

PRELIMINARY

# TC-651

General Export Model



Set using ISO screws

## SPECIFICATIONS

<b>Power Requirements:</b>	AC 100V, 110V, 117V, 120V, 125V, 220V and 240V (Changeable by using the voltage selector) 50/60 Hz, 85W	<b>Two LINE INputs</b> Impedance : 100 k $\Omega$ Maximum sensitivity: 70 mV (-22 dB)									
<b>Track System:</b>	Four-track stereo and mono	<b>REC/PB connector</b> Impedance : 80 k $\Omega$ Maximum sensitivity: 30.5 mV (-28 dB)									
<b>Reel Size:</b>	7" maximum	<b>Outputs:</b> Two LINE OUTputs Impedance : 100 k $\Omega$ Output level : 0.775 V (0 dB)									
<b>Tape Speed:</b>	7½ ips and 3¾ ips (19 cm/s and 9.5 cm/s)	<b>REC/PB connector</b> Impedance : 100 k $\Omega$ Output level : 0.775 V (0 dB)									
<b>Recording Time:</b> (with 1,800 ft. tape)	<table><thead><tr><th>Tape speed</th><th>4-track stereo</th><th>4-track mono</th></tr></thead><tbody><tr><td>7½ ips (19 cm/s)</td><td>1.5 hrs</td><td>3 hrs</td></tr><tr><td>3¾ ips (9.5 cm/s)</td><td>3 hrs</td><td>6 hrs</td></tr></tbody></table>	Tape speed	4-track stereo	4-track mono	7½ ips (19 cm/s)	1.5 hrs	3 hrs	3¾ ips (9.5 cm/s)	3 hrs	6 hrs	<b>HEADPHONE output</b> Impedance : 8 $\Omega$ load Output level : 0.038 V (-26 dB) with 8 $\Omega$ load (when line output level is 0 dB.)
Tape speed	4-track stereo	4-track mono									
7½ ips (19 cm/s)	1.5 hrs	3 hrs									
3¾ ips (9.5 cm/s)	3 hrs	6 hrs									
<b>Frequency Response:</b> (with standard tape)	20 ~ 25,000 Hz at 7½ ips (19 cm/s) 30 ~ 18,000 Hz at 3¾ ips (9.5 cm/s)	<b>Semiconductors:</b> 74 transistors and 92 diodes									
<b>Signal-to-Noise Ratio:</b> (with standard tape)	54 dB	<b>Dimensions:</b> 16 <sup>5</sup> / <sub>8</sub> (W) x 18 (H) x 9 <sup>9</sup> / <sub>16</sub> " (D) (422 x 457 x 243 mm)									
<b>Flutter and Wow:</b>	0.04% at 7½ ips (19 cm/s) 0.08% at 3¾ ips (9.5 cm/s)	<b>Weight:</b> 44 lb 8 oz (20.2kg)									
<b>Recording Bias Frequency:</b>	Approx. 120 kHz										
<b>Inputs:</b>	Two MIC inputs Impedance : 600 $\Omega$ Maximum sensitivity: 0.2 mV (-72 dB)										

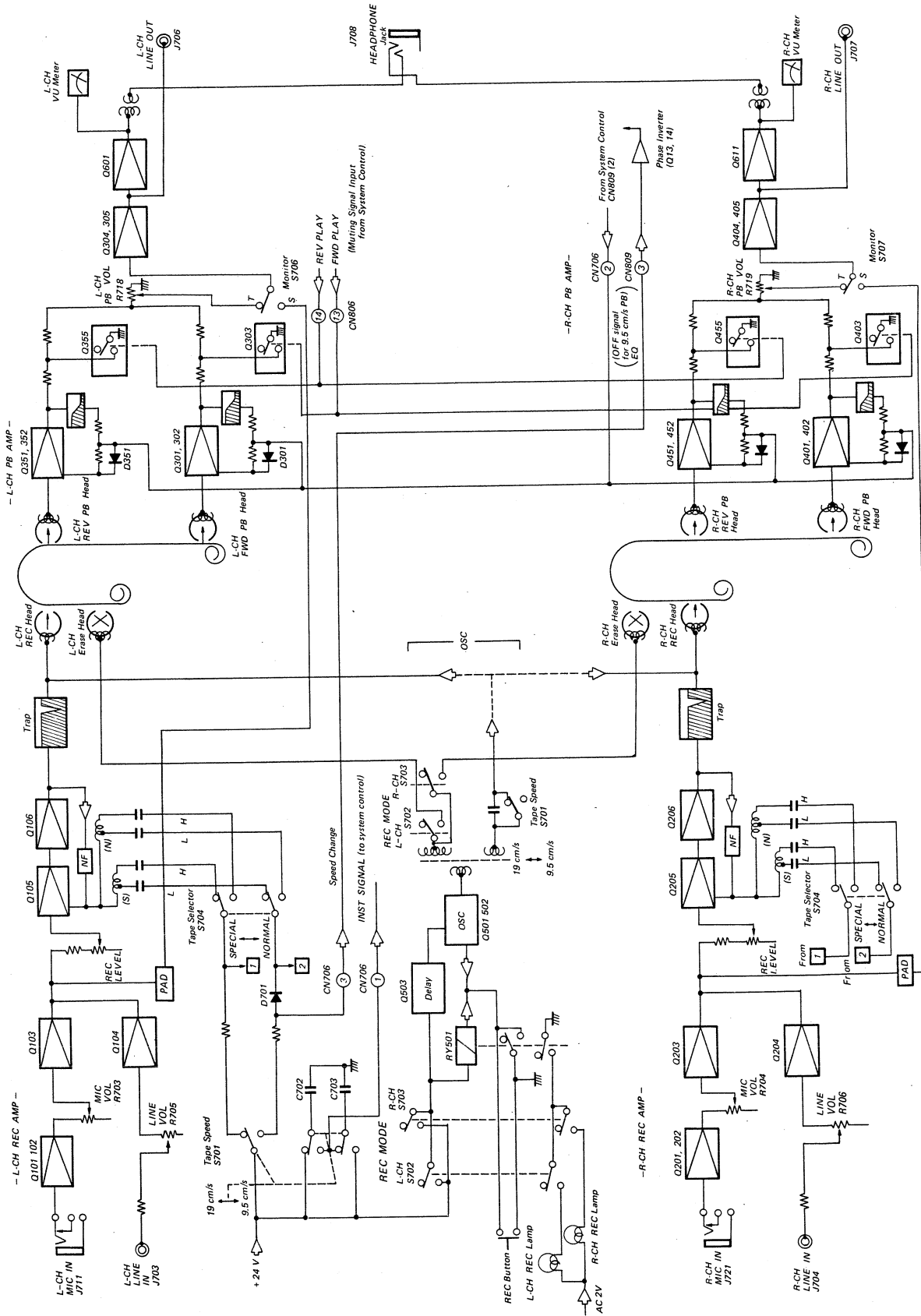
**SONY**®  
**SERVICE MANUAL**

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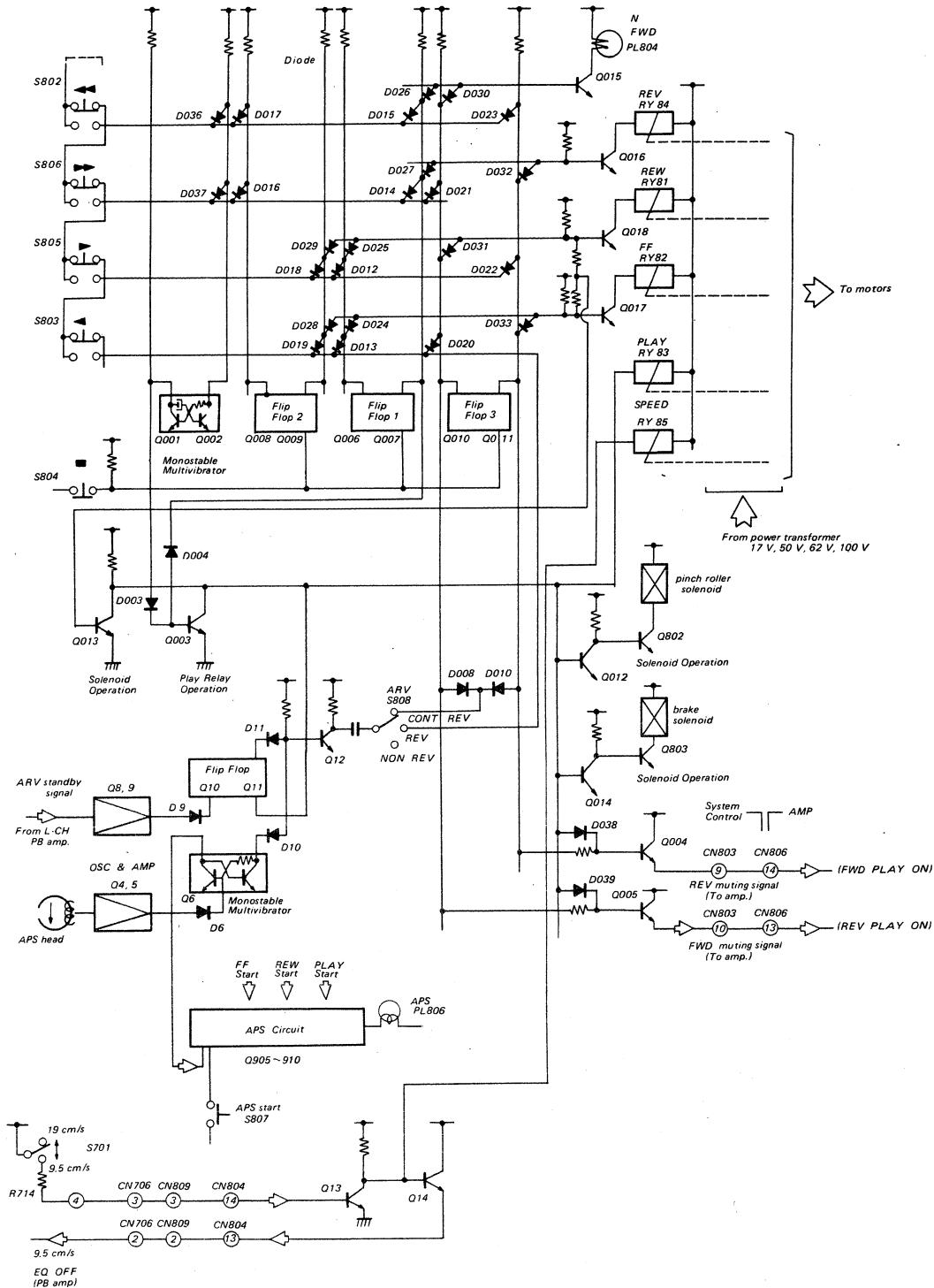
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1. BLOCK DIAGRAMS

1-1. Audio Amp. & Bias OSC Circuit

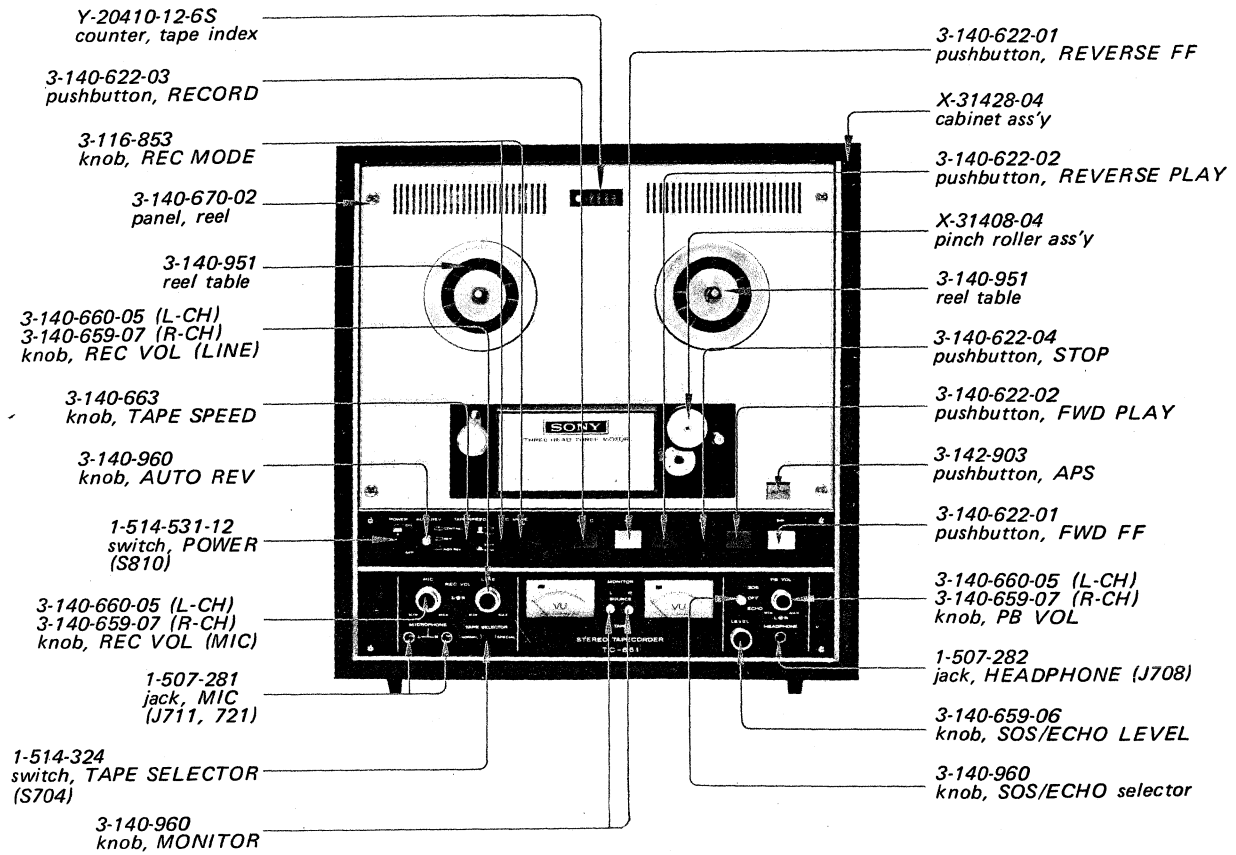


**1-2. System Control Circuit**

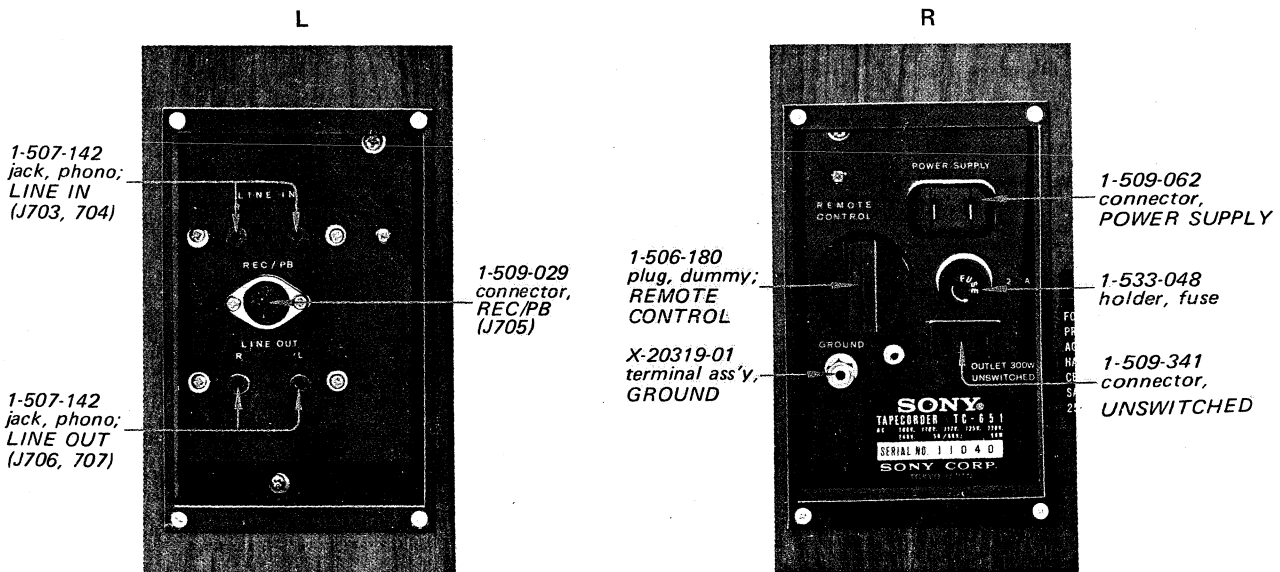


**2. MAJOR PARTS LOCATIONS**

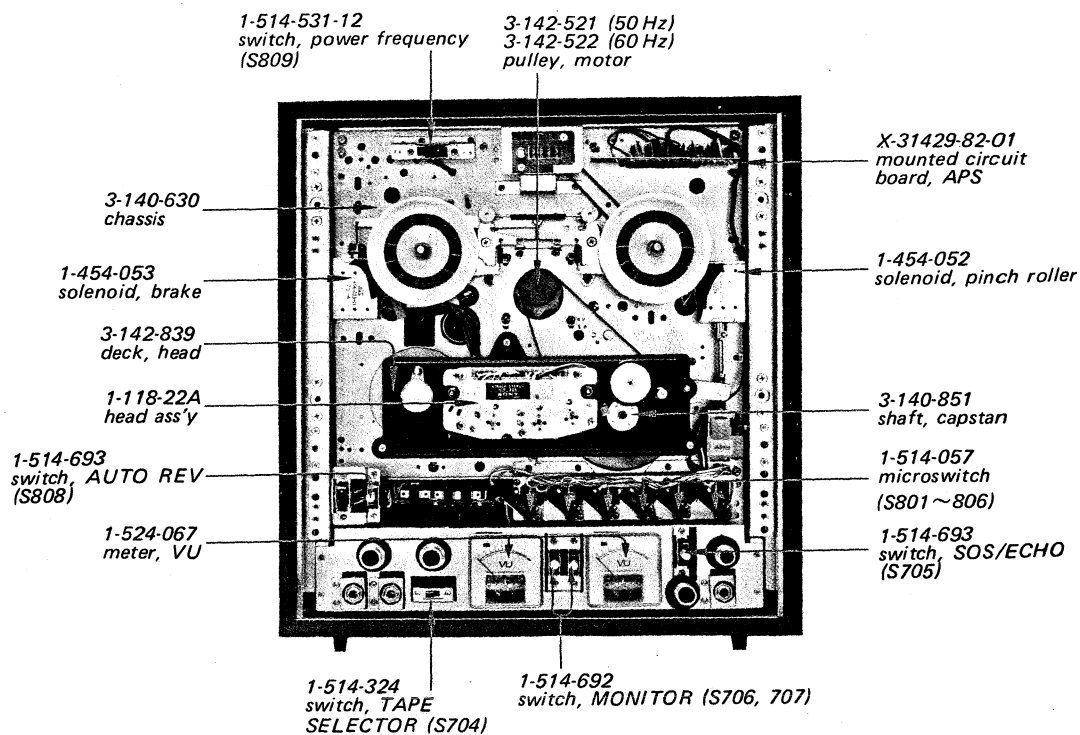
**2-1. Cabinet Front View**



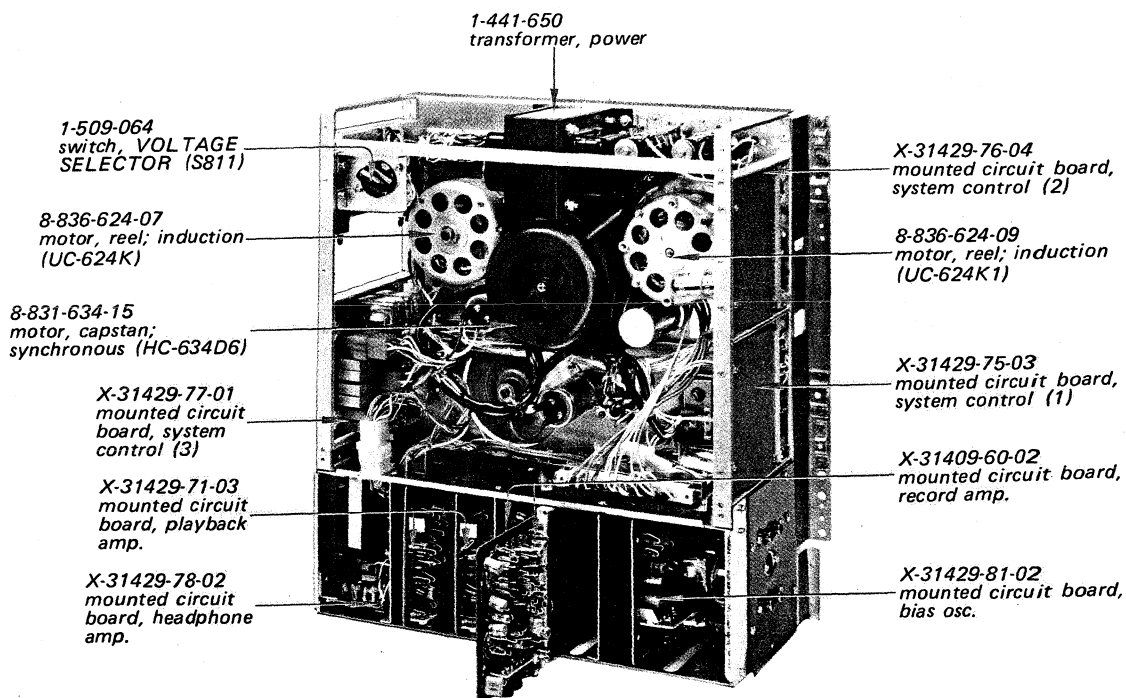
**2-2. Cabinet Side Views**



**2-3. Chassis Top View**



**2-4. Chassis Bottom View**



3. DISASSEMBLY

3-1. Cabinet Removal

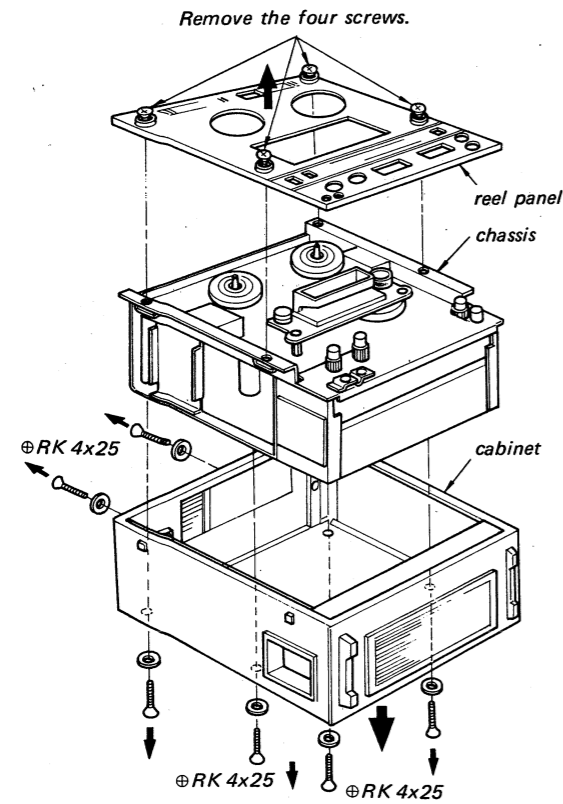


Fig. 3-1. Cabinet removal

3-2. Printed Circuit Board Removal

1. Remove the Cabinet.
2. Pull off the printed circuit boards, PB AMP, REC AMP and BIAS OSC.

Note: The voltage check can be made by using the special jig (Part No. X-31400-99).

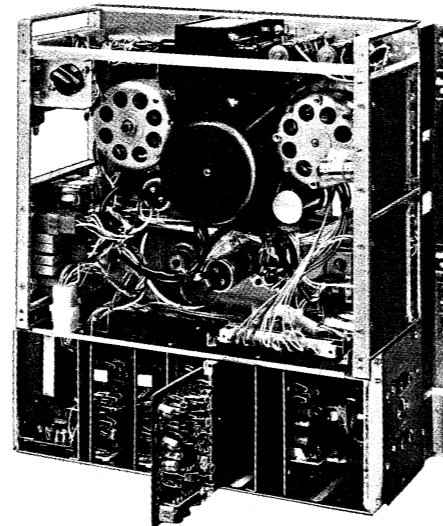
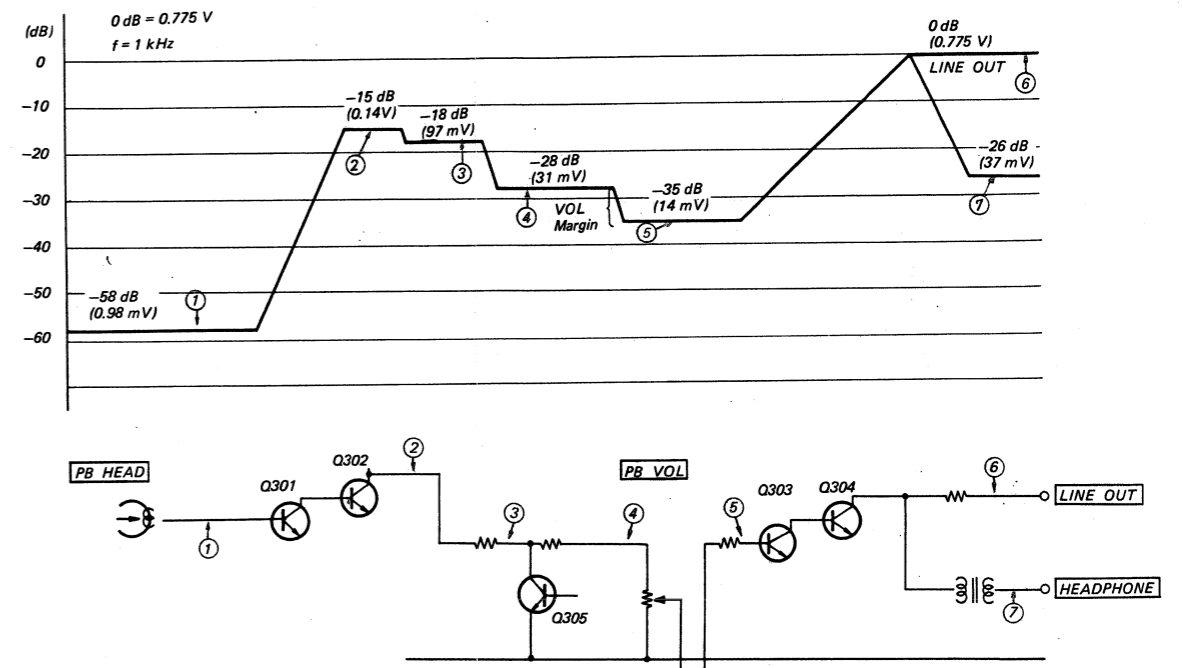


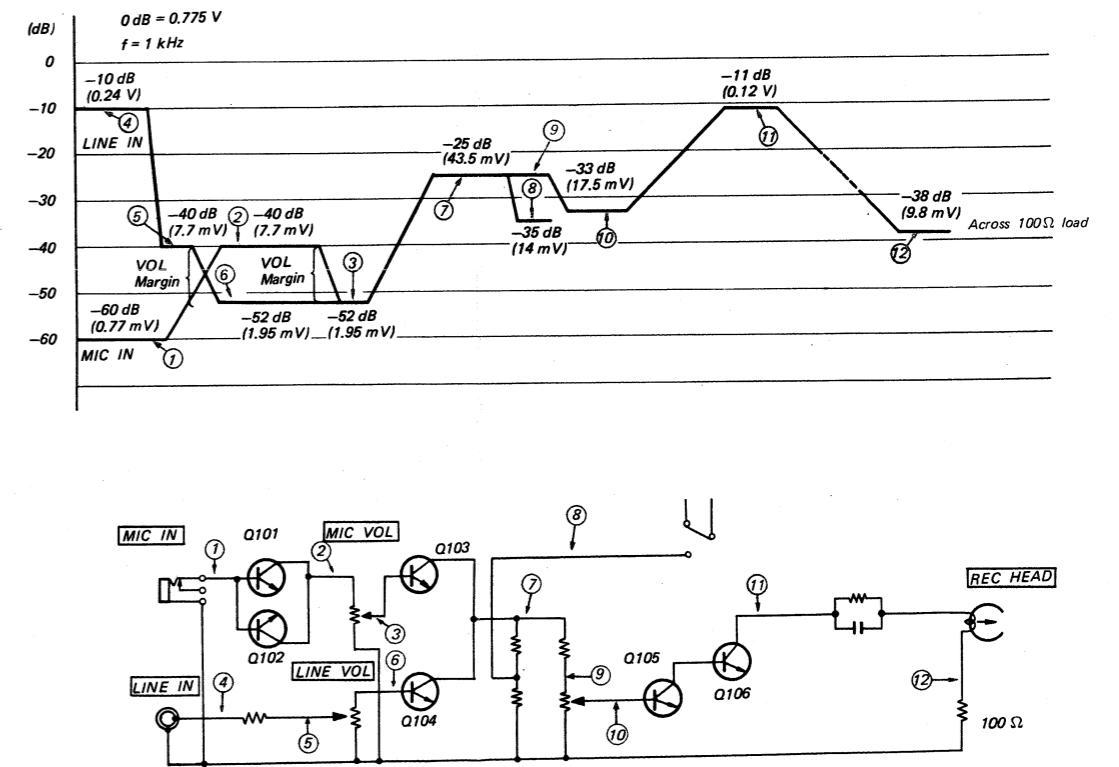
Fig. 3-2. Printed circuit board removal

4. LEVEL DIAGRAMS

4-1. Playback

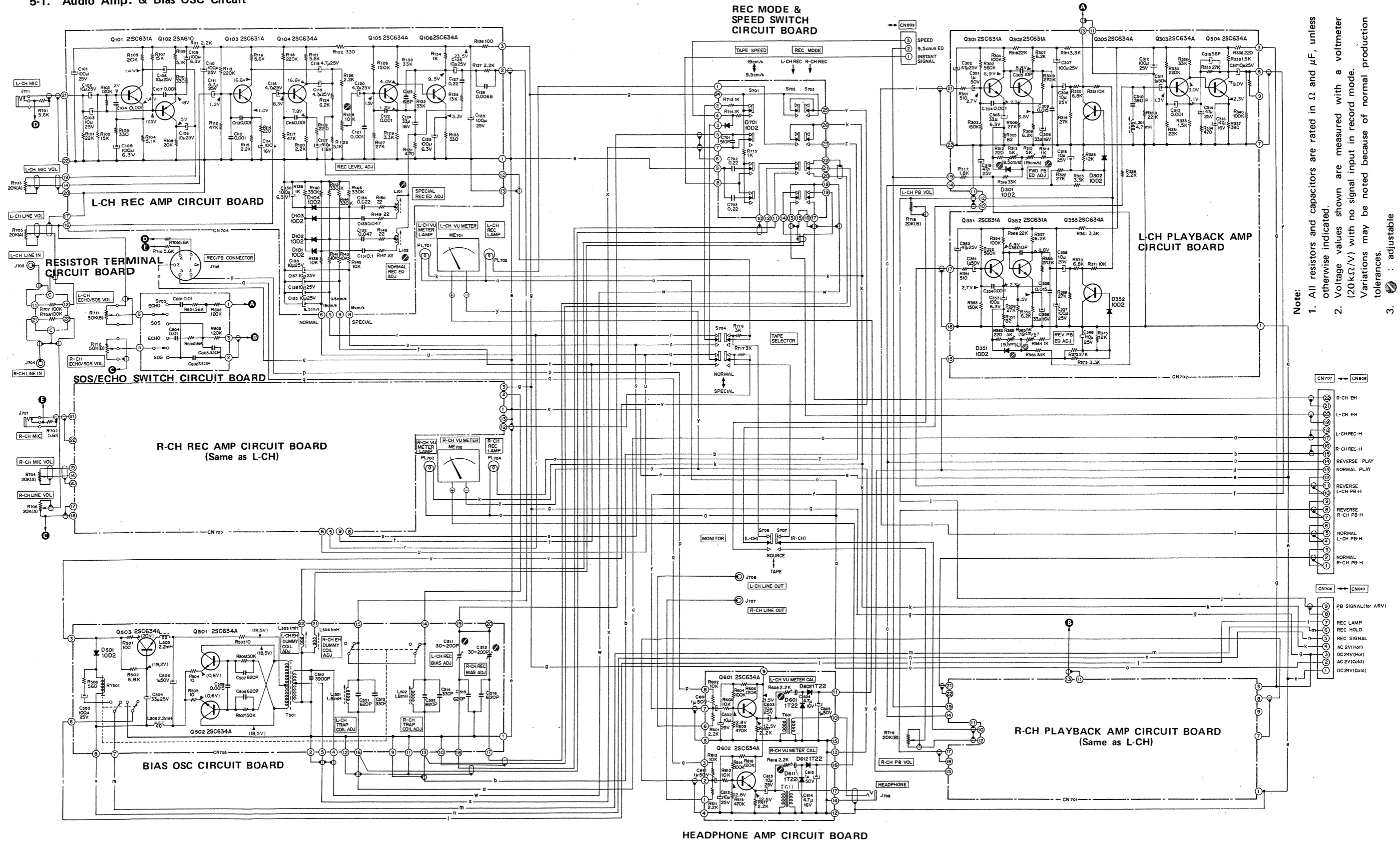


4-2. Record



5. SCHEMATIC DIAGRAMS

5-1. Audio Amp. & Bias OSC Circuit



Note:

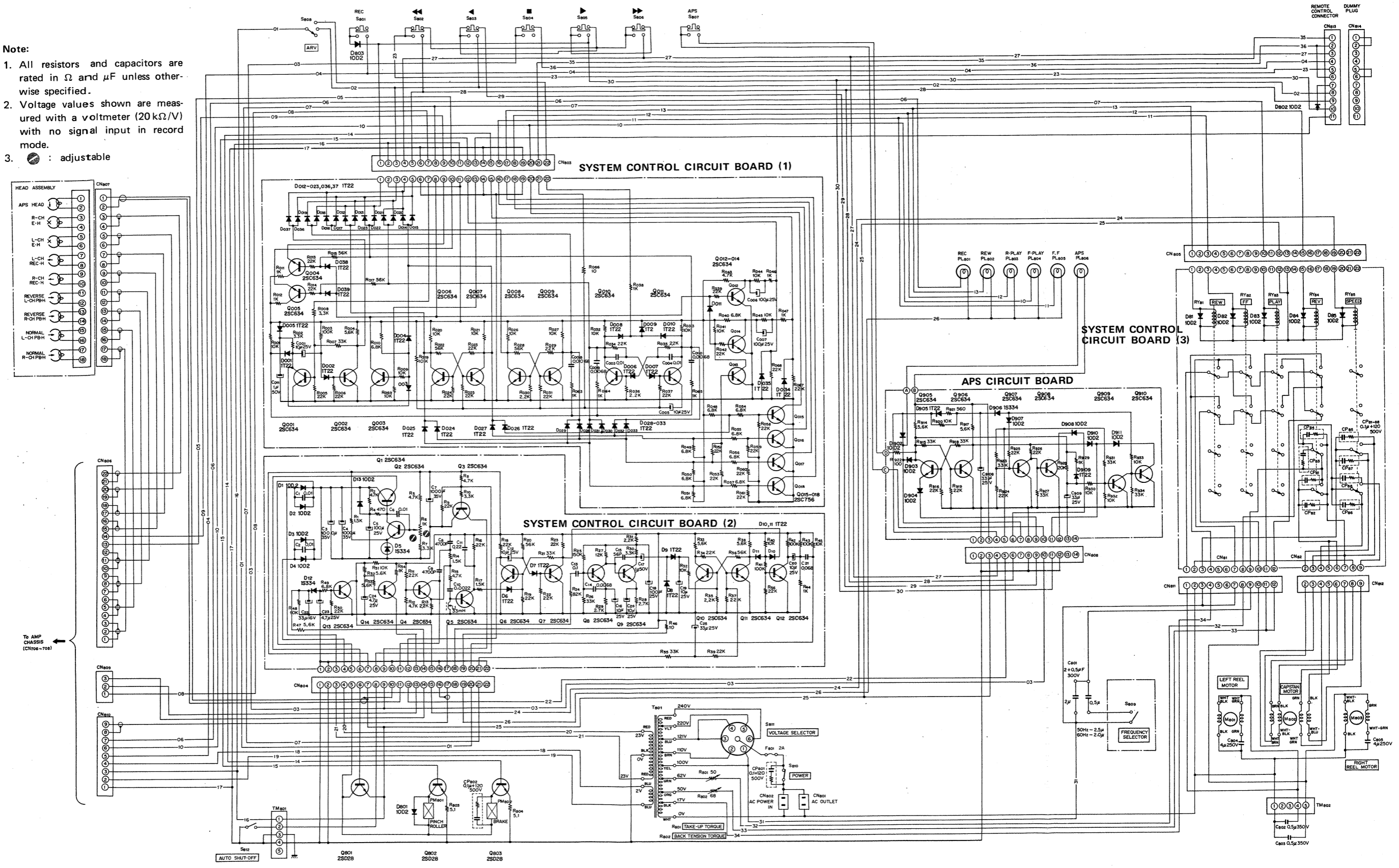
1. All resistors and capacitors are rated in  $\Omega$  and  $\mu F$ , unless otherwise indicated.
2. Voltage values shown are measured with a voltmeter (20k $\Omega/V$ ) with no signal input in record mode. Variations may be noted because of normal production tolerances.
3. : adjustable



# TC-651 TC-651

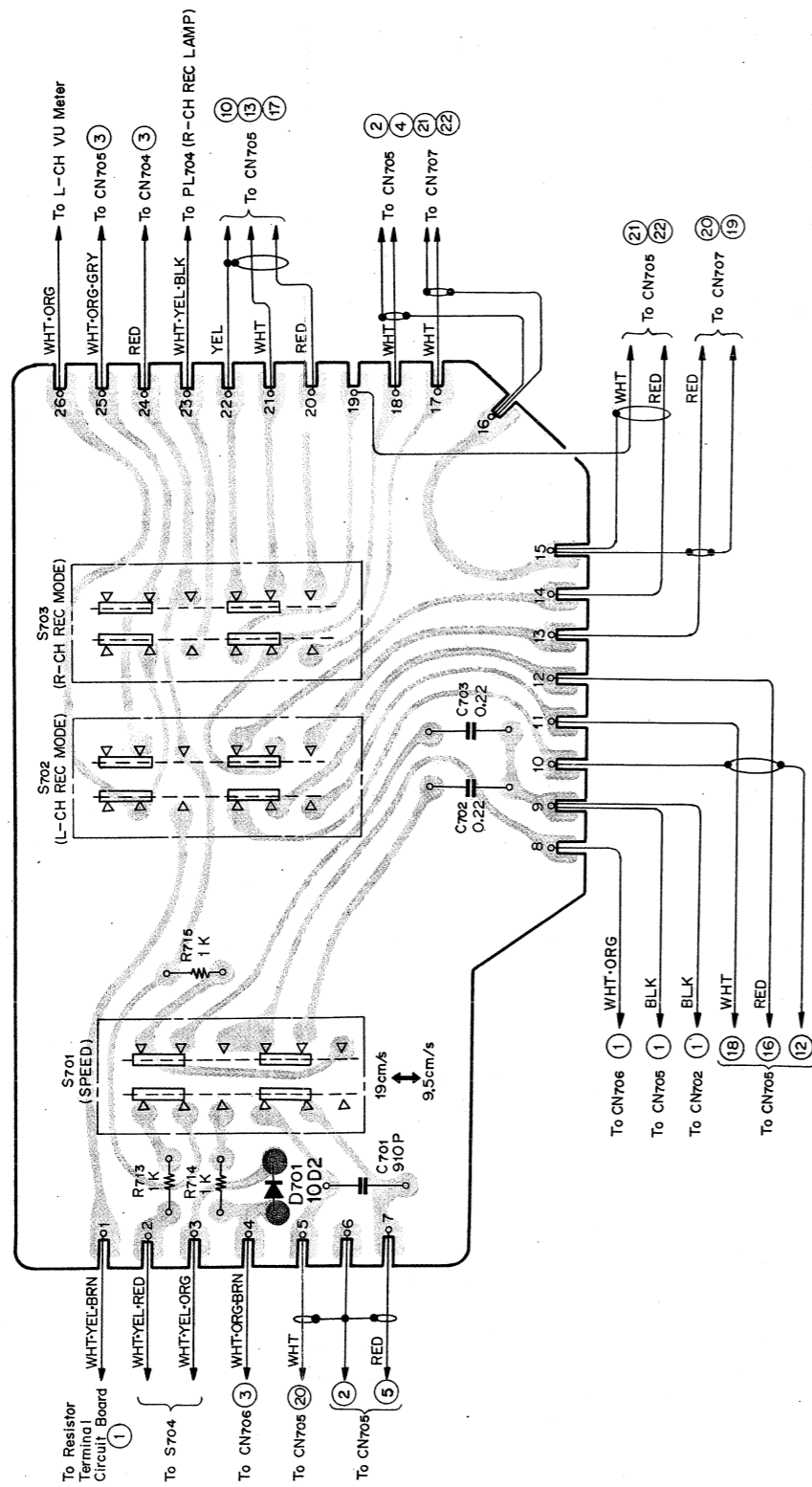
## 5-2. System Control Circuit

- Note:**
1. All resistors and capacitors are rated in  $\Omega$  and  $\mu F$  unless otherwise specified.
  2. Voltage values shown are measured with a voltmeter (20 k $\Omega/V$ ) with no signal input in record mode.
  3. : adjustable



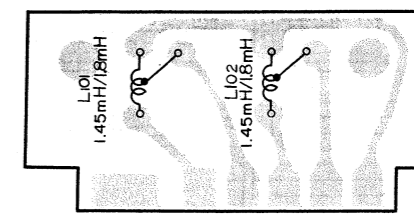
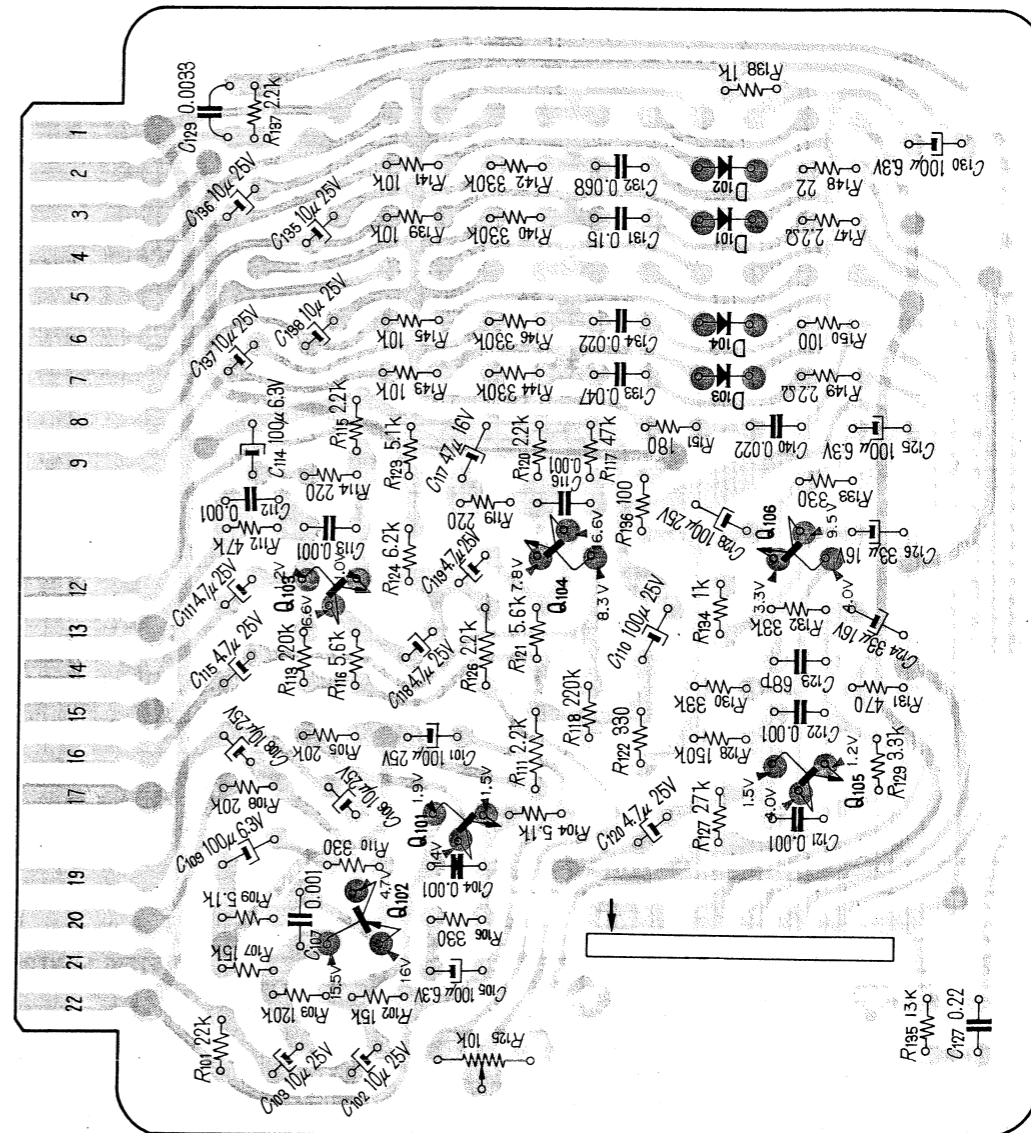
6. MOUNTING DIAGRAMS

6-1. REC MODE & SPEED Switch Circuit Board  
 - Conductor Side -



Printed Circuit Board  
 Part No. 1-539-565-11

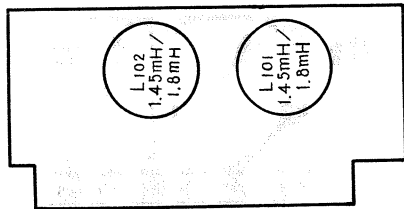
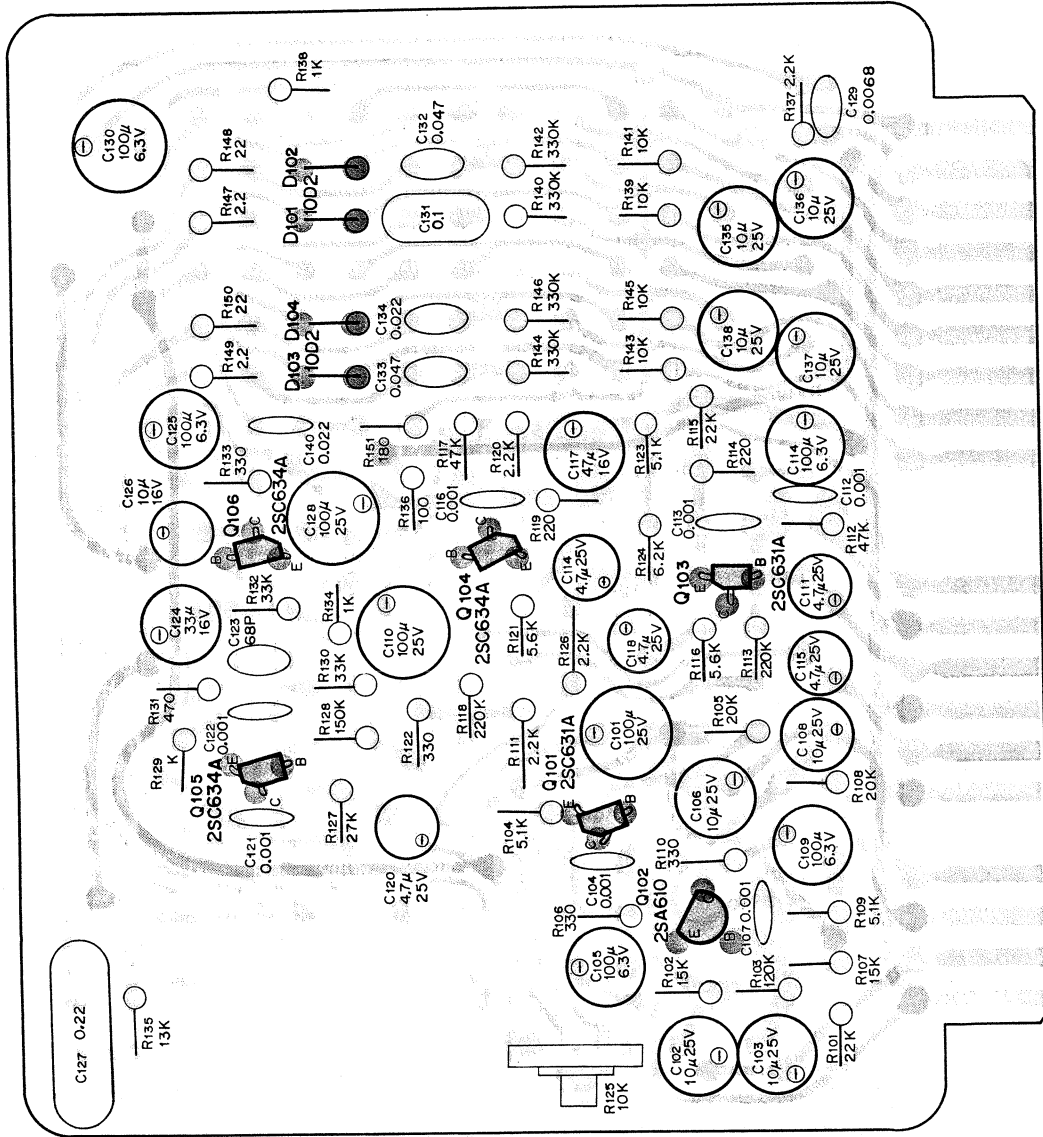
6-2. Record Amplifier Circuit Board  
 - Conductor Side -



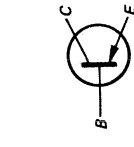
Printed Circuit Board  
 Part No.: 1-539-432-12

Printed Circuit Board  
 Part No. 1-539-431-14

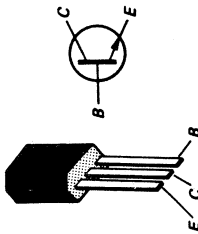
6-2. Record Amplifier Circuit Board  
 - Component Side -



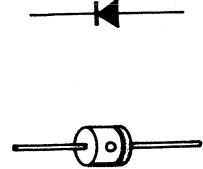
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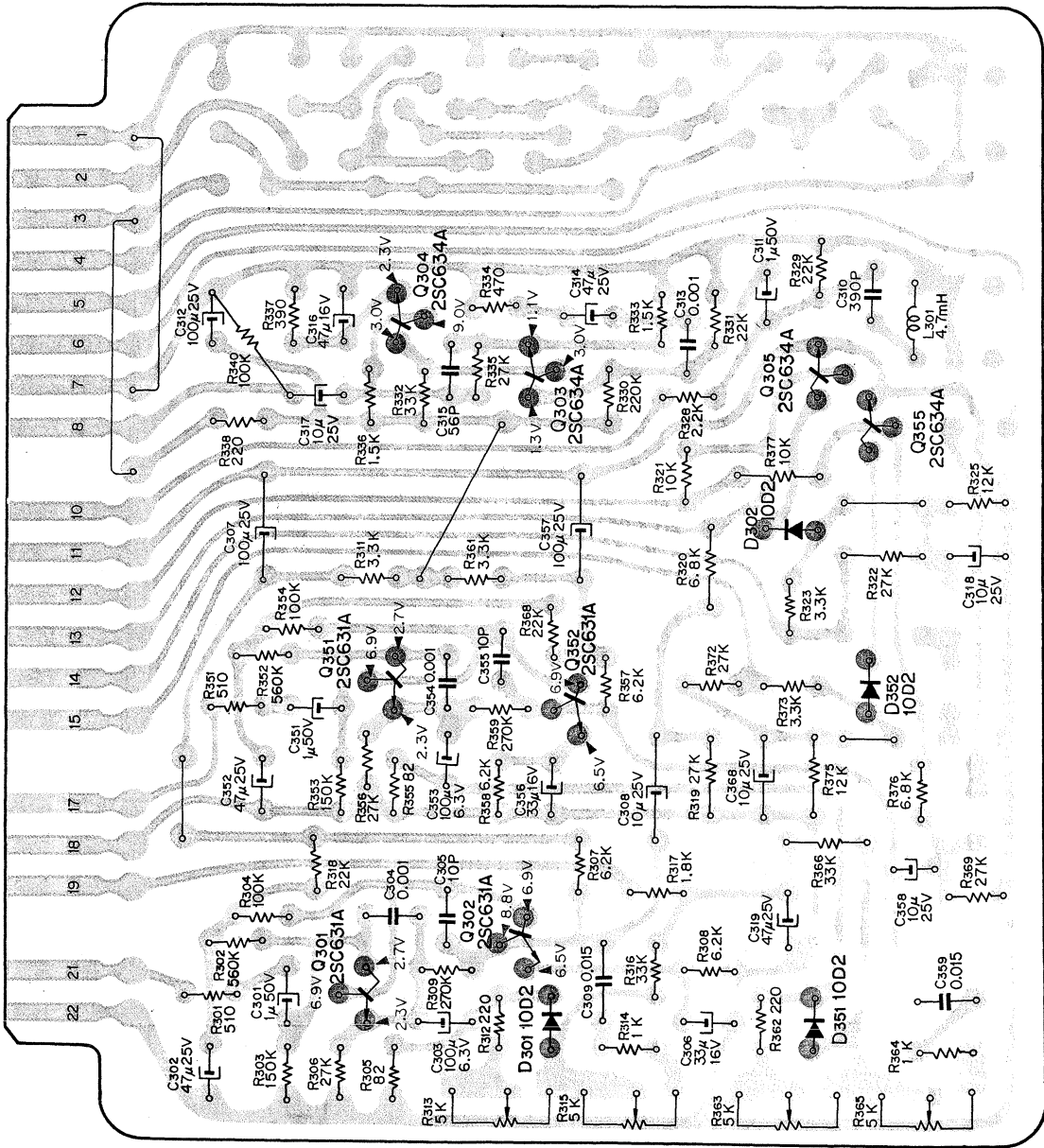
2SC631A, 2SC634A



10D2

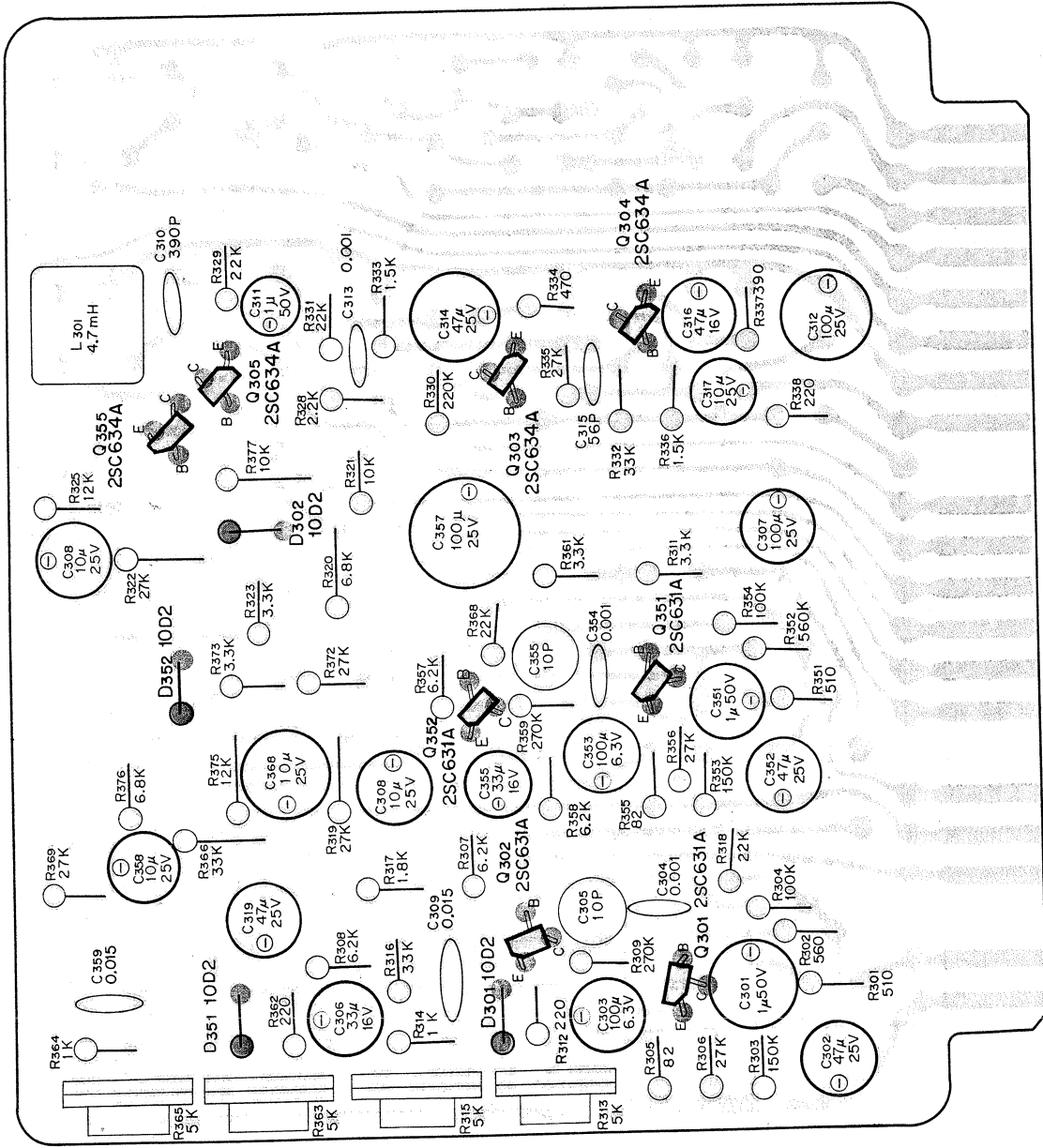


6-3. Playback Amplifier Circuit Board  
- Conductor Side -

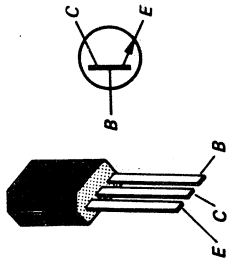


Printed Circuit Board  
Part No. 1-539-641-11

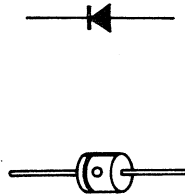
6-3. Playback Amplifier Circuit Board  
 - Component Side -



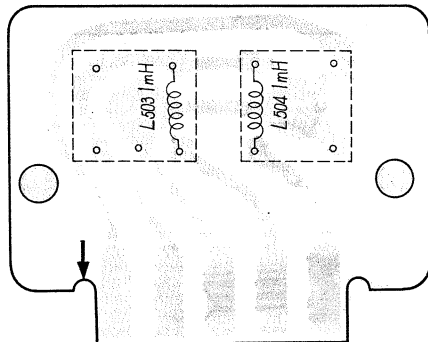
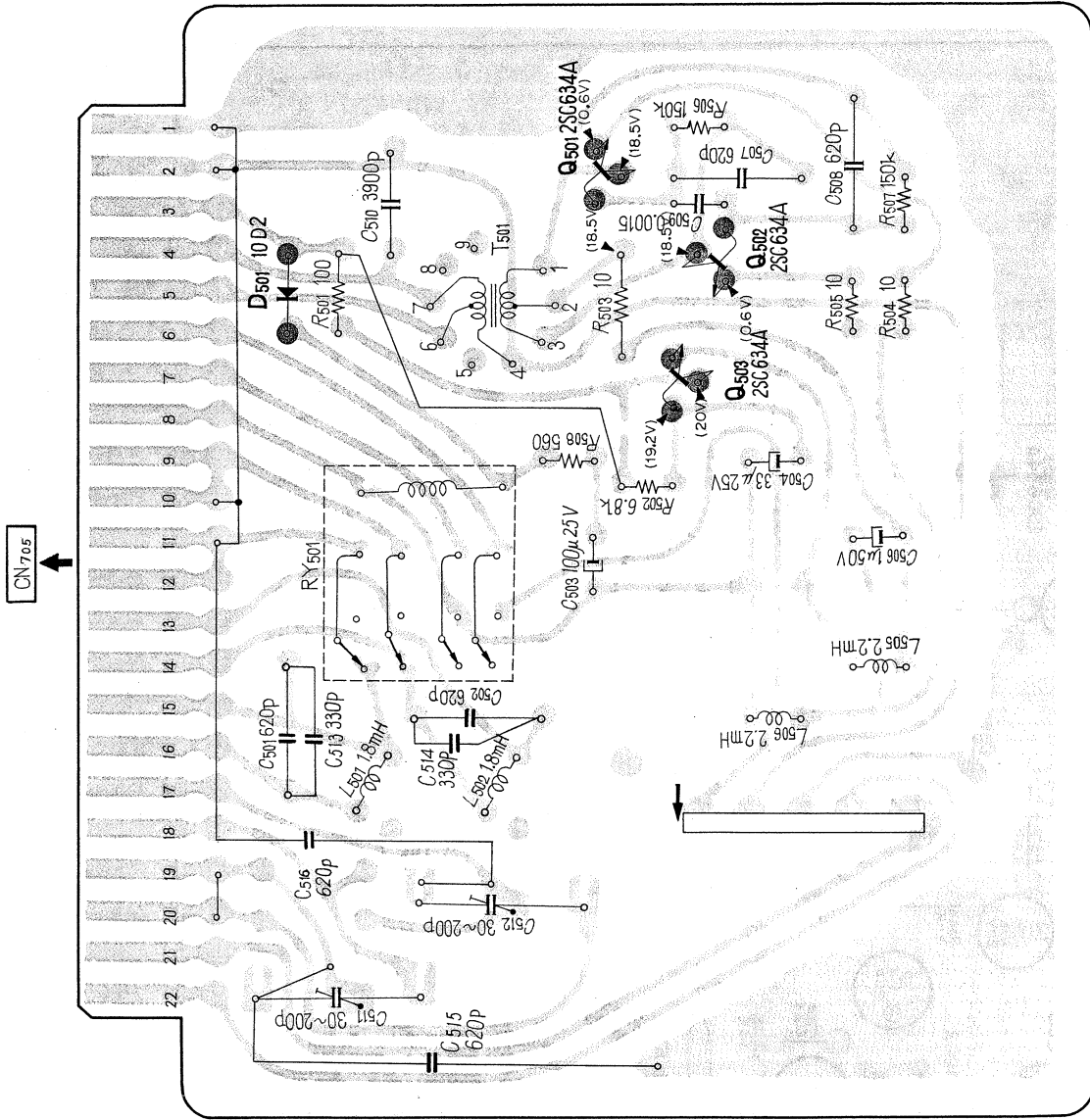
2SC631A, 2SC634A



10D2



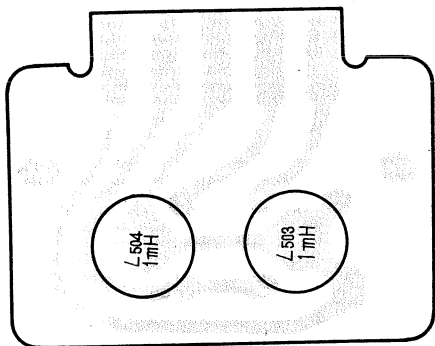
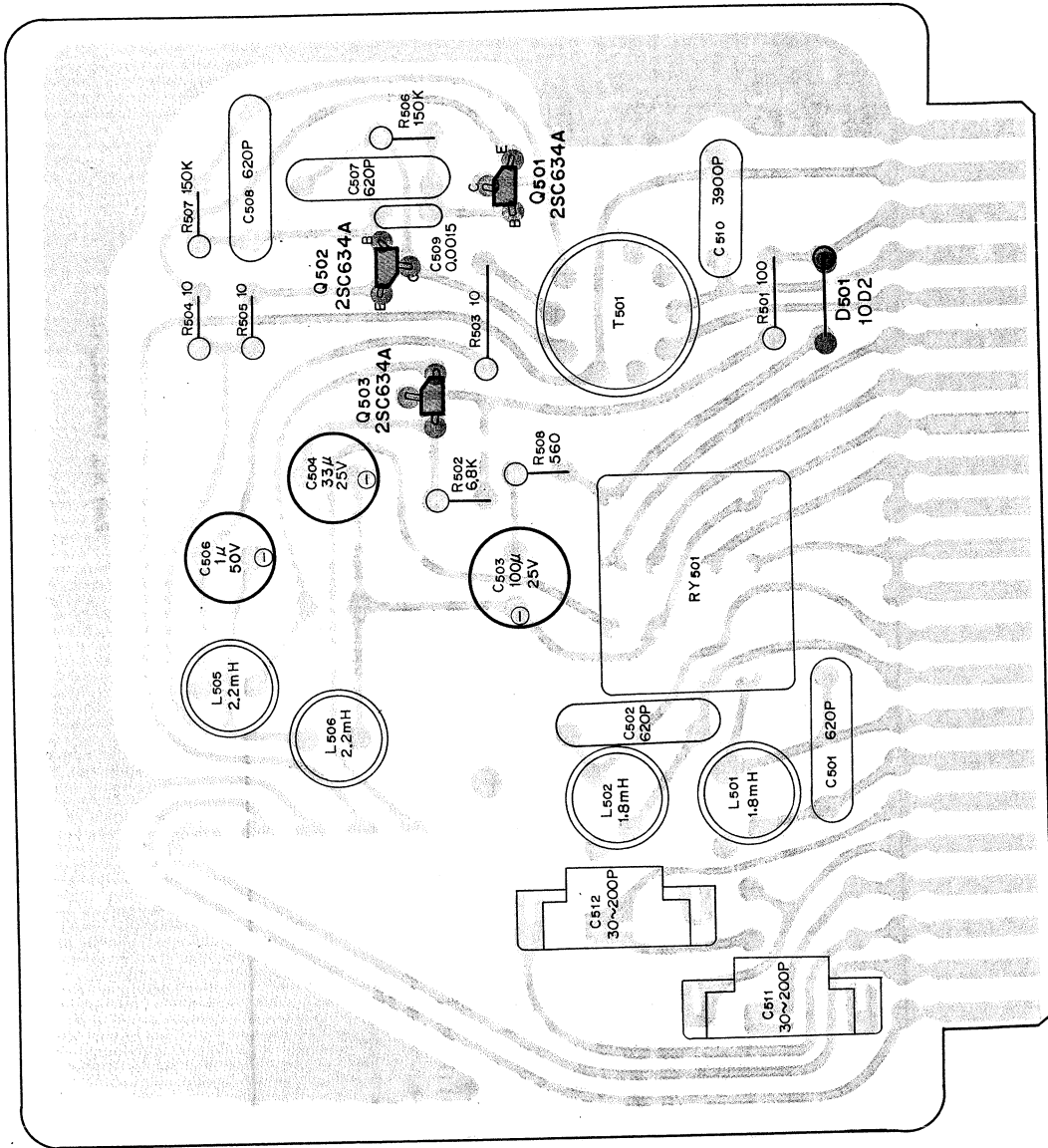
6-4. BIAS OSC Circuit Board  
 - Conductor Side -



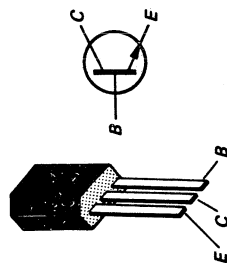
Printed Circuit Board  
 Part No. 1-539-563-12

Printed Circuit Board  
 Part No. 1-539-558-12

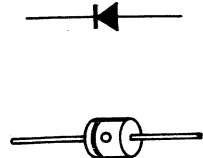
6-4. BIAS OSC Circuit Board  
 - Component Side -



2SC634A



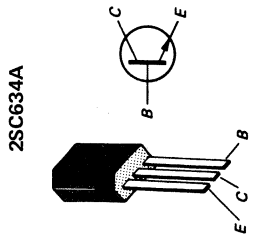
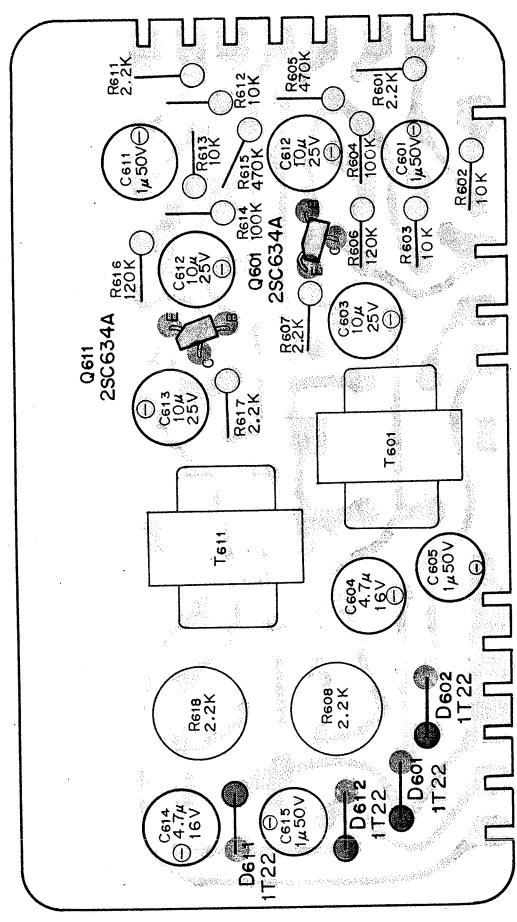
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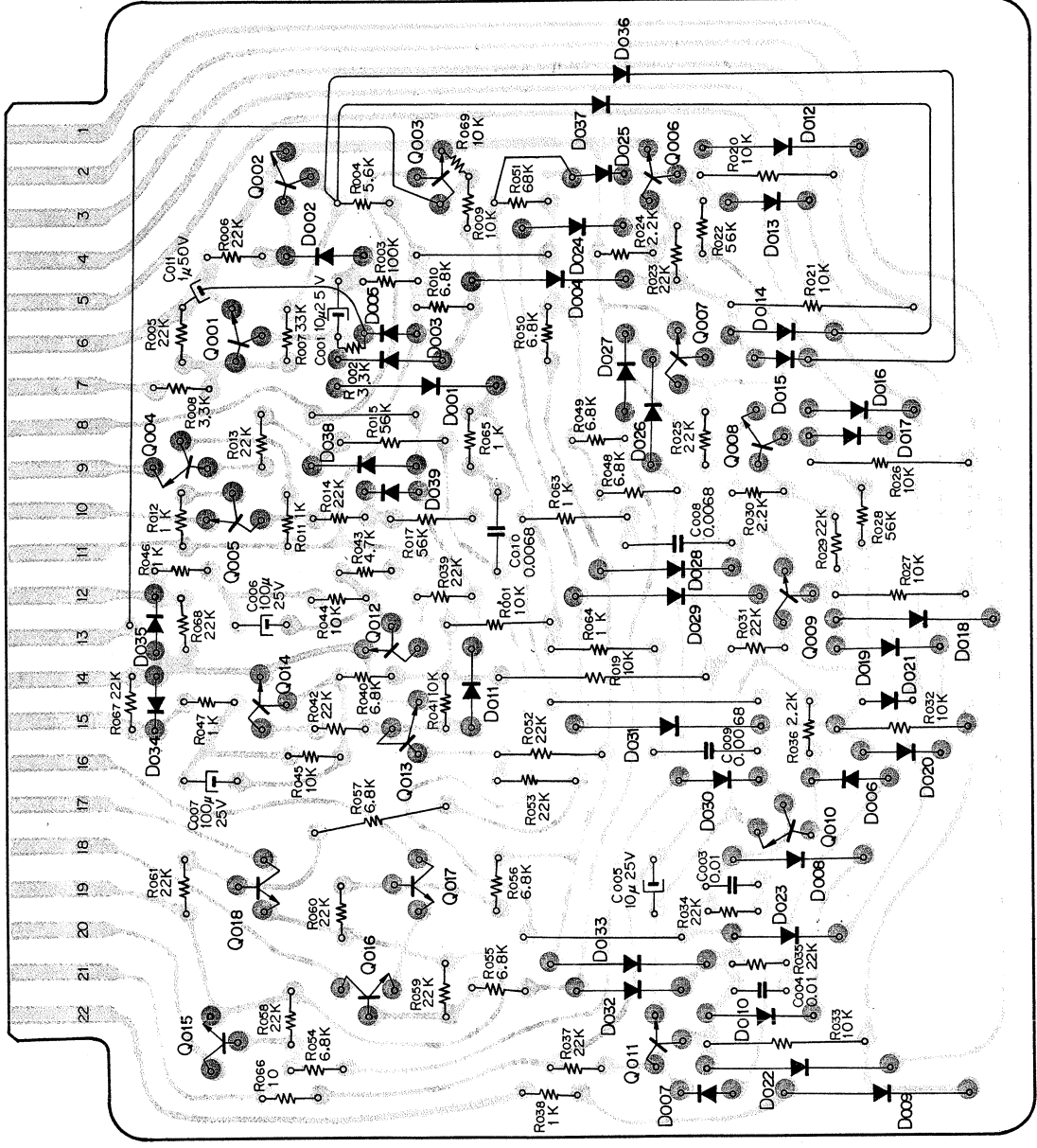




6-5. Headphone Amplifier Circuit Board  
 - Component Side -

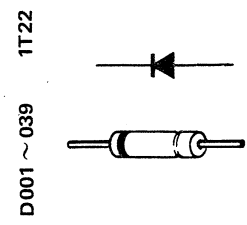
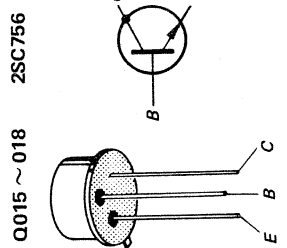
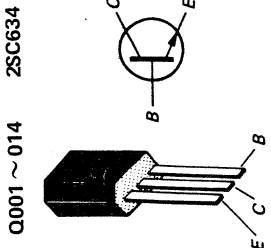
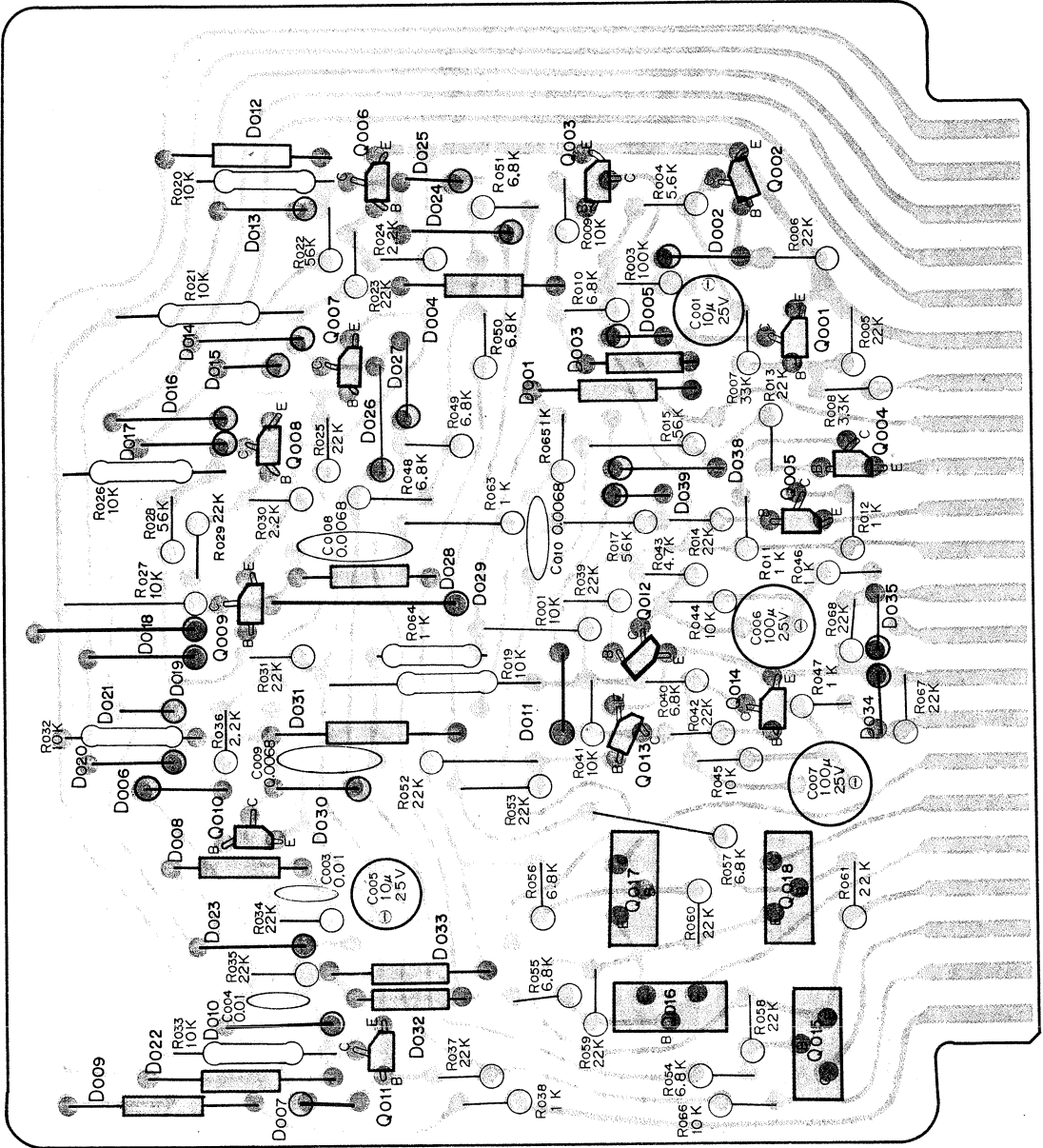


6-6. System Control Circuit Board (1)  
- Conductor Side -

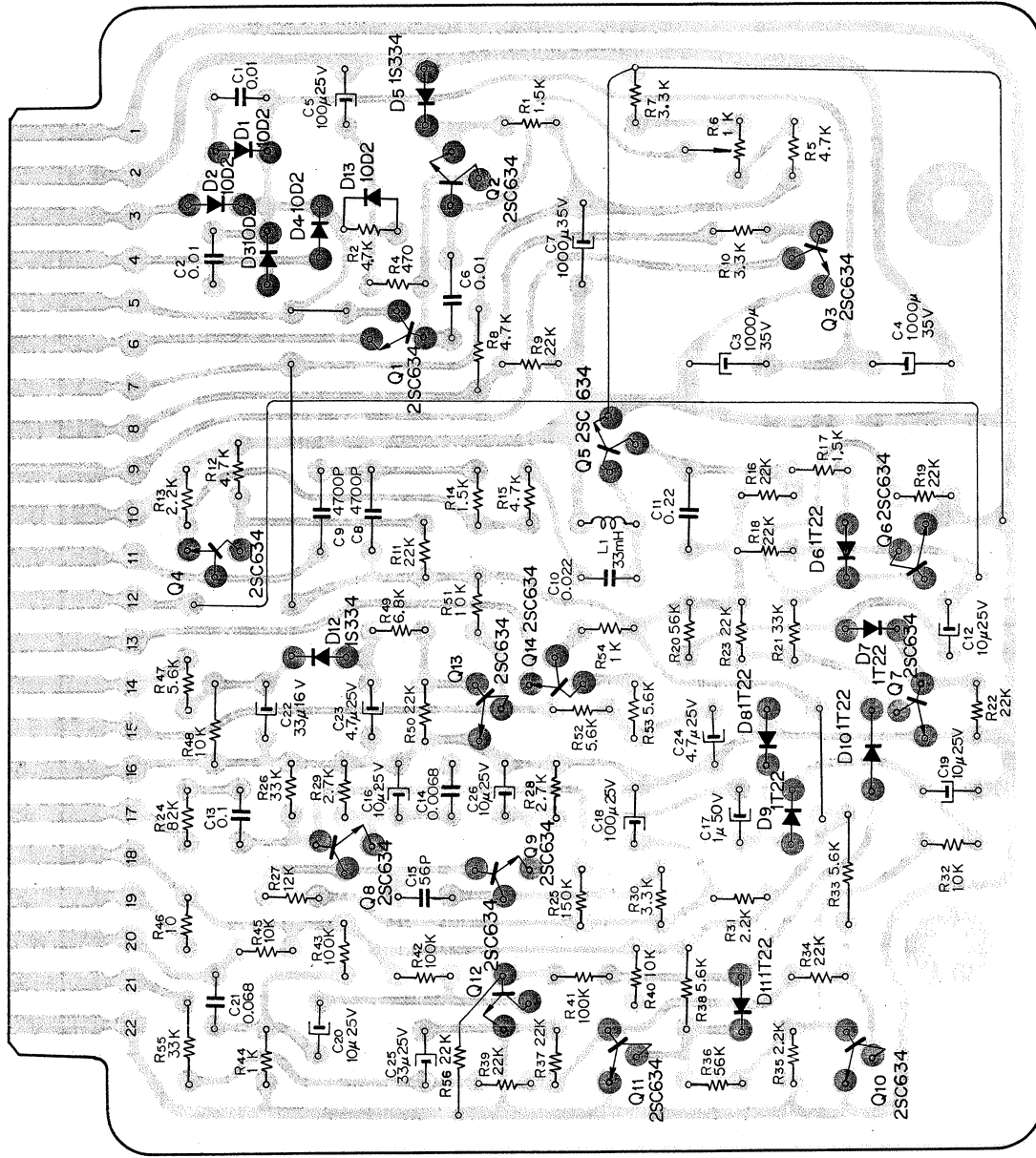


Printed Circuit Board  
Part No. 1-539-633-12

6-6. System Control Circuit Board (1)  
 - Component Side -



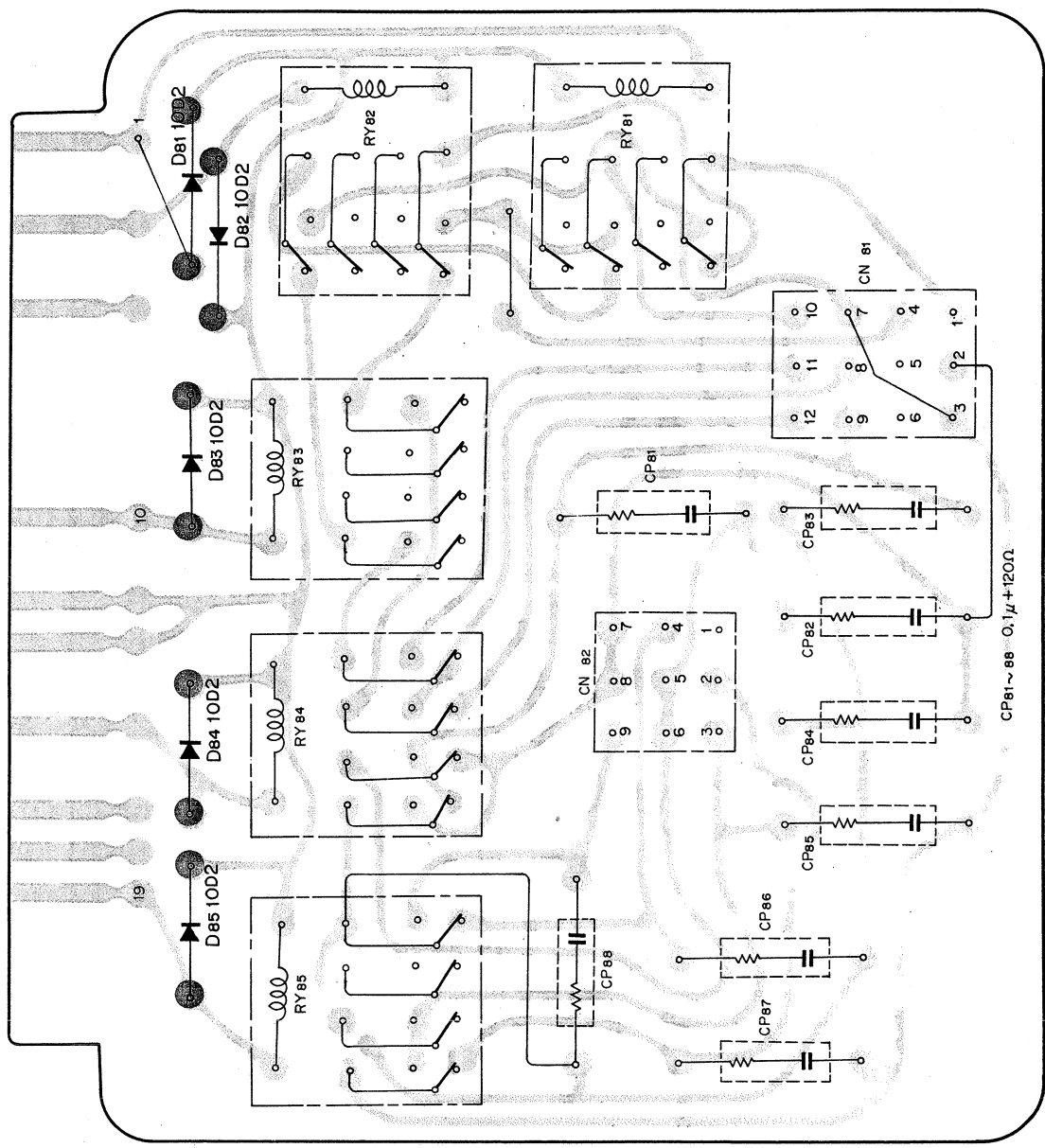
6-7. System Control Circuit Board (2)  
- Conductor Side -



Printed Circuit Board  
Part No. 1-539-634-12

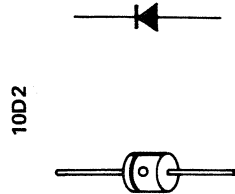
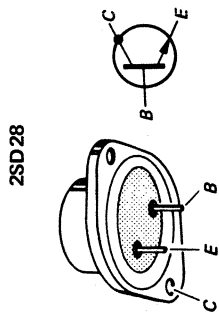
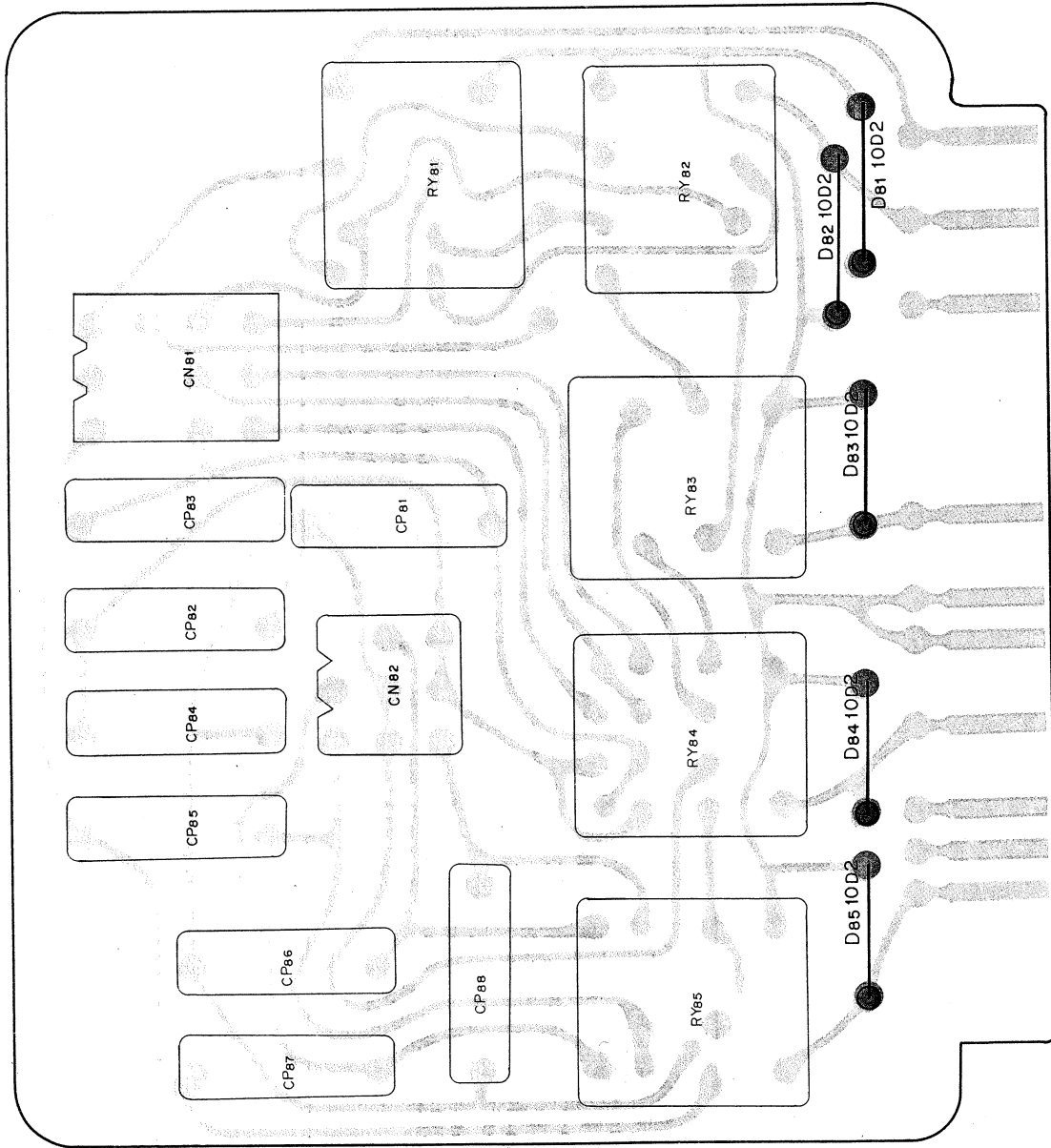


6-8. System Control Circuit Board (3)  
 - Conductor Side -

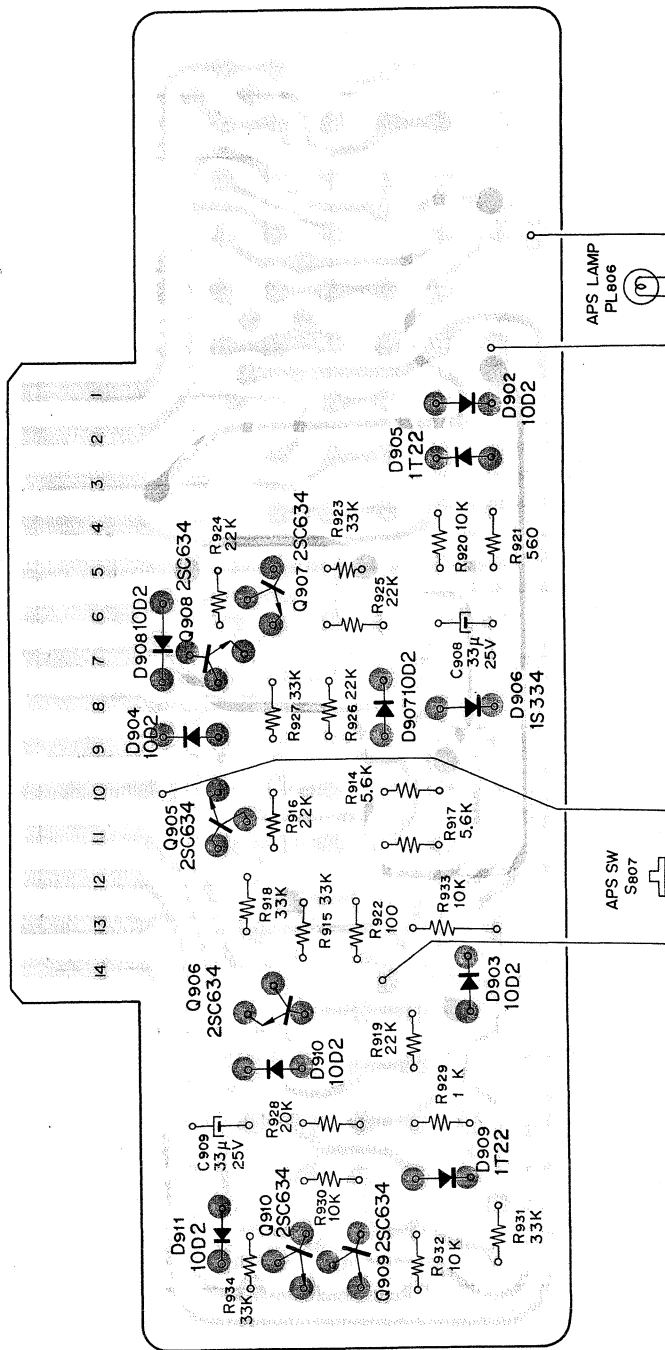


Printed Circuit Board  
 Part No. 1-539-635-11

6-8. System Control Circuit Board (3)  
- Component Side -



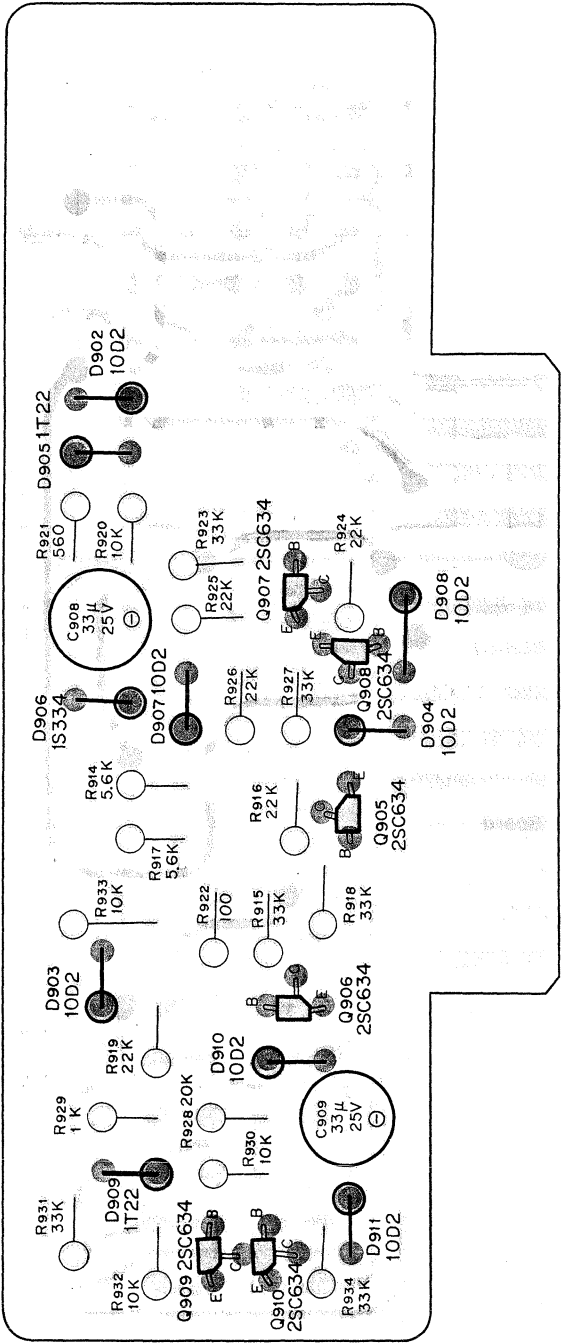
6-9. APS Circuit Board  
 - Conductor Side -



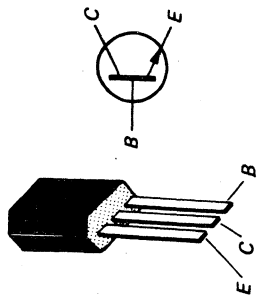
Printed Circuit Board  
 Part No. 1-539-568-11



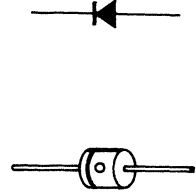
6-9. APS Circuit Board  
 - Component Side -



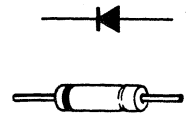
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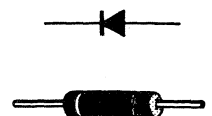
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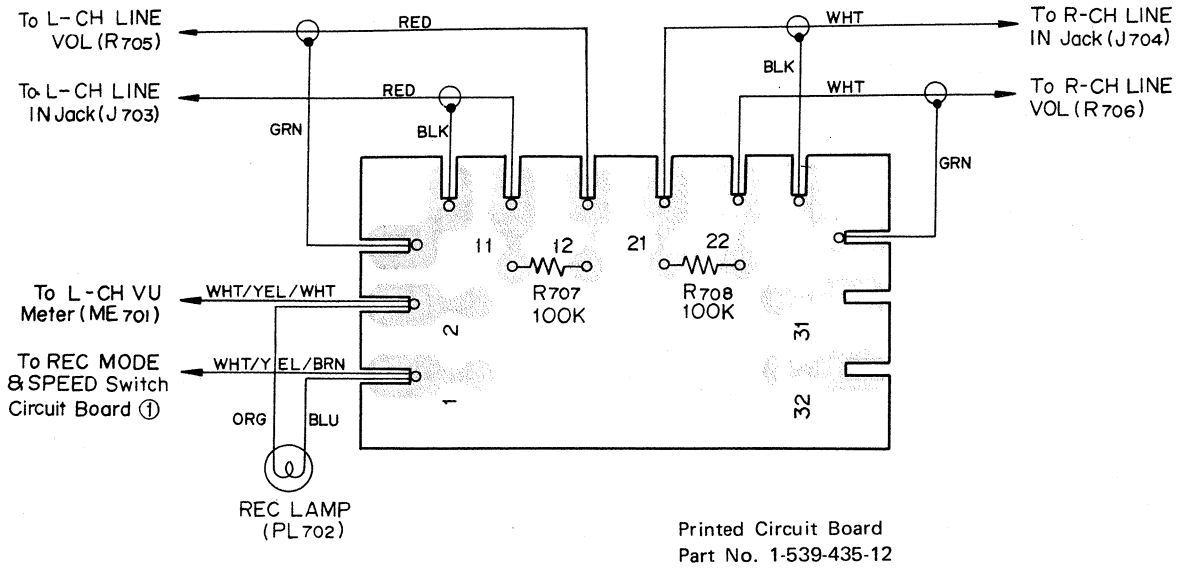
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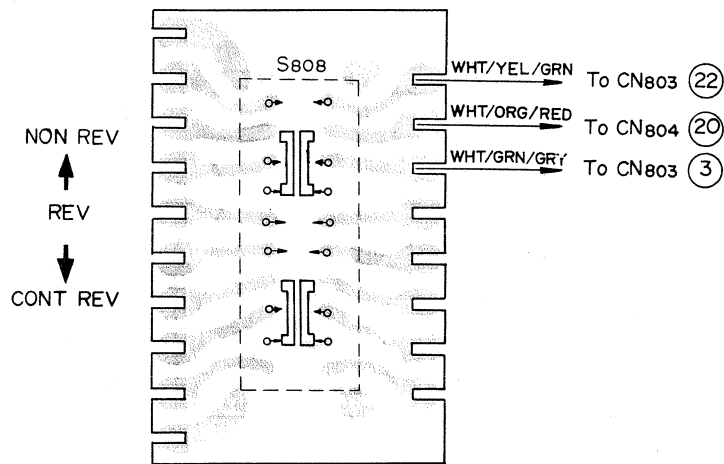
1S334



**6-10. Resistor Terminal Circuit Board**  
 — Conductor Side —



**6-11. ARV Switch Circuit Board**  
 — Conductor Side —



7. ELECTRICAL PARTS LIST

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
<b>MOUNTED CIRCUIT BOARDS</b>		
X-31409-60-02	REC amp.	
X-31429-71-03	PB amp.	
X-31429-81-02	bias osc.	
X-31429-78-02	headphone amp.	
X-31429-82-01	REC mode & speed switch	
X-31429-57-01	resistor terminal	
X-31409-65-01	ECHO & SOS	
X-31429-75-03	system control (1)	
X-31429-76-04	system control (2)	
X-31429-77-01	system control (3)	
X-31429-82-01	APS	
X-31429-58-01	ARV switch	

<b>PRINTED CIRCUIT BOARDS</b>		
1-539-431-14	REC amp.	
1-539-432-12	sub. (REC amp.)	
1-539-641-11	PB amp.	
1-539-558-12	bias osc.	
1-539-563-12	sub. (bias osc.)	
1-539-642-11	headphone amp.	
1-539-565-11	REC mode & speed switch	
1-539-435-12	resistor terminal	
1-539-560-11	ECHO & SOS	
1-539-633-12	system control (1)	
1-539-634-12	system control (2)	
1-539-635-11	system control (3)	
1-539-568-11	APS	
1-539-443-11	ARV switch	
1-539-436-11	head connector	
1-539-437-11	docking	
1-539-663-11	pilot lamp holding	

**RECORD AMP CIRCUIT**

<b>SEMICONDUCTORS</b>			
Q101, 201		transistor	2SC631A
Q102, 202		transistor	2SA610
Q103, 203		transistor	2SC631A
Q104, 204		transistor	2SC634A
Q105, 205		transistor	2SC634A
Q106, 206		transistor	2SC634A
D101, 201		diode	10D-2
D102, 202		diode	10D-2
D103, 203		diode	10D-2
D104, 204		diode	10D-2
<b>COILS</b>			
L101, 201	1-231-069	equalizer	1.45/1.8 mH
L102, 202	1-231-069	equalizer	1.45/1.8 mH

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
<b>CAPACITORS</b>		
C101, 201	1-121-416	100 $\mu$ F 25 V electrolytic
C102, 202	1-121-398	10 $\mu$ F 25 V electrolytic
C103, 203	1-121-398	10 $\mu$ F 25 V electrolytic
C104, 204	1-105-661-12	0.001 $\mu$ F 50 V mylar
C105, 205	1-121-413	100 $\mu$ F 6.3 V electrolytic
C106, 206	1-121-398	10 $\mu$ F 25 V electrolytic
C107, 207	1-105-661-12	0.001 $\mu$ F 50 V mylar
C108, 208	1-121-398	10 $\mu$ F 25 V electrolytic
C109, 209	1-121-413	100 $\mu$ F 6.3 V electrolytic
C110, 210	1-121-416	100 $\mu$ F 25 V electrolytic
C111, 211	1-121-395	4.7 $\mu$ F 25 V electrolytic
C112, 212	1-105-661-12	0.001 $\mu$ F 50 V mylar
C113, 213	1-105-661-12	0.001 $\mu$ F 50 V mylar
C114, 214	1-121-413	100 $\mu$ F 6.3 V electrolytic
C115, 215	1-121-395	4.7 $\mu$ F 25 V electrolytic
C116, 216	1-105-661-12	0.001 $\mu$ F 50 V mylar
C117, 217	1-121-409	47 $\mu$ F 16 V electrolytic
C118, 218	1-121-395	4.7 $\mu$ F 25 V electrolytic
C119, 219	1-121-395	4.7 $\mu$ F 25 V electrolytic
C120, 220	1-121-395	4.7 $\mu$ F 25 V electrolytic
C121, 221	1-105-661-12	0.001 $\mu$ F 50 V mylar
C122, 222	1-105-661-12	0.001 $\mu$ F 50 V mylar
C123, 223	1-107-127	68pF 50 V silvered mica
C124, 224	1-121-403	33 $\mu$ F 16 V electrolytic
C125, 225	1-121-413	100 $\mu$ F 6.3 V electrolytic
C126, 226	1-121-398	10 $\mu$ F 25 V electrolytic
C127, 227	1-105-689-12	0.22 $\mu$ F 50 V mylar
C128, 228	1-121-416	100 $\mu$ F 25 V electrolytic
C129, 229	1-105-671-12	0.0068 $\mu$ F 50 V mylar
C130, 230	1-121-413	100 $\mu$ F 6.3 V electrolytic
C131, 231	1-105-685-12	0.1 $\mu$ F 50 V mylar
C132, 232	1-105-681-12	0.047 $\mu$ F 50 V mylar
C133, 233	1-105-681-12	0.047 $\mu$ F 50 V mylar
C134, 234	1-105-677-12	0.022 $\mu$ F 50 V mylar
C135, 235	1-121-398	10 $\mu$ F 25 V electrolytic
C136, 236	1-121-398	10 $\mu$ F 25 V electrolytic
C137, 237	1-121-398	10 $\mu$ F 25 V electrolytic
C138, 238	1-121-398	10 $\mu$ F 25 V electrolytic

<b>RESISTORS</b>			
All resistors are 1/4W, carbon type, unless otherwise specified.			
R101, 201	1-242-705	22k $\Omega$	
R102, 202	1-242-701	15k $\Omega$	
R103, 203	1-242-723	120k $\Omega$	
R104, 204	1-242-690	5.1k $\Omega$	
R105, 205	1-242-704	20k $\Omega$	
R106, 206	1-242-661	330 $\Omega$	
R107, 207	1-242-701	15k $\Omega$	
R108, 208	1-242-704	20k $\Omega$	
R109, 209	1-242-690	5.1k $\Omega$	
R110, 210	1-242-661	330 $\Omega$	

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
R111, 211	1-242-681	2.2kΩ
R112, 212	1-242-713	47kΩ
R113, 213	1-242-729	220kΩ
R114, 214	1-242-657	220Ω
R115, 215	1-242-681	2.2kΩ
R116, 216	1-242-691	5.6kΩ
R117, 217	1-242-713	47kΩ
R118, 218	1-242-729	220kΩ
R119, 219	1-242-657	220Ω
R120, 220	1-242-681	2.2kΩ
R121, 221	1-242-691	5.6kΩ
R122, 222	1-242-661	330Ω
R123, 223	1-242-690	5.1kΩ
R124, 224	1-242-692	6.2kΩ
R125, 225	1-221-383	10kΩ (B) semi-fixed
R126, 226	1-242-681	2.2kΩ
R127, 227	1-242-707	27kΩ
R128, 228	1-242-725	150kΩ
R129, 229	1-242-685	3.3kΩ
R130, 230	1-242-709	33kΩ
R131, 231	1-242-665	470Ω
R132, 232	1-242-709	33kΩ
R133, 233	1-242-661	330Ω
R134, 234	1-242-673	1kΩ
R135, 235	1-242-700	13kΩ
R136, 236	1-242-649	100Ω
R137, 237	1-242-681	2.2kΩ
R138, 238	1-242-673	1kΩ
R139, 239	1-242-697	10kΩ
R140, 240	1-242-733	330kΩ
R141, 241	1-242-697	10kΩ
R142, 242	1-242-733	330kΩ
R143, 243	1-242-697	10kΩ
R144, 244	1-242-733	330kΩ
R145, 245	1-242-697	10kΩ
R146, 246	1-242-733	330kΩ
R147, 247	1-242-633	22Ω
R148, 248	1-242-633	22Ω
R149, 249	1-242-633	22Ω
R150, 250	1-242-633	22Ω

**PLAYBACK AMP CIRCUIT**

**SEMICONDUCTORS**

Q301, 351 Q401, 451	transistor	2SC631A
Q302, 352 Q402, 452	transistor	2SC631A
Q303, 403	transistor	2SC634A
Q304, 404	transistor	2SC634A
Q305, 355 Q405, 455	transistor	2SC634A

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
D301, 351 D401, 451		diode 10D-2
D302, 352 D402, 452		diode 10D-2
<b>COIL</b>		
L301, 401	1-407-298	trap 4.7mH
<b>CAPACITORS</b>		
C301, 351 C401, 451	1-121-391	1μF 50V electrolytic
C302, 352 C402, 452	1-121-410	47μF 25V electrolytic
C303, 353 C403, 453	1-121-413	100μF 6.3V electrolytic
C304, 354 C404, 454	1-105-661-12	0.001μF 50V mylar
C305, 355 C405, 455	1-107-107	10pF 50V silvered mica
C306, 356 C406, 456	1-121-403	33μF 16V electrolytic
C307, 357 C407, 457	1-121-416	100μF 25V electrolytic
C308, 358 C408, 458	1-121-398	10μF 25V electrolytic
C309, 359 C409, 459	1-105-675-12	0.015μF 50V mylar
C310, 410	1-107-242	390pF 50V silvered mica
C311, 411	1-121-391	1μF 50V electrolytic
C312, 412	1-121-416	100μF 25V electrolytic
C313, 413	1-105-661-12	0.001μF 50V mylar
C314, 414	1-121-410	47μF 25V electrolytic
C315	1-107-125	56pF 50V silvered mica
C316	1-121-409	47μF 16V electrolytic
C317, 417	1-121-398	10μF 25V electrolytic
C318, 368 C418, 468	1-121-398	10μF 25V electrolytic
C319, 419	1-121-410	47μF 25V electrolytic

**RESISTORS**

All resistors ¼W, carbon type, unless otherwise specified.

R301, 351 R401, 451	1-242-666	510Ω
R302, 352 R402, 452	1-242-739	560kΩ
R303, 353 R403, 453	1-242-752	150kΩ
R304, 354 R404, 454	1-242-721	100kΩ

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
R305, 355 R405, 455	1-242-647	82 $\Omega$
R306, 356 R406, 456	1-242-707	27k $\Omega$
R307, 357 R407, 457	1-242-692	6.2k $\Omega$
R308, 358 R408, 458	1-242-692	6.2k $\Omega$
R309, 359 R409, 459	1-242-731	270k $\Omega$
R310, 360 R410, 460		- discarded -
R311, 361 R411, 461	1-242-685	3.3k $\Omega$
R312, 362 R412, 462	1-242-657	220 $\Omega$
R313, 363 R413, 463	1-221-311	5k $\Omega$ (B) semi-fixed
R314, 364 R414, 464	1-242-673	1k $\Omega$
R315, 365 R415, 465	1-221-311	5k $\Omega$ (B) semi-fixed
R316, 366 R416, 466	1-242-709	33k $\Omega$
R317, 417	1-242-679	1.8k $\Omega$
R318, 368 R418, 468	1-242-705	22k $\Omega$
R319, 369 R419, 469	1-242-707	27k $\Omega$
R320, 370 R420, 470	1-242-693	6.8 $\Omega$
R321, 371 R421, 471	1-242-697	10k $\Omega$
R322, 372 R422, 472	1-242-707	27k $\Omega$
R323, 373 R423, 473	1-242-685	3.3k $\Omega$
R324, 374 R424, 474		- discarded -
R325, 375 R425, 475	1-242-699	12k $\Omega$
R326, 376 R426, 476		- discarded -
R327, 377 R427, 477		- discarded -
R328, 428	1-242-681	2.2k $\Omega$
R329, 429	1-242-705	22k $\Omega$
R330, 430	1-242-729	220k $\Omega$
R331, 431	1-242-705	22k $\Omega$
R332, 432	1-242-709	33k $\Omega$
R333, 433	1-242-677	1.5k $\Omega$
R334, 434	1-242-665	470 $\Omega$
R335, 435	1-242-707	27k $\Omega$

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
R336, 436	1-242-677	1.5k $\Omega$
R337, 437	1-242-663	390 $\Omega$
R338, 438	1-242-657	220 $\Omega$
R339, 439		- discarded -
R340, 440	1-242-721	100k $\Omega$

## BIAS OSC CIRCUIT

## SEMICONDUCTORS

Q501		transistor	2SC634A
Q502		transistor	2SC634A
Q503		transistor	2SC634A
D501		diode	10D-2

## COILS

L501	1-231-069	equalizer	1.8 mH
L502	1-231-069	equalizer	1.8 mH
L503	1-409-038	dummy	1 mH
L504	1-409-038	dummy	1 mH

## MICROINDUCTORS

L505	1-407-198	2.2 mH
L506	1-407-198	2.2 mH

## TRANSFORMER

T501	1-433-145	bias osc.
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## CAPACITORS

C501	1-107-188	620pF	500V	silvered mica
C502	1-107-188	620pF	500V	silvered mica
C503	1-121-416	100 $\mu$ F	25V	electrolytic
C504	1-121-404	33 $\mu$ F	25V	electrolytic
C505				- discarded -
C506	1-121-391	1 $\mu$ F	50V	electrolytic
C507	1-107-188	620pF	500V	silvered mica
C508	1-107-188	620pF	500V	silvered mica
C509	1-105-663-12	0.0015 $\mu$ F	50V	mylar
C510	1-109-508	3,900pF	500V	dipped mica
C511	1-141-076	30~200pF		trimmer
C512	1-141-076	30~200pF		trimmer
C513	1-107-181	330pF	500V	silvered mica
C514	1-107-181	330pF	500V	silvered mica
C515	1-107-188	620pF	500V	silvered mica
C516	1-107-188	620pF	500V	silvered mica

## RESISTORS

R501	1-242-649	100 $\Omega$	$\frac{1}{4}$ W	carbon
R502	1-242-693	6.8k $\Omega$	$\frac{1}{4}$ W	carbon
R503	1-242-625	10 $\Omega$	$\frac{1}{4}$ W	carbon
R504	1-242-625	10 $\Omega$	$\frac{1}{4}$ W	carbon
R505	1-242-625	10 $\Omega$	$\frac{1}{4}$ W	carbon

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	
R506	1-242-725	150k $\Omega$	¼W carbon
R507	1-242-725	150k $\Omega$	¼W carbon
R508	1-242-667	560 $\Omega$	¼W carbon

**MISCELLANEOUS**

RY501	1-515-127	relay, 650 $\Omega$	24V
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**HEADPHONE AMP CIRCUIT**

**SEMICONDUCTORS**

Q601, 602		transistor	2SC634A
D601, 602		diode	1T22
D611, 612		diode	1T22

**TRANSFORMERS**

T601, 611	1-427-284	headphone	
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**CAPACITORS**

C601, 611	1-121-442	1 $\mu$ F	50V electrolytic
C602, 612	1-121-472	10 $\mu$ F	25V electrolytic
C603, 613	1-121-472	10 $\mu$ F	25V electrolytic
C604, 614	1-121-396	4.7 $\mu$ F	50V electrolytic
C605, 615	1-121-442	1 $\mu$ F	50V electrolytic

**RESISTORS**

R601, 611	1-242-681	2.2k $\Omega$	¼W carbon
R602, 612	1-242-697	10k $\Omega$	¼W carbon
R603, 613	1-242-697	10k $\Omega$	¼W carbon
R604, 614	1-242-721	100k $\Omega$	¼W carbon
R605, 615	1-242-737	470k $\Omega$	¼W carbon
R606, 616	1-242-723	120k $\Omega$	¼W carbon
R607, 617	1-242-681	2.2k $\Omega$	¼W carbon
R608, 618	1-221-997	2.2k $\Omega$ (B)	semi-fixed

**RECORD MODE & SPEED SWITCH CIRCUIT**

**SEMICONDUCTORS**

D701		diode	10D-2
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**CAPACITORS**

C701	1-109-501	910pF	500V dipped mica
C702	1-105-689-12	0.22 $\mu$ F	50V mylar
C703	1-105-689-12	0.22 $\mu$ F	50V mylar

**RESISTORS**

R713	1-242-673	1k $\Omega$	¼W carbon
R714	1-242-673	1k $\Omega$	¼W carbon
R715	1-242-673	1k $\Omega$	¼W carbon

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	
<b>SWITCHES</b>			
S701	1-514-482	1-key,	TAPE SPEED
S702, 703	1-514-728	2-key,	REC MODE

**AMP CHASSIS CIRCUIT**

**RESISTORS**

R701	1-242-691	5.6k $\Omega$	¼W carbon
R702	1-242-691	5.6k $\Omega$	¼W carbon
R703, 704	1-222-369	20k $\Omega$ (A)	variable (MIC)
R705, 706	1-222-369	20k $\Omega$ (A)	variable (LINE INPUT)
R707, R708		– described in resistor terminal circuit board unit –	
R709	1-242-691	5.6k $\Omega$	¼W carbon
R710	1-242-691	5.6k $\Omega$	¼W carbon
R711, 712	1-222-313	50k $\Omega$ (B)	variable (SOS & ECHO)
R716	1-242-684	3k $\Omega$	¼W carbon
R717	1-242-684	3k $\Omega$	¼W carbon
R718, 719	1-222-314	20k $\Omega$ (B)	variable (PB)

**JACKS**

J703	1-507-142	phono, LINE INPUT (L-CH)
J704	1-507-142	phono, LINE INPUT (R-CH)
J705	1-509-029	DIN CONNECTOR, REC/PB
J706	1-507-142	phono, LINE OUTPUT (L-CH)
J707	1-507-142	phono, LINE OUTPUT (R-CH)
J708	1-507-282	binaural, HEADPHONE
J709		– discarded –
J710		– discarded –
J711	1-507-281	miniature, MIC (L-CH)
J721	1-507-281	miniature, MIC (R-CH)

**CONNECTORS**

CN701~705	1-507-300	22P, printed circuit board
CN706	1-508-400	3P, nylon
CN707	1-539-437-11	22P, docking; printed circuit board
CN708	1-508-421	9P, nylon (male)

**SWITCHES**

S704	1-514-324	slide, TAPE SELECTOR
S705		– discarded –
S706	1-514-692	lever, MONITOR
S707	1-514-692	lever, MONITOR

**METERS**

ME701	1-524-067	VU
ME702	1-524-067	VU

**MISCELLANEOUS**

TM701	1-536-179	terminal strip, 1-L-1
	1-508-411	terminal, pin (male)

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
<b>LAMPS</b>		
PL701		L-CH VU meter – built in VU meter –
PL702		L-CH REC
PL703		R-CH VU meter – built in VU meter –
PL704		R-CH REC

**RESISTOR TERMINAL CIRCUIT**

<b>RESISTORS</b>				
R707	1-242-721	100kΩ	¼W	carbon
R708	1-242-721	100kΩ	¼W	carbon

**ECHO & SOS CIRCUIT**

<b>CAPACITORS</b>				
C801	1-105-673-12	0.01μF	50V	mylar
C802	1-103-863	330pF	50V	polystyrol
C803	1-103-863	330pF	50V	polystyrol
C804	1-105-673-12	0.01μF	50V	mylar

<b>RESISTORS</b>				
R801	1-242-715	56kΩ	¼W	carbon
R802	1-242-723	120kΩ	¼W	carbon
R803		– discarded –		
R804	1-242-715	56kΩ	¼W	carbon
R805	1-242-723	120kΩ	¼W	carbon

<b>SWITCH</b>		
S705	1-514-693	3 position lever, SOS/OFF/ECHO

**SYSTEM CONTROL (1) CIRCUIT**

<b>SEMICONDUCTORS</b>		
Q001~014	transistor	2SC634
Q015~018	transistor	2SC756
D001~039	diode	1T22 (A)

<b>CAPACITORS</b>				
C001	1-121-398	10μF	25V	electrolytic
C002		– discarded –		
C003	1-105-673-12	0.01μF	50V	mylar
C004	1-105-673-12	0.01μF	50V	mylar
C005	1-121-398	10μF	25V	electrolytic
C006	1-121-416	100μF	25V	electrolytic
C007	1-121-416	100μF	25V	electrolytic
C008	1-105-671-12	0.0068μF	50V	mylar
C009	1-105-671-12	0.0068μF	50V	mylar
C010	1-105-671-12	0.0068μF	50V	mylar
C011	1-121-391	1μF	50V	electrolytic

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
<b>RESISTORS</b>		
All resistors are ¼W, carbon type, unless otherwise specified.		
R001	1-242-697	10kΩ
R002	1-203-894	3.3kΩ
R003	1-242-721	100kΩ
R004	1-242-691	5.6kΩ
R005	1-242-705	22kΩ
R006	1-242-705	22kΩ
R007	1-242-709	33kΩ
R008	1-242-685	3.3kΩ
R009	1-242-697	10kΩ
R010	1-242-693	6.8kΩ
R011	1-242-673	1kΩ
R012	1-242-673	1kΩ
R013	1-242-705	22kΩ
R014	1-242-705	22kΩ
R015	1-244-715	56kΩ
R016		– discarded –
R017	1-242-715	56kΩ
R018		– discarded –
R019	1-244-697	10kΩ
R020	1-244-697	10kΩ
R021	1-244-697	10kΩ
R022	1-242-715	56kΩ
R023	1-242-705	22kΩ
R024	1-242-681	2.2kΩ
R025	1-242-705	22kΩ
R026	1-244-697	10kΩ
R027	1-244-697	10kΩ
R028	1-242-715	56kΩ
R029	1-242-705	22kΩ
R030	1-242-681	2.2kΩ
R031	1-242-705	22kΩ
R032	1-244-697	10kΩ
R033	1-244-697	10kΩ
R034	1-242-705	22kΩ
R035	1-242-705	22kΩ
R036	1-242-681	2.2kΩ
R037	1-242-705	22kΩ
R038	1-242-673	1kΩ
R039	1-242-705	22kΩ
R040	1-242-693	6.8kΩ
R041	1-242-697	10kΩ
R042	1-242-705	22kΩ
R043	1-242-689	4.7kΩ
R044	1-242-697	10kΩ
R045	1-242-697	10kΩ
R046	1-242-673	1kΩ
R047	1-242-673	1kΩ
R048	1-242-693	6.8kΩ
R049	1-242-693	6.8kΩ
R050	1-242-693	6.8kΩ

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
R051	1-242-693	6.8kΩ
R052	1-242-705	22kΩ
R053	1-242-705	22kΩ
R054	1-242-693	6.8kΩ
R055	1-242-693	6.8kΩ
R056	1-242-693	6.8kΩ
R057	1-244-693	6.8kΩ
R058	1-242-705	22kΩ
R059	1-242-705	22kΩ
R060	1-242-705	22kΩ
R061	1-242-705	22kΩ
R062		- discarded -
R063	1-244-673	1kΩ
R064	1-244-673	1kΩ
R065	1-242-673	1kΩ
R066		- discarded -
R067	1-242-705	22kΩ
R068	1-242-705	22kΩ

**SYSTEM CONTROL (2) CIRCUIT**

**SEMICONDUCTORS**

Q1~14	transistor	2SC634
D1~4	diode	10D-2
D5	diode, zener	1S334
D6	diode	10D-2
D7~11	diode	1T22 (A)
D12	diode, zener	1S334
D13	diode	10D-2

**COIL**

L1	1-407-212	33mH
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**CAPACITORS**

C1	1-105-753-12	0.01μF	200V	mylar
C2	1-105-753-12	0.01μF	200V	mylar
C3	1-121-388	1,000μF	35V	electrolytic
C4	1-121-388	1,000μF	35V	electrolytic
C5	1-121-416	100μF	25V	electrolytic
C6	1-105-673-12	0.01μF	50V	mylar
C7	1-121-388	1,000μF	35V	electrolytic
C8	1-103-791	4,700pF	50V	polystyrol
C9	1-103-791	4,700pF	50V	polystyrol
C10	1-105-677-12	0.022μF	50V	mylar
C11	1-105-689-12	0.22μF	50V	mylar
C12	1-121-398	10μF	25V	electrolytic
C13	1-105-685-12	0.1μF	50V	mylar
C14	1-105-671-12	0.0068μF	50V	mylar
C15	1-107-125	56pF	50V	silvered mica
C16	1-121-398	10μF	25V	electrolytic
C17	1-121-391	1μF	50V	electrolytic

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
C18	1-121-416	100μF 25V electrolytic
C19	1-121-398	10μF 25V electrolytic
C20	1-121-398	10μF 25V electrolytic
C21	1-105-683-12	0.068μF 50V mylar
C22	1-121-403	33μF 16V electrolytic
C23	1-121-395	4.7μF 25V electrolytic
C24	1-121-395	4.7μF 25V electrolytic
C25	1-121-404	33μF 25V electrolytic
C26	1-121-398	10μF 25V electrolytic

**RESISTORS**

All resistors are 1/4W, carbon type, unless otherwise specified.

R1	1-242-677	1.5kΩ
R2	1-242-689	4.7kΩ
R3		- discarded -
R4	1-242-665	470Ω
R5	1-242-689	4.7kΩ
R6	1-222-804	1kΩ (B) semi-fixed
R7	1-242-685	3.3kΩ
R8	1-242-689	4.7kΩ
R9	1-242-705	22kΩ
R10	1-242-685	3.3kΩ
R11	1-242-705	22kΩ
R12	1-242-683	2.7kΩ
R13	1-242-681	2.2kΩ
R14	1-242-677	1.5kΩ
R15	1-242-689	4.7kΩ
R16	1-242-705	22kΩ
R17	1-242-677	1.5kΩ
R18	1-242-705	22kΩ
R19	1-242-705	22kΩ
R20	1-242-715	56kΩ
R21	1-242-709	33kΩ
R22	1-242-705	22kΩ
R23	1-242-705	22kΩ
R24	1-242-719	82kΩ
R25	1-242-725	150kΩ
R26	1-242-709	33kΩ
R27	1-242-699	12kΩ
R28	1-242-683	2.7kΩ
R29	1-242-683	2.7kΩ
R30	1-242-685	3.3kΩ
R31	1-242-681	2.2kΩ
R32	1-242-697	10kΩ
R33	1-242-691	5.6kΩ
R34	1-242-705	22kΩ
R35	1-242-681	2.2kΩ
R36	1-242-715	56kΩ
R37	1-242-705	22kΩ
R38	1-242-691	5.6kΩ
R39	1-242-705	22kΩ
R40	1-242-697	10kΩ



<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	
R41	1-242-721	100kΩ	
R42	1-242-721	100kΩ	
R43	1-242-721	100kΩ	
R44	1-242-673	1kΩ	
R45	1-242-697	10kΩ	
R46	1-257-825	10Ω	½W
R47	1-242-691	5.6kΩ	
R48	1-242-697	10kΩ	
R49	1-242-693	6.8kΩ	
R50	1-242-705	22kΩ	
R51	1-242-697	10kΩ	
R52	1-242-691	5.6kΩ	
R53	1-242-691	5.6kΩ	
R54	1-242-673	1kΩ	
R55	1-242-709	33kΩ	
R56	1-242-705	22kΩ	

**SYSTEM CONTROL (3) CIRCUIT**

**SEMICONDUCTORS**

D81~85 diode 10D-2

**RELAYS**

RY81	1-515-127	REW,	680Ω	29.5 mA	DC24V
RY82	1-515-127	F.F.,	680Ω	29.5 mA	DC24V
RY83	1-515-127	PLAY,	680Ω	29.5 mA	DC24V
RY84	1-515-127	REV,	680Ω	29.5 mA	DC24V
RY85	1-515-127	SPEED,	680Ω	29.5 mA	DC24V

**ENCAPSULATED COMPONENTS**

CP81~88 1-101-534 0.1μF + 120Ω 500V

**CONNECTORS**

CN81	1-508-417-21	12P (red)
CN82	1-508-418-21	9P (red)

**MISCELLANEOUS**

1-535-041 pin terminal

**MECHA CHASSIS CIRCUIT**

**SEMICONDUCTORS**

Q801	transistor	2SD28
Q802	transistor	2SD28
Q803	transistor	2SD28
D801	diode	10D-2
D802	diode	10D-2
D803	diode	10D-2

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
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**TRANSFORMER**

T801 1-441-650 power

**CAPACITORS**

C801	1-117-040	2μF + 0.5μF	300V, MP
C802	1-117-054	0.5μF	350V, MP
C803	1-117-054	0.5μF	350V, MP
C804	1-117-082	4μF	250V, MP
C805	1-117-082	4μF	250V, MP

**WIRE WOUND RESISTORS**

R801	1-205-447	50Ω	25W
R802	1-205-503	68Ω	40W
R803	1-207-273	5.1Ω	1.5W
R804	1-207-273	5.1Ω	1.5W

**CONNECTORS**

CN801	1-509-341	POWER OUTPUT, UNSWITCHED
CN802	1-509-062	POWER SUPPLY
CN803	1-507-300	22P, system control circuit board (1)
CN804	1-507-300	22P, system control circuit board (2)
CN805	1-507-300	22P, system control circuit board (3)
CN806		- included in mechanical parts -
CN807	1-507-301	18P, head assembly
CN808	1-507-307	14P
CN809	1-509-371	3P
CN810	1-509-377	9P, DOCKING, (white)
CN811	1-509-379	12P, POWER SUPPLY, (red)
CN812	1-509-381	9P, CAPSTAN MOTOR, (red)
CN813	1-507-255	11P (socket), REMOTE CONTROL
CN814	1-506-180	dummy plug, REMOTE CONTROL

**SWITCHES**

S801	1-514-057	micro, REC
S802	1-514-057	micro, REVERSE FF
S803	1-514-057	micro, REWIND
S804	1-514-057	micro, STOP
S805	1-514-057	micro, PLAY
S806	1-514-057	micro, FORWARD FF
S807	1-514-057	micro, APS
S808	1-514-693	3-position, lever; AUTO REV
S809	1-514-531-12	POWER FREQUENCY
S810	1-514-531-12	POWER
S811	1-509-064	VOLTAGE SELECTOR
S812	1-514-530	micro, AUTO SHUT-OFF

**ENCAPSULATED COMPONENTS**

CP801	1-101-534	0.1μF + 120Ω	500V
CP802	1-101-534	0.1μF + 120Ω	500V

**SOLENOIDS**

PM801	1-454-052	pinch roller
PM802	1-454-053	brake

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
<b>MOTORS</b>		
M801	8-836-624-09	reel; induction; left (UC-624K1)
M802	8-831-634-15	capstan; synchronous (HC-634D6)
M803	8-836-624-07	reel; induction; right (UC-624K)

<b>SOCKETS</b>		
PLB1	1-517-018	lamp
PLB2	1-517-018	lamp
PLB3	1-517-018	lamp
PLB4	1-517-018	lamp
PLB5	1-517-018	lamp

<b>LAMPS</b>		
PL801	1-518-053-11	RECORD
PL802	1-518-053-11	REWIND
PL803	1-518-053-11	REVERSE PLAY
PL804	1-518-053-11	FORWARD PLAY
PL805	1-518-053-11	FF
PL806	1-518-053-11	APS

<b>TERMINAL STRIP</b>		
TM801	1-536-151	2-L-2
TM802	1-536-213	5P
TM803	1-536-179	1-L-1, C type

<b>MISCELLANEOUS</b>		
	1-533-048	holder, fuse
F	1-532-100	fuse, 2A
	1-509-372	pin terminal
	3-140-900	cord, ribbon

**HEAD DECK UNIT**

<b>HEADS</b>		
PBH1	8-829-142-20	playback (PP102-4202)
PBH2	8-829-142-20	playback (PP102-4202)
REC-H	8-824-629-20	record (RP102-2902)
ERASE-H	8-826-629-25	erase (EF18-2902A1)
S-H	1-459-051	sensing

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
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**APS CIRCUIT**

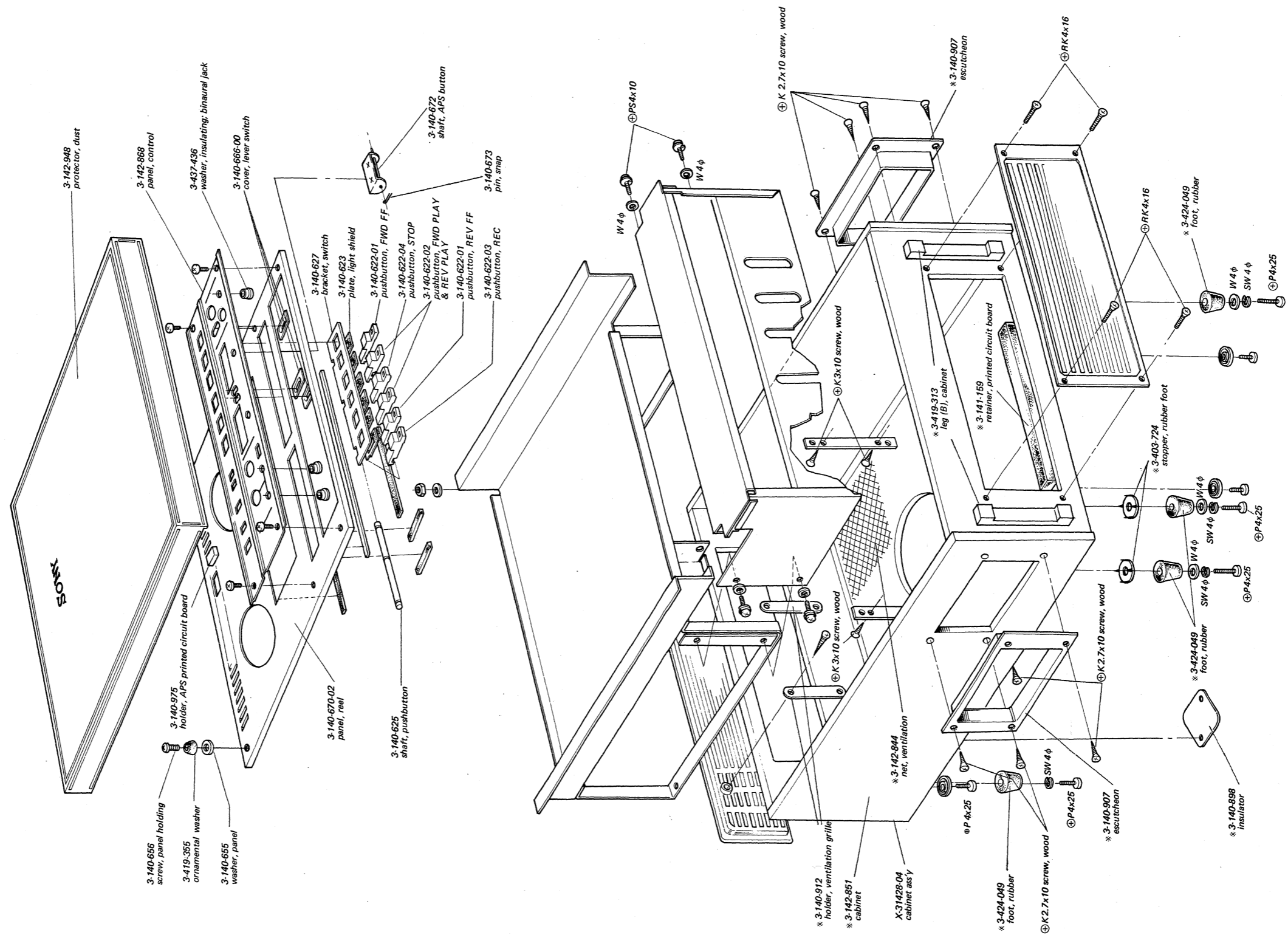
<b>SEMICONDUCTORS</b>		
Q905~910		transistor 2SC634A
D902		diode 10D-2
D903		diode 10D-2
D904		diode 10D-2
D905		diode 1T22 (A)
D906		diode, zener 1S334
D907		diode 10D-2
D908		diode 10D-2
D909		diode 1T22 (A)
D910		diode 10D-2
D911		diode 10D-2

<b>CAPACITORS</b>			
C908	1-121-286	33 $\mu$ F	25 V electrolytic
C909	1-121-286	33 $\mu$ F	25 V electrolytic

<b>RESISTORS</b>		
All resistors are 1/4W, carbon type, unless otherwise specified.		
R914	1-242-691	5.6k $\Omega$
R915	1-242-709	33k $\Omega$
R916	1-242-705	22k $\Omega$
R917	1-242-691	5.6k $\Omega$
R918	1-242-709	33k $\Omega$
R919	1-242-705	22k $\Omega$
R920	1-242-697	10k $\Omega$
R921	1-242-667	560 $\Omega$
R922	1-242-649	100 $\Omega$
R923	1-242-709	33k $\Omega$
R924	1-242-705	22k $\Omega$
R925	1-242-705	22k $\Omega$
R926	1-242-705	22k $\Omega$
R927	1-242-709	33k $\Omega$
R928	1-242-704	20k $\Omega$
R929	1-242-673	1k $\Omega$
R930	1-242-697	10k $\Omega$
R931	1-242-709	33k $\Omega$
R932	1-242-697	10k $\Omega$
R933	1-242-697	10k $\Omega$
R934	1-242-709	33k $\Omega$

**TC-651 TC-651**

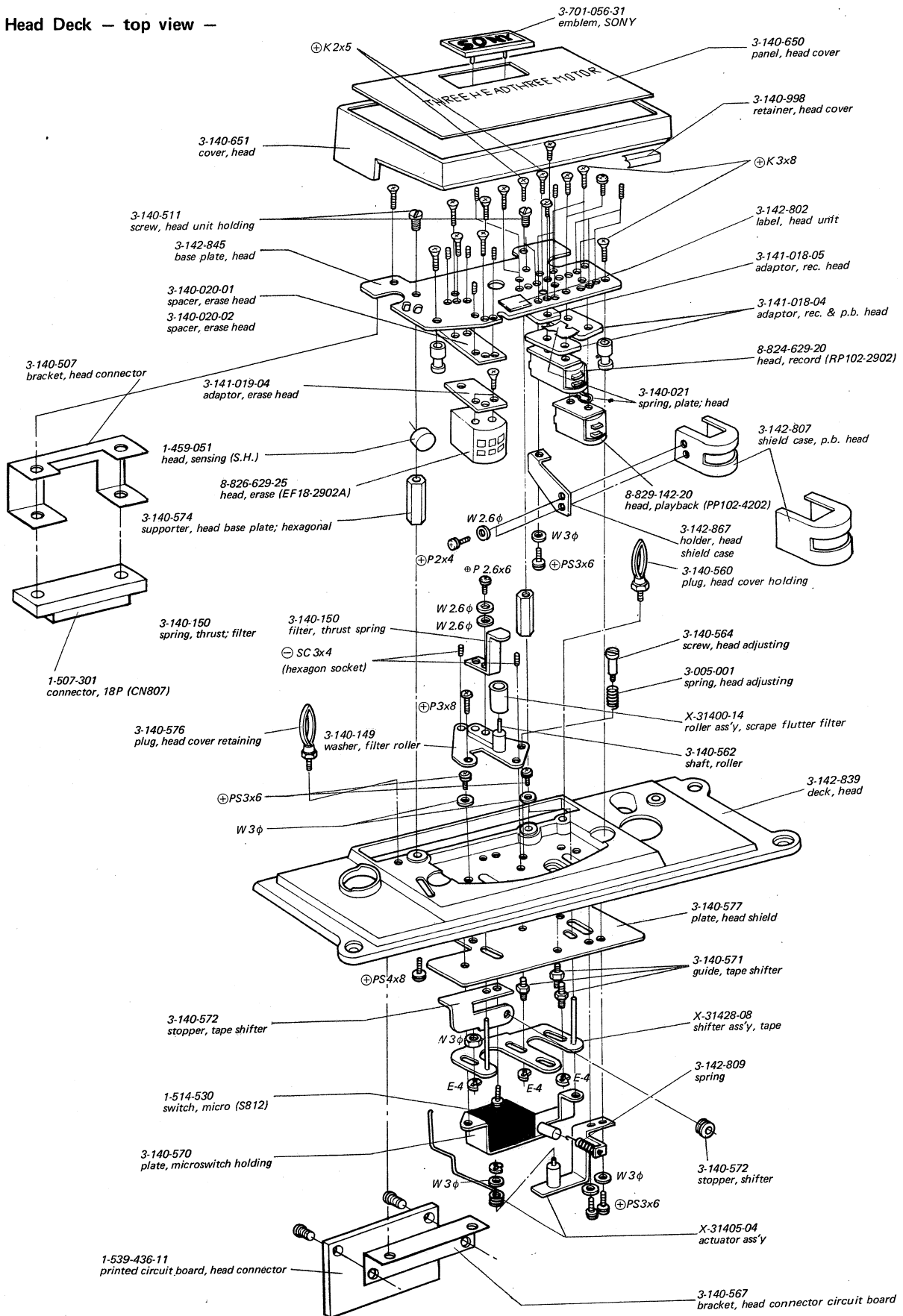
**8. EXPLODED VIEWS**  
**8-1. Cabinet — top view —**



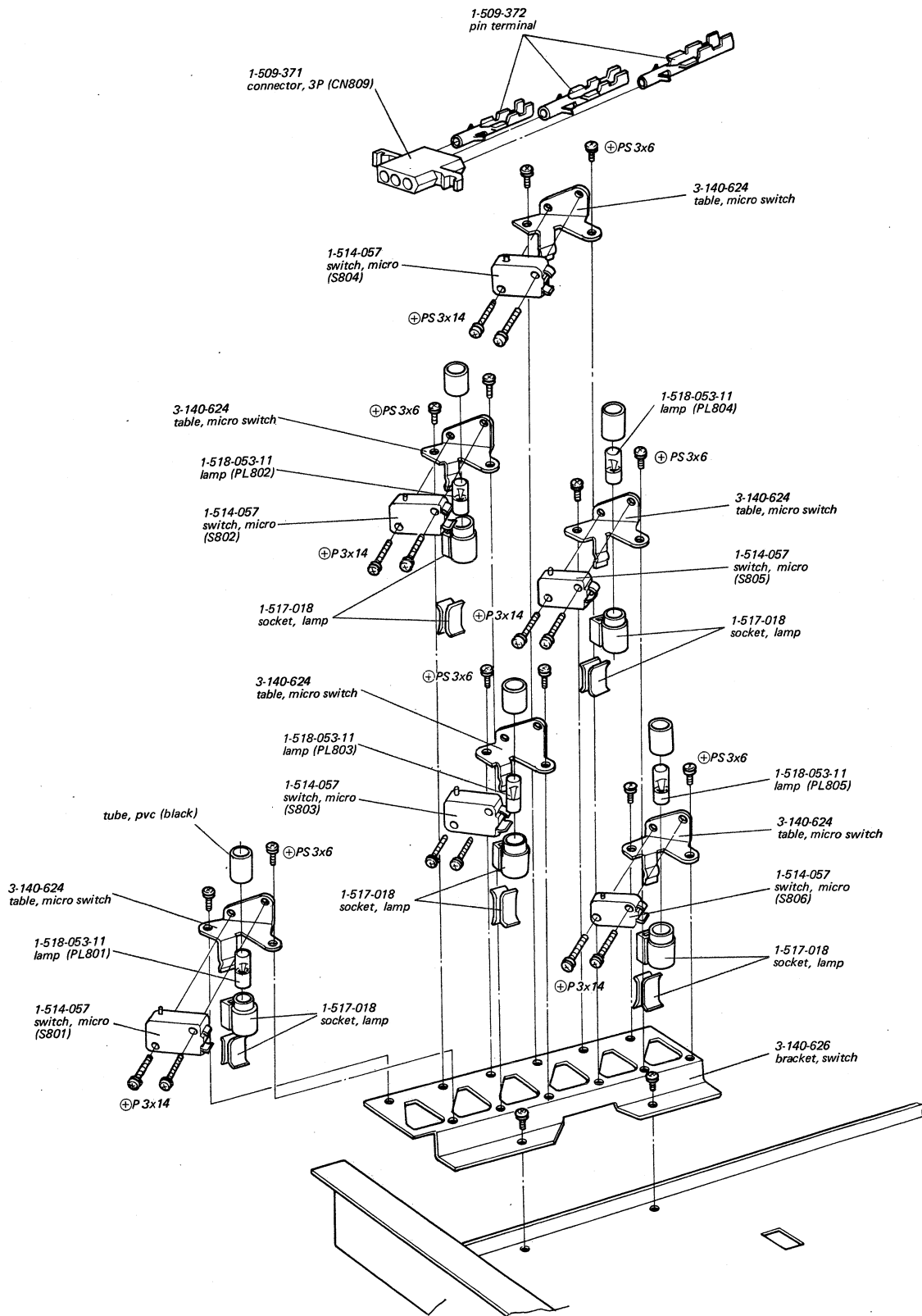
Parts marked with \* are included in cabinet ass'y (X-31428-04).



8-3. Head Deck — top view —



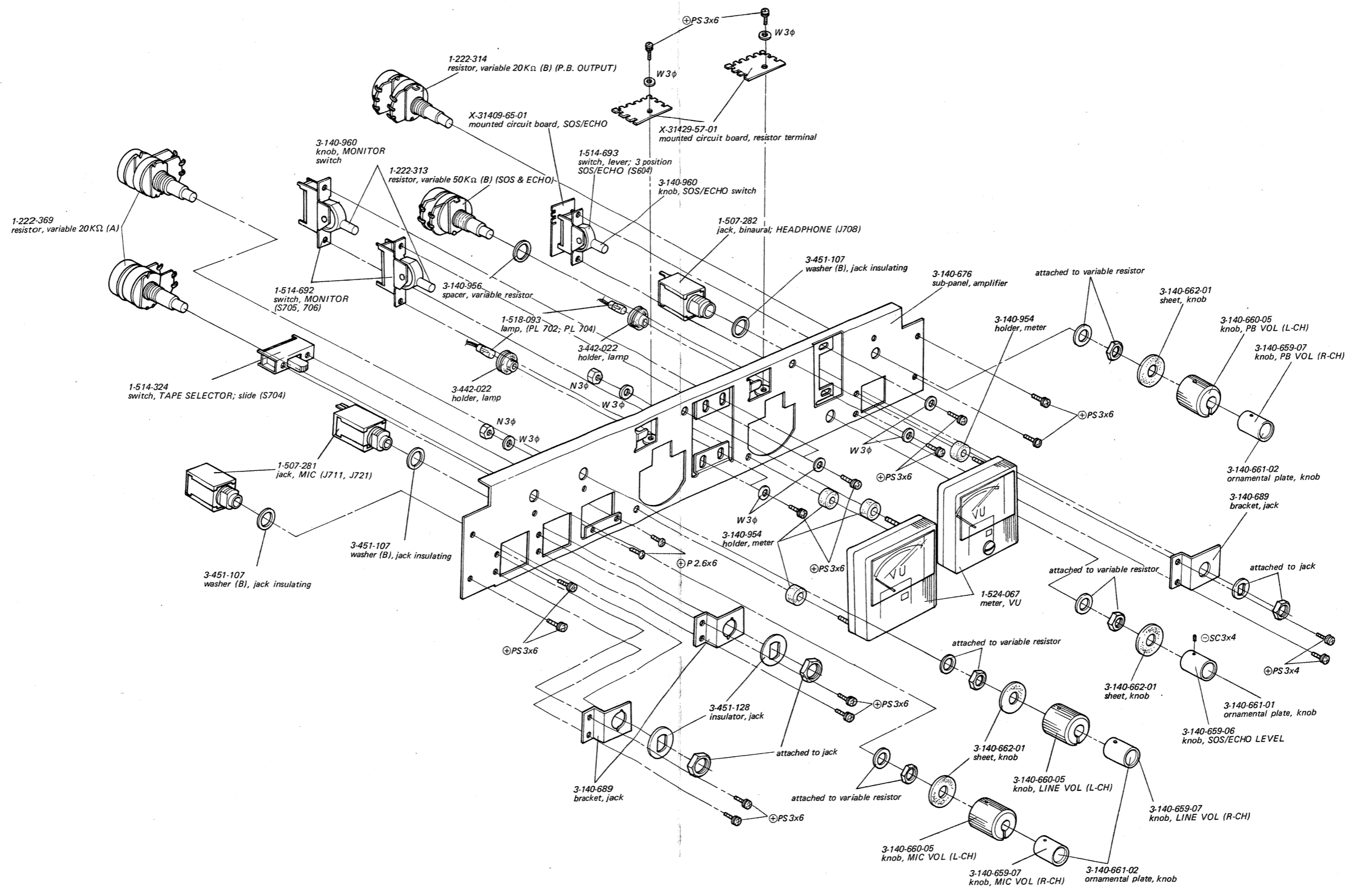
**8-4. Microswitches View**





# TC-651 TC-651

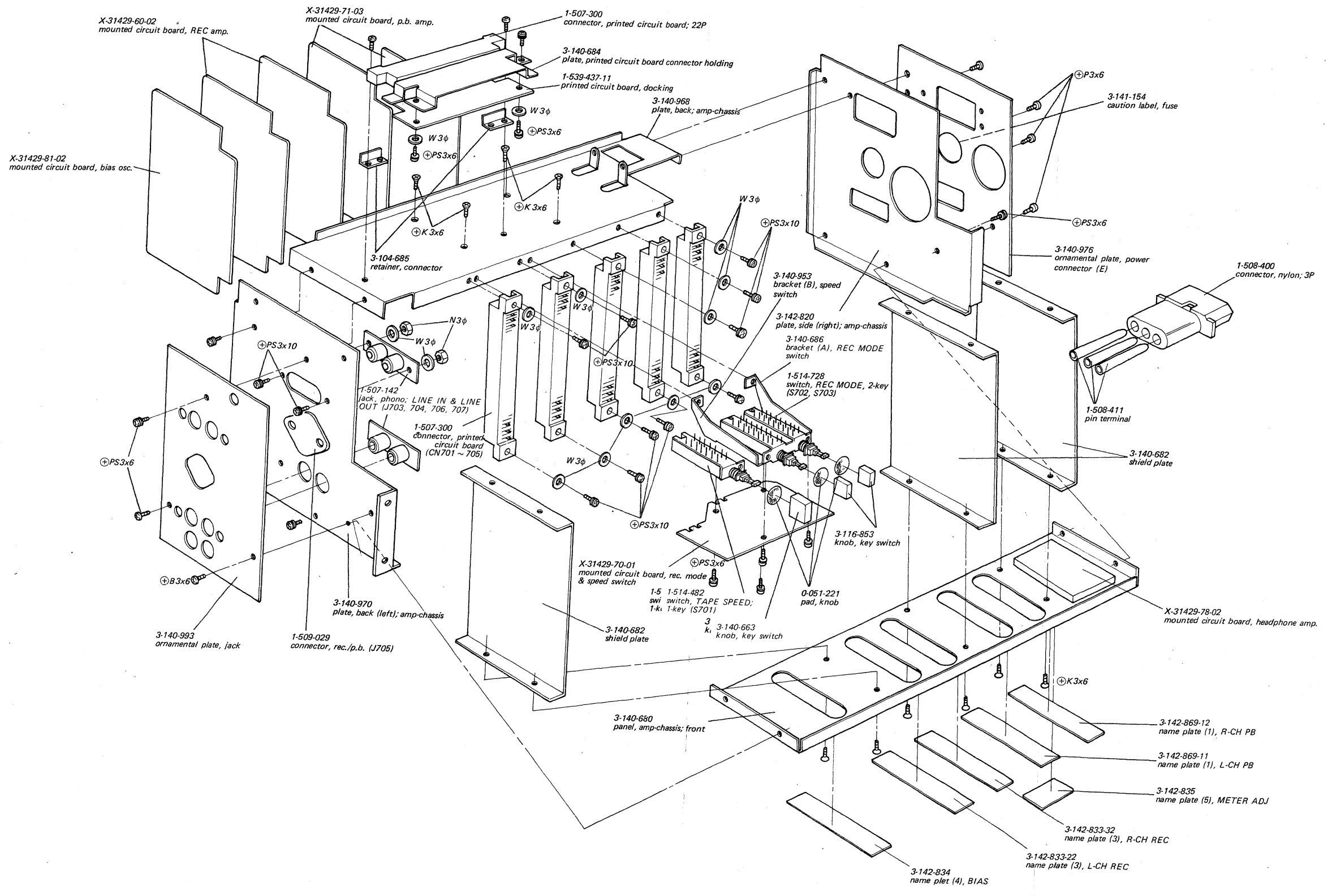
8-6. Amp. Sub-Panel — top view —





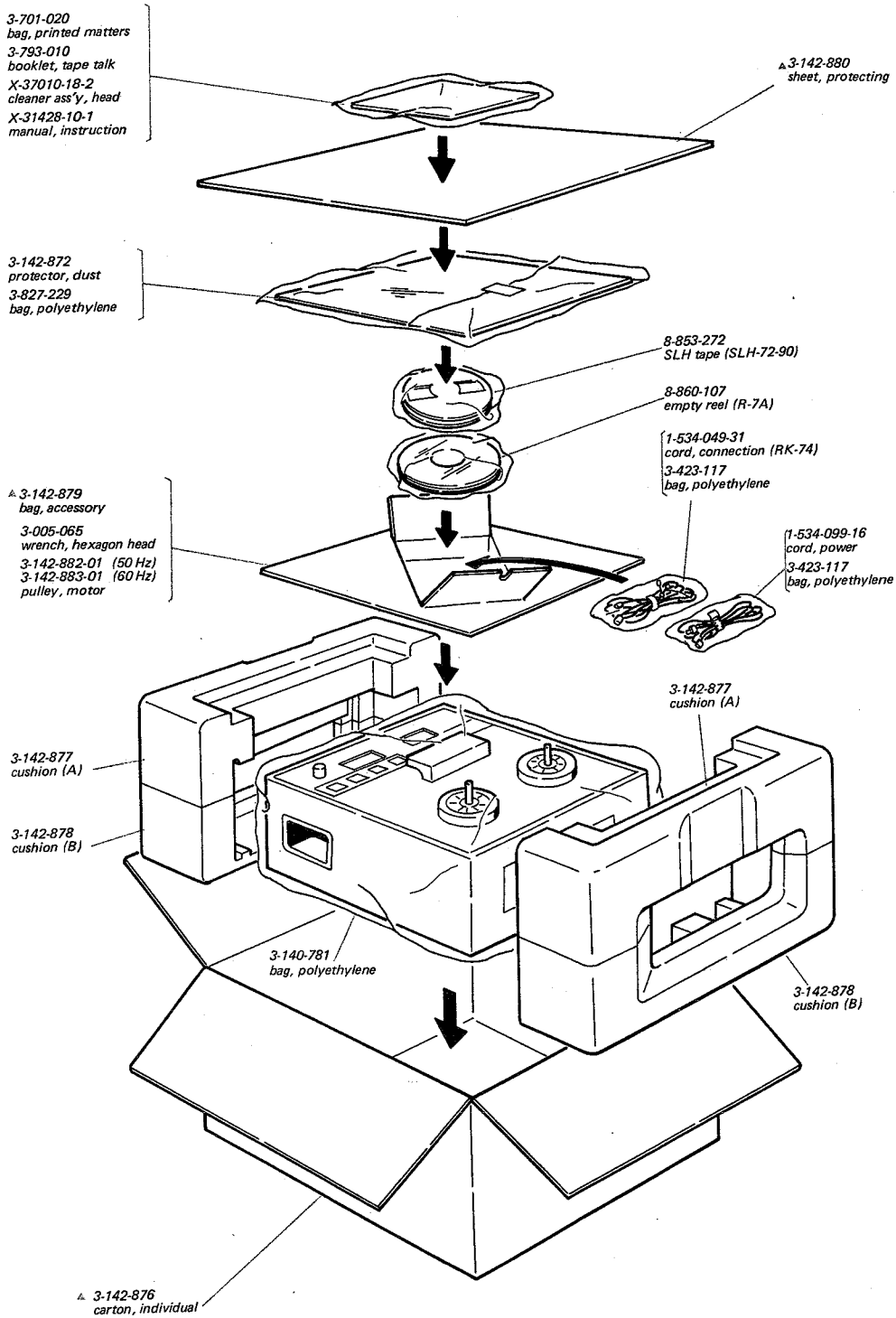
# TC-651 TC-651

## 8-7. Amp. Chassis Panel — top view —





**8-10. Packing**



Parts marked with ▲ are included in carton ass'y (X-31428-15).