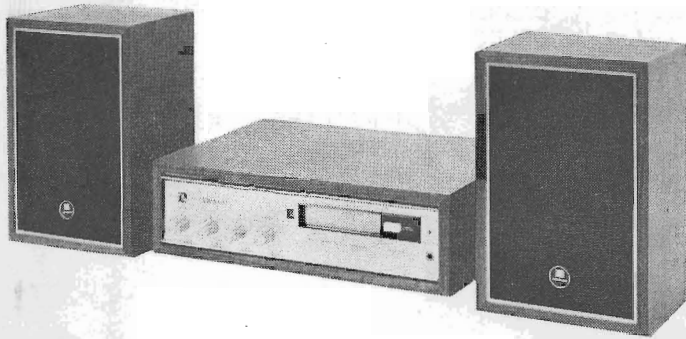


B E I



TRANSISTOR STEREO

TAPE PLAYER

MODEL TPQ-115

SERVICE MANUAL

No. 224

1969

SPECIFICATIONS

- PLAY BACK SYSTEM 8 track, 4 channels
- TRANSISTORS
 - 2SC281 Pre. Amp.
 - 2SC458 Pre. Amp.
 - 2SC281 AF. Amp.
 - 2SC458 Driver
 - 2SB367 × 2 Power Amp.
- THERMISTORS
 - 13D27 × 4 Temperature Compensator
- DIODES
 - 1S310 × 4 Rectifier
- CARTRIDGE Stereo 8 tracks
- TAPE SPEED 3¾ ips
- TAPE CHANGE SYSTEM Automatic or Manual Push Button System
- FREQUENCY RANGE 40 ~ 13,000Hz
- AUDIO OUTPUT 14W (integrate)
- SPEAKER 7" × 5" P.M. × 2
- OUTPUT IMPEDANCE 8 ohms at SP Jack
 - 8 ohms at Headphone Jack
- INPUT IMPEDANCE 10K ohms at Aux. Input Jack
- POWER SUPPLY AC 120V 60Hz or 230V 50Hz
- POWER CONSUMPTION 50W
- DIMENSIONS Player
 - 4⅝"(H) × 15⅞"(W) × 11⅝"(D)
 - Speaker
 - 11⅝"(H) × 17⅞"(W) × 5⅞"(D)
- WEIGHT..... Player 11 lbs
 - Speaker Box 4 lbs, 8oz. × 2
- ACCESSORIES Patch cord 1

CONTROLS AND CONNECTIONS

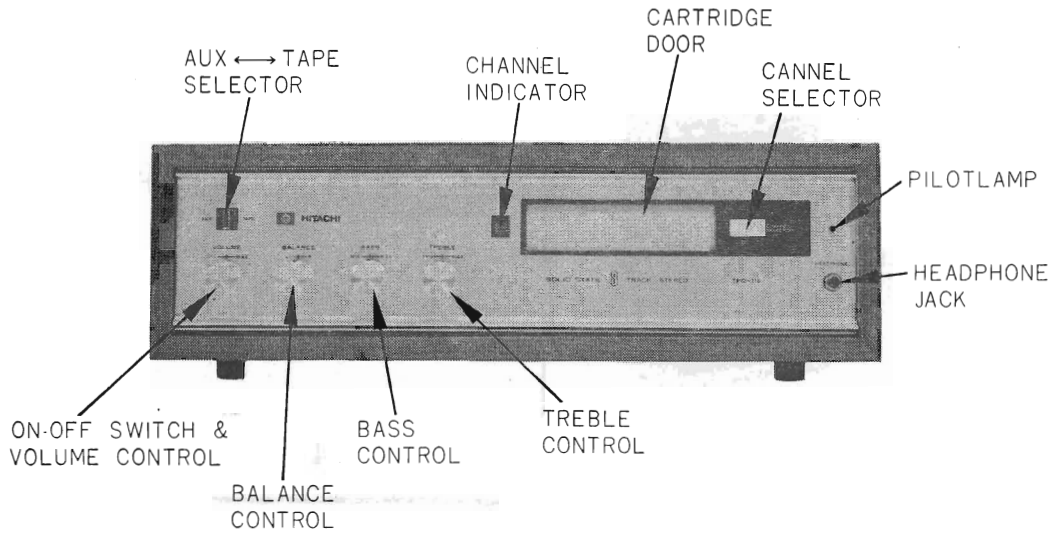


Fig. 1

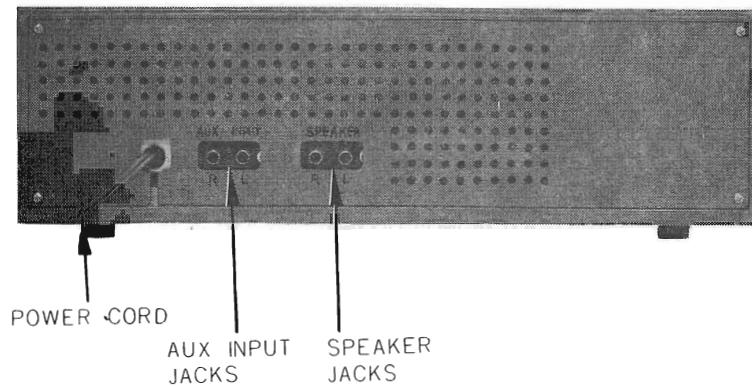


Fig. 2

DISASSEMBLY

1. Removal of Chassis.

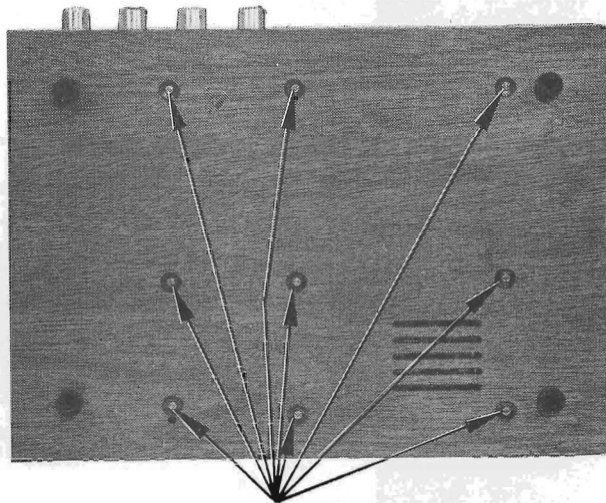
Remove nine screws holding chassis as shown in Fig. 3.

The chassis is pulled out from the cabinet, together with the escutcheon panel.

When pulling out the chassis, the cabinet is not damaged provided that the plate such as fibre is inserted in the gap between panel and cabinet so that the side surface of the escutcheon panel and the inside surface of cabinet may not contact.

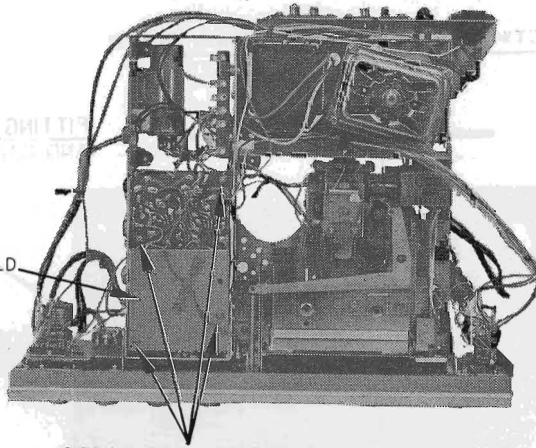
2. Removal of circuit board.

Remove four screws holding circuit board as shown in Fig. 4.



CHASSIS HOLDING SCREWS

Fig. 3



CIRCUIT BOARD HOLDING SCREWS

Fig. 4

MODEL TPQ-115 SERVICE MANUAL

3. To take off the output transistor.

The side surface of the chassis is utilized as the radiation plate of the output transistor. Referring to Figs. 5 and 6, take off the output transistor.

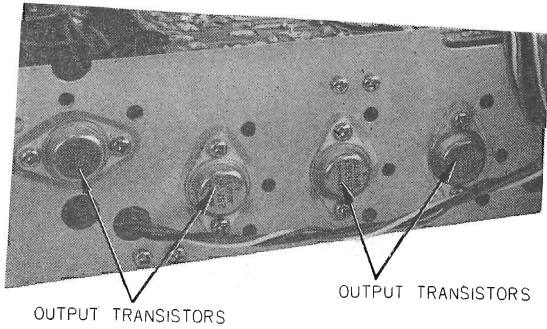


Fig. 5

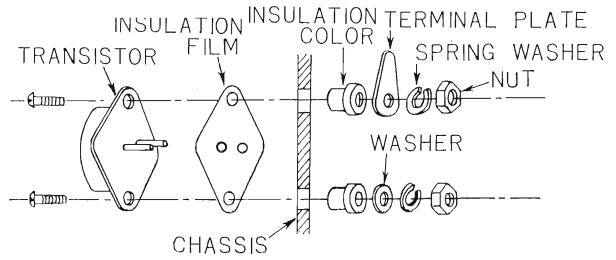


Fig. 6

LUBRICATION

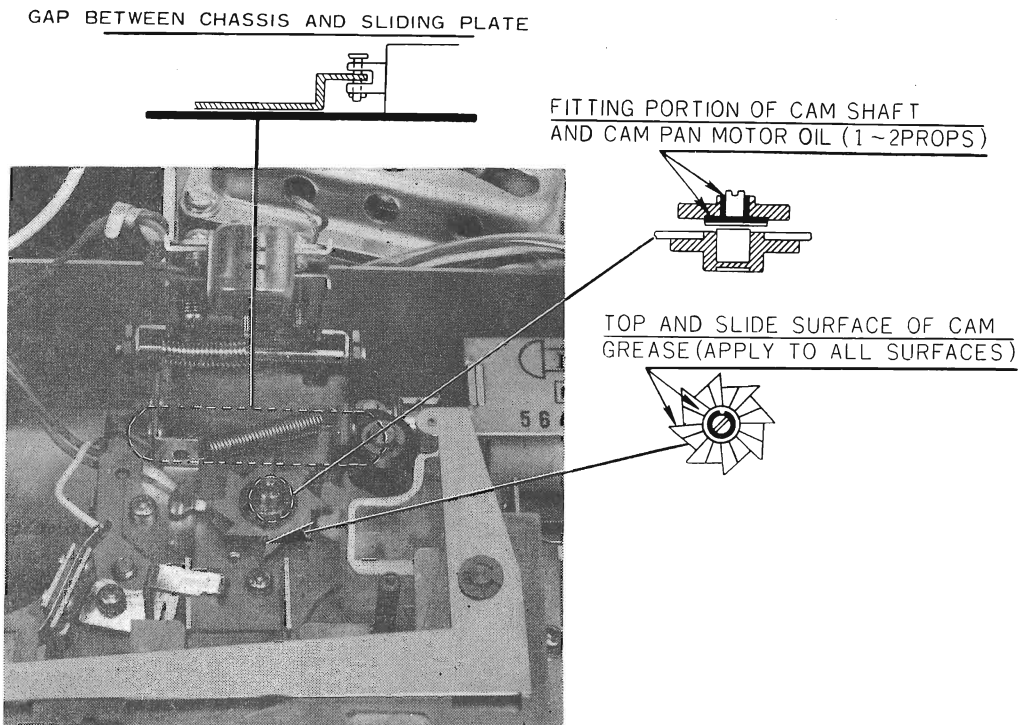


Fig. 7

ADJUSTMENT

Adjusting the Head Height

Height of the reproduction head must coincide exactly with the height of the recorded track (1-8) on the tape. The head height is adjusted by rotating the adjustment screw (shown in Fig. 8) which adjusts height of the cam.

Perform this adjustment when volume from both left and right channels seems somewhat insufficient, sounds of two channels are unbalanced, or reproduced sound is somewhat distorted. Set the adjustment screw at an optimum point (maximum volume and best tone).

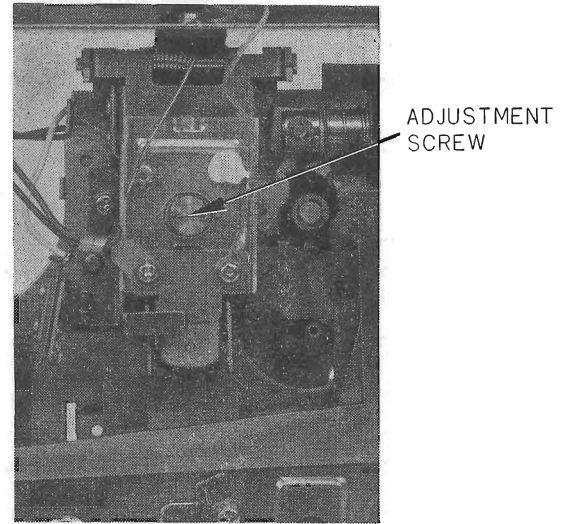


Fig. 8

CHECK AND REPAIR

1. Principal parts which require servicing or replacement during check and repair are as follows:

Table 1

	Nomenclature	Cause
1	Tape head	Abrasions
2	Motor	Deterioration of governor contacts and carbon brushes
3	Flywheel	Slip due to abraded capstan
4	Bearing	Abrasions, or oil expended
5	Belt	Abrasions or breaks
6	Escutcheon and other exterior parts	Stained or broken
7	Zener diode and other electrical parts	Irregular voltage or malconnection in power supply

NOTE: Life of the tape head exceeds 500 hours (average life 700~800 hours; that of the motor is over 1,000 hours. Estimated life of other parts exceeds 2,000 hours.

MODEL TPQ-115 SERVICE MANUAL

2. Troubles of tapes or irregular conditions due to users' careless operation are classified as listed in the following table.

Table 2

	Trouble	Cause	Checking method
1	Crosstalk	Recorded sound track width of tape exceeds the rated maximum value (0.05mm); or relative position of tracks (1-8) is not accurate.	Replace the cartridge with two or three other cartridges, and check for crosstalk. If normal performance is obtained with other cartridges, the initial cartridge is faulty.
2	Tape jamming	Tape manually pulled out jams in the cartridge. Tape is fed by capstan, but is not taken up in reel, jamming around the capstan.	If the tape is wound slack, tape slack can be absorbed in the reel. If the tape is manually pulled out 5cm or more from the reel, the reel cannot take up the jammed tape.
3	Flutter due to deformed pinch roller	Cartridge has been inserted in the set and left for a long time. Car was left with power source cut by engine key, but without removing the cartridge from player. Pinch roller deformation is apt to occur when ambient temperature is high.	Deformation of pinch roller is caused naturally; with continuous use of approximately 100 hours. However, the period depends on the cartridge manufacturer.

3. Defects in bearing

The following troubles require replacement of the flywheel bearings.

Table 3

Item	Symptoms	Possible causes	Remedy
1	Excessive rumbling sound	1) Dust or other foreign matter is mixed between the bearing balls.	Replace bearing
		2) Abraded inner or outer ring or ball bearing causes rumbling.	Replace bearing
		3) Excessive shock applied to the bearing causes rumbling.	Replace bearing
2	Excessive wow and flutter	1) Bearing rotation is not smooth, due to infiltrated foreign matter.	Replace bearing
		2) Bearing rotation is not smooth, grease in inner or outer ring or ball expended due to use exceeding the guaranteed period.	Replace bearing
		3) Excessive load applied to the bearing is causing wear in bearing portion; rotation of bearing balls is not smooth.	Replace bearing

When excessive wow and flutter remain, even after the bearing is replaced based on items 1 and 2, above, check the belt, motor, and flywheel.

3	Tape speed is retarded.	1) Grease in the bearing congealed, due to use exceeding guaranteed bearing life Retards ball rotation and increases loss-torque, thereby so wing down flywheel rotation.	Replace bearing.
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When tape speed is still slow, even after the bearing is replaced based on items 1,2 and 3, above, check the belt and motor.

4. Replacing the bearing

- 1) Remove three 4mm ϕ Pan head screws (1) and take off the flywheel holder (2).
- 2) Remove the 2mm ϕ belt (6), and remove three 2.6mm ϕ flat-head screws (4). Slowly remove the flywheel (3), paying attention not to bend the flywheel shaft.
- 3) Remove three 2.6mm ϕ flat-head screws (4), and remove the bearing (5). Since the bearing is fitted to the shaft, remove the bearing by pulling it slowly straight upward.

Clean that portion of the shaft with alcohol which contacts with the bearing inner ring, assembling it with a new bearing.

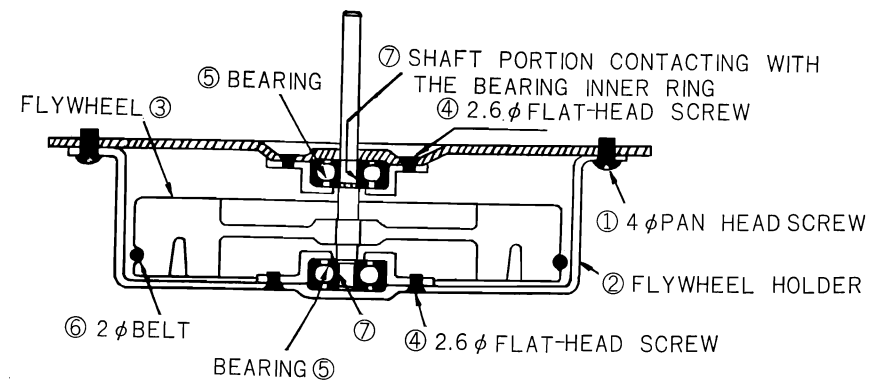


Fig. 9

5. Defect in belt

When the following troubles occur, clean or replace the belt.

Table 4

Item	Symptoms	Possible causes	Remedy
1	Flywheel does not rotate (with power switch set to ON).	Flywheel does not rotate when a cartridge is properly inserted in the set, and the power switch is turned ON; or transmission power is insufficient to feed the tape. 1) Belt is broken, or motor does not rotate 2) Belt is out of position, or a flaw in the belt has elongated it, causing a slip between the belt and pulley. (A silicon rubber belt is apt to weaken if a flaw in it occurs.)	Replace belt. Replace belt.

2	Tape speed is retarded.	1) Dust or oil adhered to the belt surface causes slip between the pulley and belt. 2) Elongation of the belt causes slip between the pulley and belt.	Clean the belt with alcohol, not with benzine.
3	Excessive wow and flutter.	1) Fluctuating flywheel rotation due to unstable slip between the pulley and belt on which surface dust or other foreign matter is adhered.	Clean belt with alcohol.

When tape speed is still retarded or flutter exists, even after the belt has been replaced or cleaned, check the bearing, motor and flywheel.

6. Replacing the belt

Remove the 2mm ϕ belt (6) after removing three 4mm ϕ pan head screws (1) and the flywheel holder (2). Clean a new belt with alcohol and check it for wear before assembling.

7. Defective flywheel.

When the following trouble occurs, clean or replace the flywheel.

Table 5

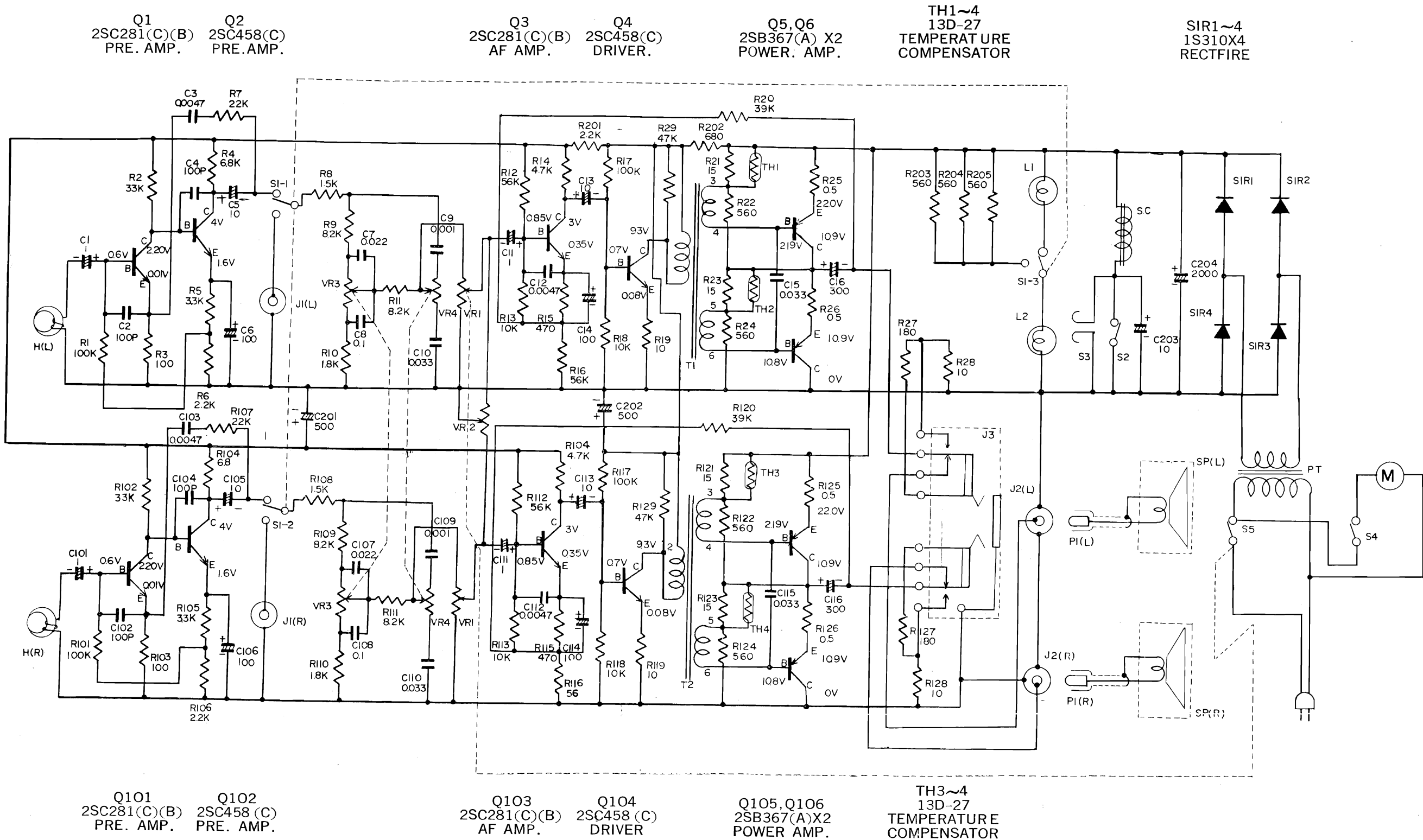
Item	Symptom	Possible causes	Remedy
1	Excessive wow and flutter	1) Ferromagnetic powder dropped from the tape has adhered on the flywheel shaft surface, varying pinch roller rotation. 2) Eccentric shaft rotation. External shock has deformed the shaft.	Clean shaft surface with alcohol. Replace flywheel.

8. Replacing the flywheel

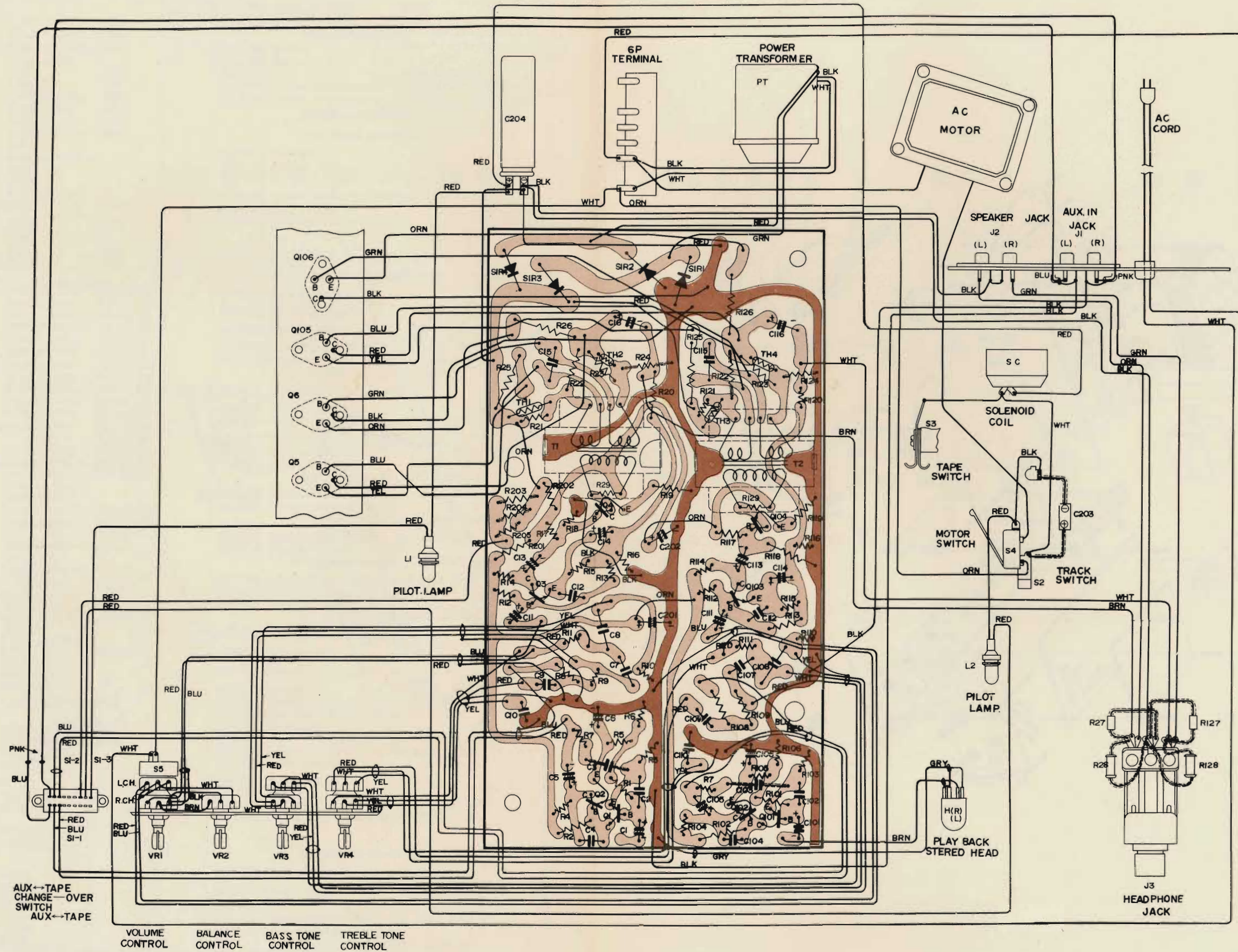
Remove three 4mm ϕ pan head screws (1), the flywheel holder (2), and 2mm ϕ belt (6) in the same manner shown in Fig. 9.

Remove and replace the flywheel (3). Be careful not to deform or bend the shaft.

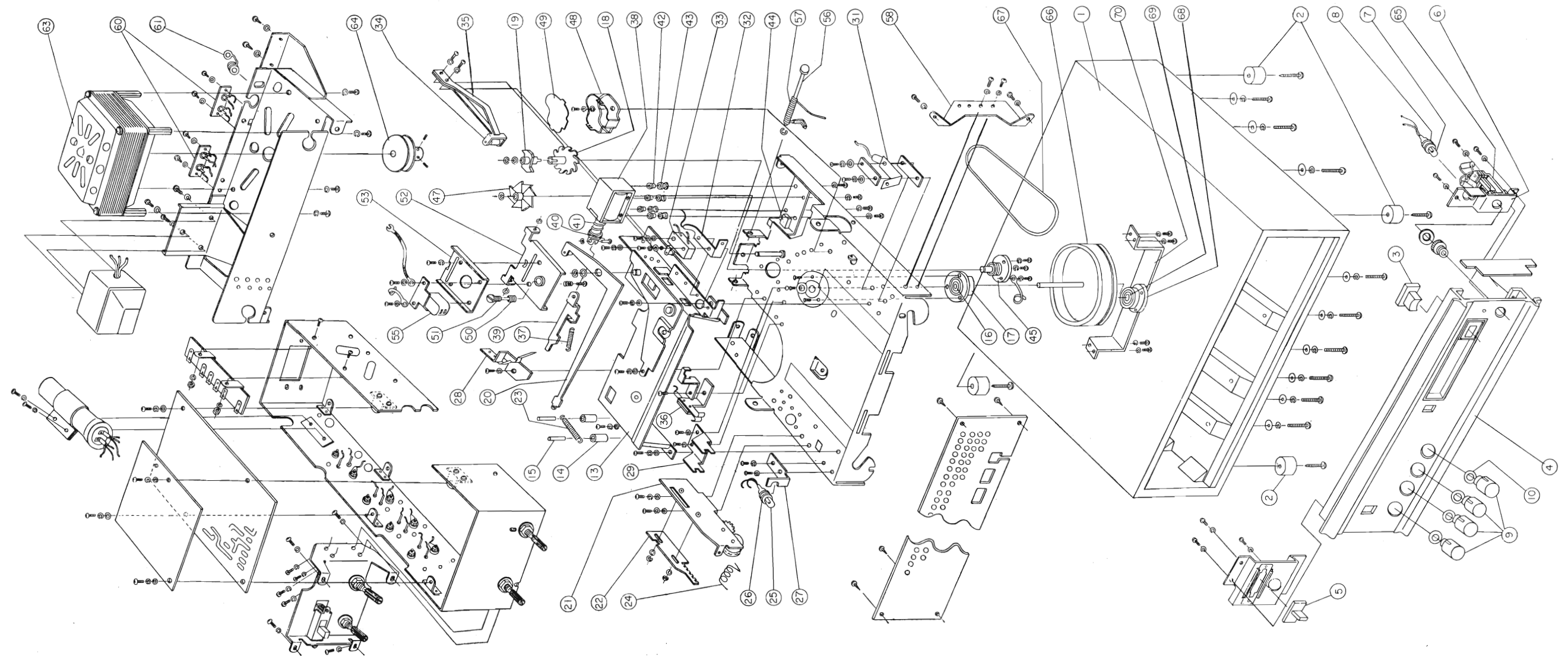
CIRCUIT DIAGRAM



CIRCUIT BOARD DIAGRAM



MECHANICAL PARTS VIEW



REPLACEMENT PARTS

Symbol No.	Stock No.	Description	Symbol No.	Stock No.	Description
CAPACITORS:			TRANSFORMERS:		
C 1,101	0252811	Electrolytic	Si R3	0552010	Same as SiR1
C 2,102	0248724	Ceramic	Si R4	0441058	Same as SiR1
C 3,103	0274115	Mylar	MISCCELLANEOUS:		
C 4,104	0248724	Same as C2	for Final assembly		
C 5,105	0252321	Electrolytic	T 1	0441058	Driver
C 6,106	0252131	Electrolytic	T 2	0441058	Same as T1
C 7,107	0275113	Mylar	5210273		(100V 50/60%)
C 8,108	0276111	Mylar	5210272		(117V 60%) (TPQ-115A)
C 9,109	0274111	Mylar	5210274		(220V50%) (TPQ-115E)
C 10,110	0275114	Mylar	MISCCELLANEOUS:		
C 11,111	0252811	Same as C1	for Final assembly		
C 12,112	0274115	Same as C3	6115071		Cabinet
C 13,113	0252321	Same as C5	0971279		Rubber base
C 14,114	0252131	Same as C6	8751513		Screw-3.5mm ϕ \times 13mm wood (4 req'd)
C 15,115	0275114	Same as C10	8711435		Screw-3mm ϕ \times 35mm pan head ISO
C 16,116	0252633	Electrolytic	0645587		Special washer
C 201	0252535	Electrolytic	8813124		Washer-3mm ϕ spring for chassis mounting
C 202	0252535	Same as C201	6161762		Back lid
C 203	0251821	Electrolytic	8755410		Screw-3.1mm ϕ \times 10mm wood (4 req'd)
C 204	0259716	Electrolytic	0015672		Switch button
RESISTORS:			6211771		Panel sub ass'y
R 1,101	0137951	Carbon film	0015329		Switch button
R 2,102	0137907	Carbon film	8711405		Screw-3mm ϕ \times 5mm pan head ISO (3 req'd)
R 3,103	0137801	Carbon film	8813124		Washer-3mm ϕ spring (3 req'd) for button holder mounting
R 4,104	0137861	Carbon film	7174111		Head phone jack holder
R 5,105	0137857	Carbon film	0594112		Pilot lamp
R 6,106	0137855	Carbon film	0948295		Rubber plate
R 7,107	0137905	Carbon film	6704271		Insulating washer (2 req'd)
R 8,108	0137853	Carbon film	0958453		Jack washer
R 9,109	0137862	Carbon film	7661511		Rubber plate for head phone jack mounting
R 10,110	0137854	Carbon film	8711405		Screw-3mm ϕ \times 5mm pan head ISO (3 req'd)
R 11,111	0137862	Carbon film	8813124		Washer-3mm ϕ spring for head phone jack holder mounting
R 12,112	0137910	Carbon film	8711405		Screw-3mm ϕ \times 5mm pan head ISO (2 req'd)
R 13,113	0137901	Carbon film	8813124		Washer-3mm ϕ spring for panel mounting side of panel holder
R 14,114	0137859	Carbon film	8711405		Screw-3mm ϕ \times 5mm pan head ISO (4 req'd)
R 15,115	0137809	Carbon film	8811234		Washer-3mm ϕ (A) for panel mountig side of volume holder
R 16,116	0137768	Carbon film	6260762		Volume control knob sub ass'y
R 17,117	0137951	Same as R1	0625898		Volume felt
R 18,118	0137901	Same as R13	6114053		Speaker box sub ass'y
R 19,119	0137759	Carbon film	0526171		Speaker
R 20,120	0137908	Carbon film	0681276		Washer-3mm ϕ special (8 req'd)
R 21,121	0137761	Carbon film	8821114		Nut-3mm ϕ ISO (8 req'd)
R 22,122	0134370	Composition	7711131		Back plate
R 23,123	0137761	Same as R21	8751410		Screw-3.1mm ϕ \times 10mm wood (8 req'd)
R 24,124	0134370	Same as R22	8751410		Screw-3.1mm ϕ \times 10mm wood (2 req'd)
R 25,125	0149101	Wire wound	7711161		Cord clamper
R 26,126	0149101	Same as R25	0598508		Patch cord
R 27,127	0134364	Composition	7614571		
R 28,128	0190026	Wire wound	7617202		Rating label (117V60%) (TPQ-115A)
R 201	0137855	Same as R6	7617203		Rating label (220V50%) (TPQ-115E)
R 202	0137811	Carbon film	for Chassis assembly		
R 203	0134370	Same as R22	7171363		Cartridge guide sub ass'y
R 204	0134370	Same as R22	0015216		Guide roller
R 205	0134370	Same as R22	0944751		Guide roller shaft
VR 1	0153641	Variable (with switch)	8711405		Screw-3mm ϕ \times 5mm pan head ISO (4 req'd)
VR 2	0153635	Variable	8813124		Washer-3mm ϕ spring for cartridge guide mounting
VR 3	0156090	Variable	TRANSISTORS:		
VR 4	0156090	Same as VR3	Q 1,101	0573066	2SC281(C)
VR 5	0156091	Variable	Q 2,102	0573481	2SC458(C)
TRANSISTORS:			Q 3,103	0573066	Same as Q1
Q 1,101	0573066		Q 4,104	0573481	Same as Q2
Q 2,102	0573481	Same as Q1	Q 5,105	0573030	2SC458(C)
Q 3,103	0573066	Same as Q1	Q 6,106	0576031	2SB367(A)P
Q 4,104	0573481	Same as Q2	TH 1	0576031	Thermistor
Q 5,105	0573030	Same as Q5	TH 2	0576031	Same as TH1
Q 6,106	0576031	Same as Q5	TH 3	0576031	Same as TH1
TH 1	0576031	Thermistor	TH 4	0552010	Same as TH1
TH 2	0576031	Same as TH1	Si R1	0552010	Silicon rectifier
TH 3	0576031	Same as TH1	Si R2	0552010	Same as SiR1
TH 4	0552010	Same as TH1			
Si R1	0552010	Silicon rectifier			
Si R2	0552010	Same as SiR1			

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Symbol No.	Stock No.	Description	Symbol No.	Stock No.	Description
	8711404	Screw-3mm ϕ \times 4mm pan head ISO		6311641	Adjust spring
	8813124	Washer-3mm ϕ spring		7504741	Adjust screw sub ass'y
	8811234	Washer-3mm ϕ (A)		7174881	Head plate sub ass'y
		for adjusting plate mounting		7174861	Head holder
	0944764	Bearing		8711412	Screw-3mm ϕ \times 12mm pan head ISO
	7500192	Bearing holder		0948154	Tape guide spring
	0721306	Screw-2.6mm ϕ \times 6mm flat (3 req'd)		8813124	Washer-3mm ϕ spring
	6340121	Channel gear		8711408	Screw-3mm ϕ \times 8mm pan head ISO
	6340132	Channel cam		5440043	Head
	0637445	Ring-"E"		8711405	Screw-3mm ϕ \times 5mm pan head ISO (2 req'd)
	7164291	Cam roller sub ass'y		8813124	Washer-3mm ϕ spring (2 req'd)
	0636553	Rewind washer		0944752	Shaft-head plate
	0637445	Ring-"E"		0637443	Ring-"E"
	7170931	Rack holder sub ass'y		0662191	Spring
	8711405	Screw-3mm ϕ \times 5mm pan head ISO		0638551	Fiber washer (2 req'd)
	8813124	Washer-3mm ϕ spring		0942157	Panel holder
		for rack holder mounting		8711405	Screw-3mm ϕ \times 5mm pan head ISO (2 req'd)
	7170921	Rack		8813124	Washer-3mm ϕ spring (2 req'd)
	0636553	Rewind washer (2 req'd)			for panel holder mounting
	0637445	Ring-"E" (2 req'd)		8711405	Screw-3mm ϕ \times 5mm pan head ISO (3 req'd)
	6311071	Return spring		8813124	Washer-3mm ϕ spring (3 req'd)
	6310841	Dial spring			for power transformer mounting
	0941257	Ring-"E"		5650131	
	0594112	Pilot lamp	J 1, 2	5670101	Jack-2P pin jack
	0948295	Rubber plate		8781436	Screw-3mm ϕ \times 6mm tapping (4 req'd)
	7171011	Lamp holder		8811234	Washer-3mm ϕ (A) (4 req'd)
	8711405	Screw-3mm ϕ \times 5mm pan head ISO (2 req'd)		0043793	Bushing
	8813124	Washer-3mm ϕ spring		5740493	
		for lamp holder mounting		0593558	Power cord
	7171293	Adjusting spring sub ass'y		5570195	
	8711405	Screw-3mm ϕ \times 5mm pan head ISO		5570342	Motor (TPQ-115A)
	8813124	Washer-3mm ϕ spring		5570341	Motor (TPQ-115E)
	7165161	Tape guide		6340513	Motor pulley (TPQ-115A)
	8711405	Screw-3mm ϕ \times 5mm pan head ISO (2 req'd)		0944876	Motor pulley (TPQ-115A.E)
	8813124	Washer-3mm ϕ spring (2 req'd)		0538564	Lock screw (2 req'd)
	0015223	Insulating plate (1)		8711606	Screw-4mm ϕ \times 6mm pan head ISO
	0941897	Switch plate		8813126	Washer-4mm ϕ spring
	0948911	Insulating plate (2)			for motor mounting
	7171412	Earth plate		5670261	Head phone jack
	0711306	Screw-2.6mm ϕ \times 6mm pan head		0930128	Flywheel sub ass'y
	8811113	Washer-2.6mm ϕ (A)		0971235	Belt-2mm ϕ
	8813433	Washer-2.6mm ϕ spring		0948578	Nylon washer
		for switch plate mounting		7500192	Bearing holder
	0948821	Insulating sheet		0944764	Bearing
	8715110	Screw-2mm ϕ \times 10mm pan head		7170991	Flywheel holder
	8811231	Washer-2mm ϕ (A)		0721306	Screw-2.6mm ϕ \times 6mm flat (3 req'd)
	8813231	Washer-2mm ϕ spring			for bearing holder mounting
		for micro switch mounting		8711608	Screw-4mm ϕ \times 8mm pan head ISO (3 req'd)
	0942154	Pressure roller sub ass'y		8813126	Washer-4mm ϕ spring (3 req'd)
	0942156	Sub pressure spring			for flywheel holder mounting
	8711406	Screw-3mm ϕ \times 6mm pan head ISO (2 req'd)		0544402	2 pale terminal
	8813124	Washer-3mm ϕ spring (2 req'd)		8711405	Screw-3mm ϕ \times 5mm pan head ISO
	7171312	Track switch plate sub ass'y		8813124	Washer-3mm ϕ spring
	6310781	Push plate spring		0711306	Screw-26mm ϕ \times 5mm pan head
	5640071	DC solenoid		8813123	Washer-2.6mm ϕ spring
	0942054	Push plate			for slide switch mounting
	0637443	Ring-"E"		8711405	Screw-3mm ϕ \times 5mm pan head ISO
	7501782	Push plate shaft		8813124	Washer-3mm ϕ spring
	6311081	Planger spring			for slide switch holder mounting
	8711410	Screw-3mm ϕ \times 10mm pan head ISO		8711408	Screw-3mm ϕ \times 8mm pan head ISO
	8811234	Washer-3mm ϕ		8813124	Washer-3mm ϕ spring
		for DC solenoid mounting			for electrolytic capacitor mounting
	7505331	Collar		0544404	6 pale terminal
	0948783	Rubber plate-8mm ϕ		8711408	Screw-3mm ϕ \times 8mm pan head ISO
	7661774	Spring pad		8813124	Washer-3mm ϕ spring
	0945061	Cam bearing plate		8821114	Nut-3mm ϕ (4 req'd)
	8711406	Screw-3mm ϕ \times 6mm pan head ISO			for 6PT mounting
	8711405	Screw-3mm ϕ \times 5mm pan head ISO (2 req'd)		8711412	Screw-3mm ϕ \times 12mm pan head ISO (8 req'd)
	8813124	Washer-3mm ϕ spring (3 req'd)		8811234	Washer-3mm ϕ (A) (4 req'd)
	7502723	Head shifting adjust screw		8813124	Washer-3mm ϕ spring (8 req'd)
	6340202	Head shifting cam		8821114	Nut-3mm ϕ ISO (8 req'd)
	0637445	Ring-"E"			for transistor mounting
	6702141	Tape holder	S 1	0532180	Switch-slide
	6702151	Tape holder cover	S 4	0539121	Switch-micro
	8711406	Screw-3mm ϕ \times 6mm pan head ISO			
	8813124	Washer-3mm ϕ spring			
	8812114	Washer-3mm ϕ (B)			
		for tape holder mounting			



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