VAA11251-R.3514.A

作成承認印	配布許可印
ニコンカンパニー CS推進部 GM	サービス計画部 M

COOLPIX 880

VAA11251(JP.E)
VAA11202(U.E)

REPAIR MANUAL

Nikon | NIKON CORPORATION
Tokyo, Japan

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Table of Contents

Specifications

1. Overview of specifications

1) Imaging device · Total number of pixels: Approx. 3.34 million
· Number of active pixels: Approx. 3.2 million
· Number of recording pixels: Approx. 3.145 million pixels (2048 x 1536)
· 1/1.8-inch interline CCD, complementary color mosaic sequential array filter

2) Imaging lens: 2.5X zoom, f = 8.0 to 20.0 mm (with 35 mm conversion: 38 to 95 mm), F2.8 to F4.2
Imaging range: From 40 cm in front of lens to infinity
macro mode, speed mode, manual focus

3) Optical viewfinder: Real image optical viewfinder
Field ratio: 82 to 85%, Magnification ratio: 0.4 to 0.9
Viewing angle adjustment: none

4) LCD monitor panel: 1.8-inch low temperature poly-silicon TFT
110,000 pixels, brightness adjustment function (5 levels),
field ratio: approx. 97% for through and freeze images and approx. 100% for reproduced images

5) Shutter: Uses both mechanical shutter and CCD electronic shutter
P mode: 1 to 1/1000 sec, A mode: 8 to 1/1000 sec, M mode: 8 to 1/1000 sec, bulb

6) Iris: blade iris diaphragm by stepping motor, Control level: 2EV
W:F2.8, F7.8 T: F4.2, F11.3

7) Brightness: Approx. ISO100
Sensitivity settings (200, 400, AUTO), auto gain-up function,
Multi-photometry (256 windows, used for imaging pixels)

8) Metering: Multi-photometry, central-weighted balance photometry, spot photometry, AF spot

9) Metering mode :Correspond to that matches the Spot Metering area automatically to selected focus area

10) Movable exposure area: EV-2 to 15.5 (W), EV-0.8 to 16.7 (T) (ISO100 conversion)

11) Exposure control : Shutter, iris-based program AE, program shift manual exposure mode, iris priority mode, shutter priority mode, AE lock Exposure correction (-2 to +2EV, in 1/3EV steps), fixed exposure, bracketing

12) Internal flash: Flash shooting distance ranges :0.4～3.7m (W) 0.4～2.5m (T), includes red eye reduction function using a pre-flash, IGBT-based serial control system (movable macro area), auto, red eye reduction, obligatory flash, flash prevention, slow synchronous, external strobe-based lighting function (allows independent flash of external strobe), illumination level correction (-2 to +2 EV, in 1/3 EV steps)

13) White balance: TTL auto-tracking, 5 level manual (allows fine adjustment) Preset white balance function

14) While half-press timer is on: 30 seconds (can be set using a menu: 1 minute, 5 minutes, or 20 minutes)

15) Auto focus: Contrast AF, multi-point (5 points), capable of AF (area selectable)

16) Focus mode: Continuous AF (when imaging using an LCD monitor) Single mode AF (when imaging without using an LCD monitor, menu setting), Manual focus (48 points)

17) Imaging mode: Full auto, custom setting (set using a menu), single shot, continuous shot, rapid shot, multi-shot , UH continuous shot (QVGA, 30 frames/sec, 80 photos), motion image (QVGA, 15 frames/sec, 40 sec), level correction (AUTO, standard, contrast high/low, bright/dark, monochrome), edge enhancement setting (AUTO, high, standard, low, OFF), electronic zoom (max. 4X)

18) Recording mode: Recording size: Full (2048x1536), XGA (1024x768), VGA (640x480), Compression ratio: Fine: 1/4, Normal: 1/8, Basic: 1/16, HI: Uncompressed mode (TIFF-RGB)

19) Recording media: Compact flash card, Type 1

20) Recording format: Conforms to JPEG standard (EXIF 2.1 DCF) Quick Time Motion JPEG (moving image)

21) Number of recordable images

	Fine	Normal	Basic
8MB	Approx. 5	Approx. 10	Approx. 19

22) Control buttons and switches: Power switch, release switch, mode dial, strobe button, focus mode button, monitor button, menu button, exposure correction button, Cross-key button,zoom buttom,

23) Select dial: AUTO, SCENE, P(program), A(aperture priority), M(manual), CSM(custom), PLAY,SETUP

24) Reproduction functions: 1 frame reproduction, thumbnail reproduction (4,9 windows), slide shows, protect function, undisplay function, reproduction zoom (up to 4X, any location can be displayed), imaging information display, imaging detailed information display, highlight, histogram, peaking

25) Deletion function: Delete all frames, delete specified frame, delete folder, includes protect function

26) Interface: Serial interface (Win: 115 kbps, Mac: 230 kbps)
USB interface (12 Mbps, approx. 2Mbps efficiency)
Video output (NTSC/PAL menu select)

27) Display LCD monitor:: Electronic viewfinder display, reproduction display, menu settings for imaging and reproduction modes
Monochrome LCD: Imaging mode display, recording mode display
Viewfinder LED: Focus status display, speed light status display

28) I/O jacks: External power input jack, video output jack, and digital output jack (used for both USB and serial lines)

29) Battery:Four: Optional Rechargeable Li-ion Battery
Li-ion Battery 2CR5

30) Battery life
Optional Rechargeable Li-ion Battery :Approx. 90 min (when using LCD monitor)
Li-ion Battery 2CR5 :Approx. 110 min (when using LCD monitor)

31) Size: 99.5(W) x 75 (H) x 53.2 (D) mm

32) Weight: 275g (batteries sold separately)

33) Operational temperature range: 0 °C to 40 °C

2. Disassembly/Assembly

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.

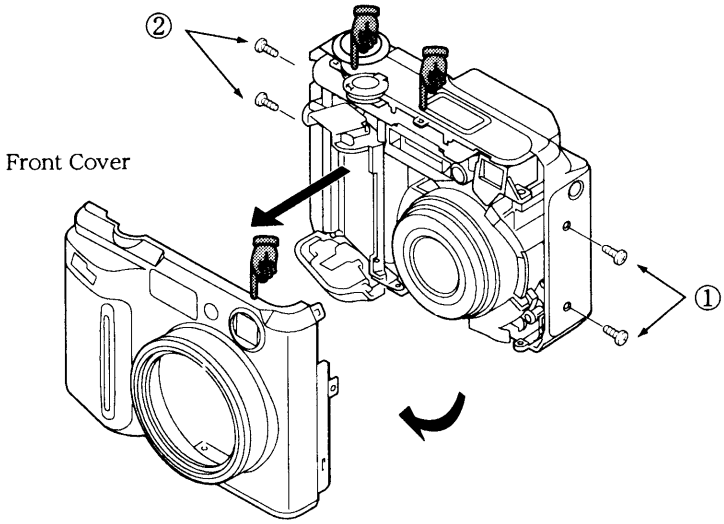
Types of used screws

The screws are expressed with the designation in the table below in Disassembly, Assembly of the Repair Manual and the illustrations and the sentences.

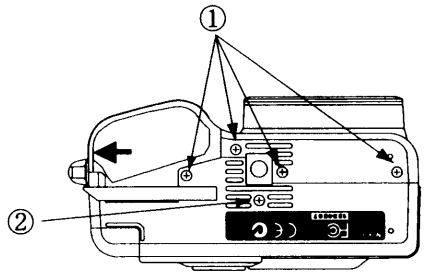
The color of the external appearance screws is different depending on the color of the body.

Designation	Size (mm)	Type	Body color	Color	Parts number
①	1.7 × 4.0	Tap	Silver	White	411-177-4102
	1.7 × 4.0	Tap	Black	Black	411-178-9403
②	1.7 × 3.0	Fine thread	Silver	White	411-175-5705
	1.7 × 3.0	Fine thread	Black	Black	411-180-2706
③	1.7 × 4.0	Tap	Community	Yellow	411-181-2903
④	1.7 × 2.0	Fine thread	Community	Black	411-180-0405
⑤	1.7 × 3.0	Tap	Community	Black	411-178-8901
⑥	1.7 × 6.0	Tap	Community	Yellow	411-169-9603
⑦	1.7 × 2.5	Fine thread	Community	Yellow	411-179-7408
⑧	1.7 × 3.5	Tap	Community	Black	AQJ1234-3

1. Front Cover

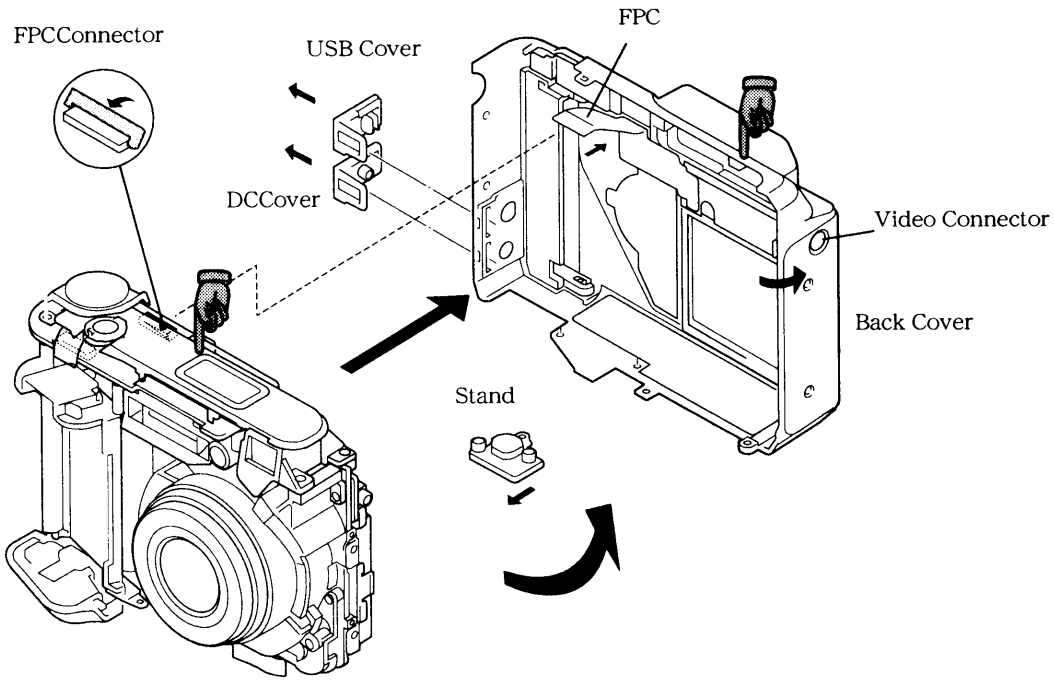


Screw position at the bottom



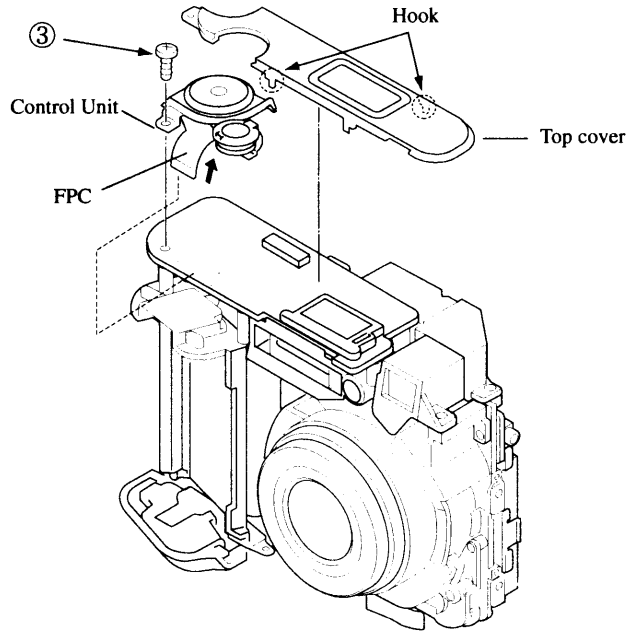
- Remove screw ①× 6.
- Remove screw ②× 3.
- Open the battery cover.
- Insert the finger tip into the arrow mark section in Figure above and remove the hinge by opening.
- Lift up the front cover by setting up from the bottom side.
- Remove the hook as pushing the section shown in the diagram with your finger, and then remove the front cover.

2. Back Cover



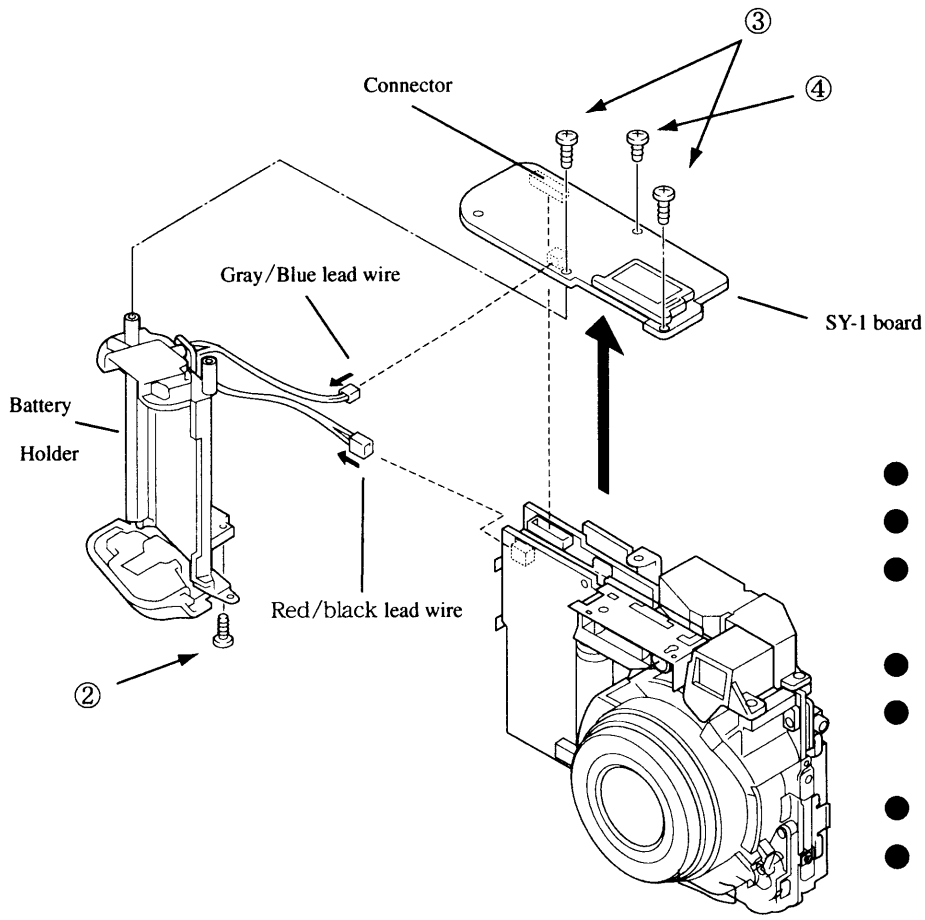
- Remove the USB cover, DC cover and Stand .
- Open the card-slot cover. Press the eject button.
- Remove the hook as pushing the section shown in the diagram with your finger, and then remove the Backcover.
- Disconnect the FPC connector.

3. Top Cover / Control Unit



- Remove the hooks , and then remove the Top cover.
- Disconnect the FPC connector.
- Remove the Control Unit.

4. SY-1 / Battery Holder

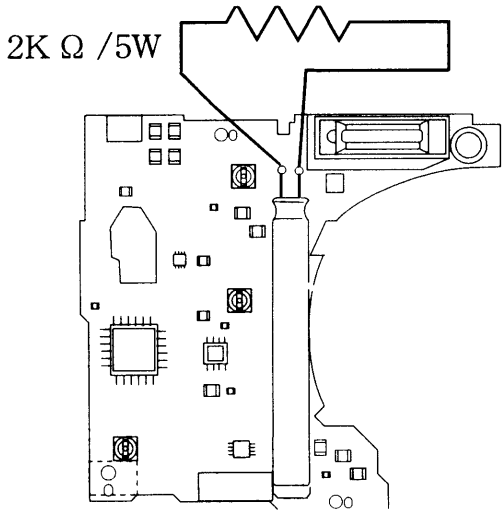


- Remove screw ③× 2.
- Remove screw ④× 1.
- Disconnect the gray/blue lead wire connector.
- Remove the SY-1 board.
- Disconnect the red/black lead wire connector.
- Remove screw ②× 1.
- Remove the Battery holder.

5. Discharging the Main Capacitor

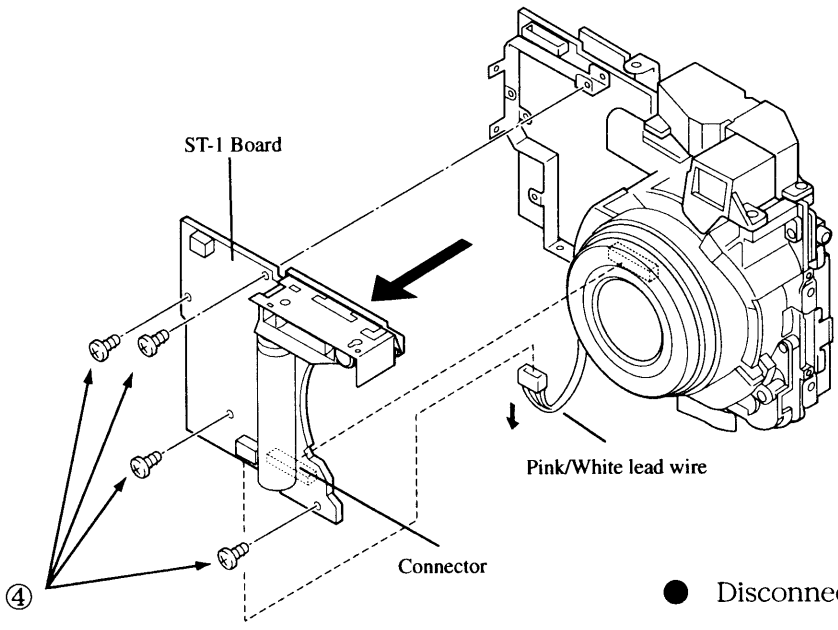
⚠ WARNING

- **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.**



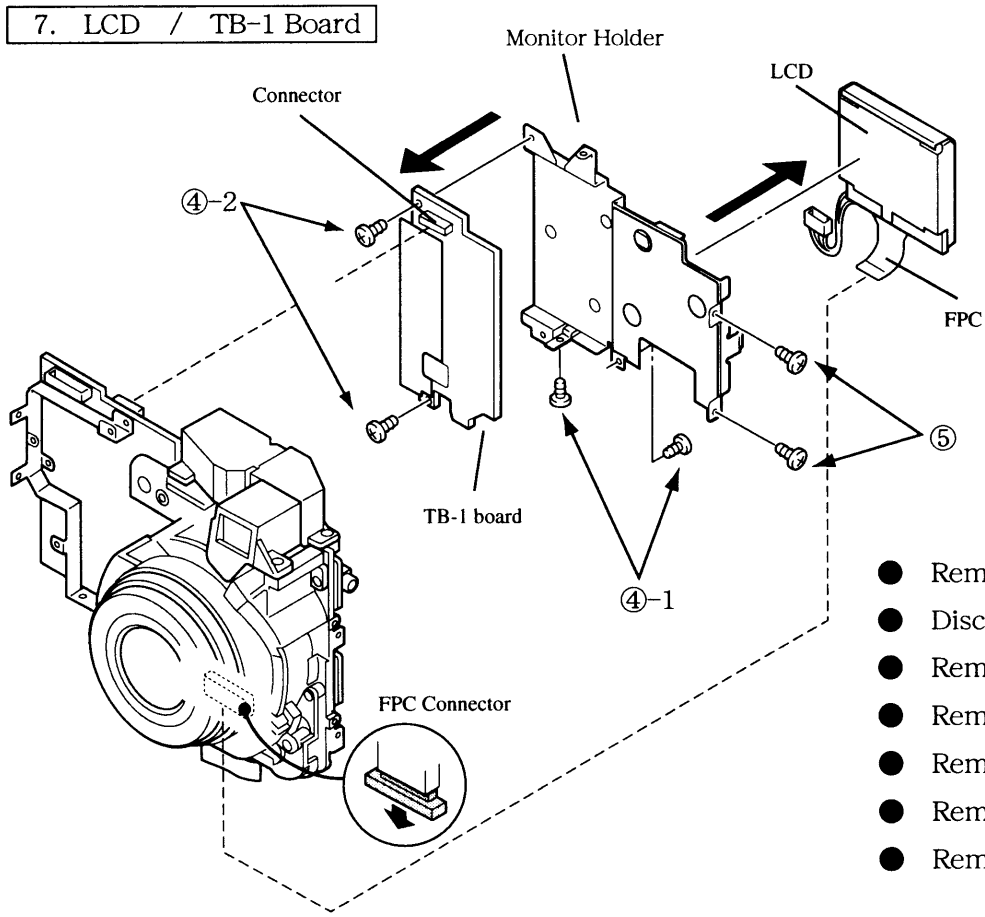
- Be certain to discharge the main capacitor located as shown in the diagram.

6. ST-1 Board



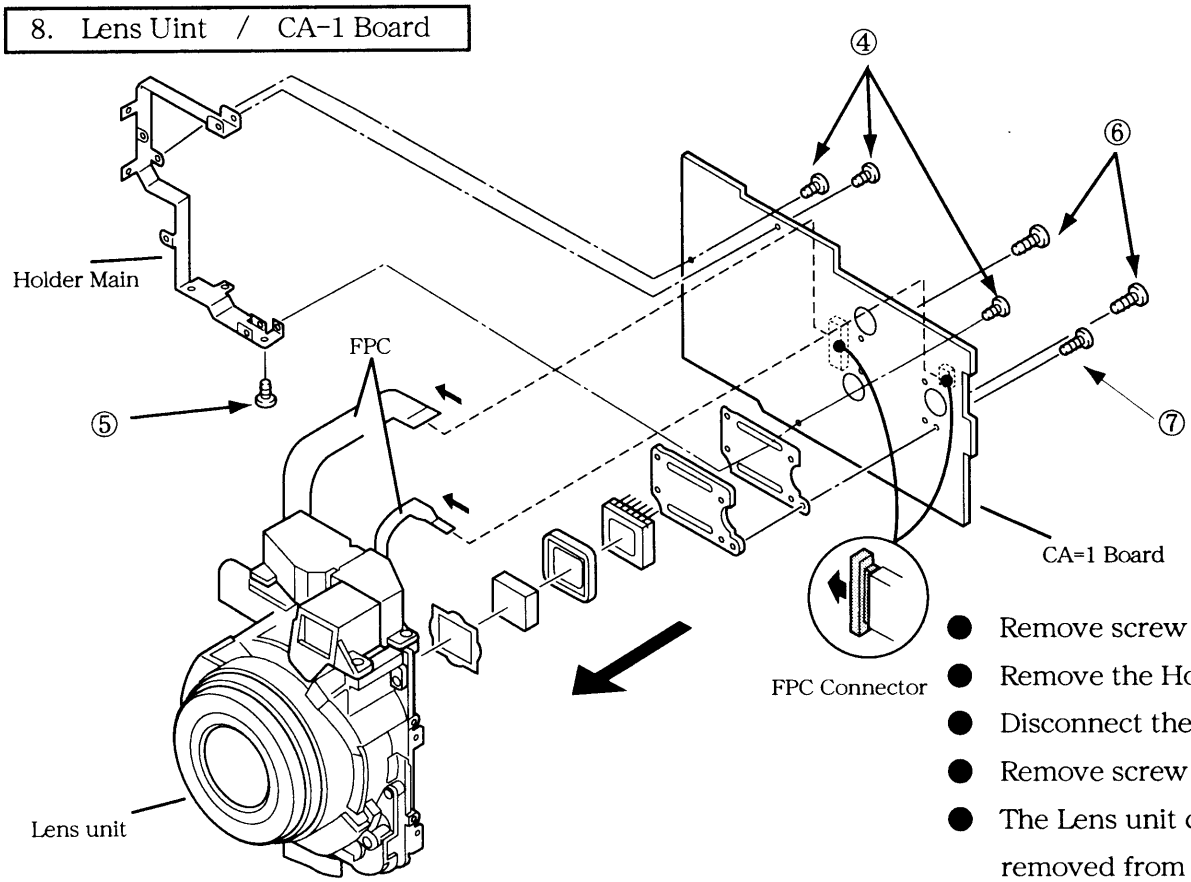
- Disconnect the pink/white lead wire connector.
- Remove screw ④× 4.
- Remove the ST-1board.

7. LCD / TB-1 Board



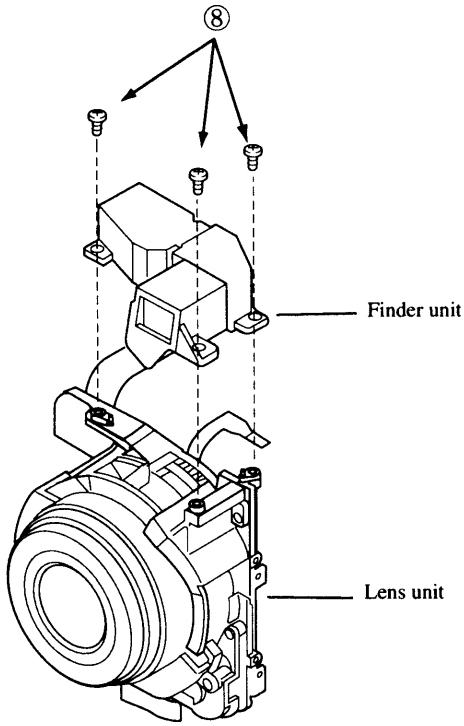
- Remove the LCD slowly.
- Disconnect the FPC connector.
- Remove screw ④-1 × 2.
- Remove screw ⑤× 2.
- Remove the Monitor holder.
- Remove screw ④-2 × 2.
- Remove the TB-1 board.

8. Lens Uint / CA-1 Board



- Remove screw ⑤× 1, ④× 3.
- Remove the Holder Main.
- Disconnect the FPC connector.
- Remove screw ⑥ 2.
- The Lens unit can now be removed from the CA-1 board.
- Remove screw ⑦× 1.
- The CCD unit can now be removed.

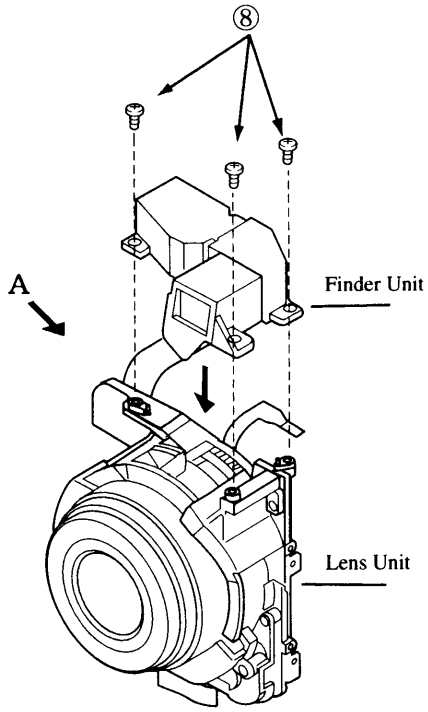
9. Lens Unit / Finder Unit

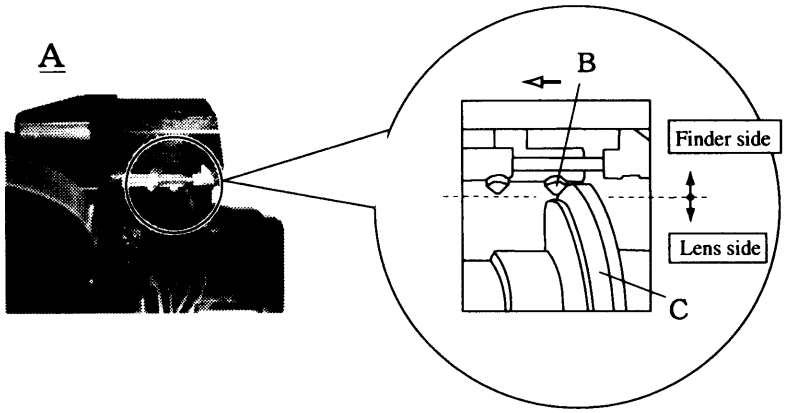


- Remove screw ⑧× 3.
- The Finder unit can now be removed from the Lens unit.

Reassembly Procedure

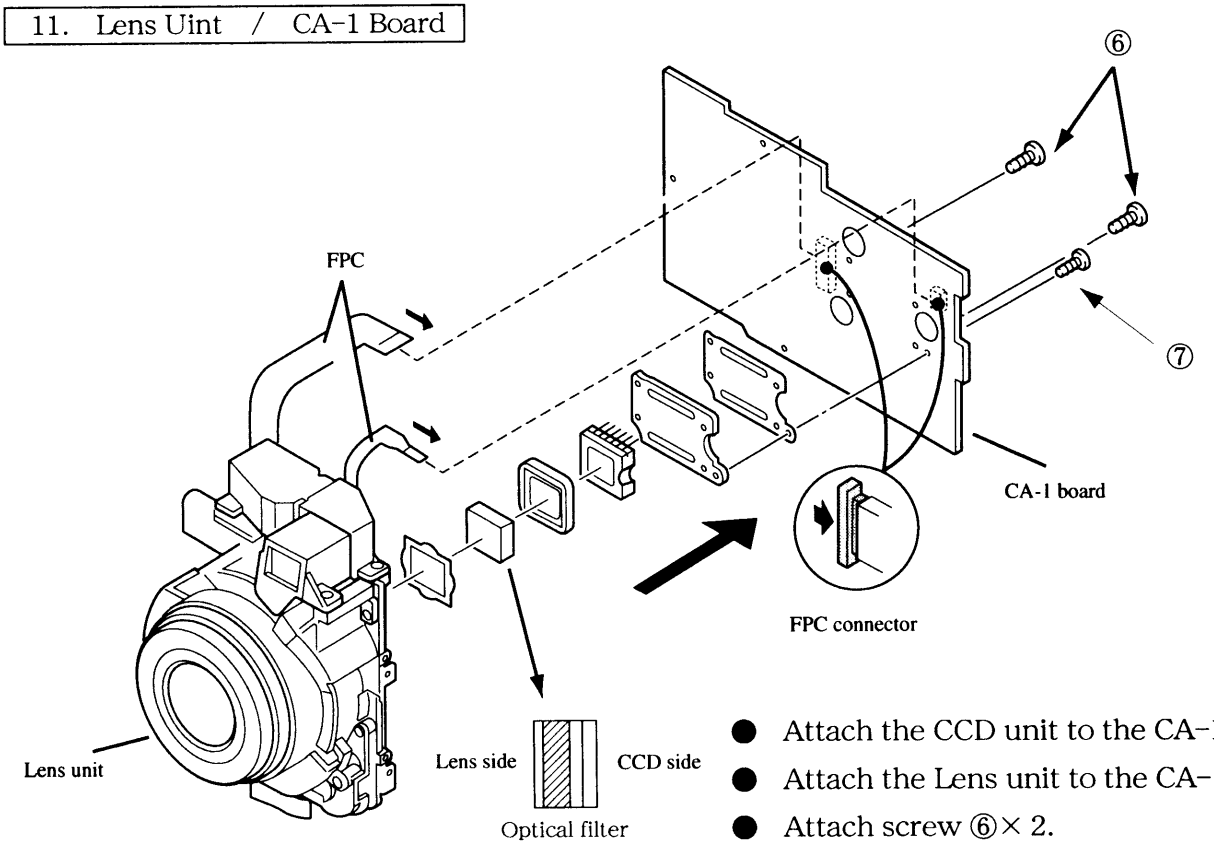
10. Lens Unit / Finder Unit





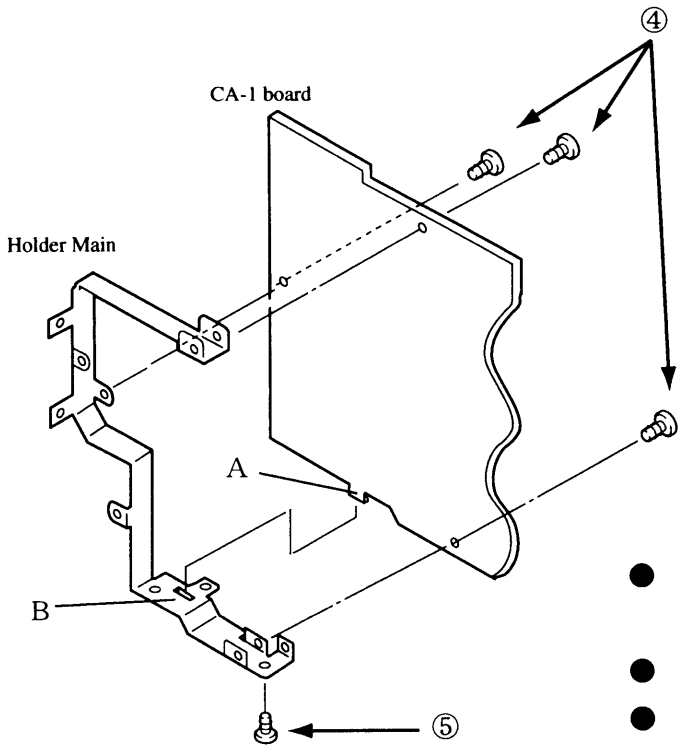
- Attach the Finder unit to the Lens unit.
- Attach the B projection to C while pushing the B projection in the arrow direction.
  (Refer to Figure above)
- Attach screw ⑧× 3.

11. Lens Uint / CA-1 Board



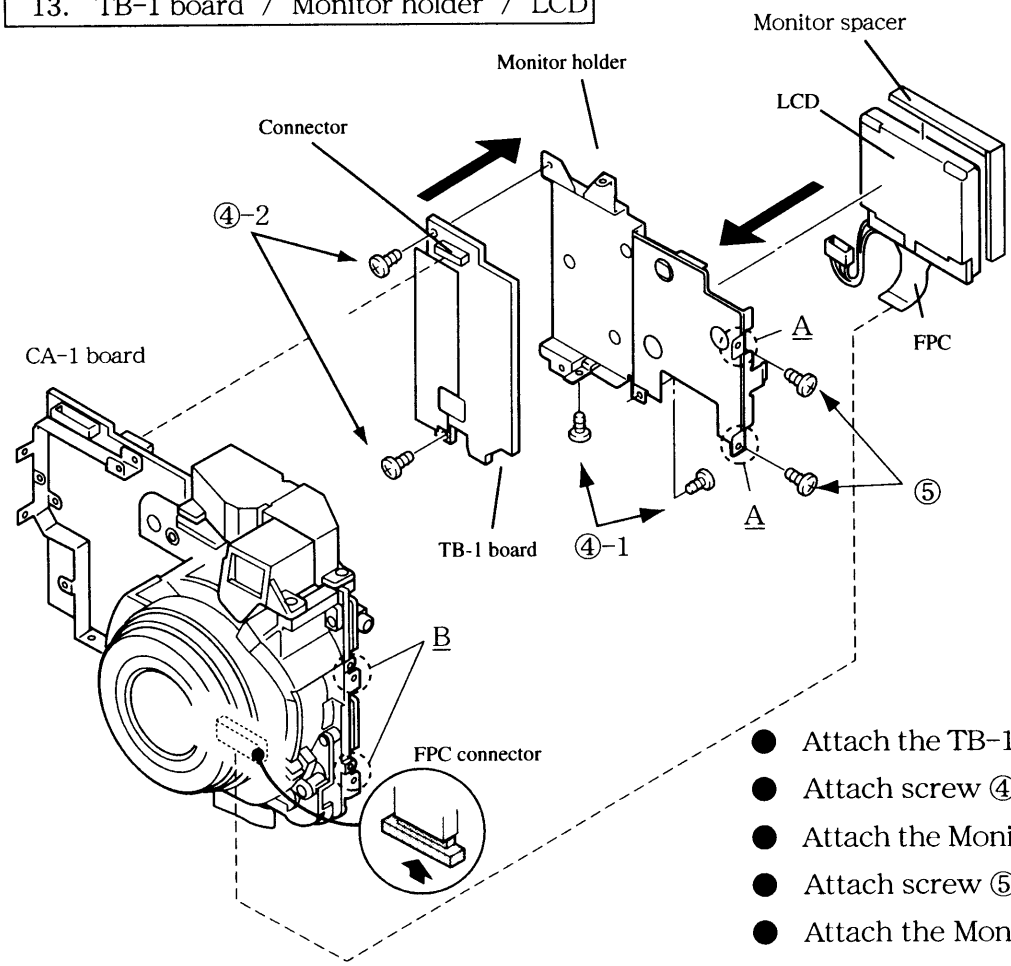
- Attach the CCD unit to the CA-1 board.
- Attach the Lens unit to the CA-1 board.
- Attach screw ⑥× 2.
- Attach screw ⑦× 1.
- Connect the FPC connector.

12. Holder Main



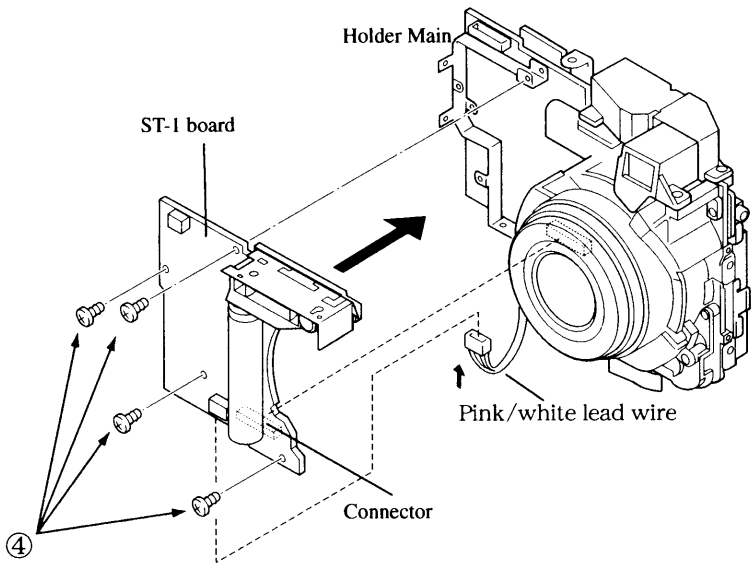
- Attach the A projection of CA-1 board to B hole of the Holder Main.
- Attach screw ④× 3.
- Attach screw ⑤× 1.

13. TB-1 board / Monitor holder / LCD



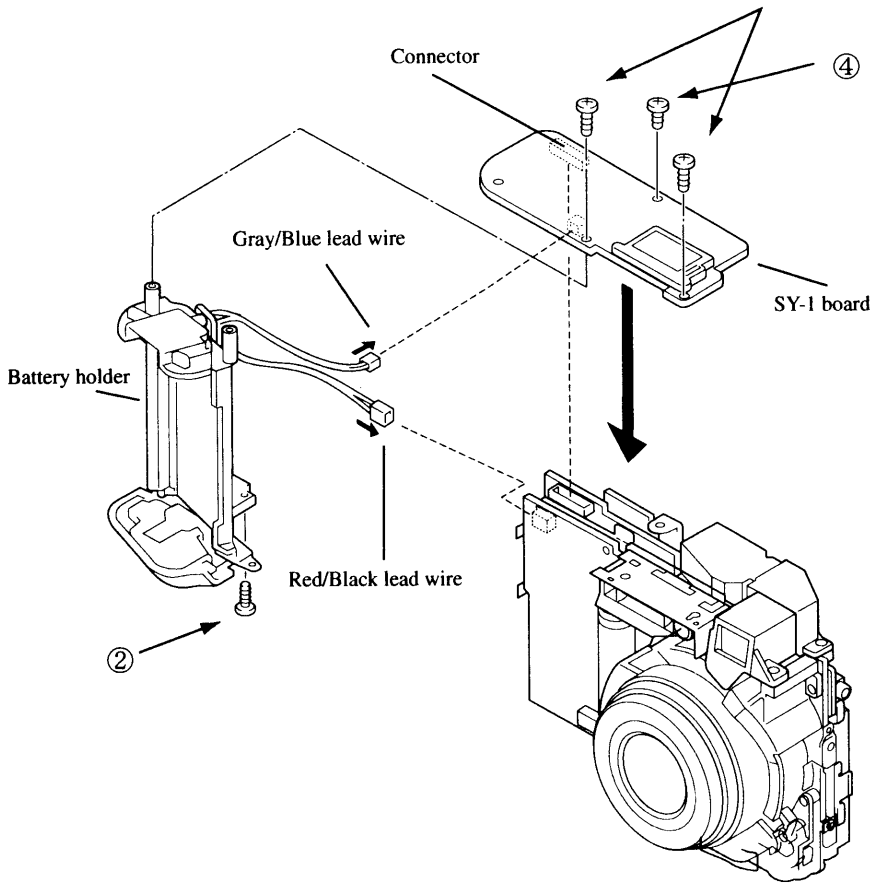
- Attach the TB-1 board to the Monitor holder.
- Attach screw ④-2 × 2.
- Attach the Monitor holder to the CA-1 board.
- Attach screw ⑤× 2, ④-1 × 2 .
- Attach the Monitor spacer to the LCD.
- Connect the FPC connector.

14. ST-1



- Attach the ST-1 board to the Holder Main.
  Attach screw ④× 4.
- Connect the pink/white lead wire connector.

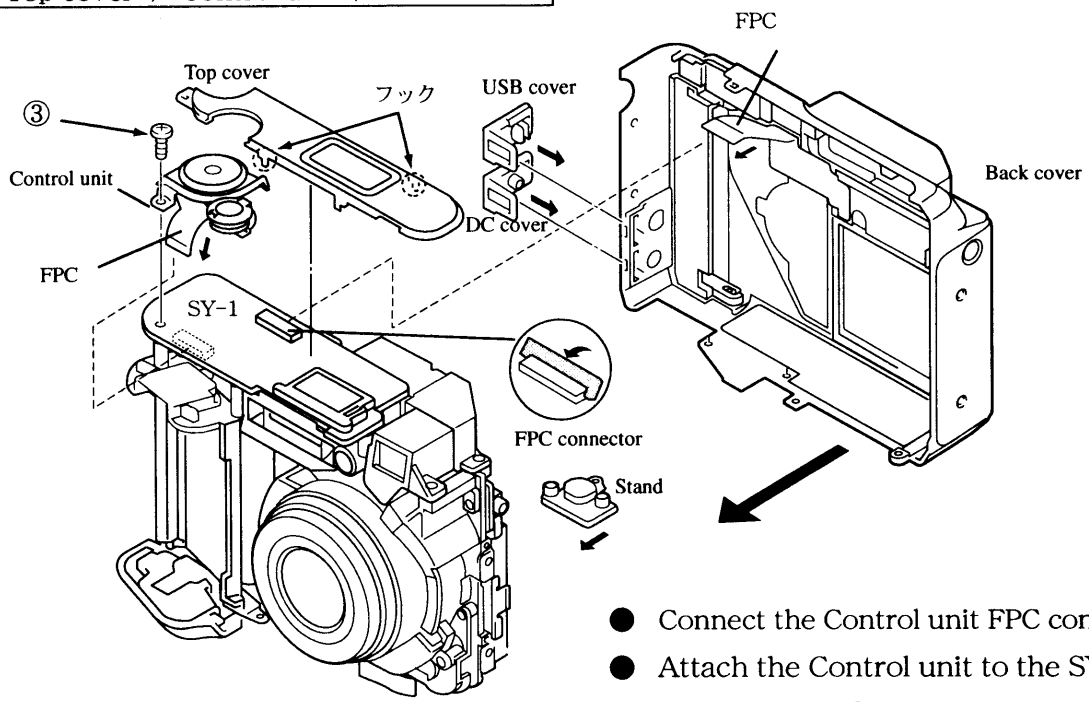
15. SY-1 / Battery Holder



- Attach the Battery holder.
- Attach screw ②× 1.
- Connect the red/black lead wire connector.
- Attach the SY-1 board.
- Attach screw ③× 2, ④× 1.
- Connect the gray/blue lead wire connector.

Notes)
Arrange the red/black lead wire and the gray/blue lead wire not to stick out from the SY-1 board when looking them from the top. (SY-1 board side)

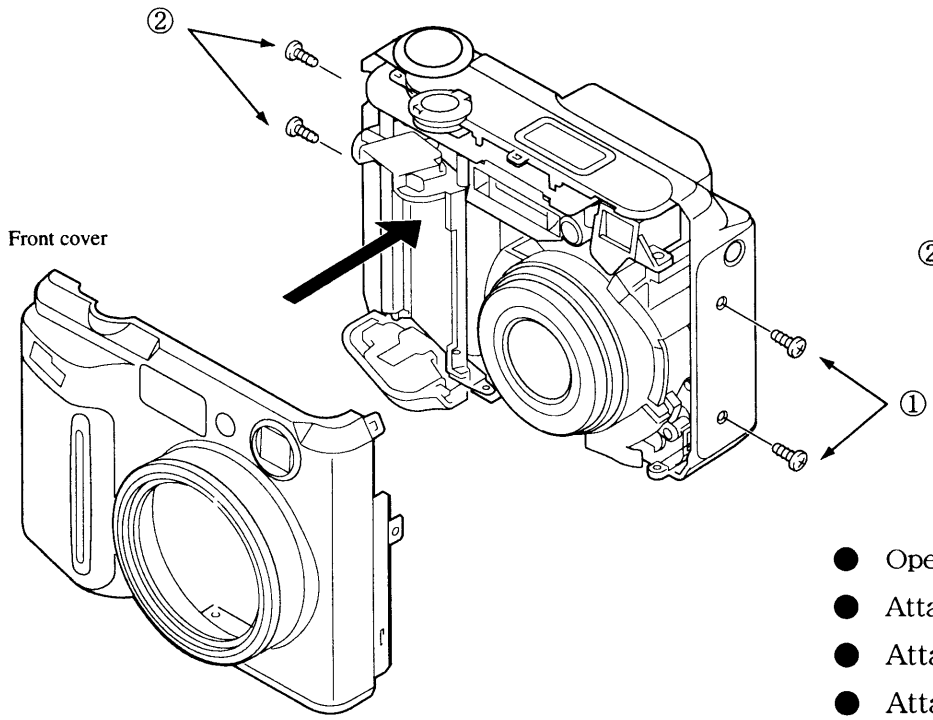
16. Top cover / Control unit / Back cover

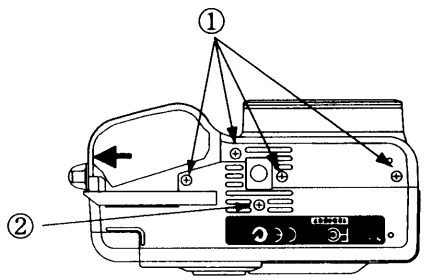


- Connect the Control unit FPC connector.
- Attach the Control unit to the SY-1 board.
- Attach screw ③× 1.
- Attach the Top cover to the SY-1 board.
- Connect the Back cover FPC connector.
- Attach the Back cover .
- Attach the Stand,USB cover and DC cover.

17. Front cover

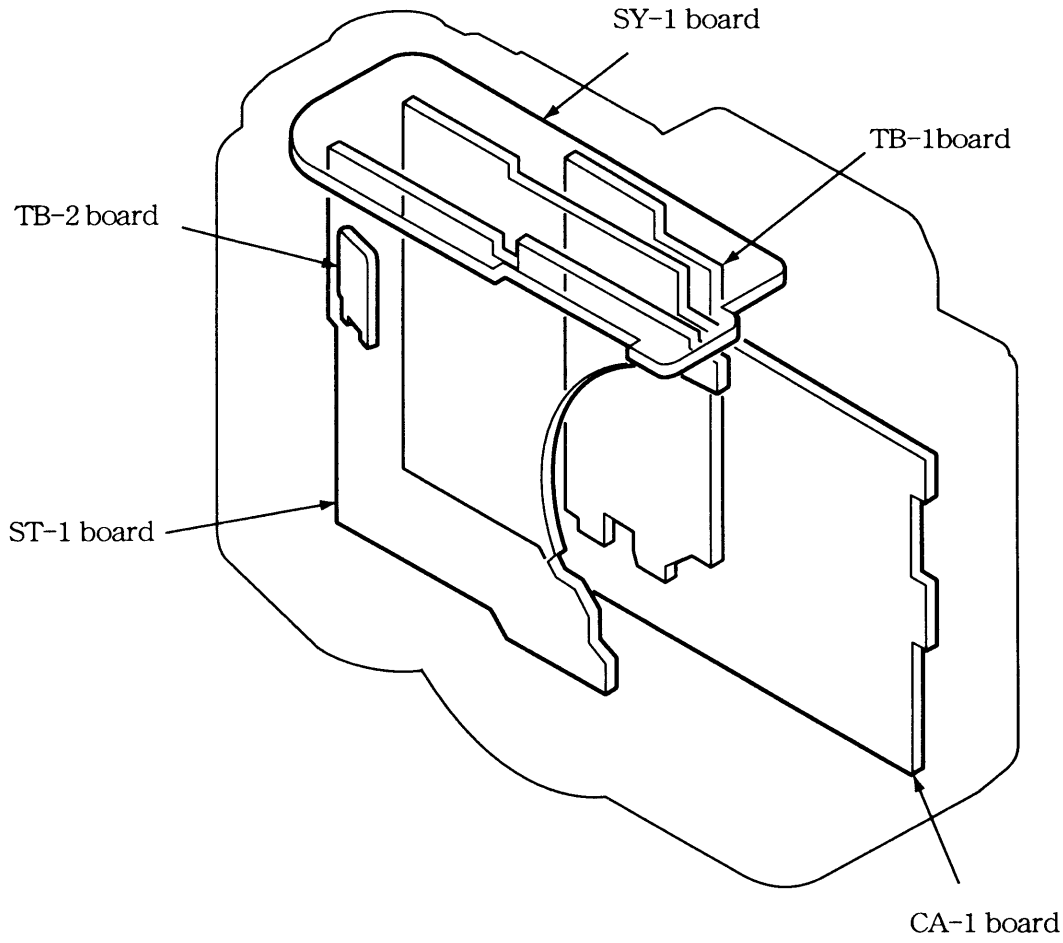
Screw position at the bottom





- Open the Batttery cover.
- Attach the Front cover.
- Attach screw ①× 6.
- Attach screw ②× 3.

18. Board location



ELECTRICAL ADJUSTMENT

1.Equipment

- IBM compatible PC
- AC adaptor （ＥＨ－２１）
- Serial cable （ＳＣ－ＥＷ３）
- Oscilloscope

2.Servicing Tools

- Color viewer 5,100 K

  Note : Due to 100 to 110 V specified for the color viewer, in case of using it in somewhere overseas, be sure to convert its voltage through the transformer in accordance with that country's voltage.
- Siemens star chart
- Calibration software
- Chart for color adjustment

3.Setup

3-1.System requirements

- Windows 98
- IBM R -compatible PC with pentium processor
- CD-ROM drive
- 3.5-inch high-density diskette drive
- Serial port with standard RS-232C interface and USB port
- Over 8 MB RAM
- Hard disk drive with at least 15 MB available
- VGA or SVGA monitor with at least 256-color display

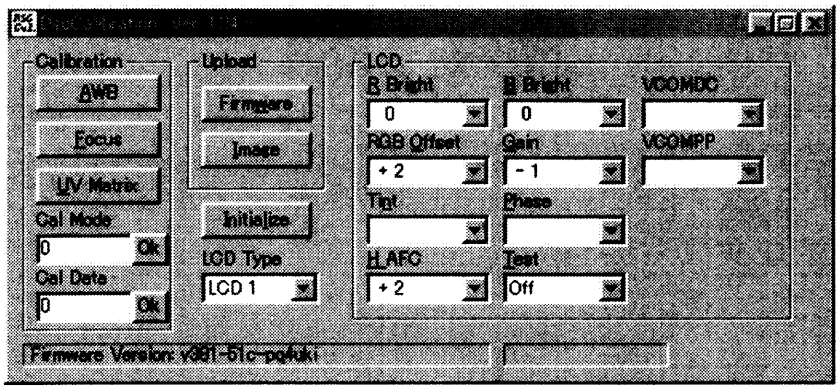
3-2. Installing calibration software

- Insert the calibration software installation diskette into your diskette drive.
- Open the explorer.
- Copy the DSC Cal folder on the floppy disk in the FD drive to a folder on the hard disk.
- Color Viewer

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

4. Calibration software

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



5. Adjustment Items and Order

① Flange-back (Lens) Adjustment

② CCD Defect Detect Adjustment

③ AWB Adjustment

④ Color matrix Adjustment

⑤ LCD Panel Adjustment

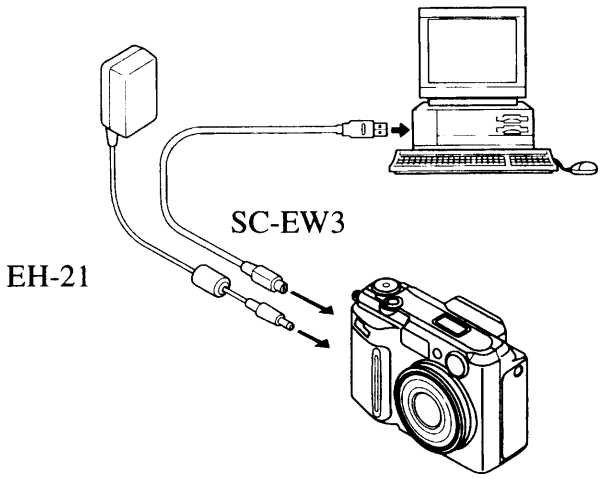
⑥Adjustment items required at replacement of parts

	Flange-back (Lens) Adjustment ①	CCD Defect Detect Adjustment ②	AWB Adjustment ③	Color matrix Adjustment ④	LCD Panel Adjustment ⑤
CA1	○	○	○	○	×
SY-1	○	×	×	×	×
ST-1	×	×	×	×	×
LCD	×	×	×	×	○
Lens Unit	○	○	○	○	×
CCD	○	○	○	○	×
Optical filter	○	○	○	○	×

○ : Adjustment required × : Adjustment not required

6. Connecting the camera to the computer

- Turn off both camera and computer.
- Locate the port cover on the side of the camera. Press on the arrows and slide the cover down to open it.
- Line up the arrow on the cable connector with the notch on the camera's serial port. Insert the connector.
- Locate a serial port on the back of your computer. You may have two serial ports labeled COM1 and COM2, or the ports may be labeled with icons. If you have two serial ports available, use port 1 to connect your camera.
- Line up the serial connector on the cable with one of the serial ports on your computer, and insert the connector.
- Turn on the camera and your computer system.

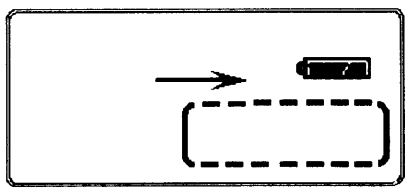


7. Communications between PC and the camera

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

8. Flange-back (Lens) Adjustment

[Preparation]

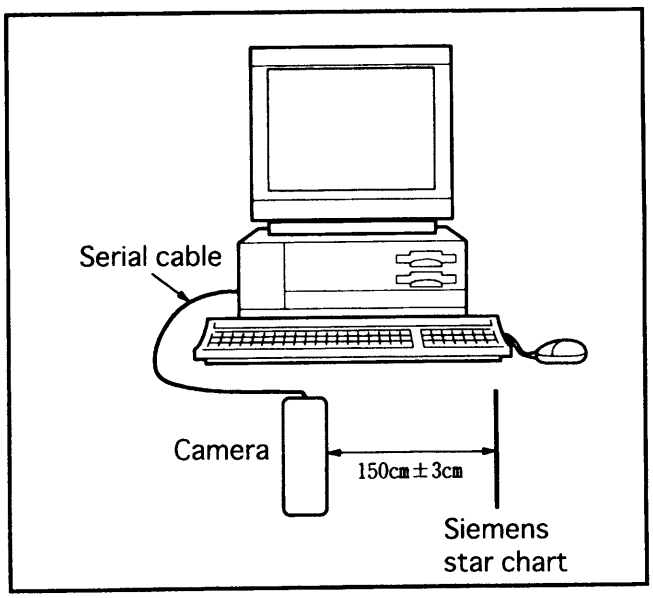
- Siemens star chart
- POWER switch: ON (set to A-REC, M-REC or PLAY MODE)

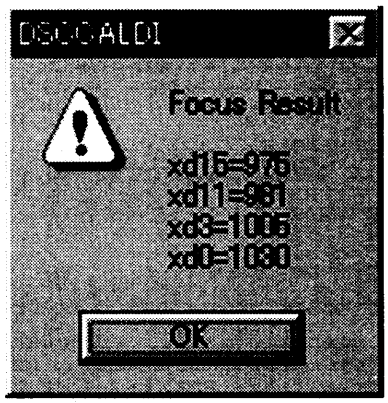
[Adjustment condition]

- 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]

- Double-click on the DscCalDi.
- Select the monitor from TEST menu of Calibration Soft (refer to the FIG-2) so that LCD monitor will be turned on.
- Set the camera's LCD center to meet the Siemens star chart's center.
- Click the Focus, and click the Yes.
- Flange-back adjustment value will appear on the screen.
  (xd adjustment value is 1000±70)
- Click 'OK'.

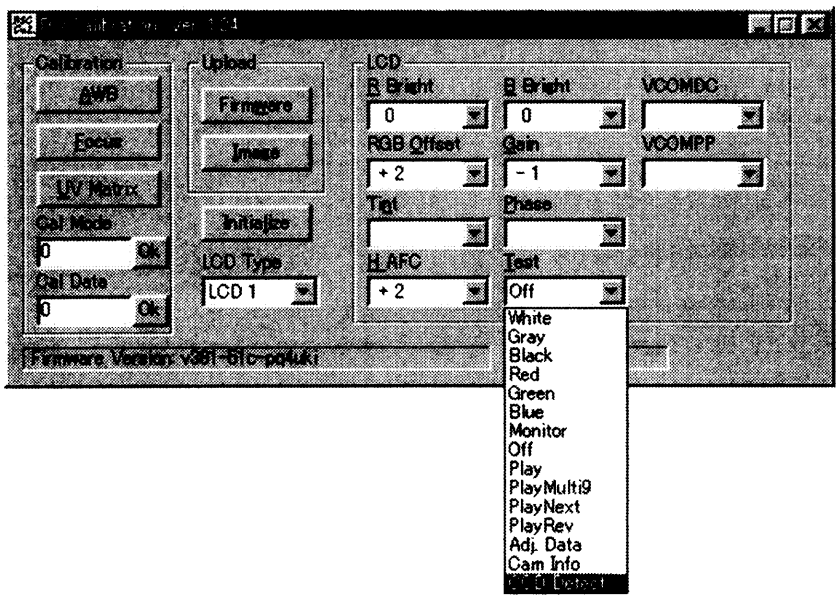


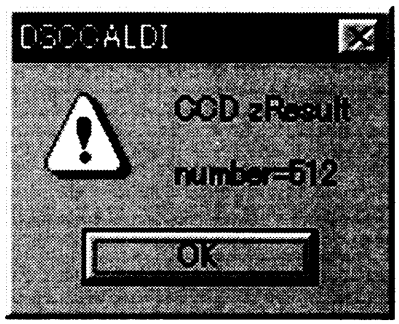


9. CCD Defect Detect Adjustment

[Adjustment method]

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





10. AWB Adjustment

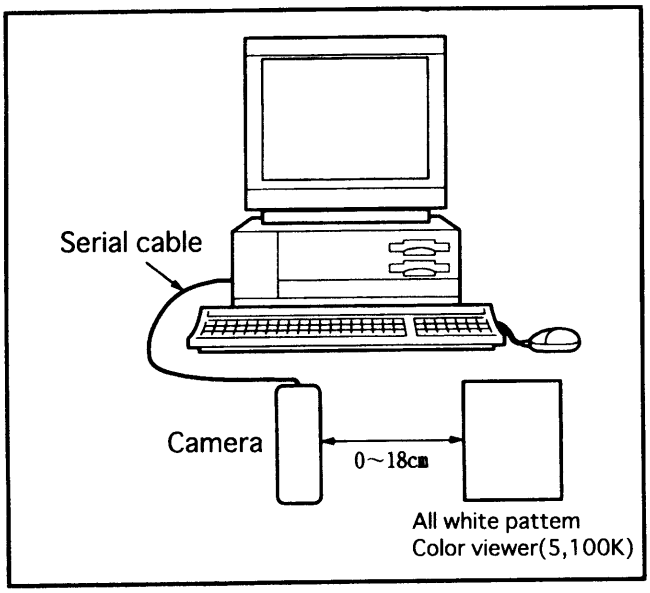
[Preparation]

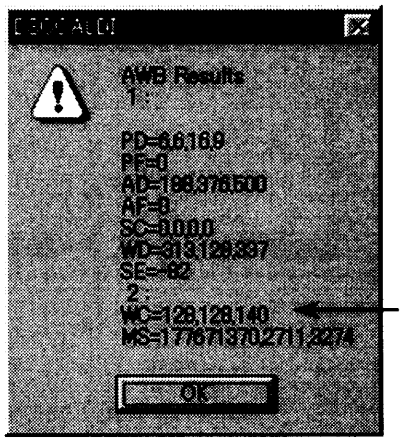
- POWER switch: ON
- Color viewer

[Adjustment method]

- 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.)
- Double-click on the DscCalDi.
- Click the AWB, and click the Yes.
- AWB adjustment value will appear on the screen.
  (WC adjustment value is 128±2,128±2,130±30)
- Click 'OK'.

Note : In any adjustment error cases, each value WC after adjustment turns to 1.





11. Color Matrix Adjustment

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

[Preparation]

- POWER switch: ON

[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.

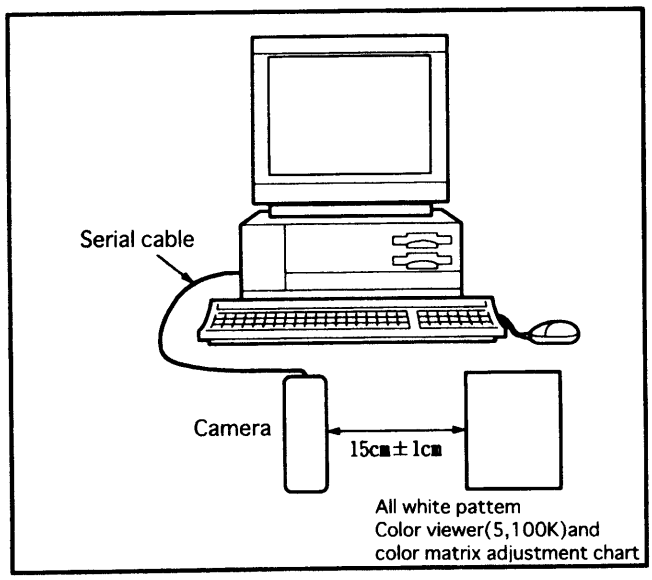
[Adjustment method]

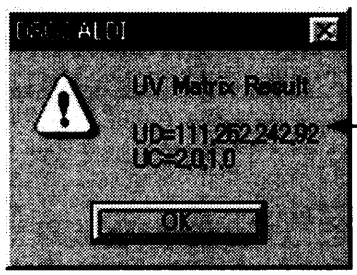
- Double-click on the DscCalDi.
- Click the UV Matrix, and Click 'Yes'.
- UC adjustment value will appear on the screen.

  (UC adjustment value is 0±2)

- Click 'OK'.

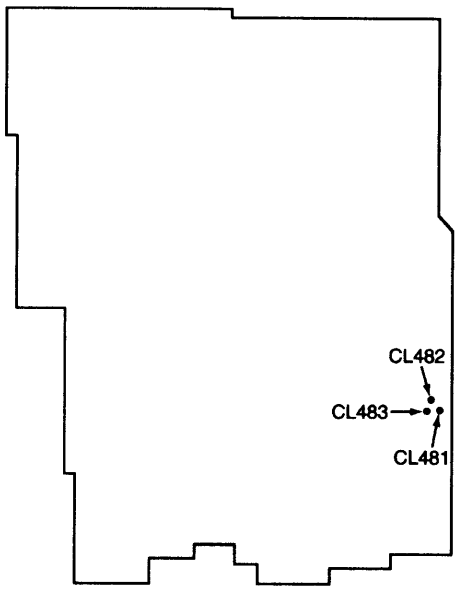
Note : In any adjustment error cases, each value UC after adjustment turns to 1.





adjustment value

12. LCD Panel Adjustment [CA3 board]



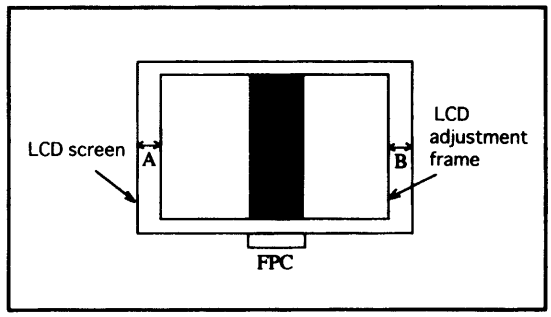
12-1. LCD H AFC Adjustment

[Preparation]

- POWER switch: ON

[Adjustment method]

- Double-click on the DscCalDi.
- Select 0 on the LCD "H AFC".
- While watching the LCD monitor, first of all, check whether the LCD adjustment frame is centered or not.
  Then, if the frame is out of center, adjust to equally maintain the both-sided edge widths, which is A = B.

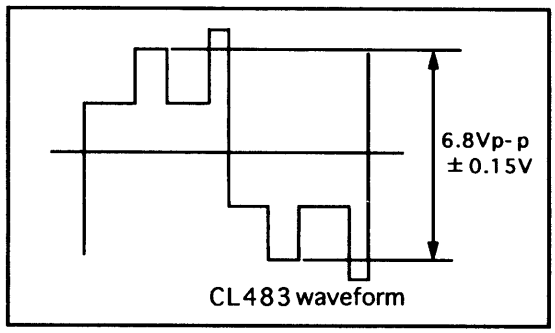


12-2. LCD RGB Offset Adjustment

[Preparation]

- Draw out three lead wires from each point, and then connect them with the oscilloscope.
  Setting of oscilloscope : 1V/DIV, 20 μ sec/DIV
  (GND : Body)

[Adjustment method]



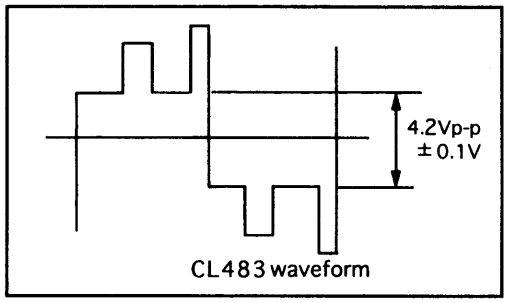
- Adjust LCD "RGB offset" so that the amplitude of the CL483 waveform is 6.8 Vp-p ± 0.15 V.

12-3. LCD Gain Adjustment

[Adjustment method]

- Adjust LCD "Gain" so that the amplitude of the CL483 waveform is 4.0 Vp-p ± 0.1 V.

Note : LCD RGB Offset adjustment should always be carried out first.

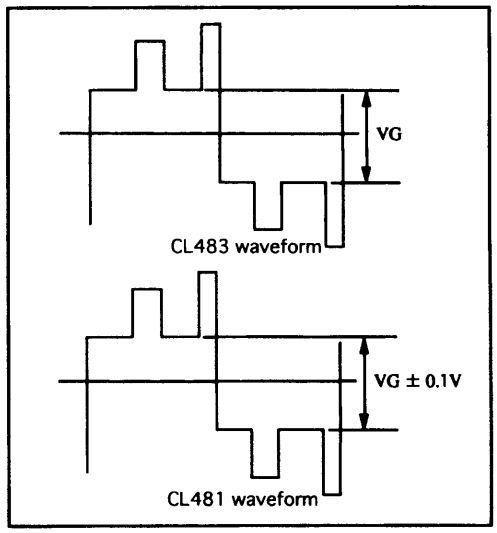


12-4. LCD Blue Brightness Adjustment

[Adjustment method]

- Adjust LCD "B Bright" so that the amplitude of the CL483 waveform is ± 0.1 V with respect to the CL481 (VG) waveform.

Note : LCD RGB Offset adjustment and LCD Gain adjustment should always be carried out first.

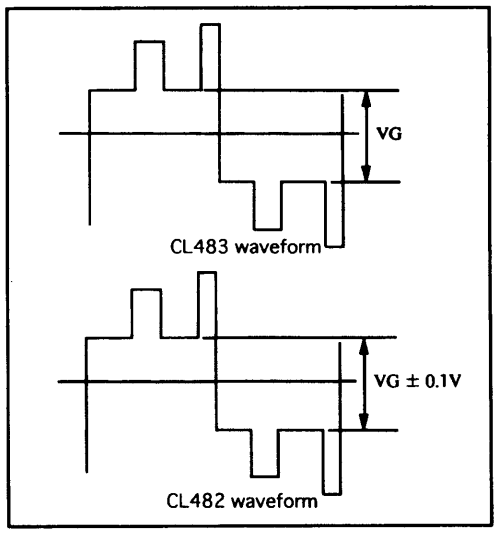


12-5. LCD Red Brightness Adjustment

[Adjustment method]

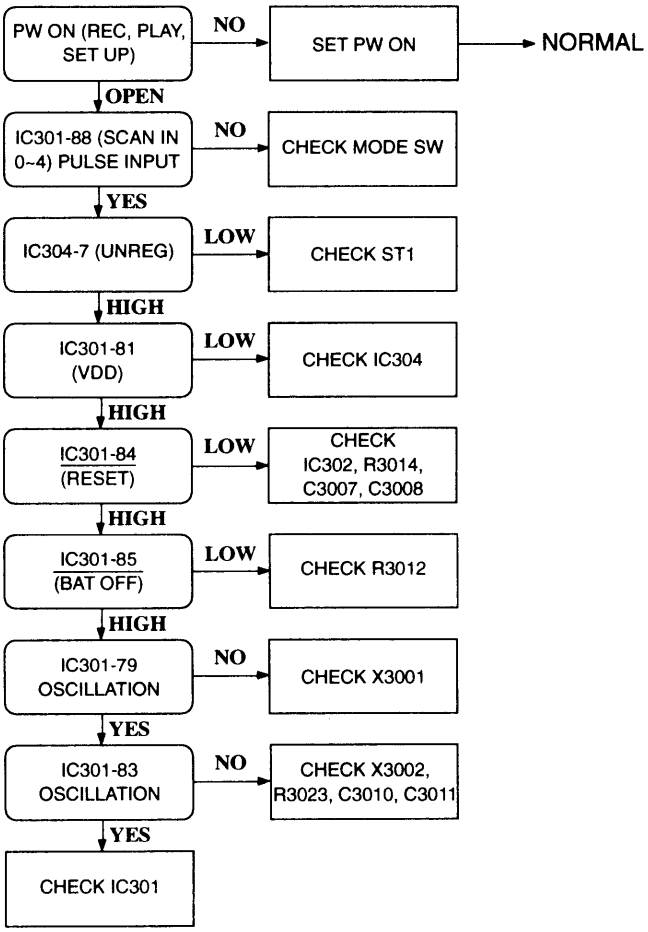
- Adjust LCD "R Bright" so that the amplitude of the CL483 waveform is ± 0.1 V with respect to the CL482 (VG) waveform.

Note : LCD RGB Offset adjustment and LCD Gain adjustment should always be carried out first.

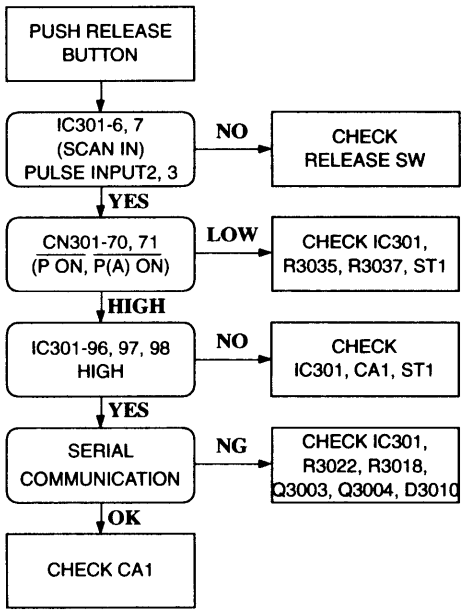


4. TROUBLESHOOTING GUIDE

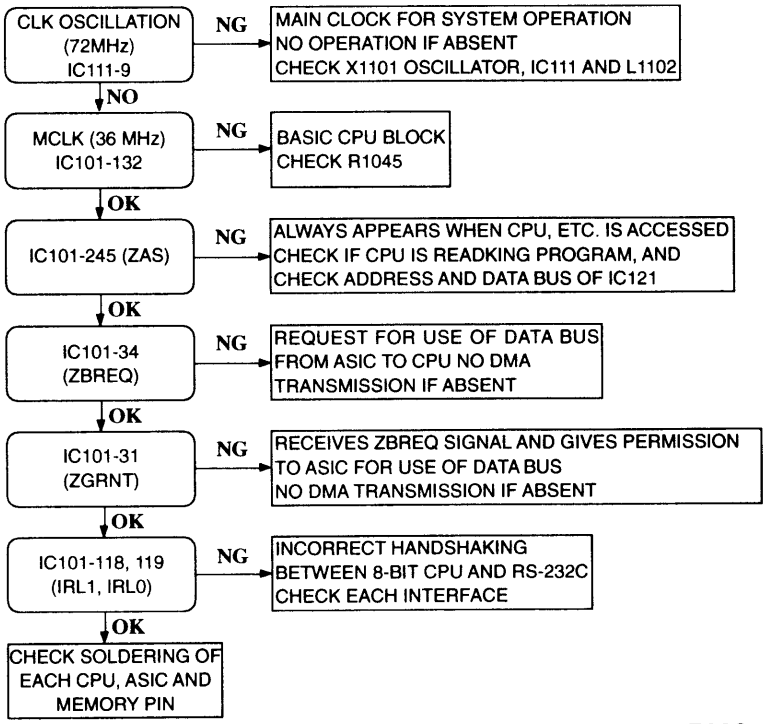
POWER LOSS INOPERTIVE



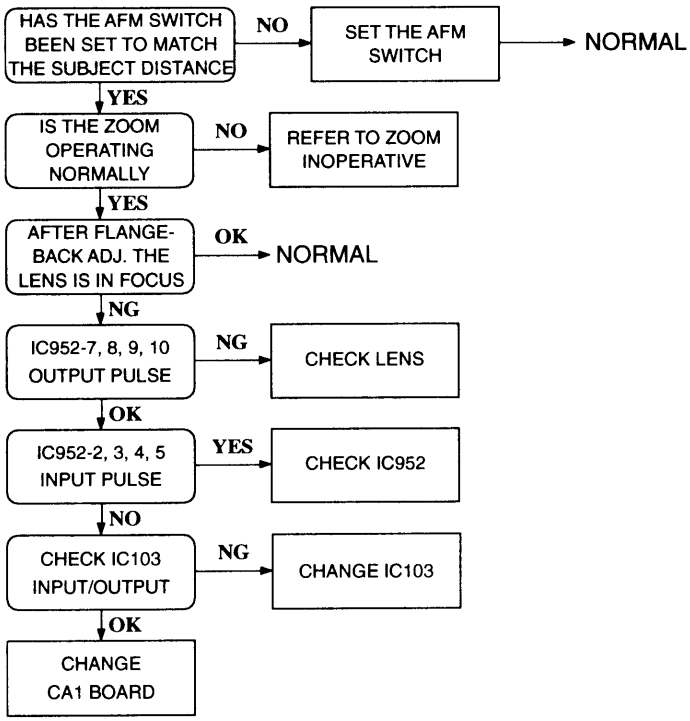
TAKING INOPERATIVE



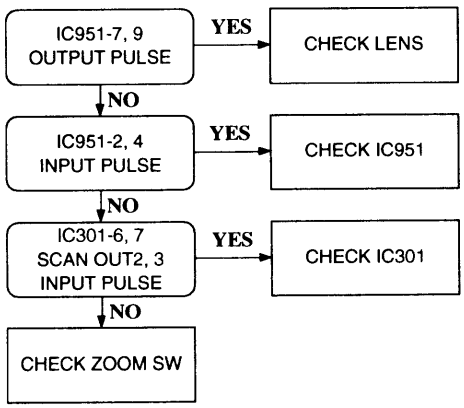
NO PICTURE



FOCUS INOPERATIVE



FOCUS INOPERATIVE



1. OUTLINE OF CIRCUIT DESCRIPTION

1-1. CA1 CIRCUIT DESCRIPTION

1. IC Configuration

IC903 (ICX252AK-B)	CCD imager
IC902 (74ACT04MTC)	H driver
IC904 (CXD3400N)	V driver
IC905 (AD9842JST)	CDS, AGC, A/D converter

2. IC903 (CCD)

[Structure]

Interline type CCD image sensor

Optical size	1/108 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)

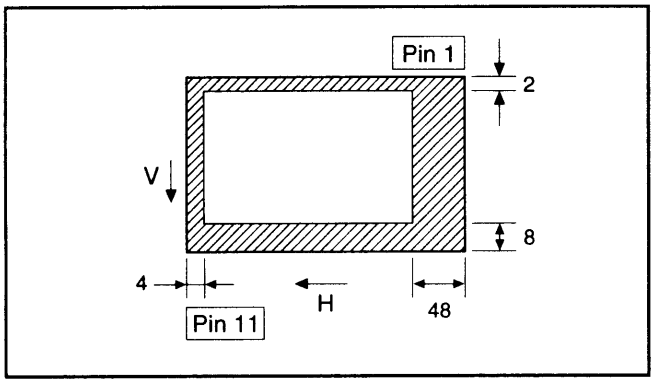


Fig. 1-1.Optical Black Location (Top View)

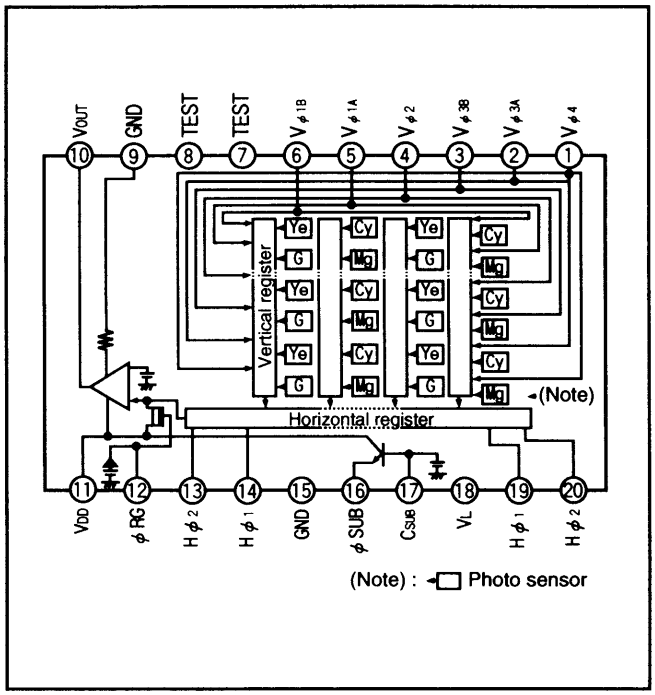


Fig. 1-2. CCD Block Diagram

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.

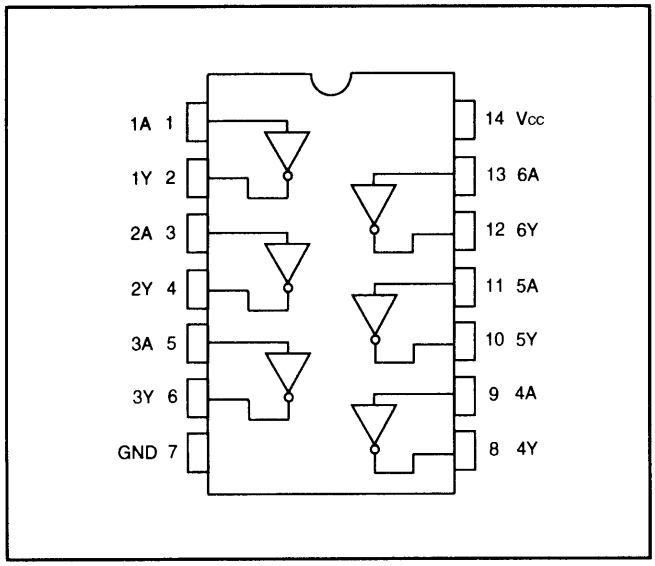


Fig. 1-3. IC902 Block Diagram

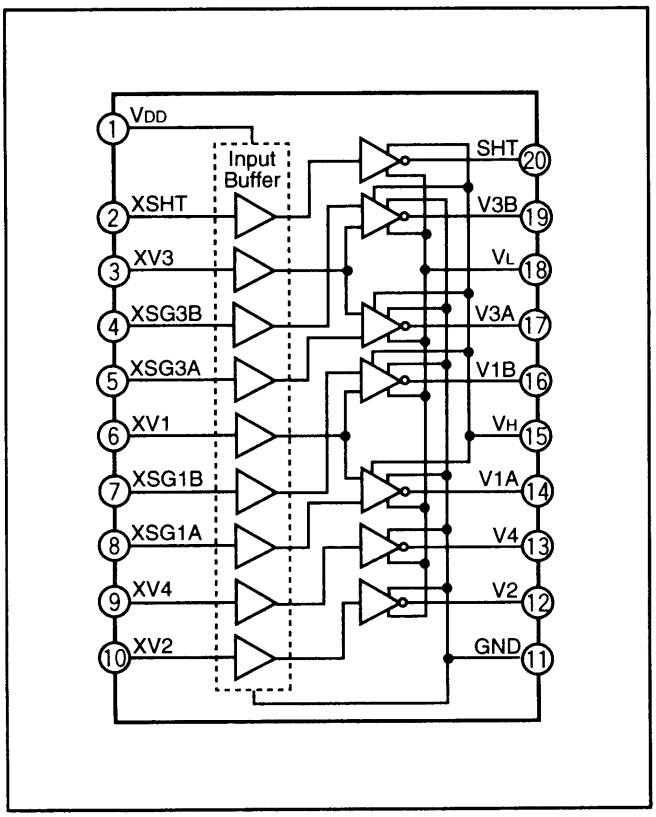


Fig. 1-4. IC904 Block Diagram

4. IC905 (CDS, AGC Circuit and A/D Converter)

The video signal which is output from the CCD is input to Pins (30) of IC905. 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 CA1 circuit board. The gain of the AGC amplifier is controlled by pin (45)-(48) serial signal which is output from IC102 of the CA1 board.

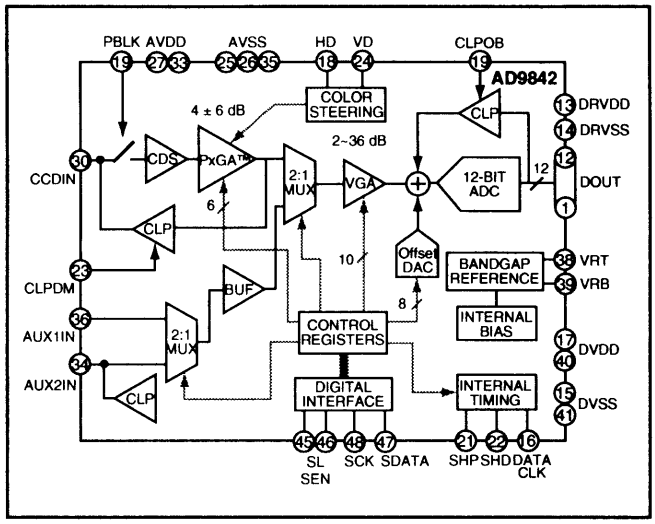


Fig. 1-5. IC905 Block Diagram

5. Transfer of Electric Charge by the Horizontal CCD

The transfer system for the horizontal CCD emplays a 2-phase drive method.

The electric charges sent to the final stage of the horizontal CCD are transferred to the floating diffusion, as shown in Fig. 1-6. RG is turned on by the timing in (1), and the floating diffusion is charged to the potential of PD. The RG is turned off by the timing in (2). In this condition, the floating diffusion is floated at high impedance. The H1 potential becomes shallow by the timing in (3), and the electric charge now moves to the floating diffusion.

Here, the electric charges are converted into voltages at the rate of V = Q/C by the equivalent capacitance C of the floating diffusion. RG is then turned on again by the timing in (1) when the H1 potential becomes deep.

Thus, the potential of the floating diffusion changes in proportion to the quantity of transferred electric charge, and becomes CCD output after being received by the source follower. The equivalent circuit for the output circuit is shown in Fig. 1-7.

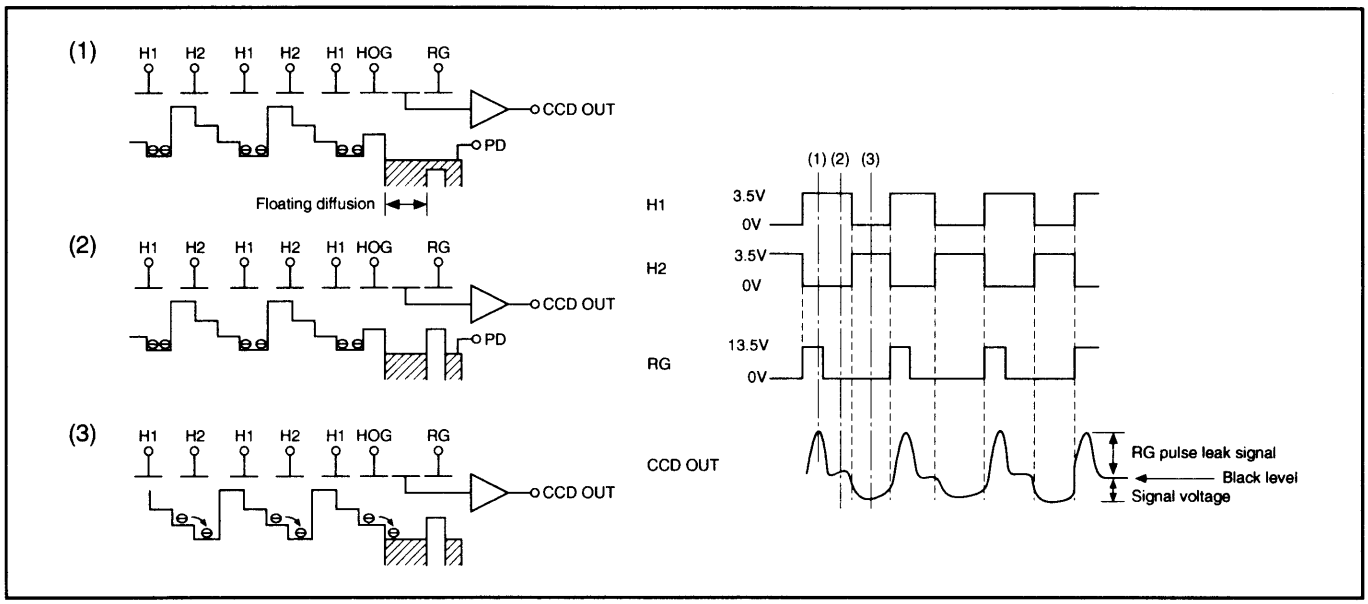


Fig. 1-6. Horizontal Transfer of CCD Imager and Extraction of Signal Voltage

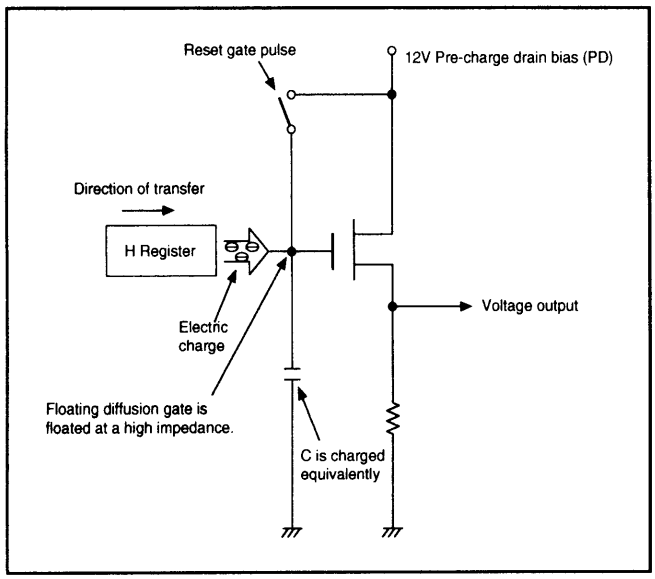


Fig. 1-7. Theory of Signal Extraction Operation

6. Lens drive block

6-1. Focus drive

The four control signals (FIN1, FIN2, FIN3 and FIN4) with different phases which are output from the ASIC expansion port (IC106) are converted into drive pulses (FOUT1, FOUT2, FOUT3 and FOUT4) by the motor driver (IC952), and are then used to drive the stepping motor for focusing operation. Detection of the standard focusing positions is carried out by means of the photointerruptor (FOCUS PI) inside the lens block.

6-3. Iris and shutter drive

The two control signals (IIN1 and IIN2) which are output from the ASIC expansion port (IC106) are converted into drive pulses (IRIS© IRIS (D)) by the motor driver (IC953), and are then iris opened/middle/little and moved.

The two control signals (SIN1 and SIN2) which is output from the ASIC expansion port (IC106) is converted into a drive pulse (SHUTTER (A) and SHUTTER (B)) by the motor driver (IC953), and are then shutter opened and closed.

6-3. Zoom drive

The two control signals (ZIN1 and ZIN2) which are output from 8-bit micro-processor are converted into drive pulses (ZOOM_DC1 and ZOOM_DC2) by the motor drive (IC953), and are then used to drive the DC motor for zoom operation. Detection of the standard zoom positions is carried out by means of the photointerruptor (ZOOM RESET1) inside the lens block. Getting of the zoom positions is carried out by means of the two photo-interrupters (ZOOM PLUSE1 and ZOOM PLUSE2) by counting 8-bit micro-processor inside the lens block.

6-4. Temperature sensor

When it is low temperature, the zoom motor drive is getting low speed, and it works torque. The sensor output is read by 8-bit micro-processor.

7. Circuit Description

7-1. 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.

7-2. 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.

7-3. 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.

7-4. SDRAM controller

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

7-5. 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.

7-6. TG/SG

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

7-7. Digital encorder

It generates chroma signal from color difference signal.

7-8. JPEG encorder and decorder

It is compressed and elongated the data by JPEG system.

8. 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.

9. 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.

1-2. ST1 POWER CIRCUIT DESCRIPTION

1. Outline

This is the main power circuit, and is comprised of the following blocks.
Switching controller (IC501, IC503)
Digital 5 V and analog system power output (T5001, Q5001)
Digital 2.5 V system power supply (Q5007)
Digital 3.4 V system power supply (Q5018)
LCD system power supply (Q5008, T5002)
Backlight power supply output (IC503, Q5013)

2. 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 four built-in channels, only CH1 (digital 5 V, analog system), CH2 (digital 2.5 V), CH4 (digital 3.4 V) and CH3 (LCD system) are used. Feedback from 5.1 V (D) (CH1), 3.4 V (D) (CH4) , 2.5 V (D) (CH2) and 5.3 V (L) (CH3) power supply outputs are received, and the PWM duty is varied so that each one is maintained at the correct voltage setting level.

2-1. Short-circuit protection circuit

If output is short-circuited for the length of time (aprox. 260 ms) determined by the condenser which is connected to Pin (17) of IC501, all output is turned off. The control signal (P ON, P(A) ON and LCD ON) are recontrolled to restore output.

3. Switching Controller (IC503)

It is controlled backlight 7 V (L) by IC for switching regulator 1ch PWM. The control signal uses 5.3 V (L).

4. Digital 5 V and Analog System Power Output

5.2 V (D) , 15.1 V (A), -7.6 V (A), 5.1 V (A) and 3.85 V (A) are output. Feedback for the 5.2 V (D) is provided to the switching controller (Pins (29) of IC501) so that PWM control can be carried out.

5. Digital 3.4 V System Power Output

3.35 V (D) is output. Feedback is provided to the swiching controller (Pin (7) of IC501) so that PWM control can be carried out.

6. LCD System Power Output

15 V (L), 12.4 V (L) and 5.3 V (L) are output. Feedback for the 5.3 V (L) is provided to the switching controller (Pin (11) of IC501) so that PWM control can be carried out.

7. Backlight Power Supply output

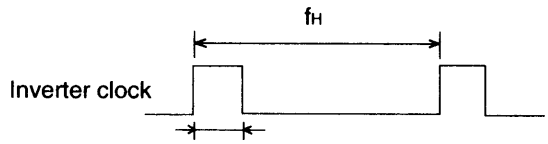
The power which is input to the inverter transformer (T5003) is controlled by means of Q5013, and 9 V (L) is output. Feedback is sent to pin (1) of the switching controller (IC503) for PWM control to be carried out.

8. Digital 2.5 V Power Output

2.5 V (D) is output. Feedback is sent to pin (26) of the switching controller (IC501) for PWM control to be carried out.

9. Inverter Control

The backlight uses a 1.8-inch flat picture tube, and is illuminated by controlling T5003 with pulses which are driven by the inverter clock.



3 seconds for illumination 5.0 µs
3 seconds after illumination 4.7 µs

1-3. SY1 CIRCUIT DESCRIPTION

1. Configuration and Functions

For the overall configuration of the SY1 circuit board, refer to the block diagram. The SY1 circuit board centers around a 8-bit microprocessor (IC301), and controls camera system condition (mode).
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 input and output for zoom and lens control.

Pin	Signal	I/O	Outline
1	GND	-	GND
2	TEMP	I	Temparature detection (analog input)
3	CHG VOL	I	Storobe charge voltage detection (analog input)
4~7	$\overline{\text{SCAN IN 0~3}}$	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	$\overline{\text{PICTL}}$	O	Photo interaptor ON/OFF control L : ON
14	LCD ON	O	DC/DC converter (LCD system) ON/OFF signal
15	NOT USED	-	-
16	ZIN 1	O	Zoom drive pulse output (rotation)
17	ZIN 2	O	Zoom drive pulse output (reversal)
18	ZRESET	I	Zoom reset
19	Z PULSE 2	I	Zoom motor drive pluse count 2
20	SELF	O	Red-eye reduction, self-timer, AF support emission drive H : Lump light
21	NC	-	-
22	CHG ON	O	Strobe charge control circuit H : ON
23~25	COM0~2	O	Mode LCD common output 0~2
26	NOT USED	O	-
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
32~50	S1~S19	O	LCD segment output 1~19
51~55	NOT USED	O	-
56	DCINCHK	I	Outside DC power detection L : AC adaptor
57	SELF BPS	O	Red-eye reduction lamp rush current limit
58~60	NOT USED	O	-
61	BATT SW	I	First battery/ Second battery distinction detection H : First L : Second
62, 63	NOT USED	O	-
64	WAKE UP	O	SPARC wake up terminal
65	$\overline{\text{ADVREF ON}}$	O	AD VREF ON/OFF signal L : ON
66, 67	NOT USED	O	-
68	AD RESET	O	ADC/CDS IC reset signal
69	NOT USED	I	-
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	$\overline{\text{DIN CONNECT}}$	I	Serial cable connection detection
73	$\overline{\text{CARD}}$	I	Card detection
74	$\overline{\text{V JACK}}$	I	Video cable connection detection
75	SI	I	Serial data input (←ASIC)

See next page →

Pin	Signal	I/O	Outline	
76	SO	O	Serial data output (→ASIC)	
77	SCK	O	Serial clock output (→ASIC)	
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	Z PULSE 1	I	Zoom drive pulse count 1	
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.

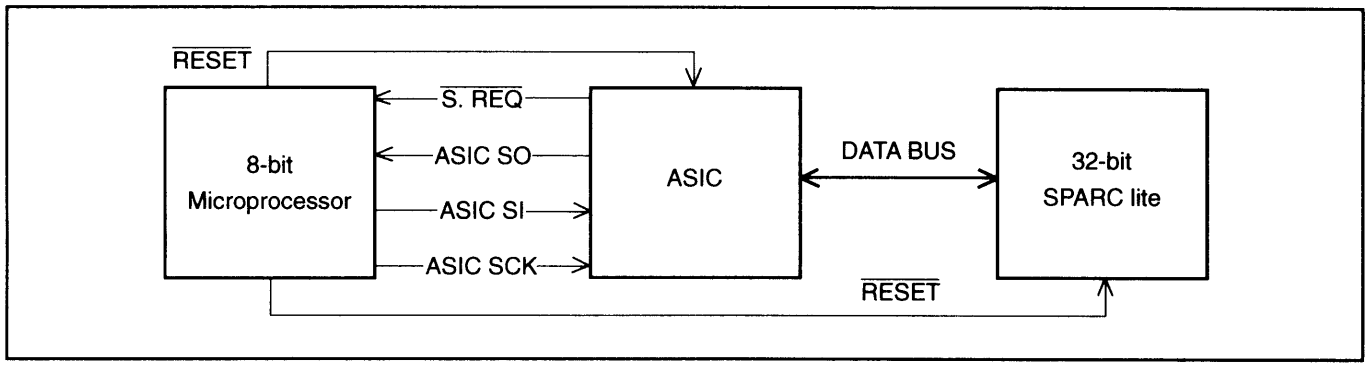


Fig. 4-1 Internal Bus Communication System

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)	POWER ON/OFF
1	+ / -	SBM	SHUTTER 2nd	SHUTTER 1st	AFM
2	MENU	MTR	ZOOM UP	ZOOM DOWN	QSW
3	LCD INVERSION SW	+ / -	QSW	FUNC	TEST
4	V JACK	CARD	DIN CONNECT		

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 IC304, 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 memory backup capacitor. 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 $\overline{\text{P (A) ON}}$ signal at pin (70) and the $\overline{\text{P ON}}$ 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 $\overline{\text{LCD ON}}$ 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 -7.5 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, SBM etc. ON	OFF	OFF	OFF	OFF	3 MHz	ON	OFF
		LCD finder	ON	ON	ON	ON	3 MHz	ON	ON

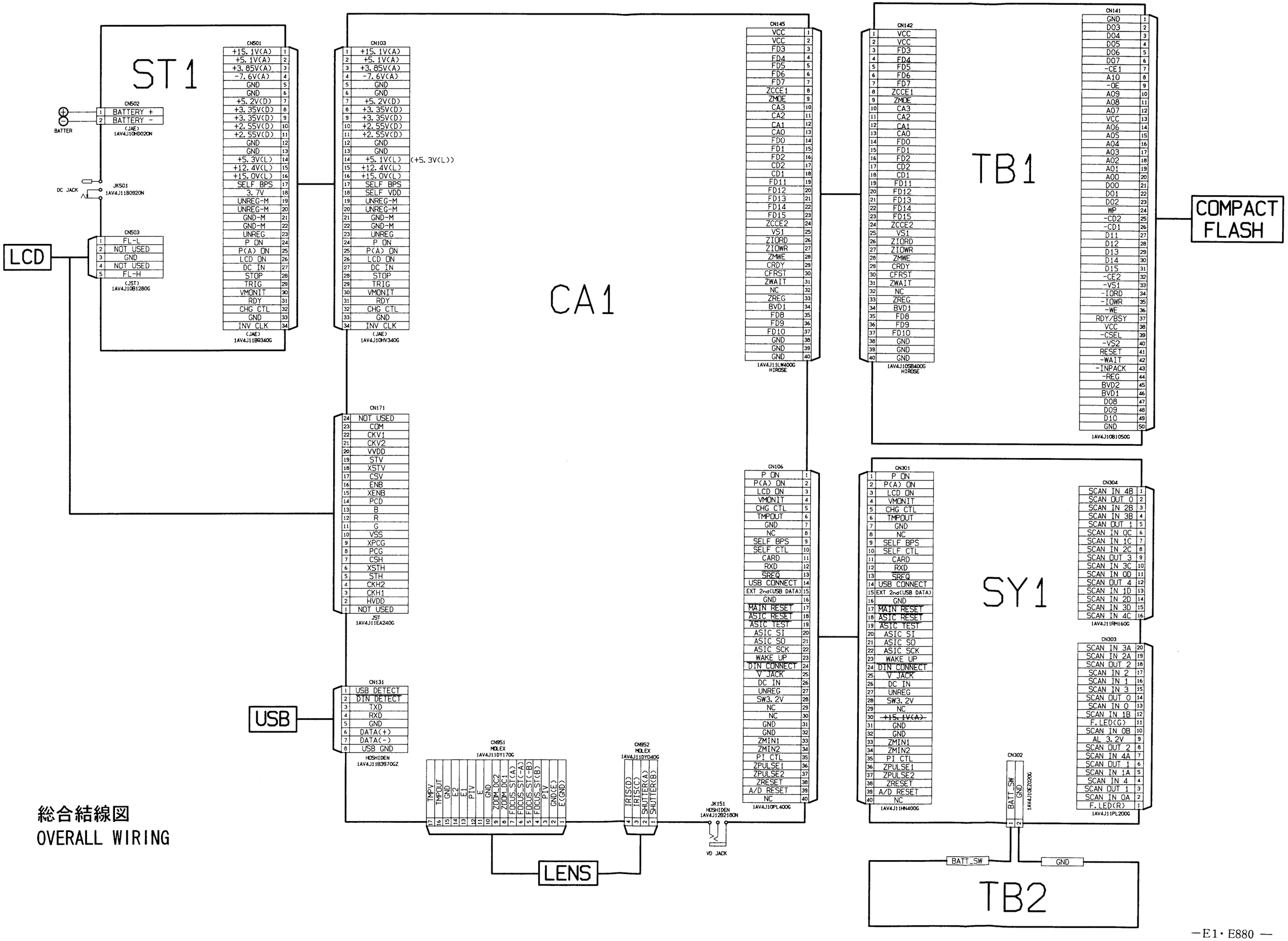
Table 4-3. Camera Mode

			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 -7.5 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	OFF	3 MHz	ON	OFF

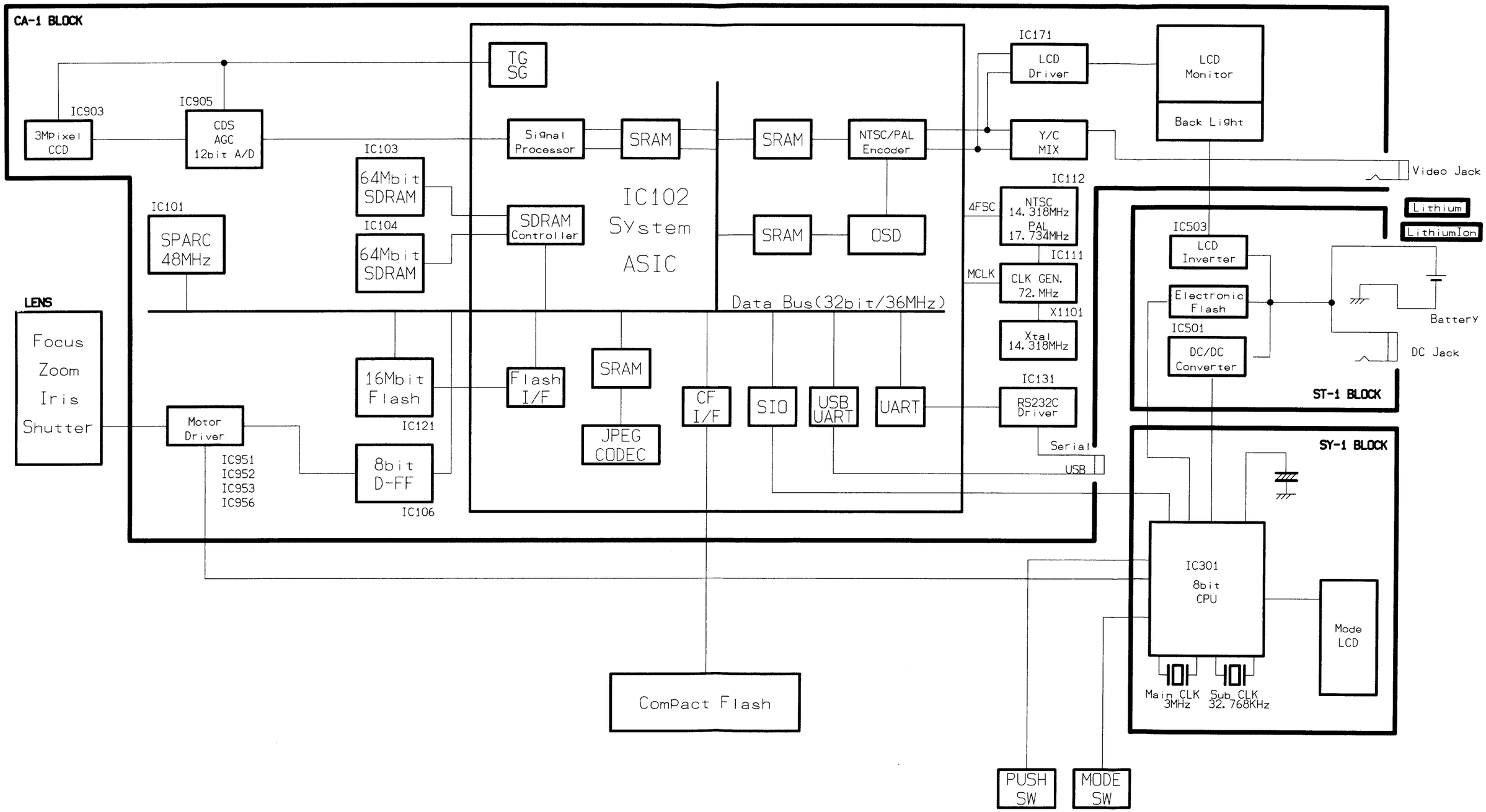
Note) 3 MHz = Main clock operation, 32 kHz = Sub clock operation

Table 4-4. Host Mode

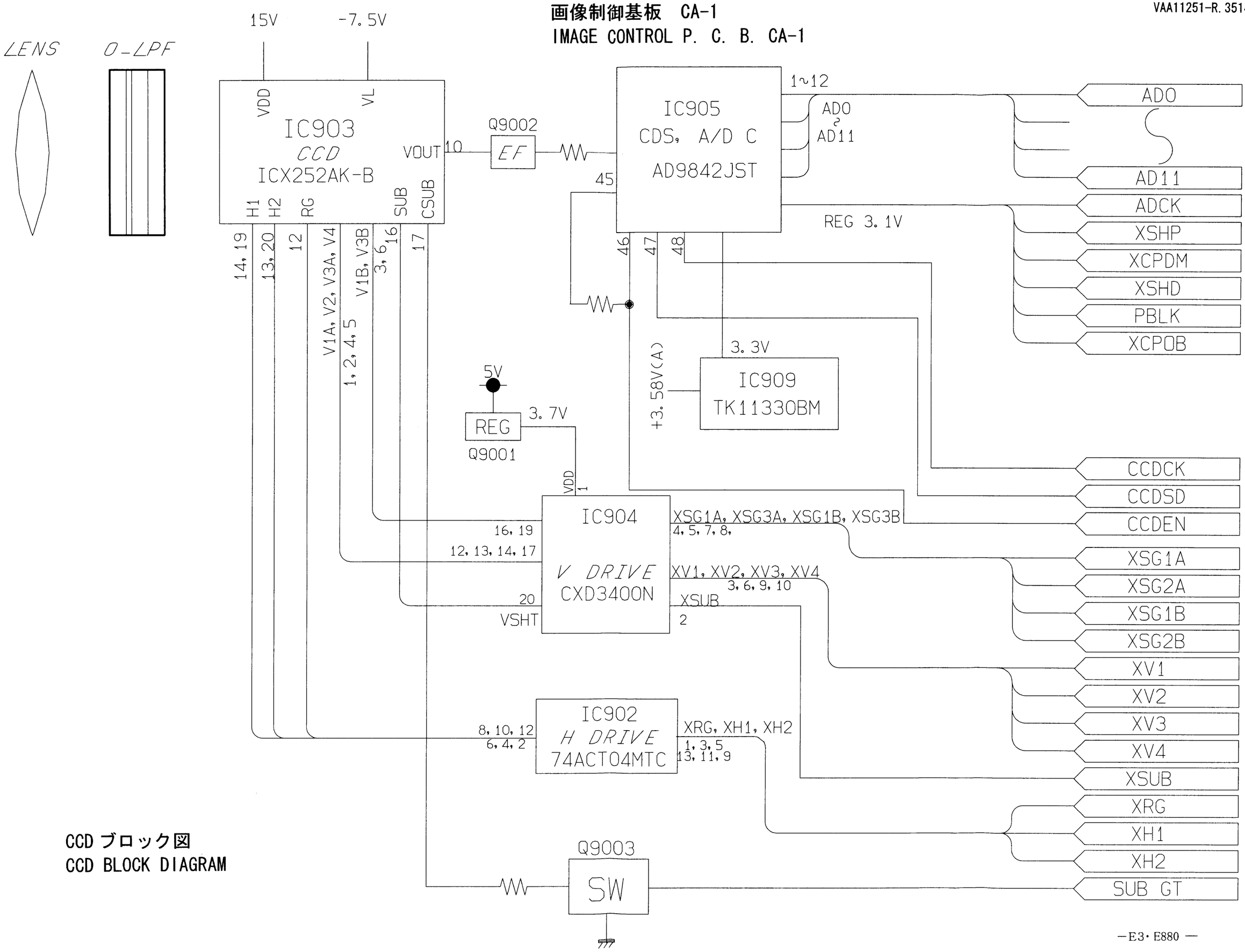
総合結線図
OVERALL WIRING



総合ブロック図
OVERALL BLOCK DIAGRAM



画像制御基板 CA-1
IMAGE CONTROL P. C. B. CA-1



CCD ブロック図
CCD BLOCK DIAGRAM

VOLTAGE: LCD MONITOR(VIEW MODE)

CA1_CCD

C1-26700/SX382-JNK

TO CA1_MAIN

GND
XH1
XH2
XRG
+5V(A)
SUBGT
XSG2B
XSG1B
XSG2A
XSG1A
XV4
XV3
XV2
XV1
XSUB
GND
XCPDM
XSHD
XSHP
GND
ADCK
AD0
AD1
AD2
AD3
AD4
AD5
AD6
AD7
AD8
AD9
AD10
AD11
CCDCK
CCDEN
CCDSD
GND
TGHD
-7.6V(A)
TGVD
+15.1V(A)
XPBLK
+3.85V(A)
XCPOB
ADRESET
GND

C9071 1000P:B

C9002 180P:CH
C9003 180P:CH
C9004 180P:CH
C9005 180P:CH
C9006 180P:CH
C9007 180P:CH
C9008 180P:CH
C9009 180P:CH
C9010 180P:CH

R9054 0:1/16Z
R9014 0:1/16Z
R9010 0:1/16Z
R9009 0:1/16Z
R9006 0:1/16Z
R9062 0:1/16Z
R9015 0:1/16Z
R9016 0:1/16Z
R9017 0:1/16Z

C9026 180P:CH

Q9001 2SD1819A
C9013 1:F 1608
C9014 0.1:B 1608
R9001 330:1/16D
R9002 2K:1/16D
C9012 1:F 1608
R9003 10K:1/16J

V-DRIVER

IC904
CXD3400ON

R9045 0:1/16Z
R9046 0:1/16Z

C9040 0.01:B 1608
C9041 22:10-T
C9044 0.1:F
C9049 0.1:F
R9033 0:1/16Z
R9052 0:1/16Z
C9043 0.1:F
C9045 4.7:H 2/25
C9046 0.15:B 2/25
C9047 0.1:F
C9048 0.1:F
C9035 0.1:F
C9036 0.01:B 1608
C9037 1:F 1608
C9038 0.01:B
C9039 1:F 1608
C9032 0.1:F
R9030 0:1/16Z
R9031 0:1/16Z
R9058 0:1/16Z
R9048 0:1/16Z

IC905
AD9842JST
CDS/AGC/ADC

C9050 0.1:F
C9051 0.1:F
C9054 0.01:B

R9034 220:1/16J
R9035 220:1/16J
R9036 220:1/16J
R9037 220:1/16J
R9038 220:1/16J
R9039 220:1/16J
R9040 220:1/16J
R9041 220:1/16J
R9042 220:1/16J
R9043 220:1/16J
R9044 220:1/16J
R9047 220:1/16J

R9023 0:1/16Z

R9019 10K:1/16D
Q9002 2SC3931
R9020 2K:1/16J

IC903
ICX252AK-B
CCD

C9029 0.1:F 1608
D9002 DSH01S
R9028 100K:1/16J

R9004 3.9:1/16J
R9005 0:1/10Z 2/25
L9001 NMF39R12C102T1
C9001 0.01:B
C9011 1:F
R9060 0:1/16Z 1608

H-DRIVER

IC902
74ACT04MTC

C9053 0.01:B 1608
C9016 1:F 2/25
R9018 82K:1/16J
C9019 0.1:F 1608
C9022 1:F 2/25
C9023 10:20-T

C9017 0.1:F 1608
C9052 1:F 2/25

R9011 68:1/16J
R9012 10:1/16J
R9013 10:1/16J
C9020 0.1:F 1608

C9027 0.1:F 1608
C9028 2200P:B
R9025 1M:1/16J
D9001 MA727

R9021 10K:1/16J
R9022 1.3K:1/16J
Q9003 2SD1819A

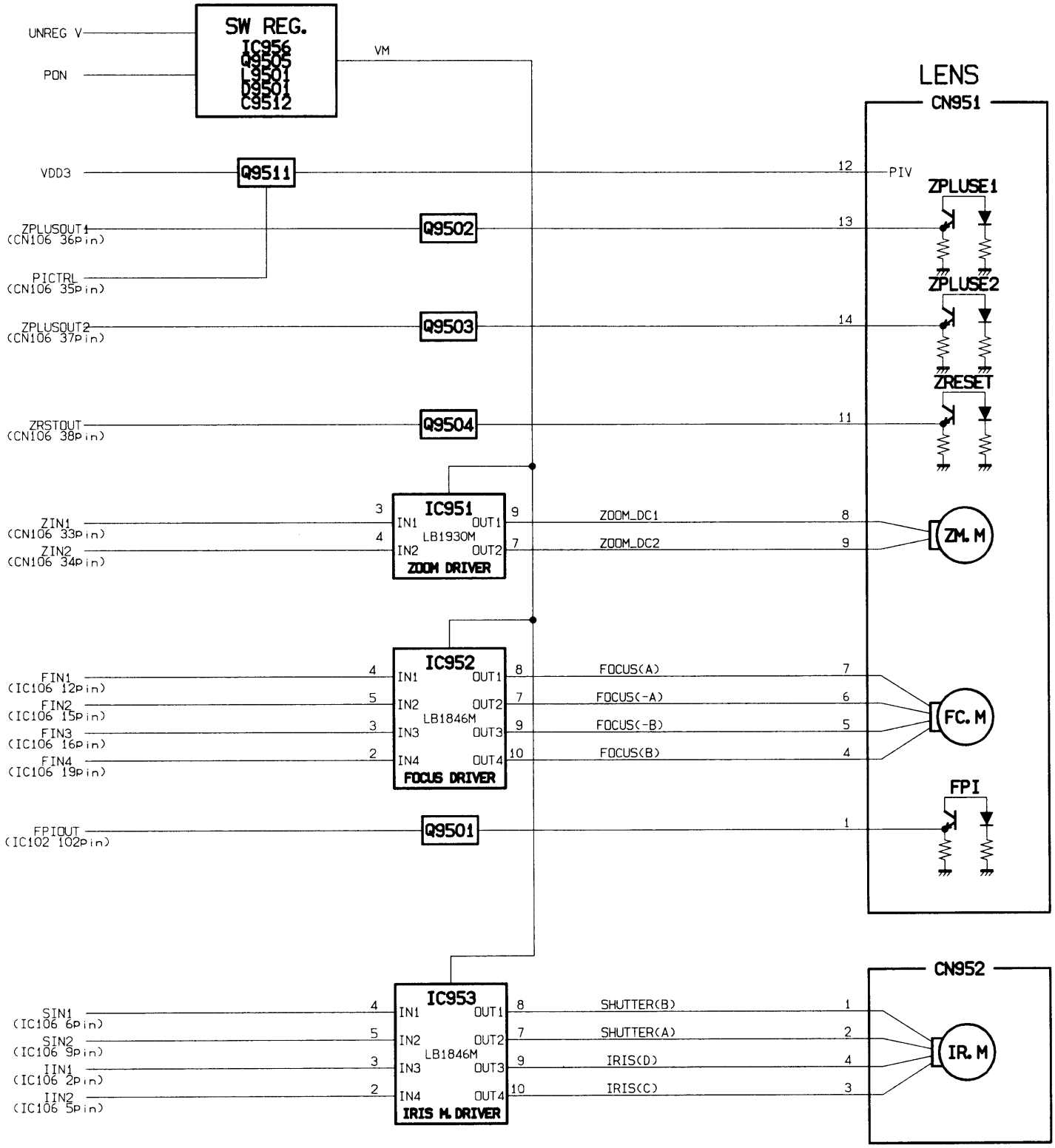
R9024 0:1/16Z
C9030 0.1:F 1608
C9031 1:F 1608
R9032 0:1/16Z 1608
C9034 0.01:B

IC909
TK11333BM
QM/QRTR36AZ
H=1.4

CCD 回路図
CCD CIRCUIT DIAGRAM

回路図
CIRCUIT DIAGRAM

画像制御基板　CA-1
IMAGE CONTROL P. C. B. CA-1



レンズブロック図
LENS BLOCK DIAGRAM

画像制御基板　CA-1
IMAGE CONTROL P. C. B. CA-1

VAA11251-R. 3514. A

TO COMPACT FLASH

TB1
CN141

-REG

IC145
TC7W74FK

-CE

IC146
TC7W74FK

X1101
FFCX-03
14. 31818MHZ

NTSC:14. 31818MHZ
PAL :17. 734476MHZ

IC111
SG588BTB
Clock Gen.

IC112
SG587ETB
Fsc Conv.

WK UP
RESET/SREQ/SO
SCK/SI

IC106

RXD/TXD

IC131
ADM3202ARU

RXD/TXD

TO SY-1
CN131
Serial
USB

DATA+/DATA-

JK151
VIDEO OUT
Video Jack

IC101

MB86836PBT

BGA

RISC CPU

ADDRESS

DATA

CKIN1
CKIN2

ZCCE
ZREG
FDE0::15]
CAE0:3]
AE0:24]
DE0:31]

IC102

KS5M9U1262CBP

BGA

SYSTEM ASIC

SAE0:13]
SDE0:15]
SDE16:31]
CCDE0:11]

COUT
YOUT

Q1502
Q1501
Q1503

AMP
IC152
TK15405TM

CN103

INVCLK

TO ST-1

LCD C
LCD Y

LCD Driver
IC171
LA4127W

LCD BLOCK

CN171
TO LCD

XHE1:2]
XVE1:4]
XSGE1A:2B]
XRG
XSUB

H
V
SG
RG
SUB

CCD
BLOCK

ADE0:11]
ADCK/PBLK/XSHD/XSHP

IC121

LE28BW168T

16Mbit FLASH

IC103

BGA

M2V64S40DTP-7
MB81F641642D

64Mbit SDRAM

IC104

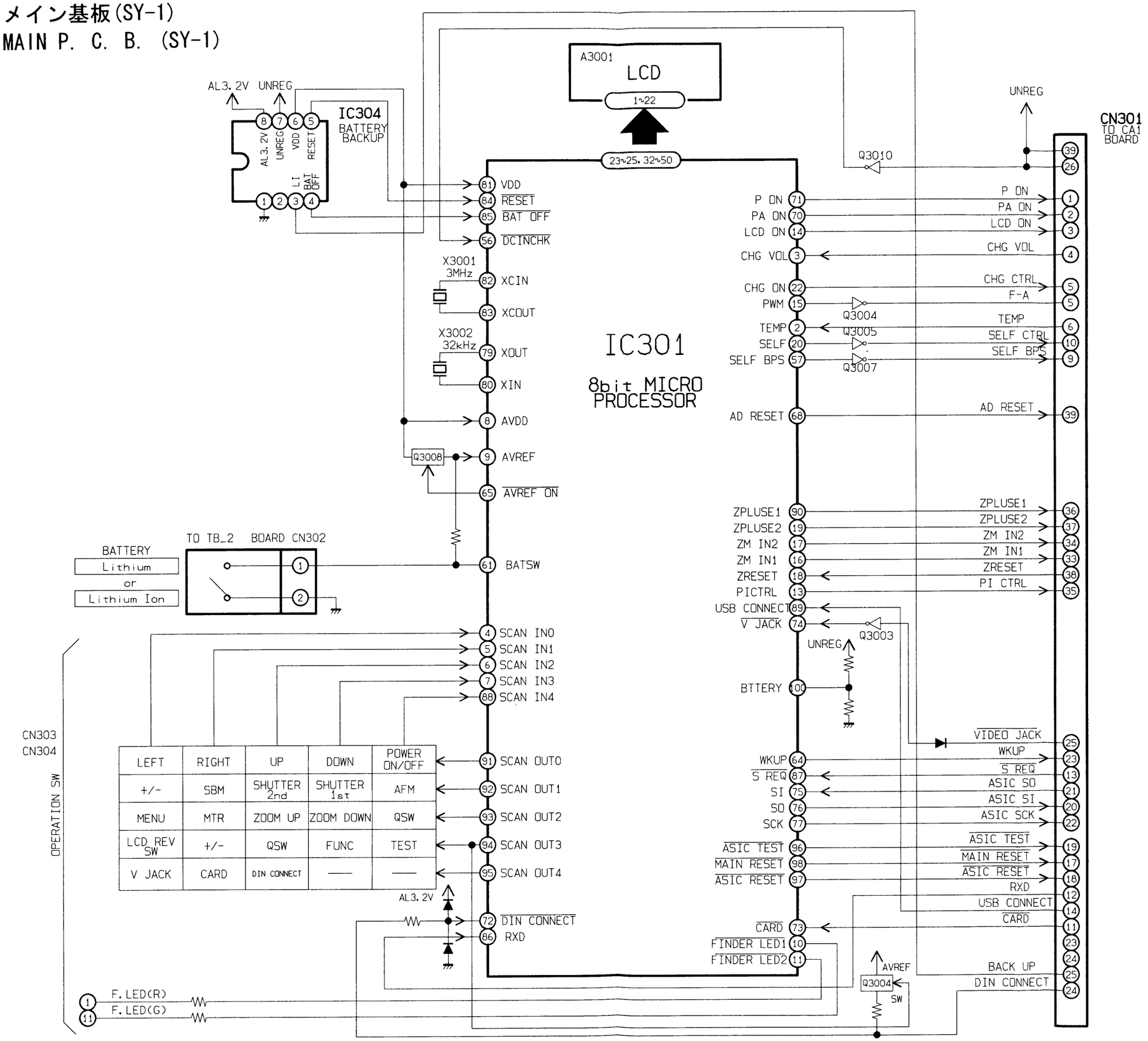
BGA

M2V64S40DTP-7
MB81F641642D

64Mbit SDRAM

MAIN LCD ブロック図
MAIN & LCD BLOCK DIGRAM

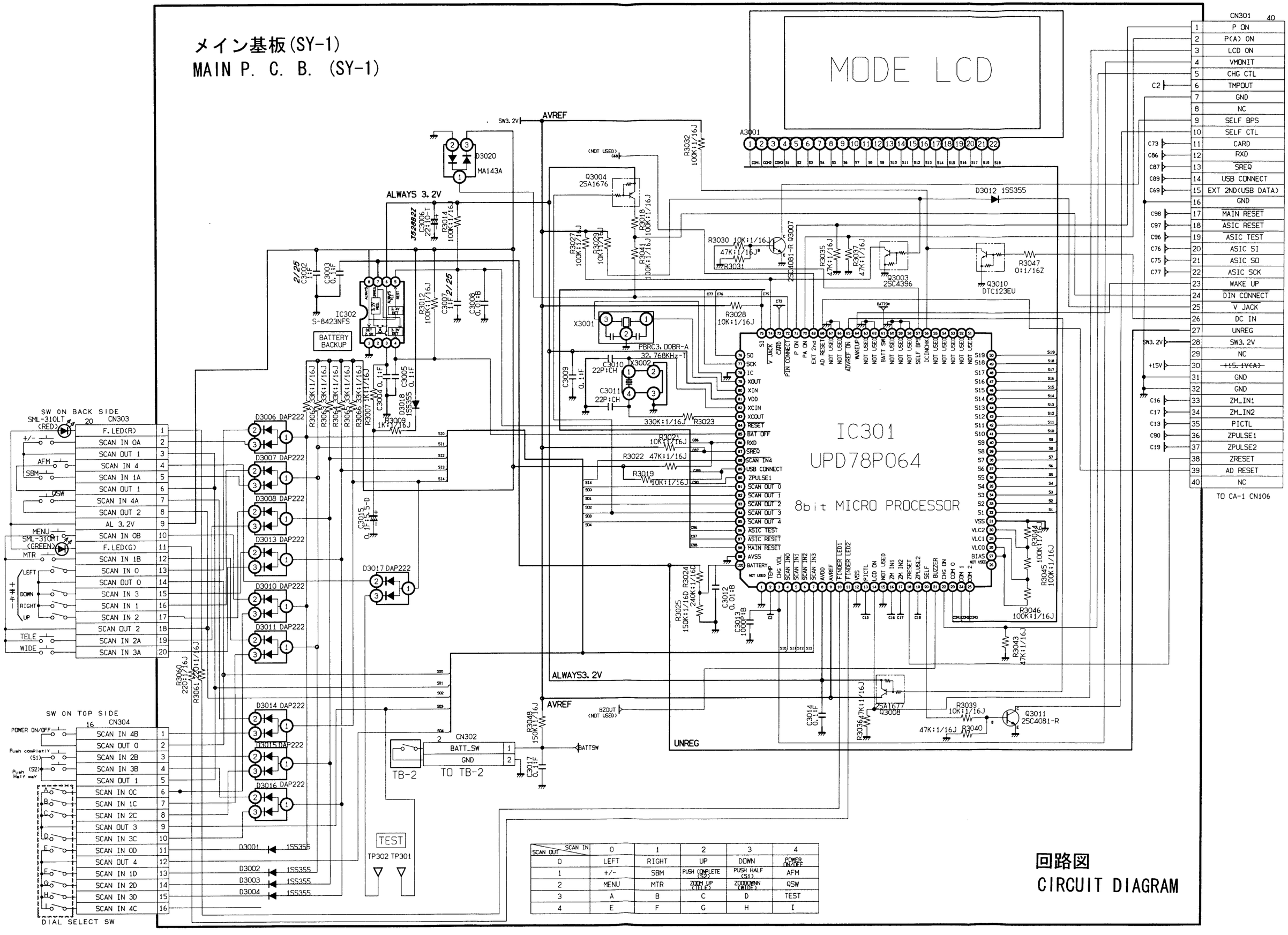
メイン基板(SY-1)
MAIN P. C. B. (SY-1)



LEFT	RIGHT	UP	DOWN	POWER ON/OFF
+/-	SBM	SHUTTER 2nd	SHUTTER 1st	AFM
MENU	MTR	ZOOM UP	ZOOM DOWN	QSW
LCD REV SW	+/-	QSW	FUNC	TEST
V JACK	CARD	DIN CONNECT	——	——

ブロック図
BLOCK DIAGRAM

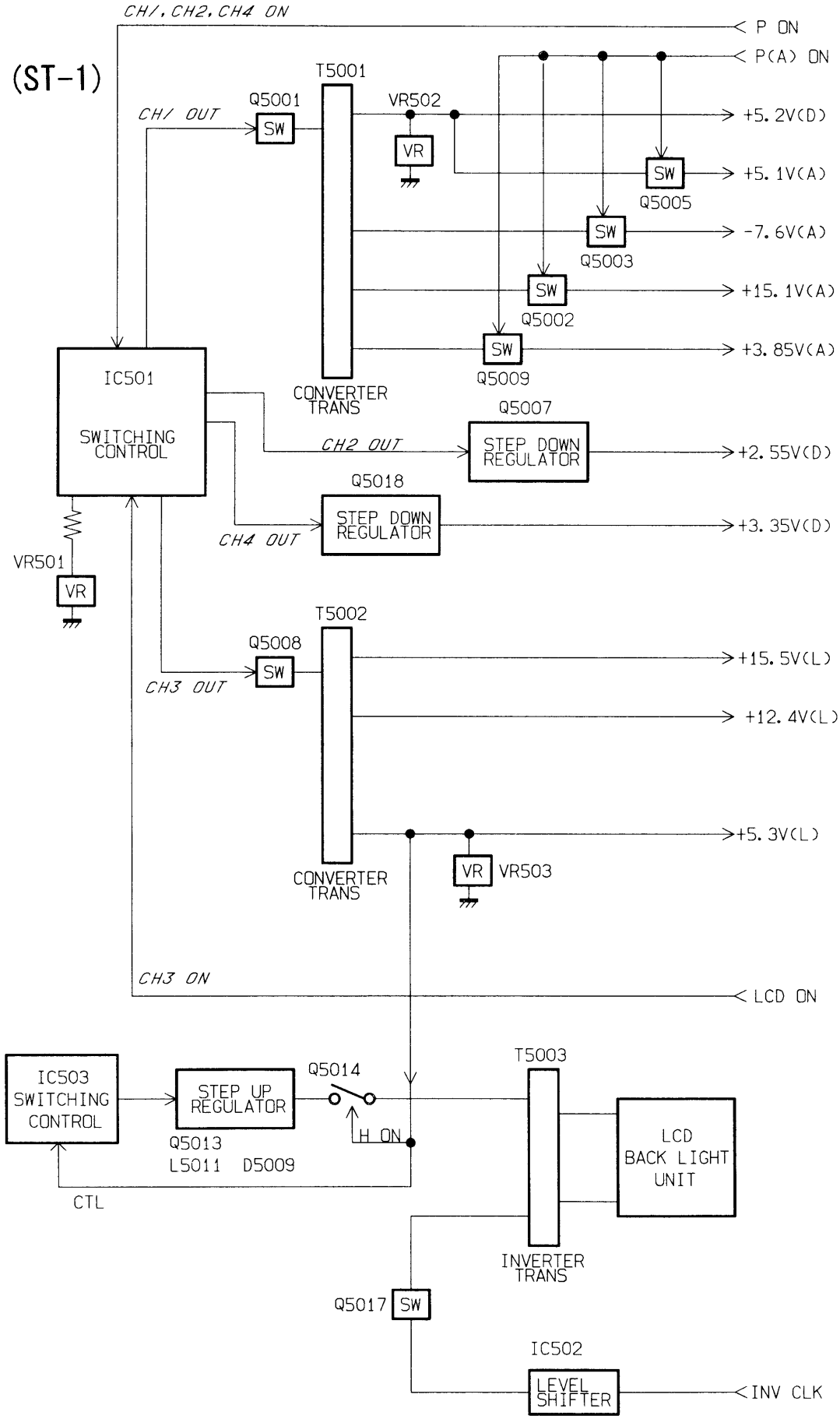
メイン基板(SY-1)
MAIN P. C. B. (SY-1)



SCAN OUT \ SCAN IN	0	1	2	3	4
0	LEFT	RIGHT	UP	DOWN	POWER ON/OFF
1	+/-	SBM	PUSH COMPLETE (S2)	PUSH HALF (S1)	AFM
2	MENU	MTR	ZOOM UP (TELE)	ZOOM DOWN (WIDE)	QSW
3	A	B	C	D	TEST
4	E	F	G	H	I

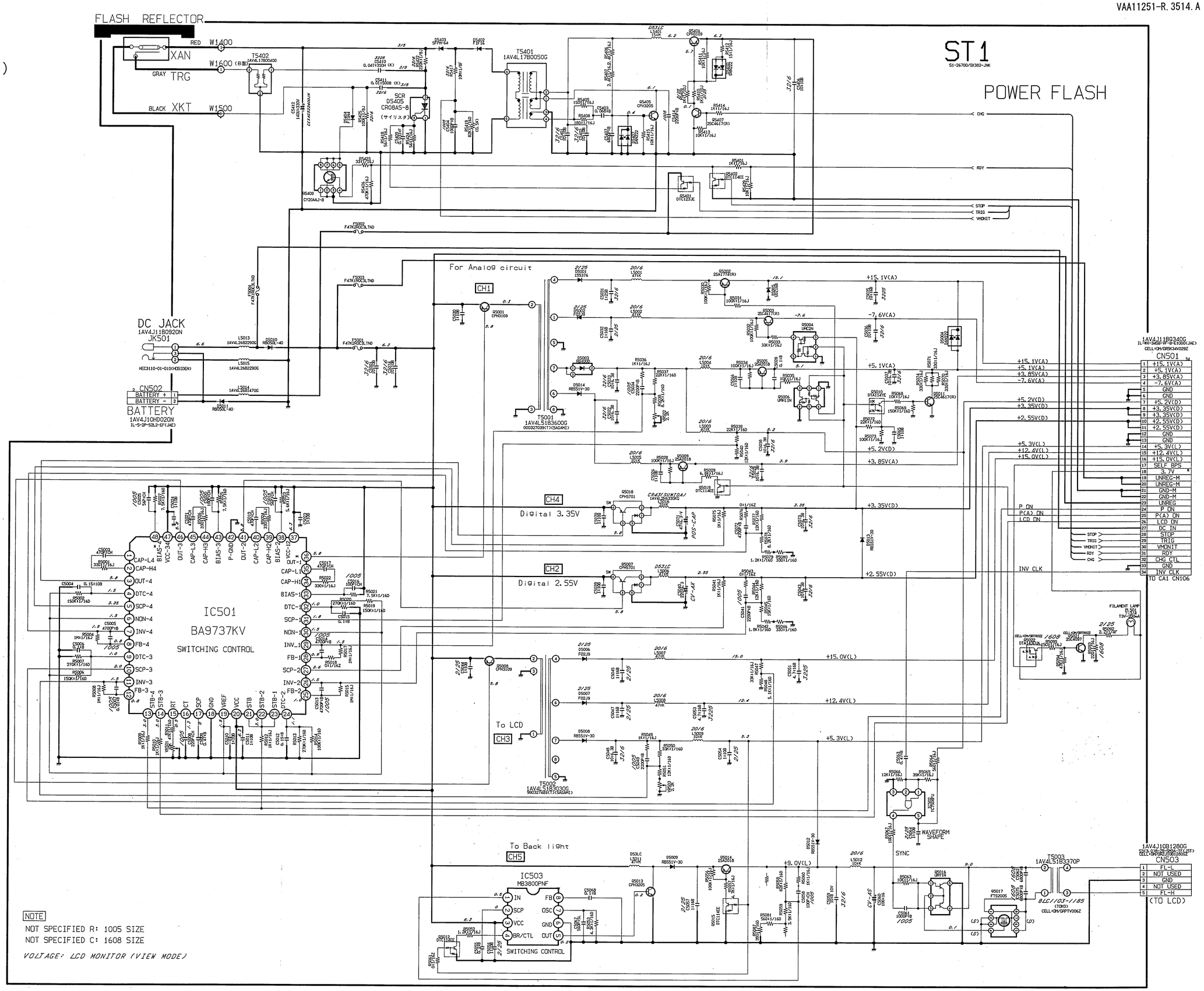
回路図
CIRCUIT DIAGRAM

電源基板(ST-1)
POWER P. C. B. (ST-1)



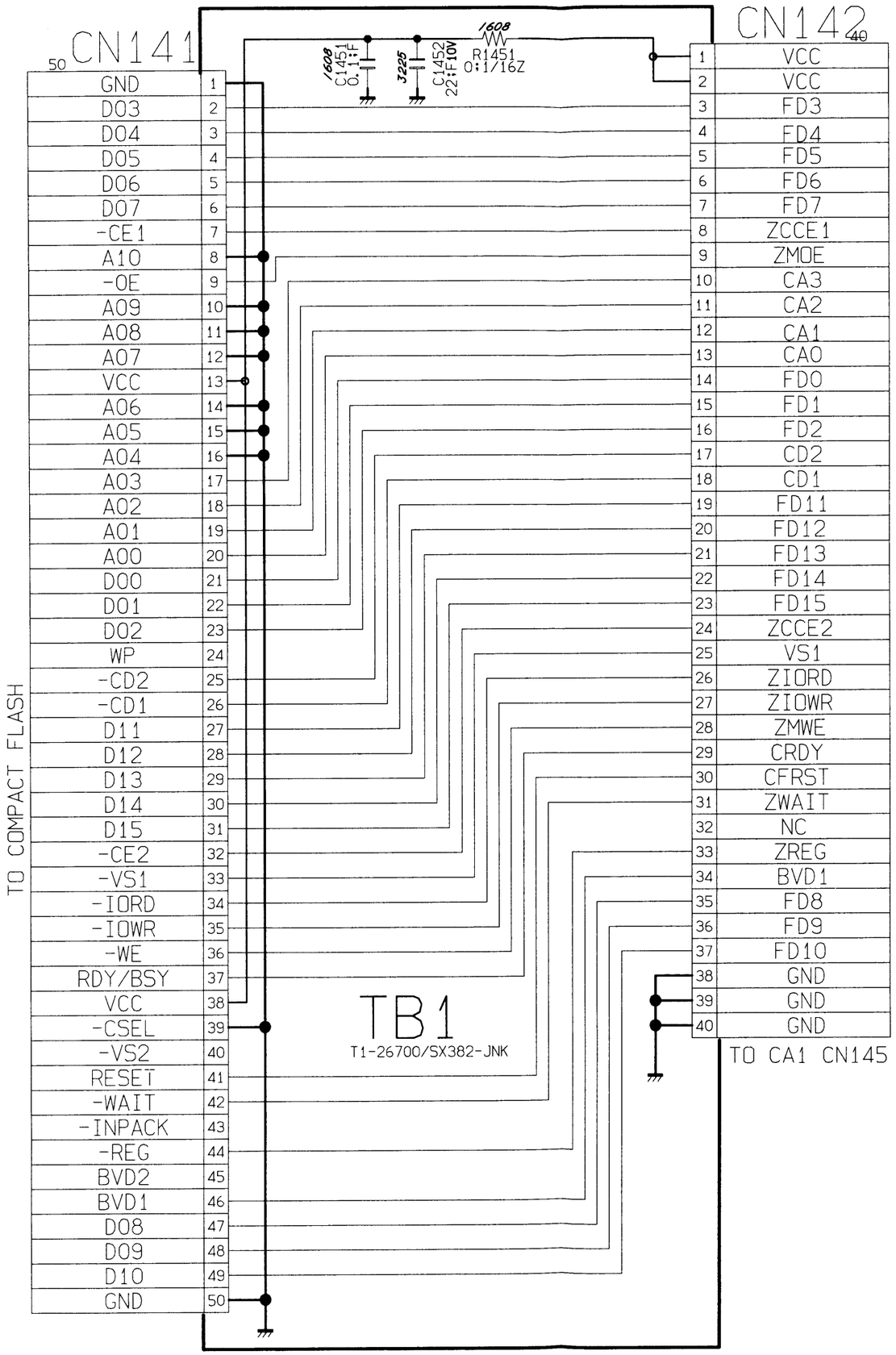
ブロック図
BLOCK DIAGRAM

電源基板(ST-1)
POWER P. C. B. (ST-1)



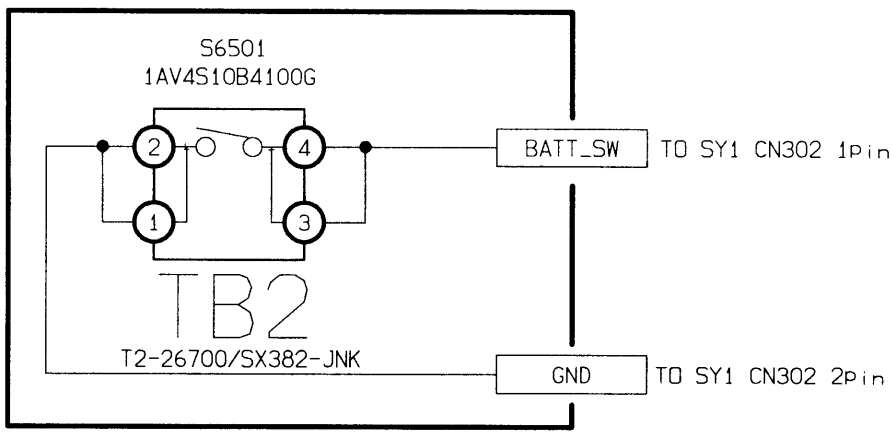
回路図
CIRCUIT DIAGRAM

TB-1 基板(TB-1)
TB-1 P. C. B. (TB-1)



回路図
CIRCUIT DIAGRAM

TB-2 基板(TB-2)
TB-2 P. C. B. (TB-2)



回路図
CIRCUIT DIAGRAM

VAA11251-R.3514.A

The contents of inspection standards and tools for E880

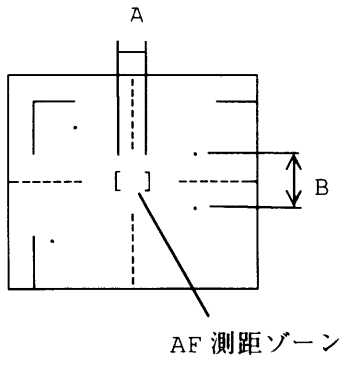
Conditions to be set and prepared for inspections

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 :
   If not specified, 6V Lithium battery (2CR5) or Rechargeable Li-ion shall be recommendable to use.
4. Standard power supply :
   Specified AC power supply EH-21 shall be required.

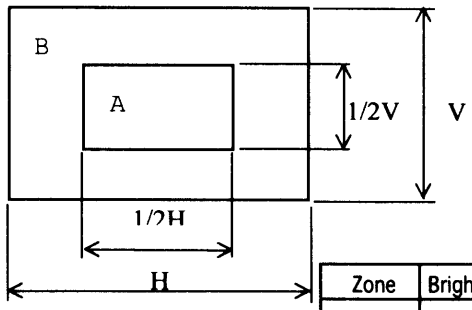
[1] Inspection standards

	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 0.5 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.	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 2mm±6%	Dedicated tool(s)
	Open aperture F No.	-Wide-end position (Compelling ∞) F2.8 ±7.8% -Tele-end position (Compelling ∞) F4 ±9.2%	
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.	

c	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 - 6.9±0.4EV 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 6 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

<table>
<tr><td></td><td>Item</td><td>Benchmark</td><td>Applied tool(s)</td></tr>
<tr><td>Quality of image</td><td></td><td>
<table>
<tr><td></td><td>R</td><td>G</td><td>B</td></tr>
<tr><td>W</td><td>210±20</td><td>215±20</td><td>215±20</td></tr>
<tr><td>Ye</td><td>210±20</td><td>215±20</td><td>80±15</td></tr>
<tr><td>R</td><td>210±20</td><td>25±15</td><td>10±10</td></tr>
</table>
-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><td>EIAJ chart
5100K viewer
Photoshop</td></tr>
<tr><td>Finder</td><td>Operation mode</td><td>- Only smooth operation mode shall be required.
'Caught-in-mechanism' touch or any unstable or unsteadily zooming mode shall not be required.</td><td>Visual observation</td></tr>
<tr><td></td><td>Dust, Fluff, Scratch(es)</td><td>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><td></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
 

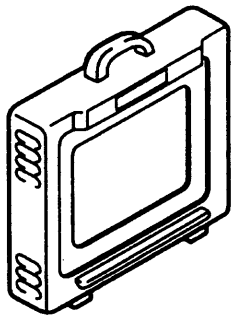
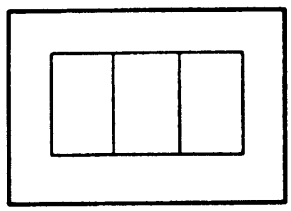
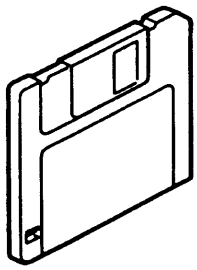
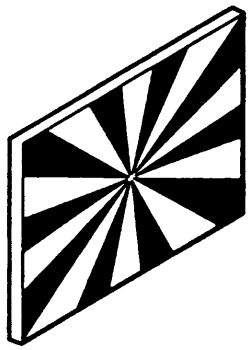
<table>
<tr><th>Zone</th><th>Bright pixel</th><th>Dim pixel</th></tr>
<tr><td>A</td><td>1</td><td>6</td></tr>
<tr><td>B</td><td>3</td><td>6</td></tr>
<tr><td>Total</td><td>3</td><td>6</td></tr>
</table>
Bright pixels:Visible normally throught 5% ND filter
Dim pixels: Visible normally</td><td>Visual
observation</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.

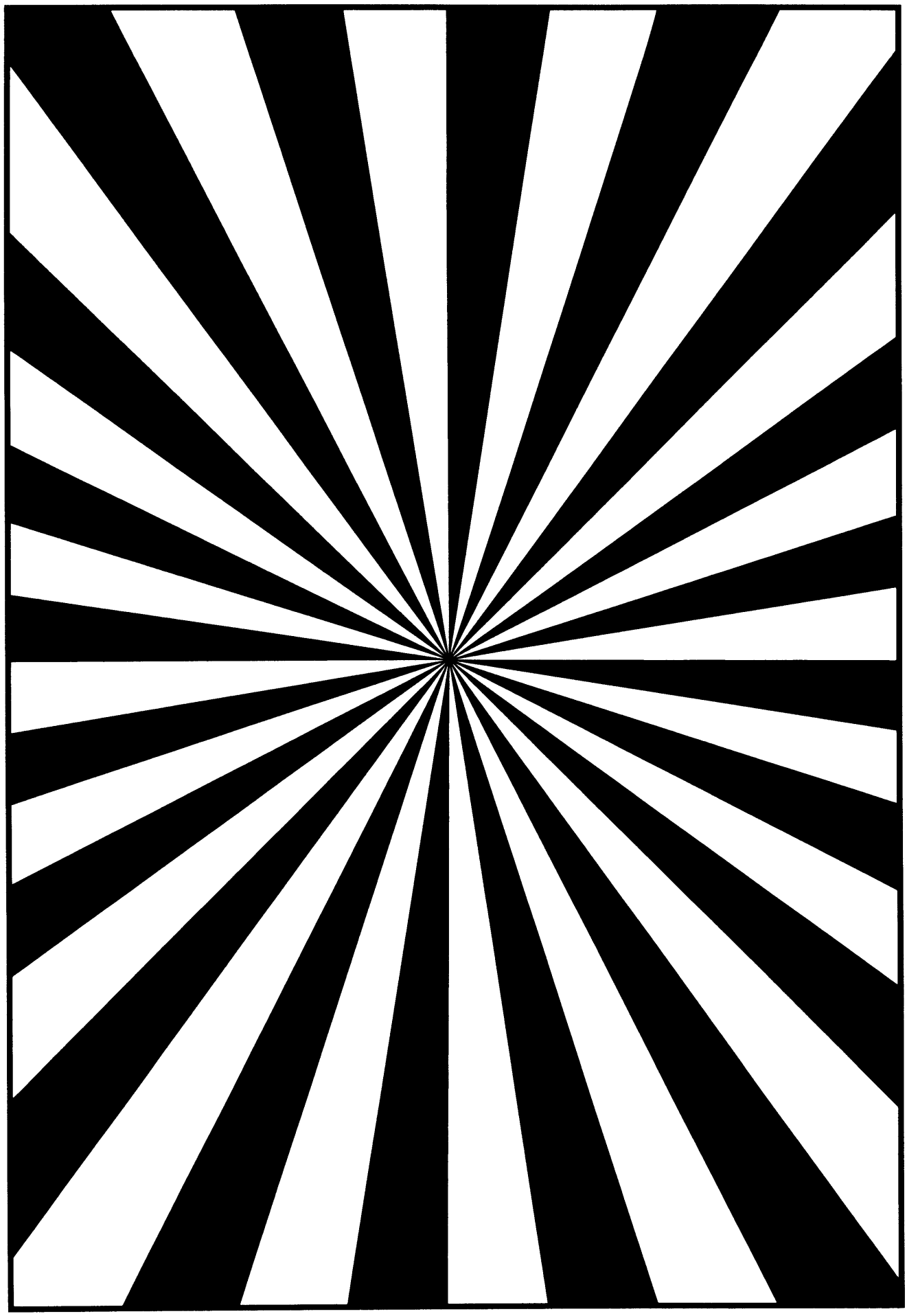
Start-up
- Select 'A-REC' from the select dial and check that any image appears on the LCD.
Then, leave it for 15 sec. or a bit longer and then measure the consumption current value.
The value shall be less than 1A.</td><td></td></tr>
</table>

	Item	Benchmark	Applied tool(s)
Visual observation	For battery-check voltage	Level 1 -4.9 ± 0.2 V(Half battery mark) 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 -4.25 ± 0.25 V (The battery mark blinks) 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 -4.23 ± 0.2 V (The LCD is turned off / The shutter release mode is locked) 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
J63049 (100Volts) J63050 (110Volts) J63051 (230Volts) J63052 (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 共通 Common
J65034	キャリブレーションソフト Calibration Software		E990 E880 共通 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 共通 Common



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