VAA11301-R.3536.A

作成承認印	配布許可印
ニコン映像カンパニー CS推進部 GM	

Nikon

COOLPIX995

VAA11301 (JP)
VAA11302 (U)
VAA11353 (EP)
VAA11354 (EN)

REPAIR MANUAL

Nikon | NIKON CORPORATION
Tokyo, Japan

Recycled paper
再生紙を使用しています

Printed in Japan May 2001

CONTENTS

Specifications

• Type :	Digital camera E995
• CCD :	1/1.8" high-density CCD, total number ofpixels: 3.34 million
• Image size (pixel):	2,048 x 1,536 (FULL) 1,600 x 1,200 (UXGA) 1,280 x 960 (SXGA) 1,024 x 768 (XGA) 640 x 480 (VGA) 2,048 x 1,360 (3:2)
• Lens :	4x Zoom-Nikkor; f=8 - 32mm [35mm (135) format equivalent to 38 - 152mm]/ f/2.6 -5.1;10 elements in 8 groups
• Autofocus :	Contrast-detect TTL AF; Multi-area AF
• Digital zoom :	4.0X
• AF area :	5-area multi-AF and Spot AF available
• Focus mode :	Continuous autofocus/Single autofocus, Infinity and Macro available, Manual (50steps) with focus confirmation indicationavailable
• Focus range :	30cm (11.8 in.) to infinity (); 2cm (0.8in.) (at middle Zoom position) to infinity () in macro mode, Manual focus
• Viewfinder :	Real-image zoom viewfinder with LED indication; diopter adjustment: -2 to +1m^{-1}
• Monitor :	1.8-in., 110,000-dot, low-temp. polysilicon TFT LCD; brightness adjustment(5 levels), hue adjustment (11 steps);frame coverage: approx. 97%
• Storage :	Filesystem:Design rule for Camera Filesystems, Digital Print-Order Format(DPOF) compliant Compression: JPEG-baseline-compliant; FINE (approx. 1/4), NORMAL(approx. 1/8), BASIC (approx.1/16), HI (uncompressed: RGB-TIFF)
• Approximate cpacity :	Compressed: FINE=10, NORMAL=19,BASIC=37(16 MB) (approx., with 2,048 x 1,536 pixelresolution/16MB memory card)
• Storage media :	CompactFlash I Card (Type I/II)
• Shooting mode :	Automatic mode
• Capture modes :	Single, Continuous, Multi-shot 16, VGASequence, Ultra HS, Movie (40 sec. forQVGA-size frames at 15 fps., QuickTime Movie)
• Metering mode :	256-segment Matrix, Center-Weighted, Spot,AF Spot
• Exposure control :	Programmed Auto with Flexible program, Shutter-Priority Auto, Aperture-Priority Auto, Manual, Exposure Compensation (72 EV in 1/3 EV steps), Auto-Exposure Bracketing
• Exposure range :	-2.2 to +17.0EV (W) (ISO 100 equivalent)
• Shutter :	Mechanical and charge-coupled electronic shutter; 1-1/2300 sec. in P mode, 8-1/2000 sec. in S mode, 8-1/2300 sec. in A mode, 8-1/2000 sec., 60 second Bulb in M mode

- Aperture : 7-blade iris diaphragm; 10 settings in 1/3 EV steps
- Sensitivity : ISO 100 equivalent, selectable (Auto, ISO100, ISO 200, ISO 400, ISO 800 equivalent)
- White Balance : Matrix-Auto White Balance, 5-mode Manual, Preset; White Balance Bracketing available
- Self-timer : 10 sec. or 3 sec. duration
- Built-in Speedlight : Guide number: 10/32 (ISO 100, m/ft.) Sync method: automatic sync control Flash mode: 4 modes; Auto Flash, Anytime Flash, Slow Sync, Red-Eye Reduction
- Sync terminal : Sync terminal connects to external Nikon Speedlight SB-28/28DX/26/25/24/22/22s through theMulti-Flash Bracket Unit SK-E900 (up to 5flash units when using AS-10 and SC-18/19)
- Auto power-off : Automatically turns off after 30 seconds (or a duration selected from 0.5/1/5/30 min.) after last camera operation
- Playback Menu : Full-frame playback, Movie, Quick review,Full-screen review, Thumbnail (4/9segments), Slide show, Zoom playback (up to 6X); Shooting data display, All
- Interface : USB, video output (NTSC/PAL selectable)
- I/O terminal : DC input, Video output, Digital terminal(USB), Sync terminal
- Power requirements : One Li-ion Rechargeable Battery EN-EL1,or one 6V lithium battery (2CR5/DL245) (optional) External power source (8.4V, 1.3A)
- Battery lif : Approx. 110 min. when using the Monitor and one Li-ion Rechargeable Battery EN-EL1 at normal temperature (20。C/68。F)
- Operating environment Temperature : 0。C to 40。C (32。F to 104。F) Humidity: under 85% (without condensation)
- Dimensions (W x H x D): 138 x 82 x 40mm/5.4 x 3.2 x 1.6 in. (Grip: 59mm/2.3 in.)
- Weight : Approx. 390g/13.8 oz. (without battery)
- Supplied accessories : Li-ion Rechargeable Battery EN-EL1,Battery Charger, USB Cable, Video cable, CompactFlashɪ (CF) Memory Card, Strap,Lens cap, Instruction manual, Nikon View

※ All specifications apply when a fully charged battery is used at normal temperature (20。C/68。F). Battery life and performance may vary depending on type,operating environment and date of manufacture.

Dsassembly

⚠ WARNING	
	● There are high voltage parts inside. Be careful of this electric shock, when you remove the cover. ● You must discharge the main condenser according to the instruction of this repair manual after you remove the front cover.

Notes:

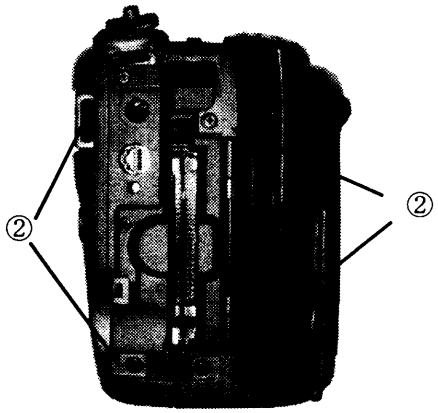
(1) Remove the battery prior to disassembly.

(2) During disassembly, make a note of the routing of the cords, which screws are mounted in which parts, etc.

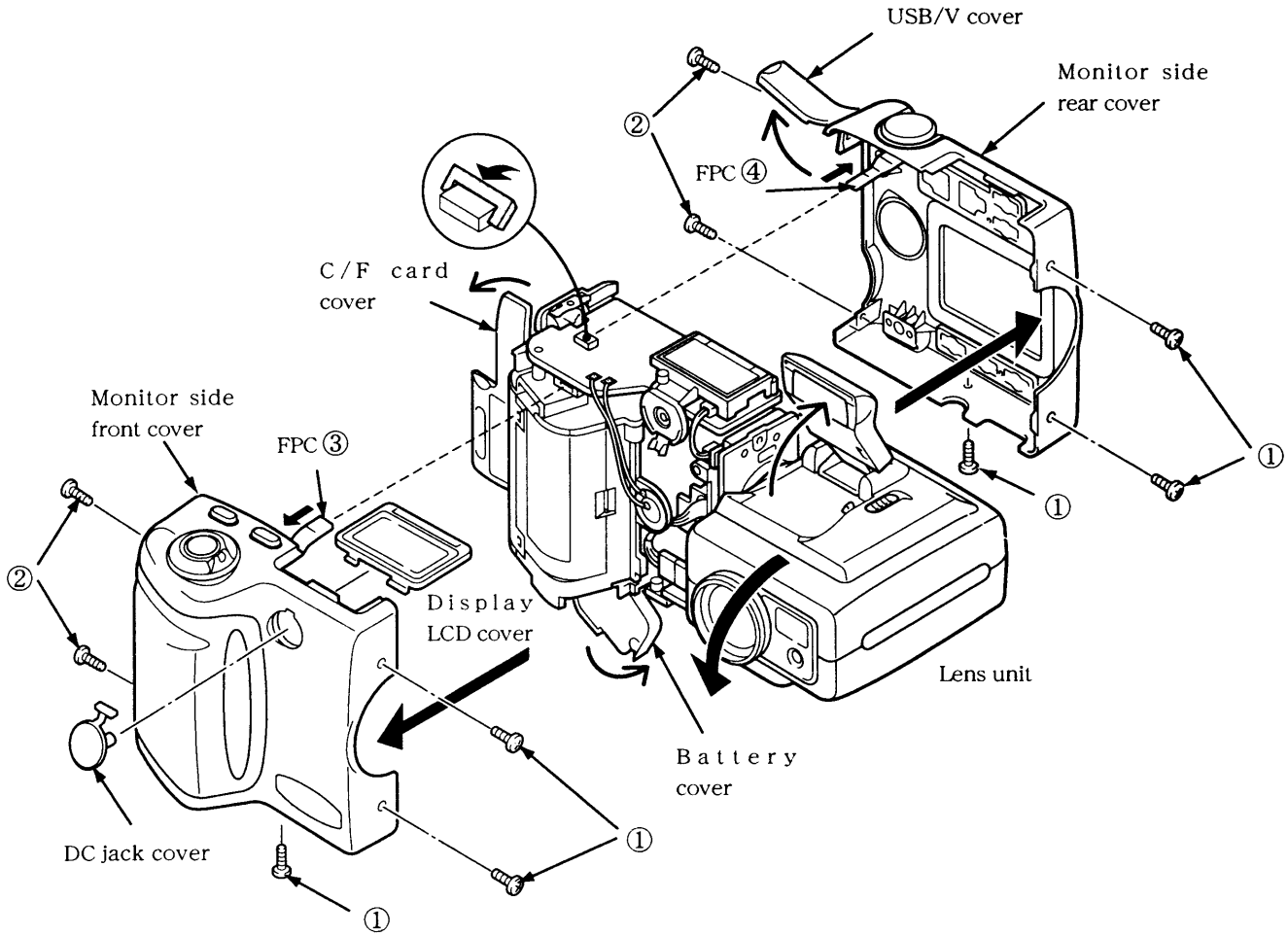
(3) Electrical parts must be grounded since they are easily damaged by static.

1. Monitor side front cover, monitor side rear cover

- Rotate the lens unit 90 degrees in the direction indicated by the arrow, and then raise the flash.
- Unscrew the six screws ① (M1.7 x 3.5).
- Open the C/F card cover and the USB/V card cover, and then unscrew the four screws ② (M1.7 x 4.0).
- Open the battery cover.
- Carefully remove the monitor side front cover, and then disconnect the FPC③from the connector.
- Remove the display LCD cover and the DC jack cover.
- Disconnect the FPC ④ from the connector, and then carefully remove the monitor side rear cover.

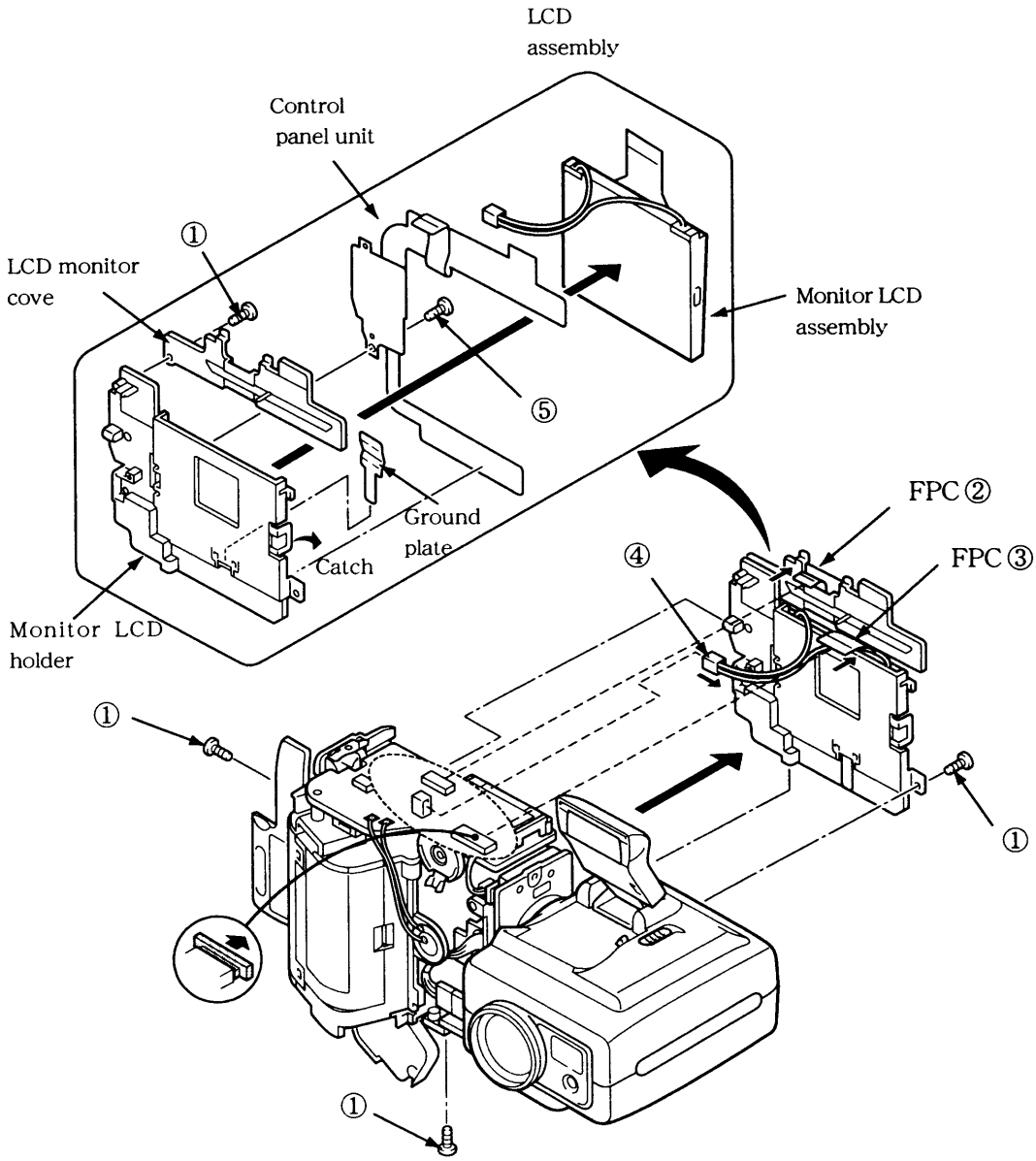


C/F card cover side

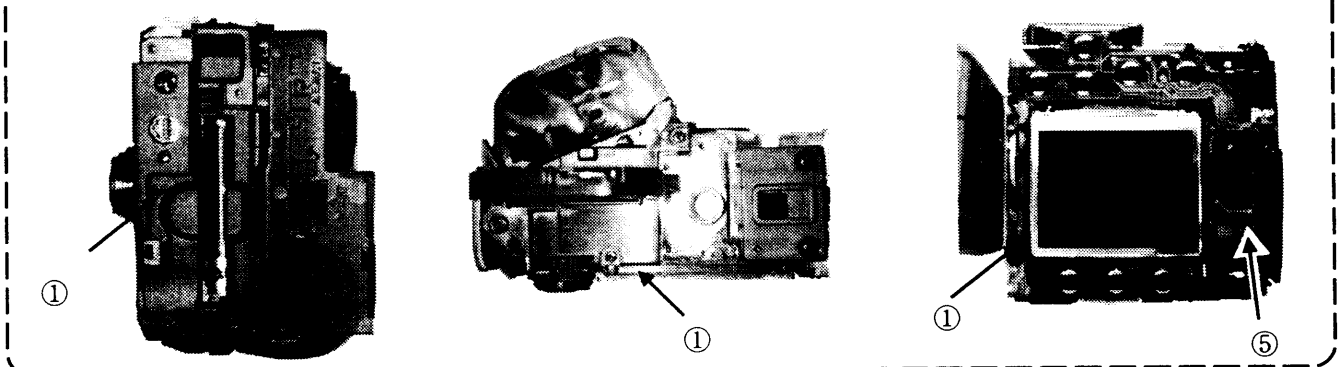


2. LCD Unit

- Unscrew the four screws ① (M1.7 x 4.0).
- Lift the LCD monitor cover, and then disconnect the FPCs ② and ③ from their connectors.
- After disconnecting the connector ④, remove the LCD assembly.
- Release the catches on both sides of the monitor LCD assembly.
- Unscrew the screw ⑤ (M1.7 x 4.0) and then remove the control panel unit.
- Remove the ground plate from the monitor LCD holder.

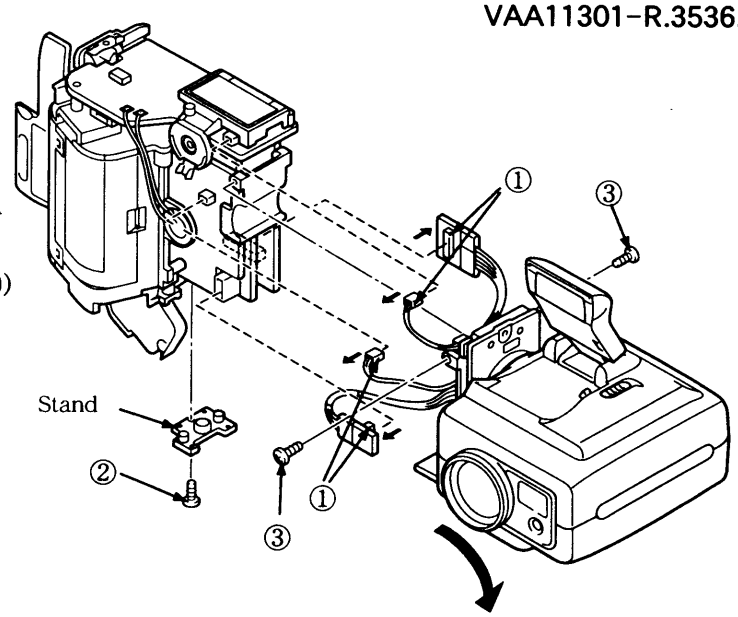


Locations of Screws



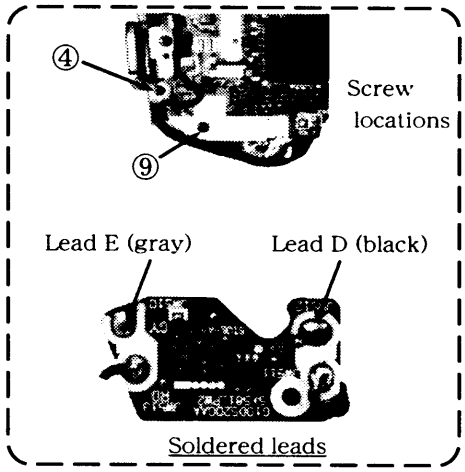
3. Detaching the Lens Unit

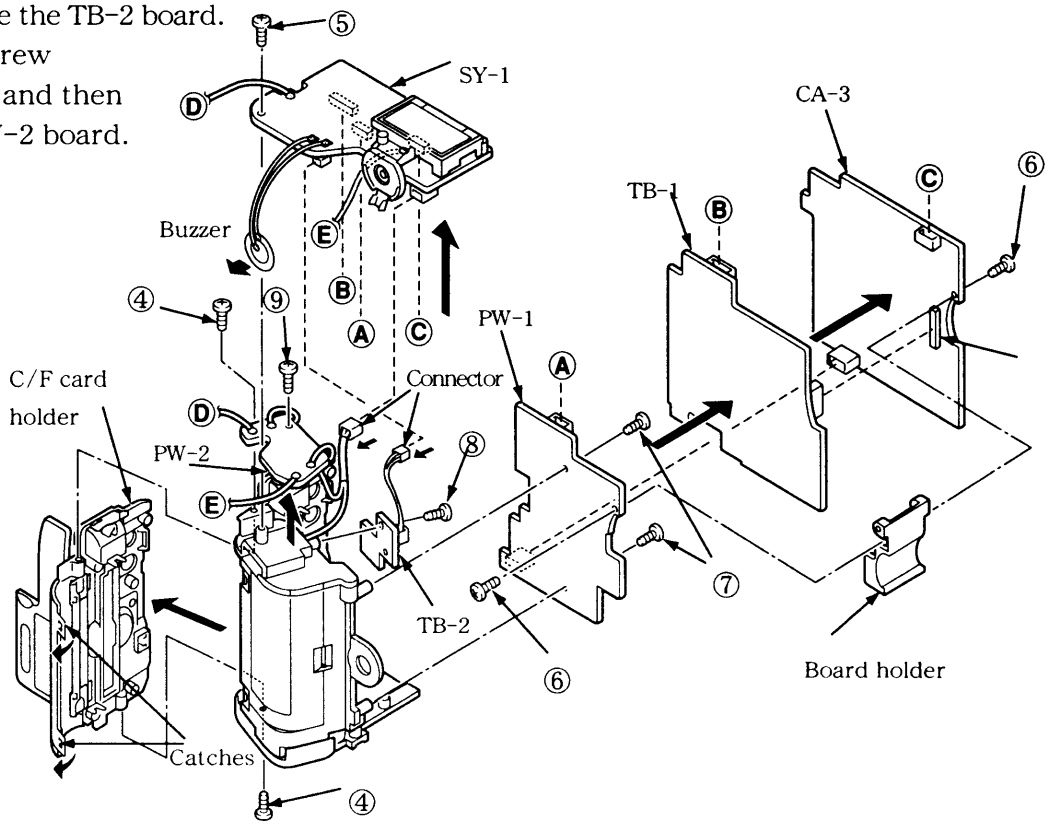
- Disconnect the four connectors ①.
- Unscrew the screw ②(M1.7 x 4.0), and then remove the stand.
- Unscrew the two screws ③ (M1.7 x 4.0) and then detach the lens unit in the direction indicated by the arrow.



4. SY-1 board, CA-3 board, TB-1 board, PW-1 board, TB-2 board, PW-2 board

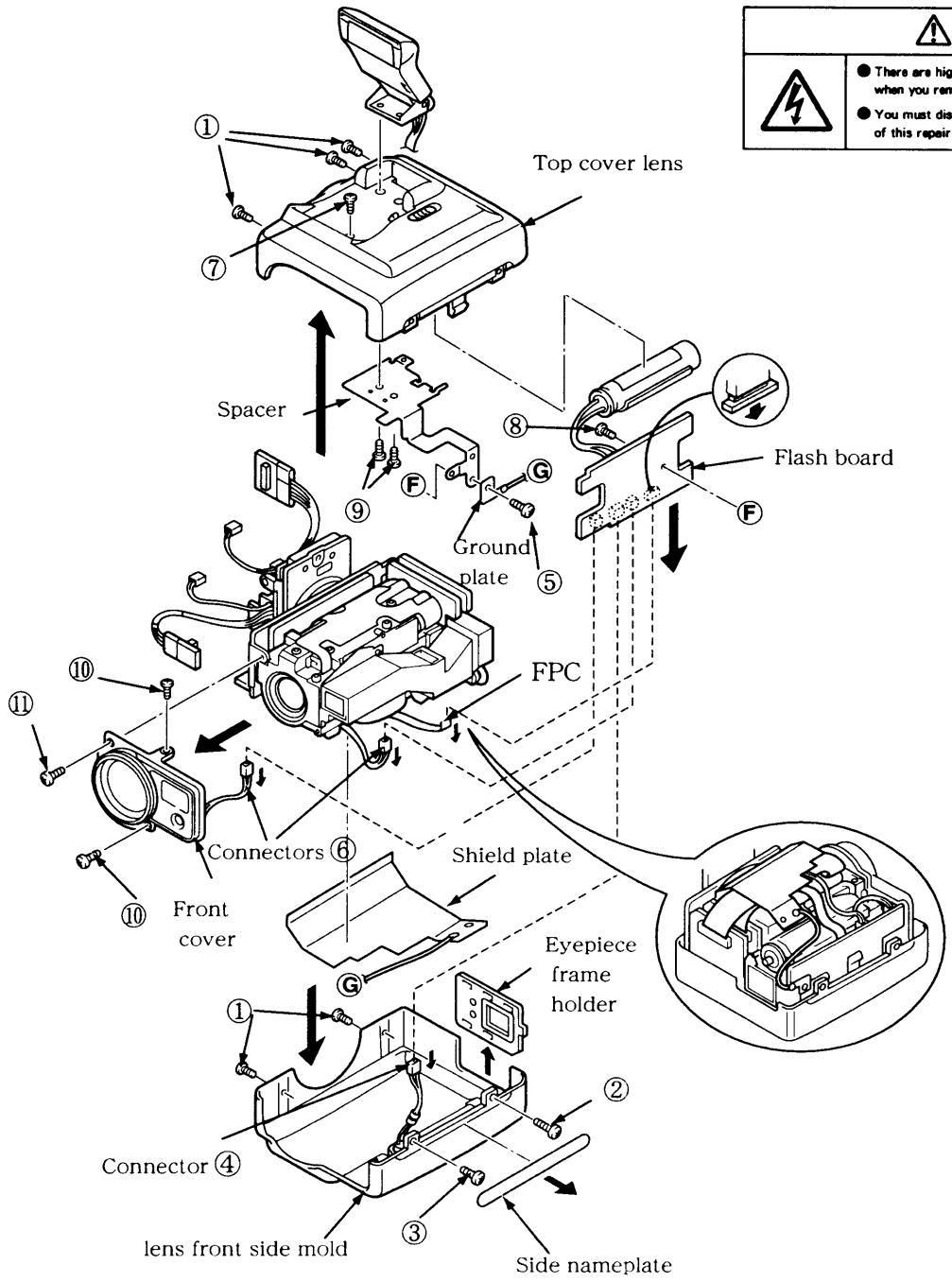
- Unscrew the two screws ④ (M1.7 x 4.0), release the two catches on the C/F card holder, and then remove the C/F card holder.
- Unscrew the screw ⑤ (M1.7 x 4.0), and disconnect the two connectors and the buzzer.
- Carefully remove the SY-1 board in the direction indicated by the arrow, and disconnect the soldered connections of leads D and E.
- Unscrew the two screws ⑥ (M1.7 x 4.0), and remove the board holder.
- Remove the CA-3 board and the TB-1 board.
- Unscrew the two screws ⑦ (M1.7 x 4.0), and then remove the PW-1 board.
- Unscrew the screw ⑧ (M1.7 x 4.0), and then remove the TB-2 board.
- Unscrew the screw ⑨ (M1.7 x 4.0), and then remove the PW-2 board.





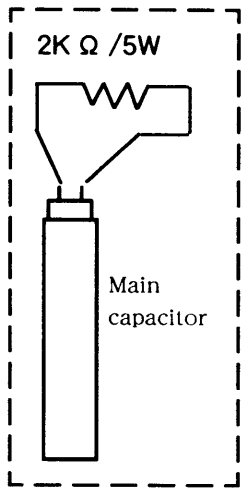
5. Lens Unit, Flash Unit

- Unscrew the five screws ① (M1.7 x 3.5).
- Remove the side nameplate, and then unscrew the screw ② (M1.7 x 5.0)and the screw ③(M1.7 x 3.5).
- Carefully remove the lens front side mold, and then remove the connector ④. Also remove the eyepiece frame holder.
- Discharge the main capacitor.
- Unscrew the screw ⑤ (M1.7 x 1.5) and then remove the ground plate and the shield plate.
- Disconnect the FPC and two connectors ⑥.
- Unscrew the screw ⑦(M1.7 x 4.0), and then remove the top cover lens.
- Unscrew the screw ⑧ (M1.7 x 1) and the screw (9) (M1.7 x2), and then remove the spacer.
- Unscrew the two screws ⑩ (M1.7 x 5.0) and the screw ⑪ (M1.7 x 3.5), and then remove the front lens unit.



⚠ WARNING

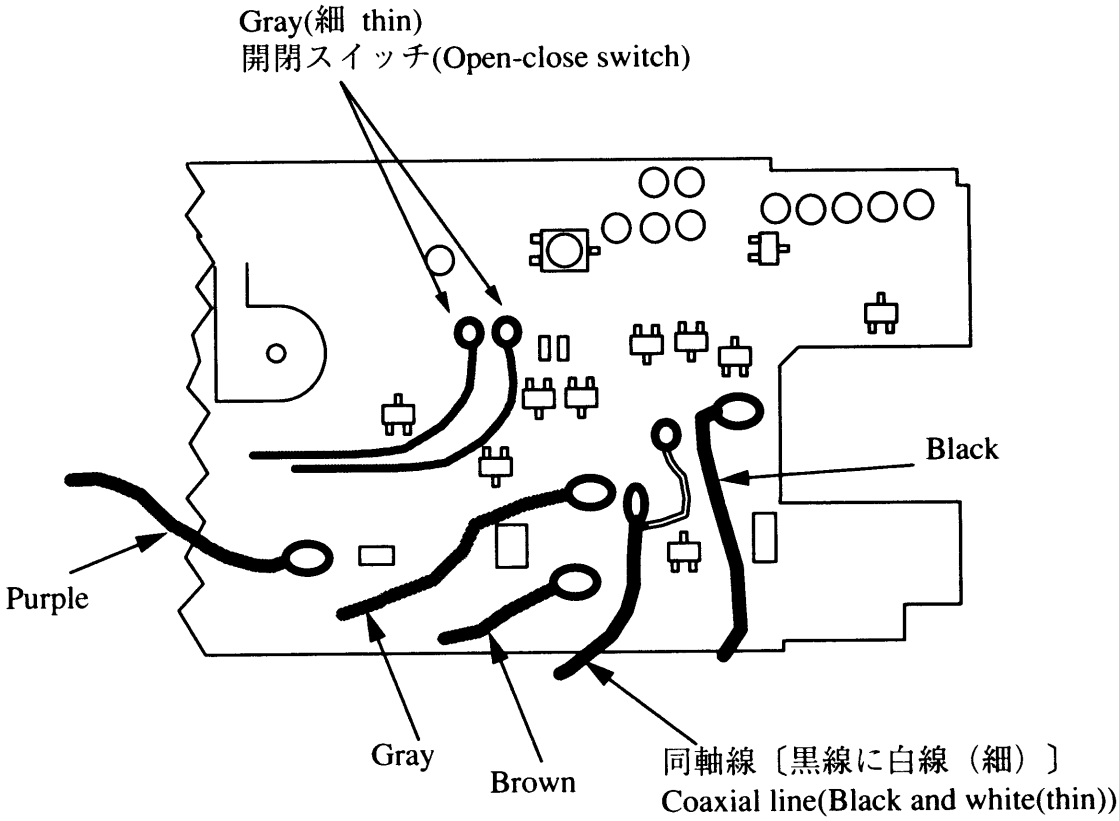
- There are high voltage parts inside. Be careful of this electric shock, when you remove the cover.
- You must discharge the main condenser according to the instruction of this repair manual after you remove the front cover.



● Be sure to discharge the main capacitor as shown in the diagram.

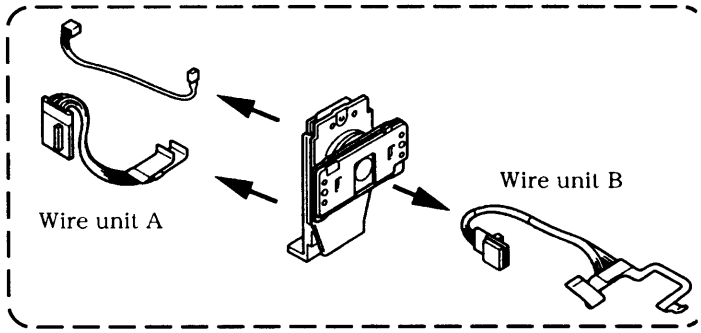
6. Flash Unit

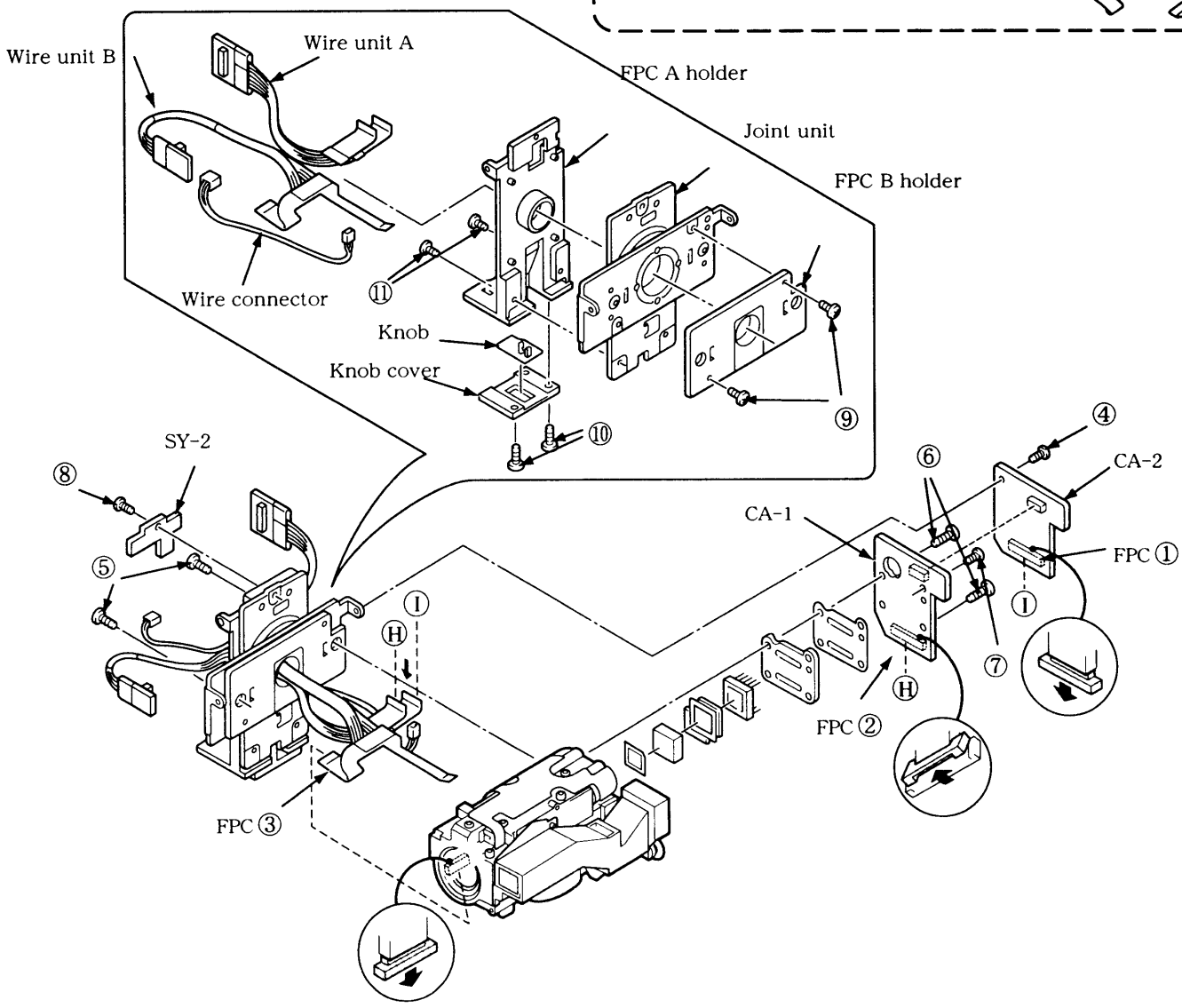
・Remove the flash board, and then disconnect the soldered lead connections (gray lead (thick), coaxial lead (black), white lead (thin), and black lead).



7. CA-1 Board, CA-2 Board, and SY-2 Board

- Disconnect the FPCs ①②③ from the connectors.
- Unscrew the screw ④ (M1.7 x 2.5) and the two screws ⑤ (M1.7 x 3.5), and then remove the board CA-2.
- Unscrew the two screws ⑥ (M1.7 x 6.0) and the screw ⑦ (M1.7 x 2.5), and then remove the board CA-1.
- Unscrew the screw ⑧ (M1.7 x 3.5) and then remove the board SY-2.
- Pull out the wire connector and the wire unit B in the direction indicated by the arrow. Curl the end of wire unit A while pulling it out.
- Unscrew the two screws ⑨ (M1.7 x 2.5) and remove the FPC-B holder.
- Unscrew the two screws ⑩ (M1.7 x 4.0) and remove the knob cover and knob.
- Unscrew the two screws ⑪ (M1.7 x 2.5) and remove the FPC-A holder.

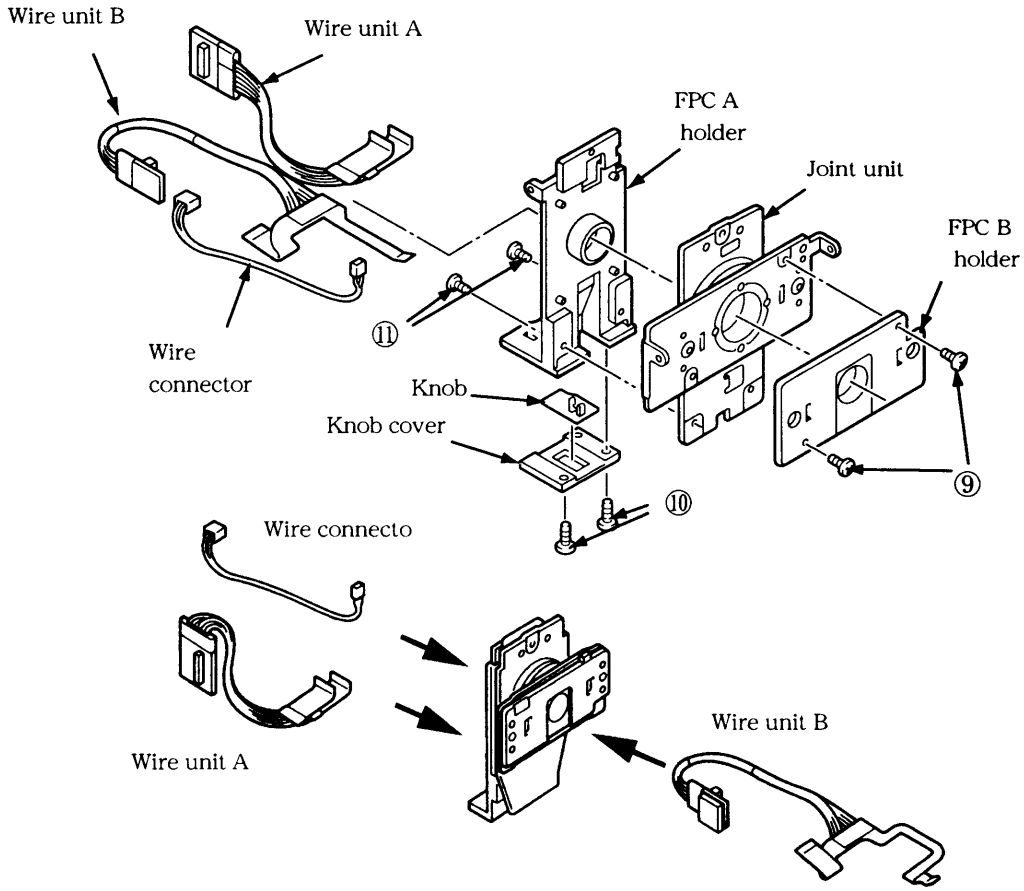




Assembly

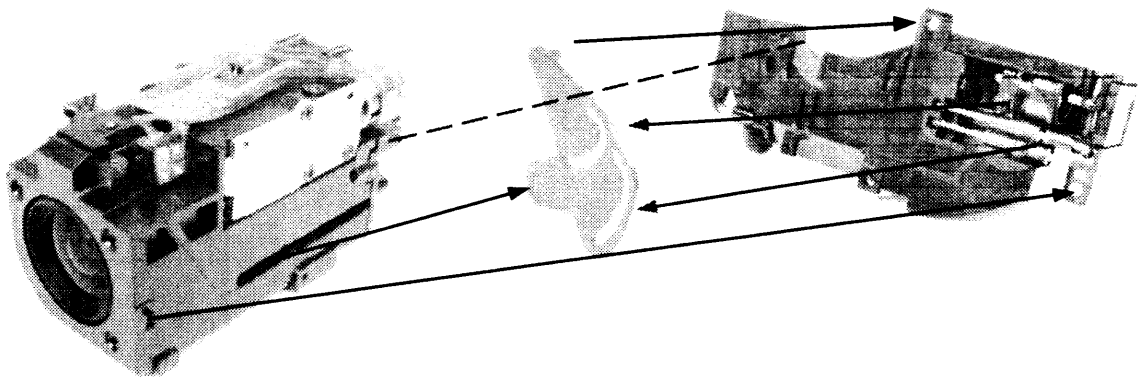
1. Joint Unit

- Use two screws ⑨ (M1.7 x 2.5) to attach the FPC-B holder.
- Use two screws ⑩ (M1.7 x 4.0) to attach the knob cover and knob.
- Use two screws ⑪(M1.7 x 2.5) to attach the FPC-B holder.
- Insert the wire connector and wire unit B into the joint in the direction indicated by the arrow. Curl the edge of wire unit A while inserting it.



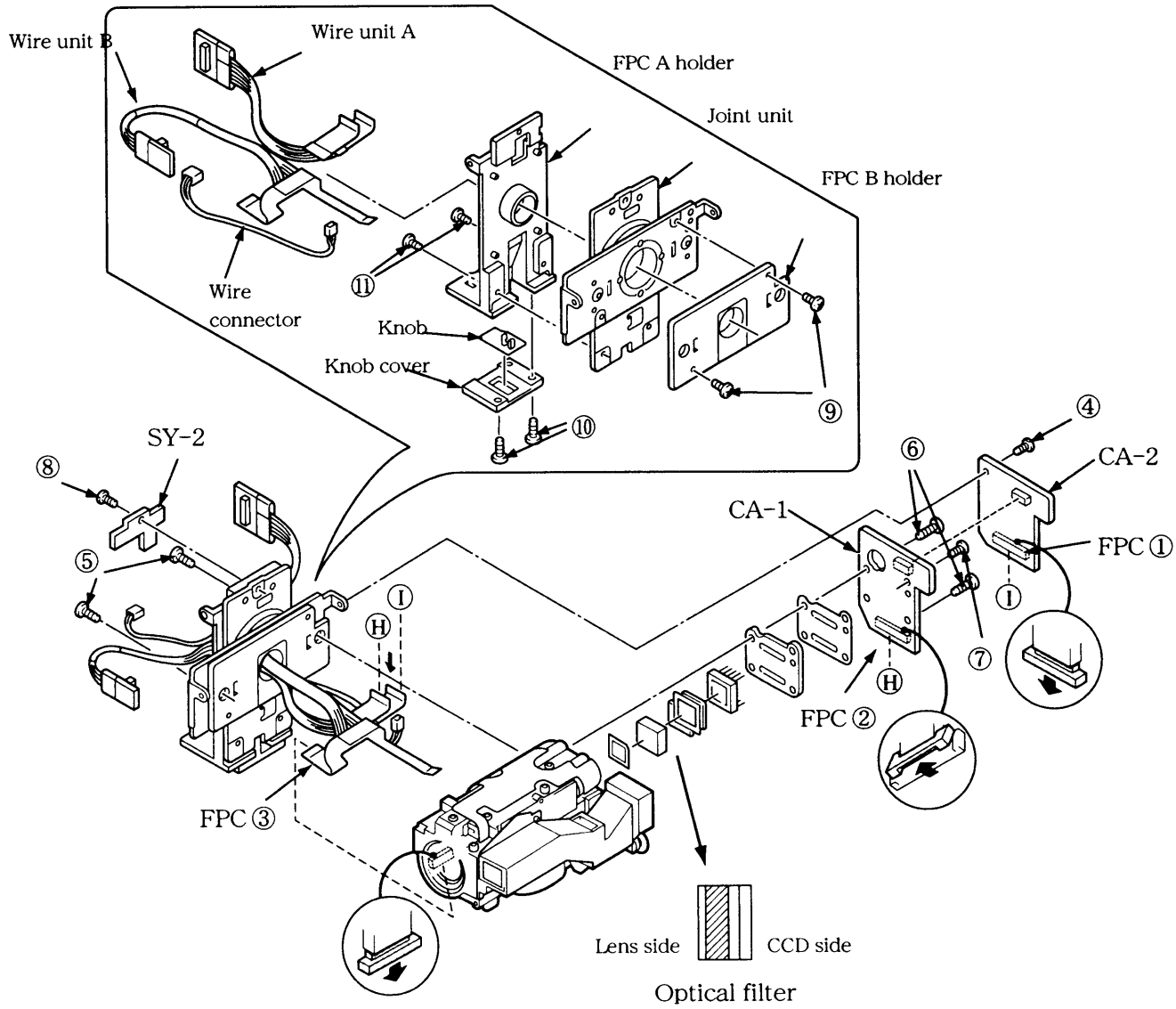
2. Lens Unit

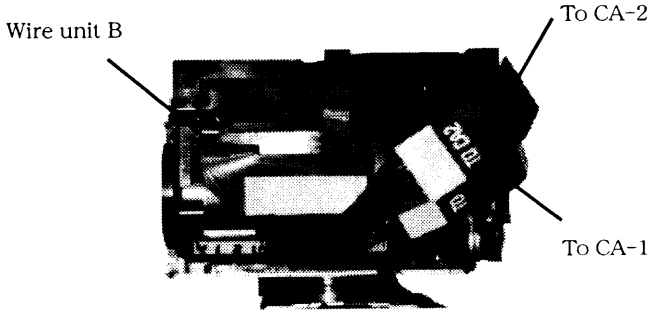
- Refer to the illustration below.



2. CA-1 Board, CA-2 Board, SY-2 Board

- Use one screw ⑧ (M1.7 x 3.5) to attach the SY-2 board.
- Use two screws ⑥ (M1.7 x 6.0) and one screw ⑦ (M1.7 x 2.5) to attach the CA-1 board.
- Attach the CA-2 board.
- Use two screws ⑤ (M1.7 x 6.0) and one screw ④ (M1.7 x 2.5) to attach the joint unit to the lens unit. (When connecting the wires, first attach wire unit B, then connect the wires that connect to CA-1, and then connect the wires that connect to the CA-2 board last. Refer to the illustration below.)
- Connect the FPCs ①②③ to the connectors.



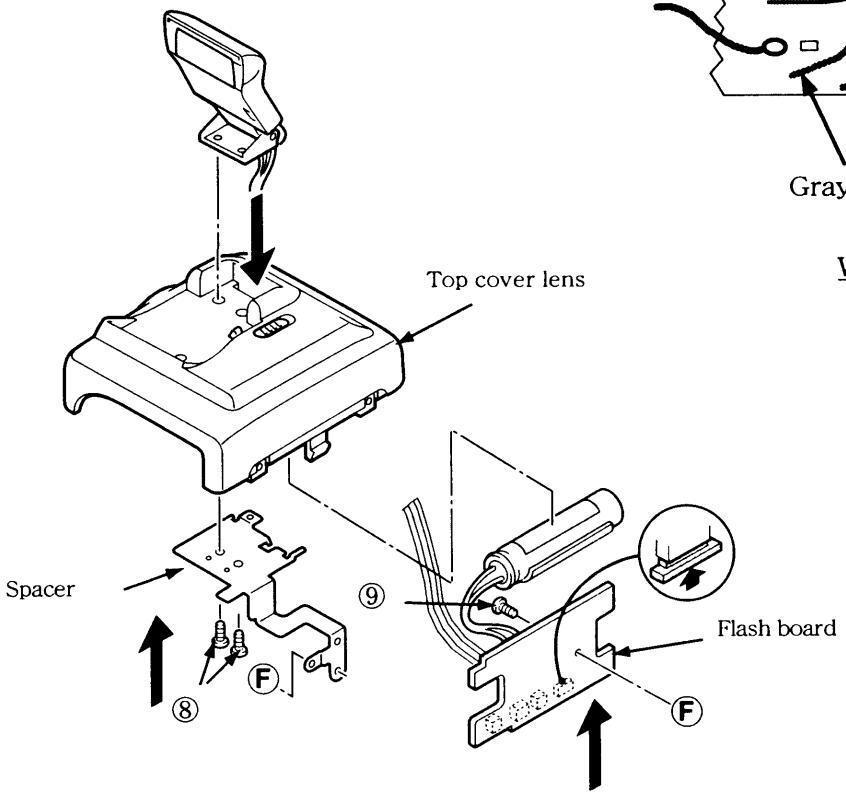


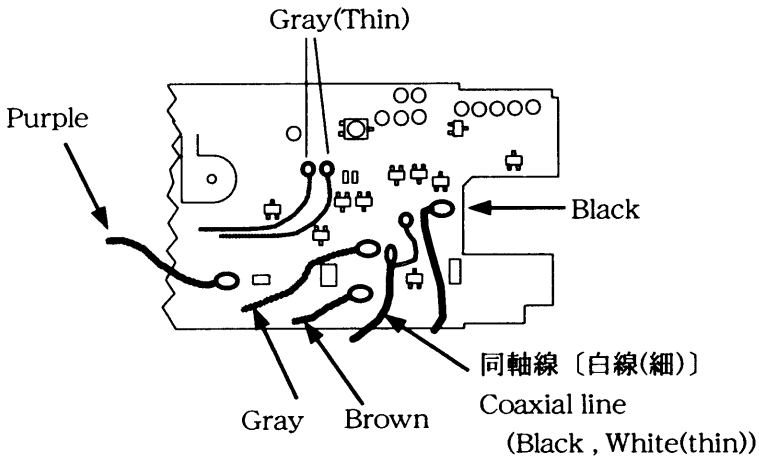
Appearance with Joint Docked in Lens Unit

4. Flash Unit

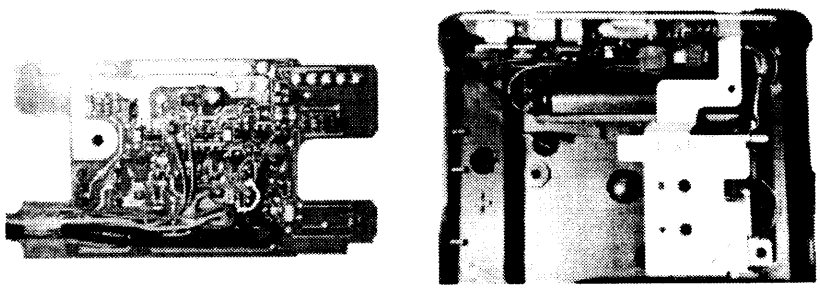
- Plug each lead from the light emitter into the top cover lens.
- Solder the leads (gray lead (thick), coaxial lead (black and white), brown lead, gray lead, and purple lead) from the flash onto the flash board.
- Attach the capacitor and the flash board to the top cover lens. See the diagram below for the treatment of the leads.
- Use two screws ⑧ (M1.7 x ?) and a screw ⑨ (M1.7 x ?) to attach the spacer.

(Make sure that none of the leads are pinched.)





Wiring diagram

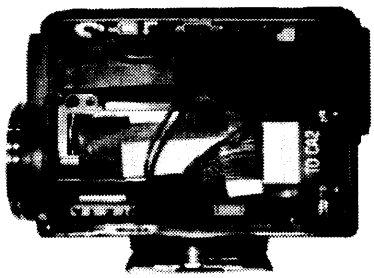


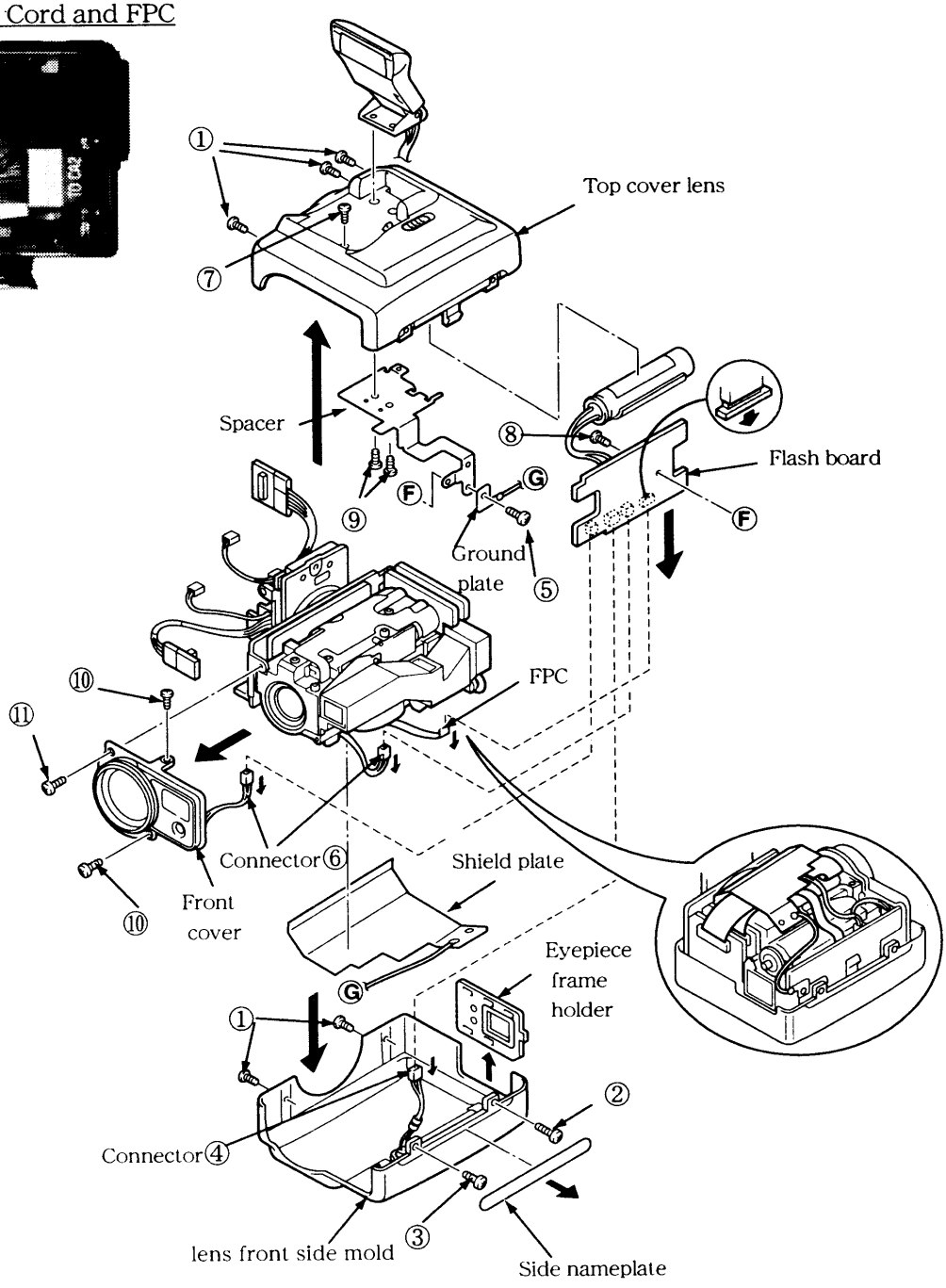
Treatment of Leads in Flash Unit

5. Lens Unit

- Use two screws ⑩ (M1.7 x 5.0) and one screw ⑪ (M1.7 x 3.5) to attach the front lens unit.
- Use a screw ⑦ (M1.7 x 4.0) to attach the top cover lens.
- Connect the FPC and two connectors ⑥.
- Insert the shield plate into the joint unit. Use a screw ⑨ (M1.7 x 1.5) to attach the ground plate.
- Attach the eyepiece frame holder, connect the connector ④, and then attach the lens side front mold.
- Screw in five screws ① (M1.7 x 3.5).
- Screw in a screw ② (M1.7 x 5.0) and a screw ③ (M1.7 x 3.5).
- Attach the side nameplate.

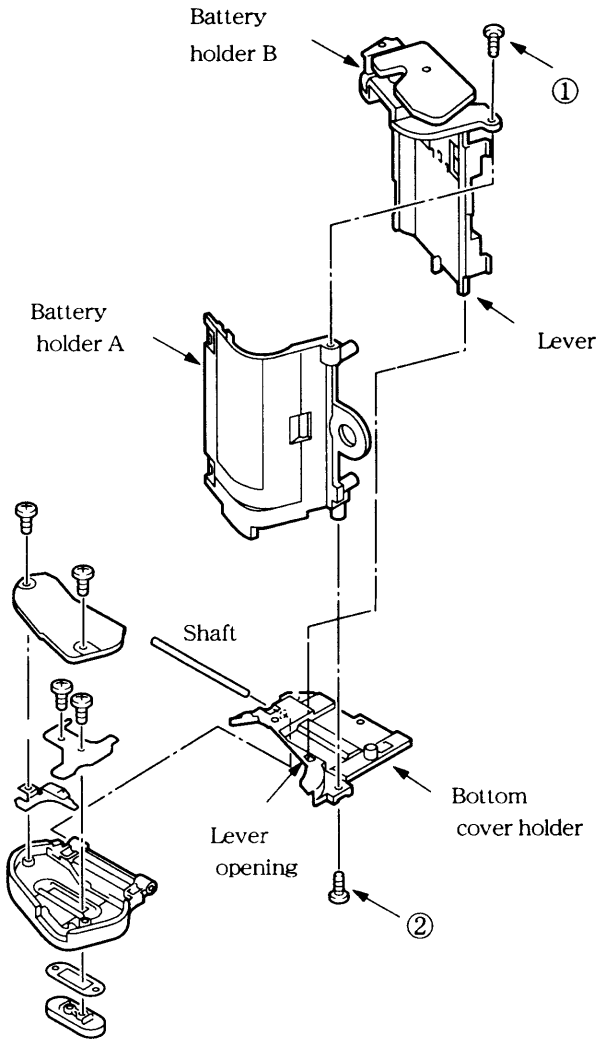
Treatment of Each Cord and FPC





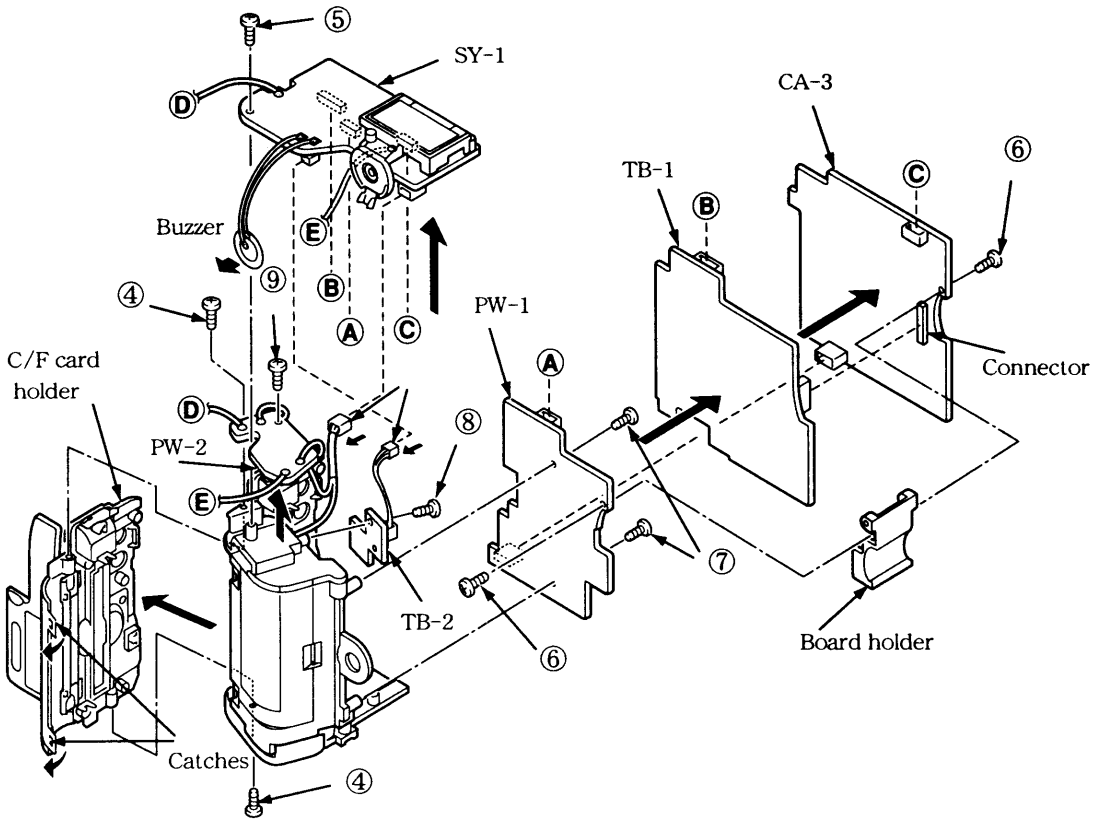
6. Battery Unit

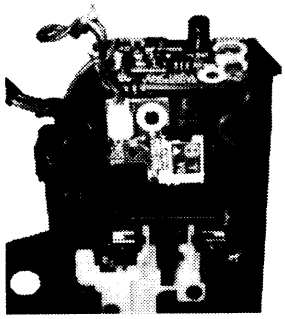
- Use a screw ① (M1.7 x 4.0) to attach battery holder A to battery holder B.
- Use the shaft to attach the battery cover to the bottom cover holder.
- Insert the battery holder B unit lever into the lever opening in the bottom cover holder.
- Use a screw ② (M1.7 x 4.0) to secure the bottom cover holder.

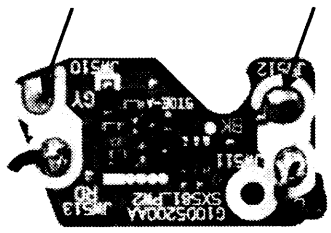


7. SY-1 board, CA-3 board, TB-1 board, PW-1 board, TB-2 board, PW-2 board

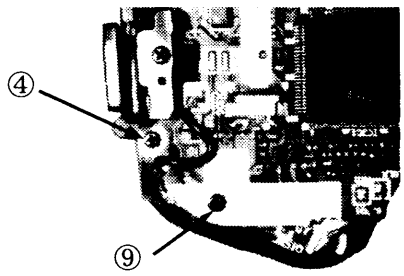
- Use a screw ⑨ (M1.7 x 4.0) to attach the PW-2 board.
- Use a screw ⑧ (M1.7 x 4.0) to attach the TB-2 board.
- Use two screws ⑦ (M1.7 x 4.0) to attach the PW-1 board.
- Connect the connector on the CA-3 board to the connector on the TB-1 board.
- Use two screws ⑥ (M1.7 x 4.0) to attach the board holder, solder leads D and E in place, and then connect connectors A, B and C to the SY-1 board.
- Screw in the screw ⑤ (M1.7 x 4.0), and then connect the two connectors "a" and attach the buzzer.
- Clip on the two catches in the C/F card holder.
- Use two screws ④ (M1.7 x 4.0) to attach the C/F card holder.







Locations to be soldered

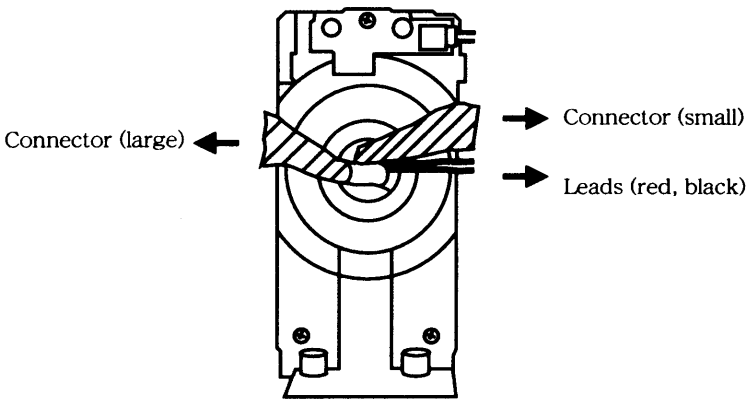


Locations of screws

8. Docking the Lens Unit with the Image Processing Unit

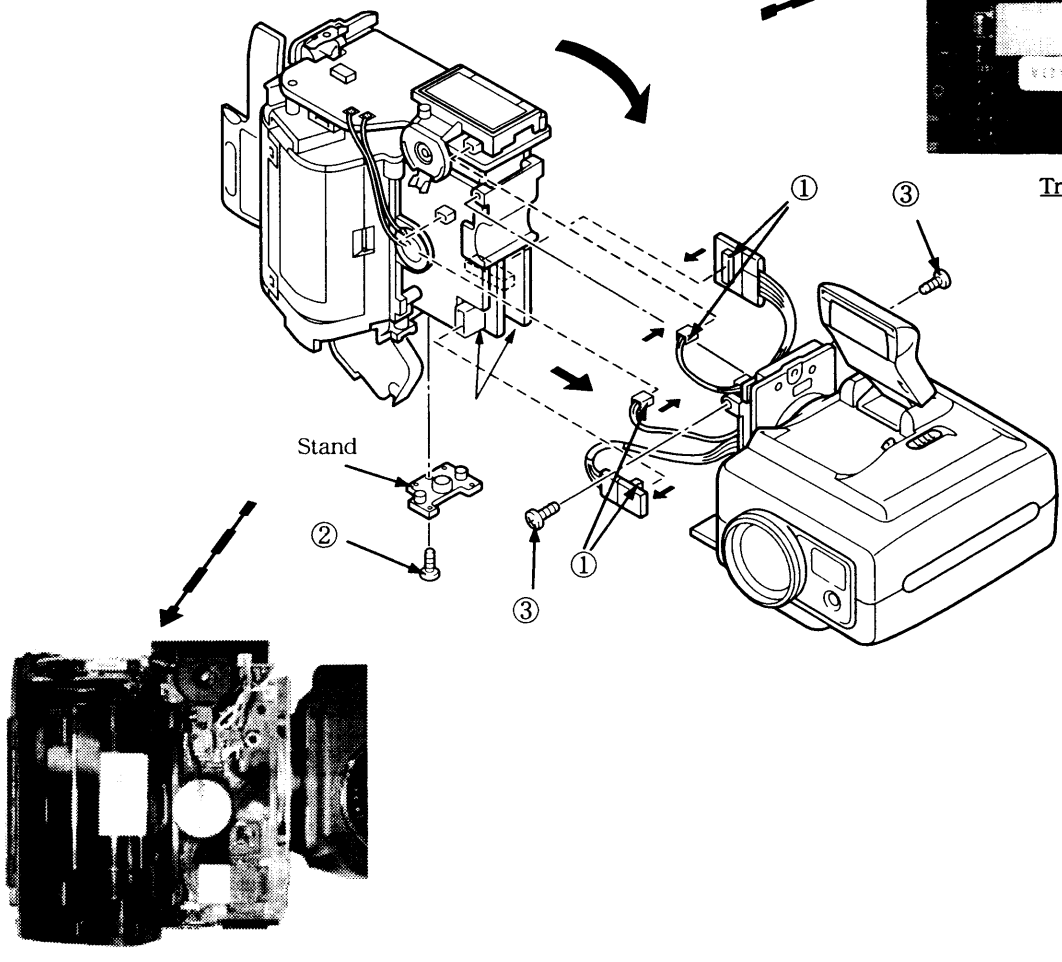
- Refer to the illustration below for details on the treatment of each of the wires in the joint unit.
- Insert the protrusions on the CA-3 and TB-1 boards in the image processing unit into the designated locations on the joint unit, docking the lens unit with the image processing unit.
- Use two screws ③ (M1.7 x 4.0) to secure the lens unit to the image processing unit.
- Use a screw ② (M1.7 x 4.0) to attach the stand.
- Connect the four connectors ①.

View A



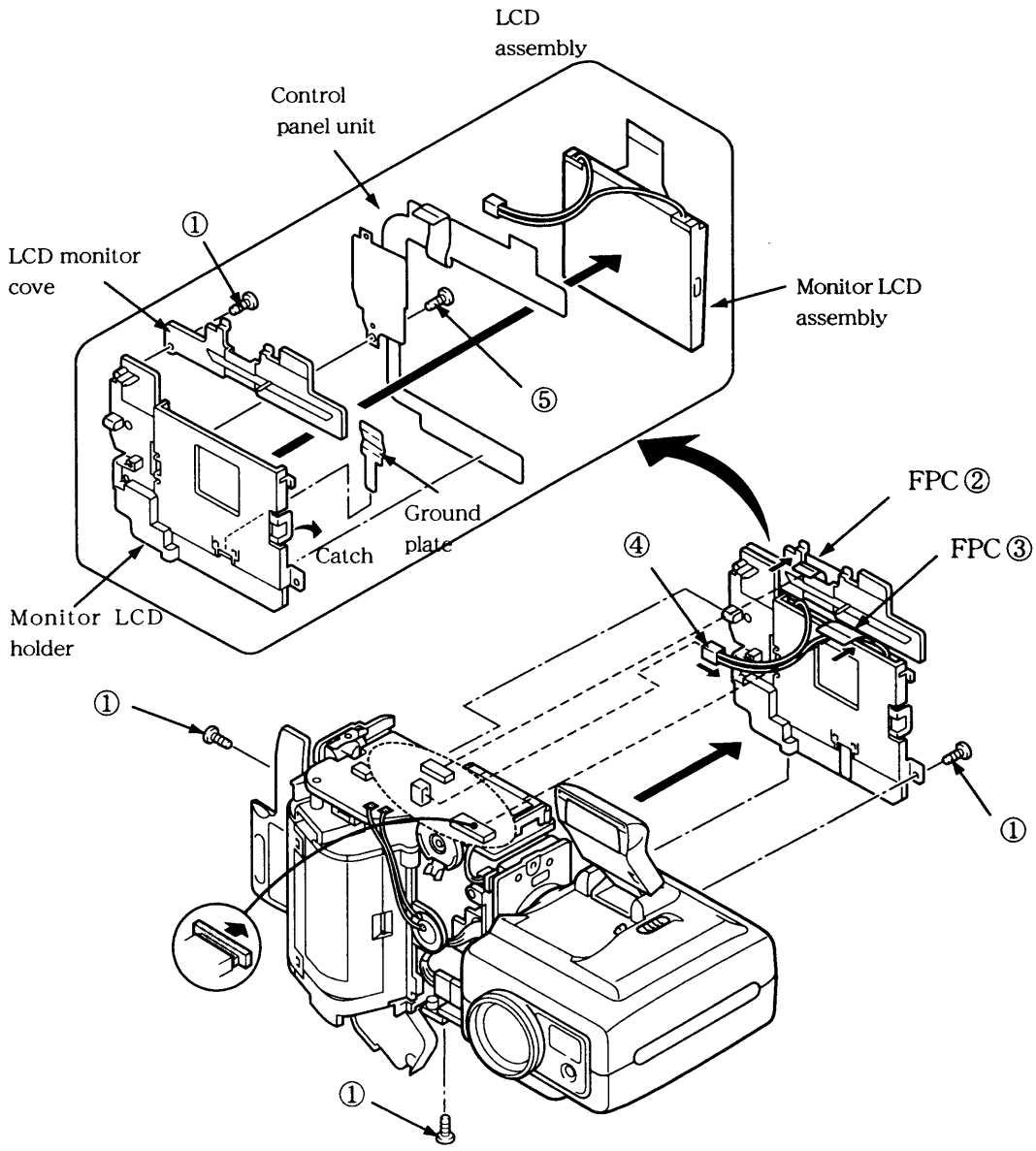
Treatment of Leads (Joint Unit)

Treatment of Leads

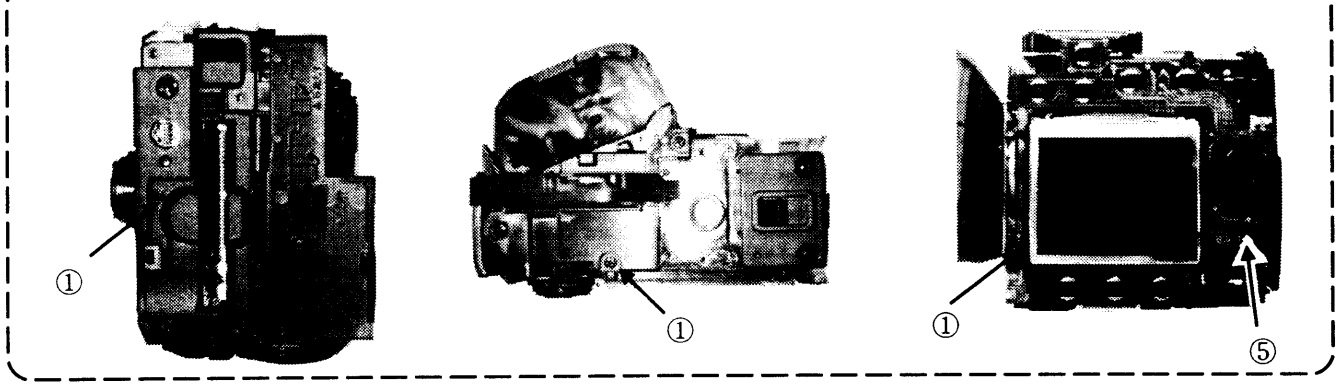


9. LCD Unit

- Attach the ground plate to the monitor LCD holder.
- Use a screw ⑤(M1.7 x 4.0) to attach the control panel unit.
- Attach the monitor LCD assembly to the monitor LCD holder.
- Connect the connectors ④ and the FPCs ②, ③.
- Screw in four screws ①(M1.7 x 4.0).

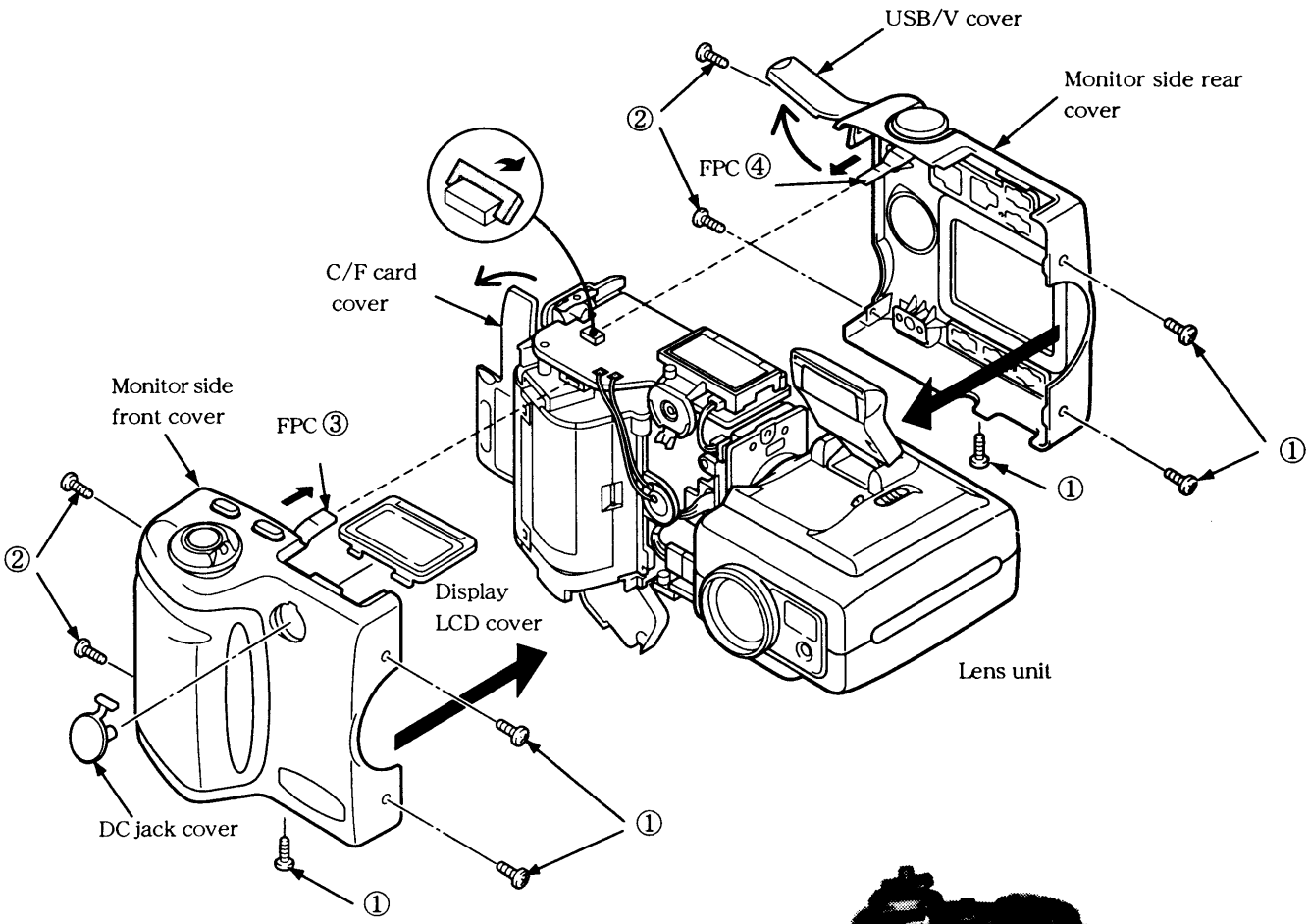


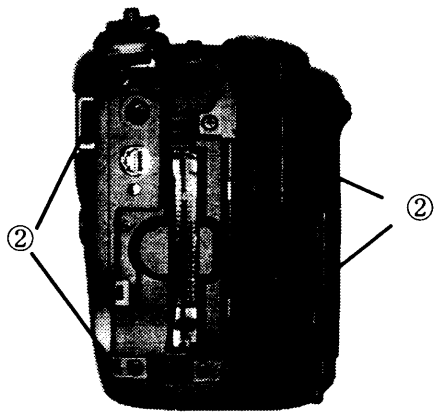
Locations of Screws



10. Monitor Side Front Cover, Monitor Side Rear Cover

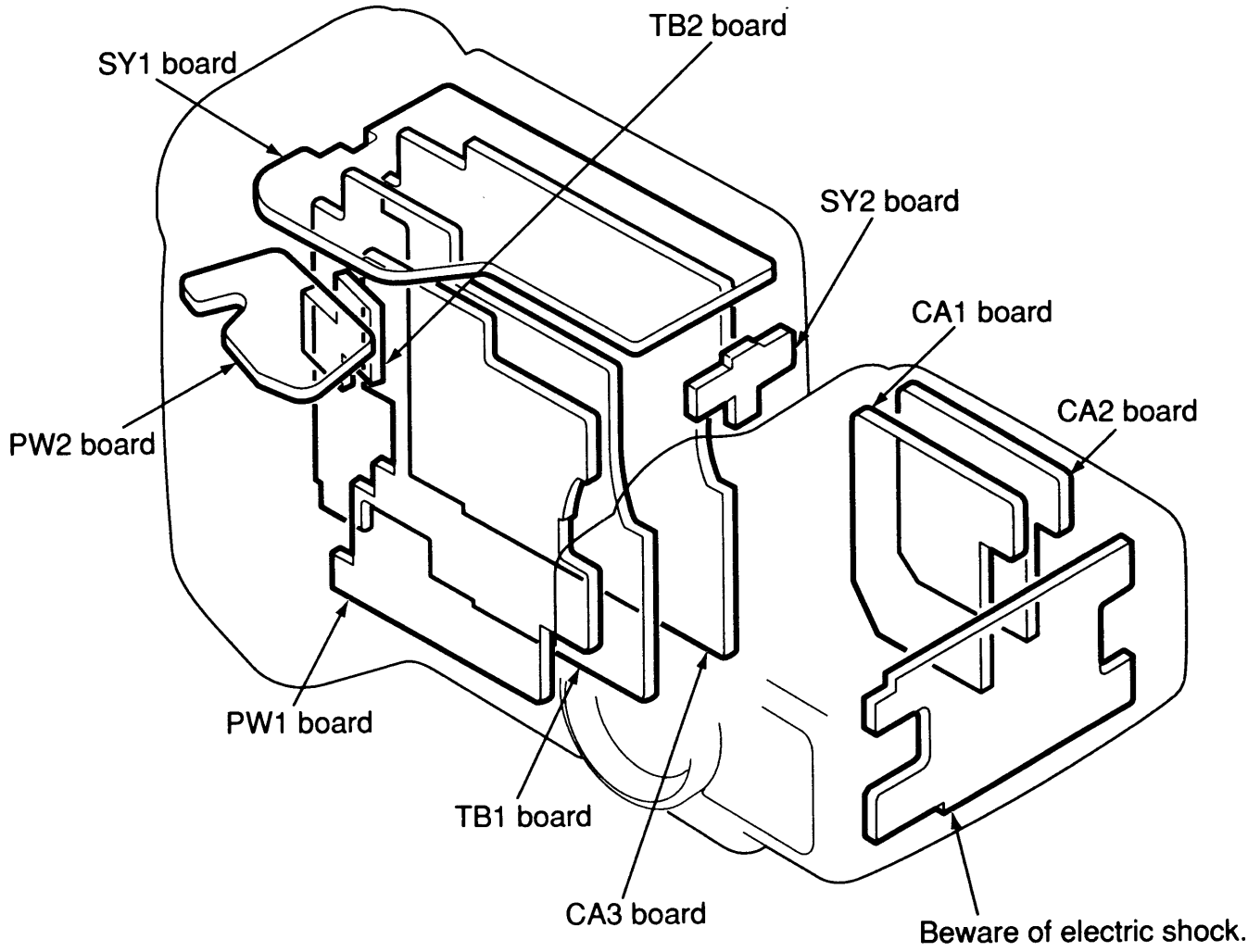
- Connect FPC ④ to the connector, and attach the monitor side rear cover.
- Attach the display LCD cover and the DC jack cover.
- Connect FPC ③ to the connector, and attach the monitor side front cover.
- Open the C/F card cover and the USB/V cover, and screw in four screws ②(M1.7 x 4.0).
- Screw in six screws ①(M1.7 x 3.5).





C/F card cover side

11. Location of Each Board



ELECTRICAL ADJUSTMENT

1. Equipment

・IBM compatible PC ・AC adaptor (EH－21) ・USB cable (UC-U1) ・Oscilloscope
・Serial cable (SC－EW3)

2. Servicing Tools

・Color viewer 5,100 K ・Siemens star chart ・Calibration software ・Chart for color adjustment

3. Setup

① System requirements
・Windows 98 , Me or 2000
・IBM R -compatible PC with Pentium processor
・CD-ROM drive
・3.5-inch high-density diskette drive
・Serial port with standard RS-232C interface or USB port
・40 MB RAM
・Hard disk drive with at least 15 MB available
・VGA or SVGA monitor with at least 256-color display

② Installing calibration software
・Insert the calibration software installation diskette into your diskette drive.
・Open Explorer.
・Copy the DscCalDI_126 folder on the floppy disk in the FD drive to a folder on the hard disk.

4. Installing USB drive

Install the USB drive with camera or connection kit for PC.

5. Color Viewer

Turn on the switch and wait for 30 minutes for aging to take place before using Color Pure.

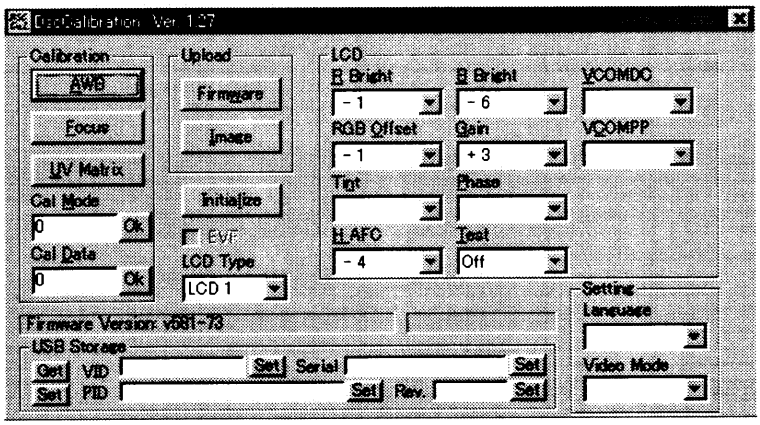
6. Adjustment items required at replacement of parts

	①Flange-back	②CCD Defect	③AWB	④Color Adj	USB	⑤LCD Panel
Lens Unit	○	○	○	○	×	×
Optical filter	○	○	○	○	×	×
CCD	○	○	○	○	×	×
CA-1	○	○	○	○	×	×
CA-2	○	○	○	○	×	×
CA-3	○	○	○	○	○	○
SY-1	○	×	×	×	×	×
PW-1	×	×	×	×	×	×
TB-1	×	×	×	×	×	×

○ : Adjustment required
× : Adjustment not required

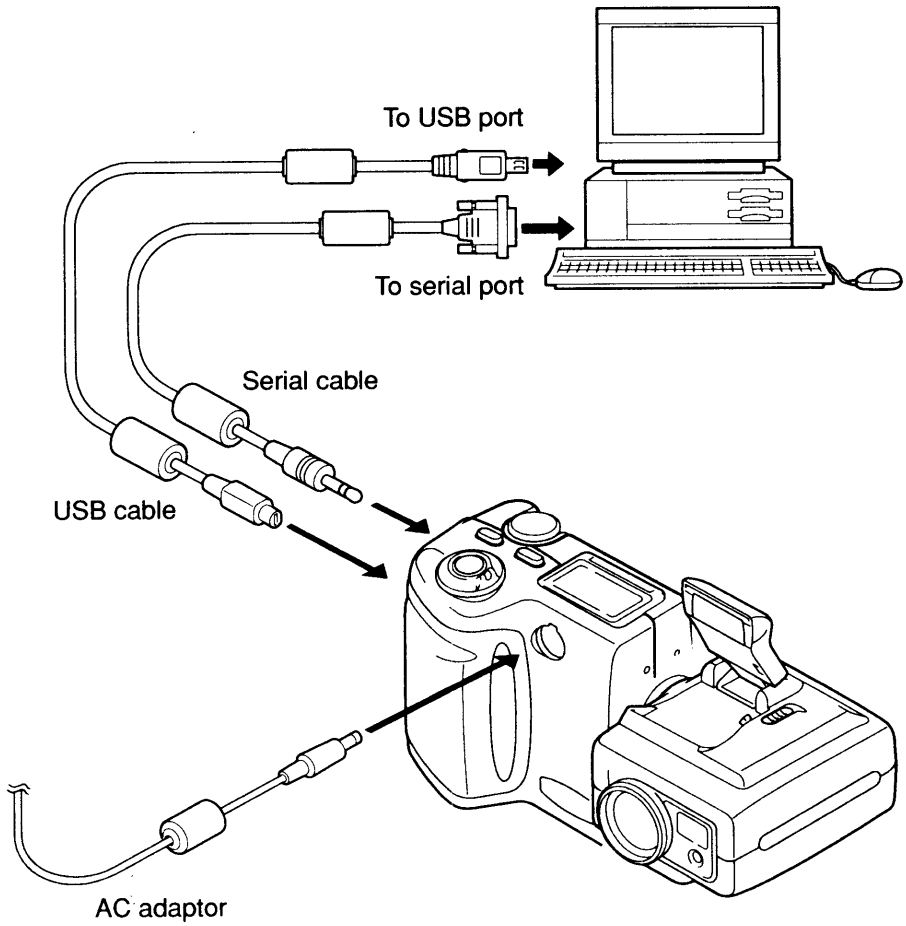
7. Calibration software

After starting the applicable calibration software, the following is displayed on the PC monitor.



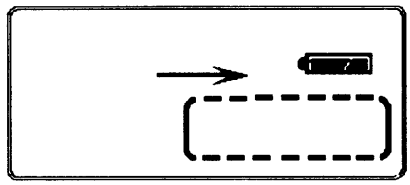
8. Connecting the camera to the computer

1. Turn off both camera and computer.
2. Line up the arrow on the serial cable connector with the notch on the camera's serial port. Insert the connector.
   In case of USB cable, line up the arrow on the USB cable connector with the notch on the camera's USB port. Insert the connector.
3. Line up the serial connector on the serial cable with the serial port on your computer, and insert the connector.
   In case of USB cable, line up the USB connector on the USB cable with the USB port on your computer, and insert the connector.
4. Turn on the camera and your computer system.



9. Communications between PC and the camera

After starting communications between PC and the camera, what is displayed on the top LCD on the camera is switched to the following figure.
The dotted line starts to go round clockwise, and after a fixed period of time, the move of line stops and the camera automatically goes to be switched to the communications mode.
In addition, this move of line automatically appears every time each adjustment item in the applicable calibration software is operated on your demand.



Top LCD Panel

10. Flange-back (Lens) Adjustment

[Preparation]

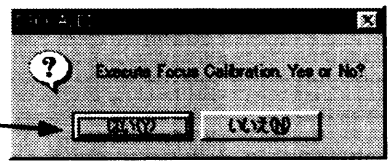
- Siemens star chart
- POWER switch: ON (set to A-REC MODE)

[Adjustment condition]

- Make a copy of A4 size siemens chart in enlarged A3 size or larger.
- Illumination above the subject should be 400 lux ± 10 %.
- Set the siemens star chart 150 cm ± 3 cm (between Siemens star chart and the surface of camera's protection lens)

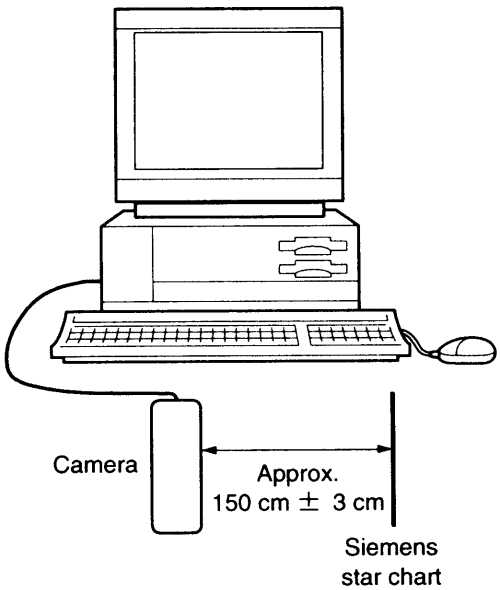
[Adjustment method]

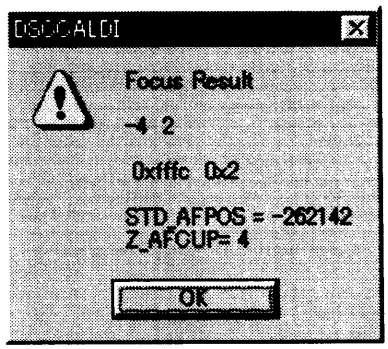
1. Set the siemens star chart 150 cm ± 3 cm so that it be-comes center of the screen.
2. Double-click on the DscCalDi127.
3. Click the Focus, and click the Yes.



"Yes"

4. Lens adjustment value will appear on the screen.
   Note: In any adjustment error cases, the adjustment operation can not completely finish through the software, Or, slightly out-of-focus mode appears on the LCD on camera.
5. Click the OK.





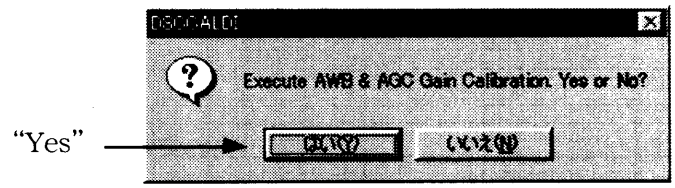
11. AWB Adjustment

[Preparation]

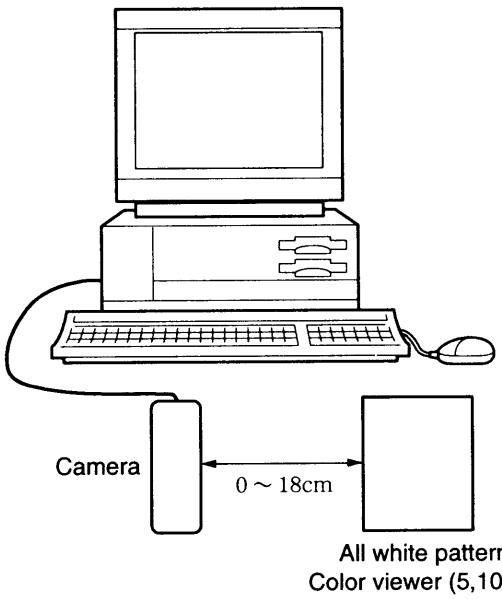
- Color viewer
- POWER switch: ON (set to Any MODE)

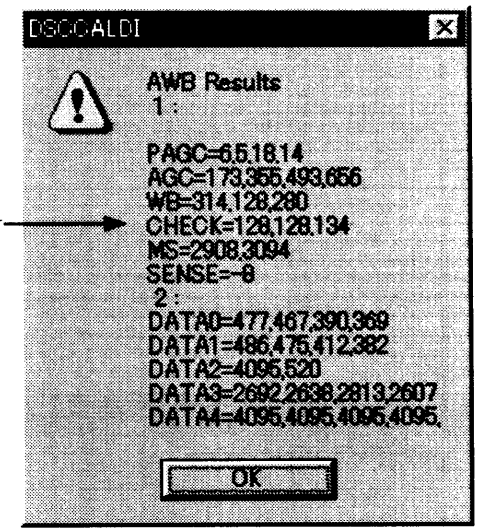
[Adjusting method]

1. When setting the camera in place, set it to an angle so that nothing appears in any part of the color viewer except the white section. (Do not enter any light.)
2. Double-click on the DscCalDi127.
3. Click the AWB, and click the Yes.
4. AWB adjustment value will appear on the screen.
   (CHECK adjustment value is 128 ± 2,128 ± 2,130 ± 30)
5. Click the OK.
   Note : In any adjustment error cases, each value CHECK after adjustment turns to 1.



"Yes"





Adjustment value

12. Color Matrix Adjustment

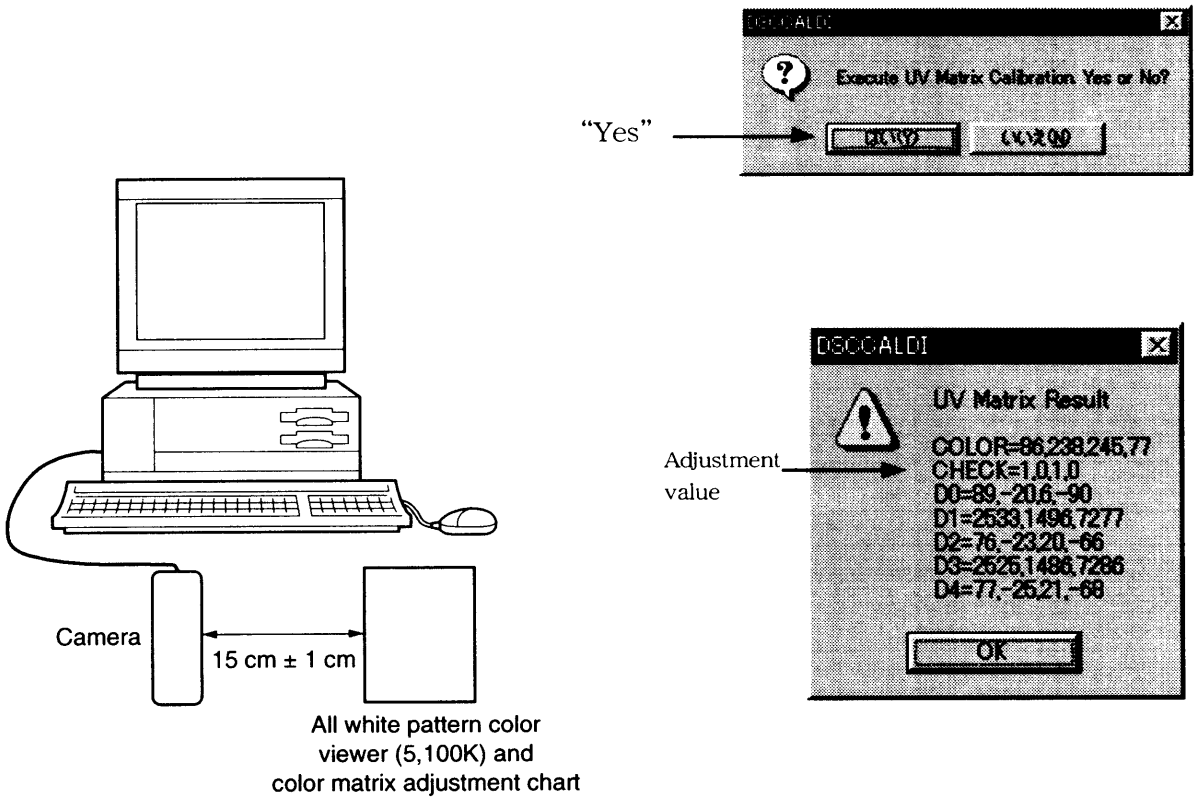
[Note] AWB adjustment should always be carried out first.

[Adjustment condition]

- Set the color adjustment chart to the color viewer.
  (Do not enter any light.)
- Set the siemens star chart so that it becomes center of the screen.

[Adjustment method]

1. Double-click on the DscCalDi127.
4. Click the UV Matrix, and click the Yes.
5. Color adjustment values will appear on the screen.
   (CHECK adjustment value are 0 ± 2 ,0 ± 2 ,0 ± 2 ,0 ± 2)
6. Click the OK.
   Note : In any adjustment error cases, each value CHECK after adjustment turns to 1.



13. CCD Defect Detect Adjustment

[Adjustment method]

1. Double-click on the DscCalDi127.
2. Select the CCD Defect from Test menu of Calibration Soft and click the OK. Refer to FIG-1.
3. After adjustment, An adjustment value will appear on the screen. Refer to FIG-2.

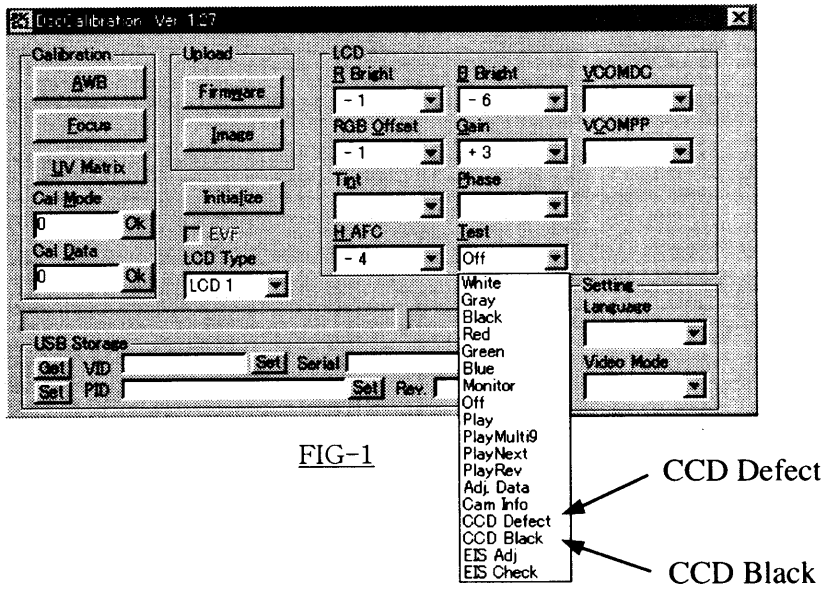


FIG-1

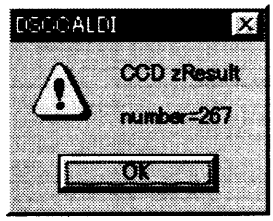


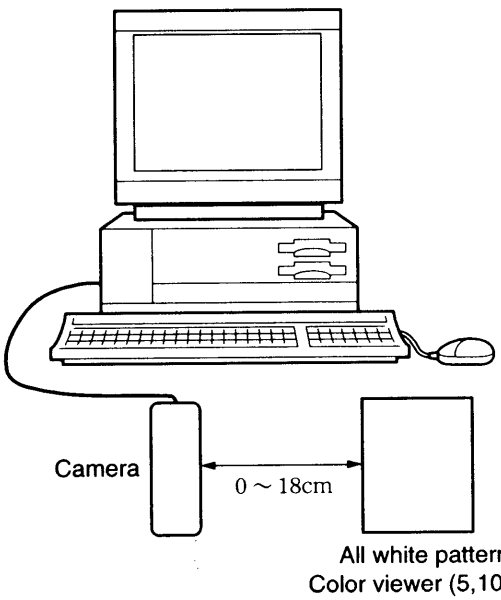
FIG-2

14. CCD Black Point Defect Detect Adjustment

[Note] AWB adjustment should always be carried out first.

[Adjusting method]

1. When setting the camera in place, set it to an angle so that nothing appears in any part of the color viewer except the white section. (Do not enter any light.)
2. Double-click on the DscCalDi127.
3. Select CCD Black on the LCD Test, and click the Yes. Refer to FIG-1.
4. After the adjustment is completed, the number of defect will appear.Refer to FIG-3.



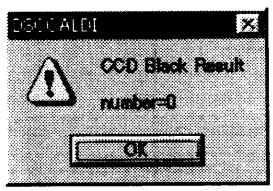


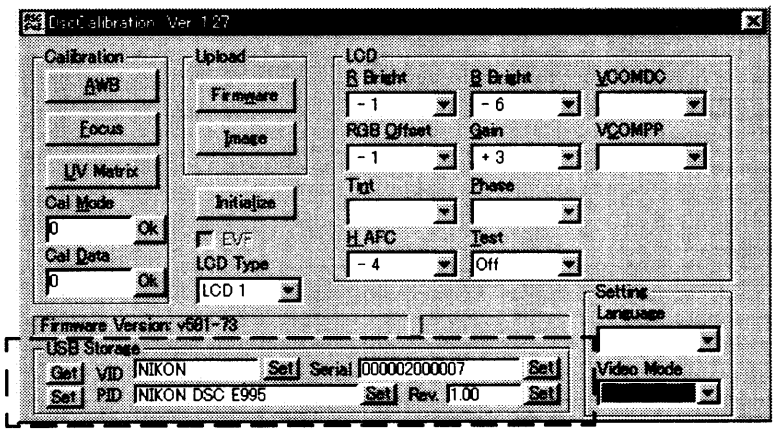
FIG-3

15. USB STORAGE INFORMATION REGISTRATION

USB storage data is important for when the camera is connected to a computer via a USB connection. If there are any errors in the USB storage data, or if it has not been saved, the USB specification conditions will not be satisfied, so always check and save the USB storage data.

[Adjustment method]

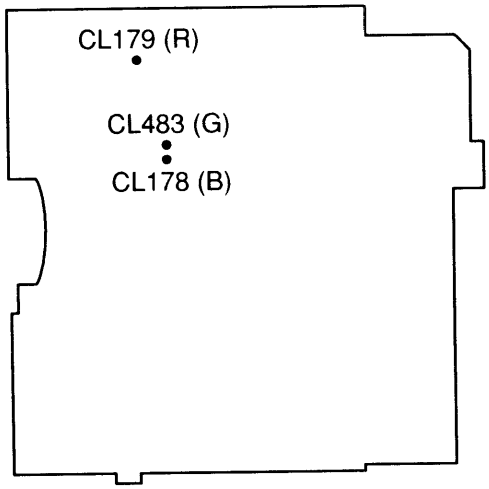
1. Connect the camera to a computer. (Refer to 6. Connecting the camera to the computer on the page 12.)
2. Double-click on the DscCalDi127.
3. Click on the Get button in the USB storage window and check the USB storage data.
   VID: NIKON
   PID: NIKON DSC E995
   Serial:
   Rev. : 1.00
4. Check the ‹Serial‡ in the above USB storage data. If the displayed value is different from the serial number printed on the base of the camera, enter the number on the base of the camera. Then click the Set button.
5. Next, check VID and Rev. entries in the USB storage data. If any of them are different from the values in 3. above, make the changes and then click the corresponding Set button.



USB strage

16. LCD Panel Adjustment

[CA3 board (Side A)]



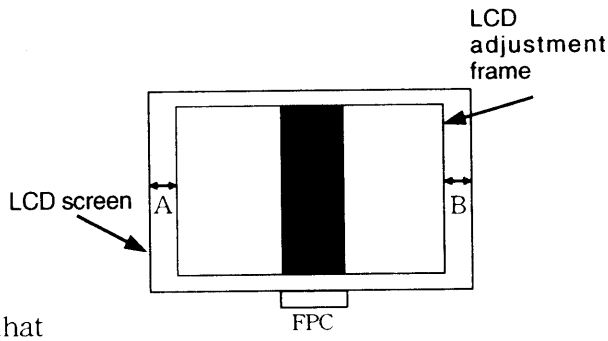
17-1. LCD H AFC Adjustment

[Preparation]

- POWER switch: ON

[Adjusting method]

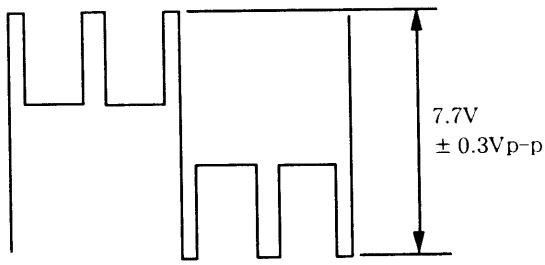
1. Double-click on the DscCalDi127.
2. Select 0 on the LCD H AFC.
3. While watching the LCD monitor, adjust H AFC so that the edge of the LCD adjustment frame are the same distance from the left and right edge of the LCD screen. (A = B)



17-2. LCD RGB Offset Adjustment

[Adjusting method]

1. Adjust LCD RGB Offset so that the amplitude of the CL483 waveform is 7.7 V ± 0.3 Vp-p.



CL483 waveform

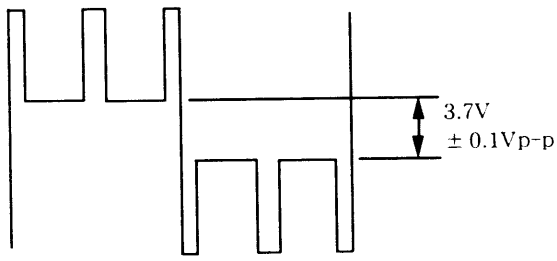
17-3. LCD Gain Adjustment

[Adjusting method]

1. Adjust LCD ‹Gain› so that the amplitude of the CL483 waveform is 3.7 V ± 0.1 Vp-p.

[Note]

13-2. LCD RGB Offset adjustment should always be carried out first.



CL483 waveform

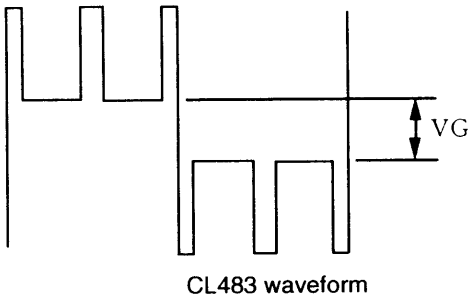
17-4. LCD Blue Brightness Adjustment

[Adjusting method]

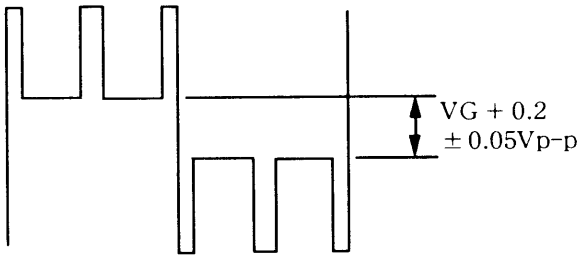
1. Adjust LCD B Bright so that the amplitude of the CL178 waveform is VG + 0.2 ± 0.05 Vp-p with respect to the CL483 (VG) waveform.

[Note]

13-2. LCD RGB Offset adjustment and 8-3. LCD Gain adjustment should always be carried out first..



CL483 waveform



CL178 waveform

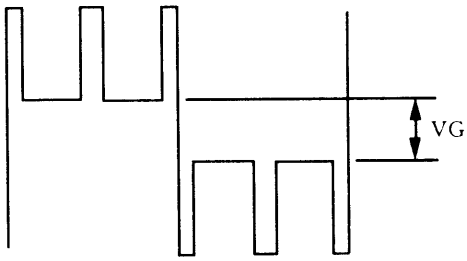
17-5. LCD Red Brightness Adjustment

[Adjusting method]

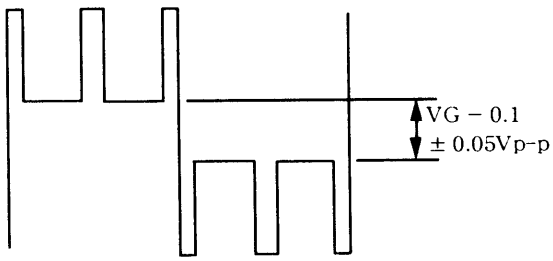
1. Adjust LCD B Bright so that the amplitude of the CL179 waveform is VG-0.1 ± 0.05 Vp-p with respect to the CL483 (VG) waveform.

[Note]

13-2. LCD RGB Offset adjustment and 13-3. LCD Gain adjustment have done.



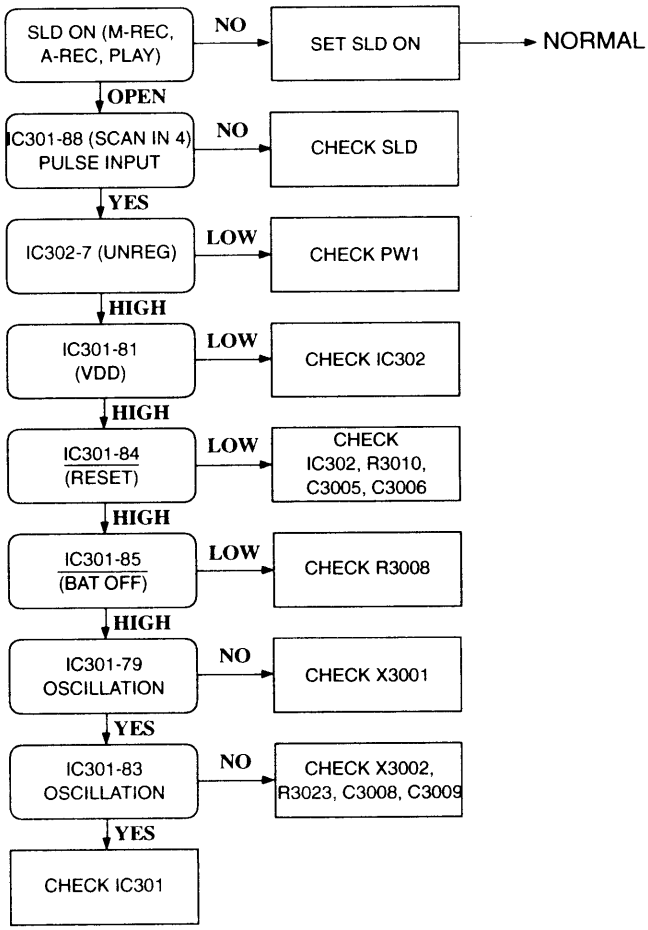
CL483 waveform



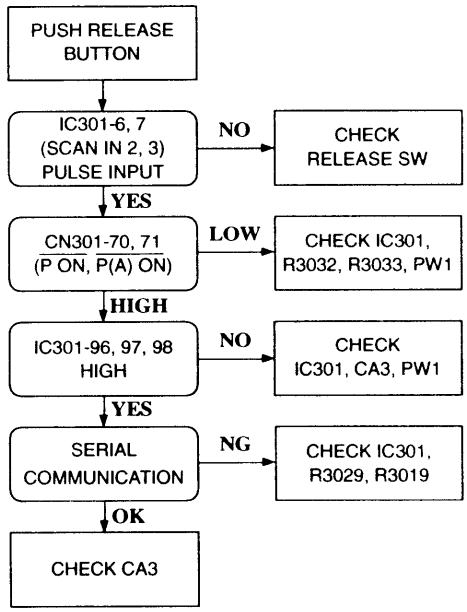
CL179 waveform

18. TROUBLESHOOTING GUIDE

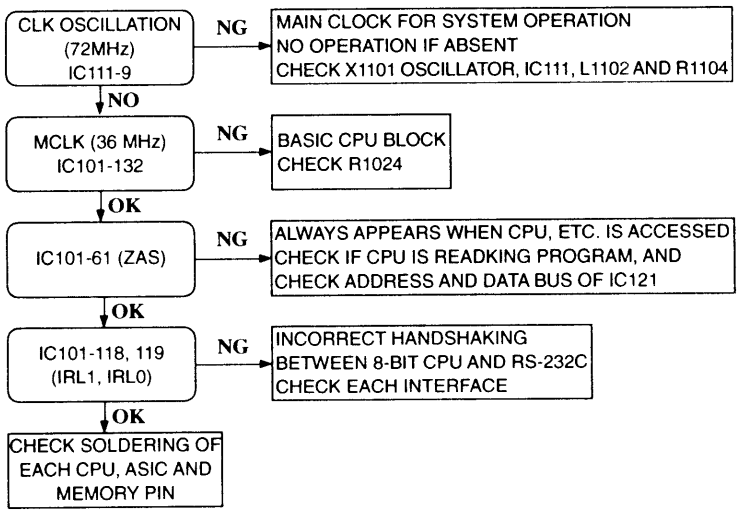
POWER LOSS INOPERTIVE



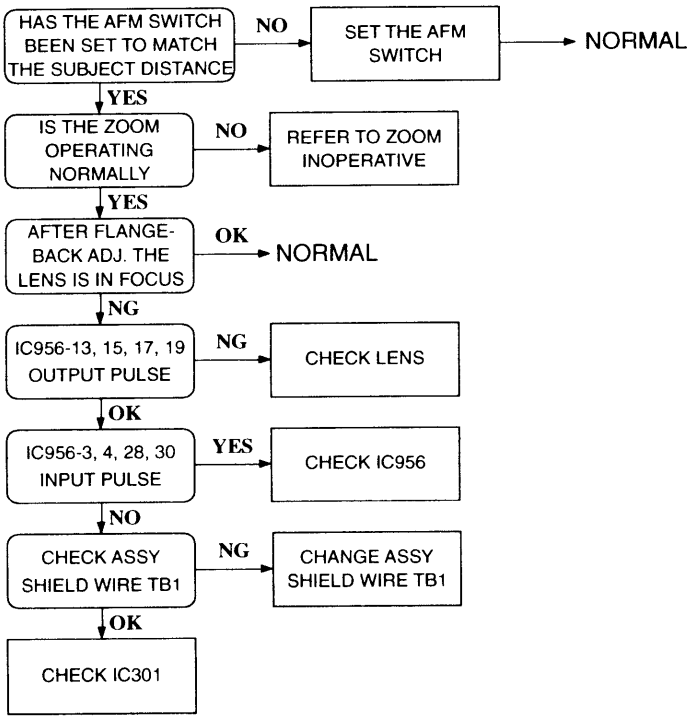
TAKING INOPERATIVE



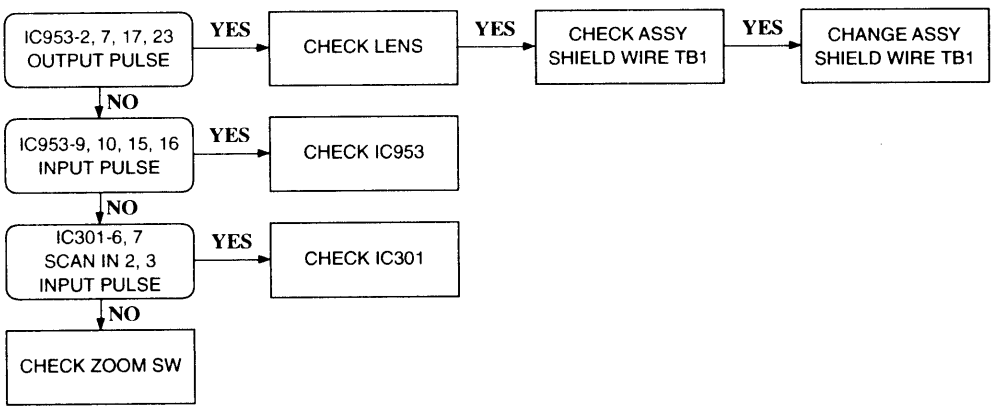
NO PICTURE



FOCUS INOPERATIVE



ZOOM INOPERATIVE



1. OUTLINE OF CIRCUIT DESCRIPTION

1-1. CA1 CIRCUIT DESCRIPTION

1. IC Configuration

IC903 (ICX252AK-B)	CCD imager
IC902 (TC74ACT04FTP)	H driver
IC904 (CXD3400N)	V driver
IC931 (AD9842AJST)	CDS, AGC, A/D converter

2. IC903 (CCD)

[Structure]

Interline type CCD image sensor

Optical size	1/1.8 type
Effective pixels	2088 (H) X 1550 (V)
Pixels in total	2140 (H) X 1560 (V)
Optical black	
Horizontal (H) direction:	Front 4 pixels, Rear 48 pixels
Vertical (V) direction:	Front 8 pixels, Rear 2 pixels
Dummy bit number	Horizontal : 28 Vertical :1 (only even number field)

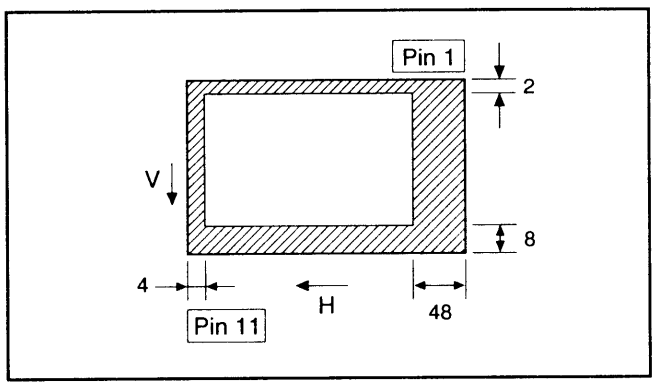


Fig. 1-1.Optical Black Location (Top View)

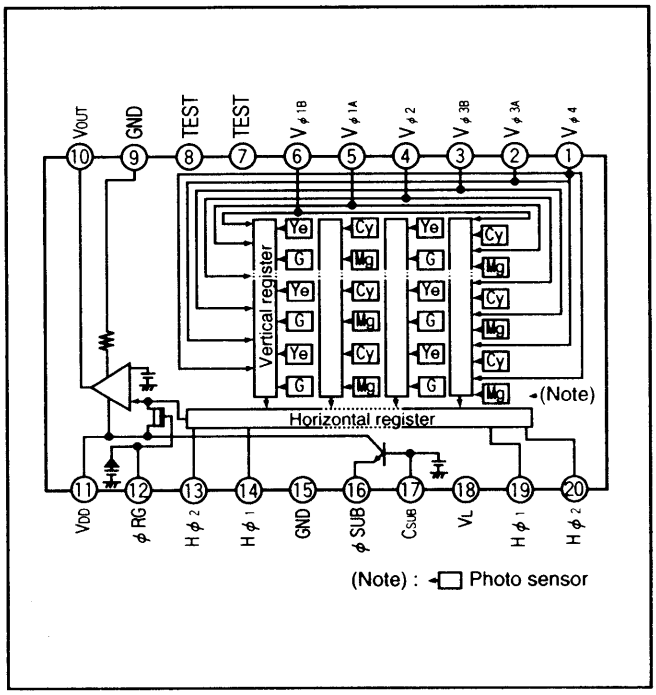


Fig. 1-2. CCD Block Diagram

Pin No.	Symbol	Pin Description	Waveform	Voltage
1	V φ 4	Vertical register transfer clock		-7.5 V, 0 V
2, 3	V φ 3A, V φ 3B	Vertical register transfer clock		-7.5 V, 0 V, 15 V
4	V φ 2	Vertical register transfer clock		-7.5 V, 0 V
5, 6	V φ 1A, V φ 1B	Vertical register transfer clock		-7.5 V, 0 V, 15 V
9, 15	GND	GND	GND	0 V
10	VOUT	Signal output		Aprox. 10 V
11	VDD	Circuit power	DC	15 V
12	φ RG	Reset gate clock		12.5 V, 16 V
13, 20	H φ 2	Horizontal register transfer clock		0 V, 5 V
14, 19	H φ 1	Horizontal register transfer clock		0 V, 5 V
16	φ SUB	Substrate clock	DC	Aprox. 8 V
17	CSUB	Substrate bias	DC	Aprox. 8V (Different from every CCD)
18	VL	Protection transistor bias	DC	

Table 1-1. CCD Pin Description

---- When sensor read-out

3. IC902 (H Driver) and IC904 (V Driver)

An H driver (IC902) and V driver (IC904) are necessary in order to generate the clocks (vertical transfer clock, horizontal transfer clock and electronic shutter clock) which driver the CCD.

IC902 is an inverter IC which drives the horizontal CCDs (H1 and H2). In addition the XV1-XV4 signals which are output from IC102 are the vertical transfer clocks, and the XSG1 and XSG signal which is output from IC102 is superimposed onto XV1 and XV3 at IC904 in order to generate a ternary pulse. In addition, the XSUB signal which is output from IC102 is used as the sweep pulse for the electronic shutter, and the RG signal which is output from IC102 is the reset gate clock.

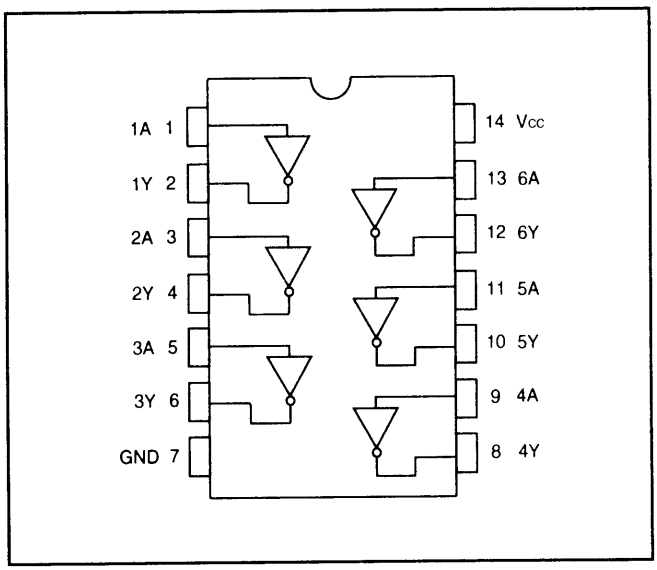


Fig. 1-3. IC902 Block Diagram

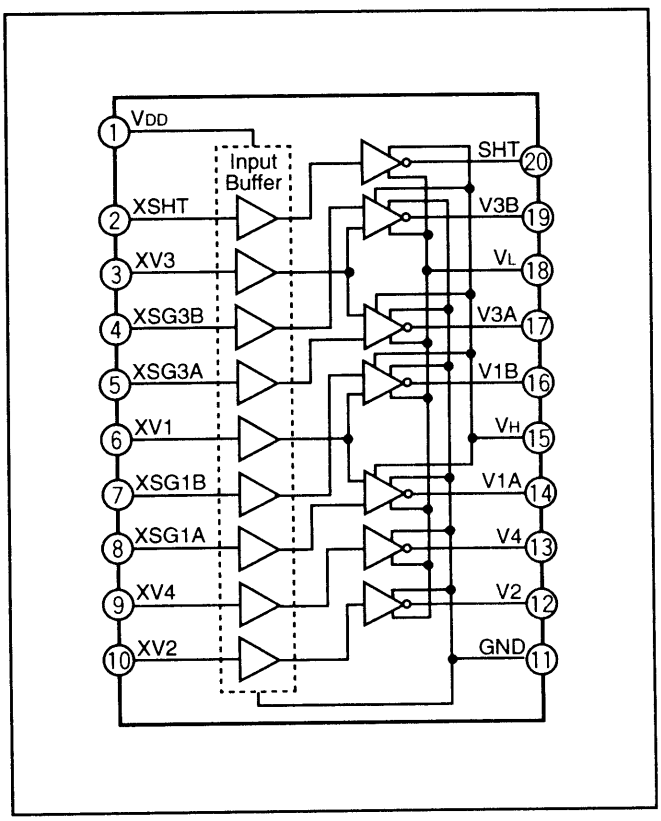


Fig. 1-4. IC904 Block Diagram

4. Lens drive block

4-1. Focus drive

The focus stepping motor drive signals (FM RESETB, FM CW, FM CLK and FM OEB) which are output from 8-bit microprocessor (IC301) are used to drive micro step by the motor driver (IC956). Detection of the standard focusing positions is carried out by means of the photointerruptor (FPI) inside the lens block.

4-2. Zoom drive

The zoom stepping motor drive signals (ZIN1, ZIN2, ZIN3 and ZIN4) which are output from 8-bit microprocessor (IC301) are used to drive by the motor driver (IC953). Detection of the standard zoom positions is carried out by means of photoreflector (ZPI) inside the lens block.

4-3. Iris drive

The iris stepping motor drive signals (IIN1, IIN2, IIN3 and IIN4) which are output from the ASIC expansion port (IC106) are converted into drive by the motor drive (IC953), and are then used to drive the iris steps.

4-4. Shutter drive

The two shutter motor drive signals (SIN1, SIN2) which are output from the ASIC expansion port (IC106) are converted into drive pulses by the motor drive (IC952), and the mecha shutter is opened and closed by regular current drive.

1-2. CA2 CIRCUIT DESCRIPTION

1. IC931 (CDS, AGC Circuit and A/D Converter)

The video signal which is output from the CCD is input to Pins (30) of IC931. There are S/H blocks inside IC905 generated from the XSHP and XSHD pulses, and it is here that CDS (correlated double sampling) is carried out.

After passing through the CDS circuit, the signal passes through the AGC amplifier. It is A/C converted internally into a 12-bit signal, and is then input to IC102 of the CA2 circuit board. The gain of the AGC amplifier is controlled by pin (45)-(48) serial signal which is output from IC102 of the CA2 board.

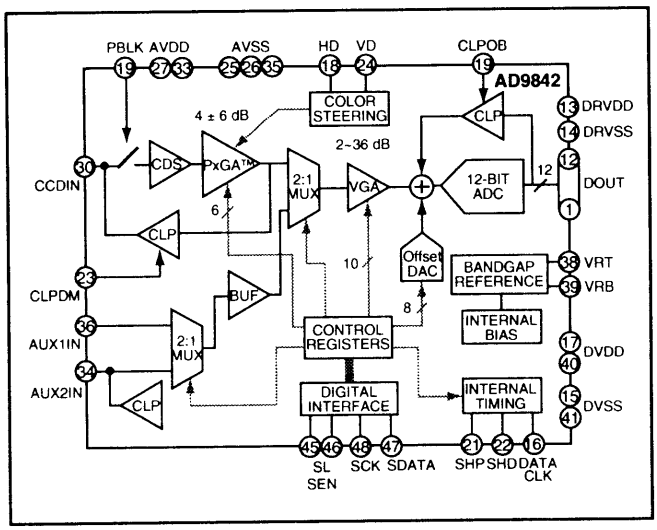


Fig. 2-1. IC931 Block Diagram

1-3. CA3 CIRCUIT DESCRIPTION

1. Circuit Description

1-1. Digital clamp

The optical black section of the CCD extracts averaged values from the subsequent data to make the black level of the CCD output data uniform for each line. The optical black section of the CCD averaged value for each line is taken as the sum of the value for the previous line multiplied by the coefficient k and the value for the current line multiplied by the coefficient 1-k.

1-2. Signal processor

1. γ correction circuit

This circuit performs (gamma) correction in order to maintain a linear relationship between the light input to the camera and the light output from the picture screen.

2. Color generation circuit

This circuit converts the CCD data into RGB signals.

3. Matrix circuit

This circuit generates the Y signals, R-Y signals and B-Y signals from the RGB signals.

4. Horizontal and vertical aperture circuit

This circuit is used gemerate the aperture signal.

1-3. AE/AWB and AF computing circuit

The AE/AWB carries out computation based on a 64-segment screen, and the AF carries out computations based on a 6-segment screen.

1-4. SDRAM controller

This circuit outputs address, RAS, CAS and AS data for controlling the SDRAM. It also refreshes the SDRAM.

1-5. Communication control

1. UART

The RS-232C can be sued for both synchronous and asynchronous transmission.

2. SIO

This is the interface for the 8-bit microprocessor.

3. PIO/PWM/SIO for LCD

8-bit parallel input and output makes it possible to switch between individual input/output and PWM input/output.

1-6. TG/SG

Timing generated for 2 million/3 million/4 million/5 million pixels CCD control.

1-7. Digital encorder

It generates chroma signal from color difference signal.

1-8. JPEG encorder and decorder

It is compressed and elongated the data by JPEG system.

2. Outline of Operation

When the shutter opens, the reset signals (ASIC (IC102) and CPU (IC101)) and the serial signals ("take a picture" commands) from the 8-bit microprocessor are input and operation starts. When the TG/SG drives the CCD, picture data passes through the A/D and CDS, and is then input to the ASIC as 10-bit data. The AF, AE, AWB, shutter, and AGC value are computed from this data, and three exposures are made to obtain the optimum picture. The data which has already been stored in the SDRAM is read by the CPU and color generation is carried out. Each pixel is interpolated from the surrounding data as being either Ye, Cy, Mg and Gr primary color data to produce R, G and B data. At this time, correction of the lens distortion which is a characteristic of wide-angle lenses is carried out. After AWB and γ processing are carried out, a matrix is generated and aperture correction is carried out for the Y signal, and the data is then compressed by the JPEG method by (JPEG) and is then written to card memory (compact flash).

When the data is to be output to an external device, it is taken data from the memory and output via the UART. When played back on the LCD and monitor, data is transferred from memery to the SDRAM, and the data elongated by JPEG decorder is displayed over the SDRAM display area.

3. LCD Block

LCD Block is in the CA3 board, and it is constructed by LCD driver (IC171) and around circuits.

The video signal (Y/C signals) from the ASIC are converted into RGB signals by the LCD driver, and these RGB signals and the control signal which is output by the LCD driver are used to drive the LCD panel. The RGB signals are 1H transposed so that no DC component is present in the LCD element, and the two horizontal shift register clocks drive the horizontal shift registers inside the LCD panel so that the 1H transposed RGB signals are applied to the LCD panel. Because the LCD closes more as the difference in potential between the COM (common polar voltage: fixed at DC) and the R, G and B signals becomes greater, the display becomes darker; if the difference in potential is smaller, the element opens and the LCD become brighter.

1-4. PW1 & PW2 POWER CIRCUIT DESCRIPTION

1. PW1 Circuit Outline

The switching regulator consists of a DC-DC converter, and it uses a digital power supply, CCD power supply, LCD panel power supply and LED backlight power supply. The controller is used BD9731KV.

1-1. Switching Controller (IC501)

This is the basic circuit which is necessary for controlling the power supply for a PWM-type switching regulator, and is provided with five built-in channels.
CH1: CCD power supply circuit
CH2: digital 1.8 V power supply circuit
CH3: digital 3.4 V power supply circuit
CH4: LCD panel power supply circuit
CH5: LED backlight circuit

1-2. Short-circuit protection circuit

If output is short-circuited for the length of time determined by the condenser which is connected to Pin (29) of IC501, all output is turned off. The power is restored by ON and OFF.

1-3. Digital 3.4 V Power Supply Output

Consists of a step-down type switching regulator, and outputs 3.35 V ± 2 %.

1-4. Digital 1.8 V Power Supply Output

Consists of a step-down type switching regulator, and outputs 1.85 V ± 2 %.

1-5. CCD Power Circuit and Digital 5 V Power Supply Circuit

15.2 V ± 0.5 V, –7.7 V ± 0.5 V and 5.1 V ± 0.1 V are output by flyback transformer. The voltage is adjusted to 5.1 V. Digital 5 V and CCD 5.1 V are shared.

1-6. LCD Panal Power Supply Circuit

15 V ± 0.5 V, 12.4 V ± 0.1 V and 5.1 V ± 0.3 V are output by flyback transformer. The voltage is adjusted to 12.4 V.

1-7. LED Backlight Power Supply Circuit

Consists of a step-up switching regulator, and carries out constant-current control for the LEDs.

1-8. LED Luminance Dimmer Circuit

Changes the standard voltage of the differential amplifier for channel 5 (CH5) inside IC501 in order to set the current to the desired level. The standard voltage is created by smoothing the INV_PWM which is output from the ASIC. The INV_PWM oscillation is approximately 15.73 kHz. The relationship between the luminosity setting and the INV_PWM is as follows.

Luminance setting	INV-PWM "H" duty	Electric current value
+2, +1	10 %	18 mA: luminance maximum
0	30 %	14 mA: typical
–2, –1	50 %	10 mA: luminance minimum

2. AC Adaptor and Battery Distinction

Differentiated by the voltage at pin 56 of the 8-bit microprocessor. When an AC adaptor is being used, transistor Q3010 on the SY1 circuit board is turned on, so that pin 56 becomes low. When a battery is being used, D3016 stops the current from flowing, so that the transistor turns off and the voltage at pin 56 becomes high.

2. PW2 Circuit Outline

2-1. Battery Charging Protection Circuit

A FET (CPH6311) switch is inserted into the (+) end of the battery harness so that charging current does not flow to the battery by mistake when a battery and an AC adaptor are being used together. When a voltage is being generated by the AC adapter, Q5101 is turned off, so that the battery circuit is isolated. If there is no voltage coming from the AC adaptor, Q5101 turns on and power is supplied from the battery.

1-5. SY1 CIRCUIT DESCRIPTION

1. Configuration and Functions

For the overall configuration of the SY1 circuit board, refer to the block diagram. The configuration of the SY1 circuit board centers around a 8-bit microprocessor (IC301).
The 8-bit microprocessor handles the following functions.
1. Operation key input, 2. Mode LCD display, 3. Clock control, 4. Power ON/OFF, 5. Storobe charge control, 6. Signal output for lens control of zoom, focus and so on.

Pin	Signal	I/O	Outline
1	ZOOM PI	I	Zoom motor standard position detection (analog input)
2	TEMP	I	Temparature detection (analog input)
3	CHG VOL	I	Storobe charge voltage detection (analog input)
4	FM PI	I	Focusing motor standard position detection (analog input)
5~7	$\overline{\text{SCAN IN 1~3}}$	I	Key matrix input
8	AVDD	-	Analog power input terminal
9	AVREF	I	Analog standard voltage input terminal
10	$\overline{\text{FINDER LED1}}$	O	Finder LED 1 (red) drive L : LED light
11	$\overline{\text{FINDER LED2}}$	O	Finder LED 2 (green) drive L : LED light
12	VSS	-	GND
13	FM RESETB	O	Focusing motor drive phase reset signal
14	LCD ON	O	DC/DC converter (LCD system) ON/OFF signal
15	PWM	O	Dimmer D/A PWM output
16	FM CKO	O	Focusing motor drive clock output
17	FM CW	O	Focusing motor drive direction signal
18	FM OEB	O	Focusing motor output inable signal
19	FM CKI	I	Focusing motor drive clock count
20	SELF	O	Red-eye reduction, self-timer, AF support emission drive H : Lump light
21	BUZZER	O	Buzzer output
22	CHG ON	O	Strobe charge control circuit
23~26	COM0~3	O	Mode LCD common output
27	BIAS	-	Mode LCD drive power supply (connect to VLCO terminal)
28~30	VLC0~2	-	Mode LCD power input terminal (connect to outside resister connection)
31	VSS	-	GND
32~55	S1~S24	O	LCD segment output 1~24
56	DCINCHK	I	Outside DC power detection L : AC adaptor
57	$\overline{\text{PICTL}}$	O	Photo interaptor ON/OFF control L : ON
58	STRBOUP	I	Strobe up detection
59	NOT USED	I	GND
60~63	ZOOM IN4~1	O	Zoom motor drive signal 4~1
64	WAKE UP	O	SPARC wake up terminal
65	$\overline{\text{ADVREF ON}}$	O	AD VREF ON/OFF signal L : ON
66	CHG LIMIT	O	F-D terminal
67	CMD IN1	I	Command input 1
68	BKUPCTL	O	Back up battery charge control
69	$\overline{\text{SCAN IN0}}$	I	Key matrix input 0
70	PA ON	O	DC/DC converter (analog) ON/OFF signal H : ON
71	P ON	O	DC/DC converter (digital) ON/OFF signal H : ON
72~74	NOT USED	I	GND
75	SI	I	Serial data input (←ASIC)
76	SO	O	Serial data output (→ASIC)
77	SCK	O	Serial clock output (→ASIC)

See next page →

Pin	Signal	I/O	Outline	
78	IC	-	Inside connection (connect to VSS terminal directly)	
79	XOUT	O	Main clock oscillation terminal	
80	XIN	I	Main clock oscillation terminal (3 MHz)	
81	VDD	-	VDD	
82	XCIN	I	Clock oscillation termianl (32.768 kHz)	
83	XCOUT	O	Clock oscillation terminal	
84	$\overline{\text{RESET}}$	I	Reset input	
85	$\overline{\text{BAT OFF}}$	I	Battery OFF detection signal	
86	RXD	I	Host wake-up input terminal	L : OFF
87	$\overline{\text{SREQ}}$	I	Serial communication request signal	L : Serial request
88	SCAN IN4	I	Key matrix input (SLD ON detection)	
89	USB CONNECT	I	USB connection detection	
90	CMD IN2	I	Command input 2	
91~95	$\overline{\text{SCAN OUT0~4}}$	O	Key matrix output	
96	$\overline{\text{ASIC TEST}}$	O	ASIC control signal	
97	$\overline{\text{ASIC RESET}}$	O	ASIC reset signal	L : Reset output
98	$\overline{\text{MAIN RESET}}$	O	SPARC reset signal	L : Reset output
99	AVSS	-	Analog GND input terminal	
100	BATTERY	I	Battery check (analog input)	

Table 4-1. 8-bit Microprocessor Port Specification

2. Internal Communication Bus

The SY1 circuit board carries out overall control of camera operation by detecting the input from the keyboard and the condition of the camera circuits. The 8-bit microprocessor reads the signals from each sensor element as input data and outputs this data to the camera circuits (ASIC) or to the LCD display device as operation mode setting data. Fig. 4-1 shows the internal communication between the 8-bit microprocessor, ASIC and SPARC lite circuits.

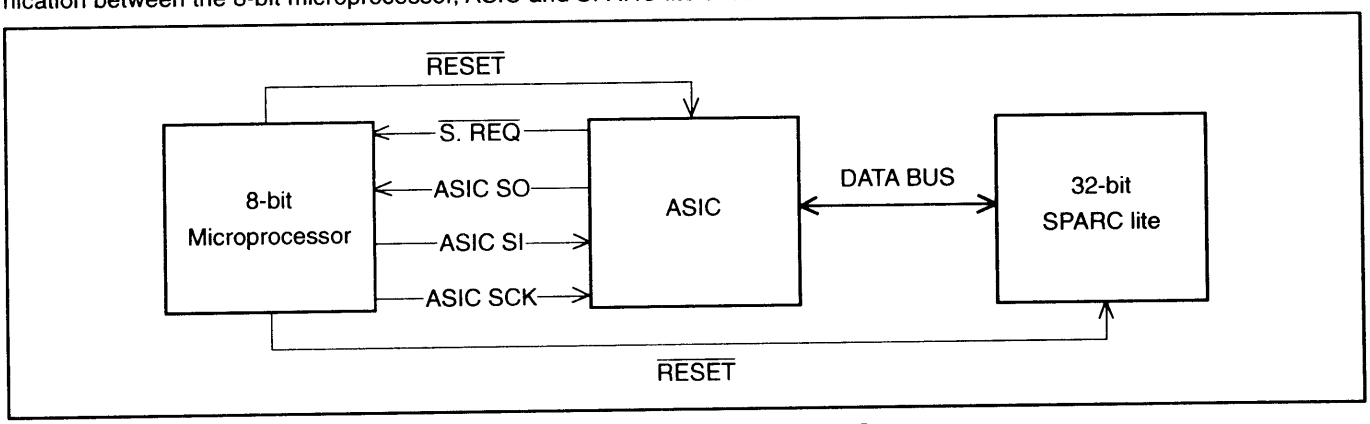


Fig. 4-1 Internal Bus Communication System

3. Key Operaiton

For details of the key operation, refer to the instruction manual.

SCAN OUT \ SCAN IN	0	1	2	3	4
0	← (LEFT)	→ (RIGHT)	↑ (UP)	↓ (DOWN)	SLD 1
1	AFM	SBS	RELEASE (S2)	SHUTTER HALF PUSH (S1)	SLD 2
2	MENU	MTR	ZOOM UP	ZOOM DOWN	TEST
3	LCD INVERSION	+ / - (FUNC 2)	QSW	MODE (FUNC 1)	QUICK
4	V JACK	CARD	DIN CONNECT		CHARGE BAT

Table 4-2. Key Operation

4. Power Supply Control

The 8-bit microprocessor controls the power supply for the overall system.

The following is a description of how the power supply is turned on and off. When the battery is attached, a regulated 3.2 V voltage is normally input to the 8-bit microprocessor (IC301) by IC302, so that clock counting and key scanning is carried out even when the power switch is turned off, so that the camera can start up again. When the battery is removed, the 8-bit microprocessor opererates in sleep mode using the backup lithum ion battery. At this time, the 8-bit microprocessor only carries out clock counting, and waits in standby for the battery to be attached again. When a switch is operated, the 8-bit microprocessor supplies power to the system as required.

The 4-bit microprocessor first sets both the P (A) ON signal at pin (70) and the P ON signal at pin (71) to High, and then turns on the DC/DC converter. After this, High signals are output from pins (97) and (98) so that the ASIC and the SPARC lite are set to the active condition. If the LCD monitor is on, the LCD ON signal at pin (14) set to High, and the DC/DC converter for the LCD monitor is turned on. Once SPARC lite processing is completed, the ASIC and the SPARC lite return to the reset condition, all DC/DC converters are turned off and the power supply to the whole system is halted.

			SPARC Lite	ASIC, memory	RS232C driver	CCD	8 bit CPU	MODE LCD	LCD MONITOR
Power voltage			3.3 V	3.3 V	3.3 V	5 V (A) +15 V -7.7 V	3.3 V (ALWAYS)	3.3 V (ALWAYS)	5V (L) +12V etc.
SLD	OFF		OFF	OFF	OFF	OFF	32 KHz	OFF	OFF
	PLAY		ON	ON	ON	OFF	3 MHz	ON	ON
	M-REC A-REC	Power switch ON- Auto power OFF	OFF	OFF	OFF	OFF	3 MHz	ON	OFF
		Shutter switch ON	ON	ON	ON	ON → OFF	3 MHz	ON	OFF
		MOS, QSW, SBS etc. ON	OFF	OFF	OFF	OFF	3 MHz	ON	OFF
		LCD finder	ON	ON	ON	ON	3 MHz	ON	ON

Table 4-3. Camera Mode

			SPARC Lite	ASIC, memory	RS232C Driver	CCD	8 bit CPU	MODE LCD	LCD MONITOR
Power voltage			3.3 V	3.3 V	3.3 V	5 V (A) +15 V -7.7 V	3.3 V (ALWAYS)	3.3 V (ALWAYS)	5 V (L) +12V etc.
SLD	OFF		OFF	OFF	OFF	OFF	32 KHz	OFF	OFF
	M-REC A-REC PLAY	Power switch ON- Auto power OFF	OFF	OFF	OFF	OFF	3 MHz	ON	OFF
		Take a picture	ON	ON	ON	ON → OFF	3 MHz	ON	OFF
		Erase image	ON	ON	ON	OFF	3 MHz	ON	OFF
		Download image	ON	ON	ON	OFF	3 MHz	ON	OFF
		Continuous image	ON	ON	ON	ON	3 MHz	ON	OFF
		Message from host	ON	ON	ON	ON	3 MHz	ON	OFF

Note) 3 MHz = Main clock operation, 32 kHz = Sub clock operation

Table 4-4. Host Mode

総合結線図
OVERALL WIRING

PW1

LED BACKLIGHT

LCD PANEL

FPC

USB/RS JACK

VIDEO JACK

STROBO

08 6212 090 340 800
1AV4J11PE091G

FPC

08 6210 021 340 800
1AV4J11PD210G

4XZOOM LENS

CA1

04 6239 027 001 800
1AV4J11PL270G

CA3

CA2

08 6212 027 340 800
1AV4J11PE270G

SY1

SY-2

SM02B-SRSS-TB
1AV4J10EZ020G

BATTERY

THERMO FUZE
FS
BATT+
BATT-

CHARGE BATTERY SENSE

CONTROLL PANEL

COM1-4, SEGMENT1-24
28PIN

BUZZER

SLD

SFL-SM1-TB
1AV4J11RM090G

CMD

DC JACK

MODE SW

HARNESS

HARNESS

TB1

TB2

BTB

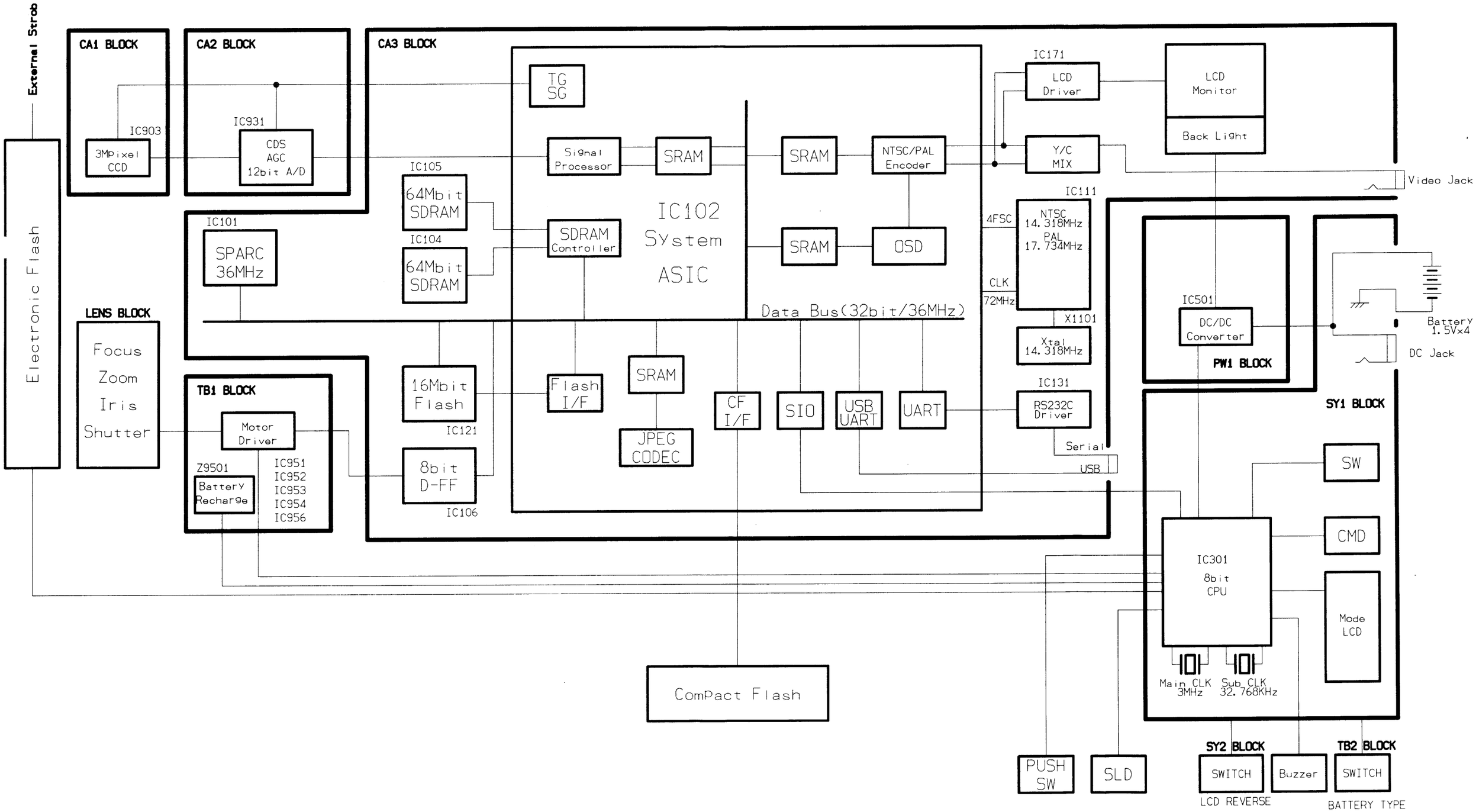
FPC

C/F CARD

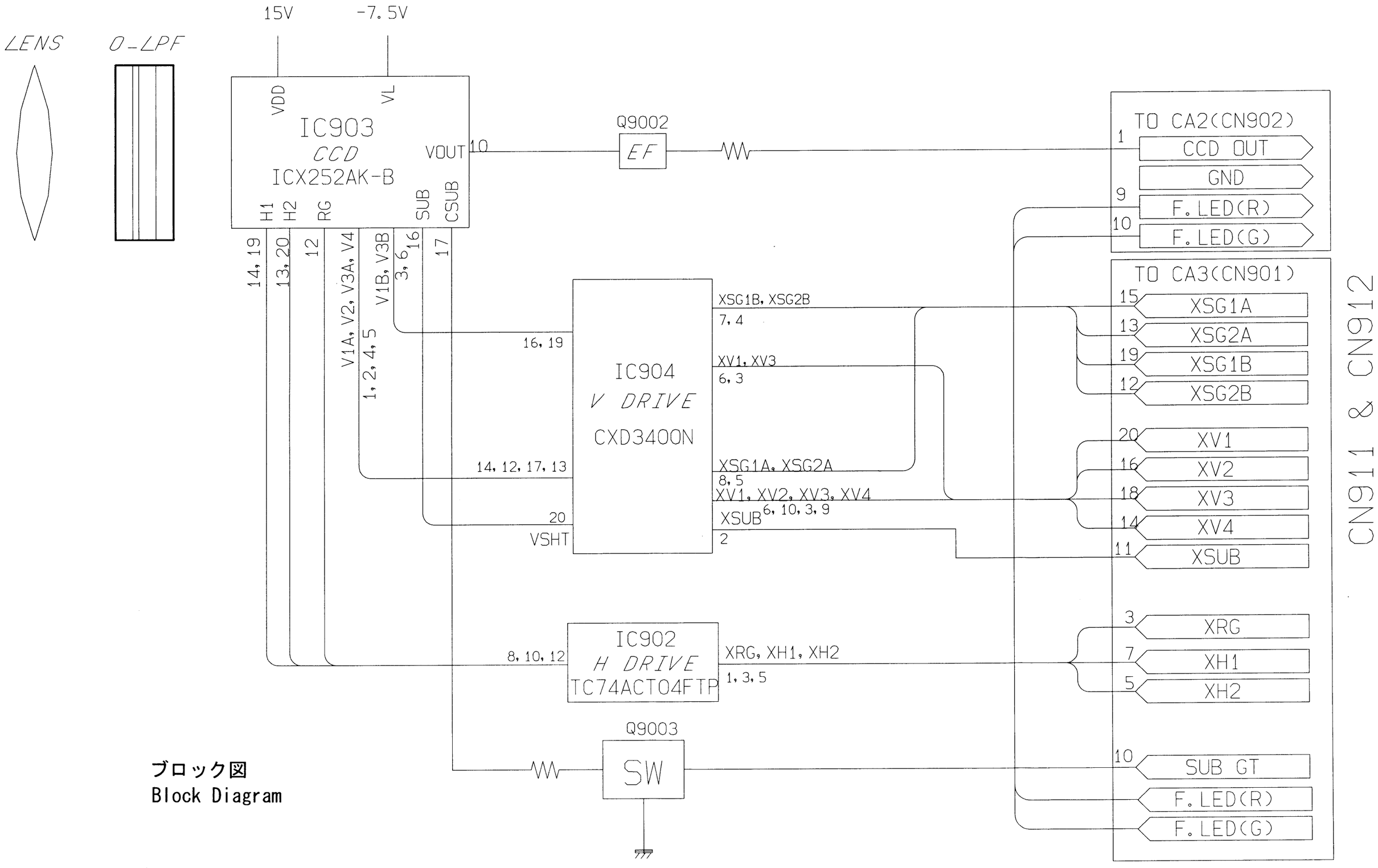
CF CARD

IDH-HA26H-SSS2-R13H

総合ブロック図
OVERALL BLOCK DIAGRAM

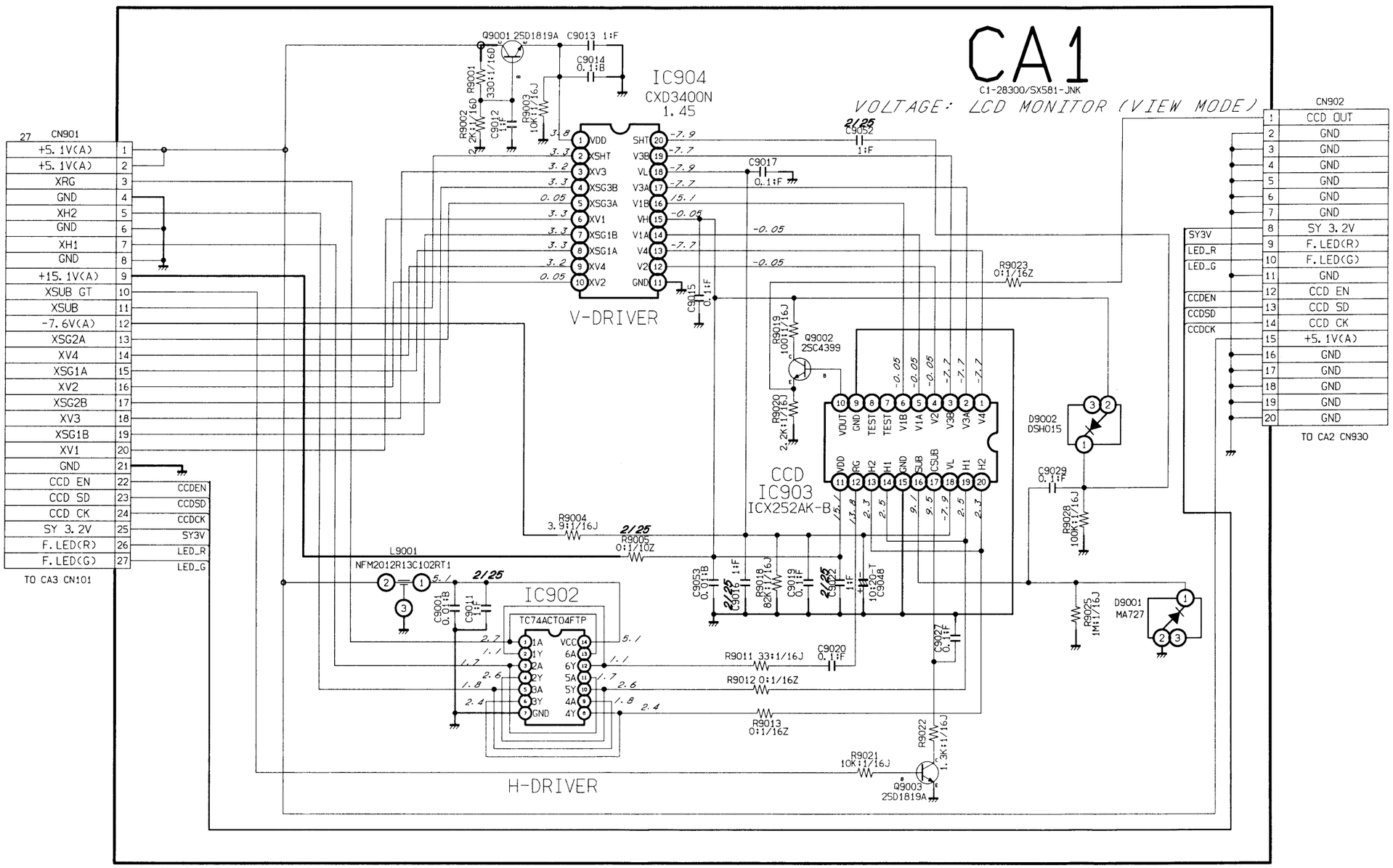


ＣＣＤ基板 (CA-1)
CCD P. C. B. (CA-1)



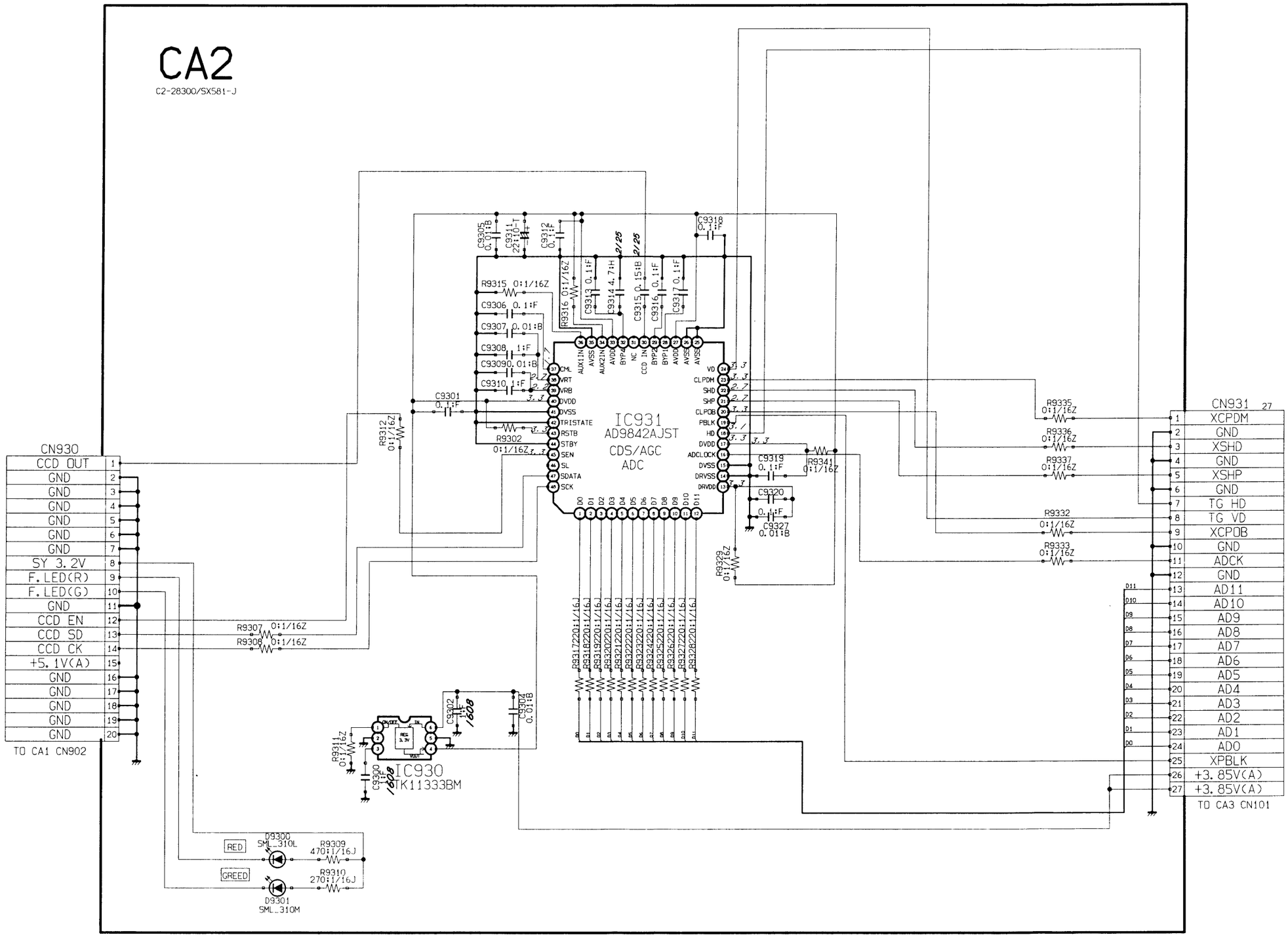
ブロック図
Block Diagram

ＣＣＤ基板 (CA-1)
CCD P. C. B. (CA-1)



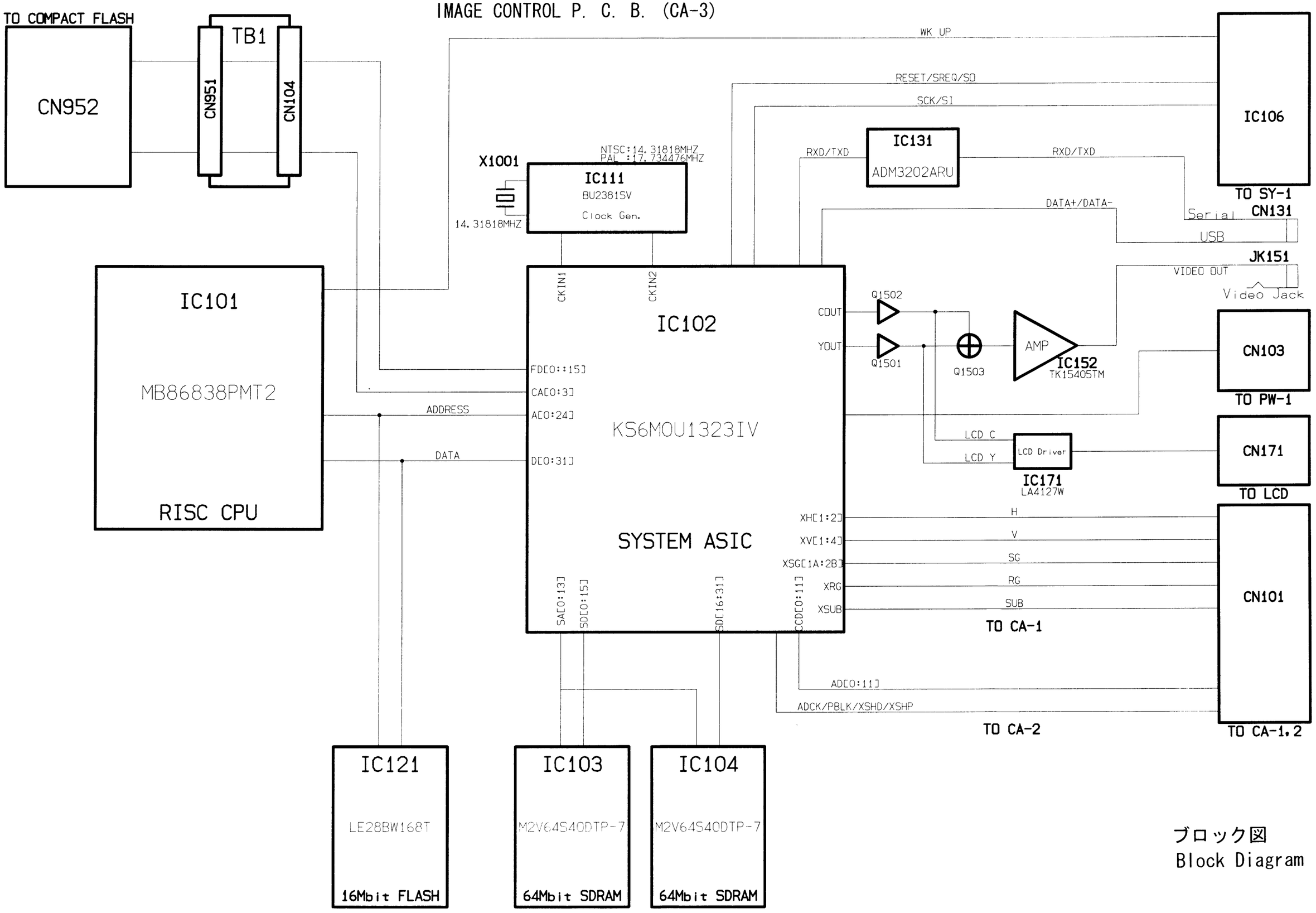
回路図
Circuit Diagram

ＣＣＤ基板 (CA-2)
CCD P. C. B. (CA-2)



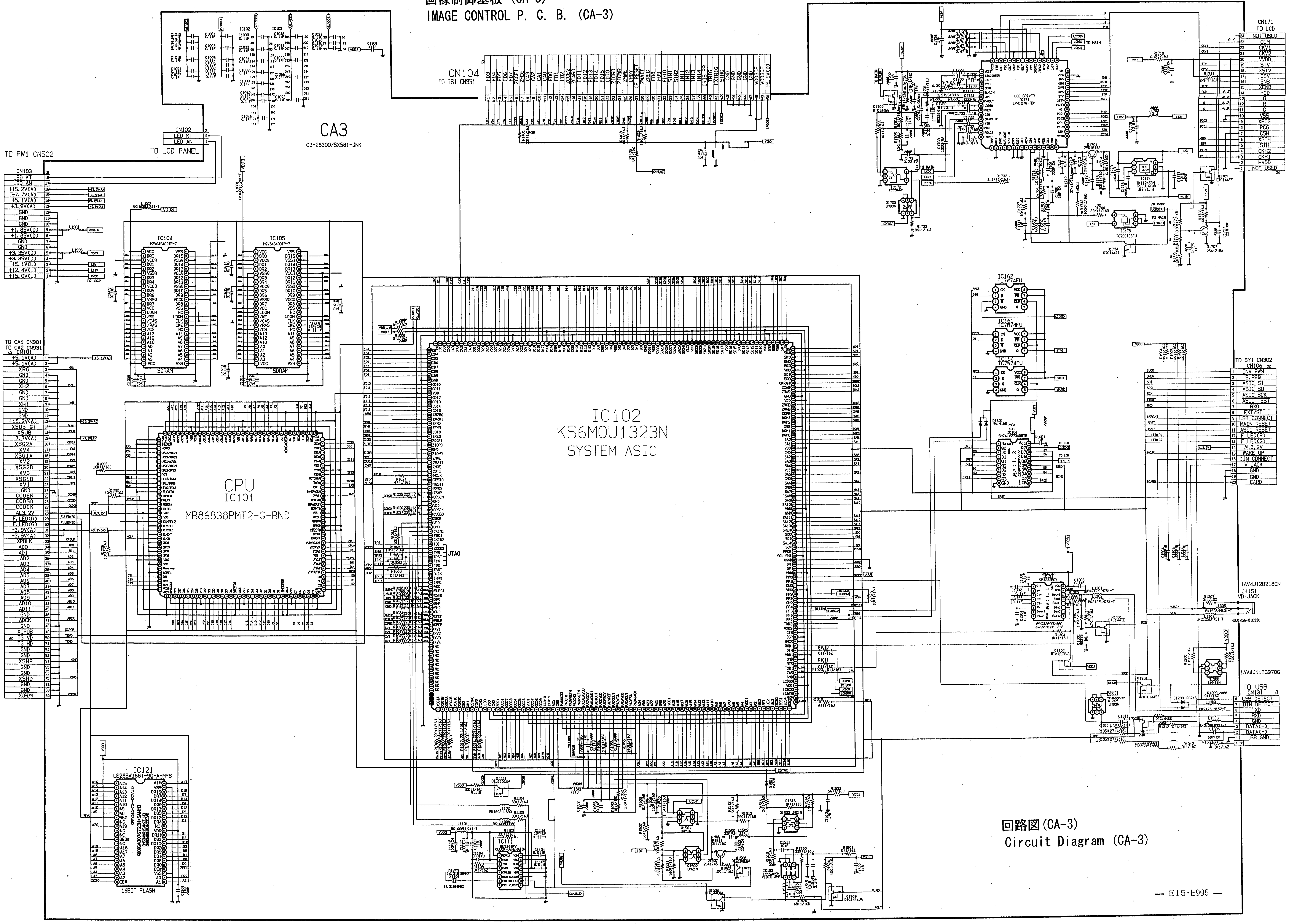
回路図
Circuit Diagram

画像制御基板 (CA-3)
IMAGE CONTROL P. C. B. (CA-3)



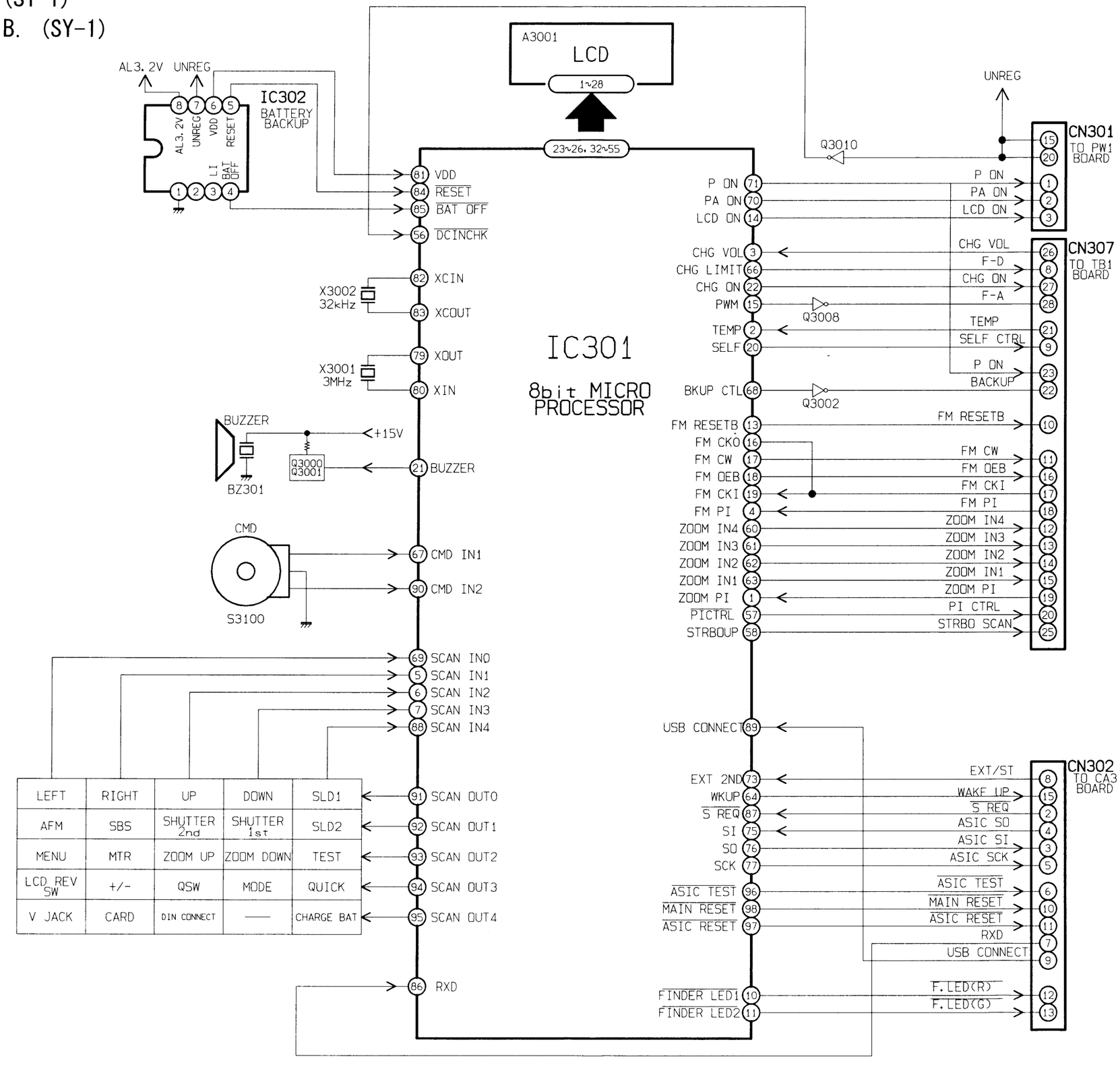
ブロック図
Block Diagram

画像制御基板 (CA-3)
IMAGE CONTROL P. C. B. (CA-3)



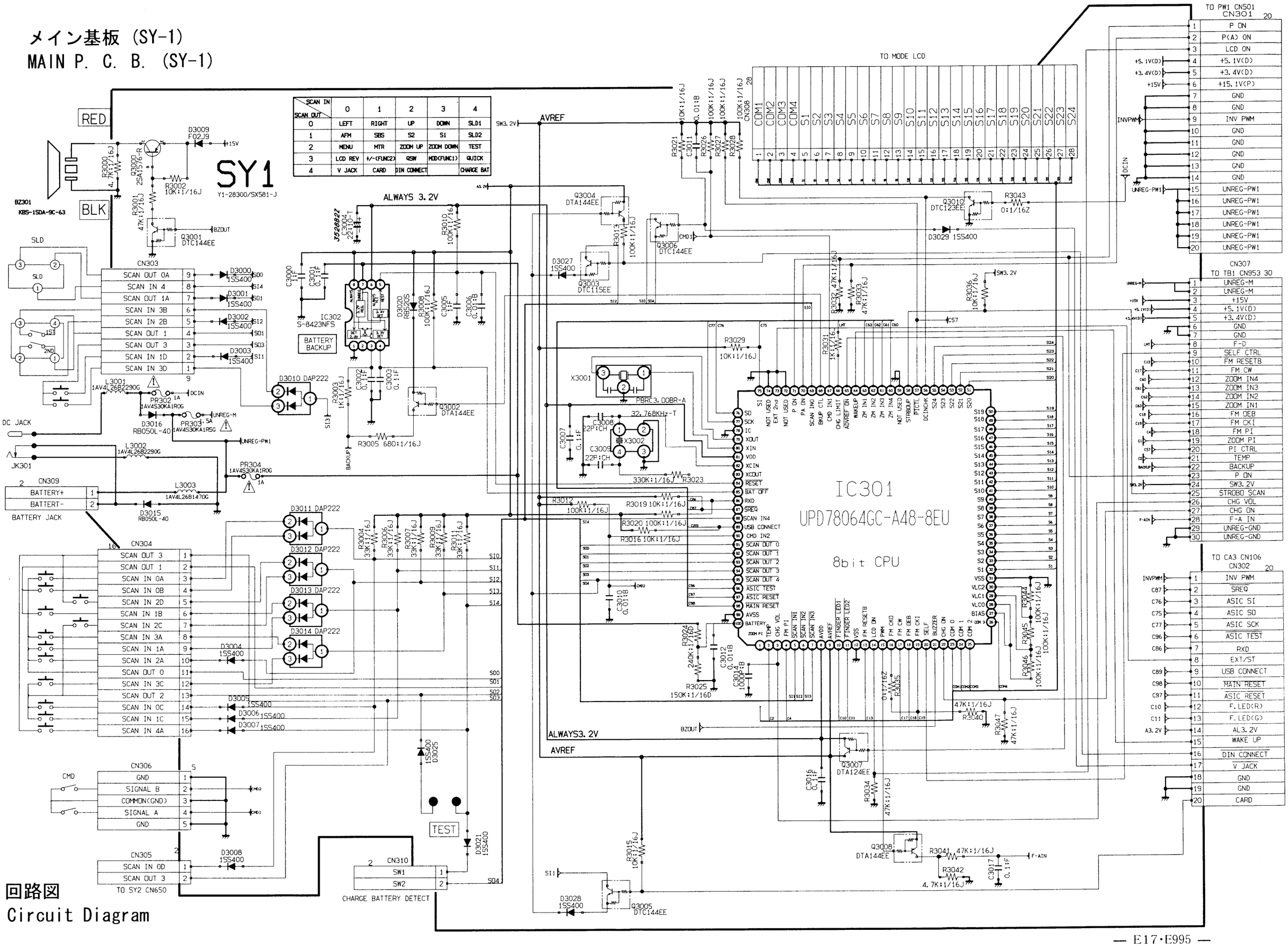
回路図 (CA-3)
Circuit Diagram (CA-3)

メイン基板 (SY-1)
MAIN P. C. B. (SY-1)



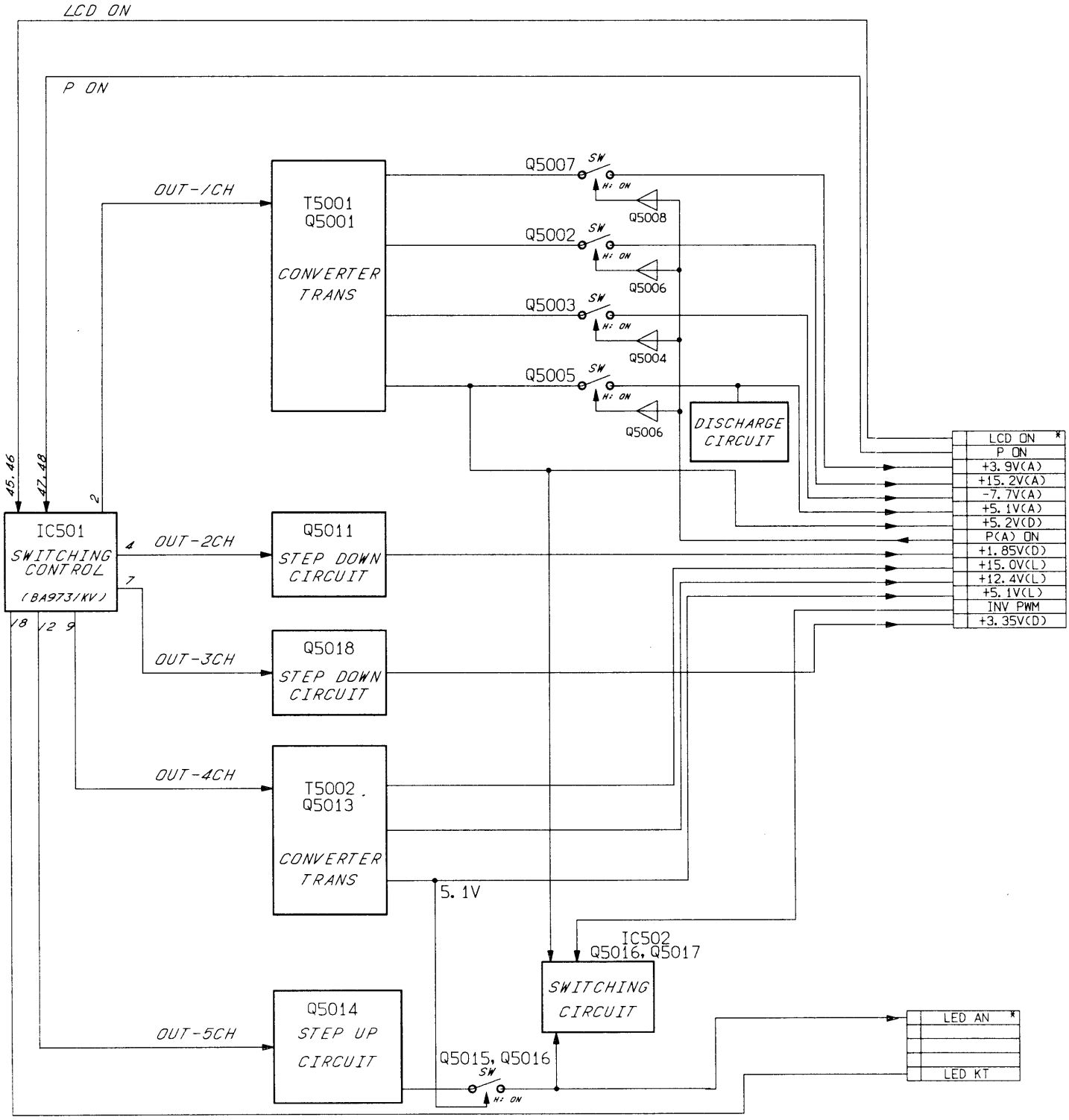
ブロック図
Block Diagram

メイン基板 (SY-1)
MAIN P. C. B. (SY-1)



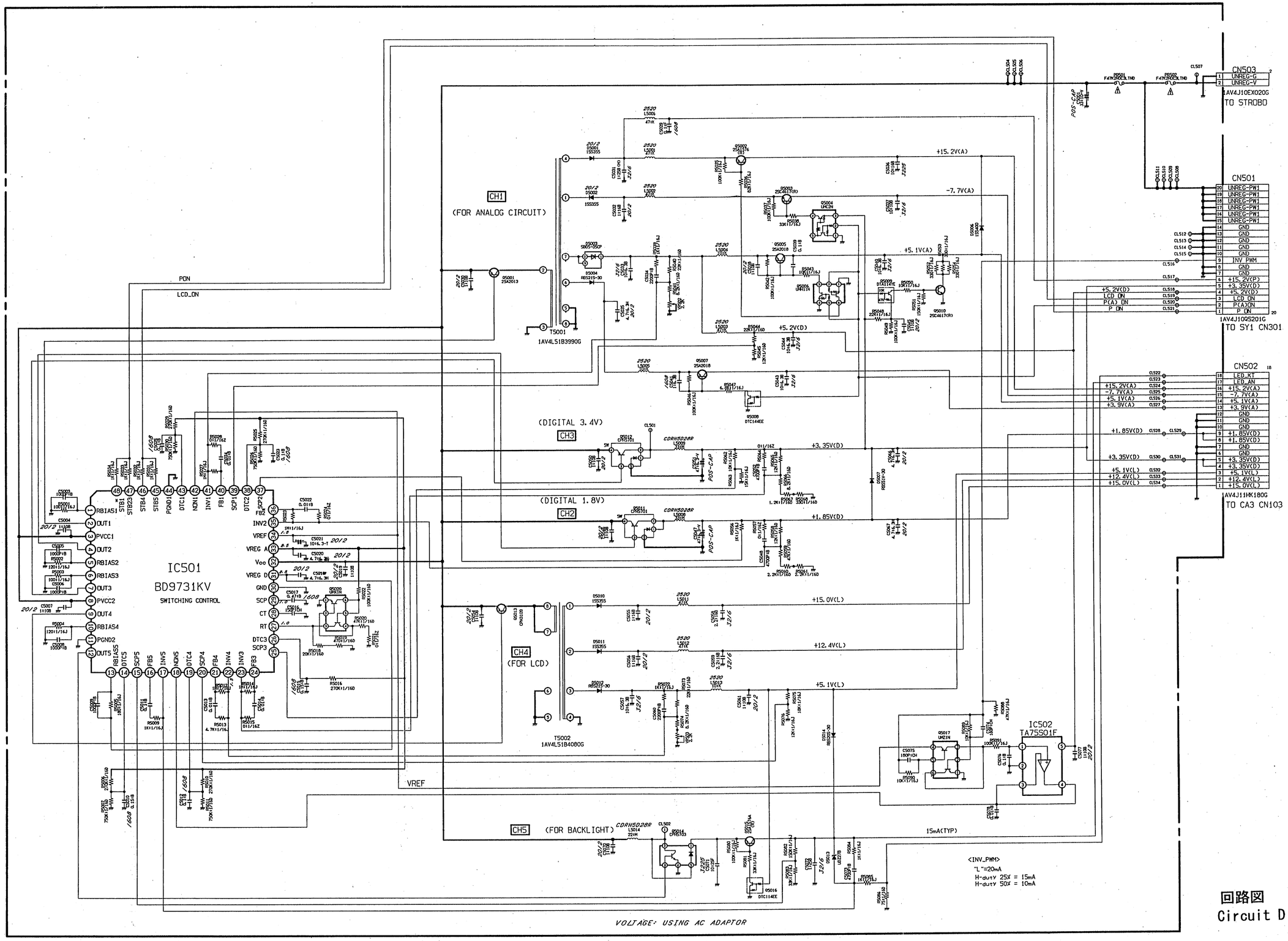
回路図
Circuit Diagram

電源回路基板 (PW-1)
POWER GENERATION P. C. B. (PW-1)



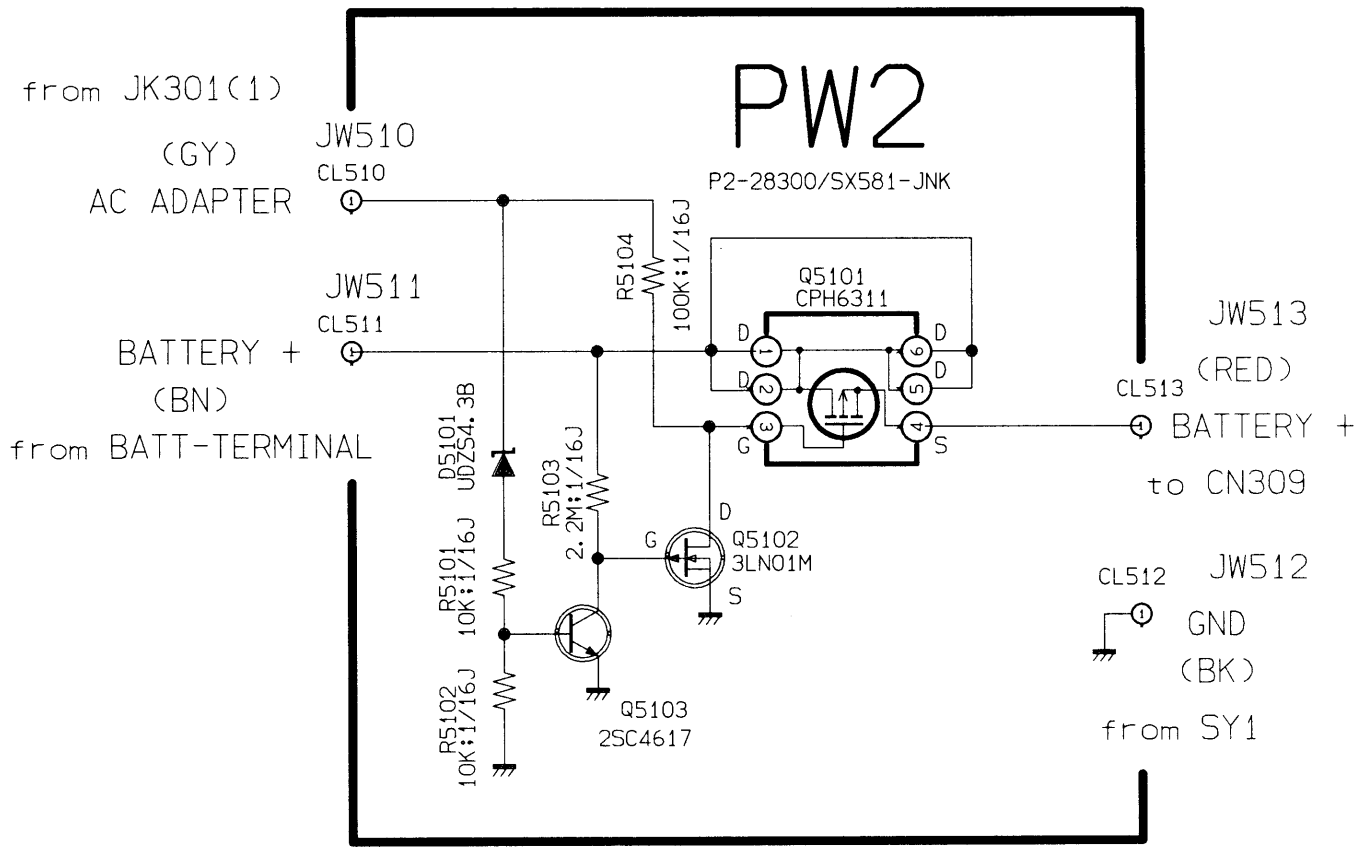
ブロック図
Block Diagram

電源回路基板 (PW-1)
POWER GENERATION P. C. B. (PW-1)



回路図
Circuit Diagram

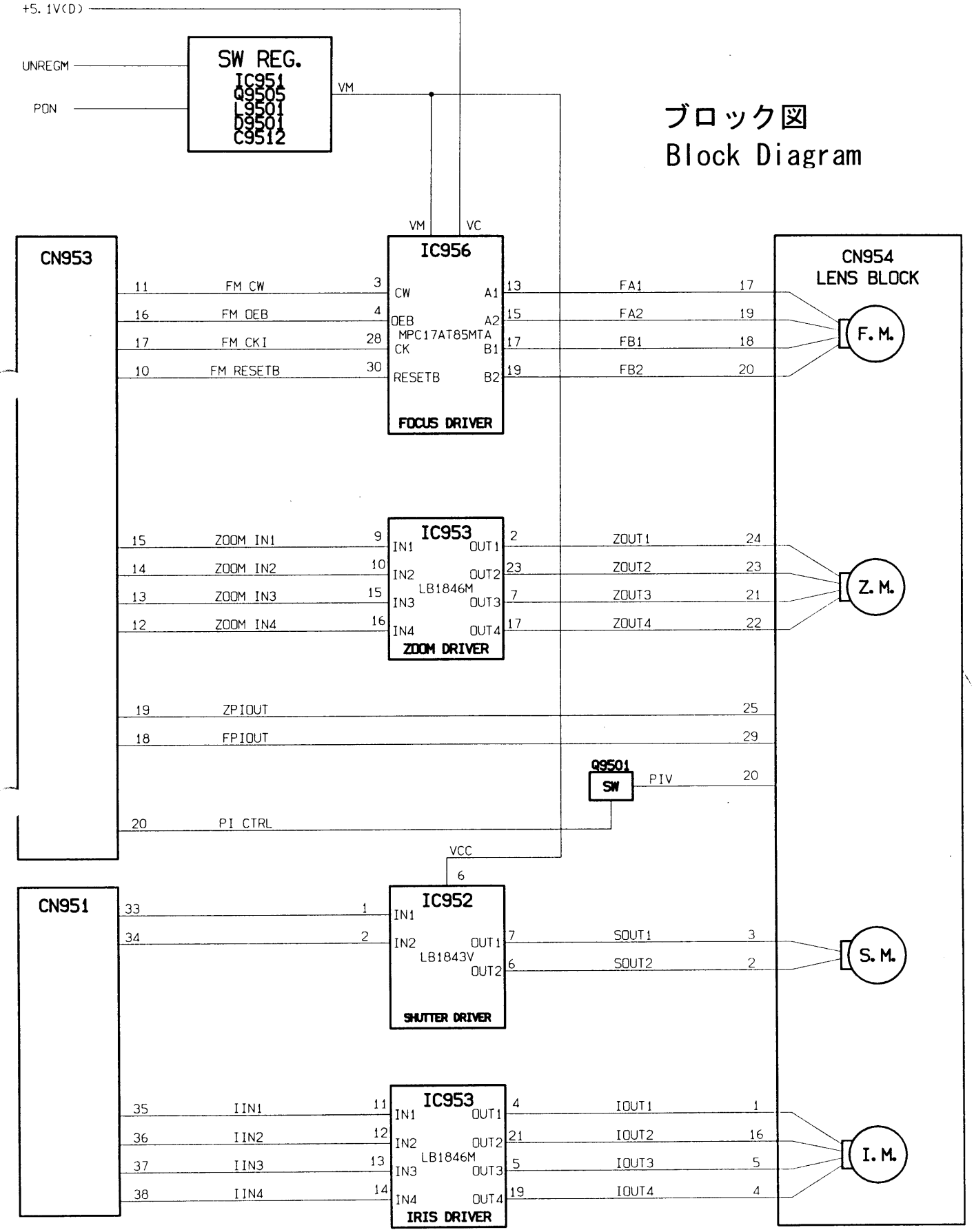
バッテリー基板 (PW-2)
BATTERY P. C. B. (PW-2)



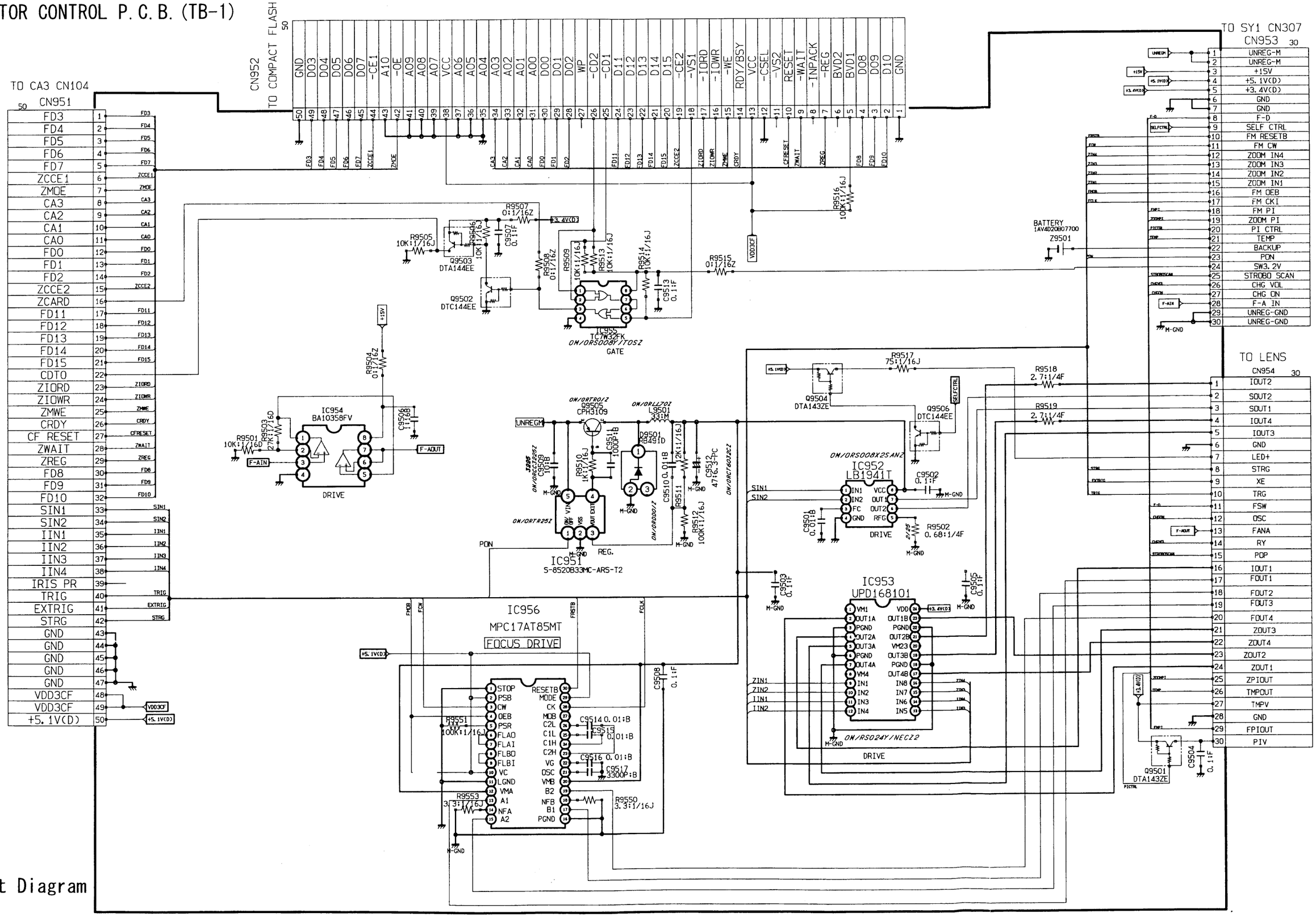
回路図
Circuit Diagram

モーター制御基板(TB-1)
MOTOR CONTROL P.C.B. (TB-1)

ブロック図
Block Diagram

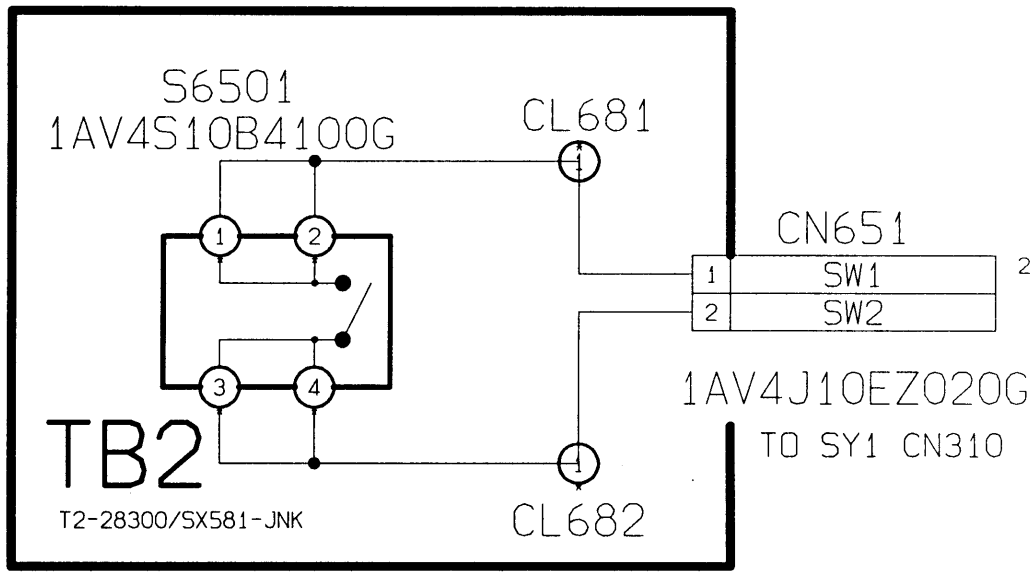


モーター制御基板(TB-1)
MOTOR CONTROL P.C.B. (TB-1)



回路図
Circuit Diagram

スイッチ基板(TB-2)
SWITCH P.C.B.(TB-2)



回路図
Circuit Diagram

VAA11301-R.3536.A

The contents of inspection standards and tools for E995

Conditions to be set and prepared for inspections

1. Physical stance to measure :

   On the applicable product, its lens shall be set flat and its monitor shall be set to vertically stand up.

2. Room temperature and constantly controlled humidity :

   25 ± 5℃ Relative humidity : 65 ± 20 %

3. Battery to be employed :

   Primary battery:

   Unless otherwise specified, use a Sanyo 2CR5 lithium battery (within four months of manufacture).

   When using various manufacturers, conduct the inspection using a Sanyo, Matsushita or Duracell 2CR5 lithium battery.

   Secondary battery:

   Use the dedicated rechargeable battery EN-EL1.

   (Use after it has been fully charged with the dedicated AC adapter EH-21.)

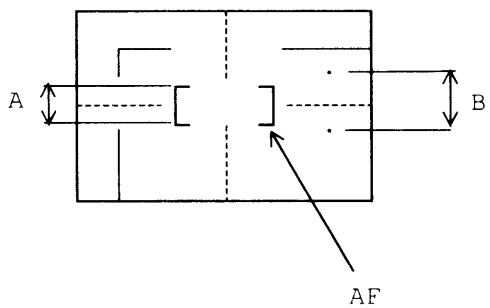
4. Standard power supply :

   Specified AC power supply EH-21 shall be required.

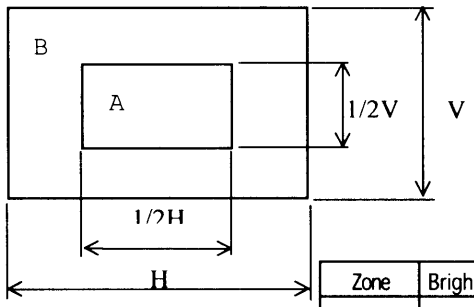
[1] Inspection standards

	Item	Benchmark	Applied tool(s)
External view	Gap/ Difference in height	- When closing the battery cover a gap between the cover and the body shall be less than 0.6 mm. -Difference in height between the body and the cover shall be less than 0.3mm. Check the condition by loading a battery and closing the cover	Vernier caliper
	External view	- Any conspicuous scratches or dirt shall not be required. Check it by naked eyes under fluorescent lamp or natural sunshine.	Visual observation
Operation-ability / Operation mode	Operational mode	- While operating, any irregularities or irregular noise shall not be required. Check it by shaking the camera while operating, or by intentionally lightly hitting the camera on to the linoleum-laid desk while operating.	Primary battery Secondary battery Visual observation
	Operate-on ability Button(s)	- While operating, any irregularities / Malfunctions shall not be required. No cave-ins of the buttons shall be required.	
	On the lever, Knob, command dial	- When clicking, normal touch shall be required. Any outstanding 'caught-in-mechanism' touch or 'rubbed-in-mechanism' touch shall not be required. Check and observe the condition through normal operation.	
	Operation touch	-While operating, any irregular conditions shall not be required.	
	Each cover	- Opening / closing each cover shall be smoothly made.	
Monitor	Shooting image	- Inclined degree of image shall be less than 0.5 degree.	Photoshop Printer
Lens capacity	Focal distance	-Wide-end position 8mm±6% -Tele-end position 32mm±6%	Dedicated tool(s)
	Open aperture F No.	-Wide-end position (Compelling ∞) F2.6 ±5% -Tele-end position (Compelling ∞) F5.1 ±9%	
AF	AF accurately	-The area which was chosen must focus	Visual observation
	Command infinite focus mode	-Both the distance view mark and the flash cancel mark shall appear on the LCD. Check it by setting to the command infinite focus mode and light pressing the shutter release button. -The speed light shall not work. Check it by releasing the shutter in the command Infinite focus mode.	

	Item	Benchmark	Applied tool(s)
AF	LED blinking for impossibility in metering	-The LED shall blink in 8 Hz after lightly pressing the shutter release button. Check it by lightly pressing the shutter release button.	Visual observation
Shooting with a speed light	Guide No. (ISO100 · m)	FULL - 10.0±0.7EV After charging for 10 sec. by a fully charged fresh battery, measure the guide No. within1 sec.	Flash meter, Full charged fresh battery, Visual Observation
	Red-eye reduction lamp	-Except the self-timer blinking, it shall not be turned on for any other functions / modes. While changing the mode, check that the lamp does not work.	
	Recycle time	The recycle time shall be within 8 sec.	
	The shutter unable to release	-While lightly pressing the shutter release button, the red LED shall blink. Then, the shutter shall not be released. Unless it is in flashing mode, or the charged condition is not enough, LED blinking mode and shutter release lock can not work.	
	Flash	-In response to any button operations for some functions, light impact from outside, or shutter release, unexpected flashing shall not be required.	
Quality of image	Resolution	-The solution shall be in compliance with the following values. -Horizontal center : 1000lines Vertical center : 1000lines Horizontal line(s) at each corner : 700lines Vertical line(s) at each corner : 700lines In the setting conditions of 'Fine as the quality of image', 'Manual white balance under the fluorescent light', 'Center weighted metering / Open aperture', '0.5 m of a distance from the chart' and equipping the 5100K viewer , a subject shall be taken in the full range of angle of view. Then, its recorded image data file shall be opened by the dedicated software Photoshop, and its solution level shall be Judged by observing.	EIAJ chart 5100K viewer Photoshop
	Incorrect centering of image	-When taking a fisheye shot, confirm that a range of 183 degrees is attained, and that the circle is free of vignetting.	

<table>
<tr><th></th><th>Item</th><th colspan="5">Benchmark</th><th>Applied tool(s)</th></tr>
<tr><td rowspan="2">Quality of image</td><td rowspan="2"></td><td colspan="5"><table>
<tr><td></td><td>R</td><td>G</td><td>B</td></tr>
<tr><td>W</td><td>170-210</td><td>170-210</td><td>170-210</td></tr>
<tr><td>Ye</td><td>170-210</td><td>170-200</td><td>80±15</td></tr>
<tr><td>R</td><td>180-200</td><td>0-10</td><td>0-5</td></tr>
</table></td><td rowspan="2">EIAJ chart
5100K viewer
Photoshop</td></tr>
<tr><td colspan="5">-Set the conditions of 'Fine as the quality of image', 'Manual white balance under the fluorescent light' ,and 'Center-weighted metering', P mode, ISO100.
-Equip the chart with the 5100K viewer and take a subject in the full range of angle of view.
Then, open the recorded image data file through the dedicated software Photoshop.
Using the Marquee tool (M), pick up the image's central area 64 x 64 picture element, and read the histogram's RGB.</td></tr>
<tr><td rowspan="2">Finder</td><td>Operation mode</td><td colspan="5">- Only smooth operation mode shall be required.
'Caught-in-mechanism' touch or any unstable or unsteadily zooming mode shall not be required.</td><td rowspan="2">Visual observation</td></tr>
<tr><td>Dust, Fluff, Scratch(es)</td><td colspan="5">1.The dust, fluff and scratch that exceed the width of the line are not good.
2.The dust, fluff and scratch that can be recognized in the AF metering zone [ ] are not good.
3.For the dust, fluff and scratch which are less than 1/2 of width of the line, the gathered ones and conspicuous ones are not good and they should be the following regulation.
• Up to 2 pieces in each block
• If they are neighboring in each block, they should be apart more than A of the AF metering mark [ ].
4.For the dust, fluff and scratch that are more than the 1/2 width of the line and up to the width of the line should be the following regulation.
• Up to 1 piece in each block
• If they are neighboring in each block, they should be apart more than A of the AF metering mark [ ]. (Should be B≧A in Figure below)
5.The total numbers of the dust, fluff and scratch 4 pieces
 
</td></tr>
</table>

<table>
<tr><th></th><th>Item</th><th>Benchmark</th><th>Applied tool(s)</th></tr>
<tr><td>LCD
and others</td><td>Monitor LCD</td><td>External view
-No vignetting or shading on the LCD shall be required.
-Inclination between the monitor and the monitor frame shall not be so outstanding.
Field of view
-Through-the-monitor image :96 to 100 %
-Play-back image : 98 to 100 %

Bright pixels or dim pixels on LCD
 

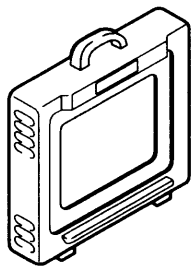
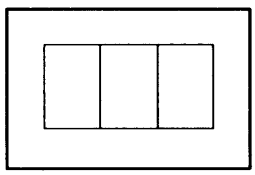
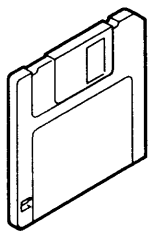
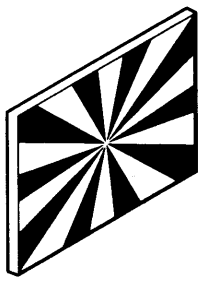
<table>
<tr><th>Zone</th><th>Bright pixel</th><th>Dim pixel</th></tr>
<tr><td>A</td><td>1</td><td>6</td></tr>
<tr><td>B</td><td>3</td><td>6</td></tr>
<tr><td>Total</td><td>3</td><td>6</td></tr>
</table>
Bright pixels:Visible normally throught 5% ND filter
Dim pixels: Visible normally</td><td>Visual observation</td></tr>
<tr><td></td><td>Self-timer;
Working period
Light blinking,
Cancel of the self-timer</td><td>-10 ± 3 sec. / 3 ± 1 sec.
-Blinking for 9 sec. and then lighting for 1 sec.
-Blinking for 3 sec. and then lighting for 1 sec.
- Prior to releasing the shutter :
By turning off either the AF switchover switch or the select dial, the self-timer can be cancelled.
- After releasing the shutter :
By turning off the select dial, it can be cancelled.
Be sure to check the turn-off condition after canceling it.</td><td>Visual Observation
Stop watch</td></tr>
<tr><td>Electrical Characters-tics</td><td>For consumption current;
Stand-by</td><td>Stand-by
- Less than 0.15 mA while turning off the main powerswitch.
Less than 0.3 mA while sleeping.
Supply 6.0V from the regulated voltage power supply to the camera, and measure the consumption current value after 12 hours from the time of supplied.

Start-up
- Select 'A-REC' from the select dial and check that any image appears on the LCD.
Then, leave it for 15 sec. or a bit longer and then measure the consumption current value.
The value shall be less than 1A.</td><td></td></tr>
</table>

	Item	Benchmark	Applied tool(s)
Visual observation	For battery-check voltage	Level 1(Half battery mark) -4.9 ± 0.2 V(Primary battery) -7.4 ± 0.2 V(Secondary battery) While lowering the power supply voltage, lightly press the shutter release button. Then, when the battery mark appears on the LCD, measure the voltage. Level 2(The battery mark blinks) -4.0 ± 0.25 V (Primary battery) -6.7 ± 0.25 V(Secondary battery) While lowering the power supply voltage, lightly press the shutter release button. Then, when the battery mark appears on the LCD, measure the voltage. Level 3(The LCD is turned off / The shutter release mode is locked) -3.8 ± 0.2 V (Primary battery) -6.3 ± 0.2 V(Secondary battery) While lowering the power supply voltage, lightly press the shutter release button. Then, when the LCD is turned off, measure the voltage	Standard power supply Ammeter

6．工具一覧表　Tool List

※：新規工具
※：New tool

工具番号 Tool No.	名　称 Name	略　図 Illustration	備　考 Remarks
J63070 (100-240Volts)	カラービューアー　5100K Colour Viwer　5100K		E900,E910 E900,E950 E700,E800 E990,E880 共通 Common
J63056	色調整用チャート Chart for Colour Adjustment		E900,E910 E900,E950 E700,E800 E990,E880 E995 共通 Common
J65042	キャリブレーションソフト Calibration Software		※ E995 ※ Exclusive
サービスマニュアル添付 Attached in Service Manual	ジーメンスチャート Siemens chart		E900,E910 E900,E950 E700,E800 E990,E880 E995 共通 Common

VAA11301-R.3536.A