

SOLID STATE INTEGRATED AMPLIFIER



# LUXMAN 31

SERVICE MANUAL

MODEL: L-31 CIRCUIT DESCRIPTION

[Power Supply]

Power supply to main amp: The power supply consists of two parts designed for supply of power to the main amplifier and the pre-amplifier respectively. For the main amplifier driven by a high current load, silicon diode D205 - D208 (Hi-Fi special) are used, and supply voltage values are +35V and -35V.

Power supply to other than main amp: Power sources other than for the main amplifier are obtainable by D203 (1N4003) with the half wave rectification circuit and ripple filter. Supply voltage values at each section are; equalizer stage -37V, tone control stages -27V and intermediate stages -24.5V.

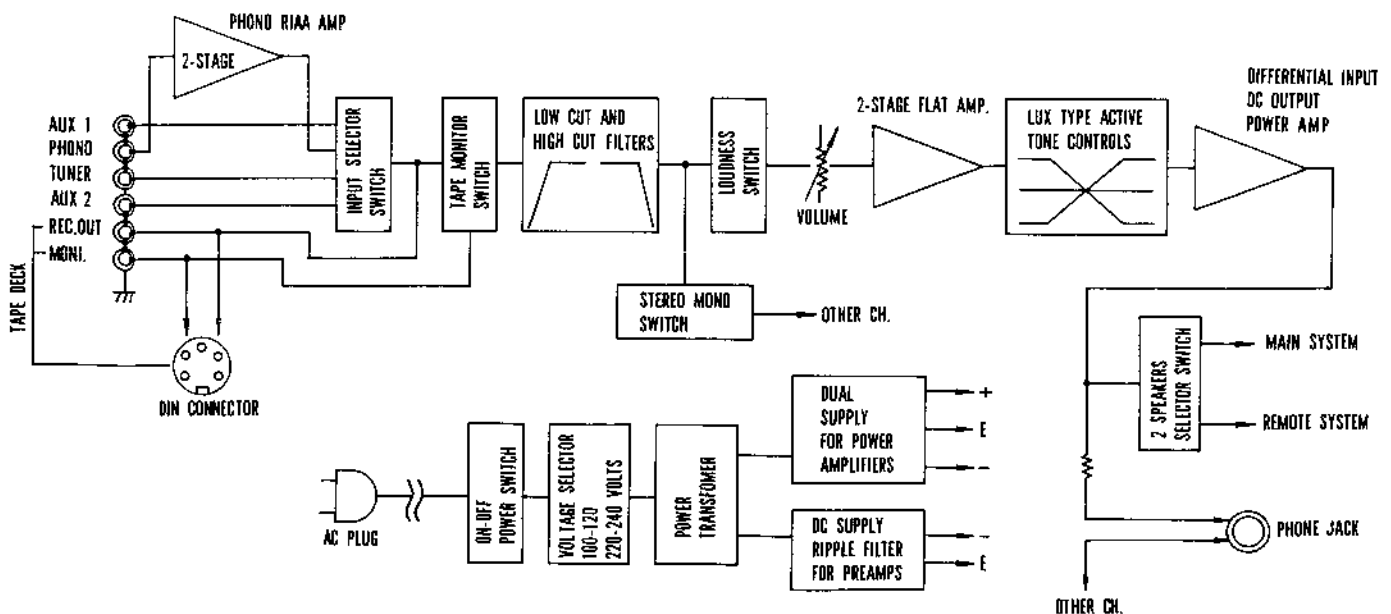
[Pre Amplifier]

The pre-amplifier consists of an equalizer, an 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-1, -2, and TUNER terminals bypass the equalizer and are fed directly to the later stages of this amplifier.

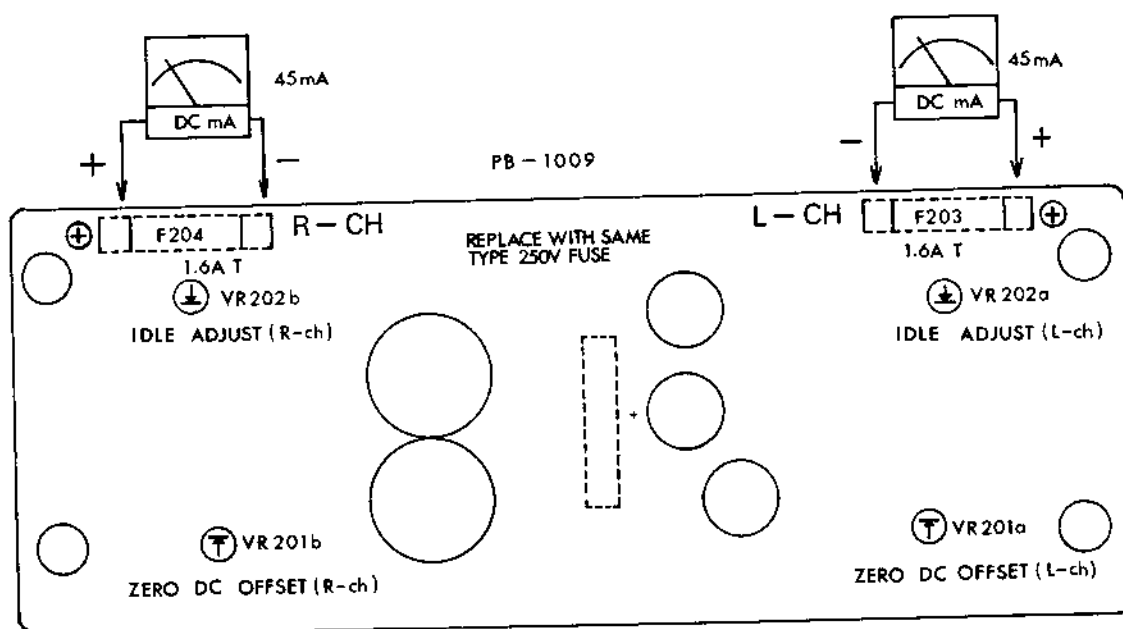
Controls arranged after the equalizer stage are: REC. OUT CONNECTOR, TAPE-MONITOR SWITCH, LOW-CUT FILTER, HIGH-CUT FILTER, MODE SELECTOR, VOLUME CONTROL, and LOUDNESS SWITCH. The intermediate amplifier consisting of Q103 Q104 is a flat amplifier adopting 2-stage Negative Feedback circuit which is designed 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 board PB1008.

[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 circuit 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.



## IDLE ADJUST & ZERO DC OFFSET



### 1. Idle Adjust

VR 202a (L-ch) and VR202b (R-ch) on PB1009 are semifixed potentiometer for quiescent current adjustment of the power transistors.

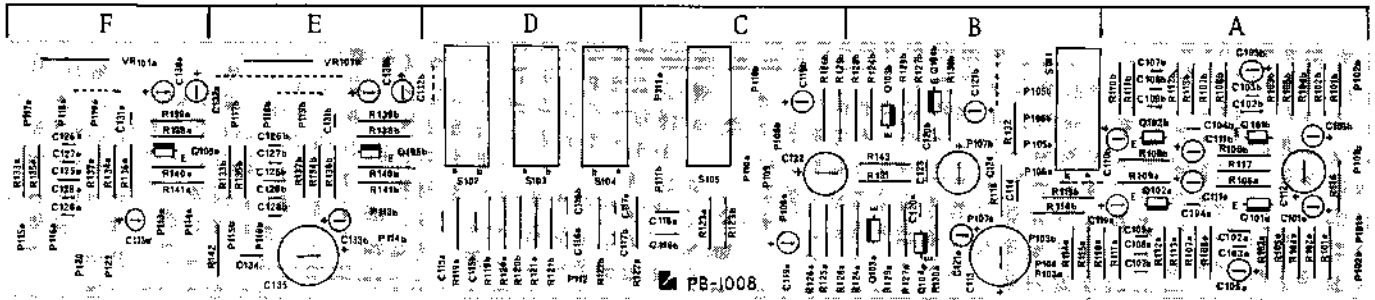
First, remove both fuses of F203 (L-ch) and F204 (R-ch), and then insert a DC ammeter between the fuse grips. (⊕ for the edge-side grip)

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

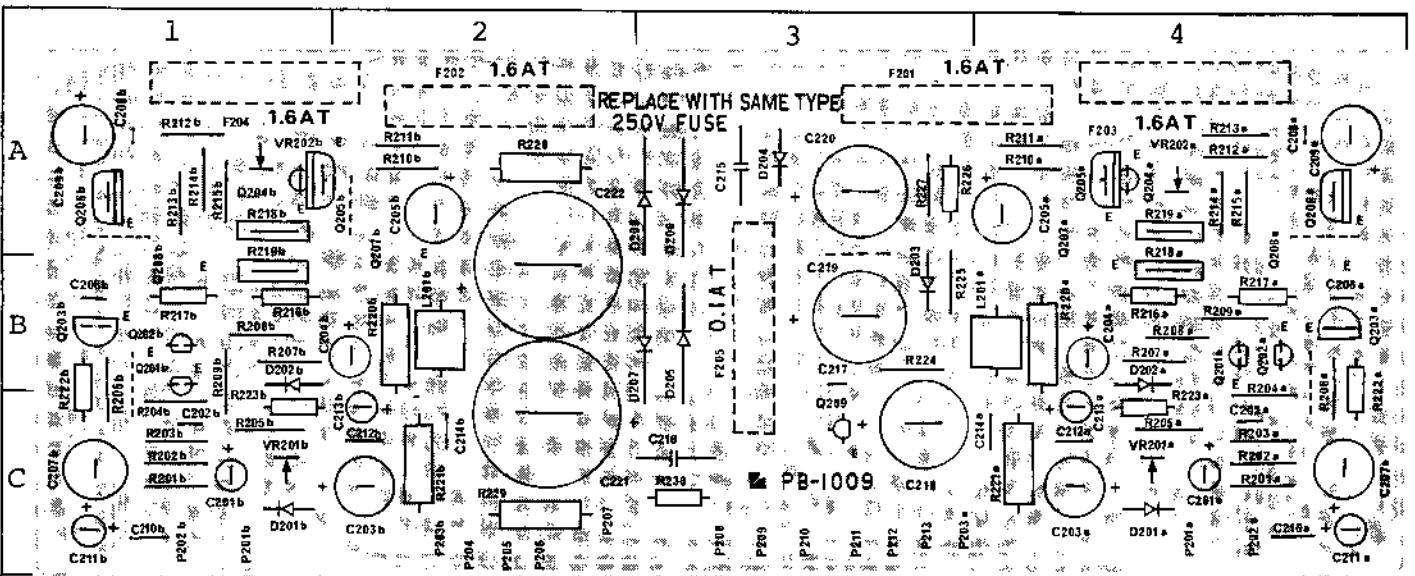
### 2. Zero DC Offset

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 millivolt meter to the speaker terminals and adjust VR201a and VR201b respectively. The DC offset voltage should be within  $\pm 50\text{mV}$ .

PB-1008



PB-1009



Replacement Parts List

PB-1008 : Resistors: 1/4W,  $\pm 5\%$  unless otherwise noted. L - for Low Noise type.

SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION	SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION
R101ab	RD0021	56k	A	R128ab	RD0043	1k	C
102ab	RD0039	2.2k	A	129ab	RD0035	4.7k	B
103ab	RD0040	1.8k	A	130ab	RD0011	330k	B
104ab	RD0077	1M L	A	131	RD0022	47k	B
105ab	RD0090	470k L	A	132	RD0037	3.3k	B
106ab	RD0084	100k L	A	133a	RD0027	18k	F
107ab	RD0172	820 L	A	L33b	RD0027	18k	E
108ab	RD0085	47k L	A	134a	RD0027	18k	F
109ab	RD0042	1.2k	A	134b	RD0027	18k	E
110ab	RD0032	8.2k	A	135a	RD0041	1.5k	F
111ab	RD0078	820k L	A	135b	RD0041	1.5k	E
112ab	RD0086	39k L	A	136a	RD0041	1.5k	F
113ab	RD0048	470	A	136b	RD0041	1.5k	E
114ab	RD0048	470	B	137a	RD0039	2.2k	F
115ab	RD0011	330k	B	137b	RD0039	2.2k	E
116	RD0028	15k	A	138a	RD0010	390k	F
117	RD0023	39k	A	138b	RD0010	390k	E
118	RD0046	680	B	139a	RD0022	47k	F
119ab	RD0004	1M	D	139b	RD0022	47k	E
120ab	RD0033	6.8k	D	140a	RD0034	5.6k	F
121ab	RD0004	1M	D	140b	RD0034	5.6k	E
122ab	RD0025	27k	D	141a	RD0043	1k	F
123ab	RD0029	12k	C	141b	RD0043	1k	E
124ab	RD0038	2.7k	B	142	RD0037	3.3k	E
125ab	RD0004	1M	C	143	RD0024	33k	B
126ab	RD0009	470k	C	(144ab	RD0004	1M	back)
127ab	RD0027	18k	B				

PB-1008 Capacitors : P - polyester film, C - ceramic, E - electrolytic, T - tantalum  
L.R. - low leakage type

SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION	SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION
C101ab	CE0173	3.3uF 25V E LR	A	C125a	CQ0012	0.027uF50VP $\pm 10\%$	F
102ab	CC0008	150pF 80V C	A	125b	CQ0012	0.027uF50VP "	E
103ab	CC0005	33pF 50V C	A	126a	CQ0026	0.001uF50VP "	F
104ab	CC0003	4.7pF 50V C	A	126b	CQ0026	0.001uF50VP "	E
105ab	CE2030	10uF 16V E	A	127a	CQ0026	0.001uF50VP "	F
107ab	CQ0101	2000pF35V P $\pm 5\%$	A	127b	CQ0026	0.001uF50VP "	E
109ab	CQ0122	6800pF50V P "	A	128a	CQ0024	1500pF 50VP "	F
110ab	CS0012	0.47uF50V T	A	128b	CQ0024	1500pF 50VP "	E
111ab	CE0068	47uF 10V E	A	129a	CQ0024	1500pF 50VP "	F
112	CE0079	220uF 16V E	A	129b	CQ0024	1500pF 50VP "	E
113	CE0103	100uF 50V E	B	130a	CE0173	3.3uF 25VE L.R.	F
114	CK0145	0.022uF 50VC $\pm 10\%$	B	130b	CE0173	3.3uF 25VE L.R.	E
115ab	CQ0011	0.033uF50VP "	D	131a	CC0033	10pF 50VC	F
116ab	CQ0020	3900pF50V P "	D	131b	CC0033	10pF 50VC	E
117ab	CC0011	470pF 50V P	D	132a	CE0068	47uF 10VE	F
118ab	CQ0011	0.033uF50VP $\pm 10\%$	C	132b	CE0068	47uF 10VE	E
119ab	CE0183	1uF 50V E LR	C	133a	CE0173	3.3uF 25VE L.R.	F
120ab	CC0033	10pF 50V C	B	133b	CE0173	3.3uF 25VE L.R.	E
121ab	CE0173	3.3uF 25V E LR	B	134	CK0145	0.022uF50VC $\pm 10\%$	E
122	CE0078	100uF 16V E	C	135	CE0096	220uF 35VE	E
123	CK0145	0.022uF50VC $\pm 10\%$	B				
124	CE0095	100uF 35V E	B				

PB-1008 (Variable Resistors)

SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION
VR101a	RV0093	100K-B	F
101b	RV0093	100k-B	E

PB-1008 (Transistors)

SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION
Q101ab	TR0125	2SA836E	A
102ab	TR0025	2SC1345E	A
103ab	TR0125	2SA836E	B
104ab	TR0025	2SC1345E	B
105a	TR0125	2SA836E	F
105b	TR0125	2SA836E	E

PB-1009 (Resistors: 1/4W, <sup>+</sup>5% unless otherwise noted, F.P. - Flame Proof)

SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION	SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION
R201a	RD0011	330k	4C	R215a	RD0047	560	4A
201b	RD0011	330k	1C	215b	RD0047	560	1A
202a	RD0037	3.3k	4C	216a	RS0074	100 1/2WFP	4B
202b	RD0037	3.3k	1C	216b	RS0074	100 "	1B
203a	RD0024	33k	4C	217a	RD0074	100 "	4B
203b	RD0024	33k	1C	217b	RD0074	100 "	1B
204a	RD0043	1k	4B	218a	RG0009	0.33 3W <sup>+</sup> 10%	4B
204b	RD0043	1k	1C	218b	RG0009	0.33 3W "	1A
205a	RD0034	5.6k	4C	219a	RG0009	0.33 3W "	4A
205b	RD0034	5.6k	1C	219b	RG0009	0.33 3W	1A
206a	RD0042	1.2k	4B	220a	RS0013	4.7 1W	4B
206b	RD0042	1.2k	1B	220b	RS0013	4.7 1W	2B
207a	RD0041	1.5k	4B	221a	RS0058	15 1W	4C
207b	RD0041	1.5k	1B	221b	RS0058	15 1W	1C
208a	RD0024	33k	4B	222a	RS0074	100 1/2WFP	4B
208b	RD0024	33k	1B	222b	RS0074	100 1/2WFP	1B
209a	RD0009	470k	4B	223a	RS0002	1.5k1/2W	4C
209b	RD0009	470k	1B	223b	RS0002	1.5k1/2W	1C
210a	RD0040	1.8k	4A	224	RD0043	1k	3B
210b	RD0040	1.8k	2A	225	RD0030	10k	3B
211a	RD0036	3.9k	4A	226	RS0074	100 1/2WFP	3A
211b	RD0036	3.9k	2A	227	RD0068	12	3A
212a	RD0061	47	4A	228	RS0022	4.7k 1W	2A
212b	RD0061	47	1A	229	RS0072	4.7k 1W	2C
213a	RD0061	47	4A	230	RS0051	3.3k1/2W	3C
213b	RD0061	47	1A				
214a	RD0040	1.8k	4A				
214b	RD0040	1.8k	1A				

PB-1009 (Capacitors: C - ceramic, E - electrolytic, L.R. - low leakage type)

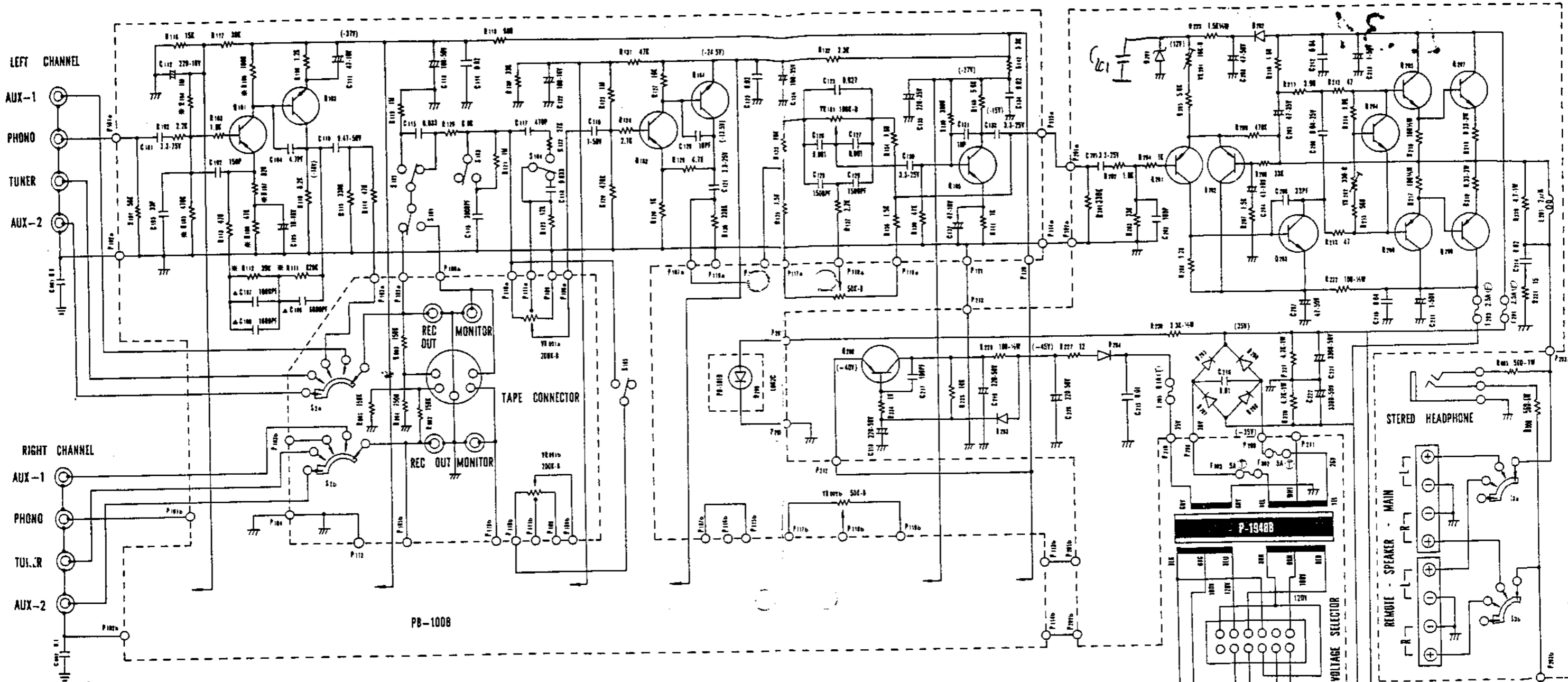
SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION	SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION
C201a	CE0173	3.3uF 25V E LR	4C	C211a	CE0098	1uF 50V E	4C
201b	CE0173	3.3uF 25V E LR	1C	211b	CE0098	1uF 50V E	1C
202a	CC0010	330pF 50V C	4C	212a	CK0146	0.04uF50V C	4C
202b	CC0010	330pF 50V C	1C	212b	CK0146	0.04uF50V C	2C
203a	CE0102	47uF 50V E	4C	213a	CE0098	1uF 50V E	4C
203b	CE0102	47uF 50V E	2C	213b	CE0098	1uF 50V E	2C
204a	CE0068	47uF 10V E	4B	214a	CK0145	0.022uF50VC	4C
204b	CE0068	47uF 10V E	1B	214b	CK0145	0.022uF50VC	2C
205a	CE0094	47uF 35V E	4A	215	CU0012	0.01uF1.4kVC	3A
205b	CE0094	47uF 35V E	2A	216	CU0012	0.01uF1.4kVC	3C
206a	CC0005	33pF 50V C	4B	217	CC0007	100pF 50VC	3B
206b	CC0005	33pF 50V C	1B	218	CE0146	220uF 50V E	3C
207a	CE0102	47uF 50V E	4C	219	CE0146	220uF 50V E	3B
207b	CE0102	47uF 50V E	1C	220	CE0146	220uF 50V E	3A
208a	CK0157	0.04uF 25V C	4A	221	CE0157	3300uF 50VE	2C
208b	CK0157	0.04uF 25V C	1A	222	CE0157	3300uF 50VE	2A
210a	CK0146	0.04uF 50V C	4C				
210b	CK0146	0.04uF 50V C	1C				

PB-1009 (Transistors)

SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION	SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION
Q201a	TR0151	2SA750(1)DA	4B	Q205b	TR0126	2SC1626Y	2A
201b	TR0151	2SA750(1)DA	1B	206a	TR0122	2SA816Y	4A
202a	TR0151	2SA750(1)DA	4B	206b	TR0122	2SA816Y	1A
202b	TR0151	2SA750(1)DA	1B	207a	TR0119	2SD371 0	4A
203a	TR0123	2SC1951-2	4B	207b	TR0119	2SD371 0	2A
203b	TR0123	2SC1951-2	1B	208a	TR0120	2SB531 0	4A
204a	TR0029	2SC945P	4A	208b	TR0120	2SB531 0	1B
204b	TR0029	2SC945P	1A	209	TR0125	2SA836E	3C
205a	TR0121	2SC1626Y	4A				

PB-1009 (Diodes)

SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION	SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION
D201a	TD0027	WZ120	4C	D204	TD0003	1N4003	3A
201b	TD0027	WZ120	1C	205	TD0106	HiFi special	3A
202a	TD0002	1N4002	4B	206	TD0106	HiFi special	3A
202b	TD0002	1N4002	1B	207	TD0106	HiFi special	3B
203	TD0002	1N4002	3B	208	TD0106	HiFi special	3A

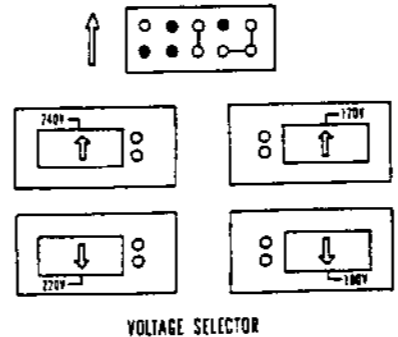


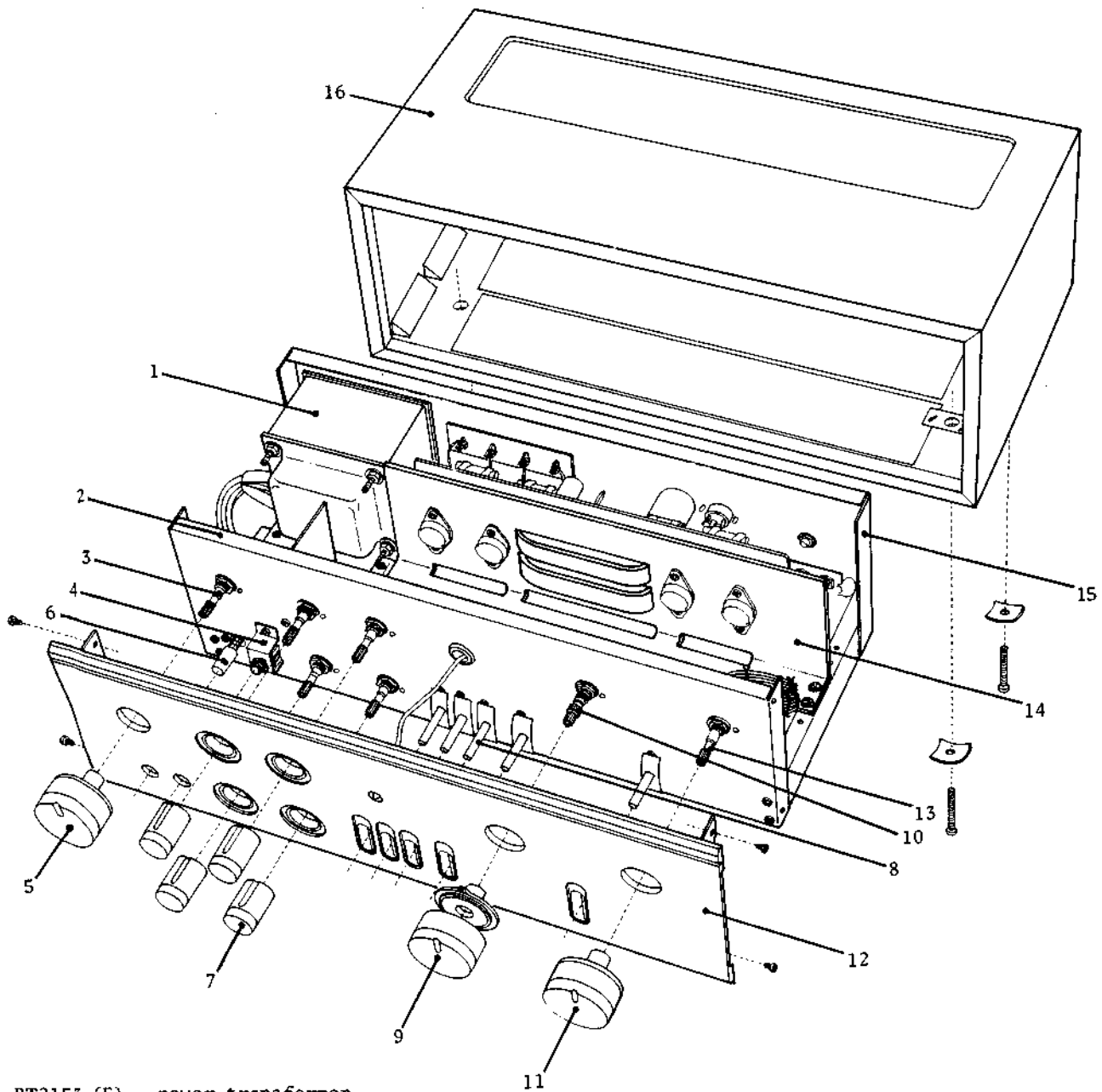
VR 101	.....	TONE CONT-BASS	Q101, Q103, Q105, Q208	.....	2SA836E
VR 002	.....	TONE CONT-TREBLE	Q102, Q104	.....	2SC1345E
VR 001	<i>RVC 121</i>	MASTER VOLUME	Q201, Q202	.....	2SA763WL
VR 201	.....	DC BALANCE	Q203	.....	2SC1951
VR 202	.....	BIAS ADJ.	Q204	.....	2SC945
S1	.....	POWER SW	Q205	.....	2SC1626
S2	.....	FUNCTION	Q206	.....	2SA816
S3	.....	SPEAKER SW	Q207	.....	2SD 371
S101	.....	MONITOR	Q208	.....	2SB 537
S102	.....	LOW CUT FILTER			
S103	.....	HIGH CUT FILTER			
S104	.....	LOUDNESS			
S105	.....	MODE SW			

D201	.....	WZ-120
D202, D203	.....	1N4002
D204	.....	1N4003
D205, D206	.....	HIFI-SPEC AL
D207, D208	.....	HIFI-SPEC AL

\* LOW NOISE "R",  $\pm 5\%$  CLASS "C"

1. UNLESS OTHERWISE SPECIFIED, ALL RESISTOR ARE IN OHM  $\frac{1}{4}$ WATT, ALL CAPACITOR ARE IN MICRO-FARAD.
2. TRANSISTOR AND DIODES MAY BE REPLACED WITH ANY TYPE HAVING COMPARABLE RATINGS.
3. DUE TO CONTINUED IMPROVEMENTS LUX RESERVE THE RIGHT TO ALTER THE CIRCUIT OR SPECIFICATIONS.





- 1. PT2153 (E) power transformer  
PT2171 (U) " "  
PT2170 (S) " "
- 2. UB1017 sub panel
- 3. SR0053 speaker selector
- 4. AJ0005 headphone jack
- 5. WH1007 sp. selector knob
- 6. SP0027 input switch  
SP0063 " " (CSA)  
SP0090 " "
- 7. WH1009 tone cont. knob
- 8. WK1074 metal knob
- 9. WH1006 main volume knob
- 10. RV0121 main volume
- 11. WH1007 input selector knob
- 12. WA1085 front panel
- 13. SR0052 input selector
- 14. BE0025 heat sink
- 15. UC1059 back panel  
UC1068 " "
- 16. WB1045 wooden case

#### SPECIFICATIONS

<b>RMS Output Power:</b>	38W/38W (8Ω, both channels driven)	
<b>Total Harmonic Distortion:</b>	no more than 0.05% (8Ω 38W)	
<b>Rated I.M.:</b>	no more than 0.1% (8Ω 38W)	
<b>Power Bandwidth:</b>	10 ~ 50KHz (±3dB less than 0.1%)	
<b>Frequency Response:</b>	15 ~ 50KHz (±1dB)	
<b>Input Sensitivity:</b>	PHONO 2.6mV AUX 1 150mV	TUNER 150mV AUX 2 150mV
<b>Input Impedance:</b>	PHONO 60KΩ AUX 1, 2 more than 60KΩ	TUNER more than 60KΩ MONITOR more than 60KΩ
<b>S/N Ratio:</b>	PHONO more than 64dB AUX 1, 2 more than 83dB	TUNER more than 83dB MONITOR more than 83dB
<b>Residual Noise:</b>	-87dB	
<b>Tone Control:</b>	LUX type NF tone Control High Cut 7KHz - 6dB/oct.	Low Cut 70Hz - 6dB/oct.
<b>Damping Factor:</b>	more than 90 (8Ω)	
<b>Accessories:</b>	Tape Monitor Switch, Tone Control, Mode Selector Switch, Volume Control, Speaker Selector Switch, DIN Connector	
<b>Transistors &amp; Diodes:</b>	TRANSISTORS (27), DIODES (8) ZENER DIODES (2), LED (1)	
<b>Power Consumption:</b>	170W (8Ω, max. output, both channel driven)	150W (CSA, UL rated)
<b>Dimensions:</b>	440mm (17-3/8") W x 160mm (6-5/16") H x 225mm (8-7/8") D	
<b>Weight:</b>	Net 7Kgs (15.4 lbs.)	Gross 8Kgs (17.6 lbs.)