

# SERVICE MANUAL

MONITOR SERIES

# 3300

INTEGRATED AMPLIFIER

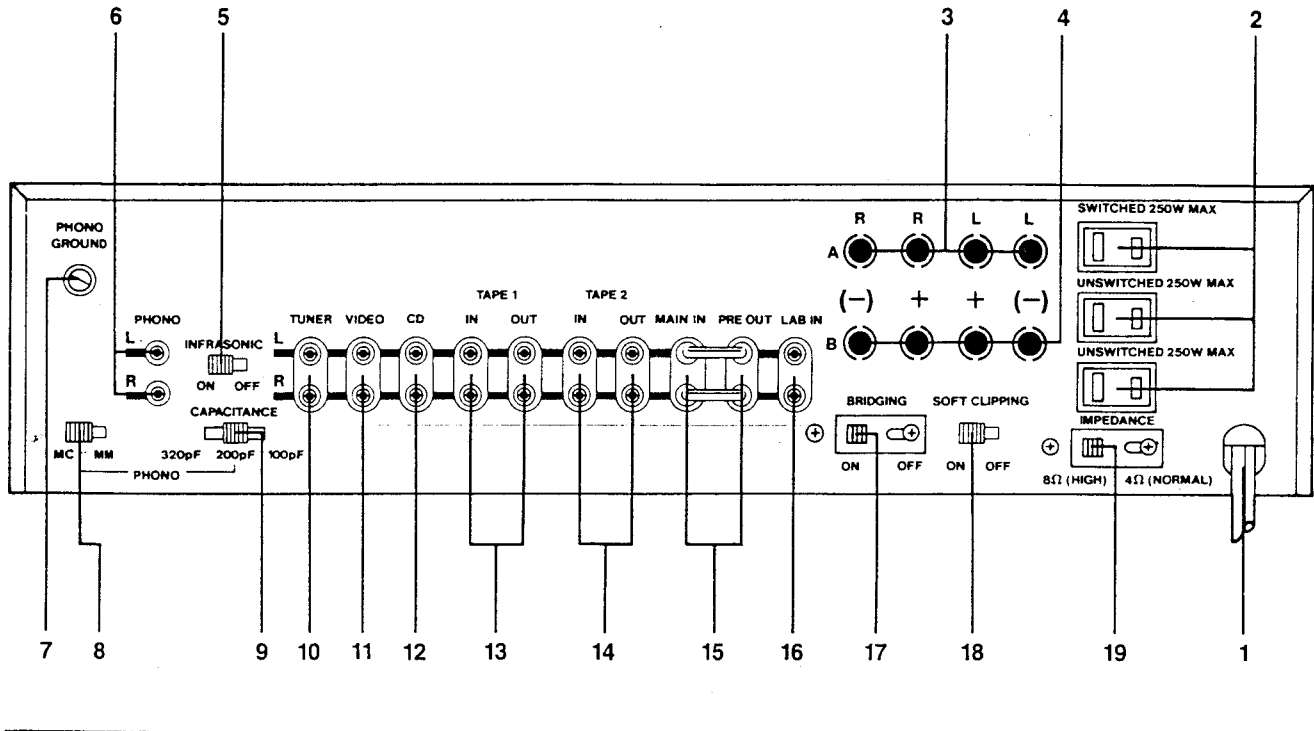
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-3300-

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**REAR PANEL**

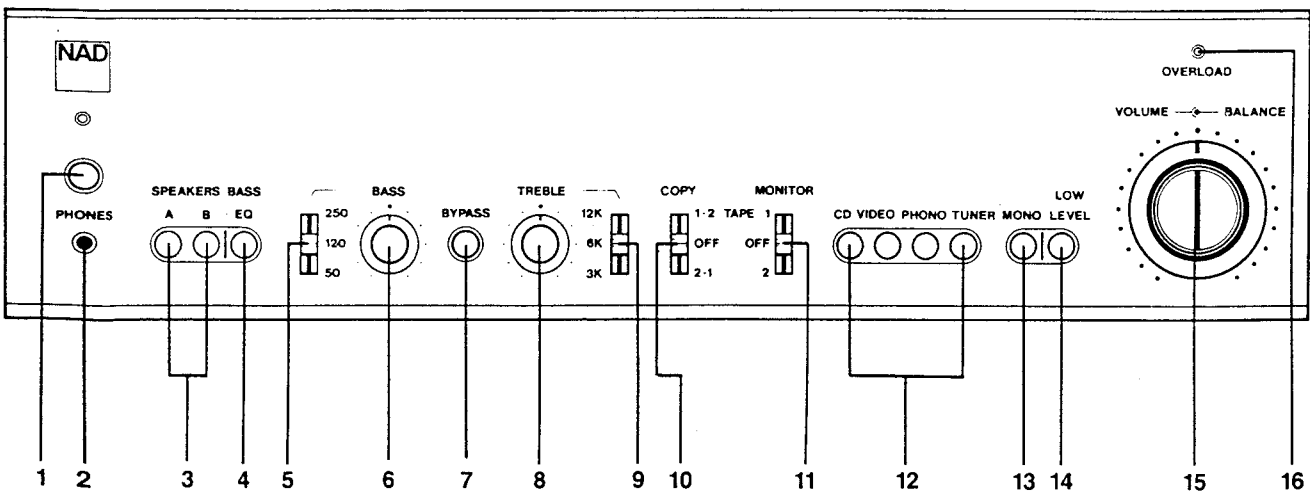
- |                                   |                                 |                          |
|-----------------------------------|---------------------------------|--------------------------|
| 1. AC Line Cord.                  | 8. MM/MC Selector.              | 15. Preamp Out, Main In. |
| 2. AC Outlets (not in U.K. model) | 9. Phono Capacitance (MM only). | 16. Lab Input.           |
| 3. Speakers A.                    | 10. Tuner Input.                | 17. Bridging.            |
| 4. Speakers B.                    | 11. Video Sound Input.          | 18. Soft Clipping.       |
| 5. Infrasonic Filter.             | 12. CD Input.                   | 19. Speaker Impedance.   |
| 6. Phono Input.                   | 13. Tape 1 Input/Output.        |                          |
| 7. Phono Ground.                  | 14. Tape 2 Input/Output.        |                          |

**CAUTION**  
RISK OF ELECTRIC SHOCK  
DO NOT OPEN  
CAUTION TO REDUCE  
THE RISK OF ELECTRIC  
SHOCK DO NOT REMOVE  
COVER (OR BACK).  
NO USER-SERVICEABLE  
PARTS INSIDE REFER  
SERVICING TO QUALIFIED  
SERVICE PERSONNEL



**FRONT PANEL**

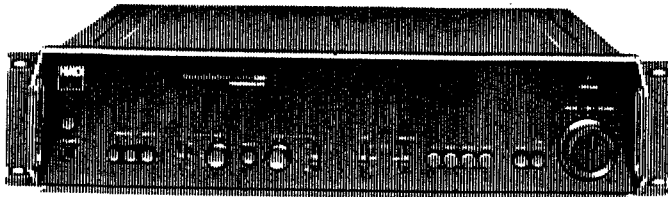
- |                      |                         |                         |
|----------------------|-------------------------|-------------------------|
| 1. Power.            | 7. Tone Control Bypass. | 13. Mono.               |
| 2. Phones.           | 8. Treble.              | 14. Low Level.          |
| 3. Speaker Selector. | 9. Treble Range.        | 15. Volume Balance.     |
| 4. Bass EQ.          | 10. Tape Copy.          | 16. Overload Indicator. |
| 5. Bass Range.       | 11. Tape Monitor.       |                         |
| 6. Bass.             | 12. Input Selector.     |                         |



## Specifications

### The 3300 Monitor Series Amplifier

Note: Specifications are measured in accordance with EIA Standard RS-490 (IHF A-202). Measurements referenced to 8 ohms are taken with the Speaker Impedance selector set to "8Ω (High)." Measurements for 4 and 2 ohms are taken with the impedance selector at "4Ω (Normal)."



#### Power Amplifier Section

|   |   |
|---|---|
| <b>CONTINUOUS AVERAGE POWER OUTPUT INTO 8 OHMS</b> (min. RMS power per channel into 8 ohms, 20Hz-20kHz, both channels driven, with no more than the rated distortion) | <b>60 W (17.8 dBW)</b>  |
| <b>Rated distortion (THD), 20Hz-20kHz</b>   | 0.03%   |
| <b>Clipping power at 8 ohms</b> (maximum continuous power per channel)  | 70W   |
| <b>IHF dynamic headroom at 8 ohms</b>   | +6 dB   |
| <b>IHF dynamic power</b> (maximum short-term power per channel)   | <b>8 ohms:</b> 250W<br><b>4 ohms:</b> 300W<br><b>2 ohms:</b> 400W |
| <b>Peak output current (amperes)</b>  | > 30A   |
| <b>Reactive load rating</b>   | +1.5 dB   |
| <b>Transient overload recovery time</b>   | <1 μsec   |
| <b>Slew rate</b>  | > 50<br>30V/μsec  |
| <b>Damping factor (ref. 8Ω, at 50 Hz)</b>   | > 100   |
| <b>Input impedance</b>  | 30 kΩ   |
| <b>Input sensitivity for rated power</b>  | 1 V   |
| <b>Input sensitivity for 1 watt out</b>   | 120 mV  |
| <b>Power amplifier gain</b>   | 28dB (25×)  |
| <b>THD (Total Harmonic Distortion, 20Hz-20kHz, from 250mW to rated output)</b>  | <0.03%  |
| <b>SMPTE I.M. (Intermodulation Distortion, 60Hz + 7kHz, 4:1, from 250mW to rated output)</b>  | <0.03%  |
| <b>IHF I.M. (CCIF IM Distortion, 19 + 20 kHz at rated output)</b>   | <0.03%  |

#### Preamplifier Section

##### Phono Input

|  |   |
|--|---|
| <b>Input impedance (R and C)</b>                           | <b>MM:</b> 47kΩ + 100/200/300 pF<br><b>MC:</b> 100Ω + 1000 pF |
| <b>Input sensitivity ref. 1 watt</b>                       | <b>MM:</b> 0.4 mV<br><b>MC:</b> 0.02 mV                       |
| <b>Input overload</b>                                      | <b>MM:</b> 18mV/170mV/1.5V<br>0.8mV/8mV/70mV                  |
| <b>THD (20Hz-20kHz) and IM Dist. at +30 dB level</b>       | <0.02%  |
| <b>RIAA response accuracy</b>                              | ± 0.3dB   |
| <b>S/N ratio, IHF A-weighted, with cartridge connected</b> | <b>MM:</b> 80 dB ref. 5 mV<br><b>MC:</b> 80 dB ref. 0.5 mV    |

##### Line Level Inputs (CD, Video, Tape)

|  |  |
|--|--|
| <b>Input impedance</b>                   | 180kΩ + 100pF                              |
| <b>Input sensitivity ref. 1 watt</b>     | 25 mV                                      |
| <b>Maximum input signal</b>              | 8V rms                                     |
| <b>Signal to noise ratio, A-weighted</b> | 100 dB ref. 1 W<br>118 dB ref. rated power |
| <b>Frequency response, 20Hz-20kHz</b>    | ± 0.5 dB                                   |
| <b>Crosstalk between channels</b>        | 60 dB at 1 kHz<br>50 dB at 20 kHz          |
| <b>Crosstalk between inputs</b>          | 70 dB at 1 kHz<br>60 dB at 20 kHz          |

##### Line-level outputs

|                                      |                             |
|--------------------------------------|-----------------------------|
| <b>Preamp output impedance</b>       | 800Ω                        |
| <b>Maximum output level</b>          | 10 V                        |
| <b>Tape output impedance</b>         | 1000Ω (buffered)            |
| <b>Tape output infrasonic filter</b> | -3dB at 15 Hz, 12 dB/octave |

##### Controls

|                                       |                                |
|---------------------------------------|--------------------------------|
| <b>Treble</b>                         | ± 10 dB at 3, 6, or 12 kHz     |
| <b>Bass</b>                           | ± 10 dB at 50, 100, or 250 Hz  |
| <b>Bass EQ</b>                        | +3 dB at 60 Hz, +6 dB at 32 Hz |
| <b>Infrasonic filter (switchable)</b> | -3 dB at 14 Hz, 18 dB/octave   |
| <b>Audio muting (low level)</b>       | -20 dB                         |

##### Physical Specifications

|  |  |
|--|--|
| <b>Dimensions (Width × Height × Depth)</b> | 43.2 cm. × 10.5 cm. × 38.1 cm.<br>17 in. × 4.12 in. × 15 in. |
| <b>Net Weight</b>                          | 10 kg/22 lb  |
| <b>Shipping Weight</b>                     | 11.3 kg/25 lb  |
| <b>Power Consumption</b>                   | 375W-110, 120, 220 or 240 VAC<br>(50/60Hz)                   |

NOTE: Specifications are those in effect at the time of printing. NAD reserves the right to change specifications or designs at any time without notice.

ALIGNMENT METHOD

AUDIO SECTION 3300

IMPORTANT

Speaker Impedance switch should be in 8 ohm position while adjusting center voltage and idling current.

INITIAL ADJUSTMENT (No load connected)

A. CENTER VOLTAGE

1. Connect DC millivoltmeter to L channel output terminals.
2. Turn on and adjust to  $0\text{ V} \pm 30\text{mV}$  with VR 5 (10Kohm). Connect DC millivoltmeter to R channel output terminals and adjust VR 6 to  $0\text{ V} \pm 30\text{mV}$ .

B. IDLING CURRENT

1. Connect DC millivoltmeter across R289 (0.22 ohm, TP1, TP2 output transistor s collector resistor) and adjust VR 7 for 6 - 7.2mV reading on meter. Repeat adjust with VR 8, connecting meter across R290(0.22 ohm, TP4, TP5)
2. Leave power on for minimum 30 minutes.

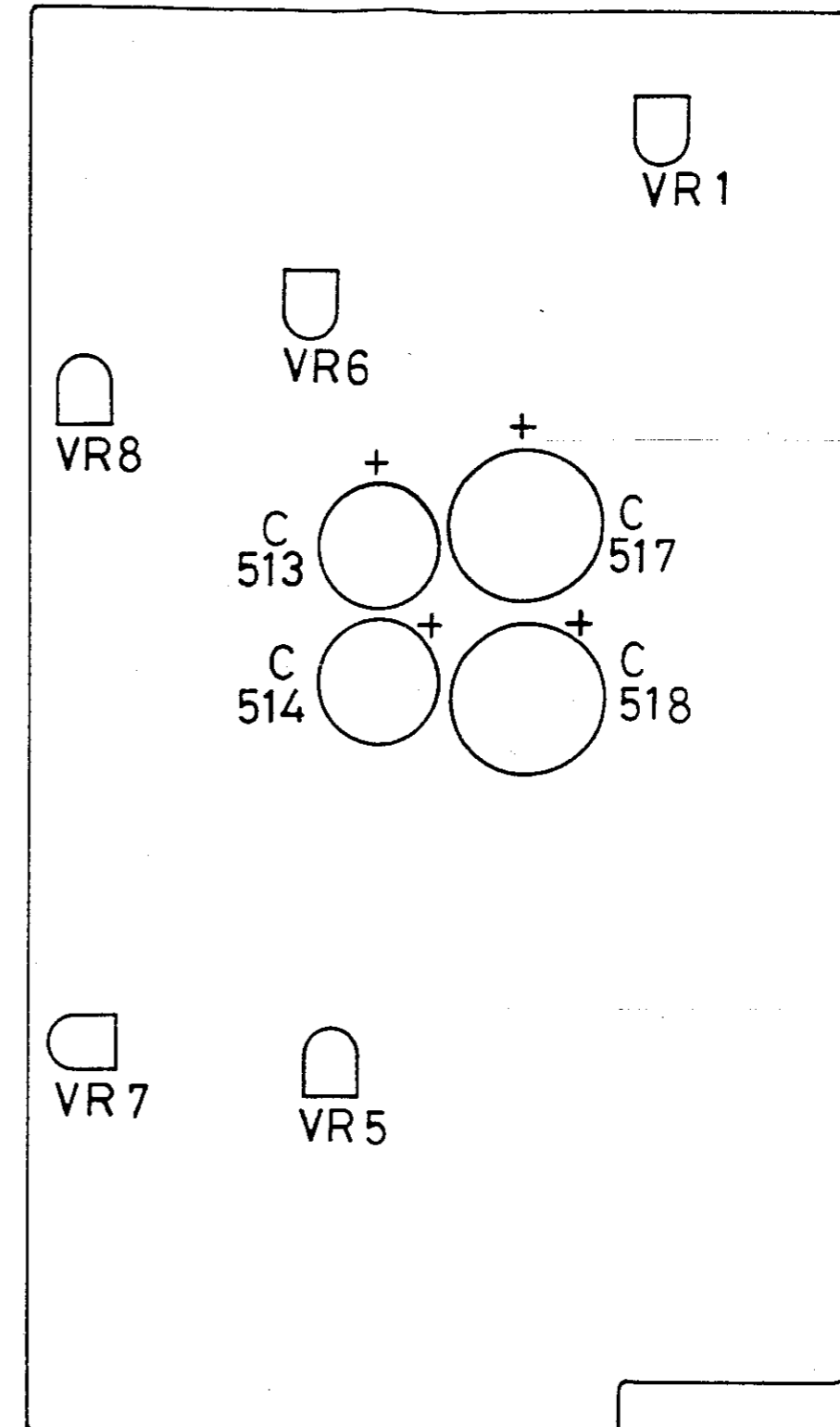
FINAL ADJUSTMENT

C. CENTER VOLTAGE

1. Repeat step A above.

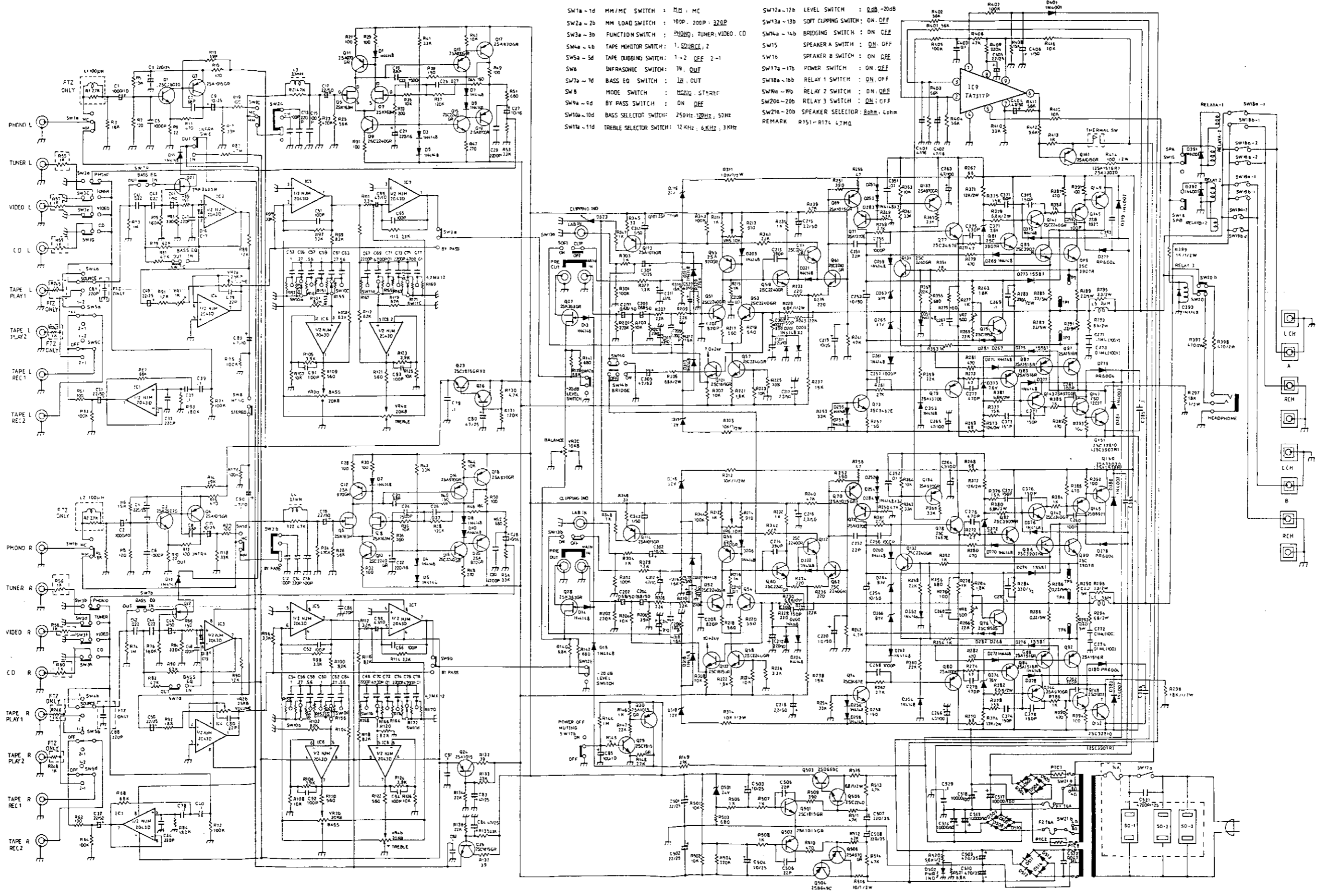
D. IDLING CURRENT

1. Repeat step B and adjust with VR 7, VR 8 for 6.6mV reading on meter.



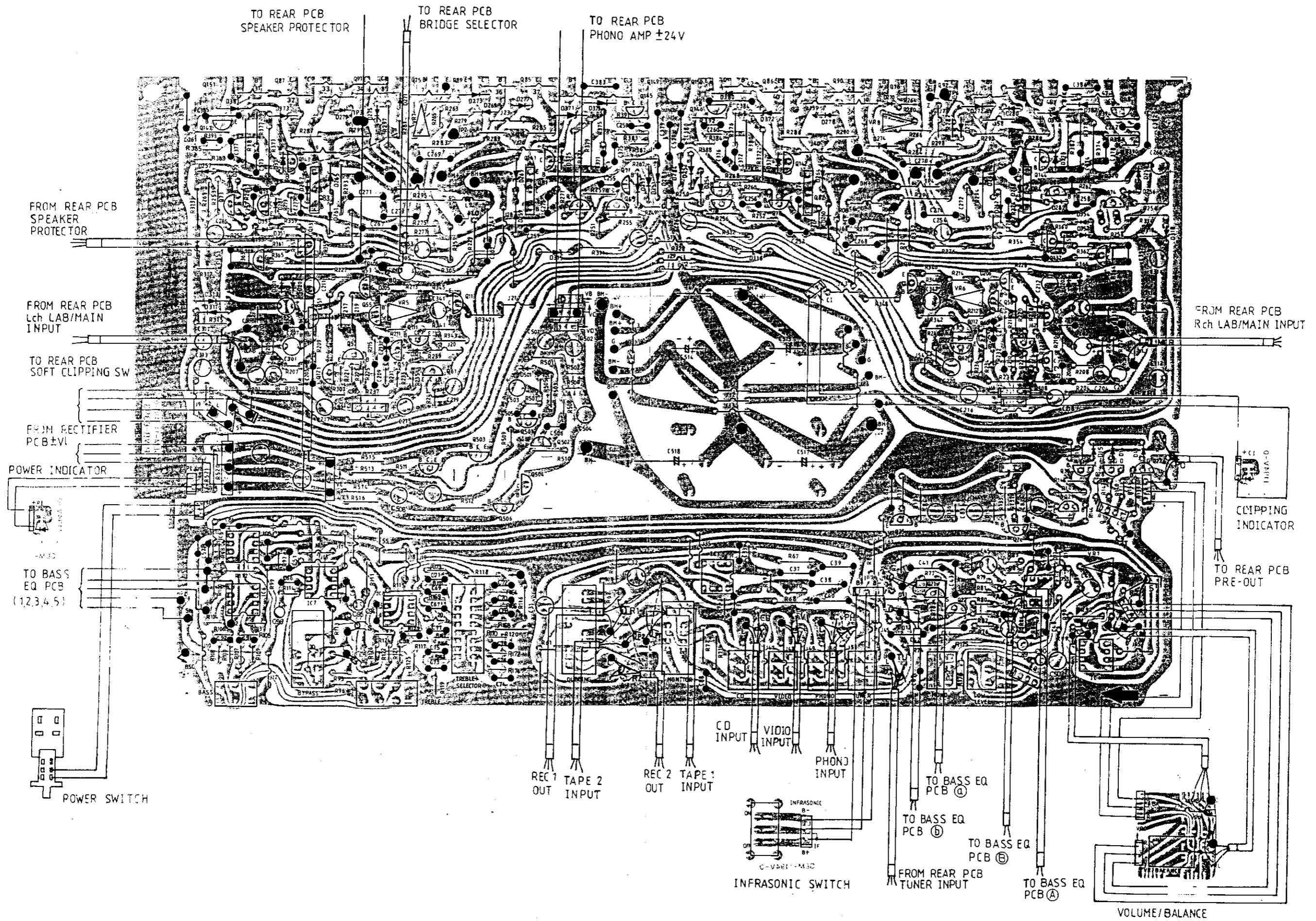
ALIGNMENT METHOD

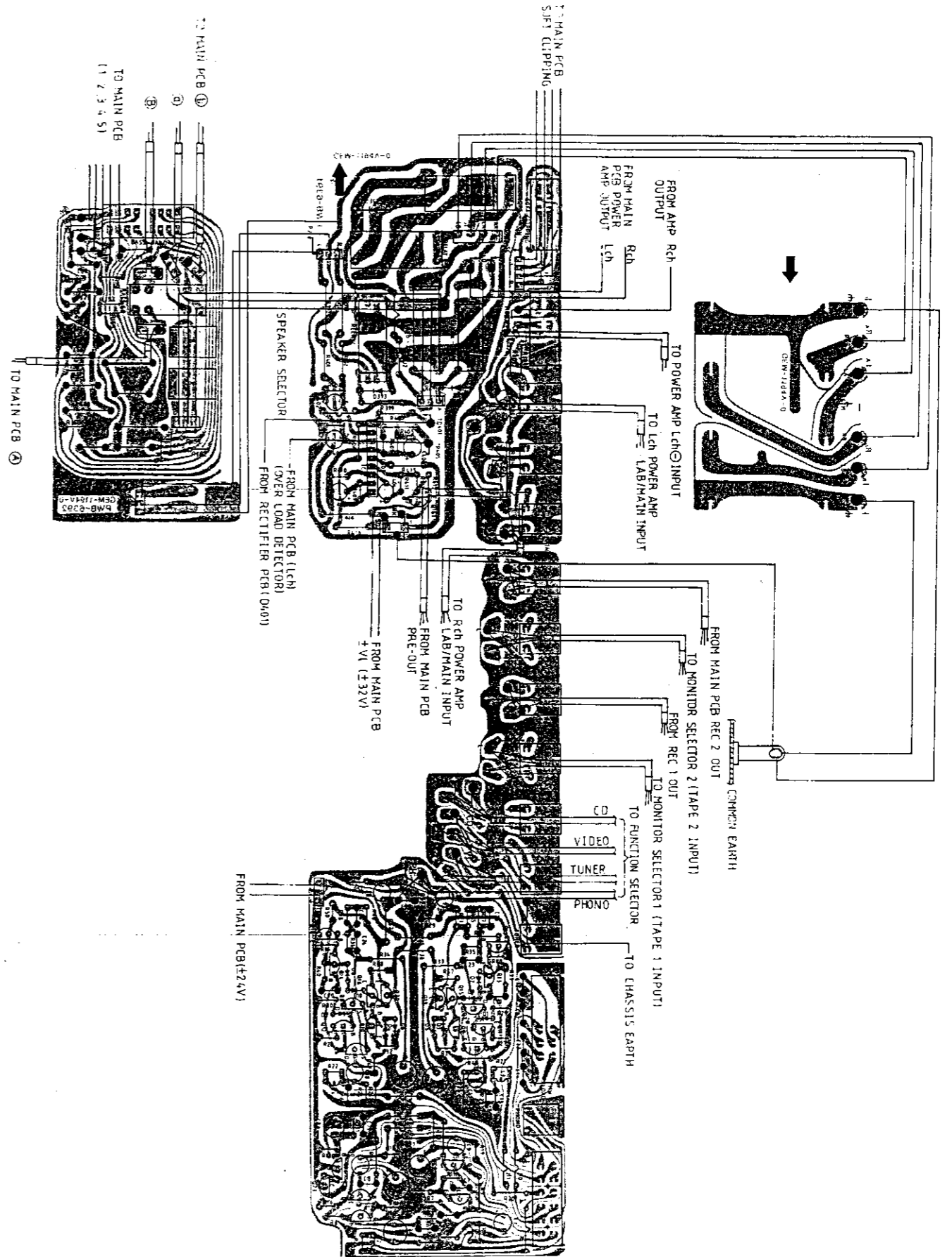
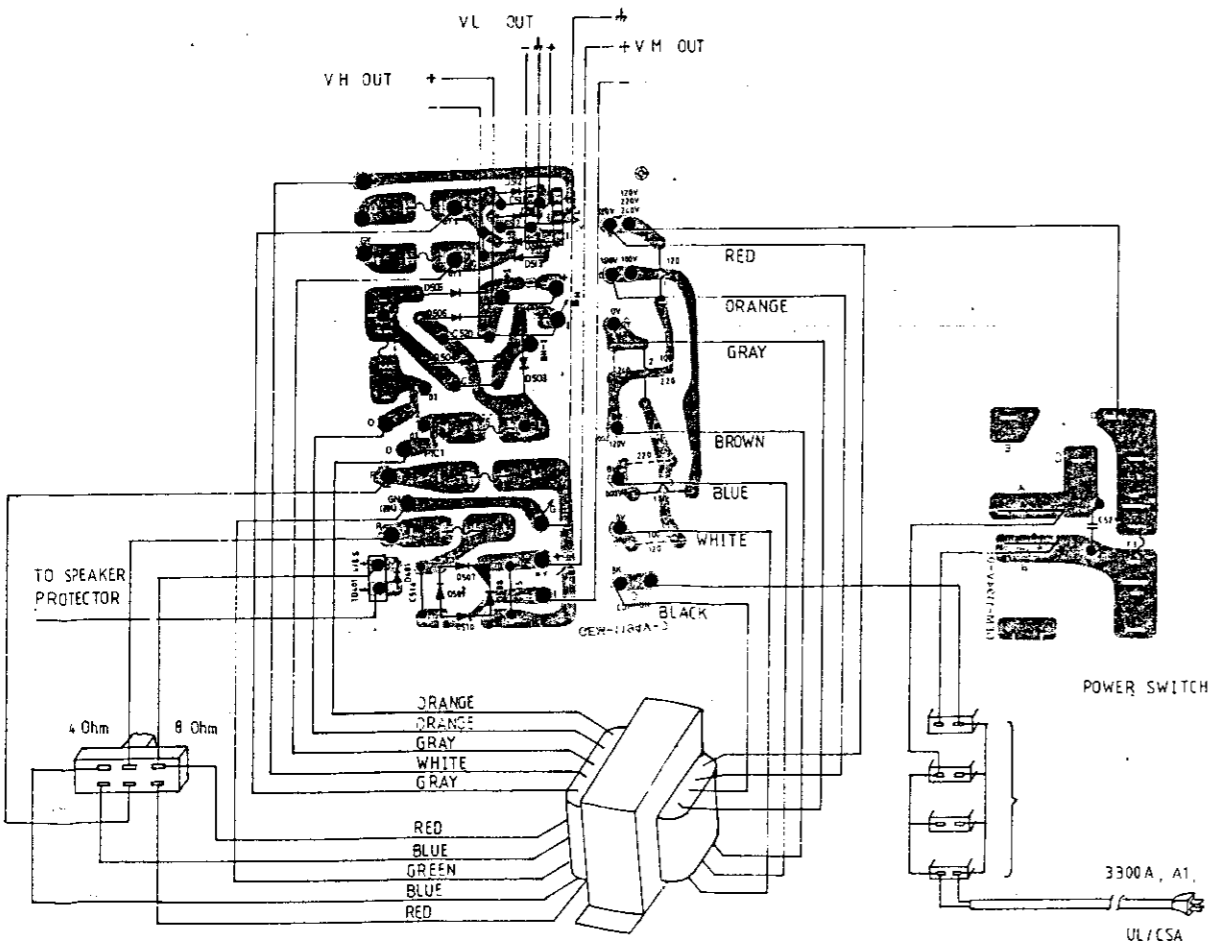
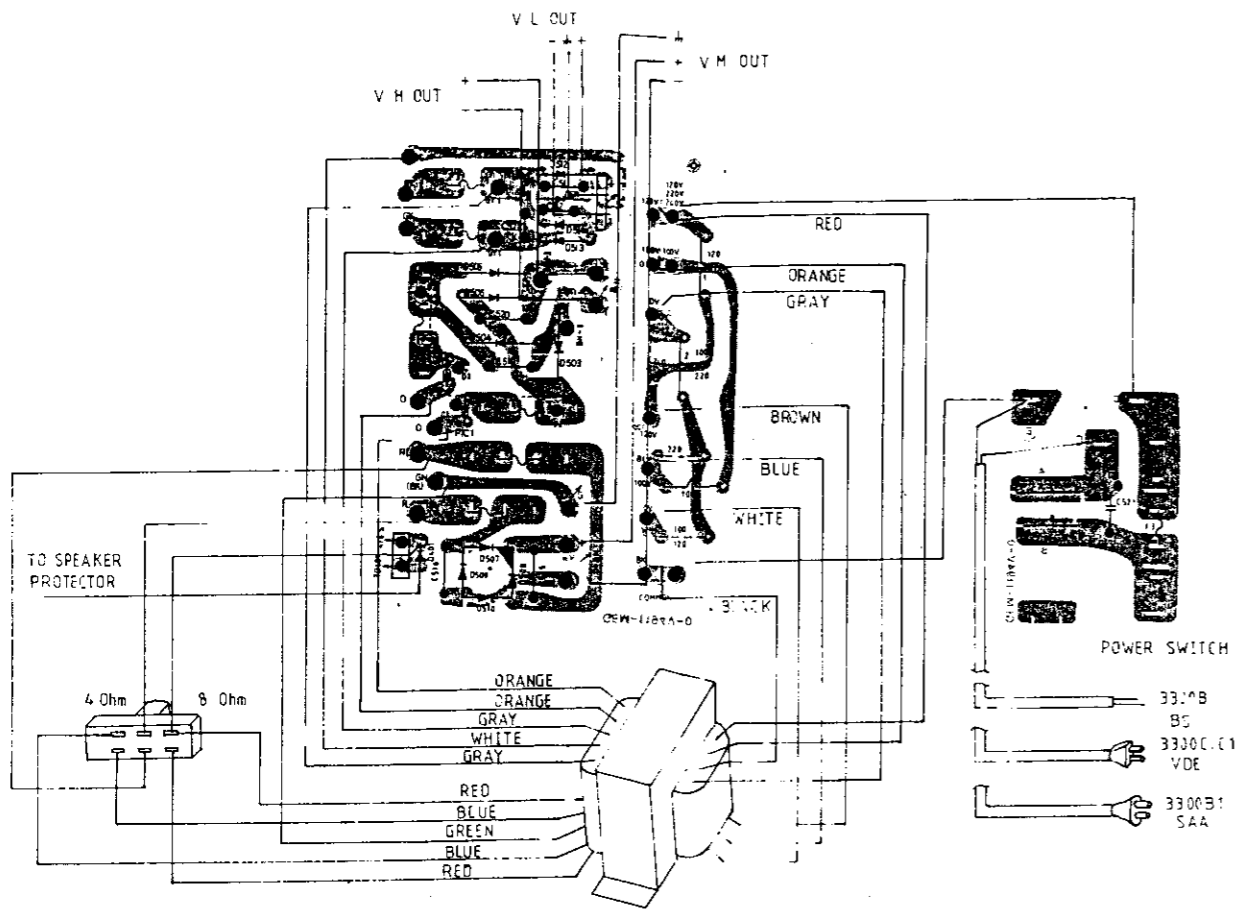
# NAD 3300 SCHEMATIC DIAGRAM



- |           |  |           |                                |
|-----------|--|-----------|--------------------------------|
| SW1a-1d   | MM/MC SWITCH : MM, MC                      | SW12a-12b | LEVEL SWITCH : 0dB -20dB       |
| SW2a-2b   | MM LOAD SWITCH : 100P, 200P, 320P          | SW13a-13b | SOFT CLIPPING SWITCH : ON, OFF |
| SW3a-3b   | FUNCTION SWITCH : PHONO, TUNER, VIDEO, CD  | SW14a-14b | BRIDGING SWITCH : ON, OFF      |
| SW4a-4b   | TAPE MONITOR SWITCH : 1, SOURCE, 2         | SW15      | SPEAKER A SWITCH : ON, OFF     |
| SW5a-5d   | TAPE DUBBING SWITCH : 1-2, OFF, 2-1        | SW16      | SPEAKER B SWITCH : ON, OFF     |
| SW6       | INFRASONIC SWITCH : IN, OUT                | SW17a-17b | POWER SWITCH : ON, OFF         |
| SW7a-7d   | BASS EQ SWITCH : IN, OUT                   | SW18a-18b | RELAY 1 SWITCH : ON, OFF       |
| SW8       | MODE SWITCH : MONO, STEREO                 | SW19a-19b | RELAY 2 SWITCH : ON, OFF       |
| SW9a-9d   | BY PASS SWITCH : ON, OFF                   | SW20a-20b | RELAY 3 SWITCH : ON, OFF       |
| SW10a-10d | BASS SELECTOR SWITCH : 250HZ, 100HZ, 50HZ  | REMARK    | R151-R174 4.7MΩ                |
| SW12c-12d | TREBLE SELECTOR SWITCH : 12KHZ, 6KHZ, 3KHZ |           |                                |

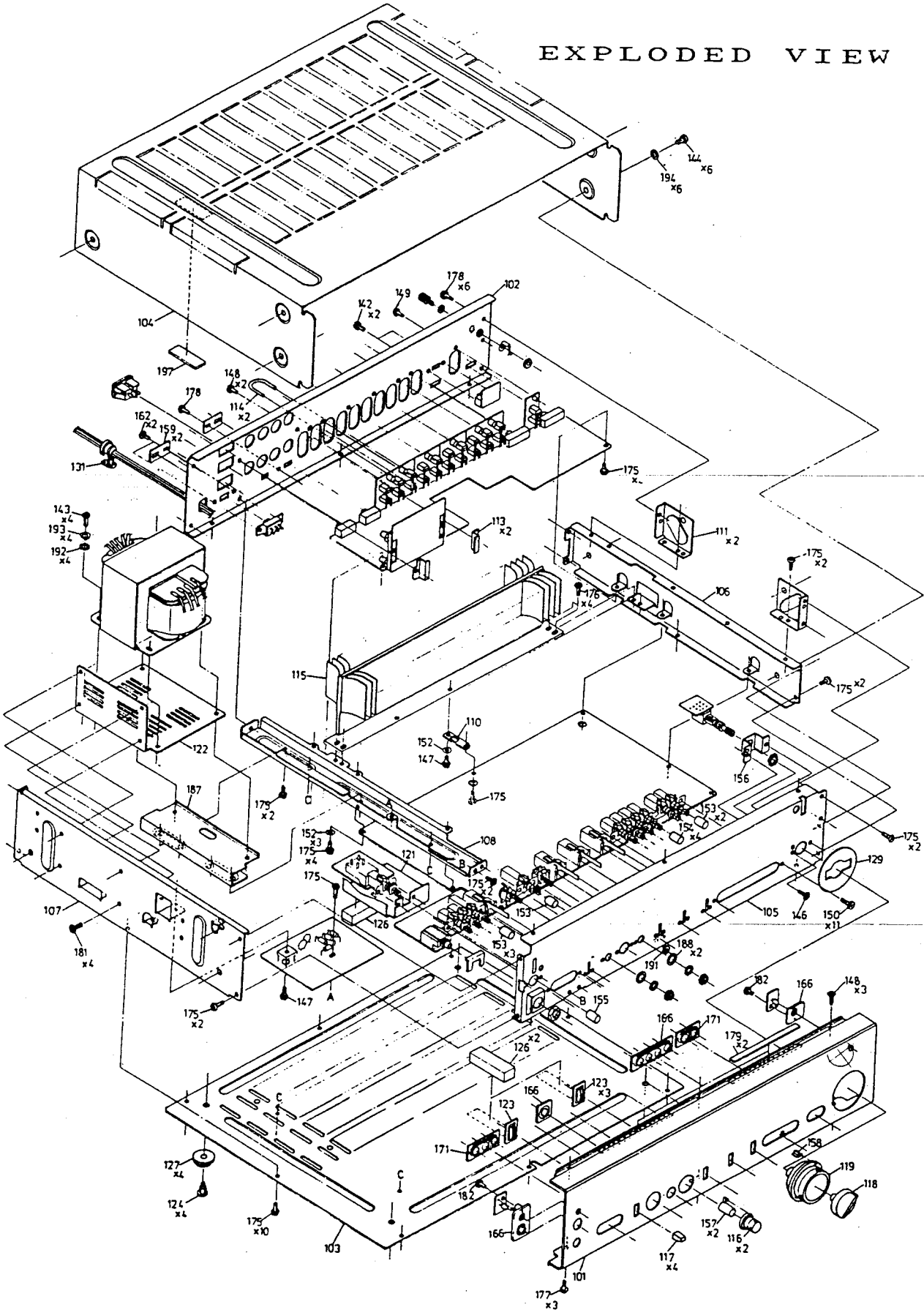
NAD 3300 PCB COMPONENT LOCATION AND WIRING DIAGRAM







EXPLODED VIEW



## EXPLODED PARTS LIST

| ITEM | PARTS NO.          | DESCRIPTION   | Q'TY |
|------|--------------------|---|------|
| 101  | 50 HPNLC1191-3PD   | FRONT PANEL   | 1    |
| 102  | 38 GCOVR1024-3     | BACK COVER  | 1    |
| 103  | 82 LCHSM1137-3P    | CHASSIS   | 1    |
| 104  | 32 GCABU1050-3ZD   | CABINET U   | 1    |
| 105  | 29 LANGV1041-3P    | VA ANGLE  | 1    |
| 106  | 38 LANGF1200-3P    | SIDE ANGLE (R)  | 1    |
| 107  | 17 LANGF1201-3P    | SIDE ANGLE (L)  | 1    |
| 108  | 88 LANGF1202-3P    | MIDDLE ANGLE  | 1    |
| 110  | 01 LANGK1408-3P    | PCB ANGLE   | 1    |
| 111  | 72 LANGK1409-3P    |   | 2    |
| 113  | 20 LANGK1410-3P    |   | 2    |
| 114  | 40 QTIPP1001-3     | JACK TIP  | 2    |
| 115  | 61 PRDAA1063-3G    |   | 1    |
| 116  | 53 JKNBR1624-3F    | VR KNOB   | 2    |
| 117  | 66 JKNBL1625-3FD   | LEVEL KNOB  | 4    |
| 118  | 77 JKNBR1626-3FD   | BALANCE KNOB  | 1    |
| 119  | 88 JKNBR1627-3F    | VOLUME KNOB   | 1    |
| 121  | 80 PSLD-1117-3-A   |   | 1    |
| 122  | 18 LANGK1509-3PL-B |   | 1    |
| 123  | 47 PSPA-1143-3     | LEVEL KNOB SPACER   | 4    |
| 124  | 58 LHL-1267-3D     | LEG PIN   | 4    |
| 126  | 27 PCUSS1304-3PD   | PCB X 2, SHIELD-P X 1   | 3    |
| 127  | 09 PCUSS1305-3PD   | LEG   | 4    |
| 131  | 56 LHLDK0066-1F    | AC CORD BUSHING   | 1    |
| 142  | 54 XBBSQ26P04000   | INFRASONIC SW X 2   | 2    |
| 143  | 83 XBPSD40P08000   | TRANS ANG X 4   | 4    |
| 144  | 44 XDPSQ40P08000   | CAB U X 6   | 6    |
| 146  | 67 XCBSD30P06000   | LANGK1468 X 2   | 2    |
| 147  | 37 XCBSD30P12000   | LANGK1408 X 1, TR X 1   | 2    |
| 148  | 36 XCBSQ30P06000   | LANGK1210 X 2, PANEL X 3  | 5    |
| 149  | 85 XCBSQ30P08000   | JACK X 7  | 7    |
| 150  | 46 XBPSD30P06000   | PUSH SW X 3, LEVEL SW X 8   | 11   |
| 152  | 61 XWVSE43-05080   | PCB X 3, LANGK1408 X 1  | 4    |
| 153  | 30 JKNBP1623-3FD-A | PUSH KNOB   | 6    |
| 154  | 88 JKNBP1623-3FC   | PUSH KNOB   | 4    |
| 155  | 06 JKNBP1722-3F    | POWER KNOB  | 1    |
| 156  | 60 LANGK1468-3P    | VOLUME/BALANCE SW ANGLE   | 1    |
| 157  | 84 LHL-1253-3      | VR KNOB HOLDER  | 2    |
| 158  | 66 LHL-1254-3      | VOLUME KNOB HOLDER  | 1    |
| 159  | 13 LHL-1252-3      | SW HOLDER PLATE   | 2    |
| 162  | 40 XBBSQ30P06000   | TURBO SW X 2  | 2    |
| 166  | 65 PSPA-1142-3     | PUSH KNOB SPACER  | 1    |
| 171  | 83 PSPA-1141-3     | PUSH KNOB SPACER  | 1    |
| 175  | 47 XHBSD30P06000   | PCB X 7, VA X 6, CHASSIS<br>X 10, LANGK1409 X 2, LANGK<br>-1202 X 4, LANGK1408 X 1. | 30   |
| 176  | 37 XCSSD30P08000   | PRDAA1063 X 4   | 4    |
| 177  | 47 XHBSD30P06000   | CHAS-R X 3  | 3    |
| 178  | 16 XHBSQ30P06000   | BACK COVER X 7  | 7    |
| 179  | 56 PCUSS1062-3PD-B | PANEL SPONG   | 2    |
| 181  | 59 XBBSD40P06000   | LANGF1201 X 4   | 4    |
| 182  | 33 XEBSD26P06000   | LED X 2   | 2    |
| 187  | 35 LANGR1512-3PL-B | TRANS ANGLE   | 1    |
| 188  | 50 TRAP-1001-3RD   |   | 2    |
| 191  | 71 XWHSQ55-08120   | PANEL * VA X 1  | 1    |
| 192  | 30 XWHSQ42-10080   | TRANS WASHER  | 4    |
| 193  | 33 XWSSD42-08100   | TRANS SP WASHER   | 4    |
| 194  | 27 XWHSQ42-08100   | CAB-U X 6   | 6    |
| 197  | 33 PCUSS1372-3     | CAB X 1   | 1    |

### 3300 BILL OF MATERIALS

| SYMBOL NO           | PARTS NO          | DESCRIPTION                  | SYMBOL NO            | PARTS NO       | DESCRIPTION                |
|---------------------|-------------------|------------------------------|----------------------|----------------|----------------------------|
| BREAKER             | QBRE-1001-3-V     | *UPO72* THERMAL BREAKER      | R-045, 046           | VRCPV4--181J-P | CARBON FILM FIXED RESISTOR |
| F-003               | QFS-D402S-32K--   | FUSE                         | R-003, 004           | VRCPV4--182J-P | CARBON FILM FIXED RESISTOR |
| F-001, 002          | QFS-D632H-31D--   | FUSE                         | R-009, 010           | VRCPV4--220J-P | CARBON FILM FIXED RESISTOR |
| HOLDER              | QFS-D632S-32K--   | FUSE                         | R-265                | VRCPV4--222J-P | CARBON FILM FIXED RESISTOR |
| SOCKET              | QF5HC1002-3----   | FUSE HOLD                    | R-409                | VRCPV4--224J-P | CARBON FILM FIXED RESISTOR |
| SOCKET              | QJAKP1005-3D2---- | 2P RCA SOCKET                | R-047, 048           | VRCPV4--271J-P | CARBON FILM FIXED RESISTOR |
| SOCKET              | QJAKP1014-3D4---- | 4P RCA SOCKET                | R-148, 149           | VRCPV4--273J-P | CARBON FILM FIXED RESISTOR |
| SOCKET              | QJAKP1017-3D6---- | 6P RCA SOCKET                | R095, 096, 097,      | VRCPV4--332J-P | CARBON FILM FIXED RESISTOR |
| JACK                | QJAKS1017-3DV---- | PHONES JACK                  | 098, 114             |                |                            |
| JUMPER              | QJUH-0003D8125-   | 12.5 MH, JUMPER              | R-053                | VRCPV4--333J-- | CARBON FILM FIXED RESISTOR |
| LG002               | QLUGS0944-1----   | LUG                          | R017, 018, 042,      | VRCPV4--333J-P | CARBON FILM FIXED RESISTOR |
| LUG                 | QPINM1001-3----   | LUG                          | 054, 410             |                |                            |
| PHONO PCB           | QPMB-6391-3----   | PCB 330x79x1.6               | R271, 272, 273, 274  | VRCPV4--470J-P | CARBON FILM FIXED RESISTOR |
| EQ, RG, SF, PCB     | QPMB-6392-3--1-   | 175.5x109.5x1.6, 94V-0       | R-016                | VRCPV4--471J-- | CARBON FILM FIXED RESISTOR |
| PRE/HAIN AMP PCB    | QPMB-6393-3----   | 330x196x1.6 94V-0            | R279, 280, 281, 387, | VRCPV4--471J-P | CARBON FILM FIXED RESISTOR |
| SOCKET              | QSOCP1014-31D--   | AC OUTLET                    | 388, 389, 390, 282   |                |                            |
| SH005, 011          | QSW-B1042-34-3-   | SWITCH, DUBBING-TREBLE       | R-130                | VRCPV4--472J-- | CARBON FILM FIXED RESISTOR |
| SH004               | QSW-B1043-32-3-   | SWITCH, MONITOR              | R-021, 022           | VRCPV4--172J-P | CARBON FILM FIXED RESISTOR |
| SH009               | QSW-P1076-32-2-   | SWITCH, BYPASS               | R-249, 250           | VRCPV4--473J-P | CARBON FILM FIXED RESISTOR |
| SH015, 016, 07      | QSW-P1077-33----  | SWITCH, SPK A, B, BASS, EQ   | R-023, 024           | VRCPV4--474J-P | CARBON FILM FIXED RESISTOR |
| SH03, 08, 012       | QSW-P1083-37----  | (CD.VIDEO.PHONO.TUNER)SWITCH | R109, 110, 121, 122  | VRCPV4--561J-P | CARBON FILM FIXED RESISTOR |
| SH017               | QSW-P1084-32V2-   | POWER SW                     | R-412                | VRCPV4--562J-- | CARBON FILM FIXED RESISTOR |
| SH013, 014          | QSW-P1088-32D2-   | POWER SW                     | R-404, 026           | VRCPV4--563J-- | CARBON FILM FIXED RESISTOR |
| SH006               | QSW-S1033-32-2-   | SOFT CLIPPING/BRIGDE SW      | R-403, 411           | VRCPV4--563J-P | CARBON FILM FIXED RESISTOR |
| SH001               | QSW-S1052-32-2-   | INFRASONIC SW                | R-079, 080           | VRCPV4--623J-P | CARBON FILM FIXED RESISTOR |
| SH021 A. B.         | QSW-S1064-34-2-   | MH/MC SELECTOR SW            | R-051                | VRCPV4--681J-P | CARBON FILM FIXED RESISTOR |
| SH002               | QSW-S1066-32-2-   | 40MH/80MH SELECTOR SW        | R-101                | VRCPV4--822J-- | CARBON FILM FIXED RESISTOR |
| TIP                 | QSW-S1069-32-3-   | MM LOAD SW                   | R100, 103, 104,      | VRCPV4--822J-P | CARBON FILM FIXED RESISTOR |
| TERMINAL            | QTIPP1001-3----   | JACK TIP                     | 117, 119             |                |                            |
| TERMINAL            | QTHLB1070-3----   | GROUND TERMINAL              | R-151, 152, 153,     | VRCPV6--475J-- | CARBON FILM FIXED RESISTOR |
| TERMINAL            | QTHLK1002-304--   | BINDING POST                 | 154, 155, 156, 157,  |                |                            |
| L-005, 006          | RCILS0010-3FS2-   | COIL, 3UH                    | 158, 159, 160, 161,  |                |                            |
| L-003, 004          | RCILT1005-3----   | COIL, 3.7NH                  | R-399                | VRCPV2--102J-- | CARBON FILM FIXED RESISTOR |
| TERMINAL            | QTHLK1002-304-A   | BINDING POST                 | R311, 312, 313, 314  | VRCPV2--103J-- | CARBON FILM FIXED RESISTOR |
| D-323, 502          | RLEDCR101-3D1--   | LIGHT EMITTING DIODE         | R-297, 298           | VRCPV2--183J-- | CARBON FILM FIXED RESISTOR |
| X' FORMER           | RPT-J1003-3-EX-   | POWER TRANSFORMER, 220V/50Hz | R-283, 284           | VRCPV2--331J-- | CARBON FILM FIXED RESISTOR |
| X' FORMER           | RPT-J1003-3-EXA   | POWER TRANSFORMER, 240V/50Hz | R-520                | VRCPV2--562J-- | CARBON FILM FIXED RESISTOR |
| R-035, 036          | RR-CZ103F-3V4-P   | CARBON FILM FIXED RESISTOR   | R-229, 230           | VRCPV2--682J-- | CARBON FILM FIXED RESISTOR |
| R-038               | RR-CZ124F-3V4--   | CARBON FILM FIXED RESISTOR   | R-020, 049           | VRCPV4--101J-T | CARBON FILM FIXED RESISTOR |
| R-037               | RR-CZ124F-3V4-P   | CARBON FILM FIXED RESISTOR   | R-303, 304           | VRCPV4--102J-T | CARBON FILM FIXED RESISTOR |
| SH020               | RRLYD1014-3C-D-   | RELAY                        | R-415, 416           | VRCPV4--103J-T | CARBON FILM FIXED RESISTOR |
| SH018, 019          | RRLYD1044-3EDG-   | A-2, RELAY B-2               | R-175, 176           | VRCPV4--104J-T | CARBON FILM FIXED RESISTOR |
| PTC01, 02           | RTHM-1001-3GU--   | POSISTOR                     | R-074                | VRCPV4--105J-T | CARBON FILM FIXED RESISTOR |
| VR003               | RVR-RK001-3J2C-   | ROTARY VARIABLE RESISTOR     | R-090, 091           | VRCPV4--122J-T | CARBON FILM FIXED RESISTOR |
| VR004               | RVR-RK002-3J2C-   | ROTARY VARIABLE RESISTOR     | R-328                | VRCPV4--132J-T | CARBON FILM FIXED RESISTOR |
| VOL/BALANCE         | RVR-RM003-3Z3--   | ROTARY VARIABLE RESISTOR     | R-237, 238           | VRCPV4--153J-T | CARBON FILM FIXED RESISTOR |
| VR007, 008          | RVRS8003-8501-    | SEMI-FIXED VAR. RES. 500ohm  | R-316, 315           | VRCPV4--162J-T | CARBON FILM FIXED RESISTOR |
| VR001               | RVRS8101-3102-    | SEMI-FIXED VAR. RES. 1kohm   | R-092, 263           | VRCPV4--182J-T | CARBON FILM FIXED RESISTOR |
| VR005, 006          | RVRS8101-3103-    | SEMI-FIXED VAR. RES. 10kohm  | R-033, 034           | VRCPV4--201J-T | CARBON FILM FIXED RESISTOR |
| C091, 092, 093, 094 | VCDSU1HL101J--    | CERAMIC CAPACITOR            | R-243, 244, 266      | VRCPV4--222J-T | CARBON FILM FIXED RESISTOR |
| C051, 052, 065, 066 | VCDSU1HL101J-P    | CERAMIC CAPACITOR            | R-147, 341, 342      | VRCPV4--223J-T | CARBON FILM FIXED RESISTOR |
| C-307               | VCDSU1HL151J--    | CERAMIC CAPACITOR            | R-259                | VRCPV4--272J-T | CARBON FILM FIXED RESISTOR |
| C385, 376, 377,     | VCDSU1HL151J-P    | CERAMIC CAPACITOR            | R-111, 112, 113,     | VRCPV4--332J-T | CARBON FILM FIXED RESISTOR |
| 308, 371, 372,      |                   |                              | 133, 135             |                |                            |
| 374, 378, 373       |                   |                              |                      |                |                            |
| C505, 506, 079, 080 | VCDSU1HL220J-P    | CERAMIC CAPACITOR            | R-253, 254           | VRCPV4--333J-T | CARBON FILM FIXED RESISTOR |
| C033, 034, 047, 048 | VCDSU1HL221J-P    | CERAMIC CAPACITOR            | R-132, 137           | VRCPV4--390J-T | CARBON FILM FIXED RESISTOR |
| C-213, 214          | VCDSU1HL391J--    | CERAMIC CAPACITOR            | R-252                | VRCPV4--391J-T | CARBON FILM FIXED RESISTOR |
| C-086               | VCDSU1HL471J--    | CERAMIC CAPACITOR            | R-255, 256           | VRCPV4--470J-T | CARBON FILM FIXED RESISTOR |
| C275, 276, 277, 278 | VCDSU1HL471J-P    | CERAMIC CAPACITOR            | R-510                | VRCPV4--471J-T | CARBON FILM FIXED RESISTOR |
| C-020               | VCDSU1HL680J--    | CERAMIC CAPACITOR            | R-239, 512, 513, 514 | VRCPV4--472J-T | CARBON FILM FIXED RESISTOR |
|                     |                   |                              | R-406                | VRCPV4--473J-T | CARBON FILM FIXED RESISTOR |

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| C-007,008,019    | VCDSU1HL680J-P  | CERAMIC CAPACITOR          | R-087             | VRCPV4--475J-T  | CARBON FILM FIXED RESISTOR |
| C259,260,261,262 | VCDSU2HL101J--  | CERAMIC CAPACITOR          | R-217,218,219,220 | VRCPV4--561J-T  | CARBON FILM FIXED RESISTOR |
| C-251,252        | VCDSU2HL220J-P  | CERAMIC CAPACITOR          | R-401,402,025     | VRCPV4--563J-T  | CARBON FILM FIXED RESISTOR |
| C-085            | VCEACU1AG107M-P | ELECTROLYTIC CAPACITOR     | R-267,268,269,270 | VRCPV4--680J-T  | CARBON FILM FIXED RESISTOR |
| C-001,002        | VCEACU1AG108H-- | ELECTROLYTIC CAPACITOR     | R-503             | VRCPV4--681J-T  | CARBON FILM FIXED RESISTOR |
| C-211,212        | VCEACU1AG227M-P | ELECTROLYTIC CAPACITOR     | R-521,139         | VRCPV4--682J-T  | CARBON FILM FIXED RESISTOR |
| C-089,090,095    | VCEACU1AG476M-- | ELECTROLYTIC CAPACITOR     | R-067,068         | VRCPV4--683J-T  | CARBON FILM FIXED RESISTOR |
| C-313,527,096,   | VCEACU1AG476H-P | ELECTROLYTIC CAPACITOR     | R-102             | VRCPV4--822J--  | CARBON FILM FIXED RESISTOR |
| 311,312,314,528  |                 |                            | R-099,115,116     | VRCPV4--822J--  | CARBON FILM FIXED RESISTOR |
| C-021,022        | VCEACU1CG227M-- | ELECTROLYTIC CAPACITOR     | 118,120           | VRCPV6--101J-T  | CARBON FILM FIXED RESISTOR |
| C-401,402        | VCEACU1CG476H-P | ELECTROLYTIC CAPACITOR     | R-061             | VRCPV6--103J-T  | CARBON FILM FIXED RESISTOR |
| C-405            | VCEACU1EG226M-P | ELECTROLYTIC CAPACITOR     | R-307             | VRCPV6--104J-T  | CARBON FILM FIXED RESISTOR |
| C-003,004        | VCEACU1EG227M-- | ELECTROLYTIC CAPACITOR     | R-344             | VRCPV6--105J-T  | CARBON FILM FIXED RESISTOR |
| C-080            | VCEACU1EG476H-- | ELECTROLYTIC CAPACITOR     | R-073,144         | VRCPV6--122J-T  | CARBON FILM FIXED RESISTOR |
| C-083,084        | VCEACU1EG476M-P | ELECTROLYTIC CAPACITOR     | R-089             | VRCPV6--132J-T  | CARBON FILM FIXED RESISTOR |
| C-046,341        | VCEACU1HG105M-- | ELECTROLYTIC CAPACITOR     | R-327             | VRCPV6--151J-T  | CARBON FILM FIXED RESISTOR |
| C-406            | VCEACU1HG105H-P | ELECTROLYTIC CAPACITOR     | R-257,258         | VRCPV6--162J-T  | CARBON FILM FIXED RESISTOR |
| C219,253,301,503 | VCEACU1HG106M-P | ELECTROLYTIC CAPACITOR     | R-317,318         | VRCPV6--182J-T  | CARBON FILM FIXED RESISTOR |
| 504,220,254,302  |                 |                            | R-075,076         | VRCPV6--184J-T  | CARBON FILM FIXED RESISTOR |
| C-018            | VCEACU1HG225H-- | ELECTROLYTIC CAPACITOR     | R-221,222         | VRCPV6--184J-T  | CARBON FILM FIXED RESISTOR |
| C-017            | VCEACU1HG225M-P | ELECTROLYTIC CAPACITOR     | R-093,094         | VRCPV6--221J-T  | CARBON FILM FIXED RESISTOR |
| C-404            | VCEACU1HG474M-P | ELECTROLYTIC CAPACITOR     | R-233,234,235,236 | VRCPV6--330J-T  | CARBON FILM FIXED RESISTOR |
| C-203,204        | VCEACU1HG684M-- | ELECTROLYTIC CAPACITOR     | R-207,208,209,210 | VRCPV6--331J-T  | CARBON FILM FIXED RESISTOR |
| C-201,202        | VCEACU1HG684H-P | ELECTROLYTIC CAPACITOR     | R-134,136,357,    | VRCPV6--223J-T  | CARBON FILM FIXED RESISTOR |
| C-305            | VCEACU1JG476M-- | ELECTROLYTIC CAPACITOR     | 358,359,360       | VRCPV6--224J-T  | CARBON FILM FIXED RESISTOR |
| C-509            | VCEACU1VG108Y-- | ELECTROLYTIC CAPACITOR     | R-202             | VRCPV6--272J-T  | CARBON FILM FIXED RESISTOR |
| C-507,508        | VCEACU1VG227M-- | ELECTROLYTIC CAPACITOR     | R-260,262         | VRCPV6--274J-T  | CARBON FILM FIXED RESISTOR |
| C-510            | VCEACU1VG477M-- | ELECTROLYTIC CAPACITOR     | R-329,330         | VRCPV6--393J-T  | CARBON FILM FIXED RESISTOR |
| C-517,518        | VCEACU2AG109Y-- | ELECTROLYTIC CAPACITOR     | R-346             | VRCPV6--472J-T  | CARBON FILM FIXED RESISTOR |
| C263,264,265,266 | VCEACU2AG475M-P | ELECTROLYTIC CAPACITOR     | R-227,228         | VRCPV6--681J-T  | CARBON FILM FIXED RESISTOR |
| C-513,514        | VCEALS1HG109Y-- | ELECTROLYTIC CAPACITOR     | R-225,226,361,    | VRCPV6--682J-T  | CARBON FILM FIXED RESISTOR |
| C255,256,257,258 | VCKBDU1HY102K-P | CERAMIC CAPACITOR          | 362,365,366       | VRFPV2--100J--  | FUSE RESISTOR              |
| C-207,208        | VCKBDU1HY821K-P | CERAMIC CAPACITOR          | R-083,084         | VRFPV2--682J--  | FUSE RESISTOR              |
| C-005,006        | VCKBDU1HY102M-P | CERAMIC CAPACITOR          | R-509,251         | VRFPV2--682K--  | WIRE WOUND RESISTOR        |
| C-521            | VCKEDU1HY472HV3 | CERAMIC CAPACITOR          | R-103,106,124     | VRHPSV4--152F-- | METAL FILM RESISTOR        |
| C267,268,269,270 | VCKFDU1HY104Z-- | CERAMIC CAPACITOR          | R-205,206         | VRHPSV4--471F-P | METAL OXIDE FILM RESISTOR  |
| C383,384,385,386 | VCKFDU2AY104Z-- | CERAMIC CAPACITOR          | R-082             | VRHPTV4--152F-T | METAL OXIDE FILM RESISTOR  |
| C-521            | VCKFDU7BY472PD3 | CERAMIC CAPACITOR          | R-141,142         | VRHPTV4--392F-T | METAL OXIDE IFLM RESISTOR  |
| C-522            | VCMEHU2AG473K-- | POLYPROFILM CAPACITOR      | R-140             | VRHPTV4--392F-T | CARBON (SOLID) RESISTOR    |
| C037,058,063,064 | VCHERY2AG564J-- | POLYPROFILM CAPACITOR      | R-214,213         | VRHPTV4--471J-- | METAL OXIDE FILM RESISTOR  |
| C071,072,077,078 | VCPELU1HG103J-P | POLYPROFILM CAPACITOR      | R-515             | VRHPTV4--681J-T | METAL OXIDE FILM RESISTOR  |
| C037,308,309,040 | VCPELU1HG104J-- | POLYPROFILM CAPACITOR      | R-285,286,287,288 | VRHPTV4--682J-T | METAL OXIDE FILM RESISTOR  |
| C-205,206        | VCPELU1HG122J-P | POLYPROFILM CAPACITOR      | 288,289,290,291,  | VRHPTV4--682J-- | METAL OXIDE FILM RESISTOR  |
| C-029,030        | VCPELU1HG222J-P | POLYPROFILM CAPACITOR      | R-006             | VRHPTV4--682J-- | METAL OXIDE FILM RESISTOR  |
| C041,042,043,044 | VCPELU1HG224J-- | POLYPROFILM CAPACITOR      | R-011,012         | VRHPTV4--682J-- | METAL OXIDE FILM RESISTOR  |
| C-025,026        | VCPELU1HG273J-P | POLYPROFILM CAPACITOR      | R-005             | VRHPTV4--682J-- | METAL OXIDE FILM RESISTOR  |
| C05,056,061,062  | VCPELU1HG274J-- | POLYPROFILM CAPACITOR      | R-013,014         | VRHPTV4--682J-- | METAL OXIDE FILM RESISTOR  |
| C059,070,075,076 | VCPELU1HG472J-P | POLYPROFILM CAPACITOR      | R-414             | VRHPTV4--682J-- | METAL OXIDE FILM RESISTOR  |
| C271,272,273,274 | VCPELU2AG104K-- | POLYPROFILM CAPACITOR      | R-371,372,373,374 | VRHPTV4--682J-- | METAL OXIDE FILM RESISTOR  |
| C-023,024        | VCPSQU1HG752J-- | POLYPROFILM CAPACITOR      | R-295,296         | VRHPTV4--682J-- | METAL OXIDE FILM RESISTOR  |
| C209,210,081,082 | VCSRU1EY104M--  | POLYPROFILM CAPACITOR      | R-397,398         | VRHPTV4--682J-- | METAL OXIDE FILM RESISTOR  |
| 351,352,529,     |                 |                            | R-293,294         | VRHPTV4--682J-- | METAL OXIDE FILM RESISTOR  |
| R-028,030        | VRCPV4--101J--  | CARBON FILM FIXED RESISTOR | R-395,379,380,    | VRHPTV4--682J-- | METAL OXIDE FILM RESISTOR  |
| R027,029,031,032 | VRCPV4--101J-P  | CARBON FILM FIXED RESISTOR | 381,382           | VRHPTV4--682J-- | METAL OXIDE FILM RESISTOR  |
| 019,030          |                 |                            | D-507,508,509,510 | VRHPTV4--682J-- | METAL OXIDE IFLM RESISTOR  |
| R-413            | VRCPV4--102J-P  | CARBON FILM FIXED RESISTOR | D-277,278,279,280 | VRHPTV4--682J-- | METAL OXIDE IFLM RESISTOR  |
| R-044            | VRCPV4--103J--  | CARBON FILM FIXED RESISTOR | D-401             | VRHPTV4--682J-- | METAL OXIDE IFLM RESISTOR  |
| R-043            | VRCPV4--103J-P  | CARBON FILM FIXED RESISTOR | D-379,380,381,382 | VRHPTV4--682J-- | METAL OXIDE IFLM RESISTOR  |
| R-008            | VRCPV4--121J--  | CARBON FILM FIXED RESISTOR | F-393             | VRHPTV4--682J-- | METAL OXIDE IFLM RESISTOR  |
| R-007            | VRCPV4--121J-P  | CARBON FILM FIXED RESISTOR | D-314,322,283,261 | VRHPTV4--682J-- | METAL OXIDE IFLM RESISTOR  |
| R-131            | VRCPV4--124J-P  | CARBON FILM FIXED RESISTOR | 284,011,012,262,  | VRHPTV4--682J-- | METAL OXIDE IFLM RESISTOR  |
| R-039,040        | VRCPV4--151J-P  | CARBON FILM FIXED RESISTOR | D-503,504,505,506 | VRHPTV4--682J-- | METAL OXIDE IFLM RESISTOR  |
| R-408            | VRCPV4--153J--  | CARBON FILM FIXED RESISTOR |                   | VRHPTV4--682J-- | METAL OXIDE IFLM RESISTOR  |