SANYO

Portable AC/DC Tape Recorder

MODEL MR-130

SERVICE MANUAL

SANYO ELECTRIC CO., LTD.
INTERNATIONAL DIVISION: SANYO ELECTRIC TRADING CO., LTD.
OSAKA, JAPAN

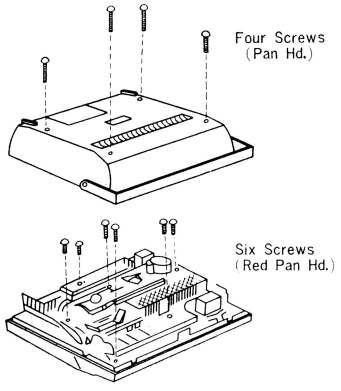
SPECIFICATIONS

Recording System	AC Bias, 1/2 Track
Erasing System	DC Erase
Tape Speed & Reacording Time	(At. 5″ reel, 1/2 track 50 μ tape) 3-3/4 IPS (9.5 cm/sec) ... 32 min 1-7/8 IPS (4.8 cm/sec) ... 64 min
Forward Time	3 min 00 sec (5″ reel 50 μ tape)
Rewind Time	2 min 30 sec (5″ reel 50 μ tape)
Frequency Response (Record & Playback)	100–7000 c/s at 3-3/4 IPS 100–4000 c/s at 1-7/8 IPS
Output Power	Maximum 1000 mW Undistorted 800 mW
Transistor Complements	2SB303×1: 1st amp. stage 2SB303×1: 2nd amp. stage 2SB186×1: 3rd amp. stage 2SB186×1: 4th amp. stage 2SB272×2: Power amp. stage 2SB187×1: Bias osc.
Othe. Elements Used	Diode SV-30×2, 1S188×1 Thermistor SDT-06×1 Rectifier FR-1P×2
Power Requirement	AC ... 115/230 V, 50–60 c/s DC ... Size — D (UM-1)×6 (9 volts)
Input Impedance	MIC ... 20 kohm×1 RADIO ... 470 kohm×1
Output Impedance	EXT. SP ... 8 ohm×1
Loudspeaker	2-2/1″×4″ permanent dynamic speaker Voice coil impedance 8 ohm
Power Consumption	8 W
Dimensions	11-1/2″ width×10-1/4″ depth×3-5/8″ height (293 mm×260 mm×92 mm)
Weight	8.6 lbs (3.9 kg) approx.
Accessories	Microphone×1: 5″ full tape×1: Empty reel×1: Splicing tape×1:

DISASSEMBLY INSTRUCTIONS

To remove the amplifier and mechanism from the cabinet.
This process is followed:

1. Unscrew the pinch roller mounting screw in counter-clockwise direction and remove. Then pull the pinch roller upward and remove. Pull the head-cover and take it out.
2. Tape recorder is up side down and remove four (+) screws by rotating them counter-clockwise. Then remove the back lid.
3. Remove all 6 (+) screws coated with red paint by turning them counter-clockwise.
4. The amplifier and mechanism can now be taken out of the cabinet.



HOW TO ADJUST THE MECHANISM

When the tape recorder fails to respond to the movement of controls such as insufficient functioning of rewinding or forwarding, slackening of recording tape when the control is moved from "stop" to "playback" or excessive tension is applied to tape at every function; make the following adjustments:

Tools & Gauges Required

To make the adjustment of mechanism practically no tools are needed. However, in order to ascertain the accuracy of mechanism as to whether it is operating as originally designed, the following gauges are to be used:

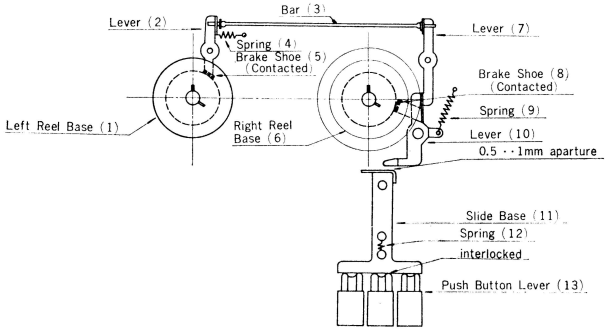
Type of Gauges	Extent of Measurement (Coverage)	
Tester	DC 10 V, DC 300 mA Range.	
Tension Gauge	0–300 gr.	0–100 gr.
	0–1 kg.	0–3 kg.

"Stop" Position

(1) Adjustment of Brake Mechanism

When the control is moved to "stop" from recording, playback, or rapid winding, the brake is applied weakly to takeup reel base and strongly to supply reel base. When the control is moved to "stop" from rewinding, the brake is applied strongly to takeup reel and weakly to supply reel. In the event the strength of brake pressure works in reverse, it will cause slackening of recroding tape when the control is moved to "stop".

Figure 1 shows the position of mechanism when the brake is applied.



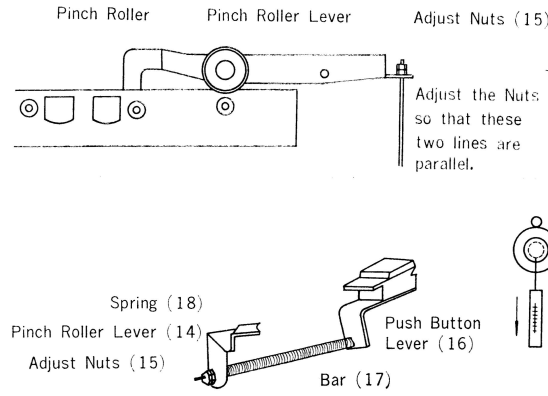
1. The slide base (11) must be in contact with push button levers (13) for rapid winding and rewinding. In case there is an aperture between the slide base and push-button levers, adjust spring (12).
2. There should be an opening of 1～2 mm between the lever (10) and slide base (11). If there is no aperture between the lever slide and base, either the brake shoe is worn out or it has come off. Check and replace. The brake shoe (8) is composed of hard pressed felt and it is designed to give satisfactory performance even when it is worn down to 0.5 mm.

   Note: Adjustment of brake on the takeup reel base side is done by spring (9). This adjustment should be done only after checking the points mentioned under 1 and 2.
3. There should be an opening of 1～2 mm between the lever (10) and lever (7).
4. When the brake fails to apply properly if the rewinding reel base is turned counterclockwise, spring (4) must be adjusted.

   Note: Since the brake on the rewinding or supply reel base is closely related with takeup reel side's brake, check the points mentioned under 1 and 2 also.

(2) Adjustment of Pinch Roller Position

At "stop" position, the pinch roller lever should be as shown in Figure 2, since the movement of this pinch roller lever (14) has much influence on the opening angle of pad, utmost caution should be paid in making adjustment. To adjust, control the adjusting nut (15). Adjust the length of functioning bar (17) which links playback button lever (16) and pinch roller lever (14). After making the adjustment, remove the capstan sleeve, so that the tape speed will become 4.75 cm/sec, and press the playback button. There must be an aperture of 0.5～1 mm between the pinch roller lever (14) and adjusting nut (15) at this time. To control the pressure of pinch roller, adjust spring (18). For adjustment of pinch roller, refer the following paragraphs.



In Normal Forwarding

In normal forwarding, it is most important that the recording tape is transported at precise speed without slipping. To insure this, the tape recorder is pre-adjusted. In case of trouble, refer to the following:

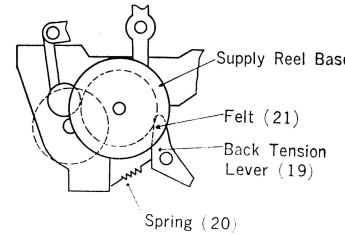
(1) Adjustment of Pressure of Pinch Roller

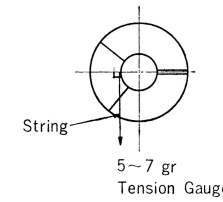
The cause of slipping of the recording tape between the capstan and the pinch roller may be traced to weak pressure of the pinch roller. The presure of the pinch roller should be 350±50 g at 4.75 cm/sec. To determine the pressure, use spring gauge and pull the pinch roller shaft, and gauge the pressure of the pinch roller when it stops to rotate. In making this check, do not load the recording tape.

(2) Adjustment of Back Tension

To prevent wobbling or slackening of recording tape at normal forwarding, tension is applied to the recording tape by applying slight brake to the supply reel base. This is done by back tension lever (19), and adjustment is made by spring (20).

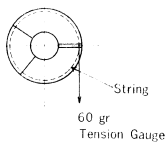
*Put the mechanism in FWD, place the reel on the left side spindle and measure the end of thread with tension gauge by pulling in the direction of arrow. The strength at the instant when the reel rotates in counterclockwise direction is determined as back tension.



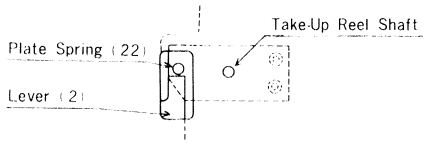


(3) Adjustment of Winding Torque

In normal forwarding, (especially when the recorder unit is in upright or suspended position) and when the recording tape slackens or when the recording tape on takeup reel is loosely wound, adjustment of the following tension is necessary:



As shown in the illustration, loaded reel is placed on the spindle and the mechanism is put into FWD. Using tension gauge, the reel is pulled in the direction of arrow, and the strength at the instant when the reel rotates in counterclockwise direction is determined. Bend lever (21) to make the adjustment. After adjustment, make sure this lever and leaf spring do not contact.



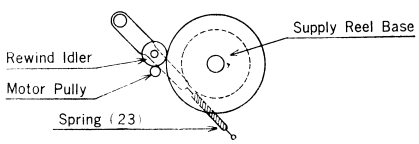
Back Side of Mechanism

In Rapid Forwarding (Winding)

In rapid winding, the entire length of recording tape must be transported at fast speed. To adjust the strength, the method is exactly the same as in the case of "Adjustment of Winding Torque". under "In Normal Forwarding". The reading of strength must be identical.

In Rewinding

In rewinding, as in the instance of rapid winding, the entire length of recording tape must be transported. At times, the spring (23) may be weak, or eyelet part (24) may be tight. Examine these points, and rewind the tape which has already been rewound. If the machine functions, the adjustment is complete.



Push-buttons

The push-buttons require the following pressure to function:

Strength needed to push	Stop Button	... 2.2 kg/or less	
〃	Rewind	〃	... 2.2 kg/ 〃
〃	Rapid Winding	〃	... 2.2 kg/ 〃
〃	Playback	〃	... 2.2 kg/ 〃
〃	Recording	〃	... 2.2 kg/ 〃

When the pressure needed differs excessively from the above figures, the mechanism requires adjustment or repair. Press the button and see where the friction is. Then smoothen the surface and apply grease. In addition, when peculiar noise or sound is produced by mechanism, adjustment or repair is necessary.

Supply Reel Base (Spindle)

At standstill, the supply reel base must not move more than 0.2～0.4 mm in vertical direction. Adjustment is done by changing the thickness of nylon washer at the upper part of the reel base.

Pinch Roller

The pinch roller must not move more than 0.5 mm in vertical direction.

STORAGE

After using the tape reocrder, make sure all the push-buttons are in raised "stop" position and then close the lid. To store the tape recorder for an extended period take out the batteries. When kept too long, the batteries may leak and damage the mechanism.

LUBRICATION

This tape recorder requires little oiling, and besides, rotating shafts are equipped with oil reservoir device. Do not put too much oil as excess oil may flow or rise on the shafts and adhere to belt or pinch roller or other rubber parts and cause slipping.

ADJUSTMENT & PERFORMANCE OF ELECTRICAL PARTS

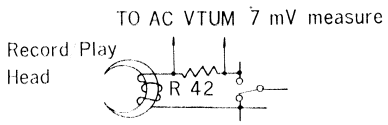
1) Measuring Instruments

In order to test and adjust electrical parts, the following instruments are required:

1. Tester
2. Vacuum Tube Voltmeter
3. Low Frequency Oscillator
4. Attenuator
5. Oscilloscope
6. Standard Recording Tape

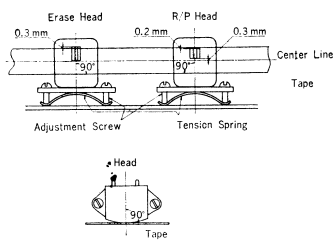
2) Oscillation Bias Current

Bias current during the recording is measured at both ends of R42. Adjustment is made by semi-fixed VR3 so that the voltage will be measured 7mV.



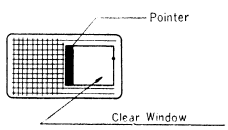
3) Head Azimuth (9.5 cm/sec. at playback) & Vertical Position

Use standard pre-recording tape of 5000 c/s and adjust the screw for azimuth positioning so that the power output will reach maximun. The Erase and Record/Play heards are adjustable in their vertical and azimuth positions. However it is not necessary to adjust the Erase head in its azimuth position.



4) Indication of Power Voltage (Battery Voltage Indication)

Connect 6.5V stable power supply to battery terminals, put the machine in "Play" position. When the volume is minimum, adjust the semi-fixed VR4 (1 kohm) so that the indicator will point to line up the left edge of pointer of the indicator with the left edge of the clear window.



5) Voltage and Current Value of Each Part

Transistors each voltage

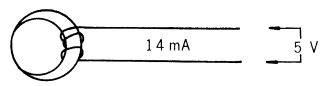
Point	Playback	Recording	Tester Range
Tr–7 C	(V)	8.0 (V)	25 (V)
Tr–4 C	7.0 (V)	6.8 (V)	25 (V)
Tr–3 C	5.4 (V)	5.0 (V)	25 (V)
Tr–2 C	2.3 (V)	2.4 (V)	10 (V)
Tr–1 C	2.1 (V)	2.3 (V)	10 (V)
Tr–7 E		1.0 (V)	10 (V)
Tr–4 E	2.0 (V)	1.9 (V)	10 (V)
Tr–3 E	1.8 (V)	1.7 (V)	10 (V)
Tr–2 E	1.5 (V)	1.5 (V)	10 (V)
Tr–1 E	2.0 (V)	2.0 (V)	10 (V)

Transistors each current

Tr–1 E	460 (μA)	380 (μA)	1 (mA)
Tr–2 E	410 (μA)	370 (μA)	1 (mA)
Tr–3 E	560 (μA)	740 (μA)	1 (mA)
Tr–4 E	2.2 (mA)	2.1 (mA)	10 (mA)
Tr–7 E	42.5 (mA)	42.5 (mA)	100 (mA)

6) Erasing Current

Erasing current 14 mA. Between the terminal voltage is 5 V DC.



7) Maximum Output: 650 mW/over (at 9.5 cm/sec)
Recording: Input terminal; at MIC. level; —70db (100 c/s)
Playback: Output terminal; EXT. speaker connects dummy resistor at volume maximum.

8) Unditorted Output Power:
AC power 117 V. ... 650 mW/over
DC power 9 V. ... 750 mW/over
Recording: Same as maximum output measuring
Playback: Same as max. output measuring, but volume is controlled to the 10% output distortion.

9) Distorting Rating: Less than 6%
Recording: Same as maximum output measuring
Playback: Same as max. output measuring, but volume is controlled to the 10db lower than maximum output.

10) S/N Ratio: 32db/over
Recording: Same as max. output measuring
Playback: Output terminal: EXT. speaker connects dummy resistor, and volume is controlled to the 10db lower than max. volume output.

11) Erasing Rate: 55db/over
Recording: Input terminal; MIC. level: —50db and nosignal
Playback: Same as S/N Ratio measuring.
Measuring Method: ratio of recording and erasing part

12) Cross Talk: 60 db/over
Recording: Input terminal; MIC. level: —50db
Playback: Maximum volume
Measuring method: Ratio of the recording and non-recording track.

SUGGESTIONS FOR MECHANICAL TROUBLE

Trouble	Cause	Repair
Capstan fails to rotate	*Defect of motor	1. Replace.
	1. Open in motor coil or defective contact of carbon brush.	*If capstan turns in Rapid Winding, or Rewinding, but fails in Recording or Playback, the cause is the defective contact of governor. Terminal resistance of normally operating governor at both ends should be 0 ohm.
	2. Burnt metal bearing.	2. Replace.
	*Defect of transmission mechanism.	
	3. Skidding of motor pulley.	3. Tighten the screw.
	4. Oil on flat belt rubber.	4. Clean.
		*Wipe with alcohol or carbon tetra chloride.
	5. Lack of oil on capstan shaft.	5. Lubricate between oilless metal and shaft.
	6. Defective flat belts.	6. Replace.
Slow rotation	*Defect of motor	
	7. Burnt metal bearing.	7. Replace or lubricate.
	*Defect of transmission mechanism.	
	8. (Same as 3–5.)	
	9. Lack of oil in take-iu reel idler.	9. Lubricate.
	10. Lack of oil in take-up reel pulley.	10. Lubricate.
Presence of wow and flutter	*Defect of Motor	
	11. Defective function of Governer.	11. Lubricate or replace.
	*Defect of transmission mechanism.	
	12. (Same as 3–10.)	
	13. Alien objects on flywheel rubber.	13. Clean. (Same as 4.)
	14. Deterioration of flywheel rubber.	14. Replace.
	*Defective movement of recording tape.	
	15. Defective back tension on rewinding reel.	15. Replace.
	16. Defective pressure of pinch roller.	16. Adjust pinch lever spring.
	17. Change of quality or shape of pinch roller.	17. Replace.
	18. Adherence of dust on points contacting recording tape.	18. Clean. (Wipe with carbon tetra chloride).
Unsatisfactory winding.	*Reel base does not rotate even when the tape is not mounted.	
	19. Broken belt or change of quality.	19. Replace belt.
	20. Weak transmission of winding ilder & winding reel pulley.	20. Adjust winding idler spring.
	21. (Same as 1–10, 16, & 19.)	
	*Reel base does not rotate when the tape is mounted.	
	22. Weak pressure of rapid forwading roller, reel base & reel base pulley.	22. Adjust rapid winding roller spring.
	23. Lack of oil on reel base.	23. Lubricate.

SUGGESTIONS FOR ELECTRICAL TROUBLE

Trouble	Cause	Repair
*Even when the button is pressed, motor fails to rotate and indicator needle does not move.	1. In case of AC:	
	*Blown or loose fuse.	
	*Bad or inadequate connection of power cord and plug.	
	*Broken line in transformers, primary and second ary.	Check.
	*Short circuit in C36, bad silicaon rectifier.	Replace or repair.
	*Inadequate contact of S21.	
	2. In case of DC:	Check voltage and replace.
	*Batteries drained and inadequate contacts or connections.	
	3. Both AC and DC:	Check, adjust or replace.
	*Inadequate connection of S17 and S20.	
*Motor rotates but indicator needle fails to rise.	4. Both AC and DC:	
	*Indicator malfunctioning.	Replace.
	*Malfunction of semi-fixed VR4 1 kohm in amplifier. (When needle does not rise as expected.)	Replace. (Adjust)
*Indicator needle rises but motor fails to rotate.	5. *Bad motor or broken line.	Check.
	*Bad remote control jack or foot control switch jack.	
	*Bad motor wiring.	Check.
*Motor fails to pick up spped in rewinding and rapid winding.	*S18 does not turn on.	Adjust.
	*Specified voltage does not reach the motor. AC-DC	Check voltage & amperage of power source.
*Low voltage of power source on amplifier side.	6. Short circuit in negative side. AC	Check each part of amplifier and motor.
	7. Bad transformer or filter capacitor C36	Check voltage & indication.
	8. Bad of diode rectifier.	
*High voltage of power source on amplifier side. AC	*Short circuit of primary side of PT	Check and replace.
*Cannot record or playback.	*Bad amplifier (incl. power output trans.)	Check voltage of cache part and repair.
	*Bad recording/playback head, sealed lead wire connection. (Bad R42.)	
	*Inadequate contact of tape and recording/ playback head.	
	*Insufficient contact of RP switch.	
*Can playback but cannot record.	*RP switch does not function or bad conact.	Check mechanism of switch.
	*Bad microphone jack or input jack.	
Indicator works.	*Bad electrical circuit. (R46 VR4)	Check each element.
Erasing insufficient.	*Broken wiring of erasing head or R43	Check and repair.
*Can record but cannot playback.	*Bad RP switch, or bad contact.	Check mechanism of switch.
	*Bad speaker or its wiring broken.	Connect earphone to EXT. speaker jack and check.
	*Insufficient contact of EXT speaker jack.	Rapair and replace.

Trouble	Cause	Repair
*Can record but cannot playback (continues)	*Broken wiring or short circuit of power output transformer.	Check indicator to see if needle swings in recording.
*Statics & Noises.	*Bad contact of VR.	Check and replace.
	*Bad transistor. (Particularly TR-1)	Check and replace.
	*Deterioration of circuit element, contact with adjacent element, insufficient soldering.	Check.
	*Magnetized RP head.	Check and erase magnetism.
	*Distortion of bias oscillation wave.	Check and adjust circuit element.
*Increased noise in recording with microphone.	*Inadequate grounding of printed circuit plate.	Check and repair.
	*Bad microphone.	Check and replace.
	*Insufficient insulation of C2.	Check and replace.
	*Insufficient capacitor of filter circuit (C1, C19, C16).	Check and replace.
*Inferior tone quality	*Bad circuit element or transistors.	Check voltage & amperage of each part.
	*Inadequare AC bias.	Check bias current.
	*Inadequate contact of tape head.	Check loading of tape, contact points and clean.
	*Worn down RP head.	Check and replace.
	*Bad microphone.	Check and replace.
	*Bad speaker.	Check and replace.
*Insufficient high tones	*Inadequate RP head angle adjustment.	Adjust so that RP head slit is perperpendicular to tape.
	*Inadequate value of AC bias value.	Check and adjust.
	*Lack of capacity of C10.	Check and adjust.
	*Lack of pressure of RP Head pad.	Check and repair.
*Tones too high.	*Lack of capacity of C4, C7, C15, C17.	Check and repair.
	*Broken wiring of tone circuit, R14, VR1.	
*Cannot erase.	*Inadequate position of erasing head.	Adjust position.
	*Insufficient contact of erasing head and tape.	Clean.
	*Lack of erasing current.	Check DC erasing current.
	*Broken wiring or short circuit of erasing head.	Check and replace.
*Mixing of recorded materials of tracks 1 and 2.	*Inadequate position of tape guide or vertical movement of tape that tilts the head.	Adjust tape guide or height of head.
	*Inadequate positioning of head for upper and lower tracks.	Check voltage & amperage of each part.
*Lack of volume.	*Deterioration of transistors or circuit elements.	Check and repair or replace.
	*Short circuit, broken wiring or insufficient soldering of circuit elements. (Especially bad emitter circuit, pass condenser)	
	*Bad bias oscillation circuit.	Check and repair or replace.
	*Bad head, microphone or speaker.	Check and repair or replace.

PARTS LIST

CABINET

STOCK No.	DESCRIPTION	Q'ty
Cabinet Parts		
R-31615	Cabinet (Bottom)	1
R-268169	Specification Plate	1
	Cloth Sheet for Cabinet 2×15 mm	2
R-318065	Deck Panel (Incl.; Insert Nut & Reinforcing Ring)	1
	Cloth Sheet for Cabinet 120×30 mm	2
R-39317	Base for Hide Hole	1
R-32550	Clear Window for VR & Tone	1
R-12261a	Plate Spring for Top Lid Fixing	2
R-39316a	Cover for Speaker & Control Panel	1
R-268170	Badge for SANYO	1
	Speaker Net	1
R-31617b	Top Lid	1
R-S81048a	Hinge Assy. for Top Lid	2
R-39277a	Clear Window for Top Lid	1
R-32498	Mounting Metal	2
R-32476a	Lid for Battery Case	1
R-32501	Knob for Battery Case	1
R-12260	Plate spring for Battery Case	1
R-261293a	Indication Plate	1
R-44228	Cushion (Rubber) for Deck Panel	1
R-44229	Cushion (Rubber) for Deck Panel	7
	Cushion (Felt) for Cabinet 20×15×5 mm	2
	Spacer (Fiber) for Top Lid Hinge Assy. 3×11 mm	2
	Cushion (Rubber) for Top Lid 4ϕ×1 mm	1
	Cushion (Felt) for Top Lid 8ϕ×1 mm	1
	Cloth Sheet for Battery Lid 2×15 mm	2
	Sheet (Fiber) for Cabinet 117×30×1 mm	2
	Cloth Sheet for Cabinet 12×12 mm	1
	Cushion (Felt) for Cabinet 10×13×19 mm	2
R-138001	Ring for Deck Panel	5
	Cushion (Felt) Deck Panel 10×10×2 mm	1
R-268172	Decoration Panel for VU Meter	1
R-261277	Label for Voltage Selection	1
	Net for Battery Lid	2
R-278068	Handle	1
	Washer (Nylon) for Handle Fixing 8.2ϕ×12ϕ×0.5t	2
R-12400	Bracket for Speaker	2
R-241164	Special Screw for Handle Fixing	2
	Washer (Polyethylen) for Handle Fixing 8.2ϕ×12ϕ×2t	2
R-128024	Tape Guide	2
R-318064	Head Cover	1
R-25277	Tip for Head Cover	2

CHASSIS

STOCK No.	DESCRIPTION	Q'ty
Chassis		
R-41501d	Printed Circuit Board	1
R-S81082	Hinge Assy. for PCB-Right	1
R-S81083	Hinge Assy. for PCB-Left	1
R-112429	Fixing Bracket for PCB-Center	1
R-112430	Heat Sink	1
R-32509a	Bracket (Plastic) for Input & Outout Jack	1
R-112440	Bracket for R/P Switch Base	1
R-39252	Base for R/P Switch	1
R-25144	Contact Metal for R/P Switch	10
R-15141	Pin for R/P Switch Base Fixing	3
R-12285	Coil Spring for Return Force of R/P Switch	1
R-25257a	Bracket for Thermistor	1
	Sheet (Fiber) for Insulating of Semi-VR	2
R-13075	Leaf Spring for R/P Switch Base	5
R-24638	Cord Fixed for ALC Lead	1
R-44228	Cushion	1
R-112425	Bracket for Printed Circuit Board	1
R-241040b	Stopper for R/P Lever Actuation Lod 5ϕ	1
R-S81081b	Bracket for VU Meter & VR	1
R-118365a	Bracket for VU Meter Fixing	1
R-112427a	Bracket for VR	2
R-39244a	Knob for VR, Tone	2
R-47938	Index Sheet for VR Knob, Tone Knob	2
R-12273a	Coil Spring for VR Knob	2
R-112550a	Bracket for AC/DC Switch	1
R-36188a	Screen for AC/DC Switch	1
R-12286a	Coil Spring for R/P Lever Actuating	1
R-241039	Stopper for R/P Lever Actuating Lod 8ϕ	1
R-241038a	Bar for R/P Lever Actuating	1
R-112426	Bracket for Battery Terminal Base	1
R-32514e	Bracket for Battery Terminal	2
R-23773	Battery Terminal (+) side	2
R-148013	Coil Spring for Battery Terminal (−) Side	2
R-471003a	Index Sheet for Battery	1
R-41277a	Cushion for VU Meter Thickness	1
R-418029	Cushion for VU Meter 8 mm Thickness	2
R-112582a	Stopper for REW Lever	1
R-43135	Ribbon for Battery Takeup	1
R-S81135	Lever Assy. for R/P Switch Actuating	1
R-14239	Shaft for R/P Switch Actuating Lever Assy.	1
	Tube for VR & Tone Knob	2
R-12296	Coil Spring for R/P Lever Actuating Bar	1
	Cushion (Felt) for Amp. 20×10×10 mm	1
R-24638	Cord Fixer for ALC Lead	1
R-112493a	Bracket for AC-DC Changing Switch	1
R-36187b	Index Sheet for AC-DC Changing Switch	1
R-112551	Bracket for Voltage Changing Switch	1
	Mechanism TM-110D	1

ELECTRIC PARTS

STOCK No.	DESCRIPTION	Q'ty
Electric Parts		
R–W6269	Output Transformer	1
R–W6240e(1)	Input Transformer	1
R–W7820	Power Transformer	1
R–R11644	Variable Resistor for Volume 10 K ohm	1
R–R11636	Variable Resistor for Tone 5 K ohm	1
R–R11013	Semi-fixed V.R. for Bias Adjust	1
R–S6354	Speaker	1
R–W8107	Oscillator Coil	1
R–S6272e	Microphone	1
R–32143b	5″ Empty Reel	1
	Splicing Tape	1
R–S6810	Speaker	1
R–S5812	VU Meter	1
R–S88191	5″ RA Full Tape Reel	1
R–S2123	Jack for Mic. & Ext. Sp.	2
R–S2124	Jack for Radio	1
R–S2112	Jack for Remote & Foot Switch	2
R–261193a	Heat Sink	1
R–S4266	Slide Switch for AC–DC Changing	1
R–S1260a	Fuse 0.5A	1
R–S3007	Lug Plate	1
R–S3165	Lug	5
R–S3308	Lug for Lead Fixer	8
R–24638	Cord Fixer	1
R–S4315a	Rotary Switch Voltage Changing	1
R–S1038	Fuse Holder	1
R–S3007	Lug Plate	1
	Diode 1S188 or 1S426G for ALC & VU meter	1
R–S1182	Varistor SV–30 for ALC	2
	Thermistor SDT–06 for Temperature Comesation	1
	Transistor 2SB303A Tr–1, 2	2
	″ 2SB186 Tr–3	1
	″ 2SB186 Tr–4	1
	″ 2SB272 Tr–5, 6	2
	″ 2SB187 Tr–7	1
R–S1234	Silicon Rectifier FR–1P } or	2
R–S1805	Silicon Rectifier SD–1Y }	
R–11014	Semi-fixed VR for Meter	1
R–S3163	AC cord complete — 250 V, 6A	1
R–S8574b	Adaptor complete — S. 2P	1
R–S8575b	Adaptor complete — E. 2P	1
R–S3169	Terminal	1
	-3 Wire Cord	1
	-Plug — 3P	1
R–S2142a	-Connector	1
R–S3168	Terminal	1
R–S1076a	Plug — E. 3P	1
	-3 Wire Cord	1
R–S1067a	-Plug — E. 3P	1
	-Cushion	1
R–S2142a	-Connector	1
R–S3168	Terminal	1
R–S1245	Plug — Aus. 3P	1
R–S3810	-AC cord	1
R–S1817	-Plug — 3P	1
R–S3169	Terminal	1
Mounting Parts		
	Screw 2.6×6	2
	Screw 3×6	2
	Screw 3×6	43
	Screw 3×8	8
	Screw 3×25	2
	Screw 3×40	4
	Screw 2.3×4	1
	Screw 3×8	2

STOCK No.	DESCRIPTION	Q'ty
	Screw 3 mm	1
	Nut 2 mm	2
	Nut 2 mm	1
	Nut 3 mm	4
	Nut 4 mm	2
	Spring Washer 2 mm	2
	Spring Washer 2.6 mm	2
	Spring Washer 3 mm	44
	Spring Washer 4 mm	2
	Washer 3 mm	11
	Washer 4 mm	2
	Washer 3.3×10×1t	1
	Washer 3.3×10×0.5t	4
Capacitors		
Mylar Sauare Type		1
25–50WV	+30, −20% or ±20% 0.1μF C14	1
″	±10% 0.082μF C8, 29	2
″	+30, −20% or −20% 0.005μF C22, 23	2
″	±10, or ±20% 0.004μF C31	1
″	±10% 0.001μF C30, 35	2
Mylar Square or Tubular Type		1
25–125WV	±20% 250PF C21	1
″	±10% 150PF C27	
Mylar Square Type		1
10–125WV	±20% 80PF C20	1
25–50WV	″ 0.1μF C28	
Electrolytic Capacitor		1
15V	2000μF C36	3
3V	500μF C18, 26, 32	1
10V	200μF C1	4
3V	30μF C3, 4, 10, 15	
6V	5μF C2, 5, 6, 7, 11, 13, 17, 16	8
15V	100μF C37, 39	2
Resistors		
P Type 1/4W	±10% 470K ohm R47, 49, 2	3
	″ 390K ohm R32	1
	″ 330K ohm R40	1
	″ 150K ohm R38	1
	″ 100K ohm R41	1
	″ 82K ohm R39	1
	″ 27K ohm R12, 13, 14	3
	″ 15K ohm R5	1
	″ 12K ohm R30	1
	″ 10K ohm R15, 24	2
	″ 8.2K ohm R4	1
	″ 6.8K ohm R3	1
	″ 5.6K ohm R16, 29, 19, 7	4
	″ 3.9K ohm R8, 23	2
	″ 3.3K ohm R18, 11	2
	″ 1.8K ohm R21, 25, 26	3
	″ 1K ohm R9	1
	″ 820 ohm R33	1
	″ 560 ohm R20, 53	2
	″ 390 ohm R31, 17	2
	″ 330 ohm R22, 37	2
	″ 270 ohm R44	1
	″ 180 ohm R43	1
	″ 150 ohm R51	1
	″ 120 ohm R52, 28	2
	″ 68 ohm R10, 35	2
	″ 2.7K ohm R1	1
	″ 56 ohm R55	1
	″ 1.2K ohm R27	1
	± 5% 1.8K ohm R34	1
	″ 27 ohm R45	1
	″ 10 ohm R42	1
	″ 2.2K ohm R36	1
	±10% 560 ohm R46	1
	″ 22 ohm R50	1
	″ 18K ohm R6	1

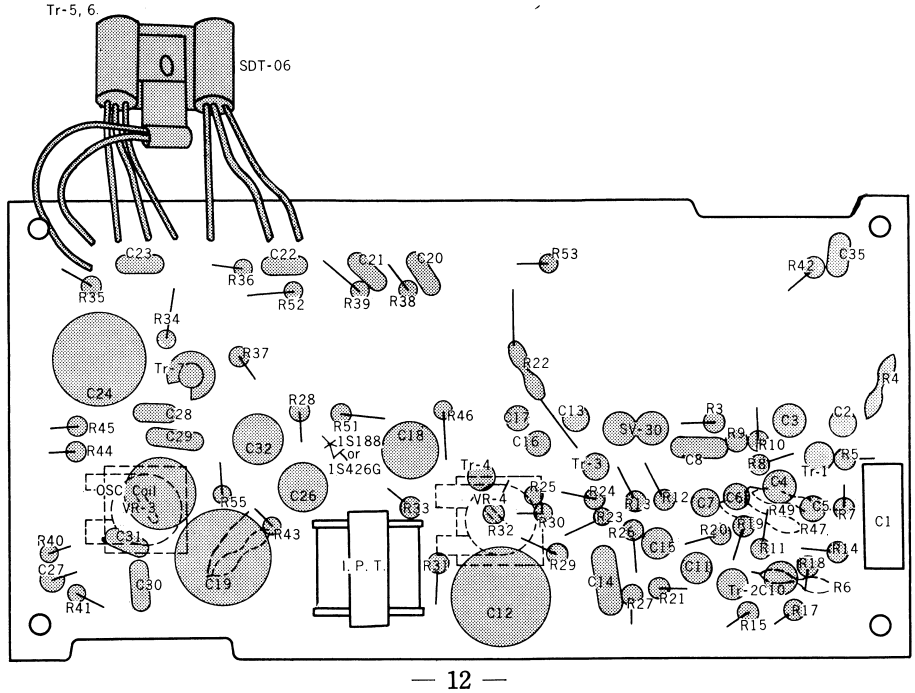
MECHANISM

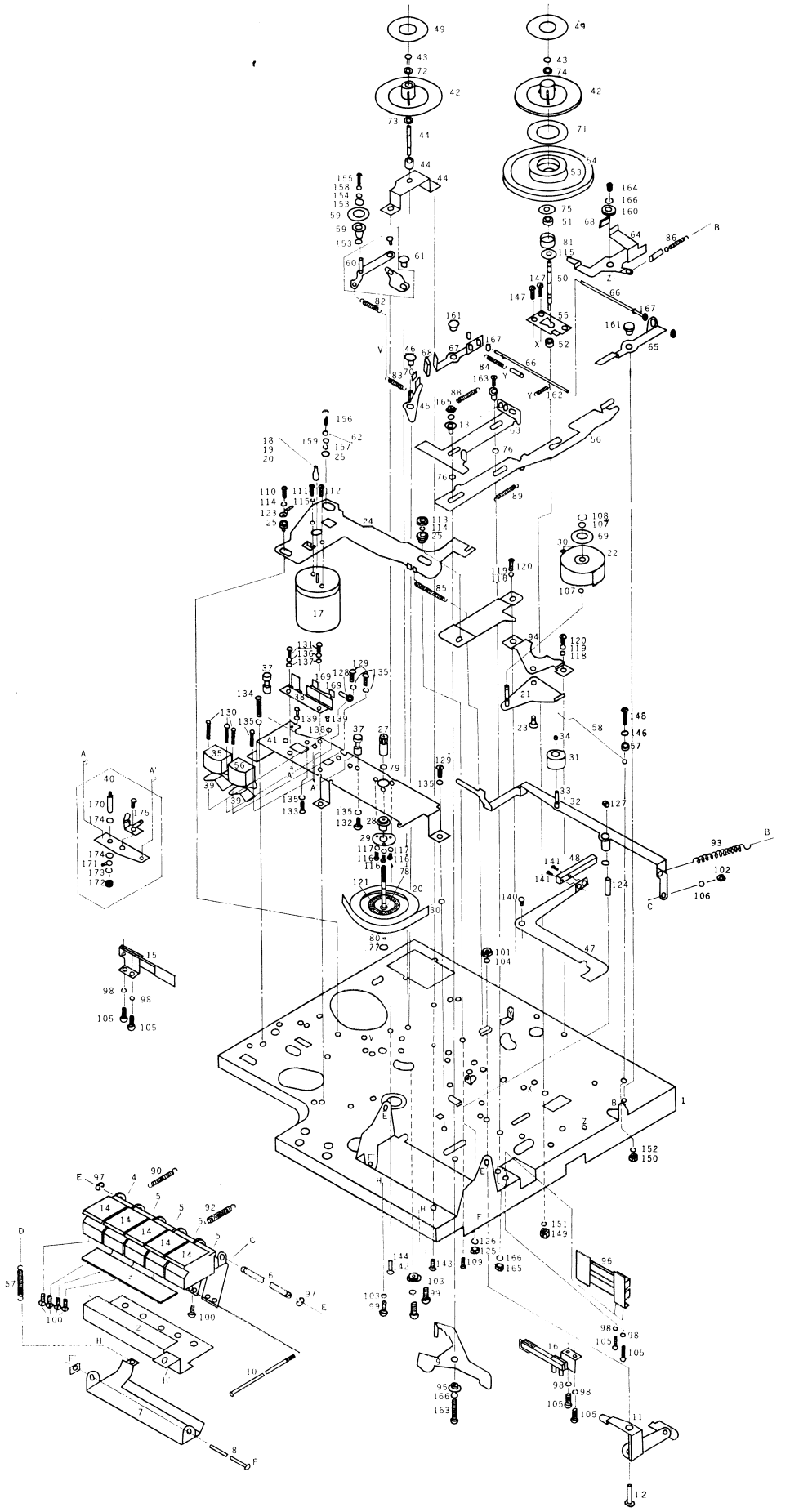
ILLUST No.	STOCK No.	DESCRIPTION	Q'ty
Chassis, Push Button			
1	R–112433h	Chassis	1
2	R–112524a	Mounting Metal-Push Button Stopper	1
3	R–44254a	Sheet-Push Button Stopper	1
4	R–112525a	Lever-Push Button Stop Lever	1
5	R–112526a	Lever-Push Button Lever	4
6	R–14174	Shaft-Push Button Shaft	1
7	R–112527	Lever-Push Button Stop	1
8	R–158002	Shaft-Stop Lever	1
9	R–112528	Lever-mis-operation Proof	1
10	R–14175a	Bar-Pinch Lever	1
95	R–241063	Spacer-mis-operation Proof Lever	1
14	R–39243	Button-Push Button	5
77		Washer 10ϕ×0.5t	1
15	R–S4312	Spring Switch	1
16	R–S4313a	Spring Switch	1
96	R–S4310	Spring Switch	1
92	R–15261	Coil Spring	1
90	R–15262	Coil Spring	1
87	R–158022	Coil Spring	1
97	R–	External "E" Ring 4 mm–Push Button Shaft	2
98	R–	Screw 3×4–Spring Switch	4
99	R–	Screw 3×6–Push Button Stopper	2
100	R–	Screw 3×8–Push Button	5
101	R–	Nut 3 mm–Record Lever	1
102	R–	Nut 2 mm–Pinch Lever	1
103	R–	Spring Washer 3 mm–Push Button Stopper	2
104	R–	Spring Washer 3 mm–Record Lever	1
105	R–	Spring Washer 3 mm–Spring Switch	4
106	R–	Washer 2 mm–Bar	1
	R–	Tube-Play Button Coil Spring	1
	R–	Tube-Stop Button Coil Spring	1
	R–	Washer 2.2ϕ×7.5ϕ×1t	1
	R–	Screw 3×12–Coil Spring	1
	R–	Screw 3×12–Coil Spring	1
	R–	Speed nut 2 mm–Shaft	1
	R–	Washer 5.2ϕ×10ϕ×0.5t	3
	R–	Washer 5.2ϕ×10ϕ×0.3t	
	R–118109	Mounting Metal-Motor Slide stopper	1
	R–	Spring Washer 3 mm–Motor Slide	1
	R–	Screw 3×8–Motor Slide	1
Motor, Flywheel			
17	R–S5158b	DC Motor	1
18	R–248040	Pulley-Motor Pulley Construction	1
19	R–248041	Pulley-Motor Pulley Diagram-Roller	
20	R–248042	Pulley-Motor Pulley	
21	R–S81139	-Lever complete	1
	R–112545	-Lever-Motor Slide	1
	R–14179	-Shaft-Roller Shaft	1
69		Felt 18ϕ×28ϕ×1t	1
107	R–	Washer 4.2ϕ×7.8ϕ×0.5t	2
	R–	Washer 4.2ϕ×7.8ϕ×0.3t	
108	R–	External "E" ring	1
24	R–118090a	Slide-Motor Slide	1
25	R–241050	Spacer-Motor Slide	3
109	R–	Screw 3×8–Motor Slide	2
110	R–	Screw 3×6–Motor Slide	2
111	R–	Screw 2.6×4–DC Motor	1
112	R–	Screw 2.6×4–DC Motor	1
113	R–	Nut 3 mm–Motor Slide	2
114	R–	Spring Washer 3 mm–Motor Slide	4
115	R–	Spring Washer 2.6 mm–Motor	1
94	R–112759	Mounting Metal	1
	R–S81140a	-Flywheel complete	1
26	R–28115a	-Flywheel	1
	R–12289a	-Shaft	1

ILLUST No.	STOCK No.	DESCRIPTION	Q'ty
27	R–S81141	-Capstan complete	1
	R–241051	-Sleeve	1
	R–241052	-Special Screw	1
28	R–22037	Shaft Bearing-Flywheel	1
29	R–112541	Mounting Metal	1
30	R–448021	Flat Belt	1
		Rubber Cushion 1t×9×34	1
78	R–	Washer 5.2ϕ×7.8ϕ×0.5t	1
	R–	Washer 5.2ϕ×7.8ϕ×0.3t	
79	R–	Washer 3.2ϕ×7ϕ×1t	1
116	R–	Screw 2×6	3
117	R–	Washer 3 mm–Mounting Metal	2
118	R–	Spring washer 2 mm–Mounting Metal	2
119	R–	Screw 3×3–Mounting Metal	2
23	R–241195	Spacer	1
22	R–34146d	-Roller	1
	R–25271	-Shaft Bearing-Flywheel	1
123	R–112777a	Limitor-Belt	1
121	R–	Felt 23ϕ×30ϕ×3t	1
		Cotton Thread 0.8×20–Roller	1
	R–29017a	Shield Plate	1
Pinch Roller			
32	R–S81138a	-Lever complete-Pinch Roller	1
	R–112535a	-Lever	1
33	R–14177a	-Shaft	1
	R–241056	-Shaft Bearing	1
124	R–14178a	Shaft-Pinch Roller	1
93	R–15263	Coil Spring	1
31	R–S88134	-Pinch Roller Complete	1
	R–228007	-Bearing-Pinch Roller	1
	R–248135	-Shaft-Pinch Roller	1
125		Nut 3 mm–Pinch Lever Shaft	1
34	R–248136	Special Screw-Pinch Roller	1
126		Spring Washer 3 mm–Pinch Roller	1
127		External "E" Ring-Pinch Roller	1
		Tube-Pinch Lever Coil Spring	1
		Fiber Washer 5.1×8×0.3–Pinch Roller	1
Head			
36	R–S6357	Erase Head	1
37	R–241044	Guide-Tape Pad	2
39	R–25221	Plate Spring	2
40	R–S81145	-Spring Switch complete	1
	R–34145	-Insulation Panel	1
170	R–241045	-Shaft	1
	R–25258	-Plate Spring	1
171	R–S3063	-Lug	1
172		-Nut 3 mm	1
173		-Spring Washer 3 mm	1
174		-Washer 3 mm	2
175		-Rivet 2×4	1
41	R–112546b	Mounting Metal-Head	1
128	R–S3008	Lug	1
	R–S6825	Record/Playback Head	1
129		Screw 3×6–Mounting Metal Head	3
130		Screw 2×10–Head	4
131		Screw 2×6–Pad	2
132		Screw 3×6–Tape Guide	1
133		Screw 3×6–Left Tape Guide	1
134		Screw 3×10–Mounting Metal Head	1
135		Spring Washer 3 mm–Tape Guide	5
136		Spring Washer 2 mm–Pad	2
137		Washer 2 mm–Pad	2
138		Washer 2 mm–Spring Switch	2
139		Rivet 2×5–Spring Switch	2
38	R–S88067	-Pad complete	1
169	R–43138	-Felt-Guide Pad	2
	R–258013	-Hinge	1
	R–128002	-Mounting Metal	1
	R–112544	-Hinge	1
	R–12290	-Bar	1
	R–12222	-Coil Spring-Pad Press	1
	R–158031	-Bar	1

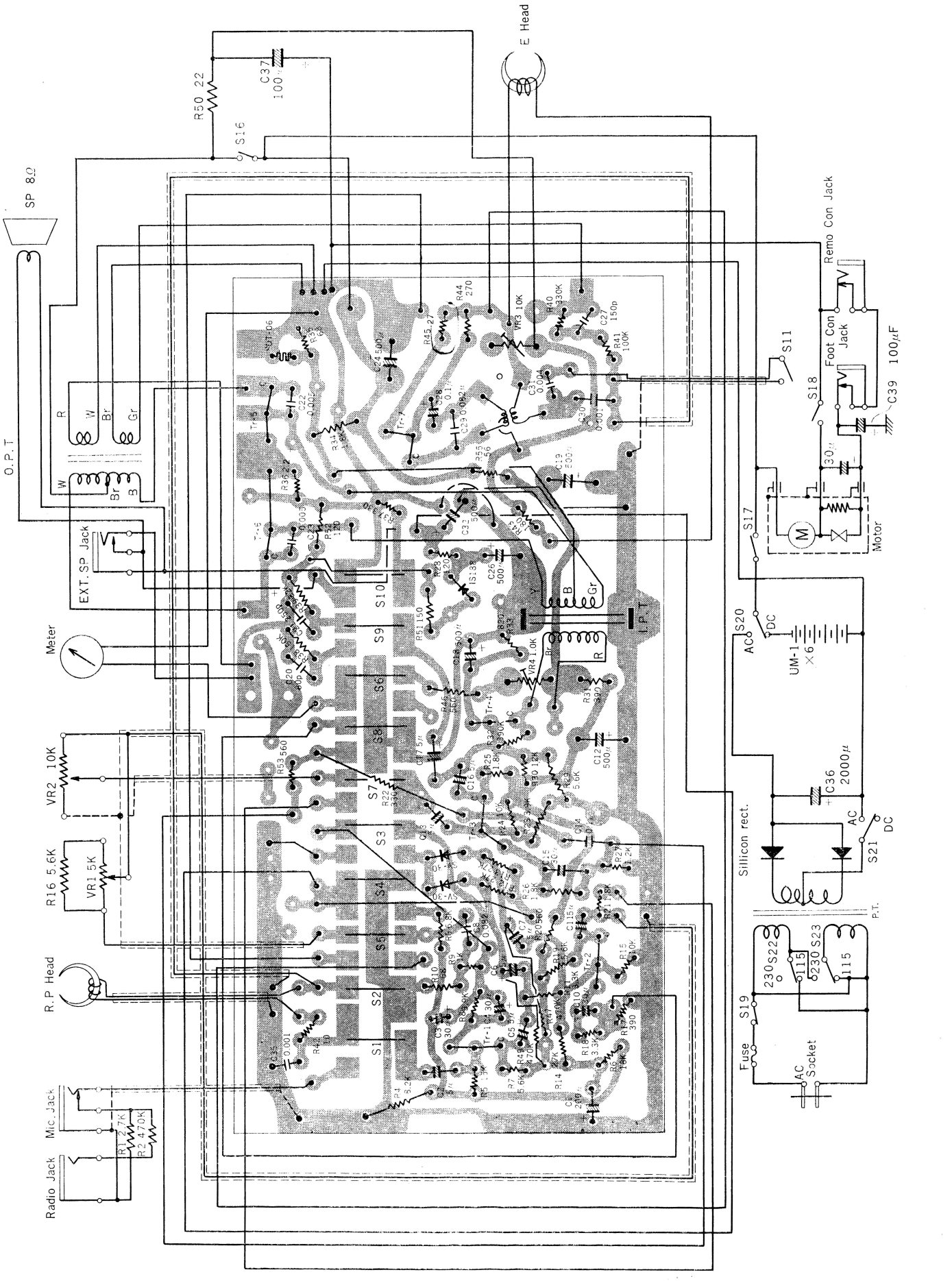
ILLUST No.	STOCK No.	DESCRIPTION	Q'ty
		Feed Reel-Base, Takeup Reel Base	
42	R–S81136a	-Reel Base complete	2
	R–34147L	-Reel Base	2
	R–12288b	-Special Spring	2
43	R–241057	Special Screw	2
4	R–S81137a	-Shaft complete	1
	R–14176a	-Shaft	1
	R–112531a	-Mounting Metal	1
45	R–112532	Lever-back	1
70		Felt-back Tension	1
46	R–24763a	Spacer Back Tension Lever	1
47	R–112533	Lever-Rewind Lever	1
140	R–24916	Spacer-Rewind Lever	1
48	R–13083a	Plate Spring	4
81	R–15264a	Coil Spring	1
83	R–15265	Coil Spring	1
141		Rivet 2×4–Plate Spring	2
142		Screw 3×6–Supply Reel Shaft	1
143		Screw 3×6–Supply Reel Shaft	1
144		Spring Washer 3 mm	1
89	R–15266	Coil Spring	1
72		Washer 4φ×7φ×0.5 Washer 4φ×7φ×0.3	1
73		Washer 4.2φ×7.5φ×0.5t	1
		Washer 4.2φ×7.5φ×0.3t	1
50	R–14181	Shaft-Takeup Reel	1
51	R–241059	Ring-Reel Shaft Base	1
52	R–241060a	Ring-Reel Shaft lift	1
53	R–34148b	-Pulley Reel Base Pulley	1
54	R–44253	-Rollller	1
71		Felt-Slip Felt	1
55	R–25259a	Plate Spring-Fast Forward	1
56	R–112534a	Slide-Fast Forward Spring	1
51	R–241050	Spacer-Fast Forward Press Spring	1
58	R–15222	Spring	1
145		Washer 5.2φ×16φ×0.5t	1
74		Washer 4φ×7φ×0.5	1
		Washer 4φ×7φ×0.3	1
75		Washer 4.2φ×12φ×0.5t Washer 4.2φ×12φ×0.3t	1
76		Washer 10φ×3.2φ×0.3t	2
146		Washer 3 mm–Forward Roller Spring	1
147		Screw 3×4–Plate Spring	2
148		Screw 3×8–Forward Roller Spring	1
149		Nut 3 mm–Reel Shaft	1
150		Nut 3 mm–Forward Roller Spring	1
151		Spring Washer 3 mm–Reel Shaft	1
152		Spring Washer 3 mm–Forward Roller	1
		Tube-Rewind Coil Spring	1
		Tube-Rewind Slide Spring	1
		Idler	
60	R–S81143a	-Lever complete-Idler Lever	1
	R–14180	-Shaft-Idler Shaft	1
	R–112542	-Lever	1
	R–112543a	-Lever	1
	R–24916	-Spacer	1
61	R–241046	-Spacer	1
62	R–241208	Mounting Metal	1
153		Washer 3.2φ×5φ×0.5 Washer 3.2φ×5φ×0.3	2
59	R–S88098	-Idler complete	1
		-Arbor	1
154		Washer 2 mm–Idler	1
155		Screw 2×4–Idler	1
156		Screw 3×8–Idler Lever	1
157		Spring Washer 3 mm	1
158		Spring Washer 2 mm	1
159		Washer 3 mm–Idler Lever	2
		Brake	
63	R–112536	Slide-Brake Slide	1
64	R–112694d	Lever-Takeup Reel Base Brake	1
65	R–112538a	Lever	1
66	R–241053	Bar	1
67	R–112539a	Lever	1
13	R–241054a	Spacer-Brake Slide	2
160	R–241063	Spacer-Brake Lever	1
161	R–24763a	Spacer-Brake Lever	2
88	R–15267	Coil Spring	1
162	R–15268	Coil Spring	1
84	R–15186	Coil Spring	1
	R–15186	Coil Spring	1
68		Leather-Brake	2
	R–15186	Coil Spring	1
163		Screw 3×16–Brake Slide	2
164		Screw 3×6–Rewind Reel Base Brake	1
165		Nut 3 mm–Brake Slide	2
166		Spring Washer 3 mm	3
167		Speed Nut 2×10	2
		Tube-Left Brake	1

MAIN PARTS LOCATION

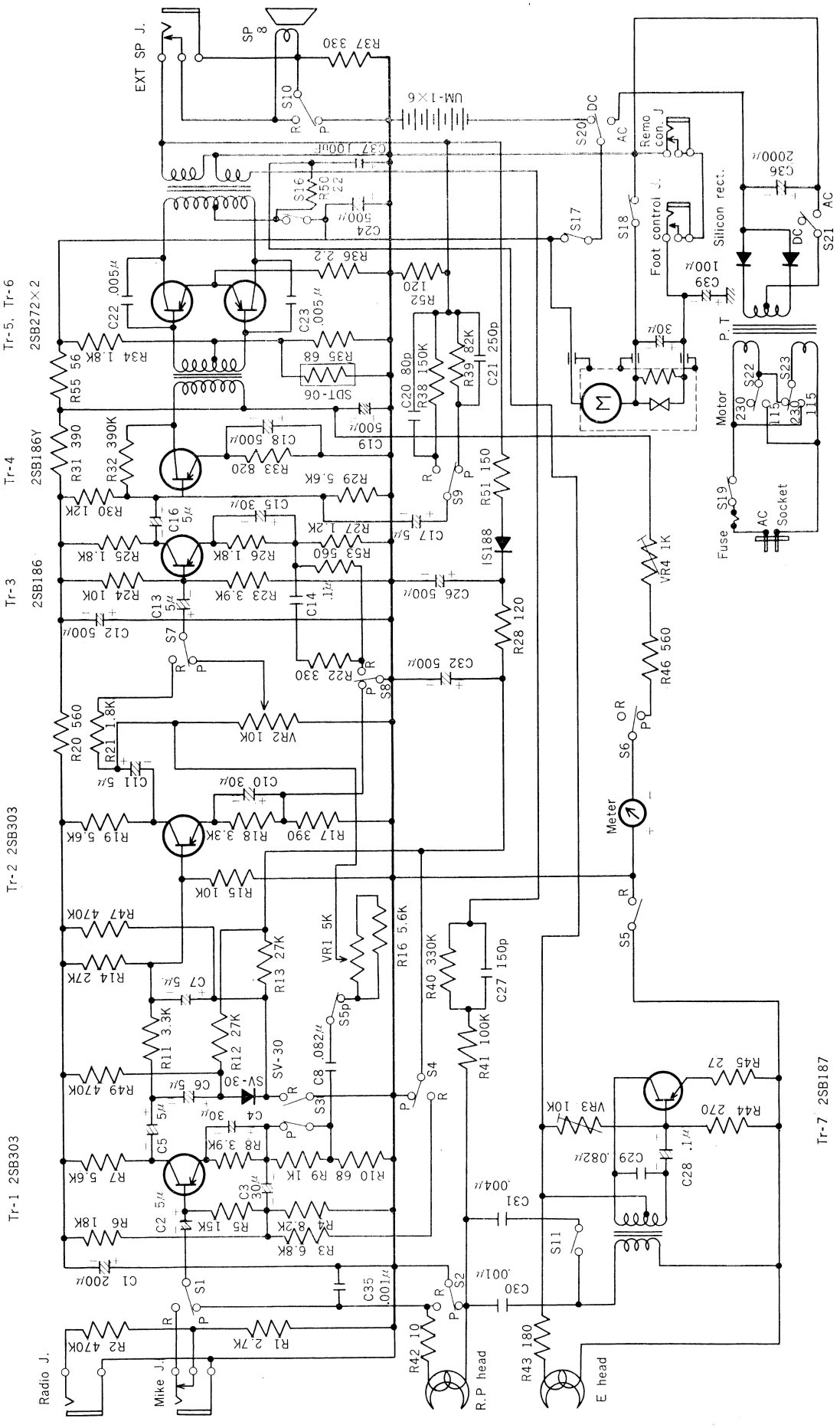




INNER-PARTS CONNECTION



CIRCUIT DIAGRAM



Trouble	Cause	Repair
Unsatisfactory rewinding (continues)	*Reel base does not rotate either with or without reel or tape. 24. Weak transmission between winding idler & rewinding idler. 25. (Same as 1–10, 16, 19–21.)	24. Adjust rewinding function disc B.
Brake does not function	*Defect of brake 26. Peeled brake shoe. 27. Brake shoe touching winding reel base pulley. 28. Defective adjustment. 29. (Same as 29.)	26. Use adhesive. 27. Adjust the size of the brake shoe. *In the case of the Right Reel. 28. Adjust spring. *In the case of left reel brake, adjust the brake function disc D.
Unable to record	*Switch fails to function the recording circuit. 30. Defective joint of RP slide lever B and C.	30. Tighten screw. *In adjusting the screw, press Rec. button, and adjust the position of switch so to over stroke that the RP slide switch will be at the recording position.
Unable to erase	31. Weak pressure of head pad.	31. Adjust. *Loosen the pad fastening screw, then bring the pad forward to move the lead front, or replace the felt with a thicker one.
Uneven winding of tape	*During recording or playback. 32. Reel shaft is not perpendicular to oprating panel. 33. Weak take-up reel base pulley spring. 34. Pressure difference at top & bottom of pinch roller & capstan.	32. Replace. *Replacement is extremely difficult since the reel shaft is fastened very tightly. 33. Adjust spring. 34. Replace pinch lever or adjust.

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