

ROTEL®

SERVICE MANUAL

RA-610 Pre-Main Stereo Amplifier

— Roland Electronics Co., Ltd. —

ALIGNMENT PROCEDURE

PRECAUTIONS

1. Always disconnect the chassis from power line when soldering. Turning the power switch OFF is not enough. Power line leakage passing through the heating element may destroy the transistors.
2. Never attempt to do any work on the transistor amplifiers without first disconnecting the AC line cord and waiting until the power supply filter capacitors have discharged.
3. Replacement for output and driver transistors, if necessary, must be made from the same beta group as the original type.
4. If one output transistor burns out (open or short), always remove all output transistors in that channel and check the bias adjustment, the control and other parts in the network with an ohm-meter before inserting a new transistor. All transistors in one channel will be destroyed if the base biasing circuit is open on the emitter end.
5. When mounting a replacement power transistor, be sure the bottom of the flange, the mica insulators and the surface of the heat sink are free of foreign matter, for they may cause transistor failure.
6. Silicon grease must be applied between the transistor and the mica insulator, and between the mica insulator and the heat sink for better heat conduction.

PREDRIVER / DRIVER ADJUSTMENT

1. Set BALANCE, BASS and TREBLE controls to their center position.
2. Set MODE switch to "STEREO", SPEAKER switch to "ON" and SELECTOR switch to "AUX" position.
3. Connect 8 ohm 50watts resistor across L speaker terminals. In parallel with the load resistor, connect the vertical input leads of the oscilloscope.
4. Connect an audio generator, set for 1,000Hz (sine wave), to L chan. AUX input.
5. Check the DC balance. Connect AC power cord and rotate volume control to clockwise position, — — full volume. Increase generator output until sine wave on scope just starts clipping, — — equal clipping on the positive and negative half cycles of the signal.
6. Rotate volume control to counter-clockwise position to get 0.9 volts RMS 8 ohm (0.1 watts) output. Adjust crossover distortion. adjust VR 505 until the crossover is extinguished. See Fig. 1 (A). Or adjust idling current using a DCmV meter, DCmV meter across R908 resistor on rear chassis; rotate VR505 to obtain a 15mV reading on DCmV meter (on signal input). See Fig 1 (B).
7. Repeat preceding steps for right channel.

AF ALIGNMENT PROCEDURE

Fig. 1. crossover distortion adjustment

(A)

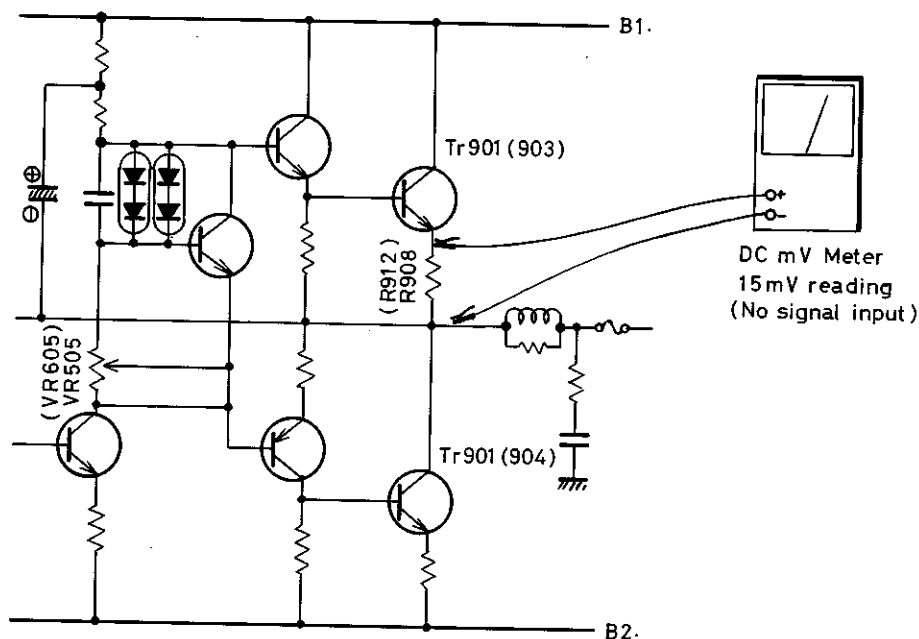
DISTORTED RESPONSE



IDEAL RESPONSE



(B)



ENTIRE UNIT INOPERATIVE

I. If the Pilot Lamp does not light,

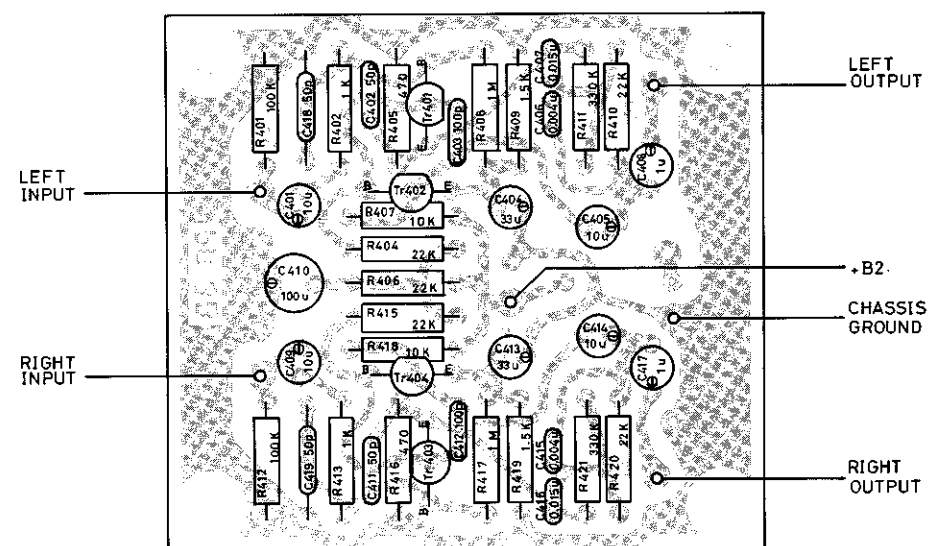
- A. Check to see if the AC Power Supply Cord is properly connected to the power source, and
- B. Check to see if there is adequate voltage from the power source, or
- C. If A & B are OK, check to see if the AC fuse is not blown, and
 1. If the AC fuse is OK,
 - a. AC Power Supply Cord is cut, or
 - b. Primary Winding in the Power Transformer is cut, or
 - c. Power Switch Connection is faulty, or
 2. If the AC fuse is blown,
 - a. Primary Winding in the Power Transformer is shorted out, or
 - b. Secondary Winding in the Power Transformer is shorted out, or
 - c. Rectifier (D901 or 902) is shorted out.

II. If the Pilot Lamp does Light,

- A. Check to see if the DC fuse is not blown, and
 1. If the DC fuse is blown,
 - a. Output Circuits are shorted out, or
 - b. +B or -B Circuits are shorted out, due to faulty C901, 902 or 903 or faulty Transistors Tr507, 508, 510, 607, 608, 610, 901, 902, 903 or 904, or
 2. If the DC fuse is OK, and
 - a. If the B voltage is not OK,
 - (1). Rectifier (D901 or 902) is open, or
 - (2). Secondary Winding in the Power Transformer (center black lead) is cut, or

- (3). Faulty Grounding of Black Lead Wire, or
- (4). Faulty DC fuse connection, and
- b. If the B voltage is OK, and
 - (1). There is signal output at the PRE-AMP OUT jacks,
 - (a). Transistors Tr505 or 605 are faulty, or
 - (b). C517 or 617 are faulty, or
 - (c). Jumper (PRE-AMP OUT to MAIN AMP) connection is faulty, and
 - (2). If there is no signal output at the PRE-AMP OUT jacks,
 - (a). Transistors Tr501, 502, 503, 504, 601, 602, 603 or 604 are shorted out or open, or
 - (b). C502, 506, 513, 514, 502, 606, 613, or 614 are faulty.

PRE-AMP CIRCUIT BOARD



ONLY PHONO SECTION INOPERATIVE

- I. If there is no fault in the wires to Pre-amplifier board,
 - A. Transistors Tr401, 402, 403 or 404 are shorted out or open, or
 - B. C401, 405, 408, 409, 414 or 417 are faulty, or
 - C. Function Switch connection is faulty.

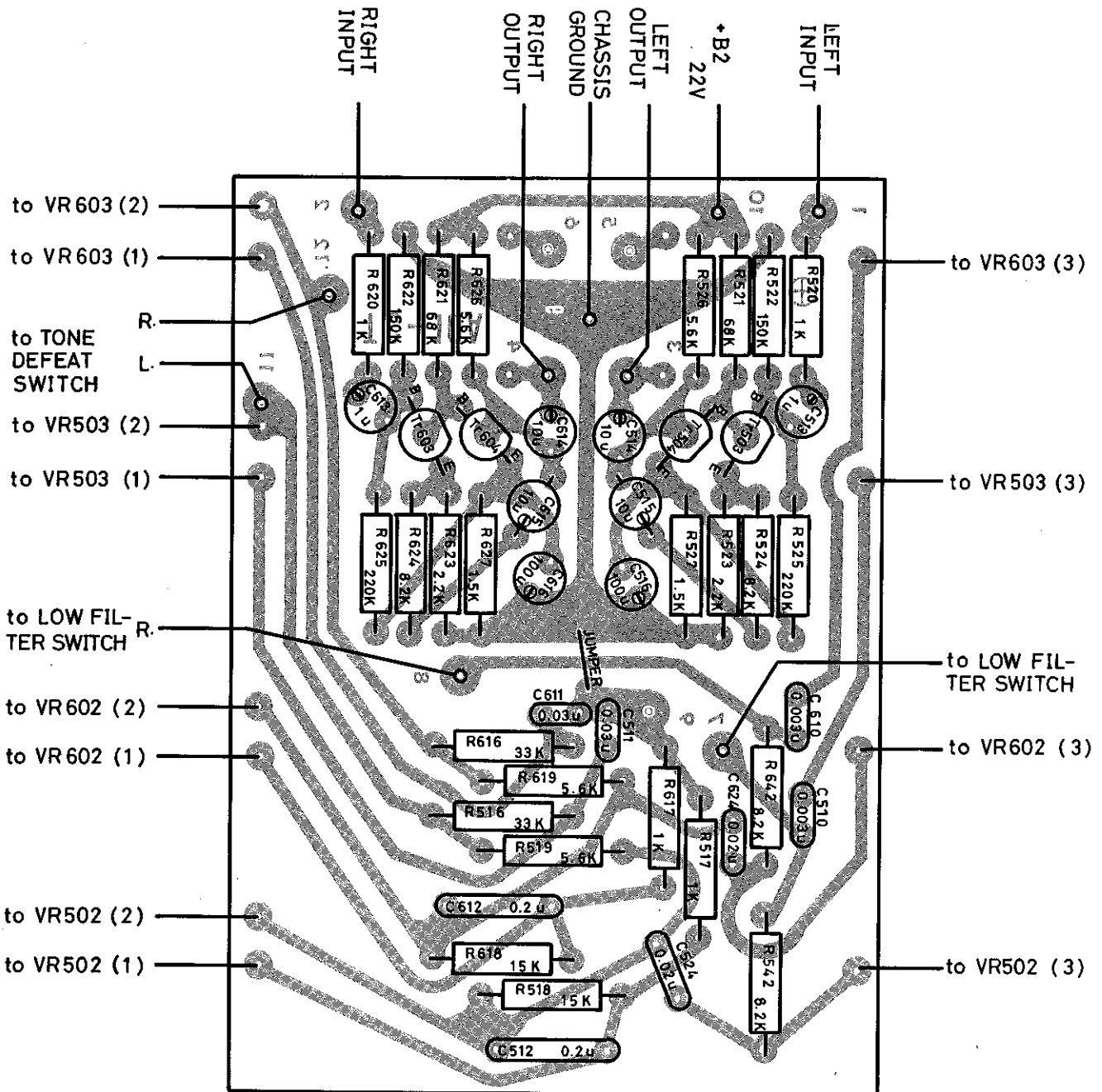
LOUDNESS CONTROL INEFFECTIVE

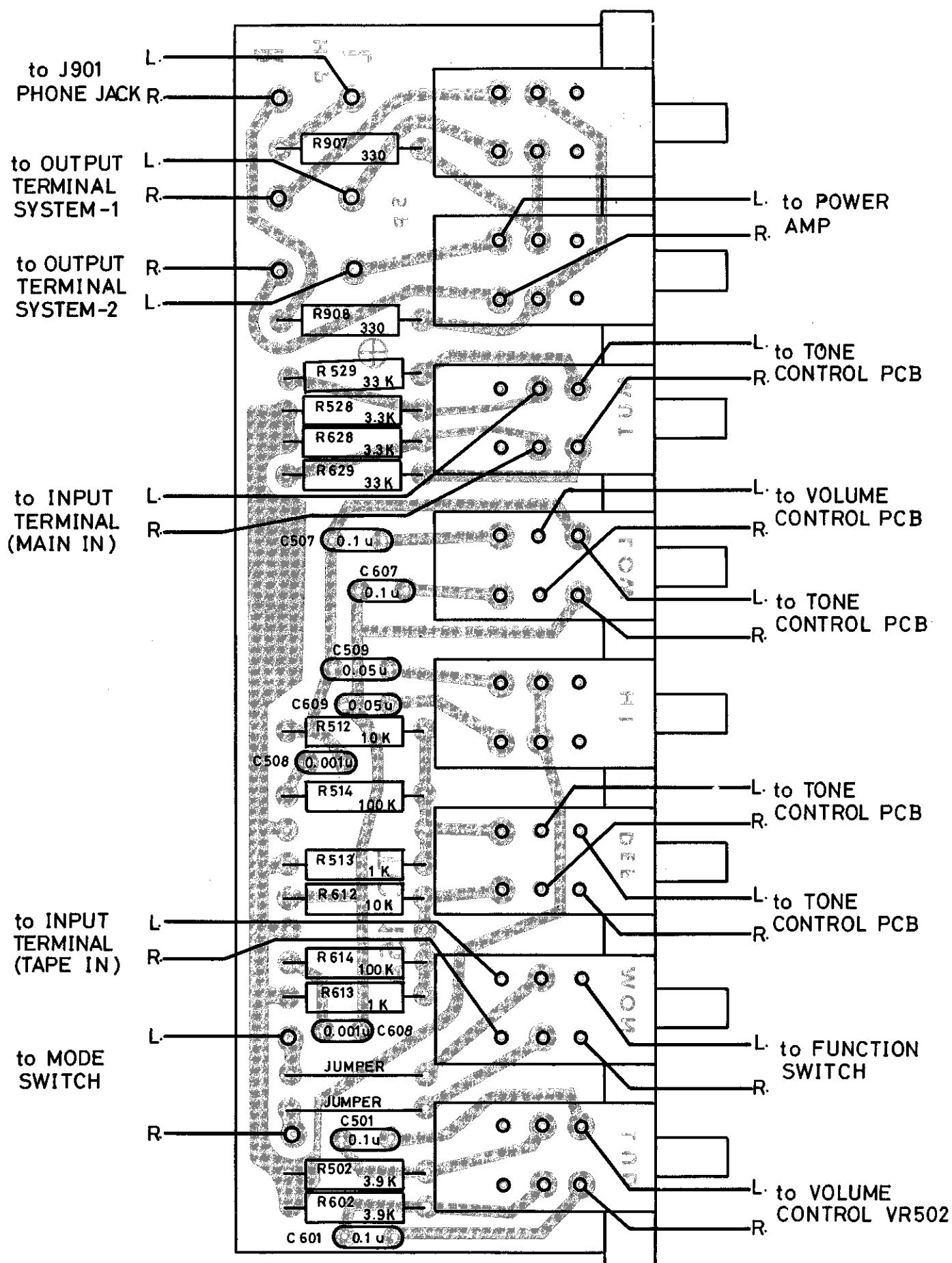
- I. C501 or 601 is faulty, or
- II. Loudness Switch connection is faulty.

TONE CONTROL INEFFECTIVE

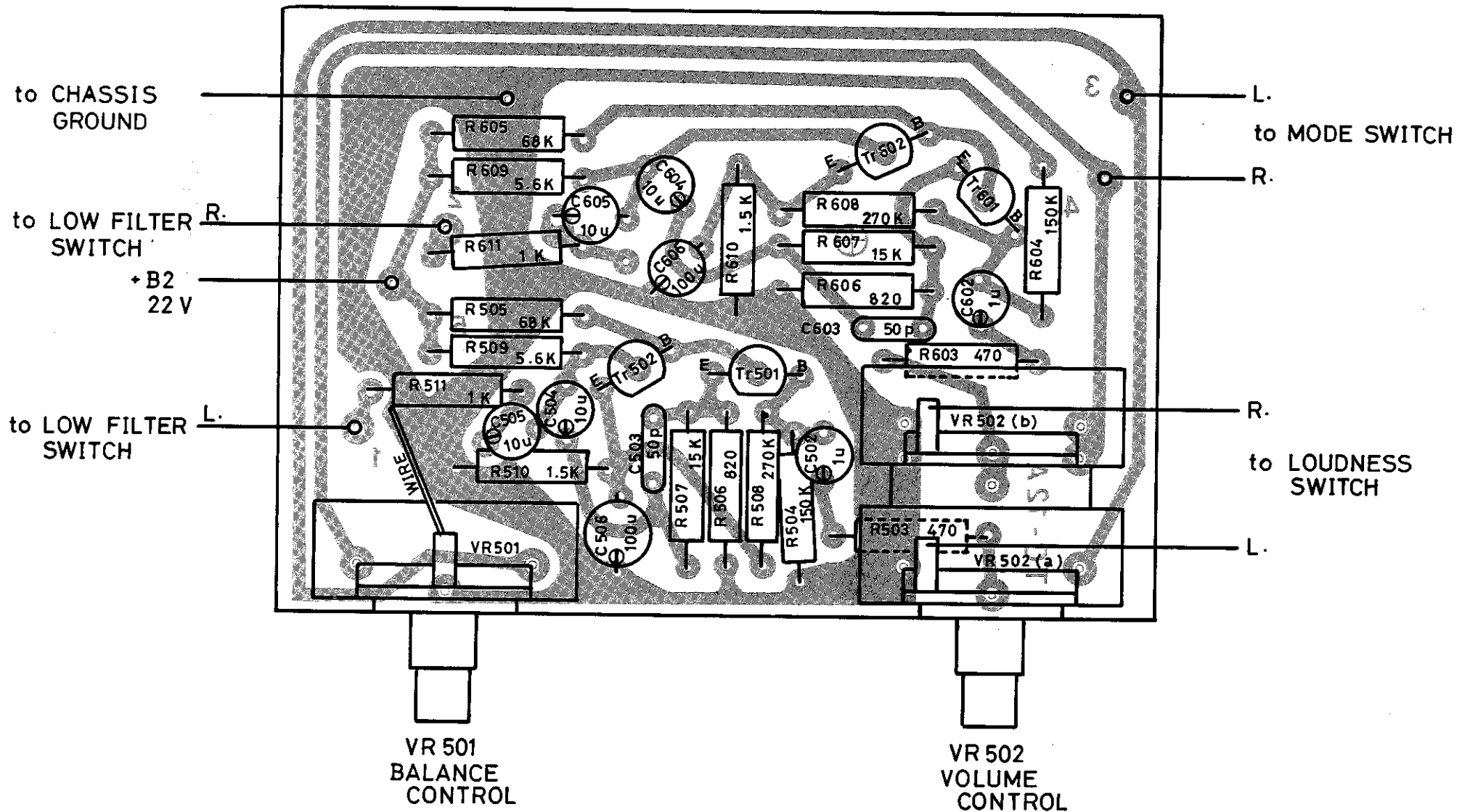
- I. C508, 510, 511, 524, 608, 610, 611, or 624 are faulty.

TONE CONTROL PCB "TC-10A"

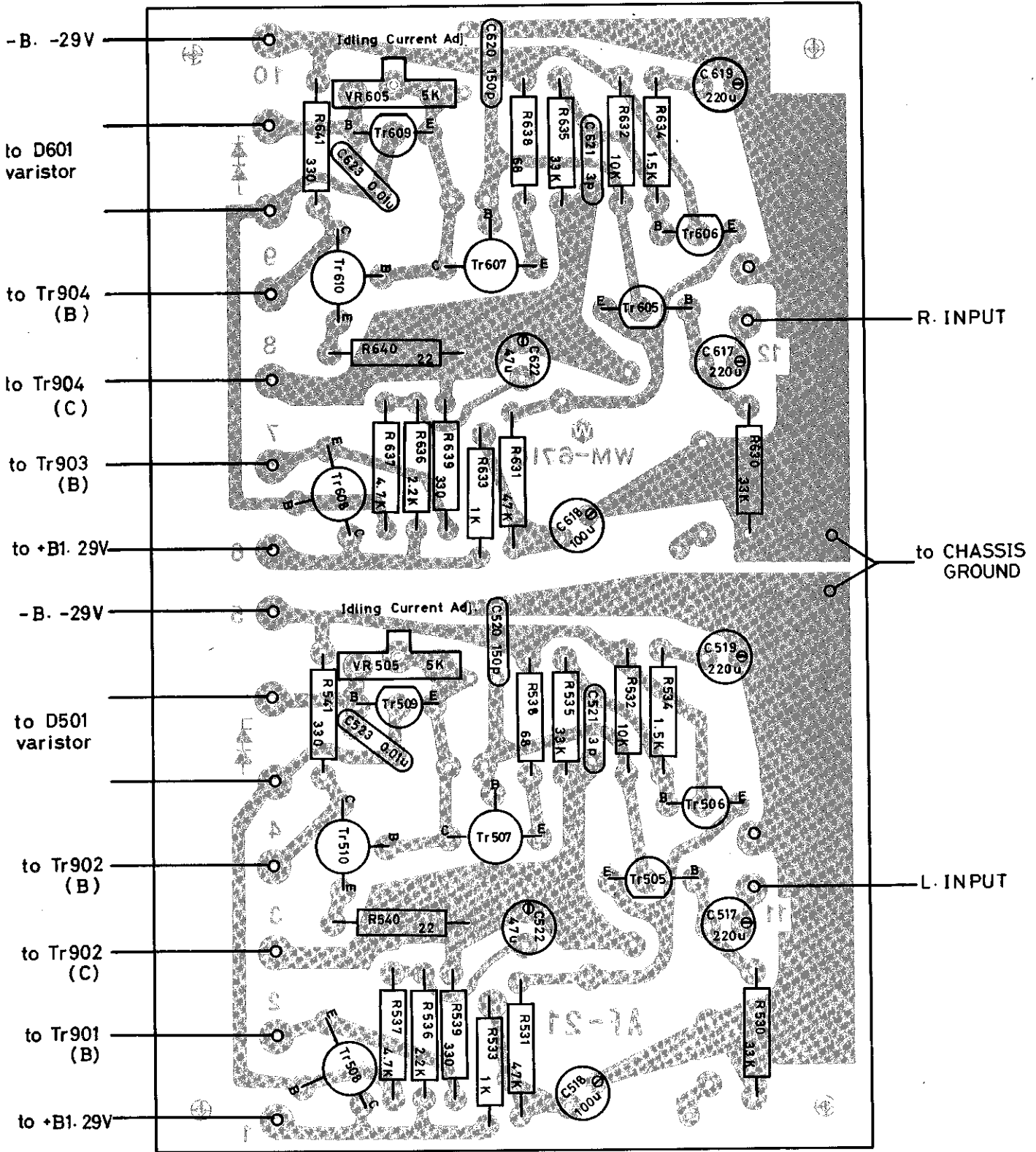




VOLUME CONTROL PCB

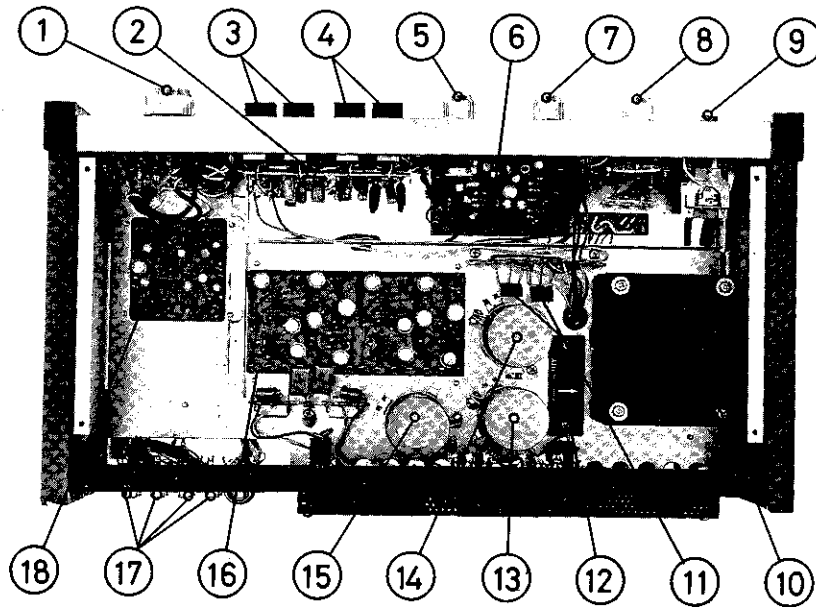


PREDRIVER / DRIVER PCB



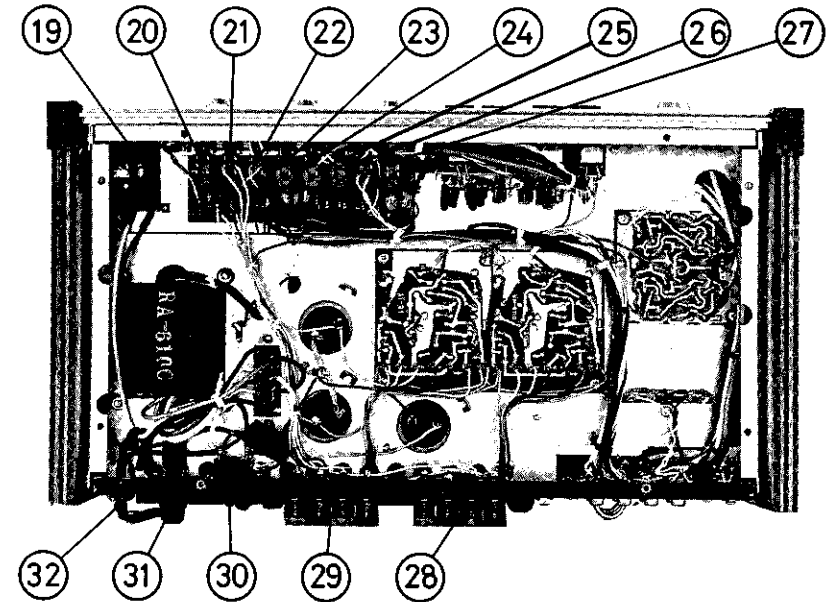
LAYOUT

TOP VIEW



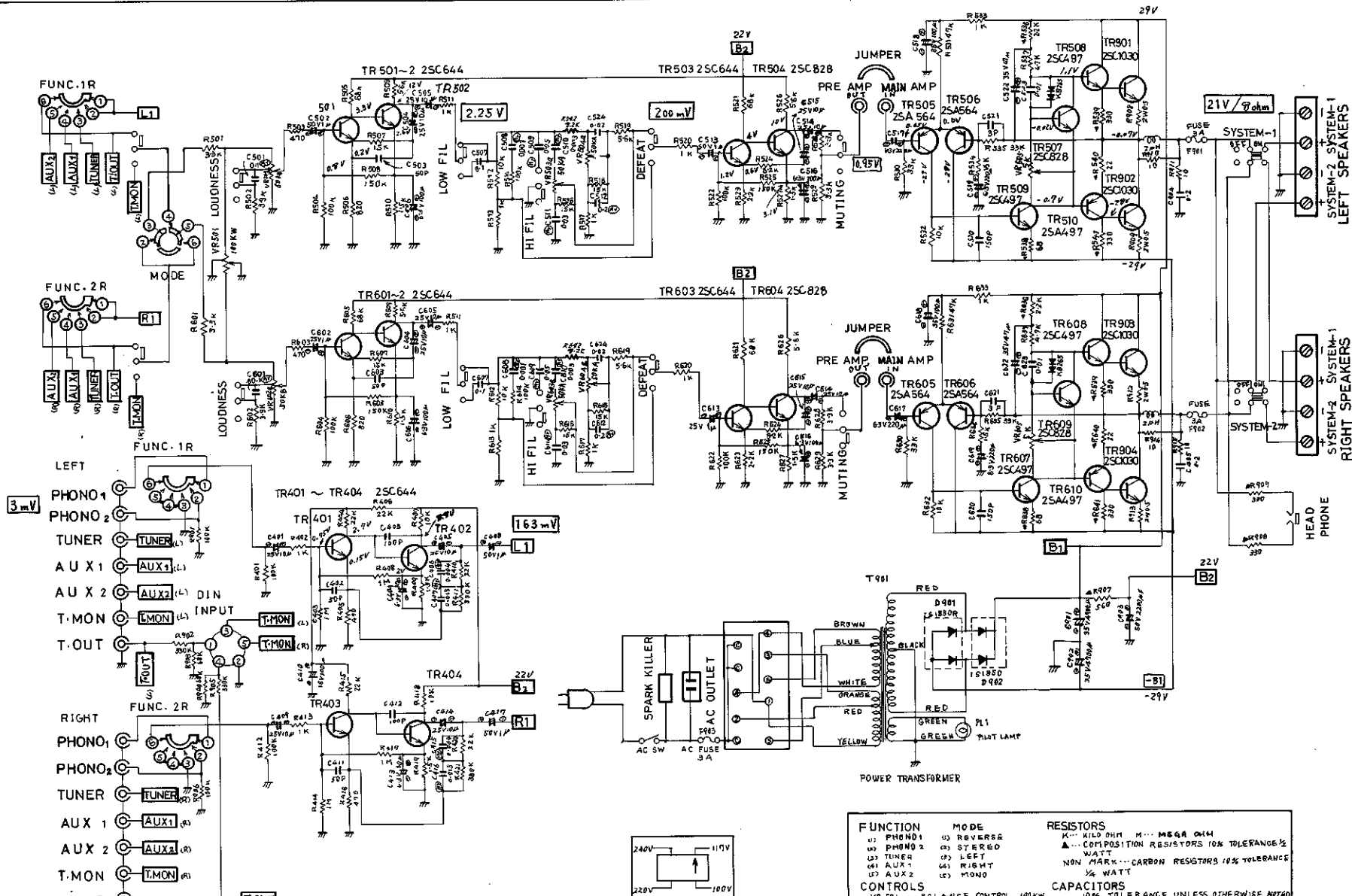
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|-----------------------|-----------------------|
| 1. Input Selector | 9. Power Switch |
| 2. Tone Control PCB | 10. Power Transformer |
| 3. Treble Control | 11. Rectifier |
| 4. Bass Control | 12. Voltage Selector |
| 5. Volume Control | 13. C901 |
| 6. Volume Control PCB | 14. C902 |
| 7. Balance Control | 15. C903 |
| 8. Mode Selector | 16. Driver PCB |

BOTTOM VIEW



- | | |
|------------------------------|---------------------------|
| 17. Input Terminal | 25. Tone Defeat Switch |
| 18. Pre-amp PCB | 26. Tape Monitor Switch |
| 19. Headphones Jack | 27. Loudness Switch |
| 20. Speakers Switch System-1 | 28. Output Terminal Right |
| 21. Speakers Switch System-2 | 29. Output Terminal Left |
| 22. Muting Switch | 31. AC Outlet |
| 23. Low Filter Switch | 30. AC Line Cord |
| 24. High Filter Switch | |

SCHEMATIC DIAGRAM



PARTS LIST FOR MODEL RA-610

Roland part No.	Symbol No.	Descriptions	Roland part No.	Symbol No.	Descriptions	Roland part No.	Symbol No.	Description
111911212		Front Panel	504005063	R908, 909, 912, 913	Bath-tub Resistor 0.5ohm	502015323	R507, 607, 518, 516, 618, 616	Carbon Resistor
116121122		Power Switch Button	504010153	R911, 915	" " 10ohm	502027423	R508, 608	" " 270Kohm (K) 1/4w
116310018		Knob, Input Selector	501022133	R540, 640	Solid Resistor 22ohm	502820123	R506, 606	" " 820 ohm (K) 1/4w
116310017		Knob, VOL. BAL.	501068133	R538, 638	" " 68 ohm (K) 1/2w	400470439	C901, 902	Electrolytic 35V4700mfd
116240001		Knob, Bass & Treble (R)	501330133	R539, 541, 639, 641, 907, 908	" " 330 ohm (K) 1/2w	400220439	C903	" 50V2200mfd (L)
116240002		Knob, Bass & Treble (L)	501022233	R536, 636	" " 2.2Kohm (K) 1/2w	402470639	C522, 622	" 35V 47mfd (SU)
205001302	T901	Power Transformer	501047233	R537, 637	" " 4.7Kohm (K) 1/2w	402100629	C401, 405, 409, 414, 504	" 25V 10mfd (SU)
301001116	Tr510, 610	Transistor 2SA497 (Y)	501560133	R907	" " 560 ohm (K) 1/2w		C604, 506, 606, 514, 614, C515, 615	
301201119	Tr507, 508, 607, 608	" 2SC497 (Y)	502010223	R402, 413, 511, 513, 613	Carbon Resistor	402330609	C404, 413	" 6.3V 33mfd (SU)
301001117	Tr505, 506, 605, 606	" 2SA564		R517, 617, 520, 620, 533, 633, 611	" " 1Kohm (K) 1/4w	402100519	C410	" 16V 100mfd (SU)
301201115	Tr504, 509, 604, 609	" 2SC828	502039223	R502, 602	" " 3.9Kohm (K) 1/4w	402100509	C506, 606, 516, 616	" 6.3V 100mfd (SU)
301201114	Tr401, 402, 403, 404, 501	" 2SC644	502010323	R407, 418, 512, 612, 532, 632	" " 10Kohm (K) 1/4w	402100739	C502, 602, 513, 613, 408, 417	" 50V 1mfd (SU)
301201126	Tr901, 902, 903, 904	" 2SC1030	502047323	R531, 631	" " 47Kohm (K) 1/4w	402100539	C518, 618	" 35V 100mfd (SU)
300919006	D901	Rectifier 1S1850 (R)	502033223	R501, 601, 529, 629	" " 3.3Kohm (K) 1/4w	402220509	C517, 617, 519, 619,	" 6.3V 220mfd (SU)
300919005	D902	" " 1S1850	502022323	R404, 406, 410, 415, 420	" " 22Kohm (K) 1/4w	450200834	C512, 612, 904, 905	Mylar 50V 0.2mfd (M)
300212001	D501, 601, 502, 602	Varistor KB265	502033423	R411, 421, 902, 905	" " 330Kohm (K) 1/4w	450100833	C501, 601, 507, 607	" 50V 0.1mfd (K)
610114245		Input Selector Switch	502010523	R408, 417	" " 1Mohm (K) 1/4w	450500933	C509, 609	" 50V 0.05mfd (K)
610114135		Mode Selector Switch	502033323	R528, 628, 530, 630, 535, 635	" " 33Kohm (K) 1/4w	450300933	C511, 611	" 50V 0.03mfd (K)
614081602		Push Switch 8keys	502015223	R409, 419, 510, 610, 527	" " 1.5Kohm (K) 1/4w	450200933	C524, 624	" 50V 0.02mfd (K)
614010101		Power Switch		R627, 534, 634		450150933	C407, 416	" 50V0.015mfd (K)
640253334		Fuse Holder	502068323	R505, 605, 521, 621, 903, 904	" " 68Kohm (K) 1/4w	440501283	C402, 411, 418, 419, 503 C603	Ceramic 250V 50pF (K)
626107702		Headphone Jack	502056223	R509, 609, 519, 619, 526, 626	" " 5.6Kohm (K) 1/4w	440101183	C403, 412	" 250V100pF (K)
620101114		AC Outlet Socket	502015423	R504, 604, 522, 622	" " 150Kohm (K) 1/4w	440301331	C521, 621	" 50V 3pF
642400104		Output Terminal	502470123	R405, 416, 503, 603	" " 470 ohm (K) 1/4w	440151183	C520, 620	" 250V150pF (K)
624100210		Input Terminal 10p	502082223	R524, 624, 542, 642	" " 8.2Kohm (K) 1/4w	440100985	C523, 623	" 250V0.01mfd (P)
624100208		" " 8p	502022423	R525, 625	" " 220Kohm (K) 1/4w	440101083-9	C508, 608	" 250V0.001mfd (K)
341220030		Fuse 3A	502022223	R523, 623	" " 2.2Kohm	440301083-9	C510, 610	" 250V0.003mfd (K)
625011105		DIN Jack 5p	502010433	R401, 412, 514, 614, 901, 906	" " 100Kohm (K) 1/4w	440401083-9	C406, 415	" 250V0.004mfd (K)
351080015		Indicator Lamp				470101112		Spark Killer
525121112	VR502	Volume Control				796301115		AC Line Cord
515121112	VR501	Balance Control				835201204		Service Manual
581005031	VR503, 504	Bass & Treble Control						
521005302	VR505, 605	Idling Current Adj.						

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