ROTEL®

Stereo Amplifier
RA-712

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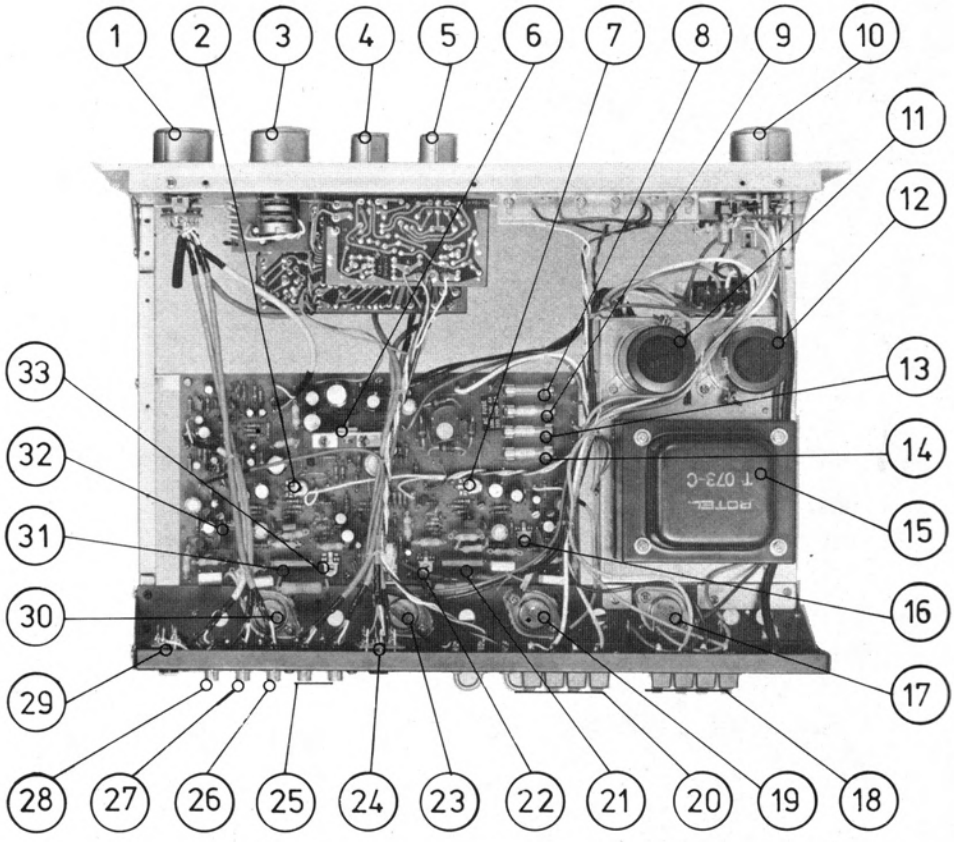
technical manual

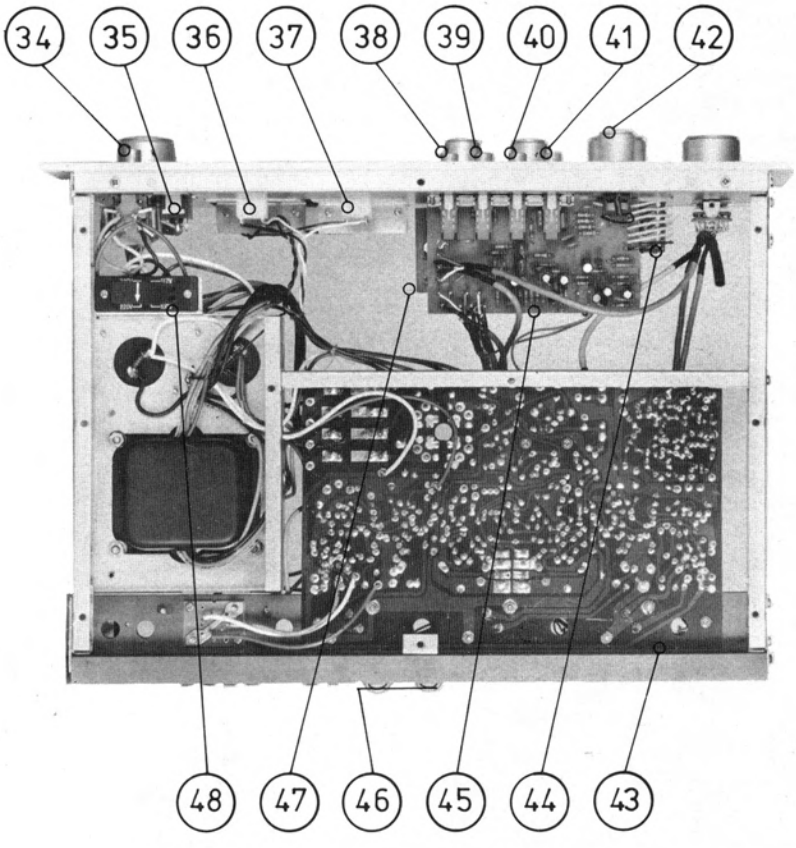
CHASSIS LAYOUT

1. S2, Speakers Switch
2. VR604, Overload Protection Level Adj. (R-ch)
3. Volume Control
4. Treble Control
5. Bass Control
6. Q901, Requrator
7. VR603, Overload Protection level Adj (L-ch)
8. F901, AC Fuse
9. F904, Pilot Lamp Protector Fuse
10. S1, Function Selector Switch
11. C001, Smoothing Capacitor
12. C002, Smoothing capacitor
13. F903, Circuit Protector
14. F902, Circuit Protector
15. T001, Power Transformer
16. VR601, Bias Adj. (L-ch)
17. Q615, Power Transistor (L-ch)
18. Speaker-2 Terminal
19. Q613, Power Teansistor (L-ch)
20. Speaker-1 Terminal
21. L601, Anti-Parasitic (L-ch)
22. VR605, Meter Adj. (L-ch)
23. Q614, Power Transistor (R-ch)
24. Monitor-2 Input &Output PCB
25. Monitor-1 Input and Output DIN Jack PCB
26. AUX Terminals
27. Tuner Input Terminals
28. Phono Input Terminals
29. Phono Input DIN Jack PCB
30. Q616, Power Transistor (R-ch)
31. L602, Anti-Parasitic (R-ch)
32. VR602, Bias Adj. (R-ch)
33. VR606, Meter Adj. (R-ch)



(TOP VIEW)

34. S3, Power Supply Switch
35. J001, Headphone Jack
36. M001, Power Meter (L-ch)
37. M002, Power Meter (R-ch)
38. S7, Monitor-1, Switch
39. S6, Monitor-2, Switch
40. S5, Low-Fil Switch
41. S4, Loudness Switch
42. Balance Control
43. Main Amp. PCB
44. Volune Control Amp. PCB
45. PRE Amp. PCB
46. Short Pin
47. Tone Control PCB
48. Voltage Selector



(BOTTOM VIEW)

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. Replacements for output and driver transistors, if necessary, must be made from the same hfe 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 transistors 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.

POWER AMPLIFIER BIAS ADJUSTMENT

Instrument: DC mili-volt meter

Set volume control to minimum (Counter-clockwise) position.

Set potentiometers VR601 to min. (Counter-clockwise) and VR602 to min. (Clockwise) too before starting this procedure.

1. Connect the plus lead of a DC milli-volt meter to test point T3 (on main amp. pcb) and minus lead to test point T1.
2. Adjust the potentiometer VR601 to obtain a 6.6mV reading on the DC milli-volt meter (see Fig 1)
3. Repeat the above steps 1 and 2 for Right Channel. (use test points Pin NO. T4, T2 and potentiometer VR602.

VR601: BIAS (IDLING CURRENT) ADJ. L–CH.

VR602: BIAS (IDLING CURRENT) ADJ. R–CH.

CHASSIS TOP VIEW (MAIN AMP PORTION)

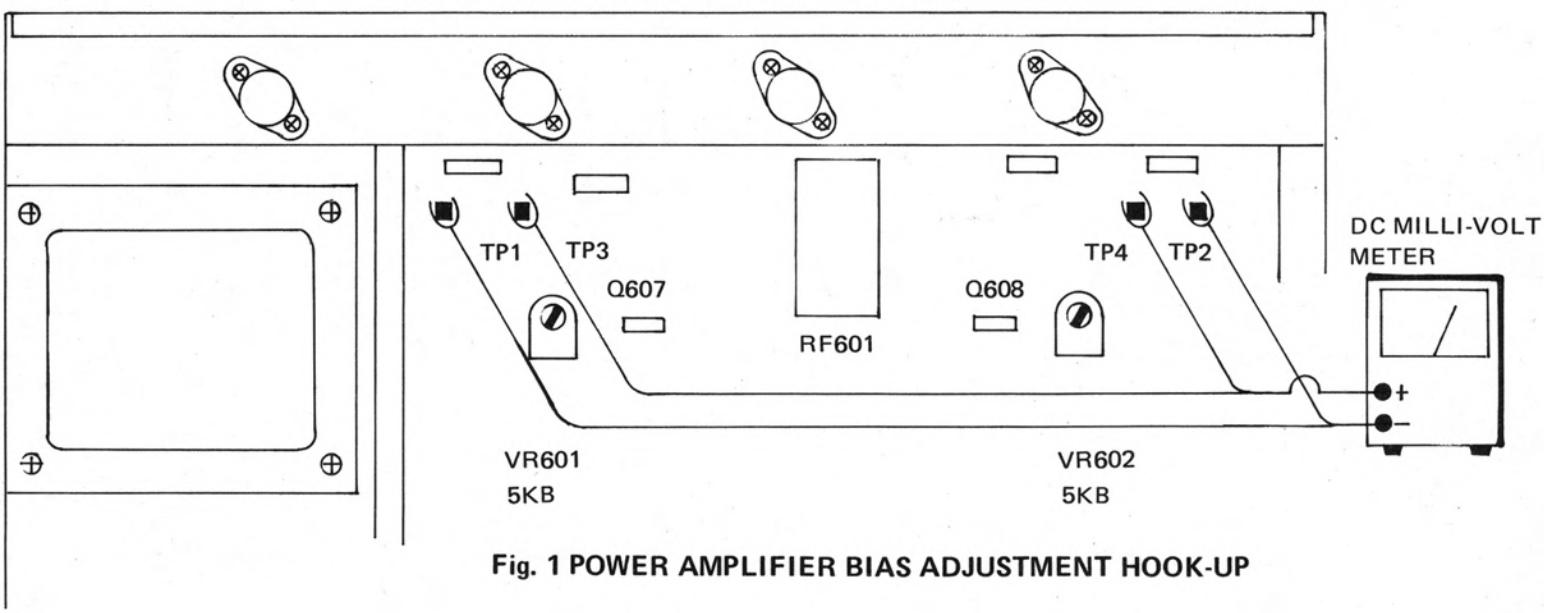


Fig. 1 POWER AMPLIFIER BIAS ADJUSTMENT HOOK-UP

OVERLOAD PROTECTION LEVEL ADJUSTMENT

Instruments: Audio Generator and AC VTVM
Set Function Selector to AUX position.
Be sure to make this adjustment with one channel driven.

1. Connect 4 ohm 100W resistor to output terminal (speaker-1) (L) or (R), then connect AC VTVM in parallel.
2. Turn potentiometer for level adjustment VR 603 (L-ch.) and VR604 (R-ch.) fully counter-clockwise.
3. Connect audio generator to AUX input terminal (L) or (R) and apply 1KHz (sine wave) signal. Adjust input level so that reading on AC VTVM is 20V.
4. Turn potentiometer VR603 or VR604 so that the Protection Relay is disengaged (when indication on AC VTVM is zero).
5. Adjust input level to confirm that the Relay remains activated when the output level is 18V.
6. Proceed the above steps from 2 through 5 for the other channel.

METER CALIBRATION ADJUSTMENT

Insturment: Audio generator and AC VTVM.
Set Function Selector to AUX position.
Set Bass and Treble to Flat (Center) position and Loudness, Low Filter, Switchs to "OUT" position.

1. Connect 8ohm 50W resistor to Right and Left Speaker-1 terminal.
2. Connect AC VTVM in parallel with this 8 ohm load of (L) or (R) channel.
3. Connect Audio generator to input terminal of AUX (L) or (R) channel and apply 1KHz (sine wave) signal. Adjust input level so that reading on AC VTVM is 2.83V (1W/8ohm).
4. Turn and adjust VR605 (L-ch.) or VR606 (R-ch.) so that VU meter indication 1W.
5. Then increase input level by 10dB (output 10W = 8.94V/8ohm) and make sure that reading on VU meter is 10W.

VR605 Left channel meter calibration adjust VR
VR606 Right channel meter calibration adjust VR

CHASSIS TOP VIEW (MAIN AMP PORTION)

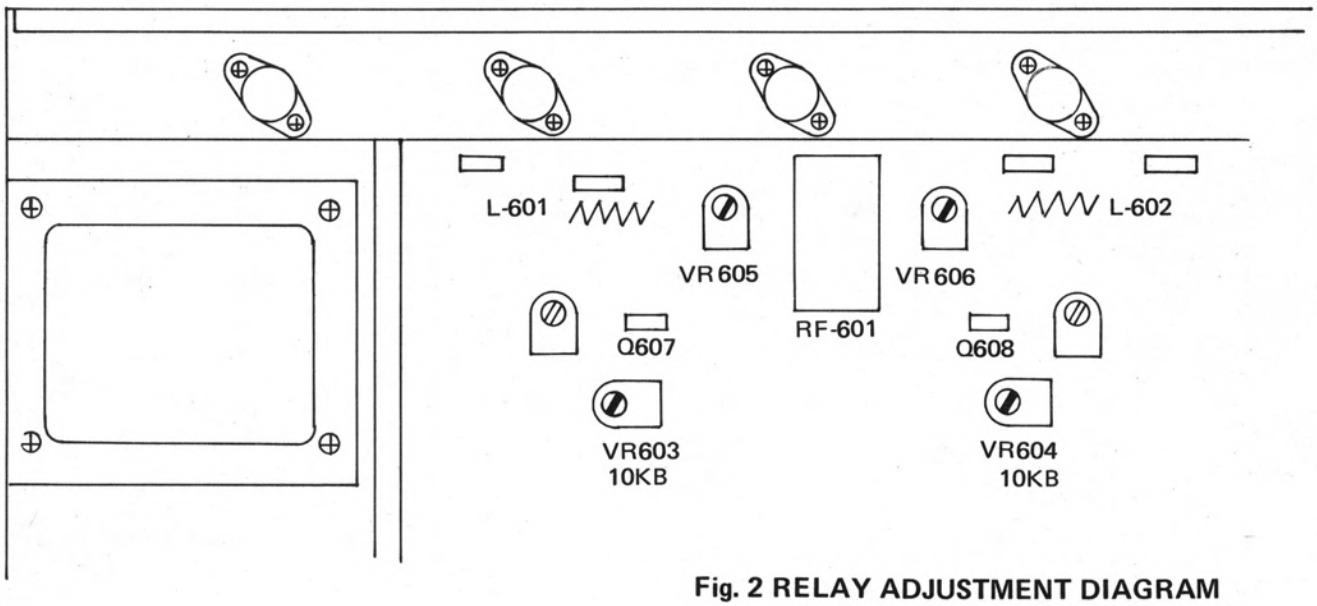
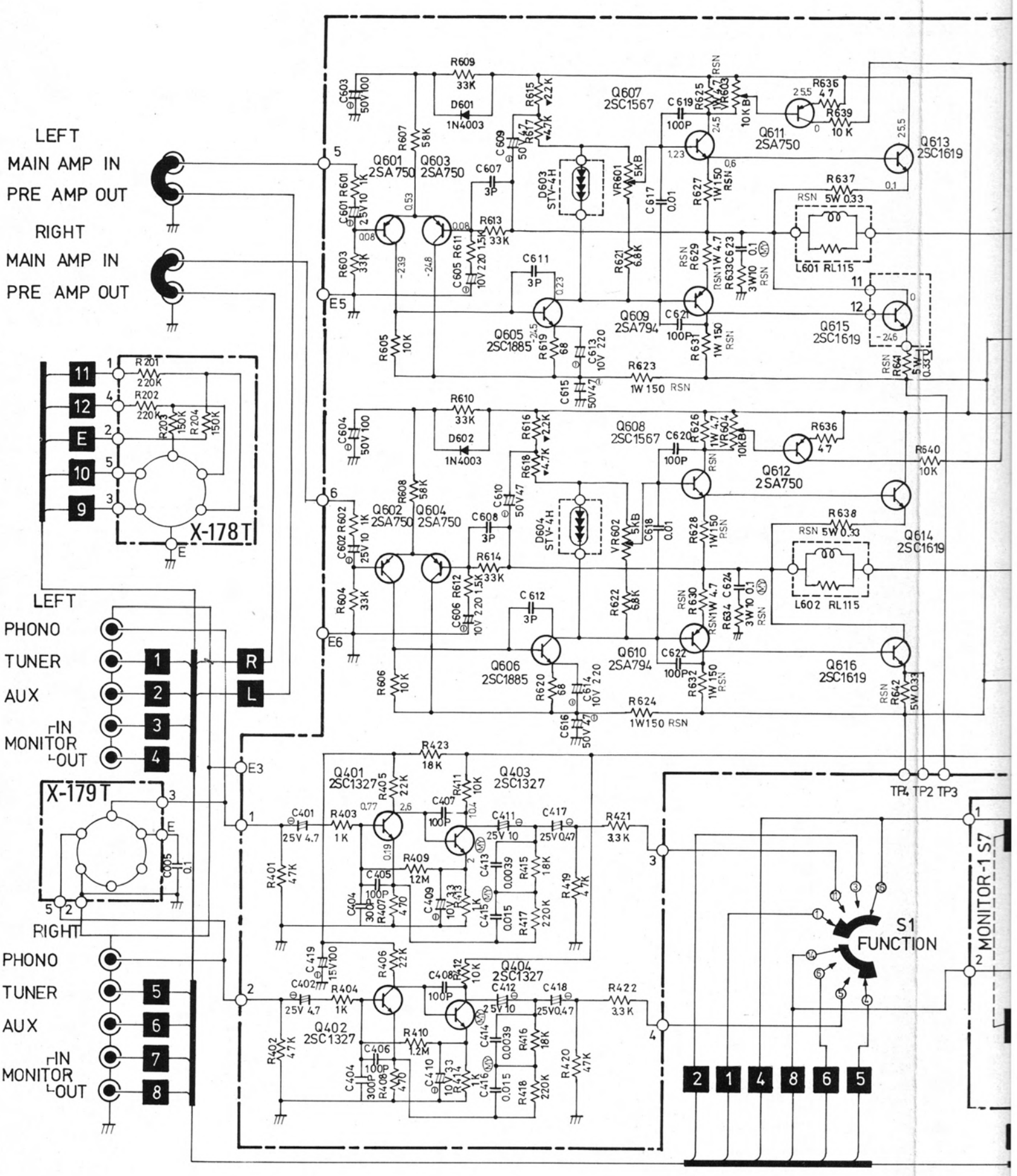
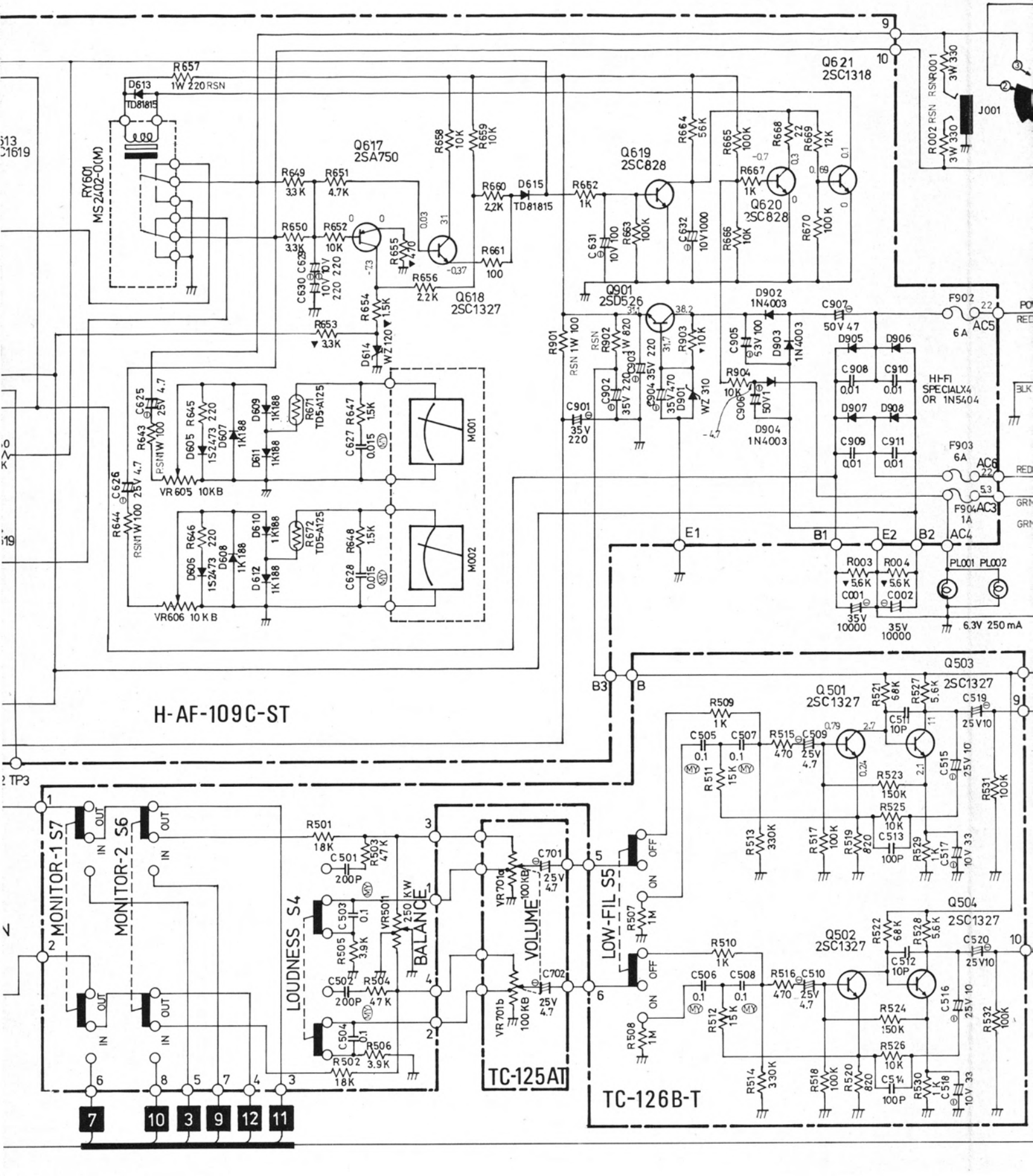
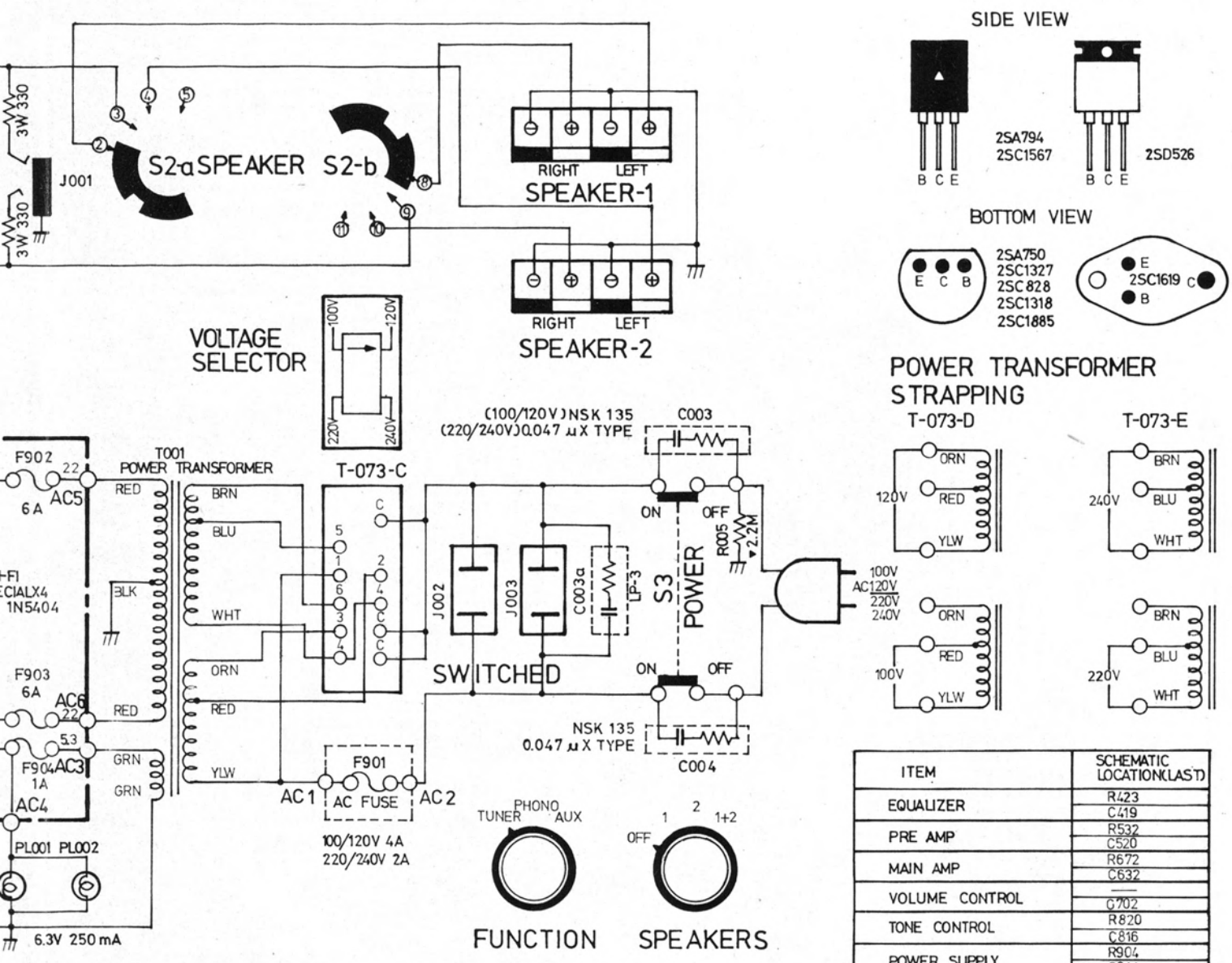


Fig. 2 RELAY ADJUSTMENT DIAGRAM
METER CALIBRATION DIAGRAM

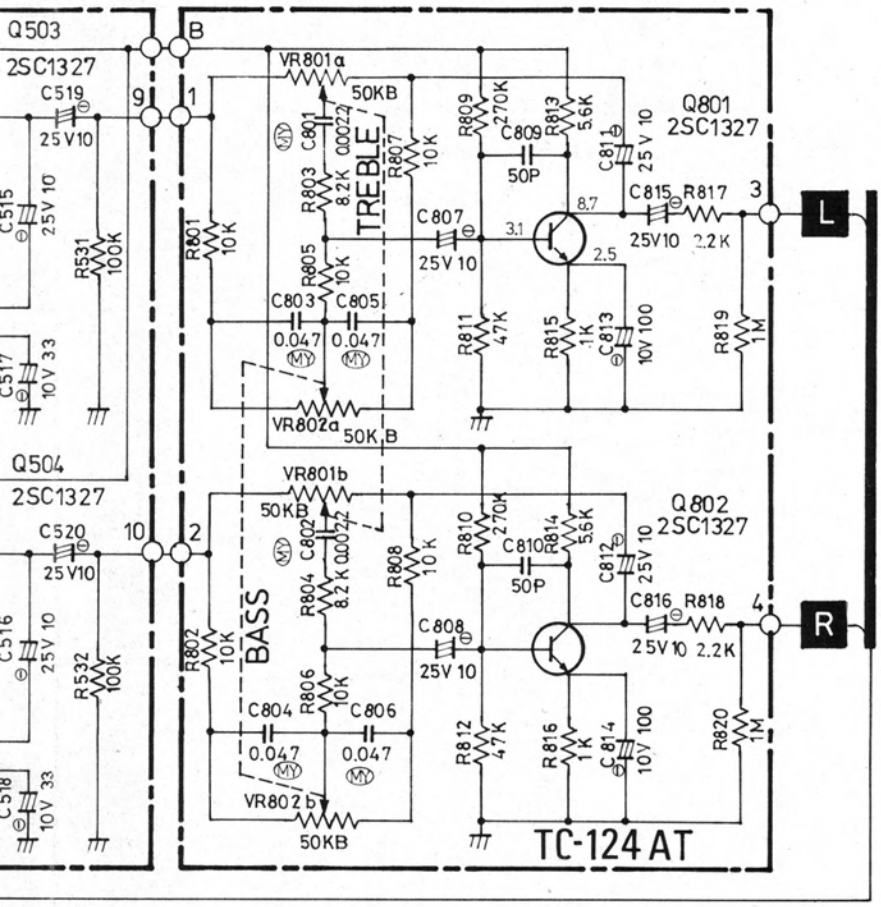

LEFT
MAIN AMP IN
PRE AMP OUT
RIGHT
MAIN AMP IN
PRE AMP OUT
X-178T
X-179T
LEFT
PHONO
TUNER
AUX
IN
MONITOR
OUT
RIGHT
PHONO
TUNER
AUX
IN
MONITOR
OUT
Q601 2SA750
Q603 2SA750
Q605 2SC1885
Q607 2SC1567
Q609 2SA794
Q611 2SA750
Q613 2SC1619
Q615 2SC1619
Q602 2SA750
Q604 2SA750
Q606 2SC1885
Q608 2SC1567
Q610 2SA794
Q612 2SA750
Q614 2SC1619
Q616 2SC1619
Q401 2SC1327
Q403 2SC1327
Q402 2SC1327
Q404 2SC1327
D601 1N4003
D602 1N4003
D603 STV-4H
D604 STV-4H
L601 RL115
L602 RL115
TP4 TP2 TP3
S1 FUNCTION
MONITOR-1 S7
2 1 4 8 6 5

SCHEMATIC DIAGRAM





ITEM	SCHEMATIC LOCATION(LAST)
EQUALIZER	R423
	C419
PRE AMP	R532
	C520
MAIN AMP	R672
	C632
VOLUME CONTROL	—
	C702
TONE CONTROL	R820
	C816
POWER SUPPLY	R904
	C911
DIN JACK	R204
	—
CHASSIS	R005
	C005



RESISTORS

5% TOLERANCE UNLESS OTHERWISE NOTED.
K--- KILO OHM
M---MEGA OHM
▼---COMPOSITION RESISTORS 1/2 WATT.
RSN---METAL OXIDE FILM RESISTORS.
NON MARK---LOW NOISE TYPE CARBON RESISTORS 1/4 WATT.

CAPACITORS

(MY)---MYLAR FILM CAPACITORS.
⊣⊢---ELECTROLYTIC CAPACITORS.
NON MARK---CERAMIC CAPACITORS.
UNLESS OTHERWISE NOTED IN SCHEMATIC ALL CAPACITANCE VALUES ARE EXPRESSED IN MFD.

FOR CSA

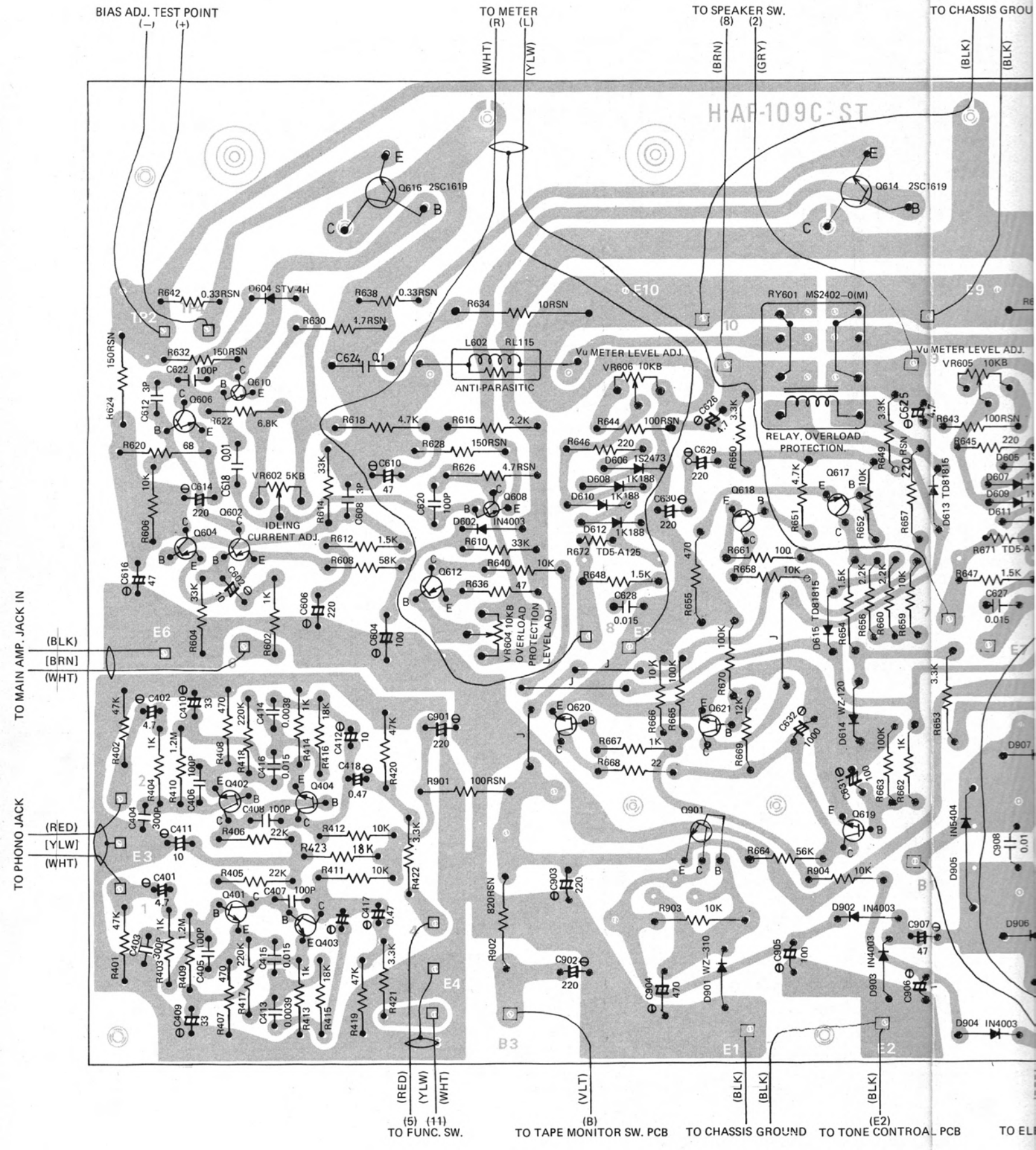
1. CANCELED SPARK KILLER C003, C004. ADD C003a.
2. CHANGED TRANSFORMER TO D TYPE.

FOR CEE

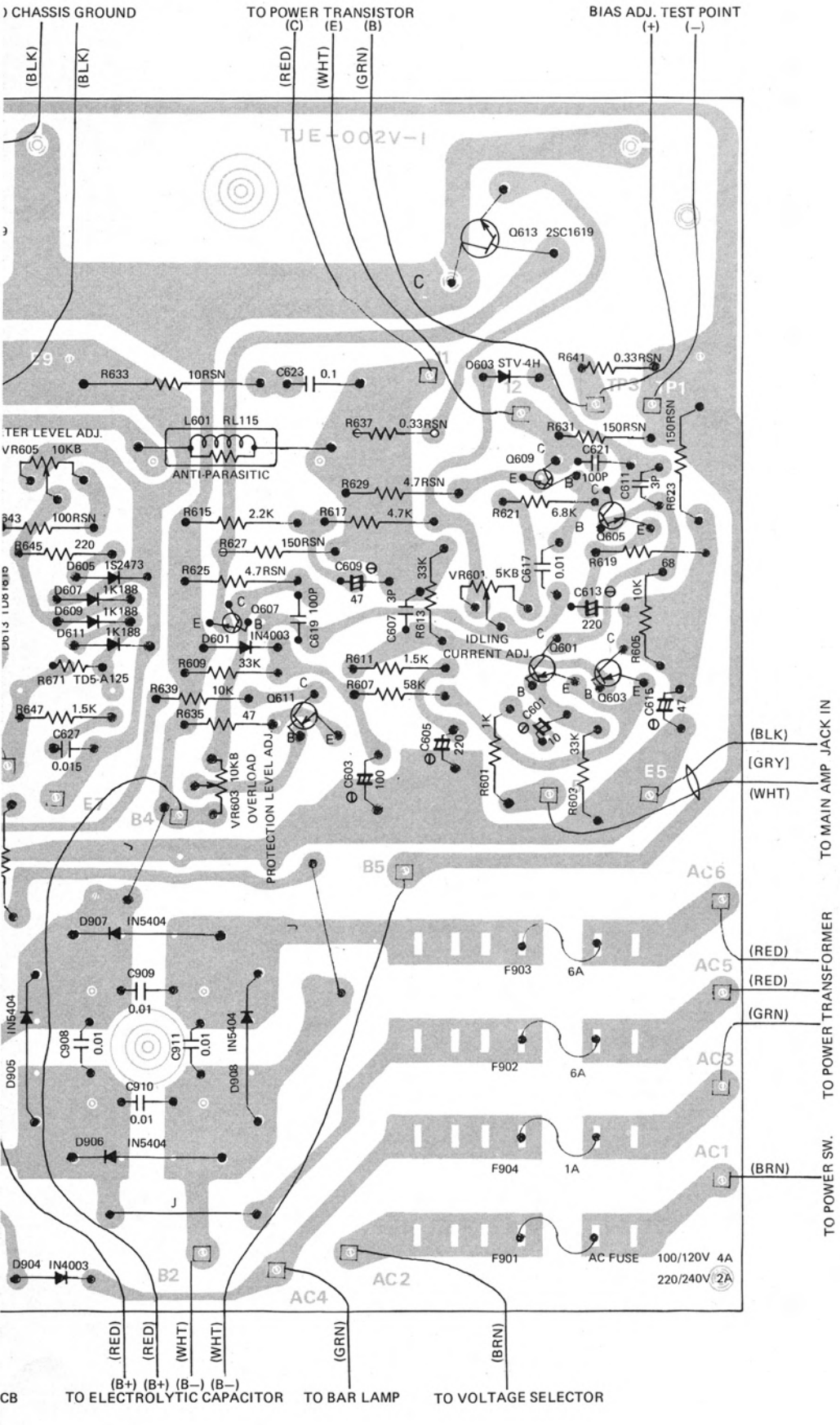
1. ALL FUSE USED MINIATURE FUSE.
2. CHANGED TRANSFORMER TO E TYPE.

- VOLTAGE READING WITH VTVM FROM THE POINT SHOWN TO THE CHASSIS GROUND(AC120V).
- VOLTAGE READING MAY VARY ±20%.
- SCHEMATIC SUBJECT TO CHANGES FOR IMPROVEMENT WITHOUT PRIOR NOTICE.

PHONO, MAIN AMP & POWER SUPPLY CI



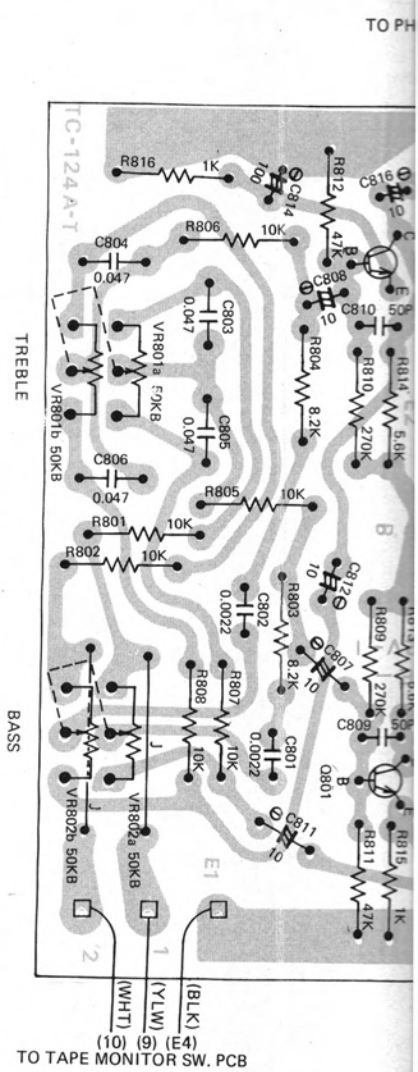
PLY CIRCUIT BOARD DIAGRAM



TAPE MONITOR INPU
CIRCUIT BOA

PHONO IN
BOA

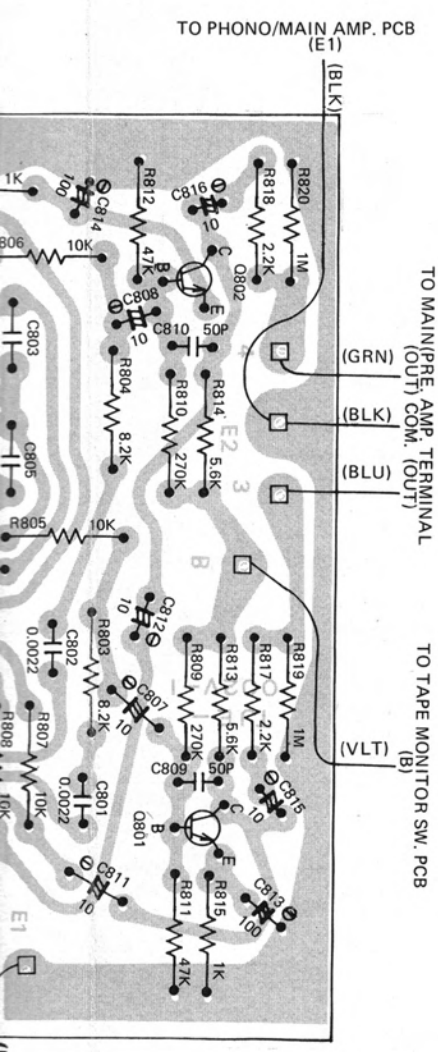
TONE CONTROL AM
BOARD DIAGRAM

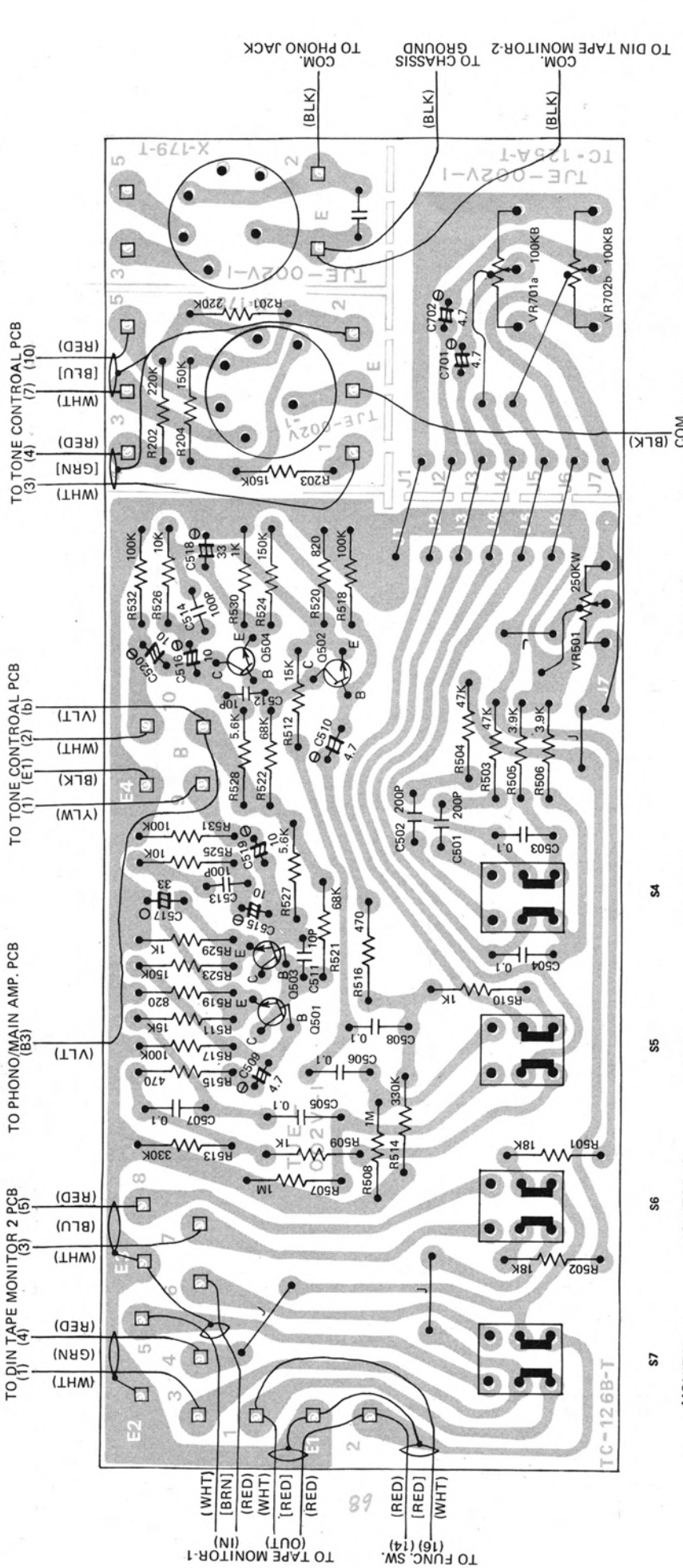


ITOR INPUT & OUTPUT
CUIT BOARD DIAGRAM

PHONO INPUT CIRCUIT
BOARD DIAGRAM

NTROL AMP. CIRCUIT
IAGRAM





VOLUME CONTROL AMP.
CIRUIT BOARD DIAGRAM

PRE AMP. CIRCUIT BOARD DIAGRAM

TROUBLE SHOOTING

I Both Channel inoperative

A. If meter lamp does not light, check AC fuse F901 and
   1. If AC fuse F901 is blown
      a. Rectifier D903, 905, 906, 907 or 908 may be short-circuited, or
      b. Primary or Secondary winding of power transformer may be short-circuited, or
      c. Capacitor C001, 002, 905, 908, 909, 910 or 911 may be short-circuited.
   2. If AC fuse is not blown
      a. Power Switch may be faulty, or
      b. Primary winding of power transformer may be broken.

B. If meter lamp does light, check B1 and B2 voltages.
   1. If no voltage at B1 and B2, check AC fuses F902 and 903.
      a. If there fuse are blown.
      (1) Repeat the above steps a and c of part 1 of item A, or
      (2) Check all transistor in Main Amp. circuit.
      b. If there fuse are not blown.
      (1) Secondary winding of power transformer may be broken, or
      (2) Recitifier D 905, 906, 907 or 908 may be open circuited.
   2. If B1 and B2 voltage are present, check following item C

C. Check if relay of Overload Protector is activated.
   1. If relay is activated when power switch is on.
      a. Contact of relay may be faulty.
   2. If relay stays disengaged
      a. Output circuit may be short-circuited, or
      b. Relay may be faulty (disconnection of coil), or
      c. Transistor Q621 may be faulty (open).

II One channel inoperative

A. Check if input signal is supplied to Main Amp. input terminal.
   1. If input signal is not supplied to Main IN terminal.
      a. Check all transistors in Tone Control Amp.
      b. Check all coupling capacitors in Tone Control Amp.
   2. If input signal is suppied properly.
      a. C601 (C602 for R– ch.) may be faulty, or
      b. Contact of Overload Protector Relay may be faulty.

III Overload protector inoperative

A. If Relay is disengaged or comes ON and OFF at the peak of signal.
   1. There may be excessive input, or
   2. Overload Detector Level may be miss-aligned.

B. If relay is disengaged or comes ON and OFF at the small signal.
   1. Overload Detector Level may be miss-aligned.

C. If Relay does not deactivate at the excessive input or short-circuit of output circuit.
   1. Transistor Q621 for driving Relay may be short-circuited.

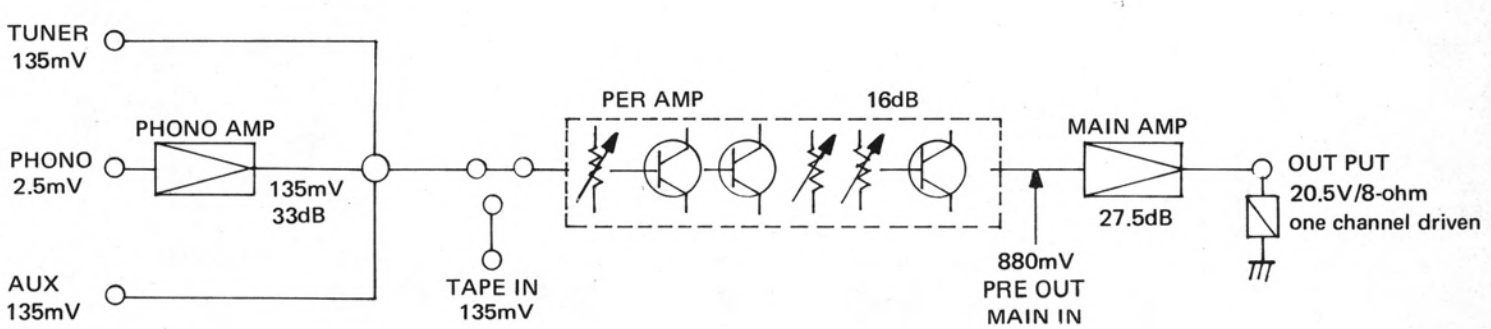
IV Hum and Noise

A. If there is hum at minimum volume
   1. Check each transistor in Main Amp.
   2. Check each coupling capacitor in Tone Amp.

B. If there is noise at minimum volume
   1. Check each transistor in Tone Amp.
   2. Check each coupling capacitor in Tone Amp.
   3. Check each resistor at collector, base and emitter ends of each transistor.

C. If there is hum or noise only in Phone Amp.
   1. Q401 or 403 (Q402 or 404 for R– ch.) may be faulty, or
   2. Capacitor C401, 409, 411, or 417 (C402, 410, 412, or 418 for R– ch.) may be faulty.

GAIN DIAGRAM



*Signal = 1000Hz sine wave

REPAIR PARTS LIST

Symbol	Part No.	Description
TRANSISTORS, AND DIODES		
Q401~404	301201134	2SC1327, Phono Amp.
Q501~504	301201134	2SC1327, Tone Amp.
Q601~604	301001134	2SA750(1), Differential Amp.
Q605, 606	301201164	2SC1885, Pre-driver
Q607, 608	301201150	2SC1567, Driver
Q609, 610	301001135	2SA794, Driver
Q611, 612	301001134	2SA750(1), Overload Protection
Q613~616	301201168	2SC1619, Power Amp.
Q617	301001134	2SA 750(1), Output DC Cut off (—)
Q618	301201134	2SC1327, Output DC Cut off (+)
Q619, 620	301201115	2SC828, Overload Protection Throshold
Q621	301201155	2SC1318, Protection Relay Driver
Q801, 802	301201134	2SC1327, Tone Amp.
Q901	301301131	2SD526, Stabilizer
D601, 602	300919026	1N4003, DC Balance Requrator
D603, 604	300212009	STV-4H, Temperature Compensator
D605, 606	300111010	1S2473, VU Meter Rectifier
D607~612	300111008	1K188, VU Meter Rectifier
D613	300111012	TD81515, Relay Overload protection
D614	300313023	BZX-83C, Zener Requrator 12V, ½W
D615	300111012	TD81515, Auto-Switching
D901	300313021	WZ-310, Zener Requrator, 31V, 1W
D902~904	300919026	1N4003, Rectifier
D905~908	300919028	1N5404, Rectifier
COIL AND SEMI-FIXED VARIABLE RESISTORS		
Ry 601	240111225	Relay, Overload Protection
VR802	525101142	50KBX2, Bass Control
VR601, 602	510502161	5KB, Idling Current Adj.
VR603, 604	510502162	10KB, Overload Protection Level Adj.
VR605, 606	510502162	10KB, VU Meter Level Adj
VR501	515121121	250KW, Balance Control
VR701	525121135	100KBX2, Volume Control
VR801	525101142	50KBX2, Treble Control

Symbol	Part No.	Description
OTHERS		
S1	601011268	Switch, Function Selector
S2	601011291	Switch, Speaker Selector
S3~ S6	614040821	Switch, Push 4-Key Low-Fil, Londness
(1 set)		Tape Monitor-2 and 1
S7	614010118	Switch, Power Supply
PL001, 002	352063025	Lamp, 63V 250mA Pilot
M001, 002	231310071	Watt Meter
F901	341220040	Fuse, 4A, 3AG, AC Circuit Protection (Line Voltage at 100V or 120V only)
	341220020	Fuse, 2A 3AG, AC Circuit Protection (Line Voltage at 220V or 240V only)
F902, 903	341220060	Fuse, 6A AC Circuit Protection
F904	341220010	Fuse, 1A, Lamp Protection
C001, 002	402100339	Capacitor, Electrlytic 10000mfd, 35V
T001,	205001393	Transformer Power Supply (Multi-Voltage)
	204001393	Transformer, Power Supply (100V/120V)
	206001393	Transformer, Power Supply (220V/240V)
	141610280	Phono, Main Amp, and Rectifier Circuit Board Assembly (without Power Amp. Transistors)
	141610281	Phono, Main Amp and Rectifier Circuit Board Assembly (without Power Amp. Transistors) For BS. Spec. Application
	141610282	Phono, Main Amp. and Rectifier Circuit Board Assembly (without Power Amp. Transistors) For CEE Spec. Application
	141710284	Tone Control Amp Circuit Board Assembly
	141710285	Volume Control Amp Circuit Board Assembly
	141710286	Tape Monitr Lo-Fil & Loudness Switch Circuit Board Assembly
	141810686	Tape Monitor (DIN Jack) Circuit Board Assembly
	111911358	Frent Panel Assembly
	626110023	Jack, Headphone
	624210106	Pin Jack, 6P RCA Type
	624210104	Pin Jack, 4P RCA Type
	642400106	Speaker Terminal
	648211121	Voltage Selector

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