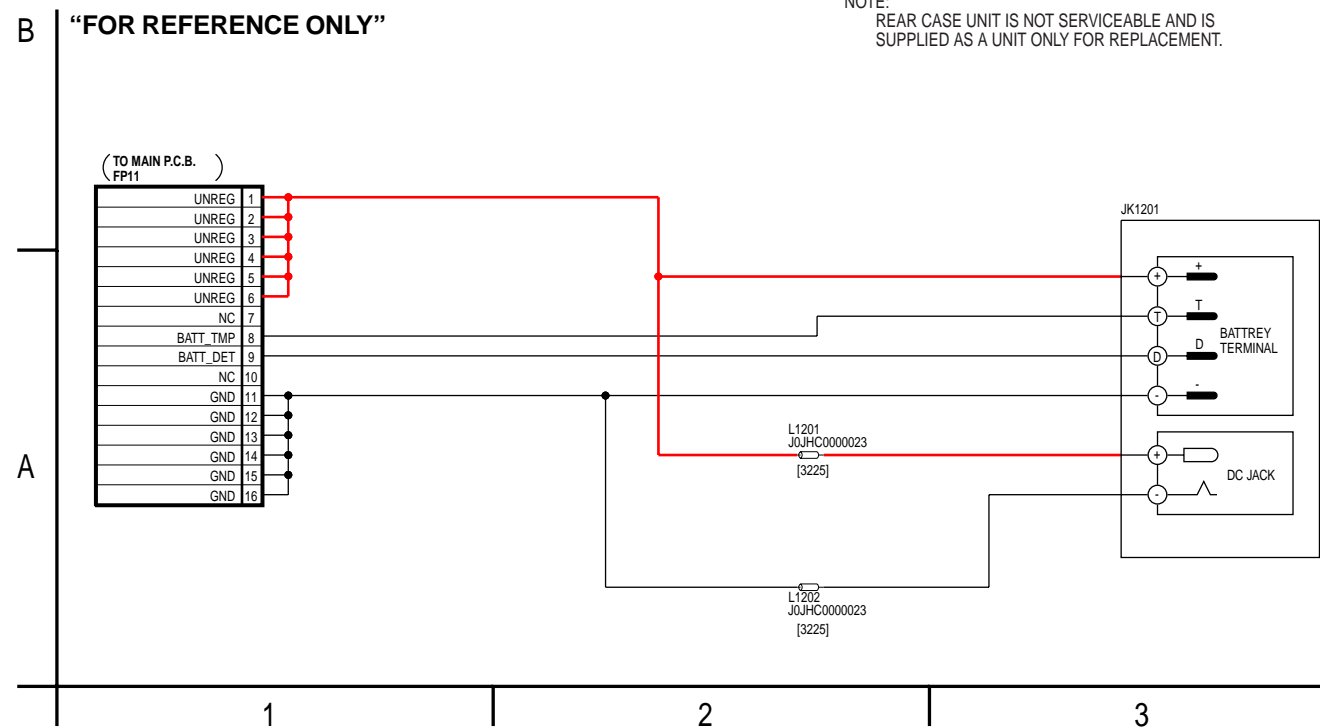
LCD SW SCHEMATIC DIAGRAM "FOR REFERENCE ONLY"

NOTE: LCD SW IS NOT SERVICEABLE AND IS SUPPLIED AS A SIDE R/SHAFT UNIT ONLY FOR REPLACEMENT.



REAR CASE SCHEMATIC DIAGRAM "FOR REFERENCE ONLY"

NOTE: REAR CASE UNIT IS NOT SERVICEABLE AND IS SUPPLIED AS A UNIT ONLY FOR REPLACEMENT.



CCD SCHEMATIC DIAGRAM
REAR SCHEMATIC DIAGRAM
LCD SW SCHEMATIC DIAGRAM

VDR-D220EG/EF/E/EP/EB/GC/GCS/SG/EE/GN, VDR-D228GK, VDR-D230EE

13.7. SIDE L/OPERATION / DISK COVER LOCK SCHEMATIC DIAGRAMS

NOTE: For placing a purchase order of the parts, be sure to use the part number listed in the parts list. Do not use the part number on this diagram.

NOTE: PARTS MARKED "PT" ARE NOT USED.

NOTE: FOR SCHEMATIC DIAGRAM AND CIRCUIT BOARD LAYOUT NOTES, REFER TO BEGINNING OF SCHEMATIC SECTION.

SIDE L / OPERATION SCHEMATIC DIAGRAM

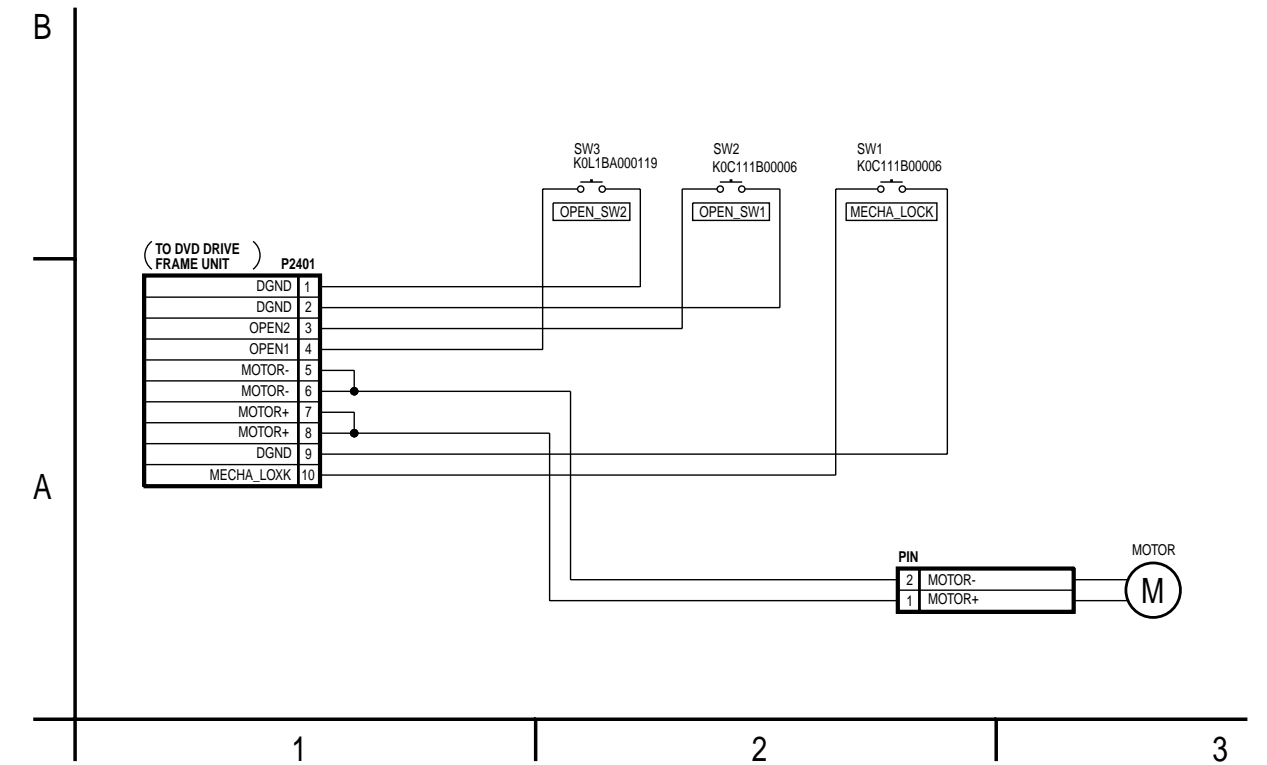
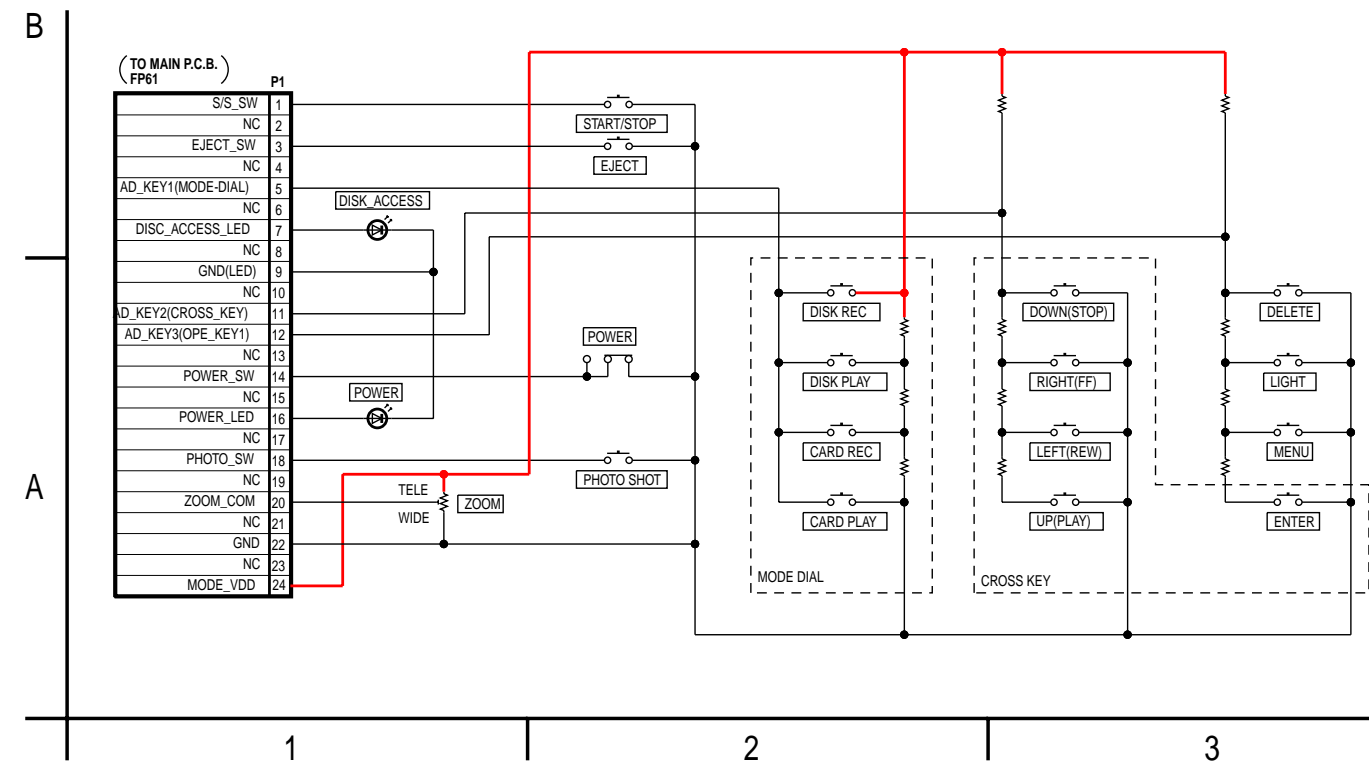
"FOR REFERENCE ONLY"

NOTE: SIDE L/OPERATION IS NOT SERVICEABLE AND IS SUPPLIED AS A UNIT ONLY FOR REPLACEMENT.

DISK COVER LOCK SCHEMATIC DIAGRAM

"FOR REFERENCE ONLY"

NOTE: DISK COVER LOCK UNIT IS NOT SERVICEABLE AND IS SUPPLIED AS A UNIT ONLY FOR REPLACEMENT.



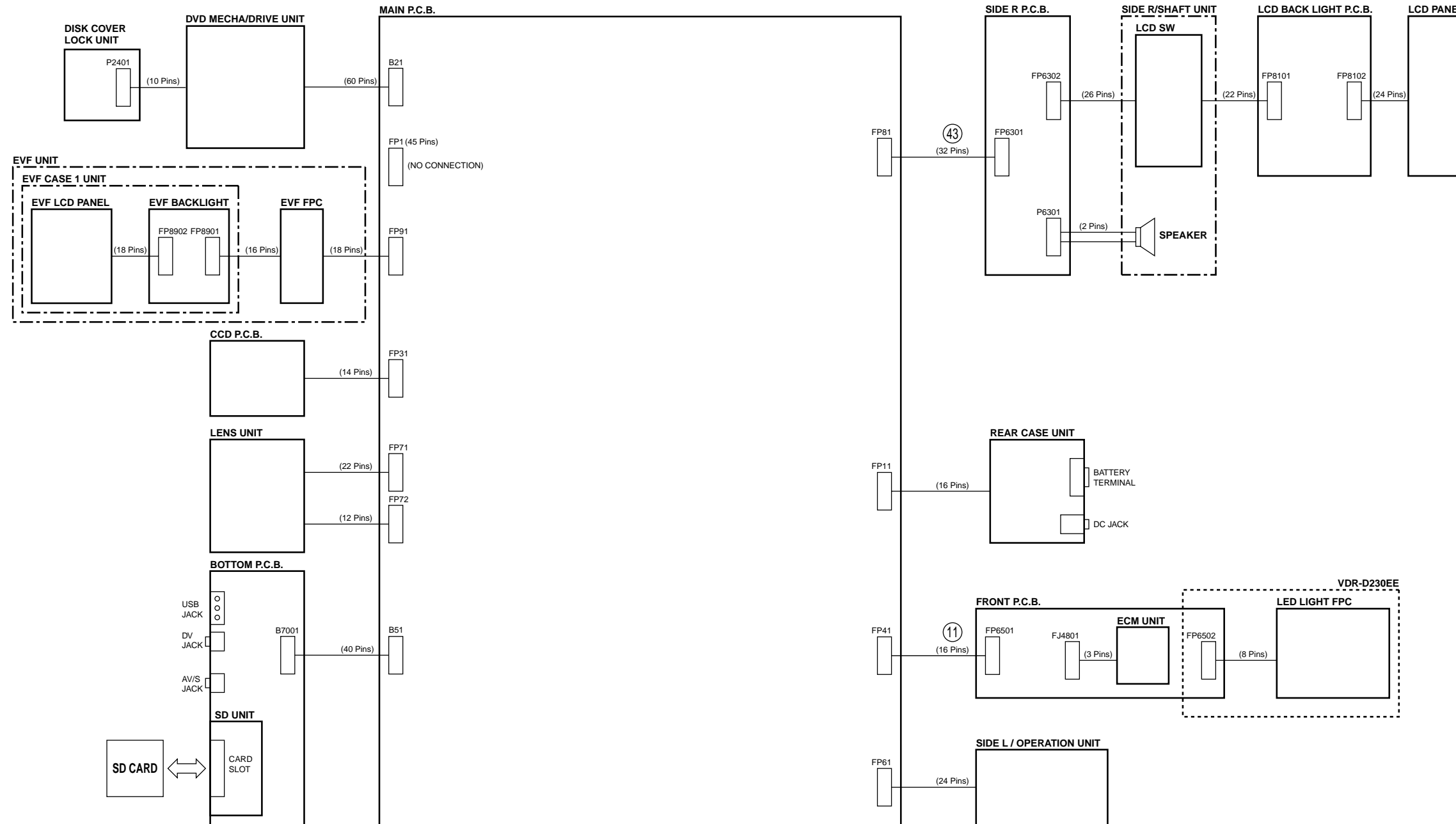
13.8. INTERCONNECTION SCHEMATIC DIAGRAM

INTERCONNECTION SCHEMATIC DIAGRAM

NOTE: For placing a purchase order of the parts, be sure to use the part number listed in the parts list. Do not use the part number on this diagram.

NOTE: PARTS MARKED "PT" ARE NOT USED.

NOTE: FOR SCHEMATIC DIAGRAM AND CIRCUIT BOARD LAYOUT NOTES, REFER TO BEGINNING OF SCHEMATIC SECTION.



14 Printed Circuit Board

14.1. FRONT P.C.B.

FRONT P.C.B. LSEP8375A1 VDR-D220EG/EF/E/EP/EB/GC/GCS
/SG/EE/GC/GN, VDR-D228GK
LSEP8375B1 VDR-D230EE

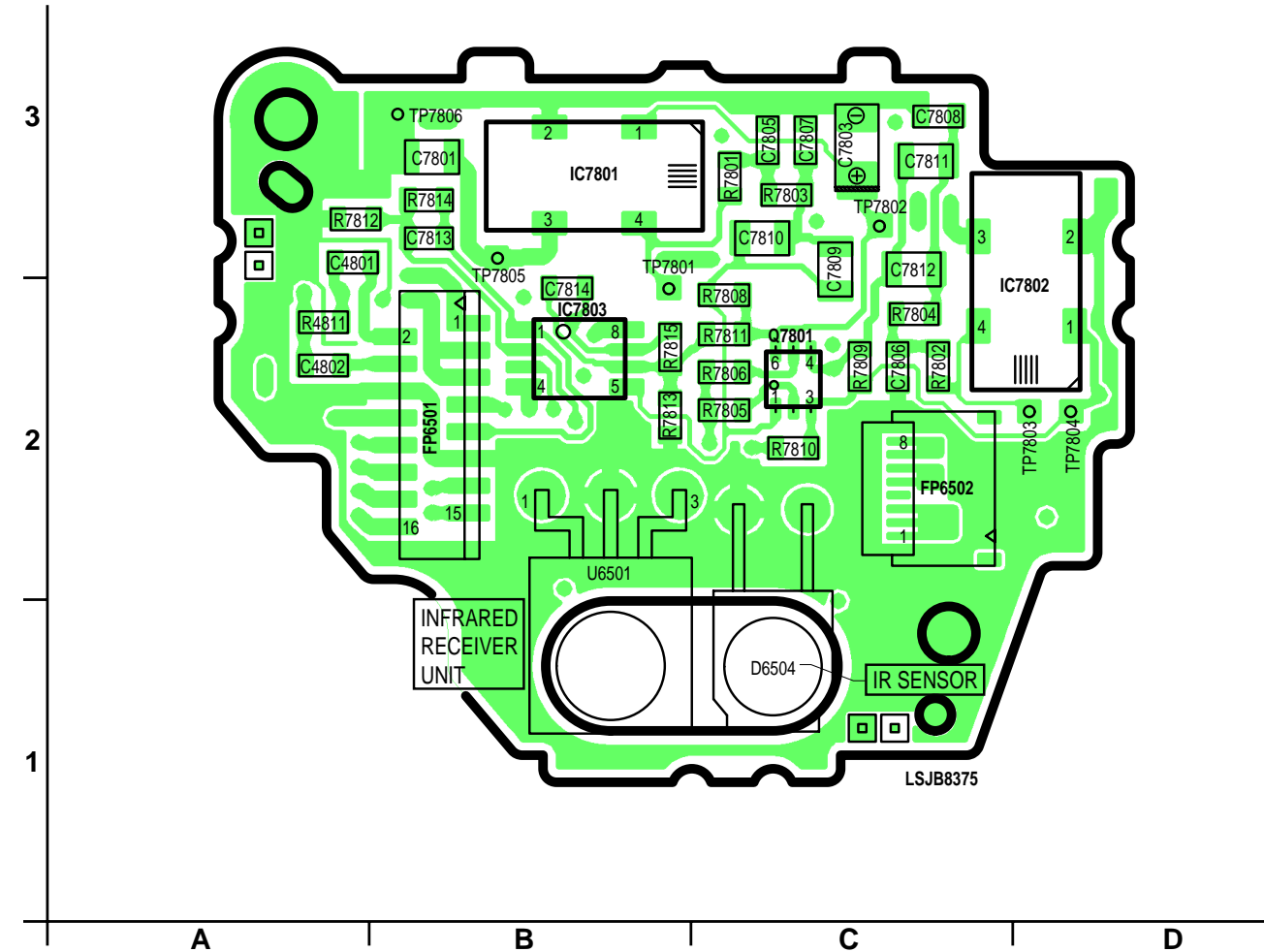
NOTE:
CIRCUIT BOARD LAYOUT SHOWS COMPONENTS INSTALLED FOR VARIOUS MODELS.
FOR PROPER PARTS CONTENT FOR THE MODEL YOU ARE SERVICING,
PLEASE REFER TO THE SCHEMATIC DIAGRAM AND PARTS LIST.

NOTE:
CIRCUIT BOARD LAYOUT INCLUDES COMPONENTS WHICH ARE NOT USED.

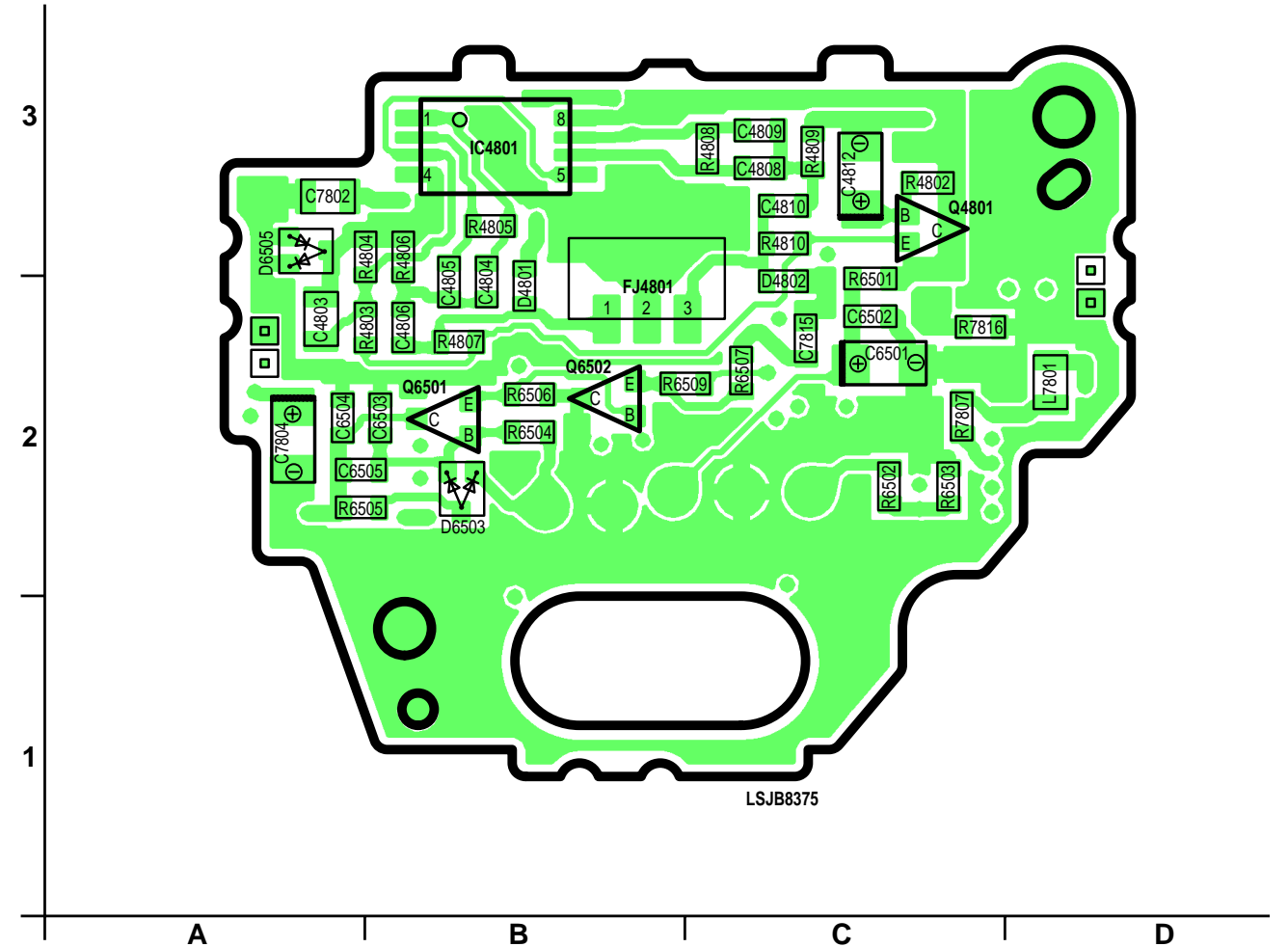
NOTE:
FOR SCHEMATIC DIAGRAM AND CIRCUIT BOARD LAYOUT NOTES,
REFER TO BEGINNING OF SCHEMATIC SECTION.

NOTE: MULTILAYER P.C.B.
THIS P.C.B. IS Multi-Layer P.C.B. THIS CIRCUIT BOARD SHOWS COMPONENT LAYOUT-PATTERN
FOR COMPONENT SIDE AND FOIL SIDE. LAYOUT PATETRNS ARE SINGLE PATTERN FOR EACH
SIDE THAT MAKE EASY TO SIGHT THE COMPONENT LAYOUT.

(COMPONENT SIDE)



(FOIL SIDE)



Parts Location

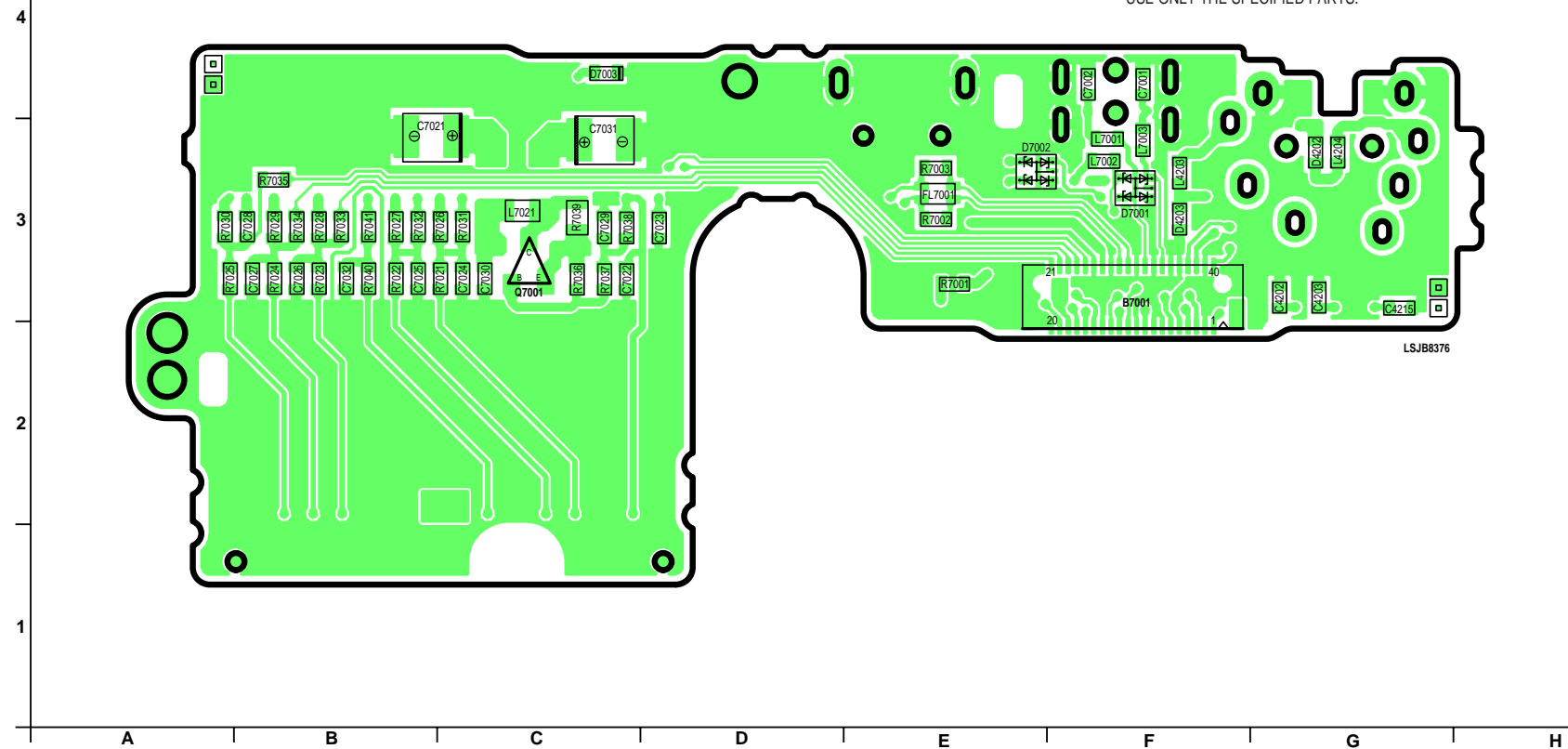
FRONT P.C.B																	
Integrated Circuits		TP7804	D-2	C	C4805	B-2	F	C7806	C-2	C	R4805	B-3	F	R7803	C-3	C	
IC4801	B-3	F	TP7805	B-3	C	C4806	B-2	F	C7807	C-3	C	R4806	B-3	F	R7804	C-2	C
IC7801	B-3	C	TP7806	B-3	C	C4808	C-3	F	C7808	C-3	C	R4807	B-2	F	R7805	C-2	C
IC7802	D-2	C	Connector			C4809	C-3	F	C7809	C-3	C	R4808	C-3	F	R7806	C-2	C
IC7803	B-2	C	FJ4801	B-2	F	C4810	C-3	F	C7810	C-3	C	R4809	C-3	F	R7807	C-2	F
Transistors		FP6501	B-2	C	C4812	C-3	F	C7811	C-3	C	R4810	C-3	F	R7808	C-2	C	
Q4801	C-3	F	Diodes			C6503	B-2	F	C7812	C-3	C	R6503	C-2	F	R7809	C-2	C
Q6501	B-2	F	D6503	B-2	F	C6504	A-2	F	C7813	B-3	C	R6504	B-2	F	R7810	C-2	C
Q6502	B-2	F	D6504	C-1	C	C6505	A-2	F	C7814	B-2	C	R6505	A-2	F	R7811	C-2	C
Q7801	C-2	C	Capacitors			C7801	B-3	C	C7815	C-2	F	R6506	B-2	F	R7814	B-3	C
Test Points		C4801	A-3	C	C7802	A-3	F	Resistors			R6507	C-2	F	R7815	B-2	C	
TP7801	B-3	C	C4802	A-2	C	C7803	C-3	C	R4802	C-3	F	R6509	B-2	F	Miscellaneous		
TP7802	C-3	C	C4803	A-2	F	C7804	A-2	F	R4803	B-2	F	R7801	C-2	C	U6501	B-2	C
TP7803	D-2	C	C4804	B-2	F	C7805	C-3	C	R4804	B-3	F	R7802	C-2	C			


FRONT P.C.B.
LSEP8375A1/LSEP8375B1
VDR-D220EG/EF/E/EP/EB/GC/GCS/SG/EE/GN, VDR-D228GK, VDR-D230EE

14.2. BOTTOM P.C.B.

BOTTOM P.C.B. LSEP8376A1

(COMPONENT SIDE)



IMPORTANT SAFETY NOTICE:
COMPONENTS IDENTIFIED BY THE SIGN  HAVE SPECIAL CHARACTERISTICS IMPORTANT FOR SAFETY. WHEN REPLACING ANY OF THESE COMPONENTS, USE ONLY THE SPECIFIED PARTS.

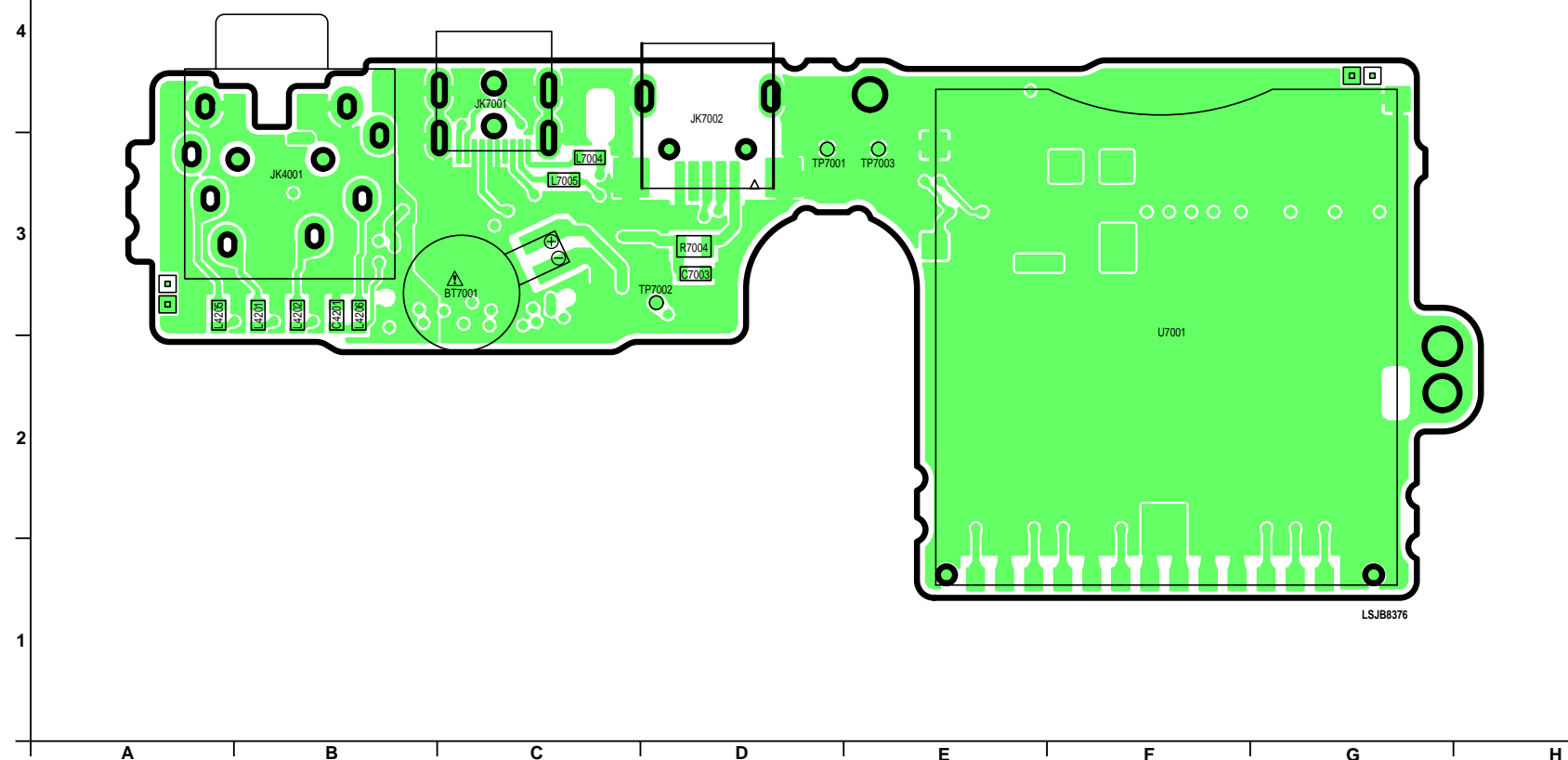
NOTE:
FOR SCHEMATIC DIAGRAM AND CIRCUIT BOARD LAYOUT NOTES, REFER TO BEGINNING OF SCHEMATIC SECTION.

NOTE:
CIRCUIT BOARD LAYOUT SHOWS COMPONENTS INSTALLED FOR VARIOUS MODELS. FOR PROPER PARTS CONTENT FOR THE MODEL YOU ARE SERVICING, PLEASE REFER TO THE SCHEMATIC DIAGRAM AND PARTS LIST.

NOTE:
CIRCUIT BOARD LAYOUT INCLUDES COMPONENTS WHICH ARE NOT USED.

NOTE: MULTILAYER P.C.B.
THIS P.C.B. IS Multi-Layer P.C.B. THIS CIRCUIT BOARD SHOWS COMPONENT LAYOUT-PATTERN FOR COMPONENT SIDE AND FOIL SIDE. LAYOUT PATETRNS ARE SINGLE PATTERN FOR EACH SIDE THAT MAKE EASY TO SIGHT THE COMPONENT LAYOUT.

(FOIL SIDE)



Parts Location

BOTTOM P.C.B.				
Transister		R7002	E-3	C
Q7001	C-3	C	R7003	E-3
Diode		R7004	D-3	F
D7003	C-4	C	R7021	C-3
Connector		R7022	B-3	C
B7001	F-3	C	R7023	B-3
Capacitors		R7024	B-3	C
C7001	F-4	C	R7025	A-3
C7002	F-4	C	R7031	C-3
C7003	D-3	F	R7032	B-3
C7021	B-3	C	R7033	B-3
C7022	C-3	C	R7034	B-3
C7023	D-3	C	R7035	B-3
C7024	C-3	C	R7037	C-3
C7025	B-3	C	R7038	C-3
C7026	B-3	C	R7039	C-3
C7027	B-3	C	R7040	B-3
C7028	B-3	C	R7041	B-3
C7030	C-3	C		
		Test Points		
Filter		TP7001	D-3	F
FL7001	E-3	C	TP7002	D-3
		TP7003	E-3	F
Coils		Miscellaneous		
L7001	F-3	C	BT7001	C-3
L7002	F-3	C	JK7001	C-4
L7003	F-3	C	JK7002	D-4
L7004	C-3	F	U7001	F-3
L7005	C-3	F		
L7021	C-3	C		
Resistors				
R7001	E-3	C		

BOTTOM P.C.B.
LSEP8376A1

VDR-D220EG/EF/E/EP/EB/GC/GCS/SG/EE/GN, VDR-D228GK, VDR-D230EE

14.3. LCD BACKLIGHT P.C.B.

LCD BACKLIGHT P.C.B. LSEP8367B1

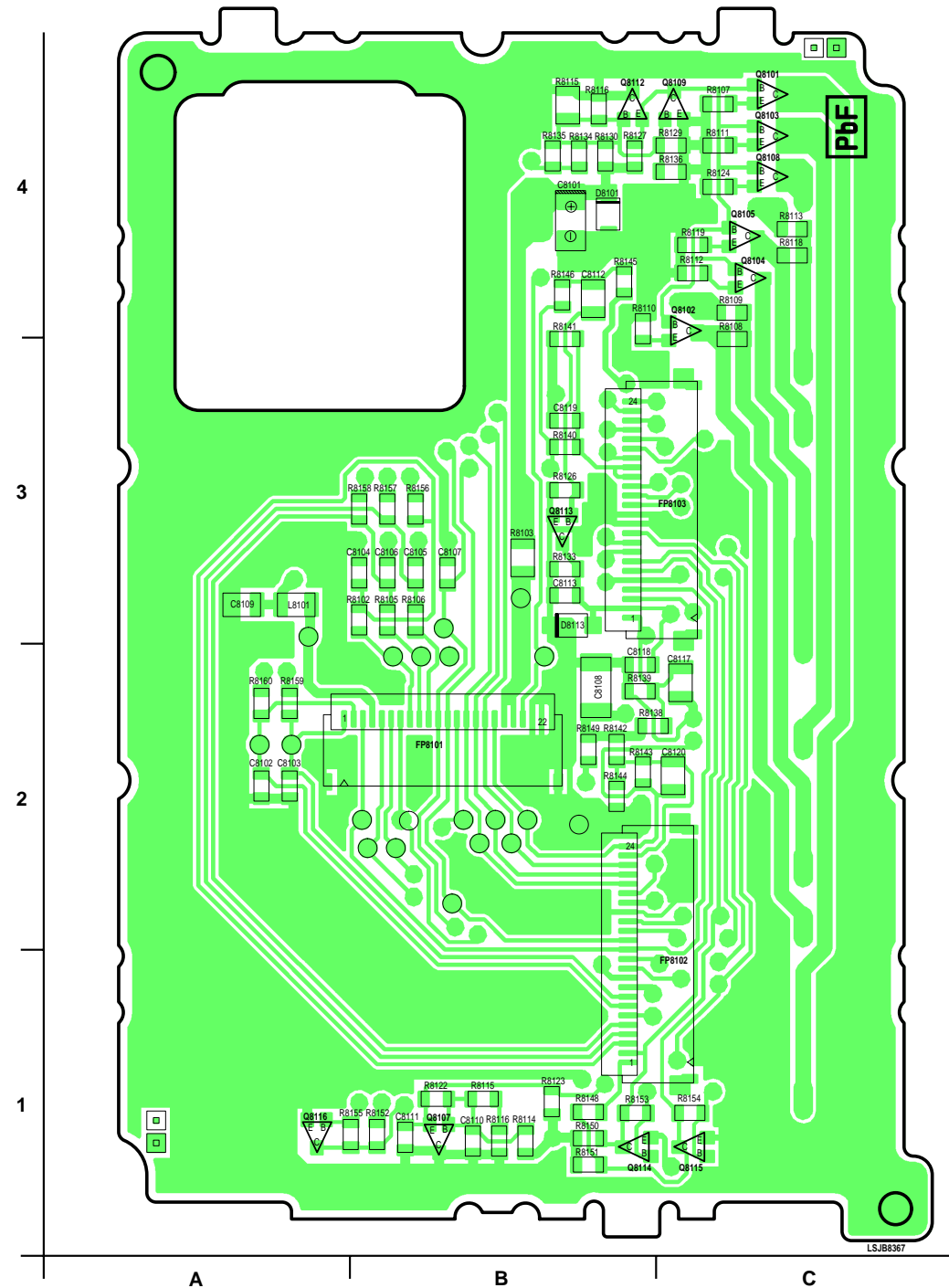
NOTE:
CIRCUIT BOARD LAYOUT SHOWS COMPONENTS INSTALLED FOR VARIOUS MODELS.
FOR PROPER PARTS CONTENT FOR THE MODEL YOU ARE SERVICING,
PLEASE REFER TO THE SCHEMATIC DIAGRAM AND PARTS LIST.

NOTE:
CIRCUIT BOARD LAYOUT INCLUDES COMPONENTS WHICH ARE NOT USED.

NOTE:
FOR SCHEMATIC DIAGRAM AND CIRCUIT BOARD LAYOUT NOTES,
REFER TO BEGINNING OF SCHEMATIC SECTION.

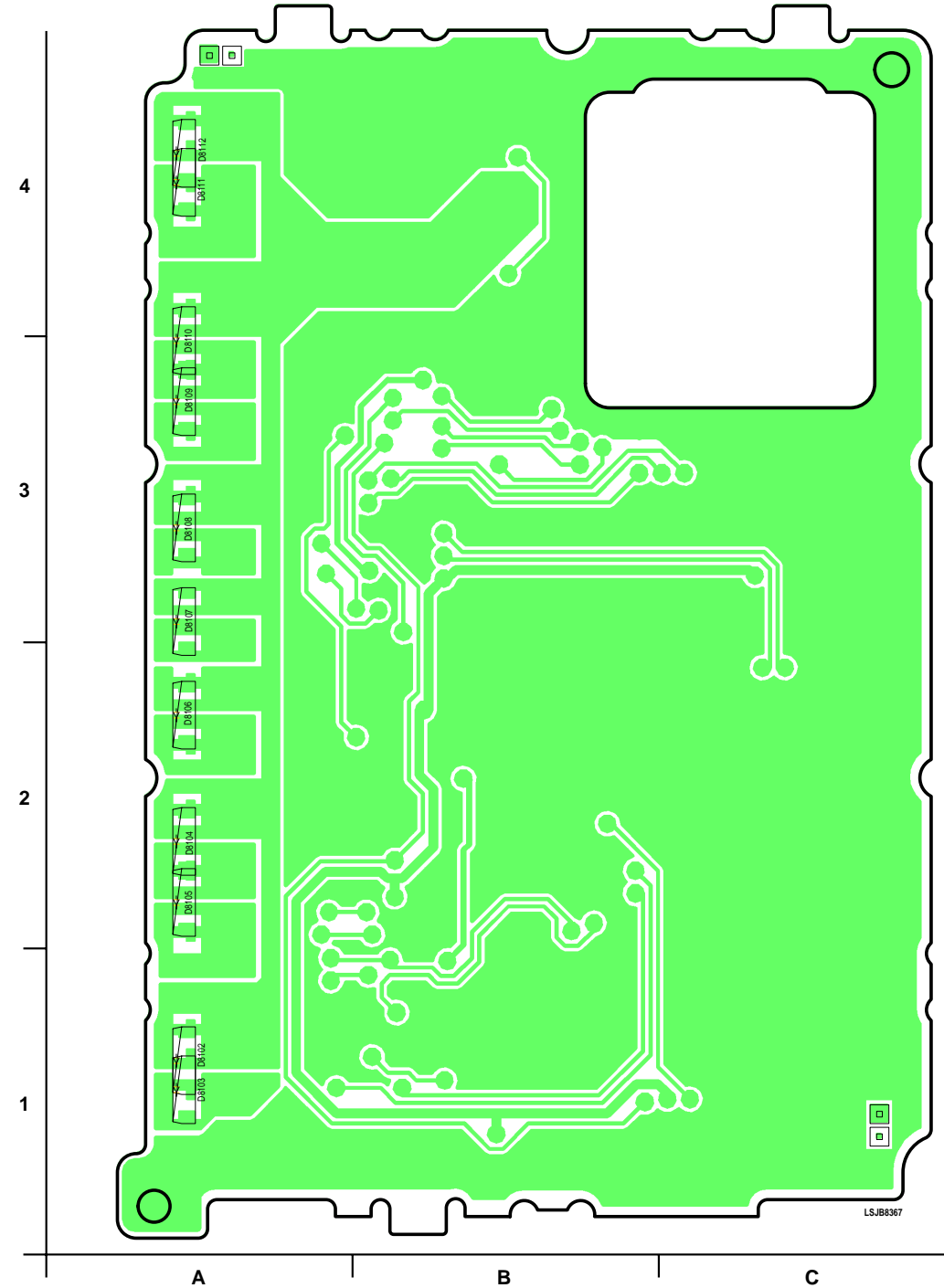
NOTE:
ALL INDIVIDUAL PARTS EXCEPT D8102, D8104, D8107, D8109 AND D8111
ON LCD BACKLIGHT P.C.B. ARE SUPPLIED AS REPLACEMENT PARTS.
WHEN SERVICING THESE PARTS, REPLACE LCD BACKLIGHT P.C.B.
INSTEAD OF INDIVIDUAL PARTS.

(COMPONENT SIDE)



(DUAL PATTERNS)

(FOIL SIDE)



(DUAL PATTERNS)

Parts Location

LCD BACKLIGHT P.C.B.					
Transistors			Resistors		
Q8101	C-4	C	R8102	B-3	C
Q8102	C-4	C	R8103	B-3	C
Q8104	C-4	C	R8105	B-3	C
Q8105	C-4	C	R8106	B-3	C
Q8107	B-1	C	R8107	C-4	C
Q8108	C-4	C	R8108	C-4	C
Q8112	B-4	C	R8110	B-4	C
Q8113	B-3	C	R8112	C-4	C
Connectors			R8113	C-4	C
FP8101	B-2	C	R8114	B-1	C
FP8102	C-1	C	R8115	B-1	C
Diodes			R8116	B-1	C
D8101	B-4	C	R8119	C-4	C
D8113	B-3	C	R8123	B-1	C
Coil			R8124	C-4	C
L8101	A-3	C	R8126	B-3	C
Capacitors			R8127	B-4	C
C8104	B-3	C	R8135	B-4	C
C8105	B-3	C	R8136	C-4	C
C8106	B-3	C	R8143	B-2	C
C8107	B-3	C	R8145	B-4	C
C8109	A-3	C	R8153	B-1	C
C8111	B-1	C	R8154	C-1	C
C8112	B-4	C	R8155	B-1	C
C8113	B-3	C			
C8116	B-4	C			

LCD BACKLIGHT P.C.B.
LSEP8367B1

VDR-D220EG/EF/E/EP/EB/GC/GCS/SG/EE/GN, VDR-D228GK, VDR-D230EE

14.4. SIDE R P.C.B.

SIDE R P.C.B. LSEP8377A1

NOTE: MULTILAYER P.C.B.
THIS P.C.B. IS Multi-Layer P.C.B. THIS CIRCUIT BOARD SHOWS COMPONENT LAYOUT-PATTERN FOR COMPONENT SIDE AND FOIL SIDE. LAYOUT PATETRNS ARE SINGLE PATTERN FOR EACH SIDE THAT MAKE EASY TO SIGHT THE COMPONENT LAYOUT.

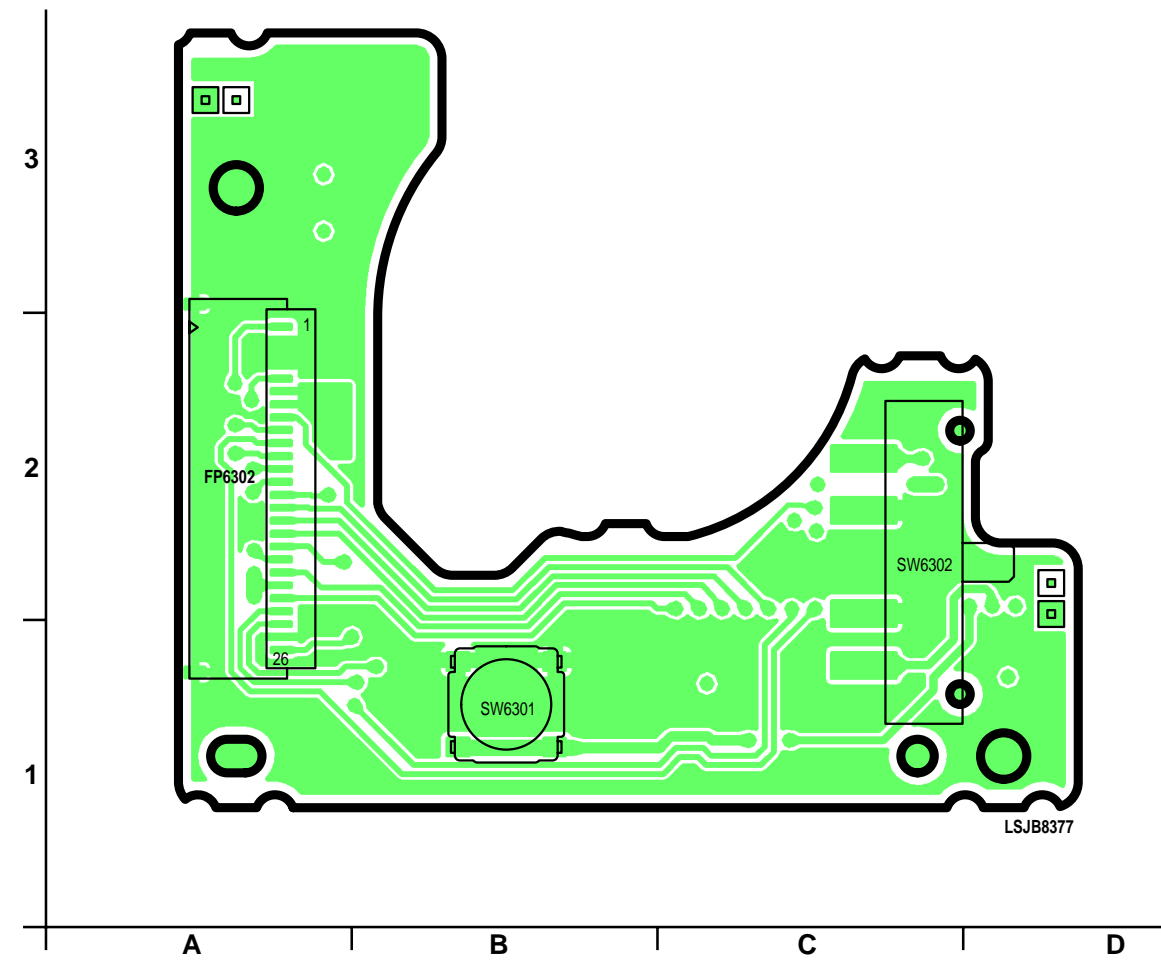
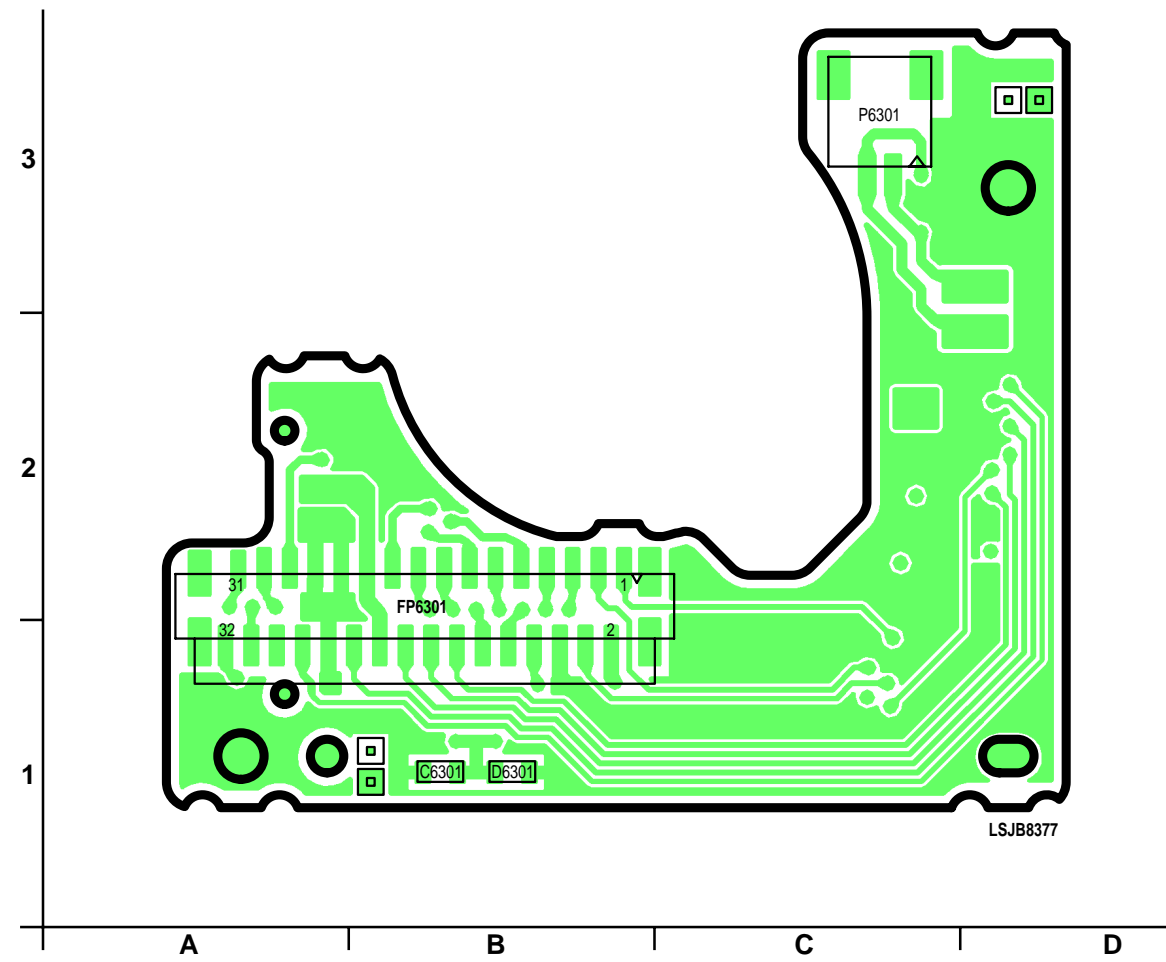
NOTE:
CIRCUIT BOARD LAYOUT SHOWS COMPONENTS INSTALLED FOR VARIOUS MODELS.
FOR PROPER PARTS CONTENT FOR THE MODEL YOU ARE SERVICING,
PLEASE REFER TO THE SCHEMATIC DIAGRAM AND PARTS LIST.

NOTE:
FOR SCHEMATIC DIAGRAM AND CIRCUIT BOARD LAYOUT NOTES,
REFER TO BEGINNING OF SCHEMATIC SECTION.

NOTE:
CIRCUIT BOARD LAYOUT INCLUDES COMPONENTS WHICH ARE NOT USED.

(COMPONENT SIDE)

(FOIL SIDE)



Parts Location

SIDE R P.C.B.		
Capacitor		
C6301	B-1	C
Connectors		
FP6301	B-2	C
FP6302	A-2	F
P6301	C-3	C
Switches		
SW6301	B-1	F
SW6302	C-2	F


SIDE R P.C.B.
LSEP8377A1

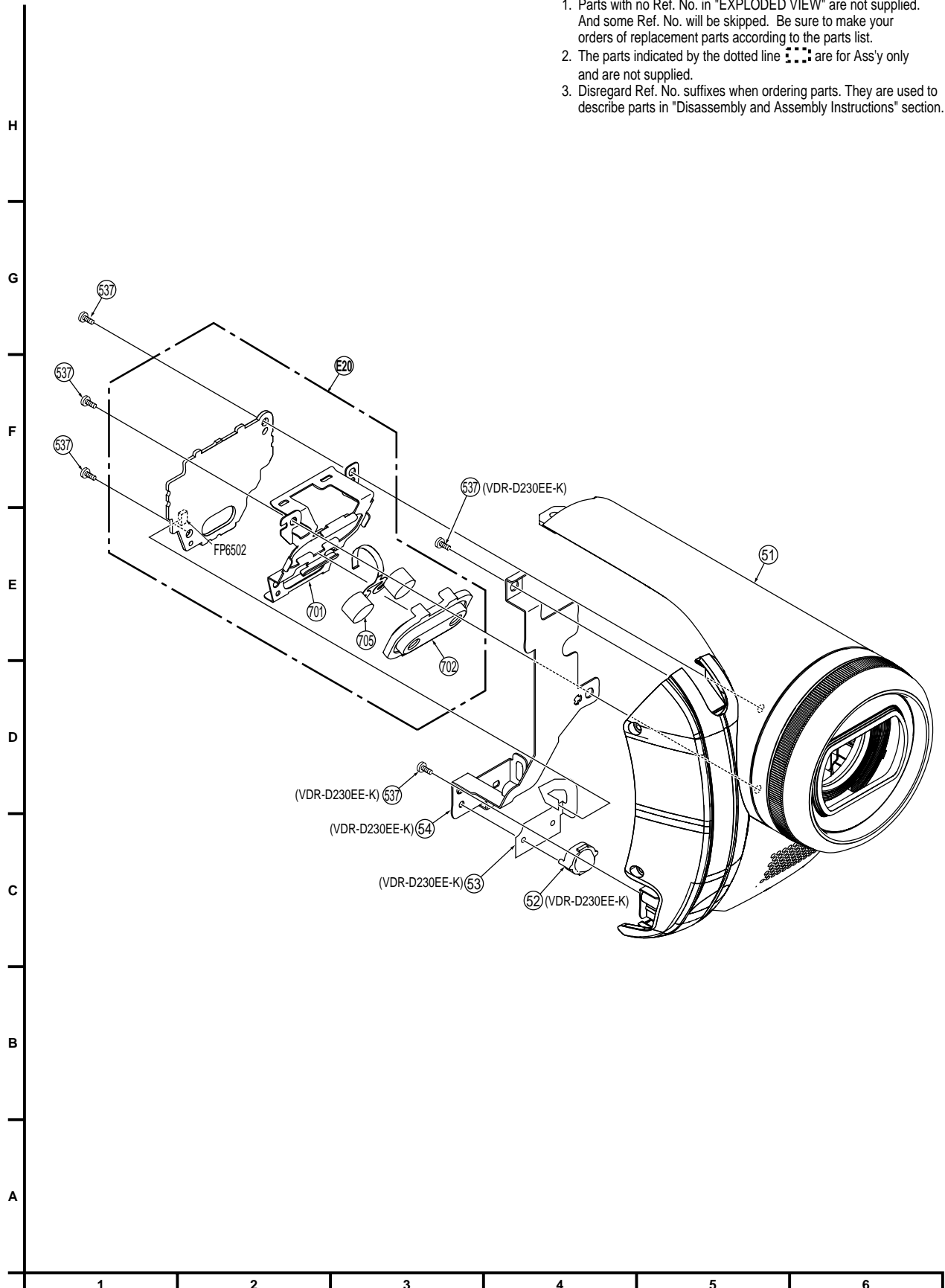
VDR-D220EG/EF/E/EP/EB/GC/GCS/SG/EE/GN, VDR-D228GK, VDR-D230EE

15.2. FRONT CASE, MAIN P.C.B. AND JACK P.C.B. SECTION

2 FRONT HOOD AND FRONT P.C.B. SECTION

Note:


1. Parts with no Ref. No. in "EXPLODED VIEW" are not supplied. And some Ref. No. will be skipped. Be sure to make your orders of replacement parts according to the parts list.
2. The parts indicated by the dotted line  are for Ass'y only and are not supplied.
3. Disregard Ref. No. suffixes when ordering parts. They are used to describe parts in "Disassembly and Assembly Instructions" section.

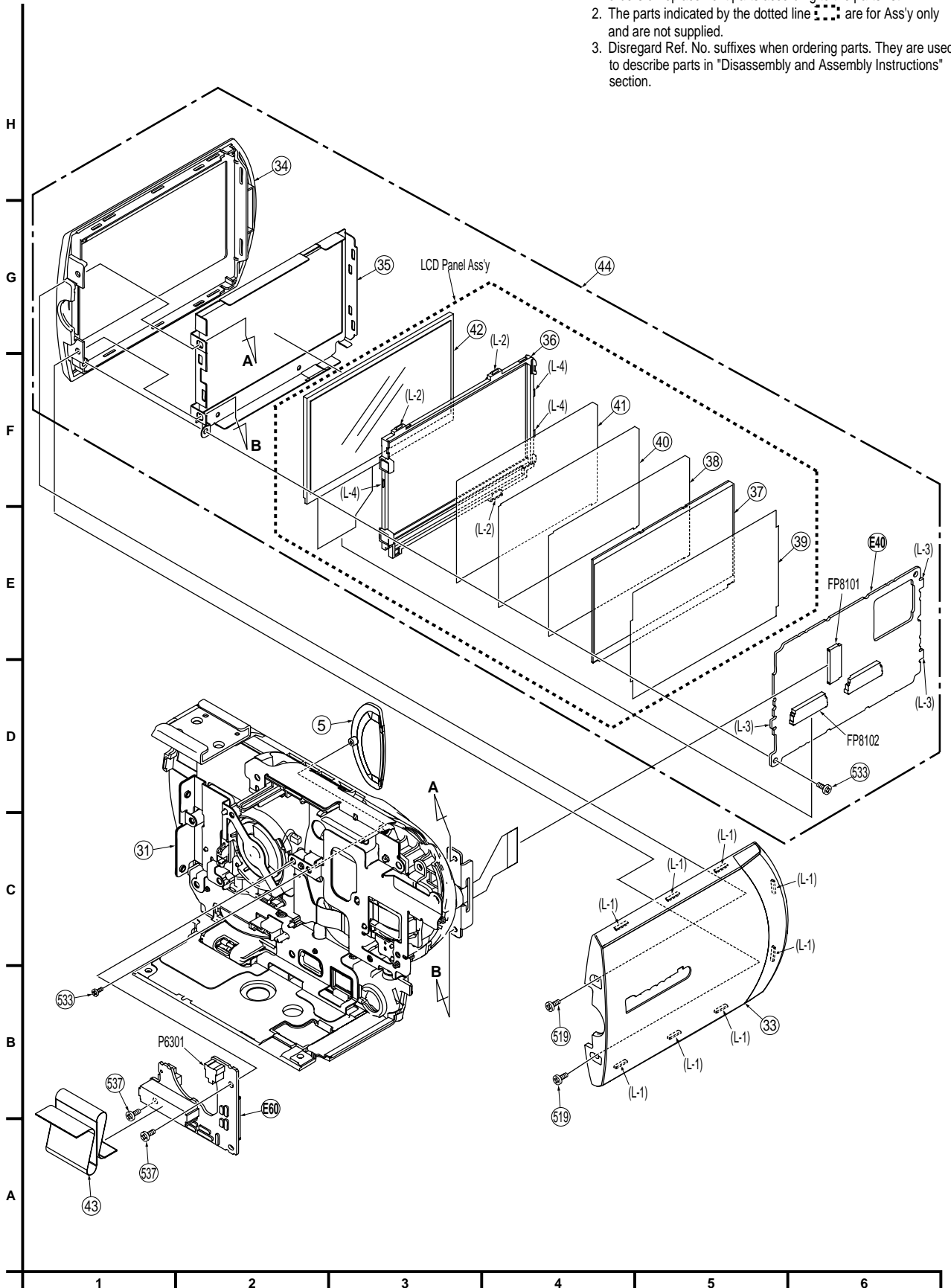


15.3. SIDE CASE R AND LCD SECTION

③ SIDE R OPERATION AND LCD SECTION

Note:


1. Parts with no Ref. No. in "EXPLODED VIEW" are not supplied. And some Ref. No. will be skipped. Be sure to make your orders of replacement parts according to the parts list.
2. The parts indicated by the dotted line  are for Ass'y only and are not supplied.
3. Disregard Ref. No. suffixes when ordering parts. They are used to describe parts in "Disassembly and Assembly Instructions" section.



15.4. CCD AND LENS SECTION



4 CCD AND LENS SECTION

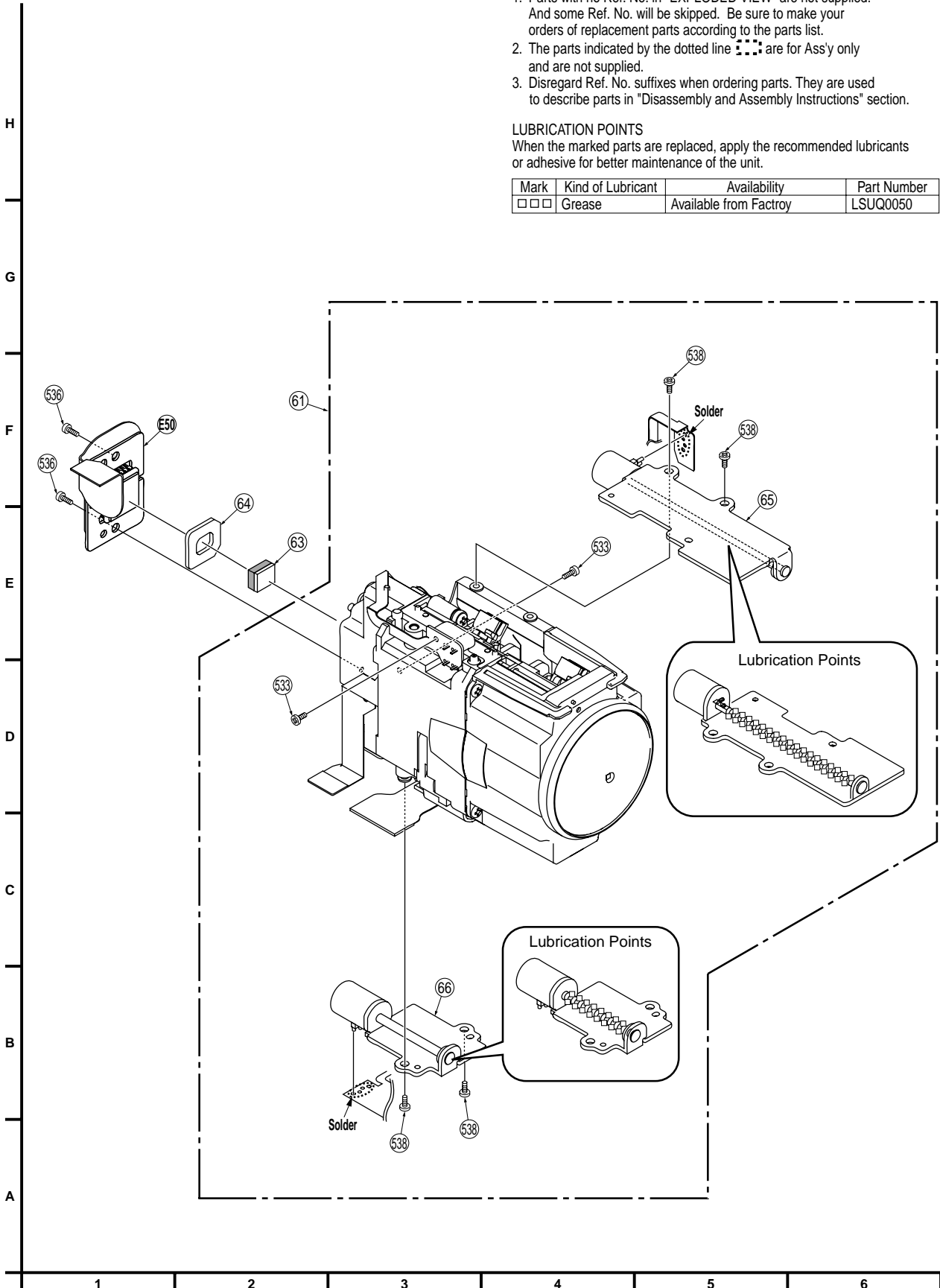
Note:

1. Parts with no Ref. No. in "EXPLODED VIEW" are not supplied. And some Ref. No. will be skipped. Be sure to make your orders of replacement parts according to the parts list.
2. The parts indicated by the dotted line  are for Ass'y only and are not supplied.
3. Disregard Ref. No. suffixes when ordering parts. They are used to describe parts in "Disassembly and Assembly Instructions" section.

LUBRICATION POINTS

When the marked parts are replaced, apply the recommended lubricants or adhesive for better maintenance of the unit.


Mark	Kind of Lubricant	Availability	Part Number
 	Grease	Available from Factory	LSUQ0050

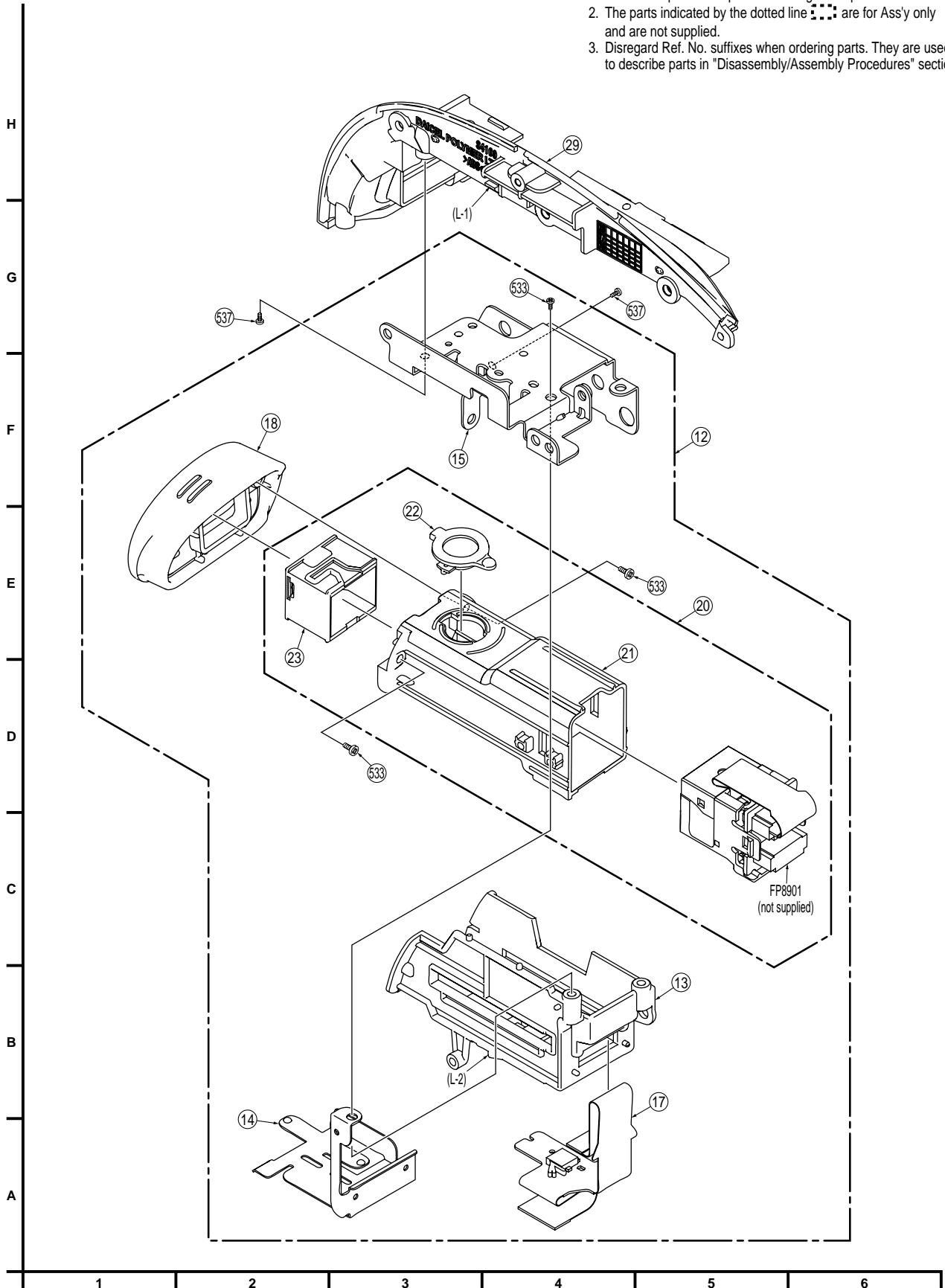


15.5. REAR CASE AND EVF SECTION

5 GRIP COVER AND EVF SECTION

Note:


1. Parts with no Ref. No. in "EXPLODED VIEW" are not supplied. And some Ref. No. will be skipped. Be sure to make your orders of replacement parts according to the parts list.
2. The parts indicated by the dotted line  are for Ass'y only and are not supplied.
3. Disregard Ref. No. suffixes when ordering parts. They are used to describe parts in "Disassembly/Assembly Procedures" section.

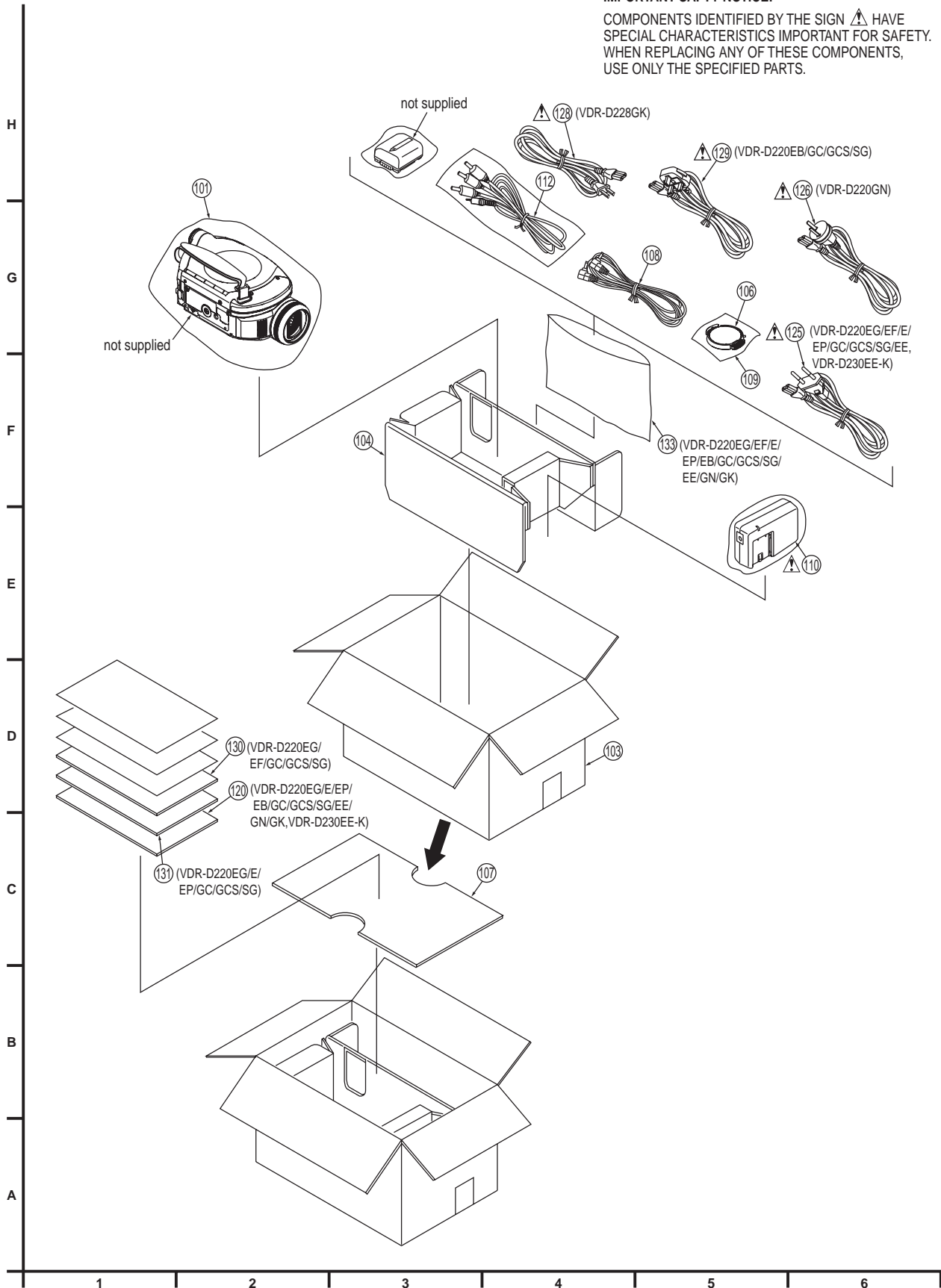


15.6. PACKING PARTS AND ACCESSORIES SECTION

⑥ PACKING PARTS AND ACCESSORIES SECTION

IMPORTANT SAFTY NOTICE:

COMPONENTS IDENTIFIED BY THE SIGN  HAVE SPECIAL CHARACTERISTICS IMPORTANT FOR SAFETY. WHEN REPLACING ANY OF THESE COMPONENTS, USE ONLY THE SPECIFIED PARTS.



16 Replacement Parts Lists

BEFORE REPLACING PARTS, READ THE FOLLOWING:

1. Use only original replacement parts:

To maintain original function and reliability of repaired units, use only original replacement parts which are listed with their part numbers in the parts list.

2. IMPORTANT SAFETY NOTICE

Components identified by the sign \triangle have special characteristics important for safety. When replacing any of these components, use only the specified parts.

3. Definition of Parts supplier:

a. Parts with mark "SPC" in the Remarks column are supplied from Spare Parts Center of Panasonic AVC Company.

b. Parts without mark in the Remarks column are supplied from PSEC.

4. Parts whose Ref. Nos. are the same are interchangeable as replacement parts. Any of these parts may be ordered and used as a replacement part.

5. Model Number Indication:

Model numbers are indicated in the Remarks column without "VDR-D"

6. Unless otherwise specified;

All resistors are in Ω , K = 1,000 Ω , M = 1,000 k Ω .

7. Abbreviation

RTL: Retention Time Limited

This indicates that the retention time is limited for this item. After the discontinuation of this item in production, it will no longer be available.

NR: Non Repairable Board Ass'y

MGF CHIP: Metal Glaze Film Chip

C CHIP: Ceramic Chip

COMPLX CMP: Complex Component

W FLMPRF: Wirewound Flameproof

P.C.B.: Circuit Board Assembly

P.C.B.: Printed Circuit Board

E.S.D.: Electrostatically Sensitive Devices

CSP: Chip Size Package

8. AC Adaptor replacement note

a. VSK0561 is indicated on the AC Adaptor used in the following model:

VDR-D228GK.

However, the AC Adaptor replacement part number is DE-974HC which should be used when ordering.

b. VSK0561 is indicated on AC Adaptor used in the following models:

VDR-D220EG, VDR-D220EF, VDR-D220E, VDR-D220EP, VDR-D220EB, VDR-D220GC, VDR-D220GCS, VDR-D220SG, VDR-D220EE, VDR-D220GN, and VDR-D230EE.

However, the AC Adaptor replacement part number is DE-974GC which should be used when ordering.

16.1. MECHANICAL REPLACEMENT PARTS LIST

Definition of Parts supplier:

1. Parts with mark "SPC" in the Remarks column are supplied from Spare Parts Center of Panasonic AVC Company.

2. Parts without mark in the Remarks column are supplied from PSEC.

MECHANICAL REPLACEMENT PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
1	LSYK1934	SIDE L/OPERATION UNIT	220EG/E F/E/EP/ EB/GC/G CS/SG/E E/GN,22 8GK
1	LSYK1991	SIDE L/OPEARATION UNIT	230EE
2	LMXK1987S-2	DVD DRIVE FRAME UNIT	\triangle 220EG/E F/E/EP/ EB/GC
2	LMXK1987S-3	DVD DRIVE FRAME UNIT	\triangle 220GCS/ SG
2	LMXK1987S-5	DVD DRIVE FRAME UNIT	\triangle 220EE, 2 30EE
2	LMXK1987S-4	DVD DRIVE FRAME UNIT	\triangle 220GN
2	LMXK1987S-6	DVD DRIVE FRAME UNIT	\triangle 228GK
3	LSXY1076	DISC COVER LOCK UNIT	\triangle
5	LSKF0678	LCD PROTECTOR	220EG/E F/E/EP/ EB/GC/G CS/SG/E E/GN,22 8GK
5	LSKF0689	LCD PROTECTOR	230EE
6	LSXY1090	HEAT SINK/SHEET UNIT	
7	LSXY1095	BOTTOM ANGLE UNIT	
8	LSSC0930	HEAT CONDUCT SHEET	
11	LSJB8384	FRONT F.P.C.	
12	LSXY1096	EVF ANGLE UNIT	RTL 220EG/E F/E/EP/ EB/GC/G CS/SG/E E/GN,22 8GK
12	LSXY1126	EVF ANGLE UNIT	RTL 230EE
13	LSMD0859	EVF SLIDE BASE	220EG/E F/E/EP/ EB/GC/G CS/SG/E E/GN,22 8GK
13	LSMD0869	EVF SLIDE BASE	230EE
14	LSMA0980	EVF LOCK PLATE, STEEL	
15	LSMA0981	SHOE ANGLE	
16	LSMD0862	DISC EJECT COVER	
17	LSEP8382A1	EVF F.P.C.	
18	LSKM1530	EYE CAP	
20	LSYK1904	EVF CASE 1 UNIT,ABS RESIN	
21	LSKM1234	EVF CASE,ABS RESIN	
22	LSGT0615	EYE SIGHT LEVER	
23	LSYK1907	EVF LENS UNIT	
27	LSYK1941	REAR CASE UNIT,ABS RESIN	
28	LSMC0159	GROUNDING PLATE, STEEL	

Ref. No.	Part No.	Part Name & Description	Remarks
29	LSYK1944	GRIP COVER UNIT	220EG/E F/E/EP/ EB/GC/G CS/SG/E E/GN, 22 8GK
29	LSYK1994	GRIP COVER UNIT	230EE
31	LSYK1954	SIDE R/SHAFT UNIT	220EG/E F/E/EP/ EB/GC/G CS/SG/E E/GN, 22 8GK
31	LSYK1997	SIDE R/SHAFT UNIT	230EE
33	LSYK1967	LCD CASE A UNIT, ABS RESIN	220EG/E F/E/EP/ EB/GC/G CS/SG/E E/GN
33	LSYK2035	LCD CASE A UNIT, ABS RESIN	228GK
33	LSYK2000	LCD CASE A UNIT, ABS RESIN	230EE
34	LSKM1542	LCD CASE B, ABS RESIN	220EG/E F/E/EP/ EB/GC/G CS/SG/E E/GN, 22 8GK
34	LSKM1610	LCD CASE B, ABS RESIN	230EE
35	LSSC0924	LCD SHIELD CASE, ABS RESIN	
36	LSYK1924	PANEL HOLDER UNIT	
37	LSGL0505	LEAD LIGHT PANEL	
38	LSGL0511	DIFFUSION SHEET	
39	LSGL0506	REFLECT SHEET	
40	LSGL0443	BEF SHEET	
41	LSGL0444	BEF SHEET A	
42	LSBDDYH00025	LIQUID CRYSTAL DISPLAY PANEL	
43	LSJB8385	SIDE-R F.P.C.	
44	LSYK1964	LCD CASE B UNIT, ABS RESIN	RTL 220EG/E F/E/EP/ EB/GC/G CS/SG/E E/GN, 22 8GK
44	LSYK2006	LCD CASE B UNIT, ABS RESIN	RTL 230EE
51	LSYK1971	FRONT/HOOD UNIT	220EG/E F/E/EP/ EB/GC/G CS/SG/E E/GN, 22 8GK
51	LSYK2002	FRONT/HOOD UNIT	230EE
52	LSMD0822	LED LIGHT LENS	230EE
53	LSEP8406A1	LED-LIGHT F.P.C.	230EE
54	LSSC0973	HEAT SINK	230EE
61	LSXN0046	LENS UNIT	
63	LSFL0292	OPTICAL LOW PASS FILTER	
64	LSMX0230	FILTER RUBBER	
65	L6HA66NB0007	ZOOM MOTOR UNIT	
66	L6HA66NB0008	FOCUS MOTOR UNIT	
101	VPF1129	POLY BAG	
103	LSPG2359	PACKING CASE, PAPER	220EG/E F/E/EP/ EB
103	LSPG2360	PACKING CASE, PAPER	220GC/G CS/SG/E E/GN
103	LSPG2361	PACKING CASE, PAPER	228GK
103	LSPG2441	PACKING CASE, PAPER	230EE
104	LSPN0780	PAD	
106	LSYK2004	LENS CAP UNIT	
107	LSPN0772	TOP PAD	
108	K2GJ2DC00011	DC CABLE W/PLUG	
109	LSPF0227	BAG, POLYETHYLENE	

Ref. No.	Part No.	Part Name & Description	Remarks
110	DE-974GC	AC ADAPTOR	△ 220EG/E F/E/EP/ EB/GC/G CS/SG/E E/GN, 23 0EE
110	DE-974HC	AC ADAPTOR	△ 228GK
112	K2KZ9CB00001	AUDIO VIDEO CABLE W/PLUG	
120	LSQT1153-A	INSTRUCTION BOOK (GERMAN/TURKISH)	220EG
120	LSQT1155-A	INSTRUCTION BOOK (PORTUGUESE/SPANISH)	220E
120	LSQT1156-A	INSTRUCTION BOOK (ENGLISH/POLISH)	220EP
120	LSQT1157-A	INSTRUCTION BOOK (ENGLISH)	220EB
120	LSQT1158-A	INSTRUCTION BOOK (ENGLISH/CHINESE TRADITIONAL)	220GC/G CS/SG
120	LSQT1160-A	INSTRUCTION BOOK (RUSSIAN/UKRAINIAN)	220EE, 2 30EE
120	LSQT1161-A	INSTRUCTION BOOK (ENGLISH)	220GN
120	LSQT1162-A	INSTRUCTION BOOK (CHINESE SIMPLIFIED)	228GK
125	K2CR2DA00004	AC CORD W/PLUG	△ 220EG/E F/E/EP/ GC/GCS/ EE, 230E E
125	K2CQ2CA00006	AC CORD W/PLUG	△ 220SG
126	K2CJ2DA00011	AC CORD W/PLUG	△ 220GN
128	K2CA2CA00020	AC CORD W/PLUG	△ 228GK
129	K2CT3CA00004	AC POWER CORD W/PLUG, 250V	△ 220EB/G C/GCS/S G
130	LSQT1154-A	INSTRUCTION BOOK (FRENCH)	220EG/E F
130	LSQT1199-A	INSTRUCTION BOOK (THAI/INDIAN)	220GC/G CS/SG
131	LSQT1194-A	INSTRUCTION BOOK (ITALIAN/DUTCH)	220EG
131	LSQT1196-A	INSTRUCTION BOOK (SWEDISH/DANISH)	220E
131	LSQT1197-A	INSTRUCTION BOOK (CZECH/HUNGARIAN)	220EP
131	LSQT1198-A	INSTRUCTION BOOK (ARABIC/PERSIAN)	220GC/G CS/SG
133	LSPF0107	POLY BAG	220EG/E F/E/EP/ EB/GC/G CS/SG/E E/GN, 22 8GK
456	XQN16+BJ3FN	SCREW, STEEL	
518	XQS2+A35FN	SCREW, STEEL	
519	XQN16+BF4FN	SCREW, STEEL	
533	XQN16+BJ4FN	SCREW, STEEL	
536	XQN16+AJ4FN	SCREW, STEEL	
537	XQN16+BJ5FN	SCREW, STEEL	220EG/E F/E/EP/ EB/GC/G CS/SG/E E/GN, 22 8GK
537	XQN16+BJ5FN	SCREW, STEEL	230EE
538	XQN14+BJ4FN	SCREW, STEEL	
540	XQN16+BF3FN	SCREW, STEEL	
701	LSSC0928	GROUNDING PLATE, STEEL	
702	LSMG0136	MIC DAMPER	
705	LSEK0695	MIC DEVICE UNIT	
706	LSMX0233	INSULATION SHEET	
E10	LSEP8374P1	MAIN P.C.B.	RTL 220EG/E F/E/EP/ EB

Ref. No.	Part No.	Part Name & Description	Remarks
E10	LSEP8374Q1	MAIN P.C.B.	RTL 220GC/G CS/SG/E E/GN, 22 8GK
E10	LSEP8374R1	MAIN P.C.B.	RTL 230EE
E20	LSEP8375A1	FRONT P.C.B.	RTL 220EG/E F/E/EP/ EB/GC/G CS/SG/E E/GN, 22 8GK
E20	LSEP8375B1	FRONT P.C.B.	RTL 230EE
E30	LSEP8376A1	BOTTOM P.C.B.	RTL
E40	LSEP8367B1	LIQUID CRYSTAL DISPLAY BACKLIGHT P.C.B.NR	
E50	LSEQ0833	CCD P.C.B.NR	220EG/E F/E/EP/ EB/GC/G CS/SG/E E/GN, 22 8GK
E50	LSEQ0832	CCD P.C.B.NR	230EE
E60	LSEP8377A1	SIDE R P.C.B.	RTL

SERVICE FIXTURES AND TOOLS

Ref. No.	Part No.	Part Name & Description	Remarks
	LSVQ0028	PLIER FOR NON ZIF CONNECTOR	
	LSUQ0050	GREASE	
	VUVS0007	EXTENSION CABLE 12P	
	VFKW0124A	EXTENSION CABLE 14P	
	LSUA0020	EXTENSION CABLE 20P	
	VUVS0012	EXTENSION CABLE 22P	
	LSUA0059	EXTENSION CABLE 60P	
	VFK1164LBX1	LIGHT BOX	SPC
	VFK1164TCM02	INFINITY LENS (WITH FOCUS CHART)	SPC
	VFK1164TAR58	ATTACHMENT RING (58mm)	SPC
	VFK1164TAR55	ATTACHMENT RING (55mm)	SPC
	VFK1164TAR52	ATTACHMENT RING (52mm)	SPC
	VFK1164TAR49	ATTACHMENT RING (49mm)	SPC
	VFK1164TAR46	ATTACHMENT RING (46mm)	SPC
	VFK1164TAR43	ATTACHMENT RING (43mm)	SPC
	VFK1164TAR37	ATTACHMENT RING (37mm)	SPC
	VFK1164TAR3A	ATTACHMENT RING (30.5mm)	SPC
	VFK1164TAR27	ATTACHMENT RING (27mm)	SPC
	VFK1164TFCT2	COLOR CONVERSION FILTER (C14)	SPC
	VFK1164TFWC2	WHITE CHART	SPC
	VFK1164TFBC2	COLOR BAR CHART	SPC
	VFK1164TFGS2	GRAY SCALE CHART	SPC

16.2. ELECTRICAL REPLACEMENT PARTS LIST

Definition of Parts supplier:

1. All parts are supplied from PSEC.

PRINTED CIRCUIT BOARD ASSEMBLY

Ref. No.	Part No.	Part Name & Description	Remarks
E10	LSEP8374P1	MAIN P.C.B.	E.S.D. RTL 220EG/E F/E/EP/ EB
E10	LSEP8374Q1	MAIN P.C.B.	E.S.D. RTL 220GC/G CS/SG/E E/GN, 22 8GK

Ref. No.	Part No.	Part Name & Description	Remarks
E10	LSEP8374R1	MAIN P.C.B.	E.S.D. RTL 230EE
E20	LSEP8375A1	FRONT P.C.B.	RTL 220EG/E F/E/EP/ EB/GC/G CS/SG/E E/GN, 22 8GK
E20	LSEP8375B1	FRONT P.C.B.	RTL 230EE
E30	LSEP8376A1	BOTTOM P.C.B.	RTL
E40	LSEP8367B1	LIQUID CRYSTAL DISPLAY BACKLIGHT P.C.B.NR	
E50	LSEQ0833	CCD P.C.B.NR	220EG/E F/E/EP/ EB/GC/G CS/SG/E E/GN, 22 8GK
E50	LSEQ0832	CCD P.C.B.NR	230EE
E60	LSEP8377A1	SIDE R P.C.B.	RTL

16.2.1. MAIN P.C.B.

FPC CONNECTORS

Ref. No.	Part No.	Part Name & Description	Remarks
FP11	K1MN16A00077	CONNECTOR 16P	
FP31	K1MN14BA0088	CONNECTOR 14P	
FP41	K1MN16A00077	CONNECTOR 16P	
FP61	K1MN24BA0197	CONNECTOR 24P	
FP71	K1MN22A00065	CONNECTOR 22P	
FP72	K1MN12A00075	CONNECTOR 12P	
FP81	K1MN32AA0091	CONNECTOR 32P	
FP91	K1MN18A00064	CONNECTOR 18P	

16.2.2. FRONT P.C.B.

INTEGRATED CIRCUITS

Ref. No.	Part No.	Part Name & Description	Remarks
IC4801	C0ABBB000369	IC, LINEAR	
or IC4801	C0ABBB000262	IC, LINEAR	
IC7801	L2ES00000016	GYROSCOPE	
IC7802	L2ES00000017	GYROSCOPE	
IC7803	C0ABHA000078	IC, LINEAR	

TRANSISTORS

Ref. No.	Part No.	Part Name & Description	Remarks
Q4801	2SD2216J08	TRANSISTOR SI NPN CHIP	
or Q4801	BLABCF000104	TRANSISTOR SI NPN CHIP	
or Q4801	BLABCF000110	TRANSISTOR SI NPN CHIP	
Q6501	BLABCF000098	TRANSISTOR SI NPN CHIP	
or Q6501	BLABCF000099	TRANSISTOR SI NPN CHIP	
Q6502	2SB1218AHL	TRANSISTOR SI PNP CHIP	
or Q6502	BLADCF000063	TRANSISTOR SI PNP CHIP	
or Q6502	BLADCF000075	TRANSISTOR SI PNP CHIP	
Q7801	XP0450100L	TRANSISTOR COMPLX CMP SI NPN CHIP	
or Q7801	BIHBCFA00011	TRANSISTOR COMPLX CMP SI NPN CHIP	
or Q7801	BIHBCFA00016	TRANSISTOR COMPLX CMP SI NPN CHIP	

DIODES

Ref. No.	Part No.	Part Name & Description	Remarks
D6503	B0ADEJ000038	DIODE SI CHIP	
D6504	B3GA00000064	LIGHT EMITTING DIODE	

RESISTORS

Ref. No.	Part No.	Part Name & Description	Remarks
R4802	ERJ3GEYJ472V	MGF CHIP 1/16W 4.7K	
R4803	ERJ3GEYJ223V	MGF CHIP 1/16W 22K	
R4804	ERJ3GEYJ333V	MGF CHIP 1/16W 33K	
R4805	ERJ3GEYJ124V	MGF CHIP 1/16W 120K	
R4806	ERJ3GEYJ333V	MGF CHIP 1/16W 33K	
R4807	DOHB392ZA002	MGF CHIP 1/16W 3.9K	
R4808	ERJ3GEYJ124V	MGF CHIP 1/16W 120K	
R4809	ERJ3GEYJ333V	MGF CHIP 1/16W 33K	
R4810	DOHB392ZA002	MGF CHIP 1/16W 3.9K	
R6503	ERJ3GEYJ104V	MGF CHIP 1/16W 100K	
R6504	ERJ3GEYJ106V	MGF CHIP 1/16W 10M	
R6505	ERJ3GEYJ335V	MGF CHIP 1/16W 3.3M	
R6506	ERJ3GEYJ184V	MGF CHIP 1/16W 180K	
R6507	ERJ3GEYJ103V	MGF CHIP 1/16W 10K	
R6509	ERJ3GEYJ102V	MGF CHIP 1/16W 1K	
R7801	ERJ3GEYJ392V	MGF CHIP 1/16W 3.9K	
R7802	ERJ3GEYJ392V	MGF CHIP 1/16W 3.9K	
R7803	ERJ3GEYJ332V	MGF CHIP 1/16W 3.3K	
R7804	ERJ3GEYJ332V	MGF CHIP 1/16W 3.3K	
R7805	ERJ3GEYJ102V	MGF CHIP 1/16W 1K	
R7806	ERJ3GEYJ102V	MGF CHIP 1/16W 1K	
R7807	ERJ3GEYJ103V	MGF CHIP 1/16W 10K	
R7808	ERJ3GEYJ394V	MGF CHIP 1/16W 390K	
R7809	ERJ3GEYJ394V	MGF CHIP 1/16W 390K	
R7810	ERJ3GEYJ472V	MGF CHIP 1/16W 4.7K	
R7811	ERJ3GEYJ472V	MGF CHIP 1/16W 4.7K	
R7814	ERJ3GEYJ274V	MGF CHIP 1/16W 270K	
R7815	ERJ3GEYJ274V	MGF CHIP 1/16W 270K	

CAPACITORS

Ref. No.	Part No.	Part Name & Description	Remarks
C4801	F1H1A105A036	C CHIP 10V 1UF	
C4802	F1H1A105A036	C CHIP 10V 1UF	
C4803	FLJ0J106A004	C CHIP 6.3V 10UF	
C4804	F1H1H822A219	C CHIP 50V 8200PF	
C4805	F1H1C273A041	C CHIP 16V 0.027UF	
C4806	F1H1C273A041	C CHIP 16V 0.027UF	
C4808	F1H1C273A041	C CHIP 16V 0.027UF	
C4809	F1H1H822A219	C CHIP 50V 8200PF	
C4810	F1H1C273A041	C CHIP 16V 0.027UF	
C4812	F3F0J226A032	TANTALUM CHIP 6.3V 22UF	
C6503	F1H1A224A012	C CHIP 10V 0.22UF	
C6504	F1H1C104A041	C CHIP 16V 0.1UF	
C6505	F1H1A224A012	C CHIP 10V 0.22UF	
C7801	FLJ1A106A023	C CHIP 10V 10UF	
C7802	FLJ1A106A023	C CHIP 10V 10UF	
C7803	F3F0J226A032	TANTALUM CHIP 6.3V 22UF	
C7804	F3F0J226A032	TANTALUM CHIP 6.3V 22UF	
C7805	F1H1H153A219	C CHIP 50V 0.015UF	
C7806	F1H1H153A219	C CHIP 50V 0.015UF	
C7807	F1H1H153A219	C CHIP 50V 0.015UF	
C7808	F1H1H153A219	C CHIP 50V 0.015UF	
C7809	FLJ1A106A023	C CHIP 10V 10UF	
C7810	FLJ1A106A023	C CHIP 10V 10UF	
C7811	FLJ1A106A023	C CHIP 10V 10UF	
C7812	FLJ1A106A023	C CHIP 10V 10UF	
C7813	F1H1H222A219	C CHIP 50V 2200PF	
C7814	F1H1H222A219	C CHIP 50V 2200PF	
C7815	F1H1A105A036	C CHIP 10V 1UF	

COILS

Ref. No.	Part No.	Part Name & Description	Remarks
L7801	G1C100KA0055	COIL CHIP 10UH	

FPC CONNECTORS

Ref. No.	Part No.	Part Name & Description	Remarks
FP6501	K1MN16A00077	CONNECTOR 16P	
FP6502	K1MN08BA0197	CONNECTOR 8P	230EE

MISCELLANEOUS

Ref. No.	Part No.	Part Name & Description	Remarks
701	LSSC0928	GROUNDING PLATE,STEEL	
702	LSMG0136	MIC DAMPER	
705	LSEK0695	MIC DEVICE UNIT	

16.2.3. BOTTOM P.C.B.

TRANSISTORS

Ref. No.	Part No.	Part Name & Description	Remarks
Q7001	2SB09700RL	TRANSISTOR SI PNP CHIP	

DIODES

Ref. No.	Part No.	Part Name & Description	Remarks
D7003	B3AAB0000137	LIGHT EMITTING DIODE RED	

RESISTORS

Ref. No.	Part No.	Part Name & Description	Remarks
R7001	ERJ3GEYJ122V	MGF CHIP 1/16W 1.2K	
R7002	ERJ3GEY0R00V	MGF CHIP 1/16W 0	
R7003	ERJ3GEY0R00V	MGF CHIP 1/16W 0	
R7004	ERJ6GEYJ102V	MGF CHIP 1/10W 1K	
R7021	ERJ3GEYJ220V	MGF CHIP 1/16W 22	
R7022	ERJ3GEYJ220V	MGF CHIP 1/16W 22	
R7023	ERJ3GEYJ220V	MGF CHIP 1/16W 22	
R7024	ERJ3GEYJ220V	MGF CHIP 1/16W 22	
R7025	ERJ3GEYJ220V	MGF CHIP 1/16W 22	
R7031	ERJ3GEY0R00V	MGF CHIP 1/16W 0	
R7032	ERJ3GEY0R00V	MGF CHIP 1/16W 0	
R7033	ERJ3GEY0R00V	MGF CHIP 1/16W 0	
R7034	ERJ3GEY0R00V	MGF CHIP 1/16W 0	
R7035	ERJ3GEY0R00V	MGF CHIP 1/16W 0	
R7037	ERJ3GEYJ561V	MGF CHIP 1/16W 560	
R7038	ERJ3GEY0R00V	MGF CHIP 1/16W 0	
R7039	ERJ6GEYJ150V	MGF CHIP 1/10W 15	
R7040	ERJ3GEY0R00V	MGF CHIP 1/16W 0	
R7041	ERJ3GEY0R00V	MGF CHIP 1/16W 0	

CAPACITORS

Ref. No.	Part No.	Part Name & Description	Remarks
C7001	F1H1H332A219	C CHIP 50V 3300PF	
C7002	F1H1H332A219	C CHIP 50V 3300PF	
C7003	F1H1A105A036	C CHIP 10V 1UF	
C7021	F3G0J107A017	TANTALUM CHIP 6.3V 100UF	
C7022	F1H1C104A041	C CHIP 16V 0.1UF	
C7023	F1H1C104A041	C CHIP 16V 0.1UF	
C7024	ECJ1VC1H180J	C CHIP 50V 18PF	
C7025	ECJ1VC1H180J	C CHIP 50V 18PF	
C7026	ECJ1VC1H180J	C CHIP 50V 18PF	
C7027	ECJ1VC1H180J	C CHIP 50V 18PF	
C7028	ECJ1VC1H180J	C CHIP 50V 18PF	
C7030	F1H1H103A219	C CHIP 50V 0.01UF	

COILS

Ref. No.	Part No.	Part Name & Description	Remarks
L7001	J0JBC0000027	FERRITE BEAD CHIP	
L7002	J0JBC0000027	FERRITE BEAD CHIP	
L7003	J0JBC0000027	FERRITE BEAD CHIP	
L7004	J0JBC0000027	FERRITE BEAD CHIP	
L7005	J0JBC0000027	FERRITE BEAD CHIP	
L7021	G1C100KA0031	COIL CHIP 10UH	

PIN HEADERS

Ref. No.	Part No.	Part Name & Description	Remarks
B7001	K1KA40BA0052	BOARD TO BOARD 40P	

JACKS

Ref. No.	Part No.	Part Name & Description	Remarks
JK7001	K2HZ110E0002	AUDIO/VIDEO s-VIDEO JACK SOCKET	
JK7002	K2HZ105E0012	USB MINI JACK SOCKET	

BATTERY

Ref. No.	Part No.	Part Name & Description	Remarks
BT7001	ML-621S/F9DE	BATTERY	△

MISCELLANEOUS

Ref. No.	Part No.	Part Name & Description	Remarks
U7001	K1NA09E00084	SD UNIT	
706	LSMX0233	INSULATION SHEET	

16.2.4. LIQUID CRYSTAL DISPLAY BACKLIGHT P.C.B.NR

TRANSISTORS

Ref. No.	Part No.	Part Name & Description	Remarks
Q8101	2SC6054J0L	TRANSISTOR SI NPN CHIP	
Q8102	2SC6054J0L	TRANSISTOR SI NPN CHIP	
Q8104	2SC6054J0L	TRANSISTOR SI NPN CHIP	
Q8105	2SC6054J0L	TRANSISTOR SI NPN CHIP	
Q8107	2SA2174J0L	TRANSISTOR SI PNP CHIP	
Q8108	2SC6054J0L	TRANSISTOR SI NPN CHIP	
Q8112	2SA2174J0L	TRANSISTOR SI PNP CHIP	
Q8113	2SA2174J0L	TRANSISTOR SI PNP CHIP	

DIODES

Ref. No.	Part No.	Part Name & Description	Remarks
D8101	MAZ80620ML	DIODE ZENER CHIP 6.2V	
D8113	MAZ80560ML	DIODE ZENER CHIP 5.6V	

RESISTORS

Ref. No.	Part No.	Part Name & Description	Remarks
R8102	ERJ3RBD271V	MGF CHIP 1/16W 270	
R8103	ERJ6GEY0R00V	MGF CHIP 1/10W 0	
R8105	ERJ3RBD271V	MGF CHIP 1/16W 270	
R8106	ERJ3RBD271V	MGF CHIP 1/16W 270	
R8107	ERJ3RED270V	MGF CHIP 1/16W 27	
R8108	ERJ3GEY0R00V	MGF CHIP 1/16W 0	
R8110	ERJ3RED270V	MGF CHIP 1/16W 27	
R8112	ERJ3RED270V	MGF CHIP 1/16W 27	
R8113	ERJ3GEY0R00V	MGF CHIP 1/16W 0	
R8114	ERJ3RBD563V	MGF CHIP 1/16W 56K	
R8115	ERJ3GEY0R00V	MGF CHIP 1/16W 0	
R8116	ERJ3RBD562V	MGF CHIP 1/16W 5600	
R8119	ERJ3RED270V	MGF CHIP 1/16W 27	
R8123	ERJ3GEYJ473V	MGF CHIP 1/16W 47K	
R8124	ERJ3RED270V	MGF CHIP 1/16W 27	
R8126	ERJ3GEYJ104V	MGF CHIP 1/16W 100K	
R8127	ERJ3GEYJ102V	MGF CHIP 1/16W 1K	
R8135	ERJ3RBD473V	MGF CHIP 1/16W 47K	
R8136	ERJ3RBD103V	MGF CHIP 1/16W 10K	
R8143	ERJ3GEY0R00V	MGF CHIP 1/16W 0	
R8145	ERJ3GEY0R00V	MGF CHIP 1/16W 0	
R8153	ERJ3GEY0R00V	MGF CHIP 1/16W 0	
R8154	ERJ3GEY0R00V	MGF CHIP 1/16W 0	
R8155	ERJ3GEY0R00V	MGF CHIP 1/16W 0	

CAPACITORS

Ref. No.	Part No.	Part Name & Description	Remarks
C8104	ECJ1VC1H390J	C CHIP 50V 39PF	
C8105	ECJ1VC1H390J	C CHIP 50V 39PF	
C8106	ECJ1VC1H390J	C CHIP 50V 39PF	
C8107	FLH1A105A036	C CHIP 10V 1UF	
C8109	FLJ1A475A023	C CHIP 10V 4.7UF	
C8111	FLH1C104A041	C CHIP 16V 0.1UF	
C8112	FLJ1A2250007	C CHIP 10V 2.2UF	
C8113	FLH1A105A036	C CHIP 10V 1UF	
C8116	FLH0J1050012	C CHIP 6.3V 1UF	

COILS

Ref. No.	Part No.	Part Name & Description	Remarks
L8101	G1C101KA0055	COIL CHIP 100UH	

FPC CONNECTORS

Ref. No.	Part No.	Part Name & Description	Remarks
FP8101	K1MN22BA0197	CONNECTOR 22P	
FP8102	K1MN24BA0196	CONNECTOR 24P	

16.2.5. SIDE R P.C.B.

CAPACITORS

Ref. No.	Part No.	Part Name & Description	Remarks
C6301	FLH1H103A219	C CHIP 50V 0.01UF	

PIN HEADERS

Ref. No.	Part No.	Part Name & Description	Remarks
P6301	K1KA02BA0014	CONNECTOR 2P	

FPC CONNECTORS

Ref. No.	Part No.	Part Name & Description	Remarks
FP6301	K1MN32AA0091	CONNECTOR 32P	
FP6302	K1MN26BA0197	CONNECTOR 26P	

SWITCHES

Ref. No.	Part No.	Part Name & Description	Remarks
SW6301	K0F111A00547	SWITCH PUSH	
SW6302	K0D113B00027	SWITCH SLIDE SWITCH	