

ROTEL®

50.12.10

RX-7707

AM/FM STEREO RECEIVER

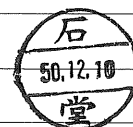
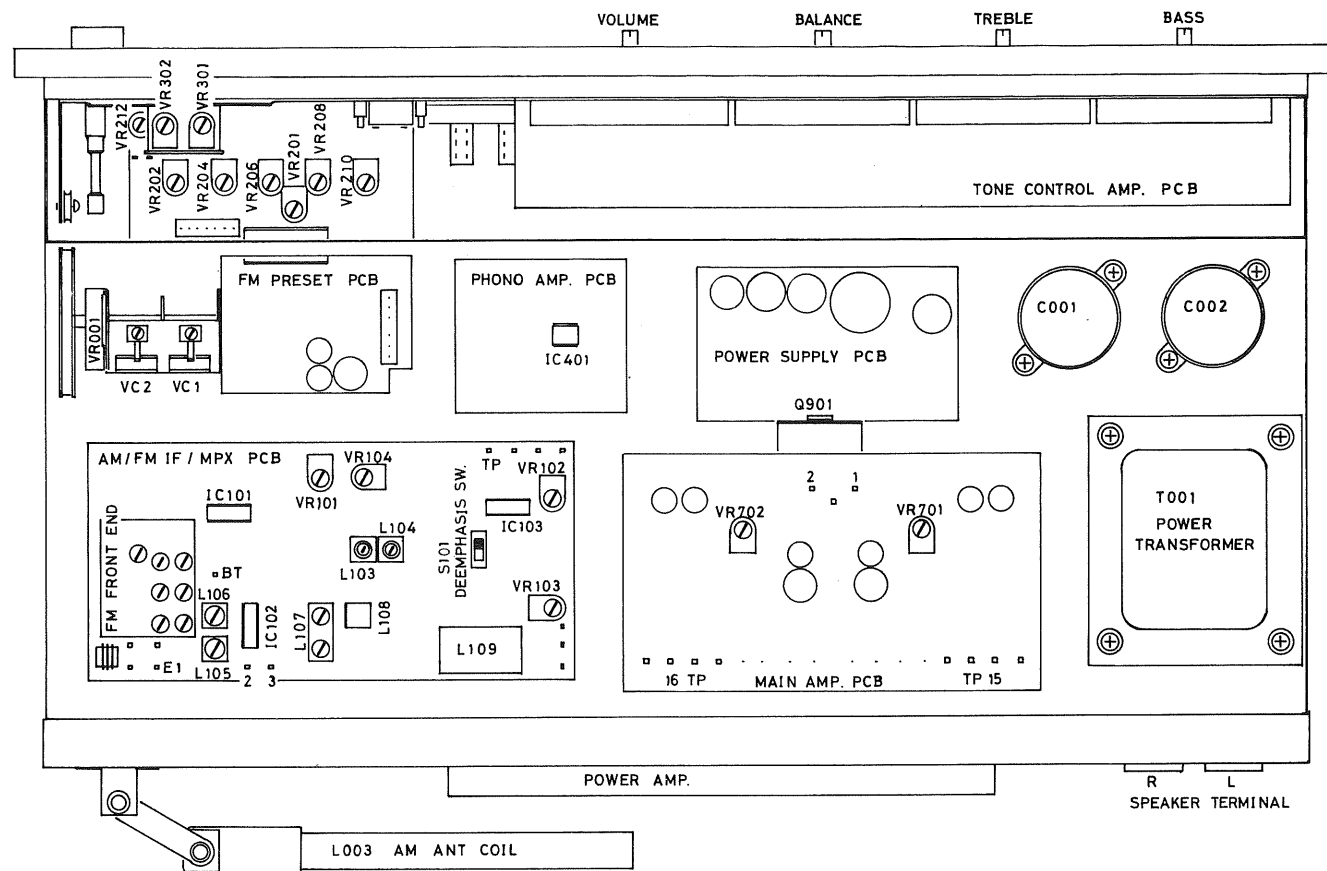


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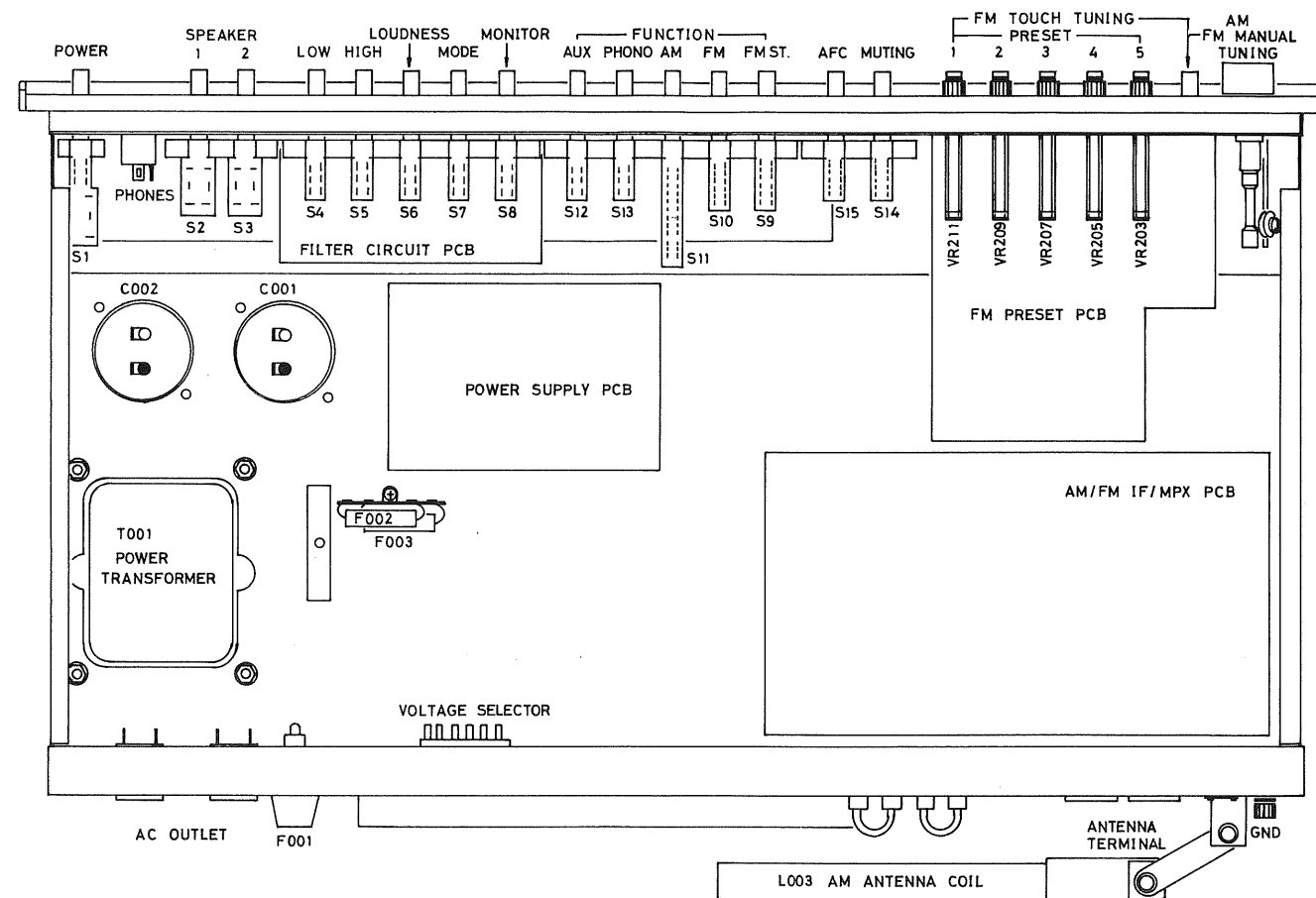
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TECHNICAL MANUAL

CHASSIS LAYOUT TOP VIEW



CHASSIS LAYOUT 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 milli-volt meter

- Notes:**
- a. Set Volume Control to minimum position.
 - b. Set potentiometers VR701 and VR702 to counterclockwise position before starting this procedure.

1. Connect the plus lead of a DC milli-volt meter to test point TP (on main amp. pcb) and minus lead to Pin 15.
2. Adjust the potentiometer VR701 to obtain a 15mV reading on DC milli-volt meter.
3. Repeat the above steps 1 and 2, for Right Channel (use test point TP, Pin 16 and potentiometer VR702).

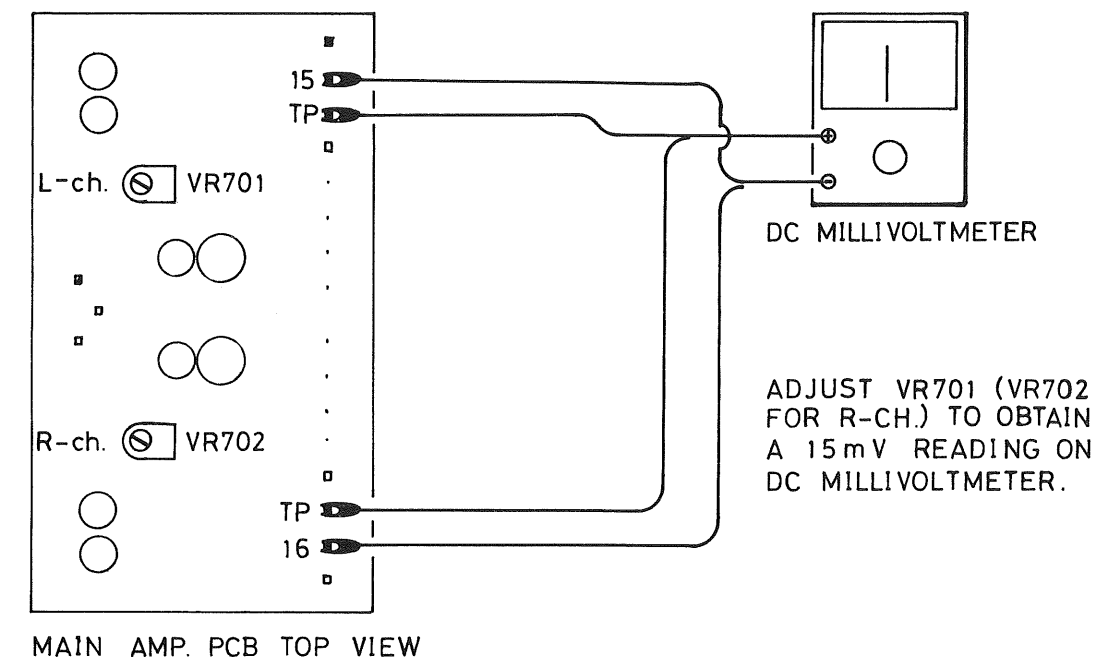


Fig. 1 POWER AMP. BIAS ADJUSTMENT HOOK-UP

ALIGNMENT PROCEDURE

Instruments: AM Signal Generator, FM Signal Generator, FM Stereo Signal Generator, H.D. Analyzer, Oscilloscope, AC VTVM and Digital Voltmeter.

Note: Instead of Digital Voltmeter, accurately calibrated DC VTVM may be used.

A. Alignment of Fixed Voltage

1. Set the Function Switch to FM and set the Touch Tuning at MANUAL position. Turn all Preset Tuning Knobs (beneath the Touch Tuning Points) Counter-Clockwise all the way until the "click" sound is heard. The alignment will not be properly done, if each Preset Tuning Knob is not clicked. There will be no problem if the Knobs are turned slightly past the click.
2. Connect Digital Voltmeter to the terminal post 'BT' on the IF Printed Circuit Board. Turn the Manual

Tuning Knob all the way counter-clockwise, and adjust the Potentiometer VR201 on the Preset Circuit Board so that reading on the Voltmeter is +3V DC.

Next, turn the Manual Tuning Knob all the way clockwise and adjust VR212 so that reading is +24V DC. Finally, turn the Tuning Knob back all the way counter-clockwise and read just VR201, if necessary, to make certain that the reading is +3V DC.

3. Adjust each Potentiometer successively of Touch Tuning Points (Knobs 1 to 5) so that each reading on the Voltmeter is +3V DC.
 - a. For Knob 1, adjust VR210
 - b. For Knob 2, adjust VR208
 - c. For Knob 3, adjust VR206
 - d. For Knob 4, adjust VR204
 - e. For Knob 5, adjust VR202

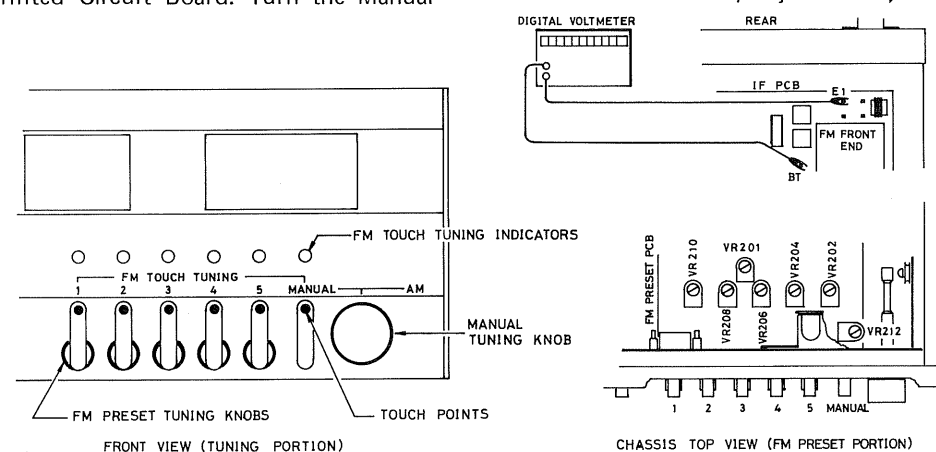


Fig. 2 FIXED VOLTAGE ADJUSTMENT HOOK-UP

B. Frequency (dial) Meter Calibration

Note: This alignment must follow the Adjustment A above.

1. Set the Function Switch to FM and Touch Tuning at MANUAL position.
2. Turn the Tuning Knob fully counter-clockwise and adjust the Potentiometer VR301 on the Meter Circuit Board so that the Meter Pointer lines up exactly on

the Low Edge Point (see diagram).

3. Turn the Tuning Knob fully clockwise and adjust the VR302 so that the Pointer lines up exactly on the High Edge Point.
4. Repeat steps 2 and 3 above.

Caution: Be sure your eyes are directly front of each Edge Point.

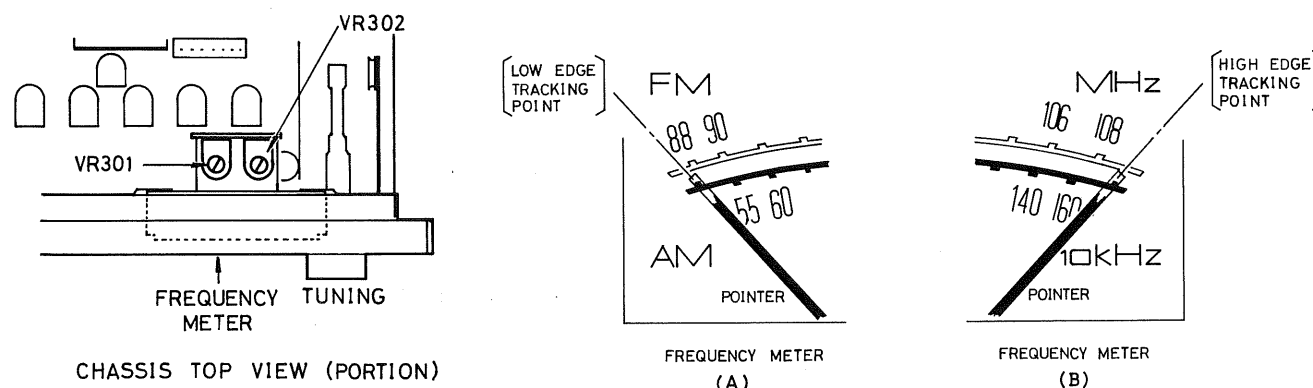


Fig. 3-1
FREQUENCY METER
TRACKING ADJUSTMENT

ADJUST POTENTIOMETER VR301 ON CIRCUIT BOARD BEHIND FREQUENCY METER (SEE FIG.3-1) SO THAT POINTER LINES UP ON LOW EDGE TRACKING POINT RESPECTIVELY.

ADJUST POTENTIOMETER VR302 ON CIRCUIT BOARD BEHIND FREQUENCY METER (SEE FIG.3-1) SO THAT POINTER LINES UP ON HIGH EDGE TRACKING POINT RESPECTIVELY.

Fig. 3-2 FREQUENCY METER TRACKING

C. AM IF and RF Alignment

1. Set the Function Switch to AM.
2. Connect AM SG (Signal Generator) with Pin 2 on the IF Circuit Board, and Connect AC VTVM with the TAPE OUT terminal.
3. Feed 455 kHz (400 Hz 30% modulation) signal from AM SG, and adjust AM IFT's L106 and L107 so that reading on AC VTVM is maximum. (Keep the output of AM SG as low as possible.)
4. Apply AM SG to AM Antenna Coil by use of Test Loop. Set frequency of AM SG at 600 kHz, as well as turn the Tuning Knob and set the Meter Pointer exactly at 600 kHz on Frequency Meter. Adjust AM Oscillation Coil L105 and AM Antenna Coil L003 so that reading on AC VTVM is maximum.
5. Change frequency of AM SG to 1,400 kHz, as well as tune to 1,400 kHz on the Frequency Meter. Adjust AM Oscillation Trimmer CT002 and AM Antenna Trimmer CT001 so that reading on AC VTVM is maximum.
6. Repeat steps 4 and 5.

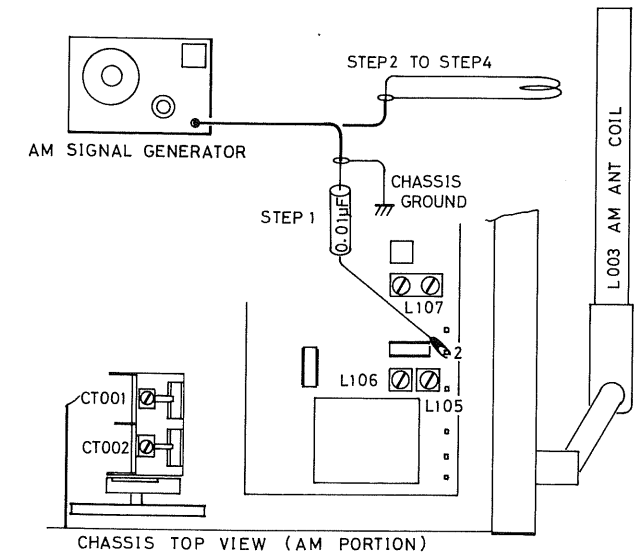


Fig. 4 AM ALIGNMENT HOOK-UP

D. FM IF and RF Alignment

1. Set the Function Switch to FM and Touch Tuning to MANUAL position. Make sure that both muting and AFC switches are off.
2. Connect FM Signal Generator to FM Antenna Terminal, and connect H.D. Analyzer to TAPE OUTPUT terminal.
3. At zero input, adjust FM IFT L104 so that the Pointer of FM Tuning (center-tune) Meter lies perfectly on the center of the Meter.
4. Feed 98 MHz (400 Hz, 100% modulation) signal from FM SG, and tune the receiver to the same frequency accurately (output level does not have to be maximum, but Pointer on Tuning Meter should be on dead center). Adjust IFT of FM front-end so that Level Meter on H.D. Analyzer indicates

maximum.

5. Adjust FM IFT L103 so that distortion reading on H.D. Analyzer is minimum. However, if this alignment effects Pointer of Tuning Meter to deflect from the center position, adjust FM IFT L104 slightly.
6. Set FM SG at 90 MHz (400 Hz, 100% modulation) and tune the receiver to 90 MHz on the Freq. Meter. Adjust FM Oscillation Coil (LO), RF Coil (LR) and Antenna Coil (LA) on FM front-end so that reading on Level Meter of H.D. Analyzer is maximum.
7. Set FM SG at 106 MHz (400 Hz, 100% modulation) and tune the receiver to 106 MHz on the Freq. Meter. Adjust FM Oscillation Trimmer (Tco), RF Trimmer (TCR) and Antenna Trimmer (TCA) so that reading on Level Meter of H.D. Analyzer is maximum.
8. Repeat Steps 6 and 7.

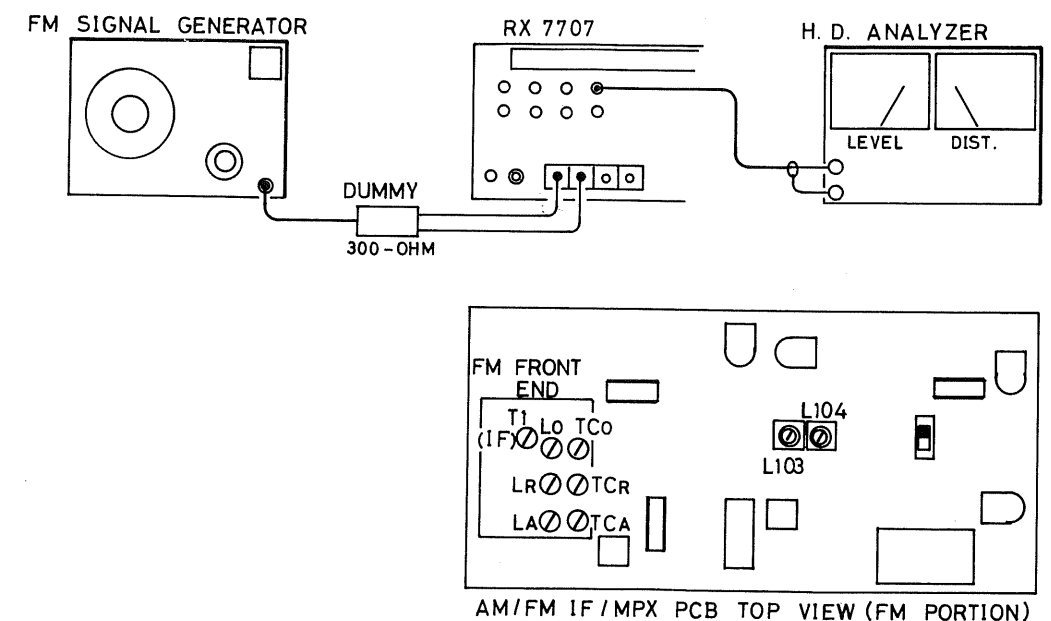


Fig. 5 FM IF & RF ALIGNMENT HOOK-UP

FM MPX DECODER AND MUTING LEVEL ADJUSTMENT

1. Set Function Switch to FM STEREO.
Make sure Muting, AFC and Filter Switches are on OFF positions.
2. Connect FM Stereo Signal Generator to FM Antenna Terminal, and connect Oscilloscope and AC VTVM to TAPE OUT (right channel) terminal.
3. Feed, 98 MHz signal [pilot 10%, 1 kHz (left channel) 90% modulation] from FM Stereo SG, and set Potentiometer VR102 (on the IF Circuit Board) to around the middle of stereo operation range (if at this setting distortion of output is substantial, turn VR102 to direction of lesser distortion all the way to mono operation switched in and turn VR102 gradually back until stereo switched in). Adjust VR103 until leakage from left channel signal to right channel is minimum.
4. Change modulation signal to 1 kHz (right channel), and connect Oscilloscope and AC VTVM to TAPE OUT (left channel) terminal. Check if leakage level from right channel signal to left channel is about same as the level obtained on item 3 above. If the difference is large, adjust VR103 to obtain approximately same level.
5. Attenuate output of FM Stereo SG and at FM Antenna input level of $5 \mu\text{V}$, adjust Potentiometer VR101 so that stereo operation switches in.

FM MUTING LEVEL ADJUSTMENT

1. Feed 98 MHz (or another frequency is necessary) from FM SG and push the Muting Switch ON. Connect Oscilloscope to TAPE OUT terminal.
 2. Attenuate output of FM SG and adjust Potentiometer VR104 until waveform on Oscilloscope just disappears at FM antenna input level of $15 \mu\text{V}$.
 3. Increase output of FM SG and Antenna input level, and then gradually attenuate to check if waveform on Oscilloscope does indeed disappear when input level is $15 \mu\text{V}$.
- Note:** Tolerance of Muting Level range is accepted as $15 \mu\text{V} \pm 3 \text{ dB}$ on normal condition.

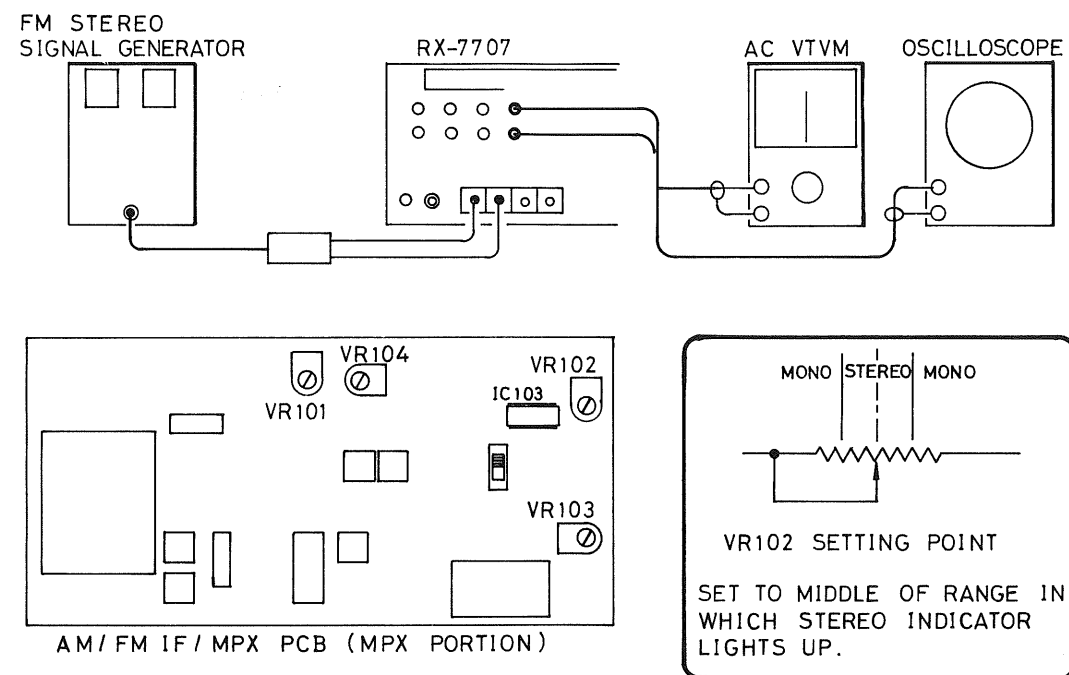


Fig. 6 FM MPX ALIGNMENT HOOK-UP

TROUBLE SHOOTING GUIDE

Unit Inoperative

- I. If the meter lamps do not light, check to see if the AC Fuse is blown.
 - A. If the AC Fuse is blown,
 1. Primary or Secondary winding of the Power Transformer may be shorted out.
 - B. If the AC Fuse is OK,
 1. Primary winding of the Power Transformer may be opened or
 2. Power Switch may be faulty.
- II. If the Meter lamps light, check to see if the DC Fuses, F002 and 003 are blown.
 - A. If the DC Fuses are blown,
 1. Rectifier D901, 902, 903, 904, 905 or 906 may be faulty, or
 2. Capacitor C727, 728, 901, 902, 903, 001 or 002 may be faulty, or
 3. Transistor Q707, 708, 715, 716, 901, 001, 002, 003 or 004 may be shorted out, or
 4. IC 201 may be faulty.

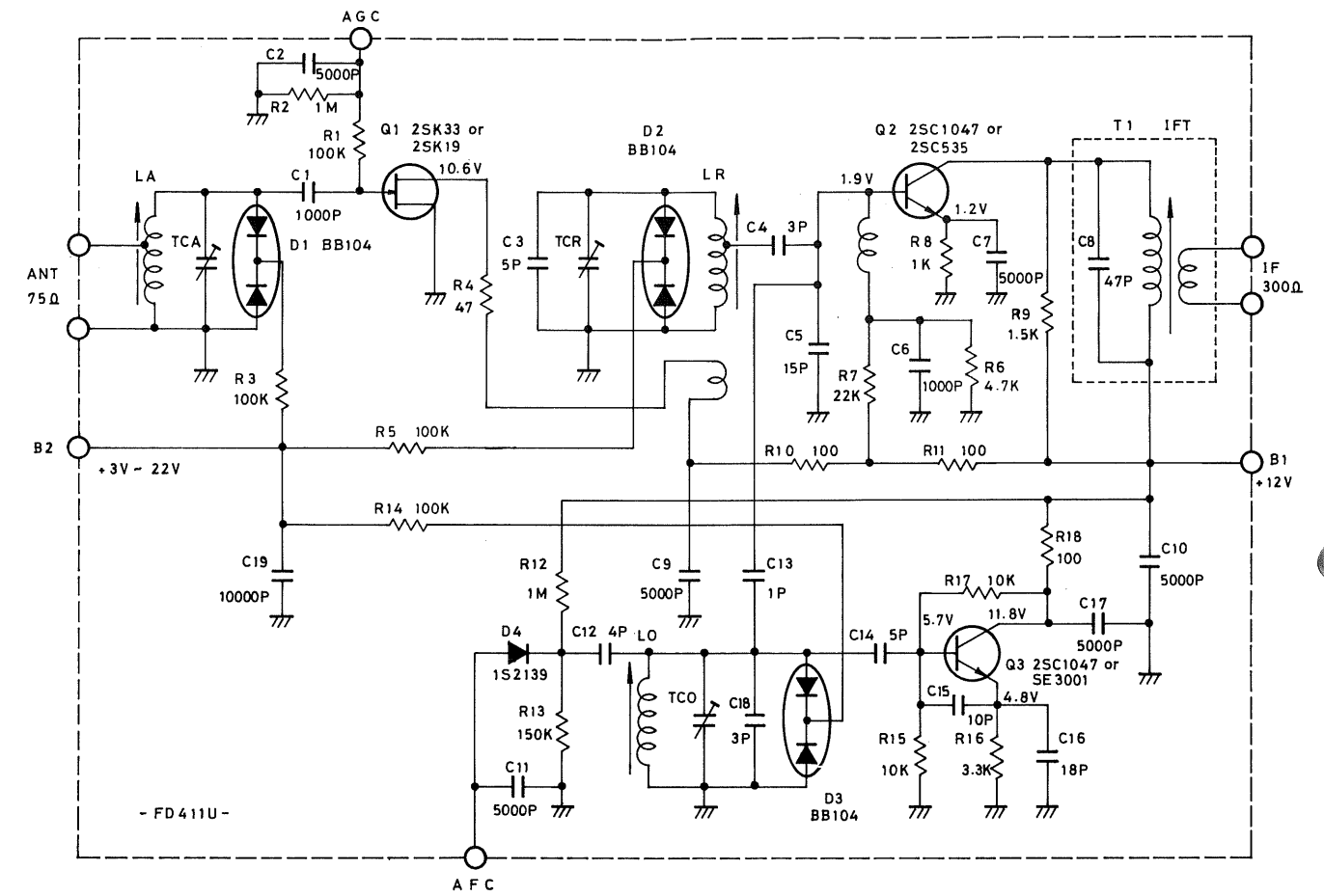
Left or Right Channel Inoperative

- I. If the Left channel is inoperative; check to see if there is a signal at Main Amp. pcb Pin 1.
 - A. If there is a signal,
 1. Capacitor C701 may be faulty, or
 2. Transistor Q701, 702, or 703 may be faulty.
 - B. If there is no signal,
 1. Capacitor C601, 606, 610 or 614 may be faulty, or
 2. Transistor Q601, 602 or 603 may be faulty.
- II. If the Right channel is inoperative, check to see the circuits according as item 1, above.

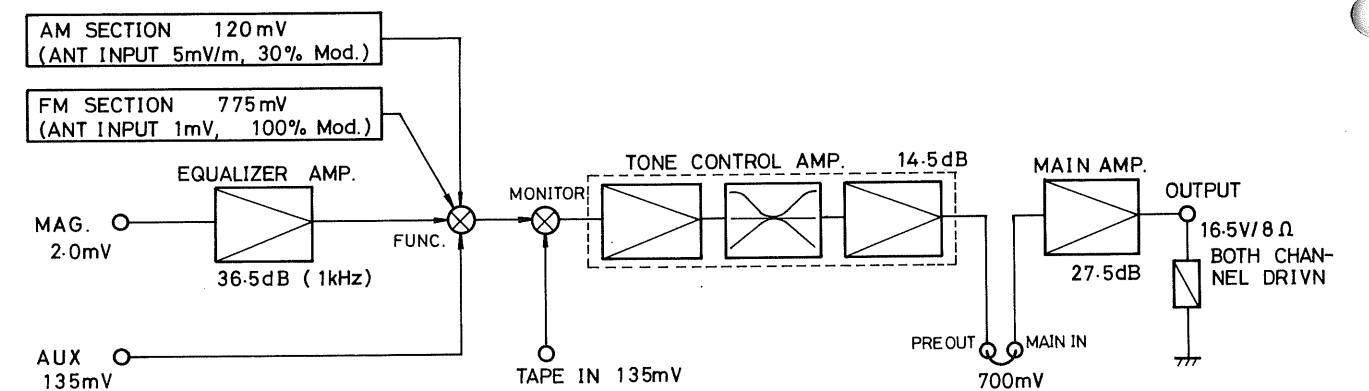
Radio Section Inoperative

- I. AM is inoperative
 - A. If there is proper voltage at IF pcb Pin B2,
 1. IC 102 or Transistor Q 106 may be faulty, or
 2. Coil L105, 106, 107 or 003 may be faulty.
- II. FM is inoperative
 - A. If there is proper voltage at IF pcb Pin B3.
 1. IC101, 103 or 202 may be faulty, or
 2. Transistor Q101, 102, 105 or 203 may be faulty, or
 3. Front end may be faulty.
 - B. At FM Stereo broadcast, the set only receives in Mono.
 1. FM Stereo Auto-switching circuit is inoperative, or
 2. FM MPX 19 kHz Alignment may become faulty, or
 3. IC 103 may be faulty.
 - C. FM Touch Tuning is inoperative,
 1. IC201 or 202 may be faulty, or
 2. Transistor Q203 may be faulty, or
 3. The Basis Voltages Alignment may become faulty.

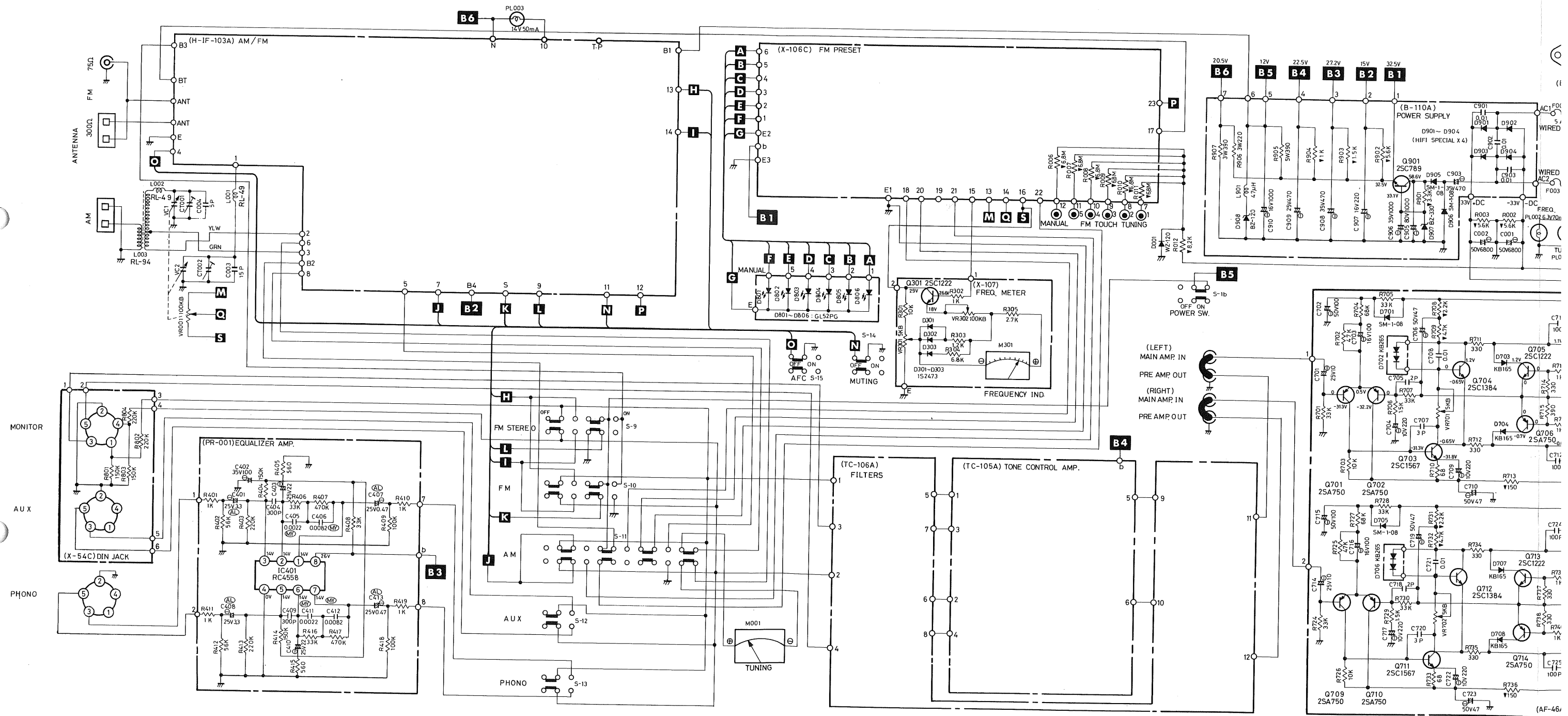
FRONT END SCHEMATIC DIAGRAM

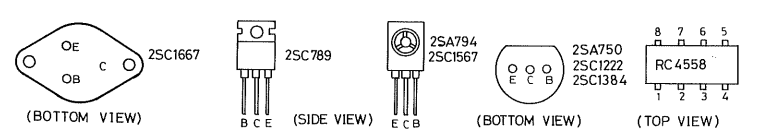
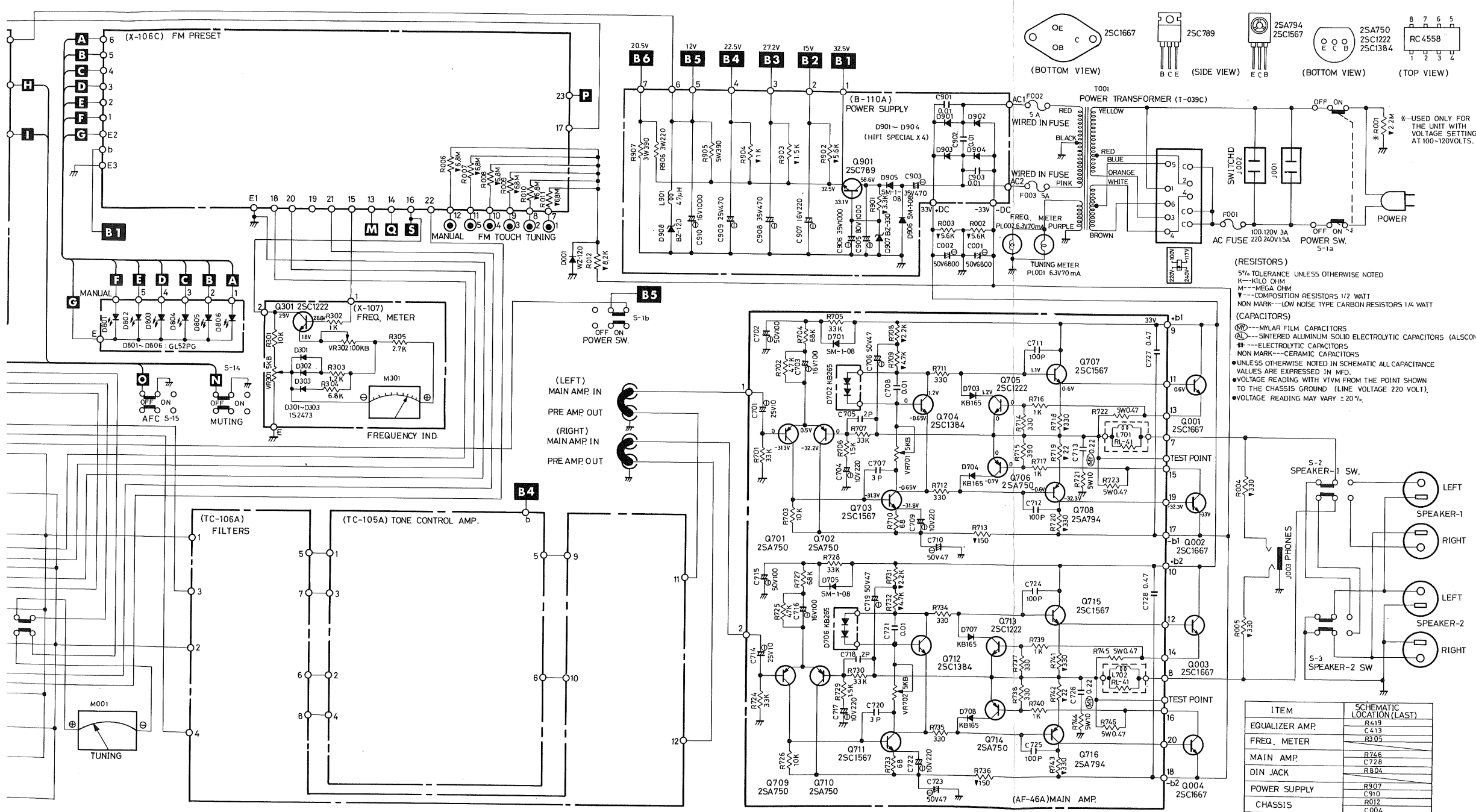


GAIN DIAGRAM



SCHEMATIC DIAGRAM

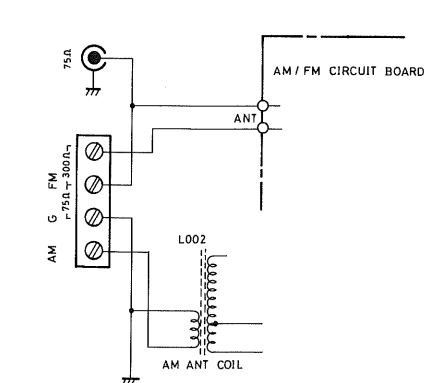




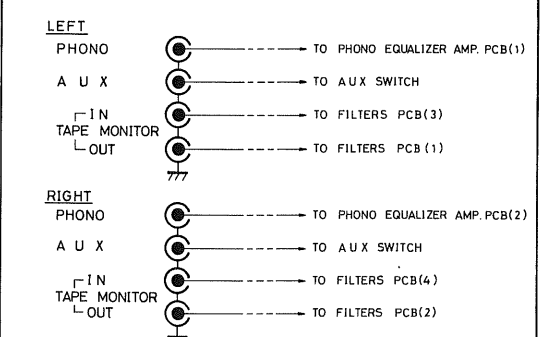
(RESISTORS)
 5% TOLERANCE UNLESS OTHERWISE NOTED
 K--KILO OHM
 M--MEGA OHM
 ---COMPOSITION RESISTORS 1/2 WATT
 NON MARK---LOW NOISE TYPE CARBON RESISTORS 1/4 WATT
 (CAPACITORS)
 ---MYLAR FILM CAPACITORS
 ---SINTERED ALUMINUM SOLID ELECTROLYTIC CAPACITORS (ALSCON)
 ---ELECTROLYTIC CAPACITORS
 NON MARK---CERAMIC CAPACITORS
 *UNLESS OTHERWISE NOTED IN SCHEMATIC ALL CAPACITANCE
 VALUES ARE EXPRESSED IN MFD.
 *VOLTAGE READING WITH VTVM FROM THE POINT SHOWN
 TO THE CHASSIS GROUND (LINE VOLTAGE 220 VOLTS).
 *VOLTAGE READING MAY VARY $\pm 20\%$.

ITEM	SCHEMATIC LOCATION (LAST)
EQUALIZER AMP.	R419
FREQ. METER	C413
MAIN AMP.	R746
DIN JACK	R804
POWER SUPPLY	C910
CHASSIS	R012
	C004

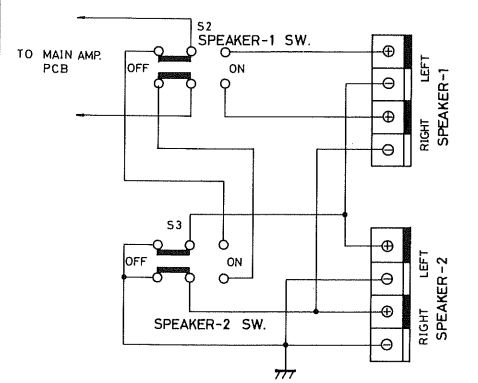
RCA TYPE UNIT



ANTENNA TERMINALS CONNECTION

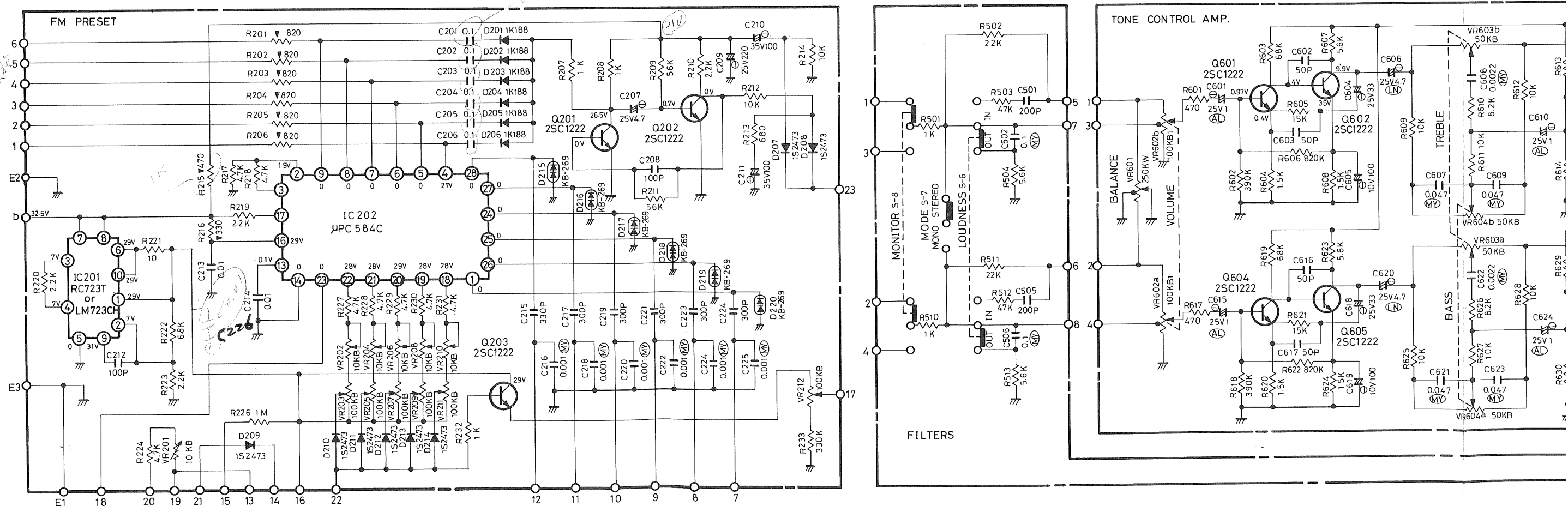
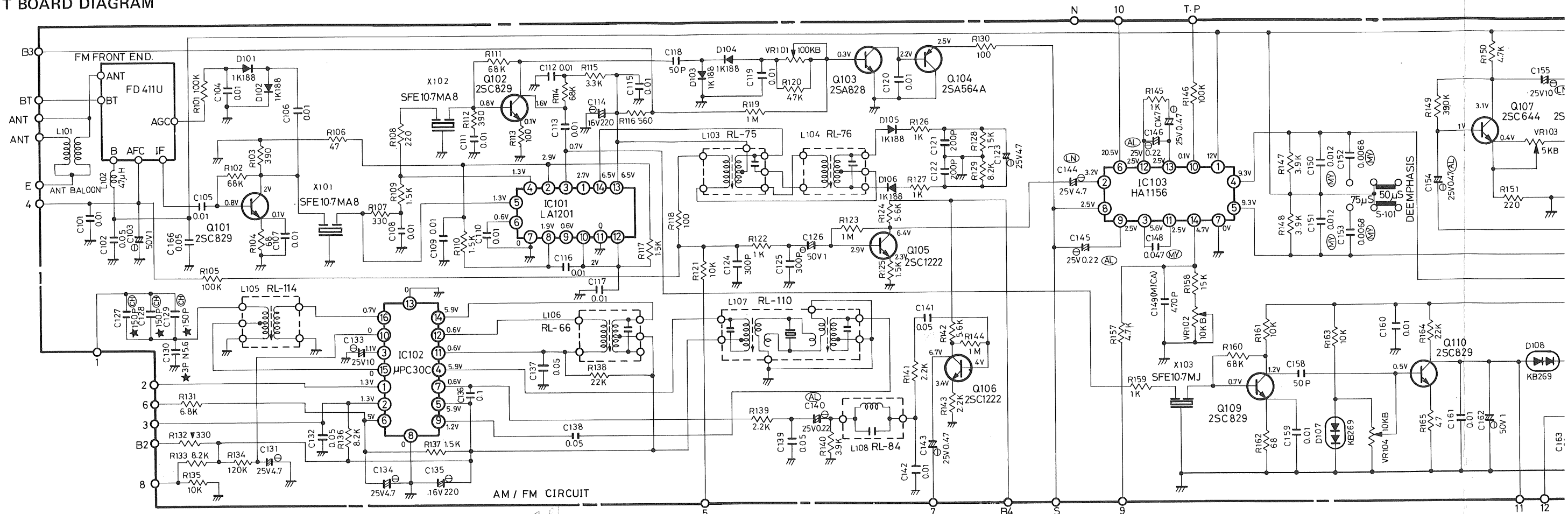


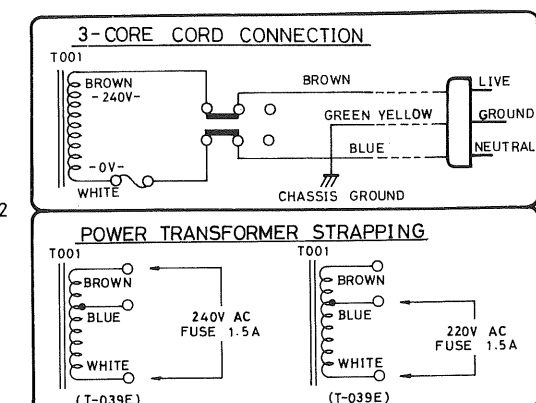
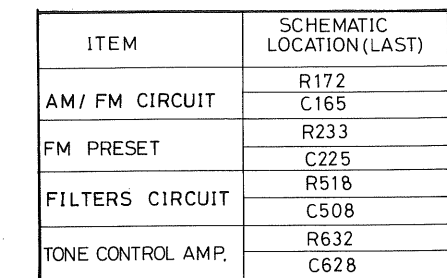
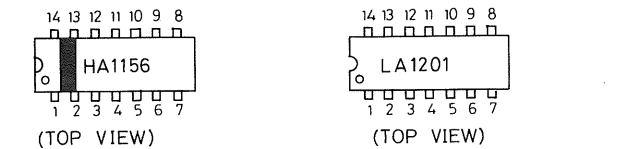
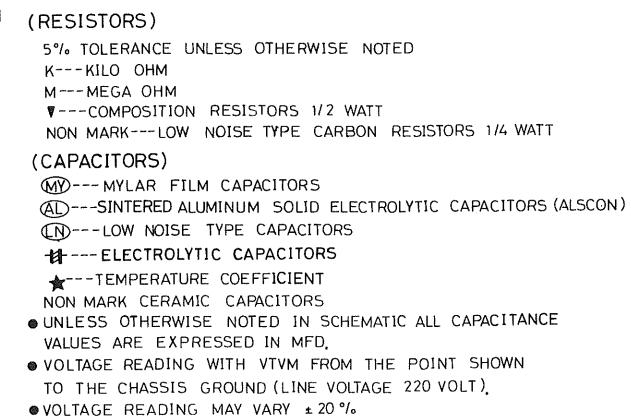
INPUT TERMINALS CONNECTION



SPEAKER TERMINALS CONNECTION

CIRCUIT BOARD DIAGRAM





REPAIR PARTS LIST

Schematic Location	Description	Part No.
Transistors, Diodes and IC's		
Q101, 102, 109, 110	2SC829 (C), FM IF Amp., FM Muting	301201117
Q103	2SC828 (R), FM Stereo Autoswitching Amp.	301201115
Q104	2SA564A, FM Stereo Autoswitching Gate	301001117
Q105, 106, 111, 112, 201, 202, 203, 301, 601, 602, 603, 604, 605, 606, 705, 713,	2SC1222, FM Composite Amp., Tone Amp., etc.	301201156
Q107, 108	2SC644 (S), FM Stereo Amp.	301201114
Q701, 702, 706, 709, 710, 714	2SA750 (E), Differential Amp., etc.	301001133
Q703, 707, 711, 715	2SC1567, Predriver, Driver	301201150
Q704, 712	2SC1384, Bias Compensator	301201132
Q708, 716	2SA794, Driver	301001135
Q901	2SC789, Stabilizer	301201142
Q001, 002, 003, 004	2SC1667, Power Amp.	301201154
D101, 102, 103, 104, 105, 106, 201, 202, 203, 204, 205, 206	1K188, FM AGC Rect., FM Det., etc.	300111008
D207, 208, 209, 210, 211, 212, 213, 214, 301, 302, 303	1S2473, FM Touch Tuning Rect., etc.	300111010
D107, 108, 215, 216, 217, 218, 219, 220	KB-269, FM Muting Bias	300212004
D701, 705, 905, 906	SM-1-08, Rectifier for Radio and Preamp. Section	300919016
D702, 706	KB-265, Temperature Compensator	300212002
D703, 704, 707, 708	KB-165, Overload Protection Bias	300212008
D801, 802, 803, 804, 805, 806	GL-52PG, FM Touch Tuning Indicator	300414008
D901, 902, 903, 904	Hi-Fi Special, Rectifier for Main Amp.	300919017
D907	BZ-330, Regulator, 33V	300313020
D908	BZ-120, Regulator, 12V	300313004
IC101	LA-1201, FM IF Amp.	303452148
IC102	μ PC30C, AM Conv., IF Amp. and Det.	303452157
IC103	HA-1156, FM MPX Decoder	303452151

Schematic Location	Description	Part No.
IC201	RC723T or LM723CH, Stabilizer for FM Preset	303452144
IC202	μ PC584C, FM Preset	303452158
IC401	RC4558, Phono Amp.	303452152
Coils and Transformers		
L101	FM Antenna Matching Transformer	226501121
L102, 901	RF Choke, 47 micro-Henry	226501123
L103	FM IFT, Ratio (Pri.)	225501125
L104	FM IFT, Ratio (Sec.)	225501126
L105	AM Local OSC Coil	223301131
L106	AM IFT, 1st	225301125
L107	AM IFT, 2nd	229101176
L108	AM Low Pass Filter	228641119
L109	FM Low Pass Filter	228641118
L701, 702	Anti-parasitic Coil	228641105
L001, 002	RF Choke, 2 micro-Henry	226501124
L003	AM Antenna Coil Assembly	222391130
T001	Power Transformer, Pri. = Multivoltage Type	205001368
	Power Transformer, Pri. = 220V/240V Type	206001368
Variable Resistors		
VR101, 212	100KB, FM Stereo Autoswitching Level Adj.	510502130
VR102, 104, 201, 202, 204, 206, 208, 210,	10KB, MPX 19kHz Adj., Muting Level Adj., etc.	510502126
VR103, 701, 702	5KB, FM Separation Ad., etc.	510502128
VR203, 205, 207, 209, 211	100KB, FM Preset Tuning	581005040
VR301	5KB, Frequency Meter Low End Tracking Adj.	510502121
VR302	100KB, Frequency Meter High End Tracking Adj.	510502132
VR601	250KW, Balance Control	581005039
VR602	100KB, Volume Control	581005037
VR603, 604	50KB, Bass and Treble Control	581005038
Miscellaneous		
X101, 102	FM IF Bandpass Filter	229101171
X103	FM IF Bandpass Filter	229101139
	FM Front end	321501592
S1	Power Switch	614010117
S2, 3(1 set)	Speaker Switch	614020408
S4, 5, 6, 7, 8 (1 set)	Push Switch, 5-key, Loudness, Mode, etc.	614051012
S9, 10, 11, 12, 13 (1 set)	Push Switch, 5-key, Function Selector	614051013
S14, 15 (1 set)	Push Switch, 2-key, FM AFC and Muting	614020402
S101	FM Deemphasis Switch	613000024
M301	AM/FM Frequency Meter	231310055
M001	Tuning Meter	231310058

Schematic Location	Description	Part. No.
VC1, 2 (gang)	Variable Capacitor, AM Tuning w/Variable Resistor for FM Tuning	322420011
F001	Fuse, 3A (100V – 120V)	341220030
	Fuse, 1.5A (220V – 240V)	341220015
	Fuse, 1.5A Miniature Type (220V – 240Vf for Europe)	345220015
F002, 003	Fuse, 5A, DC Circuit Protector	343220050
	AM/FM IF Amp. and MPX Decoder	
	Circuit Assembly	141311364
	FM Preset Circuit Assembly	141810633
	Frequency Meter Circuit Assembly wo/ Freq. Meter	141810634
	Phono Equalizer Amp. Circuit Assembly	141510152
	Filter Circuit Assembly	141710272
	Tone Control Amp. Circuit Assembly	141710273
	Main Amp. Circuit Assembly	141610261
	Touch Tuning Indicator Circuit Assembly	141810635
	Power Supply Circuit Assembly	141810632

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ROTEL OF AMERICA, INC.	2642 CENTRAL PARK AVE., YONKERS, N.Y. 10710, U.S.A.