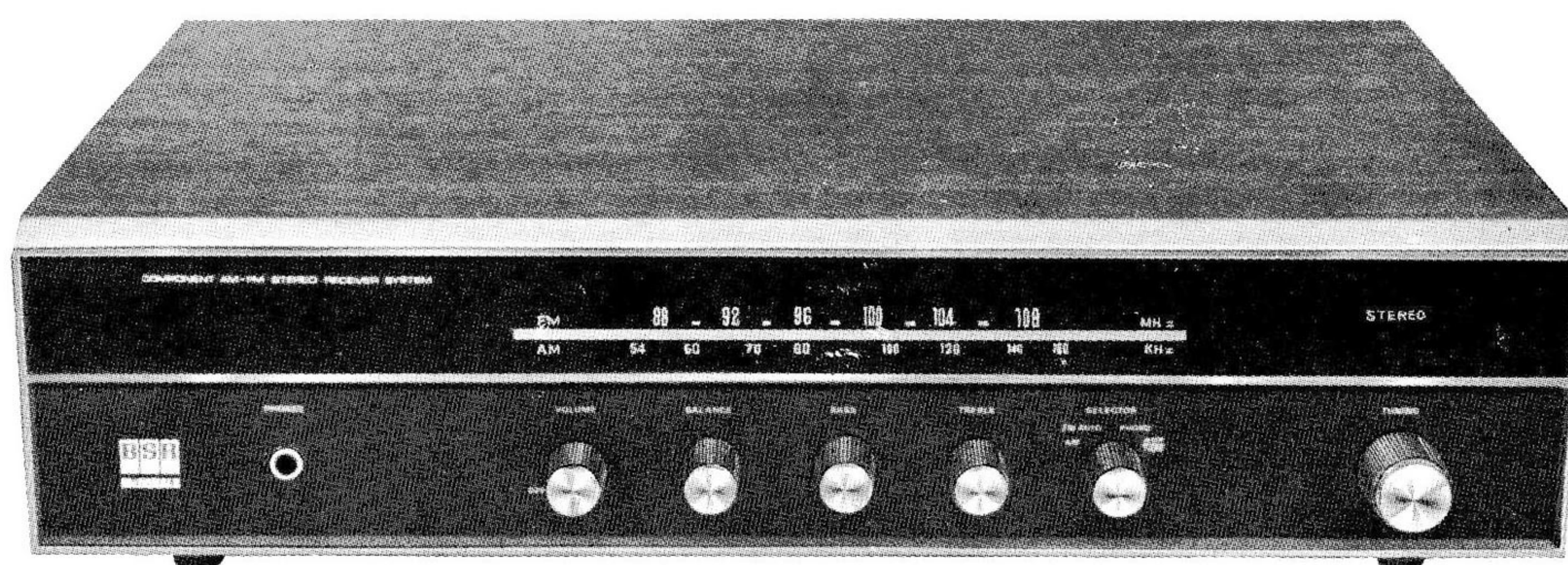




20 WATT AM-FM STEREO RECEIVER

SERVICE MANUAL



PRECISION CRAFTED BY BSR(USA) LTD.

ALIGNMENT PROCEDURE

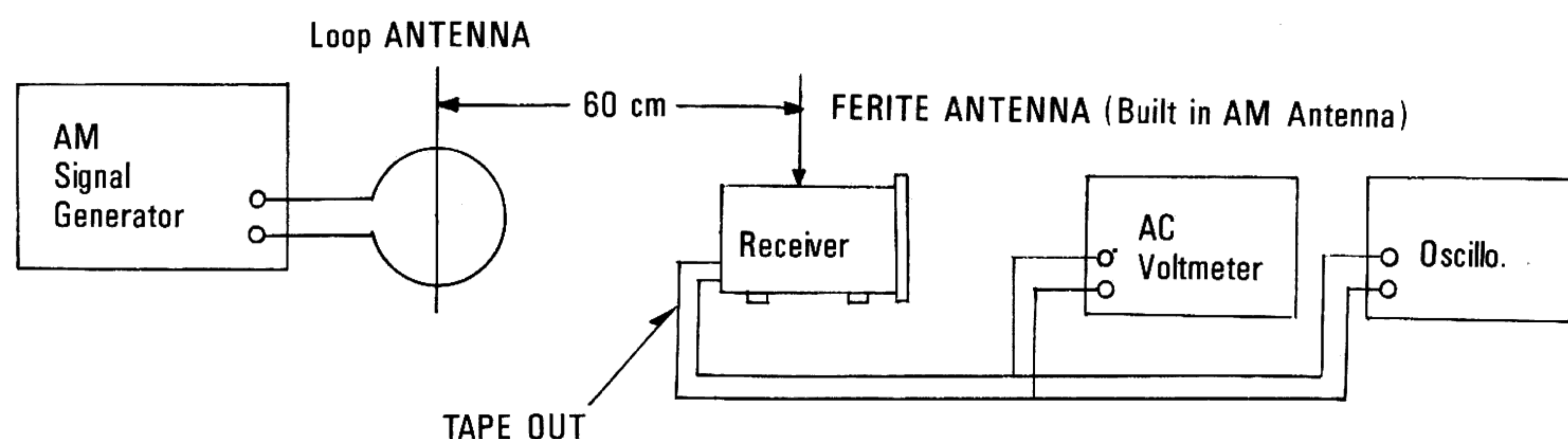
Do not attempt alignment unless the following equipment is available.

EQUIPMENT DESCRIPTION

- | | |
|------------------------|---------------------|
| 1. AM Signal Generator | 5. Stereo Modulator |
| 2. Oscilloscope | 6. Audio Generator |
| 3. AC Voltmeter | 7. Distortion meter |
| 4. FM Signal Generator | |

AM IF & RF ALIGNMENT

Output of signal generator should be no higher than necessary to obtain an output reading. Set SELECTOR switch to AM position.						
STEP	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	INDICATOR	ADJUSTMENT	REMARK
1	Refer to Fig. 1	455 KHz (400 Hz Mod.)	Point of non-interference. (on/about 600 KHz)	Output meter to TAPE OUT jack.	T205 (1st IFT) T206 (2nd IFT) T207 (3rd IFT)	Adjust for maximum reading.
2	Same as step 1	600 KHz (400 Hz Mod.)	600 KHz	Same as step 1	L801 (OSC coil) L201 (ANT coil)	Adjust for maximum reading.
3	Same as step 1	1400 KHz (400 Hz Mod.)	1400 KHz	Same as step 1	(OSC Trimmer) (ANT Trimmer)	Adjust for maximum reading. Repeat steps (2) and (3)
Note: Remove line cord antenna from FM external antenna terminal when aligning.						



AM ALIGNMENT CONNECTION

Fig. I

FM RF AND IF ALIGNMENT

Refer to Fig. II

Signal generator output should be no higher than necessary to obtain an output reading. Set Selector switch to FM. Signal Generator deviation: 75 KHz						
STEP	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUSTMENT	REMARKS
1	Connect to FM Antenna Terminal through FM Dummy antenna (300 Ω)	90 MHz (400 Hz, Mod)	90 MHz	AC Voltmeter connected to TAPE OUT jack	L104 (FM OSC Coil) L101 (FM ANT Coil) L102 (FM RF Coil)	Adjust for maximum reading on AC Voltmeter
2	SAME	106 MHz (400 Hz, Mod)	106 MHz	SAME	TC-2 (FM OSC Trimmer) (FM ANT Trimmer) (FM RF Trimmer)	Adjust for maximum reading
Repeat step 1 & 2 until no further improvement is possible.						
3	SAME	90 MHz (400 Hz, Mod)	90 MHz	SAME	T101 (FM IFT) Top & Bottom T201 (FM IFT) T202 (FM IFT) T203 (FM IFT)	Adjust for maximum reading
4	SAME	SAME	SAME	SAME	T204 (DISCRI TRANS)	See Fig. II (A).

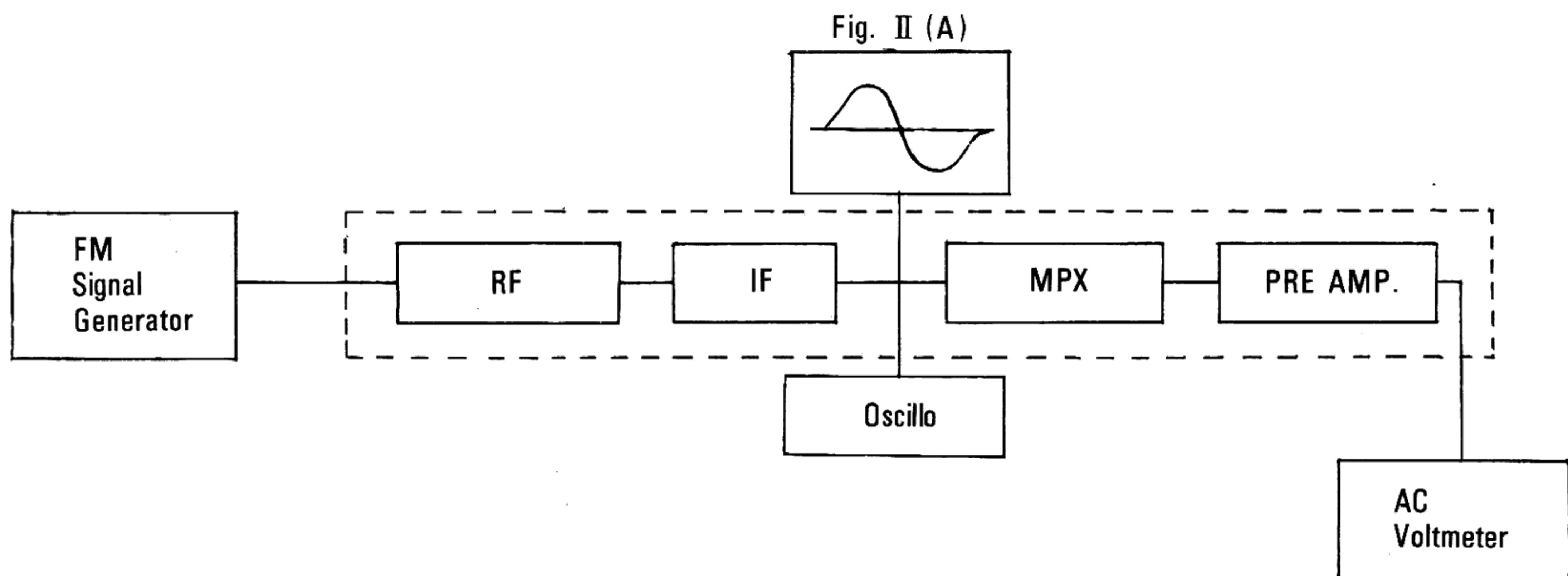


Fig. II

MPX ALIGNMENT

Refer to fig. III

Set SELECTOR Switch to FM position.
Tune for 98 MHz on band.
Signal Generator output level: 1000 μ V, Deviation: 75 KHz at 100% modulation of composite signal.
Connect Signal Generator to FM Antenna Terminal through FM Dummy Antenna (300 Ω).

STEP	19 KHz (PILOT SIGNAL) MODULATION Level set	SIGNAL GENERATOR	OUTPUT INDICATOR	ADJUST	ADJUST for	NOTE
		Freq. Set to	Connected to			
1		Audio Generator (connected to input of MPX board MX-6) 67 KHz	AC Voltmeter Tr301 Emitter	L301	Minimum	
2	1 ~ 2%	Stereo Modulator 19 KHz (pilot only)	AC Voltmeter collector of TR302 on MPX board MX-6.	L303 L304	Maximum	Stereo Beacon lamp becomes brightest.
3	8%	Composite 1 KHz L channel	AC Voltmeter TAPE OUT jack of L channel.	L305	Maximum	
4	8%	Composite 1 KHz R channel	Same as step 3.	VR301 (2K)	Minimum	AC Voltmeter reading should be at least 28 db below reading in step 3.
5	8%	Composite 1 KHz R channel	AC Voltmeter to TAPE OUT jack of R channel.	—	—	Same AC Voltmeter reading as obtained in step 3 (± 2 db)
6	8%	Composite 1 KHz L channel	Same as step 5.	—	—	AC Voltmeter reading should be at least 28 db below reading in step 5.

If unable to obtain 28 db in steps 4 and 6 readjust L305.

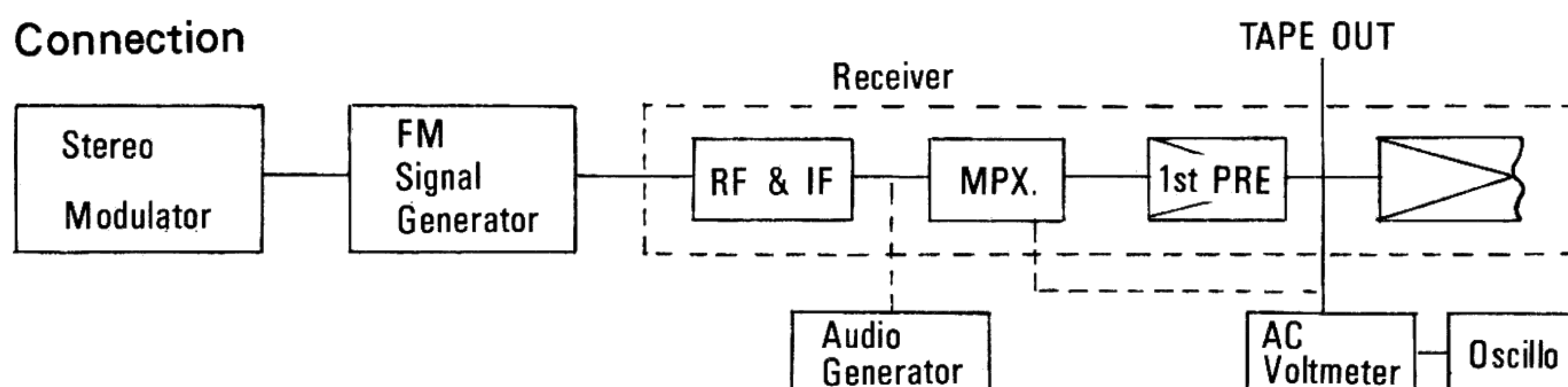


Fig. III

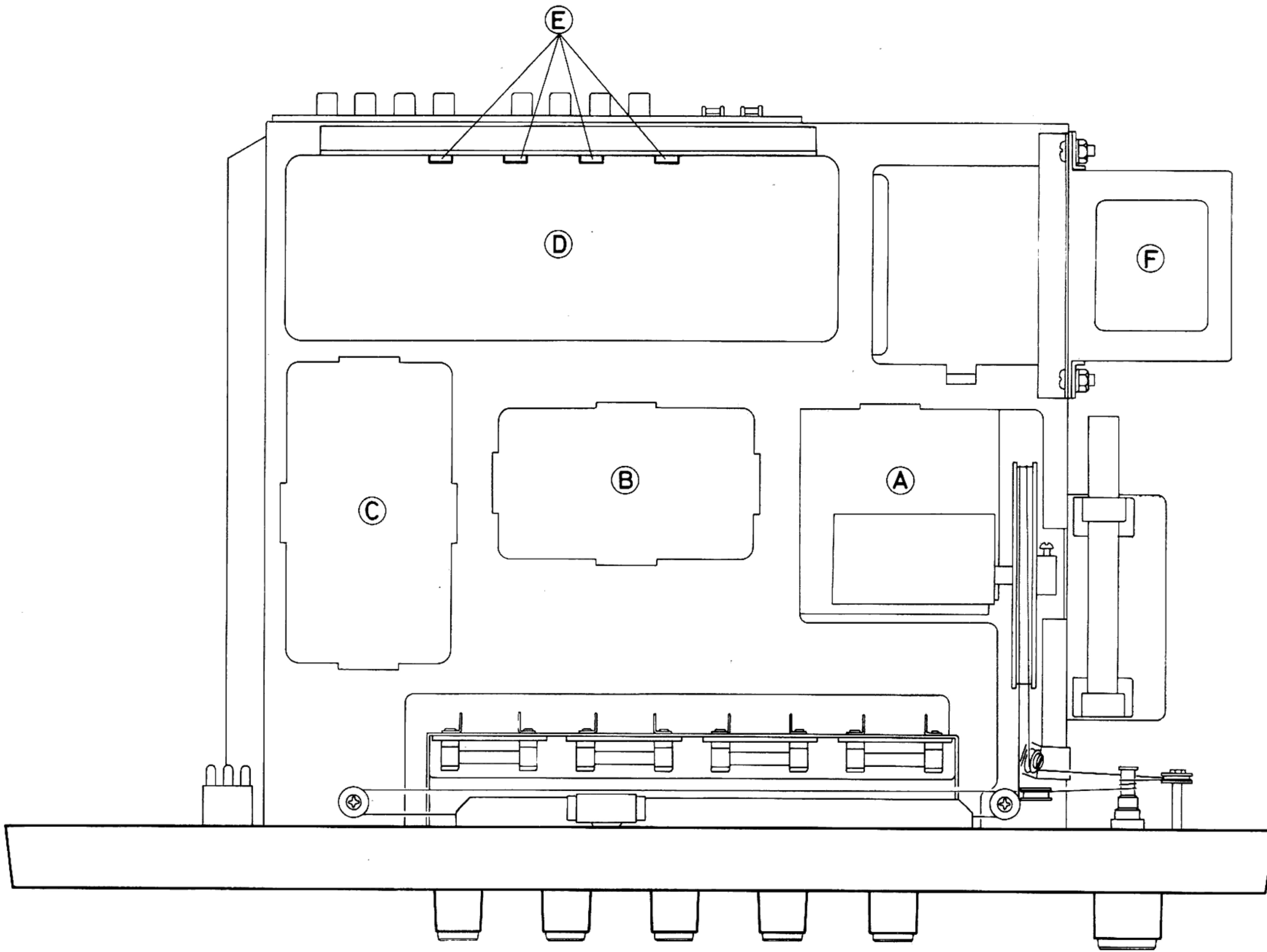
TROUBLE SHOOTING

Symptom	Cause and Remedy
1) No output.	A) Faulty AC power cord § Replace the cord. B) Defect in the power switch SW5 (switch with volume control resistor) § Replace the switch. C) Broken wire in the power transformer § Replace the transformer.
2) Pilot lamp does not light	A) Broken lamp § Replace the lamp. B) Open in the power transformer. § Replace the transformer.
3) Pilot lamp lights but no speaker output.	A) Capacitor C443, C444 or C440 defective § Replace the defective capacitor. B) Either diode D403 or D404 damaged § Replace the damaged diode.
4)-1 No output 1 channel when "VOLUME" is maximum and Balance is in the center, when a test signal is applied to the terminal of non-operating side channel of the balance control resistor VR 1	A) Damaged Tr305 Tr401 or Tr403 § Replace the damaged part. B) Damaged Tr407 or Tr409 § Replace the damaged part. C) Open in copper foil of the printed circuit board in the main amplifier or in the tone control § Repair or replace it. D) Faulty C431 § Replace it. E) Broken resistor R401, R403, R405, R407, R411, R417, R419, R423 or R449 § Replace the broken part.
4)-2 Same as 4)-1 above but speaker works when Test signal is applied.	A) Defective transistor Tr401 or Tr403 § Replace the defective transistor. B) Faulty resistor, R801, § Replace the faulty one. C) Faulty capacitor C401, C803 § Replace the faulty one. D) Defective selector switch § Repair or replace it.
5) Speaker works normally but headphone does not work	A) Open in R803 (left) or R804 (right) § Change it.
6) All the inputs work normally except "PHONO" input	A) Poor contact in "PHONO" input jack § Repair or replace it. B) Broken resistor R801 § Replace it. C) Poor contact in selector switch § Repair or replace the switch.
7) "TAPE OUT" does not work	A) Poor contact in "TAPE OUT" output jack § Repair or replace the jack. B) Broken resistor R409 § Replace it.
8) No AM or FM (TUNER + B voltage is not 9-10V)	A) Open winding in the power transformer. § Replace the transformer. B) Damaged diode D405 § Change the damaged diode. C) Faulty capacitor C422, C440, C439 § Change it. D) Short-Circuit in TUNER + B circuit § Repair the short. E) Poor contact in selector switch § Repair or change it.
9) No FM	A) Poor contact in selector switch SW2 § Repair or replace it. B) Resistor R223 defective § Change it. C) Capacitor C221 defective § Change it. D) Transistor, diode, IFT, resistor or capacitor of FM IF. Board defective § Replace the defective one. E) Front End defective § Repair or replace it.

TROUBLE SHOOTING

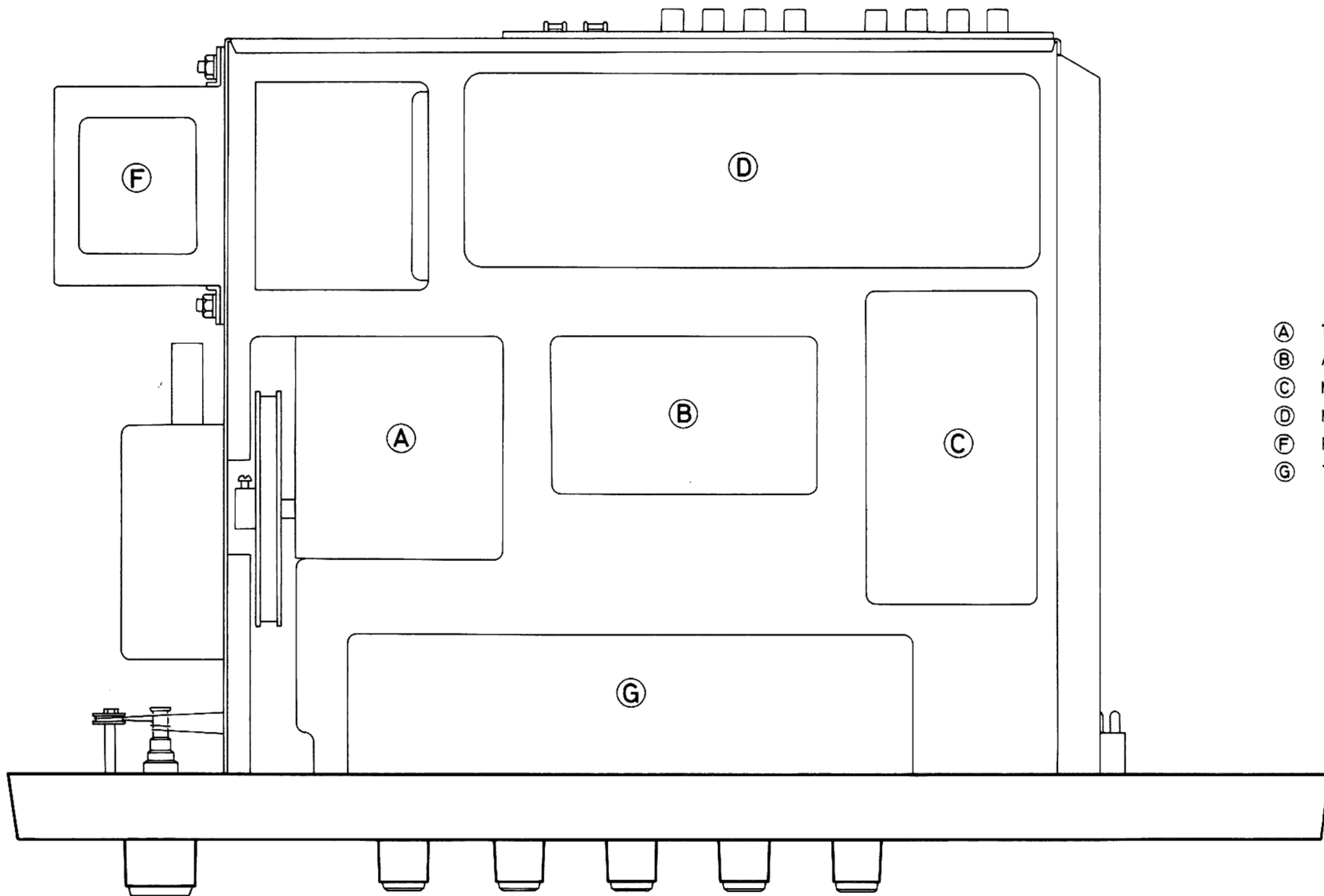
Symptom	Cause and Remedy
10) No AM	A) Poor contact in selector SW2 § Repair or change it. B) Transistor, diode, IFT, resistor or capacitor of AM IF BOARD defective § Replace the defective one. C) Front End defective § Repair or change it. D) Bar-Antenna coil defective § Repair or change it.
11) No MPX separation	A) Deviation in adjustment § Readjust it. B) Tr302 of MPX Board defective § Change the transistor. C) One of diodes D301 through D306 defective § Change the defective diode. D) VR301 defective § Change it.
12) No stereo light	A) Broken ST. indicator lamp § Replace the lamp. B) Deviation in adjustment of L303, L304, L305 on MPX Board § Readjust. C) Defective Tr303 on MPX Board § Change the defective transistor.
13) Distorted FM	A) Defective Tr301 § Change the transistor.
14) Noisy FM	A) Front End defective § Replace it. B) Defective antenna or feeder. § Repair or change it.
15) Low FM output	A) Front End defective, or faulty transistor, IFT or diode of Board § Replace the defective one. B) If sound of one channel is low: Defective Tr305 in case of R channel, or defective Tr306 in case of L channel § Change the defective one.
16) Low AM output	A) Defective IF, transistor, Diode, IFT's, Resistors or capacitors § Replace the defective one.
17) "LOUDNESS" gives no effect	A) Defective "LOUDNESS" control § Replace. B) Defective C401, C402, or R401 § Change the Defective one. C) Defective VR1 § Change it.
18) "BASS CONTROL" gives no effect	A) VR403 defective § Change it. B) Defective C411, C413 or R413 on Tone Control Board § Replace the defective one.
19) "TREBLE CONTROL" gives no effect	A) Faulty VR402 § Change it. B) Defective C407, C409 or R411 on Tone Control Board § Replace the defective one.
20) Sound distorted	A) Broken R439 or R437 § Replace the broken one. B) Faulty Tr403 § Change the transistor.
21) Noisy PHONO input	A) Faulty Tr401 or Tr403 § Change the faulty one. B) Faulty R801, R401, R403 or R405 § Change the faulty one.
22) Noisy Volume	A) Defective VR401 § Replace it.

CHASSIS LAYOUT (TOP VIEW)



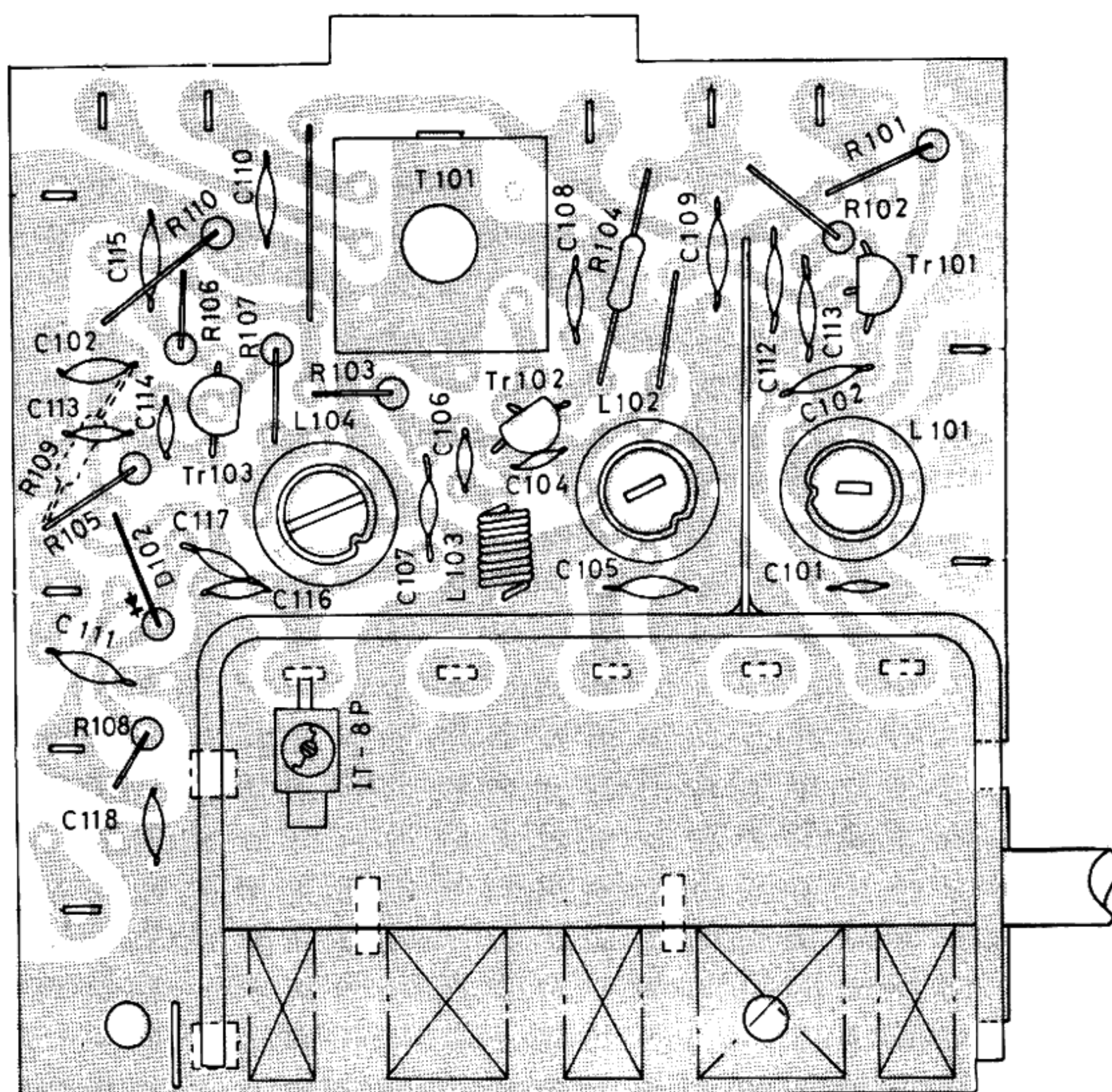
- Ⓐ TUNER FRONT END
- Ⓑ AM FM IF BOARD
- Ⓒ MULTIPLEX BOARD
- Ⓓ MAIN AMP BOARD
- Ⓔ POWER TRANSISTOR
- Ⓕ POWER TRANSFORMER

CHASSIS LAYOUT (BOTTOM VIEW)

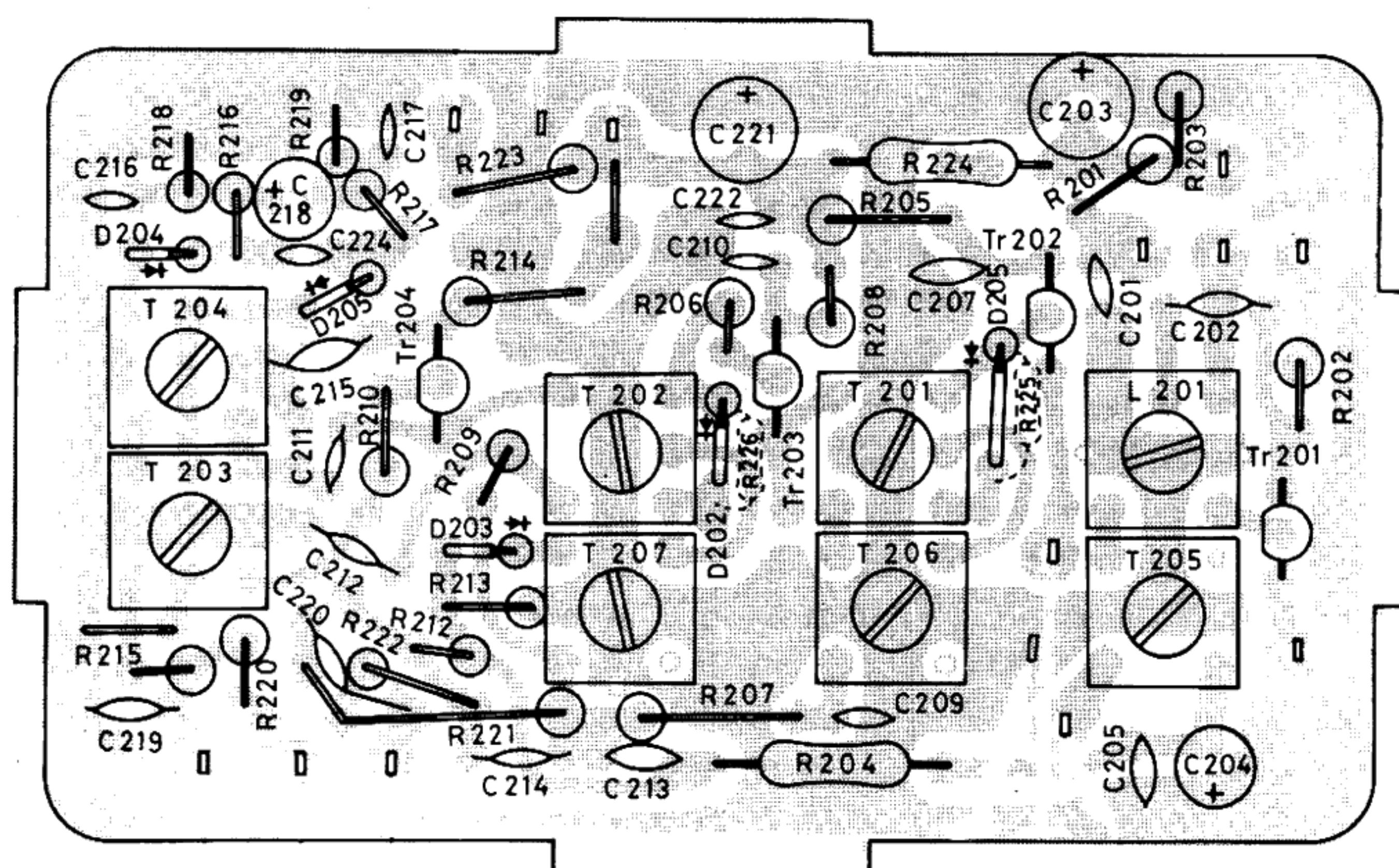


- Ⓐ TUNER FRONT END
- Ⓑ AM FM IF BOARD
- Ⓒ MULTIPLEX BOARD
- Ⓓ MAIN AMP BOARD
- Ⓕ POWER TRANSFORMER
- Ⓖ TONE CONTROL BOARD

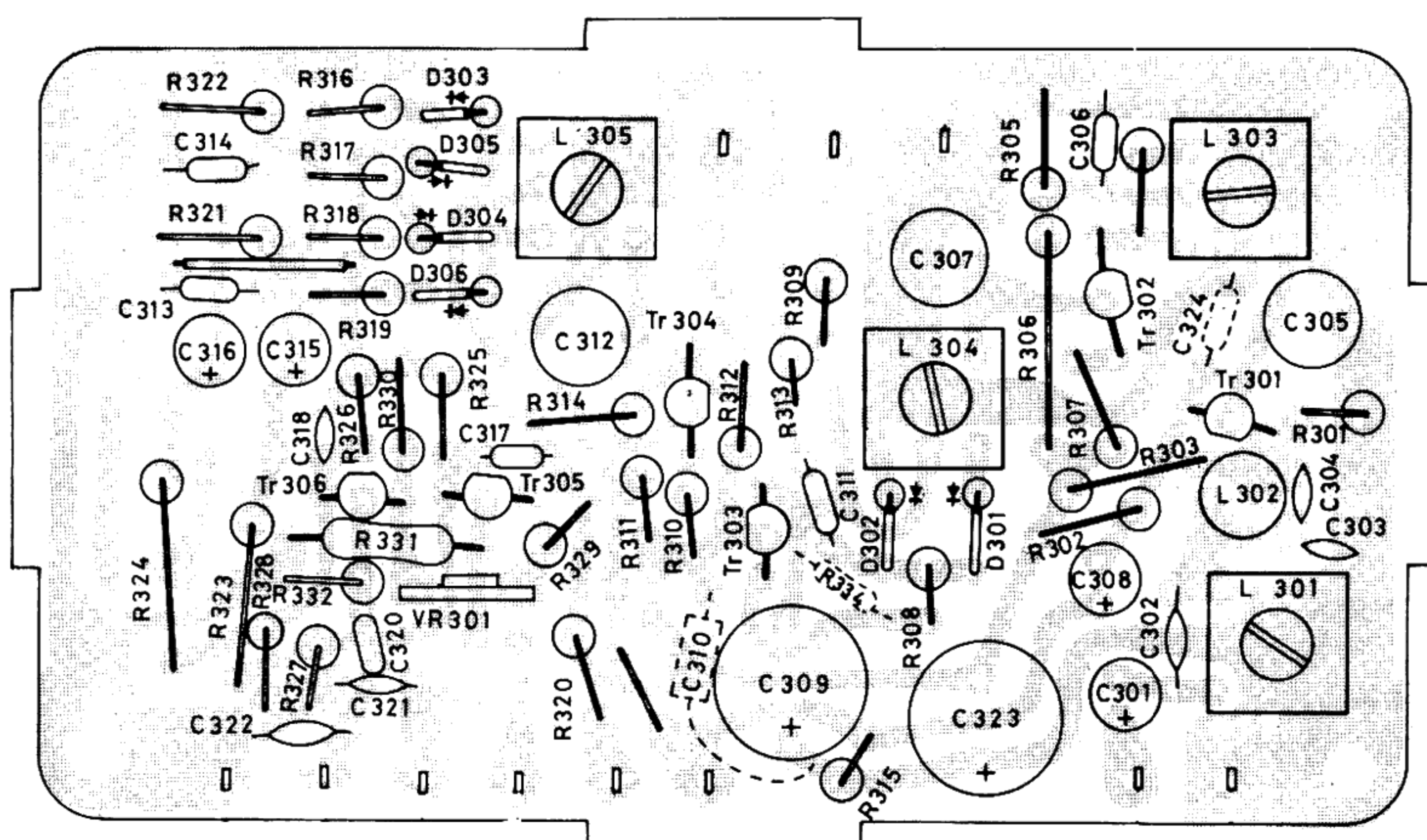
TUNER (TOP VIEW)



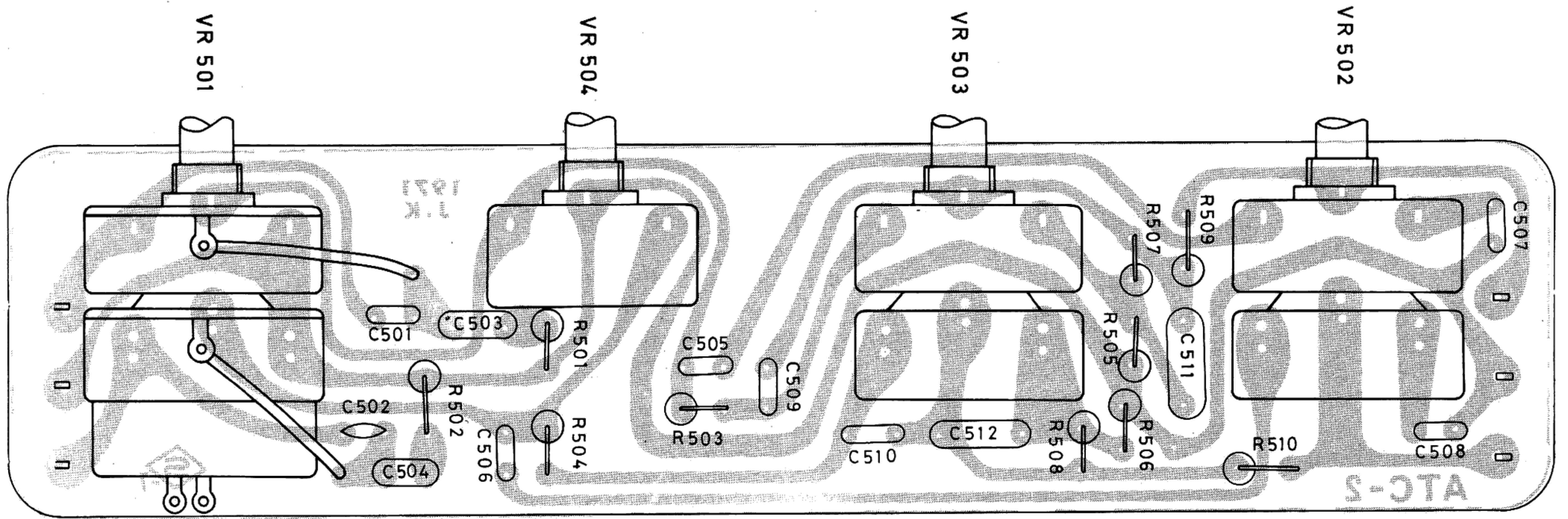
MPX. (TOP VIEW)



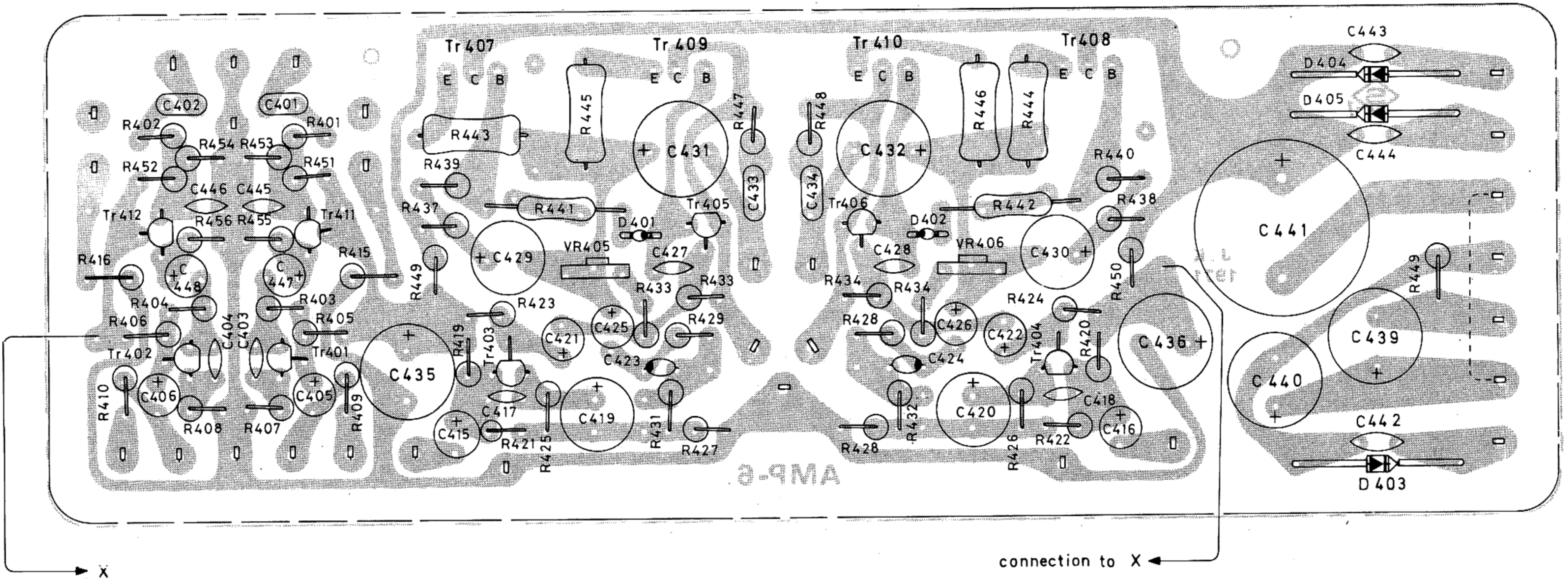
AM/FM IF. (TOP VIEW)



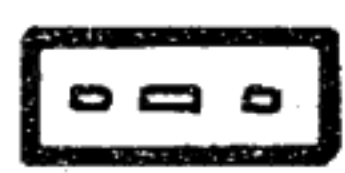
TONE CONTROL (TOP VIEW)



MAIN AMP. (TOP VIEW)



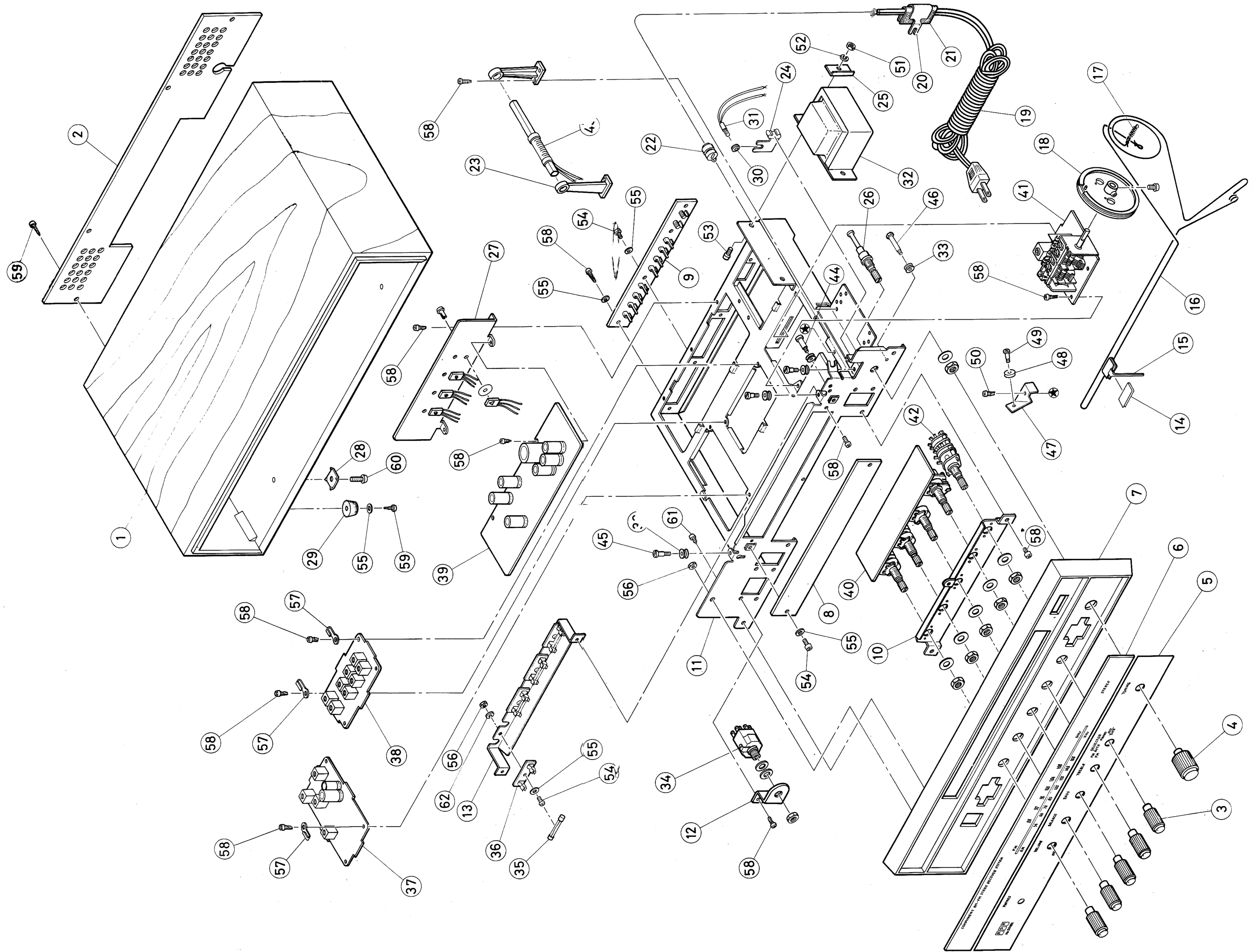
TRANSISTOR CONNECTIONS



2SA496
2SC496

2SC373
— 644
— 828
— 829
— 1047

McDONALD 20A
EXPLODED VIEW



McDONALD 20A EXPLODED VIEW PARTS LIST

REF. NO.	BSR PART NO.	DESCRIPTION	Q'ty	REF. NO.	BSR PART NO.	DESCRIPTION	Q'ty
1	ES14000	Cabinet	1	32	ES14031	Power transformer	1
2	ES14001	Back board	1	33	ES14032	Tuning pulley (A)	1
3	ES14002	Control knob	5	34	ES14033	Headphone jack	1
4	ES14003	Tuning knob	1	35	ES14034	Pilot lamp	4
5	ES14004	Front name plate	1	36	ES14035	Lamp socket	4
6	ES14005	Dial scale	1	37	ES14036	Mounted MPX Board	1
7	ES14006	Front panel	1	38	ES14037	Mounted IF Board	1
8	ES14007	Light diffuser	1	39	ES14038	Mounted Main Board	1
9	ES14008	Terminal plate	1	40	ES14039	Mounted Tone Board	1
10	ES14009	VR. holder metal	1	41	ES14040	Mounted RF Board	1
11	ES14010	Chassis	1	42	ES14041	Rotary Switch	1
12	ES14011	H. Jack fixing metal	1	43	ES14042	AM Bar Antenna	1
13	ES14012	Shield plate	1	44	ES14043	Roller Shaft (A)	1
14	ES14013	Teflon sheet for pointer	1	45	ES14044	Roller Shaft (B)	3
15	ES14014	Dial pointer	1	46	ES14045	Roller Shaft (C)	1
16	ES14015	Dial string	1	47	ES14046	Roller Shaft Metal	1
17	ES14016	Spring for Dial string	1	48	ES14047	Tuning pulley (B)	1
18	ES14017	Dial drum	1	49	ES14048	Roller Shaft (D)	1
19	ES14018	AC cord UL	1	50	ES14049	Tapping Screw 3 × 6	2
20	ES14019	Antenna metal	1	51	ES14050	Nut 9 m/m	2
21	ES14020	Antenna sheet	1	52	ES14051	Spring washer 9 W	2
22	ES14021	Cord bushing	1	53	ES14052	Screw 4 × 10	2
23	ES14022	Antenna supportor	2	54	ES14053	Screw 3 × 6	4
24	ES14023	Indicator holder	1	55	ES14054	Washer 3 m/m	11
25	ES14024	Power transformer stopper	2	56	ES14055	Nut 3 m/m	2
26	ES14025	Tuning shaft	1	57	ES14056	Lug 3 m/m	2
27	ES14026	Heat sink	1	58	ES14057	Tapping Screw (2.6 × 6)	19
28	ES14027	Square washer	4	59	ES14058	Wood Screw	8
29	ES14028	Rubber foot	4	60	ES14059	Screw 4 × 16	4
30	ES14029	Indicator bushing	1	61	ES14060	Wood Screw 3.1 × 10	4
31	ES14030	Stereo indicator lamp	1				

McDONALD 20A ELECTRICAL PARTS LIST

BSR PART NO.	REF. NO.	DESCRIPTION	Q'ty
TRANSISTORS			
ES14065	TR101	Transistor 2SC1047 (B.C)	1
ES14066	TR102,103,201,202,203,204	Transistor 2SC829 (B.C)	6
ES14067	TR301,302,304,305,306,401,402	Transistor 2SC828 (Q.R)	7
ES14068	TR303	Transistor 2SC1317 (Q.R)	1
ES14069	TR411,412	Transistor 2SC644	2
ES14070	TR403,404,405,406	Transistor 2SC373	4
ES14071	TR409,410	Transistor 2SA496	2
ES14072	TR407,408	Transistor 2SC496	2

McDONALD 20A ELECTRICAL PARTS LIST

BSR PART NO.	REF. NO.	DESCRIPTION	Q'ty
DIODES			
ES14073	D201,202	Silicon Diode MJ-40	2
ES14074	D203,204,205,301,302,303,304,305,306	Diode 1N-60	9
ES14075	D403,404,405	Silicon Diode 10D-1	3
ES14076	D401,402	Varistor 1S1211	2
ES14077	D102	Vari-Cap 1S2139B	1
RESISTORS			
ES14108	R449	Carbon Resistor RD1/2UZ 330 ohms	1
ES14109	R443,444,445,446	Wire-wound resistor 1/2W 0.5 ohm	4
ES14150	R312	Carbon Resistor RD1/4UZ 15 ohms	1
ES14151	R107,427,428,441,442,447,448	Carbon Resistor RD1/4UZ 22 ohms	7
ES14152	R309	Carbon Resistor RD1/4UZ 47 ohms	1
ES14153	R215,308,320	Carbon Resistor RD1/4UZ 100 ohms	3
ES14154	R206,437,438	Carbon Resistor RD1/4UZ 220 ohms	3
ES14155	R105,439,440	Carbon Resistor RD1/4UZ 330 ohms	3
ES14156	R210,223,224,307,310	Carbon Resistor RD1/4UZ 470 ohms	5
ES14157	R104,329,330	Carbon Resistor RD1/4UZ 560 ohms	3
ES14158	R102	Carbon Resistor RD1/4UZ 680 ohms	1
ES14159	R205,407,408	Carbon Resistor RD1/4UZ 820 ohms	3
ES14160	R202,208,212,303,425,426	Carbon Resistor RD1/4UZ 1K ohms	6
ES14161	R203,214,216,222	Carbon Resistor RD1/4UZ 1.2K ohms	4
ES14162	R431,432	Carbon Resistor RD1/4UZ 2.2K ohms	2
ES14163	R106,505,506	Carbon Resistor RD1/4UZ 2.7K ohms	3
ES14164	R431,432,501,502	Carbon Resistor RD1/4UZ 3.3K ohms	4
ES14165	R109	Carbon Resistor RD1/4UZ 3.9K ohms	1
ES14166	R209,218,219,405,406,423,424,509,510	Carbon Resistor RD1/4UZ 4.7K ohms	9
ES14167	R103,304,331,334	Carbon Resistor RD1/4UZ 5.6K ohms	4
ES14168	R101,201,221,306,429,430	Carbon Resistor RD1/4UZ 8.2K ohms	6
ES14169	R110,316,317,318,319,401,402,433,434, 503,504,507,508	Carbon Resistor RD1/4UZ 10K ohms	13
ES14170	R207,325,326	Carbon Resistor RD1/4UZ 15K ohms	3
ES14171	R225,409,410,435,455,456	Carbon Resistor RD1/4UZ 22K ohms	7
ES14172	R323,324,441,412	Carbon Resistor RD1/4UZ 27K ohms	4
ES14173	R226,321,322,415,416	Carbon Resistor RD1/4UZ 33K ohms	5
ES14174	R305	Carbon Resistor RD1/4UZ 39K ohms	1
ES14175	R313,421,422	Carbon Resistor RD1/4UZ 47K ohms	3
ES14176	R314	Carbon Resistor RD1/4UZ 56K ohms	1
ES14177	R315	Carbon Resistor RD1/4UZ 82K ohms	1
ES14178	R308,302,311,327,328	Carbon Resistor RD1/4UZ 100K ohms	5
ES14179	R301	Carbon Resistor RD1/4UZ 120K ohms	1
ES14180	R213	Carbon Resistor RD1/4UZ 150K ohms	1
ES14181	R419,420	Carbon Resistor RD1/4UZ 220K ohms	2
ES14182	R220	Carbon Resistor RD1/4UZ 470K ohms	1
ES14183	R403,404	Carbon Resistor RD1/4UZ 1M ohms	2
ES14184	R451,452	Carbon Resistor RD1/4UZ 1.5M ohms	2
ES14185	R453,454	Carbon Resistor RD1/4UZ 1.8M ohms	2
ES14186	R332	Carbon Resistor RD1/4PZ 5.6K ohms	1
ES14187	R204	Carbon Resistor RD1/4PZ 10K ohms	1
ES14188	R803,804	Carbon Resistor RD1/4PZ 100K ohms	2
ES14189	R805,806	Carbon Resistor RD1/4PZ 1M ohms	2
ES14190	R807	Carbon Resistor RD1/2PZ 3.3M ohms	1
ES14191	R801,802	Carbon Resistor RD1/2UZ 150 ohms	2
VARIABLE RESISTORS			
ES14095	VR50	Variable Resistor 50KBX2	1
ES14096	VR502,503	Variable Resistor 50KAX2	2
ES14097	VR504	Variable Resistor 100KW	1
ES14100	VR405,406	Semi-fixed Variable Resistor 100KB 2P	2
ES14101	VR301	Semi-fixed Variable Resistor 2KB 2P	1
CAPACITORS			
ES14110	C107	Ceramic Capacitor 2 pF	1
ES14111	C102,104,211	Ceramic Capacitor 5 pF	3

McDONALD 20A ELECTRICAL PARTS LIST

BSR PART NO.	REF. NO.	DESCRIPTION	Q'ty
ES14112	C116	Ceramic Capacitor 6 pF	1
ES14113	C114	Ceramic Capacitor 7 pF	1
ES14114	C117	Ceramic Capacitor 8 pF	1
ES14115	C101,105	Ceramic Capacitor 15 pF	2
ES14116	C113	Ceramic Capacitor 20 pF	1
ES14117	C224,445,446,803,804,808,809	Ceramic Capacitor 100 pF	7
ES14118	C219,303,427,428	Ceramic Capacitor 220 pF	4
ES14119	C302,304,403,404,417,418	Ceramic Capacitor 470 pF	6
ES14120	C106,216,217	Ceramic Capacitor 500 pF	3
ES14121	C201,202,213,214	Ceramic Capacitor 0.01 μ F Z	4
ES14122	C103,108,109,111,112,115,119,805	Ceramic Capacitor 0.02 μ F Z	8
ES14123	C205,207,209,210,212,215,222,443,444, 442	Ceramic Capacitor 0.04 μ F Z	10
ES14124	C806,807	Ceramic Capacitor 0.001 μ F Z	2
ES14125	C110	Ceramic Capacitor 0.001 μ F Y	1
ES14126	C305,307,312	Styrol Capacitor 5100 pF K	3
ES14127	C447,448	Electrolytic Capacitor 0.01 μ F 10V K	2
ES14128	C118,423,424	Electrolytic Capacitor 0.22 μ F 10V K	3
ES14129	C501,502	Mylar Capacitor 0.001 μ F K	2
ES14130	C511,512	Mylar Capacitor 0.0015 μ F K	2
ES14131	C220,306	Mylar Capacitor 0.0022 μ F K	2
ES14132	C317,318,324	Mylar Capacitor 0.0033 μ F K	3
ES14133	C503,504	Mylar Capacitor 0.0047 μ F K	2
ES14134	C313	Mylar Capacitor 0.01 μ F K	1
ES14135	C507,508,509,510	Mylar Capacitor 0.015 μ F K	4
ES14136	C313,314	Mylar Capacitor 0.022 μ F K	2
ES14137	C321,322,319,320,401,433,434	Mylar Capacitor 0.047 μ F K	8
ES14138	C505,506	Mylar Capacitor 0.15 μ F K	2
ES14139	C801	Mylar Capacitor 0.1 μ F K	1
ES14140	C301,308,315,316,405,406,415,416,421, 422	Electrolytic Capacitor 3.3 μ F 10V	10
ES14141	C203,221	Electrolytic Capacitor 47 μ F 10V	2
ES14142	C204,218	Electrolytic Capacitor 10 μ F 10V	2
ES14143	C419,420	Electrolytic Capacitor 100 μ F 10V	2
ES14144	C323	Electrolytic Capacitor 470 μ F 10V	1
ES14145	C425,526	Electrolytic Capacitor 10 μ F 16V	2
ES14146	C310	Electrolytic Capacitor 33 μ F 16V	1
ES14147	C429,430	Electrolytic Capacitor 100 μ F 16V	2
ES14148	C309,431,432,435,436,439,440	Electrolytic Capacitor 470 μ F 16V	7
ES14149	C441	Electrolytic Capacitor 2200 μ F 25V	1
VARIABLE CAPACITOR and TRIMMER			
ES14098	VC	Variable Capacitor C157B141	1
ES14099	TC-2	Trimmer 2T-P8	1
TRANSFORMERS and COILS			
ES14078	L101	FM-Ant. Coils LB-20Z	1
ES14031	32	Power Transformer	1
ES14079	L102	FM-RF Coils LB-073C-A	1
ES14080	L104	FM-OSC Coils LB-073C-B	1
ES14081	L103	FM-IF Trap Coil LO-510	1
ES14082	T101	FM-IF Coils OSM837	4
ES14083	T201	FM-IF Coils HF-115S	1
ES14084	T202	FM-IF Coils HF-120S	1
ES14085	T203	FM-IF Coils HF-132A	1
ES14086	T204	FM-IF Coils S74-035	1
ES14087	T205	AM-IFT Coils HI-137S	1
ES14088	T206	AM IFT Coils HI-134S	1
ES14089	T207	AM IFT Coils HI-144S	1
ES14090	L801	AM OSC Coils OIM-1705	1
ES14091	L302	MPX Coils RO-082 72KB	1
ES14092	L301	MPX Coils OIM-1813 67KC	1
ES14093	L303,304	MPX Coils OIM-1814 19KC	2
ES14094	L305	MPX Coils OIM-1815 38KC	1

McDONALD 20A ELECTRICAL PARTS LIST

BSR PART NO	REF. NO.	DESCRIPTION	Q'ty
SWITCHES			
ES14041	42	Rotary Switch	1
ES14095	50	Power Switch (with VR)	1
PILOT (INDICATOR) LAMPS			
ES14030	31	Stereo indicator lamp	1
ES14034	35	Pilot lamp	4
MOUNTED BOARD			
ES14036	37	Mounted MPX Board	1
ES14037	38	Mounted IF Board	1
ES14038	39	Mounted Main Amp. board	1
ES14039	40	Mounted Tone board	1
ES14040	41	Mounted RF board	1

McDONALD 20A MECHANICAL PARTS LIST AND MECHANICAL HARDWARE

REF. NO.	BSR PART NO.	DESCRIPTION	Q'ty	REF. NO.	BSR PART NO.	DESCRIPTION	Q'ty
1	ES14000	Cabinet	1	29	ES14028	Rubber foot	4
2	ES14001	Back board	1	30	ES14029	Indicator bushing	1
3	ES14002	Control knob	5	33	ES14032	Tuning pulley (A)	1
4	ES14003	Tuning knob	1	34	ES14033	Headphone jack	1
5	ES14004	Front name plate	1	36	ES14035	Lamp socket	4
6	ES14005	Dial scale	1	43	ES14042	AM Bar Antenna	1
7	ES14006	Front panel	1	44	ES14043	Roller Shaft (A)	1
8	ES14007	Light diffuser	1	45	ES14044	Roller Shaft (B)	3
9	ES14008	Terminal plate	1	46	ES14045	Roller Shaft (C)	1
10	ES14009	VR. holder metal	1	47	ES14046	Roller Shaft Metal	1
11	ES14010	Chassis	1	48	ES14047	Tuning pulley (B)	1
12	ES14011	H. Jack fixing metal	1	49	ES14048	Roller Shaft (D)	1
13	ES14012	Shield plate	1	50	ES14049	Tapping Screw 3 × 6	2
14	ES14013	Teflon sheet for pointer	1	51	ES14050	Nut 9 m/m	2
15	ES14014	Dial pointer	1	52	ES14051	Spring washer 9W	2
16	ES14015	Dial string	1	53	ES14052	Screw 4 × 10	2
17	ES14016	Spring for dial string	1	54	ES14053	Screw 3 × 6	4
18	ES14017	Dial drum	1	55	ES14054	Washer 3 m/m	11
19	ES14018	AC cord UL	1	56	ES14055	Nut 3 m/m	2
20	ES14019	Antenna metal	1	57	ES14056	Lug 3 m/m	2
21	ES14020	Antenna sheet	1	58	ES14057	Tapping Screw (2.6 × 6)	19
22	ES14021	Cord bushing	1	59	ES14058	Wood Screw	8
23	ES14022	Antenna supportor	2	60	ES14059	Screw 4 × 16	4
24	ES14023	Indicator holder	1	61	ES14060	Wood Screw 3.1 × 10	4
25	ES14024	Power transformer stopper	2		ES14061	Owners manual	1
26	ES14025	Tuning shaft	1		ES14062	Snow box	2
27	ES14026	Heat sink	1		ES14063	Gift box	1
28	ES14027	Square washer	4		ES14064	Poly bag	1

McDONALD 20A SPECIFICATION

	NOMINAL	LIMIT
FM SECTION		
1. TUNING RANGE		88 ~ 108MHz
2. I H F SENSITIVITY (3% Distortion)	3.5 μ V	11 μ V
3. AFC HOLDING RANGE (1mV input-3db)	250KHz	150KHz-500KHz
4. DIAL CALIBRATION		
90MHz		\pm 500KHz
98MHz		\pm 500KHz
106MHz		\pm 500KHz
5. OUTPUT VOLTAGE	1.0V	1.0V \pm 2.5db
6. LIMITING VOLTAGE	25 μ V	70 μ V
7. SIGNAL TO NOISE RATIO (at 1mV Signal)	55db	40db
8. STEREO SEPARATION (100% mod. 1mV input)	28db	20db
1KHz		
9. STEREO BEACON SENSITIVITY (Pilot 10%)	25 μ V	70 μ V
10. IMAGE REJECTION	40db	30db
AM SECTION		
1. TUNING RANGE		535 ~ 1605KHz
2. SENSITIVITY (1KHz 30% mod. 20db S/N)		
600KHz	250 μ V/m	630 μ V/m
1000KHz	250 μ V/m	630 μ V/m
1400KHz	250 μ V/m	630 μ V/m
3. IMAGE REJECTION (at 1400KHz)	40db	30db
4. OUTPUT VOLTAGE (1KHz 30% mod. 5mV input)	0.3V	0.3V \pm 2.5db
AUDIO SECTION		
1. POWER OUTPUT (MUSIC POWER)	5W	4W
2. HARMONIC DISTORTION		
(at 1KHz 2 WATTS at 8 Ω)	1.5%	3%
3. FREQUENCY RESPONSE	40Hz	50Hz
	30KHz	20KHz
4. INPUT SENSITIVITY		
PHONO	160mV	160mV \pm 3 db
5. TONE CONTROL		
100Hz	+10 db -7 db	+10 \pm 3 db -7 \pm 4 db
10KHz	+8 db -10 db	+8 \pm 4 db -10 \pm 4 db
6. RESIDUAL NOISE (VR mini)	3mV	8mV
7. SIGNAL TO NOISE RATIO		
PHONO	55db	46db

SCHEMATIC DIAGRAM

