Canon Digital Imaging Product

SERVICE MANUAL

PowerShot S400
DIGITAL IXUS 400

Digital Camera

English Edition

Photo Products Service Administration Division
First Edition 2003

Application

This manual has been issued by Canon Inc. for qualified persons to learn technical theory, and repair of the products.

Corrections

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Tokyo 146-8501, Japan

SAFETY PRECAUTIONS

The following precautions should be observed when servicing.

1. Since many parts in the unit have special safety-related characteristics, always use genuine CANON replacement parts. Especially critical parts in the power circuit block should not be replaced with other makes. Critical parts are marked with ⚠ in the schematic diagrams.
2. 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.
3. After servicing, see to it that all the protective devices such as insulation barriers, insulation papers shields are properly installed.
4. After servicing, make the following leakage current checks to prevent the customer from being exposed to shock hazards.

4-1 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 1MΩ and 5.2MΩ. When the exposed metal does not have a return path to the chassis, the reading must be ∞.

4-2 Leakage Current Hot Check

1) Plug the AC cord directly into the AC outlet. Do not use an isolation transformer for this check.
2) Connect a 1.5KΩ 10 watt resistor, paralleled by 0.15μF capacitor, between each exposed metallic parts on the unit and a good earth ground such as a water pipe, as shown in the figure below.
3) Use an AC voltmeter, with 1000Ω/volt or more sensitivity, to measure the potential across the resistor.
4) Check all exposed metallic parts of the cover (Cable connection, Handle bracket, metallic cabinet. Screwheads, Metallic overlays, etc), 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 0.75V RMS.
   A leakage current tester (FLUKE MODEL : 8000A equivalent) may be used to make the hot checks.
   Leakage current must not exceed 0.5 milliamp.
   In case a measurement is outside of the limits specified, there is a possibility of a shock hazard, and corrective action must be taken before returning the instrument to the customer.

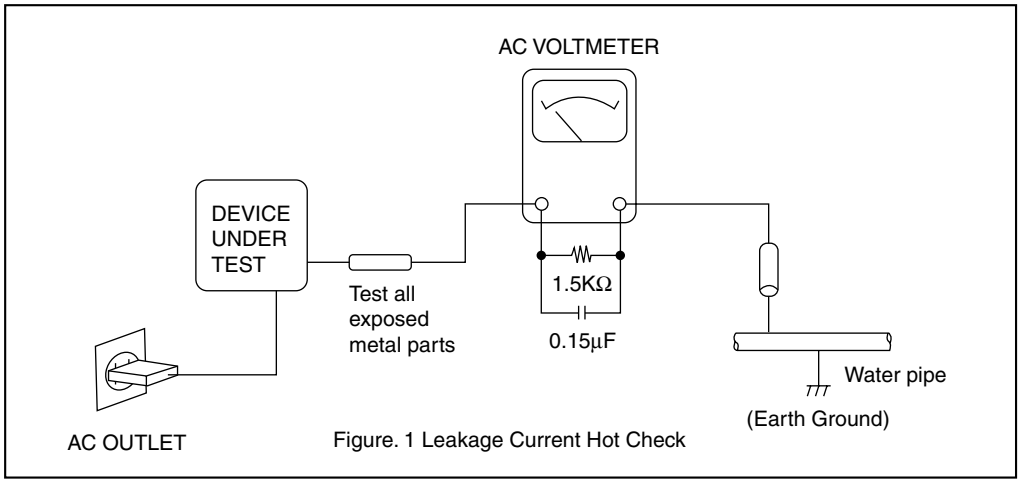


Figure. 1 Leakage Current Hot Check

CHAPTER 1. GENERAL DESCRIPTION OF PRODUCT

CONTENTS

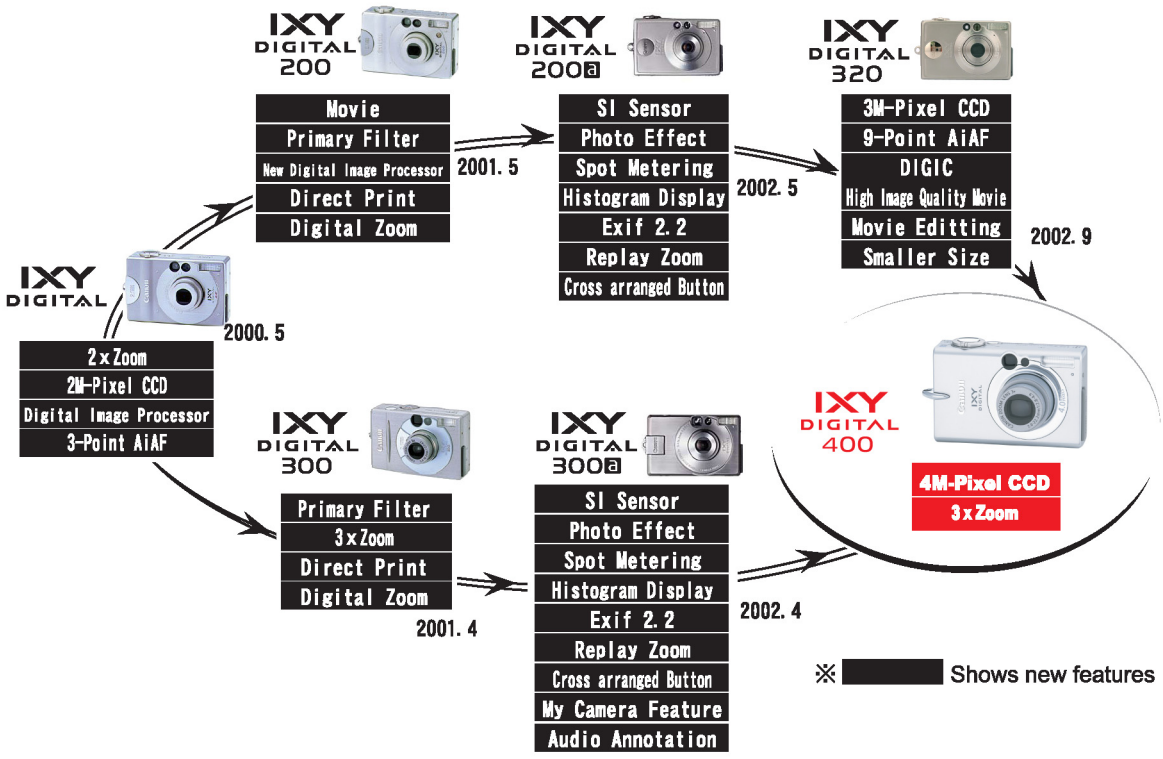
* The "IXY DIGITAL 400" Product designation used in this document refers to the IXY DIGITAL 400, The DIGITAL IXUS 400 and PowerShot S400 DIGITAL ELPH designations are used in various marketing areas.

1 Development Background

1-1 Development Objectives

The IXY DIGITAL, which went on sale in May 2000, is still a standard for many companies today and will go down in digital-camera history. By introducing six models in the IXY series in acknowledgement of customer's demands, Canon has instilled on the market the idea that "compact, lightweight, flat-body digital cameras = the IXY DIGITAL".
Keeping with this tradition, we are introducing a strategic product to the market that will be the world's smallest in its class, but still pack a 4-megapixel-class CCD sensor and widely hoped-for 3x zoom lens into the original IXY DIGITAL size. With an upgraded and refined exterior design on par with high-end models and the basic features* of the IXY DIGITAL 320, we plan to use this camera to show off Canon's "true capabilities".

* Because the CCD sensor is different than that of the IXY DIGITAL 320, the camera is not equiped with the high-quality VGA movie function.



1-2 Product Concept

The concept behind the IXY DIGITAL 400 was to achieve a refined exterior distinct (Super Hard Cerabrite) from comparable competing models, in addition to providing excellent image quality and advanced features. The goals also included making the IXY DIGITAL 400 the world's smallest 4-megapixel, 3x-zoom model as the culmination of the IXY series.

★ New features unique to the IXY DIGITAL 400 (Spring 2003 model)
● Updated features from the IXY DIGITAL 320
○ Succeeded features from the IXY DIGITAL 320

High Quality Design / Ultra Compact

● Refined, stylish design befitting the finest model in IXY seriesl
● Surface finishing with ultracorpuscle aluminum-filled coating (Super Hard Cerabrite Finish) exudes sophistication
● Higher packing density achieved with double-sided CSP-IC mounting

○ 1.5-inch Low-temperature poly-silicon TFT LCD monitor with thin and low power consumption back-light
○ New designed small size light-guide flash

Full Features / Ease of Operation

★ Ultra compact and real image type 3x optical viewfinder

● Macro function focuses close to 5 cm (wide-end) and 30 cm (telephoto-end)
● Three types of metering function (evaluative metering, center-weighted average metering and spot metering)
● Digital zoom function with continuously changing angle of view
(Approx. 3.6x, Approx. 11x when used in conbination with optical zoom)
● Mode dial switches shooting and replay mode instantly
● Choice of high speed mode (approx. 2.5 shots/sec.) or normal mode (approx. 1.5 shots/sec.) in continuous shooting (Under LCD monitor off conditions)
● Maximum recording pixels of still image : 2272 x 1704
● My Camera function (Customizeable of Start-up image, Start-up sound, Operation sound, Self -timer sound and Shutter sound on-camera content can also be created)
● Sound memos of up to 60 seconds can be appended during replay
● Long time movie recording with audio (internal microphone and speaker, max. of 3 minutes)
● FAT12, FAT16 and FAT32 support

○ 9-point AiAF and single-point AF selectable
○ Settable display times for rec review (Off, 2 to 10 seconds)
(Images can be erased during display)
○ Unwanted scenes can be deleted in movie replay mode (image and audio)
○ Total of 12 image quality modes (recording pixels (4) x compression (3))
○ Direct Print function compatible (Card Photo Printers and Bubble Jet printers)
○ 5 photo effect positions (Vivid color, Neutral color, Low sharpening, Sepia and Black & White)
○ AF, AE and FE lock function
○ On/Off selection of AF-assist Beam available
○ From 15-second to 1/2000-second shutter speeds
○ IO sensor automatically detects vertical or horizontal photography
○ Convenient operation with cross-configured buttons
○ Built-in flash with 5 flashing modes
(Provides the range of 3.5 m in wide angle and 2.0 m in tele-photo end)
○ Self-Timer function for 2 or 10 seconds selectable
○ Histpgram displays during rec-review and replay
○ Reset of all settings by one-touch operation

○ High-speed image feed on replay
○ Magnified replay for convenient image confirmation (from approx. 2x to 10x zoom)
○ First frame, Last frame, Next frame, Previous frame, Fast forward and Rewind available during movie replay
○ Supports DPOF format image transfer
○ Selectable video output format (NTSC/PAL)
○ Computer connections with Picture Transfer Protocol (PTP) support
○ USB Interface with multi-use connecter (mini-B jack)
○ 12 languages international support UI
○ Index replay (9-images)

High Image Quality

★ High resolution and ultra compact 3x zoom lens (Retractable)

● Approx. 4.0M camera effective pixel CCD (Total of approx. 4.1M pixels)

○ High definition and fast processing with the Digital Imaging Processor "DIGIC"
○ Fine color reproduction owing to primary color filters
○ High speed AF and high definition AE/AWB based on iSAPS technology
○ Noise reduction function reduces noize with slow shutter speed
○ IO sensor enhances precision of AF, AE and AWB
○ Wide range of ISO-equivalent speed settings including the high image quality ISO 50 (AUTO / ISO 50/100/200/400 equivalent)
○ High-precision white balance (Auto + Five preset positions + Custom)
○ Totally round aperture for better background blur
○ Exif 2.2 (Exif Print) compliant

System Accessory

★ Waterproof case submersible to 40m (Equiped with flash light defusion plate)

○ Compact Li-ion battery with high energy capacity (Nominal capacity : 840mAH)
○ Dedicated car battery charger for Li-ion battery

Application Software

* Win:Windows Mac:Macintosh

● Full feature application software

- ZoomBrowser EX (Win) / ImageBrowser (Mac) enables customized image control and dis play
- Photorecord (Win) for easy layout and printing of many pictures
- PhotoStitch (Win/Mac) for creating panoramic pictures with precision
- RemoteCapture (Win/Mac) or remote picture-taking through a PC
- File Viewer Utility (Win/Mac) for developing RAW images
- Twain driver 5.0 / WIA driver 5.0 (Win)
- USB Mounter (Mac) that allows the system to handle the camera as a card reader *
- Adobe Acrobat Reader (Win/Mac) for reading of manual
- Well-established third-party software
  - Apple QuickTime (Win) (replay for movies)
  - ArcSoft PhotoImpression (Win/Mac) (processing/editing for still images)
  - ArcSoft VideoImpression (Win/Mac) (processing/editing for movies)

*USB Mounter is not used in IXY DIGITAL 400.

*The details for application software are written to “Software Configuration Guide“.

1-3 Design Concept

-Box and circle

- Adds evolutionary chrome plating to the original IXY series concept

  By adding chrome finish to the distinctive ring, which adds flare to the high-ratio lens, together with the strap rings, lends the camera an exquisite top-class sensibility.

-Compact design

- Large, crosswise ridged R

  The small ridged R on the previous IXY series models makes each side look independent from each other. The crosswise ridged R was made as large as possible for the IXY DIGITAL 400 to make it appear thinner and smaller.

- Never-before smooth surface-joint construction

  A never-before surface construction smoothly joins the bottom, front, top and rear sides. This gives a finishing touch to the overall design and creates a robust feel and beautiful look from any angle. It also puts value on how the camera ″fits″ in the hand.

-Two-tone silver

- Ultrafine aluminum-particle filler coating produces two-tone color

  Since our competitors have been filling the racks with products with conventional stainless steel covers, we went on a quest for a new surface process that would set the IXY DIGITAL 400 apart. Our new technology allows us to apply an ultrathin film coating that gives the stainless steel cover a two-tone color without losing its metallic feel. The combination of this cover and the shape of its assembly create a fresh look for the IXY DIGITAL 400.

  ⇒ Super Hard Cerabrite

-Strap ring badge

- Strap ring as a common design element

  The strap ring was made the focus of the overall design as an element common to the new IXY series. By molding it into the front surface of the cover, it emphasizes the camera's low-slung image. The overall simplicity of the camera is also stressed by centering the design on functional components without adding superfluous elements.

1-4 IXY DIGITAL 400 and IXY DIGITAL 320 Specifications Comparison

			IXY DIGITAL 400	IXY DIGITAL 320
Image sensor (CCD)			Camera effective pixels : Approx. 4 M, 1/1.8" type (Total pixels: Approx. 4.1 M)	Camera effective pixels : Approx. 3.2 M, 1/2.7"type (Total pixels: Approx. 3.3 M)
Color filter			Primary color filter (Bayer type)	<--
Lens	Focal length (35mm film equivalent)		36 - 108 mm	35 - 70 mm
	f/number		F2.8 - 4.9	F2.8 - 4.0
	Optical zoom		3x	2x
	Focusing range (from tip of the lens)	Normal	46 cm - infinity	47 cm - infinity
		Macro	5 - 46 cm (W), 30 - 46 cm (T)	10 - 47 cm (W), 27 - 47 cm (T)
Optical viewfinder		Type	Real-image zoom viewfinder	<--
		Dioptric adjustment	-	<--
LCD monitor			1.5 inch low-temperature polycrystalline sillicon TFT color LCD (Approx. 118k-pixels)	<--
Focusing	Focusing frame		9-point AiAF / 1-point AF (Fixed to center)	<--
	Manual focus		-	<--
	AF lock		O	<--
	On/Off selection of AF-assist beam		O	<--
Exposure control	Metering modes		Evaluation / Center-weighted averaging / Spot (Metering frame when Spot : Center)	Evaluation / Spot (Metering frame when Spot : Center)
	Exposure control systems		Program AE	<--
	AE lock		O	<--
	Exposure compensation		+/- 2 EV in 1/3-step increments	<--
	Sensitivity (ISO film speed)		AUTO / ISO 50/100/200/400 equivalent	<--
White balance			Auto + Pre-set (Daylight / Cloudy / Tungsten / Fluorescent / Fluorescent H) + Custom	<--
Shutter		Type	Mechanical shutter + electronic shutter	<--
		Speed	15 - 1/2,000 sec.	15 - 1,500 sec.
Aperture		Type	Round shaped aperture	<--
		f/number	f/2.8 / 7.1 (W), f/4.9 / 13.0 (T)	f/2.8 / 7.2 (W), f/4.0 / 10.0 (T)
Flash	Operation modes		Auto / Red-eye reduction auto / Flash On / Flash Off / Slow-Syncro.	<--
	Flash range		30 cm - 3.5 m (W), 30 cm - 2.0 m (T) (When ISO equivalen speed is set to AUTO)	27 cm - 3.0 m (W), 27 cm - 2.0 m (T) (When ISO equivalent speed is set to 100)
	Flash exposure compensation		-	<--
	Manual setting of flash output		-	<--
	FE lock		O	<--
	Slow-sync.		O	<--
	Second curtain flash sync.		-	<--
Shooting specifications	Shooting modes		AUTO/ Manual / Stitch Assist / Movie	<--
	Digital zoom		Approx. 3.6x	3.2x
	Photo effects		Vivid / Neutral / Low sharpening / Sepia / Black & White	<--
	Image quality adjusting function		-	<--
	Noise reduction		O	<--
	Focus bracketing		-	<--
	AEB (Auto Exposure Bracketing)		-	<--
	Rec-review		O	<--
	Continuous shooting		High speed (Approx. 2.5 shots/sec.) Normal (Approx. 1.5 shots/sec.) <Large / Fine, LCD monitor off>	Approx. 2.0 shots/sec.
	Intervalometer		-	<--
	Self-timer		Operates with approx. 2/10 sec. Count-down.	<--
	Wireless controler		-	<--
	Shooting operation from PC		O	<--

			IXY DIGITAL 400	IXY DIGITAL 320
Recording specifications	Storage media		CompactFlash card (Type Ⅰ)	<--
	File format	Still	Design rule for Camera File system, DPOF (Ver. 1.1) compliant	<--
		Movie	AVI	<--
	Recording format	Still	JPEG (Exif 2.2 compliant)	<--
		Movie	Image: Motion JPEG Audio: WAVE(Monaural)	<--
	Number of recording pixels	Still	(L) 2272 x 1704、(M1) 1600 x 1200 (M2) 1024 x 768、(S) 640 x 480	(L) 2048 x 1536 (M1) 1600 x 1200 (M2) 1024 x 768 (S) 640 x 480
		Movie	(QVGA) 320 x 240 Approx. 3 min. at 15 fps (QQVGA) 160 x 120 Approx. 3 min. at 15 fps	(VGA) 640 x 480 Approx. 30 sec. at 15 fps (QVGA) 320 x 240 Approx. 3 min. at 15 fps (QQVGA) 160 x 120 Approx. 3 min. at 15 fps
Replay specifications	Play modes		Single / Index (9 thumbnail images) / Magnification / Movie	<--
	Still	Magnified replay	2 - 10x	<--
		Auto V/H detection	O (By IO sensor)	
		Histogram display	O	<--
		Sound memos	The max. record/play time is approx. 60 sec	<--
		DPOF	Print Order/ Slide show/Image transfer	<--
		Direct print	CP-100/CP-10, New card photo printers in 2003, BJ printers with direct print support (free trimming)	CP-100/CP-10, BJ 895PD/535PD (free trimming)
	Movie	Special replay	Next frame, Previous frame, Fast forward, Rewind, First frame and Last frame	-
		Editing	Unnecessary scenes can be erased.	-
Languages			12 languages (English, German, French, Dutch, Danish, Finnish, Italian, Norwegian, Swedish, Spanish, Chinese and Japanese)	<--
My Camera settings			Start-up image/ Start-up sound/ Shutter sound/ Operation sound and Self-timer sound (Creation of on-camera content)	-
Interface			USB, Audio / Video output	<--
Power supplies	Power sources	Primary batteries	-	<--
		Secondary batteries	Rechargeable Lithium-ion battery (NB-1LH/NB-1L)	<--
		AC Adapter	Compact Power Adapter kit (ACK500)	<--
		Car Battery Adapter	Car Battery Cable Kit (CBC-NB1)	<--
	Battery performance	Number of shots	Approx. 190 shots (LCD monitor ON) Approx. 440 shots (LCD monitor OFF)	Approx. 170 shots (LCD monitor ON) Approx. 420 shots (LCD monitor OFF)
		Replay time	Approx. 140 min.	Approx. 130 min.
Dimensions (W x H x D)			87.0 x 57.0 x 27.8 mm	87.0 x 57.0 x 26.7 mm
Weight (camera body only)			Approx. 185 g	Approx. 180 g

2 Features

2-1 High Quality Design / Ultra Compact

-Refined, stylish design befitting the finest model in IXY seriesl

While sticking to the basic IXY series design concept (box and circle), the IXY DIGITAL 400 features a two-tone color and employs a large crosswise-ridged R to create a look appropriate for a top-of-the-line model.

→ Refer to 1-3 Design Concept for details.

-Surface finishing with ultracorpuscle aluminum-filled coating exudes sophistication

The IXY DIGITAL 400 adopts a surface finishing with ultracorpuscle aluminum-filled coating (Super Hard Cerabrite Finish). This finishing is based on ultra-thin film coting with new technology and renders a sophisticated exterior.

→ Refer to 1-3 Design Concept for details.

-Higher packing density achieved with double-sided CSP-IC mounting

The IXY DIGITAL 400 continues to use the double-sided CSP mounts from the IXY DIGITAL 200a.
However, by cutting the area of the 1005 size package and IC solder lands by nearly 40 percent, components can be mounted closer together than before.
In addition, the area of the secondary board has been reduced by moving the DC/DC converter, which was mounted on the secondary board in the IXY DIGITAL 320, to the main board. Also, the secondary board now uses a normal double-sided board creating a cost-performance advantage over the previous rigid-flexible board.

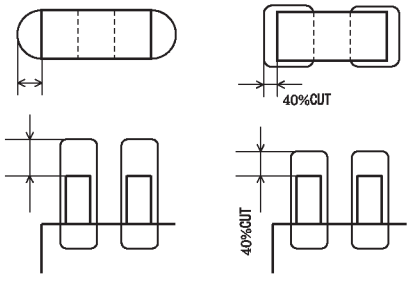


Figure 2-1 Solder land dimension

With these improvements, the IXY DIGITAL 400's total board area is reduced to 83 percent of that of the IXY DIGITAL 320.

2-2 Full Features/Ease of Operation

-Ultra-compact, real-image 3x optical zoom viewfinder

The IXY DIGITAL 400's optical viewfinder is a real-image viewfinder composed of an objective lens, a total reflection prism, a roof prism and an eyepiece lens.
In order to make a viewfinder small enough to fit in the IXY DIGITAL 400's slim shape, the objective lens was constructed from three lenses and each reflection surface was positioned so that the optic axis bends through the same plane in the two prism elements. As well, a newly developed space-saving prism was employed. Furthermore, a brighter viewfinder with better visibility was achieved by making the total reflection surfaces four-sided to minimize the amount of light lost and by placing the flare-cut aperture more effectively to eliminate unnecessary light rays. Finally, because the eye relief has been lengthened to 16 mm, eyeglass wearers too can see more clearly.

- Macro function focuses close to 5 centimeters (wide-end) and 30 centimeters (telephoto-end)

With the IXY DIGITAL 400, macro shots can be taken as close as 5 centimeters from the top of the lens in wide-angle mode and 30 centimeters in telephoto mode.
In this case, the area of the photographed subject is approximately 58 mm by 43 mm in the wide-angle mode and 107 mm by 80 mm in the telephoto mode.

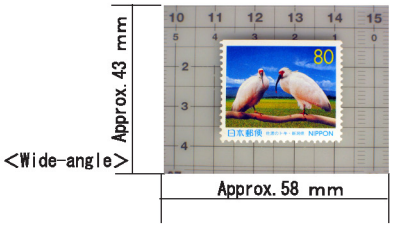


Figure 2-2 Sooting Area

- Three types of metering function (evaluative metering, center-weighted average metering and spot metering)

3 light metering modes can be selected on the IXY DIGITAL 400, like the PowerShot S40/S30 — evaluative metering, center-weighted average metering and spot metering. When spot metering is selected, the light metering point can be chosen to be either linked to the AF frame or fixed to the center of the photo frame.

- Digital zoom function with continuously changing angle of view (Approx. 3.6x, Approx. 11x when used in conbination with optical zoom)

The digital zoom magnification of the IXY DIGITAL 400 enlarges from 3.2x a that is employed on IXY DIGITAL 320 to approx. 3.6x owing to employment of 4.0M camera effective pixel CCD. It can adjust the field of view by up to a maximum of approx. 11x (35 mm film equivalent: 36 to 383 mm) by combining a 3.6x digital zoom magnification with the optical 3x zoom lens.
Furthermore, several dozen image input positions are calibrated for the monitor display to ensure a smooth digital zoom of the image on the monitor display. The actual zoom position can be stopped in five positions in consideration of practicability.

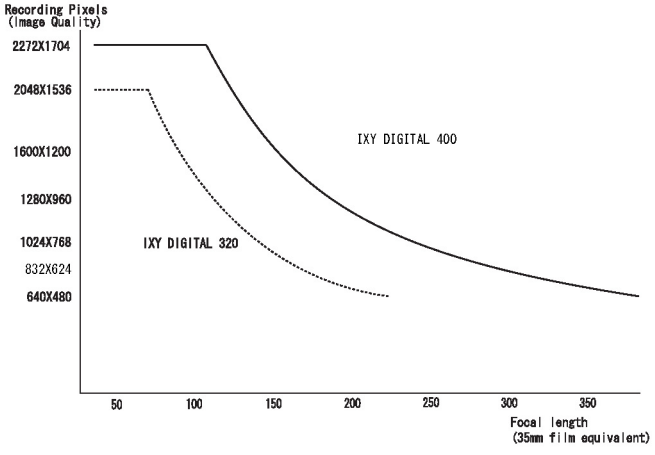


Figure 2-3 Relation between Digital zoom and image Quality

Due to fast signal processing, the optical zoom and digital zoom are driven at nearly the same speed so that no peculiarity is sensed in operation (during switchover).

-Mode Dial switches shooting and reply mode instantly

The IXY DIGITAL 400 comes with the same Mode Dial found on the Power Shot S45/40/30 models. With this dial, the user can switch shooting modes with one touch.

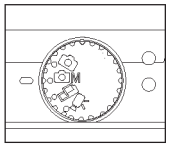


Figure 2-4 Shooting Mode Dial

-Coice of "High speed" mode (approx. 2.5 shots/sec.) or "Normal" mode (approx. 1.5 shots/sec.) in continuous shooting

Similar to the PowerShot G and S series, the IXY DIGITAL 400 comes equipped with two selectable continuous shooting modes, the High Speed mode and the Normal mode. In the High Speed mode, the IXY DIGITAL 400 differs from conventional cameras in that it saves image data temporarily in a buffer. For continuous shooting, the IXY DIGITAL 400 can take approximately 2.5 shots/sec (using Large/Fine). However, at those speeds, the number of shots that can be taken successively is approximately 5 images (using Large/Fine) and LCD monitor goes to black-out.
Normal mode is similar to high-speed continuous shooting with conventional cameras, but slower than the current High Speed mode. the IXY DIGITAL 400 take approximately 1.5 shots/sec (using Large/Fine, LCD monitor off). At those speeds, the number of shots that can be taken successively is approximately 8 images (using Large/Fine) with the IXY DIGITAL 400 and enables image confirmation on the LCD monitor during shooting.
When the buffer becomes full, regardless of which mode was selected, the continuous shooting speed slows to one picture per second due to the need to create space for each picture while continuing to shoot. Shooting can still continue at this pace until the CF card becomes full.
Providing these two continuous shooting modes allows the user to select whichever is best suited to the application at hand.

- Maximum recording pixels of still image : 2272 x 1704

Since the number of camera effective pixels on the CCD has been increased to approx. 4.0M with the IXY DIGITAL 400, the recording pixels in "Large size" increase to 2,272 x 1,704.
There are now 4 possible settings for the number of recording pixels: Large, Medium 1, Medium 2, and Small. Since there are also 3 compression rates (Superfine, Fine and Normal), a total of 12 different combinations can be selected.

	Recording Pixels
Large	2,272 × 1,704
Medium 1	1,600 × 1,200
Medium 2	1,024 × 768
Small	640 × 480

Table 2-1 Recording Pixels

- My Camera function (Customizeable of Start-up image, Start-up sound, Operation sound, Self -timer sound and Shutter sound on-camera content can also be created)

The IXY DIGITAL 400 can be customized start-up image, start-up sound, operation sounds, self-timer sound and shutter sound with the My Camera function from the Solution Disk included with the camera or from the My Camera Contents in the "On-line service"on the Canon Image Gateway*1 Web site accessible via ZoomBrowser EX/ImageBrowser.
Also, images or sounds*2 captured with the camera itself can be used as camera contents.

*1 Only for the Japanese market.
*2 The start-up sound, operation sound, self-timer sound and shutter sound can be recorded separately with the microphone.

-Sound menos of up to 60 seconds can be appended during replay

When replaying images on the IXY DIGITAL 400, because a sound recording of up to 60 seconds can be appended to images, you can easily attach comments to images as desired. The recording format is WAVE (monaural).

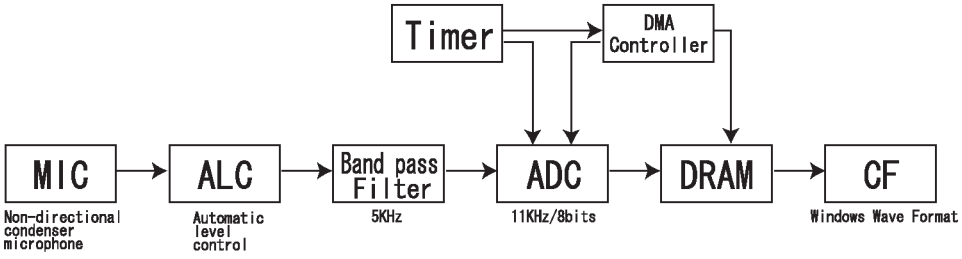


Figure 2-5 Block-diagram for Sound memos

-Long time movie recording with audio (internal microphone and speaker, max. of 3 minutes)

The IXY DIGITAL 400 can record moving images at 15 frames per second along with audio in 2 formats, QVGA (320 by 240 pixels) and QQVGA (160 x 120 pixels). Because a method is employed that consecutively writes images that are temporary stored in the buffer to the CF card while recording, long continuous filming times are also achieved.

In practice, if the write speed of the CF card is slower*1 than the speed to write an image to the buffer, the recording will stop when the buffer capacity is reached. Taking this circumstance into account, the specification limits the maximum recording time in both QVGA and QQVGA formats to three minutes. Even after three minutes of elapsed filming, the IXY DIGITAL 400 allows the next recording to be resumed in less time than previous models.

During filming, the values for the focus, exposure and white balance determined at the beginning are used continuously to the end of the recording. The storage time is also displayed on the LCD monitor during filming.

The file is saved in AVI format, while the image is saved as Motion JPEG data and the audio data in WAVE format (monaural).

Since the camera is equipped with an internal microphone and speaker, movie with sound can be played on the camera without connecting to a computer.

*1 The write speed varies depending on the brand and capacity of the CF card.
*2 If the free space on the CF card is less than the size of the recording, recording will stop just prior to the CF card reaching full capacity.

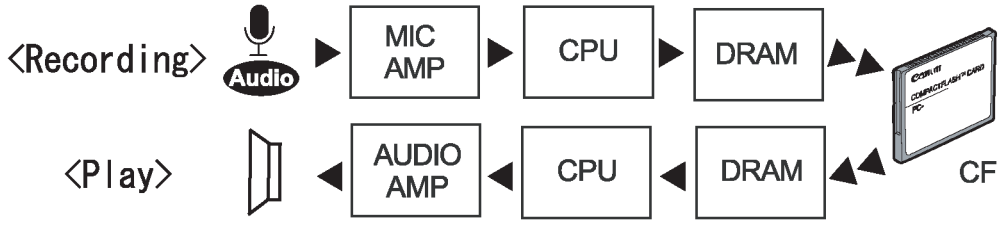


Figure 2-6 Block diagram for Audio recording and replay

-FAT12, FAT16 and FAT32 support

In the near future, memoty cards with 2GB or more storage capacity will be released. The IXY DIGITAL 400 automatically uses FAT32*1/2 to format such memory cards. In addition, the IXY DIGITAL 400 automatically uses FAT12 or FAT16 to format memory cards under 2GB, depending on the storage capacity of the memory card.

*1 File Allocation Table
*2 The memory card with 2GB or more storage capacity is not recognized by Canon digital cameras which were released before spring in 2002.

2-3 High Image Quality

-High-resolution, ultra-compact, 3x zoom lens (retractable)

The IXY DIGITAL 400 lens is a 3x zoom lens with a 7.4 to 22.2 mm focal length (equivalent to 36 to 108 mm on a 35 mm camera) and is suitable for a wide range of shooting conditions from landscapes to snapshots.
The lens is built in three blocks using 7 elements in 5 groups including two aspherical lenses. The rear focus method permits focusing by moving only one lens. Minimizing the number of focusing lenses saves energy and increases focusing speed.
The power position of each lens group has been optimized and the lens shape revised to shorten the overall retraction length and the total optical length when shooting. The lens also has sufficient resolution to support the 4-megapixel CCD sensor. As a result, the total retraction length is about 5 mm shorter than on the PowerShot S30/S40. This allows a 3x optical zoom lens to be incorporated in the width of the original IXY DIGITAL camera.

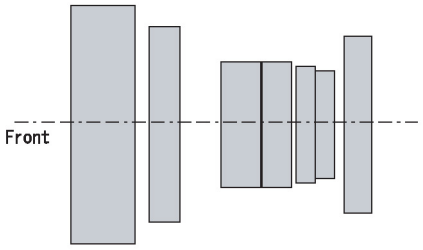


Figure 2-7 Conceptional cross-section of lens

-Approx. 4.0M camera effective pixel CCD (Total of approx. 4.1M pixels)

The IXY DIGITAL 400 equipped with approx. 4.0 million camera effective pixel CCD (total of approx. 4.1 million pixels) which was equipped with PowerShot G and S series.
The large size of recording pixels on the IXY DIGITAL 400 is 2272 x 1704. As a result, postcard size will, as an example, produce a print with a resolution of 6.3 lp*2/mm, which is close to the limits of visual acuity in humans. Even large (A4) size will produce a print with a practical resolution of 3.7 lp/mm.

Print Size (W x H) Unit : mm	Large (A4) size (254X203)	5x7" (cabinet) size (165X120)	Postcard size (148X100)	Service (E) size (120X82)	Card size (86X54)
					
Resolution (Unit: lp/mm)	3.7	5.6	6.3	7.8	10.8

Table 2-2 Print Size and Resolutions Produced by the IXY DIGITAL 400 (Calculated Values)

*The resolutions indicated are derived from the number of pixels in the CCD; in actual practice, these resolutions will be affected by the printer resolution.
*lp(line-pair):Count 1 unit with pair of black and white lines

2-4 System accessories

-Waterproof case submersible to 40 m (Equiped with flash light defusion plate)

An optional waterproof housing is available so that the camera can be used in locations where it is liable to get wet, such as in the rain, at the beach or at construction sites.
The waterproof housing has been strengthened so that it can now withstand water pressure to 40 meters from the previous 30 meters. Furthermore, in addition to the diffusion plate in front of the flash, the front lens glass has been constructed of two layers to prevent fogging when immersed in water.

⇒ A separate Technical Guidance is issued concerning the waterproof case.

3 Exterior

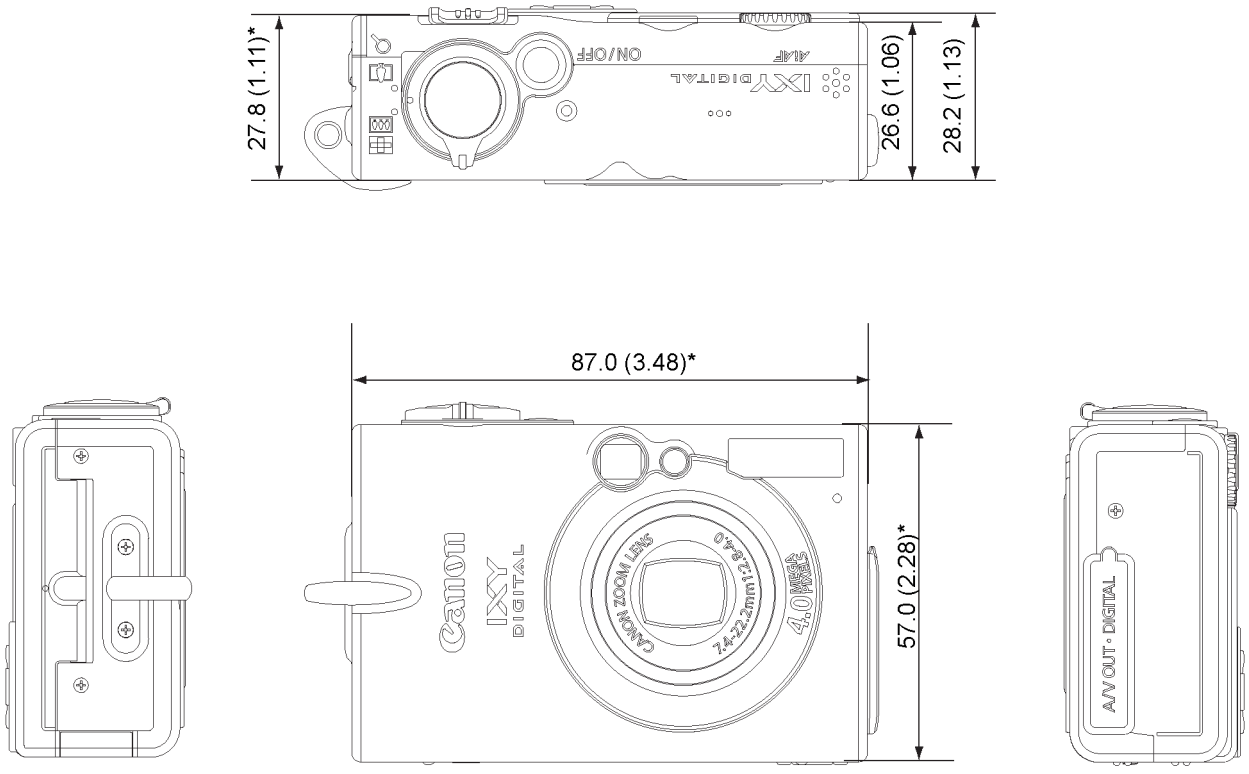
3-1 Exterior Photos

Photo 3-1 IXY DIGITAL 400 Front

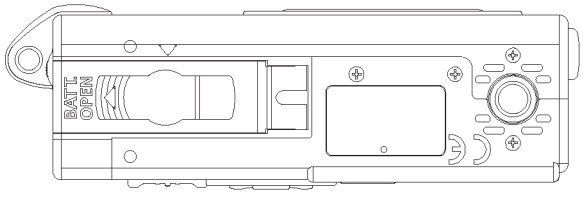
Photo 3-2 IXY DIGITAL 400 Vertical angle

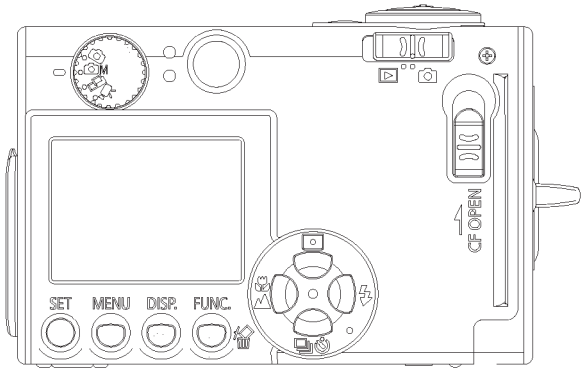
Photo 3-3 IXY DIGITAL 400 Rear

3-2 6-dimentional diagram



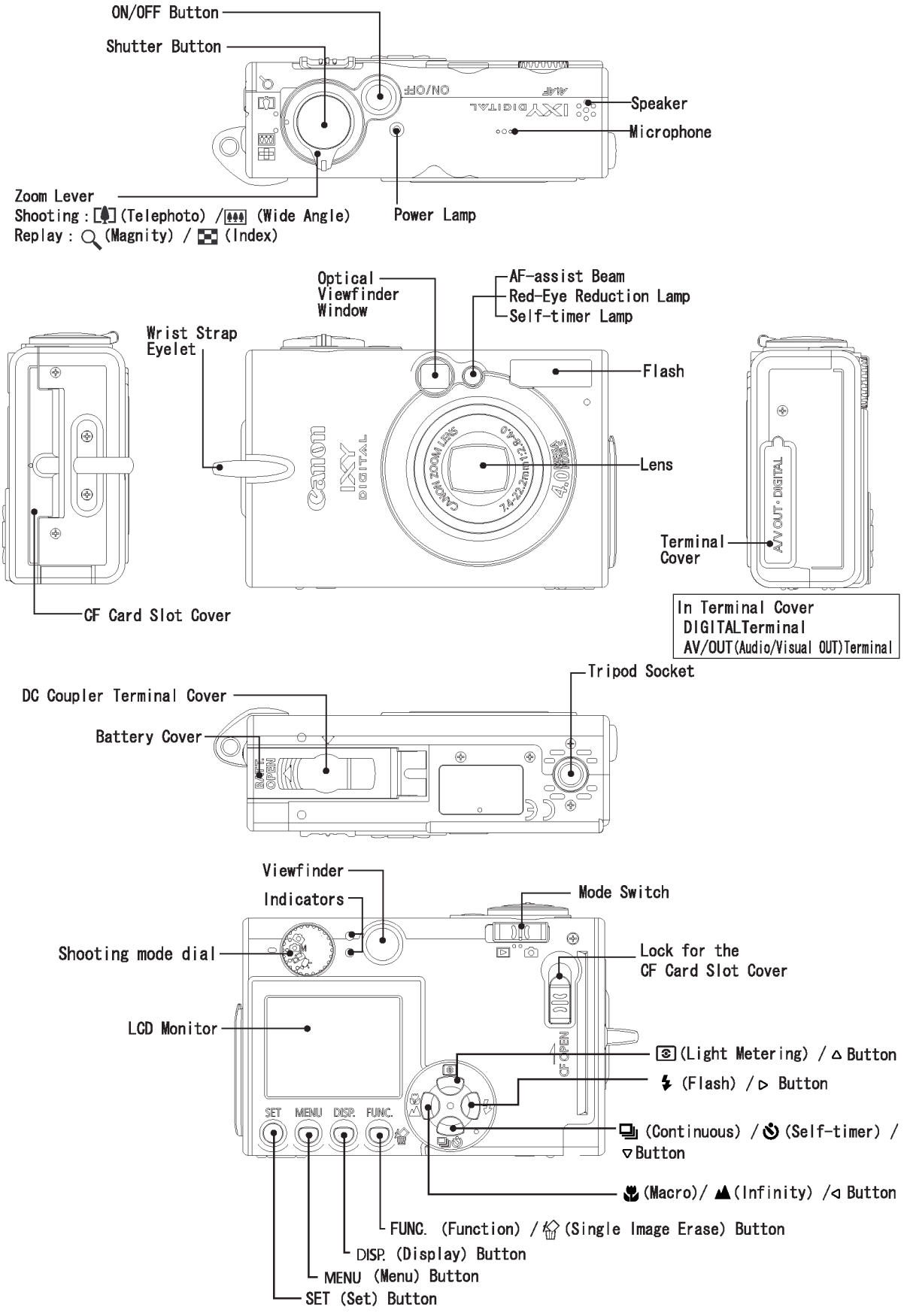
* nominal value





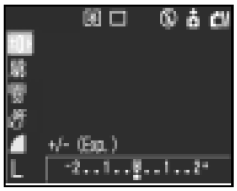
Unit : mm (inch)

3-3 Nomenclature

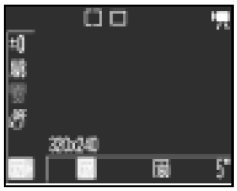


3-4 UI Information

◆FUNC.Menu

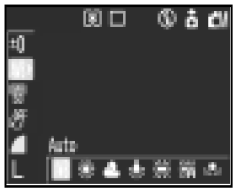


Exposure Compensation
・－2～±0～＋2

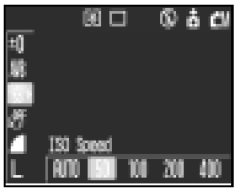


Recording Pixels(Movies)
・320x240 pixels
・160x120 pixels

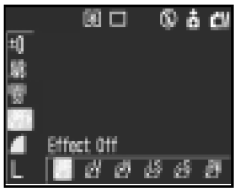
Long Shutter
・Off
・1 to 15 seconds



White Balance
・Auto ・Fluorsecent
・Daylight ・FluorsecentH
・Cloudy ・Coustom
・Tungsten

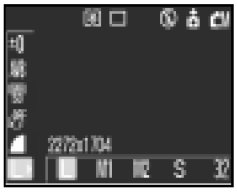


ISO Speed
・AUTO
・50
・100
・200
・400



Effect
・Effect off ・Vivid
・Neutral
・Low Sharpening
・Sepia ・BW

Compression
・Superfine
・Fine
・Normal



Recording Pixels(Stills)
・Large 2272x1704 pixels
・Medium 1 1600x1200 pixels
・Medium 2 1024x768 pixels
・Small 640x480 pixels

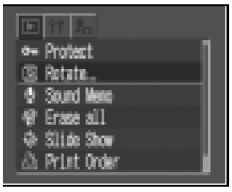
◆REC.MENU

AiAF
- On
- Off

Continuous Shooting Mode
- Standard continuous Shooting
- High-speed continuous shooting

Self-timer
- 10 seconds
- 2 seconds

AF-assist Beam
- On
- Off



Digital Zoom
- On
- Off

Review
- Off
- 2-10 seconds

(1-second increments)

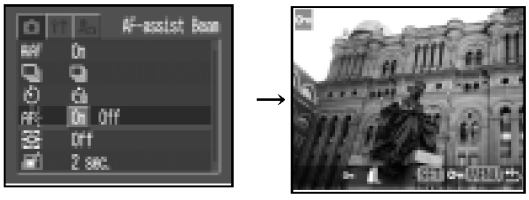
Long Shutter
- On
- Off

◆My Camera Menu

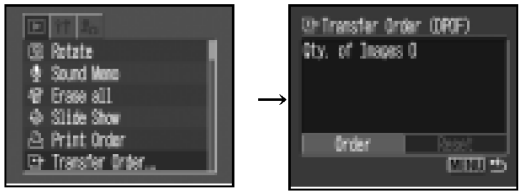
- ○Theme
- ○Start-up Image
- ○Start-up Sound
- ○Operation Sound
- ○Self-timer Sound
- ○Shutter Sound

◆Play Menu

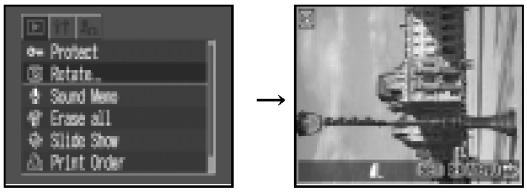
Protect



Transfer Order

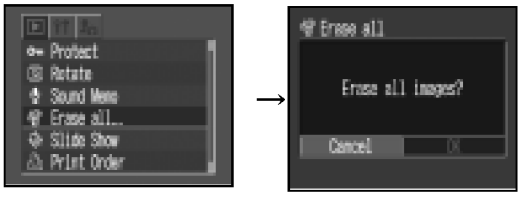


Rotate



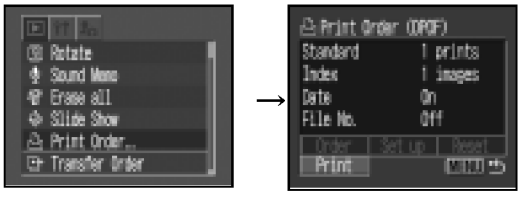
Sound Memo

Erase all



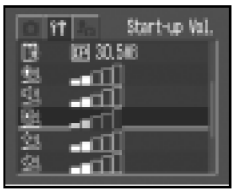
Slide Show

Print Oder



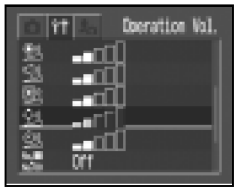
◆Set up Menu

Beep
- On
- Off

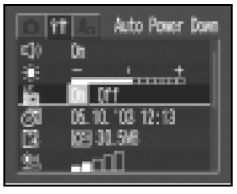


Start-up Volume
- Off to 5

LCD Brightness
- -7 to 0 to +7



Operation Sound Volume
- Off to 5

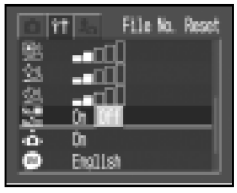


Power Save
- On
- Off

Self-timer Sound Volume
- Off to 5

→

Date/Time



File No. Reset
- On
- Off

→

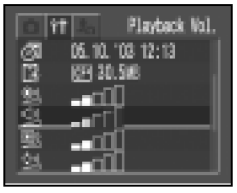
Format

Auto Rotate
- On
- Off

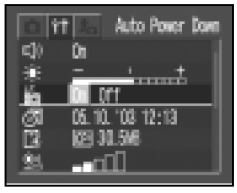
Shutter Sound Volume
- Off to 5

→

Language



Playback Volume
- Off to 5



Video System
- NTSC
- PAL

4 Specifications

4-1 Camera specifications

■ Image sensor (CCD)	
Camera effective pixels	Approx. 4.0 M pixels
Total pixels	Approx. 4.1 M pixels
Transfer method	Interline
Chip size	1/1.8 in.
Aspect ratio	4:3
Filter type	Primary color filter (Beyer)
■ Lens	
Focal length	7.4(W) - 22.2 (T) mm (35mm film equivalent: 36 (W) - 108 (T) mm)
f/number	F2.8(W) - 4.9 (T)
Lens construction	7 elements in 5 groups (including 2 aspherical lenses)
Optical zoom	3 x
Focusing range	Normal : 46 cm (1.5 ft.) - infinity
(from tip of the lens)	Macro : 5 - 46 cm (2.0 in. - 1.5 ft.)(W), 30 - 46 cm (1.0 ft. - 1.6 ft.)(T)
	Manual : Not available
Area of photograph (at the minimum focal distance)	58 x 43 mm (2.3 x 1.7 in.)(W) , 107x 80 mm (4.2 x 3.1 in.)(T)
Magnification of photograph (at the minimum focal distance)	0.60 x (W) , 0.32 x (T) (35 mm film equivalent)
■ Optical viewfinder	
Type	Real-image zoom viewfinder
Eyepoint	16 mm
Diopter adjustment	Not available
■ LCD monitor	
Type	Low-temperature polycrystalline silicon TFT color LCD
Effective pixels	Approx. 118 K pixels
Display size	39 mm diagonal (1.5 in.)
Picture coverage	100 %
Brightness adjustment	15 steps
■ Focusing	
Control system	TTL Autofocus
Manual focus	Not available
Focusing frame	9-point AiAF / 1-point AF
	1-point AF: Center
Focusing range	Normal / Macro / Landscape
AF lock	Available
AF-assist beam On/Off	Available

■ Exposure control	
Metering methods	Evaluation / Center-weighted averaging / Spot *Metering frame with Spot mode: Center
Exposure control methods	Program AE
AE lock	Available
Exposure compensation	+/- 2 EV in 1/3-step increments
Sensitivity (Equivalent film speed)	AUTO / ISO 50/100/200/400 equivalent *Camera automatically sets optimum speed when "AUTO" is slected.
ND (Neutral Density) Filter On/Off	Not available
■ White balance	
Modes	TTL auto / Pre-set (Daylight / Cloudy / Tungsten / Fluorescent / Fluorescent H) / Custom
■ Shutter and aperture	
Shutter type	Mechanical shutter and electronic shutter
Aperture type	Round shaped aperture
Shutter speed	15 - 1/2,000 sec. *1.0 - 15 sec. shutter speed is available with manual setting in long shutter mode.
f/number	f/2.8 / 7.1 (W), f/4.9 / 13.0 (T)
■ Flash (Built-in)	
Operation modes	Auto / Red-eye reduction auto / On / Off/ Slow-syncro.
Flash range	30 cm - 3.5 m (1.0 - 12 ft.)(W), 30 cm - 2.0 m (1.0 - 6.7 ft.)(T) (When ISO speed is set to AUTO.)
Flash sync speed	1/60 - 1/500 sec. (when in Flash on mode) 1-1/500 sec. (when in Slow-syncro. mode) 15-1 sec. (when in Slow-shutter and Slow-syncro mode)
Recycling time (Full flash)	10 sec. or shorter (battery voltage = 3.7 V)
Flash exposure compensation	Not available
Manual flash output setting	Not available
FE lock	Available
Slow-sync.	Available
Second curtain sync.	Not available
■ Flash (External)	Not available
Flash contacts	
Recommended flashes	
Flash exposure compensation	
FE lock	
Slow-sync.	
Second-curtain sync.	

■ Shooting specifications

Shooting modes: Auto / Manual / Stitch Assist / Movie

Shooting functions

Digital zoom: Maximum of approx. 3.6 x (Maximum of approx. 11 x zoom is available when combined with optical zoom.)

Photo effects: Vivid / Neutral / Low sharpening / Sepia / Black & White

Image quality adjustment: Not available

Noise reduction: When shutter speed is set between 1.3 sec and 15 sec. .

Bracketing: Not available

Focus Bracketing

AEB (Auto Exposure

Review: Off / 2-10 sec. (1 sec. increaments)

Camera start-up time / Release time lag

Mode	Finder	Camera start-up time (sec.)	Release time lag (sec.)
Shooting	LCD monitor On (Start-up display On)	2.7	0.1
	LCD monitor Off (Start-up display Off)	2.3	0.1
Replay	Start-up display On	2.7	-
	Start-up display Off	2.4	-

Shooting interval: 1.7 sec. (Wide angle, LCD monitor on) / 1.9 sec. (Wide angle, LCD monitor off)

*The actual shooting interval time consists of the shutter speed time added to the above times .

Continuous shooting

Speed mode selection: High speed / Normal speed

Speed: High speed: Approx. 2.5 shots/sec. Normal speed: Approx. 1.5 shots/sec. (Large / Fine mode and LCD monitor is Off)

Number of shots

		High- Speed	Standard
Recording Pixels/ Compression	L/SF	3	4
	L/F	5	8
	L/N	9	15
	M1/SF	5	8
	M1/F	9	15
	M1/N	16	29
	M2/SF	8	15
	M2/F	14	25
	M2/N	25	47
	S/SF	17	33
	S/F	28	54
	S/N	49	96

*The above data shows the maximum number of shots for recording pixels and compression setting.

*Despite achieving the maximum number of shots, continuous shooting is still available. However the shooting speed is reduced.

Intervalometer: Not available

Self-timer: Operates with approx. 2 sec. or approx. 10 sec. count-down.

Wireless control: Not available

Operation from PC: Shooting operation is possible with the use of "RemoteCapture" software when camera is connected to the PC.

■ Recording specifications

<Still image>

File format: Design rule for Camera File system,
Digital Print Order Format (DPOF) Version 1.1 compliant

Image recording format: JPEG(Exif 2.2)

JPEG compression mode: Super Fine / Fine / Normal

Number of recording pixel: Large: 2272 x 1704, Midium 1: 1600 x 1200,
Midium 2: 1024 x 768, Small: 640 x 480

Recording capacity *

Image Quality	L/SF	L/F	L/N	M1/SF	M1/F	M1/N	M2/SF	M2/F	M2/N	S/SF	S/F	S/N
File Size (KB)	2002	1116	556	1002	558	278	570	320	170	249	150	84
FC-8M	3	6	13	7	13	26	12	23	42	29	47	83
FC-16M	7	13	26	14	26	52	25	46	84	58	94	165
FC-32M	14	27	54	30	54	108	53	94	174	120	196	337
FC-64M	30	54	110	61	109	217	107	189	349	241	393	676
FC-128M	61	110	220	122	219	435	215	379	700	482	788	1355
FC-256MH	123	222	443	246	440	868	431	762	1390	962	1563	2720

*The above data is measured under Canon testing standard and may vary depending on the scene, subjects or camera settings.

<Movie>

File format: AVI

Recording format: Image: Motion JPEG、 Audio: WAVE (Monaural)

Number of recording pixels: QVGA: 320 x 240 QQVGA: 160 x 120

Frame rate / Recording time

	Frame rate (fps)	Recording time (min)*
320 × 240	15	3
160 × 120	15	3

*The maximum recording time with an individual movie clip
*The CF card is required to contain the fixed space or over.

Recording capacity *

Recording Pixels	320×240	160×120
File Size (KB.)	330	120
FC-8M	21"	58"
FC-16M	44"	118"
FC-32M	91"	242"
FC-64M	183"	486"
FC-128M	368"	973"
FC-256MH	735"	1954"

* Above data is measured under Canon's testing standard and may vary depending on the scene, subjects or camera settings.

<Common>

Storage media: CompactFlash™ (CF) card (Type Ⅰ)

Format: FAT12 / FAT16 / FAT32
*When formatting with the camera, it automatically selects FAT12 and FAT16 according to the capacity of the CF card.
When the capacity of CF card is 2GB or over, FAT32 is selected.

■ Replay specifications

Replay modes	Single / Index (9 thumbnail images) / Magnification / Movie
<Still image>	
Magnification	Approx. 2 - 10 x
Automatic vertical/ horizontal detection	Possible(Owing to IO sensor) *Images are displayed vertically or horizontally according to the camera's shooting position.
Image rotation	Rotate image to 90-degree or 270-degree
Histogram display	Display brightness allocation of image. (Available during review.)
Sound memos	Maximum of 60sec. sound recording and sound replaying per image.
Slide show	Interval time : 3-10 sec. / 15 sec. / 30 sec. / Manual * The slide show function only plays images selected with the DPOF settings (with checkmarks). Repeat : On/Off
DPOF	Print order / Slide show / Image transfer
Direct print	Card photo printers : CP-100, CP-10, New card photo printers in 2003 BJ printers with Direct print support : BJ 895PD, 535PD, New models in 2003's spring
<Movie>	
Special replay	First frame / Last frame / Next frame / Previous frame / Fast forward / Rewind
Editing	Unnecessary scenes can be erased. (Refer to "Erasing mode".)

■ Erasing specifications

Erasing modes	Still images: Single image / All images *The image data recorded with the Design rule for Camera File system's format can be erased. However, protected images can not be erased. Movie : Part of imovie* / All of movie * Can be erased from start-point to mid-point or from mid-point to end-point with the movie editing function. Furthermore, can be erased both from start-point to mid-point and from mid-point to end-point.
Protection	Erase prohibited (Set in replay mode.)

■ Interface

Computer I/F	USB* (mini-B jack) *All procedures performed with a connection to a USB 2.0 compliant board are not guaranteed.
Communication settings	PTP
Video	NTSC/PAL
Audio	Monaural

■ Others

Languages

12 languages are available for menu and messages.
English, German, French, Dutch, Danish, Finnish, Italian, Norwegian, Swedish, Spanish, Chinese and Japanese

My Camera settings

Selectable items

Start-up image, Start-up sound, Shutter sound, Operation sound and Self-timer sound

*Each items can be created by users with the camera.

Specifications

Items	File size	Specifications		
Start-up image	20 KB	320×240 pixels, JPEG file with 4 : 2 : 0 or 4 : 2 : 2, Aspect ratio of 4 : 3		
Start-up sound	10.9 KB	WAVE (monaural) 8bit	11 kHz : 1.0 sec. or less	8 kHz : 1.3 sec. or less
Shutter sound	3.36 KB		11 kHz : 0.3 sec. or less	8 kHz : 0.4 sec. or less
Operation sound	3.36 KB		11 kHz : 0.3 sec. or less	8 kHz : 2.0 sec. or less
Self-timer sound	21.7 KB		11 kHz : 2.0 sec. or less	8 kHz : 0.4 sec. or less

■ Power supplies

Primary batteries

Not usable

Secondary batteries

Rechargeable Lithium-ion battery (NB-1LH/NB-1L)

AC adapter

Compact Power Adapter (CA-PS500)

Car battery adapter

Car Battery Adapter (CBC-NB1)

Sub-battery

Coin-type secondary Lithium battery (MS-614S)

Battery performance

Number of shots

LCD monitor On : Approx. 190 shots

LCD monitor Off : Approx. 440 shots

*Under Canon testing standard:

Using NB-1LH. Normal temperature (23 ℃). LCD viewfinder is On. Shoot images at wide angle and at telephoto end alternately with 20 seconds intervals. Use flash at every fourth shot. Turn camera off and on at every eighth shot.

Replay time

Approx. 140 min.

*Under Canon testing standard:

Using NB-1LH. Normal temperature (23 ℃). Repeat replay automatically at a speed of 1 image per 3 seconds.

Battery charging time

Inside the camera

Not available

Charger

Approx. 130 minutes.(NB-1LH) / Approx. 120 minutes.(NB-1L)

*Battery Charger : CB2LS(E)

Power-saving function On / Off

Available

Shooting mode: Powers down approx. 3 minutes after last operation.

Replaying mode: Powers down approx. 5 minutes after last operation.
Does not power down in Slide show mode.

Printer connection: Power down approx. 5 minutes after last operation.

PC connection: Does not powers down even if power-saving function is On.

■ Camera specifications

Operating temperature	0 - 40 °C
Operating humidity	10 - 90 %
Dimensions (W x H x D)	87.0 x 57.0 x 27.8 mm (3.43 x 2.24 x 1.09 in.) (Excluding protrusions)
Weight	Approx. 185 g (6.52 oz) (Camera body only)

4-2 Functions' availability and data's memory in each shooting mode

		Manual	Long shutter	AUTO	Stitch	Movie
Exposure compensation	±0	D	D	D	D	D
	～±2	○	×	×	△	○
White balance	Auto	D		D	D	D
	Daylight	○		×	△	○
	Cloudy	○		×	△	○
	Tungsten	○		×	△	○
	Fluorescent	○		×	△	○
	Fluorescent H	○		×	△	○
	Custom1 *1	○		×	△	○
Drive *2	Single shot	D		D	D	D
	Continuous (Normal)	○		×	×	×
	Continuous (High-speed)	○		×	×	×
	Self-timer (2 sec)	○		○	△	○
	Self-timer (10 sec)	○		○	△	○
Sensitivity (Equivalent film speed)	AUTO	○	★	D	D	D
	ISO 50	D		×	×	×
	ISO 100	○		×	×	×
	ISO 200	○		×	×	×
	ISO 400	○		×	×	×
Photo effect	Off	D		D	D	D
	Vivid color	○		×	△	○
	Neutral color	○		×	△	○
	Low sharpening	○		×	△	○
	Sepia	○		×	△	○
	Black & White	○		×	△	○
Number of recording pixels (Still image)	L	D		D	D	×
	M1	○		○	△	×
	M2	○		○	△	×
	S	○		○	△	×
Number of recording pixels	320x240	×				D
	160x120	×				○
JPEG compression mode	Super Fine	○		○	△	×
	Fine	D		D	D	×
	Normal	○		○	△	×
Metering methods	Evaluation	D	D	Best	Best	Best
	Center-weighted averaging	○	×	×	×	×
	Spot	○	×	×	×	×
Long shutter setting	1 sec.	×	D	×	×	×
	～15 sec.	×	○	×	×	×
AE/FE lock	Off	○	×	×	×	×
AF lock	Off	○	○	×	×	×
Zoom position *3	Optical (Wide)	D				
	Optical (Other)	○			△	○
	Digital zoom	○			×	×
AF range	Normal	D		D	D	D
	Macro	○		○	△	○
	Landscape	○		×	△	○
Flash	Auto	○	×	○	×	×
	Red-eye reduction auto	D	×	D	×	×
	Slow-sync.	○	○	×	△	×
	Flash On	○	○	×	△	×
	Flash Off	○	D	○	D	×
Display EVF	OVF	○			★	★
	EVF only	D				
	EVF+INFO	○				
Stitching direction selection	Left	×			D	×
	Right	×			△	×

Explanatory notes

・The PLAY ⇔ REC switch set is maintained regardless of the color of the cell.

・Modes that do not have a separation line between them have the same settings. (The △ mark simply means that settings can only be selected for the first image in stich assist mode. Settings are common.)

<Cell color>

- ■ The setting is memorized. (Mode that does not remember settings, settings not remembered when the camera is off.)
- □ Resets when switching to a mode that does not share the setting.

<Cell description>

- □ The setting follows the registered shooting mode.
- D Default value
- D? Default varies according to region.
- ○ Selectable
- × Not selectable
- △ Only the first shot in stitch assist can be selected.
- ★ If the mode is selected with a suitable value, D is set. If the value is changed afterwards it is effective in subsequent modes. If the value is not changed, it is also effective in subsequent modes.
- Best The camera sets the optimal value.
- * Item values with an asterisk(*) next to them are the default value.

REC MENU		Manual / Long shutter	AUTO	Stitch	Movie
AiAF	On	D	D	D	D
	Off	○	×	×	×
Continuous shooting mode	Normal speed	D	D	×	×
	High speed	○	×	×	×
Self-timer	2 sec.	○		△	
	10 sec.	D			
AF-assist beam	On	D			
	Off	○		△	
Digital zoom	On	○		×	×
	Off	D		×	×
Review	Off	○		△	×
	2 sec.	D			×
	～10 sec.	○		△	×
Long shutter shooting	On	○	×		
	Off	D	×		

※ All items in this chart are locked in for the first image and cannnot be changed for subsequent shots.

SETUP MENU		Manual / Long shutter	AUTO	Stitch	Movie
Beep	On	D			
	Off	○		△	
LCD brightness (multistep)	1～8*～15	○			
Auto power down	On	D			
	Off	○		△	
Date/Time		○		△	
Date style	m/d/y*,d/m/y,y/m/d	○		△	
CF card formatting		○		×	
Shutter sound vol.	0,1,2*,3,4,5	○		△	
Replay sound vol.	0,1,2*,3,4,5	○		△	
Start-up sound vol.	0,1,2*,3,4,5	○		△	
Operation sound vol.	0,1,2*,3,4,5	○		△	
Self-timer sound vol.	0,1,2*,3,4,5	○		△	
File No. reset	On	○		△	
	Off	D			
Auto rotate	On	D			×
	Off	○		△	D
Language		D?		△	
Video system	NTSC	D?		△	
	PAL	D?		△	

Explanatory notes

・The PLAY ⇔ REC switch set is maintained regardless of the color of the cell.

・Modes that do not have a separation line between them have the same settings. (The △ mark simply means that settings can only be selected for the first image in stich assist mode. Settings are common.)

<Cell color>

■ The setting is memorized. (Mode that does not remember settings, settings not remembered when the camera is off.)

□ Resets when switching to a mode that does not share the setting.

<Cell description>

□ The setting follows the registered shooting mode.

D Default value

D? Default varies according to region.

○ Selectable

× Not selectable

△ Only the first shot in stitch assist can be selected.

★ If the mode is selected with a suitable value, D is set. If the value is changed afterwards it is effective in subsequent modes. If the value is not changed, it is also effective in subsequent modes.

Best The camera sets the optimal value.

※ All items in this chart are locked in for the first image and cannnot be changed for subsequent shots.

Settings vary according to region as follows:

Region	Japan	USA	Europe	Oceania
Language	Japanese	English	English	English
Video	NTSC	NTSC	PAL	PAL
Date style	YYMMDD	MMDDYY	DDMMYY	DDMMYY

・The time is not set before shipping.

4-3 Replay compatibility

Image taking Cameras			Replay Cameras														
			PS 350	PS A5/ A5 Z	PS Pro70	PS A50	PS S10 PS S20	PS G1 PS Pro90 IS	ID 200 ID 300	IXY D PS A20 PS A10	PS G2 PS S40 PS S30	PS A200 PS A100	EOS D30 D60	EOS 1Ds EOS 1D	PS A40 PS A30 ID 300a ID 200a PS A60	PS S45 PS G3 PS S50	ID 320 PS A70 IXY D400 PS A300
	PS 350	CIFF	○	○	○	○	○	×	×	×	×	×	×	×	×	×	×
	PS A5/A5 Z	CIFF	△	○∗1	○∗1	○∗1	○∗1	×	×	×	×	×	×	×	×	×	×
	PS Pro70	CIFF	△	○∗2	○∗1	○∗1	○∗1	×	×	×	×	×	×	×	×	×	×
	PS A50	CIFF	△	○∗2	○∗1	○∗1	○∗1	×	×	×	×	×	×	×	×	×	×
		DCF	×	×	×	○∗1	○∗1	○∗1	○∗1	○∗1	○∗1	○∗1	○∗1	○∗7	○∗1	○∗1	○∗1
	PS S10/S20	DCF (Still)	×	×	×	○∗3	○	○	○	○	○	○	○	○∗7	○	○	○
	PS G1 PS Pro90 IS	DCF (Still)	×	×	×	○∗1∗3	○∗1	○	○∗1	○∗1	○	○∗1	○	○∗7	○∗1	○	○∗1
		(Movie)	×	×	×	▲	▲	○	○∗5	▲	○	○∗5	▲	▲	○∗5	○	○
	IXY DIGITAL 200/300	DCF (Still)	×	×	×	○	○	○	○	○	○	○	○	○∗7	○	○	○
		(Movie)	×	×	×	▲	▲	○∗6	○	▲	○	○∗5∗6	▲	▲	○	○	○
	IXY D/PS A10/A20	DCF (Still)	×	×	×	○	○	○	○	○	○	○	○	○∗7	○	○	○
	PS G2 PS S40/S30	DCF (Still)	×	×	×	○∗1∗3	○∗1	○	○∗1	○∗1	○	○∗1	○	○∗7	○∗1	○	○∗1
		(Movie)	×	×	×	▲	▲	○∗5 ∗6	○∗5∗6	▲	○	○∗5∗6	▲	▲	○∗5∗6	○	○
	PS A200/A100	DCF (Still)	×	×	×	○	○	○	○	○	○	○	○	○∗7	○	○	○
		(Movie)	×	×	×	▲	▲	○∗6	○∗5	▲	○	○	▲	▲	○	○	○
	ID 200a/300a	DCF (Still)	×	×	×	○	○	○	○	○	○	○	○	○∗7	○	○	○
		(Movie)	×	×	×	▲	▲	○∗6	○	▲	○	○∗5∗6	▲	▲	○	○	○
	EOS D30/D60/1D	DCF (Still)	×	×	×	○∗1∗3	○∗1	○	○∗1	○∗1	○	○∗1	○	○∗7	○∗1	○	○∗1
	EOS 1Ds	DCF (Still)	×	×	×	○∗1∗3∗4	○∗4	○∗4	○∗4	○∗4	○∗4	○∗4	○∗4	○∗7	○∗4	○∗4	○∗4
	PS A40/A30 PS A60	DCF (Still)	×	×	×	○	○	○	○	○	○	○	○	○∗7	○	○	○
		(Movie)	×	×	×	▲	▲	○∗6	○∗5	▲	○	○∗5∗6	▲	▲	○	○	○
	PS S45/G3 PS S50	DCF (Still)	×	×	×	○∗1∗3	○∗1	○	○∗1	○∗1	○	○∗1	○	○∗7	○∗1	○	○∗1
		(Movie)	×	×	×	▲	▲	○∗5∗6	○∗5∗6	▲	○∗5∗6	○∗5∗6	▲	▲	○∗5∗6	○	○
	ID 320/PS A70 IXY D400 / PS A300	DCF (Still)	×	×	×	○∗3	○	○	○	○	○	○	○	○∗7	○	○	○
		(Movie)	×	×	×	▲	▲	○∗5∗6	○∗5∗6	▲	○∗5∗6	○∗5∗6	▲	▲	○∗5∗6	○	○
	DCF models without Canon	DCF (Still)	×	×	×	○∗3	○∗4	○∗4	○∗4	○∗4	○∗4	○∗4	○∗4	○∗7	○∗4	○∗4	○∗4
		(Movie)	×	×	×	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲

○ : Replayable
△ : Not replayable when RAW image
▲ : Thumbnail replays when movie
× : Not replayable

∗1 : Thumbnail displays of RAW image
∗2 : Thumbnail displays of RAW image / JPEG file replays up to 1024×768 pixels
∗3 : JPEG file replays up to 1632×1232 pixels / (Thumbnail displays when more than 1632×1232 pixels)
∗4 : JPEG file replays up to 3200×2400 pixels / (Thumbnail displays when more than 3200×2400 pixels)
∗5 : Not replay when file size exceeds fixed capacity
∗6 : Not replay when movie's play time exceeds time limit
∗7 : Thumbnail displays

5 System

5-1 Accessories' compatibility

	IXY DIGITAL 400	PS A300 PS A200 PS A100	PS A70 PS A60	PS S50 PS S45 PS S40 PS S30	PS G3	I D 320 I D 200a I D 200	I D 300a I D 300	PS A40 PS A30 PS A20 PS A10	PS G2	IXY DIGITAL	PS Pro 90 IS	PS G1	PS S10 PS S20	PS Pro70	PS A5 PS A5 Z PS A50
＜Battery＞															
NB-5H	-	-	-	-	-	-	-	-	-	-	-	-	O	-	O
NB-4H	-	-	-	-	-	-	-	-	-	-	-	-	-	O	-
NB-1L	O	-	-	-	-	O	O	-	-	O	-	-	-	-	-
BP-511	-	-	-	-	O	-	-	-	O	-	O	O	-	-	-
BP-512	-	-	-	-	O	-	-	-	O	-	-	-	-	-	-
NB4-100	-	O*1	O	-	-	-	-	O	-	-	-	-	-	-	-
NB-2L	-	-	-	O	-	-	-	-	-	-	-	-	-	-	-
NB-1LH	O	-	-	-	-	O	O	-	-	O	-	-	-	-	-

*1: 2 sets of 2 batteries (4 battery packages).

＜Adapter/Charger＞															
CA-PS100/100E	-	-	-	-	-	-	-	-	-	-	-	-	O	-	O
CA-PS200	-	-	-	-	-	-	-	-	-	-	-	-	-	O	-
CA-PS300	-	-	-	-	-	-	-	-	-	O	-	-	-	-	-
CA-PS500	O	-	-(O)*2	-	-	O	O	-(O)*2	-	O	-	-	-	-	-
CA-560	-	-	-	-	O	-	-	-	O	-	O	O	-	-	-
CR-560	-	-	-	-	O	-	-	-	O	-	O	O	-	-	-
CA-PS800	-	O	-	-	-	-	-	-	-	-	-	-	-	-	-
CB-2L/2LE	-	-	-	-	-	-	-	-	-	O	-	-	-	-	-
CB-2LS/2LSE	O	-	-	-	-	O	O	-	-	-	-	-	-	-	-
CB-3AH	-	O*3	O	-	-	-	-	O	-	-	-	-	-	-	-
CBK100	-	O*3	O	-	-	-	-	O	-	-	-	-	-	-	-
CB-2LT/CB-2LTE	-	-	-	O	-	-	-	-	-	-	-	-	-	-	-
CBC-NB1	O	-	-	-	-	O	O	-	-	-	-	-	-	-	-
CBC-NB2	-	-	-	O	-	-	-	-	-	-	-	-	-	-	-

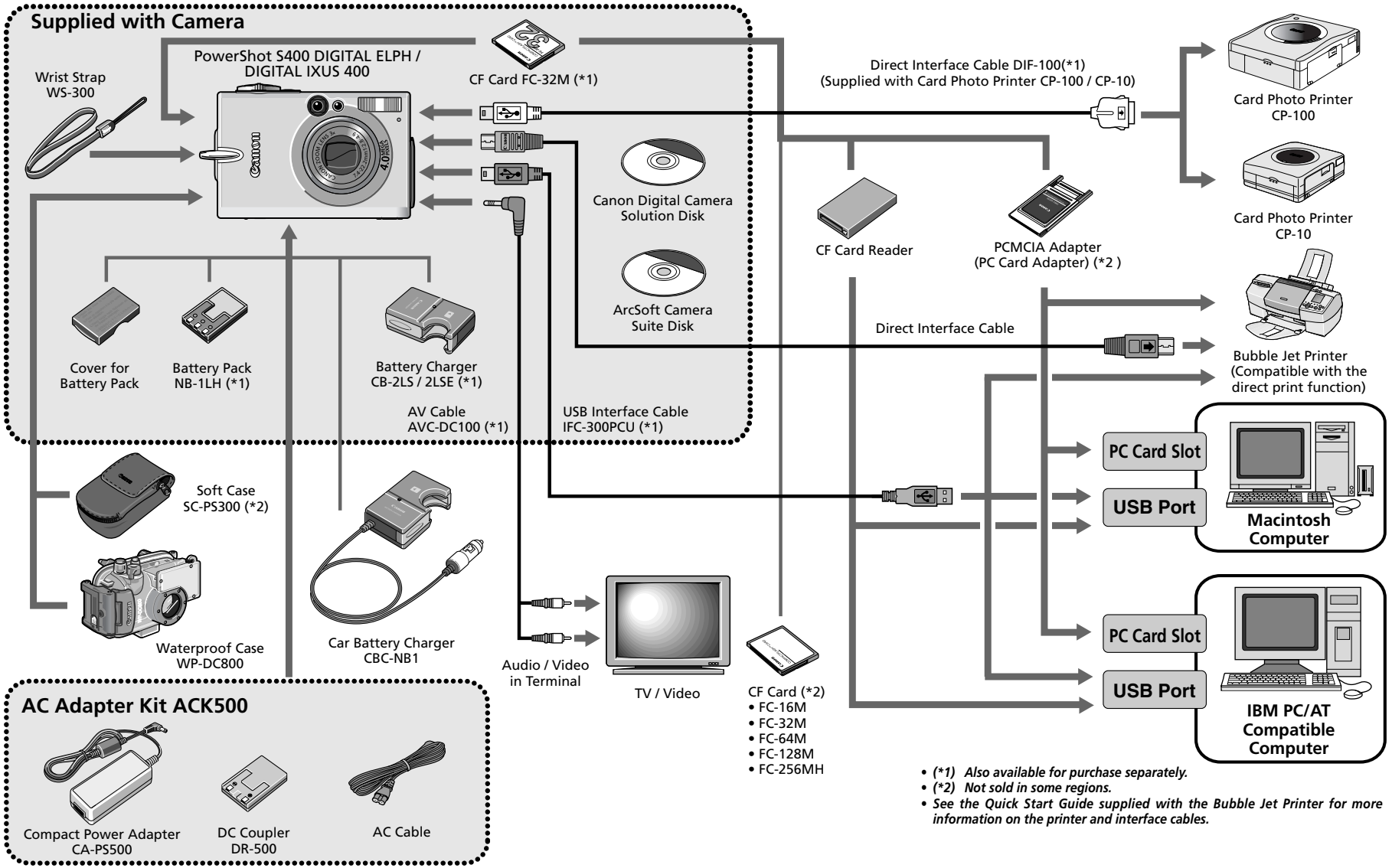
*2: It is possible to use by inserting the adapter's DC plug in the jack of PS A40/A30/A20/A10 cameras directly without using DC coupler.
*3: 4 batteries (2 set of 2) can be recharged.

＜DC Coupler＞															
DR-100/100A	-	-	-	-	-	-	-	-	-	-	-	-	O	-	O
DR-200	-	-	-	-	-	-	-	-	-	-	-	-	-	O	-
DR-300	-	-	-	-	-	-	-	-	-	O	-	-	-	-	-
DR-500	O	-	-	-	-	O	O	-	-	-	-	-	-	-	-
DR-700	-	-	-	O	-	-	-	-	-	-	-	-	-	-	-

＜Lens Accesory＞															
WC-DC58	-	-	-	-	-	-	-	-	O	-	O	O	-	-	-
WC-DC52	-	-	O	-	-	-	-	O	-	-	-	-	-	-	-
WC-DC58N	-	-	-	-	O	-	-	-	-	-	-	-	-	-	-
TC-DC58	-	-	-	-	-	-	-	-	O	-	-	O	-	-	-
TC-DC58N	-	-	-	-	O	-	-	-	-	-	-	-	-	-	-
250D 58mm	-	-	-	-	O	-	-	-	O	-	-	O	-	-	-
500D 58mm	-	-	-	-	-	-	-	-	-	-	O	-	-	-	-
250D 52mm	-	-	O	-	-	-	-	O	-	-	-	-	-	-	-
LA-DC58	-	-	-	-	-	-	-	-	O	-	-	O	-	-	-
LA-DC52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LA-DC58N	-	-	-	-	O	-	-	-	-	-	-	-	-	-	-
LH-DC58	-	-	-	-	-	-	-	-	-	-	O	-	-	-	-
TC-DC52	-	-	O	-	-	-	-	O	-	-	-	-	-	-	-
LA-DC52B	-	-	-	-	-	-	-	O	-	-	-	-	-	-	-
LA-DC52C	-	-	O	-	-	-	-	-	-	-	-	-	-	-	-

＜Speed Light＞															
220EX	-	-	-	-	O	-	-	-	O	-	O	O	-	O	-
380EX	-	-	-	-	O	-	-	-	O	-	O	O	-	O	-
550EX	-	-	-	-	O	-	-	-	O	-	O	O	-	-	-
420EX	-	-	-	-	O	-	-	-	O	-	O	O	-	-	-
(MR-14EX)	-	-	-	-	O	-	-	-	O	-	-	-	-	-	-
(MT-24EX)	-	-	-	-	O	-	-	-	-	-	-	-	-	-	-
＜Remote Switch＞															
WL-DC100	-	-	-	-	O	-	-	-	O	-	O	O	-	-	-
RS-8N3	-	-	-	-	-	-	-	-	-	-	-	-	-	O	-
＜Cable/Others＞															
VC-100	-	-	-	-	-	-	-	O(A30/A20)	-	-	-	-	O	O	O
VC-200	-	-	-	-	-	-	-	-	-	O	-	-	-	-	-
AVC-DC100	O	-	O	O	O	-	O	O(A40)	O	-	O	O	-	-	-
AVC-DC200	-	-	-	-	-	O	-	-	-	-	-	-	-	-	-
IFC-100PCS	-	-	-	-	-	-	-	-	-	-	-	-	-	O	O
IFC-100MC	-	-	-	-	-	-	-	-	-	-	-	-	-	O	O
IFC-200PCS	-	-	-	-	-	-	-	-	-	-	O	O	O	-	-
IFC-200PCU	-	-	-	-	O	O	-	-	O	O	O	O	O	-	-
IFC-200MC	-	-	-	-	-	-	-	-	-	-	O	O	O	-	-
IFC-300PCU	O	O	O	O	-	-	O	O	-	-	-	-	-	-	-
AD-PC98	-	-	-	-	-	-	-	-	-	-	O	O	O	O	O
DIF-100	O	O	O	O	O	-	O	O	O	-	-	-	-	-	-
DIF-200	-	-	-	-	-	O	-	-	-	-	-	-	-	-	-
＜Case＞															
SC-PS100	-	-	-	-	-	-	-	-	-	-	-	-	O	-	O
SC-PS300	-	-	-	-	-	O(200a/200)	-	-	-	O	-	-	-	-	-
SC-PS400	-	-	-	-	-	-	-	-	-	-	-	O	-	-	-
SC-PS500	-	-	-	-	-	-	O	-	-	-	-	-	-	-	-
SC-PS600	-	-	O	-	-	-	-	O	-	-	-	-	-	-	-
SC-PS700	-	-	-	-	-	-	-	-	O	-	-	-	-	-	-
SHC-PS200	-	-	-	-	-	-	-	-	-	-	-	-	-	O	-
SHC-PS300	-	-	-	-	-	-	-	-	-	-	O	-	-	-	-
SC-PS800	-	-	-	O	-	-	-	-	-	-	-	-	-	-	-
SC-PS900	-	O	-	O	-	-	-	-	-	-	-	-	-	-	-
IXC-200A/B	O	-	-	-	-	O	-	-	-	O	-	-	-	-	-
IXC-300A/B	-	-	-	-	-	-	O	-	-	-	-	-	-	-	-
SC-DC10	-	-	-	-	O	-	-	-	-	-	-	-	-	-	-
＜All Wether Case / Water Proof Case＞															
AW-PS100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O(A5)
AW-PS110	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O(A5Z/A50)
AW-PS200	-	-	-	-	-	-	-	-	-	O	-	-	-	-	-
WP-DC100	-	-	-	-	-	-	O(300)	-	-	-	-	-	-	-	-
WP-DC200	-	-	-	-	-	-	-	O(A20/A10)	-	-	-	-	-	-	-
WP-DC300	-	-	-	O	-	-	-	-	-	-	-	-	-	-	-
WP-DC200s	-	-	-	-	-	-	-	O	-	-	-	-	-	-	-
WP-DC400	-	O(A200/A100)	-	-	-	-	-	-	-	-	-	-	-	-	-
WP-DC500	-	-	-	-	-	-	O(300a)	-	-	-	-	-	-	-	-
WP-DC600	-	-	-	-	-	O	-	-	-	-	-	-	-	-	-
WP-DC700	-	-	O	-	-	-	-	-	-	-	-	-	-	-	-
WP-DC800	O	-	-	-	-	-	-	-	-	-	-	-	-	-	-

PowerShot S400 DIGITAL ELPH / DIGITAL IXUS 400 SYSTEM MAP



- *(*1) Also available for purchase separately.*
- *(*2) Not sold in some regions.*
- *See the Quick Start Guide supplied with the Bubble Jet Printer for more information on the printer and interface cables.*

CHAPTER 2. TECHNICAL DESCRIPTION

CONTENTS

1. Functions of each unit

1.1 MAIN PCB ASS'Y

1) Driving the CCD Sensor.
2) Conversion of the image signal from the analog signal to the digital signal.
3) Controlling the power supply and the system by CPU. (Refer to Sections 2.1 and 2.2.)
4) Image processing, and reading and writing the image signal to and from the CF card using DSP. (Refer to Section 2.2.2.)
5) LCD drive and amplification of the video and audio output. (Refer to Section 2.2.3.)
6) Power supply drive (DC/DC converter).

1.2 ST UNIT

1) Flash drive and charging circuit for the flash.

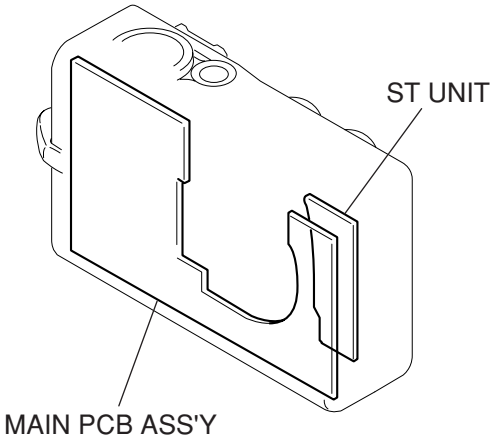


Fig. 1

2. Outline of Circuits

2.1 Power Supply Control

The power supply is controlled by the CPU mounted on the MAIN PCB ASS'Y.

2.1.1 Power Supply Block Diagram

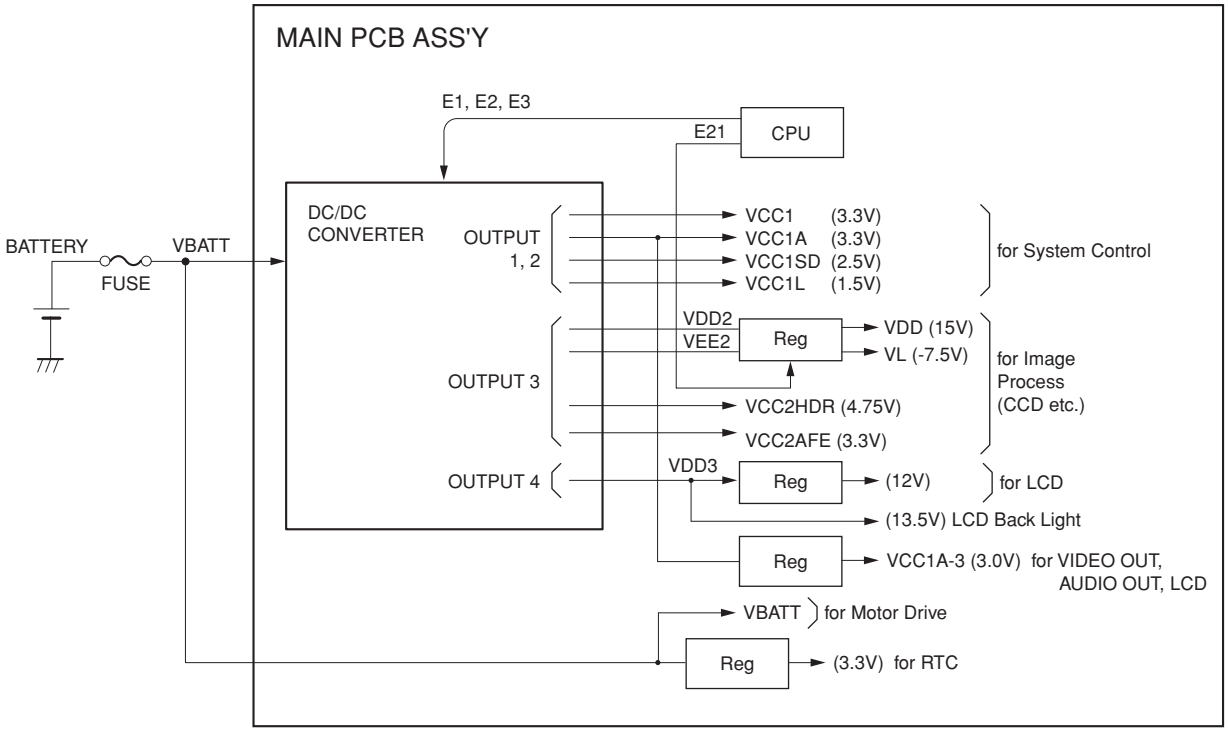
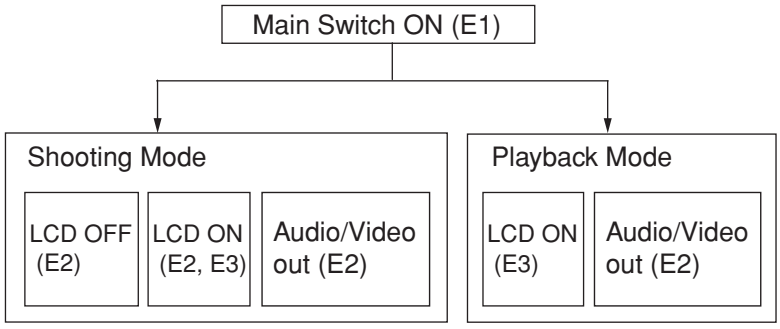


Fig. 2 Power System Block Diagram

2.1.2 Power Control Sequence



2.2 Signal Processing

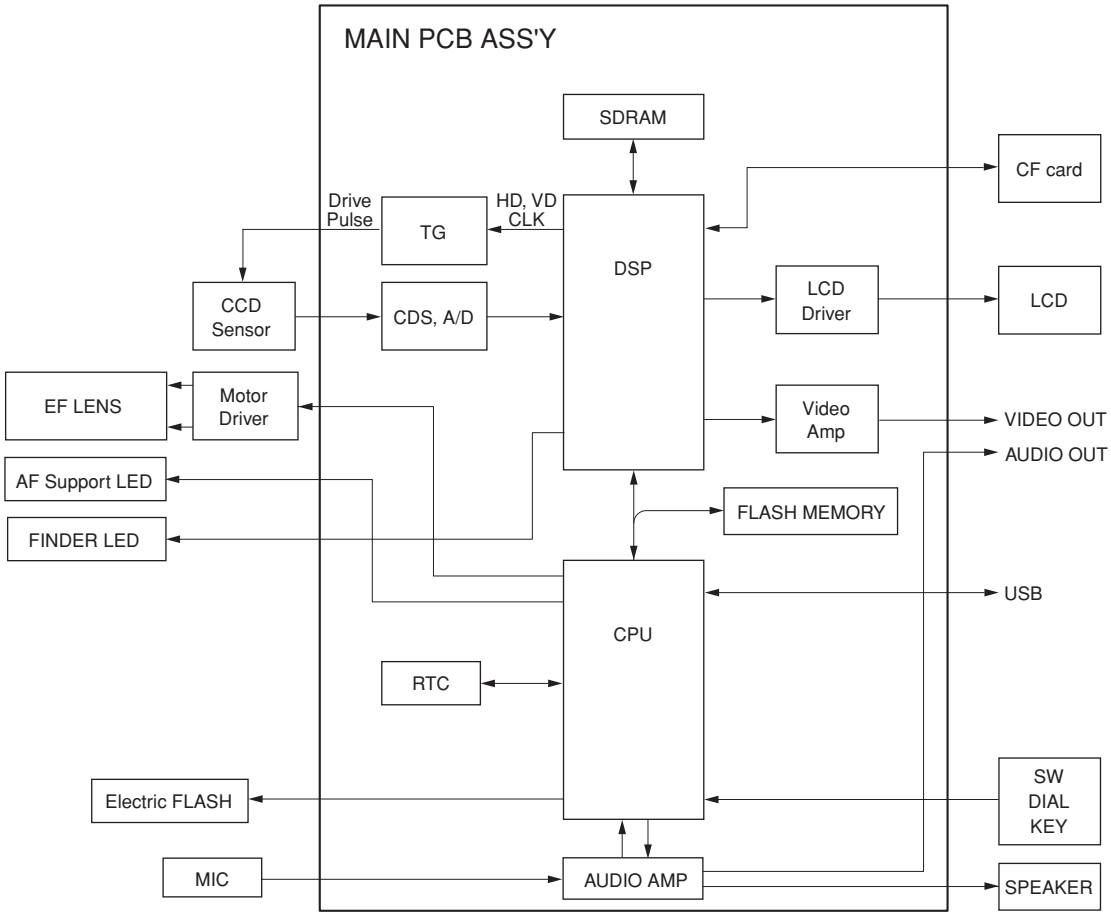


Fig. 3 Signal System Block Diagram

2.2.1 System Control

The CPU on the main PCB ass'y controls the EF lens (motor, shutter), operation switch receiver, USB communication and flowing circuits.

- TG: Creation of the CCD drive pulse
- CDS, A/D: CCD signal processing and conversion of the digital data
- LCD Driver: Driving the LCD
- FLASH MEMORY: Firmware memory
- DSP: Picture processing
- RTC: Clock count for watch
- AF Support LED: AF auxiliary, self-timer and red-eye protection also serves as a lamp
- Electric Flash: Flash and charging circuit

2.2.2 Picture Processing

1) The drive pulse of the CCD sensor is created by both clock from DSP and TG that is operated by sync. signal.
   The picture signal by the drive pulse is output from CCD sensor.
   The output signal of the CCD picture is converted to the signal processing and the digital data by the CDS and A/D converter, and is sent to the DSP.

2) The DSP circuit performs the following signal processing.
   - Processes the picture data (using the SDRAM).
   - Writes and reads the picture data to and from the CF card.
   - Outputs analog video signal to the LCD and VIDEO OUT.

3) The LCD driver converts the digital video signal coming from DSP to the analog video signal and display the video signal on the LCD panel.

4) The video amplifier is activated when the video plug is inserted to the AV connector and drives the video signal in 75 Ω.

2.2.3 Audio Processing (During record and playback)

1) During animation recording.
   - The microphone audio signal is converted to the digital data by CPU and is recorded.
2) During playback, the data is converted back to the analog audio signal and is output to the AV connector and speaker.

3. Troubleshooting

3.1 When an Error Code is Displayed

[Remedy]

- Check for any abnormalities in the mounting of probable faulty parts or connector connections referring to the table below.
- Try replacing probable faulty parts referring to the below.

[NOTE]

- The error code is displayed on the LCD Monitor.
- Adjustments must be performed after the part has been replaced. For details, see the chapter of "Adjustments".

Error Code	Name	Occurrence Conditions	Cause and Probable Faulty Part
E02	AF TIME OUT	AF processing did not end within the specified time.	MAIN PCB ASS'Y
		The focus lens was not driven.	MAIN PCB ASS'Y
E03	EF TIME OUT	Auto Flash Control did not end within the specified time.	MAIN PCB ASS'Y
E09	JPEG DMA TIME OUT	JPEG processing did not end within the specified time.	MAIN PCB ASS'Y
E14	UNKOWN	When unkown error, cause of which is not known, occurs.	UNKOWN
E16	IMAGING TIME OUT	When communication between CPU and peripheral IC is not completed within the specified time during recording using EVF or after completion of recording.	MAIN PCB ASS'Y
E18	ZOOM LENS ERROR	Movement of the lens barrel did not end within the specified time.	MAIN PCB ASS'Y
E23	CF NO SPACE	When the CF becomes full during writing of photographed images to CF, writing is repeatedly performed with the JPEG compression ratio successively increased to reduce the size of the image file until it can be successfully written to CF. This error occurs when writing of the JPEG image file fails after 10 retries at increasingly higher compression ratios.	MAIN PCB ASS'Y
E24	POWER ON ERROR	The power of the imaging circuit on the MAIN PCB ASS'Y was not detected.	MAIN PCB ASS'Y
E25	FOCUS PI ERROR	Detection of the focus PI (photo-interrupter) failed.	OPTICAL MODULE UNIT
			MAIN PCB ASS'Y
E26	CAPTURE TIME OUT	Writing of the photograph image to SDRAM did not end within the specified time.	MAIN PCB ASS'Y

Error Code	Name	Occurrence Conditions	Cause and Probable Faulty Part
E27	CF WRITE TIME OVER	Free area could not be secured in the buffer for the photograph image within the specified time in the continuous shooting mode.	CF CARD MAIN PCB ASS'Y
E30	POWER OFF ERROR	The camera power was turned OFF while the image was being recorded to the CF Card. (The error code is displayed when the camera is next turned ON.) * This error may occur after E23.	The battery or DC plug was removed while the image was being recorded to the CF Card. → Remedy: Restart the camera.
E50	CF FORMAT ERROR	The CF Card could not be formatted properly.	CF CARD
E51	CF ACCESS ERROR	When image data cannot be read from CF normally.	CF CARD
E52	QUICK REVIEW ERROR	Review of the photograph image failed.	MAIN PCB ASS'Y

3.2 When a Problem Occurs

[Remedy]

- Check for any abnormalities in the mounting of probable faulty parts or connector connections referring to the table below.
- Try replacing probable faulty parts referring to the table below.

[NOTE]

- Adjustments must be performed after the part has been replaced. For details, see the chapter of "Adjustments".

Problem (when an error code is not displayed)	Cause and Probable Faulty Part
The camera does not work.	MAIN PCB ASS'Y
	FLASH/BASE UNIT
	BATTERY BOX UNIT
The image is not displayed on the LCD Monitor.	MAIN PCB ASS'Y
	LCD PANEL
	BACK LIGHT UNIT
The photograph image is abnormal.	OPTICAL UNIT
	MAIN PCB ASS'Y
The zoom does not function.	OPTICAL UNIT
	MAIN PCB ASS'Y
	BATTERY BOX UNIT
The Built-in Flash does not fire.	FLASH/BASE UNIT
Video output is strange.	MAIN PCB ASS'Y
Communications with the personal computer is not possible.	MAIN PCB ASS'Y
The CF card or Micro Drives is not recognized.	CF CARD
	MAIN PCB ASS'Y
Buttons/The Mode dial do not work.	OPERATION KEY UNIT
	RLS FPC

CHAPTER 3. REPAIR INSTRUCTION

CONTENTS

1. Before Starting the Repair Work

Be sure to read the following precaution before starting the repair work.

1.1 Precaution on Flash High Tension Circuit

- When the MAIN PCB ASS'Y is removed, be sure to discharge the main capacitor. (Discharging resistor : 1 kΩ, approx. 5 W.)
- First contact the GND ⊖ terminal of the main capacitor with the discharging resistor. Then contact the positive ⊕ terminal of the main capacitor.

CAUTION:
Be careful of electric shock because the circuit is the high tension circuit.

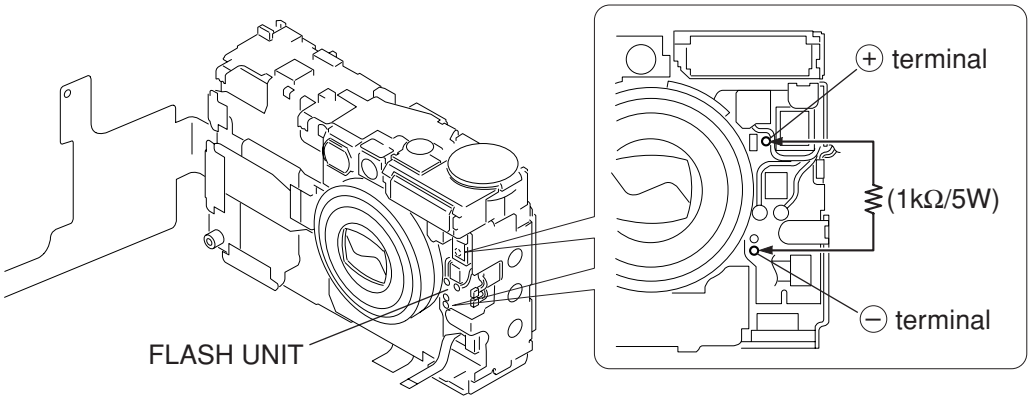


Fig. 3-1 Precaution on flash high tension circuit

1.2 List of Tools

The following tools are used for the re-assembling during service.

(1) List of tools

New	Name of tools	Part No.	Remarks
	Screwdriver (Local Purchase)		
	Tweezers (Local Purchase)		
	Soldering iron (Local Purchase)		

1.3 List of Supplies

The following supplies are used for the re-assembling during service.

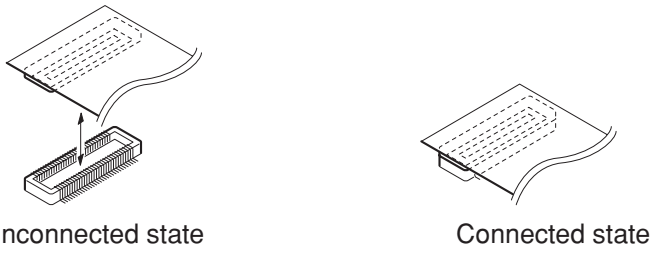
(1) List of supplies

New	Name of supplies	Part No.	Remarks
	ADHESIVE TAPE SONY T4000	CY4-6012-000	Double-sided Tape
	DIA BOND No.1663G	CY9-8129-000	
	LOGENEST RAMBDA A-74	CY9-8102-000	
	HANARL FL-778	DY9-3026-010	
	Solder (Local Purchase)		

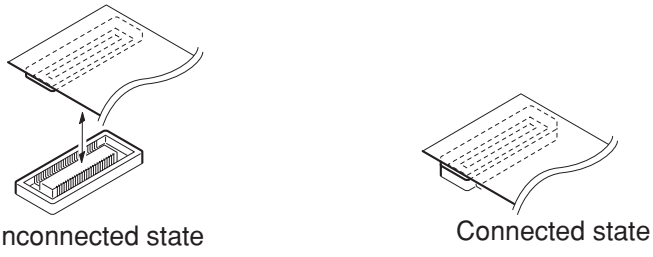
1.4 Flexible Connectors

This product uses the five types of the flexible connectors.

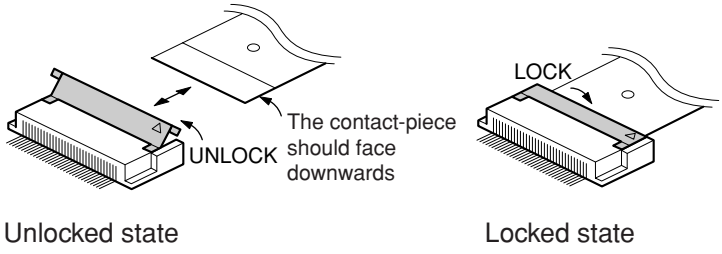
① Type A



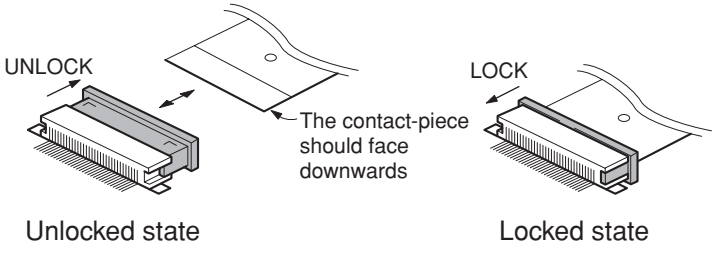
② Type B



③ Type C



④ Type D



⑤ Type E

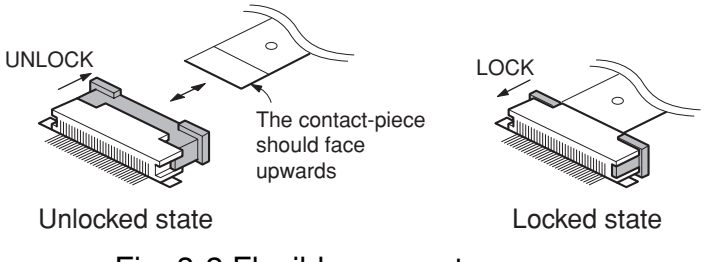


Fig. 3-2 Flexible connectors

CAUTIONS:

1. For the connectors of Type C, Type D and Type E, set them to the unlocked state before removing and inserting flexible card. After flexible card is inserted, set them to the locked state.
2. The flexible card is equipped with the holes as shown. Use them for removal and insertion by inserting the tweezers into them as required.

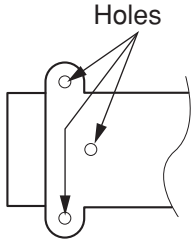
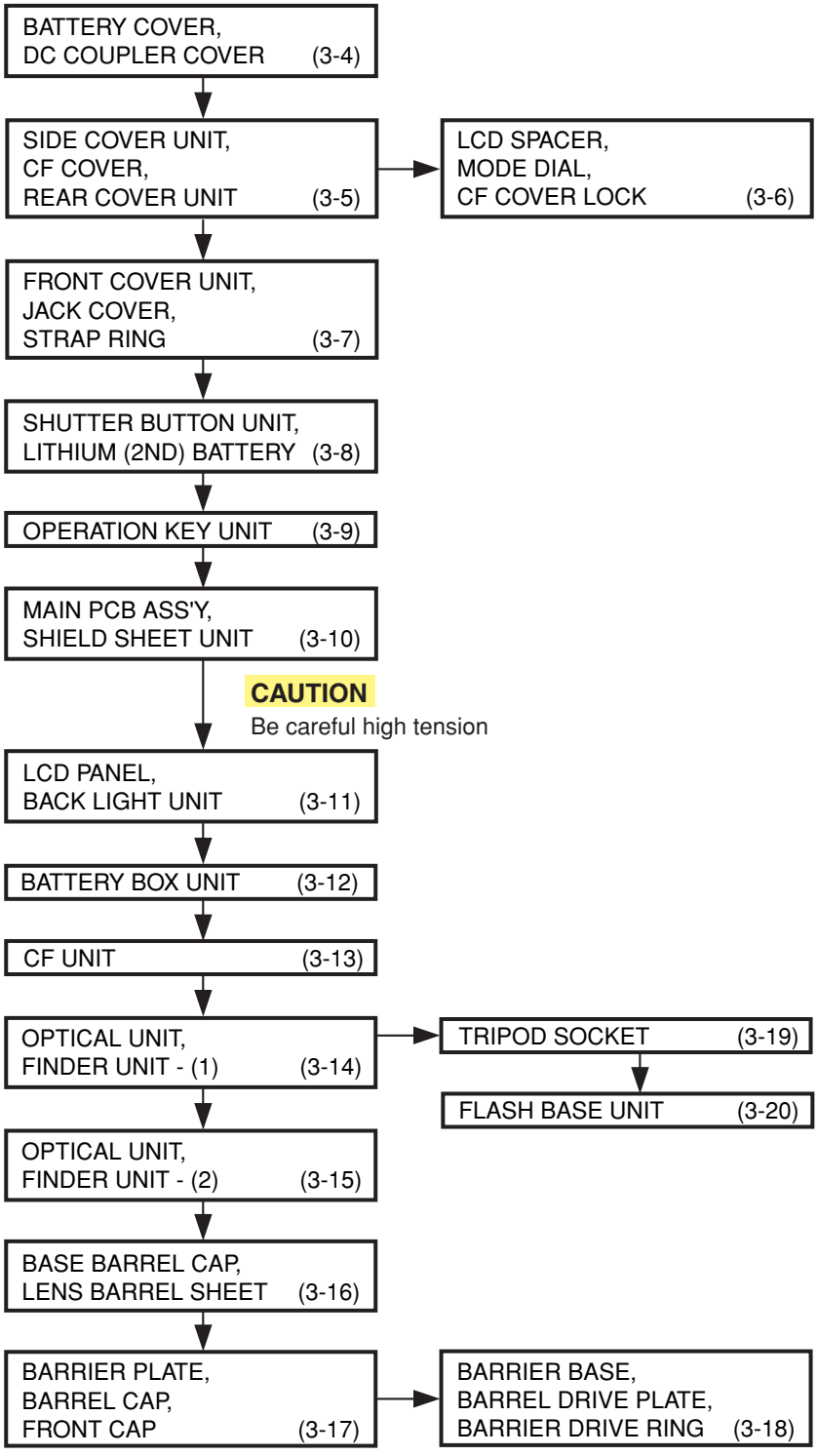


Fig. 3-3 Holes for removal

2. Disassembly/Assembly

2.1 Procedure

Disassembling procedure of PowerShot S400 is shown by the following flowchart.
Reverse the disassembling procedure to reassemble them. ∗ The pages to refer are shown in parenthesis ( ).



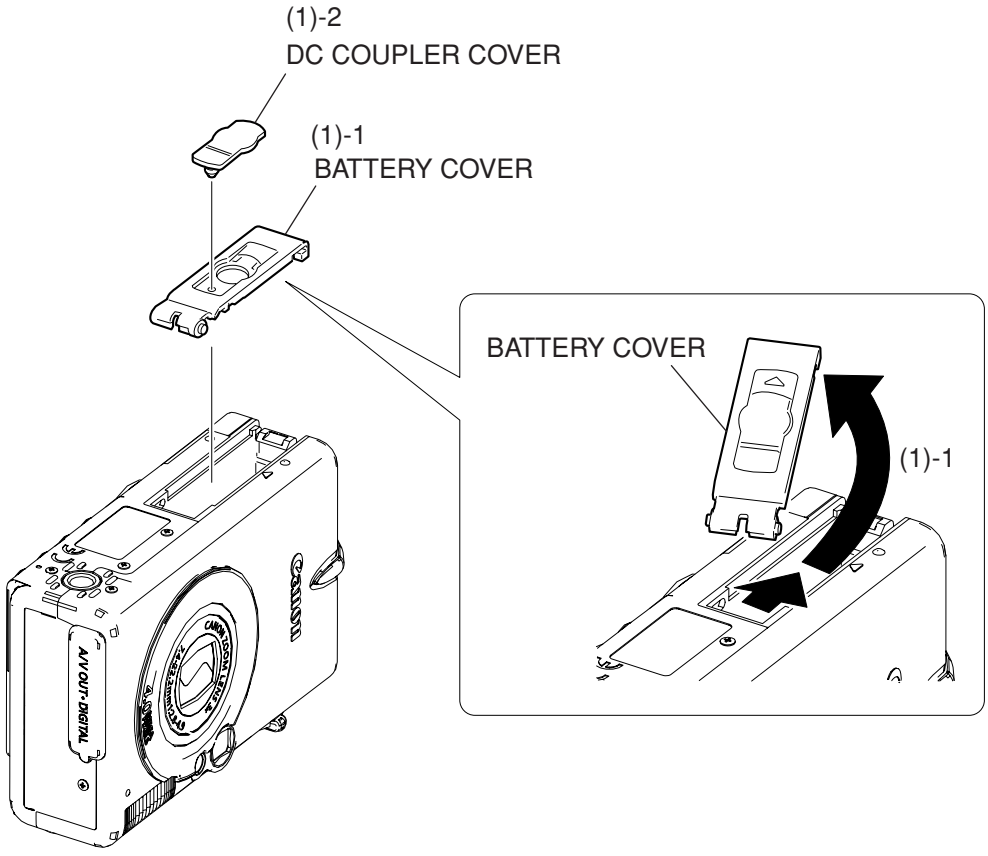


Fig. 3-4 BATTERY COVER, DC COUPLER COVER

2.2 BATTERY COVER, DC COUPLER COVER

(1) Slide and twist the BATTERY COVER in the direction of arrow, then remove the BATTERY COVER.
(2) Remove the DC COUPLER COVER.

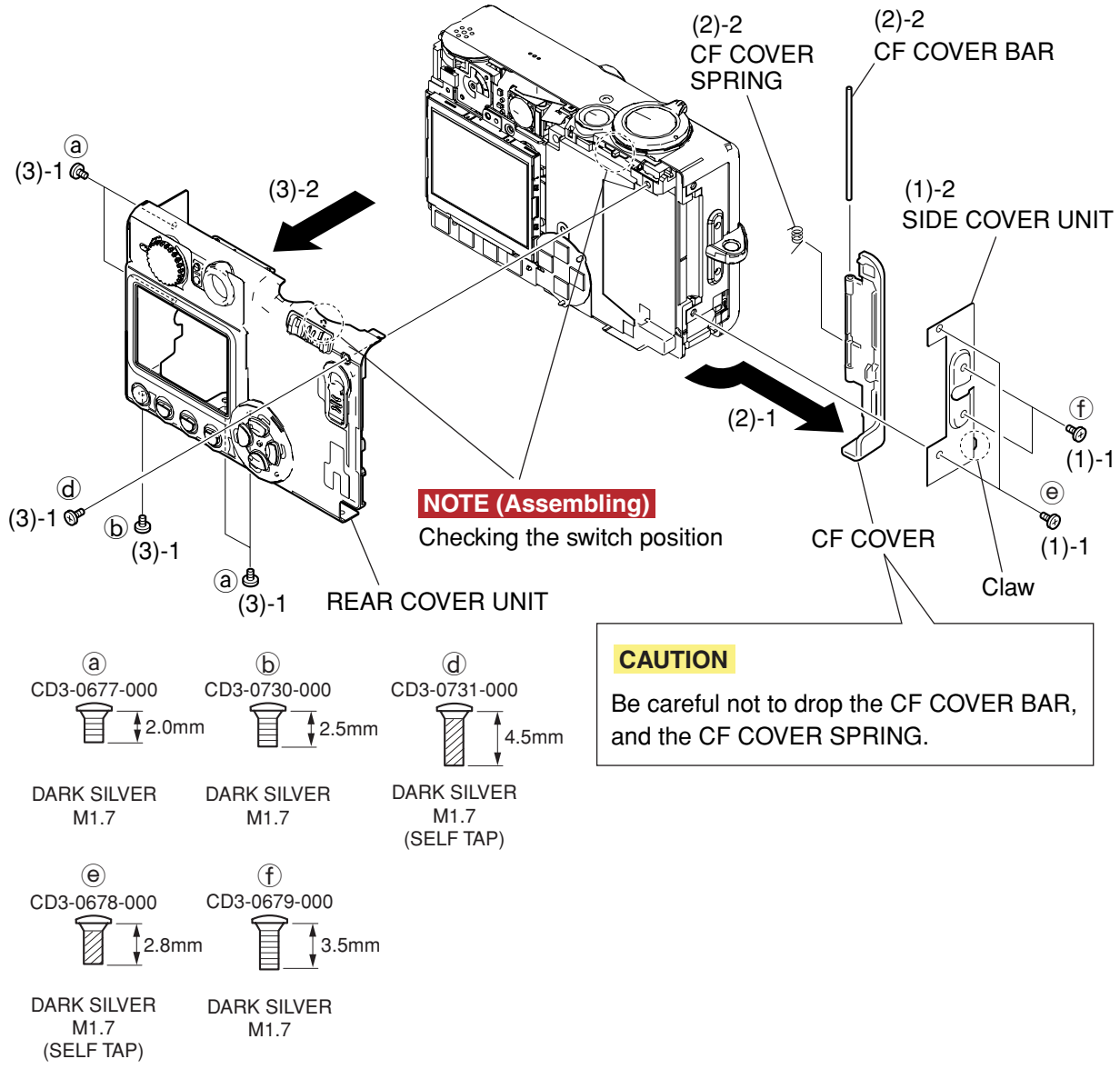


Fig. 3-5 SIDE COVER UNIT, CF COVER, REAR COVER UNIT

2.3 SIDE COVER UNIT, CF COVER, REAR COVER UNIT

(1) SIDE COVER UNIT
1. Remove the two screws of ⓔ, and the two screws of ⓕ.
2. Remove the one claw and remove the SIDE COVER UNIT.

(2) CF COVER
1. Remove the CF COVER in the direction of arrow.

CAUTION

Be careful not to drop the CF COVER BAR, and the CF COVER SPRING.

2. Remove the CF COVER BAR, and the CF COVER SPRING.

(3) REAR COVER UNIT
1. Remove the four screws of ⓐ, the screw of ⓑ, and the screw of ⓓ.
2. Remove the REAR COVER UNIT.

NOTE (Assembling)

When assembling, check that the switch is in the correct position.

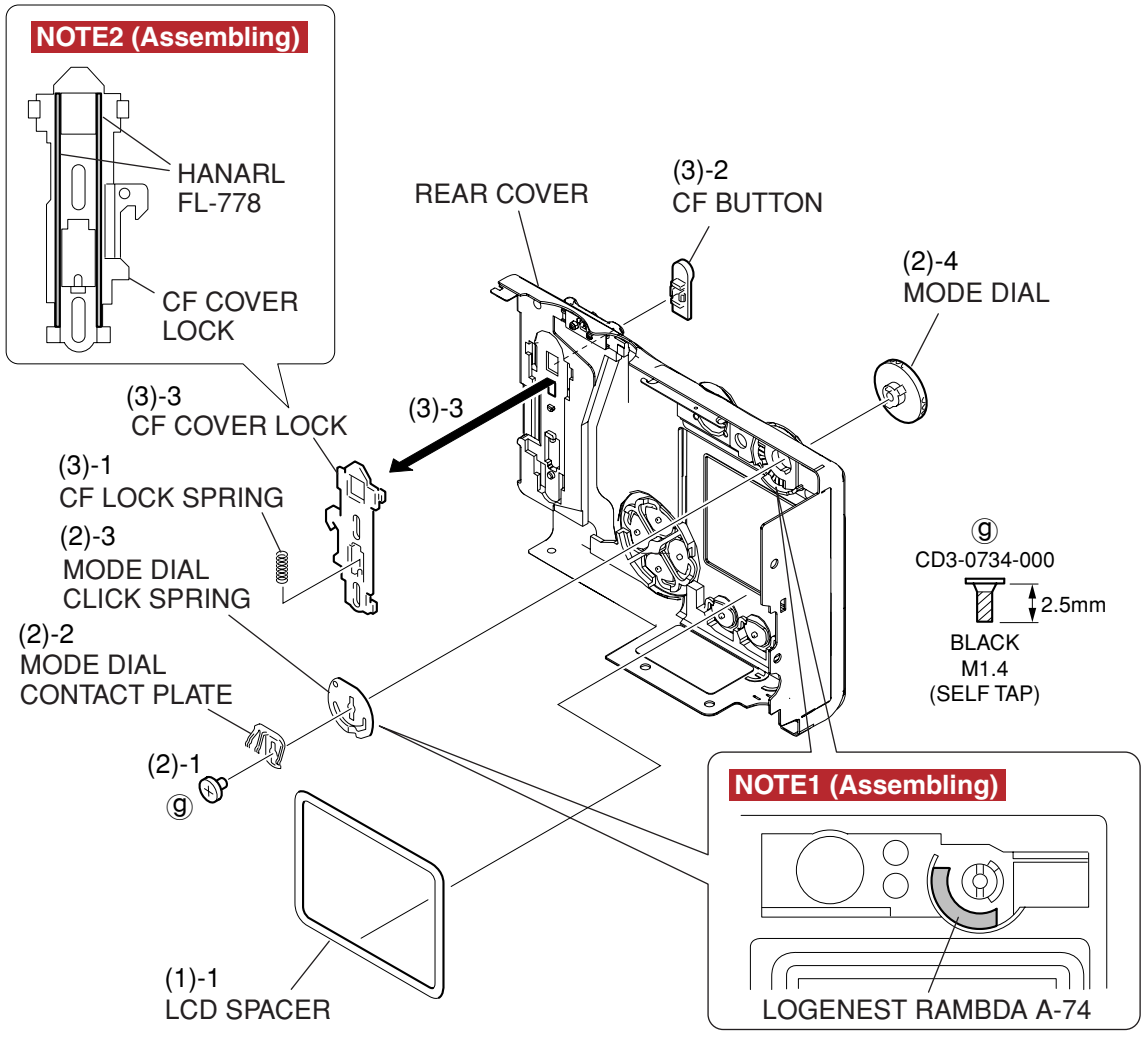


Fig. 3-6 LCD SPACER, MODE DIAL, CF COVER LOCK

2.4 LCD SPACER, MODE DIAL, CF COVER LOCK

(1) LCD SPACER

1. Remove the LCD SPACER.

(2) MODE DIAL

1. Remove the screw of ⓖ.
2. Remove the MODE DIAL CONTACT PLATE.
3. Remove the MODE DIAL CLICK SPRING.

NOTE1 (Assembling)

Coat it with the LOGENEST RAMBDA A-74 at the area as shown in the figure.

4. Remove the MODE DIAL.

(3) CF COVER LOCK

1. Remove the CF LOCK SPRING.
2. Remove the CF BUTTON.
3. Remove the CF COVER LOCK in the direction of arrow.

NOTE2 (Assembling)

Coat the contact surface of the CF COVER LOCK and the REAR COVER with the HANARL FL-778 as shown in the figure.

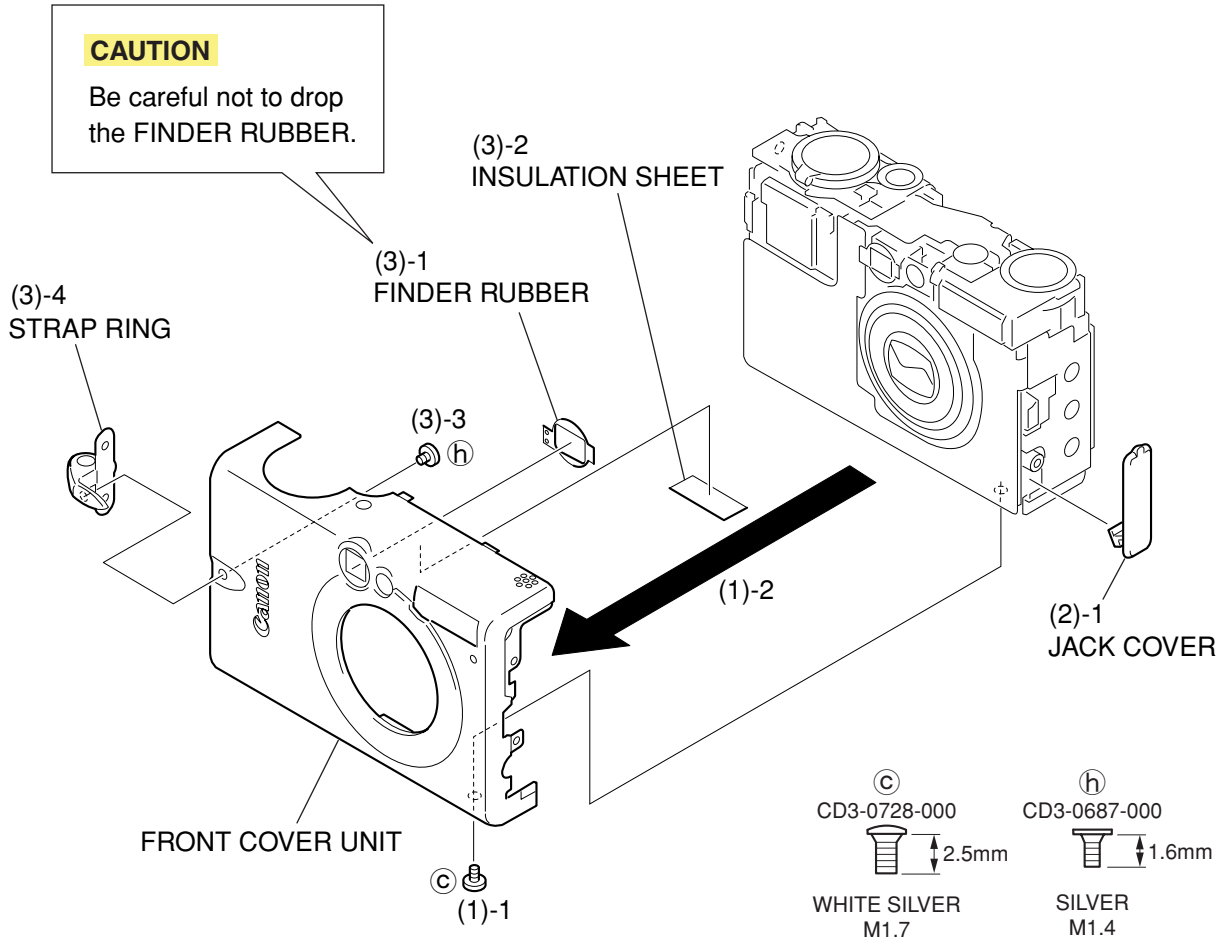


Fig. 3-7 FRONT COVER UNIT, JACK COVER, STRAP RING

2.5 FRONT COVER UNIT, JACK COVER, STRAP RING

(1) FRONT COVER UNIT
1. Remove the screw of ⓒ.
2. Remove the FRONT COVER UNIT in the direction of arrow.

CAUTION
Be careful not to drop the FINDER RUBBER.

(2) JACK COVER
1. Remove the JACK COVER.

(3) STRAP RING
1. Remove the FINDER RUBBER.
2. Remove the INSULATION SHEET.
3. Remove the screw of ⓗ.
4. Remove the STRAP RING.

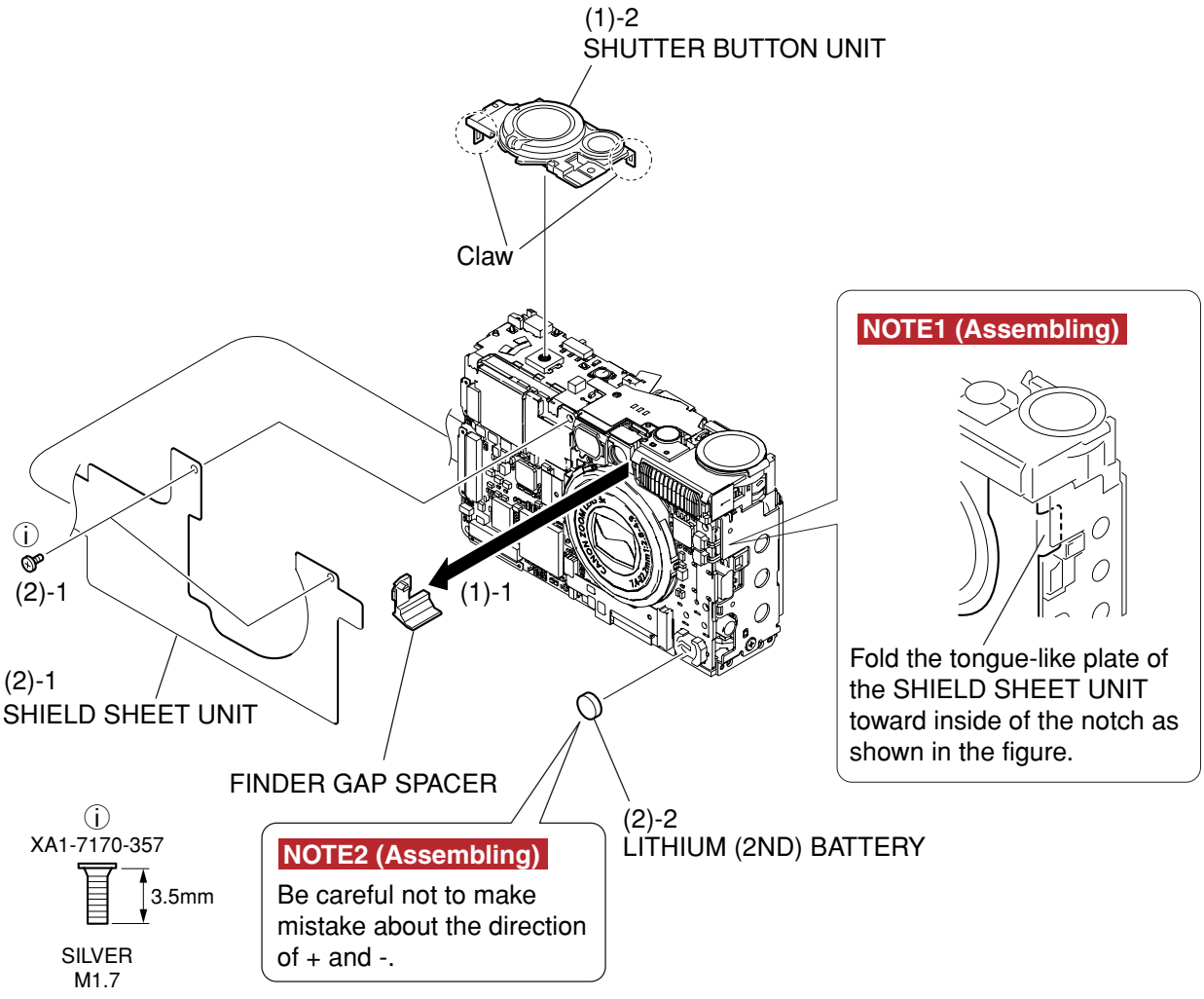


Fig. 3-8 SHUTTER BUTTON UNIT, LITHIUM (2ND) BATTERY

2.6 SHUTTER BUTTON UNIT, LITHIUM (2ND) BATTERY

(1) SHUTTER BUTTON UNIT

1. Remove the FINDER GAP SPACER in the direction of arrow.
2. Remove the two claws and remove the SHUTTER BUTTON UNIT.

(2) LITHIUM (2ND) BATTERY

1. Remove the two screws of ⓘ, and open the SHIELD SHEET UNIT.

NOTE1 (Assembling)

Fold the tongue-like plate of the SHIELD SHEET UNIT toward inside of the notch as shown in the figure.

2. Remove the LITHIUM (2ND) BATTERY.

NOTE2 (Assembling)

Be careful not to make mistake about (+) and (-) direction.

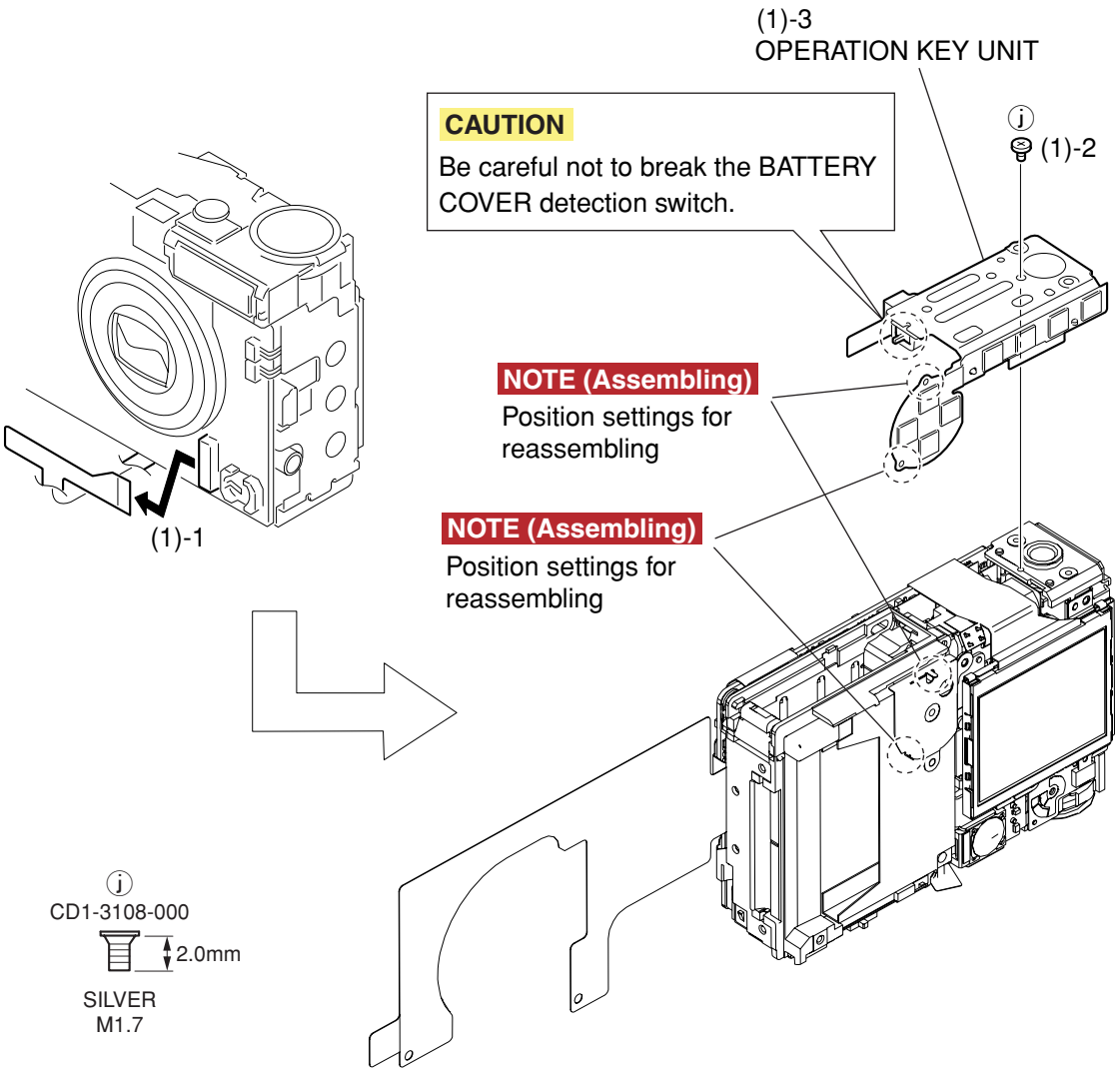


Fig. 3-9 OPERATION KEY UNIT

2.7 OPERATION KEY UNIT

(1) OPERATION KEY UNIT

1. Disconnect the connector of the flexible board.
2. Remove the screw of ⓙ.
3. Remove the OPERATION KEY UNIT.

CAUTION

Be careful not to break the BATTERY COVER detection switch.

NOTE (Assembling)

Align the main body with the two dowels for position setting of OPERATION KEY UNIT.

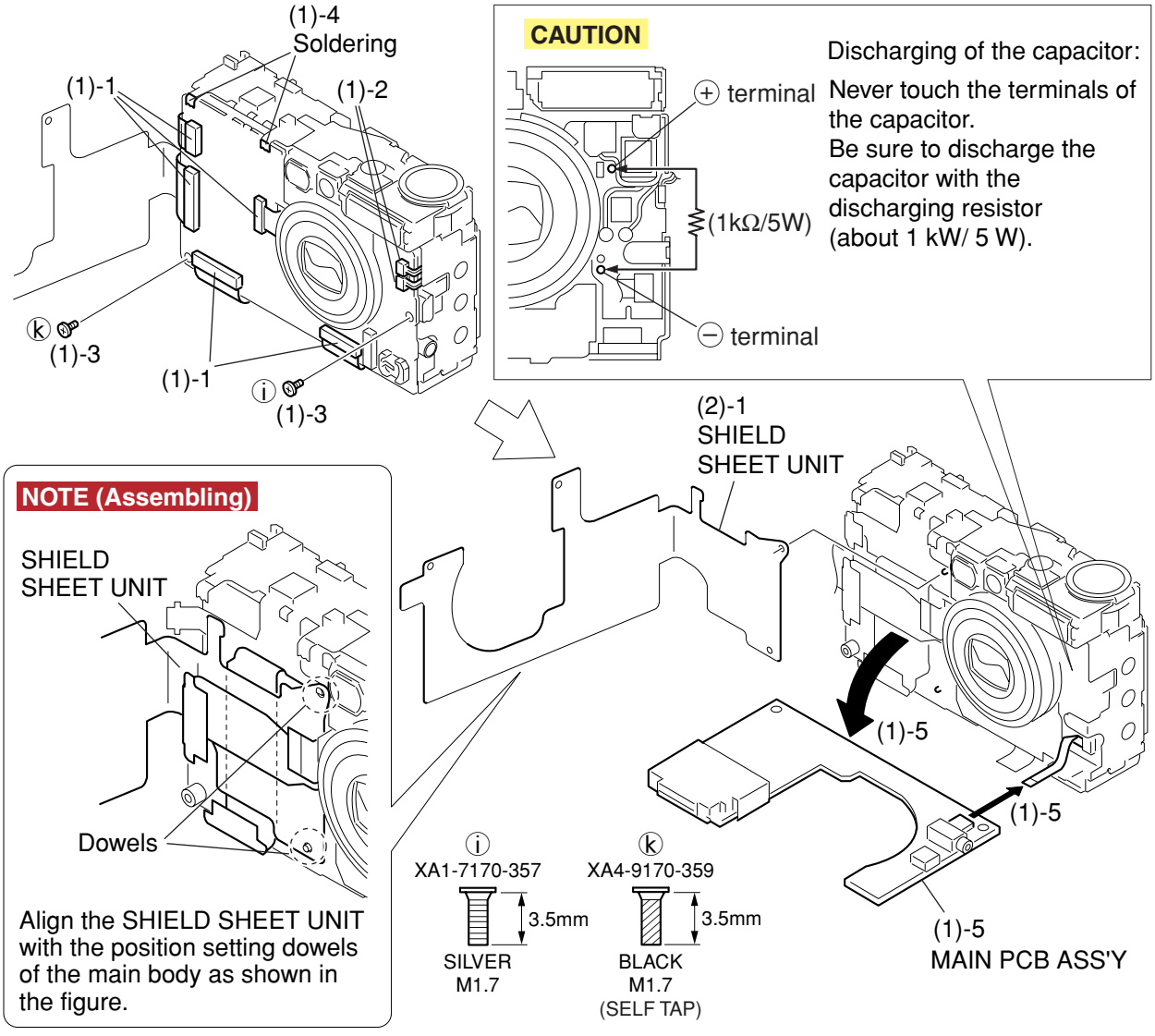


Fig. 3-10 MAIN PCB ASS'Y, SHIELD SHEET UNIT

2.8 MAIN PCB ASS'Y, SHIELD SHEET UNIT

(1) MAIN PCB ASS'Y

1. Disconnect the five connectors.
2. Remove the two connector-cables.
3. Remove the screw of ⓘ, and the screw of ⓚ.
4. Remove the soldering (in the two places)
5. Slant the MAIN PCB ASS'Y in the direction of arrow, and disconnect the connector (in one place) then remove the MAIN PCB ASS'Y.

CAUTION

Never touch the terminals of the capacitor. Be sure to discharge the capacitor with the discharging resistor (about 1 kW/ 5 W).

(2) SHIELD SHEET UNIT

1. Remove the SHIELD SHEET UNIT.

NOTE (Assembling)

Align the SHIELD SHEET UNIT with the position setting dowels of the main body as shown in the figure.

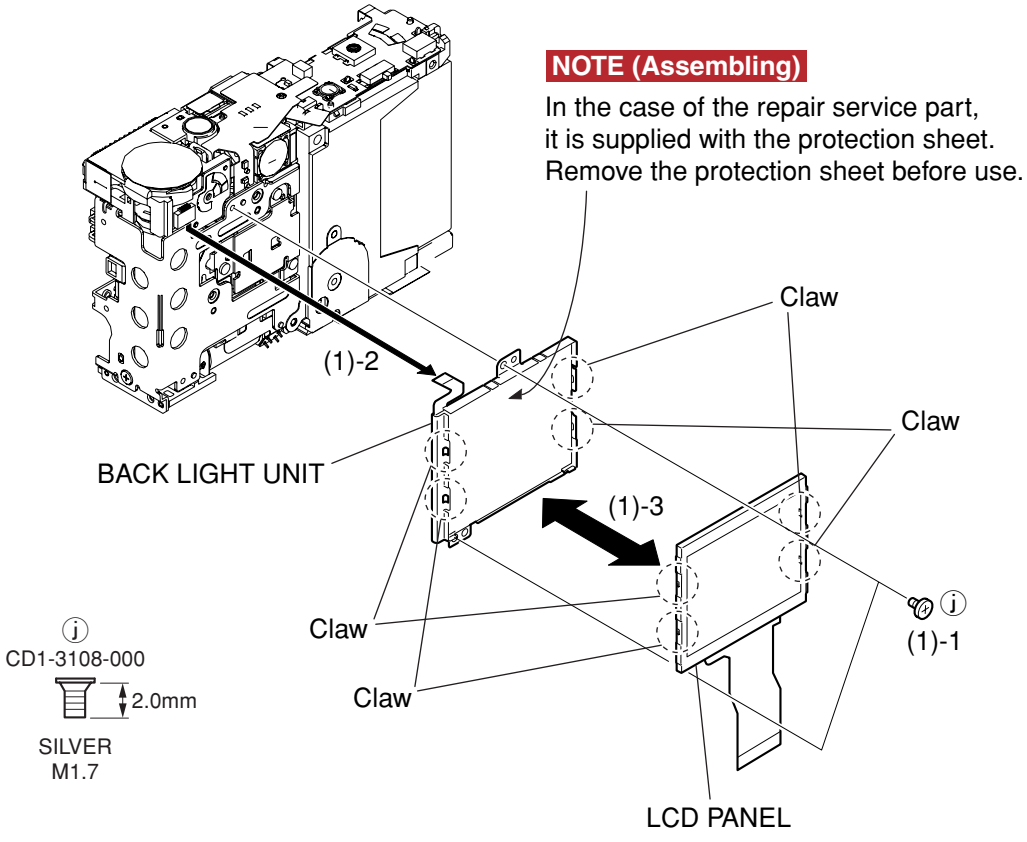


Fig. 3-11 LCD PANEL, BACK LIGHT UNIT

2.9 LCD PANEL, BACK LIGHT UNIT

(1) LCD PANEL, BACK LIGHT UNIT

1. Remove the two screws of ⓙ.
2. Disconnect the connector.
3. Remove the four claws and separate the LCD PANEL from the BACK LIGHT UNIT.

NOTE (Assembling)

In the case of the repair service part, it is supplied with the protection sheet. Remove the protection sheet before use.

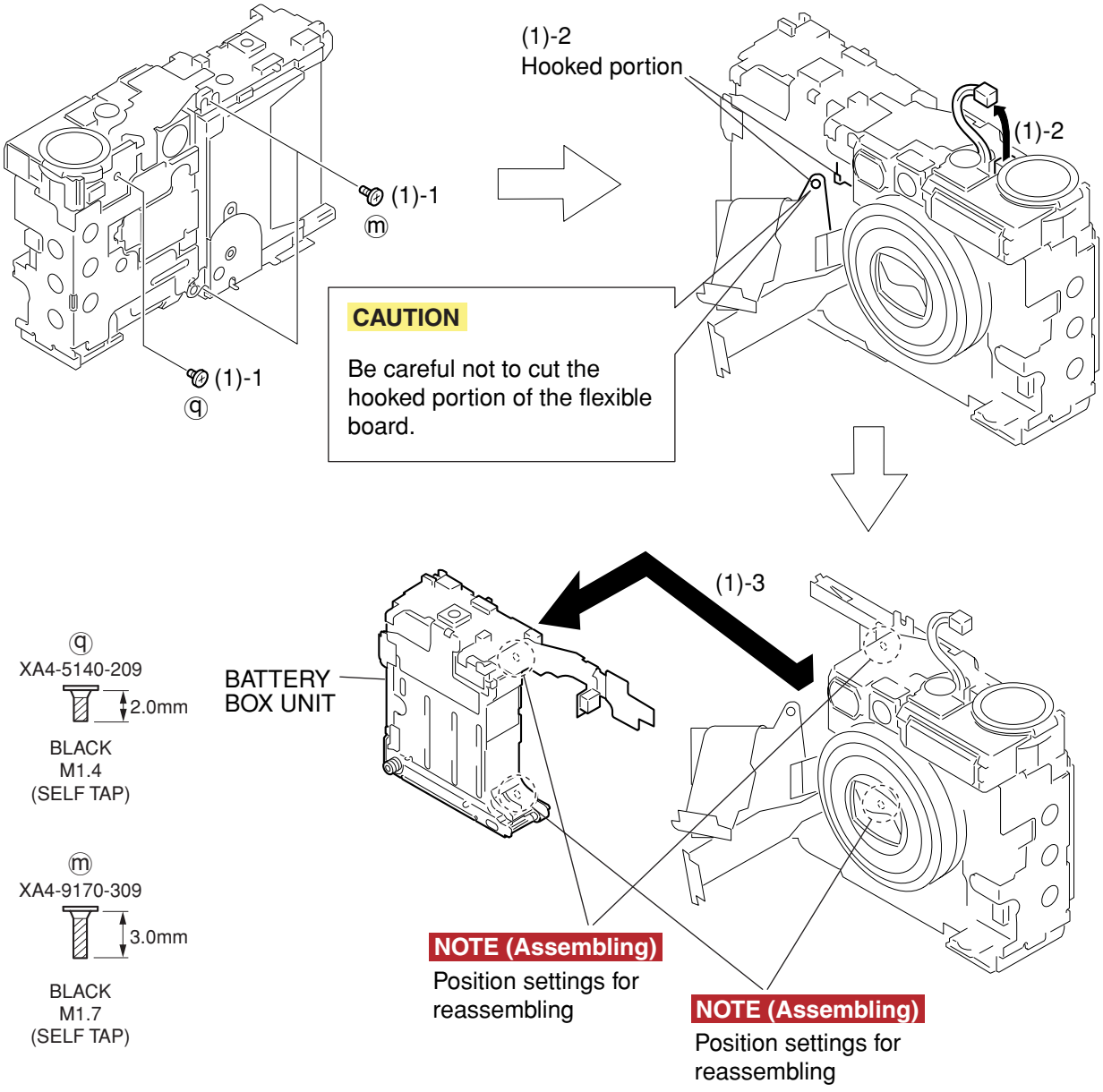


Fig. 3-12 BATTERY BOX UNIT

2.10 BATTERY BOX UNIT

(1) BATTERY BOX UNIT

1. Remove the two screws of ⓜ, and the screw of ⓠ.
2. Release the hooked portion and remove the connector cable.

CAUTION

Be careful not to cut the hooked portion of the flexible board.

3. Remove the BATTERY BOX UNIT in the direction of arrow.

NOTE (Assembling)

Align the two position setting dowels of the BATTERY BOX UNIT.

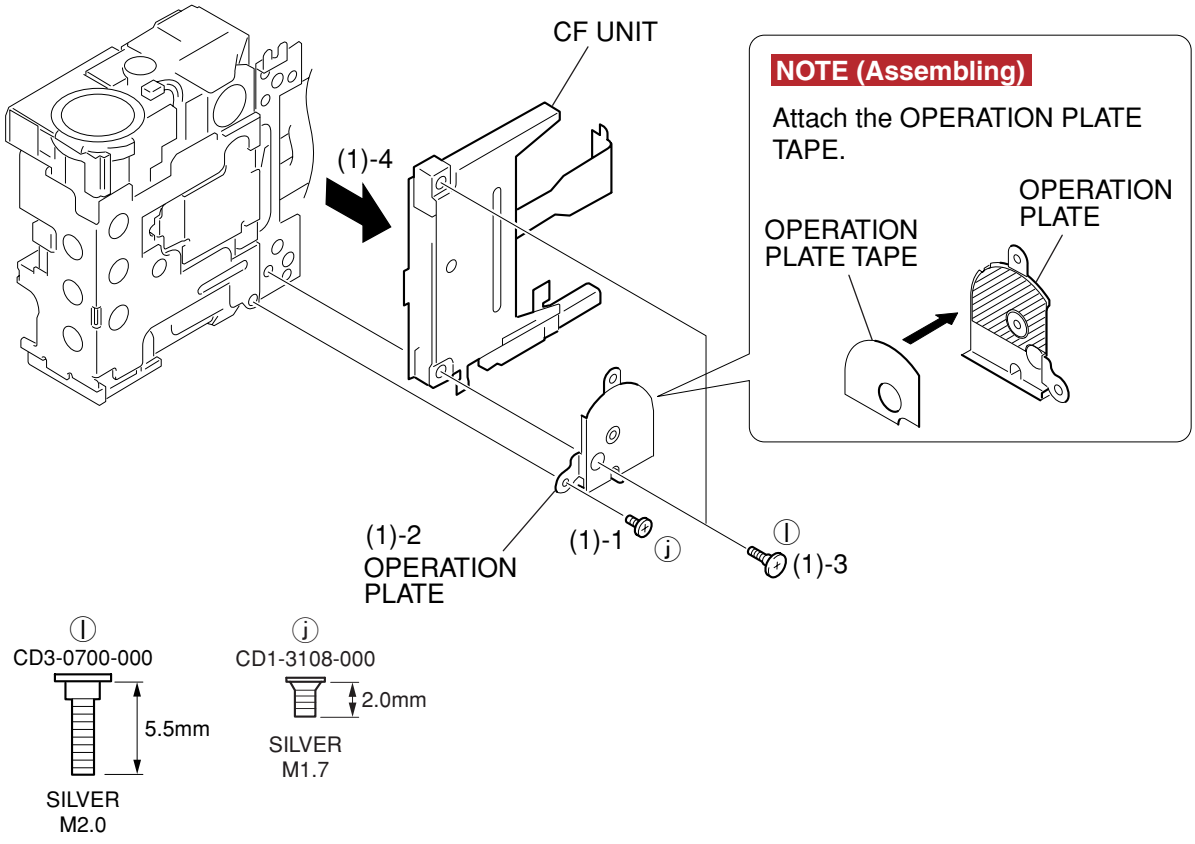


Fig. 3-13 CF UNIT

2.11 CF UNIT

(1) CF UNIT

1. Remove the screw of ⓙ.
2. Remove the OPERATION PLATE.

NOTE (Assembling)

Attach the OPERATION PLATE TAPE.

3. Remove the two screws of ⓘ.
4. Remove the CF UNIT.

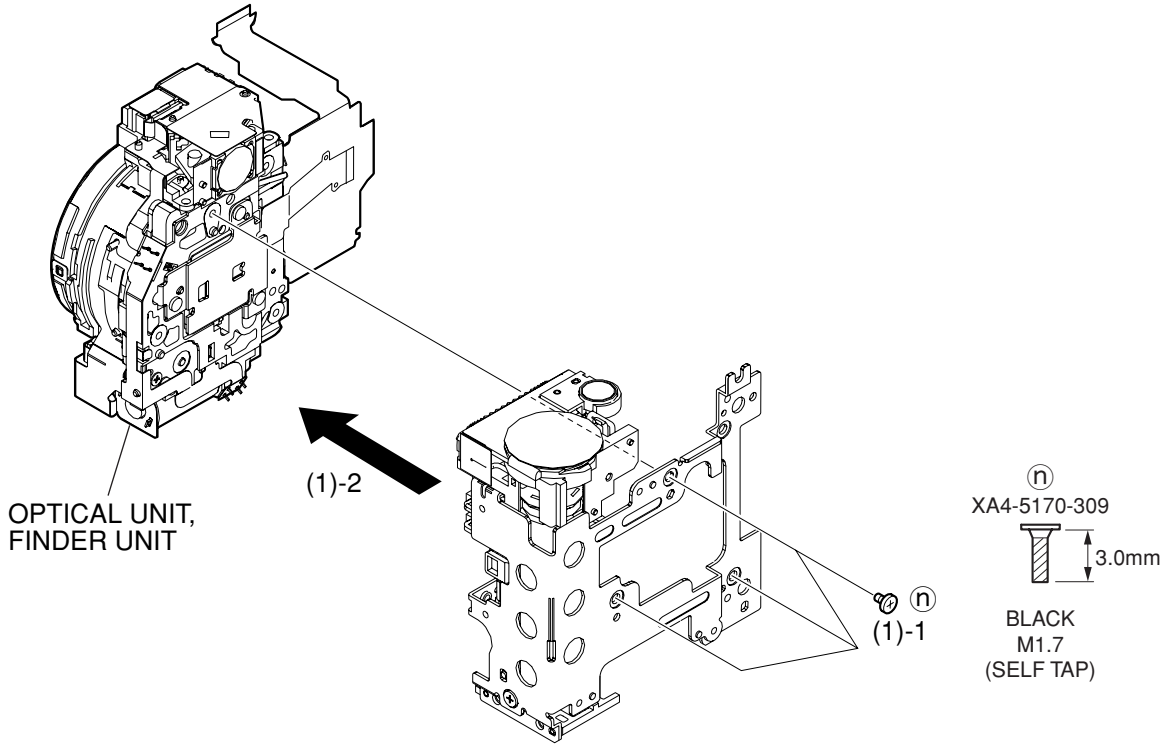


Fig. 3-14 OPTICAL UNIT, FINDER UNIT - (1)

2-12 OPTICAL UNIT, FINDER UNIT - (1)

(1) OPTICAL UNIT, FINDER UNIT - (1)

1. Remove the three screws of ⓝ.
2. Remove the OPTICAL UNIT, and the FINDER UNIT as an assembled unit.

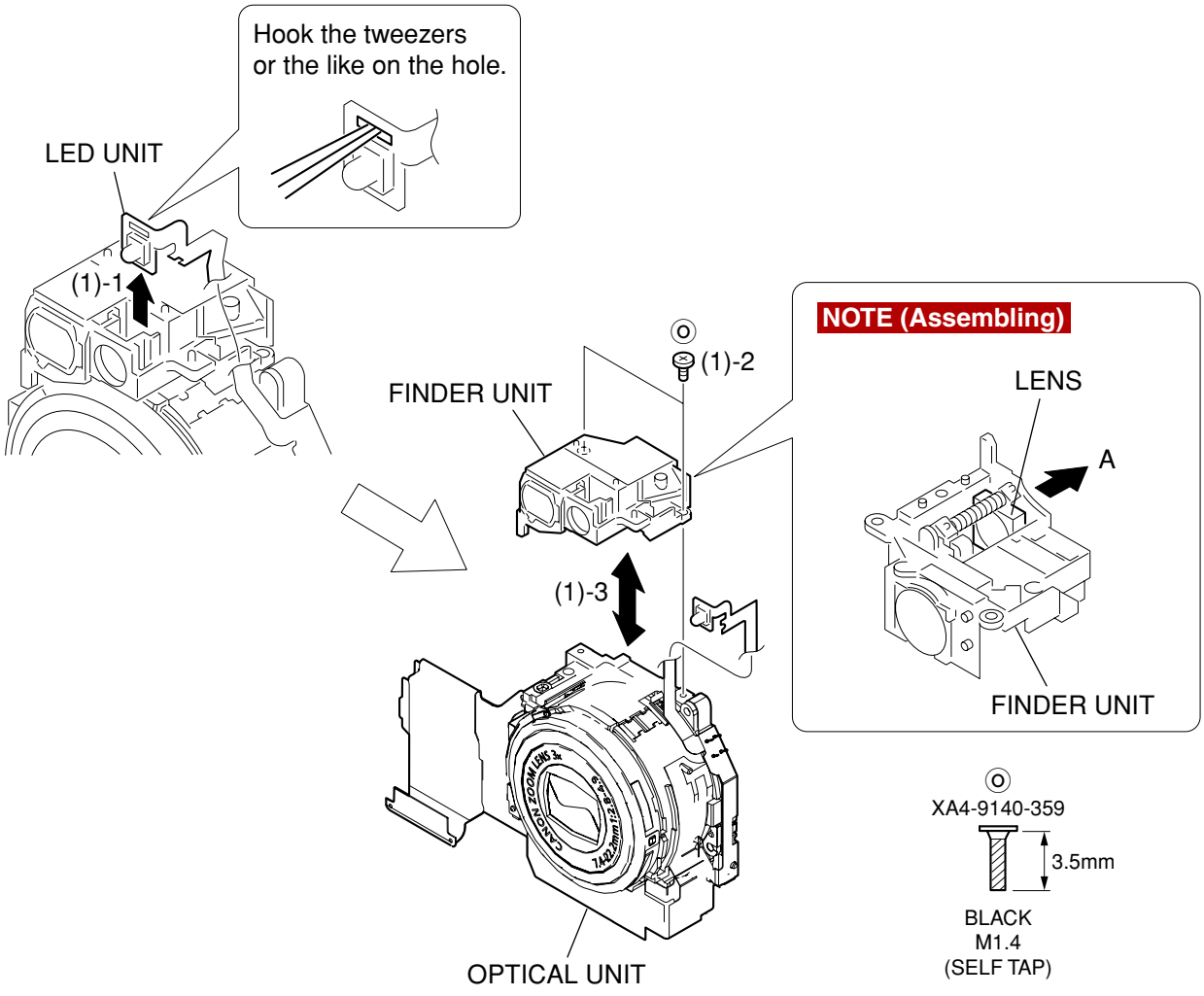


Fig. 3-15 OPTICAL UNIT, FINDER UNIT - (2)

2-13 OPTICAL UNIT, FINDER UNIT - (2)

(1) OPTICAL UNIT, FINDER UNIT - (2)

1. Hook the tweezers or the like on the hole of the LED flexible board, and remove the LED unit.
2. Remove the two screws of ⓞ.
3. Separate the OPTICAL UNIT from the FINDER UNIT.

NOTE (Assembling)

Confirm that the LENS is pushed in the very end of the direction A as shown in the figure, and install the FINDER UNIT in the barrel that has been moved in the retracted position.

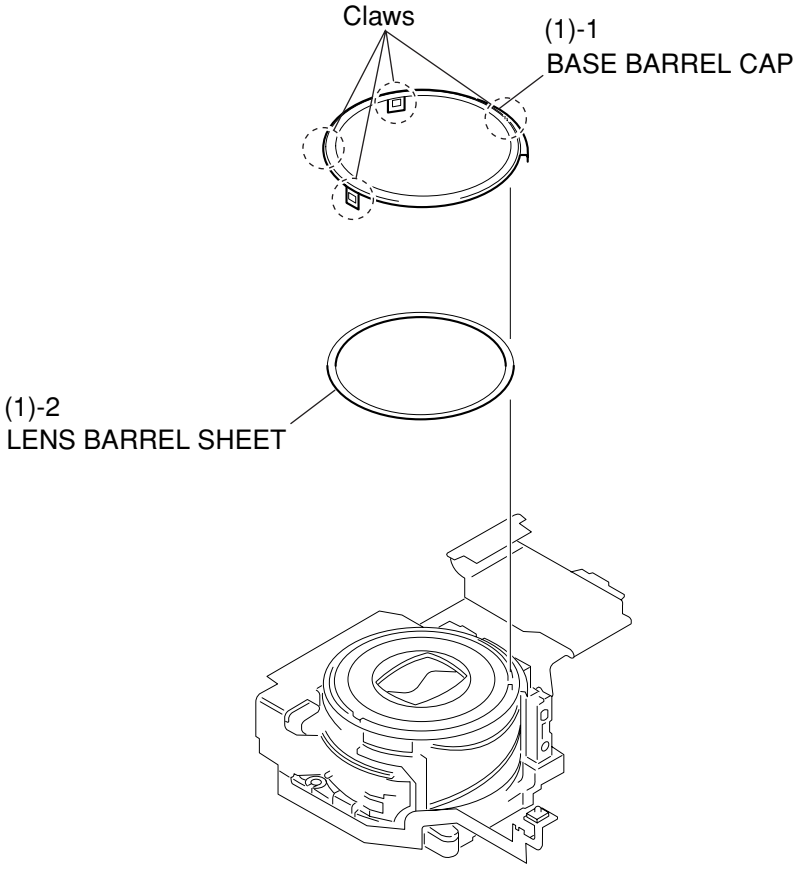


Fig. 3-16 BASE BARREL CAP, LENS BARREL SHEET

2-14 BASE BARREL CAP, LENS BARREL SHEET

(1) BASE BARREL CAP, LENS BARREL SHEET

1. Remove the four claws, and remove the BASE BARREL CAP.
2. Remove the LENS BARREL SHEET.

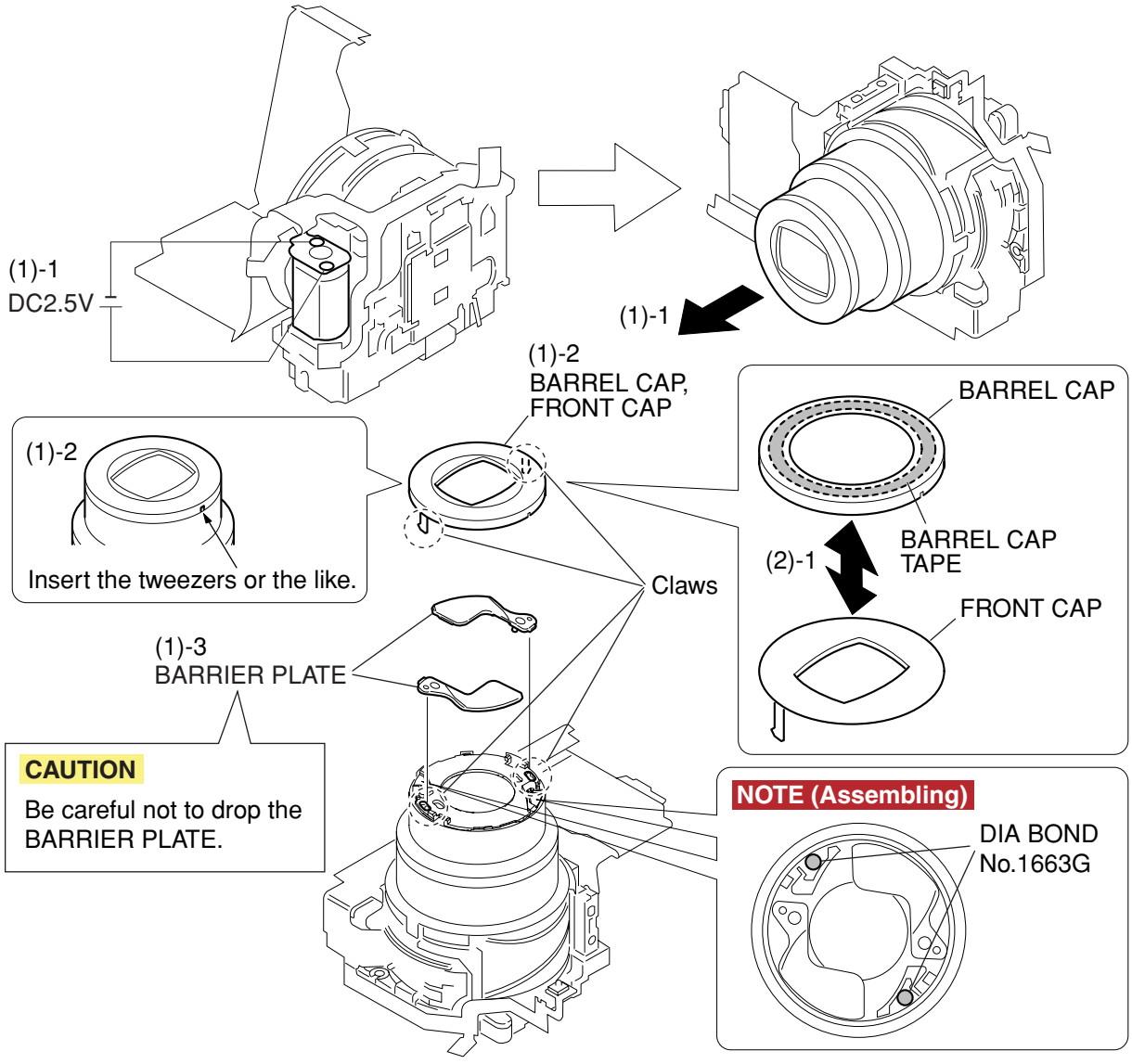


Fig. 3-17 BARRIER PLATE, BARREL CAP, FRONT CAP

2.15 BARRIER PLATE, BARREL CAP, FRONT CAP

(1) BARRIER PLATE

1. Apply the voltage (DC2.5V) across the motor terminal to drive the motor until the motor stops and the barrel fully comes out.
2. Insert the tweezers or the like into the groove of LENS BARREL CAP and remove the two claws, then remove the BARREL CAP, and the FRONT CAP as an assembled unit.

CAUTION

Be careful not to drop the BARRIER PLATE.

NOTE (Assembling)

Coat it with the DIA BOND No. 1663G at the area as shown in the figure.

3. Remove the BARRIER PLATE (2 pieces).

(2) BARREL CAP, FRONT CAP

1. Separate the BARREL CAP from the FRONT CAP which is installed with the BARREL CAP TAPE.

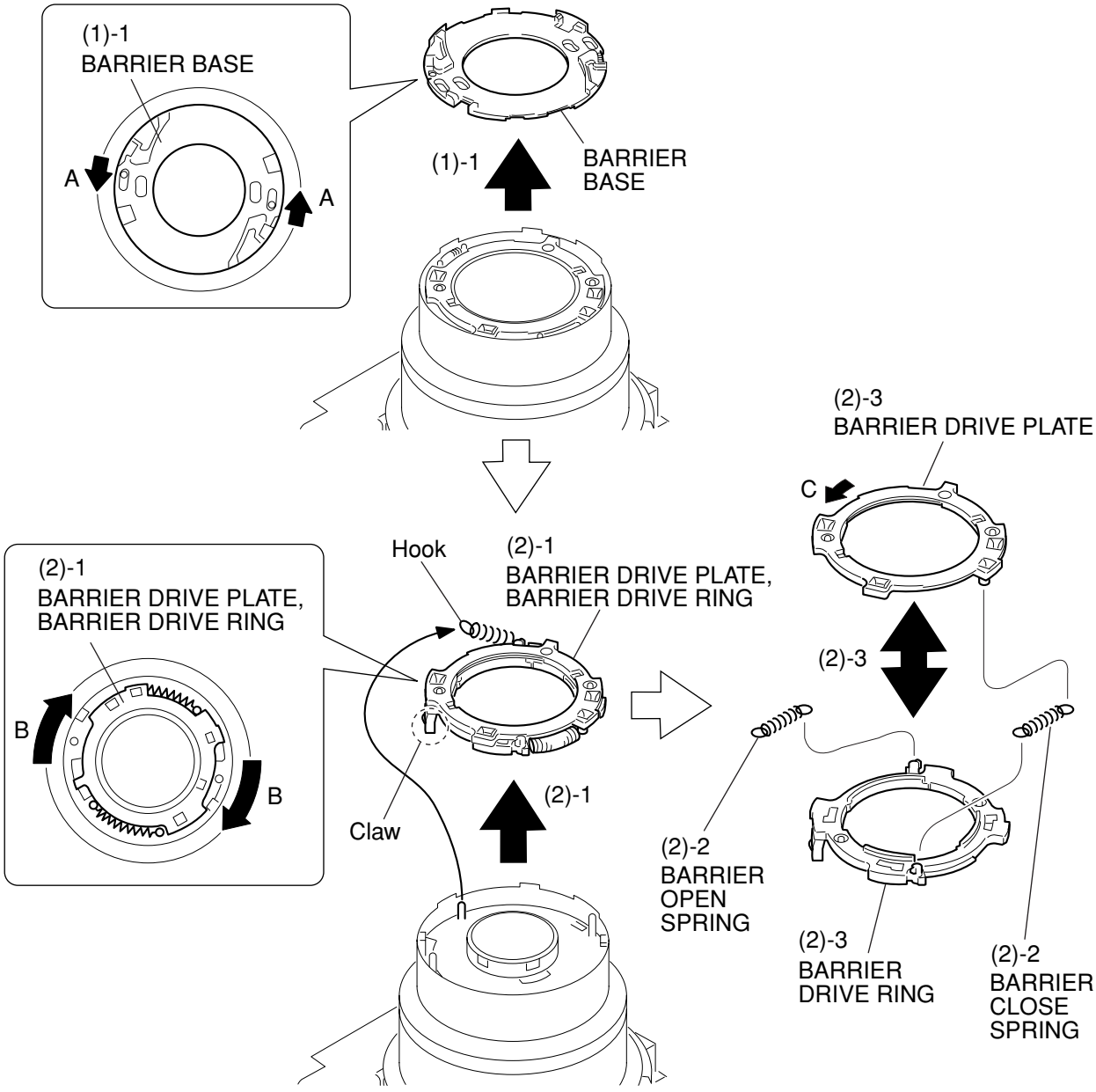


Fig. 3-18 BARRIER BASE, BARREL DRIVE PLATE, BARRIER DRIVE RING

2.16 BARRIER BASE, BARREL DRIVE PLATE, BARRIER DRIVE RING

(1) BARRIER BASE

1. Rotate the BARRIER BASE in the direction of arrow A, then remove it.

(2) BARREL DRIVE PLATE, BARRIER DRIVE RING

1. Rotate the BARREL DRIVE PLATE and BARRIER DRIVE RING in the direction of arrow B, then remove it as an assembled unit.
2. Remove the BARRIER OPEN SPRING and the BARRIER CLOSE SPRING.
3. Rotate the BARRIER DRIVE PLATE in the direction of arrow C, then separate it from the BARRIER DRIVE RING.

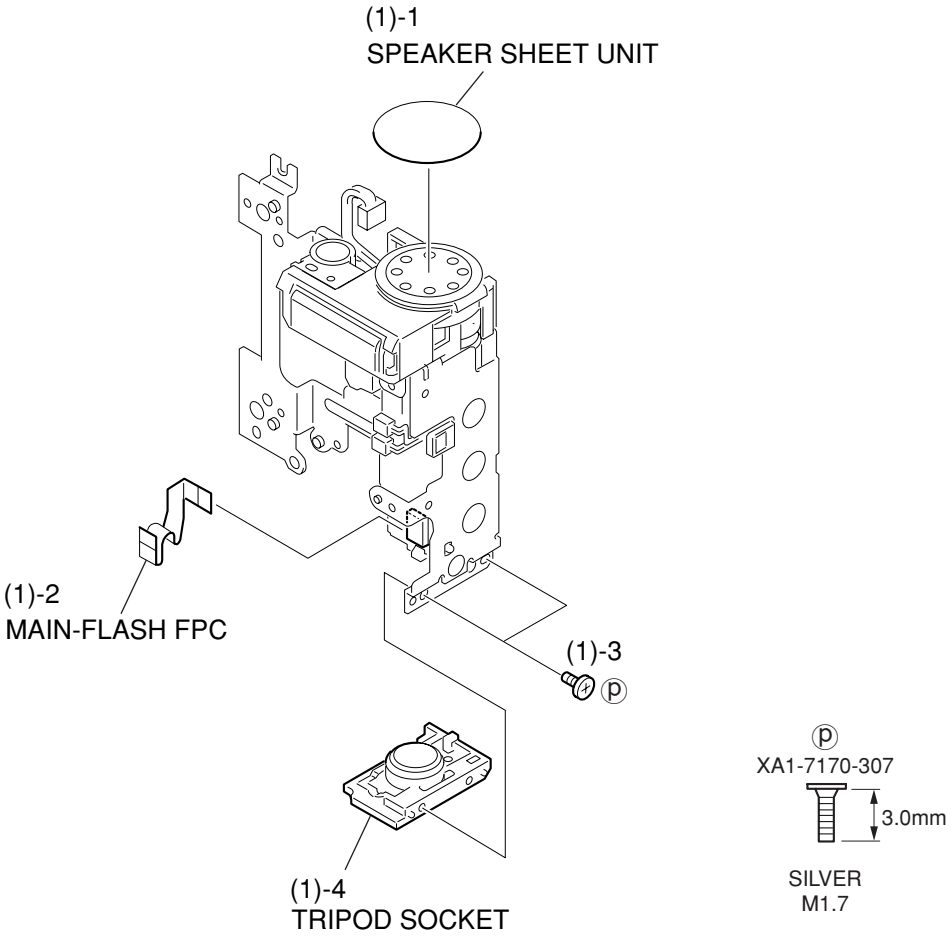


Fig. 3-19 TRIPOD SOCKET

2-17 TRIPOD SOCKET

(1) TRIPOD SOCKET

1. Remove the SPEAKER SHEET UNIT.
2. Remove the MAIN-FLASH FPC.
3. Remove the two screws of ⓟ.
4. Remove the TRIPOD SOCKET.

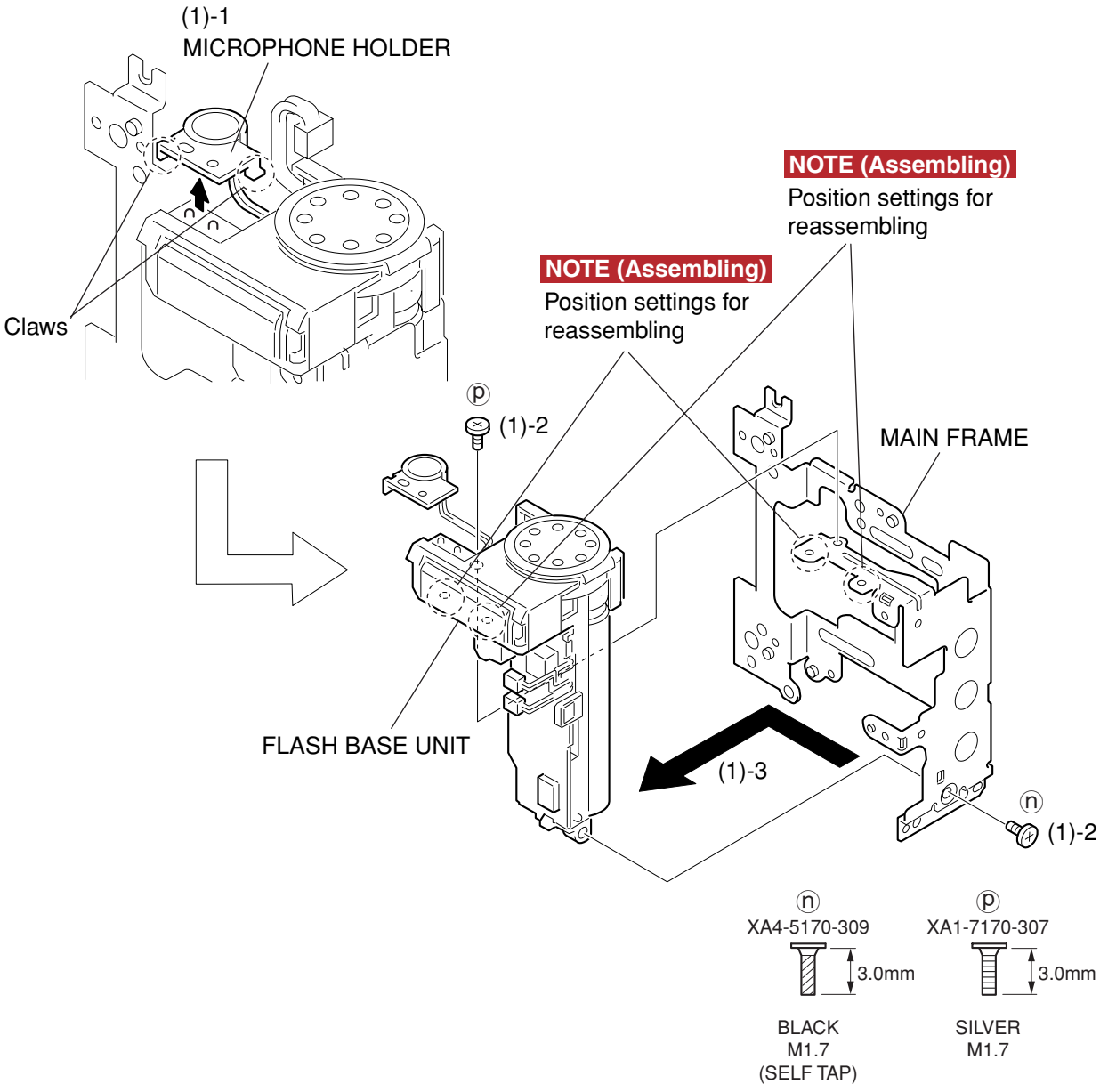


Fig. 3-20 FLASH BASE UNIT

2-18 FLASH BASE UNIT

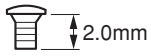
(1) FLASH BASE UNIT

1. Remove the two claws and remove the MICROPHONE HOLDER.
2. Remove the screw of ⓟ and the screw of ⓝ.
3. Remove the FLASH BASE UNIT in the direction of arrow.

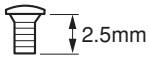
NOTE (Assembling)

Align the FLASH BASE UNIT with the two dowels for position setting of MAIN FRAME.

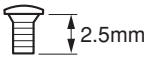
2.19 Screw List

ⓐ
CD3-0677-000


DARK SILVER
M1.7

ⓑ
CD3-0730-000


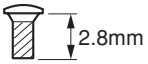
DARK SILVER
M1.7

ⓒ
CD3-0728-000


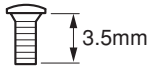
WHITE SILVER
M1.7

ⓓ
CD3-0731-000

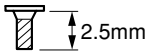

DARK SILVER
M1.7
(SELF TAP)

ⓔ
CD3-0678-000


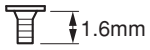
DARK SILVER
M1.7
(SELF TAP)

ⓕ
CD3-0679-000


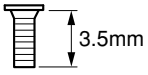
DARK SILVER
M1.7

ⓖ
CD3-0734-000


BLACK
M1.4
(SELF TAP)

ⓗ
CD3-0687-000


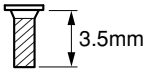
SILVER
M1.4

ⓘ
XA1-7170-357


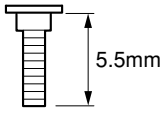
SILVER
M1.7

ⓙ
CD1-3108-000

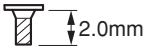

SILVER
M1.7

ⓚ
XA4-9170-359


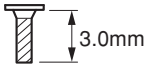
BLACK
M1.7
(SELF TAP)

ⓛ
CD3-0700-000


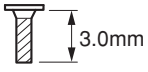
SILVER
M2.0

ⓠ
XA4-5140-209


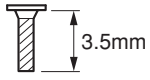
BLACK
M1.4
(SELF TAP)

ⓜ
XA4-9170-309


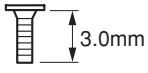
BLACK
M1.7
(SELF TAP)

ⓝ
XA4-5170-309


BLACK
M1.7
(SELF TAP)

ⓞ
XA4-9140-359


BLACK
M1.4
(SELF TAP)

ⓟ
XA1-7170-307


SILVER
M1.7

3. Adjustments

3.1 Replacement Parts and Adjustment Items

PowerShot S400/DIGITAL IXUS 400 requires electrical adjustments when certain parts are replaced.
The table below indicates the adjustments required for the respective part replacements.
For all other parts not listed below, no electrical adjustments are necessary after replacement.

Adjustment Items / Replacement Part	CCD Adjustment	Optical Unit Adjustment	Imaging Process Adjustment	Color Adjustment	Pixel Dot Adjustment	LCD Adjustment	Flash Adjustment
BATTERY BOX UNIT							
OPTICAL UNIT	● #1	● #2	● #3	● #4	● #5		● #6
FLASH BASE UNIT							●
MAIN PCB ASS'Y	○	○	○	○	○	○	○
LCD PANEL							
BACK LIGHT UNIT							

● : Adjustment is necessary after replacement.
○ : Adjustment is necessary after replacement.
(Adjustment is not necessary, only if the adjustment data has been saved and then transferred after the part is replaced.)
Blank : Adjustment is unnecessary.

* When OPTICAL UNIT is replaced, adjust certainly at the procedure as below.

#1. CCD Adjustment

#2. Optical Unit Adjustment

#3. Imaging Process Adjustment

#4. Color Adjustment

#5. Pixel Dot Adjustment

#6. Flash Adjustment

3.2 Adjustment Tools

The following tools are required for electrical adjustment.

DESCRIPTION	PARTS NO.	REMARKS
PC/AT-Compatible Machine (Windows98 or 2000 pre-installed Model, USB port)	—	Local purchase
SERVICE MANUAL (CD-ROM)	CY8-4384-031	
ADJUSTMENT SOFTWARE	—	Download
Compact Power Adapter CA-PS500	—	Enclosed in “AC Adapter Kit ACK500”
AC Cable	—	Enclosed in “AC Adapter Kit ACK500”
DC Coupler DR-500	—	Enclosed in “AC Adapter Kit ACK500”
INTERFACE CABLE IFC-300PCU	—	(or Local purchase)
Brightness Box (light source A)	—	(Verified with EF-5000)
Color Viewer (5600° K)	DY9-2039-100	
Color Bar Chart	DY9-2002-000	
18% Gray Chart	CY4-6016-000	
Auto Focus Chart	—	Attached to “SERVICE MANUAL (CD-ROM)” 2 types *2
W-10 Filter *1	CY9-1556-000	
C-12 Filter	CY9-1555-000	
FL-W Filter	CY9-1557-000	
ND-2 Filter	CY9-1552-000	
ND-4 Filter	CY9-1553-000	
ND-8 Filter	CY9-1554-000	
Light-Shielding Cloth (500 × 500 or larger)	—	Local purchase
Tripod	—	Local purchase
Reference Camera	—	Merchandise
DIGITAL CAMERA SolutionDisk	—	Enclosed in Merchandise

*1 2pcs. required.
*2 The file containing “How to print out” and Chart for print-out is in the Service Manual APPENDIX.

3.3 Before Starting Electrical Adjustments

3.3.1 TWAIN Driver Installation

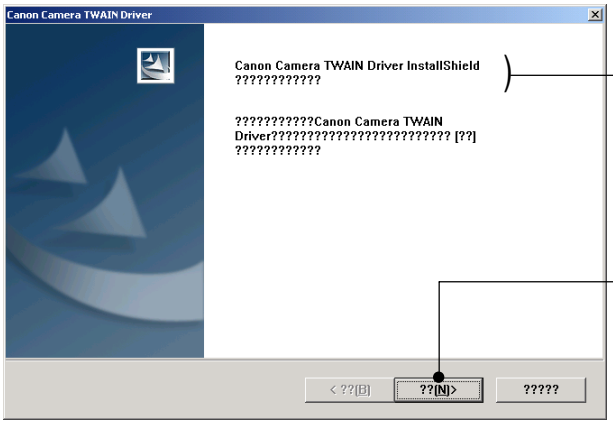
Install the USB Driver for Adjustment in the CD-ROM to PC.
("This Adjustment Software" is impossible when the RS-232C TWAIN driver is used.)

3.3.2 Factory Mode Driver Installation

After downloading and extracting Factory Mode Driver, double-click Setup.exe (\Factory Mode Driver\Win 2000_98\Setup.exe) to install it.

If InstallShield Wizard appears as shown in the first picture below, install the TWAIN (Factory Mode) Driver by following the instructions.

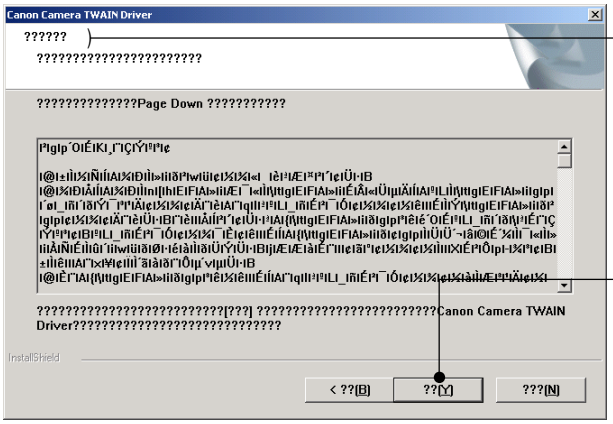
1



The InstallShield Wizard will install TWAIN Driver on your computer.

Click the "??[N]>" button.

2

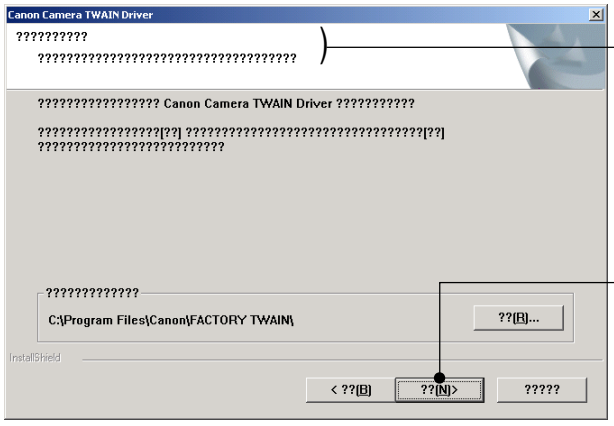


License Agreement

See the file "Service Manual/English/Ch6/License.pdf" for the contents of the License.

Click the "??[Y]" button.

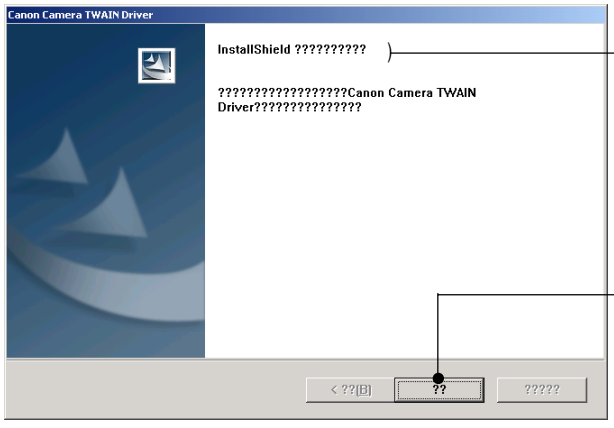
3



Choose Destination Location
Select folder where Setup will install files.

Click the "??[N]>" button.

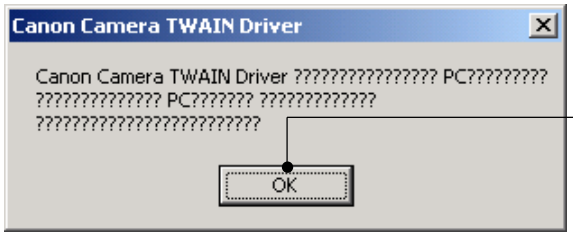
4



InstallShield Wizard Complete

Click the "??" button.

5



Click the "OK" button.

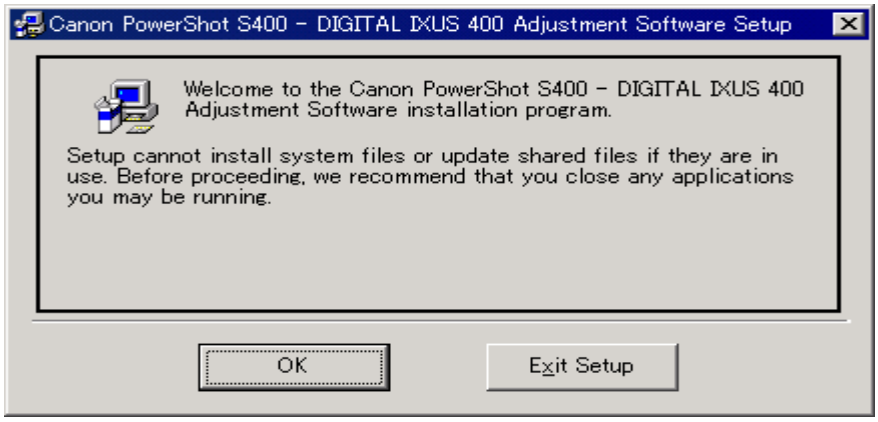
Installing TWAIN (Factory Mode) Driver is completed.

If you cannot install Factory Mode Driver in above procedure, install it in the following procedure.

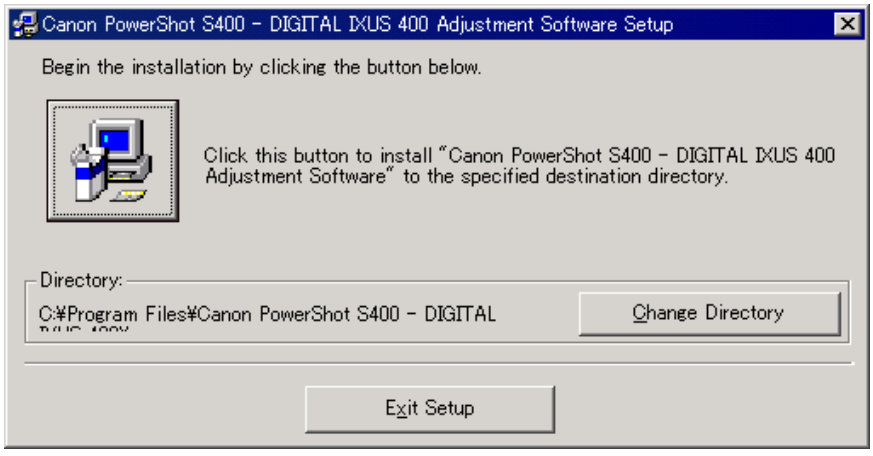
1. Change the camera to Factory mode.
2. Install Wizard of new hardware starts up.
3. Select the option that directly chooses the driver's place.
4. Choose CAP_FACT.INF
   (Factory Mode Driver\Win2000_98\Win_2k98\CAP_FACT.INF).
5. Installment starts. When the Wizard finishes, the installment finishes.

3.3.3 Adjustment Software Installation

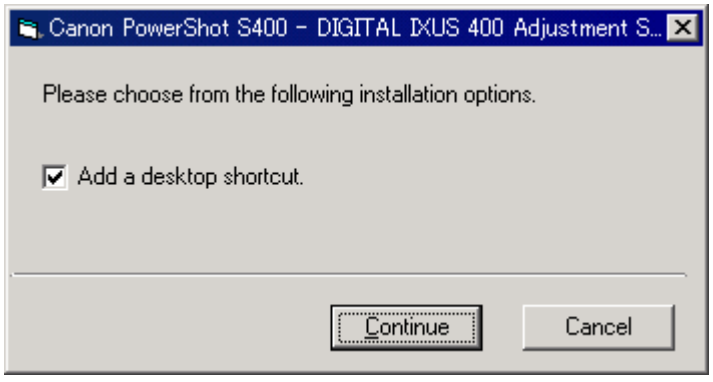
1. After downloading and extracting Adjustment Software, double-click Setup.exe to install it.
   (Adjustment Softwares are different according to the model of camera that you are going to adjust.)
2. When the dialog box below appears, click the “OK” button.



3. When the dialog box below appears, click the  button. (Software installation will then begin.)



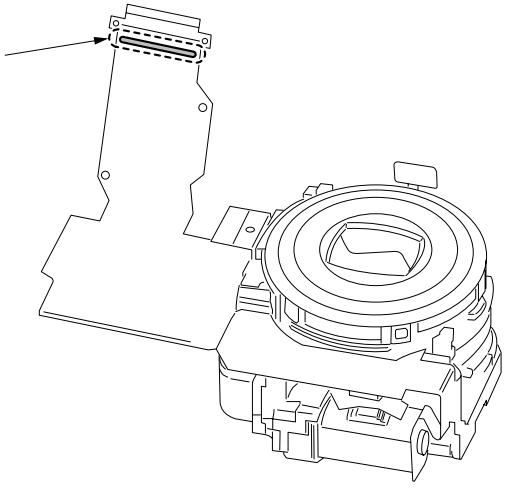
4. When the dialog box below appears, click the “Continue” button.
   (In the case that you do not add a shortcut on desktop, remove clicking from the check box.)



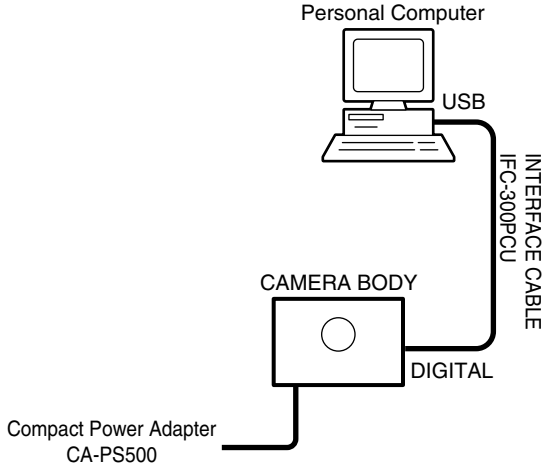
3.3.4 Preparation

Before starting up the Adjustment Software, follow the preparatory steps below:

1. Obtain all the tools necessary for the adjustment.
2. For the Optical Unit Adjustment, jot down the color drawn (Black or Red) on tne flat cable of the Optical Unit. You will need it later.



3. Connect the Camera to the Power Source with the Compact Power Adapter CA-PS500, AC Cable & DC Coupler DR-500.
4. Set the Replay Mode on the camera and turn on.
5. Set the Communication Mode to Normal.



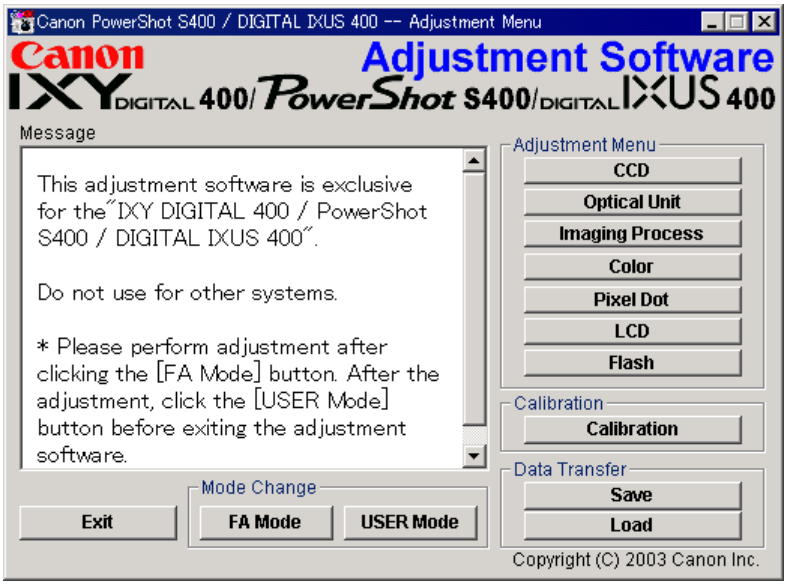
6. Connect the Camera's Digital terminal to the PC's USB Port with INTERFACE CABLE IFC-300 PCU.
7. Turn on the camera.
   Note: Perform the preparation in the following order otherwise the camera won't work properly.

3.3.5 Starting up the Adjustment Software

After completing the preparatory steps, click Start and move the cursor to Program; then select Canon Digital Camera and click PowerShot S400/DIGITAL IXUS 400 Adjustment.

3.3.6 Menu Window

When the Adjustment Software starts up, the Menu Window below will appear.



3.3.7 How to Use the Adjustment Software

■ Mode change
This camera uses normally PTP for communication with PC. Because calibration and adjustment become impossible depending on the condition of PTP, select the TWAIN mode of the PTP before starting calibration and adjustment.
- "FA Mode" button: This button is used to change the mode from the USER mode to the FA mode. (PTP to TWAIN)

* Before starting calibration and adjustment, be sure to set the FA mode.
- "USER Mode" button: This button is used to change the mode from the FA mode to the USER mode. (TWAIN to PTP)

* When calibration and adjustment are completed, be sure to change the mode to the USER mode before quitting the software.

■ Calibration/Adjustment
For starting, click the button related with calibration/adjustment.
* Whenever you use your light source for the adjustment for the first time, be sure to click the "Calibration" Button.

■ Quitting the Adjustment Software
Click the "Exit" button.

■ Saving or Loading data
- "Save" button : This button saves all adjustment data stored on the camera in text format.
- "Load" button : This button loads all adjustment data saved in text format to the camera.

■ Notes
- If the adjustment fails, a message indicating the failure will appear on each product. If this happens, do the adjustment again.
- The Adjustment Software is dedicated only to Canon Digital Camera PowerShot S400/DIGITAL IXUS 400.
  Never use it for any other camera.
- The Windows2000 or 98 must be pre-installed on the computer that is equipped with the USB terminal.

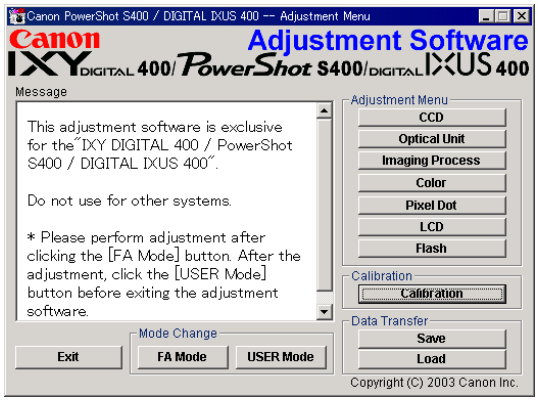
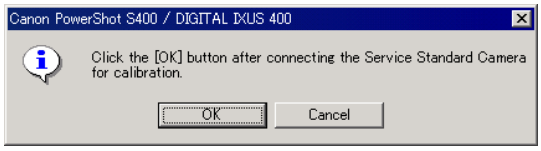
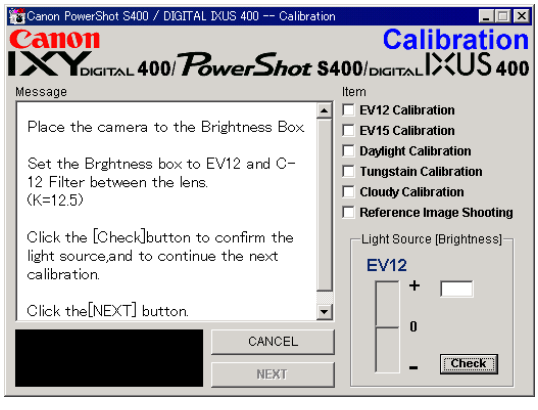
* Operations on the other Operating Systems such as Windows95, Windows XP and others are not guaranteed. (Because Windows95 does not support USB.)

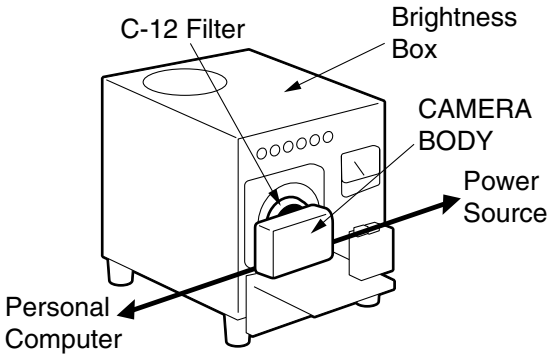
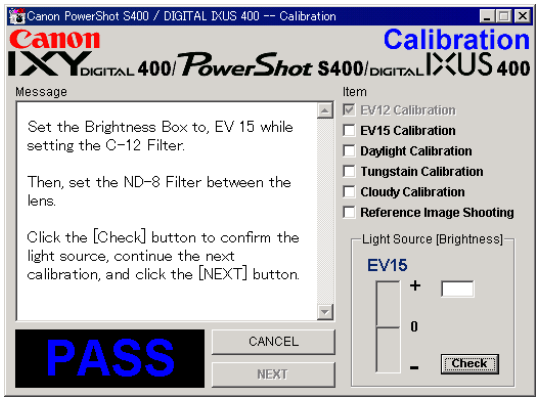
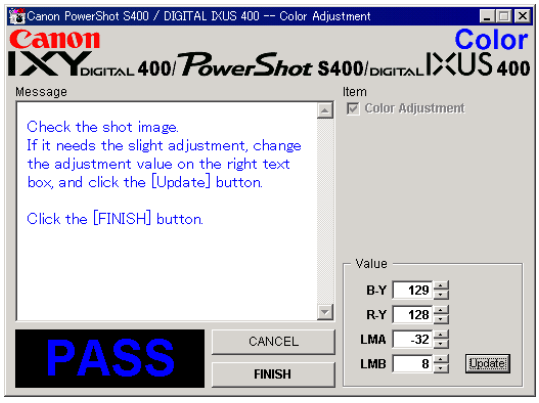
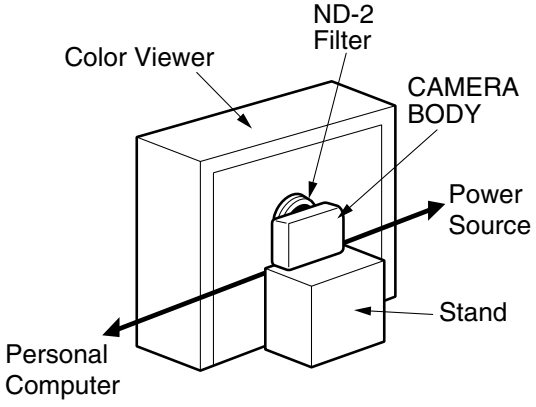
3.4 Calibration

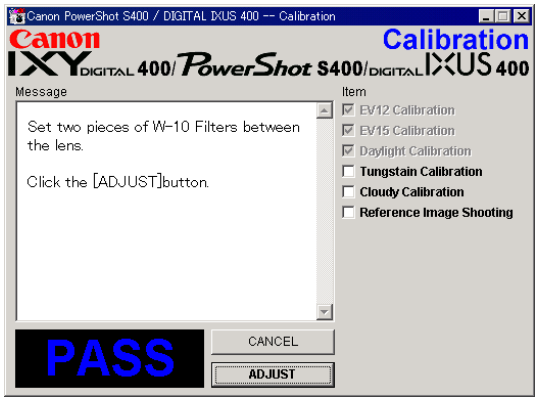
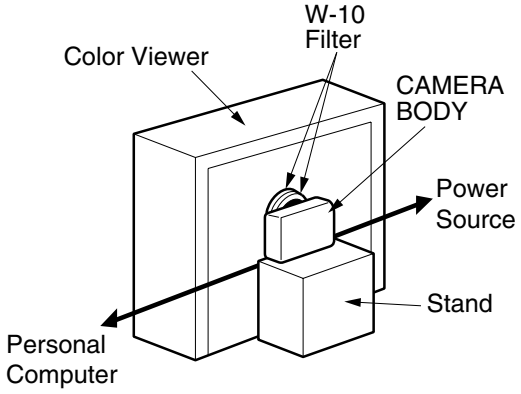
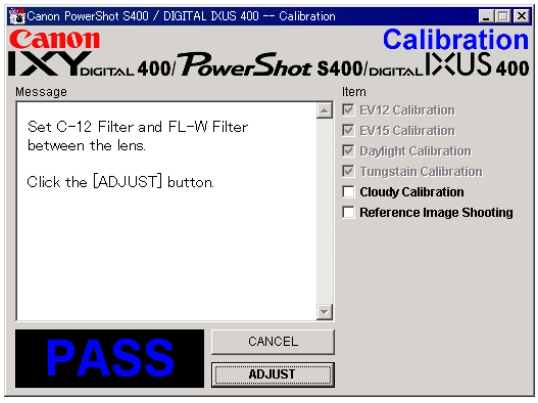
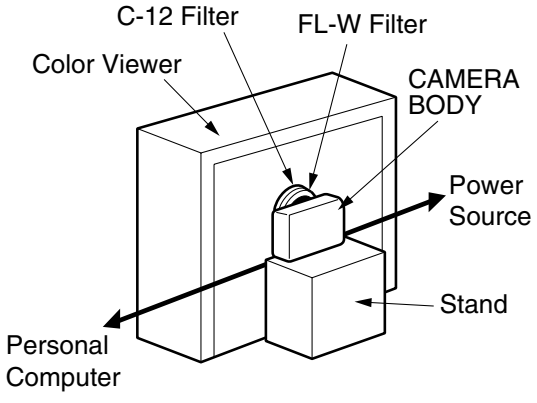
3.4.1 Calibration

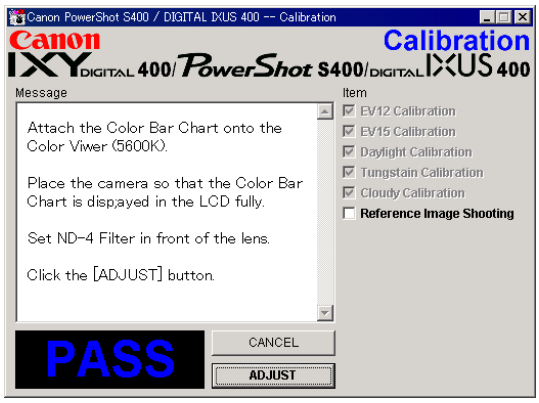
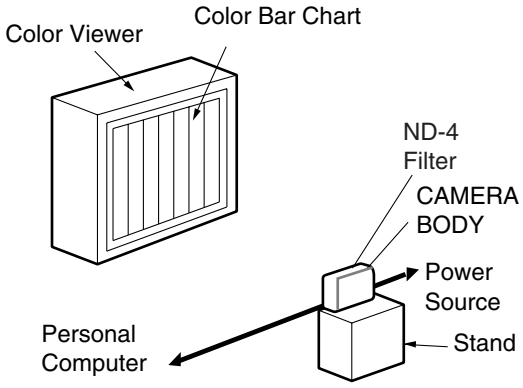
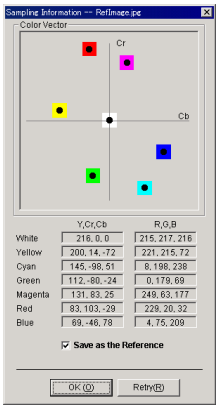
■ Tools Used

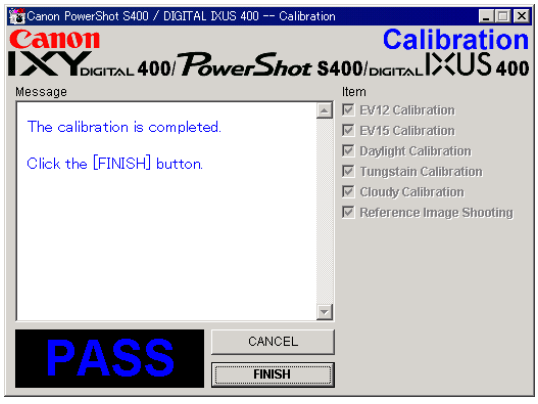
- Personal Computer
- ADJUSTMENT SOFTWARE
- Compact Power Adapter CA-PS500
- AC Cable
- DC Coupler DR-500
- INTERFACE CABLE IFC-300PCU
- Brightness Box (light source A)
- Color Viewer (5600° K)
- Color Bar Chart
- W-10 Filter (2pcs.)
- C-12 Filter
- FL-W Filter
- ND-2 Filter
- ND-4 Filter
- ND-8 Filter
- Reference Camera (Merchandise)

1	Click the “Calibration” button.	
2	1. When the message on the right appears, check that the reference camera (Merchandise) is connected to the computer. 2. Click the “OK” button.	
3	When the message on the right appears, go to 4.	

4	1. Place the camera so that lens is set against the light source surface of the Brightness Box via the C-12 Filter. 2. Set the Brightness Box to EV12. 3. Click the “Check” button. 4. Check the Brightness level if it is within 0 ± 5. * If not, calibrate the Brightness Box until it becomes within 0 ± 5. 5. Click the “NEXT” button.	
5	1. When the message on the right appears, Set the Brightness Box to EV15 and attach the ND-8 Filter while setting the C-12 Filter between the lens. 2. Click the “Check” button. 3. Check the Brightness level if it is within 0 ± 5. * If not, calibrate the Brightness Box until it becomes within 0 ± 5. 4. Click the “NEXT” button.	
6	When the message on the right appears go to 7.	
7	1. Attach the ND-2 Filters between the Lens and the Color Viewer. 2. Place the camera so that the lens is set against the center part of the Color Viewer. 3. Click the “ADJUST” button.	

8	When the message on the right appears go to 9.	
9	1. Remove the ND-2 Filter. 2. Attach the two W-10 Filters between the Lens and the Color Viewer. Place the camera so that the lens is set against the center part of the Color Viewer. 3. Click the “ADJUST” button.	
10	When the message on the right appears go to 11.	
11	1. Remove the two W-10 Filters. 2. Attach the C-12 and FL-W Filter between the Lens and the Color Viewer. Place the camera so that the lens is set against the center part of the Color Viewer. 3. Click the “ADJUST” button.	

12	When the message on the right appears go to 13.	
13	1. Attach the Color Bar Chart to the Color Viewer. 2. Place the camera so that the Viewing image of the color bar chart is the full of LCD with the ND-4 Filter attached. 3. Click the “ADJUST” button.	
14	1. Shift a frame on the displayed screen with a mouse to choose a color of color bar. 2. Click the “Sampling” button.	
15	Check “Save as the Reference”, and click the “OK” button to store the data.	

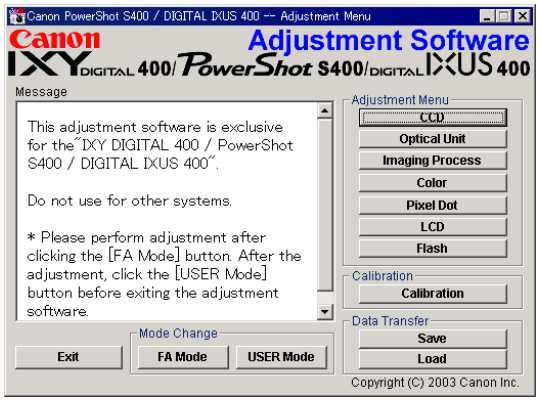
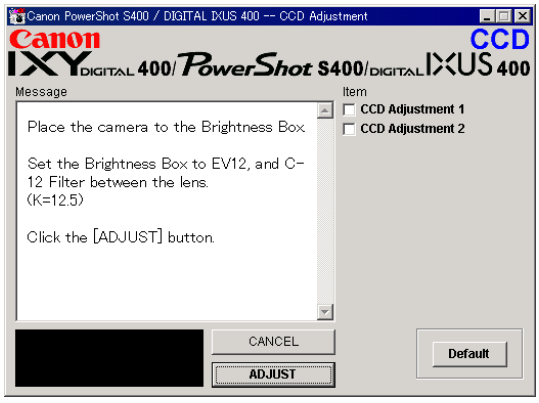
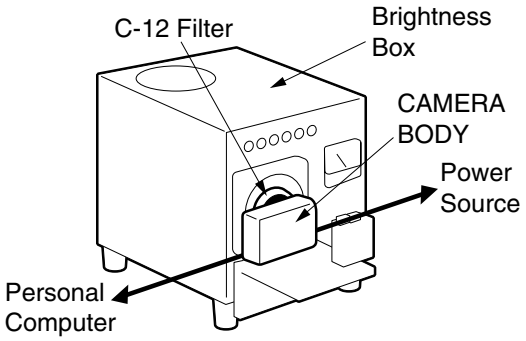
16	When the message on the right appears, click the “FINISH” button. (This ends the “Calibration”.)	

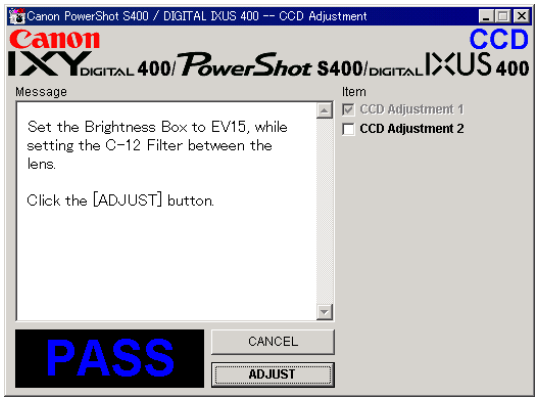
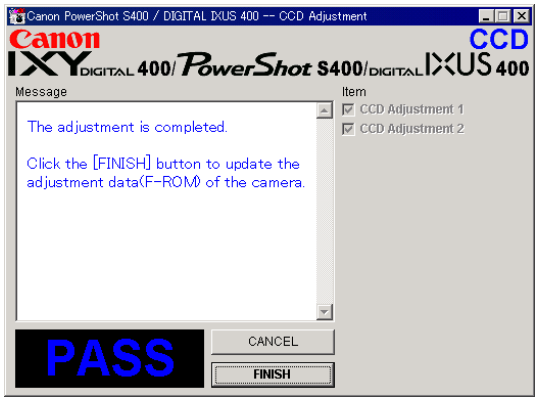
3.5 Adjustment Procedure

3.5.1 CCD Adjustment

■ Tools Used

- Personal Computer
- ADJUSTMENT SOFTWARE
- Compact Power Adapter CA-PS500
- AC Cable
- DC Coupler DR-500
- INTERFACE CABLE IFC-300PCU
- Brightness Box (light source A)
- C-12 Filter

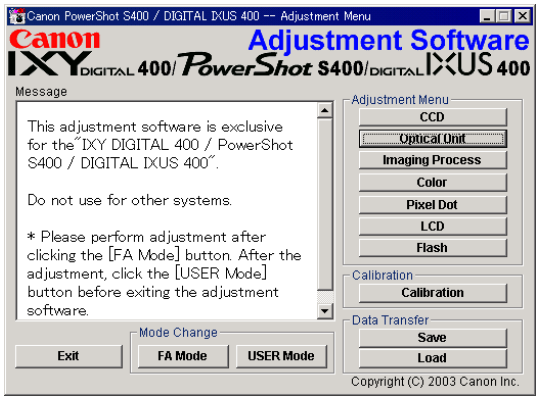
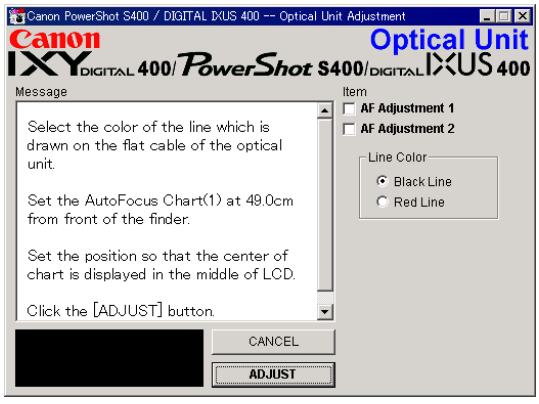
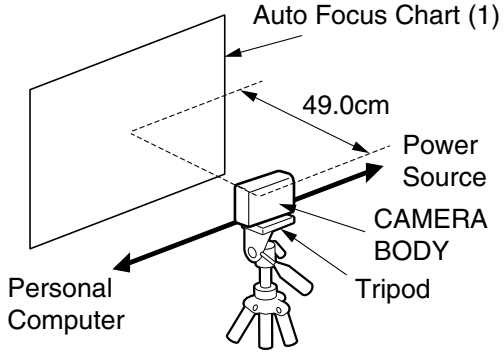
1	Click the “CCD” button.	
2	When the message on the right appears, go to 3.	
3	1. Place the camera so that lens is set against the light source surface of the Brightness Box via the C-12 Filter. 2. Set the Brightness Box to EV12. 3. Click the “ADJUST” button. * When the adjustment does not work, click the “Default” button.	

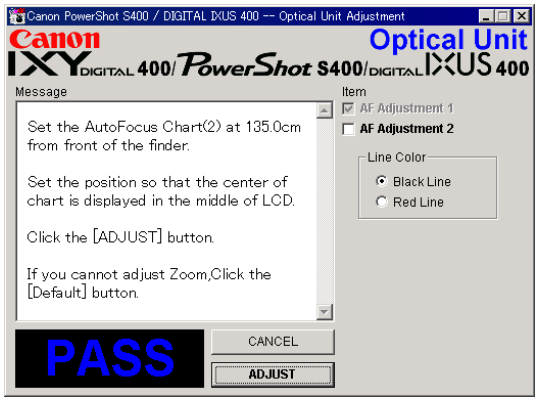
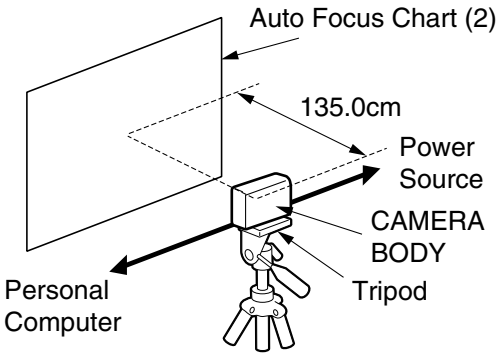
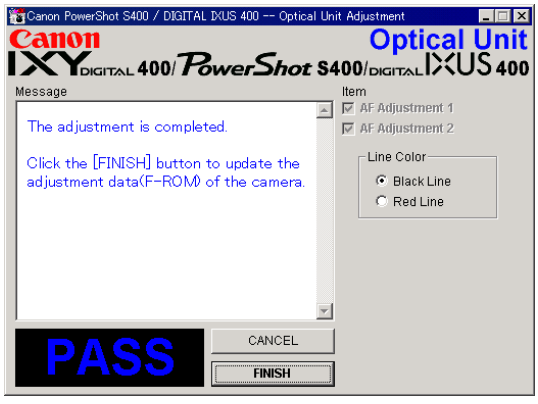
4	When the message on the right appears, Set the Brightness Box to EV15 while setting the C-12 Filter between the lens. Click the “ADJUST” button.	
5	When the message on the right appears, click the “FINISH” button. (This ends the “CCD” Adjustment.)	

3.5.2 Optical Unit Adjustment

■ Tools Used

- Personal Computer
- ADJUSTMENT SOFTWARE
- Compact Power Adapter CA-PS500
- AC Cable
- DC Coupler DR-500
- INTERFACE CABLE IFC-300PCU
- AutoFocus Chart (2 types)
- Tripod

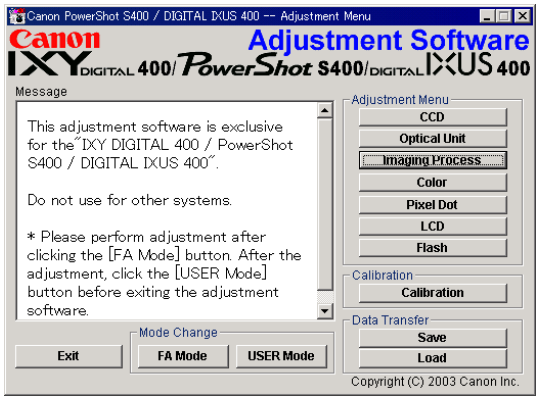
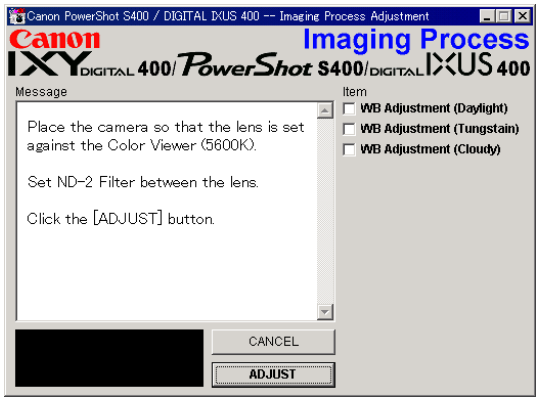
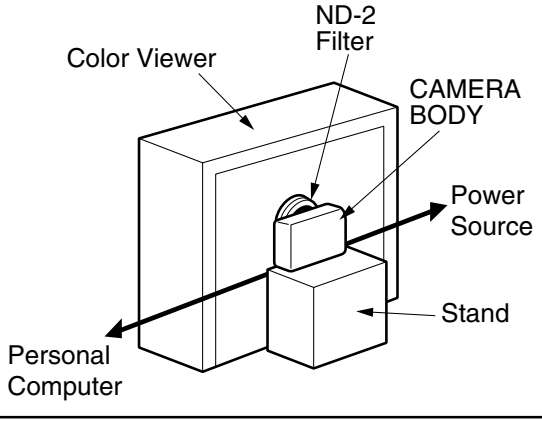
1	Click the “Optical Unit” button.	
2	When the message on the right appears, Select the color of the line which is drawn on the flat cable of the Optical Unit.	
3	1. Place the Auto Focus Chart (1) at 49.0cm away from the front of the camera finder. * Place the Auto Focus Chart on a plain color wall or equivalent. * Adjust the light so that the brightness of the chart will be about EV8.5. 2. Adjust the position of the camera finely so that the center of the Auto Focus Chart is aligned with the center of the LCD. 3. Click the “ADJUST” button.	

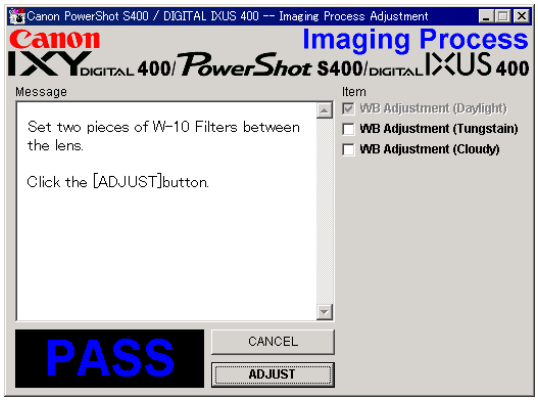
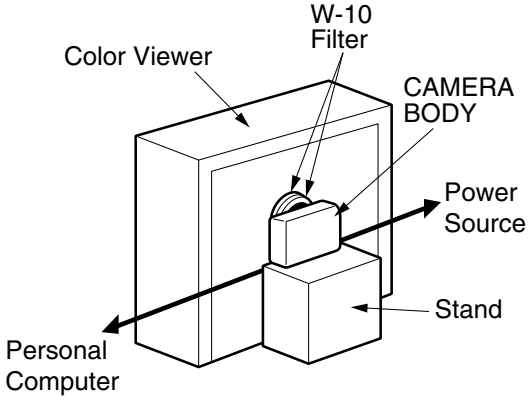
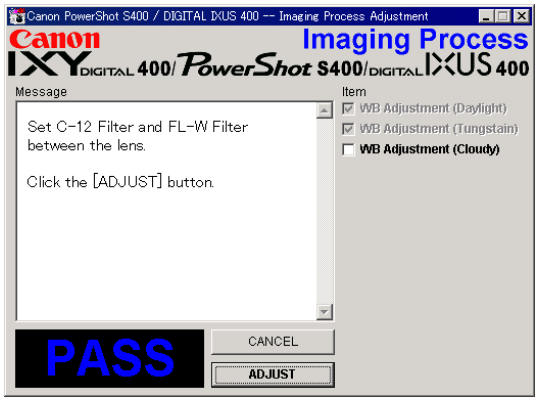
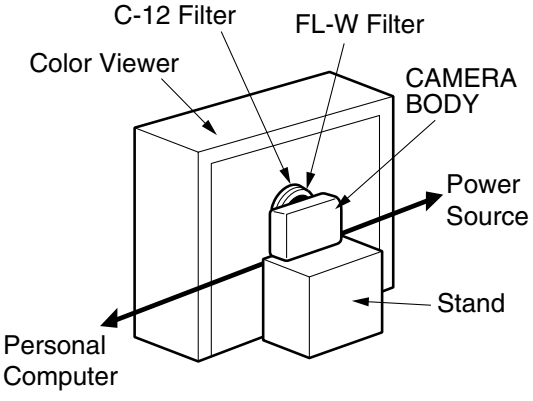
4	When the message on the right appears, go to 5.	
5	1. Place the Auto Focus Chart (2) at 135.0cm away from the front of the camera finder. * Place the Auto Focus Chart on a plain color wall or equivalent. * Adjust the light so that the brightness of the chart will be about EV8.5. 2. Adjust the position of the camera finely so that the center of the Auto Focus Chart is aligned with the center of the LCD. 3. Click the “ADJUST” button.	
6	When the message on the right appears, click the “FINISH” button. (This ends the “Optical Unit” Adjustment.)	

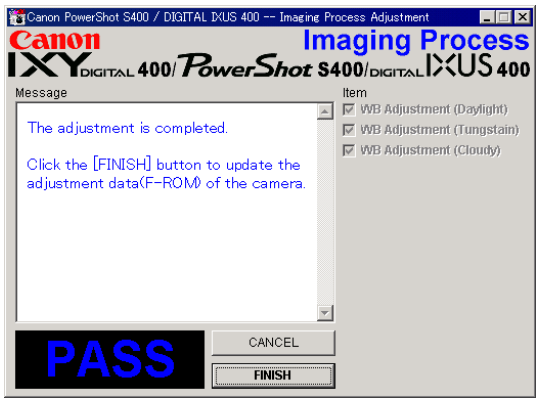
3.5.3 Imaging Process Adjustment

■ Tools Used

- Personal Computer
- ADJUSTMENT SOFTWARE
- Compact Power Adapter CA-PS500
- AC Cable
- DC Coupler DR-500
- INTERFACE CABLE IFC-300PCU
- Color Viewer (5600° K)
- W-10 Filter (2 pcs.)
- C-12 Filter
- FL-W Filter
- ND-2 Filter
- Tripod

1	Click the “Imaging Process” button.	
2	When the message on the right appears, go to 3.	
3	1. Attach the ND-2 Filters between the Lens and the Color Viewer. 2. Place the camera so that the lens is set against the center part of the Color Viewer. 3. Click the “ADJUST” button.	

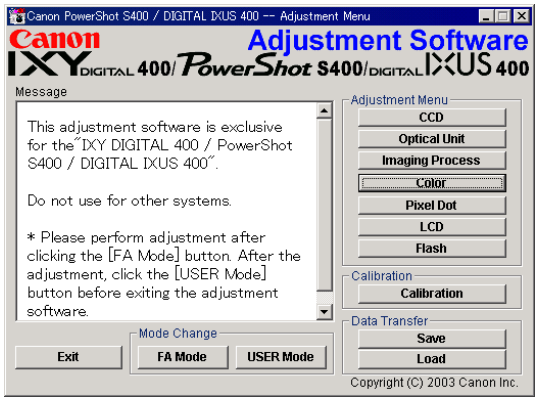
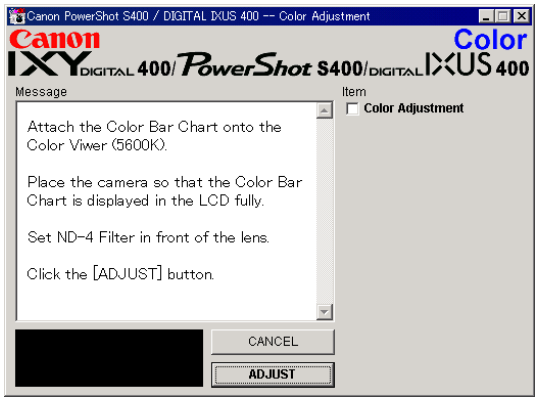
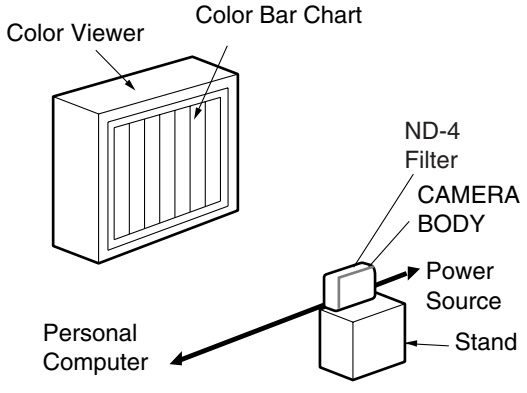
4	When the message on the right appears, go to 5.	
5	1. Remove the ND-2 Filter. 2. Attach the two W-10 Filters between the Lens and the Color Viewer. Place the camera so that the lens is set against the center part of the Color Viewer. 3. Click the “ADJUST” button.	
6	When the message on the right appears, go to 7.	
7	1. Remove the W-10 Filters. 2. Attach the C-12 and FL-W Filter between the Lens and the Color Viewer. Place the camera so that the lens is set against the center part of the Color Viewer. 3. Click the “ADJUST” button.	

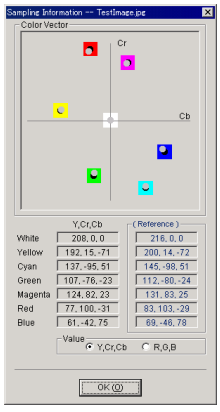
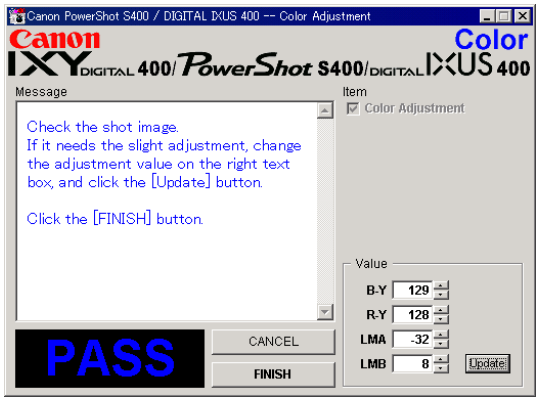
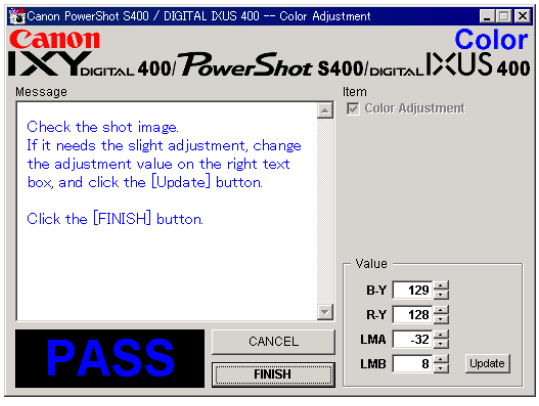
8	When the message on the right appears, click the "FINISH" button. (This ends the "Imaging Process" Adjustment.)	

3.5.4 Color Adjustment

■ Tools Used

- Personal Computer
- ADJUSTMENT SOFTWARE
- Compact Power Adapter CA-PS500
- AC Cable
- DC Coupler DR-500
- INTERFACE CABLE IFC-300PCU
- Color Viewer (5600° K)
- Color Bar Chart
- ND-4 Filter

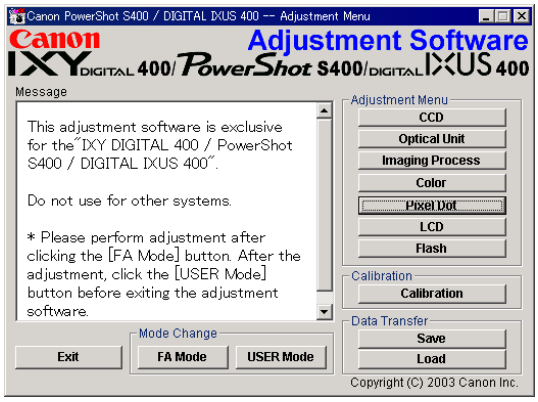
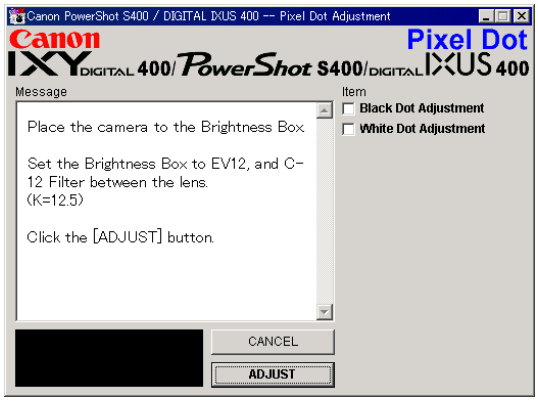
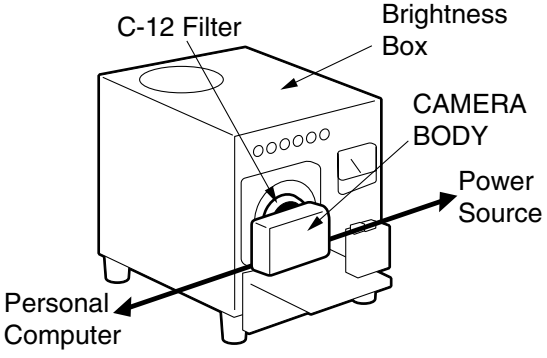
1	Click the “Color” button.	
2	When the message on the right appears, go to 3.	
3	1. Attach the Color Bar Chart to the Color Viewer. 2. Place the camera so that the Viewing image of the color bar chart is the full of LCD with the ND-4 Filter attached. 3. Click the “ADJUST” button.	

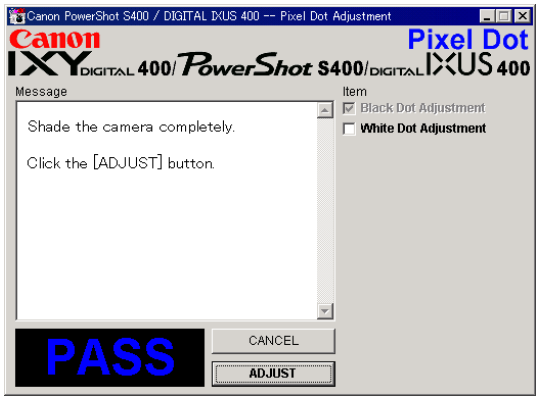
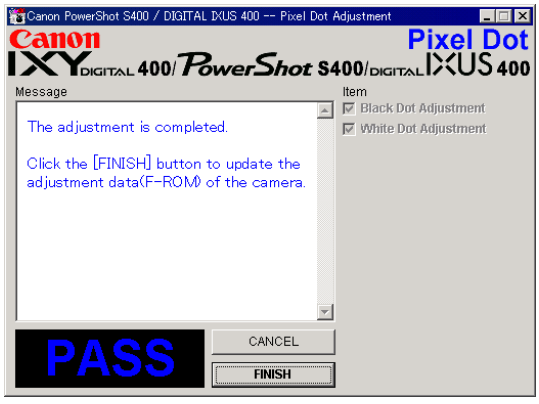
4	1. Shift a frame on the displayed screen with a mouse to choose a color of color bar. 2. Click the “Sampling” button.	
5	Check “Yellow and Red”, and click the “OK” button. If these data are within specifications, go to 7. * Specification Ave_Cr = Reference Camera ± 10 Ave_Cb = Reference Camera ± 10	
6	1. Confirm to see that the image on the PC monitor satisfies the specifications. 2. If the image on the PC monitor does not satisfy the specifications, change the data using UP, DOWN button or change the data directly by typing the data in the text box. Then click the “UPDATE” button.	
7	When the adjustment is completed, click the “FINISH” button. (This ends the “Color” Adjustment.)	

3.5.5 Pixel Dot Adjustment

■ Tools Used

- Personal Computer
- ADJUSTMENT SOFTWARE
- Compact Power Adapter CA-PS500
- AC Cable
- DC Coupler DR-500
- INTERFACE CABLE IFC-300PCU
- Brightness Box (Light source A)
- C-12 Filter
- Light-Shielding Cloth (500 × 500 or larger)

1	Click the “Pixel Dot” button.	
2	When the message on the right appears, go to 3.	
3	1. Place the camera so that lens is set against the light source surface of the Brightness Box via the C-12 Filter. 2. Set the Brightness Box to EV12. 3. Click the “ADJUST” button.	

4	1. When the message on the right appears, cover the camera with the Light-Shielding Cloth so that the no light reasons the CCD. 2. Click the “ADJUST” button.	
5	When the message on the right appears, click the “FINISH” button. (This ends the “Pixel Dot” Adjustment.)	

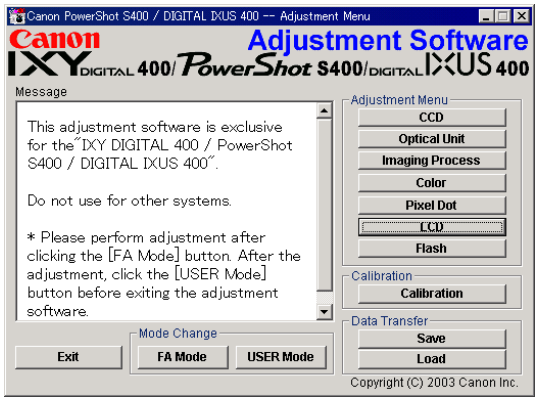
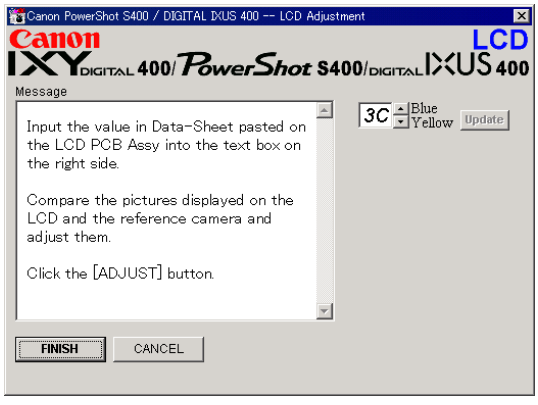
3.5.6 LCD Adjustment

■ Tools Used

- Personal Computer
- ADJUSTMENT SOFTWARE
- Compact Power Adapter CA-PS500
- AC Cable
- DC Coupler DR-500
- INTERFACE CABLE IFC-300PCU
- Reference Camera (Merchandise)
- DIGITAL CAMERA SolutionDisk

■ Preparation

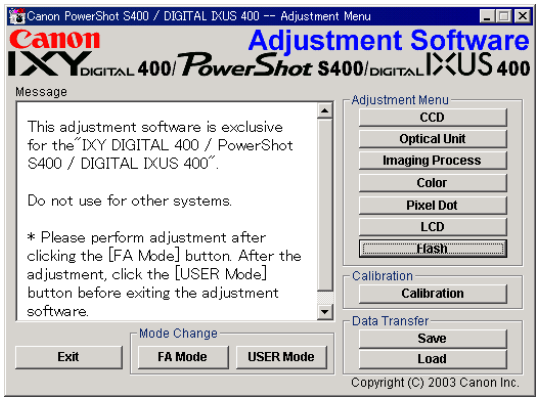
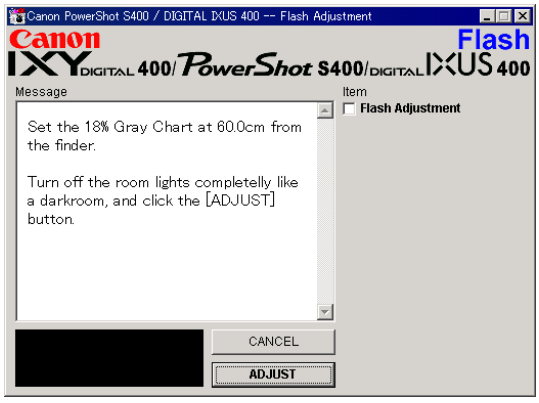
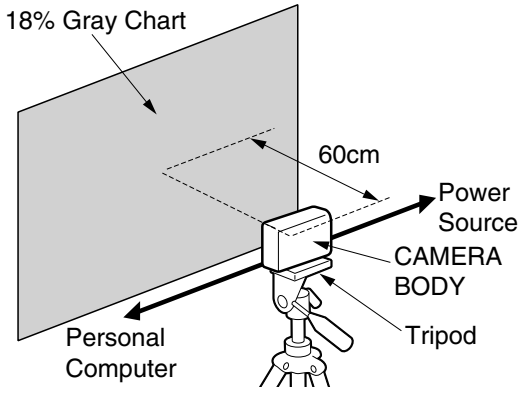
1. Insert the blank CF Card into the reference camera.
2. Connect the reference camera with the PC to start the ZoomBrowser EX.
3. Click the “IMPORT IMAGES” button, and choose the “From Canon Camera....”.
4. Click the “UPLOAD” button on the window menu for the images in the reference camera, and add the “Gray.jpeg” image. (Gray.jpg is in the folder of Adjustment Software downloaded.)
5. Finish the ZoomBrowser EX.
6. Disconnect the reference camera from the PC, and display the “Gray.jpg” image in PLAY mode.

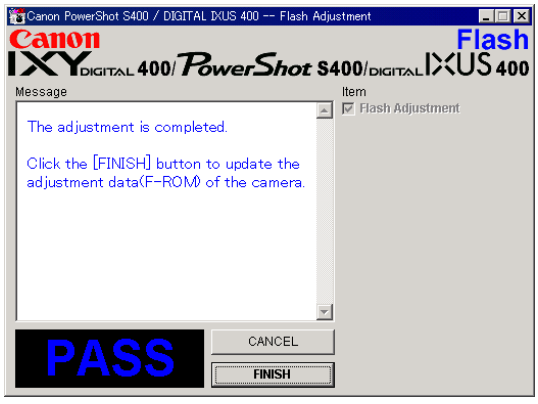
1	Click the “LCD” button.	
2	1. Compare the image with that of the reference camera. If it has a different color tint, adjust it by repeating clicking the Yellow/Blue button and the “Update” button alternately. 2. Click the “FINISH” button. (This ends the “LCD” Adjustment.)	

3.5.7 Flash Adjustment

■ Tools Used

- Personal Computer
- ADJUSTMENT SOFTWARE
- Compact Power Adapter CA-PS500
- AC Cable
- DC Coupler DR-500
- INTERFACE CABLE IFC-300PCU
- 18% Gray Chart
- Tripod

1	Click the “Flash” button.	
2	When the message on the right appears, go to 3.	
3	1. Set 18% Gray Chart 60cm from the Finder front. 2. Make the room as dark as a darkroom. 3. Click the “ADJUST” button.	

4	When the message on the right appears, click the "FINISH" button. (This ends the "Flash" Adjustment.)	

3.5.8 Checking of sound recording/output

It is not required to adjust the recording/output (volume, etc.) of sound.
Check the camera if the sound is recorded/play-backed properly.

CHAPTER 4. PARTS CATALOG

CONTENTS

CLASS凡例

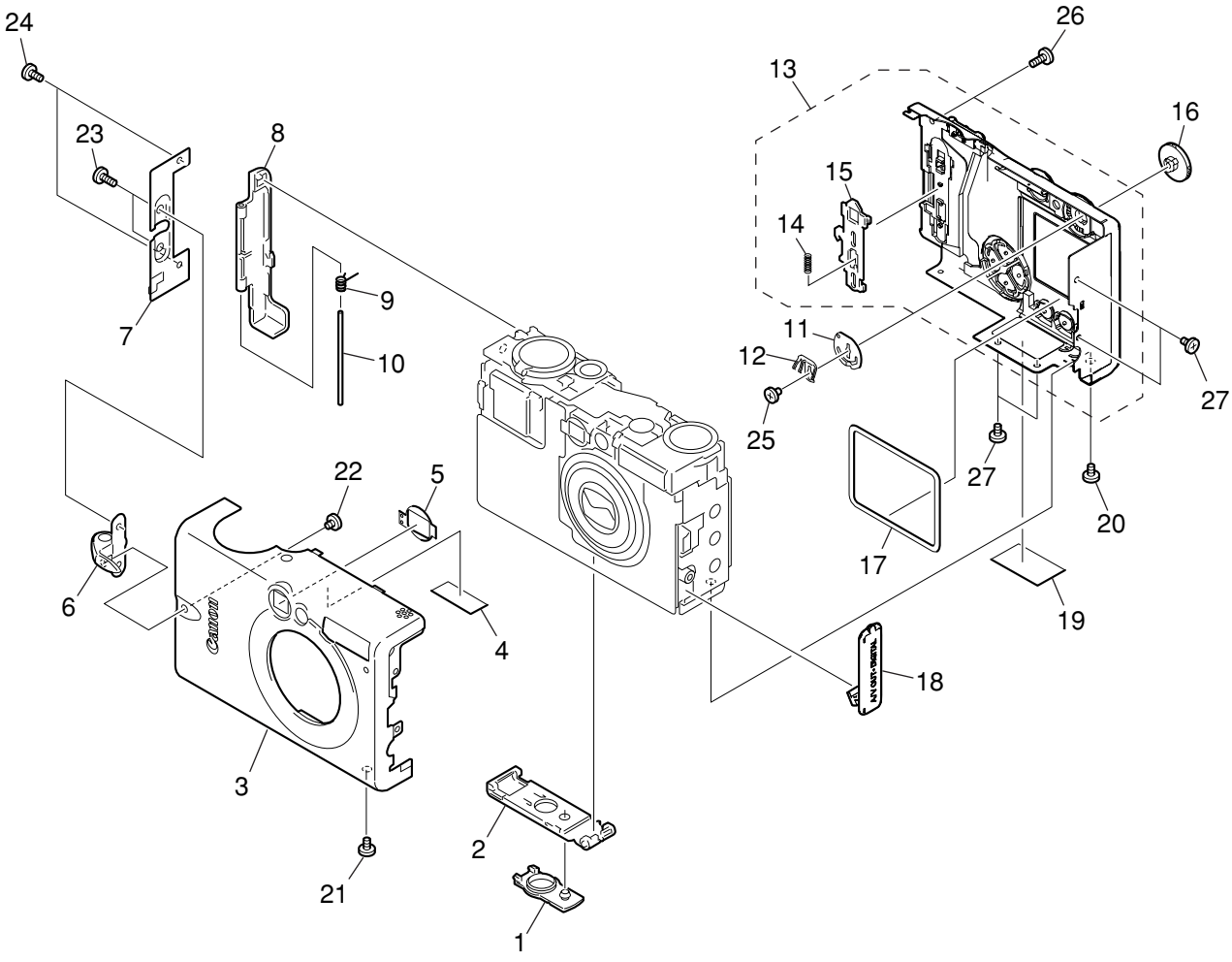
A: 使用頻度　高
B: 使用頻度　中
C: 使用頻度　低
D: 安全規格部品
E: 消耗部品
F: 標準ネジ、ワッシャー
S: 供給制限品
Y: サービス工具

Category of CLASS

A: Frequency of use: High
B: Frequency of use: Middle
C: Frequency of use: Low
D: Safety-related critical parts
E: Consumable parts
F: Standard screws and washers
S: Supply of the parts is limited
Y: Service Tools

Pg1

Casing Parts

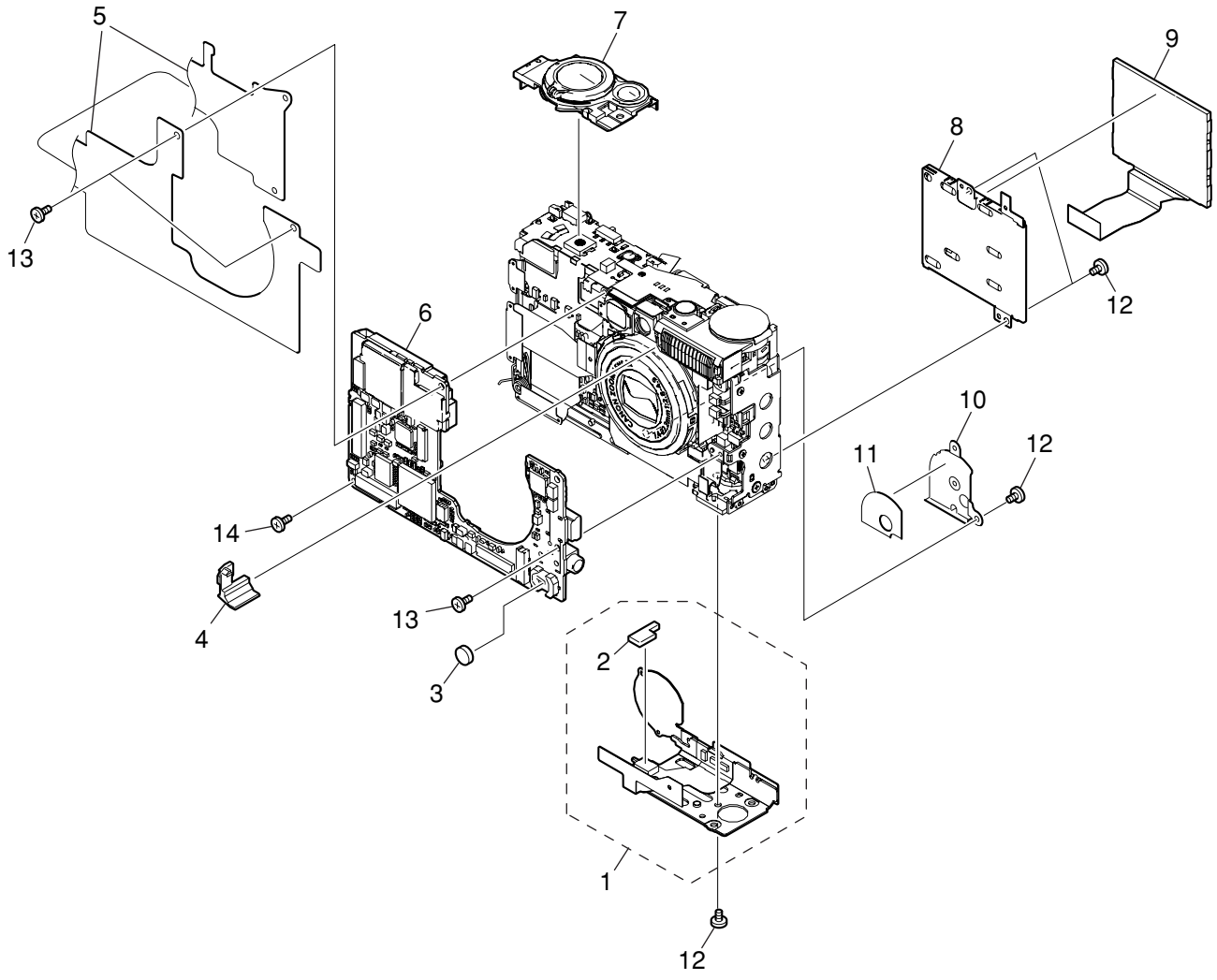


PARTS LIST

SYMBOL	PARTS NO.	CLASS	QTY	DESCRIPTION	REMARKS
1	CD3-0675-000	B	1	COVER, DC COUPLER	
2	CD3-0657-000	B	1	COVER, BATTERY	
3	CM1-2113-000	B	1	FRONT COVER UNIT	IXY DIGITAL 400
	CM1-2114-000	B	1	FRONT COVER UNIT	PowerShot S400
	CM1-2115-000	B	1	FRONT COVER UNIT	DIGITAL IXUS 400
4	CD3-0684-000	C	1	SHEET, INSULATION	
5	CD3-0648-000	C	1	RUBBER, FINDER	
6	CD3-0645-000	B	1	RING, STRAP	
7	CL1-2022-000	B	1	SIDE COVER UNIT	
8	CD3-0698-000	B	1	COVER, CF	
9	CS8-6162-000	C	1	SPRING, CF COVE	
10	CD3-0699-000	C	1	BAR, CF COVER	
11	CD3-0711-000	C	1	SPRING, MODE DIAL CLICK	
12	CD3-0712-000	C	1	PLATE, MODE DIAL CONTACT	
13	CM1-2111-000	B	1	REAR COVER UNIT	
14	CS8-5264-000	C	1	SPRING, CF LOCK	
15	CD1-4200-000	C	1	LOCK, CF COVER	
16	CD3-0710-000	B	1	DIAL, MODE	
17	CD3-0706-000	C	1	SPACER, LCD	
18	CD3-0704-000	B	1	COVER, JACK	
19	CY1-6259-000	B	1	PLATE, BODY NUMBER	#13011xxxxx
20	CD3-0730-000	C	1	SCREW	
21	CD3-0728-000	C	1	SCREW	
22	CD3-0687-000	C	1	SCREW	
23	CD3-0679-000	C	2	SCREW	
24	CD3-0678-000	C	2	SCREW	
25	CD3-0734-000	C	1	SCREW	
26	CD3-0731-000	C	1	SCREW	
27	CD3-0677-000	C	4	SCREW	

Pg2

Internal Parts-1

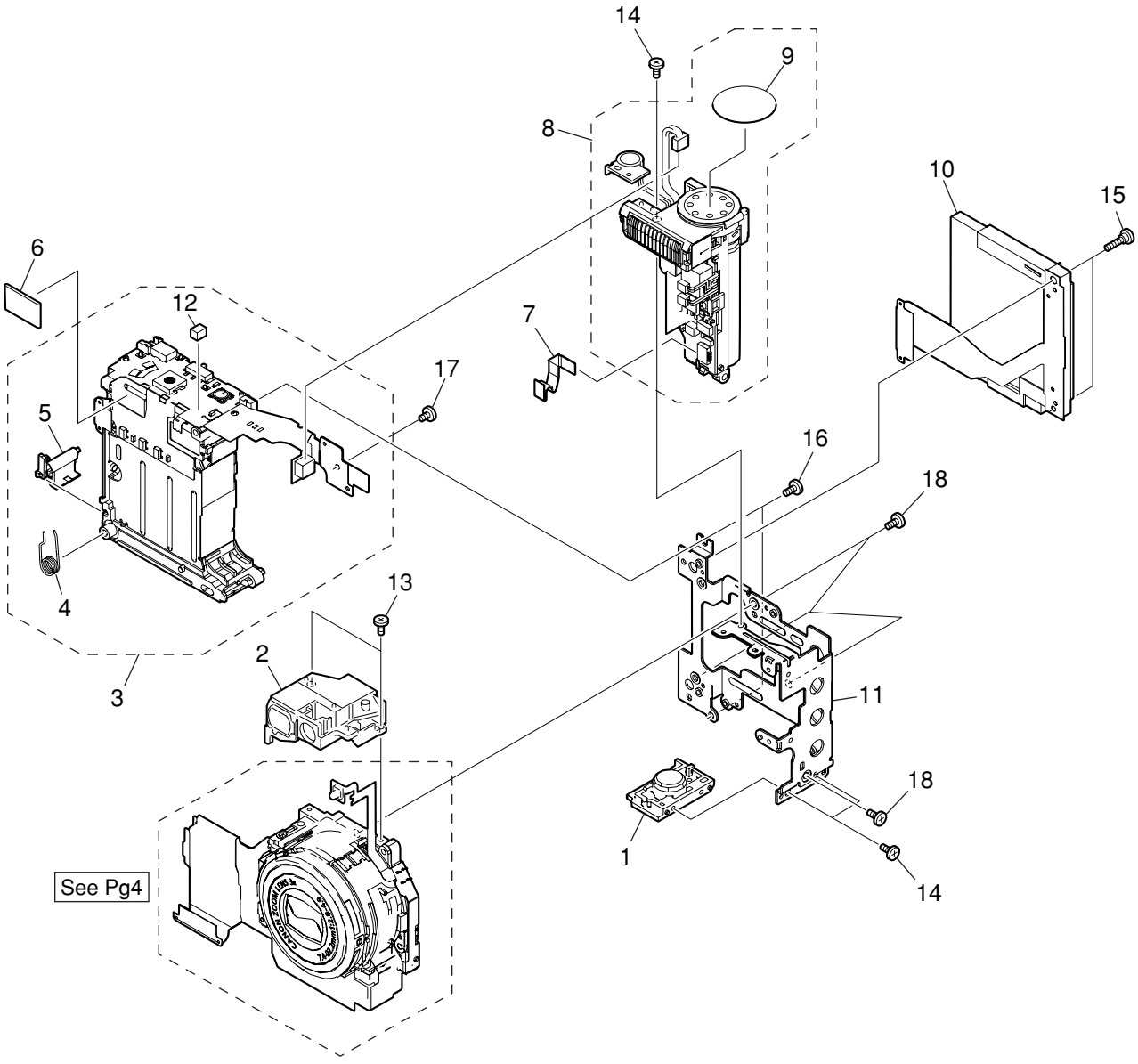


PARTS LIST

SYMBOL	PARTS NO.	CLASS	QTY	DESCRIPTION	REMARKS
1	CM1-2086-000	C	1	OPERATION KEY UNIT	
2	CD3-0735-000	C	1	SHEET, DUSTPROOF	
3	WK1-5140-000	C	1	BATTERY, LITHIUM(2ND)	
4	CD3-0631-000	C	1	SPACER, FINDER GAP	
5	CL1-2024-000	C	1	SHIELD SHEET UNIT	
6	CM1-2085-000	C	1	PCB ASS'Y, MAIN	
7	CM1-2072-000	B	1	SHUTTER BUTTON UNIT	
8	CM1-2075-000	C	1	BACK LIGHT UNIT	
9	WG2-5243-000	C	1	PANEL, LCD	
	WG2-5243-001	C	1	PANEL, LCD (SELECTION)	
10	CD3-0715-000	C	1	PLATE, OPERATION	
11	CD3-0716-000	C	1	TAPE, OPERATION PLATE	
12	CD1-3108-000	C	4	SCREW	
13	XA1-7170-357	F	3	SCREW	
14	XA4-9170-359	F	1	SCREW	

Pg3

Internal Parts-2

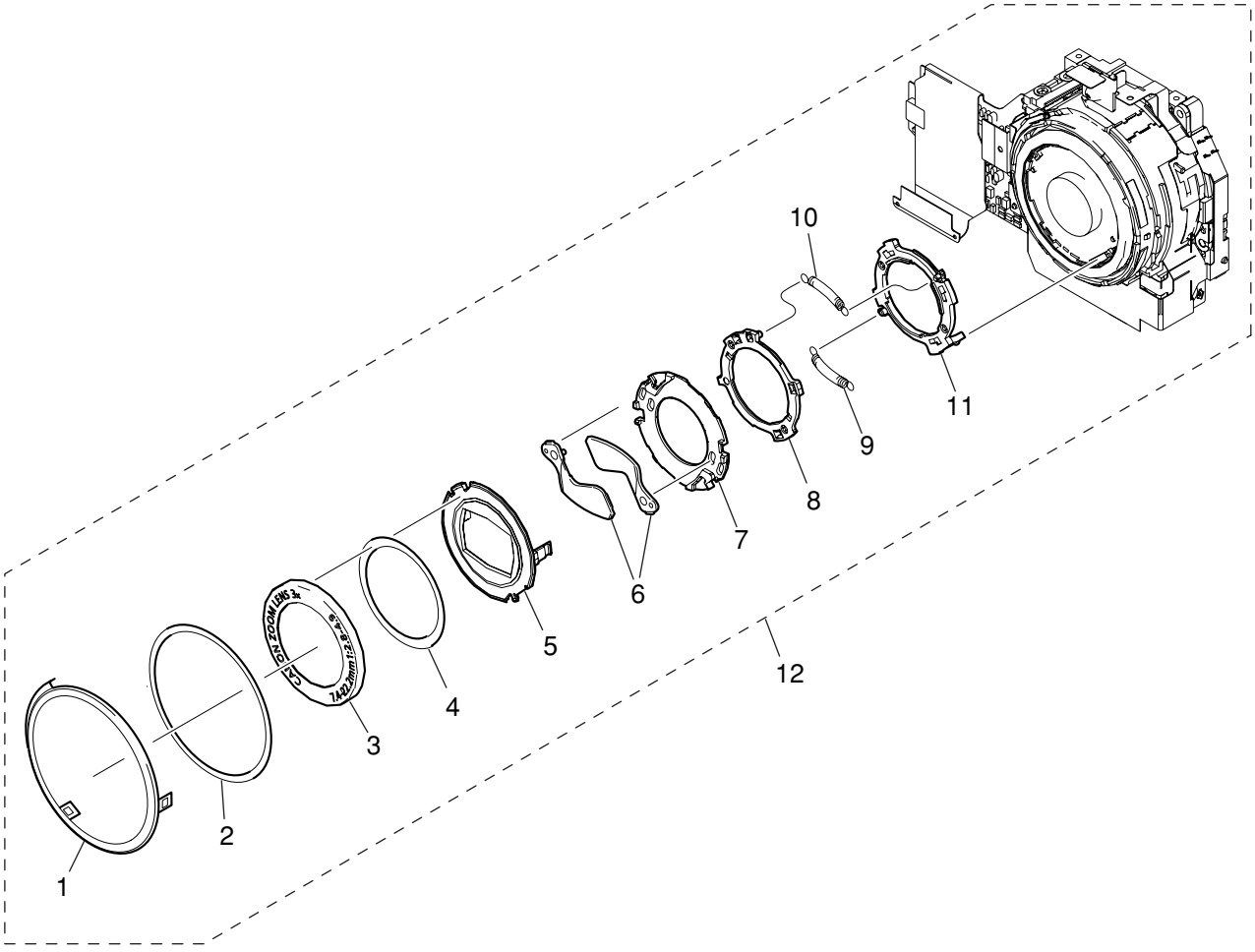


PARTS LIST

SYMBOL	PARTS NO.	CLASS	QTY	DESCRIPTION	REMARKS
1	CD3-0723-000	C	1	SOCKET, TRIPOD	
2	CM1-2090-000	C	1	FINDER UNIT	
3	CM1-2074-000	C	1	BATTERY BOX UNIT	
4	CD3-0655-000	C	1	SPRING, BATTERY LOCK	
5	CD3-0654-000	C	1	LOCK, BATTERY	
6	CD3-0690-000	C	1	SHEET, GROUND	
7	CK2-2027-000	C	1	FPC, MAIN-FLASH	
8	CM1-2071-000	C	1	FLASH BASE UNIT	
9	CM1-2112-000	C	1	SPEAKER SHEET UNIT	
10	CM1-2084-000	C	1	CF UNIT	
11	CD3-0707-000	C	1	FRAME, MAIN	
12	CY4-6074-000	D	1	FUSE, MATSU. DENKI UNHS 206	
13	XA4-9140-359	F	2	SCREW	
14	XA1-7170-307	F	3	SCREW	
15	CD3-0700-000	C	2	SCREW	
16	XA4-9170-309	F	2	SCREW	
17	XA4-5140-209	F	1	SCREW	
18	XA4-5170-309	F	4	SCREW	

Pg4

OPTICAL UNIT

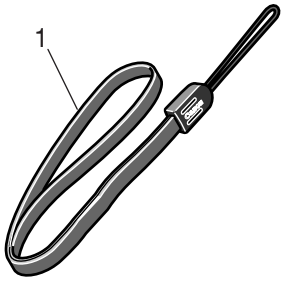


PARTS LIST

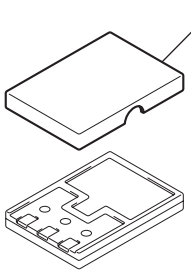
SYMBOL	PARTS NO.	CLASS	QTY	DESCRIPTION	REMARKS
1	CD3-0597-000	B	1	CAP, BASE BARREL	
2	CD3-0548-000	C	1	SHEET, LENS BARREL	
3	CD3-0543-000	B	1	CAP, BARREL	
4	CD3-0558-000	C	1	TAPE, BARREL CAP	SIZE (015)
5	CD3-0552-000	B	1	CAP, FRONT	
6	CD3-0550-000	B	2	PLATE, BARRIER	
7	CD3-0551-000	C	1	BASE, BARRIER	
8	CD3-0554-000	C	1	PLATE, BARRIER DRIVE	
9	CD3-0557-000	C	1	SPRING, BARRIER OPEN	
10	CD3-0556-000	C	1	SPRING, BARRIER CLOSE	
11	CD3-0553-000	C	1	RING, BARRIER DRIVE	
12	CM1-2062-000	C	1	OPTICAL UNIT	

Accessories-1

Wrist Strap WS-300

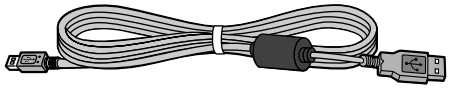


Terminal Cover NB-1LH



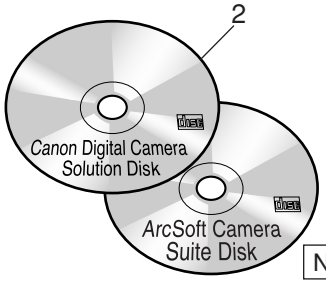
N.S

USB Interface Cable IFC-300PCU



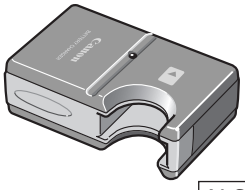
N.S

Canon Digital Camera Solution Disk, ArcSoft Camera Suite Disk



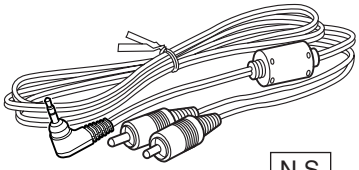
N.S

Battery Charger CB-2LS/2LSE



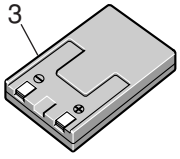
N.S

AV Cable AVC-DC100



N.S

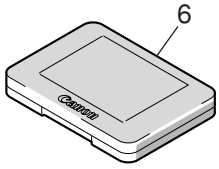
DC Coupler DR-500



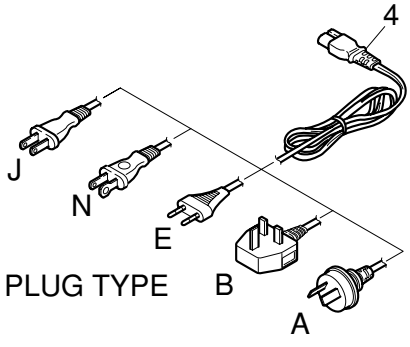
CF Card FC-32M

N.S

CF Case



AC Cable



N.S : N.S Stand for No Stock (Product available)

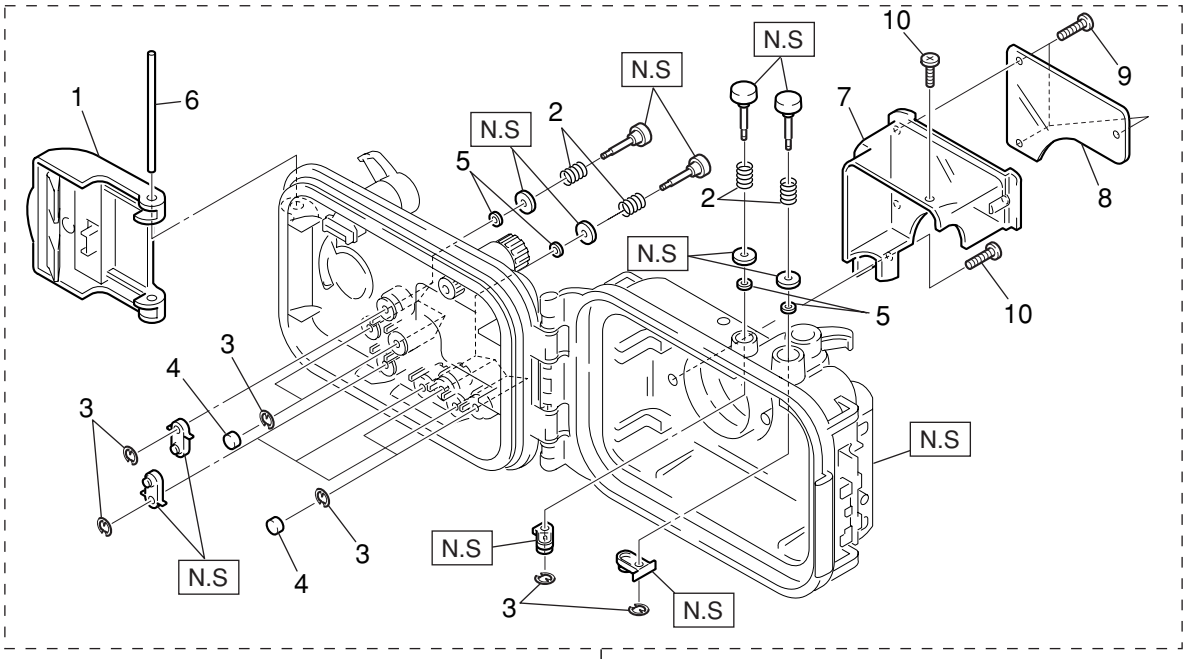
PARTS LIST

SYMBOL	PARTS NO.	CLASS	QTY	DESCRIPTION	REMARKS
1	C84-1082-000	B	1	STRAP, WRIST WS-300	
2	C84-1165-000	S	1	CD-ROM, SOLUTION VER.12.0 (J/E)	FOR JAPAN
	C84-1166-000	S	1	CD-ROM, SOLUTION VER.12.0 (E/F/S)	FOR USA, CANADA
	C84-1167-000	S	1	CD-ROM, SOLUTION VER.12.1 (J/E/C)	FOR ASIA, AUSTRALIA
3	C84-1044-000	B	1	DC COUPLER DR-500	
4	D82-0641-000	C	1	CABLE, AC (J)	FOR JAPAN
	D82-0642-000	C	1	CABLE, AC (N)	FOR USA, CANADA
	D82-0643-000	C	1	CABLE, AC (E)	FOR EUROPE, ASIA
	D82-0644-000	C	1	CABLE, AC (B)	FOR ASIA
	D82-0645-000	C	1	CABLE, AC (A)	FOR AUSTRALIA
5	CD1-4329-000	B	1	COVER, TERMINAL NB-1LH	
6	FC2-9610-000	B	1	CASE, CF	

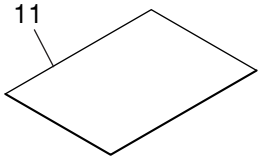
Pg6

Accessories-2

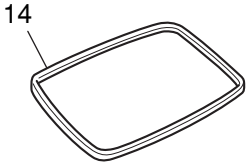
Waterproof Case WP-DC 800 N.S



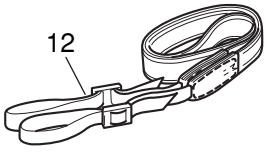
Sheet



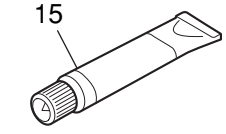
Waterproof Seal



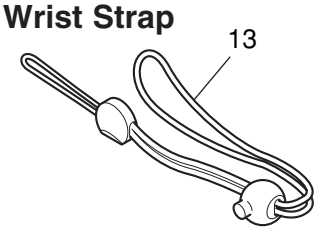
Neck Strap



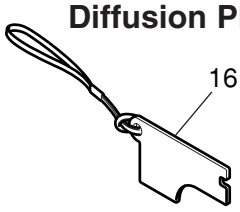
Silicone Grease



Wrist Strap



Diffusion Plate Unit



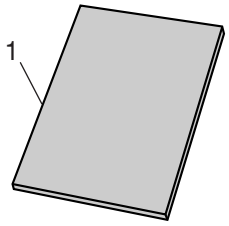
N.S : N.S Stand for No Stock (Product available)

PARTS LIST

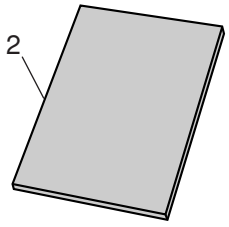
SYMBOL	PARTS NO.	CLASS	QTY	DESCRIPTION	REMARKS
1	CY1-6171-000	C	1	BUCKLE ASS'Y	
2	CY1-6167-000	C	10	SPRING, COIL	
3	CY1-6168-000	C	10	E RING	
4	CY1-6169-000	C	4	CAP, BUTTON	
5	CY1-6252-000	C	10	O RING	
6	CY1-6203-000	C	1	SHAFT, BUCKLE	
7	CY1-6279-000	C	1	HOLDER, DEFUSION PLATE	
8	CY1-6280-000	C	1	PROTECTOR, DEFUSION PLATE	
9	CY6-3210-000	C	3	SCREW (2 x 7)	
10	CY6-3211-000	C	2	SCREW (2 x 6)	
11	CY1-6276-000	C	1	SHEET	FOR JAPAN
12	CY1-6099-000	B	1	STRAP, NECK	
13	CY1-6174-000	B	1	STRAP, WRIST	
14	CY1-6277-000	B	1	PACKING, RUBBER	
15	CY9-3029-000	C	1	GREASE PACKING	
16	CY1-6278-000	B	1	DIFFUSION PLATE UNIT	

Accessories-3

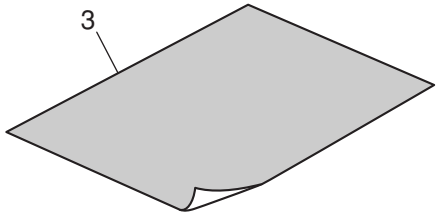
Camera User Guide



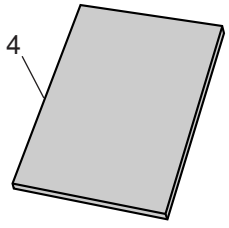
Software Starter Guide



System Map



Quick Start Guide

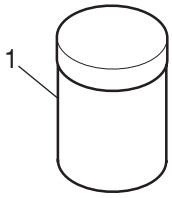


PARTS LIST

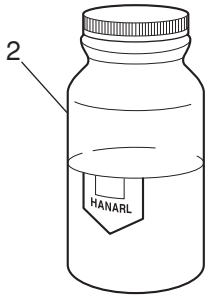
SYMBOL	PARTS NO.	CLASS	QTY	DESCRIPTION	REMARKS
1	CDI-E081-000	S	1	I.BOOK(ENGLISH)	FOR USA, CANADA, ASIA, AUSTRALIA
	CDI-S071-000	S	1	I.BOOK(SPANISH)	FOR USA
	CDI-J072-000	S	1	I.BOOK(JAPANESE)	FOR JAPAN
	CDI-F070-000	S	1	I.BOOK(FRENCH)	FOR CANADA
2	CDI-E070-000	S	1	SOFTWARE GUIDE(ENGLISH) VER.12	FOR USA, CANADA, ASIA, AUSTRALIA
	CDI-S060-000	S	1	SOFTWARE GUIDE(SPANISH) VER.12	FOR USA
	CDI-J061-000	S	1	SOFTWARE GUIDE(JAPANESE) VER.12	FOR JAPAN
	CDI-F059-000	S	1	SOFTWARE GUIDE(FRENCH) VER.12	FOR CANADA
3	CDI-E082-000	S	1	SYSTEM MAP(ENGLISH)	FOR USA, CANADA, ASIA, AUSTRALIA
	CDI-S072-000	S	1	SYSTEM MAP(SPANISH)	FOR USA
	CDI-J073-000	S	1	SYSTEM MAP(JAPANESE)	FOR JAPAN
	CDI-F071-000	S	1	SYSTEM MAP(FRENCH)	FOR CANADA
4	CDI-E083-000	S	1	QUICK START GUIDE(ENGLISH)	FOR USA, CANADA, ASIA, AUSTRALIA
	CDI-S073-000	S	1	QUICK START GUIDE(SPANISH)	FOR USA
	CDI-J074-000	S	1	QUICK START GUIDE(JAPANESE)	FOR JAPAN
	CDI-F072-000	S	1	QUICK START GUIDE(FRENCH)	FOR CANADA

Service Tools-1

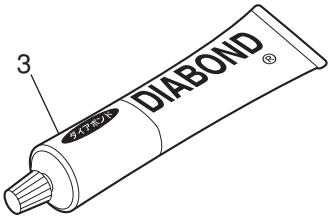
Logenest Rambda A-74



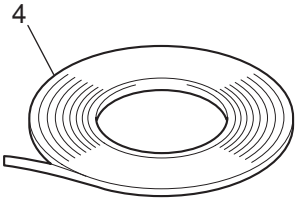
Hanarl FL-778



DIA Bond NO.1663G Black



Adhesive Tape SONY T4000



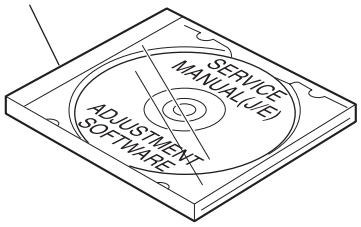
PARTS LIST

SYMBOL	PARTS NO.	CLASS	QTY	DESCRIPTION	REMARKS
1	CY9-8102-000	Y	1	LUBE, LOGNEST RAMBDA A-74	80g
2	DY9-3026-010	Y	1	LUBE, HANARL FL-778, OIL	
3	CY9-8129-000	Y	1	BOND, DIA BOND NO.1663G BLACK	
4	CY4-6012-000	Y	1	ADHESIVE TAPE, SONY T4000	6mm × 50m roll

Service Tools-2

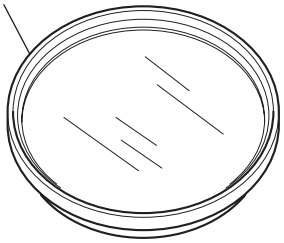
Service Manual CD-ROM

1



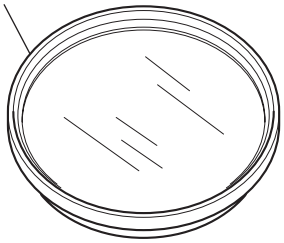
C-12 Filter

5



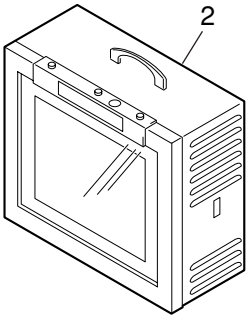
ND-2 Filter

8



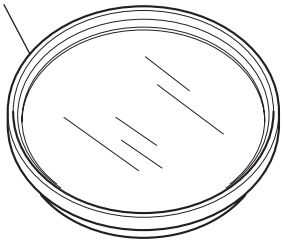
Color Viewer (5600° K)

2



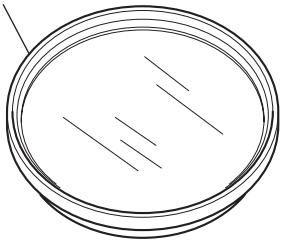
W-10 Filter

6



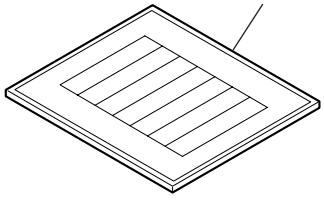
ND-4 Filter

9



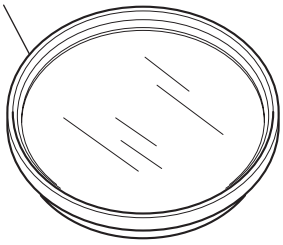
Standard Color Bar Chart

3



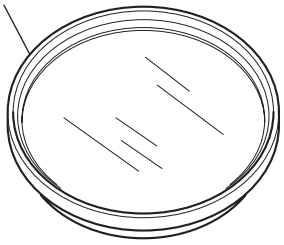
FL-W Filter

7



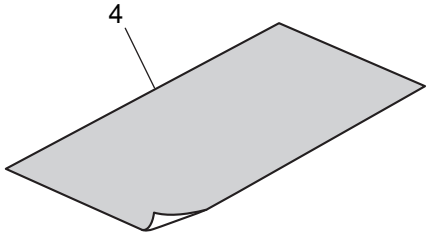
ND-8 Filter

10



18% Gray Chart

4



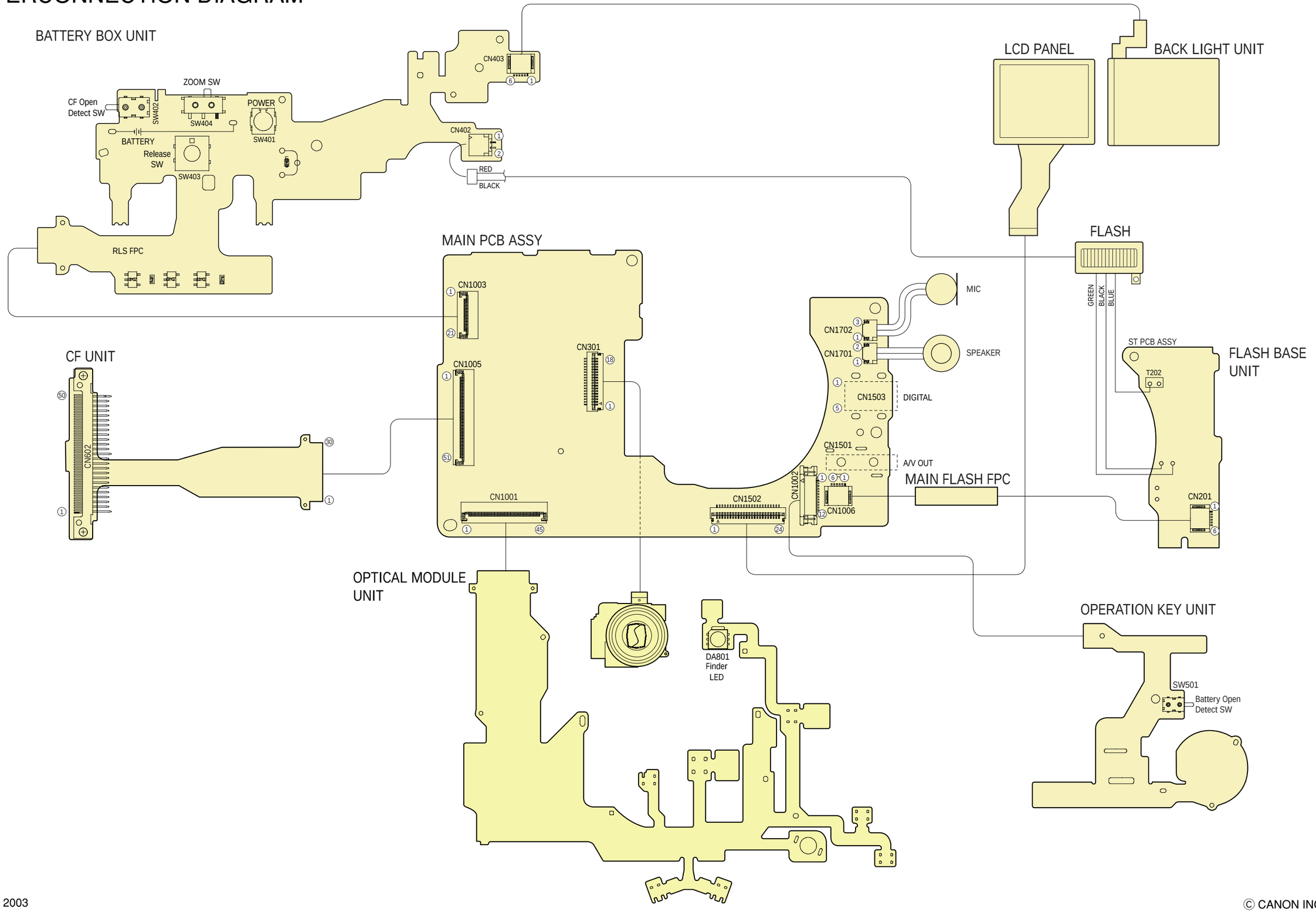
PARTS LIST

SYMBOL	PARTS NO.	CLASS	QTY	DESCRIPTION	REMARKS
1	CY8-4384-031	Y	1	CD-ROM, SERVICE MANUAL (J/E)	
2	DY9-2039-100	Y	1	COLOR VIEWER 5600K	
3	DY9-2002-000	Y	1	COLOR BAR CHART	
4	CY4-6016-000	Y	1	CHART, 18% GRAY	
5	CY9-1555-000	Y	1	FILTER, C-12	
6	CY9-1556-000	Y	1	FILTER, W-10	
7	CY9-1557-000	Y	1	FILTER, FL-W	
8	CY9-1552-000	Y	1	FILTER, ND-2	
9	CY9-1553-000	Y	1	FILTER, ND-4	
10	CY9-1554-000	Y	1	FILTER, ND-8	

CHAPTER 5. DIAGRAMS

CONTENTS

1. INTERCONNECTION DIAGRAM



CONNECTORS

MAIN PCB ASS'Y

CN1001	
1	ZMP00
2	ZNP01
3	VCC1
4	VCC1
5	VCC1
6	VCC1
7	ZMRST
8	AFRST
9	C_GND
10	C_GND
11	C_GND
12	C_GND
13	VZMCNT
14	SLNT_DET0
15	SLNT_DET1
16	AF1
17	AF2
18	AF3
19	AF4
20	ZM1
21	ZM2
22	SHCL
23	SHOP
24	IR1
25	SHDC
26	IR2
27	VBATT
28	VBATT
29	VBATT
30	VBATT
31	VBATT
32	VBATT
33	VBATT
34	EMPIEN
35	AFPIEN
36	SLPIEN
37	M_GND
38	M_GND
39	M_GND
40	M_GND
41	M_GND
42	M_GND
43	M_GND
44	AFLED
45	VDPTTMP

CN1002	
1	BTOP
2	UP
3	LEFT
4	RIGHT
5	EXP/WB/ERASE
6	DOWN
7	SCAN
8	DISP
9	MENU
10	SET
11	M_GND
12	M_GND
CN1003	
1	VDD3
2	LED_BL
3	VCC1
4	LED_MACRO
5	LED_ORANGE
6	LED_GREEN
7	LED_POWER
8	POWER
9	MODE0
10	SCAN
11	SCON
12	DIAL0
13	DIAL1
14	CFOP
15	VBATTEP
16	SW2
17	SW1
18	WIDE
19	TELE
20	M_GND
21	M_GND

CN1005	
1	C_GND
2	C_GND
3	/CD2
4	D10
5	/IOIS16
6	D09
7	D02
8	D08
9	D01
10	Not Connected
11	D00
12	Not Connected
13	A00
14	/REG
15	A01
16	Not Connected
17	/CE1
18	D15
19	D07
20	D14
21	D06
22	D13
23	D05
24	D12
25	D04
26	D11
27	D03
28	/CD1
29	A02
30	/WAIT
31	A03
32	RESET
33	A04
34	Not Connected
35	A05
36	Not Connected
37	A06
38	VCC1
39	VCC1
40	IREQ
41	A07
42	/WE
43	A08
44	/IOWR
45	A09
46	/IORD
47	/OE
48	/VS1
49	A10
50	/CE2
51	C-GND

CN1301	
1	C-GND
2	VDD
3	RG
4	H2
5	H1
6	C_GND
7	SUB
8	CSUB
9	VL
10	V4
11	V3A
12	V3B
13	V2
14	V1A
15	V1B
16	C_GND
17	C_GND
18	VOUT
CN1501	
1	UV_GND
2	AUDIO
3	VIDEO
4	VC_DET
CN1502	
1	Not Connected
2	RGT
3	BLUE
4	RED
5	GREEN
6	PSIG
7	HCK1
8	HCK2
9	CEXT/REXT
10	Not Connected
11	REF
12	HST
13	WIDE
14	Not Connected
15	VSSG
16	VDDG
17	VSS
18	VDD
19	DWN
20	EN
21	VCK
22	VST
23	COM
24	Not Connected
CN1503	
1	VBUS
2	D-
3	D+
4	Not Connected
5	UV_GND

CN1701	
1	SP+
2	SP-
CN1702	
1	MIC
2	MIC_GND

BATTERY BOX UNIT

CN402	
1	VBATT
2	GND
CN403	
1	Not Connected
2	VDD3
3	Not Connected
4	Not Connected
5	LED_BL
6	Not Connected

CF UNIT

CN602	
1	GND
2	D03
3	D04
4	D05
5	D06
6	D07
7	/CE1
8	A10
9	/OE
10	A09
11	A08
12	A07
13	VCC
14	A06
15	A05
16	A04
17	A03
18	A02
19	A01
20	A00
21	D00
22	D01
23	D02
24	/IOIS16
25	/CD2
26	/CD1
27	D11
28	D12
29	D13
30	D14
31	D15
32	/CE2
33	/VS1
34	/IORD
35	/IOWR
36	/WE
37	IREQ
38	VCC
39	/CSEL
40	/VS2
41	RESET
42	/WAIT
43	/INPACK
44	/REG
45	/SPKR
46	/STSCHG
47	D08
48	D09
49	D10
50	GND

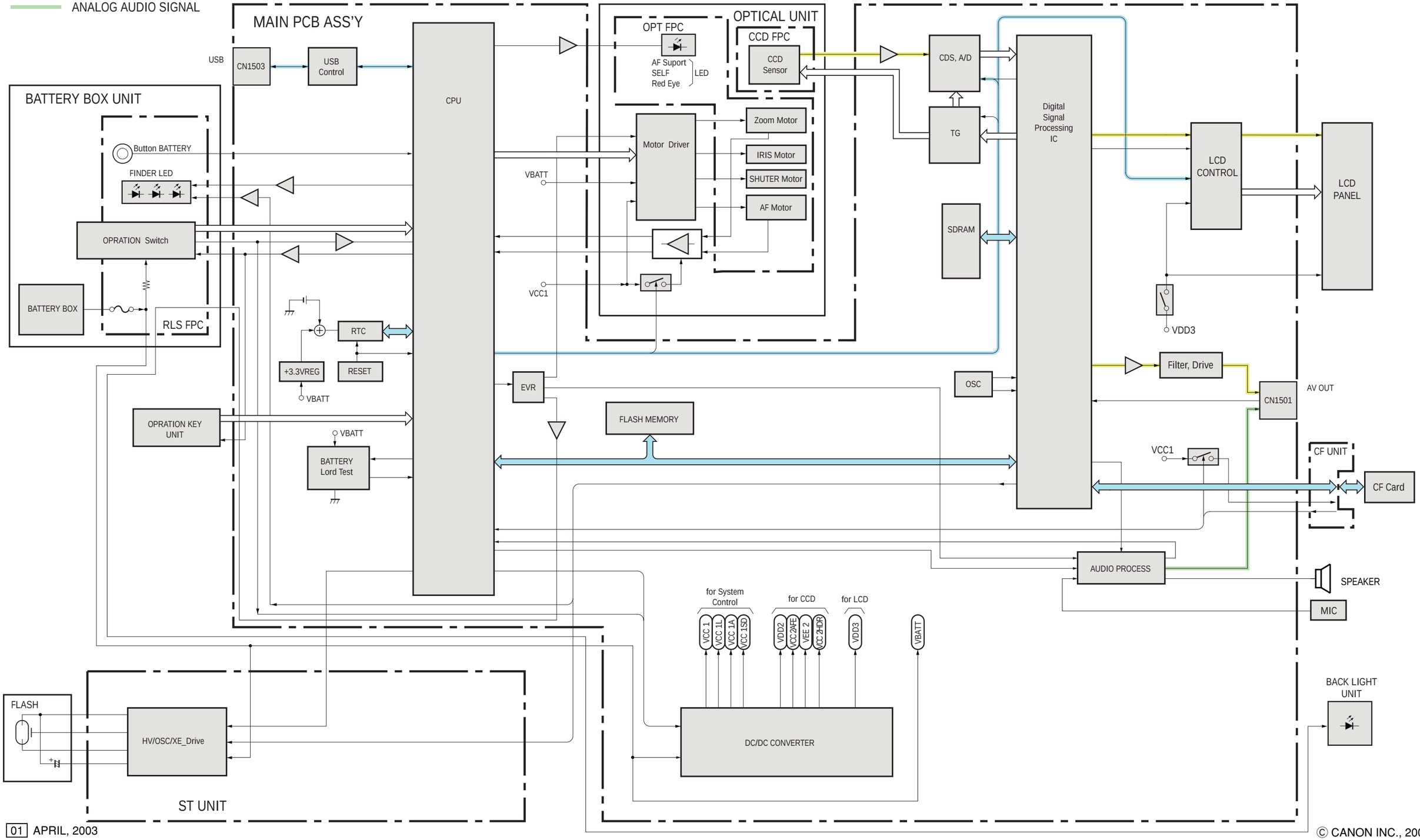
FLASH UNIT

CN201	
1	EFCHG
2	VCHGLVL
3	VCHGLVL
4	STSP
5	GND
6	GND

2. BLOCK DIAGRAMS

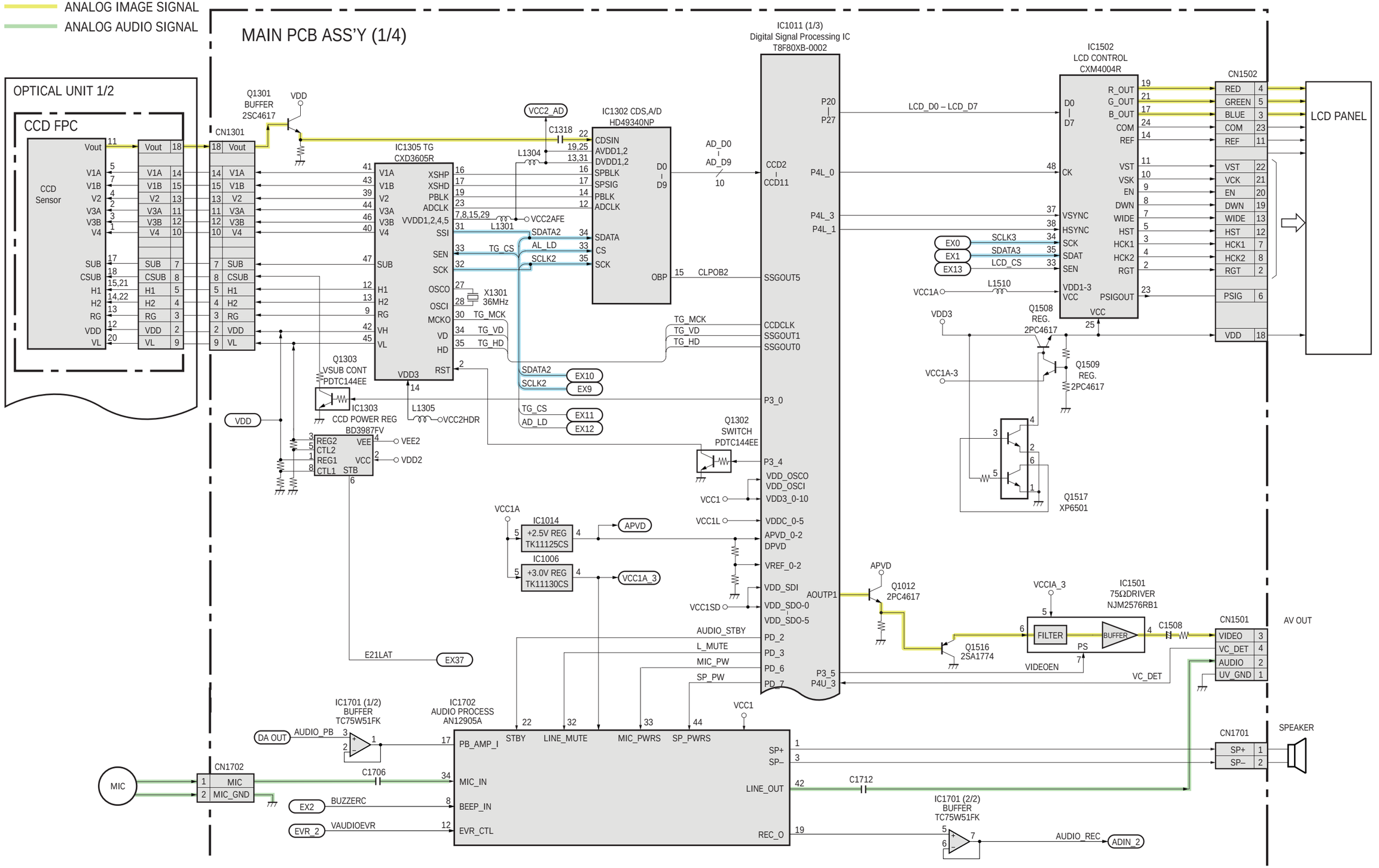
2.1 OVERALL

DATA COMMUNICATION
ANALOG IMAGE SIGNAL
ANALOG AUDIO SIGNAL

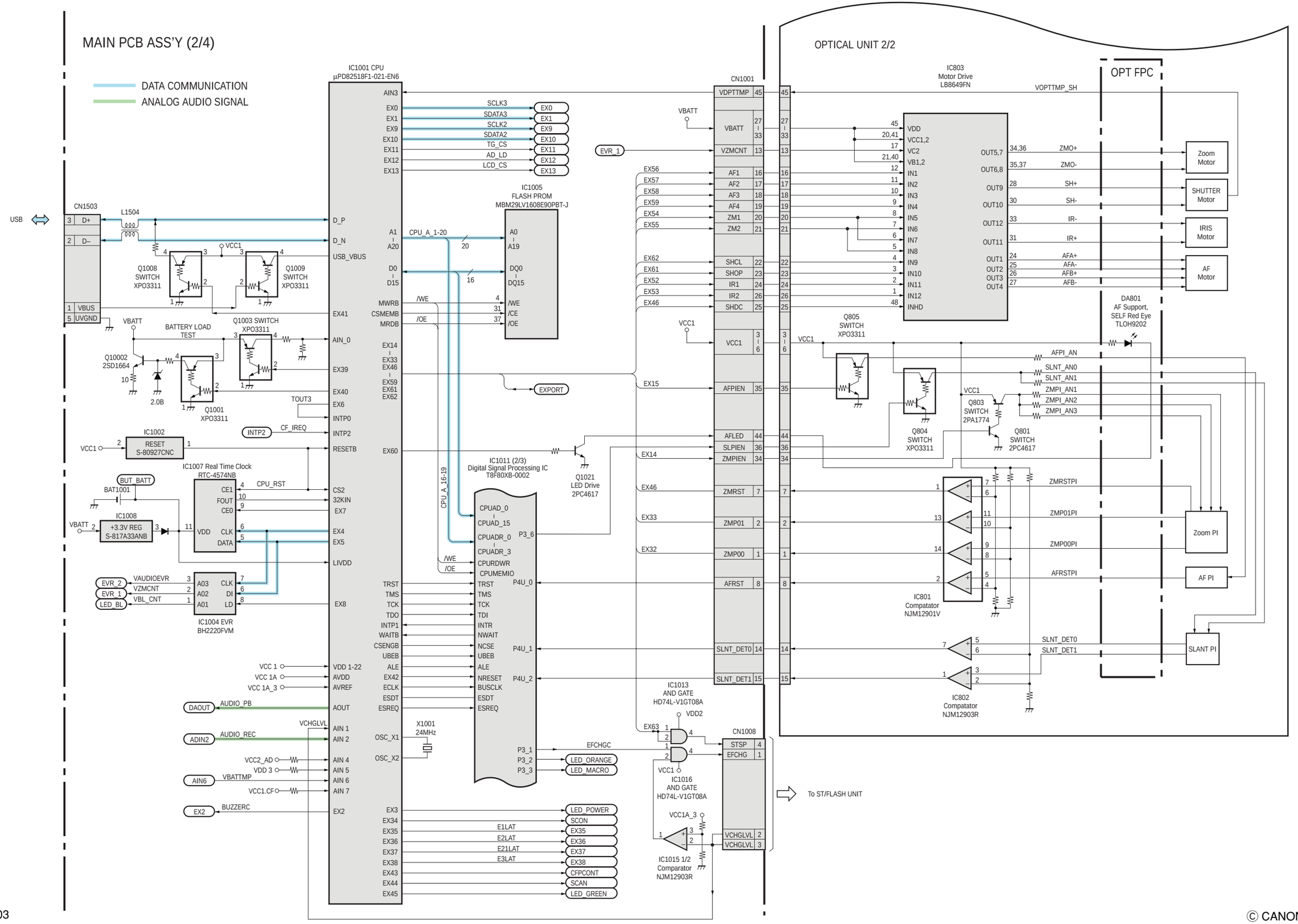


2.2 MAIN PCB ASS'Y (1/4)

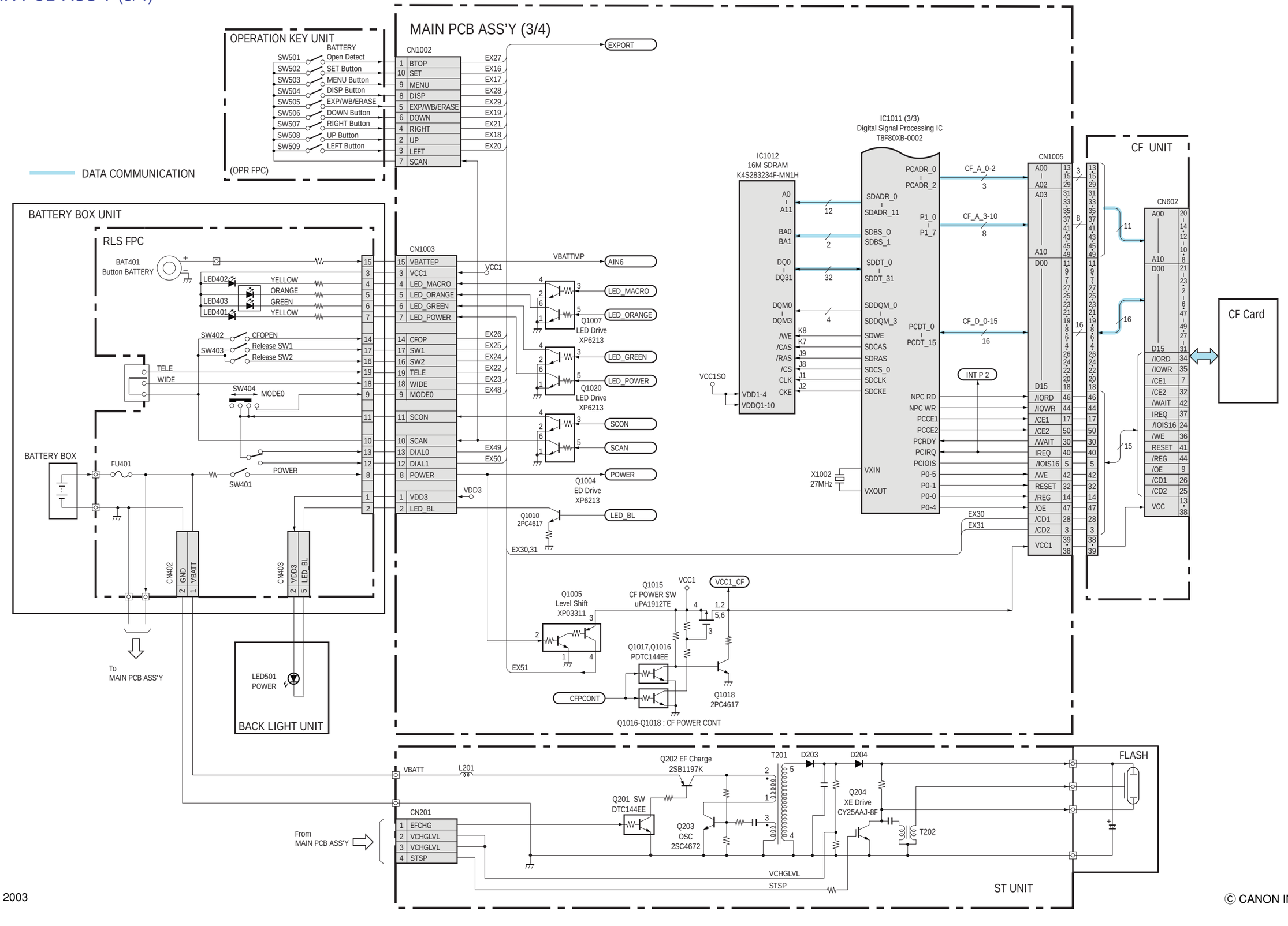
DATA COMMUNICATION
ANALOG IMAGE SIGNAL
ANALOG AUDIO SIGNAL



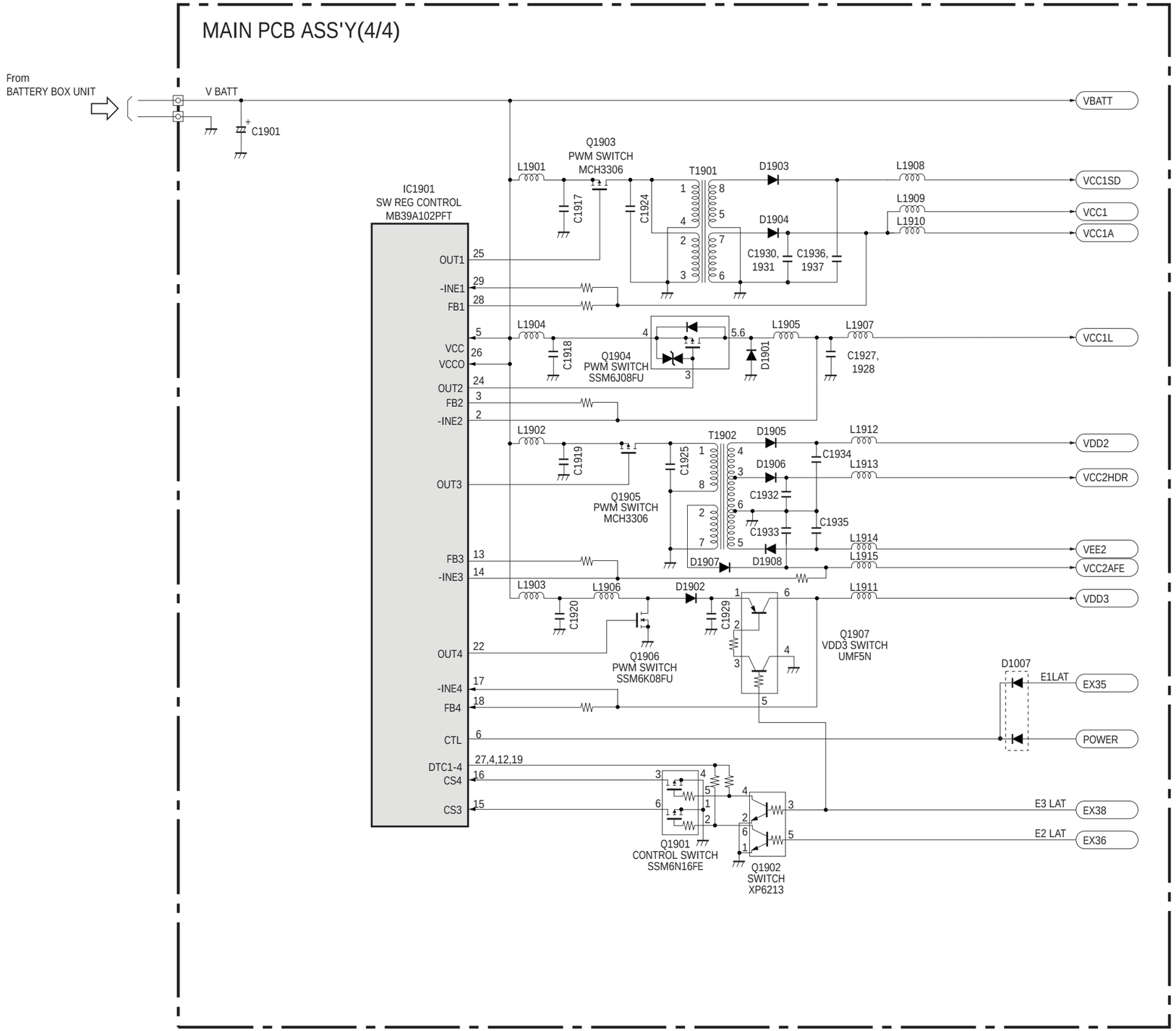
2.3 MAIN PCB ASS'Y (2/4)



2.4 MAIN PCB ASS'Y (3/4)



2.5 MAIN PCB ASS'Y (4/4)



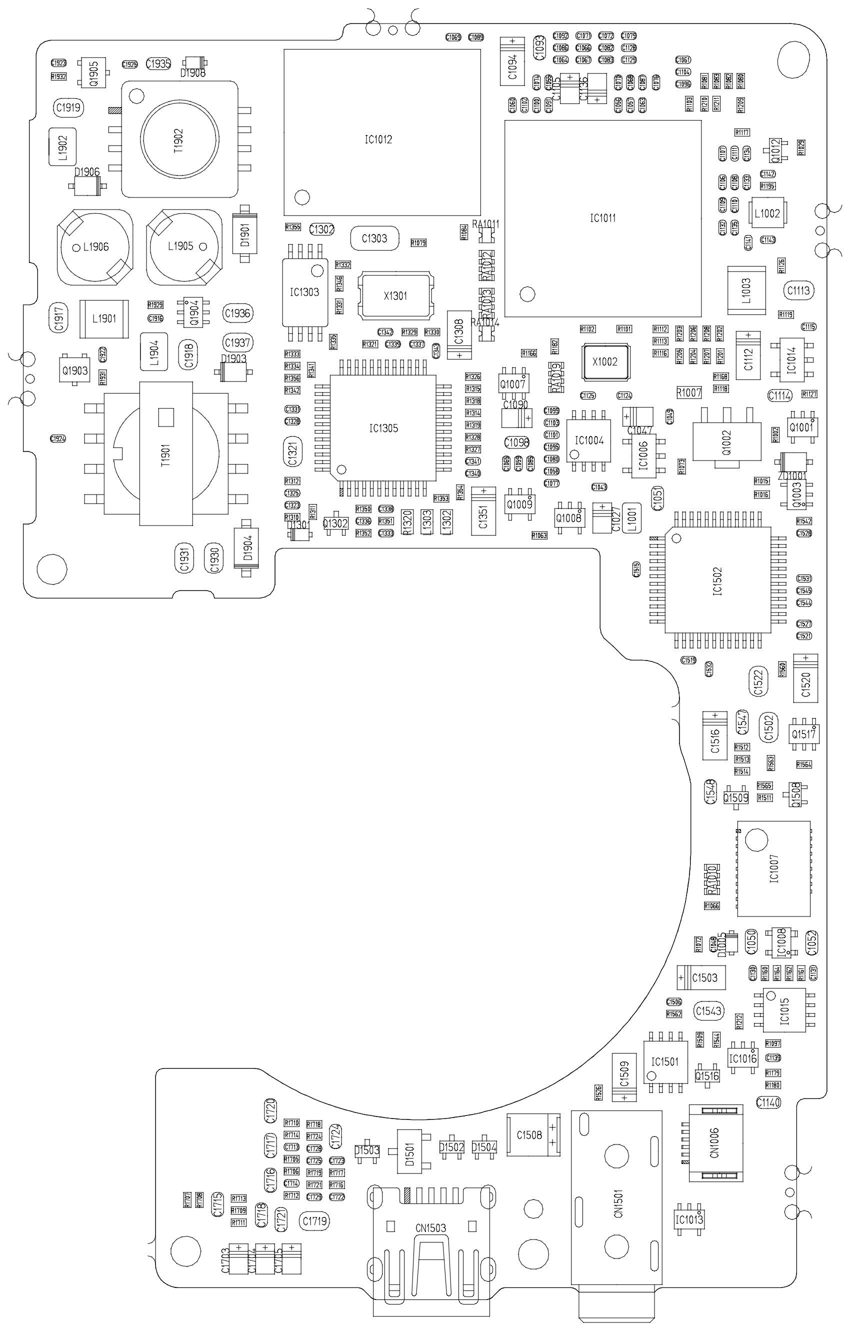
2.6 Abbreviation in Block Diagrams

Abbreviation	Nominal name	Description
ADC	Analog-to-Digital (A/D) Converter	
AE	Automatic Exposure control	
AF	Automatic Focussing control	
AND	Logic AND circuit	
R-Y/B-Y		Color difference signals of TV system
BPF	Band-Pass Filter	
BUFFER	Buffer circuit	
C	Chrominance signal	Color component signal of TV system
CCD	Charge-Coupled Device	CCD imager
CDS	Correlated Double Sampling system	
COMP.VIDEO	Composite video signal	
COMPARATOR	Voltage comparator	
CPU	Central Processing Unit	
DAC	Digital-to-Analog (D/A) Converter	
DRAM	Dynamic Random Access Memory	Memory with which read and write are freely possible.
DSP	Digital Signal Processing	Typically DSP device
EEPROM	Electrically Erasable PROM	PROM that is electrically erasable.
EVF	Electronic View Finder	
FET	Field Effect Transistor	
FLASH MEMORY		Non-volatile memory with which write and read are freely possible.
HPF	High-Pass Filter	
I/F	InterFace	The circuit that interconnects 2 devices or circuits.
IGBT	Insulated Gate Bipolar Transistor	Conductivity-modulation type FET transistor
INV.	Logic Inverter circuit	
IR	InfraRed ray	
IRIS	Iris	
LCD	Liquid Crystal Device	Typically LCD display
LED	Light Emitting Diode	Typically LED display
LPF	Low-Pass Filter	
NTSC	National Television System Committees	NTSC color TV system developed in USA
OP Amp	OPerational Amplifier	
OR	Logic OR circuit	
OSC	OSCillator	
PAL	Phase Alternating by Line	PAL color TV system developed in Germany
PLL	Phase Locked Loop	
PROM	Programmable Read Only Memory	Non-volatile memory in which program can be written.
PWM	Pulse Width Modulation	
REG.	REGulated power supply	
RTC	Real Time Clock	Reference clock oscillator
SDRAM	Synchronous Dynamic RAM	DRAM whose bus interface is synchronous.
SECAM	SEquential Colour À Mémoire	SECAM color TV system developed in France
SW REG	SWitching REGulator	Switching type regulated power supply device
TG	Timing Generator	
USB	Universal Serial Bus	USB type serial data communication system
VCO	Voltage Controlled Oscillator	
VCXO	Voltage Controlled X'tal Oscillator	
XE	Xenon Tube	
Y	Y-signal	Luminance component signal of TV system

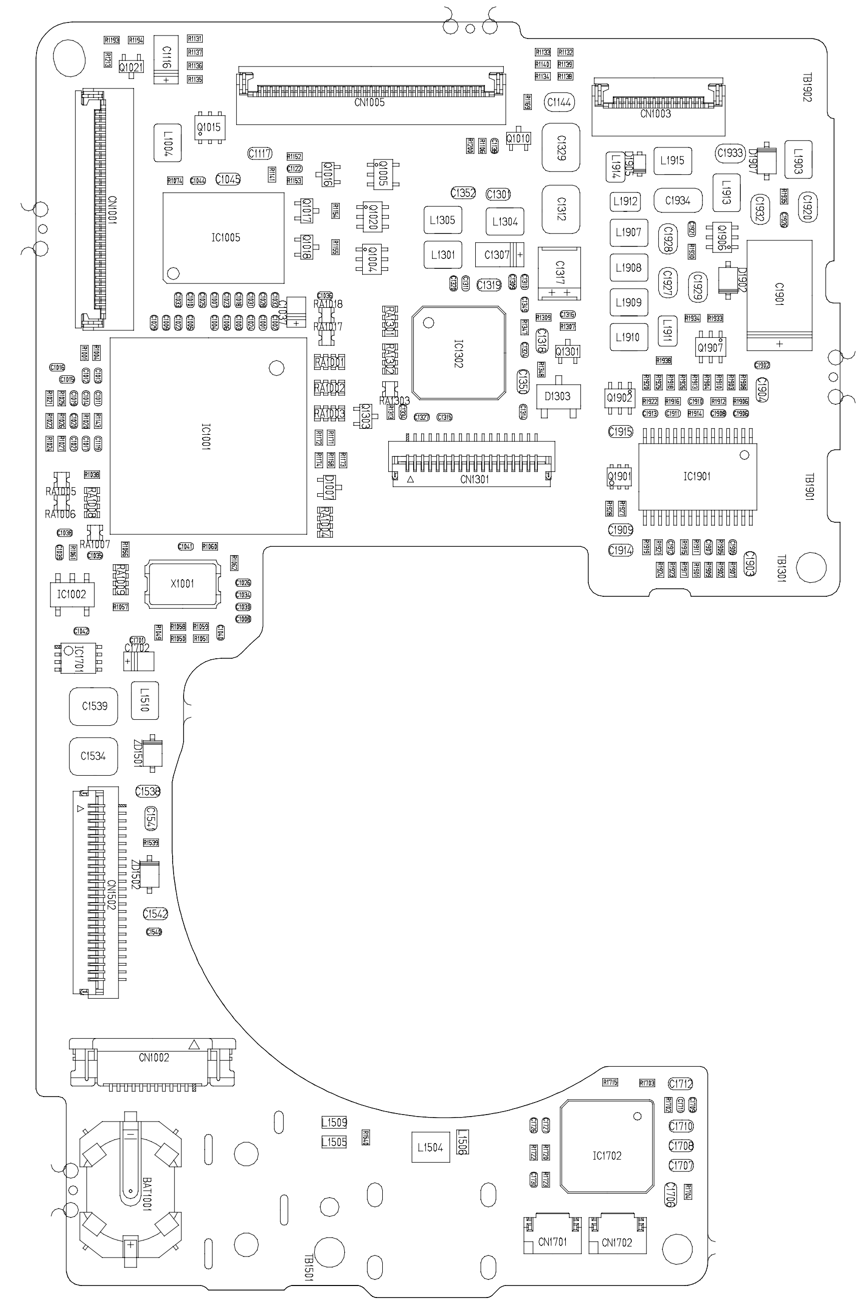
3. P.C.B. DIAGRAMS

3.1 MAIN PCB ASS'Y

MAIN PCB ASS'Y (SOLDERING SIDE)

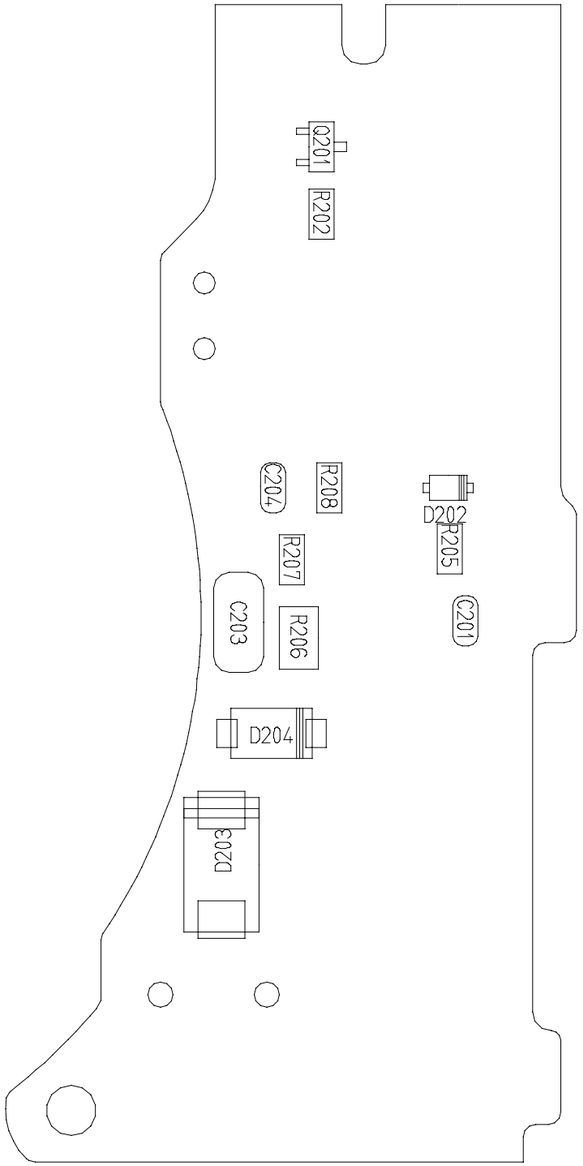


MAIN PCB ASS'Y (COMPONENT SIDE)

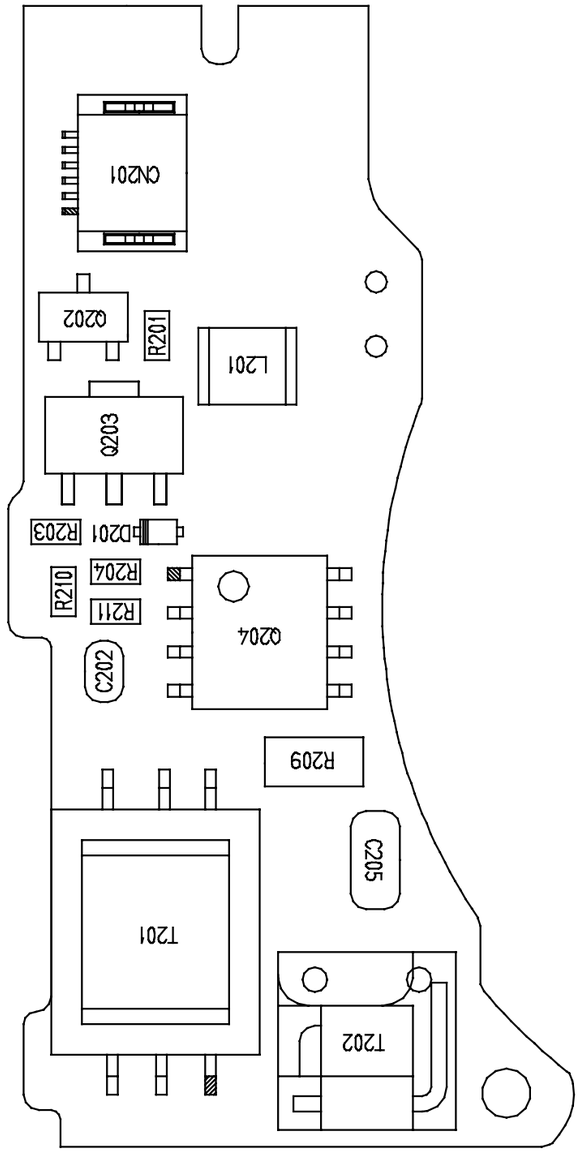


3.2 FLASH BASE UNIT

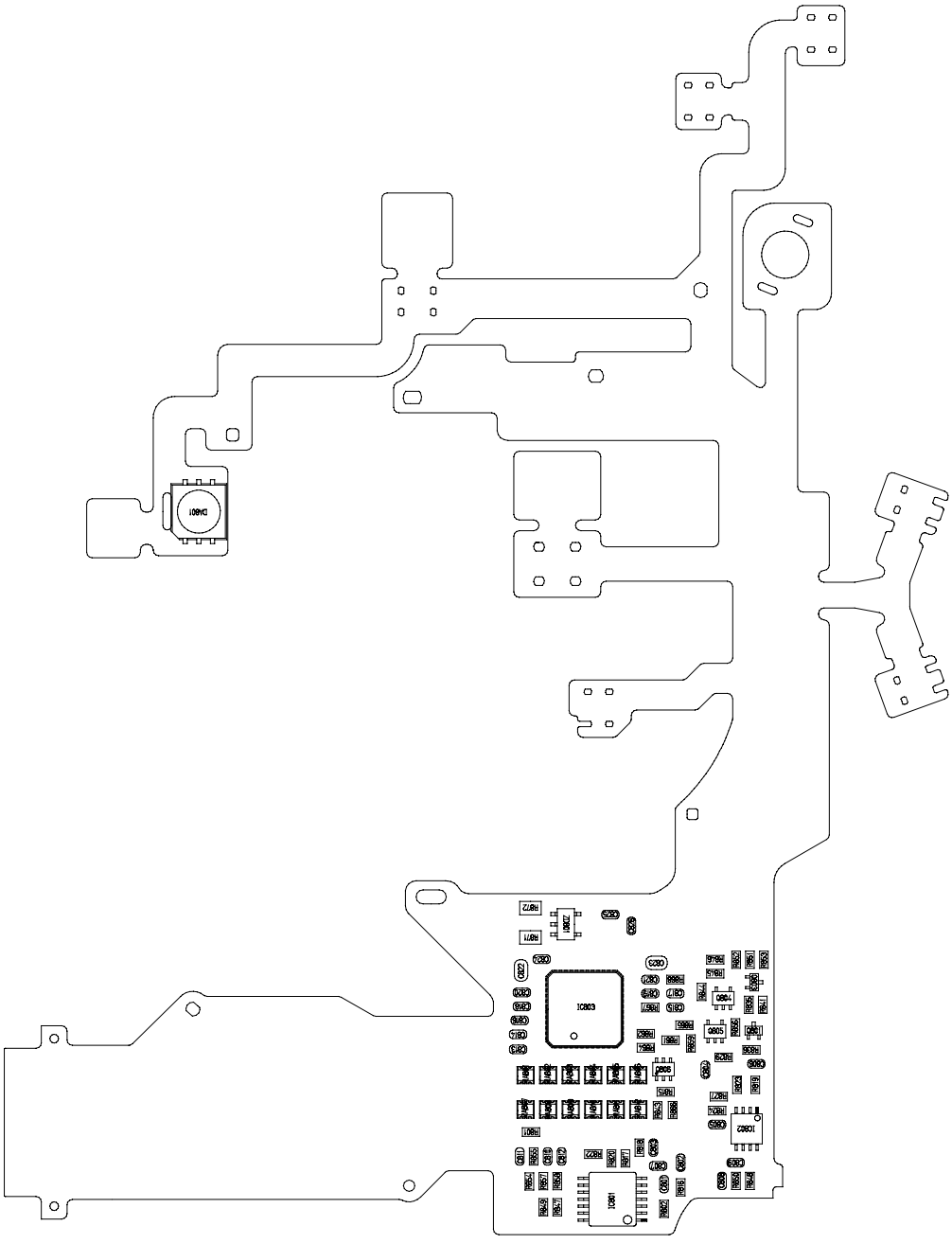
FLASH BASE UNIT (SOLDERING SIDE)



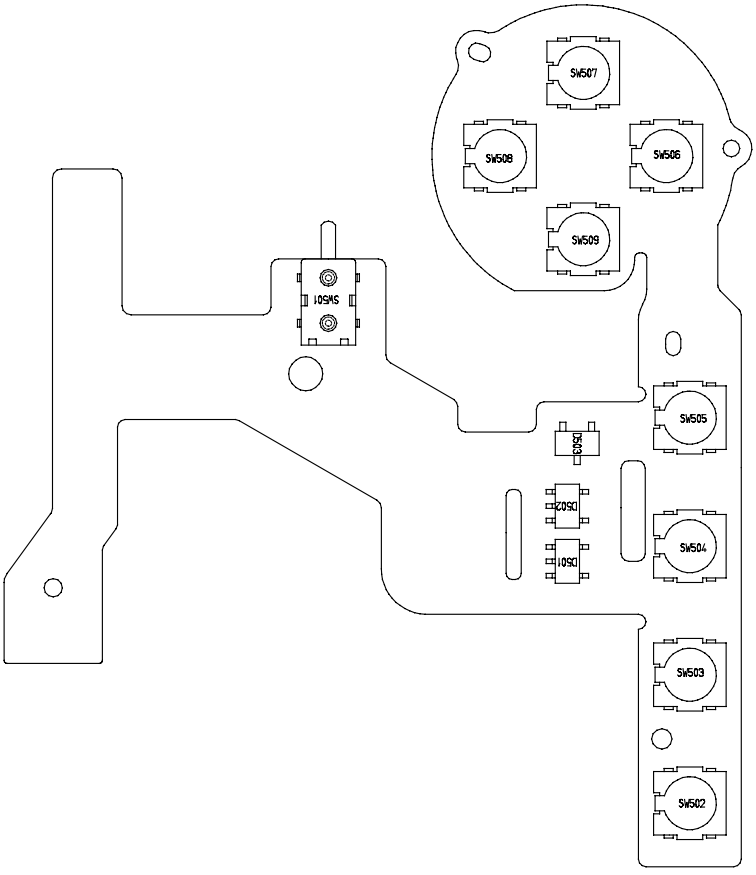
FLASH BASE UNIT (COMPONENT SIDE)



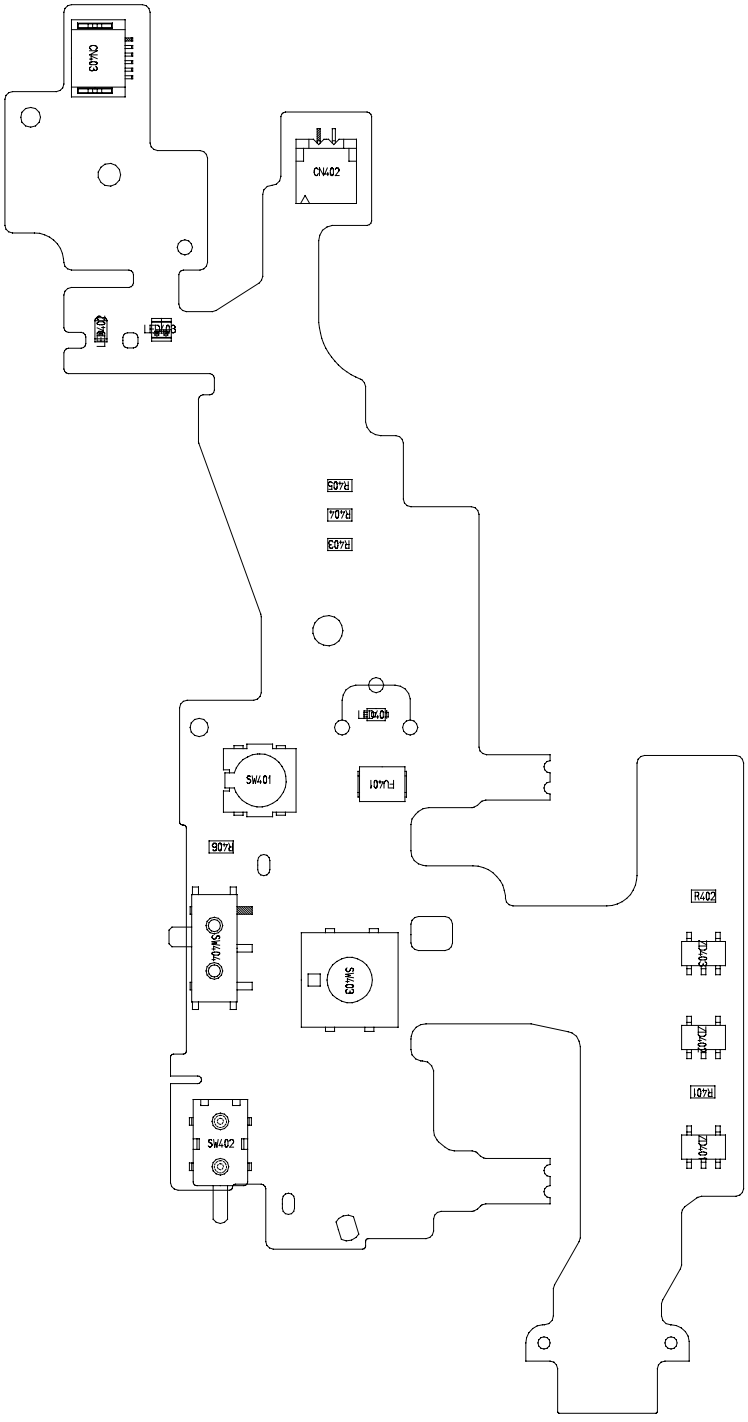
3.3 OPTICAL MODULE UNIT



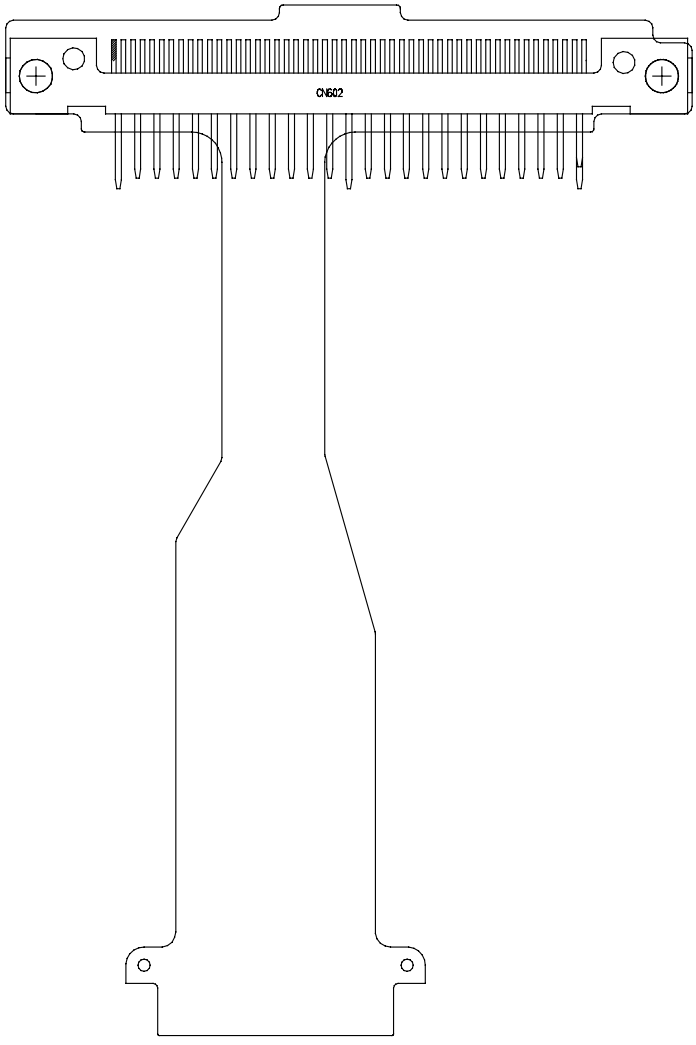
3.4 OPERATION KEY UNIT



3.5 BATTERY BOX UNIT



3.6 CF UNIT



How to print out the Auto Focus Chart

< Procedures >

1. Click “ Print” of the Menu Bar.

2. Remove clicking from “Shrink oversized pages to paper size” and “Expand small pages to paper size”, and then print on A4 or legal. (A3 can be used.)

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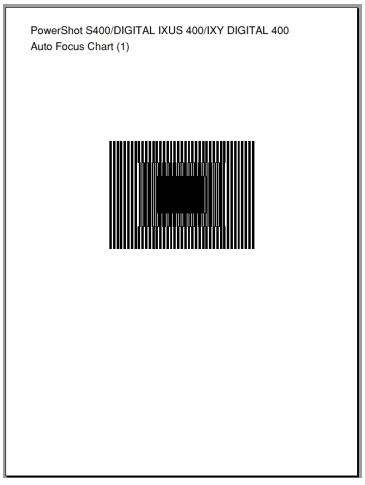

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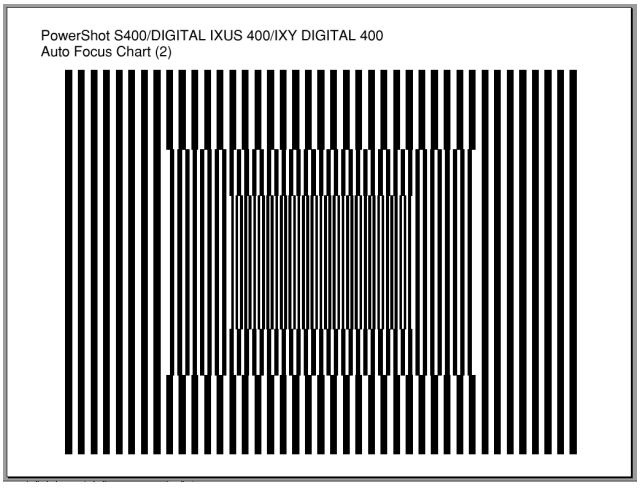

PowerShot S400/DIGITAL IXUS 400/IXY DIGITAL 400

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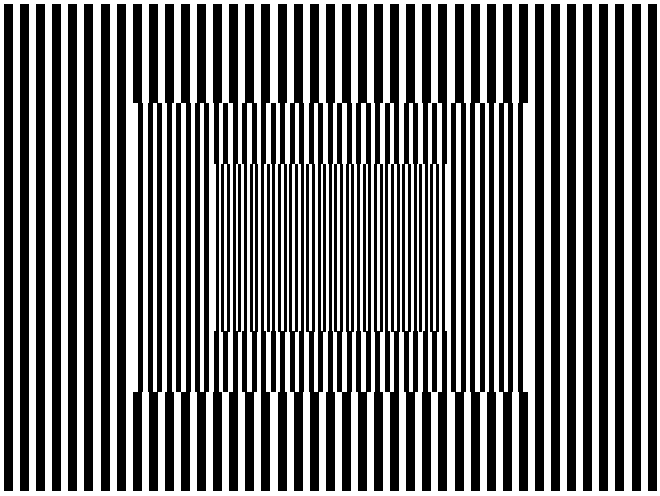

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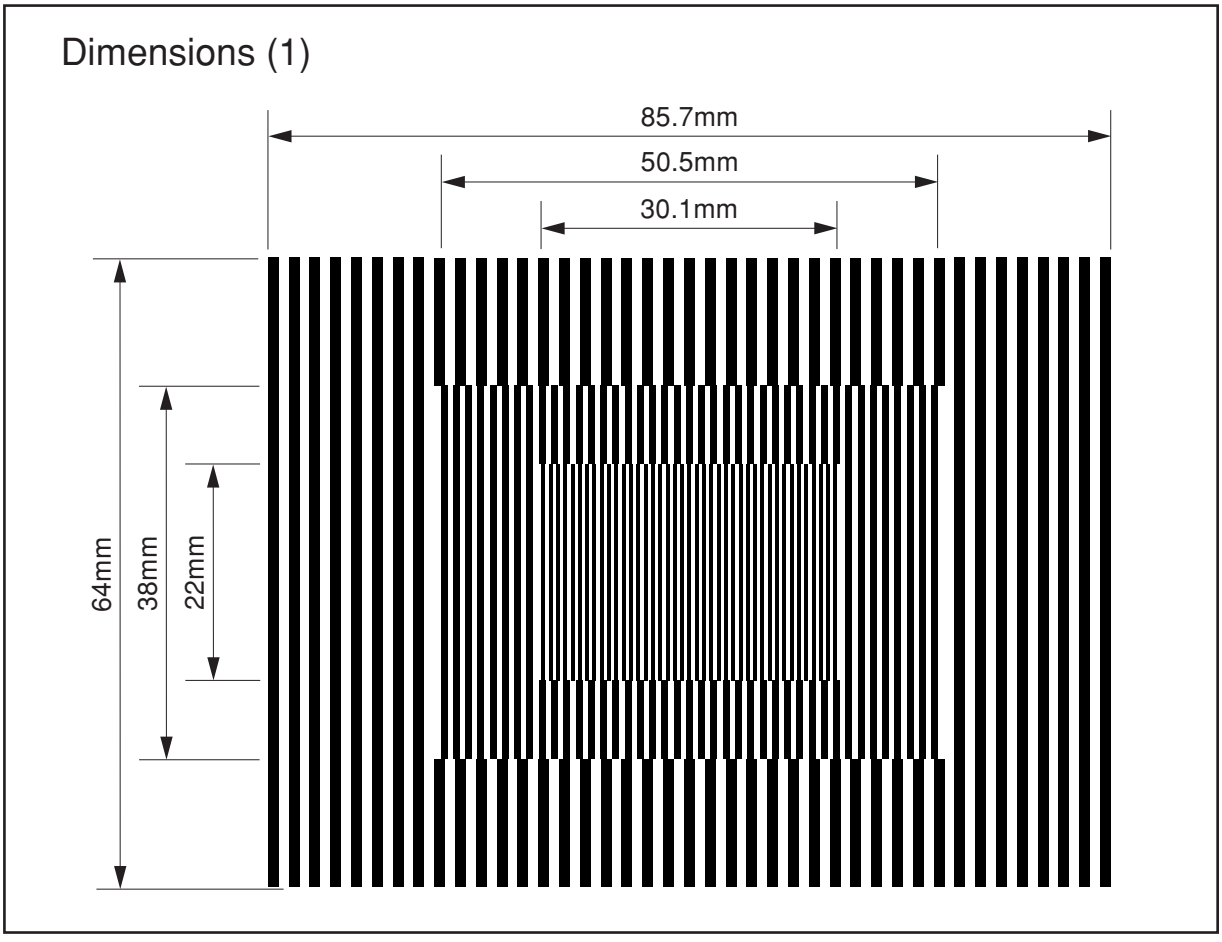

PowerShot S400/DIGITAL IXUS 400/IXY DIGITAL 400
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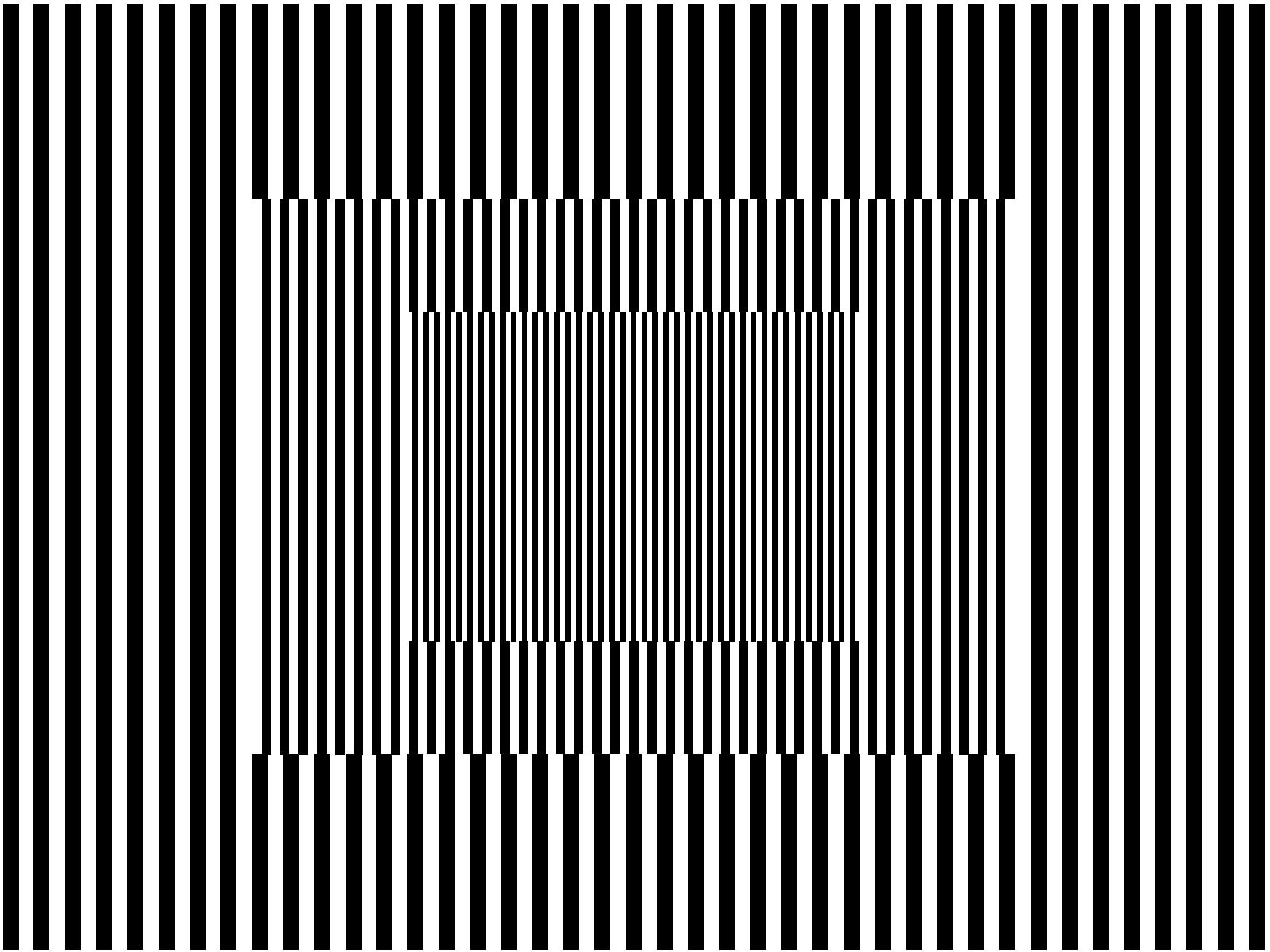

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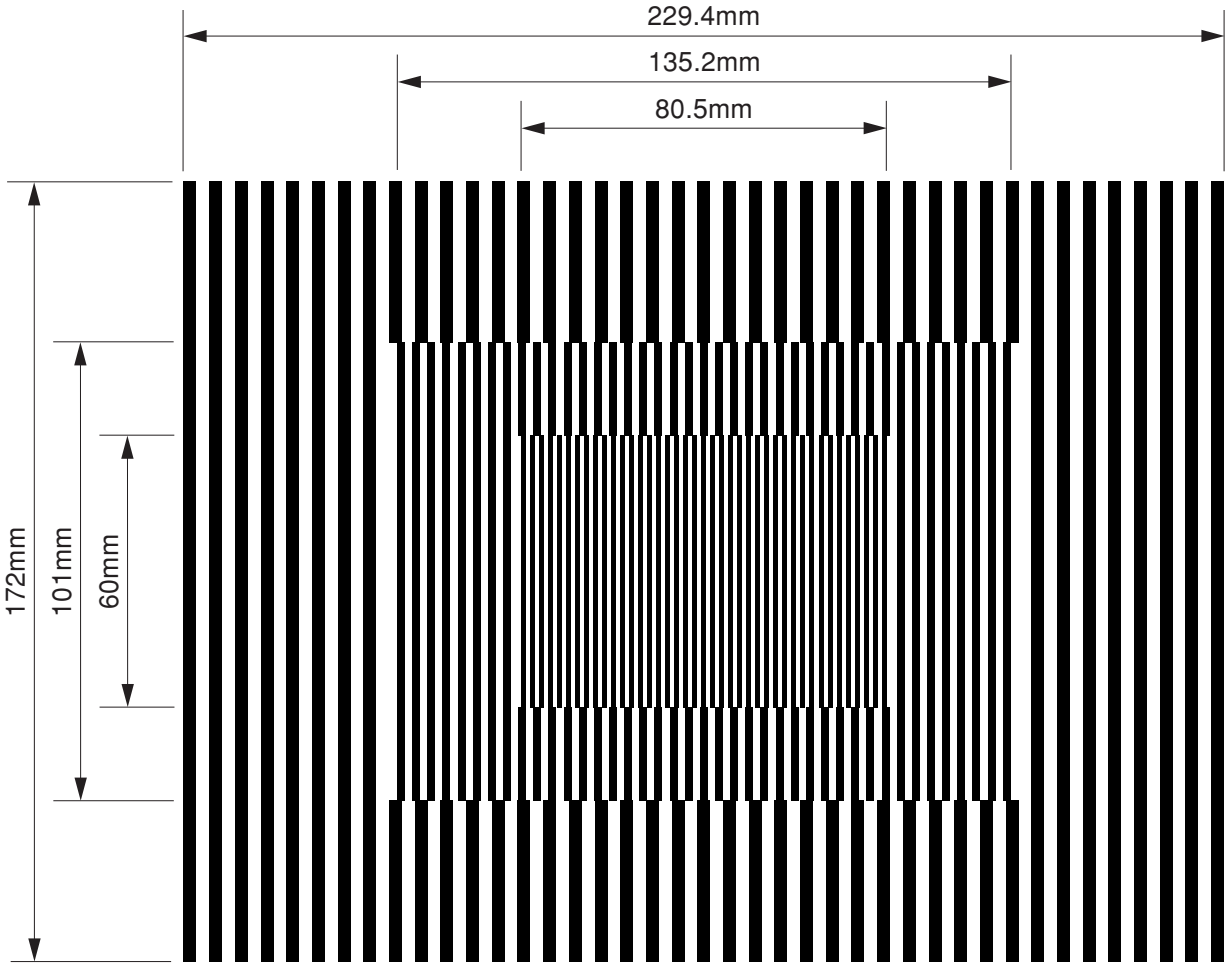
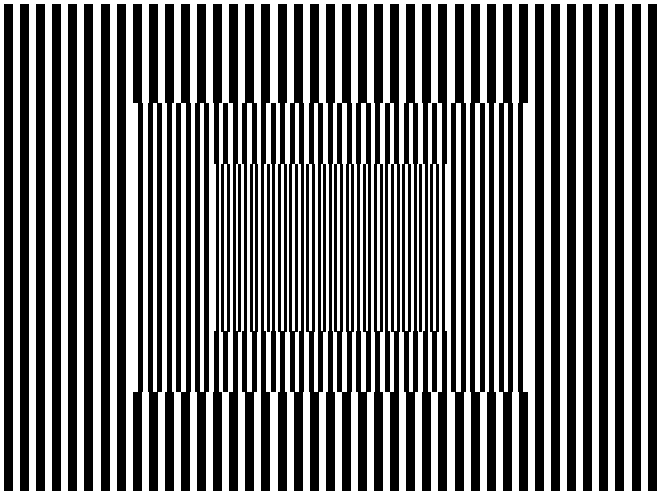


PowerShot S400/DIGITAL IXUS 400/IXY DIGITAL 400

Auto Focus Chart (1)



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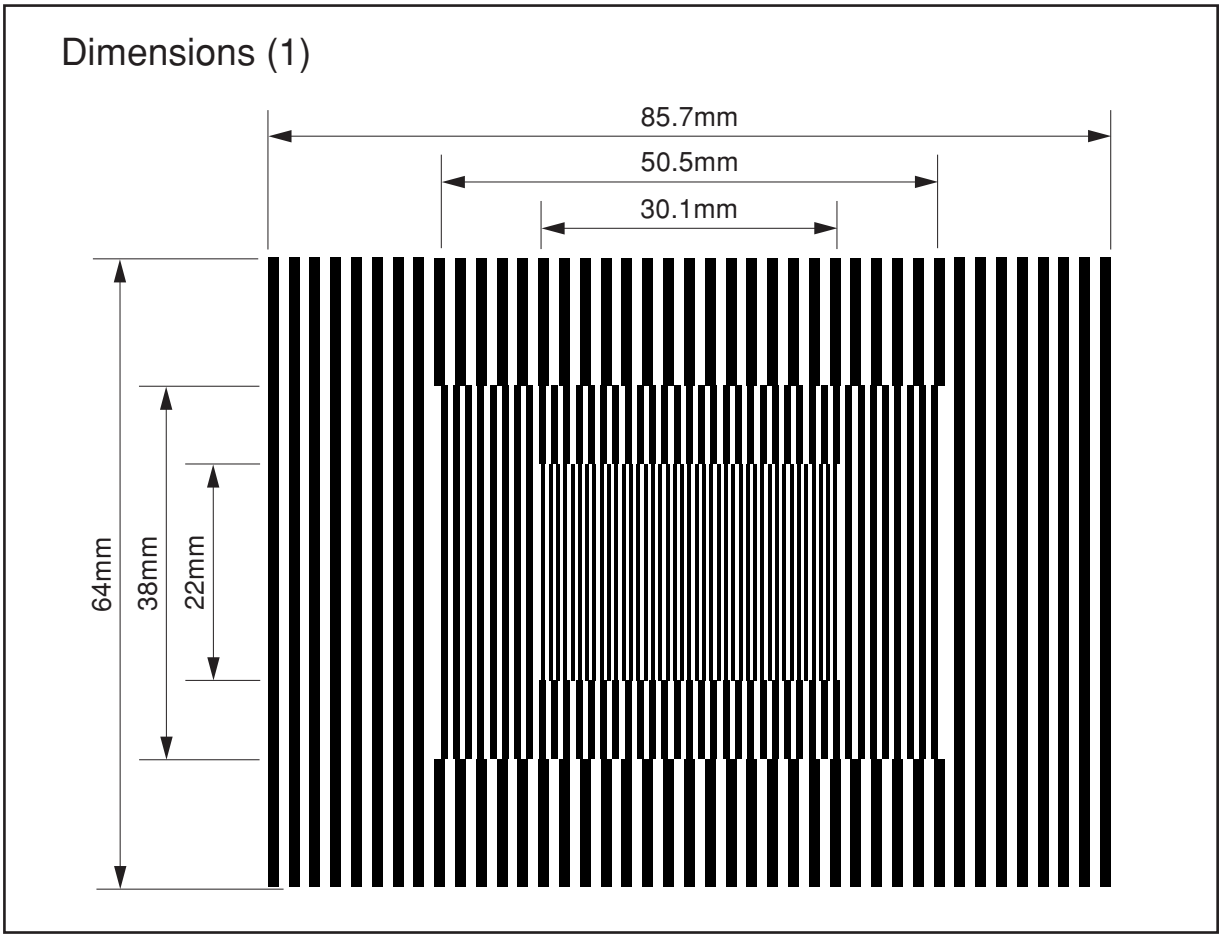

PowerShot S400/DIGITAL IXUS 400/IXY DIGITAL 400
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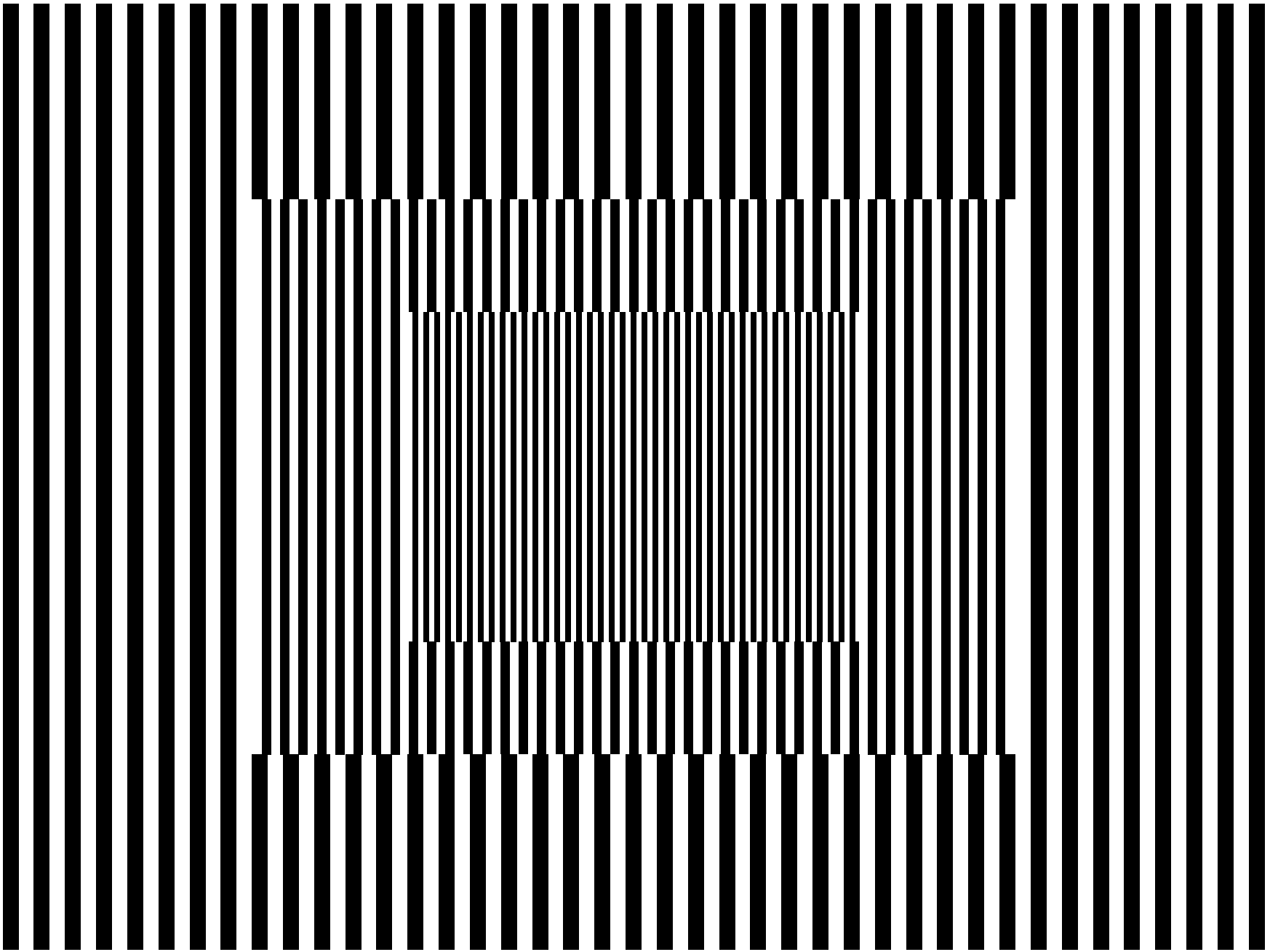

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