

Service Manual

Digital Camera

LUMIX



Model No. **DMC-FS20P**
DMC-FS20PC
DMC-FS20PL
DMC-FS20PR
DMC-FS20E
DMC-FS20EB
DMC-FS20EE
DMC-FS20EF
DMC-FS20EG
DMC-FS20GC
DMC-FS20GD
DMC-FS20GK
DMC-FS20GN
DMC-FS20GT
DMC-FS20GJ
DMC-FS20SG

Vol. 1

Colour

(S).....Silver Type

(K).....Black Type

(P).....Pink Type (only P/PC/GC/GK/GJ/SG)

(R).....Red Type (only P)

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 (ERG5SJ102:1k Ω /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.

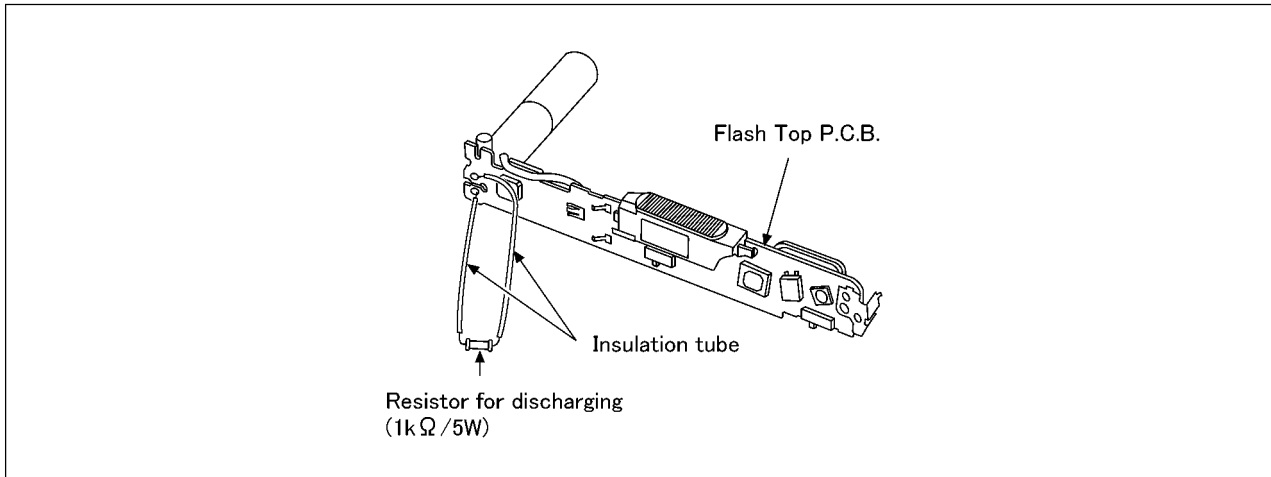


Fig. F1

2 Warning

2.1. Prevention of Electrostatic 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 electrostatic 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 Recycle the Lithium Ion Battery (U.S. Only)

ENGLISH



A lithium ion battery that is recyclable powers the product you have purchased. Please call 1-800-8-BATTERY for information on how to recycle this battery.

FRANÇAIS



L'appareil que vous vous êtes procuré est alimenté par une batterie au lithium-ion recyclable. Pour des renseignements sur le recyclage de la batterie, veuillez composer le 1-800-8-BATTERY.

2.3. Caution for AC Cord (For EB/GC/SG)

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.



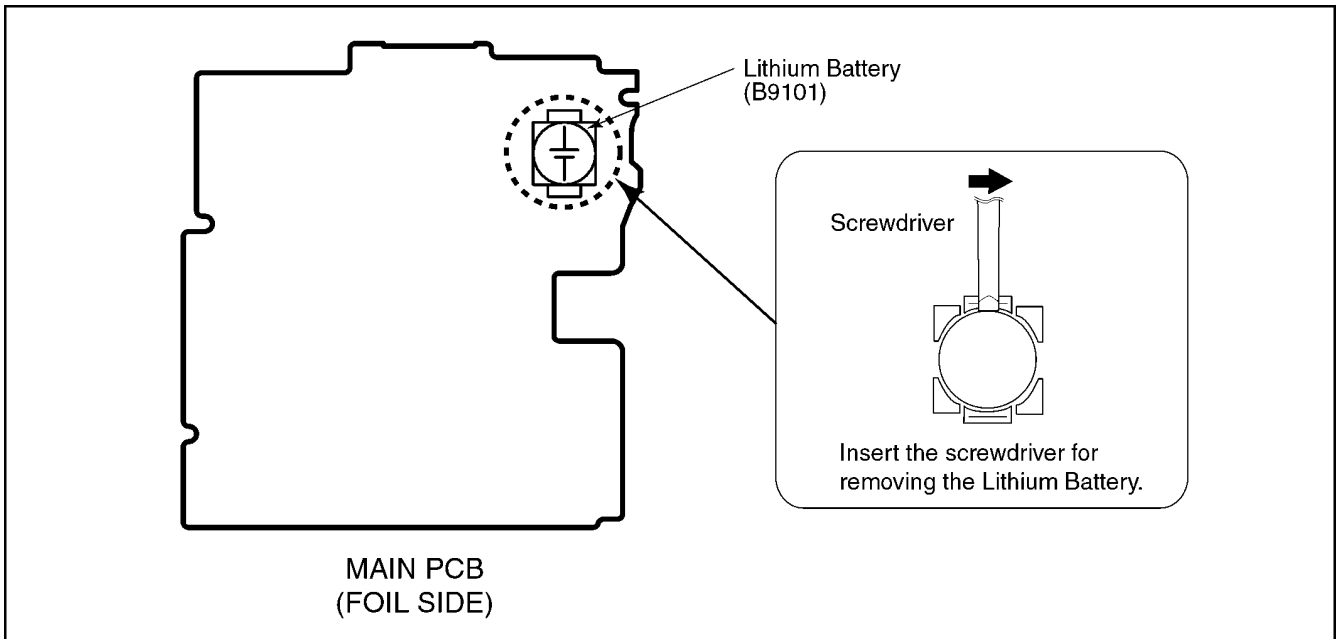
2. Replace the fuse and attach the Fuse cover.



2.4. How to Replace the Lithium Battery

2.4.1. Replacement Procedure

1. Remove the MAIN PCB. (Refer to Disassembly Procedures.)
2. Remove the Lithium battery (Ref. No. "B9101" at foil side of MAIN PCB) and then replace it into new one.



NOTE:

This Lithium battery is a critical component.

(Type No.: ML421S/ZT **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 is applicable for a battery pack which is for DMC-FS20 series, as well.

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 (VEP56058A): Excluding replacement of Lithium Battery

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







There are seven kinds of DMC-FS20, regardless of the colours.

- a) DMC-FS20 (Japan domestic model)
- b) DMC-FS20P/PC
- c) DMC-FS20E/EB/EF/EG/GN
- d) DMC-FS20EE
- e) DMC-FS20GD
- f) DMC-FS20GT/GK
- g) DMC-FS20PL/GC/PR/GJ/SG

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.

<p>a) DMC-FS20 (Japan domestic model) The nameplate for this model show the following Safety registration mark.</p> 	 <p>Safety registration mark</p>
<p>b) DMC-FS20P/PC The nameplate for these models show the following Safety registration mark.</p> 	
<p>c) DMC-FS20E/EB/EF/EG/GN The nameplate for these models show the following Safety registration mark.</p> 	
<p>d) DMC-FS20EE The nameplate for this model show the following Safety registration mark.</p> 	
<p>e) DMC-FS20GD The nameplate for this model show the following Safety registration mark.</p> 	
<p>f) DMC-FS20GT/GK The nameplate for these models show full model number. (with suffix)</p>	
<p>g) DMC-FS20PL/GC/PR/GJ/SG The nameplate for these models do not show any above Safety registration marks.</p>	

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)

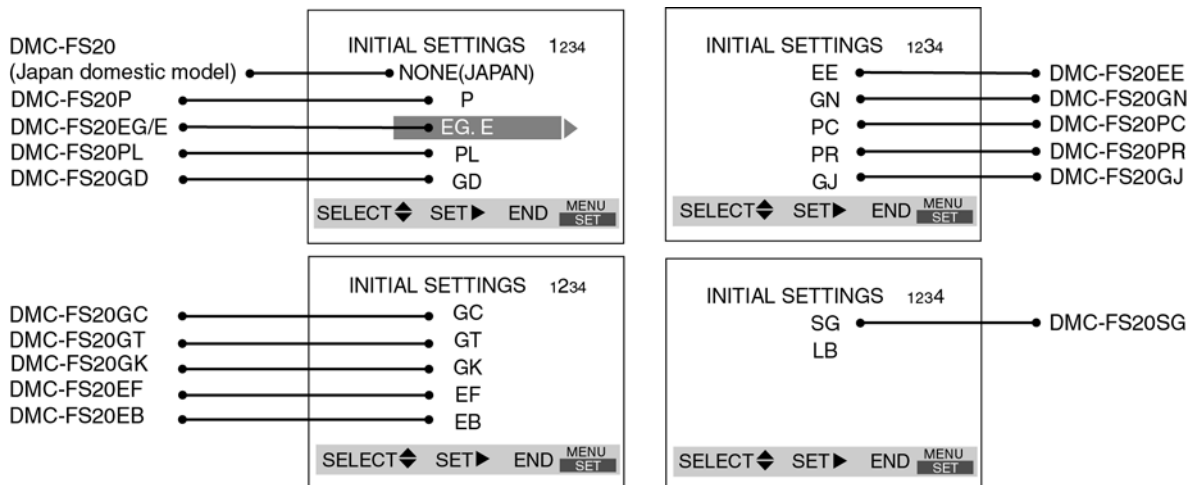
DO NOT select "NONE(JAPAN)" or "P"(North America) if need to select "EG/E/PL/PR/GD/GC/GT/GK/GJ/EF/EB/EE/GN/SG and PC".
Otherwise, once "NONE(JAPAN)" or "P"(North America) are selected, "EG/E/PL/PR/GD/GC/GT/GK/GJ/EF/EB/EE/GN/SG and PC" will not displayed, thus, RE-Settings (changing area) can not be made.

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

This unit employs "Built-in Memory" for picture image data recording.(Approx. 50MB)
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:

- Precautions: Proceed the picture back up from the unit. (Refer to above "CAUTION 2")
- Preparation. Set the Recording mode to "Normal Picture Mode".
Set the [REC]/[PLAYBACK] selector switch to "[REC] (Red camera mark)".
Turn on the power and then press the [MODE] button.
Select the "NORMAL PICTURE MODE" using "[UP] / [DOWN] of Joystick".
Press [MENU/SET] button, then turn the power off.
- **Step 1. The temporary cancellation of initial setting:**
Set the [REC]/[PLAYBACK] selector switch to "[REC] (Red camera mark)".
While keep pressing [E.ZOOM] and "[UP] of Joystick" simultaneously, turn the Power on.
- **Step 2. The cancellation of initial setting:**
Set the [REC]/[PLAYBACK] selector switch to "[PLYBACK]".
Press [E.ZOOM] and "[UP] of Joystick" simultaneously, then turn the Power off.
- **Step 3. Turn the Power on:**
Set the [REC]/[PLAYBACK] selector switch to "[REC] (Red camera mark)", and then turn the Power on.
- **Step 4. Display the INITIAL SETTING:**
While keep pressing "[RIGHT] of Joystick" simultaneously, turn the Power off.



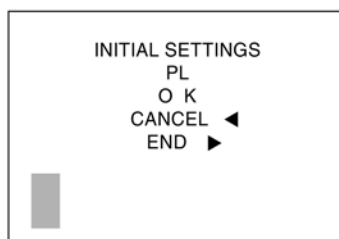
• **Step 5. Set the INITIAL SETTING: (Refer to “CAUTION 1”)**

[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 Joystick”, and then press the “[RIGHT] of Joystick”.



The only set area is displayed, and then press the “[RIGHT] of Joystick” 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 “GT” or “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-FS20 (Japan domestic model)	NTSC	Japanese	Year/Month/Date	
b)	DMC-FS20P/PC/PL	NTSC	English	Month/Date/Year	
c)	DMC-FS20E/EB/EG/GC/GN/PR/SG	PAL	English	Date/Month/Year	
d)	DMC-FS20EF	PAL	French	Date/Month/Year	
e)	DMC-FS20EE	PAL	Russian	Date/Month/Year	
f)	DMC-FS20GK	PAL	Chinese (simplified)	Year/Month/Date	
g)	DMC-FS20GT	NTSC	Chinese (traditional)	Year/Month/Date	
h)	DMC-FS20GD	NTSC	Korean	Year/Month/Date	
i)	DMC-FS20GJ	PAL	Thai	Date/Month/Year	

4 Specifications

Digital Camera: Information for your safety

Power Source:	DC 5.1 V
Power Consumption:	1.6 W (When recording) 0.8 W (When playing back)

Camera effective pixels: 10,100,000 pixels
Image sensor: 1/2.33" CCD, total pixel number 10,700,000 pixels, Primary color filter
Lens: Optical 4× zoom, f=5.2 mm to 20.8 mm (35 mm film camera equivalent: 30 mm to 120 mm)/F3.3 to F5.8
Digital zoom: Max. 4×
Extended optical zoom: Max. 7.1×
Focus: Normal/Macro/Face detection/9-area-focusing/1-area-focusing (High speed)/1-area-focusing
Focus range: Normal: 50 cm (1.64 feet) to ∞
Macro/Intelligent auto: 5 cm (0.17 feet) (Wide)/50 cm (1.64 feet) (Tele) to ∞
Scene mode: There may be differences in the above settings.
Electronic shutter+Mechanical shutter
Shutter system:
Motion picture recording: When the aspect ratio setting is [4:3] 640×480 pixels (30 frames/second, 10 frames/second, only when using a Card)
320×240 pixels (30 frames/second, 10 frame/second)
When the aspect ratio setting is [16:9] 848×480 pixels (30 frames/second, 10 frames/second, only when using a Card)
Burst recording
Burst speed: 2.5 pictures/second (Normal), Approx. 2 pictures/second (Unlimited)
Number of recordable pictures: Max. 5 pictures (Standard), max. 3 pictures (Fine), Depends on the remaining capacity of the built-in memory or the card (Unlimited).
(Performance in burst recording is only with SD Memory Card/SDHC Memory Card. MultiMediaCard performance will be less.)
Hi-speed burst
Burst speed: Approx. 6 pictures/second
(2M (4:3), 2.5M (3:2) or 2M (16:9) is selected as the picture size.)
Number of recordable pictures: When using the built-in memory: Approx. 20 pictures (immediately after formatting)
When using a Card: Max. 100 pictures (differs depending on the type of Card and the recording conditions)
ISO sensitivity: AUTO/100/200/400/800/1600
[HIGH SENS.] mode: 1600 to 6400
Shutter speed: 8 seconds to 1/2000th of a second
[STARRY SKY] mode: 15 seconds, 30 seconds, 60 seconds
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: 3.0" TFT LCD
(Approx. 230,000 dots) (field of view ratio about 100%)
Flash: Flash range: [ISO AUTO]
Approx. 30 cm (0.99 feet) to 5.3 m (17.4 feet) (Wide)
AUTO, AUTO/Red-eye reduction, Forced flash ON (Forced ON/Red-eye reduction), Forced flash OFF (, Slow sync./Red-eye reduction)
Microphone: Monaural
Speaker: Monaural

Recording media: Built-in Memory (Approx. 50 MB)/SD Memory Card/SDHC Memory Card/MultiMediaCard (Still pictures only)

Picture size
Still picture: When the aspect ratio setting is [4:3] 3648×2736 pixels, 3072×2304 pixels, 2560×1920 pixels, 2048×1536 pixels, 1600×1200 pixels, 640×480 pixels
When the aspect ratio setting is [3:2] 3648×2432 pixels, 3072×2048 pixels, 2560×1712 pixels, 2048×1360 pixels
When the aspect ratio setting is [16:9] 3648×2056 pixels, 3072×1728 pixels, 2560×1440 pixels, 1920×1080 pixels

Motion pictures: When the aspect ratio setting is [4:3] 640×480 pixels (Only when using a Card), 320×240 pixels
When the aspect ratio setting is [16:9] 848×480 pixels (Only when using a Card)
Fine/Standard

Quality:
Recording file format
Still Picture: JPEG (based on "Design rule for Camera File system", based on "Exif 2.21" standard)/DPOF corresponding "QuickTime Motion JPEG" (motion pictures with audio)

Motion pictures:
Interface
Digital: "USB 2.0" (Full Speed)
Analog video/ audio: NTSC/PAL Composite (Switched by menu), Audio line output (monaural)

Terminal
[AV OUT/DIGITAL]: Dedicated jack (8 pin)
[DC IN]: Dedicated jack (2 pin)
Dimensions: Approx. 94.9 mm (W)×57.1 mm (H)×22.9 mm (D)
[3 3/4" (W)×2 1/4" (H)×7/8" (D)] (excluding the projecting parts)
Mass (weight): Approx. 132 g/4.66 oz (excluding card and battery)
Approx. 154 g/5.43 oz (with card and battery)
Operating temperature: 0 °C to 40 °C (32 °F to 104 °F)
Operating humidity: 10% to 80%

Battery Charger
(Panasonic DE-A39B): Information for your safety

Input:	110 V to 240 V~50/60 Hz, 0.2 A
Output:	CHARGE 4.2 V=0.8 A

Equipment mobility: Movable

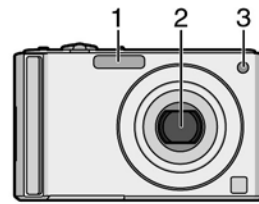
Battery Pack (lithium-ion)
(Panasonic DMW-BCE10PP): Information for your safety

Voltage/capacity:	3.6 V, 1000 mAh
--------------------------	-----------------

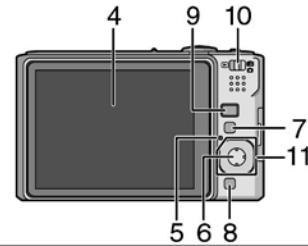
5 Location of Controls and Components

Names of the Components

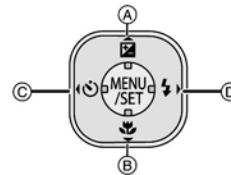
- 1 Flash
- 2 Lens
- 3 Self-timer indicator
AF assist lamp



- 4 LCD monitor
- 5 Status indicator
- 6 [MENU/SET] button
- 7 [DISPLAY] button
- 8 [Q.MENU]/Delete button
- 9 [MODE] button
- 10 [REC]/[PLAYBACK] selector switch

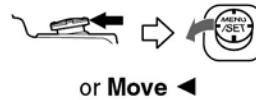


- 11 Joystick
 - Ⓐ: ▲/Exposure compensation/
Auto bracket/The Backlight
Compensation
 - Ⓑ: ▼/Macro mode
 - Ⓒ: ◀/Self-timer
 - Ⓓ: ▶/Flash setting



The joystick is operated in two different ways: it can be moved in the up, down, left and right directions to perform an operation, or it can be pressed to select. In these operating instructions, it is pictured as shown in the figure below or described with ▲/▼/◀/▶.

Example: When the joystick is moved toward ◀ (left)
Place your finger on the right side of the joystick, and move the joystick toward the left.



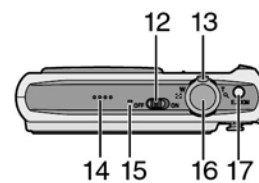
or Move ◀

Example: When the [MENU/SET] button is pressed
Push the joystick straight in.

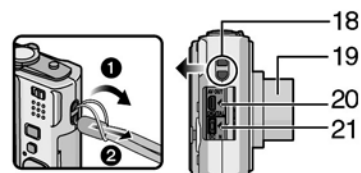


or Press [MENU/SET]

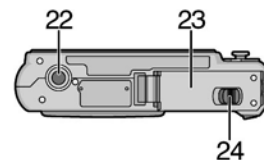
- 12 Camera ON/OFF switch
- 13 Zoom lever
- 14 Speaker
- 15 Microphone
- 16 Shutter button
- 17 [E.ZOOM] button



- 18 Strap eyelet
 - Be sure to attach the strap when using the camera to ensure that you will not drop it.
- 19 Lens barrel
- 20 [AV OUT/DIGITAL] socket
- 21 [DC IN] socket
 - Always use a genuine Panasonic AC adaptor (DMW-AC5PP; optional).
 - This camera cannot charge the battery even when the AC adaptor (DMW-AC5PP; optional) is connected to it.



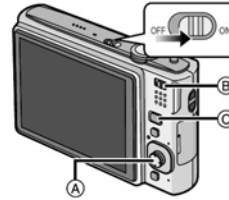
- 22 Tripod receptacle
 - When you use a tripod, make sure the tripod is stable when the camera is attached to it.
- 23 Card/Battery door
- 24 Release lever



Selecting the [REC] Mode

When the [REC] mode is selected, the camera can be set to the Intelligent auto mode in which the optimal settings are established in line with the subject to be recorded and the recording conditions, or to the scene mode which enables you to take pictures that match the scene being recorded.

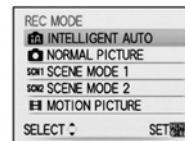
- 1 Turn the camera on.
 - A [MENU/SET] button
 - B [REC]/[PLAYBACK] selector switch
 - C [MODE] button



- 2 Slide the [REC]/[PLAYBACK] selector switch to [iA/📷].

- 3 Press [MODE].

- 4 Move ▲/▼ to select the mode.



- 5 Press [MENU/SET].

List of [REC] modes

iA Intelligent auto mode

The subjects are recorded using settings automatically selected by the camera.

📷 Normal picture mode

The subjects are recorded using your own settings.

SCN1 Scene mode1/Scene mode2
SCN2

This allows you to take pictures that match the scene being recorded.

🎞️ Motion picture mode

This mode allows you to record motion pictures with audio.

Note

- When the mode has been switched from [PLAYBACK] mode to [REC] mode, the previously set [REC] mode will be set.

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 [REC]/[PLAYBACK] selector switch to “[REC] (Red camera mark)”.

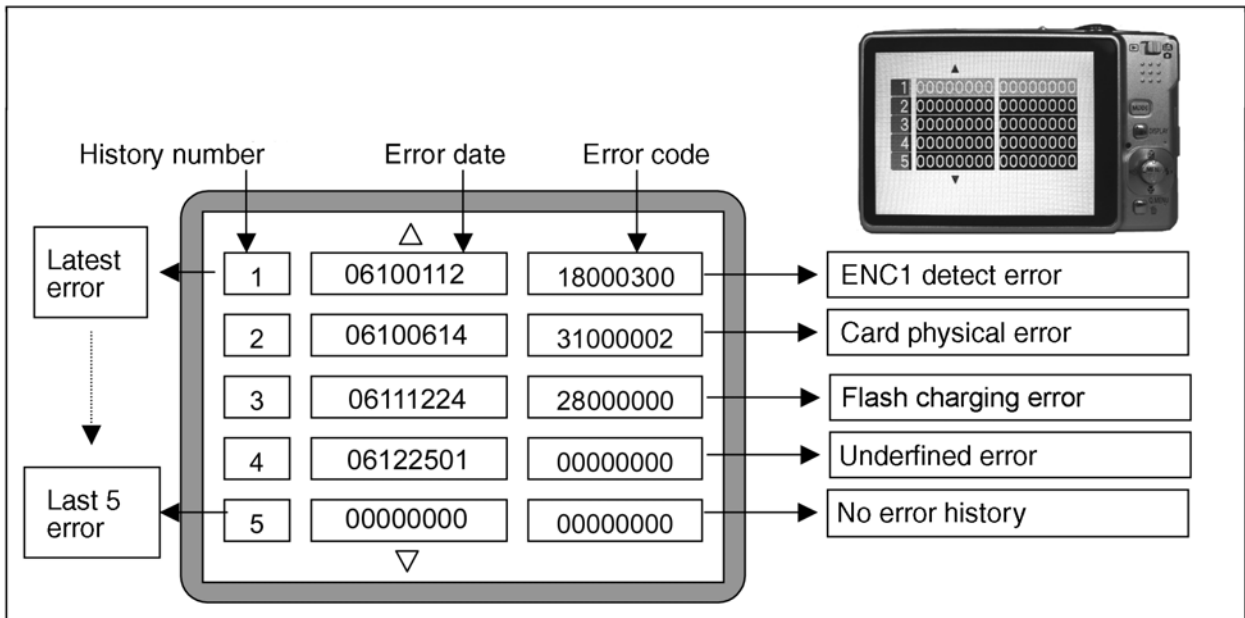
While keep pressing [E.ZOOM] and “[UP] of Joystick” simultaneously, turn the Power on.

• 2. The display of error code:

Press [E.ZOOM] and “[LEFT] of Joystick” 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 Joystick” : It can be scroll up or down one.

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

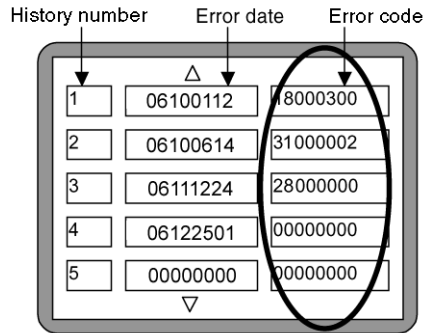
• 4. How to read the error date:

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 (IC7101: X axis) detect error on Main P.C.B.. IC7101 (Gyro element) or IC6001 (VENUS 4)
				4000	GYRO (Y) error. Gyro (IC7101: Y axis) detect error on Main P.C.B.. IC7101 (Gyro element) or IC6001 (VENUS 4)
				5000	MREF error (Reference voltage error). IC9101 (LENS drive) or IC6001 (VENUS 4)
				6000	Drive voltage (X) error. VENUS 4 AD value error, LENS Unit, LENS flex breaks etc.
				7000	Drive voltage (Y) error. VENUS 4 AD value error, LENS Unit, LENS flex breaks etc.
		C.B./Zoom	0010	HP Low detect error. (HP ENC. detects always low. (Fully retracted condition.)) Zoom motor, ABS ENC., and/or circuit failure. Zoom deadlock (Exit side).	
				0020	HP Low detect error. (HP ENC detects always High. (Exit condition.)) Zoom motor, ABS ENC., and/or circuit failure. Zoom deadlock (Retract side).
				0030 0040 0050	Zoom ENC. detect error.(No signal is supplied from Encoder located on Zoom Motor.) Zoom motor, ABS ENC., and/or circuit failure. Zoom deadlock.
		Focus	0001	HP Low detect error (Focus encoder always Low detect error). FP9002-(3) signal line or IC6001 (VENUS 4)	
				0002	HP High detect error (Focus encoder always High detect error). FP9002-(2) signal line or IC6001 (VENUS 4)
		Lens	18*1	0000	Power ON time out error. Lens drive system
				18*2	0000
	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)	
			High 4 bits	Low 4 bits	Check point (Lower)	
HARD	VENUS A/D	Flash	28*0	0000	Flash charging error. IC6001-(AC17) signal line or Flash charging circuit	
				0001	EEPROM read error IC6002 (FLASH ROM)	
	SYSTEM	RTC	2C*0		0001	SYSTEM IC initialize failure error Communication between IC6001 (VENUS 4) and IC9101 (SYSTEM)
				0002	EEPROM write error IC6002 (FLASH ROM)	
SOFT	CPU	Reset	30*0	0001	NMI reset	
				0007	Non Mask-able Interrupt (30000001-30000007 are caused by factors)	
	Card	Card	31*0	0001	Card logic error SD memory card data line or IC6001 (VENUS 4)	
					0002	Card physical error SD memory card data line or IC6001 (VENUS 4)
					0004	Write error SD memory card data line or IC6001 (VENUS 4)
						Format error
	CPU, ASIC hard	Stop	38*0	0001	Camera task finish process time out. Communication between Lens system and IC6001 (VENUS 4)	
					0002	Camera task invalid code error. IC6001 (VENUS 4)
					0100	File time out error in recording motion image IC6001 (VENUS 4)
					0200	File data send error in recording motion image IC6001 (VENUS 4)
					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	Inperfect zoom lens processing Zoom lens	
					35*0	0000
			35*1	0000		
			35*2	0000	Though record preprocessing is necessary, it is not completed.	

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.

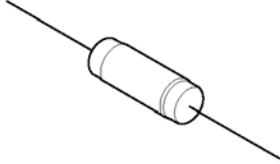
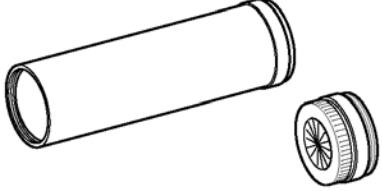
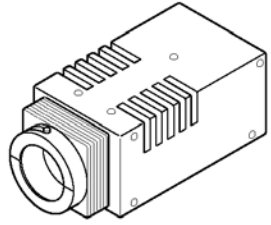
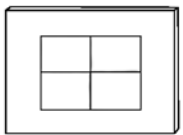

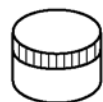
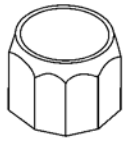
NOTE:

The error code can not be initialized.

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.	 * RFKZ0422 can be used.	 ※ with DC Cable
TR Chart RFKZ0443	Lens Cleaning Kit (BK) VFK1900BK	Grease (for lens) RFKZ0472
	 * Only supplied as 10 set/box.	
Dome type magnifying glass VFK1835		
		

7.2. When Replacing the Main PCB

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

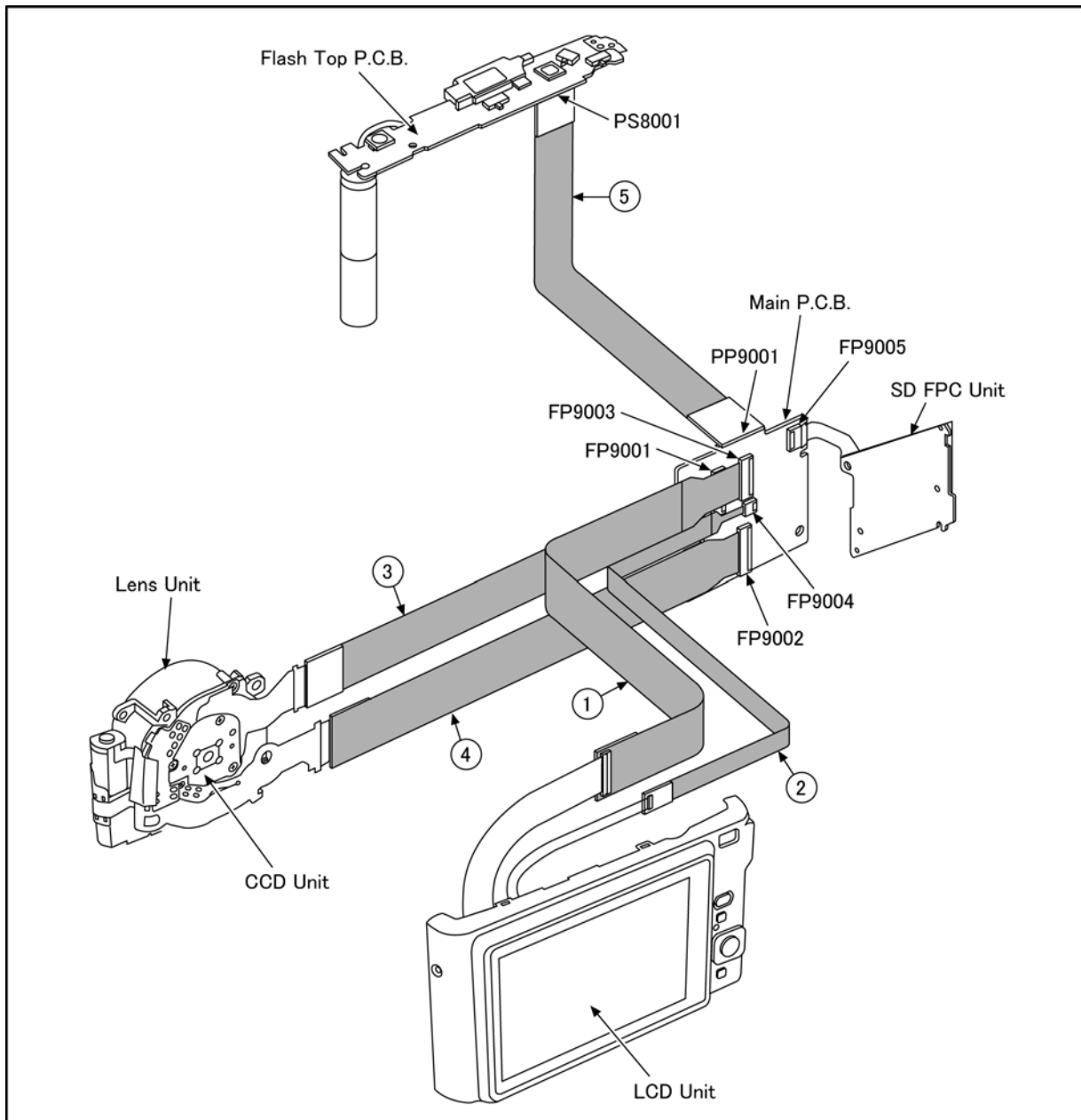
The adjustment instruction is available at “software download” on the “Support Information from NWBG/VDBG-PAVC” web-site in “TSN system”, together with Maintenance software.

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	FP9003 (MAIN) - LCD UNIT	39PIN 0.3 FFC
2	VFK1974	FP9004 (MAIN) - LCD UNIT	4PIN 0.5 FFC
3	RFKZ0416	FP9001 (MAIN) - CCD UNIT	41PIN 0.3 FFC
4	RFKZ0477	FP9002 (MAIN) - LENS UNIT	45PIN 0.3 FFC
5	RFKZ0418	PP9001 (MAIN) - PS8001 (FLASH TOP)	30PIN B to B

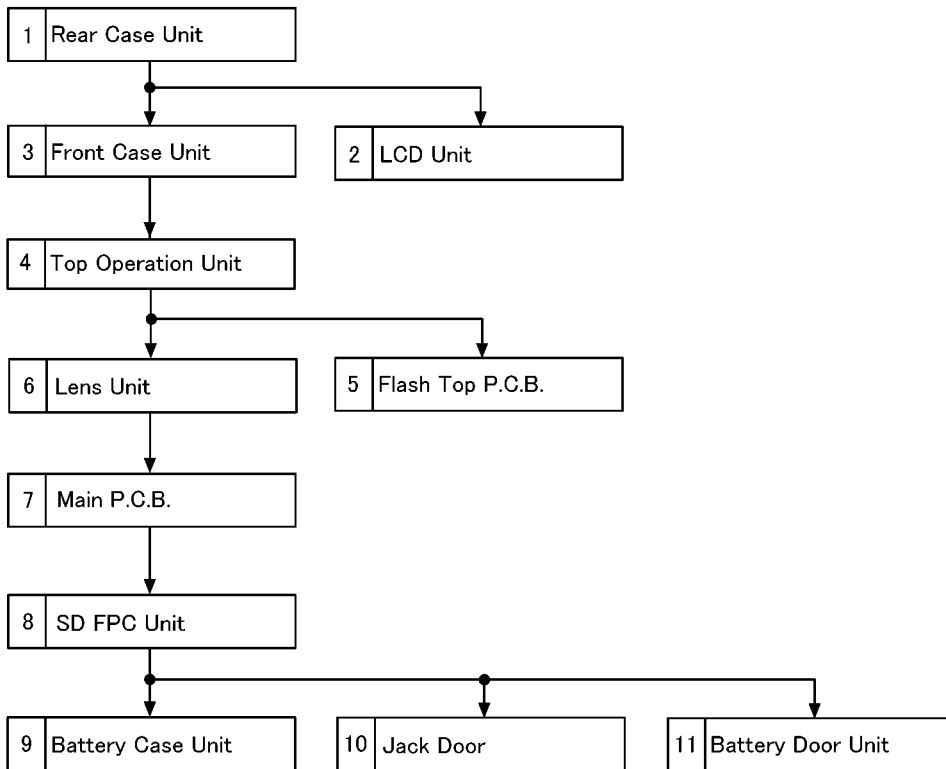


CAUTION-1. (When servicing FLASH TOP PCB)

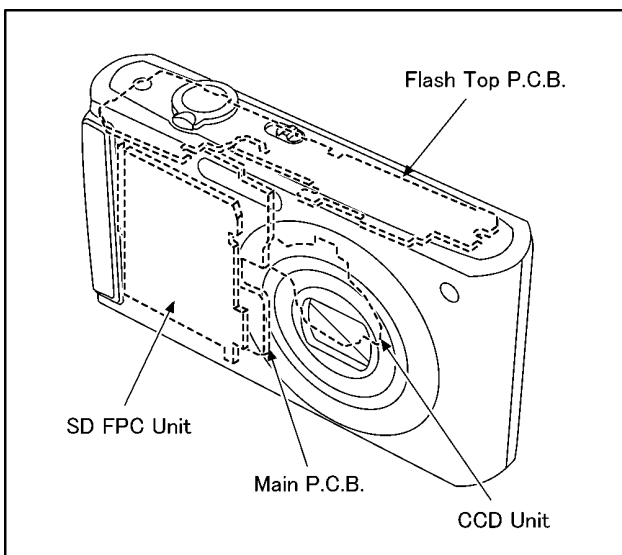
1. Be sure to discharge the capacitor on FLASH TOP PCB.
Refer to “HOW TO DISCHARGE THE CAPACITOR ON FLASH TOP PCB”.
The capacitor voltage is not lowered soon even if the AC Cord is unplugged or the battery is removed.
2. Be careful of the high voltage circuit on FLASH TOP PCB.
3. DO NOT allow other parts 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
			1 Screw (A)
			3 Screws (B)
			1 Lock A
		2 Locks B	
		Fig.D2	FP9004(Flex)
			FP9003(Flex)
			Rear Case Unit
2	LCD Unit	Fig.D3	2 Locking tabs LCD Unit
3	Front Case Unit	Fig.D4	1 Screw (C)
			4 Screws (D)
			1 Locking tab
			Front Case Unit
4	Top Operation Unit	Fig.D5	PS8001(Connector) Top Operation Unit
5	Flash Top P.C.B.	Fig.D6	AF Panel Light
			2 Screws (E)
			3 Locking tabs
			Mode Knob
			Top Ornament Unit
		Fig.D7	Speaker
			Mic Damper
			Power knob base
			Power knob
			Flash Top P.C.B.
6	Lens Unit	Fig.D8	3 Screws (F)
			1 Screw (G)
			Frame Plate
			Tripod Fixing Plate
			FP9001(Flex)
			FP9002(Flex)
			Lens Unit
7	Main P.C.B.	Fig.D9	1 Screw (H)
			FP9005(Flex)
			PCB Spacer
			Main P.C.B.
8	SD FPC Unit	Fig.D10	1 Screw (I)
			SD FPC Unit
9	Battery Case Unit	Fig.D11	Battery Out Spring
			Battery Case Unit
10	Jack Door	Fig.D12	Jack Door Shaft
			Jack Door
11	Battery Door Unit	Fig.D13	Battery Door Shaft
			Battery Door Spring
			Battery Door Unit

8.3.1. Removal of the Rear Case Unit

NOTE:

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

- Card
- Battery
- Screw(A) × 1
- Screw(B) × 3
- Lock A × 1
- Lock B × 2

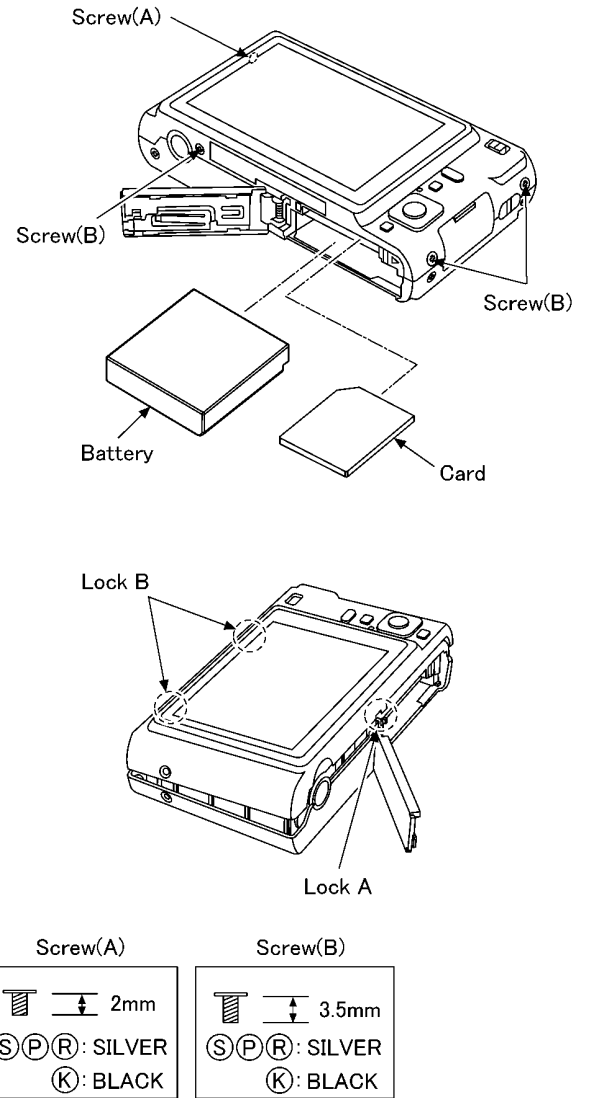


Fig.D1

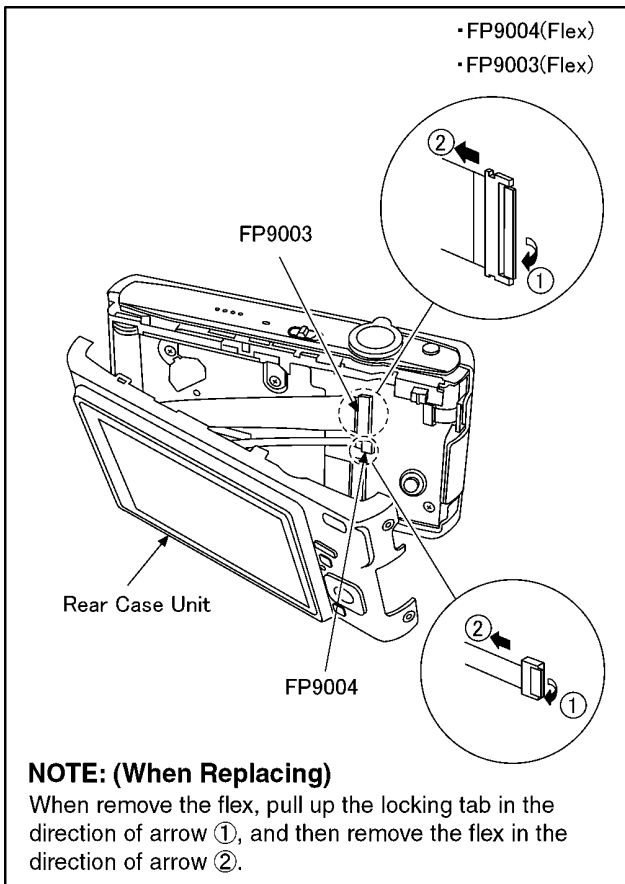


Fig.D2

8.3.2. Removal of the LCD Unit

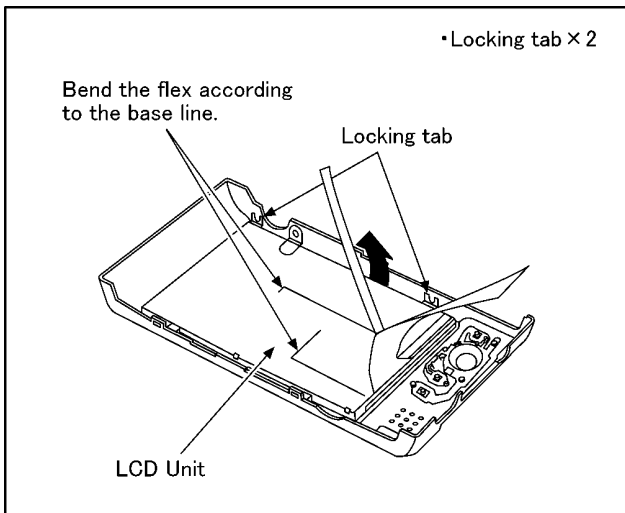


Fig.D3

8.3.3. Removal of the Front Case Unit

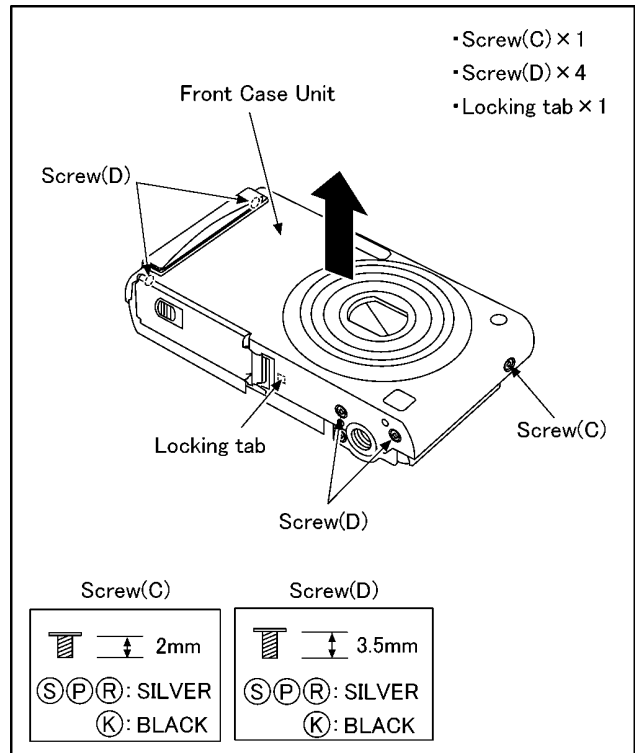


Fig.D4

8.3.4. Removal of the Top Operation Unit

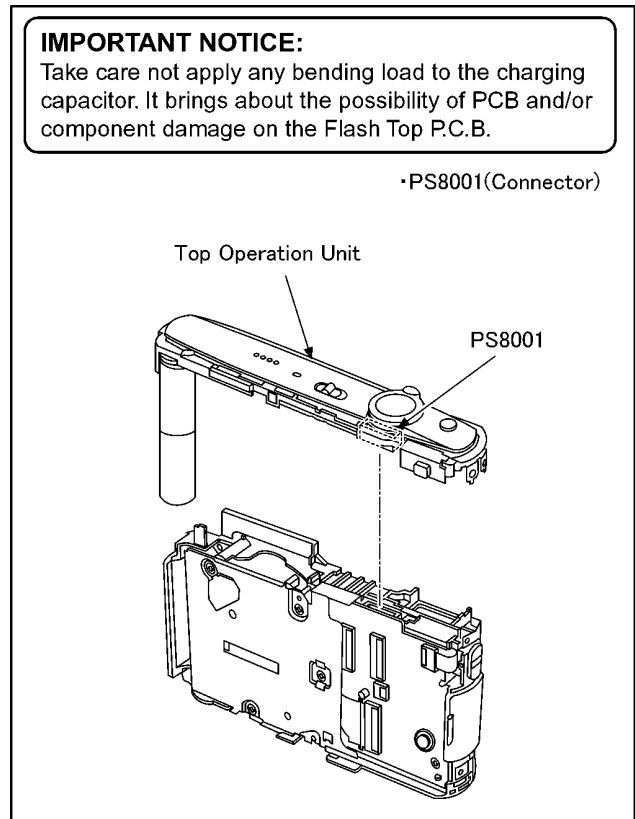


Fig.D5

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

IMPORTANT NOTICE:

Take care not apply any bending load to the charging capacitor. It brings about the possibility of PCB and/or component damage on the Flash Top P.C.B.

- AF Panel Light
- Screw(E) × 2
- Locking tab × 3
- Mode knob
- Top Ornament Unit
- Speaker
- Mic Damper
- POWER knob base
- POWER knob

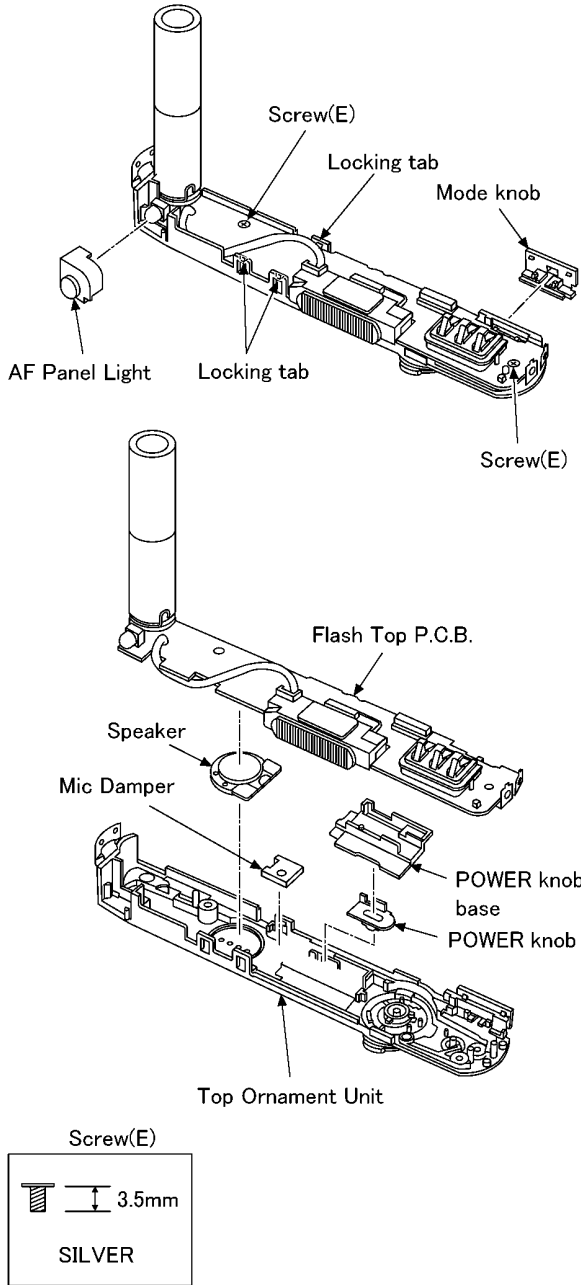
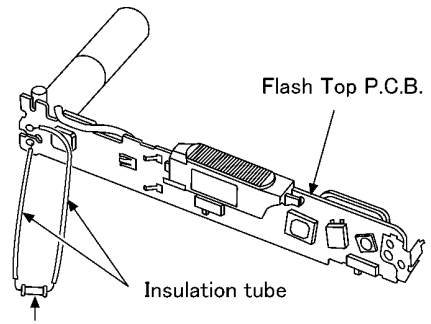


Fig.D6



Resistor for discharging
(1kΩ / 5W)

CAUTION

Be sure to discharge the capacitor on Flash Top P.C.B. before disassembling.

1. Remove the Flash Top P.C.B..
2. Put the insulation tube on the lead part of resistor (ERG5SJ102: 1kΩ/5W).
3. Put the resistor between both terminals of capacitor unit for approx. 5 seconds.

NOTE: (When Installing)

- Align the convex of power switch and power knob.
- Align the convex of mode switch and mode knob.

IMPORTANT NOTICE:

Take care not apply any bending load to the charging capacitor. It brings about the possibility of PCB and/or component damage on the Flash Top P.C.B.

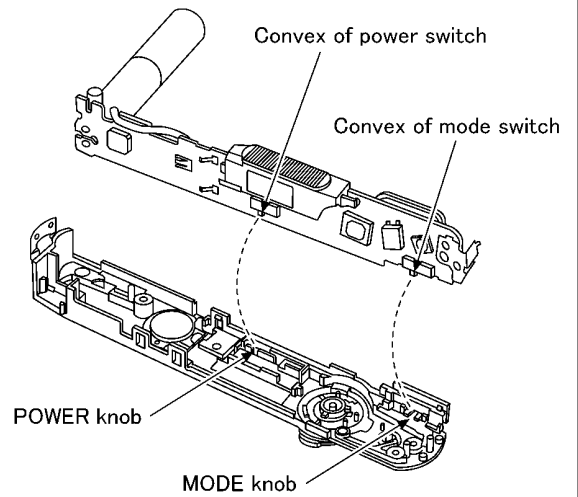


Fig.D7

8.3.6. Removal of the Lens Unit

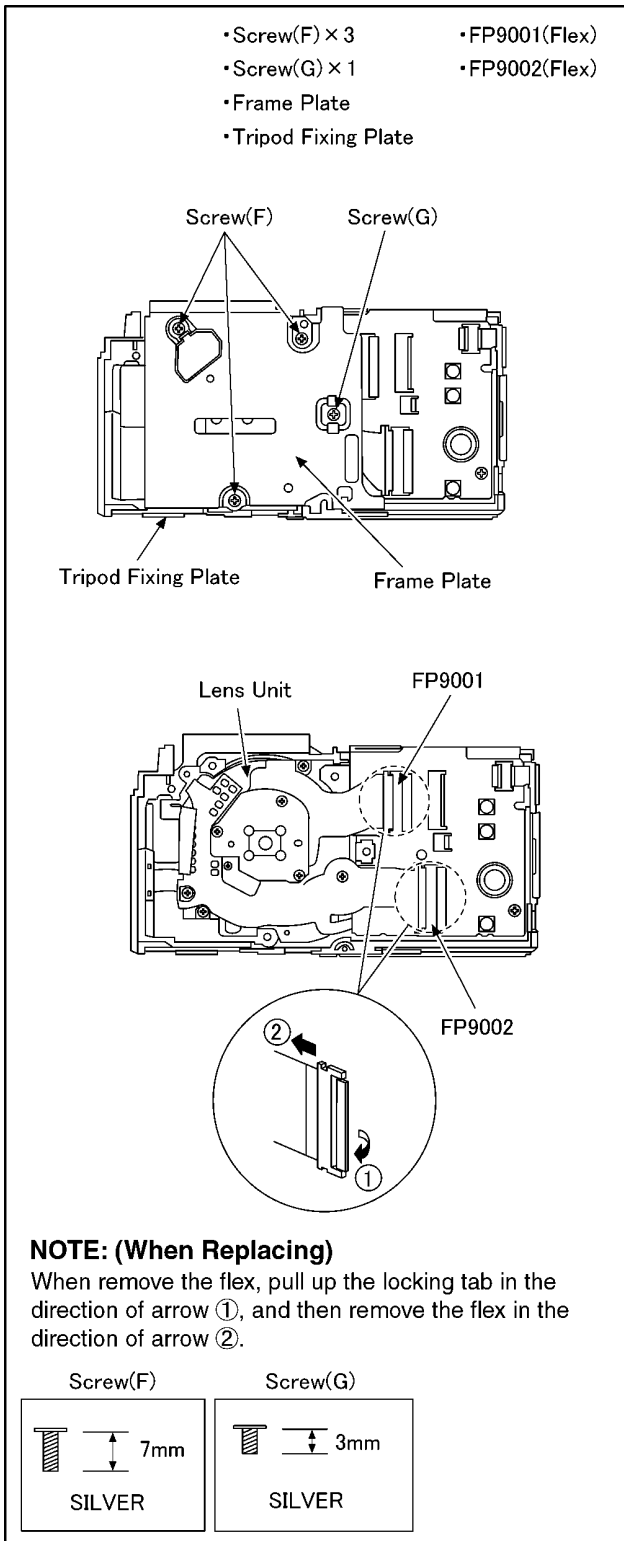


Fig.D8

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

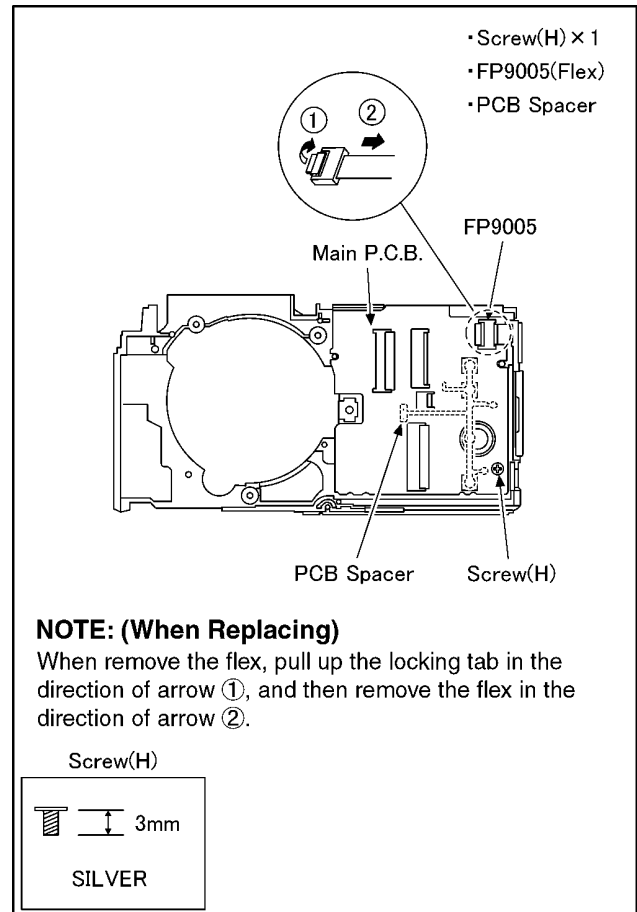


Fig.D9

8.3.8. Removal of the SD FPC Unit

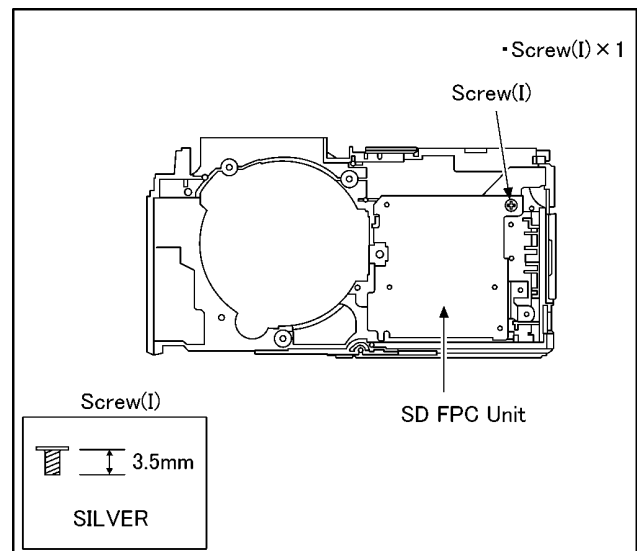


Fig.D10

8.3.9. Removal of the Battery Case Unit

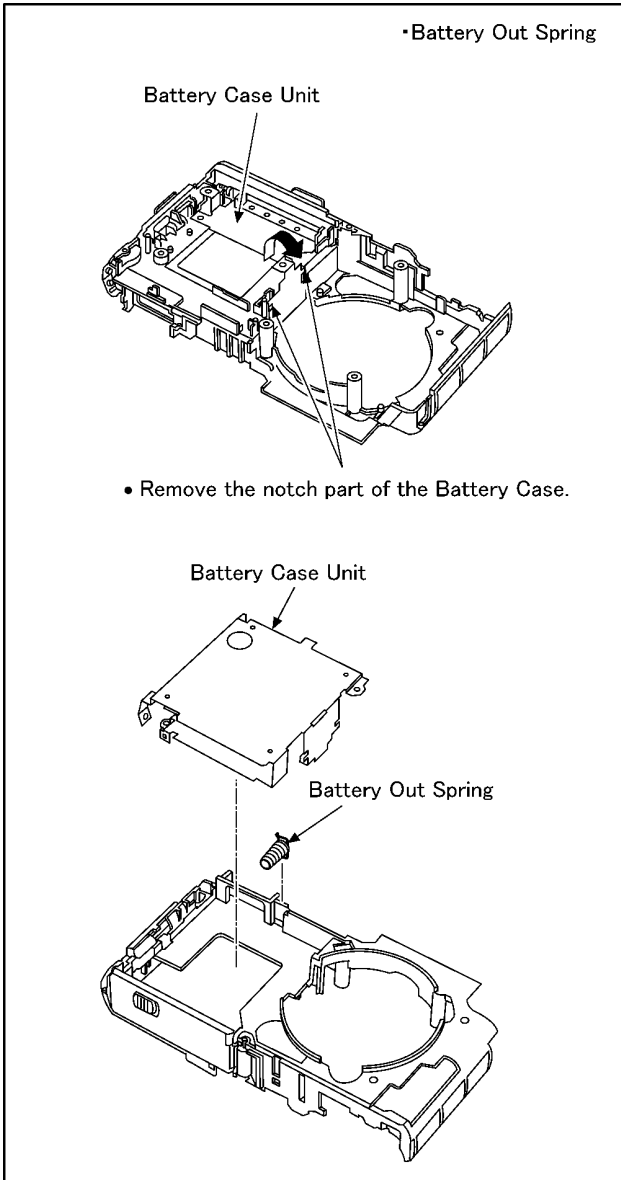


Fig.D11

8.3.10. Removal of the Jack Door

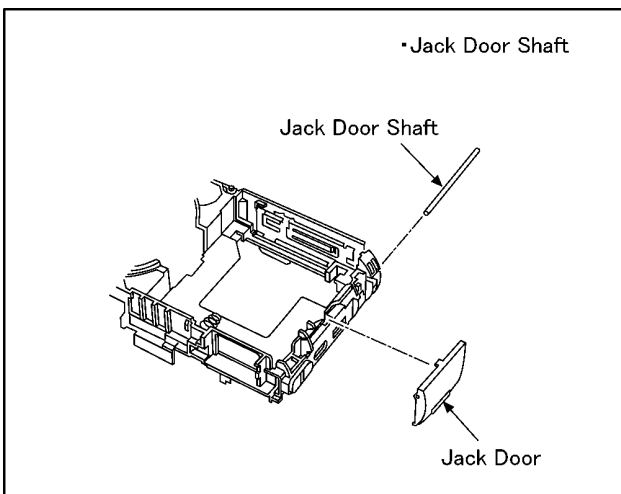


Fig.D12

8.3.11. Removal of the Battery Door Unit

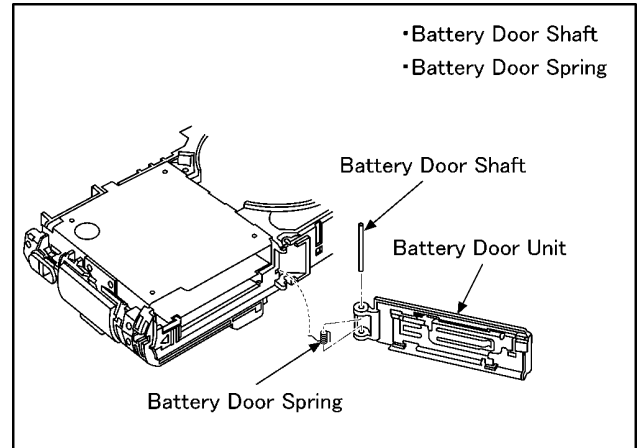


Fig.D13

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.)

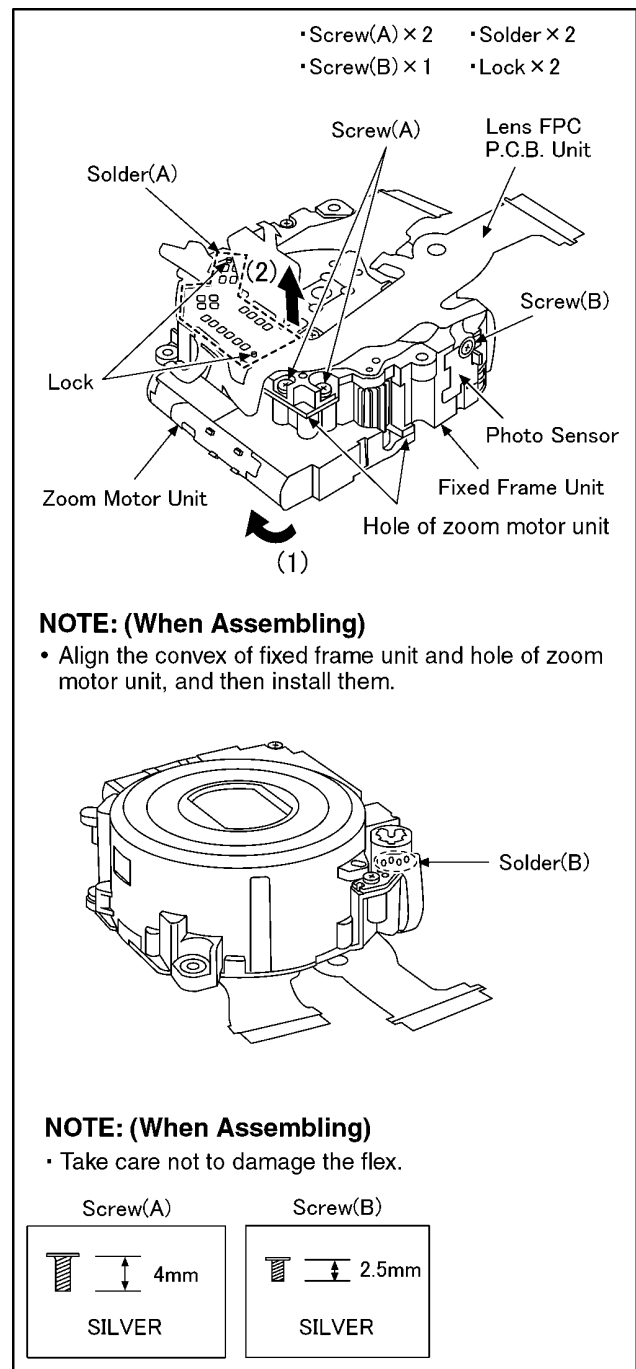
8.4. Disassembly Procedure for the Lens

NOTE: When Disassembling and Assembling for the Lens

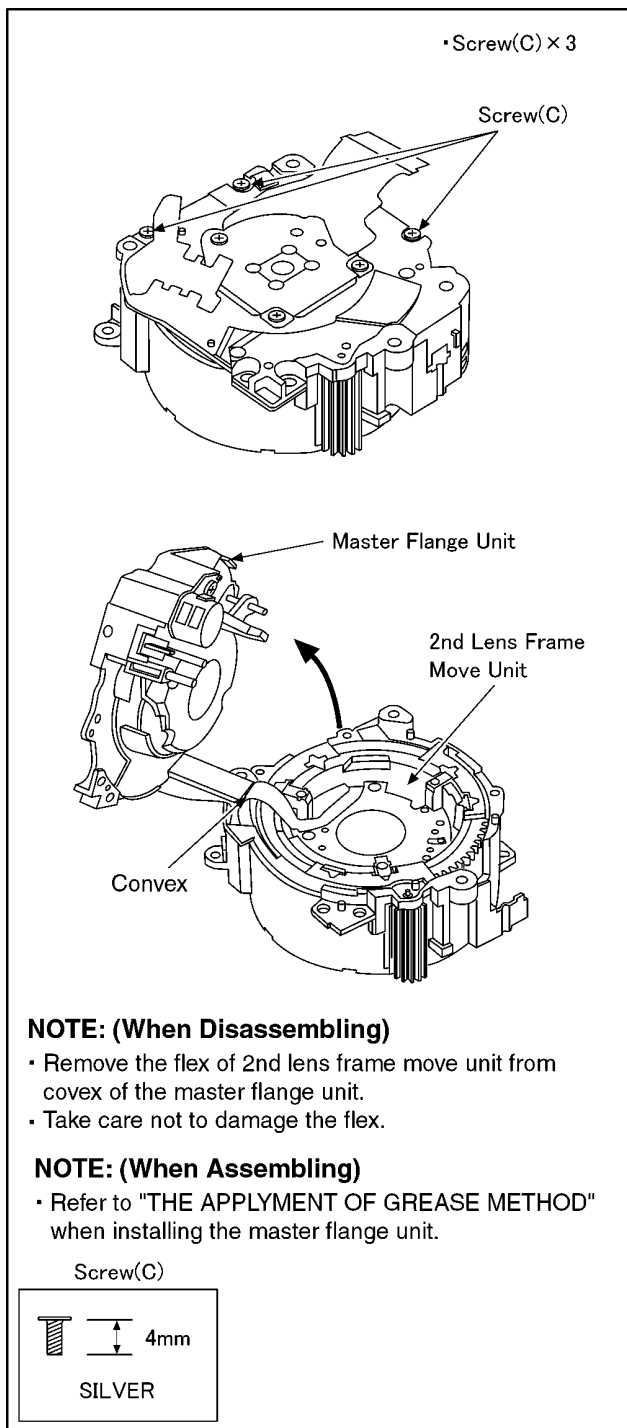
- To minimize the possibility of the CCD being dirt, perform disassemble and/or assemble under the condition of the CCD is being mounted.
Disassembling procedures for the CCD unit, refer to item 8.6.
- Take care that the dust and dirt are not entered into the lens.
In case of the dust is putted on the lens, blow off them by airbrush.
- Do not touch the surface of lens.
- Use lens cleaning KIT (BK)(VFK1900BK).
- Apply the grease (RFKZ0472) to the point where is shown to "Grease apply" in the figure.
When the grease is applied, use a toothpick and apply thinly.
- When repair the fixed frame, drive frame and direct frame, must be unit exchange.

8.4.1. Removal of the Zoom Motor Unit and Lens FPC P.C.B. Unit

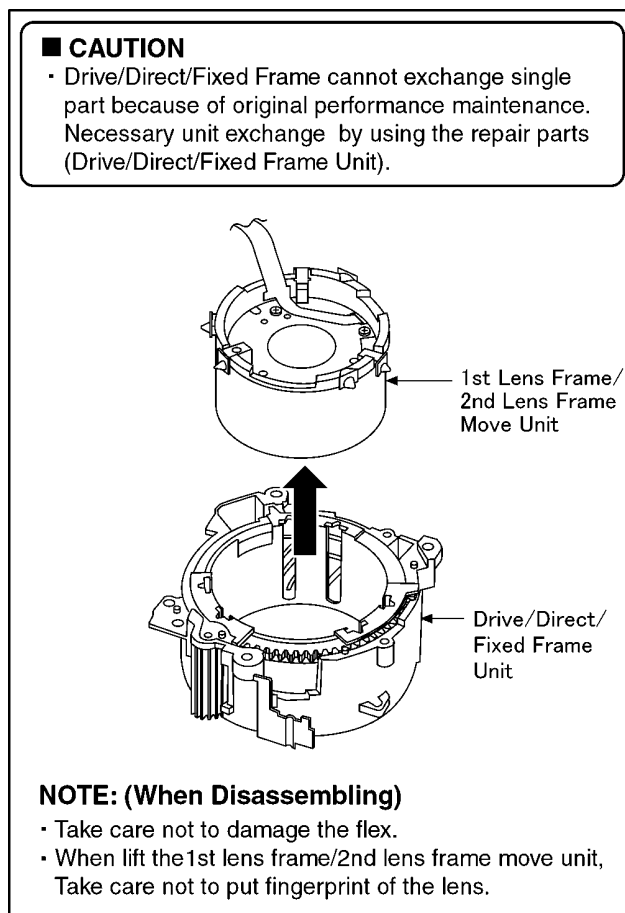
- Remove the 1 solder (A).
- Remove the 1 solder (B).
- Unscrew the 2 screws (A).
- Unscrew the 1 screw (B).
- Remove the 2 locks.
- Remove the zoom motor unit to the indicated by arrow (1).
- Remove the lens FPC P.C.B. unit to the indicated by arrow (2).



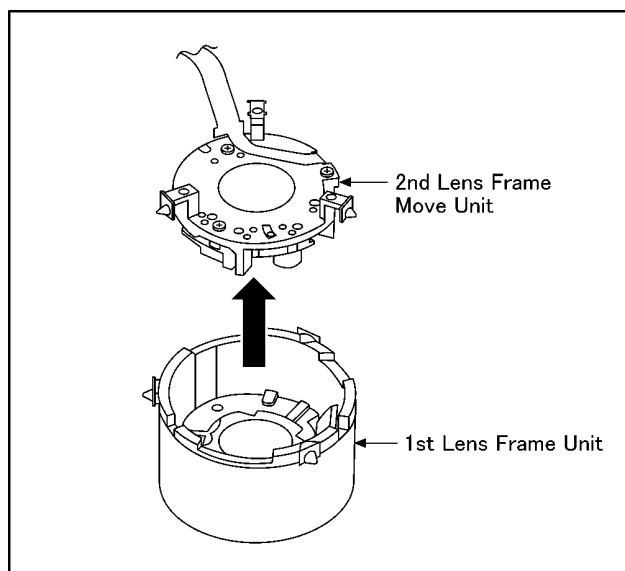
8.4.2. Removal of the Master Flange Unit



8.4.3. Removal of the 1st Lens Frame/2nd Lens Frame Move Unit



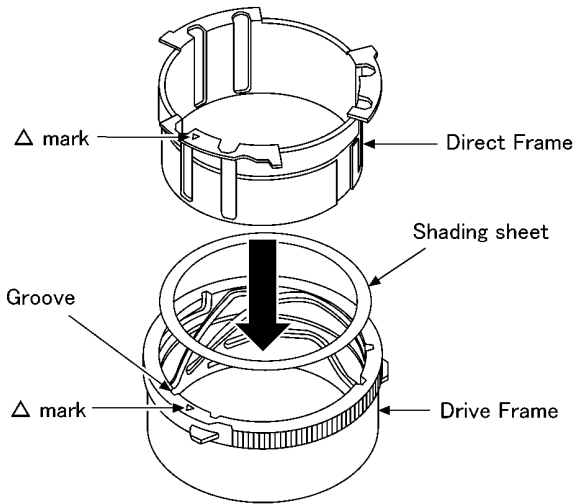
8.4.4. Removal of the 2nd Lens Frame Move Unit



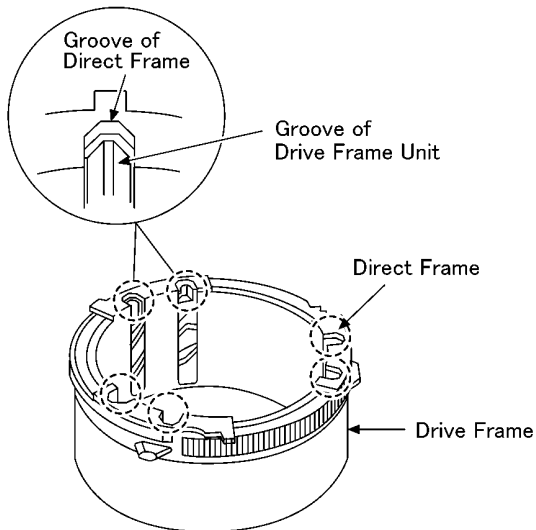
8.5. Assembly Procedure for the Lens

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

- Insert the shading sheet to drive frame.
(When insert the shading sheet, so that the luster side facing to subject side)
- Align the Δ mark of direct frame and groove in the interior of Δ mark of drive frame, and then install the direct frame to drive frame.

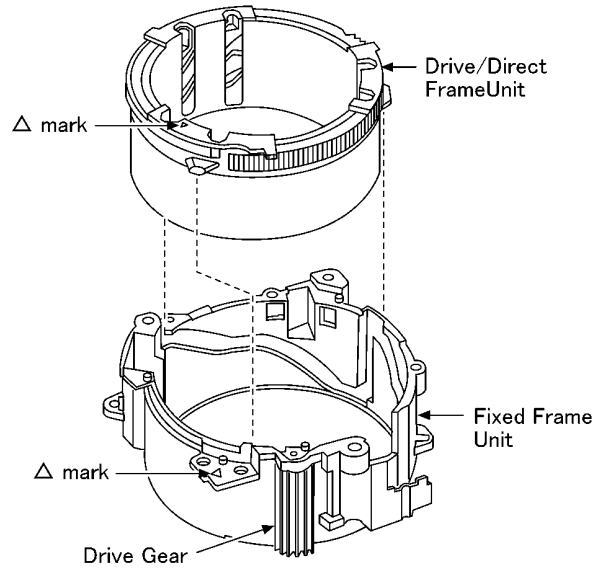


- Move the external U cut of direct frame to gear edge, and then align the phase of the groove (6 points).



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

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

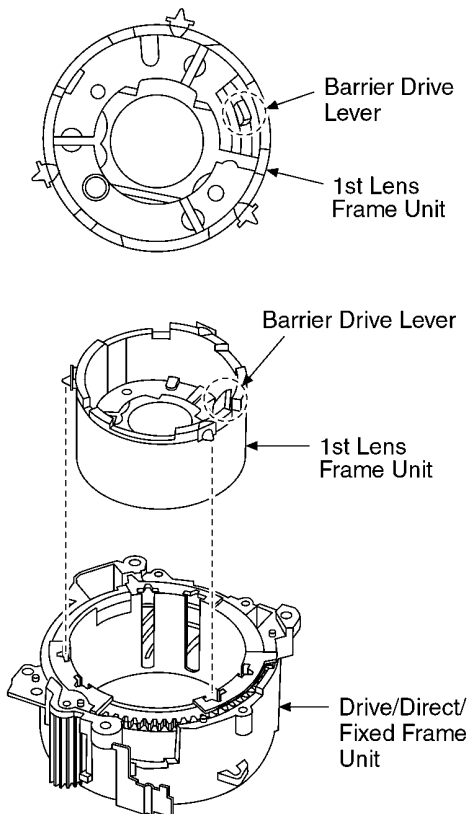


NOTE: (When Assembling)

- With aligning the phase of the drive/direct frame unit , confirm the gear of drive unit is engaged with the fixed frame unit firmly.

8.5.3. Assembly for the 1st Lens Frame Unit and Drive/Direct/Fixed Frame Unit

- Inserts the 1st lens frame unit to the drive/direct/fixed frame unit so that the barrier drive lever may become the position of the figure below.

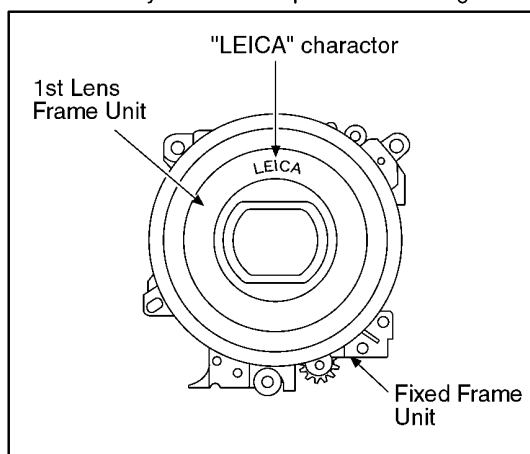


NOTE: (When Assembling)

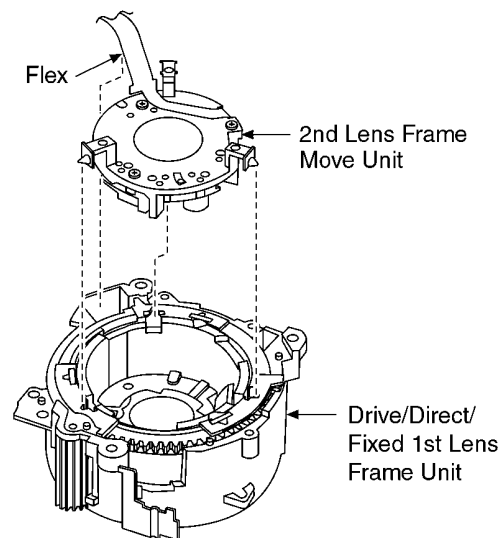
Take care not to put fingerprint of the lens.

FRONT VIEW

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



8.5.4. Assembly for the 2nd Lens Frame Move Unit and Drive/Direct/Fixed Frame/1st Lens Frame Unit



NOTE: (When Assembling)

Take care not to put fingerprint of the lens.

8.5.5. Assembly for the Master Flange Unit and Drive/Direct/Fixed Frame/1st Lens Frame/2nd Lens Frame Move Unit

• Screw(C) × 3

- Align the flex insert part of fixed frame unit and convex of the master flange unit, and then insert the master flange unit.

NOTE: (When Assembling)

- Take care not to damage the flex.
- Refer to "THE APPLYMENT OF GREASE METHOD" when installing the master flange unit.

Shutter

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

Screw(C)

Screw(C)
4mm
SILVER

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.

- Screw(D) × 3
- Optical Filter × 1
- CCD Cushion × 1

CCD Unit

Screw(D)

Screw(D)
3mm
BLACK

CCD side (red is pale)

↑

↓

Lens side (red is deep)

CCD Cushion

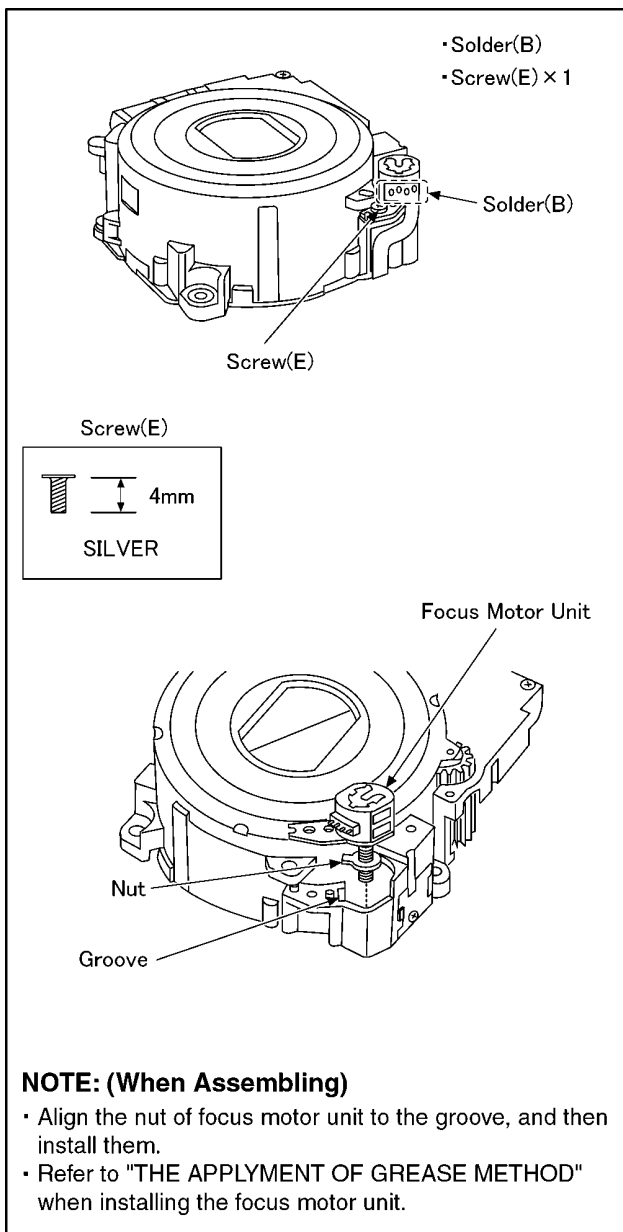
Optical Filter

NOTE: (When Assembling)

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.

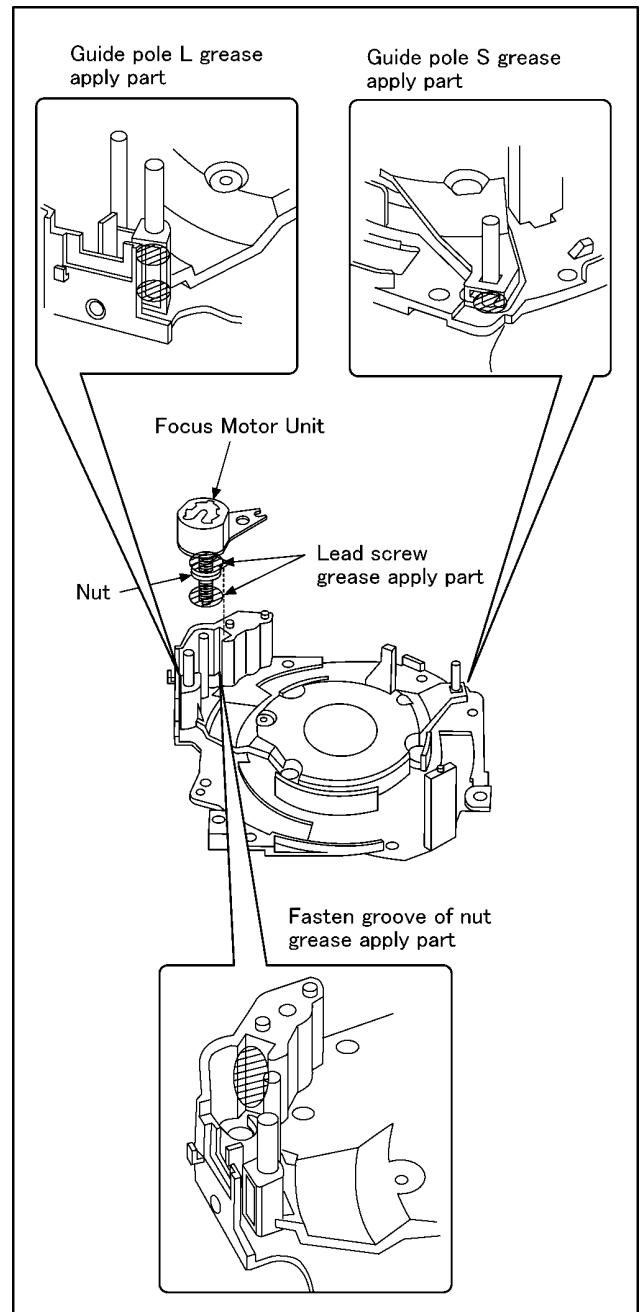
8.7. Removal of the Focus Motor Unit



8.8. The Applyment 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/Guide pole L,S/Fasten groove of nut
 - Grease: RFKZ0472
 - 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:

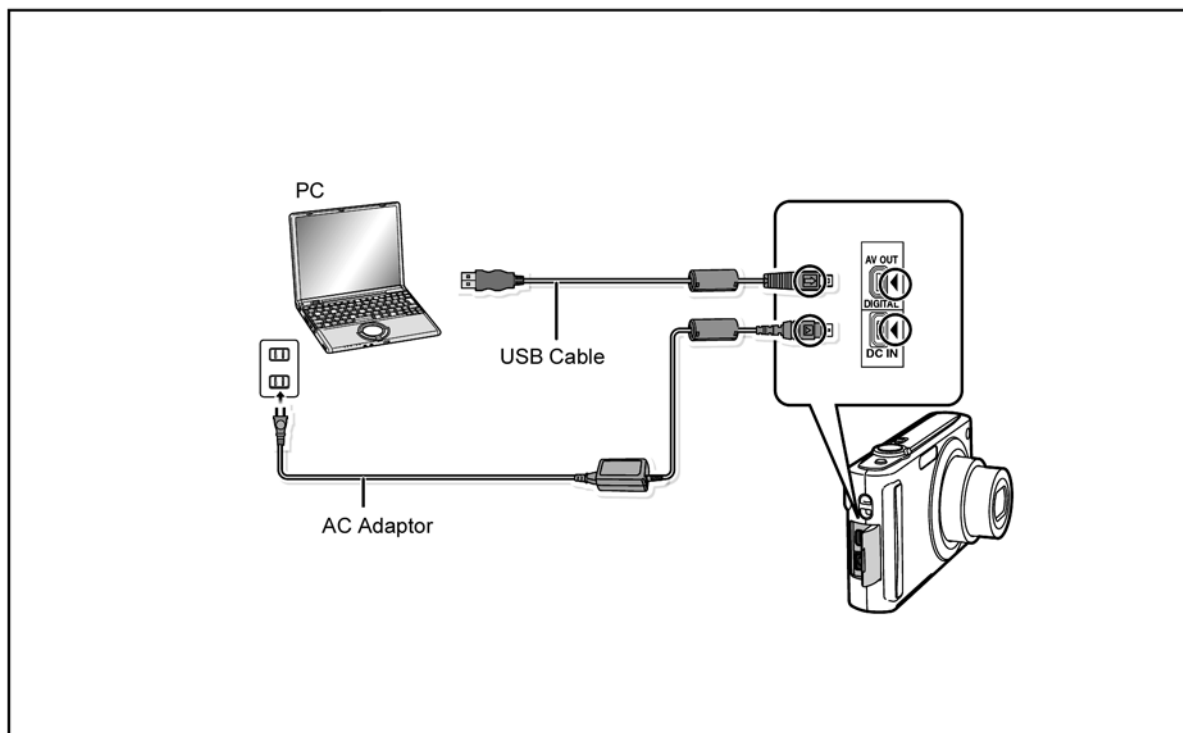
After adjustments have been terminated, make sure to achieve "INITIAL SETTINGS".

Adjustment Item		Replaced Part				
		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)	○	○	○	○	○ ^{*1}
	Shutter adjustment (SHT)	○	○	○	○	○
	ISO sensitivity adjustment (ISO)	○	○	○	○	○
	AWB adjustment High brightness coloration inspection (WBL)	○	○	○	○	○
	CCD white scratch compensation (WKI)	○	○	○	—	○ ^{*1}
	CCD black scratch compensation (BKI)	○	○	○	—	○ ^{*1}

*1: This adjustment is necessary, not only replacing CCD unit but also removing it from the lens unit.

NOTE:

*There is no LCD adjustment in this model.



10 Maintenance

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-FS20P	DMC-FS20EG
DMC-FS20PC	DMC-FS20GC
DMC-FS20PL	DMC-FS20GD
DMC-FS20PR	DMC-FS20GK
DMC-FS20E	DMC-FS20GN
DMC-FS20EB	DMC-FS20GT
DMC-FS20EE	DMC-FS20GJ
DMC-FS20EF	DMC-FS20SG

Vol. 1

Colour

- (S).....Silver Type
- (K).....Black Type
- (P).....Pink Type (only P/PC/GC/GK/GJ/SG)
- (R).....Red Type (only P)

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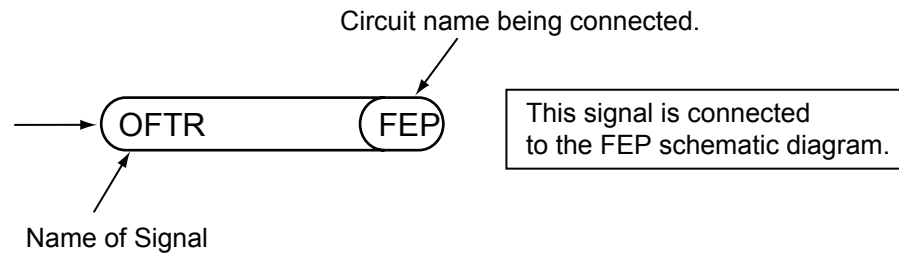
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S1. About Indication of The Schematic Diagram

S1.1. Important Safety Notice

COMPONENTS IDENTIFIED WITH THE MARK \triangle 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

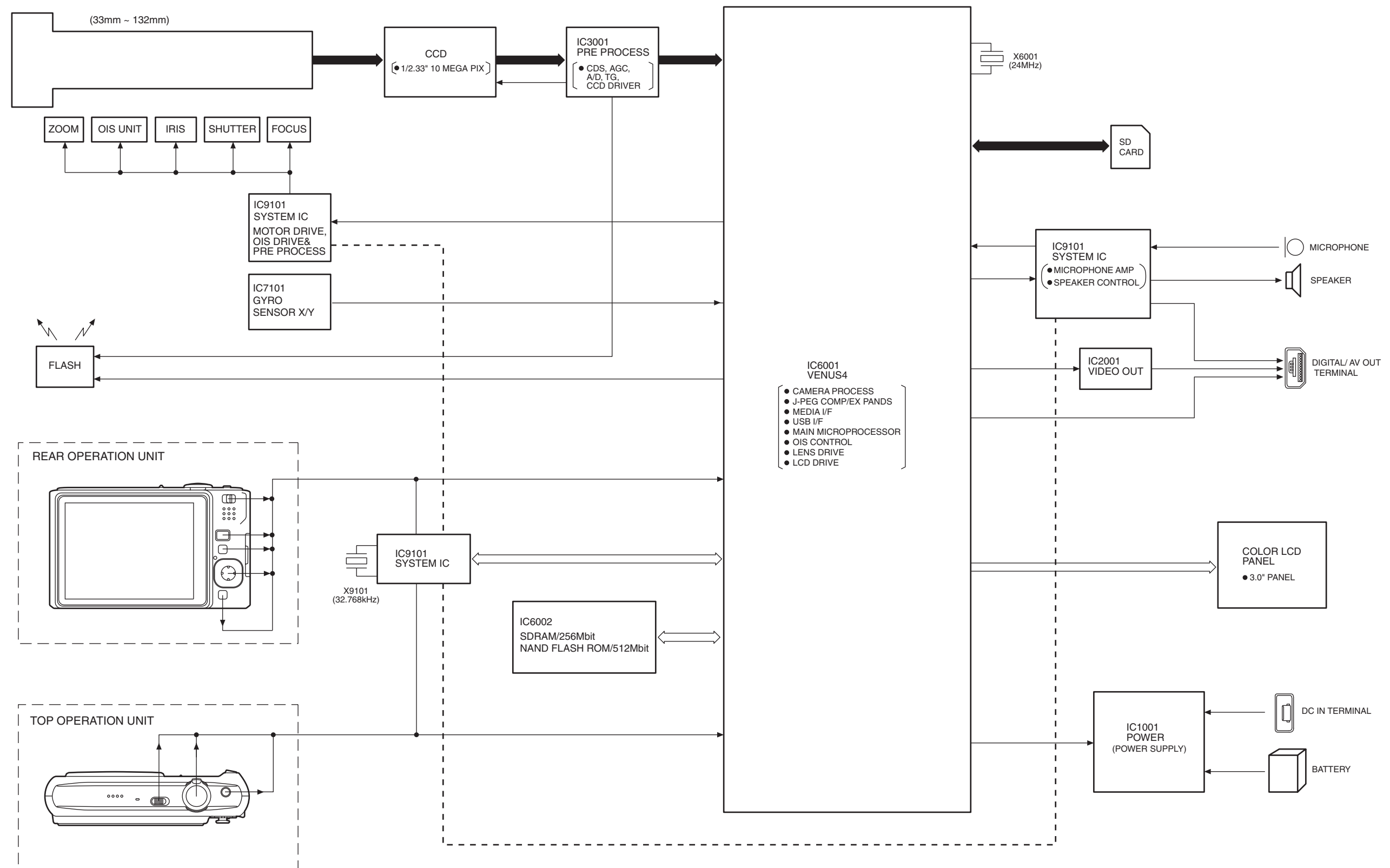
Note) Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard.
Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.

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

REF No.	PIN No.	POWER ON
IC8001	1	4.2
IC8001	2	0
IC8001	3	0
IC8001	4	0
IC8001	5	4.2
Q8009	1	4.3
Q8009	2	4.3
Q8009	3	0
Q8009	4	0
Q8009	5	4.3
Q8009	6	4.3

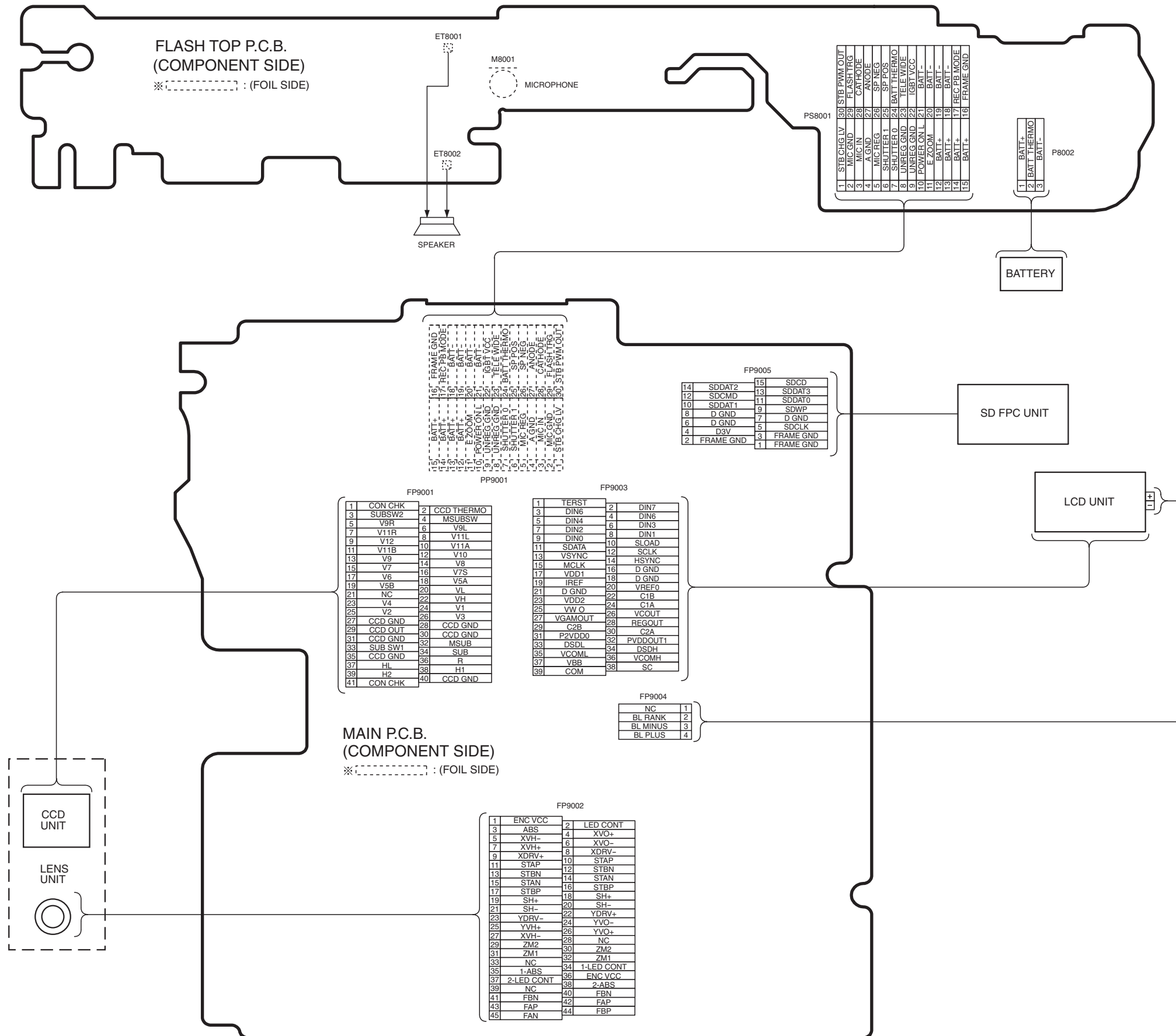
S3. Block Diagram

S3.1. Overall Block Diagram

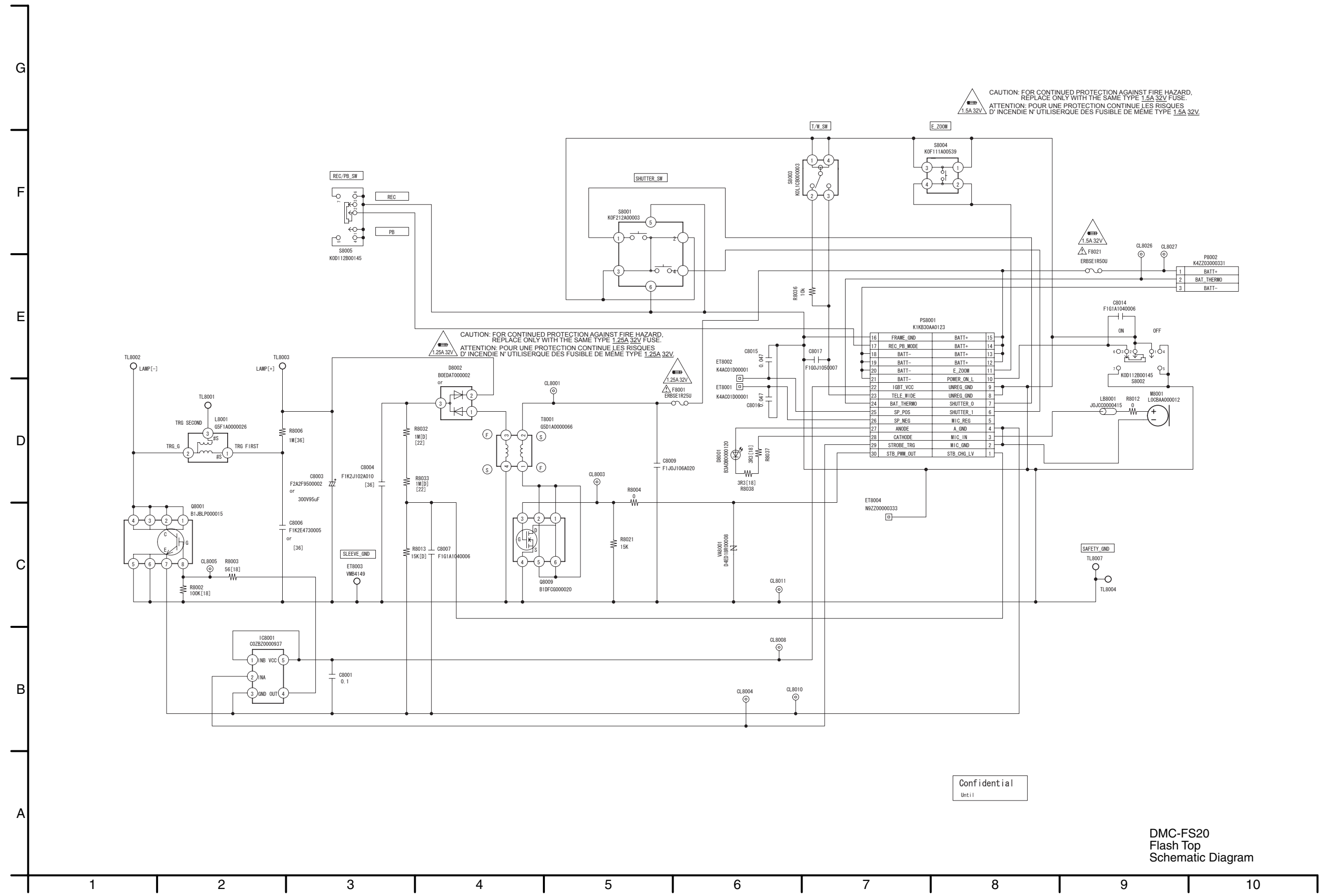


S4. Schematic Diagram

S4.1. Interconnection Diagram



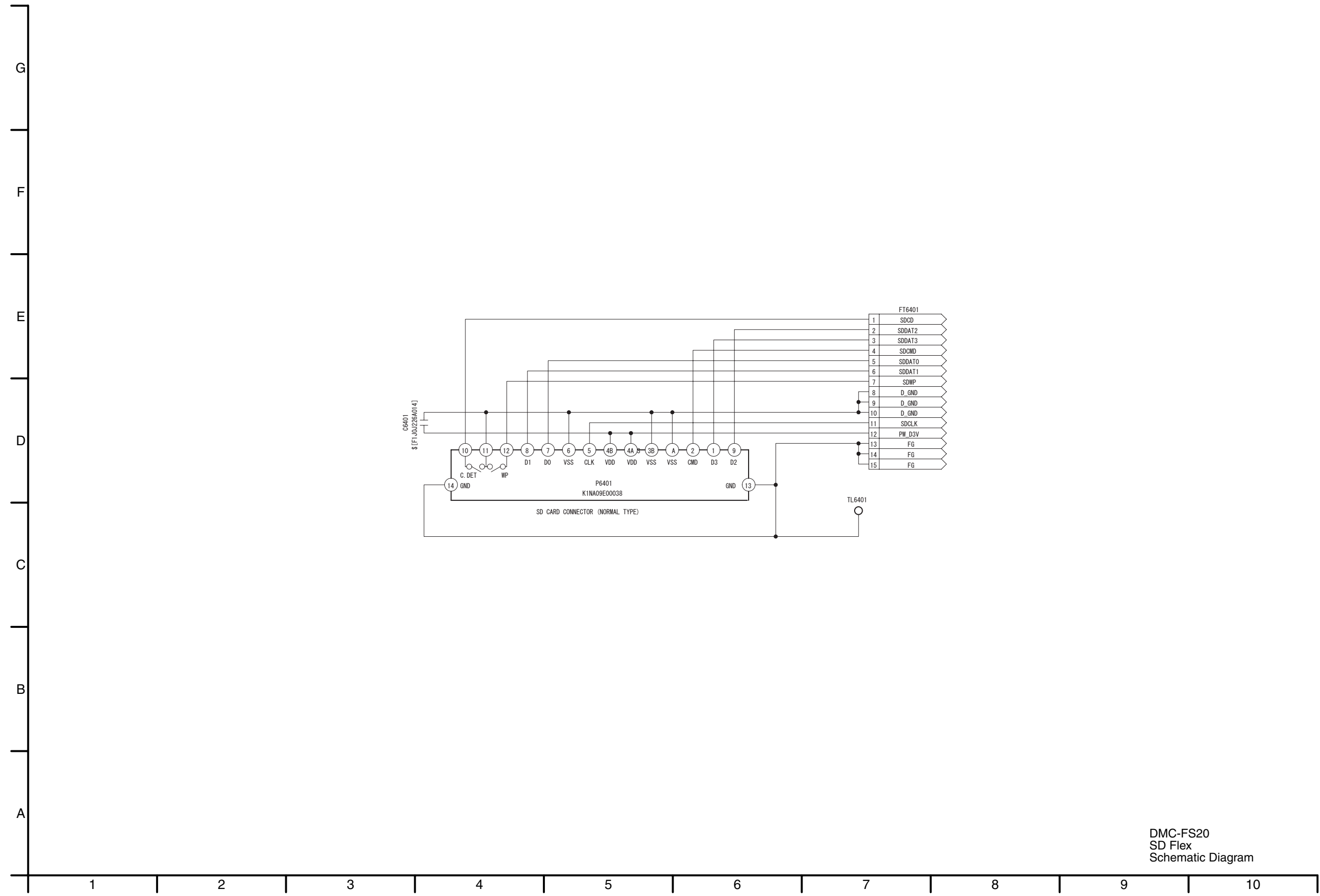
S4.2. Flash Top Schematic Diagram



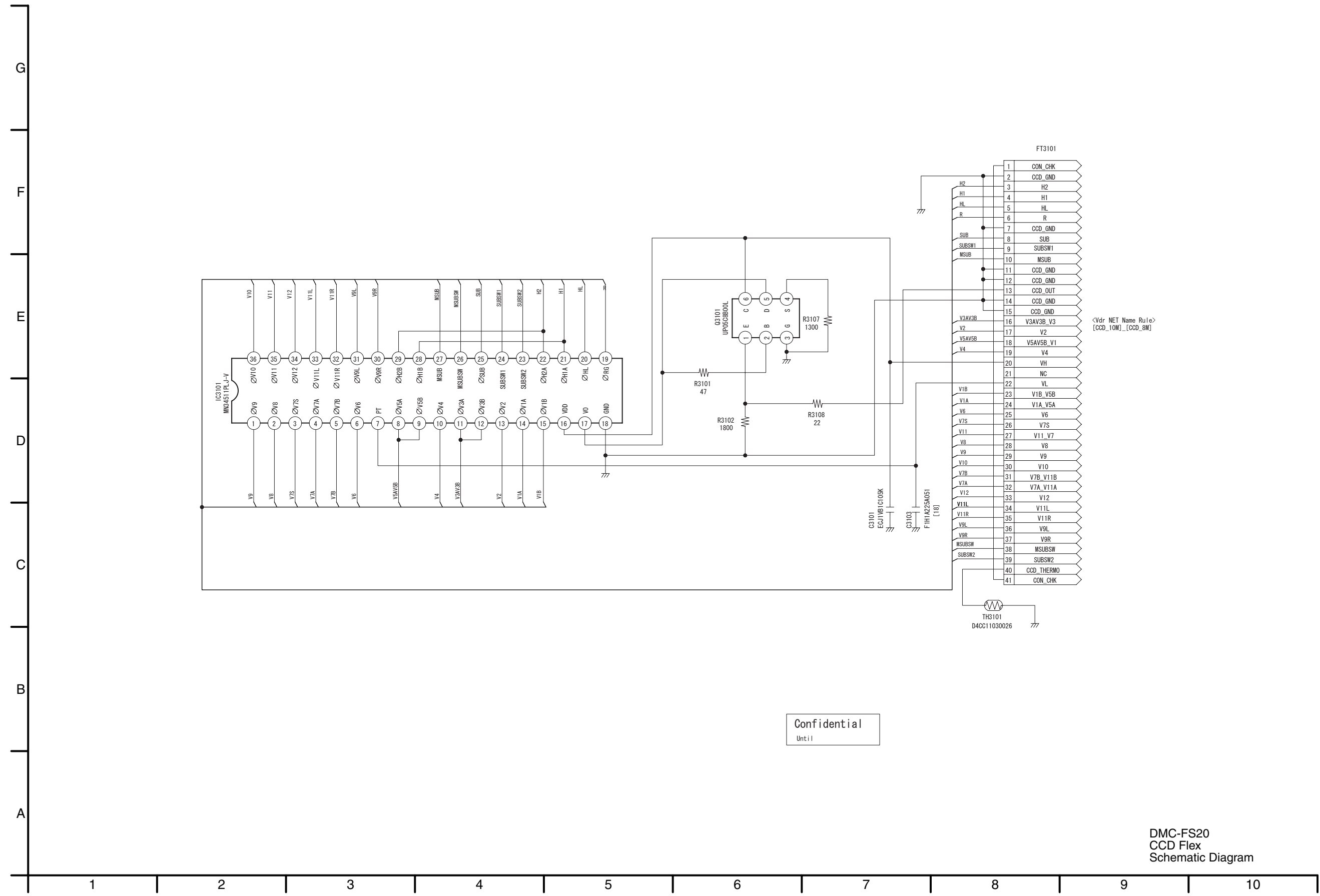
Confidential
Until

DMC-FS20
Flash Top
Schematic Diagram

S4.3. SD Flex Schematic Diagram

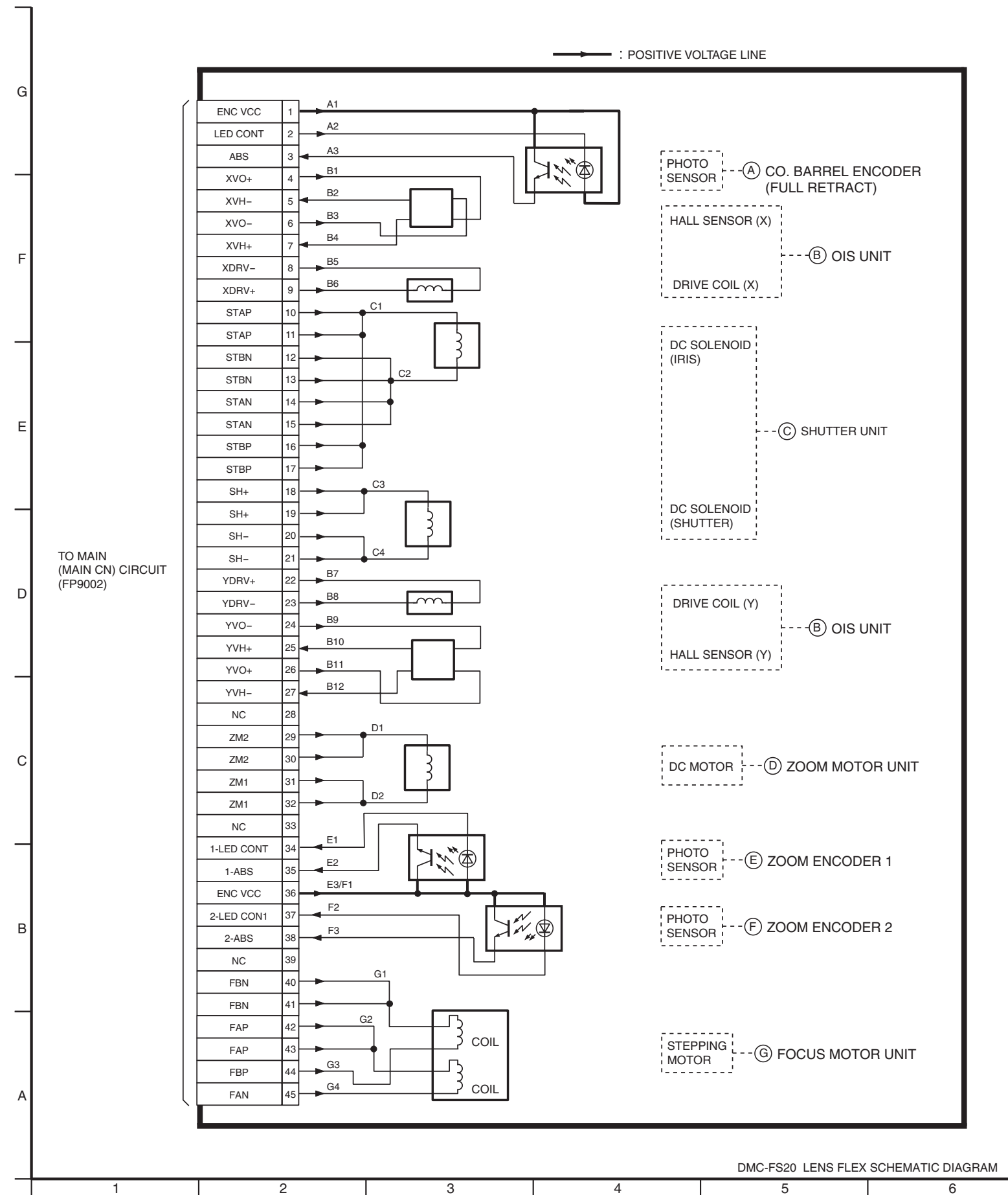


S4.4. CCD Flex Schematic Diagram



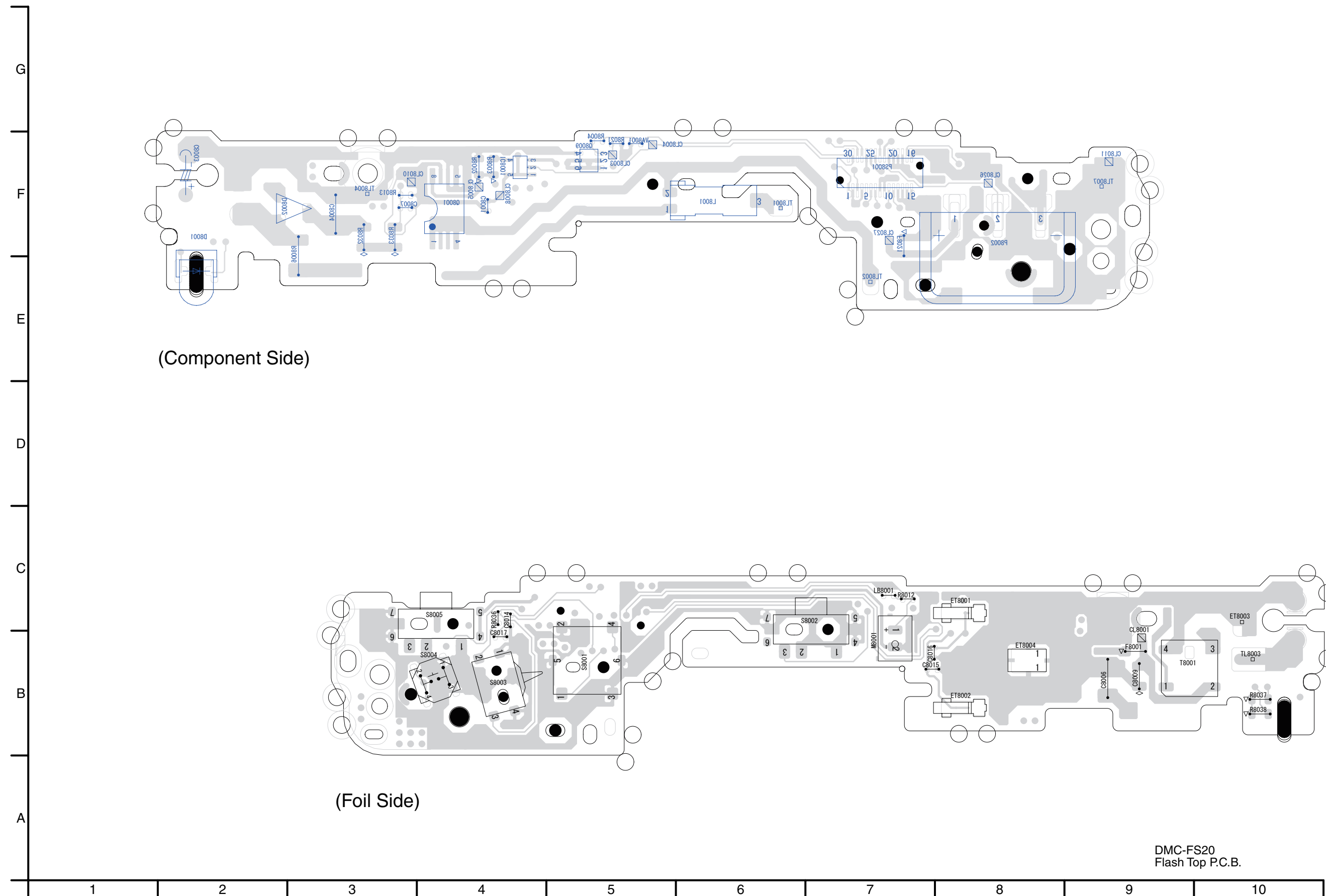
Confidential
Until

S4.5. Lens Flex Schematic Diagram

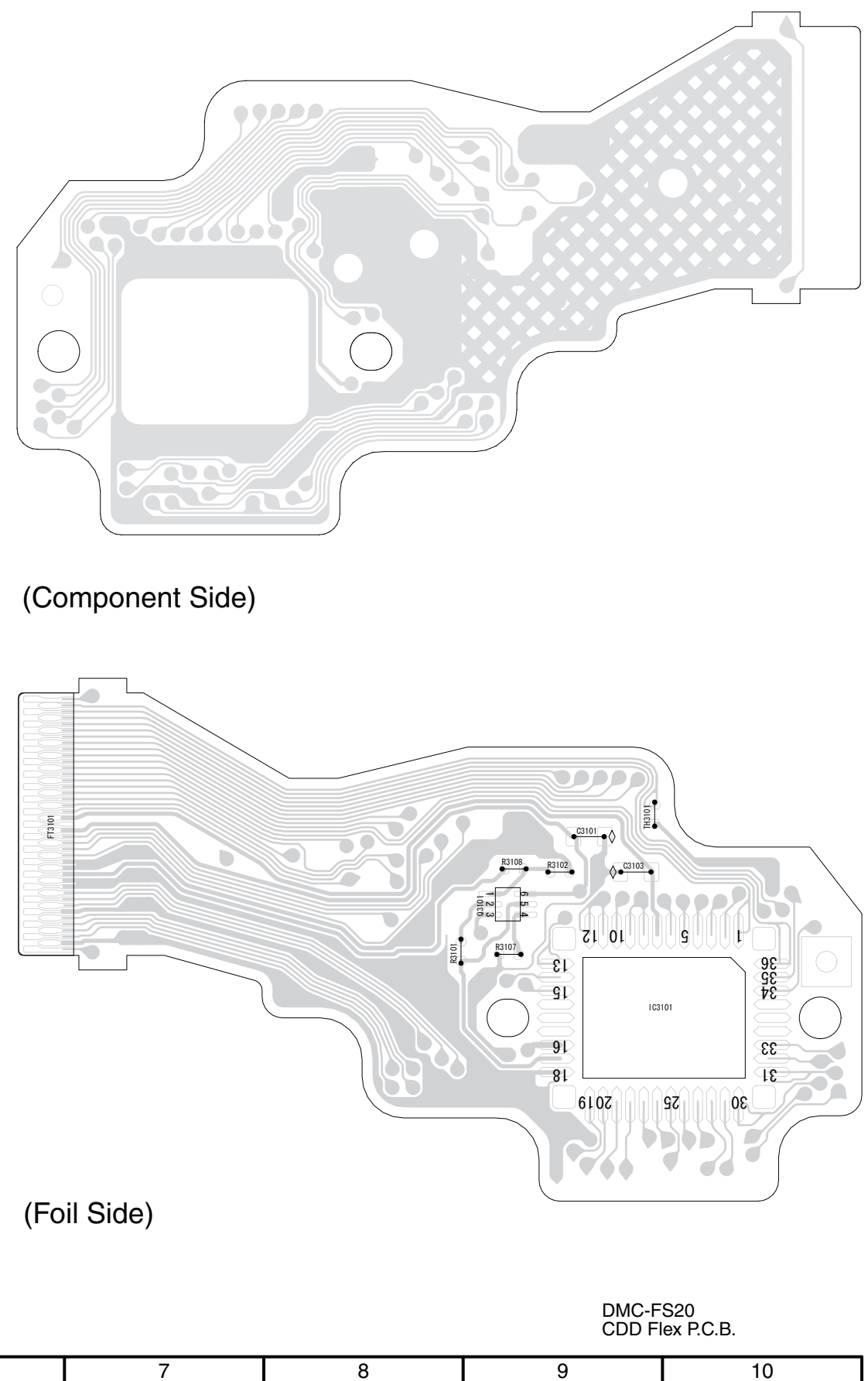
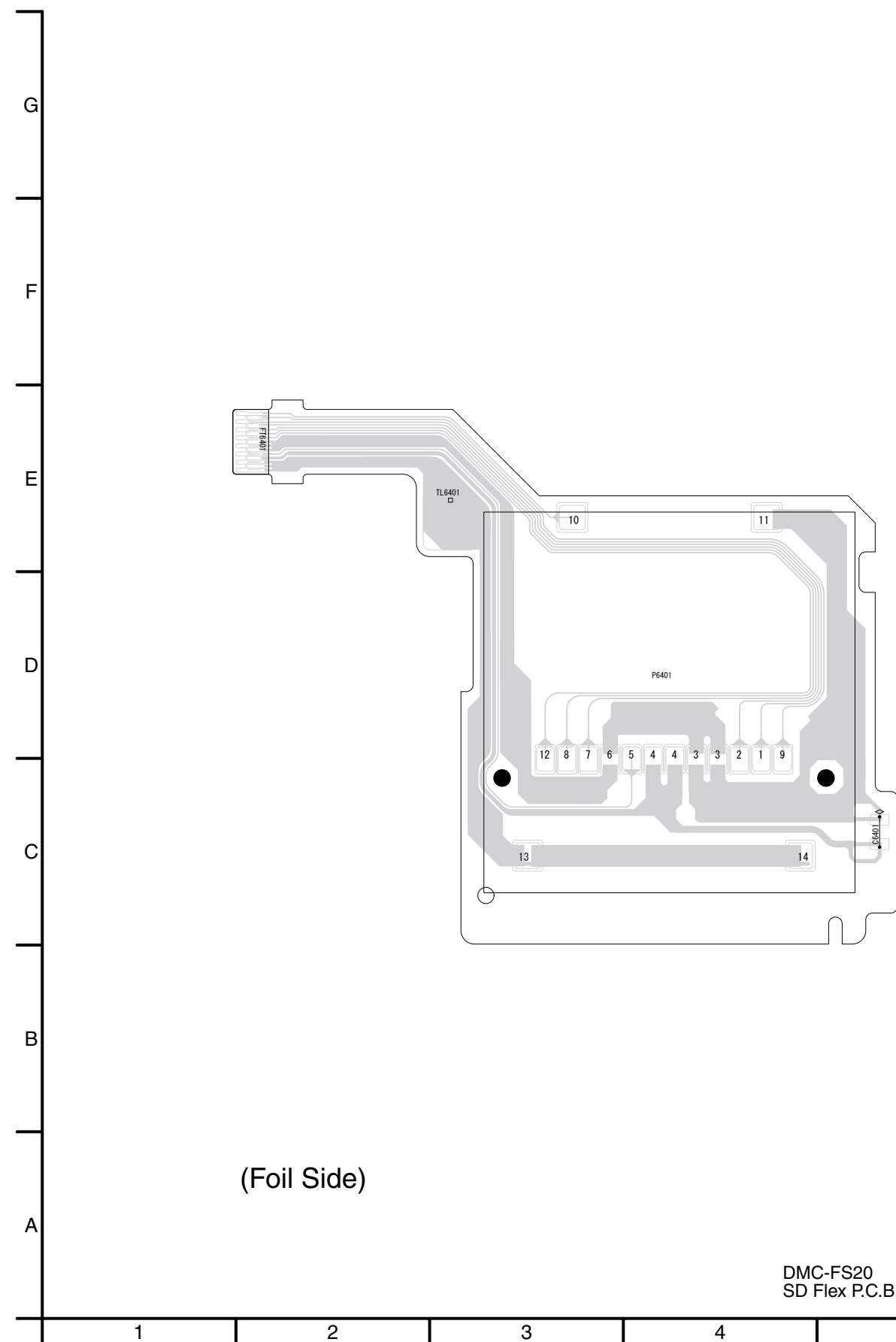


S5. Print Circuit Board

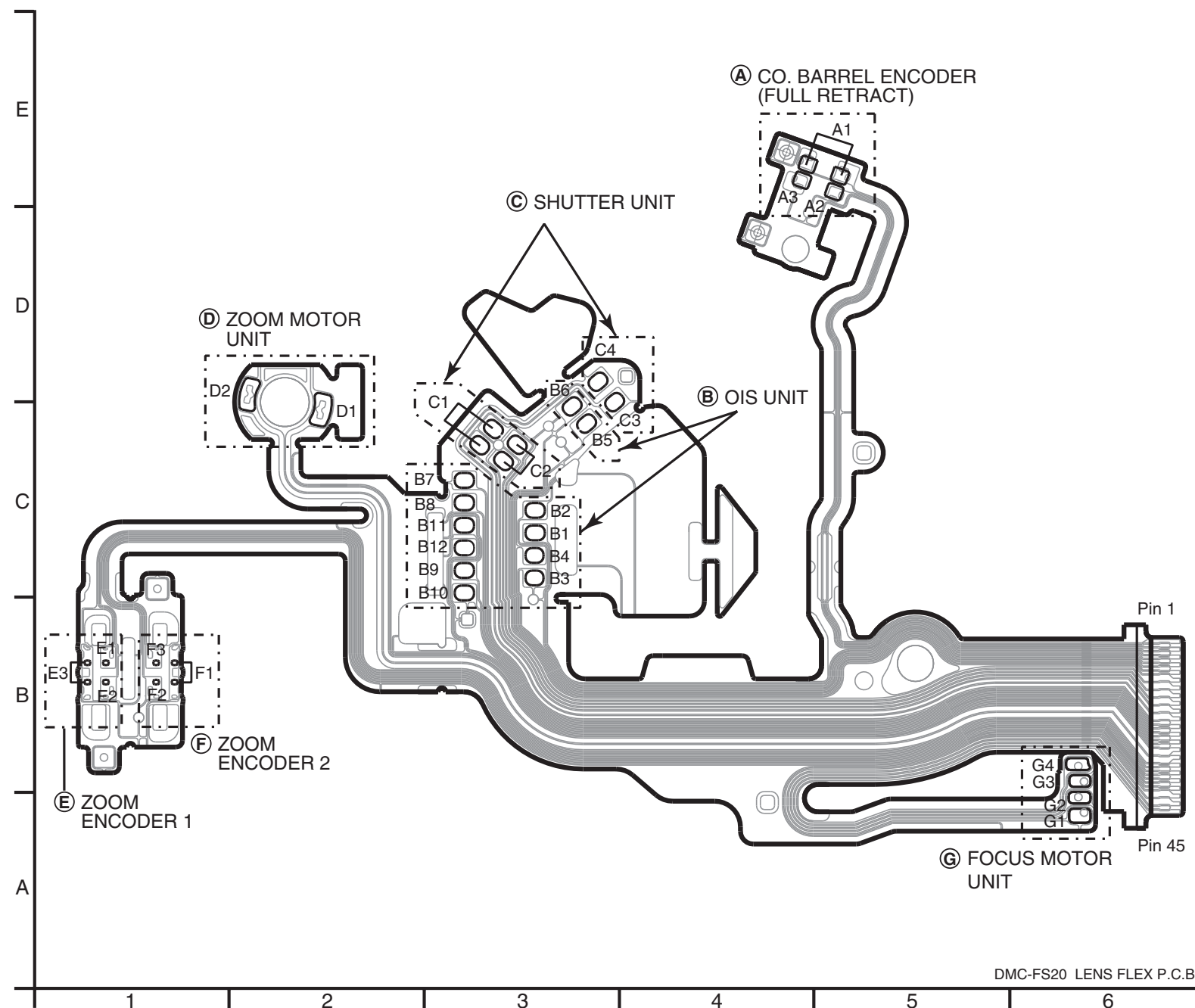
S5.1. Flash Top P.C.B.



S5.2. SD Flex P.C.B. / S5.3. 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 \triangle 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.
5. Supply of CD-ROM, in accordance with license protection, is allowable as replacement parts only for customers who accidentally damaged or lost their own.

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 [PAVCSG] in the remarks column are supplied from **PAVCSG (ASPC).**
Others are supplied from **PAVC COMPANY CS Group (PAVC-CSG).**

Ref.No.	Part No.	Part Name & Description	Pcs	Remarks	Ref.No.	Part No.	Part Name & Description	Pcs	Remarks
					L8001	G5F1A000026	CHIP INDUCTOR	1	[PAVCSG]
					LB8001	J0JCC0000415	FILTER	1	[PAVCSG]
					M8001	L0CBAA000012	MICROPHONE UNITS	1	[PAVCSG]
					PS8001	K1KB30AA0123	CONNECTOR 30P	1	[PAVCSG]
					Q8001	B1JBLP000015	TRANSISTOR	1	E.S.D.[PAVCSG]
					Q8009	B1DFCG000020	TRANSISTOR	1	E.S.D.[PAVCSG]
					R8002	ERJ3GEYJ104	M.RESISTOR CH 1/10W 100K	1	[PAVCSG]
					R8003	ERJ3GEYJ560	M.RESISTOR CH 1/10W 56	1	[PAVCSG]
					R8004	DOYAR0000007	M.RESISTOR CH 1/16W 0	1	[PAVCSG]
					R8006	ERJ8GEYJ105V	M.RESISTOR CH 1/8W 1M	1	[PAVCSG]
					R8012	DOYAR0000007	M.RESISTOR CH 1/16W 0	1	[PAVCSG]
					R8013	ERJ2RHD153X	M.RESISTOR CH 1/16W 15K	1	[PAVCSG]
					R8021	ERJ2GEJ153	M.RESISTOR CH 1/16W 15K	1	[PAVCSG]
					R8032	ERJ6RED105	M.RESISTOR CH 1/16W 1M	1	[PAVCSG]
					R8033	ERJ6RED105	M.RESISTOR CH 1/16W 1M	1	[PAVCSG]
					R8036	ERJ2GEJ103	M.RESISTOR CH 1/16W 10K	1	[PAVCSG]
					R8037	ERJ3GEYJ3R3	M.RESISTOR CH 1/10W 3.3	1	[PAVCSG]
					R8038	ERJ3GEYJ3R3	M.RESISTOR CH 1/10W 3.3	1	[PAVCSG]
					S8001	K0F212A00003	SWITCH	1	[PAVCSG]
					S8002	K0D112B00145	SWITCH	1	[PAVCSG]
					S8003	K0L1CB000003	SWITCH	1	[PAVCSG]
					S8004	K0F111A00539	SWITCH	1	[PAVCSG]
					S8005	K0D112B00145	SWITCH	1	[PAVCSG]
					T8001	G5D1A0000066	TRANSFORMER	1	[PAVCSG]
					VA8001	D4ED18R00008	VARISTORS	1	[PAVCSG]
					##	VEK0L78	CCD UNIT		E.S.D.
					C3101	F1H1C105A097	C.CAPACITOR CH 16V 1U	1	
					C3103	F1H1A225A051	C.CAPACITOR CH 10V 2.2U	1	
					Q3101	UP05C8B00L	TRANSISTOR	1	E.S.D.
					R3101	ERJ2GEJ470	M.RESISTOR CH 1/16W 47	1	
					R3102	ERJ2GEJ182	M.RESISTOR CH 1/16W 1.8K	1	
					R3107	ERJ2GEJ132	M.RESISTOR CH 1/16W 1.3K	1	
					R3108	ERJ2GEJ220	M.RESISTOR CH 1/16W 22	1	
					TH3101	D4CC11030026	NTC THERMISTORS	1	
					##	VEP58056A	FLASH TOP P.C.B.		(RTL) E.S.D.[PAVCSG]
					C8001	F1G1A1040006	C.CAPACITOR CH 10V 0.1U	1	[PAVCSG]
					C8004	F1K2J102A010	C.CAPACITOR 630V 1000P	1	[PAVCSG]
					C8006	F1K2E4730005	C.CAPACITOR 250V 0.047U	1	[PAVCSG]
					C8007	F1G1A1040006	C.CAPACITOR CH 10V 0.1U	1	[PAVCSG]
					C8009	F1J0J106A020	C.CAPACITOR CH 6.3V 10U	1	[PAVCSG]
					C8014	F1G1A1040006	C.CAPACITOR CH 10V 0.1U	1	[PAVCSG]
					C8015	ECJ0EB1A473K	C.CAPACITOR CH 10V 0.047U	1	[PAVCSG]
					C8016	ECJ0EB1A473K	C.CAPACITOR CH 10V 0.047U	1	[PAVCSG]
					C8017	F1G0J1050007	C.CAPACITOR CH 6.3V 1U	1	[PAVCSG]
					D8001	B3ADB0000120	AF LED	1	E.S.D.[PAVCSG]
					D8002	B0EDAT000002	DIODE	1	E.S.D.[PAVCSG]
					ET8001	K4AC01D00001	EARTH SPRING	1	[PAVCSG]
					ET8002	K4AC01D00001	EARTH SPRING	1	[PAVCSG]
					ET8004	N9ZZ00000333	EARTH SPRING	1	[PAVCSG]
					⚠ F8001	ERBSE1R25U	FUSE 32V 1.25A	1	[PAVCSG]
					⚠ F8021	ERBSE1R50U	FUSE 32V 1.5A	1	[PAVCSG]
					IC8001	COZBZ0000937	IC	1	E.S.D.[PAVCSG]

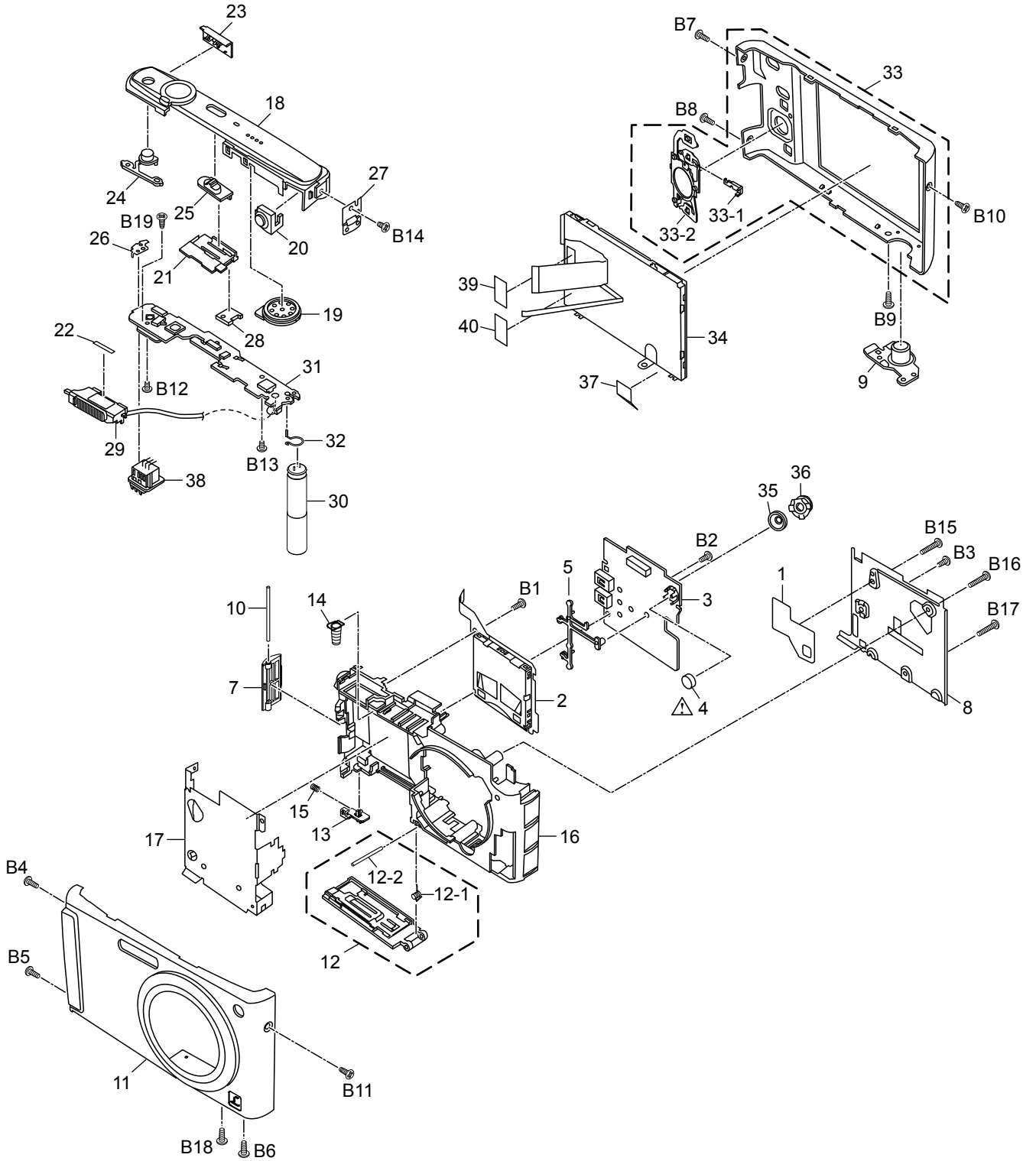
DMC-FS20P/PC/PL/PR/EB/EE/EF/EG/E/GC/GD/GK/GN/GT/GJ/SG

Ref.No.	Part No.	Part Name & Description	Pcs	Remarks
300	VPF1221	CAMERA BAG	1	(EXCEPT P,PC)
△ 301	DE-A40PA	BATTERY CHARGER	1	PR
△ 301	DE-A40AA	BATTERY CHARGER	1	EB,EF,EG,E,GN
△ 301	DE-A40BA	BATTERY CHARGER	1	EE,GC,GD,GK,GJ,SG
△ 301	DE-A40CA	BATTERY CHARGER	1	GT
304	K1HA08CD0007	USB CABLE W/PLUG	1	(EXCEPT P,PC)
305	K1HA08CD0008	AV CABLE W/PLUG	1	(EXCEPT P,PC)
306	VFC4297	HAND STRAP	1	(EXCEPT P,PC)
307	VFF0401-S	CD-ROM	1	(EXCEPT P,PC)
				See "Notes"
309	VPF1294	BAG, POLYETHYLENE	1	(EXCEPT P,PC)
△ 310	VFF0405	CD-ROM(INSTRUCTION BOOK)	1	PL,PR,EG,E,GC,GJ,SG
△ 311	VQT1M62	SIMPLIFIED O/I (ENGLISH/SPANISH)	1	PL
△ 311	VQT1M63	SIMPLIFIED O/I (PORTUGUESE)	1	PL
△ 311	VQT1M64	SIMPLIFIED O/I (GERMAN/FRENCH)	1	EG
△ 311	VQT1M65	SIMPLIFIED O/I (ITALIAN/DUTCH)	1	EG
△ 311	VQT1M66	SIMPLIFIED O/I (SPANISH/PORTUGUESE)	1	PR,EG
△ 311	VQT1M67	SIMPLIFIED O/I (SWEDISH/DANISH)	1	E
△ 311	VQT1M68	SIMPLIFIED O/I (POLISH/CZECH)	1	E
△ 311	VQT1M69	SIMPLIFIED O/I (HUNGARIAN/FINISH)	1	E
△ 311	VQT1M70	INSTRUCTION BOOK (FRENCH)	1	EF
△ 311	VQT1M71	INSTRUCTION BOOK (ENGLISH)	1	EB
△ 311	VQT1M72	INSTRUCTION BOOK (RUSSIAN)	1	EE
△ 311	VQT1M73	INSTRUCTION BOOK (UKRAINIAN)	1	EE
△ 311	VQT1M74	SIMPLIFIED O/I (ENGLISH/ CHINESE(TRADITIONAL))	1	GC,GJ,SG
△ 311	VQT1M75	SIMPLIFIED O/I (ARABIC/PERSIAN)	1	GC
△ 311	VQT1M76	INSTRUCTION BOOK (CHINESE(TRADITIONAL))	1	GT
△ 311	VQT1M77	INSTRUCTION BOOK (CHINISE(SIMPLIFIED))	1	GK
△ 311	VQT1M78	INSTRUCTION BOOK (ENGLISH)	1	GN
△ 311	VQT1M79	INSTRUCTION BOOK (KOREAN)	1	GD
312	VQT1M48	O/I SOFTWARE (ENGLISH/SPANISH/ PORTUGUESE)	1	PL
312	VQT1M49	O/I SOFTWARE (GERMAN/FRENCH/ITALIAN/ DUTCH/SPANISH/ PORTUGUESE)	1	PR,EG
312	VQT1M50	O/I SOFTWARE (FINISH/SWEDISH/DANISH/ POLISH/CZECH/HUNGAREAN)	1	E
312	VQT1M51	O/I SOFTWARE (FRENCH)	1	EF
312	VQT1M52	O/I SOFTWARE (ENGLISH)	1	EB,GN
312	VQT1M53	O/I SOFTWARE (RUSSIAN/UKRAINIAN)	1	EE
312	VQT1M54	O/I SOFTWARE (ENGLISH/ CHINESE(TRADITIONAL)/ ARABIC/PERSIAN)	1	GC,GJ,SG
312	VQT1M55	O/I SOFTWARE (CHINESE(TRADITIONAL))	1	GT
312	VQT1M56	O/I SOFTWARE (CHINISE(SIMPLIFIED))	1	GK
312	VQT1M57	O/I SOFTWARE (KOREAN)	1	GD

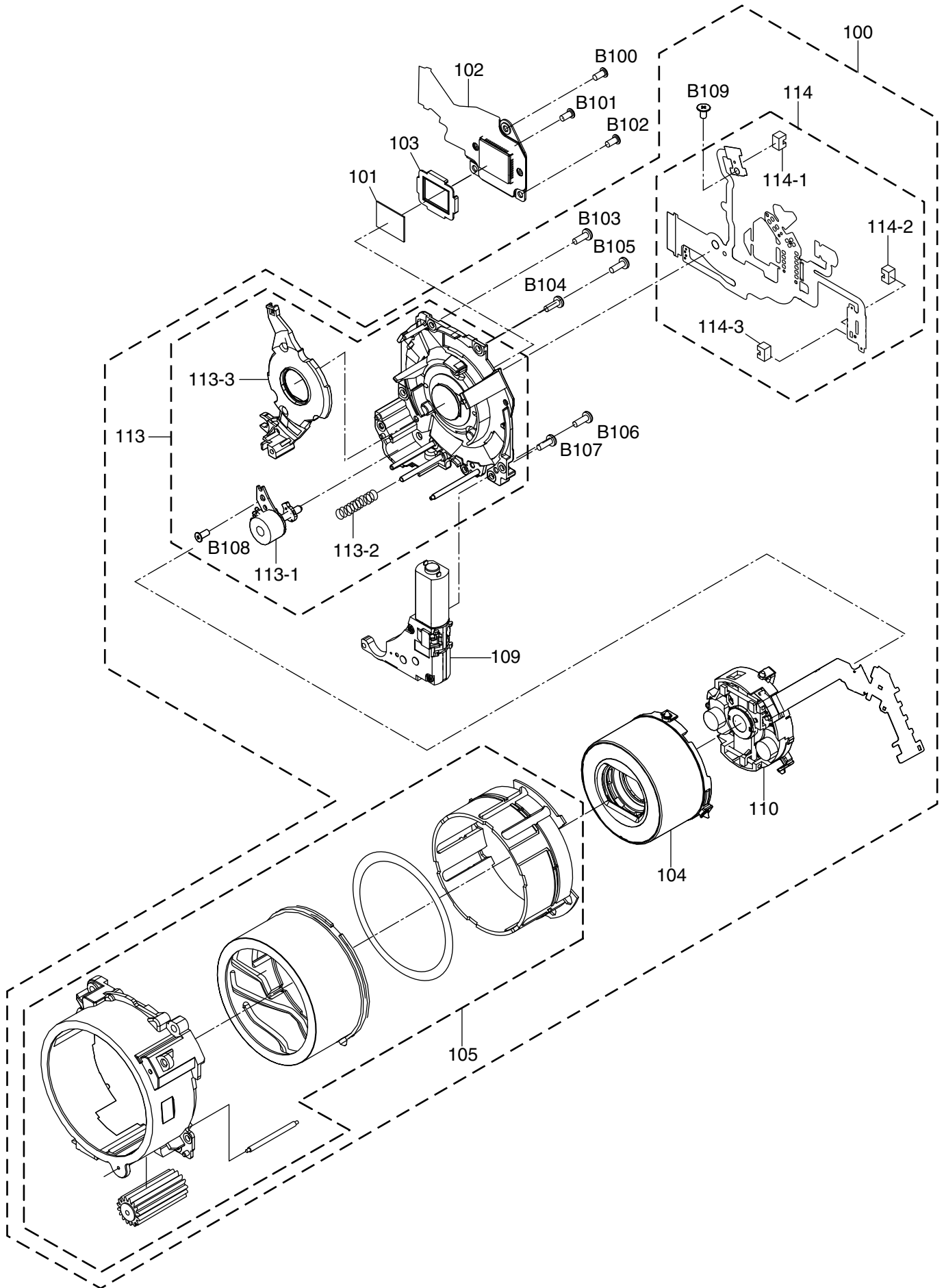
Ref.No.	Part No.	Part Name & Description	Pcs	Remarks
313	VYQ3914	BATTERY CARRYING CASE U	1	(EXCEPT P,PC,GK)
313	VYQ4384	BATTERY CARRYING CASE U	1	GK
314	VPK3437	PACKING CASE	1	PL-S,PR-S,EB-S,EE-S,EF-S, EG-S,E-S,GC-S,GD-S,GN-S, GT-S,GJ-S,SG-S
314	VPK3466	PACKING CASE	1	PL-K,PR-K,EB-K,EE-K,EF-K, EG-K,E-K,GC-K,GD-K,GN-K, GT-K,GJ-K,SG-K
314	VPK3470	PACKING CASE	1	GC-P,GJ-P,SG-P
314	VPK3439	PACKING CASE	1	GK-S
314	VPK3467	PACKING CASE	1	GK-K
314	VPK3471	PACKING CASE	1	GK-P
315	VPN6658	CUSHION	1	(EXCEPT P,PC)
316	VQL1G34	OPERATING LABEL	1	GT
317	VPN6666	PAD	1	EB,GC,SG
317	VPN6664	PAD	1	PL,PR,EE,EF,EG,E, GD,GK,GN,GT,GJ
△ 318	----	BATTERY	1	(EXCEPT P,PC)
△ 319	K2CT3CA00004	AC CORD W/PLUG	1	EB,GC,SG
△ 320	K2CQ2CA00006	AC CORD W/PLUG	1	EE,EF,EG,E,GC,SG
△ 320	K2CP2YY00001	AC CORD W/PLUG	1	GJ
△ 321	K2CR2CA00003	AC CORD W/PLUG	1	GD
△ 322	K2CA2CA00020	AC CORD W/PLUG	1	GK
△ 322	K2CA2CA00027	AC CORD W/PLUG	1	GT
△ 323	K2CJ2DA00006	AC CORD W/PLUG	1	PR
△ 323	K2CJ2DA00008	AC CORD W/PLUG	1	GN

S7. Exploded View

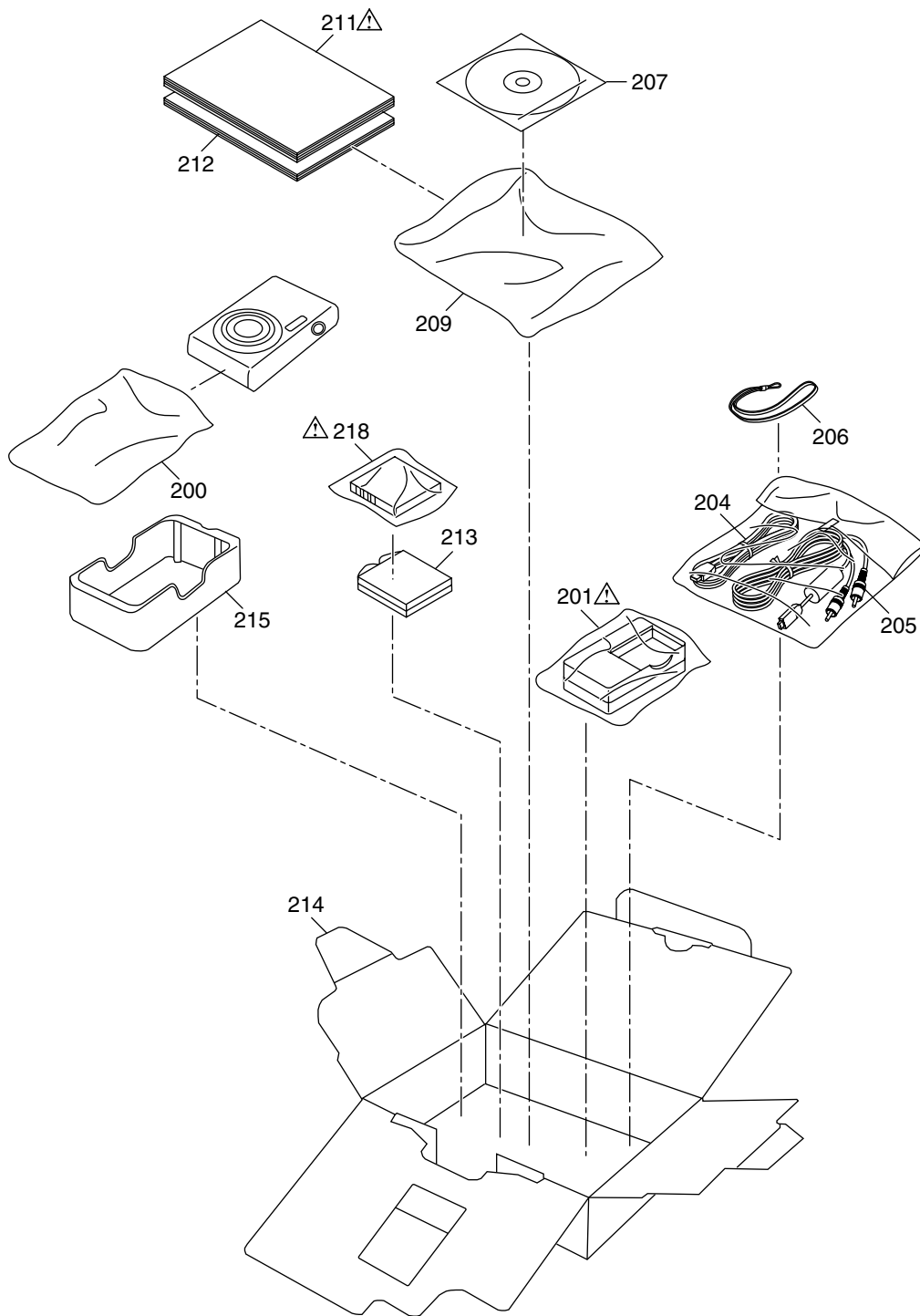
S7.1. Frame and Casing Section



S7.2. Camera Lens Section



S7.3. Packing Parts and Accessories Section (1)



S7.4. Packing Parts and Accessories Section (2)

