

# SANYO

## Solid State Cassette Recorder

**MODEL MR-402**

## SERVICE MANUAL

**SANYO ELECTRIC CO., LTD.**

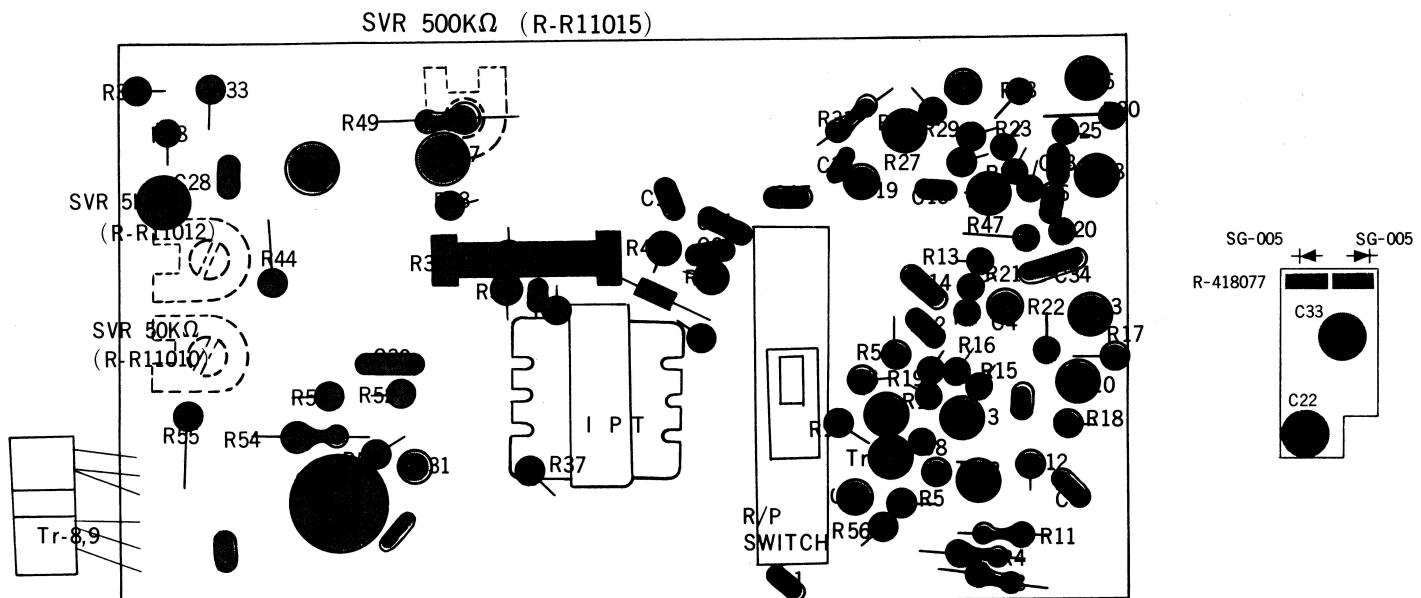
INTERNATIONAL DIVISION : SANYO ELECTRIC TRADING CO., LTD.  
OSAKA, JAPAN



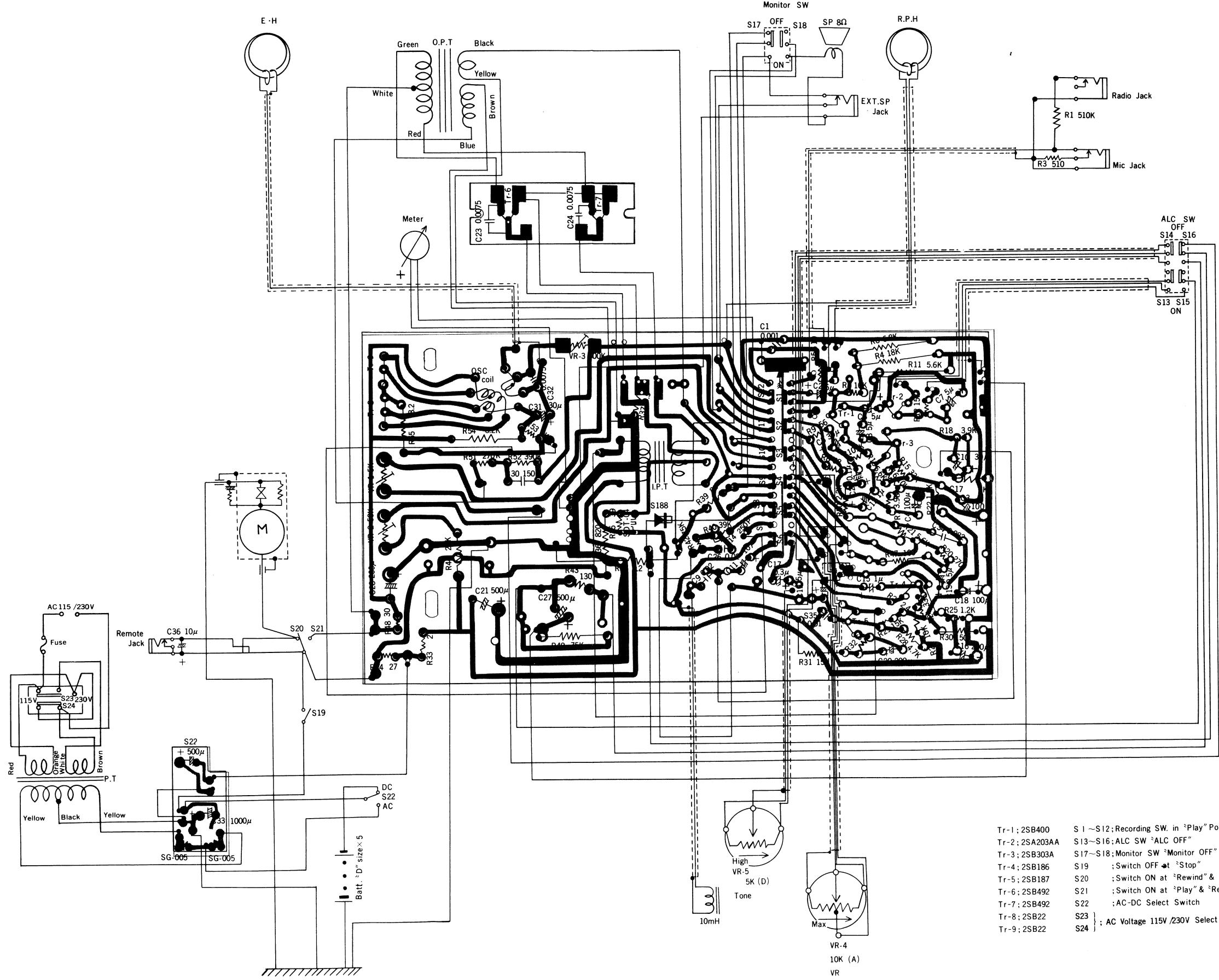
### SPECIFICATIONS

Recording system	AC bias	Frequency response	100~7,000 Hz $\pm 6$ db
Erasing system	AC erase	Speaker	4" permanent dynamic speaker
Tape speed	1-7/8 ips.	Microphone	Voice coil impedance 8 ohm
Fast forward & rewind time	90 sec. (C-60 cassette)	Recording level indicator	Dynamic microphone
Transistor	2SB400 x 1 1st audio amplifier	Input impedance	VU meter or ALC
	2SB303 x 1 Audio amplifier	Output impedance	Mic. 10 kohm
	2SB186 x 1 Audio amplifier	Power source	Radio 520 kohm
	2SB187 x 2 Driver amplifier	Power consumption	Ext. speaker 8 ohm
	2SB22 x 2 Bias oscillator	Dimensions	AC 115, 230 V or DC 7.5 V
	2SA203 x 1 ALC	Weight	15 W
Diode	1S188 x 1 ALC	Accessories	10-3/4"(W) x 9"(D) x 2-7/8"(H)
Thermistor	SDT-04 x 1		7.4 lbs.
Rectifier	SG-005		Microphone (w/stand), Cassette,
Output power	1.8 W (undistorted)		Patch cord, Accessories bag

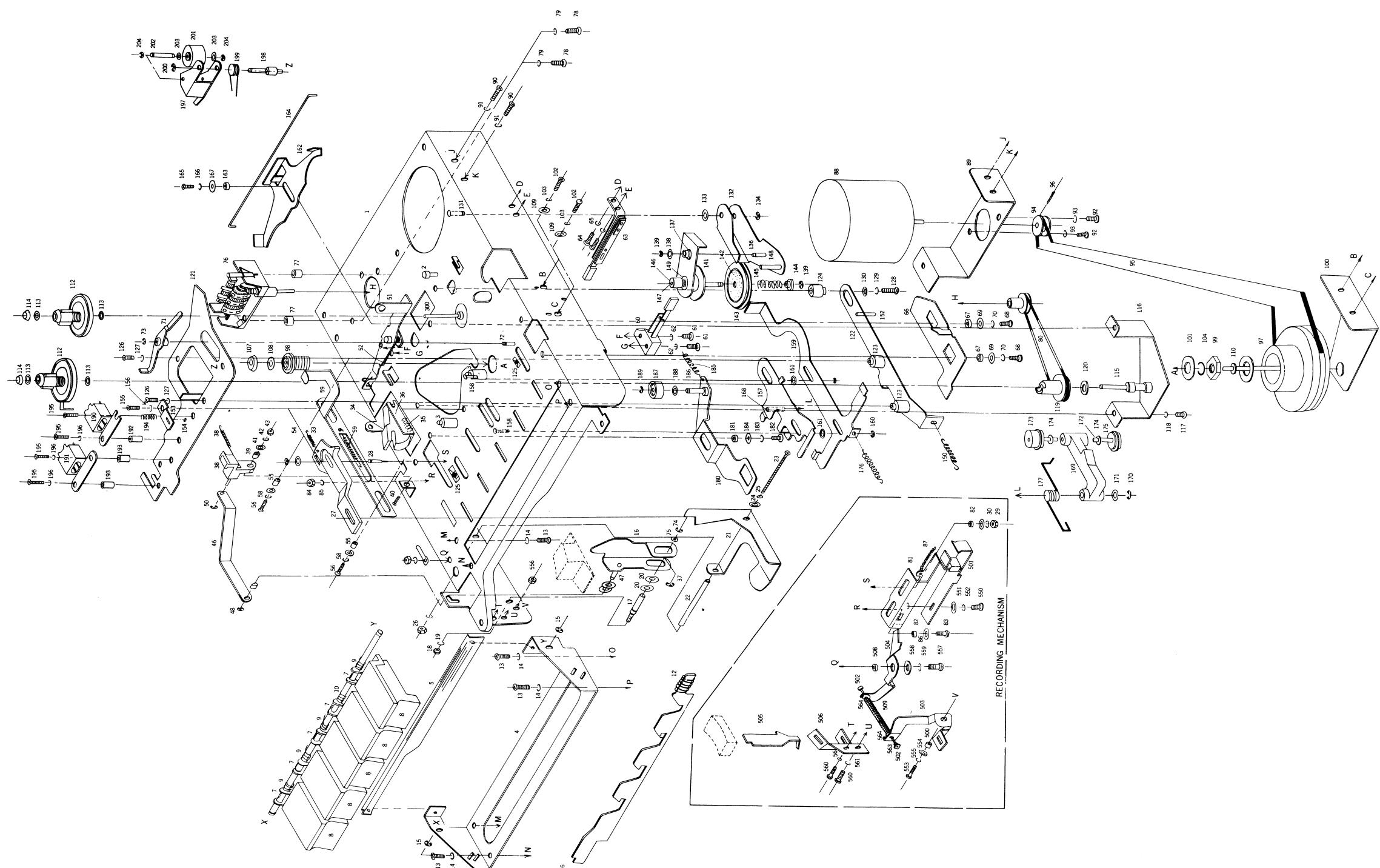
### MAIN PARTS LOCATION



# PRINTED CIRCUIT BOARD



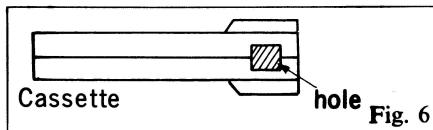
# EXPLODED VIEW



9. Erase rate ..... more than 55 db  
 recording : Feed a -56 db signal(1000 Hz) to the Mic. input jack and set the tape speed at 1-7/8 ips.  
 playback : Measuring point is Ext. SP (with 8 ohm dummy load).  
 Turn the VR to 10 db lower than the maximum output power.
10. Cross talk ..... more than 60 db  
 recording : Feed a -56 db signal(1000 Hz) to the Mic. input jack and set the tape speed at 1-7/8 ips.  
 playback : Measuring point is Ext. SP (with 8 ohm dummy load).  
 Turn the VR to 10 db lower than the maximum output power.
11. Hum and noise level ..... VR max. : less than 40mV  
 Measuring point is Ext. SP (with 8 ohm dummy load).  
 Press the PLAY button without a Cassette.
12. Current consumption
- |            |        |                          |
|------------|--------|--------------------------|
| Play       | 120 mA | at 7.5 V DC, VR minimum. |
| Rewind     | 260 mA |                          |
| F. Forward | 230 mA |                          |

## MECHANICAL ADJUSTMENT

To measure the torque of the tape recorder, a torque gauge (Fig.5) and a tension gauge are necessary. To use a tension gauge, make a hole in the side of the Cassette as shown in fig. 6. Be careful that the tape does not rub against the edge of the Cassette; this will make correct measurement impossible.



### 1. Take-up torque (measure with torque gauge)

Play ..... 40 ~ 60 gr/cm  
 Fast Forward ..... 55 ~ 90 "  
 Rewind ..... 55 ~ 90 "

### 2. Back tension (measure with tension gauge)

Play ..... 2 ~ 15 gr/cm  
 Fast Forward ..... 2 ~ 15 "  
 Rewind ..... 2 ~ 15 "

### 3. Tape tension

As shown in fig. 7, cut off a length of tape. Tie one end to a thread connected to the tension gauge, and leave the other end hanging loose. Press the PLAY button and hold the tension gauge steady (do not move it to the left or right). When the tape stops, read the tension gauge. If this reading falls within the range of 130~200 gr., no adjustment is needed.

If it does not fall within this range, adjust the pinch roller pressure. This is done by changing the force of the coil spring (199). Clean the pinch roller (with alcohol only) so that the tape will not slip.

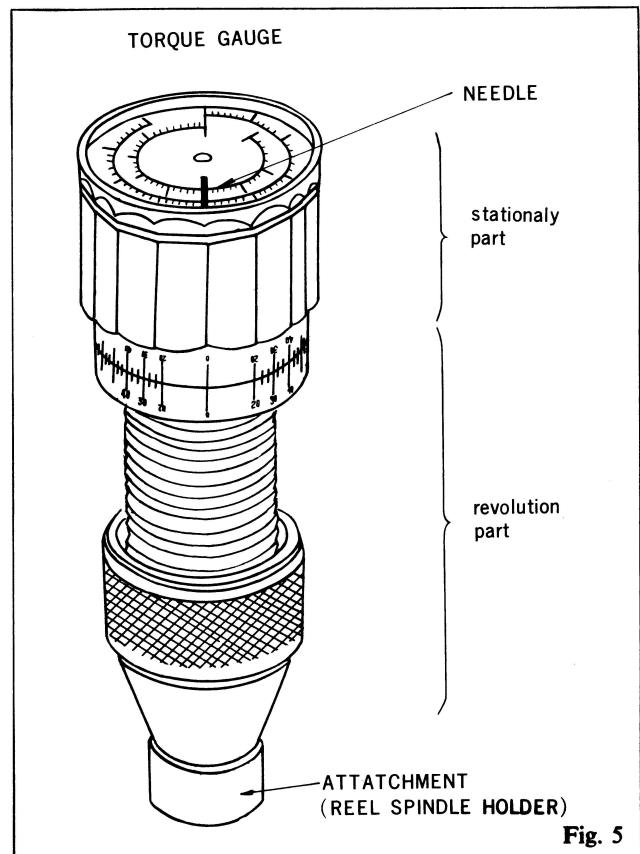


Fig. 5

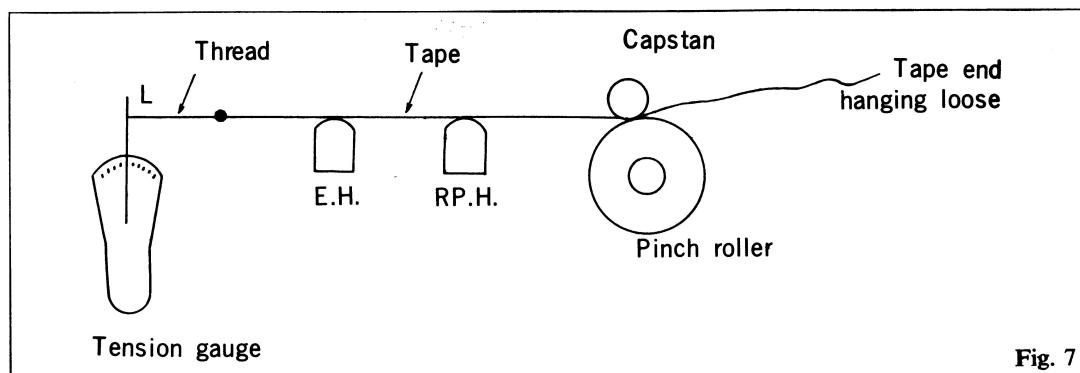


Fig. 7

## DISASSEMBLY & REASSEMBLY

To remove the complete mechanism from the cabinet:

Pull out the volume knob and tone control knob.

2. Remove the four phillips-head screws holding the bottom lid (Fig.1)
3. Remove the two red phillips-head screws and the stud nut.
4. Disconnect battery compartment lead wires and other wires.

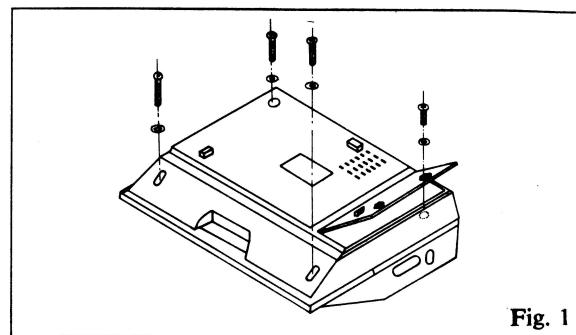


Fig. 1

## ADJUSTMENT & PERFORMANCE OF ELECTRICAL PARTS

### 1. Measuring instruments

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

1. Tester (V.O.M.)
2. Vacuum tube voltage meter
3. Low frequency oscillator
4. Attenuator
5. Oscilloscope
6. Standard tape

### 2. Adjustment of standard recording level

Arrangement of Tape Recorder: Switch position "REC", volume maximum

Feed a -76 db signal to Mic. input and adjust the VU meter to indicate "Zero" (boundary of red and white) by turning the semi-fixed VR-1 (5 kohm).

### 3. Oscillation bias current

Bias current during recording is replaced by voltage. Adjustment is made by turning the semi-fixed VR-3 (100 kohm) so that the voltage across the R56 is 2mV.

### 4. Indication of power voltage (Battery voltage indication)

Feed a power of 5.3 V to the battery terminal and put the machine in play position. Adjust the semi-fixed VR-2(50 kohm) so that the indicator points to "Zero" when the volume is minimum.

### 5. Frequency response

Frequency	150 Hz	1000 HZ	3000 Hz	5000 Hz
Tape speed 1-7/8 ips.	+6 ~ -6db	0 db	—	+6 ~ -6db

When recording : Feed a -96db signal to the Mic. input with the VR set at max.

When playback : Measure the voltage from the Ext. SP socket with the VTVM.

VR is max. and dummy load is 8 ohm.

### 6. Undistorted output ..... more than 1.8 W

recording : Feed a -76db signal (1000 Hz) to the Mic. input jack and set the tape speed at 1-7/8 ips.  
playback : Measuring point is Ext. SP (with 8 ohm dummy load).  
Distortion level of output power should be 10% when the VR is turned.

### 7. Distortion ..... less than 5%

recording : Feed a -76 db signal(1000Hz)to the Mic. input jack and set the tape speed at 1-7/8 ips.  
playback : Measuring point is Ext. SP (with 8 ohm dummy load).  
Tune the VR to 10 db lower than the maximum output power.

### 8. Signal to noise ratio ..... more than 38 db

recording : Feed a -76 db signal(1000 Hz)to the Mic. input jack and set the tape speed at 1-7/8 ips.  
playback : Measuring point is Ext. SP (with 8 ohm dummy load).  
Turn the VR to 10 db lower than the max. output power.

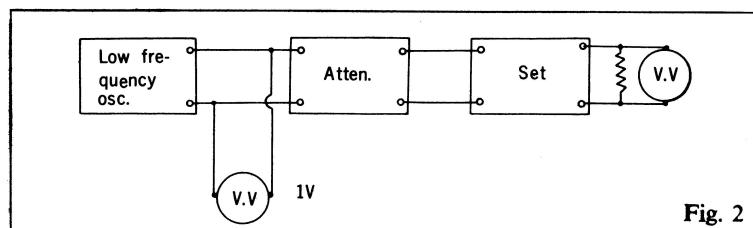


Fig. 2

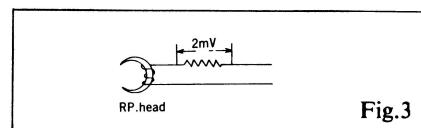


Fig. 3

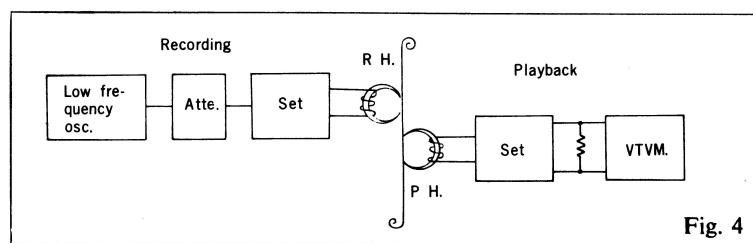


Fig. 4

#### 4. Button pressure

Push the edges of the button as shown in fig. 8. When the pressure required to lock each button falls within the range shown below, no adjustment is necessary:

- Stop ..... less than 1 kg.
- Fast Forward ..... less than 1.5 kg.
- Rewind ..... less than 1.5 kg.
- Play ..... less than 1.9 kg.
- Pause ..... 0.5 ~ 1.1 kg.

If the pressure does not correspond to the above figures, adjust the strength of the coil springs (9) and (10); also adjust the force of the coil spring (12) connected to the slide (5).

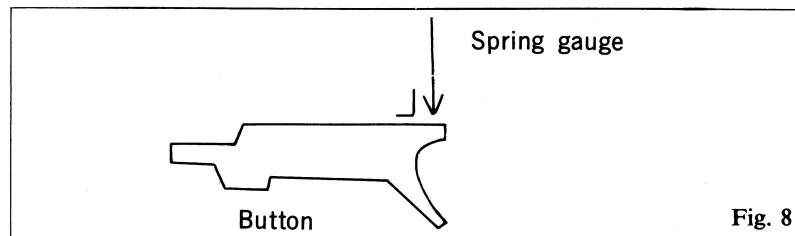


Fig. 8

## MEASUREMENT DATA

Measuring condition

		Power source voltage	7.5 V DC
		VR, Tone control knob	Maximum
		ALC switch	OFF
		Monitor switch	ON
	Input {	Play	Feed the 1KHz (-80db) signal to the RP head terminal.
	Recording		Feed the 1KHz (-77db) signal to Mic jack.

	D.C (V)		SIGNAL (mV)	
	Play	Rec.	Play	Rec.
Tr-1	C	3.6	3.6	0.7
	B	0.95	0.95	0.1
Tr-3	E	1.3	1.3	
	C	4.1	4.1	2.9
Tr-4	B	0.95	0.95	0.7
	E	1.1	1.1	
Tr-5	C	3.8	3.8	23.0
	B	1.1	1.1	2.5
	E	1.25	1.25	0.9
	C	6.1	6.1	580.0
	B	1.1	1.1	240.0
	E	1.0	1.0	9.5

	D.C (V)		SIGNAL (mV)	
	Play	Rec.	Play	Rec.
Tr-6	C	7.4	7.5	1260.0
	B	0.13	0.17	270.0
Tr-7	E	0.1	0.05	
	C	7.4	7.5	1260.0
Tr-8	B	0.13	0.17	270.0
	E	0.1	0.05	
Tr-9	C	7.5	6.0	
	B	6.6	0.2	
	E	6.9	0.45	
	C	7.5	6.0	
	B	6.6	0.2	
	E	6.9	0.45	

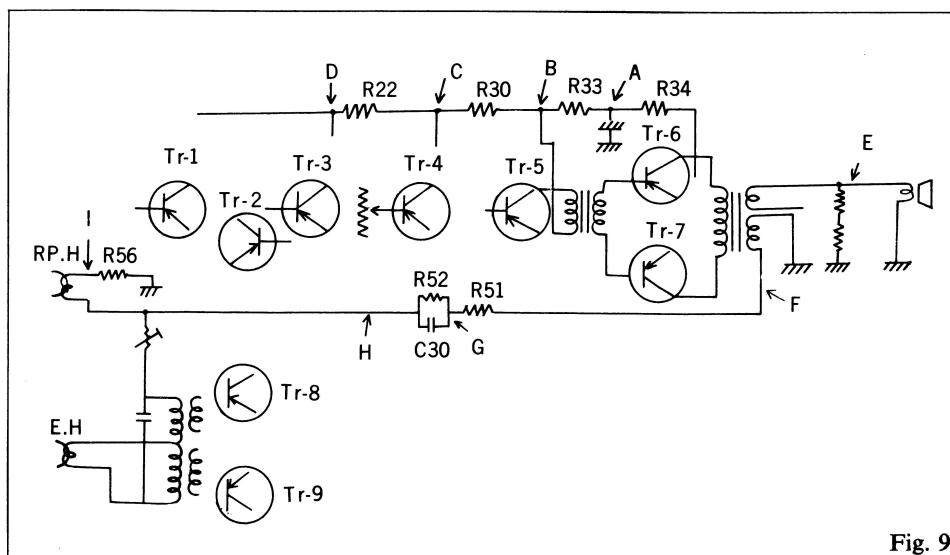


Fig. 9

Test point	Play (V)	Rec. (V)
A	7.0	7.0
C	6.7	6.7
C	6.3	6.3
D	5.1	5.1
E	1.48	0.6
F	13.0	
G	9.3	
H	32 (mA)	
I	0.3 (mA)	

#### Erasing Current

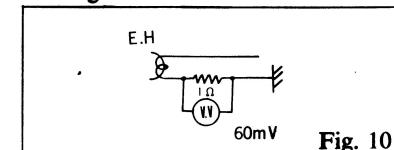


Fig. 10

## TROUBLE-SHOOTING GUIDE

SYMPTOMS:	CAUSE	CORRECTION:
*Motor does not turn in recording or playback mode.	*Defective power switch (S19). *Power switch (S19) cannot be depressed. *Short in filter circuit.  *Defective socket for exterior power source. *Defective DC motor. *Defective remote switch jack.	*Check, repair or replace.  *Inspect mechanism. *Inspect when B voltage does not start. *Check or replace. *Check or replace. *Check, repair or replace.
*Motor turns, but recording and playback are impossible.	*Defective amplifier (including IPT and OPT).  *Faulty connection of RP head, R51 or R52. *Defective contact between tape and head.  *Faulty connection of S21.  *Defective EXT. SP. jack (i. e. grounded).	*Inspect both voltage and current. *Check. *Check adjustment of cartridge; inspect and clean it. *Check mechanism; repair or replace. *Check, repair or replace.
*Can play back, but not record.	*Incorrect connection of RP change switch, or defective part.  *Defective microphone. *Defective microphone input jack. *Defective derailing of R4, R5 and R6. *Defective disconnection of R51 and R52. *Defective constant-current circuit (R51, R52, C30, etc.) or wiring. *Defective bias oscillation circuit. *Disconnection of OPT 3-stage winding.	*Inspect change mechanism and switch connections; repair or replace. *Check, repair or replace. *Check, repair or replace. *Check and replace. *Check and replace. *Inspect, check and replace. *Check each element and inspect bias current. *Check and replace.
*Can record, but not play back.	*Incorrect connection of RP change switch, or defective part. *Defective speaker. *Defective EXT. SP. jack. *Disconnection or short-circuit of OPT. *Defective band of E head.	*Inspect change mechanism and switch. *Repair or replace. *Check, repair or replace. *Check, repair or replace. *Demagnetize E head.
*Excessive noise level.	*Defective connection of VR. *Defective transistor (especially Tr-1). *Deterioration of circuit element. *Defective connection or soldering between circuit elements.	*Check and replace. *Inspect and replace. *Inspect and replace. *Inspect and repair.
*Excessive noise when recording by microphone.	*Defective microphone. *Defective C2 (defective insulation.) *Filter circuit (reduced capacity of C3, C25 and C21).	*Check and replace. *Check and replace. *Check and replace.
*Defective tone quality.	*Defective circuit element or transistor. *Unsuitable alternating current bias. *Insufficient touching of tape and head. *Worn RP head. *Defective microphone. *Defective speaker.	*Check both voltage and current. *Inspect bias current. *Check adjustment of Cassette and clean the head surface. *Check.
*Trebles repressed.	*Angular divergence of RP head.  *Capacity of C23 and 24 too great. *Unsuitable movement of AC bias oscillation circuit.	*Adjust the head so that the slit is at right angles to the tape. *Inspect and replace. *Inspect bias current.
*Trebles overemphasized.	*Insufficient capacity of C23 and C24.	*Inspect and replace.
*Erasing impossible.	*Defective mounting position of E head. *Defective contact of E head and tape. *Insufficient erasing current. *Disconnection or short-circuit of E head.	*Adjust the position. *Clean the head surface. *Inspect DC erasing current. *Check and replace.
*Crosstalk between upper and lower tracks.	*Defective upper and lower position of head.  *Defective contact of Cassette.	*Adjust height of head mounting position. *Inspect.
*Insufficient volume.	*Deterioration of transistor or circuit element. *Defective (short-circuit), disconnection or faulty soldering of circuit element (especially defective emitter circuit bypass condenser). *Defective bypass oscillating circuit. *Defective head, microphone or speaker.	*Inspect and correct both voltage and current. *Inspect and repair, or inspect and replace. *Inspect and adjust. *Inspect and replace.

# PARTS LIST

REF. No.	Parts No.	Description	Q'ty
<b>PACKING</b>			
	R-498431	Individual Carton	1
	R-418072	Cushion for set	1
	R-418073a	Cushion for set	1
		Polyethylene Bag for Set (0.05t, 370 x 450H)	1
		Cushion, between Acc. Bag and set (18x18, 235x110)	1
	R-368055	Acc. Bag (power corde B. D make)	1
	R-368019	" " (power corde A. C make)	1
		Polyethylene bag for Mic. (0.05t, 135x210H)	1
		" for Acc. Bag (0.05t, 80x200H)	1
	R-478254	" for Instruction book (0.05t, 100x200H)	1
		" for Instruction Book	1
<b>CABINET</b>			
	R-318140	Top panel	1
	R-278131	-Insert - nut	2
	R-278132	" "	2
	R-278129	" "	1
	R-278137	" "	2
	R-318152	Base for Top panel	1
	R-388004	Counter window	1
	R-118714a	Bracket for movement SW	1
	R-398098	Cloth for Top panel	2
	R-41277a	Cushion for Top panel	1
	R-268304a	Al. plate, between reel shafts	1
	R-268350	Al. plate, for SP movement SW	1
	R-268348a	Al. plate, right side of Top panel	1
	R-268454	Front panel	1
	R-268455	Control panel	1
	R-268456	Al. plate for left side of Top panel	1
	R-398103	SP, net	1
	R-318143	Cushion, form 25x55x15t for Top panel	1
	R-398072	Lid for cassette	1
	R-318144	Window for cassette lid	1
	R-318142	Cushion 5ø for cassette lid	4
	R-268346	Lid for SP	1
	R-268347	Bottom cover	1
	R-258047a	Metal sash for bottom cover	1
	R-268347	Metal sash for bottom cover	1
	R-258047a	Batt, terminal (-) for Bottom cover	5
	R-23838	Batt. terminal (+) for Bottom cover	5
	R-478308	Specification plate	1
	R-478255	Batt. sheet for Bottom cover	1
	R-438021	Ribbon for Batt. Takeup	1
		Felt 1t x 10ø	1
		Cloth 16x40	1
	R-428075	Cushion, Form for Bottom cover 20x30x6t	1
		Leads clamp for Battery terminal (3.3ø x 6ø x 1.5t)	1
	R-398071	Batt. cover	1
		Cushion 2 x 10t	6
		Cushion 10 x 10 x 6t for Bottom cover	1
	R-88273a	Shaft assembly for cassette lid	1
	R-248185	Shaft	1
	R-118702a	Bracket	1
	R-S88274a	Shaft assembly for cassette lid	1
	R-248185	Shaft assembly	1
	R-118703a	Bracket	1
	R-S88238	Shaft assembly for SP lid	2
	R-118585	Bracket	2
	R-248185	Shaft	2
	R-128116	Plate spring for SP lid	2

REF. No.	Parts No.	Description	Q'ty
	R-358032a	Porjection for SP lid	2
	R-158151	Spring for cassette lid	1
	R-118562	Mounting metal for SP	3
	R-32501	Knob for Batt. cover	2
	R-128115	Plate spring for Batt. cover	2
		Cushion rubber 8 x 10 x 12	1
	R-288022	Handle	1
	R-S88276	Knob assembly for volume and tone	2
	R-328083	Knob	2
	R-268353	Inlay of knob	2
	R-398042	Cover for voltage selector	1
	R-112432	Lug	1
	R-118456	Stud nut	1
		Washer 5ø x 1.8 x 1t Voltage select cover	1
		Cushion, form 60 x 125 x 2t Bottom cover	1
		Cushion, form 75 x 10 x 10 "	1
		Cushion, 3 x 8 x 2t Top panel	1
		Cushion. 4.5ø x 1.5t SP lid	1
<b>CHASSIS</b>			
	R-418074a	Printed Circuit Board for Amp.	1
	R-318145a	Mounting base for Jack	1
	R-118715	Mounting metal for V.U. meter	1
	R-418101	Printed circuit board	1
	R-118866	Sheet, Fiber 15x15x0.5 for semi VR	3
	R-398094	Mounting metal for heat sink	1
	R-418077a	Cloth for mounting metal (R-118715)	1
	R-128145	Printed circuit board for power rectifier	1
	R-118865b	Mounting metal for CH coil	1
		Mounting metal for P.T.	1
	R-368075	Felt 4t x 6 x 15	2
	R-118862a	Index sheet for AC input	1
	R-148275	Mounting metal for heat sink	1
	R-148255	Stud nut	1
	R-148277	Stud nut	1
	R-148273	Stud nut	1
	R-24638	Card fixtion	2
	R-S3008	Lug plate	1
	R-248277	Pipe for mounting metal (R-118866)	1
		Sheet for chassis (1.5t)	1
		Cushion, Rubber 4x8x12 for heat sink	1
	R-398099	Card for Rec. Button	1
	R-398104	Cloth for Rec. Button	1
		Cloth 16x40 for chassis	1
	R-268180	Control panel	1
	R-498198	Control panel	1
	R-S88323a	Mounting metal for Rec. lever	1
	R-138033	Spring	1
	R-138035	Spring	1
	R-158195	Screw for Rec. lever	1
	R-138030	Lever for Rec. lever	1
	R-248277	Pipe for Rec. lever	2
	R-118892	Lever for R-P changing	1
	R-118991	Mounting metal for P.C.B.	1
	R-328099	Button for Rec-PB changing	1
	R-158197	Coil spring for Rec-PB SW	1
	R-158196	Coil spring for Rec-PB SW	1
	R-119017	Plate nut	1
	R-118891	Mounting metal for Rec. lever	1
	R-112432	Lug	1
	R-428076	Fiber sheet 0.2t, slide switch	1
		Fiber sheet 17 x 22 x 0.3t, P.C.B.	1

REF. No.	Parts No.	Description	Q'ty
<b>ELECTRICAL PARTS</b>			
	R-W7855	Power transformer	1
	R-W6835	Output transformer	1
	R-W6836	Input transformer	1
	R-R124831	Variable resistor for volmve	1
	R-R124832	Variable resistor for tone	1
	R-S6894	Speaker	1
	R-S6895	Microphone	1
	R-S5819	Meter 130/ $\mu$ A	1
	R-W8814	Oscillator coil	1
	R-W1837	Coil, chock 10mH	1
	R-R11015	Semi fixed V.R. 500K for Bias adjust	1
	R-R11010	Semi fixed V.R. 50K for meter	1
	R-R11012	Semi fixed V.R. 5K for meter	1
	R-R7803	Special resistor 0.5ohm, 1/2W R37	1
	R-S4860	Slide switch for R-P changing	1
	R-S4861a	Slide switch for A.L.C.	1
	R-S4821	Slide switch for voltage select	1
	R-S88312	Cassette C-60	1
	R-S2139	Jack for Mic. Radio and Ext. SP	3
	R-S2839	Jack for Remote control	1
	R-28085	Heat sink for 2SB492	2
	R-41370	Insulater 0.04t	2
	R-44223	Insulater 1.2t	2
	R-39320	Special washer for heat sink	4
	R-261193a	Heat sink for 2SB22	1
	R-S3801	AC cord 1.8m	1
	R-S3833	AC input terminal	1
	R-S4266	Slide switch for AC-DC changing	1
	R-S8678b	Patch cord	1
	R-S3008	Lug	1
	R-398093	Microphone stand	1
	R-S1845	Fuse 150 m A	1
	R-S1855	Fuse holder	1
	AC cord is chosen among following A,B, C & D		
A	R-S1076a	3-Wired cord	1
	R-S1076a	Plug, English-type 3 pin	1
		Rubber cushion	1
	R-398043	Sleeve	1
B	R-S2813	Connector	1
	R-S3823	Terminal 3 pin	1
	R-S1245	Plug, Australia 3 pin	1
	R-S3824	Terminal	1
C	R-S1817	Plug, Siemens 2 pin	1
	R-S3818	Cord SEV	1
		3-Wired cord	1
D	R-398043	Plug, Photex-type 3 pin	1
	R-S2813	Sleeve	1
	R-S3823	Connector	1
	R-S1076a	Terminal	1
	R-S3812	Plug, English-type 3 pin	1
	R-S3824	Cord SEV	1
	R-S8574b	Terminal	1
	R-S8575b	AC adaptor, Siemens-type 2 pin	1
		AC adaptor, English-type 2 pin	1
		Transistor 2SB400A for 1st amp	1
		" 2SB203AA for A.L.C.	1
		" 2SB303A for 2nd Amp.	1
		" 2SB186B for 3rd Amp.	1
		" 2SB187 for Driver	1
		" 2SB492 for Power Amp.	2

REF. No.	Parts No.	Description	Q'ty
		Transistor 2SB22 for Bias Oscillator	2
		Diode 1S188 for ALC	1
		Thermistor SDT-04	1
		Silicon Diode SG-005 for Power rectifier	2
<b>RESISTORS</b>			
		Carbon P type	
	R1	510KΩ ±10% 1/4W	1
	R52	330KΩ "	1
	R51	100KΩ "	1
	R42,49	75KΩ "	2
	R40	39KΩ "	1
	R15,24	33KΩ "	2
	R44	22KΩ "	1
	R4	18KΩ "	1
	R12,29	15KΩ "	2
	R5	10KΩ "	1
	R16,23	10KΩ "	2
	R54	8.2KΩ "	1
	R6	6.8KΩ "	1
	R11,19,	5.6KΩ "	3
	R28	4.7KΩ "	1
	R7,18	3.9KΩ "	2
	R17	3.0KΩ "	1
	R27	2.4KΩ "	1
	R50	2.2KΩ "	1
	R22	1.5KΩ "	1
	R25	1.2KΩ "	1
	R10,53	1.0KΩ "	2
	R36	820Ω "	1
	R3	510Ω "	1
	R20	270Ω "	1
	R30	150Ω "	1
	R43,39	130Ω "	2
	R47	100Ω "	1
	R8,32	68Ω "	2
	R9	56Ω "	1
	R35	39Ω "	1
	R48	30Ω "	1
	R33,34	27Ω "	2
	R56	10Ω "	1
	R55	8.2Ω "	1
	R31	15Ω "	1
	R38	8.2Ω "	1
<b>CAPACITORS</b>			
	C34	Mylar 0.082/ $\mu$ F ±20% 35WV or 50WV	1
	C26	" 0.02/ $\mu$ F "	1
	C35	" 0.01/ $\mu$ F "	1
	C32,23, 24	" 0.075/ $\mu$ F "	3
	C1	Ceramic 0.001/ $\mu$ F "	1
	C30	" 150pF "	1
	C9	50WV	1
	C22	500pF "	1
	C21	500/ $\mu$ F "	1
	C28	200/ $\mu$ F "	1
	C27	500/ $\mu$ F "	1
	C3, 18	3WV	1
	C16,20	100/ $\mu$ F "	2
	C4	10WV	2
	C5,10,31	200/ $\mu$ F "	2
	R-C9162	6WV	2
	R-C9162	100/ $\mu$ F "	1
	R-C9146	3WV	1
	R-C9144	100/ $\mu$ F "	2
	R-C9145	10WV	2
	R-C9143	200/ $\mu$ F "	2
	R-C9134	3WV	1
	R-C9137	30/ $\mu$ F "	3

REF No.	Parts No.	Description	Q'ty
C2,6,7,8 9	R-C9131	Electric Capacitor 5 $\mu$ F 6WV	5
C13	R-C9116	0.5 $\mu$ F 10WV	1
C17	R-C9140	0.3 $\mu$ F 10WV	1
C36	R-C9170	10 $\mu$ F 10WV	1
C12, 15	R-C9115	1 $\mu$ F 10WV	1
C12, 15	R-C9160	1 $\mu$ F 10WV	1
C29	R-C9126	0.1 $\mu$ F 10WV	1
C29	R-C9831	0.1 $\mu$ F 10WV	1
C33	R-C9854	1000 $\mu$ F 10WV	1
C11	R-C9132	10 $\mu$ F 3WV	1

#### MOUNTING PARTS

		Hexagonal bolt 3x10	2
		Pan-head tapping screw 2, 2.3x8	8
		Pan-head tapping screw 2, 2.3x6	6
		Pan-head tapping screw 2, 2.3x4	2
		Pan-head tapping screw 2, 3x10	1
		Pan-head tapping screw 2, 3x8	2
		Pan-head tapping screw 2, 3x6	2
		Pan-head screw 3x6	16
		Pan-head screw 3x4	4
		Pan-head screw 3x20	3
		Pan-head screw 3x8	6
		Pan-head screw 3x14	3
		Pan-head screw 2x12	1
		Pan-head screw 2x6	1
		Pan-head screw 2.6x6	1
		Snap-head screw 2.6x4	2
		Pan-head screw 2.6x8	1
		Hexagonal nut 3, 3	2
		Hexagonal nut 1, 3	8
		Hexagonal nut 1, 2	2
		Small screw washer 3	17
		Small screw washer 2	4
		Spring washer 3	29
		Spring washer 2	2
		Spring washer 2.6	1
		Outer tooth washer 3	6
		Bolt washer 2	1
		Bolt washer 3	4

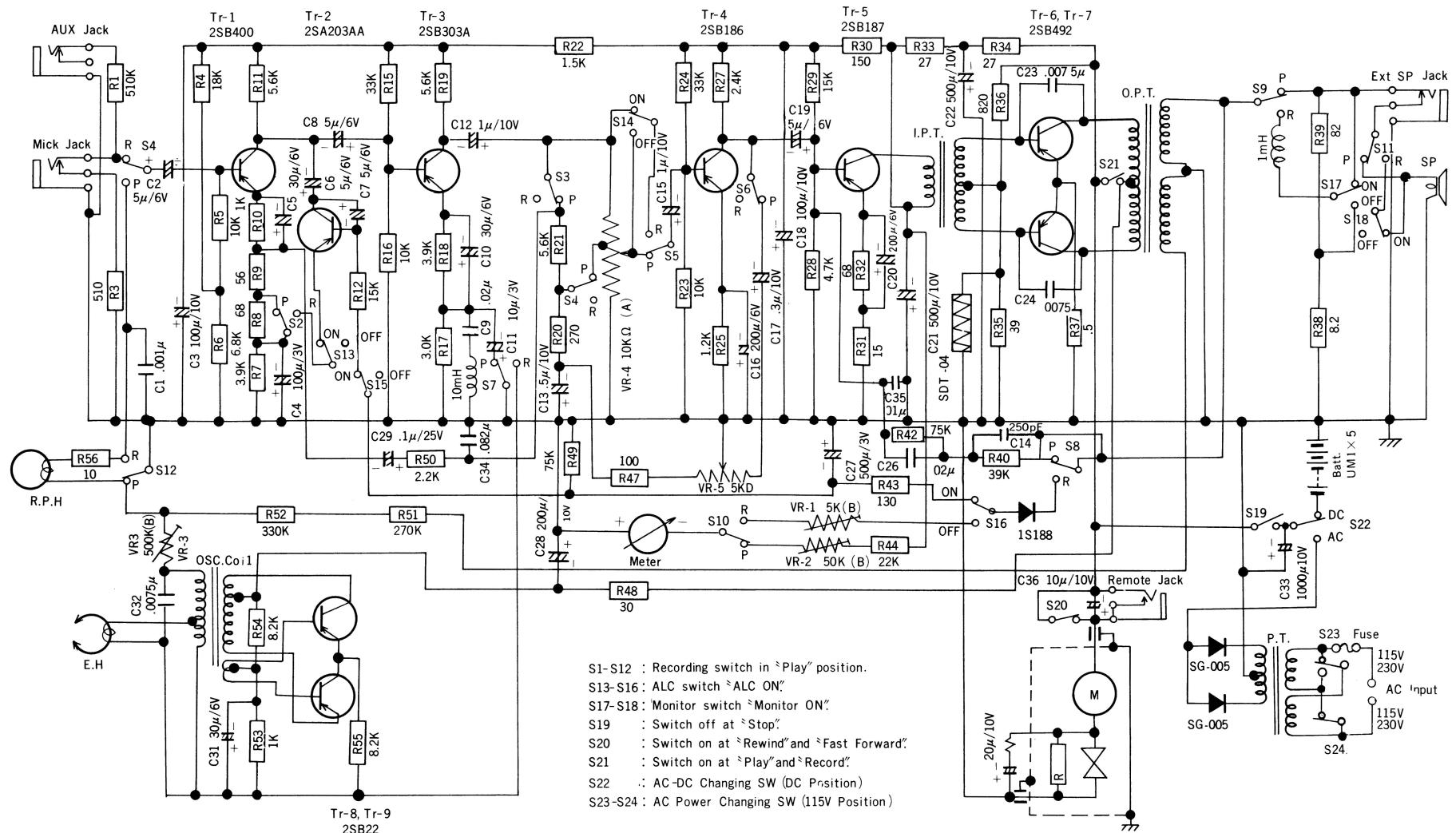
#### MECHANISM

1	R-118700	Mechanism chassis assembly	1
2	R-128103a	Tip, Cassette Holding	2
3	R-128104	Guide, Cassette Holding	2
4	R-118963	Frame, Push Button Lever	1
5	R-118943	Slide, Push Button Lever Lock	1
6	R-118850	Slide, Push Button Lever	1
7	R-118701	Lever, Push Button	5
8	R-328086	Push Button	5
9	R-158126a	Coil Spring for Fwd., Rew., Stop, Pause push Button Lever	4
10	R-158137a	Coil Spring for Play Push Button Lever	1
11	R-148136	Shaft, Push Button Lever	1
12	R-158127	Coil Spring, Push Button Lever Slide	1
16	R-118854	Lever, Cassette-eject Button	1
17	R-148264	Shaft, Cassette-eject Lever	1
21	R-118630	Lever, Cassette-ejector	1
22	R-248269	Shaft, Cassette-eject Lever	1
27	R-398107	Slide, Cassette-ejector	1
28	R-248182a	Shaft, Cassette-eject Slide	1
33	R-158193	Coil Spring, Cassette-eject Lever	1
34	R-328061a	Lever, Cassette-ejector	1

REFNo.	Parts No.	Description	Q'ty
<b>MECHANISM</b>			
35	R-158134a	Coil Spring, Cassette-eject Lever	1
36	R-118581	Bracket, Cassette-eject Lever	1
38	R-398089	Lever, Top-Lid holding hook act.	1
39	R-248211	Spacer, Top-Lid holding hook act. Lever	1
44	R-158135	Coil Spring, Top-Lid holding hook	1
45	R-118962	Hook, Top-Lid holding	1
46	R-118629	Lever, Top-Lid holding	1
47	R-148263	Shaft, Top-Lid holding Lever	1
51	R-118579a	Lever, Cassette holding	1
52	R-158133	Spring, Cassette holding Lever	1
53	R-158118	Rod, Cassette holding Lever actuating	1
54	R-118852	Slide, Anti-recording	1
55	R-248183	Spacer, Anti-recording Slide	2
59	R-158212	Coil Spring, Cassette-up Lever release Slide	1
60	R-S4314	Spring Switch, Power ON/OFF S-9	1
66	R-118391	Slide, Pause	1
67	R-248183	Spacer, Pause Slide	2
63	R-S4833	Spring Switch, S-10	1
71	R-S88350	Lever Assembly, Pause act.	1
72	R-148131	Shaft, Pause Act. Lever	1
76	R-S5821	Counter	1
77	R-248271	Spacer, Counter Mtg.	2
80	R-448041	Counter Drive Belt	1
81	R-11888	Slide, Record Act.	1
82	R-248285	Spacer, Record Act. Slide	2
	R-328084	Button, Cassette-up	1
88	R-S5165	DC Motor	1
89	R-118388a	Bracket, Motor	1
94	R-278069a	Motor Pulley	1
95	R-448040a	Drive Belt	1
97	R-S88168a	Flywheel Assembly	1
98	R-S88167	Bearing Assembly	1
99	R-ST069	Nut, Flywheel Bearing	1
100	R-118961	Bracket, Flywheel Shaft Support	1
	R-112432	Lug, hook-up Leads	1
107	R-238024	Cap for Flywheel Bearing	1
112	R-S88192	Pulley, Supply and Take-up under Guide Ring, Casette Shaft	2
	R-328038	Guide Ring, Casette Shaft	2
	R-328037	Stopper, Guide Ring	2
	R-128083	Coil Spring, Supply and Take-up Spindle	2
300	R-S88236	Shaft, Take-up Spindle	1
114	R-328039	Cap, Flywheel Bearing	2
115	R-S88347	Shaft, Supply Spindle	1
116	R-118853	Bracket, Supply Spindle Shaft	1
119	R-398090	Puley for counter	1
121	R-118851	Slide, Head Mtg.	1
122	R-118386	Slide, Play activation	1
123	R-248289	Spacer, Play activation Slide	2
124	R-248184	Spacer, Play activation Slide	1
131	R-148128	Shaft, Take-up act. Pully Lever	1
132	R-118379	Lever, Take-up Act. Pullye	1
135	R-118735	Arm, Take-up Idler	1
136	R-148129	Shaft, Take -up Idler Arm	1
137	R-248144	Spacer, Take-up Idler Arm Shaft	1
140	R-S88147	Bearing, Take-up Idler	1
141	R-398035	Under Puley, Take-up Idler	1
125		Steel Ball, Play activation Slide	2
143	R-S88186	Under Pulley Assembly, Take-up Idler	1
144	R-248120	Stopper, Take-up Under Pulley Spring	1
145	R-158185	Spring, Take-up Under Pulley	1
146	R-278061	Under Pulley, Take-up	1
147	R-148116	Shaft, Take-up Pulley	1

REF.No.	Parts No.	Description	Q'ty
<b>MECHNISM</b>			
148	R-148127	Pin, Take-up act. Pulley Lever return	1
150	R-158121	Coil Spring, Return Play act. Slide	1
151	R-158119a	Coil Spring, Return Take-up act. Pulley Leve	1
152	R-148127	Pin, Spring Switch act. S-10	1
153	R-138026	Spring, Head Mtg. Slide	1
154		Steel Ball, Head Mtg. Slide	1
157	R-118392	Slide, Fwd. Activation	1
158	R-148141	Shaft, Fwd. and Brake Act. Slide	2
159	R-118393a	Slide, Brake Activation	1
162	R-118375	Lever, Brake	1
163	R-248183	Spacer, Brake Lever	1
164	R-158123	Spring, Brake Lever Return	1
168	R-148138	Shaft, Fwd. Idler Lever	1
169	R-298007	Lever, Fwd. Idler	1
172	R-148140	Shaft, Fwd. Idler	1
173	R-S88185	Upper Pulley, Fwd. Idler	1
175	R-S88235a	Under Pulley, Fwd. Idler	1
176	R-158120	Coil Spring, Brake act. Slide	1
177	R-158124a	Spring, Fwd. act. Lever Return	1
178	R-248206	Spacer, Fwd. act. Slide	1
179	R-248257	Spacer, Fwd. act. Slide	1
180	R-118376a	Slide, Rew. act. Roller	1
181	R-248183	Spacer, Rew. act. Roller Slide	1
185	R-158122	Coil Spring, Rew. act. Slide Return	1
186	R-148126a	Shaft, Rew. Idler	1
187	R-398036a	Pulley, Rewind	1
190	R-S6854	Record/Play Head	1
191	R-S6859	Erase Head	1
192	R-248179	Spacer, Rec./Play Head Mtg.	1
193	R-248107	Spacer, Erase Head Mtg.	2
194	R-128055	Coil Spring, Rec./Play Head Adj.	1
197	R-118384	Lever, Pinch Roller	1
198	R-148137	Shaft, Pinch Lever	1
199	R-158125	Spring, Pinch Roller Pressure	1
201	R-S88139	Pinch Roller	1
202	R-148114	Shaft, Pinch Roller	1
		Screw, 2.6ø x 4mm Round Head	6
		Screw, 2.6ø x 6mm Round Head	9
		Screw, 2.6ø x 8mm Round Head	3
		Screw, 2.6ø x 10mm Round Head	3
		Screw, 3ø x 16mm Round Head	1
		Screw, 2ø x 6mm Pan Head	1
		Screw, 2ø x 10mm Pan Head	4
		Screw, 3ø x 6 mm Pan Head	6
		Screw, 3ø x 10mm Pan Head	2
		Screw, 3ø x 34 mm Pan Head	1
		Screw, 2ø x 6 mm Headless	2
		Spring Washer, 2ø	4
		Spring Washer, 2.6ø	23
		Spring Washer, 3ø	10
		Spring Washer, 8ø	2
		Washer, 2ø	1
		Washer, 2.6ø	7
		Washer, 3ø	4
		Washer, 3ø	1
		External "E" ring 2ø	7
		External "E" ring 3ø	5
		External "E" ring 4ø	2
		External "E" ring 1.5ø	2
		Washer, Nylon 1.7 x 3.2 x 0.5mm	4
		Washer, Nylon 2.1 x 8 x 0.5 mm	1

REF.No.	Parts No.	Description	Q'ty
<b>MECHANISM</b>			
		Washer, Nylon 2.1 x 4 x 0.5 mm	6
		Washer, Nylon 2.1 x 4 x 0.25 mm	2
		Washer, Nylon 3.1 x 5.4 x 0.5 mm	1
		Washer, Nylon 3.6 x 6 x 0.25 mm	1
		Washer, Nylon 4.1 x 6.5 x 0.5 mm	1
		Washer, Nylon 5.2 x 8 x 0.25mm	2
		Washer, Nylon 6.2 x 9.5 x 0.5 mm	1
		Washer, Felt 2.2 x 8 x 2mm	1
		Washer, Felt 4.2 x 20 x 1mm	1
		Washer, Felt 11 x 14 x 1mm	1
		Washer, 8.2 x 1.4 x 0.8mm	1
		Nut, 2ø	1
		Nut, 2.6ø	3
		Nut, 3ø	1



S1-S12 : Recording switch in "Play" position.  
 S13-S16: ALC switch "ALC ON".  
 S17-S18: Monitor switch "Monitor ON".  
 S19 : Switch off at "Stop".  
 S20 : Switch on at "Rewind" and "Fast Forward".  
 S21 : Switch on at "Play" and "Record".  
 S22 :: AC-DC Changing SW (DC Position)  
 S23-S24 : AC Power Changing SW (115V Position)