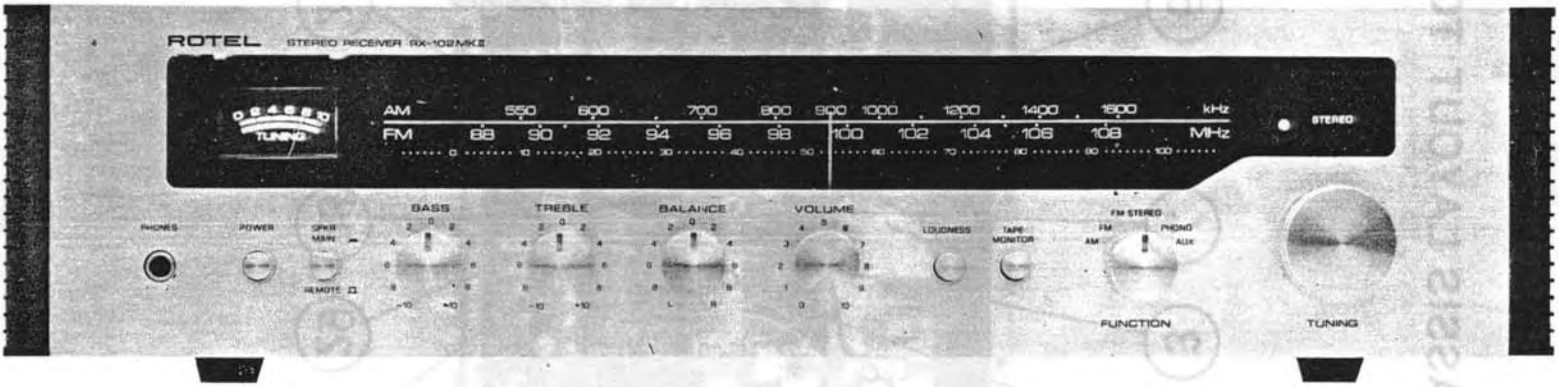
ROTEL®

STEREO RECEIVER
RX-102MKII



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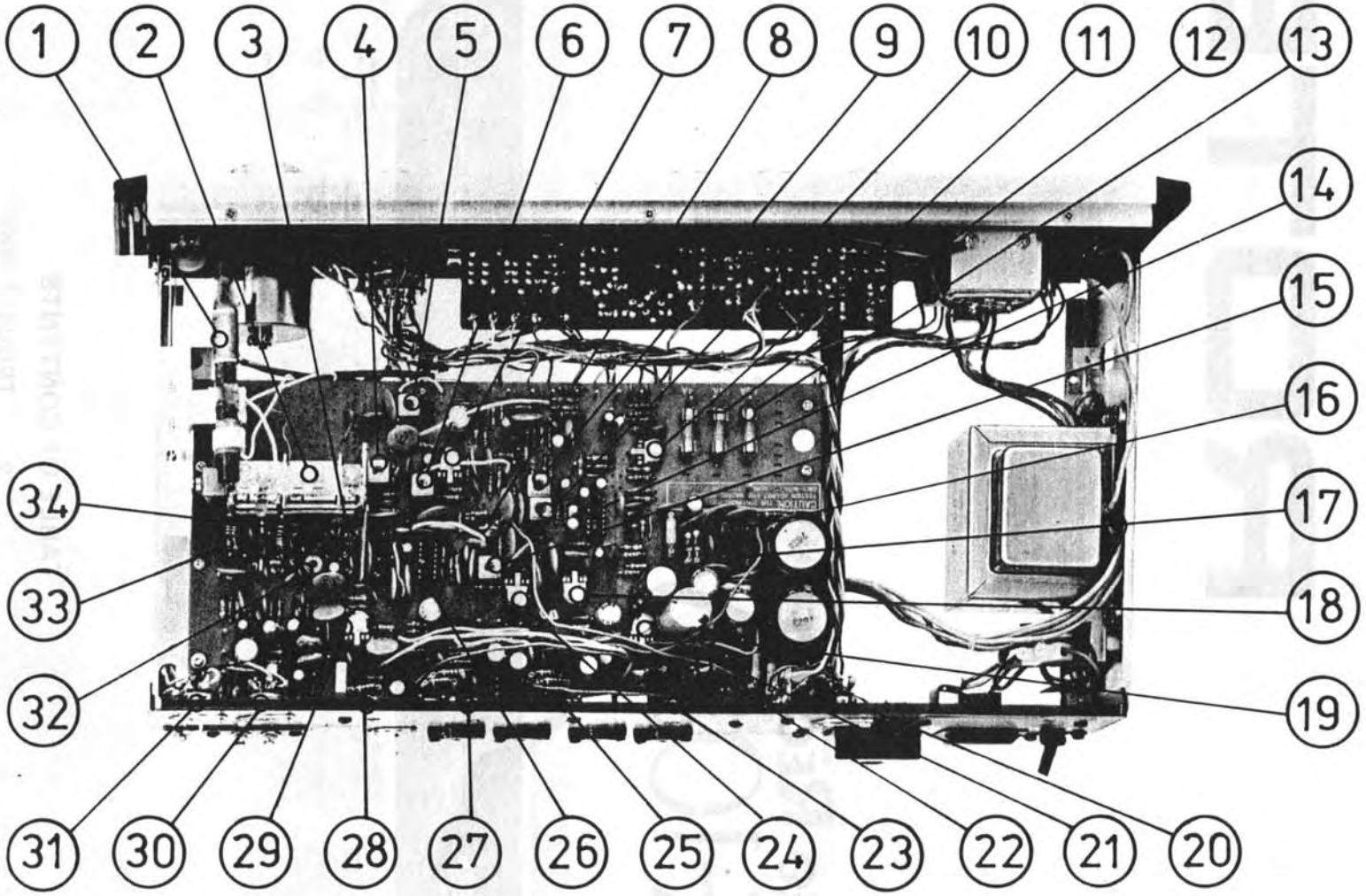
technical manual

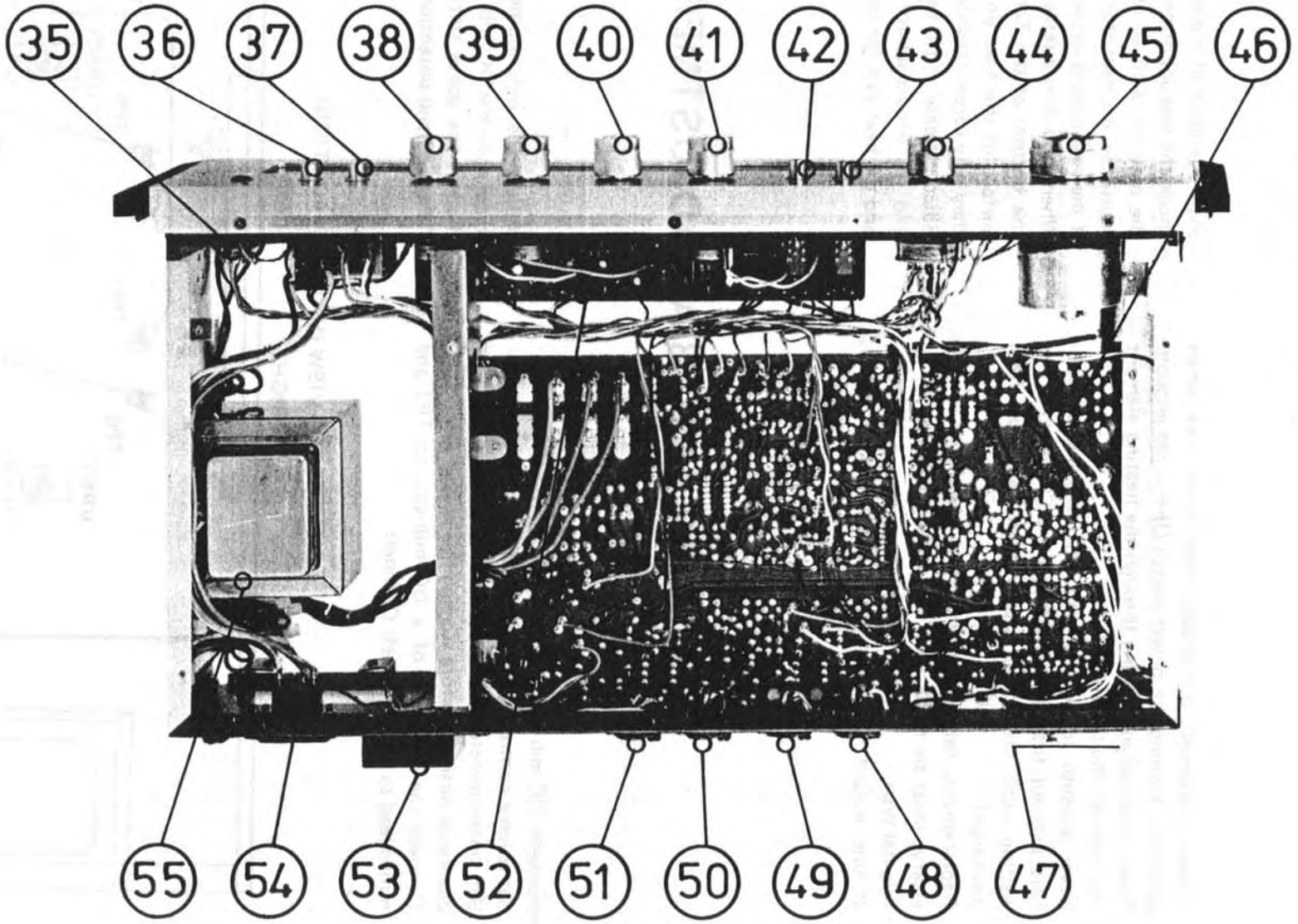
CHASSIS LAYOUT TOP VIEW

1. L001, AM Antenna Coil
2. Air Varicon
3. L106, FM OSC Coil
4. L113, AM IFT, 1st
5. L112, AM OSC Coil
6. L114, AM IFT, 2nd
7. VR103, AM Gain Adj.
8. VR102, AM Meter Adj.
9. L111, FM IFT, Ratio (Sec.)
10. L110, FM IFT, Ratio (Pri.)
11. VR302, FM Stereo Separation Adj.
12. F901, F902, AC Fuse 4A
13. F903, Pilot Lamp Fuse 1.5A
14. IC301, FM MPX Decoder
15. L109, AM IFT, 3rd
16. D904, Rectifier
17. D905, Rectifier
18. VR301, FM Stereo VCO Adj.
19. L601, Anti-Parasitic (L-ch)
20. Tape Monitor Jack (RCA Type or DIN Type)
21. VR602, Bias Adj. (R-ch)
22. L602, Anti-Parasitic (R-ch)
23. Q612, Power Amp. (R-ch)
24. VR101, FM Meter Adj.
25. Q614, Power Amp. (R-ch)
26. IC101, AM and FM IF Amp.
27. Q613, Power Amp. (L-ch)
28. Q611, Power Amp. (L-ch)
29. VR601, Bias Adj. (L-ch)
30. AUX Input Jack (RCA Type or DIN Type)
31. Phono Input Jack (RCA Type or DIN Type)
32. L107, FM IFT
33. L101, L102, FM Antenna Coil
34. L103, L104, FM RF Coil



CHASSIS LAYOUT BOTTOM VIEW

35. Headphone Jack
36. S5, Power Supply Switch
37. S4, Speaker Switch
38. Bass Control
39. Treble Control
40. Balance Control
41. Volume Control
42. S3, Loudness Switch
43. S2, Tape Monitor Switch
44. S1, Function Switch
45. Tuning Knob
46. AM/FM/MPX Amp. PCB
47. Antenna Terminal
48. Main Speaker Jack (R-ch)
49. Main Speaker Jack (L-ch)
50. Remote Speaker Jack (R-ch)
51. Remote Speaker Jack (L-ch)
52. Tone Control Amp. PCB
53. Speaker Fuse
54. AC Outlet
55. T001, Power Transformer



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 apli-fiers 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 AMP. BIAS ADJUSTMENT

Instrument: DC mili-volt meter.

- Set volume control to minimum position.
- Set potentiometer VR 601 and VR 602 to Counter clockwise position before starting this procedure.

1. Connect the plus lead of a DC mili-volt to TP3 and minus lead to TP5. (for Left Channel)
2. Adjust the potentiometer VR601 to obtain a 15 mV reading on the DC mili-volt meter. (See Figure 1)
3. Repeat the above step 1 and 2 for right channel. (Use TP4, TP6 and potentiometer VR602)

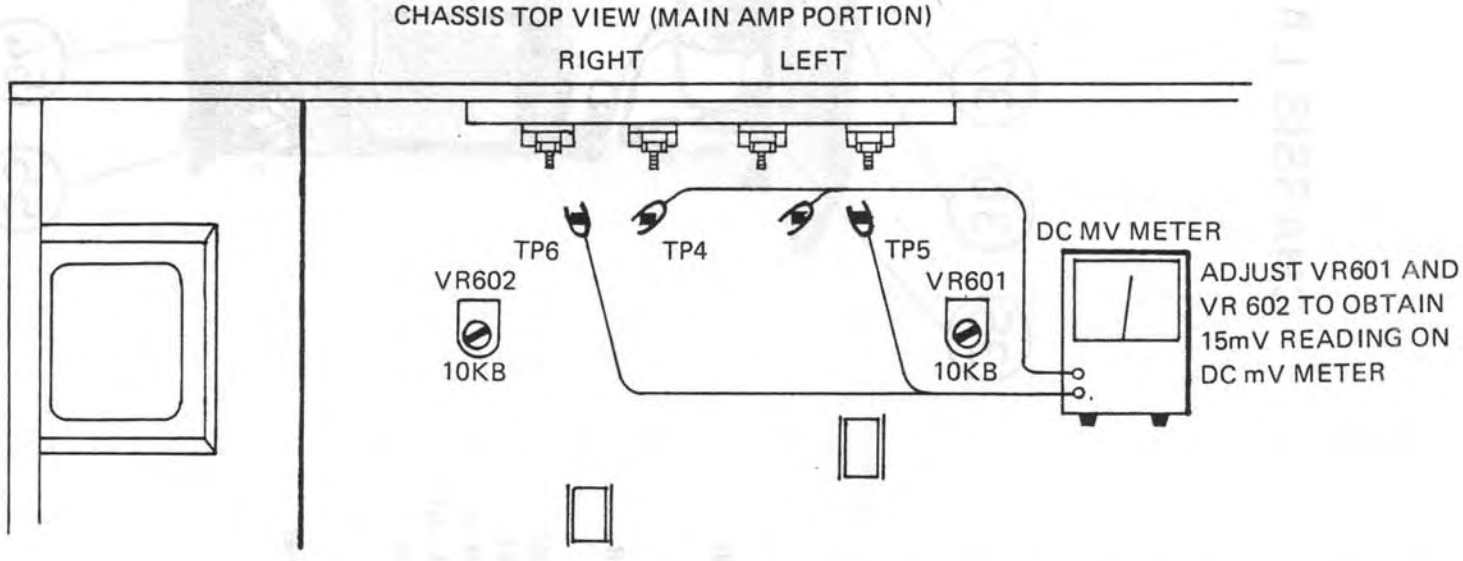


Fig. 1 POWER AMPLIFER BIAS ADJUSTMENT HOOK-UP

AM IF & RF ALIGNMENT PROCEDURE

Instruments: AM Signal Generator and AC VTVM.

NOTES: Set Function Selector Switch to AM position.
Input signal must be kept as low as possible to avoid AVC action.

Step	Generator		Turning Dial Setting	Output Indicator Connected to	Adjust	Adjust for
	Coupling	Frequency				
1	Pin No. 38 on IF board through a 0.01 mfd cap.	455 KHz (400 Hz 30% mod.)	Non interfering at low end of scale.	AC VTVM to TAPE OUT jack	L109, 113 and 114 (on IF BOARD) & VR103	Maximum reading on VTVM
2	Connect to short loop of wire. Radiate signal into ferrite loop-stick antenna	600KHz (400Hz 30% mod.)	600KHz		L112 (OSC) (on IF board) and L001 (ANT)	
3		1400 KHz (400 Hz 30% Mod.)	1400 KHz		CT5 (OSC) and CT4 (ANT) (on Front-end)	
4	Repeat steps 2 and 3 until no further improvement is noticed.					

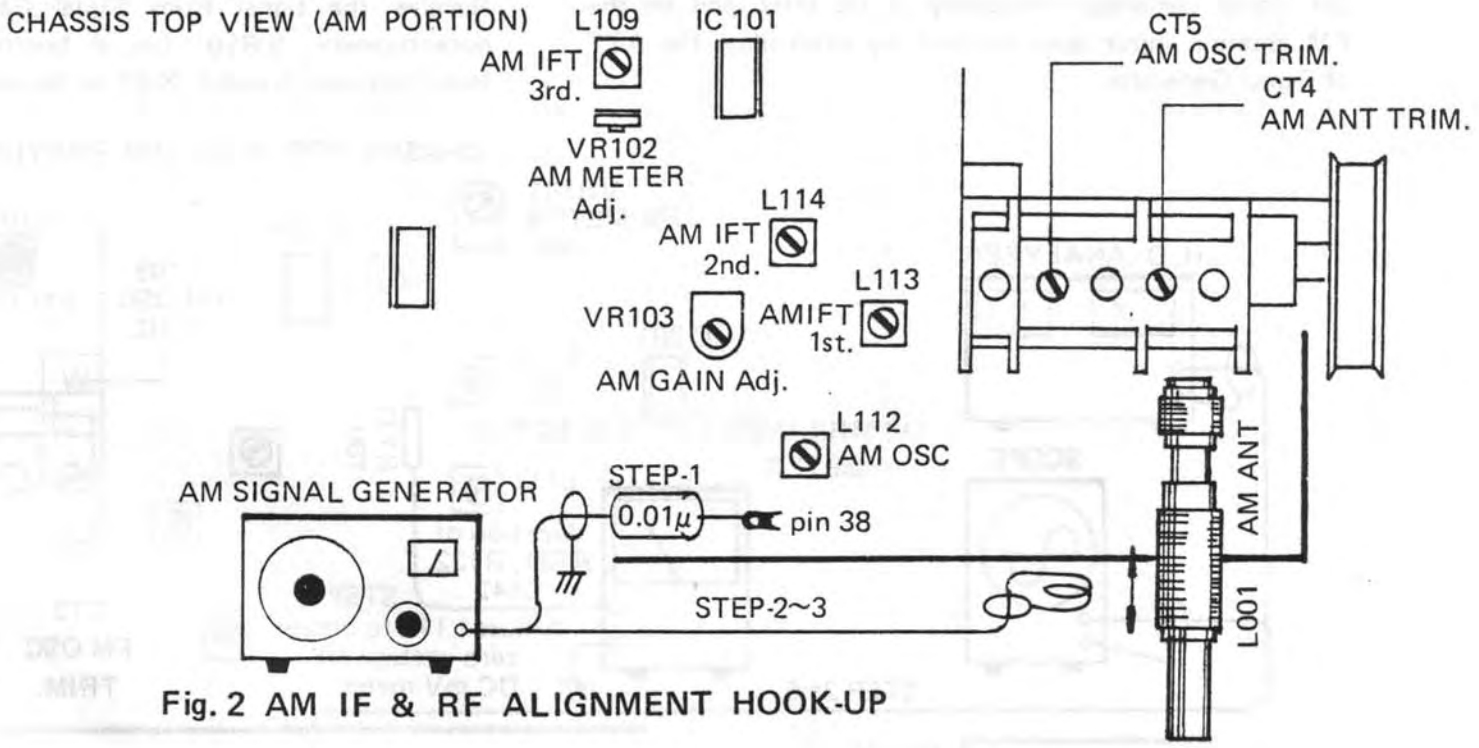


Fig. 2 AM IF & RF ALIGNMENT HOOK-UP

FM IF & RF ALIGNMENT PROCEDURE

Step	Generator		Tuning Dial Setting	Output Indicator Connected to	Adjust	Adjust for
	Connected to	Frequency				
1	No signal input.		Non interfering appears on band	DC millivoltmeter To Junction of R131, R132, C142	L111 (on IF board)	Zero Voltage on DC milli-volt meter
2	FM Signal Generator		Tune for maximum output point.	H.D. Analyzer	L107 (on Front-end)	Maximum reading on level meter of H.D. Analyzer
	To FM antenna terminals Note: Signal Strength must be kept-3 dB of limiter saturation	98 MHz (400 Hz 100% Mod.)		To output jack		
3					L110 (on IF board)	Minimum reading on Distortion meter of H.D. Analyzer
4		90 MHz (400 Hz 100% Mod.)	90 MHz on dial scale		L106 (OSC) L104 (RF), L102 (ANT) Coil (on Frontend)	Maximum reading on level meter of H.D. Analyzer
5		106 MHz (400 Hz 100% Mod.)	106 MHz on dial scale		CT3 (OSC), CT2 (RF), CT1 (ANT) Trim (on Frontend)	
6	Repeat the above steps 4 and 5 until no further improvement is noticed.					

FM METER LEVEL ADJUSTMENT

Set Signal Generator frequency to 90 MHz, and set the FM antenna input level to 1mV by controlling the ATT of Signal Generator.

Receive the signal from Signal Generator, and adjust potentiometer, VR101 (on IF board) so that the Signal Meter indicates toward "8.5" on the scale.

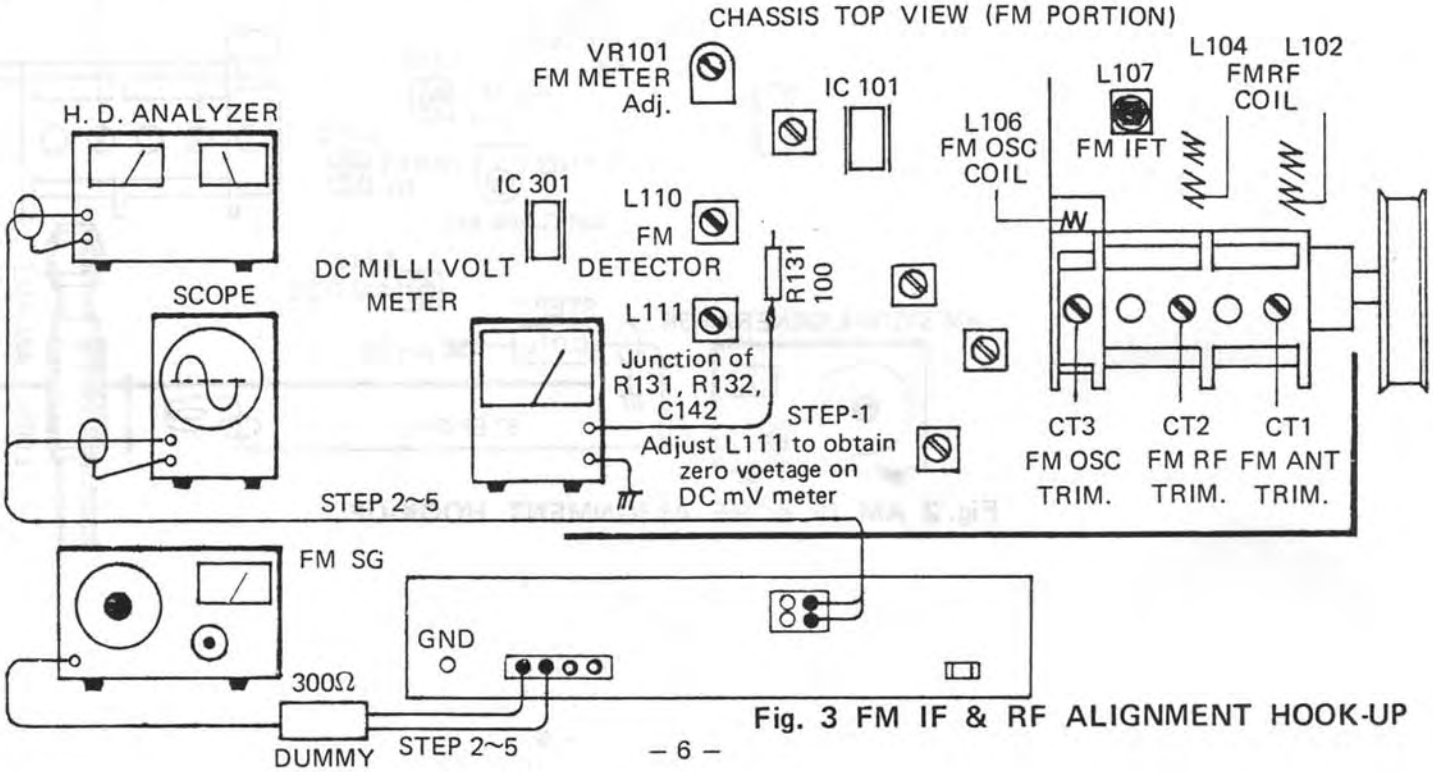


Fig. 3 FM IF & RF ALIGNMENT HOOK-UP

FM MPX ALIGNMENT PROCEDURE

Note: The FM IF amplifier alignment must be completed before attempting this MPX alignment. Poor FM IF alignment will result in poor multiplex adjustment.

Instruments: FM Stereo Generator, AC VTVM and Oscilloscope

1. Set Function Selector to FM STEREO position.
2. Set VR301 at the middle of range in which Stereo Indicator lights up.
3. Connect FM Stereo Generator to FM antenna terminals and AC VTVM and Oscilloscope to Tape Out (R-ch.)
4. Set the frequency at 98MHz (if a disturbing signal appears, select another frequency). FM Stereo Generator modulation is as follows:
   Pilot 10%
   Modulation Frequency 1 KHz (L-ch. Signal) 90%
5. Turn and adjust the VR302 so that the leakage signal on the Oscilloscope and AC VTVM is minimum.
6. Then change the connections of Oscilloscope and AC VTVM from R-ch. to L-ch. Tape Out jack, as well as the modulation signal from L-ch. to R-ch. At the same time, check that the leakage signal is minmum. If the difference in leakage signals between R-ch. and L-ch. is large, adjust the VR302 precisely so as to obtain equal levels between leakage signals.
7. Make sure the Stereo can be operated normally even when the modulation degree of pilot Signal of FM Stereo Generator is reduced from 10% to 6%.

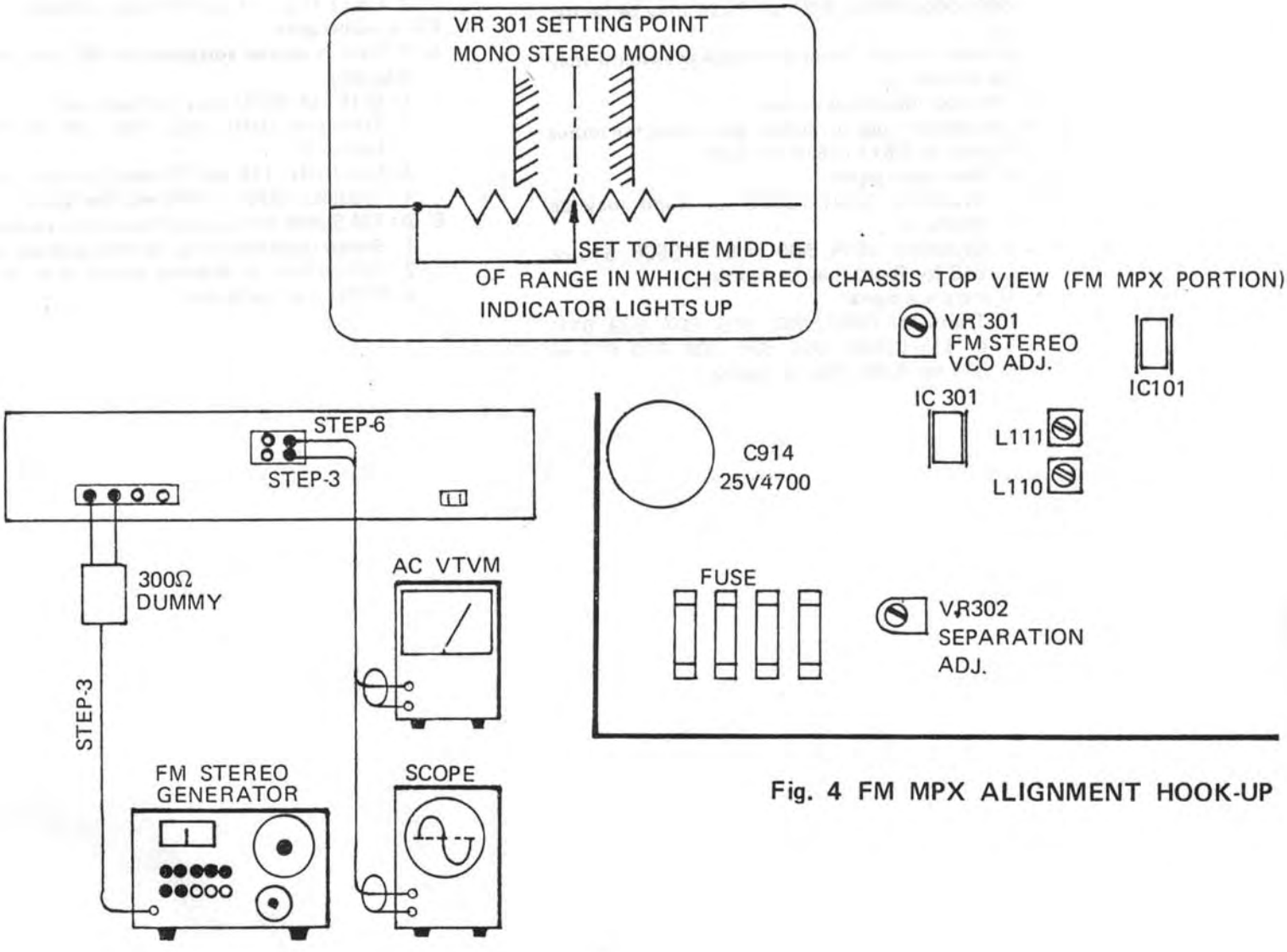


Fig. 4 FM MPX ALIGNMENT HOOK-UP

TROUBLE SHOOTING

Unit incoperative

I. If the pilot lamp does not light, check the flow at the AC outlet and
   A. If no voltage across
      1. The AC cord may be broken, or
      2. Connections in the power switch may be faulty.
   B. If there is proper voltage across, check the AC fuse F904 and If the AC fuse is blown
      1. Rectifier D904 or D905 may be shorted, or
      2. Capacitor C901, 902, 903, 904, 906, 907, 908, 914, or 915 may be shorted, or
      3. Primary or secondary winding of the power transformer T001 may be shorted.

II. If the pilot lamp does light, measure voltage across +B, −B and B5 (on main amp. pcb) and
   A. If no voltage across.
      1. Rectifier D904 or D905 may be open, or
      2. Secondary winding of the power transformer may be open.
   B. If there is proper voltage across, check the speaker fuse and
      1. If the speaker fuse is blown.
         a. Transistor Q611 or 613 (Q612 or 614 for R-ch) may be shorted, or
         b. Transistor Q601, 603, 605, 607 or 609 (Q602, 604, 606, 608 or 610 for R-ch) may be faulty, or
         c. Output circuit (including speaker system) may be shorted, or
         d. The fuse may be worn out.
      2. If the speaker fuse is normal and check the minus "−" point of C517 (C518 for R-ch)
         a. If there is no signal
            i. Transistor Q501 (Q502 for R-ch) may be faulty, or
            ii. Capacitor C505, 509 or 517 (C506, 510 or 518 for R-ch) may be faulty.
         b. If there is a signal
            i. Transistor Q601, 603, 605, 607, 609, 611, or 613 (Q602, 604, 606, 608, 610, 612 or 614 for R-ch) may be faulty.

Only PHONO Section Inoperative

A. Transistor Q401 or 403 (Q402 or 404 for R-ch) may be faulty, or
B. Capacitor C401, 403, 411 or 417 (C402, 404, 412, or 418 for R-ch) may be faulty.

Hum And/or Noise

A. Hum and/or noise produced with Volume Control set at Minimum
   1. Transistor Q501 (Q502 for R-ch) may be faulty, or
   2. Capacitor C505, 509, or 517 (C506, 510, or 518 for R-ch) may be faulty, or
B. Hum and/or noise produced only in PHONO.
   1. Transistor Q401 or 403 (Q402 or 404 for R-ch) may be faulty, or
   2. Capacitor C904, 906, 401, or 411 (C904, 906 402, or 412 for R-ch) may be faulty, or
   3. Resister R904, 405, 423, or 413 (R904, 406, 423, or 414 for R-ch) may be faulty.

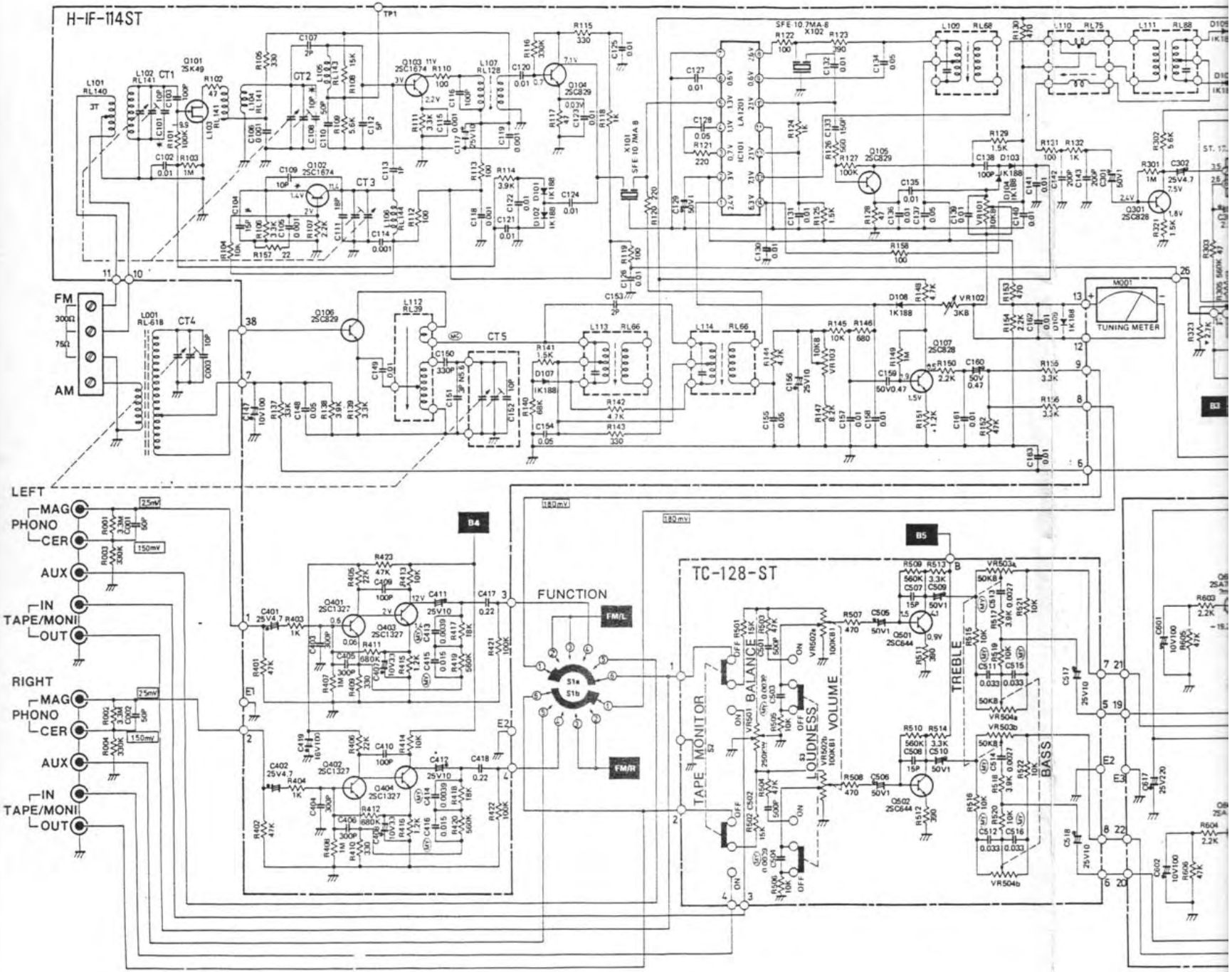
Radio Section Inoperative

I. AM is inoperative.
   A. If there is proper voltage at pin B3 (see the schematic diagram)
      1. IC101 or transistor Q106, or 107 may be faulty, or
      2. Coil L113, 114, or 109 may be faulty.
II. FM is inoperative
   A. If there is proper voltage at pin B3 (see the schematic diagram)
      1. IC101 or IC301 may be faulty, or
      2. Transistor Q101, 102, 103, 104, or 301 may be faulty, or
      3. Coil L107, 110, or 111 may be faulty, or
      4. Capacitor C301 or 302 may be faulty.
   B. At FM Stereo broadcast, the set only receives in Mono
      1. Stereo separation may be miss-aligned, or
      2. Connection of selector switch may be faulty, or
      3. IC301 may be faulty.

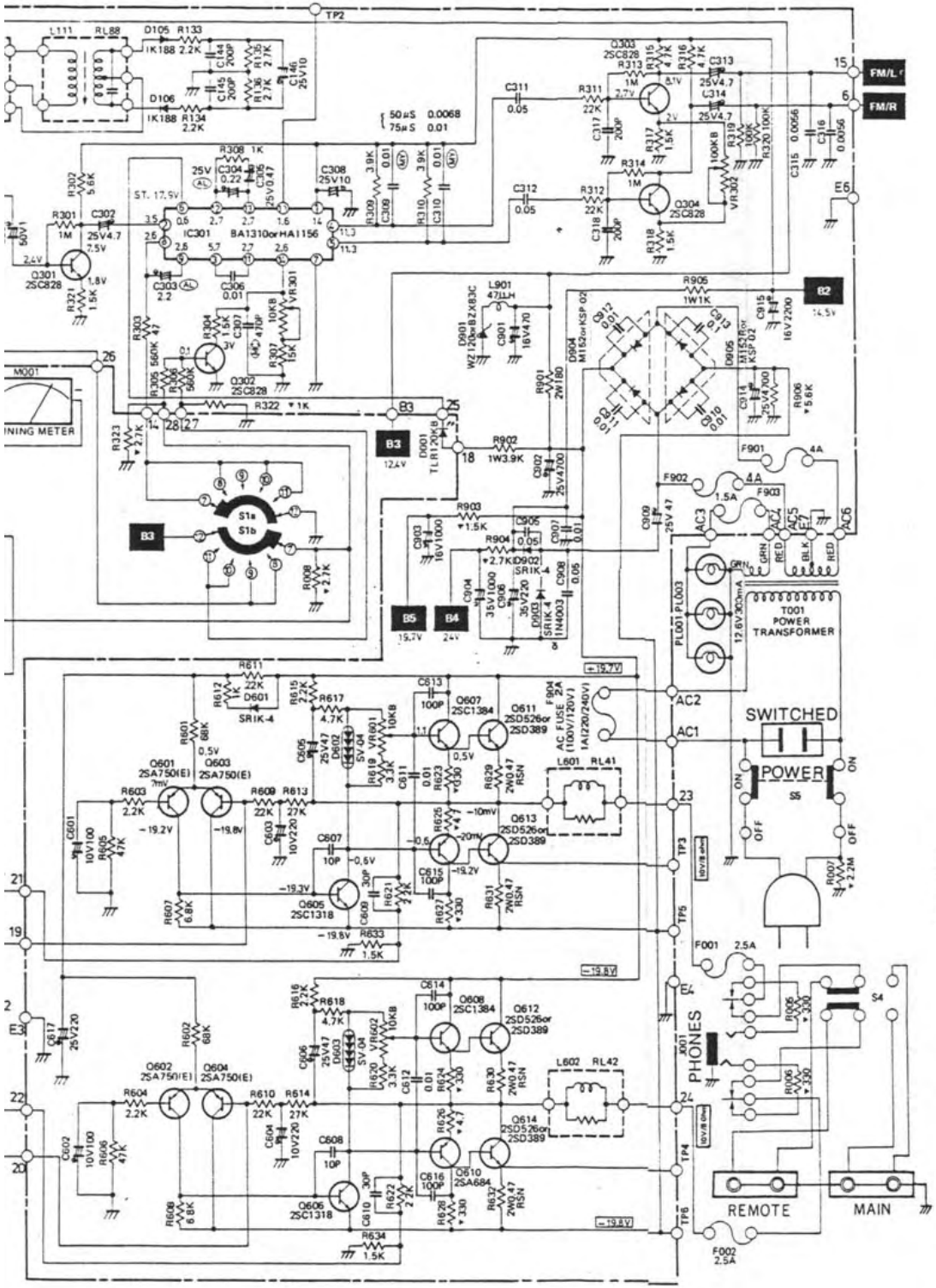
ROTEL

STEREO RECEIVER RX-102MKII

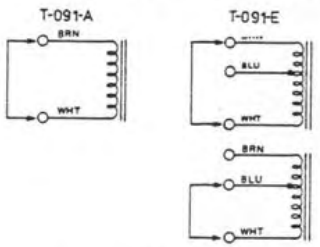
SCHEMATIC DIAG



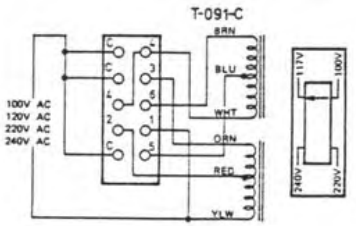
ATIC DIAGRAM



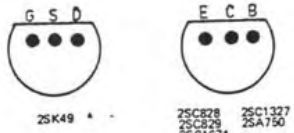
POWER TRANSFORMER STRAPPING



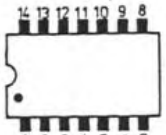
VOLTAGE CHANGE SELECTOR



BOTTOM VIEW



TOP VIEW



SIDE VIEW

FUNCTION

ITEM	SCHEMATIC LOCATION(LAST)
AM / FM IF AMP.	R158
	C163
FM MPX AMP.	R323
	C318
EQUALIZER AMP.	R423
	C419
TONE CONTROL AMP.	R522
	C518
MAIN AMP.	R634
	C617
POWER SUPPLY	R905
	C915
CHASSIS	R008
	C003

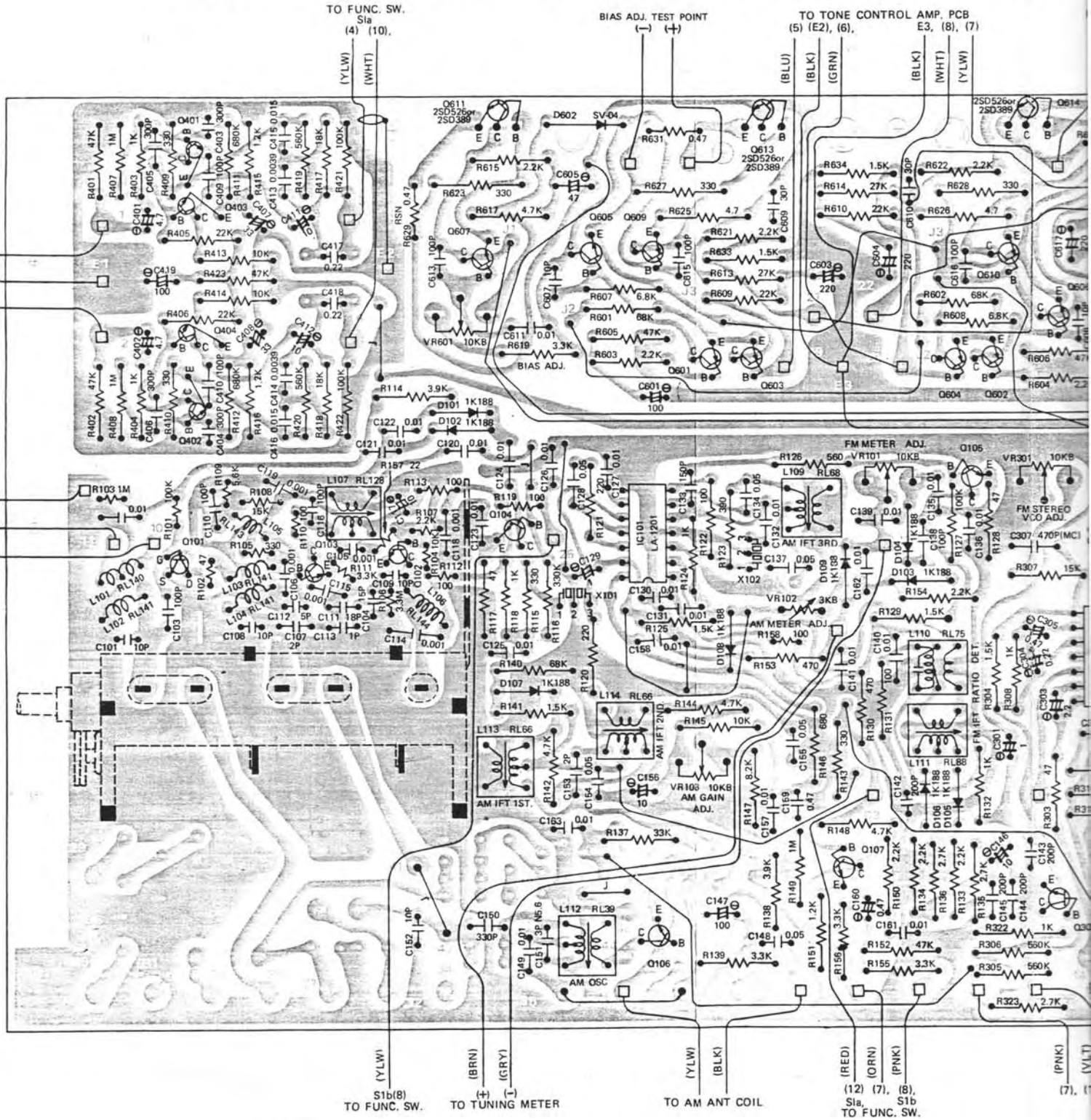
RESISTORS

5% TOLERANCE UNLESS OTHERWISE NOTED
K— KILO OHM
M— MEGA OHM
RSN— METAL OXIDE FILM RESISTORS
▼— COMPOSITION RESISTORS ½WATT
NON MARK— LOW NOISE TYPE CARBON RESISTORS ¼WATT

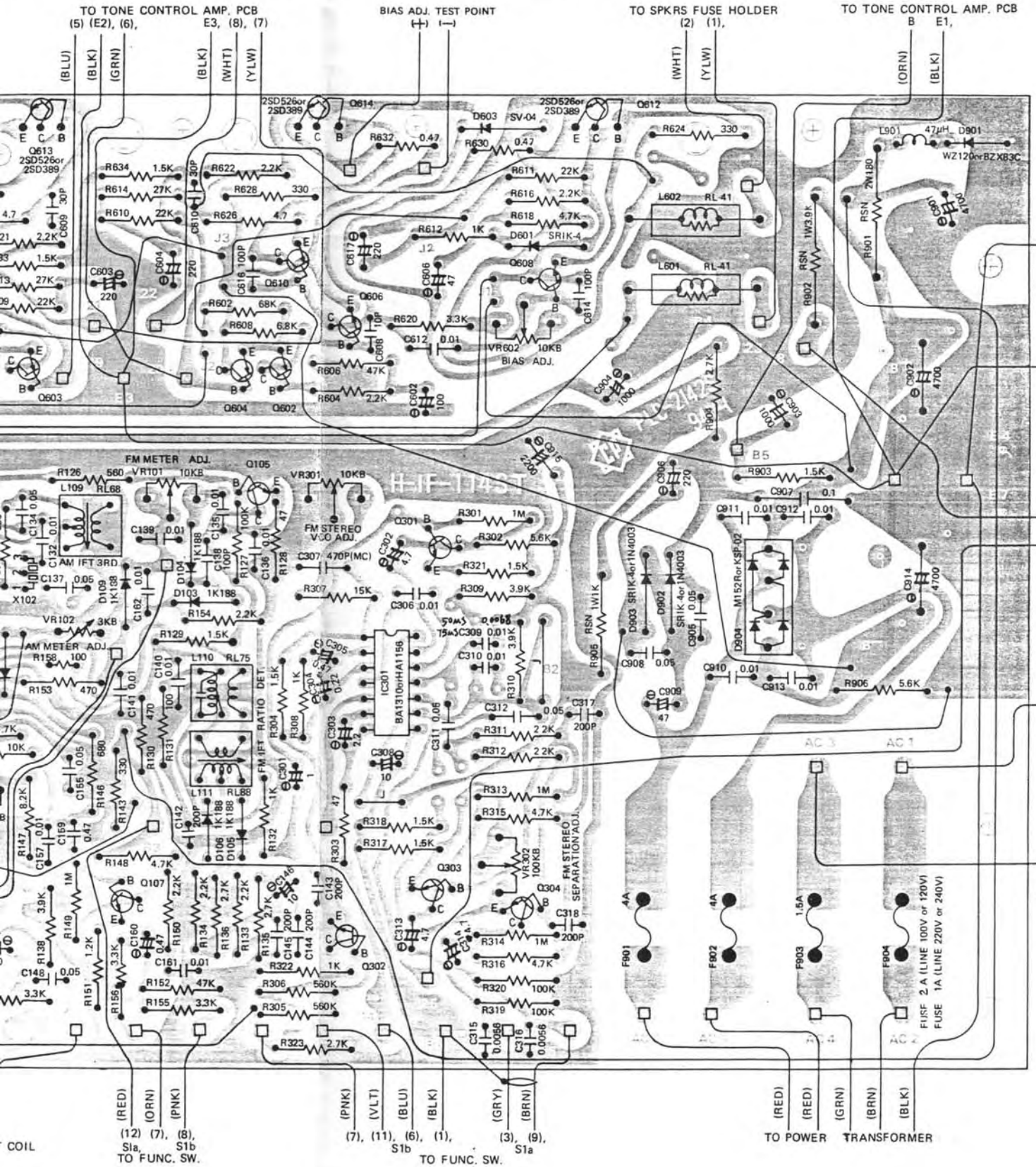
CAPACITORS

(MY) — MYLAR FILM CAPACITORS
⊣⊢ — ELECTROLYTIC CAPACITORS
✳— TEMPERATURE COEFFICIENT CAPACITORS
(AL) —ALUMINUM CAPACITORS
(MC) — MICA CAPACITORS
NON MARK — CERAMIC CAPACITORS
• UNLESS OTHERWISE NOTED IN SCHEMATIC ALL CAPACITANCE VALUES ARE EXPRESSED IN MFD
• VOLTAGE READING MAY VARY ± 20%

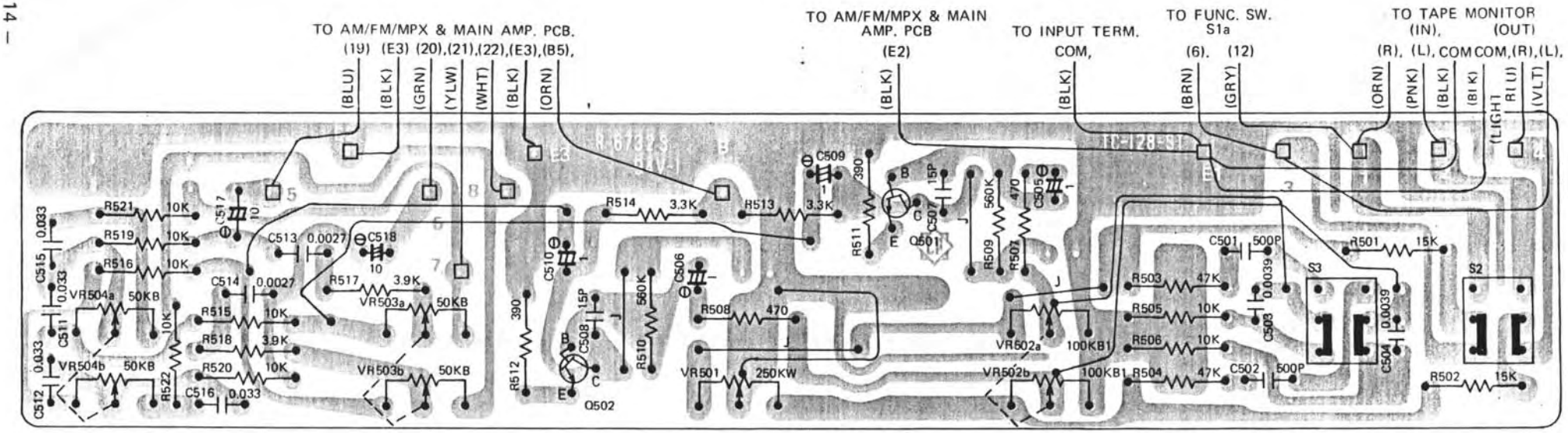
AM/FM/MPX/EQUALIZER AMP./MAIN AMP. & POWER SUPPLY CIRCUIT



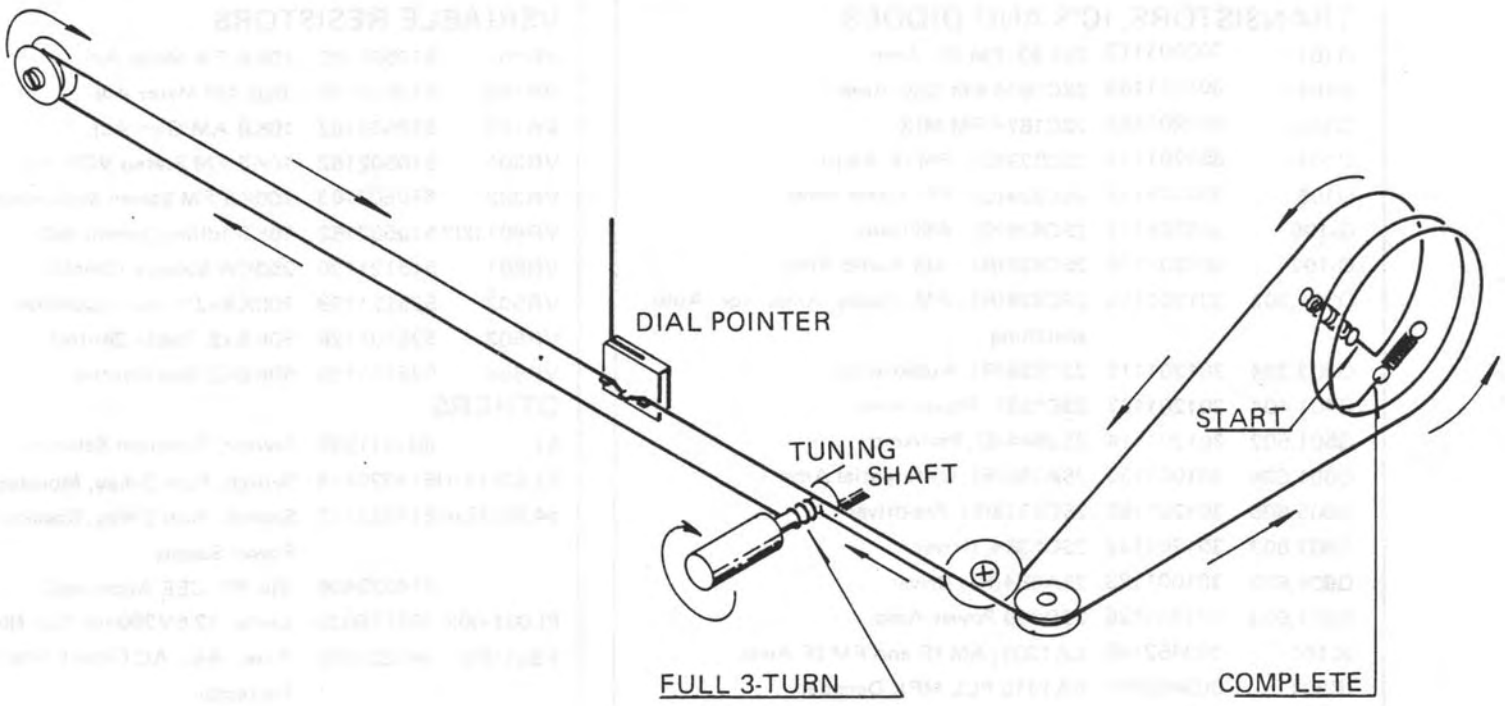
POWER SUPPLY CIRCUIT BOARD DIAGRAM



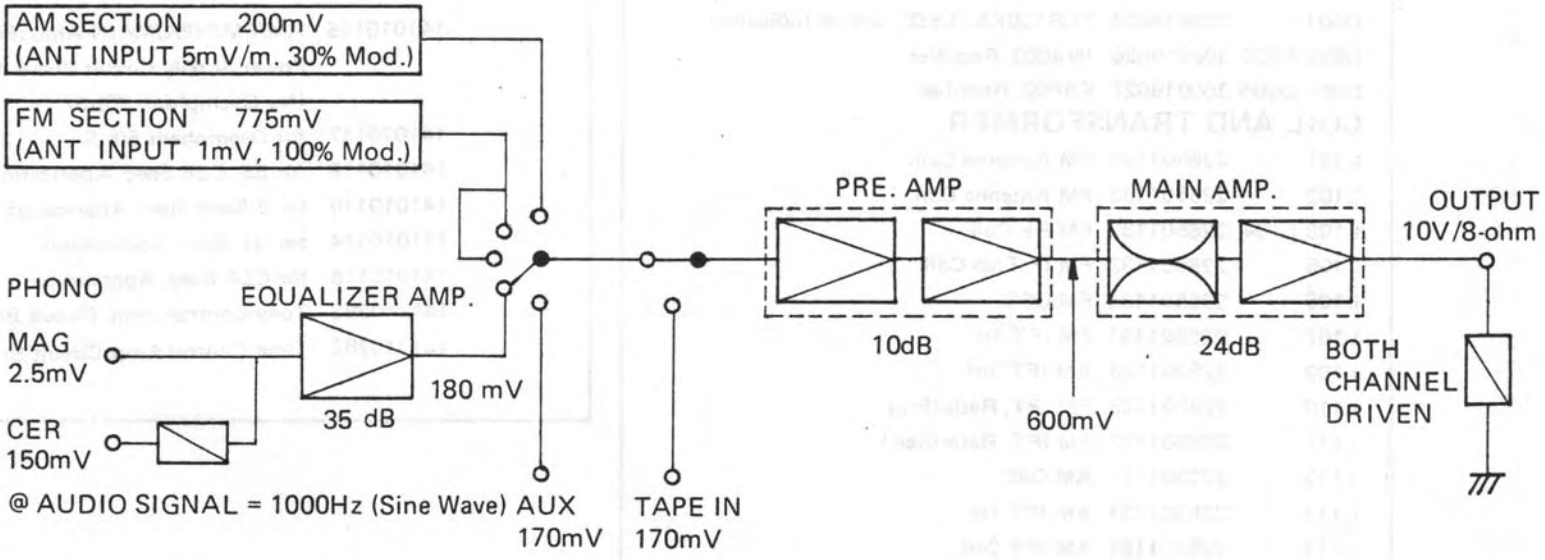
TONE CONTROL AMP. CIRCUIT BOARD DIAGRAM



DIAL STRINGING DIAGRAM



GAIN DIAGRAM



REPAIR PARTS LIST

Symbol	Part No.	Description
TRANSISTORS, IC'S AND DIODES		
Q101	302001112	2SK49 FM RF Amp
Q102	301201163	2SC1674 FM OSC Amp.
Q103	301201163	2SC1674 FM MIX.
Q104	301201117	2SC829(C), FM IF Amp.
Q105	301201117	2SC829(C), FM Meter Amp.
Q-106	301201117	2SC829(C), AM Conv.
Q-107	301201115	2SC828(R), AM Audio Amp.
Q301,302	301201115	2SC828(R), FM Audio Amp. for Auto-switching
Q303,304	301201115	2SC828(R), Audio Amp.
Q401,404	301201127	2SC1327, Phono Amp.
Q501,502	301201114	2SC644(S), Pre-Amp.
Q601,604	301001133	2SA750(E), Differential Amp.
Q605,606	301201155	2SC1318(S), Pre-driver
Q607,608	301201132	2SC1384, Driver
Q609,610	301001123	2SA684(R), Driver
Q611,614	301301126	2SD389 Power Amp.
IC101	303452148	LA1201, AM IF and FM IF Amp.
IC301	303452151	BA1310 PLL MPX Decoder
D101,D102	300111008	1K188 FM AGC Rectifier
D103,D104	300111008	1K188 AM/FM Meter Rectifier
D105,D106	300111008	1K188 FM Det.
D107	300111008	1K188 AM AGC Rectifier
D108	300111008	1K188 AM Meter Rectifier
D109	300111008	1K188 Meter Overload Protector r
D601	300919026	1N4003, Balance Requlator
D602,D603	300212006	SV-04, Temperature Compensator
D901	300313013	WZ120, Zener Regulator 12V 500mW
D001	300414004	TLR120KB (LED), Stereo Indicator
D902,D903	300919026	1N4003, Rectifier
D904,D905	300919027	KBP02, Rectifier
COIL AND TRANSFORMER		
L101	226501131	FM Antenna Coil
L102	226501132	FM Antenna Coil
L103,L104	226501132	FM RF Coil
L105	226501133	FM IF Trap Coil
L106	226501134	FM OSC
L107	225501131	FM IFT 1st.
L109	225301133	AM IFT 3rd.
L110	225501125	FM IFT, Ratio(Pri.)
L111	225501127	FM IFT, Ratio(Sec.)
L112	223301127	AM OSC
L113	225301131	AM IFT 1st.
L114	225301131	AM IFT 2nd.
L601,L602	228641105	Anti-Parasitic
L001	222301204	AM Antenna Coil
L901	226501123	47μH Choke

Symbol	Part No.	Description
VSRIABLE RESISTORS		
VR101	510502162	10KB FM Meter Adj.
VR102	510502134	3KB AM Meter Adj.
VR103	510502162	10KB AM Gain Adj.
VR301	510502162	10KB FM Stereo VCO Adj.
VR302	510502163	100KB FM Stereo Separation Adj.
VR601,602	510502162	10KB Idling Current Adj.
VR501	515121120	250KW Balance Control
VR502	525121129	100KBx2 Volume Control
VR503	525101128	50KBx2 Treble Control
VR504	525101128	50KBx2 Bass Control
OTHERS		
S1	601011255	Switch, Function Selector
S2,S3(1Set)	614020414	Switch, Push 2-Key, Monitor and Loudness
S4,S5(1Set)	614020413	Switch, Push 2-Key, Speaker Selector and Power Supply
	614020406	(for BS, CEE Approved)
PL001-003	352126030-	Lamp, 12.6V300mA Dial Illumination
F901,902	341220040	Fuse, 4A , AC Circuit (Sec.) Overload Protector
F903	341220015	Fuse, 1.5A, Lamp Overload Protector
F904	341220020	Fuse, 2A (line 100V, 120V)
	341220010	1A (Line 220V, 240V)
F001,002	341220025	Fuse, 2.5A (Speaker)
M001	231310046	Meter, AM/FM Tuning Ind.
T001	201001409	Transformer, Power Supply (120V only)
	206001410	Transformer, Power Supply (220V, 240V)
	205001410	Transformer, Power Supply (100V, 120V, 220V, 240V)
	141010116	AM/FM/MPX/MAIN Amp./PRE Amp. & Power Supply Circuit Board Assembly (for Deemphasis 75μS)
	141010117	for Deemphasis 50μS
	141010118	for BS, CEE Spec. Appreciation
	141010119	for 3 Band Spec. Appreciation
	141010114	for UL Spec. Appreciation
	141010115	for CSA Spec. Appreciation
	141710282	Tone Control Amp. Circuit Board Assembly
	141710282	Tone Control Amp. Circuit Board Assembly

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