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Nikon Digital Camera E700

COOLPIX700

MODEL [J : VAA10801]
MODEL [US/EN :VAA10802]
MODEL [EU:VAA10811]

SERVICE MANUAL

Nikon

NIKON CORPORATION Tokyo Japan

Table of Contents

Specification

1. Chief Specifications

1) CCD 211M pixels 1/2-in. high-desity
Full size : 1600 x 1200, XGA : 640 x 480

2) Lens f=6.5mm [35mm (135) format equivalent to 35mm) F2.6
Shooting distance 30cm (11.8in) ~∞ / 8cm (0.8in) ~∞ in macro mode

3) Optical viewfinder Real-image optical viewfinder, magnification : 0.45x
frame coverage : approx. 85% : LED indication

4) LCD monitor 1.8-in, 112,000-dot, TFT LCD
Backlight / brightness adjustment available (3 steps)
frame coverage : approx. 97%

5) Shutter Mechanical and charged-coupled electric shutter, 8 - 1/750 sec
A-REC:1sec - 1/750sec , M-REC:8 sec - 1/750sec

6) Aperture Electrio-magnetically controlled

7) Sensitivity ISO 80 equivalent

8) Expouser metering 256-segment Mtrix / Center-Weighted / Spot

9) Expouser control Programmed Auto / Shutter-Priority Auto / Aperture-Priority Auto /
Expouser compensation (±2EV in 1/3 EV steps)

10) Expouser range EV -2 ~+15.5 (ISO 100 equivalent)

11) Expouser control Program AE by Aperture control and Electric shutter

12) Expouser compensation
EV-2 - EV+2 (1/3EV / step)

13) Speedlight
- Guide number : 7 (at ISO 100, m/ft)

- Flash contorl sensor flash system
- Flash modes Auto flash / Flash cancel / Anytime flash / Slow sync
- Red-eye reduction (illuminates for 0.8 sec.before main flash)

14) White balance — Automatic TTL control;can be set manually; presetting possible

15) Auto power off — 30 sec

19) Auto focus — Contrast AF

20) Shooting mode — Fully Automatic (A-REC) mode / Custom M-REC can be memorized
Single / Continuous (approx, 1.5fps for full-size images)
Multiple continuous (16 frames in 1/16 size)

21) Compression — Hi (uncompressed TIFF), Fine=1/4, Normal=1/8, Basic=1/16

22) Storage — CompactFlush Card

23) Capacity — Hi=1, Fine=8, Normal=16, Basic=32 (with 8Mbyte CF Card)
Type of image file JPEG / uncompressed TIFF

24) Playback menu — Frame/Thumbnail (4 / 9 segments) / Slide show / 2x or 3x zoom playback (selectable from 9 segments)

24) Delete function — Dletes all frames or selected frames

25) Interface — Serial interface (Windows:115kbps, Macintosh:230kbps) /
Video output (NTSC/PAL)

26) I/O terminal — Power input / Video output / High-speed serial terminal / Sync termial for external speedlight

27) Power requirements — 4 batteries:1.5V LR6[alkaline AA-size(L40)] / 1.5 FR6 Lithium/1.2V Ni-MH / 1.2V NiCd AA-size AC adapter(option)

28) Self-timer — 10 sec, 3 sec. duration

29) Battery life	Approx:60 min. when using LCD monitor and four 1.5V LR6 batteries at normal temperature (20℃/68℉)
30) Dimensions (W x H x D)	114 x 67 x 38.5mm
31) Weight (without battery)	Approx. 270g (without Battery)

Disassembly Procedure

⚠ 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.

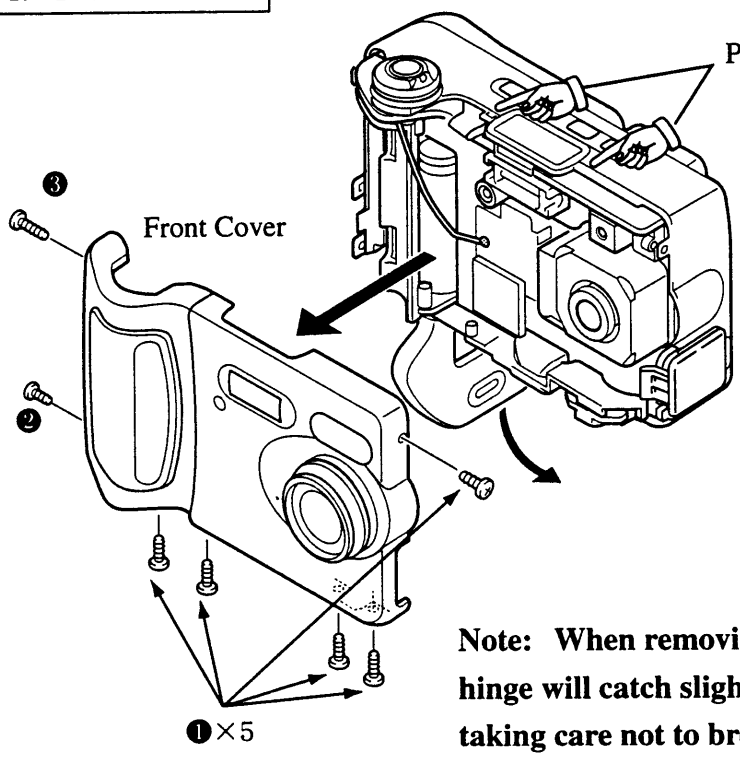
(3) Electrical parts must be grounded since they are easily damaged by static.

Types of screws used

The screws are indicated in the illustrations and text of the disassembly and reassembly sections of the Repair Guidelines by the numbers given in the table below.

Designation	Size (mm)	Type	Head size	Color	Parts number
❶	1.7×5.0	Tap	Small	Black	411-177-7301
❷	1.7×4.0	Tap	Small	Black	411-175-6504
❸	1.7×8.0	Tap	Small	Black	411-177-8209
❹	1.7×6.0	Tap	Large	White	411-169-9603
❺	2.0×4.0	Fine thread	Large	White	411-002-4901

1. Front Cover



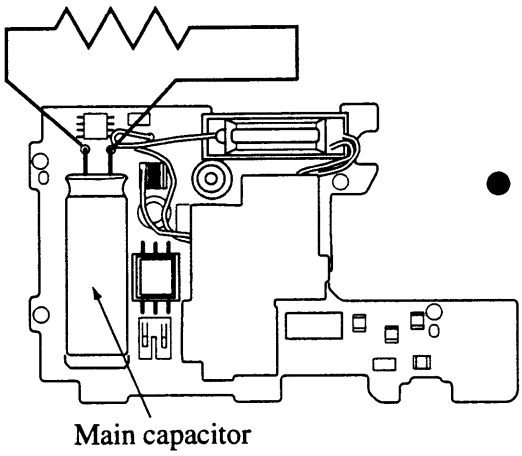
- Open the battery cover.
- Remove screw ❶×5 .
- Remove screw ❷×1 and screw ❸×1.
- The front cover can now be removed.

Note: When removing the front cover, the battery cover hinge will catch slightly. Remove the front cover carefully, taking care not to break the battery cover.

2. Discharging the Main Capacitor

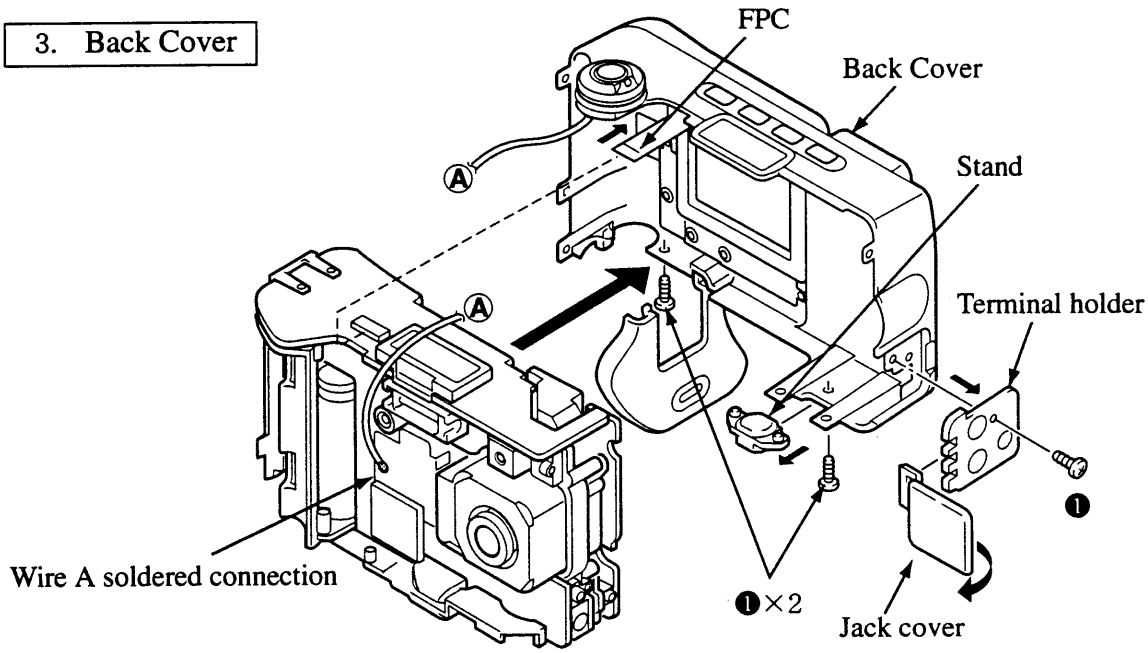
⚠ WARNING

- **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.**



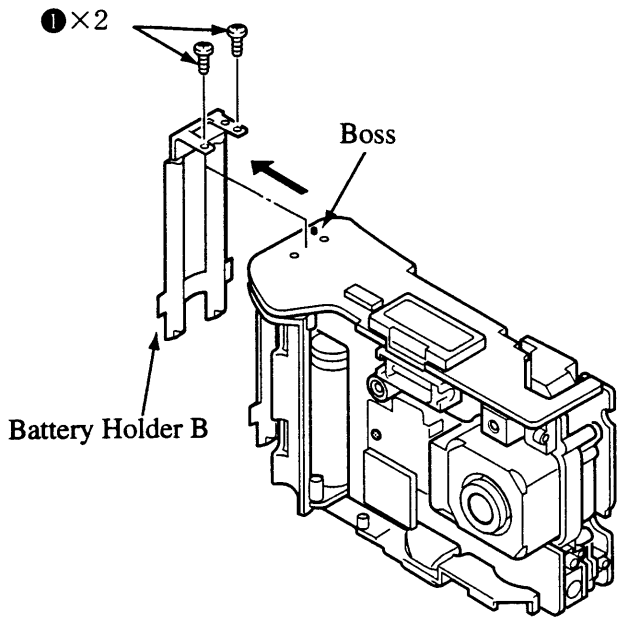
- Be certain to discharge the main capacitor located as shown in the diagram.

3. Back Cover



- Remove the jack cover.
- Remove screw ❶×3 .
- Remove the terminal holder.
- Disconnect wire A where it is soldered to the SB board.
- Disconnect the FPC connector.
- The back cover, stand, and battery cover can now be removed.

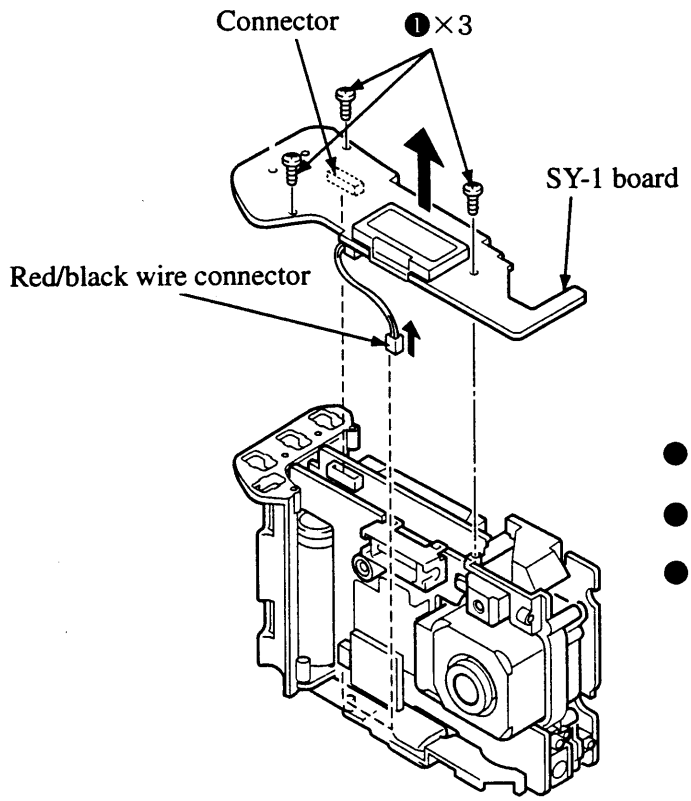
4. Battery Holder B



- Remove screw ❶×2 .
- Remove battery holder B.

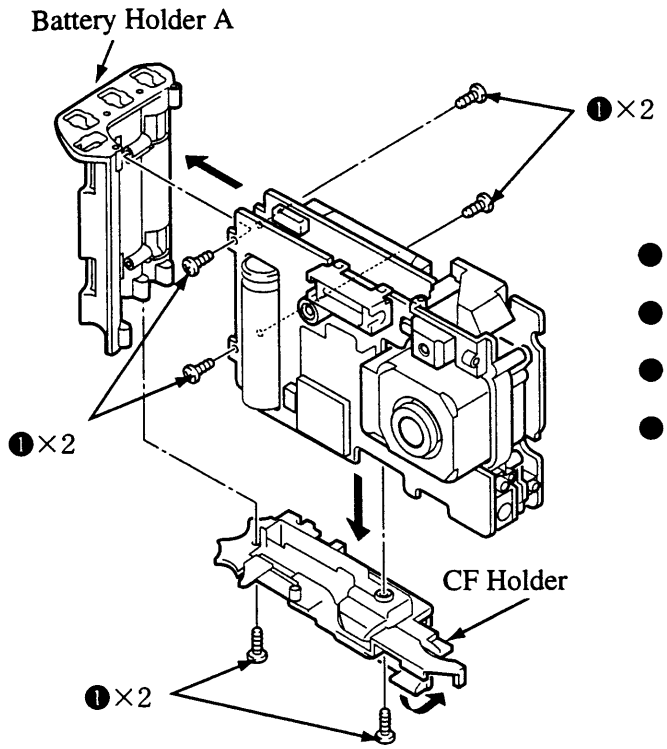
Note: When removing battery holder B, be careful not to break off the positioning boss.

5. SY-1 Board



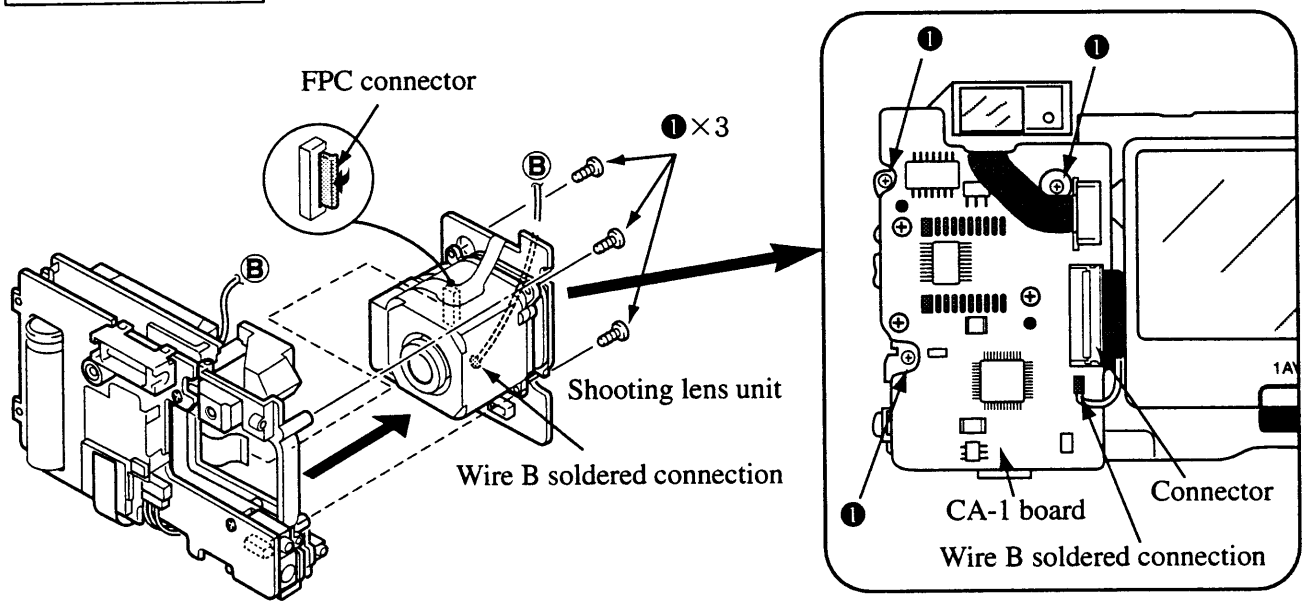
- Disconnect the red/black wire connector.
- Remove screw ❶×3 .
- Remove the SY-1 board.

6. Battery Holder A/CF Holder

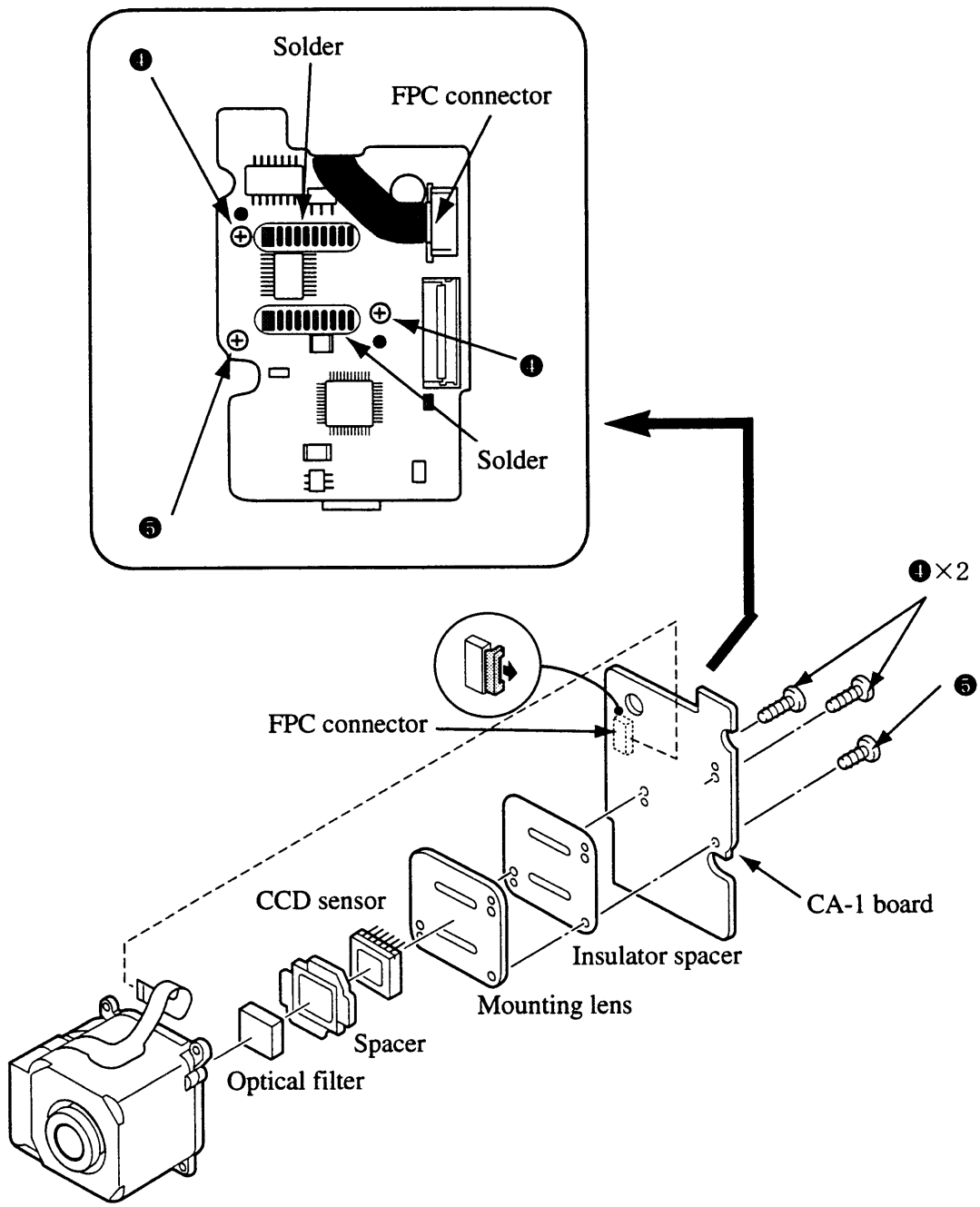


- Open the CF holder and remove screw ❶×2 .
- Remove the CF holder.
- Remove screw ❶×4 .
- Spread the two boards apart, and remove the battery holder.

7. Lens unit

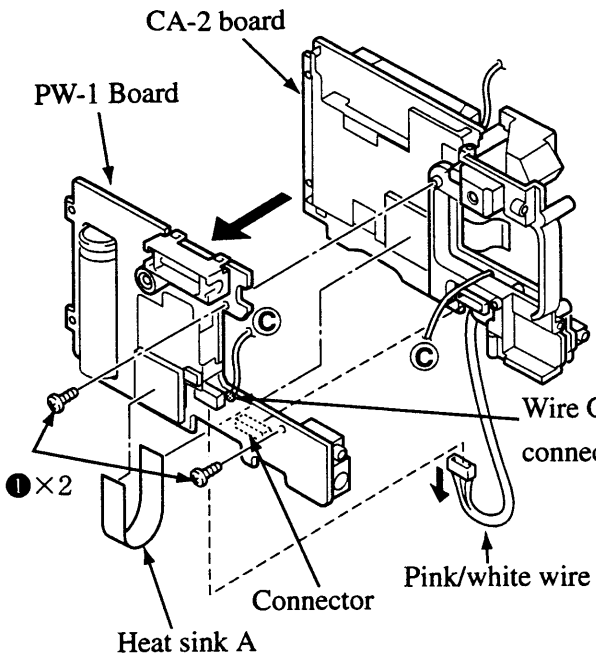


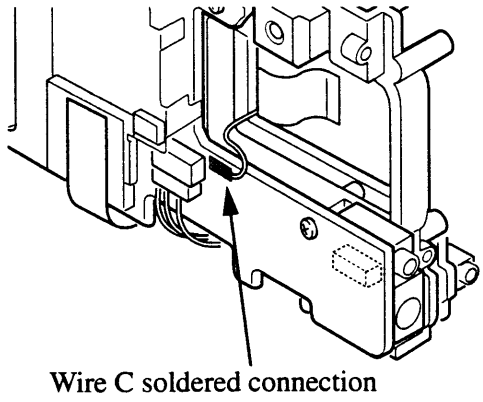
- Disconnect wire B where it is soldered to the CA-1 board.
- Disconnect the FPC connector.
- Remove screw ❶×3 .
- Remove the shooting lens assembly.



- Remove the solder on the CA-1 board.
- Disconnect the FPC connector.
- Remove screw ❹× 2 and screw ❺× 1 .
- The CA-1 board, insulator spacer, mounting lens, CCD sensor, spacer, and optical filter can now be removed, in that order.

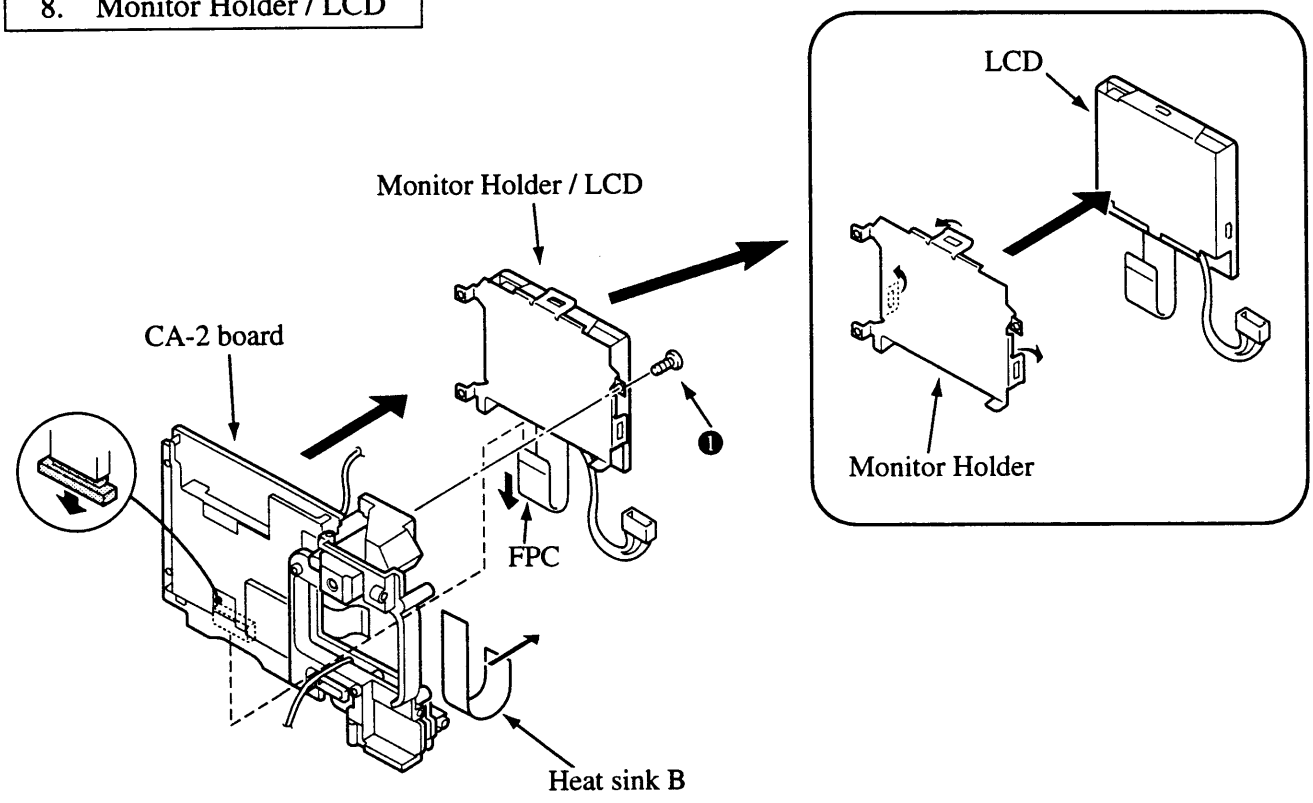
8. PW-1 Board





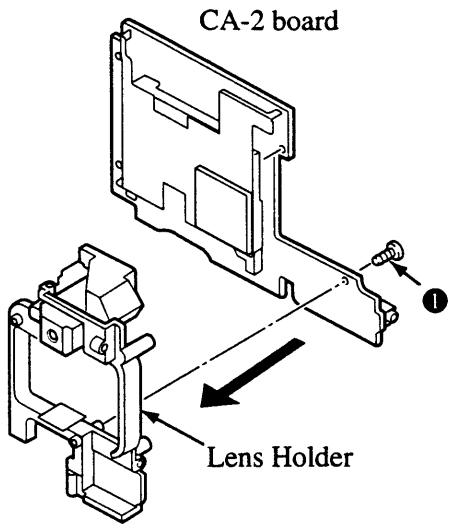
- Disconnect wire C where it is soldered to the PW-1 board.
- Remove heat sink A.
- Disconnect the pink/white wire connector.
- Remove screw ❶×2 .
- Remove the PW-1 board from CA-2.

8. Monitor Holder / LCD



- Remove heat sink B.
- Disconnect the FPC connector.
- Remove screw ❶×1.
- The monitor holder/LCD can now be removed.
- Open the three hooks on the monitor holder slightly and remove the LCD.

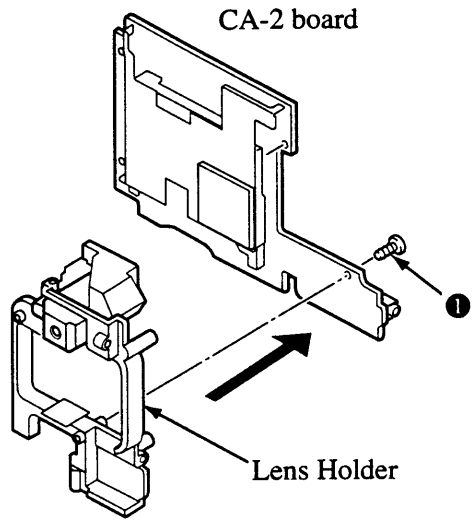
8. Lens Holder



- Remove scre ❶×1.
- The lens holder can now be removed.

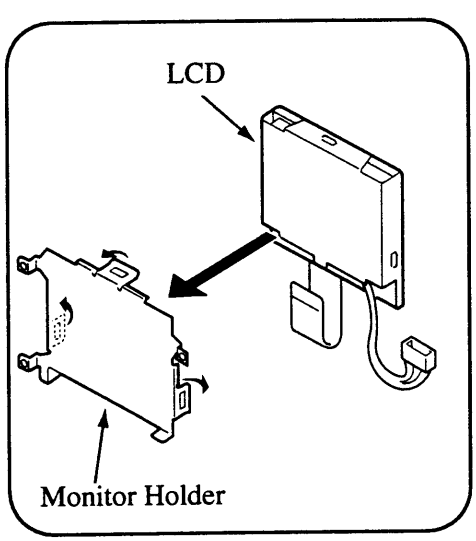
Re-assembly Procedure

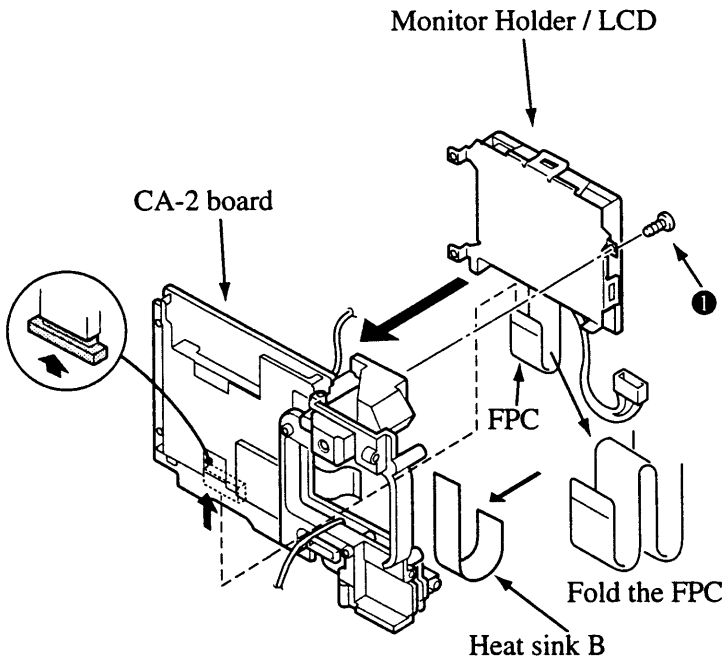
1. Lens Holder



- Use screw ❶×1 to attach the lens holder to the CA-2 board.

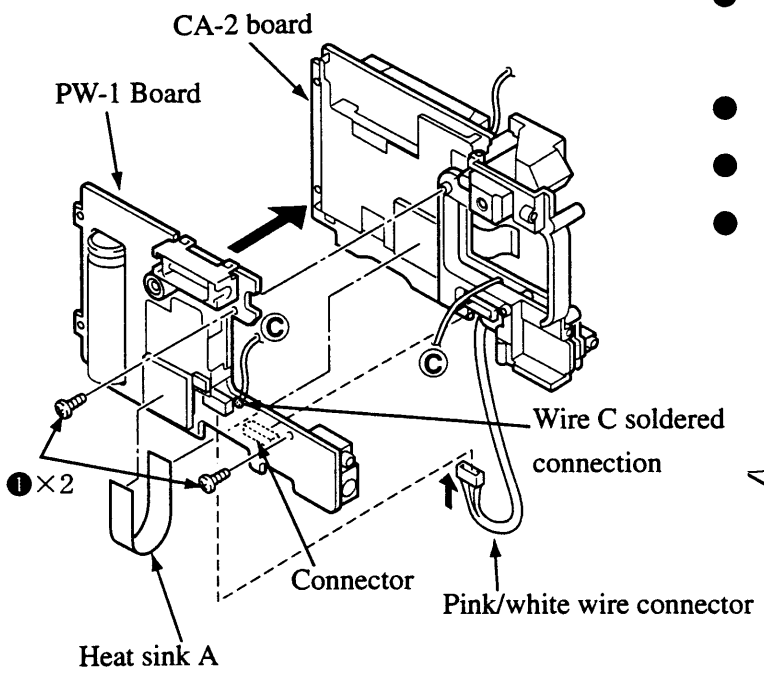
2. Monitor Holder / LCD



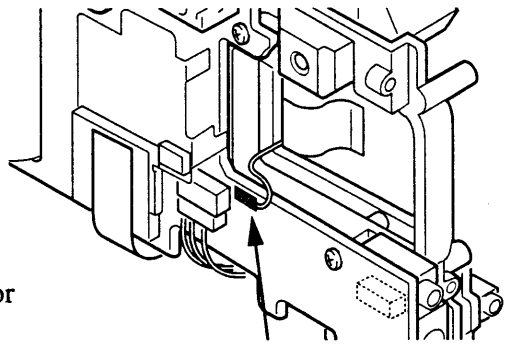


- Open the three hooks on the monitor holder slightly, and insert the LCD into the monitor holder.
- Use screw ❶×1 to attach the monitor holder/LCD assembly to the CA-2 board.
- Connect the FPC connector.
- Attach heat sink B.

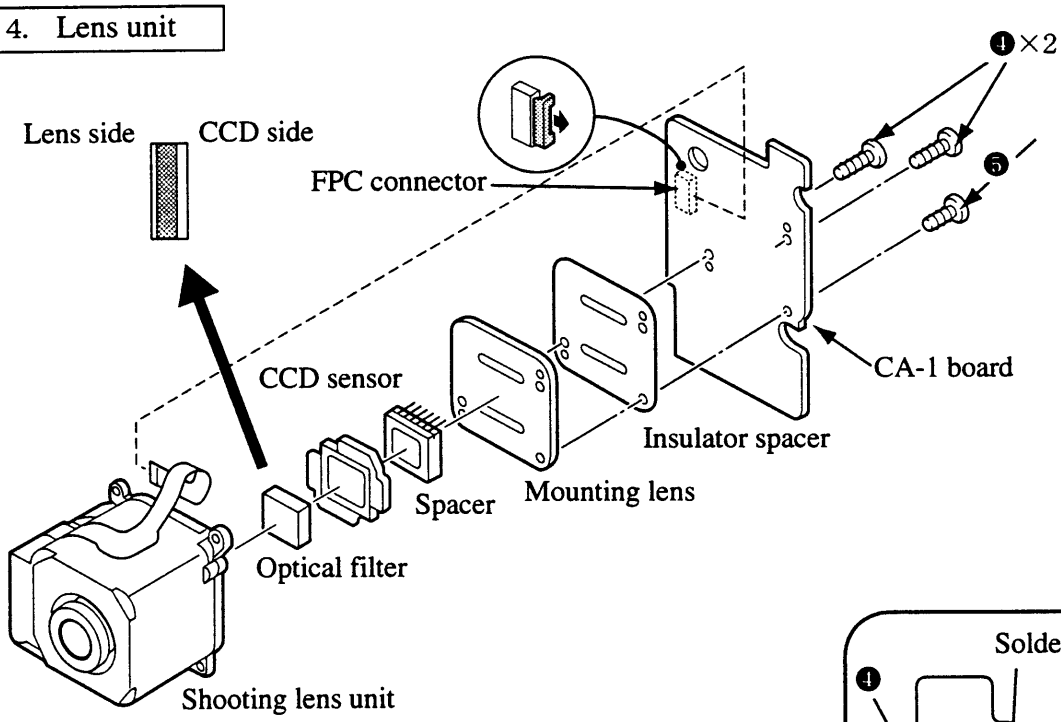
3. PW-1 Board

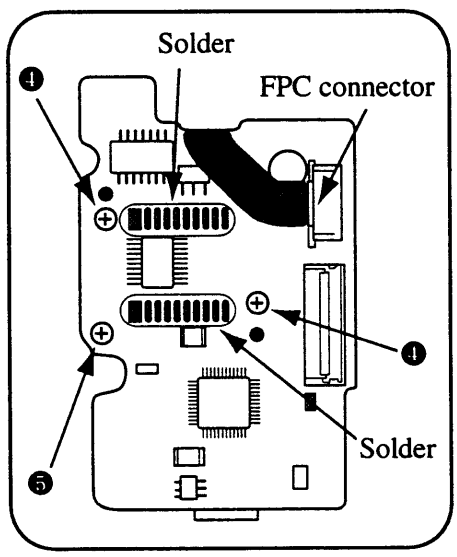


- Use screw ❶×2 to attach the PW-1 board to the CA-2 board.
- Connect the pink/white wire connector.
- Attach heat sink A.
- Solder shielded wire C.

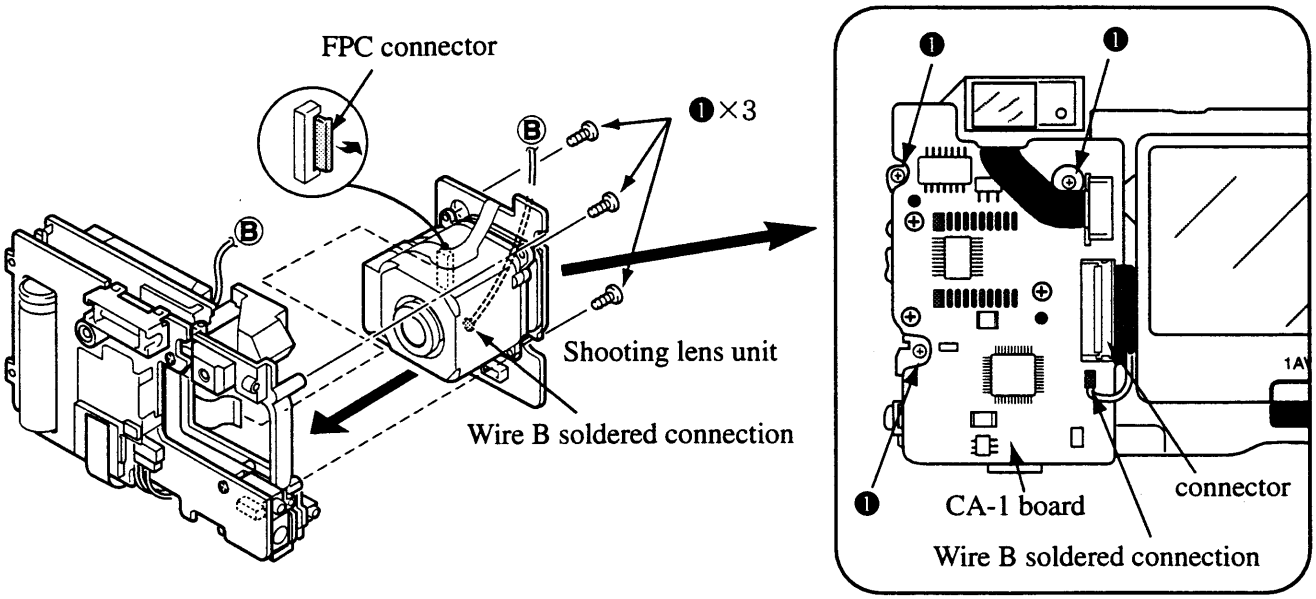


4. Lens unit



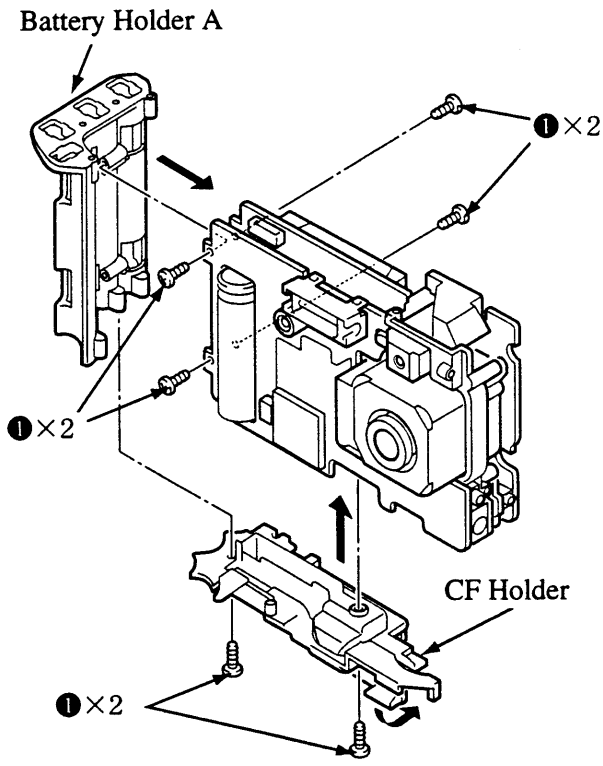


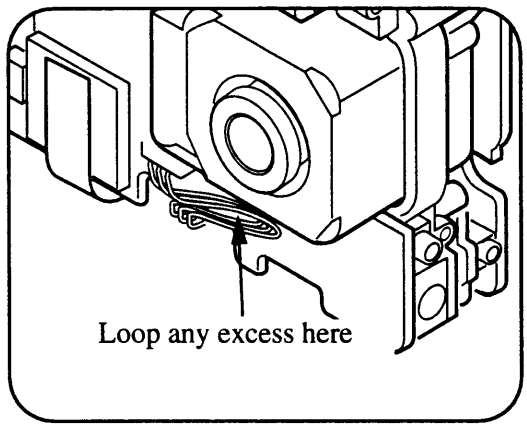
- Attach the optical filter, spacer, CCD sensor, mounting lens, insulator spacer, and the CA-1 board to the lens assembly, in that order.
- Attach screw ❹× 2 and screw ❺× 1 .
- Connect the FPC connector.
- Solder the CA-1 board.



- Use screw ❶×3 to attach the shooting lens assembly to the CA-2 board.
- Connect the FPC connector.
- Solder wire B on the CA-1 board.

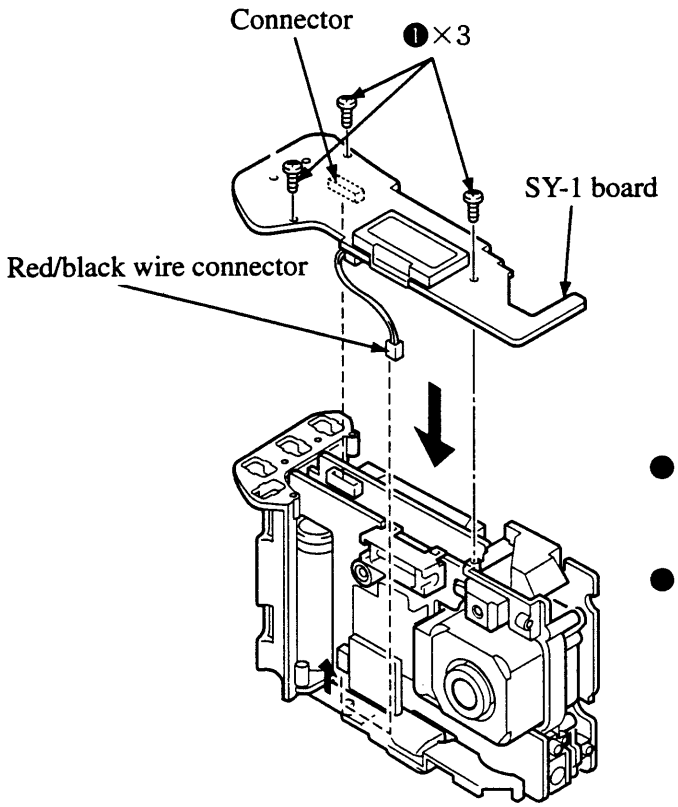
5. Battery Holder A/CF Holder





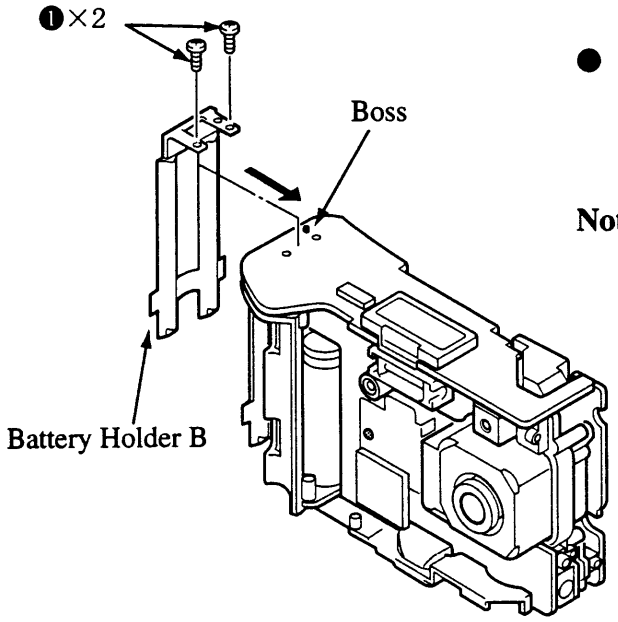
- Spread the two boards apart slightly and attach battery holder A.
- Attach screw ❶×4 .
- Use screw ❶×2 to attach the CF holder to the camera.

6. SY-1 Board



- Use screw ❶×3 to attach the SY-1 board to the camera.
- Connect the red/black wire connector.

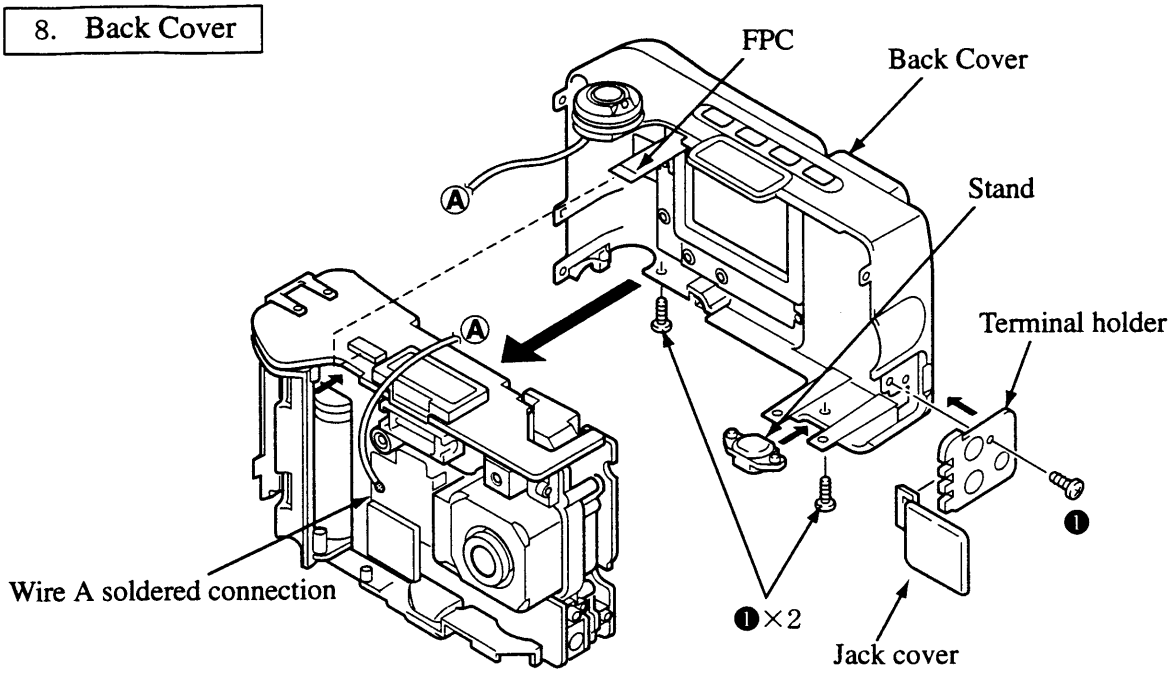
7. Battery Holder B



- Use screw ❶×2 to attach battery holder B to the camera.

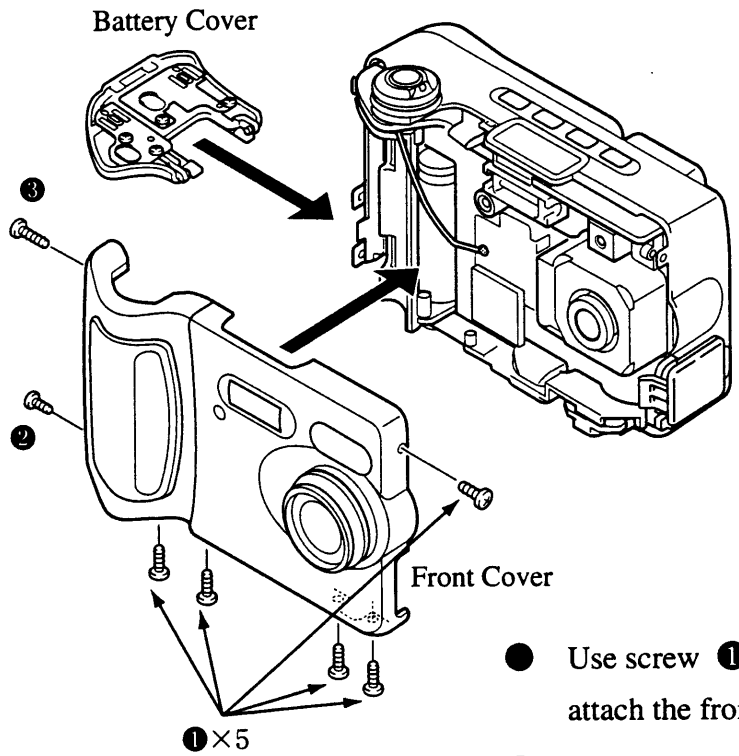
Note : When attaching battery holder B, be careful not to break off the positioning boss.

8. Back Cover



- Use screw ❶×2 to attach the back cover to the camera.
- Use screw ❶×1 to attach the terminal holder to the camera.
- Attach the jack cover.
- Connect the FPC connector.
- Solder wire A.
- Insert the stand.

9. Front Cover



- Use screw ❶×5, screw ❷×1 and screw ❸×1 to attach the front cover to the camera.
- Open the hinge and attach the battery cover.

ELECTRICAL ADJUSTMENT

1. Equipment
- OscilloscopeIBM R compatible PC
- AC adaptor (EH-30)
- IBM R compatible PC

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 95 or 98
- IBM R -compatible PC with 486 or higher processor
- CD-ROM drive
- 3.5-inch high-density diskette drive
- Serial port with standard RS-232C interface
- 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.

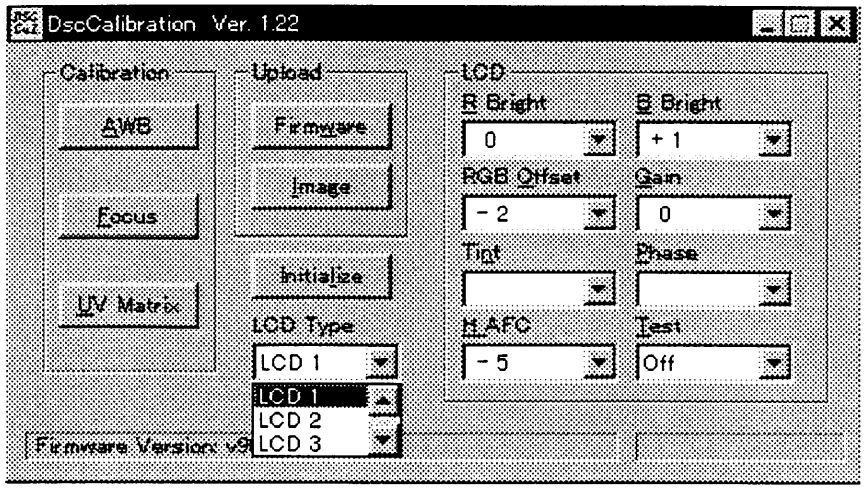
4. Calibration software

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

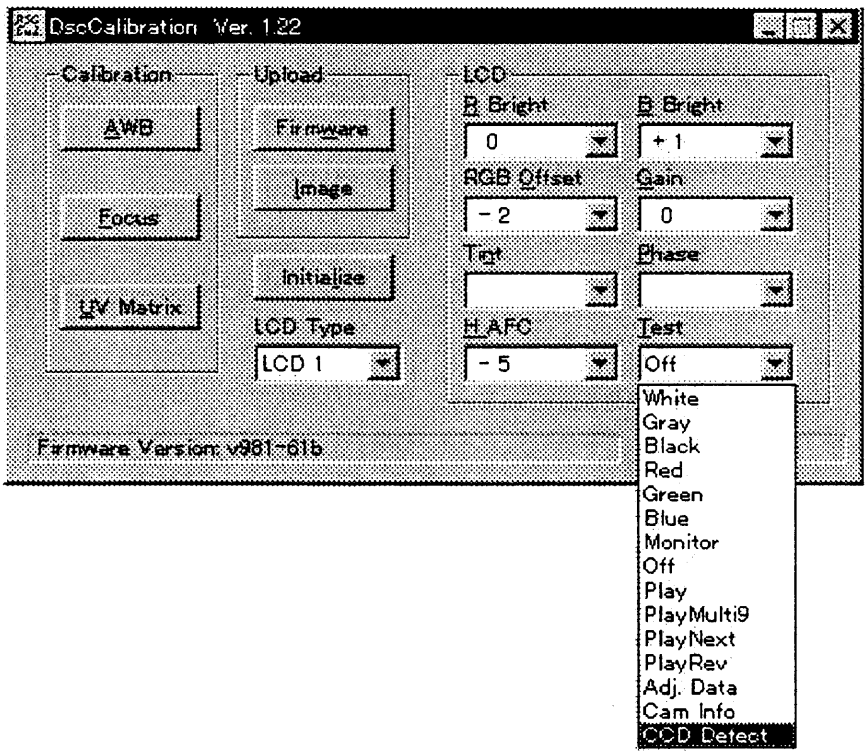
- For adjusting [10. LCD Panel Adjustment], select the camera's LCD type.

*LCD1 for E950

*LCD2 for E700



<F I G－1>



<F I G－2>

5. Adjustment Items and Order

① Flange-back (Lens) Adjustment

② AWB AdjustmentCCD Defect Detect Adjustment

③ Color matrix Adjustment

④ CCD Defect Detect Adjustment

⑤ LCD Panel Adjustment

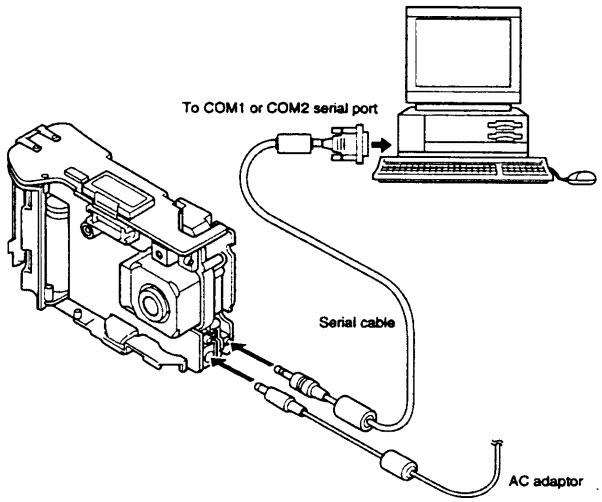
⑥Adjustment items required at replacement of parts

	Flange-back (Lens) Adjustment ①	CCD Defect Detect Adjustment ②	AWB Adjustment ③	Color matrix Adjustment ④	LCD Panel Adjustment ⑤
CA1	○	○	○	○	×
CA2	○	○	○	○	○
SY-1	○	×	×	×	×
PW1	×	×	×	×	×
Lens Unit	○	○	○	○	×
CCD	○	○	○	○	×
Optical filter	○	○	○	○	×

○ : Adjustment required × : Adjustment not required

6. Connecting the camera to the computer

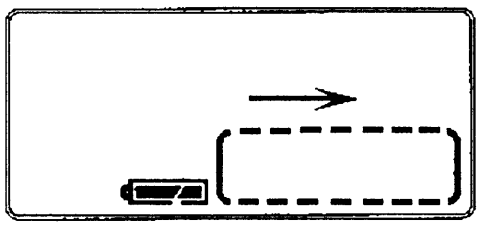
- Turn off both camera and computer.
- Locate the port cover on the side of the camera. Press on the arrows and slide the cover down to open it.
- Line up the arrow on the cable connector with the notch on the camera's serial port. Insert the connector.
- Line up the serial connector on the cable with 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)

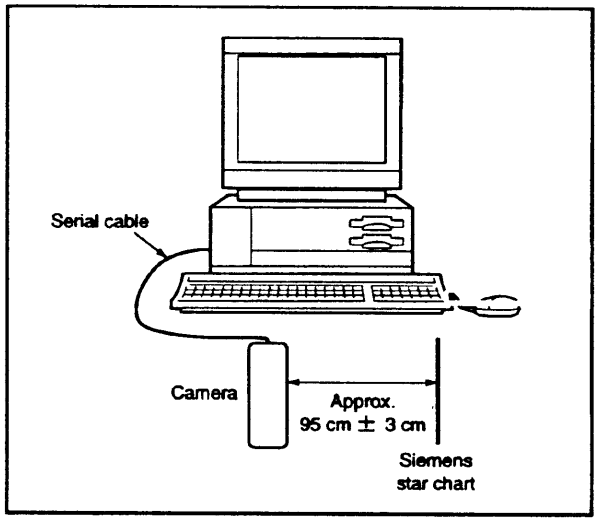
[Adjustment condition]

- 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 95 cm ± 3 cm (between Siemens star chart and the surface of camera's protection lens)

[Adjustment method]

- Double-click on the DscCalV122.
- 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.
- Click 'OK'.

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.



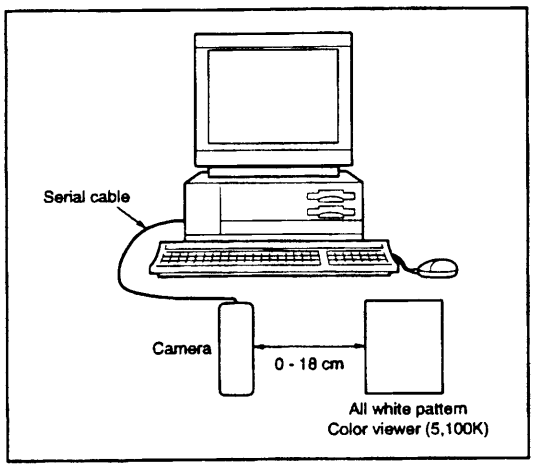
9. AWB Adjustment

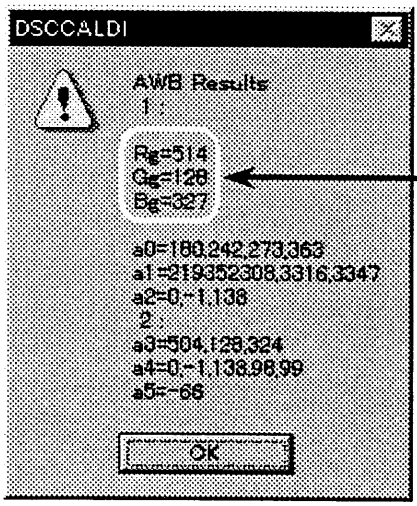
[Preparation]

- 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 DscCalV122.
- Click the AWB, and click the Yes.
- AWB adjustment value will appear on the screen.
  (AGC3 adjustment value is 1019-1024 indicates an error.)
- Click 'OK'.





10. Color Matrix Adjust ment

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

[Preparation]

- POWER switch: ON

[Adjustment condition]

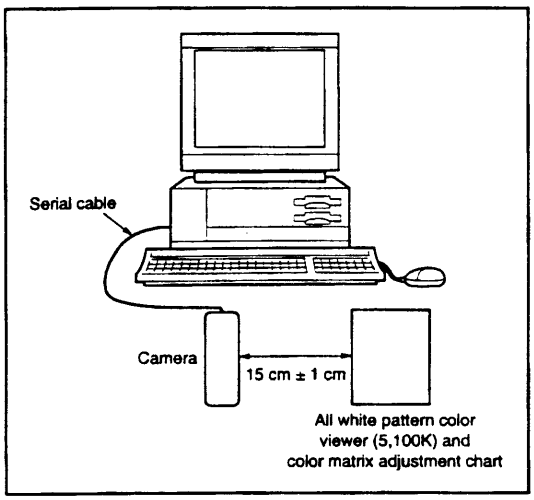
- Set the color adjustment chart to the color viewer.
  (Do not enter any light.)
- Set the siemens star chart so that it becomes center of the screen.

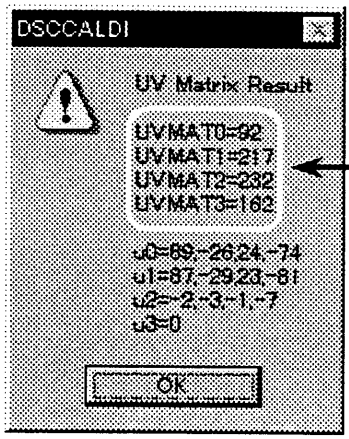
[Adjustment method]

- Double-click on the DscCalV122.
- Click the UV Matrix, and Click 'Yes'.
- Four color matrix (UVMAT0, UVMAT1, UVMAT2 and UVMAT3) adjustment value will appear on the screen.
- Click 'OK'.

Note : The criteria for the adjustment value is from 0 to 255.

In any adjustment error cases, each value from UVMAT0 to UVMAT3 after adjustment turns to 1.





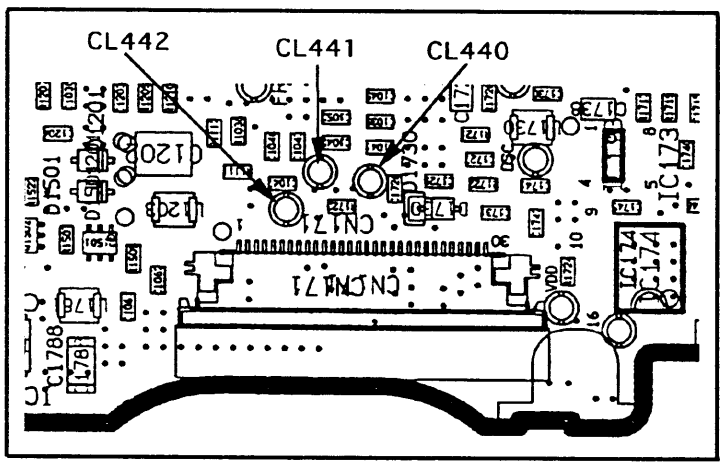
11. CCD Defect Detect Adjustment

[Adjustment method]

- Double-click on the DscCalV122.
- Select the CCD Defect from Test menu of Calibration Soft and click the OK.
- After adjustment, An adjustment value will appear on the screen.

12. LCD Panel Adjustment

[CA2 board (Side A)]



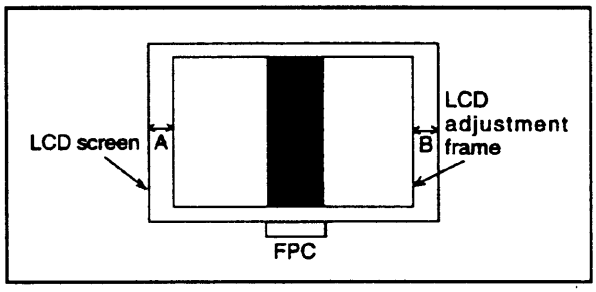
12-1. LCD H AFC Adjustment

[Preparation]

- POWER switch: ON

[Adjustment method]

- Double-click on the DscCalV122.
- Check that the "LCD Type" is set to "LCD1". (refer to the FIG-1)
- 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.



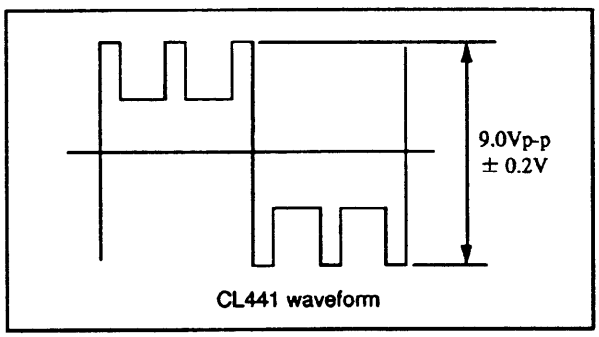
12-2. LCD RGB Offset Adjustment

[Preparation]

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

[Adjustment method]

- Adjust LCD "RGB offset" so that the amplitude of the CL441 waveform is 9.0 Vp-p ± 0.2 V.

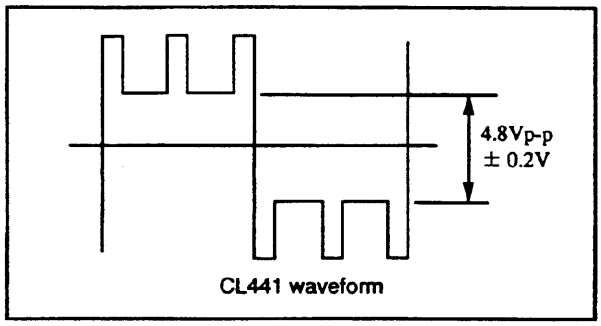


12-3. LCD Gain Adjustment

[Adjustment method]

- Adjust LCD "Gain" so that the amplitude of the CL441 wave form is 4.8 Vp-p ± 0.2 V.

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

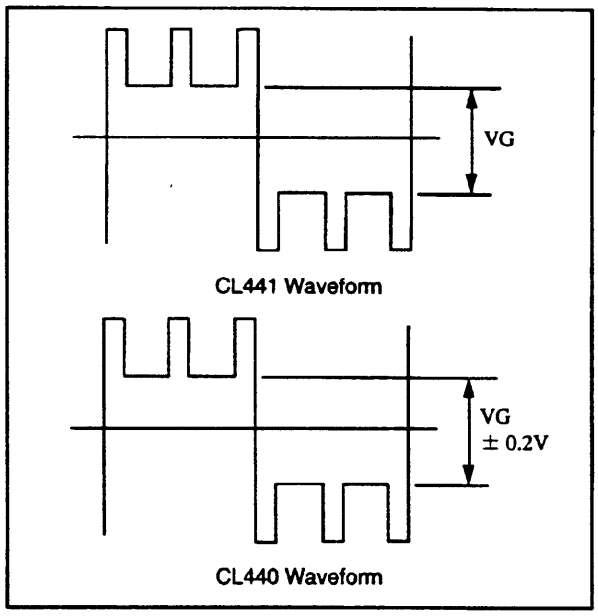


12-4. LCD Blue Brightness Adjustment

[Adjustment method]

- Adjust LCD "B Bright" so that the amplitude of the CL440 waveform is ± 0.2 V with respect to the CL441 (VG) wave-form.

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

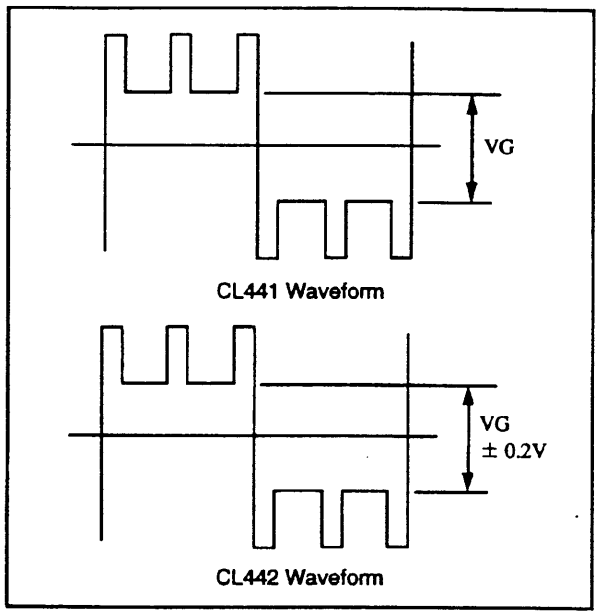


12-5. LCD Red Brightness Adjustment

[Adjustment method]

- Adjust LCD "R Bright" so that the amplitude of the CL442 waveform is ± 0.2 V with respect to the CL441 (VG) waveform.

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

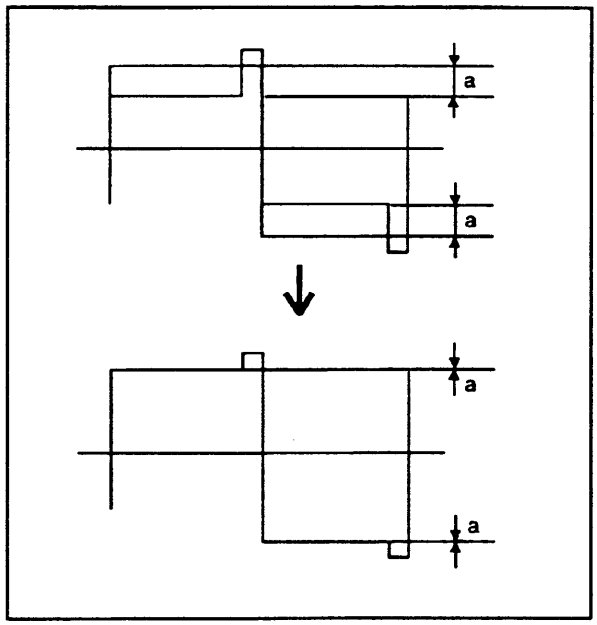


12-6. LCD TINT Adjustment (for PAL)

[Adjustment method]

Adjust LCD "Tint" so that the amplitude of CL442 waveform is minimum.

Note : LCD TINT adjustment should always be carried out last.



12-7. LCD Phase Adjustment (for PAL)

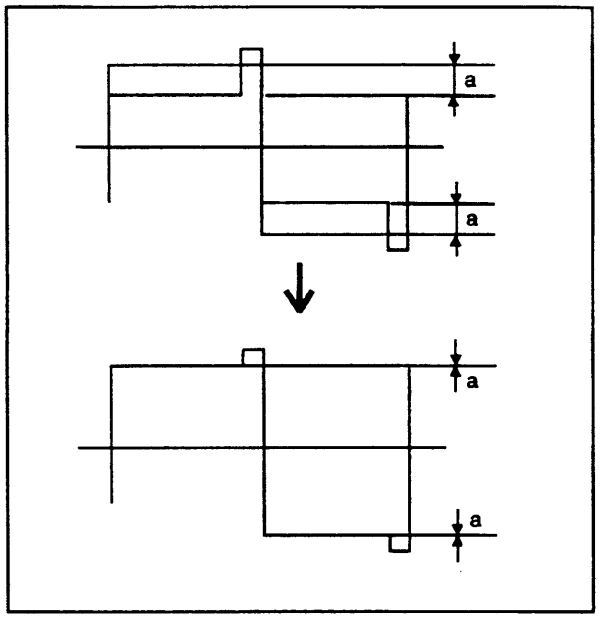
[Adjustment method]

1. Adjust Phase so that the amplitude of CL440 waveform is minimum.

<Note>

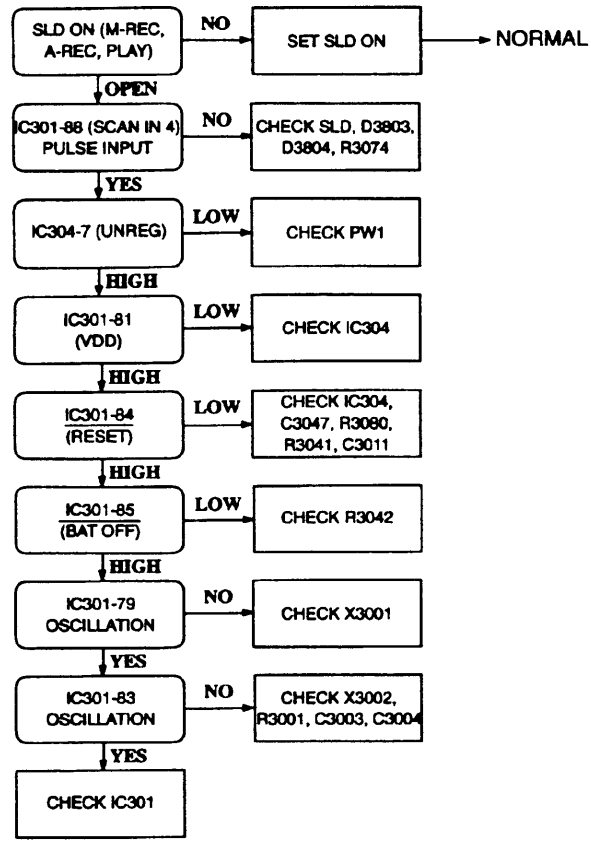
12-1. LCD H AFC adjustment, 12-2. LCD RGB Offset adjustment, 12-3. LCD Gain adjustment, 12-4. LCD Blue Brightness adjustment,

12-5. LCD Red Brightness adjustment and 12-6. LCD Tint adjustment (for PAL) should always be carried out last.

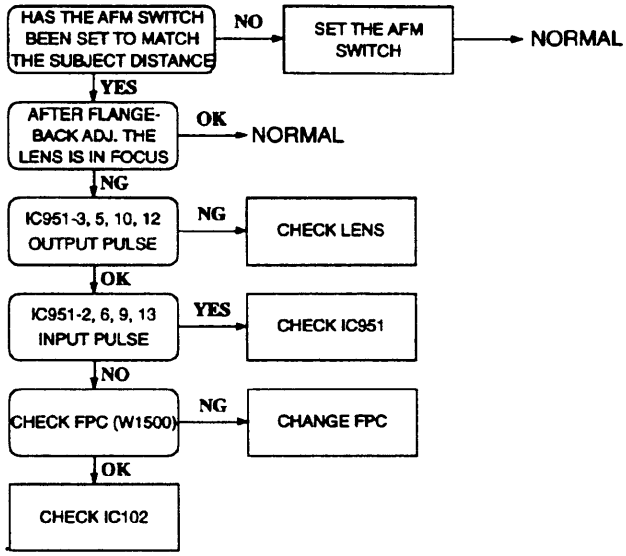


13. Trouble Shooting Guide

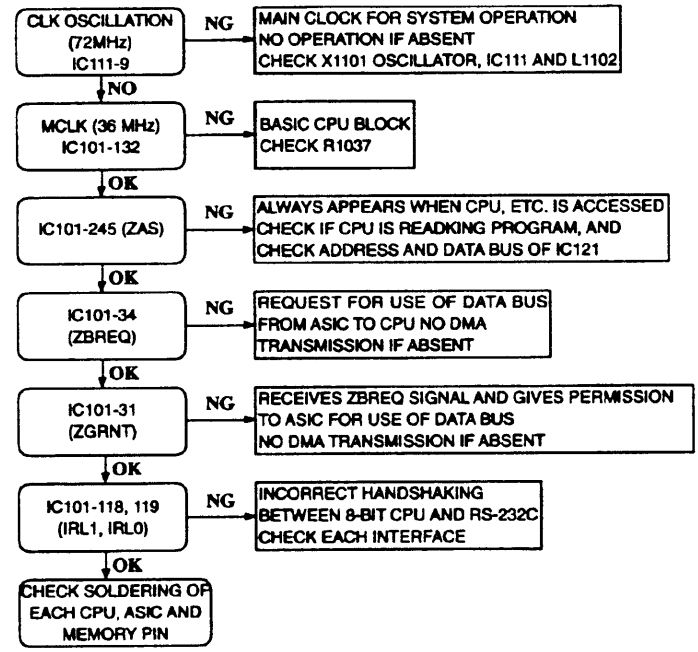
POWER LOSS INOPERATIVE



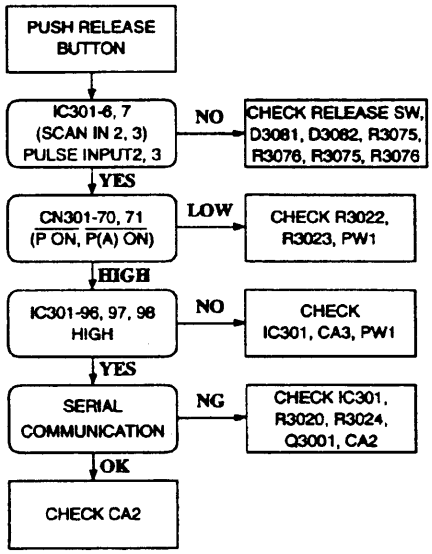
FOCUS INOPERATIVE



NO PICTURE



TAKING INOPERATIVE



Outline of Circuit description

1. CA1 CIRCUIT DESCRIPTION

[IC Configuration]

IC903 (ICX224AK) CCD imager

IC902 (74ACT04MTC) H driver

IC904 (CXD3400N) V driver

1-1. IC903 (CCD)

[Structure]

Interline type CCD image sensor

- Optical size 1/2 inch format
- Effective pixels 1636 (H) x 1236 (V)
- Pixels in total 1688 (H) x 1248 (V)
- Optical black
- Horizontal (H) direction: Front 4 pixels, Rear 48 pixels
- Vertical (V) direction: Front 10 pixels, Rear 2 pixels
- Dummy bit number Horizontal : 28 Vertical :1

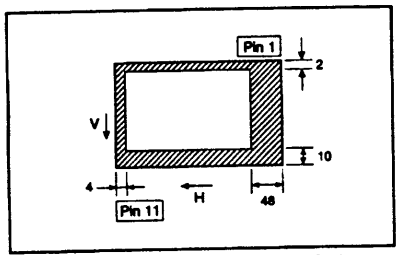


Fig. 1-1.Optical Black Location (Top View)

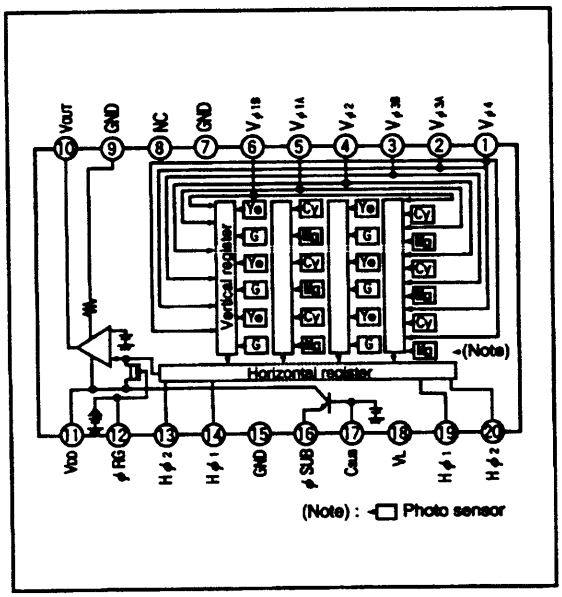


Fig. 1-2. CCD Block Diagram

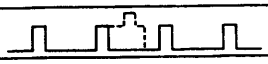
Pin No.	Symbol	Pin Description	Waveform	Voltage
1	V ϕ 4	Vertical register transfer clock		-7.5 V, 0 V
2, 3	V ϕ 3A, V ϕ 3B	Vertical register transfer clock		-7.5 V, 0 V, 15 V
4	V ϕ 2	Vertical register transfer clock		-7.5 V, 0 V
5, 6	V ϕ 1A, V ϕ 1B	Vertical register transfer clock		-7.5 V, 0 V, 15 V
7, 9	GND	GND	GND	0 V
10	V_{OUT}	Signal output		Aprox. 10 V
11	V_{DD}	Circuit power	DC	15 V
12	ϕ RG	Reset gate clock		12.5 V, 17.5 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	C_{SUB}	Substrate bias	DC	Aprox. 8V (Different from every CCD)
18	V_L	Protection transistor bias	DC	

Table 1-1. CCD Pin Description

----When sensor read-out

1-2. 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.

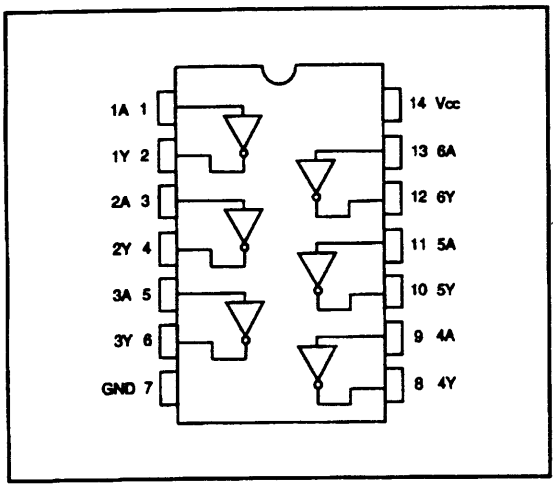


Fig. 1-3. IC902 Block Diagram

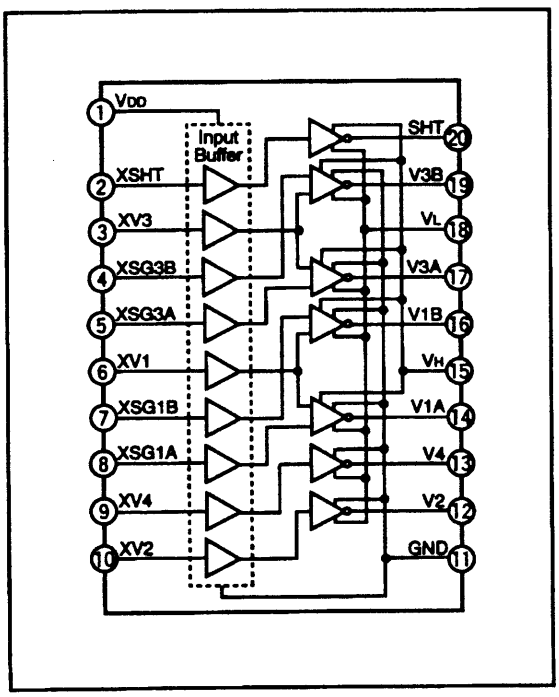


Fig. 1-4. IC904 Block Diagram

2. Lens drive block

2-1. Zoom drive

The four control signals (FIN1, FIN2, FIN3 and FIN4) with different phases which are output from the ASIC are converted into drive pulses (FOUT1, FOUT2, FOUT3 and FOUT4) by the motor drive (IC951), and are then used to drive the stepping motor for focus operation. Detection of the standard focus positions is carried out by means of the photo-interrupter (FOCUS PI) inside the lens block.

2-2. Shutter and iris drive

The two control signals (IIN1 and IIN2) which are output from the ASIC expansion port (IC106) are converted into drive pulses (IOUT1 and IOUT2) by the motor driver (IC952), and are then iris opened and moved.

The two control signals (SIN1 and SIN2) which is output from the ASIC expansion port (IC106) is converted into a drive pulse (SOUT1 and SOUT2) by the motor driver (IC952), and are then shutter opened and closed.

3. CA2 CIRCUIT DESCRIPTION

3-1. 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.

3-2. Signal processor

- Gammer orrection 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.

- Color generation circuit

  This circuit converts the CCD data into RGB signals.

- Matrix circuit

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

- Horizontal and vertical aperture circuit

  This circuit is used gemerate the aperture signal.

3-3. 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.

3-4. SDRAM controller

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

3-5. Communication control

· UART

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

3-6. SIO

This is the interface for the 8-bit microprocessor.

3-7. PIO/PWM/SIO for LCD

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

3-8. TG/SG

Timing generated for 2 million pixel CCD control.

3-9. Digital encorder

It generates chroma signal from color difference signal.

3-10. JPEG control

Controls the interface for the externally-connected JPEG IC.

4. 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 É¡ 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 is displayed over the SDRAM display area.

5. LCD Block

During monitoring, YUV conversion is carried out for the 10-bit CCD data which is input from the A/D conversion block to the ASIC and is then transferred to the DRAM so that the CCD data can be displayed on the LCD.

The data which has accumulated in the DRAM is passed through the NTSC encoder , and after D/A conversion is carried out to change the data into a Y/C signal, the data is sent to the LCD panel and displayed.

If the shutter button is pressed in this condition, the 10-bit data which is output from the A/D conversion block of the CCD is sent to the DRAM (DMA transfer), and after processor, it is displayed on the LCD as a freeze-frame image.

During playback, the JPEG image data which has accumulated in the flash memory is converted to YUV signals, and then in the same way as during monitoring, it is passed through the NTSC endoder, and after D/A conversion is carried out to change the data into a Y/C signal, the data is sent to the LCD panel and displayed.

The two analog signal (Y/C signals) from the ASIC are converted into RGB signals by the LCD driver, and these RGB signals and built-in panel 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.

6. PW1 CIRCUIT DESCRIPTION

[Outline]

This is the main power circuit, and is comprised of the following blocks.

- Switching controller (IC501)
- Digital 5 V and analog system power output (T5001, Q5001)
- Digital 3.4 V system power supply (Q5007)
- LCD system power supply (Q5008, T5002)
- Backlight power supply output (Q5011, T5003)

6-1. 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 four built-in channels, only CH1 (digital 5 V, analog system), CH3 (LCD system), CH2 (digital 3.4 V) and CH4 (backlight) are used. Feedback from 5.1 V (D) (CH1), 3.4 V (D) (CH2) , 5 V (L) (CH3) and 7 V (L) (CH4) power supply outputs are received, and the PWM duty is varied so that each one is maintained at the correct voltage setting level.

- Short-circuit protection circuit

  If output is short-circuited for the length of time (aprox. 120 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.

6-2. Digital 5 V and Analog System Power Output

5.1 V (D) , 15.2 V (A), -7.7 V (A) and 5.1 V (A) are output. Feedback for the 5.1 V (D) is provided to the switching controller (Pins (29) of IC501) so that PWM control can be carried out.

6-3. Digital 3.4 V System Power Output

3.4 V (D) is output. Feedback is provided to the swiching controller (Pin (26) of IC501) so that PWM control can be carried out.

6-4. LCD System Power Output

5 V (L), -4.8 V (L), 14.3 V (L) and 22 V (L) are output. Feedback for the 5 V (L) is provided to the switching controller (Pin (11) of IC501) so that PWM control can be carried out.

6-5. Backlight Power Supply output

The power which is input to the inverter transformer (T5003) is controlled by means of Q5011, and 7 V is output.

7. PW1 STROBE CIRCUIT DESCRIPTION

7-1. Charging Circuit

When UNREG power is supplied to the charge circuit and the CHG signal becomes High (3.3 V), the charging circuit starts operating and the main electorolytic capacitor is charged with high-voltage direct current.
However, when the CHG signal is Low (0 V), the charging circuit does not operate.

7-1. Power switch

When the CHG signal switches to Hi, Q5406 turns ON and the charging circuit starts operating.

7-2. Power supply filter

L5401 and C5401 constitute the power supply filter. They smooth out ripples in the current which accompany the switching of the oscillation transformer.

7-3. Oscillation circuit

This circuit generates an AC voltage (pulse) in order to increase the UNREG power supply voltage when drops in current occur. This circuit generates a drive pulse with a frequency of approximately 50-100 kHz. Because self-excited light omission is used, the oscillation frequency changes according to the drive conditions.

7-4. Oscillation transformer

The low-voltage alternating current which is generated by the oscillation control circuit is converted to a high-voltage alternating current by the oscillation transformer.

7-5. Rectifier circuit

The high-voltage alternating current which is generated at the secondary side of T5401 is rectified to produce a high-voltage direct current and is accumulated at electrolytic capacitor C5412 on the main circuit board.

7-6. Voltage monitoring circuit

This circuit is used to maintain the voltage accumulated at C5412 at a constance level.
After the charging voltage is divided and converted to a lower voltage by R5417 and R5419, it is output to the SY1 circuit board as the monitoring voltage VMONIT. When this VMONIT voltage reaches a specified level at the SY1 circuit board, the CHG signal is switched to Low and charging is interrupted.

7-7. Light Emission Circuit

When RDY and TRIG signals are input from the ASIC expansion port, the stroboscope emits light.

7-8. Emission control circuit

When the RDY signal is input to the emission control circuit, Q5409 switches on and preparation is made to let current flow to the light emitting element. Moreover, when a STOP signal is input, the stroboscope stops emitting light.

7-9. Trigger circuit

When a TRIG signal is input to the trigger circuit, D5405 switches on, a high-voltage pulse of several kilovolts is generated inside the trigger circuit, and this pulse is then applied to the light emitting part.

7-10. Light emitting element

When the high-voltage pulse form the trigger circuit is applied to the light emitting part, currnet flows to the light emitting element and light is emitted.

***Beware of electric shocks.**

8. SY1 CIRCUIT DESCRIPTION

[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 and back-up 4. Power ON/OFF,

5. Storobe charge control and so on.

Pin	Signal	I/O	Outline	
1~2	NOT USED	-	Connect to GND	
3	CHG VOL	I	Strobe charge voltage input (analog input)	
4	NOT USED	-	Connect to GND	
5~7	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	
13~19	NOT USED	-	Connect to GND	
20	SELF	O	Red-eye reduction, self-timer lump light emission drive	H : Lump light
21	NOT USED	-	Connect to GND	
22	CHG ON	O	Strobe charge ON/OFF signal	H : ON
23~25	COM 0~2	O	Mode LCD common output	
26	NOT USED	-	-	
27	BIAS	-	Mode LCD drive power supply (connect to VLCO terminal)	
28~30	VLC 0~2	-	Mode LCD power input terminal (outside resister connection)	
31	VSS	-	GND	
32~50	S1~S21	O	LCD segment output 1~19	
51~55	NOT USED	-	-	
56	$\overline{\text{DCINCHK}}$	I	Outside DC power detection	L : AC adaptor
57~63	NOT USED	-	Connect to GND	
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	-	Connect to GND	
68	LCD ON2	O	LCD ON 2 signal	H : ON
69	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	$\overline{\text{DIN CONNECT}}$	I	PC cable connection detection	L : Connection
73	$\overline{\text{CARD}}$	I	Memory card detection	L : Attachment
74	$\overline{\text{V JACK}}$	I	Video cable connection detection	L : Connection
75	SI	I	Serial data input (←ASIC)	
76	SO	O	Serial data output (→ASIC)	
77	SCK	O	Serial clock output (→ASIC)	
78	IC	-	Internal connection (connect to VSS terminal directly)	
79	XOUT	O	Main clock oscillation terminal	
80	XIN	I	Main clock oscillation terminal (4 MHz)	
81	VDD	-	VDD	
82	XCIN	I	Clock oscillation terminal (32.768 kHz)	
83	XCOUT	O	Clock oscillation terminal	
84	$\overline{\text{RESET}}$	I	Reset input	

See next page →

Pin	Signal	I/O	Outline	
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)	
89~90	NOT USED	-	Connect to GND	
91~94	SCAN OUT0~3	O	Key matrix output	
95	LCD ON	O	D/D converter (LCD system) ON/OFF signal	H : ON
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 voltage input (analog input)	

Table 4-1. 8-bit Microprocessor Port Specification

8-1. 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.

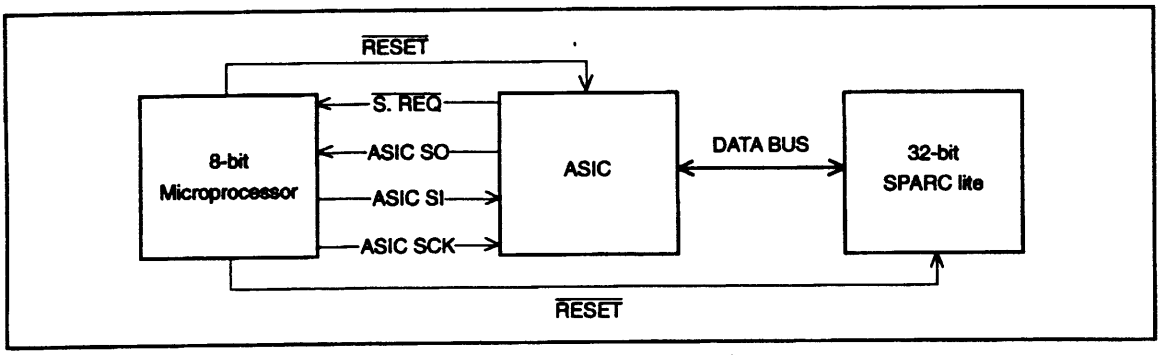


Fig. 4-1 Internal Bus Communication System

8-2. Key Operaiton

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

SCAN IN / SCAN OUT	0	1	2	3	4
0	AFM		SBS	TEST	SLD 1
1			SHUTTER 2nd	SHUTTER 1st	SLD 2
2	MENU	MTR	UP	DOWN	
3		QSW	+/-		

Table 4-2. Key Operation

9. 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 check power switch 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 super 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 8-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 (95) and the LCD ON 2 signal at pin (68) 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.

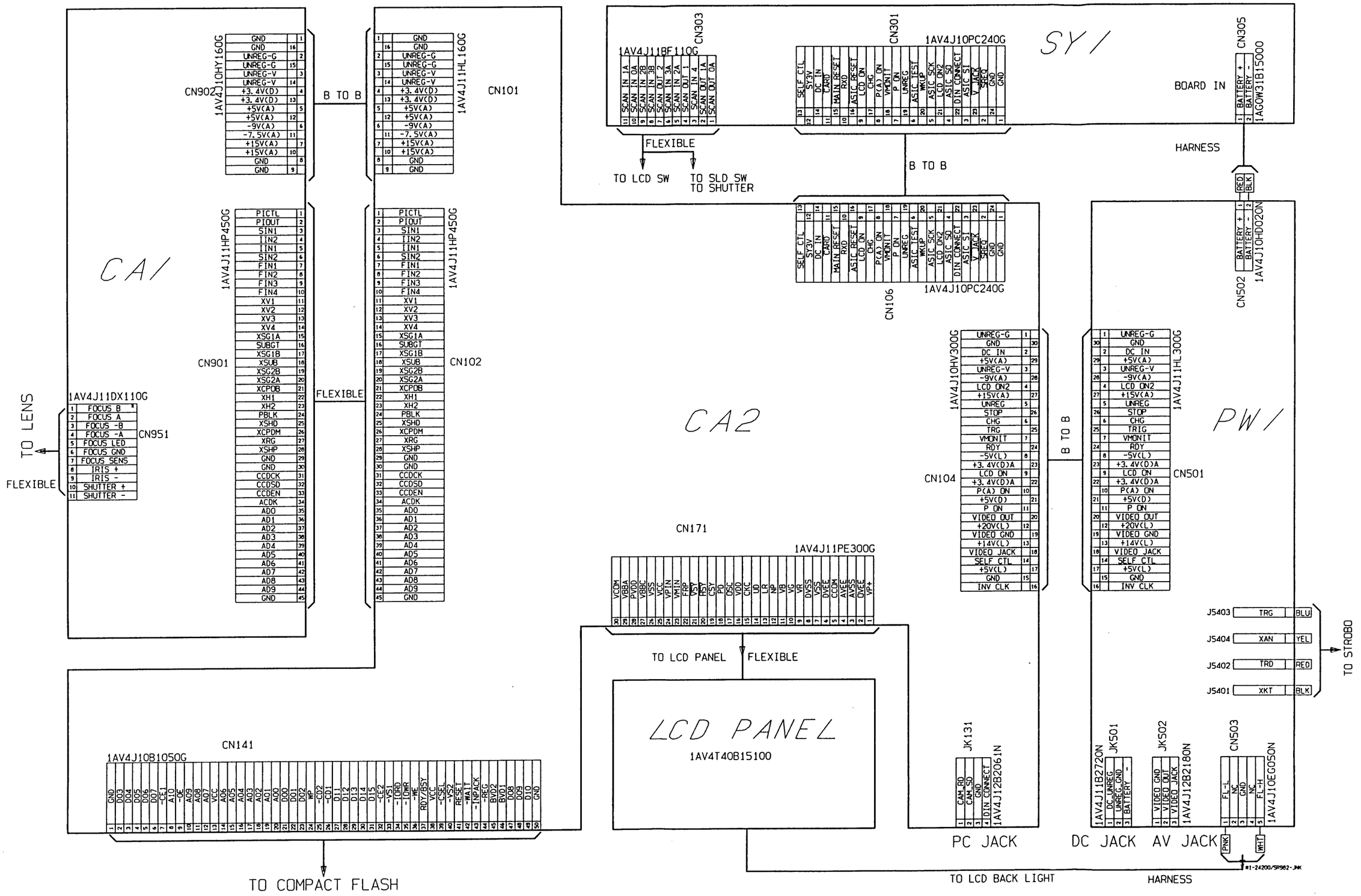
			SPARC Lite	ASIC, memory	RS232C driver	CCD	8 bit CPU	MODE LCD	LCD MONITOR
Power voltage			3.3 V	3.3 V	5 V	5 V (A) +15 V -7.5 V	3.3 V (ALWAYS)	3.3 V (ALWAYS)	5V (L) +12V etc.
SLD	OFF		OFF	OFF	OFF	OFF	32 KHz	OFF	OFF
	PLAY		ON	ON	ON	OFF	4 MHz	ON	ON
	M-REC A-REC	Power switch ON- Auto power OFF	OFF	OFF	OFF	OFF	4 MHz	ON	OFF
		Shutter switch ON	ON	ON	ON	ON → OFF	4 MHz	ON	OFF
		MOS, QSW, SBM etc. ON	OFF	OFF	OFF	OFF	4 MHz	ON	OFF
		LCD finder	ON	ON	ON	ON	4 MHz	ON	ON

Table 4-3. Camera Mode

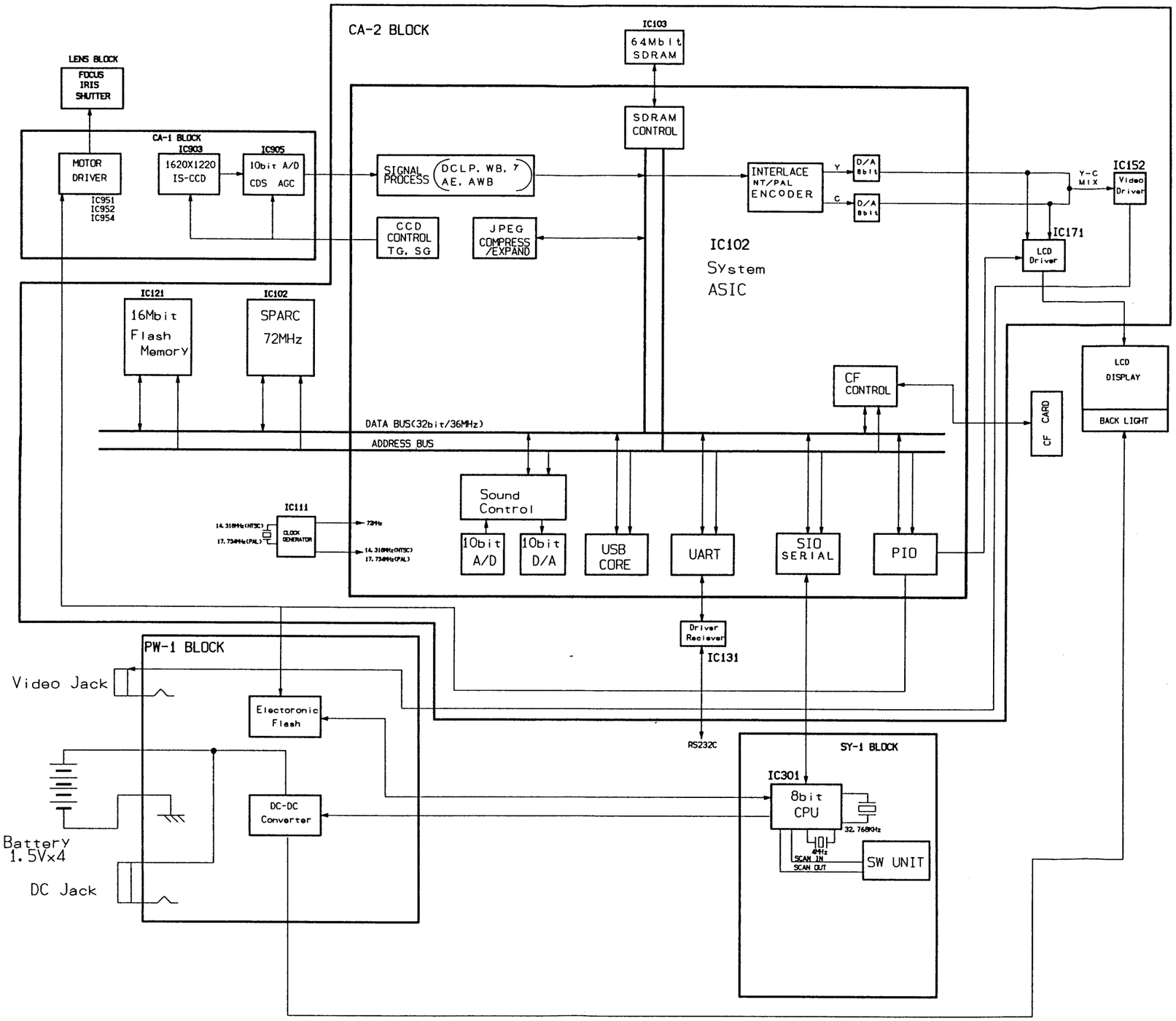
			SPARC Lite	ASIC, memory	RS232C Driver	CCD	8 bit CPU	MODE LCD	LCD MONITOR
Power voltage			3.3 V	3.3 V	5 V	5 V (A) +15 V -7.5 V	3.3 V (ALWAYS)	3.3 V (ALWAYS)	5 V (L) +12V etc.
SLD	OFF		OFF	OFF	OFF	OFF	32 KHz	OFF	OFF
	M-REC A-REC PLAY	Power switch ON- Auto power OFF	OFF	OFF	OFF	OFF	4 MHz	ON	OFF
		Take a picture	ON	ON	ON	ON → OFF	4 MHz	ON	OFF
		Erase image	ON	ON	ON	OFF	4 MHz	ON	OFF
		Download image	ON	ON	ON	OFF	4 MHz	ON	OFF
		Continuous image	ON	ON	ON	ON	4 MHz	ON	OFF
		Message from host	ON	ON	ON	ON	4 MHz	ON	OFF

Note) 4 MHz = Main clock operation, 32 kHz = Sub clock operation

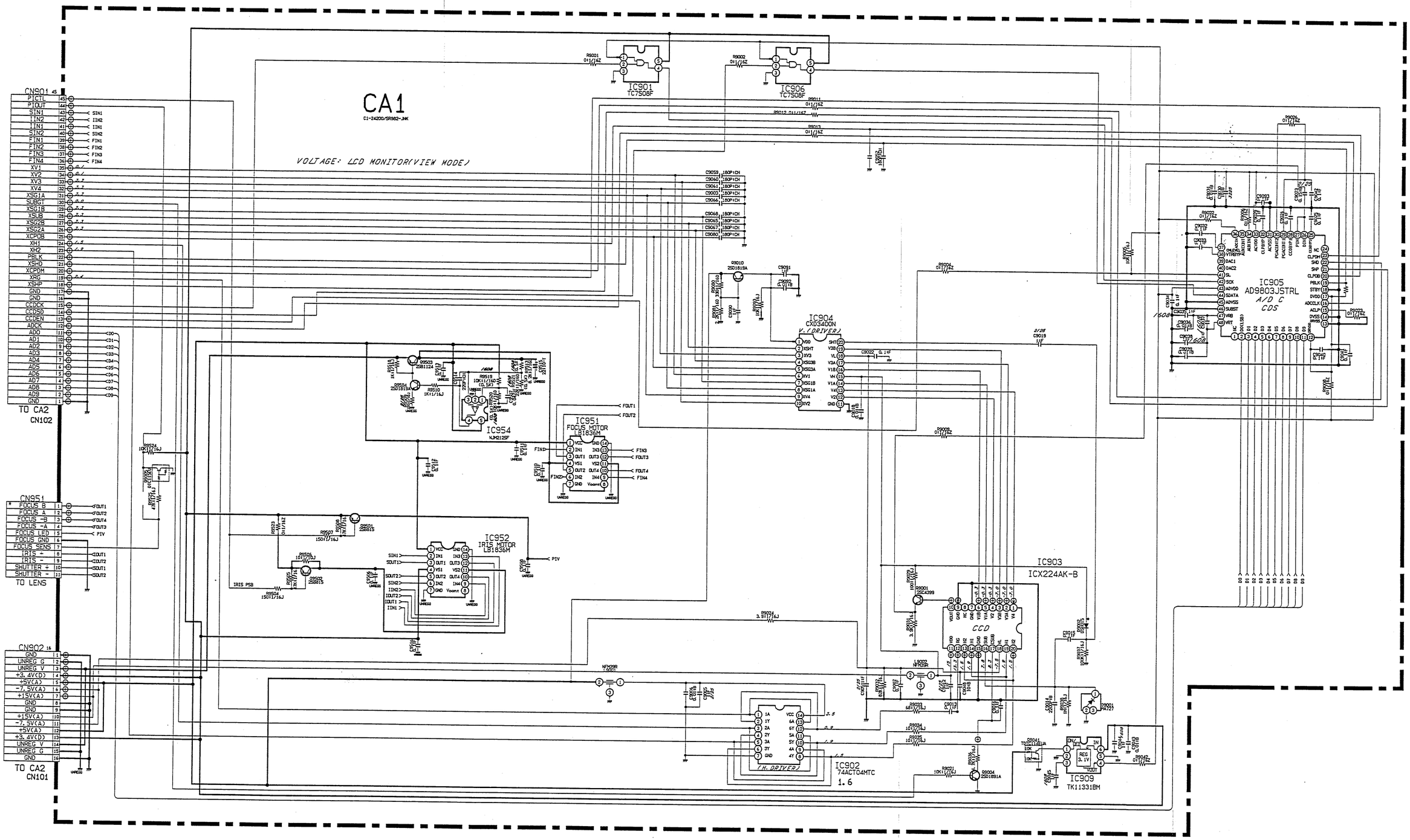
Table 4-4. Host Mode



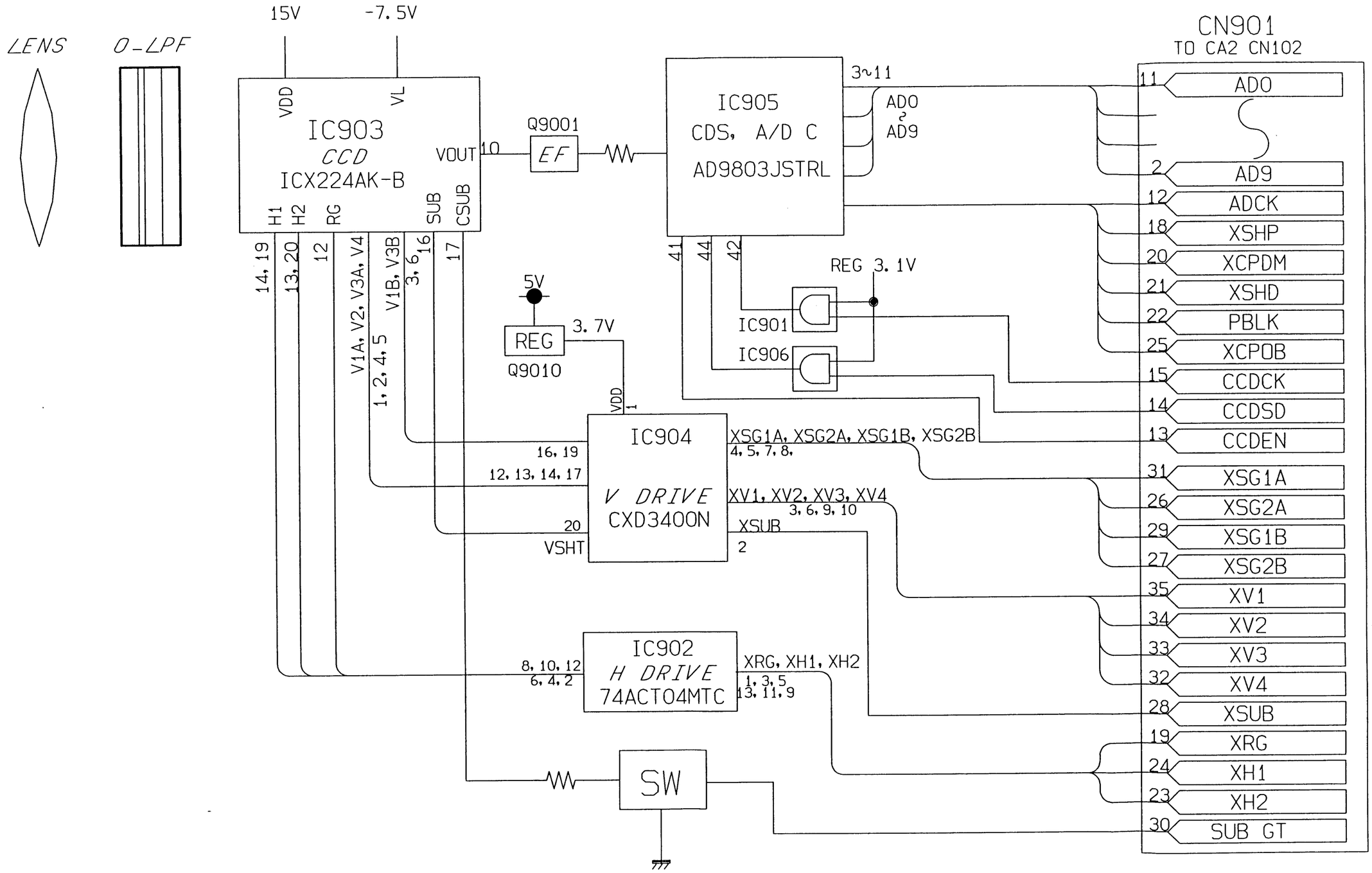
[OVERALL WIRING]


CA-2 BLOCK
IC103
64Mbit
SDRAM
SDRAM
CONTROL
LENS BLOCK
FOCUS
IRIS
SHUTTER
CA-1 BLOCK
MOTOR
DRIVER
IC951
IC952
IC954
IC903
1620X1220
IS-CCD
IC905
10bit A/D
CDS AGC
SIGNAL
PROCESS
DCLP, WB, γ
AE, AWB
CCD
CONTROL
TG, SG
JPEG
COMPRESS
/EXPAND
INTERLACE
NT/PAL
ENCODER
Y
C
D/A
8bit
D/A
8bit
Y-C
MIX
IC152
Video
Driver
IC171
LCD
Driver
IC102
System
ASIC
IC121
16Mbit
Flash
Memory
IC102
SPARC
72MHz
CF
CONTROL
CF CARD
LCD
DISPLAY
BACK LIGHT
DATA BUS(32bit/36MHz)
ADDRESS BUS
IC111
14.31818MHz(NTSC)
17.73494MHz(PAL)
CLOCK
GENERATOR
72MHz
14.31818MHz(NTSC)
17.73494MHz(PAL)
Sound
Control
10bit
A/D
10bit
D/A
USB
CORE
UART
SIO
SERIAL
PIO
Driver
Reciever
IC131
PW-1 BLOCK
Video Jack
Electoronic
Flash
DC-DC
Converter
Battery
1.5Vx4
DC Jack
RS232C
SY-1 BLOCK
IC301
8bit
CPU
32.768KHz
4MHz
SCAN IN
SCAN OUT
SW UNIT

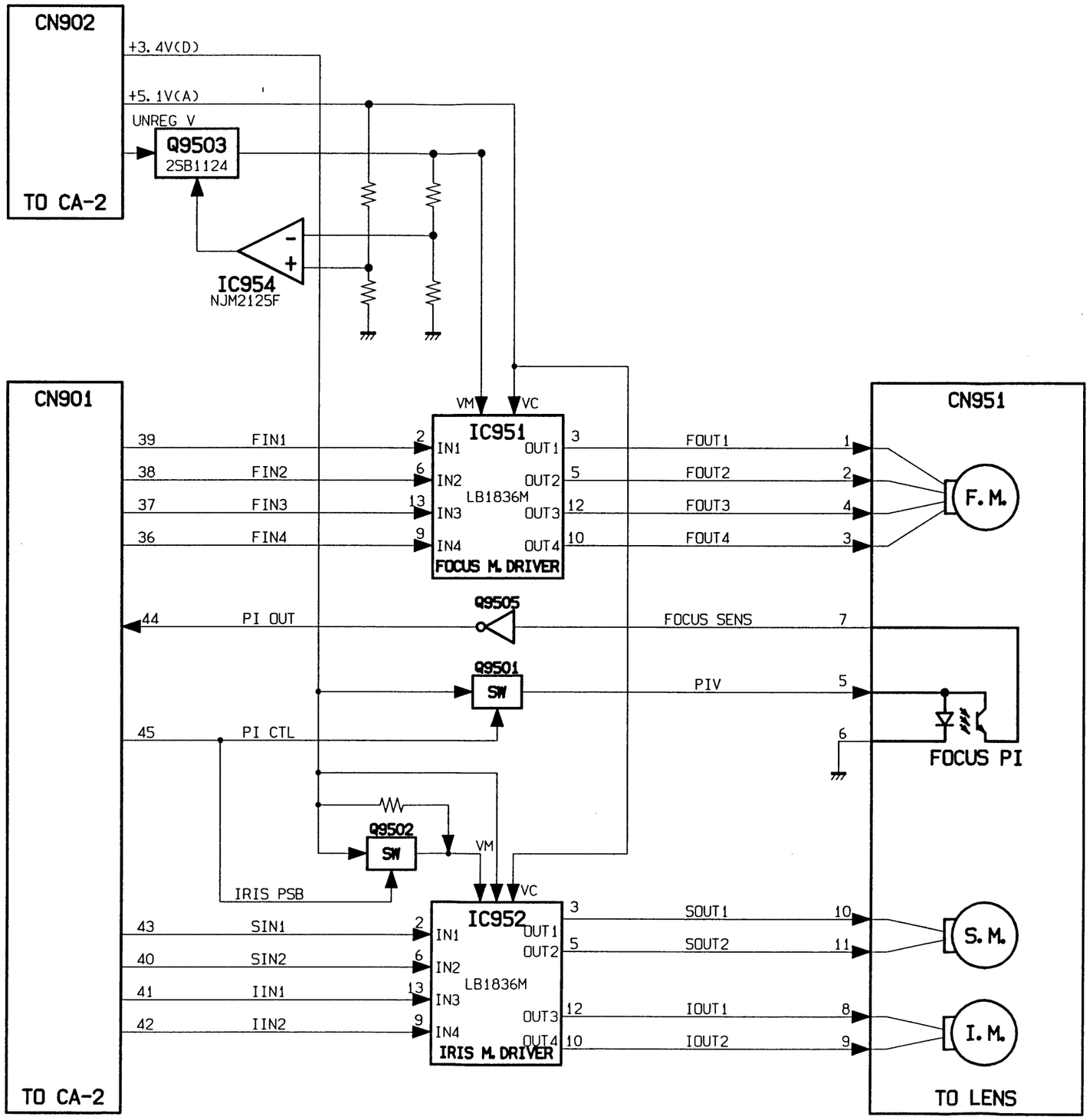
[OVERALL]



[CIRCUIT DIAGRAM CA-1]



[BLOCK DIAGRAM CA-1 1/2]



[BLOCK DIAGRAM CA-1 2/2]

CA2_MAIN

C2-24200/SR082-JNK

VOLTAGE: PLAY(LCD ON)

CPU
IC101
MB86835PMT2

IC102
MB87L1100PBT-G

ASIC

PROGRAM FLASH

SDRAM

TRANSCEIVER/RECEIVER

CA2_LCD

C2-24200/SR082-JNK

LCD DRIVER

D/A COMVERTER

TO CA-1 CN902

TO CA1 CN901

TO SY-1 CN301

TO LCD PANEL

TO COMPACT FLASH

[CIRCUIT DIAGRAM (NTSC) CA-2]

CA2_MAIN

C2-24202/SR862-ENK

VOLTAGE: PLAY(LCD ON)

CN104

CN101

CN102

CN106

CN171

IC102

MB87L1100PBT-G

ASIC

CPU

IC101

MB86835PMT2

FLASH MEMORY

SDRAM

COMPACT FLASH

LCD DRIVER

D/A CONVERTER

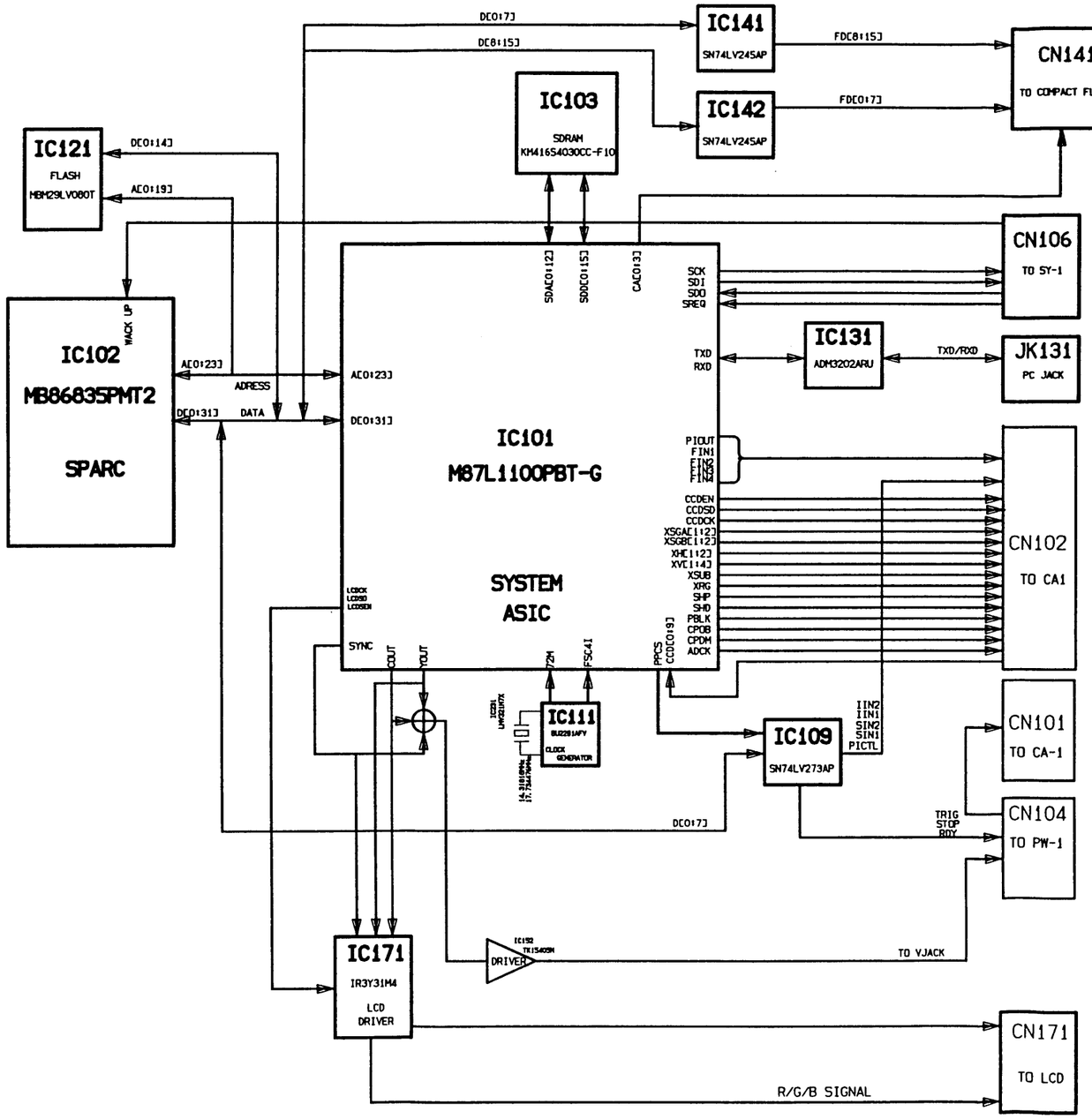
CA2_LCD

C2-24202/SR862-ENK

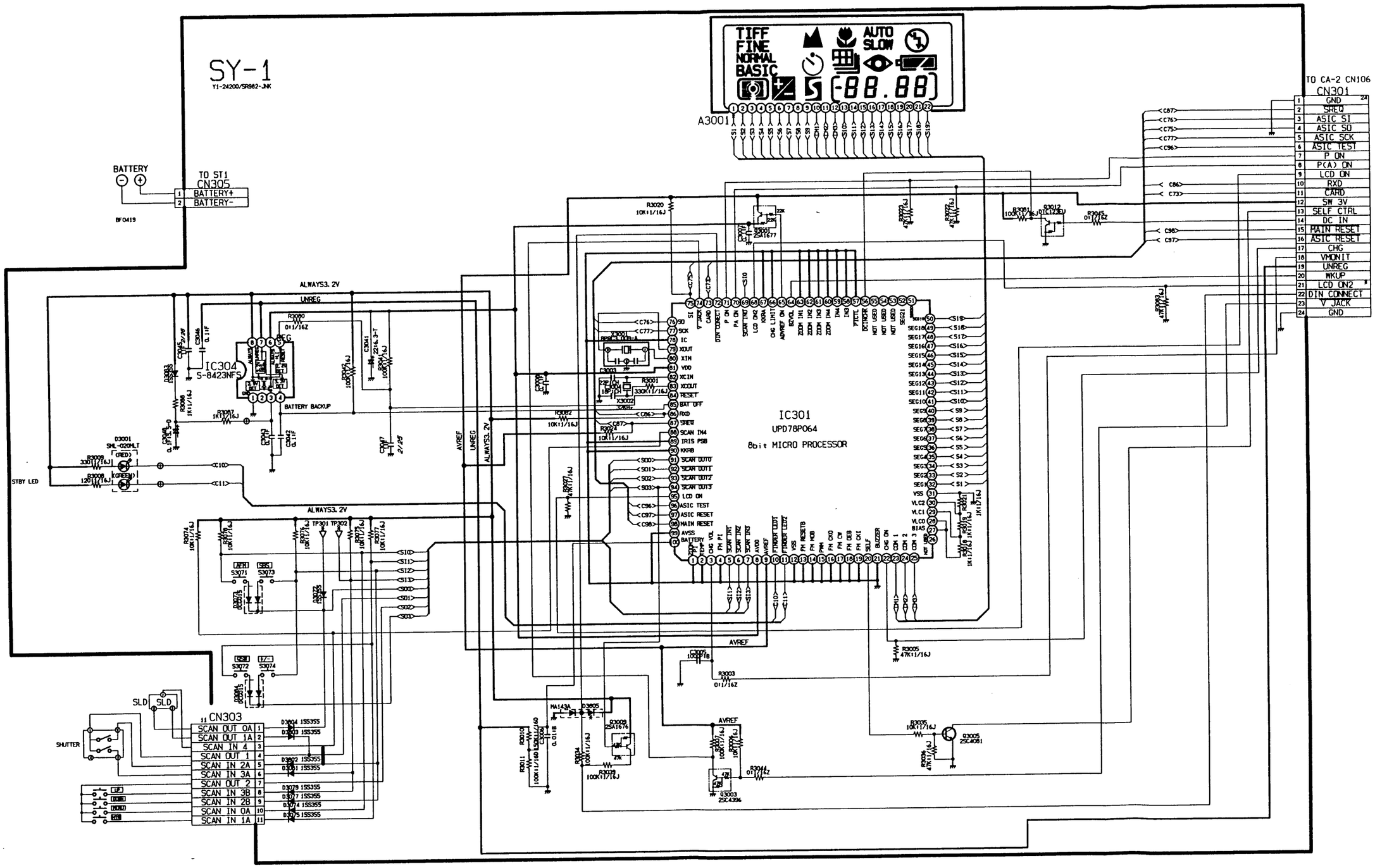
TRANSCEIVER/RECEIVER

[CIRCUIT DIAGRAM (PAL) CA-2]

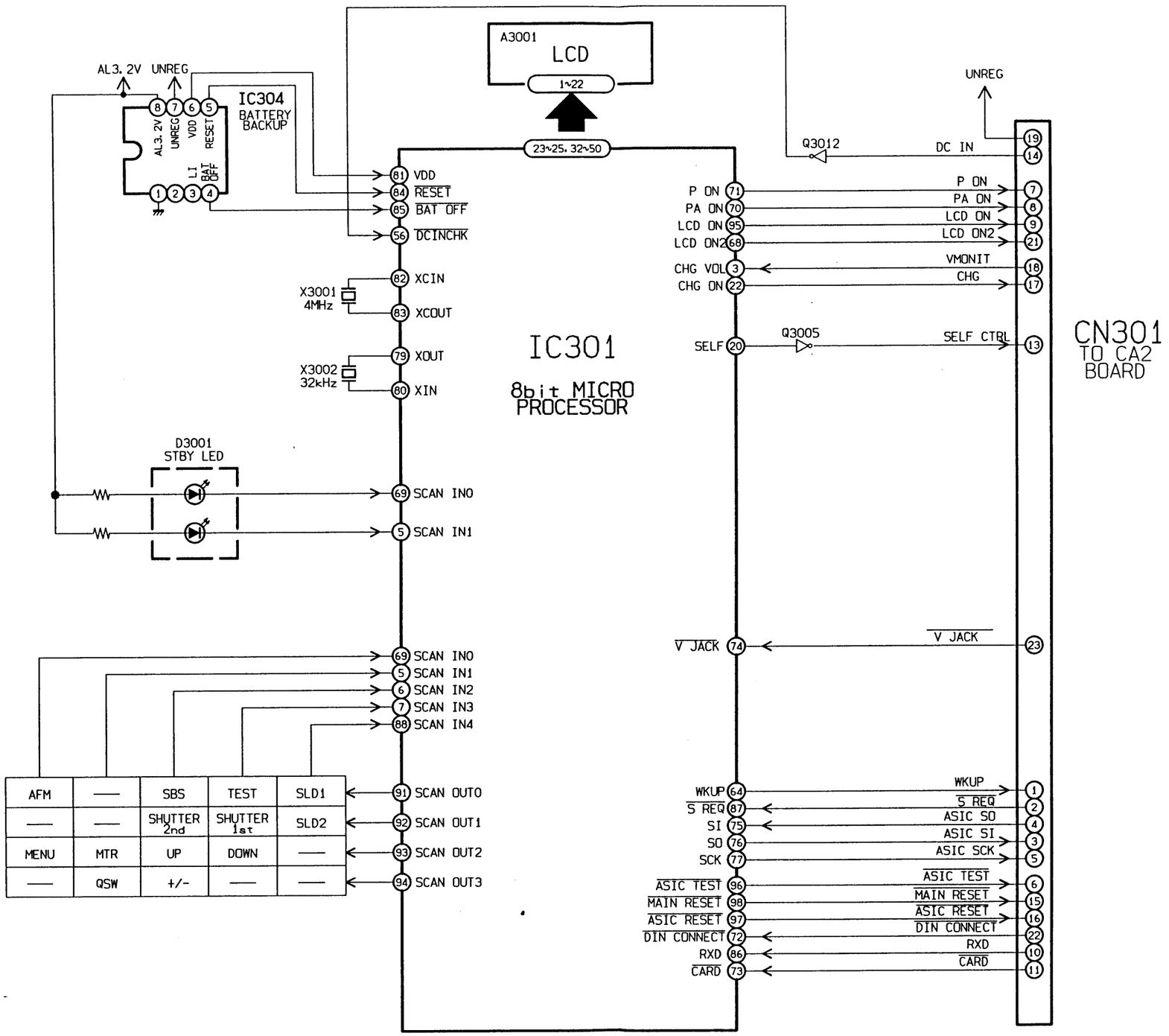
MAIN PROCESS



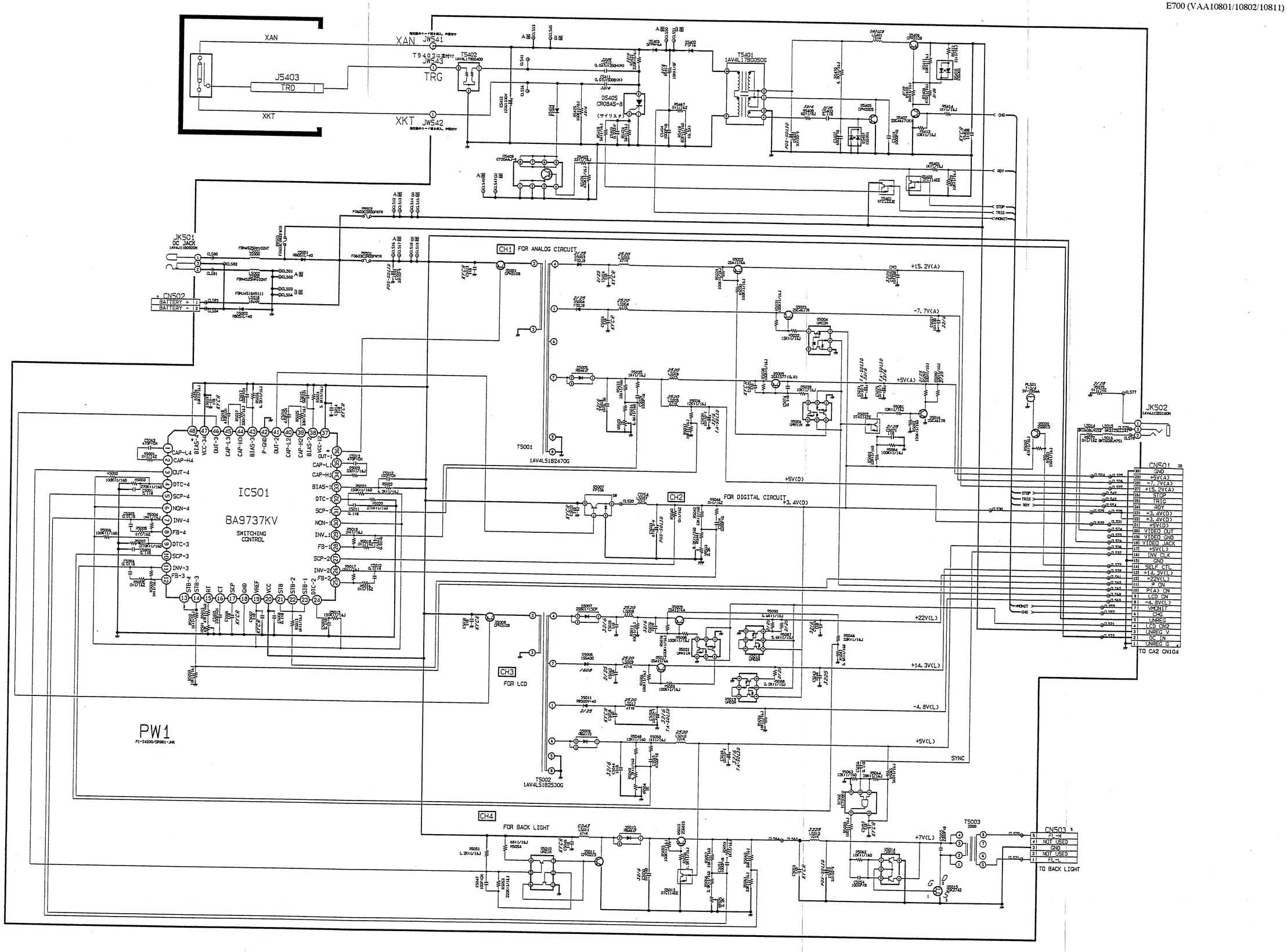
[BLOCK DIAGRAM CA-2]



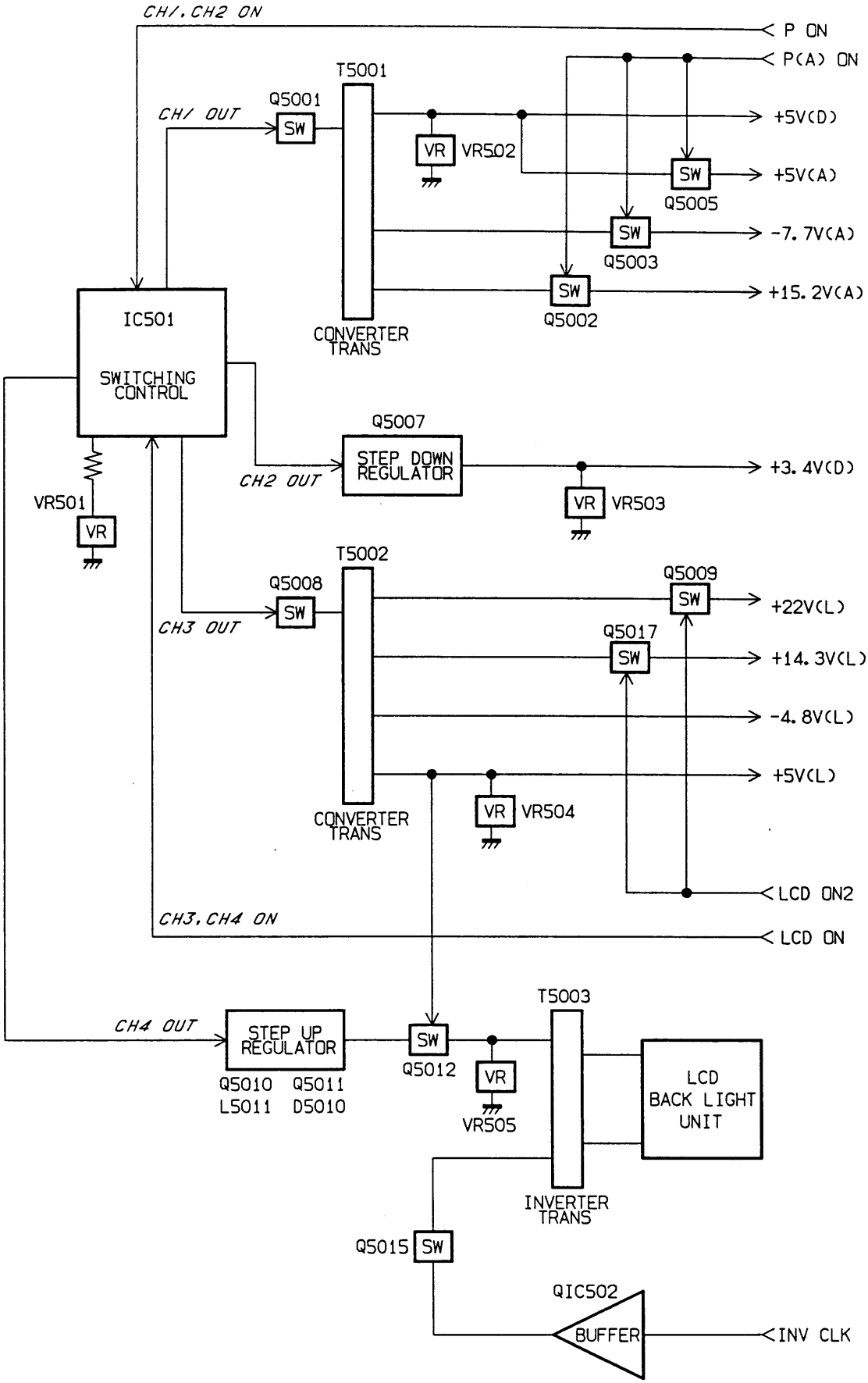
[CIRCUIT DIAGRAM SY-1]



[BLOCK DIAGRAM SY-1]



[CIRCUIT DIAGRAM PW-1]



[BLOCK DIAGRAM PW-1]

The contents of inspection standards and tools for E700

[1] Inspection standards : R1 to R7

[2] Tools : T1

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, Sanyo-manufactured alkaline AA-sized battery which is manufactured within four months from the manufacturing date shall be recommendable to use.

4. Standard power supply :
   Specified AC power supply EH-30 shall be required.

[1]Inspection standards

	Item	Benchmark	Applied tool(s)
Externl view	Gap / Differen-ce in height	- When closing the battery cover, a gap between the cover and the body shall be less than 0.5 mm. - Gaps on the body shall be less than 0.3 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
		- Any conspicuous scratch(es) or dirt shall not be required. Check it by naked eyes under fluorescent lamp or natural sunshine.	
Operati-onabili-ty / Operati-on mode	Operati-onability ; Button(s)	- While operating, any irregularities / malfunctions shall not be required. No cave-ins of the buttons shall be required.	battery
	Operatio-nal 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
	On the lever, knob, command dial Operation touch Each cover	- 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. - While operating, any irregular conditions shall not be required. - Opening / closing each cover shall be smoothly made.	battery
Monitor	Shooting image	- Inclined degree of image shall be less than 0.5 degree.	Photo-shop, Printer
Lens capacit y	Focal distance ; Value 6.8 mm	- 6.8 mm ± 5 %	Dedica-ted tool(s)
	Open aperture F No. ; F2.7	- F2.7 ± 7 %	

	Item	Benchmark	Applied tool(s)
	Resolu-tion	- Center : More than 120 lines / mm - Y = 3 : More than 80 lines / mm - Fixed point : 1.5 m	Lens barrel unit
Lens barrel	Driving noise	- Induction evaluation : Any irregular noises shall not be required. Check it by listening to the operation noise in the macro mode.	Regula-ted voltage power supply, stop watch
	Driving current	- It shall be less than 300 mA.	
AF	Focus lock	It shall be operated. Check it by lightly pressing the shutter release button from any distance, shifting the camera to any other subject and then observing the monitor.	
	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.	
	LED blinking for impossi-bility 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 check
Shootig with a speed light	Guide No. ; Full Soon after flashing	- 7 ± 0.4 EV - It shall be more than 4.5 EV ; After charging for 18 sec. by a fully charged fresh battery, measure the guide No. within 1 sec. Then, in the speed of 2 times per sec., the shutter shall be released three times. Measure each lowest value at releasing the shutter. Then, confirm that the lowest value is more than 4.5 EV.	Flash meter, fully charged fresh battery

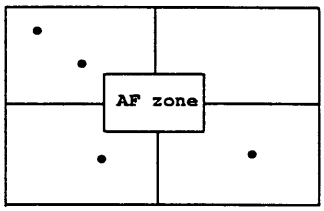
	Item	Benchmark	Applied tool(s)
	Light distribution characteristics	- In the setting conditions of 'more than 60 degree vertically' and 'more than 50 degree horizontally', the allowable drop in brightness shall be within 0.5 EV'.	
	Luminousity at flashing	Auto mode : Measure the guide No. and then compare it to the center's. - The distance shall be taken 2 m. - While changing the luminous level of tester, read the flashing period in sec.	
	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	As a series of measuring the recycle time between 'the end of third flashing' and 'the fourth flashing', follow the procedures below. Spend 2 sec. as a recycle time between 'the end of second flashing' to 'the third flashing'. Then, release the shutter for the third flash and measure the recycle time from 'after the third shutter release' to 'the moment of fourth shutter release'. Then, 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.	

	Item	Benchmark	Applied tool(s)
Quality of image	Resolution	- The solution shall be in compliance with the following values. - Horizontal center : 900 lines Vertical center : 900 lines Horizontal line(s) at each corner : 600 lines Vertical line(s) at each corner : 600 lines 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
Quality of image	Gradation and luminous level	<Histogram gray average value(s)> Black : 8 ± 5 Gray : 110 ± 10 White : 205 ± 15 How to check : 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, 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 each colour's value through the histogram. Then, each value shall be within the values advised above.	5100K viewer, ITE γ 0.45 scale, Photoshop

<table>
<tr><th></th><th>Item</th><th>Benchmark</th><th>Applied tool(s)</th></tr>
<tr><td>Capacity of image</td><td>Noise</td><td><Histogram gray standard deflection(s)>
- Gray noise : Less than 3.0
- Black noise : Less than 4.0
Gray from the histogram, and the gray's basic deflection shall be read.
- Where to measure :
For luminous level :
- Upper, 1st from left : Black,
Upper, 6th from left : Gray
- Center : White
- Lower, 6th from left : Gray,
Lower, 11th from left : Black
For noise :
- Upper, 2nd from left : Black,
Upper, 6th from left : Gray
- Lower, 6th from left : Gray,
Lower, 10th from left : Black</td><td>5100K viewer,
ITE γ 0.45 scale,
Photoshop</td></tr>
<tr><td></td><td>The center of image being out of position</td><td>When shooting using the fish-eye lens, no vignetting or shading mode shall be required in the angle of 183 degree.</td><td>Standard fish-eye lens converter</td></tr>
<tr><td></td><td>Play-back of colour(s)</td><td><table><tr><th></th><th>R</th><th>G</th><th>B</th></tr><tr><td>W</td><td>127～155</td><td>148～180</td><td>164～200</td></tr><tr><td>Ye</td><td>123～146</td><td>158～193</td><td>11～13</td></tr><tr><td>Cy</td><td></td><td></td><td></td></tr><tr><td>G</td><td></td><td></td><td></td></tr><tr><td>Mg</td><td></td><td></td><td></td></tr><tr><td>R</td><td>140～170</td><td>7～9</td><td>0～2</td></tr><tr><td>B</td><td></td><td></td><td></td></tr></table>- Set the conditions of 'Fine as the quality of image', 'Manual white balance under the fluorescent light', and 'Center-weighted metering'.
- 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>Colour bar chart</td></tr>
<tr><td>Finder</td><td>Operation mode, zoom

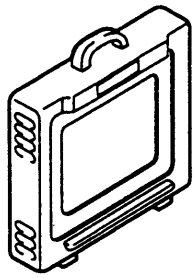
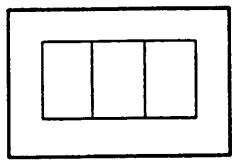
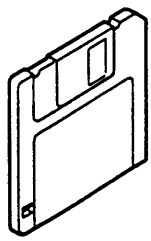
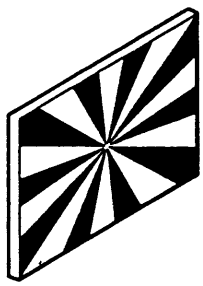
Diopter adjust-ment</td><td>- Only smooth operation mode shall be required.
'Caught-in-mechanism' touch or any unstable or unsteadily zooming mode shall not be required.

- It shall stop at anywhere defined.
Capacity : 100 ± 50 gf
Check it by driving the dial for diopter adjustment.</td><td></td></tr>
</table>

	Item	Benchmark	Applied tool(s)
Finder	Dust, fluff, scratch(es)	- Any dust / fluff / scratch(es) shall not exceed the half width of lines in the focus frame. Any of them shall not be conspicuous either. - Any dust / fluff / scratch(es) shall not exceed the width of lines, nor be conspicuous. - In case of anything where the conditions above can not apply, follow the conditions below.  - Divide the finder into 5 areas as shown above and count the quantity of dust / fluff / scratch(es) in the AF zone. - In each area, there shall be less 2 pieces of them. As the total quantity of dust / fluff / scratch(es), 4 pieces or less shall be desirable. In the AF zone, 0 pieces of such dust / fluff / scratch(es) shall be desirable.	Visual check
LCD, and others	Monitor LCD - External view - Field of view	 - No vignetting or shading on the LCD shall be required. - Inclination between the monitor and the monitor frame shall not be so outstanding. - Through-the-monitor image : 96 to 98 % - Play-back image : 98 to 100 %	Visual check
	Self-timer ; Working period Light blinking Cancel of the self-timer	 - 10 ± 3 sec. / 3 ± 1 sec. - Blinking for 9 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.	Visual check, stop watch

	Item	Benchmark	Applied tool(s)
Electrical characteristics	For consumption current ; Stand-by	- Less than 0.3 mA while turning off the main power switch. Less than 0.35 mA while sleeping. Supply 6.5V from the regulated voltage power supply to the camera, and measure the consumption current value after 12 hours from the time of supplied.	Regulated voltage power supply, current meter
	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.	
Electrical characteristics	For B.C. voltage ; Level 1	4.7 ± 0.2 V	Regulated voltage power supply
	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.	

工具一覧表　Tool List

工具番号 Tool No	名　称 Name	略　図 Illustration	備　考 Remarks
J63049 (100Volts) J63050 (110Volts) J63051 (230Volts) J63052 (240Volts)	カラービュアー５１００Ｋ Colour Viwer 5100 K		E900 E910 E900s E950 E700 共通 Common
J63056	色調整用チャート Chart for Colour Adjustment		E900 E910 E900s E950 E700 共通 Common
J65030	キャリブレーションソフト Calibration Software		E950 E700 共通 Common
ｻｰﾋﾞｽﾏﾆｭｱﾙ添付 Attached in Service Manual	ジーメンスチャート Siemens star chart		EE900 E910 E900s E950 E700 共通 Common

Siemens star chart