JVC

SERVICE MANUAL

DIGITAL STILL CAMERA

GC-X1E-S/E-BK/E-BL/E-RD/EK-S/EA

DIGITAL STILL CAMERA

SPECIFICATIONS

Power source	: DC 5 V ⎓
Power consumption	: 4.0 W (when the LCD screen is off) 5.6 W (when the LCD screen is on)
Dimensions	: 101 (W) mm x 67 (H) mm x 59 (D) mm (except protruding parts)
Weight	: Approx. 290 g (without a Memory card and battery)
Operating temperature	: 0°C to 40°C
Relative humidity	: 35% to 80%
Storage temperature	: –20°C to 50°C
LCD screen	: 2.0 inch, polysilicon TFT (200,000 pixels)
Storage media	: SmartMedia™ 3.3V (up to 64MB)
CCD	: 3.34 million pixels (3.24 million valid pixels), 1/1.8" square pixels, primary color filter, interlace scan CCD
Focal distance	: 7.5 mm to 17.5 mm (equivalent to 37mm to 86 mm on a 35 mm still camera)
Lens	: 2.3X optical zoom lens
Video	: 160 pixels x 120 pixels, 20 seconds, JVC original format
Recording format	: Exif Ver. 2.1 (DCF compliant), TIFF (Uncompressed), DPOF-compatible
Sensitivity	: 80/160/320 (ISO compliant)
Iris value (F value)	: F2.8/3.8, 5.6, 8, 11
Exposure control	: Program AE, iris priority AE
Exposure compensation	: +/–2EV (0.5EV steps)
Minimum subject distance	: Approx. 2 cm to 50 cm (in Macro mode)
Light measurement system	: Multi, spot
Flash	: Built-in, Auto/red-eye prevention/forced/disabled
Recommended distance for flash	: Approx. 2.5 m
Shutter speed	: Auto (Program AE: 1/8 seconds – 1/750 seconds, Iris priority AE: 1/4 seconds – 1/750 seconds)
White balance	: Auto/Manual (☀, ☁, 💡, MWB, 🌙)
Focus	: Auto/Manual
Self timer	: 1 second, 8 seconds
Photo quality	: 3 modes (STANDARD/FINE/NO COMP.)
Number of storable photos (with an 8MB Memory card, STANDARD/FINE/NO COMP.)	: 2032 x 1536: approx. 10/8/0 1024 x 768: approx. 43/32/3 640 x 480: approx. 87/65/8
Battery	: Lithium ion battery
Printer connector	: Output for optional printer
VIDEO output connector	: Two-pole plug, 3.5 mm diameter (PAL)
Digital output connector	: Mini-USB connector

AC Power Adapter/Charger AA-V37

Power requirement	
U.S.A. and Canada	: AC 120 V∿, 60 Hz
Other countries	: AC 110 V – 240 V∿, 50 Hz/60 Hz
Power consumption	: 23 W
Output	
Charge	: DC 3.6 V ⎓, 0.77 A
Camera	: DC 5.0 V ⎓, 1.5 A
Operating temperature	: 0°C to 40°C [when charging: 10°C to 35°C]
Dimensions	: 68 (W) mm x 38 (H) mm x 110 (D) mm
Weight	: Approx. 230 g (without a DC cord)

E. & O. E. Design and specifications subject to change without notice.

No.86572
June 2000

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SOFTWARE SECTION FOR Windows®

Operating Environment

The host computer that runs the Windows® operating environment must satisfy the following conditions.

USB Driver

1. Microsoft® Windows® 98/Windows® 98 Second Edition, pre-installed
2. Available USB port
3. CD-ROM drive

Video Player

1. CPU: Intel® Pentium® 200MHz class or higher
2. Microsoft® Windows® 95/Windows® 98
3. Display capability of 65,536 colors or more
4. CD-ROM drive
5. Minimum RAM requirement: 32MB
6. Minimum hard disk space requirement: 1MB

* The system requirements information is not a guarantee that provided software applications will work on all personal computers meeting those requirements.
* Microsoft®, Windows® are either registered trademarks or trademarks of Microsoft corporation in United States and/or other countries.
* Intel®, Pentium® are registered trademarks of Intel corporation.
* Other trademarks are property of their respective owners.
* If you use Windows® 95 or a personal computer which does not have a USB port, use an optional flash path, conversion card adapter, etc. For details on the operating environment of these devices, contact the dealers or manufacturers.

SOFTWARE SECTION FOR Macintosh®

Operating Environment

The host computer that runs the Macintosh® operating environment must satisfy the following conditions.

USB Driver

1. USB-compatible computer (iMac™, iBook™, Power Mac™ G3/G4, Power Book™ G3, etc.)
2. Mac OS 8.5.1/Mac OS 8.6/Mac OS 9.0

JVC Video Decoder

1. Power PC 603e/120MHz or faster
2. Mac OS 7.6.1 or later
3. QuickTime 3.0 or later
4. Minimum RAM requirement: 32MB
5. Minimum hard disk space requirement: 1MB

* Macintosh® is a registered trademark of Apple Computer.
* Other trademarks are property of their owners.
* If you use Macintosh® which does not have a port, use an optional flash path, conversion adapter, etc. For details on the operating en ment of these devices, contact the dealers or manufacturers.

The following table lists the differing points between Models GC-X1E-S, GC-X1E-BK, GC-X1E-BL, GC-XE-RD, GC-X1EK-S/GC-X1EA in this series.

	E-S	E-BK	E-BL	E-RD	EK-S	EA
AC POWER ADAPTER	AA-V37E	←	←	←	AA-V37EK	AA-V37EA

Important Safety Precautions

Prior to shipment from the factory, JVC products are strictly inspected to conform with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

●Precautions during Servicing

1. Locations requiring special caution are denoted by labels and inscriptions on the cabinet, chassis and certain parts of the product. When performing service, be sure to read and comply with these and other cautionary notices appearing in the operation and service manuals.

2. Parts identified by the ⚠ symbol and shaded ( ) parts are critical for safety.
   Replace only with specified part numbers.
   Note: Parts in this category also include those specified to comply with X-ray emission standards for products using cathode ray tubes and those specified for compliance with various regulations regarding spurious radiation emission.

3. Fuse replacement caution notice.
   Caution for continued protection against fire hazard.
   Replace only with same type and rated fuse(s) as specified.

4. Use specified internal wiring. Note especially:
   1) Wires covered with PVC tubing
   2) Double insulated wires
   3) High voltage leads

5. Use specified insulating materials for hazardous live parts. Note especially:
   1) Insulation Tape 3) Spacers 5) Barrier
   2) PVC tubing 4) Insulation sheets for transistors

6. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.) wrap ends of wires securely about the terminals before soldering.

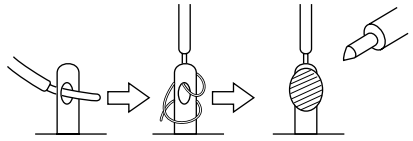


Fig.1

7. Observe that wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.)

8. Check that replaced wires do not contact sharp edged or pointed parts.

9. When a power cord has been replaced, check that 10-15 kg of force in any direction will not loosen it.

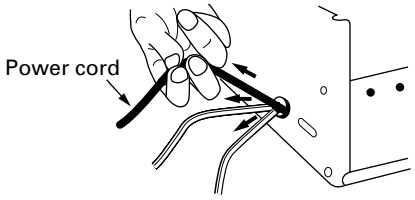


Fig.2

10. Also check areas surrounding repaired locations.

11. Products using cathode ray tubes (CRTs)
    In regard to such products, the cathode ray tubes themselves, the high voltage circuits, and related circuits are specified for compliance with recognized codes pertaining to X-ray emission. Consequently, when servicing these products, replace the cathode ray tubes and other parts with only the specified parts. Under no circumstances attempt to modify these circuits. Unauthorized modification can increase the high voltage value and cause X-ray emission from the cathode ray tube.

12. Crimp type wire connector
    In such cases as when replacing the power transformer in sets where the connections between the power cord and power transformer primary lead wires are performed using crimp type connectors, if replacing the connectors is unavoidable, in order to prevent safety hazards, perform carefully and precisely according to the following steps.

    1) **Connector part number** : E03830-001
    2) **Required tool** : Connector crimping tool of the proper type which will not damage insulated parts.
    3) **Replacement procedure**
       (1) Remove the old connector by cutting the wires at a point close to the connector.
       Important : Do not reuse a connector (discard it).

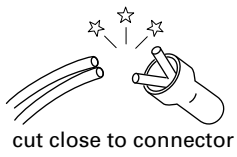


Fig.3

(2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.

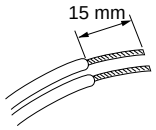


Fig.4

(3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.

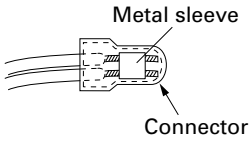


Fig.5

(4) As shown in Fig.6, use the crimping tool to crimp the metal sleeve at the center position. Be sure to crimp fully to the complete closure of the tool.

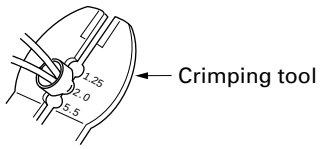


Fig.6

(5) Check the four points noted in Fig.7.

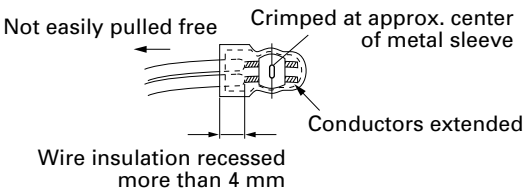


Fig.7

● Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts and wires have been returned to original positions, Afterwards, perform the following tests and confirm the specified values in order to verify compliance with safety standards.

1. Insulation resistance test

Confirm the specified insulation resistance or greater between power cord plug prongs and externally exposed parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table 1 below.

2. Dielectric strength test

Confirm specified dielectric strength or greater between power cord plug prongs and exposed accessible parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table 1 below.

3. Clearance distance

When replacing primary circuit components, confirm specified clearance distance (d), (d') between soldered terminals, and between terminals and surrounding metallic parts. See table 1 below.

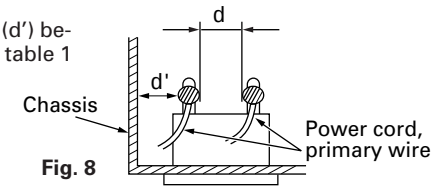


Fig. 8

4. Leakage current test

Confirm specified or lower leakage current between earth ground/power cord plug prongs and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.).

Measuring Method : (Power ON)

Insert load Z between earth ground/power cord plug prongs and externally exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See figure 9 and following table 2.

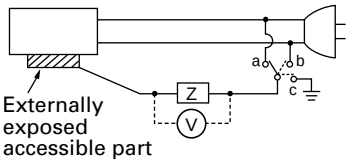


Fig. 9

5. Grounding (Class Ⅰ model only)

Confirm specified or lower grounding impedance between earth pin in AC inlet and externally exposed accessible parts (Video in, Video out, Audio in, Audio out or Fixing screw etc.).

Measuring Method:

Connect milli ohm meter between earth pin in AC inlet and exposed accessible parts. See figure 10 and grounding specifications.

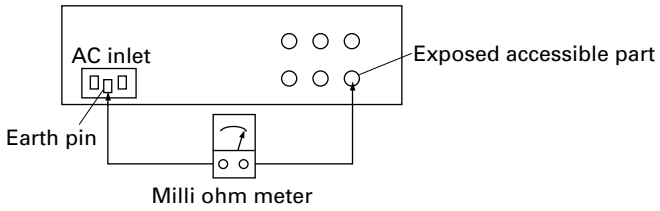


Fig. 10

Grounding Specifications

Region	Grounding Impedance (Z)
USA & Canada	Z ≦ 0.1 ohm
Europe & Australia	Z ≦ 0.5 ohm

AC Line Voltage	Region	Insulation Resistance (R)	Dielectric Strength	Clearance Distance (d), (d')
100 V	Japan	R ≧ 1 MΩ/500 V DC	AC 1 kV 1 minute	d, d' ≧ 3 mm
100 to 240 V			AC 1.5 kV 1 miute	d, d' ≧ 4 mm
110 to 130 V	USA & Canada	1 MΩ ≦ R ≦ 12 MΩ/500 V DC	AC 1 kV 1 minute	d, d' ≧ 3.2 mm
110 to 130 V 200 to 240 V	Europe & Australia	R ≧ 10 MΩ/500 V DC	AC 3 kV 1 minute (Class Ⅱ) AC 1.5 kV 1 minute (Class Ⅰ)	d ≧ 4 mm d' ≧ 8 mm (Power cord) d' ≧ 6 mm (Primary wire)

Table 1 Specifications for each region

AC Line Voltage	Region	Load Z	Leakage Current (i)	a, b, c
100 V	Japan	1 kΩ	i ≦ 1 mA rms	Exposed accessible parts
110 to 130 V	USA & Canada	0.15 μF, 1.5 kΩ	i ≦ 0.5 mA rms	Exposed accessible parts
110 to 130 V 220 to 240 V	Europe & Australia	2 kΩ	i ≦ 0.7 mA peak i ≦ 2 mA dc	Antenna earth terminals
		50 kΩ	i ≦ 0.7 mA peak i ≦ 2 mA dc	Other terminals

Table 2 Leakage current specifications for each region

Note: These tables are unofficial and for reference only. Be sure to confirm the precise values for your particular country and locality.

SECTION 1
DISASSEMBLY

1.1 BEFORE ASSEMBLY AND DISASSEMBLY

1.1.1 Precautions

1. Be sure to remove the power supply unit prior to mounting and soldering of parts.
2. When connecting and disconnecting the connectors, be careful not to damage the wire.
3. When replacing chip parts (especially IC parts), desolder completely first (to prevent peeling of the pattern).
4. Tighten screws properly during the procedures.
   Unless specified otherwise, tighten screws at a torque of 0.1N•m (1.0 kgf•cm).

CAUTION!!
RISK OF ELECTRIC SHOCK

When disassembling the unit, electric hazards may occur in some cases if the capacitor for strobe emission (STROBE board C6512) has been charged. Therefore be also very careful when performing repairs and inspections.
It is recommended that operations be carried out after waiting for more than ten minutes with the power supply removed or after discharging the capacitor forcibly.
Discharge the capacitor according to <NOTE 2> on Page 1-3.
C6512 is located behind the STROBE board.

PRECAUTIONS ON HANDLING
THE LITHIUM SECONDARY BATTERY

This unit is equipped with a coin type lithium secondary battery.
Improper handling of this battery may cause heat to be generated, damage, fires, or leakage. Always follow the precautions below.

① Do not short-circuit, disassemble, distort, nor heat the battery.
② Load the battery with its + and - poles connected correctly.
③ Do not solder the battery itself.
④ When replacing parts, also refer to the numbers listed in the Parts List of the manual.
⑤ Do not store the battery in direct sunlight and hot and humid places.
⑥ When replacing the battery, handle it with care and do not attempt to hold it with tweezers as it may short-circuit.
⑦ When disposing the battery, wind tape around the terminal to insulate the battery, and dispose the battery according to the method prescribed.

1.1.2 Assembly and disassembly

STEP	PART NAME	FIG. NO.	POINT	NOTE
①	FRONT CASE REAR CASE	Fig 1-2-1	Remove screws 2(115), 3(156), 4(114), 1(116)	
②	OPERATION UNIT		Remove the Connector ⓡ MAIN CN4001 ⟺ OPERATION UNIT Remove the TOP COVER Remove screws 3 (116) 2 (115)	NOTE 1

(1) (2) (3) (4) (5)

(1) : Indicate the disassembly steps. When assembling, perform in the reverse order of these steps. This number corresponds to the number in the disassembly diagram.
(2) : Indicates the name of disassembly/assembly parts.
(3) : Indicates the number in the disassembly diagram.
(4) : Indicates parts and points such as screws, washers, springs which must be removed during disassembly/assembly.
Lock (L), soldering (SD), shield, connector, etc.

Note: *The encircled numbers indicate the order for disassembling the cabinet parts.*
The screw numbers indicate the disassembling order.
⟷:Wire
⟺:Flat wire
⬌:Board to Bord Connector

[Example]
- (115) = Remove the parts No 115 screw.
- (SD1) = Desoldering at the point SD1.
- ⓐ = Disconnect the connector/ML ⓐ .

(5) : Precautions on disassembly/assembly.

1.1.3 Disconnection of Connectors (Wires)

Connector
Pull both ends of the connector in the arrow direction, remove the lock and disconnect the flat wire.

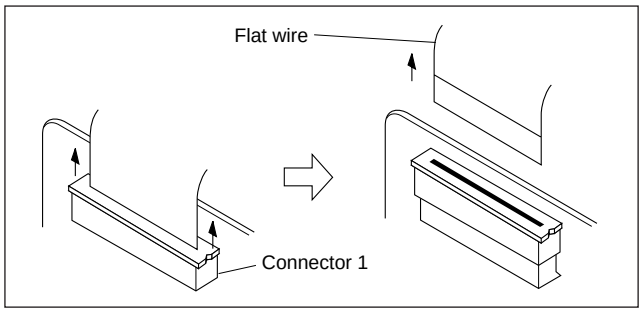


Fig. 1-1-1 Connector 1

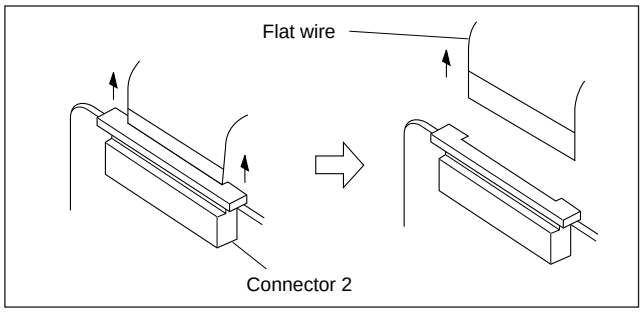


Fig. 1-1-2 Connector 2

Extend the locks in the direction of the arrow for unlocking and then pull out the wire. After removing the wire, immediately restore the locks to their original positions because the locks are apt to come off the connector.

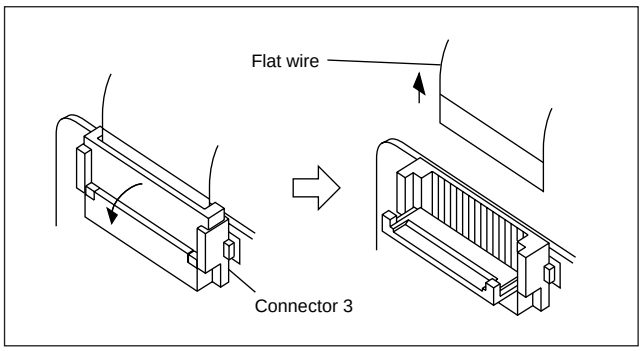


Fig. 1-1-3 Connector 3

B-B connector
Pull the board by both the sides in the direction of the arrow for disconnecting the B-B connector.

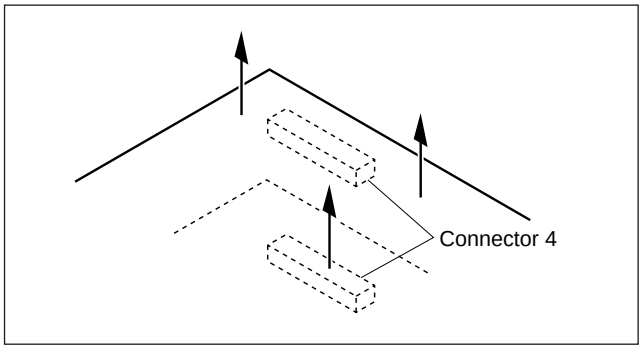
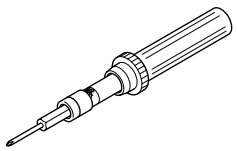
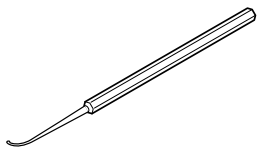
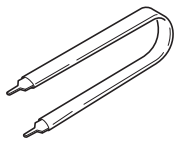
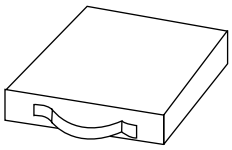


Fig. 1-1-4 Connector 4

1.2 TOOLS AND EQUIPMENTS REQUIRED FOR ADJUSTMENTS

1.2.1 Tools required for adjustments

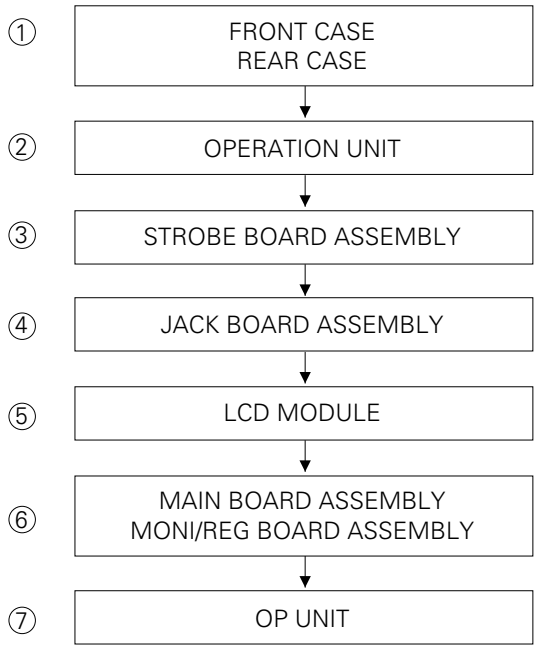
1 Torque driver YTU94088	2 Clip IC replacement jig PTS40844-2
	
3 Connector catcher YTU94036A	4 Soldering kit YTU96016B
	

1.3 DISASSEMBLY/ASSEMBLY OF CABINET PARTS

1.3.1 Disassembly flow chart

The following flow chart shows the steps for disassembling the cabinet parts. To assemble, perform the steps of the flow chart in the reverse order.

Note: *The encircled numbers indicate the order for disassembling the cabinet parts.*
The screw numbers indicate the disassembling order.



1.3.2 Disassembly method (I)

STEP	PART NAME	FIG. NO.	POINT		NOTE
①	FRONT CASE REAR CASE	Fig 1-3-1		Remove screws 2 (115), 3 (156), 4 (157), 1 (154)	
②	OPERATION UNIT		Remove the Connector ⓡ MAIN CN4001 ⟺ OPERATION UNIT Remove the TOP COVER	Remove screws 3 (116) 2 (115)	Note 1
③	STROBE BOARD ASSEMBLY	Fig 1-3-1	Remove the Connector ⓝ MAIN CN6601 ⬌ STROBE CN6501	Remove screw 1 (114)	Note 1 Note 2
	JACK BOARD ASSEMBLY	Fig 1-3-2	Remove the Connector ⓟ MAIN CN5501 ⟺ JACK CN101 ⓜ LCD MODULE (BL) ⟺ JACK CN701	Remove screws 2 (114) ⓔ(SD3), ⓕ (SD4), ⓖ(SD5)	
④	LCD MODULE		Remove the Connector ⓚ MAIN CN3002 ⟺ LCD MODULE (LCD) Remove from the Frame Assy Remove from the LCD Holder	Remove screws 2 (114)	Note 1 Note 3 Note 4
⑤	MAIN BOARD ASSEMBLY MONI/REG BOARD ASSEMBLY		Remove the Connector ⓗ MAIN CN501 ⟺ OP UNIT ⓒ MAIN CN3001 ⬌ MON/REG CN9001 ⓓ MON/REG TL9001 ⟷ Frame Assy Remove the PWB HOLDER	 ⓓ(SD1) Remove screws 2 (114)	Note 1 Note 1
⑥	OP UNIT	Fig 1-3-3	Remove from the Frame Assy	Remove screws 3 (117)	

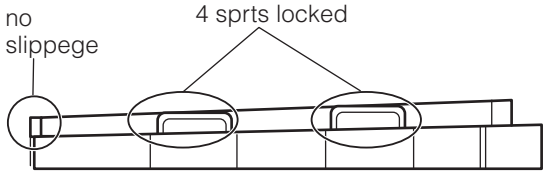
CONNEC-TOR/HL	NO.OF PINS	CONNECTION
ⓒ	80	MAIN Board CN3001 ⬌ MONI/REG Board CN9001
ⓓ	1	MONI/REG Board TL9001 ⟷ MAIN FRAME (RED)
ⓔ	1	JACK Board TP3 ⟷ MAIN FRAME (BROWN)
ⓕ	1	JACK Board TP2 ⟷ MONI/REG Board J9001 (BLACK)
ⓖ	1	JACK Board TP1 ⟷ MONI/REG Board J9002 (RED)
ⓗ	22	MAIN Board CN501 ⟺ OP UNIT
ⓙ	2	MAIN Board CN502 ⟺ OP UNIT
ⓚ	24	MAIN Board CN3002 ⟺ LCD MODULE (LCD)
ⓜ	2	JACK Board CN701 ⟺ LCD MODULE (BL)
ⓝ	14	MAIN Board CN6601 ⬌ STROBE Board CN6501
ⓟ	38	MAIN Board CN5501 ⟺ JACK Board CN101
ⓠ	28	MAIN Board CN2001 ⬌ CCD Board CN1001
ⓡ	12	MAIN Board CN4001 ⟺ OPERATION UNIT
ⓢ	1	STROBE UNIT WIRE (ORANGE) ⟷ STROBE Board J6501 (Through hole)
ⓣ	1	STROBE UNIT WIRE (BROWN) ⟷ STROBE Board J6502 (Through hole)
ⓤ	1	STROBE UNIT WIRE (RED) ⟷ STROBE Board J6503 (Through hole)
ⓥ	1	STROBE UNIT WIRE (BLACK) ⟷ STROBE Board J6504 (Through hole)
ⓦ	1	STROBE UNIT WIRE (Red, Thin wire) ⟷ STROBE Board J6505 (Through hole)
ⓧ	1	STROBE UNIT WIRE (BLACK, Thin wire) ⟷ STROBE Board J6506 (Through hole)

Note 1
Destination of connectors.
Note: *Three kinds of double-arrows in connection tables respectively show kinds of connector/wires.*

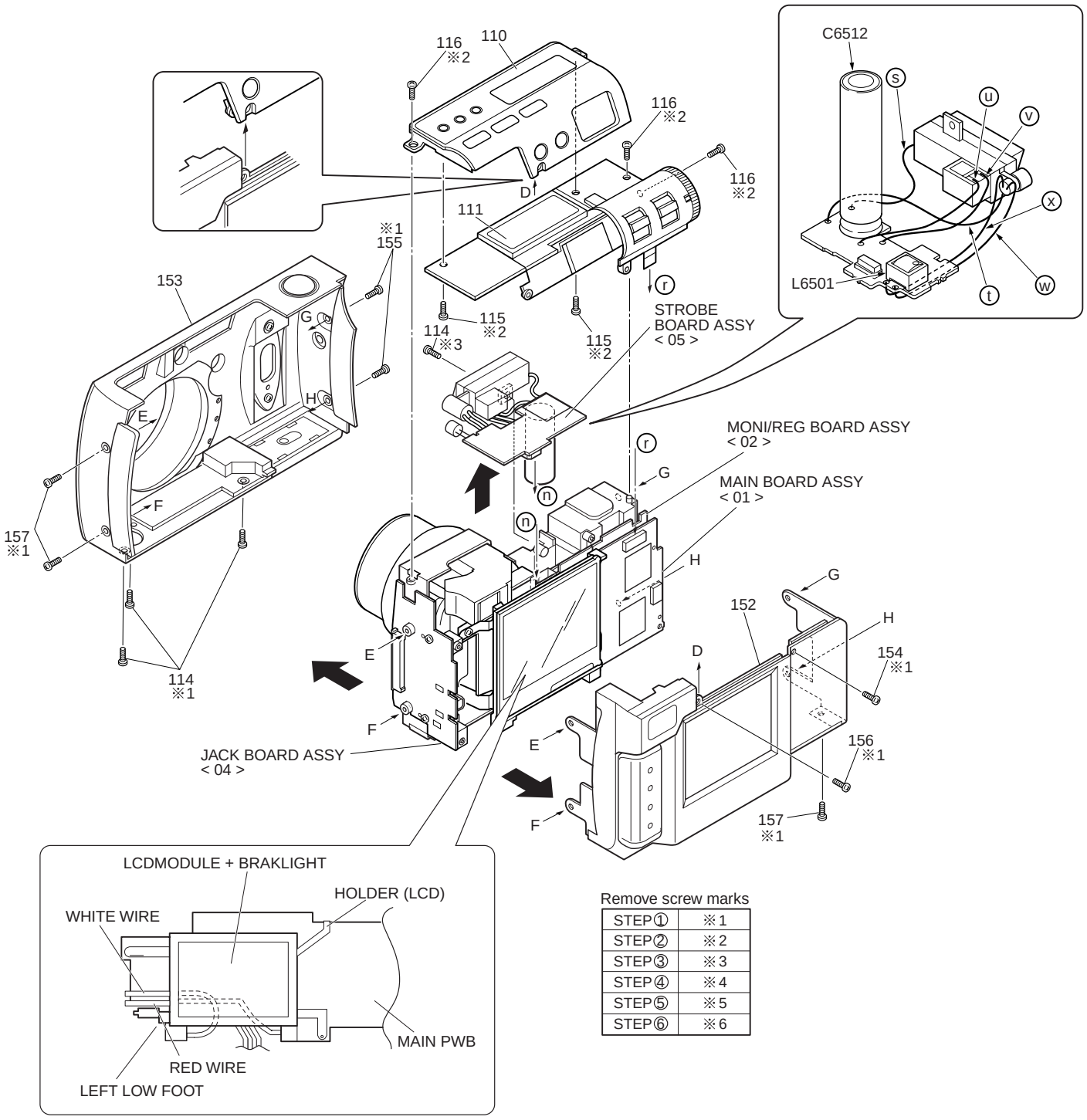
⬌ : *Board to Board connector*
⟺ : *Flat wire*
⟷ : *Wire*

Note 2
Be careful from electric shock hazard because the capacitor (C6512) for the strobe is exposed. Be sure to positively discharge the capacitor if it is energized by short-circuiting a resistor (10 - 22 k) connected at both capacitor terminals. Please be very careful when doing this job.

Note 3
Make sure that there is no slippage between the LCD panel and the backlight, the four spots are locked with hooks securely, and the sheet is placed in the correct direction.



Note 4
Both the stripe pattern and the non-slippage (notch) on the sheet surface are to be in the direction as illustrated.



Remove screw marks

STEP①	※1
STEP②	※2
STEP③	※3
STEP④	※4
STEP⑤	※5
STEP⑥	※6

Fig.1-3-1

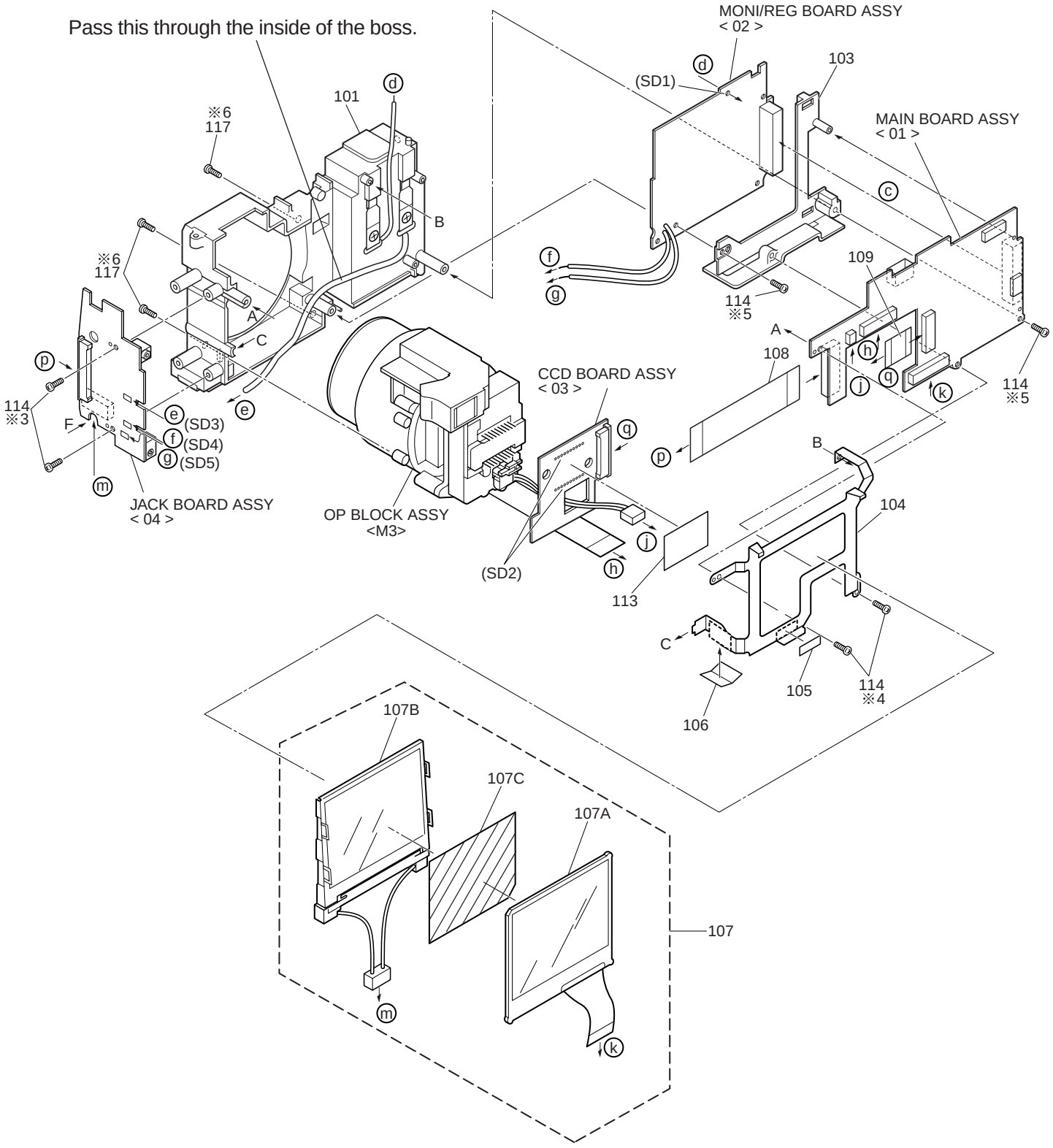

Pass this through the inside of the boss.
MONI/REG BOARD ASSY
< 02 >
MAIN BOARD ASSY
< 01 >
CCD BOARD ASSY
< 03 >
JACK BOARD ASSY
< 04 >
OP BLOCK ASSY
<M3>
※6
117
※3
※4
※5
101
103
104
105
106
107
107A
107B
107C
108
109
113
114
(SD1)
(SD2)
(SD3)
(SD4)
(SD5)
A
B
C
F
a
b
c
d
e
f
g
h
j
k
m
p
q

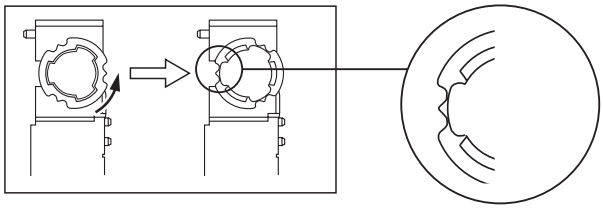
Fig.1-3-2

1.3.3 Disassembly method (II) <OP Unit>

STEP	PART NAME	POINT	NOTE
①	OP Block ASSEMBLY	Remove screws 3 (208)	
②	COVER CCD BASE ASSEMBLY SPACER SET PLATE	Remove screws 3 (206),2 (207), 1 (236) Remove screws 3(206),2(207). Remove the CCD Board Assy 20(SD1)	
③	TILT FRAME RATCH GEAR MAIN PIN	Remove the SET RING 2 (231)	Note 1 Note 2 Note 3
④	RATCH MAGNET NUT ASSEMBLY RATCH PIECE	Remove Screws 3 (237),1 (236)	Note 4

Note 1

Turn and fix the set ring and make sure that the convex marks are identical.

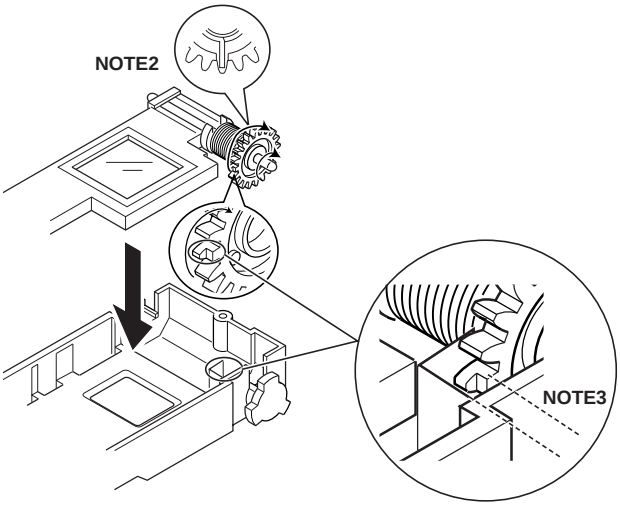


Note 2

Make sure that the torsion spring is in the groove of the latch gear.

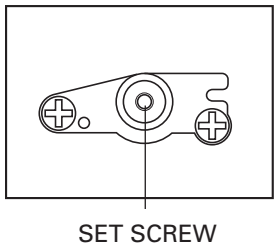
Note 3

Turn the latch gear clockwise (↷) and position it so that the toothless portion comes to the level that is as high as the main frame.



Note 4

Never move the setscrew in the center of the nut assembly!



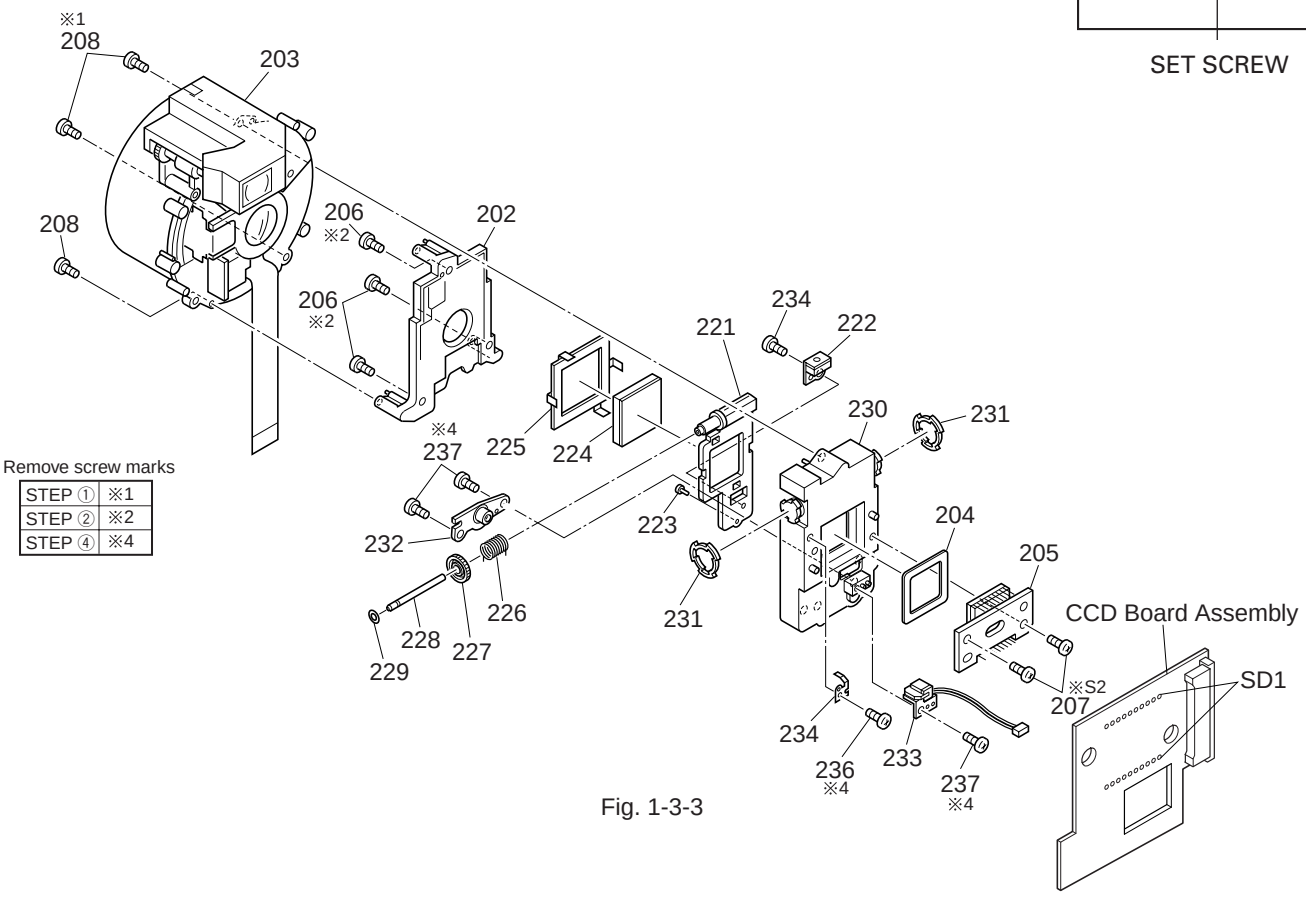


Fig. 1-3-3

1.3.4 OP BLOCK Lens Composition

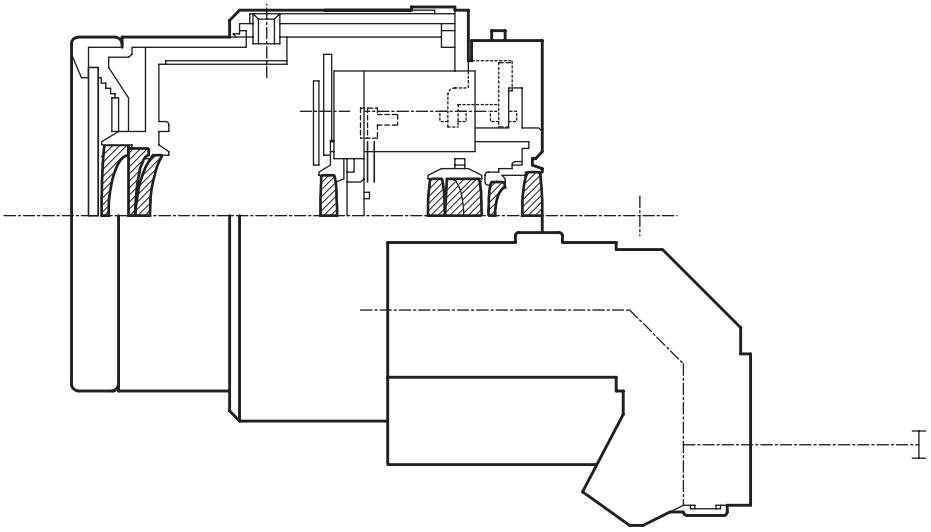


Fig. 1-3-4 Composition of GC-X1E Lens (8-group 9-element lens composition)

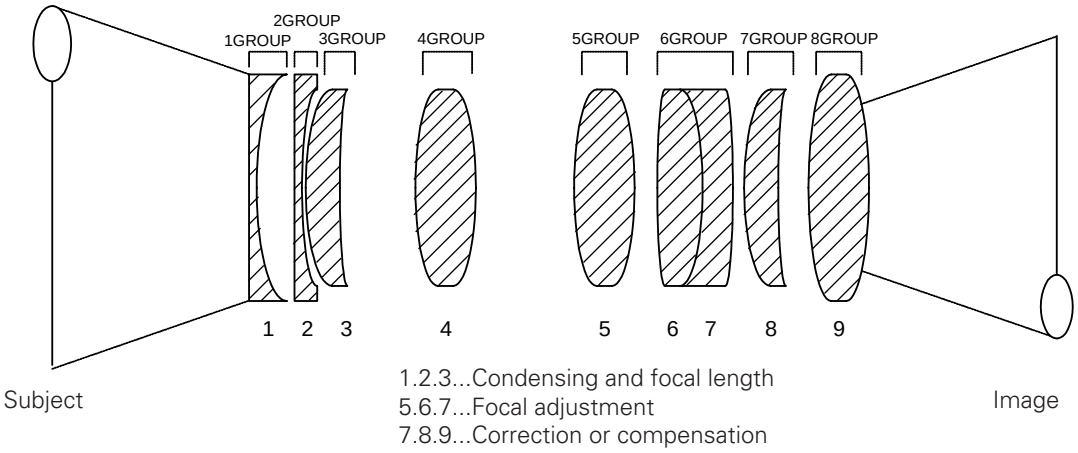
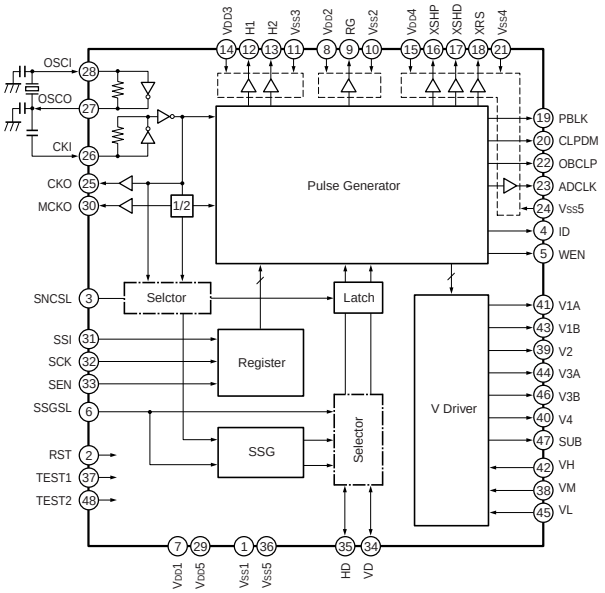


Fig. 1-3-5 8-group-9-piece lens composition

1.4 IC BLOCK DIAGRAM

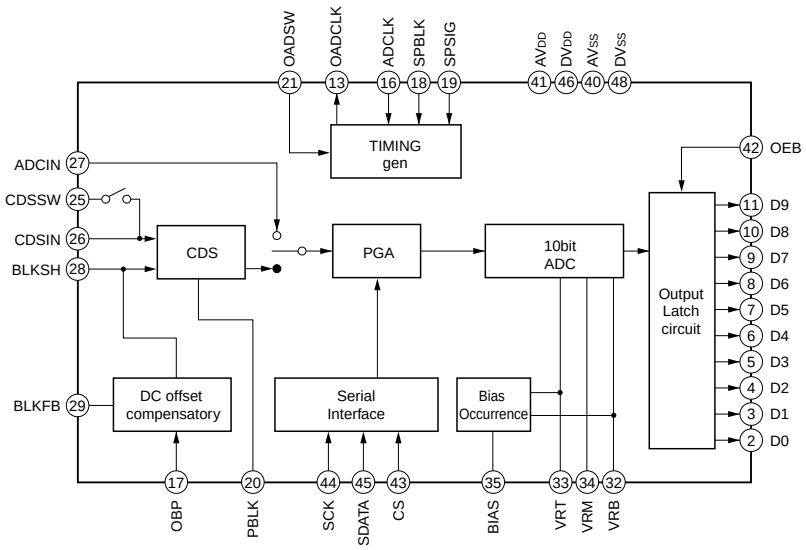
1.4.1 IC 1002 (CXD2497R)



Pin Descriptions

Pin No.	Pin Name	I/O	Description
1	$V_{SS}1$	-	GND
2	RST	I	System reset input terminal H: Reset released L: Reset activated (Should be activated at power ON, normally.) (Schmitt trigger input/without protection diode on power supply side)
3	SNCSL	I	Sync system switching control input terminal (with pull-down resistor) H: CKI sync L: MCKO sync
4	ID	O	Line identification pulse output terminal in the vertical direction
5	WEN	O	Memory write timing pulse output terminal
6	SSGSL	I	Built-in SSG enable input terminal (with pull-down resistor) H: Built-in SSG is effective. L: External sync is effective.
7	$V_{DD}1$	-	3.3V power (for common logic section)
8	$V_{DD}2$	-	3.3V power (for RG terminal)
9	RG	O	Reset gate pulse output terminal for CCD
10	$V_{SS}2$	-	GND
11	$V_{SS}3$	-	GND
12	H1	O	Clock output terminal for CCD horizontal register
13	H2	O	Clock output terminal for CCD horizontal register
14	$V_{DD}3$	-	3.3V to 5.0V power (for H1 and H2 terminals)
15	$V_{DD}4$	-	3.3V power (for CDS system terminals)
16	XSHP	O	CCD pre-charge level sample/hold pulse output terminal
17	XSHD	O	CCD data level sample/hold pulse output terminal
18	XRS	O	Sample/hold pulse output terminal for phase matching in analog-to-digital conversion
19	PBLK	O	Pulse output terminal for pulse cleaning during horizontal and vertical blanking period
20	CLPDM	O	Pulse output terminal for CCD dummy signal clamping
21	$V_{SS}4$	-	GND
22	OBCLP	O	Pulse output terminal for CCD optical black signal
23	ADCLK	O	Clock output terminal for analog-to-digital conversion IC Logical phase is adjustable with the serial interface data
24	$V_{SS}5$	-	GND
25	CKO	O	Inverter output terminal
26	CKI	I	Inverter input terminal
27	OSCO	O	Inverter output terminal for oscillation (If not used, should be opened or connected to GND through a capacitor.)
28	OSCI	I	Inverter input terminal for oscillation (If not used, should be fixed to "Low".)
29	$V_{DD}5$	-	3.3V power (for common logic section)
30	MCKO	O	System clock output terminal for signal processing IC
31	SSI	I	Serial interface data input terminal for setting each IC mode (Schmitt trigger input/without protection diode on power supply side)
32	SCK	I	Serial interface clock input terminal for setting each IC mode (Schmitt trigger input/without protection diode on power supply side)
33	SEN	I	Serial interface strobe input terminal for setting each IC mode (Schmitt trigger input/without protection diode on power supply side)
34	VD	I/O	Vertical sync signal input/output terminal
35	HD	I/O	Horizontal sync signal input/output terminal
36	$V_{SS}6$	-	GND
37	TEST1	I	IC test terminal 1 with pull-down resistor (Should be fixed to GND normally.)
38	VM	-	GND (for vertical drivers)
39	V2	O	Clock output terminal for CCD vertical register
40	V4	O	Clock output terminal for CCD vertical register
41	V1A	O	Clock output terminal for CCD vertical register
42	VH	-	15.0V power (for vertical drivers)
43	V1B	O	Clock output terminal for CCD vertical register
44	V3A	O	Clock output terminal for CCD vertical register
45	VL	-	-7.5V power (for vertical drivers)
46	V3B	O	Clock output terminal for CCD vertical register
47	SUB	O	Pulse output terminal for CCD electronic shutter
48	TEST2	I	IC test terminal 2 with pull-down resistor (Should be fixed to GND normally.)

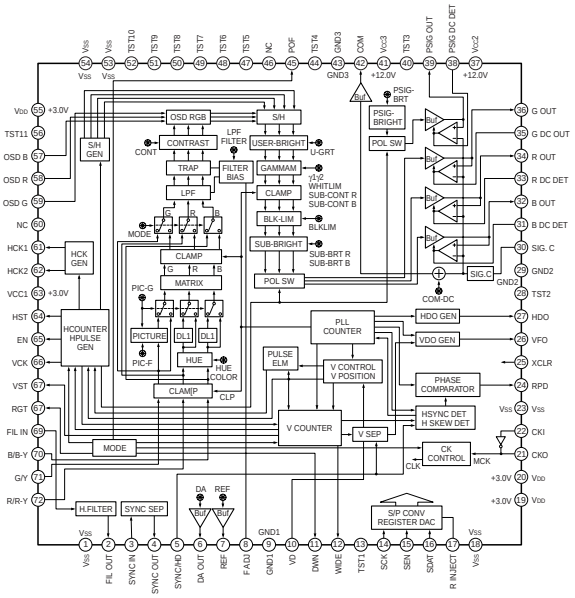
1.4.2 IC 2001 (CDS/AGL)



Pin Descriptions

Pin No.	Pin Name	Description	I/O	Analog (A) or Digital (D)
1	NC	No internal connection	-	-
2	D0	Digital output terminal (LSB)	O	D
3-10	D1-D8	Digital output terminals	O	D
11	D9	Digital output terminal (MSB)	O	D
12	NC	No internal connection	-	-
13	OADCLK	Latch clock output terminal for D0 to D9	O	D
14	DV_{SS}	Digital GND (0V)	-	D
15	DV_{DD}	Power for digital 3.0V system (Should be connected to AV_{DD} outside the IC.)	-	D
16	ADCLK	Analog-to-digital conversion clock input terminal	I	D
17	OBP	Optical black pulse input terminal	I	D
18	SPBLK	Black level sampling clock input terminal	I	D
19	SPSIG	Signal level sampling clock input terminal	I	D
20	PBLK	Pre-blanking signal input terminal	I	D
21	OADSW	OADCLK enable input terminal	I	D
22	AV_{SS}	Analog GND (0V)	-	A
23	AV_{DD}	Power for analog 3.0V system	-	A
24	NC	No internal connection	-	-
25	CDSSW	Signal level sampling output terminal	O	A
26	CDSIN	CDS input terminal	I	A
27	ADCIN	ADC input terminal	I	A
28	BLKSH	Black level sample/hold terminal	-	A
29	BLKFB	Black level feedback terminal	-	A
30	AV_{SS}	Analog GND (0V)	-	A
31	AV_{DD}	Power for analog 3.0V system (Should be connected to DVDD outside the IC.)	-	A
32	VRT	Reference voltage terminal 3 (Ceramic capacitor of 0.1µF or more should be connected between this terminal and AVss.)	-	A
33	VRB	Reference voltage terminal 2 (Ceramic capacitor of 0.1µF or more should be connected between this terminal and AVss.)	-	A
34	VRM	Reference voltage terminal 1 (Ceramic capacitor of 0.1µF or more should be connected between this terminal and AVss.)	-	A
35	BIAS	Internal bias terminal (A 24-Kohm resistor should be connected between this terminal and AVss.)	-	A
36	NC	No internal connection	-	-
37	AV_{SS}	Analog GND (0V)	-	A
38	AV_{DD}	Power for analog 3.0V system (Should be connected to DV_{DD} outside the IC.)	-	A
39	NC	No internal connection	-	-
40	AV_{SS}	Analog GND (0V)	-	A
41	AV_{DD}	Power for analog 3.0V system (Should be connected to DV_{DD} outside the IC.)	-	A
42	OEB	Digital output enable control input terminal	I	D
43	CS	Serial interface control input terminal	I	D
44	SCK	Serial clock input terminal	I	D
45	SDATA	Serial data input terminal	I	D
46	DV_{DD}	Power for digital 3.0V system (Should be connected to AV_{DD} outside the IC.)	-	D
47,48	DV_{SS}	Digital GND	-	D

1.4.3 IC 7302 (CXA3268AR)

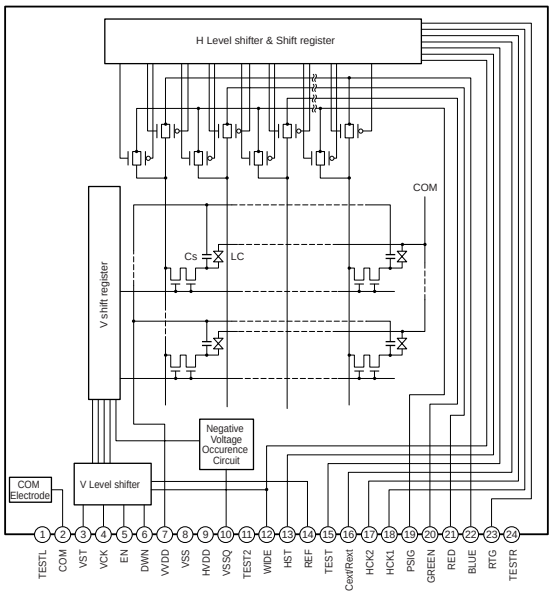


Pin Descriptions

Pin No.	Pin Name	I/O	Description	Input Res.
1	Vss	-	GND terminal for digital 3.0V system	
2	FIL OUT	O	H filter output terminal (for internal sync separator use)	
3	SYNC IN	I	Sync input terminal for sync separator circuit (for internal sync separator use)	
4	SYNC OUT	O	Sync output terminal for sync separator circuit (for internal sync separator use)	
5	CSYNC/HD	I	CSYNC/horizontal sync signal input terminal	
6	DA OUT	O	DAC output terminal	
7	REF	O	Level shifter circuit reference voltage output terminal for LCD panel	
8	F ADJ	O	f0 adjust resistor connecting terminal for TRAP	
9	GND1	-	GND terminal for analog 3.0V system	
10	VD	I	Vertical sync signal input terminal	L
11	DWN	O	Up/Down switching signal output terminal	
12	WIDE	O	16:9 wide display switching pulse output terminal	
13	TST1	-	Test terminal (Should be opened.)	
14	SCK	I	Serial clock input terminal	
15	SEN	I	Serial load input terminal	
16	SDAT	I	Serial data input terminal	
17	R INJECT	O	Resistor connecting terminal for serial block current control	
18	Vss	-	GND terminal for digital 3.0V system	
19	VDD	-	Power for digital 3.0V system	
20	VDD	-	Power for digital 3.0V system	
21	CKO	O	Oscillation cell output terminal	
22	CKI	I	Oscillation cell input terminal	
23	Vss	-	GND terminal for digital 3.0V system	
24	RPD	O	Phase comparison output terminal	
25	XCLR	I	Capacitor connecting terminal for power-on reset (for timing generating system)	H
26	VDO	O	VDO pulse output terminal	
27	HDO	O	HDO pulse output terminal	
28	TST2	-	Test terminal (Should be connected to GND.)	
29	GND2	-	GND terminal for analog 12.0V system	
30	SIG.C	I	DC voltage adjust terminal for R, G, B and PSIG outputs	
31	B DC DET	O	Capacitor connecting terminal for B signal's DC voltage feedback circuit	
32	B OUT	O	B signal output terminal	
33	R DC DET	O	Capacitor connecting terminal for R signal's DC voltage feedback circuit	
34	R OUT	O	R signal output terminal	
35	G DC DET	O	Capacitor connecting terminal for G signal's DC voltage feedback circuit	
36	G OUT	O	G signal output terminal	
37	Vcc2	-	Power for analog 12.0V system	
38	PSIG DC DET	O	Capacitor connecting terminal for G signal's DC voltage feedback circuit	
39	PSIG OUT	O	PSIG output terminal	
40	TST3	-	Test terminal (Should be opened.)	
41	Vcc3	-	Power for analog 12.0V system COM (CS)	
42	COM	O	Common electrode voltage output terminal (CS) for LCD panel	
43	GND3	-	GND terminal for analog 12.0V system COM (CS)	
44	TST4	-	Test terminal (Should be opened.)	
45	POF	O	LCD panel power ON/OFF terminal (Open, if this function is not used.)	
46	NC	-	No internal connection	
47	TST5	-	Test terminal (Should be connected to GND.)	
48	TST6	-	Test terminal (Should be connected to GND.)	
49	TST7	-	Test terminal (Should be opened.)	
50	TST8	-	Test terminal (Should be opened.)	
51	TST9	-	Test terminal (Should be opened.)	
52	TST10	-	Test terminal (Should be opened.)	
53	Vss	-	GND terminal for digital 3.0V system	
54	Vss	-	GND terminal for digital 3.0V system	
55	VDD	-	Power for digital 3.0V system	
56	TST11	-	Test terminal (Should be connected to GND.)	
57	OSD B	I	OSD B input terminal	
58	OSD R	I	OSD R input terminal	
59	OSD G	I	OSD G input terminal	
60	NC	-	No internal connection	
61	HCK1	O	H clock pulse 1 output terminal	
62	HCK2	O	H clock pulse 2 output terminal	
63	Vcc1	-	Power for analog 3.0V system	
64	HST	O	H start pulse output terminal	
65	EN	O	EN pulse output terminal	
66	VCK	O	V clock pulse output terminal	
67	VST	O	V start pulse output terminal	
68	RGT	O	Right/Left switching signal output terminal	
69	FIL IN	I	H FILTER input terminal (for internal sync separator use)	
70	B/B-Y	I	B/B-Y signal input terminal	
71	G/Y	I	G/Y signal input terminal	
72	R/R-Y	I	R/R-Y signal input terminal	

* DWN: DOWN SCAN and UP SCAN RGT: RIGHT SCAN and LEFT SCAN
H: Pull-up resistor incorporated L: Pull-down resistor incorporated

1.4.4 LCD (ACX301AK)

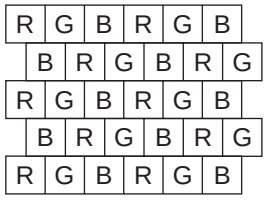


Pin Descriptions

Pin No.	Pin Name	Description
1	TESTL	Panel testing terminal (Should be opened.)
2	COM	Common electrode voltage input terminal for panel
3	VST	Start pulse input terminal for V shift register drive
4	VCK	Clock input terminal for V shift register drive
5	EN	Enable signal input terminal for gate select pulse
6	DWN	Drive direction signal input terminal for V shift register
7	VV_{DD}	Power for V driver
8	V_{SS}	GND for H and V drivers
9	HV_{DD}	Power for H driver
10	VSSG	Negative voltage setting terminal for V driver
11	TEST2	Connected to GND through a 1-Mohm resistor in the panel
12	WIDE	Pulse input terminal for 16:9 mode
13	HST	Start pulse input terminal for H shift register drive
14	REF	Level shifter circuit reference voltage input terminal
15	TEST	Panel testing terminal (Should be opened.)
16	Cext/Rext	Power input terminal for setting H shift register drive time constant
17	HCK2	Clock input terminal for H shift register drive
18	HCK1	Clock input terminal for H shift register drive
19	PSIG	Uniformity improving signal input terminal
20	GREEN	Video signal (G) input terminal for the panel
21	RED	Video signal (R) input terminal for the panel
22	BLUE	Video signal (B) input terminal for the panel
23	RGT	Drive direction signal input terminal for H shift register
24	TESTR	Panel testing terminal (Should be opened.)

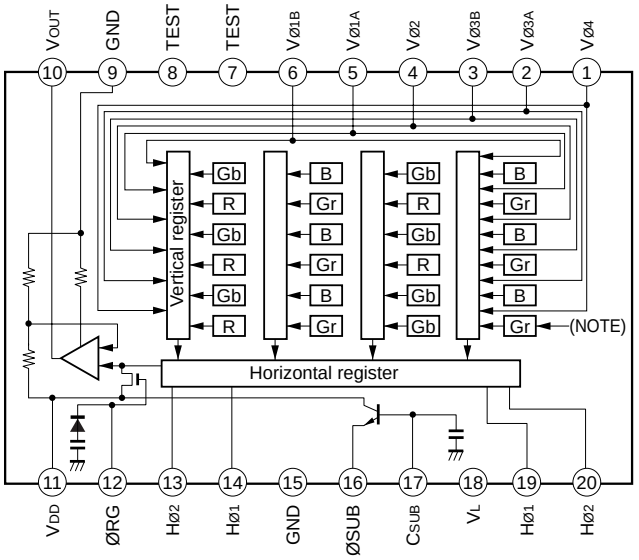
Features

- Device Structure
  - Active matrix panel with internal driver using low-temperature polysilicon transistors
  - Pixels
    Total dots: 896 (H) x 230 (V) =206,080
    Display dots: 880 (H) x 228 (V) =200,640 (2.0 in.)
- Total dots: 200,000 dots 5.1cm diagonal (2.0 in.)
- Horizontal resolution: 440 TV scanning lines
- Light permeability: 5.6% (standard)
- Smooth screen image with RGB delta array
- NTSC/PAL compatible
- High image quality internal circuitry
- 16:9 screen display function
- Low-reflection screen display processing assures easy viewing even outdoors
- Anti-grime display



Delta array

1.4.5 CCD (ICX262AQ)



(NOTE) ☐ : Photo Sensor

Pin Descriptions

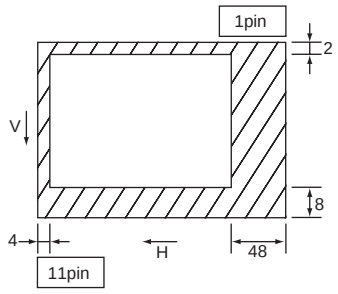
Pin No.	Pin Name	Description
1	VØ4	Vertical register transfer clock
2	VØ3A	Vertical register transfer clock
3	VØ3B	Vertical register transfer clock
4	VØ2	Vertical register transfer clock
5	VØ1A	Vertical register transfer clock
6	VØ3B	Vertical register transfer clock
7	TEST	Test terminal*1
8	TEST	Test terminal*1
9	GND	GND
10	VOUT	Signal output
11	VDD	Circuit power
12	øRG	Reset gate clock
13	HØ2	Horizontal register transfer clock
14	HØ1	Horizontal register transfer clock
15	GND	GND
16	øSUB	PCB clock
17	CSUB	PCB bias*2
18	VL	Protection transistor bias
19	HØ1	Horizontal register transfer clock
20	VØ2	Horizontal register transfer clock

*1: Terminal should be opened.

*2: A 0.1µF capacitor should be connected between the pin and GND, since the DC bias is generated inside the CCD.

Features

- Field period readout system
- Interline CCD image sensor
- Total number of pixels: 2140 (H) x 1560 (V) approx. 3340k pixels
- Number of effective pixels: 2088 (H) x 1550 (V) approx. 3240k pixels
- Effective number of pixels: 2080 (H) x 1542 (V) approx. 3210k pixels (1.18in)
- Chip size: 8.10mm (H) x 6.64mm (V)
- Unit cell size: 3.45m m (H) x 3.45m m (V)
- Optical black:
  Horizontal (H) direction : front 4 pixels, rear 48 pixels
  Vertical (V) direction : front 8 pixels, rear 2 pixels
- Number of dummy bits: Horizontal 28 Vertical 1 (even fields only)
- Square pixels
- Horizontal drive frequency: 18kHz
- RGB basic color mosaic on-chip color filter
- High sensitivity
- Cyclic, variable speed shutter
- Excellent anti-blooming characteristics



Optical black wiring diagram
(Top View)

SECTION 2
ELECTRICAL ADJUSTMENT

2.1 ELECTRICAL ADJUSTMENT

2.1.1 Precautions

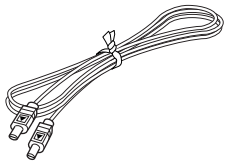
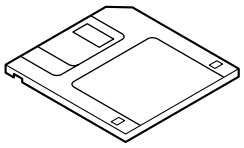
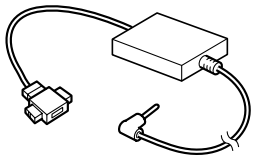
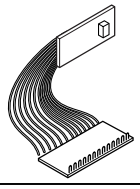
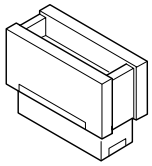
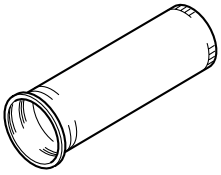
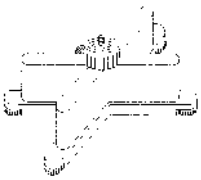
Both the camera section and deck section of this model are designed and manufactured to be adjustment-free. However, if both or either of the following parts is replaced, it needs special adjustment with a personal computer at a JVC service equipment after the part replacement

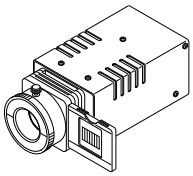
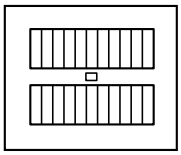
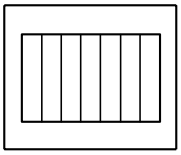
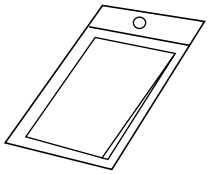
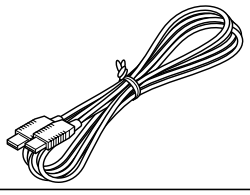
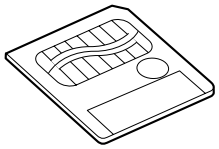
- OP block assembly
- EEPROM (on the MAIN board)

When there is some trouble in the electric circuit, it is required to detect the faulty part with specified test instruments first and then to proceed to repair, replacement and adjustment.

1. When cheking a signal at a chip test point, be sure to use an IC clip or the like not to apply any stress to the test point. When replacing a chip part (IC in particular), completely remove solder chips from it and its periphery before proceeding to part replacement (in order to avoid exfoliation of the pattern).
2. Carefully disconnect/connect connectors because they are apt to get damaged.

2.1.2 Test instruments required for electrical adjustment

1 Patch cord YTU93099A	2 Jig connector cable YTU93102A
	
3 Service support system YTU94057-47	4 PC cable QAM0099-002
	
5 Jig connector cable YTU93091B	6 Extension connector YTU94145A
	
7 INF adjustment lens YTU92001B	8 Camera stand YTU93079
	

9 Light box assembly YTU93096A	10 Gray scale chart YTU94133A
	
11 Color bar chart YTU94133C	12 Cleaning cloth KSMM-01
	
13 USB QAM0252-001	14 Smart media card 16MB
	

2.1.3 Required test equipment

1. Color TV monitor.
2. AC power adapter (AA-V37 or equivalent)
3. Oscilloscope (dual-trace type, for more than 20 MHz).
4. Digital voltmeter
5. Frequency counter (with threshold level adjuster)
6. Personal computer

2.1.4 Setup (LCD ADJUSTMENT)

Setup for electrical adjustment with personal computer

Note 1: *As a general rule for adjustment with a personal computer, connect a personal computer to its PRINTER terminal.*

Note 2: *Use DC cord to supply the power.*

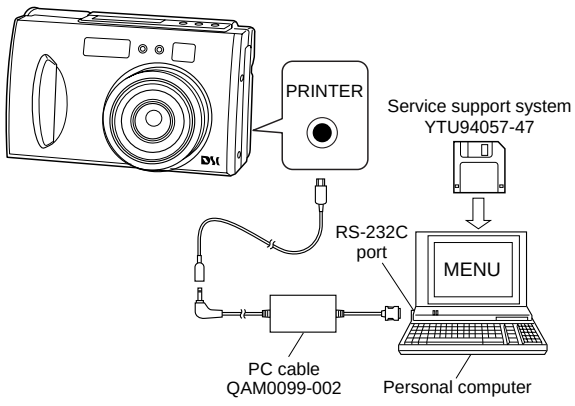


Fig. 2-1-1 Setup for electrical adjustment with personal computer (I)

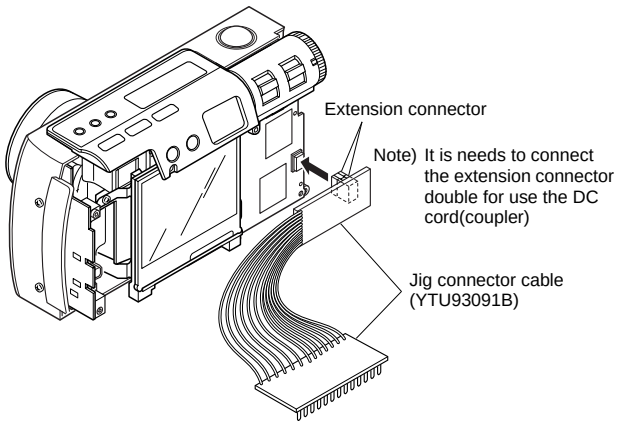


Fig. 2-1-2 Setup for electrical adjustment with personal computer (II)

Pin No.	FUNCTION
1	135TMS
2	135TDI
3	nTRST
4	AL_3.3V
5	32DBI
6	GND
7	M_COM
8	M_SIG_C
9	M_RED
10	M_SIG_GND
11	JTAGMODE
12	135TDO
13	135TCK
14	AL_3.3V
15	32RST
16	M_BLUE
17	RPD
18	M_PSIG
19	M_GREEN
20	NC

Table 2-1-1 Jig Connector Function

2.1.5 Setup (CCD ADJUSTMENT)

Setup for electrical adjustment with personal computer

Note 1: *As a general rule for adjustment with a personal computer, connect a personal computer to its DIGITAL terminal.*

Note 2: *Use DC cord to supply the power.*

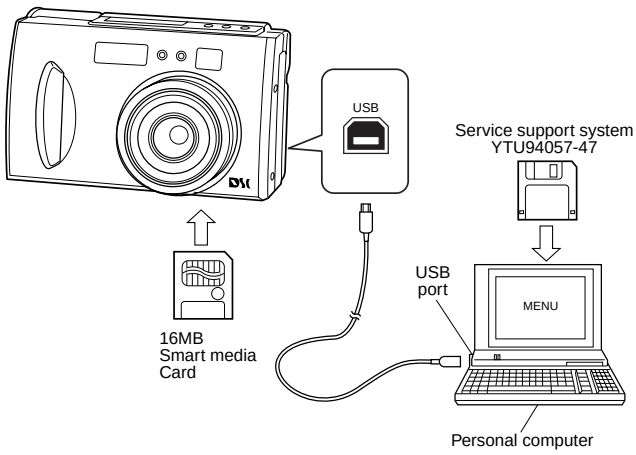


Fig. 2-1-3 Setup for electrical adjustment with personal computer (I)

2.2 Setup with patch cords and jig connector cables

Note:

Fig. 2-2-1 shows an example of expansion setup that facilitates inspection of major boards because main components are connected by means of patch cords and jir cables.For proceeding to electrical adjustment in such the setup, disassemble the set at certain level required for the current adjustment objectives referring to the section 1 "DISASSEMBLY" and properly set up the expanded set and test instruments.

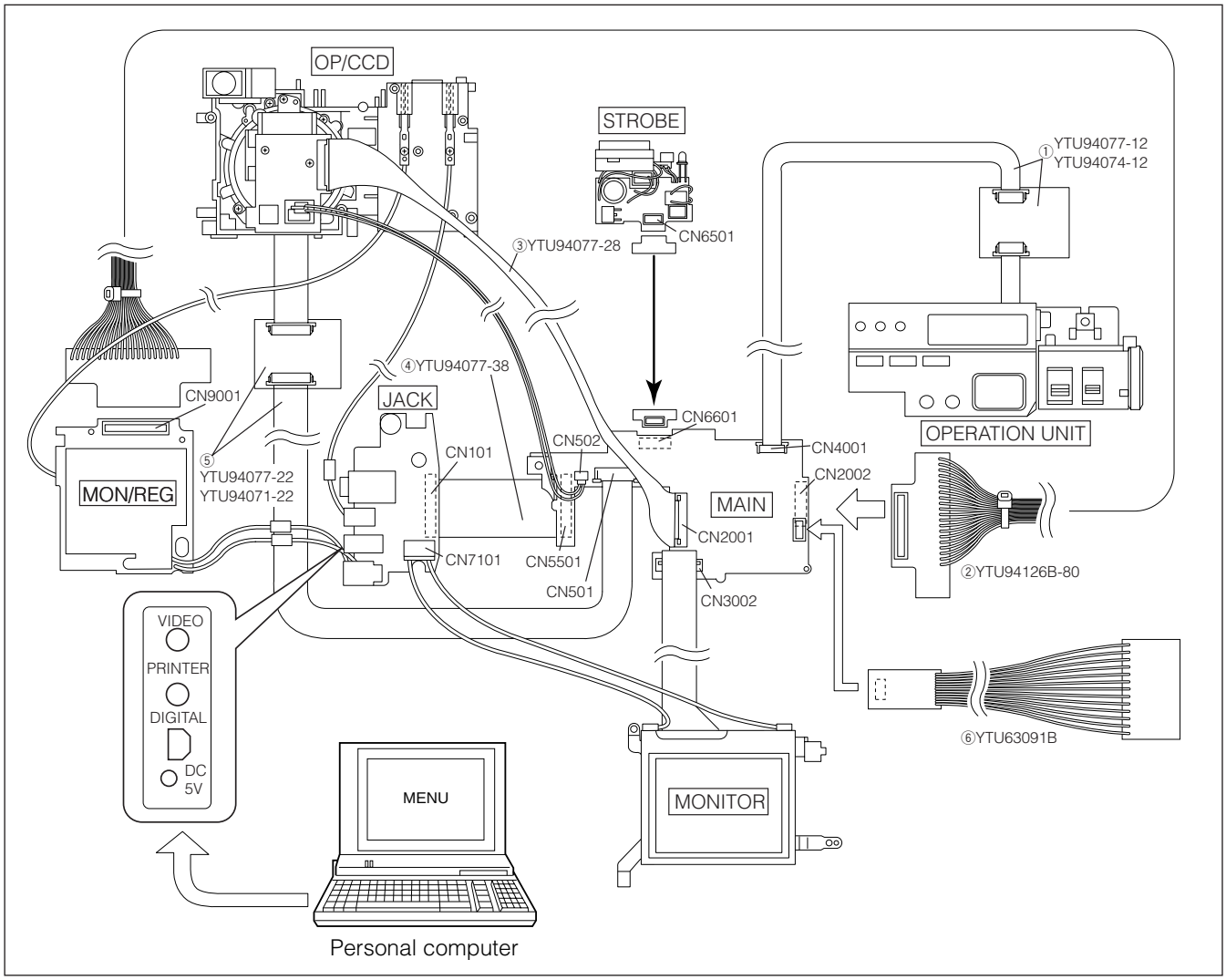


Fig. 2-2-1

	Connection				Pin No.	Parts Number	
①	MAIN CN4001	←→	OPRATION UNIT		12	YTU94077-12	FPC wire
						YTU94074-12	FPC CN.ASSY
②	MAIN	←→	MON/REG	CN9001	80	YTU94126B-80	B TO B CN.ASSY
③	MAIN CN2001	←→	CCD	CN1001	28	YTU94077-28	FPC wire
④	MAIN CN5501	←→	JACK	CN101	38	YTU94077-38	FPC wire
⑤	MAIN CN501	←→	OPUNIT		22	YTU94077-22	FPC wire
						YTU94074-22	FPC CN.ASSY
⑥	MAIN CN2202	←→			20	YTU93091B	JIG CN.cable

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