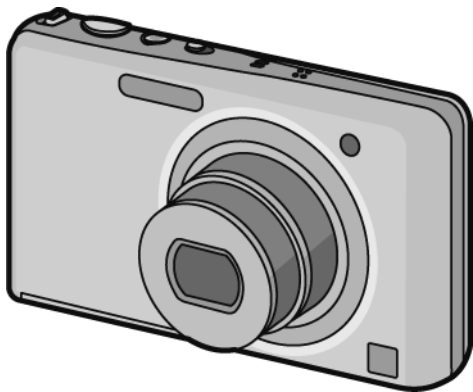# Service Manual

Digital Camera

LUMIX

Model No. DMC-FX77EB
DMC-FX77EE
DMC-FX77EF
DMC-FX77EG
DMC-FX77EP
DMC-FX77SG
DMC-FX78P
DMC-FX78PU
DMC-FX78GC
DMC-FX78GD
DMC-FX78GH
DMC-FX78GK
DMC-FX78GN
DMC-FX78GT

Vol. 1

Colour
[DMC-FX77]
(S)...........Silver Type (only EB/EG/EP)
(K)...........Black Type (except SG)
(N)...........Gold Type (only SG)
(A)...........Blue Type (only EE/EG/SG)
(P)...........Pink Type (only EE/EG/SG)
(W)..........White Type (only SG)
[DMC-FX78]
(S)...........Silver Type (only GC/GH/GK/GN)
(K)...........Black Type (except GN)
(N)...........Gold Type (only P/GK/GT)
(A)...........Blue Type (only P/GN)
(P)...........Pink Type (except P/PU)
(W)..........White Type (except PU/GD)

Panasonic®

TABLE OF CONTENTS

1 Safety Precautions

1.1. General Guidelines

1. **IMPORTANT SAFETY NOTICE**

   There are special components used in this equipment which are important for safety. These parts are marked by

   ⚠ in the Schematic Diagrams, Circuit Board Layout, Exploded Views and Replacement Parts List. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent 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 MΩ and 5.2 MΩ. 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 kΩ, 10 W resistor, in parallel with a 0.15 μF 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 kΩ/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 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
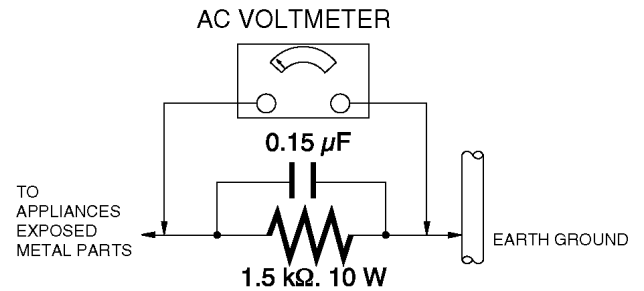
Figure. 1

1.4. How to Discharge the E.Capacitor on Flash Top P.C.B.

CAUTION:
1. **Be sure to discharge the E.capacitor on FLASH TOP P.C.B..**
2. **Be careful of the high voltage circuit on FLASH TOP P.C.B. when servicing.**

[Discharging Procedure]
1. Refer to the disassemble procedure and remove the necessary parts/unit.
2. Install the insulation tube onto the lead part of resistor (ERG5SJ102:1kΩ /5W).
   (An equivalent type of resistor may be used.)
3. Place a resistor between both terminals of E.capacitor on the FLASH TOP P.C.B. for approx. 5 seconds.
4. After discharging, confirm that the E.capacitor voltage is lower than 10V by using a voltmeter.
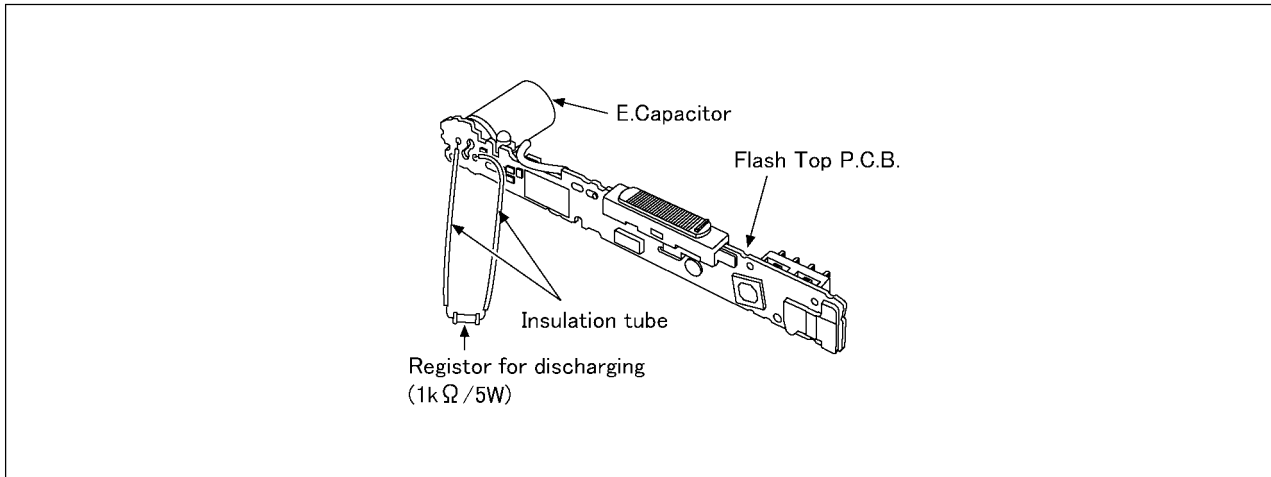
Fig. F1

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/GH)

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 ASTA 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 safety.
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.
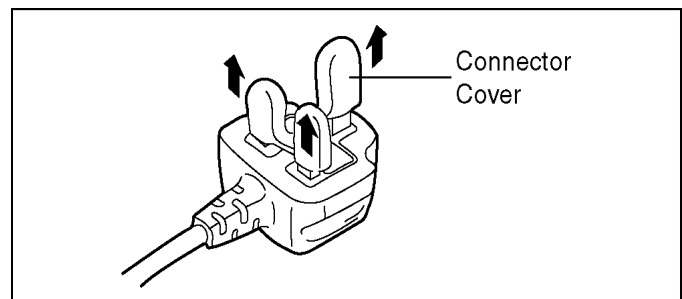
2.3.2.3. How to Replace the Fuse

1. Remove the Fuse Cover with a screwdriver.
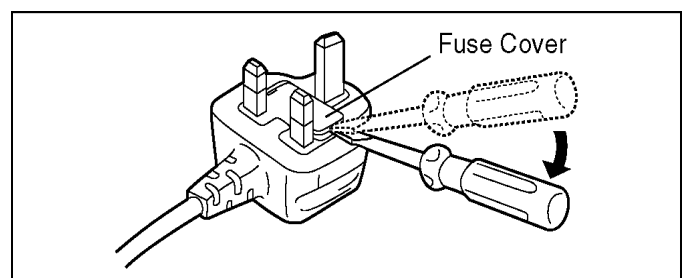
2. Replace the fuse and attach the Fuse cover.
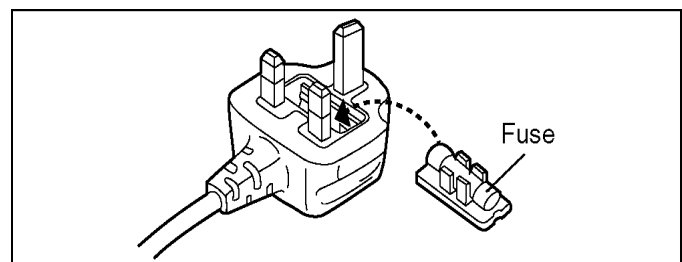
2.4. How to Replace the Lithium Battery

2.4.1. Replacement Procedure

1. Remove the MAIN P.C.B.. (Refer to Disassembly Procedures.)
2. Remove the Lithium battery (Ref. No. "B9101" at component side of MAIN P.C.B.) and then replace it into new one.
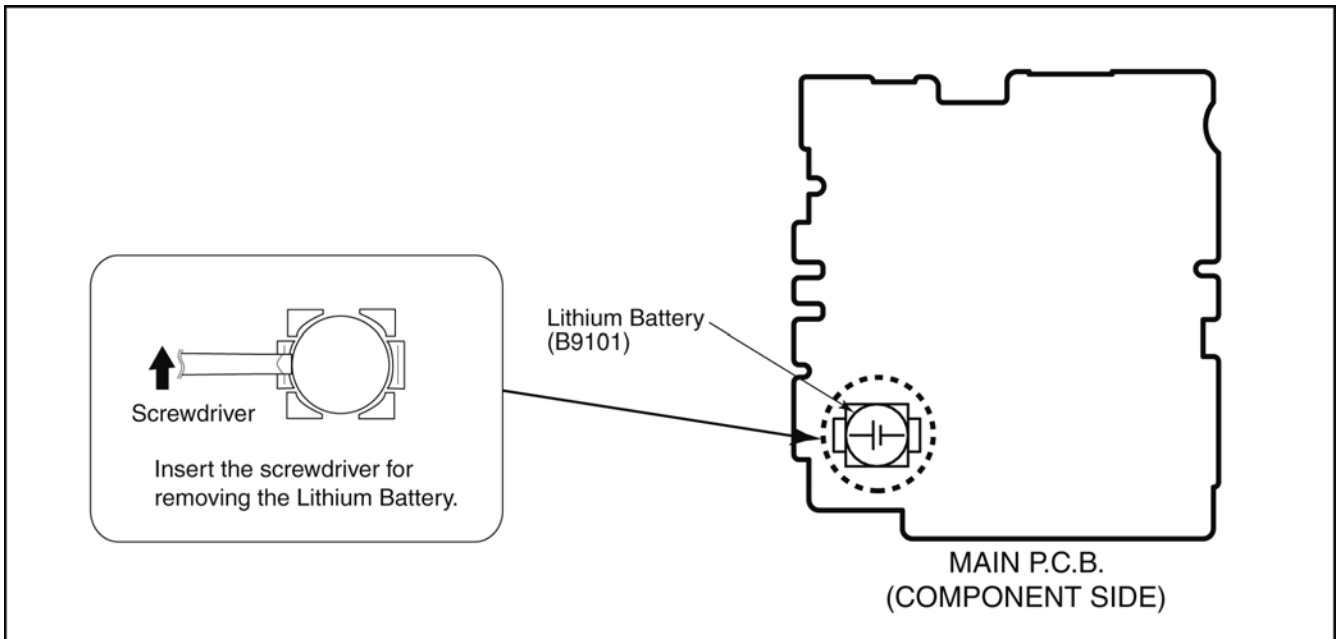
NOTE:

This Lithium battery is a critical component.
(Type No.: ML421 **Manufactured by Energy Company, Panasonic Corporation.**)
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-FX77/78 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 P.C.B. Lead Free Solder being used

The letter of "PbF" is printed either foil side or components side on the P.C.B. 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 P.C.B. 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 P.C.B. 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.
  RFKZ03D01KS-----------(0.3mm 100g Reel)
  RFKZ06D01KS-----------(0.6mm 100g Reel)
  RFKZ10D01KS-----------(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 issues servicing to component level without necessary equipment/facilities.
   a. Schematic diagram, Block Diagram and P.C.B. layout of MAIN P.C.B..
   b. Parts list for individual parts for MAIN P.C.B..
   When a part replacement is required for repairing MAIN P.C.B., replace as an assembled parts. (MAIN P.C.B.)
2. The following category is/are recycle module part. please send it/them to Central Repair Center.
   - MAIN P.C.B. (VEP56123A : EE/SG/P/PU/GC/GH/GT/GK/GN/GD): Excluding replacement of Lithium Battery
   - MAIN P.C.B. (VEP56123B : EG/EP/EF/EB): Excluding replacement of Lithium Battery

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

There are nine kinds of DMC-FX77/78, regardless of the colours.
- a) DMC-FX77 (Japan domestic model), FX77SG
- b) DMC-FX78P
- c) DMC-FX77EB/EF/EG/EP
- d) DMC-FX77EE
- e) DMC-FX78GT
- f) DMC-FX78GK
- g) DMC-FX78GD
- h) DMC-FX78GN
- i) DMC-FX78PU/GC/GH

What is the difference is that the "INITIAL SETTINGS" data which is stored in Flash-ROM mounted on MAIN P.C.B..

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.

NOTE:
>   After replacing the MAIN P.C.B., be sure to achieve adjustment.
>   The service software is available at "TSN Website". To download, click on "Support Information from NWBG/VDBG-AVC".

3.4.2. INITIAL SETTINGS:

After replacing the MAIN P.C.B., 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)

---AFTER REPLACING THE MAIN P.C.B. and/or FLASH-ROM ---

[Except "EG, EF, EB and EP" models : (VEP56123A is used as a Main P.C.B.)]

*.The model suffix can be chosen <u>JUST ONE TIME.</u>
  (Effective model suffix : " P/EG/PU/GD/GC/GT/GK/EF/EB/EE/GN/SG/GH/EP and NONE (JAPAN)")
*.Once one of the model suffix has been chosen, the model suffix lists will not be displayed,
  thus, it can not be changed.

[Only for "EG, EF, EB and EP" models : (VEP56123B is used as a Main P.C.B.)]

*.From the beginning, only "EG, EF, EB and EP" are displayed as model suffix lists, and these are
  displayed from the second times as well.

CAUTION 2:(Stored picture image data in the unit)

This unit employs "Built-in Memory" for picture image data recording.(Approx.70MB)
After proceeding "INITIAL SETTINGS", the picture image data stored in the unit is erased.

---

2. PROCEDURES:
 • Precautions: Read the above "CAUTION 1" and "CAUTION 2", carefully.
 • Preparation:
   1. Attach the Battery or AC Adaptor with a DC coupler to the unit.
      (Since this unit has built-in memory, it can be performed without inserting SD memory card.)
   2. Slide the lens cover fully downward.
   3. Select with the touch panel in order to [REC] mode and [NORMAL PICTURE] mode.
   4. Turn off the power by pressing the power button which is located on the top case unit.
      (If the unit is other than [NORMAL PICTURE] mode, it does not display the initial setting menu.)
 • **Step 1. The temporary cancellation of "INITIAL SETTINGS":**
   While pressing "W side of [ZOOM LEVER]", [SHUTTER BUTTON] and touch the screen (Any position of the screen is acceptable) simultaneously, turn the power on.
 • **Step 2. The cancellation of "INITIAL SETTINGS":**
   1. Select with the touch panel to [PLAYBACK] mode.
   2. Touch Setup after touching MENU. Then, find and select Ver..
   3. Touch near the center of screen, while [SHUTTER BUTTON] is pressed halfway.
   4. Turn the power off.

   The LCD displays the " ! " mark before the unit powers down.

 • **Step 3. Turn the Power on:**
   Turn the Power on.
 • **Step 4. Display the INITIAL SETTING:**
   Display "Clock Set" screen, and then move the [ZOOM LEVER] to "T" side, turn the power off.
   The "INITIAL SETTINGS" menu is displayed.
   There are two kinds of "INITIAL SETTINGS" menu form as follows:

[CASE 1. After replacing MAIN P.C.B.]
When MAIN P.C.B. has just been replaced, all of the model suffix is displayed as follows. (Six pages in total)
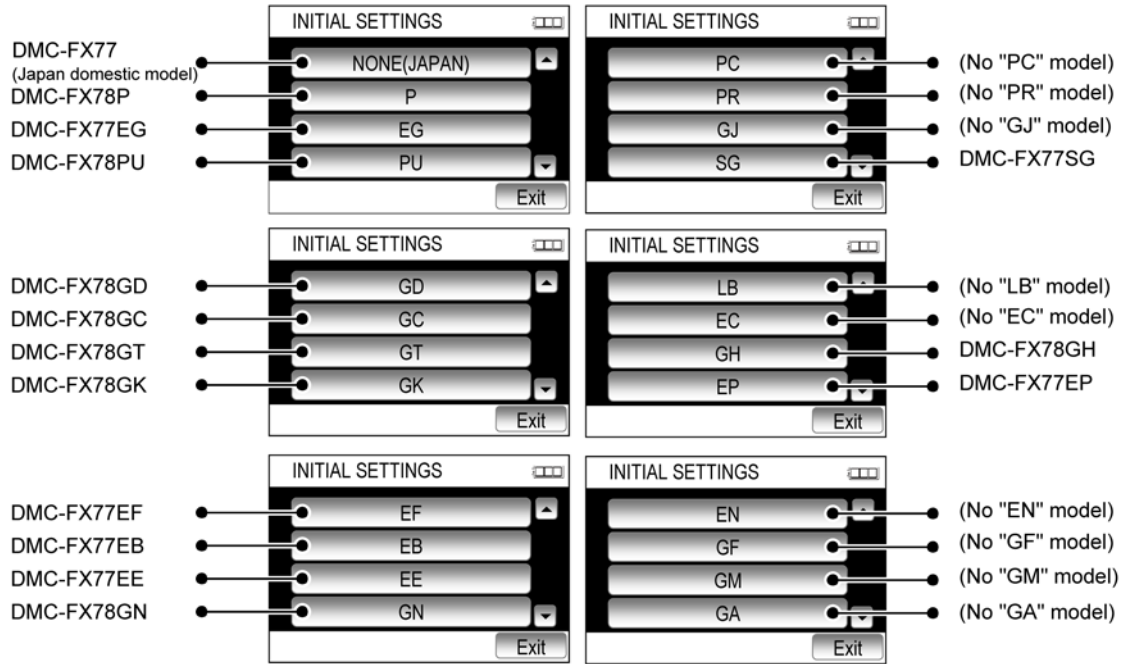
[CASE 2. Other than "After replacing MAIN P.C.B."]
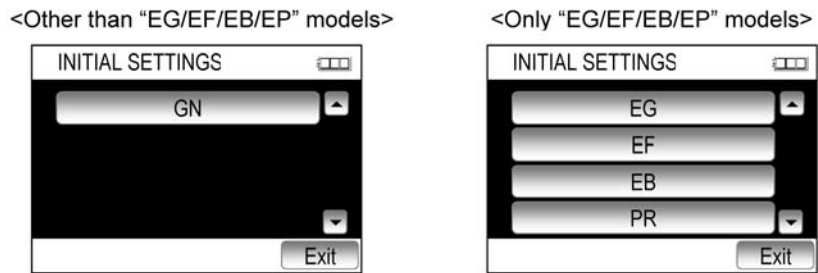
- **Step 5. Choose the model suffix in "INITIAL SETTINGS": (Refer to "CAUTION 1")**
  [Caution: After replacing MAIN P.C.B.]
    The model suffix can been chosen, **JUST ONE TIME**.
    Once one of the model suffix have been chosen, the model suffix lists will not be displayed, thus, it can not be changed.
    Therefore, select the area carefully.
  Select the area with touch panel.

• Step 6. Set the model suffix in "INITIAL SETTINGS":
• The only set area is displayed, and then press the "[End] of Cursor buttons" after confirmation.
  (The unit is powered off automatically.)
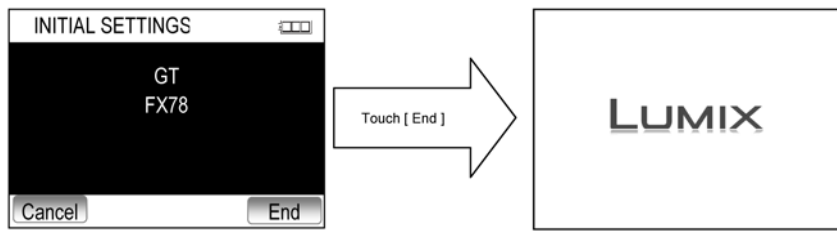
• Step 7. CONFIRMATION:
  Confirm the display of "PLEASE SET THE CLOCK" in concernd language when the unit is turned on again.
  When the unit is connected to PC with USB cable, it is detected as removable media.
  (When the "GT" or "GK" model suffix is selected, the display shows "PLEASE SET THE CLOCK" in Chinese.)

1) As for your reference, major default setting condition is as shown in the following table.
  • Default setting (After "INITIAL SETTINGS")

	MODEL	VIDEO OUTPUT	LANGUAGE	DATE	REMARKS
a)	DMC-FX77 (Japan domestic model)	NTSC	Japanese	Year/Month/Date	
b)	DMC-FX78P	NTSC	English	Month/Date/Year	
c)	DMC-FX77EG	PAL	English	Date/Month/Year	
d)	DMC-FX78PU	NTSC	Spanish	Month/Date/Year	
e)	DMC-FX78GD	NTSC	Korea	Year/Month/Date	
f)	DMC-FX78GC	PAL	English	Date/Month/Year	
g)	DMC-FX78GT	NTSC	Chinese (traditional)	Year/Month/Date	
h)	DMC-FX78GK	PAL	Chinese (simplified)	Year/Month/Date	
i)	DMC-FX77EF	PAL	French	Date/Month/Year	
j)	DMC-FX77EB	PAL	English	Date/Month/Year	
k)	DMC-FX77EE	PAL	Russian	Date/Month/Year	
l)	DMC-FX78GN	PAL	English	Date/Month/Year	
m)	DMC-FX77SG	PAL	English	Date/Month/Year	
n)	DMC-FX78GH	PAL	English	Date/Month/Year	
o)	DMC-FX77EP	PAL	English	Date/Month/Year	

4 Specifications

Digital Camera:
Information for your safety

Power Source:	DC 5.1 V
Power Consumption:	1.6 W (When recording) 0.9 W (When playing back)

Camera effective pixels	12,100,000 pixels	
Image sensor	1/2.33″ CCD, total pixel number 12,500,000 pixels, Primary color filter	
Lens	Optical 5×zoom, f=4.3 mm to 21.5 mm (35 mm film camera equivalent: 24 mm to 120 mm)/F2.5 to F5.9	
Digital zoom	Max. 4×	
Extended optical zoom	Max. 9.8× (When set to 3,000,000 pixels [3M] or less)	
Focus range	Normal	50 cm (1.64 feet) (Wide)/1 m (3.28 feet) (Tele) to ∞
	Macro/ Intelligent auto/ Motion Picture	3 cm (0.10 feet) (Wide)/1 m (3.28 feet) (Tele) to ∞
	Scene Mode	There may be differences in the above settings.
Shutter system	Electronic shutter+Mechanical shutter	
Burst recording		
Burst speed	Approx. 3.7 pictures/second	
Number of recordable pictures	Max. 7 pictures	
Hi-speed burst		
Burst speed	Approx. 10 pictures/second (Speed priority) Approx. 6 pictures/second (Image priority)	
	[3M (4:3), 2.5M (3:2), 2M (16:9) or 2.5M (1:1) is selected as the picture size.]	
Number of recordable pictures	Approx. 15 to 100 pictures	
Minimum Illumination	Approx. 6 lx (when i-low light is used, the shutter speed is 1/30th of a second)	
Shutter speed	8 seconds to 1/4000th of a second [Starry Sky] Mode: 15 seconds, 30 seconds, 60 seconds	
Exposure (AE)	Program AE Exposure compensation (1/3 EV Step, −2 EV to +2 EV)	
Metering mode	Multiple	
LCD monitor	3.5″ TFT LCD (16:9) (Approx. 230,000 dots) (field of view ratio about 100%) Touch panel	
Flash range	Approx. 60 cm (1.97 feet) to 5.9 m (19.4 feet) (Wide, [ISO AUTO] is set)	
Microphone	Monaural	
Speaker	Monaural	
Recording media	Built-in Memory (Approx. 70 MB)/SD Memory Card/ SDHC Memory Card/SDXC Memory Card	
Recording file format		
Still Picture	JPEG (based on "Design rule for Camera File system", based on "Exif 2.3" standard)/DPOF corresponding/ MPO	
Motion pictures with audio	AVCHD/QuickTime Motion JPEG	

Interface		
Digital	"USB 2.0" (High Speed)	
Analog video Audio	NTSC Audio line output (monaural)	
Terminal		
[AV OUT/ DIGITAL]	Dedicated jack (8 pin)	
[HDMI]	MiniHDMI TypeC	
Dimensions (excluding the projecting parts)	Approx. 99.7 mm (W)×55.2 mm (H)×20.6 mm (D) [3.93″(W)×2.17″(H)×0.81″(D)]	
Mass (weight)	Approx. 142 g/0.32 lb (with card and battery) Approx. 126 g/0.28 lb (excluding card and battery)	
Operating temperature	0 °C to 40 °C (32 °F to 104 °F)	
Operating humidity	10%RH to 80%RH	
Language select	[ENGLISH]/[ESPAÑOL]	

Battery Charger (Panasonic DE-A91B):
Information for your safety

Input:	～110 V to 240 V, 50/60 Hz, 0.2 A
Output:	⎓4.2 V, 0.43 A

Equipment mobility:
Movable

Battery Pack (lithium-ion) (Panasonic DMW-BCK7PP):
Information for your safety

Voltage/capacity:	3.6 V/680 mAh

NOTE:(Only for "EB/EF/EG/EP" models)
● Data from the PC can not be written to the camera using the USB connection cable.

Motion pictures
(Only "EB/EF/EG/EP" models:)
● Motion pictures can be recorded continuously for up to 29 minutes 59 seconds.

(Except "EB/EF/EG/EP" models:)
● Motion picture recorded continuously in [MOTION JPEG] or [HIGH SPEED MOVIE] in Scene Mode is up to 2 GB. Only the maximum recordable time for 2 GB is displayed on the screen.

5 Location of Controls and Components

1 Flash
2 Lens
3 Self-timer indicator
  AF Assist Lamp
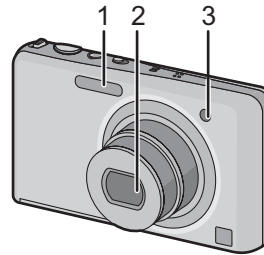
4 Touch panel/LCD monitor
5 Speaker
6 Microphone
7 Camera ON/OFF switch
8 Motion picture button
9 Shutter button
10 Zoom lever
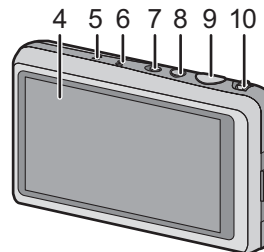
11 Strap eyelet
   • Be sure to attach the strap when using the camera to ensure that you will not drop it.
12 Lens barrel
13 [HDMI] socket
14 [AV OUT/DIGITAL] socket
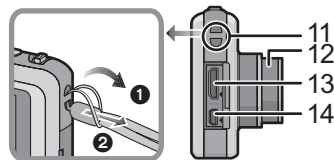
15 Tripod receptacle
16 Card/Battery door
17 Release lever
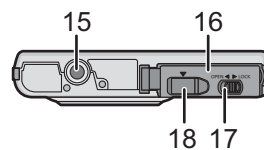
18 DC coupler cover
   • When using an AC adaptor, ensure that the Panasonic DC coupler and AC adaptor are used.
   • Always use a genuine Panasonic AC adaptor.
   • It is recommended to use a fully charged battery or AC adaptorand DC coupler and DC couple when recording motion pictures.
   • If while recording motion pictures using the AC adaptor and the power supply is cut off due to a power outage or if the AC adaptor is disconnected etc., the motion picture being recorded will not be recorded.

How to Use the Touch Panel

This touch panel is a type that detects pressure.

Touch the screen To touch and release the touch panel.	Drag A movement without releasing the touch panel.
Use this to perform tasks such as selecting icons or images displayed on the touch panel. • It may not operate properly when multiple icons are touched simultaneously, so try to touch the center of the icon.	This is used when performing tasks such as moving to the next image by dragging horizontally, or changing the range of the displayed image. This can also be used to perform tasks such as switching the screen by operating the slide bar.

Note

• If you use a commercially available liquid crystal protection sheet, please follow the instructions that accompany the sheet. (Some liquid crystal protection sheets may impair visibility or operability.)
• **Apply a little extra pressure** when touching if you have a commercially available protection sheet affixed or if you feel it is not responding well.
• Touch panel will not operate properly when the hand holding this unit is pressing on the touch panel.
• Do not press using anything with a sharp tip or anything hard, except for the supplied stylus pen.
• Do not operate with your fingernails.
• Wipe the LCD monitor with dry soft cloth when it gets dirty with finger prints and others.
• Do not scratch or press the LCD monitor too hard.

■ About the Stylus pen

It is easier to use the stylus pen (supplied) for detailed operation or if it is hard to operate with your fingers.
• Do not place it where small children can reach.
• Do not place the stylus pen on the LCD monitor when storing. LCD monitor may break when the stylus pen is pressed strongly against the LCD monitor.

Selecting the [Rec] Mode

| 1 | Touch [◀◎]. |

| 2 | Touch the mode icon. |

■ List of [Rec] Modes

◎	Normal Picture Mode
The subjects are recorded using your own settings.	
🅸🅰	Intelligent Auto Mode
The subjects are recorded using settings automatically selected by the camera.	
SCN	Scene Mode
This allows you to take pictures that match the scene being recorded.	
3D	3D Photo Mode
Takes a 3D picture.	
🖌	Cosmetic Mode
Takes a picture adjusting the skin texture.	
🖌	My Color Mode
Use this mode to check coloring effects, select a color mode from among 8 color modes, and then take pictures.	

[Rec] Mode: ◎

Taking Pictures with Your Favorite Settings
(Normal Picture Mode)

The camera automatically sets the shutter speed and the aperture value according to the brightness of the subject.
You can take pictures with greater freedom by changing various settings in the [Rec] menu.

| 1 | Touch [◀◎]. |

| 2 | Touch [◎]. |

| 3 | Aim the AF area at the point you want to focus on. |

| 4 | Press the shutter button halfway to focus. |

Ⓐ ISO sensitivity
Ⓑ Aperture value
Ⓒ Shutter speed
• The focus indication Ⓓ (green) lights when the subject is focused.
• The minimal distance (how close you can be to the subject) will change depending on the zoom factor. Please check with the recordable range display on the screen.
• Aperture value and shutter speed is displayed in red when correct exposure is not achieved. (Exclude when using a flash)
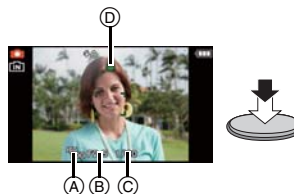
| 5 | Press the halfway pressed shutter button fully to take a picture. |

[Rec] Mode: iA ⬛ SCN 3D 🎨 ♨

Taking pictures using the Touch Shutter function

Just by touching the subject to focus, it will focus on the subject and take the picture automatically.

1 **Touch [⬆×].**

• Icon will change to [⬆—], and taking a picture with the Touch Shutter function becomes possible.

2 **Touch the subject you wish to focus on, and then take a picture.**

• AF area with same function as [▪] in AF Mode is displayed at the position you touch, and a picture is taken when it is focused. (It cannot be set to edge of the screen)

3 **Touch [⬆—] to cancel the Touch Shutter function.**

[Rec] Mode: iA ⬛ SCN 🎨 ♨

Recording Motion Pictures

This can record full high definition motion pictures compatible with the AVCHD format or motion pictures recorded in Motion JPEG.
Audio will be recorded in monaural.

1 **Start recording by pressing the motion picture button.**

Ⓐ Available recording time
Ⓑ Elapsed recording time
• You can record motion pictures fitting each Recording Mode.
• Release the motion picture button right after you press it.
• The recording state indicator (red) Ⓒ will flash while recording motion pictures.
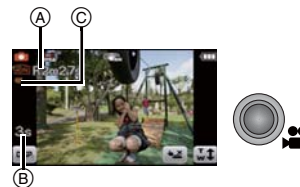
2 **Stop the recording by pressing the motion picture button again.**

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 (i.e.,when the unit is powered on by the battery, the battery is pulled out) The error code is memorized to FLASH-ROM when the unit has just before powered off.

2. **How to display**
   The error code can be displayed by ordering the following procedure:

   • **Preparation:**
       a. Attach the Battery or AC Adaptor with a DC coupler to the unit.
       b. Slide the lend cover fully downward and turn off the power by pressing the power button which is located on the top case unit.

     NOTE:
     *Since this unit has built-in memory, it can be performed without inserting SD memory card.

   • **Step 1. The temporary cancellation of "INITIAL SETTINGS":**
   While pressing "W side of [ZOOM LEVER]", [SHUTTER BUTTON] and touch the screen (Any position of the screen is acceptable) simultaneously, turn the power on.

   • **Step 2. Execute the error code display mode:**
   Display [Version Disp.] screen in the state of Step 1, and then move the [ZOOM LEVER] to "W" side.
   The display is changed as shown below when the moving to W side.
   Version Disp. → Error code display → Operation history display → Version Disp. → .....
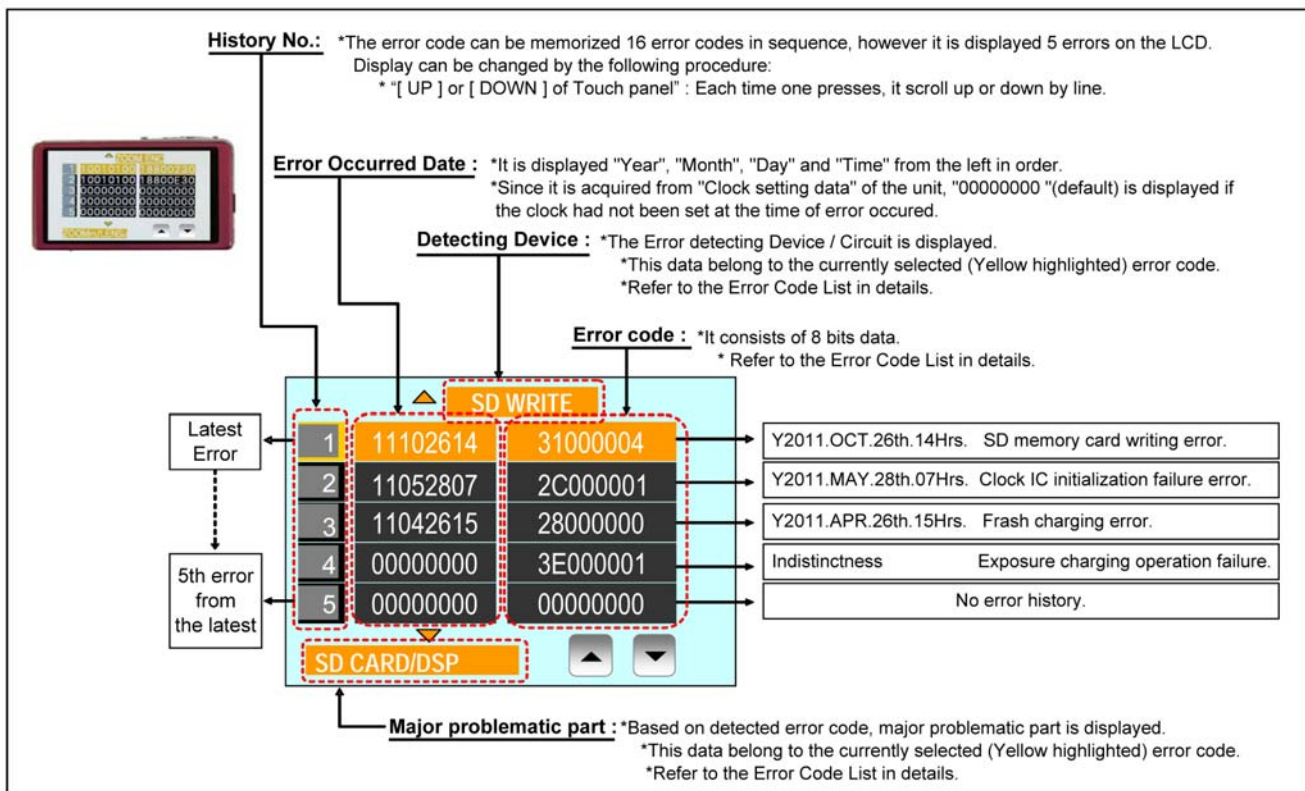
Example of Error Code Display

• 3. Error Code List

The error code consists of 8 bits data and it shows the following information.

Attribute	Main item	Sub item	Error code High 4 bits	Error code Low 4 bits	Contents (Upper line) / Problematic Part & Check point (Lower line)	Error Indication Detecting device	Error Indication Problematic Part/Circuit
LENS	Lens drive	OIS	18*0	1000	PSD (X) error. Hall element (X axis) position detect error in OIS unit. / OIS Unit	OIS X	LENSu NG
				2000	PSD (Y) error. Hall element (Y axis) position detect error in OIS unit. / OIS Unit	OIS Y	LENSu NG
				3000	GYRO (X) error. Gyro (IC7101: X axis) detect error on Sub P.C.B.. / IC7101 (Gyro element) or IC6001 (VENUS FHD)	GYRO X	GYRO NG
				4000	GYRO (Y) error. Gyro (IC7101: Y axis) detect error on Sub P.C.B.. / IC7101 (Gyro element) or IC6001 (VENUS FHD)	GYRO Y	GYRO NG
				5000	MREF error (Reference voltage error). / IC9101 (SYSTEM) or IC6001 (VENUS FHD)	OIS REF	LENSSd/DSP NG
				6000	Drive voltage (X) error. / LENS Unit, LENS flex breaks, IC6001 (VENUS FHD) AD value error, etc.	OISX REF	LENSu/LENS FPC
				7000	Drive voltage (Y) error. / LENS Unit, LENS flex breaks, IC6001 (VENUS FHD) AD value error, etc.	OISY REF	LENSu/LENS FPC
		Zoom		0?10	Collapsible barrel Low detect error (Collapsible barrel encoder always detects Low.) / Mechanical lock, FP9002-(40) signal line or IC6001 (VENUS FHD)	ZOOM L	ZOOMm/LENSu
				0?20	Collapsible barrel High detect error (Collapsible barrel encoder always detects High.) / Mechanical lock, FP9002-(40) signal line or IC6001 (VENUS FHD)	ZOOM H	ZOOMm/LENSu
				0?30	Zoom motor sensor error. / Mechanical lock, FP9002-(7), (10) signal line or IC6001 (VENUS FHD)	ZOOM ENC	ZOOMm/LENSu
				0?40	Zoom motor sensor error. (During monitor mode.) / Mechanical lock, FP9002-(7), (10) signal line or IC6001 (VENUS FHD)	ZOOM ENC	ZOOMm/LENSu
				0?50	Zoom motor sensor error. (During monitor mode with slow speed.) / Mechanical lock, FP9002-(7), (10) signal line or IC6001 (VENUS FHD)	ZOOM ENC	ZOOMm/LENSu
		Focus		0?01	HP Low detect error (Focus encoder always detects High, and not becomes Low) / Mechanical lock, FP9002-(40) signal line or IC6001 (VENUS FHD)	FOCUS L	LENS FPC/DSP
				0?02	HP High detect error (Focus encoder always detects Low, and not becomes High) / Mechanical lock, FP9002-(40) signal line or IC6001 (VENUS FHD)	FOCUS H	LENS FPC/DSP
		Lens	18*1	0000	Power ON time out error. / Lens drive system	LENS DRV	LENSu
			18*2	0000	Power OFF time out error. / Lens drive system	LENS DRV	LENSu
	Adj. History	OIS	19*0	2000	OIS adj. Yaw direction amplitude error (small)	OIS ADJ	OIS ADJ
				3000	OIS adj. Pitch direction amplitude error (small)	OIS ADJ	OIS ADJ
				4000	OIS adj. Yaw direction amplitude error (large)	OIS ADJ	OIS ADJ
				5000	OIS adj. Pitch direction amplitude error (large)	OIS ADJ	OIS ADJ
				6000	OIS adj. MREF error	OIS ADJ	OIS ADJ
				7000	OIS adj. time out error	OIS ADJ	OIS ADJ
				8000	OIS adj. Yaw direction off set error	OIS ADJ	OIS ADJ
				9000	OIS adj. Pitch direction off set error	OIS ADJ	OIS ADJ
				A000	OIS adj. Yaw direction gain error	OIS ADJ	OIS ADJ
				B000	OIS adj. Pitch direction gain error	OIS ADJ	OIS ADJ
				C000	OIS adj. Yaw direction position sensor error	OIS ADJ	OIS ADJ
				D000	OIS adj. Pitch direction position sensor error	OIS ADJ	OIS ADJ
				E000	OIS adj. other error	OIS ADJ	OIS ADJ
HARD	VENUS A/D	Flash	28*0	0000	Flash charging error. / IC6001-(AC16) signal line or Flash charging circuit	STRB CHG	STRB PCB/FPC
	FLASH ROM (EEPROMArea)	FLASH ROM (EEPROM Area)	2B*0	0001	EEPROM read error / IC6002 (FLASH ROM)	FROM RE	FROM
				0002	EEPROM write error / IC6002 (FLASH ROM)	FROM WR	FROM
				0005	Firmware viersion up error / Replace the firmware file in the SD memory card.	(No indication)	(No indication)
				0008	SDRAM error	(No indication)	(No indication)
				0009	SDRAM Mounting defective	(No indication)	(No indication)
	SYSTEM	RTC	2C*0	0001	SYSTEM IC initialize failure error / Communication between IC6001 (VENUS FHD) and IC9101 (SYSTEM)	SYS INIT	MAIN PCB
SOFT	CPU	Reset	30*0	0001 | 0007	NMI reset / Non Mask-able Interrupt (30000001-30000007 are caused by factors)	NMI RST	MAIN PCB
	Card	Card	31*0	0001	Card logic error / SD memory card data line or IC6001 (VENUS FHD)	SD CARD	SD CARD/DSP
				0002	Card physical error / SD memory card data line or IC6001 (VENUS FHD)	SD CARD	SD CARD/DSP
				0004	Write error / SD memory card data line or IC6001 (VENUS FHD)	SD WRITE	SD CARD/DSP
			39*0	0005	Format error	INMEMORY	FROM
	CPU, ASIC hard	Stop	38*0	0001	Camera task finish process time out. / Communication between Lens system and IC6001 (VENUS FHD)	LENS COM	LENSu/DSP
				0002	Camera task invalid code error. / IC6001 (VENUS FHD)	DSP	DSP
				0100	File time out error in recording motion image / IC6001 (VENUS FHD)	DSP	DSP
				0200	File data cue send error in recording motion image / IC6001 (VENUS FHD)	DSP	DSP
				0300	Single or burst recording brake time out.	DSP	DSP
		Memory area	3A*0	0008	USB work area partitioning failure / USB dynamic memory securing failure when connecting	(No indication)	(No indication)
	Operation	Power on	3B*0	0000	FLASH ROM processing early period of camera during movement.	INIT	(No indication)
	Zoom	Zoom	3C*0	0000	Inperfect zoom lens processing / Zoom lens	ZOOM	ZOOMm/LENSu
			35*0	0000 | FFFF	Software error (0-7bit : command, 8-15bit : status)	DSP	DSP
			35*1	0000	Though record preprocessing is necessary, it is not called.	(No indication)	(No indication)
			35*2	0000	Though record preprocessing is necessary, it is not completed.	(No indication)	(No indication)

Important notice about "Error Code List"

1) About "*" indication:

The third digit from the left is different as follows.

- In case of 0 (example: 18**0**01000)

  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: 18**8**01000)

  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.

2) About "?" indication: ("18*0 0?01" to "18*0 0?50"):

The third digit from the right shows one of the hexadecimal ("0" to "F") character.

• 4. How to exit from Error Code display mode:

Simply, turn the power off. (Since Error code display mode is executed under the condition of temporary cancellation of "INITIAL SETTINGS", it wake up with normal condition when turn off the power.)
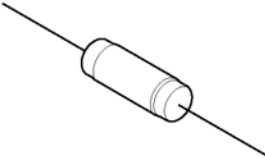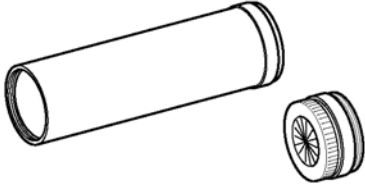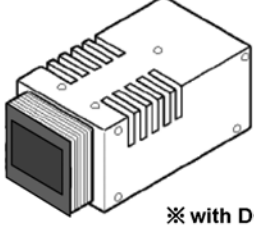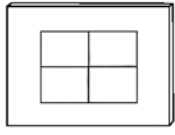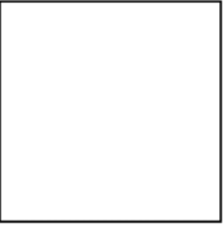
    NOTE:

        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 RFKZ0523
An equivalent type of Resistor may be used.	* VFK1164TCM03 can be used. * RFKZ0422 can be used.	※with DC Cable * VFK1164TDVLB can be used.
TR Chart RFKZ0443	Lens Cleaning Kit (BK) VFK1900BK	Grease (for lens) RFKZ0472
	* Only supplied as 10 set/box.	
ND FILTER (ND 1.5) VFK1164ND15	TOUCH PEN VGQ0C14	
	VYQ4370 can be used.	

7.2. When Replacing the Main P.C.B.

After replacing the MAIN P.C.B., be sure to achieve adjustment.

The adjustment instruction is available at "software download" on the "Support Information from NWBG/VDBG-AVC" 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	RFKZ0494	FP9001 (MAIN) - CCD UNIT	45PIN 0.3FFC
2	RFKZ0416	FP9002 (MAIN) - LENS UNIT	41PIN 0.3FFC
3	RFKZ0418	PP9001 (MAIN) - PS8001 (FLASH TOP)	30PIN B to B
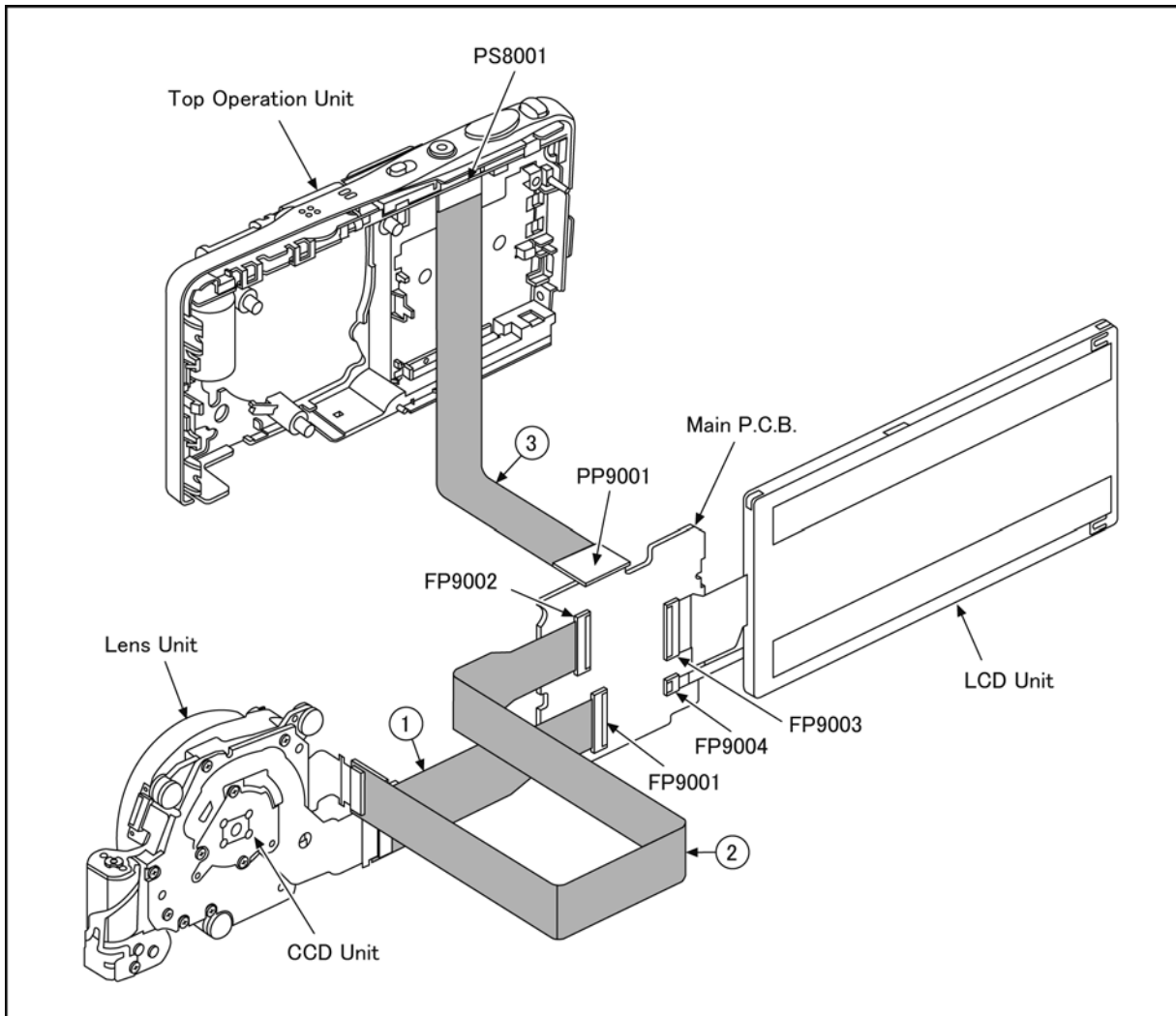
CAUTION-1. (When servicing FLASH TOP P.C.B.)

  1. Be sure to discharge the E.capacitor on FLASH TOP P.C.B..
     Refer to "HOW TO DISCHARGE THE E.CAPACITOR ON FLASH TOP P.C.B.".
     The E.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 P.C.B..
  3. DO NOT allow other parts to touch the high voltage circuit on FLASH TOP P.C.B..

8 Disassembly and Assembly Instructions

8.1. Disassembly Flow Chart

This is a disassembling chart.
When assembling, perform this chart conversely.

```
┌─┬──────────────────┐
│1│Rear Case Unit,   │
│ │Front Case Unit   │
└─┴──────────────────┘
         │
         ▼
┌─┬──────────────────┐
│2│LCD Unit          │
└─┴──────────────────┘
         │
         ├──────────────────────────────┐
         ▼                              ▼
┌─┬──────────────────┐     ┌─┬──────────────────┐
│4│Top Operaton Unit │     │3│Touch Panel Unit  │
└─┴──────────────────┘     └─┴──────────────────┘
         │
         ├──────────────────────────────┐
         ▼                              ▼
┌─┬──────────────────┐     ┌─┬──────────────────┐
│6│Lens Unit         │     │5│Flash Top P.C.B.  │
└─┴──────────────────┘     └─┴──────────────────┘
         │
         ▼
┌─┬──────────────────┐
│7│Main P.C.B.       │
└─┴──────────────────┘
         │
         ├─────────────────┬──────────────────────┐
         ▼                 ▼                      ▼
┌─┬───────────────┐ ┌─┬─────────────┐ ┌──┬──────────────────┐
│8│Battery Case   │ │9│Jack Door    │ │10│Battery Door Unit │
└─┴───────────────┘ └─┴─────────────┘ └──┴──────────────────┘
```

8.2. PCB Location

8.3. Disassembly Procedure

No.	Item	Fig	Removal
1	Rear Case Unit Front Case Unit	(Fig. D1)	Card
			Battery
			2 Screws (A)
			2 Screws (B)
			2 Screws (C)
		(Fig. D2)	2 Locking tabs
			Rear Case Unit
			2 Locking tabs
			Front Case Unit
2	LCD Unit	(Fig. D3)	1 Locking tab
			Frame Plate
			Tripod Fixing Plate
			FP9003(Flex)
			FP9004(Flex)
			LCD Unit
3	Touch Panel Unit	(Fig. D4)	LCD Unit
			Touch Panel Unit
4	Top Operation Unit	(Fig. D5)	1 Locking tab
			PP9001(Connector)
			Top Operation Unit
5	Flash Top P.C.B.	(Fig. D6)	1 Locking tab
			AF Panel Light
			FP8001(Flex)
			2 Screws (D)
			3 Locking tabs
			Speaker
			MIC Unit
			Motion Picture Button
			Power Knob Base
			Power Knob
			Flash Top P.C.B.
		(Fig. D7)	Discharge of the capacitor
			NOTE: (When Installing)
6	Lens Unit	(Fig. D8)	FP9001(Flex)
			FP9002(Flex)
			3 Screws (E)
			Lens Unit
7	Main P.C.B.	(Fig. D9)	1 Screw (F)
			1 Locking tab
			Main P.C.B.
8	Battery Case	(Fig. D10)	6 Locking tabs
			Side Ornament
			Battery Out Spring
			Battery Case
9	Jack Door	(Fig. D11)	Jack Door
10	Battery Door Unit	(Fig. D12)	Battery Door Shaft
			Battery Door Spring
			Battery Door Unit

8.3.1. Removal of the Rear Case Unit and Front Case Unit

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

・ Card   ・ Screw(B)×2
・ Battery   ・ Screw(C)×2
・ Screw(A)×2

(Fig. D1)

· Locking tab × 2
· Locking tab × 2

Locking tab

Rear Case Unit

LCD Unit

NOTE: (When Replacing)
· When removing the rear case unit, LCD gently press down and then lift the riar case unit only.

Locking tab

Front Case Unit
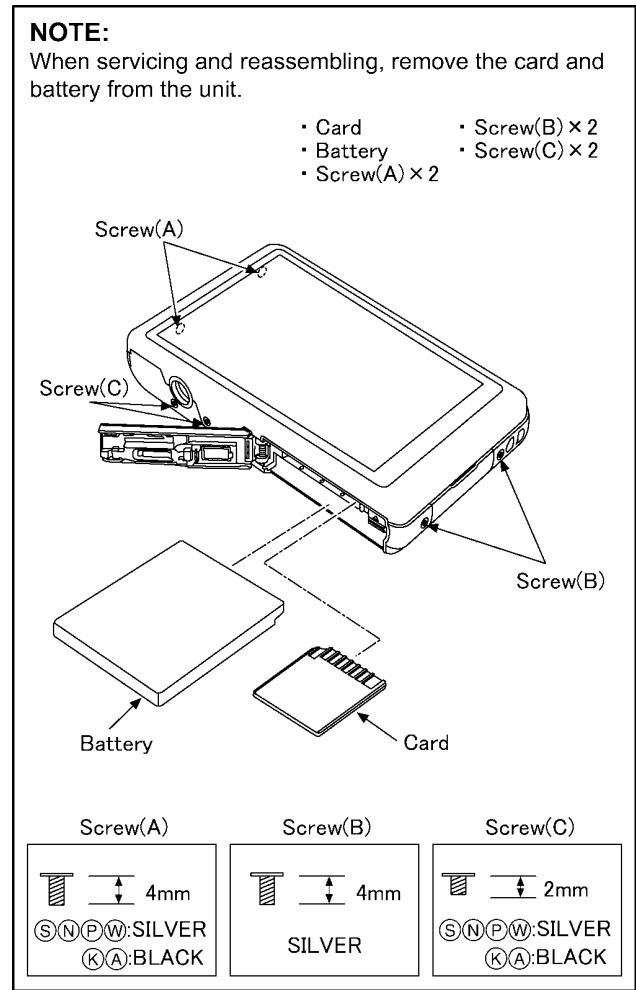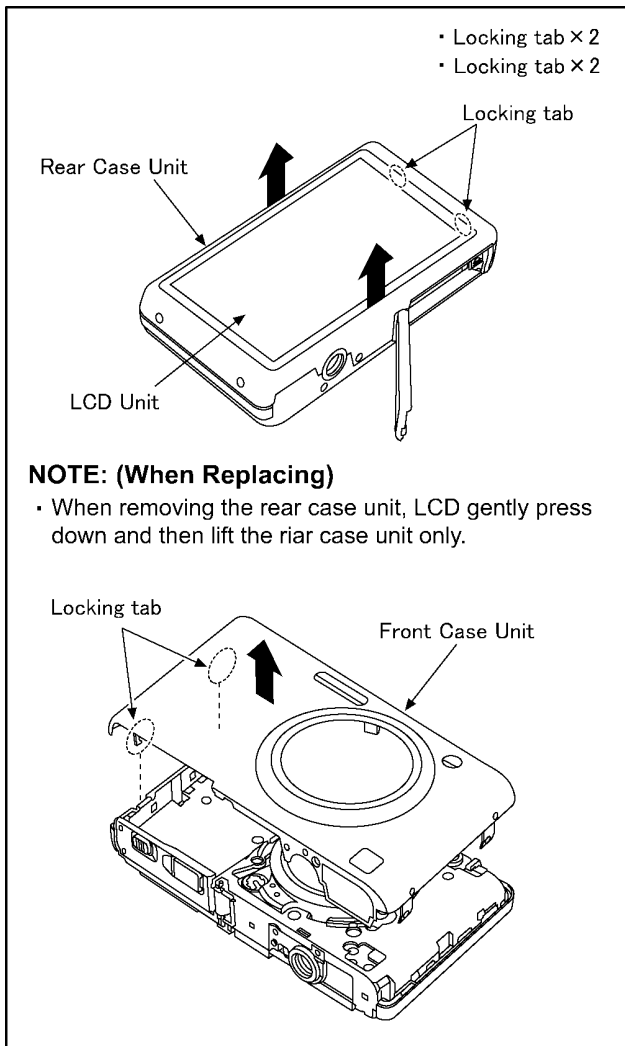
(Fig. D2)

8.3.2.   Removal of the LCD Unit

· Locking tab × 1   · FP9003 (Flex)
· Frame Plate   · FP9004 (Flex)
· Tripod Fixing Plate

LCD Unit

(2)
(3)
(1)

NOTE: (When Replacing)
• When remove the LCD unit, pull up the flex side of LCD unit in the direction of arrow (1), slide the LCD unit direction of arrow (2) and then half turn the LCD unit in the direction of arrow (3).
• Take care noto to damage the flex.

Locking tab

Frame Plate

Tripod Fixing Plate

LCD Unit

FP9003

(1)

(2)

FP9004

LCD Unit

NOTE: (When Replacing)
· When remove the flex, pull up the locking tab in the direction of arrow (1), and then remove the flex in the direction of arrow (2).

(Fig. D3)

8.3.3. Removal of the Touch Panel Unit

Don't disassemble LCD unit when it's not exchanged.

Touch panel unit ・LCD Unit

LCD unit

Peel off touch panel unit from here.

■ **Notes for exchange**
・ In case that two-sided tape is remained on LCD when you remove touch panel unit, exchange touch panel unit after peeling off every last shred of the tape.
・ The touch panel unit for repair includes LCD tape.
・ When you assemble touch panel unit, assemble it not to spread out of LCD unit.
・ Don't apply the fingerprint on the surface of LCD unit.

(Fig. D4)

8.3.4. Removal of the Top Operation Unit

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

・Locking tab × 1
・PP9001 （Connector）

Top Operation Unit

PP9001

Locking tab

(Fig. D5)

8.3.5. How to remove Flash Top P.C.B.

- Locking tab × 1
- AF Panel Light
- FP8001 (Flex)
- Screw(D) × 2
- Locking tab × 3
- Speaker
- Mic Unit
- Motion Picture Button
- Power Knob Base
- Power Knob

NOTE: (When Replacing)

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

Locking tab

Screw(D)

(1) (2)

FP8001

Locking tab

AF Panel Light

Screw(D)

Flash Top P.C.B.

Speaker

Mic Unit

Power Knob Base

Power Knob

Motion Picture Button

Screw(D)

2.5mm

SILVER

(Fig. D6)

E.Capacitor

Flash Top P.C.B.

Insulation tube

Registor for discharging (1kΩ/5W)

⚠ CAUTION

Be sure to discharge the E.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 E.Capacitor unit for approx. 5 seconds.

NOTE:(When Installing)

- Align the convex of power switch and power knob.

Convex of POWER Switch

POWER Knob
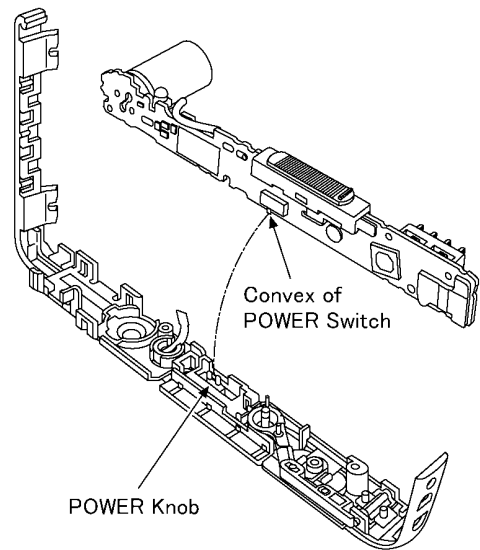
(Fig. D7)

8.3.6. Removal of the Lens Unit

- FP9001 (Flex)
- FP9002 (Flex)
- Screw(E) × 3

Screw(E)

FP9002

(2)

(1)

Lens Unit

Screw(E)

FP9001

Screw(E)

7mm

SILVER

NOTE: (When Replacing)
- When remove the flex, pull up the locking tab in the direction of arrow (1), and then remove the flex in the direction of arrow (2).
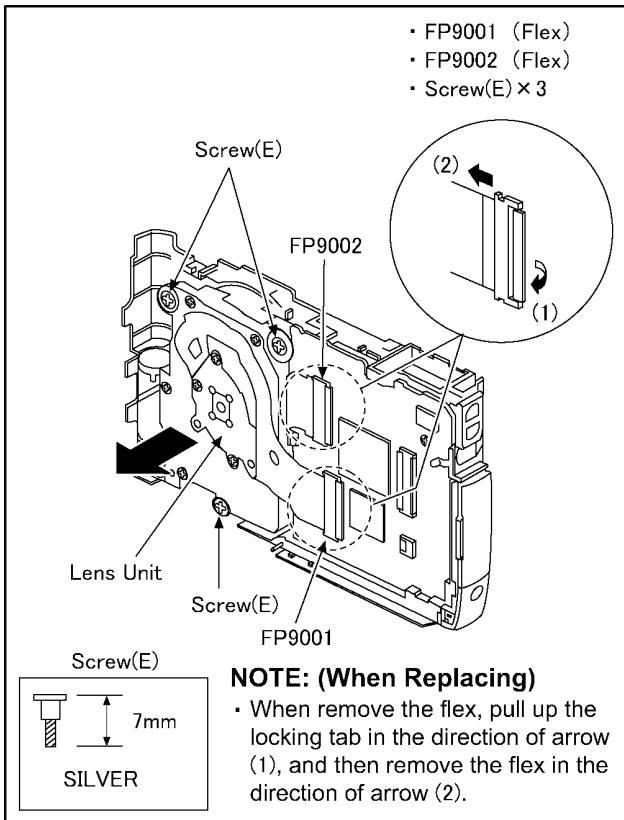
(Fig. D8)

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

- Screw(F) × 1
- Locking tab × 1

Locking tab   Screw(F)

Main P.C.B.

Screw(F)

2mm

SILVER
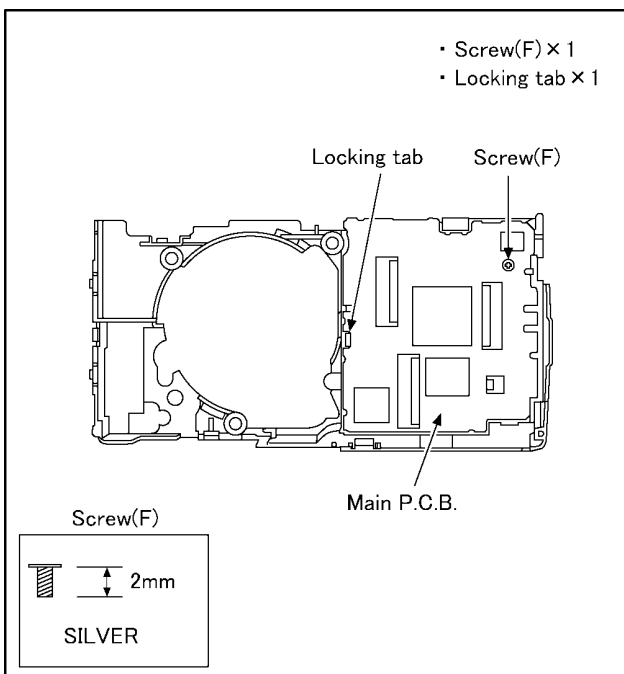
(Fig. D9)

8.3.8. Removal of the Battery Case

- Locking tab × 6
- Side ornament
- Battery Out Spring

Locking tab

Side ornament

- Push the battery case.

Locking tab

Battery Case

Battery Out Spring

(Fig. D10)

28
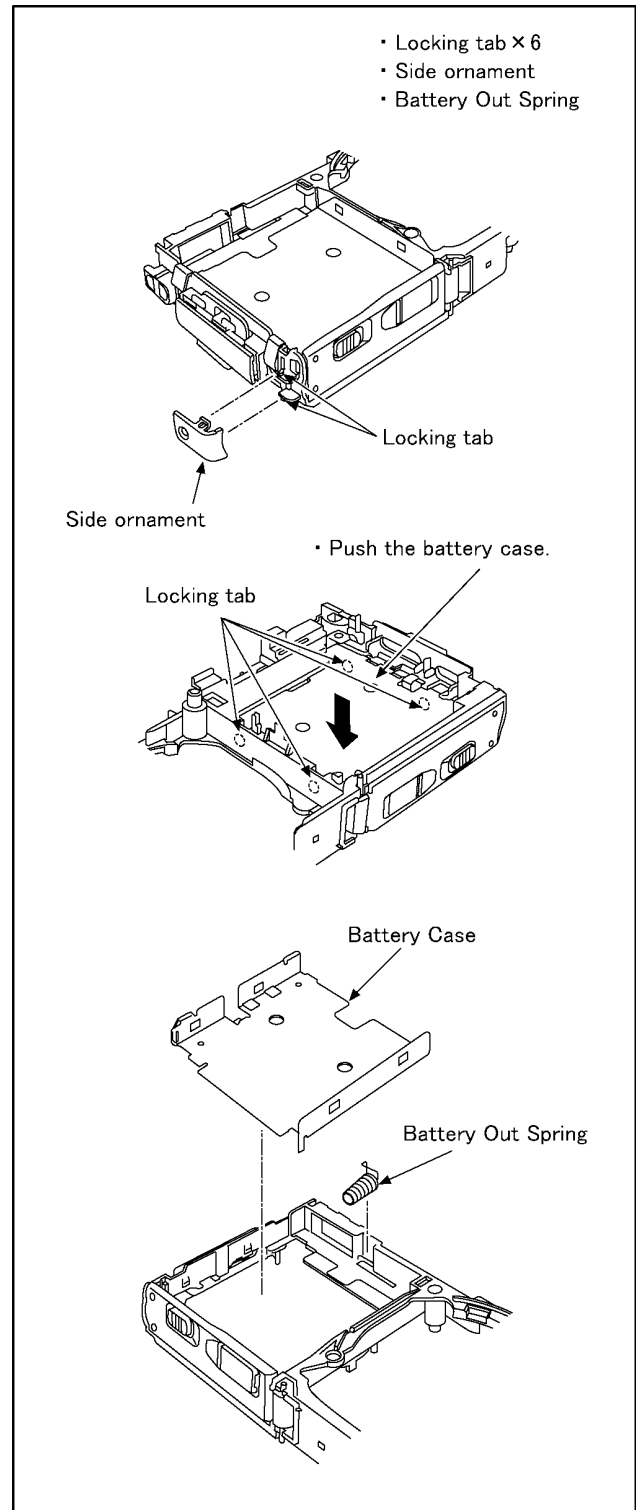
8.3.9.   Removal of the Jack Door

NOTE:(When Replacing)
• When remove the Jack door, slide the lock in the direction of arrow(1) to release, and then remove the jack door in thedirection of arrow(2).
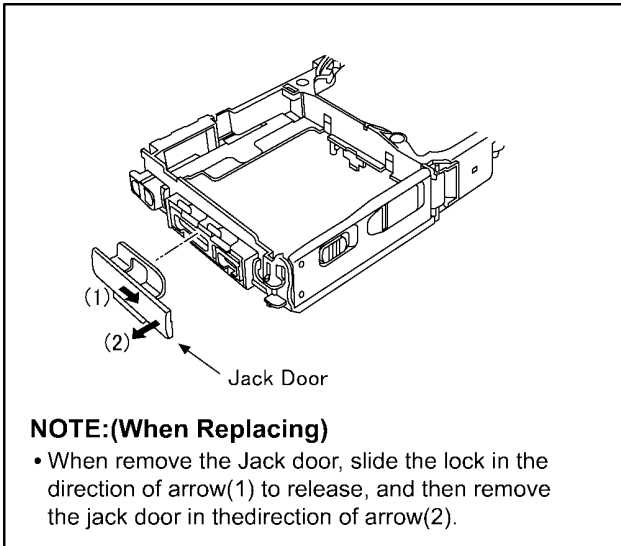
(Fig. D11)

8.3.10.   Removal of the Battery Door Unit

• Battery Door Shaft
• Battery Door Spring

Pull the battery door unit

Battery Door Shaft

Battery Door Spring   Battery Door Unit
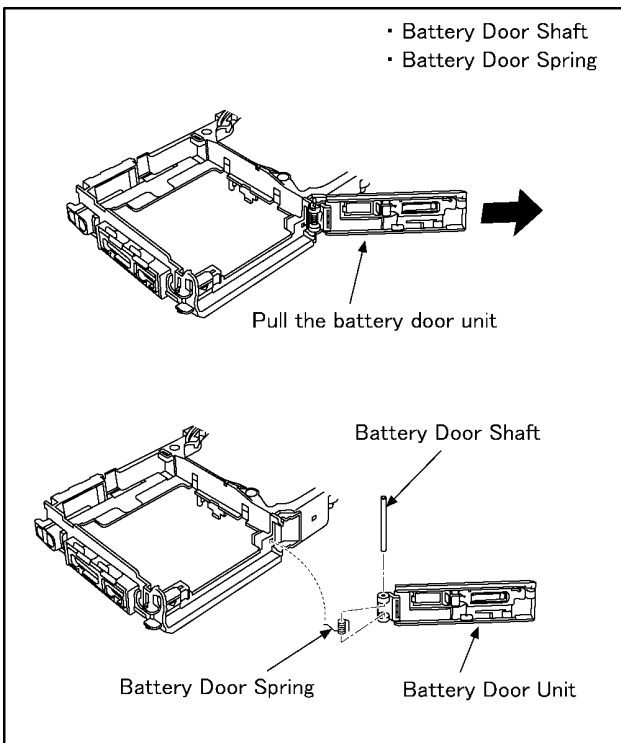
(Fig. D12)

NOTE: (When Installing)
    Make sure to confirm the following points when installing:
 • The Screw is tightened enough.
 • Installing conditions are fine. (No distortion, no abnormal-space.)
 • No dust and/or dirt on Lens surfaces.
 • LCD image is fine. (No dust and dirt on it, and no gradient images.)

8.4.   Lens Disassembly Procedure

Precaution:
  1. Do not remove the CCD unit when disassembling or re-assembling the lens in order to maintain it clean.
     The screw fitting the CCD unit to the master flange unit is fixed by the bond lock with the adjustment of the installation angle of the CCD unit against the lens (optical axis adjustment) finished.
     When remove it, refer to item "8.7.".
  2. Keep dust or dirt away from the lens.
     To remove dirt or dust from the lens, blow with dry air.
  3. Do not touch the lens surface.
  4. Use lens cleaning KIT (VFK1900BK).
  5. Apply grease (RFKZ0472) as shown on "THE APPLICATION OF GREASE METHOD" in the figure.

8.4.1. Removal of the Zoom Motor

1. Unscrew the 2 screws (A).
2. Remove the Connector.
3. Remove the FPC to the hanging part.

・Connector
・Screw(A)×2

Screw(A)

Zoom Motor

Connector

(2)

Hanging part

(1)

NOTE: (When Replacing)

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

NOTE: (When Installing)

・ Align the convex of fixed frame unit and hole of zoom motor, and then install them.(A)

Convex

Hole

Fixed Frame Unit   Convex

Hole   Zoom Motor

Screw(A)

4mm

BLACK

8.4.2. Removal of the Lens FPC P.C.B. Unit

1. Unscrew the 1 screw (B).
2. Remove the Connector.
3. Unsolder (4 points).
4. Remove the 5 Locks.
5. Remove the Lens FPC P.C.B. Unit to the hanging part.

・Screw(B)×1   ・Solder (4 points)
・Connector   ・Lock×5

Connector

Screw(B)   Lock

Solder(4 points)

Lock

Lock

Hanging part   Hanging part

Lens FPC P.C.B. Unit

Screw(B)

2.5mm

SILVER

NOTE:(When Replacing)

● Take care not to damage the flex.
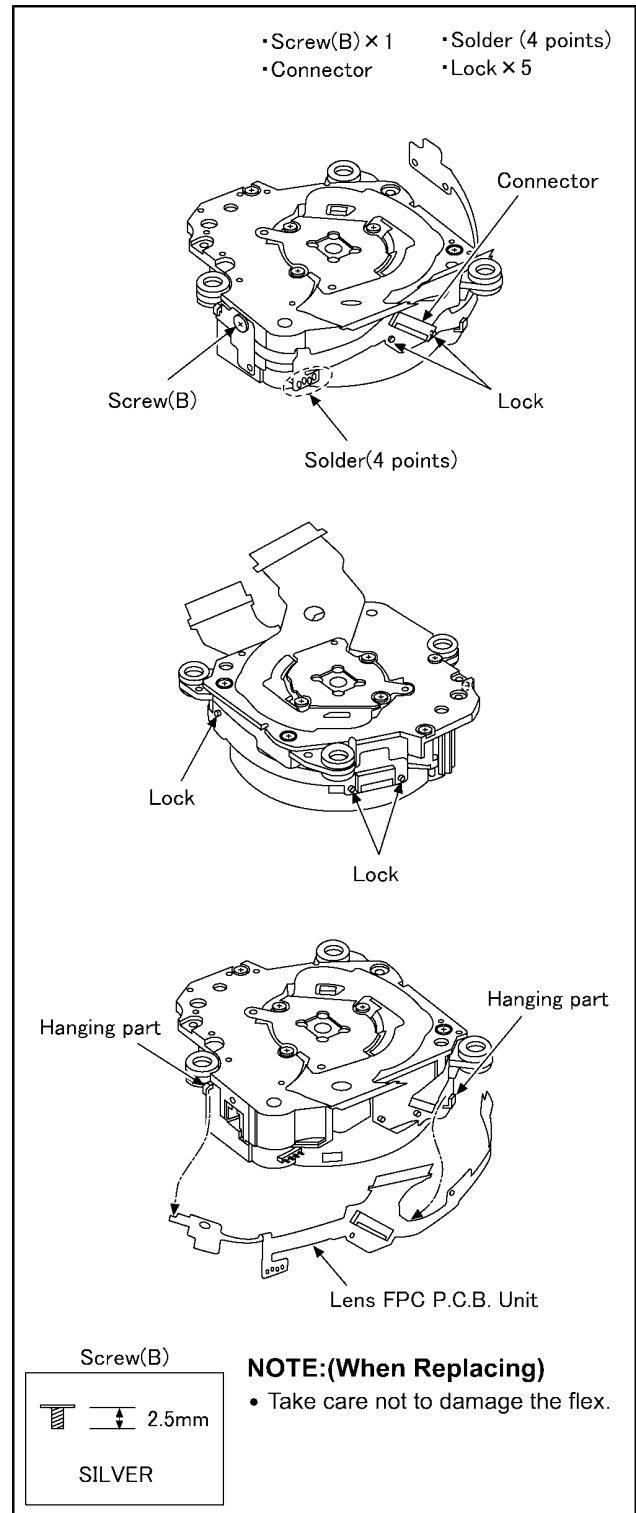
8.4.3.   Removal of the Master Flange Unit

1. Unscrew the 5 screws (C).
2. Remove the master flange unit.

Screw(C) × 5

Screw(C)

Master Flange Unit

2nd Lens Frame
Move Unit

Convex

NOTE:(When Replacing)

• Remove the flex of 2nd lens frame move unit from
  convex of the master flange unit.
• Take care not to damage the flex.

NOTE:(When Installing)

• Refer to "THE APPLICATION OF GREASE METHOD"
  when installing the master flange unit.

Screw(C)

4mm

BLACK
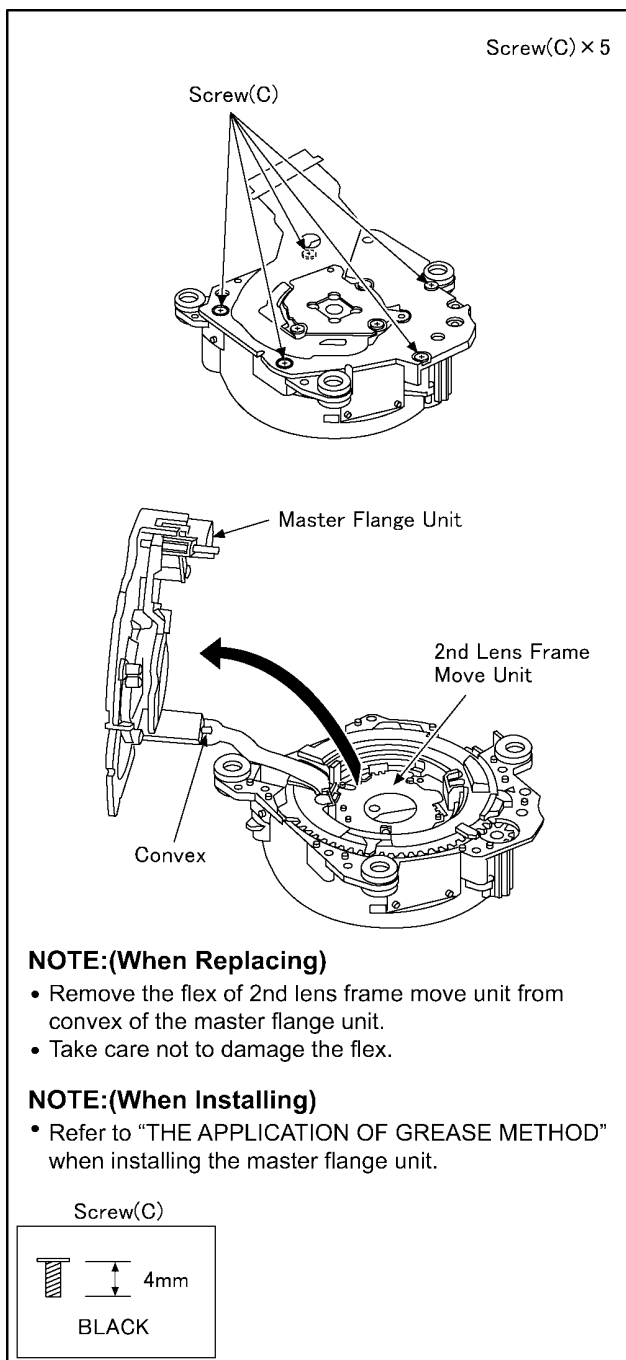
8.4.4.   Removal of the 2nd Lens Frame Move Unit/2nd Lens Frame Unit/1st Lens Frame Move Unit/1st Lens Frame Unit and Cam Frame Unit

1. Push the 1st lens frame unit from the lens front side in the
   direction of arrow, and then remove the unit of 2nd lens
   frame move unit/2nd lens frame unit/1st lens frame move
   unit/1st lens frame unit and cam frame unit from fixed
   frame unit.

Flex

2nd Lens Frame Move
Unit・2nd LensFrame
Unit・1st LensFrame
Move Unit・1st Lens
Frame Unit・Cam Frame
Unit

Fixed Frame Unit

NOTE: (When Replacing)

・ Take care not to damage the flex.
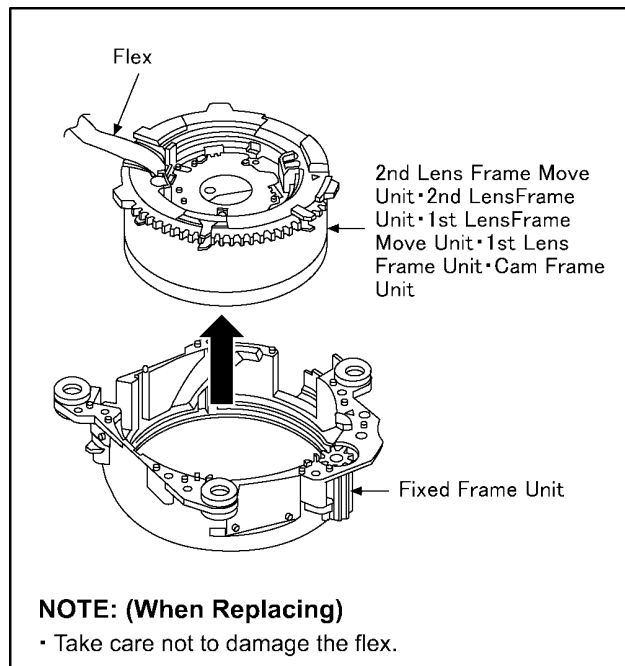
8.4.5. Removal of the 2nd Lens Frame Move Unit

1. Remove the 2nd Lens frame move unit in the direction of the arrow.

2nd Lens Frame Move Unit

Flex

2nd LensFrame Unit・
1st LensFrame Move Unit・
1st Lens Frame Unit・
Cam Frame Unit

NOTE: (When Replacing)
・ Take care not to damage the flex.
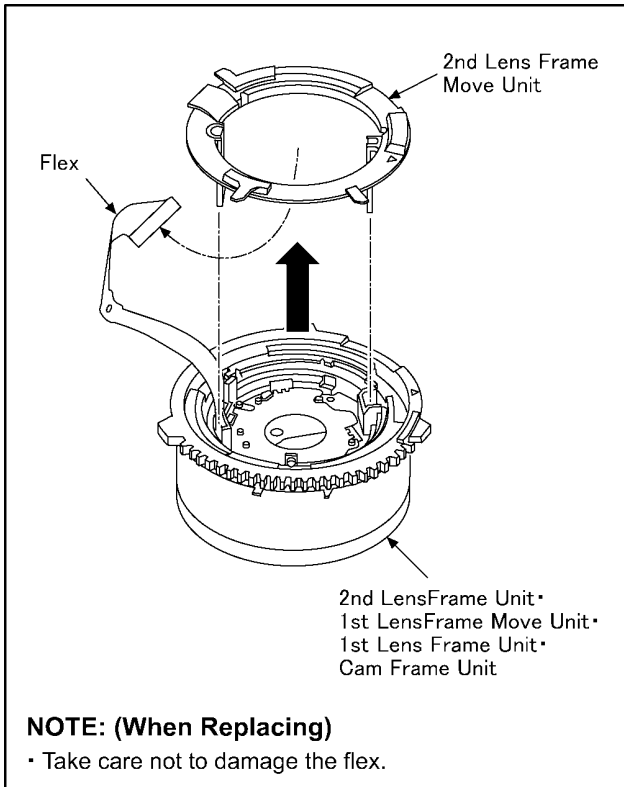
8.4.6. Removal of the 2nd Lens Frame Unit

1. Remove the 2nd Lens frame unit in the direction of the arrow (1) and (2).

2nd LensFrame Unit

1st LensFrame Move Unit・1st Lens Frame Unit・Cam Frame Unit

NOTE: (When Replacing)
• Take care not to damage the flex.
• Take care not to put finger print of the lens.
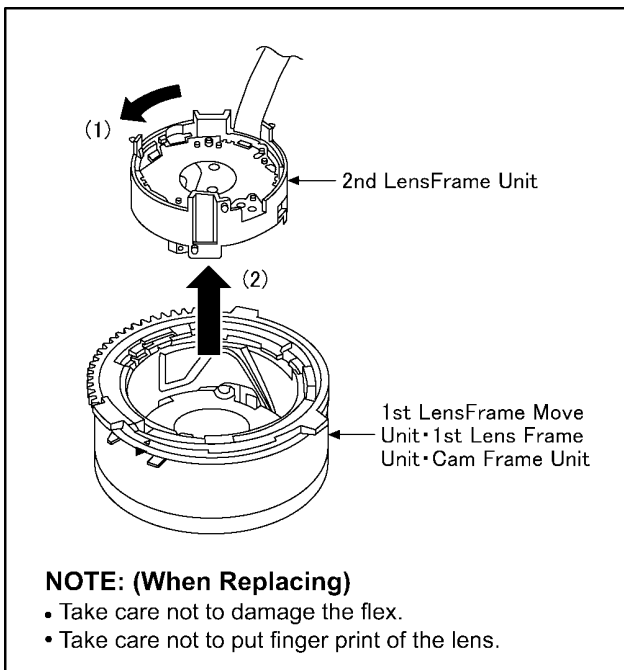
8.4.7. Removal of the 1st Lens Frame Move Unit

1. Slide the 1st Lens frame move unit in the direction of the arrow (1).
2. Remove the 1st Lens frame move unit in the direction of the arrow (2).

1st Lens Frame Unit・Cam Frame Unit

1st Lens Frame Unit・Cam Frame Unit

1st LensFrame Move Unit
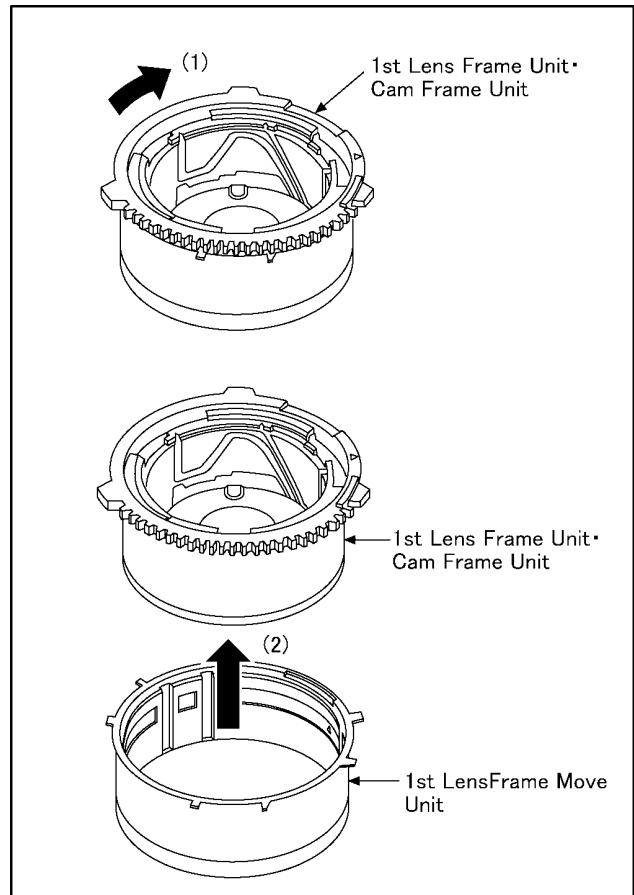
8.4.8. Removal of the Cam Frame Unit

1. Remove the cam frame unit while rotating.

Cam Frame Unit

Cam Frame Unit

1st LensFrame Unit

NOTE: (When Replacing)
- Take care not to put finger print of the lens.
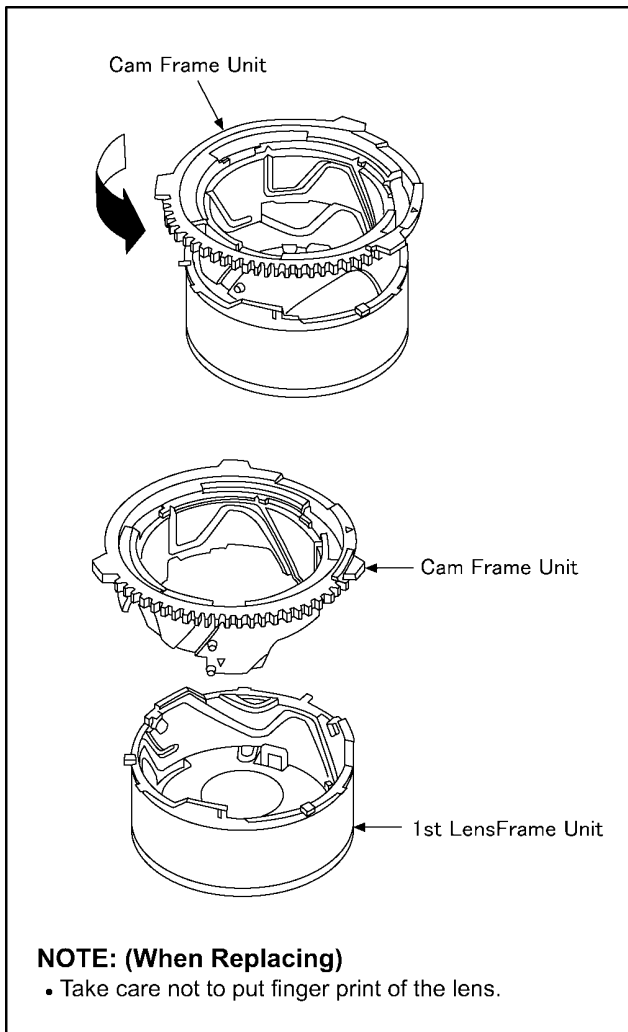
8.5. Assembly Procedure for the Lens

8.5.1. Phase alignment of the Cam Frame Unit and 1st Lens Frame Unit

- Align the △ mark of cam frame unit and 1st lens frame unit, and then install the cam frame unit to 1st lens frame unit in clockwise.
(The cam frame is locked clockwise.)

Cam Frame

△ mark

1st Lens Frame Unit

Marking
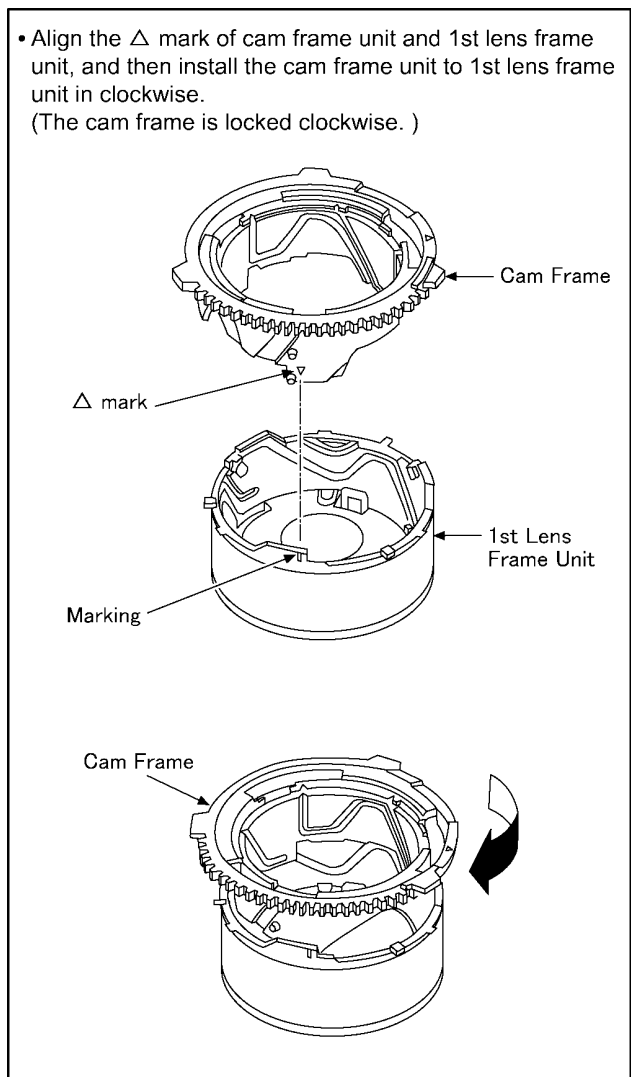
Cam Frame

8.5.2. Phase alignment of the Cam Frame Unit/1st Lens Frame Unit and 1st Lens Frame Move Unit

• Align the △ mark of cam frame unit and 1st lens frame unit, and then install the cam frame unit/1st lens frame unit to direct frame.

Cam Frame Unit/
1st Lens Frame Unit

△ mark

△ mark

1st Lens Frame
Move Unit
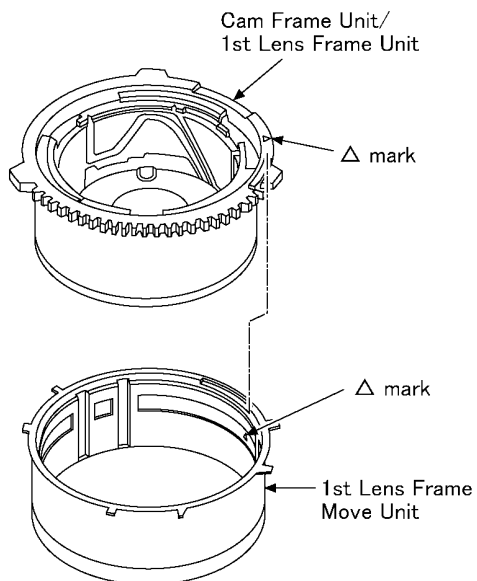
• Slide the cam frame unit/1st lens frame unit a little in the direction of the arrow.

Cam Frame Unit/
1st Lens Frame Unit
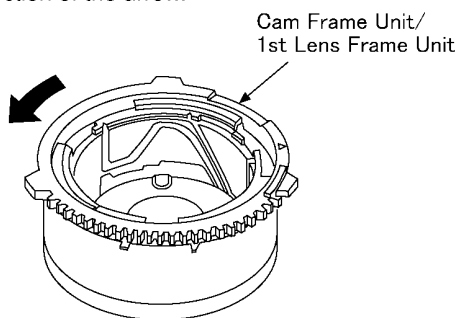
8.5.3. Install of the 2nd Lens Frame Unit

• Align the △ mark of cam pin and cam frame unit, and then install the cam pin of 2nd lens frame unit to the groove of cam frame.

Shutter Flex

2nd Lens Frame Unit

Cam Pin
(Other side of the
shutter flex)

1st Lens Frame
Move Unit・
1st Lens FrameUnit・
Cam Frame Unit

△ mark

Groove of Cam Frame
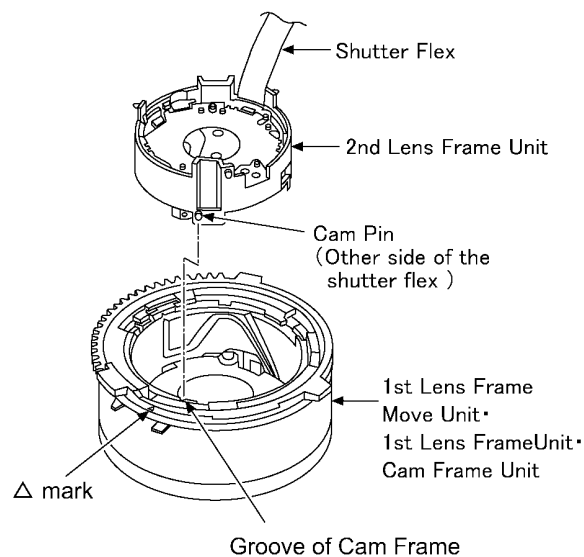
8.5.4. Phase alignment of the Cam Frame/1st Lens Frame Unit/1st Lens Frame Move Unit/2nd Lens Frame Unit and 2nd Lens Frame Move Unit

• Align the △ mark of 2nd lens frame move unit and cam frame unit, and then install the two places legs of 2nd lens frame move unit to concave of 2nd lens frame unit.

Shutter Flex

2nd Lens Frame Move Unit

△ mark

Leg

△ mark

2nd Lens FrameUnit/
1st Lens FrameMove Unit/
Cam Frame Unit
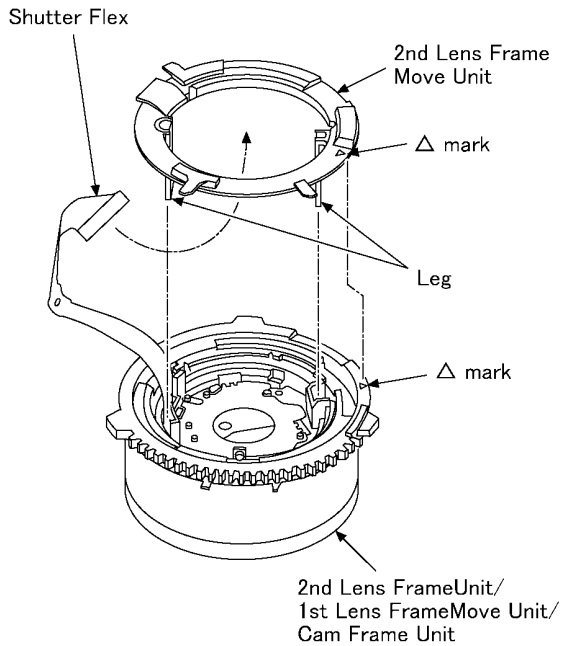
NOTE:(When Replacing)
• Passes over the shutter flex inside of the 2nd lens frame unit.
• Take care not to damage the flex.

8.5.5. Phase alignment of the Cam Frame Unit/1st Lens Frame Unit/1st Lens Frame Move Unit/2nd Lens Frame Unit and 2nd Lens Frame Move Unit/Fixed Frame Unit

• Align the △ mark of fixed frame unit and △ mark of cam frame unit, and then install the 2nd lens frame move unit/2nd lens frame unit/1st lens frame move unit/1st lens frame unit/cam frame unit to fixed frame unit.

2nd lens frame move unit/
2nd lens frame unit/
1st lens frame move unit/
1st lens frame unit/
cam frame unit

△ mark

△ mark
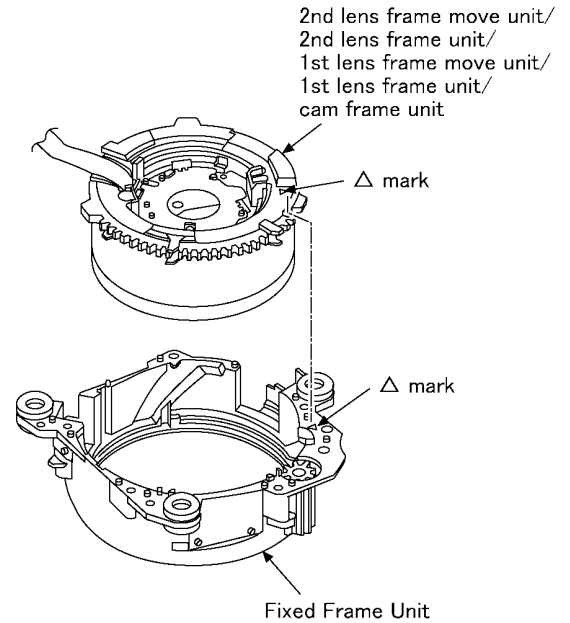
Fixed Frame Unit

• Align the gear of fixed frame unit to the gear of the cam frame surely, and then rotate the gear of the cam frame more than two cogwheels

Gear of the Cam Frame

Gear of Fixed Frame Unit
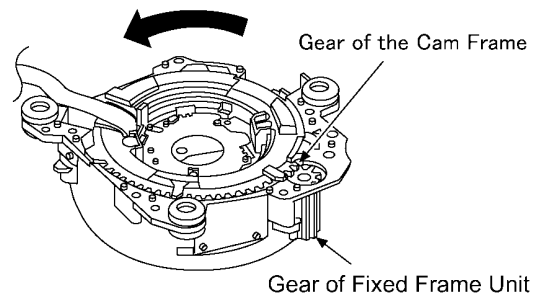
8.5.6.　Install of the Master Flange Unit

•Screw(D)×5

• Insert the convex to the
hole for registration of flex,
and then insert to the flex
insert part

Flex

Master Flange Unit

Flex insert part

Flex insert part

Fixed Frame Unit
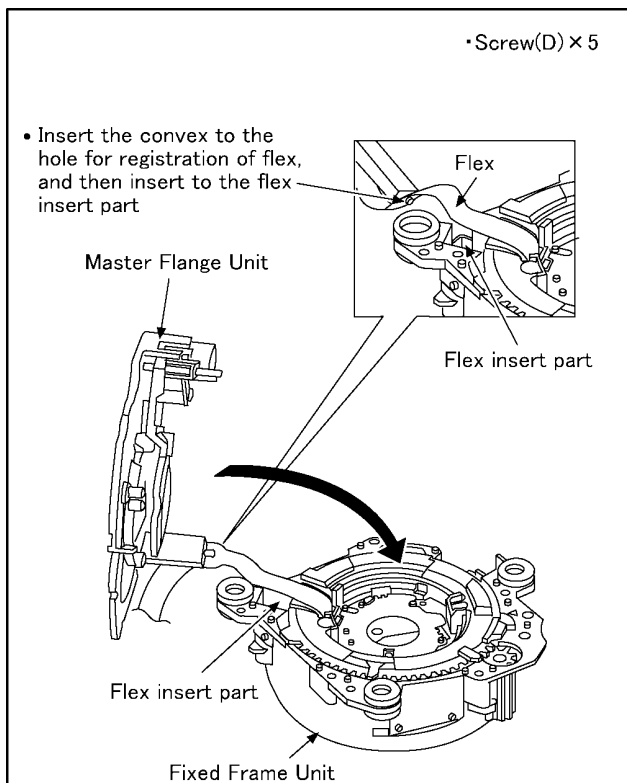
NOTE:(When Replacing)

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

Screw(D)

Screw(D)

4mm

BLACK
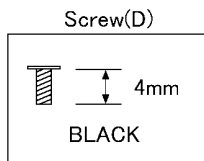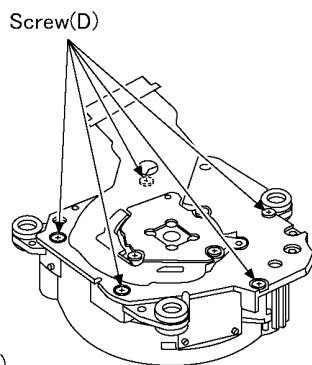
8.6.　Removal of the Focus Motor

•Screw(E)×1

Screw(E)

Focus Motor

Projection
part of nut

Groove

NOTE:(When Installing)

• Align the projection part of nut to groove, and then
insert the focus motor
• Refer to "THE APPLICATION OF GREASE METHOD"
when installing the focus motor.

Screw(E)

4mm

BLACK
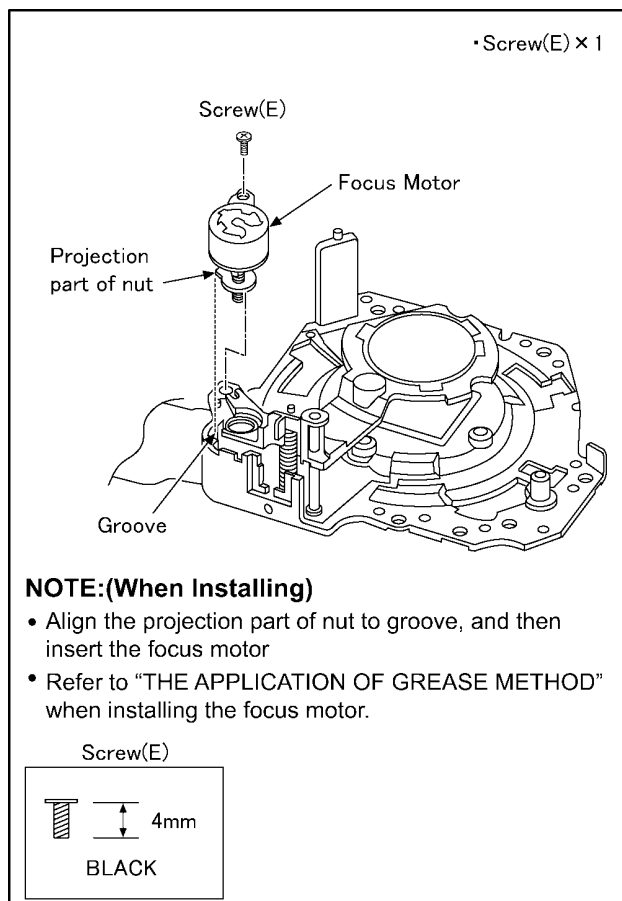
8.7. Removal of the CCD Unit

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

・Screw(F) × 3

CCD Unit

Screw(F)

CCD Unit

Positioning pin

Screw(F)

3mm

BLACK
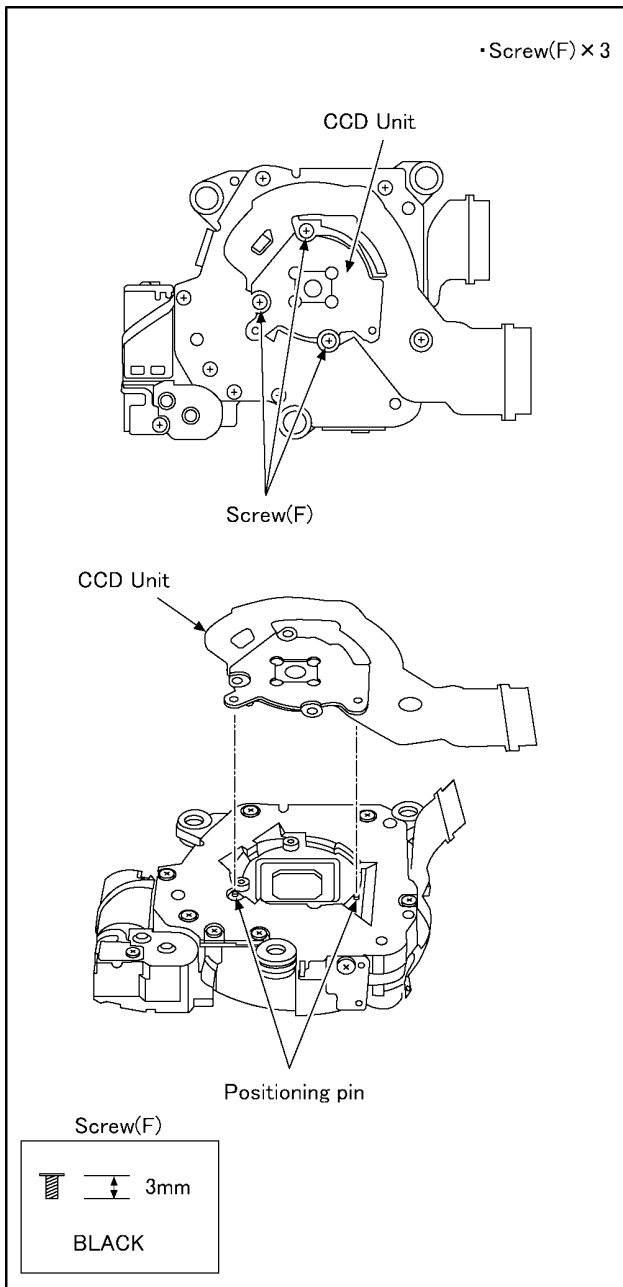
8.8. The Application of Grease Method

The grease application parts 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.

• Focus motor (lead screw)/Fasten groove of nut/Guide pole
  - Grease: RFKZ0472
  - Amount of application: 2 - 4 mg
• Resin pin
  - Grease: RFKZ0472
  - Amount of application: 1 - 2 mg

3rd lens frsme support axis grease application part

Focus Motor

Lead screw grease application part

Nut

3rd lens frsme sub axis grease application part

Nut sliding area grease application part
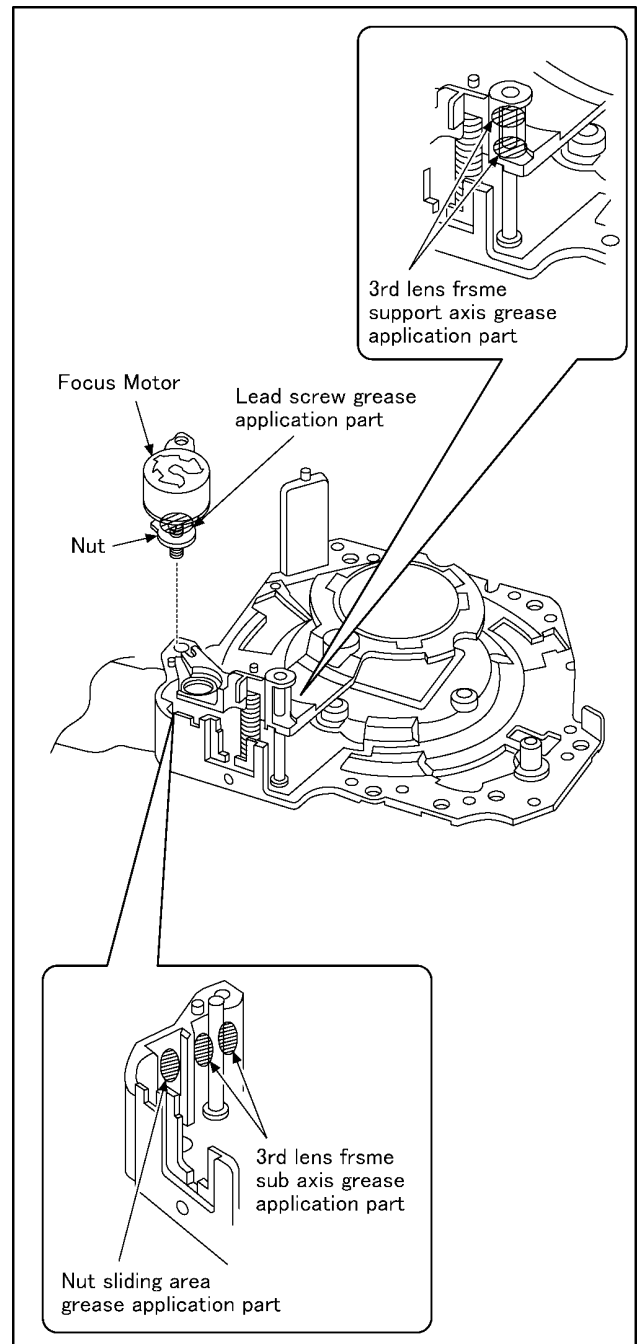
9 Measurements and Adjustments

9.1. Introduction

When servicing this unit, make sure to perform the adjustments necessary based on the part(s) replaced.

Before disassembling the unit, it is recommended to back up the camera data stored in flash-rom as a data file.

IMPORTANT NOTICE (After replacing the MAIN P.C.B.)

> After replacing the MAIN P.C.B., it is necessary to use the "DIAS" software to allow the release of adjustment flag(s).
>
> The Adjustment software "DIAS" is available at "TSN Website". To download, click on "Support Information from NWBG/VDBG-AVC".
>
> *DIAS (DSC Integrated Assist Software)

9.2. Before Disassembling the unit

9.2.1. Initial Setting Release

The cameras specification are initially set in accordance with model suffix (such as EB, EG, GK, GC, and so on.).

Unless the initial setting is not released, an automatic alignment software in the camera is not able to be executed when the alignment is carried out.

Note:

> The initial setting should be again done after completing the alignment. Otherwise, the camera may not work properly.
>
> Therefore as a warning, the camera display a warning symbol " ! " on the LCD monitor every time the camera is turned off.
>
> Refer to the procedure described in "3.4.2 INITIAL SETTINGS" for details.

[How to Release the camera initial setting]

Preparation:

1. Attach the Battery or AC Adaptor with a DC coupler to the unit.
   (Since this unit has built-in memory, it can be performed without inserting SD memory card.)
2. Slide the lens cover fully downward.
3. Select with the touch panel in order to [REC] mode and [NORMAL PICTURE] mode.
4. Turn off the power by pressing the power button which is located on the top case unit.
   (If the unit is other than [NORMAL PICTURE] mode, it does not display the initial settings menu.)

Step 1. Temporary cancellation of "INITIAL SETTINGS":

While pressing "W side of [ZOOM LEVER]", [SHUTTER BUTTON] and touch the screen (Any position of the screen is acceptable) simultaneously, turn the power on.

Step 2. Cancellation of "INITIAL SETTINGS":

1. Select with the touch panel to [PLAYBACK] mode.
2. Touch Setup after touching MENU. Then, find and select Ver..
3. Touch near the center of screen, while [SHUTTER BUTTON] is pressed halfway.
4. Turn the power off.

The LCD displays the " ! " mark before the unit powers down.

9.2.2. Flash-Rom Data Backup

When trouble occurs, it is recommended to backup the Flash-rom data before disassembling the unit.
There are two kinds of Flash-rom data backup methods:

[ROM_BACKUP (Method of Non-PC backup)]

1. Insert the SD-card into the camera.
2. Set the camera to "Temporary cancellation of the initial settings".
3. Select the "SETUP" menu.
   From the "SETUP" menu, select "ROM BACKUP".
   NOTE:
   This item is not listed on the customer's "SETUP" menu.
4. When this "ROM_BACKUP" item is selected, the following submenus are displayed.
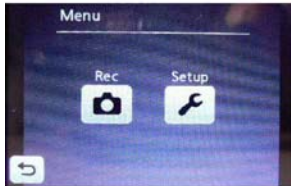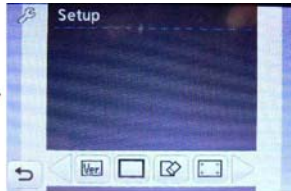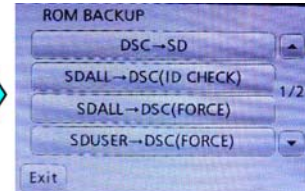
Fig.2-1   Fig.2-2   Fig.2-3

Item	Function	Details

DSC → SD	Save all the DSC's Flash-rom data to SD-CARD	*DSC's Flash-rom data is saved to the SD-CARD as a data file by the same format as the TATSUJIN software for the previous models. (DATA BACKUP)
		 -File location: ROOT DIRECTORY in SD-CARD.
		 -File Name:
		   1) User Setup Information data: <Model Number>U.txt [Example: DMC-FX66 : "FX66U.txt"]
		   2) Optical Adjustment data: <Model Number>F.txt [Example: DMC-FX66 : "FX66F.txt"]
		*If the concerned file already exists, "OVERWRITE?" message is displayed.

SDALL→ DSC (ID CHECK)	Write the all data to DSC's Flash-rom from SD-CARD	*The backup data being stored in the SD card is transferred to DSC unit. *ID CHECK: When the model ID is different, data is not transferred.
SDALL→ DSC (FORCE)	Write the all data to DSC's Flash-rom from SD-CARD	*FORCE: Even if the model ID is different, data is transferred. ※If the main PCB is replaced, select "SDALL → DSC (FORCE)".
SDUSER→DSC (FORCE)	Only "User setup information" is written from the saved file in the SD-CARD to DSC's Flash-rom.	*Only the user's "setup" setting condition is transferred to DSC unit. *FORCE: Even if the model ID is different, the data is transferred.
!→LUMIX	Shipping set without initializing "User setup information"	*Initial setting is executed without initializing the user's set up setting condition. ※ The initial setting must be perform while the Self-timer LED is blinking, ※ The picture data stored in the built-in memory of the DSC is not erased, with this operation.

[DSC Integrated Assist Software (Method of Using PC)]

Same as TATSUJIN software for previous models.

9.2.3. Light Box

If using VFK1164TDVLB Light Box, remove the lens connection
ring by loosing three hexagon screws.
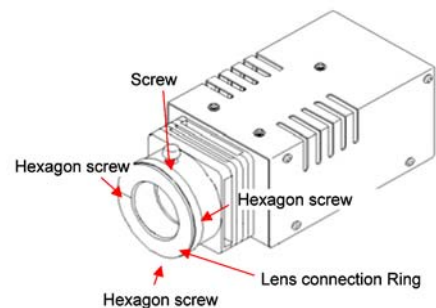
9.3. Details of Electrical Adjustment

9.3.1. How to execute the Electrical Adjustment

It is not necessary to connect the camera to a PC to perform adjustments.
"Flag reset operation" and "Initial setting operation" are required when carrying out the alignment, follow the procedure below.

9.3.1.1. Startup Electrical Adjustment mode

1. Release the initial settings.
2. Insert a recordable SD card.
   (Without a SD card, the automatic adjustment can not executed.)
3. Procedure to set the camera into adjustment mode:
   a. Turn the Power on.
   b. Select with the touch panel in order to [REC] mode and [NORMAL PICTURE] mode.
   c. Turn the Power off.
   d. Touch the screen while the power is turned on.
      LCD monitor displays "SERVICE MODE" (Fig. 3-1), and then start the automaticcaly adjustment software.
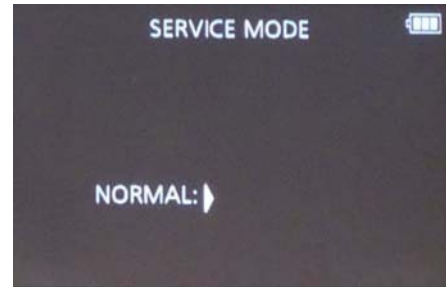
Fig.3-1

9.3.1.2. Status Adjustment Flag Setting

Reset (Not yet adjusted) the status flag condition.

1. Move the [ZOOM LEVER] to "W" side.
2. While display the screen, select the "T" or "W" side of [ZOOM LEVER] to adjustment item (Flagged items), and then press the [SHUTTER BUTTON].
   NOTE:
   The selected item's flag has been changed from "F (green)" to "0 (yellow)".

   *Flag conditions:

   F (green)

   means that the alignment has been completed and the status flag condition is set. In this case, the flag condition should be reset, if you try to carry out the automatic alignment.

   0 (yellow)

   means that the alignment has been not "completed" and the status flag condition is "reset". In this case, automatic alignment is available.
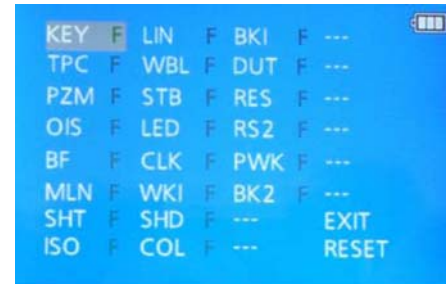
Fig.3-2

• In case of setting the status flag into set condition again without completion of the alignment, the status flag should be SET by using PC, or UNDO by using ROM BACKUP function.

9.3.1.3. Execute Adjustment
(In case of "OIS Adjustment")

1. Perform step "9.3.1.1." to "9.3.1.2.", to reset the OIS flag status "F" (Set) to "0" (Reset)
2. Reselect "EXIT" with [ZOOM LEVER] in the preceding paragraph, and then press the [SHUTTER BUTTON]. (Refer to Fig.3-3)
3. Press the [SHUTTER BUTTON]. The adjustment will start automatically.

Fig.3-3

4. When the adjustment is completed successfully, adjustment report menu appears with Green OK on the LCD monitor. (Refer to Fig.3-4)
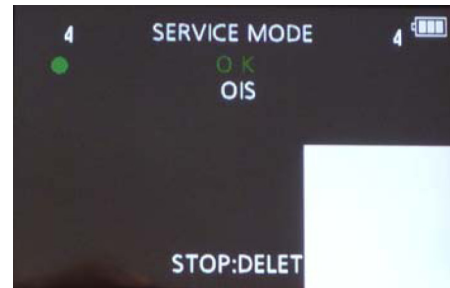
Fig.3-4

9.3.1.4. Attention point during Adjustment

1. Step "9.3.1.3." procedure shows OIS adjustment as an example. To perform the adjustment, refer to the "9.3.2. Adjustment Specifications" table which shows key point for each adjustment.
2. Do not move the light box, the camera or the chart while adjusting. If one of these is moved accidentally, start the adjustment again.
3. Do not press any buttons/keys until the default menu (Fig.3-5) is displayed on the LCD monitor. Otherwise, adjustment data may not be stored properly.
4. If the adjustment is interrupted accidentally, the alignment data may not be properly saved in the Flash-rom.
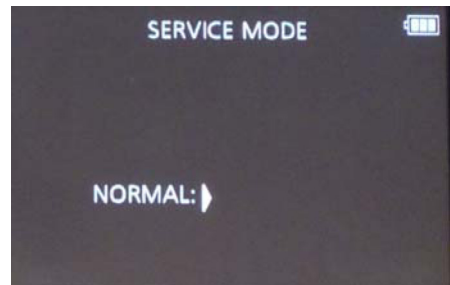
Fig.3-5

9.3.1.5. Finalizing the Adjustment

1. Several adjustment flags can be reset ("F" into "0") at the same time. In this case, when the adjustment has been completed, the screen will change showing the adjustment for the next item until all reset items are completed.
   Also, when the shutter button is pressed, the screen jump to the next adjustment item.
2. To cancel the adjustment mode while in the process of performing the adjustment, follow this procedures.
   (1) Move the [ZOOM LEVER] to "T" side.
   NOTE:
   • If adjustment is cancelled with above procedure, adjustment is not completed. Make sure to adjust it later.
   • Adjustment software "DIAS" is able to control the status of the adjustment flags.

9.3.2. Adjustment Specifications

The following matrix table shows the relation between the replaced part and the Necessary Adjustment.

When a part is replaced, make sure to perform the necessary adjustment(s) in the order indicated.

The table below shows all the information necessary to perform each adjustment.

Adjustment order	Adjustment Item	FLAG	Purpose	MAIN PCB	VENUS (IC6001)	MCP (IC6002)	Lens Parts (except CCD)	CCD Unit	T.PANEL DRIVER	T.PANEL	GYRO (IC7101)	JIG/TOOLS	SET UP	How to Operate
				Replacing Parts										
1	Touch Panel Control	TPC	Touch Panel Inspection	O	O	O	−	−	O	O	−	·TOUCH PEN VGQ0C14 (VGQ4370)	NONE	1)Touches sequentially + mark with the touch pen on the display. 2)If OK is displayed, it is adjustment completion.
2	Venus Zoom	PZM	Venus Zoom Inspection	O	O	O	−	−	−	−	−	NONE	NONE	1)Press Shutter Button 2)After displaying "PZM", press Shutter Button again. 3)After completed, the"OK" message appears.
3	OIS sensor	OIS	OIS sensor output level adjustment	O	O	O	O	O	−	−	−	NONE	NONE	1)Press Shutter Button (Do not apply any shock and vibration for the camera while adjusting) 2)After completed, the"OK" message appears.
4	Backfocus / GYRO	BF	To have the focus tracking curve be appropriate shape and GYRO sensor adjustment	O	O	O	O	O ※1	−	−	O	·COLLIMATOR (VFK1164TCM02 or VFK1164TCM03 or RFKZ0422)	1)Set the camera in front of collimator so that the distance between collimator and camera becomes about 2.5cm as shown in Fig.A. 【NOTE】 Please note that "NG" might happen while auto adjusting. - Do not put the black colored stuff at the back side of collimator near hunching chart to get some certain brightness. - Make sure the hunting chart has no dust and dirty condition. - Not connect the USB cable at this stage.	1)Press Shutter Button (Do not apply any shock and vibration for the camera while adjusting) 2)After completed, the "OK" message appears.
5	Monitor Linearity	MLN	Monitor Linearity adjustment	O	O	O	O	O	−	−	−	·LIGHT BOX RFKZ0523 (VFK1164TDVLB)	1)Set the camera in front of LIGHTBOX so that the distance between collimator and camera becomes about 3.5 cm as shown in Fig.B.	1)Press Shutter Button 2)After completed, the "OK" message appears.
6	Shutter	SHT	Shutter speed adjustment	O	O	O	O	O	−	−	−	·LIGHT BOX RFKZ0523 (VFK1164TDVLB) ·TR CHART (RFKZ0443)	1) Insert the TR chart into the slot of LIGHTBOX. 2) Set the camera in front of LIGHTBOX so that the distance between LIGHTBOX and camera becomes about 16 cm as shown in FigB. 3) Set the camera angle so that the color chart is displayed on the LCD monitor fully. 【NOTE】 - Since the lens position is automatically set into certain position after executing auto adjustment, confirm the angle after stopping the lens zoom position. - It is no problem even though the chart on to the LCD monitor slightly cut at the corner. - It is no problem even though the focusing slightly becomes out of focusing condition. - Not connect the USB cable at this stage.	1)Press Shutter Button 2)After completed, the "OK" message appears.
7	ISO	ISO	ISO sensitivity adjustment	O	O	O	O	O	−	−	−			1)Press Shutter Button 2)After completed, the "OK" message appears.
8	High brightness coloration	LIN	High brightness coloration adjustment	O	O	O	O	O	−	−	−			1)Press Shutter Button 2)After completed, the "OK" message appears.
9	White Balance	WBL	White balance adjustment under various color temperature	O	O	O	O	O	−	−	−			1)Press Shutter Button 2)After completed, the "OK" message appears.
10	CCD Missing Pixels (White)	WKI	Compensation of CCD Missing Pixels (White)	O	O	O	O	O ※1	−	−	−	NONE	NONE	1)Press Shutter Button 2)After completed, the "OK" message appears.
11	Color reproduction inspection and Microphone check	COL	Color reproduction inspection and Microphone check	O	O	O	O	O	−	−	−	NONE	NONE	1)Press Shutter Button 2)After completed, the "OK" message appears.
		BKI	Do not use "BKI" adjustment flag for this unit. Use "BK2" adjustment flag, instead. (In case of most DSC models, the adjustment flag for CCD Missing Pixels is "BKI". But, in this model, "BK2" the adjustment flag for CCD Missing Pixels.)											

Adjustment order	Adjustment Item	FLAG	Purpose	MAIN PCB	VENUS (IC6001)	MCP (IC6002)	Lens Parts (except CCD)	CCD Unit	T.PANEL DRIVER	T.PANEL	GYRO (IC7101)	JIG/TOOLS	SET UP	How to Operate
							Replacing Parts							
12	CCD Missing Pixels (Black)	BK2	Compensation of CCD Missing Pixels (Black)	○	○	○	○	○ ※1	–	–	–	·LIGHT BOX RFKZ0523 (VFK1164TDVLB) ·ND FILTER (VFK1164ND15)	1) Prepair the LIGHTBOX (RFKZ0523). (The LIGHTBOX "VFK1164TDVLB" can be used if the front hood of VFK1164TDVLB is removed.) 2) Set the ND Filter (VFK1164ND15) to the LIGHTBOX. 3) Set the LIGHTBOX and Camera unit so that distance becomes about 3 cm. **NOTE:** Do not use "BKI" adjustment flag for this unit. Use "BK2" adjustment flag, instead.	1)Press Shutter Button. (The lens starts zooming and stops automatically, then green ●mark is displayed on LCD). 2)Aim the LIGHTBOX so that the entire LCD screen becomes fully "white". (No dark area). 3)Press Shutter Button. (The <BKI adjustment 1> is executed, and then green ●mark is displayed on LCD). 4)Press Shutter Button. (The lens starts zooming and stops automatically, then green ●mark is displayed on LCD). 5)Press Shutter Button. (The <BKI adjustment 2> is executed, and then green ●mark is displayed on LCD). 6)Press Shutter Button. (The lens starts zooming and stops automatically, then green ●mark is displayed on LCD). 7)Press Shutter Button. (The <BKI adjustment 3> is executed, and then green ●mark is displayed on LCD). 8)Press Shutter Button. ("OK" mark is displayed on LCD when the adjustment has been completed successfully.).

※1：Execute the adjustment when remove the CCD unit and replace the CCD unit.
※2：The pixel that always lights while shaded is called a white wound.
※3：The pixel that does not light while complete exposed is called a black wound.
*This unit does not have the LCD adjustment of the camera (LCD flicker adjustment etc.).

※**Touch panel adjustment screen**
Touch with the touch pen + mark on the upper side of the left.
To similar, touch with the touch pen + mark sequentially lower side of the left, lower side of the right, upper side of the right and center.
If OK is displayed, it is adjustment completion.

Fig.A — CAMERA / COLLIMATOR — a

Fig.B — CAMERA / LIGHT BOX — b

Fig.C How to Insert the TR chart into LIGHTBOX

【VFK1164TDVLB】   【RFKZ0523】
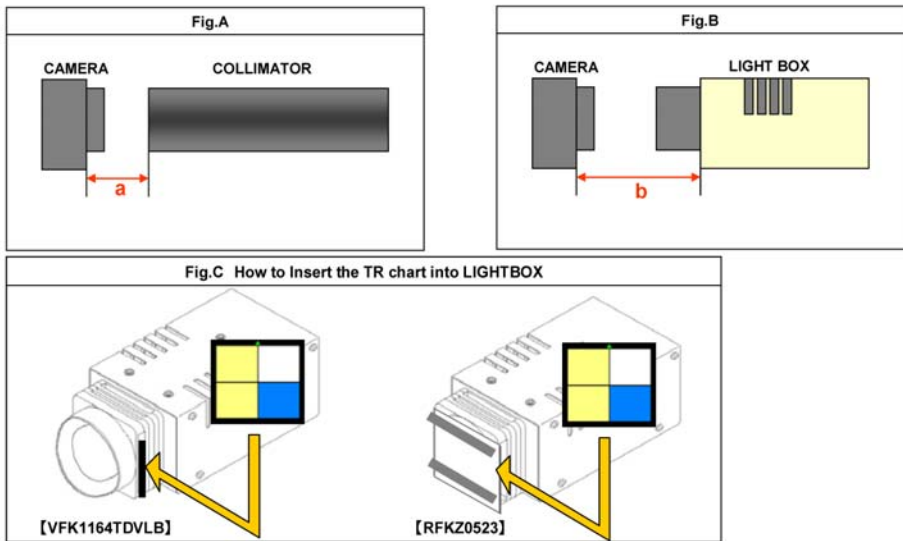
■IMPORTANT NOTICE (After replacing the MAIN P.C.B.)
After replacing the MAIN P.C.B., make sure to perform the
"INITIAL SETTINGS" first, then release the "INITIAL SETTINGS"
in order to proceed the electrical adjustment.
NOTE:
  1). If electrical adjustment or data re-writing is executed before
      "INITIAL SETTINGS", suffix code list is never displayed, and it
      cannot be chosen suitable suffix code.
  2). Never remove the battery during initial setting in process.

9.4.   After Adjustment

9.4.1.   Initial Setting

Since the initial setting has been released to execute the built-in adjustment software, it should be set up again before shipping the camera to the customer.
Refer to the procedure described in "3.4.2. INITIAL SETTINGS" for details.

[IMPORTANT]
  1. The initial setting should be done again after completing the alignment. Otherwise, the camera will not work properly.
     Therefore as a warning, the camera display a warning symbol " ! " on the LCD monitor every time the camera is turned off.
  2. Confirm that status of all adjustment flag show "F". Even if one of the adjustment flag shows "0", initial setting programmed is
     never executed.
  3. Adjustment software "DIAS" is able to control the status of the adjustment flags.
     The Adjustment software "DIAS" is available at "TSN Website", therefore, access to "TSN Website" at "Support Information
     from NWBG/VDBG-AVC".

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 its 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-FX77EB   DMC-FX78P   DMC-FX78GN

DMC-FX77EE   DMC-FX78PU   DMC-FX78GT

DMC-FX77EF   DMC-FX78GC

DMC-FX77EG   DMC-FX78GD

DMC-FX77EP   DMC-FX78GH

DMC-FX77SG   DMC-FX78GK

Vol. 1
Colour

[DMC-FX77]	[DMC-FX78]
(S)...........Silver Type (only EB/EG/EP)	(S)...........Silver Type (only GC/GH/GK/GN)
(K)...........Black Type (except SG)	(K)...........Black Type (except GN)
(N)...........Gold Type (only SG)	(N)...........Gold Type (only P/GK/GT)
(A)...........Blue Type (only EE/EG/SG)	(A)...........Blue Type (only P/GN)
(P)...........Pink Type (only EE/EG/SG)	(P)...........Pink Type (except P/PU)
(W)..........White Type (only SG)	(W)..........White Type (except PU/GD)

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:

Circuit name being connected.

OFTR — FEP

This signal is connected to the FEP schematic diagram.

Name of Signal

Table of contents
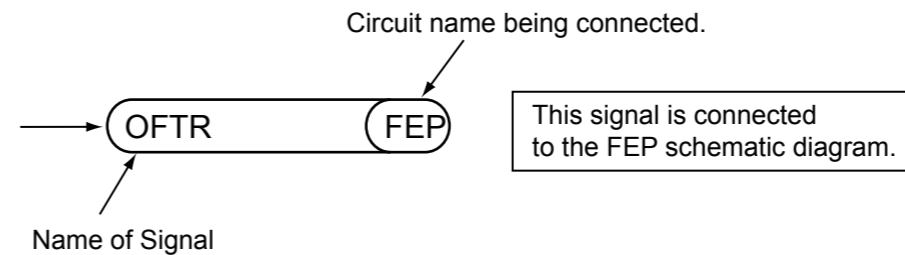
S2. Voltage Chart

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
IC8100	1	0
IC8100	2	0
IC8100	3	0
IC8100	4	0
IC8100	5	3.4
IC8100	6	0
IC8100	7	0
IC8100	8	0
IC8100	9	3.1
IC8100	10	3.8

S3. Block Diagram

S3.1. Overall Block Diagram

(25mm ~ 125mm)

CCD
● 1/2.33" 12 MEGA PIX

IC3001
CCD SIGNAL PROCESSOR
● CDS, AGC, A/D, TG, CCD DRIVER

X6001
(24MHz)

SD CARD

ZOOM | OIS UNIT | IRIS | SHUTTER | FOCUS

IC3002,3003
REGULATOR

IC9101
SYSTEM IC
MOTOR DRIVE, OIS DRIVE& PRE PROCESS

IC9101
SYSTEM IC
● MICROPHONE AMP
● SPEAKER CONTROL
● VIDEO OUT

MICROPHONE

SPEAKER

AV OUT / DIGITAL TERMINAL

IC7101
GYRO SENSOR & AMP

FLASH

IC8100
IGBT DRIVER

IC6001
VENUS FHD
● CAMERA PROCESS
● J-PEG COMP/EX PANDS
● MEDIA I/F
● USB I/F
● MAIN MICROPROCESSOR
● OIS CONTROL
● LENS DRIVE
● LCD DRIVE

IC9602
REGULATOR

IC9601
HDMI DRIVER

HDMI TERMINAL

IC9301
TOUCH PANEL DRIVER

TOUCH PANEL

COLOR LCD PANEL
● 3.5" PANEL 230k dots

IC9101
SYSTEM IC

X9101
(32.72kHz)

IC6002
SDRAM/1Gbit
NAND FLASH ROM/1Gbit

IC1110,1210,1220
REGULATOR

TOP OPERATION UNIT

IC1001
POWER
(POWER SUPPLY)

BATTERY

S-3

DMC-FX77/FX78 OVERALL BLOCK DIAGRAM

S4. Schematic Diagram

S4.1. Interconnection Diagram

DMC-FX77/FX78 INTERCONNECTION DIAGRAM
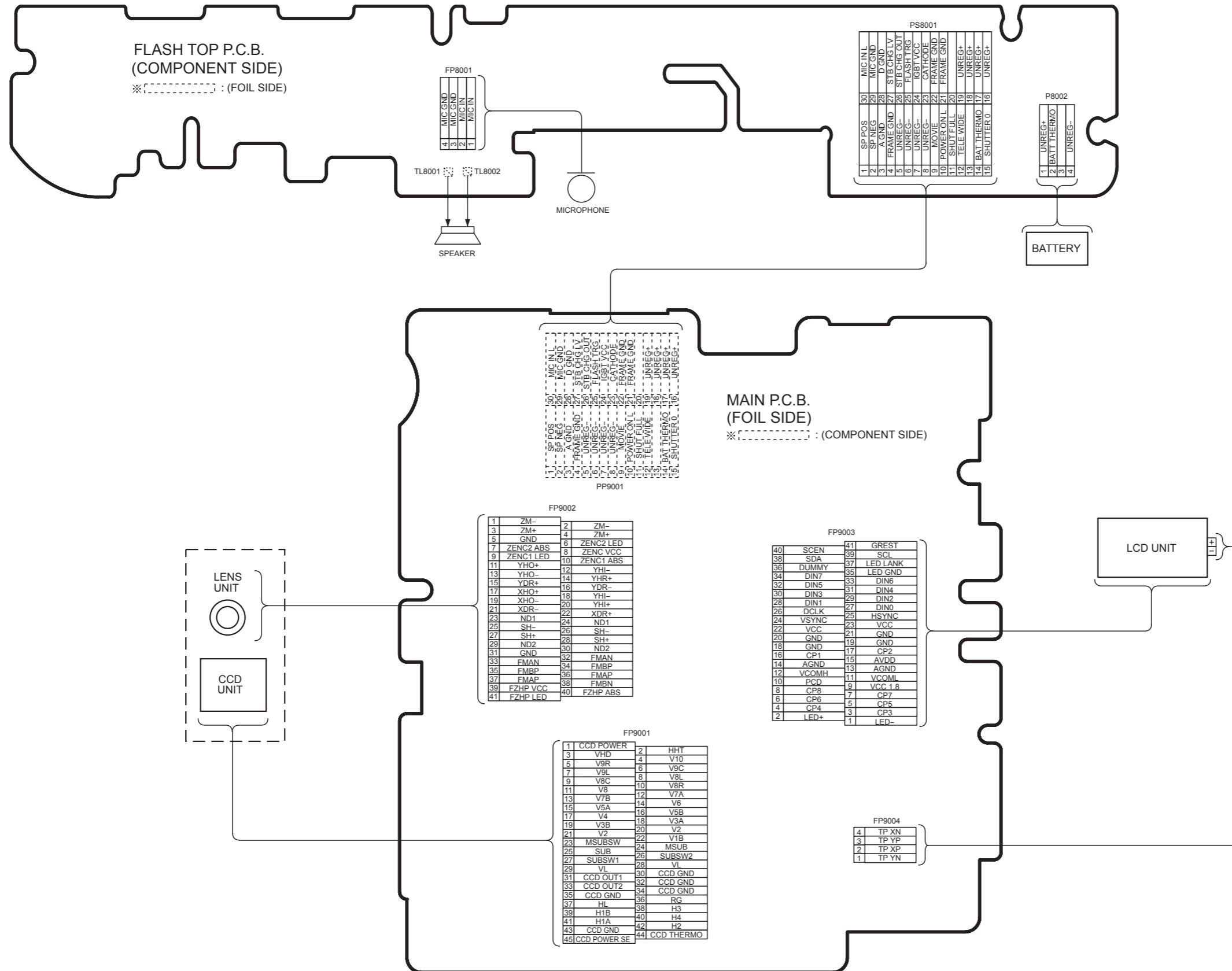
S4.2. Flash Top Schematic Diagram
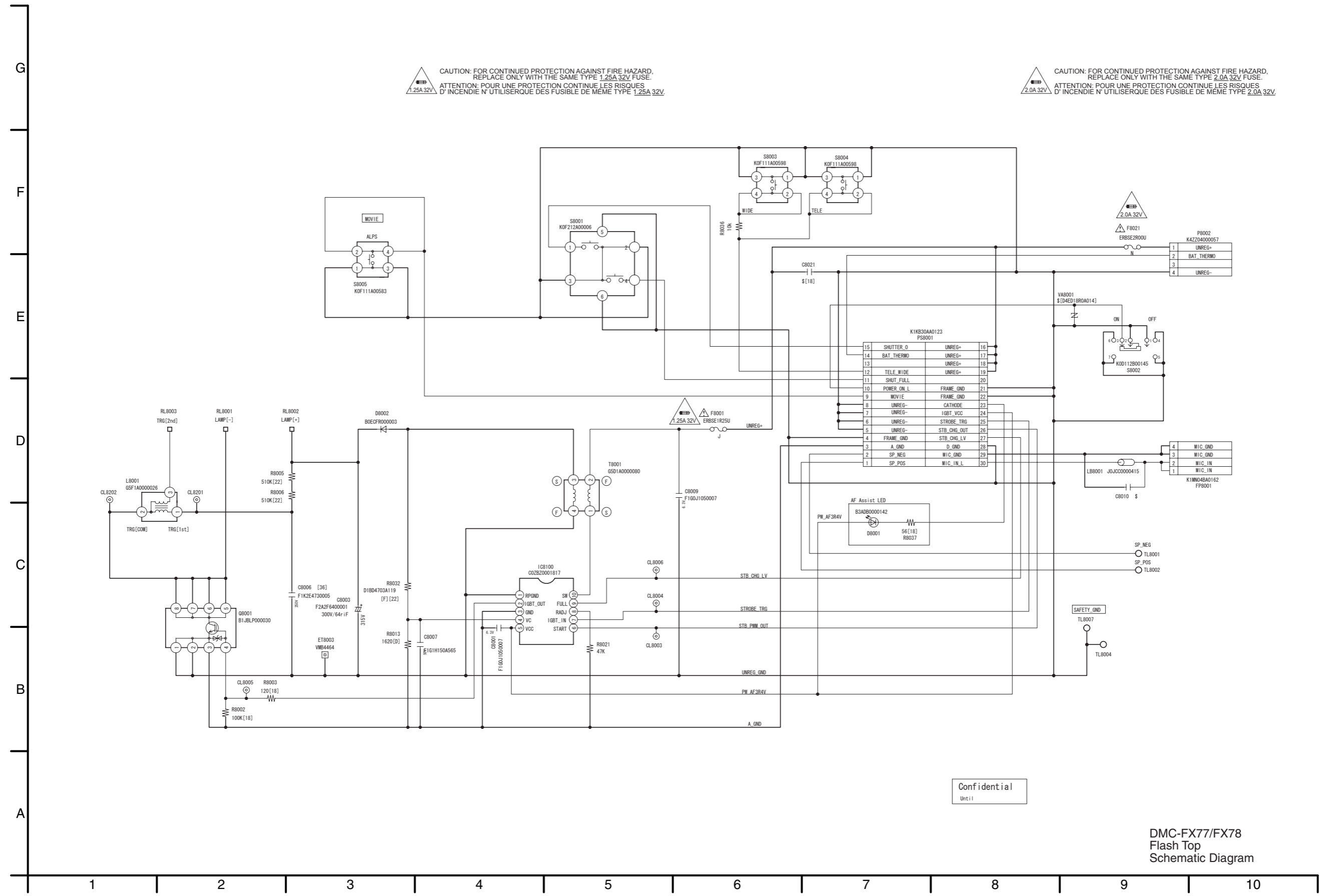
DMC-FX77/FX78
Flash Top
Schematic Diagram

DMC-FX77/FX78
CCD Flex
Schematic Diagram
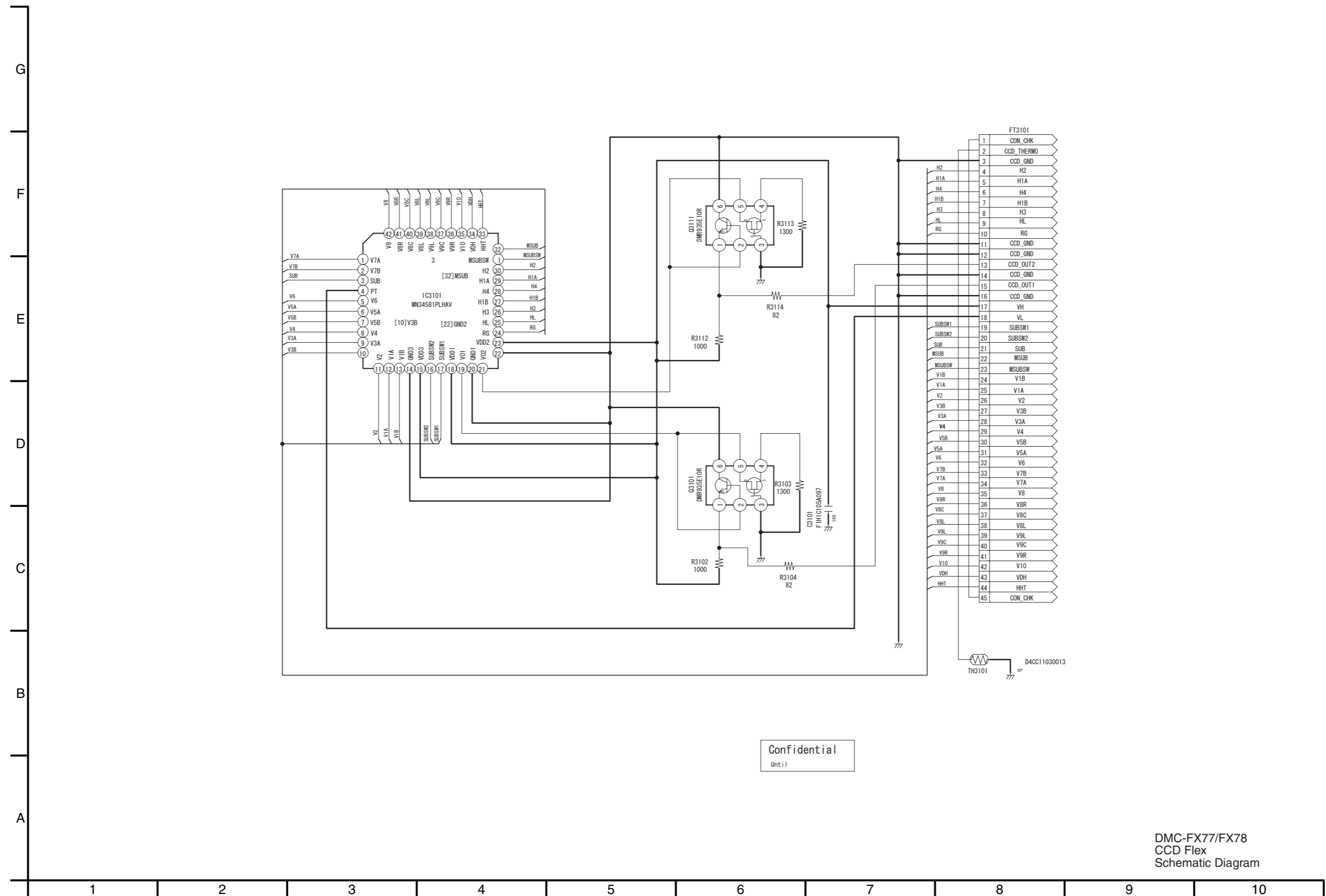
Confidential
Until

S4.4. Lens Flex Schematic Diagram

: POSITIVE VOLTAGE LINE

ZM-	1
ZM-	2
ZM+	3
ZM+	4
GND	5
ZENC2 LED	6
ZENC2 ABS	7
ZENC VCC	8
ZENC1 LED	9
ZENC1 ABS	10
YHO+	11
YHI-	12
YHO-	13
YHI+	14
YDR+	15
YDR-	16
XHO+	17
XHI-	18
XHO-	19
XHI+	20
XDR-	21
XDR+	22
ND1	23
ND1	24
SH-	25
SH-	26
SH+	27
SH+	28
ND2	29
ND2	30
GND	31
FMAN	32
FMAN	33
FMBP	34
FMBP	35
FMAP	36
FMAP	37
FMBN	38
FZHP VCC	39
FZHP ABS	40
FZHP LED	41

TO MAIN
(MAIN CN) CIRCUIT
(FP9002)

A1
A2

B1
B2
B3/C1
C2
C3

DC MOTOR -- (A) ZOOM MOTOR UNIT

PHOTO SENSOR -- (B) ZOOM ENCODER 2

PHOTO SENSOR -- (C) ZOOM ENCODER 1

D1
D2
D3
D4
D5
D6
D7
D8
D9
D10
D11
D12

HALL SENSOR (Y)

DRIVE COIL (Y)

HALL SENSOR (X)

DRIVE COIL (X)

-- (D) OIS UNIT

E1
E2
E3
E4

DC SOLENOID (SHUTTER)

DC SOLENOID (IRIS)

-- (E) SHUTTER UNIT

F1
F3
F2
F4

COIL
COIL

STEPPING MOTOR -- (F) FOCUS MOTOR UNIT

G1
G2
G3

PHOTO SENSOR -- (G) FOCUS PHOTO UNIT

DMC-FX77/FX78 LENS FLEX SCHEMATIC DIAGRAM

| 1 | 2 | 3 | 4 | 5 | 6 |

S5. Print Circuit Board

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

(Component Side)

(Foil Side)

VJB5B145
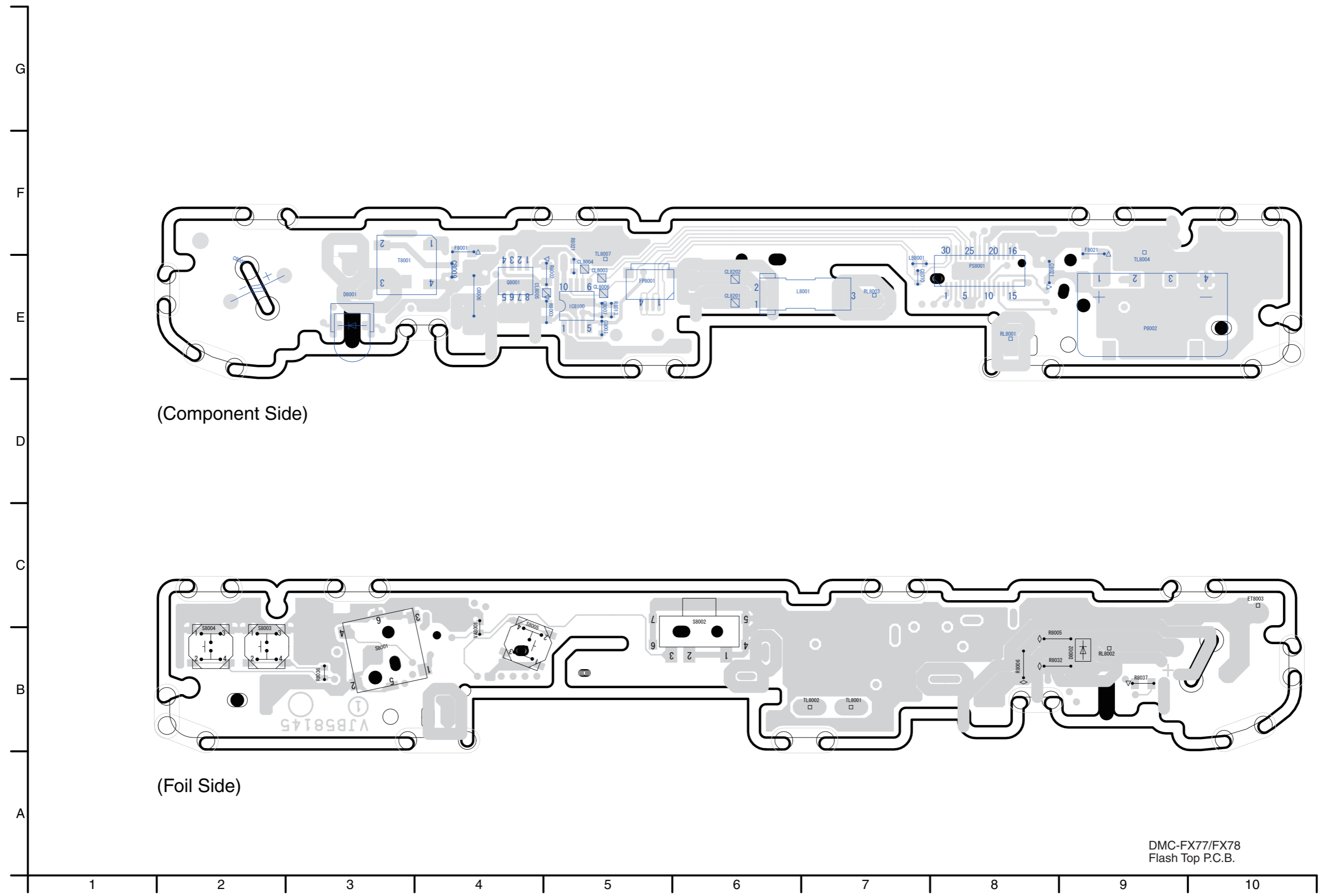
DMC-FX77/FX78
Flash Top P.C.B.

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

(Component Side)

(Foil Side)
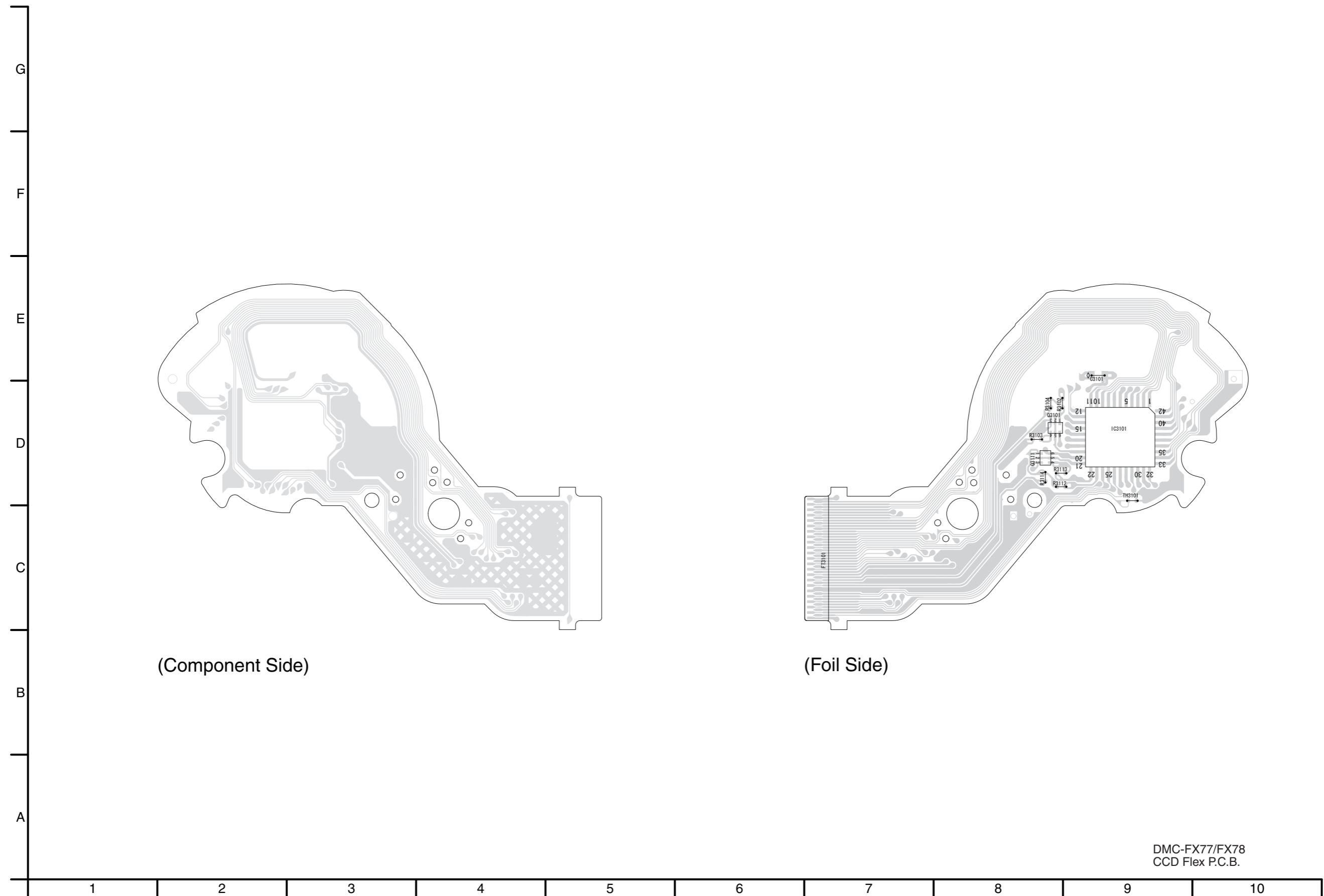
DMC-FX77/FX78
CCD Flex P.C.B.

S5.3. Lens Flex P.C.B.

A1
A2 Ⓐ ZOOM MOTOR UNIT

B1
B2
B3/C1 Ⓑ ZOOM ENCODER 2
C2
C3 Ⓒ ZOOM ENCODER 1

Pin 1

Pin 41

D1
Ⓓ OIS UNIT
D12

E1
E4 Ⓔ SHUTTER UNIT

F1
F2
F3 Ⓕ FOCUS MOTOR UNIT
F4

G2
G1 Ⓖ FOCUS PHOTO UNIT
G3

DMC-FX77/FX78 LENS FLEX P.C.B.
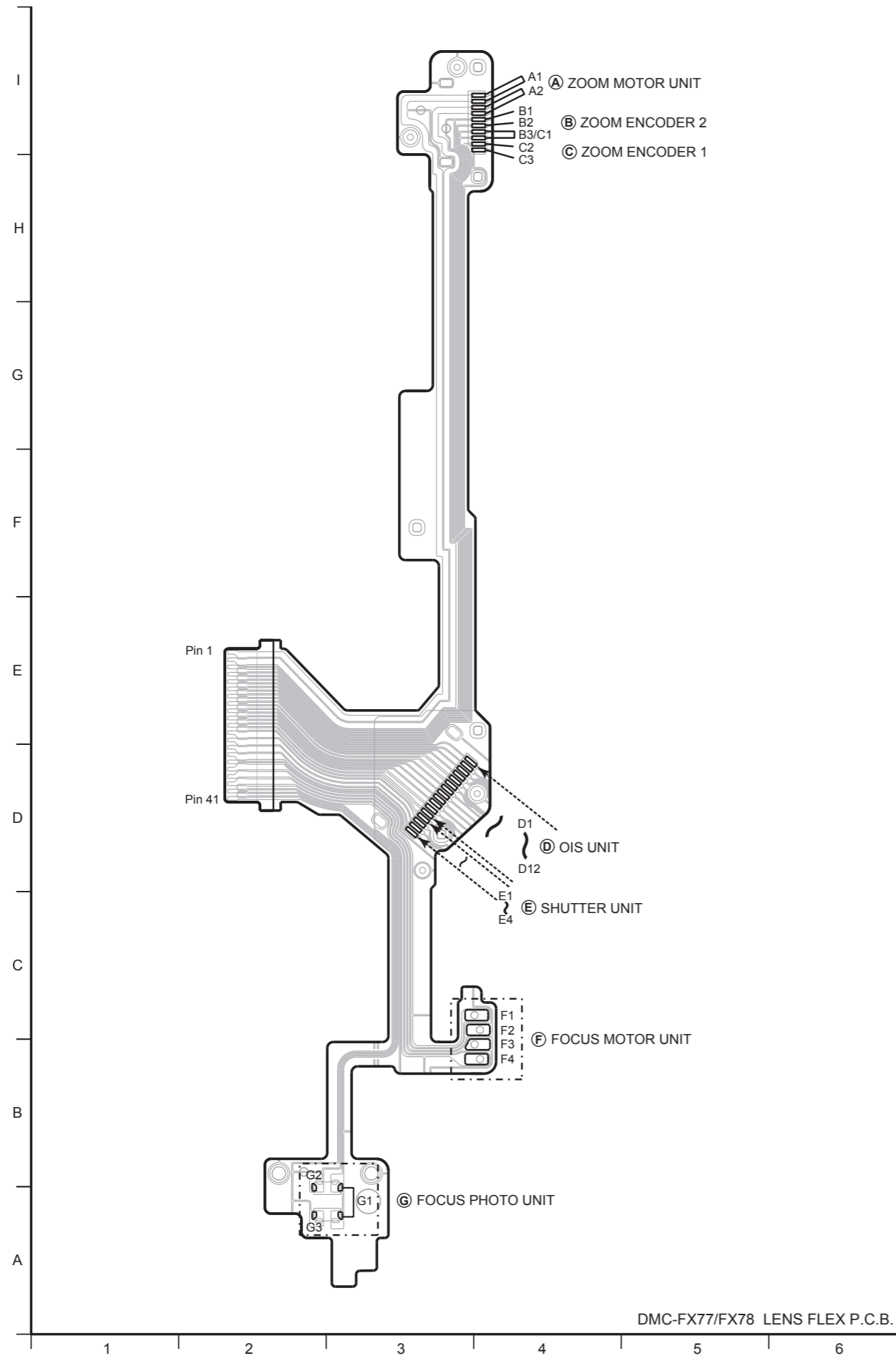
S6. Replacement Parts List

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.
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 [ENERGY] in the remarks column are supplied from Panasonic
       Corporation Energy Company.**
   **2. Parts marked with [PAVCSG] in the remarks column are supplied from PAVCSG.
       Others are supplied from AVC-CSC-SPC.**

DMC-FX77EG-S

Ref.No.	Part No.	Part Name & Description	Pcs	Remarks	Ref.No.	Part No.	Part Name & Description	Pcs	Remarks
##	VEP56123B	MAIN P.C.B.	1	(RTL) E.S.D. EG,EP,EF,EB					
##	VEP56123A	MAIN P.C.B.	1	(RTL) E.S.D. EE,SG,P,PU,					
				GC,GH,GT,GK,GN,GD					
##	VEP58145A	FLASH TOP P.C.B.	1	(RTL) (PAVCSG) E.S.D.					
##	VEK0R66	CCD UNIT	1	(RTL) E.S.D.					
##	VEP58145A	FLASH TOP P.C.B.		(RTL) (PAVCSG) E.S.D.					
C8001	F1G0J1050007	C.CAPACITOR CH 6.3V 1U	1	(PAVCSG)					
C8006	F1K2E4730005	C.CAPACITOR 250V 0.047U	1	(PAVCSG)					
C8007	F1G1H150A565	C.CAPACITOR CH 50V 15P	1	(PAVCSG)					
C8009	F1G0J1050007	C.CAPACITOR CH 6.3V 1U	1	(PAVCSG)					
D8001	B3ADB0000142	DIODE	1	(PAVCSG) E.S.D.					
D8002	B0ECFR000003	DIODE	1	(PAVCSG) E.S.D.					
⚠ F8001	ERBSE1R25U	FUSE 32V 1.25A	1	(PAVCSG)					
⚠ F8021	ERBSE2R00U	FUSE 32V 2.0A	1	(PAVCSG)					
FP8001	K1MN04BA0162	CONNECTOR 4P	1	(PAVCSG)					
IC8100	C0ZBZ0001817	IC	1	(PAVCSG) E.S.D.					
L8001	G5F1A0000026	CHIP INDUCTOR	1	(PAVCSG)					
LB8001	J0JCC0000415	FILTER	1	(PAVCSG)					
P8002	K4ZZ04000057	CONNECTOR 4P	1	(PAVCSG)					
PS8001	K1KB30AA0123	CONNECTOR 30P	1	(PAVCSG)					
Q8001	B1JBLP000030	TRANSISTOR	1	(PAVCSG) E.S.D.					
R8002	ERJ3GEYJ104V	M.RESISTOR CH 1/10W 100K	1	(PAVCSG)					
R8003	ERJ3GEYJ121V	M.RESISTOR CH 1/10W 120	1	(PAVCSG)					
R8005	ERJ6GEYJ514V	M.RESISTOR CH 1/8W 510K	1	(PAVCSG)					
R8006	ERJ6GEYJ514V	M.RESISTOR CH 1/8W 510K	1	(PAVCSG)					
R8013	ERJ2RHD1621X	M.RESISTOR CH 1/16W 1620	1	(PAVCSG)					
R8021	ERJ2GEJ473X	M.RESISTOR CH 1/16W 47K	1	(PAVCSG)					
R8032	D1BD4703A119	RESISTOR	1	(PAVCSG)					
R8036	ERJ2GEJ103X	M.RESISTOR CH 1/10W 10K	1	(PAVCSG)					
R8037	ERJ3GEYJ560V	M.RESISTOR CH 1/10W 56	1	(PAVCSG)					
S8001	K0F212A00006	SWITCH	1	(PAVCSG)					
S8002	K0D112B00145	SWITCH	1	(PAVCSG)					
S8003	K0F111A00598	SWITCH	1	(PAVCSG)					
S8004	K0F111A00598	SWITCH	1	(PAVCSG)					
S8005	K0F111A00583	SWITCH	1	(PAVCSG)					
T8001	G5D1A0000080	TRANSFORMER	1	(PAVCSG)					
##	VEK0R66	CCD UNIT		(RTL) E.S.D.					
C3101	F1H1C105A097	C.CAPACITOR CH 16V 1U	1						
Q3101	DMR935E10R	TRANSISTOR	1	E.S.D.					
Q3111	DMR935E10R	TRANSISTOR	1	E.S.D.					
R3102	ERJ2GEJ102X	M.RESISTOR CH 1/16W 1K	1						
R3103	ERJ2GEJ132	M.RESISTOR CH 1/10W 1.3K	1						
R3104	ERJ2GEJ820	M.RESISTOR CH 1/16W 82	1						
R3112	ERJ2GEJ102X	M.RESISTOR CH 1/16W 1K	1						
R3113	ERJ2GEJ132	M.RESISTOR CH 1/10W 1.3K	1						
R3114	ERJ2GEJ820	M.RESISTOR CH 1/16W 82	1						
TH3101	D4CC11030013	NTC THERMISTORS	1						

DMC-FX77EG-S

Ref.No.	Part No.	Part Name & Description	Pcs	Remarks	Ref.No.	Part No.	Part Name & Description	Pcs	Remarks
1	VEP56123B	MAIN P.C.B.	1	(RTL) E.S.D. EG,EP,EF,EB	100	VXW1236	LENS UNIT (W/O CCD)	1	
1	VEP56123A	MAIN P.C.B.	1	(RTL) E.S.D. EE,SG,P,PU,	102	VEK0R66	CCD UNIT	1	(RTL) E.S.D.
				GC,GH,GT,GK,GN,GD	103	L6DAYYYD0002	ZOOM MOTOR	1	
⚠ 2	ML-421S/ZTK	BATTERY	1	[ENERGY] (B9101)	104	VEK0R47	LENS FPC P.C.B. UNIT	1	
3	VYK5B99	REAR CASE UNIT	1	EG-S,EP-S,EB-S	104-1	B3NBA0000018	PHOTO SENSOR	1	
3	VYK5C00	REAR CASE UNIT	1	EG-K,EP-K,EF-K,EB-K,EE-K	105	VXP3544	1ST LENS FRAME UNIT	1	
3	VYK5C03	REAR CASE UNIT	1	EG-A,EE-A,SG-A	108	VXQ2053	MASTER FLANGE UNIT	1	
3	VYK5C01	REAR CASE UNIT	1	EG-P,EE-P,SG-P	108-1	L6HAYYYD0011	FOCUS MOTOR	1	
3	VYK5C02	REAR CASE UNIT	1	SG-N	108-2	VMB4308	FOCUS SPRING	1	
3	VYK5C04	REAR CASE UNIT	1	SG-W	108-3	VXP3553	3RD LENS FRAME UNIT	1	
3	VYK5C52	REAR CASE UNIT	1	P-K,PU-K,GC-K,GH-K,GT-K,	109	VXP3546	1ST DIRECT FRAME UNIT	1	
				GK-K,GD-K	110	VDW2219	CAM FRAME UNIT	1	
3	VYK5C55	REAR CASE UNIT	1	P-A,GN-A	111	VDW2218	2ND DIRECT FRAME	1	
3	VYK5C54	REAR CASE UNIT	1	P-N,GT-N,GK-N	112	VXP3548	2ND LENS FRAME UNIT	1	
3	VYK5C56	REAR CASE UNIT	1	P-W,GC-W,GH-W,GT-W,GK-W,	113	VXQ2052	FIX FRAME UNIT	1	
				GN-W					
3	VYK5C51	REAR CASE UNIT	1	GC-S,GH-S,GK-S,GN-S	B1	VHD2239	SCREW	1	
3	VYK5C53	REAR CASE UNIT	1	GC-P,GH-P,GT-P,GK-P,GN-P,	B2	VHD2239	SCREW	1	
				GD-P	B3	VHD2239	SCREW	1	(-S,-N,-P,-W)
4	VGU0H52	BATTERY LOCK KNOB	1		B3	VHD2240	SCREW	1	(-K,-A)
5	VKF4810	JACK DOOR	1		B4	VHD2239	SCREW	1	(-S,-N,-P,-W)
6	VMB3962	BATTERY LOCK SPRING	1		B4	VHD2240	SCREW	1	(-K,-A)
7	VMB4395	BATTERY OUT SPRING	1		B5	VHD1678	SCREW	1	
8	VMP9909	FRAME	1		B6	VHD2305	SCREW	1	(-S,-N,-P,-W)
9	VMP9910	BATTERY CASE	1		B6	VHD2306	SCREW	1	(-K,-A)
10	VMP9913	SIDE ORNAMENT	1		B7	VHD2305	SCREW	1	(-S,-N,-P,-W)
11	VYK4U97	LCD UNIT	1		B7	VHD2306	SCREW	1	(-K,-A)
11-1	VYK4Y67	TOUCH PANEL UNIT	1		B8	VHD2315	SCREW	1	
13	VGQ0S60	TRIPOD	1		B9	VHD2315	SCREW	1	
14	VYK4U58	FRONT CASE UNIT	1	EG-S,EP-S,EB-S,GC-S,GH-S,	B10	VHD2315	SCREW	1	
				GK-S,GN-S	B50	VHD2314	SCREW	1	(PAVCSG)
14	VYK4U60	FRONT CASE UNIT	1	EG-P,EE-P,SG-P,GC-P,GH-P,	B51	VHD2314	SCREW	1	(PAVCSG)
				GT-P,GK-P,GN-P,GD-P	B101	VHD1871	SCREW	1	
14	VYK4U61	FRONT CASE UNIT	1	SG-N,GT-N,GK-N	B102	VHD1871	SCREW	1	
14	VYK4U63	FRONT CASE UNIT	1	SG-W,GC-W,GH-W,GT-W,GK-W,	B103	VHD1871	SCREW	1	
				GN-W	B105	VHD2011	SCREW	1	
14	VYK4U88	FRONT CASE UNIT	1	P-N	B106	VHD2296	SCREW	1	
14	VYK4U90	FRONT CASE UNIT	1	P-W	B107	VHD2296	SCREW	1	
14	VYK4U59	FRONT CASE UNIT	1	EG-K,EP-K,EF-K,EB-K,EE-K,	B108	VHD2296	SCREW	1	
				PU-K,GC-K,GH-K,GT-K,	B109	VHD2296	SCREW	1	
				GK-K,GD-K	B110	VHD2296	SCREW	1	
14	VYK4U62	FRONT CASE UNIT	1	EG-A,EE-A,SG-A,GN-A	B111	VHD2296	SCREW	1	
14	VYK4U86	FRONT CASE UNIT	1	P-K	B112	VHD2296	SCREW	1	
14	VYK4U89	FRONT CASE UNIT	1	P-A	B113	VHD2296	SCREW	1	
15	VYK4Y69	FRAME PLATE UNIT	1						
⚠ 50	F2A2F6400001	E.CAPACITOR	1	(PAVCSG) (C8003)					
51	L0AA01A00048	SPEAKER	1	(PAVCSG)					
52	VEK0R40	FLASH UNIT	1	(PAVCSG)					
53	VEP58145A	FLASH TOP P.C.B.	1	(RTL) (PAVCSG) E.S.D.					
54	VGL1367	AF PANEL LIGHT	1	(PAVCSG)					
55	VMB4464	EARTH SPRING	1	(PAVCSG) (ET8003)					
56	VMT2159	ZOOM CUSHION	1	(PAVCSG)					
57	VMX3879	SPEAKER SHEET	1	(PAVCSG)					
58	VYK4S89	TOP CASE ASSY	1	(PAVCSG)					
58-1	VGQ0S38	POWER KNOB BASE	1	(PAVCSG)					
58-2	VGU0H80	POWER KNOB	1	(PAVCSG)					
58-3	VGU0H83	REC BUTTON	1	(PAVCSG)					
59	WM-G10DT651	MIC UNIT	1	(PAVCSG)					
80	VYK4Q36	BATTERY DOOR UNIT	1	(S) (PAVCSG)					
80	VYK4Q37	BATTERY DOOR UNIT	1	(K) (PAVCSG)					
80	VYK4Q39	BATTERY DOOR UNIT	1	(N) (PAVCSG)					
80	VYK4Q40	BATTERY DOOR UNIT	1	(A) (PAVCSG)					
80	VYK4Q38	BATTERY DOOR UNIT	1	(P) (PAVCSG)					
80	VYK4Q41	BATTERY DOOR UNIT	1	(W) (PAVCSG)					
80-1	VMB4143	BATTERY DOOR SPRING	1	(PAVCSG)					
80-2	VMS7863	BATTERY DOOR SHAFT	1	(PAVCSG)					

DMC-FX77EG-S

Ref.No.	Part No.	Part Name & Description	Pcs	Remarks	Ref.No.	Part No.	Part Name & Description	Pcs	Remarks
200	VPF1317	CAMERA BAG	1	P					
⚠ 201	DE-A91BA	BATTERY CHARGER	1	P					
202	VPK4882	PACKING CASE	1	P-N					
202	VPK4904	PACKING CASE	1	P-W					
202	VPK4900	PACKING CASE	1	P-A					
202	VPK4890	PACKING CASE	1	P-K					
⚠ 204	-----	BATTERY	1	P					
205	K1HY08YY0019	USB CABLE W/PLUG	1	P					
206	K1HY08YY0020	AV CABLE W/PLUG	1	P					
207	VFC4297	HAND STRAP	1	P					
⚠ 208	VFF0759-S	CD-ROM	1	P					
		(SOFT/INSTRUCTION BOOK)		See "Notes"					
209	VGQ0C14	TOUCH PEN	1	P					
210	VPN7184	CUSHION	1	P					
212	VPF1230	BAG, POLYETHYLENE	1	P					
⚠ 213	VQT3G16	BASIC O/I	1	P					
		(ENGLISH/SPANISH)							
214	VQC8089	O/I SOFTWARE	1	P					
		(ENGLISH/CANADIAN FRENCH)							

DMC-FX77EG-S

Ref.No.	Part No.	Part Name & Description	Pcs	Remarks
300	VPF1317	CAMERA BAG	1	EXCEPT P
302	VPK4883	PACKING CASE	1	SG-N
302	VPK4905	PACKING CASE	1	SG-W
302	VPK4896	PACKING CASE	1	EG-P,EE-P,SG-P
302	VPK4897	PACKING CASE	1	GC-P,GH-P,GT-P,GN-P,GD-P
302	VPK4906	PACKING CASE	1	GC-W,GH-W,GT-W,GN-W
302	VPK4884	PACKING CASE	1	GT-N
302	VPK4887	PACKING CASE	1	EG-S,EP-S,EB-S
302	VPK4888	PACKING CASE	1	GC-S,GH-S,GN-S
302	VPK4901	PACKING CASE	1	EG-A,EE-A,SG-A
302	VPK4902	PACKING CASE	1	GN-A
302	VPK4891	PACKING CASE	1	EG-K,EP-K,EF-K,EB-K,EE-K
302	VPK4885	PACKING CASE	1	GK-N
302	VPK4898	PACKING CASE	1	GK-P
302	VPK4907	PACKING CASE	1	GK-W
302	VPK4892	PACKING CASE	1	PU-K,GC-K,GH-K,GT-K,GD-K
302	VPK4889	PACKING CASE	1	GK-S
302	VPK4893	PACKING CASE	1	GK-K
⚠ 303	DE-A92AA	BATTERY CHARGER	1	EG,EP,EF,EB,EE,GN
⚠ 303	DE-A92EA	BATTERY CHARGER	1	SG
⚠ 303	DE-A91BA	BATTERY CHARGER	1	PU
⚠ 303	DE-A92BA	BATTERY CHARGER	1	GC,GH,GK,GD
⚠ 303	DE-A92CA	BATTERY CHARGER	1	GT
⚠ 304	-----	BATTERY	1	EG,EP,EF,EB,EE,SG,PU,GC,GH,GT,GN,GD
⚠ 304	-----	BATTERY	1	GK
305	K1HY08YY0019	USB CABLE W/PLUG	1	EXCEPT P
306	K1HY08YY0020	AV CABLE W/PLUG	1	EXCEPT P
307	VFC4297	HAND STRAP	1	EXCEPT P
⚠ 308	VFF0760-S	CD-ROM (SOFT/INSTRUCTION BOOK)	1	EG / See "Notes"
⚠ 308	VFF0761-S	CD-ROM (SOFT/INSTRUCTION BOOK)	1	EE / See "Notes"
⚠ 308	VFF0762-S	CD-ROM (SOFT/INSTRUCTION BOOK)	1	GC,GH,GN,SG / See "Notes"
⚠ 308	VFF0763-S	CD-ROM (SOFT/INSTRUCTION BOOK)	1	GT,GD / See "Notes"
⚠ 308	VFF0764-S	CD-ROM (SOFT/INSTRUCTION BOOK)	1	GK / See "Notes"
⚠ 308	VFF0802-S	CD-ROM (SOFT/INSTRUCTION BOOK)	1	EP,EF,EB / See "Notes"
⚠ 308	VFF0759-S	CD-ROM (SOFT/INSTRUCTION BOOK)	1	PU / See "Notes"
309	VGQ0C14	TOUCH PEN	1	EXCEPT P
310	VPN7184	CUSHION	1	EXCEPT P
312	VPF1230	BAG, POLYETHYLENE	1	EXCEPT P
⚠ 313	VQT3G28	BASIC O/I (ENGLISH/ CHINESE(TRADITIONAL))	1	SG,GC,GH
⚠ 313	VQT3G26	BASIC O/I (ENGLISH)	1	EB
⚠ 313	VQT3G29	BASIC O/I (ARABIC/PERSIAN)	1	GC
⚠ 313	VQT3G18	BASIC O/I (GERMAN/FRENCH)	1	EG
⚠ 313	VQT3G22	BASIC O/I (SWEDISH/DANISH)	1	EP
⚠ 313	VQT3M13	BASIC O/I (VIETNAMESE)	1	GC
⚠ 313	VQT3G32	BASIC O/I (ENGLISH)	1	GN
⚠ 313	VQT3G33	BASIC O/I (KOREAN)	1	GD
⚠ 313	VQT3G19	BASIC O/I (ITALIAN/DUTCH)	1	EG
⚠ 313	VQT3G23	BASIC O/I (POLISH/CZECH)	1	EP
⚠ 313	VQT3G17	BASIC O/I (SPANISH/PORTUGUESE)	1	PU
⚠ 313	VQT3G30	BASIC O/I (CHINESE(TRADITIONAL))	1	GT
⚠ 313	VQT3G31	BASIC O/I (CHINESE(SIMPLIFIED))	1	GK
⚠ 313	VQT3G20	BASIC O/I (SPANISH/PORTUGUESE)	1	EG
⚠ 313	VQT3G24	BASIC O/I (HUNGARIAN/FINNISH)	1	EP
⚠ 313	VQT3G25	BASIC O/I (FRENCH)	1	EF
⚠ 313	VQT3G27	BASIC O/I (RUSSIAN/UKRAINIAN)	1	EE
⚠ 313	VQT3G21	BASIC O/I (TURKISH)	1	EG
314	VQC8096	O/I SOFTWARE (ENGLISH/ CHINESE(TRADITIONAL)/ ARABIC/PERSIAN)	1	SG,GC,GH
314	VQC8094	O/I SOFTWARE (ENGLISH)	1	EB,GN
314	VQC8091	O/I SOFTWARE (GERMAN/FRENCH/ITALIAN/ DUTCH/SPANISH/ PORTUGUESE/TURKISH)	1	EG
314	VQC8092	O/I SOFTWARE (FINNISH/SWEDISH/DANISH/ POLISH/CZECH/HUNGARIAN)	1	EP
314	VQC8097	O/I SOFTWARE (CHINESE(TRADITIONAL))	1	GT
314	VQC8099	O/I SOFTWARE (KOREAN)	1	GD
314	VQC8090	O/I SOFTWARE (SPANISH/PORTUGUESE)	1	PU
314	VQC8098	O/I SOFTWARE (CHINESE(SIMPLIFIED))	1	GK
314	VQC8093	O/I SOFTWARE (FRENCH)	1	EF
314	VQC8095	O/I SOFTWARE (RUSSIAN/UKRAINIAN)	1	EE
315	VQL2C68-1	OPERATING LABEL	1	GT
⚠ 316	K2CT39A00002	AC CORD W/PLUG	1	EB,GC,GH
⚠ 317	K2CQ29A00002	AC CORD W/PLUG	1	EG,EP,EF,EE,GC
⚠ 317	K2CR29A00001	AC CORD W/PLUG	1	GD
⚠ 318	K2CJ29A00002	AC CORD W/PLUG	1	GN
⚠ 319	K2CA29A00023	AC CORD W/PLUG	1	SG
⚠ 319	K2CA29A00021	AC CORD W/PLUG	1	GT
⚠ 319	K2CA2YY00070	AC CORD W/PLUG	1	GK

S7. Exploded View

S7.1. Frame and Casing Section

213

214

208

212

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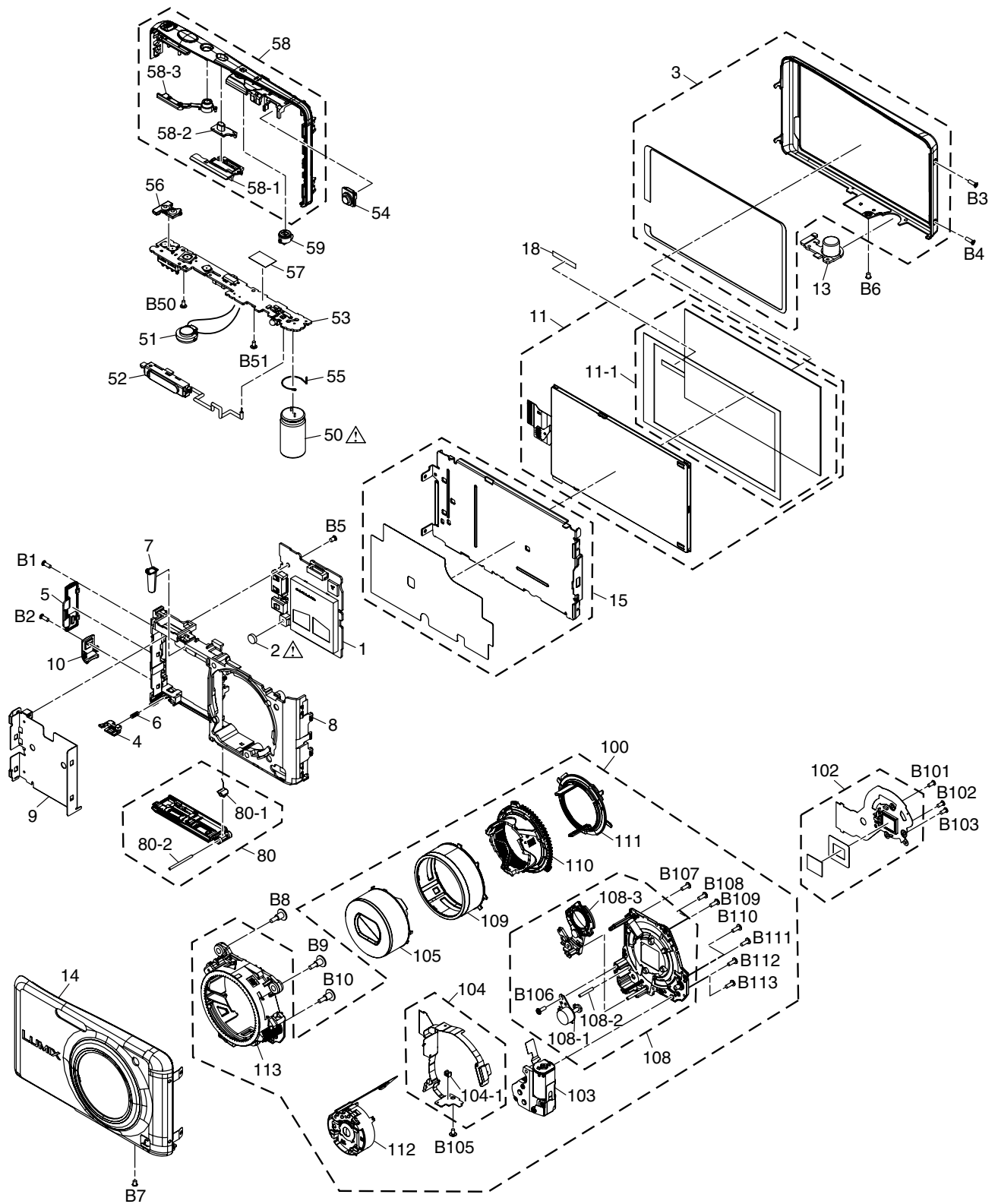
S7.3. Packing Parts and Accessories Section (2)

307

306

⚠313

⚠308

314

315
(GT only)

312

305

(DMC-FX77EE/EF/EG/EP)
(DMC-FX78GC/GD)

317 ⚠

(DMC-FX77EB)
(DMC-FX78GC/GH)

⚠316

(DMC-FX77SG)
(DMC-FX78GK/GT)

⚠319

(DMC-FX78GN)

⚠318

300

⚠303

310

309

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302