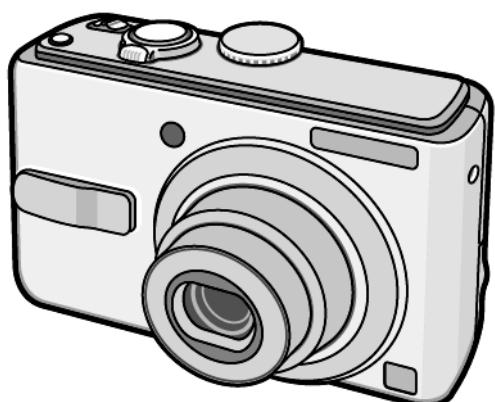


Service Manual

Digital Camera

LUMIX



DMC-LS70P
DMC-LS70PC
DMC-LS70PL
DMC-LS70EB
DMC-LS70EE
DMC-LS70EG
DMC-LS70EGM
DMC-LS70GC
DMC-LS70GK
DMC-LS70GN
DMC-LS75P
DMC-LS75PC
DMC-LS75PL
DMC-LS75EB
DMC-LS75EE
DMC-LS75EF
DMC-LS75EG
DMC-LS75EGM
DMC-LS75GC
DMC-LS75GK
DMC-LS75GN
DMC-LS60PC

Panasonic®

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DMC-LS60PL
DMC-LS60EB
DMC-LS60EE
DMC-LS60EF
DMC-LS60EG
DMC-LS60EGM

DMC-LS60GC
DMC-LS60GK
DMC-LS60GN

Vol. 1

Colour

(S).....Silver Type (except DMC-LS75PC)
 (K).....Black Type (only DMC-LS75P/PC/EB/EE/
 EF/EG/EGM)

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.

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1 Safety Precaution

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 X-RADIATION, 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.

1.2. Leakage Current Cold Check

1. Unplug the AC cord and connect a jumper between the two prongs on the plug.
2. Measure the resistance value, with an ohmmeter, between the jumpered AC plug and each exposed metallic cabinet part on the equipment such as screwheads, connectors, control shafts, etc. When the exposed metallic part has a return path to the chassis, the reading should be between $1\text{ M}\Omega$ and $5.2\text{ M}\Omega$. When the exposed metal does not have a return path to the chassis, the reading must be infinity.

1.3. Leakage Current Hot Check (See Figure 1.)

1. Plug the AC cord directly into the AC outlet. Do not use an isolation transformer for this check.
2. Connect a $1.5\text{ k}\Omega$, 10 W resistor, in parallel with a $0.15\text{ }\mu\text{F}$ capacitor, between each exposed metallic part on the set and a good earth ground, as shown in Figure 1.
3. Use an AC voltmeter, with $1\text{ k}\Omega/\text{V}$ or more sensitivity, to measure the potential across the resistor.
4. Check each exposed metallic part, and measure the voltage at each point.
5. Reverse the AC plug in the AC outlet and repeat each of the above measurements.
6. The potential at any point should not exceed 0.75 V RMS . A leakage current tester (Simpson Model 229 or equivalent) may be used to make the hot checks, leakage current must not exceed $1/2\text{ mA}$. In case a measurement is outside of the limits specified, there is a possibility of a shock hazard, and the equipment should be repaired and rechecked before it is returned to the customer.

Hot-Check Circuit

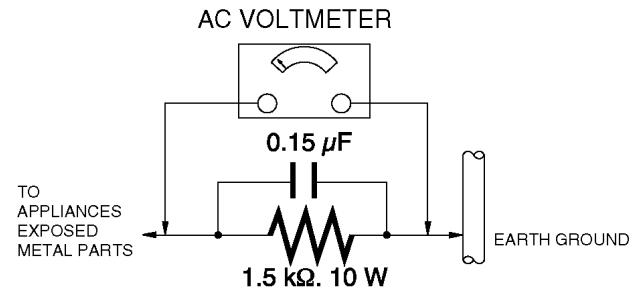


Figure. 1

1.4. How to Discharge the Capacitor on Flash Top PCB

CAUTION:

1. Be sure to discharge the capacitor on FLASH TOP PCB.
2. Be careful of the high voltage circuit on FLASH TOP PCB when servicing.

[Discharging Procedure]

1. Refer to the disassemble procedure and Remove the necessary parts/unit.
2. Put the insulation tube onto the lead part of Resistor (ERG5SJ102:1kΩ /5W).
(an equivalent type of resistor may be used.)
3. Put the resistor between both terminals of capacitor on FLASH TOP PCB for approx. 5 seconds.
4. After discharging confirm that the capacitor voltage is lower than 10V using a voltmeter.

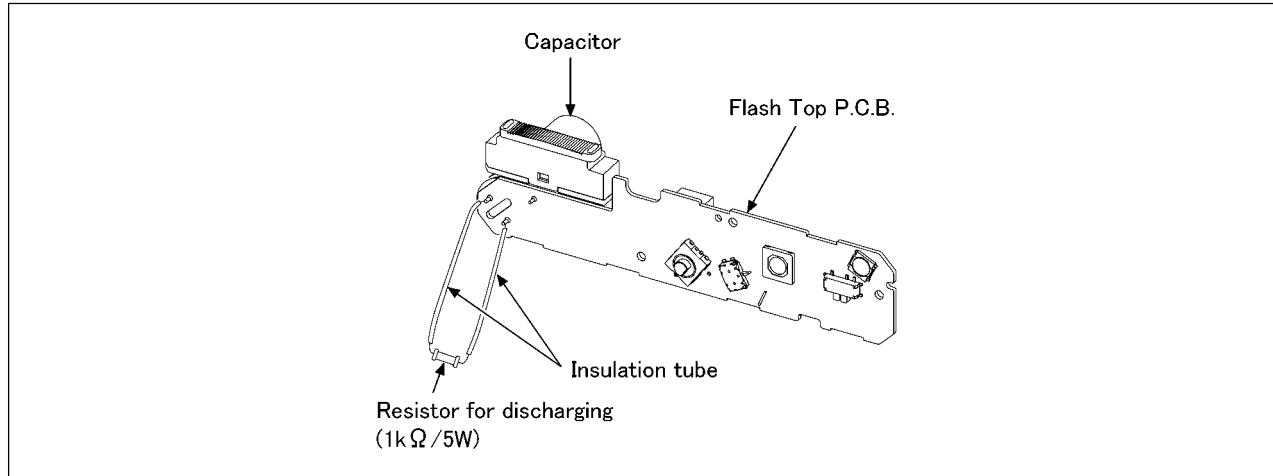


Fig. F1

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 CCD image sensor, IC (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).

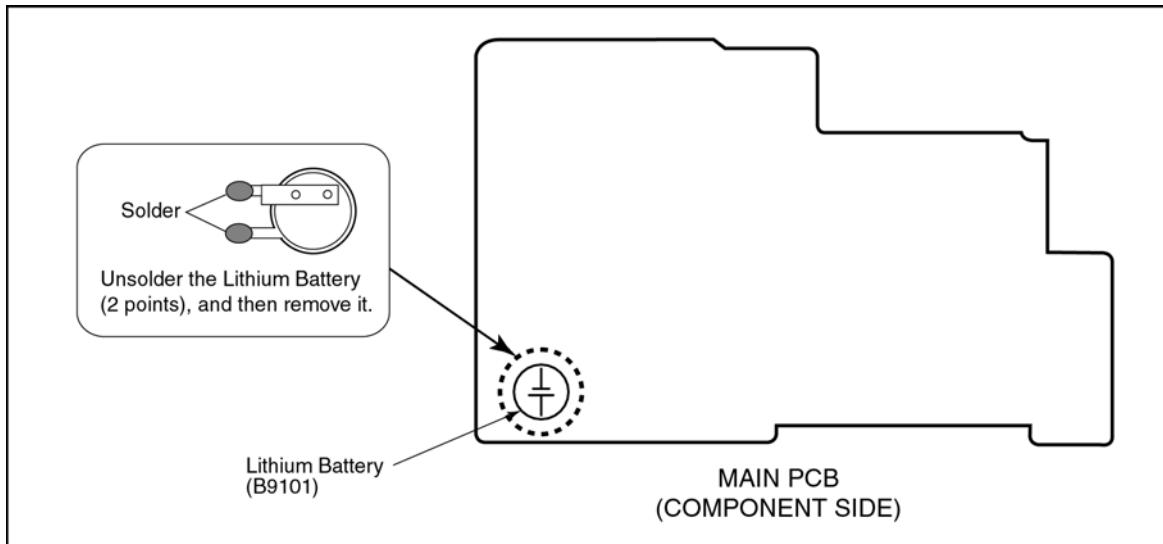
2.2. How to Replace the Lithium Battery

2.2.1. Replacement Procedure

1. Remove the Main PCB. (Refer to Disassembly Procedures.)
2. Unsolder the each soldering point of electric lead terminal for Lithium battery (Ref. No. "B9101" at component side of Main PCB) and remove the Lithium battery together with electric lead terminal. Then replace it into new one.

NOTE:

The Type No. ML614S/F9FE includes electric lead terminals.



NOTE:

This Lithium battery is a critical component.

(Type No.: ML614S/F9FE **Manufactured by Matsushita Battery Industrial Co.,Ltd.**)

It must never be subjected to excessive heat or discharge.

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

Replacement batteries must be of 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.

(For English)

CAUTION

Danger of explosion if battery is incorrectly replaced.

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

Dispose of used batteries according to the manufacturer's instructions.

(For German)

ACHTUNG

Explosionsgefahr bei falschem Anbringen der Batterie. Ersetzen Sie nur mit einem äquivalentem vom Hersteller empfohlenem Typ.

Behandeln Sie gebrauchte Batterien nach den Anweisungen des Herstellers.

(For French)

MISE EN GARDE

Une batterie de remplacement inappropriée peut exploser. Ne remplacez qu'avec une batterie identique ou d'un type recommandé par le fabricant. L'élimination des batteries usées doit être faite conformément aux instructions du manufacturier.

NOTE:

Above caution are also applicable for below batteries which is for DMC-LS60, LS70 and LS75 all series, as well.

1. AA Oxyride batteries
2. AA Alkaline batteries
3. AA Rechargeable Ni-MH (nickel-metal hydride) batteries

3 Service Navigation

3.1. Introduction

This service manual contains technical information, which 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, the information will be followed by service manual to be controlled with original service manual.

3.2. 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°C (86°F) more than that of the normal solder.

Distinction 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°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%

3.3. Important Notice 1:(Other than U.S.A. and Canadian Market)

1. The service manual does not contain the following information, because of the impossibility of servicing at component level without concerned equipment/facilities.
 - a. Schematic diagram, Block Diagram and PCB layout of MAIN PCB.
 - b. Parts list for individual parts for MAIN PCB.

When a part replacement is required for repairing MAIN PCB, replace as an assembled parts. (Main PCB)

2. The following category is/are recycle module part. please send it/them to Central Repair Center.
 - MAIN PCB (DMC-LS60/LS70: VEP56043B, DMC-LS75: VEP56043A)
: Excluding replacement of Lithium Battery

3.4. How to Define the Model Suffix (NTSC or PAL model)

There are five kinds of DMC-LS60/LS70/LS75, regardless of the colours.

- a) DMC-LS75S
- b) DMC-LS70, LS75P, DMC-LS60, LS70, LS75PC
- c) DMC-LS60, LS70, LS75EB/EG/EGM/GN, DMC-LS60, LS75EF
- d) DMC-LS60, LS70, LS75EE
- e) DMC-LS60, LS70, LS75PL/GC/GK

(DMC-LS75S is exclusively Japan domestic model.)

What is the difference is that the "INITIAL SETTINGS" data which is stored in Flash ROM mounted on Main PCB.

3.4.1. Defining methods:

To define the model suffix to be serviced, refer to the nameplate which is putted on the bottom side of the Unit.

a) DMC-LS75S

DMC-LS75S is exclusively Japan domestic model.

b) DMC-LS70, LS75P, DMC-LS60, LS70, LS75PC

The nameplate for these models show the following
Safty registration mark.



c) DMC-LS60, LS70, LS75EB/EG/EGM/GN DMC-LS60, LS75EF

The nameplate for these models show the following
Safty registration mark.



d) DMC-LS60, LS70, LS75EE

The nameplate for these models show the following
Safty registration mark.



e) DMC-LS60, LS70, LS75PL/GC/GK

The nameplate for these models do not show any above Safty registration mark.

NOTE:

After replacing the MAIN PCB, be sure to achieve adjustment.

The adjustment instruction is available at "software download" on the "Support Information from NWBG/VDBG-PAVC" web-site in "TSN system", together with Maintenance software.

3.4.2. INITIAL SETTINGS:

When you replace the Main PCB, be sure to perform the initial settings after achieving the adjustment by ordering the following procedure in accordance with model suffix of the unit.

1. IMPORTANT NOTICE:

Before proceeding Initial settings, be sure to read the following CAUTIONS.

CAUTION 1 (Initial Settings)

DO NOT select "NONE(JAPAN)" or "P"(North America) if need to select "EG/EGM/PL/GC/GK/EF/EB/EE/GN and PC".

Otherwise, once "NONE(JAPAN)" or "P"(North America) are selected, "EG/EGM/PL/GC/GK/EF/EB/EE/GN and PC" will not displayed, thus, RE-Settings (changing area) can not be made.

CAUTION 2 (Picture back up from "Built-in Memory")

This unit employs "Built-in Memory" for picture image data recording.(Approx.27MB)
Be sure to make picture data back up (i.e., Copying to SD memory card), before proceeding "INITIAL SETTINGS".

Once "INITIAL SETTINGS" has been carried out, all image data stored at "Built-in Memory" is erased.

2. PROCEDURES:

- Preparation. Proceed the picture back up from the unit (Refer to above "CAUTION 2")

- Step 1. The temporary cancellation of initial setting:**

Set the mode dial to "[Normal picture mode] (Red camera mark)".

While keep pressing [E.ZOOM] and "[UP] of Cross key" simultaneously, turn the Power on.

- Step 2. The cancellation of initial setting:**

Set the mode dial to "[Playback]".

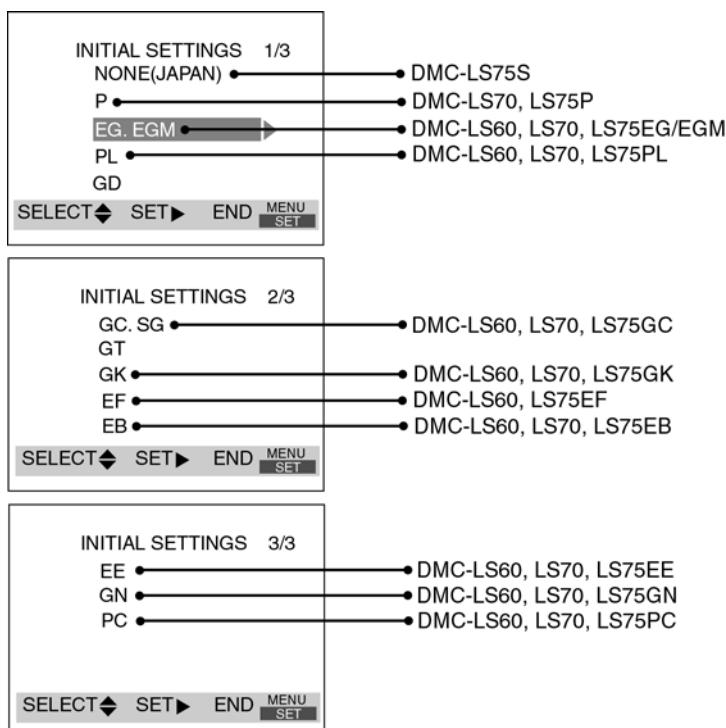
Press [E.ZOOM] and "[UP] of Cross key" simultaneously, then turn the Power off.

- Step 3. Turn the Power on:**

Set the mode dial to "[Normal picture mode] (Red camera mark)", and then turn the Power on.

- Step 4. Display the INITIAL SETTING:**

While keep pressing [MENU] and "[RIGHT] of Cross key" simultaneously, turn the Power off.



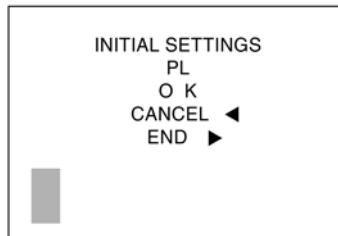
• **Step 5. Set the INITIAL SETTING: (Refer to “CAUTION 1”)**

[Caution for before settings]

Once "NONE(JAPAN)" (Area for Japan) or "P" (Area for North America) is selected with "INITIAL SETTINGS", other areas will not be displayed even if "INITIAL SETTINGS" menu is displayed again, thus, the area can not be changed.

Select the area carefully.

Select the area with pressing “[UP] / [DOWN] of Cross key”, and then press the “[RIGHT] of Cross key”.



The only set area is displayed, and then press the “[RIGHT] of Cross key” after confirmation.

(The unit is powered off automatically.)

Confirm the display of “PLEASE SET THE CLOCK” in English when the unit is turned on again.

• **Step 6. CONFIRMATION:**

The display shows “PLEASE SET THE CLOCK” when turn the Power on again.

When the unit is connected to PC with USB cable, it is detected as removable media.

(When the “GK” model suffix is selected, the display shows “PLEASE SET THE CLOCK” in Chinese.)

1) As for your reference Default setting condition is given in the following table.

• **Default setting (After “INITIAL SETTINGS”)**

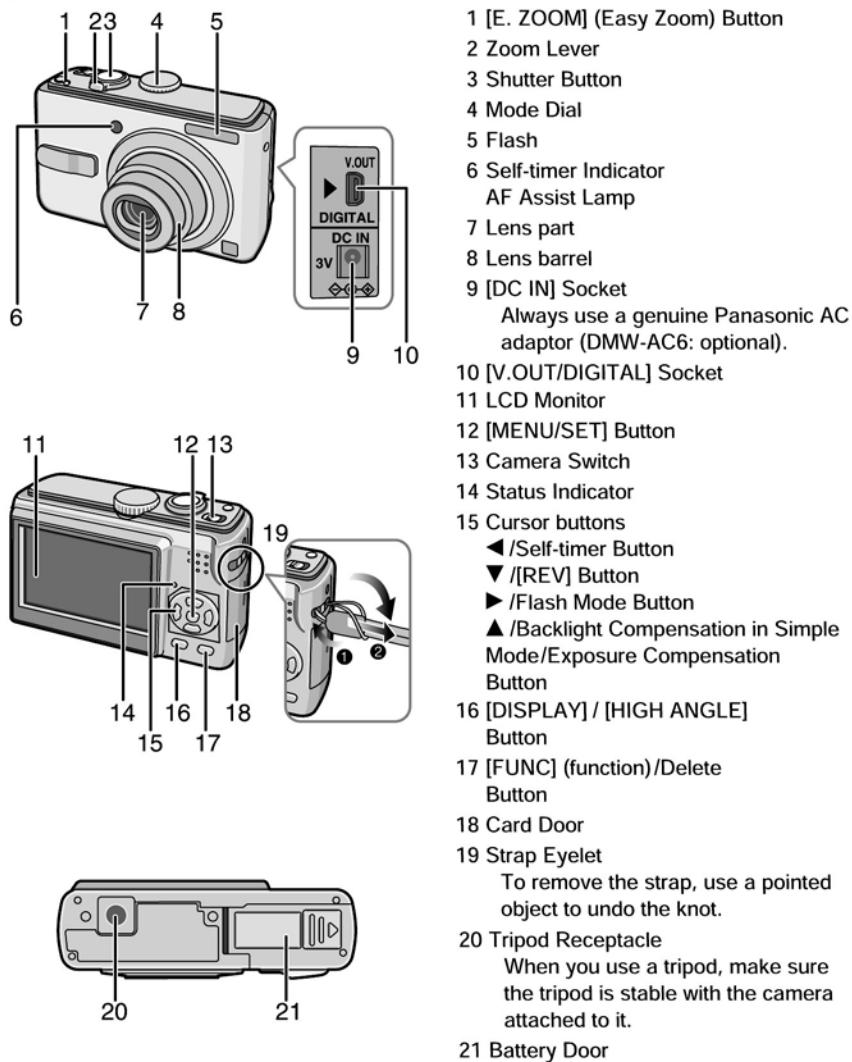
	MODEL	VIDEO OUTPUT	LANGUAGE	DATE	REMARKS
a)	DMC-LS75S	NTSC	Japanese	Year/Month/Date	
b)	DMC-LS70, LS75P, DMC-LS60, LS70, LS75PC/PL	NTSC	English	Month/Date/Year	
c)	DMC-LS60, LS70, LS75EB/EG/EGM/GC/GN	PAL	English	Date/Month/Year	
d)	DMC-LS60, LS75EF	PAL	French	Date/Month/Year	
e)	DMC-LS60, LS70, LS75EE	PAL	Russian	Date/Month/Year	
f)	DMC-LS60, LS70, LS75GK	PAL	Chinese (simplified)	Year/Month/Date	

4 Specifications

Digital Camera:	Information for your safety	Flash:	Flash range: (ISO AUTO) Approx. 30 cm (0.98 feet) to 4.7 m (15.42 feet) (Wide [ISO AUTO] mode) AUTO, AUTO/Red-eye reduction, Forced ON (Forced ON/Red-eye reduction), Slow sync./Red-eye reduction, Forced OFF
Power Source:	DC 3 V	Recording media:	Built-in Memory (Approx. 27 MB)/SD Memory Card/SDHC Memory Card/MultiMediaCard (Still pictures only)
Power Consumption:	DMC-LS75/DMC-LS70: 1.5 W (When recording) DMC-LS60: 1.4 W (When recording) 0.6 W (When playing back)	Picture size:	Aspect ratio [4:3]: 3072 × 2304 pixels (DMC-LS75/DMC-LS70), 2816 × 2112 pixels (DMC-LS60 only), 2560 × 1920 pixels (DMC-LS75/DMC-LS70), 2048 × 1536 pixels, 1600 × 1200 pixels, 1280 × 960 pixels, 640 × 480 pixels Aspect ratio [3:2]: 3072 × 2048 pixels (DMC-LS75/DMC-LS70), 2816 × 1880 pixels (DMC-LS60 only), 2048 × 1360 pixels Aspect ratio [16:9]: 3072 × 1728 pixels (DMC-LS75/DMC-LS70), 2816 × 1584 pixels (DMC-LS60 only), 1920 × 1080 pixels Aspect ratio [4:3]: 640 × 480 pixels(Only when using an SD Memory card/SDHC Memory Card), 320 × 240 pixels Aspect ratio [16:9]: 848 × 480 pixels(Only when using an SD Memory card/SDHC Memory Card) Fine/Standard
Camera Effective pixels:	DMC-LS75/DMC-LS70: 7,200,000 pixels DMC-LS60: 6,000,000 pixels	Motion picture:	Quality: Recording file format
Image sensor:	1/2.5" CCD	Still Picture:	JPEG (Design rule for Camera File system, based on Exif 2.21 standard), DPOF corresponding QuickTime Motion JPEG
Total pixels	DMC-LS75/DMC-LS70: 7,380,000 pixels DMC-LS60: 6,370,000 pixels	Interface	USB 2.0 (Full Speed) NTSC/PAL Composite (Switched by menu)
Lens:	Primary color filter	Digital:	Dedicated jack (8 pin)
Digital zoom:	Optical 3 × zoom, f=5.8 to 17.4 mm [35 mm film camera equivalent: 35 to 105 mm] /F2.8 to F5.0	Analog video:	Type1 jack
Extended optical zoom:	Max. 4 ×	Terminal	3.69"(W) × 2.44"(H) × 1.17"(D) (93.7 mm (W) × 62.0 mm (H) × 29.7 mm (D)) (excluding the projection part)
Focus:	DMC-LS75/DMC-LS70 : max 4.5 × (When recording resolution is [3M] or less) DMC-LS60 : max 4.1 × (When recording resolution is [3M] or less)	Dimensions:	DMC-LS75: Approx. 4.87 oz/138 g (excluding Memory Card and battery) Approx. 6.49 oz/184 g (with Memory Card and battery) DMC-LS70/DMC-LS60: Approx. 4.76 oz/135 g (excluding Memory Card and battery) Approx. 6.38 oz/181 g (with Memory Card and battery)
Focus range:	Normal/Macro (Mode dial) 5-area-focusing/1-area-focusing (high speed)/1-area-focusing	Weight:	Operating Temperature: 0 °C to 40 °C (32 °F to 104 °F) Operating Humidity: 10 % to 80 %
Shutter system:	Normal : 50 cm (1.64 feet) to ∞ Macro/Simple/Intelligent ISO/Motion picture: 5 cm (0.16 feet) (Wide)/ 30 cm (0.98 feet) (Tele) to ∞ Scene mode: settings may be different to those shown above		
Motion picture recording:	Aspect ratio [4:3]: 640 × 480 pixels (When a card is used.)/ 320 × 240 pixels Aspect ratio [16:9]: 848 × 480 pixels (When a card is used.) 30 or 10 frames/second without audio		
Burst recording			
Burst speed:	Depends on the type of card, the recording resolution, and picture quality		
Number of recordable pictures:	Depends on the remaining capacity of the Built-in memory or the card. (unlimited)		
ISO sensitivity:	AUTO/ 100/200/400/800/1250 [HIGH SENS.] mode: 3200		
Shutter speed:	8 seconds to 1/2,000th of a second [STARRY SKY] mode: 15 seconds, 30 seconds, 60 seconds Motion picture mode: 1/30th of a second to 1/6,400th of a second		
White balance:	Auto white balance/Daylight/Cloudy/Shade/Halogen/White set		
Exposure (AE):	Program AE Exposure compensation (1/3 EV Step, -2 EV to +2 EV)		
Metering mode:	Multiple		
LCD monitor:	Amorphous silicon active TFT LCD DMC-LS75: 2.5" (Approx. 115,200 pixels) (field of view ratio about 100%) DMC-LS70/DMC-LS60: 2.0" (Approx. 86,400 pixels) (field of view ratio about 100%)		

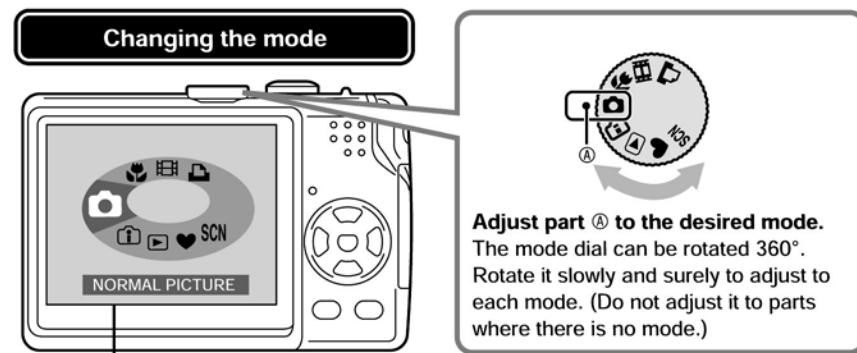
5 Location of Controls and Components

Names of the Components



About the Mode Dial

When the power is on and you turn the mode dial, you can switch between shooting and playback modes, and also select modes suited to the subject such as the macro mode and scene modes.



This screen appears when you turn the mode dial to show which mode is selected. The current mode appears on the LCD when you turn the camera on.

Basic	Advanced
Normal picture mode Use this mode for normal recording.	Intelligent ISO mode This feature detects the subject's movement and brightness, choosing the optimal ISO sensitivity and shutter speed for shooting.
Simple mode This mode is recommended for beginners.	Macro mode This mode allows you to take a close-up picture of a subject.
Playback mode This mode allows you to play back recorded pictures.	SCN Scene mode This mode allows you to take pictures depending on the recording scenes.
	Motion picture mode This mode allows you to record motion pictures.
	Print mode This mode allows you to print pictures from a PictBridge-compliant printer connected directly to the camera.

6 Service Mode

6.1. Error Code Memory Function

1. General description

This unit is equipped with history of error code memory function, and can be memorized 16 error codes in sequence from the latest. When the error is occurred more than 16, the oldest error is overwritten in sequence.

The error code is not memorized when the power supply is shut down forcibly (when the unit is powered on by the battery, the battery is pulled out) because the error code is memorized to FLASH ROM when the unit is powered off.

2. How to display

The error code can be displayed by the following procedure:

Before perform the error code memory function, connect the AC adaptor or insert the battery.

(Since this unit has built-in memory, this error code memory function can be performed without inserting SD memory card.)

- 1. The temporary cancellation of initial setting:

Set the mode dial to “[Normal picture mode] (Red camera mark)”.

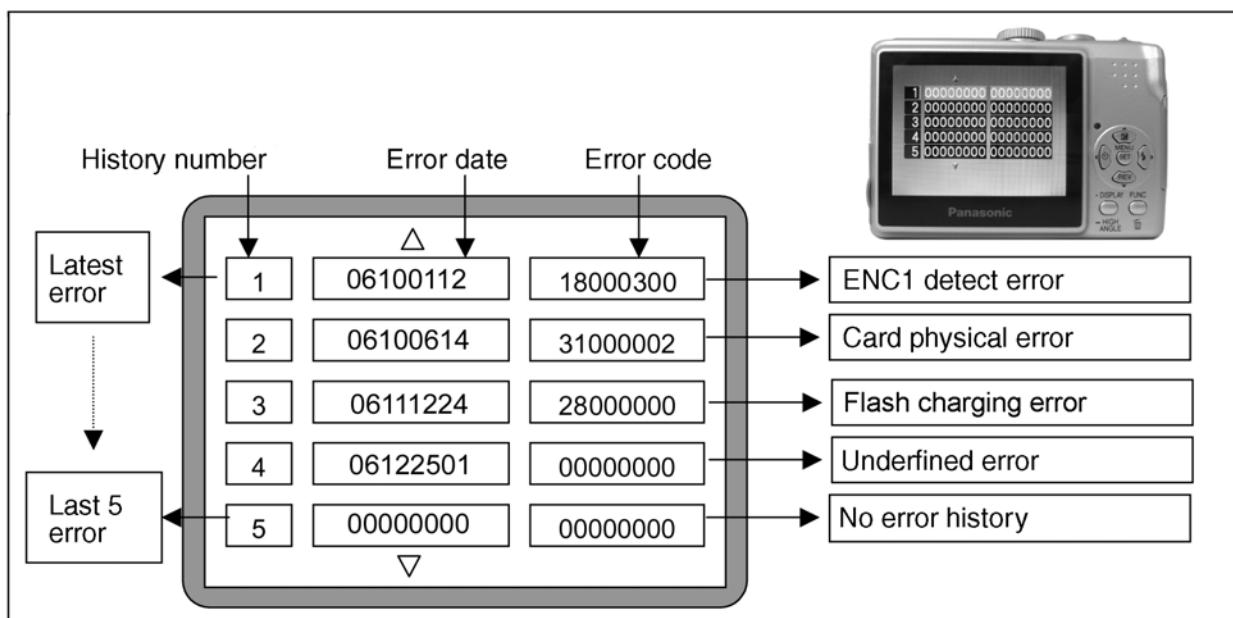
While keep pressing [E.ZOOM] and “[UP] of Cross key” simultaneously, turn the Power on.

- 2. The display of error code:

Press [E.ZOOM], [MENU] and “[LEFT] of Cross key” simultaneously with the step 1 condition.

The display is changed as shown below when the above buttons is pressed simultaneously.

Normal display → Error code display → Operation history display → Normal display →



Example of Error Code Display

- 3. The change of display:

The error code can be memorized 16 error codes in sequence, however it is displayed 5 errors on the LCD.

Display can be changed by the following procedure:

“[UP] or [DOWN] of Cross key” : It can be scroll up or down one.

“[LEFT] or [RIGHT] of Cross key” : It can be display last 5 error or another 5 error.

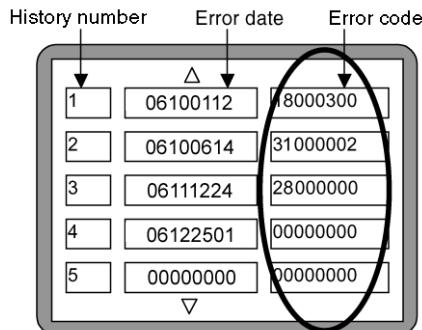
- 4. How to read the error date:

The error date code is displayed from the left in order at the year, month, day, time.

Error date information is acquired from "Clock setting" information when the error occurs. When the clock is not setting, it is displayed as “00000000”.

• 5. How to read the error code:

One error code is displayed for 8 bit, the contents of error codes is indicated the table as shown below.



Attribute	Main item	Sub item	Error code		Contents (Upper)	
			High 4 bits	Low 4 bits	Check point (Lower)	
LENS	Lens drive	OIS	18*0	1000	PSD (X) error. Hall element (X axis) position detect error in OIS unit.	
					OIS Unit	
				2000	PSD (Y) error. Hall element (Y axis) position detect error in OIS unit.	
					OIS Unit	
				3000	GYRO (X) error. Gyro (IC7102: X axis) detect error on Main P.C.B..	
					IC7102 (Gyro element) or IC6001 (VENUS 3)	
				4000	GYRO (Y) error. Gyro (IC7101: Y axis) detect error on Main P.C.B..	
					IC7101 (Gyro element) or IC6001 (VENUS 3)	
				5000	MREF error (Reference voltage error).	
					IC7001 (LENS drive) or IC6001 (VENUS 3)	
		C.B./Zoom		6000	Drive voltage (X) error.	
					VENUS 3 AD value error, LENS Unit, LENS flex breaks etc.	
				7000	Drive voltage (Y) error.	
					VENUS 3 AD value error, LENS Unit, LENS flex breaks etc.	
				0100	HP Low detect error (C.B. encoder (full retract) always Low detect).	
					FP9001-(3,5) signal line or IC6001 (VENUS 3)	
				0200	HP High detect error (C.B. encoder (full retract) always High detect).	
					FP9001-(2,4) signal line or IC6001 (VENUS 3)	
		Focus		0300	ENC1 detect error (C.B. motor encoder detect error).	
					FP9001-(3) signal line or IC6001 (VENUS 3)	
				0400	ENC2 detect error (C.B. motor encoder detect error).	
					FP9001-(5) signal line or IC6001 (VENUS 3)	
		Lens	18*1	0001	HP Low detect error (Focus encoder always Low detect error).	
					FP9001-(23) signal line or IC6001 (VENUS 3)	
			18*2	0002	HP High detect error (Focus encoder always High detect error).	
					FP9001-(21) signal line or IC6001 (VENUS 3)	
				0000	Power ON time out error.	
					Lens drive system	
				0000	Power OFF time out error.	
					Lens drive system	
	Adj.History	OIS	19*0	2000	OIS adj. Yaw direction amplitude error (small)	
				3000	OIS adj. Pitch direction amplitude error (small)	
				4000	OIS adj. Yaw direction amplitude error (large)	
				5000	OIS adj. Pitch direction amplitude error (large)	
				6000	OIS adj. MREF error	
				7000	OIS adj. time out error	
				8000	OIS adj. Yaw direction off set error	
				9000	OIS adj. Pitch direction off set error	
				A000	OIS adj. Yaw direction gain error	
				B000	OIS adj. Pitch direction gain error	
				C000	OIS adj. Yaw direction position sensor error	
				D000	OIS adj. Pitch direction position sensor error	
				E000	OIS adj. other error	

Attribute	Main item	Sub item	Error code		Contents (Upper) Check point (Lower)
			High 4 bits	Low 4 bits	
HARD	VENUS A/D	Flash	20*0	0000	Flash charging error. IC6001-(247) signal line or Flash charging circuit
	FLASH ROM (EEPROM Area)	FLASH ROM (EEPROM Area)	2B*0	0001	EEPROM read error IC6002 (FLASH ROM)
				0002	EEPROM write error IC6002 (FLASH ROM)
SOFT	SYSTEM	RTC	2C*0	0001	SYSTEM IC initialize failure error Communication between IC6001 (VENUS 3) and IC9101 (SYSTEM)
	CPU	Reset	30*0	0001 0007	NMI reset Non Mask-able Interrupt (30000001-30000007 are caused by factors)
SOFT	Card	Card	31*0	0001	Card logic error SD memory card data line or IC6001 (VENUS 3)
				0002	Card physical error SD memory card data line or IC6001 (VENUS 3)
				0004	Write error SD memory card data line or IC6001 (VENUS 3)
				0005	Format error
	CPU, ASIC hard	Stop	38*0	0001	Camera task finish process time out. Communication between Lens system and IC6001 (VENUS 3)
				0002	Camera task invalid code error. IC6001 (VENUS 3)
				0100	File time out error in recording motion image IC6001 (VENUS 3)
				0200	File data send error in recording motion image IC6001 (VENUS 3)
				0300	Single or burst recording brake time out.
	Operation	Power on	3B*0	0000	FLASHROM processing early period of camera during movement.
	Zoom	Zoom	3C*0	0000	Imperfect zoom lens processing. Zoom lens
				0001 0007	Software error. (0-7bit : command, 8-15bit : status)
			35*0	0000	Though record preprocessing is necessary, it is not called.
			35*1	0000	Though record preprocessing is necessary, it is not completed.
			3C*0	0000	Imperfect zoom lens processing.

About "*" indication in the above table:

The third digit from the left is different as follows.

- In case of 0 (example: 18001000)

When the third digit from the left shows "0", this error occurred under the condition of INITIAL SETTINGS has been completed.

It means that this error is occurred basically at user side.

- In case of 8 (example: 18801000)

When the third digit from the left shows "8", this error occurred under the condition of INITIAL SETTINGS has been released.

(Example; Factory assembling-line before unit shipment, Service mode etc.)

It means that this error is occurred at service side.

• 6. How to returned to Normal Display:

Turn the power off and on, to exit from Error code display mode.

NOTE:

The error code can not be initialized.

6.2. Confirmation of Firmware Version

The Firmware version can be confirmed by ordering the following steps:.

- **Step 1. The temporary cancellation of initial setting:**

Set the mode dial to “[Normal picture mode] (Red camera mark)”.

Insert the SD memory card which has a few photo data.

While keep pressing [E.ZOOM] and “[UP] of Cross key” simultaneously, then turn the power on.

- **Step 2. Confirm the version:**

Set the mode dial to “[Playback]” and then press [DISPLAY] to switch to LCD with indication. (Fig. A)

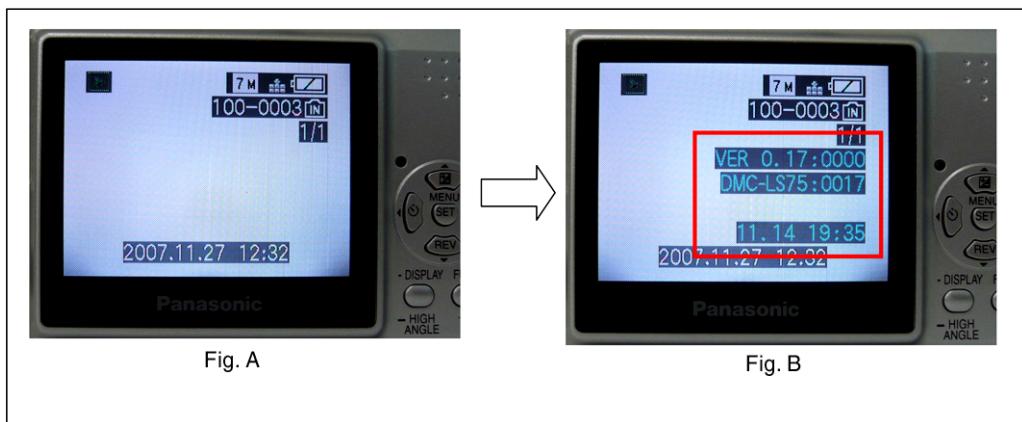
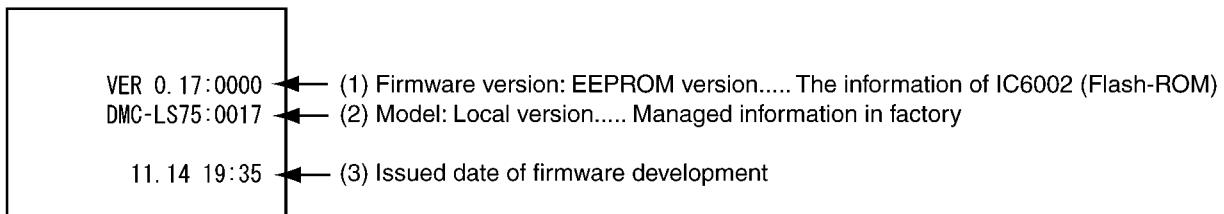
Press [E.ZOOM] and “[DOWN] of Cross key” simultaneously. (No need to keep pressing.)

(The version information is displayed on the LCD with light blue colour letters.) (Fig. B)

CAUTION:

The version information does not display if the LCD has switched to LCD with indication already.

In this case, press [DISPLAY] to switch to LCD with indication.



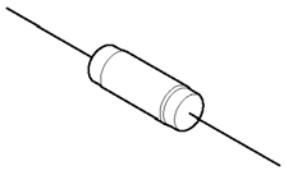
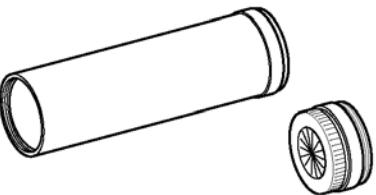
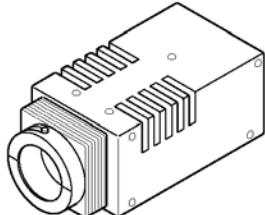
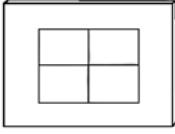
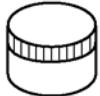
<Point>

- The firmware version and EEPROM version can be confirmed with the information (1).
- The information (2), (3) are just reference.

7 Service Fixture & Tools

7.1. Service Fixture and Tools

The following Service Fixture and tools are used for checking and servicing this unit.

Resistor for Discharging ERG5SJ102	Infinity Lens (with Focus Chart) VFK1164TCM02	LIGHT BOX VFK1164TDVLB
 An equivalent type of Resistor may be used.		 ※ with DC Cable
TR Chart RFKZ0434	Lens Cleaning Kit (BK) VFK1900BK	Grease (for lens) VFK1829
	 * Only supplied as 10 set/box.	
Furoyl grease (for focus motor) VFK1850	T3 Torx Driver RFKZ0334	
		

7.2. When Replacing the Main PCB

After replacing the MAIN PCB, be sure to achieve adjustment.

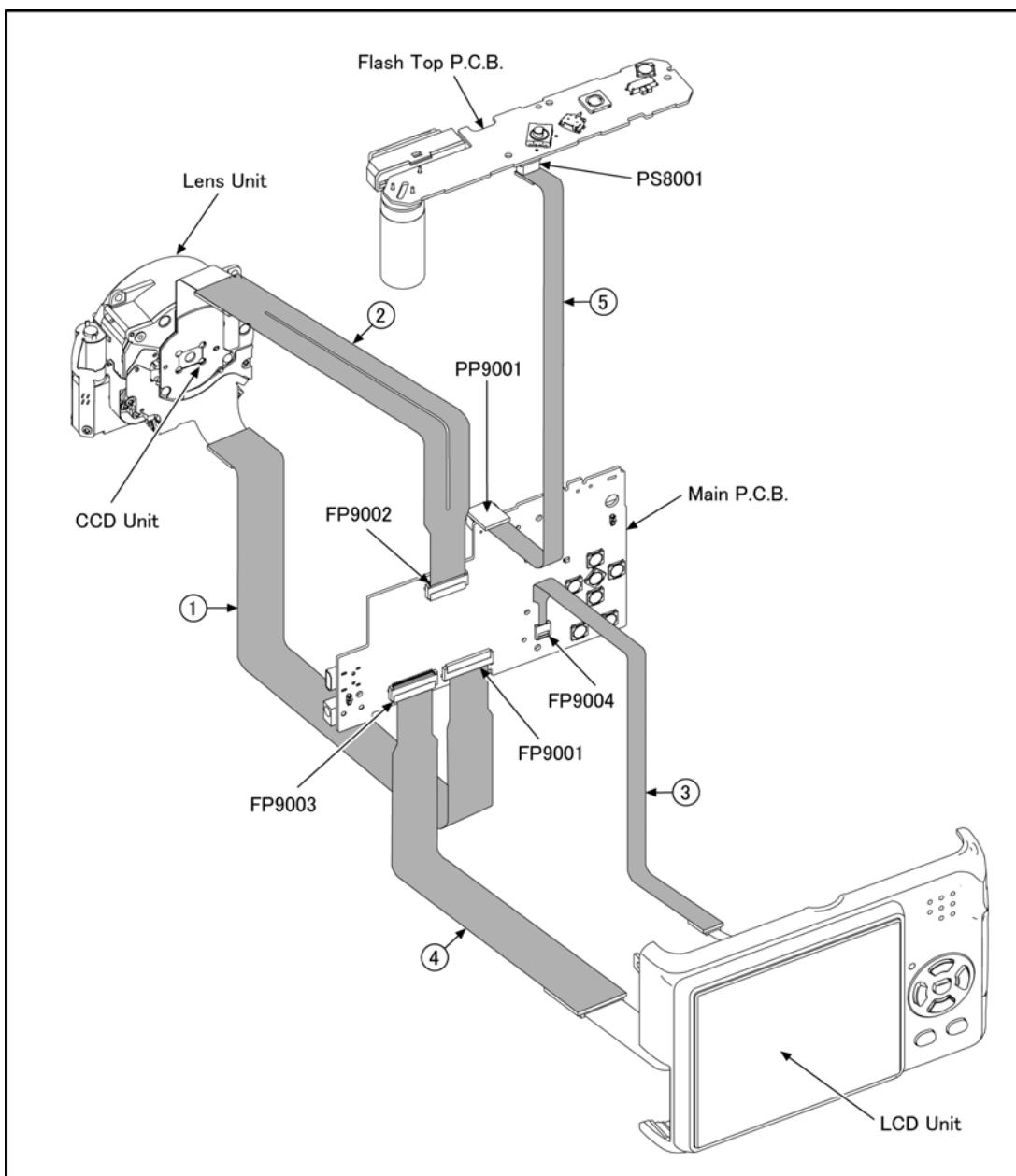
The adjustment instruction is available at "software download" on the "Support Information from NWBG/VDBG-PAVC" web-site in "TSN system", together with Maintenance software.

7.3. Service Position

This Service Position is used for checking and replacing parts. Use the following Extension cables for servicing.

Table S1 Extension Cable List

No.	Parts No.	Connection	Form
1	VFK1951	FP9001 (MAIN) - LENS UNIT	39PIN 0.3 FFC
2	VFK1978	FP9002 (MAIN) - CCD UNIT	31PIN 0.3 FFC
3	VFK1974	FP9004 (MAIN) - LCD UNIT	4PIN 0.3 FFC
4	RFKZ0354	FP9003 (MAIN) - LCD UNIT	37PIN 0.5 FFC
5	VFK1906	PP9001 (MAIN) - PS8001 (FLASH TOP)	20PIN B to B



CAUTION-1. (When servicing FLASH TOP PCB)

1. Be sure to discharge the capacitor on FLASH TOP PCB.

Refer to "HOW TO DISCHARGE THE CAPACITOR ON FLASH TOP PCB".

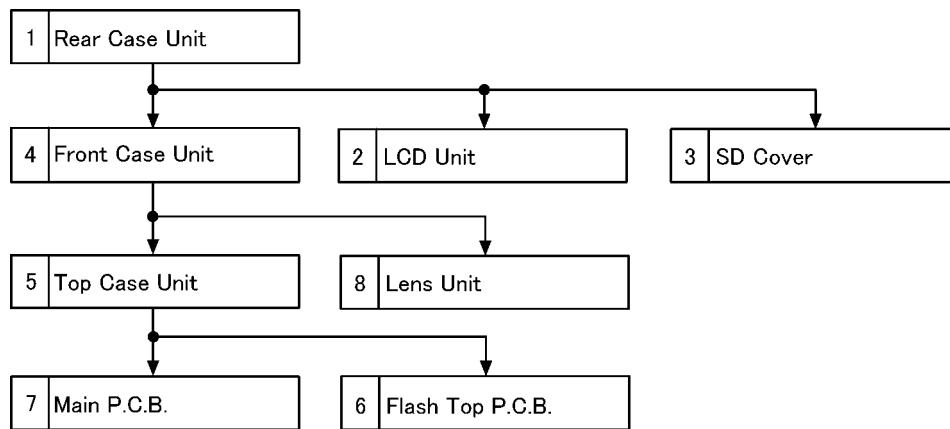
The capacitor voltage is not lowered soon even if the AC Cord is unplugged or the battery is removed.

2. Be careful of the high voltage circuit on FLASH TOP PCB.

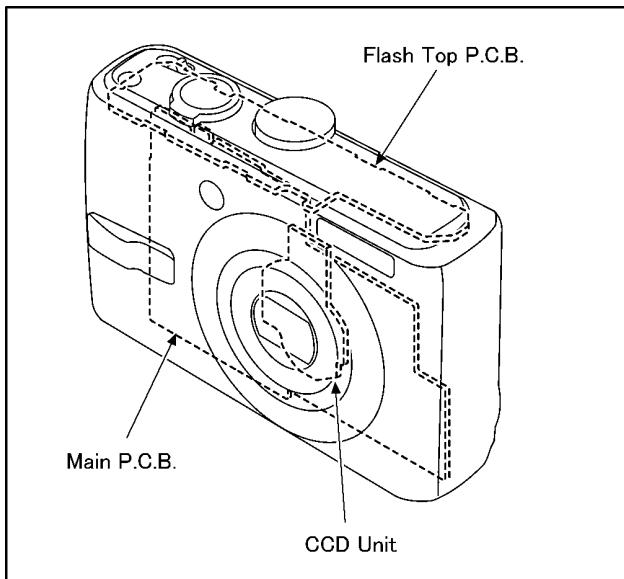
3. DO NOT allow other parts to touch the high voltage circuit on FLASH TOP PCB.

8 Disassembly and Assembly Instructions

8.1. Disassembly Flow Chart



8.2. PCB Location



8.3. Disassembly Procedure

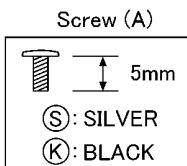
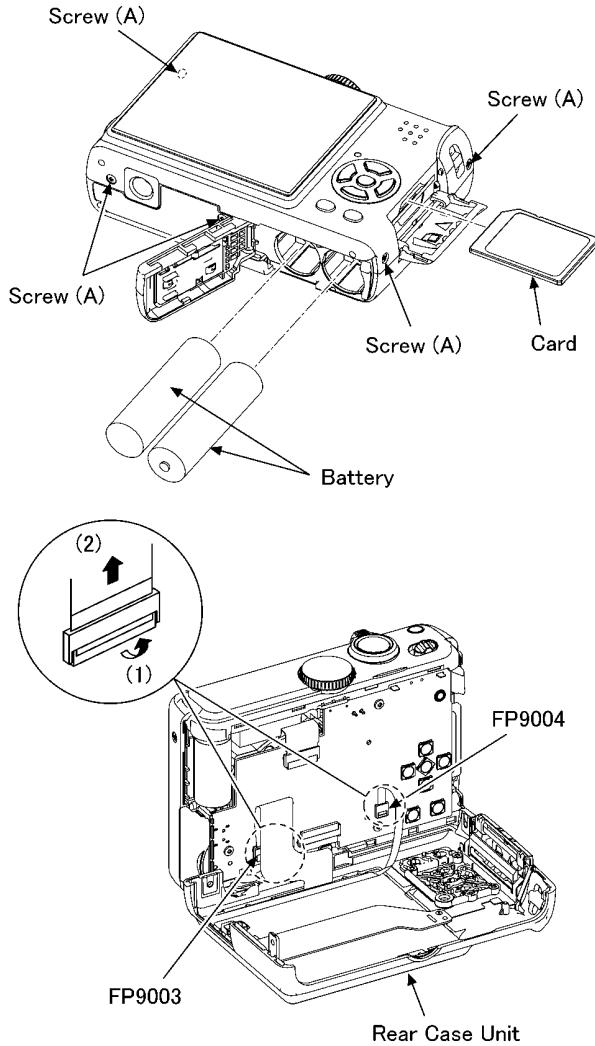
No.	Item	Fig	Removal
1	Rear Case Unit	Fig. D1	Card Battery 5 Screws (A) FP9003(Flex) FP9004(Flex) Rear Case Unit
2	LCD Unit	Fig. D2	1 Screw (B) LCD Holder LCD Unit
3	SD Cover	Fig. D3	Rear Knob LED Panel R SD Earth Plate Shaft SD Cover
4	Front Case Unit	Fig. D4	1 Screw (C) FP9001(Flex) FP9002(Flex) Front Case Unit
5	Top Case Unit	Fig. D5	PP9001(Connector) Top Case Unit
6	Flash Top P.C.B.	Fig. D6 Fig. D7	2 Screws (D) Top Operation Cover Flash Top P.C.B.
7	Main P.C.B.	Fig. D8	3 Screws (E) Solder (5 points) Main P.C.B.
8	Lens Unit	Fig. D9	3 Screws (F) Lens Unit

8.3.1. Removal of the Rear Case Unit

NOTE:

When servicing and reassembling, remove the card and battery from the unit.

- Card FP9003(Flex)
- Battery FP9004(Flex)
- Screw (A) x 5



NOTE: (When Replacing)

When remove the flex, pull up the connector in the direction of arrow (1), and then remove the flex in the direction of arrow (2).

Fig. D1

8.3.2. Removal of the LCD Unit

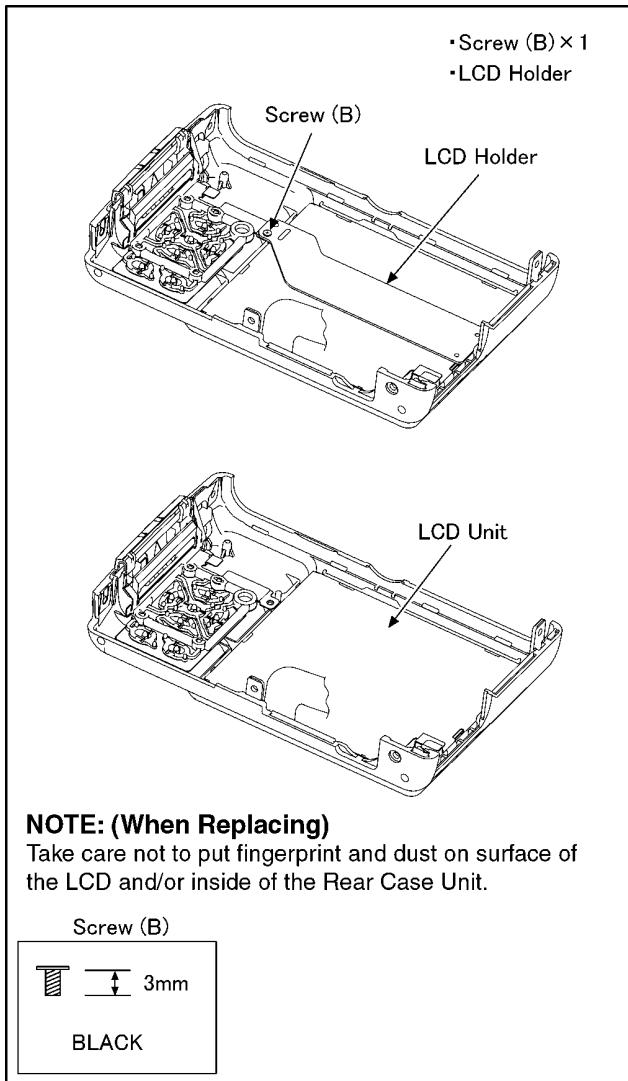


Fig. D2

8.3.3. Removal of the SD Cover

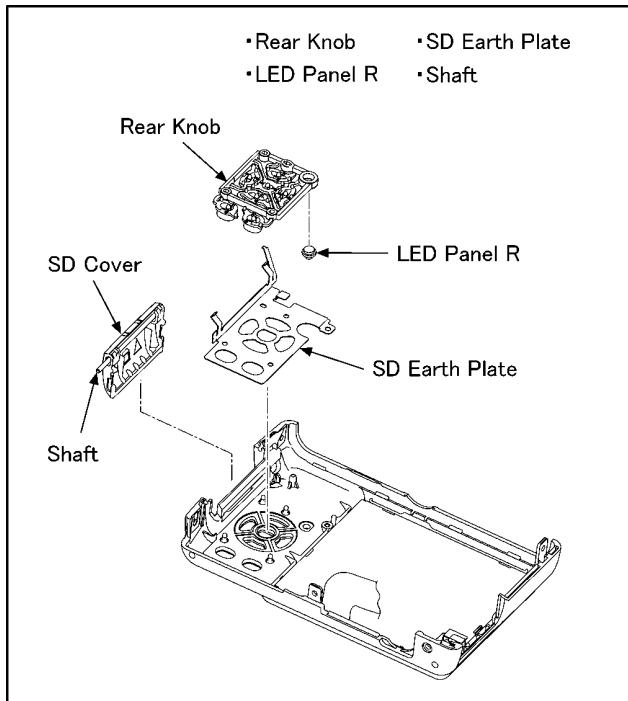


Fig. D3

8.3.4. Removal of the Front Case Unit

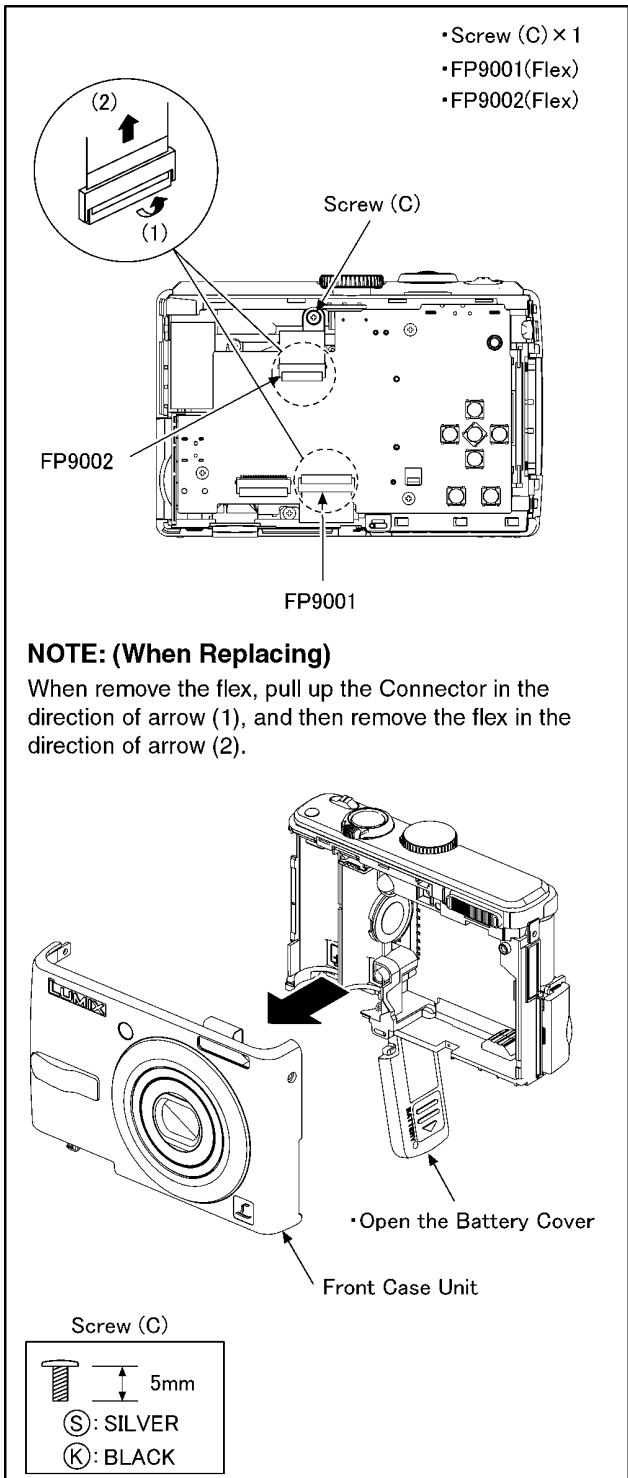


Fig. D4

8.3.5. Removal of the Top Case Unit

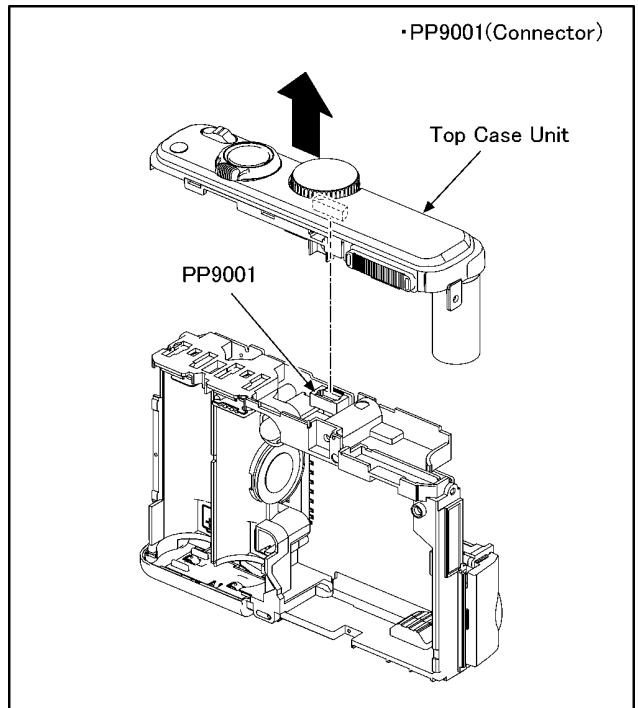


Fig. D5

8.3.6. Removal of the Flash Top P.C.B.

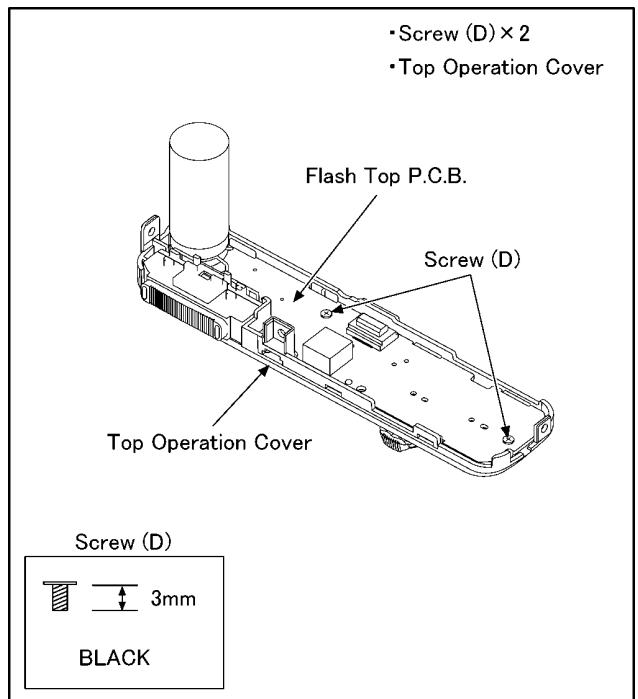


Fig. D6

8.3.7. Removal of the Main P.C.B.

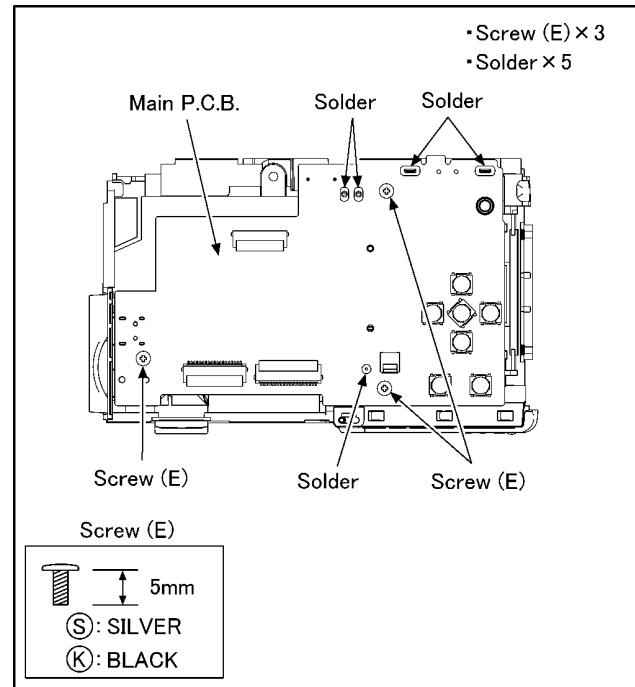


Fig. D8

8.3.8. Removal of the Lens Unit

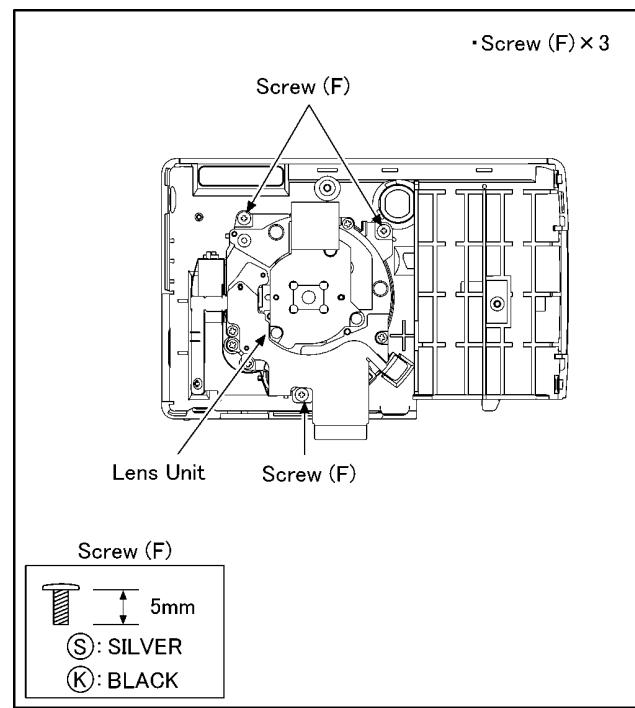


Fig. D9

NOTE: (When Assembling)

Be sure to confirm the following points when assembling.

- The Screw is tightened enough.
- Assembling conditions are fine. (No distortion, no illegal space.)
- No dust and/or dirt on every Lens surfaces.
- LCD image is fine. (No dust and dirt on it, and no gradient images.)

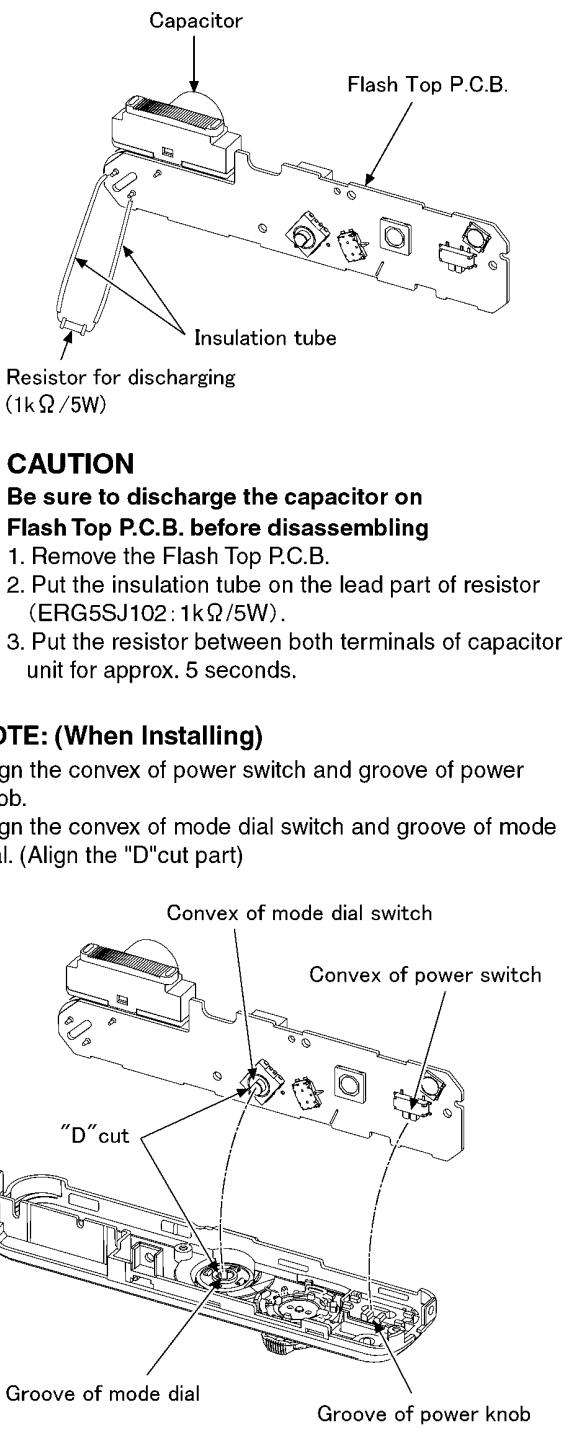


Fig. D7

8.4. Disassembly Procedure for the Lens

NOTE: When Disassembling and Assembling for the Lens

1. To minimize the possibility of the CCD being dirt, perform disassemble and/or assemble under the condition of the CCD is being mounted.

Disassembling procedures for the CCD unit, refer to item 8.6.

2. Take care that the dust and dirt are not entered into the lens.

In case of the dust is putted on the lens, blow off them by airbrush.

3. Do not touch the surface of lens.

4. Use lens cleaning KIT (BK)(VFK1900BK).

5. Apply the grease to the point where is shown to "Grease apply" in the figure.

8.4.1. Removal of the Zoom Motor Unit, Direct Frame/Drive Frame Unit and 1st Lens Frame/2nd Lens Frame Unit

1. Remove the 2 locks.

2. Unscrew the 5 screws (A).

3. Turn the zoom motor unit to the indicated by arrow.

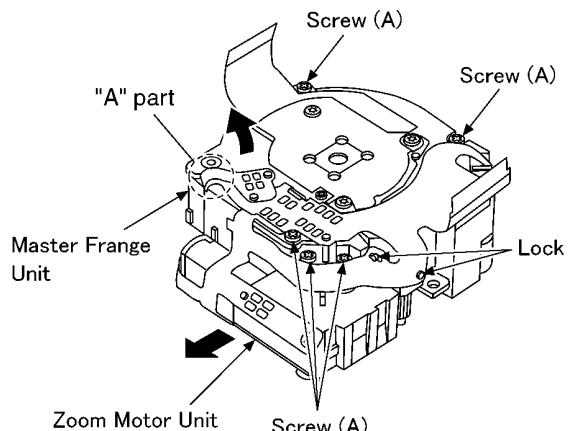
4. Remove the cover to the indicated by arrow.

5. Move the master flange unit to the indicated by arrow.

CAUTION:

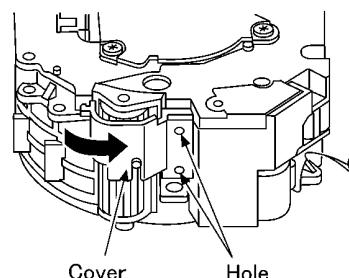
2nd lens frame move unit is connected with flex ("A" part).
Take care not to damage the flex.

• Screw (A) x 5
• Lock x 2
• Cover

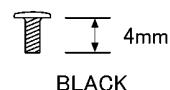


NOTE: (When Disassembling)

• When move the master flange unit to the indicated by arrow, take care not to damage the flex.



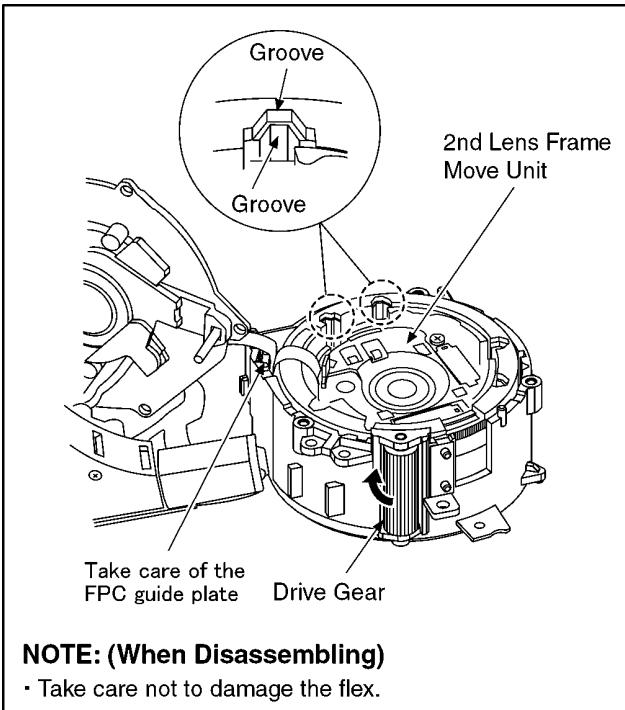
Screw (A)



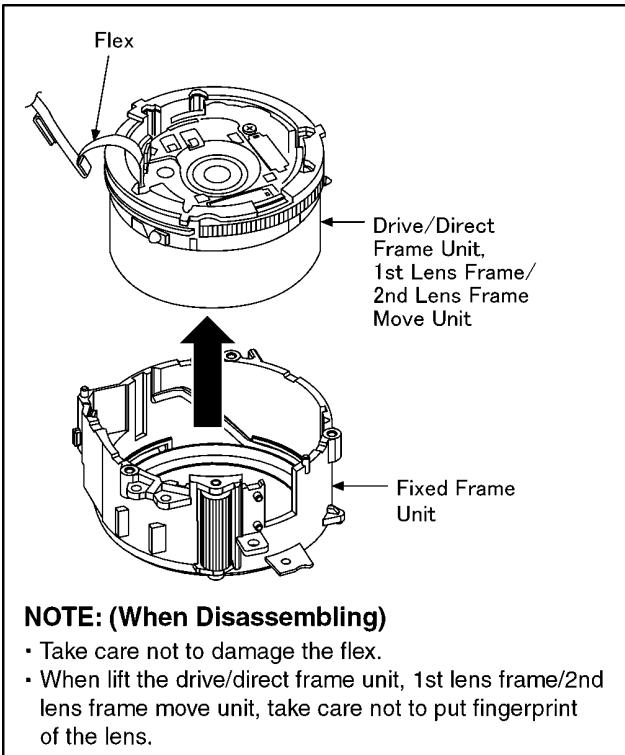
NOTE: (When Installing)

• Refer to "THE APPLIMENT OF GREASE METHOD" when installing the master flange unit.
• Align the convex of fixed frame unit and hole of cover, and then install them.

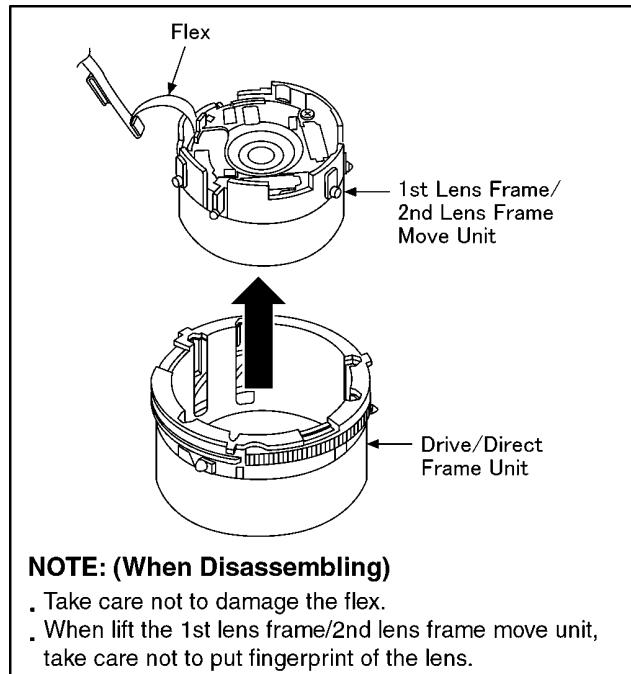
6. Turn the drive gear to the indicated by arrow fully.



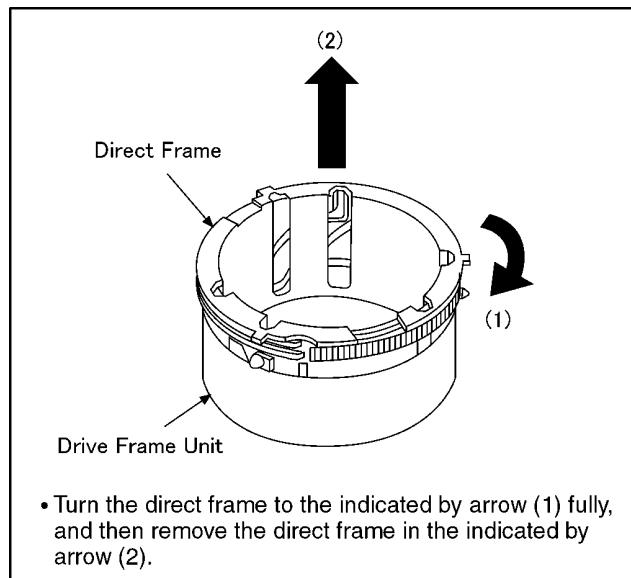
7. Push the drive frame unit to the indicated by arrow from lens front side, and then remove the drive/direct frame unit and 1st lens frame/2nd lens frame move unit from direct frame.



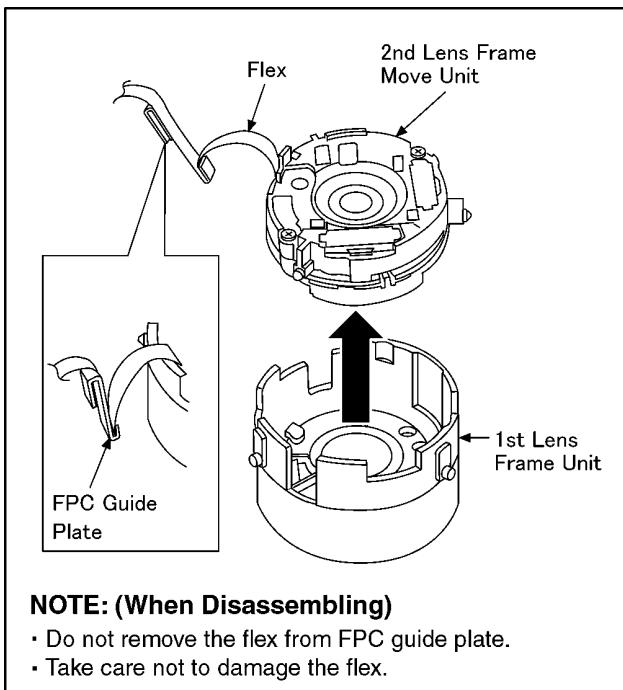
8. Push the 1st lens frame unit to the indicated by arrow from lens front side, and then remove the 1st lens frame/2nd lens frame move unit from drive/direct frame unit.



8.4.2. Removal of the Direct Frame Unit



8.4.3. Removal of the 2nd Lens Frame Move Unit



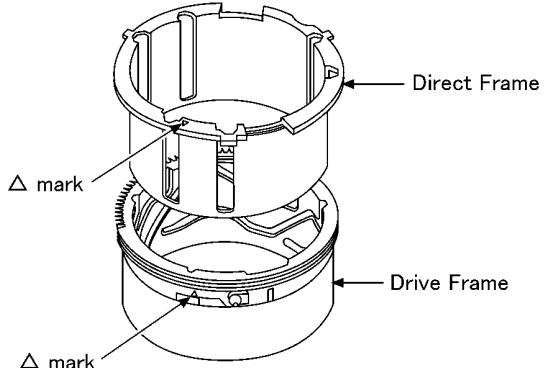
NOTE: (When Disassembling)

- Do not remove the flex from FPC guide plate.
- Take care not to damage the flex.

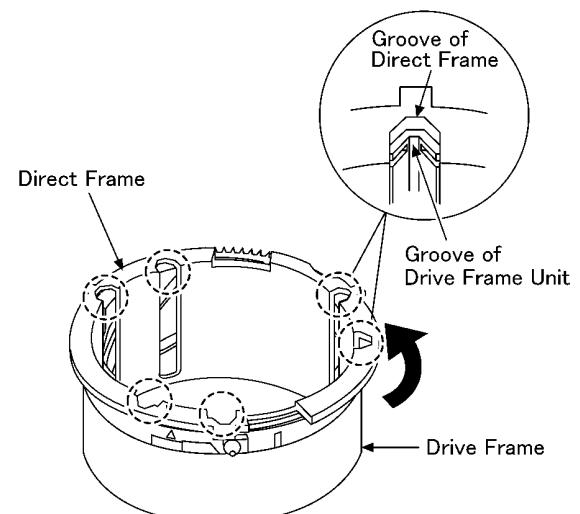
8.5. Assembly Procedure for the Lens

8.5.1. Phase alignment of the Direct Frame and Drive Frame Unit

- Align the Δ mark, and then install the direct frame to drive frame.

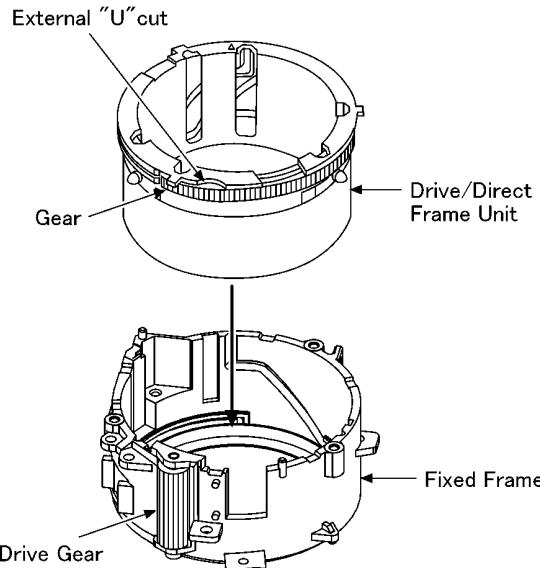


- Turn the Direct Frame in the direction of an arrow (about 5mm : 0.2 in.), and then align the phase so that six groove places to be aligned.



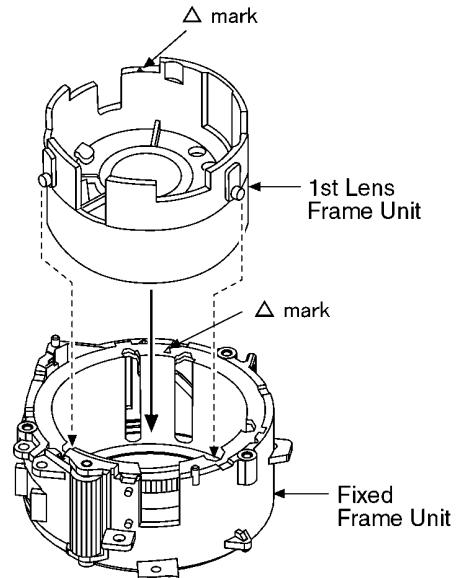
8.5.2. Phase alignment of the Direct/Drive Frame Unit and Fixed Frame

- Align the external "U"cut and drive gear, and then install the drive/direct frame unit to fixed frame unit.
- With aligning the phase of 6 grooves of the drive/direct frame unit, confirm the gear of drive/direct frame unit is engaged with the fixed frame firmly.



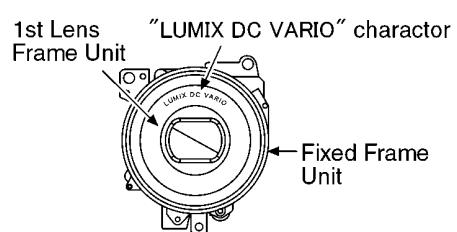
8.5.3. Assembly for the 1st Lens Frame Unit

- Align the Δ mark, and then install the 1st lens frame unit to fixed frame unit.

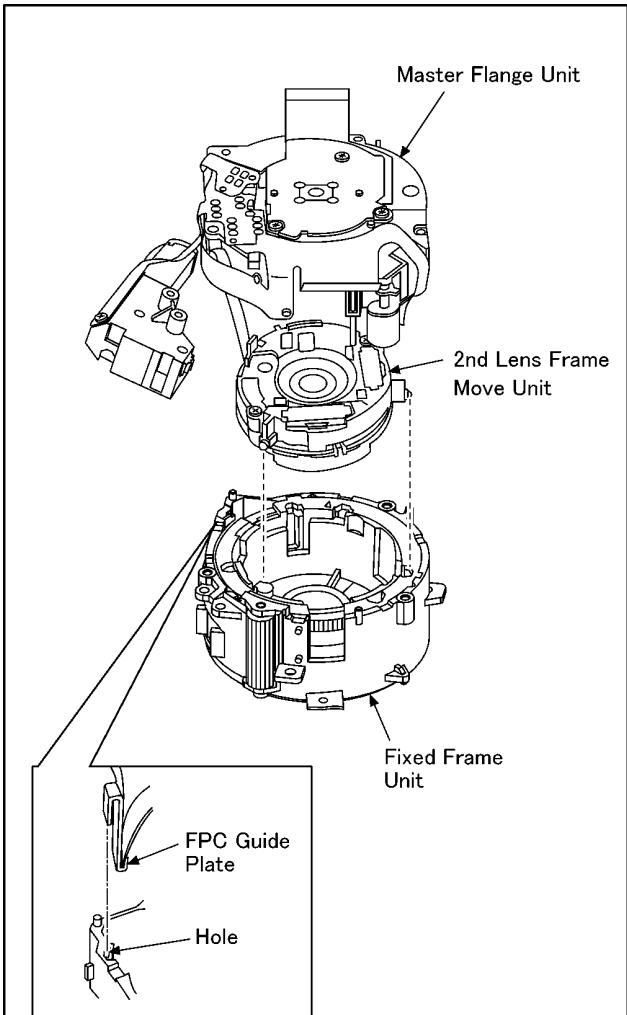


FRONT VIEW

- Install the 1st lens frame unit so that the "LUMIX DC VARIO" character may become the position of the figure below.



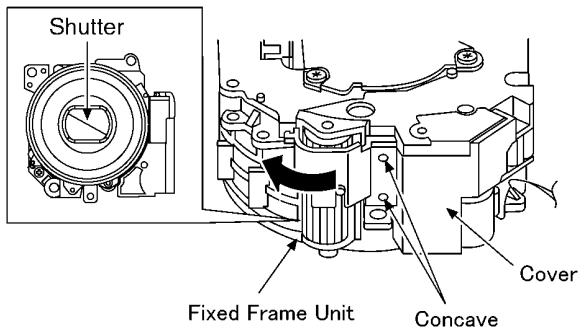
8.5.4. Assembly for the 2nd Lens Frame Move Unit



NOTE: (When Installing)

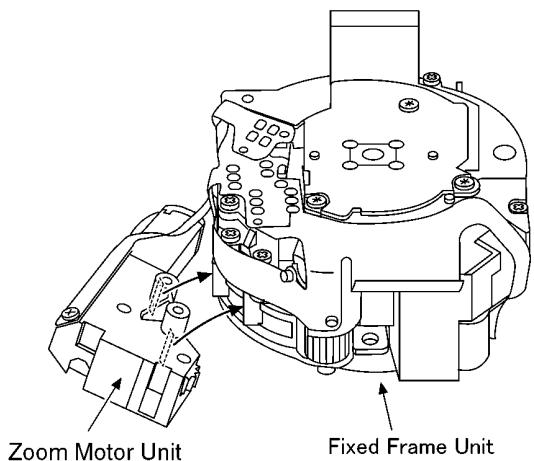
- Be sure to install the FPC guide plate to the hole of fixed frame unit.
- Take care not to damage the flex.
- Refer to "THE APPLIMENT OF GREASE METHOD" when installing the master flange unit.

- Turn the Drive Gear in the direction of an arrow, and then confirm the lens shutter is closed.



NOTE: (When Installing)

- Align the convex of fixed frame unit and concave of cover, and then install them.



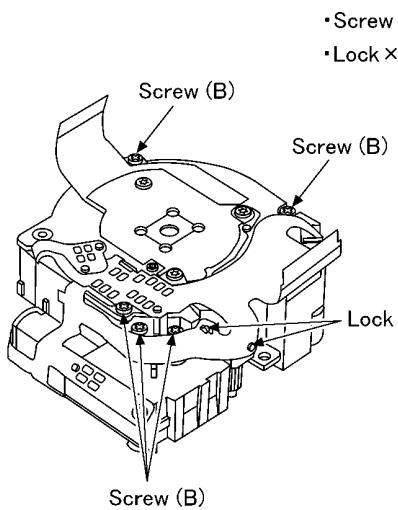
NOTE: (When Installing)

- Align the convex of fixed frame unit and convex of zoom motor unit, and then install them.

8.6. Removal of the CCD Unit

To prevent the CCD unit from catching the dust and dirt, do not remove the CCD unit except for replacing.

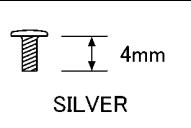
- Torx driver (T3) Part No. RFKZ0334



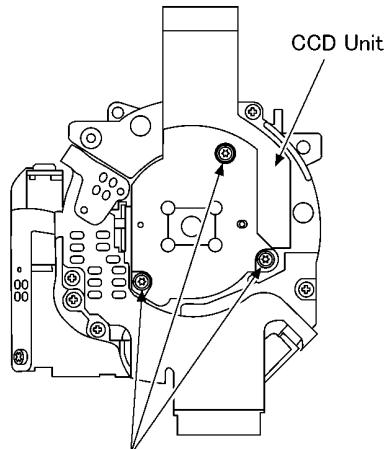
NOTE: (When Installing)

- Fix the flex to lock part
- Do not bend the flex excessively and handle the flex with care, to prevent any damage.

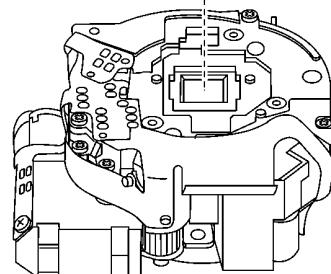
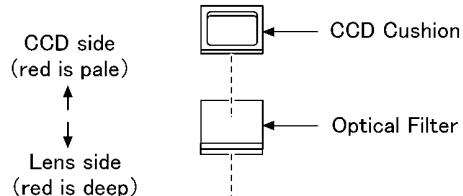
Screw (B)



- Trox Type Screw (C) x 3
- Optical Filter
- CCD Cushion



Trox Type Screw (C)
(Trox driver (T3) Part No.: RFKZ0334)



NOTE: (When Installing the CCD Unit)

Definitions of mount side of Optical filter.

*Set the optical filter under the condition of reflecting the fluorescent lamp can be seen by your eyes.

*Although depth of the red color may be changed in accordance with seeing angle, compare the deepest red color in both sides to define each side.

 Lens side: red color is deeper than the other side.

 CCD side: red color is paler than the other side.

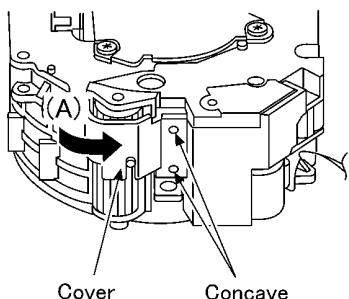
It can be easy to confirm the red color density on the blue paper.

*The optical filter might stuck to CCD unit.

When replace the CCD unit, remove the optical filter, and then install it with CCD unit.

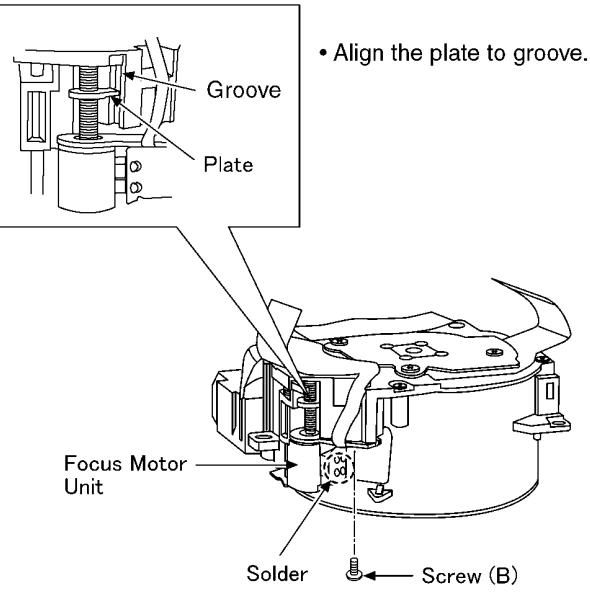
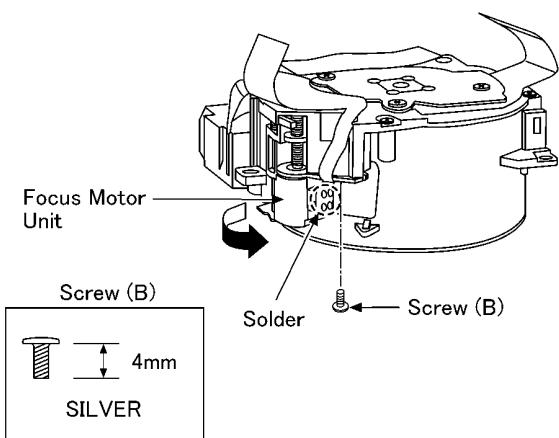
8.7. Removal of the Focus Motor

1. Remove the cover to the indicated by arrow (A).
2. Unscrew the 1 screw (B).
3. Unsolder (4 points).
4. Remove the focus motor.



NOTE: (When Installing)

- Align the convex of fixed frame unit and concave of cover, and then install them.

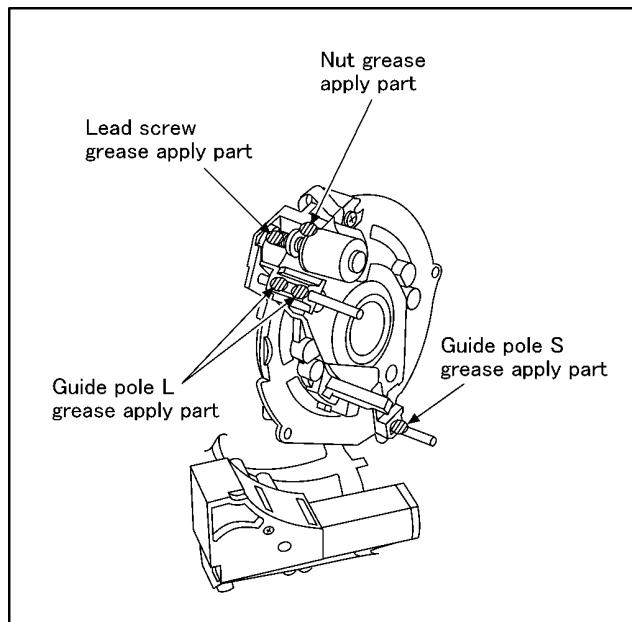


8.8. The Application of Grease Method

The grease apply point of lens unit are as follows.

Apply grease additionally in the specified position if necessary. When the grease is applied, use a toothpick and apply thinly.

- Lead screw
 - Grease: VFK1850 (Furoyl type)
 - Amount of apply: 2 - 4 mg
- Guide pole
 - Grease: VFK1829
 - Amount of apply: 2 - 4 mg



9 Measurements and Adjustments

9.1. Matrix Chart for Replaced Part and Necessary Adjustment

The relation between Replaced part and Necessary Adjustment is shown in the following table.

When concerned part is replaced, be sure to achieve the necessary adjustment(s).

As for Adjustment condition/procedure, consult the "Adjustment Manual" which is available in Adjustment software.

The Adjustment software is available at "TSN Website", therefore, access to "TSN Website" at "Support Information from NWBG/VDBG-PAVC".

NOTE:

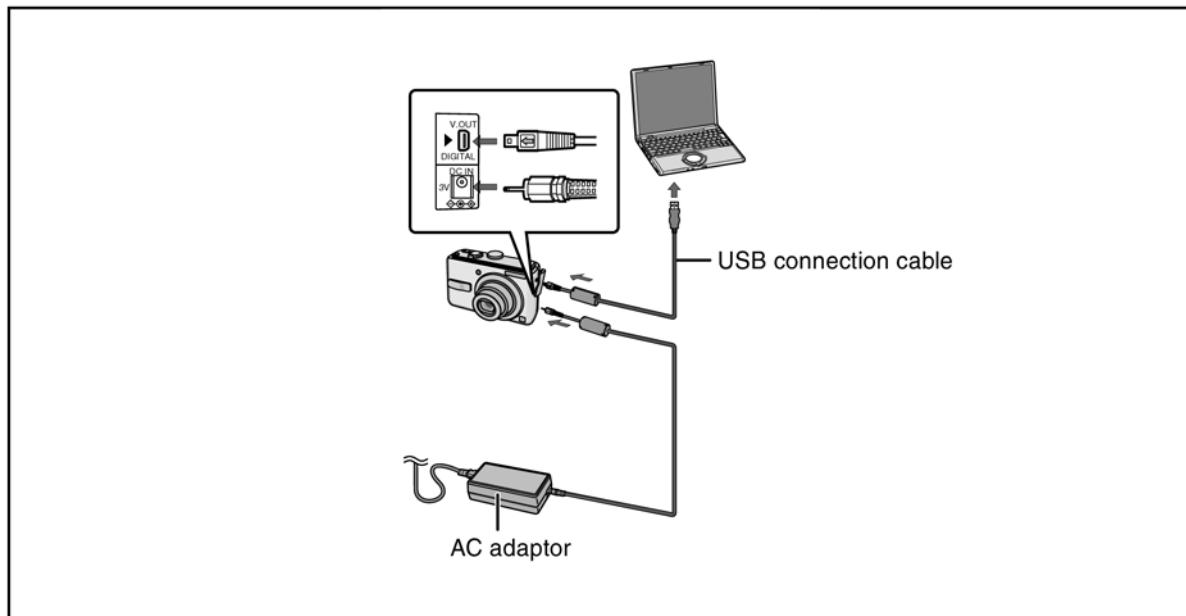
After adjustments have been terminated, make sure to achieve "INITIAL SETTINGS".

		Replaced Part				
Adjustment Item		Main P.C.B.	VENUS (IC6001)	Flash-ROM (IC6002)	Lens Part (Excluding CCD)	CCD Unit
Camera Section	OIS hall element adjustment (OIS)	○	○	○	○	
	Back focus adjustment (BF)	○	○	○	○	
	Shutter adjustment (SHT)	○	○	○	○	○
	ISO sensitivity adjustment (ISO)	○	○	○	○	○
	AWB adjustment High brightness coloration inspection (WBL)	○	○	○	○	○
	CCD white scratch compensation (WKI)	○	○	○		○

NOTE:

*There is no LCD adjustment in this model.

*There is no CCD Black scratch compensation adjustment (BKI) in this model.



10 Maintenace

10.1. Cleaning Lens and LCD Panel

Do not touch the surface of 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 the gently wipe the their surface.

Note:

The Lens Cleaning KIT ; VFK1900BK (Only supplied as 10 set/Box) is available as Service Aid.

Service Manual

Diagrams and Replacement Parts List

Digital Camera

Model No.

DMC-LS60PC	DMC-LS70PC	DMC-LS75PL
DMC-LS60PL	DMC-LS70PL	DMC-LS75EB
DMC-LS60EB	DMC-LS70EB	DMC-LS75EE
DMC-LS60EE	DMC-LS70EE	DMC-LS75EF
DMC-LS60EF	DMC-LS70EG	DMC-LS75EG
DMC-LS60EG	DMC-LS70EGM	DMC-LS75EGM
DMC-LS60EGM	DMC-LS70GC	DMC-LS75GC
DMC-LS60GC	DMC-LS70GK	DMC-LS75GK
DMC-LS60GK	DMC-LS70GN	DMC-LS75GN
DMC-LS60GN	DMC-LS75P	
DMC-LS70P	DMC-LS75PC	

Vol. 1

Colour

(S).....Silver Type (except DMC-LS75PC)

(K).....Black Type (only DMC-LS75P/PC/EB/EE/EF/EG/EGM)

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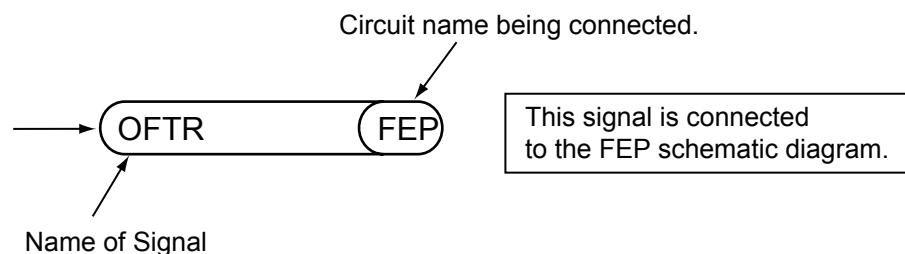
S1. About Indication of The Schematic Diagram	S-1	S5.3. 7M CCD Flex P.C.B.....	S-11
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S1. About Indication of The Schematic Diagram

S1.1. Important Safety Notice

COMPONENTS IDENTIFIED WITH THE MARK  HAVE THE SPECIAL CHARACTERISTICS FOR SAFETY. WHEN REPLACING ANY OF THESE COMPONENTS USE ONLY THE SAME TYPE.

- 1.Although reference number of the parts is indicated on the P.C.B. drawing and/or schematic diagrams, it is NOT mounted on the P.C.B. when it is displayed with "\$" mark.
- 2.It is only the "Test Round" and no terminal (Pin) is available on the P.C.B. when the TP (Test Point) indicated as "●" mark.
- 3.The voltage being indicated on the schematic diagram is measured in "Standard-Playback" mode when there is no specify mode is mentioned.
- 4.Although the voltage and waveform available on here is measured with standard frame, it may be differ from actual measurement due to modification of circuit and so on.
- 5.The voltage being indicated here may be include observational-error (deviation) due to internal-resistance and/or reactance of equipment. Therefore, handle the value indicated on here as reference.
- 6.Use the parts number indicated on the Replacement Parts List .
- 7.Indication on Schematic diagrams:



S2. Voltage Chart

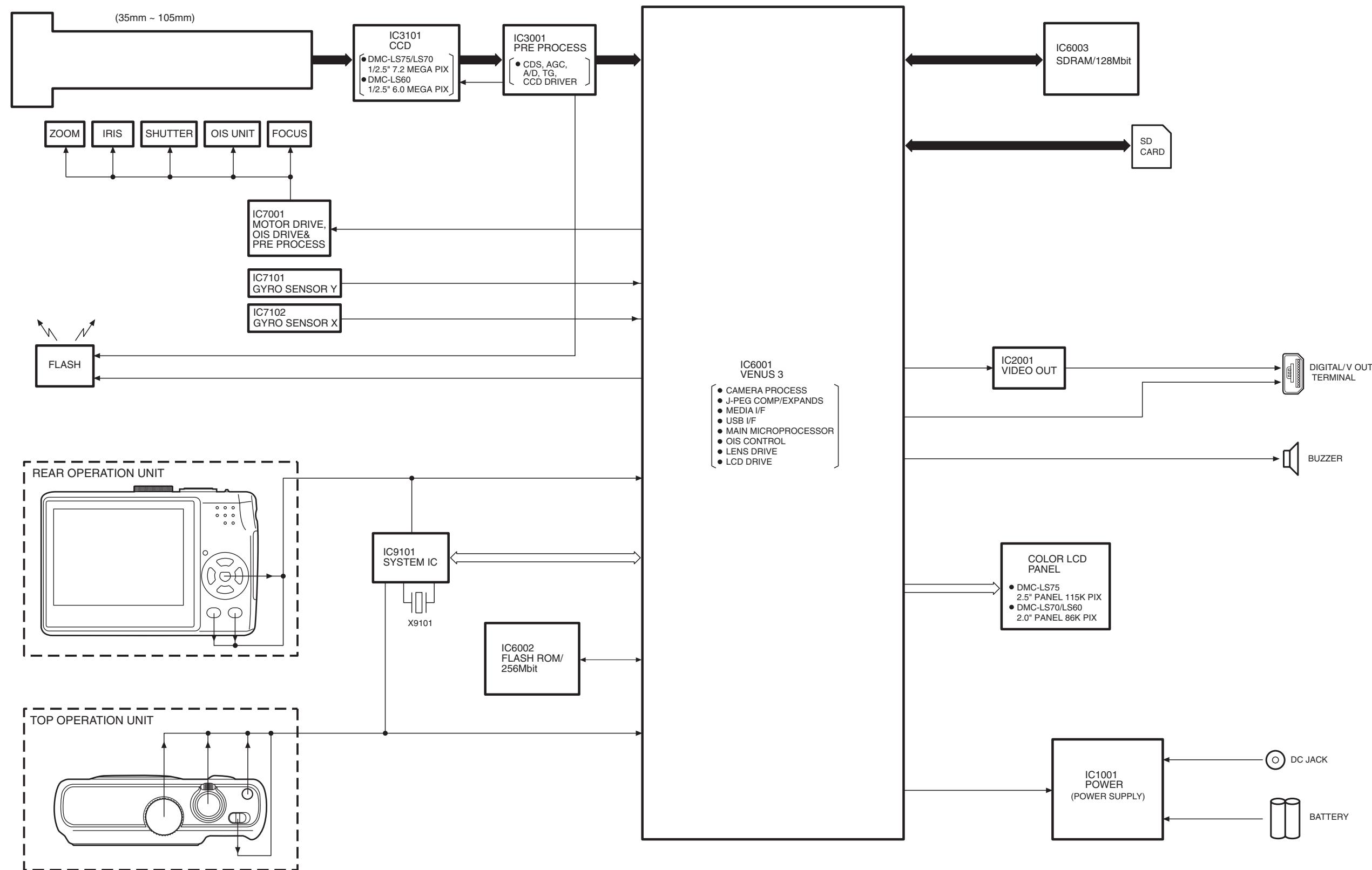
Note) Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard.
Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.

S2.1. Flash Top P.C.B.

REF No.	PIN No.	POWER ON
Q8002	1	0
Q8002	2	0
Q8002	3	0
Q8002	4	0
Q8002	5	0.1
Q8002	6	0.1
Q8002	7	0.1
Q8002	8	0.1
Q8009	1	3.4
Q8009	2	3.4
Q8009	3	0
Q8009	4	0.1
Q8009	5	3.4
Q8009	6	3.4

S3. Block Diagram

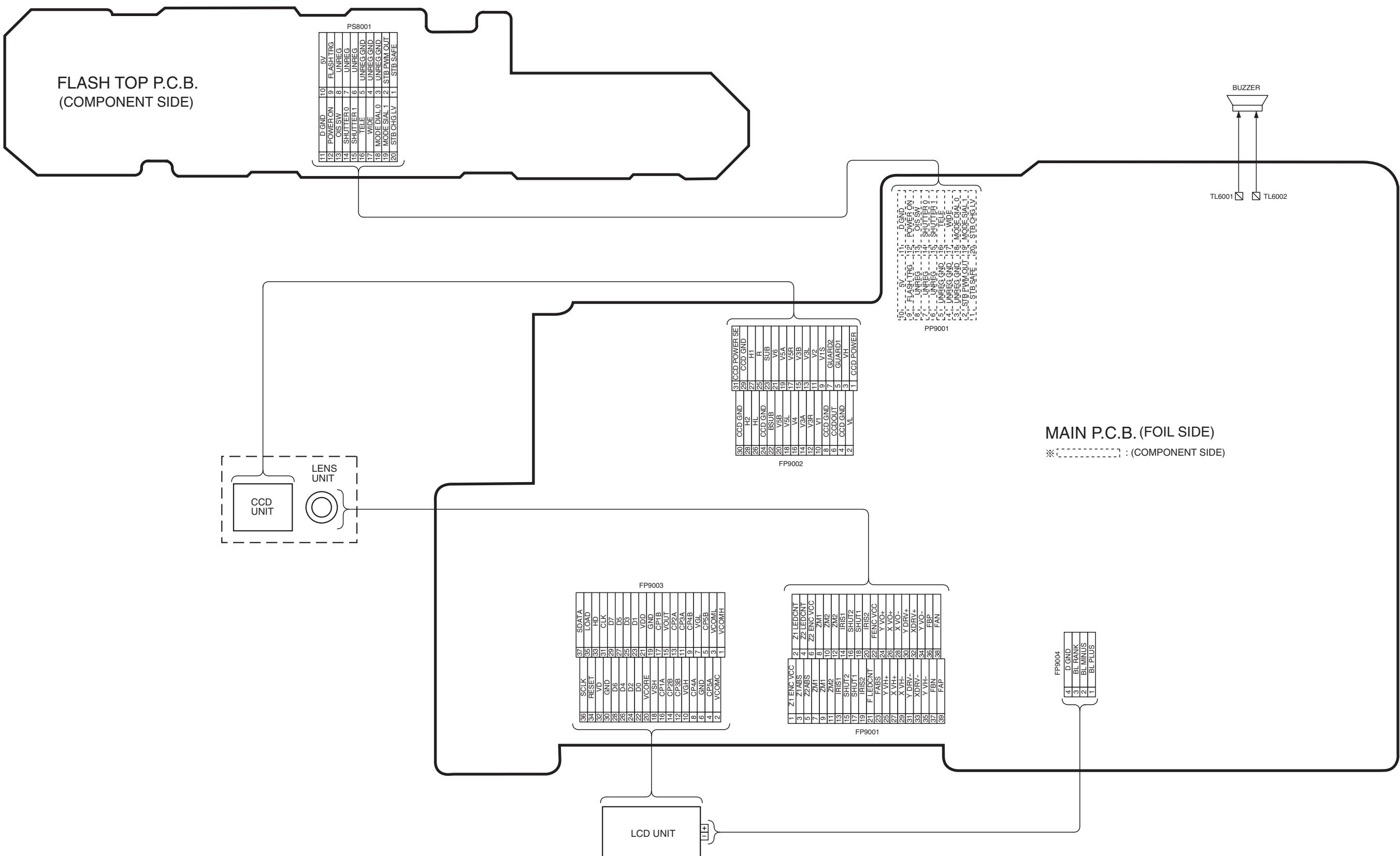
S3.1. Overall Block Diagram



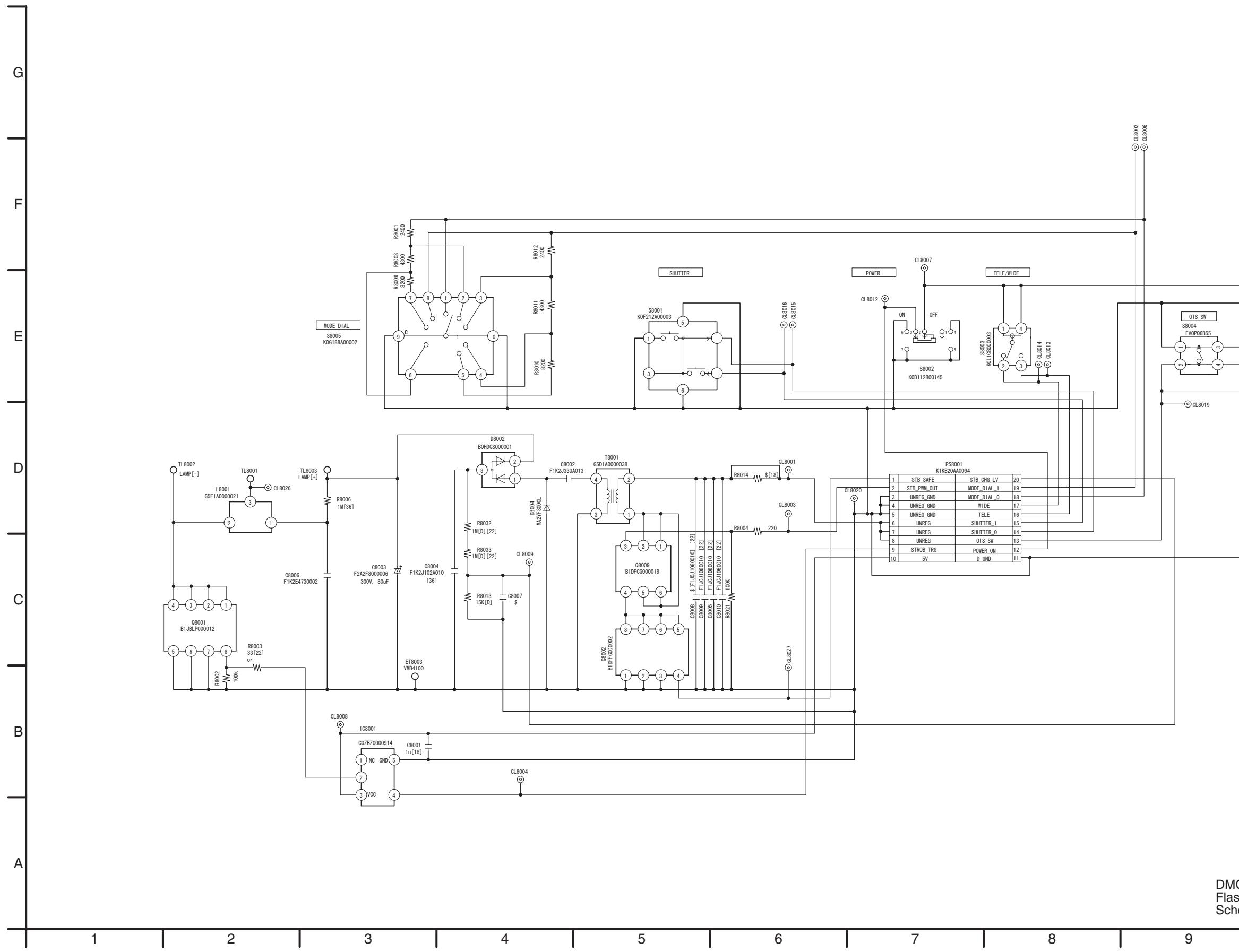
DMC-LS75/LS70/LS60 OVERALL BLOCK DIAGRAM

S4. Schematic Diagram

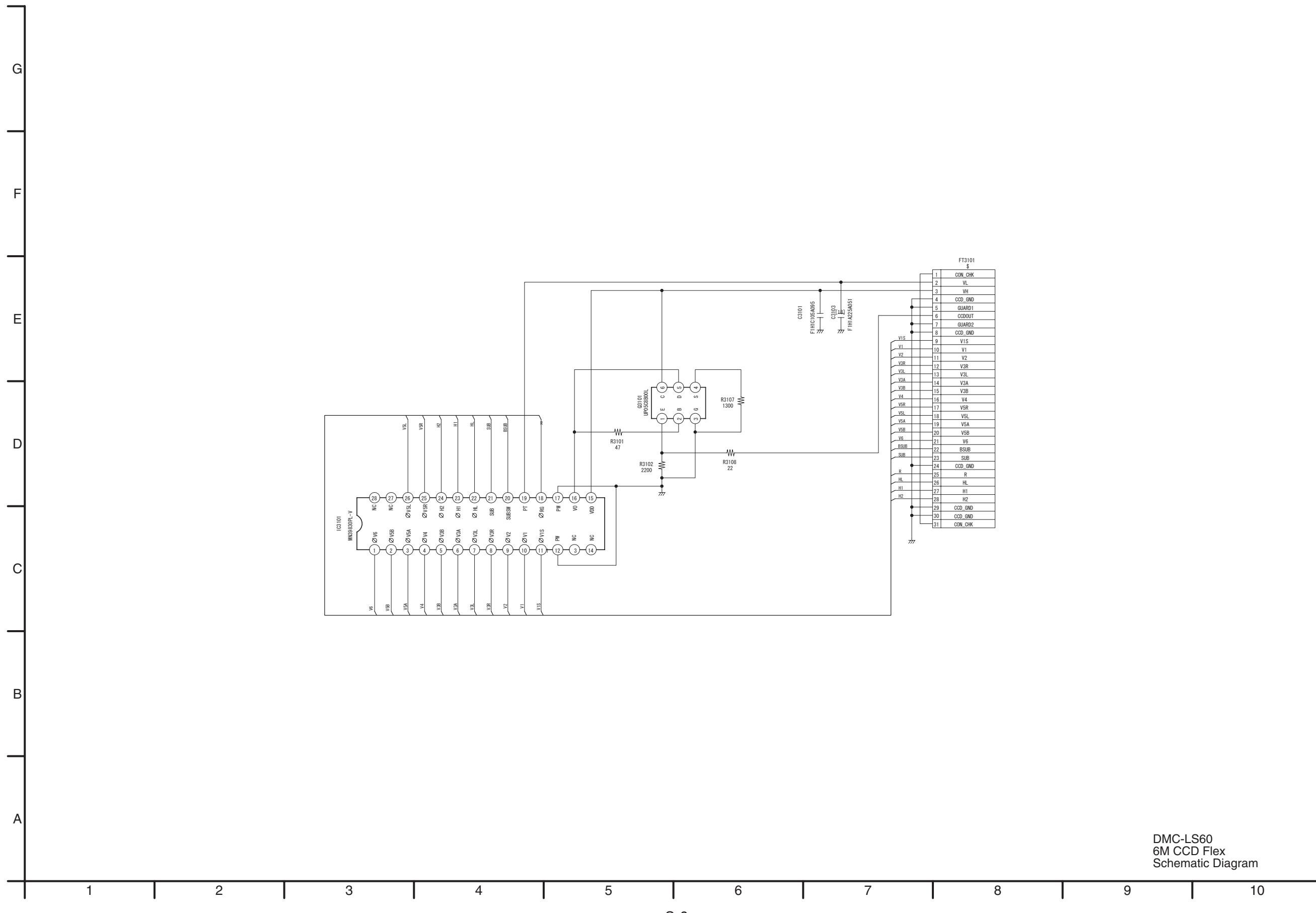
S4.1. Interconnection Diagram



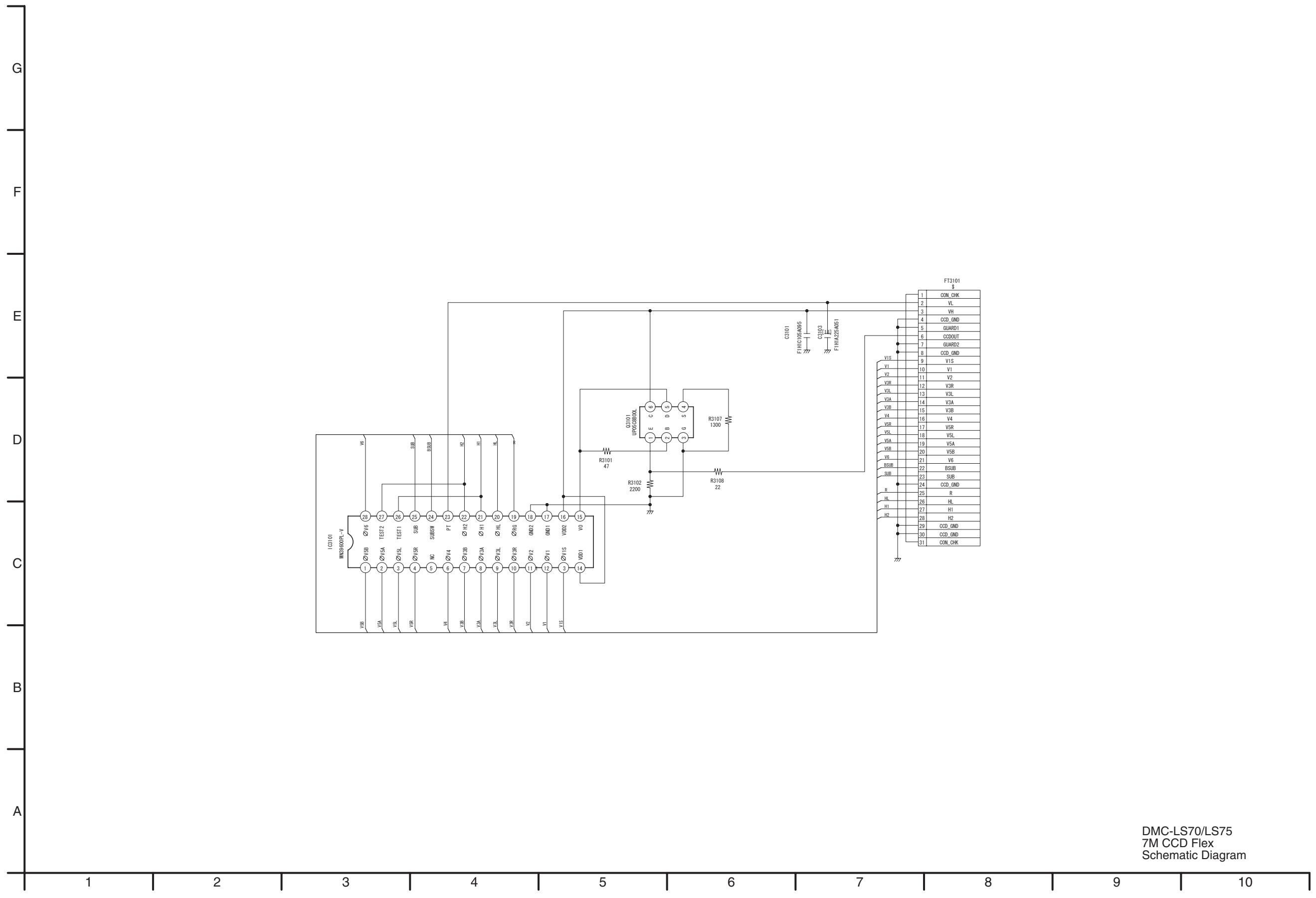
S4.2. Flash Top Schematic Diagram



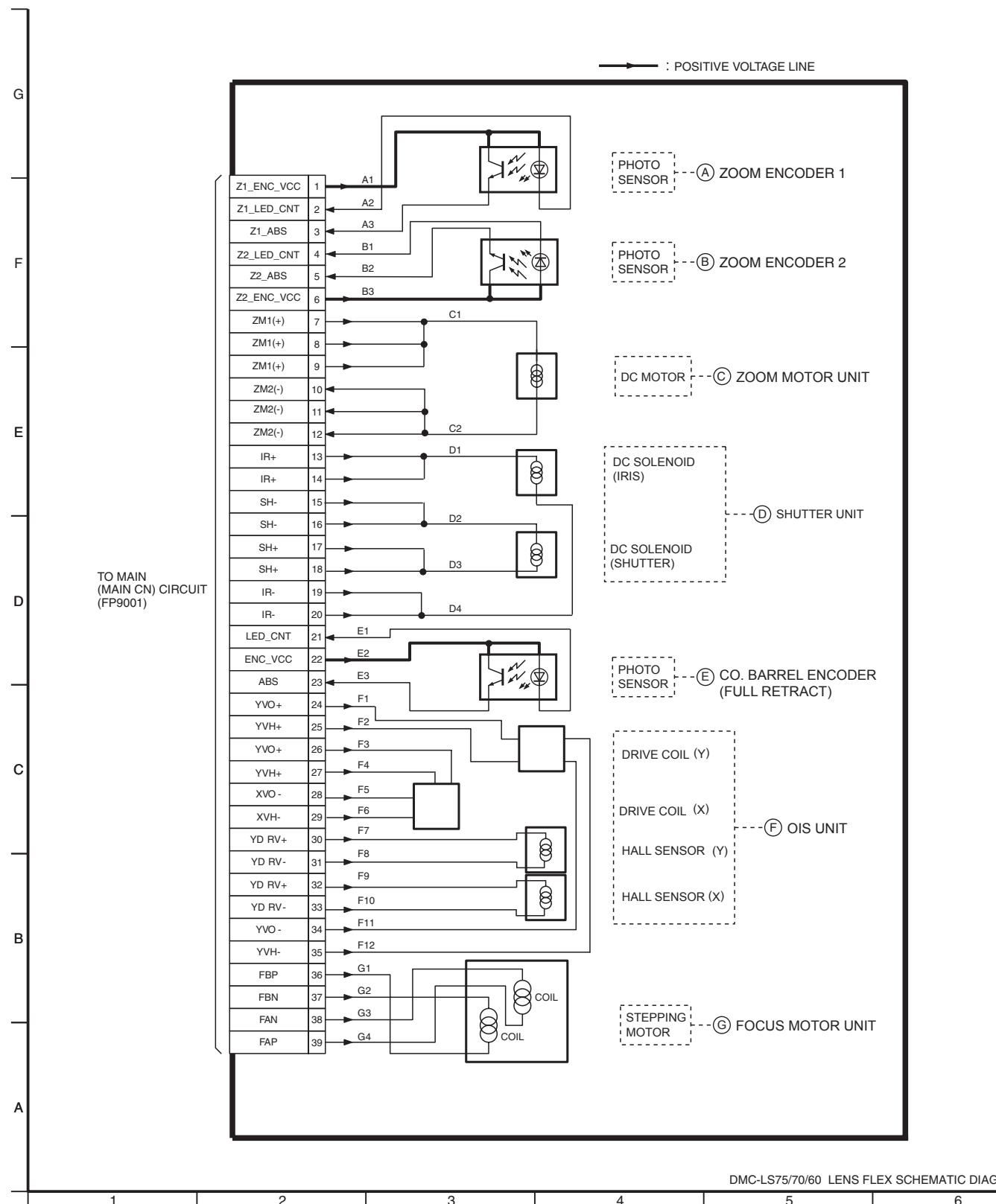
S4.3. 6M CCD Flex Schematic Diagram



S4.4. 7M CCD Flex Schematic Diagram

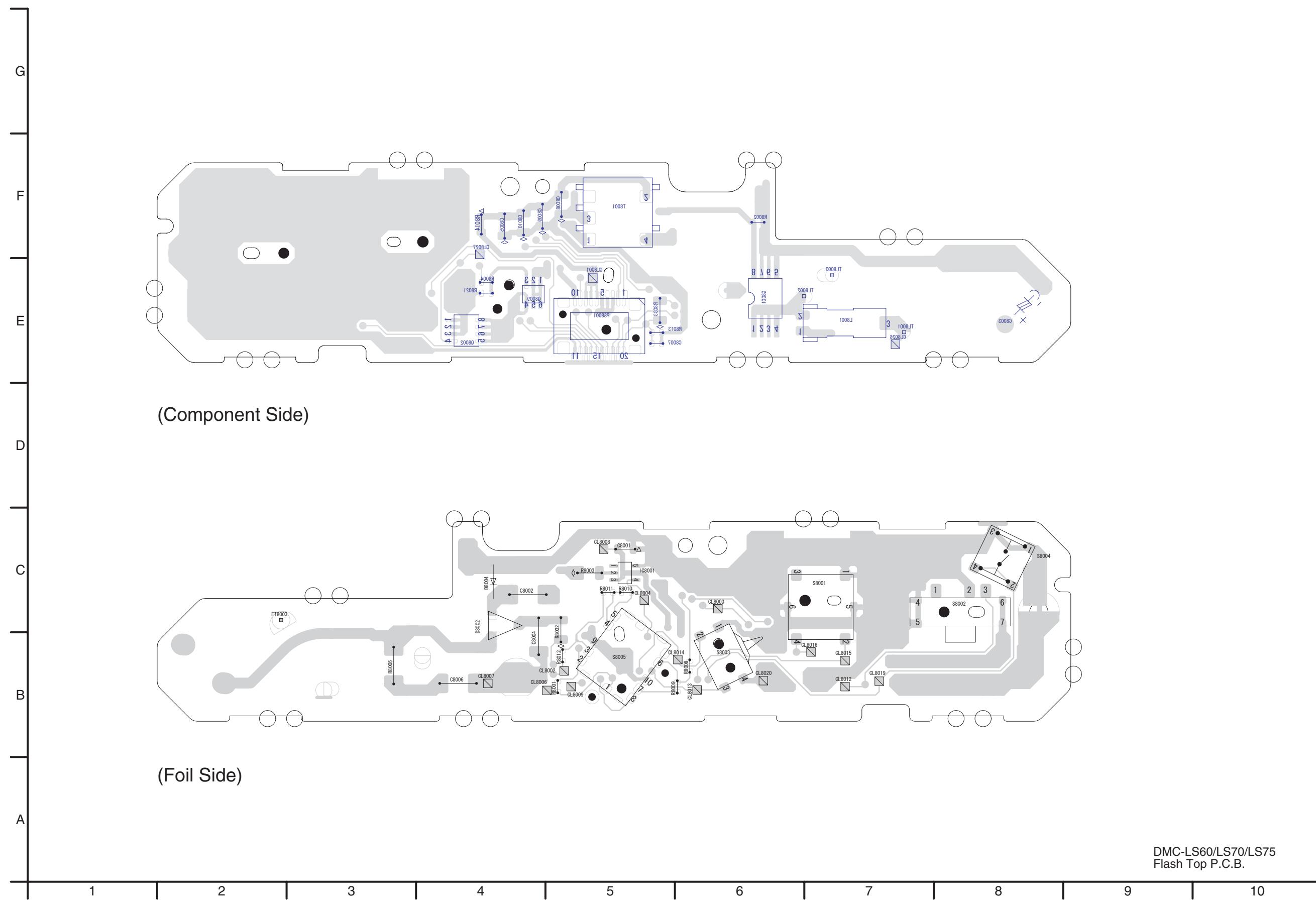


S4.5. Lens Flex Schematic Diagram

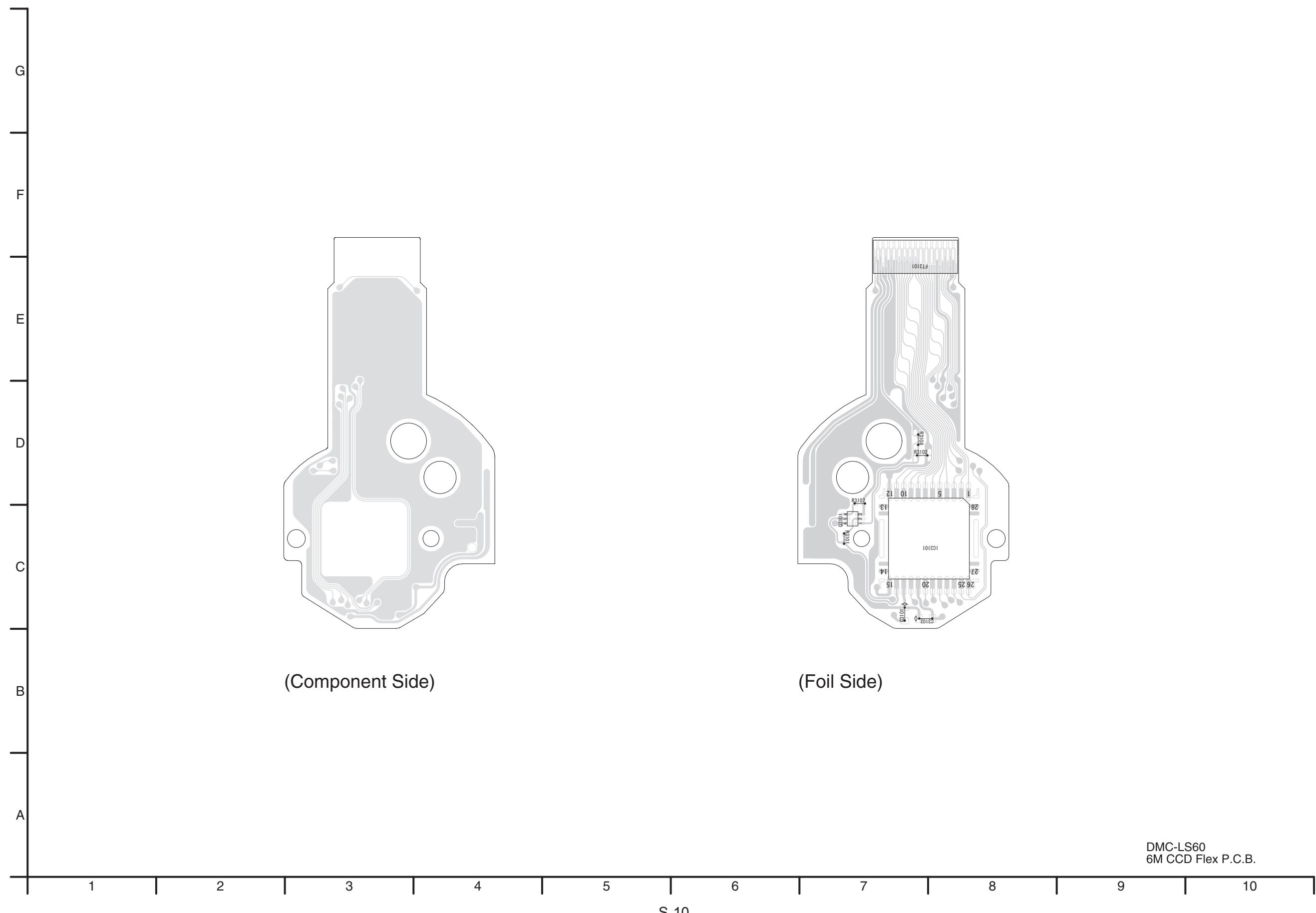


S5. Print Circuit Board

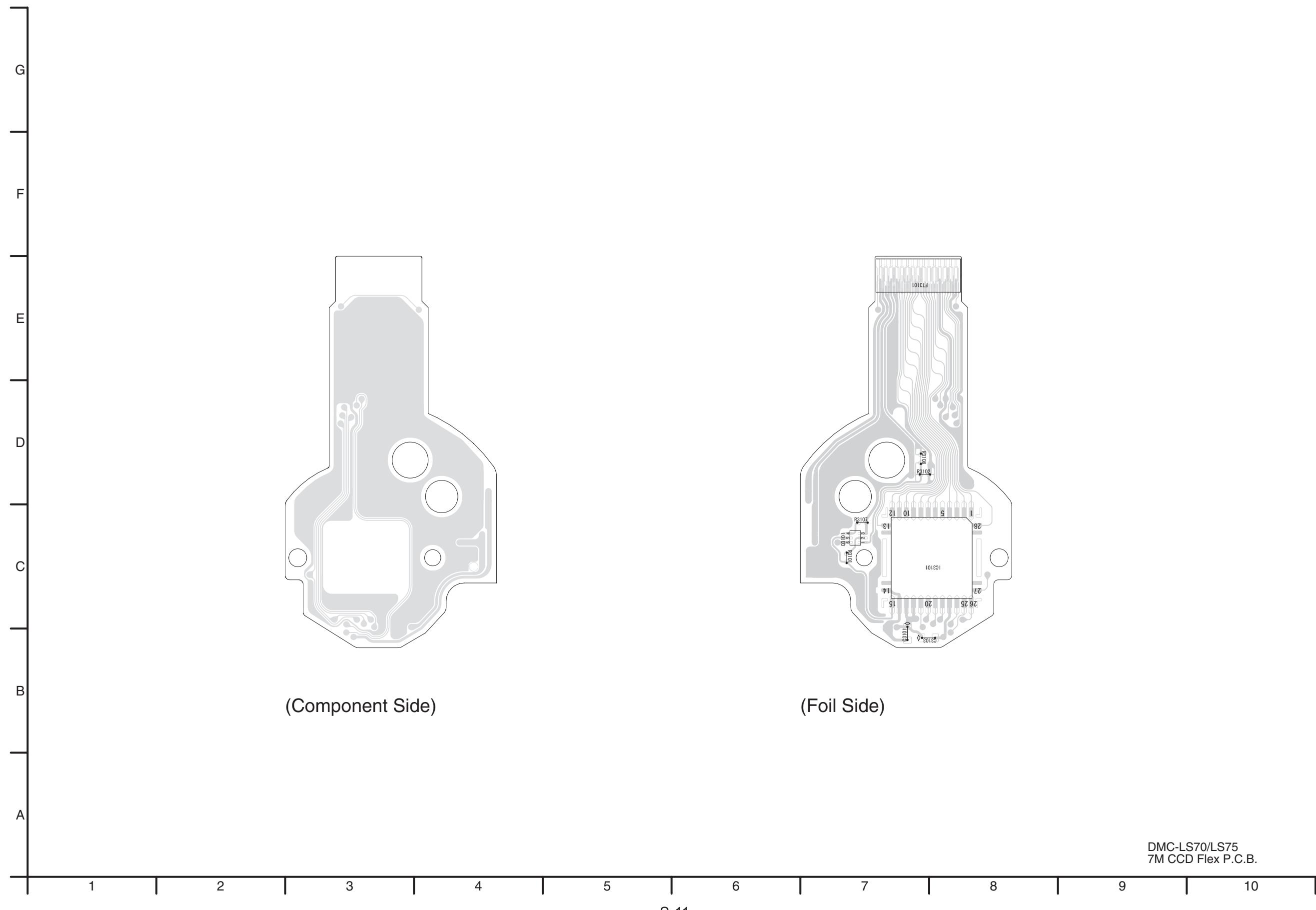
S5.1. Flash Top P.C.B.



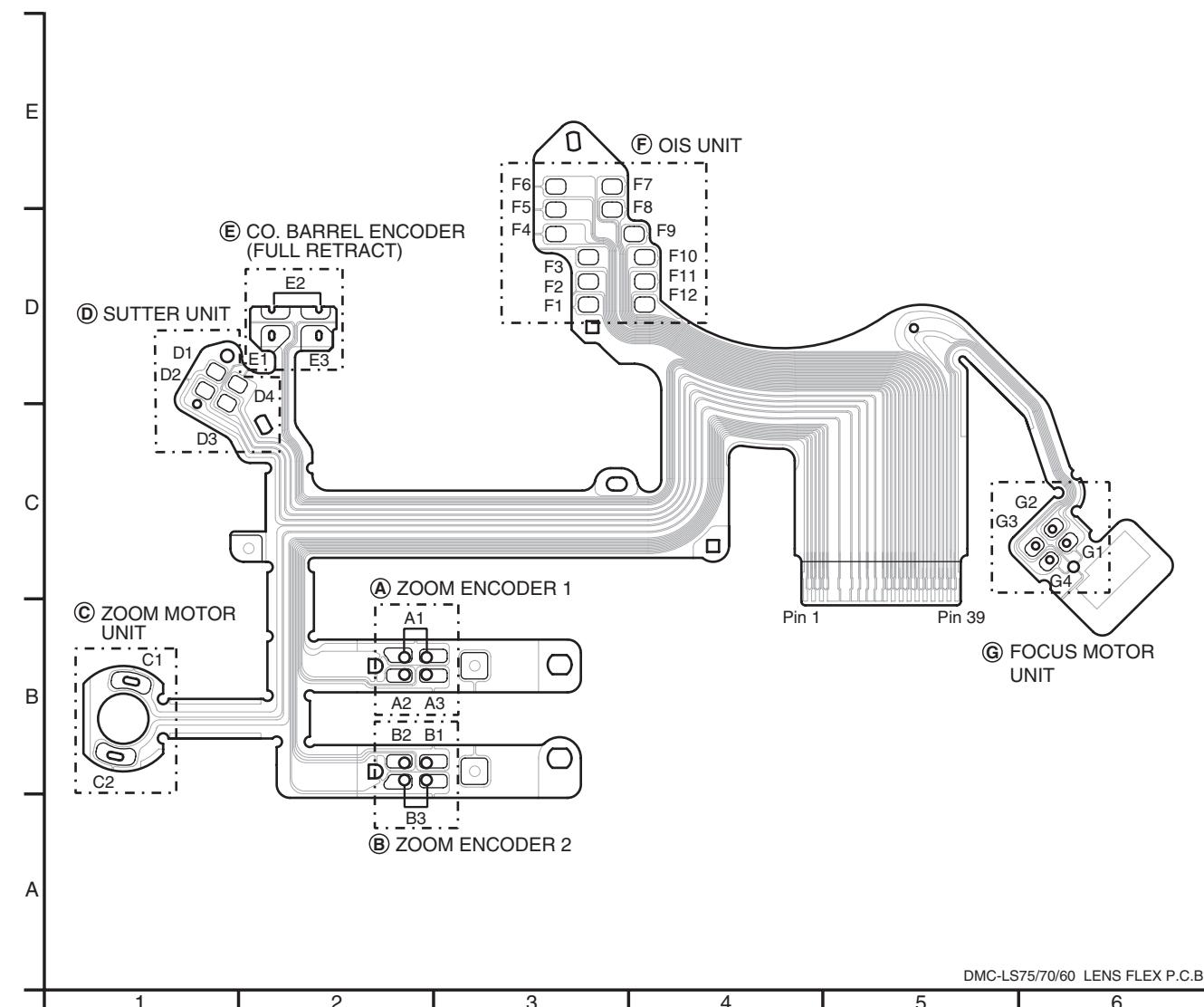
S5.2. 6M CCD Flex P.C.B.



S5.3. 7M CCD Flex P.C.B.



S5.4. Lens Flex P.C.B.



S6. Replacement Parts List

Note:

- 1.* Be sure to make your orders of replacement parts according to this list.
2. **IMPORTANT SAFETY NOTICE**
Components identified with the mark  have the special characteristics for safety.
When replacing any of these components, use only the same type.
3. Unless otherwise specified,
All resistors are in OHMS, K=1,000 OHMS. All capacitors are in MICRO-FARADS (uf), P=uuF.
4. The marking (RTL) indicates the retention time is limited for this item. After the discontinuation of this assembly in production, it will no longer be available.

E.S.D. standards for Electrostatically Sensitive Devices, refer to "PREVENTION OF ELECTROSTATIC DISCHARGE (ESD) TO ELECTROSTATICALLY SENSITIVE (ES) DEVICES" section.

Definition of Parts supplier:

1. Parts marked with **[MBI]** in the remarks column are supplied from
"Matsushita Battery Industrial Co., Ltd."
2. Parts marked with **[PAVC-CSG]** in the remarks column are supplied from
PAVC COMPANY CS Group (PAVC-CSG).
Others are supplied from "PAVCSG" (ASPC).

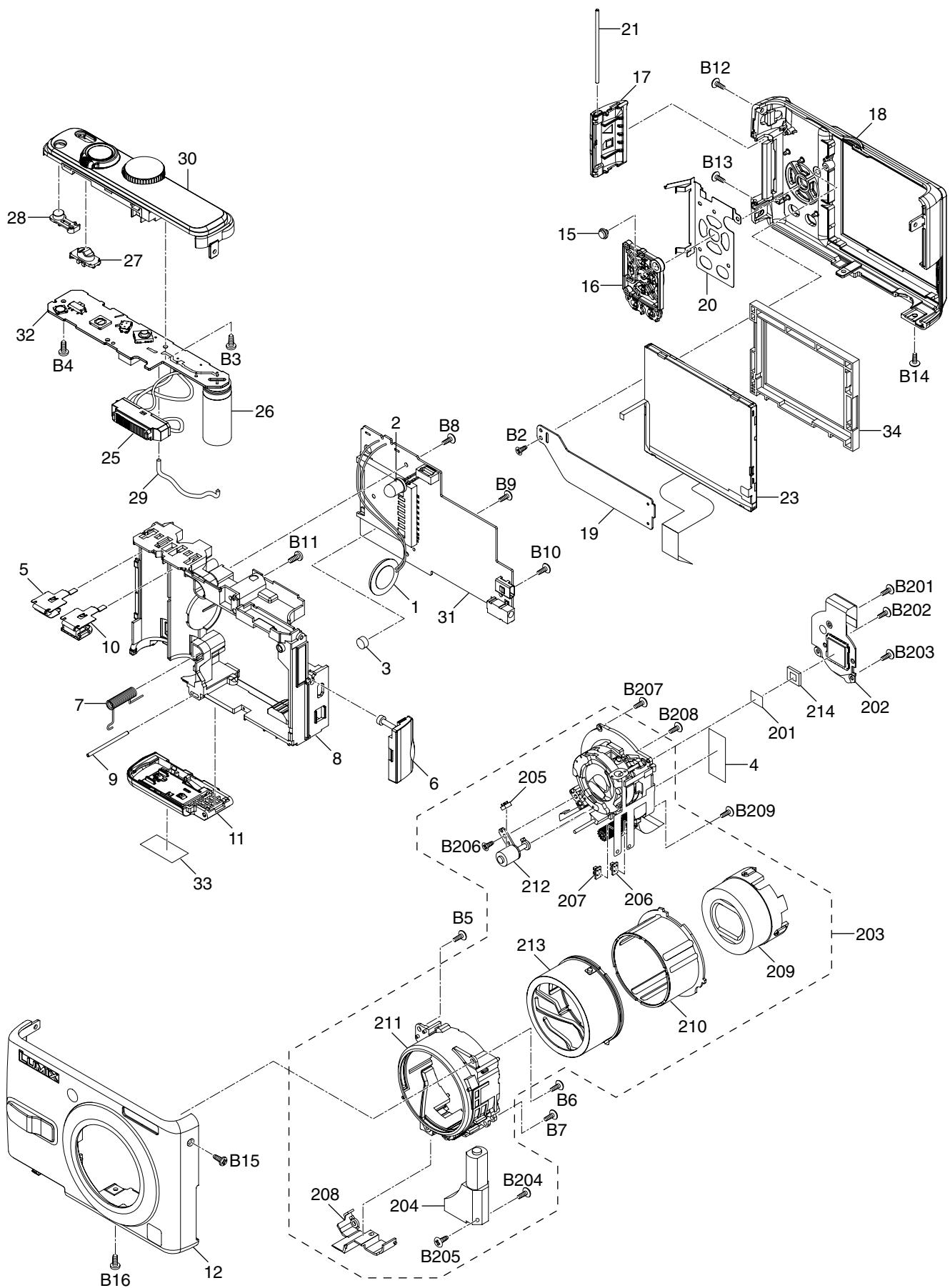
Ref.No.	Part No.	Part Name & Description	Pcs	Remarks	Ref.No.	Part No.	Part Name & Description	Pcs	Remarks
##	VEP56043B	MAIN PCB UNIT	1	LS60/70 [RTL]E.S.D.	##	VEK0K92	CCD UNIT		LS70/75 E.S.D.[PAVC-CSG]
##	VEP56043A	MAIN PCB UNIT	1	LS75 [RTL]E.S.D.	C3101	ECJ1VB1C105K	C.CAPACITOR CH 16V 1U	1	[PAVC-CSG]
##	VEP58037A	TOP OPERATION PCB UNIT	1	[RTL]E.S.D.	C3103	F1H1A225A051	C.CAPACITOR CH 10V 2.2U	1	[PAVC-CSG]
##	VEK0K91	CCD UNIT	1	LS60 E.S.D.[PAVC-CSG]	Q3101	UP05C8B00L	TRANSISTOR	1	E.S.D.[PAVC-CSG]
##	VEK0K92	CCD UNIT	1	LS70/75 E.S.D.[PAVC-CSG]	R3101	ERJ2GEJ470	M.RESISTOR CH 1/16W 47	1	[PAVC-CSG]
##	VEP58037A	TOP OPERATION PCB UNIT	1	[RTL]E.S.D.	R3102	ERJ2GEJ222	M.RESISTOR CH 1/16W 2.2K	1	[PAVC-CSG]
C8001	ECJ1VB0J105K	C.CAPACITOR CH 6.3V 1U	1		R3107	ERJ2GEJ132	M.RESISTOR CH 1/16W 1.3K	1	[PAVC-CSG]
C8002	F1K2J333A013	C.CAPACITOR 630V 0.033U	1		R3108	ERJ2GEJ220	M.RESISTOR CH 1/16W 22	1	[PAVC-CSG]
C8004	F1K2J102A010	C.CAPACITOR 630V 1000P	1						
C8005	F1J0J1060010	C.CAPACITOR CH 6.3V 10U	1						
C8006	F1K2E4730002	C.CAPACITOR 250V 0.047U	1						
C8009	F1J0J1060010	C.CAPACITOR CH 6.3V 10U	1						
C8010	F1J0J1060010	C.CAPACITOR CH 6.3V 10U	1						
D8002	B0HDCS000001	DIODE	1	E.S.D.					
D8004	MA2YF8000L	DIODE	1	E.S.D.					
IC8001	C0ZBZ0000914	IC	1	E.S.D.					
L8001	G5F1A0000021	COIL	1						
PS8001	K1KB20AA0094	CONNECTOR 20P	1						
Q8001	B1JBLP000012	TRANSISTOR	1	E.S.D.					
Q8002	B1DFFC000002	TRANSISTOR	1	E.S.D.					
Q8009	B1DFCG000018	TRANSISTOR	1	E.S.D.					
R8001	ERJ2GEJ242X	M.RESISTOR CH 1/16W 2.4K	1						
R8002	ERJ2GEJ104X	M.RESISTOR CH 1/16W 100K	1						
R8003	ERJ6GEYJ330V	M.RESISTOR CH 1/10W 33	1						
R8004	ERJ2GEJ221X	M.RESISTOR CH 1/16W 220	1						
R8006	ERJ8GEYJ105V	M.RESISTOR CH 1/8W 1M	1						
R8008	ERJ2GEJ432X	M.RESISTOR CH 1/16W 4.3K	1						
R8009	ERJ2GEJ822X	M.RESISTOR CH 1/16W 8.2K	1						
R8010	ERJ2GEJ822X	M.RESISTOR CH 1/16W 8.2K	1						
R8011	ERJ2GEJ432X	M.RESISTOR CH 1/16W 4.3K	1						
R8012	ERJ2GEJ242X	M.RESISTOR CH 1/16W 2.4K	1						
R8013	ERJ2RH153X	M.RESISTOR CH 1/16W 15K	1						
R8021	ERJ2GEJ104X	M.RESISTOR CH 1/16W 100K	1						
R8032	ERJ6RED105V	M.RESISTOR CH 1/16W 1M	1						
R8033	ERJ6RED105V	M.RESISTOR CH 1/16W 1M	1						
S8001	K0F212A00003	SWITCH	1						
S8002	K0D112B00145	SWITCH	1						
S8003	K0L1CB00003	SWITCH	1						
S8004	EVQPOQ6B55	SWITCH	1						
S8005	K0G18A00002	SWITCH	1						
T8001	G5D1A0000038	TRANSFORMER	1						
##	VEK0K91	CCD UNIT	1	LS60 E.S.D.[PAVC-CSG]					
C3101	ECJ1VB1C105K	C.CAPACITOR CH 16V 1U	1	[PAVC-CSG]					
C3103	F1H1A225A051	C.CAPACITOR CH 10V 2.2U	1	[PAVC-CSG]					
Q3101	UP05C8B00L	TRANSISTOR	1	E.S.D.[PAVC-CSG]					
R3101	ERJ2GEJ470	M.RESISTOR CH 1/16W 47	1	[PAVC-CSG]					
R3102	ERJ2GEJ222	M.RESISTOR CH 1/16W 2.2K	1	[PAVC-CSG]					
R3107	ERJ2GEJ132	M.RESISTOR CH 1/16W 1.3K	1	[PAVC-CSG]					
R3108	ERJ2GEJ220	M.RESISTOR CH 1/16W 22	1	[PAVC-CSG]					

Ref.No.	Part No.	Part Name & Description	Pcs	Remarks	Ref.No.	Part No.	Part Name & Description	Pcs	Remarks
1	L0DCDD000008	BUZZER	1		B203	XQN14+CJ4FJ	SCREW	1	[PAVC-CSG]
2	LNG8A4CN8A	LED	1		B204	XQN14+CJ4FJ	SCREW	1	[PAVC-CSG]
3	ML614S/F9FE	BUTTON BATTERY	1	[MBI](B9101)	B205	XQN14+CJ4FJ	SCREW	1	[PAVC-CSG]
4	VGQ8891	LENS SHEET	1		B206	XQN14+CJ4FJ	SCREW	1	[PAVC-CSG]
5	VJH1255	BATTERY TERMINAL	1		B207	XQN14+CJ4FJ	SCREW	1	[PAVC-CSG]
6	VKF4172	JACK COVER	1	(-S)	B208	XQN14+CJ4FJ	SCREW	1	[PAVC-CSG]
6	VKF4176	JACK COVER	1	(-K)	B209	XQN14+CJ4FJ	SCREW	1	[PAVC-CSG]
7	VMB4099	EARTH SPRING	1						
8	VMP8789	FRAME	1						
9	VMS7813	BATT.Door SHAFT	1						
10	VXQ1419	BATT TERMINALE+U	1						
11	YVF3132	BATT.Door UNIT	1	(-S)					
11	YVF3133	BATT.Door UNIT	1	(-K)					
12	YVK2A74	FRONT CASE UNIT	1	(-S)					
12	YVK2A79	FRONT CASE UNIT	1	(-K)					
15	VGL1231	LED PANEL (R)	1						
16	VGU0A93	REAR KNOB	1	(-S)					
16	VGU0A96	REAR KNOB	1	(-K)					
17	VKF4171	SD COVER	1	(-S)					
17	VKF4175	SD COVER	1	(-K)					
18	VUKM7074A	REAR CASE U 1	1	LS60/70					
18	VUKM7074B	REAR CASE U 1	1	(-S)LS75					
18	VUKM7078B	REAR CASE U 1	1	(-K)LS75					
19	VMA0V28	LCD HOLDER	1						
20	VMA0V29	EARTH PLATE	1						
21	VMS7812	JACK SHAFT	1						
23	VYQ3935	LCD UNIT	1	LS60/70					
23	VYQ3930	LCD UNIT	1	LS75					
25	EFN-AMW502ZD	FLASH UNIT	1						
26	F2A2F800006	CAPACITOR	1	(C8003)					
27	VGU0A90	POWER KNOB	1						
28	VGU0A95	Q.ZOOM BTN	1						
29	VMB4100	C-EARTH SPRING	1						
30	VYK2B10	TOP CASE ASSY	1	LS60					
30	YVK2C35	TOP CASE ASSY	1	LS70					
30	YVK2A77	TOP CASE ASSY	1	LS75					
31	VEP56043B	MAIN PCB UNIT	1	[RTL]E.S.D.(LS60/70)					
31	VEP56043A	MAIN PCB UNIT	1	[RTL]E.S.D.(LS75)					
32	VEP58037A	TOP OPERATION PCB UNIT	1						
33	VGH4938	CAUTION LABEL	1						
34	VUMP8790	LCD FRAME U	1	LS60/70					
201	VDL1603	OPTICAL FILTER	1	[PAVC-CSG]					
202	VEK0K91	CCD UNIT	1	LS60 E.S.D.[PAVC-CSG]					
202	VEK0K92	CCD UNIT	1	LS70/75 E.S.D.[PAVC-CSG]					
203	VXW0865	LENS UNIT(W/O CCD)	1	[PAVC-CSG]					
204	L6DA8BEC0001	ZOOM MOTOR UNIT	1	[PAVC-CSG]					
205	B3NAA0000074	PHOTO SENSOR	1	[PAVC-CSG]					
206	B3NAA0000091	PHOTO SENSOR	1	[PAVC-CSG]					
207	B3NAA0000091	PHOTO SENSOR	1	[PAVC-CSG]					
208	VMA0V34	COVER	1	[PAVC-CSG]					
209	VXP2724	1ST LENS FRAME UNIT	1	[PAVC-CSG]					
210	VXP2731	DIRECT FRAME	1	[PAVC-CSG]					
211	VXQ1493	FIX FRAME UNIT	1	[PAVC-CSG]					
212	06SSS6F3NM	FOCUS MOTOR UNIT	1	[PAVC-CSG]					
213	VDW1426	DRIVE FRAME	1	[PAVC-CSG]					
214	VMX3529	CCD CUSHION RUBBER	1	[PAVC-CSG]					
B2	VHD1909	SCREW	1						
B3	VHD1909	SCREW	1						
B4	VHD1909	SCREW	1						
B5	XQN16+BJ5FN	SCREW	1						
B6	XQN16+BJ5FN	SCREW	1						
B7	XQN16+BJ5FN	SCREW	1						
B8	XQN16+BJ5FN	SCREW	1						
B9	XQN16+BJ5FN	SCREW	1						
B10	XQN16+BJ5FN	SCREW	1						
B11	XQN16+BJ5FN	SCREW	1						
B12	XQN16+BJ5FN	SCREW	1						
B13	XQN16+BJ5FN	SCREW	1						
B14	XQN16+BJ5FN	SCREW	1						
B15	XQN16+BJ5FN	SCREW	1						
B16	XQN16+BJ5FN	SCREW	1						
B201	XQN14+CJ25FJ	SCREW	1	[PAVC-CSG]					
B202	XQN14+CJ25FJ	SCREW	1	[PAVC-CSG]					

Ref.No.	Part No.	Part Name & Description	Pcs	Remarks	Ref.No.	Part No.	Part Name & Description	Pcs	Remarks
103	K1HA08CD0013	USB CABLE	1		109	VQT1D48	O/I PC CONNECTION (FRENCH)	1	LS60EF/70EF/75EF
104	K1HA08CD0015	VIDEO CABLE	1		109	VQT1D49	O/I PC CONNECTION (ENGLISH)	1	LS60EB/60GN/ 70EB/70GN/75EB/75GN
105	VFC4090	HAND STRAP	1		109	VQT1D50	O/I PC CONNECTION (RUSSIAN/UKRAINIAN)	1	LS60EE/70EE/75EE
106	VFF0361-S	CD-ROM	1	[PAVC-CSG] LS60(EXCEPT PC) LS70(EXCEPT P/PC) LS75(EXCEPT P/PC)	109	VQT1D51	O/I PC CONNECTION (ENGLISH/ARABIC/PERSIAN/ CHINESE(TRADITIONAL))	1	LS60GC/LS70GC/75GC
106	VFF0360-S	CD-ROM	1	[PAVC-CSG] LS60PC LS70P/PC LS75P/PC	109	VQT1E39	O/I PC CONNECTION (CANADIAN FRENCH)	1	LS60PC/70PC/75PC
107	VPF1100	BAG, POLYETHYLENE	1	LS60EB/EE/GK/GN/PC/EF LS70EB/EE/GK/GN/PC/P LS75EB/EE/GK/GN/PC/P/EF	109	VQT1F34	O/I PC CONNECTION (CHINESE(SIMPLIFIED))	1	LS60GK/LS70GK/75GK
107	VPF1132	BAG, POLYETHYLENE	1	LS60EGM/EG/GC/PL LS70EGM/EG/GC/PL LS75EGM/EG/GC/PL	110	VQT1D84	O/I SOFTWARE (ENGLISH/CANADIAN FRENCH)	1	LS60PC/70PC/70P/75P/75PC
108	VQT1C63	INSTRUCTION BOOK	1	LS60PC/70PC/70P/75P (ENGLISH)	110	VQT1D85	O/I SOFTWARE (ENGLISH/SPANISH/ PORTUGUESE)	1	LS60PL/70PL/75PL
108	VQT1C64	INSTRUCTION BOOK	1	LS60PC/70PC/75PC (CANADIAN FRENCH)	110	VQT1D86	O/I SOFTWARE (GERMAN/FRENCH/ITALIAN/ DUTCH)	1	LS60EG/70EG/75EG
108	VQT1C65	INSTRUCTION BOOK	1	LS60PL/70PL/75PL (ENGLISH)	110	VQT1D87	O/I SOFTWARE (SPANISH/PORTUGUESE/ SWEDISH/DUTCH)	1	LS60EGM/70EGM/75EGM
108	VQT1C66	INSTRUCTION BOOK	1	LS60PL/70PL/75PL (SPANISH)	110	VQT1D88	O/I SOFTWARE (FRENCH)	1	LS60EF/70EF/75EF
108	VQT1C67	INSTRUCTION BOOK	1	LS60PL/70PL/75PL (PORTUGUESE)	110	VQT1D89	O/I SOFTWARE (ENGLISH)	1	LS60EB/60GN/ 70EB/70GN/75EB/75GN
108	VQT1C68	INSTRUCTION BOOK	1	LS60EG/70EG/75EG (GERMAN)	110	VQT1D90	O/I SOFTWARE (RUSSIAN/UKRAINIAN)	1	LS60EE/70EE/75EE
108	VQT1C69	INSTRUCTION BOOK	1	LS60EF/60EG/70EF/70EG/ (FRENCH)	110	VQT1D91	O/I SOFTWARE (ENGLISH/ARABIC/PERSIAN/ CHINESE(TRADITIONAL))	1	LS60GC/LS70GC/75GC
108	VQT1C70	INSTRUCTION BOOK	1	LS60EG/70EG/75EG (ITALIAN)	110	VQT1D92	O/I SOFTWARE (CHINESE(SIMPLIFIED))	1	LS60GK/LS70GK/75GK
108	VQT1C71	INSTRUCTION BOOK	1	LS60EG/70EG/75EG (DUTCH)	111	VPFW0004	CAMERA BAG	1	
108	VQT1C72	INSTRUCTION BOOK	1	LS60EGM/70EGM/75EGM (SPANISH)	112	VPK3249	PACKING CASE	1	LS60(EXCEPT PC/GK)
108	VQT1C73	INSTRUCTION BOOK	1	LS60EGM/70EGM/75EGM (PORTUGUESE)	112	VPK3250	PACKING CASE	1	LS60GK
108	VQT1C74	INSTRUCTION BOOK	1	LS60EGM/70EGM/75EGM (SWEDISH)	112	VPK3248	PACKING CASE	1	LS60PC
108	VQT1C75	INSTRUCTION BOOK	1	LS60EGM/70EGM/75EGM (DANISH)	112	VPK3330	PACKING CASE	1	LS70EB/EE/EGM/EG/GC/GN/ PL/EF
108	VQT1C76	INSTRUCTION BOOK	1	LS60EB/70EB/75EB (ENGLISH)	112	VPK3332	PACKING CASE	1	LS70GK
108	VQT1C77	INSTRUCTION BOOK	1	LS60EE/70EE/75EE (RUSSIAN)	112	VPK3329	PACKING CASE	1	LS70PC/P
108	VQT1C78	INSTRUCTION BOOK	1	LS60EE/70EE/75EE (UKRAINIAN)	112	VPK3245	PACKING CASE	1	LS75PS
108	VQT1C79	INSTRUCTION BOOK	1	LS60GC/LS70GC/75GC (ENGLISH)	113	VPN6545	PAD	1	
108	VQT1C80	INSTRUCTION BOOK	1	LS60GC/LS70GC/75GC (CHINESE(TRADITIONAL))					
108	VQT1C81	INSTRUCTION BOOK	1	LS60GC/LS70GC/75GC (ARABIC)					
108	VQT1C83	INSTRUCTION BOOK	1	LS60GK/LS70GK/75GK (CHINESE(SIMPLIFIED))					
108	VQT1C84	INSTRUCTION BOOK	1	LS60GN/70GN/75GN (ENGLISH)					
108	VQT1C96	INSTRUCTION BOOK	1	LS60GC/LS70GC/75GC (PERSIAN)					
108	VQT1E30	INSTRUCTION BOOK	1	LS70P/75P (SPANISH)					
109	VQT1D44	O/I PC CONNECTION	1	LS60PC/70PC/70P/75P/75PC (ENGLISH)					
109	VQT1D45	O/I PC CONNECTION	1	LS60PL/70PL/75PL (ENGLISH/SPANISH/ PORTUGUESE)					
109	VQT1D46	O/I PC CONNECTION	1	LS60EG/70EG/75EG (GERMAN/FRENCH/ITALIAN/ DUTCH)					
109	VQT1D47	O/I PC CONNECTION	1	LS60EGM/70EGM/75EGM (SPANISH/PORTUGUESE/ SWEDISH/DUTCH)					

S7. Exploded View

S7.1. Frame and Casing Section



S7.2. Packing Parts and Accessories Section

