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# **ROTEL***hi-fi*

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**STEREO INTEGRATED AMPLIFIER**

# **RA-920AX**

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# **TECHNICAL MANUAL**

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**THE ROTEL CO., LTD.**

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**ROTEL ELECTRONICS CO., LTD.**

3F-2, NO.35, FU HSING NORTH ROAD, TAIPEI, TAIWAN, REPUBLIC OF CHINA

**MN20001860**





# Specifications

## SPECIFICATIONS RA-920AX

Continuous Power Output...20 watts\* per channel,min.  
 RMS both channels driven into  
 8 ohms from 20 to 20,000 Hz  
 with no more than 0.03% total  
 harmonic distortion.

DIN Output.....35 watts per channel (1 kHz, 4  
 ohms, 1% THD)

Music Power.....75 watts

Total Harmonic Distortion...No more than 0.03% (contin-  
 (20 to 20kHz from AUX) uous rated power output) No  
 more than 0.03% (continuous  
 1/2 rated power output) No  
 more than 0.03% (1 watt per  
 channel power output, 8 ohms)

Intermodulation Distortion...No more than 0.03% (contin-  
 (60 Hz: 7 kHz = 4:1) uous rated power output) No  
 more than 0.03% (continuous  
 1/2 rated power output) No  
 more than 0.03% (1 watt per  
 channel power output, 8 ohms)

Output: Speaker.....4 ohms minimum  
 Headphone.....8 – 2,000 ohms

Damping Factor.....180 (20 to 20,000 Hz, 8 ohms)

Input Sensitivity/ Impedance:

PHONO.....2.5 mV/ 47 kohms  
 CD, TUNER.....150 mV/ 20 kohms  
 TAPE, AUX.....150 mV/ 20 kohms

Overload Level (THD 0.5% 1kHz.):  
 PHONO.....180 mV

CD, TUNER.....5 V  
 TAPE, AUX.....5 V

Frequency Response:

PHONO.....20 to 15,000 Hz, +/- 0.3 dB  
 (RIAA STD)

CD, TUNER.....10 to 40,000 Hz, +/- 1.0 dB  
 TAPE, AUX.....10 to 40,000 Hz, +/-1.0 dB

Tone Control:

BASS..... +/- 6.0 dB (100 Hz)  
 TREBLE..... +/- 6.0 dB (10 KHz)

Signal to Noise Ratio (IHF, A network):

PHONO.....78 dB  
 CD, TUNER.....98 dB  
 TAPE, AUX.....98 dB

## MISCELLANEOUS

Power Requirement.....120 V/ 60 Hz, 220 V/ 50 Hz,  
 240 V/ 50 Hz (depending on  
 destinations)

Power Consumption.....120 watts

Dimension (overall).....440 (W) x 92 (H) x 304 (D)mm  
 17- 3/8" x 3-5/8" x 12"

Weight (net).....5.1 kg / 11.2 lbs

- Specifications and design subject to possible modifica-  
 tion without notice.
- \*Measured pursuant to the Federal Trade Commis-  
 sion's Trade Regulation Rule or, Power Claims for  
 Amplifiers (applicable to the U.S.A. only).

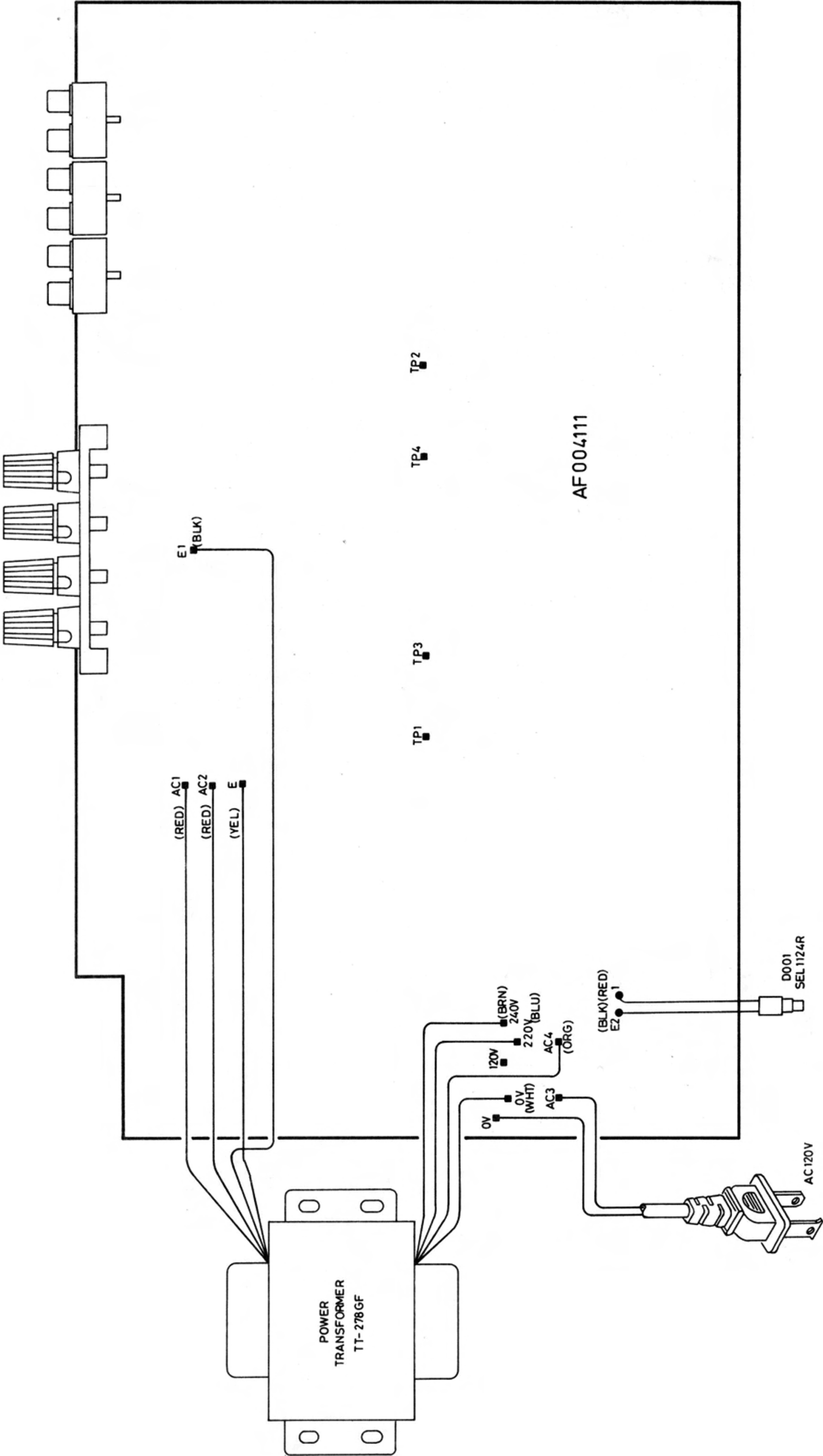
## Power Amplifier Bias Adjustment

Instruments:DC milli-voltmeter

Notes:Prior to Bias Adjustment,run about 5 minutes with rated output (8 ohm)  
 and warm up power Transistor and Heat Sink.  
 Set Volume Control to minimum.

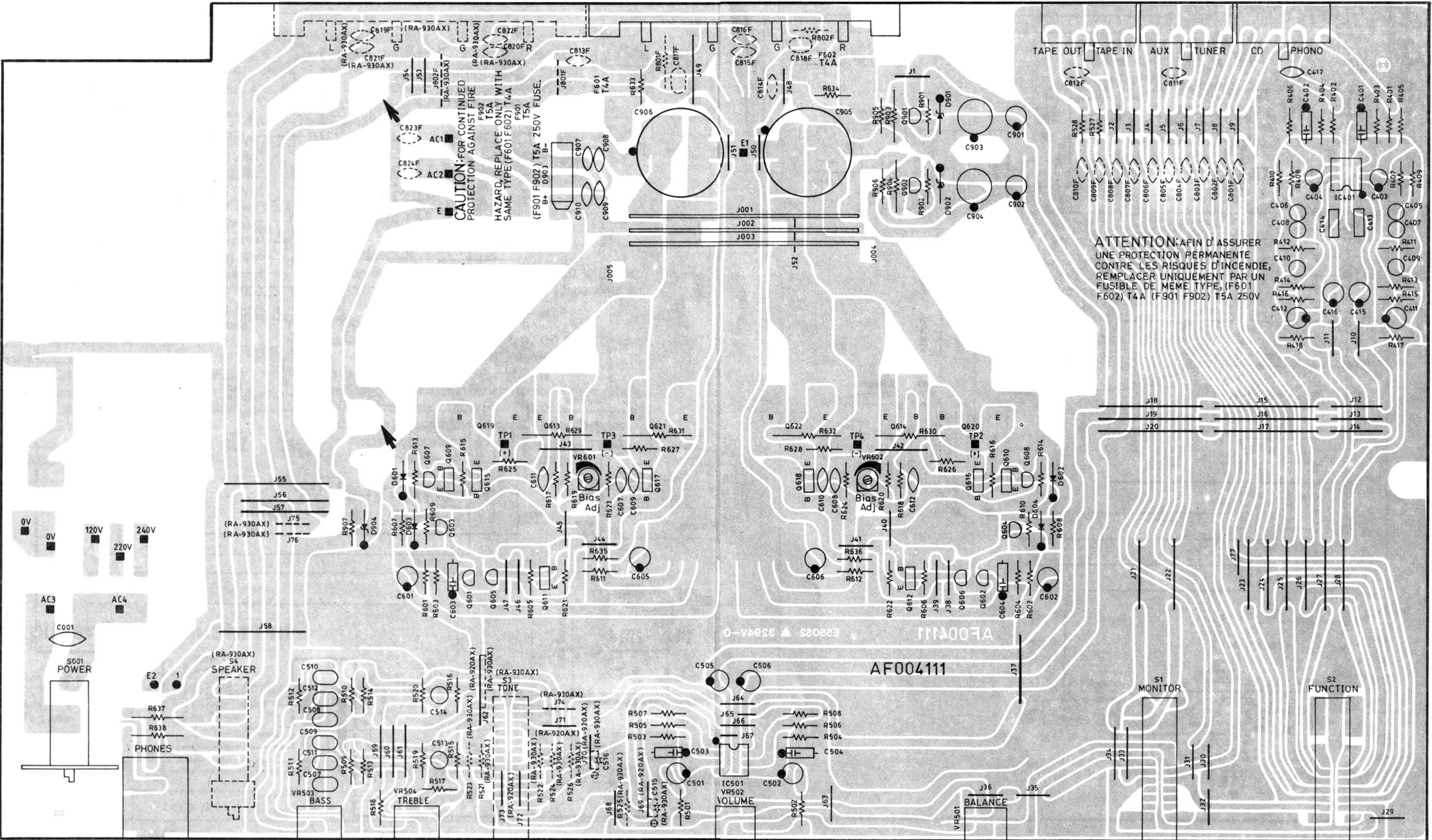
| Step | Coupling  |            | Adjust | Adjust for                       |
|------|-----------|------------|--------|----------------------------------|
|      | Plus Lead | Minus Lead |        |                                  |
| 1    | TP1       | TP3        | VR601  | DC milli-voltmeter<br>reads 4 mV |
| 2    | TP2       | TP4        | VR602  |                                  |

# Wiring Diagram



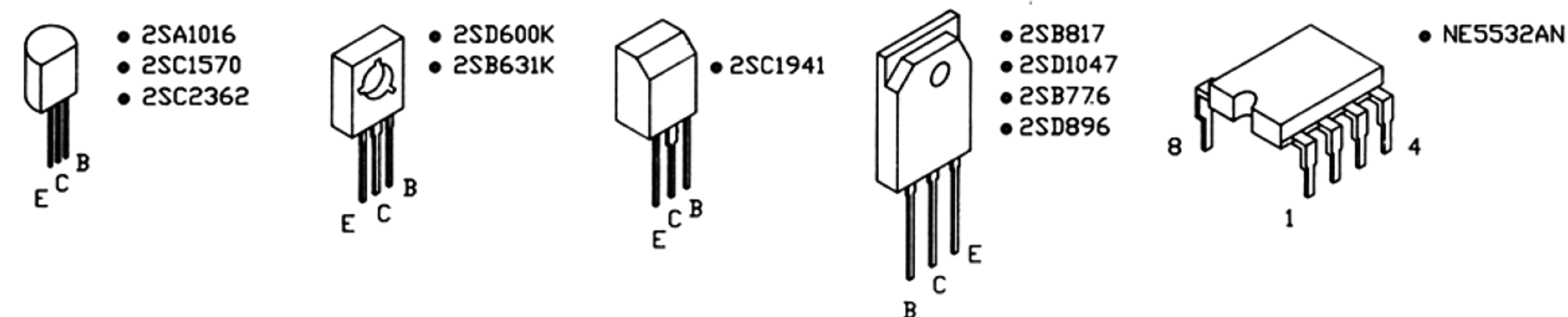


# Printed Circuit Boards





( NOTE : PARTS AND CIRCUIT SUBJECT TO CHANGES FOR IMPROUEMENT WITHOUT PRIOR NOTICE. )



- 1). USE ONLY REPLACEMENT PARTS THAT HAVE THE CRITICAL CHARACTERISTICS RECOMMENDED BY MANUFACTURER.
- 2). MAKE LEAKAGE-CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE AC SUPPLY CIRCUIT BEFORE RETURNING THE UNIT TO THE CUSTOMER.




# Parts List

NOTE: THE COMPONENTS IDENTIFIED BY  $\Delta$  MARK ARE FOR SAFETY. REPLACE ONLY WITH ORIGINAL PARTS. DO NOT SUBSTITUTE.

| SYMBOL                | PARTS NO.  | DESCRIPTION                                   |
|-----------------------|------------|-----------------------------------------------|
| AF004111 PCB ASSEMBLY |            |                                               |
| R401,402              | RM21001811 | R,METAL 1K F 1/4W                             |
| R403,404              | RM24752818 | R,METAL 47.5K F 1/4W                          |
| R405,406              | RM21211817 | R,METAL 1.21K F 1/4W                          |
| R407,408              | RM24751814 | R,METAL 4.75K F 1/4W                          |
| R409,410              | RM25622815 | R,METAL 56.2K F 1/4W                          |
| R411,412              | RM29103818 | R,METAL 909K F 1/4W                           |
| R413,414              | RM26810810 | R,METAL 681 F 1/4W                            |
| R415,416              | RM21001811 | R,METAL 1K F 1/4W                             |
| R417,418              | RM21003819 | R,METAL 100K F 1/4W                           |
| C401,402              | CS41511420 | CAP,STYROL 150PF 50V                          |
| C403,404              | CE31006258 | CAP,LOW NOISE 041 U25V10LN                    |
| C405,406              | CS41010417 | CAP,STYROL 1000PF 50V                         |
| C407,408              | CS42011417 | CAP,STYROL 200PF 50V                          |
| C409,410              | CS44310412 | CAP,STYROL 4300PF 50V                         |
| C411,412              | CE01006251 | CAP,ELEC. 10uF 25V                            |
| C413,414              | CP61008321 | CAP,M.P 0.1uF 100V                            |
| C415,416              | CE01005258 | CAP,ELEC. 100uF 25V                           |
| C417                  | CC05009457 | CAP,CERMAIC 0.047uF 50V                       |
| IC401                 | IC00001693 | IC NE5532AN                                   |
| R501,502              | RM24750810 | R,METAL 475 F 1/4W                            |
| R503,504              | RM24752818 | R,METAL 47.5K F 1/4W                          |
| R505,506              | RM21001811 | R,METAL 1K F 1/4W                             |
| R507,508              | RM21782810 | R,METAL 17.8K F 1/4W                          |
| R509,510              | RM22211810 | R,METAL 2.21K F 1/4W                          |
| R511,512              | RM21821814 | R,METAL 1.82K F 1/4W                          |
| R513,514              | RM22212814 | R,METAL 22.1K F 1/4W                          |
| R515,516              | RM21501819 | R,METAL 1.5K F 1/4W                           |
| R517,518              | RM28251812 | R,METAL 8.25K F 1/4W                          |
| R519,520              | RM21501819 | R,METAL 1.5K F 1/4W                           |
| C501,502              | CE01006251 | CAP,ELEC. 10uF 25V                            |
| C503,504              | CS44712423 | CAP,STYROL 47PF 50V                           |
| C505,506              | CE01005258 | CAP,ELEC. 100uF 25V                           |
| C507,508              | CM01008423 | CAP,MYLAR 104 J 50V                           |
| C509,510              | CM01208424 | CAP,MYLAR 124 J 50V                           |
| C511,512              | CM01008423 | CAP,MYLAR 104 J 50V                           |
| C513,514              | CS41510414 | CAP,STYROL 1500PF 50V                         |
| IC501                 | IC00001693 | IC NE5532AN                                   |
| VR501                 | RV10001565 | R,VARIABLE 4TR-2776 100KMN K-20 (BALANCE)     |
| VR502                 | RV10001553 | R,VARIABLE 4TR-2775 50KAx2 K-30 (VOLUME)      |
| VR503,504             | RV10001541 | R,VARIABLE 4TR-2774 20KBx2 K-20 (BASS,TREBLE) |
| R601,602              | RM21821814 | R,METAL 1.82K F 1/4W                          |
| R603,604              | RM24752818 | R,METAL 47.5K F 1/4W                          |
| R605,606              | RM21501819 | R,METAL 1.5K F 1/4W                           |
| R607,608              | RM24750810 | R,METAL 475 F 1/4W                            |
| R609,610              | RM26811814 | R,METAL 6.81K F 1/4W                          |
| R611,612              | RM24750810 | R,METAL 475 F 1/4W                            |
| R613,614              | RM21002815 | R,METAL 10K F 1/4W                            |
| R615,616              | RM21000818 | R,METAL 100 F 1/4W                            |
| R617,618              | RM26811814 | R,METAL 6.81K F 1/4W                          |
| R619,620              | RM22211810 | R,METAL 2.21K F 1/4W                          |
| R621,622              | RM24759813 | R,METAL 47.5 F 1/4W                           |
| R623,624              | RM23322816 | R,METAL 33.2K F 1/4W                          |
| R625,626              | RM22210817 | R,METAL 221 F 1/4W                            |
| R627,628              | RM22210817 | R,METAL 221 F 1/4W                            |
| R629,632              | RM90228220 | R,METAL 0.22 2W                               |
| R633,634              | RM23322816 | R,METAL 33.2K F 1/4W                          |
| R635,636              | RM28251812 | R,METAL 8.25K F /14W                          |
| R637,638              | RM93300123 | R,METAL 330 1W J                              |
| C601,602              | CE01006251 | CAP,ELEC.10uF 25V                             |
| C603,604              | CS47511428 | CAP,STYROL 750PF 50V                          |
| C605,606              | CE01005258 | CAP,ELEC.100uF 25V                            |
| C607,608              | CC33311434 | CAP,CERAMIC 330P                              |
| C609,610              | CC31511432 | CAP,CERAMIC 150PF 50V                         |

| SYMBOL    | PARTS NO.  | DESCRIPTION                                         |
|-----------|------------|-----------------------------------------------------|
| C611,612  | CC31009465 | CAP,CERAMIC 0.01uF 50V                              |
| Q601-608  | TR10000023 | TRANSISTOR 2SA1016 (F)                              |
| Q609,610  | TR10000047 | TRANSISTOR 2SB631K (E,F)                            |
| Q611,612  | TR30000169 | TRANSISTOR 2SC1941 (K,L)                            |
| Q613-616  | TR40000069 | TRANSISTOR W/MICA 2SD600K (E,F)                     |
| Q617,618  | TR10000047 | TRANSISTOR W/MICA 2SB631 (E,F)                      |
| Q619,620  | TR40000021 | POWER TRANSISTOR W/MICA 2SD896 (D,E)                |
| Q621,622  | TR20000041 | POWER TRANSISTOR W/MICA 2SB776 (D,E)                |
| VR601,602 | RV40000022 | R,SEMI-FIXED VM6CKPV-1S-B 2.2K                      |
| D601-604  | DD10000100 | DIODE 1N4148-85                                     |
| F601,602  | FU24000112 | FUSE (BEL 5MF) 125V 4.0A UL/CSA $\Delta$            |
|           | FU23000049 | FUSE (BEL 5SF) 250V 4A S $\Delta$                   |
| R901,902  | RM22740818 | R,METAL 274 F 1/4W                                  |
| R903,904  | RM92200121 | R,METAL 220 1W J                                    |
| R905,906  | RM22741811 | R,METAL 2.74K F 1/4W                                |
| R907      | RM23322816 | R,METAL 3.32K F 1/4W                                |
| C901,902  | CE01005258 | CAP,ELEC.100uF 25V                                  |
| C903,904  | CE04705255 | CAP,ELEC. 470uF 25V                                 |
| C905,906  | CE56804451 | CAP,ELEC. 041 50LPSS6800uF                          |
| C907-910  | CC01009256 | CAP,CERAMIC 0.01uF 250V                             |
| D901,902  | DD20000041 | DIODE RD-18E                                        |
| D903      | DD10000342 | DIODE PBP206                                        |
| F901,902  | FU24000124 | FUSE (BEL 5MF) 125V 5.0A UL/CSA $\Delta$            |
|           | FU23000074 | FUSE (BEL 5SF) 250V 5A S $\Delta$                   |
| C001      | CK00000035 | SPSRK KILLER DE7150F472M                            |
| S001      | SH40000120 | POWER SWITCH C-3600B-T $\Delta$                     |
| S1        | SH30000470 | FUNCTION SW 4TR-2777                                |
| S2        | SH30000481 | FUNCTION SW 4TR-2778                                |
|           | JH00000135 | HEAD PHONE JACK C-3399#1                            |
| D001      | DD40000095 | LED SEL1124R                                        |
| Q901      | TR30000212 | TRANSISTOR 2SC2362 (F,G)                            |
| Q902      | TR10000023 | TRANSISTOR 2SA1016 (F)                              |
|           |            | OTHERS                                              |
|           | AF20000258 | FRONT CHASSIS 2TQF-2                                |
|           | AR20000577 | PRINTED REAR CHASSIS TRP-581                        |
|           | AS01000282 | SIDE CHASSIS 3TQG-1                                 |
|           | PT27807102 | POWER TRANSFORMER TT-278GF $\Delta$                 |
|           | SB00000601 | P.V.C SHIELD PLATE 4TR-2824                         |
|           | SB00000613 | P.V.C SHIELD PLATE 4TR-2825                         |
|           | SP10006375 | P.T SUPPORT 3TQG-3                                  |
|           | SR00000390 | SPACER 4TR-1003                                     |
|           | NP00001949 | NAME STICKER 120V 4TR-2828#1 TNP-382 (U,A)          |
|           | NP00001974 | NAME STICKER 120V(C) 4TR-2828#4 TNP-385 (C)         |
|           | NP00001962 | NAME STICKER 240V 4TR-2828#3 TNP-384 (H,E,K)        |
|           | NP00001950 | NAME STICKER 220V 4TR-2828#2 TNP-383                |
|           | CD00000218 | AC CORD SPT-2 AWG#18 4TR-670#4 (C,U A) $\Delta$     |
|           | CD00000048 | AC POWER CORD 4TR-815 (H,E,K2) $\Delta$             |
|           | CD00000085 | AC POWER CORD C-2504A (K1) $\Delta$                 |
|           | CD00000292 | AC POWER CORD UP-401F 4TR-2631#1 H05VV-F-D $\Delta$ |
|           | CD00000115 | AC POWER CORD C-3763-T (G) $\Delta$                 |
|           | SC00000131 | AC CORD STOPPER SR-5N-4 (K1) $\Delta$               |



| SYMBOL | PARTS NO.  | DESCRIPTION                                                                                                    |
|--------|------------|----------------------------------------------------------------------------------------------------------------|
|        | SC00000027 | AC CORD STOPPER<br>SR-4N-4  |
|        | AH20000837 | HEAT SINKER BOARD 4TQG-5#2                                                                                     |
|        | SP10006287 | H.S SUPPORT 4TQG-4                                                                                             |
|        | AA20000610 | FRONT PANEL 2TQF-4 TFP-620                                                                                     |
|        | BU00001145 | POWER RING 4TQF-13 14x14                                                                                       |
|        | BU00001169 | KNOB RING 4TQF-17 39F                                                                                          |
|        | KB20002681 | POWER BUTTON 4TQF-15 14x14                                                                                     |
|        | OM10001272 | ORNAMENTAL SIDE BOARD<br>4TR-2799#2 H=80MM                                                                     |
|        | OM70000065 | PUSH BUTTON CONNECTOR<br>4TTL-15                                                                               |
|        | SN00000179 | BUTTON SPRING<br>4TR-1988#2 10MM                                                                               |
|        | SR00000870 | ORNAMENTAL PLATE SPACER<br>4TR-2411                                                                            |
|        | AB00000559 | BOTTOM BOARD 2TQG-2                                                                                            |
|        | AU00001195 | TOP COVER POLY<br>3TTF-5#6 H=80MM                                                                              |
|        | KB10001722 | KNOB 4TQF-18 13F                                                                                               |
|        | KB10001734 | KNOB 4TQF-19 24F                                                                                               |
|        | KB10001760 | KNOB 4TQF-6 33F                                                                                                |
|        | FT00000217 | PLASTIC FOOT CAP 4TR-2807                                                                                      |
|        | SR00000882 | UPPER COVER SPACER 4TR-2418                                                                                    |
|        | PL00000782 | STYROL SIDE MOULDING<br>4TTH-13 TZ-166                                                                         |
|        | TN10003690 | INSIDE CARTON 3TR-2788#1                                                                                       |