NO.	419-01-50-RA5BL01

KYOCERA
MEDICAL-EYE
YASHICA
DENTAL-EYE 3
Repair Manual

KYOCERA CORPORATION
Optical Equipment Group
Service Dept. 5BL 970925

NO.	419-01-50-RA5BL01

KYOCERA
MEDICAL-EYE
YASHICA
DENTAL-EYE 3
Repair Manual

KYOCERA CORPORATION
Optical Equipment Group
Service Dept. 5BL 970925

FOREWORD

- This Repair Manual provides technical information concerning the product mechanisms, maintenance and repair of DENTAL-EYE3.

- Major technical changes will be made known through the Technical Bulletins. You are advised to revise this manual according to the content of the Technical Bulletins.
  Information in this manual is subject to change without notice.

-

CONTENTS

A. GENERAL & TECHNICAL INFORMATION

Specifications ---- A- 2
Names of Parts ---- A- 4
Internal Structure ---- A- 5
Electric Circuit Block Diagram ---- A- 8
Electric Circuits ---- A- 9
Timing Chart ---- A-10
Description of Electric Circuits ---- A-11
Description of Functions of IC Terminals ---- A-23
Description of Functions of Electric Parts ---- A-33
Functions of Switches ---- A-38
Schematic Diagram ---- A-39

B. DISASSEMBLY & REASSEMBLY PROCEDURES

Removal of Exterior Parts ---- B- 2
Removal of Main FPC Ass'y ---- B- 7
Removal of Mirror Box Ass'y ---- B-12
Disassembly of Winding Mechanism ---- B-14
Removal of Shutter Unit ---- B-15
Removal of Rewind Mechanism ---- B-16
Removal of Other Parts ---- B-17
Disassembly and Assembly of Ass'y Parts ---- B-18
Disassembly of Lens Barrel Ass'y ---- B-29
Disassembly of Back Cover Ass'y ---- B-35
Dressing of Lead Wires ---- B-37
Parts Modification List ---- B-38

C. ADJUSTMENT PROCEDURES, ETC.

Adjustment of Perforation Position ---- C- 2
Adjustment of Viewfinder LED Display Position ---- C- 4
Adjustment of Lens Barrel Ass'y Back Focusing ---- C- 5
Adjustment of Flange Back Distance ---- C- 6
Adjustment of Viewfinder Focusing ---- C- 6
Adjustment of Charge Voltage ---- C- 7
Adjustments of Compensation Values ---- C- 8
Others ---- C-19
Electric Elements Locating Diagram ---- C-20
Test Points on Main FPC ---- C-21
Wiring Diagram ---- C-22

A. GENERAL & TECHNICAL INFORMATION

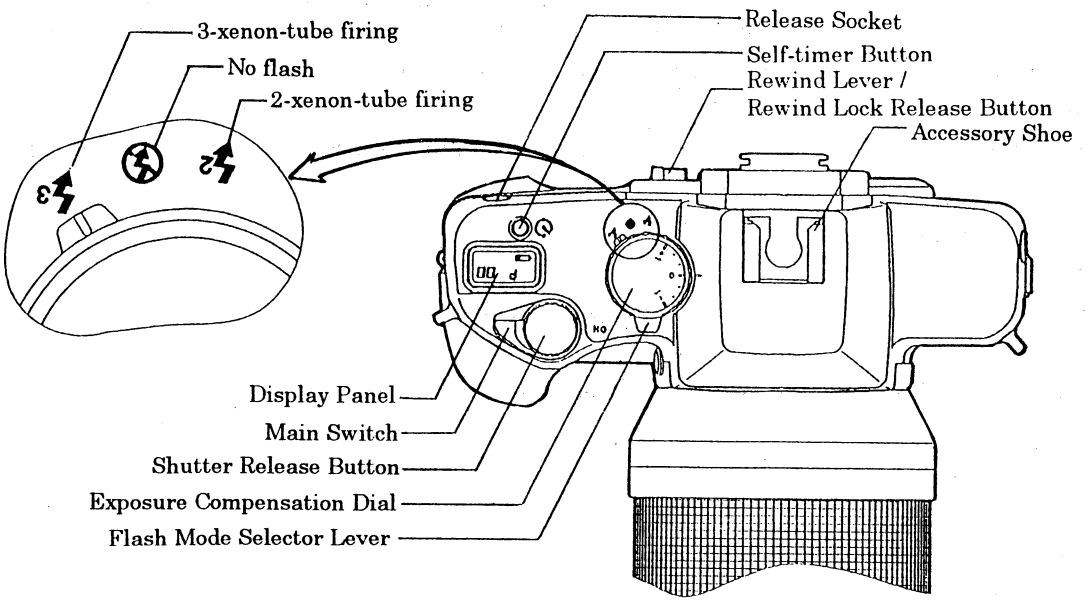
[SPECIFICATIONS]

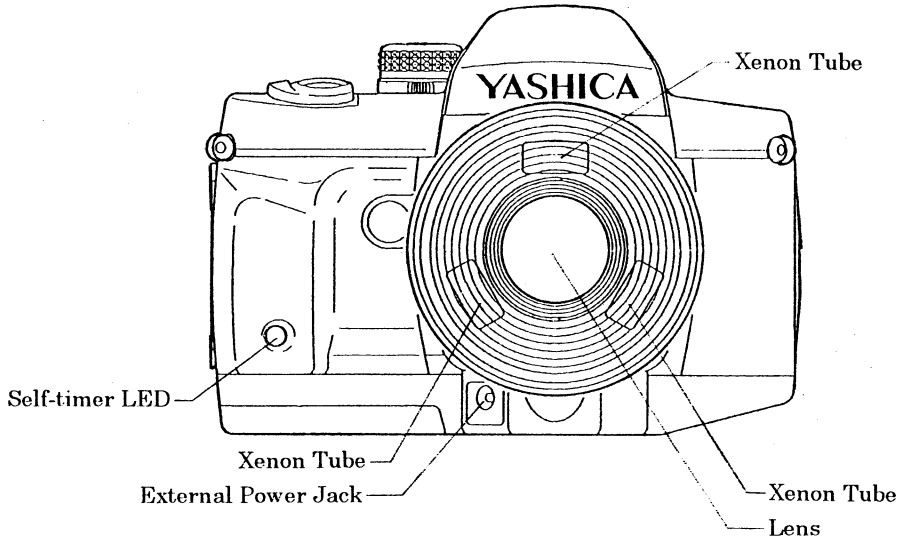
Model	: Single-lens-reflex camera with focal-plane shutter and built-in electronic flash.
Film size	: 24×36 mm
Lens	: 100mm / F4 macro lens (5 elements in 3 groups)
Shutter type	: Vertical traveling focal plane shutter
Shutter speeds	: When internal flash is ON: 1/125 second When internal flash is OFF: 16 seconds to 1/4000 second With X synchro: 1/125 second
Exposure control	: When internal flash is ON: Shutter-priority flashmatic mode When internal flash is OFF: Aperture-priority automatic exposure (fixed at F4)
Exposure metering	: TTL center-weighted averaging system (only when internal flash is OFF).
Exposure range	: EV 4 to EV 23 (with ISO 100 film at F4)
Film speed auto synchro	: DX code automatic sensing (with non-DX films, fix at ISO 100) ① When internal flash is ON: ISO 50 to ISO 400 (1 step intervals) Films of ISO 50 or below are exposed at ISO 50; films of ISO 800 or above are exposed at ISO 800. ② When internal flash is OFF: ISO 25 to ISO 5000 (1 step intervals)
Exposure compensation	: +1 EV to−1 EV (in 1/3 step intervals)
Image magnification scale	: 1/1-1/1.2-2/3-1/1.8-1/2-1/2.5-1/3-1/3.5-1/4-1/5-1/6-1/8-1/10-1/12-1/15
Subject area	: 24×36 to 360×540 mm
Camera-to-subject distance	: 155 cm (1/15) to 15.5 cm (1/1)
Viewfinder	: Pentaprism eye-level finder
Focusing screen	: Horizontal split image prism with microprism
Viewfinder LED	: Green ① Lighted: Flash ready (when internal flash is ON) ② Slow blinking: Flash charging (when internal flash is ON) ③ Rapid blinking: Low-light warning (when internal flash is OFF)
Display panel	: Power indicator, exposure counter, self-timer remaining time, battery warning indicator
Film loading	: Auto loading type, with automatic winding to "01" on exposure counter.
Film winding	: Auto winding with internal motor
Film rewinding	: Auto rewinding with internal motor; following rewinding, motor stops automatically. Rewinding from midway through roll possible.
Exposure counter	: Automatic resetting incremental type
Flash	: Three-element built-in ring flash (upper, lower-right and lower-left for shadowless type; also upper element can be disabled when desired). Auto flashmatic mechanism, minimum aperture F22, guide number about 7.5 (with ISO 100 film)
Synchro contacts	: Direct X contact

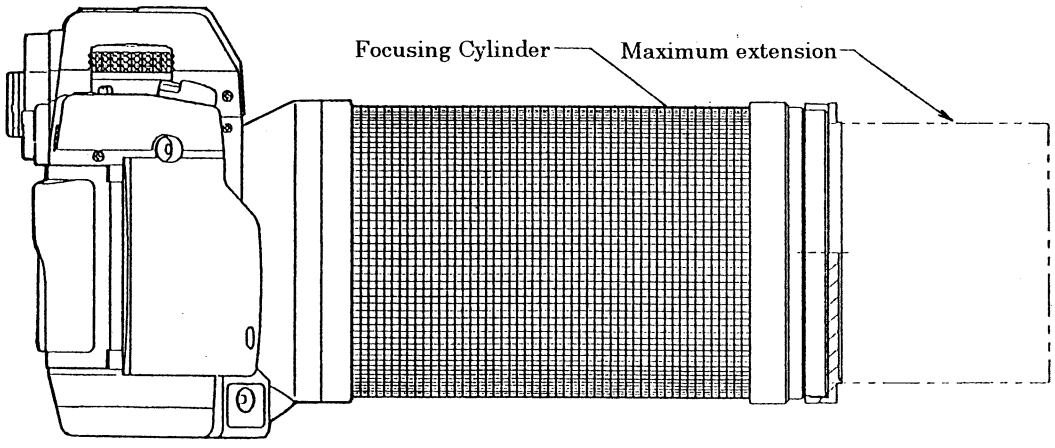
Battery	: Uses one 6V Lithium (type 2CR5) battery (provides power for about 450 exposures, using continuous flash exposure at room temperature, new battery, under standard exposure conditions).
Camera back	: Opens with back release lever; removable
Data-back	: Built-in quartz clock with automatic calendar
Printing data	: Year-Month-Day, Day-Hour-Minute, -- -- -- (no print), Month-Date-Year, Day-Month-Year
Other	: Carrying case
Dimensions	: 151 (W)×204 (D)×112 (H)
Weight	: 1,390 g (not including battery)

* Appearance and specifications subject to change without notice

[NAMES OF PARTS]







[INTERNAL STRUCTURE]

(1) Body Structure

The main driving units and their layout are as shown in Fig.1. ① is the Film Winding Mechanism, ② the Quick Return Mechanism and ③ and ④ the Film Rewind Mechanism. These units are provided with their own motors which are designed to give appropriate torques, respectively.

The Film Winding Gear Train, located above the Grip, is driven by the motor Ⓐ in the Spool.

The Quick Return Mechanism, placed at the side of the Mirror Box on the Grip side, is driven by the motor Ⓑ in the lower part on the Grip side. This mechanism **performs mirror up and down, and Shutter Lever charge by rotating the cam.**

The Rewind Mechanism rewinds the film by the energy which is given from a motor Ⓒ to the 1st Gear Train ③ and transmitted to the 2nd Gear Train via the Transmission Shaft ⑤.

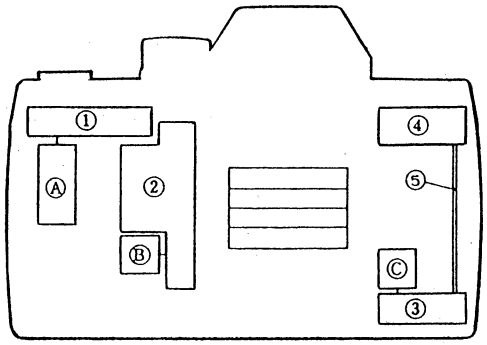


Fig.1 Layout of Units

(2) Film Winding and Rewind Mechanisms

Fig.2 shows the structure of the Winding and Rewind Mechanisms. For winding, the dedicated high-performance miniature motor ① incorporated in the spool drives the Winding Spool via the Gear Train ② having a proper reduction ratio.

For rewinding, the dedicated high-performance miniature motor ③ at the bottom of the body drives the Rewind Fork via the Primary Reduction Gear Train ④ at the bottom of the body, the Drive Shaft ⑤ and the Secondary Reduction Gear Train ⑥ at the top of the body. In the winding and rewind mechanisms, a clutch mechanism using an epicyclic gear is provided in the drive gear trains. Before the driving of one of the two mechanisms, the motor of the other mechanism is reversed to make the latter mechanism free.

Fig.3 shows operational positions of the Frame Limiting Mechanism which enhances the accuracy of the film stop position.

When the Magnet Plunger has been energized after completion of the shutter travel sequence, the claw at the end of the Frame Limiting Lever ③ is released from the groove in the Frame Limiting Cam ④ by tensile force of the Frame Limiting Cam ④ (II).

Consequently, the Sprocket connected directly to the Frame Limiting Cam becomes free and the motor can drive the Spool to advance the film.

During the film advancement by one frame, the trip-in force for the claw is charged by the cam (III). And when the film has advanced by one frame, the claw trips in the groove of the cam at the end of its one revolution so that the Sprocket stops with accuracy.

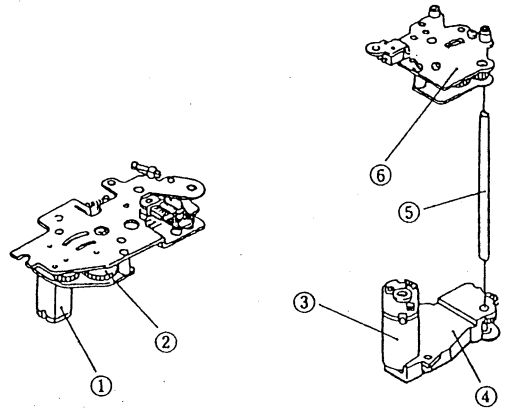


Fig.2 Winding and Rewind Units

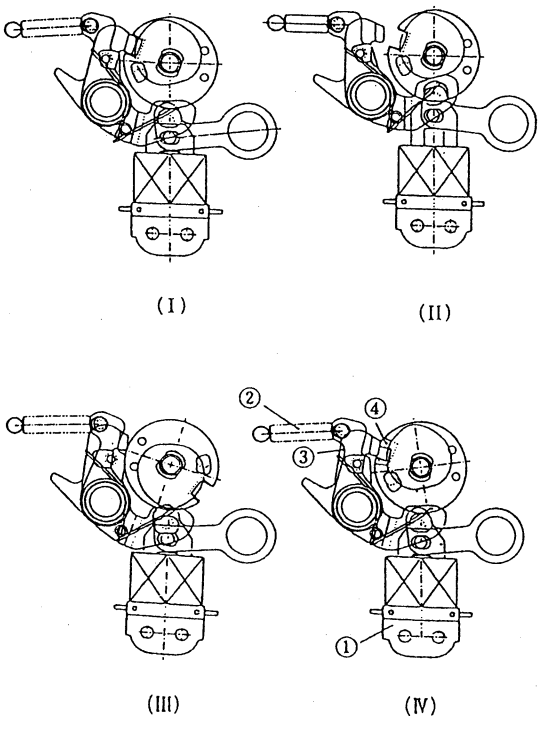


Fig.3 Film Frame Limiting Mechanism

The cam consisting of two layers reverses during rewinding. At reversing, the two layers rotate differentially to narrow the width of the groove, thus preventing the claw from tripping in (Ⅳ). Therefore, in spite of the incorporation of the mechanical frame limiting means, automatic rewinding is allowed.

(3) Mirror Drive

The release sequence is such that the plunger operates to release the hook first and then the motor runs so that the lever moves on the cam to perform mirror-up, and release the shutter trigger.
After the opening and closing of the shutter, the motor runs again to perform mirror-down, and shutter charge at different timings so that the motor is loaded evenly.

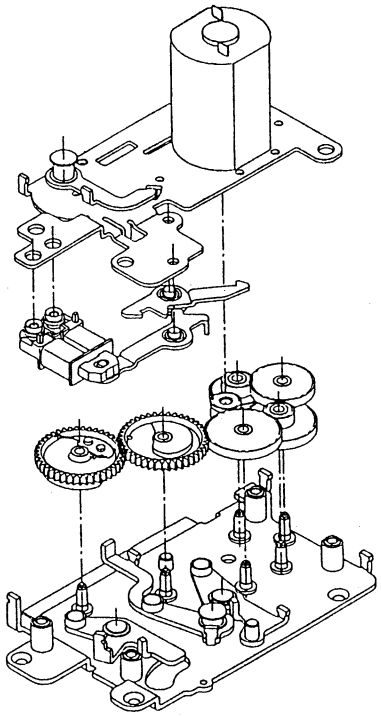


Fig. 4 Mirror Drive Unit

[INFORMATION DISPLAY]

(1) Viewfinder Display

LED display (green) at the bottom center of the viewfinder frame:

- When built-in flash is ON : blinks (3 Hz) during charge.
  : lights up at charge completion.
- When built-in flash is OFF: blinks (6 Hz) for camera shake warning at a shutter speed of 1/60 second or slower.
  : goes out at a shutter speed faster of 1/60 second.

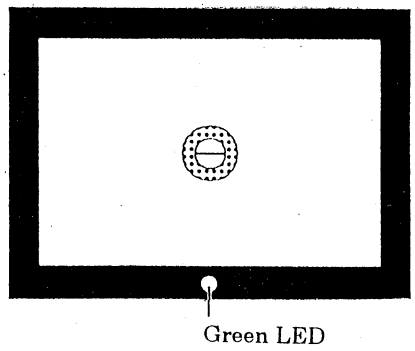


Fig. 5 Viewfinder Display

(2)Display Panel

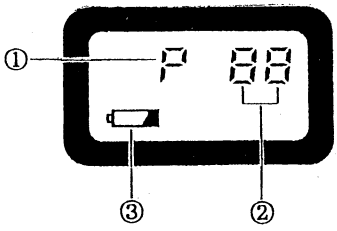
An LCD panel is used for the Display Panel. The indications are as follows:

① P mark: appears when the power to the camera is turned ON.

② Exposure counter
The exposure counter is always displayed when the Main Switch is OFF.
- The exposure counter indicates the exposure count of 00 ~99.
- During film rewinding, the exposure counter displays a counted down number and at completion of rewinding, the exposure counter blinks displaying "00".
- When the self-timer is in use, the counter displays the remaining time until shutter release (10 seconds → 00).

③ Battery warning indicator (see page A-12)

Fig. 6 Display Panel



[MECHANISM OF LENS BARREL ASS'Y]

Figs. 8 and 9 show sectional views of the Lens Barrel Ass'y that indicate the parts arrangements.

< Function >

(1) The focus can be aligned manually by rotating the Focusing Cylinder with your hand to move the Straight Cylinder along the optical axis. The aperture stop-down value corresponding to the amount of the extension of the Straight Cylinder is set by the cam.
(2) Flash firing occurs by use of the three xenon tubes located along the periphery of the Lens.
(3) Aperture opening and closing are controlled by the solenoid located inside the Lens Barrel.

< Constitution >

(1) The Straight Cylinder is, via the Slide Roller Screw, engaged with the straight groove in the Fixer Cylinder and the spiral groove in the Focusing Cylinder. Consequently, the Straight Cylinder moves along the optical axis according to the rotation of the Focusing Cylinder.
(2) When the Straight Cylinder moves, the Cam Plate Arm Shaft engaged with the cam groove in the Fixer Cylinder is guided by the cam groove. As a result, the Cam Plate Arm Shaft produces a turning force via the Cam Plate Arm and rotates the Cam Plate of the Lens Ass'y. The stop-down value of the Lens depends on the amount of rotation of the Cam Plate relative to its reference position. Consequently, the aperture stop-down value is set according to the position of the Lens (Straight Cylinder).
(3) At shooting, the solenoid, via the plunger, turns the Aperture Release Lever, which knocks the Aperture Coupling Arm to operate the Aperture.

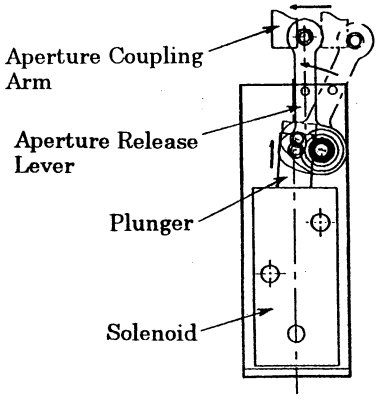


Fig. 7 Aperture Opening and Closing Mechanism

① Lens Ass'y
② Focusing Cylinder
③ Fixer Cylinder
④ Straight Cylinder
⑤ Ring
⑥ Aperture Barrel Mounting Plate
⑦ Flash P.C. Board
⑧ Base
⑨ Lens Front Frame
⑩ Reflector
⑪ Xenon Tube
⑫ Mask
⑬ S. Retaining Nut
⑭ Light-Shield Frame
⑮ Cam Plate
⑯ Cam Plate Arm
⑰ Cam Plate Arm Shaft
⑱ Roller, Cam Plate Arm Shaft
⑲ Slide Roller Screw
⑳ Slide Roller
㉑ Solenoid
㉒ Aperture Release Lever
㉓ Capacitor P.C. Board

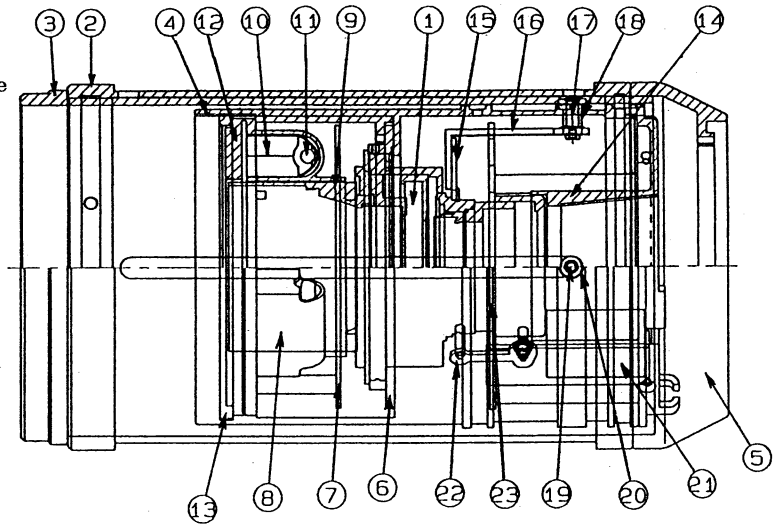


Fig. 8 When magnification is 1/15

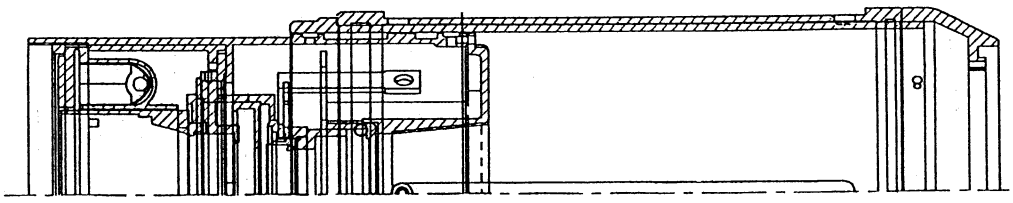
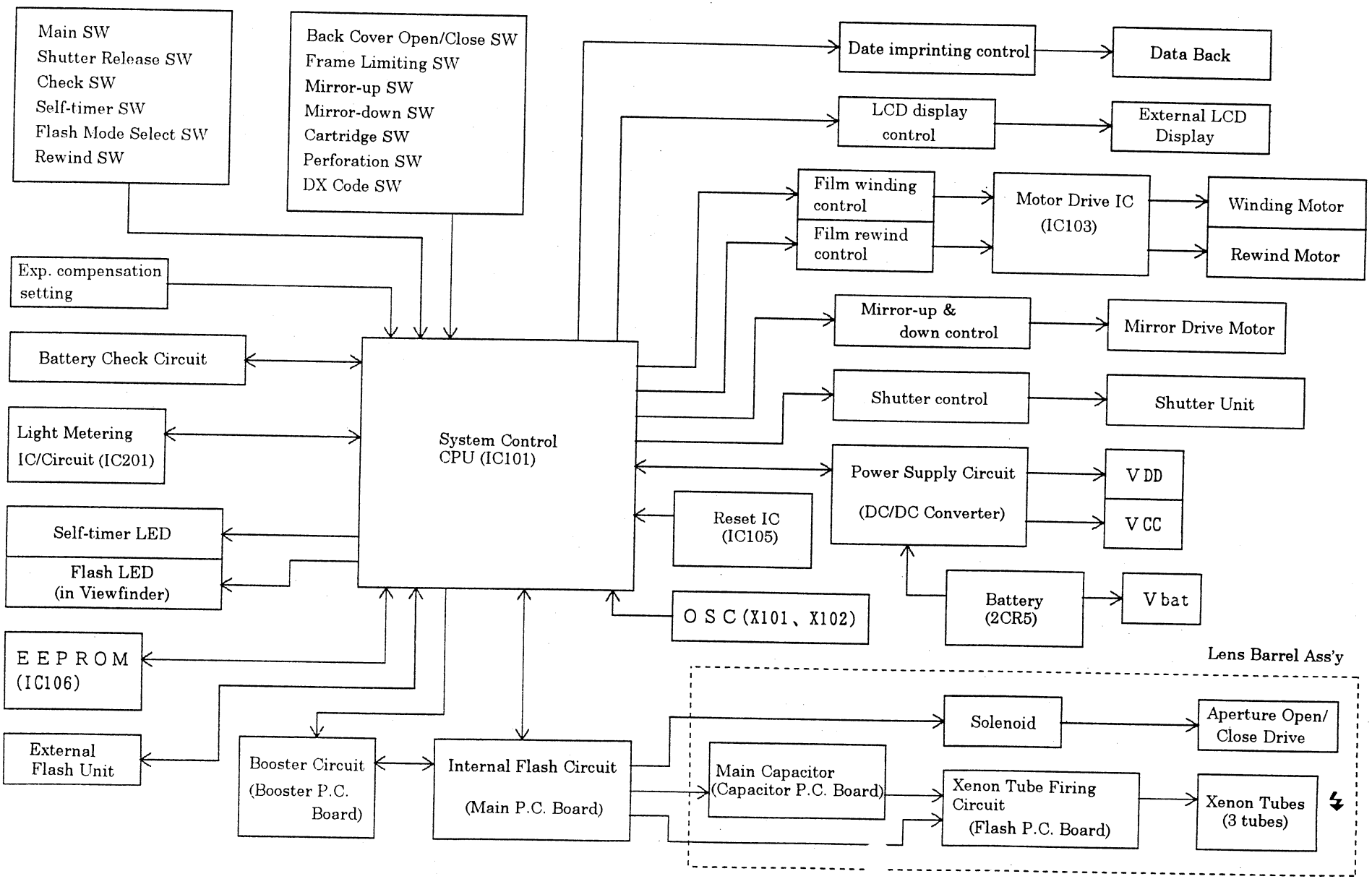


Fig. 9 When magnification is 1/1

ELECTRIC CIRCUIT BLOCK DIAGRAM

No.	419-01-50-RA5BL01



[ELECTRONIC CIRCUITRY]

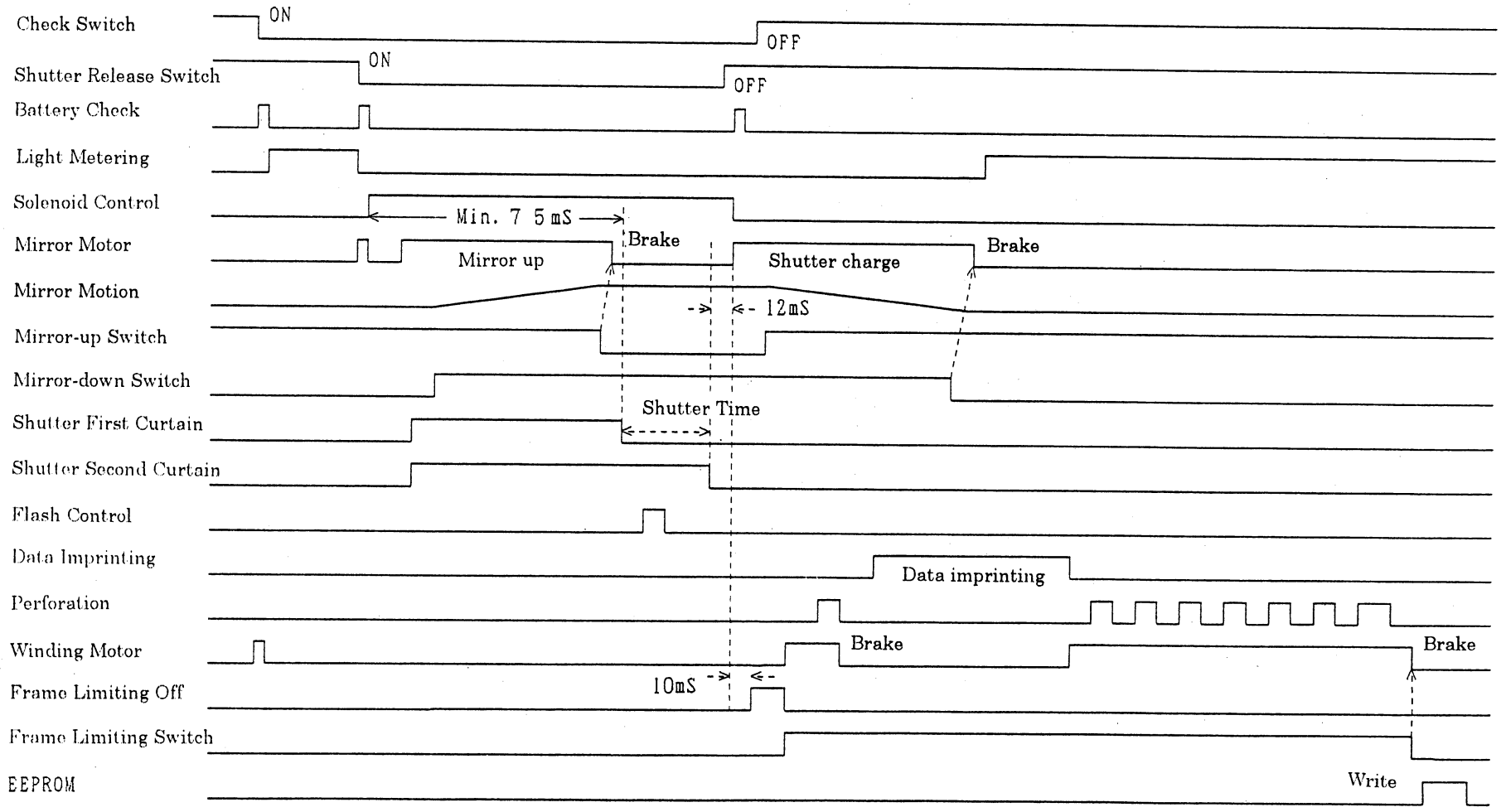
The electronic circuitry, as shown in ELECTRIC CIRCUIT BLOCK DIAGRAM on page A-8, consists of one high-performance CPU as its central element, a power supply circuit, light metering circuit, internal flash control circuit and other drive circuits.
The CPU controls the basic operations of the camera, such as light metering and release sequence, and related arithmetic operations.
The battery check circuit checks the battery voltage according to the load at the turning ON of the Main Switch, the Mirror up or down and film rewinding. It sends current into each drive motor for a moment and checks the battery voltage A/D converted by the CPU at that time. Judgment is made in two stages. In the 1st stage, the user is warned that the battery voltage is insufficient and in the 2nd stage, not only warning is given but also the camera operation is inhibited to prevent operation errors caused by voltage drop.
The light metering circuit consists of a light metering sensor IC and the CPU. The light metering sensor IC, which is a package containing a photodiode (SPD) and processing circuit, converts the photocurrent flowing in the SPD to a voltage and transmit it to the CPU. The CPU has only to read this voltage by A/D conversion, since temperature compensation is made in the IC.
The Main P.C. Board and Booster P.C. Board are provided for interface with the CPU. In addition, the Capacitor P.C. Board and Flash P.C. Board are provided to incorporate the Flash Firing Circuit.
The Main P.C. Board incorporates the circuit to control the input power supply line for the Booster Circuit, the circuit to control the solenoid, the circuit for flash firing trigger, the circuit to send the flash charge completion signal to the CPU and the circuit to adjust the flash charge voltage.
The Booster P.C. Board generates 270 V, which is the flash charge voltage, from the 6 V power supply line.
The Capacitor P.C. Board incorporates the independent Main Capacitors and related parts for each of the three xenon tubes. The Flash P.C. Board incorporates the circuit to fire the xenon tubes.

[EXPOSURE CONTROL]

The light metering optical system and SPD are located above the eyepiece and an aspheric lens is used for the condensing lens to minimize the light metering error.
Light metering is carried out only in the center-weighted average light metering mode. When flash mode is set to OFF, the appropriate shutter speed (1/4000 to 16 seconds, in 1/8 Tv steps) is calculated and determined in F4.0 aperture-priority mode (Av) by taking into account the exposure compensation setting and the film speed (DX code).
When the result of light metering and calculation shows a shutter speed slower than 1/60 second, the green LED in the viewfinder blinks at 6 Hz for camera shake warning.
When flash mode is set to three-xenon-tube firing or two-xenon-tube firing, the shutter will always operate at a speed of 1/125 second, irrespective of the result of light metering and calculation.

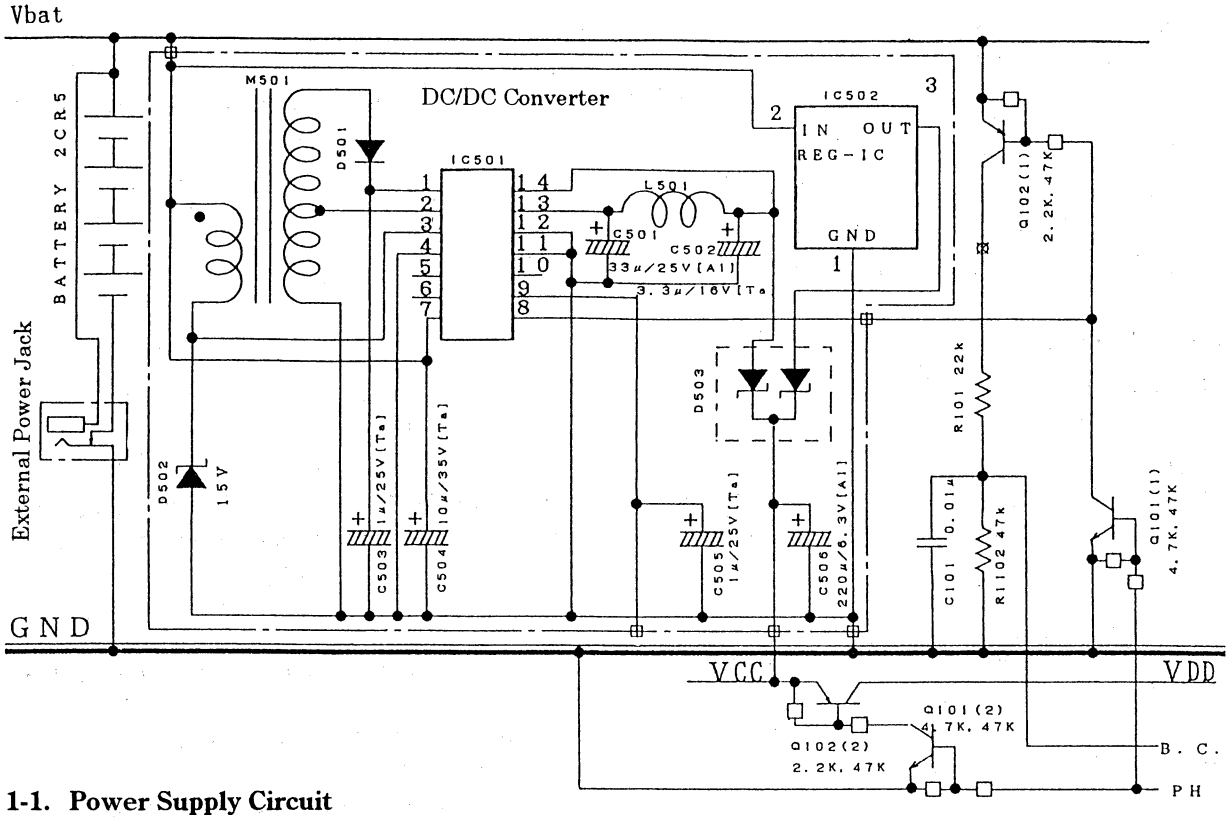
No.	419-01-50-RA5BL01

TIMING CHART



[DESCRIPTION OF ELECTRIC CIRCUITRY]

1. POWER SUPPLY AND BATTERY CHECK CIRCUIT



1-1. Power Supply Circuit

< Constitution >

The Power Supply Circuit, containing the Lithium Battery (6 V) as the power source, consists of the DC/DC Converter IC, Regulator IC, D502, D503, Q101 and Q102. The DC/DC Converter is controlled by the signal from the PH (Power Hold) terminal of the CPU.

< Functions >

At a PH ON operation, the 62 Pin of the CPU outputs the "Hi" signal, which turns Q101 (1) ON. Consequently, the "Lo" signal is input to the 8 Pin of the DC/DC Converter and turns ON the DC/DC Converter. With the DC/DC Converter turned ON, a voltage of VCC (5V) is supplied through D503.

At the same time, Q102 (2) is turned ON and a voltage of 5 V is also supplied to VDD.

At PH OFF ("Lo"), the DC/DC Converter stops and power to VCC is supplied from the Regulator IC (IC502). In this state, Q102 (2) is turned OFF and thus the voltage supply to VDD is stopped.

	Supplied to		Supplied to
VB (about 6 V)	① DC/DC Converter ② Each motor drive ③ Internal flash charge circuit ④ Shutter Magnet drive circuit ⑤ Mirror Magnet drive circuit ⑥ Frame Limiting Magnet drive circuit ⑦ Viewfinder LED lighting circuit ⑧ Self-timer LED lighting circuit	VCC (about 5 V)	① CPU ② Reset IC (IC105) ③ Regulator IC (IC104, IC502)
		VDD (about 5 V)	① EEPROM (IC106) ② Light Metering Circuit (IC201) ③ Internal flash firing circuit

1-2. Power Hold

* After completion of various operations with the Main Switch turned ON, the power-ON state is retained for 16 seconds before transition to power OFF. During this period of 16 seconds, light metering and calculation are repeated and the result is indicated on the Display Panel.

< Power-ON Operations >

(1) The Main Switch is turned OFF → ON.

(2) The Main Switch is ON and one of the following operations occurs or there is a change in the state of a switch:

① Check Switch is turned ON.
② Shutter Release Switch is turned ON.
③ Rewind Switch is turned ON.
④ External release is turned ON.

1-3. Battery Check Circuit

< Constitution >

The Battery Check Circuit consists of Q102 (1), R101, R102 and C101.

< Functions >

The VB voltage divided by R101 and R102 is input to the A/D port (7 Pin) of the CPU for checking. This voltage is stabilized by C101 and the current to be consumed by this resistor is cut by Q102 (1) at PH OFF.

1-4. Battery Check Timing

* In normal operation, battery check is automatically performed at start of a motor and at completion of flash charge.

Battery check operation timing
① After completion of internal flash charge following the turning ON of the Main Switch
② After completion of internal flash charge following power ON
③ At start of film winding operation
④ At start of mirror-up operation
⑤ At start of shutter charge
⑥ At start of film rewinding operation

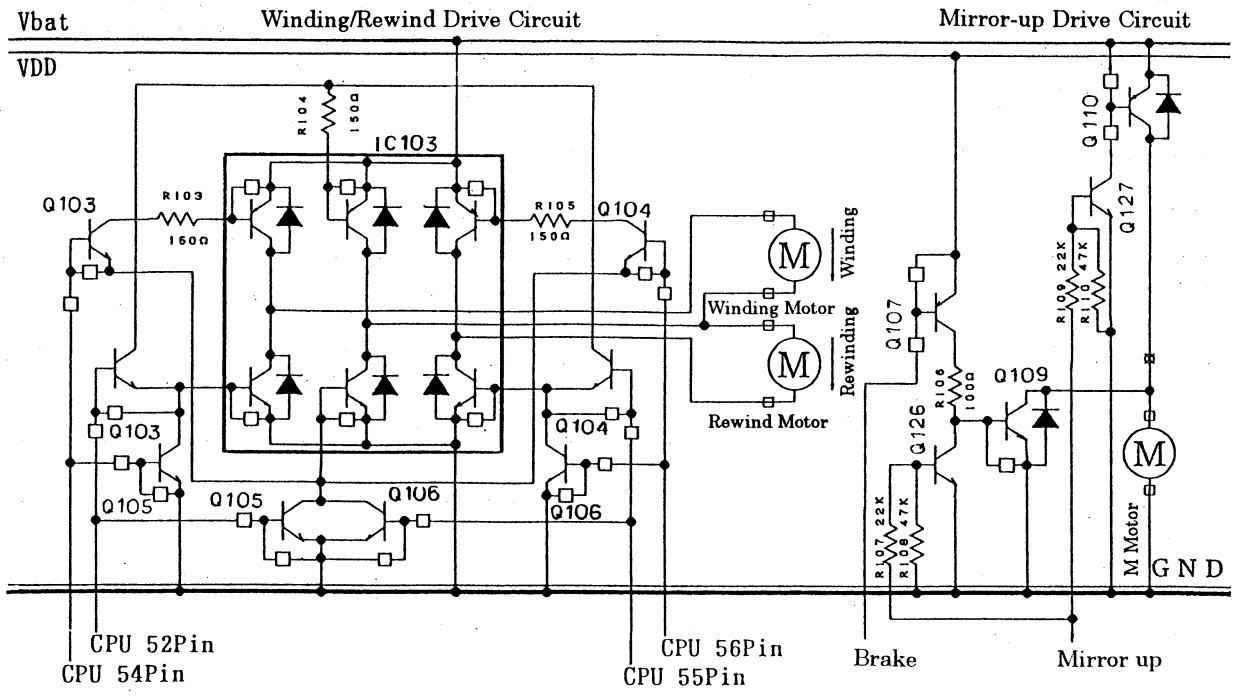
- When battery voltage is OK, the subsequent operations in the normal sequence are carried out.
- When battery voltage has dropped to B1, the battery warning indicator lights up, but operations in the normal sequence are carried out.
- When battery voltage has dropped to B2, the battery warning indicator blinks to warn that normal operation can not be performed.

< Display of battery warning indicator >

Going out	3.8 V or above	Normal operation
Lighting	About 3.7 V to about 3.6 V	Warning display (B1)
Blinking (2 Hz)	3.5 V or below	Operation stop (B2)

2. WINDING/REWIND CIRCUIT

2-1. Winding/Rewind Circuit



< Constitution >

This circuit consists of the Motor Drive IC (IC103), transistors Q103 and Q104 for predriving, transistors Q105 and Q106 for protection, and base resistors R104 and 105.

< Functions >

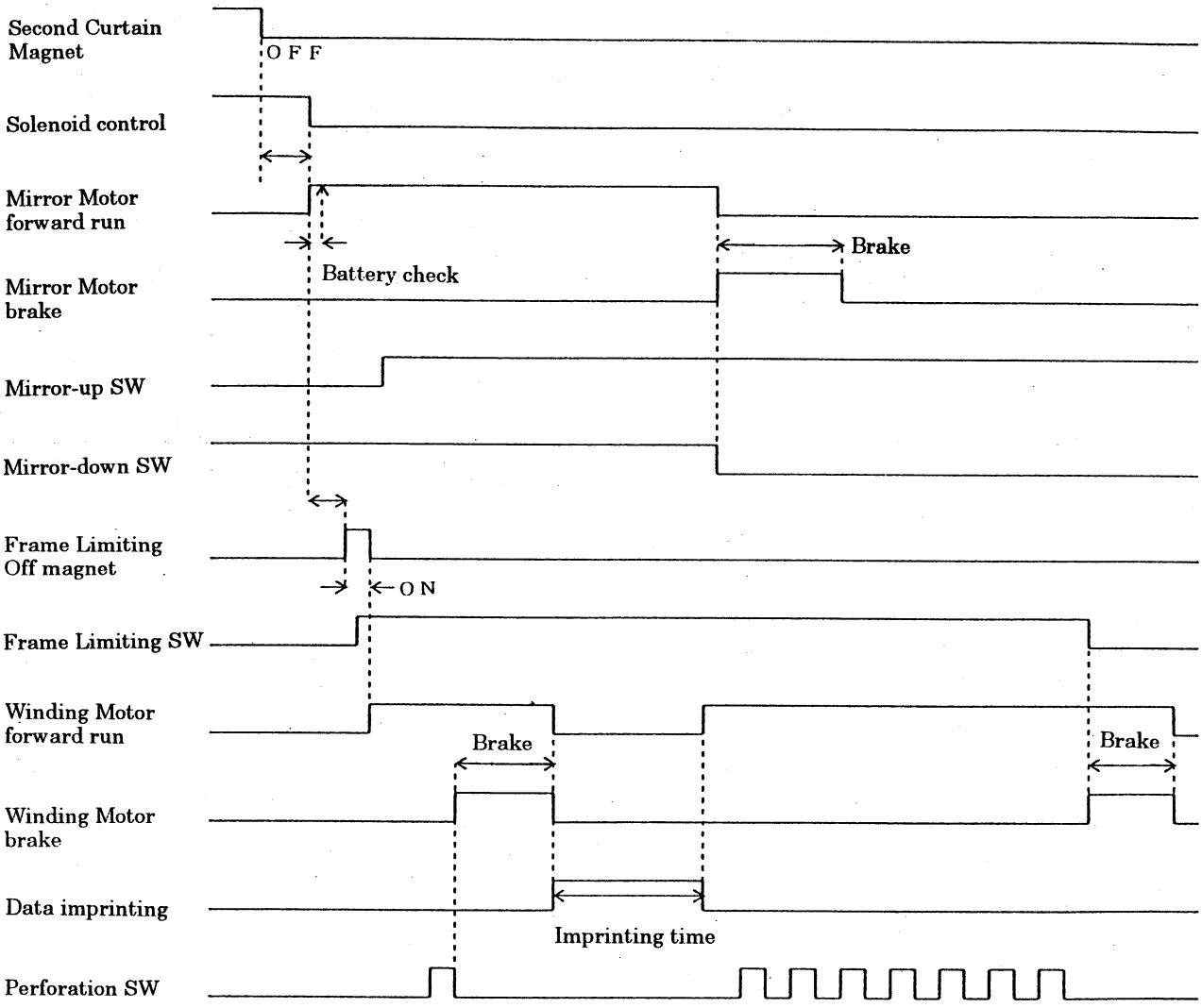
The control terminals are connected to the Motor Drive IC by the control signals from the CPU to control the forward run, reverse run, brake and stop of the motors as shown below.
Thanks to a safety circuit incorporated, no through current flows even if all the control terminal signals turn "Hi" at the same time because of, say, the runaway of the CPU.

(Relationship between control signals and motor operations)

CPU 54 Pin	CPU 52 Pin	CPU 55 Pin	CPU 56 Pin	Winding	Rewind
Hi	Lo	Lo	Lo	Forward run	Stop
Lo	Hi	Lo	Lo	Reverse run	Stop
Hi	Hi	Lo	Lo	Brake	Stop
Lo	Lo	Hi	Lo	Stop	Forward run
Lo	Lo	Lo	Hi	Stop	Reverse run
Lo	Lo	Hi	Hi	Stop	Brake

2-2. Shutter Charge & Winding Control and Data Imprinting

* Shutter charge operation is driven by the Mirror Motor and at the same time, one-frame winding is controlled at different start timing. Battery check is performed at the start of the Mirror Motor.
  During film winding operation, the Perforation Switch is checked and upon detection of one perforation, film winding is stopped and data is imprinted. After that, the Winding Motor is started again to complete film winding.



① The Mirror Motor starts running forward 12 msec after the turning OFF of the Shutter Magnet. Battery check is performed one msec after the start of the forward run of the Mirror Motor.
- When battery voltage is OK, the subsequent operations in the normal sequence (continuation of shutter charge operation and start of film winding operation) are carried out.
- When battery voltage has dropped to B1, the battery warning indicator lights up, but shutter charge operation is continued and film winding operation is started.
- When battery voltage has dropped to B2, shutter charge operation is stopped, the release sequence operation is terminated and the battery warning indicator blinks to warn that normal operation can not be performed.

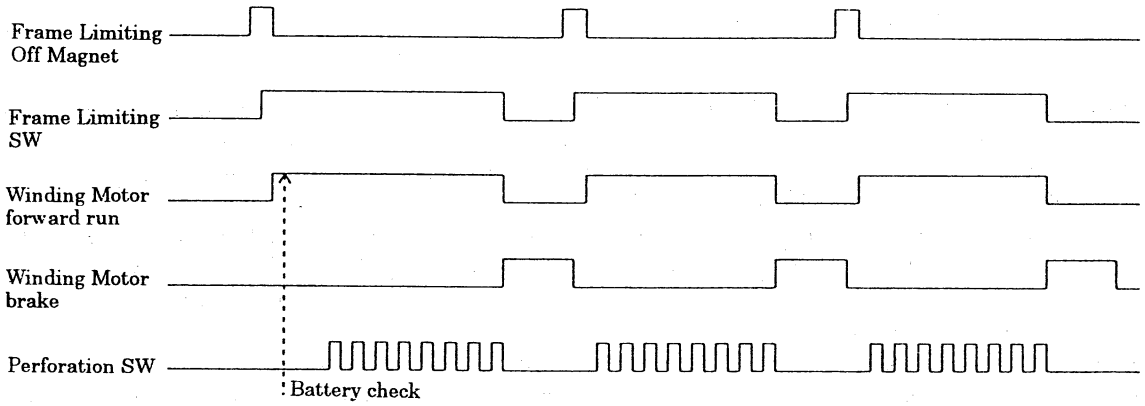
② After detection of the normal battery voltage, the Frame Limiting Off Magnet is turned ON to unhook the Frame Limiting Claw and thus the frame limiting mechanism is released.

③ Upon release of the frame limiting mechanism, the Frame Limiting Switch turns OFF. At the detection of the turning OFF of the Frame Limiting Switch by the CPU, the Winding Motor runs forward to advance the film.
④ During operation of the Winding Motor, the Perforation Switch is checked and upon detection of one perforation, a short brake is applied to the Winding Motor. At the passage of 60 msec after the turning ON of the brake, the Winding Motor stops and the date imprinting is started.
- The date imprinting time is controlled on the camera side according to the ISO value.

⑤ Upon detection of the completion of date imprinting, film winding operation is restarted.
⑥ Upon detection of the turning ON of the Mirror-down Switch, the short brake is applied to the Mirror Motor to complete shutter charge.
⑦ Upon detection of the turning ON of the Frame Limiting Switch, the short brake is applied to the Winding Motor to complete film winding.
- When no film has been loaded, the winding operation is stopped at completion of shutter charge. (This is because the Frame Limiting Switch is coupled with the Sprocket, which does not rotate without film loaded.)
- When film winding is not completed within one second after restart of film rewinding operation, the operation is stopped and the Winding Motor stops after 100 msec reverse run. At this point, the camera judges that the film has come to the end and starts rewinding the film.

2-3. Blank Shots Advance Control

* After loading the film with the Back Cover open, close the Back Cover and turn ON the Check Switch or Shutter Release Switch, and the camera will start blank shots advance by three frames. After the blank shots advance by three frames, the camera sets the exposure counter to "1" and is ready for shooting.

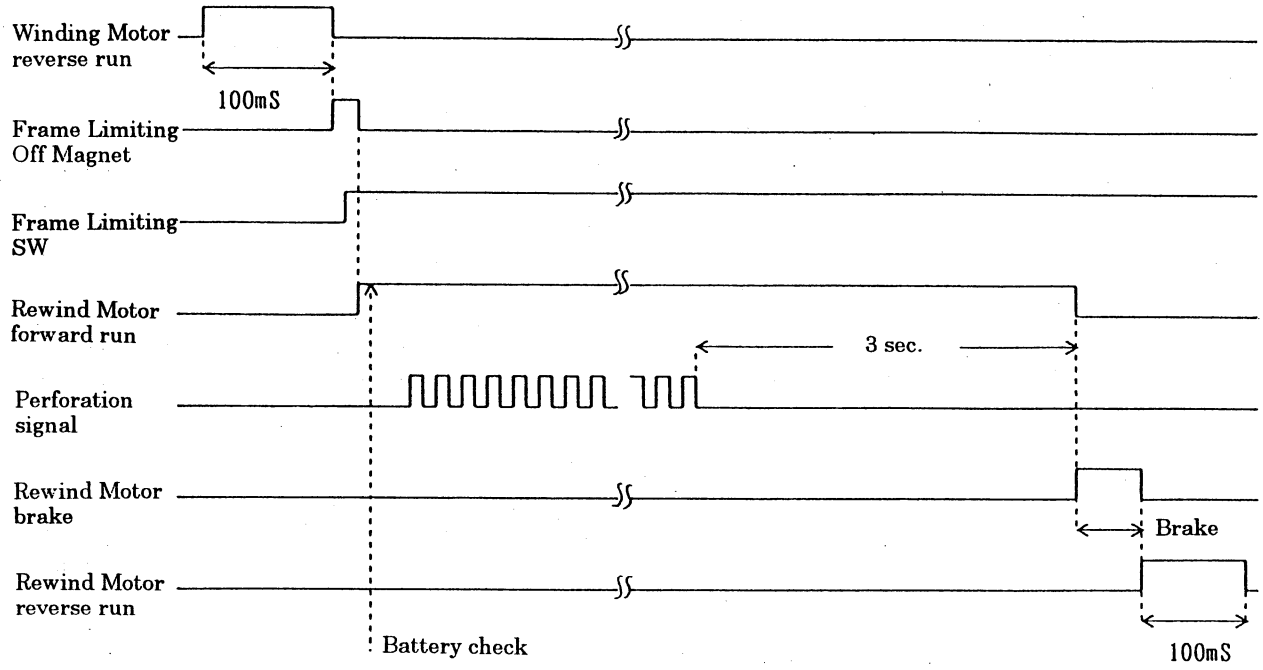


① When the Check Switch or the Shutter Release Switch is turned ON, the Frame Limiting Off Magnet is turned ON to unhook the Frame Limiting Claw and thus the frame limiting mechanism is released.
② Upon release of the frame limiting mechanism, the Frame Limiting Switch turns OFF. At the detection of the turning OFF of the Frame Limiting Switch by the CPU, the Winding Motor runs forward. At the passage of 1 msec after the start of the forward run of the Winding Motor, battery check is performed.
③ Upon detection of the turning ON of the Frame Limiting Switch, the short brake is applied to the Winding Motor to stop the Winding Motor.
④ After that, the operations of ② and ③ are repeated two times and the exposure counter is set to "1" and the camera is ready for shooting.
However, the battery check during blank shots advance is performed only at the first frame.
⑤ During the blank shots advance by three frames, the CPU counts the perforation signals to check to see if blank shots advance is performed correctly.

* When no film has been loaded, the Film (Cartridge) Detect Switch remains ON. In this case, blank shots advance is not performed even by turning ON the Check Switch or Shutter Release Switch after Back Cover opening → closing.

2-4. Film Rewinding Control

* When the Rewind Switch is turned ON with the Back Cover closed, film rewinding operation is performed. Otherwise, when no change in the Perforation SW for three seconds is detected during normal film winding, rewinding operation is automatically started.



① When the Rewind Switch is turned ON or the film end is detected during normal winding, the Rewind Motor is reversed for 100 msec to make the Spool free prior to rewinding operation.

② The Frame Limiting Off Magnet is turned ON to unhook the Frame Limiting Claw and thus the frame limiting mechanism is released.

③ Upon release of the frame limiting mechanism, the Frame Limiting Switch turns OFF. At the detection of the turning OFF of the Frame Limiting Switch by the CPU, the Rewind Motor runs forward. At the passage of 1 msec after the start of the forward run of the Rewind Motor, battery check is performed.
When the battery voltage is OK, film rewinding operation is continued.

④ During film rewinding operation, perforation signals are counted (8 pulses per frame) and the number displayed at the exposure counter is counted down by one every 8 pulses until the displayed count becomes "00".

⑤ For 3 seconds after the detection of the final perforation signal, the Rewind Motor is kept ON to wind in the film completely.

⑥ After the stop of forward run, the Rewind Motor is braked for 60 msec and then reversed for 100 msec to make the fork free.

3. MIRROR-UP CIRCUIT

3-1. Mirror-up Circuit

* See the circuit diagram on page A-13.

< Constitution >

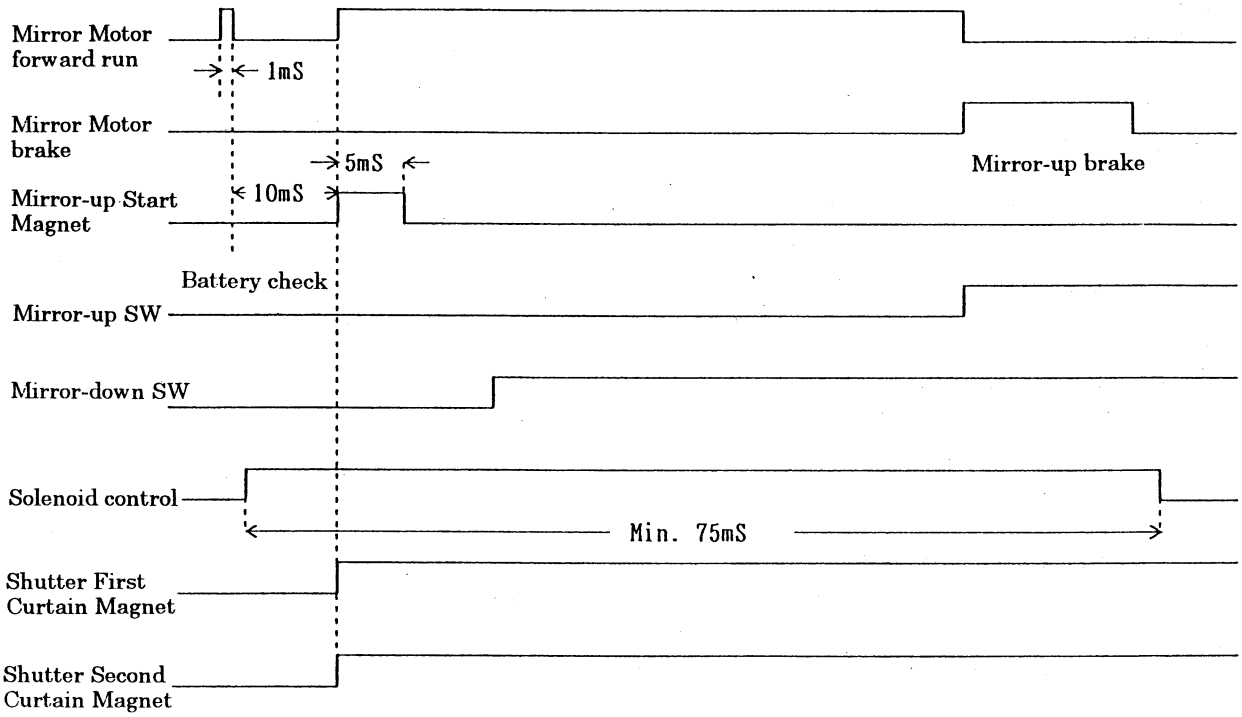
This circuit consists of Q110 for driving, Q109 for brake, Q107, Q126 and Q127 for predriving and for protection against through-current and the resistors R106, R107, R108, R109 and R110 for current-limiting of the transistors.

< Functions >

When the "Hi" signal is output from the mirror-up control terminal (69 Pin of the CPU), the Mirror Motor starts running.
When the signal at the brake control terminal (70 Pin of the CPU) turns "Lo", the Mirror Motor is braked and comes to a stop.
To prevent a through-current flowing in Q109 and Q110, Q109 does not turn ON when the Mirror Motor is running even if the signal at the brake control terminal turns "Lo".

3-2. Mirror-up Control

* Mirror-up operation and the solenoid drive are performed by driving the Mirror Motor.



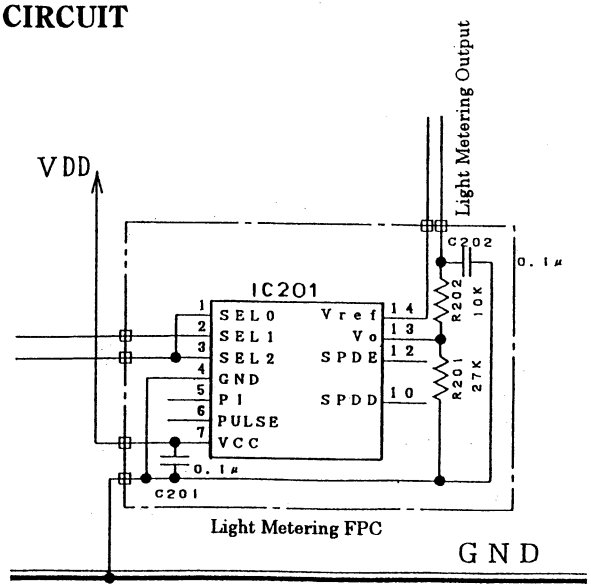
① When the Shutter Release Switch is turned ON, the Mirror Motor starts running forward and one msec later, battery check is performed.
Upon completion of battery check, the Mirror Motor stops.
When the battery voltage is OK, the mirror-up sequence operation is continued.

② The solenoid control circuit is turned ON and at the same time, the counting of 75 msec is started in the CPU to control the duration of keeping the solenoid circuit ON.
- After keeping the solenoid control circuit ON for about 75 msec, the shutter operation is started.
- In the internal flash OFF mode, the solenoid control signal is not output.

③ After battery check, the Mirror Motor starts running forward and at the same time, the Mirror-up Start Magnet is turned ON (kept ON for 5 msec) to start mirror-up operation.

④ When the Mirror-up Switch is turned ON, the power to the Mirror Motor is turned OFF and the short brake is applied to stop the Mirror Motor. After detection of mirror-up state, the subsequent operation in shutter sequence is started.

4. LIGHT METERING CIRCUIT



4-1. Light Metering Circuit

< Outline >

For light metering, the center-weighted average light metering system is provided. The light metering value data is read in and from the read-in light metering value, the time to be controlled and the aperture stop-down value to be controlled are determined by arithmetic operation in the aperture (F 4.0) priority mode according to the internal flash mode (OFF or 3-xenon-tube firing or 2-xenon-tube firing).

However, the light metering operation is valid only in the flash OFF mode if there is no flash charge signal even with an external flash unit connected.

< Constitution >

This circuit consists of a light metering IC (IC201) incorporating an SPD, and R201, R202, C201 and C202.

The circuit comprising R201, R202 and C202 stabilizes the voltage signal (Vo).

< Functions >

As the Vo terminal (13 Pin) outputs a voltage proportional to the quantity of light received by the built-in SPD, the CPU (IC101) receives this voltage for a certain time through the A/D conversion port and calculates the quantity of light. Since the light metering output (Vo) changes by 1/8 LV, a change by 1 LV causes a change by 90 mV.

Also an A/D reference voltage in proportion to the absolute temperature is output from the Vref terminal (14 Pin) and input to the CPU. (Vref : typical 2.88 V)

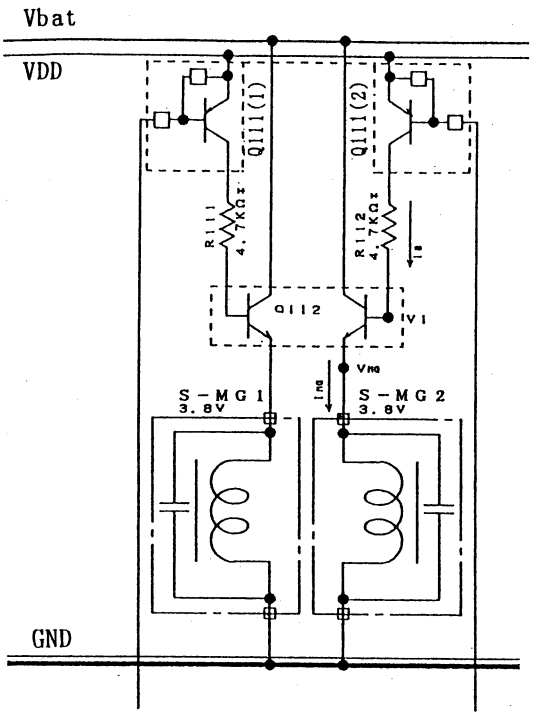
The CPU, using the Vref as the A/D reference voltage, performs A/D conversion and handles the resultant value as the light metering data.

Also this Light Metering IC automatically performs temperature compensation by itself.

Light exposure adjustment is not performed by hardware, but by arithmetic operation on software using the adjusted values (reference value and inclination) which have been written in EEPROM (IC106) as backup data. These data must be measured and written at the adjustment described later.

5. SHUTTER DRIVE CIRCUIT

5-1. Shutter Drive Circuit



Shutter Magnet 1 Shutter Magnet 2

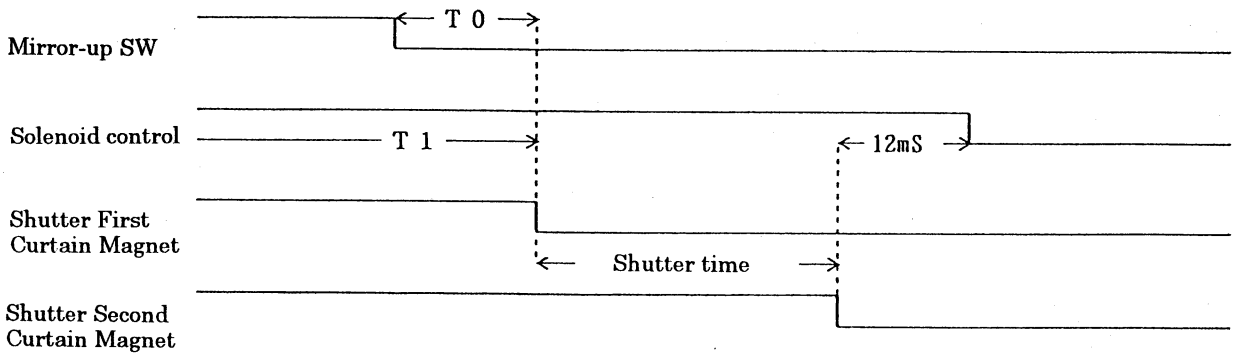
This circuit is basically a regulated DC power circuit. When VB is 4.2V or above, about 4.1 V is applied across each Shutter Magnet and when VB is 4.1V or below, about (VB−0.1) V is applied.
This power is usually kept OFF, but turned ON at mirror up after the turning ON of the Shutter Release Switch. After completion of mirror up, the Shutter Magnet for the First Curtain is turned OFF to let the first curtain travel. And after the passage of the determined shutter time, the Shutter Magnet for the Second Curtain is turned OFF to let the second curtain travel.
This control is performed by the CPU (IC101) and the control signals are as follows :

For first curtain (S-M1) ----- ON when signal from CPU (30 Pin) is "Lo".
For second curtain (S-M2) -- ON when signal from CPU (29 Pin) is "Lo".

When the "Lo" signal is output from the CPU, Q111 (1) and (2) turn ON and current flows through R111 and R103 into the bases of Q112 (1) and (2) to turn Q112 (1) and (2) ON. Then current flows into the Shutter Magnets and thus the Shutter Magnets turn ON to hold the shutter curtains.
Each shutter curtain travels when the "Hi" signal is output from the CPU and Q111 (1) or (2) is turned OFF, thus turning OFF the Shutter Magnet to let the shutter curtain travel.

5-2. Shutter Control

* After completion of mirror up, the Shutter Magnets are controlled according to the calculated shutter time.

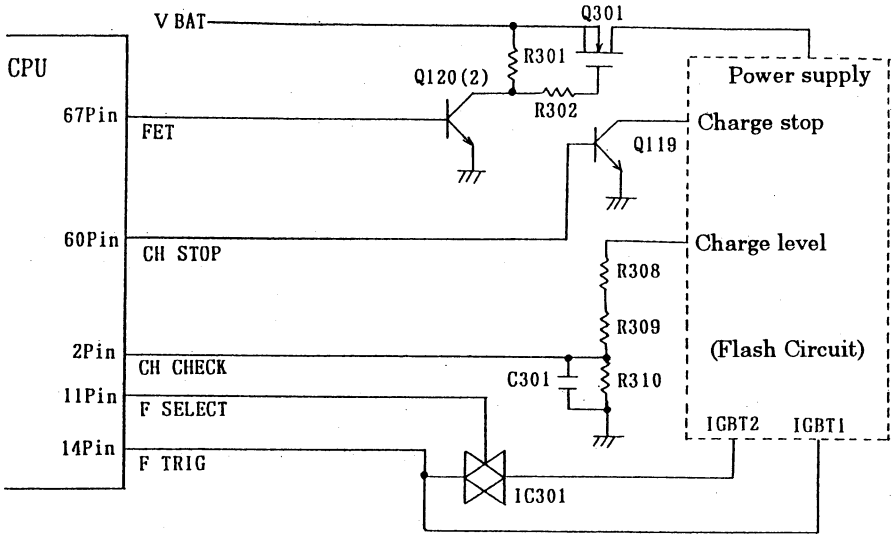


① About 75 msec (T1) after the turning ON of the solenoid control circuit or at mirror motor brake start (T0) following the turning ON of the Mirror-up Switch, whichever later, the Shutter First Curtain Magnet is turned OFF and the shutter time counting is started.
② At completion of shutter time counting, the Shutter Second Curtain Magnet is turned OFF.
③ At the passage of 12 msec after the turning OFF of the Shutter Second Curtain Magnet, the solenoid control circuit is turned OFF.

6. FLASH CIRCUIT

6-1. Outline

The flash circuit controls internal flash firing (3-xenon-tube firing or 2-xenon-tube firing).



(Description of Signals)

Signal Name	Function	I/O	Description of Function
F SELECT	Switching between 3-xenon-tube firing and 2-xenon-tube firing	I	3-xenon-tube firing at "H", 2-xenon-tube firing at "L"
F TRIG	Flash firing trigger	I	Firing at "H"
IGBT1	Control of IGBT (lower right/ lower left xenon tube)	O	Receives F TRIG signal and fires lower right and lower left xenon tubes.
IGBT2	Control of IGBT (upper xenon tube)	O	Receives F TRIG signal and fires upper xenon tube.
CH CHECK	Check of charged result	O	CPU judges charge completion when 2.77 V is exceeded.
FET	Control of power to charge circuit and solenoid	I	Turns Q301 ON at "L" to supply power from battery or AC adaptor.
CH STOP	Charge stop	I	Stops charge at "L".

* Each I/O specified above is that on the Main P.C. Board circuit side or Booster P.C. Board circuit side.

6-2. Flash Charge Circuit

Conditions of flash charge start

- Main Switch is ON.
- A power hold operation for internal flash occurs. (Check Switch, Shutter Release Switch or external release switch is turned ON.)

(See the SCHEMATIC DIAGRAM on page A-40.)
When the conditions of flash charge start as mentioned above are satisfied, "H" is output from the 67 Pin of IC101 to turn Q120 ON. Then the FET signal is turned "L" and thus FET Q301 is turned ON. At the turning ON of Q301, Q401 turns ON and the Oscillator Transformer T401 starts oscillation.

① Flash firing voltage

The high voltage output generated on the secondary side (4 Pin and 5 Pin) of T401 is rectified by the diode D403 and then it charges the capacitor C405 on the secondary side. At the same time, this output is also rectified by D701 (for upper xenon tube), D702 (for lower left xenon tube) and D703 (for lower right xenon tube) and it charges the Main Capacitors C701 and C702 (for upper xenon tube), C703 and C704 (lower left xenon tube) and C705 and C706 (lower right xenon tube).

② IGBT trigger voltage

At the same time, the voltage output generated at the 6 Pin of T401 is rectified by the diode D402 and is regulated by the Zener diode ZD401 to a constant voltage of 30 V.

6-3. Charge Voltage Monitor Circuit

The voltage equal to the C405 charged voltage minus the Zener voltage (220 V) of the Zener diode ZD402 is divided by the adjusted resistance of the Variable Resistor VR301 and the resistance of the Resistor R403 and input to the Vref terminal of IC401. When this voltage rises higher than the reference voltage (typical value 2.75 V) of IC401, the cathode and anode terminals of IC401 are turned ON to stop charging temporarily. After that, the cathode and anode terminals of IC401 are turned OFF to start charging again. These operations are repeated to make the charge voltage constant at 290 V.

6-4. Flash Charge Check Circuit

The C405 charged voltage is divided by R308, R309 and R310 and input to the 2 Pin of IC101.
During flash charging, IC101 always monitors the 2 Pin. When the C405 charged voltage rises to about 280 V, the voltage at the 2 Pin becomes 2.77 V, by which the CPU judges that charging is completed. At this point, if the internal flash ON mode (3-xenon-tube firing or 2-xenon-tube firing mode) has been set, the LED in the viewfinder changes from blinking to lighting.
The full charge voltage is constant at 290 V as mentioned at "Charge Voltage Monitor Circuit" above.

6-5. Charge Stop Circuit

To reduce the load to the battery during shutter release operation, film rewinding operation and blank shots advance, the 60 Pin of IC101 outputs "H". This "H" signal turns Q119 and Q401 ON and thus Q402 OFF, so that T401 stops oscillation and inhibits flash charge.

6-6. Flash Firing Circuit

Conditions of flash firing

- The Flash Mode Selector Lever has been set to the 3-xenon-tube firing position or 2-xenon-tube firing position.
- CPU judges that flash charge has been completed.

① 3-xenon-tube firing

When the Flash Mode Selector Lever has been set to the 3-xenon-tube firing position, the 11 Pin (F SELECT) of IC101 outputs "H" and turns ON the connection between the 1 Pin and the 2 Pin of the analog switch IC301. After that, when the Shutter Release Switch is turned ON, with the shutter open, the flash firing trigger (F TRIG) "H" is output from the 14 Pin of IC101 and consequently Q303 and Q304 are turned ON. During the output of this "H" signal, an "H" signal of 30 V is generated on the emitter side (IGBT2) of Q305 and the emitter side (IGBT1) of Q307. The IGBT2 signal turns Q801 ON and at the same time, the IGBT1 signal turns Q802 and Q803 ON. Consequently, the trigger voltage is generated and the xenon tubes are excited to start firing.

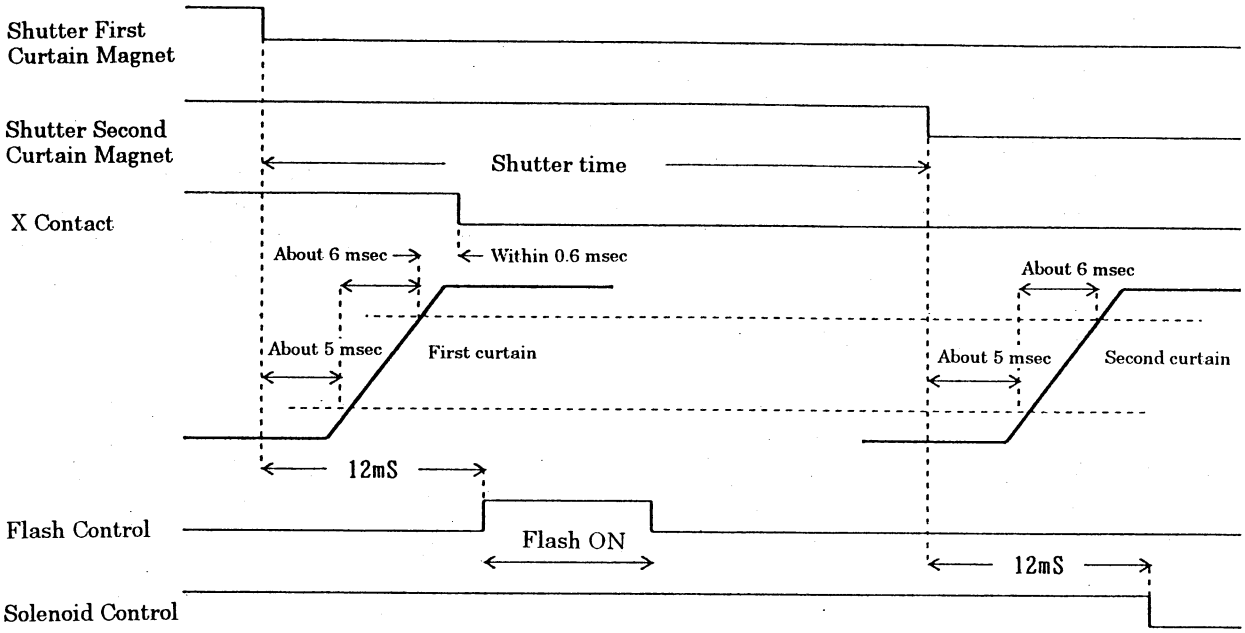
* The upper xenon tube fires by turning Q801 ON, the lower left xenon tube by turning Q802 ON and the lower right xenon tube by turning Q803 ON.

② 2-xenon-tube firing

When the Flash Mode Selector Lever has been set to the 2-xenon-tube firing position, the 11 Pin (F SELECT) of IC101 outputs "L" and turns OFF the connection between the 1 Pin and the 2 Pin of the analog switch IC301. Consequently, as in the case of 3-xenon-tube firing, the flash firing trigger (F TRIG) is output. In this case, only Q303 is turned OFF and IGBT2 signal is not output, so that the lower left and lower right xenon tubes fire but the upper xenon tube does not fire.

6-7. Flash Firing Control

Internal flash and external flash firing timing and firing time are controlled.



① At the passage of about 12 msec after the turning OFF of the First Curtain Magnet, the X Contact is turned ON (L).
The external flash unit, if set, fires at this timing.

② At the passage of about 12 msec after the turning OFF of the First Curtain Magnet, the flash control signal is turned ON and the duration of keeping this signal ON is controlled according to the DX code (ISO value) and the exposure compensation setting.

③ At the passage of 12 msec after the turning OFF of the Second Curtain Magnet following the passage of the shutter time, the solenoid control circuit is turned OFF.

[DESCRIPTION OF FUNCTIONS OF IC TERMINALS]

< IC101 > CPU

Pin No.	Signal Name	I/O	Signal Functions
1	Flash Mode Setting	I	3-xenon-tube firing, 2-xenon-tube firing, no flash (A/D converted input)
2	Charge Check	I	Check of flash charge voltage (A/D converted input)
3	Not used	-	
4	Not used	-	
5	Exposure Compensation Setting	I	Reading of setting value of exposure compensation (−1.0～+1.0, 1/3 EV steps) (A/D converted input)
6	Not used	-	
7	B. C. Level	I	Detection of battery level (A/D converted input)
8	Light Metering Vout	I	Detection of Light Metering IC output (A/D converted input)
9	Perforation SW	I	Film perforation detection signal (A/D trigger input)
10	DBL/Adjusting Tool ACK	I	Data Back imprinting signal (ON: "L") and input signal of Adjusting Tool ACK (in common)
11	CONT32	O	3-xenon-tube firing / 2-xenon-tube firing control "L"
12	Frame Limiting SW	I	Frame Limiting Switch for film winding control (During winding : "H")
13	Adjustment M/A	I	Input terminal for switching between manual adjustment and auto adjustment (Manual: "H", Auto: "L")
14	Flash Trigger Output	O	Internal flash control "H"
15	Adjusting Tool C/D	I	Adjusting Tool C/D input
16	CHS	I	Detection of external flash charge completion signal (flash charge completed : "L", not completed : "H")
17	Not used	-	
18	SCK	O	Serial clock — For serial communication with EEPROM / Adjusting Tool
19	SDO	O	Serial data output
20	SDI	I	Serial data input
21	Back Cover SW	I	Detection of Back Cover Open/Close Switch (Open: "L", Close: "H")
22	Main SW	I	Detection of Main Switch (ON: "L", OFF: "H")
23	Not used	-	

< IC101 > CPU

Pin No.	Signal Name	I/O	Signal Functions
24	Vref Switching	O	Switching of reference voltage for A/D conversion (Vref =Vdd: "L", Light Metering IC output: "H")
25	DX4	I	DX code 4 input
26	Not used	-	
27	DX3	I	DX code 3 input
28	DX2	I	DX code 2 input
29	M2	O	Control of second curtain magnet (Hold: "L", Release: "H")
30	M1	O	Control of first curtain magnet (Hold: "L", Release: "H")
31	DX1	I	DX code 1 input
32	DX0	I	DX code 1 input
33	RESET	I	CPU reset terminal (Reset: "L")
34	Xcin	I	Sub clock, 32.768 kHz oscillator connected
35	Xcout	O	Sub clock, 32.768 kHz oscillator connected
36	Xin	I	Main clock, 8.0 MHz oscillator connected
37	Xout	O	Main clock, 8.0 MHz oscillator connected
38	GND	-	Power supply grounding
39	Adjusting Tool REQ	I	Adjusting Tool REQ
40	Cartridge SW	I	Film detection switch (film loaded: "L", not loaded: "H")
41	Test	I	Test terminal for adjustment (Test adjusting mode: "L")
42	Rewind SW	I	Rewind Switch detection (ON: "L", OFF: "H")
43	Self-timer SW / UP SW	I	Self-timer Start Switch / UP Button Switch (ON: "L", OFF: "H")
44	DOWN SW	I	UP/DOWN manual adjustment only (ON: "L", OFF: "H")
45	Release SW	I	Release Switch detection (ON: "L", OFF: "H")
46	Check SW	I	Check Switch detection (ON: "L", OFF: "H")
47	Mirror-up SW	I	Mirror-up Switch detection (Mirror-up state ON: "L", OFF: "H")
48	Mirror-down SW	I	Mirror-down Switch detection (Mirror-down state ON: "L", OFF: "H")
49	Mirror Mg	O	Mirror-up start magnet (Mirror-up operation permission ON: "H", OFF: "L")

< IC101 > CPU

Pin No.	Signal Name	I/O	Signal Functions
50	Solenoid Control	O	Aperture stop-down drive magnet (Aperture stop-down drive ON: "H", OFF: "L")
51	Not used	-	
52	Winding Control 2	O	Control of Winding Motor Forward run / Reverse run / Short brake Control 1: H / L / H Control 2: L / H / H
53	Not used	-	
54	Winding Control 1	O	
55	Rewind Control 2	O	Control of Rewind Motor Forward run / Reverse run / Short brake Control 1: H / L / H Control 2: L / H / H
56	Rewind Control 1	O	
57	Frame Limiting Mg	O	Magnet control to release Frame Limiting Switch (Release ON: "H", OFF: "L")
58	Not used	-	
59	EEPROM CS	O	CS for serial communication with EEPROM (Select: "H")
60	CHSTOP	O	Internal flash charge stop "H"
61	Not used	-	
62	DATE	O	Data Back imprinting signal (Imprinting: "H")
63	PH-CONT	O	Power hold (DC/DC) control (ON: "H")
64	SEL0, 2	O	Selection of Light Metering IC output of average light metering
65	SEL1	O	Selection of Light Metering IC output of average light metering
66	Flash LED	O	Control of Finder LED (Lighting/blinking: "H", Going out: "L")
67	Flash Power Control	O	Flash power control signal "H"
68	Self-timer LED	O	Control of Self-timer count indicating LED (Lighting: "H", Going out: "L")
69	Mup Forward	O	Mirror-up (Shutter Charge) Motor forward run
70	Mup Brake	O	Mirror-up (Shutter Charge) Motor brake
71~ 76	Not used	-	

	Mup forward run	Mup brake
Forward run	1	0
Brake	0	1

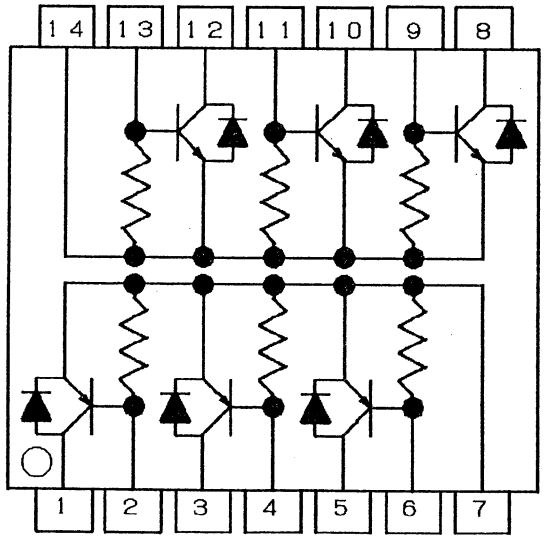
< IC101 > CPU

Pin No.	Signal Name	I/O	Signal Functions
77	SEG11	O	ISO, 4−E, F
78	SEG10	O	4−D, G, A
79	SEG9	O	DX, 4−C, B
80	SEG8	O	◀, 3−E, F
81	SEG7	O	3−D, G, A
82	SEG6	O	3−C, B
83	SEG5	O	−, 2−E, F
84	SEG4	O	2−D, G, A
85	SEG3	O	−, 2−C, B
86	SEG2	O	−, 1−E, F
87	SEG1	O	1−D, G, A
88	SEG0	O	CF, 1−C, B
89	Vcc	-	Power supply voltage (5 V)
90	Vref	I	Reference voltage for A/D conversion (Light metering: 2.88V, Others: VDD used by switching)
91	GND	-	Grounding terminal
92	Not used	-	
93	COM2	O	Common signal 2 for external indication LCD
94	COM1	O	Common signal 1 for external indication LCD
95	COM0	O	Common signal 0 for external indication LCD
96	VL3	-	LCD drive power input terminal (0≦VL1≦VL2≦VL3≦Vcc)
97	VL2	-	LCD drive power input terminal (0≦VL1≦VL2≦VL3≦Vcc)
98	C2	-	Capacity external mounting terminal for LCD drive built-in boosting circuit
99	C1	-	Capacity external mounting terminal for LCD drive built-in boosting circuit
100	VL1	-	LCD drive power input terminal (0≦VL1≦VL2≦VL3≦Vcc)

< IC103 > Motor Drive IC

Pin No.	Port Name	I/O	Symbol Name	Pull Up	Contents of Functions
1	PNP1 Collector	O	REWIND	----------	Winding forward : PNP3, NPN2 ON Winding reverse : PNP2, NPN1 ON Rewind forward : PNP2, NPN3 ON Rewind reverse : PNP1, NPN2 ON Winding brake : PNP2, PNP3 ON Rewind brake : PNP1, PNP2 ON All the transistors other than specified above: OFF CPU is controlled by four ports: P06: "H" → Winding forward P07: "H" → Winding reverse P10: "H" → Rewind forward P12: "H" → Rewind reverse P06, P07: "H" → Winding brake P10, P12: "H" → Rewind brake
2	PNP1 Base	I	BASEP1	Built-in	
3	PNP2 Collector	O	COMMON	----------	
4	PNP2 Base	I	BASEP2	Built-in	
5	PNP3 Collector	O	WIND	----------	
6	PNP3 Base	I	BASEP3	Built-in	
7	PNP Emitter	-	VB	----------	
8	NPN1 Collector	O	WIND	----------	
9	NPN1 Base	I	BASEN1	PULL DOWN	
10	NPN2 Collector	O	COMMON	----------	
11	NPN2 Base	I	BASEN2	PULL DOWN	
12	NPN3 Collector	O	REWIND	----------	
13	NPN3 Base	I	BASEN3	PULL DOWN	
14	NPN Emitter	-	GND	----------	

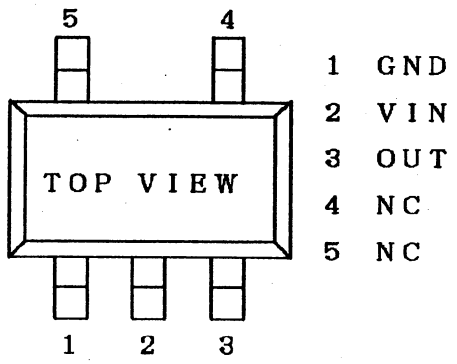
(IC103 Motor Drive IC Pin Arrangement)



< IC104 > Regulator IC

Pin No.	Port Name	I/O	Symbol Name	Pull Up	Contents of Functions
1	GND	-	GND	----------	Grounding terminal
2	Vin	I	IN	----------	Vcc input terminal
3	Vout	O	OUT	----------	1.7 V output terminal
4	NC	-	NC	----------	Non-connection
5	NC	-	NC	----------	Non-connection

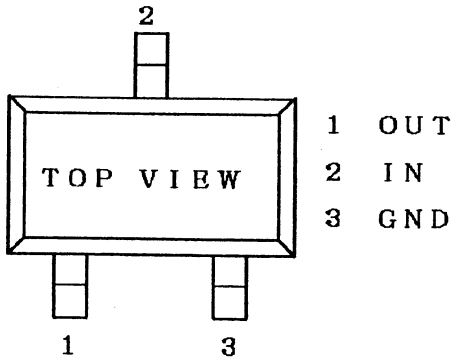
(IC104 Regulator IC Pin Arrangement)



< IC105 > Reset IC

Pin No.	Port Name	I/O	Symbol Name	Pull Up	Contents of Functions
1	OUT	O	OUT	----------	"L" output and reset of IC101 (CMOS output)
2	IN	I	IN	----------	Detection of Vcc=3.75±0.15V
3	GND	-	GND	----------	Grounding terminal

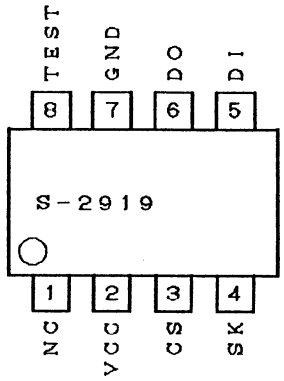
(IC105 Reset IC Pin Arrangement)



< IC106 > EEPROM

Pin No.	Port Name	I/O	Symbol Name	Pull Up	Contents of Functions
1	NC	-	NC	----------	Non-connection
2	Vcc	-	VDD	----------	Power supply (VDD≒4.8V)
3	CS	I	CS	----------	Chip select
4	SK	I	SCK	----------	Serial clock input
5	DI	I	SDO	----------	Serial data input
6	DO	O	SDI	----------	Serial data output
7	GND	-	GND	----------	Grounding terminal
8	TEST		TEST	----------	Test terminal for manufacturer (connected to GND)

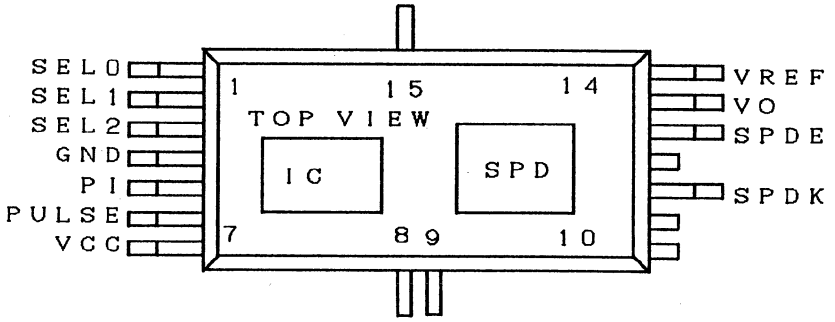
(IC106 EEPROM Pin Arrangement)



< IC201 > Light Metering IC

Pin No.	Port Name	I/O	Symbol Name	Pull Up	Contents of Functions
1	SEL0	I	SEL0	Built-in	Divided light metering select terminal SEL0 = SEL1 = SEL2 = "H": Average metering
2	SEL1	I	SEL1	Built-in	
3	SEL2	I	SEL2	Built-in	
4	GND	-	GND	----------	Grounding terminal
5	PI	I	PI	----------	Not used
6	PULSE	O	PULSE	----------	Not used
7	Vcc	-	Vcc	----------	Power supply input (VDD≒4.8V connected)
8	SPDB	-	SPDB	----------	Internal SPD connecting terminal (Not used: open)
9	SPDA	-	SPDA	----------	
10	SPDD	-	SPDD	----------	
11	SPD K	-	SPD K	----------	
12	SPDE	-	SPDE	----------	
13	Vo	O	Vo	----------	Light metering output terminal
14	Vref	O	VREF	----------	Reference voltage output (TYP 2.88V)
15	SPDC	-	SPDC	----------	Internal SPD connecting terminal (Not used)

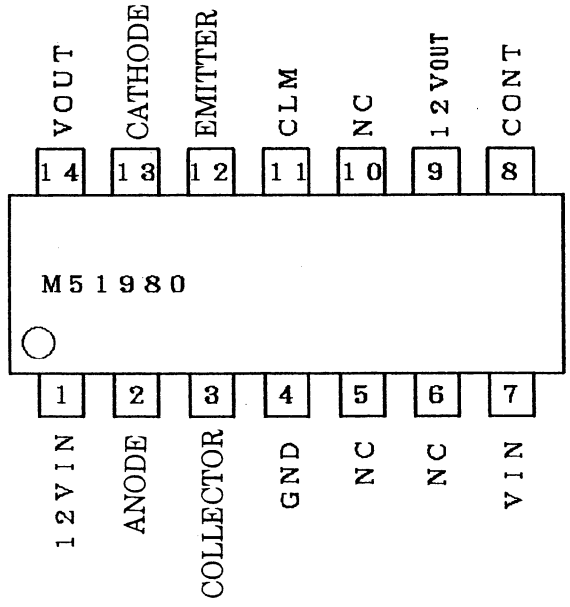
(IC201 Light Metering IC Pin Arrangement)



< IC501 > DC/DC Converter IC

Pin No.	Port Name	I/O	Symbol Name	Pull Up	Contents of Functions
1	12V IN	I	NC	----------	Non-connection
2	ANODE	-	ANODE	----------	5V AC voltage input
3	COLLECTOR	O	COLLECTOR	----------	Coil primary-side control terminal
4	GND	-	GND	----------	Grounding terminal
5	NC	-	NC	----------	Non-connection
6	NC	-	NC	----------	Non-connection
7	VB	-	VIN	----------	Battery voltage input
8	CONT	I	CONTROL	----------	Operation control terminal ("L": active)
9	12V OUT	O	NC	----------	Non-connection
10	NC	-	NC	----------	Non-connection
11	CLM	I	CLM	----------	Current feedback terminal (connected to GND)
12	EMITTER	-	EMITTER	----------	GND of coil control terminal
13	CATHODE	-	CATHODE	----------	5V feedback
14	V OUT	O	OUTPUT1	----------	5V output

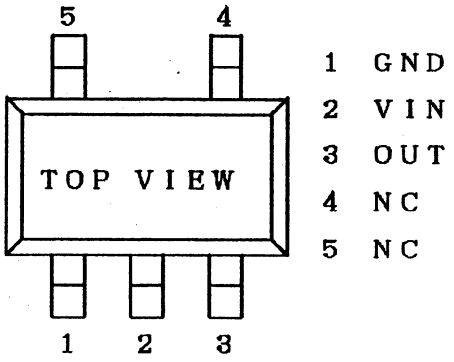
(IC501 DC/DC Converter IC Pin Arrangement)



< IC502 > Regulator IC

Pin No.	Port Name	I/O	Symbol Name	Pull Up	Contents of Functions
1	GND	-	GND	----------	Grounding terminal
2	Vin	I	IN	----------	Terminal for input of VB, DC/DC output
3	Vout	O	OUT	----------	5V output terminal
4	NC	-	NC	----------	Non-connection
5	NC	-	NC	----------	Non-connection

(IC502 Regulator IC Pin Arrangement)



[DESCRIPTION OF FUNCTIONS OF ELECTRIC PARTS]

Symbol	Part Name	Functions	P.C. Board
IC101	CPU	Entire control of camera (arithmetic operation for light metering and mechanical controls, such as winding, rewinding, shutter and solenoid controls) Control of external LCD display and LED display in viewfinder, input of various information, input of film information, etc.	Main FPC
IC103	Motor Drive IC	Motor drive IC (Winding and rewinding)	Main FPC
IC104	REG IC	1.7V regulated DC voltage IC (LCD drive of CPU)	Main FPC
IC105	RESET IC	Reset IC (reset of CPU)	Main FPC
IC106	EEPROM	EEPROM (Memory for backup data, counter and status information)	Main FPC
IC201	Light Metering IC	Light metering IC	AE FPC
IC301	Analog SW IC	Switching between 3-xenon-tube firing and 2-xenon-tube firing	Main P.C. Board
IC401	Shunt Regulate IC	Charge voltage control IC	Booster P.C. Board
Q101	Transistor NPN*2	B.C. circuit, power ON	Main FPC
Q102	Transistor PNP*2	B.C. circuit, power ON	Main FPC
Q103	Transistor NPN*2	Predriving of winding motor drive circuit	Main FPC
Q104	Transistor NPN*2	Predriving of rewind motor drive circuit	Main FPC
Q105	Transistor NPN*2	Prevention of through-current in winding motor drive circuit	Main FPC
Q106	Transistor NPN*2	Prevention of through-current in rewind motor drive circuit	Main FPC
Q107	Transistor PNP	Predriving of mirror motor brake circuit	Main FPC
Q109	Transistor NPN	Driving of mirror motor brake circuit	Main FPC
Q110	Transistor PNP	Driving of mirror motor drive circuit	Main FPC
Q111	Transistor PNP*2	Predriving of shutter drive circuit	Main FPC
Q112	Transistor NPN*2	Driving of shutter drive circuit	Main FPC
Q113	Transistor NPN*2	Predriving of Frame Limiting Mg. and Solenoid drive circuit	Main FPC
Q114	Transistor NPN*2	Predriving of Mirror Mg. and Self-timer LED drive circuit	Main FPC
Q115	Transistor PNP	Driving of Frame Limiting Mg. drive circuit	Main FPC
Q116	Transistor PNP	Driving of Solenoid drive circuit	Main FPC
Q117	Transistor PNP	Driving of Mirror Mg. drive circuit	Main FPC
Q118	Transistor PNP	Driving of Self-timer LED drive circuit	Main FPC
Q119	Transistor NPN*2	Driving of Finder LED drive circuit	Main FPC
Q120	Transistor NPN*2	Inversion of Accessory Shoe CHI/O signal	Main FPC
Q122	Transistor NPN	Inversion of Data Back imprinting signal	Main FPC
Q123	Transistor NPN + PNP	Switching of analog reference voltage of CPU	Main FPC
Q124	Transistor PNP	Switching of analog reference voltage of CPU	Main FPC
Q126	Transistor NPN	Prevention of through-current in mirror motor drive circuit	Main FPC

Symbol	Part Name	Functions	P.C. Board
Q127	Transistor NPN	Predriving of mirror motor drive circuit	Main FPC
Q301	P Type FET	Control of power to Booster Circuit and Solenoid	Main P.C. Board
Q302	Transistor NPN	Driving of Solenoid	Main P.C. Board
Q303	Transistor NPN+PNP	Control of flash (1 upper xenon tube) firing (5V signal)	Main P.C. Board
Q304	Transistor NPN+PNP	Control of flash (lower right and lower left 2 xenon tubes) firing (5V signal)	Main P.C. Board
Q305	Transistor NPN	Control of flash (1 upper xenon tube) firing (30V signal)	Main P.C. Board
Q306	Transistor PNP	Control of flash (1 upper xenon tube) firing (30V signal)	Main P.C. Board
Q307	Transistor NPN	Control of flash (lower right and lower left 2 xenon tubes) firing (30V signal)	Main P.C. Board
Q308	Transistor PNP	Control of flash (lower right and lower left 2 xenon tubes) firing (30V signal)	Main P.C. Board
Q401	Transistor PNP	Predriver for oscillation	Booster P.C. Board
Q402	Transistor PNP	Flash charge (primary-side switching)	Booster P.C. Board
Q801	IGBT	Control of flash (1 upper xenon tube) firing	Flash P.C. Board
Q802	IGBT	Control of flash (1 lower left xenon tube) firing	Flash P.C. Board
Q803	IGBT	Control of flash (1 lower right xenon tube) firing	Flash P.C. Board
C101	Capacitor 0.01 μ	Stabilization of battery check line	Main FPC
C102	Capacitor 0.47 μ	Stabilization of LCD drive power	Main FPC
C103	Capacitor 0.47 μ	LCD drive 1/3 bias boosting	Main FPC
C104	Capacitor 0.47 μ	LCD drive 1/3 bias boosting	Main FPC
C105	Capacitor 0.47 μ	LCD drive 1/3 bias boosting	Main FPC
C106	Capacitor 0.1 μ	Stabilization of reset output	Main FPC
C107	Capacitor 6.8 μ	Bypass capacitor of CPU	Main FPC
C109	Capacitor 22P	Stabilization of sub clock oscillation of CPU	Main FPC
C110	Capacitor 22P	Stabilization of sub clock oscillation of CPU	Main FPC
C111	Capacitor 6.8 μ	Stabilization of data write in EEPROM	Main FPC
C201	Capacitor 0.1 μ	Bypass capacitor of light metering IC	AE FPC
C202	Capacitor 0.1 μ	Stabilization of light metering output	AE FPC
C301	Capacitor 0.01 μ	Stabilization of flash charge completion signal	Main P.C. Board
C302	Capacitor 0.1 μ	Bypass capacitor of Analog SW IC	Main P.C. Board
C303	Capacitor 0.01 μ	Stabilization of control signal of flash (1 upper xenon tube) firing	Main P.C. Board
C304	Capacitor 0.01 μ	Stabilization of control signal of flash (3 xenon tubes) firing	Main P.C. Board
C401	Capacitor 100 μ	Stabilization of input power to booster circuit	Booster P.C. Board
C402	Capacitor 1500P	Stabilization of primary-side power of transformer	Booster P.C. Board
C403	Capacitor 22 μ	Stabilization of IGBT drive power (30V)	Booster P.C. Board

Symbol	Part Name	Functions	P.C. Board
C404	Capacitor 100P	Stabilization of transformer output power	Booster P.C. Board
C405	Capacitor 3.3 μ	Stabilization of transformer output power	Camera Body
C701	Capacitor 130 μ	Main capacitor for flash (1 upper xenon tube)	Capacitor P.C. Board
C702	Capacitor 130 μ	Main capacitor for flash (1 upper xenon tube)	Capacitor P.C. Board
C703	Capacitor 130 μ	Main capacitor for flash (1 lower left xenon tube)	Capacitor P.C. Board
C704	Capacitor 130 μ	Main capacitor for flash (1 lower left xenon tube)	Capacitor P.C. Board
C705	Capacitor 130 μ	Main capacitor for flash (1 lower right xenon tube)	Capacitor P.C. Board
C706	Capacitor 130 μ	Main capacitor for flash (1 lower right xenon tube)	Capacitor P.C. Board
C801	Capacitor 0.022 μ	Generation of trigger voltage for xenon tube (1 upper)	Flash P.C. Board
C802	Capacitor 0.022 μ	Generation of trigger voltage for xenon tube (1 lower left)	Flash P.C. Board
C803	Capacitor 0.022 μ	Generation of trigger voltage for xenon tube (1 lower right)	Flash P.C. Board
C804	Capacitor 0.044 μ	Generation of double voltage for xenon tube (1 upper)	Flash P.C. Board
C805	Capacitor 0.044 μ	Generation of double voltage for xenon tube (1 lower left)	Flash P.C. Board
C806	Capacitor 0.044 μ	Generation of double voltage for xenon tube (1 lower right)	Flash P.C. Board
C807	Capacitor 0.1 μ	Absorption of noise in IGBT trigger signal (1 upper xenon tube)	Flash P.C. Board
C808	Capacitor 0.1 μ	Absorption of noise in IGBT trigger signal (1 lower left xenon tube)	Flash P.C. Board
C809	Capacitor 0.1 μ	Absorption of noise in IGBT trigger signal (1 lower right xenon tube)	Flash P.C. Board
D101	Diode	Absorption of counter electromotive force of Frame Limiting Mg. and Solenoid	Main FPC
D102	Diode	Absorption of counter electromotive force of Mirror Mg.	Main FPC
D106	Diode	Prevention of counter current of charge in power supply bypass capacitor for EEPROM	Main FPC
D301	Diode	Absorption of counter electromotive force of Solenoid	Main P.C. Board
D401	Diode	Oscillation of booster circuit	Booster P.C. Board
D402	Diode	Rectification on secondary dide (30V) of transformer	Booster P.C. Board
D403	Diode	Rectification on secondary dide (290V) of transformer	Booster P.C. Board
ZD401	Zener diode	Generation of IGBT power (30V)	Booster P.C. Board
ZD402	Zener diode	Generation of Shunt Regulator IC control signal	Booster P.C. Board
D701	Diode	Prevention of counter current of discharge voltage	Capacitor P.C. Board
D702	Diode	Prevention of counter current of discharge voltage	Capacitor P.C. Board
D703	Diode	Prevention of counter current of discharge voltage	Capacitor P.C. Board
D704	Diode	Absorption of counter electromotive force of Coil (L701)	Capacitor P.C. Board
D705	Diode	Absorption of counter electromotive force of Coil (L702)	Capacitor P.C. Board
D706	Diode	Absorption of counter electromotive force of Coil (L703)	Capacitor P.C. Board
D801	Diode	Generation of double voltage for xenon tube (1 upper)	Flash P.C. Board
D802	Diode	Generation of double voltage for xenon tube (1 lower left)	Flash P.C. Board

Symbol	Part Name	Functions	P.C. Board
D803	Diode	Generation of double voltage for xenon tube (1 lower right)	Flash P.C. Board
R101	Resistor 22K	Division of Vbat voltage of battery check circuit	Main FPC
R102	Resistor 47K	Division of Vbat voltage of battery check circuit	Main FPC
R103	Resistor 150	Base current limiting of winding motor drive Tr.	Main FPC
R104	Resistor 150	Base current limiting of winding/rewind motor drive Tr.	Main FPC
R105	Resistor 150	Base current limiting of rewind motor drive Tr.	Main FPC
R106	Resistor 100	Base current limiting of mirror motor brake Tr.	Main FPC
R107	Resistor 22K	Current limiting of through-current prevention Tr. for mirror motor drive circuit	Main FPC
R108	Resistor 47K	Control stabilization of through-current prevention Tr. for mirror motor drive circuit	Main FPC
R109	Resistor 22K	Base current limiting of mirror motor brake Tr.	Main FPC
R110	Resistor 47K	Control stabilization of mirror motor drive Tr.	Main FPC
R111	Resistor 4.7	Current limiting of shutter first curtain	Main FPC
R112	Resistor 4.7	Current limiting of shutter second curtain	Main FPC
R113	Resistor 220	Current limiting of Self-timer LED	Main FPC
R114	Resistor 3K	Current limiting of Finder LED	Main FPC
R116	Resistor 1M	Pull-up resistance of Main Switch	Main FPC
R117	Resistor 1M	Pull-up resistance of Back Cover Switch	Main FPC
R122	Resistor 1K	Prevention of static electricity at CHI/O terminal of Accessory Shoe	Main FPC
R123	Resistor 10K	Pull-up resistance of flash charge completion signal	Main FPC
R127	Resistor 5.1K	Pull-up resistance of DX0 signal	Main FPC
R131	Resistor 220K	Load resistance of sub clock of CPU	Main FPC
R132	Resistor 10M	Load resistance of sub clock of CPU	Main FPC
R201	Resistor 27M	Output stabilization of Light Metering IC	AE FPC
R202	Resistor 10K	Output stabilization of Light Metering IC	AE FPC
R301	Resistor 2K	Stabilization of FET control	Main P.C. Board
R302	Resistor 1K	FET gate current limiting	Main P.C. Board
R303	Resistor 510	Base current limiting of Solenoid drive Tr.	Main P.C. Board
R304	Resistor 10K	Pull-down resistance of flash (1 upper xenon tube) firing control Tr.	Main P.C. Board
R305	Resistor 10K	Pull-down resistance of flash (lower right and lower left 2 xenon tubes) firing control Tr.	Main P.C. Board
R306	Resistor 33	Turn-OFF limiting resistance for IGBT (1 upper xenon tube)	Main P.C. Board
R307	Resistor 33	Turn-OFF limiting resistance for IGBT (lower right and lower left 2 xenon tubes)	Main P.C. Board
R308	Resistor 1M	Division of charge completion signal voltage	Main P.C. Board
R309	Resistor 1M	Division of charge completion signal voltage	Main P.C. Board
R310	Resistor 20K	Division of charge completion signal voltage	Main P.C. Board

Symbol	Part Name	Functions	P.C. Board
R311	Resistor 10K	Control stabilization of Solenoid drive Tr.	Main P.C. Board
VR301	Variable Resistor 200K	Charge voltage adjustment (290V)	Main P.C. Board
R401	Resistor 2K	Stabilization of IGBT drive power (30V)	Booster P.C. Board
R402	Resistor 10K	Limitation of Transformer primary-side power	Booster P.C. Board
R403	Resistor 4.3K	Division of control signal voltage for Shunt Regulator IC	Booster P.C. Board
R404	Resistor 2.2	Separation between Lens Barrel grounding and Main Circuit grounding	Booster P.C. Board
R801	Resistor 1M	Charge of flash firing trigger voltage and charge of double voltage for xenon tube (1 upper)	Flash P.C. Board
R802	Resistor 1M	Charge of flash firing trigger voltage and charge of double voltage for xenon tube (1 lower left)	Flash P.C. Board
R803	Resistor 1M	Charge of flash firing trigger voltage and charge of double voltage for xenon tube (1 lower right)	Flash P.C. Board
R804	Resistor 100K	Application of double voltage to xenon tube (1 upper)	Flash P.C. Board
R805	Resistor 100K	Application of double voltage to xenon tube (1 lower left)	Flash P.C. Board
R806	Resistor 100K	Application of double voltage to xenon tube (1 lower right)	Flash P.C. Board
R807	Resistor 39	Q801 protection	Flash P.C. Board
R808	Resistor 39	Q802 protection	Flash P.C. Board
R809	Resistor 39	Q803 protection	Flash P.C. Board
R810	Resistor 100K	Q801 protection	Flash P.C. Board
R811	Resistor 100K	Q802 protection	Flash P.C. Board
R812	Resistor 100K	Q803 protection	Flash P.C. Board
X01	Oscillator (8MHz)	Main clock of CPU	Main FPC
X02	Oscillator (32kHz)	Sub clock of CPU	Main FPC
LED101	LED	Finder LED display	Main FPC
LED102	LED	Lamp of self-timer mode	Main FPC
T401	Oscillation Transformer	Flash boosting	Booster P.C. Board
L701	Coil	Waveform shaping of flash firing current	Capacitor P.C. Board
L702	Coil	Waveform shaping of flash firing current	Capacitor P.C. Board
L703	Coil	Waveform shaping of flash firing current	Capacitor P.C. Board
T801	Trigger Coil	Flash firing trigger voltage (forXE1)	Flash P.C. Board
T802	Trigger Coil	Flash firing trigger voltage (forXE2)	Flash P.C. Board
T803	Trigger Coil	Flash firing trigger voltage (forXE3)	Flash P.C. Board
XE1	Xenon Tube	Flash lamp (1 upper)	Flash P.C. Board
XE2	Xenon Tube	Flash lamp (1 lower left)	Flash P.C. Board
XE3	Xenon Tube	Flash lamp (1 lower right)	Flash P.C. Board

[NAMES AND FUNCTIONS OF SWITCHES]

< External Operation Switches >

Name	Functions
Main Switch	OFF → ON Generates main system clock and starts flash charge → light metering, display, etc. ON → OFF Stops main system clock and stops the entire system.
Check Switch	Depressing the Shutter Release Button halfway starts light metering and starts flash charge when flash firing is required. Waits for shutter release. Active at "L"
Shutter Release Switch	Depressing the Shutter Release Button all the way starts shutter sequence operation. Active at "L"
Flash Mode Switch	Switches flash mode between 3-xenon-tube firing, no flash and 2-xenon-tube firing.
Exp. Compensation Dial	Turning the Dial selects exposure compensation value in the range from −1 to +1 in 1/3 steps.
Self-timer Switch	Starts the self-timer. Active at "L" * This switch works as the UP Button Switch at adjusting mode setting.
Rewind Switch	Turning the Rewind Switch Lever while depressing the Rewind Lock Release Button starts film rewinding. Active at "L"

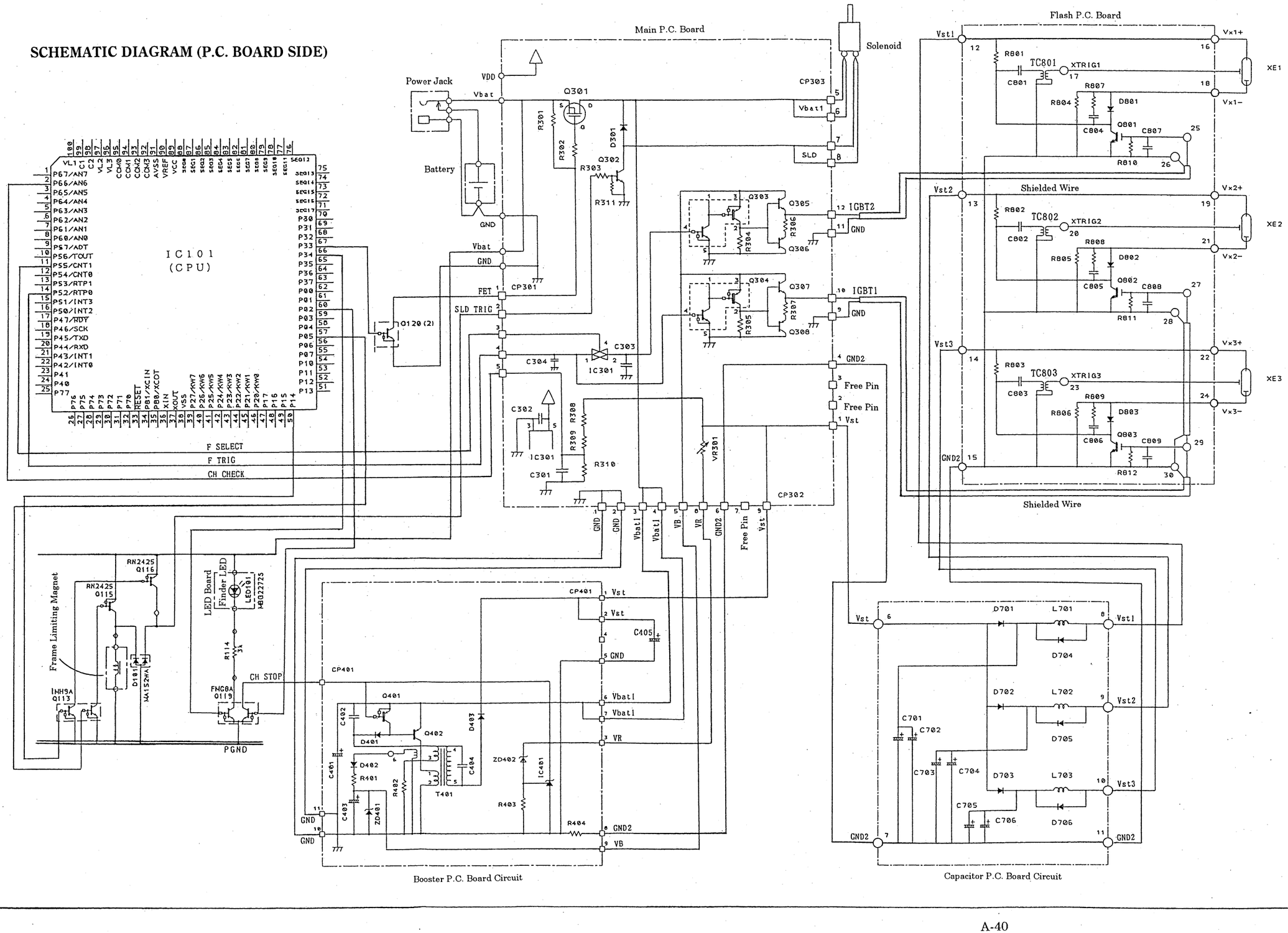
< Internal Mechanical Switches >

Back Cover Switch	Detects the opening/closing of the Back Cover. Closing the Back Cover starts blank shots advance by three frames. "H" ----- Back Cover closed, "L" ----- Back Cover open
Mirror-up Switch	This switch, coupled with the Mirror Motor, detects the mirror-up state. "H" ----- Mirror-down state, "L" ----- Mirror-up state
Mirror-down Switch	This switch, coupled with the Mirror Motor, detects the mirror-down state. "H" ----- Mirror-up state, "L" ----- Mirror-down state
Frame Limiting Switch	This switch, coupled with the Winding Sprocket, detects the winding by one frame. "H" ----- During winding, "L" ----- Winding is stopped
Perforation Switch	Detects a film perforation. (Detects the number of the frames of the film.)
Cartridge Switch	Detects the presence/absence of film. "H" ----- No film, "L" ----- Film loaded
X Contact	Synchro switch for external flash unit
DX Code Switch	Detects the film speed.

Power Supply Circuit
Winding/Rewind Drive Circuit
Shutter Charge Drive Circuit
Shutter Drive Circuit
DC/DC Converter
IC502
IC501
L501
Winding Motor
Rewind Motor
Mirror Motor
PGND
VDD
VCC
Vbat
Date Module
Lamp Print
DB Board
Data Back
Back Cover Contact FPC
Exp. Compensation Board
Flash Mode
Exp. Compensation
Perforation SW Board
Perforation SW
Frame Limiting SW
Main SW Board
Light Metering FPC
IC201
External LCD
IC101 (CPU)
Flash Mode
CHCHECK
Exp. Compensation
B.C
ACK
M/A
C/D
FSELECT
FTRIG
CHI/O
SCK
SDO
SDI
Back Cover
Main
Light Motoring Output
Vref Switching
Light Metering Output
DX-FPC
Cartridge SW
Rewind SW
U/D Board
Self-timer SW
Release SW
Check SW
Release Board
Mirror Up
Mirror Down
Mirror FPC
Frame Limiting Magnet
Mirror-up Magnet
Self-timer LED P.C. Board
LED Board
Finder LED
Accessory Shoe
X Contact
FET
FSERECT
FTRIG
CHCHECK
GND (1)
Main P.C. Board
Booster P.C. Board
6-Terminal Tr.
5-Terminal Tr.

SCHEMATIC DIAGRAM (MAIN FPC SIDE)

SCHEMATIC DIAGRAM (P.C. BOARD SIDE)



B. DISASSEMBLY & REASSEMBLY PROCEDURES

No.	419-01-50-RA5BL01

B-1. REMOVAL OF EXTERIOR PARTS

[Chart for Removal of Exterior Parts]

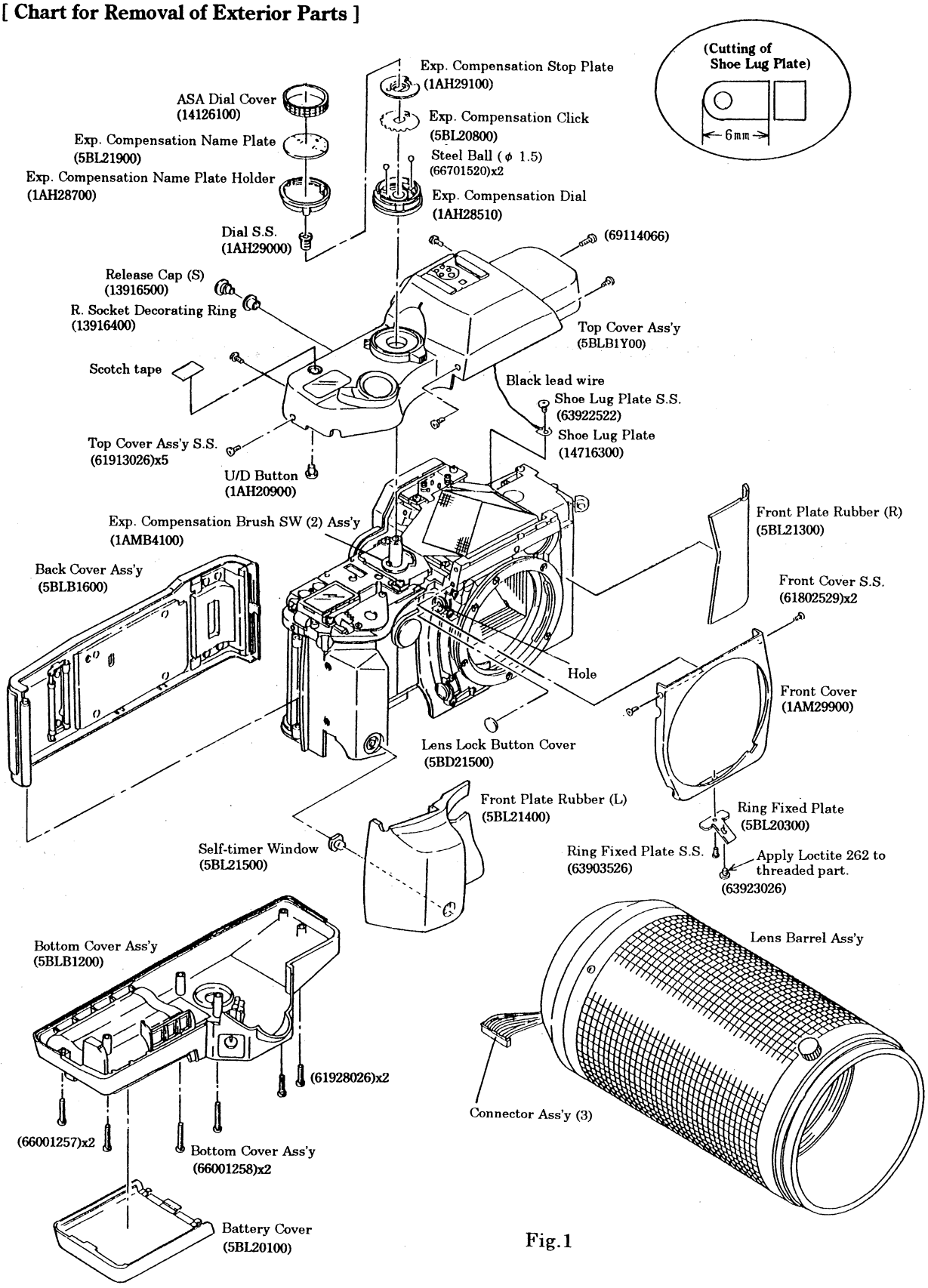


Fig.1

[WARNING]

The capacitors for xenon tubes retain a high voltage by the effect of the flash circuit. Before disassembling the camera, be sure to discharge the capacitors by the following procedure :

1) Remove the S. Retaining Nut (5BD18000) from the front of the Lens Barrel Ass'y (5BLM0100) and take off the Mask (5BD21002) and Mask Cover (5BD21411). (See Fig. 56)
2) Pull out the Flash Unit Ass'y (5BLM0900) and connect one terminal of the discharge tool to the soldered joint (GND) of the Black lead wire on the Flash P.C. Board.
3) Connect the other terminal of the discharge tool to the soldered joint of the Yellow lead wire on the Flash P.C. Board, thus discharging the capacitor.

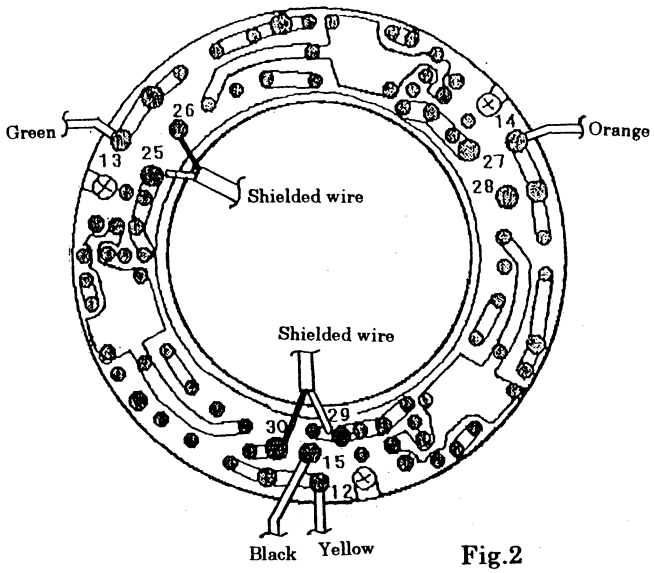


Fig.2

(Flash P.C. Board Ass'y)

4) With the first terminal of the discharge tool kept connected to the soldered joint of the Black lead wire, connect the second terminal to the soldered joint of the Green lead wire on the Flash P.C. Board, thus discharging the capacitor.
5) With the first terminal of the discharge tool kept connected to the soldered joint of the Black lead wire, connect the second terminal to the soldered joint of the Orange lead wire on the Flash P.C. Board, thus discharging the capacitor.

Note :

- Never connect the terminals of the discharge tool to any of the soldered joints of the shielded wires; otherwise, the "IGBT" in the flash circuit could be broken.

B-1-1. Removal of Back Cover Ass'y

1) Open the Back Cover Ass'y (5BLB1600) by pressing and sliding down the Lock Release Button of the Lock Plate Unit.
2) Remove the Back Cover Ass'y while pushing down the Back Cover Release Pin.

B-1-2. Removal of Front Plate Rubbers

1) Peel off the Front Plate Rubber (R) (5BL21300).
2) Peel off the Front Plate Rubber (L) (5BL21400) and remove the Self-timer Window (5BL21500).

Note :

- The Front Plate Rubber (R) and Front Plate Rubber (L) are fixed to the Front Plate with double-stick tape. (See Figs. 9 and 10)

B-1-3. Removal of Top Cover Ass'y

1) Remove the ASA Dial Cover (14126100).

Note :

- The ASA Dial Cover is fixed to the Exp. Compensation Dial with the bond (Cemedine 551).

2) Raise gently the three claws of Exp. Compensation Name Plate Holder (1AH28700) positioned away from the "0" position of the Exp. Compensation Name Plate (5BL21900) and remove upward the Exp. Compensation Name Plate Holder W/Exp. Compensation Name Plate.

Notes :

- The Exp. Compensation Name Plate is fixed to the Exp. Compensation Name Plate Holder with the bond (Cemedine 551). (See Fig. 8)
  In repair, do not remove the Exp. Compensation Name Plate.
- The three claws of the Exp. Compensation Name Plate Holder break easily, so take ample care in removal and installation.

3) Remove the Dial Setscrew (1AH29000) and take off the Exp. Compensation Stop Plate (1AH29100), Exp. Compensation Click (5BL20800) and Exp. Compensation Dial (1AH28510).
Note :
- Take care not to lose the Steel Balls (66701520)×2 fitted in the Exp. Compensation Dial.

4) Remove the Release Cap (S) (13916500) and R. Socket Decorating Ring (13916400).
5) Stick the Scotch Tape to the U/D Button (1AH20900). (See Fig. 1)
6) Remove the Top Cover Ass'y Setscrews (61913026)×5, (69114066) and take off the Top Cover Ass'y (5BLB1Y00) and then remove the Shoe Lug Plate Setscrew (63922522) and take off the Shoe Lug Plate (14716300) W/Black lead wire (from Top Cover Ass'y).
Notes :
- When removing the Top Cover Ass'y, the Exp. Compensation Brush SW (2) Ass'y (1AMB4100) will be ready for coming off. After the removal of the Top Cover Ass'y, take off the Exp. Compensation Brush SW (2) Ass'y. The contact of the Exp. Compensation Brush bends easily, so take ample care in handling. (See Fig. 1)
- Cut the Shoe Lug Plate (14716300) to the length of about 6 mm and install it. (See Fig. 1)

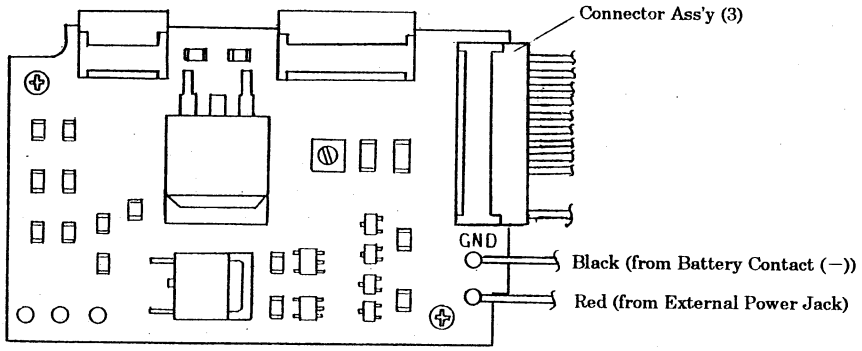
[Notes on Handling of Top Cover Ass'y]

a) The Top Cover Ass'y incorporates the A.B.C. Contact (Flash Select Mode SW Contact), and Main Switch. Take care not to bend or deform the contacts.

B-1-4. Removal of Bottom Cover Ass'y

1) Remove the Battery Cover (5BL20100).
2) Remove the Bottom Cover Ass'y Setscrews (66001258)×2, (66001257)×2, (61928026)×2 and take off the Bottom Cover Ass'y (5BLB1200).
3) Unsolder the Black lead wire (from Battery Contact (−)) and the Red lead wire (from External Power Jack) on the Main P.C. Board.

Fig.3



(Main P.C. Board Ass'y)

B-1-5. Removal of Lens Barrel Ass'y

1) Remove the Ring Fixed Plate Setscrews (63903526), (63923026) and take off the Ring Fixed Plate (5BL20300).
2) Remove the Connector Ass'y (3) on the Main P.C. Board. (See Fig. 3)
3) Peel off the Lens Lock Button Cover (5BD21500) using tweezers or the like.
4) Insert a thin screwdriver into the hole that appears after peeling off the Lens Lock Button Cover. While pushing in the Lens Lock Lever (1AA78420) in the horizontal direction with the screwdriver, turn the Lens Barrel Ass'y counterclockwise and take it off.
Note :
- The Lens Lock Button Cover is fixed to the Mirror Box with the bond (Cemedine 551).

B-1-6. Removal of Front Cover

1) Remove the Front Cover Setscrews (61802529)×2 and take off the Front Cover (1AM29900).

[Assembly Procedure for Exp. Compensation Dial]

1) Make certain that the Exp. Compensation Brush SW (2) Ass'y (1AMB4100) (Contact) is positioned as shown in Fig. 4.

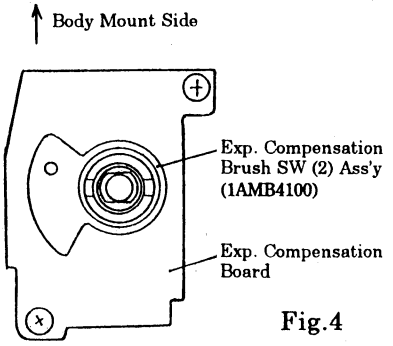


Fig.4

2) Install the Exp. Compensation Dial (1AH28510) in the position as shown in Fig. 5.
3) Put the Steel Balls (66701520)×2 in the two holes in the Exp. Compensation Dial.

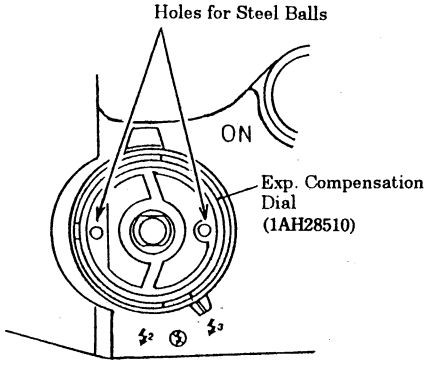


Fig.5

4) Apply the Grease (HK-9) to the grooves in the Exp. Compensation Click (5BL20800) on its dull corner side and install it in the Exp. Compensation Dial.
5) Install the Exp. Compensation Stop Plate (1AH29100) so that its projection comes in the square hole in the Exp. Compensation Click. Then tighten the Dial Setscrew (1AH29000).
6) Fit the positioning notch in the Exp. Compensation Dial onto the positioning projection of the Exp. Compensation Name Plate Holder (5BL21900) and install the Exp. Compensation Name Plate Holder W/Exp. Compensation Name Plate. In doing so, lock the three claws of the Exp. Compensation Name Plate Holder to the Exp. Compensation Dial. Turn the Exp. Compensation Dial and make certain that it turns smoothly without a catch or rough feel but with clicks to the feel.
7) Apply the bond (Cemedine 551) to the whole periphery along the gap between the Exp. Compensation Dial and the Exp. Compensation Name Plate Holder. (See Fig. 7)
   However, do not apply bond to the three claws of the Exp. Compensation Holder.
8) Put the ASA Dial Cover (14126100) on the periphery of the Exp. Compensation Dial.

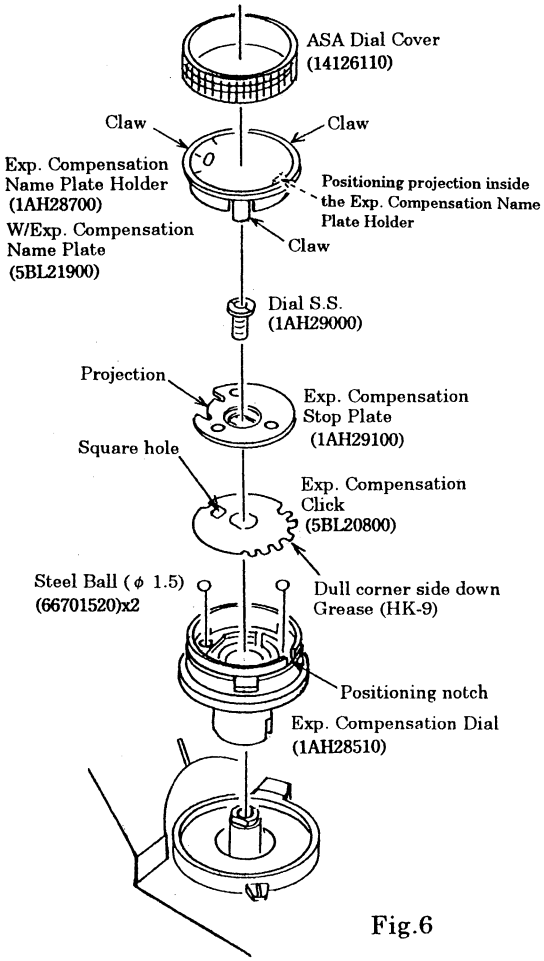


Fig.6

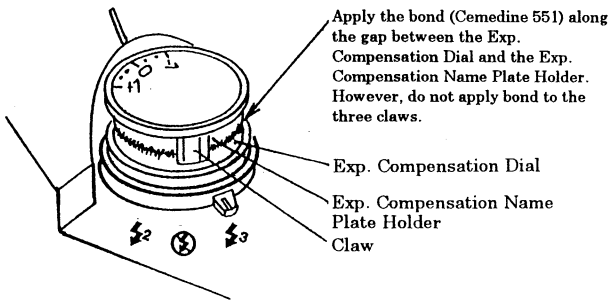


Fig.7

[How to Attach Exp. Compensation Name Plate]

1) Set the Exp. Compensation Name Plate (5BL23200) in the Exp. Compensation Name Plate Holder (1AH28700) by positioning the "0" of the Name Plate at the claw (triangle mark) of the Holder.
2) Apply the bond (Cemedine 551) to the back side of Exp. Compensation Name Plate.

Note :

- Do not apply the bond to the Ⓐ, Ⓑ or Ⓒ area.

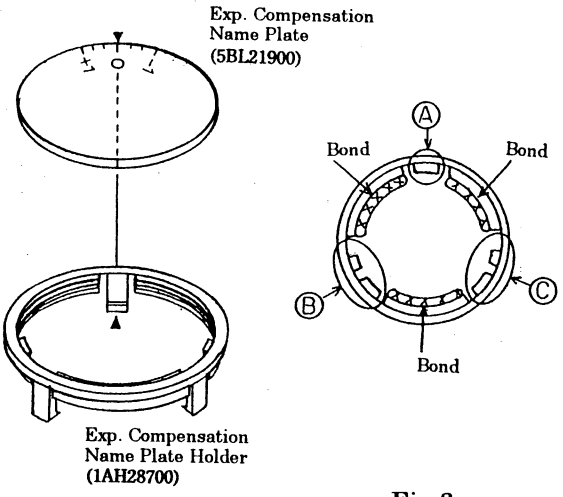


Fig.8

[Sticking of Double-Stick Tape to Front Plate Rubbers]

Notes :

- The adhesive force of the double-stick tape on the Front Plate Rubber (L) and Front Plate Rubber (R) weakens, once the Front Plate Rubbers are peeled off. Therefore, stick new double-stick tape before attaching the Front Plate Rubbers again.
- Stick the double-stick tapes so that they do not protrude from the Front Plate Rubbers.

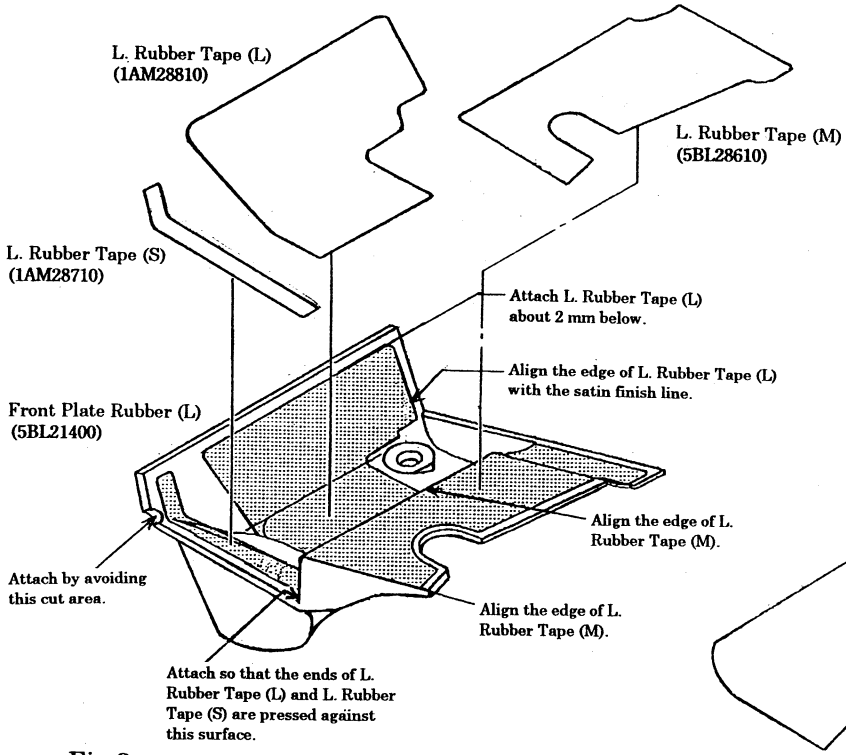


Fig.9

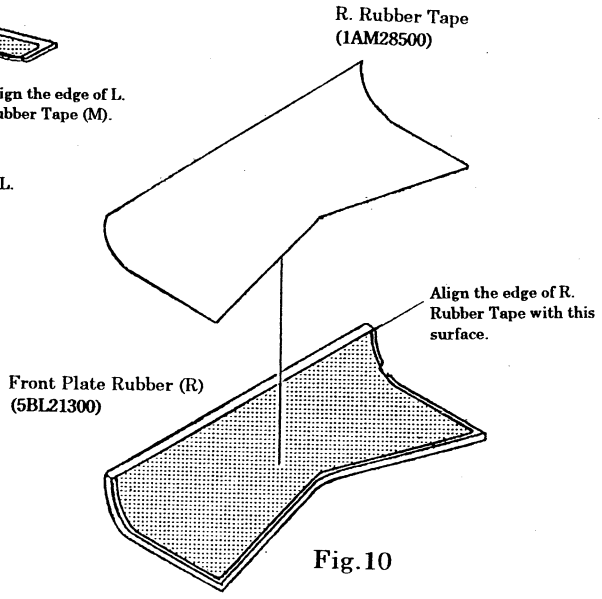


Fig.10

B-2. REMOVAL OF MAIN FPC ASS'Y

[Chart for Removal of Main FPC Ass'y]

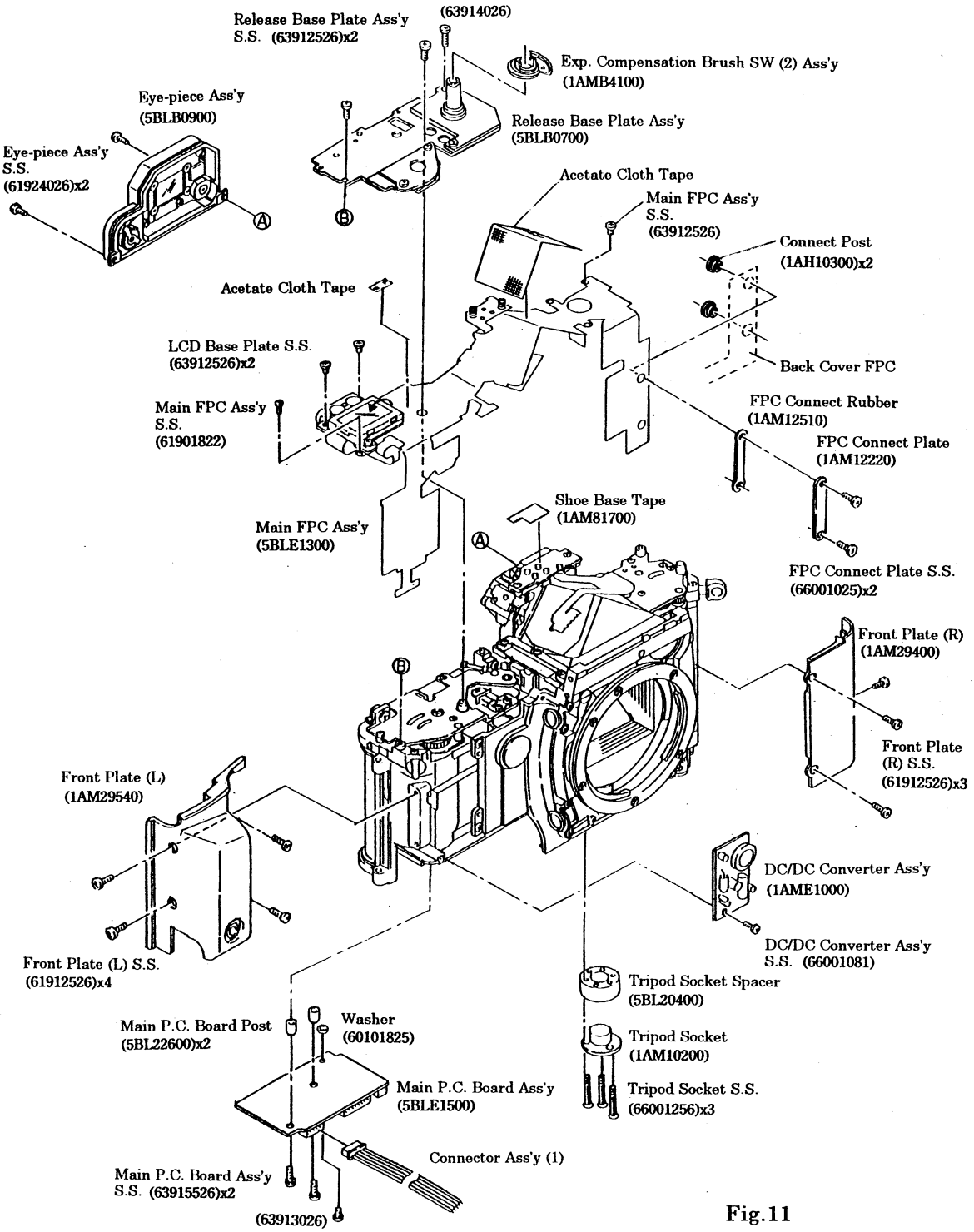


Fig.11

B-2-1. Removal of Tripod Socket

* It is recommended to remove the Tripod Socket and the Tripod Socket Spacer for speedy repair work.

1) Remove the Tripod Socket Setscrews (66001256) × 3 and take off the Tripod Socket (1AM10200) and Tripod Socket Spacer (5BL20400).

B-2-2. Removal of Eye-piece Ass'y

1) Remove the Eye-piece Ass'y Setscrews (61924026) × 2 and take off the Eye-piece Ass'y (5BLB0900).

B-2-3. Removal of Front Plates

(See Figs. 11 and 13)

1) Remove the Front Plate (R) Setscrews (61912526) × 3 and take off the Front Plate (R) (1AM29400).
2) Remove the Front Plate (L) Setscrews (61912526) × 4 and take off the Front Plate (L) (1AM29540).
3) Unsolder the Green and Orange lead wires (from Self-timer LED Board) on the Main FPC.

B-2-4. Removal of Main P.C. Board Ass'y

(See Figs. 11 and 12)

1) Unsolder the Black and Red lead wires (from DC/DC Converter) on the Main P.C. Board.
2) Unsolder the Orange lead wire (from Main FPC) on the Main P.C. Board.
3) Remove the Connector Ass'y (1) and Connector Ass'y (2) on the Main P.C. Board.
4) Remove the Main P.C. Board Ass'y Setscrews (63915526) × 2, (63913026) and take off the Main P.C. Board Posts (5BL22600) × 2, Washer (60101825) and Main P.C. Board Ass'y (5BLE1500).

Note :

- The Washer (60101825) (t: 1 mm) is fixed to the Body with the bond (Cemedine 551).

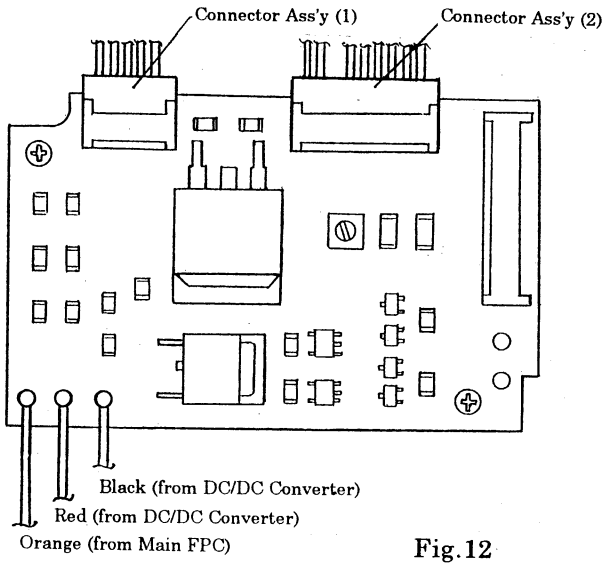


Fig.12

(Main P.C. Board Ass'y)

B-2-5. Removal of Main FPC Ass'y

(Top of Body) (See Figs. 11 and 13)

1) Peel off the Acetate Cloth Tape.
2) Unsolder the Blue lead wire (from Shutter).
3) Unsolder the Black and Blue lead wires (from Rewind Switch).
4) Unsolder the Brown, Orange and Black lead wires (from Shutter).
5) Unsolder the 6 soldered joints between the Light Metering FPC and the Main FPC.
6) Unsolder the Black and White lead wires (from Cartridge Switch).
7) Unsolder the Green and Orange lead wires (from Finder LED).
8) Unsolder the Blue lead wire (from Booster P.C. Board).

Note :

- In the course of production, the Blue lead wires were disused and Red lead wires were employed instead. Please take due care.

No.	419-01-50-RA5BL01

[Chart for Unsoldering on Main FPC Ass'y]

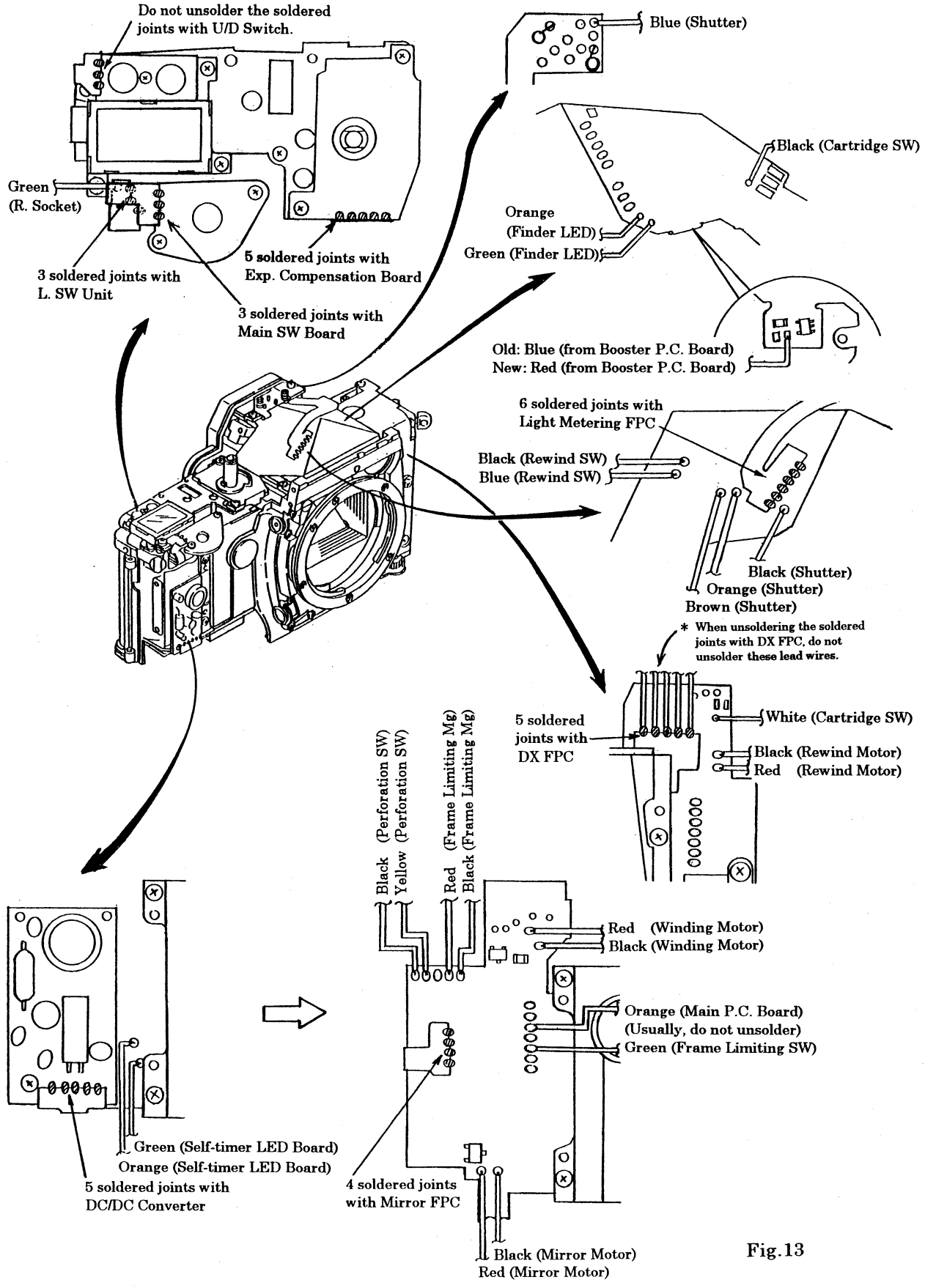


Fig.13

(Top Left of Body) (See Fig. 13)

9) Unsolder the Green lead wire (from R. Socket).
10) Unsolder the 3 soldered joints between the Main SW Board and the Main FPC.
11) Unsolder the 3 soldered joints between the L. SW Unit and the Main FPC.
12) Unsolder the 5 soldered joints between the Exp. Compensation Board and the Main FPC.

(Front Right of Body) (See Figs. 11, 12 and 13)

13) Unsolder the 5 soldered joints between the DC/DC Converter and the Main FPC.
14) Remove the DC/DC Converter Ass'y Setscrew (66001081) and take off the DC/DC Converter Ass'y (1AME1000).
15) Unsolder the Red and Black lead wires (from Mirror Motor).
16) Unsolder the Black and Yellow lead wires (from Perforation Switch Board), Green lead wire (from Frame Limiting Switch), Red and Black lead wires (from Frame Limiting Magnet).
17) Unsolder the 4 soldered joints between the Mirror FPC and the Main FPC.

(Front Left of Body) (See Figs. 11, and 13)

18) Unsolder the Black and Red lead wires (from Rewind Motor).
19) Unsolder the 5 soldered joints between the DX FPC and the Main FPC.

Note :

- When unsoldering the soldered joints between the DX FPC and the Main FPC, do not unsolder any of the jumper wires (Brown, Red, Orange, Yellow, Green lead wires).

20) Remove the FPC Connect Plate Setscrews (66001025)×2 and take off the FPC Connect Plate (1AM12220) and FPC Connect Rubber (1AM12510).
21) Remove the Connect Post (1AH10300)×2.

(Top Right of Body) (See Figs. 11)

22) Remove the LCD Base Plate Setscrews (63912526)×2 and raise the LCD Base Plate W/External LCD Panel in the direction of the arrow.
23) Remove the Release Base Plate Setscrews (63912526)×2, (63914026) and take off the Release Base Plate Ass'y (5BLB0700).
24) Peel off the smaller Acetate Cloth Tape.
25) Remove the Main FPC Ass'y Setscrew (61901822).

(Top Left of Body) (See Figs. 11)

26) Remove the Main FPC Ass'y Setscrew (63912526) and take off the Main FPC Ass'y (5BLE1300).

Note :

- The Main FPC Ass'y is stuck on the Accessory Shoe Base with the Shoe Base Tape (1AM81700), so take due care in removing the Main FPC Ass'y.

Notes :

- There is no need of removing any of the following lead wires on the Main FPC Ass'y: (See Fig. 14)
  ① Brown, Red, Orange, Yellow and Green jumper wires.
  ② Gray jumper wire.
  ③ Blue and Purple jumper wires.
  ④ Yellow, Orange, Red, Brown and Green lead wires of Connector Ass'y (1)
- The pattern on the Main FPC will be so changed that the jumper wires of ①, ② and ③ will be disused.
- Fasten the Green, Yellow, Black, Brown, Green and Gray lead wires with the smaller Acetate Cloth Tape.

No.	419-01-50-RA5BL01

[Wiring of Jumper Wires on Main FPC Ass'y and Connector Ass'y (1)]

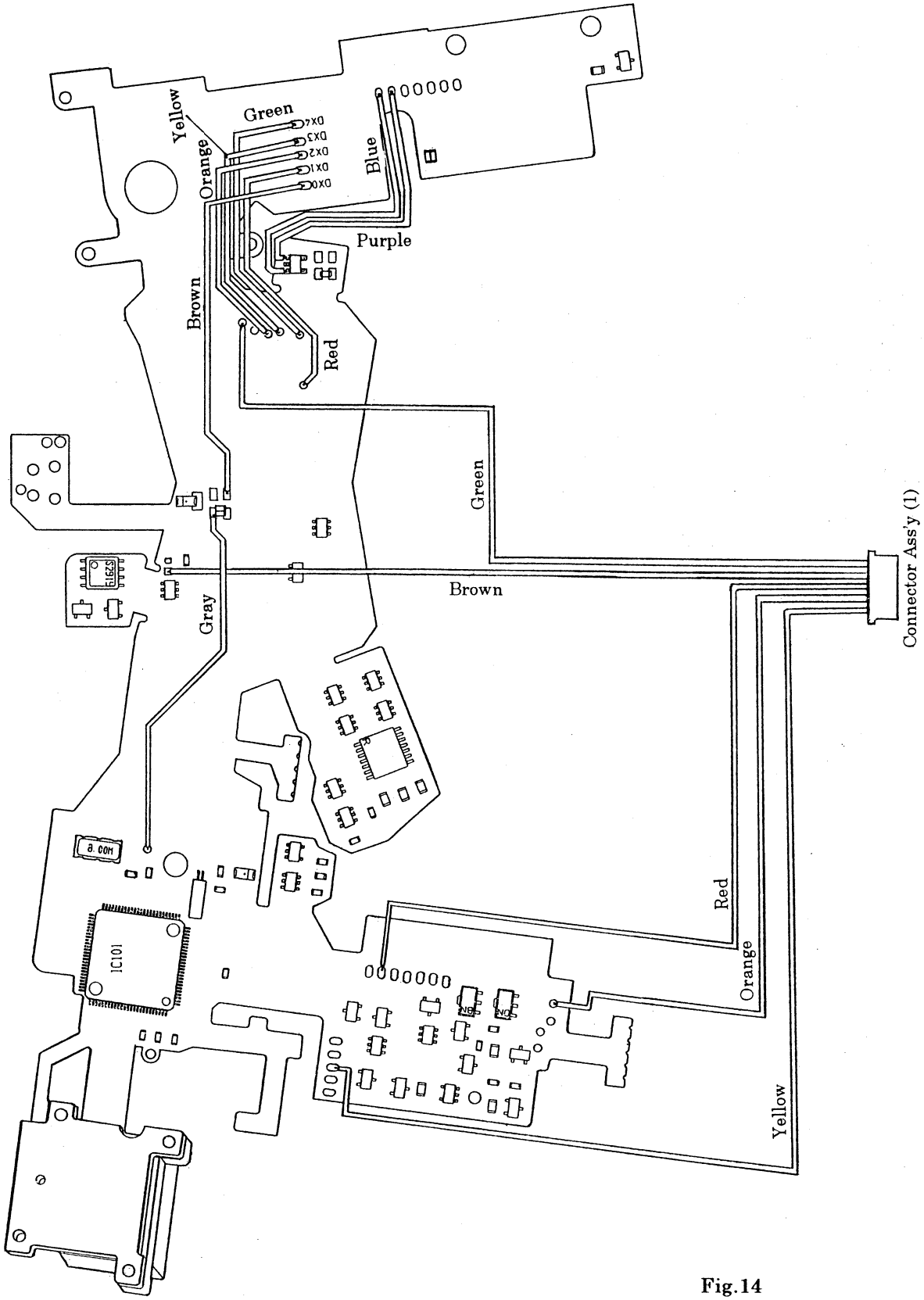


Fig.14

B-3. REMOVAL OF MIRROR BOX ASS'Y

B-3-1. Removal of Mirror Box Ass'y

1) Remove the Front Cover Light-Proof Curtain (1AA74900).
2) Remove the Mirror Box Ass'y Setscrews (6600160)×2, (63925026)×6 and take off the Mirror Box Ass'y (5BLB0100).

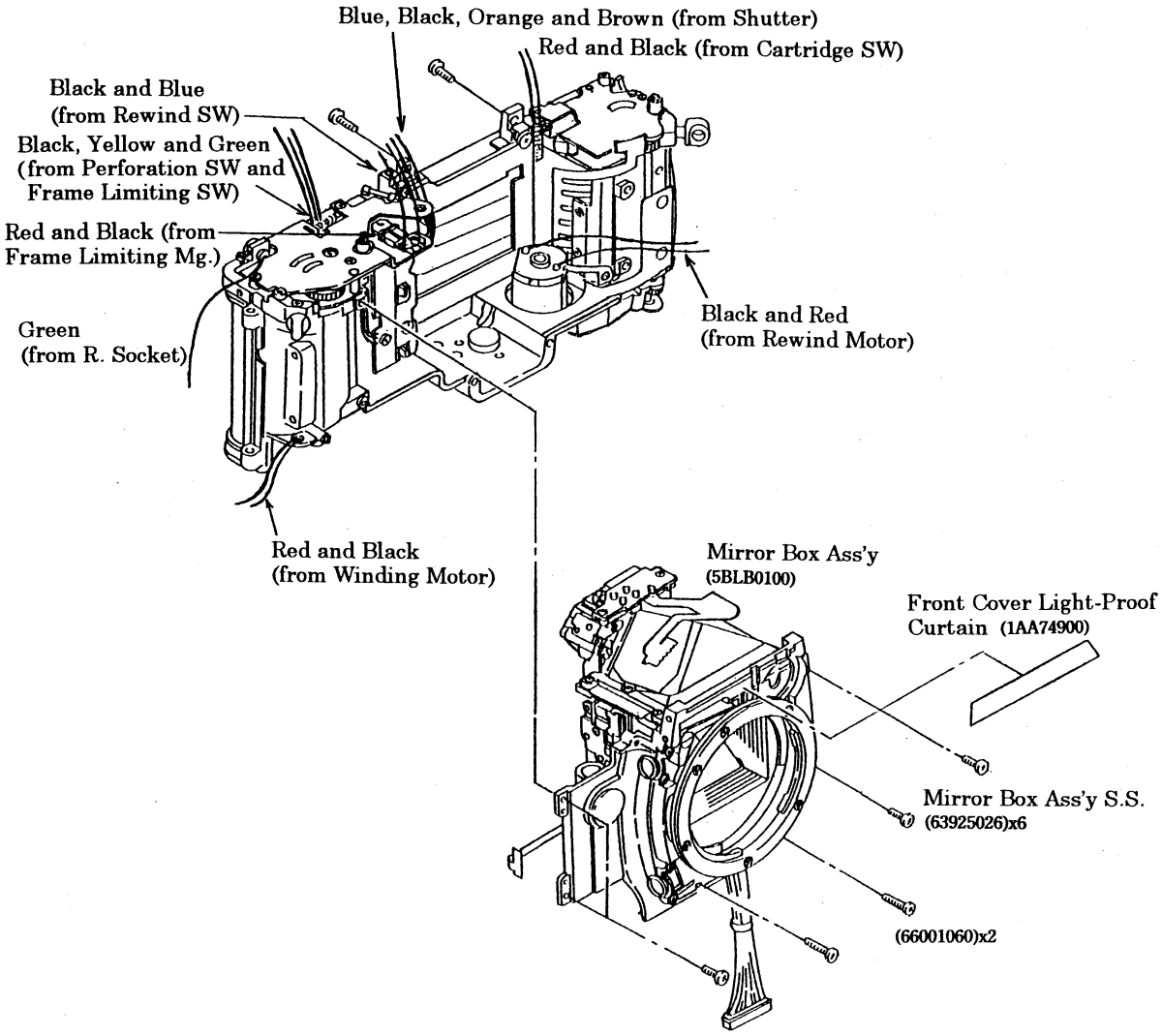


Fig.15

[Notes on Installation of Mirror Box Ass'y]

*** When installing the Mirror Box Ass'y in the Body, observe the following instructions:**

a) The lead wires connected to the Body and those connected to the Mirror Box Ass'y must be placed out of the Body as shown in Fig. 15. And when installing the Mirror Box Ass'y, take care not to catch any lead wires or FPC between the Body and the Mirror Box Ass'y.
Make certain that the lead wires are placed out as shown in Fig. 17.
b) Make certain that the hook of the S. Charge Lever and the hook of the S. Charge Hold Lever are released, and then install the Mirror Box Ass'y in the Body.

(Procedure for Releasing Hook of S. Charge Lever and Hook of S. Charge Hold Lever)

① Turn the Mirror Gear (3) (1AM71300) in the direction of the arrow Ⓐ, and the FC Charge Lever will be moved upward in the hole in the Mirror Base Plate (Upper) by the effect of the cam of the Cam Gear.
② Turn the Mirror Gear (3) further, and the S. Charge Lever is pulled downward by the force of the Charge Lever Spring (1AM72710).
After that, move the S. Charge Hold Lever in the direction of the arrow Ⓑ, and the hook of the S. Charge Lever and the hook of S. Charge Hold Lever will be released and the Mirror will move up.
③ Turn the Mirror Gear (3) further in the direction of the arrow Ⓐ until the Aperture Lever comes to the up position (see Fig. 30). Then install the Mirror Box Ass'y in the Body.

(Side View of Mirror Box Ass'y)

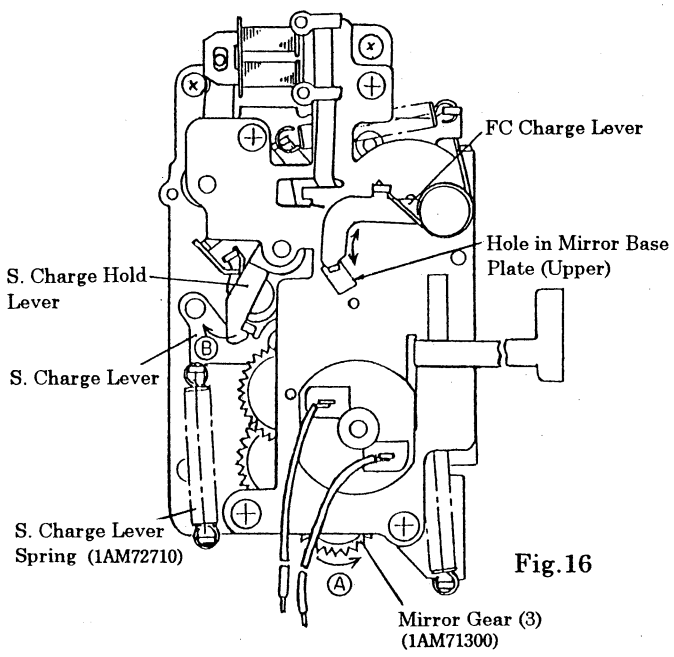


Fig.16

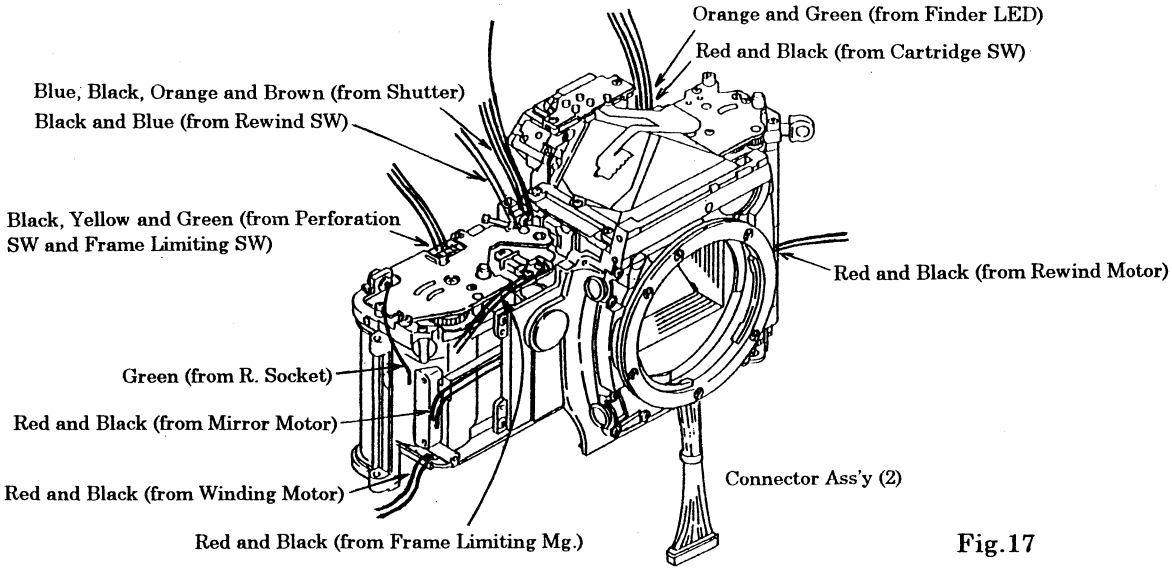


Fig.17

B-4. DISASSEMBLY OF WINDING MECHANISM

B-4-1. Disassembly of Winding Mechanism

1) Peel off the Lock Claw Moquette (2) (1741600).
2) Remove the Hinge Cover Ass'y Setscrews (66001187), (69113576) and take off the Hinge Cover Ass'y (1AMB0600).
   Notes :
   - Remember that the Hinge Cover Ass'y Setscrew (66001187) is an inverse screw.
   - In repair, it is not necessary to remove the Lock Claw Moquette (2) or Hinge Cover Ass'y.
3) Remove the Film Fixer Ass'y Setscrews (63913526)×2 and take off the Film Fixer Ass'y (174B1100).
4) Remove the Winding Unit Ass'y Setscrews (61913522), (61813026)×2 and take off the Winding Unit Ass'y (1AMB1700).
5) Remove the Spool (1AM31600).
6) Remove the Spool Holder Setscrews (63911826)×3 and take off the Spool Holder (17438200).
7) Remove the Sprocket (17437100).

[Notes on Installation of Winding Mechanism]

a) Take care not to mistake the mounting orientation of the Sprocket.
b) Move the Film Roller in the direction of the arrow and while holding it there, install the Spool.
c) Pass the Black and Red lead wires of the FW Motor through the bores in the Spool and Spool Holder and then through the hole Ⓐ in the Body.

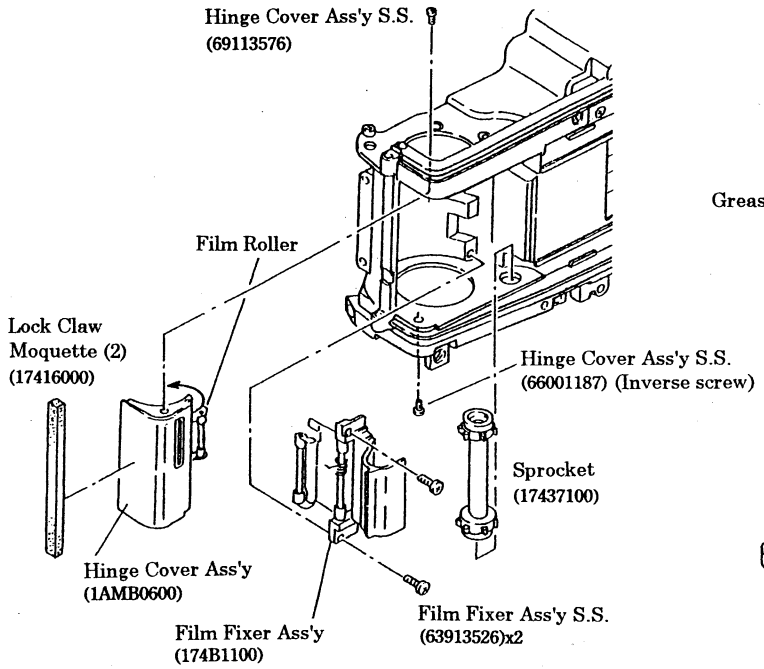


Fig.18

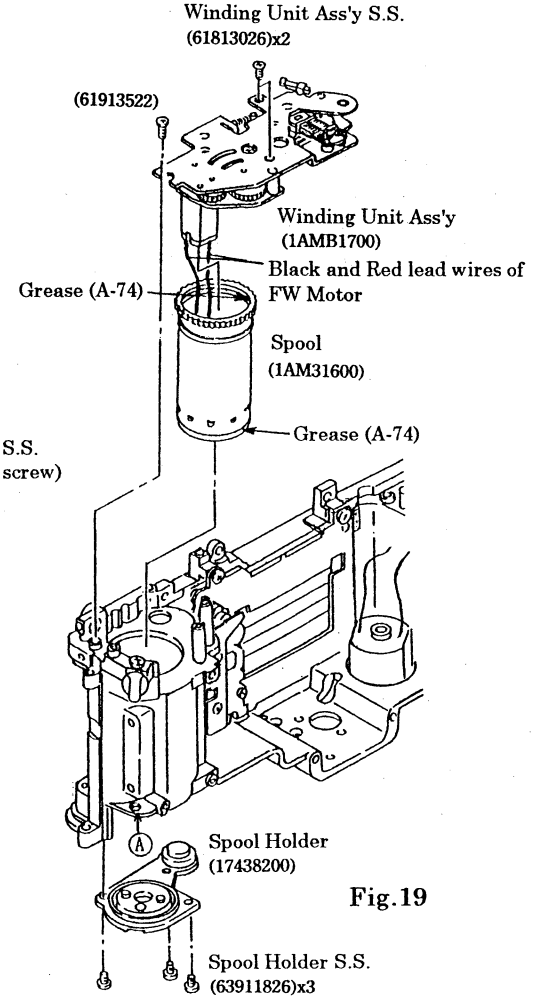


Fig.19

B-5. REMOVAL OF SHUTTER UNIT

B-5-1. Removal of Shutter Unit

1) Peel off the Light-Proof Curtain (1) (1AH88200).
2) Remove the Shutter Unit Setscrews (61924029), (66001065), (66001001) and take off the Shutter Unit (1AM30100).

Notes :

- The blades of the Shutter Unit are made with precision. Never touch the blades with your finger, nor push them with any tool.
- The Light-Proof Curtain (1) is attached to the Body with the Shutter Light-Proof Curtain Tape (1AM30200).
- Apply a small amount of the bond (Loctite #262) to one-third end area of the Shutter Unit Setscrew (61924029).

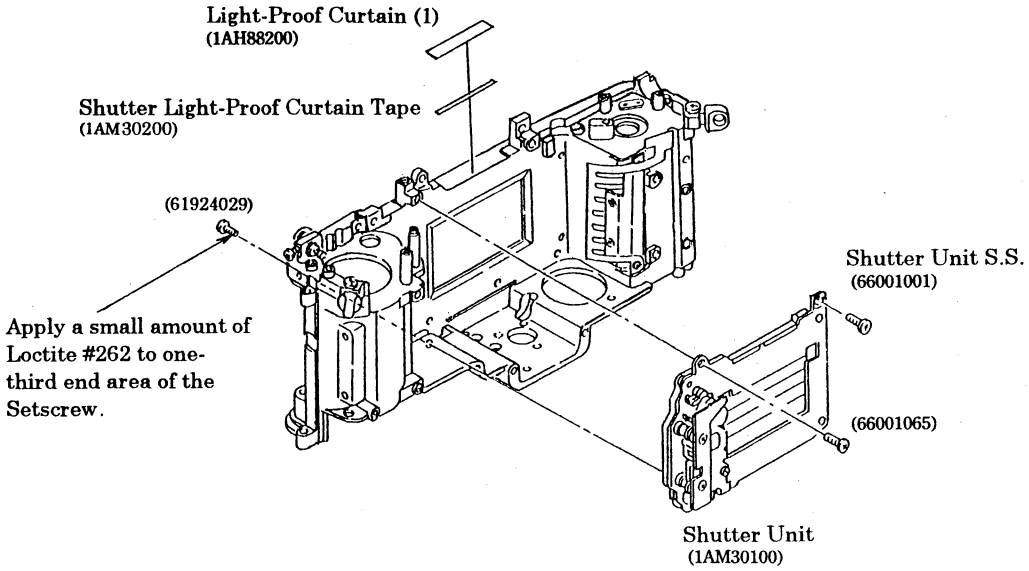


Fig.20

[Layout of Lead Wires of Shutter Unit]

① Blue lead wire (X)
② Brown lead wire (M1)
③ Black lead wire (GND)
④ Orange lead wire (M2)

(Front View of Shutter Unit)

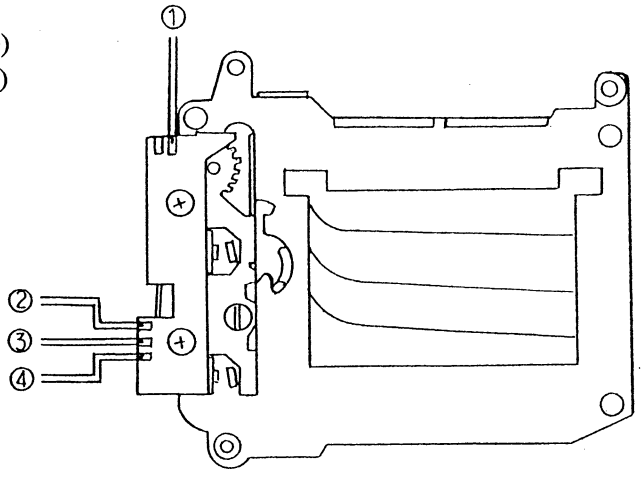


Fig.21

B-6. REMOVAL OF REWIND MECHANISM

B-6-1. Removal of Rewind Base Plate (Upper) Ass'y and Rewind Base Plate (Lower) Ass'y

1) Remove the Rewind Base Plate (Upper) Ass'y Setscrews (61913526)×3 and take off the Rewind Base Plate (Upper) Ass'y (1AMB0800).
2) Remove the Drive Shaft (1AM41820).
3) Remove the Cartridge SW Pin (1AM11700).
4) Remove the Rewind Base Plate (Lower) Ass'y Setscrews (63914026)×3 and take off the Rewind Base Plate (Lower) Ass'y (1AMB1400).

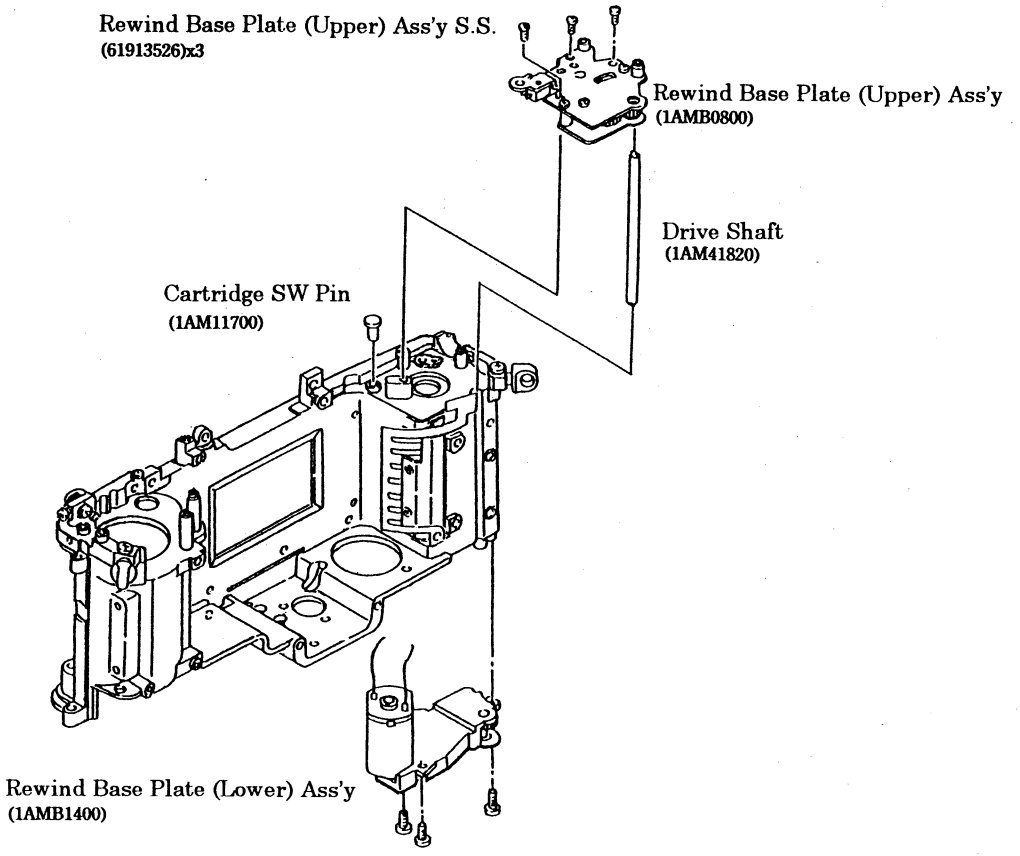


Fig.22

B-7. REMOVAL OF OTHER PARTS

B-7-1. Removal of Back Cover FPC

1) Remove the Lock Plate Unit Ass'y Setscrew (66001122) and take off the Lock Plate Unit Ass'y (1AHA1Q00).
2) Remove the Contact Cover Setscrews (66001167) × 3 and take off the Contact Cover (1AM13510).
3) Remove the Back Cover FPC (1AM51500).
   Note :
   - Remove the Back Cover FPC carefully, since it is attached to the Body with the Bottom FPC Tape (1AM11900).

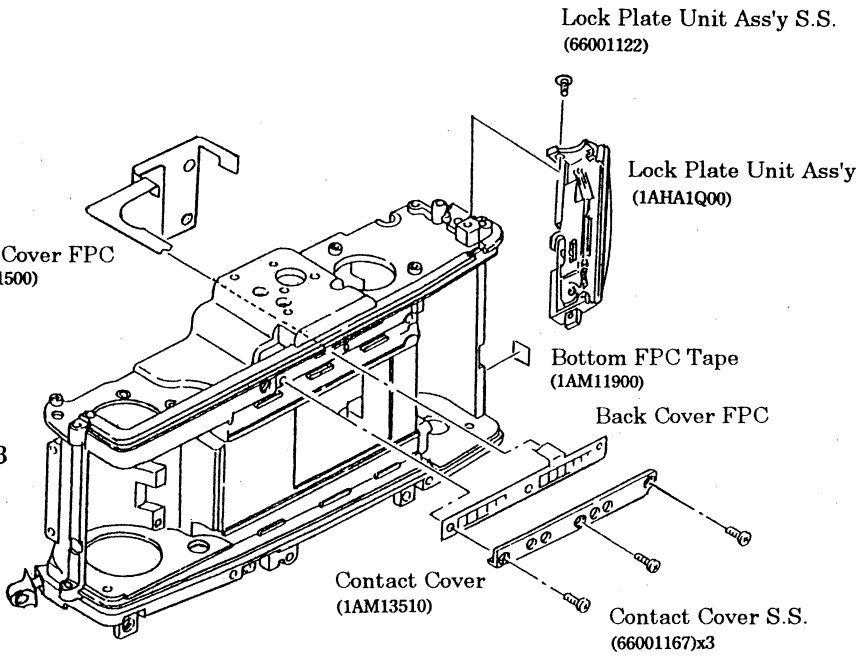


Fig.23

B-7-2. Removal of DX Ass'y

1) Remove the DX Ass'y Setscrews (61913022)×2 and take off the DX Ass'y (174B1400).

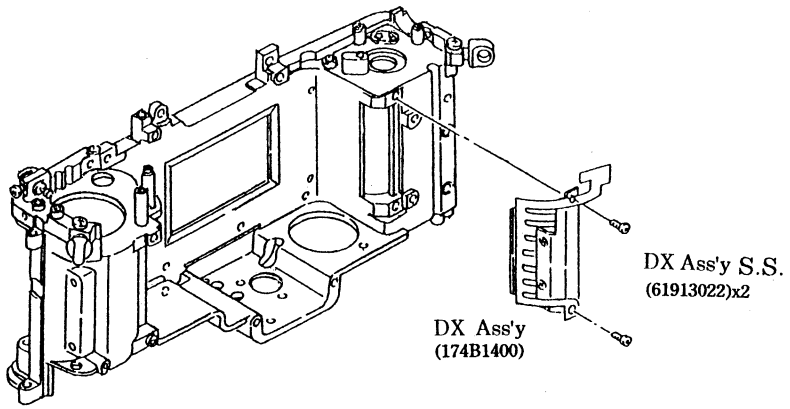


Fig.24

B-8. DISASSEMBLY & REASSEMBLY PROCEDURES FOR ASS'Y PARTS

B-8-1. Disassembly of Mirror Box Ass'y

*** When disassembling the Mirror Box Ass'y, do not remove any of the Mirror Frame Ass'y, Mirror Hinge Plate, Main Mirror Adjusting Plate and Mirror Stopper. Their removal can cause incorrect finder focusing.**

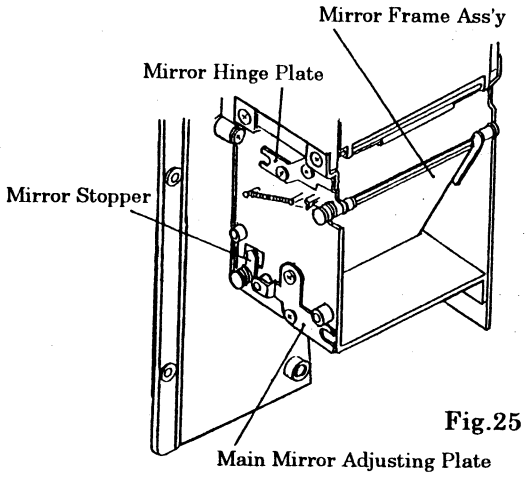


Fig.25

1) Remove the Dioptric Adjuster Ass'y Setscrews (63914026)×2 and take off the Dioptric Adjuster Ass'y (5BLF 1000).
2) Remove the Finder LED Ass'y Setscrews (63902226)×2 and take off the Finder LED Ass'y (5BLE1200).
3) Remove the Penta Prism Holder Setscrews (63915526)×4 and take off the Penta Prism Holder W/Penta Prism.
4) Remove the four or eight Focus Adjust Washers.

   Note :

   - In reassembly, put back the same Focus Adjust Washers (four or eight) that have been removed.
     When the finder focusing is not right, make the finder focus adjustment by replacing these Focus Adjust Washers. (See page C-6)

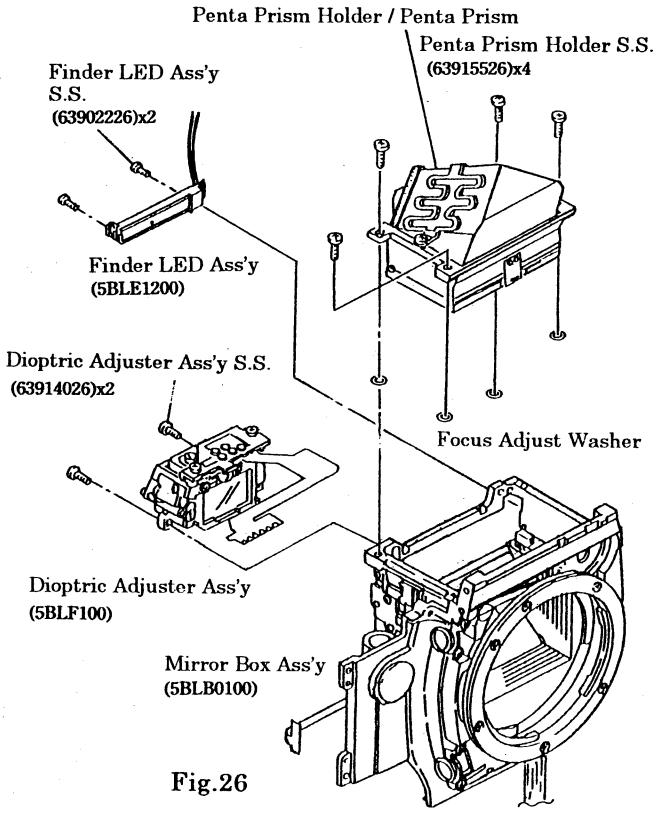


Fig.26

(See Fig. 27)

5) Disconnect the Connector Ass'y (2) from the connector on the Booster P.C. Board Ass'y.
6) Remove the Capacitor Ass'y Setscrews (63912526)×2 and take off the Capacitor Ass'y (5BLE1100).
7) Remove the Booster P.C. Board Ass'y Setscrews (63913526)×2 and take off the Booster P.C. Board Ass'y (5BLE1000) and Booster P.C. Board Posts (5BL20700)×2.
8) Remove the Mirror Base Plate Ass'y Setscrews (63913026), (61812226)×3 and take off the Mirror Base Plate Ass'y (1AMG1900).

9) Remove the Body Mount Setscrews (61925522)×5, (66001138) and take off the Body Mount (1AA75000) and Mount Ring (1AM79000).
10) Remove the Mount Stopper Setscrews (61913026)×2 and take off the Mount Stopper (13981300).
11) Remove the Mount Spring Setscrews (61913026)×6 and take off the Mount Springs (13981230) ×3.
12) Remove the Lens Lock Lever Setscrew (1AA78600) and take off Lens Lock Lever Spring (1AA78510) and Lens Lock Lever (1AA78420).

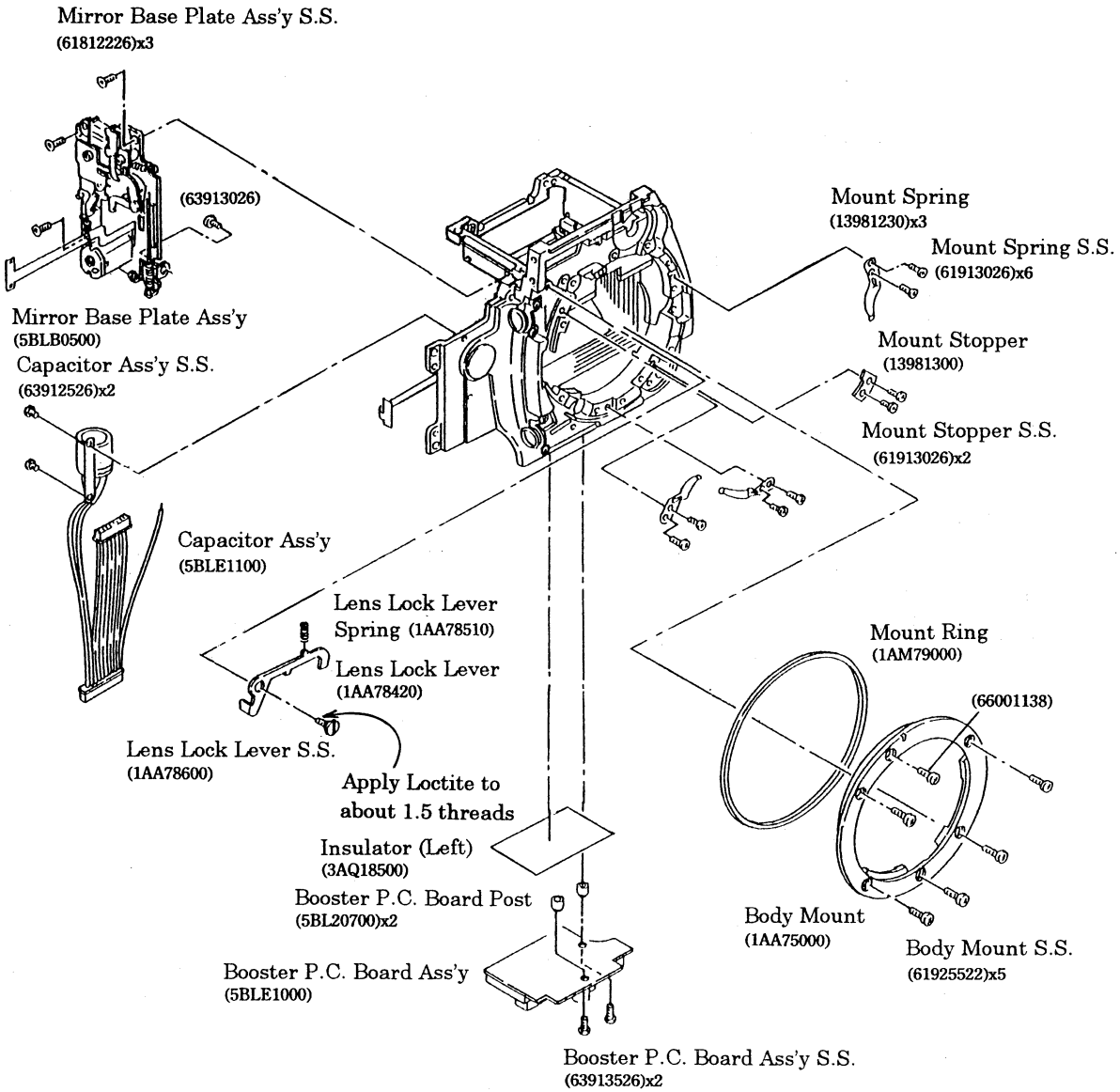
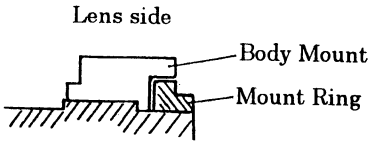


Fig.27

[Notes on Parts Installation of Mirror Box Ass'y]

a) Apply Loctite to about 1.5 threads of the Lens Lock Lever Setscrew. Take care that the Loctite does not come out of the screw hole. Apply a proper amount of Loctite.
b) In installing the Mount Ring, orient it as shown in Fig. 28.

Fig.28



(Sectional View of Body Mount / Mount Ring)

[Installation Procedure for Mirror Base Plate Ass'y]

1) Turn the Mirror Gear (3) of the Mirror Base Plate Ass'y (1AMG1900) in the direction of the arrow Ⓐ (see Fig. 29) until the Aperture Lever comes to the up position. At this point, the Aperture Lever Spring must be in the expanded position. (See Fig. 30)
2) Install the Mirror Base Plate Ass'y in the Mirror Box while inserting the pin of the Mirror Frame Ass'y in the hole in the Mirror Base Plate Ass'y. And tighten the Mirror Base Plate Ass'y Setscrews (61812226)×3, (63913026).

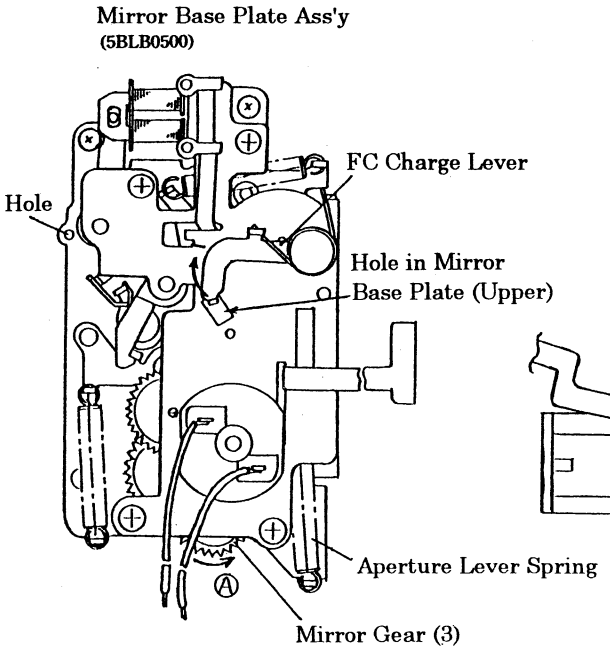


Fig.29

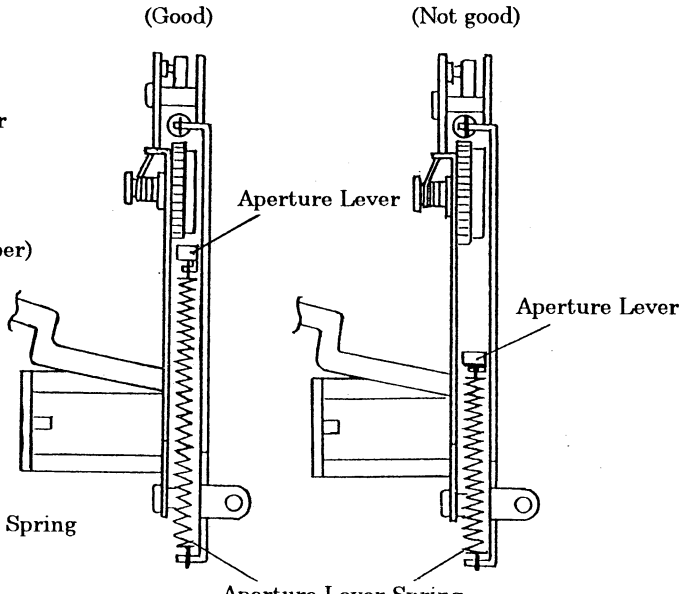


Fig.30 Fig.31

(Side View of Mirror Base Plate Ass'y)

[Assembly Procedure for Mirror Base Plate Ass'y]

1) Set the S. Hold Lever Spring (1AM73800) and FC Charge Lever Spring (1AM74800) on the Mirror Base Plate (Upper).
   Note :
   - Take care not to deform the S. Hold Lever Spring or FC Charge Lever Spring.
2) Install the Mirror Motor Ass'y (1AMG2300) and tighten the Mirror Motor Ass'y Setscrews (61812026)×2.
   Lock the Mirror Motor Ass'y Setscrews by applying the bond (Cemedine 551) to their heads.
3) Install the Magnet (1AD87400) and tighten the Magnet Setscrews (61903526)×2.
   In doing so, make sure that the pin of the S. MG Lever is positioned at the center of the hole in the Armature.
   Lock the Magnet Setscrews by applying the bond (Cemedine 551) to their heads.
4) Pass the Ⓐ portion of the Mirror FPC (1AM51900) through the slit in the Mirror Base Plate (Upper).
   Fit the hole Ⓑ in the Mirror FPC on the guide pin of the Mirror Base Plate (Upper). And tighten the Mirror FPC Setscrew (61911826) so that the Mirror FPC does not float.
5) Pass the Ⓒ portion of the Mirror FPC through the slot in the Mirror Base Plate (Upper) and bend the Mirror FPC.
6) Bend the Ⓐ portion of the Mirror FPC as shown in Fig. 32 and solder it to the terminals of the Magnet.

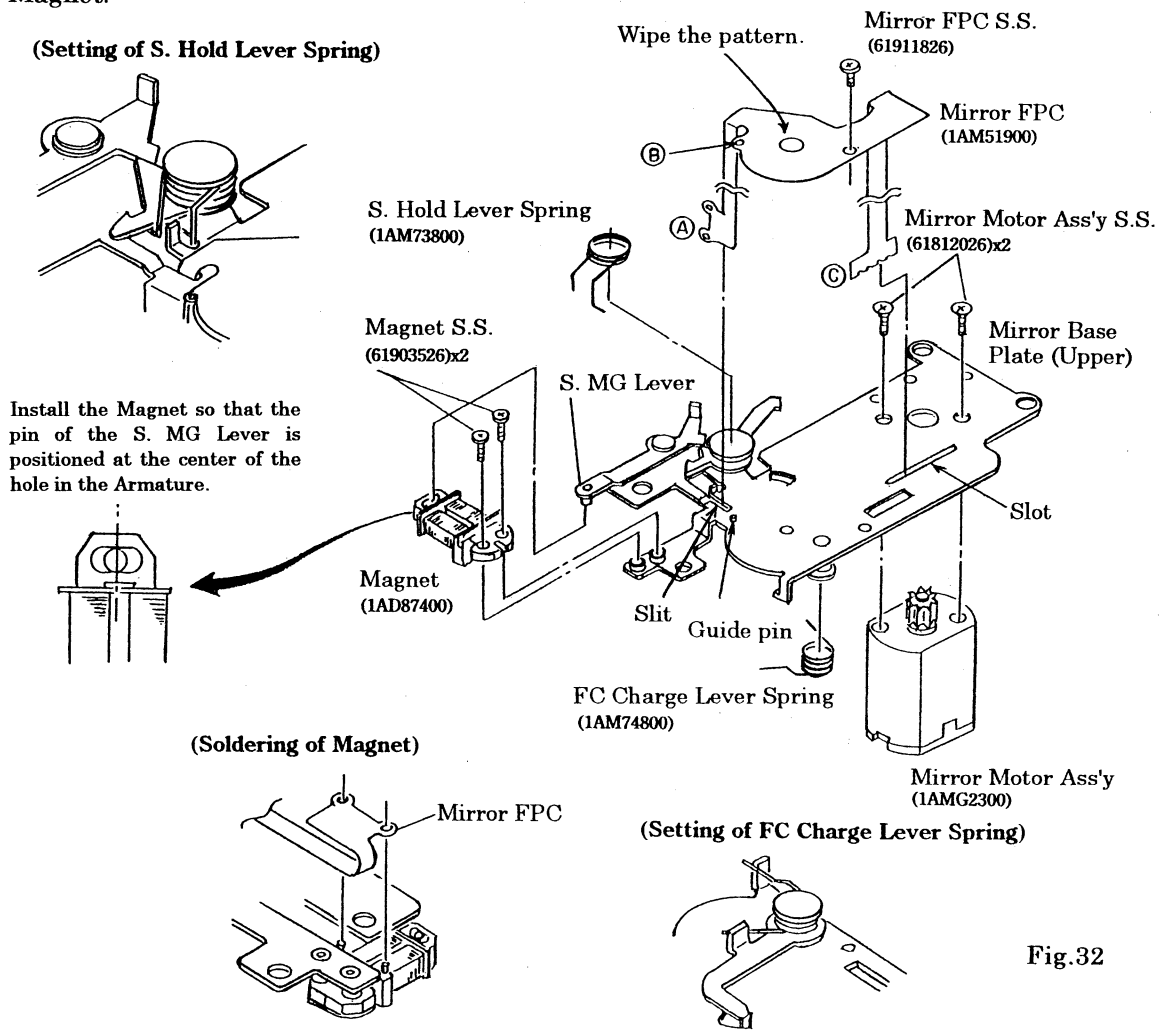


Fig.32

7) Set the S. MG Lever Spring (1AM74200) on the Mirror Base Plate (Lower).
Note :
- Take care not to deform the S. MG Lever Spring.

8) Install the Mirror Cam (2) Ass'y (1AMG2100).
Notes :
- Take care not to deform the contact of the Mirror Cam (2) Ass'y.
- Take care that the roller of the Mirror Up Lever does not come inside the cam of the Mirror Cam (2) Ass'y.

9) Install the Mirror Cam (1) (1AM71600) so that the hole in the Mirror Cam (1) is positioned at the hole in the Mirror Cam (2) Ass'y.
Note :
- Take care that the roller of the Aperture Lever or S. Charge Lever does not come inside the cam of the Mirror Cam (1).

10) Install the Mirror Gear (2) (1AM71200), Mirror Gear (4) (1AM71400), Mirror Gear (3) (1AM71300) and Mirror Gear (5) (1AM71500) in the named order.

11) Set the S. Charge Lever Spring (1AM72700), Mirror Up Lever Spring (1AM72900) and Aperture Lever Spring (1AM73300) in the named order.
Notes :
- Hook the Mirror Up Lever Spring to the Mirror Up Lever so that the cut end of the Mirror Up Lever Spring is positioned up.
- Lock the hook of the S. Charge Lever Spring to the Mirror Base Plate with the bond (Cemedine 551).

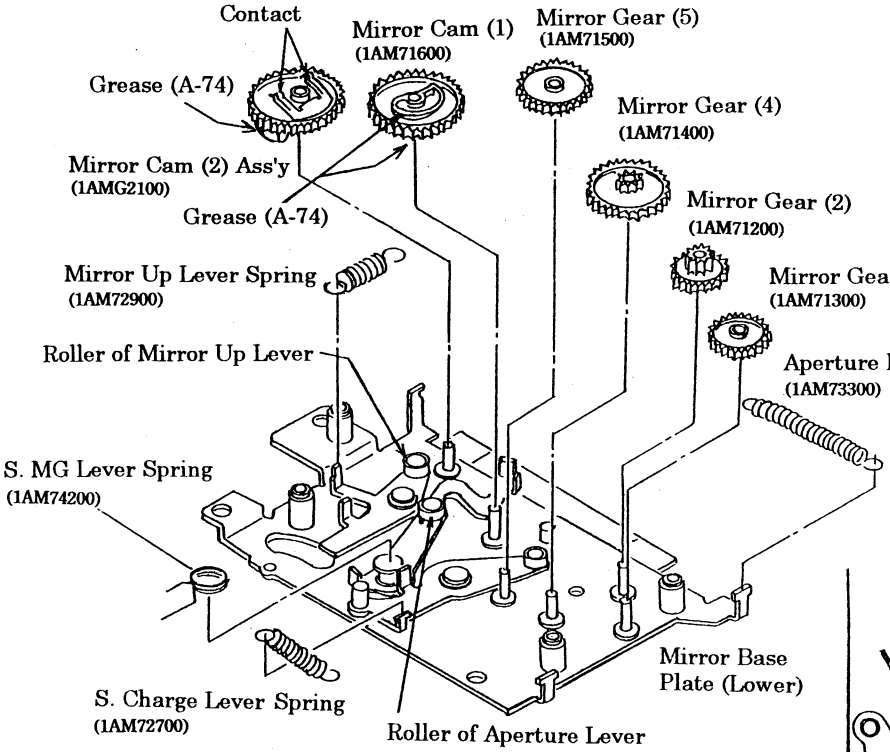


Fig.33

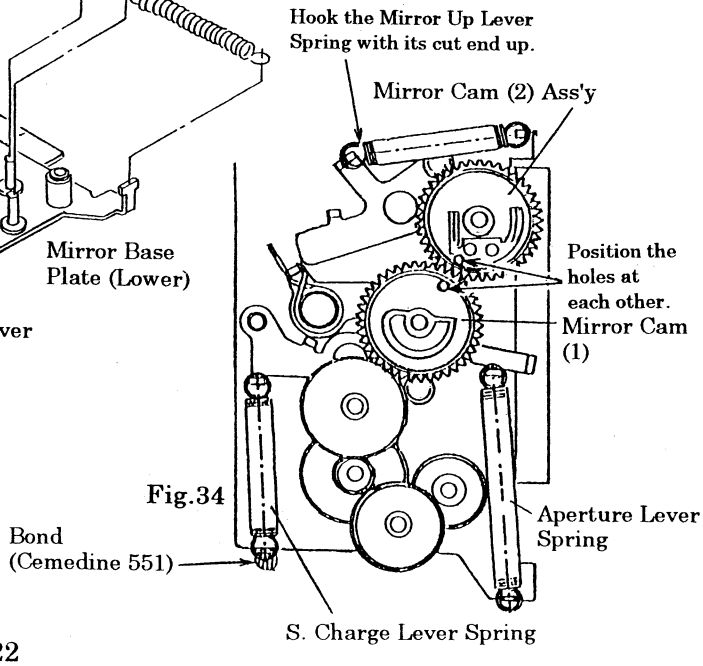


Fig.34

12) Wipe the contact pattern on the Mirror FPC with lens cleaning paper with ether alcohol. (See Fig. 32)
13) Make certain that the contacts of the Mirror Cam (2) Ass'y are free from fatigue or deformation.
14) Make certain that the hole in the Mirror Cam (2) Ass'y is positioned at the hole in the Mirror Cam (1). (See Fig. 33)
15) Install the Mirror Base Plate (Upper) on the Mirror Base Plate (Lower) with care taken that the end of the FC Charge Lever does not come inside the cam of the Mirror Cam (1). In doing so, the S. MG Lever Spring must be positioned outside the S. MG Lever.
16) Make certain that all the four posts of the Mirror Base Plate (Lower) are inserted in the holes in the Mirror Base Plate (Upper), and then tighten the Mirror Base Plate (Upper) Setscrews (63913026)×4.
17) Move the Armature against the magnetic force by pushing the S. MG Lever and make certain that the S. MG Lever returns to the original position by the attraction force of the Magnet.
18) Operate the S. Hold Lever and make certain that the S. Hold Lever returns to the original position fully by the force of the Spring.

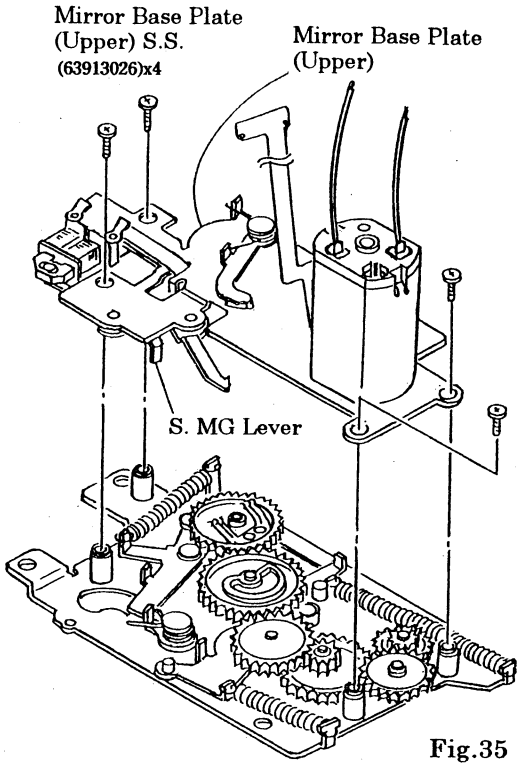


Fig.35

(Greasing Points)

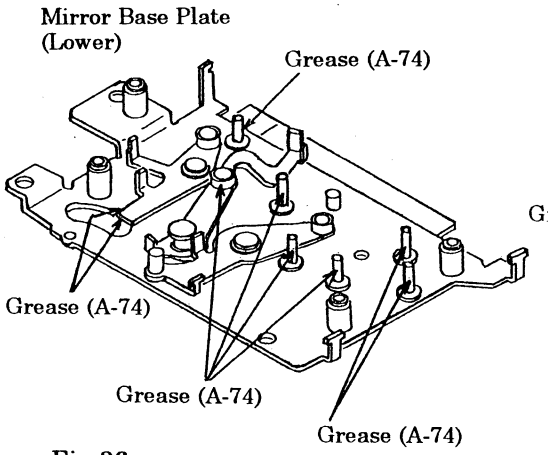


Fig.36

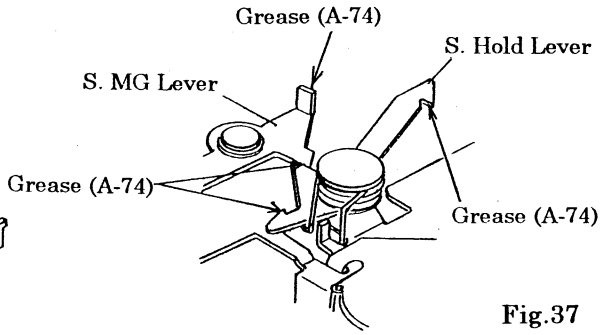


Fig.37

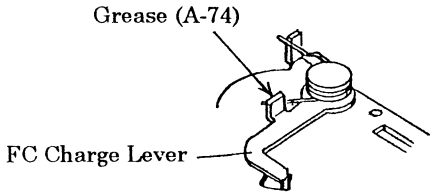


Fig.38

B-8-2. Disassembly of Penta Prism Ass'y

Note :

- Shielder (black) has been applied to the gap between the Penta Prism and the Penta Prism Holder to prevent dust from entering the Viewfinder. Therefore, remove the shielder before removing the Penta Prism.

1) Push the end of the FS Lock Spring (L) and remove the Focusing Screen **(1AH84900)**.
2) Take out the FS Hinge Shaft (1AM83000) and remove the FS Holder Ass'y (1AMF0200).
3) Peel off the Penta Prism Dust-Proof Moquette (1AH85000) and Mirror Cushion (L) (1AA75200).
4) Pick off the Shielder applied around the Penta Prism, using tweezers or the like.
5) Peel off the Penta Cover (17484210).

   Note :

   - The Penta Cover is fixed to the Penta Prism Retaining Spring with double-stick tape.
6) Remove the Penta Prism Retaining Spring Setscrews (61913026) × 2 and take off the Penta Prism Retaining Spring (1AM82110).
7) Remove the Penta Prism Cover (1AH84800), Penta Prism (1AM84100) and Viewfinder Frame (B) (1AM82510).
8) Remove the Finder Indicator Prism (1AM82310).

   Note :

   - The Finder Indicator Prism is fixed to the Penta Prism Holder with the bond (Cemedine 551).
9) Remove the Penta Prism Spacer (1AM82000), and Viewfinder Frame (A) (1AH84400).

   Note :

   - The Penta Prism Spacer is fixed to the inside of the Penta Prism Holder with the UV bond.

[Notes on Installation of Penta Prism]

a) When a new Penta Prism is installed, apply black oil ink with a felt-tipped marker to the back corners of the Penta Prism.
b) Install the Viewfinder Frame (B) and Penta Prism in a position where they are pushed in the direction of the arrow.

[Checks after Installation of Penta Prism]

a) After the installation of the Penta Prism, make certain that there is no dust in the Viewfinder.
b) After the assembly of the Penta Prism, apply the shielder to the gap between the Penta Prism and the Penta Prism Holder.

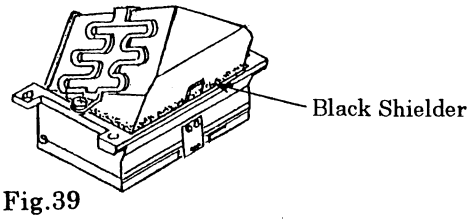


Fig.39

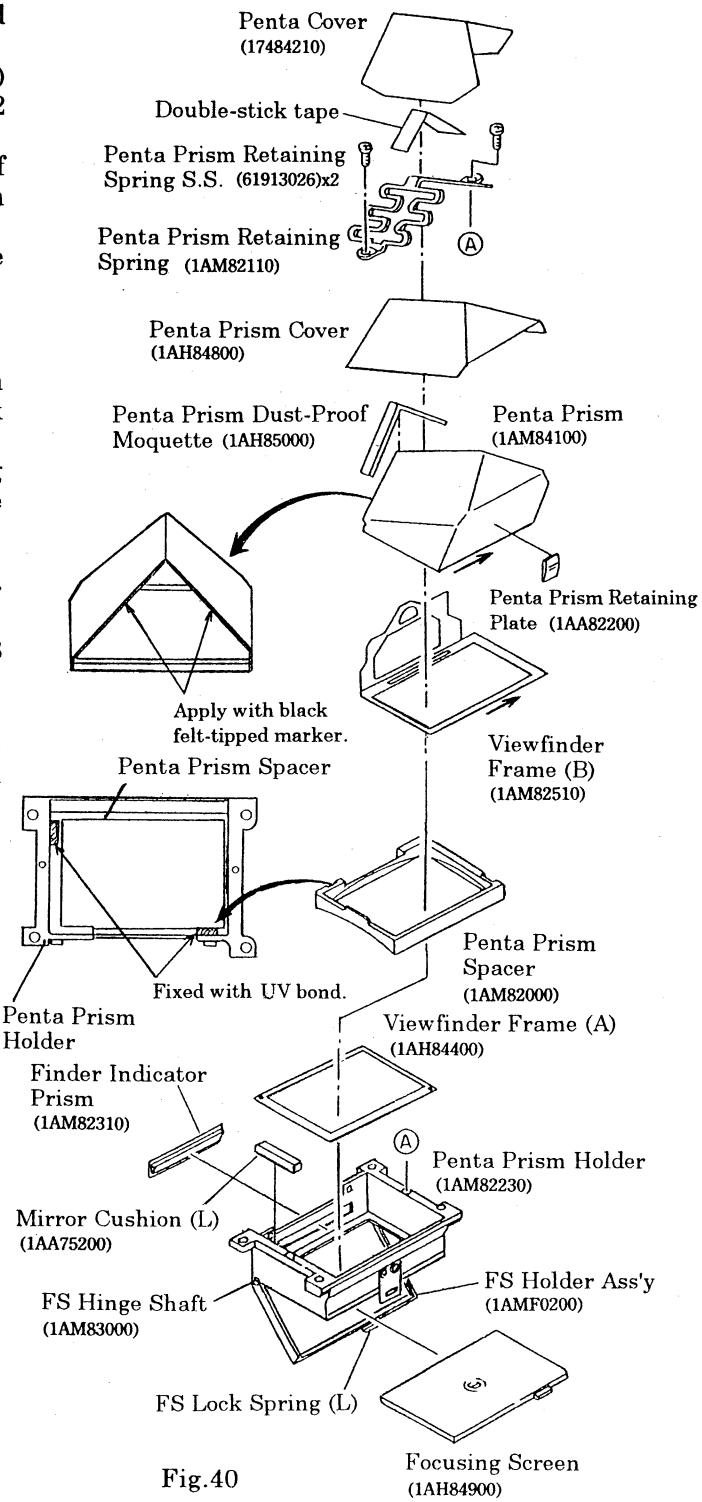


Fig.40

B-8-3. Disassembly of Winding Unit Ass'y

Notes :

- During repair, take care not to bend or deform the Rewind Switch (1AA5 7400).
- Once the Winding Unit Ass'y is disassembled, make the adjustment of perforation position. (See page C-2)
- Remove the Sprocket Gear Holder (1AM35120) and mark the Sprocket Gear and the Frame Limiting Gear with a felt-tipped marker before moving the Sprocket Gear. In doing so, the Frame Limiting Gear must be engaged with the Frame Limiting Lever and must not move.
  In installing the Sprocket Gear, engage the marked teeth, and you will not have to make the adjustment of perforation position. However, check the perforation position for properness. (See page C-3)

1) Remove the Sprocket Gear Holder Setscrews (61901826)×2 and take off the Sprocket Gear Holder (1AM35120) and Sprocket Gear (17437010) (or Sprocket Gear (A) (17436910) used by selection).
2) Remove the FW Lower Base Plate Setscrews (66001068)×3 and take off the FW Upper Base Plate.
3) Disassemble the Winding Unit Ass'y as shown in Fig. 42.

Note :

- The Frame Limiting Gear Ass'y (1A MB2000) is attached to the FW Lower Base Plate with the Frame Tape (1AM34300).

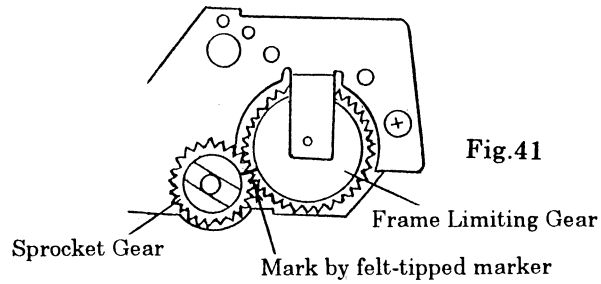


Fig.41

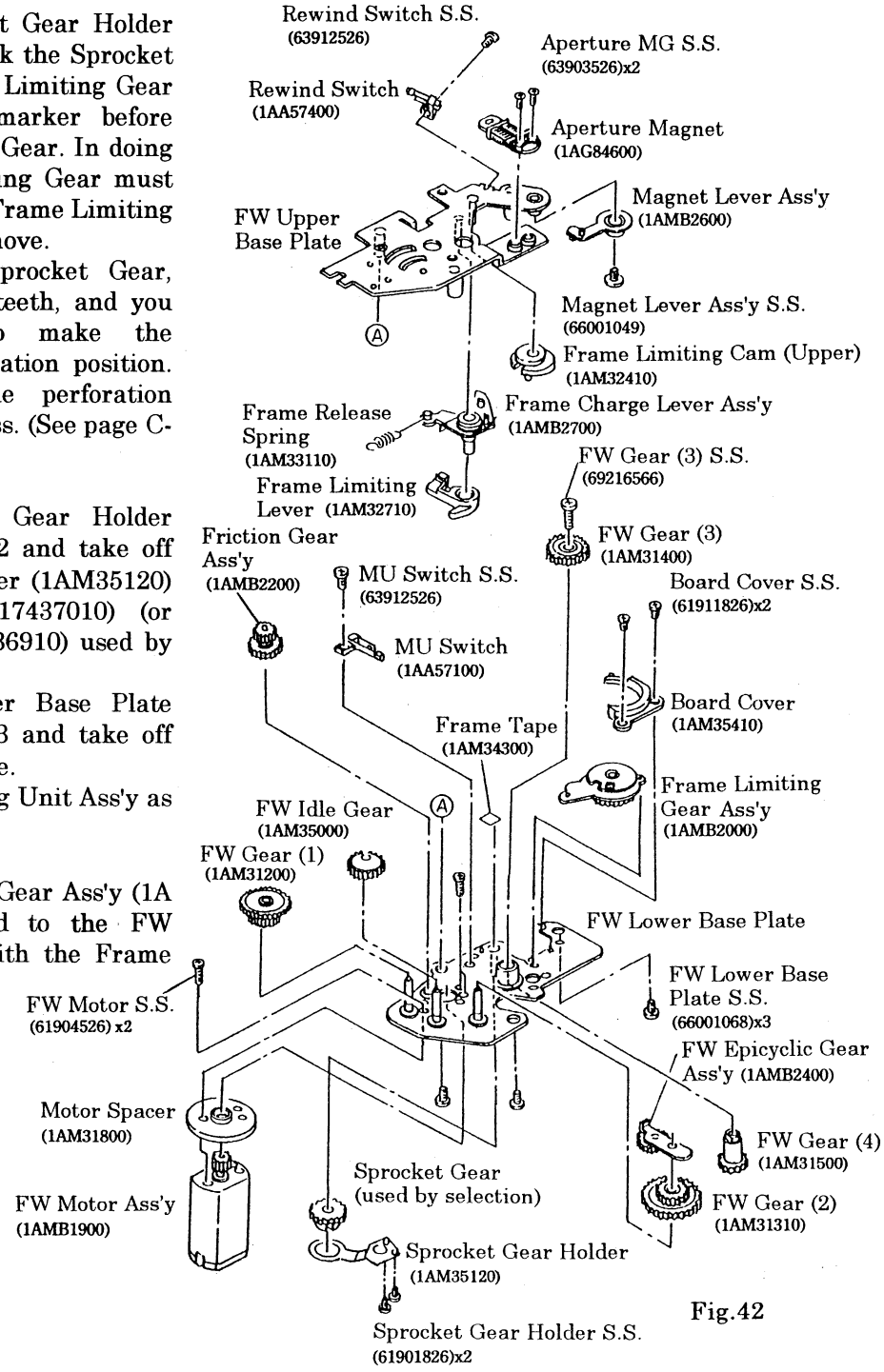


Fig.42

[Assembly Procedure for Winding Unit Ass'y]

1) As shown in Fig. 42, install the parts on the FW Upper Base Plate.
   Notes :
   (See Fig. 43)
   - The spring of the Frame Charge Lever Ass'y (1AMB2700) must be in contact with the pin of the Magnet Lever Ass'y (1AMB2600).
   - Engage the end of the Frame Limiting Lever (1AM32710) with the groove in the Frame Limiting Cam (Upper) (1AM32410).
   - Catch the Frame Release Spring (1AM33100) in the groove. And lock the Spring with the bond (Cemedine 551).
   - When installing a new Aperture Magnet (1AG84600), cut off the two upper terminals of the Aperture Magnet at their root beforehand.

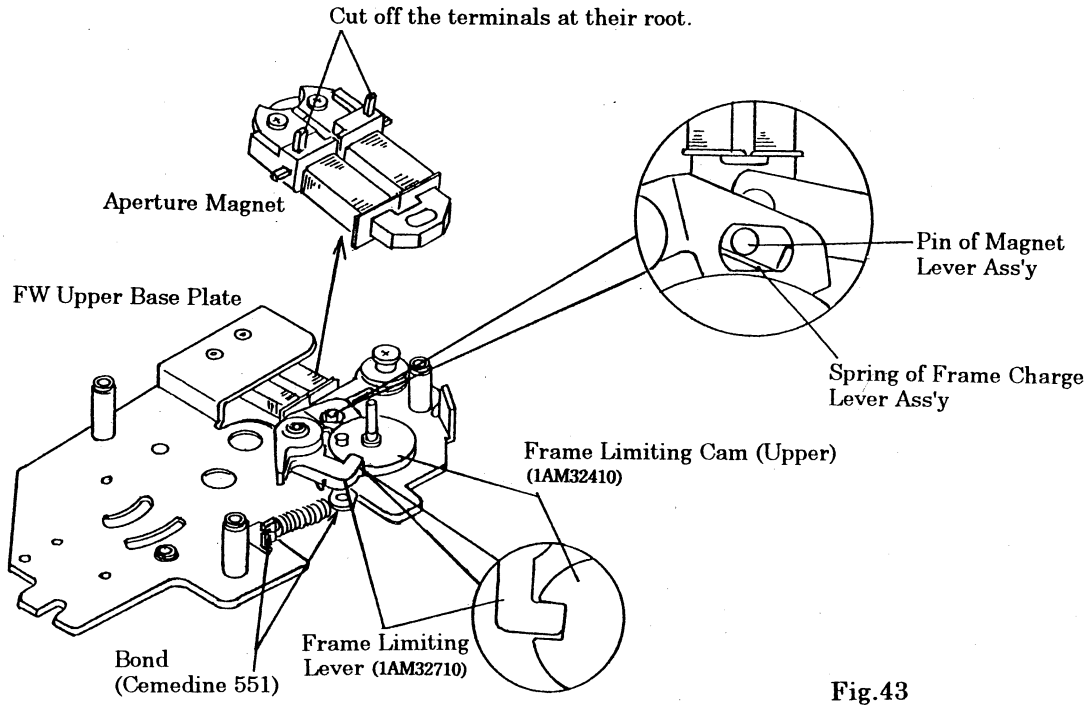


Fig.43

2) As shown in Fig. 42, install the parts on the FW Lower Base Plate.
   Note :
   - Push the MU Switch (1AA57100) in the direction of the arrow shown in Fig. 44 and tighten the MU Switch Setscrew (63912526).

3) Install the FW Upper Base Plate on the FW Lower Base Plate. In doing so, engage the groove in the Frame Limiting Cam (Lower) with the end of the Frame Limiting Lever.
4) Tighten the FW Lower Base Plate Setscrews (66001068) × 3.

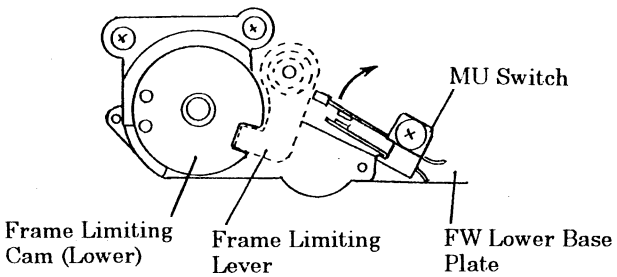


Fig.44

5) Install the Sprocket Gear (Sprocket Gear (A) (17436910) or Sprocket Gear (174370 10) selected for use) and align the mark by felt-tipped marker on the Sprocket Gear with that on the Frame Limiting Gear. (See Fig. 45)
6) Install the Sprocket Gear Holder **(1AM35120)** and tighten the Sprocket Gear Holder Setscrews (61901826)×2.

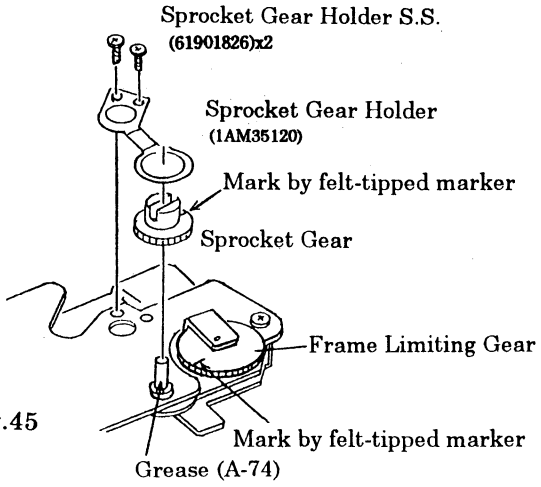


Fig.45

7) Loosen the Aperture Magnet Setscrews (63903526)×2.
Tighten the Aperture Magnet Setscrews while positioning the pin of the Magnet Lever Ass'y at the center of the Armature. Lock the Aperture Magnet Setscrews by applying the bond (Cemedine 551) to their heads. (See Fig. 46)

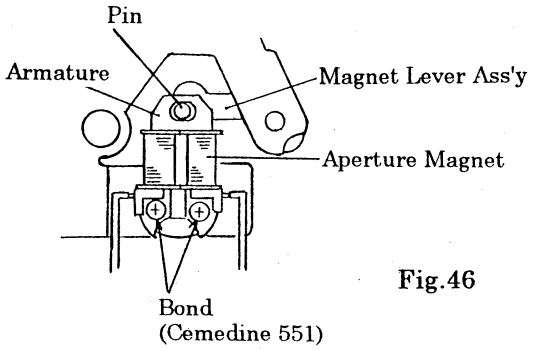


Fig.46

(Greasing Points)

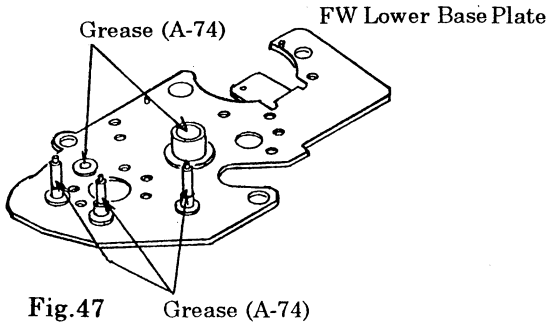


Fig.47

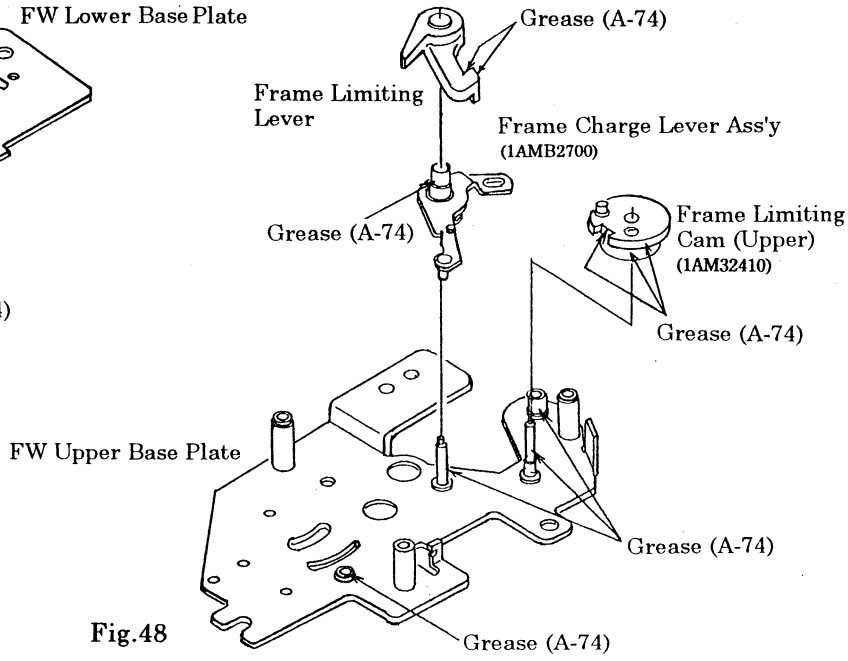


Fig.48

B-8-4. Disassembly of Rewind Base Plate (Upper) Ass'y

1) Remove the RW Upper Base Plate Ass'y Setscrews (66001068) × 3 and take off the RW Upper Base Plate.
2) Disassemble the Ass'y as shown in Fig. 49.

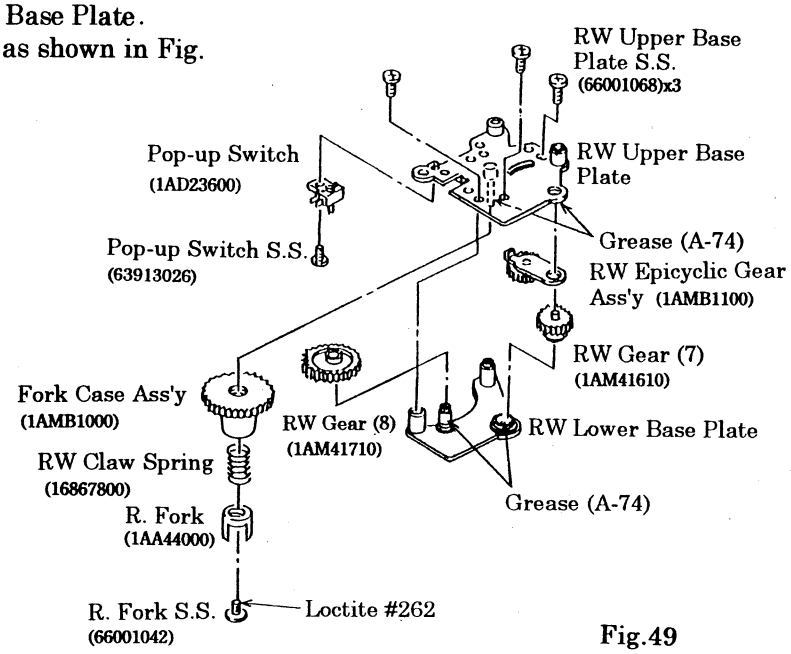


Fig.49

B-8-5. Disassembly of Rewind Base Plate (Lower)

1) Remove the RW Gear Box Plate Setscrews (69113576)×3 and take off the RW Gear Box Plate.
2) Disassemble the Ass'y as shown in Fig. 50.

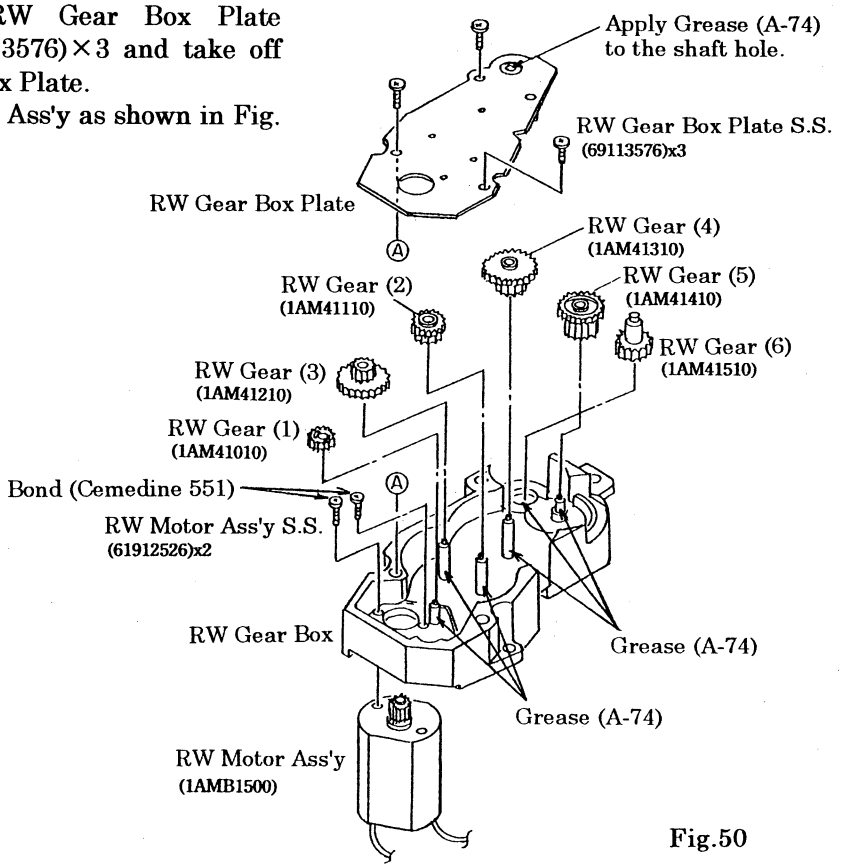


Fig.50

B-9. DISASSEMBLY OF LENS BARREL ASS'Y

B-9-1. Removal of Straight Cylinder Ass'y

(See Fig. 51)

1) Remove the Focusing Band (5BL11500).
2) Remove the Mount Frame Setscrews (61815522) × 4 and take off the Mount Frame (54417800) W/Decorating Ring (54417700) and Focus Adjusting Plates.
3) Remove the Ring Setscrew (61914526) × 4 and take off the Ring (5BL10300).
4) Remove the Lead Wire Retainer Setscrew (61813026) and take off the Lead Wire Retainer (54422500) from the Ring.
5) Remove the Ferrite Core (5BL50300) from the Connector Ass'y (3) and pull the Connector Ass'y (3) off the hole in the Ring.

[Notes on Assembly]

a) Before installing the Focusing Band (5BL1 1500) in the Focusing Cylinder, apply a small amount of Grease (#015) to the internal whole periphery of the Focusing Band to make its installation and removal easy.

b) When installing the Lead Wire Retainer (54422500) on the Ring (5BL10300), extend the Lens Barrel to the maximum extension position and slacken the lead wires of the Connector Ass'y (3). (See Fig. 52)
In addition, make sure that the tube of the Connector Ass'y (3) protrudes from the hole of the Ring by about 5 mm. (See Fig. 53)

c) In reassembly, put back the same Focus Adjusting Plates that have been removed.
When the back focusing of the Lens Barrel Ass'y is not right, make the back focus adjustment by replacing these Focus Adjusting Plates.

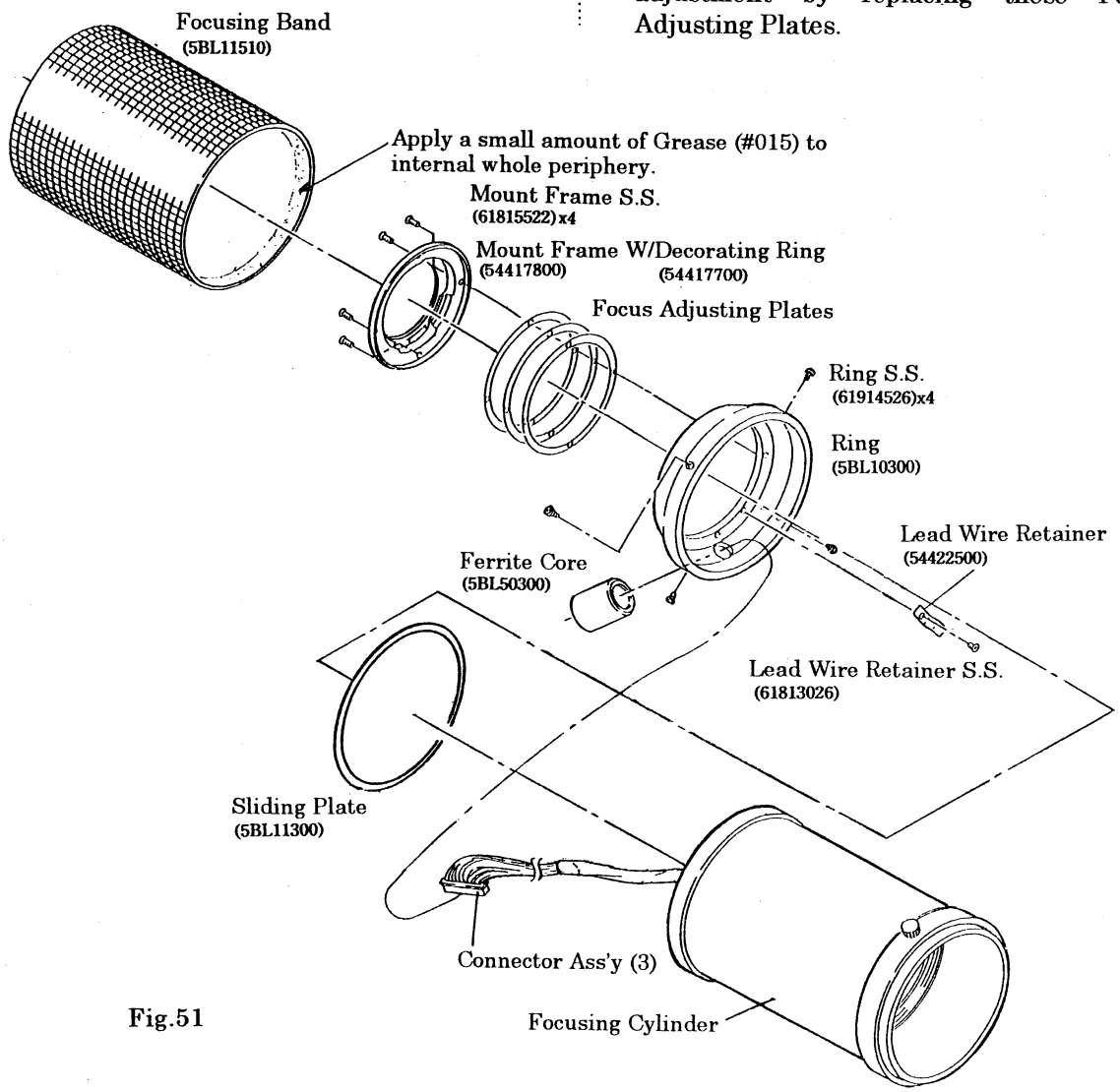


Fig.51

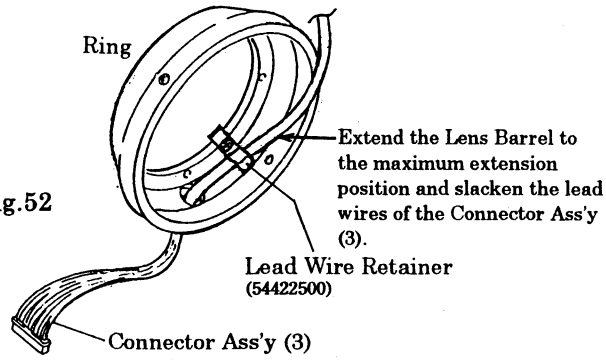


Fig.52

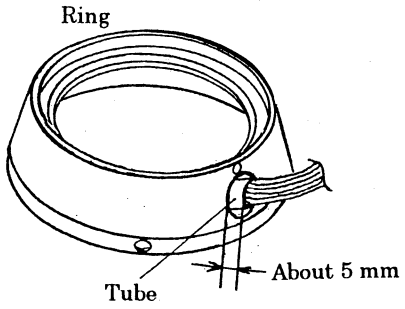


Fig.53

(See Fig. 54)

6) Peel off the Tapes, Focusing Groove Cam Cover (54418600)×2.
7) Remove the Slide Roller Screws (5BL11400)×2 and take off the Slide Roller Screw Collars×2.

Note :

- Select Slide Roller Screw Collars that have the least play in the groove in the Focusing Cylinder.

8) Remove the Focusing Cylinder Ass'y (5BLM1200) and Sliding Plate (5BL11300) from the periphery of the Fixer Cylinder.

[Notes on Assembly]

a) Apply a thin film of Grease (#015) evenly to the two grooves in the Focusing Cylinder Ass'y (5BLM1200).
b) Apply a thin film of Grease (#015) evenly to the internal whole periphery at both of the front end and the tail end of the Focusing Cylinder Ass'y.
c) Be sure to tighten up the Slide Roller Screws (5BL11400)×2.
d) Before attaching the Tapes, Focusing Groove Cam Cover (54418600)×2, wipe the Grease off the cylinder surface around the two grooves of the Focusing Cylinder Ass'y, using lens cleaning paper with ether alcohol.
e) Cut two pieces from the Tape, Focusing Groove Cam Cover and stick them on the Focusing Cylinder Ass'y so as to cover the two holes — one at the front end and the other at the tail end.

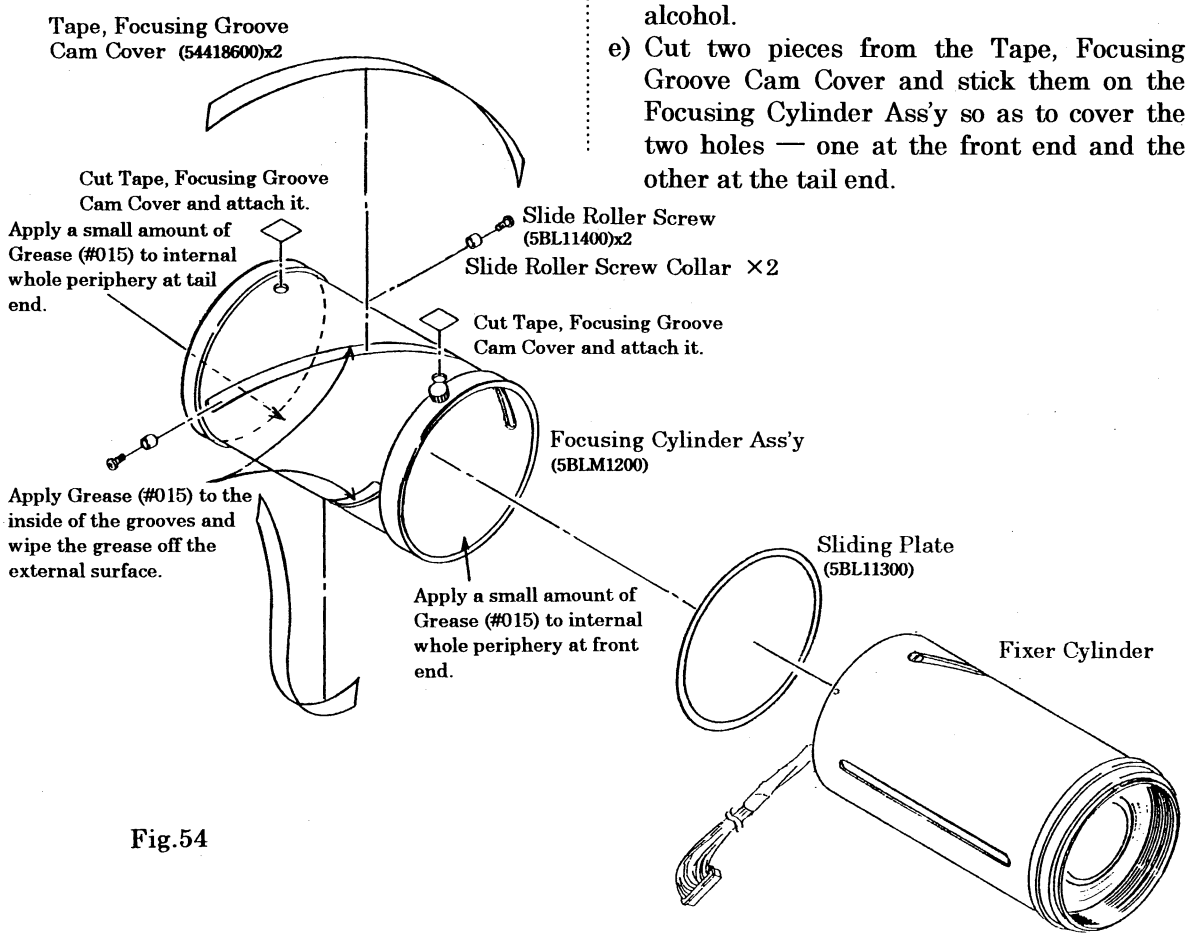


Fig.54

9) Remove the Cam Plate Arm Shaft (5BD16700) and Roller, Cam Plate Arm Shaft (5BD16800) and take off the Fixer Cylinder (5BL10100) from the Straight Cylinder Ass'y.

[Notes on Assembly]

a) Apply a thin film of Grease (#015) evenly to the three grooves in the Fixer Cylinder (5BL10100).
b) Apply a thin film of Grease (#015) evenly to the internal lower part of the Fixer Cylinder along the cylinder axis.
c) If the Focusing Cylinder rotates too lightly, apply a thin film of Grease (#015) to the front end and tail end of the Fixer Cylinder.
d) When installing the Fixer Cylinder, align the cam groove in the Fixer Cylinder with the screw hole in the Aperture Lever of the Lens Ass'y and tighten the Cam Plate Arm Shaft.
e) Do not use excessive force to tighten the Cam Plate Arm Shaft. Apply the bond (Cemedine 551) to the head of the Cam Plate Arm Shaft.

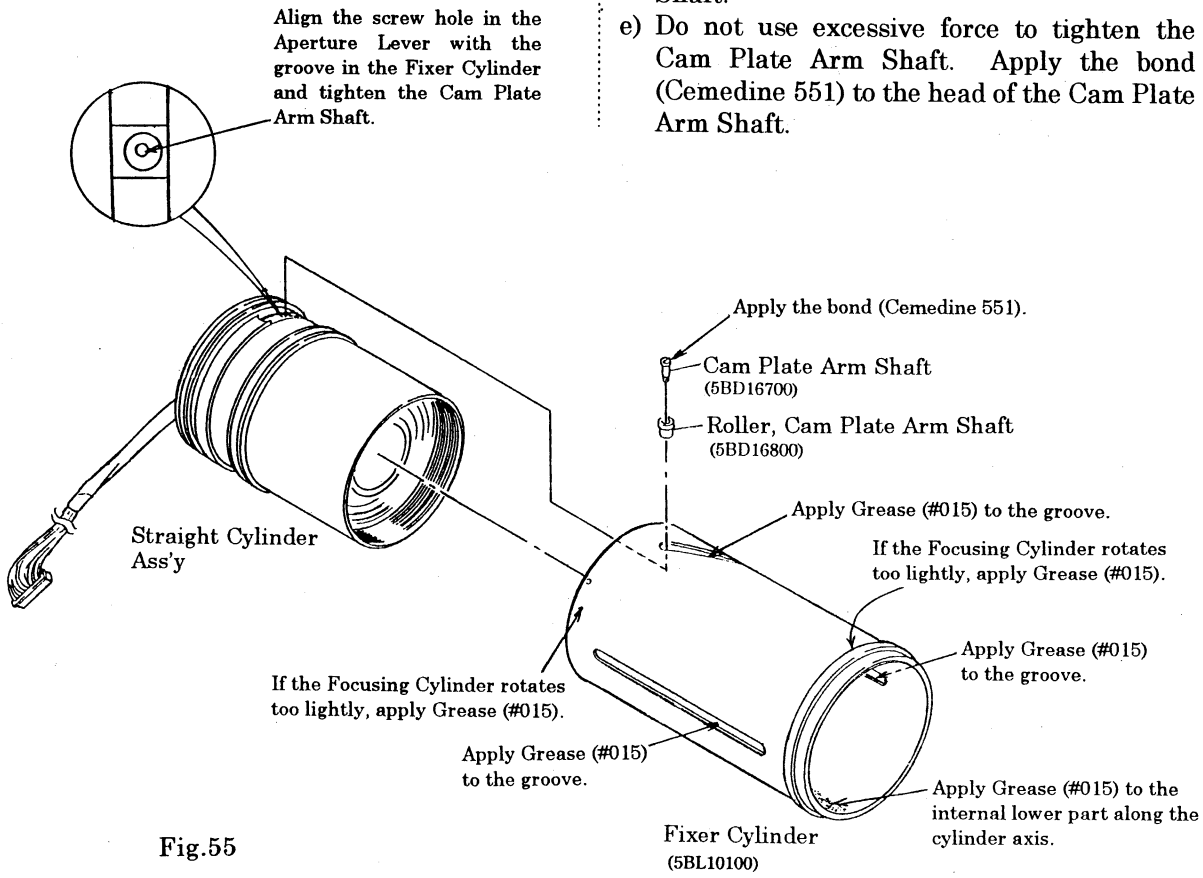


Fig.55

B-9-2. Removal of Flash Unit Ass'y

(See Fig. 55)

1) Remove the S. Retaining Nut (5BD18000) by turning it with tweezers or dividers and take off the Mask (5BD21200) and Mask Cover (5BD21400).

Note :

- The Mask Cover is fixed to the Flash P.C. Board with double-stick tape.

[Notes on Assembly]

a) Attach the Mask Cover (5BL21400) with the lusterless surface up so that the Reflector Frame of the Flash Unit is not seen.
Wipe the surface of the Mask Cover with lens cleaning paper with alcohol or the like and stick it so that no creases are left.
b) Install the Mask (5BD21200) with the glossy surface up and the rough surface down.

2) Pull the Flash Unit Ass'y (5BLM0900) out of the Straight Cylinder.
3) Unsolder the Orange, Green, Yellow and Black lead wires (from Capacitor P.C. Board) on the back of the Flash Unit Ass'y.
4) Unsolder the two shielded wires on the back of the Flash Unit Ass'y.

Note :

- Do not unsolder any of the Jumper shielded wires.

5) Remove the Insulation Cover (5BL10500).

c) When soldering the core wires and shields of the two shielded wires, take care that none of them are in contact with any surrounding soldered joints.
d) Install the Insulation Cover (5BL10500) by fitting the two guide pins on the back of the Insulation Cover into the holes inside the Straight Cylinder.
e) Install the Flash Unit Ass'y (5BLM0900) by fitting the two guide pins on the base into the notches of the Insulation Cover. At installation, take care not to catch any lead wires.

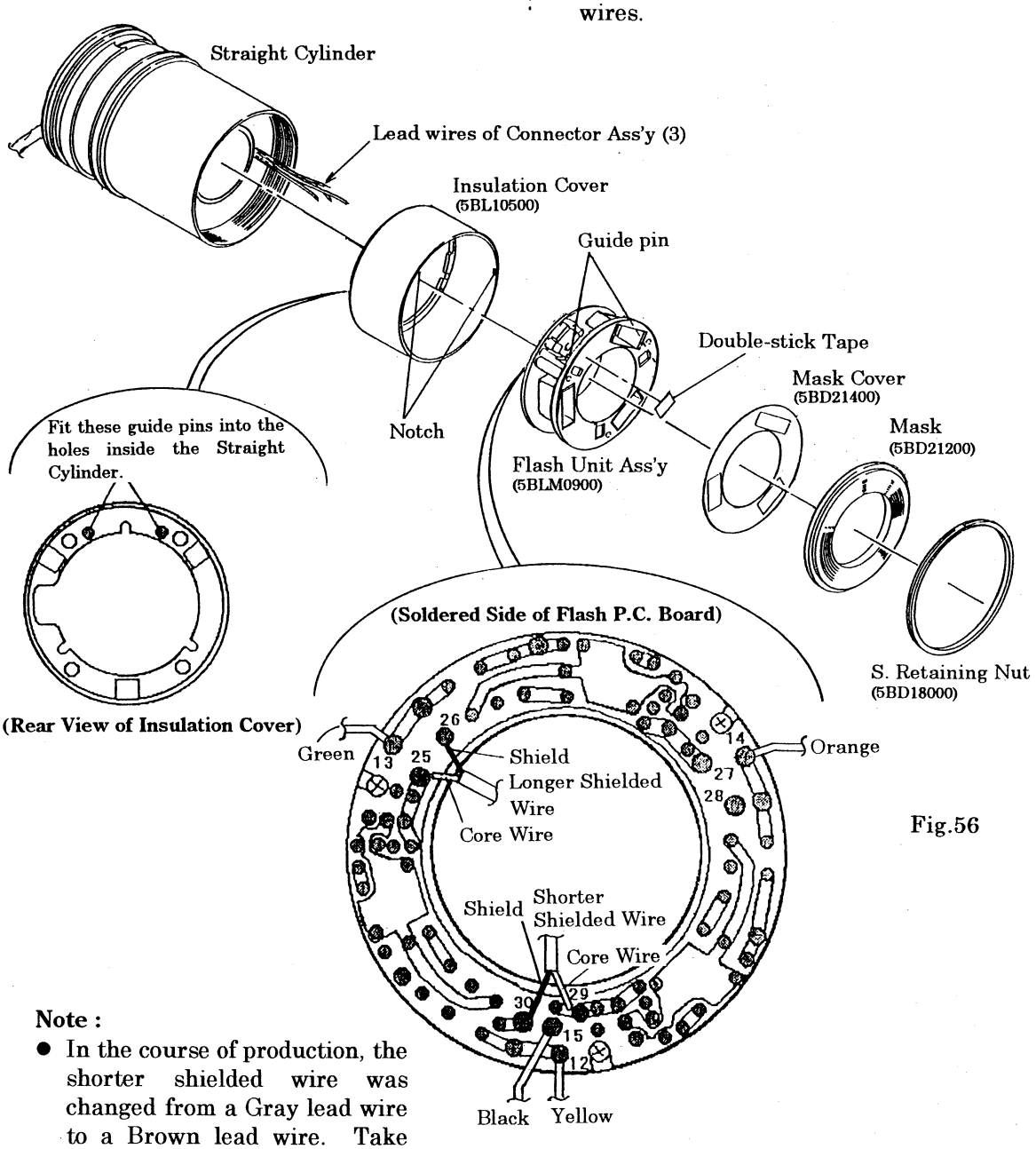


Fig.56

Note :

- In the course of production, the shorter shielded wire was changed from a Gray lead wire to a Brown lead wire. Take due care.

B-9-3. Removal of Lens Ass'y

(See Fig. 57)

1) Remove the Sliding Pins (5BD16500)×6 and Washers ×6.

Notes :

- In usual repair, there is no need of this disassembly.
- At the completion of the assembly of Lens Barrel Ass'y, extend it to the position for the magnification of 1/2 and check the play between the Straight Cylinder and the Fixer Cylinder. If the play is found 0.5 mm or more, make an adjustment by inserting the Washer (12 866600)(t: 0.05) or (12866700)(t: 0.02).

2) Remove the Light-Shield Frame Ass'y Setscrews (63914026)×4 and take off the Light-Shield Frame Ass'y (5BLM0500) from the Straight Cylinder.

3) Remove the Lens Ass'y Setscrews (619128 26)×3 and take off the Lens Ass'y (5BLM 0200) from the Straight Cylinder.

[Notes on Assembly]

(See Fig. 58)

a) Apply Grease (#015) to the ends of the six Sliding Pins (5BD16500) and install them into the Straight Cylinder.

b) Install the Lens Ass'y so that the cut portion inside the Straight Cylinder is aligned with the oval hole in the Aperture Barrel Mounting Plate of the Lens Ass'y (5BLM 0200).

c) When installing the Light-Shield Frame Ass'y (5BLM0500), pass the lead wires of the Light-Shield Frame Ass'y through the oval hole inside the Straight Cylinder. Then move the Aperture Release Lever in the direction of the arrow Ⓐ.

Make certain that the Aperture Release Lever Pin is positioned at the Diaphragm Operation Plate Ⓑ.

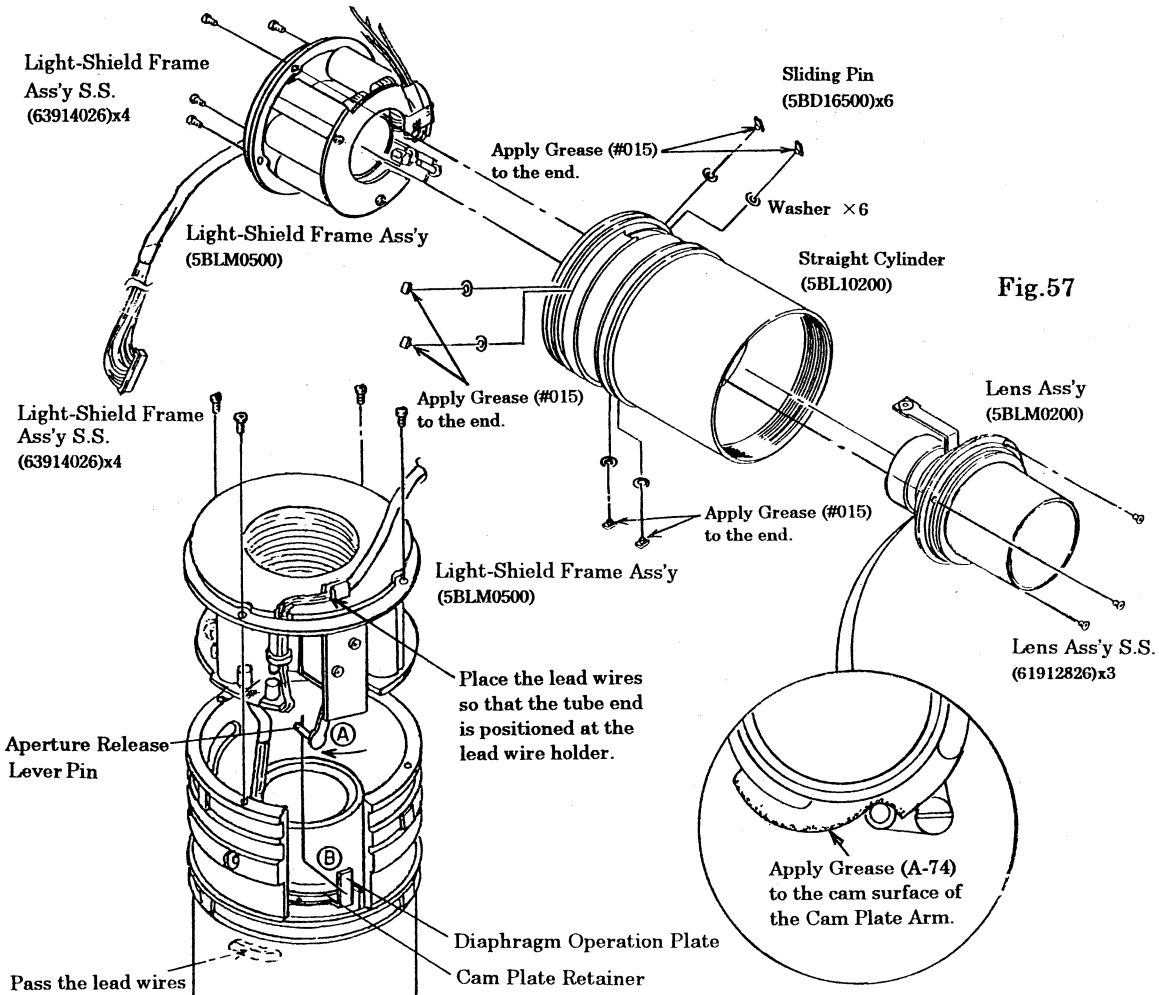


Fig.57

Fig.58

[Checks after Installation of Lens Ass'y and Light-Shield Frame Ass'y]

* After installing the Lens Ass'y and the Light-Shield Frame Ass'y, check the operation of the Aperture Blades (for caught or obstructed Aperture Blades). If the Aperture Blades do not operate properly, perform checks and make adjustments as follows :

1) Remove the Lens Ass'y and the Light-Shield Frame Ass'y from the Straight Cylinder.
2) Put the Light-Shield Frame Ass'y on the Lens Ass'y.
3) Adjust the positional relationship between the Lens Ass'y and the Light-Shield Frame Ass'y so that the screw hole Ⓐ in the Light-Shield Frame Ass'y is in alignment with the Aperture Barrel Mounting Plate Setscrew (61514026) Ⓑ of the Lens Ass'y. (See Fig. 59)
4) Turn the Cam Plate Arm of the Lens Ass'y in the direction of the arrow Ⓒ until it comes in contact with the Flash P.C. Board of the Light-Shield Frame Ass'y (minimum aperture position).

   Note :
   - Make sure that the hole Ⓐ and the Setscrew Ⓑ are in alignment with each other.
5) In the minimum aperture position, make certain that there is a clearance of 0.5 mm or more between the Aperture Release Lever Pin and the Cam Plate Retainer. (See Fig. 61)

* At the closest position including the effect of the play of the Aperture Release Lever.

6) Turn the Cam Plate Arm of the Lens Ass'y in the direction of the arrow Ⓓ until it comes in contact with the Flash P.C. Board of the Light-Shield Frame Ass'y (maximum aperture position).

   Note :
   - Make sure that the hole Ⓐ and the Setscrew Ⓑ are in alignment with each other.
7) In the fully open aperture position, make certain that the Aperture Release Lever Pin is engaged with the Diaphragm Operation Plate by more than 0.5 to 1.0 mm. (See Fig. 62)

* At the most separate position including the effect of the play of the Aperture Release Lever.

Adjustment Method

* The adjustment method is limited to the change in shape of the Light-Shield Frame and the Cam Plate Retainer. Perform checks to ensure that the corrected conditions will be kept permanently.

① If the engagement of the Aperture Release Lever Pin with the Diaphragm Operation Plate at the fully open aperture position is insufficient
   → Check to see if the Aperture Release Ass'y is not installed upright on the Light-Shield Frame.
   If the engagement is insufficient even after reinstallation, bend the Diaphragm Operation Plate by about 10 degrees. (See Fig. 63)

② If the clearance between the Aperture Release Lever Pin and the Cam Plate Retainer at the minimum aperture position is so small that the two parts are nearly or actually in contact.
   → Stick the Spacer (double-stick tape) on the Solenoid and Light-Shield Frame. (See Fig. 64)

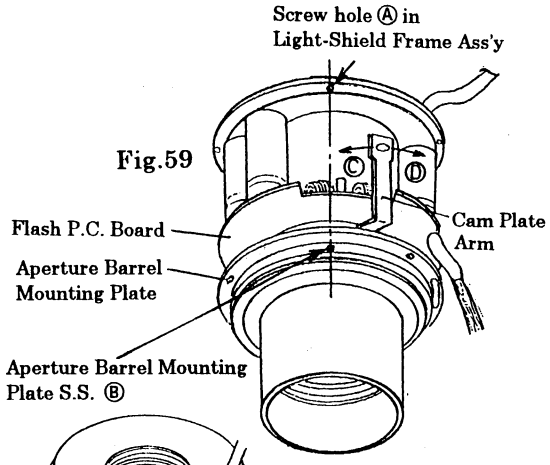


Fig.59

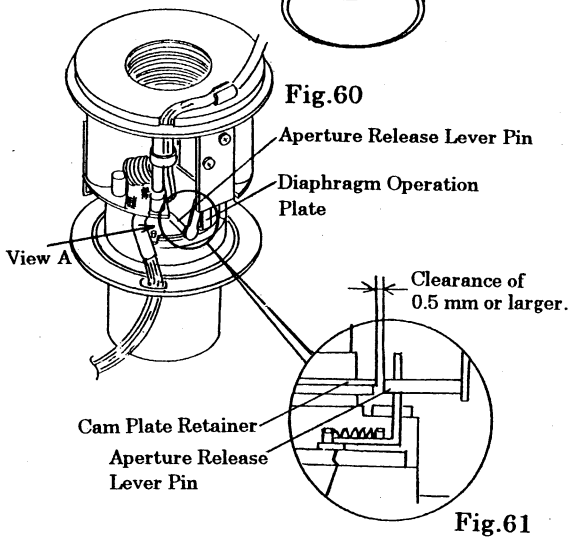


Fig.60

Fig.61

(Expanded View A of Fig. 60)

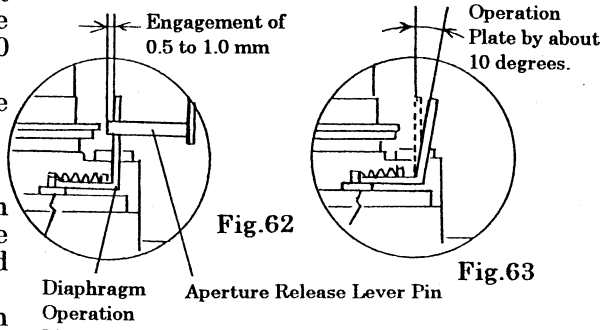


Fig.62

Fig.63

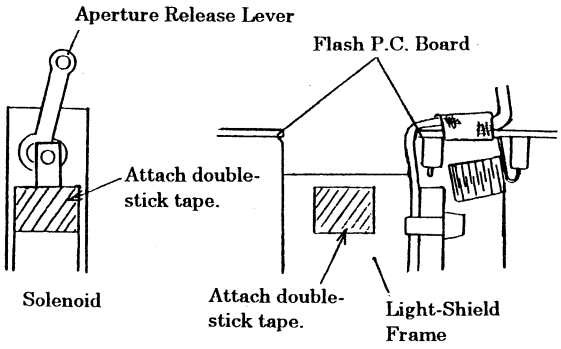


Fig.64

B-10. DISASSEMBLY OF BACK COVER ASS'Y

B-10-1. Disassembly of Back Cover Ass'y

1) Disassemble the Back Cover Ass'y as shown below.

Notes :

- The Auto Date Module is fixed to the DM Holder with super glue. Once the Auto Date Module is removed, adjust its position.
- The D. Battery Contact (–) (38415930) and the D. Battery Contact (+) (38415840) are fixed to the DM Holder with the bond (Cemedine 551).
- Once the Back Cover Rubber (S) (5BL21200) and the Back Cover Rubber (L) (5BL21100) are removed, the adhesive force of the double-stick tape weakens. Therefore, replace the Back Cover Tape (S) (1AM15400), Back Cover Tape (L1) (1AM15210) and the Back Cover Tape (L2) (1AM15300) with new ones.

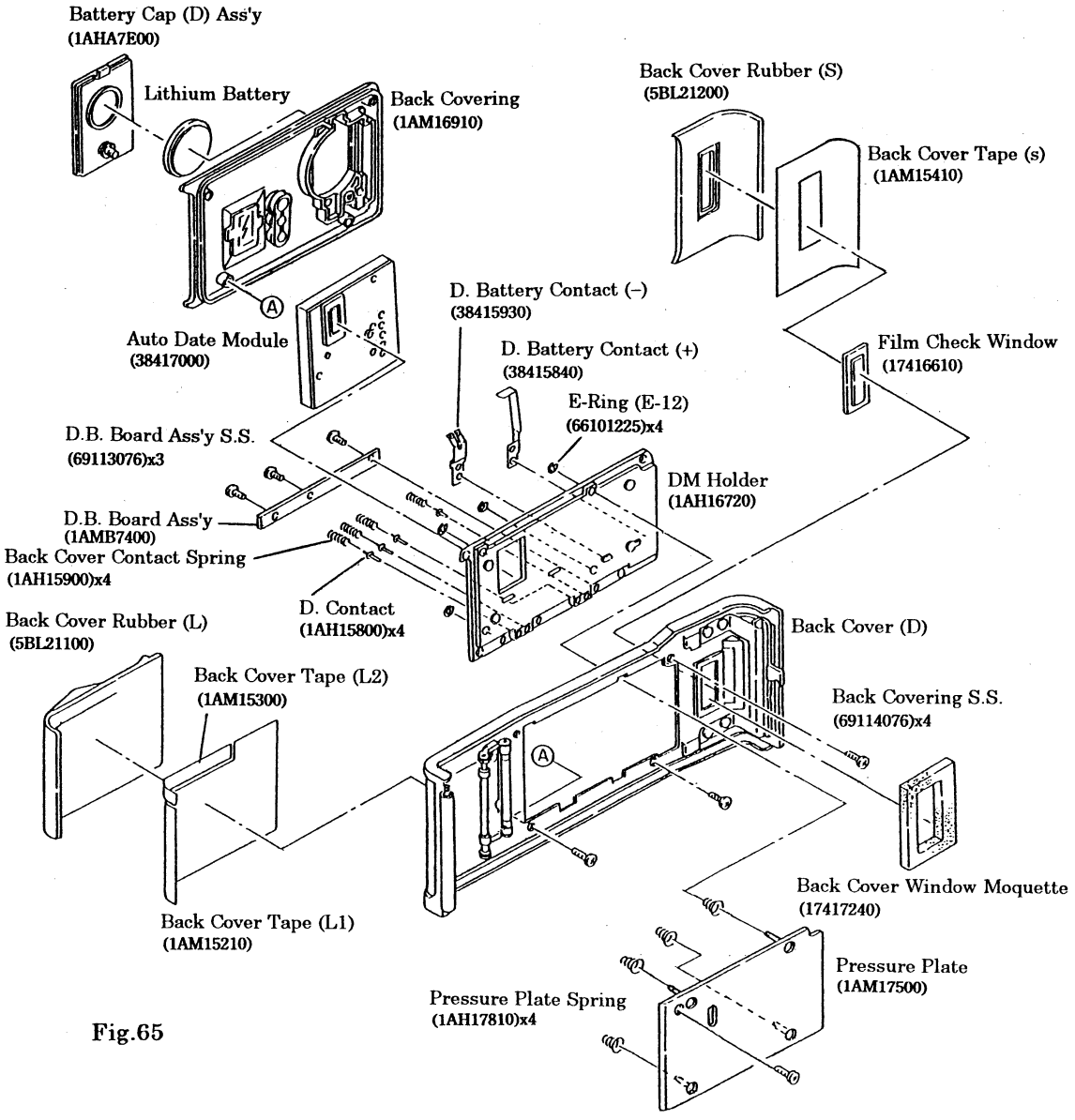


Fig.65

[Wiring of Auto Date Module and D.B. Board]

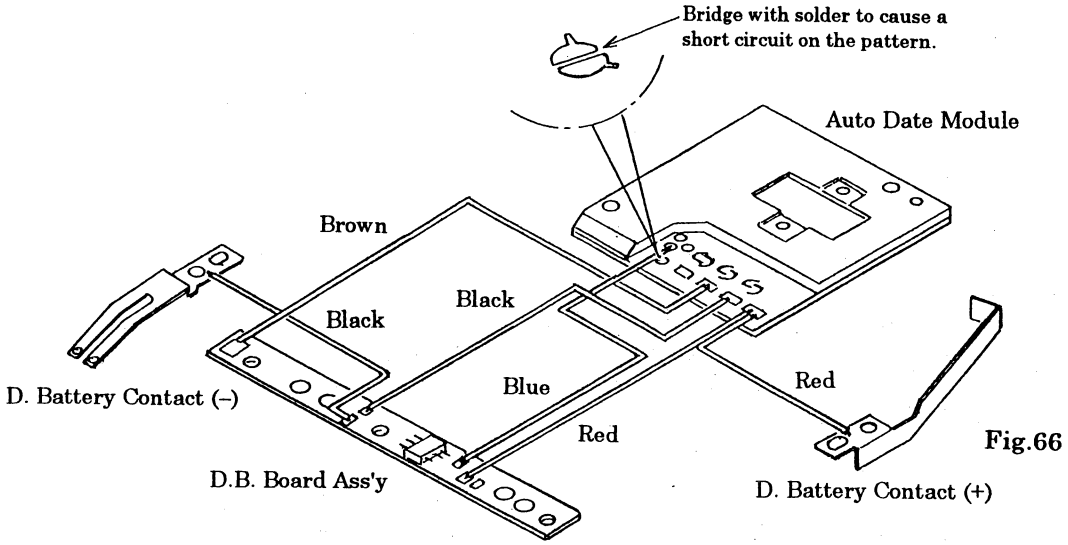


Fig.66

[Installation of Parts on Back Covering]

1) Install the Date Window (1AH19400), Mode Button (38515410) and Battery Cap Screw Socket (1AH16800) on the Back Covering (1AH16910).
2) Lock the Date Window, Mode Button and Battery Cap Screw Socket by applying the bond (Cemedine 551) to their whole peripheries.

Note :

- The Back Covering, Date Window and Mode Button, which are exterior parts, must be free from flaws, stains, spilling bond, etc.

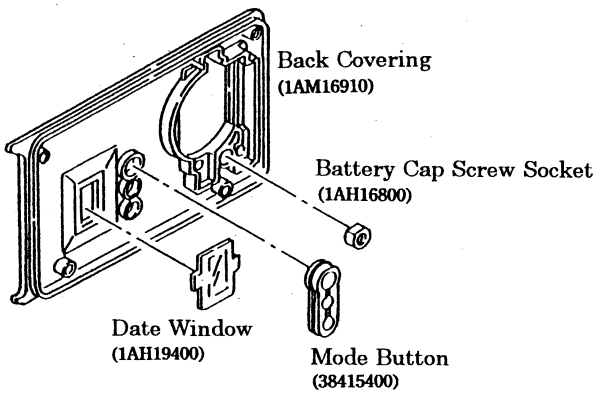


Fig.67

B-11. DRESSING OF LEAD WIRES

B-11-1. Dressing of Lead Wires

* Dress the lead wires as shown in Fig. 68.

(Top left of Main FPC after removing the Release Base Plate Ass'y)

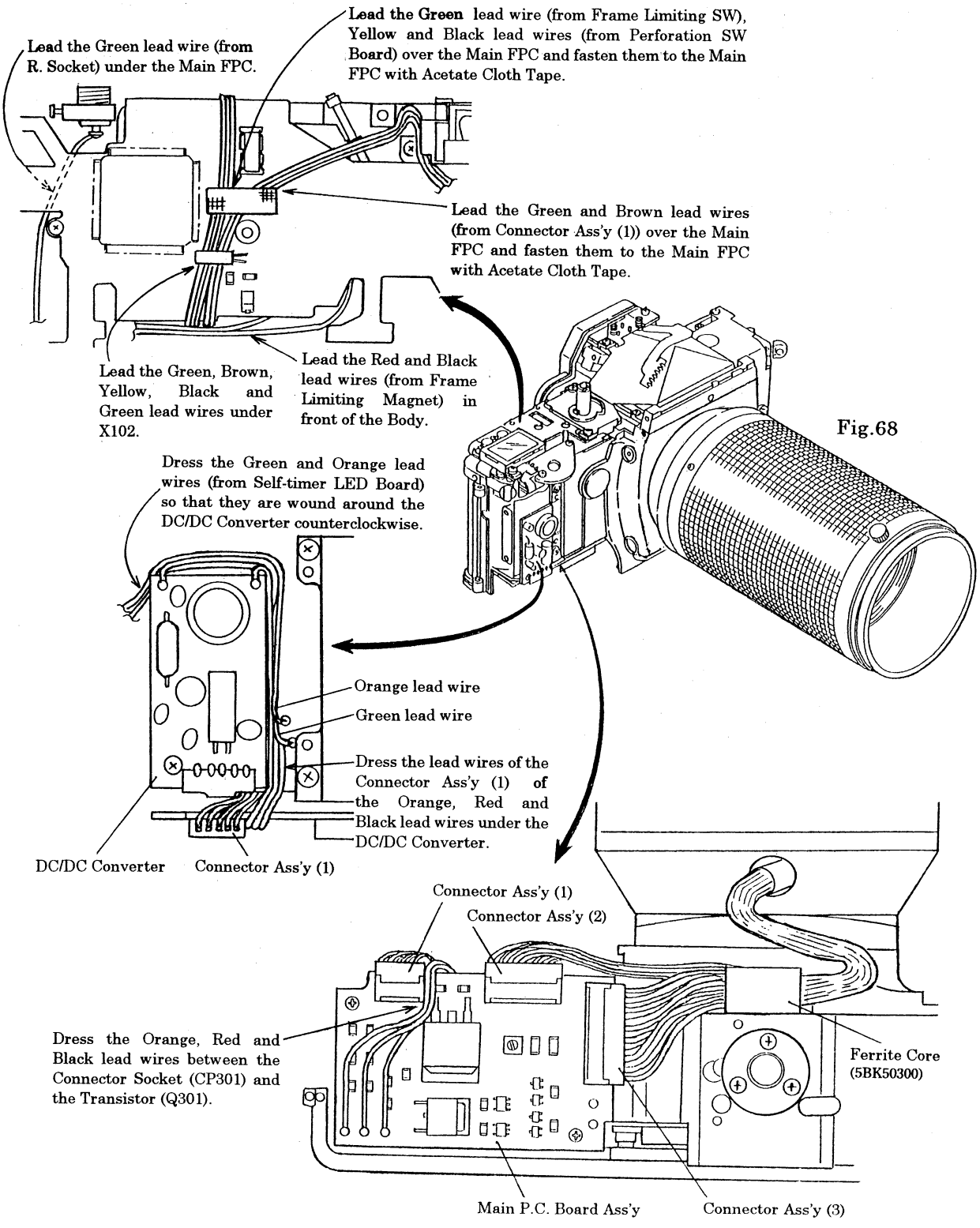


Fig.68

No.	419-01-50-RA5BL01

■ PARTS MODIFICATION LIST

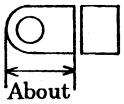
[1] Addition of Shoe Lug Plate

1. Explanation

As a temporary measure to improve the reliability of the electric circuit, the Shoe Lug Plate (14716300) has been added at the Release Base Plate Ass'y Setscrew.
In the camera improved by this measure, the Release Base Plate Ass'y Setscrew (61913022) (White screw) is used.
As the permanent measure, the pattern on the Main FPC will be changed so that the Shoe Lug Plate will be disused.
Simultaneously with the disuse of the Shoe Lug Plate, the Release Base Plate Ass'y Setscrew (61913022) (White screw) will be replaced by the Release Base Plate Ass'y Setscrew (63912526) (Black screw).

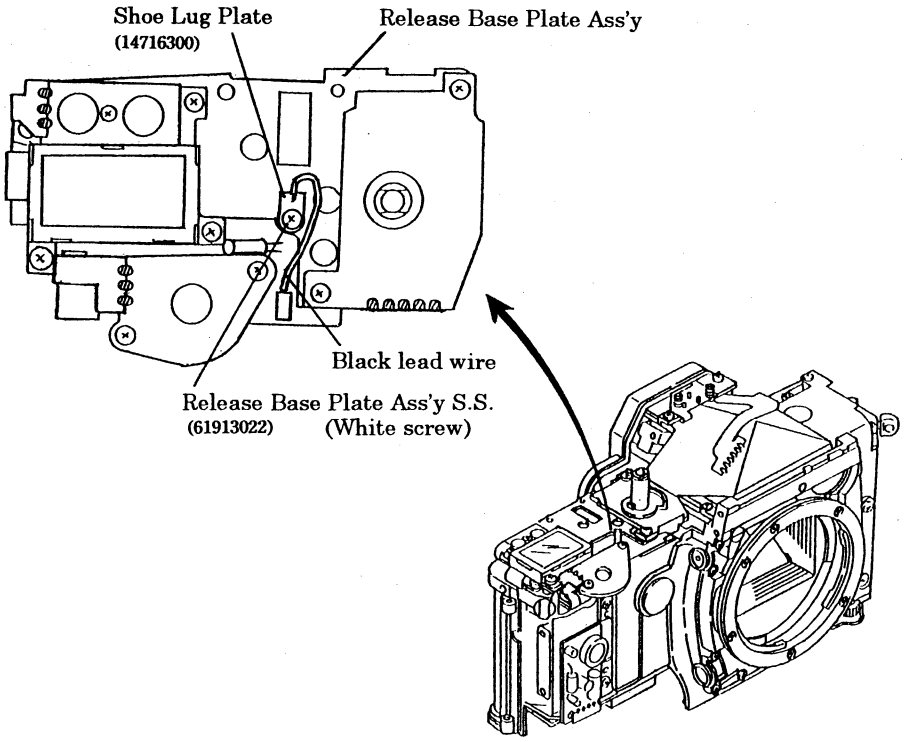
2. Cutting of Shoe Lug Plate

Use the Shoe Lug Plate by cutting it as shown below :



3. Location and Orientation of Shoe Lug Plate

Install the Shoe Lug Plate as shown below :



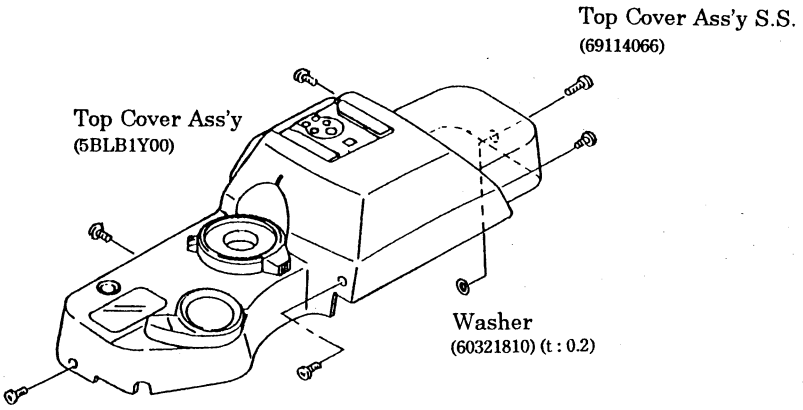
[2] Addition of Washer at Top Cover Ass'y Setscrew

1. Explanation

As a temporary measure to prevent the cracking of the Top Cover that could be caused by excessive tightening of the Top Cover Ass'y Setscrew (69114066), a Washer (60321810) (t: 0.2) has been added between the Top Cover Ass'y **(5BLB1Y00)** and the Body.
As the permanent measure, the wall of the Top Cover Ass'y around the Setscrew will be thickened toward the inside so that the Washer will be disused.

2. Notes on Repair

a) Take care not to lose the Washer during your repair work.
b) Do not tighten the Top Cover Ass'y Setscrew excessively.



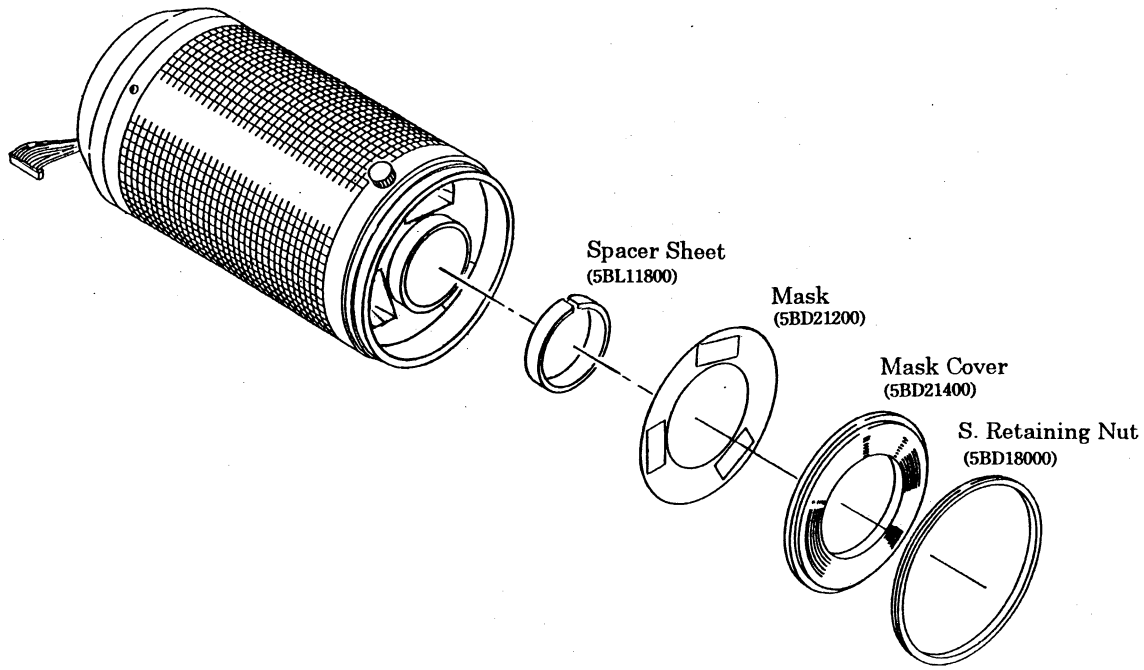
[3] Addition of Spacer Sheet

1. Explanation

As a temporary measure to fill up the gap between the Lens Front Frame and the Mask, the Spacer Sheet (5BL11800) has been added.
As the permanent measure, the shape of the Mask (5BD21200) will be changed so that the Spacer Sheet will be disused.

2. Notes on Repair

a) Do not use the Spacer Sheet that has been peeled off once.
b) Attach the Spacer Sheet along the front end of the Lens Front Frame so that it does not protrude from the Lens Front Frame.



C. ADJUSTMENT PROCEDURES, ETC.

C-1. ADJUSTMENT OF PERFORATION POSITION

*** Once the Winding Unit Ass'y is disassembled, adjust the position of perforations.**

1) Turn the Frame Limiting Gear in the direction of the arrow to eliminate the play of the gear.
2) Install the Sprocket Gear (A) (1743 6910) so that the end of the groove is positioned at the center of the screw hole in the FW Upper Base Plate.
3) When the Sprocket Gear (A) can not be installed in the position as shown in Fig. 69, install it in the 180-degree turned position.
   If the Sprocket Gear (A) can not be installed properly even in the 180-degree turned position, replace it with the Sprocket Gear (17437010).
   If even the Sprocket Gear can not be installed in the position as shown in Fig. 69, install it in the 180-degree turned position.

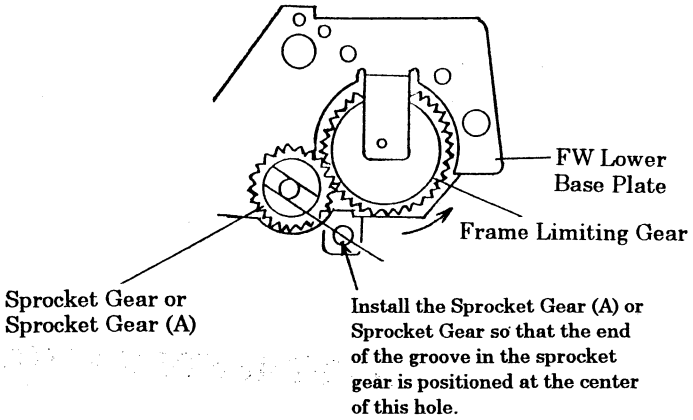


Fig.69

4) After installing the Sprocket Gear (A) or Sprocket Gear in the correct position, install the Sprocket Gear Holder (1AM35120) and tighten the Sprocket Gear Holder Setscrews (61901826) ×2.
5) Install the Winding Unit Ass'y (1AMB1700) in the Body and tighten the Winding Unit Ass'y Setscrews (61813026)×2, (61913522). (See Fig. 19)
6) Perform the checking of perforation position.

* Make the adjustment of perforation position by selecting one of the four ways, using the two sprocket gears, namely, the Sprocket Gear and the Sprocket Gear (A).
* Do not install the Winding Unit Ass'y in the Body with the Sprocket Gear or Sprocket Gear (A) dislocated; otherwise, the perforations will not be positioned properly.

(Distinction between Sprocket Gear and Sprocket Gear (A))

Sprocket Gear
(17437010)

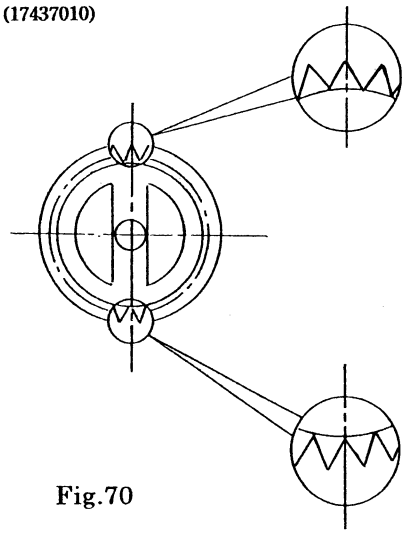


Fig.70

Sprocket Gear (A)
(1743910)

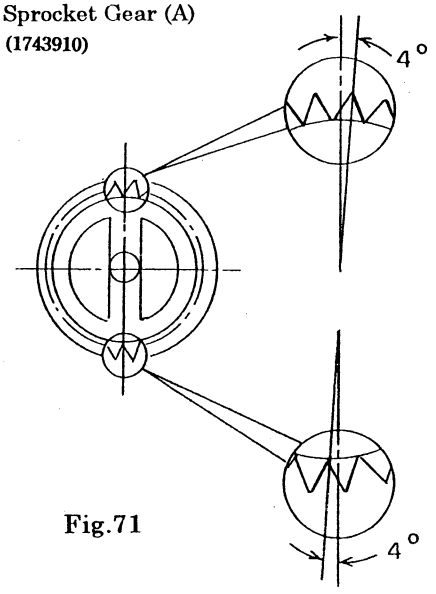


Fig.71

[Checking of Perforation Position]

* Put a film (non-exposed and developed Black & White film) on the Sprocket and check the position of a perforation relative to the image plane frame (aperture for film).
* Make certain that the edge of the aperture for film is positioned 0.2~**0.9mm** away to the right from a perforation in the film.

< Checking Procedure >

① Engage film perforations with Sprocket teeth.
② Press the right side of the film gently with your fingers and pull the film gently to the right (in the direction of the arrow).
③ Make certain that the edge of the aperture for film is positioned 0.2~**0.9mm** away to the right from a perforation in the film.
④ If the perforation position is not proper, make the adjustment of C-1 again.

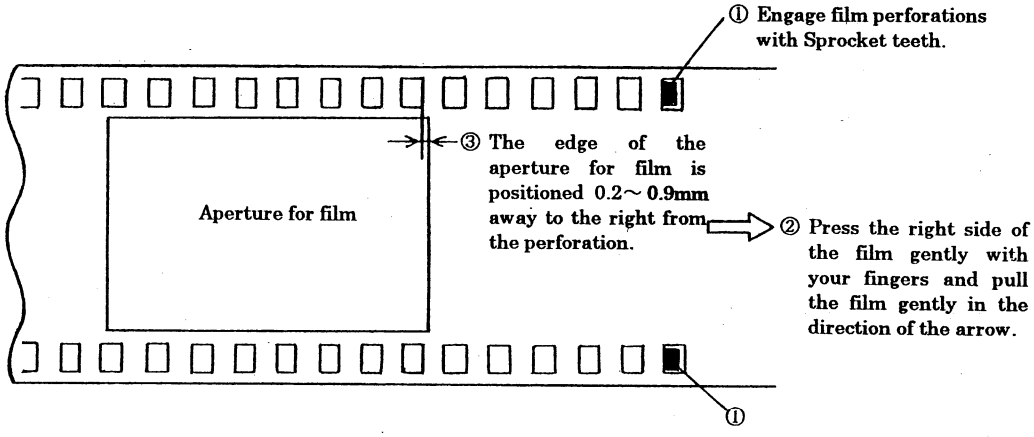


Fig.72

C-2. ADJUSTMENT OF VIEWFINDER LED DISPLAY POSITION

* Place your eye at the center of the eyepiece lens and make adjustment so that the LED in the viewfinder can be seen round without vignetting.

< Tool for Adjustment >

- Regulated DC power supply

< Adjustment Procedure >

1) Loosen the Finder LED Ass'y Setscrews (63902226) × 2.
2) Set the voltage of the regulated DC power supply to about 5.1 V.
3) Connect the (+) terminal of the regulated DC power supply to the Orange lead wire of the Finder LED Ass'y (5BLE1200) and the (–) terminal to the Green lead wire.
4) Turn ON the switch of the regulated DC power supply.
5) Look in the viewfinder through the eyepiece lens and make adjustment by moving the Finder LED Ass'y so that the Green LED is seen without vignetting.
6) Tighten the Finder LED Ass'y Setscrews.
   Apply the bond (Cemedine 551) to the heads of the Finder LED Ass'y Setscrews.

(Viewfinder Display)

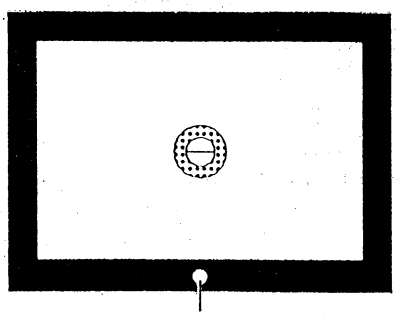


Fig.73

(Rear View of Body)

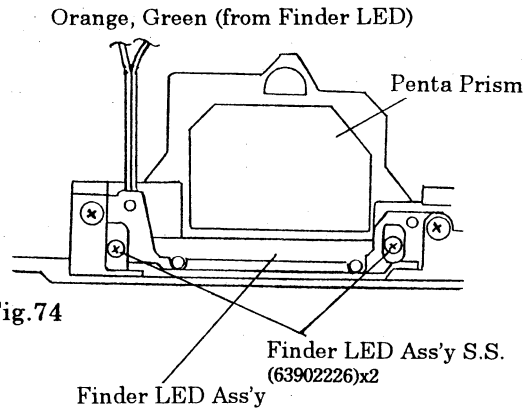


Fig.74

C-3. ADJUSTMENT OF LIGHT METERING IC POSITION

* When the Dioptric Adjuster Ass'y has been replaced, make the adjustment of Light Metering IC position. On the service side, however, the precise adjustment method is not available. Therefore, make a simple adjustment by the procedure described below.
* When replacing the AE FPC Ass'y, do not turn the Light Metering Eccentric Pin. Install the new AE FPC Ass'y without changing any conditions.

< Adjustment Procedure >

1) Using the AE Camera Tester, measure the quantity of light on the film plane.
2) Make adjustment by turning the Light Metering Eccentric Pins so that the measured value on the film plane becomes the central value.
3) After adjustment, apply the bond (Cemedine 551) to the Light Metering Eccentric Pins.

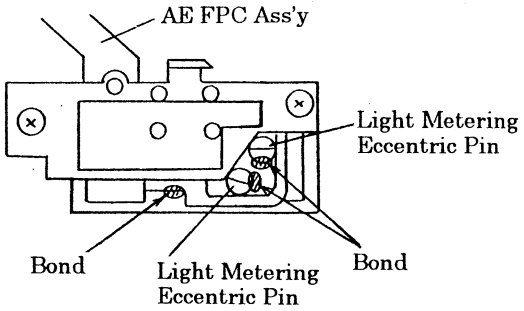


Fig.75

C-4. ADJUSTMENT OF LENS BARREL ASS'Y BACK FOCUSING

* Once the Lens Barrel Ass'y is disassembled, make the back focus adjustment of the Lens Barrel Ass'y.

< Tools for Adjustment >

- Lens tester F = 300 mm (32LT-2DS Lens Tester)
- Lens micrometer (Focusing Mirror Tool)
- Block gauge for lens back focusing (38.87 mm)

< Adjustment Procedure >

1) Set the lens micrometer on the round stage of the lens tester.
2) Adjust the diopter of the lens tester by turning its eyepiece ring.
3) Set the block gauge on the lens micrometer and set the scale of the lens micrometer to "0.0".
4) Adjust the Focus Ring of the Lens Barrel Ass'y to "1/15" and lock the Focus Ring with the Lock Screw. Then set the Lens Barrel Ass'y on the block gauge.
5) Find the best focus position of the lens tester by turning its helicoid and read the helicoid position (D mm).
6) By replacing the Focus Adjusting Plates in the Lens Barrel Ass'y with the appropriate ones, make adjustment so that the reading of the helicoid position (D mm) is within the limits specified at "Standard" below when the lens tester is in the best focus position. (See Fig. 51)

- Focus Adjusting Plates: **(54418200) (t: 0.1), (54418300) (t: 0.05), (54418400) (t: 0.2), (54418500)** (t: 0.5)

< Standard >

- Reading of helicoid : ± 5 (D = 0 ± 0.05 mm)

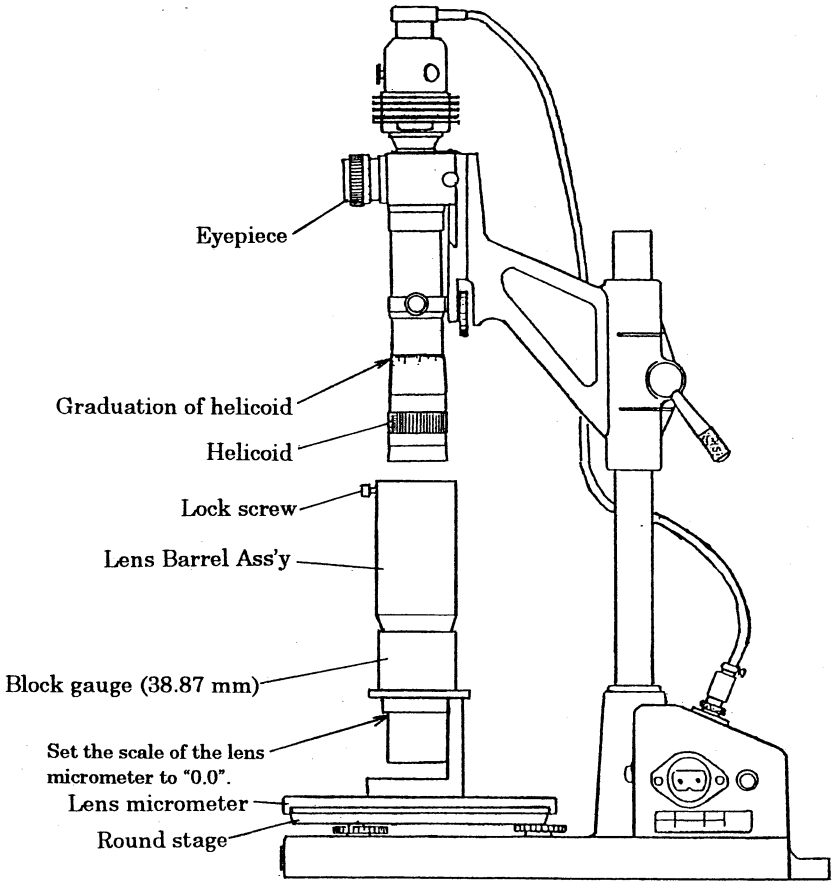


Fig.76

Lens Tester F=300

C-5. ADJUSTMENT OF FLANGE BACK DISTANCE

* For the adjustment of flange back distance, make measurements and adjustments with the Lens Barrel Ass'y removed.

1) Distance from the Body Mount surface to the film rail surface:

   45.43 ±0.02 mm

- For the adjustment, insert appropriate washers between the Body Mount and the Mirror Box.
- Adjusting washers: 0.05 mm (12866600), 0.02 mm (12866700)

2) Level difference between the film rail surface and the pressure plate rail surface:

   0.20 ±0.02 mm

C-6. ADJUSTMENT OF VIEWFINDER FOCUSING

* For the adjustment of viewfinder focusing, make measurements and adjustments with the Lens Barrel Ass'y removed.

< Tools for Adjustment >

- Planar F1.4/50 Lens
- Collimator

< Adjustment Procedure >

[Adjustment of Viewfinder Rough Focusing]

* For adjustment, replace the washers under the Penta Prism Holder. (See Fig. 26)

1) Set the Planar F1.4/50 Lens on the Body Mount.
2) Turn the Focus Ring of the Lens and check to see if focusing is achieved at the infinity position.
   ① If focusing is not achieved even when the focus ring is turned to the infinity position
   The finder back distance is too long, so shorten (lower) the position of the focusing plate.
   ② If focusing occurs before the focus ring is turned to the infinity position
   The finder back distance is too short, so lengthen (raise) the position of the focusing plate.

[Fine Adjustment of Viewfinder Focusing]

* With the Focus Ring of the Planar F 1.4/50 Lens turned to the infinity position, adjust the viewfinder focus by bending the Focus Adjusting Lever in the Mirror Box only when the adjustment is achieved within the Lens travel of 0.1 mm (±1/4 of the "∞" mark)

1) Release the shutter five or more times, turn the Focus Ring of the Lens to the infinity position and check to see if focusing is achieved.
   ① If focusing is not achieved even when the focus ring is turned to the infinity position
   Bend the Adjusting Lever in the direction of Ⓑ.
   ② If focusing occurs before the focus ring is turned to the infinity position
   Bend the Adjusting Lever in the direction of Ⓐ.
2) After adjustment, release the shutter five or more times, turn the Focus Ring of the Lens to the infinity position and make certain that focusing is achieved.

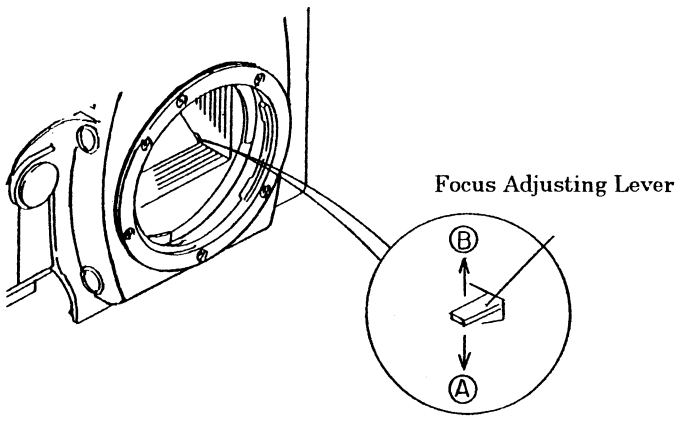


Fig.77

C-7. ADJUSTMENT OF CHARGE VOLTAGE

< Tools for Adjustment >

- Regulated DC power supply
- Tester or digital voltmeter

< Adjustment Procedure >

1) Remove the Battery Cover (5BL20100) and the Battery 2CR5.
2) Remove the Bottom Cover Ass'y Setscrews (66001258)×2, (66001257)×2, (61928026)×2 and take off the Bottom Cover Ass'y (5BLB1200).
3) Set the Flash Mode Selector Lever of the Body to the 3-xenon-tube firing position and turn ON the Main Switch.
4) Set the voltage of the regulated DC power supply to 6.0 V.
5) Connect the (+) terminal of the regulated DC power supply to the Battery Contact (+) and the (–) terminal to the Battery Contact (–).
6) Connect the (+) terminal of the tester to the point Ⓐ of the Main P.C. Board Ass'y and the (–) terminal to the "GND" of the Main P.C. Board Ass'y.
7) Turn ON the switch of the regulated DC power supply.
8) Adjust the Variable Resistor VR301 so that the tester indicates 290^{+3}_{0} V.

Notes :

- Take due care in measurement and adjustment, since a high voltage is applied on the Main P.C. Board Ass'y.
- Power is automatically turned OFF after the passage of 16 seconds without any power hold operation. To make measurement again, therefore, turn the Main Switch as ON → OFF → ON or press the Shutter Release Button halfway.

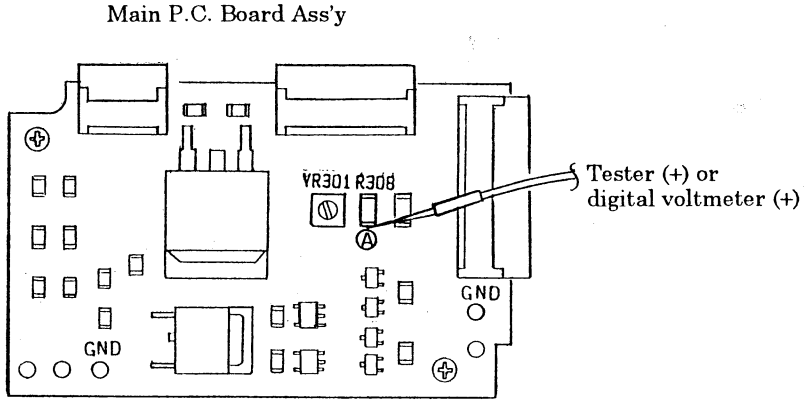


Fig.78

C-8. ADJUSTMENT OF COMPENSATION VALUES

*** This camera permits the adjustments of compensation values (adjusted values) only by its manual operation. Therefore, adjustments can be made without communication with any special adjusting tools.**

C-8-1. Setting of Adjusting Mode and Return to Normal Mode

1) Open the Back Cover.
2) Remove the Contact Cover Setscrews (6600 1167)×3 and take off the Contact Cover (1A M13510).
3) Turn ON the Main Switch.
4) Connect the TEST terminal to the GND terminal on the Back Cover FPC with tweezers or the like, and the adjusting mode will be set.

   Note :
   - Once adjusting mode is set, you may remove the tweezers.

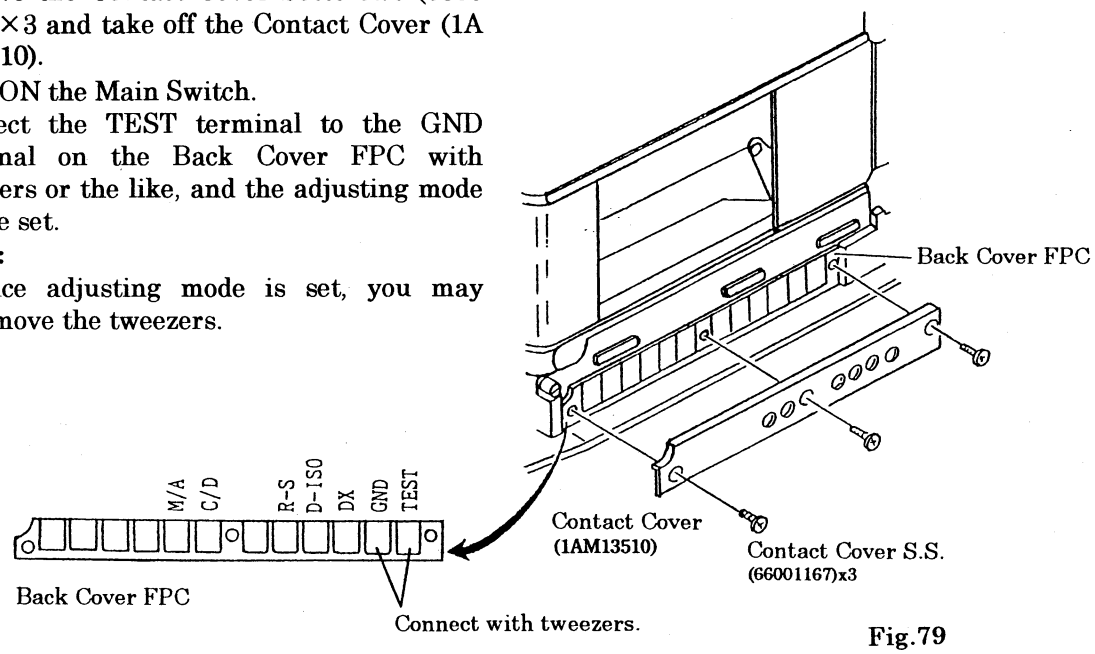


Fig.79

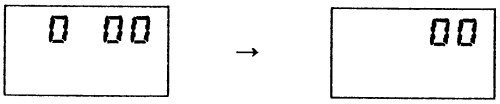
5) At transition to adjusting mode, the display on the External LCD Panel changes as follows:

Normal Mode → Adjusting Mode

* 0 is displayed at each digit position except the 3rd position.

6) The normal mode will be restored by turning OFF the Main Switch or removing the battery.
7) At transition to the normal mode, the display on the External LCD Panel changes as follows:

Adjusting Mode → Normal Mode



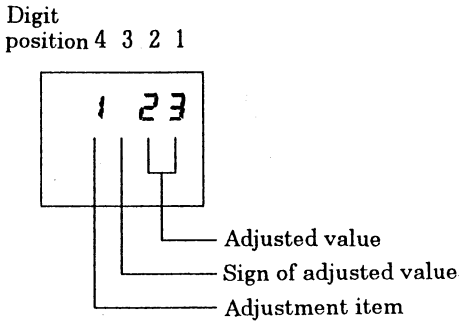
C-8-2. Display, Change and Storage of Adjusted Values

(1) Display of Adjusted Value

① 4th digit : Indicates the adjustment item number. The hexadecimal numbers of 0 ~ F represent 16 adjustment items.
Initial display : " 0 "

② 3rd digit : Indicates the plus or minus sign of the number indicated at the 1st and 2nd digit positions. However, the plus is represented by a blank and the minus is represented by "–".
Initial display : " " (blank)

③ 1st and 2nd digits: Indicates the adjusted value of the selected adjustment item. Adjusted values are represented by decimal numbers in the range of - 99 ~99.
Initial display : " 00 "



(2) Change of Adjusting Mode

Change the adjusting mode (among three modes) by setting the Flash Mode Selector Lever to the appropriate position according to the following table:

Table 1. Change of Adjusting Mode

Position of Flash Mode Selector Lever	Adjusting Mode
2-xenon-tube firing	Output adjustment
No flash	Input adjustment
3-xenon-tube firing	Semiautomatic adjustment/ display

(3) Change of Adjustment Item and Adjusted Value

① Adjustment item : Depress the Shutter Release Button halfway (Check Switch is turned ON) and while keeping it depressed halfway, press the UP Button (Self-timer Switch is turned ON), and the adjustment item number will be incremented.
One press of the UP Button will change the adjustment item one time. Keep pressing the UP Button, and the adjustment item will be changed as rapidly as at four times a second.

UP
→ 0→ 1→2→ 3→4→5→6→ 7→8→9→A→b→c→d→E→F →

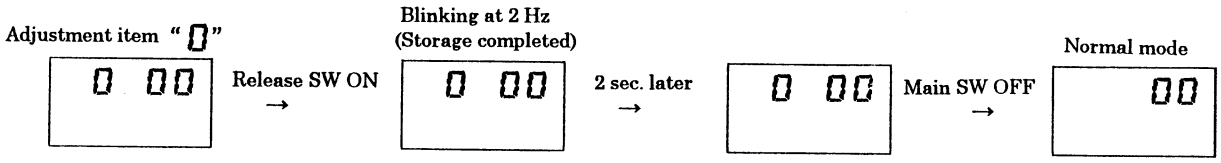
② Adjusted value : Change the adjusted value of the adjustment item selected in ①. The value adjusted previously in manual or semiautomatic mode is displayed first. Then adjust the displayed value (initial value is " 00 ").
Press the UP Button (Self-timer Switch is turned ON) to increment the adjusted value. One press of the button will change the value one time. Keep pressing the UP Button, and the value will be changed as rapidly as at four times a second.

* The adjustment range (range of indications) varies with the adjustment item. (See Table 2)

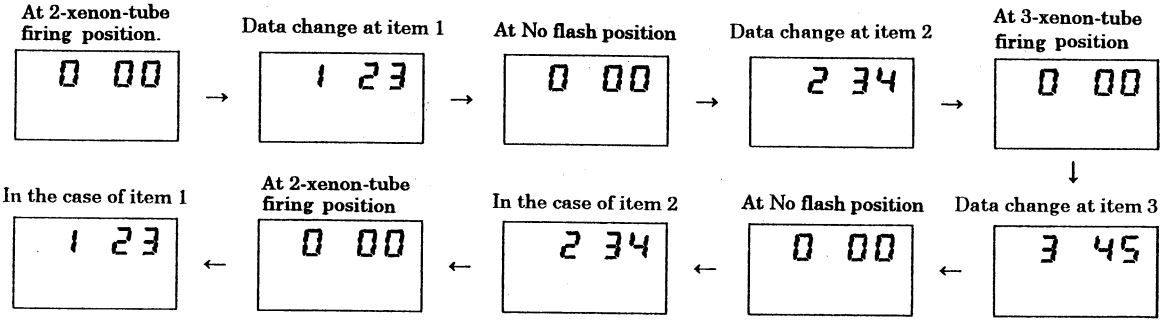
UP
→ - 99→ - 98→ - 97→····- 2→ - 1→0→ 1→2→····97→98→99 →

(4)Storage of Adjusted Value (Write in EEPROM)

1) Depress the Shutter Release Button halfway (Check Switch is turned ON) and while keeping it depressed halfway, press the UP Button (Self-timer Switch is turned ON) to return the adjustment item to " 0 ". (Data writing item)
2) Depress the Shutter Release Button all the way (Shutter Release Switch is turned ON) to store the adjusted value in EEPROM.
   After storage completion of the adjusted value, the display blinks at 2 Hz for 2 seconds.



3) Turn OFF the Main Switch to terminate the adjusting mode.
   Notes :
   a) At the beginning of adjusting mode, the item number " 0 " is displayed in each mode even by changing the Flash Mode Selector Lever only. At this point, the display at the adjusted value position is " 00 " as mentioned above.
   b) Once the data is changed after adjustment, set the adjustment item number in each adjusting mode to " 0 " and depress the Shutter Release Button all the way to write the adjusted value in EEPROM.
   c) The display is changed as shown below by changing the Flash Mode Selector Lever position. However, if the Shutter Release Button is depressed all the way not to write the adjusted value in EEPROM, the adjusted values in that mode will remain as before. Therefore, if the Main Switch is turned OFF at this point, the changed data becomes invalid.



(5)Description of Adjustment Items

* Table 2 describes the adjustment items in each mode.
* In the spare area, " 00 " is displayed at the adjusted value position even by changing the item number. That is, the operation at the adjusted value position is impossible.
* Never change any data of the adjustment items other than specified for use on service side.

① Output adjustment mode (Flash Mode Selector Lever at 2-xenon-tube firing position)
- For the adjustment items 1~d , the release sequence in the normal mode is executed by turning ON the Shutter Release Switch. At this time, however, the battery check is not performed. Therefore, pay attention to the voltage of the battery.
- Do not change any data on the battery check B1 and B2 of the adjustment items E and F .

② Semiautomatic adjustment/display mode
(Flash Mode Selector Lever at 3-xenon-tube firing position)

- In the normal adjustment, the adjusted value is changed by operating the UP Button. In semiautomatic adjustment mode, however, the relationship between the setting position and the A/D converted value is adjusted semiautomatically.
- The items 2 and 3 are semiautomatic adjustment items. At each of these items, turning ON the Shutter Release Switch will write the data in EEPROM.
- For the items 4~7, set the item 0 and turn ON the Shutter Release Switch to write the data in EEPROM.
- The items 4~8 and A are display items. 4, 7, 8 and A are hexadecimal notations.
- The item 6 and 7 complements the cumulative counter of 5 by indicating the shots count on the way to 1024 shots.
- At the item d, all the LCD indications are lit. At turning ON the Shutter Release Switch, all the LCD indications change to blinking (2 Hz).
  In this case, the characters other than used in this camera are also displayed.
- At the item E, never press the Shutter Release Switch; otherwise, all the data in EEPROM will be lost.

Table 2 Adjustment Items

Mode	Item No.	Adjustment Item	Resolution	Range of Indications (Adjusted Values)
2-xenon-tube firing	0	Writing	----	00 → (0 00 blinking)
Output Adjustment	1	Shutter time	8 μs	-30~16 (-30*8~16*8 μs)
	2	Flash firing time adjustment 1 (3-xenon-tube firing)	2 μs	-99~99 (-198~198 μs) ISO 50
	3	Flash firing time adjustment 2 (3-xenon-tube firing)	2 μs	-50~50 (-100~100 μs) ISO 100
	4	Flash firing time adjustment 3 (3-xenon-tube firing)	2 μs	-30~30 (-60~60 μs) ISO 200
	5	Flash firing time adjustment 4 (3-xenon-tube firing)	2 μs	-20~20 (-40~40 μs) ISO 400
	6	Flash firing time adjustment 5 (3-xenon-tube firing)	2 μs	-10~10 (-20~20 μs) ISO 800
	7	Flash firing time adjustment A (2-xenon-tube firing)	2 μs	-99~99 (-198~198 μs) ISO 50
	8	Flash firing time adjustment B (2-xenon-tube firing)	2 μs	-50~50 (-100~100 μs) ISO 100
	9	Flash firing time adjustment C (2-xenon-tube firing)	2 μs	-30~30 (-60~60 μs) ISO 200
	A	Flash firing time adjustment D (2-xenon-tube firing)	2 μs	-20~20 (-40~40 μs) ISO 400
	b	Flash firing time adjustment E (2-xenon-tube firing)	2 μs	-10~10 (-20~20 μs) ISO 800
	c	Reference value for average metering light exposure	1/8 Lv	-24~24 (-24/8~24/8 Lv)
	d	Average metering inclination	0.0078	-99~99 (-0.773~0.773)
	E	Battery check B1	28.67 mV	* Never change the data.
	F	Battery check B2	28.67 mV	* Never change the data.
No flash	0	Writing	----	00→ (0 00 blinking)
Input Adjustment	1	Reference value for exposure compensation resistance	1/48 Ev	-50 ~ 50 (-50/48~50/48 Ev)
	2	Inclination of exposure compensation resistance	0.031	-65 ~ 65
	3	Not used		
	4	Not used		
	5	Not used		
	6	Not used		
	7	Not used		
	8	Not used		
	9	Not used		
	A	Production technology data		* Not used on service side.
	b	Production technology data		* Not used on service side.
	c	Production technology data		* Not used on service side.
	d	Production technology data		* Not used on service side.
	E	Production technology data		* Not used on service side.
	F	Production technology data		* Not used on service side.
3-xenon-tube firing	0	Writing	----	00→(0 00 blinking)
Semiautomatic Adjustment/Display	1	Not used		
	2	Semiautomatic adjustment of light metering	----	15→ 9→ (2 22 blinking/E EE blinking)
	3	Semiautomatic adjustment of exposure compensation resistance	----	-01→ 01→ (3 33 blinking/E EE blinking)
	4	Error code display	----	See Table 3.
	5	Cumulative counter value	1024 shots	00~99 (0~101,376 shots)
	6	Cumulative counter value (H)	256 shots	00~03 (0~1,023 shots)
	7	Cumulative counter value (L)	1 shot	00~FF (0~255 shot)
	8	A/D value of average metering voltage	1/8 Lv	00~FF
	9	Not used		
	A	A/D value of battery check voltage	28.67 mV	00~FF (0~7.31 V)
	b	Not used		
	c	Not used		
	d	All LCD Indications lighting	----	00 → (All Indications blinking)
	E	Erasure of data in EEPROM	* Never press the Shutter Release Switch; otherwise, all the data will be broken.	
	F	Not used		

Table 3 Error Code Table

Error Code	Error	Error Code	Error
00	No error (initial state)	10	B2 error (no-load battery check)
01		11	B2 error (initial)
02	Winding Timing Switch error	12	B2 error (winding)
03	Mirror-up control error	13	B2 error (mirror-up)
04	Mirror-down control error	14	B2 error (rewind)
05		15	B2 error (blank shots advance)
06	Blank shots advance perforation error	16	
07	Blank shots advance Timing Switch error	17	
08	Frame Limiting Switch release error	18	
09		19	
0A	Flash charge error	1A	
0b		1b	
0c		1c	
0d		1d	
0E		1E	
0F		1F	

* The displayed error code represents the latest error. When the error is corrected by repair, be sure to write 00 by pressing the UP Button.
  Even when the error has been corrected, the error display remains unless 00 is written.
* When the Shutter has been replaced with a new one by servicing, be sure to write 00 in the Cumulative Counters at the items 5, 6 and 7.

C-8-3. Adjustment Procedure

(1) Adjustment of Shutter Time

* Make this adjustment, when the Shutter Unit or the Main FPC Ass'y has been replaced with a new one.
* With the AE Camera Tester (EF500, EF5000, EF8000), it is impossible to measure the shutter speed for the fully open lens F4.0. Therefore, make measurement with the AE Camera Tester setting in the EE mode. **In this measurement, however, the measured values should be used** for reference only.

< Tool for Adjustment >

- AE Camera Tester (EF500, EF5000, EF8000)

< Adjustment Procedure >

1) Set the Flash Mode Selector Lever to the "no flash" position.
2) Adjust the focus ring of the Lens Barrel to "1/15".
3) Set the AE Camera Tester to the EE mode and its light source to LV 15.
4) Set the light receiver of the AE Camera Tester at the aperture for film of the camera.
5) Turn ON the Shutter Release Switch to execute the shutter release sequence, and check the light exposure variance △EV displayed on the AE Camera Tester.
6) Set the adjusting mode.
7) Set the Flash Mode Selector Lever to the 2-xenon-tube firing position.
8) Depress the Shutter Release Button halfway and press the UP Button to select the item 1 .
9) According to the light exposure variance △EV displayed on the AE Camera Tester, change the adjusted value by operating the UP Button.
10) Depress the Shutter Release Button halfway (Check Switch is turned ON) and while keeping it depressed halfway, press the UP Button (Self-timer Switch is turned ON) to return the adjustment item to " 0 ". (Data writing item)
11) Depress the Shutter Release Button all the way (Shutter Release Switch is turned ON) to store the adjusted value in EEPROM.
    After storage completion of the adjusted value, the display blinks at 2 Hz for 2 seconds.
12) Repeat the steps 1) to 5) above and make certain that the shutter time has been adjusted properly.

    Note :

    - Since the measurement at the exposure time of 1/2000 sec. is impossible, make the adjustment so that the central value of the measured values (EV) is obtained.

(2) Semiautomatic Adjustment of Light Metering

* When this adjustment is made, there is no need of making the adjustment of reference value for average metering light exposure or the adjustment of average metering inclination.
* Make this adjustment when the AE FPC Ass'y or Main FPC Ass'y has been replaced with a new one.

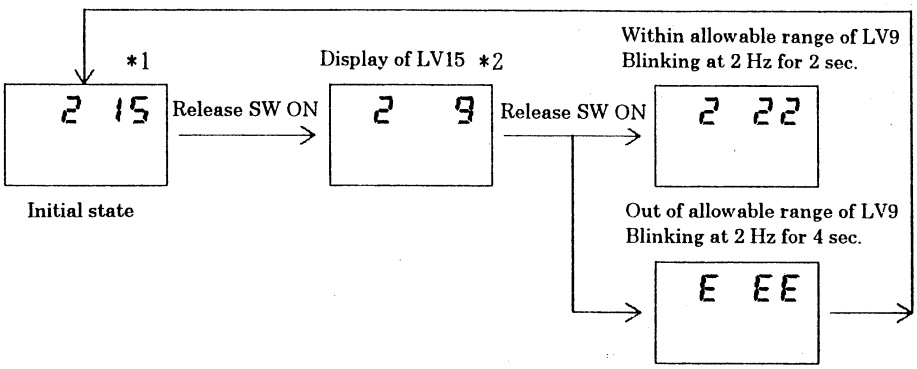
< Tool for Adjustment >

- AE Camera Tester (EF500, EF5000, EF8000)

< Adjustment Procedure >

1) Set the adjusting mode.
2) Set the Flash Mode Selector Lever to the 3-xenon-tube firing position.
3) Adjust the focus ring of the Lens Barrel to "1/15".
4) Depress the Shutter Release Button halfway and press the UP Button to select the item 2 . Then the display will show 2 15 (*1).
5) Set the camera in front of the light source of the AE Camera Tester.
6) Set the light source of the AE Camera Tester to LV 15.
7) Depress the Shutter Release Button all the way, and the display will show 2 9 (*2).
8) Set the light source of the AE Camera Tester to LV 9.
9) Depress the Shutter Release Button all the way, and the display will show 2 22 blinking (at 2 Hz for 2 sec.) when adjusted value is within the allowable range. If the adjusted value is out of the allowable range, the display will show E EE blinking (at 2 Hz for 4 sec.) and then return to the initial state.

When the operations of 1) to 9) above are performed, the arithmetic operation of the reference value for average metering light exposure and the average metering inclination (output adjustment mode items c and d) will be carried out inside the camera and the adjusted values will be automatically written in EEPROM.



10) Depress the Shutter Release Button halfway (Check Switch is turned ON) and while keeping it depressed halfway, press the UP Button (Self-timer Switch is turned ON) to return the adjustment item to "0". (Data writing item)
11) Depress the Shutter Release Button all the way (Shutter Release Switch is turned ON) to store the adjusted value in EEPROM.
After storage completion of the adjusted value, the display blinks at 2 Hz for 2 seconds.

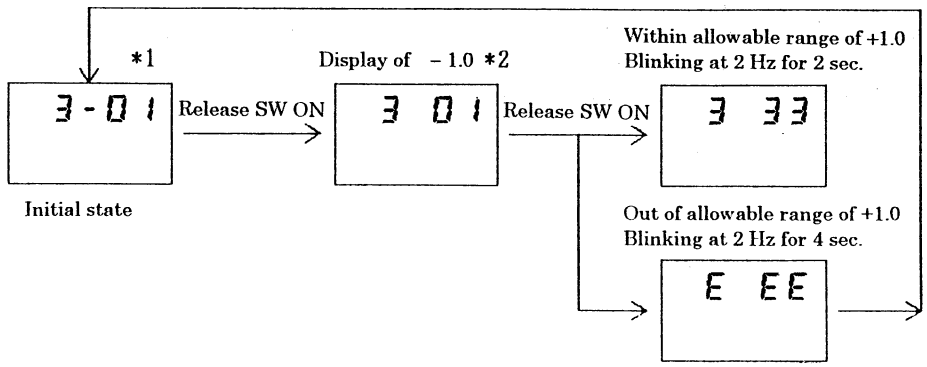
(3) Semiautomatic Adjustment of Exposure Compensation Resistance

* When this adjustment is made, there is no need of making the adjustment of reference value for exposure compensation resistance or the adjustment of inclination of exposure compensation resistance.
* Make this adjustment when the Exposure Compensation Board or Main FPC Ass'y has been replaced with a new one.

< Adjustment Procedure >

1) Set the adjusting mode.
2) Set the Flash Mode Selector Lever to the 3-xenon-tube firing position.
3) Depress the Shutter Release Button halfway and press the UP Button to select the item 3. Then the display will show 3-01 (*1).
4) Set the Exposure Compensation Dial to "– 1.0".
5) Depress the Shutter Release Button all the way, and the display will show 3 01 (*2).
6) Set the Exposure Compensation Dial to "+ 1.0".
7) Depress the Shutter Release Button all the way, and the display will show 3 01 blinking (at 2 Hz for 2 sec.) when adjusted value is within the allowable range. If the adjusted value is out of the allowable range, the display will show E EE blinking (at 2 Hz for 4 sec.) and then return to the initial state.

When the operations of 1) to 7) above are performed, the arithmetic operation of the reference value for exposure compensation resistance and the inclination of exposure compensation resistance (input adjustment mode items 1 and 2) will be carried out inside the camera and the adjusted values will be automatically written in EEPROM.



8) Depress the Shutter Release Button halfway (Check Switch is turned ON) and while keeping it depressed halfway, press the UP Button (Self-timer Switch is turned ON) to return the adjustment item to " 0 ". (Data writing item)
9) Depress the Shutter Release Button all the way (Shutter Release Switch is turned ON) to store the adjusted value in EEPROM.
After storage completion of the adjusted value, the display blinks at 2 Hz for 2 seconds.

(4) Check of Light Exposure Reference Value Adjustment

< Tool for Adjustment >

- AE Camera Tester (EF500, EF5000, EF8000)

< Standard >

*** Allowable range in light exposure reference value adjustment and light exposure inclination adjustment**

Light Source	Standard
LV 15	− 1.0 ~ + 1.0
LV 9	− 1.0 ~ + 1.0

K value : 1.3
ISO : 100

< Adjustment Procedure >

* There is no need of making this adjustment when the semiautomatic adjustment of light metering is made.

1) Set the adjusting mode.
2) Set the Flash Mode Selector Lever to the 2-xenon-tube firing position.
3) Depress the Shutter Release Button halfway and press the UP Button to select the item c .
4) Adjust the focus ring of the Lens Barrel to "1/15".
5) Set the AE Camera Tester to the EE mode and its light source to LV 15.
6) Set the light receiver of the AE Camera Tester at the aperture for film of the camera.
7) Turn ON the Shutter Release Switch to execute the shutter release sequence, and check the light exposure variance △EV displayed on the AE Camera Tester.

(5) Check of Light Exposure Inclination Adjustment

< Tool for Adjustment >

- AE Camera Tester (EF500, EF5000, EF8000)

< Adjustment Procedure >

* There is no need of making this adjustment when the semiautomatic adjustment of light metering is made.

1) Set the adjusting mode.
2) Set the Flash Mode Selector Lever to the 2-xenon-tube firing position.
3) Depress the Shutter Release Button halfway and press the UP Button to select the item d .
4) Adjust the focus ring of the Lens Barrel to "1/15".
5) Set the AE Camera Tester to the EE mode and its light source to LV 15.
6) Set the light receiver of the AE Camera Tester at the aperture for film of the camera.
7) Turn ON the Shutter Release Switch to execute the shutter release sequence, and check the light exposure variance △EV displayed on the AE Camera Tester.

(6) Adjustment of Flash Firing Time

< Tools for Adjustment >

- AE Camera Tester (EF500, EF5000, EF8000)
- Standard Reflector (Gray chart of 18% reflectivity, about 30 cm × about 30 cm)
- Film cartridges of ISO 50, ISO 200, ISO 400 and ISO 800

Notes :

- Regularly, the flash light exposure is measured and adjusted with a film plane exposure meter for flash. In actual measuring and adjustment, however, use the AE Camera Tester, since the film plane exposure meter for flash is expensive. For the reference value, fire the flash of the Master Camera five times (or several products) and make measurements for each of the 10 items in Table 2 consisting of the flash firing time adjustments 1 to 5 for 3-xenon-tube firing and the flash firing time adjustments A to E for 2-xenon-tube firing and handle the mean value of the five or several measurements as the central value of each flash firing time.
- Make measurement between 10 seconds and 15 seconds after completion of flash charge.
- Since there is no difference in the adjustment procedure between the 3-xenon-tube firing time adjustment and the 2-xenon-tube firing time adjustment, the adjustment procedure for **the 2-xenon-tube firing time will be described only with the selection items (7) ~ (b).**
- As shown in Fig. 80, set the camera (film plane) at **26 cm** from the Reflector. Focus the Lens of the camera by turning the focus ring of the Lens Barrel and lock the focus ring with the lock screw and then start measuring.
- Make measurement in a dark place where no external light enters.
- This camera is automatically set to ISO 100 when no film has been loaded.

< Standard >

- Take measurements of the film plane exposure of the Master Camera or several products and handle the average of the measured values as the central value.

Light Source	Standard
----	Average ±0.3 EV

(6)-1. Flash firing time adjustment 1 (A)

< Adjustment Procedure >

1) Set the adjusting mode.
2) Set the Flash Mode Selector Lever to the 2-xenon-tube firing position.
3) Depress the Shutter Release Button halfway and press the UP Button to select the item 2 (7).
   * The item (7) means the item to be selected at the 2-xenon-tube firing time adjustment.
4) Set the ISO 50 film cartridge in the camera.
5) Set the AE Camera Tester to the EE mode and its light source to LV 6.
6) Set the light receiver of the AE Camera Tester at the aperture for film of the camera.
7) Turn ON the Shutter Release Switch to execute the shutter release sequence. And according to the light exposure variance △EV displayed on the AE Camera Tester, change the adjusted value by operating the UP Button.

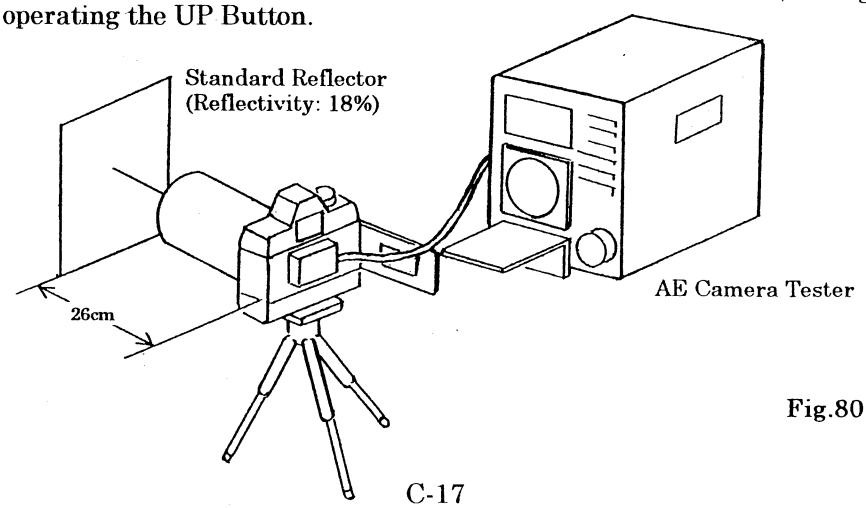


Fig.80

(6)-2. Flash firing time adjustment 2 (B)

< Adjustment Procedure >

1) Depress the Shutter Release Button halfway and press the UP Button to select the item 3 (8).
   * The item (8) means the item to be selected at the 2-xenon-tube firing time adjustment.
2) Set the light receiver of the AE Camera Tester at the aperture for film of the camera.
3) Turn ON the Shutter Release Switch to execute the shutter release sequence. And according to the light exposure variance △EV displayed on the AE Camera Tester, change the adjusted value by operating the UP Button.

(6)-3. Flash firing time adjustment 3 (C)

< Adjustment Procedure >

1) Depress the Shutter Release Button halfway and press the UP Button to select the item 4 (9).
   * The item (9) means the item to be selected at the 2-xenon-tube firing time adjustment.
2) Set the ISO 200 film cartridge in the camera.
3) Set the light receiver of the AE Camera Tester at the aperture for film of the camera.
4) Turn ON the Shutter Release Switch to execute the shutter release sequence. And according to the light exposure variance △EV displayed on the AE Camera Tester, change the adjusted value by operating the UP Button.

(6)-4. Flash firing time adjustment 4 (D)

< Adjustment Procedure >

1) Depress the Shutter Release Button halfway and press the UP Button to select the item 5 (A).
   * The item (A) means the item to be selected at the 2-xenon-tube firing time adjustment.
2) Set the ISO 400 film cartridge in the camera.
3) Set the light receiver of the AE Camera Tester at the aperture for film of the camera.
4) Turn ON the Shutter Release Switch to execute the shutter release sequence. And according to the light exposure variance △EV displayed on the AE Camera Tester, change the adjusted value by operating the UP Button.

(6)-5. Flash firing time adjustment 5 (E)

< Adjustment Procedure >

1) Depress the Shutter Release Button halfway and press the UP Button to select the item 6 (b).
   * The item (b) means the item to be selected at the 2-xenon-tube firing time adjustment.
2) Set the ISO 800 film cartridge in the camera.
3) Set the light receiver of the AE Camera Tester at the aperture for film of the camera.
4) Turn ON the Shutter Release Switch to execute the shutter release sequence. And according to the light exposure variance △EV displayed on the AE Camera Tester, change the adjusted value by operating the UP Button.
5) After changing the adjusted values at the flash firing time adjustments 1 to 5 (3-xenon-tube firing) and the flash firing time adjustments A to E (2-xenon-tube firing), depress the Shutter Release Button halfway and press the UP Button to select the item 0. And turn ON the Shutter Release Switch to write all the adjusted values in EEPROM at a time.

C-9. OTHERS

C-9-1. Curtain Travel Speed

* The curtain travel speed can not be adjusted. Therefore, replace the Shutter Unit with a new one if the travel speed of each curtain is significantly different from the standard value below.

  < Standard >
  The travel speeds of the first curtain and second curtain are both such that each curtain takes about 5.30 ms to travel the vertical length of 21 mm.

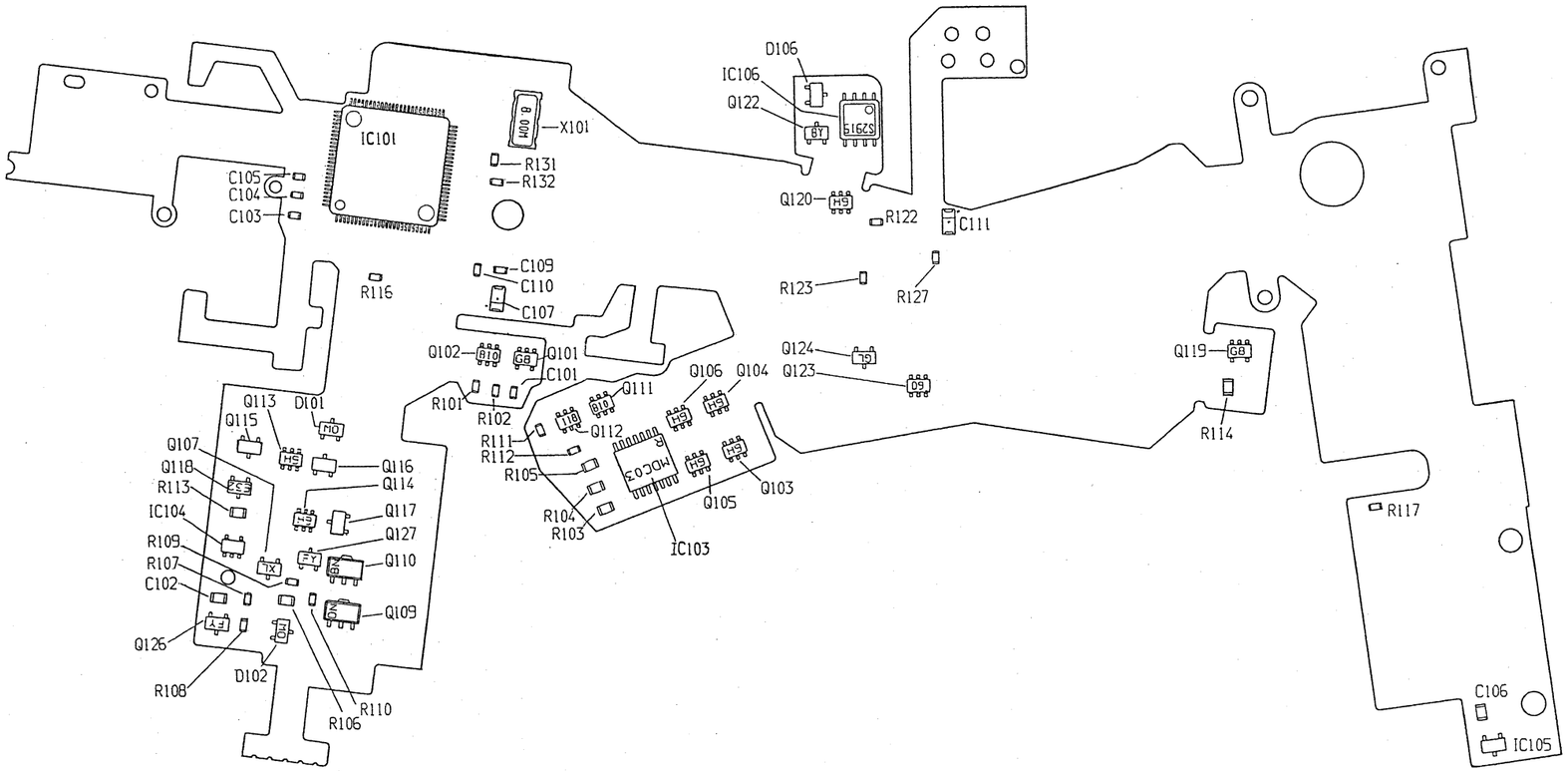
C-9-2. Synchro Contact

* Contact efficiency --------- 60% or above (at shutter speed of 1/125 sec. or less)
* Insulation resistance ----- 30 M Ω or more (at shutter speed of 1/125 sec. or less)

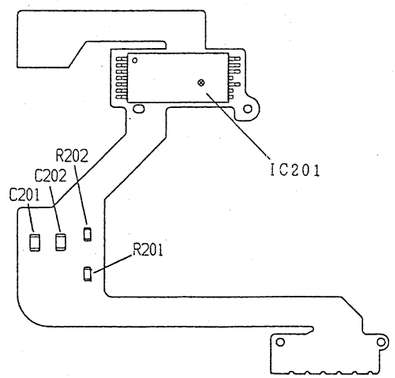
C-9-3. Current Consumption

Main Switch OFF (standby current)	20 μA or below
Main Switch ON	
Display Panel ON	100 mA or below
Display Panel OFF	30 μA or below
Winding operation	800 mA or below (Check with film in)
Winding stop	2000 mA or below (Check with film in)
Rewinding operation	500 mA or below (Check with film in)
Shutter operation	600 mA or below (Check with film in)

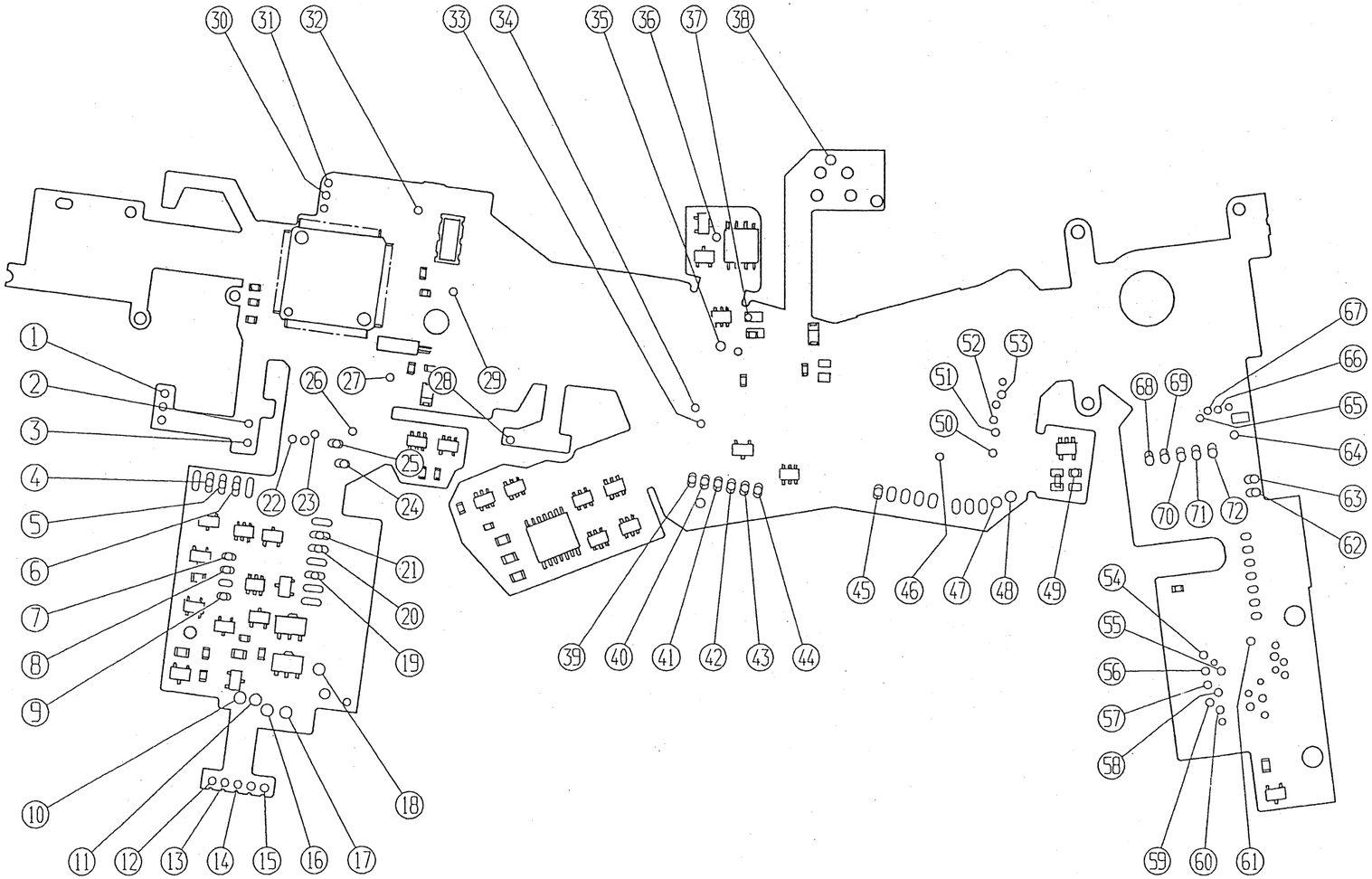
ELECTRIC PARTS ON MAIN FPC ASS'Y



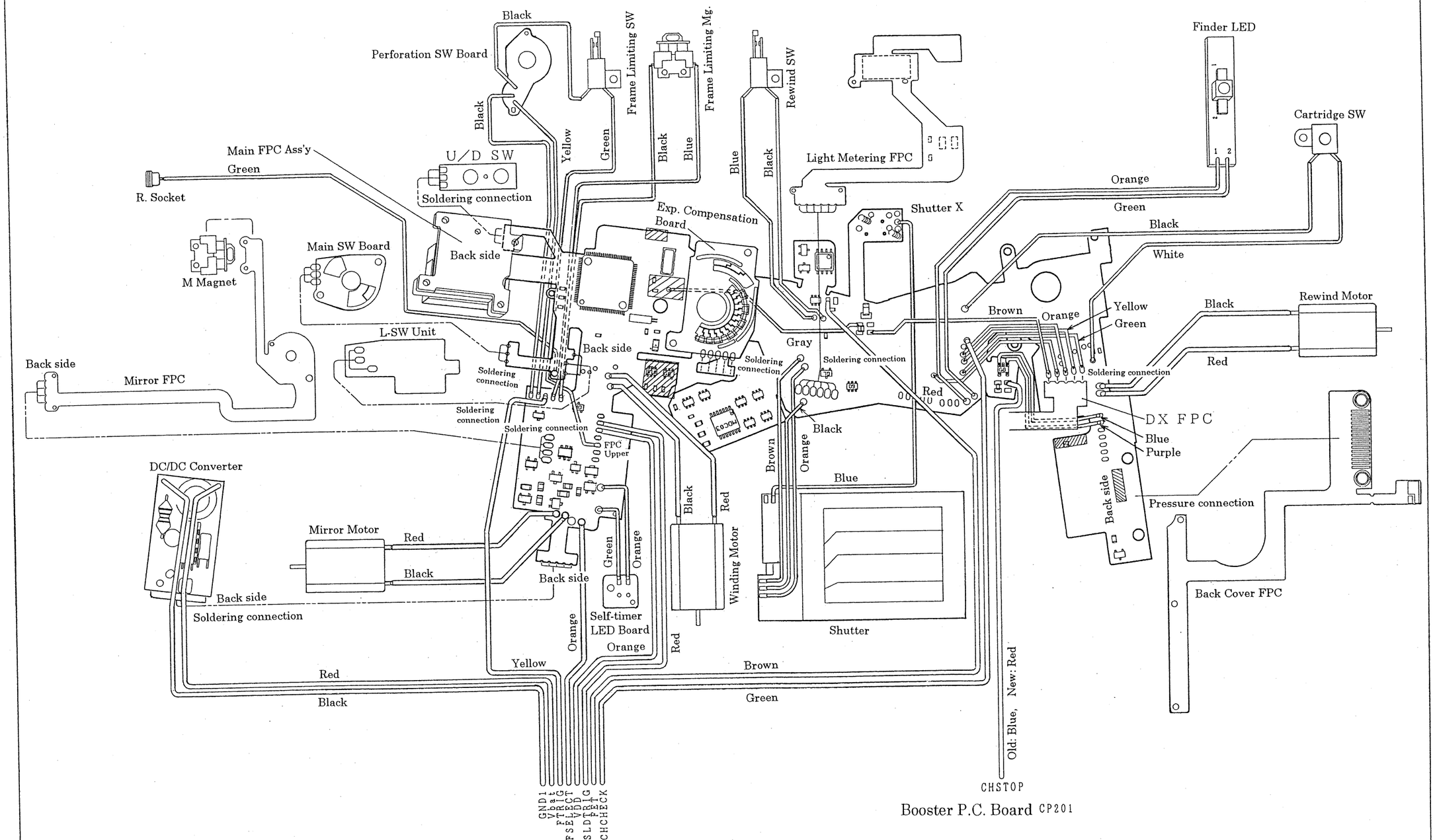
ELECTRIC PARTS ON AE FPC ASS'Y



TEST POINTS ON MAIN FPC ASS'Y

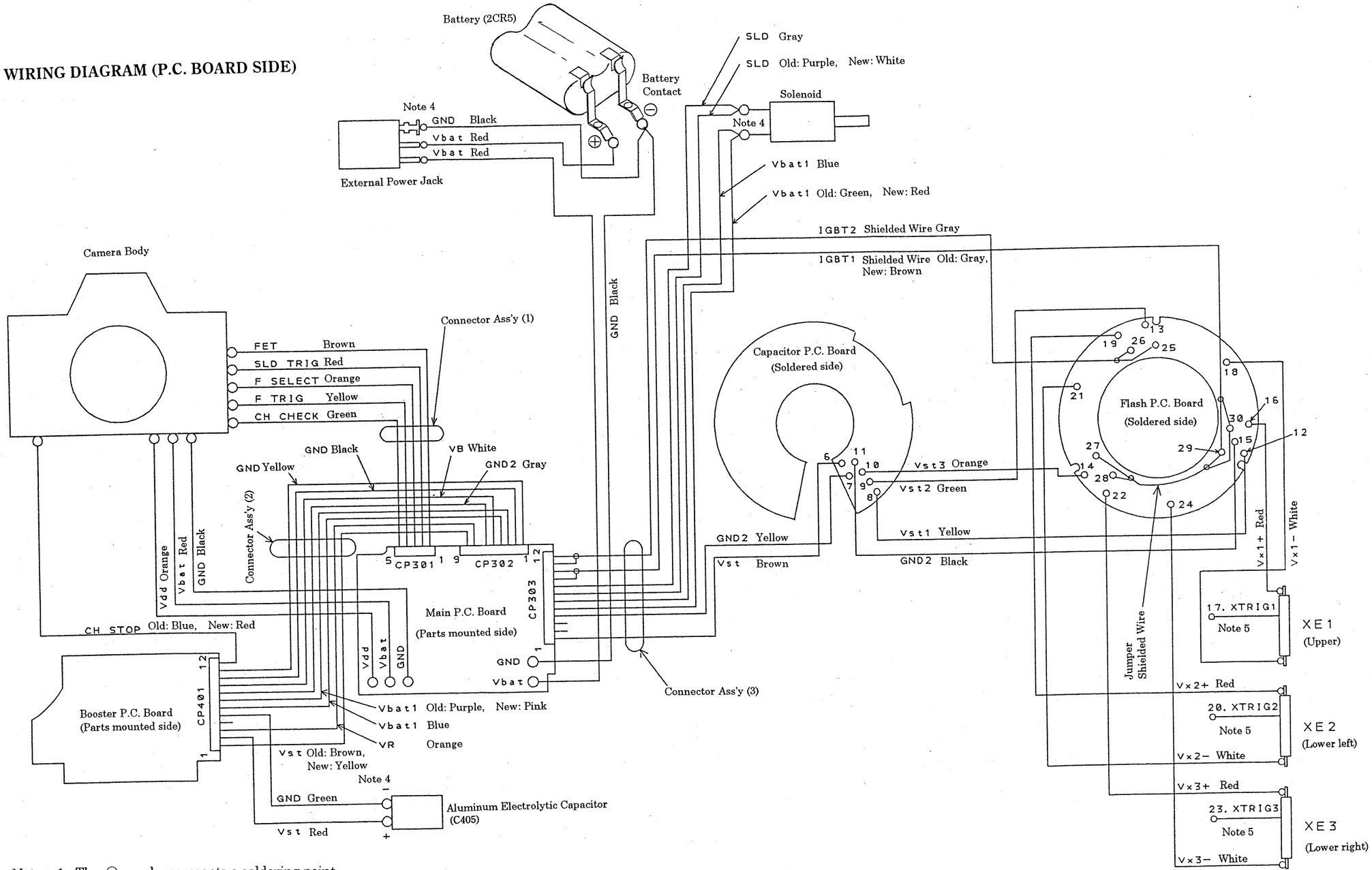


No.	Signal Name	No.	Signal Name
1	Main SW	37	FET
2	Check SW	38	CH I/O
3	Shutter Release SW	39	Light Metering Output
4	Perforation SW	40	VREF (IC Output)
5	F TRIG	41	SEL1
6	Frame Limiting Mg. (+)	42	SEL0, 2
7	Mirror Mg. (+)	43	GND
8	Mirror-up SW	44	VDD
9	Mirror-down SW	45	GND
10	Mirror Motor (+)	46	DX1
11	Mirror Motor (–)	47	Finder LED (+)
12	Vcc	48	Finder LED (–)
13	Vbat	49	CH STOP
14	GND	50	DX4
15	PH (DC/DC)	51	DX3
16	GND	52	DX2
17	F SELECT	53	CH CHECK
18	Self-timer LED	54	Back Cover SW
19	Frame Limiting SW	55	REQ
20	VDD	56	ACK
21	SLD TRIG	57	M/A
22	VL1	58	TEST
23	B.C.	59	C/D
24	Winding Motor (–)	60	SDI
25	Winding Motor (+)	61	DB-PRN (DB)
26	Vcc	62	Rewind Motor (+)
27	Exposure Compensation	63	Rewind Motor (–)
28	Flash Mode	64	Cartridge SW
29	DX0	65	SDI
30	UP SW	66	SCK
31	DOWN SW	67	SDO
32	VREF	68	DX0
33	Shutter Mg. M2	69	DX1
34	Shutter Mg. M1	70	DX2
35	Rewind SW	71	DX3
36	EEPROM CS	72	DX4



WIRING DIAGRAM (MAIN FPC SIDE)

WIRING DIAGRAM (P.C. BOARD SIDE)



Notes : 1. The ○ mark represents a soldering point.
2. Solder Vx1+, Vx1−, Vx2+, Vx2−, Vx3+ and Vx3− onto the parts mounted side of the Flash P.C. Board.
3. Solder X TRIG1～3 to the TC801～TC803 (Trigger Coils), respectively.
4. Put an insulation tube on each of the soldered portions of the Solenoid, External Power Jack and Capacitor (C405).
5. Put a silicone tube on each of the lead wires of X TRIG1, 2 and 3.
6. In the course of production, the colors of some lead wires were changed, so take due care.