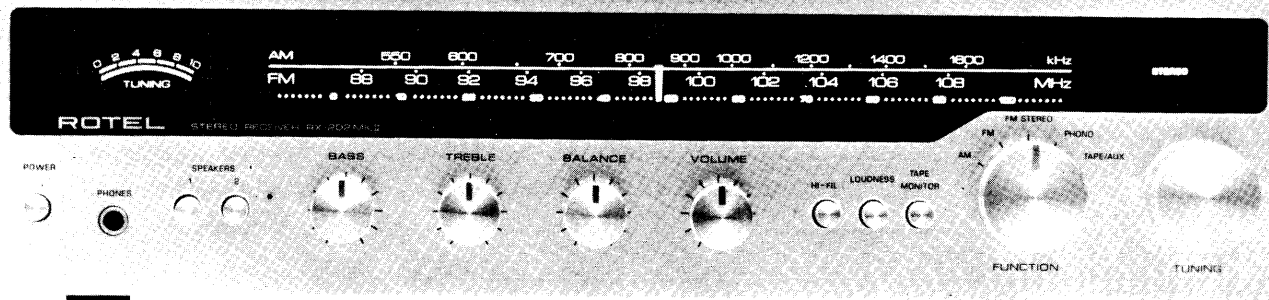


# ROTEL®

## STEREO RECEIVER RX-202MKII

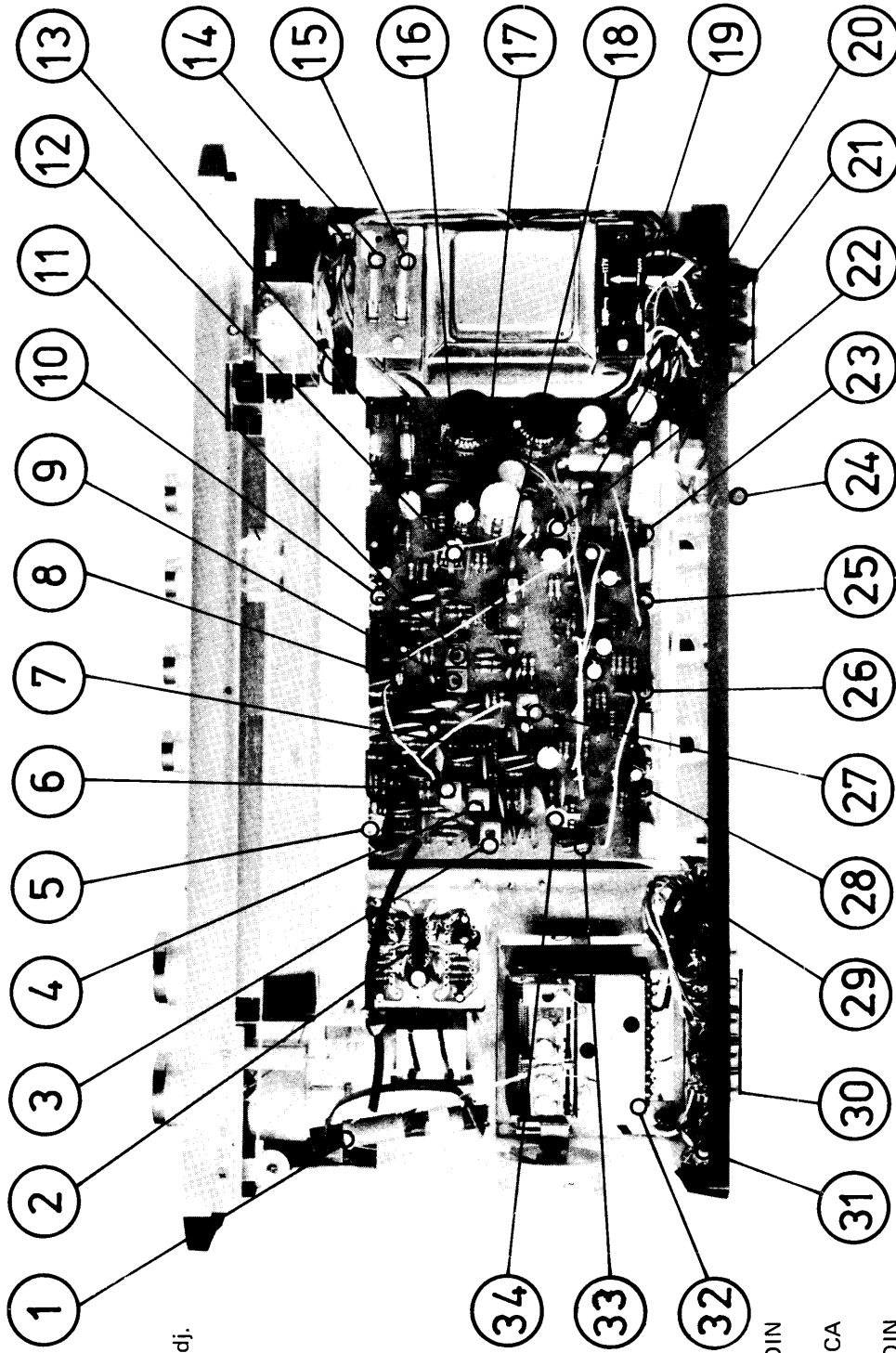


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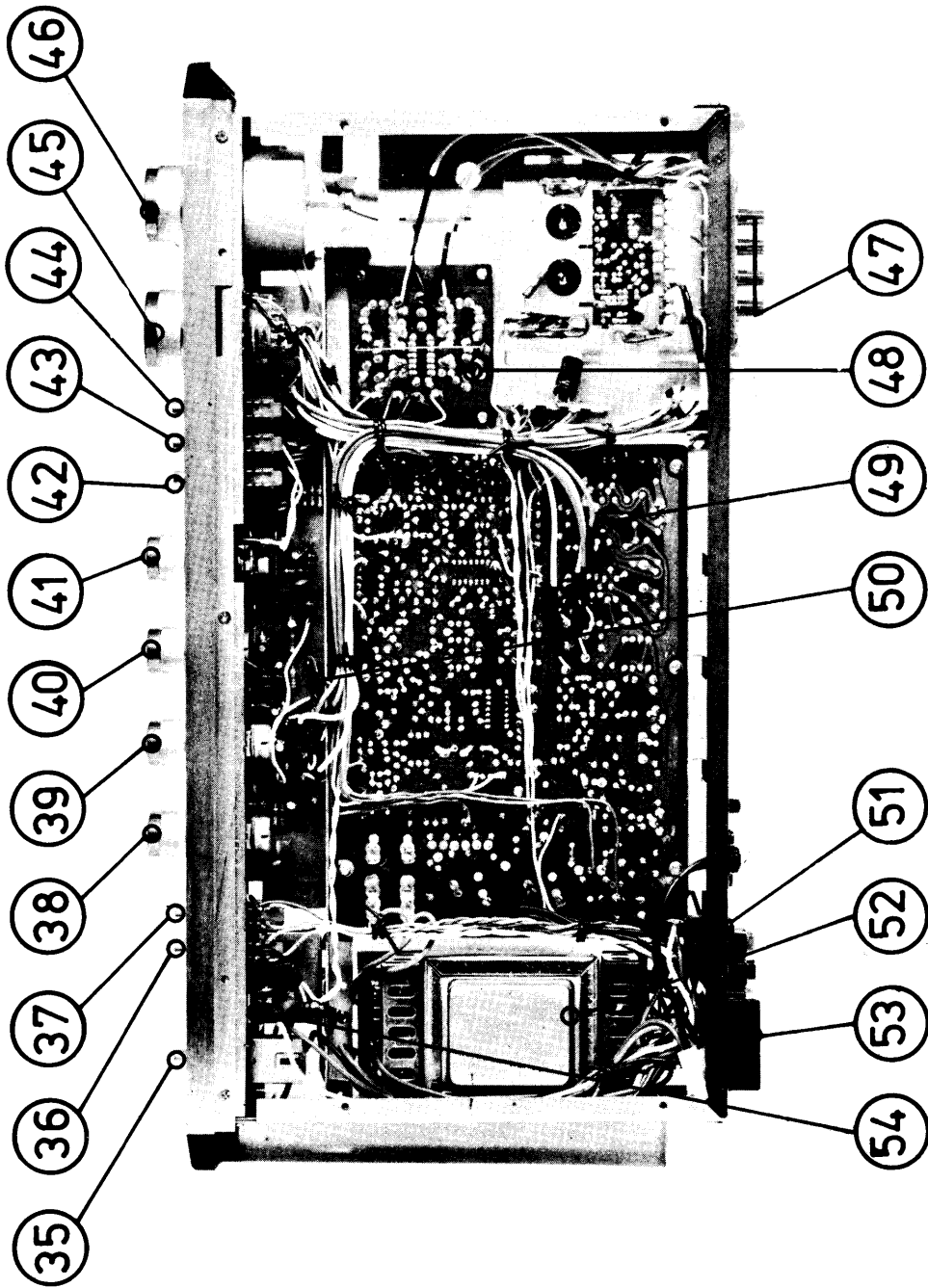
## technical manual

# CHASSIS LAYOUT TOP VIEW



- 1. L002, AM Antenna Coil
- 2. IC401, Phono Amp. IC
- 3. L104, AM OSC Coil
- 4. L105, AM IFT, 1st.
- 5. VR101, AM Gain Adj.
- 6. L106, AM IFT, 2nd.
- 7. IC101, AM and FM IF Amp. IC
- 8. VR102, FM Meter Adj.
- 9. L102, FM IFT Ratio (Pri.)
- 10. VR302, FM Stereo Separation Adj.
- 11. L103, FM IFT Ratio (Sec.)
- 12. VR301, FM Stereo VCO Adj.
- 13. F901, F902, AC Fuse, 4A
- 14. Fuse, 2A, Pilot Lamp Protector
- 15. AC Fuse, 2A (Line 100V or 120V 1.5A (Line 220V or 240V))
- 16. D904, Rectifier
- 17. D903, Rectifier
- 18. IC301, FM MPX Decoder
- 19. Powe Transformer Strapping
- 20. L601, Anti-Parasitic (L-ch)
- 21. Speaker Terminal
- 22. VR601, Idling Current Adj.
- 23. O611, Power Amp. (L-ch)
- 24. S8, Speaker Matrix Switch
- 25. O613, Power Amp. (L-ch)
- 26. O614, Power Amp. (R-ch)
- 27. L101, AM IFT, 3rd.
- 28. O612, Power Amp. (R-ch)
- 29. Tape Input and Output Jack (DIN Type)
- 30. Input and Tape Output Jack (RCA Type)
- 31. Phono Input and Output Jack (DIN Type)
- 32. AM/FM Front-End
- 33. L602, Anti-Parasitic (R-ch)
- 34. VR602, Idling Current Switch

# BOTTOM VIEW



- 35. S7, Power Supply Switch
- 36. S6, Speaker-1 Switch
- 37. S5, Speaker-2 Switch
- 38. Bass Control
- 39. Treble Control
- 40. Balance Control
- 41. Volume Control
- 42. S4, Hi-Filter Switch
- 43. S3, Loudness Switch
- 44. S2, Tape Monitor Switch
- 45. S1, Function Switch
- 46. Tuning Knob
- 47. Antenna Terminal
- 48. Equalizer Amp. PCB
- 49. AM/FM/MPX/MAIN Amp. PCB
- 50. Tone Control Amp. PCB
- 51. AC Outlet
- 52. T001, Power Transformer
- 53. Speaker Fuse
- 54. Headphone Jack

# 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 milli-volt meter.

- Set volume control to minimum position.
  - Set VR601 and 602 to CCW position before starting this procedure.
1. Connect the plus lead of a DC milli-volt meter to test point 23 (on main amp. pcb) and minus lead to test point 25.
  2. Adjust the VR601 to obtain a 15 mV reading on the DC milli-volt meter (See Figure 1)
  3. Repeat the above steps 1 and 2 for Right Channel. (use test points Pin No. 24, 26 and VR602.)

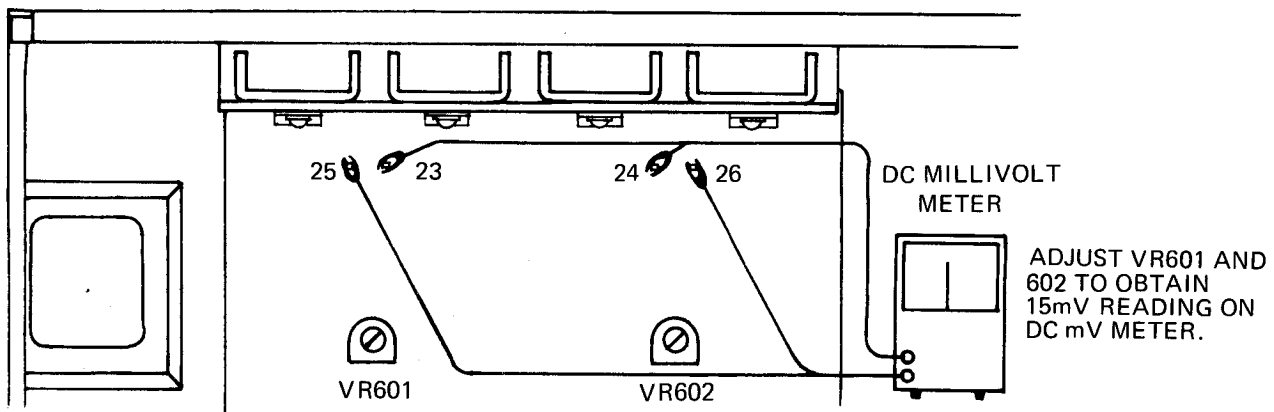


Fig.1 IDLING CURRENT ADJUSTMENT HOOK-UP

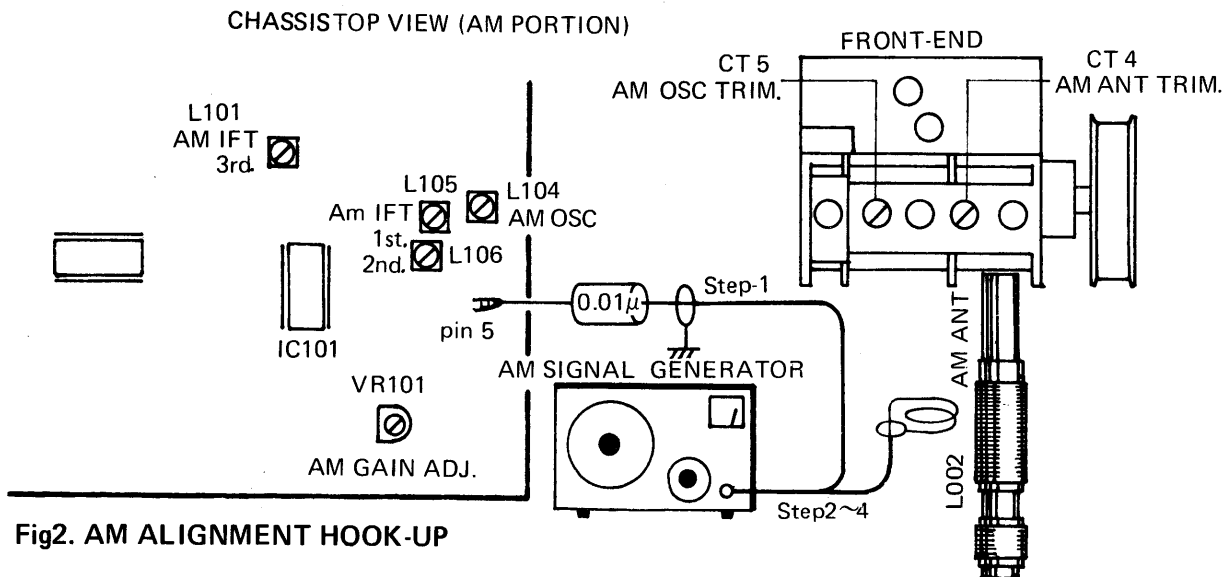
# AM IF & RF ALIGNMENT PROCEDURE

**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. 5 on IF board through a 0.01 mfd capacitor	455 KHz (400 Hz 30% mod.)	Non interfering at low end of scale.	AC VTVM to TAPE OUT jack	L101, 105 and 106 (on IF board & VR101)	Maximum reading on VTVM
2	Connect to short loop of wire. Radiate signal into ferrite loop-stick antenna	600KHz (400Hz 30% mod.)	600KHz		L104 (OSC) (on IF board) and L002 (ANT)	
3		1400 KHz (400 Hz 30% Mod.)	1400 KHz		CT5 (OSC) and CT4 (ANT) (on Front-end)	
4	Repeat steps 2n and 3 until no further improvement is noticed;					



# FM IF & RF ALIGNMENT PROCEDURE

**Instruments:** FM Signal Generator, Oscilloscope and H.D. Analyzer

- Set Function Selector Switch to FM position.
- Connect FM Signal Generator to FM antenna terminals.
- Connect Oscilloscope and H.D. Analyzer to Tape Out jack.

## A. FM IF Alignment

1. Set Signal Generator frequency at 98 MHz (400 Hz, 100% Mod.) and tune the receiver to maximum output point. (The antenna terminal voltage should be 1mV).
2. Adjust FM IFT L103 and T1 (on Front-end) to obtain maximum deflection on scope.
3. Adjust FM IFT, L102 to obtain minimum reading on H.D. Analyzer.

## B. FM RF Alignment

1. Set Signal Generator Frequency at 106 MHz and also the receiver at 106 MHz on the dial scale. Then adjust FM OSC trimmer CT3 (on Front-end) to obtain maximum deflection on scope.

2. Set the receiver at 90 MHz on the dial scale, and change the frequency of Signal Generator so that the output of the receiver becomes maximum. Then make sure Signal Generator frequency stays within 90 MHz  $\pm$  150 KHz.
3. Sensitivity on this alignment must be attempt at 106 MHz by adjusting CT1 and CT2 (on Front-end) to obtain maximum deflection on scope, and fine adjust to balance sensitivity at 90 MHz and 106 MHz.
4. Adjust Coil L3 (FM OSC) and L2 (FM RF) as described below only when tracking and sensitivity adjustments are not attained by adjusting CT1, CT2 and CT3.
  - a. Fine tune Signal Generator and the receiver to 90 MHz and adjust L2 and L3 so that maximum output is obtained.
  - b. Fine tune Signal Generator and the receiver to 106 MHz and adjust CT1, CT2 and CT3 so that maximum output is obtained.
  - c. Repeat steps a and b to obtain enough effect.

# FM METER LEVEL ADJUSTMENT

**Note:** The FM IF and FM RF alignment must be completed before attempting this Adjustment.

Set the antenna input level (terminal voltage) to 1 mV by controlling the Signal Generator. Adjust VR102 so that the Tuning Meter indicates toward "8" on the scale.

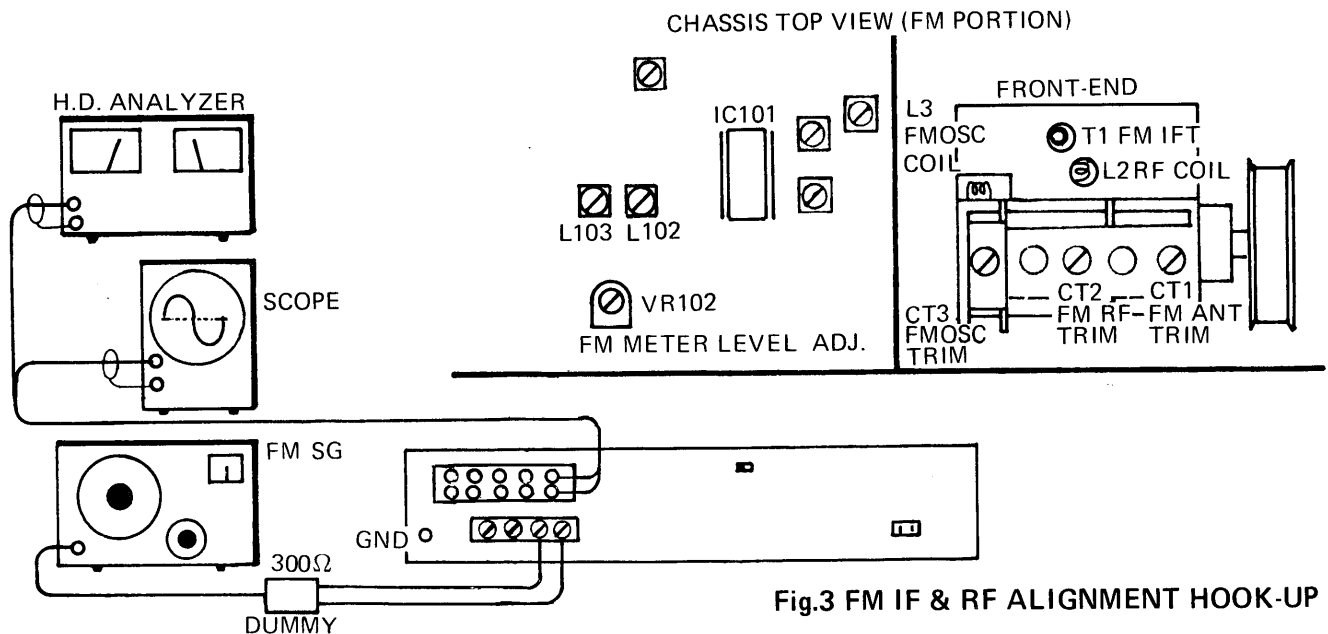


Fig.3 FM IF & RF ALIGNMENT HOOK-UP

# FM MPX ALIGNMENT PROCEDURE

**Note:** Be sure the FM IF alignment is in the best state before attempting the FM MPX alignment. If FM IF is not properly aligned, FM MPX alignment may give inferior result.

**Instruments:** FM Stereo Generator, AC VTVM and Oscilloscope

1. Set Function Selector to FM STEREO position.
2. Set VR302 to mid-position.
3. Connect FM Stereo Generator to FM antenna terminals and AC VTVM and Oscilloscope to Tape Out (R-ch) jack.
4. Set the frequency at 98 MHz (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 minimum. 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%.

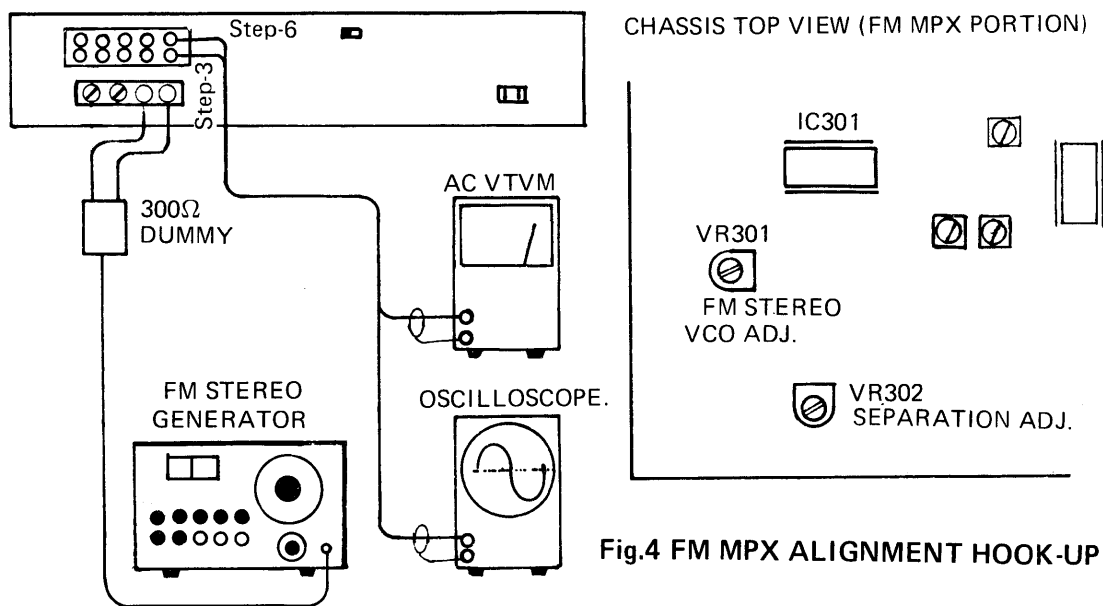
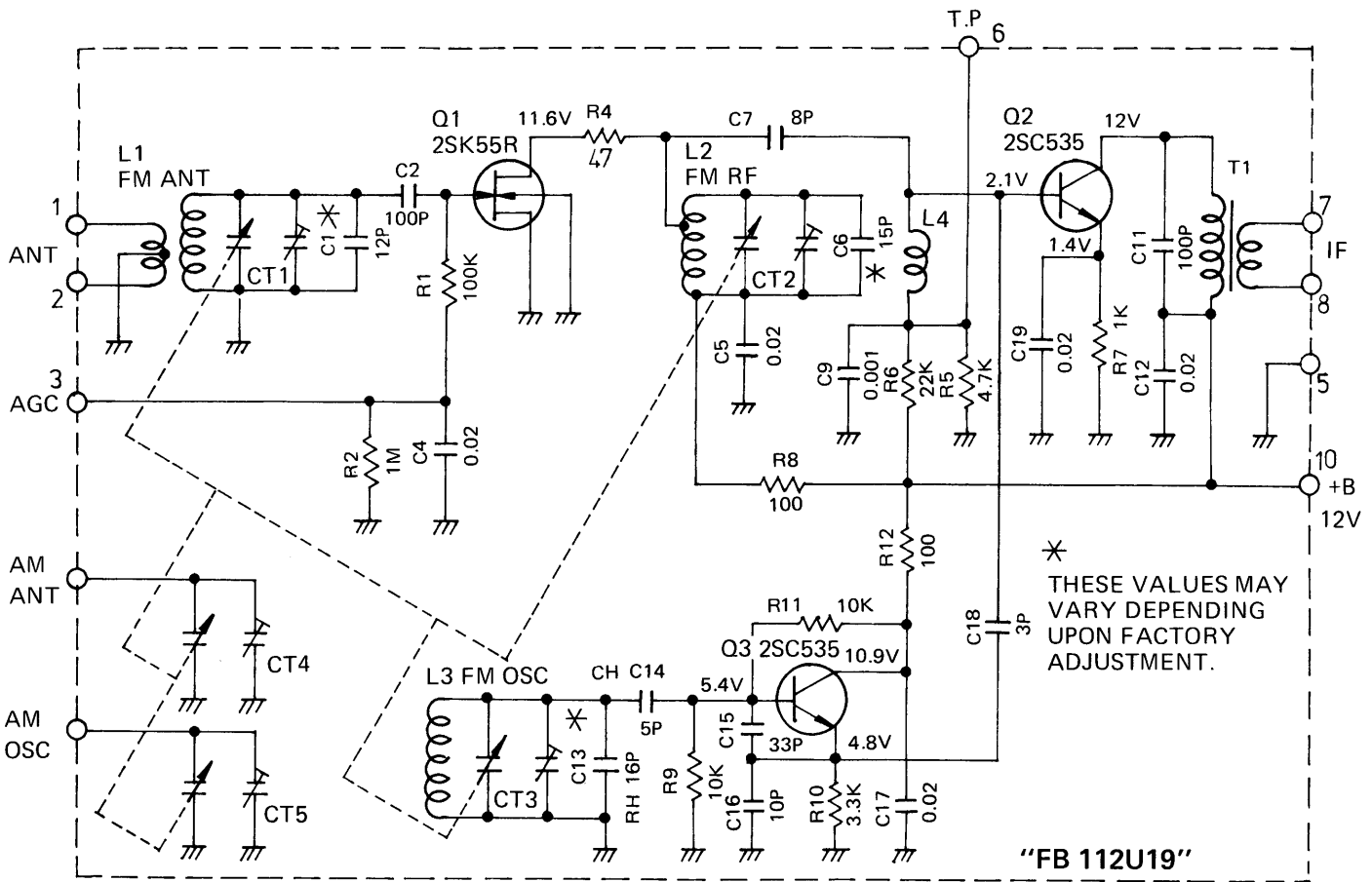
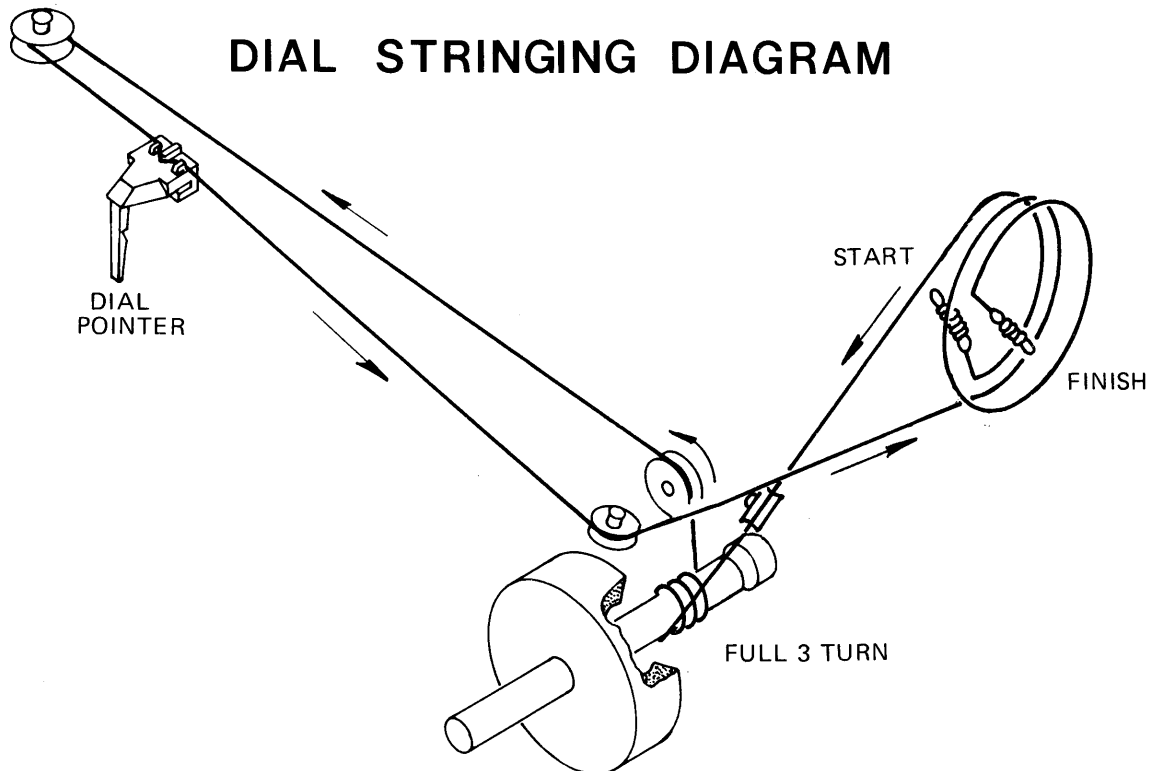


Fig.4 FM MPX ALIGNMENT HOOK-UP

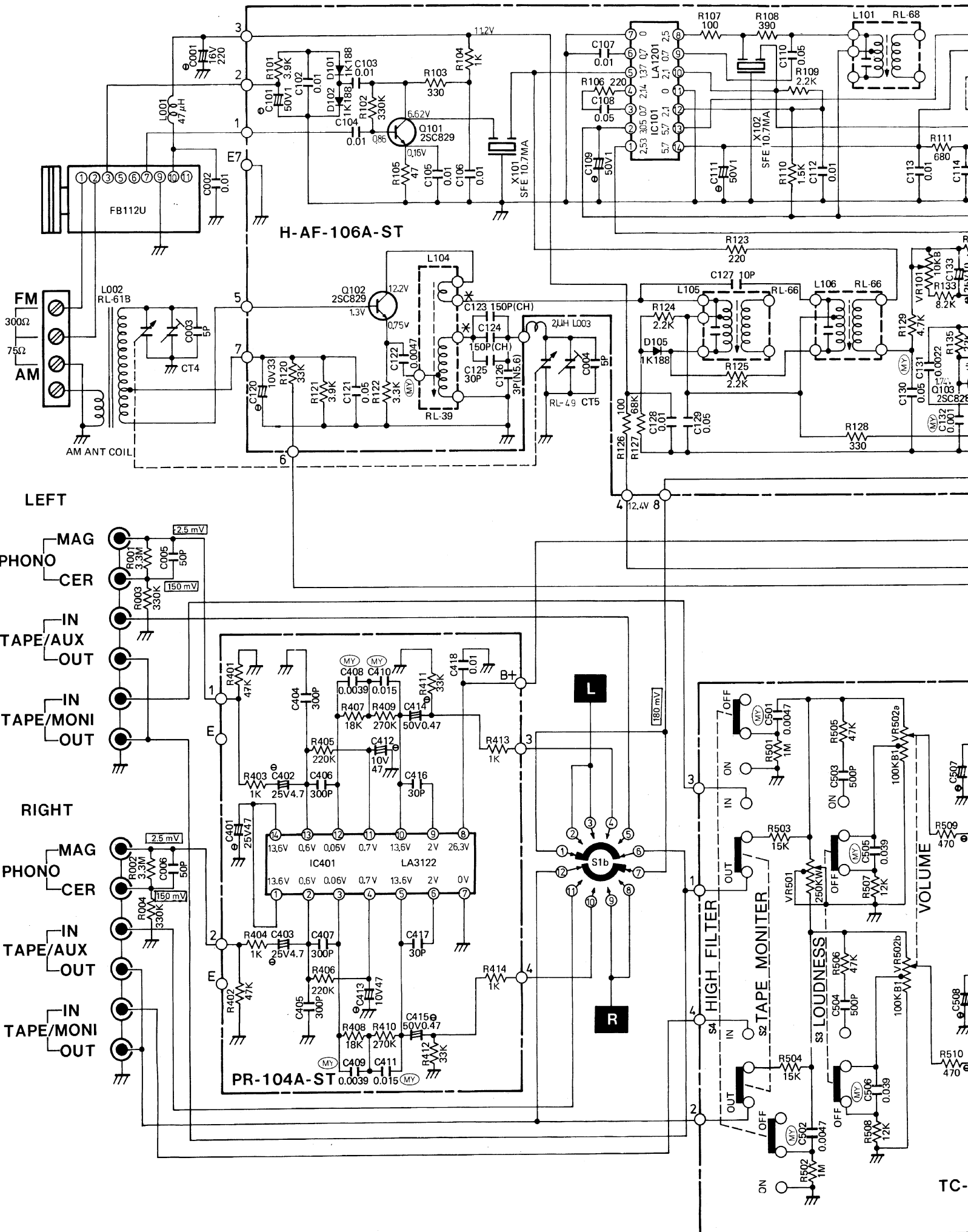
# FRONT-END SCHEMATIC DIAGRAM



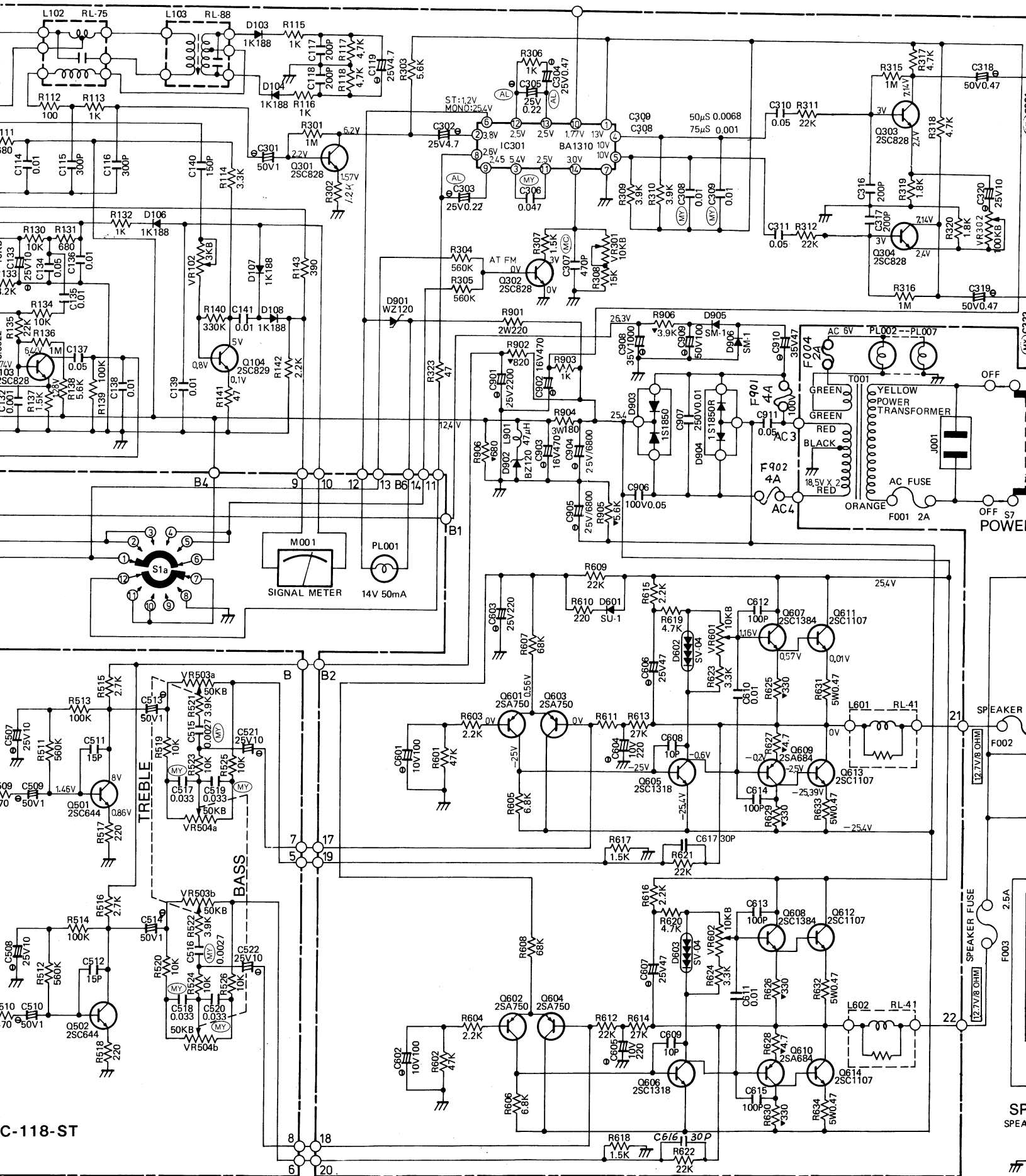
# DIAL STRINGING DIAGRAM





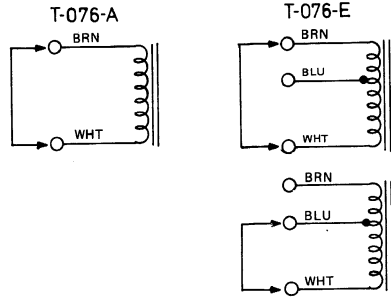


# SCHEMATIC DIAGRAM

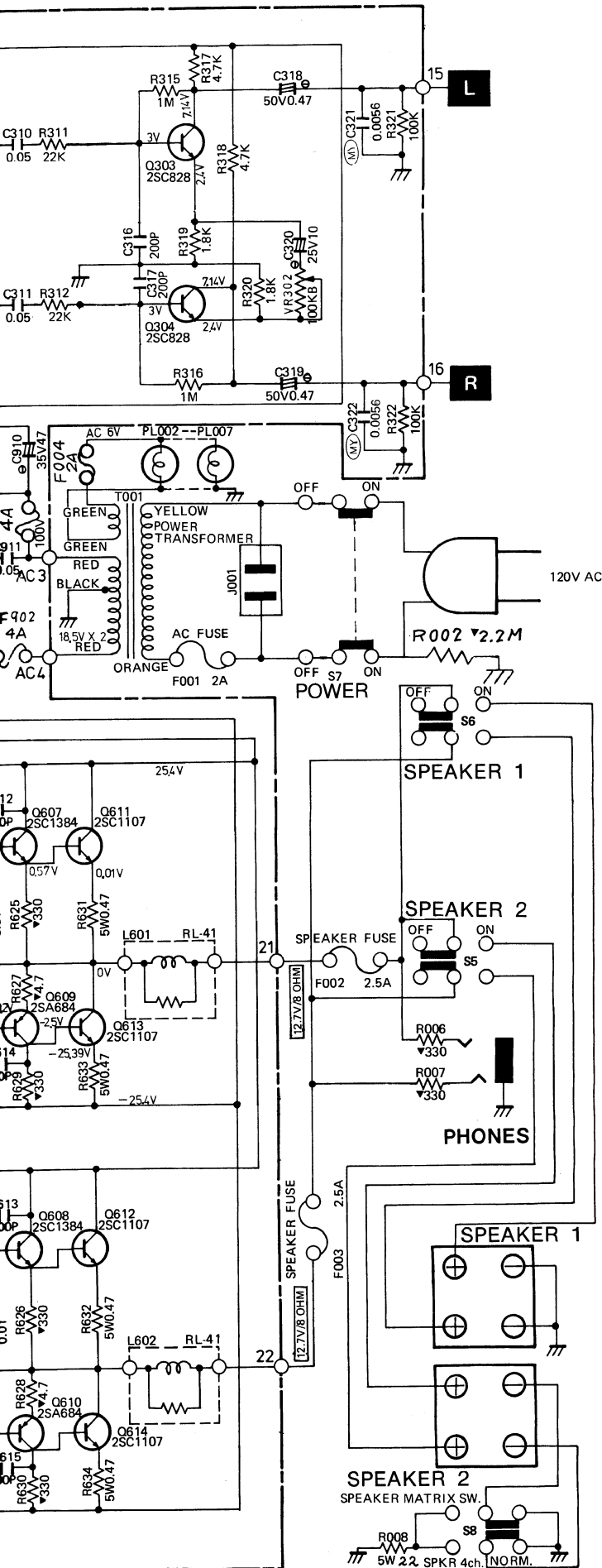
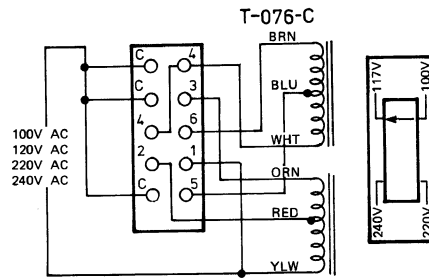


C-118-ST

# POWER TRANSFORMER STRAPPING



# VOLTAGE CHANGE SELECTOR



ITEM	SCHEMATIC LOCATION (LAST)
AM/FM IF AMP.	R143
	C141
FM MPX DEC.	R322
	C322
EQUALIZER AMP.	R414
	C418
tone CONTROL	R526
	C522
MAIN AMP.	R634
	C617
POWER SUPPLY	R906
	C911
CHASSIS	R009
	C006

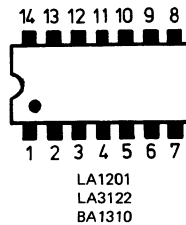
## RESISTORS

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

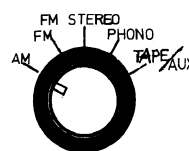
## CAPACITORS

- MY-- MYLAR FILM CAPACITORS
- EL-- 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%

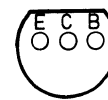
## SIDE VIEW



## FUNCTION

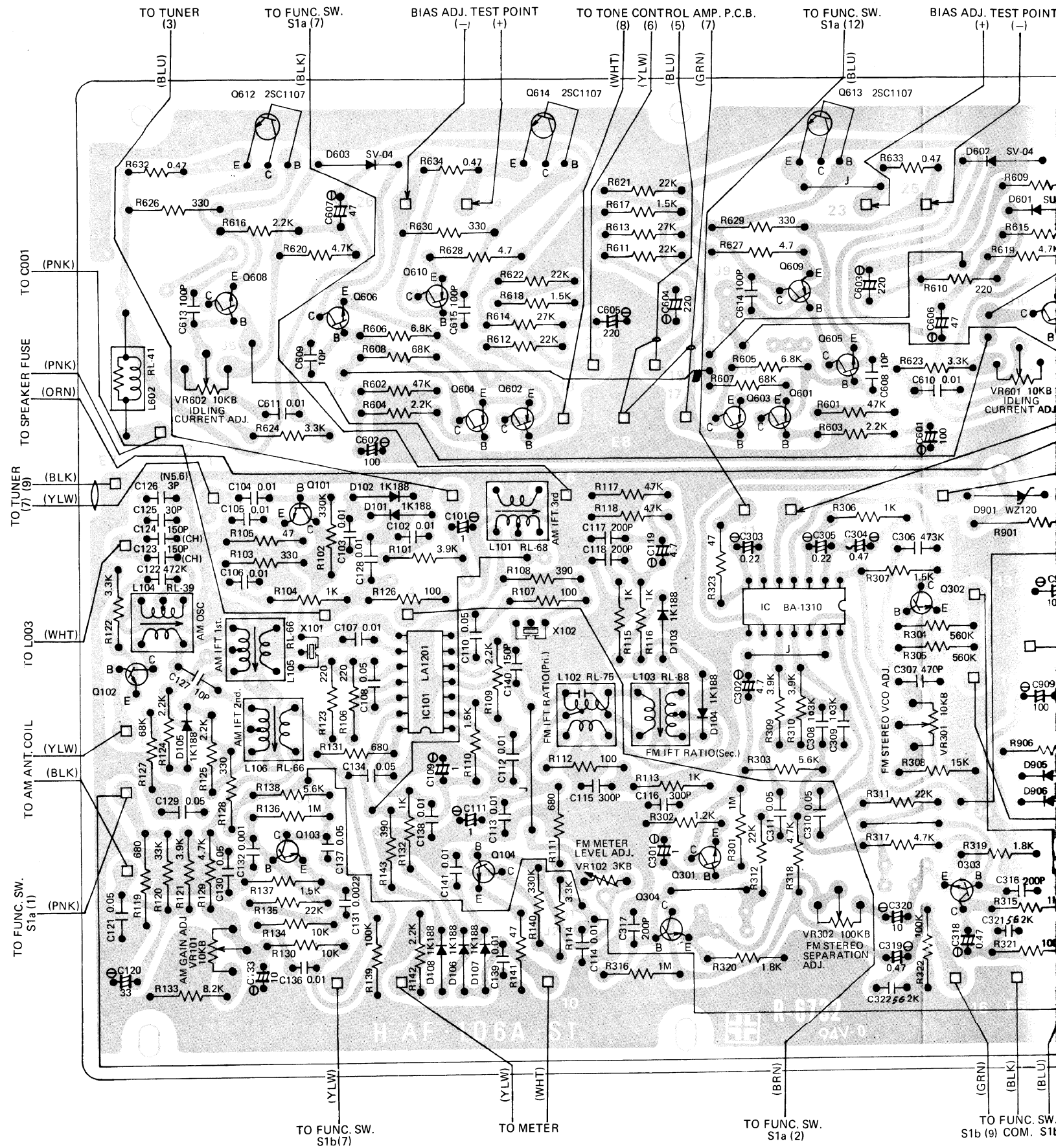


## BOTTOM VIEW

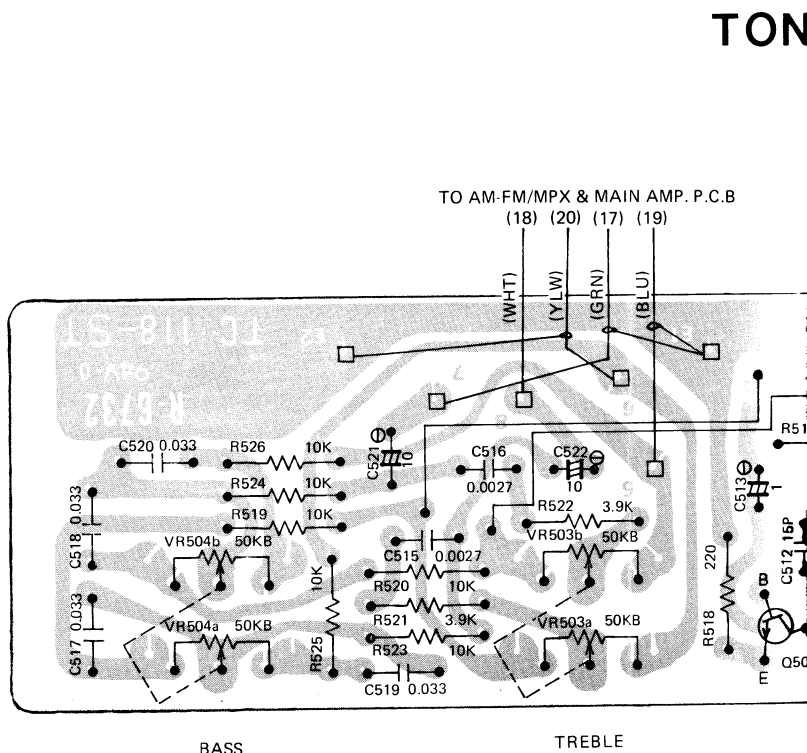
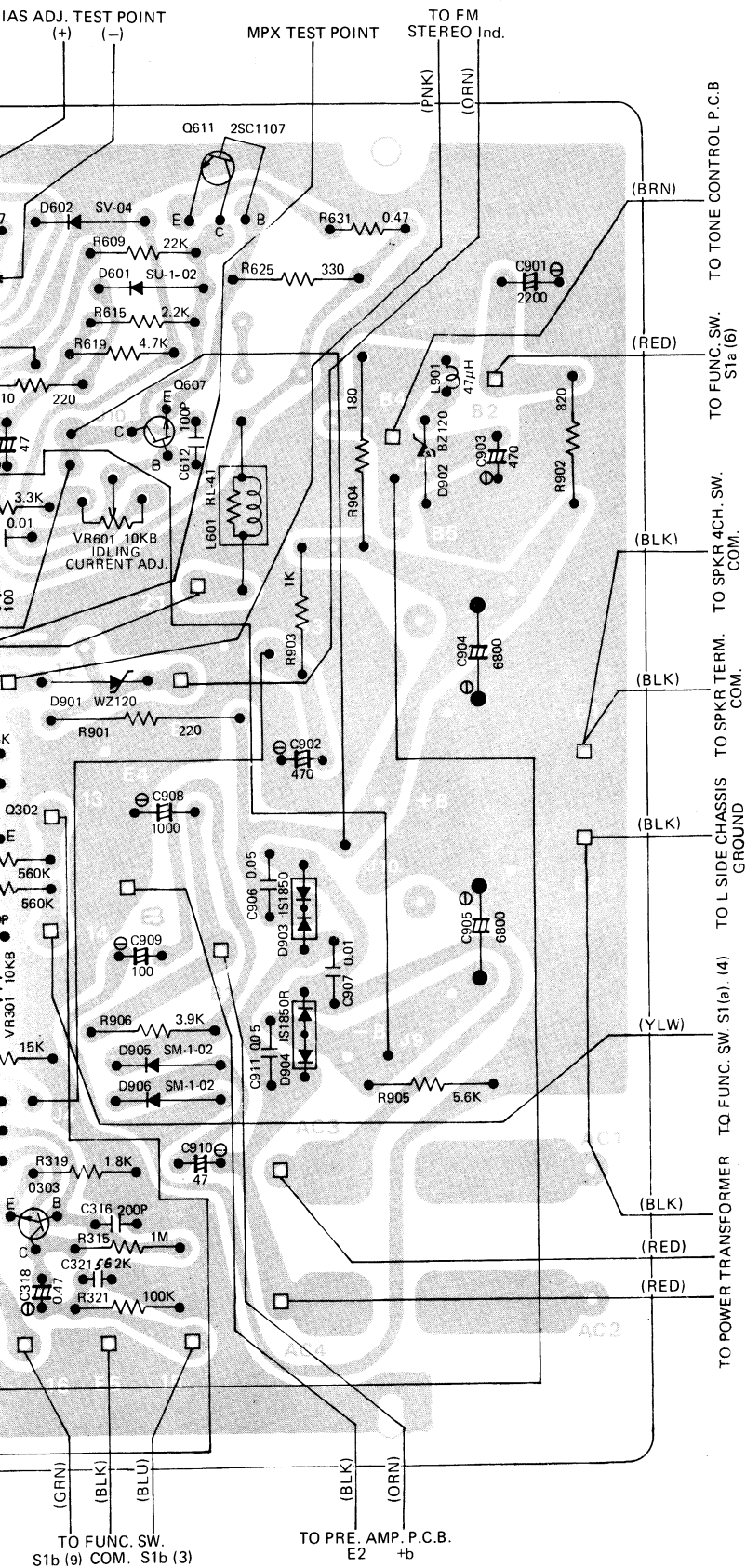


- 25C828
- 25C1318
- 25A684
- 25C829
- 25A750
- 25C1384

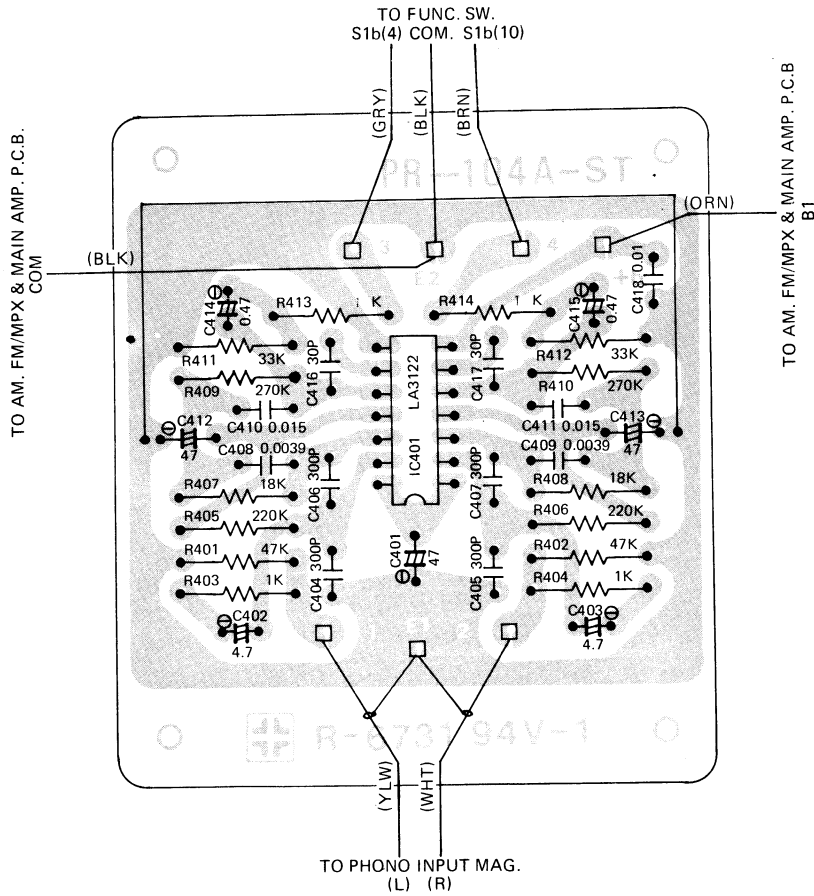
# AM/FM/MPX/MAN AMP. & POWER SUPPLY CIRCUIT BOARD



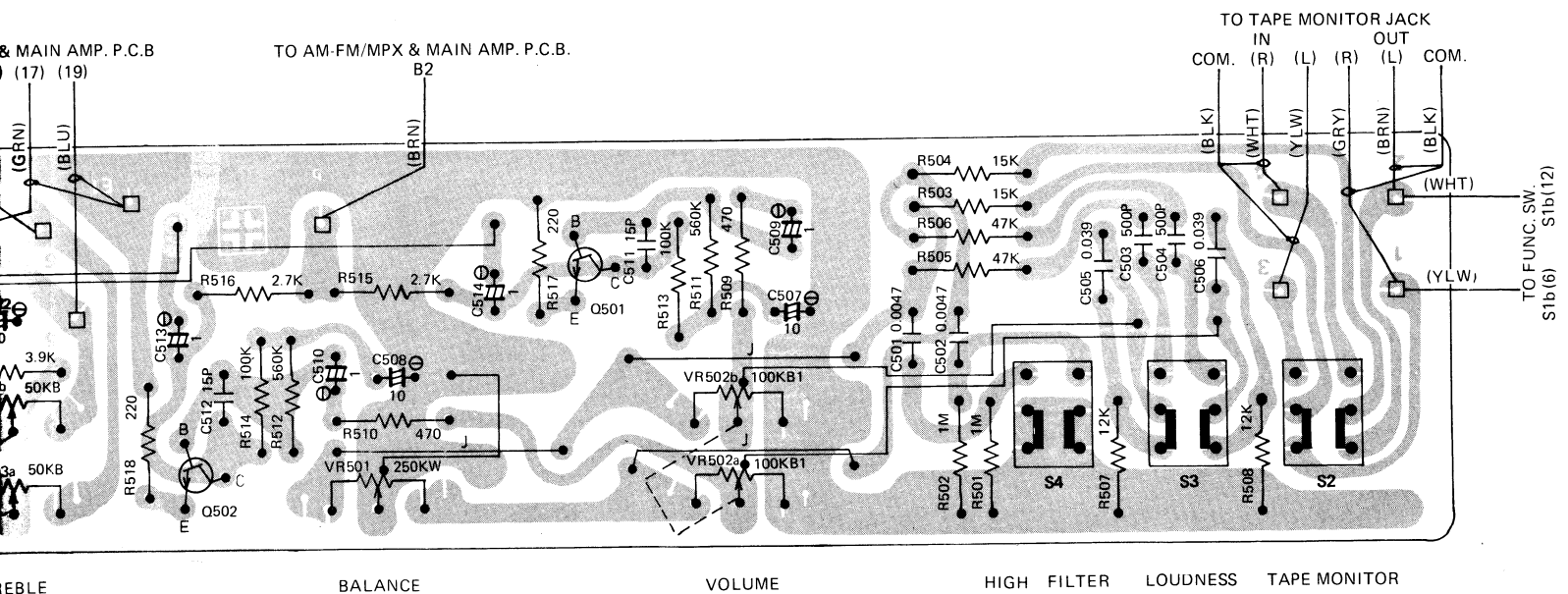
# CIRCUIT BOARD DIAGRAM



# EQUALIZER AMP. CIRCUIT BOARD DIAGRAM



# TONE CONTROL AMP. CIRCUIT BOARD DIAGRAM



# TROUBLE SHOOTING

## Unit inoperative

- I. If the pilot lamp does not light, check the flow at the AC Outlet and
  - A. If no voltage across
    - a. The AC cord may be broken, or
    - b. Connections in the power switch may be faulty.
  - B. If there is proper voltage across, check the AC fuse F001 and If the AC fuse is blown
    1. Rectifier D903 or 904 may be shorted, or
    2. Capacitor C901, 902, 903, 904, 905, 907, 908, or 909 may be shorted.
    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 B2, (on main Amp. pcb) and
  - A. If no voltage across.
    - a. Rectifier D903 or 904 may be open.
    - b. Secondary winding of the power transformer may be opened.
  - B. If there is proper voltage across, check the speaker fuse and
    - a. If the speaker fuse is blown.
      1. Transistor Q611 or 613 (Q612 or 614 for R-ch) may be shorted, or
      2. Transistor Q601, 603, 605, 607, or 609 (Q602, 604, 606, 608, or 610 for R-ch) may be faulty, or
      3. Output circuit (including speaker system) may be shorted, or
      4. The fuse may be worn out.
    - b. If the speaker fuse is normal and check the minus "-" point of C521 (C522 for R-ch)
      1. If there is no signal
        - i. Transistor Q501 (Q502 for R-ch) may be faulty, or
        - ii. Capacitor C507, 509, 513 or 521 (C508, 510, 514 or 522 for R-ch). may be faulty.
      2. 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. IC401 may be faulty, or
- B. Capacitor C401, 402, 412, or 414 (IC401, 403, 413, or 415 for R-ch) may be faulty.

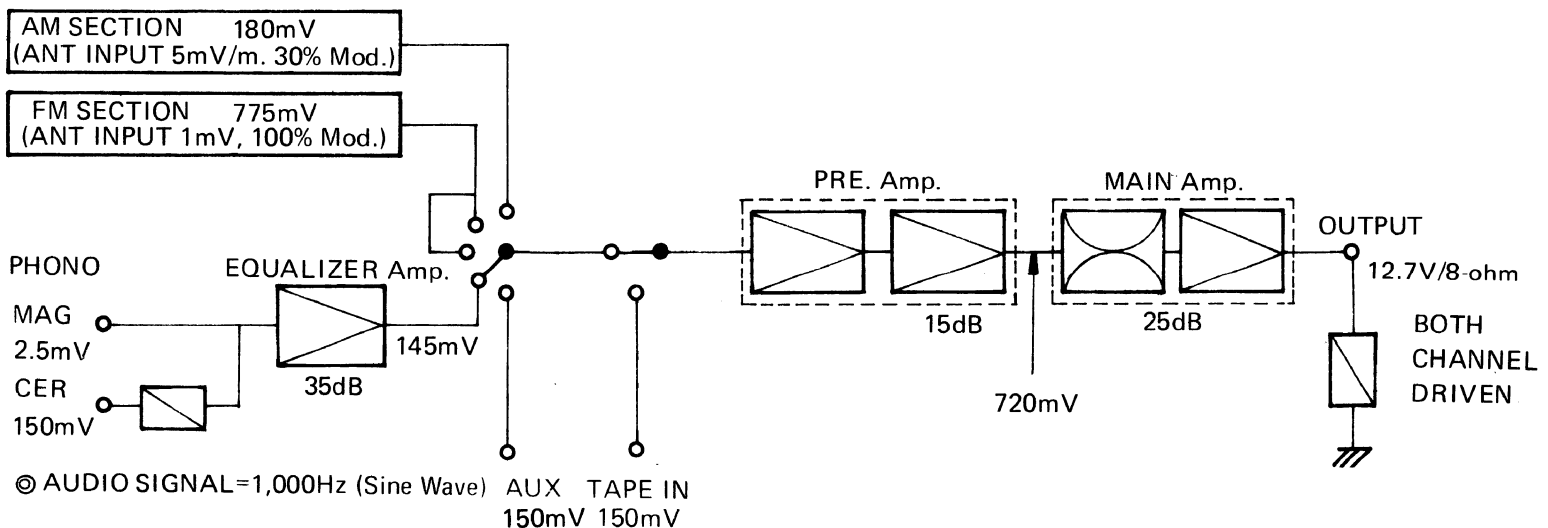
## Hum And/or Noise

- 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 C507, 509, 513, or 521 (C508, 510, 514, or 522 for R-ch) may be faulty, or
  3. Resistor R511, 513, or 515 (R512, 514, or 516 for R-ch) may be faulty.
- B. Hum and/or Noise produced only in PHONO-
  1. IC401 may be faulty, or
  2. Capacitor C908, 909, 402, or 414 (C908, 909, 403 or 415 for R-ch) may be faulty.

## Radio Section Inoperative

- I. AM is inoperative.
  - A. If there is proper voltage at Pin B4 (see the schematic diagram)
    1. IC101 or Transistor Q102 may be faulty, or
    2. Coil L104, 105, 106, or 101 may be faulty.
- II. FM is inoperative
  - A. If there is proper voltage at Pin B4 (see the schematic diagram)
    1. IC101 or IC301 may be faulty, or
    2. Transistor Q101 or 301 may be faulty, or
    3. Coil L102, or 103 may be faulty, or
    4. Capacitor C301 or 302 may be faulty, or
    5. Front-end 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.

## GAIN DIAGRAM



# REPAIR PARTS LIST

Symbol	Part No.	Description
<b>TRANSISTORS, IC'S AND DIODES</b>		
Q101, 102	301201117	2SC829(C), FM IF Amp., AM Conv.
Q103	301201115	2SC828(R), AM Audio Amp.
Q104	301201117	2SC829(C), FM Meter Amp.
Q301, 302	301201115	2SC828(R), FM Audio Amp., For Auto-Switching
Q303, 304	301201115	2SC828(R), Audio 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	301201133	2SC1107, Power Amp.
IC101	303452148	LA1201, AM IF and FM IF Amp.
IC301	303452151	BA1310, MPX Decoder
IC401	303452159	LA3122, Phono Amp.
D101, 102	300111008	1K 188, FM AGC Rectifier
D103, 104	300111008	1K 188, FM Det.
D105	300111008	1K188, FM AGC Rectifier
D106, 107	300111008	1K188, AM/FM Meter Rectifier
D108	300111008	1K 188, AM/FM Meter Rectifier
D601	300919021	SU-1-02, DC Balance Regulator
D602, 603	300212006	SV-04, Temperature Compensator
D901	300313013	WZ120, Zener Regulator, 12V, 500mW
D902	300313004	BZ120, Zener Regulator, 12V, 1W
D903	300919005	1S1850, Rectifier
D904	300919006	1S1850R, Rectifier
D905, 906	300919008	SM-1-02 Rectifier
<b>COILS AND TRANSFORMER</b>		
L101	225301133	AM, IFT, 3rd.
L102	225501125	FM IFT, Ratio (Pri.)
L103	225501127	FM IFT, Ratio (Sec.)
L104	223301127	AM OSC
L105, 106	225301131	AM IFT 1st., AM IFT 2nd.
L601, 602	228641105	Anti-Parasitic
L001	226501123	47 $\mu$ H, RF Choke
L002	222301204	AM Antenna Coil
L003	226501124	2 $\mu$ H, RF Choke
T001	201001400	Transformer, Power Supply (120V only)
	206001400	Transformer, Power Supply (220V, 240V)
	205001400	Transformer, Power Supply (100V, 120V, 220V, 240V)

Symbol	Part No.	Description
<b>VARIABLE RESISTORS</b>		
VR101	510502162	10KB, AM Gain Adj.
VR102	510502134	3KB, FM Meter Level Adj.
VR103	510502134	3KB, AM Meter Level 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
<b>OTHERS</b>		
S1	601011255	Switch, Function Selector
S2, 3, 4	614030809	Switch, Push 3-key, Tape Monitor (1 set) Loudness and Hi-Filter
S5, 6 (1 set)	614020403	Switch, Push 2-key, Speaker-1 and 2
S7	614010118	Switch, Power Supply
S8	613000022	Switch, Speaker Matrix
PL001	351140005	Lamp, 14V 50mA, FM Stereo Ind.
PL002~007	352063025	Lamp, 6.3V 250mA, Dial Illumination
F001	341220020	Fuse, 2A (Line 100V, 120V)
	341220010	1A (Line 220V, 240V)
F004	341220020	Fuse, 2A, Lamp Overload Protector
F002,003	341220025	Fuse, 2.5A (speaker)
F901,902	341220040	Fuse, 4A, Main Amp. Circuit Protector
	321304368	AM/FM Front-end.
	141510153	Equalizer Amp. Circuit Board Assembly
	141710274	Tone Control Amp. Circuit Board Assembly
	141010124	AM/FM/MPX/MAIN Amp. & Power Supply Circuit Board Assembly (for Deemphasis 75 $\mu$ S)
	141010125	for Deemphasis 50 $\mu$ S
	141010126	for BS, CEE Spec. Application
	141010127	for 3 Band Spec. Application
M001	231310043	Meter, AM/FM Tuning Ind.

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