

Quality. Uncompromised.

ROTEL®

Technical Manual

STEREO CASSETTE DECK RD-12F

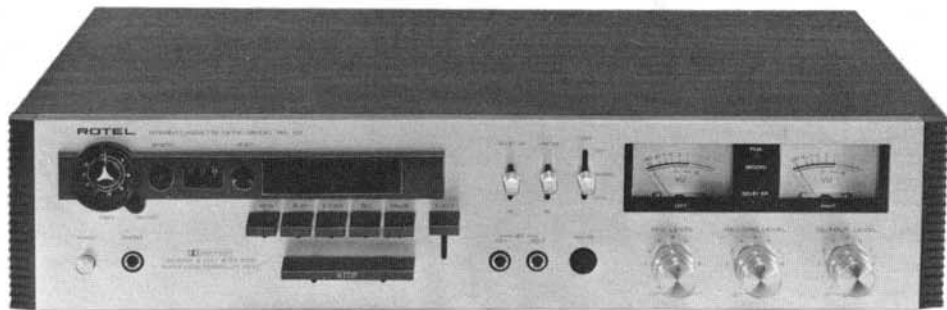
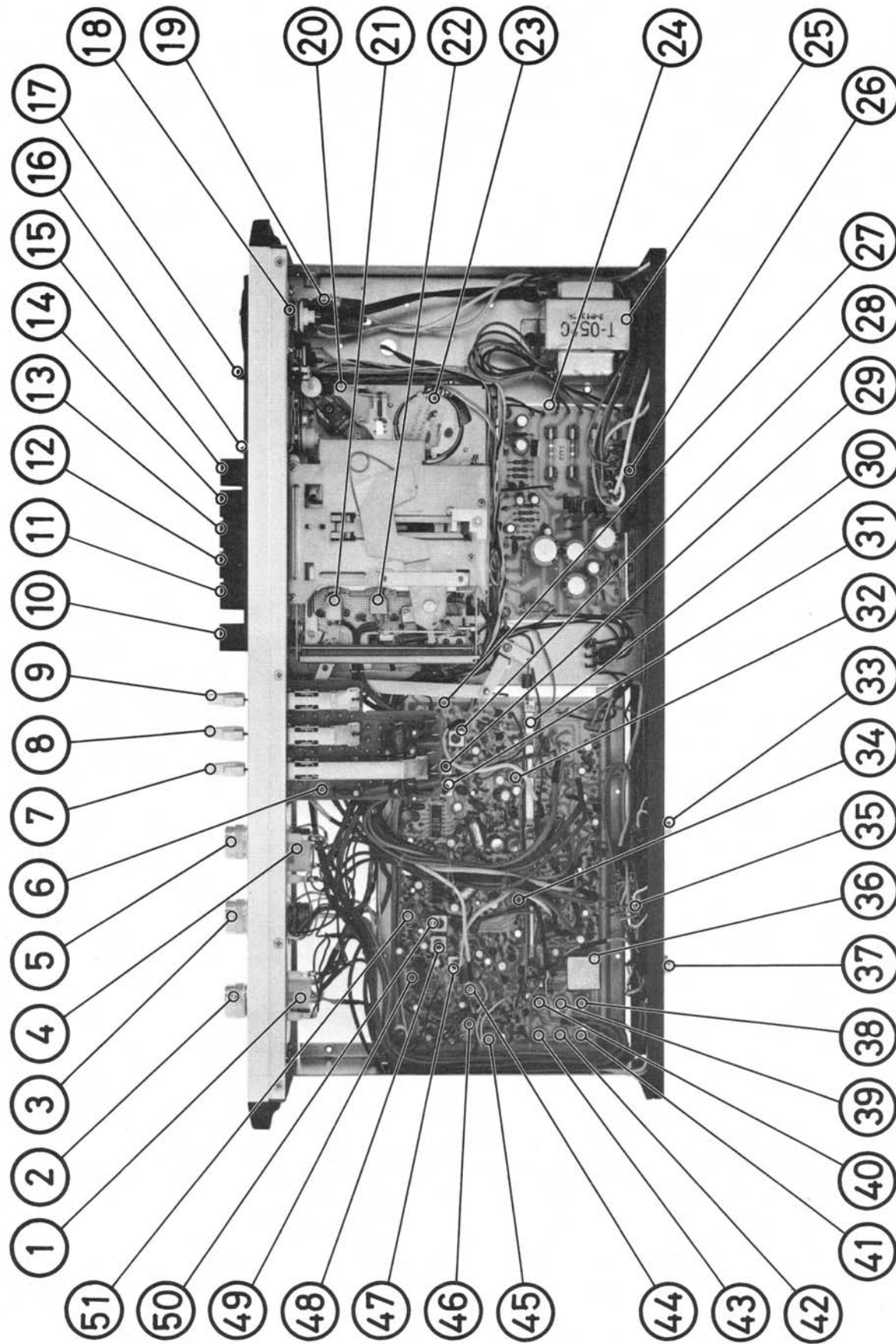


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CHASSIS LAYOUT (TOP VIEW)



- | | | |
|--------------------------|--------------------------------------|---|
| 1. VU METER, L-CH. | 18. TAPE TIMER | 35. DIN TERMINAL PCB |
| 2. OUTPUT LEVEL CONTROL | 19. POWER SWITCH | 36. REC BIAS OSC. UNIT |
| 3. RECORD LEVEL CONTROL | 20. CASSETTE CHASSIS | 37. LINE-OUT TERMINAL |
| 4. VU METER, R-CH. | 21. ERASE HEAD | 38. VR104, FeCr BIAS ADJ, L-CH. |
| 5. MIC LEVEL CONTROL | 22. REC/PB HEAD | 39. VR105, NORM. BIAS ADJ, L-CH. |
| 6. TAPE SELECTOR PCB | 23. MOTOR | 40. VR106, CrO ₂ BIAS ADJ, L-CH. |
| 7. TAPE SELECTOR SWITCH | 24. POWER SUPPLY PCB | 41. VR206, FeCr BIAS ADJ, R-CH. |
| 8. LIMITER SWITCH | 25. POWER TRANSFORMER | 42. VR205, NORM. BIAS ADJ, R-CH. |
| 9. DOLBY NR SWITCH | 26. VOLTAGE SELECTOR | 43. VR204, CrO ₂ BIAS ADJ, R-CH. |
| 10. EJECT BUTTON | 27. REC/PB AMP PCB | 44. VR203, VU METER LEVEL ADJ, R-CH. |
| 11. PAUSE BUTTON | 28. L103, BIAS CARRIER TRAP, L-CH. | 45. VR207, PEAK IND. LEVEL ADJ |
| 12. REC BUTTON | 29. L101, 19kHz FILTER, L-CH. | 46. VR103, VU METER LEVEL ADJ, L-CH. |
| 13. F. FWD BUTTON | 30. REC/PB SWITCH | 47. L203, BIAS CARRIER TRAP, R-CH. |
| 14. PLAY BUTTON | 31. L102, 19kHz FILTER, L-CH. | 48. L201, 19kHz FILTER, R-CH. |
| 15. REW BUTTON | 32. VR101, PLAYBACK LEVEL ADJ, L-CH. | 49. PHONE OUTPUT TRANS., R-CH. |
| 16. COUNTER RESET BUTTON | 33. LINE-IN TERMINAL | 50. L202, 19kHz FILTER, R-CH. |
| 17. MEMORY BUTTON | 34. VR201, PLAYBACK LEVEL ADJ, R-CH. | 51. VR202, REC LEVEL ADJ, R-CH. |

ADJUSTMENT OF PLAYBACK SYSTEM

A. DOLBY LEVEL ADJUSTMENT

Instruments: AC VTVM and Test Tape (MTT-150 or the equivalent)

1. Connect AC VTVM to Terminal Pin 25 (Pin 26 for right channel) on the REC/PB PCB. Set Tape Selector to NORMAL and set DOLBY NR and LIMITER to OFF.
2. Insert Test Tape (MTT-150) into recorder and play it back. Adjust Potentiometer VR101 (VR201 for right channel) so that AC VTVM reads 580mV.
3. Then, adjust Potentiometer VR103 (VR203 for right channel) so that the needle on the VU meter corresponds with the Dolby Mark (+2dB position).

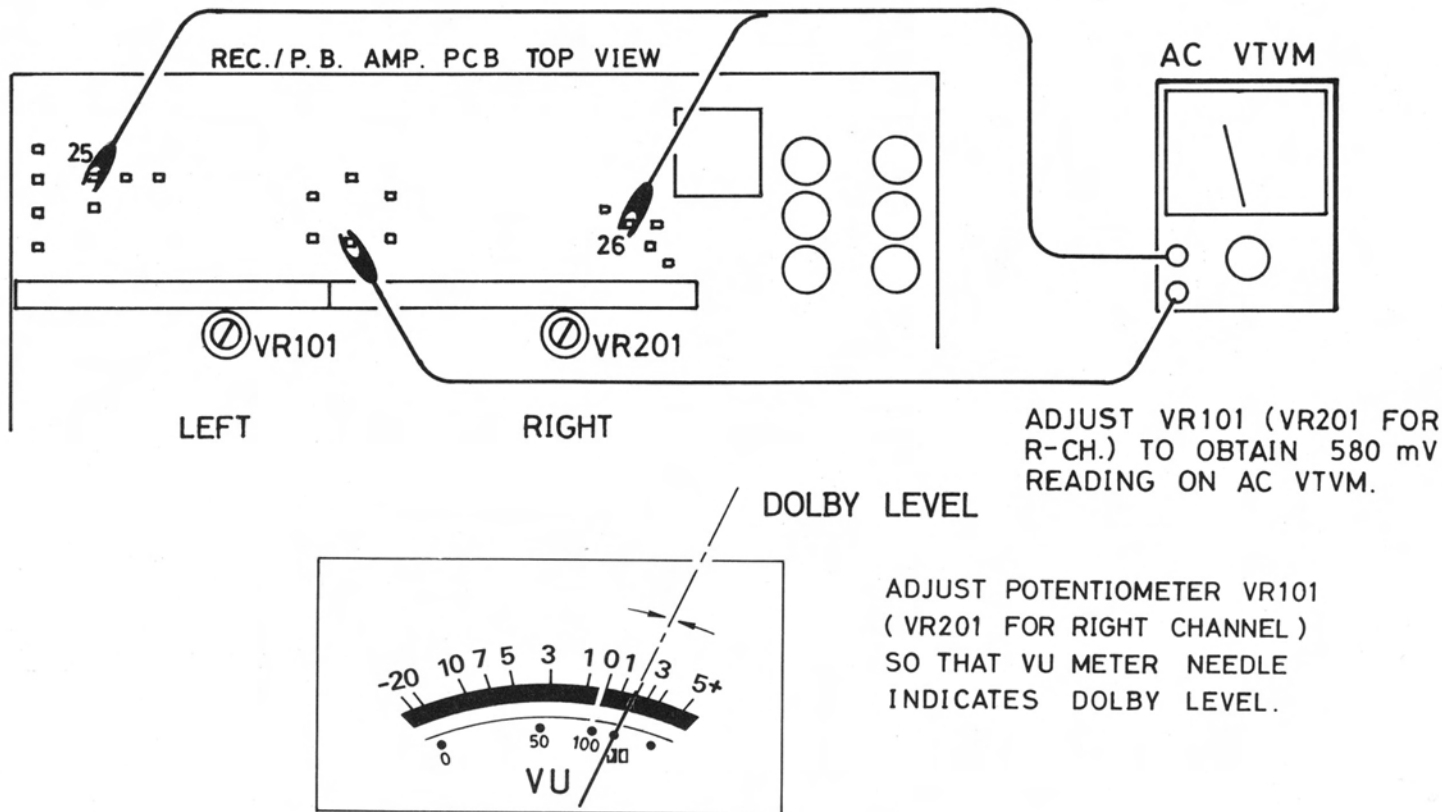


FIG. 1 DOLBY LEVEL ADJUSTMENT HOOK-UP

B. AZIMUTH ADJUSTMENT

Instruments: Oscilloscope and Test Tape (MT-114 or the equivalent)

1. Connect oscilloscope to LINE-OUT and insert Test Tape (MT-114) into recorder and play it back. Set Tape Selector to NORMAL, and set DOLBY NR and LIMITER to OFF.
2. Adjust Azimuth Screw to obtain largest wave form on the oscilloscope for both channels. (When adjusting, observe wave form while switching oscilloscope from left to right channel or vice versa.) Make sure output difference between right and left channels falls within 2dB.
3. After completing adjustment, lock the screw.

ADJUST AZIMUTH SCREW TO OBTAIN MAXIMUM DEFLECTION ON SCOPE.

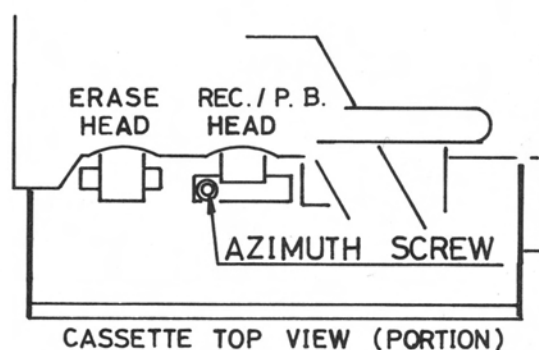


FIG. 2 AZIMUTH ADJUSTMENT

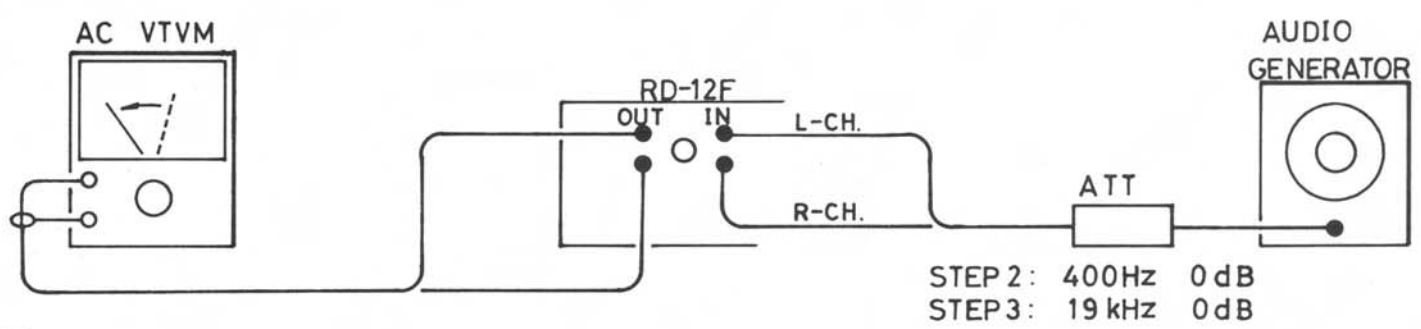
C. After completing Azimuth Adjustment, recheck Dolby Level Adjustment.

ADJUSTMENT OF RECORDING SYSTEM

A. 19kHz TRAP ADJUSTMENT

Instruments: Audio Generator, AC VTVM and Blank Tape

1. Connect Audio Generator to LINE-IN and AC VTVM to LINE-OUT respectively. Insert Blank Tape into recorder and depress REC, PLAY and PAUSE buttons.
2. Apply 400Hz, 0dB signal from Audio Generator. Adjust OUTPUT LEVEL control so that AC VTVM reads 0dB.
3. Then, set switch frequency from Audio Generator to 19kHz, and adjust Trap Coil L101 (L201 for right channel) so that output at this state is smallest. Check to see that attenuation at 19kHz is under -30dB compared to output level at 400Hz.



STEP 2:
ADJUST OUTPUT LEVEL CONTROL TO OBTAIN 0dB READING ON AC VTVM.

STEP 3:
ADJUST TRAP COIL L101 (L201 FOR R-CH.) TO OBTAIN MINIMUM READING (UNDER -30dB) ON AC VTVM.

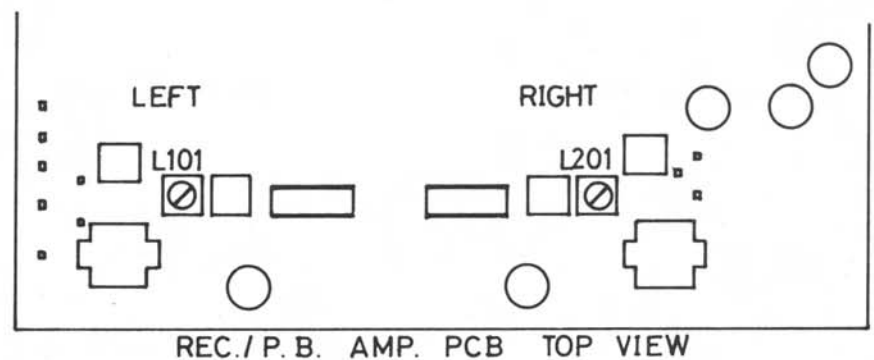


FIG. 3 19kHz TRAP COIL ADJUSTMENT HOOK-UP

B. BIAS CARRIER TRAP ADJUSTMENT

Instruments: Oscilloscope and Blank Tape

1. Connect oscilloscope to Test Point (TP) of REC/PB PCB.
2. Set RECORD LEVEL control to minimum and insert Blank Tape. Depress REC, PLAY and PAUSE buttons.
3. Adjust Trap Coil, L103 (L203 for right channel) to obtain minimum deflection on the oscilloscope.

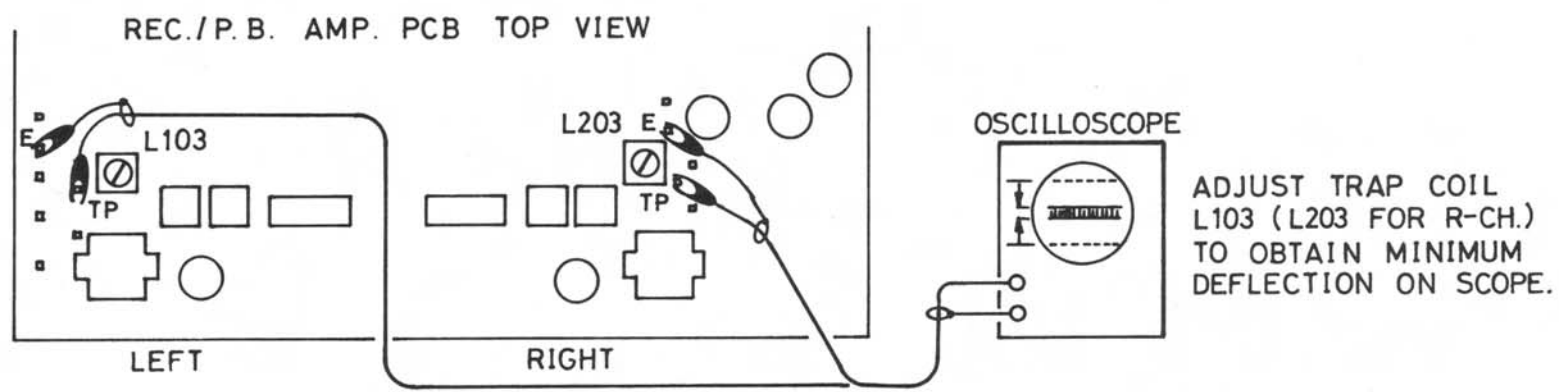


FIG. 4 BIAS CARRIER TRAP ADJUSTMENT HOOK-UP

C. BIAS VOLTAGE ADJUSTMENT

Instruments: AC VTVM and Blank Tape

1. Connect AC VTVM to Pin 11 (Pin 12 for right channel) of REC/PB PCB and insert Blank Tape. Depress REC, PLAY and PAUSE buttons.
2. Set Tape Selector to NORMAL. Make adjustment by turning Potentiometer VR105 (VR205 for right channel) so that AC VTVM reads 4.5mV.

3. Set Tape Selector to "CrO₂". Make adjustment by turning Potentiometer VR106 (VR204 for right channel) so that AC VTVM reads 6.5mV.
4. Next, set Tape Selector to "FeCr". Adjust Potentiometer VR104 (VR206 for right channel) so that AC VTVM reads 4.5mV.

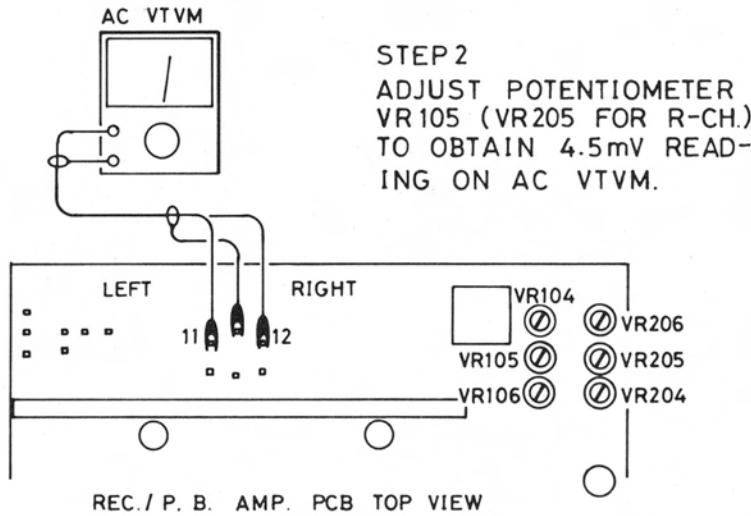


FIG. 5 BIAS VOLTAGE LEVEL ADJUSTMENT HOOK-UP

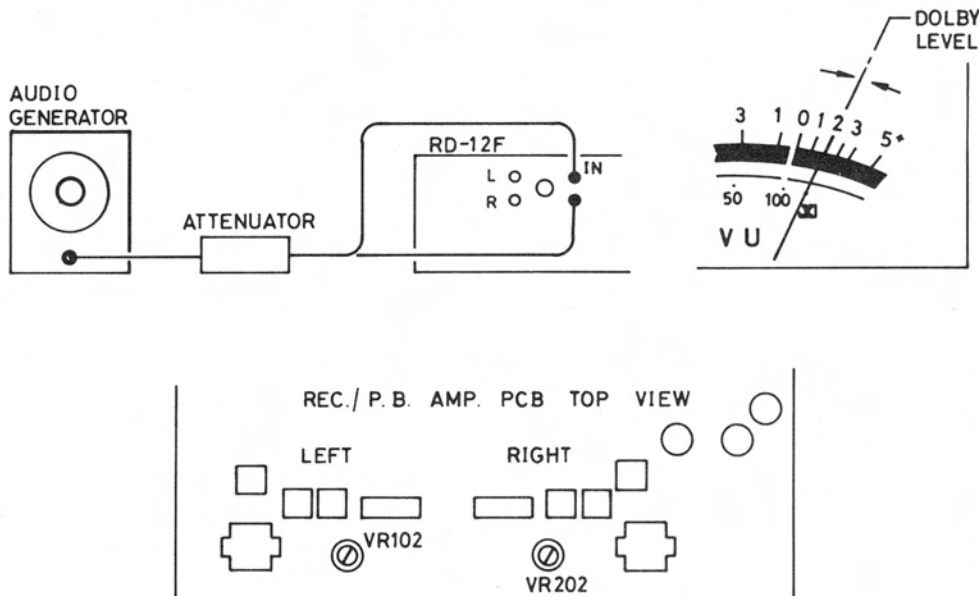
D. DOLBY REC/PB OUTPUT LEVEL ADJUSTMENT

Instruments: Audio Generator and Normal Blank Tape (Sony Hf, etc.)

1. Insert Normal Tape into recorder and depress REC, PLAY and PAUSE buttons. Set RECORD LEVEL control to maximum. Then set DOLBY NR switch to ON.
2. Connect Audio Generator to LINE-IN, and apply 400Hz (sine wave). Control output of Audio Generator so that VU meter needle falls on Dolby Mark (+2dB).
3. In Step 2, release PAUSE and record the tape. Check to see that the VU meter needle falls on Dolby Mark when playing back the recorded tape.

4. If recording and playback levels are different. Repeat Step 3 until two levels are almost equal by adjusting Potentiometer VR102 (VR202 for right channel) when recording tape. Allowable margin of difference is within ± 1.5 dB.

Note: If playback level is higher, turn Potentiometer (VR102 or 202) counterclockwise, and if it is lower, turn clockwise. Then, record and play back the tape.



STEP 2
ADJUST ATTENUATOR SO THAT THE READING OF VU METER IS DOLBY LEVEL (+2dB POINT).

STEP 3
ADJUST POTENTIOMETER VR102 (VR202 FOR R-CH.) SO THAT THE READING OF VU METER IS DOLBY LEVEL (+2dB POINT).

FIG. 6 REC/PB LEVEL ADJUSTMENT HOOK-UP

E. BIAS CURRENT ADJUSTMENT

Instruments: Audio Generator, AC VTVM and Blank Tapes

1. Normal Tape

- Set Tape Selector to NORMAL and insert Normal Tape (Sony Hf, etc.) into recorder. Set RECORD LEVEL and OUTPUT LEVEL to maximum.
- Connect AC VTVM to LINE-OUT, and connect Audio Generator to LINE-IN. Apply 400Hz signal from Audio Generator. Record 400Hz signal at 20dB below 0VU. Then, record 10kHz signal at the same level.
- Check to see that output level difference between 400Hz and 10kHz signals is within $\pm 1.0\text{dB}$ when playing back the recorded tape.
- If the difference is large, repeat Step b) and c) until the difference falls within $\pm 1.0\text{dB}$ by making fine adjustment of potentiometer VR105 (VR205 for right channel).
 - If output level at 10kHz is higher, turn potentiometer counterclockwise.
 - If output level at 10kHz is lower, turn potentiometer clockwise.

2. Chrome Tape

- Set Tape Selector to "CrO₂" position, and insert Chrome Tape (Sony CR, etc.). Follow the same procedures as in Normal Tape. Be sure to adjust Potentiometer VR106 (VR204 for right channel).

3. Ferri-chrome Tape

- Set Tape Selector to "FeCr" position and insert Ferri-chrome Tape (Sony Duad). Follow the same procedures as in Normal Tape. Be sure to adjust Potentiometer VR104 (VR206 for right channel).

Note: Make sure to check Procedure F after completing the above adjustment.

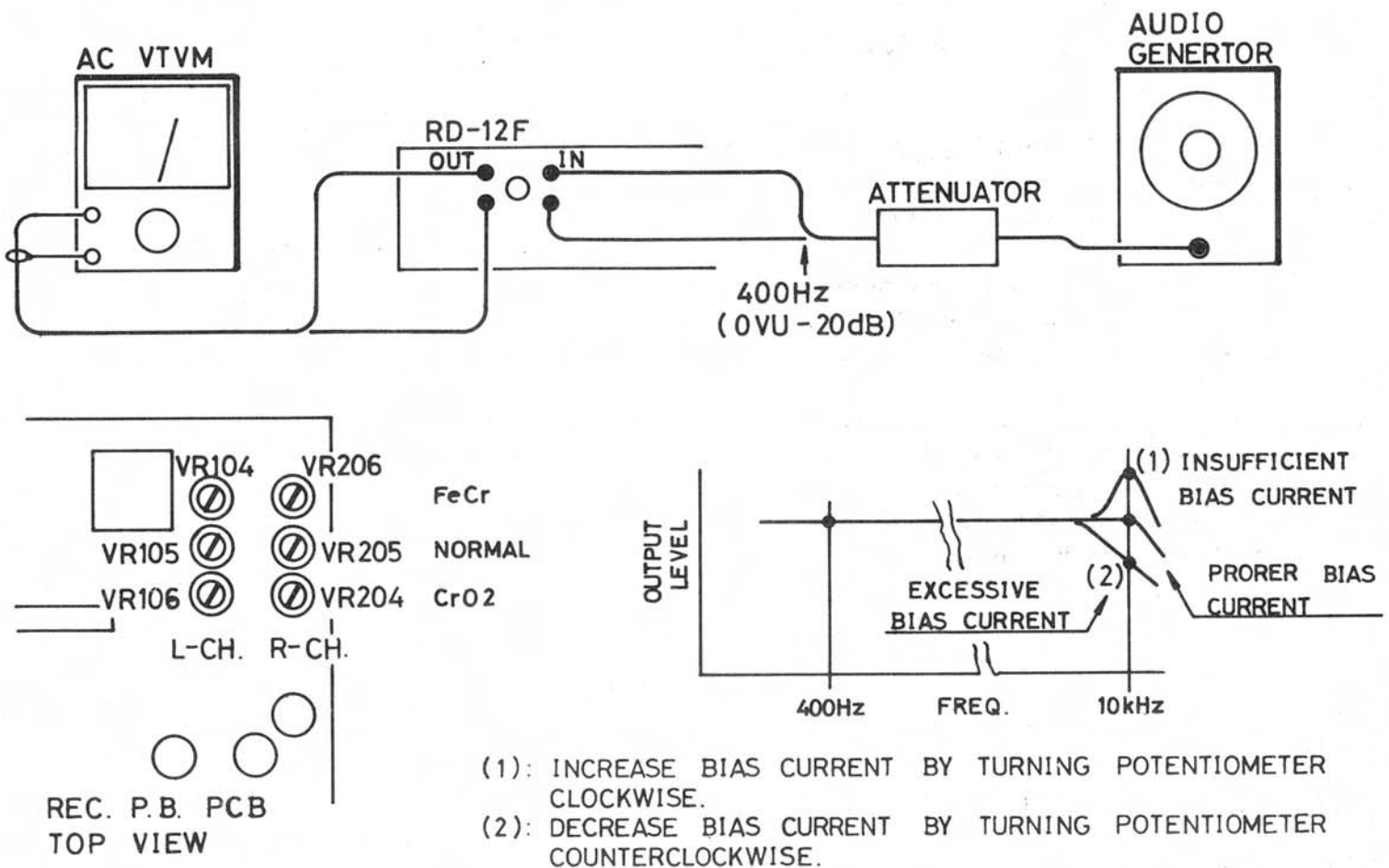


FIG. 7 BIAS CURRENT ADJUSTMENT HOOK-UP

F. DISTORTION CHECK

Instruments: HD Analyzer, Audio Generator and Blank Tape

1. Connect Audio Generator to LINE-IN, and HD Analyzer to LINE-OUT.
2. Insert Blank Tape and apply 400Hz signal from Audio Generator. Record the tape at 0VU.
3. Check to see that the distortion is within the following range when playing back the recorded tape.
 - a) Normal Tape: under 1.5%
 - b) CrO₂ Tape: under 2.5%
 - c) FeCr Tape: under 1.5%
4. If the distortion factor exceeds the above values, check bias current and make fine adjustment. Then check distortion again.

G. PEAK INDICATOR LEVEL ADJUSTMENT

Instruments: Audio Generator and Blank Tape

1. Insert Blank Tape into recorder. Connect Audio Generator to LINE-IN. Depress REC, PLAY and PAUSE buttons and apply 400Hz, +6VU signals.
2. Adjust Potentiometer VR207 to light up Peak Indicator in Step 1.
3. Carry out Steps 1 and 2 for the other channel.
4. Repeat the above steps until potentiometers of both channels come to the same position.

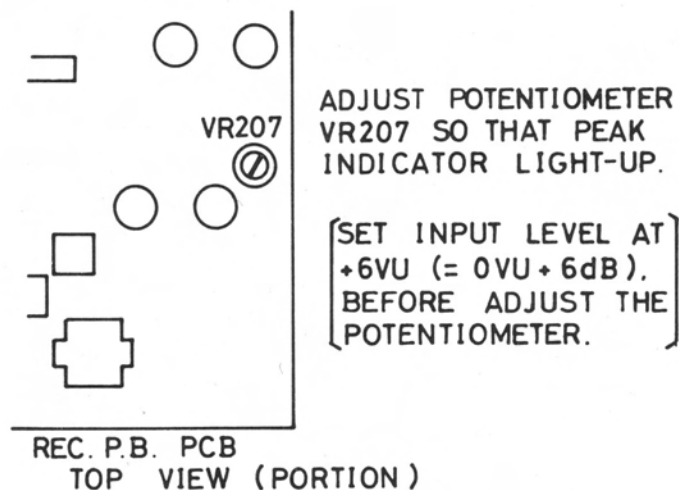


FIG. 8 PEAK INDICATOR LEVEL SETTING

H. CHECKING TAPE SPEED DEFLECTION AND ADJUSTING SPEED

Instruments: Frequency Counter and Test Tape (MT-111 or the equivalent).

1. Connect Frequency Counter to LINE-OUT. Set Tape Selector to NORMAL, and DOLBY NR and LIMITER to OFF.
2. Insert Test Tape (MT-111) into recorder and depress PLAY button to play back the tape. Check to see that allowable margin of deflection at the beginning of, at the middle of or at the end of winding is in the range of +1% ~ -2%. (at 3,000Hz, allowable margin of deflection of speed is 3,030 ~ 2,940).
3. If tape speed deflected surpasses the above range, adjust speed of the motor.

ADJUST POTENTIOMETER INSIDE THE MOTOR, SO THAT FREQUENCY COUNTER INDICATES 3000Hz.

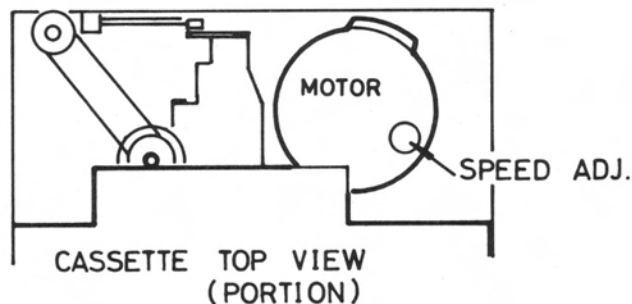
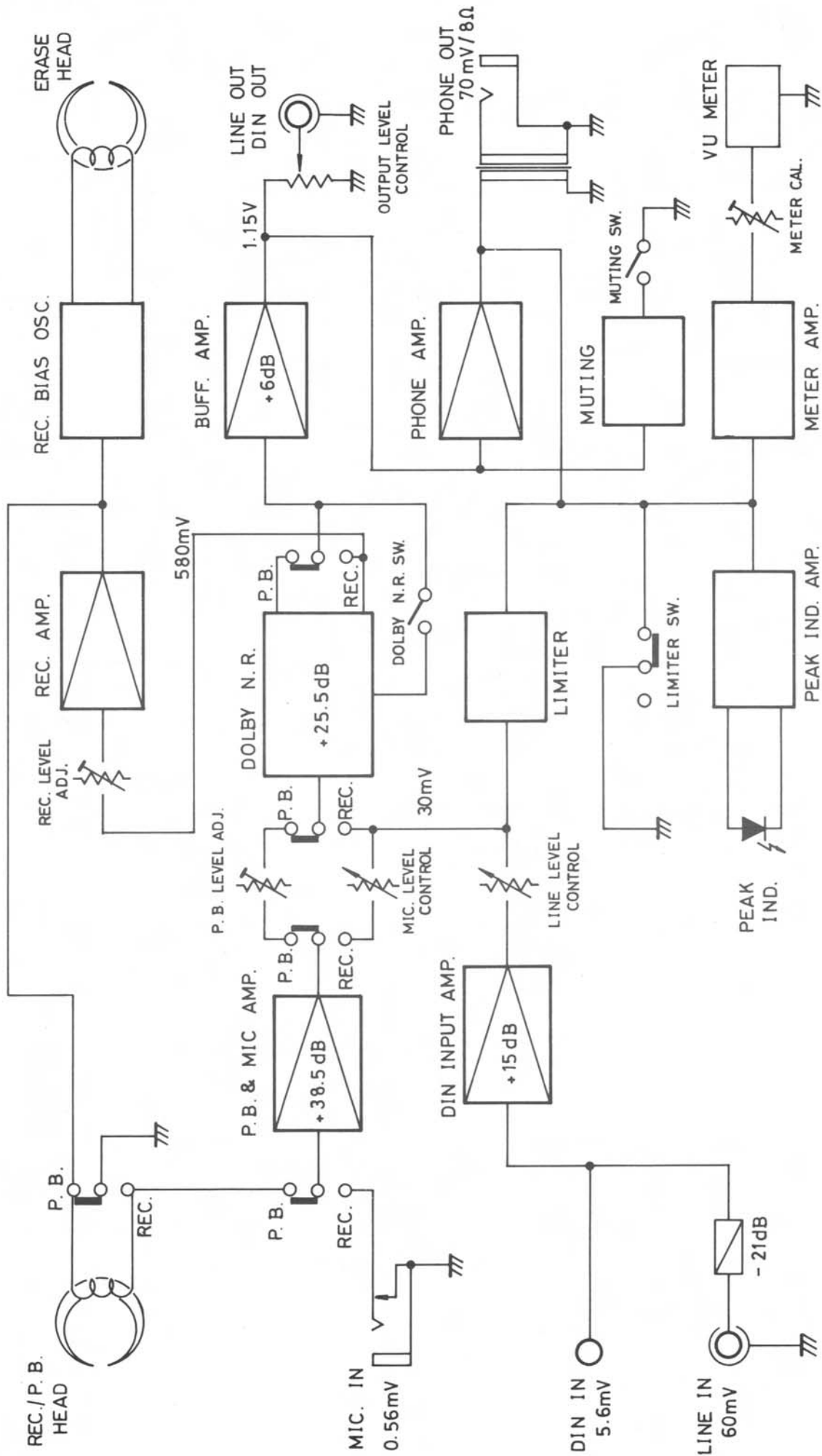
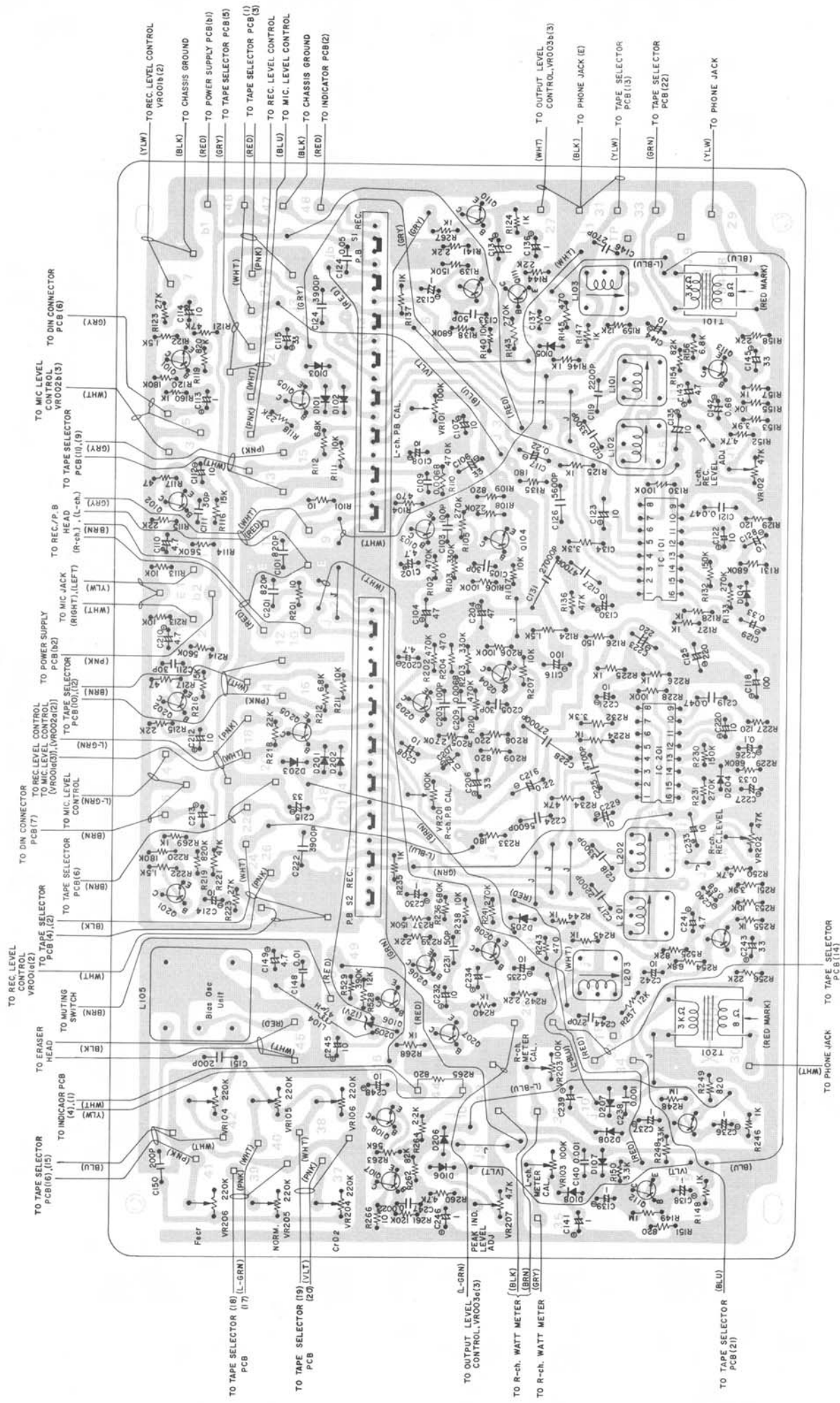


FIG. 9 TAPE SPEED ADJUSTMENT

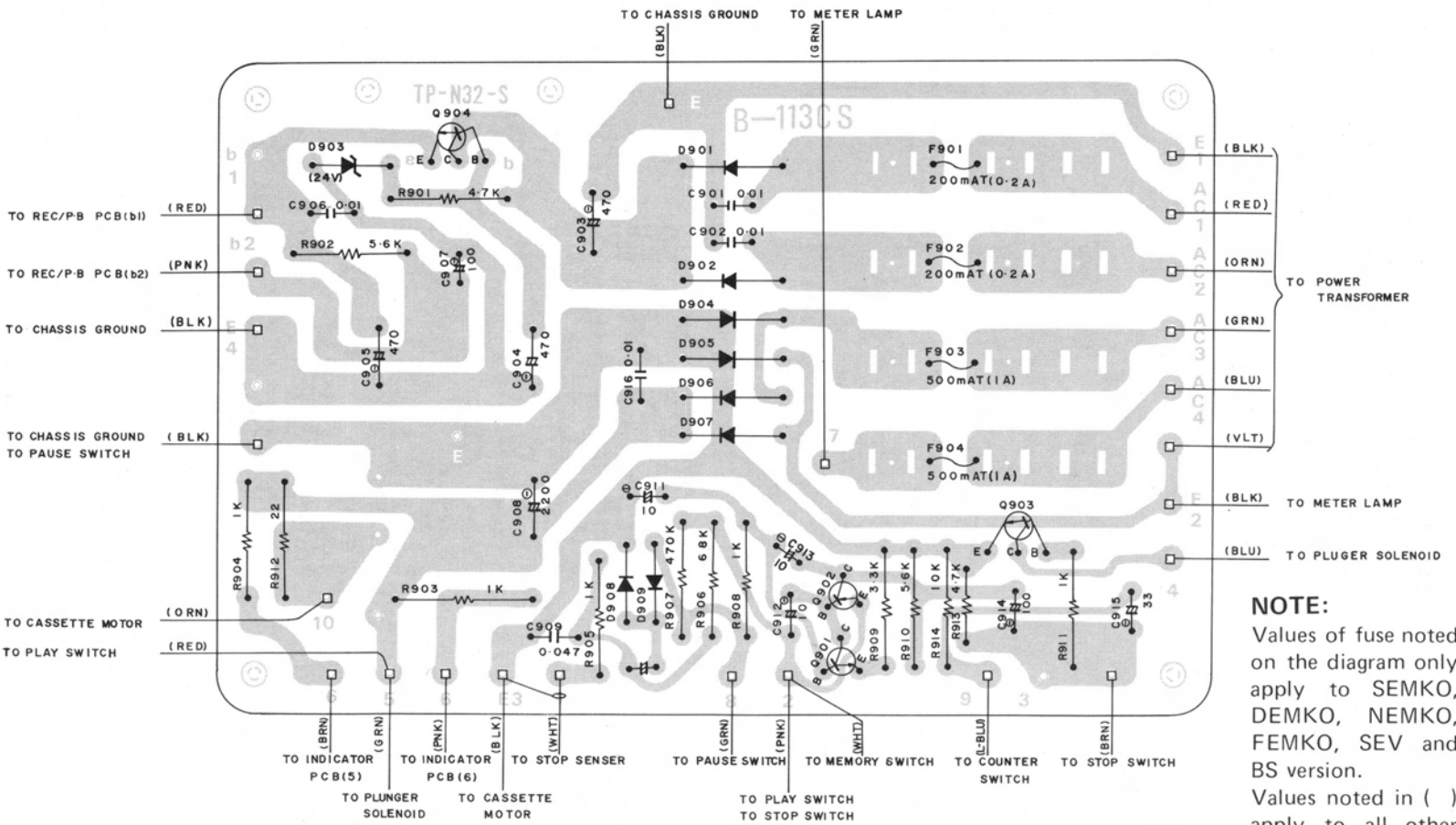
BLOCK DIAGRAM



REC/PLAYBACK AMP CIRCUIT BOARD DIAGRAM

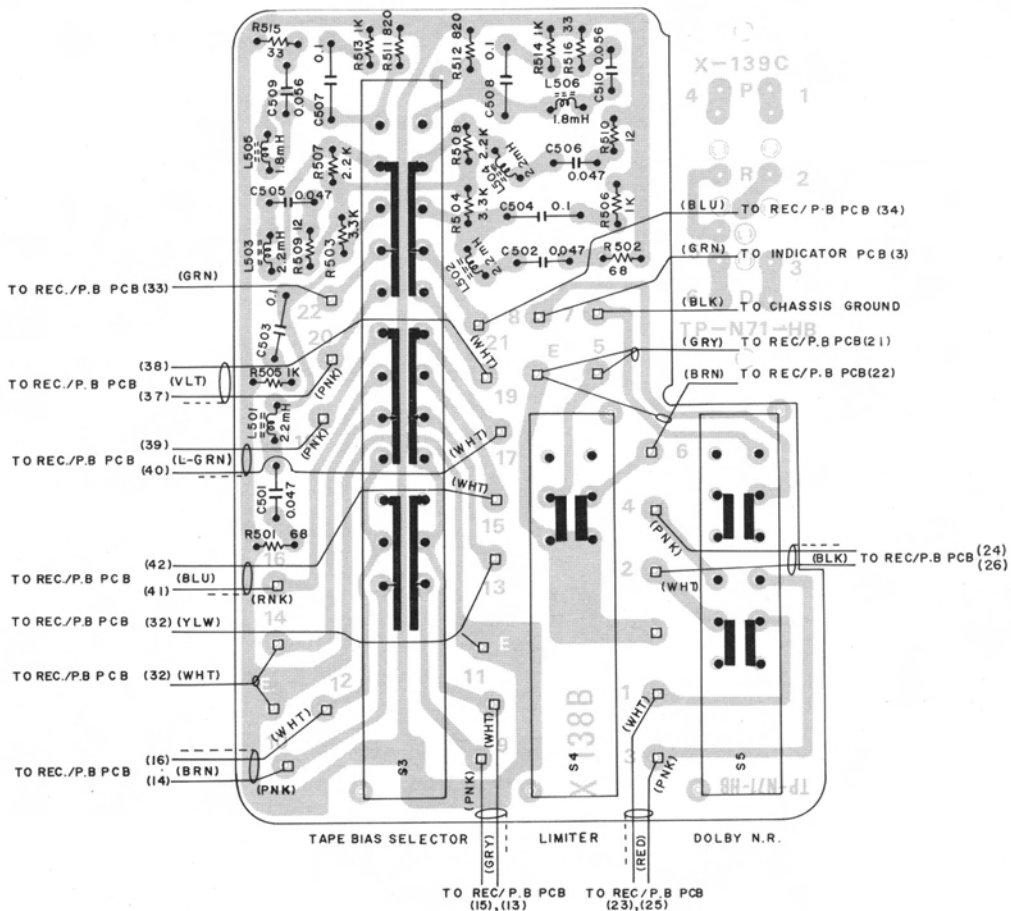


POWER SUPPLY CIRCUIT BOARD DIAGRAM

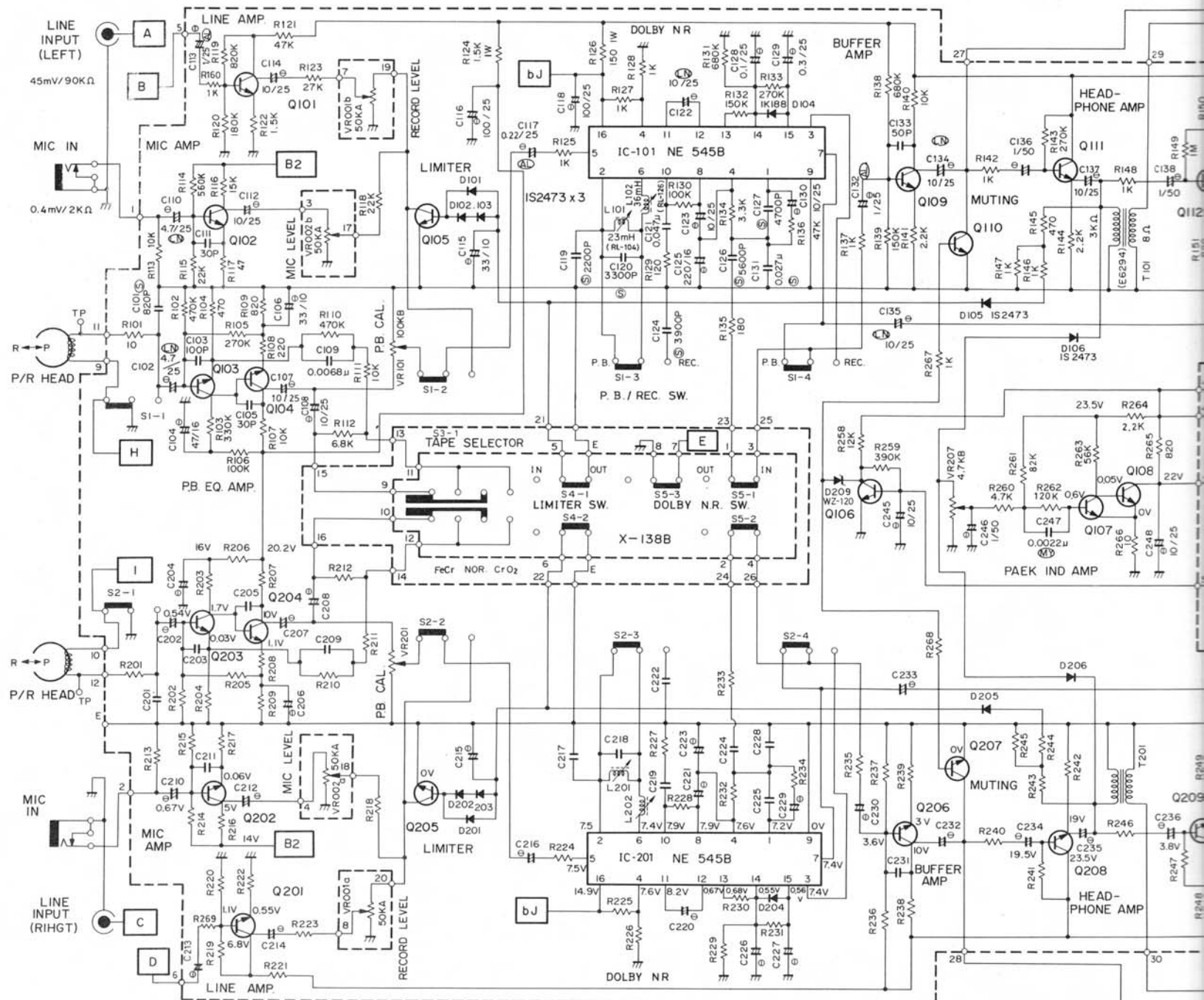


NOTE:
 Values of fuse noted on the diagram only apply to SEMKO, DEMKO, NEMKO, FEMKO, SEV and BS version.
 Values noted in () apply to all other versions.

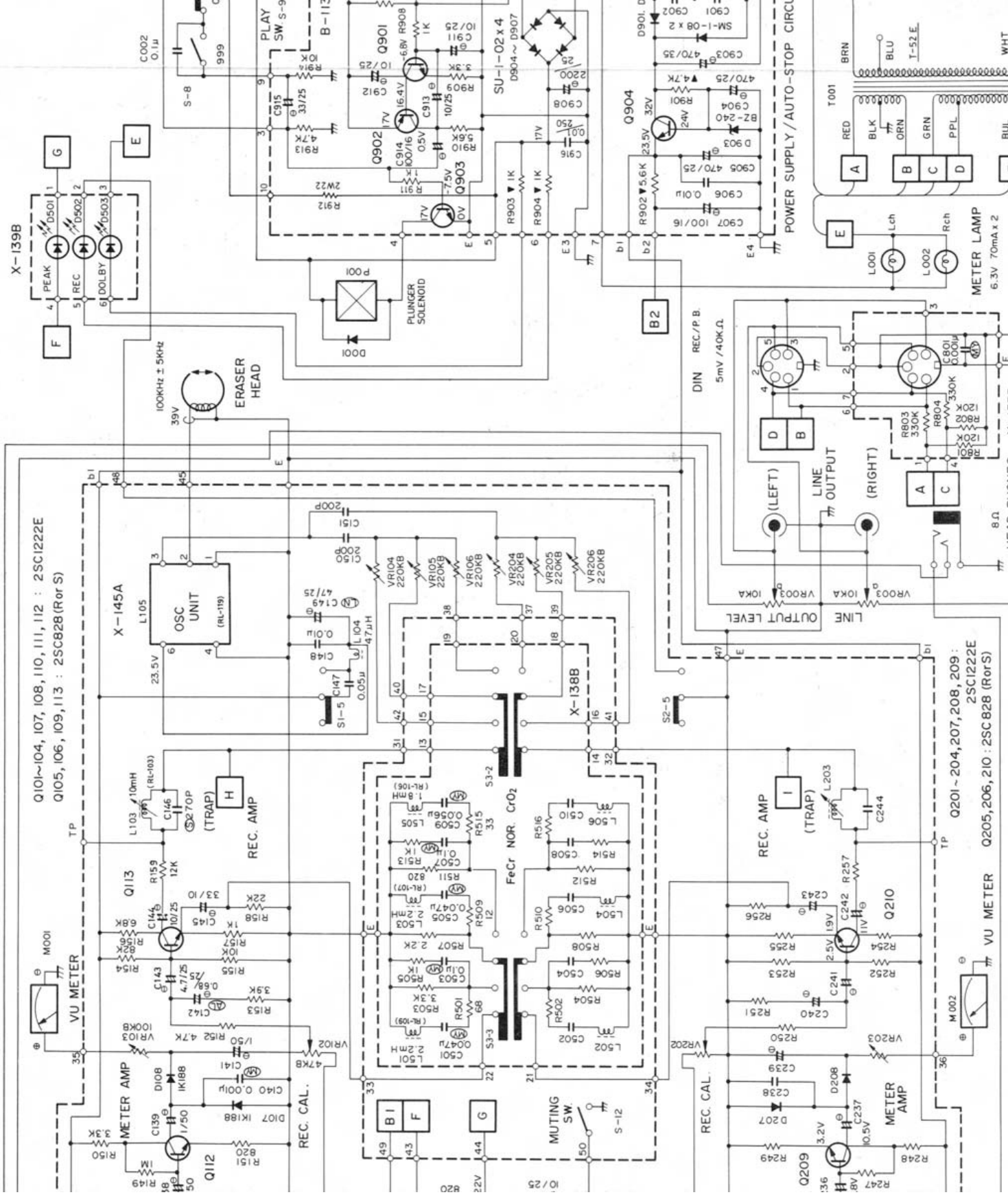
TAPE BIAS SELECTOR CIRCUIT BOARD DIAGRAM



SCHEMATIC DIAGRAM



D501 : SEL -
D502 : SEL -
D503 : SEL -



Q101~104, 107, 108, 110, 111, 112 : 2SC1222E
Q105, 106, 109, 113 : 2SC828 (Ror S)

Q201~204, 207, 208, 209 :
2SC1222E
Q205, 206, 210 : 2SC 828 (Ror S)

HEAD PHONES X-153B

METER LAMP
6.3V 70mA x 2

POWER SUPPLY / AUTO-STOP CIRCUIT

X-139B

X-145A

X-153B

D501 : SEL - I03RC (RED)
 D502 : SEL - I03S (RED)
 D503 : SEL - 303E (GREEN)

POSITION
 S1, S2 : PLAY/ REC. SW. (PLAY)
 S3 : TAPE BIAS EQ. SELECTOR (NOR)
 S4 : LIMITER SW. (OUT)
 S5 : DOLBY N.R. SW. (IN)
 S6 : STOP SW. (OFF)
 S7 : MEMORY SW. (ON)
 S8 : COUNTER SW. (OFF)
 S9 : PLAY SW. (OFF)
 S10 : PAUSE SW. (OFF)
 S11 : TAPE STOP SENSER (OFF)
 S12 : MUTING SW. (OFF)
 S13 : POWER SW. (ON)

MODEL RD-12F SCHEMATIC DIAGRAM

RESISTORS

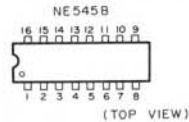
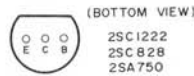
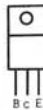
5% TOLERANCE UNLESS OTHERWISE NOTED
 K---KILO OHM
 M---MEGA OHM
 ▽--- COMPOSITION RESISTORS 1/2 WATT
 NON MARK---LOW NOISE TYPE CARBON RESISTORS 1/4 WATT

CAPACITORS

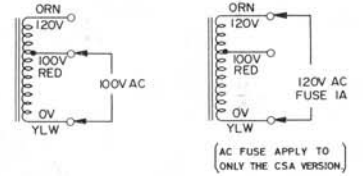
(LN) LOW NOISE TYPE CAPACITORS
 (MY) MYLAR FILM CAPACITORS
 (AL) SINTERED ALUMINUM SOLID ELECTROLYTIC CAPACITORS (ALSICON)
 (S) POLYSTYRENE CAPACITORS
 #--- ELECTROLYTIC CAPACITORS
 NON MARK--- CERAMIC CAPACITORS
 • UNLESS OTHERWISE NOTED IN SCHEMATIC ALL CAPACITANCE VALUES ARE EXPRESSED IN MFD.
 • VOLTAGE READING WITH VTVM FROM THE POINT SHOWN TO THE CHASSIS GROUND (LINE VOLTAGE 220 VOLT).
 • VOLTAGE READING MAY VARY ± 20%.

* GANG

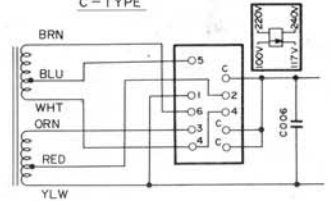
• VALUES OF FUSE NOTED ON THIS SCHEMATIC DIAGRAM ONLY APPLY TO SEMKO, DEMKO, NEMKO, FEMKO, SEV AND B5 VERSIONS. VALUES NOTED IN () APPLY TO ALL OTHER VERSIONS.



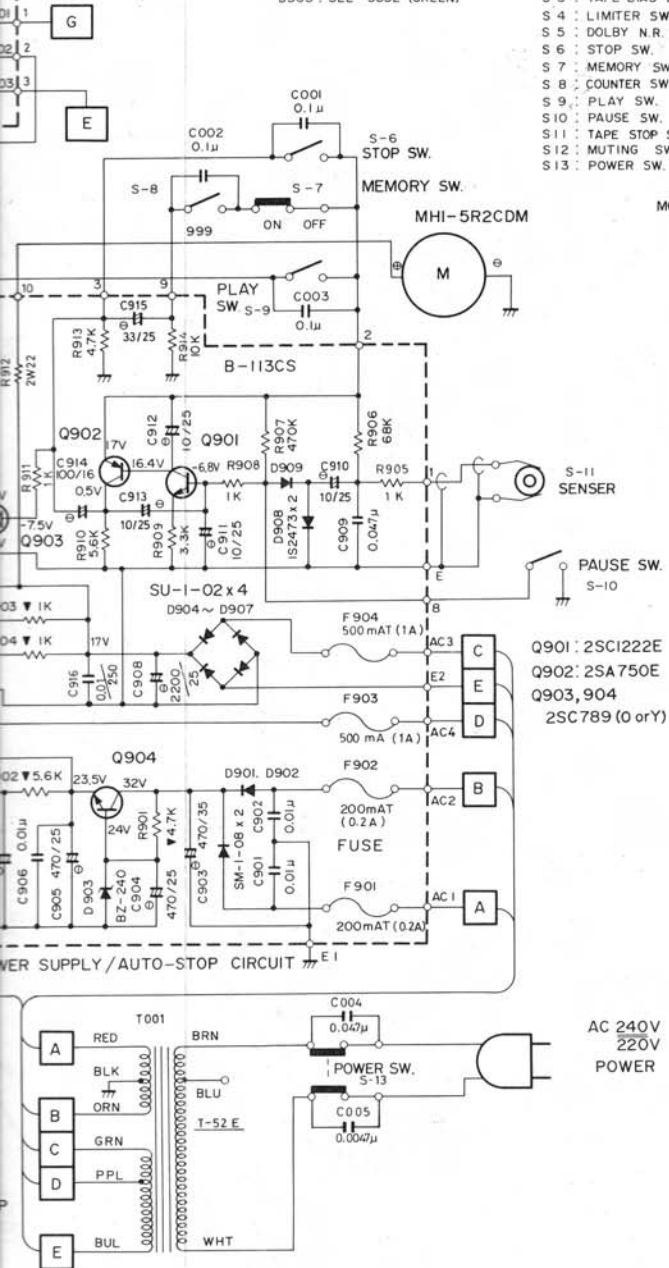
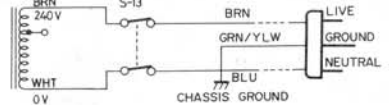
POWER TRANSFORMER STRAPPING
 D-TYPE



POWER TRANSFORMER STRAPPING
 C-TYPE



3-CORE CORD CONNECTION

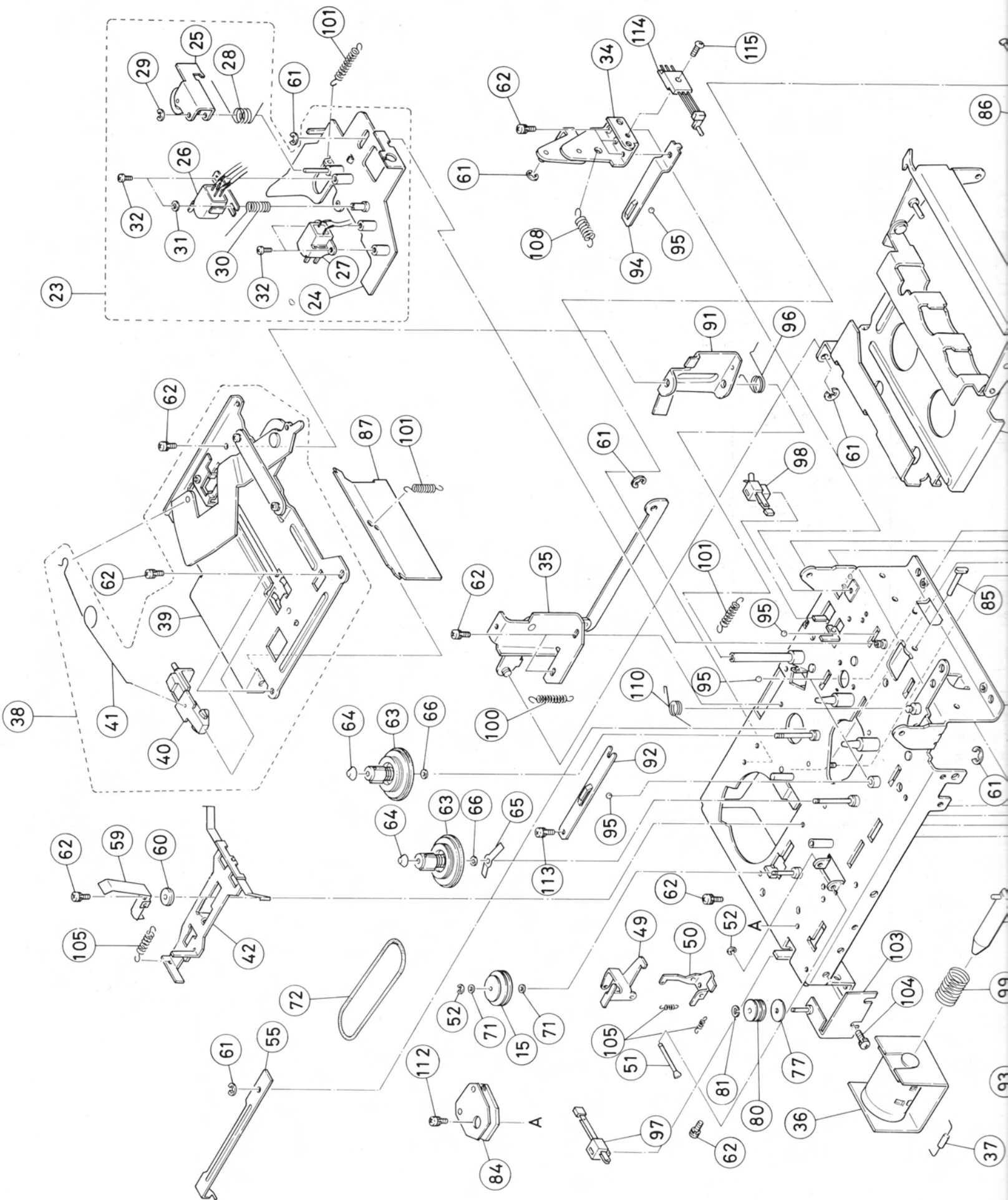


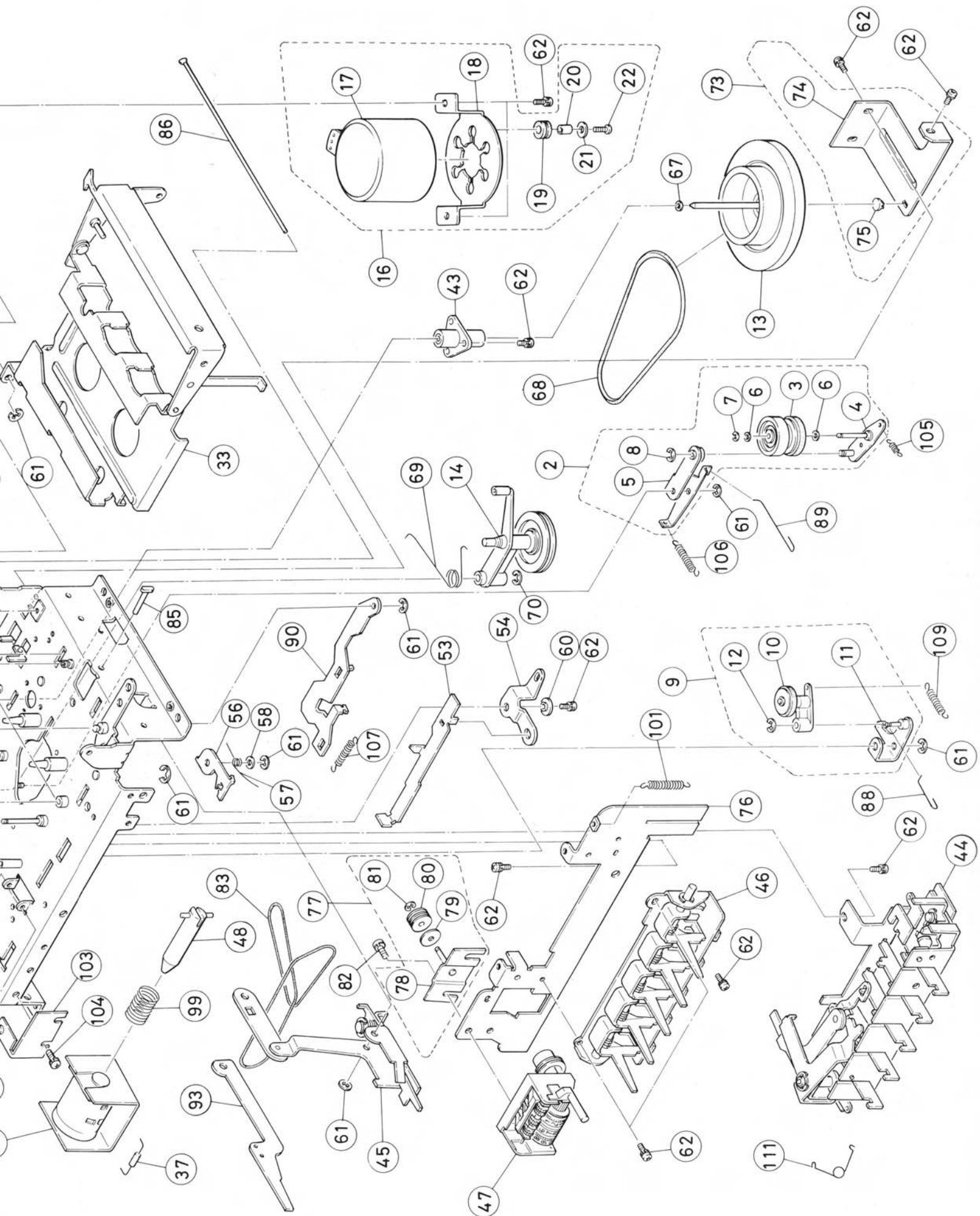
Q901 : 2SC1222E
 Q902 : 2SA750E
 Q903, 904 : 2SC789 (O or Y)

AC 240V
 220V
 POWER

ITEM	SCHEMATIC LOCATION (LAST)	
	R	C
REC./PB. AMP.	R 159	C 151
TAPE SELECTOR	R 516	C 510
DIN CIRCUIT	R 804	C 801
POWER SUPPLY	R 914	C 916
CHASSIS		C 005

MECHANISM ASSEMBLY BLOCK DIAGRAM

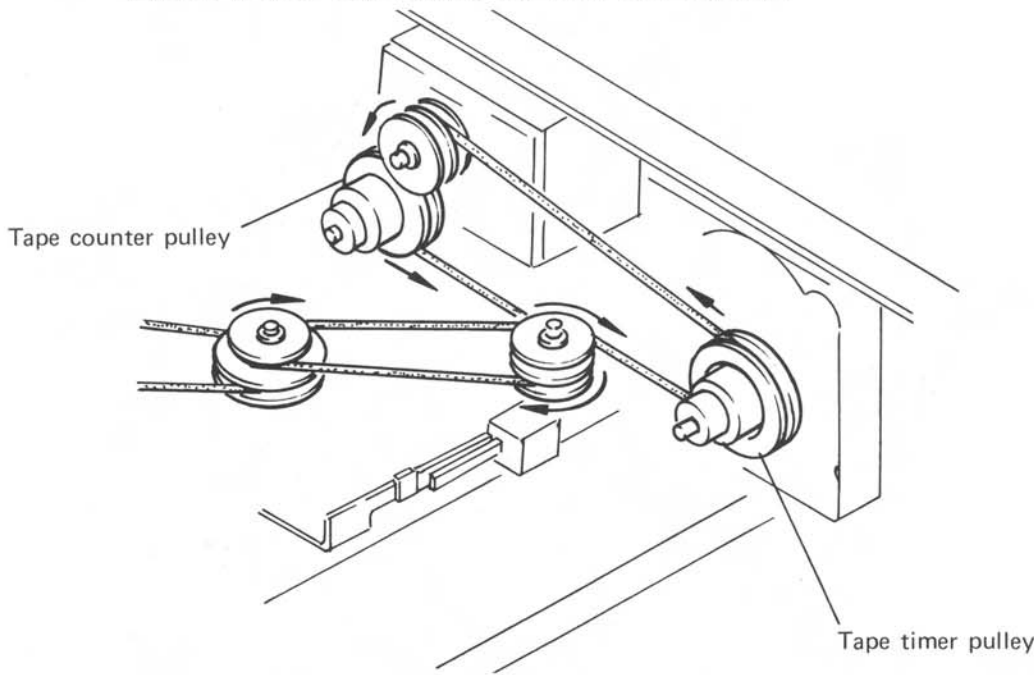




RD-12F MECHANISM ASSEMBLY BLOCK

No.	Part No.	Description	Q'ty	No.	Part No.	Description	Q'ty
1.	090151511	Ass'y, Riv. Tape Deck Chassis	1	61.	090157313	Washer, "C" (2.5φ)	10
2.	090151512	Ass'y, F.F.	1	62.	090157327	Screw, Machine	30
3.	090156611	Ass'y, Clutch, F.F.	1	63.	090156620	Reel, Drive	2
4.	090151513	Ass'y, Arm, F.F.	1	64.	090156621	Cap, Wheel	2
5.	090151514	Ass'y, Lever, F.F.	1	65.	090156622	Spring, Back Tension	1
6.	090157311	Washer P.S. (2.1φ x 4φ x 0.5t)	2	66.	090157328	Washer P.S. (1.7φ x 3.2φ x 0.5t)	2
7.	090157312	Washer "C" (1.5φ)	1	67.	090157329	Washer P.S. (2.6φ x 4.7φ x 0.5t)	1
8.	090157313	Washer "C" (2.5φ)	1	68.	090156623	Belt, Drive	1
9.	090151515	Ass'y, Idler	1	69.	090156624	Spring, Arm Clutch	1
10.	090151516	Ass'y, Arm Idler	1	70.	090157330	Washer, "C" (3φ)	1
11.	090151517	Ass'y, Lever Rew.	1	71.	090157311	Washer, P.S. (2.1φ x 4φ x 0.5t)	2
12.	090157313	Washer "C" (2.5φ)	1	72.	090156625	Belt, Pulley	1
13.	090156612	Ass'y, Flywheel & Shaft	1	73.	090151542	Ass'y, Bracket Flywheel	1
14.	090151518	Ass'y, Clutch	1	74.	090151543	Bracket, Flywheel	1
15.	090156613	Ass'y, Pulley Counter	1	75.	090151544	Spacer	1
16.	090151519	Ass'y, Motor & Bracket	1	76.	090151545	Frame, Front	1
17.	260101116	Ass'y, Motor	1	77.	109111002	Ass'y, Bracket Pulley (B)	1
18.	090151520	Bracket, Motor	1	78.	120012461	Bracket (B), Pulley	1
19.	090156614	Cushion, Motor	3	79.	761911168	Washer, Mylar (2φ)	2
20.	090157315	Sleeve, Cushion	3	80.	651110010	Pulley	2
21.	090157316	Washer, Flat (2.6φ)	3	81.	757001015	Washer, "C" (1.5φ)	2
22.	090157317	Screw, Machine (M2.6 x 6)	3	82.	715213006	Screw, (3 x 6mm)	3
23.	090151521	Ass'y, Plate Head & Pinch Roller	1	83.	671011013	Belt, Counter	1
24.	090151522	Ass'y, Plate Head	1	84.	090156627	Tape Stop Sensor	1
25.	090151523	Bracket, Pinch Roller	1	85.	090156628	Shaft, Eject Lever	1
26.	241001113	Head, Rec./P.B.	1	86.	090156629	Rod, Lifter	1
27.	241001112	Head, Erase	1	87.	090151546	Plate, Idler	1
28.	090156615	Spring, Pinch Roller	1	88.	090156630	Link, F.F. Rew.	1
29.	090157318	Washer, "C" (2.05φ)	1	89.	090156631	Link, F.F. Rew.	1
30.	090156616	Spring, Azimuth	1	90.	090151547	Lever, Fwd	1
31.	090157319	Washer, Flat (2.3φ x 4.3φ)	1	91.	090151548	Stopper, Support	1
32.	090157320	Screw, Machine	4	92.	090156645	Spring, Hold	1
33.	090151524	Ass'y, Support Cassette	1	93.	090151550	Lever, Stop	1
34.	090151525	Ass'y, Lifter	1	94.	090156646	Spring, Hold	1
35.	090151526	Ass'y, Bracket, Arm Lifter	1	95.	090151552	Steel Ball	6
36.	090152321	Ass'y, Solenoid & Bracket	1	96.	090156632	Spring, Latching	1
37.	090153322	Rectifier, Silicon (10D2)	1	97.	090156633	Leaf Switch, Play	1
38.	090151527	Ass'y, Plate Base	1	98.	090156634	Leaf Switch, Pause	1
39.	090151528	Ass'y, Plate Base & Arm	1	99.	090156635	Spring, Solenoid	1
40.	090151529	Slide, Cassette	1	100.	090156636	Spring	1
41.	090156617	Spring, Eject	1	101.	090156637	Spring	4
42.	090151530	Ass'y, Brake	1	102.	109111003	Ass'y, Bracket Pulley (A)	1
43.	090151531	Ass'y, Housing	1	103.	120012460	Bracket (A), Pulley	1
44.	090151532	Ass'y, Bracket, Slider & Lever Switch	1	104.	725213006	Screw, 3 x 6 Tapping	2
45.	090151533	Ass'y, Lever Eject	1	105.	090156638	Spring	4
46.	090151534	Ass'y, Frame Switch Button	1	106.	090156639	Spring	1
47.	650901113	Tape Counter	1	107.	090156640	Spring	1
48.	090151535	Ass'y, Plunger & Pin	1	108.	090156641	Spring	1
49.	090151536	Stopper, Rec. A	1	109.	090156642	Spring	1
50.	090151537	Stopper, Rec. B	1	110.	090156643	Spring, Lever Rec.	1
51.	090156618	Pin, Stopper	1	111.	090156644	Spring, Bar	1
52.	090157312	Washer, "C" (1.5φ)	2	112.	090157333	Screw, Machine	1
53.	090151538	Slide, Rec. A	1	113.	090157334	Screw, Machine	1
54.	090151539	Lever, Rec.	1	114.	090156647	Switch, Muting	1
55.	090151540	Slide, Rec. B	1	115.	090157335	Screw, Machine	1
56.	090151541	Cam, Pause	1				
57.	090156626	Spring, Cam	1				
58.	090157324	Washer, Flat	1				
59.	090156619	Spring, Cassette Hold	1				
60.	090157325	Post, Slide	2				

BELTING COUNTER PULLEYS



REPAIR PARTS LIST

Schematic Location	Part No.	Description
TRANSISTORS, DIODES AND IC's		
Q101, 102, 103, 104, 107, 108, 110, 111, 112, 201, 202, 203, 204, 207, 208, 209, 901	301201156	2SC1222 (E), MIC/PB Amp. etc.
Q105, 106, 109, 113, 205, 206, 210		
Q902	301001133	2SA750 (E), Auto-stop Sensing Amp.
Q903, 904	301201142	2SC789 (D) or (Y), Stabilizer, etc.
D101, 102, 103, 105, 106, 201, 202, 203, 205, 206, 908, 909	300111010	1S2473 or TD81515, Limiter Rect., etc.
D104, 107, 108, 204, 207, 208		
D209	300313013	WZ-120, Zener, Muting Bias
D501	300414012	SEL-103RC., Peak Indicator
D502	300414013	SEL-103, Rec. Indicator
D503	300414011	SEL-303E, Dolby NR Indicator
D901, 902	300919016	SM-1-08, Rectifier for Amp. Section
D903	300313009	BZ-240, Zener Regulator
D904, 905, 906, 907	300919021	SU-1-02, Rectifier for Auto-stop Sensor
IC101, 201		
VARIABLE RESISTORS		
VR101, 103, 201, 203	510502136	100KB, Playback Level Cal., Meter Cal.
VR102, 202		
VR104, 105, 106, 204, 205, 206	510502160	47KB, Rec. Level Cal.
VR207	510502135	220KB, Rec. Bias Level Adj.
VR001, 002	510502159	4.7KB, Peak Ind. Level Adj.
VR003	525321117	50KA x 2, Rec. Level Control and Mic. Level Control
	525321116	10KA x 2, Output Level Control

Schematic Location	Part No.	Description
COILS AND TRANSFORMERS		
L101, 201	228641127	23mH, 19kHz Filter
L102, 202	228641133	36mH, 19kHz Filter
L103, 203	228641128	10mH, Rec. Bias Carrier Trap
L104	226501123	47mH, Choke Coil
L105	228641130	Rec./Erase Carrier Osc. Unit
L501, 502, 503, 504	226501128	2.2mH, Choke Coil
L505, 506		
T101, 201	227111011	Phone Output Transformer
T001	205001399	Power Transformer (Multi-Voltage)
	206001399	Power Transformer (220V-240V)
	241001113	Rec./Playback Head
	241001112	Erase Head
OTHERS		
S1, 2	613000028	Switch, Rec./Playback
S3	611001639	Switch, Tape Bias Selector
S4	611001632	Switch, Limiter
S5	611001628	Switch, Dolby NR
S6	615212254	Switch, Stop
S7	614010121	Switch, Memory ON
S9	090156633	Switch, Play
S10	090156634	Switch, Pause
S11	090156627	Tape Stop Sensor
S12	090156647	Switch, Muting
S13	614010118	Switch, Power Supply
M001, 002	231310054	VU Meter
P001	090152321	Solenoid & Bracket Assembly
	260101116	Motor, DC12V
	650901113	Tape Counter with Memory OFF Switch
	650901112	Tape Timer
	671011013	Tape Timer & Counter Belt
	090156623	Drive Belt
	900111015	Cassette Mech. Unit
	141810669	Rec./Playback Amp. Circuit Board Ass'y
	141810667	Tape Bias Selector Circuit Board Ass'y
	141810670	Power Supply Circuit Board Ass'y