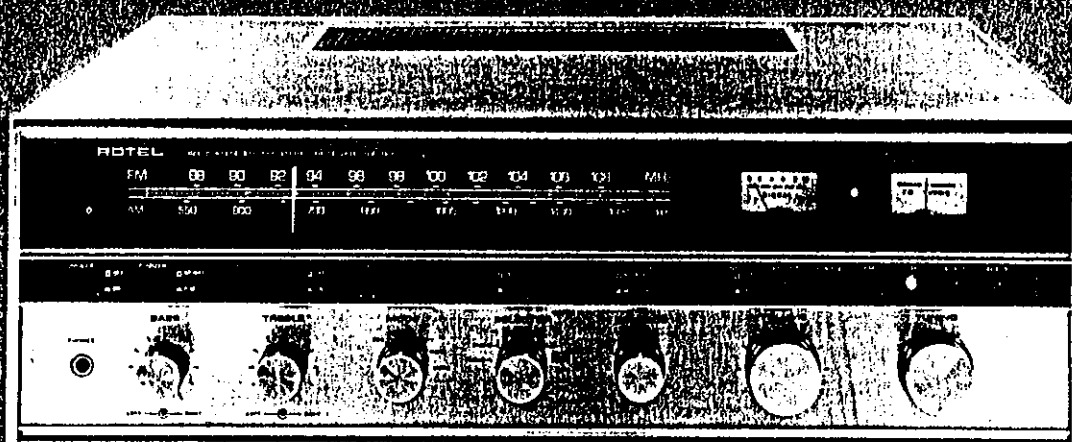


ROTEL®

RX-800

AM/FM STEREO RECEIVER



technical manual

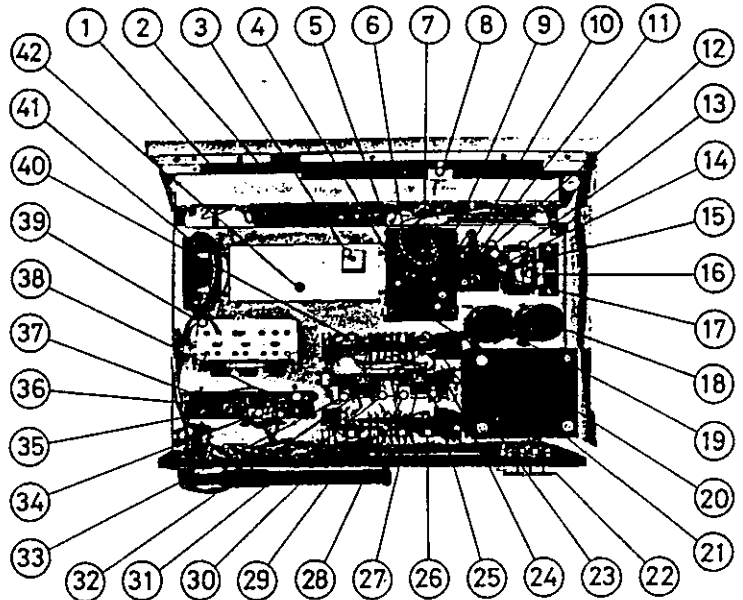
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ROTEL®

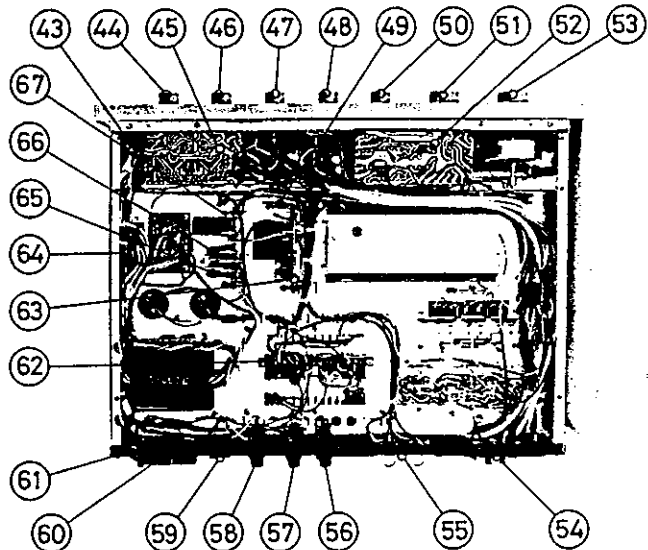
CHASSIS LAYOUT

1. FM Tuning Meter
2. Signal Strength Meter
3. T101, FM IFT, Ratio Det.
4. FM MPX PCB
5. L301, MPX Coil, 19KHz tune
6. L302, MPX Coil, 19KHz tune
7. IC301, Integrated Circuit
8. Dial Pointer
9. VR302, Separation Adj.
10. L303, MPX Coil, 38KHz tune
11. VR801, Muting Level Adj.
12. Muting PCB
13. Relay PCB
14. L801, Muting Coil, 10.7MHz
15. Q901, Relay Control
16. RY901, Relay
17. VR802, Strength Meter Level Adj.
18. C014, Ripple Filter Capacitor
19. C015, Ripple Filter Capacitor
20. VR301, FM Stereo Light Level Adj.
21. T001, Power Transformer
22. Speakers Terminal, L-ch.
23. Q001, Power Transistor, L-ch.
24. Main Amp. PCB
25. Q606, Driver Transistor, L-ch.
26. Q003, Power Transistor, R-ch.
27. VR601, Idling Current Adj., L-ch.
28. Q605, Driver Transistor, L-ch.
29. L003, AM Antenna Coil
30. Q004, Power Transistor, R-ch.
31. Q611, Driver Transistor, R-ch.



32. VR602, Idling Current Adj., R-ch.
33. Q612, Driver Transistor, R-ch.
34. T203, AM IFT
35. T201, AM RF Coil
36. T202, AM OSC Coil
37. AM PCB
38. T204, AM IFT
39. Front end, AM/FM
40. Q002, Power Transistor
41. Equalizer PCB
42. VR301, FM Stereo Threshold Adj.

43. J005, Phone Jack
44. VR702, Bass Control
45. Tone Control Amp. PCB
46. VR701, Treble Control
47. Mode Switch
48. Selector Switch
49. Q902, Stabilizer Transistor
50. VR501, Balance Control
51. VR502, Volum Control
52. Volume Control PCB
53. Tuning Knob
54. Antenna Terminal Strip
55. Terminal, Pre Out — Main In
56. F003, Speaker Fuse, R-ch.
57. F002, Speaker Fuse, L-ch.
58. F001, AC Fuse
59. J003, AC Outlet
60. Speakers Terminal, R-ch.
61. J004, AC Outlet
62. Bracket, Main Amp. PCB
63. Stabilizer PCB



64. Voltage Selector
65. D901, Rectifier
66. D902, Rectifier
67. Rectifier PCB

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.

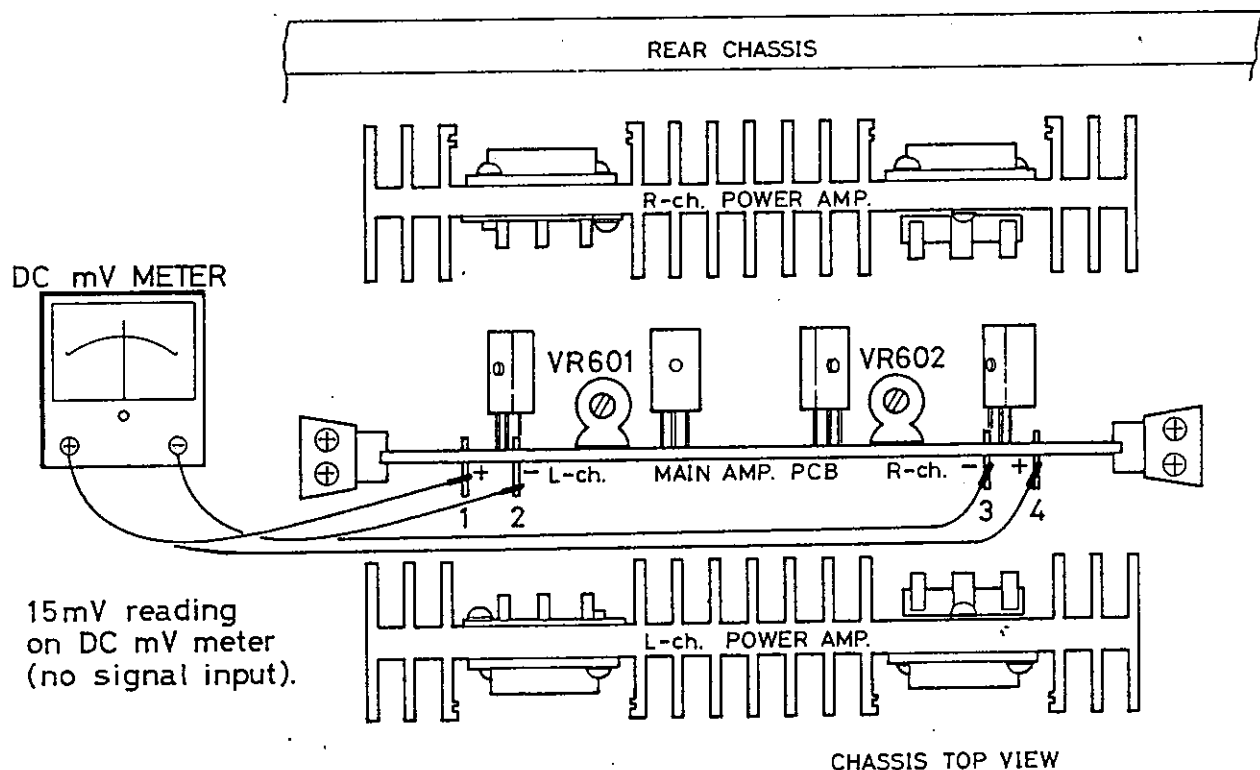
5. When mounting a replacement power transistor, be sure the bottom of the flange, the mica insulators and the surface of the heat sink are free of foreign matter, for they may cause transistor failure.
6. Silicon grease must be applied between the transistor and the mica insulator, and between the mica insulator and the heat sink for better heat conduction.

BIAS (IDLING CURRENT) ADJUSTMENT

Adjust Idling Current using a DC milli-volt meter.

1. Set Volume Control to minimum position = no signal input.
2. Connect the plus lead of a DC mV meter to pin No.1 (on Main Amp. PCB) and the minus lead of a DC mV meter to pin No.2 (see Fig.1).

3. Rotate VR601 potentiometer (on Main Amp. PCB) to obtain a 15mV reading on DC mV meter.
4. Repeat the steps 2 and 3 as above for Right channel (use pins No.4, No.3 and potentiometer VR602). Plus lead to pin No.4 and Minus lead to pin No.3.



AM ALIGNMENT PROCEDURE

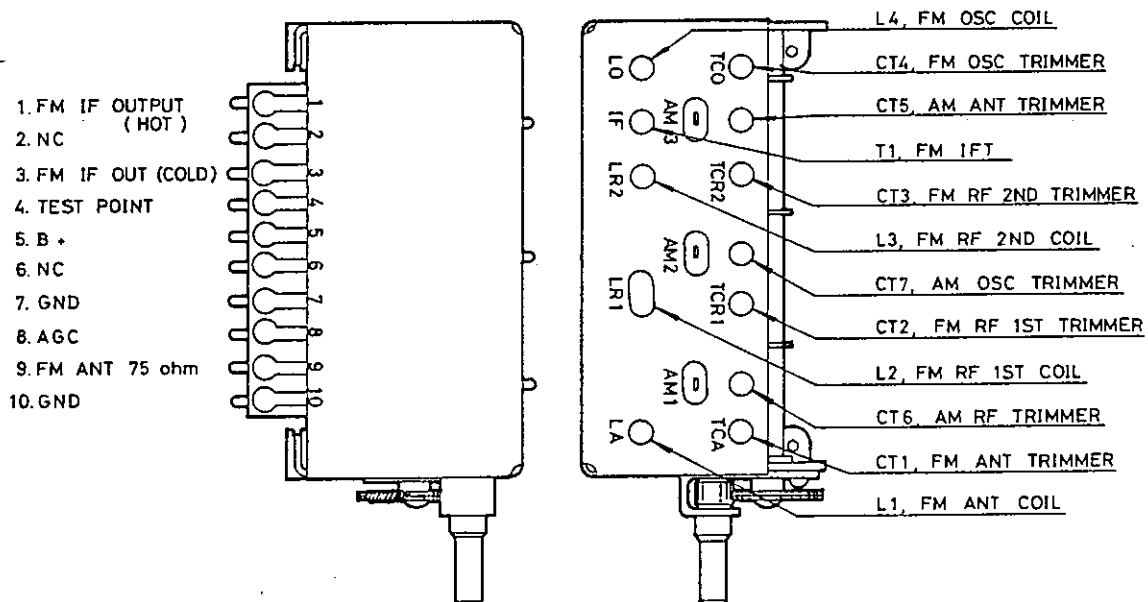
Instruments: AM Signal Generator, Distortion Analyzer and AC VTVM.

NOTES: Set Selector switch to AM.

Input signal must be kept as low as possible to avoid AVC action.

Step	Generator		Tuning Dial Setting	Output Indicator Connected to	Adjust	Adjust for
	Coupling	Frequency				
1	Tr202 Base (on AM 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-1 OUT jack	T203 and 204 (on AM IF board)	Maximum reading on VTVM.
2	Connect to short loop of wire. Radiate signal into ferrite loop-stick antenna.	600 KHz (400 Hz 30% mod.)	600 KHz		T202 (OSC) T201 (RF) (on AM IF board) and L003 (ANT)	
3		1400 KHz (400 Hz 30% mod.)	1400 KHz		CT7 (OSC) CT6 (RF) and CT5 (ANT) (on Front end)	
4	Repeat steps 2 and 3 until no further improvement is noticed.					
5	Same as in Step 2. Set antenna terminal voltage to 5mV	1000KHz (400 Hz 30% mod.)	1000 KHz	Distortion analyzer to TAPE-1 OUT	T204	Minimum Distortion

FRONT END LAYOUT



FM ALIGNMENT PROCEDURE

Instruments: FM Signal Generator, Oscilloscope and Distortion Analyzer.

Set Selector switch to FM, Muting switch to OFF and Filter switches to OFF position.

Connect FM Signal Generator to FM antenna terminals.

Connect Oscilloscope and Distortion Analyzer to TAPE-1 OUT jack.

Step	Generator		Tuning Dial Setting	Adjust	Adjust for
	Sig. Strength	Frequency			
1	No signal input		Quiet point on band.	T101 (on FM IF board) Top	Center of Tuning Meter (zero point on FM Tuning Meter)
2	1 mV	98 MHz (400 Hz 100% Mod.)	Tune for Center of Tuning Meter	T101 Bottom	Minimum reading on Distortion Analyzer (minimum distortion).
3	1 mV $\rightarrow$ 0			T1 (on Front end) Top and Bottom.	Maximum I.H.F. sensitivity.
4	Repeat steps 2 and 3 until no further improvement is noticed.				
5	3 μ V	90 MHz (400 Hz 100% Mod.)	90 MHz	LO (FM OSC), LR2, LR1 (FM RF) and LA (FM ANT) coil (on Front end)	Maximum output and maximum I.H.F. sensitivity.
6		106 MHz (400 Hz 100% Mod.)	106 MHz	TCO (FM OSC), TCR2, TCR1 (FM RF) and TCA (FM ANT) trimmer (on Front end)	
7	Repeat steps 5 and 6 until no further improvement is noticed.				

FM-STEREO (MPX) ALIGNMENT PROCEDURE

Instruments: FM Signal Generator, AC VTVM and Oscilloscope.

NOTE: The FM IF Amplifier Alignment must be completed before attempting this FM-Stereo Alignment.

Poor IF alignment will result in poor Multiplex Adjustment.

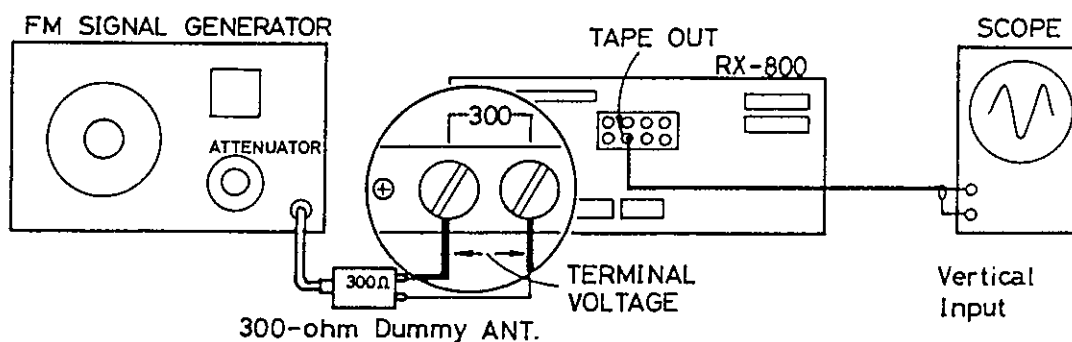
Set Stereo Beacon Level Adj. VR301 (on MPX board) to mid-position.

Set Separation Adj. VR302 (on MPX board) to max-position before starting this procedure.

Set Selector switch to "FM STEREO."

Connect Stereo Generator to FM antenna terminals.

Step	Stereo Generator		Output Indicator Connected to	Adjust	Adjust for
	Modulation	RF Deviation			
1	19 KHz Pilot signal only	2 – 5%	Oscilloscope to Test Point #6 on MPX board	L301, 302 and 303	Maximum Amplitude on scope.
2		5%		VR301	Stereo Beacon Lamp just comes on.
3	Composite 1 KHz signal to Left channel only	Pilot 10% Signal 90%	Oscilloscope and VTVM to Left channel TAPE-1 OUT jack.	L302	Maximum and un- distorted sine wave on scope.
4			Oscilloscope and VTVM to Right channel TAPE-1 OUT jack.		Minimum reading on VTVM.
5	Composite 1 KHz signal to Right channel only		Same as in step 3.		
6	Repeat steps 4 and 5 until no further improvement is noticed. And adjust Separation Adj. VR302, if necessary.				



FM MONO-STEREO AUTOMATIC SWITCHING LEVEL ADJUSTMENT PROCEDURE

1. Connect a VTVM and Oscilloscope to the TAPE-1 OUT jack (Left or Right).
2. Feed the FM signal whose MPX has been varied into the FM ANT terminals.
MPX variation
Pilot 10%
Modulation Frequency 1,000Hz Left or Right chan.
Signal 90%
3. Set the frequency at 98 MHz (when there are disrupting signal, choose another setting).
4. Set the MODE switch to STEREO and SELECTOR switch to FM.

5. Turn CCW the MONO — STEREO Auto-switching Level Adj. VR101 (on FM IF board): this is a condition in which Auto-switching does not function.
6. Adjust the FM MPX so that the distortion and separation will be best.
7. Adjust the VR101 so that when the antenna input level is $30\mu\text{V}$ or more, Stereo will switch in and when the input is below the $30\mu\text{V}$ level, Mono will switch in.
8. After adjustment, check to make sure that, indeed, when the antenna input level exceeds $30\mu\text{V}$, Stereo will switch in.

MUTING ALIGNMENT PROCEDURE

Instruments: FM Signal Generator, Oscilloscope and 300-ohm "dummy" ANT.

Preliminaries: Note that the FM IF and RF alignments must be properly completed before attempting this adjustment.

Set the Selector switch to FM.

Connect FM Signal Generator to FM antenna terminals (marked 300-ohm) through 300-ohm "dummy" ANT.

Set frequency of the Generator at about 98 MHz.

Connect Oscilloscope to Left or Right channel TAPE-1 Output jack.

I. Meter Adjustment

- a) Set the antenna input level (terminal voltage) to $100\mu\text{V}$ — 1 mV by controlling output of the Generator, so that the FM

Tuning Meter indicates dead center (zero) position.

Maintaining the above condition, adjust Coil L801 (on Muting Circuit Board) until the Signal Strength Meter indicates as maximum (deflection) as possible.

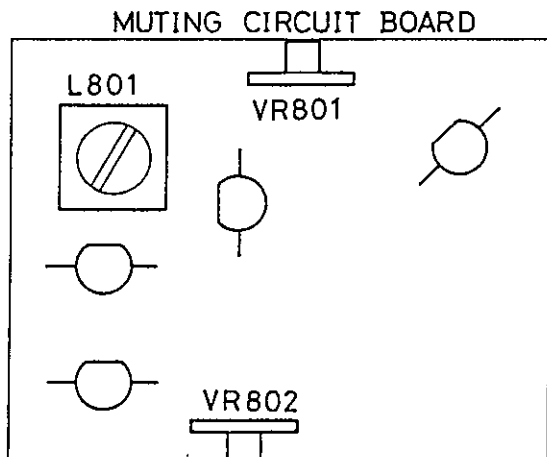
- b) Change the antenna terminal voltage to 10 mV by controlling the Generator. Adjust the potentiometer VR802 so that the Signal Strength Meter indicates toward "8" on the scale.

II. Muting Level Adjustment

- a) NOTE: Complete the Meter adjustment above before attempting this adjustment.

Set the antenna terminal voltage to $20\mu\text{V}$ by controlling the Generator, and adjust VR801 (on Muting Circuit Board) until output wave form on the Scope just disappears.

- b) Changing the output of the Generator, check and confirm if when the antenna terminal voltage is $30\mu\text{V}$ the wave form appears, and if when $20\mu\text{V}$ the wave form disappears.



TROUBLE SHOOTING

CHART 1.

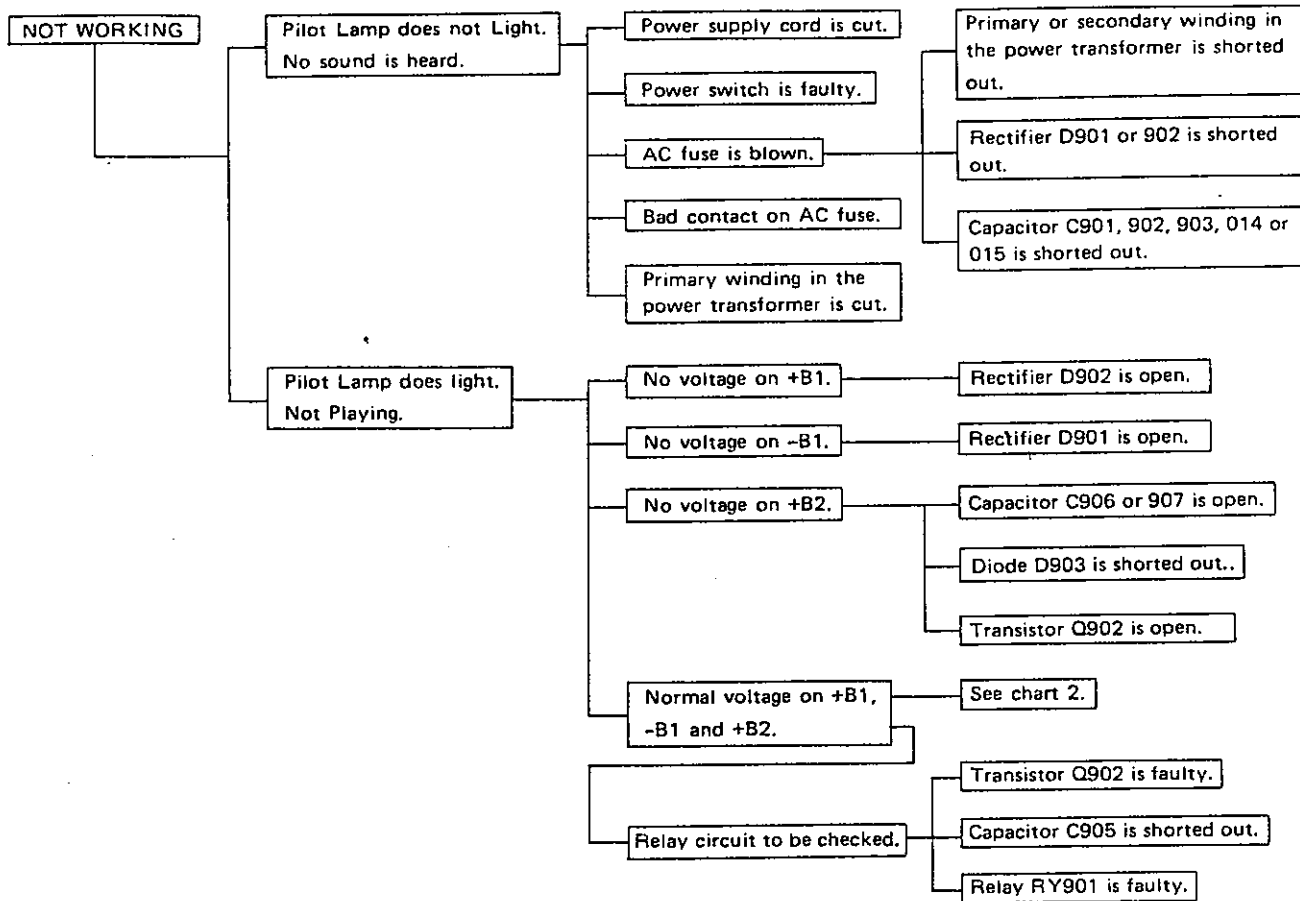


CHART 2.

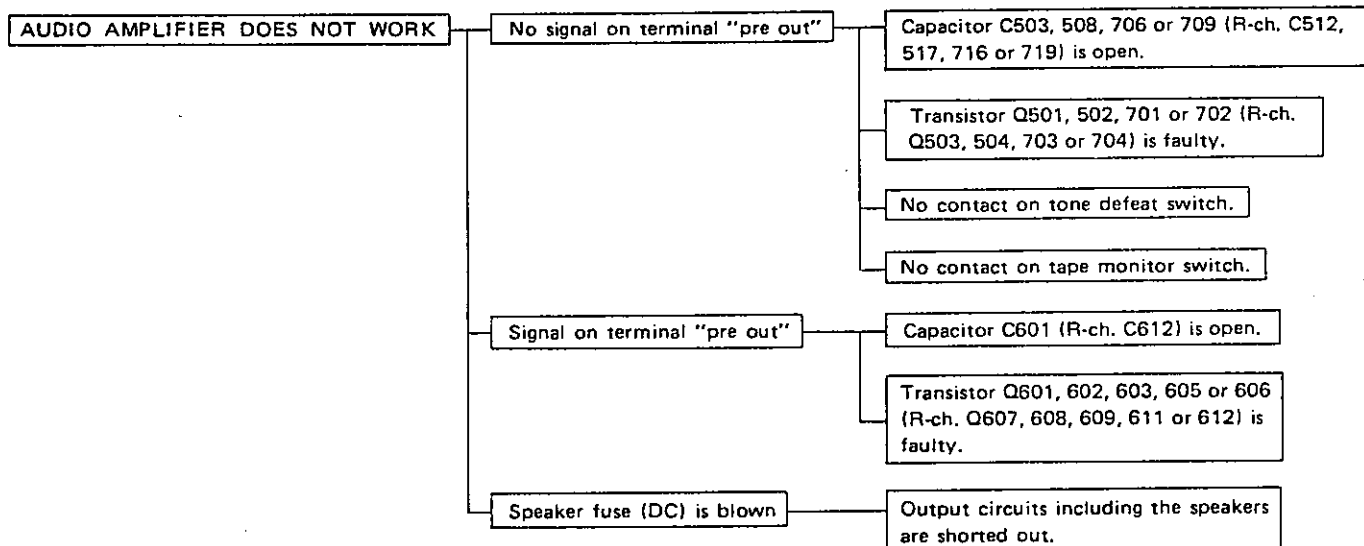


CHART 3.

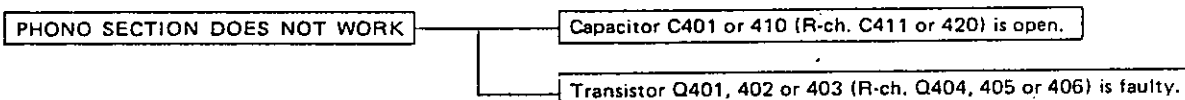


CHART 4.

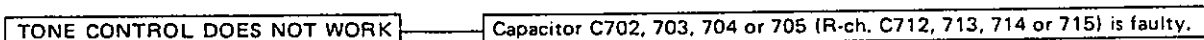


CHART 5.

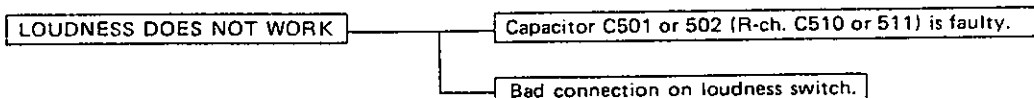


CHART 6.

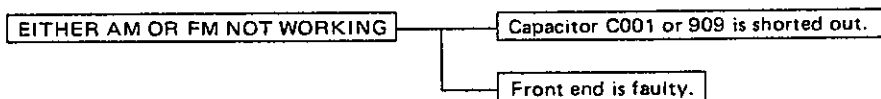


CHART 7.

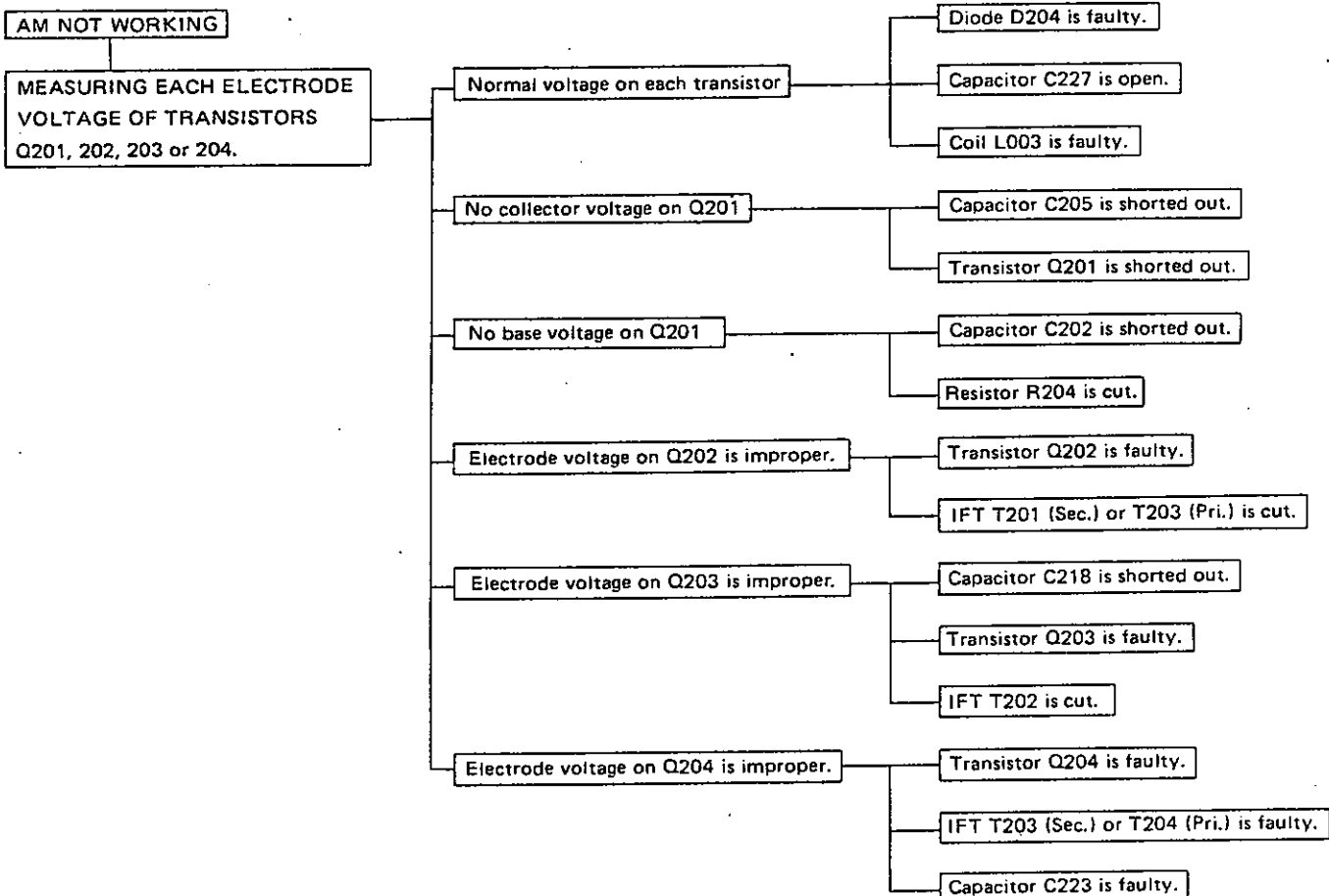


CHART 8.

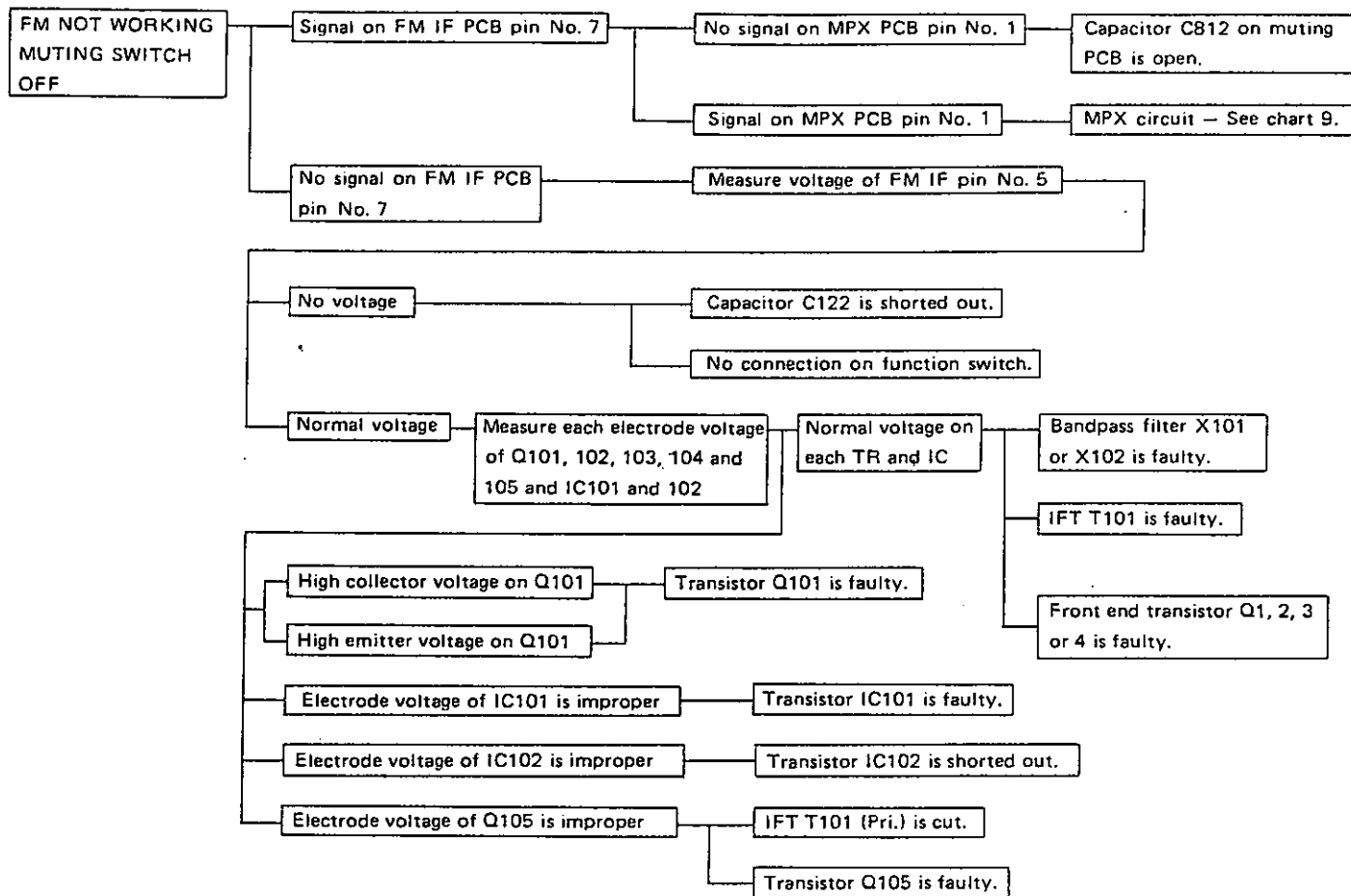
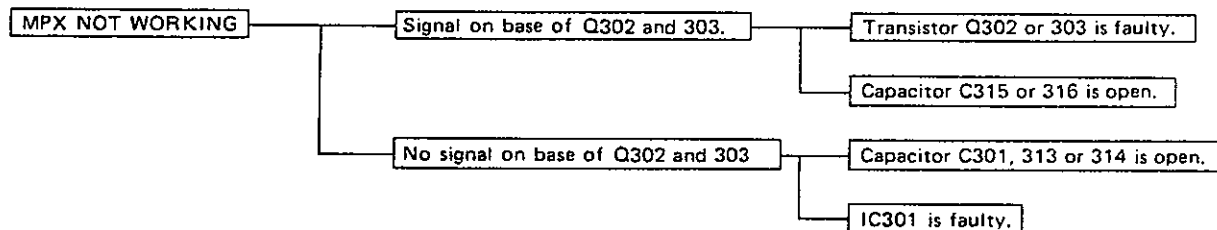


CHART 9.



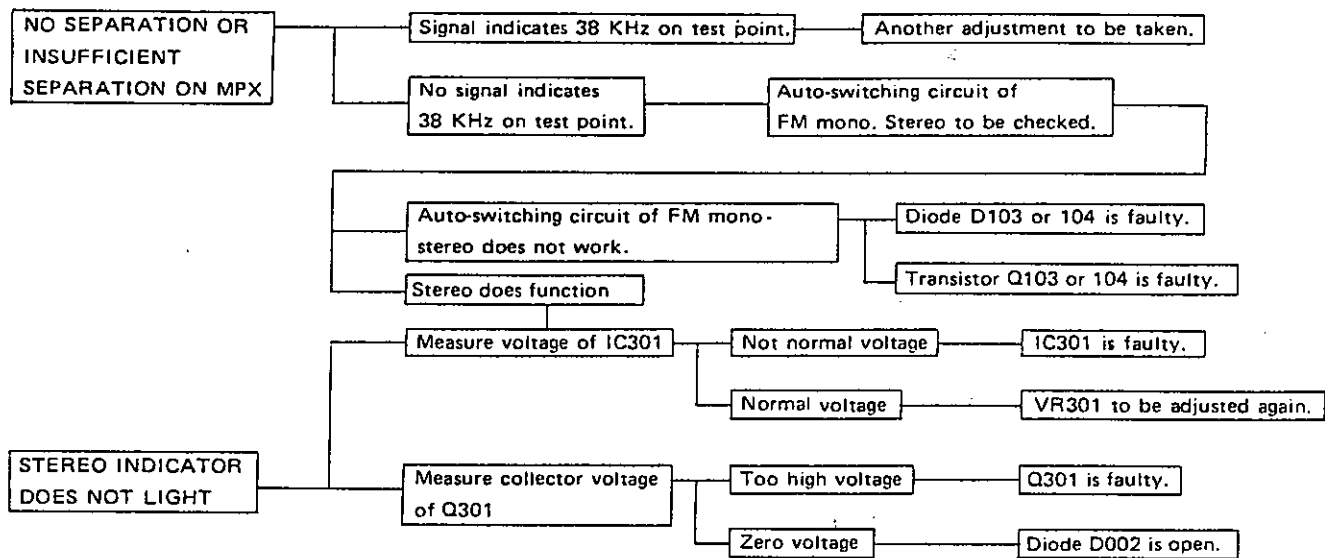
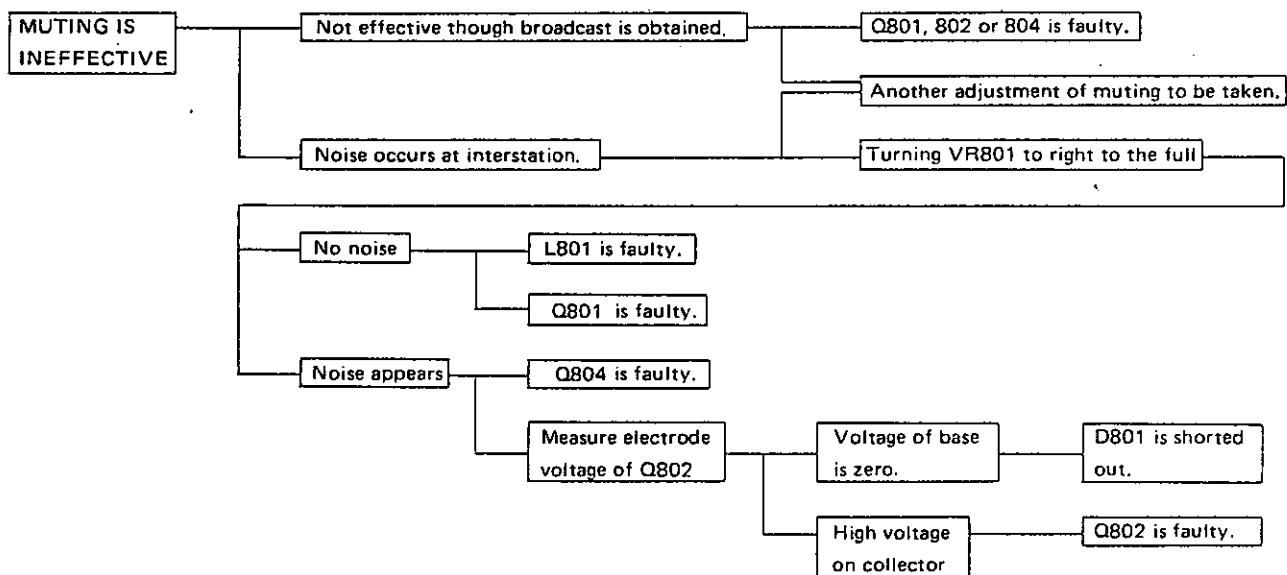
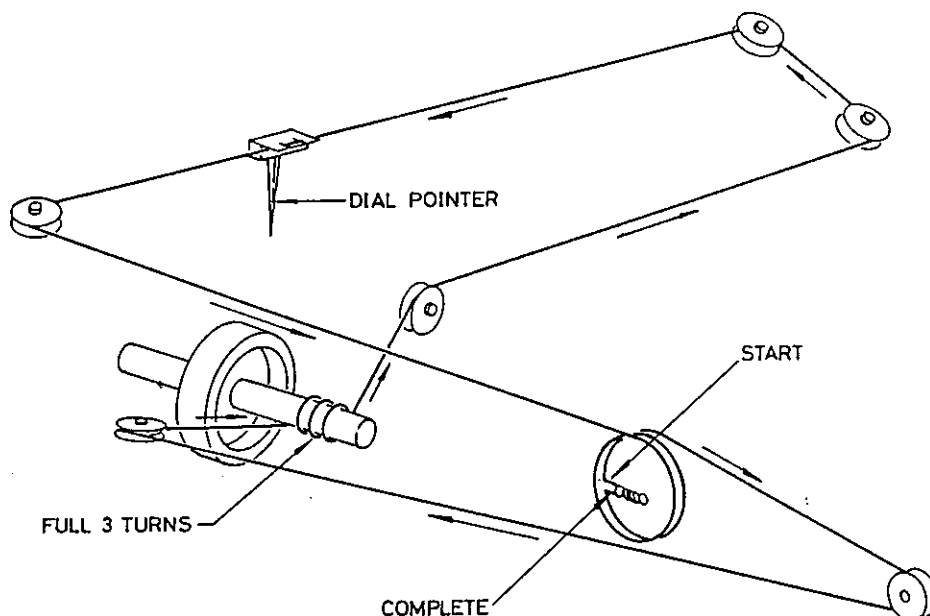


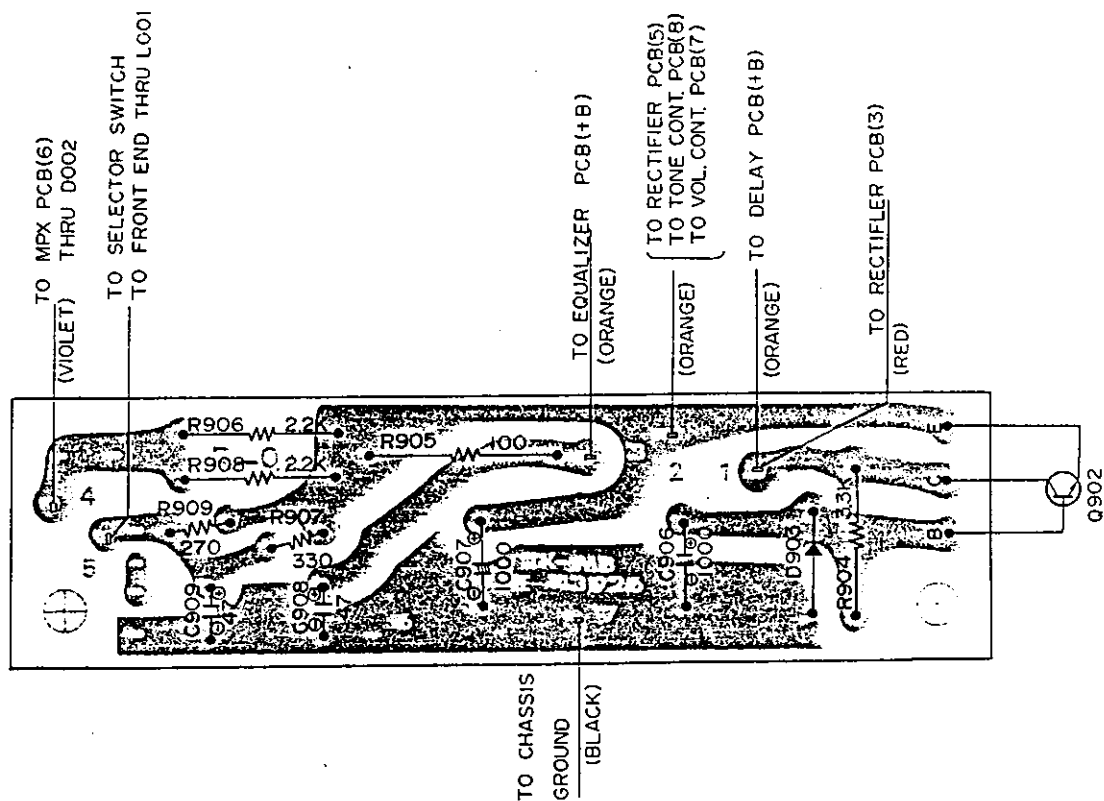
CHART 10.



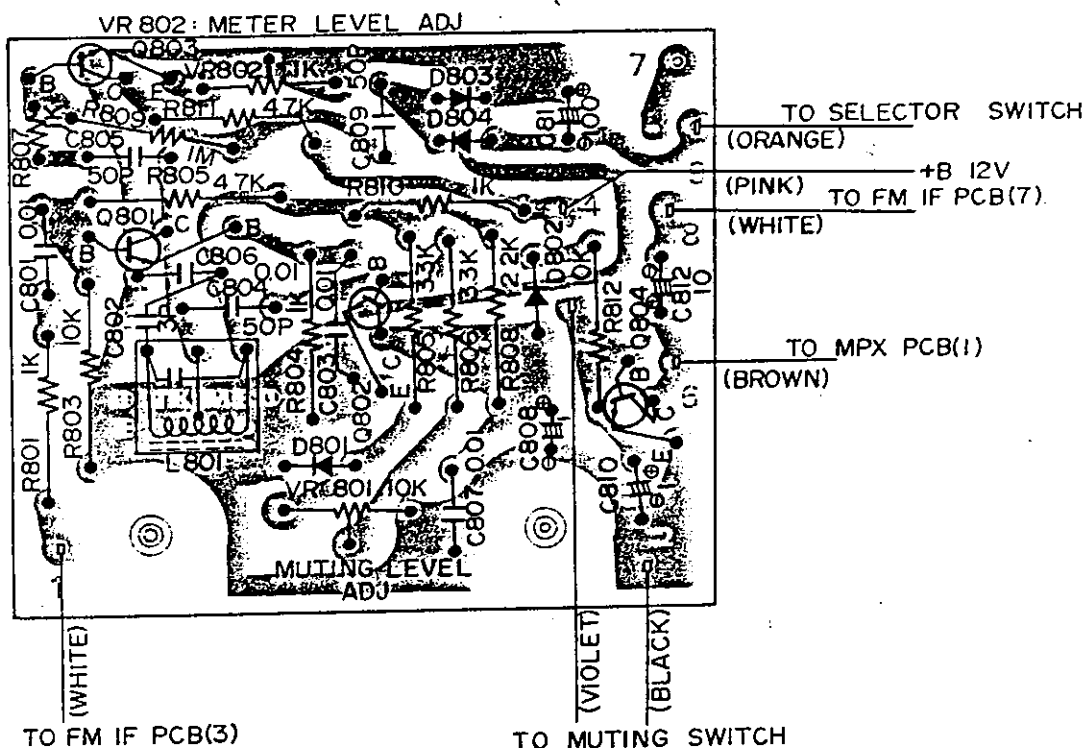
DIAL STRINGING DIAGRAM



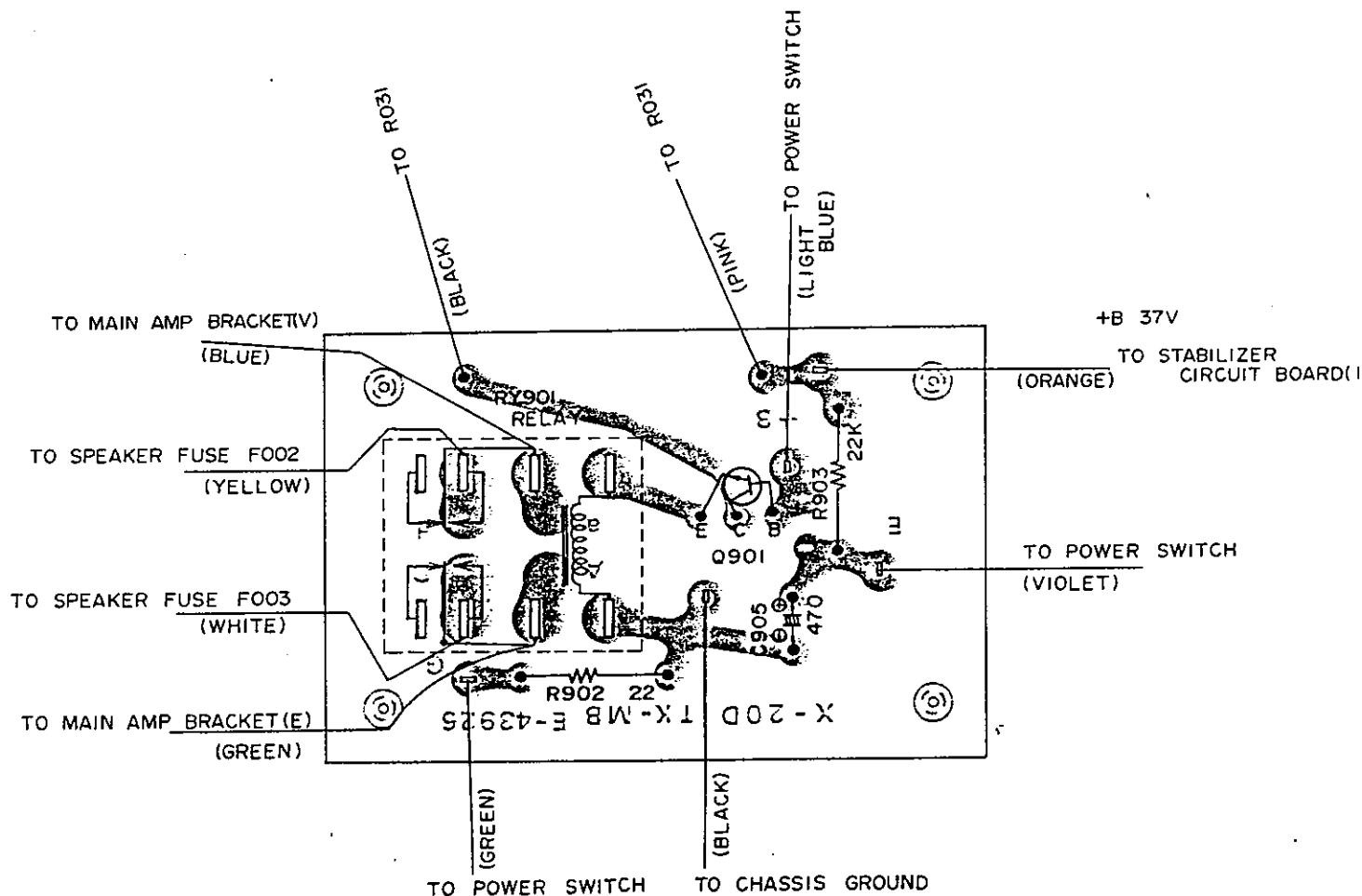
STABILIZER CIRCUIT BOARD DIAGRAM



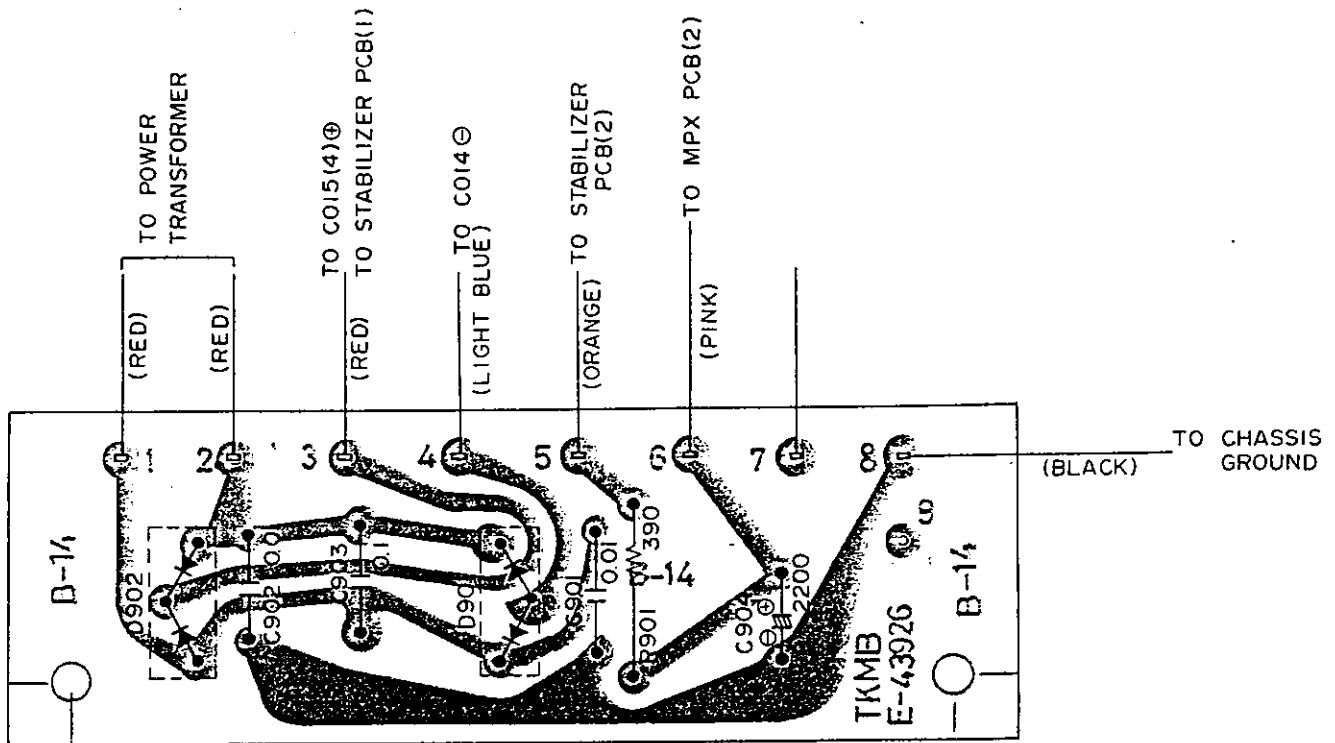
FM MUTING CIRCUIT BOARD DIAGRAM



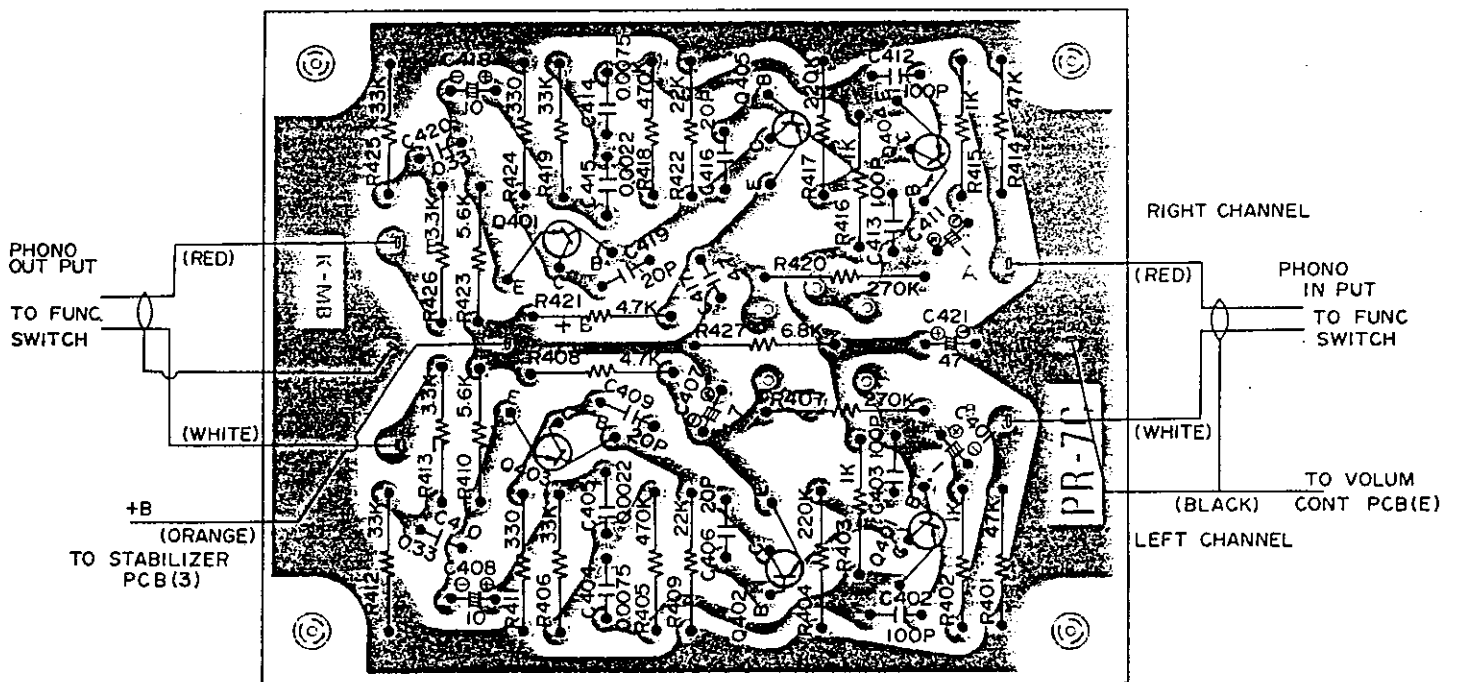
RELAY CIRCUIT BOARD DIAGRAM



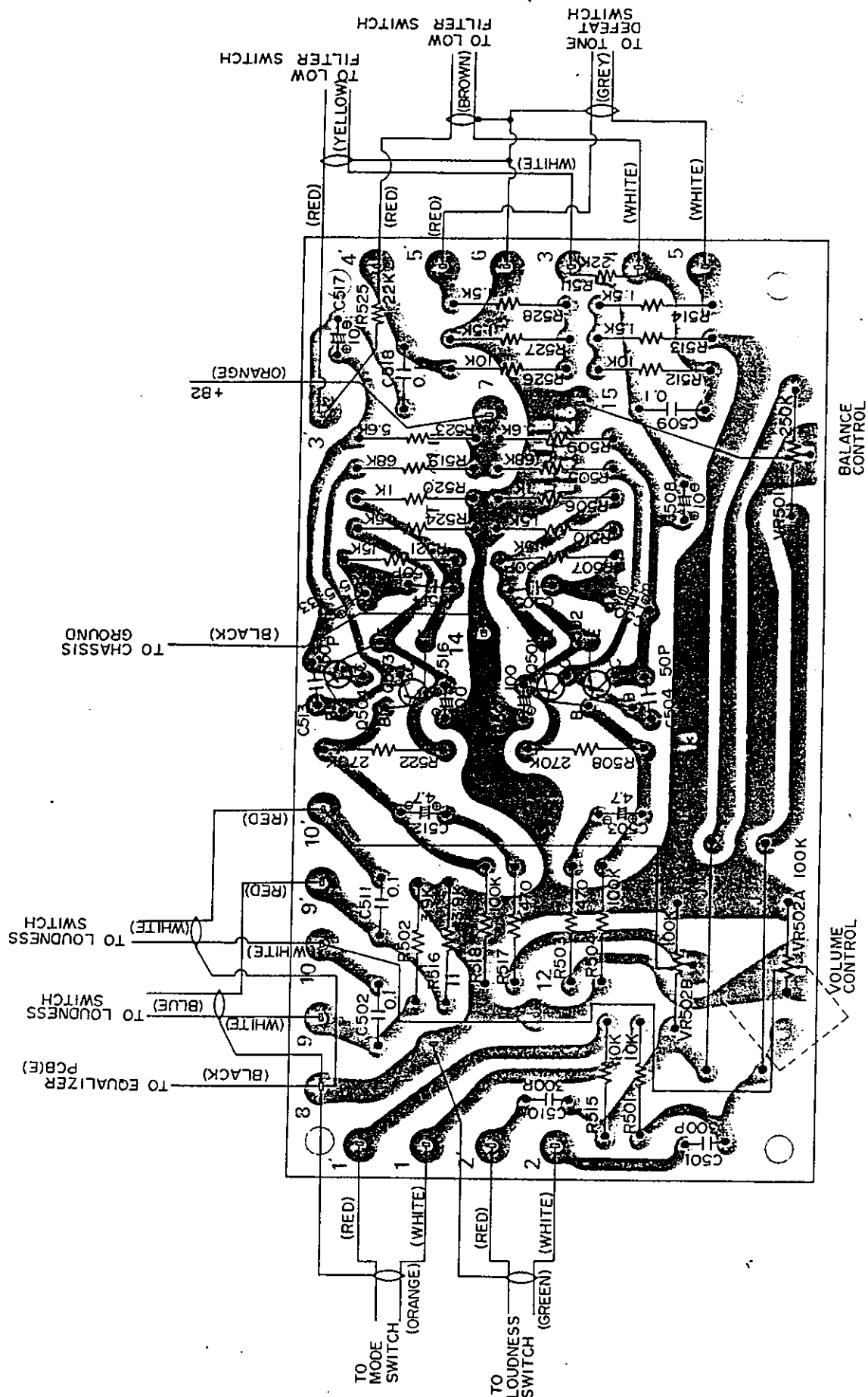
RECTIFIER CIRCUIT BOARD DIAGRAM



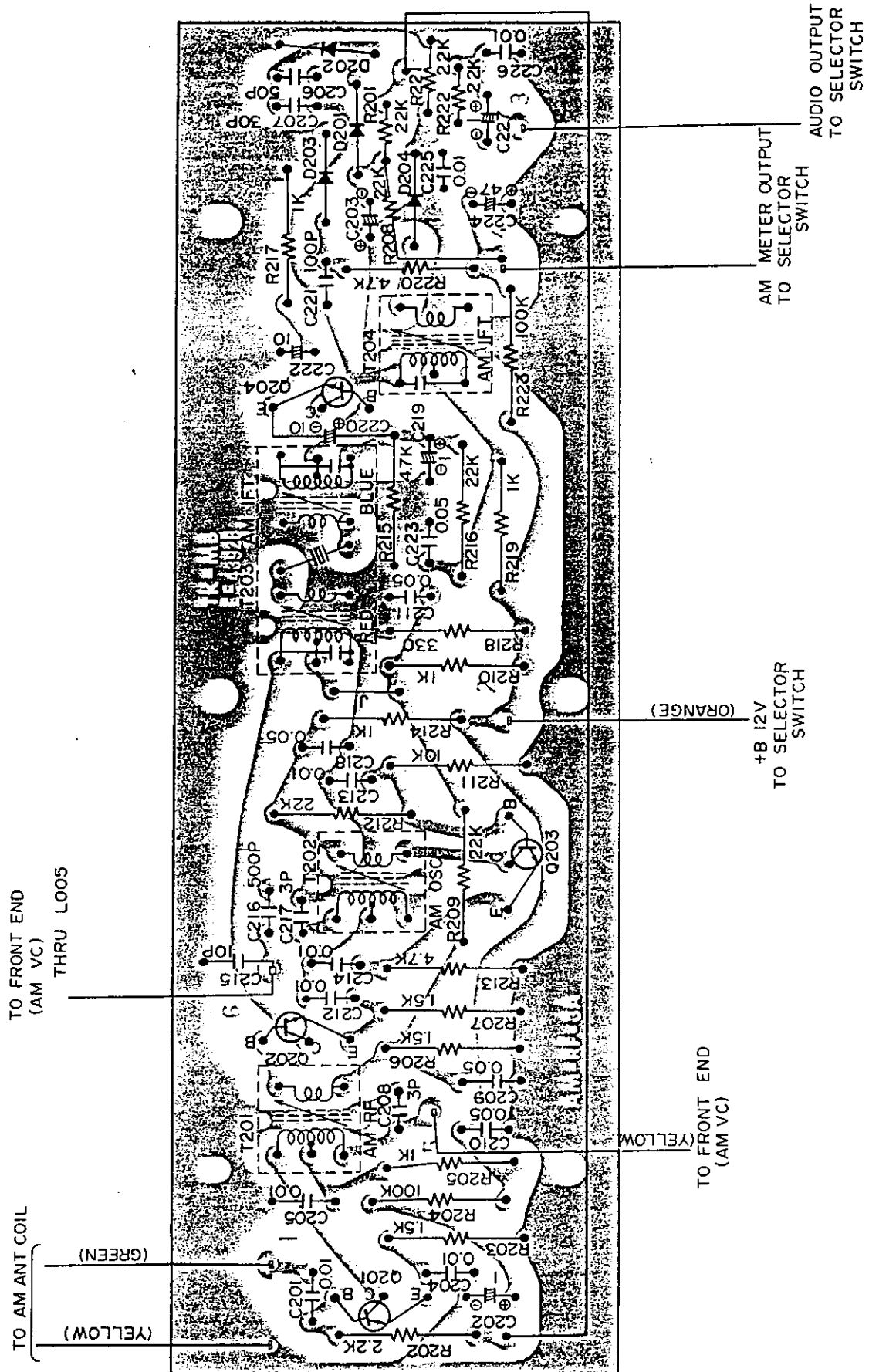
EQUALIZER AMPLIFIER CIRCUIT BOARD DIAGRAM



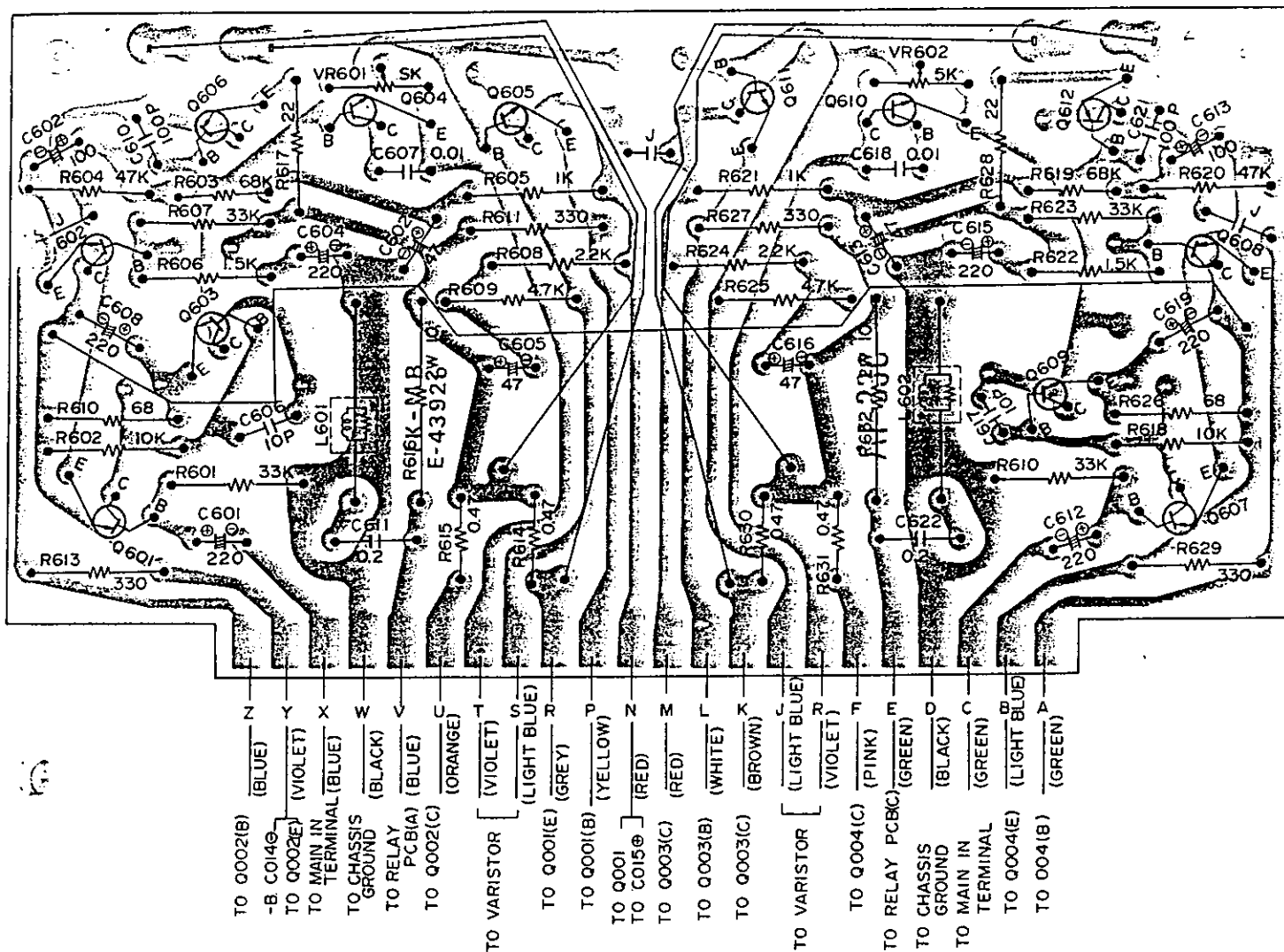
VOLUME CONTROL CIRCUIT BOARD DIAGRAM



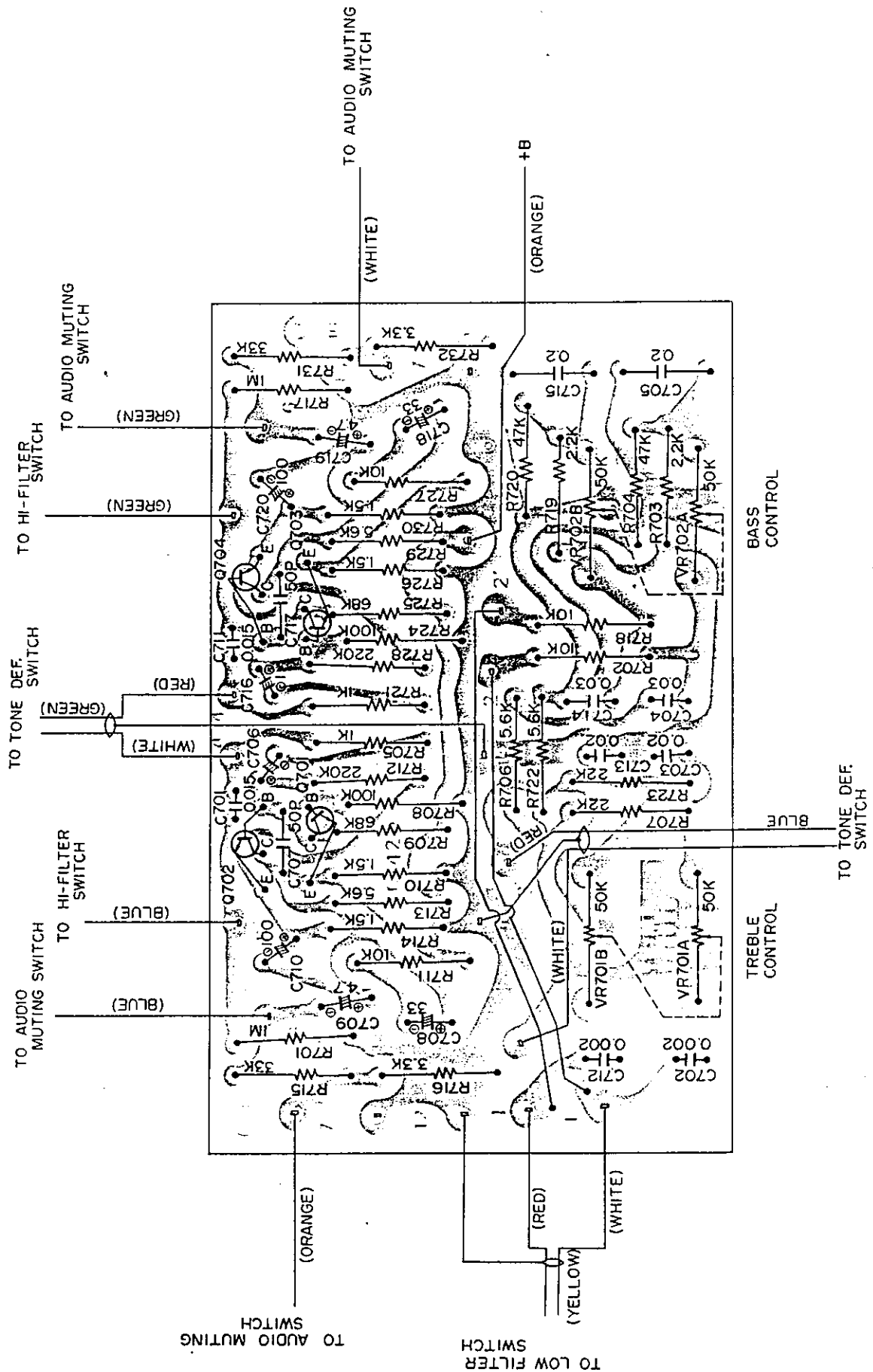
AM CIRCUIT BOARD DIAGRAM



MAIN AMPLIFIER CIRCUIT BOARD DIAGRAM



TONE CONTROL CIRCUIT BOARD DIAGRAM



INPUT
TO MUTING PCB
(BROWN)

+B (PINK)

TO STEREO IND. LAMP
(YELLOW)

TO FM IF PCB
(WHITE)

TO SELECTOR SWITCH
(GREEN)

OUTPUT
TO FUNC. SWITCH
(RED)

PCB 15392

STEREO IND. THRESHOLD ADJ.

SEPARATION ADJ.

38 KHZ FILTER

IC301, IC302

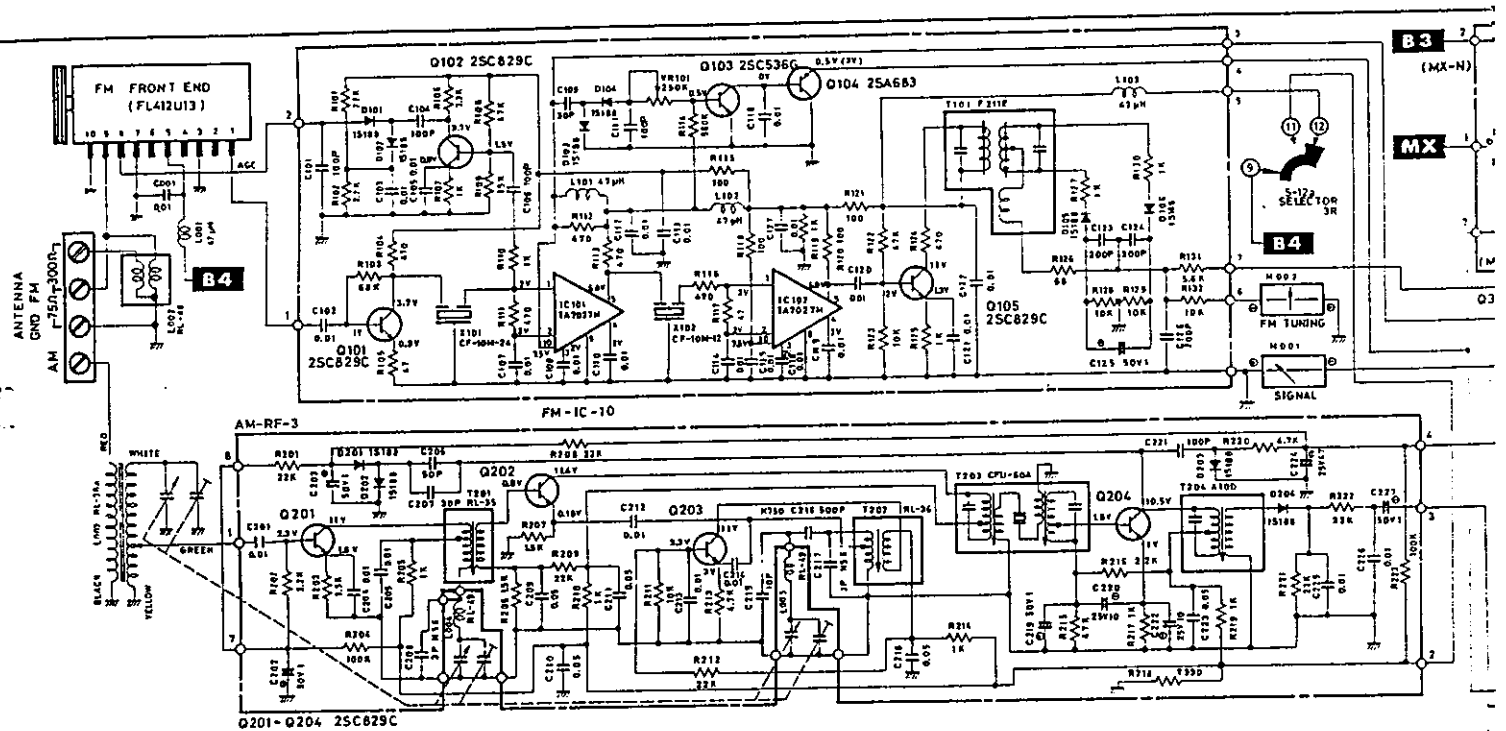
R301, R302, R303, R304, R305, R306, R307, R308, R309, R310, R311, R312, R313, R314, R315, R316, R317, R318

C301, C302, C303, C304, C305, C306, C307

L301, L302, L303, L304

VR301

SCHEMATIC CIRCUIT DIAGRAM

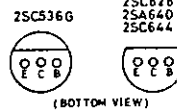
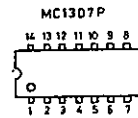
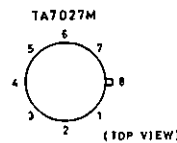
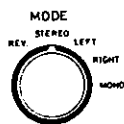


(RESISTORS)

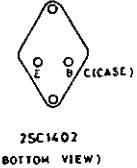
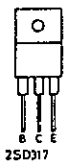
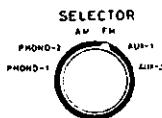
5% TOLERANCE UNLESS OTHERWISE NOTED
 K---KILO OHM
 M---MEGA OHM
 1/2---COMPOSITION RESISTORS 1/2 WATT
 NON MARK---LOW NOISE TYPE CARBON RESISTOR 1/4 WATT

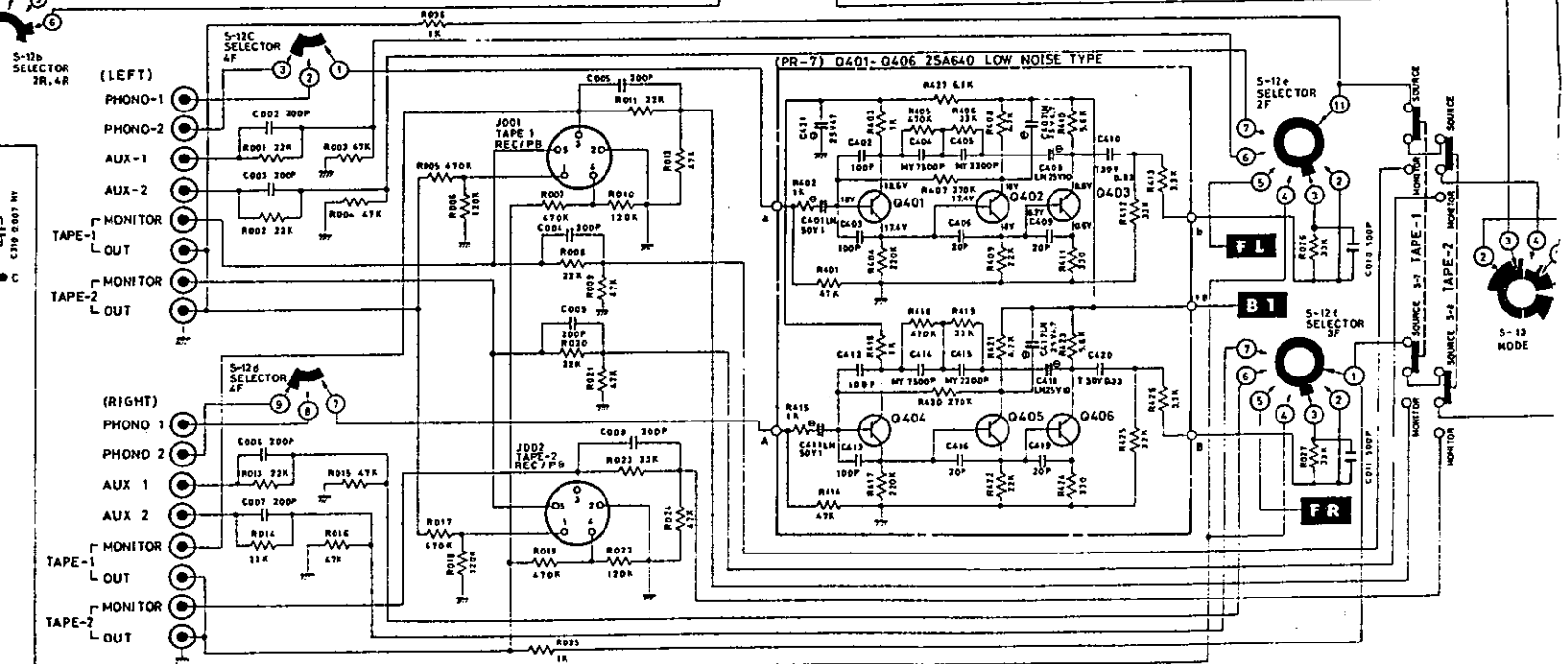
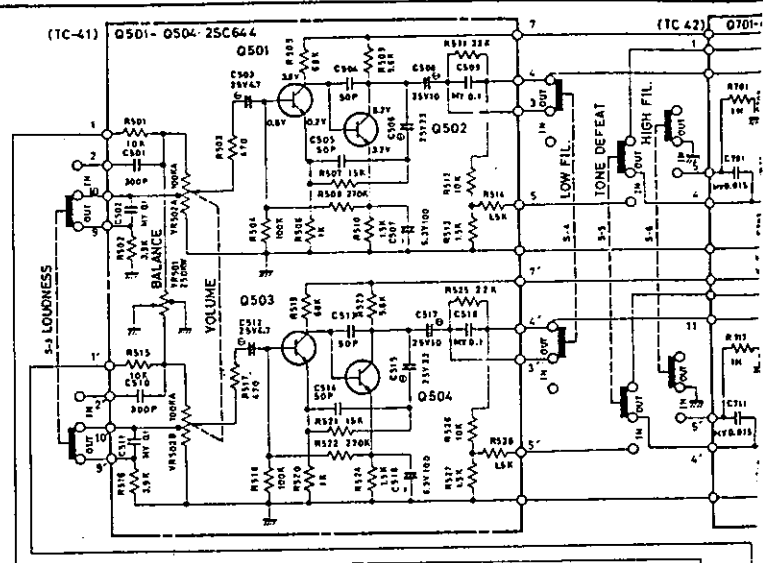
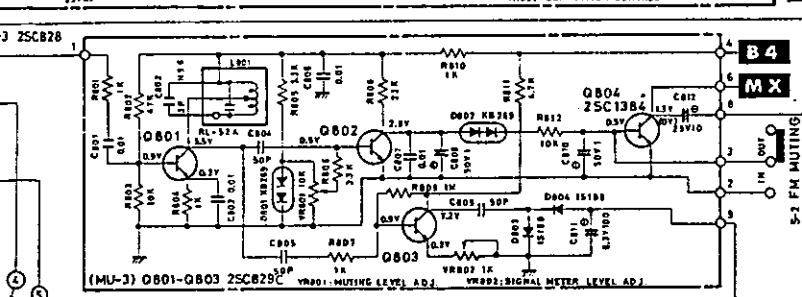
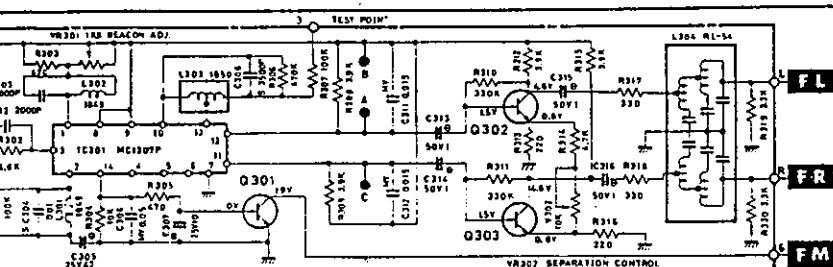
(CAPACITORS)

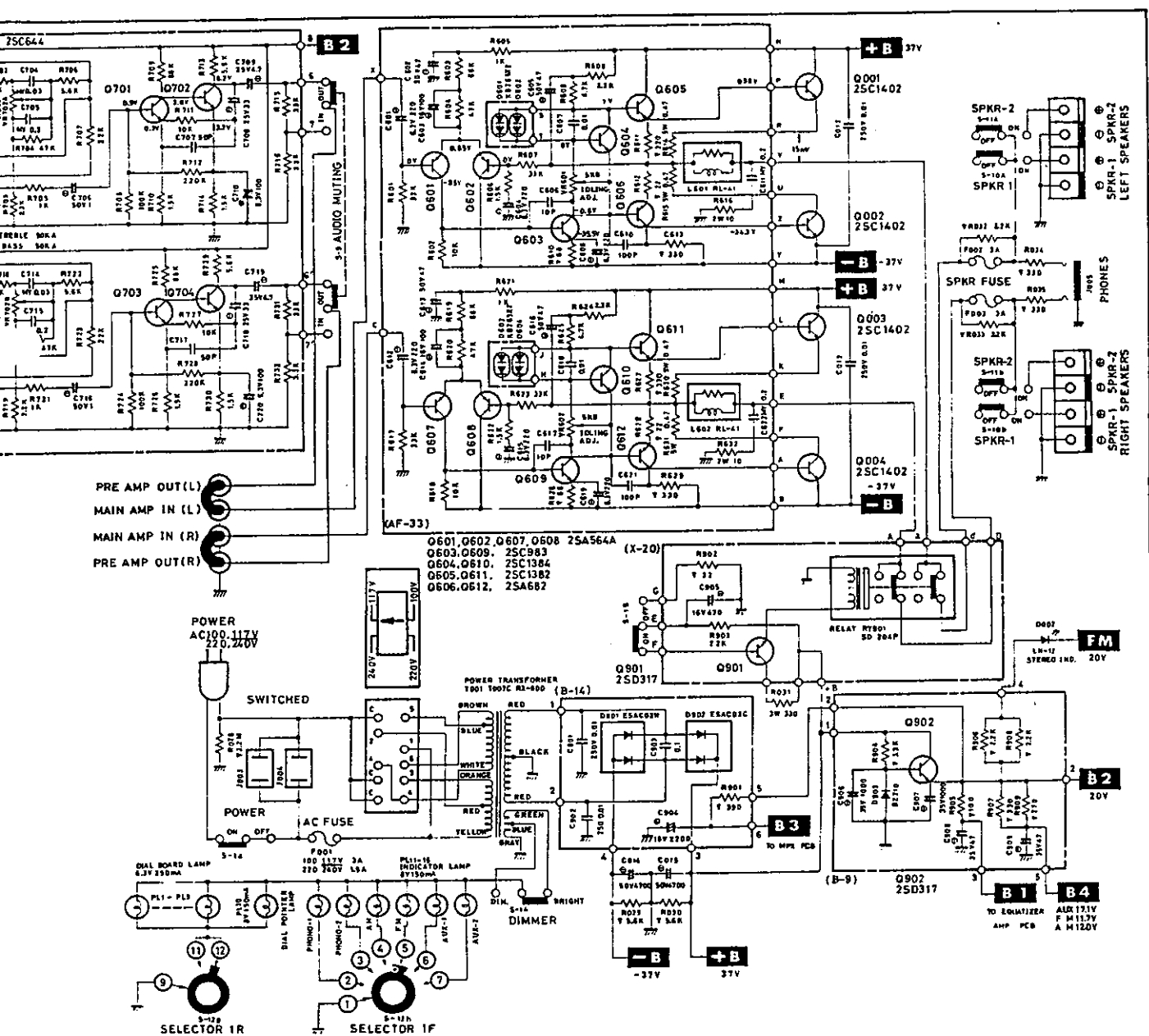
MY---MYLAR FILM CAPACITORS
 O---OIL CAPACITORS
 T---TANTALUM CAPACITORS
 E---ELECTROLYTIC CAPACITORS
 LN---LOW NOISE TYPE ELECTROLYTIC CAPACITORS
 NON MARK--- CERAMIC CAPACITORS
 UNLESS OTHERWISE NOTED IN SCHEMATIC ALL CAPACITOR
 VALUES ARE EXPRESSED IN MFD
 S--- POLY STYROL CAPACITORS
 VOLTAGE READING WITH VTVM FROM THE POINT SHOWN
 TO THE CHASSIS GROUND (LINE VOLTAGE 117 VOLT)
 VOLTAGE READING MAY VARY $\pm 20\%$



25A683
 25C1384
 25C829C
 25C828
 25A640
 25C644







PARTS LIST

CABINET AND CHASSIS PARTS

Schematic Location	Part Number	Description
	131011235	Cabinet
	111911242	Front Panel Assembly
	116310067	Knob, Volume
	116310054	Knob, Tuning
	116310055	Knob, Selector, Mode, Balance
	116310056	Knob, Bass, Treble (Left channel)
	116310057	Knob, Bass, Treble (Right channel)
	116210004	Button, Push switch
	112011248	Dial Board
	654911285	Tuning Shaft w/Flywheel
001	231310007	Meter, FM Tuning
002	231310006	Meter, Signal Strength
	321304366	Front end, AM/FM
1,2,3,4,5,6,7,8,9	352063028	Lamp, 6.3V, 0.28A, Dial Illumination
10,11,12,13,14,15,16	351080015	Lamp, 8V, 0.15A, Function Indicator
4	614010103	Switch, Power,
	614010104	Switch, Dimmer,
	614020403	Push switch, 2 keys, Muting, Monitor, Speakers.
	614040803	Push switch, 4 keys, Tone Defeat etc.
3	601011240	Switch, Mode
2	601011237	Switch, Selector
5	613000022	Switch, De-emphasis
001,002	625001112	Din Jack, 5p, Tape Rec/PB
003,004	648211116	AC Outlet
005	626110023	Headphone Jack
	641201104	Antenna Terminal Strip, 4P
	624100104	Pin Jack, 4P, RCA type
	624100208	Pin Jack, 8P, RCA type
	641400104	Speakers terminal, 4P
	648211117*	Bracket, Main Amp. PCB
	648211118	Bracket, Power Transistor
	648211114	Bracket, Fuse
	648211115	Bracket, Dial Lamp
	151911117	Dial Pointer Assembly
RESISTORS		
001,002,008,011,013,014,020,023,003,004,009,012,015,016,021,024	552022322	Carbon Film, 22K $\pm 5\%$, 1/4W
	552047322	Carbon Film, 47K $\pm 5\%$, 1/4W

Schematic Location	Part Number	Description
R005,007, R017,019, R006,010, R018,022	552047422	Carbon Film, 470K $\pm 5\%$, 1/4W
R025,036, R026,027	552012422	Carbon Film, 120K $\pm 5\%$, 1/4W
R028	552010222	Carbon Film, 1K $\pm 5\%$, 1/4W
R029,030	552033322	Carbon Film, 33K $\pm 5\%$, 1/4W
R031	551022533	Composition, 2.2M $\pm 10\%$, 1/2W
R032,033	551056233	Composition, 5.6K $\pm 10\%$, 1/2W
R034,035	553133163	Metal Oxide, 330 $\pm 10\%$, 3W
	551022233	Composition, 2.2K $\pm 10\%$, 1/2W
	551033133	Composition, 330 $\pm 10\%$, 1/2W
CAPACITORS		
C001,012, C013	440100985	Ceramic, 0.01mfd, 250V
C002,003, C004,005, C006,007, C008,009	440201183	Ceramic, 200pF $\pm 10\%$, 250V
C010,011	440501183	Ceramic, 500pF $\pm 10\%$, 250V
C014,015	400470449	Electrolytic, 4700mfd, 50V
C309,310	450701033	Mylar Film, 7000pF (5000pF $\pm 10\%$ // 2000pF $\pm 10\%$)
COILS AND TRANSFORMER		
L001	220001121	Coil, RF choke, 47 micro-Henry
L002	226501111	Coil, FM Antenna Matching
L003	222391119	AM Antenna Coil Assembly
L004,005	220001122	Coil, RF choke, 2 micro-Henry
T001	205001328	Transformer, Power Supply
DIODES AND TRANSISTORS		
D001	300111008	Diode, 1S188, AM meter rect.
D002	300414002	Diode, LN-12, FM Stereo Beacon
D601,602, D603,604	300212002	Diode, KB-265, Varistor
Q001,002, Q003,004	301201139	Transistor, 2SC1402, Power Amp.
F001,002	341220030	Fuse, 3A-3AG, Speakers
F003	341220030	Fuse, 3A-3AG, Power Supply (100-120V), 1.5A-3AG (341220015), (220-240V)

FM IF AMPLIFIER CIRCUIT BOARD

Schematic Location	Part Number	Description
RESISTORS		
001	552022322	Carbon Film, 22K $\pm 5\%$, 1/4W
002	552022222	Carbon Film, 2.2K $\pm 5\%$, 1/4W
003	552068322	Carbon Film, 68K $\pm 5\%$, 1/4W
004,111, 112,113, 116,124	552047122	Carbon Film, 470 $\pm 5\%$, 1/4W
005,117	552047022	Carbon Film, 47 $\pm 5\%$, 1/4W
006	552033222	Carbon Film, 3.3K $\pm 5\%$, 1/4W
007,110, 119,125, 127,130	552010222	Carbon Film, 1K $\pm 5\%$, 1/4W

Schematic Location	Part Number	Description
R108,122	552047322	Carbon Film, 47K $\pm 5\%$, 1/4W
R109	552015322	Carbon Film, 15K $\pm 5\%$, 1/4W
R114	552056422	Carbon Film, 560K $\pm 5\%$, 1/4W
R115,118, R120,121	552010122	Carbon Film, 100 $\pm 5\%$, 1/4W
R123,128, R129,132	552010322	Carbon Film, 10K $\pm 5\%$, 1/4W
R126	552068022	Carbon Film, 68 $\pm 5\%$, 1/4W
R131	552056222	Carbon Film, 5.6K $\pm 5\%$, 1/4W
VR101	510502127	Potentiometer, 250K, FM Stereo Threshold Adj.

Schematic Location	Part Number	Description
CAPACITORS		
C101,104, C106,111, C102,103, C105,107, C108,110, C112,113, C114,115, C116,117, C118,119, C120,121, C122,127	440101183	Ceramic, 100pF $\pm 10\%$, 250V
C109, C123,124, C126, C125	440100985	Ceramic, 0.01mfd, 250V
	440301283	Ceramic, 30pF $\pm 10\%$, 250V
	440201183	Ceramic, 200pF $\pm 10\%$, 250V
	402100749	Electrolytic, 1 mfd, 50V
COILS AND TRANSFORMER		
L101,102, L103	220001121	Coil, RF choke, 47 micro-Henry

Schematic Location	Part Number	Description
T101	225501113	IFT, FM Ratio Det.
D101,102, D103,104, D105,106	300111008	Diode, 1S188
TRANSISTORS AND IC		
Q101,102, Q105	301201117	2SC829C
Q103	301201112	2SC536G
Q104	301001126	2SA683
IC101,102	303452141	TA-7027M
X101	229101127	Bandpass Filter, 10.70MHz, (Red)
X102	229101125	Bandpass Filter, 10.70MHz, (Red)
	770101223	Pin, Terminal
	140200122	Printed Circuit Board "FM-IC-10"
	141210134	FM IF Circuit Board Assembly

AM CIRCUIT BOARD

Schematic Location	Part Number	Description
RESISTORS		
R201,208, R209,212, R216,221, R222	552022322	Carbon Film, 22K $\pm 5\%$, 1/4W
R202	552022222	Carbon Film, 2.2K $\pm 5\%$, 1/4W
R203,206, R207	552015222	Carbon Film, 1.5K $\pm 5\%$, 1/4W
R204,223	552010422	Carbon Film, 100K $\pm 5\%$, 1/4W
R205,210, R214,217, R219	552010222	Carbon Film, 1K $\pm 5\%$, 1/4W
R211	552010322	Carbon Film, 10K $\pm 5\%$, 1/4W
R213,220	552047222	Carbon Film, 4.7K $\pm 5\%$, 1/4W
R215	552047322	Carbon Film, 47K $\pm 5\%$, 1/4W
R218	551033133	Composition, 330 $\pm 10\%$, 1/2W
CAPACITORS		
C201,204, C205,212, C213,214, C225,226	440100985	Ceramic, 0.01mfd, 250V
C202,203, C219,227	402100749	Electrolytic, 1 mfd, 50V

Schematic Location	Part Number	Description
C206	440501283	Ceramic, 50pF $\pm 10\%$, 250V
C207	440301283	Ceramic, 30pF $\pm 10\%$, 250V
C208,217	441301336	Ceramic, 3pF, N5.6, 50V
C209,210, C211,218, C223	440500935	Ceramic, 0.05mfd, 50V
C216	441501136	Ceramic, 500pF, N750, 50V
C215	440101283	Ceramic, 10pF $\pm 10\%$, 250V
C220,222	402100629	Electrolytic, 10mfd, 25V
C221	440101183	Ceramic, 100pF $\pm 10\%$, 250V
C224	402470629	Electrolytic, 47mfd, 25V
TRANSFORMERS		
T201	226501112	AM RF
T202	223301123	AM Local Oscillator
T203	229101129	Bandpass Filter, 455KHz
T204	225301124	IFT, AM, 455KHz
D201,202 D203,204	300111008	Diode, 1S188
Q201,202, Q203,204	301201117	Transistor, 2SC829C
	77010223	Pin, Terminal
	140100123	Printed Circuit Board "AM-RF-3"
	141110131	AM Circuit Board Assembly

FM MPX CIRCUIT BOARD

Schematic Location	Part Number	Description
RESISTORS		
R301,307	552010422	Carbon Film, 100K $\pm 5\%$, 1/4W
R302	552056222	Carbon Film, 5.6K $\pm 5\%$, 1/4W
R303,305	552047122	Carbon Film, 470 $\pm 5\%$, 1/4W
R304	552010322	Carbon Film, 10K $\pm 5\%$, 1/4W
R306	552047422	Carbon Film, 470K $\pm 5\%$, 1/4W
R308,309, R312,315	552039222	Carbon Film, 3.9K $\pm 5\%$, 1/4W

R310,311	552033422	Carbon Film, 330K $\pm 5\%$, 1/4W
R313,316, R317,316	552022122	Carbon Film, 220 $\pm 5\%$, 1/4W
R314	552047222	Carbon Film, 4.7K $\pm 5\%$, 1/4W
R319,320	552033222	Carbon Film, 3.3K $\pm 5\%$, 1/4W
VR301	510502119	Potentiometer, 1K, Stereo Ind. Level Adj.
VR302	510502125	Potentiometer, 10K, Separation Adj.

Schematic Location	Part Number	Description
CAPACITORS		
C301,307	402100629	Electrolytic, 10mfd, 25V
C302	442201033	Ceramic, 0.002mfd $\pm 10\%$, 50V
C303,304	454100933	Polystyrene Film, 0.01mfd $\pm 10\%$, 50V
C305	402470529	Electrolytic, 4.7mfd, 25V
C306	450500933	Mylar Film, 0.05mfd $\pm 10\%$, 50V
C308	454251033	Polystyrene Film, 2500pF $\pm 10\%$, 50V
C311,312	450150933	Mylar Film, 0.015mfd $\pm 10\%$, 50V
C313,314, } C315,316 }	402100749	Electrolytic, 1 mfd, 50V

Schematic Location	Part Number	Description
COILS		
L301,302	225601127	MPX 19KHz Tune
L303	225601128	MPX 38KHz Tune
L304	228641113	38KHz Filter
Q301,302, } Q303 }	301201115	Transistor, 2SC828
IC301	303452143	IC, MC1307P
	770101223	Pin, Terminal
	140400443	Printed Circuit Board "MX-N"
	141410428	FM MPX Circuit Board Assembly

EQUALIZER AMPLIFIER CIRCUIT BOARD

Schematic Location	Part Number	Description
RESISTORS		
R401,414	552047322	Carbon Film, 47K $\pm 5\%$, 1/4W
R402,403, } R415,416 }	552010222	Carbon Film, 1K $\pm 5\%$, 1/4W
R404,417	552022422	Carbon Film, 220K $\pm 5\%$, 1/4W
R405,418	552047422	Carbon Film, 470K $\pm 5\%$, 1/4W
R406,412, } R419,425 }	552033322	Carbon Film, 33K $\pm 5\%$, 1/4W
R407,420	552027422	Carbon Film, 270K $\pm 5\%$, 1/4W
R408,421	552047222	Carbon Film, 4.7K $\pm 5\%$, 1/4W
R409,422	552022322	Carbon Film, 22K $\pm 5\%$, 1/4W
R410,423	552056222	Carbon Film, 5.6K $\pm 5\%$, 1/4W
R411,424	552033122	Carbon Film, 330 $\pm 5\%$, 1/4W
R413,426	552033222	Carbon Film, 3.3K $\pm 5\%$, 1/4W
R427	552068222	Carbon Film, 6.8K $\pm 5\%$, 1/4W
CAPACITORS		
C401,411	412100749	Electrolytic, 1 mfd, 50V (low noise)

Schematic Location	Part Number	Description
C402,403, } C412,413 }	440101183	Ceramic, 100pF $\pm 10\%$, 250V
C404,414	452751032	Mylar Film, 7500pF $\pm 5\%$, 50V
C405,415	452221032	Mylar Film, 2200pF $\pm 5\%$, 1/4W
C406,409, } C416,419 }	442201083	Ceramic, 0.002mfd $\pm 10\%$, 250V
C407,417	412470729	Electrolytic, 4.7mfd, 25V, (low noise)
C408,418	412100629	Electrolytic, 10mfd, 25V, (low noise)
C410,420	444330843	Tantalum, 0.33mfd, 30V
C421	402470629	Electrolytic, 47mfd, 25V
Q401,402, } Q403,404, } Q405,406 }	301201120	Transistor, 2SA640
	770101223	Pin, Terminal
	140500525	Printed Circuit Board "PR-7"
	141510130	Equalizer Amp. Circuit Board Assembly

VOLUME CONTROL AMP. CIRCUIT BOARD

Schematic Location	Part Number	Description
RESISTORS		
R501,512, } R515,526 }	552010322	Carbon Film, 10K $\pm 5\%$, 1/4W
R502,516	552039222	Carbon Film, 3.9K $\pm 5\%$, 1/4W
R503,517	552047122	Carbon Film, 470 $\pm 5\%$, 1/4W
R504,518	552010422	Carbon Film, 100K $\pm 5\%$, 1/4W
R505,519	552068322	Carbon Film, 68K $\pm 5\%$, 1/4W
R506,520	552010222	Carbon Film, 1 K $\pm 5\%$, 1/4W
R507,521	552015322	Carbon Film, 15K $\pm 5\%$, 1/4W
R508,522	552027422	Carbon Film, 270K $\pm 5\%$, 1/4W
R509,523	552056222	Carbon Film, 5.6K $\pm 5\%$, 1/4W
R510,513, } R514,524, } R527,528 }	552015222	Carbon Film, 1.5K $\pm 5\%$, 1/4W
R511,525	552022322	Carbon Film, 22K $\pm 5\%$, 1/4W
VR501	515121115	Variable, 250KW, Balance Control
VR502	525121113	Variable, 100KAx2, Volume Control

Schematic Location	Part Number	Description
CAPACITORS		
C501,510	440301183	Ceramic, 300pF $\pm 10\%$, 250V
C502,509, } C511,518 }	450100833	Mylar Film, 0.1mfd $\pm 10\%$, 50V
C503,512	402470729	Electrolytic, 4.7mfd, 25V
C504,505, } C513,514 }	440501283	Ceramic, 50pF $\pm 10\%$, 250V
C506,515	402330629	Electrolytic, 33mfd, 25V
C507,516	402100509	Electrolytic, 100mfd, 6.3V
C508,517	402100629	Electrolytic, 10mfd, 25V
Q501,502, } Q503,504 }	301201114	Transistor, 2SC644
	770101223	Pin, Terminal
	140700732	Printed Circuit Board "TC-41"
	141710224	Preamplifier Circuit Board Assembly

MAIN AMPLIFIER CIRCUIT BOARD

Schematic Location	Part Number	Description
RESISTORS		
R601,607, R617,623 }	552033322	Carbon Film, 33K $\pm 5\%$, 1/4W
R602,618	552010322	Carbon Film, 10K $\pm 5\%$, 1/4W
R603,619	552068322	Carbon Film, 68K $\pm 5\%$, 1/4W
R604,620	552047322	Carbon Film, 47K $\pm 5\%$, 1/4W
R605,621	552010222	Carbon Film, 1K $\pm 5\%$, 1/4W
R606,622	552015222	Carbon Film, 1.5K $\pm 5\%$, 1/4W
R608,624	552022222	Carbon Film, 2.2K $\pm 5\%$, 1/4W
R609,625	552047222	Carbon Film, 4.7K $\pm 5\%$, 1/4W
R610,626	551068033	Composition, 68 $\pm 10\%$, 1/2W
R611,613, R627,629 }	551033133	Composition, 330 $\pm 10\%$, 1/2W
R612,628	551022033	Composition, 22 $\pm 10\%$, 1/2W
R614,615, R630,631 }	554147973	Cement, 0.47 $\pm 10\%$, 5W
R616,632	554010053	Bath tub, 10 $\pm 10\%$, 2W
VR601,602	510502121	Potentiometer, 5K, Idling Current Adj.
CAPACITORS		
C601,604, C608,612, C615,619 }	402220509	Electrolytic, 220mfd, 6.3V
C602,605, C613,616 }	402470649	Electrolytic, 47mfd, 50V

Schematic Location	Part Number	Description
C603,614	402100519	Electrolytic, 100mfd, 16V
C606,617	440101283	Ceramic, 10pF $\pm 10\%$, 250V
C607,618	440100985	Ceramic, 0.01mfd, 250V
C610,621	440101183	Ceramic, 100pF $\pm 10\%$, 250V
C611,622	450200833	Mylar Film, 0.2mfd $\pm 10\%$, 50V
TRANSISTORS		
Q601,602, Q607,608 }	301001117	2SA564A
Q603,609	301201137	2SC983
Q604,610	301201132	2SC1384
Q605,611	301201136	2SC1382
Q606,612	301001125	2SA682
L601,602	220401120	Coil, Anti-parasitic
	127012096	Heat sink for Q605,606,611 and 612
	770101223	Pin, Terminal
	140600651*	Printed Circuit Board "AF-33C"
	141610230*	Main Amplifier Circuit Board Assembly
		* Applicable to units of serial numbers E 42871 to 59370 and F 01601 to 01630.
	140600655**	Printed Circuit Board "AF-33D"
	141610239**	Main Amplifier Circuit Board Assembly
		** Applicable to units with serial numbers starting E 76921 and F 05931 and on.

TONE CONTROL AMP. CIRCUIT BOARD

Schematic Location	Part Number	Description
RESISTORS		
R701,717	552010522	Carbon Film, 1M $\pm 5\%$, 1/4W
R702,711, R718,727 }	552010322	Carbon Film, 10K $\pm 5\%$, 1/4W
R703,719	552022222	Carbon Film, 2.2K $\pm 5\%$, 1/4W
R704,720	552047322	Carbon Film, 47K $\pm 5\%$, 1/4W
R705,721	552010222	Carbon Film, 1K $\pm 5\%$, 1/4W
R706,713, R722,729 }	552056222	Carbon Film, 5.6K $\pm 5\%$, 1/4W
R707,723	552022322	Carbon Film, 22K $\pm 5\%$, 1/4W
R708,728	552010422	Carbon Film, 100K $\pm 5\%$, 1/4W
R709,725	552068322	Carbon Film, 68K $\pm 5\%$, 1/4W
R710,714, R726,730 }	552015222	Carbon Film, 1.5K $\pm 5\%$, 1/4W
R712,728	552022422	Carbon Film, 220K $\pm 5\%$, 1/4W
R715,731	552033322	Carbon Film, 33K $\pm 5\%$, 1/4W
R716,732	552033222	Carbon Film, 3.3K $\pm 5\%$, 1/4W
VR701,702	525101115	Variable, 50KAx2, Bass, Treble Control

Schematic Location	Part Number	Description
CAPACITORS		
C701,711	450150933	Mylar Film, 0.015mfd $\pm 10\%$, 50V
C702,712	450201033	Mylar Film, 0.002mfd $\pm 10\%$, 50V
C703,713	450200933	Mylar Film, 0.02mfd $\pm 10\%$, 50V
C704,714	450300933	Mylar Film, 0.03mfd $\pm 10\%$, 50V
C705,715	450100833	Mylar Film, 0.1mfd $\pm 10\%$, 50V
C706,716	402100749	Electrolytic, 1 mfd, 50V
C707,717	440301283	Ceramic, 30pF $\pm 10\%$, 250V
C708,718	402330629	Electrolytic, 33mfd, 25V
C709,719	402470729	Electrolytic, 4.7mfd, 25V
C710,720	402100509	Electrolytic, 100mfd, 6.3V
Q701,702, Q703,704 }	301201114	Transistor, 2SC644
	770101223	Pin, Terminal
	140700733	Printed Circuit Board "TC-42"
	141710225	Tone Control Amp. Circuit Board Assembly

FM MUTING CIRCUIT BOARD

Schematic Location	Part Number	Description
RESISTORS		
R801,804, R807,810 }	552010222	Carbon Film, 1K $\pm 5\%$, 1/4W
R802	552047322	Carbon Film, 47K $\pm 5\%$, 1/4W
R803,812	552010322	Carbon Film, 10K $\pm 5\%$, 1/4W
R805,806	552033222	Carbon Film, 3.3K $\pm 5\%$, 1/4W

Schematic Location	Part Number	Description
R808	552022322	Carbon Film, 22K $\pm 5\%$, 1/4W
R809	552010522	Carbon Film, 1M $\pm 5\%$, 1/4W
R811	552047222	Carbon Film, 4.7K $\pm 5\%$, 1/4W
VR801	510502125	Potentiometer, 10K, Muting Level Adj.
VR802	510502119	Potentiometer, 1K, Meter Level Adj.

Schematic Location	Part Number	Description
CAPACITORS		
C801,803, C806,807 } C802 C804,805, C809 } C808,810 C811 C812	440100985 441301336 440501283 402100749 402100509 402100629	Ceramic, 0.01mfd, 250V Ceramic, 3pF, N5.6, 50V Ceramic, 50pF $\pm 10\%$, 250V Electrolytic, 1 mfd, 50V Electrolytic, 100mfd, 6.3V Electrolytic, 10mfd, 25V

Schematic Location	Part Number	Description
DIODES AND TRANSISTORS		
D801,802 D803,804, Q801,802, } Q803 Q804 L801	300212004 300111008 301201117 301201132 226501115 770101223 140800143 141810142	KB-269, Varistor 1S188, FM Meter Rect. 2SC829C 2SC1384 Coil, Muting, 10.7MHz tune Pin, Terminal Printed Circuit Board "MU-3" Muting Circuit Board Assembly

RECTIFIER CIRCUIT BOARD

Schematic Location	Part Number	Description
RESISTOR		
R901	551039133	Composition, 390 $\pm 10\%$, 1/2W
CAPACITORS		
C901,902 C903 C904	440100985 431100804 402220419	Ceramic, 0.01mfd, 250V Oil, 0.1mfd $\pm 20\%$, 600V Electrolytic, 2200mfd, 16V

Schematic Location	Part Number	Description
DIODES		
D901 D902	300919010 300919009	ESAC02-N, Rectifier ESAC02-C, Rectifier
	770101223 140800144 141810144	Pin, Terminal Printed Circuit Board "B-14" Rectifier Circuit Board Assembly

RELAY CIRCUIT BOARD

Schematic Location	Part Number	Description
RESISTORS		
R902 R903 C905	551022033 552033322 402470519	Composition, 22 $\pm 10\%$, 1/2W Carbon Film, 22K $\pm 5\%$, 1/4W Capacitor, Electrltyic, 470mfd, 16V

Schematic Location	Part Number	Description
Q901 RY901	301301122 240111221 770101223 140800142 141810146	Transistor, 2SD317 Relay Pin, Terminal Printed Circuit Board "X-20" Delay Relay Circuit Board Assembly

STABILIZER CIRCUIT BOARD

Schematic Location	Part Number	Description
RESISTORS		
R904 R905 R906,908 R907 R909	551033233 551010133 551022233 551033133 551027133	Composition, 3.3K $\pm 10\%$, 1/2W Composition, 100 $\pm 10\%$, 1/2W Composition, 2.2K $\pm 10\%$, 1/2W Composition, 330 $\pm 10\%$, 1/2W Composition, 270 $\pm 10\%$, 1/2W

Schematic Location	Part Number	Description
CAPACITORS		
C906,907 C908,909 D903 Q902	402100439 402470639 300313007 301201123 770101223 140800141 141810143	Electrolytic, 1000mfd, 35V Electrolytic, 47mfd, 35V Diode, BZ-210 Transistor, 2SD317 Pin, Terminal Printed Circuit Board "B-9" Stabilizer Circuit Board Assembly

RELAY CIRCUIT BOARD

Schematic Location	Part No.	Description
RESISTORS		
R903	552022322	Carbon Film, 22K $\pm 5\%$, 1/4W
R904	551022033	Composition, 22 $\pm 10\%$, 1/2W
C906	402470519	Capacitor, Electrolytic, 470mfd, 16V

Schematic Location	Part No.	Description
Q902	301301122	Transistor, 2SD317
RY901	240111221	Relay
	770101223	Pin, Terminal
	140800142	Printed Circuit Board "X-20"
	141810146	Delay Relay Circuit Board Assembly

ADDENDA

CIRCUIT CHANGES

A. The units with serial numbers from E 42871 to E 42970 differ from the others on the following points.

1. The FM De-emphasis Circuit is fixed at 75 usec only.
2. The Equalizer Amp Circuit is a 2-transistor system.
3. The Bias Test Points of the Main Amp Circuit have the polarities as below:

Pins #1 and #3 +, positive
Pins #2 and #4 -, negative

B. The units with serial numbers from E 42871 to E 59370 and F 01601 to F 01630 differ from the others on the following points:

1. The Main Amp Circuit Board is the type designated "AF-33C". Compared to the type "AF-33D", it has slightly wider plug-in section.
2. The Circuit Board Socket for the Main Amp Circuit Board has slightly longer length in accordance to the item 1 above.
3. Whenever it is necessary to replace the Main Amp Circuit Board or the Socket, refer to the parts designations below for replacement.

a) Printed Circuit Board "AF-33C" Part No.140600651

PCB Assembly "AF-33C"

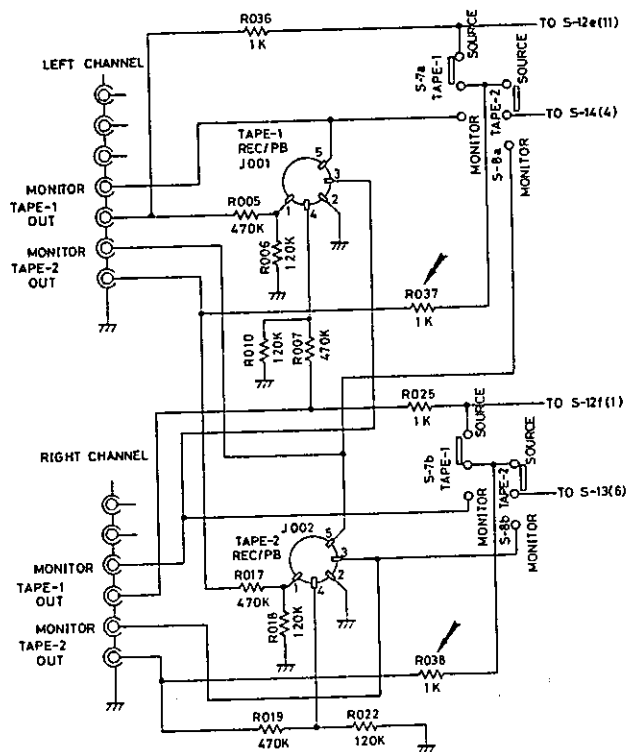
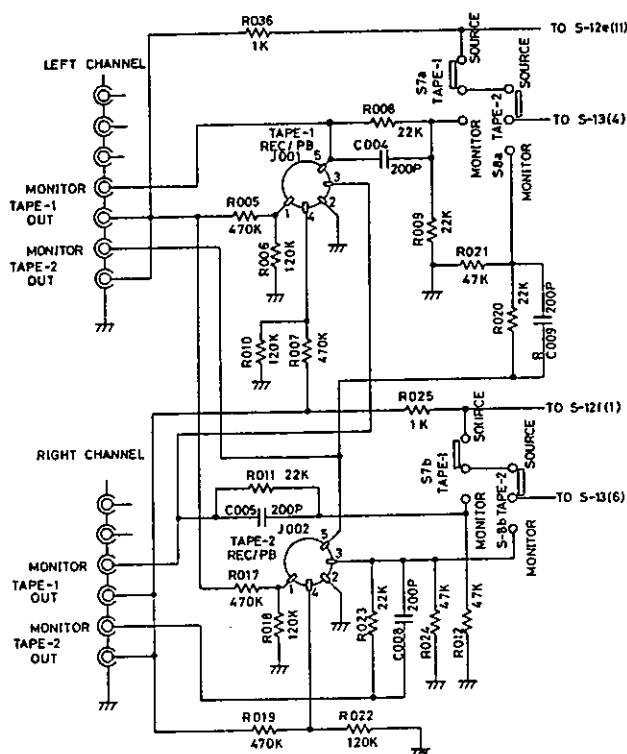
Part No.141610230

b) Bracket, for "AF-33C"

Part No.648211117

Do not use the "AF-33D" on the Socket intended for the "AF-33C", as it will leave small free space in the Socket and may not stabilize the Circuit Board connection causing possible inoperation or defection of parts.

4. If there were annoying pop noise exists whenever the Low Filter switch is turned on and off, insert a carbon film resistor, 22 K ohms $\pm 5\%$ 1/4W, between pins #3 and #4 (#3' and #4' for the right channel) on the Preamp PCB designated TC-4 (see the Circuit Diagram).
- C. The units with serial numbers from E 76291 and F 05931 and onward will have tape dubbing feature with the change in the Tape Out Circuit as shown in the below.
1. TAPE OUT 1 and TAPE OUT 2 become independent of each other.
 2. Resistors R008, 009, 011, 012, 020, 021, 023 and 024 are removed.
 3. R037 and 038, carbon-film resistors 1Kohm $\pm 5\%$ 1/4W (Part No. 552010222) added.



D. The units with serial numbers from F 37041 onward and G 04220 onward will have a speaker matrix (for stimulated 4-channel sound effect) circuit added to the output circuit. See below for the change.

