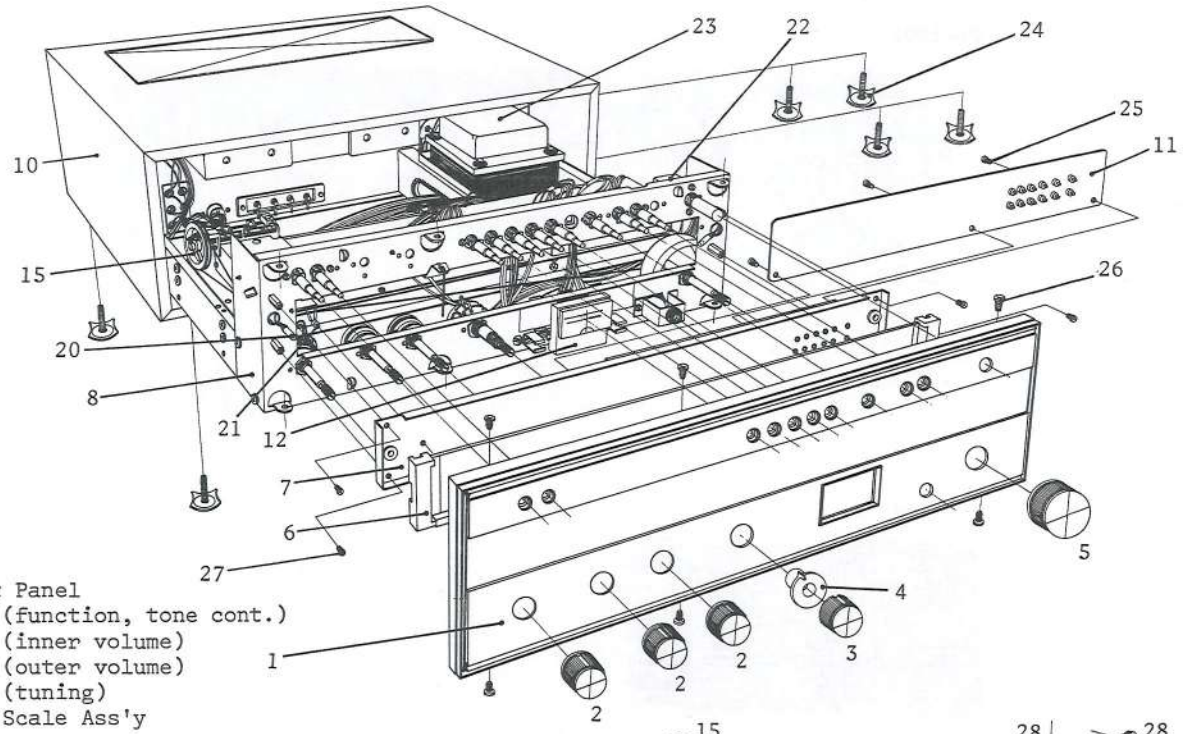
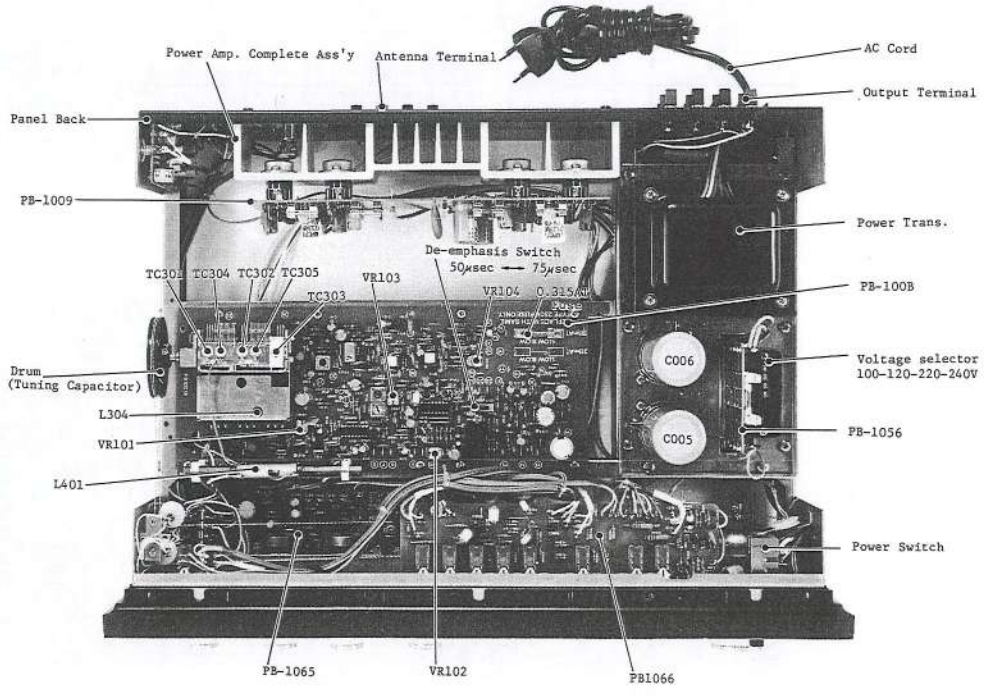
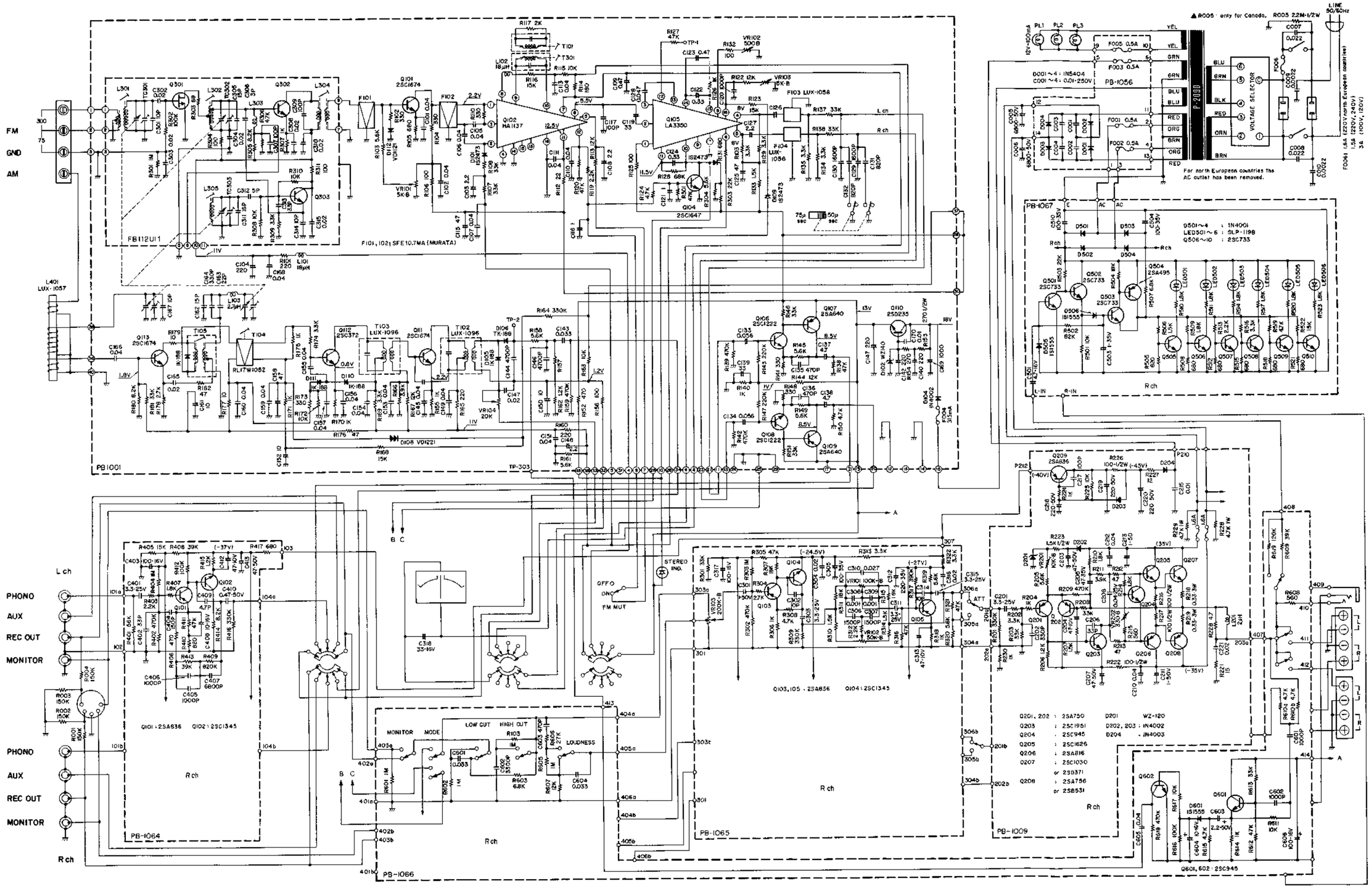
LG

R-3800
SERVICE MANUAL



1. Front Panel
2. Knob (function, tone cont.)
3. Knob (inner volume)
4. Knob (outer volume)
5. Knob (tuning)
6. Dial Scale Ass'y
7. Holder
8. Sub Panel
9. Knob (power sw.)
10. Wooden Case
11. PB-1067
12. AM/FM Tuning Meter
13. Headphone Jack
14. L.E.D.'s (SLP-119B)
15. Drum (tuning capacitor)
16. Rotary Sw. (Y484)
17. Bass VR (100k ohms x 2)
18. Treble VR (50k ohms x 2)
19. Main Volume VR (200k ohms x 2)
20. Dial Lamp
21. L.E.D. (SLP-119B)
22. Power Switch (SDG-5P)
23. Power Trans. P-2090
24. Screw 4mm x 20mm
25. Screw 3mm x 6mm
26. Screw 4mm x 10mm
27. Screw 3mm x 6mm
28. Plastic Pulley
29. Tuning Pointer Ass'y
30. Tuning Shaft & Flywheel Ass'y
31. Dial Cord





1. Unless otherwise specified, all resistors are in ohm ¼ watt, all capacitors are in micro-farad.
2. Transistors and diodes may be replaced with any types having comparable ratings.
3. Due to continued improvements L&G reserve the right to alter the circuit or specification.

STEREO RECEIVER R3800

PB-1056

C001 - 4	0.01uF 250V P	D001 - 4	1N5404
F001 - 3	0.5A	F005	0.5A

PB-1066

R601	1M	R608	560	R614	1K
602	1M	609	39K	615	4.7K
603	6.8K	610a	4.7K	616	100K
604	1M	610b	4.7K	617	10K
605	1M	611	10K	618	470K
606	27K	612	47K	619	120K
607	12K	613	33K		

C601	0.033uF P	C601	1000pF C	C605	0.04uF C
602	3300pF ST	602	1000pF C	606	100uF 16V E
603	470pF ST	603	2.2uF 50V E		
604	0.033uF P	604	10uF 16V E		

Q601	2SC945	Q602	2SC945	D601	1S1555

PB-1067

R501	10K	R509	1.8K	R517	1.8K
502	82K	510	1.8K	518	680
503	22K	511	1.8K	519	4.7K
504	18K	512	680	520	1.8K
505	820	513	2.2K	521	680
506	1.5K	514	1.8K	522	15K
507	6.8K	515	680	523	1.8K
508	680	516	3.3K		

C501	4.7uF 16V E	C504	100uF 35V E
503	1uF 35V E	510	100uF 35V E

Q501-3	2SC733	D501-4	1N4002	LED501-6	SLP-119B
504	2SA495	505	1S1555		
505-10	2SC733	506	1S1555		

PB-1009

R201	330K	R211	3.9K	R222	100 1/2W FP
202	3.3K	212	4.7K	223	1.5K 1/2W
203	33K	213	47K	224	1K
204	1K	214	1.8K	225	10K
205	5.6K	215	560	226	100 1/2W FP
206	1.2K	216	100 1/2W FP	227	12
207	1.5K	217	100 1/2W FP	228	4.7K 1W
208	33K	218	0.33 3W ±10%	229	4.7K 1W
209	470K	219	0.33 3W ±10%	230	1K
210	1.8K	221	1S	220	4.7 1W

C201	3.3uF 25V E,LR	C208	0.04uF 25V C	C215	0.01uF 1.4KV C
202	330pF C	210	0.04uF C	217	100pF C
203	47uF 50V E	211	1uF 50V E	218	220uF 50V E
204	47uF 10V E	212	0.04uF C	219	220uF 50V E
205	47uF 35V E	213	1uF 50V E	220	220uF 50V E
206	33pF C	214	0.02uF 50V C		
207	47uF 50V E				

Q201	2SA750 (1)DA	Q204	2SC945	Q207	2SC1030 or 2SD371
202	2SA750 (1)DA	205	2SC1626	208	2SA756 or 2SB531
203	2SC1951	206	2SA816		

D201	WZ-120	D203	1N4002
202	1N4002	204	1N4003

VR201	10K-B	VR202	330-B	L201	2uH

C I R C U I T D E S C R I P T I O N

[POWER SUPPLY]

The AC line is connected to the primary side of power transformer via a two pole power switch (front panel) and a voltage selector. Four windings are provided for the secondary side i.e. (1) 12 volt AC for the dial lamps. (2) 15 volts AC for tuner section: This 15V AC is falf-wave rectified by D104 to obtain 18V unsmooth DC, which is further regulated by transistor Q110 and zener diode D102 to realize 13V regulated DC against ±20% AC line. (3) 35 volt AC for preamp (equalizer stage, intermediate stage and tone control): The 35V AC is falf-wave rectified by D204 to obtain -45V unsmooth DC, which is turned into low noise -40V DC via ripple filter Q209. Actual supply voltage at each section is; equalizer stage -37V, tone control -27V, intermediate stage -24.5V, all of which are determined by the voltage-drop at the de-coupling circuit placed in each stage. (4) 30 volt x 2 AC for main amp.: The 30V x 2 AC are rectified by D001 - D004 and then led to large filtering capacitors C005 and C006 (6800uF x 2) to obtain dual supply +35V, -35V. (5) 21 volt x 2 AC for Peak Indicator, which are tapped out from the same winding of the above (4). The 21V x 2 AC are rectified by D501 - D504 to obtain dual supply +23V and -23V.

[PRE AMP SECTION]

The pre-amplifier consists of an equalizer, and intermediate amplifier, and a tone control. The equalizer adopts the Negative Feedback circuit using two silicon transistors, 2SA836 (Q101), 2SC1345 (Q102) per channel and is designed to provide proper equalization to the input signals. Input signals given through the AUX and TUNER section bypass the equalizer and are fed directly to the later stages of this amplifier.

Controls arranged after the equalizer stage are: REC. OUT connector, TAPE MONITOR SWITCH, LOW-CUT FILTER, HIGH-CUT FILTER, MODE SELECTOR, VOLUME CONTROL, and LOUDNESS SWITCH. The intermediate amplifier consisting of Q103, Q104 is a flat amplifier adopting 2-stage Negative Feedback circuit which is designed to boost the equalizer, tuner or AUX. This covers sufficiently the insertion loss by the tone control in the next stage and leads low impedance output to the tone control for its smooth function. The tone control adopts the CB-NF-circuit of Q105. Any desired frequency response can be adjusted by the following controls: Variable resistor VR101 (Bass), and variable resistor VR102 (TREBLE). Major components of the pre-amplifier are arranged on the printed circuit boards PB1064 ~ 1066. (PB1064 for Equalizer, PB1065 for Filters, Loudness and Mode, PB1066 for Flat Amp and Tone Control)

[MAIN AMPLIFIER]

The main amplifier is of full stage direct coupling, one stage differential amplification, predriving and fully complementary circuits. The power transistors Q207 2SD371 (NPN) and Q309 2SB531 (PNP) (2-transistor per channel) are fitted over to the heat sink inside the chassis. All components are assembled to the printed circuit board PB1009. The differential amplifier is consisted of Q201 and Q202, the pre-driving stage of Q203, and the driver transistors, Q205 and Q206. Besides the above transistors, capacitors, resistors, and semi-fixed volume controls are integrated in the circuit.

[AM SECTION]

The RF signal received by the ferrite-rod antenna is converted into 455KHz IF frequency by Q113. The output of the local oscillation circuitry composed of Q113 and T105 is mixed in Q113 with the incoming radio signal to provide the 455KHz IF frequency, which is connected to the next stage.

VR101	5K-B	F101	SFE10.7MA	L101	18uH	F004	315mA
102	500-B	102	SFE10.7MA	102	18uH		
103	5K-B	103	LUX-1058	103	2.7uH		
104	20K	104	LUX-1058				

T101	LA-1093	T104	RL17W105Z
102	LUX-1096	105	LUX-1073
103	LUX-1096	T301	LA-1092

FB112U11

R301	1M	R305	8.2K	R309	3.3K
302	100K	306	4.7K	310	10K
303	68	307	1K	311	100
304	100	308	10K		

C301	10pF C	C306	3pF C	C311	16pF C
302	0.02uF C	307	100pF C	312	5pF C
303	0.02uF C	308	0.02uF C	313	33pF C
304	0.02uF C	309	100pF C	314	10pF C
305	15pF C	310	0.02uF C	315	0.02uF C

Q301	2SK19 or 2SK55	Q302	2SC535	Q303	2SC1342 or SE3001

PB-1064

R401	56K	R407	1.8K	R413	39K L
402	470K L	408	39	414	8.2K
403	2.2K	409	820K L	415	1.2K
404	1M L	410	820 L	416	330K
405	15K	411	47K L	417	680
406	470	412	100K L		

C401	2.2uF 25V T	C406	1000pF P	C412	47uF 10V E
402	33pF C	407	6800pF P	413	47uF 50V E
403	100uF 16V E	408	10uF 16V E,LL		
404	150pF C	409	4.7pF C		
405	1000pF P	410	0.47uF 35V T		

Q101	2SA836E	Q102	2SC1345E		

PB-1065

R301	33K	R309	330K	R317	390K
302	470K	310	1.5K	318	1K
303	1M	311	18K	319	5.6K
304	2.7K	312	2.2K	320	5.6K
305	47K	313	3.3K	321	47K
306	1K	314	1.5K	322	3.3K
307	18K	315	18K		
308	4.7K	316	47K		

C301	1uF 50V E, LR	C307	1500pF P	C313	47uF 10V E
302	10pF C	308	0.001uF P	314	10pF C
303	3.3uF 25V E, LR	309	0.001uF P	315	3.3uF 25V E,LR
304	0.02uF C	310	0.027uF P	316	0.02uF C
305	100uF 35V E	311	3.3uF 25V E,LR	317	100uF 16V E
306	1500pF P	312	220uF 35V E	318	33uF 16V E

Q103	2SA836E	Q104	2SC1345E	Q105	2SA836E

VR103	200K-B	VR102	50K-B	VR101	100K-B

Only the desired signal is selected by T104, a ceramic filter of sharp characteristic. The selected signal is then amplified by the 455KHz IF amplifier composed of Q112 and Q111 and is detected by D106.

For a strong signal, a strong AGC action can be applied by lowering the base potential of Q112, when the collector potential of Q112 increases, and D110 and D111 are being released, which by-passes the signal level given to the base of Q112. Normally these D110 and D111 are of reverse-bias each other, therefore no signal is by-passed. D108 is arranged as a noise cancel circuit. The potential at the TP2 point is sharply reduced to a negative voltage when pulse noise comes in, when D108 is released to provide potential to the TP2 point from C158. Thus noise level is reduced.

[FM SECTION]

The FM section has been designed to realize superior characteristics for various spurious responses, or image ratio etc., by integrating in a 3-gang tuning capacitor the tuning circuitry with a matching transformer for 75-ohm and 300-ohm, a FET RF amplifier with an excellent noise figure, stable frequency converter. Further the whole section is housed in an excellent shield cover.

[IF AMPLIFIER]

The signal, converted to 10.7MHz IF frequency at the Frontend, is connected to F101 ceramic filter to remove interfering signals, then amplified up to a certain level by Q101. The output is connected to F102 ceramic filter, where any further interfering signals are removed to obtain the necessary selectivity. F101 and F102 are of the linear-phase type, therefore less distortion in stereo phonic reception is realized. Then the signal is supplied to Q102 the quadrature IC, which has a 3-gang IF amplifier and incorporates these circuits of FM detection, muting and signal strength.

But at the time of AM reception, noises are possible from this IC, therefore in this occasion this IC is designed not to operate by applying some voltage to PIN No 2. The quadrature detection system is adopted for the FM detection circuitry, which operates in combination with the external circuitry of T101, T301 and L102.

AT Pin No 12, output of the muting circuitry, the voltage will be 0V when signals are available, while approximately 4V will appear at no-signal time. By feeding the voltage to Pin No 5, the muting circuitry can be operated. The detection output is available at the Pin No 6, where usually an output of about 350mV appears, which is supplied to Q105, the P.L.L. IC is used for the multiplex to obtain stereo reception. The 76KHz voltage control oscillator is incorporated in the P.L.L. IC, where the 76KHz signal is divided by 2 to make 38KHz for switching of the composite signal. The oscillation frequency is controlled to perfectly match with that of the 19KHz pilot signal of the composite signal, therefore deterioration of the separation etc. caused by the change of ambient conditions is eliminated. For the weak signal, the Pin No 10 is grounded by supplying the muting signal to the base of Q104 to set up monaural signal. The VCO output of 19KHz is available at Pin No 12 of this IC (TP-1), which is controlled by VR103. The separation adjustment is easily done with VR102 by canceling the leak-signals of L- and R-ch. The spurious by VCO will be the interfering signal at the time of AM reception, therefore the oscillator is cancelled by supplying some voltage to Pin No 16.

The discriminated signals appear at Pin No 4 and Pin No 5 which is then connected to the audio amplifier via low-pass filter and de-emphasis circuit. Selection of 75 usec and 50 usec is possible by this switch. The final output of approximately 1V r.m.s. (400Hz, 100% modulation), is obtained with low output impedance from the audio amplifier composed of Q106 - Q109.

REPLACEMENT PARTS LIST

Resistors; 1/4W, ±5% unless otherwise noted

L.....low noise type

Capacitors; P...polyester film, ST...polystyrol, E...electrolytic, T...tantalum,

C...ceramic

LR.....low leakage type, LL.....semi low leakage type

PB-1001

R101	220	R125	100	R146	33K	R168	15K
102	330	126	1K	147	220K	169	3.3K
103	5.6K	127	47K	148	330	170	1K
104	330	128	68K	149	5.6K	171	1K
105	680	129	3.3K	150	47K	172	10K
106	100	130	3.3K	151	33K	173	330
107	33K	131	680	152	470	174	3.3K
108	33K	132	100	153	270	175	1K
110	330	133	1.5K	154	270	176	47
112	22	134	3.3K	155	1K	177	10
113	12K	135	3.3K	156	100	178	2.7K
114	180	136	33K	158	5.6K	179	10
115	10K	137	33K	159	470K	180	8.2K
116	15K	138	47K	160	220	181	33K
117	2K	139	470K	161	5.6K	182	47
119	2.2K	140	1K	162	1.2K	301	47K
120	47K	141	330	163	10K	302	33K
121	47K	142	470K	164	330K	303	22K
122	12K	143	220K	165	220	304	5.6K
123	15K	144	12K	166	3.9K		
124	4.7K	145	5.6K	167	12K		

C101	0.04uF C	C125	47uF 16V E	C147	0.02uF C
102	0.04uF C	126	2.2uF 50V E	148	2.2uF 50V E
103	2.2uF 50V E	127	2.2uF 50V E	149	0.04uF C
104	220uF 25V E	128	0.047uF P	150	10uF 16V E
105	0.04uF C	129	1600pF ST	151	0.04uF C
106	0.04uF C	130	1600pF ST	152	10uF 16V E
107	0.04uF C	131	820pF ST	153	0.04uF C
108	2.2uF 50V E	132	820pF ST	154	0.04uF C
109	0.47uF 50V E	133	0.056uF P	155	0.04uF C
110	0.04uF C	134	0.056uF P	156	0.04uF C
111	0.04uF C	135	470pF C	157	0.04uF C
112	0.02uF C	136	470pF C	158	47uF 16V E
113	0.04uF C	137	4.7uF 25V E	159	0.04uF C
115	47uF 16V E	138	4.7uF 25V E	160	0.04uF C
116	1uF 50V E	139	33uF 10V E	161	10uF 16V E
117	100pF C	140	220uF 25V E	162	15pF C
119	33uF 10V E	141	220uF 25V E	163	22pF C
120	1000pF ST	142	220uF 25V E	164	330pF ST C
121	1uF 50V E	143	0.033uF P	165	0.02uF C
122	0.33uF 35V ET	144	4700pF C	166	0.04uF C
123	0.47uF 50V E	145	0.04uF C	167	10pF C
124	0.33uF 35V E	146	4700pF C	168	0.04uF C
				169	1000uF E
				170	0.01uF C

Q101	2SC1674	Q106	2SC1222	Q110	2SD235
102	HA1137	107	2SA640	111	2SC1674
104	2SC1674	108	2SC1222	112	2SC372
105	LA3350	109	2SA640	113	2SC1674

D101	1S2473	D106	1K188	D111	1K188
102	WZ140	108	VD1221	112	VD1121
104	1N4002	109	1S2473	301	1S2473
105	1K188	110	1K188	302	1K188

[PEAK INDICATOR CIRCUIT]

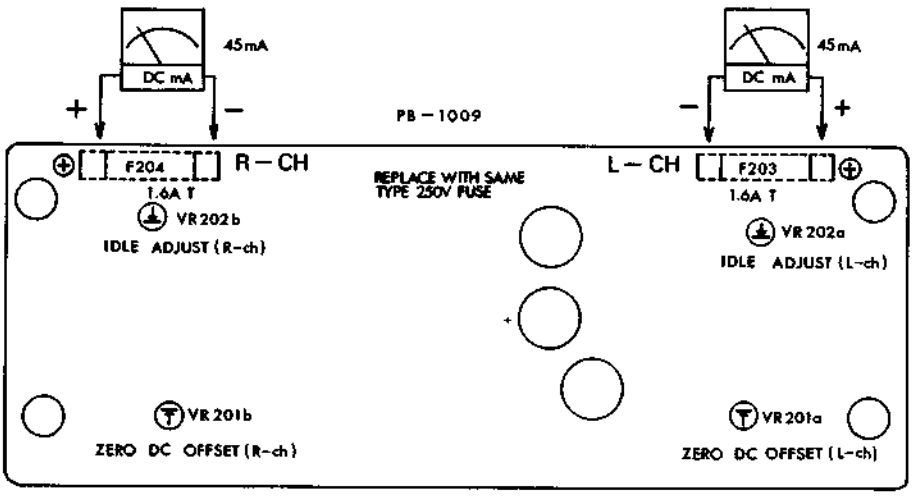
The output signal passed through the "Peak Indicator Sensitivity Selector Switch" meets the Peak Detection circuit composed of Q501, Q502, D506 and C506, whose detected DC signal is then converted into low-impedance by current booster Q503 and Q504.

Of course different threshold level is arranged for each LED driver Q505 - Q510 to make them light up in accordance with the signal level.

[A.F.C.C.--- Automatic Filter Control Circuit]

At the time of AM reception, if the higher order harmonics caused by cliping of power amp are fed back to the AM antenna, the operation will be unstable. Therefore the harmonics passed through the high pass filter Q601 are detected by D601, which controls the electronic high frequency attenuator Q602 and C602 connected to the output of AM detector. Thus unstable factors such as oscillation are eliminated.

IDLE ADJUST & ZERO DC OFFSET



1. Idle Adjust

VR202a (L-ch) and VR202b (R-ch) on PB1009 are semifixed potentiometer for quiescent current adjustment of the power transistors.

First, remove both fuses of F203 (L-ch) and F204 (R-ch), and then insert a DC ammeter between the fuse grips. (⊕ for the edge-side grip)

After one minute of POWER-ON, adjust VR202a and VR202b respectively to have 45mA reading on the meter.

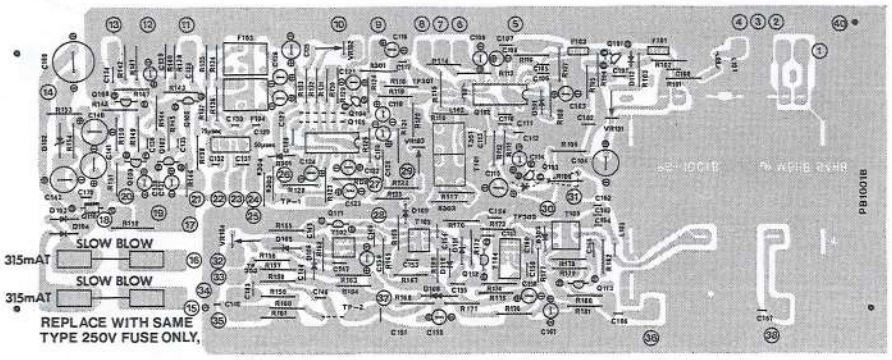
2. Zero DC Offset

VR201a (L-ch) and VR201b (R-ch) on PB1009 are semifixed potentiometers for the Zero DC Offset adjustment of the power amplifier section. Connect a DC milivolt meter to the speaker terminals and adjust VR201a and VR201b respectively. The DC offset voltage should be within $\pm$50mV.

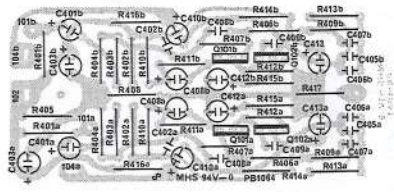
STEP	SIGNAL SOURCE CONNECTED TO	SET SIGNAL TO	SET RADIO DIAL TO	OUTPUT INDICATOR CONNECTED TO	ADJUST	ADJUST FOR
1	Set selector switch to "AM" and the mains power switch to "OFF".					
2	Press Power switch for "ON".					
3				DCVTVM PB1001 point 19	check	13 - 14 DCVTVM reading
4	Output of sweep generator to PB1001B 36 and ground	±40KHz sweep cnetred at 455KHz generator output level 40dB - 50dB	Quiet point on band near 1600KHz	Oscilloscope PB1001B terminal TP-2	T104 core	Maximum symmetrical response.
5	Standard radiating loop antenna placed near AM built-in antenna	600KHz at 400Hz, 30% modulation Field strength 50dB/m -80dB/m	600KHz	Oscilloscope ACVTVM output terminal	T105 core	Dial pointer to be tuned at 600KHz.
6					Bar antenna coil L401	Maximum ACVTVM reading - Slide coil bobbin
7		1400KHz at 400Hz, 30% modulation Field strength 50dB/m - 80dB/m	1400KHz		TC305	Dial pointer to be tuned at 1400KHz
8					TC304	Maximum ACVTVM reading
9	Repeat steps 5 - 8 as necessary to obtain maximum sensitivity and exact tuning point on dial scale.					
10	Fix by adhesive agent the core and bobbin aligned at step 5.					
11	Standard radiating loop antenna placed near AM built-in antenna	1000KHz at 400Hz, 30% modulation Field strength 126dB/m	1000KHz		VR104	Set pointer of signal strength meter to the right hand dot mark.
12		600KHz at 400Hz, 30% modulation	600KHz	Oscilloscope ACVTVM Distortion Meter output terminal		IHF maximum usable sensitivity which is equivalent electric field strength at the loopstick antenna adjusted by at attenuator of AMSG so that noise and distortion can be -20dB of total output.
13		1400KHz at 400Hz, 30% modulation	1400KHz			
14	Set the function at the "FM Auto" position and the muting switch at "OFF".					
15	Connect 20 and 21 on PB1001B.					
16	First, set the VR101 at counter-clockwise position.					

STEP	Signal Source Connected to	Set Signal to	Set Radio Dial to	Output Indicator Connected to	Adjust	Adjust for
17	FM signal generator Across FM antenna terminals (300-ohm) through matching network.	Reduce the output level to zero. (interstation receiving condition)	Quiet point on band near 98MHz		T301	Center indication of the tuning meter.
18		98MHz at 400Hz, 100% modulation Output level 1mV	Correct reception of 98MHz signals of FMSG at the center of tuning meter	Oscilloscope Distortion Meter ACVTVM output terminals	T101	Minimum distortion.
19	Repeat steps 17, 18 so as to get distortion of less than 0.1 - 0.2%.					
20	FM signal generator Across FM antenna terminals through 300-ohm matching network	108MHz at 400Hz, 100% modulation, generator output level 1.5 - 2uV	108MHz	Oscilloscope Distortion Meter ACVTVM output terminals	TC301 TC302	Maximum output level (Hands Off ; TC303)
21		98MHz at 400Hz, 100% modulation, generator output level 1.5 - 2uV	98MHz		L305	Maximum output level
22	Put the muting switch to "ON".					
23	FM signal generator Across FM antenna terminals through 300-ohm matching network.	98MHz at 400Hz, 100% modulation generator output level 2.2uV	98MHz	Oscilloscope ACVTVM output terminals	VR101	Fix VR101 at the point where output audio drops by 1dB.
24	Repeat steps 17, 18 and check that it gets distortion of less than 0.1 - 0.2%.					
25	Remove wiring made at step 15.					
26	FM signal generator Across AM antenna terminals through 300-ohm matching network.	98MHz no modulation generator output level 1mV	98MHz	Frequency Counter PB1001B, TP-1	VR103	Adjust the frequency of P.L.L. VCO at 19KHz.
27		98MHz at 19KHz, 10% (Lch) 400Hz 90% 98MHz at	98MHz	15KHz L.P.F. ACVTVM output terminal	VR102	Rch output level to minimum. Lch output level to minimum.

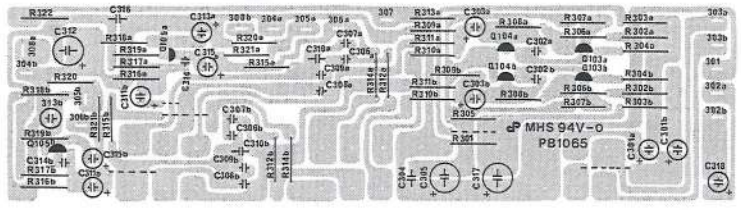
PB-1001



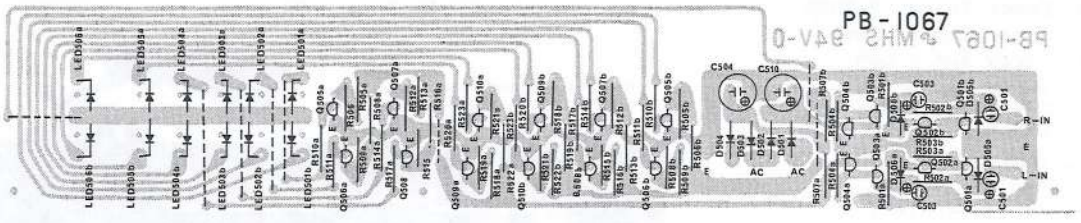
PB-1064



PB-1065



PB-1067



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