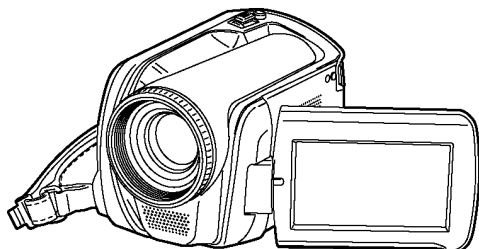


Service Manual

SD Card/Hard Disk Video Camera



LEICA
DICOMAR



PbF
Solder Lead free

SDR-H20E

SDR-H20EB

SDR-H20EE

SDR-H20EF

SDR-H20EG

SDR-H20EP

SDR-H20GC

SDR-H20GN

SDR-H21EE

SDR-H21GC

SDR-H28GK

SDR-H29GK

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. Service caution based on legal restrictions

2.2.1. General description about Lead Free Solder (PbF)

The lead free solder has been used in the mounting process of all electrical components on the printed circuit boards used for this equipment in considering the globally environmental conservation.

The normal solder is the alloy of tin (Sn) and lead (Pb). On the other hand, the lead free solder is the alloy mainly consists of tin (Sn), silver (Ag) and Copper (Cu), and the melting point of the lead free solder is higher approx.30 degrees C (86°F) more than that of the normal solder.

Definition of PCB Lead Free Solder being used

The letter of "PbF" is printed either foil side or components side on the PCB using the lead free solder. (See right figure)	PbF
---	-----

Service caution for repair work using Lead Free Solder (PbF)

- The lead free solder has to be used when repairing the equipment for which the lead free solder is used.
(Definition: The letter of "PbF" is printed on the PCB using the lead free solder.)
- To put lead free solder, it should be well molten and mixed with the original lead free solder.
- Remove the remaining lead free solder on the PCB cleanly for soldering of the new IC.
- Since the melting point of the lead free solder is higher than that of the normal lead solder, it takes the longer time to melt the lead free solder.
- Use the soldering iron (more than 70W) equipped with the temperature control after setting the temperature at 350±30 degrees C (662±86°F).

Recommended Lead Free Solder (Service Parts Route.)

- The following 3 types of lead free solder are available through the service parts route.
RFKZ03D01K----- (0.3mm 100g Reel)
RFKZ06D01K----- (0.6mm 100g Reel)
RFKZ10D01K----- (1.0mm 100g Reel)

Note

* Ingredient: tin (Sn), 96.5%, silver (Ag) 3.0%, Copper (Cu) 0.5%, Cobalt (Co) / Germanium (Ge) 0.1 to 0.3%

2.3. Caution for AC Cord (RJA0053-3X type)

2.3.1. 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.

2.3.2. 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.

2.3.2.1. Important

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

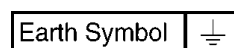
Blue	Neutral
Brown	Live

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.

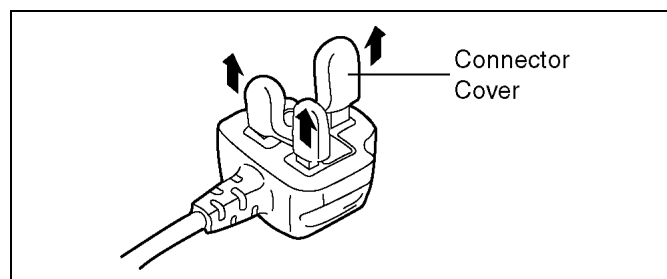
The wire which is coloured BROWN must be connected to the terminal in the plug which is marked with the letter L or coloured RED.

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.



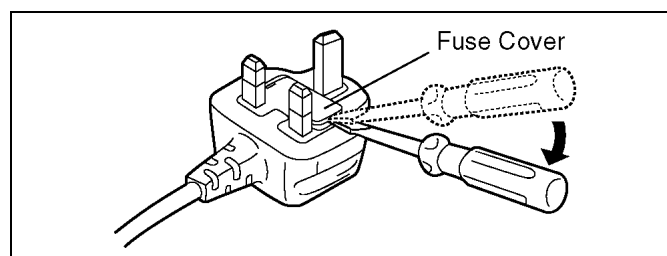
2.3.2.2. Before use

remove the Connector Cover as follows.

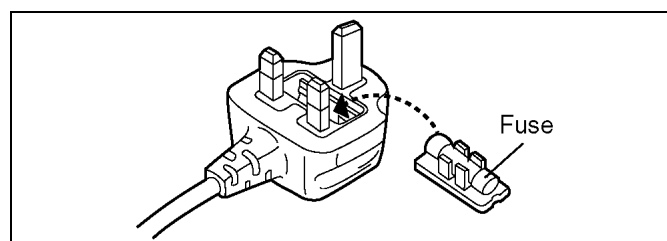


2.3.2.3. How to replace the Fuse

1. Remove the Fuse Cover with a screwdriver.

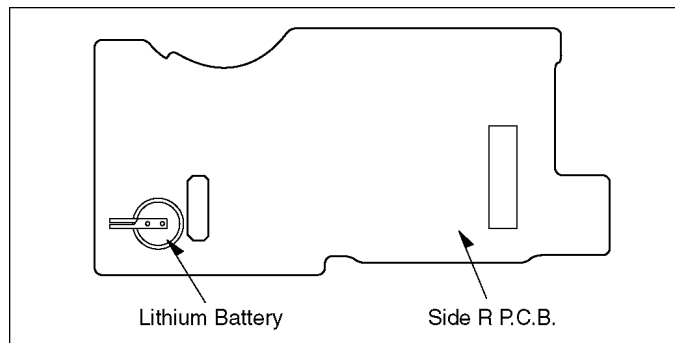


2. Replace the fuse and attach the Fuse cover.



2.4. How to Replace the Lithium Battery

1. Remove the Side R P.C.B.. (Refer to Disassembly Procedures.)
2. Unsolder the Lithium Battery “ML-621S/F9D” and then replace the new one.



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.: ML-621S/F9D Manufactured by Panasonic.)
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-Eksplodingsfare 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 suosittelemaan tyyppiin.
Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

3 Service Navigation

3.1. Service Information

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:

These movie camera uses AC Adaptor is DE-974GC or DE-974HC.

Note 2:

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

1. Schematic Diagram, Block Diagram and P.C.B. layout of Main P.C.B.
2. Parts List for individual parts of Main P.C.B.

2) The following category are recycle module part. Please send them to Central Repair Center.

*Main P.C.B.

(LSEP8388P1)

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

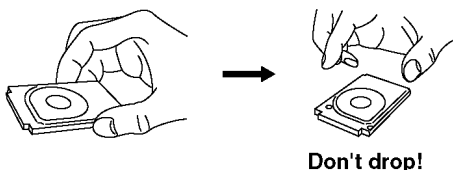
The following circuits are contained in Main P.C.B.

1. Main Connection Circuit
2. AVIO Circuit
3. Video Circuit
4. Memory Circuit
5. Control Circuit
6. LCD Circuit
7. Power Circuit
8. Lens Drive Circuit
9. TG/AFF Circuit

3.2. Precautions for Handling HDD

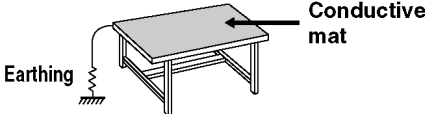
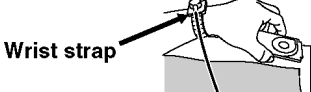
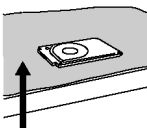
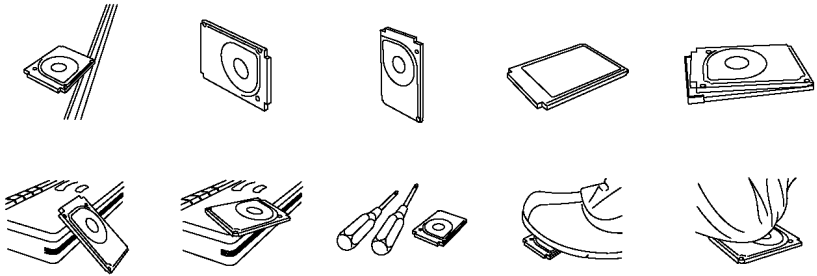
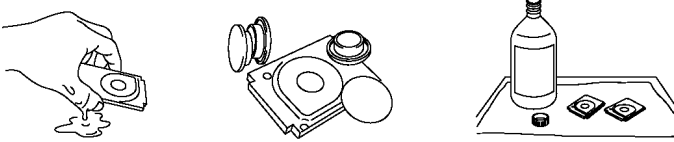
1. Handle HDD very carefully to prevent the static electricity and shock.
2. Set the HDD quickly after taking it out from the package. Make sure to put the HDD on buffer materials, etc.

3.2.1. Precautions at incoming process and for opening packages

Preventing shock	• Do not throw down HDD from luggage carrier or avoid dropping accidentally when unloading. The HDD may not be reliable when impacts of dropping, throwing or rolling occur. • Avoid HDD hitting other equipment or other HDD. Hold HDD firmly but do not apply excessive force when taking out from the package because it is particularly slippery. • When taking out HDD from the package, make sure to put buffer materials such as conductive urethane materials on a work table. Also, a stable place is recommended to avoid impacts or vibration.
Preventing condensation	• To prevent dew condensation on HDD due to sharp temperature change, keep it indoors without unpacking, and adjust the package of HDD to room temperature completely before unpacking. • Avoid entrance or window areas where temperature changes easily for storage.
Holding example	• Take out HDD holding both sides, not to press the top cover and the center of the device label. <OK>  Don't drop! <NG> 
Preventing static electricity	• After opening package, HDD must be handled only by a specified worker in E.S.D.* free environment on a conductive mat. It may cause damage on HDD components due to overvoltage such as electrostatic discharge, etc.

*E.S.D. = Electrostatically Sensitive Devices

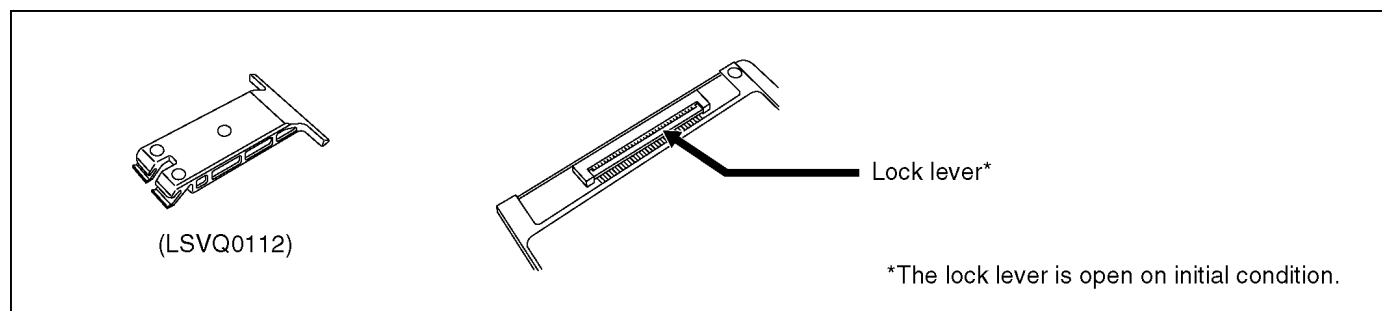
3.2.2. Precautions for installing HDD

Preventing static electricity	HDD may be destroyed by static electricity charged to clothes or human body. Place a conductive mat with removed earthing and use the wrist strap to prevent static charge. <OK>  <OK> 
Preventing shock	- Place HDD with its face upward (the device label upward) on the flat and stable surface using buffer materials, etc. - Do not stand HDD. If it falls down, the excessive impacts may damage HDD. - Do not store or carry HDD close to other HDD or other components. The components may be distorted due to impacts or weight, which may result in the performance deterioration of the HDD. - Do not put HDD in the working area. Do not put HDD close to industrial tools in particular or temporarily put it on the floor. - Be extremely careful not to drop HDD when working on it because even dropping HDD down on the work table with a mat on it may cause damage to HDD. <OK>  Buffer materials <NG> 
No water / solvent	Do not hold HDD with a wet hand or put magnets, solvent, tea, coffee, etc, close to HDD. This affects internal components and outside of HDD <NG> 
Connector	- The interface connector pin is easily damaged. Push it lightly and firmly to the end along the connector guide. - For further details, refer to "Precautions for inserting and removing HDD FPC".

3.2.3. Precautions for inserting and removing HDD FPC

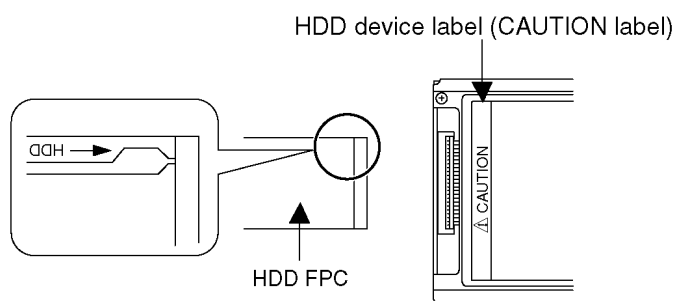
Make sure to use the tool (LSVQ0112) when locking and unlocking the lock lever of HDD FPC connector.

Do not lock the lock lever without inserting HDD FPC. Otherwise, the connector may be damaged.



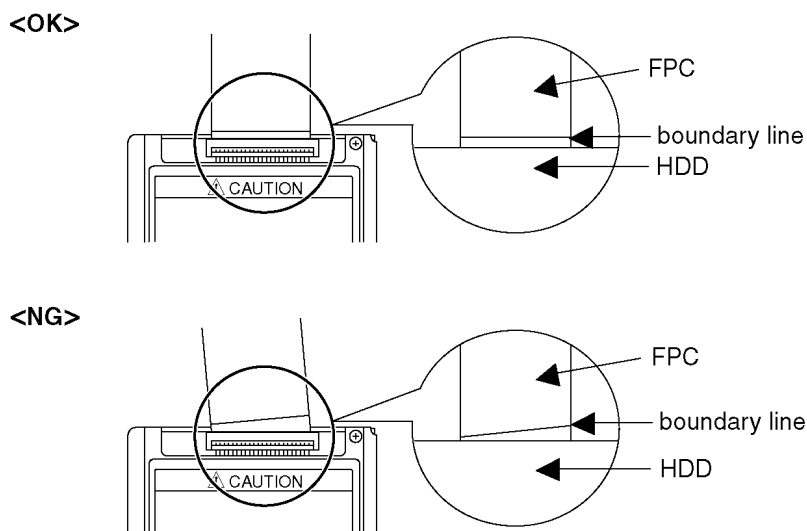
Insert HDD FPC

- ① Place HDD so that HDD device label (CAUTION label) faces up.
Caution: Do not set the HDD cushion when installing HDD FPC.
- ② Insert HDD FPC straight to the connector, and make sure if HDD FPC has been inserted to the end.
Caution: The connector surface of HDD FPC must face down and the letter "HDD" and the arrow must be seen as shown.



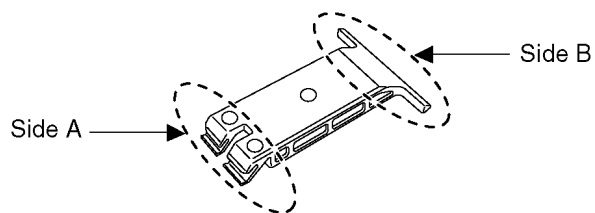
Check HDD FPC

Make sure if HDD FPC has been correctly inserted by confirming the FPC pattern boundary line.



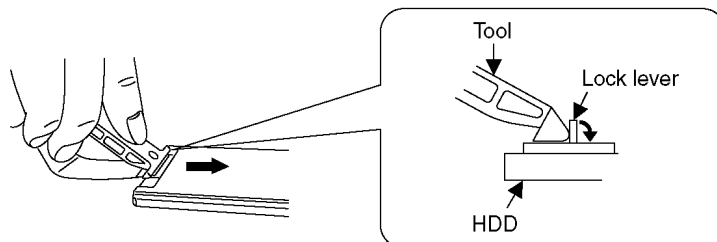
Tool operation

Lock using the tool after inserting HDD FPC.



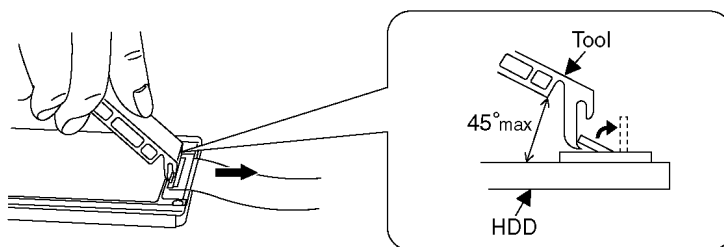
<How to lock>

After inserting HDD FPC, put the tool (Side B) on the connector and slide it slightly to the direction as shown to lock the lock lever.



<How to unlock>

Hook up the tip of the tool (Side A) and unlock the lock lever.
The angle of the tool must be less than 45 degree.



Make sure to use the tool (LSVQ0112) when opening and closing the lock lever.

*See "Disassembly Procedures" (Fig. D4) for attaching to the unit.

3.3. Formatting HDD

When HDD is exchanged, format HDD as the procedure below.

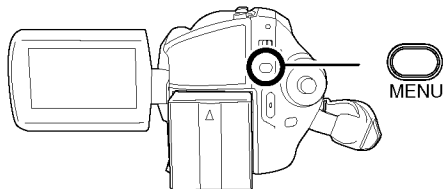
Without formatting, the error message appears on the LCD display when accessing HDD.

<Formatting procedure>

Rotate the mode dial to select  .

Select [HDD] in [MEDIA SELECT].

1. Press the MENU button, then
select [SETUP] →
[FORMAT HDD] → [YES] and
press the joystick.



2. When the confirmation message appears, select [YES], then press the joystick.

- When formatting is complete, press the MENU button to exit the message screen.

Note:

- During formatting, do not turn this unit off.
- When you format the HDD, use a battery with sufficient battery power or the AC adaptor.
- During formatting, do not cause any vibrations or impacts to this unit.

4 Specifications

ITEM	SPECIFICATION												
Power	SD Card/Hard Disk Video Camera: Power Source: DC 7.9/7.2 V Power Consumption: 4.4 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	SD Card: Based on the SD-Video standard HDD: Independent standard												
Image Sensor	1/6-inch CCD Image Sensor Total: 800 K Effective pixels: Moving picture: 400 K (4:3), 540 K (16:9)/Still picture: 410 K (4:3), 550 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)												
Microphone	Stereo (with a zoom function)												
Speaker	1 round speaker φ 20 mm												
Standard Illumination	1,400 lx												
Minimum Required Illumination	12 lx (Low light Mode : 1/50) approx. 2 lx (with the colour night view function)												
Output Level	Video Output Level: 1.0 Vp-p, 75Ω S Video Output Level: Y: 1.0 Vp-p, 75Ω, C: 0.3 Vp-p, 75Ω Audio Output Level (Line): 316 mV, 600 Ω												
USB	Card reader function (No copyright protection support) HDD reader function Hi-Speed USB (USB 2.0) compliant PictBridge-compliant												
Motion pictures	Recording media: SD Memory Card: 32 MB ^{*1} /64 MB ^{*1} /128 MB ^{*1} /256 MB/512 MB/1 GB/2 GB (removable type) (FAT12 and FAT16 format corresponding) SDHC Memory Card: 4 GB (removable type) (FAT32 format corresponding) HDD: 30 GB ^{*2} (fixed type) Compression: MPEG-2 Recoding mode and transfer rate: XP: 10 Mbps (VBR) SP: 5 Mbps (VBR) LP: 2.5 Mbps (VBR) Recordable time: <table><tr><td></td><td>SD Card (1GB)</td><td>HDD (30GB)</td></tr><tr><td>XP</td><td>12 minutes</td><td>7 hours</td></tr><tr><td>SP</td><td>25 minutes</td><td>13 hours 30 minutes</td></tr><tr><td>LP</td><td>50 minutes</td><td>27 hours</td></tr></table> Audio compression: SD card: MPEG-1 Audio Layer 2, 16bit (48 kHz/2 ch) HDD: Dolby Digital, 16 bit (48 kHz/2 ch) Maximum number of recordable folders and scenes: SD card: 99 folders × 99 scenes (9801 scenes) HDD: 999 folders × 99 scenes (98901 scenes) (When the date changes, a new folder is created and scenes are recorded in this new folder even if the number of scenes in the old folder has not reached 99.)		SD Card (1GB)	HDD (30GB)	XP	12 minutes	7 hours	SP	25 minutes	13 hours 30 minutes	LP	50 minutes	27 hours
	SD Card (1GB)	HDD (30GB)											
XP	12 minutes	7 hours											
SP	25 minutes	13 hours 30 minutes											
LP	50 minutes	27 hours											
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) (removable type) (FAT12 and FAT16 format corresponding) SDHC Memory Card: (4 GB) (removable type) (FAT32 format corresponding) HDD: 30 GB ^{*2} (fixed) 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 (Temperature) 10 %-80 % (Humidity) Less than 3000 m above sea level (Altitude)												
Weight	SD Card/Hard Disk Video Camera: 430 g (without battery and lens cap) AC Adaptor: 110 g												
Dimensions	SD Card/Hard Disk Video Camera: (excluding the projecting parts) 70.1 mm × 73.0 mm × 120.8 mm (W × H × D) AC Adaptor: 61 mm × 32 mm × 91 mm (W × H × D)												
Solder	This model uses lead free solder (PbF).												

*1 Cannot be guaranteed in operation.

*2 The 30 GB hard drive utilizes a portion of the storage space for formatting, file management and other purposes.
 30 GB is 30,000,000,000 bytes. Usable capacity will be less.

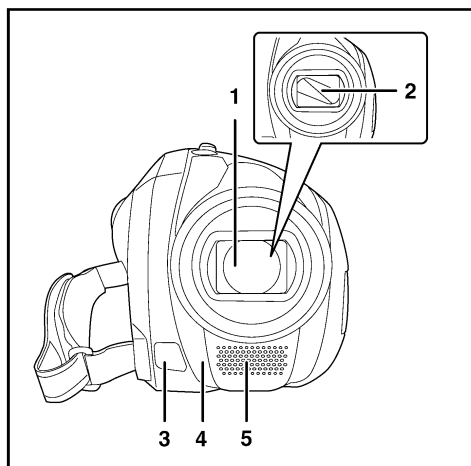
Design and Specifications are subject to change without notice.
 Weight and Dimensions shown are approximate.

5 Location of Controls and Components

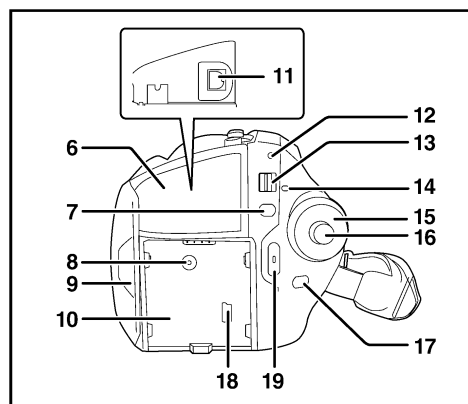
Followings are the Operation Guide for SDR-H20EB, SDR-H250EB as a sample.

For other models, refer to each original Operation Guide.

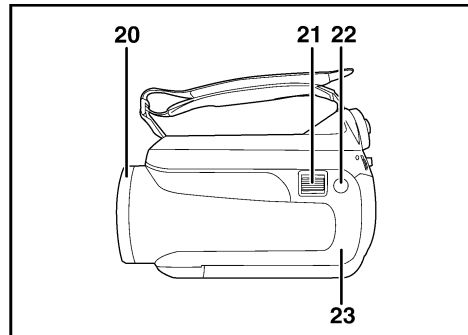
Parts identification and handling



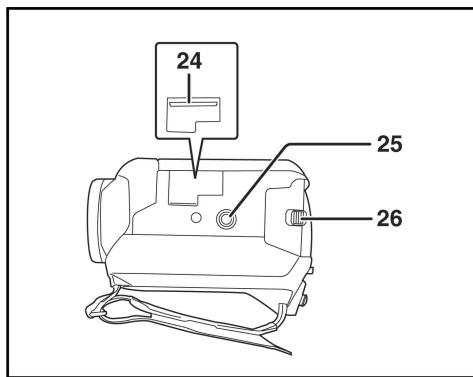
- 1 Lens (LEICA DICOMAR) (SDR-H250)
Lens (SDR-H20)
• Do not attach a conversion lens or a filter to this unit as it will cause vignetting.
- 2 Lens cover (SDR-H250)
- 3 Video light (SDR-H250)
- 4 White balance sensor
- 5 Remote control sensor (SDR-H250)
- 5 Microphone (built-in, stereo)



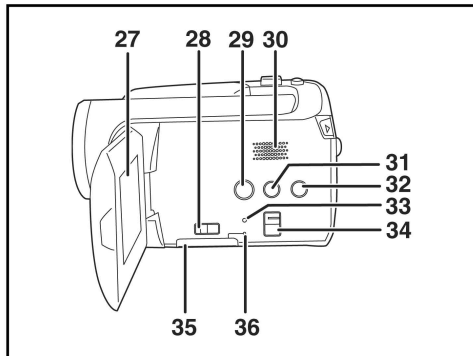
- 6 Terminal cover
- 7 Menu button [MENU]
- 8 DC input terminal [DC/C.C. IN]
- 9 LCD monitor open part
- 10 Battery holder
- 11 Audio-video output terminal [A/V]
- 12 Status indicator
- 13 Power switch [OFF/ON]
- 14 HDD/computer access lamp [ACCESS/PC]
- 15 Mode dial
- 16 Joystick
- 17 Delete button [⌫]
- 18 USB terminal [•⌂•]
- 19 Recording start/stop button



- 20 Lens cover open/close ring (SDR-H250)
- 21 When recording: Zoom lever [W/T]
When playing back: Volume lever [−VOL+]
- 22 Photoshot button [📷]
- 23 Illumination LED



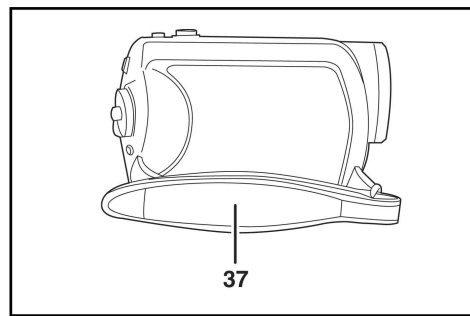
- 24 Card slot
25 Tripod receptacle
26 Battery release lever [BATTERY]



27 LCD monitor

Due to limitations in LCD production technology, there may be some tiny bright or dark spots on the LCD monitor screen. However, this is not a malfunction and does not affect the recorded picture.

- 28 Card slot open lever
29 DVD COPY button [DVD COPY]
30 Speaker
31 Power LCD plus button [POWER LCD PLUS]
32 Video light button [LIGHT] (SDR-H250)
33 Reset button [RESET]
34 Mode select switch [AUTO/MANUAL/ FOCUS]
35 Card slot cover [SD CARD]
36 Card access lamp [ACCESS]

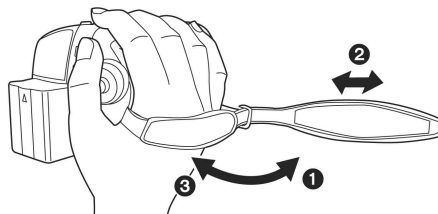


37 Grip belt

Using grip belt

Adjust the belt length so it fits your hand.

Adjust the belt length and the pad position.



- ❶ Flip the belt.
- ❷ Adjust the length.
- ❸ Replace the belt.

6 Service Mode

6.1. Error Display

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

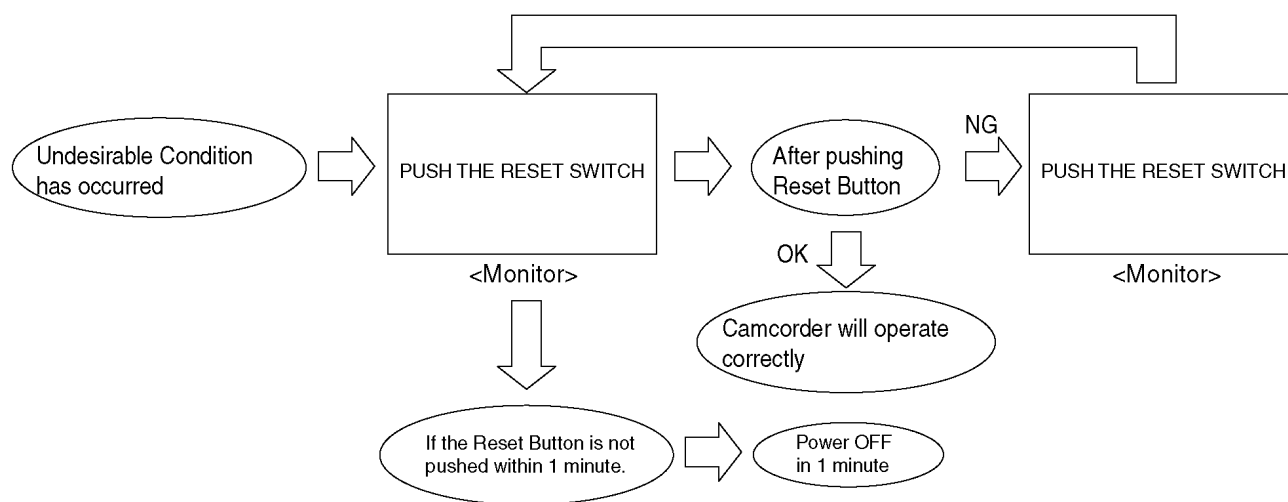


Fig. 1

Note:

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

6.2. 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 [DVD COPY] simultaneously for 3 seconds (with no SD Card inserted).

Note:

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

This operation displays the following Service Menu items.

				ignore							
9 4 0 E		0 8 1 7 0 0		1 8		F F F F		1 / 3			
1						N O					
2						N O					
3						N O					
4						N O					
5						N O					
9 4 0 E		9 4 0 E		0 0 0 5 0 0 0 1		0 0 0 4 0 0 0 0					
				ignore							
<Service Menu 1/3>											

9 4 0 E		0 8 1 7 0 0		1 8		F F F F		2 / 3			
6						N O					
7						N O					
8						N O					
9						N O					
1 0						N O					
9 4 0 E		9 4 0 E		0 0 0 5 0 0 0 1		0 0 0 4 0 0 0 0					
<Service Menu 2/3>											

9 4 0 E		0 8 1 7 0 0		1 8		F F F F		3 / 3			
1 1						N O					
1 2						N O					
1 3						N O					
1 4						N O					
1 5						N O					
9 4 0 E		9 4 0 E		0 0 0 5 0 0 0 1		0 0 0 4 0 0 0 0					
<Service Menu 3/3>											

Item [1]: HDD information
 Item [2]: Reset the total elapsed CCD time
 Item [3]: HDD 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
 Item [9]: Lock record clear
 Item [10]: HDD Self check

} ignore

Item [11]: Not used
 Item [12]: Not used
 Item [13]: Not used
 Item [14]: HDD Hardware test
 Item [15]: Not used

} ignore

} ignore ※ NOTE

※ NOTE: Be careful not to execute the Item [15]. If doing so, the entire HDD data will be erased.

Fig. 2-1

Note:

Only perform items 1, 2, 3, 4, 9, 10 and 14 in the Service Menu.

To select the Item of Service Menu

1. Press [JOYSTICK CONTROL UP/DOWN] to select item [1], [2], [3], [4], [9], [10] or [14].
2. Press [JOYSTICK CONTROL RIGHT] to display [YES/NO] screen.
3. Press [JOYSTICK CONTROL UP/DOWN] to select [YES].
4. Press [JOYSTICK CONTROL CENTER] to end.

<Item [1] screen : HDD information (1/7 screen)>

DRIVE Information 1/7

01. FALL	ABCD	← 01. Number of times of fall detection (Base 16 number)
02. HIGH TEMP	9A	← 02. Number of times of shut down due to high temperature (Base 16 number)
03. LOW TEMP	9A	← 03. Number of times of shut down due to low temperature (Base 16 number)
04. SERIAL	0123456789ABCDEF0123 }	← ignore

<Item [1] screen : HDD information (3/7 screen)>

Press [JOYSTICK CONTROL RIGHT] to display 3/7 screen.

```

DRIVE Information      3/7
07.READ ERROR
010B006464000000000000
08.THROUPT
0205006464000000000000
09.SPINUP
0327006464330800000000
10.START/S
0432006464170100000000
11.REALLOC SECTOR      }
C532006464270000000000 } ← Re-allocated Sector Count (Quantity)

```

For example :

Diagram illustrating the sorting of a 16-bit number (C532006464) into its sorted order (FEE DCBA) using bit-level operations. The initial number is shown with its hexadecimal digits and corresponding binary values. The sorted result is shown with its hexadecimal digits and corresponding binary values, indicating the final sorted order (FEE DCBA).

Change to decimal number

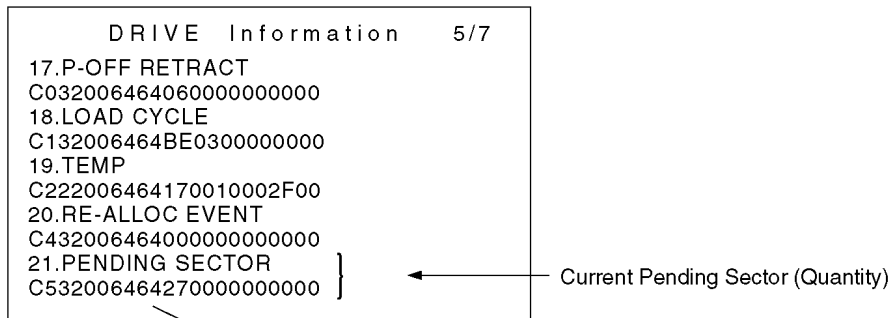
➡ 39 (Re-allocated Sector Count)

- If Re-allocated Sector Count is 500 and over, replace HDD.

Fig. 2-2

<Item [1] screen : HDD information (5/7 screen)>

Press [JOYSTICK CONTROL RIGHT] to display 5/7 screen.



For example :

ignore A B C D E F
C 5 3 2 0 0 6 4 6 4 2 7 0 0 0 0 0 0 0 0 0 0 0

↓ Sorting

F E D C B A
0 0 0 0 0 0 0 0 0 0 0 2 7
(Base 16 number)

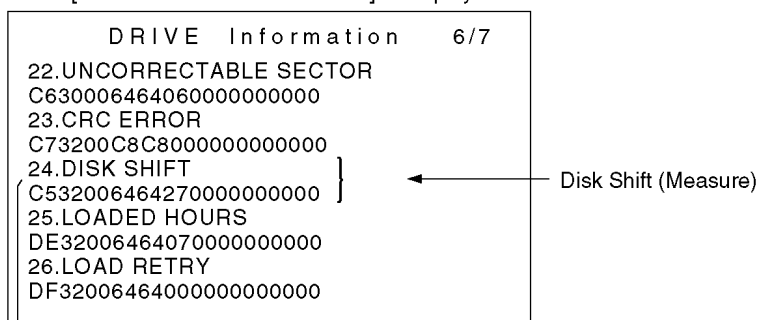
Change to decimal number

→ 39 (Current Pending Sector)

- If Current Pending Sector is 500 and over, replace HDD.

<Item [1] screen : HDD information (6/7 screen)>

Press [JOYSTICK CONTROL RIGHT] to display 6/7 screen.



For example :

ignore A B C D E F
C 5 3 2 0 0 6 4 6 4 2 7 0 0 0 0 0 0 0 0 0 0 0

↓ Sorting

F E D C B A
0 0 0 0 0 0 0 0 0 0 0 2 7
(Base 16 number)

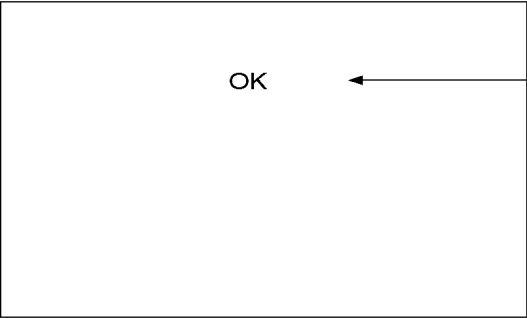
Change to decimal number

→ 39 (Disk Shift)

- If Disk Shift is 400 and over, replace HDD.

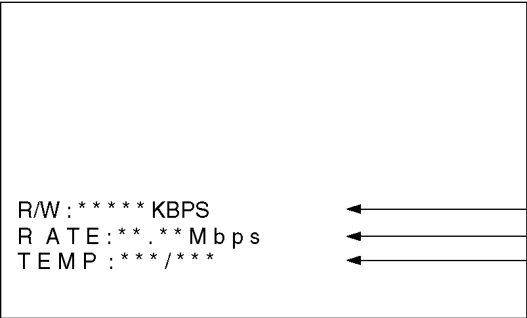
Fig. 2-3

<Item [2] screen : Reset the total elapsed CCD time>



← "OK" is displayed after "Reset the total elapsed CCD time" is executed.

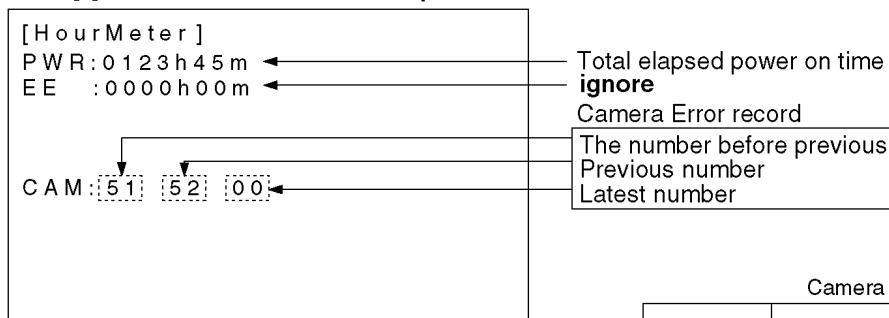
<Item [3] screen : HDD temperature information>



← Reading/Writing speed (While ACCESS/PC lamp is lighting)
← Recording bit rate
← Main Unit temperature (current)/
Maximum temperature after the power is turned on

Fig. 2-4

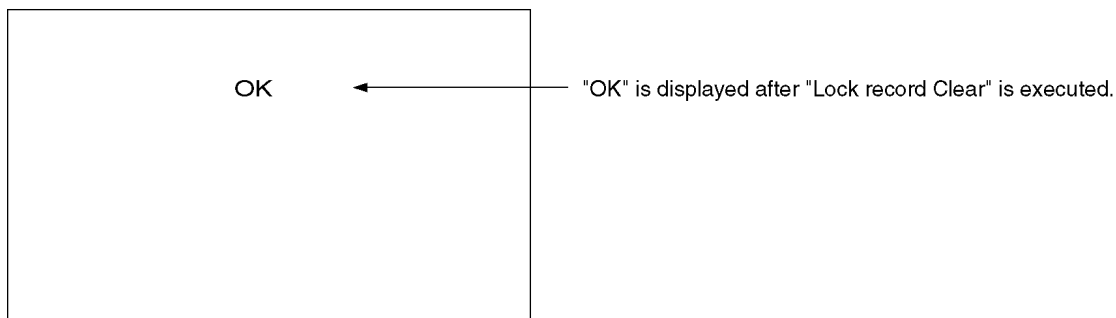
<Item [4] screen : Camera lock code/Elapsed time>



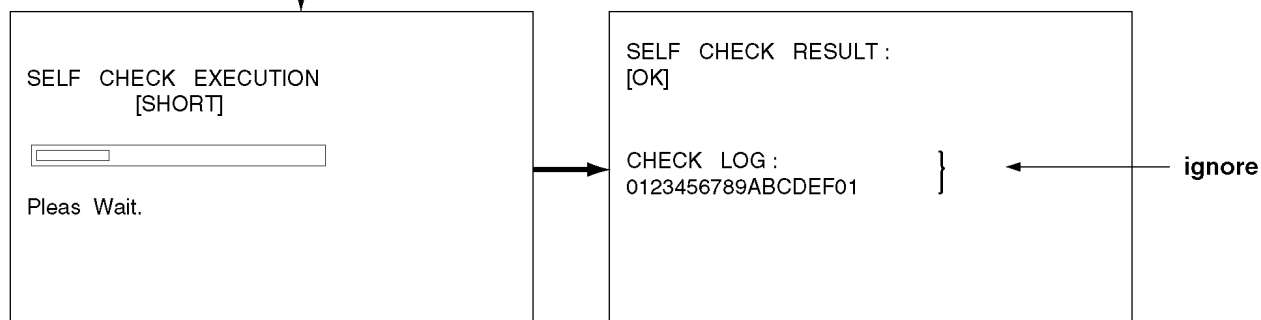
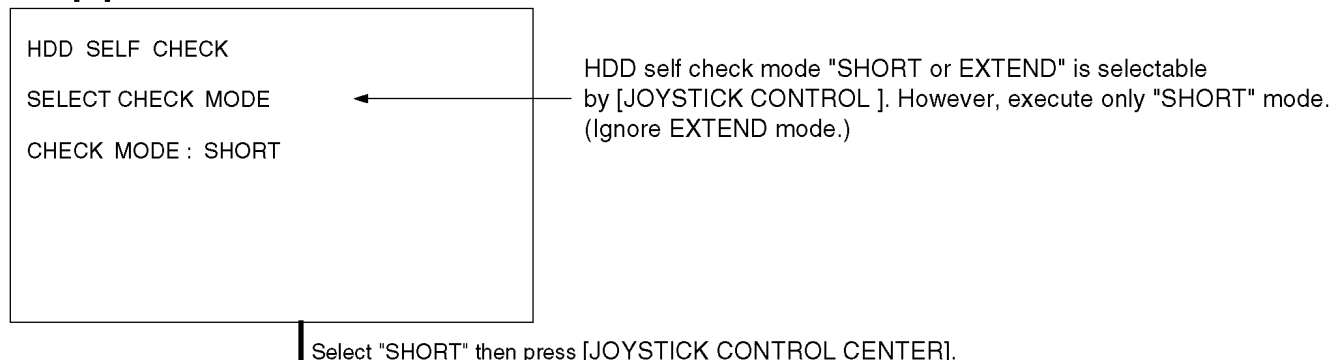
Camera Error code record in hexadecimal

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

<Item [9] screen : Lock record clear>



<Item [10] screen : HDD Self check>



(Execution time: 3 or 4 minutes)

●If "SELF CHECK RESULT" is [NG] or [COMMAND NG] in SHORT check mode, replace HDD.

Fig. 2-5

<Item [14] screen : HDD Hardware test>

HDD HARDWARE TEST RESULT NO ERROR

HDD HARDWARE TEST RESULT
NO ERROR
CTR ERROR
BUFF RAM ERROR
ECC DEV ERROR
CPU ERROR
COMMAND ERROR

} Replace HDD

- Replace HDD when "HDD HARDWARE TEST RESULT" is other than [NO ERROR].

Fig. 2-6

To exit the Service Menu

Unplug the AC Cord.

6.3. About Default Setting

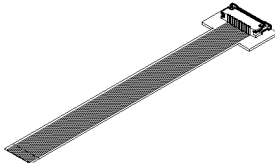
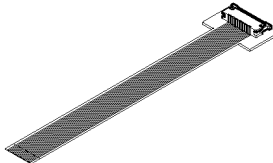
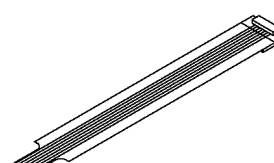
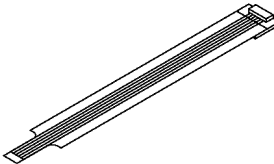
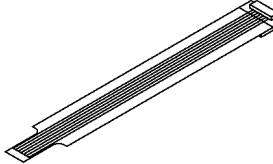
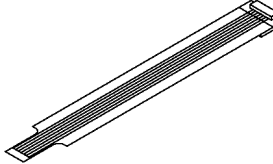
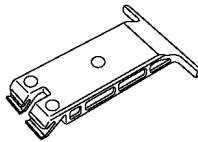
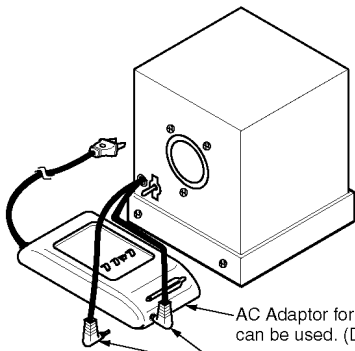
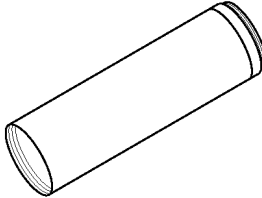
The data of Menu, Mode, Card and EEPROM setting, etc. is set to the default condition in factory.

6.3.1. How to set the Default Setting

1. Turn the Power on and set the Mode Dial to [VIDEO RECORDING MODE].
2. When pressing [DELETE], [JOYSTICK CONTROL RIGHT] and [DVD COPY] for more than 3 minutes simultaneously (with no SD Card inserted), the items below are set to the Default Setting.
 1. Menu, Mode, Adjusted Value
 2. Card format
 3. Reset of picture files and directory number (Set the picture record file number to 1)
 4. Clear the information of Mechanism Lock
 5. Set the time setting to no-setting

7 Service Fixture & Tools

7.1. Service Fixture and Tools

Extension Cable 18P LSUA0017 	Extension Cable 24P (2 pcs) VFK1284 	Extension Cable 14P VFKW0124A 	
Extension Cable 16P (2 pcs) VFK1286 	Extension Cable 12P VUVS0007 	Extension Cable 22P (2 pcs) VUVS0012 	
HDD Connector Tool LSVQ0112 	Grease LSUQ0050 	Plier for Non ZIF Connector LSVQ0028 	
Light Box and AC Adaptor VFK1164LBX1  AC Adaptor for C-Movie can be used. (DC +6V) Either plug can be used. (AC Adaptor is not supplied)	Infinity Lens (with Focus Chart) VFK1164TCM02 	27mm Ring VFK1164TAR27 	Color Conversion Filter (C14) VFK1164TFCT2 
White Chart VFK1164TFWC2 	Color Bar Chart VFK1164TFCB2 	Gray Scale Chart VFK1164TFGS2 	

7.2. Service Position

7.2.1. Extension Cables for Service Position

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

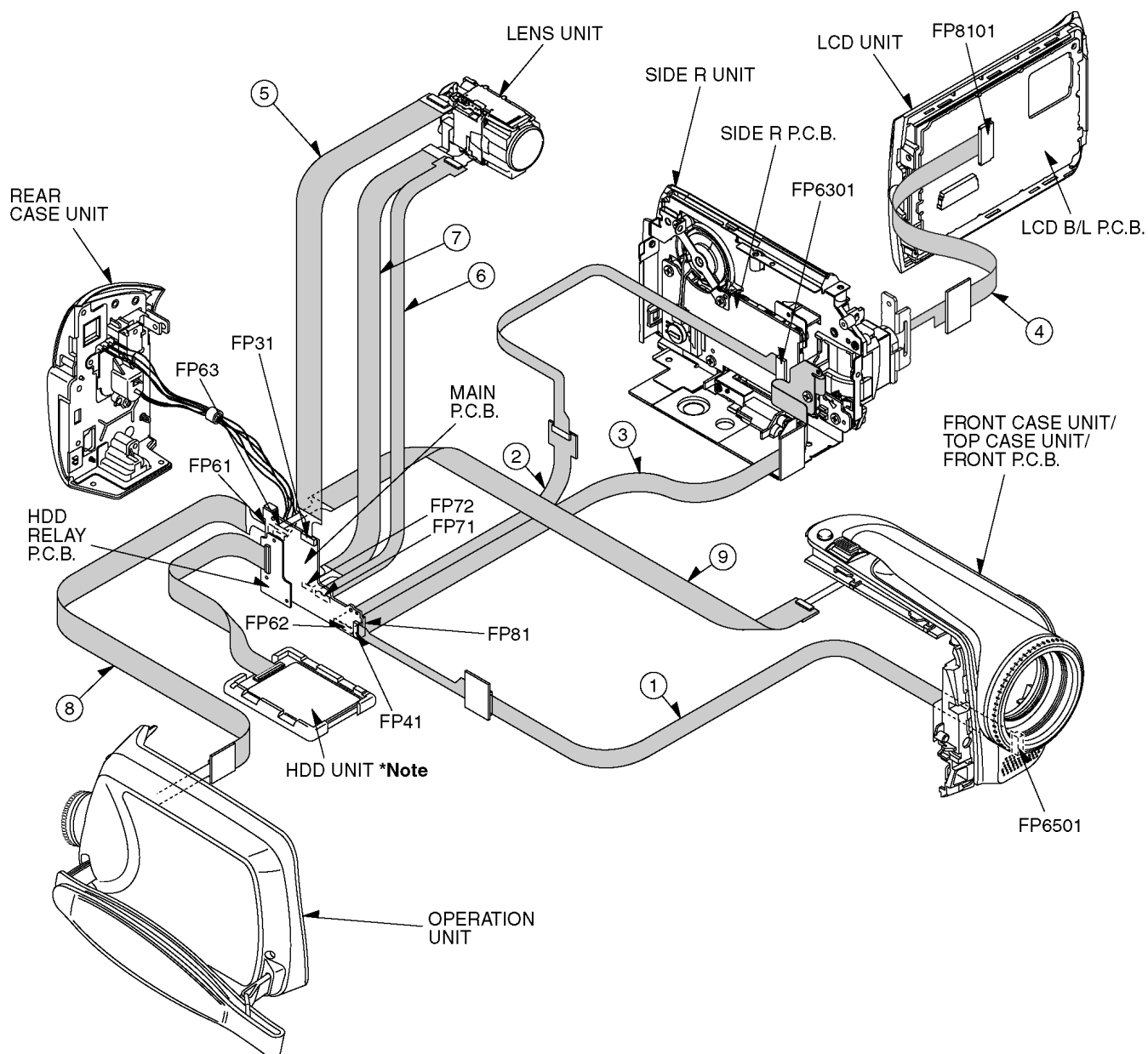
NO.	PART NUMBER	PART NAME	CONNECTION
1	LSUA0017	18Pin Extension Cable	FP41 on Main P.C.B. - FP6501 on Front P.C.B.
2	VFK1284	24Pin Extension Cable	FP62 on Main P.C.B. - Side R F.P.C. of Side R P.C.B.
3	VFK1284	24Pin Extension Cable	FP81 on Main P.C.B. - LCD Shaft F.P.C. of Side R Unit
4	VUVS0012	22Pin Extension Cable	LCD Shaft F.P.C. - FP8101 on LCD Backlight P.C.B.
5	VFKW0124A	14Pin Extension Cable	FP31 on Main P.C.B. - CCD F.P.C. on CCD P.C.B.
6	VUVS0012	22Pin Extension Cable	FP71 on Main P.C.B. - Lens F.P.C. on Lens Unit
7	VUVS0007	12Pin Extension Cable	FP72 on Main P.C.B. - OIS F.P.C. on Lens Unit
8	VFK1286	16Pin Extension Cable	FP61 on Main P.C.B. - Side L F.P.C. on Side L/Ope. Unit
9	VFK1286	16Pin Extension Cable	FP63 on Main P.C.B. - Top Ope. F.P.C. on Top Ope. Unit

Note:

1. Use a grounded ESD wrist strap while disassembling the Lens portion.
2. Connect the F.P.C.s to the connectors, verifying the direction of F.P.C.s.
3. Use extreme care when plugging in or unplugging connectors.

Service Position 1

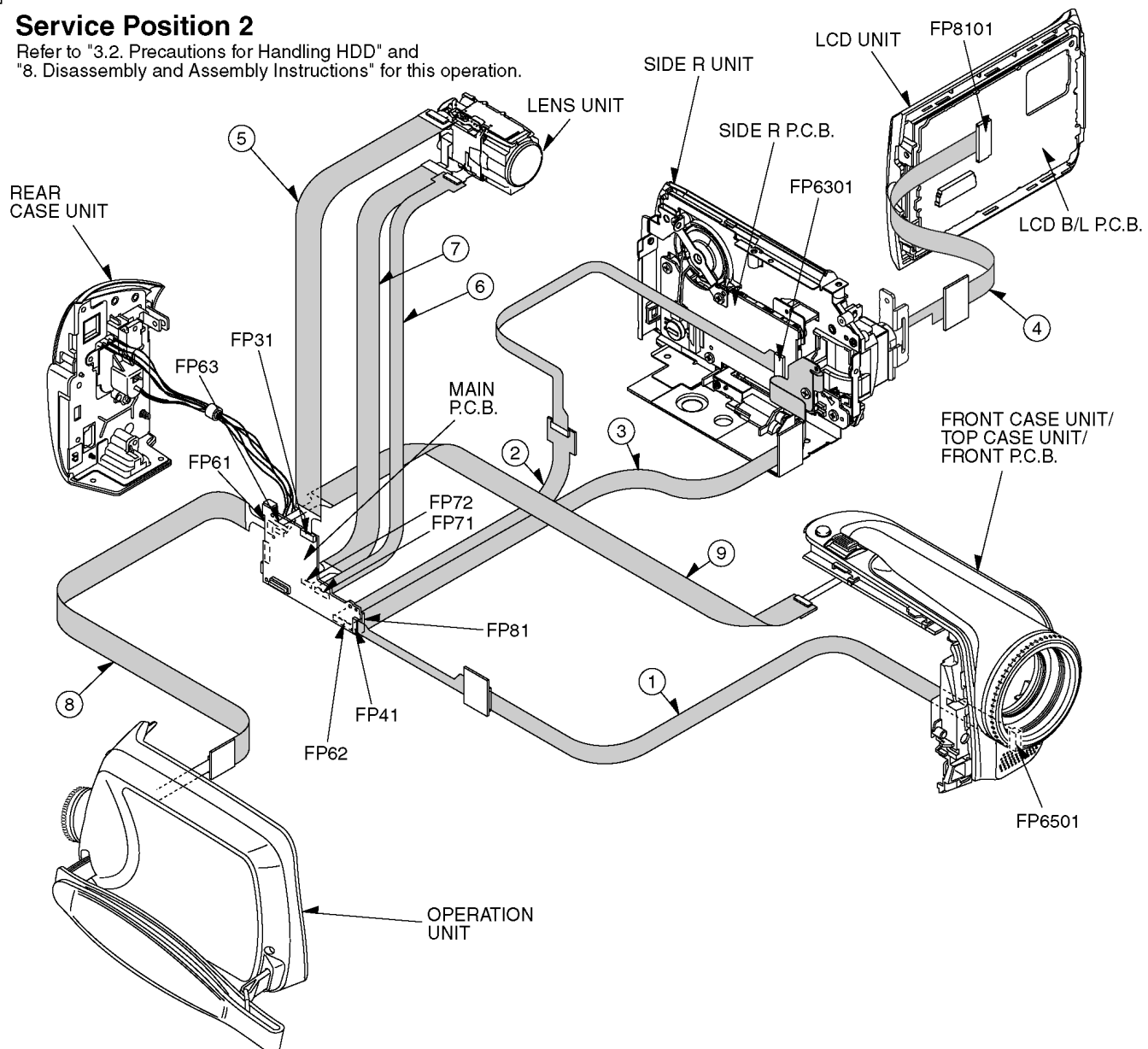
Refer to "3.2. Precautions for Handling HDD" and "8. Disassembly and Assembly Instructions" for this operation.



***Note:** Refer to "Disassembly Procedures" fig. D4 regarding the preparation of HDD UNIT.

Service Position 2

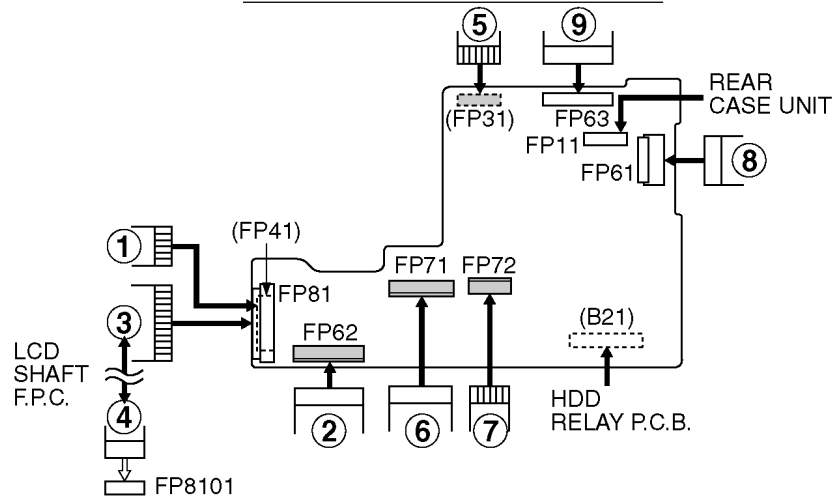
Refer to "3.2. Precautions for Handling HDD" and "8. Disassembly and Assembly Instructions" for this operation.



- You can measure voltage with HDD Relay P.C.B removed.
If an error occurs in that condition, turn the power on forcibly as described below and measure voltage.
Press [JOYSTICK CONTROL RIGHT] and [MENU] simultaneously.

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

Direction of F.P.C.s connection



7.3. 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.

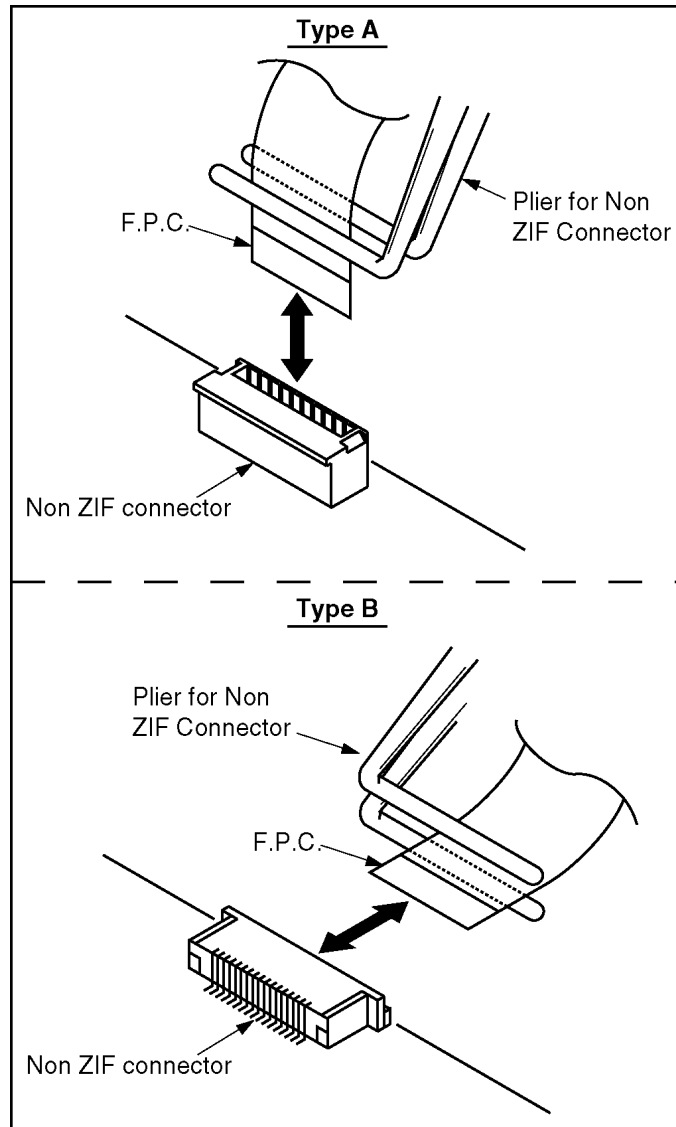
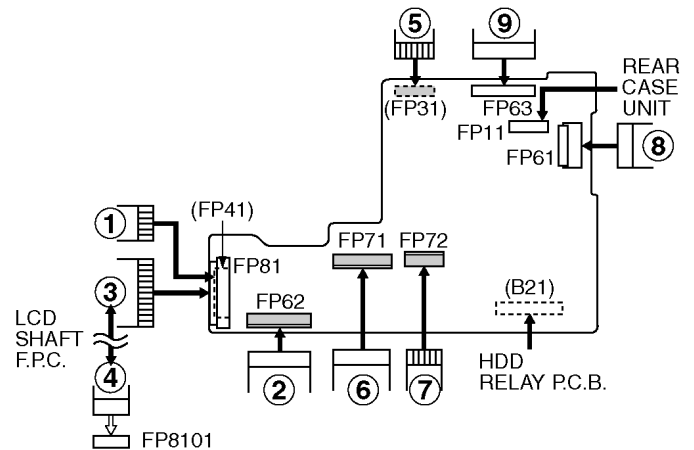


Fig. 4-1

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



7.4. Special Note

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

7.5. 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

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

7.6. Model No. Identification Mark

Use Marks shown in the chart below to distinguish the different models included in this Service Manual.

MODEL	MARK
SDR-H20EG	A
SDR-H20EF	B
SDR-H20E	C
SDR-H20EP	D
SDR-H20EB	E
SDR-H20GC	F
SDR-H20EE	G
SDR-H20GN	H
SDR-H28GK	I
SDR-H21EE	J
SDR-H21GC	K
SDR-H29GK	L
NOT USED	PT

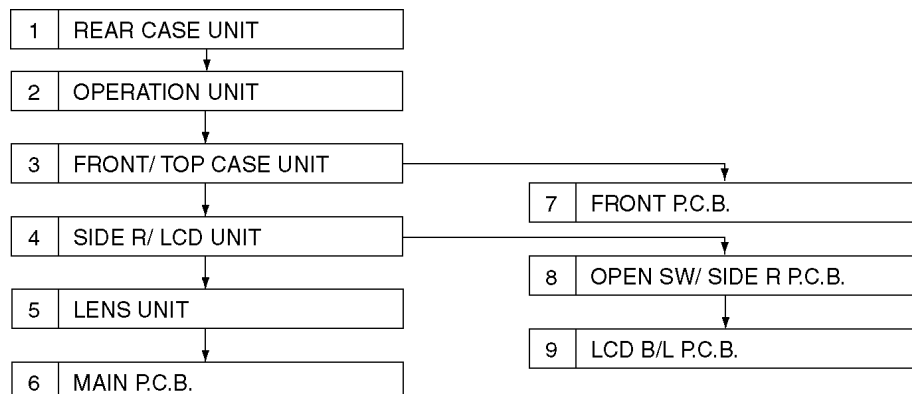
Note:

Refer to Item 3 of Schematic Diagram Notes of Schematic Diagram and Circuit Board Layout Notes, for Mark "PT."

8 Disassembly and Assembly Instructions

8.1. Disassembly Flow Chart

This flow chart indicates the disassembly steps the cabinet parts and P.C.B.. Unit in order to access to be serviced.
When reinstalling, perform the steps in the reverse order.



8.2. P.C.B. Layout

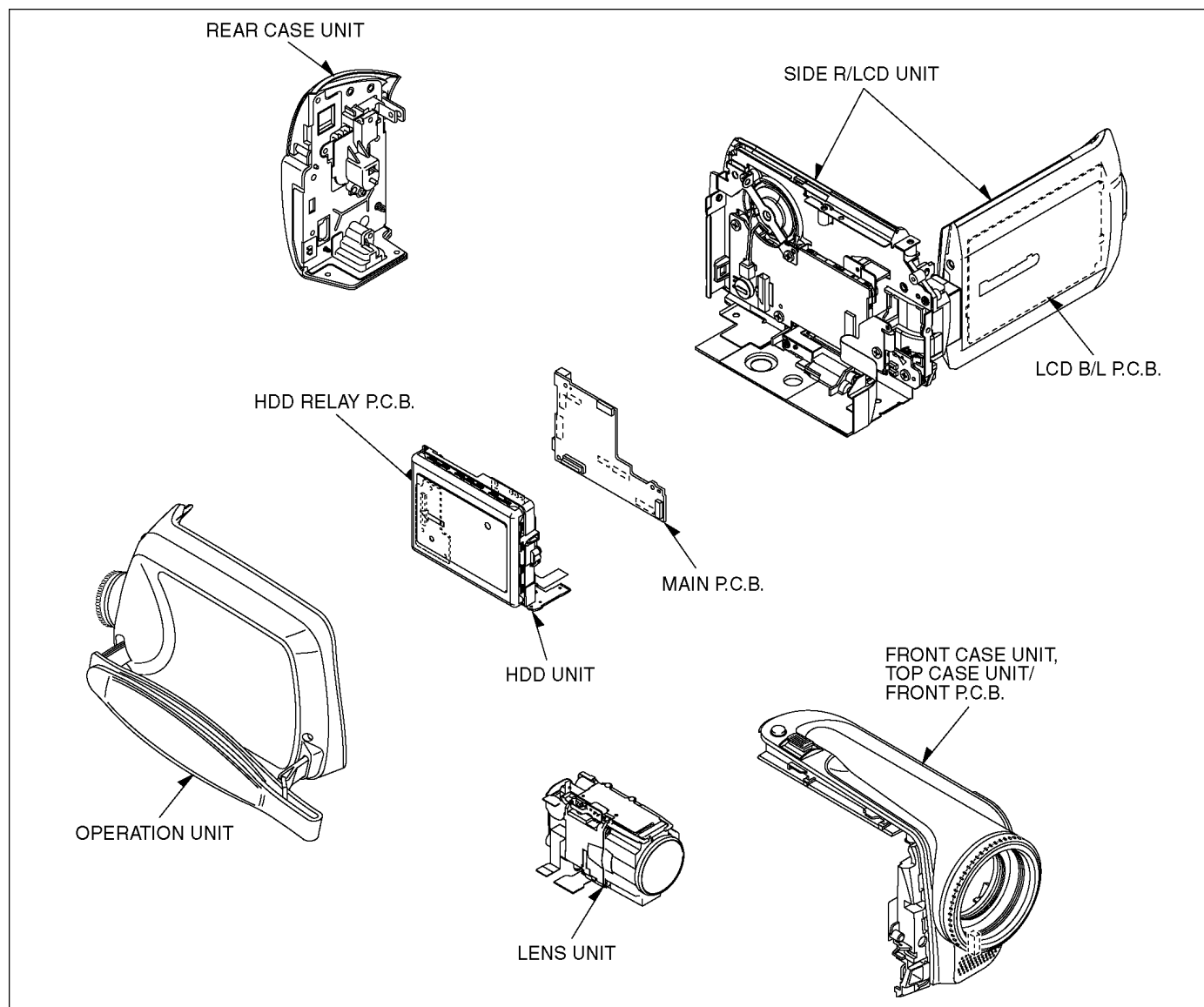


Fig. F1

8.3. Disassembly Procedures

Flow-Chart for Disassembly Procedure

No.	Item / Part	Fig.	Removal (Screw,Connector,FPC. & Other)
1	Rear Case Unit	Fig. D2	Open the LCD Unit and Jack Cover. 7-Screws (A) 1-Connector FP11 Rear Case Unit
2	Operation Unit	Fig. D3	2-Screws (B) 4-Tabs 1-Connector FP61 Operation Unit
3	Front/ Top Case Unit	Fig. D4	4-Hooks 1-Connector P2502 Hard Disk Drive, HDD Cushion, Top Case 3-Screws (C) 1-Connector B21 HDD Relay P.C.B.
		Fig. D5	3-Screws (D), 2-Screw (E) 1-Tab 2-Connectors FP63, FP6501 Front/ Top Case Unit
4	Side R/ LCD Unit	Fig. D6	1-Screw (F) 2-Connectors FP62, FP81 Side R/ LCD Unit
5	Lens Unit	Fig. D7	1-Screw (G) 3-Connectors FP31, FP71, FP72 Lens Unit
6	Main P.C.B.	Fig. D8	1-Screw (H) Bottom Angle Unit
		Fig. D9	1-Screw (I), 1-Screw (J) Main Shield Plate A 2-Screws (K) Main P.C.B.
7	Front P.C.B.	Fig. D10	4-Screws (L) Front Earth Angle, Front P.C.B.
8	Open Switch/ Side R P.C.B.	Fig. D11	2-Screws (M) Speaker Fixing Angle 1-Connector P6301 Speaker 5-Screws (N) Open Switch P.C.B., Side R P.C.B. Note: When fixing the Open SW P.C.B. and Side R P.C.B., open the LCD Unit and SD Cover. If you fix them without opening, both the Open SW (SW8301) and SD Det. SW (SW6305) will be damaged.
9	LCD B/L P.C.B.	Fig. D12	Turn the LCD Case to the arrow direction so that the screws can be seen, and remove the 2 screws (O). 6-Tabs LCD Case (Upper) 1-Connector FP8101 LCD Case (Lower) Unit
		Fig. D13	1-Connector FP8102 1-Screw (P) 3-Tabs LCD B/L P.C.B.

If the Card inserted, take out it before disassembling.

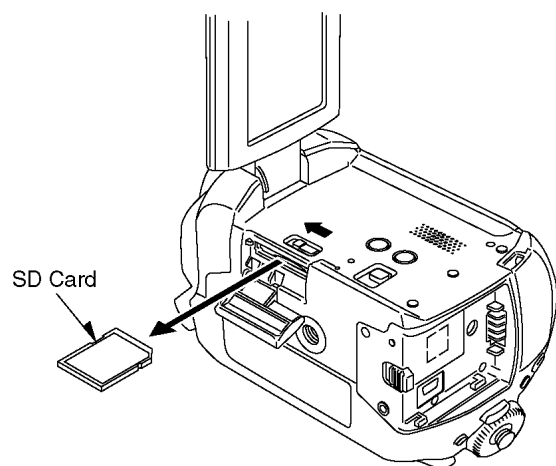
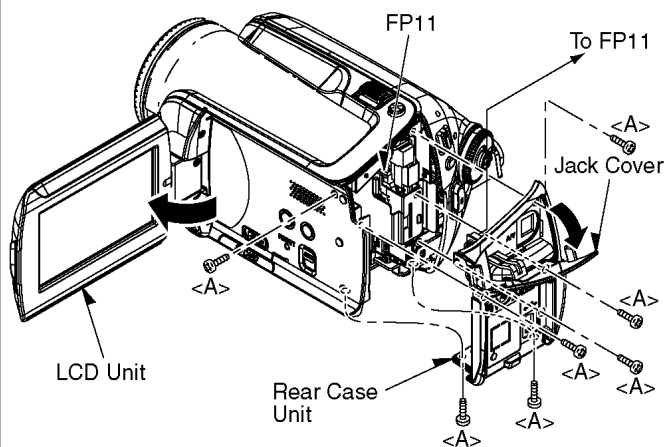


Fig. D1

Open the LCD Unit and Jack Cover.



Screw (A)

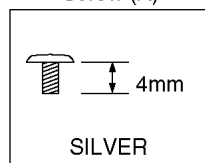
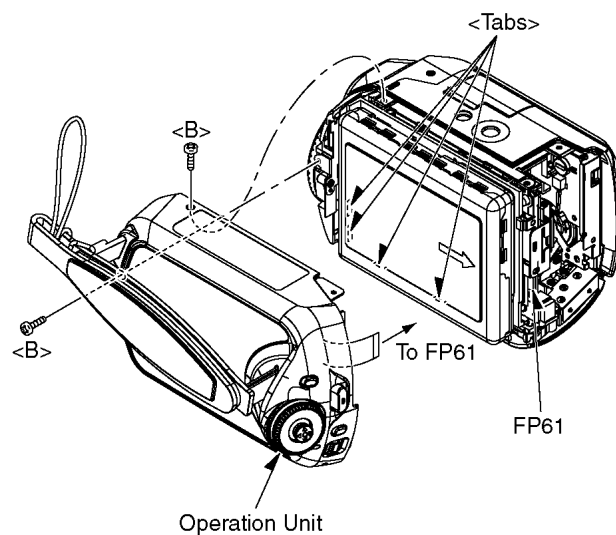
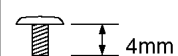


Fig. D2

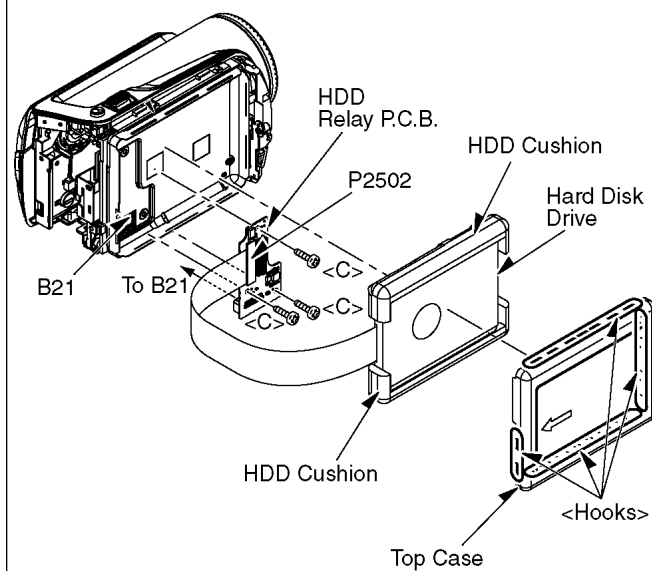


Screw (B)

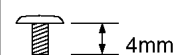


SILVER

Fig. D3



Screw (C)



SILVER

Fig. D4

Note for replacing HDD

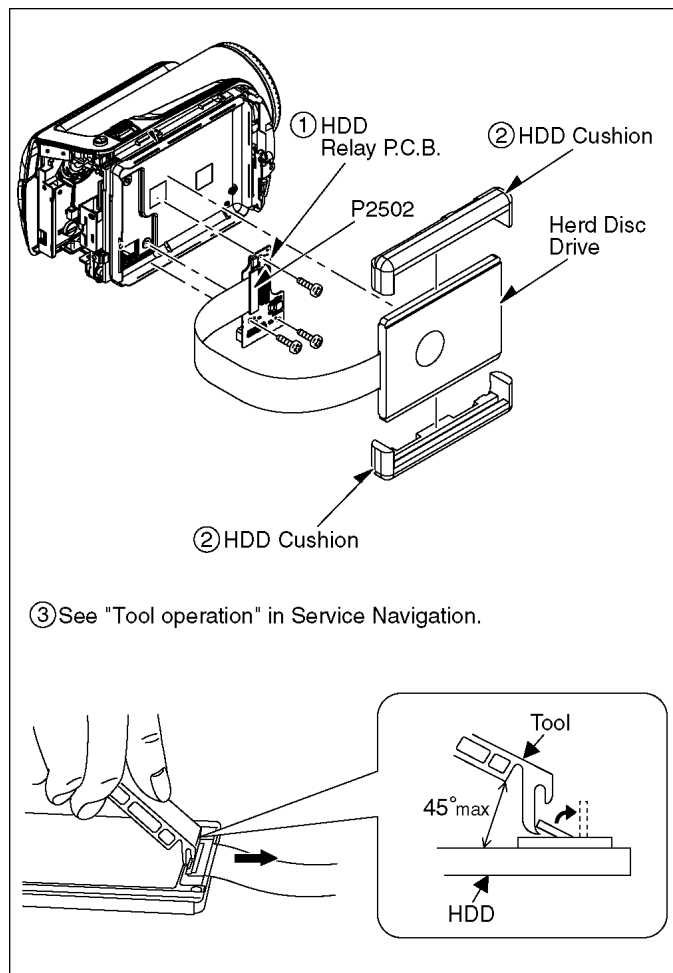
- Be sure to use the tool when inserting and removing HDD FPC.

After replacing the HDD, be sure to format the new HDD.

See "Formatting HDD" in Service Navigation.

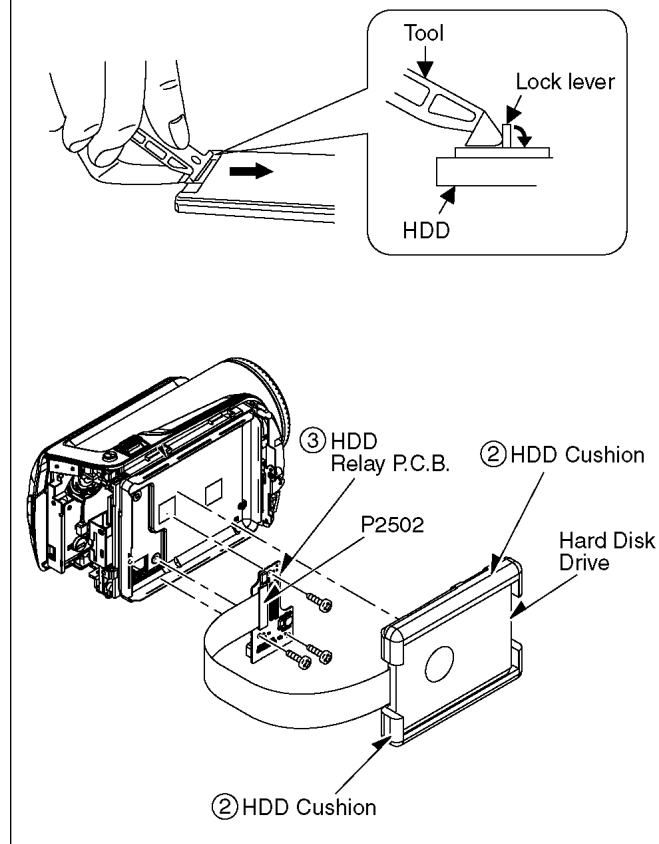
1) How to Remove

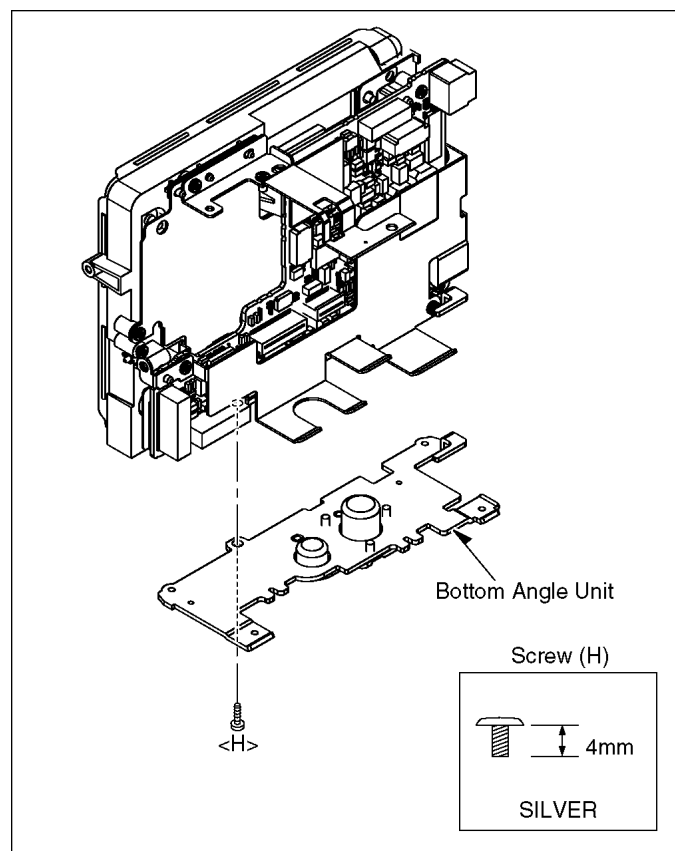
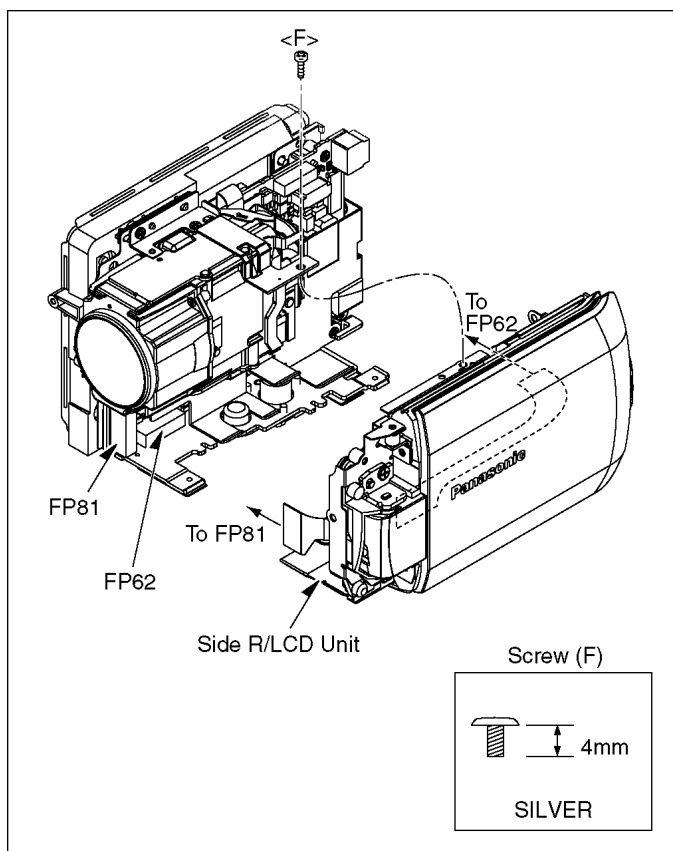
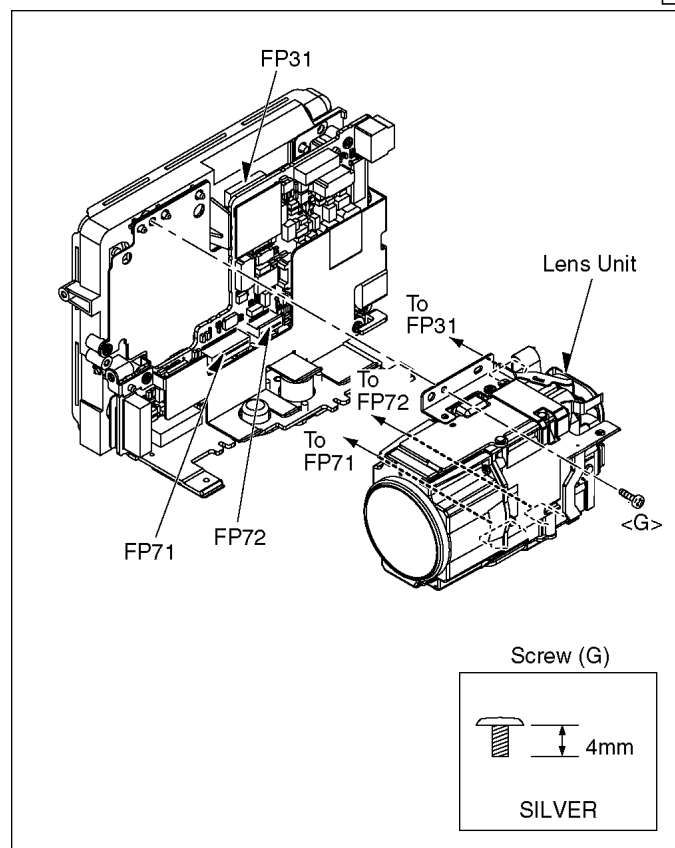
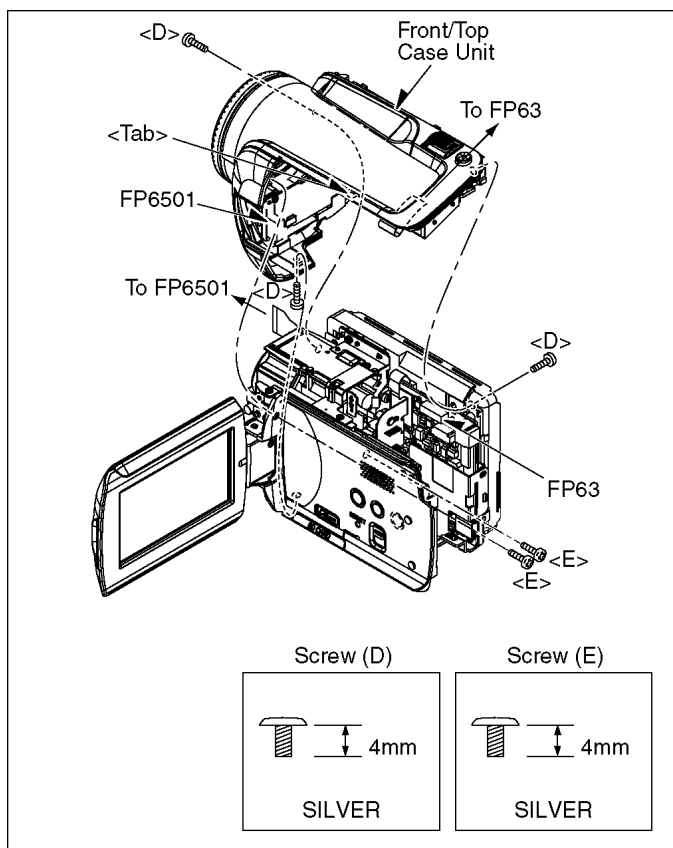
- ① Remove the screw and then remove the HDD Relay P.C.B. from the unit.
- ② Remove the HDD cushion from the HDD.
- ③ Remove the HDD FPC from HDD using the tool.

**2) How to Attach**

- ① Attach the HDD FPC to the new HDD using the tool.
- ② Attach the HDD cushion to the HDD.
- ③ Attach the HDD Relay P.C.B. to the unit.

- ① See "Tool operation" in Service Navigation.





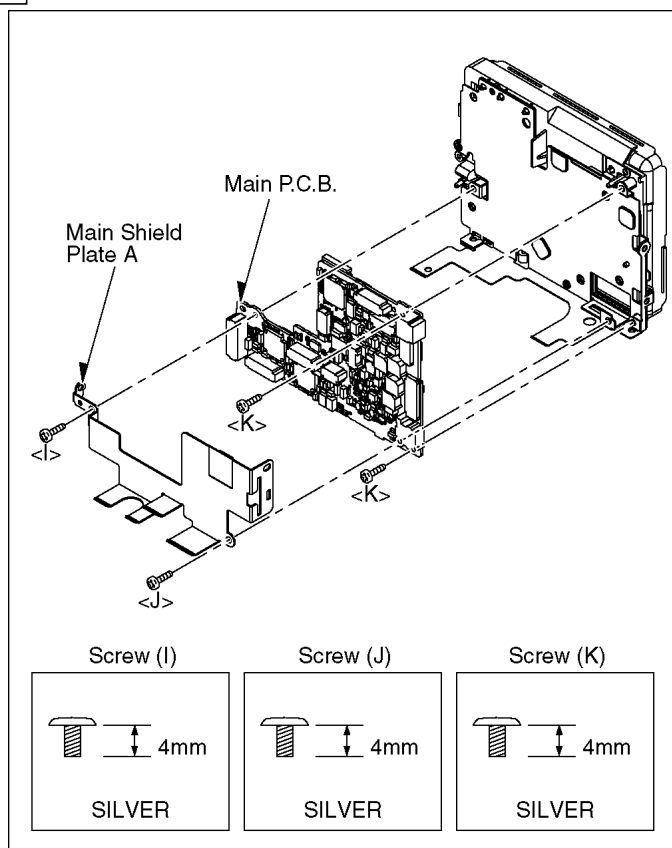


Fig. D9

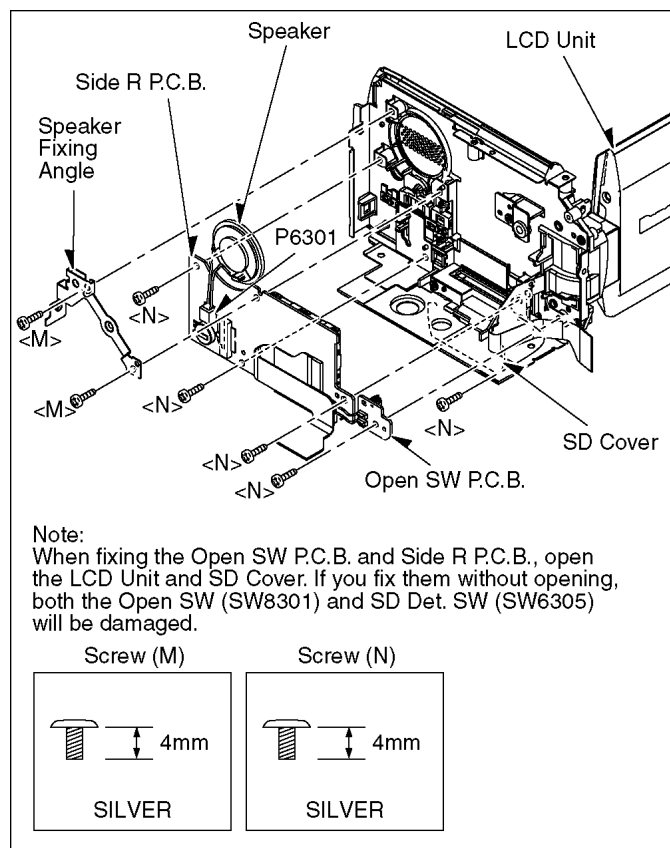


Fig. D11

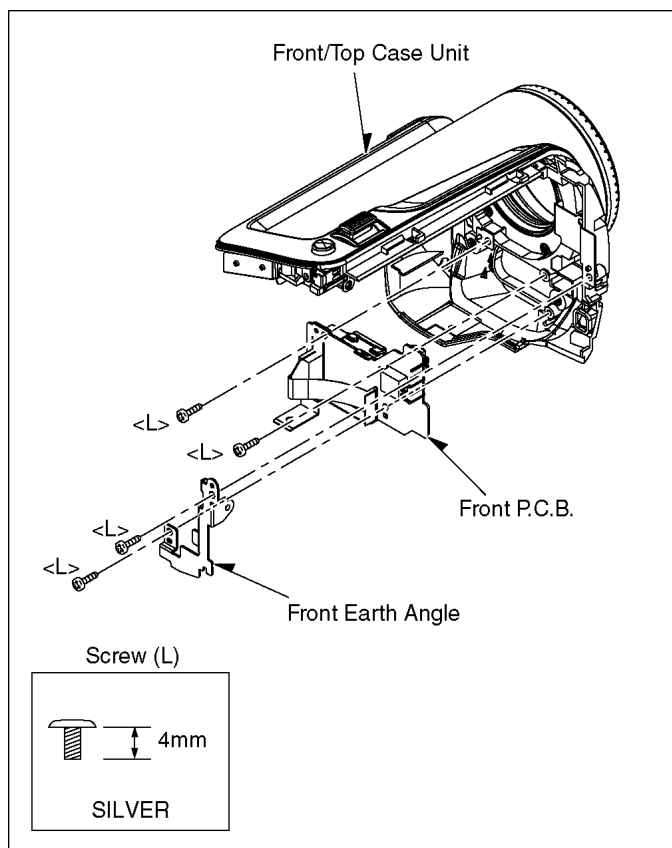


Fig. D10

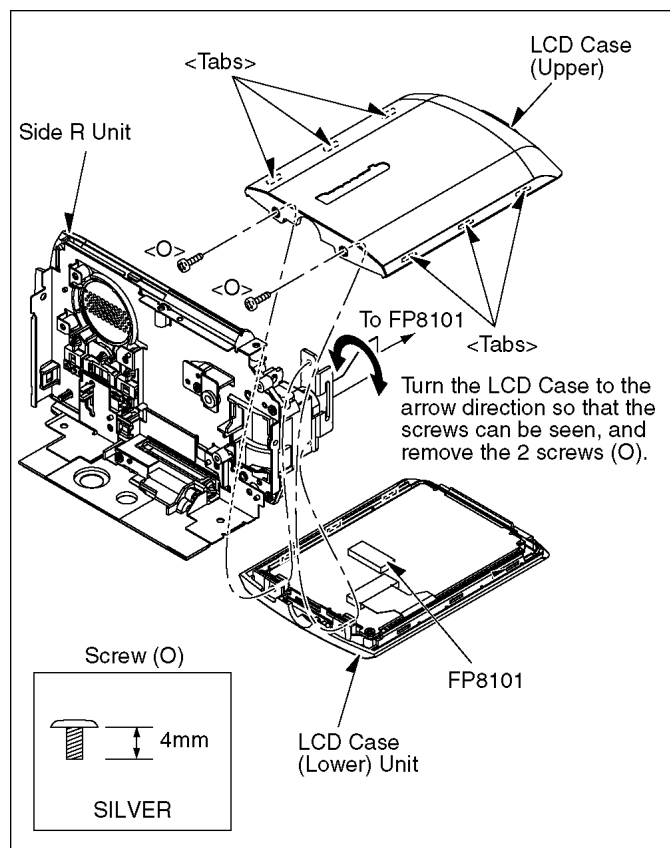


Fig. D12

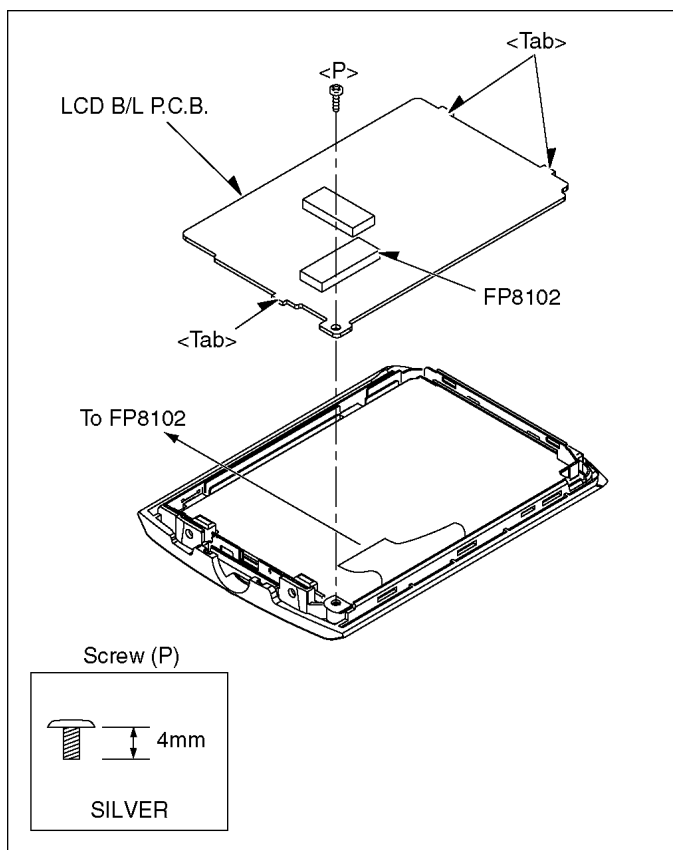


Fig. D13

9 Measurements and Adjustments

9.1. Electrical Adjustment

9.1.1. 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.

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

Note: ○ : Adjustment Item

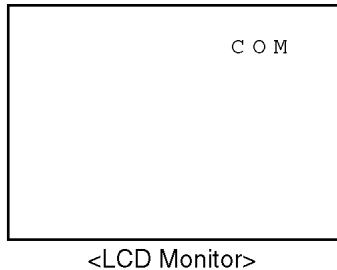
9.1.2. Installation of USB-SERIAL driver

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

9.1.3. COM Mode

If a SD Card is inserted, remove it before operation.

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



9.1.4. 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 "khd2007.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".

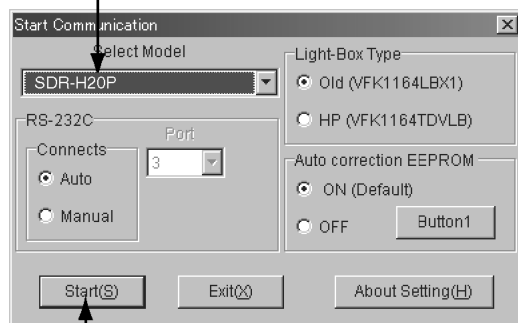
Note:

When the camcorder does not power on, turn the power on with forced power on function.

<How to turn the power on with forced power on function >

Push and hold the [MENU] and [JOYSTICK CONTROL RIGHT], then set [POWER SW] to ON until the power is turned on.

① Select the appropriate model.



② Click to start.

Fig. E2-1

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.

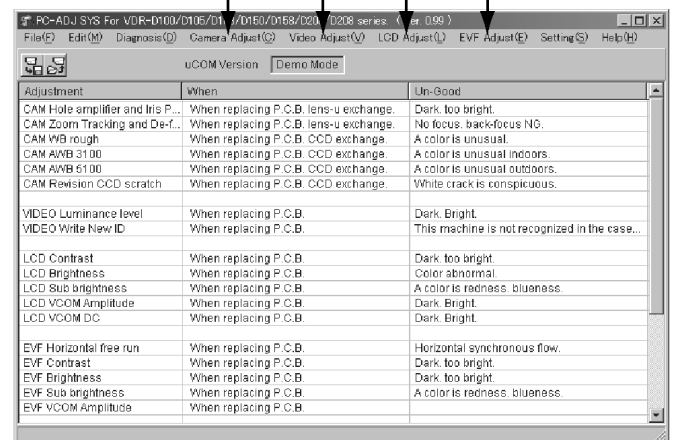


Fig. E2-3

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.

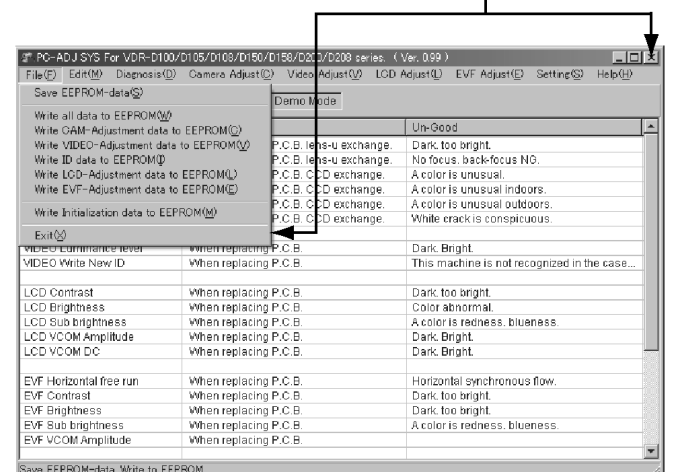


Fig. E2-4

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

9.1.5. How to confirm "OneNAND-Flash ROM Error"

If there is a problem with Flash ROM (IC3203), the unit does not turn the power on.

(Problem: When the power SW is turned on, the power LED lights for 3 seconds and goes out. The power can not be turned on again.)

If this problem occurs, check if the Flash ROM (IC3203) has a problem in the following procedure.

1. Start PC-EVR Adjustment Program.

Refer to "8.1.4. Set up of PC-EVR Adjustment Program" and start PC-EVR Adjustment Program.

2. Select the "Diagnosis"

- ① Select the "Diagnosis"

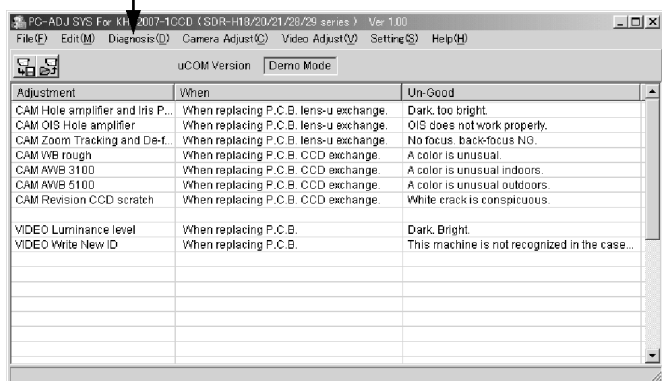


Fig. E2-5

3. Select the "Lock Info"

- ② Select the "Lock Info"

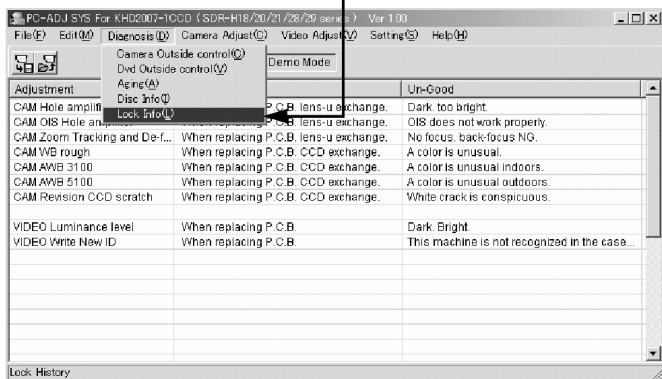


Fig. E2-6

4. Confirm the OneNAND-Flash ROM Error information.

OneNAND-Flash ROM Error information

No Error : Flash ROM (IC3203) is normal.

Fatal Error : Flash ROM (IC3203) is defective.

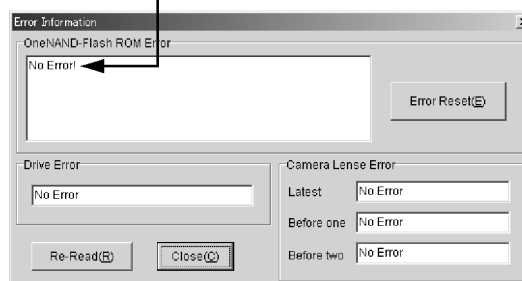


Fig. E2-7

5. If "Fatal Error" is displayed, Flash ROM (IC3203) is defective. Replace Main P.C.B.

Note:

This error information is recorded on EEPROM.

Click "Error Reset" to clear the error information after replacing Flash ROM (IC3203).

- ③ Click the "Error Reset"

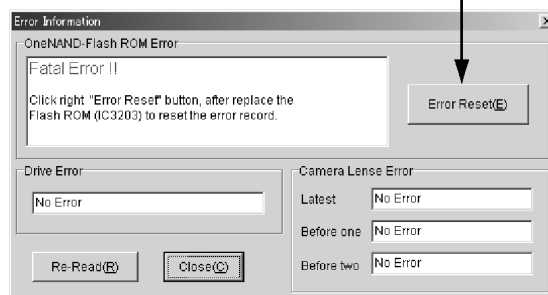


Fig. E2-8

10 Maintenance

10.1. Cleaning Lens and LCD Panel

Do not touch the surface of the lens 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.

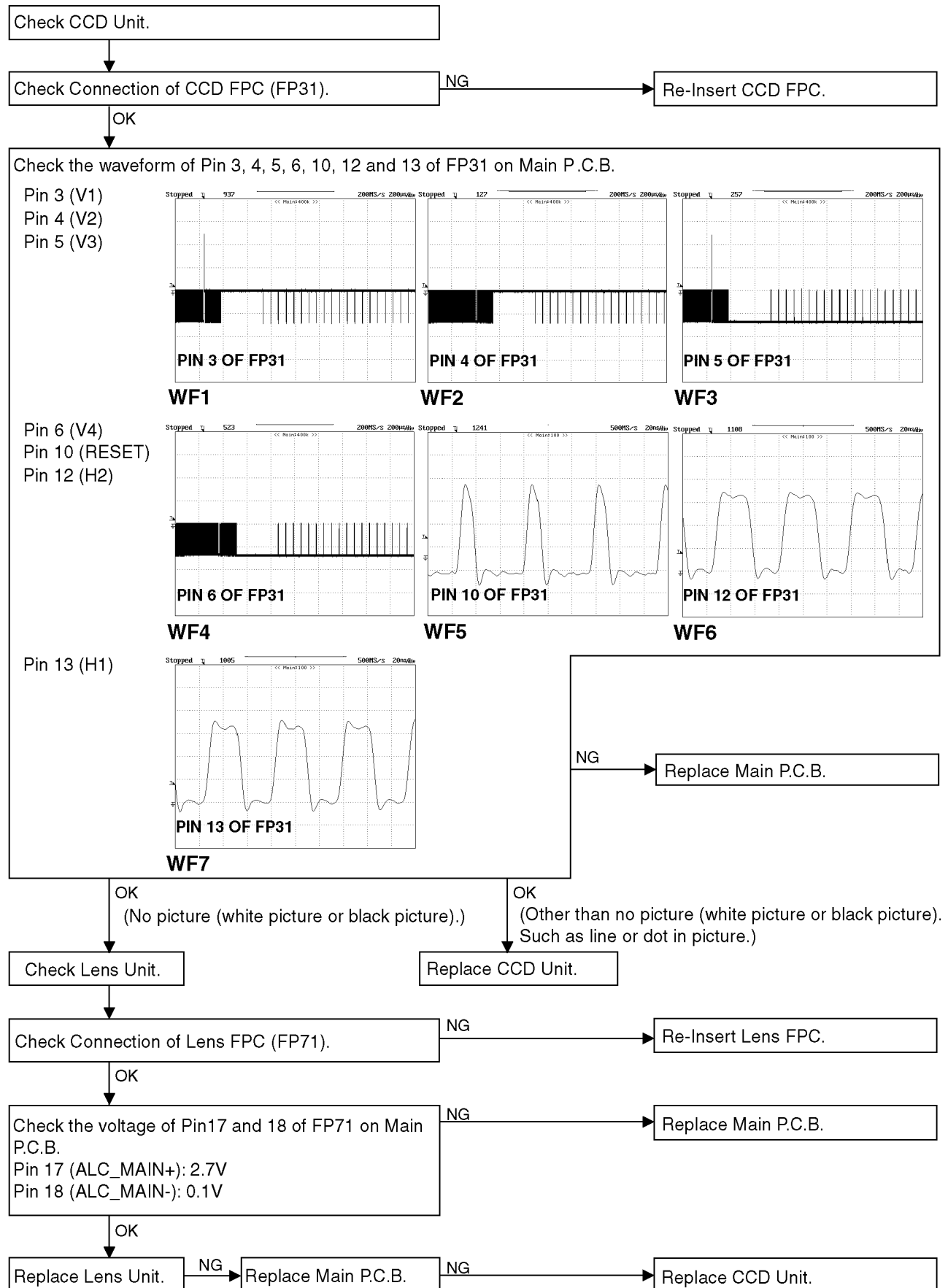
Note:

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

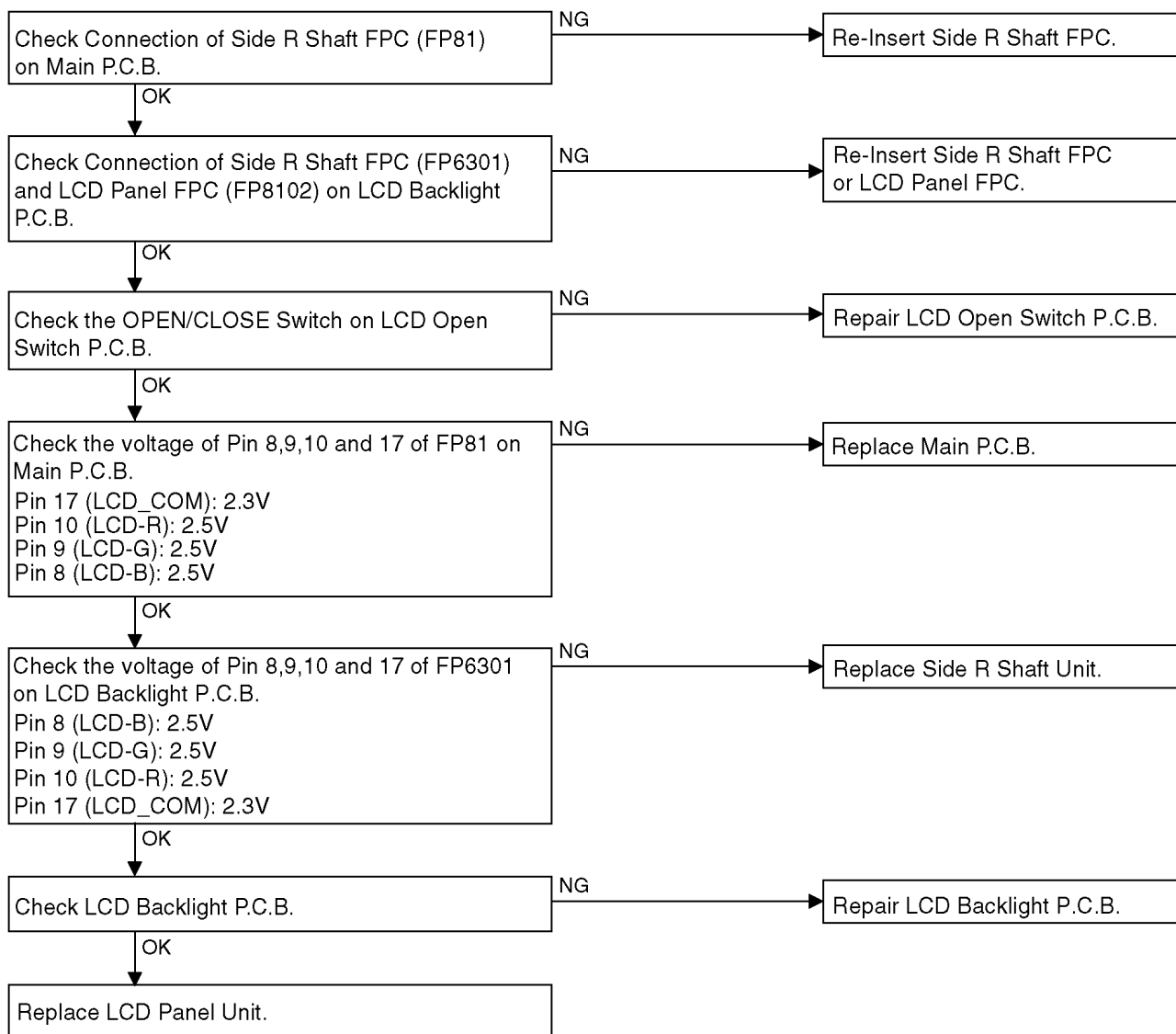
11 Troubleshooting

VIDEO

No picture LCD in Camera Mode

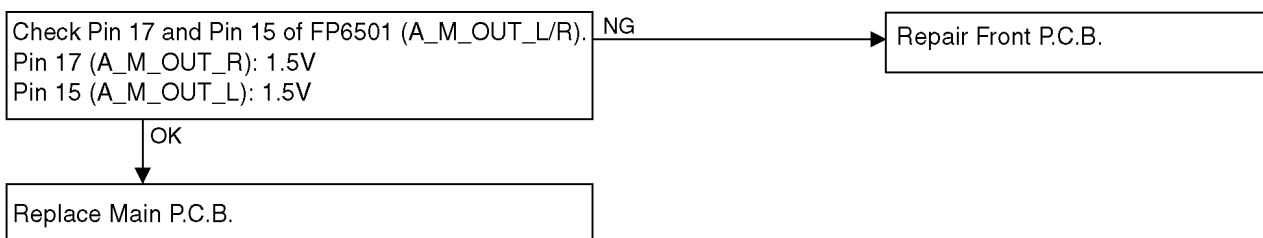


No picture on LCD

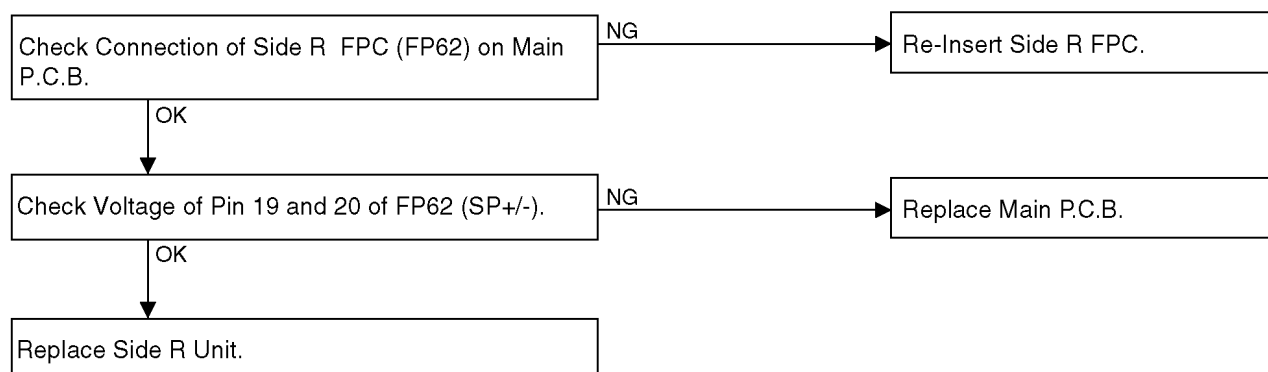


AUDIO

No Audio in Camera Mode

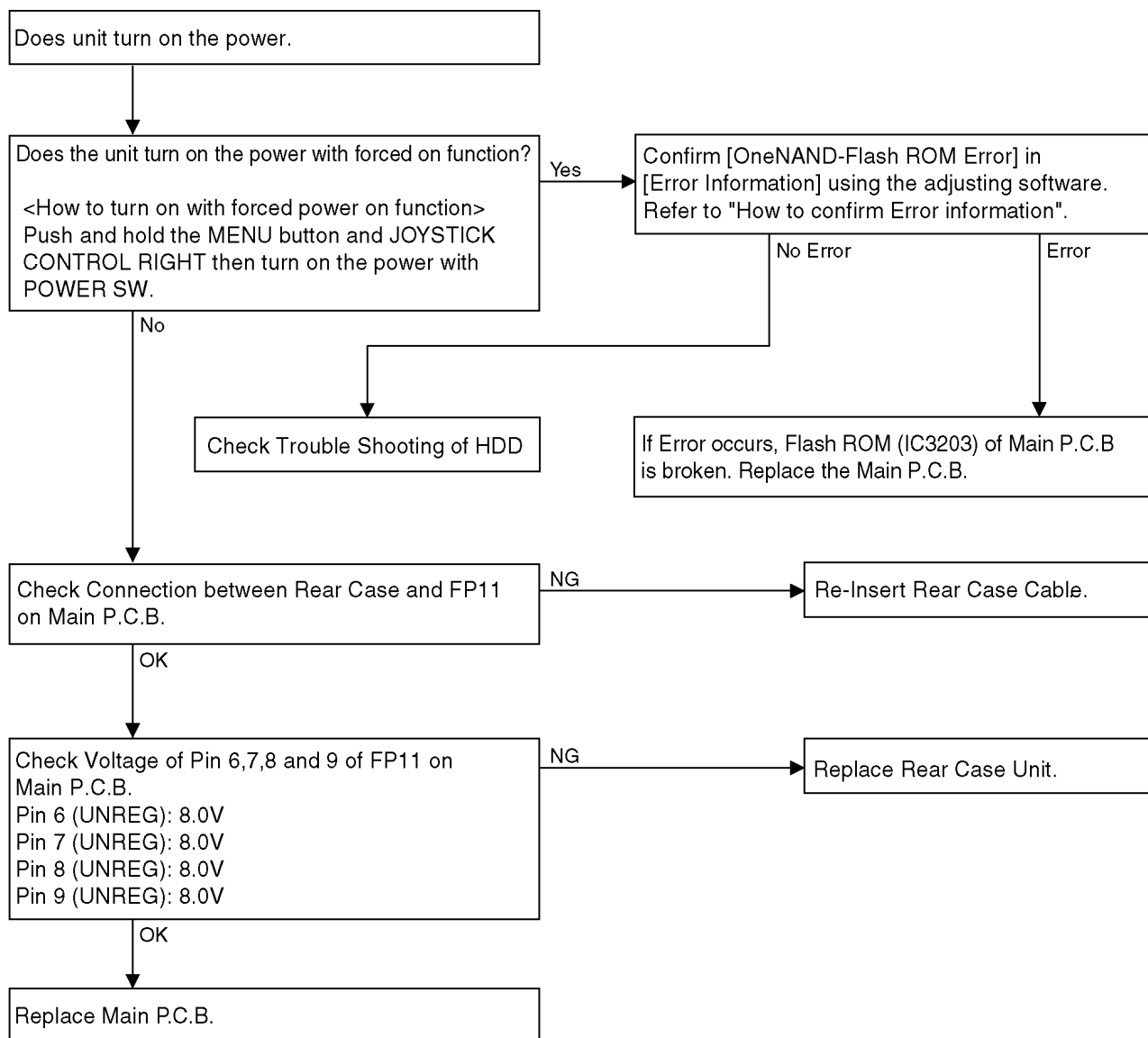


No Audio from Speaker (When AV Jack is normal)



POWER

No power

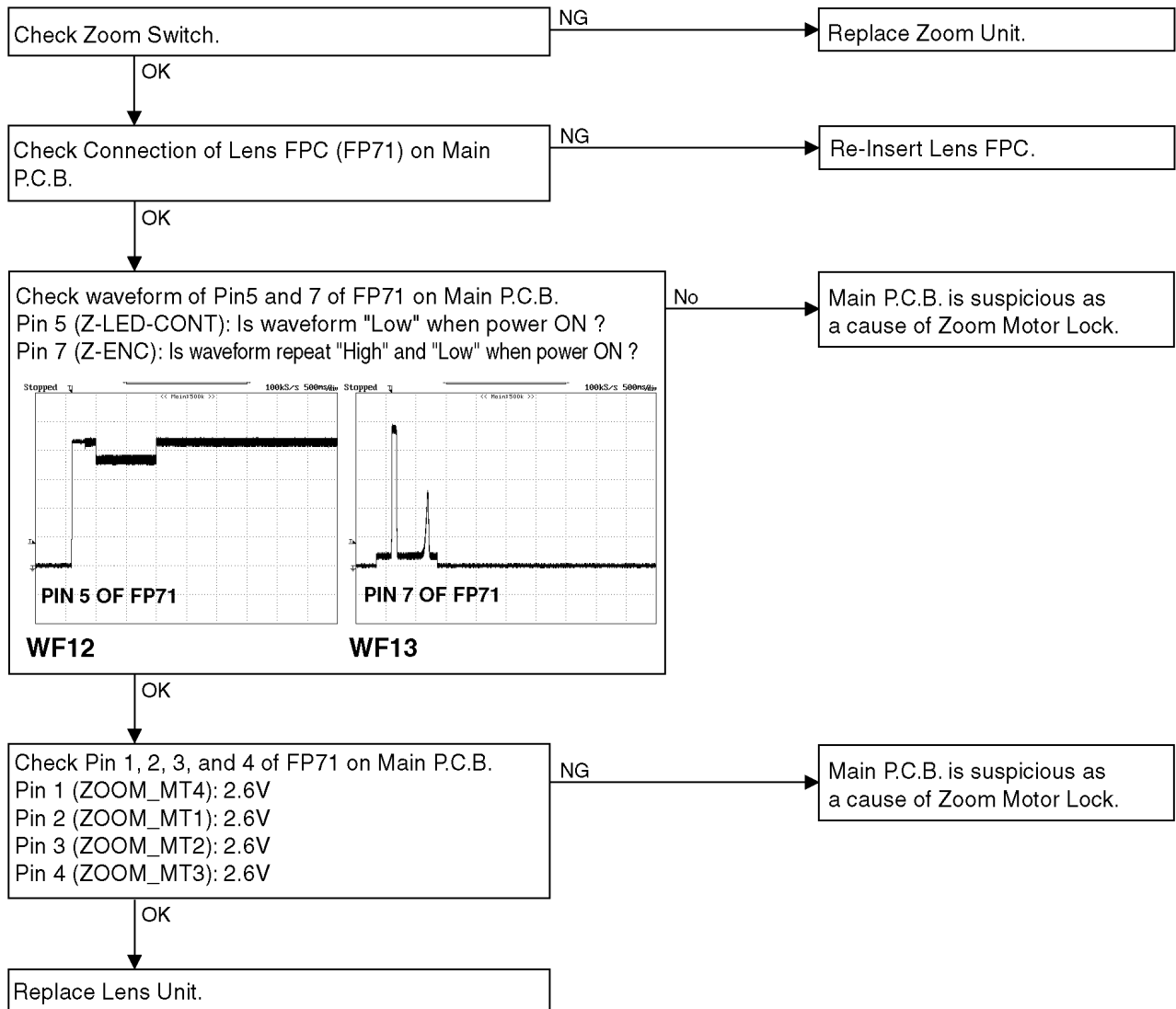


SYSCON

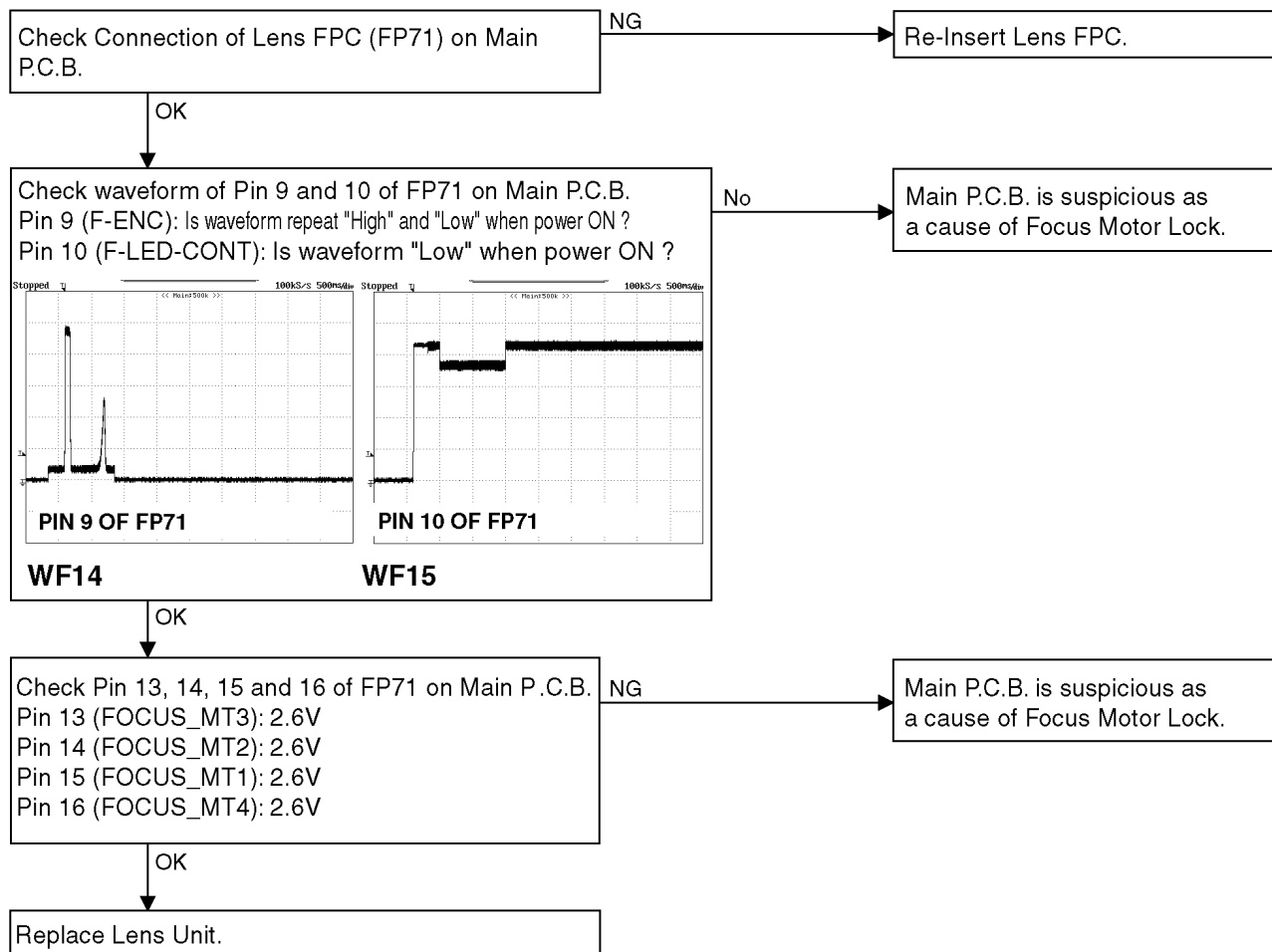
Mechanism & Lens Motor lock code is displayed in Service Menu

(Refer to "Service Menu.")

Zoom Motor Lock (Zoom does not work)



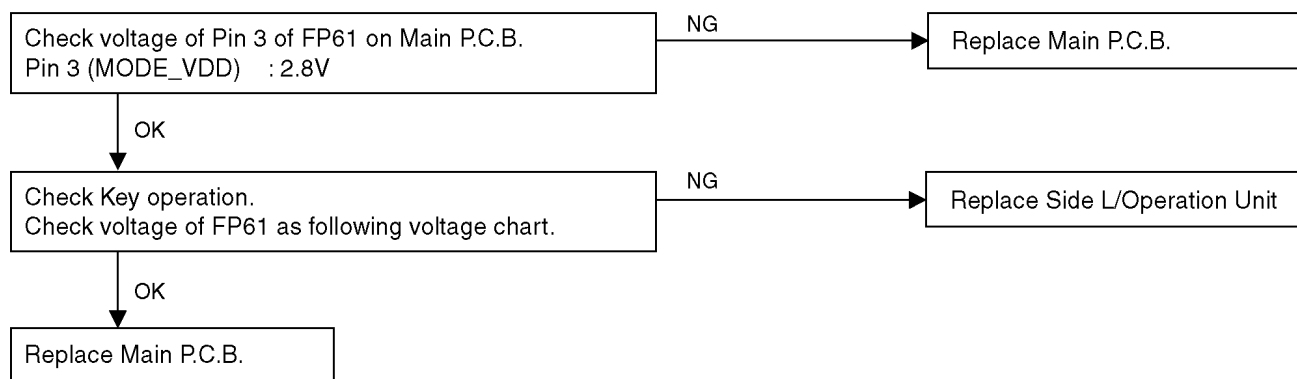
Focus Motor Lock (Focus does not work)



Communication error between CAMERA and ARM

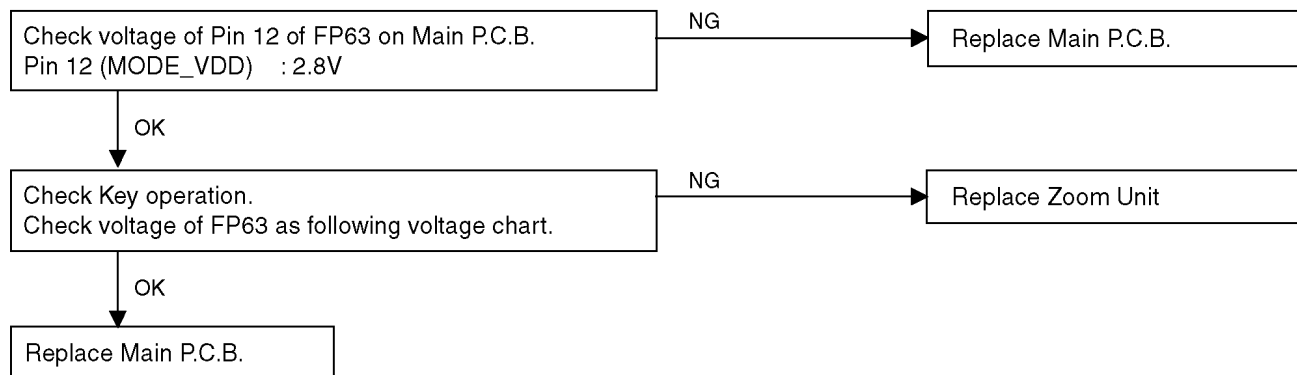
Replace Main P.C.B.

Operation Key on Side L/Operation Unit does not work



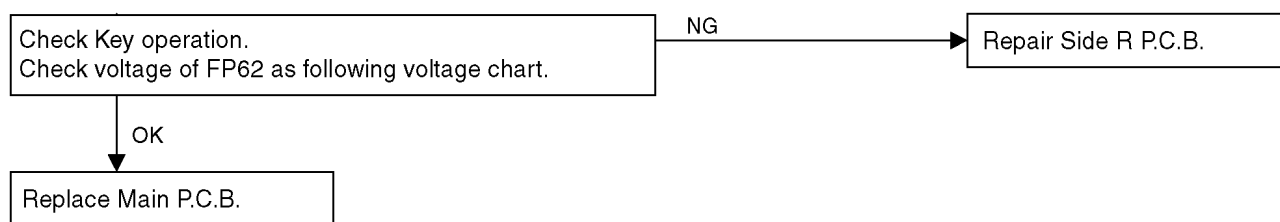
Operation Key	Pin No. of FP61	When push or select
DELETE	Pin 1	0V
MENU	Pin 1	1.3V
JOYSTICK DIAL (ENTER)	Pin 1	2V
START/STOP	Pin 2	0V
JOYSTICK DIAL (DOWN)	Pin 4	0V
JOYSTICK DIAL (RIGHT)	Pin 4	0.6V
JOYSTICK DIAL (LEFT)	Pin 4	1.3V
JOYSTICK DIAL (UP)	Pin 4	2V
MODE DIAL (HDD REC)	Pin 6	2.8V
MODE DIAL (HDD PLAY)	Pin 6	1.9V
MODE DIAL (SD CARD REC)	Pin 6	1V
MODE DIAL (SD CARD PLAY)	Pin 6	0V
POWER SW (ON)	Pin 10	0V

Operation Key on Top Operation Unit does not work



Operation Key	Pin No. of FP63	When push or select
PHOTO	Pin 10	0V
ZOOM (TELE)	Pin 14	2.8V
ZOOM (WIDE)	Pin 14	0V

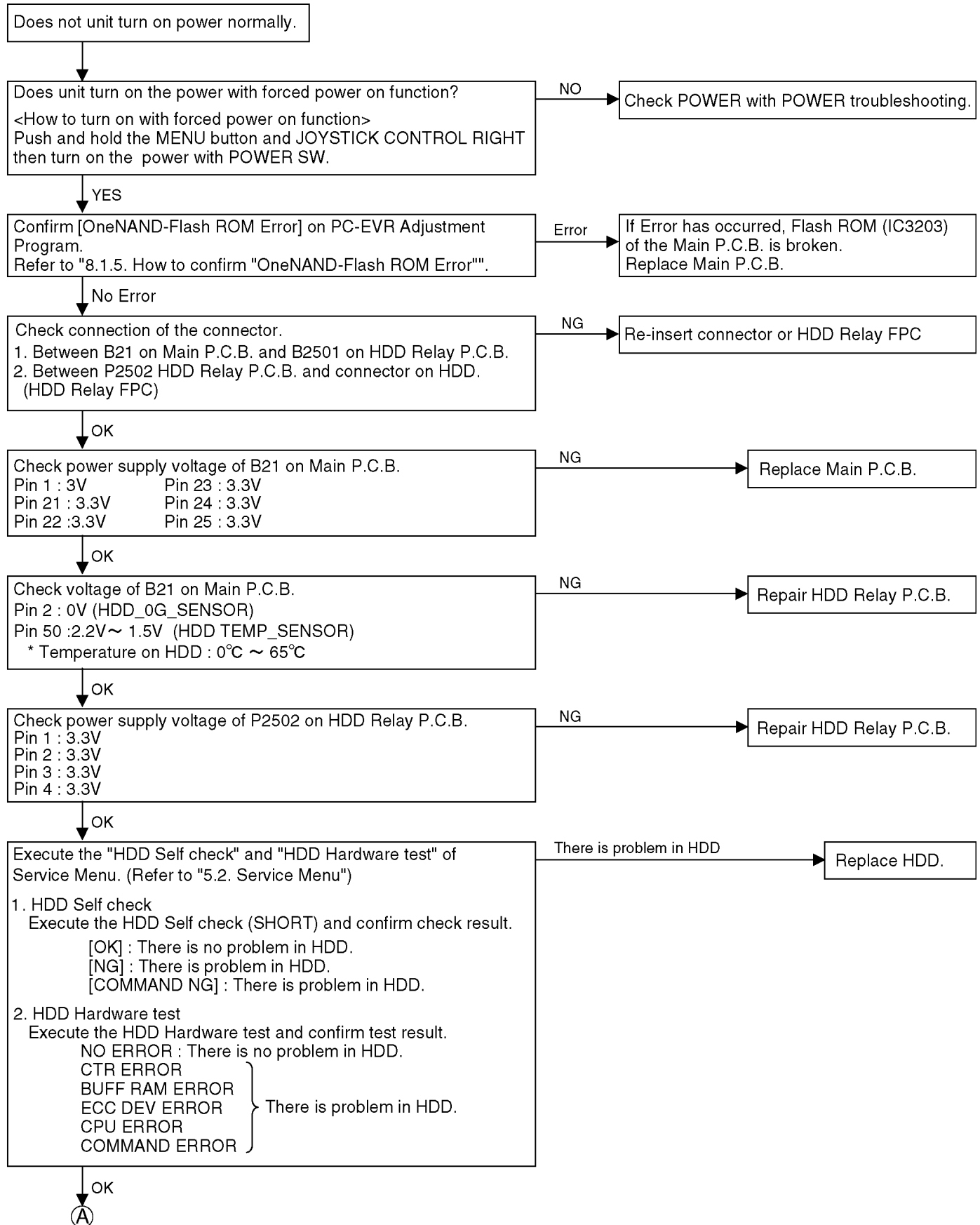
Operation Key on Side R Unit does not work

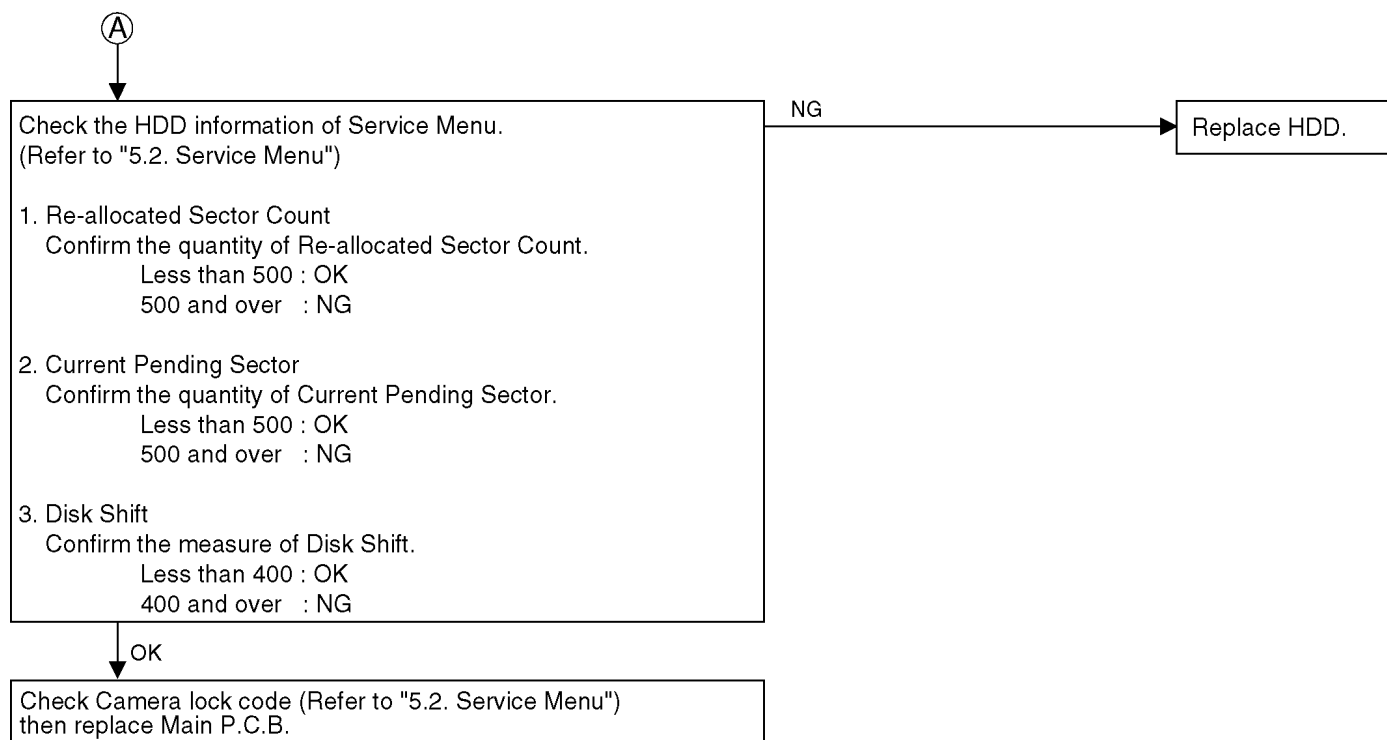


Operation Key	Pin No. of FP62	When push or select
DVD COPY	Pin 13	0V
RESET	Pin 14	0V
POWER LCD PLUS	Pin 16	0V
SD DOOR (CLOSE)	Pin 23	0V

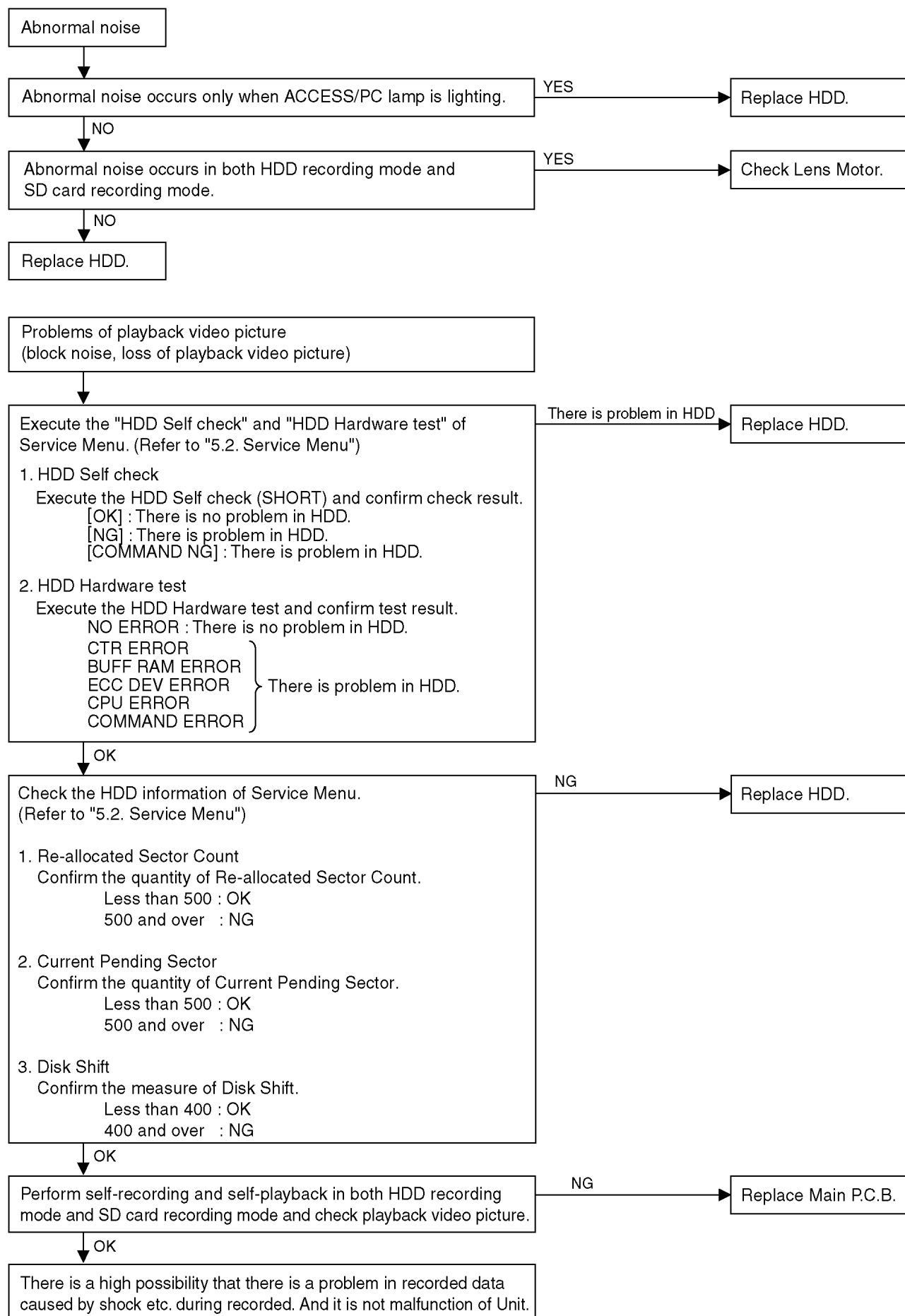
HARD DISK DRIVE

How to confirm which there is malfunction in Main P.C.B. or HDD.





How to confirm which there is malfunction in HDD or other part.



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

MAIN P.C.B.

MODE PIN NO.	REC
B21	
1	3.0
2	3.0
3	0
4	0
5	0
6	0
7	0.6
8	0.6
9	1.0
10	0.6
11	0.6
12	0.6
13	0.6
14	0
15	0
16	3.3
17	0
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
30	3.3
31	0
32	3.3
33	3.3
34	0
35	3.3
36	0
37	0
38	2.0
39	1.0
40	0.9
41	2.0
42	0.6
43	0.6
44	2.2
45	0.6
46	0
47	0
48	0
49	0
50	2.9
FP11	
1	2.9
2	0

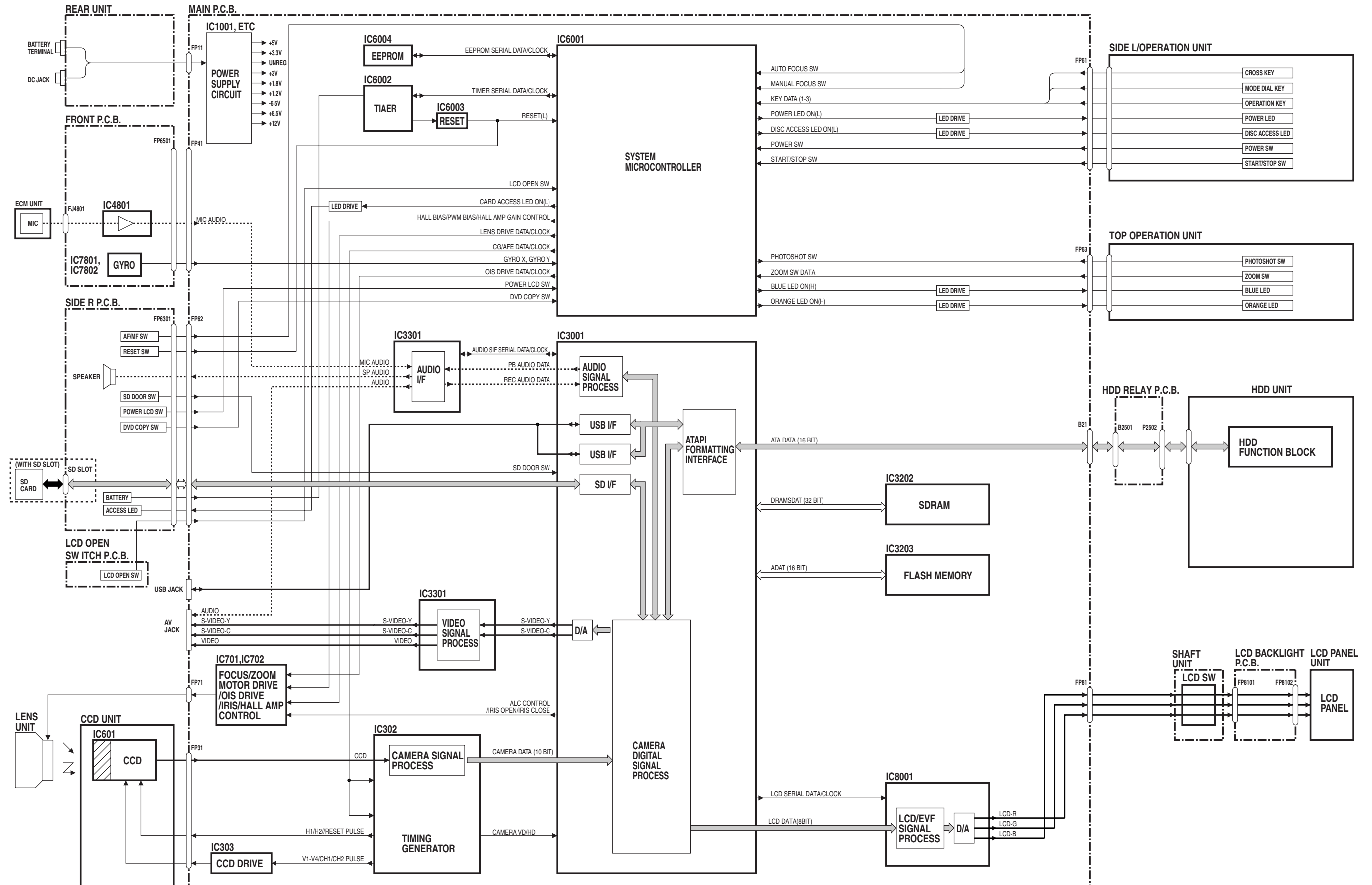
MODE PIN NO.	REC
3	0
4	0
5	0
6	8.0
7	8.0
8	8.0
9	8.0
FP31	
1	8.2
2	0
3	-0.2
4	-0.2
5	-6.0
6	-6.0
7	0
8	0
9	12.0
10	6.0
11	-6.4
12	1.3
13	1.6
14	6.8
FP41	
1	4.8
2	1.5
3	0
4	1.5
5	0
6	0
7	0
8	0
9	0
10	4.9
11	4.9
12	2.5
13	2.5
14	3.0
15	1.5
16	1.4
17	0
18	0
FP61	
1	2.9
2	2.8
3	2.9
4	2.9
5	---
6	2.9
7	---
8	0
9	---
10	0
11	---
12	0

MODE PIN NO.	REC
13	---
14	0
15	---
16	1.8
FP62	
1	3.3
2	3.3
3	2.9
4	3.3
5	3.3
6	3.3
7	3.3
8	0
9	0
10	3.3
11	3.3
12	0
13	2.9
14	2.9
15	2.8
16	2.8
17	0
18	0
19	0.5
20	0.9
21	0
22	0
23	0
24	3.2
FP63	
1	4.0
2	4.0
3	---
4	0
5	---
6	4.9
7	4.9
8	4.9
9	---
10	2.8
11	---
12	2.9
13	---
14	1.5
15	---
16	0
FP71	
1	1.5
2	1.5
3	1.5
4	1.5
5	4.3
6	4.9
7	0

MODE PIN NO.	REC
8	4.9
9	0
10	4.2
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	1.0
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	1.2
12	1.5
FP81	
1	1.4
2	1.4
3	0
4	8.5
5	2.9
6	0
7	0
8	2.6
9	2.6
10	2.6
11	2.6
12	0
13	2.8
14	2.2
15	1.2
16	0
17	2.4
18	4.8
19	4.8
20	1.4
21	0
22	0
23	0
24	2.9

13 Block Diagrams

OVERALL BLOCK DIAGRAM



OVERALL BLOCK DIAGRAM
SDR-H20E/EB/EE/EF/EG/EP/GC/GN, SDR-H21EE/GC, SDR-H28GK, SDR-H29GK

14 Schematic Diagrams

14.1. 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.

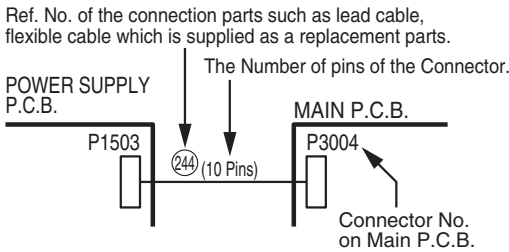
Schematic Diagram Notes

1. Indication for Zener Voltage of Zener Diodes
The Zener Voltages of Zener Diodes are indicated as such on Schematic Diagrams.

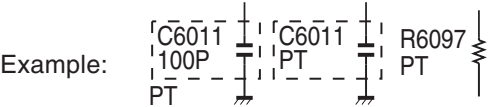
Example:
(6.2V).....Zener Voltage

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.

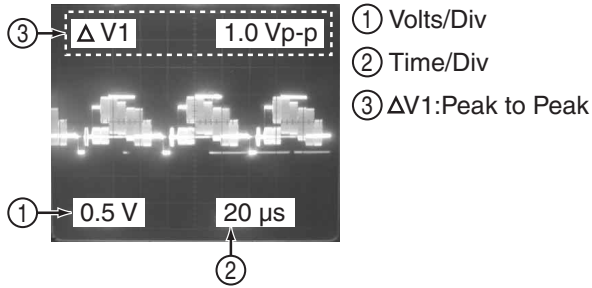


3. Parts marked "PT" are not used in any models included in this service model.



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 No. Identification Mark

COMPARISON CHART OF MODELS & MARKS

MODEL	MARK	MODEL	MARK
SDR-H20EG	A	SDR-H20GN	H
SDR-H20EF	B	SDR-H28GK	I
SDR-H20E	C	SDR-H21EE	J
SDR-H20EP	D	SDR-H21GC	K
SDR-H20EB	E	SDR-H29GK	L
SDR-H20GC	F	Not Used	PT
SDR-H20EE	G		

Note : Refer to item 3 of Schematic Diagram Notes for mark "PT".

Model Number Indication

Model number are indicated without "SDR-H".

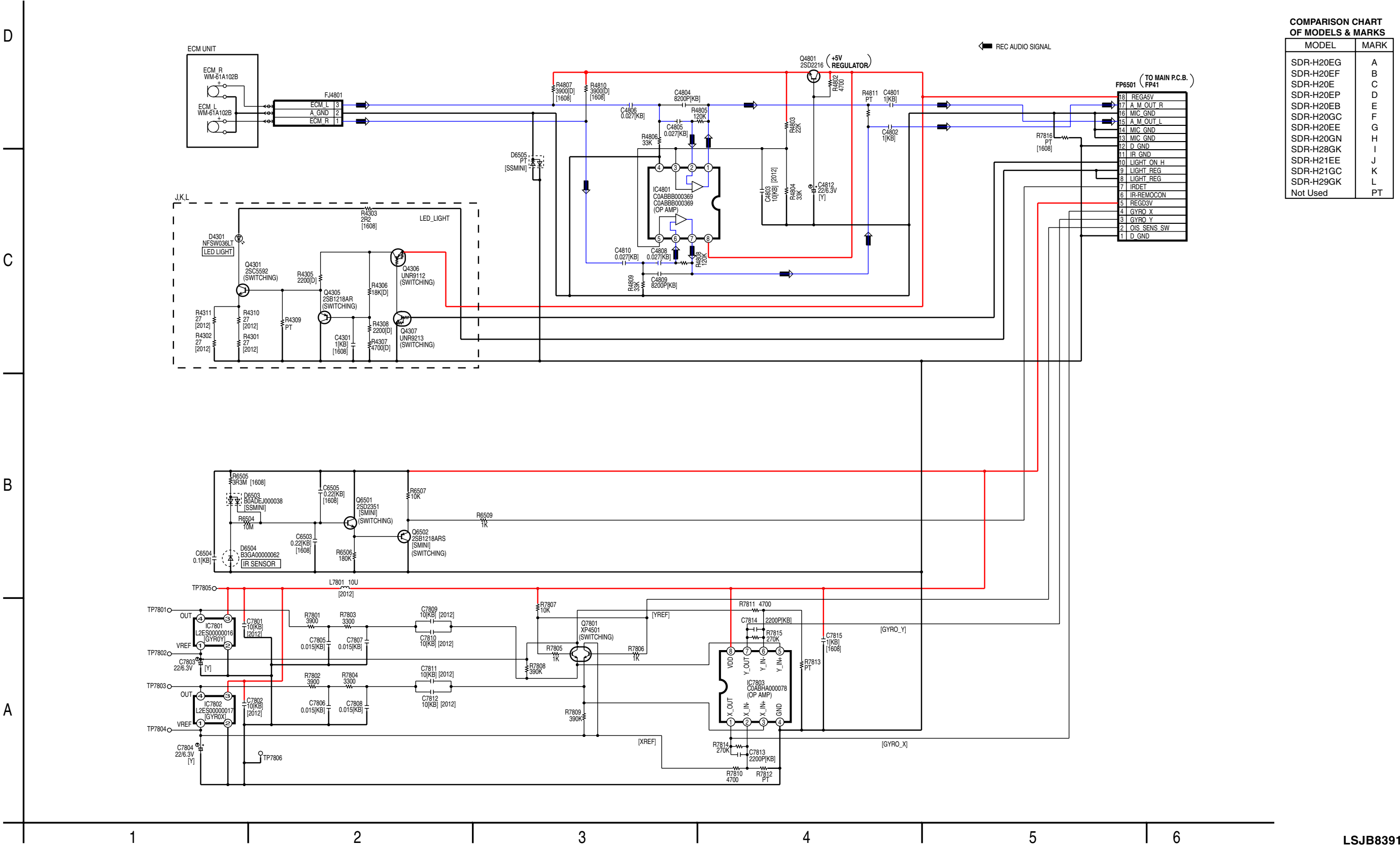
14.2. FRONT SCHEMATIC DIAGRAM

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.



COMPARISON CHART OF MODELS & MARKS	
MODEL	MARK
SDR-H20EG	A
SDR-H20EF	B
SDR-H20E	C
SDR-H20EP	D
SDR-H20EB	E
SDR-H20GC	F
SDR-H20EE	G
SDR-H20GN	H
SDR-H28GK	I
SDR-H21EE	J
SDR-H21GC	K
SDR-H29GK	L
Not Used	PT

14.3. LCD BACKLIGHT SCHEMATIC DIAGRAM

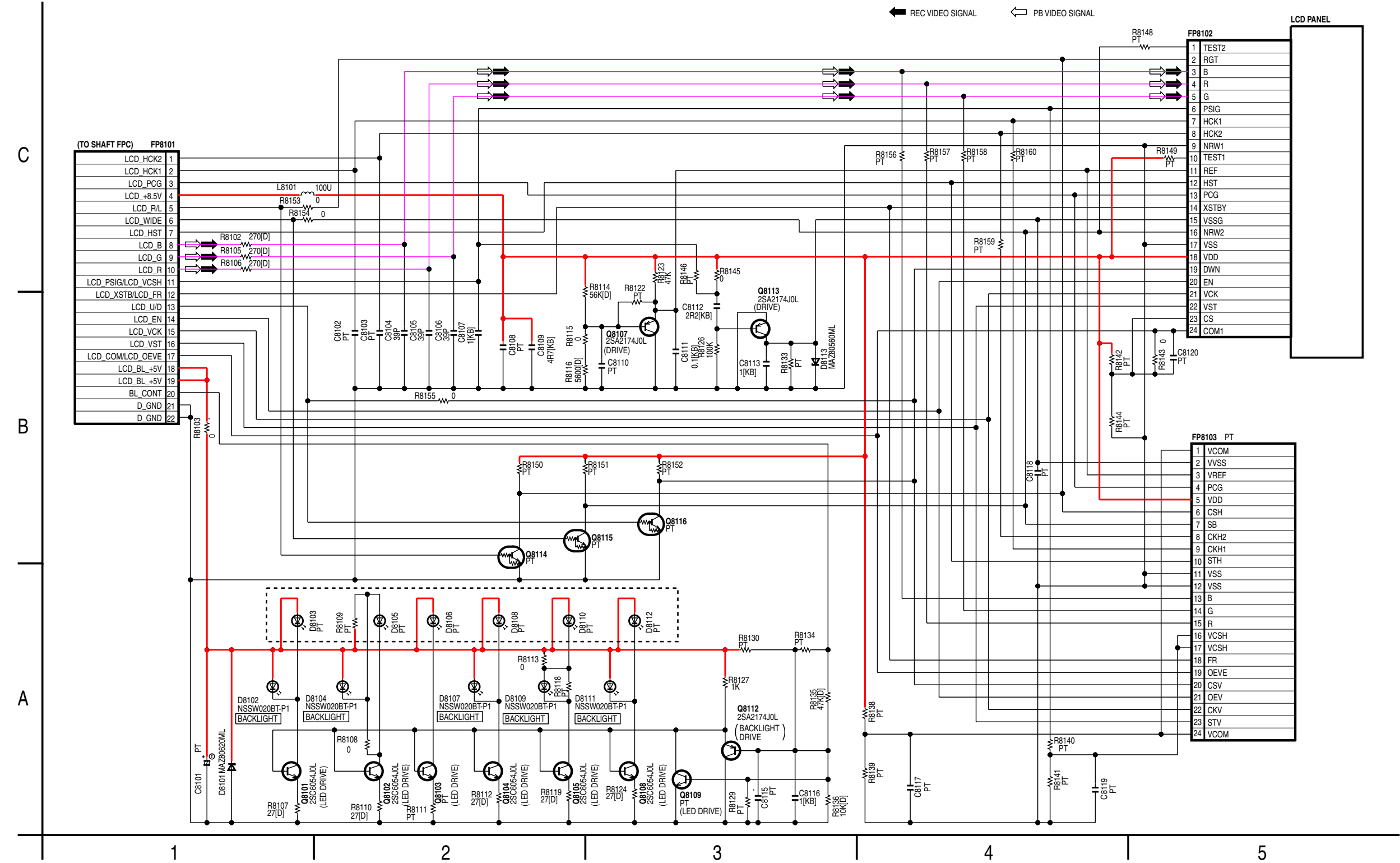
LCD BACKLIGHT SCHEMATIC DIAGRAM

NOTE:
ALL INDIVIDUAL PARTS EXCEPT D8101, D8103, D8105, AND D8107
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.

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.



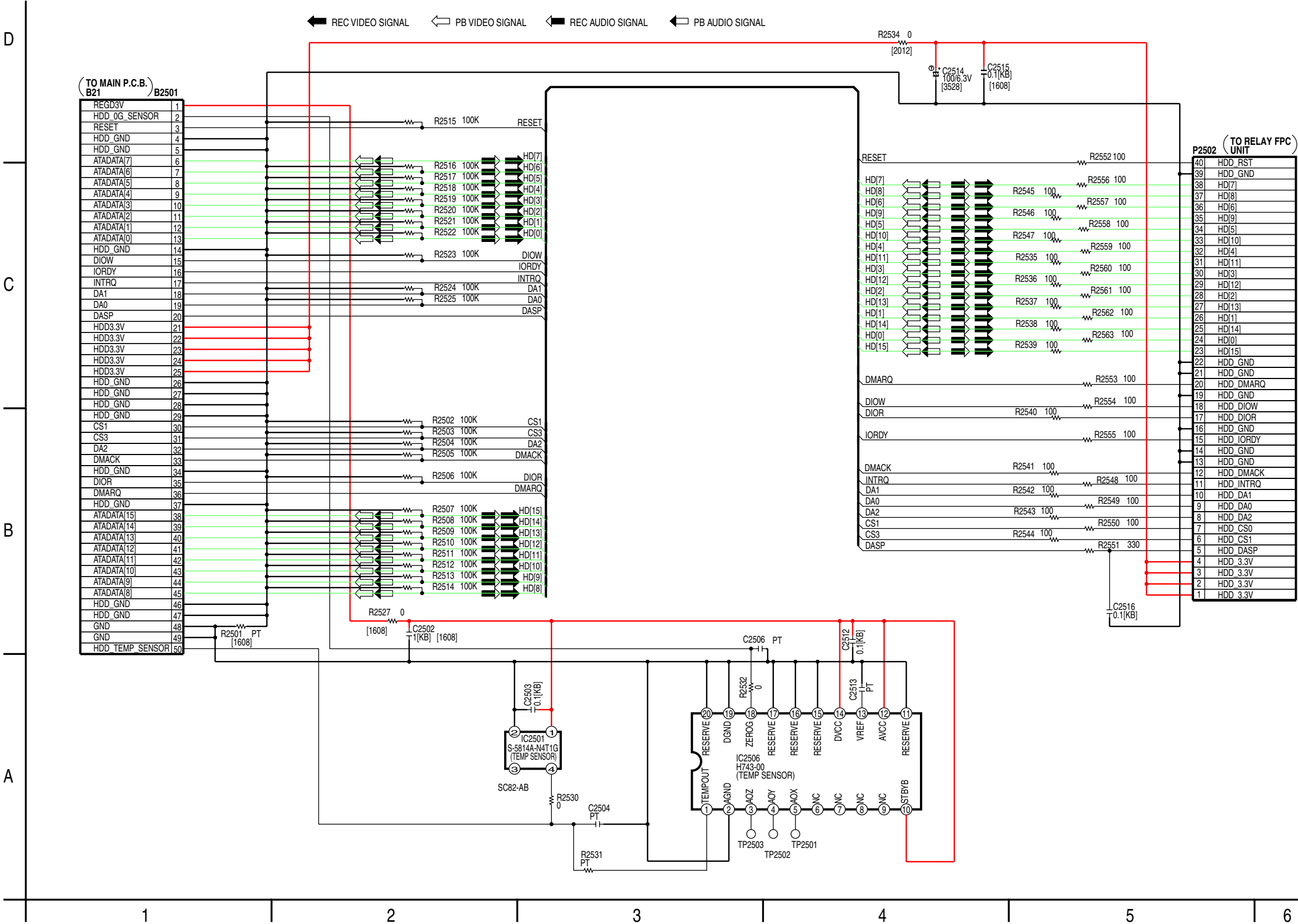
14.4. HDD RELAY SCHEMATIC DIAGRAM

HDD RELAY 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.



14.5. SIDE R / LCD OPEN SWITCH SCHEMATIC DIAGRAM

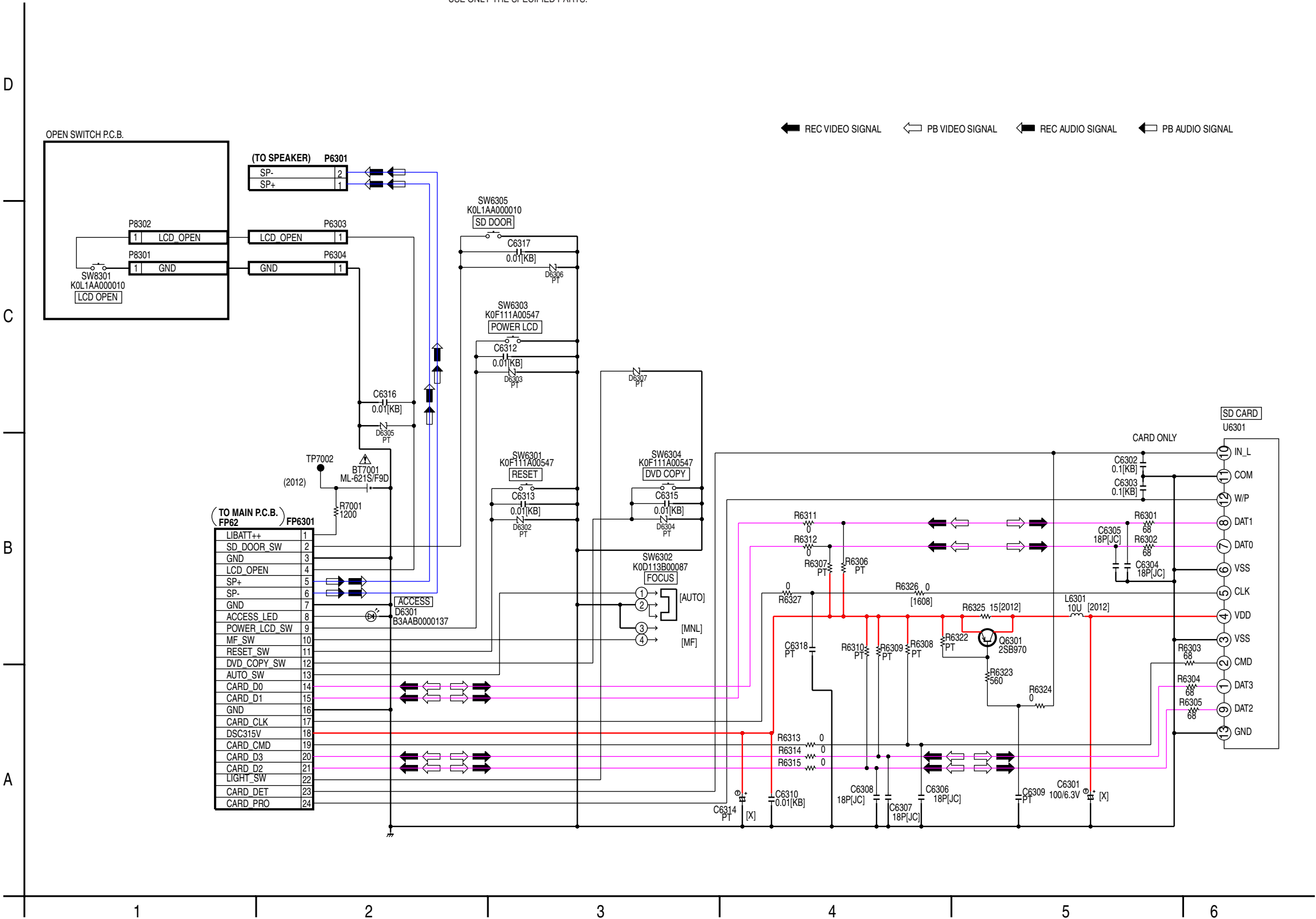
SIDE R/LCD OPEN SWITCH SCHEMATIC DIAGRAM

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.

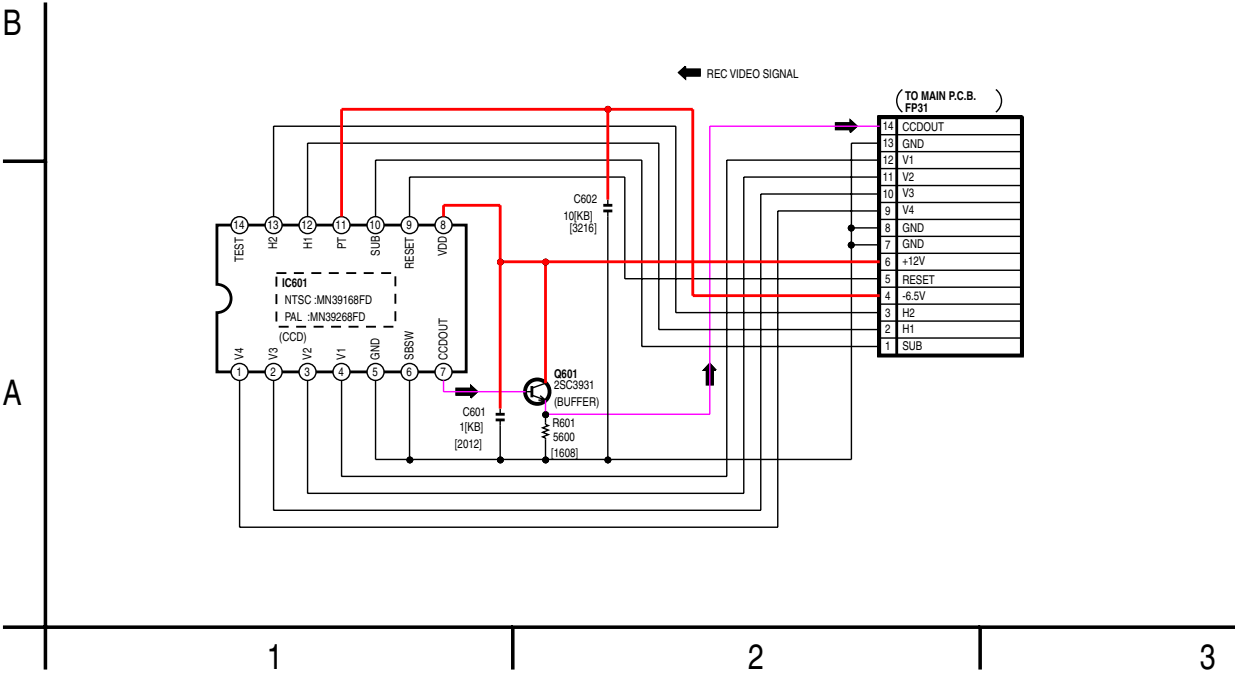
NOTE:
PARTS MARKED "PT" ARE NOT USED.

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

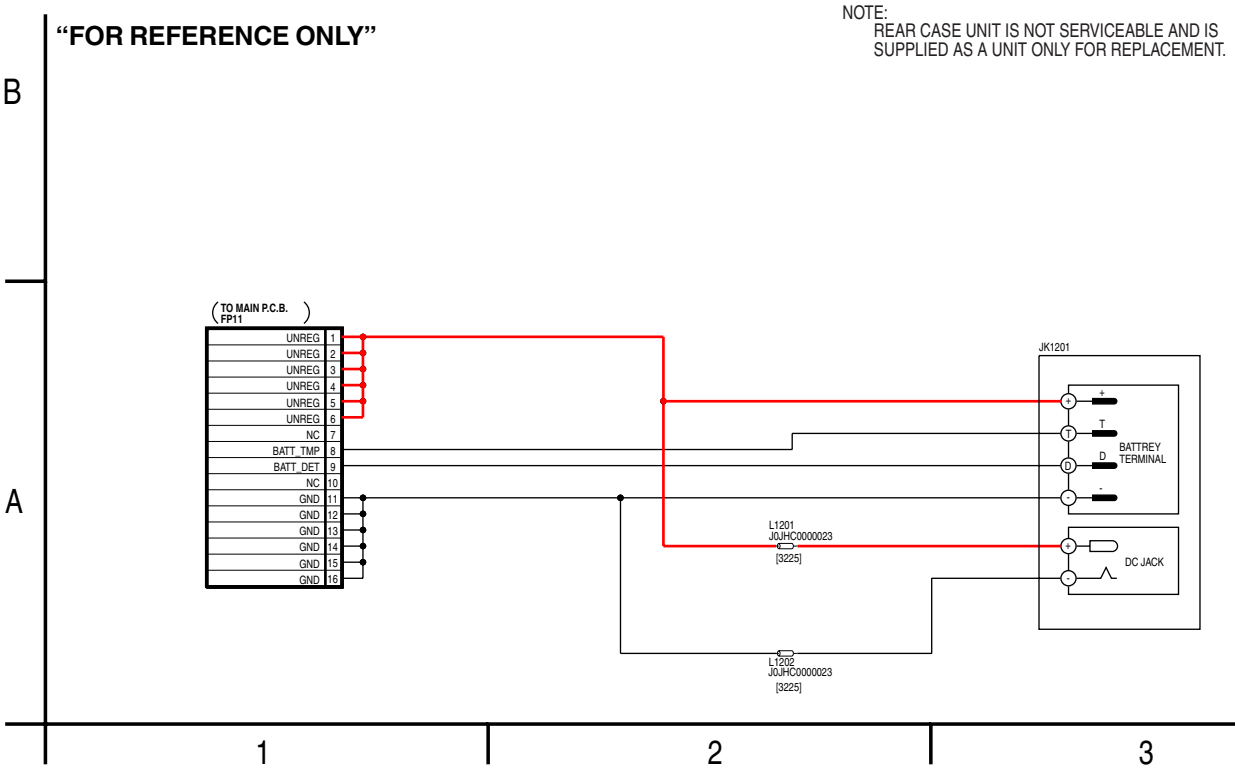


14.6. CCD / REAR CASE / SHAFT FPC / HDD RELAY FPC SCHEMATIC DIAGRAMS

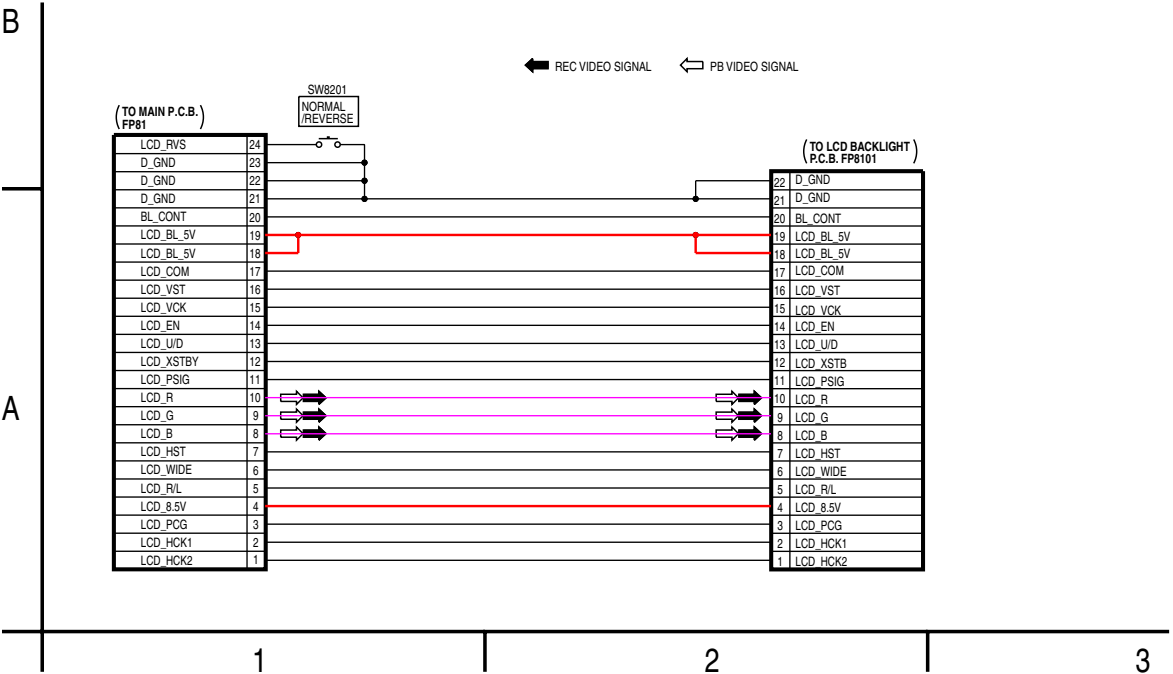
CCD SCHEMATIC DIAGRAM
“FOR REFERENCE ONLY”



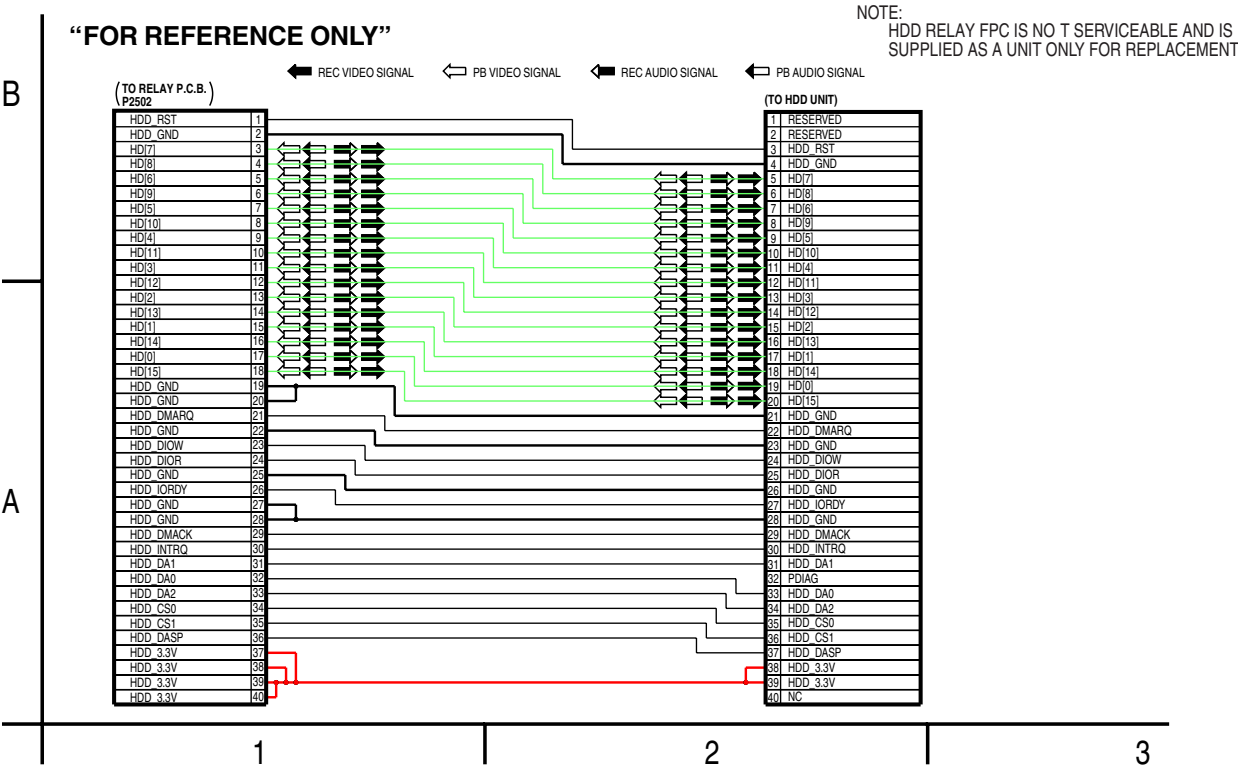
REAR CASE SCHEMATIC DIAGRAM
“FOR REFERENCE ONLY”



SHAFT FPC SCHEMATIC DIAGRAM
“FOR REFERENCE ONLY”



HDD RELAY FPC SCHEMATIC DIAGRAM
“FOR REFERENCE ONLY”



CCD SCHEMATIC DIAGRAM
REAR CASE SCHEMATIC DIAGRAM
SHAFT FPC SCHEMATIC DIAGRAM
HDD RELAY FPC SCHEMATIC DIAGRAM
SDR-H20E/EB/EE/EF/EG/EP/GC/GN, SDR-H21EE/GC, SDR-H28GK, SDR-H29GK

14.7. SIDE L / OPERATION / TOP OPERATION 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.

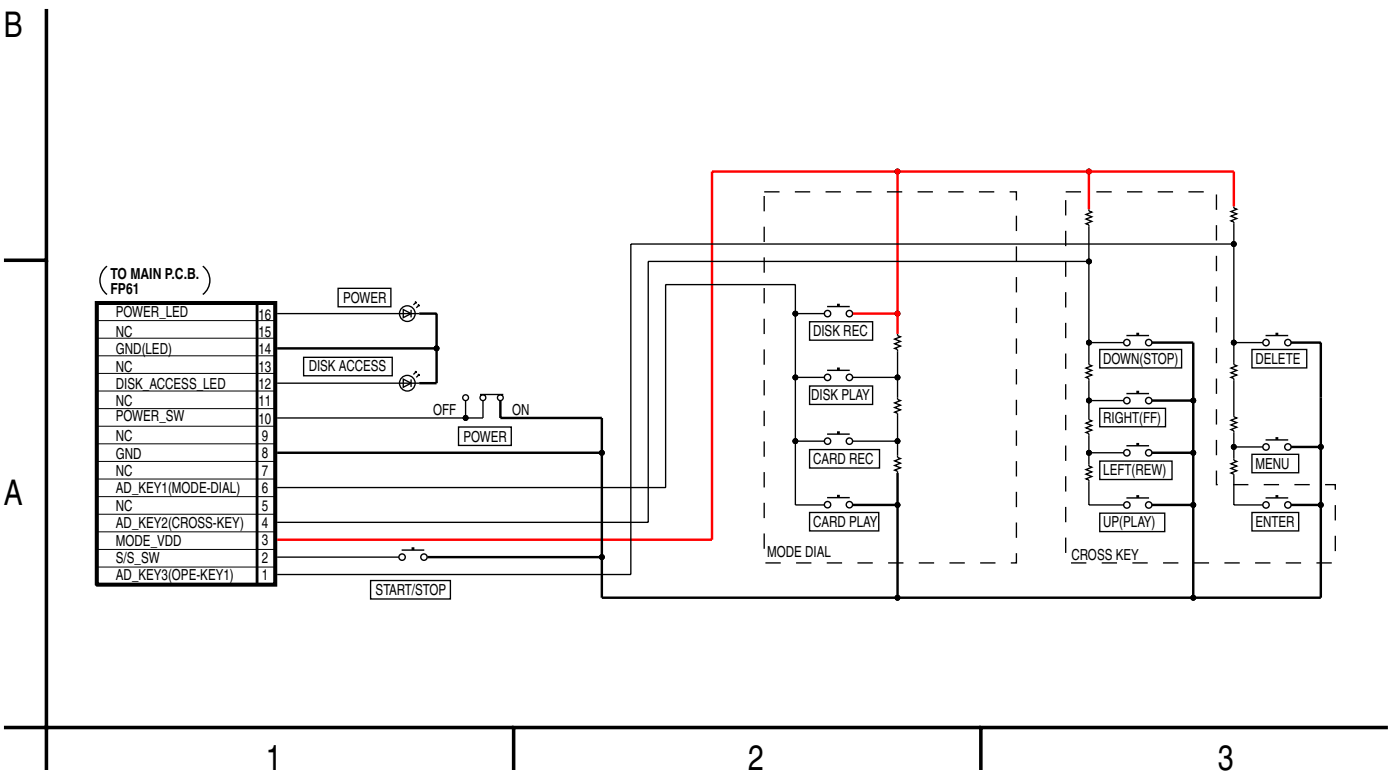
NOTE:
PARTS MARKED "PT" ARE NOT USED.

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

SIDE L / OPERATION SCHEMATIC DIAGRAM

“FOR REFERENCE ONLY”

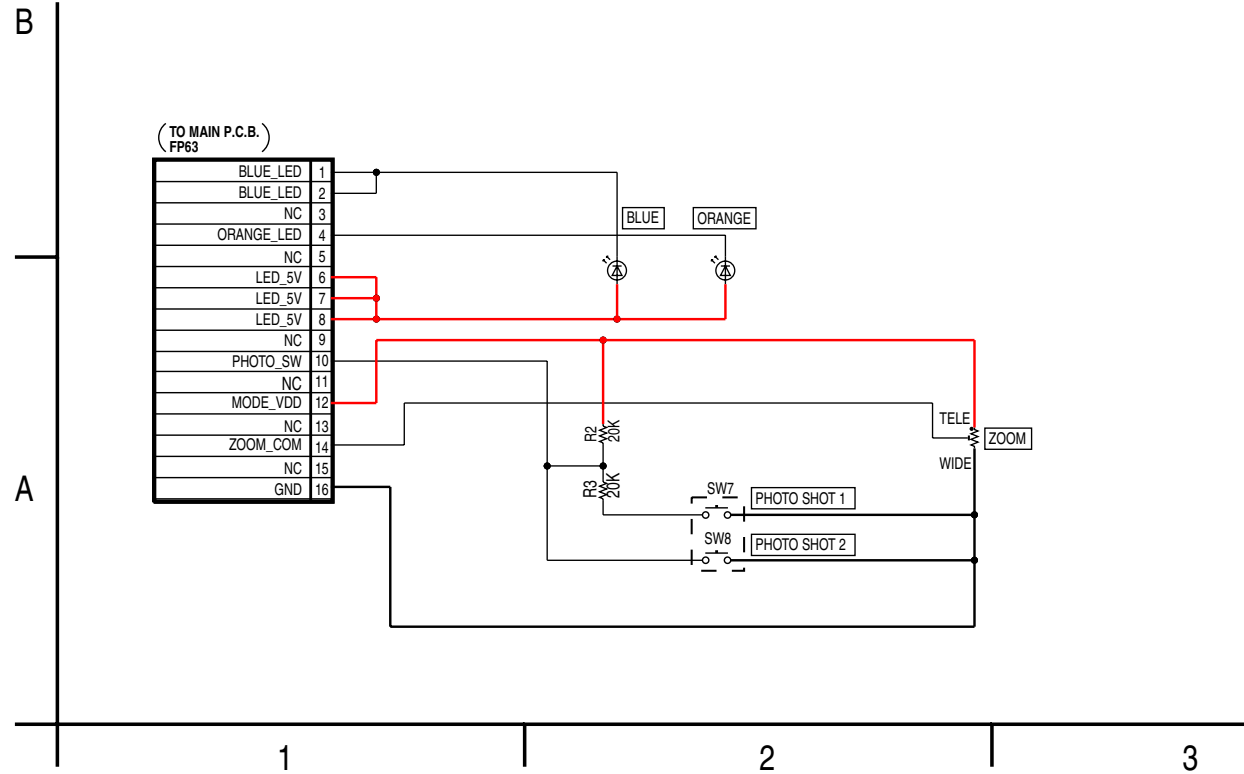
NOTE:
SIDE L/OPERATION IS NOT SERVICEABLE AND IS
SUPPLIED AS A UNIT ONLY FOR REPLACEMENT.



TOP OPERATION SCHEMATIC DIAGRAM

“FOR REFERENCE ONLY”

NOTE:
TOP OPERATION UNIT IS NOT SERVICEABLE AND IS
SUPPLIED AS A UNIT ONLY FOR REPLACEMENT.



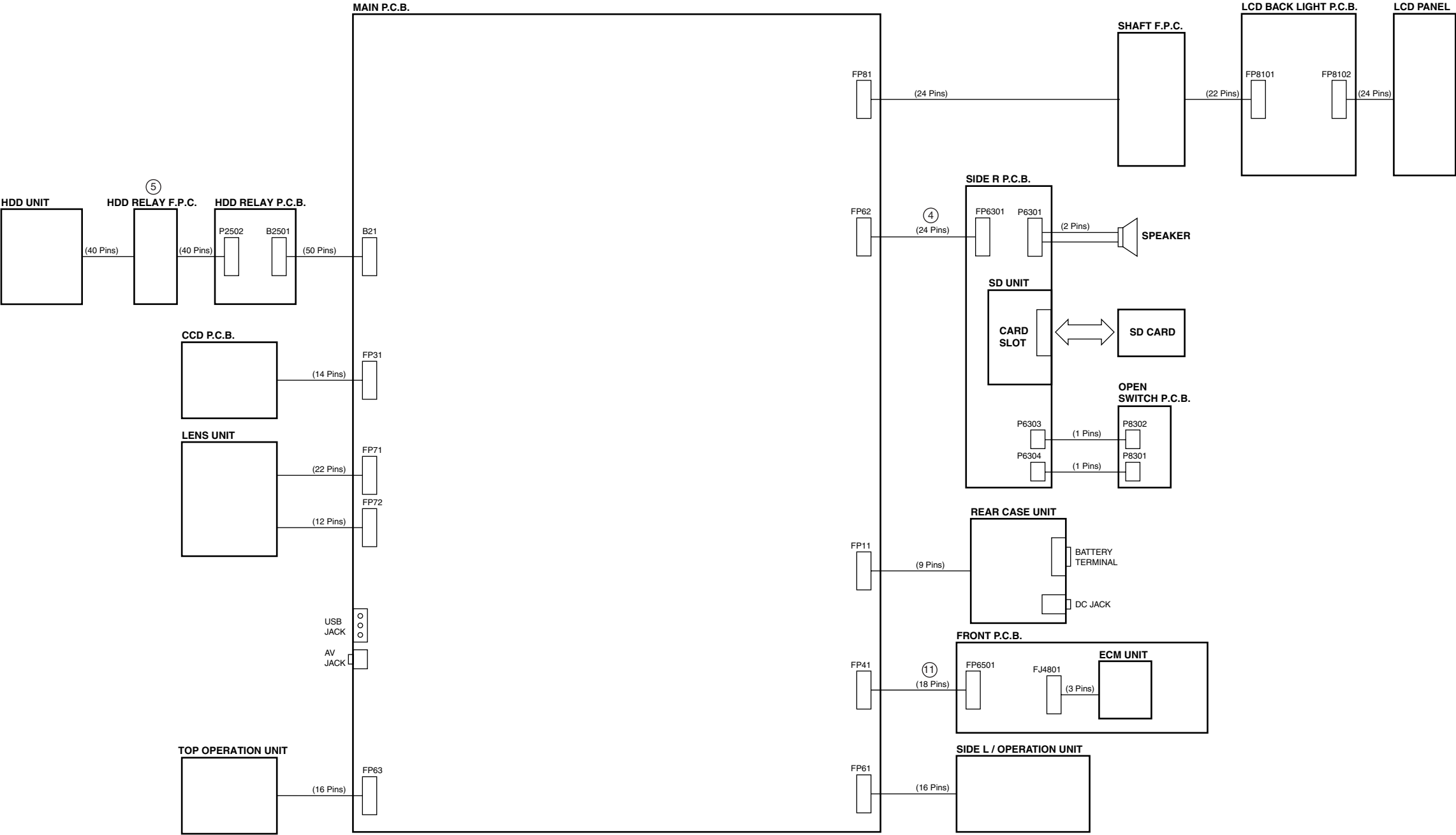
14.8. INTERCONNECTION SCHEMATIC DIAGRAM

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.



15.1. FRONT P.C.B.

**FRONT P.C.B. LSEP8391A1 (A,B,C,D,E,F,G,H,I)
/ LSEP8391C1 (J,K,L)**

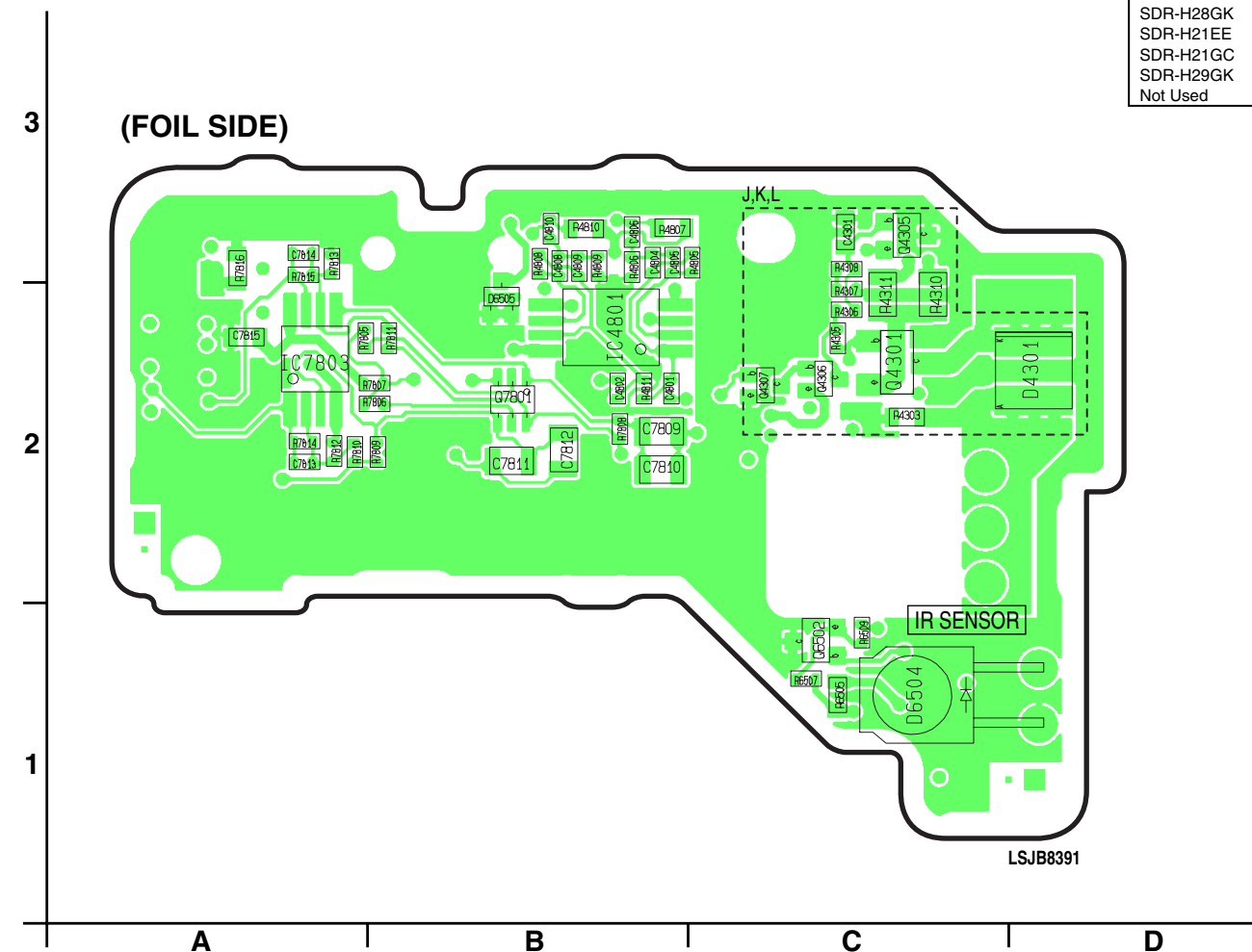
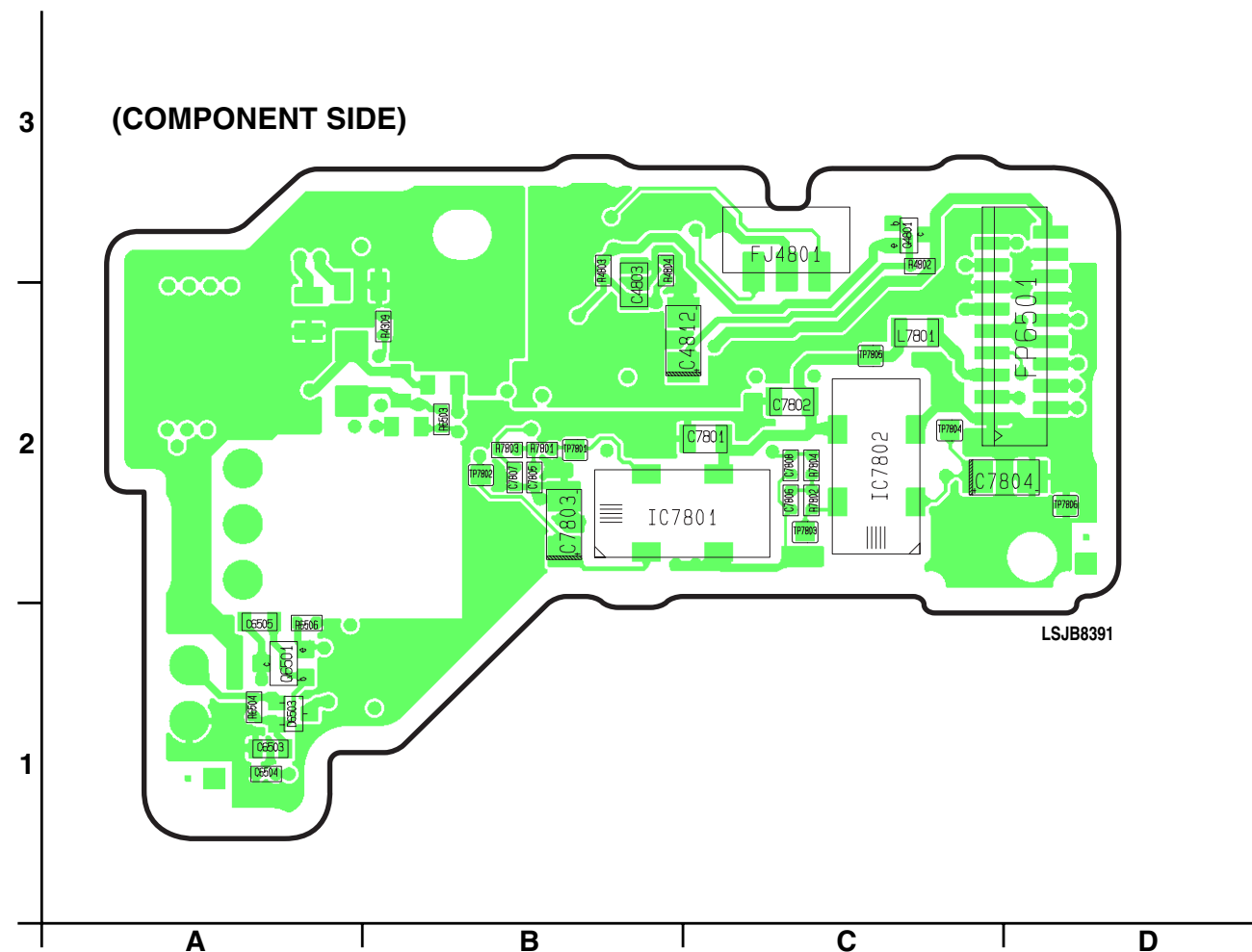
NOTE:
CIRCUIT BOARD LAYOUT SHOWS COMPONENTS INSTALLED FOR VARIOUS MODELS.
FOR PROPER PARTS CONTENT FOR THE MODEL YOU ARE SERVICING,
PLEASE REFER TO THE SCHEMATIC DIAGRAM AND PARTS LIST.

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.

MODEL	MARK
SDR-H20EG	A
SDR-H20EF	B
SDR-H20E	C
SDR-H20EP	D
SDR-H20EB	E
SDR-H20GC	F
SDR-H20EE	G
SDR-H20GN	H
SDR-H28GK	I
SDR-H21EE	J
SDR-H21GC	K
SDR-H29GK	L
Not Used	PT



Parts Location

FRONT P.C.B.																							
Integrated Circuits			TP7801	B-2	C	C4301	C-3	F	C6505	A-2	C	C7815	A-2	F	R4803	B-3	C	R6507	C-1	F	R7814	A-2	F
IC4801	B-2	F	TP7802	B-2	C	C4801	B-2	F	C7801	C-2	C	Coil			R4804	B-3	C	R6509	C-1	F	R7815	A-2	F
IC7801	B-2	C	TP7803	C-2	C	C4802	B-2	F	C7802	C-2	C	L7801	C-2	C	R4805	C-3	F	R7801	B-2	C	R7816	A-3	F
IC7802	C-2	C	TP7804	C-2	C	C4803	B-3	C	C7803	B-2	C	Resistors			R4806	B-3	F	R7802	C-2	C	Miscellaneous		
IC7803	A-2	F	TP7805	C-2	C	C4804	B-3	F	C7804	C-2	C	R4301	A-2	C	R4807	C-3	F	R7803	B-2	C	U6501	A-2	C
Transistors			TP7806	D-2	C	C4805	C-3	F	C7805	B-2	C	R4302	A-2	C	R4808	B-3	F	R7804	C-2	C			
Q4301	C-2	F	Connectors			C4806	B-3	F	C7806	C-2	C	R4303	C-2	F	R4809	B-3	F	R7805	B-2	F			
Q4305	C-3	F	FJ4801	C-3	C	C4808	B-3	F	C7807	B-2	C	R4305	C-2	F	R4810	B-3	F	R7806	B-2	F			
Q4306	C-2	F	FP6501	D-2	C	C4809	B-3	F	C7808	C-2	C	R4306	C-2	F	R4811	B-2	F	R7807	B-2	F			
Q4307	C-2	F	Diodes			C4810	B-3	F	C7809	B-2	F	R4307	C-2	F	R6501	B-2	C	R7808	B-2	F			
Q4801	C-3	C	D4301	D-2	F	C4812	C-2	C	C7810	B-2	F	R4308	C-3	F	R6502	B-2	C	R7809	B-2	F			
Q6501	A-1	C	D6503	A-1	C	C6501	A-2	C	C7811	B-2	F	R4309	B-2	C	R6503	B-2	C	R7810	A-2	F			
Q6502	C-1	F	D6504	C-1	F	C6502	B-2	C	C7812	B-2	F	R4310	C-2	F	R6504	A-1	C	R7811	B-2	F			
Q7801	B-2	F	D6505	B-2	F	C6503	A-1	C	C7813	A-2	F	R4311	C-2	F	R6505	C-1	F	R7812	A-2	F			
Test Points			Capacitors			C6504	A-1	C	C7814	A-3	F	R4802	C-3	C	R6506	A-1	C	R7813	A-3	F			

FRONT P.C.B.
LSEP8391A1/LSEP8391C1
GC, SDR-H28GK, SDR-H29GK

15.2. HDD RELAY P.C.B.

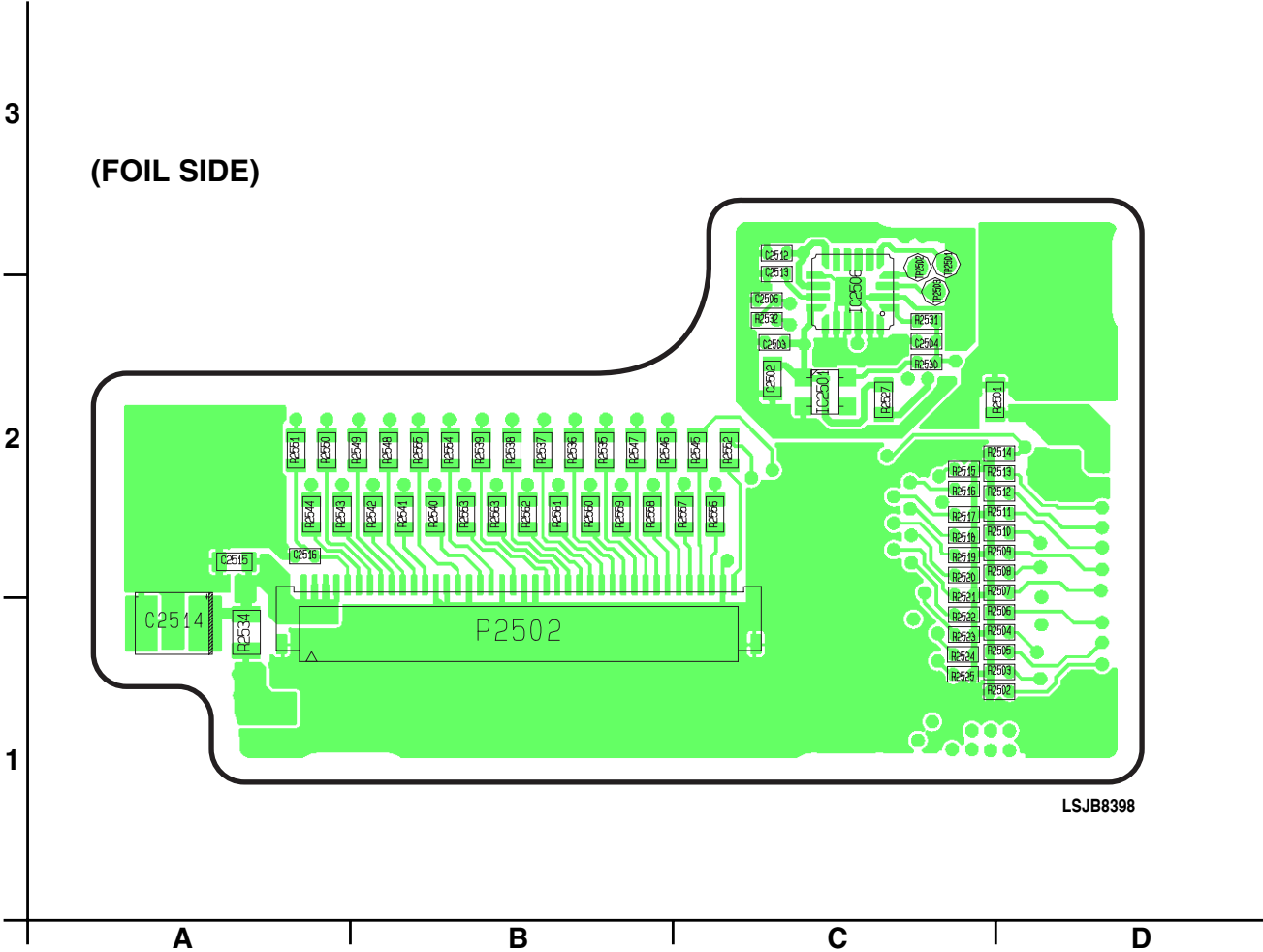
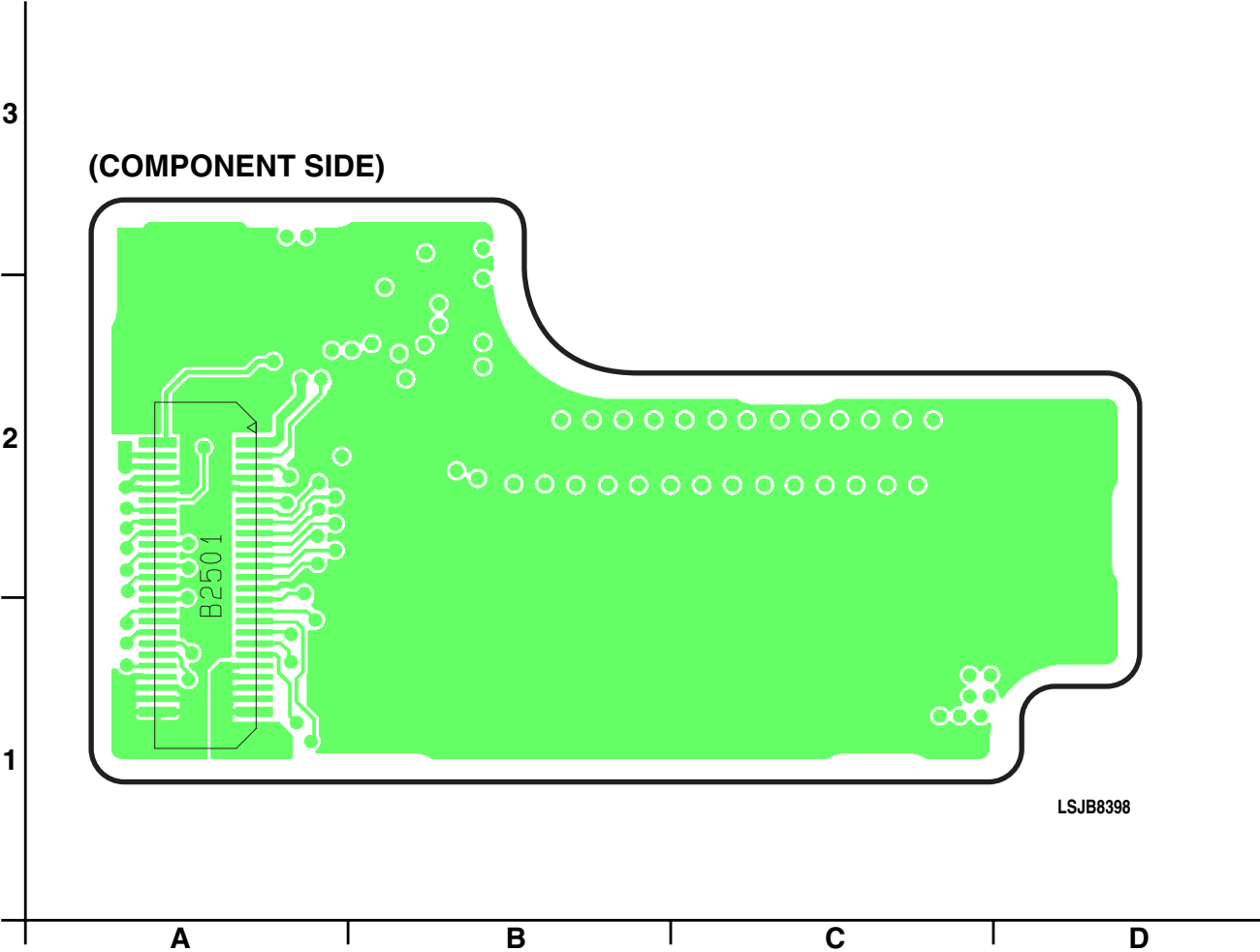
HDD RELAY P.C.B. LSEP8398A1

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.



Parts Location														
HDD RELAY P.C.B.														
Integrated Circuits			C2506	C-2	F	R2510	C-2	F	R2525	C-1	F	R2544	A-2	F
IC2501	C-2	F	C2512	A-1	F	R2511	C-2	F	R2527	C-2	F	R2545	C-2	F
IC2506	C-2	F	C2513	C-3	F	R2512	C-2	F	R2530	C-2	F	R2546	B-2	F
Test Points			C2514	A-2	F	R2513	C-2	F	R2531	C-2	F	R2547	B-2	F
TP2501	C-3	F	C2515	A-2	F	R2514	C-2	F	R2532	C-2	F	R2548	B-2	F
TP2502	C-3	F	C2516	A-2	F	R2515	C-2	F	R2534	A-1	F	R2549	A-2	F
TP2503	C-2	F	Resistors			R2516	C-2	F	R2535	B-2	F	R2550	A-2	F
Connectors			R2502	C-1	F	R2517	C-2	F	R2536	B-2	F	R2551	A-2	F
B2501	A-2	C	R2503	C-1	F	R2518	C-2	F	R2537	B-2	F	R2552	C-2	F
P2502	B-1	F	R2504	C-1	F	R2519	C-2	F	R2538	B-2	F	R2553	B-2	F
Capacitors			R2505	C-1	F	R2520	C-2	F	R2539	B-2	F	R2554	B-2	F
C2501	C-2	F	R2506	C-1	F	R2521	C-2	F	R2540	B-2	F	R2555	B-2	F
C2502	C-2	F	R2507	C-2	F	R2522	C-1	F	R2541	B-2	F	R2556	C-2	F
C2503	C-2	F	R2508	C-2	F	R2523	C-1	F	R2542	B-2	F	R2557	C-2	F
C2504	C-2	F	R2509	C-2	F	R2524	C-1	F	R2543	A-2	F	R2558	B-2	F

15.3. LCD BACKLIGHT P.C.B.

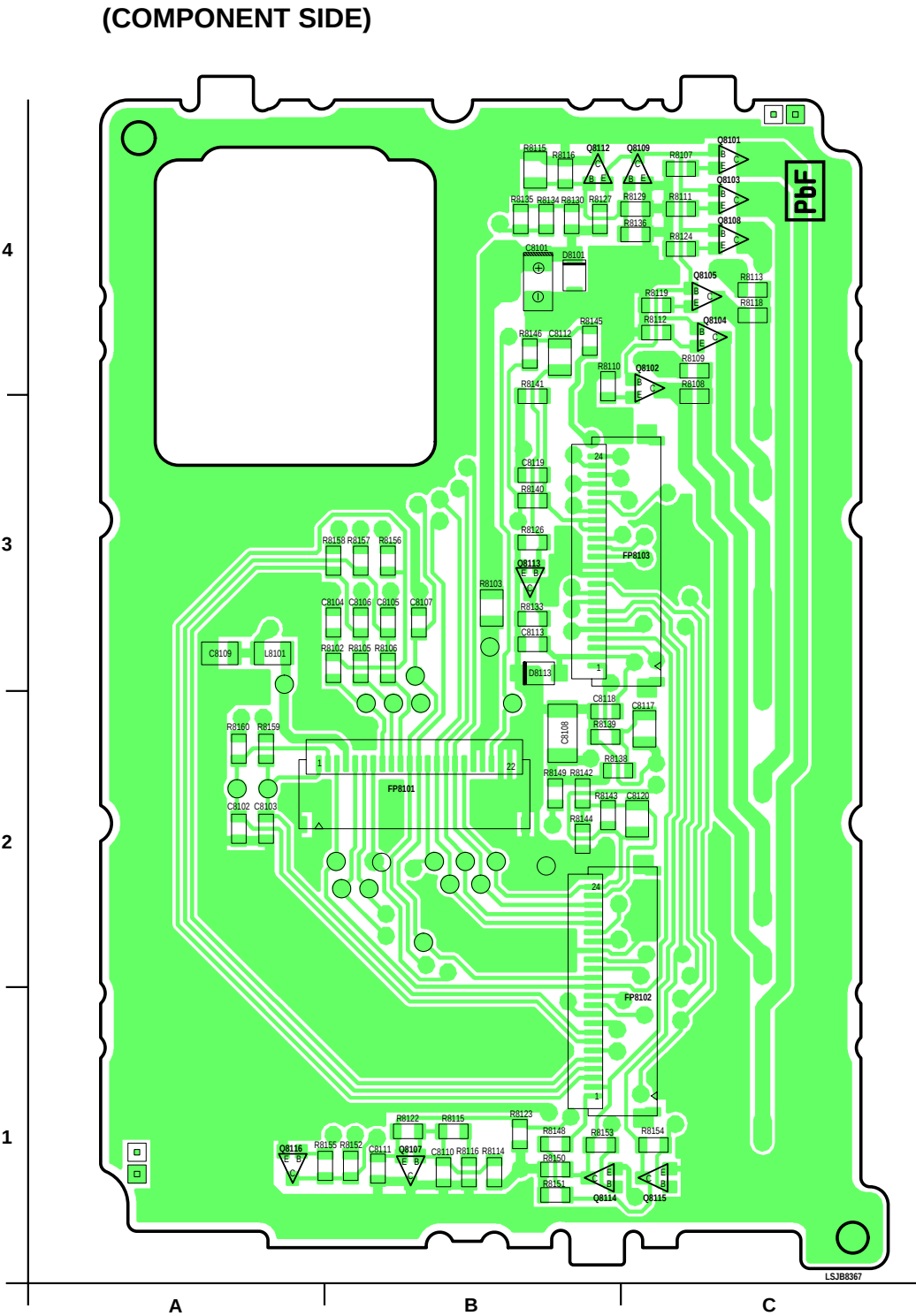
LCD BACKLIGHT P.C.B. LSEP8367C1

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.

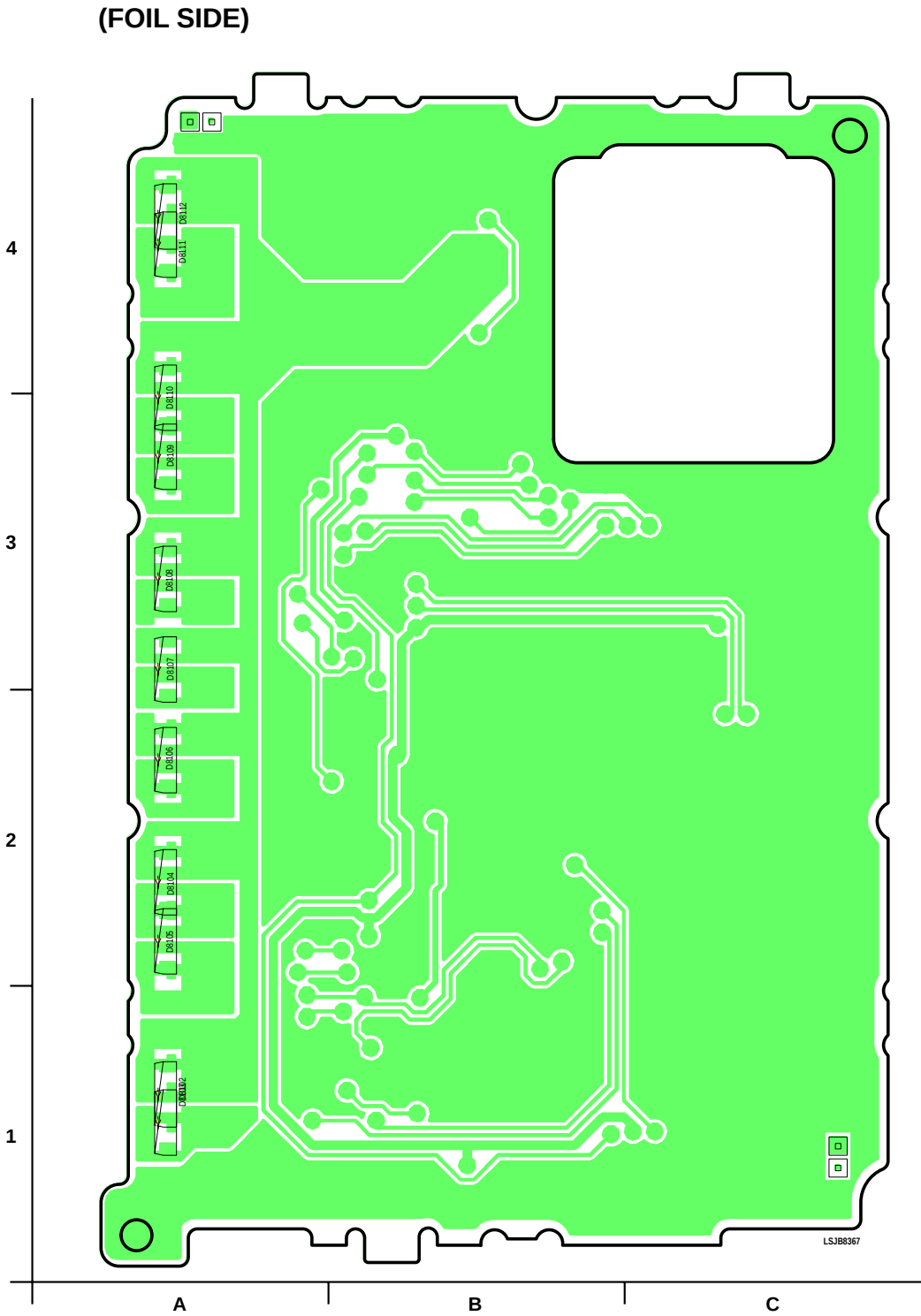
NOTE:
CIRCUIT BOARD LAYOUT INCLUDES COMPONENTS WHICH ARE NOT USED.

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.



(DUAL PATTERNS)



(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			

15.4. SIDE R P.C.B.

SIDE R P.C.B. LSEP8392A1 (A,B,C,D,E,F,G,H,I)
/ LSEP8392B1 (J,K,L)

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.

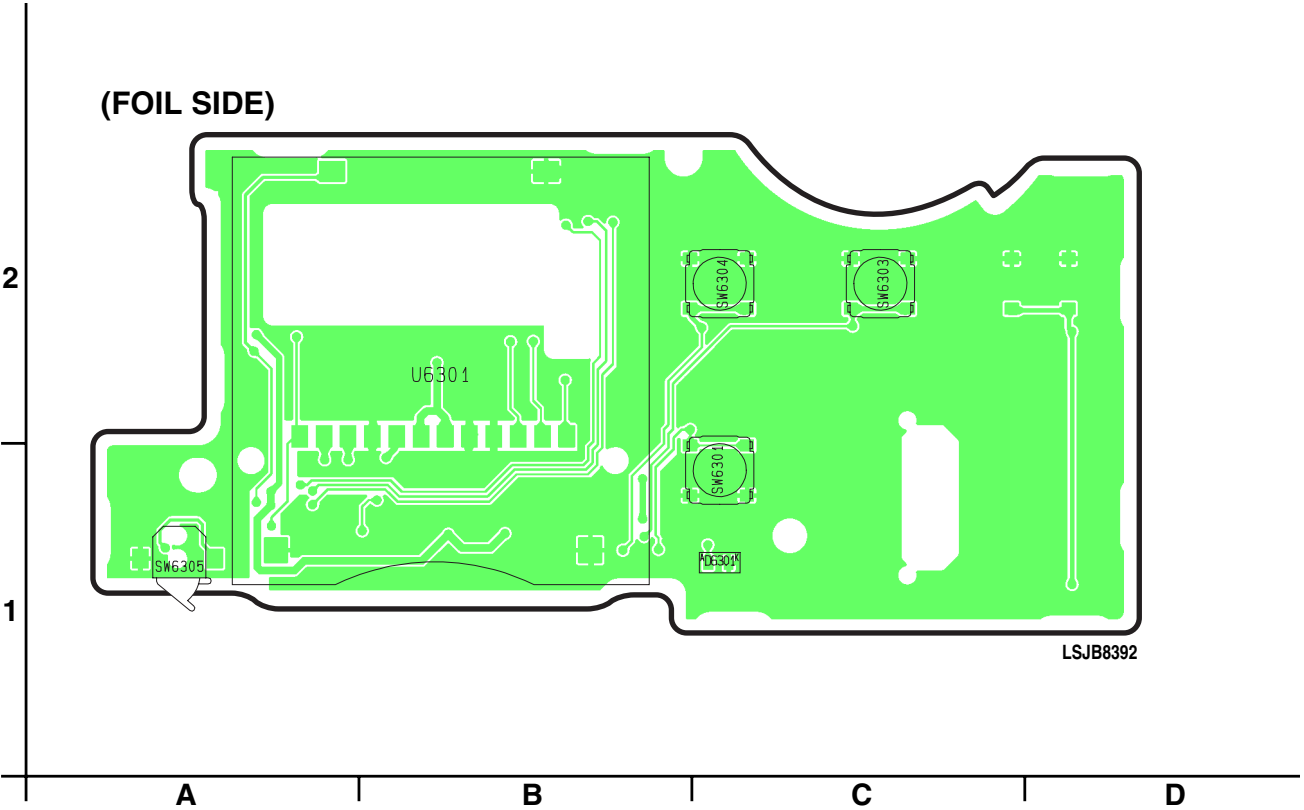
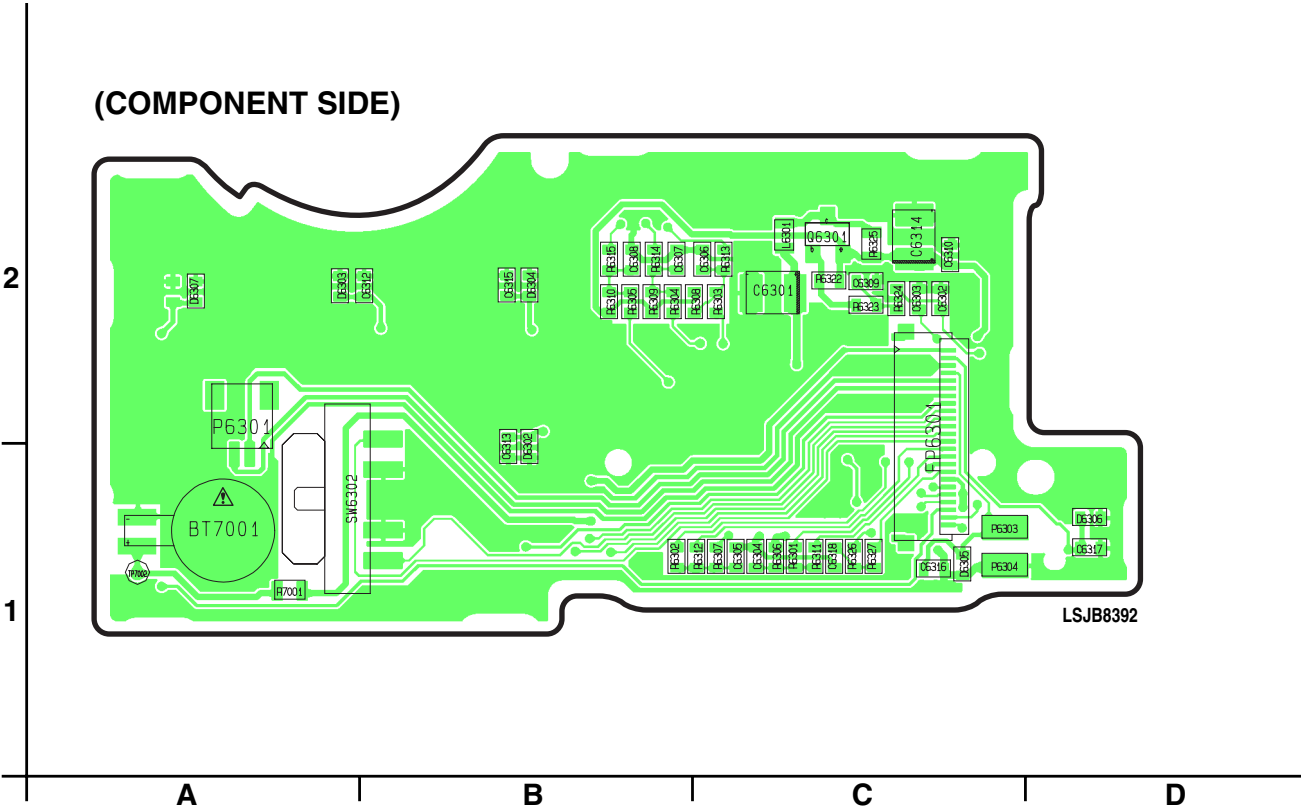
NOTE:
CIRCUIT BOARD LAYOUT SHOWS COMPONENTS INSTALLED FOR VARIOUS MODELS.
FOR PROPER PARTS CONTENT FOR THE MODEL YOU ARE SERVICING,
PLEASE REFER TO THE SCHEMATIC DIAGRAM AND PARTS LIST.

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.

COMPARISON CHART
OF MODELS & MARKS

MODEL	MARK
SDR-H20EG	A
SDR-H20EF	B
SDR-H20E	C
SDR-H20EP	D
SDR-H20EB	E
SDR-H20GC	F
SDR-H20EE	G
SDR-H20GN	H
SDR-H28GK	I
SDR-H21EE	J
SDR-H21GC	K
SDR-H29GK	L
Not Used	PT



Parts Location

SIDE R P.C.B.														
Transistor			D6306	D-1	C	C6314	C-2	C	R6307	C-1	C	R7001	A-1	C
Q6301	C-2	C	D6307	A-2	C	C6315	B-2	C	R6308	B-2	C			
Test Point			Capacitors			C6316	C-1	C	R6309	B-2	C	SW6301	C-1	F
TP7002	A-1	C	C6301	C-2	C	C6317	D-1	C	R6310	B-2	C	SW6302	A-1	C
Connectors			C6302	C-2	C	C6318	C-1	C	R6311	C-1	C	SW6303	C-2	F
FP6301	C-1	C	C6303	C-2	C	C6319	A-2	C	R6312	C-1	C	SW6304	C-2	F
P6301	A-2	C	C6304	C-1	C	Coil			R6313	C-2	C	SW6305	A-1	F
P6303	C-1	C	C6305	C-1	C	L6301	C-2	C	R6314	B-2	C	SW6306	D-2	F
P6304	C-1	C	C6306	C-2	C	Resistors			R6315	B-2	C	Miscellaneous		
Diodes			C6307	B-2	C	R6301	C-1	C	R6322	C-2	C	BT7001	A-1	C
D6301	C-1	F	C6308	B-2	C	R6302	B-1	C	R6323	C-2	C	U6301	B-2	F
D6302	B-1	C	C6309	C-2	C	R6303	C-2	C	R6324	C-2	C			
D6303	A-2	C	C6310	C-2	C	R6304	B-2	C	R6325	C-2	C			
D6304	B-2	C	C6312	A-2	C	R6305	B-2	C	R6326	C-1	C			
D6305	C-1	C	C6313	B-1	C	R6306	C-1	C	R6327	C-1	C			

SIDE R P.C.B.
LSEP8392A1 /LSEP8392B1
SDR-H20E/EB/EE/EF/EG/EP/GC/GN, SDR-H21EE/GC, SDR-H28GK, SDR-H29GK

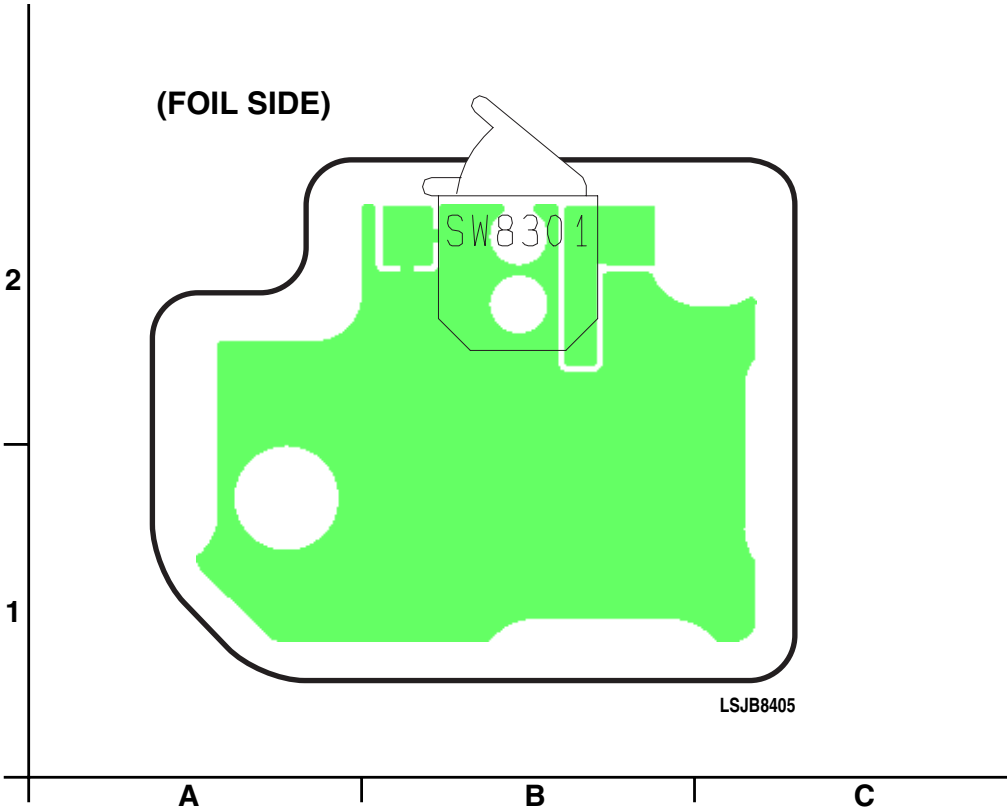
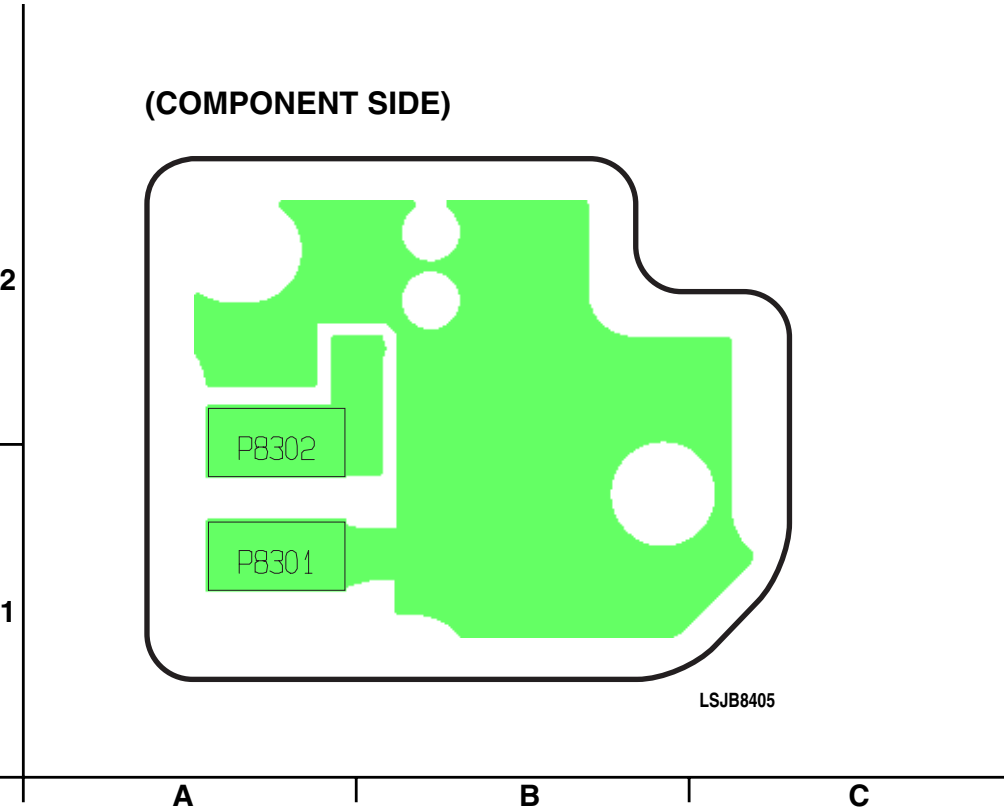
15.5. OPEN SWITCH P.C.B.

OPEN SWITCH P.C.B. LSEP8405A1

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.



Parts Location

OPEN SWITCH P.C.B.		
Connectors		
P8301	A-1	C
P8302	A-1	C
SW8301	B-2	F

16 Exploded View

16.1. MAIN PARTS SECTION

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.

COMPARISON CHART OF MODELS & MARKS

MODEL	MARK	MODEL	MARK
SDR-H20EG	A	SDR-H20EE	G
SDR-H20EF	B	SDR-H20GN	H
SDR-H20E	C	SDR-H28GK	I
SDR-H20EP	D	SDR-H21EE	J
SDR-H20EB	E	SDR-H21GC	K
SDR-H20GC	F	SDR-H29GK	L

H

G

F

E

D

C

B

A

1

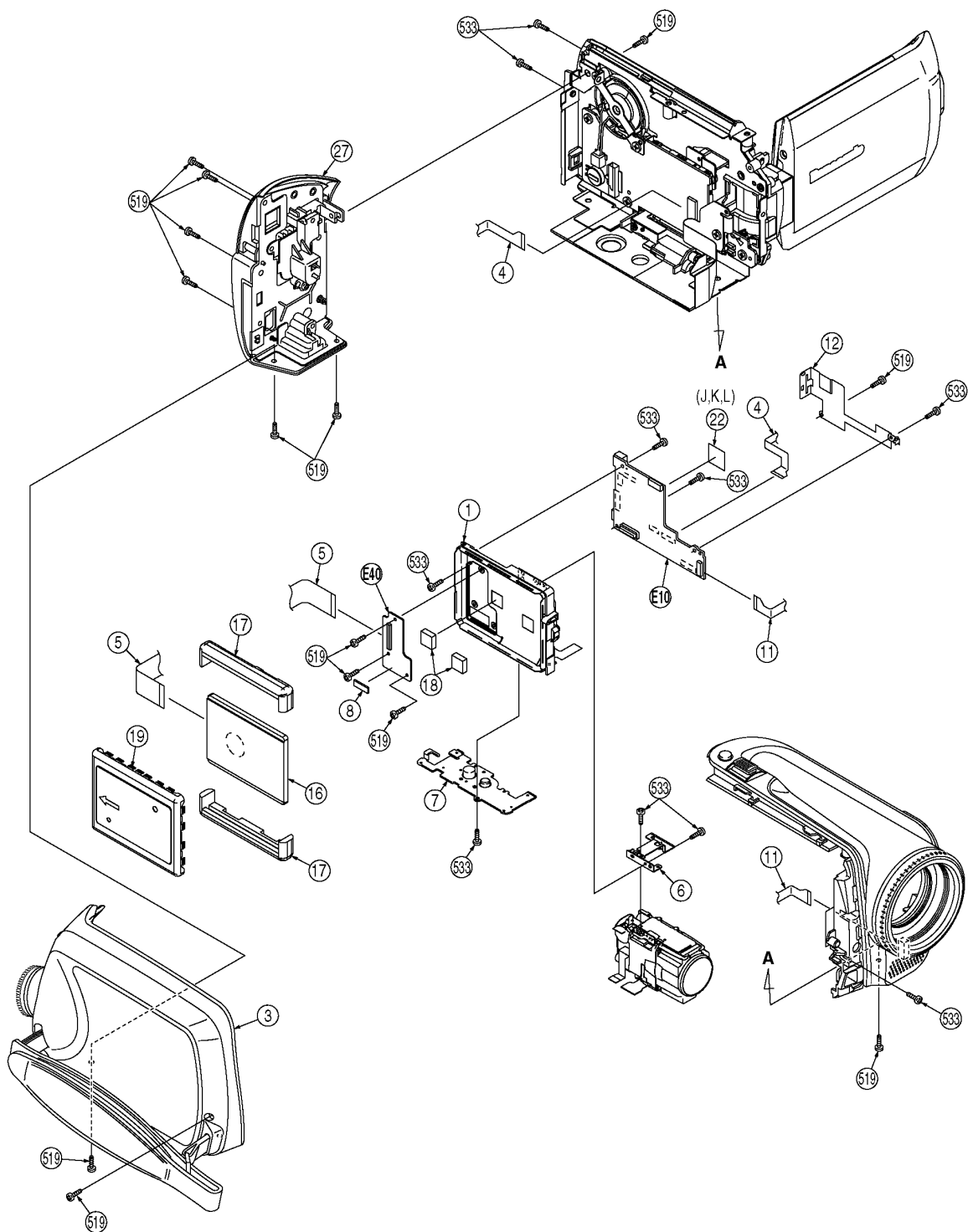
2

3

4

5

6

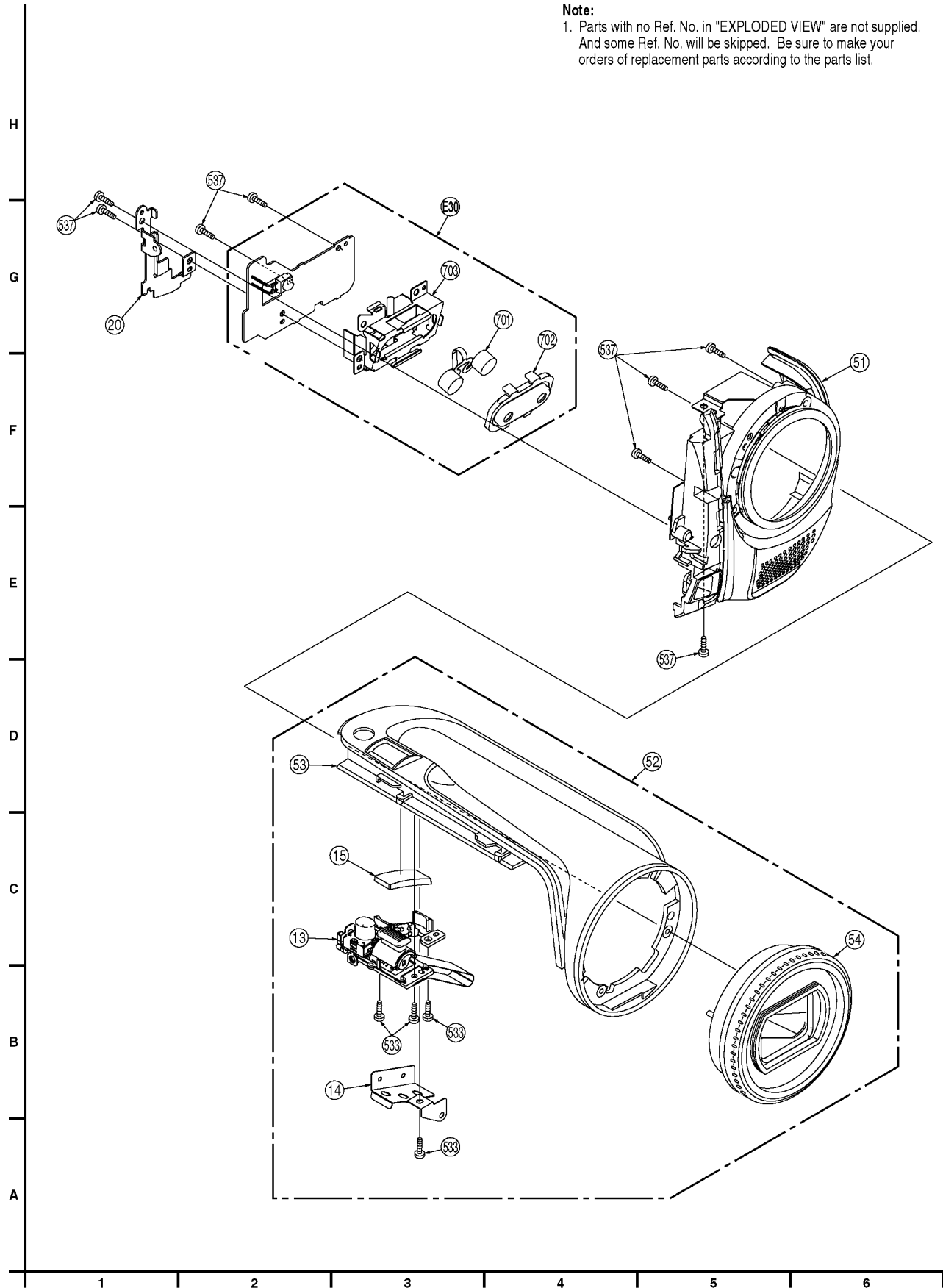


16.2. FRONT HOOD AND FRONT P.C.B. SECTION

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.

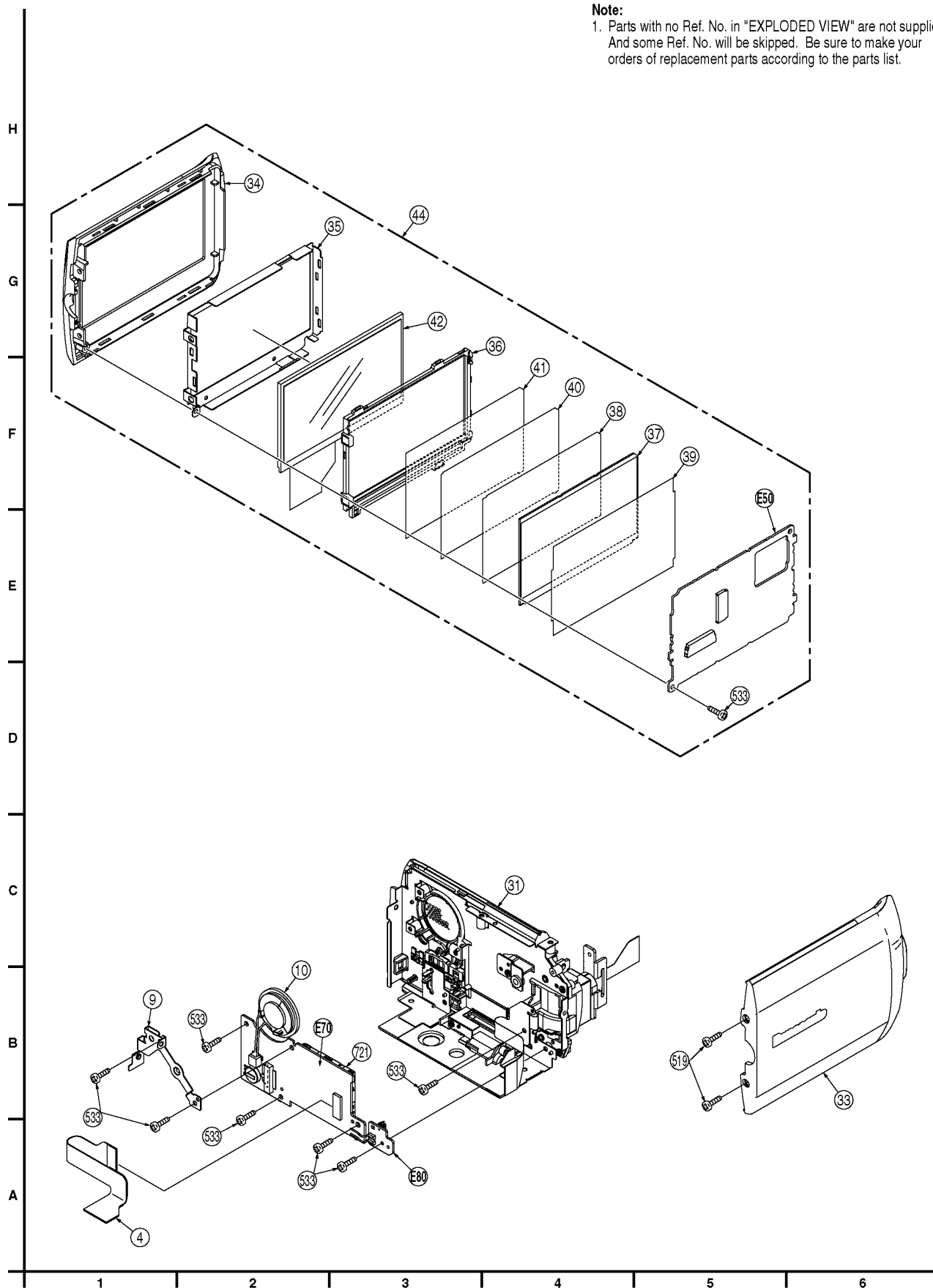


16.3. SIDE R OPERATION AND LCD SECTION

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.



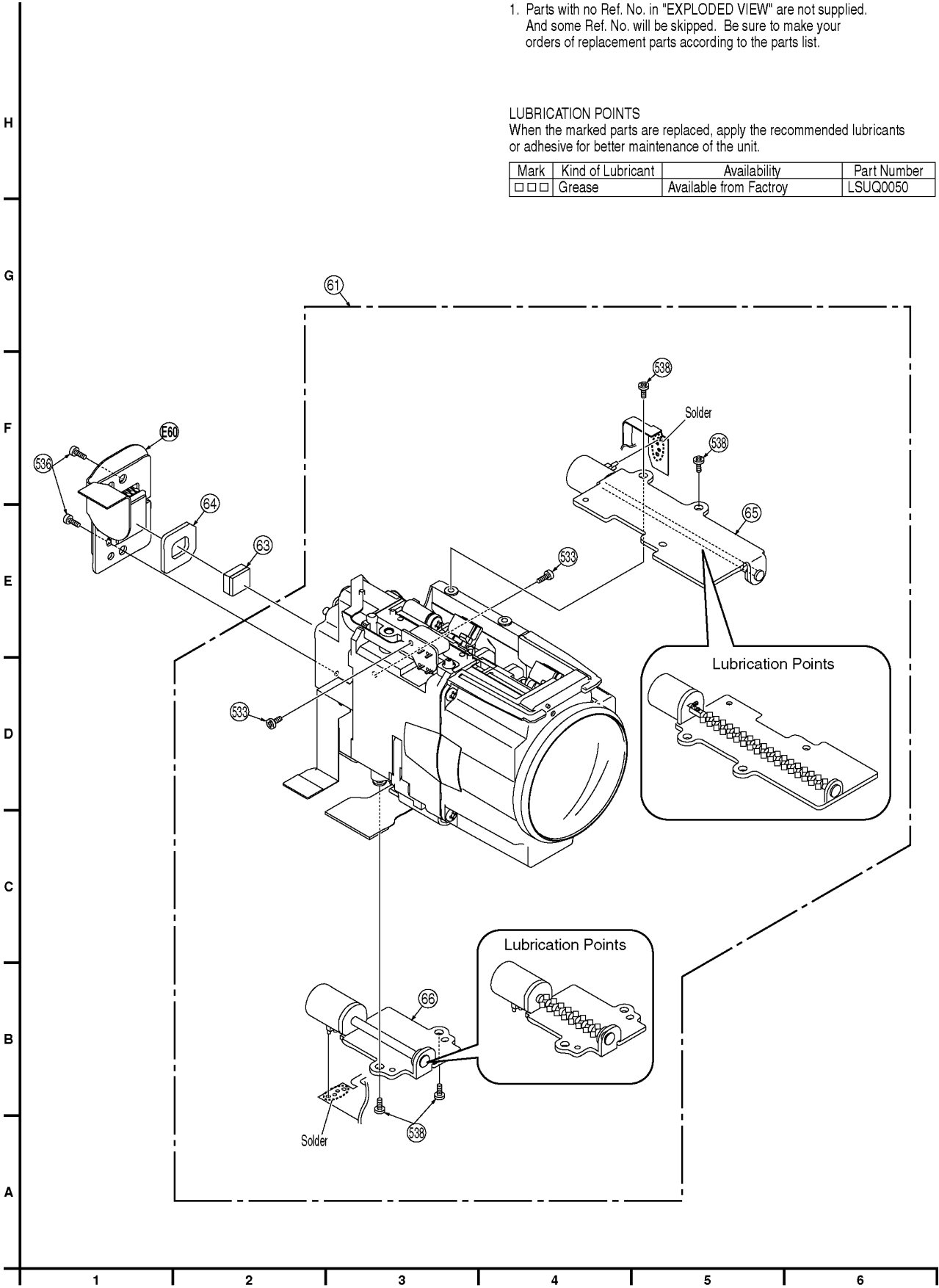
16.4. CCD AND LENS SECTION

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.

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 Factroy	LSUQ0050



16.5. PACKING PARTS AND ACCESSORIES SECTION

PACKING PARTS AND ACCESSORIES SECTION

COMPARISON CHART OF MODELS & MARKS

MODEL	MARK	MODEL	MARK
SDR-H20EG	A	SDR-H20EE	G
SDR-H20EF	B	SDR-H20GN	H
SDR-H20E	C	SDR-H28GK	I
SDR-H20EP	D	SDR-H21EE	J
SDR-H20EB	E	SDR-H21GC	K
SDR-H20GC	F	SDR-H29GK	L

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.

H

G

F

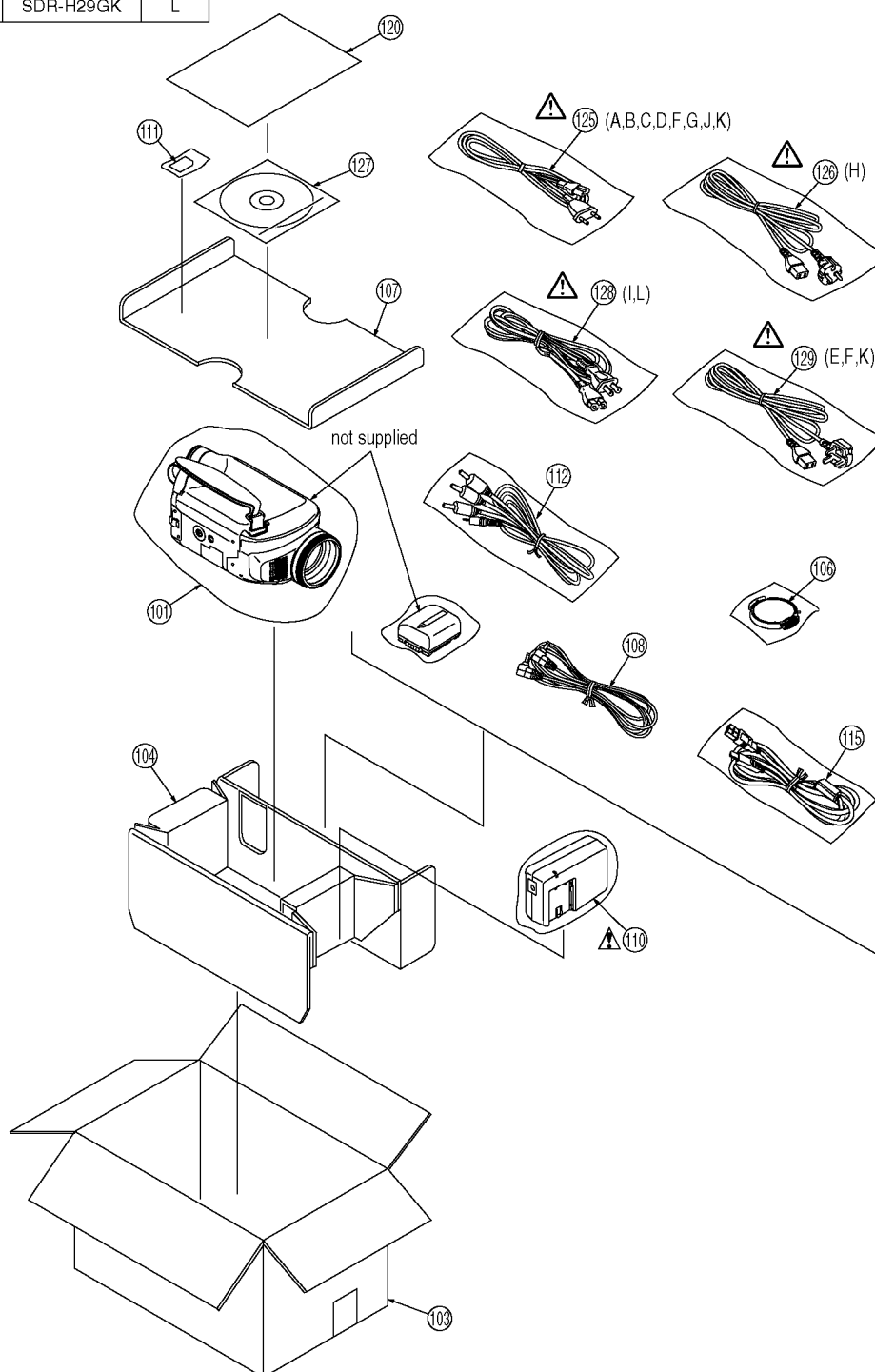
E

D

C

B

A



17 Replacement Parts Lists

BEFORE REPLACING PARTS, READ THE FOLLOWING:

17.1. REPLACEMENT NOTES

17.1.1. General Notes

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. **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.

4. Parts with no Ref. No. in "EXPLODED VIEWS" are not supplied. And some Ref. No. will be skipped. Be sure to make your orders of replacement parts according to the parts list.

5. Parts different in shape or size may be used. However, only interchangeable parts will be supplied as service replacement parts.

6. 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.

7. Item numbers with capital letter E (Example: E10, E20,...) in the Ref. No. column are shown in the exploded views.

8. 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.

17.1.2. Mechanical Replacement Notes

1. Section No. of parts shown in Exploded Views are indicated in the Remarks column.

2. **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.

17.1.3. Electrical Replacement Notes

1. Unless otherwise specified;

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

2. **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.: Printed Circuit Board

E.S.D.: Electrostatically Sensitive Devices

3. **SERVICE OF CHIP PARTS**

When servicing chip parts, please use a soldering iron of less than 30 W.

4. When replacing 0 Ω resistor, a wire can be substituted for it.

5. Parts with mark "CSP" in the Remarks column are CSP (Chip Size Package) IC.

6. IC6004 replacement note:

When replacing this IC, be sure to write the initial data with PC-EVR Adjustment Program.

COMPARISON CHART OF MODELS & MARKS

MODEL	MARK
SDR-H20EG	A
SDR-H20EF	B
SDR-H20E	C
SDR-H20EP	D
SDR-H20EB	E
SDR-H20GC	F
SDR-H20EE	G
SDR-H20GN	H
SDR-H28GK	I
SDR-H21EE	J
SDR-H21GC	K
SDR-H29GK	L

17.2. MECHANICAL REPLACEMENT PARTS LIST

COMPARISON CHART OF MODELS & MARKS

MODEL	MARK
SDR-H20EG	A
SDR-H20EF	B
SDR-H20E	C
SDR-H20EP	D
SDR-H20EB	E
SDR-H20GC	F
SDR-H20EE	G
SDR-H20GN	H
SDR-H28GK	I
SDR-H21EE	J
SDR-H21GC	K
SDR-H29GK	L

Definition of Parts supplier:

- Parts with mark "SPC" in the Remarks column are supplied from Spare Parts Center of Panasonic AVC Company.
- Parts without mark in the Remarks column are supplied from PSEC.

MECHANICAL REPLACEMENT PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
1	LSYK2045	SIDE L UNIT	1
3	LSYK2155	OPERATION SHEET UNIT (A,B,C,D,E,F,G,H,I)	1
3	LSYK2181	OPERATION SHEET UNIT (J,K,L)	1
4	LSJB8395	SIDE R F.P.C.	1
5	LSJB8397	HDD RELAY F.P.C.	1
6	LSMA0998	LENS ANGLE A	1
7	LSYK2231	BOTTOM ANGLE UNIT	1
8	LSMX0235	SPACER	1
9	LSSC0945	SPEAKER FIXING ANGLE	1
10	L0AA02A00074	SPEAKER	1
11	LSJB8394	FRONT F.P.C.	1
12	LSSC0949	MAIN SHIELD PLATE A	1
13	LSYK2072	ZOOM UNIT	1
14	LSSC0960	LED EARTH PLATE	1
15	LSGF0546	ILLUMINATE PIECE	1
16	N3CZBQH00001	HARD DISK DRIVE	1
17	LSMG0181	HDD CUSHION	2
18	LSMG0182	SUB SUPPORT DUMPER	2
19	LSSC0975	TOP CASE,ABS RESIN	1
20	LSSC0947	FRONT EARTH ANGLE	1
22	LSMF0563	SHEET (J,K,L)	1
27	LSYK2076	REAR CASE UNIT,ABS RESIN	1
31	LSYK2224	SIDE R SHAFT UNIT (A,B,C,D,E,F,G,H,I)	1
31	LSYK2226	SIDE R SHAFT UNIT (J,K,L)	1
33	LSYK2082	LCD CASE A UNIT (A,B,C,D,E,F,G,H)	1
33	LSYK2098	LCD CASE A UNIT (I)	1
33	LSYK2177	LCD CASE A UNIT (J,K)	1
33	LSYK2178	LCD CASE A UNIT (L)	1
34	LSKM1606	LCD CASE B,ABS RESIN	1
35	LSSC0924	LCD SHIELD CASE,ABS RESIN	1
36	LSYK2153	PANEL HOLDER UNIT	1
37	LSGL1518	LEAD LIGHT PANEL	1
38	LSGL0511	DIFFUSION SHEET	1
39	LSGL0506	REFLECT SHEET	1
40	LSGL0443	BEF SHEET	1
41	LSGL0444	BEF SHEET A	1

Ref. No.	Part No.	Part Name & Description	Remarks
42	L5BDDXH00031	LIQUID CRYSTAL DISPLAY PANEL	1
44	LSYK2060	LCD CASE B UNIT,ABS RESIN	1
51	LSYK2065	FRONT UNIT	1
52	LSYK2067	TOP ZOOM UNIT	1
53	LSYK2217	TOP COVER U	1
54	LSYK2072	LENS HOOD U	1
61	LSXN0046	LENS UNIT	1
63	LSFL0292	OPTICAL LOW PASS FILTER	1
64	LSMX0230	FILTER RUBBER	1
65	L6HA66NB0007	ZOOM MOTOR UNIT	1
66	L6HA66NB0008	FOCUS MOTOR UNIT	1
101	VFF1129	POLY BAG	1
103	LSPG2421	PACKING CASE,PAPER (A,B,C,D,E)	1
103	LSPG2422	PACKING CASE,PAPER (F,G,H)	1
103	LSPG2423	PACKING CASE,PAPER (I)	1
103	LSPG2455	PACKING CASE,PAPER (J,K)	1
103	LSPG2456	PACKING CASE,PAPER (L)	1
104	LSPN0793	PAD	1
106	LSYK2119	LENS CAP SET	1
107	LSPN0772	TOP PAD	1
108	K2GJ2DC00011	DC CABLE W/PLUG	1
110	DE-974GC	AC ADAPTOR (A,B,C,D,E,F,G,H,J,K)	1 △
110	DE-974HC	AC ADAPTOR (I,L)	1 △
111	RP-SDR512MK0	SD CARD	1
112	K2KZ9CB00001	AUDIO VIDEO CABLE W/PLUG	1
115	K1HA05CD0010	USB CABLE W/PLUG	1
120	LSQT1207-A	INSTRUCTION BOOK (A)	1
120	LSQT1208-A	INSTRUCTION BOOK (A,B)	1
120	LSQT1209-A	INSTRUCTION BOOK (C)	1
120	LSQT1210-A	INSTRUCTION BOOK (D)	1
120	LSQT1211-A	INSTRUCTION BOOK (E)	1
120	LSQT1212-A	INSTRUCTION BOOK (F,K)	1
120	LSQT1213-A	INSTRUCTION BOOK (G,J)	1
120	LSQT1214-A	INSTRUCTION BOOK (H)	1
120	LSQT1215-A	INSTRUCTION BOOK (I,L)	1
120	LSQT1216-A	INSTRUCTION BOOK (A)	1
120	LSQT1218-A	INSTRUCTION BOOK (C)	1
120	LSQT1219-A	INSTRUCTION BOOK (D)	1
120	LSQT1221-A	INSTRUCTION BOOK (F,K)	1
120	LSQT1222-A	INSTRUCTION BOOK (F,K)	1
125	K2CR2DA00004	AC CORD W/PLUG (A,B,C,D,F,G,J,K)	1 △
126	K2CJ2DA00011	AC CORD W/PLUG (H)	1 △
127	LSFT0727	CD-ROM	1
128	K2CA2CA00020	AC CORD W/PLUG (I,L)	1 △
129	K2CT3CA00004	AC POWER CORD W/PLUG,250V (E,F,K)	1 △
519	XQN16+BF4FN	SCREW,STEEL	14
533	XQN16+BJ4FN	SCREW,STEEL	10
536	XQN16+AJ4FN	SCREW,STEEL	2
537	XQN16+BJ5FN	SCREW,STEEL	7
538	XQN14+BJ4FN	SCREW,STEEL	8
701	LSEK0684	ELECTRIC CONDENSOR MICROPHONE UNIT	1
702	LSMG0136	MIC DAMPER	1
703	LSSC0961	FRONT EARTH PLATE	1
721	KINA09E00063	SD UNIT	1
E10	LSEP8388P1	MAIN P.C.B.	1
E30	LSEP8391A1	FRONT P.C.B. (A,B,C,D,E,F,G,H,I)	1
E30	LSEP8391C1	FRONT P.C.B. (J,K,L)	1
E40	LSEP8398A1	HDD RELAY P.C.B.	1
E50	LSEP8367C1	LIQUID CRYSTAL DISPLAY BACKLIGHT P.C.B. NR	1
E60	LSEQ0839	CCD P.C.B. NR	1
E70	LSEP8392A1	SIDE R P.C.B. (A,B,C,D,E,F,G,H,I)	1
E70	LSEP8392B1	SIDE R P.C.B. (J,K,L)	1
E80	LSEP8405A1	OPEN SWITCH P.C.B.	1

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	
	LSUA0017	EXTENSION CABLE 18P	
	VUVS0012	EXTENSION CABLE 22P	
	VFK1284	EXTENSION CABLE 24P	SPC
	VFK1286	EXTENSION CABLE 16P	SPC
	LSVQ0112	HDD Connector Tool	
	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
	VFK1164TFCB2	COLOR BAR CHART	SPC
	VFK1164TFGS2	GRAY SCALE CHART	SPC

17.3. ELECTRICAL REPLACEMENT PARTS LIST

COMPARISON CHART OF MODELS & MARKS

MODEL	MARK
SDR-H20EG	A
SDR-H20EF	B
SDR-H20E	C
SDR-H20EP	D
SDR-H20EB	E
SDR-H20GC	F
SDR-H20EE	G
SDR-H20GN	H
SDR-H28GK	I
SDR-H21EE	J
SDR-H21GC	K
SDR-H29GK	L

Definition of Parts supplier:

1. All parts are supplied from PSEC.

PRINTED CIRCUIT BOARD ASSEMBLY

Ref. No.	Part No.	Part Name & Description	Remarks
E10	LSEP8388P1	MAIN P.C.B.	1
E30	LSEP8391A1	FRONT P.C.B. (A,B,C,D,E,F,G,H,I)	1
E30	LSEP8391C1	FRONT P.C.B. (J,K,L)	1
E40	LSEP8398A1	HDD RELAY P.C.B.	1
E50	LSEP8367C1	LIQUID CRYSTAL DISPLAY BACKLIGHT P.C.B. NR	1
E60	LSEQ0839	CCD P.C.B. NR	1
E70	LSEP8392A1	SIDE R P.C.B. (A,B,C,D,E,F,G,H,I)	1
E70	LSEP8392B1	SIDE R P.C.B. (J,K,L)	1
E80	LSEP8405A1	OPEN SWITCH P.C.B.	1

17.3.1. MAIN P.C.B.

FPC CONNECTORS

Ref. No.	Part No.	Part Name & Description	Remarks
B21	K1KA50AA0697	CONNECTOR 50P	1
FP11	K1KA09AA0051	CONNECTOR 9P	1
FP31	K1MN14BA0088	CONNECTOR 14P	1
FP41	K1MN18BA0196	CONNECTOR 18P	1
FP61	K1MN16BA0197	CONNECTOR 16P	1
FP62	K1MN24A00062	CONNECTOR 24P	1
FP63	K1MN16AA0058	CONNECTOR 16P	1
FP71	K1MN22A00065	CONNECTOR 22P	1
FP72	K1MN12A00075	CONNECTOR 12P	1
FP81	K1MN24AA0091	CONNECTOR 24P	1

17.3.2. FRONT P.C.B.

INTEGRATED CIRCUITS

Ref. No.	Part No.	Part Name & Description	Remarks
IC4801	C0ABBB000369	IC, LINEAR	1
or IC4801	C0ABBB000262	IC, LINEAR	1
IC7801	L2ES00000016	GYROSCOPE	1
IC7802	L2ES00000017	GYROSCOPE	1
IC7803	C0ABHA000078	IC, LINEAR	1

TRANSISTORS

Ref. No.	Part No.	Part Name & Description	Remarks
Q4301	2SC559200L	TRANSISTOR SI NPN CHIP (J,K,L)	1

Ref. No.	Part No.	Part Name & Description	Remarks
Q4305	2SB1218ARL	TRANSISTOR SI PNP CHIP (J,K,L)	1
Q4306	UNR9112J08	TRANSISTOR SI PNP CHIP (J,K,L)	1
or Q4306	B1GDCFL0019	TRANSISTOR SI PNP CHIP (J,K,L)	1
or Q4306	B1GDCFL0020	TRANSISTOR SI PNP CHIP (J,K,L)	1
Q4307	UNR9213J08	TRANSISTOR SI NPN CHIP (J,K,L)	1
or Q4307	B1GBCFNN0029	TRANSISTOR SI NPN CHIP (J,K,L)	1
or Q4307	B1GBCFNN0030	TRANSISTOR SI NPN CHIP (J,K,L)	1
Q4801	2SD2216J08	TRANSISTOR SI NPN CHIP	1
or Q4801	B1ABCF000104	TRANSISTOR SI NPN CHIP	1
or Q4801	B1ABCF000110	TRANSISTOR SI NPN CHIP	1
Q6501	B1ABCF000098	TRANSISTOR SI NPN CHIP	1
or Q6501	B1ABCF000099	TRANSISTOR SI NPN CHIP	1
Q6502	2SB1218AHL	TRANSISTOR SI PNP CHIP	1
or Q6502	B1ADCF000063	TRANSISTOR SI PNP CHIP	1
or Q6502	B1ADCF000075	TRANSISTOR SI PNP CHIP	1
Q7801	XP0450100L	TRANSISTOR COMPLX CMP SI NPN CHIP	1
or Q7801	B1HBCFA00011	TRANSISTOR COMPLX CMP SI NPN CHIP	1
or Q7801	B1HBCFA00016	TRANSISTOR COMPLX CMP SI NPN CHIP	1

DIODES

Ref. No.	Part No.	Part Name & Description	Remarks
D4301	B3AFB0000171	LIGHT EMITTING DIODE (J,K,L)	1
D6503	B0ADEJ000038	DIODE SI CHIP	1
D6504	B3GA00000062	INFRARED SENSOR	1

RESISTORS

Ref. No.	Part No.	Part Name & Description	Remarks
R4301	ERJ6GEYJ270V	MGF CHIP 1/10W 27 (J,K,L)	1
R4302	ERJ6GEYJ270V	MGF CHIP 1/10W 27 (J,K,L)	1
R4303	ERJ3GEYJ2R2V	MGF CHIP 1/16W 2.2 (J,K,L)	1
R4305	ERJ2RHD222X	MGF CHIP 1/16W +-0.5% (J,K,L)	1
R4306	ERJ2RHD183X	MGF CHIP 1/16W 18K (J,K,L)	1
R4307	ERJ2RHD472X	MGF CHIP 1/16W 4.7K (J,K,L)	1
R4308	ERJ2RHD222X	MGF CHIP 1/16W +-0.5% (J,K,L)	1
R4310	ERJ6GEYJ270V	MGF CHIP 1/10W 27 (J,K,L)	1
R4311	ERJ6GEYJ270V	MGF CHIP 1/10W 27 (J,K,L)	1
R4802	D0GA472JA015	MGF CHIP 1/16W 4.7K	1
R4803	D0GA223JA015	MGF CHIP 1/16W 22K	1
R4804	D0GA333JA015	MGF CHIP 1/16W 33K	1
R4805	ERJ2GEJ124X	MGF CHIP 1/16W 120K	1
R4806	D0GA333JA015	MGF CHIP 1/16W 33K	1
R4807	D0HB392ZA002	MGF CHIP 1/16W 3.9K	1
R4808	ERJ2GEJ124X	MGF CHIP 1/16W 120K	1
R4809	D0GA333JA015	MGF CHIP 1/16W 33K	1
R4810	D0HB392ZA002	MGF CHIP 1/16W 3.9K	1
R6503	ERJ2GEJ104X	MGF CHIP 1/16W 100K	1
R6504	ERJ2GEJ106X	MGF CHIP 1/16W 10M	1
R6505	ERJ3GEYJ335V	MGF CHIP 1/16W 3.3M	1
R6506	ERJ2GEJ184X	MGF CHIP 1/16W 180K	1
R6507	D0GA103JA015	MGF CHIP 1/16W 10K	1
R6509	D0GA102JA015	MGF CHIP 1/16W 1K	1
R7801	D0GA392JA015	MGF CHIP 1/16W 3.9K	1
R7802	D0GA392JA015	MGF CHIP 1/16W 3.9K	1
R7803	D0GA332JA015	MGF CHIP 1/16W 3.3K	1
R7804	D0GA332JA015	MGF CHIP 1/16W 3.3K	1
R7805	D0GA102JA015	MGF CHIP 1/16W 1K	1
R7806	D0GA102JA015	MGF CHIP 1/16W 1K	1
R7807	D0GA103JA015	MGF CHIP 1/16W 10K	1

Ref. No.	Part No.	Part Name & Description	Remarks
R7808	ERJ2GEJ394X	MGF CHIP 1/16W 390K	1
R7809	ERJ2GEJ394X	MGF CHIP 1/16W 390K	1
R7810	D0GA472JA015	MGF CHIP 1/16W 4.7K	1
R7811	D0GA472JA015	MGF CHIP 1/16W 4.7K	1
R7814	ERJ2GEJ274X	MGF CHIP 1/16W 270 +-5%	1
R7815	ERJ2GEJ274X	MGF CHIP 1/16W 270 +-5%	1

CAPACITORS

Ref. No.	Part No.	Part Name & Description	Remarks
C4301	F1H1A105A036	C CHIP 10V 1UF (J,K,L)	1
C4801	F1G0J1050007	C CHIP 6.3V 1UF	1
C4802	F1G0J1050007	C CHIP 6.3V 1UF	1
C4803	F1J0J106A004	C CHIP 6.3V 10UF	1
C4804	ECJ0EB1C822K	C CHIP 16V 8200PF	1
C4805	ECJ0EB1A273K	C CHIP 10V 0.027UF	1
C4806	ECJ0EB1A273K	C CHIP 10V 0.027UF	1
C4808	ECJ0EB1A273K	C CHIP 10V 0.027UF	1
C4809	ECJ0EB1C822K	C CHIP 16V 8200PF	1
C4810	ECJ0EB1A273K	C CHIP 10V 0.027UF	1
C4812	F3F0J226A032	TANTALUM CHIP 6.3V 22UF	1
C6503	F1H1A224A012	C CHIP 10V 0.22UF	1
C6504	F1G1A1040006	C CHIP 10V 0.1UF	1
C6505	F1H1A224A012	C CHIP 10V 0.22UF	1
C7801	F1J1A106A024	C CHIP 10V 10UF	1
C7802	F1J1A106A024	C CHIP 10V 10UF	1
C7803	F3F0J226A032	TANTALUM CHIP 6.3V 22UF	1
C7804	F3F0J226A032	TANTALUM CHIP 6.3V 22UF	1
C7805	F1G1C153A048	C CHIP 16V 0.015UF	1
C7806	F1G1C153A048	C CHIP 16V 0.015UF	1
C7807	F1G1C153A048	C CHIP 16V 0.015UF	1
C7808	F1G1C153A048	C CHIP 16V 0.015UF	1
C7809	F1J1A106A024	C CHIP 10V 10UF	1
C7810	F1J1A106A024	C CHIP 10V 10UF	1
C7811	F1J1A106A024	C CHIP 10V 10UF	1
C7812	F1J1A106A024	C CHIP 10V 10UF	1
C7813	F1G1H222A571	C CHIP 50V 2200PF	1
C7814	F1G1H222A571	C CHIP 50V 2200PF	1
C7815	F1H0J1050012	C CHIP 6.3V 1UF	1

COILS

Ref. No.	Part No.	Part Name & Description	Remarks
L7801	G1C100KA0055	COIL CHIP 10UH	1

FPC CONNECTOR

Ref. No.	Part No.	Part Name & Description	Remarks
FP6501	K1MN18A00064	CONNECTOR 18P	1

17.3.3. LCD BACKLIGHT P.C.B.

TRANSISTORS

Ref. No.	Part No.	Part Name & Description	Remarks
Q8101	2SC6054J0L	TRANSISTOR SI NPN CHIP	1
Q8102	2SC6054J0L	TRANSISTOR SI NPN CHIP	1
Q8103	2SC6054J0L	TRANSISTOR SI NPN CHIP	1
Q8104	2SC6054J0L	TRANSISTOR SI NPN CHIP	1
Q8105	2SC6054J0L	TRANSISTOR SI NPN CHIP	1
Q8108	2SC6054J0L	TRANSISTOR SI NPN CHIP	1
Q8112	2SA2174J0L	TRANSISTOR SI PNP CHIP	1
Q8113	2SA2174J0L	TRANSISTOR SI PNP CHIP	1
Q8114	UNR9213J08	TRANSISTOR SI NPN CHIP	1
or Q8114	B1GBCFNN0029	TRANSISTOR SI NPN CHIP	1
or Q8114	B1GBCFNN0030	TRANSISTOR SI NPN CHIP	1
Q8115	UNR9213J08	TRANSISTOR SI NPN CHIP	1
or Q8115	B1GBCFNN0029	TRANSISTOR SI NPN CHIP	1
or Q8115	B1GBCFNN0030	TRANSISTOR SI NPN CHIP	1
Q8116	UNR9213J08	TRANSISTOR SI NPN CHIP	1
or Q8116	B1GBCFNN0029	TRANSISTOR SI NPN CHIP	1

Ref. No.	Part No.	Part Name & Description	Remarks
or Q8116	B1GBCFNN0030	TRANSISTOR SI NPN CHIP	1

DIODES

Ref. No.	Part No.	Part Name & Description	Remarks
D8101	MAZ80620ML	DIODE ZENER CHIP 6.2V	1
D8113	MAZ80470ML	DIODE ZENER CHIP 4.7V	1

RESISTORS

Ref. No.	Part No.	Part Name & Description	Remarks
R8102	ERJ3RBD271V	MGF CHIP 1/16W 270	1
R8103	ERJ6GEY0R00V	MGF CHIP 1/10W 0	1
R8105	ERJ3RBD271V	MGF CHIP 1/16W 270	1
R8106	ERJ3RBD271V	MGF CHIP 1/16W 270	1
R8107	ERJ3RED270V	MGF CHIP 1/16W 27	1
R8109	ERJ3GEY0R00V	MGF CHIP 1/16W 0	1
R8110	ERJ3RED270V	MGF CHIP 1/16W 27	1
R8111	ERJ3RED270V	MGF CHIP 1/16W 27	1
R8112	ERJ3RED270V	MGF CHIP 1/16W 27	1
R8118	ERJ3GEY0R00V	MGF CHIP 1/16W 0	1
R8119	ERJ3RED270V	MGF CHIP 1/16W 27	1
R8124	ERJ3RED270V	MGF CHIP 1/16W 27	1
R8126	ERJ3GEYJ104V	MGF CHIP 1/16W 100K	1
R8127	ERJ3GEYJ102V	MGF CHIP 1/16W 1K	1
R8135	ERJ3RBD822V	MGF CHIP 1/16W 8.2K $\pm 0.5\%$	1
R8136	ERJ3RBD222V	MGF CHIP 1/16W 2.2K	1
R8142	ERJ3GEYJ683V	MGF CHIP 1/16W 68K	1
R8144	ERJ3GEYJ224V	MGF CHIP 1/16W 220K	1
R8145	ERJ3GEY0R00V	MGF CHIP 1/16W 0	1
R8148	ERJ3GEY0R00V	MGF CHIP 1/16W 0	1
R8149	ERJ3GEY0R00V	MGF CHIP 1/16W 0	1
R8150	ERJ3GEYJ473V	MGF CHIP 1/16W 47K	1
R8151	ERJ3GEYJ473V	MGF CHIP 1/16W 47K	1
R8152	ERJ3GEYJ473V	MGF CHIP 1/16W 47K	1

CAPACITORS

Ref. No.	Part No.	Part Name & Description	Remarks
C8104	ECJ1VC1H390J	C CHIP 50V 39PF	1
C8105	ECJ1VC1H390J	C CHIP 50V 39PF	1
C8106	ECJ1VC1H390J	C CHIP 50V 39PF	1
C8107	FIH1A105A036	C CHIP 10V 1UF	1
C8109	FIJ1A475A024	SURFACE MOUNTING MULTILAYER CERAMIC CAPA	1
C8112	FIJ1A2250007	C CHIP 10V 2.2UF	1
C8113	FIH1A105A036	C CHIP 10V 1UF	1
C8115	FIJ0J4750005	C CHIP 6.3V 4.7UF	1
C8120	FIJ0J4750005	C CHIP 6.3V 4.7UF	1

COILS

Ref. No.	Part No.	Part Name & Description	Remarks
L8101	G1C101KA0055	COIL CHIP 100UH	1

FPC CONNECTOR

Ref. No.	Part No.	Part Name & Description	Remarks
FP8101	K1MN22BA0197	CONNECTOR 22P	1
FP8102	K1MN24BA0196	CONNECTOR 24P	1

17.3.4. HDD RELAY P.C.B.

INTEGRATED CIRCUITS

Ref. No.	Part No.	Part Name & Description	Remarks
IC2501	C0ZBZ0001479	IC, LINEAR	1
IC2506	L2EE00000007	MECHANICAL SENSOR UNIT	1

RESISTORS

Ref. No.	Part No.	Part Name & Description	Remarks
R2502	ERJ2GEJ104X	MGF CHIP 1/16W 100K	1
R2503	ERJ2GEJ104X	MGF CHIP 1/16W 100K	1
R2504	ERJ2GEJ104X	MGF CHIP 1/16W 100K	1
R2505	ERJ2GEJ104X	MGF CHIP 1/16W 100K	1

Ref. No.	Part No.	Part Name & Description	Remarks
R2506	ERJ2GEJ104X	MGF CHIP 1/16W 100K	1
R2507	ERJ2GEJ104X	MGF CHIP 1/16W 100K	1
R2508	ERJ2GEJ104X	MGF CHIP 1/16W 100K	1
R2509	ERJ2GEJ104X	MGF CHIP 1/16W 100K	1
R2510	ERJ2GEJ104X	MGF CHIP 1/16W 100K	1
R2511	ERJ2GEJ104X	MGF CHIP 1/16W 100K	1
R2512	ERJ2GEJ104X	MGF CHIP 1/16W 100K	1
R2513	ERJ2GEJ104X	MGF CHIP 1/16W 100K	1
R2514	ERJ2GEJ104X	MGF CHIP 1/16W 100K	1
R2515	ERJ2GEJ104X	MGF CHIP 1/16W 100K	1
R2516	ERJ2GEJ104X	MGF CHIP 1/16W 100K	1
R2517	ERJ2GEJ104X	MGF CHIP 1/16W 100K	1
R2518	ERJ2GEJ104X	MGF CHIP 1/16W 100K	1
R2519	ERJ2GEJ104X	MGF CHIP 1/16W 100K	1
R2520	ERJ2GEJ104X	MGF CHIP 1/16W 100K	1
R2521	ERJ2GEJ104X	MGF CHIP 1/16W 100K	1
R2522	ERJ2GEJ104X	MGF CHIP 1/16W 100K	1
R2523	ERJ2GEJ104X	MGF CHIP 1/16W 100K	1
R2524	ERJ2GEJ104X	MGF CHIP 1/16W 100K	1
R2525	ERJ2GEJ104X	MGF CHIP 1/16W 100K	1
R2527	ERJ3GEY0R00V	MGF CHIP 1/16W 0	1
R2530	ERJ2GE0R00X	MGF CHIP 1/16W 0	1
R2532	ERJ2GE0R00X	MGF CHIP 1/16W 0	1
R2534	ERJ6GEY0R00V	MGF CHIP 1/10W 0	1
R2535	ERJ3GEYJ101V	MGF CHIP 1/16W 100	1
R2536	ERJ3GEYJ101V	MGF CHIP 1/16W 100	1
R2537	ERJ3GEYJ101V	MGF CHIP 1/16W 100	1
R2538	ERJ3GEYJ101V	MGF CHIP 1/16W 100	1
R2539	ERJ3GEYJ101V	MGF CHIP 1/16W 100	1
R2540	ERJ3GEYJ101V	MGF CHIP 1/16W 100	1
R2541	ERJ3GEYJ101V	MGF CHIP 1/16W 100	1
R2542	ERJ3GEYJ101V	MGF CHIP 1/16W 100	1
R2543	ERJ3GEYJ101V	MGF CHIP 1/16W 100	1
R2544	ERJ3GEYJ101V	MGF CHIP 1/16W 100	1
R2545	ERJ3GEYJ101V	MGF CHIP 1/16W 100	1
R2546	ERJ3GEYJ101V	MGF CHIP 1/16W 100	1
R2547	ERJ3GEYJ101V	MGF CHIP 1/16W 100	1
R2548	ERJ3GEYJ101V	MGF CHIP 1/16W 100	1
R2549	ERJ3GEYJ101V	MGF CHIP 1/16W 100	1
R2550	ERJ3GEYJ101V	MGF CHIP 1/16W 100	1
R2551	ERJ3GEYJ331V	MGF CHIP 1/16W 330	1
R2552	ERJ3GEYJ101V	MGF CHIP 1/16W 100	1
R2553	ERJ3GEYJ101V	MGF CHIP 1/16W 100	1
R2554	ERJ3GEYJ101V	MGF CHIP 1/16W 100	1
R2555	ERJ3GEYJ101V	MGF CHIP 1/16W 100	1
R2556	ERJ3GEYJ101V	MGF CHIP 1/16W 100	1
R2557	ERJ3GEYJ101V	MGF CHIP 1/16W 100	1
R2558	ERJ3GEYJ101V	MGF CHIP 1/16W 100	1
R2559	ERJ3GEYJ101V	MGF CHIP 1/16W 100	1
R2560	ERJ3GEYJ101V	MGF CHIP 1/16W 100	1
R2561	ERJ3GEYJ101V	MGF CHIP 1/16W 100	1
R2562	ERJ3GEYJ101V	MGF CHIP 1/16W 100	1
R2563	ERJ3GEYJ101V	MGF CHIP 1/16W 100	1

CAPACITORS

Ref. No.	Part No.	Part Name & Description	Remarks
C2502	F1H0J1050013	C CHIP 6.3V 1UF	1
C2503	F1G1A1040006	C CHIP 10V 0.1UF	1
C2512	F1G1A1040006	C CHIP 10V 0.1UF	1
C2514	F3G0J107A018	TANTALUM CHIP 6.3V 100UF	1
C2515	ECJ1VB1E104K	C CHIP 25V 0.1UF	1
C2516	F1G1A1040006	C CHIP 10V 0.1UF	1

PIN HEADERS

Ref. No.	Part No.	Part Name & Description	Remarks
B2501	K1KB50AA0223	CONNECTOR 50P	1
P2502	K1MN40BA0256	CONNECTOR 40P	1

17.3.5. SIDE R P.C.B.

TRANSISTORS

Ref. No.	Part No.	Part Name & Description	Remarks
Q6301	2SB09700RL	TRANSISTOR SI PNP CHIP	1

DIODES

Ref. No.	Part No.	Part Name & Description	Remarks
D6301	B3AAB0000137	LIGHT EMITTING DIODE RED	1

RESISTORS

Ref. No.	Part No.	Part Name & Description	Remarks
R6301	ERJ3GEYJ680V	MGF CHIP 1/16W 68	1
R6302	ERJ3GEYJ680V	MGF CHIP 1/16W 68	1
R6303	ERJ3GEYJ680V	MGF CHIP 1/16W 68	1
R6304	ERJ3GEYJ680V	MGF CHIP 1/16W 68	1
R6305	ERJ3GEYJ680V	MGF CHIP 1/16W 68	1
R6311	ERJ3GEY0R00V	MGF CHIP 1/16W 0	1
R6312	ERJ3GEY0R00V	MGF CHIP 1/16W 0	1
R6313	ERJ3GEY0R00V	MGF CHIP 1/16W 0	1
R6314	ERJ3GEY0R00V	MGF CHIP 1/16W 0	1
R6315	ERJ3GEY0R00V	MGF CHIP 1/16W 0	1
R6323	ERJ3GEYJ561V	MGF CHIP 1/16W 560	1
R6324	ERJ3GEY0R00V	MGF CHIP 1/16W 0	1
R6325	ERJ6GEYJ150V	MGF CHIP 1/10W 15	1
R6326	ERJ3GEY0R00V	MGF CHIP 1/16W 0	1
R6327	ERJ3GEY0R00V	MGF CHIP 1/16W 0	1
R7001	ERJ6GEYJ122V	MGF CHIP 1/10W 1.2K +-5%	1

CAPACITORS

Ref. No.	Part No.	Part Name & Description	Remarks
C6301	F3G0J107A017	TANTALUM CHIP 6.3V 100UF	1
C6302	F1H1C104A041	C CHIP 16V 0.1UF	1
C6303	F1H1C104A041	C CHIP 16V 0.1UF	1
C6304	ECJ1VC1H180J	C CHIP 50V 18PF	1
C6305	ECJ1VC1H180J	C CHIP 50V 18PF	1
C6306	ECJ1VC1H180J	C CHIP 50V 18PF	1
C6307	ECJ1VC1H180J	C CHIP 50V 18PF	1
C6308	ECJ1VC1H180J	C CHIP 50V 18PF	1
C6310	F1H1H103A219	C CHIP 50V 0.01UF	1
C6312	F1H1H103A219	C CHIP 50V 0.01UF	1
C6313	F1H1H103A219	C CHIP 50V 0.01UF	1
C6315	F1H1H103A219	C CHIP 50V 0.01UF	1
C6316	F1H1H103A219	C CHIP 50V 0.01UF	1
C6317	F1H1H103A219	C CHIP 50V 0.01UF	1
C6319	F1H1H103A219	C CHIP 50V 0.01UF (J,K,L)	1

COILS

Ref. No.	Part No.	Part Name & Description	Remarks
L6301	G1C100KA0031	COIL CHIP 10UH	1

PIN HEADERS

Ref. No.	Part No.	Part Name & Description	Remarks
P6301	K1KA02BA0014	CONNECTOR 2P	1
FP6301	K1MN24BA0196	CONNECTOR 24P	1

SWITCHES

Ref. No.	Part No.	Part Name & Description	Remarks
SW6301	K0F111A00547	SWITCH PUSH	1
SW6302	K0D113B00087	SWITCH SLIDE	1
SW6303	K0F111A00547	SWITCH PUSH	1
SW6304	K0F111A00547	SWITCH PUSH	1
SW6305	K0L1AA000010	SWITCH SEESAW	1
SW6306	K0F111A00547	SWITCH PUSH (J,K,L)	1

17.3.6. OPEN SWITCH P.C.B.

SWITCH

Ref. No.	Part No.	Part Name & Description	Remarks
SW8301	K0L1AA000010	SWITCH SEESAW	1