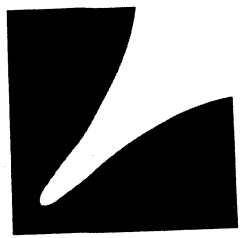




LUXM - 00181

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.

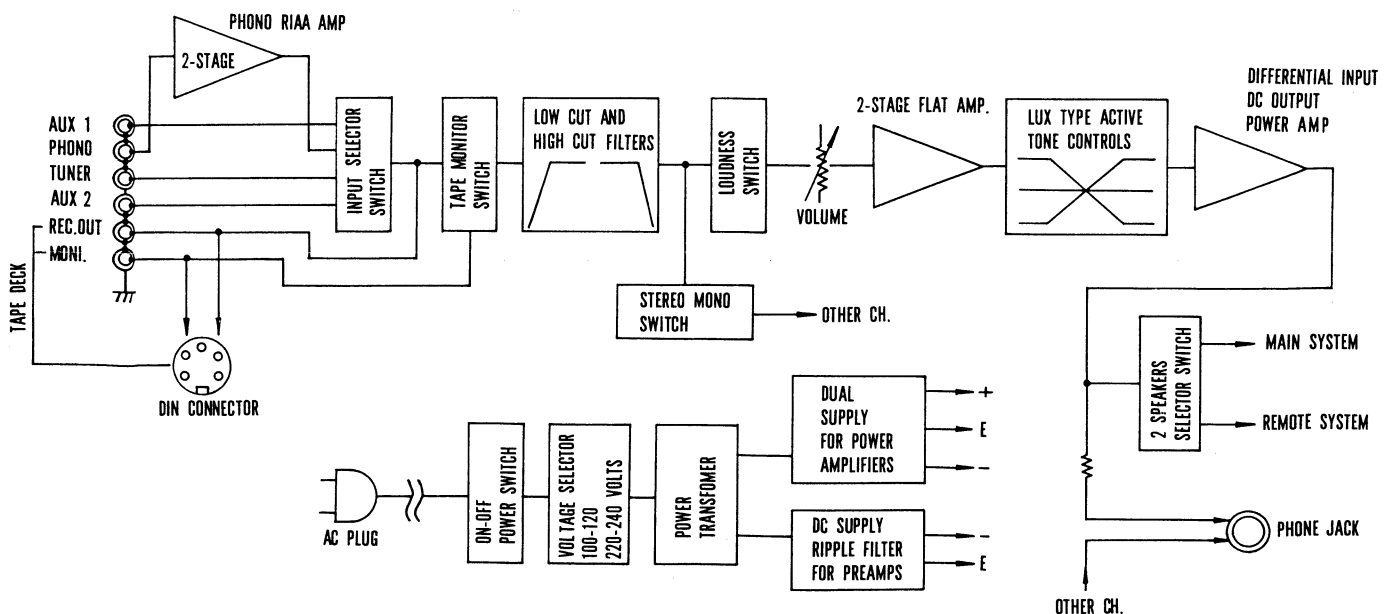
[Pre Amplifier]

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.

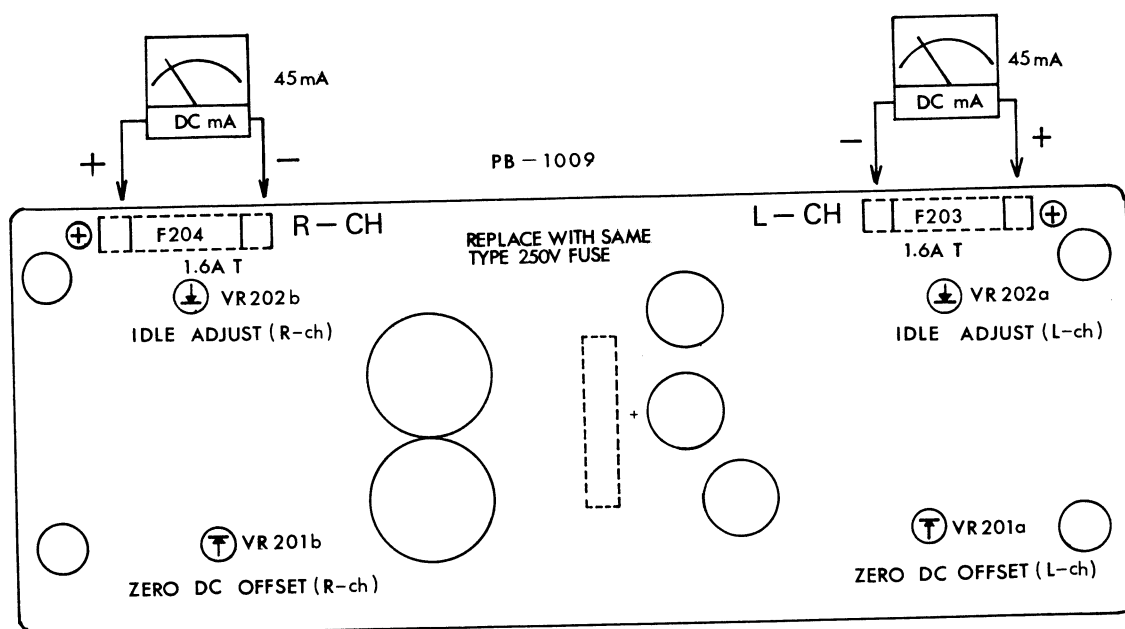
Controls arranged after the equalizer stage are: REC. OUT CONNECTOR, TAPE-MONITOR SWITCH, LOW-CUT FILTER, HIGH-CUT FILTER, MODE SELECTOR, VOLUME CONTROL, and LOUDNESS SWITCH. The intermediate amplifier consisting of Q103 Q104 is a flat amplifier adopting 2-stage Negative Feedback circuit which is designed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

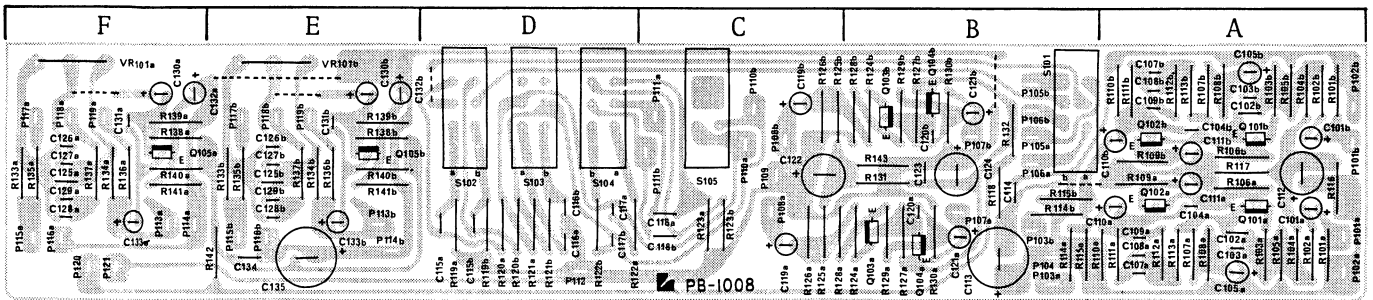
First, remove both fuses of F203 (L-ch) and F204 (R-ch), and then insert a DC ammeter between the fuse grips. (⊕ for the edge-side grip)

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

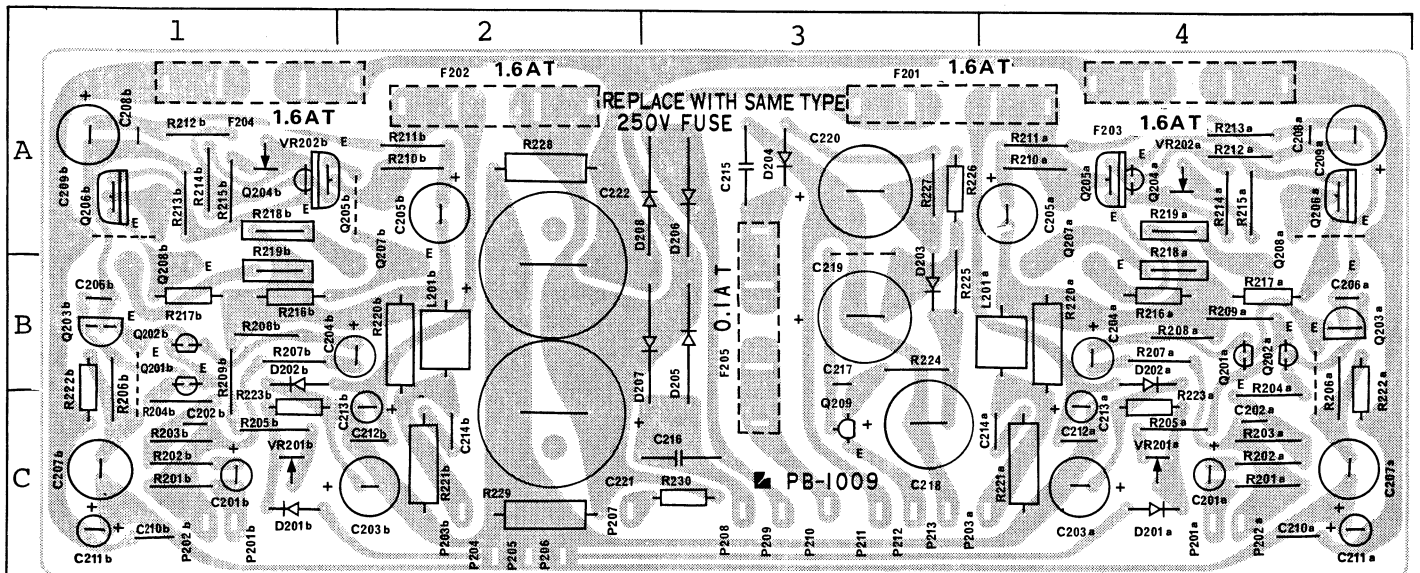
2. Zero DC Offset

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, [±]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 [±] 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)

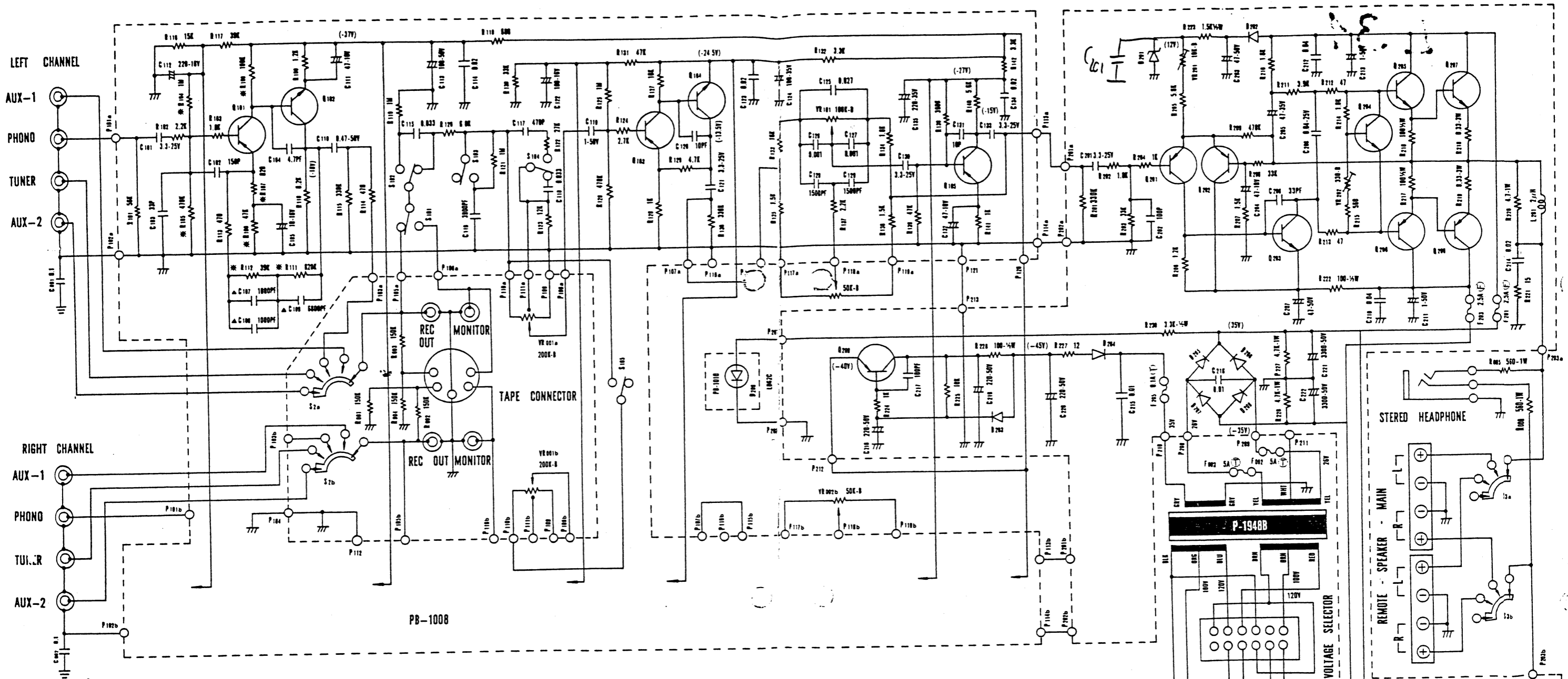
| SYMBOL NO. | STOCK NO. | DESCRIPTION | LOCATION | SYMBOL NO. | STOCK NO. | DESCRIPTION | LOCATION |
|------------|-----------|----------------|----------|------------|-----------|--------------|----------|
| C201a | CE0173 | 3.3uF 25V E LR | 4C | C211a | CE0098 | 1uF 50V E | 4C |
| 201b | CE0173 | 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 | 5A |
| 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 |

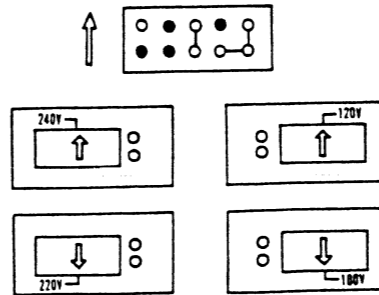


- VR 101 TONE CONT-BASS
- VR 002 TONE CONT-TREBLE
- VR 001 *R.V. 0.21* MASTER VOLUME
- VR 201 DC BALANCE
- VR 202 BIAS ADJ.
- S1 POWER SW
- S2 FUNCTION
- S3 SPEAKER SW
- S101 MONITOR
- S102 LOW CUT FILTER
- S103 HIGH CUT FILTER
- S104 LOUDNESS
- S105 MODE SW

- Q101, Q103, Q105, Q209 2SA836E
- Q102, Q104 2SC1345E
- Q201, Q202 2SA763WL
- Q203 2SC1951
- Q204 2SC945
- Q205 2SC1626
- Q206 2SA816
- Q207 2SD 371
- Q208 2SB 531

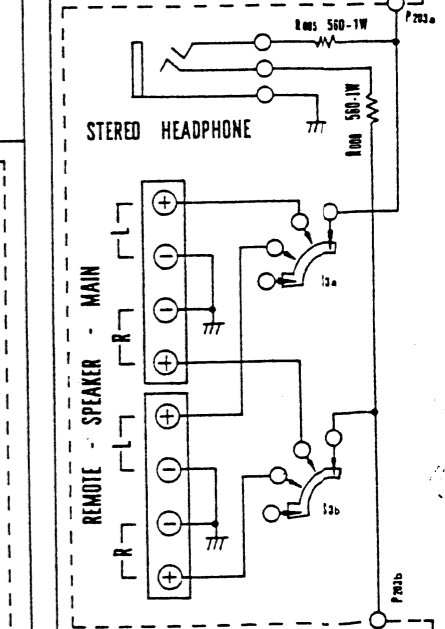
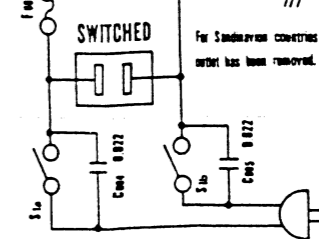
- D201 WZ-120
 - D202, D203 1N4002
 - D204 1N4003
 - D205, D208 } HI-FI-SPEC-AL
 - D207, D208 }
- * LOW NOISE "R", \pm 5% CLASS "C"

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.

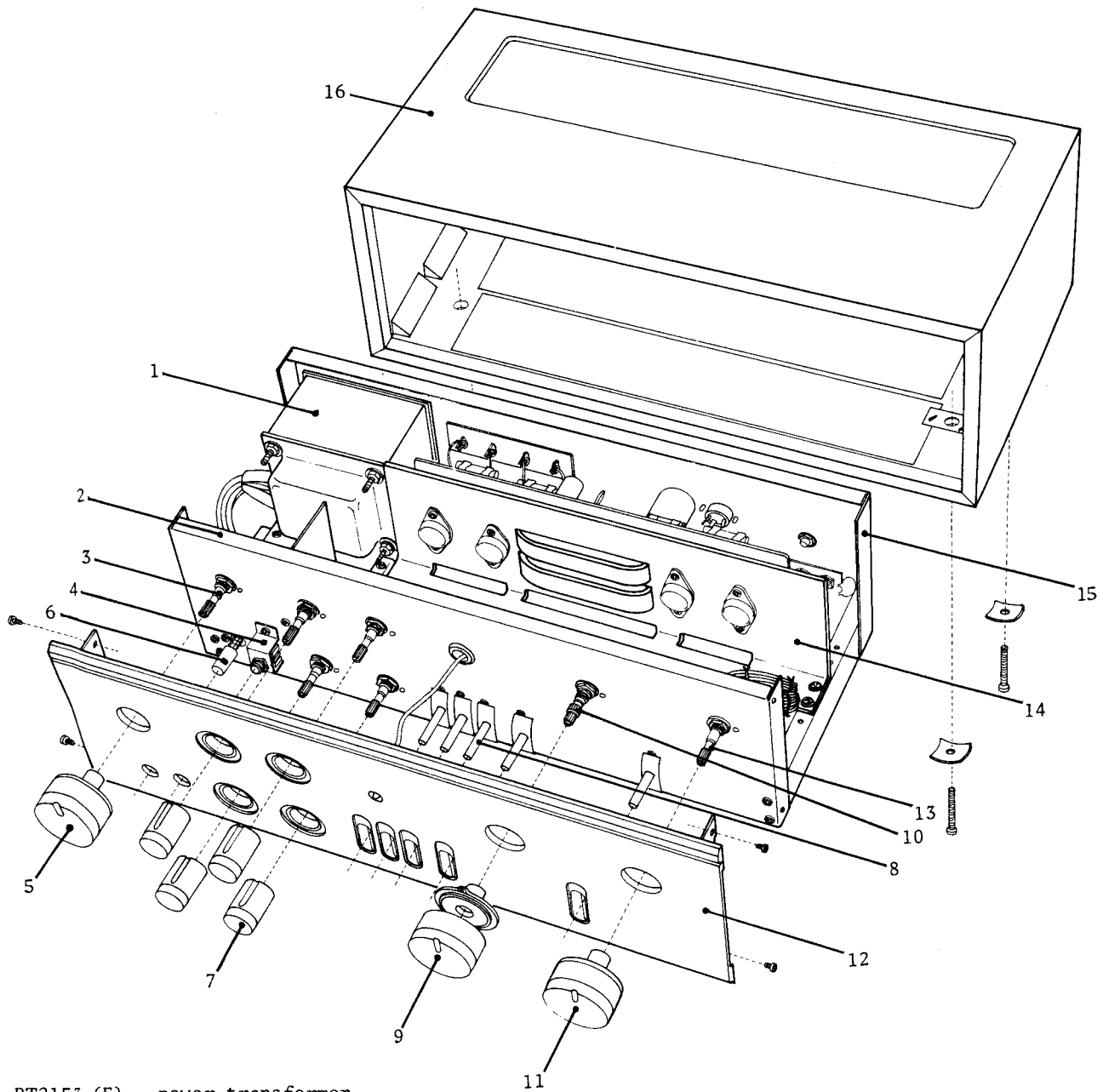


VOLTAGE SELECTOR

1.6A(200V/200V)
3.15A(100V/100V)



PB-1009



- | | | |
|-----|------------|---------------------|
| 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 | power 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

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