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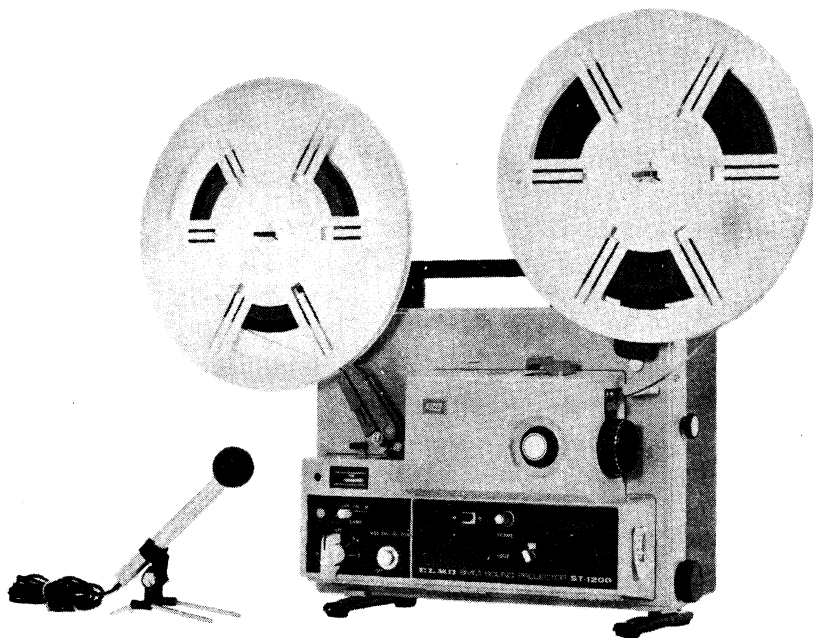
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# **ELMO**

## **SERVICE MANUAL**

### **ST-1200**



**ELMO CO., LTD.**

NAGOYA, JAPAN

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I. DISASSEMBLY & ASSEMBLY

A. FRONT & REAR ARM

1. FRONT ARM (Fig. 1)

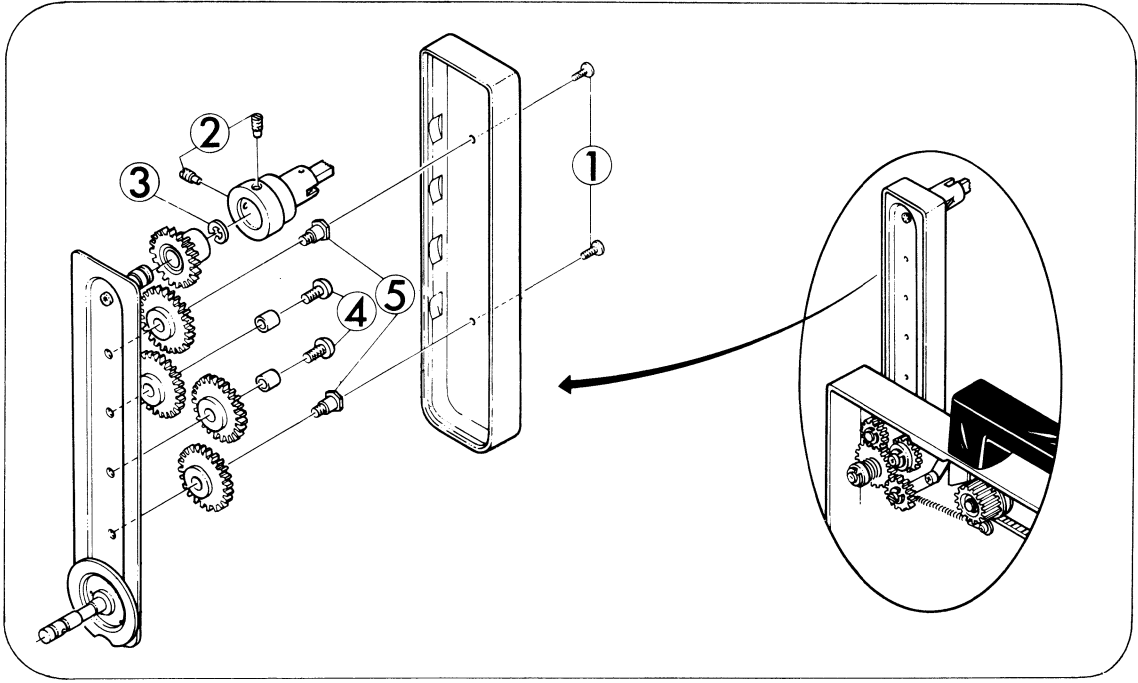


Fig. 1

DISASSEMBLY

1. Take out attaching screws (Fig.1-1,x2) and remove Front arm.
2. Take out Reel shaft pins (Fig.1-2,x2) and remove Reel shaft assy.
3. Take out attaching E-ring (Fig.1-3) and remove Reel shaft gear.
4. Take out attaching screws (Fig.1-4,x2) and remove Arm gears (x2).
5. Take out Arm gear shafts (Fig.1-5,x2) and remove Arm gears (x2).

ASSEMBLY

1. As to the assembling, follow the reverse way of the above steps.
2. Lubricate all the gears with aluminum grease.

NOTE: In comparison with the rear arm, Front arm, Front arm base plate and Front arm shaft gear are fundamentally different, but otherwise same.

## 2. FRONT ARM (Fig. 2)

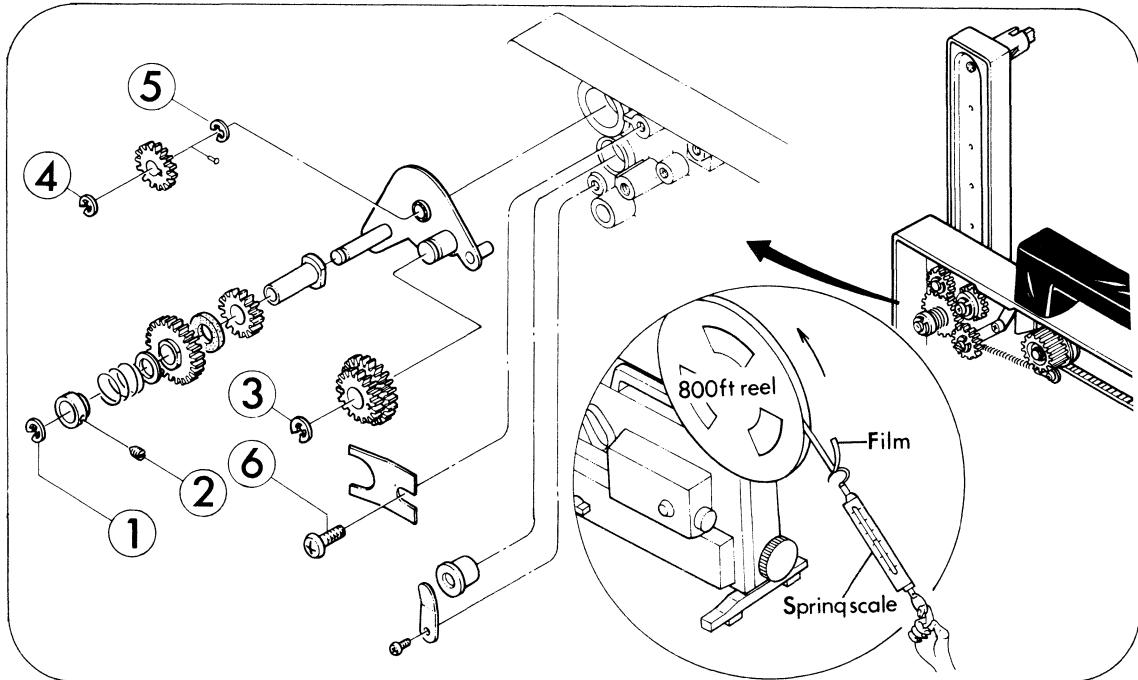


Fig. 2

### DISASSEMBLY

1. Take out attaching E-ring (Fig.2-1).
2. Take out attaching screws (Fig.2-2,x2) and remove Spring adjusting collar, Reverse slip spring, Pulley washer, Reverse middle gear 2, Friction plate 1, Reverse middle gear 1 and Reverse gear boss.
3. Take out attaching E-ring (Fig.2-3) and remove Rewind gear.
4. Take out attaching E-ring (Fig.2-4) and remove Reverse middle gear 3 as well as Sprocket shaft pin inserted.
5. Take out attaching E-ring (Fig.2-5) and remove Rewind gear holder.
6. Take out attaching screw (Fig.2-6) and Arm lock spring, then pull out Front arm assy.

### ASSEMBLY

1. As to the assembling, follow the reverse way of the above steps.
2. Lubricate all the gears with Alvania grease.
3. Adjust the rewinding tension of the front arm to be 75 gr. by the position of Spring adjusting collar. Rewinding tension .. Tolerance 65-90 gr.
4. The rewinding time should be within 100 sec. with 400 feet reel.

NOTE: Pay attention for the attaching direction of gears.

### 3. REAR ARM (Fig. 3)

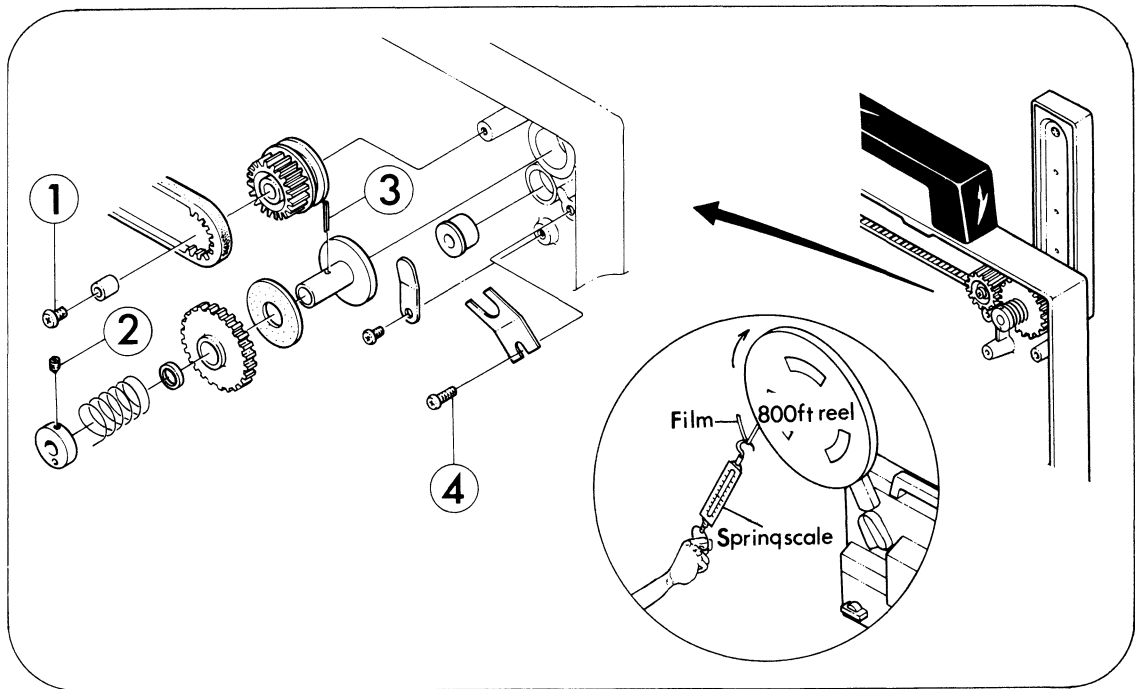


Fig. 3

#### DISASSEMBLY

1. Take out attaching screw (Fig.3-1) and remove Take-up middle pulley 2, Take-up pulley washer and Take-up belt.
2. Take out attaching screw (Fig.3-2) and remove Spring adjusting collar, Rear pulley shaft spring, Pulley washer, Rear take-up gear and Friction plate 2.
3. Pull out pin (Fig.3-3) and remove Friction wheel pulley.
4. Take out attaching screw (Fig.3-4) and Arm lock spring, then pull out Rear arm assy.

#### ASSEMBLY

1. As to the assembling, follow the reverse way of the above steps.
2. Lubricate Take-up pulley washer and the teeth of Take-up middle pulley 2 with Alvania grease.
3. Adjust the take up tension of the rear arm to be 65 gr. by the position of Spring adjusting collar. Take up tension ... Tolerance 55-80 gr.

NOTE: When replace Take-up belt, take out just attaching screw (Fig.3-1).

#### 4. TAKE-UP GUIDE (Fig.4)

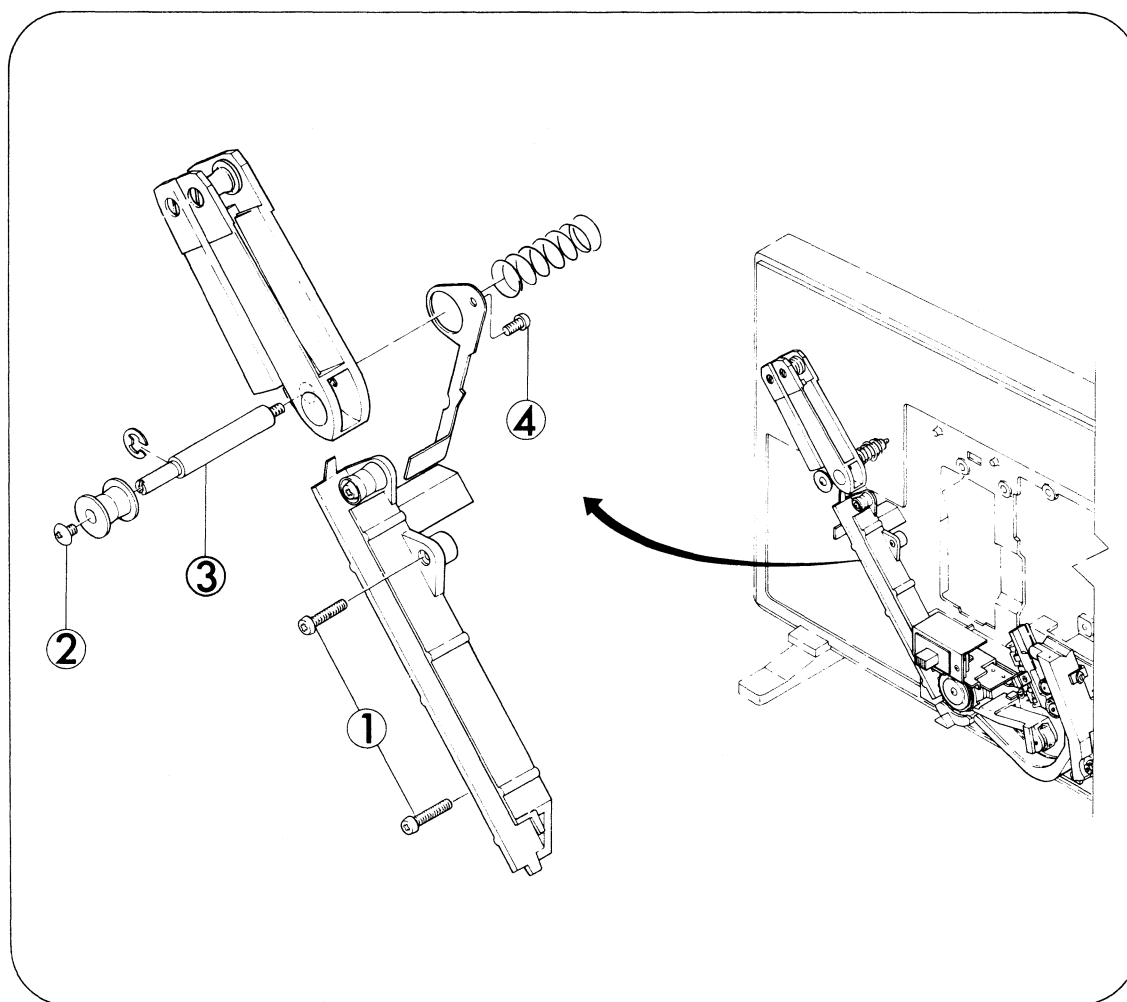


Fig. 4

#### DISASSEMBLY

1. Take out attaching screws (Fig.4-1,x2) and remove Film guide 4.
2. Take out attaching screw (Fig.4-2) and remove Take-up guide roller 1.
3. Take out Take-up guide shaft (Fig.4-3) and remove Take-up guide and Take-up lock spring.
4. Take out attaching screw (Fig.4-4) and remove Release switch presser.

#### ASSEMBLY

1. As to the assembling, follow the reverse way of the above steps.
2. All the rollers should rotate smoothly.

## B. PROJECTION LAMP & LENS

### 1. HEAT PROOF GLASS (Fig. 5)

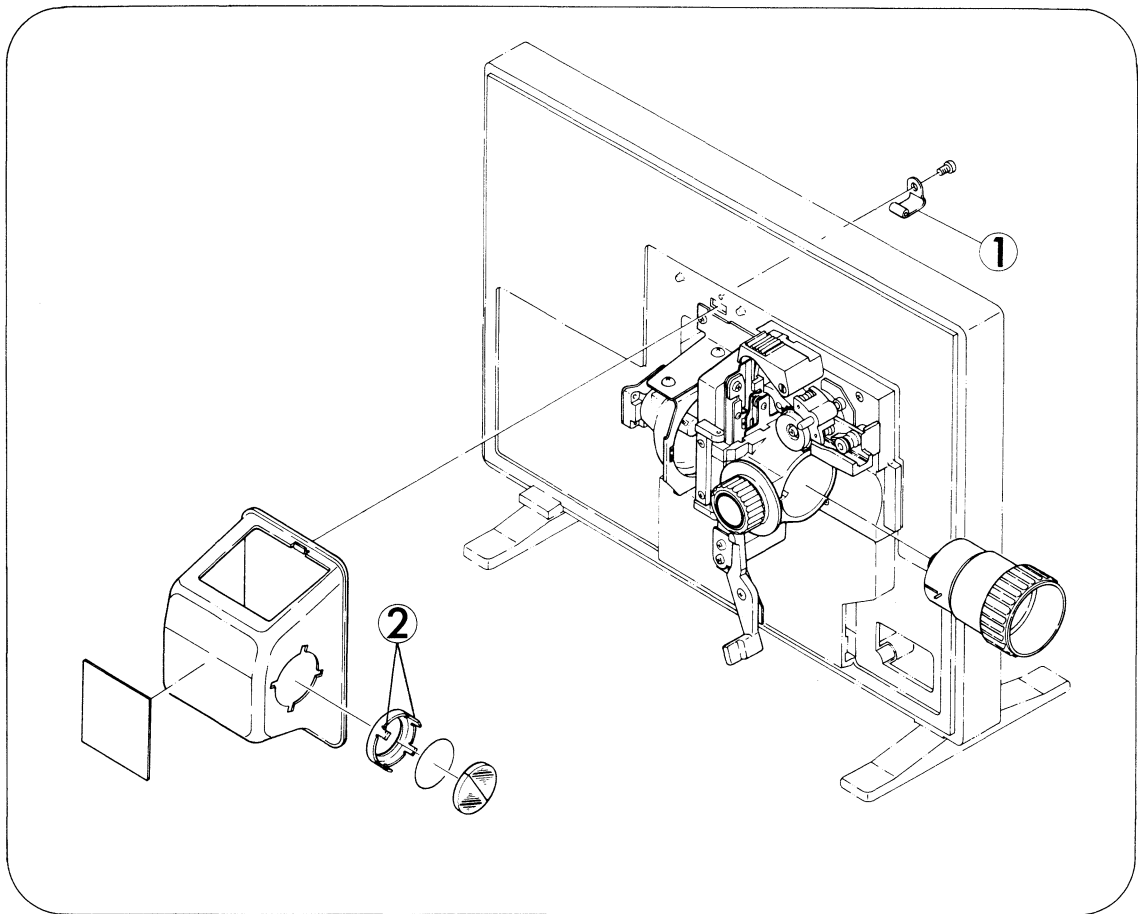


Fig. 5

#### DISASSEMBLY

1. Push lamp cover stopper (Fig.5-1) and take off Lamp cover.
2. Straighten out the latches (Fig.5-2,x4) of Heat proof glass holder and take out LC heat proof glass and Heat proof glass presser.

#### ASSEMBLY

1. As to the assembling, follow the reverse way of the above steps.
2. When replace LC heat proof glass, of which divided crack should not be captured by the latches of Heat proof glass holder.



## 2. PROJECTION LAMP (Fig. 6)

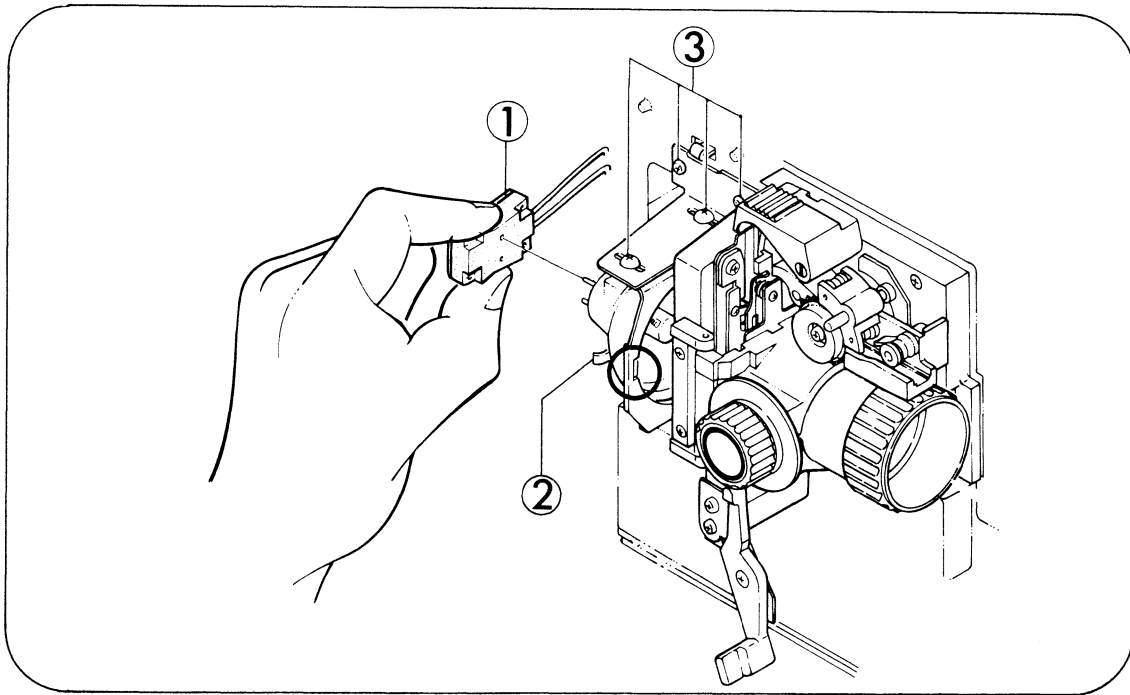


Fig. 6

### REPLACEMENT

1. Pull out Lamp socket assy (Fig.6-1) from Lamp.
2. Hold the Lamp presser (Fig.6-2) of Lamp holder (2) assy and pull out Lamp.
3. To install a replacement Lamp, place the square base of Lamp into the hollow and push the reflector into the metal rim of Lamp holder (2) assy.
4. To obtain the sufficient screen brightness, first loosen attaching screws (Fig.6-3,x4) and move Lamp fixing plate and Lamp holder (2) assy back and forth or up and down, until most bright and leveled screen brightness can be accomplished.
5. Screen brightness of the high position should be satisfied undermentioned specification.

Screen Center .... 800 Lx. min.

Screen Corner .... 50% of the center brightness

### NOTE:

1. Do not touch inside of the Lamp reflector as well as Lamp itself.
2. Replacing Lamp, first disconnect Power cord.
3. Life of the Lamp installed is averaged 35 hours under normal projection.
4. Applied voltage to the lamp should be 14.3-15V A.C. on high position and 12.3-13V A.C. on low position, under the lamp lighting condition.

### 3. LENS HOLDER (Fig. 7)

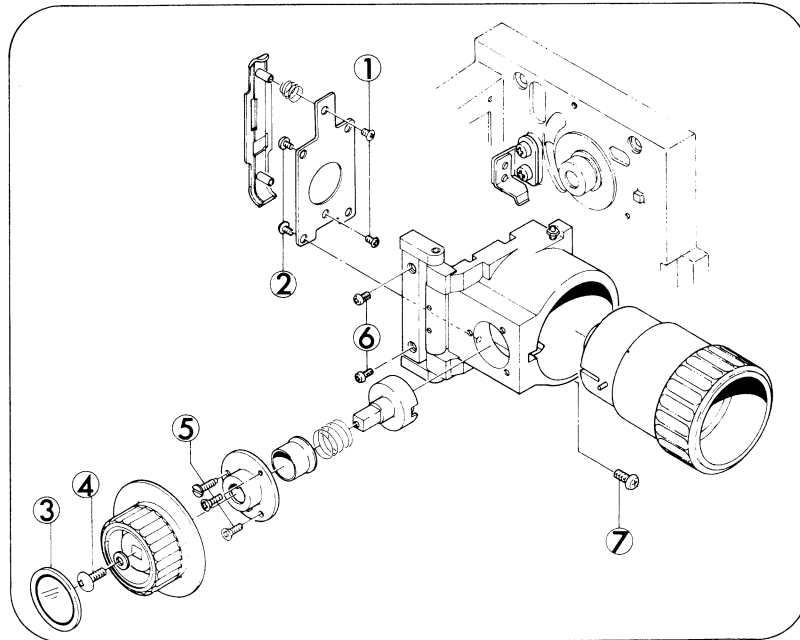


Fig. 7

#### DISASSEMBLY

1. Turn Focusing knob fully clockwise and pull out Projection lens.
2. Take out attaching screws (Fig.7-1,x2) and remove Pressure plate assy and Pressure plate spring.
3. Take out attaching screws (Fig.7-2,x4) and remove Pressure plate holder.
4. Strip off Focusing plate (Fig.7-3).
5. Take out Lamp socket holder screw (Fig.7-4) and remove Focusing knob.
6. Take out attaching screws (Fig.7-5,x2) and Focusing guide pin, then remove Focusing cam mount, Tube, Focusing spring and Focusing cam.
7. Take out attaching screws (Fig.7-6,x2) and remove Lens holder assy.

#### ASSEMBLY

1. As to the assembling, follow the reverse way of the above steps.
2. Lubricate Focusing cam with permalub H3002 grease.
3. Lens holder assy should not only smoothly move back and forth but also be certainly locked by Click spring.
4. To align the optical axis, first pass the focusing test film and either tighten or loosen attaching screw (Fig.7-7) to obtain evenness in focusing. Then, secure the screw with screw-tight.

NOTE: Attach Focusing cam mount as the stopper (Protuberance) of Focusing cam mount towards lower side.

C. TRANSFORMER & MOTOR

1. TRANSFORMER (Fig. 8)

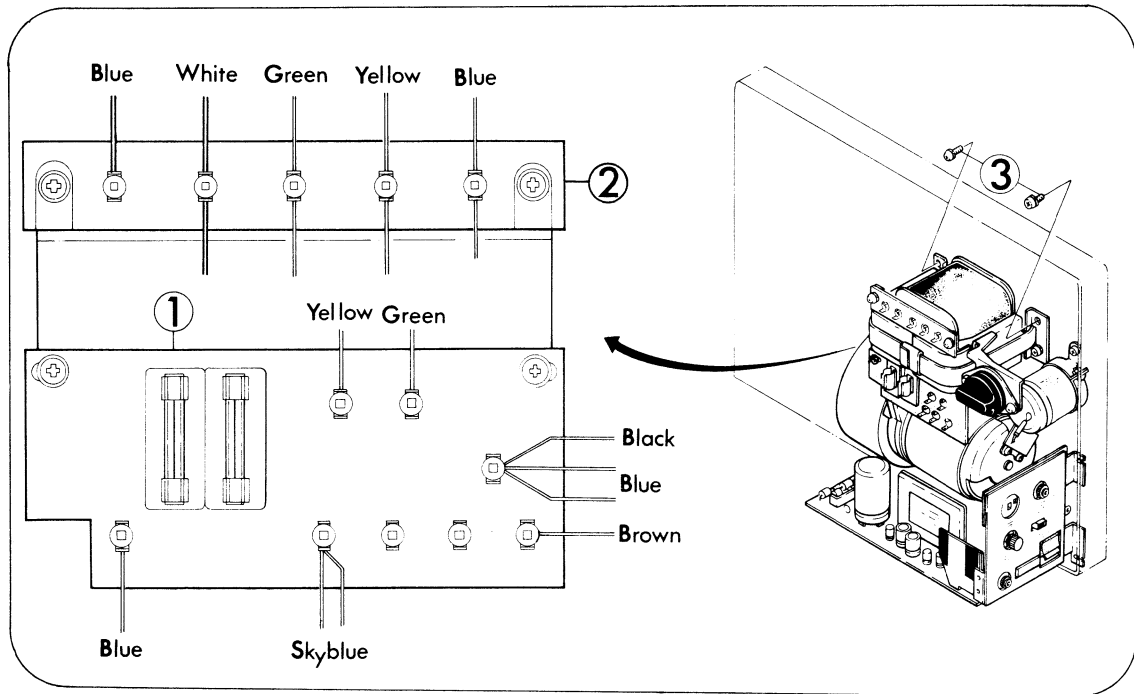
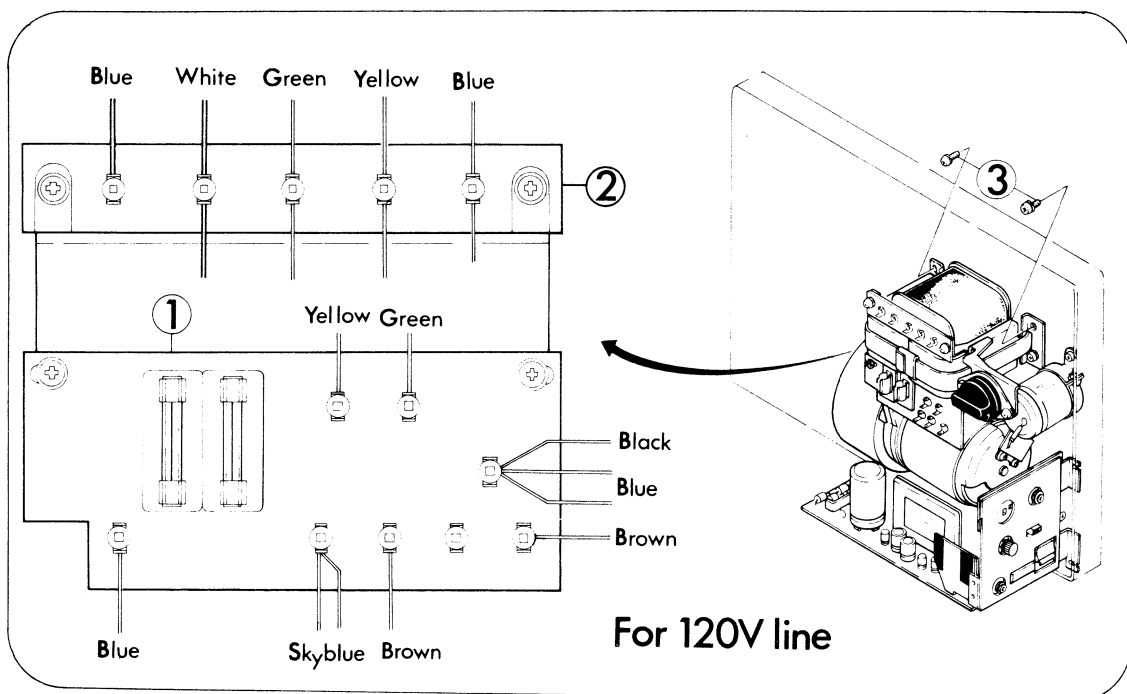


Fig. 8

REPLACEMENT

1. Unsolder the end of the wires connected to Transformer terminal (Fig.8-1) and Terminal 2 (Fig.8-2).
2. Take out attaching screws (Fig.8-3,x4) and replace Transformer.



2. MOTOR (Fig. 9)

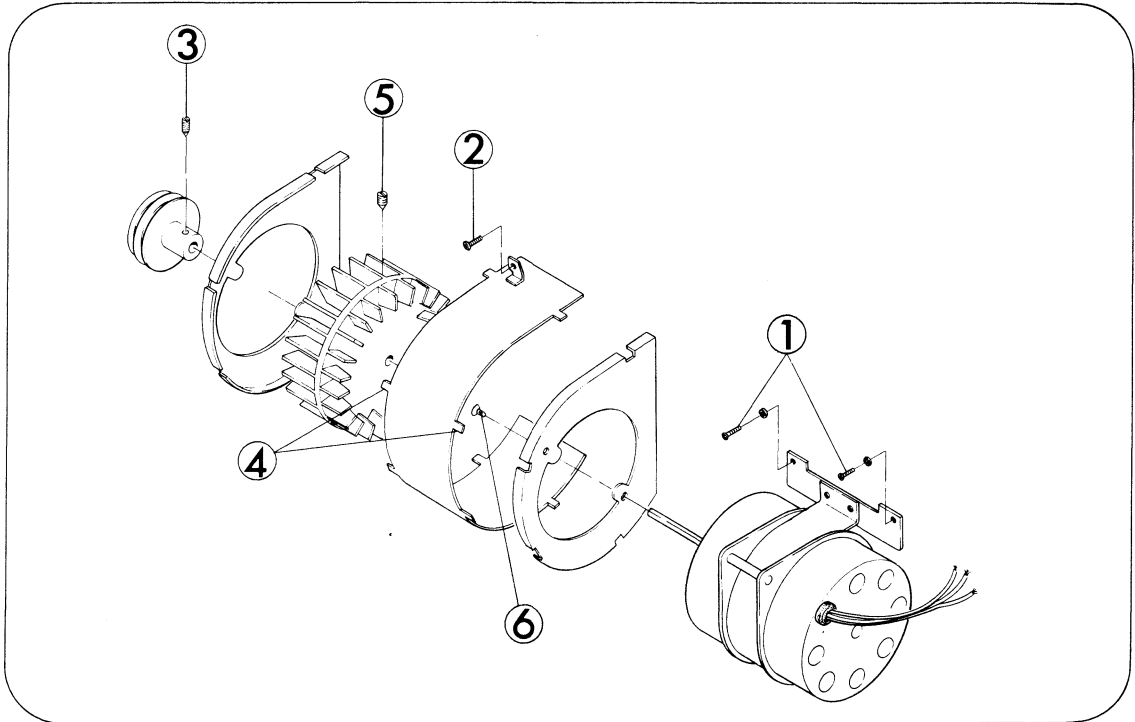


Fig. 9

DISASSEMBLY

1. Remove Transformer. (Refer to page 8)
2. Take out AMP assy. (Refer to page 15)
3. Take out attaching screws (Fig.9-1,x4) and (Fig.9-2), and remove Motor unit assy.
4. Loosen attaching screws (Fig.9-3,x2) and pull out Pulley unit (just Pulley 50 Hz or with Pulley 60 Hz).
5. Straighten out the latches (Fig.9-4,x8) of Fan casing 3 and remove Fan casing 2 and Fan casing 3.
6. Loosen attaching screws (Fig.9-5,x2) and pull out Fan.
7. Take out attaching screws (Fig.9-6,x2) and remove Fan casing 1.

ASSEMBLY

1. As to the assembling, follow the reverse way of the above steps.
2. Fan should not be interrupted by Fan casing 1,2,3.



4. DRIVE BELT (Fig. 11)

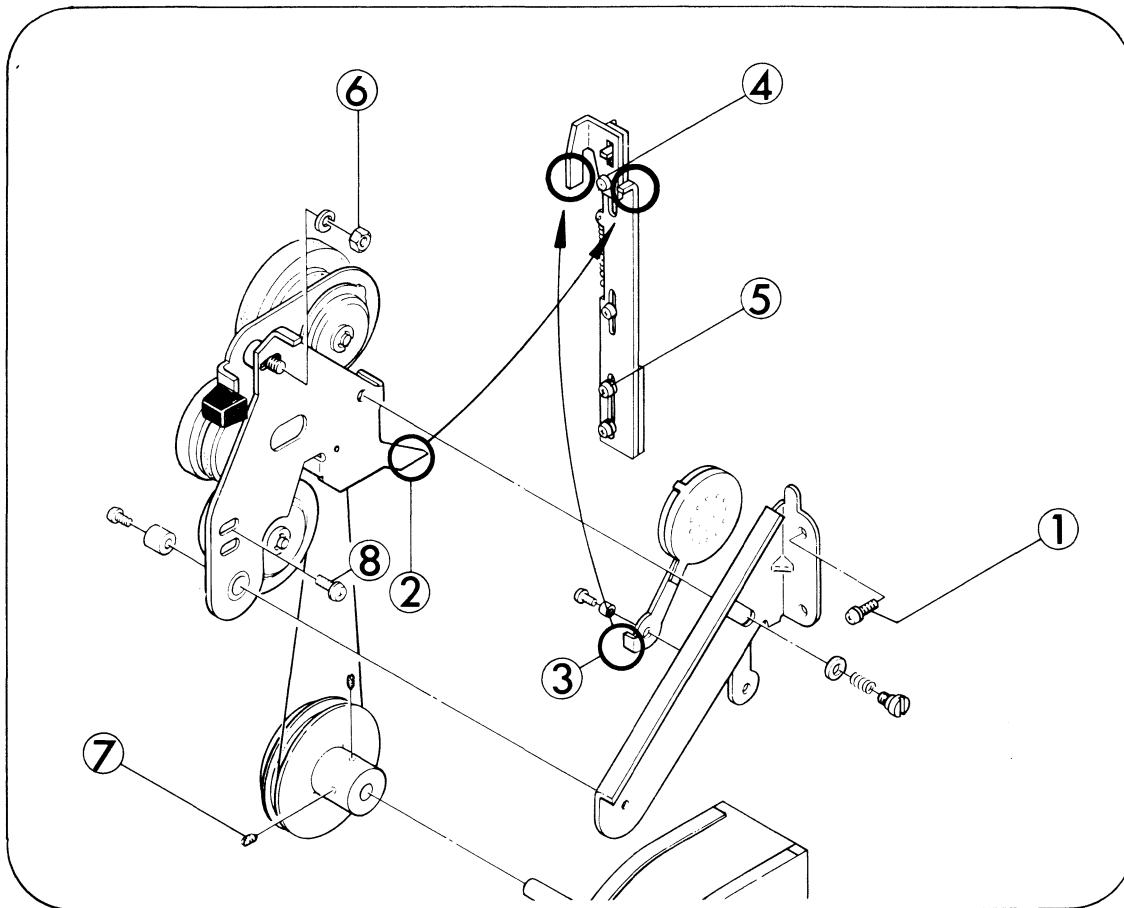


Fig. 11

REPLACEMENT

1. Loosen attaching screws (Fig.11-7,x2) and move Pulley 50 Hz or with Pulley 60 Hz towards Fan.
2. Take out attaching screw (Fig.11-8) and remove Idler holder, then replace Drive belt.
3. Move back Pulley 50 Hz so that Drive belt and Pulley 50 Hz could line up in a straight line, and tighten attaching screws (Fig.11-7,x2).
4. Attach Idler holder to obtain adequate tension of Drive belt and tighten attaching screw (Fig.11-8).
5. Drive belt should not be twisted.

## 5. SWITCH MECHANISM (Fig. 12)

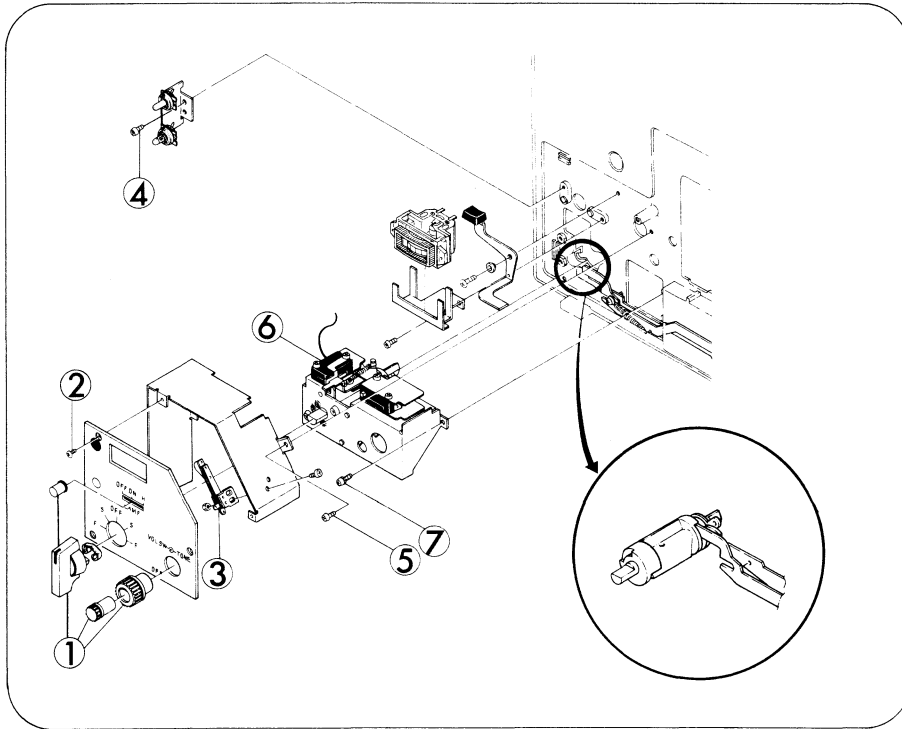


Fig. 12

### DISASSEMBLY

1. Pull out knobs (Fig.12-1,x3) such as Motor switch, Volume control and Tone control knobs. To do this, Motor switch knob should be positioned F.
2. Take out attaching screws (Fig.12-2,x3) and remove Switch panel.
3. Unsolder the end of the wires (x2) connected to Release switch (Fig.12-3).
4. Take out attaching screw (Fig.12-4) and remove Pilot lamp holder.
5. Take out attaching screw (Fig.12-5) and remove Switch cover.
6. Unsolder the end of the wire connected to Micro switch V-2A (Fig.12-6).
7. Take out attaching screws (Fig.12-7,x3) and pull out Switch assy.

### ASSEMBLY

1. Pull out AMP assy. (Refer to page 15)
2. Attach Switch assy to Base frame. To do this, first, join Switch cam and both Reverse lever and Clutch lever (3) as indicated in Fig. 12, and tighten attaching screws (Fig.12-7,x3).
3. Attach AMP assy.
4. To complete the rest, follow the reverse way of the above steps.  
(Disassembly: 6, 5, 4, 3, 2, 1)

## D. MACHINE FRAME

### 1. MACHINE FRAME (Fig. 13)

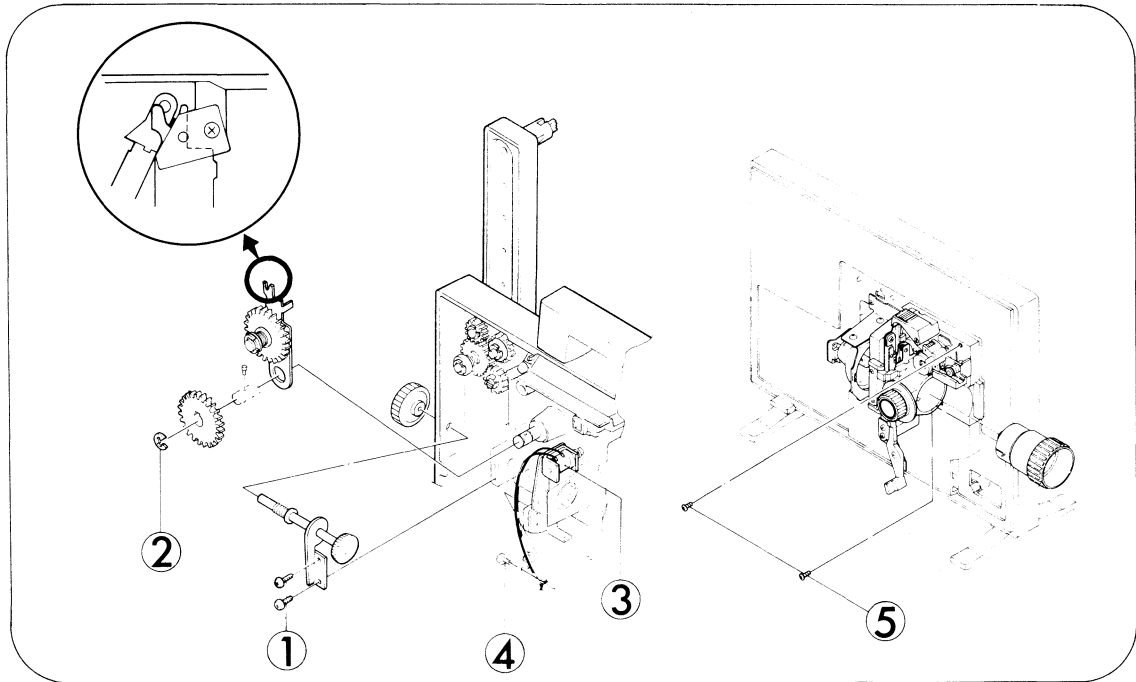


Fig. 13

#### DISASSEMBLY

1. Take out attaching screws (Fig.13-1,x2) and remove Threading knob holder.
2. Take out attaching E-ring (Fig.13-2) and remove Changing gear as well as Sprocket shaft pin, then remove Changing holder from Sprocket shaft (1).
3. Unsolder the end of the wires (x2) connected to Solenoid assy (Fig.13-3) and loosen attaching screw (Fig.13-4), then remove the wires (x2) from cord supporter.
4. Take out attaching screws (Fig.13-5,x3) and pull out Machine frame assy.

#### ASSEMBLY

1. Attach Machine frame assy of which Loop former should be released and tighten attaching screws (Fig.13-5,x3) strong enough.
2. Solder the end of the wires (x2) to Solenoid assy (Fig.13-3) and hold the wires by Cord supporter, then tighten attaching screw (Fig.13-4).
3. Insert Changing holder to Sprocket shaft (1). To do this, join the "U" shaped hollow to Changing plate lock (1) as indicated in Fig.13.
4. Attach Sprocket shaft pin and Changing gear, and clasp attaching E-ring (Fig. 13-2).
5. Attach the Threading knob holder with attaching screws (Fig.13-1,x2) so that pulled-out Threading knob could complete the single frame feed.



## 2. SECOND SPROCKET (Fig. 14)

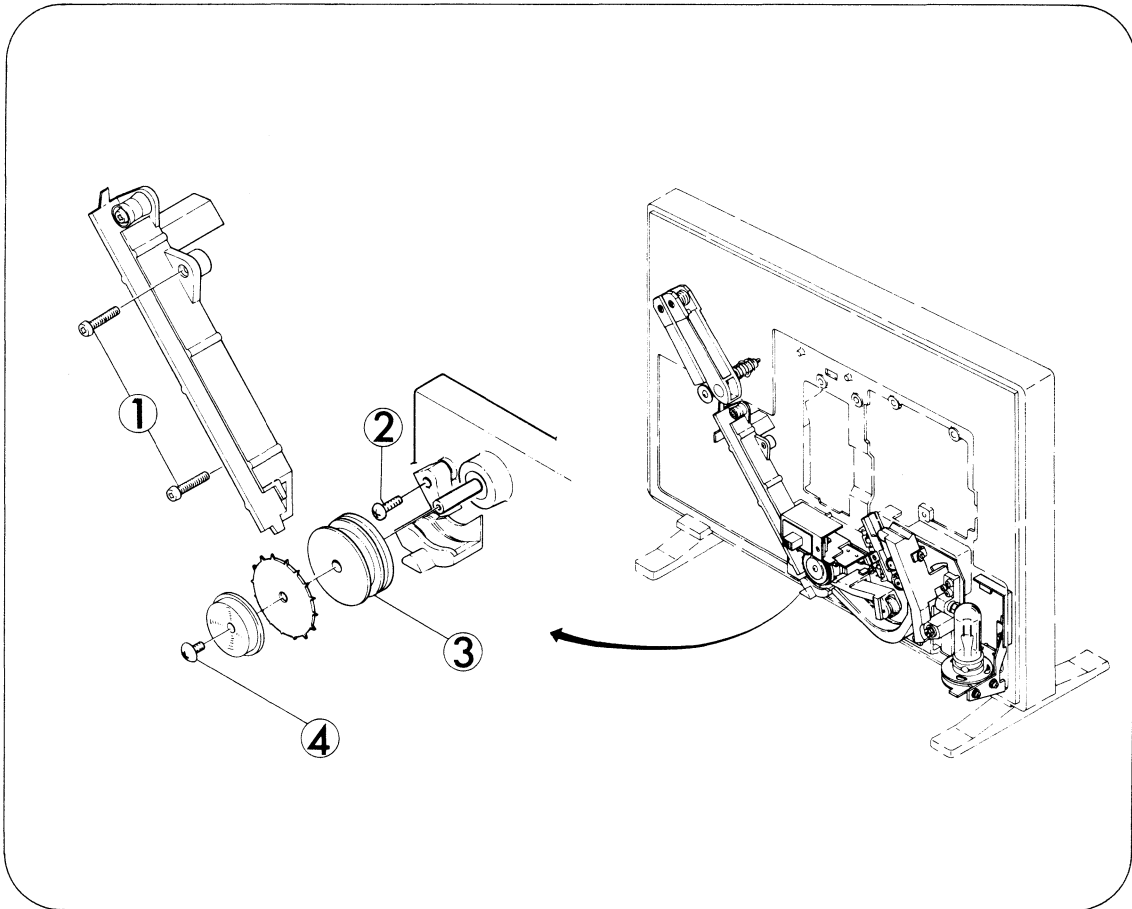


Fig. 14

### DISASSEMBLY

1. Take out attaching screws (Fig.14-1,x2) and remove Film guide 4.
2. Take out attaching screw (Fig.14-2) and remove Sprocket presser and Sprocket presser washer.
3. Pull out Second sprocket boss (Fig.14-3) as directed by the arrow in Fig. 14 and take out attaching screw (Fig.14-4), then remove Second sprocket cap and Second sprocket.

### ASSEMBLY

1. Attach Second sprocket and Second sprocket cap and pull out Second sprocket shaft as directed in Fig. 14, then tighten attaching screw (Fig.14-4).
2. To carry out the rest, follow the reverse way of the above steps.  
(Disassembly: 2, 1)

NOTE: Even if attaching screw (Fig.14-4) would be loosened or tightened without performing pulled out Second sprocket shaft, wow in sound reproduction might be developed.

## E. SOUND

### 1. AMPLIFIER (Fig. 15)

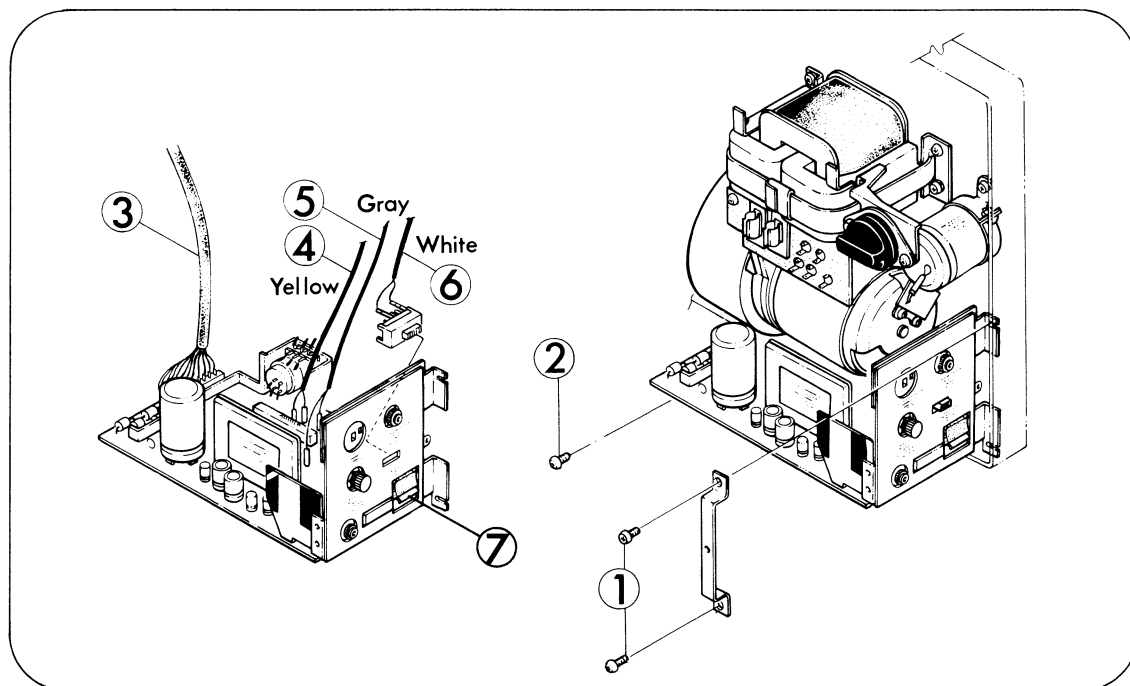


Fig. 15

#### DISASSEMBLY

1. Pull out Volume control knob and Tone control knob.
2. Take out attaching screws (Fig.15-1,x2) and remove AMP decoration plate.
3. Take out attaching screw (Fig.15-2) and pull out AMP assy.
4. Disconnect the connector pin of the wires (Fig.15-3,4,5,6) and remove AMP assy.

#### ASSEMBLY

1. Connect the connector pin of the wires (Fig.15-3,4,5,6) to AMP assy.
2. Position Motor switch knob F and attach AMP assy to Base frame so that Switch cam and Recording knob assy could cooperate.
3. Attach AMP decoration plate and tighten attaching screw (Fig.15-1,x2) (Fig.15-2) temporarily.
4. Fit AMP assy so that a click of Micro switch could not be made while Motor switch positioned S, but a click of Micro switch could be made while Motor switch positioned F besides being Recording knob pushed.
5. Attach Volume control knob and Tone control knob.

## 2. HEAD BASE PLATE (Fig. 16)

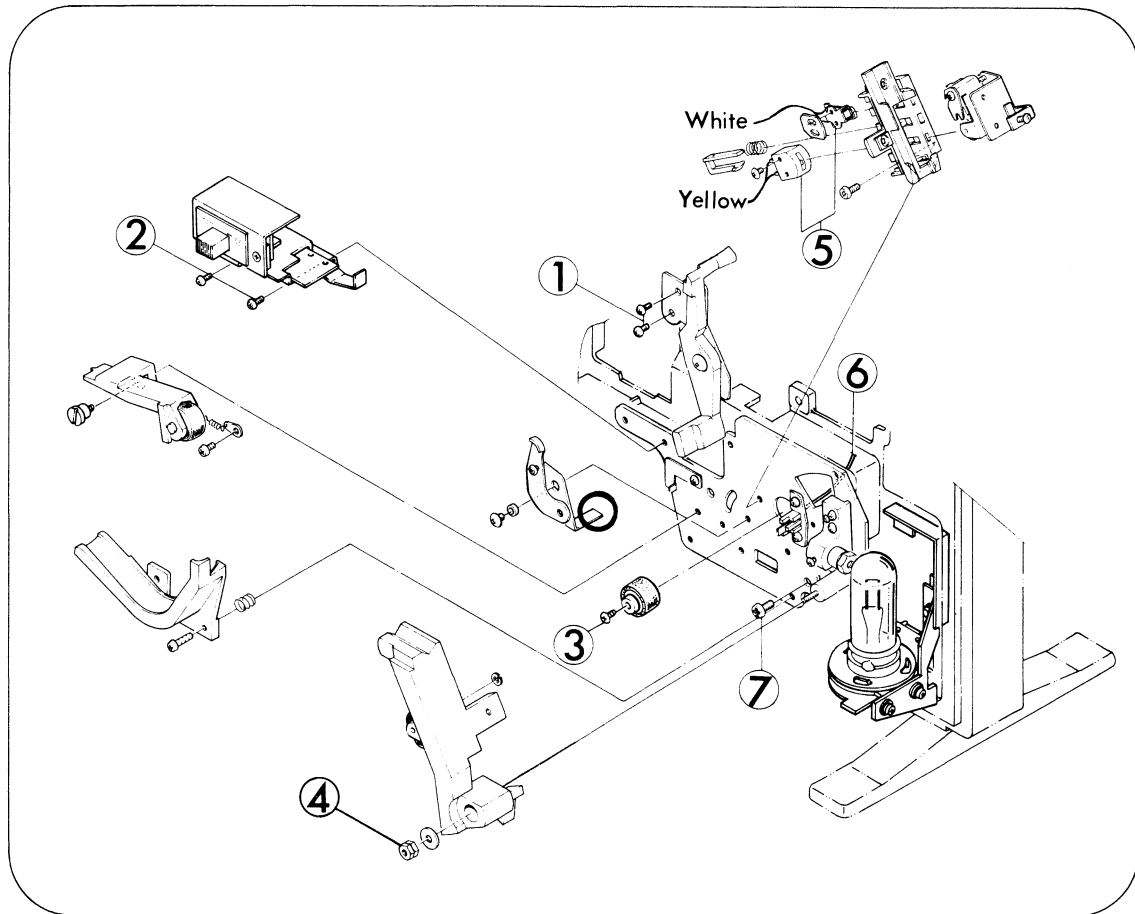


Fig. 16

### DISASSEMBLY

1. Take out attaching screws (Fig.16-1,x2) and remove Loop setter holder.
2. Take out attaching screws (Fig.16-2,x2) and remove M-0 changing holder. Optical guide and Optical guide spring come off this time.
3. Take out attaching screw (Fig.16-3) and remove Sound drum.
4. Take out attaching nuts (Fig.16-4,x2) in turn and remove Pad roller lever.
5. Unsolder the end of the wires (Fig.16-5,x2) connected to Sound head and Erasing head.
6. Disconnect the connecting pin of the wire (Fig.16-6) on AMP assy side. (Refer to page 15)
7. Take out attaching screws (Fig.16-7) and remove Head base plate assy.

### ASSEMBLY

1. As to the assembling, follow the reverse way of the above steps.
2. Attach Head base plate assy so that Reverse lever (1) and Reverse lever could join to cooperate.

### 3. SOUND LENS (Fig. 17)

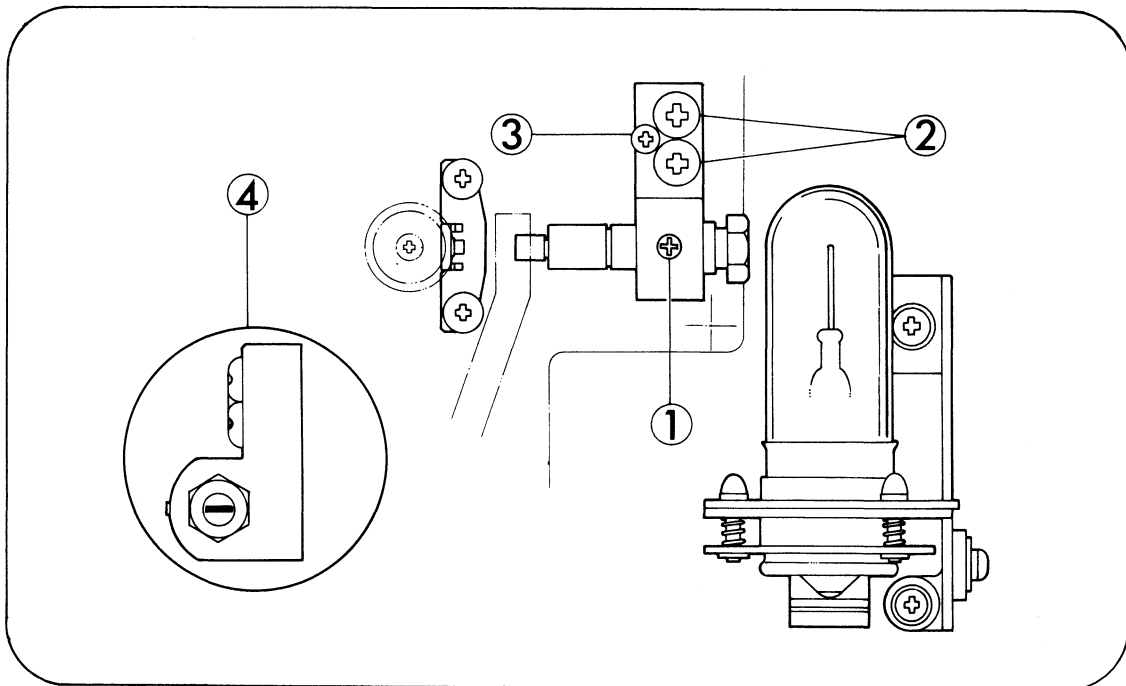


Fig. 17

#### REPLACEMENT

1. Remove Exciter lamp.
2. Remove Pad roller lever. (Refer to page 18)
3. Loosen attaching screw (Fig.17-1) and pull out Sound lens assy. Insert replacement Sound lens assy of which window to be parallel to the optical axis as illustrated (Fig.17-4).
4. Install Exciter lamp.
5. Light Exciter lamp and first loosen attaching screws (Fig.17-2,x2) slightly and either tighten or loosen attaching screw (Fig.17-3) to adjust the slit image through Sound lens can be screened in the center of Silicon photo diode.
6. Attach Pad roller lever.
7. Pass the optical focusing test film (4000 Hz).
8. Connect both the resistor (8 ohms, 10W) and the voltage meter (AC 10V max.) parallel to the output terminals of the amplifier (Extension speaker cord terminal).
9. Run the projector, move Sound lens back and forth to search the position where the output voltage is maximized, under Volume control knob positioned somewhat below max.
10. Secure all the attaching screws by screw-tight.

4. SOUND HEAD (Fig. 18)

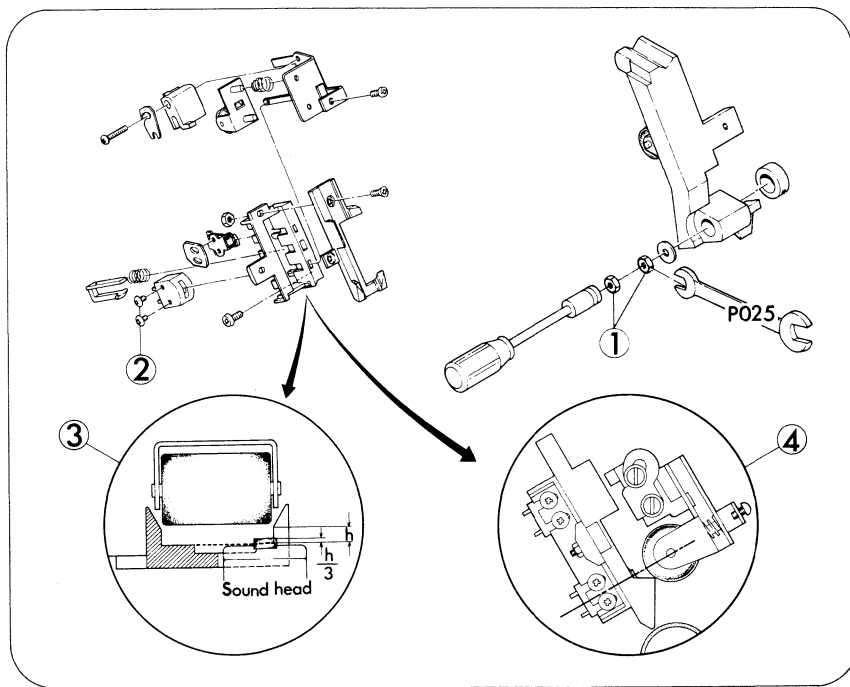


Fig. 18

REPLACEMENT

1. Remove Loop setter holder. (Refer to page 16)
2. Take out attaching nuts (Fig.18-1,x2) in turn and remove Pad roller lever. To do this, special tool No. P025 had better to be used.
3. Take out attaching screws (Fig.18-a,x2), and replace Sound head.
4. Attach Sound head temporarily so that the top of Sound head could position a little ( $h/3$ ) higher from the surface of Head film guide as illustrated (Fig.18-3) also Sound head and Head presser roller could line up in a straight line as illustrated (Fig.18-4).
5. Attach Pad roller lever and tighten attaching nuts (Fig.18-1,x2) in turn.
6. Pass the magnetic pre-recorded test film (5000 Hz).
7. Connect both the resistor (8 ohms, 10W) and the voltage meter (AC 10V max.) parallel to the output terminals of the amplifier (Extension speaker cord terminal).
8. Run the projector, move Sound head gradually to search the position where the output voltage is maximized, under Volume control knob positioned somewhat below max.
9. Secure attaching nuts (Fig.18-1,x2) and attaching (Fig.18-2,x2) by screw-tight.
10. Attach Loop setter holder.

NOTE: P025 .. Pad roller lever spanner (Offer price US\$1.00, FOB JAPAN)

II. TROUBLE SHOOTING

A. FRONT & REAR ARM

Case	Point	Step	Remark
Rewind knob can not be locked during rewinding	Changing plate lock (2) (P2-28)	Adjust Changing plate lock (2) by attaching screw to be locked enough with Rewind gear holder.	
	Changing holder (P4-6)	Check whether Changing holder could move smoothly without interrupting by Changing plate presser.  If so, bend Changing plate presser to move smoothly.	P-13
Front reel cannot rewind smoothly	Rewind gear holder (P2-9)	Check whether Front arm shaft gear would be depressed by Rewind gear holder.  If so, replace Rewind gear holder.	P-2
Reel shaft assy cannot take up with 1200 ft reel	Spring adjusting collar (P2-44)	Adjust Spring adjusting collar first loosen attaching screw to raise the take-up tension.	P-3
Reel shaft assy cannot rewind with 1200 ft reel	Spring adjusting collar (P2-2)	Adjust Spring adjusting collar first loosen attaching screw to raise the rewinding tension.	P-2

NOTE: To find out the parts in question in "Parts List of ST-Series", refer to the page as well as illustration number in brackets.

B. PROJECTION LAMP & LENS

Case	Point	Step	Remark
Lamp does not light	Lamp (P3-3)	Take out Lamp and check the defective of Lamp itself. If so, install new Lamp.	P-6
	Lamp socket assy (P3-2)	Take out Lamp, check the output terminals of Lamp socket assy whether the voltage (approx. A.C. 22-23V) would be applied. If so, raise the output terminals of Lamp socket assy to be in contact with Lamp.	P-6
	Switch assy (P6-i)	Check Micro switch SW9, SW10 whether would work properly, also of which attaching screw would be loosened.	P-12
		Check the position of Lamp switch lever 1. If not, replace or adjust.	
Transformer (P7-18)	Check both terminals of H.L. on Transformer terminal whether the voltage would be applied.	P-8	
Dark image	Lamp (P3-3)	Check whether Lamp would be off the rim of Lamp holder (2) assy.	P-6
		To obtain the sufficient brightness, first loosen attaching screws and move Lamp fixing plate and Lamp holder (2) assy back and forth until most bright screen can be achieved.	
	Safety shutter (P7-11)	If Safety shutter could not keep off from the optical axis of the screen during Motor switch knob positioned F or R, adjust the position of Safety shutter.	P-10
Uneven screen brightness	Lamp (P3-3)	To obtain leveled brightness, first loosen attaching screws and move back and forth until most bright and leveled screen brightness can be achieved.	P-6
Uneven screen focusing	Projection lens (P3-8)	To align the optical axis, first pass the focusing test film and either tighten or loosen attaching screw to obtain evenness in focusing.	P-7

C. TRANSFORMER & MOTOR

Case	Point	Step	Remark
Pilot lamp does not light	Power cord (P1-4)	Check whether Power cord would be damaged apparently, and be broken by a tester.	
	Fuse 3, 1.5A, Midget fuse 2A (P7-27, 28)	Pull out both Fuses and check the breakage. If so, replace.	P-8
	Power cord socket (P7-25)	Check Power cord socket whether would be damaged apparently. If so, replace.	
	Transformer (P7-18)	Check the line voltage and the output voltage on Transformer terminal. If the output voltage could not be approved, replace Transformer.	P-8
Motor does not run	Switch assy (P6-i)	Check Micro switch SW8 whether could not operate due to looseness of attaching screw.	P-12
		Check the breakage of Micro switch SW7, SW8 by a tester.	
	Phase change condenser (P7-48)	Check the breakage of Condenser (19 MFD, 125WV). If so, replace.	
	Motor stator (P7-61)	Check the breakage of the coil of Motor stator. If so, replace Motor assy.	P-9
	Motor circuit (P7-46)	Check the breakage of the wires connected to Terminal (2).	P-8
	Drive belt (P7-4)	During rewinding 1200 ft. reel, Drive belt would be off Clutch gum roller (1) and also captured between Clutch gum roller (1) and Clutch lever (2) assy. Consequently, Motor could not run. If so, hang Drive belt properly and adjust the position of Idler to increase the tension.	P-10,11

- to be continued -



TRANSFORMER & MOTOR (Cont'd)

Case	Point	Step	Remark
Motor vibration	Motor bearing (P7-61)	Take out Drive belt and check the jolting of Motor shaft to find out the defacement of Motor bearing. If so, replace Motor assy.	P-9
	Fan casing (1),(2),(3) (P-7,57,59,60)	If Fan would be interrupted by Fan Casings, adjust the position of Fan casing (1),(2),(3).	P-9
Motor runs relatively slow	Line voltage (P7-46)	Check the line voltage whether would drop due to fluctuation. If so, stop the projection or use a voltage regulator.	P-8
	Motor torque (P7-61)	If the motor torque would be not sufficient to achieve proper speed, replace Motor assy.	P-9
	Film feeding mechanism (P3-f)	Turn Threading knob manually, and if its movement seems to be heavy, lubricate all gears, shafts and cam.	P-13
	Clutch roller (P7-8)	If Clutch roller could not be joined with Shutter assy due to slip, adjust the position of Clutch lever (2) assy to convey the rotation of Motor.	P-10
	Drive belt (P7-4)	If the deterioration of Drive belt would be causing slip, replace Drive belt.	P-11
Motor runs but very slow	Motor stator (P7-61)	Although taking out Drive belt and running Motor itself, the rotation is very slow due to burning-up or poor layer insulation of Rotor. If so, replace Motor assy.	P-9
	Motor bearing (P7-61)	Although taking out Drive belt and running Motor itself, the rotation is very slow due to seizure of Bearing.	P-9
Yet Motor switch knob positioned R, Motor runs forward	Micro switch (P6-i)	Check Micro switch SW7 whether could not operate properly due to looseness of attaching screw.	P-12

D. MACHINE FRAME

Case	Point	Step	Remark
Film jumping	Claw (P4-40)	If the tip of Claw has been worn or inclined, adjust the position of Claw against the film perforation.	
	Pressure plate assy (P3-40)	If Pressure plate assy has been deformed or tilted unevenly, replace or adjust the position.	P-7
		If the spring pressure of Pressure plate is insufficient, replace Pressure plate spring.	
	Cam shaft (P4-27)	If the uneven end-play of Cam shaft has been developed due to wearing, replace Cam assy.	P-13
	Film guide 2 (P3-37)	If the film is held excessively between Film guide 1 and 2, adjust the position of Film guide 2.	
Picture flow	Shutter assy (P4-28)	To complete the synchronization between Shutter assy and Claw, adjust the position of Shutter.	
Film flow	Claw (P4-40)	If the tip of Claw has been broken or the stroke of Claw is insufficient with respect to the film perforation pitch, replace Claw.	
		If the tip of Claw could not protrude far enough above Aperture plate assy or is not in perforation during feeding, adjust the position of Claw.	
	Film	Check the film perforations whether has been damaged.	
Upper film loop is gradually illuminated	First sprocket shoe assy (P3-30)	Replace Shoe mount spring 2 to obtain sufficient pressure.	P-14
Lower film loop is gradually illuminated	Sprocket presser (P5-30)	Replace Lock lever spring to obtain sufficient pressure.	

- to be continued -

MACHINE FRAME (Cont'd)

Case	Point	Step	Remark
Lower film loop increases during forward projection	Middle gear 1, 2 (P5-35,36)	Replace either the damaged Middle gear 1 or 2.	
Noise around Second sprocket during forward projection	Second sprocket (P5-13)	If the sprocket teeth has been deformed, replace second sprocket.	P-14
		Turn Second sprocket gradually to search the position where the noise is minimized.	
	Tension roller (P5-63)	Move the position of Balance lever spring 1 by attaching plate to search the position where the noise is minimized.	P-16
Film passing is not smooth during auto-threading	Erasing head (P5-58)	If the film is interrupted by Erasing head, adjust the position of Erasing head.	P-18
	Sound drum (P5-19)	If the film is interrupted by Sound drum, adjust the position of Head stand.	P-18
	Head presser (P5-51)	If the space between Head presser (1) assy and Head film guide either too wide or narrow and the film is interrupted around Head film guide, bend Head presser holder assy to adjust the space.	P-18
Film cannot pass through second sprocket during auto-threading	Film guide 3 (P5-74)	Adjust the position of Film guide 3 to pass the film smoothly.	P-16
Film does not wind on Reel during auto-threading	Film guide 4 (P5-11)	If the film hits the edge of Reel, adjust the position of Film guide 4.	P-14
	Take-up guide (P5-3)	If the angle of Take-up guide with respect to Reel is distorted, bent Release switch presser to obtain the correct angle.	P-4

- to be continued -

MACHINE FRAME (Cont'd)

Case	Point	Step	Remark
Auto-threading mechanism cannot be released	Solenoid lever (P4-32)	Adjust the position of Solenoid lever so that Loop former lever assy may be released.	P-13
Film loop moves to upper side	Lateral guide 1,2 (P3-35)	Increase the spring tension of lateral guide spring to prevent the movement of film loop.	
	Slide plate (P3-39)	Bend Slide plate upward to prevent the movement of film loop.	
Lower film loop cannot be performed	Fly wheel (P5-24)	Increase the spring tension of Fly wheel spring.	
	Pad roller (P5-64)	Adjust the position of Link lever spring so that the tension of Pad roller may be increased.	P-16
	Tension roller (P5-63)	Move the position of Balance lever spring so that the film may not be stretched downward excessively.	P-16
Motor switch knob cannot be turned	Reverse lever (P6-20)	If Reverse lever has been interrupted and deformed by AMP holder 2, replace or fix Reverse lever and also cut off the portion of AMP holder 2 to not interrupt the movement of Reverse lever.	P-12
Film has been feeded during still projection	Clutch mechanism (P7-8)	Adjust the position of Clutch lever (1) assy, at the same time, adjust the position of Clutch link adjuster as well as Clutch lever (2) assy to convey the rotation of Motor assy during both 18 f/s and 24 f/s projection.	P-10

E. SOUND

Case	Point	Step	Remark
Neither optical nor magnetic recorded film cannot be reproduced	AMP assy (P7-j)	Check whether the input connecting pin to AMP assy or 12P connector has been disconnected.	
	Fuse (P7-27)	Check the breakage of Midget fuse 2A for AMP input.	P-8
	Speaker (P2-62)	If Speaker connector is not in contact with contact late of AMP assy, bend Speaker connector to make contact.	
		Check the breakage of Speaker itself. If so, replace.	
Optical recorded film cannot be reproduced	Exciter lamp (P5-68)	Check whether Exciter lamp would be off Exciter lamp socket assy as well as the breakage of Exciter lamp itself.	P-17
	Changing switch (P5-46)	Check the breakage of Changing switch by a tester. If so, replace.	P-16
	Sound lens assy (P5-81)	If Sound lens assy has bee misplaced due to loosening of attaching screws for Sound lens holder, adjust the position of Sound lens assy.	P-17
	Silicon photo diode (P5-77)	Check the br akage of the wire of Silicon photo diode by a tester. If so, replace.	
	AMP assy (P7-j)	Check the output voltages on Circuit plate in comparison with the voltage checking points on AMP circuit plate. If the unusual voltage would be measured, replace AMP assy.	P-34
Magnetic recorded film cannot be reproduced	Sound head (P5-81)	Check whether Sound head either would be tilted or extremely distorted and not touching recorded track. If so, adjust the position of Sound head and or Head film guide.	P-18
	Cancel coil (P7-34)	Check the breakage of Cancel coil. If so, replace.	
	Changing switch (P5-46)	Check the brwakage of Changing switch by a tester. If so, replace.	P-16
	AMP assy (P7-j)	Check the output voltages on Circuit plate in comparison with the voltage checking points on AMP circuit plate. If the unusual voltage would be measured, replace AMP assy.	P-34

- to be continued -

SOUND (Cont'd)

Case	Point	Step	Remark
Magnetic recording cannot be effected	Recording knob assy (P7-k)	Check the breakage of Recording knob assy by a tester.	
	AMP assy (P7-j)	Check Sound head whether the adequate bias voltage has been effected. If not, replace AMP assy. *Bias voltage: Single recording .. 30-50V A.C. Double recording .. 25-30V A.C.	
		Check the breakage of Tr3 in AMP assy to find out the damage of high frequency circuit in AMP assy. If so, replace AMP assy.	
Recording level is low	AMP assy (P7-j)	Check the bias voltage of Sound head to find out under-bias current. If so, replace AMP assy.	
	Sound head (P5-56)	If Sound head has been exhausted or broken, replace Sound head.	P-18
	Head presser (P5-51)	If the film cannot be held in parallel with Head presser and Sound head, adjust the position of Head presser holder assy.	P-18
	Film	If the sound track of film has been exhausted, replace film.	
Output sound is low during optical recorded film reproduction	Exciter lamp (P5-68)	Adjust the position of Exciter lamp if it has been distorted.	P-17
	Sound lens (P5-81)	Adjust the angle and position of Sound lens if it has been distorted. If Sound lens has been stained, replace.	P-17
	Silicon photo diode (P5-77)	Check the breakage of Silicon photo diode and if so, replace.	P-17
	AMP assy (P7-j)	Check the output voltages on Circuit plate in comparison with the voltage checking points on AMP circuit plate and if the unusual voltage would be measured, replace AMP assy.	P-34
	Film	Recording level of the film loaded is low.	

- to be continued -

SOUND (Cont'd)

Case	Point	Step	Remark
Output sound is low during magnetic recorded film reproduction	Sound head (P5-56)	If Sound head would not be in touch with the sound track exactly, adjust the position of Sound head.	P-18
	AMP assy (P7-j)	Check the output voltages on Circuit plate in comparison with the voltage checking points on AMP circuit plate. If the unusual voltage would be measured, replace AMP assy.	P-34
	Film	Recording level of the film loaded is low.	
Tone color is inferior during optical recorded film reproduction	Sound lens (P5-81)	If the slit image through Sound lens has not been exactly focused in the center of Silicon photo diode, adjust the position of Sound lens.	P-17
		If Sound lens has been stained, replace.	
	Exciter lamp (P5-68)	If Exciter lamp is distorted, adjust the position of Exciter lamp.	P-17
	AMP Assy (P7-j)	If the AMP assy is inferior, replace	P-15
	Speaker (P2-62)	If Speaker is inferior, replace.	
Tone color is inferior during magnetic recorded film reproduction	Sound head (P5-56)	If sound head has been exhausted, replace.	P-18
	Head presser (P5-51)	If Head presser cannot press the film to Sound head evenly, adjust the tension to obtain adequate spring pressure.	P-18
	AMP assy (P7-j)	If AMP assy is inferior, replace.	P-15
	Speaker (P2-62)	If Speaker is inferior, replace.	

- to be continued -

SOUND (Cont'd)

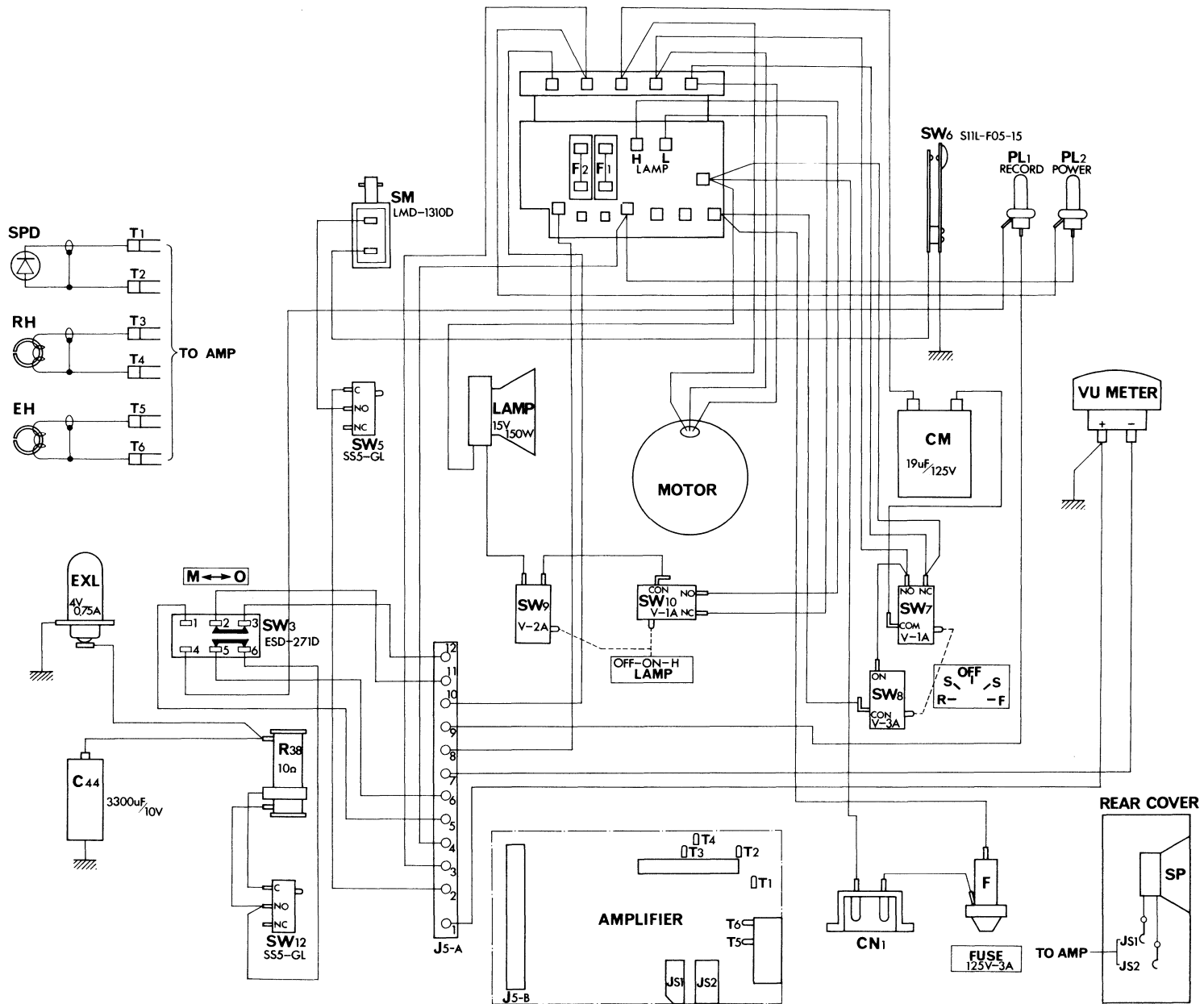
Case	Point	Step	Remark
Wow and flutter	Sound drum (P5-19)	If Sound drum has been deformed, replace.	P-16
	Pad roller (P5-64)	If Pad roller has been deformed, replace and if the film is not pressed evenly, adjust the tension of Link lever spring.	P-16
	Tension roller (P5-63)	Adjust the position of Tension roller by Balancing lever spring (1).	P-16
	Silicon photo holder (P5-76)	If the film is interrupted by Silicon photo holder, adjust the position of Silicon photo holder.	P-17
	Fly wheel (P5-24)	If the rotation of Ball bearing is not smooth, replace Ball bearing.	
		If the spring tension of Fly wheel spring is not sufficient, bend Fly wheel spring to obtain the adequate spring tension.	
	Middle gear 1,2 (P5-35,36)	If either Middle gear 1 or 2 has been broken, replace and if stained, lubricate with grease first clean up by alcohol.	
	First sprocket gear (P3-27)	If the rotation of First sprocket gear is not smooth, replace.	
	Motor assy (P7-61)	If the vibration of Motor is so big, replace Motor assy.	P-9
	Spring adjusting collar (P2-44)	If the film cannot be taken up smoothly due to excessive take-up tension, adjust the position of spring adjusting collar.	P-3
Changing gear (P4-1)	If Changing gear is distorted by Front arm shaft and Changing holder, bend Changing holder somehow.	P-13	
Film	The perforations of film loaded has been damaged.		

- to be continued -



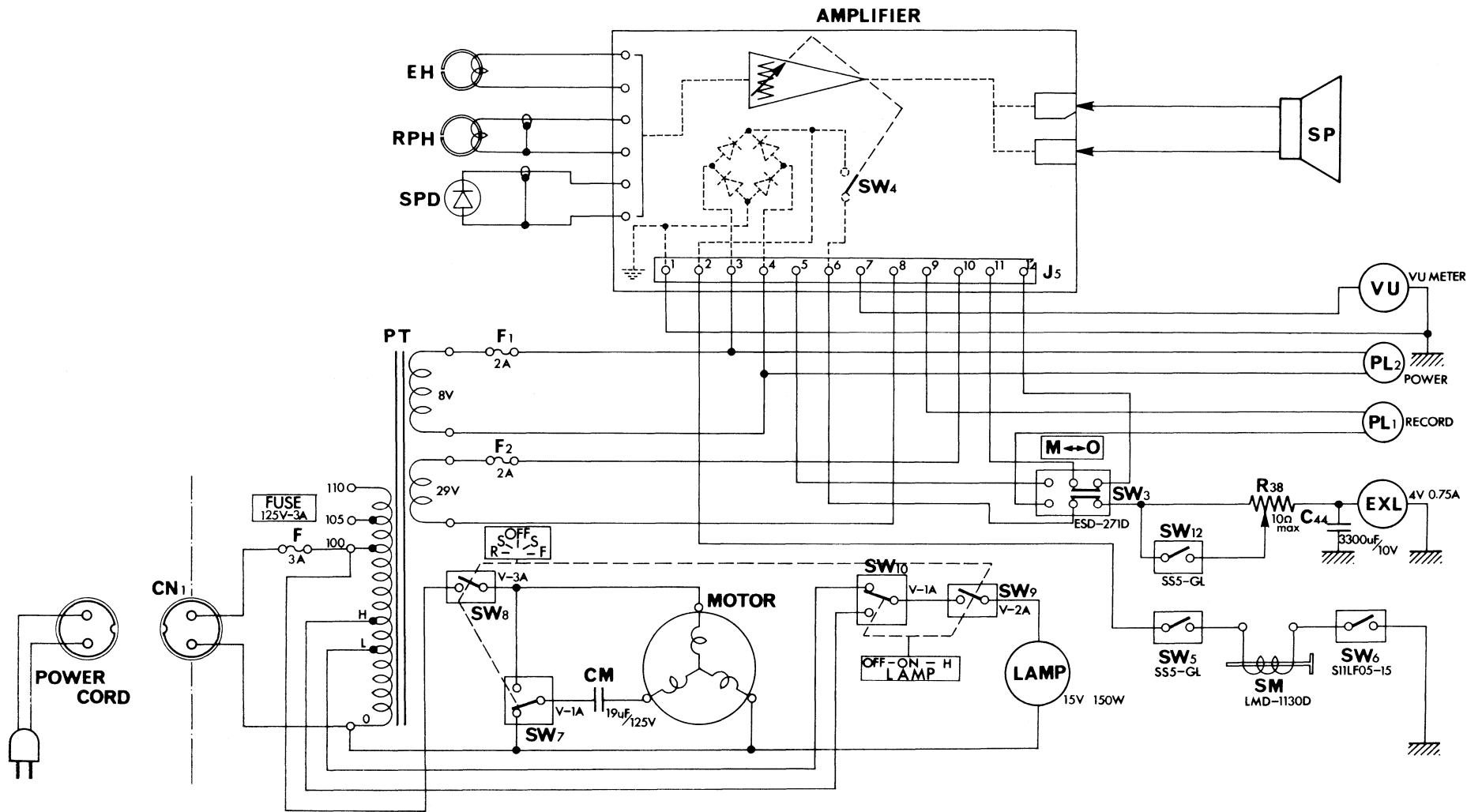
SOUND (Cont'd)

Case	Point	Step	Remark
Noise is recognized before Projection	AMP assy (P7-j)	If AMP assy is inferior, replace.	P-15
	Silicon photo diode (P5-77)	If Silicon photo diode is inferior, replace during optical recorded film reproduction.	P-17
Noise is recognized after motor is started	Cancel coil (P7-34)	Adjust the position of Cancel coil or if it is inferior, replace.	
Noise is recognized when sound drum is rotated	Power IC (P7-19)	Replace IC3 (STK-015) if it is inferior, at the same time, replace C32 (0.047 MFD) and R23 (5 ohms).	
	AMP assy (P7-j)	Check whether earthed circuit in AMP assy is either inferior or mid-wired.	P-15
		If the input wire to AMP assy is excessively long and close by the speaker circuit of AMP assy, cut the wire adequately to prevent oscillation of AMP assy.	
Silicon photo diode (P5-77)	If Sound drum is touching Silicon photo diode, adjust the position of Silicon photo holder.	P-17	



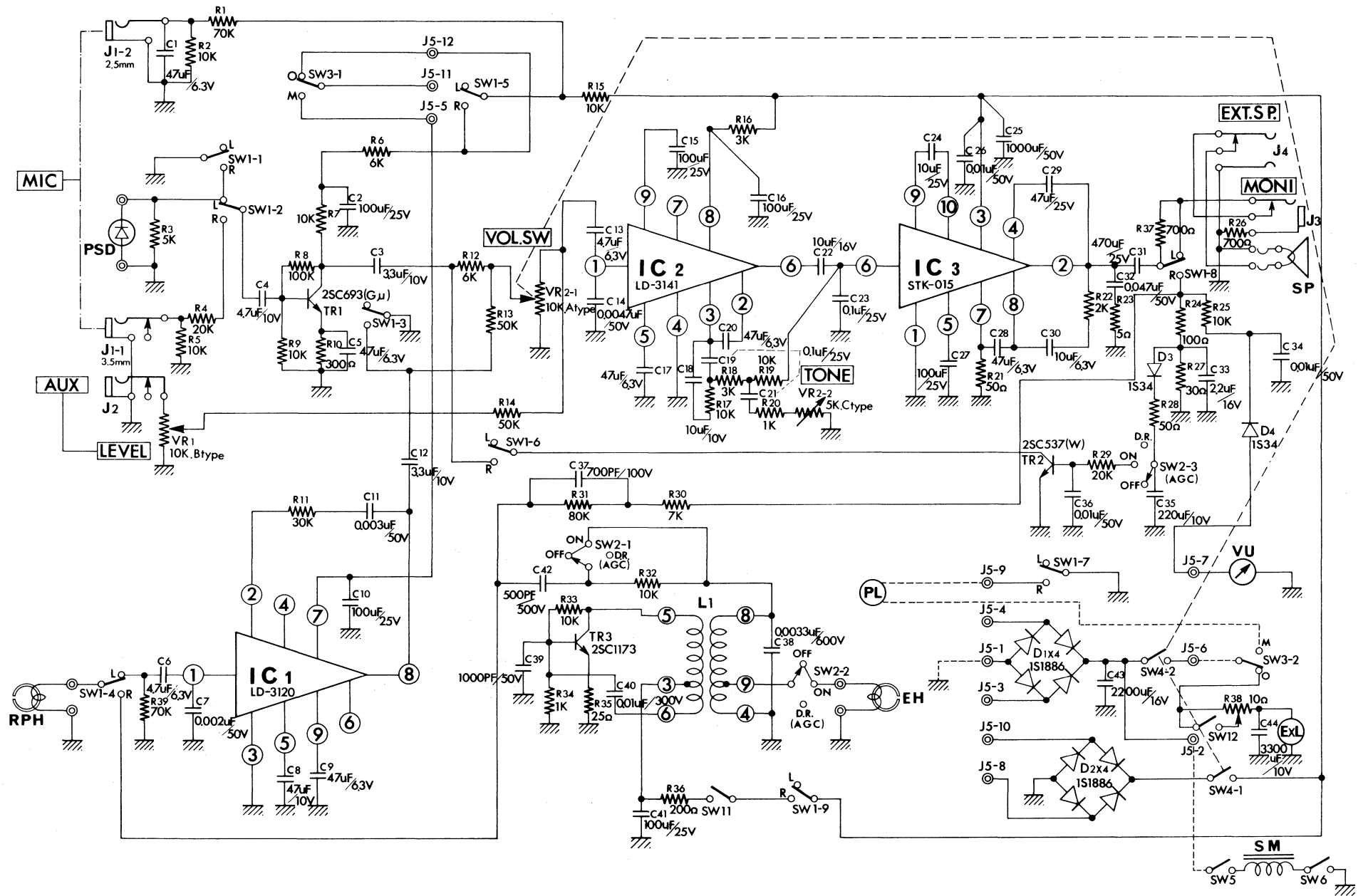
Connecting diagram for machine for ST-1200

E 20309B



Schematic diagram for machine for ST-1200

E 30653B



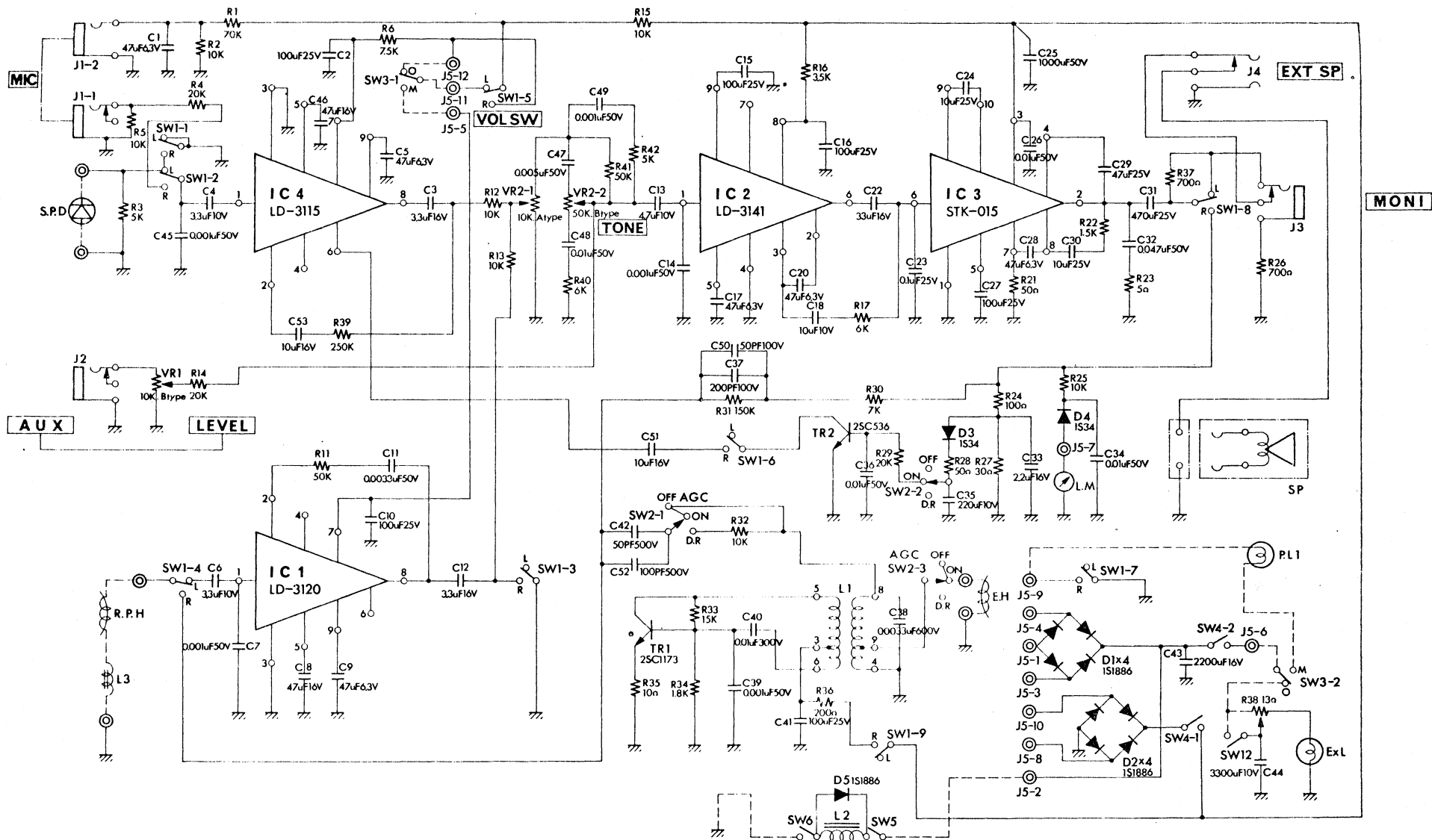
Schematic diagram for amplifier for ST-1200

E30627B



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Service Department  
Nagoya Japan  
February 1973  
SERVICE MANUAL No.201



Schematic diagram for Amplifier for ST-1200 E30694 (Type-C)





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