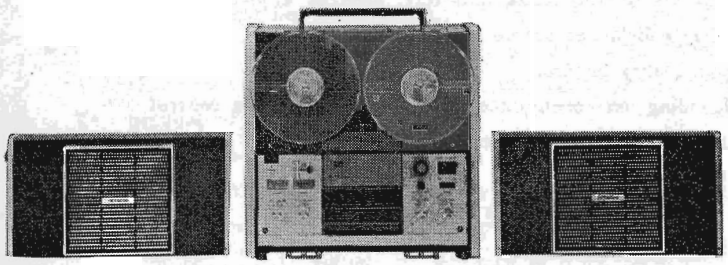
HITACHI
Hitachi, Ltd. Tokyo Japan



TRANSISTOR STEREO TAPE RECORDER

MODEL TRQ-707

SERVICE MANUAL

No. 156 1968

SPECIFICATIONS

ELECTRICAL CHARACTERISTICS

POWER SUPPLY RATING·····AC:117V 60% or 210V/230V 50%

POWER CONSUMPTION·····60W

RECORDING SYSTEM·····AC bias

ERASING SYSTEM·····AC erase

AUDIO OUTPUT·····2.5W x 2

FREQUENCY RANGE·····50~15,000 cps at $7^1/_2$ ips speed
50~9,500 cps at $3^3/_4$ ips speed
50~5,500 cps at $1^7/_8$ ips speed

INPUT IMPEDANCE
- MICROPHONE TERMINAL·····6kΩ
- LINE-IN TERMINAL·····330kΩ
- REC./P.B. TERMINAL·····6kΩ

OUTPUT IMPEDANCE
- EXT. SPEAKER TERMINAL···8Ω
- REC./P.B. TERMINAL·····600Ω

MECHANICAL CHARACTERISTICS

TAPE SPEED·····$7^1/_2$ ips (19cm/s)
$3^3/_4$ips (9.5cm/s)
$1^7/_8$ ips (4.75cm/s)

TAPE REEL·····7″ (18cm), 5″ (13cm) & $3^1/_3$″ (8.5cm)

RECORDING OR PLAYING TIME·····Stereo (using 7″, 35μ tape)
1.5 hr at $7^1/_2$ ips speed
3 hr at $3^3/_4$ ips speed
6 hr at $1^7/_8$ ips speed
Monaural (using 7″, 35μ tape)
3 hr at $7^1/_2$ ips speed
6 hr at $3^3/_4$ ips speed
12 hr at $1^7/_8$ ips speed

REWINDING TIME·····4 min. using 7″, 50μ tape

FAST FORWARDING TIME···4 min. using 7″, 50μ tape

COMPONENTS USED

TRANSISTORS·····2SB73 (B) x 2, 2SB75 (C) x 4
2SB89 (C) x 2, 2SB367 (B) x 4
2SB370 (A) x 3, 2SC281 (C) x 4
2SC156 (A)

DIODES·····IN34A x 4, OA90 x 2, IS314
IS310 x 6

TERMISTORS·····D IE x 5, 3ID46

LOUDSPEAKER·····$6^1/_4$″ PM x 2

MICROPHONE·····Dynamic microphone

MISCELLANEOUS

TRACK SYSTEM·····4 track stereo

DIMENSIONS·····$8^{11}/_{16}$″ (H) x $14^3/_4$″ (W) x 14″ (D)
(22 x 37.5 x 35.5cm)

WEIGHT·····31 lbs (14kg)

DESCRIPTION

Special Features

1. 4-track, 2-channel system for stereo recording and reproducing.
2. Autostopper (Automatic stopping device)
   When playing back, fast forwarding or rewinding, the recording tape used with this set will automatically come to a complete stop at any optional position by means of the automatic control device.
3. Levelmatic device
   Since the level adjustment during recording is automatic, a recording without distortion can be performed, even when a sound of great intensity enters the machine suddenly.
4. All-transistor system, intensive total output of 5W.
5. Satellite speaker system
   Hitachi's high-performance speaker, positioned symmetrically on the right and left, ensures enjoyment of perfectly-balanced stereo sound.
6. Tone quality control
   Depending on preference, the machine can be controlled for soft or sharp tones or for a variation of tone in between.
7. Recording and playback terminals according to DIN standard
   If the stereo set has recording and playback terminals of the same standard, the connection for recording and player can be performed with one cord, regardless of stereo or monaral sound.

CONTROLS

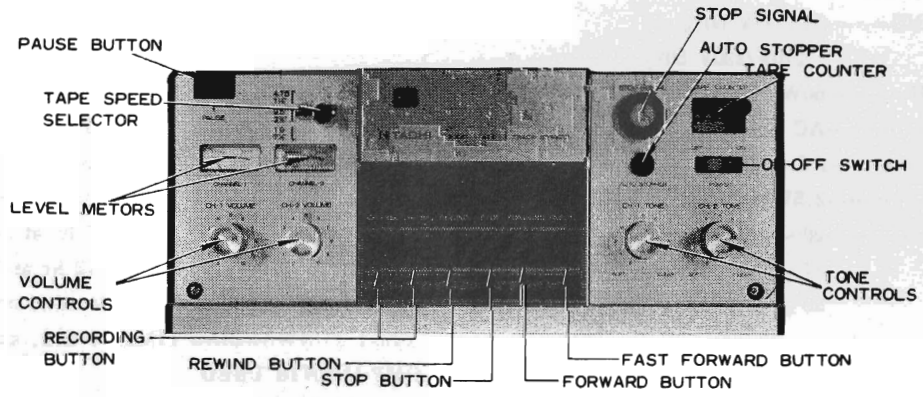


Fig.

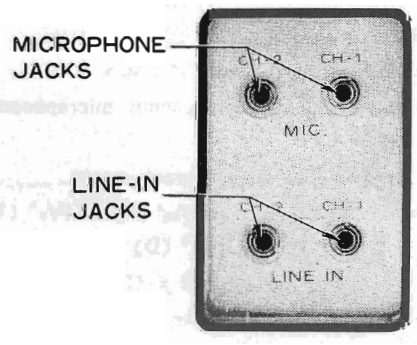


Fig. 2

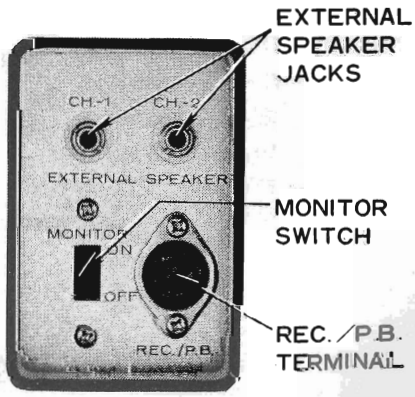


Fig. 3

OPERATION PRINCIPLE OF AUTOMATIC STOPPING DEVICE

The automatic stopping device has a magnetic head (for recording and reproducing of automatic stop signal) which is installed at an inclined angle, and is separated from the recording and reproducing head as shown in Fig. 7. Ordinary voice signals recorded in this head are not detected because of the inclined position.

This head only detects signals purposely designed to be recorded through it. Accordingly, when a stop signal is recorded on an optional track position of the tape through this head, that signal is detected in a playback condition and the signal is amplified in the transistor circuit and energizes the relay. This relay is connected to a circuit which actuates the powerful electromagnet. As shown in Fig. 6, when the relay is not actuated, it is connected to A, and the condenser (100μF) is charged. When the current flows to the relay, however, the relay is actuated, becomes connected to B, and the electric charge accumulated in the condenser flows to the electromagnet, thus actuating it. Because of the operation of this electromagnet, the lock on the stopping mechanism is released, creating a stop in the same way as if the stop button were depressed manually.

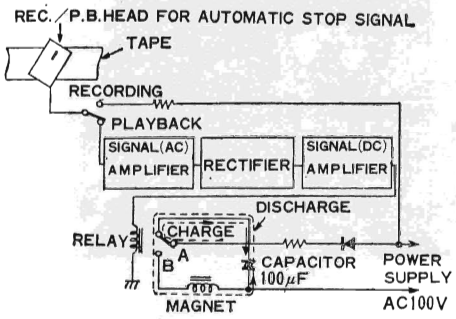


Fig. 6

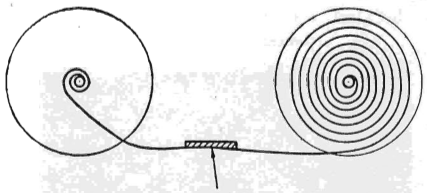


Fig4

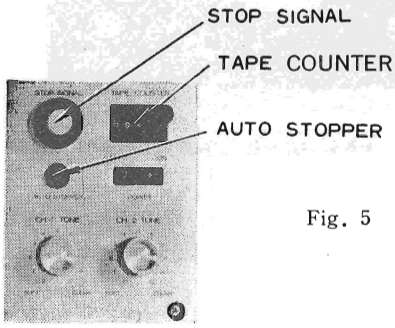


Fig. 5

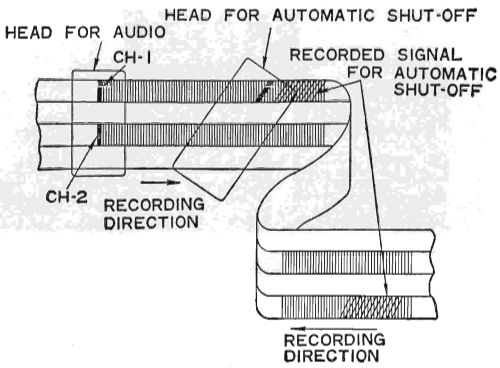


Fig 7

SERVICE POINTS

When inspecting, repairing and lubricating, disassemble the machine in the following manner:

1. Removing the front panel.

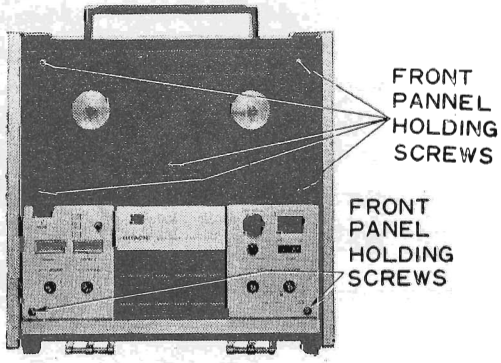


Fig. 8

Remove setscrews (7 pcs) as shown in Fig. 8, after removing the volume control knob, tone control knob, speed selector and head cover.

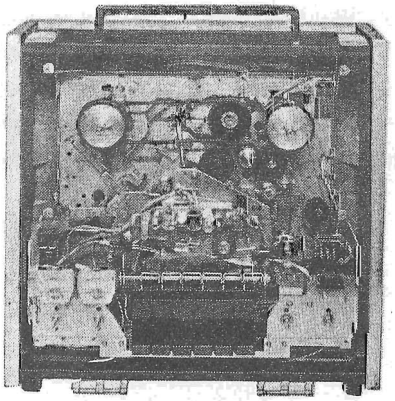


Fig. 9

2. Pulling out the chassis

Upon removing the rubber legs and chassis setscrews (4 pcs) located on the bottom of the case, shown in Fig. ,10 and chassis holding screws (2 pcs) shown in Fig. 11, the chassis can be removed from the case body.

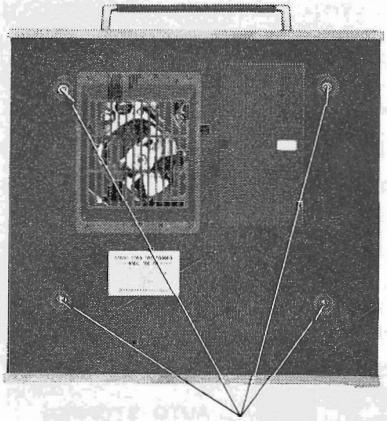


Fig. 10

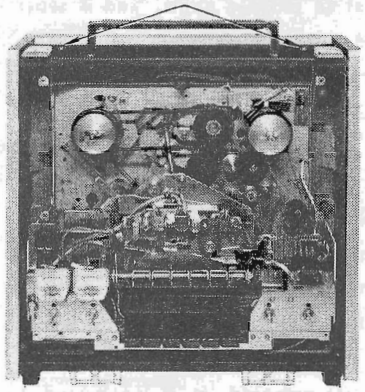


Fig. 11

3. Removing the circuit board

Remove screws (5 pcs) shown in Fig. 12. When removing the circuit board for automatic stopping device, remove holding screws (3pcs) as shown in Fig. 13.

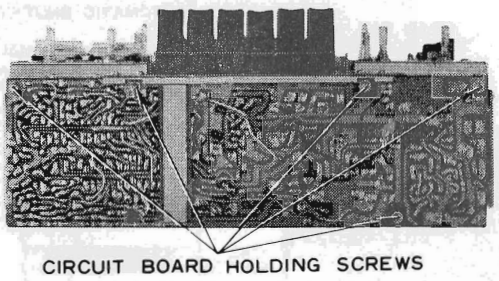


Fig. 12

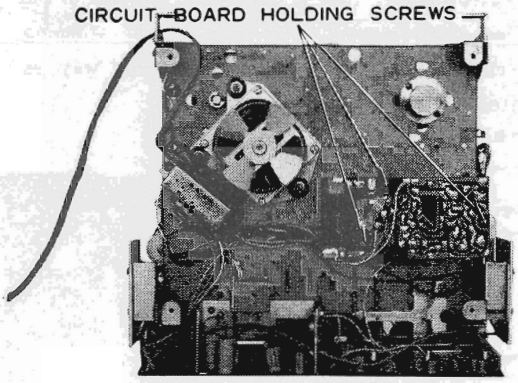


Fig. 13

LUBRICATING (Photo 1)

Lubricate each part shown in Fig. 14, when repairing.

Lubricate to each revolving part with one drop of pan motor oil and use a suitable quantity of grease on each sliding part.

On the shafts of the idler, pinch roller and capstan, oilless metal is used, ensuring stable operation without the use of feeding oil.

(Note) If oil is deposited on belts, idler, capstan, pinch roller and so on, they will slip. Be sure to remove the oil with alcohol.

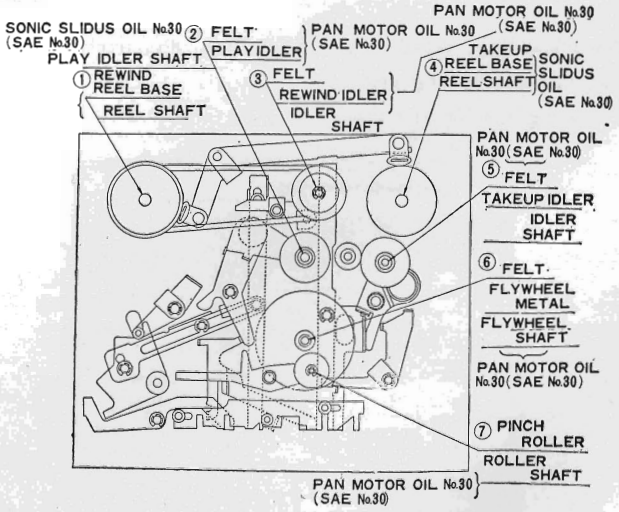


Fig. 14

ADJUSTMENT

1. Adjustment of electric circuit

1) Angle adjustment of recording and playback head

a) Adjustment of tape position

Check whether or not the tape is correctly positioned on the recording and playback head. This adjustment can be made by regulating the height of the tape guide (⊖ screw).

b) Angle adjustment of the tape

Prepare a standard tape for angle adjustment (NAB standard, 4-track) and adjust the screw for angle adjustment so that the voltage of the reproducing output reaches the maximum. Further, connect the V.T.V.M. (vacuum tube voltmeter) on each output side of No. 1 channel and No. 2 channel to measure respective voltage, and at the same time, check whether or not there is a large difference in the output between both channels. Pay special attention to the pad pressing force and check to see if it is the same for both channels. After the adjustment, the output level should not change excessively if the pad is slightly pressed manually.

When using an ordinary recorded tape (4-track, 2-channel), adjust the volume of the right and left channels according to the desired volume of sound.

Adjustment is made under conditions of maximum sound volume and high-stressed, high-pitched tone by turning the volume control knob (VOLUME) and tone control knob (TONE) completely to the right (clockwise).

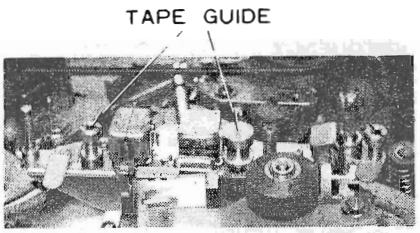


Fig.15

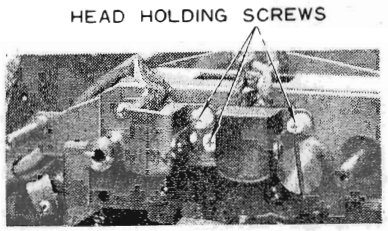


Fig.16

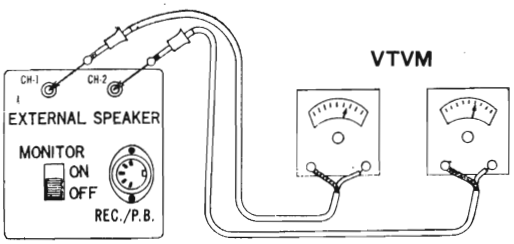


Fig.17

2) Adjustment of the recording level

a) Place the machine in the recording condition and transmit 1000 ℅ low-frequency signals from the low-frequency oscillator to the microphone terminal or LINE 1-N terminal.

b) Place the monitor switch (MONITOR) of the set to ON position, and turn the volume control knob (VOLUME: CH-1 or CH-2) completely to the right (clockwise) to gain maximum volume. Then connect the V.T.V.M. (vacuum tube voltmeter) to the speaker terminal as shown in Fig.17. Adjust the output of thelow-frequency oscillator so that the output voltage reaches 0.45V (Adjust the intensity of input signals). Even when decreasing the input, if the output voltage does not decrease to the predetermined value (0.45V) try to decrease the volume output by turning the volume control knob (VOLUME) to the left (counterclockwise).

c) In this condition, adjust the semi-fixed resistors (VR3, VR6) so that deflection of the level meter pointer indicates a borderline position between black and red.

Adjust (VR3 for No.1 channel (CH-1)
VR6 for No.2 channel (CH-2)

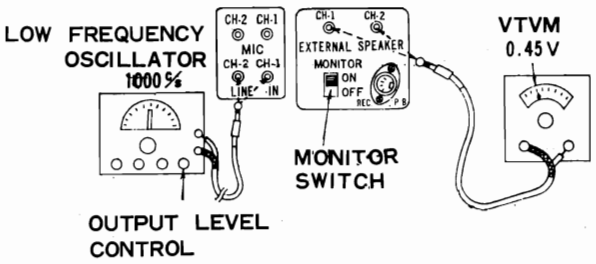


Fig. 18

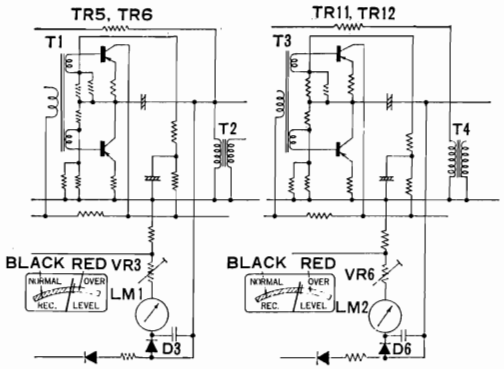


Fig. 19

3) Bias adjustment

Bias oscillating frequency of TRQ-707 is 50~60kc. Adjust the bias in the following way:

a) Place the machine in a recording condition.

b) Remove the ground side lead wire of the recording and playback head terminal, then connect the resistor (100Ω) and connect the resistor to the ground side.

c) Measure the voltage after connecting V.T.V.M. (vacuum tube voltmeter) as shown in Fig.20, and adjust the semi-fixed resistors (VR7, VR8) so that the voltage shows the value indicated below.

Adjust (VR7 for No.1 channel
VR8 for No.2 channel

from serial no. 28200001~28200844	27mV
after serial no. 28200845	45mV

∘ Erasing current of the erasing head is normal when it is within 13-30mA.

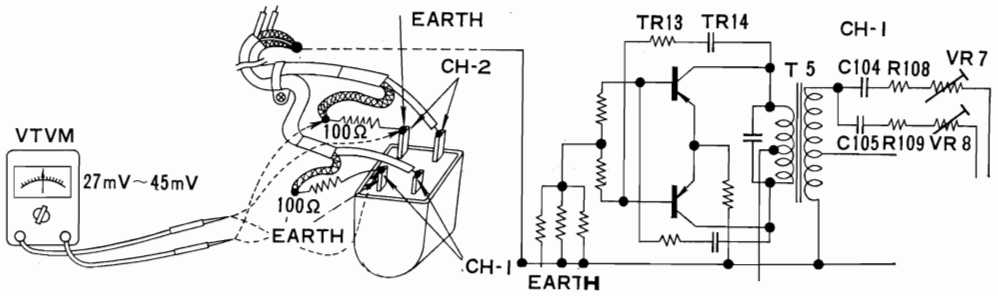


Fig. 20

4) Bias trap adjustment

This adjustment is made to eliminate high-frequency which leaks into the audio amplifier circuit from the bias oscillating circuit (oscillating frequency: 50-60KC). Adjusting order

∘ This is begun from No.1 channel (CH-1).

a) Place the No. 1 channel (CH-1) in a playback condition and also place the No. 2 channel (CH-2) in arecording condition. Do not insert the micro phone and auxiliary cord into the mic-jack (MIC) or the input jack (LINE IN) in a condition without applying the jack.

b) Turn the volume control knob (CH-1 VOLUME, CH-2 VOLUME) and the tone control knob (CH-1 TONE, CH-2 TONE) completely clockwise to produce a maximum output.

c) Connect 8Ω pure resistor to the No. 1 channel speaker jack (EXTERNAL SPEAKER CH-1) in a reproducing condition as shown in Fig. 21, then connect V. T.V.M. (vacuum tube voltmeter) to both ends of it. A high-frequency voltage leaking from the oscillating circuit is indicated in this condition. Turn the core of the TRAP COIL (L1) to produce minimum voltage (under 40mV).

∘ Next, adjust the trap for No. 2 channel (CH-2), following the same procedures as used in No. 1 channel (CH-1) adjustment.

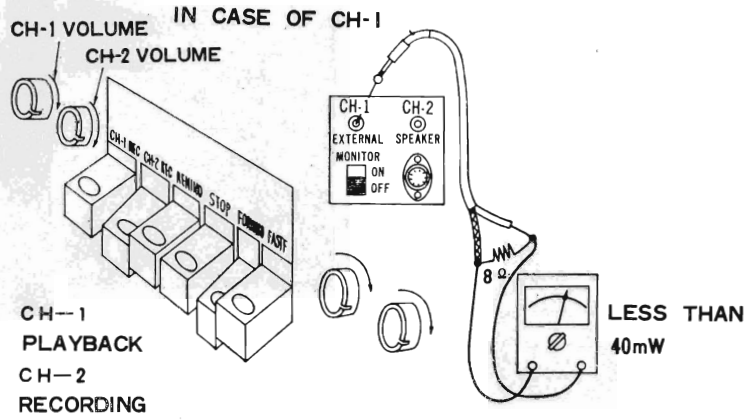


Fig. 21

5) Hum balance
   a) Place the set in a playback condition without applying tape.
   b) Turn the volume control knobs and tone quality control knobs for CH-1 and CH-2 fully clockwise.
   c) Adjust by moving the choke coils of L3 and L4 so that the induced noise heard from the speakers is reduced to a minimum.
6) Automatic stopping circuit
   Adjust the power source voltage to 90% of the rated voltage (as the rated voltage is 100V, 90% means 90V), and record the stopping signal after adjusting the tape speed to 4.75cm/sec. Next, connect the V.T.V.M. (vacuum tube voltmeter) between the C201 and the ground as shown in Fig. 22, and then playback. Monitor the signal level with the V.T.V.M. and adjust VR201 and VR202 so that the level actuating the stopping mechanism reaches +1.5dB. VR201 is for rough adjustment and VR202 is for fine adjustment.

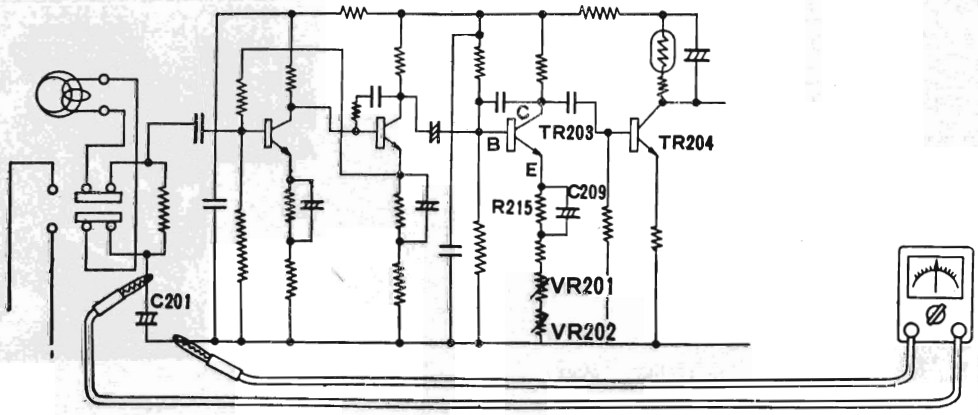


Fig. 22

2. Adjustment for mechanical sections

1) Pressing force on each section
   a) Pinch roller Pressing force·····1.0kg $^{+0.3}_{-0.1}$kg.
   Measuring method
   Arrange so that the pinch roller presses against the capstan shaft (playback condition), and pull the pinch roller in a right angle direction against the pinch roller arm. Then measure the slight value remaining, occasioned by the by using a bar pressure of the pinch roller against the capstan shaft, gauge (rating 3kg or 5kg).

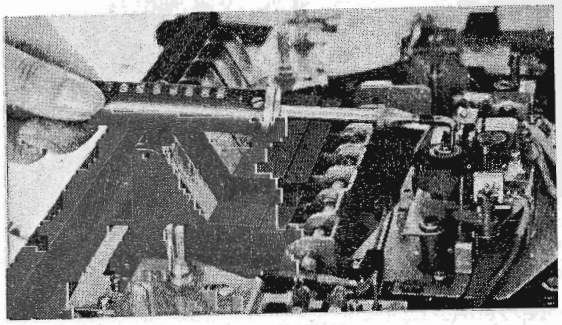


Fig. 23

b) Pad pressing force 50gr ±10gr

c) F-pad pressing force (for automatic stopping head) ……5～15gr

Measuring method

This is a pad-pressing force for the purpose of pressing the tape against the head surface. The value is measured when the pad is disengaged from the head surface by applying the tension gauge (rating 30gr or 100gr) to the pad center and upper end.

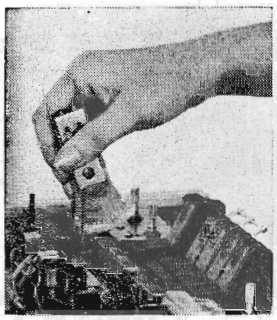


Fig. 24

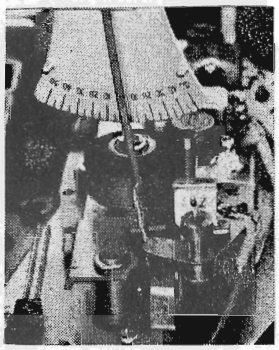


Fig. 25

d) Winding idler pressing force ……150gr±30gr

Measuring method

Lock the machine by depressing the play button (FORWARD) (play condition).

Measure the value when the winding idler disengages from the motor pulley and the winding pulley at the same time.

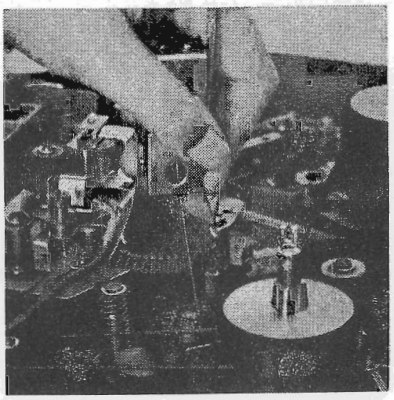


Fig. 26

e) Playback idler pressing force

When the tape speed is 19 cm/sec……200gr ±40gr

When the tape speed is 9.5 cm/sec……175gr ±40gr

When the tape speed is 4.75 cm/sec…150gr ±40gr

Measuring method

Lock the machine by depressing the play button (FORWARD) (play condition). Measure the value when the playback idler disengages from the flywheel and the motor pulley at the same time.

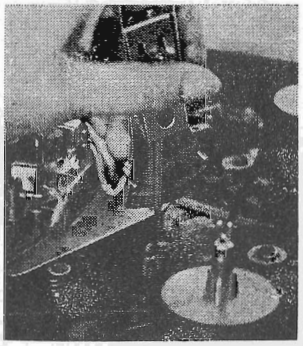


Fig. 27

f) Rewinding (R) idler pressing force…… 550gr ±50gr

Measuring method

Lock the machine by depressing the rewinding button (REWIND) (rewinding condition). Measure the value when the rewinding idler disengages from the motor pulley.

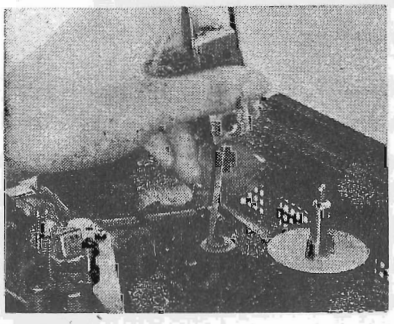


Fig. 28

2) Torque of each section

a) Winding torque·····50-90gr

Measuring method

Place the machine in a horizontal position and turn the power source to ON position: then place the 7″ empty reel on the winding side reel shaft Wind a thread inside it and measure the winding torque in a play condition (FORWARD).

b) Winding and supplying friction coupling torque Takeup or rewinding torque·····200~300gr

Measuring method

Place the machine in a vertical position, and throw the power source to ON position. Wind a thread inside the 7″ empty reel and measure the torque in a fast forwarding condition of the takeup Place in a rewinding condition for the rewinding

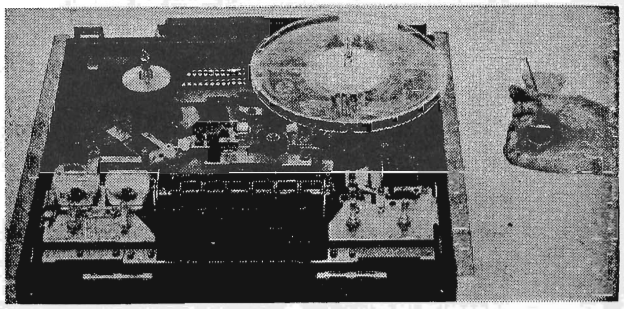


Fig.29

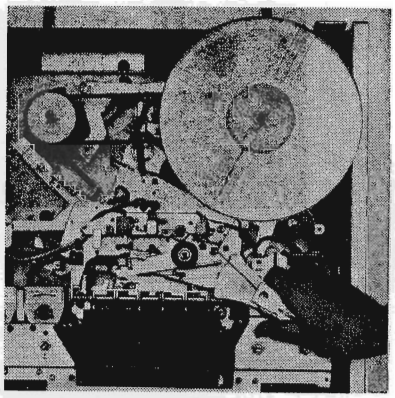


Fig.30

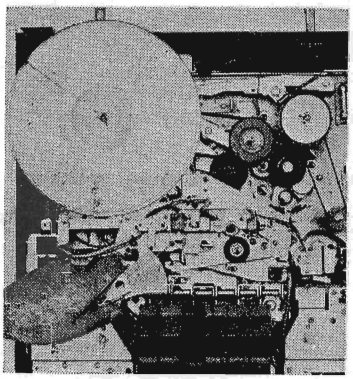


Fig.31

c) Back tension ·····15-36gr

Place empty reel on the rewinding reel shaft after winding a thread. Set the machine to play condition. Measure the force when pulling out the thread.

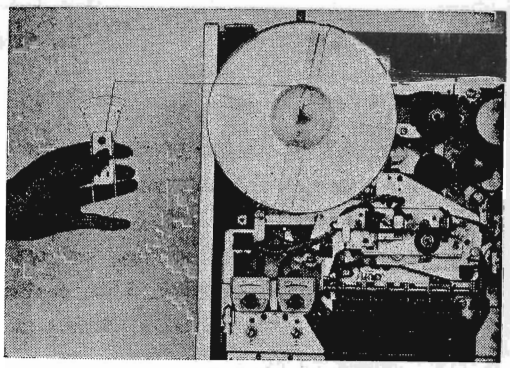


Fig.32

d) Takeup back tension·····15~35gr

Place 7″ empty reel on the takeup reel shaft after winding a thread. Set the machine to rewinding condition. Measure the force when pulling out the thread.

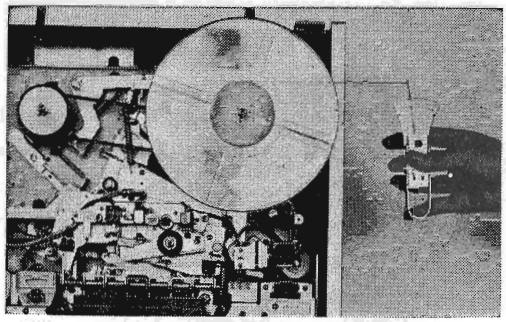


Fig.33

e) Push button operating force···Under 3.5kg

Place the machine in a horizontal position. Apply the bar gauge to the tip of the push button and measure the force until the button is locked.

Note) When applying the bar gauge directly to the push button, the push button may be damaged. To prevent any possible damage, use a rubber sheet between the gauge and the button.

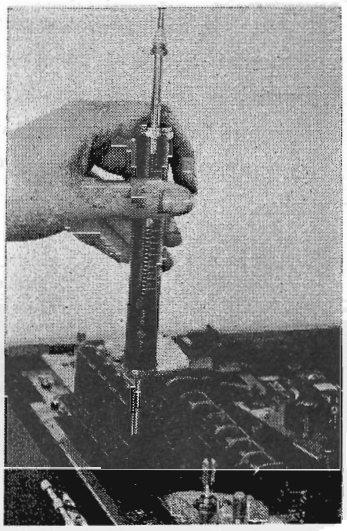
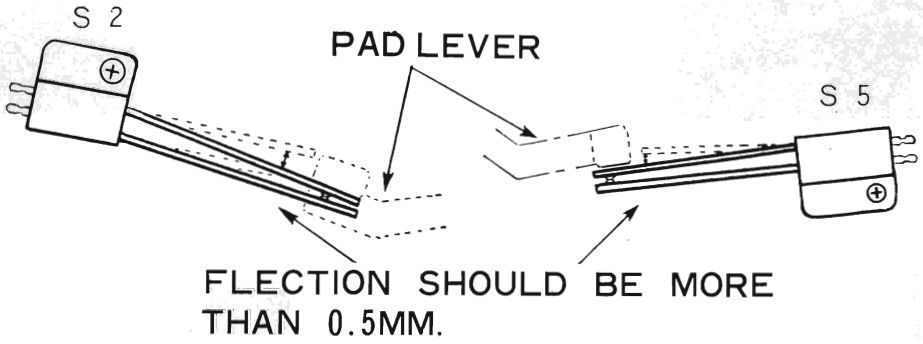


Fig.34

3) Adjustment of installation position

a) Installation position of the muting switch (Fig. 1)



b) Installation position of motor pulley (Fig.1)

The standard distance between the chassis and the motor pulley is 2 ± 0.1mm. After installing the pulley in this position, try the speed change and adjust the position, while confirming that the Playback idler correctly enters each stage of the motor pulley.

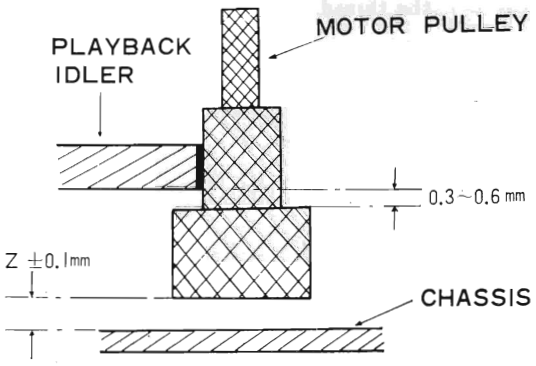


Fig.35

TROUBLE-SHOOTING

The following are important malfunctions and their countermeasures.

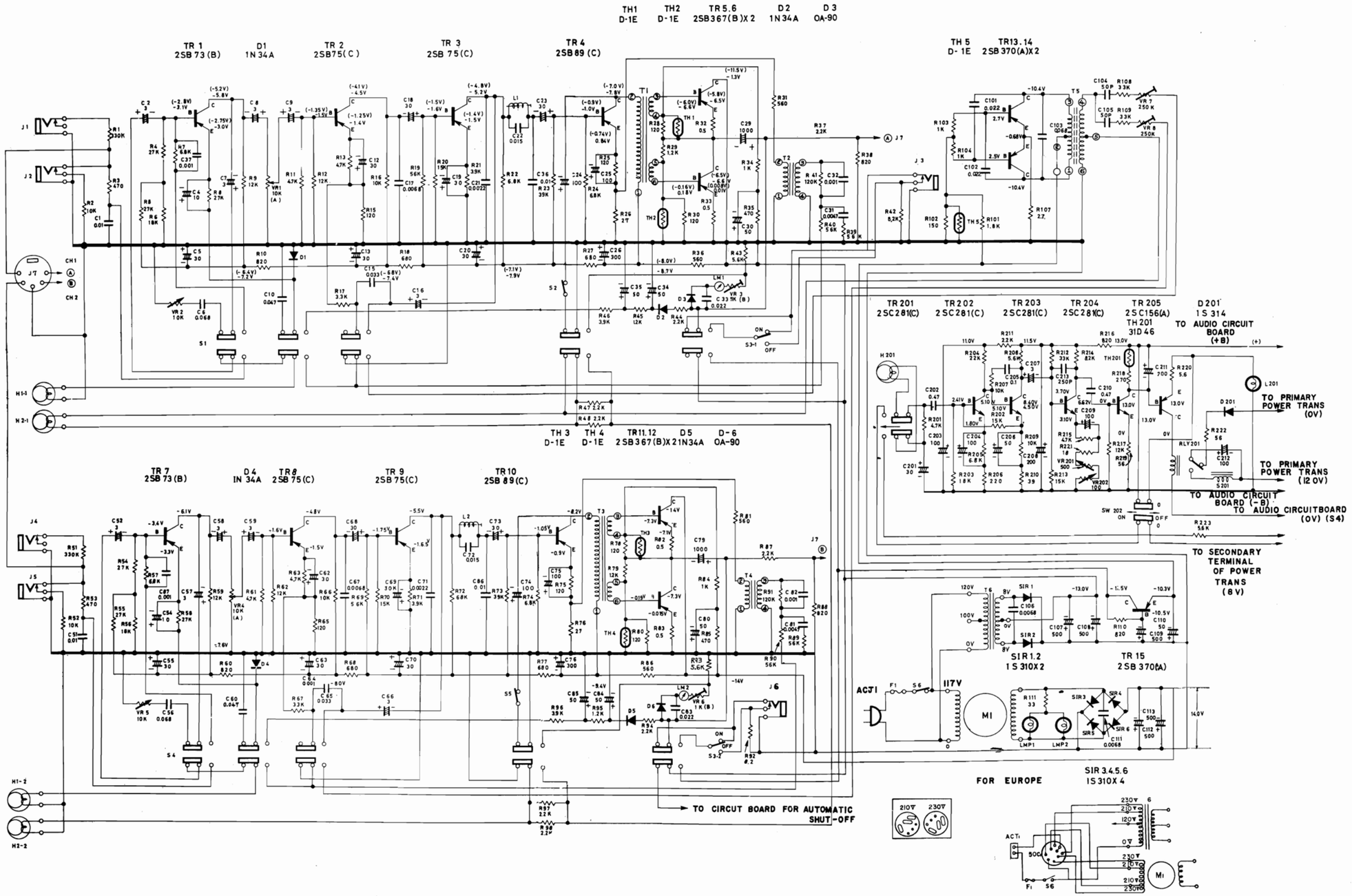
While reproduciug	Cause	Countermeasures
Tape does not run.	Pinch roller does not press, or it slips.	Is pressing force normal? Is the spring disconnected? Does oil adhere to the pinch roller and the capstan?
Speeds do not coincide. Unstable revolution	Heights of the playback idler and the motor pulley do not coincide Winding torque is large. Insufficient oil on the capstan shaft.	Pulley is lowered because of loose screwing of the motor pulley. Check the pressing force on each section. Check relative mechanisms of the winding reel base Oiling.
Disabled fast forward	Check the supply, back tension. Check the winding coupling torque.	Oiling. When the torque and tension are too weak, replace the assembly.
Disabled rewinding	Check slipping portion. Check the supply coupling torque and winding side back tension. Check the pressing force of playback idler	When it is weak and does not conform to designated value, replace the assembly. Oiling. Confirm any deformation of the spring.
Automatic stopping does not occur.		
Is solenoid actuated? Lock is not disconnected.	Stroke cannot function because of loosened screws of the solenoid iron core and the solenoid pin.	Tighten the screws securely.
No solenoid stroke.	Solenoid is installed in a bent or inclined fashion. Heavy lock plate motion.	

REPLACEMENT PARTS

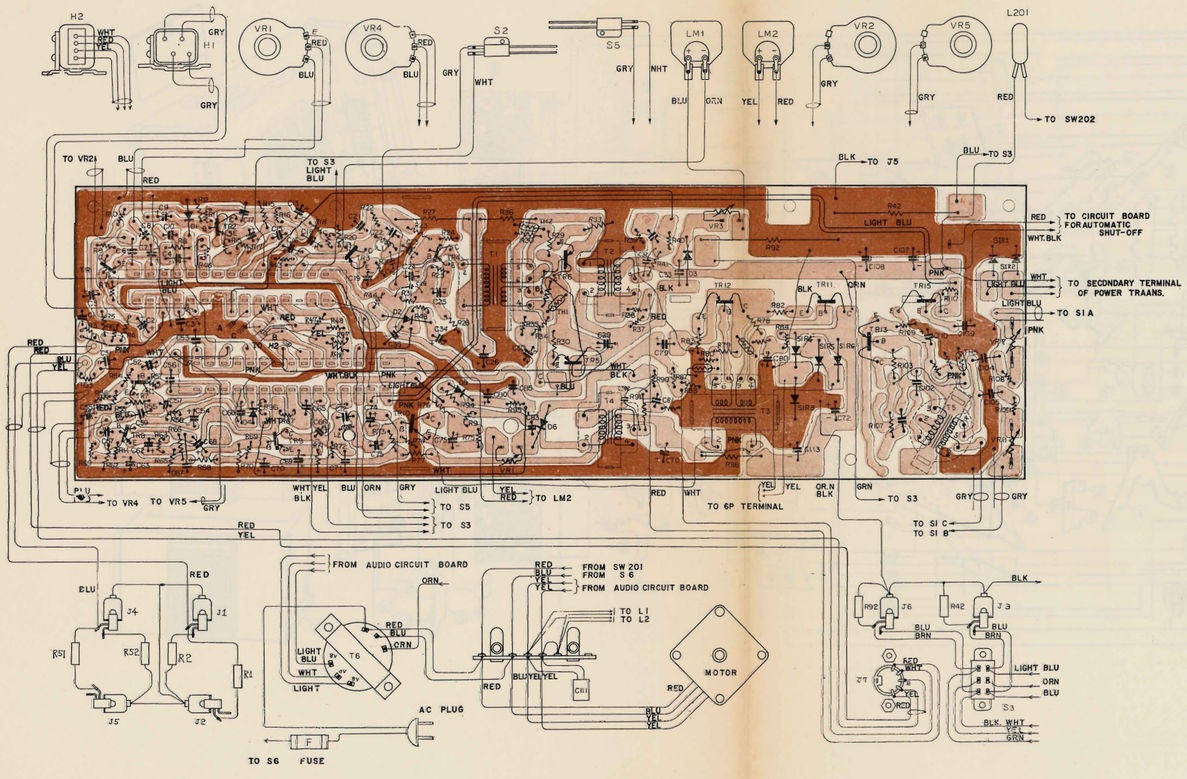
Symbol No.	Stock No.	Description		
		CAPACITORS:		
C 1	0275111	Mylar	0.01μF±20%	50WV
C 2	0252313	Electrolytic	3μF	10WV
C 4	0252321	Electrolytic	10μF	10WV
C 5	0252323	Electrolytic	30μF	10WV
C 6	0275016	Mylar	0.068μF±10%	50WV
C 7	0252313	Same as C2		
C 8	0252313	Same as C2		
C 9	0252313	Same as C2		
C 10	0275014	Mylar	0.033μF±10%	50WV
C 12	0252323	Same as C5		
C 13	0252323	Same as C5		
C 15	0275014	Same as C10		
C 16	0276113	Mylar	0.22μF±20%	50WV
C 17	0274016	Mylar	0.0068μF±10%	50WV
C 18	0252321	Same as C4		
C 19	0252323	Same as C5		
C 20	0252523	Electrolytic	30μF	15WV
C 21	0274013	Mylar	0.0022μF±10%	50WV
C 22	0275012	Mylar	0.015μF±10%	50WV
C 23	0252323	Same as C5		
C 24	0252323	Same as C5		
C 25	0252131	Electrolytic	100μF	3WV
C 26	0252533	Electrolytic	300μF	15WV
C 29	0259651	Electrolytic	1000μF	12WV
C 30	0252525	Electrolytic	50μF	15WV
C 31	0233022	Ceramic	250pF±5%	50WV
C 32	0233013	Ceramic	370pF±5%	50WV
C 33	0275113	Mylar	0.022μF±20%	50WV
C 34	0252325	Electrolytic	50μF	10WV
C 35	0252325	Same as C34		
C 36	0275111	Same as C1		
C 51	0275111	Same as C1		
C 52	0252313	Same as C2		
C 54	0252321	Same as C4		
C 55	0252323	Same as C5		
C 56	0275016	Same as C6		
C 57	0252313	Same as C2		
C 58	0252313	Same as C2		
C 59	0252313	Same as C2		
C 60	0275014	Same as C10		
C 62	0252323	Same as C5		
C 63	0252323	Same as C5		
C 65	0275014	Same as C10		
C 66	0276113	Same as C16		
C 67	0274016	Same as C17		
C 68	0252321	Same as C4		
C 69	0252323	Same as C5		
C 70	0252523	Same as C20		
C 71	0274013	Same as C21		
C 72	0275012	Same as C22		
C 73	0252323	Same as C5		
C 74	0252323	Same as C5		
C 75	0252131	Same as C25		
C 76	0252533	Same as C26		
C 79	0259651	Same as C29		
C 80	0252525	Same as C30		
C 81	0233022	Same as C31		
C 82	0233013	Same as C32		
C 83	0275113	Same as C33		
C 84	0252325	Same as C34		
C 85	0252325	Same as C34		
C 86	0275111	Same as C1		
C 101	0275111	Same as C1		

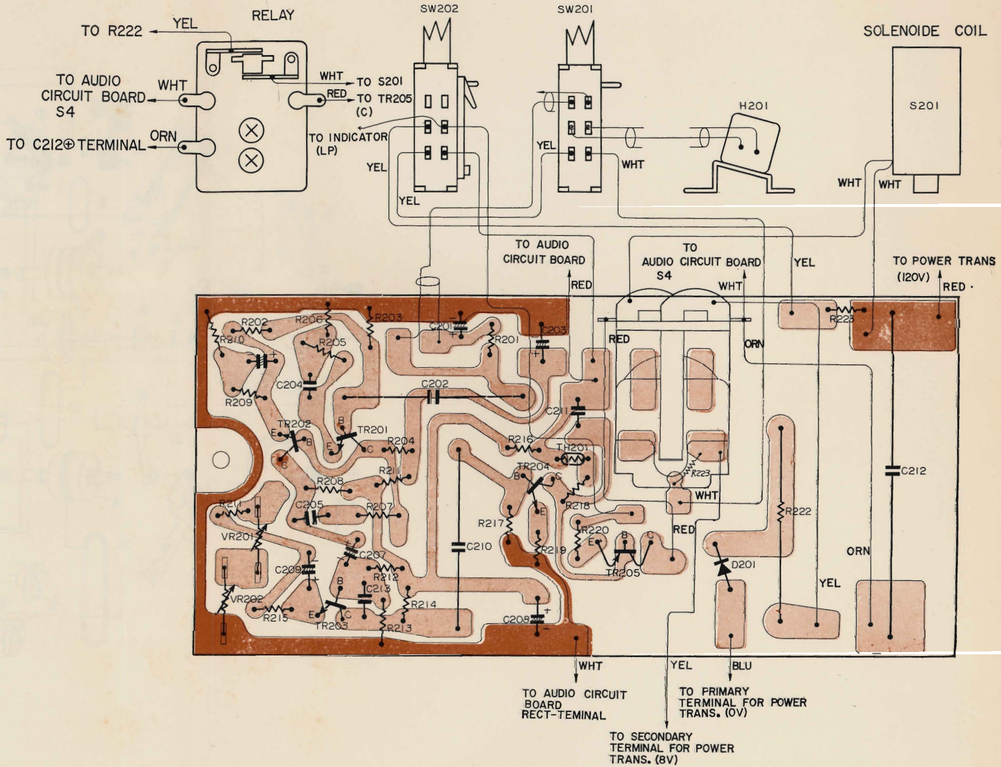
Symbol No.	Stock No.	Description		
C 102	0275111	Same as C1		
C 103	0275016	Same as C6		
C 104	0242820	Ceramic	50pF±10%	500WV
C 105	0242820	Same as C104		
C 107	0252535	Electrolytic	500μF	15WV
C 108	0252535	Same as C107		
C 109	0252535	Same as C107		
C 110	0252525	Same as C30		
C 111	0274116	Mylar	0.0068±20%	50WV
C 112	0252535	Same as C107		
C 113	0252535	Same as C107		
		RESISTORS:		
R 1	0134403	Carbon film	330kΩ±10%	RC½GF
R 2	0134385	Carbon film	10kΩ±10%	RC½GF
R 3	0137809	Carbon film	470Ω±10%	SRD¼SD
R 4	0137906	Carbon film	27kΩ±10%	SRD¼SD
R 5	0137906	Same as R4		
R 6	0137904	Carbon film	18kΩ±10%	SRD¼SD
R 7	0137621	Carbon film	6.8kΩ±5%	SRD¼SD
R 8	0137906	Same as R4		
R 9	0137902	Carbon film	12kΩ±10%	SRD¼SD
R 10	0137812	Carbon film	820Ω±10%	SRD¼SD
R 11	0137909	Carbon film	47kΩ±10%	SRD¼SD
R 12	0137902	Same as R9		
R 13	0137859	Carbon film	4.7kΩ±10%	SRD¼SD
R 15	0137802	Carbon film	120Ω±10%	SRD¼SD
R 16	0137901	Carbon film	10kΩ±10%	SRD¼SD
R 17	0137860	Carbon film	5.6kΩ±10%	SRD¼SD
R 18	0137811	Carbon film	680Ω±10%	SRD¼SD
R 19	0137910	Carbon film	56kΩ±10%	SRD¼SD
R 20	0137903	Carbon film	15kΩ±10%	SRD¼SD
R 21	0137858	Carbon film	3.9kΩ±10%	SRD¼SD
R 22	0137861	Carbon film	6.8kΩ±10%	SRD¼SD
R 23	0137908	Carbon film	39kΩ±10%	SRD¼SD
R 24	0137861	Same as R22		
R 25	0137802	Same as R15		
R 26	0137763	Carbon film	22Ω±10%	SRD¼SD
R 27	0134371	Carbon film	680Ω	RC½GF
R 28	0137802	Same as R15		
R 29	0137852	Carbon film	1.2kΩ±10%	SRD¼SD
R 30	0137802	Same as R15		
R 31	0137810	Carbon film	560Ω±10%	SRD¼SD
R 32	0149101	Wire wound	0.5Ω±10%	RU½
R 33	0149101	Same as R32		
R 34	0137851	Carbon film	1kΩ±10%	SRD¼SD
R 35	0137809	Same as R3		
R 36	0134370	Carbon film	560Ω±10%	RC½GF
R 37	0137855	Carbon film	2.2kΩ±10%	SRD¼SD
R 38	0137812	Same as R10		
R 39	0137909	Same as R11		
R 40	0137912	Carbon film	82kΩ±10%	SRD¼SD
R 41	0137952	Carbon film	120kΩ±10%	SRD¼SD
R 42	0190046	Wire wound	8.2Ω±10%	RG5
R 43	0137860	Same as R17		
R 44	0137855	Same as R37		
R 45	0137852	Same as R29		
R 46	0137615	Carbon film	3.9kΩ±5%	SRD¼SD
R 47	0134377	Carbon film	2.2kΩ±10%	RC½GF
R 48	0134377	Same as R47		
R 49	0134297	Carbon film	47Ω±10%	RC½GF
R 51	0134403	Same as R1		
R 52	0134385	Same as R2		
R 53	0137809	Same as R3		
R 54	0137906	Same as R4		
R 55	0137906	Same as R4		
R 56	0137904	Same as R6		
R 57	0137621	Same as R7		
R 58	0137906	Same as R4		
R 59	0137902	Same as R9		
R 60	0137812	Same as R10		
R 61	0137909	Same as R11		

CIRCUIT DIAGRAM

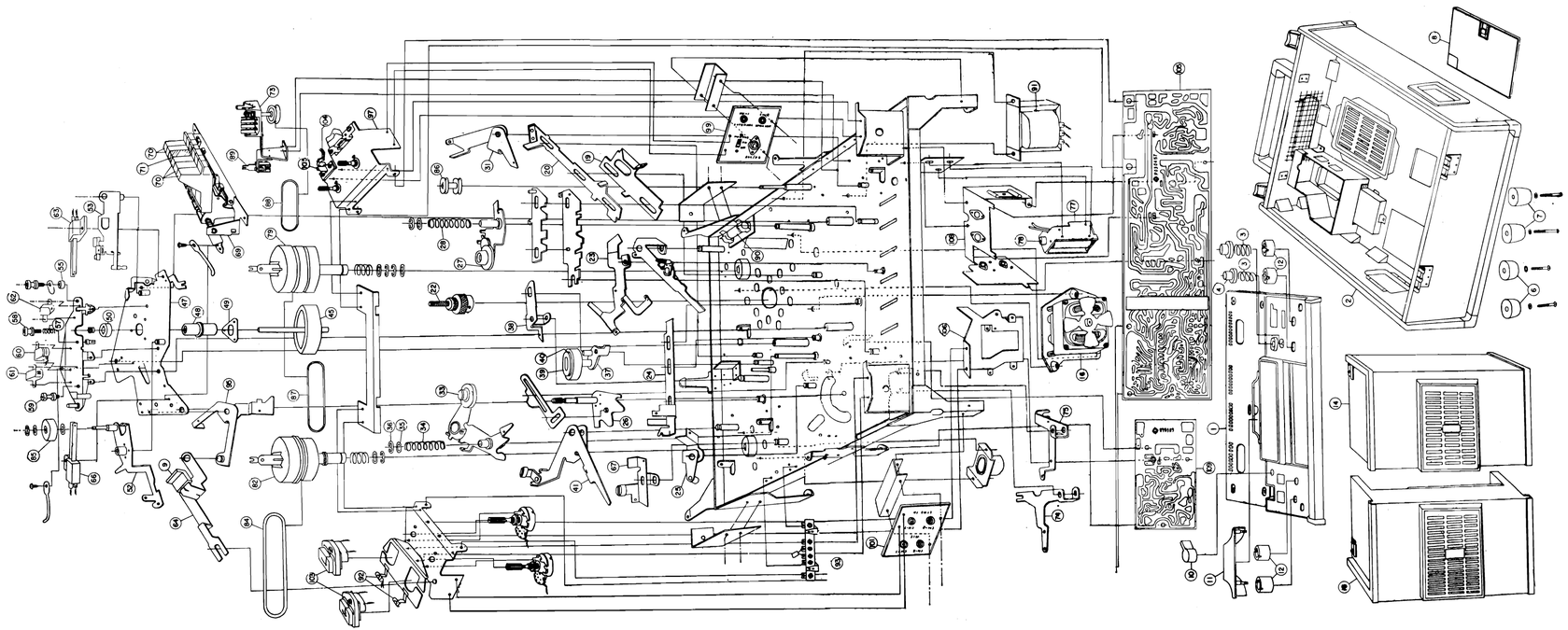


CIRCUIT BOARD DIAGRAM





MECHANICAL PARTS VIEW



Symbol No.	Stock No.	Description		
R 62	0137902	Same as R9		
R 63	0137859	Same as R13		
R 65	0137802	Same as R15		
R 66	0137901	Same as R16		
R 67	0137860	Same as R17		
R 68	0137811	Same as R18		
R 69	0137910	Same as R19		
R 70	0137903	Same as R20		
R 71	0137858	Same as R21		
R 72	0137861	Same as R22		
R 73	0137908	Same as R23		
R 74	0137861	Same as R22		
R 75	0137802	Same as R15		
R 76	0137764	Carbon film	27Ω±10%	SRD¼SD
R 77	0134371	Same as R27		
R 78	0137802	Same as R15		
R 79	0137852	Same as R29		
R 80	0137802	Same as R15		
R 81	0137810	Same as R31		
R 82	0149101	Same as R32		
R 83	0149101	Same as R32		
R 84	0137851	Same as R34		
R 85	0137809	Same as R3		
R 86	0134370	Same as R36		
R 87	0137855	Same as R37		
R 88	0137812	Same as R10		
R 89	0137909	Same as R11		
R 90	0137912	Same as R40		
R 91	0137952	Same as R41		
R 92	0190046	Same as R42		
R 93	0137860	Same as R17		
R 94	0137855	Same as R37		
R 95	0137852	Same as R29		
R 96	0137615	Same as R46		
R 97	0134377	Same as R47		
R 98	0134377	Same as R47		
R 99	0134297	Same as R49		
R 101	0137854	Carbon film	1.8kΩ±10%	SRD¼SD
R 102	0137803	Carbon film	150Ω±10%	SRD¼SD
R 103	0137851	Same as R34		
R 104	0137851	Same as R34		
R 107	0134281	Carbon film	2.2Ω±10%	RC½GF
R 108	0137953	Carbon film	150kΩ±10%	SRD¼SD
R 109	0137953	Same as R108		
R 110	0137806	Carbon film	270Ω±10%	SRD¼SD
R 201	0137859	Carbon film	4.7kΩ±10%	SRD¼SD
R 202	0137903	Carbon film	15kΩ±10%	SRD¼SD
R 203	0137904	Carbon film	18kΩ±10%	SRD¼SD
R 204	0137659	Carbon film	22kΩ±5%	SRD¼SD
R 205	0137861	Carbon film	6.8kΩ±10%	SRD¼SD
R 206	0137559	Carbon film	220Ω±5%	SRD¼SD
R 207	0137901	Carbon film	10kΩ±10%	SRD¼SD
R 208	0137619	Carbon film	5.6kΩ±5%	SRD¼SD
R 209	0137901	Same as R207		
R 210	0137531	Carbon film	39Ω±5%	SRD¼SD
R 211	0137855	Carbon film	2.2kΩ±10%	SRD¼SD
R 212	0137907	Carbon film	33kΩ±10%	SRD¼SD
R 213	0137903	Same as R202		
R 214	0137862	Carbon film	8.2kΩ±10%	SRD¼SD
R 215	0137859	Same as R201		
R 216	0137812	Carbon film	820Ω±10%	SRD¼SD
R 217	0137902	Carbon film	12kΩ±10%	SRD¼SD
R 218	0137806	Carbon film	270Ω±10%	SRD¼SD
R 219	0137901	Same as R207		
R 220	0133206	Carbon film	5.6Ω±10%	RC½BE
R 221	0137762	Carbon film	18Ω±10%	SRD¼SD
R 222	0126211	Carbon film	56Ω±10%	RD2L
R 223	0131685	Carbon film	5.6kΩ±5%	RC¼GF
VR 1	0153152	adjustable	10kΩ (A)	VR—24
VR 2	0153152	adjustable	10kΩ (A)	VR—24
VR 3	0151066	adjustable	1kΩ (B)	VR—9
VR 4	0153152	adjustable	10kΩ (A)	VR—24
VR 5	0153152	adjustable	10kΩ (A)	VR—24
VR 6	0151066	adjustable	1kΩ (B)	VR—9

Symbol No.	Stock No.	Description		
VR 7	0151129	adjustable	250kΩ (B)	VR—S
VR 8	0151129	adjustable	250kΩ (B)	VR—S
VR201	0159016	adjustable	500Ω (B)	RV—S
VR202	0159015	adjustable	100Ω (B)	RV—S
		TRANSISTORS:		
TR 1	0573018		2SB 73 (B)	
TR 2	0573153		2SB 75 (C)	
TR 3	0573153	Same as TR2		
TR 4	0573118		2SB 89 (C)	
TR 5	0573031		2SB 367 (B)P	
TR 6				
TR 7	0573018	Same as TR1		
TR 8	0573153	Same as TR2		
TR 9	0573153	Same as TR2		
TR 10	0573118	Same as TR4	2SB 89 (C)	
TR 11	0573031	Same as TR5,6		
TR 12				
TR 13	0573022		2SB 370 (A)	
TR 14	0573022	Same as TR13		
TR 15	0573022	Same as TR3		
TR201	0573469		2SC 281 (C)	
TR202	0573469	Same as TR201		
TR203	0573469	Same as TR201		
TR204	0573469	Same as TR201		
TR205	0573029		2SB 156 (A)	
TH 1	0576004	Thermistor	D—IE	
TH 2	0576004	Same as TH1		
TH 3	0576004	Same as TH1		
TH 4	0576004	Same as TH1		
TH 5	0576004	Same as TH1		
TH201	0576021	Thermisistor	31D 46	
D 1	0575001	Diode	1N 34A	
D 2	0575001	Same as D1		
D 3	0575039	Diode	OA—90	
D 4	0575001	Same as D1		
D 5	0575001	Same as D1		
D 6	0575039	Same as D3		
D 201	0552006	Silicon rectifire	1S 314	
SIR 1	0552010	Diode	1S 310	
SIR 2	0552010	Same as SIR1		
SIR 3	0552010	Same as SIR1		
SIR 4	0552010	Same as SIR1		
SIR 5	0552010	Same as SIR1		
SIR 6	0552010	Same as SIR1		
		TRANSFORMERS:		
T 1	0441054	Input		
T 2	0451106	Output		
T 3	0441054	Same as T3		
T 4	0451106	Same as T2		
T 5	0316531	Oscillator coil		
		COILS:		
L 1	0317148	Trap		
L 2	0317148	Same as L1		
		MISCELLANEOUS:		
		for Final assembly		
	0592096	Microphone		
	0593454	Cord (120V 50,60%)		
1	0958389	Deck assembly		
2	0020774	Cabinet assembly (120V 50,60%)		
	0020775	Cabinet assembly (210/230V 50%)		
	0621751	Air duct		
		Screw-2.7mm⌀×10mm screw (8 req'd)		
	0020294	Cabinet metal plate (1)		
	0020394	Cabinet metal plate (2)		
	0020295	Cabinet metal plate (3)		

Symbol No.	Stock No.	Description
	0020761	Connector for metal mounting,
	0020432	Screw(1) for metal mounting (16 req'd)
	0621761	Lock
	0020296	Hinge (B)
	0621763	Screw for hinge mounting (10 req'd)
	0043692	Handle assembly
	0020838	Mortor cooling
	0020323	Screw for mortor cooling
3	0958437	Spring (2 req'd)
4	0958438	Button-auto stop switch button
6	0971196	Rubber base (2 req'd)
		Washer-4mmØ washer (2 req'd)
		Screw-4mmØ×25mm pan head screw (2 req'd) for rubber base mounting
7	0971239	Rubber base (large, 2 req'd)
	0711635	Screw-4mmØ×35mm pan head screw (2 req'd)
		Washer-4mmØ washer (2 req'd) for rubber base mounting
	0624387	Column (B)
		Screw-4mmØ×20mm screw (2 req'd) for shassis mounting
8	0958355	Storage cover assembly
9	0958431	Button-pause control button
10	0693422	Knob-speed changing knob
11	0958435	Cover-head cover
12	0958433	Control knob assembly
13	0020325	Speaker box assembly (Left)
	0020298	Cabinet metal plate
	0020299	Cabinet metal plate
	0020300	Hinge (A)
	0971205	Rubber base
		Washer-3mmØ washer for rubber base
	0020323	Screw mounting
	0524099	Speaker
	0542239	Cord-plag cord
		Screw-3mmØ×12mm pan head screw
		Washer-3mmØ locking washer (4 req'd)
		Nut-3mmØ nut
		for speaker mounting
	0958370	Speaker grill assembly
		Screw-3mmØ×16mm tapping screw (4 req'd) for speaker grill mounting
	0020301	Speaker box lid
		Screw-2.7mmØ×13mm screw (8 req'd) for speaker box lid mounting
14	0020329	Speaker box assembly (right)
		for Chassis assembly
	0971107	Rubber for Deck
		Washer-4mmØ spring
		Screw-4mmØ×18mm pan head screw (3 req'd)
	0941291	Pad-motor pad
16	0514137	Motor-induction motor (120V 50/60%)
	0514138	Motor-induction motor (210/230V 50%)
19	0941141	Lever-fast foward lever

Sybolm No.	Stock No.	Description
	0662124	Spring for fast forward lever
20	0941144	Brake actuator
		Washer-fibber washer for brake actuator (3 req'd)
		Washer-"E"type retaining washer (3 req'd)
	0944452	Screw (2 req'd)
22	0945014	Pulley-motor pulley (60%)
	0945015	Pulley-motor pulley (50%)
23	0941829	Plaging lever assembly
	0941259	Washer-"E" type retaining washer
	0948316	Spring for fast forward (2 req'd)
24	0941150	Control Lever for Rewinding idler
		Fibber washer (4 req'd)
		"E" type retaining washer (2 req'd)
	0948637	Control lever spring fo rrewinding idler
25	0941151	Adjusting lever assembly
	0948316	Spring for adjusting lever
26	0941832	Tape speed exchage cum assembly
27	0971150	Idler wheel
	0948595	Washer-nylon washer (2 req'd)
	0941159	Fast forward ider lever assembly
28	0948631	Spring for selector (Fast-Forwavd)
31	0941162	Lever-fast forward idler lever
		Washer-"E" type retaining washer
	0662126	Spring for fast forward idler lever
	0662128	Spring for playing idler wheel
33	0971223	Idler wheel (R)
	0948727	Washer-nylon washer
	0971215	Cap-idler cap
	0941818	Playing idler lever assembly
34	0662127	Spring for exchange
35		Washer-fibber washer
36		Washer-"E" type retaining washer
	0662129	Spring for Playing idler lever
37	0941310	Rewinding idler lever assembly
38	0941170	Lever-rewinding idler lever (2)
		Washer-"E" type retaining washer
	0662125	Spring-rewinding idler lever spring
39	0971099	Rewinding idler wheel
41	0941564	Brake lever assembly (left)
	0662130	Brake spring
	0662105	Spring for left-brake lever
	0941567	Brake lever assmbly (right)
	0948316	Spring for brake lever

Symbol No.	Stock No.	Description
45	0944468	Flywheel assembly
47	0941588	SH plate assmbly
48	0944832	Bearing
49	0638150	Bearing holder
		Washer-3mmØ spring washer
		Screw-3mmØ×6mm tapping screw (6 req'd)
		Flywheel washer
50	0941183	Cap-oil cap
52	0941176	Pressure roller arm assembly
53	0941573	Pad plate assembly
	0948756	Pad
	0948835	Pad
55	0941939	Tape guide collar
	0662183	Spring for pad lever
57	0948154	Tape guide spring
58	0944913	Tape guide (right)
59	0944742	Tape guide (left)
60	0513293	Record-playback head
61	0513222	Erase head
62	0513292	Head for auto stop
		Screw-2.6mmØ×6mm pan head screw (5 req'd)
	0948102	Head adjust spring
		Screw-2.6mmØ×16mm pan head screw
63	0539087	Switch-muting switch
		Screw-3mmØ×12mm tapping screw
		Washer-3mmØ spring washer
64	0941378	Pause lever (2) assembly
		Washer-"E" type retaining washer
	0662251	Spring-pad spring
	0662071	Spring for slide switch
	0948637	Spring for pause control lever
	0638651	Wire holcler
		Screw-3mmØ×8mm pan head screw (1 req'd) }
		Screw-3mmØ×6mm pan head screw (2 req'd) }
		Washer-3mmØ spring washer (3 req'd) }
		for shassis plate mounting
66	0539063	Switch-muting switch
		Screw-3mmØ×12mm tapping screw
		Washer-3mmØ spring washer
67	0941380	Pause lever assmbly
68	0662195	Spring-pause lever spring
69	0015050	Push holder assembly
70	0015237	Button-push button (5 req'd)
71	0015238	Button-stop push button
	0662131	Spring-push lever spring (4 req'd)
	0662062	Spring-record, playback switch spring (2 req'd)
	0662173	Spring-shaft spring
		Screw-3mmØ×6mm tapping screw (4 req'd)
73	0971206	Counter-tap counter
74	0941366	Lever-Recording lever (1)
75	0941367	Lever-Recording lever (2)
	0948658	Spring-switch spring (1)
	0948659	Spring-switch spring (2)
77	0539126	DC solenoid

Symbol No.	Stock No.	Description
78	0944743	Shaft-solenoid shaft
		Washer-3mmØ spring washer
		Screw-3mmØ×6mm tapping screw (2 req'd)
	0542184	Plug-changing of voltage plug (210/230V)
	0541313	Socket-changing of voltage socket (210/230V)
79	0015322	Take up reel base assembly
82	0015321	Sending reel base assembly
	0662190	Spring-reel base Spring
	0948822	Washer thrust washer (2req'd)
	0948752	Washer thrust nylon washer (4 req'd)
	0941260	Washer "E" type retaining Washer (2 req'd)
84	0971126	Belt rewinding belt
85	0971104	Roller pressure roller
		Washer-rewinding washer (2 req'd)
		Washer "E" type retaining washer
86	0948003	Pulley counter pulley
		Washer rewinding washer
		Washer "E" type retaining washer
87	0971236	Belt counter belt (L)
88	0971193	Belt-counter belt (S)
89	0533158	Switch-push switch
		Screw-2.6mmØ×4mm pan head screw (2 req'd)
90	0591167	Fuse 1A fuse
93	0544404	Board 6Pterminal board
		Screw-3mmØ×6mm tapping screw
91	0411767	Transformer power trans (100~120V)
	0411782	Transformer power trans (210~230V)
		Washer-4mmØ washer (2 req'd) }
		Screw 4mmØ×8 tapping screw (2 req'd) }
		for transformer mounting
92	0594110	Lamp pilot lamp (2 req'd)
	0333126	Coil hum balancing coil (30μH)
	0043793	Bushing (100~120V)
		Screw 3mmØ×30mm binding screw (2 req'd)
		Washer 3mmØ washer
95	0941585	Lever pause lever (1)
	0593464	Cord power cord (120V 50,60%)
	0593443	Cord power cord (210,230V 50%)
		for Printed circuit board assembly
99	0948656	Plate-jack plate (output)
		Screw 3mmØ×6mm pan head screw (2 req'd)
	0532149	Switch slide switch
		Screw 3mmØ×8mm pan head screw (2 req'd)
		Nut 3mmØ nut (2 req'd)
	0541357	Socket 5P socket
	0541358	Socket 5P socket
		Screw 3mmØ×6mm pan head screr
		Washer 3mmØ spring washew
101	0543082	Jack
1,2,3,4	0948689	Plate jack plate (input)
	0533110	Switch see saw switch

Symbol No.	Stock No.	Description
103	0514203	Metor level metor
	0948718	Cushion level metor cushion
104	0594110	Lamp pilot lamp
		Screw 2.6mm⌀ × 4mm pan head screw)2 req'd)
105	0533141	Switch push switch
		Washer 3mm⌀ washer (4 req'd)
		Screw 3mm⌀ × 6mm pan head screw (6 req'd)
		Washer 3mm⌀ spring washer (6 req'd)
	0532168	Switch slide switch (2 req'd)

Symbol No.	Stock No.	Description
		Screw 3mm⌀ × 10mm pan head screw (8 req'd)
		Washer 3mm⌀ spring washer (8 req'd)
		Washer 3mm⌀ washer (4 req'd)
		Nut 3mm⌀ nut (8 req'd)
	0544186	Terminal lug terminal (4 req'd)
		Screw 3mm⌀ × 8mm pan head screw
		Washer 3mm⌀ spring washer
		Washer 3mm⌀ washer
	0629902	Radiator
	5640002	DC Relay

CAPACITORS: for automatic stopping signal circuit

Symbol No.	Stock No.	Description		
C 201	0252323	Electrolytic	30μF	10WV
C 202	0266301	Metalized	0.47μF ±20%	150WV
C 203	0252531	Electrolytic	100μF	15WV
C 204	0252131	Electrolytic	100μF	3WV
C 205	0276011	Mylar	0.1μF ±10%	50WV
C 206	0252225	Electrolytic	50μF	6WV
C 207	0252313	Electrolytic	3μF	10WV
C 208	0252532	Electrolytic	200μF	15WV
C 209	0252231	Electrolytic	100μF	6WV
C 210	0266301	Same as C202		
C 211	0252132	Electrolytic	200μF	3WV
C 212	0253231	Electrolytic	100μF	250WV
C 213	0233018	Ceramic	250pF ±10%	50WV

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