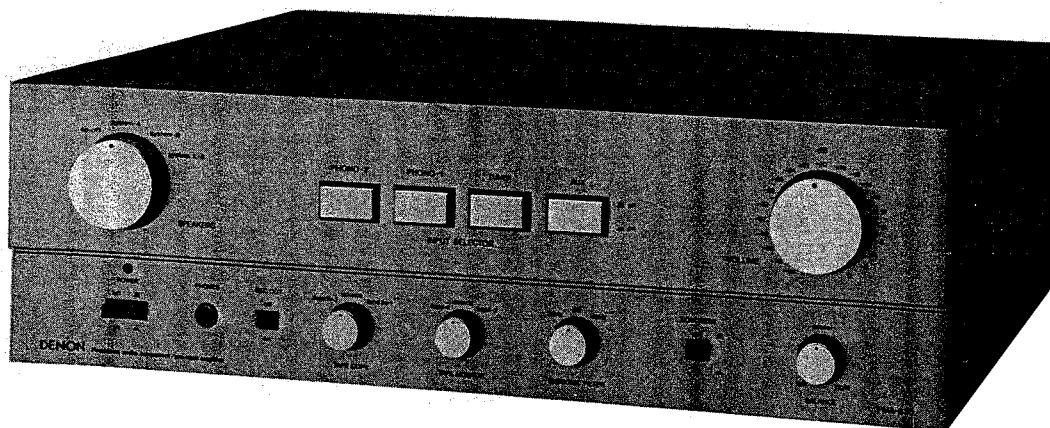


DENON

Hi-Fi Component Amplifier

SERVICE MANUAL MODEL PMA-630



| | |
|--|----|
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NIPPON COLUMBIA CO., LTD.

SPECIFICATIONS

MAIN AMPLIFIER SECTION

Type: Pure complementary push-pull system
DC circuit

Rated Output (Both channels driven)
20 Hz to 20 kHz: 80 W + 80 W r.m.s. at each channel (T.H.D. 0.008% at 8 ohm)
1 kHz: 80 W + 80 W r.m.s. at each channel (T.H.D. 0.01% at 4 ohm)

Total Harmonic Distortion: less than 0.01%

Intermodulation Distortion
60 Hz/7 kHz = 4/1: less than 0.005% (at equivalent rated output)
less than 0.005% (at 1 watt output)

Power Band width: 5 Hz to 100 kHz (IHF, T.H.D. 0.05%)

Transmission Characteristic: DC to 100 kHz + 0 dB, -1 dB (at 1 watt output)

Input Sensitivity: 320 mV r.m.s.
Input Impedance: 100 k ohm
Output Impedance: less than 0.09 ohm
Signal to Noise Ratio: 112 dB

Output Terminals
Speakers: A & B, 4 to 16 ohm load
A + B, 8 to 16 ohm load
Headphone: for Stereo Headphone

PRE AMPLIFIER SECTION

Pre Amplifier Output
Max. Output: 25 V (at 50 k ohm), T.H.D. 0.01%
Rated Output: 320 mV
Total Harmonic Distortion: 0.003% (at 10 V output)

Input Sensitivity/Input Impedance

PHONO-1, 2 (MM): 2.5 mV/50 k ohm
Tuner: 320 mV/30 k ohm
Aux, Tape: 320 mV/30 k ohm

Maximum Allowable Input
PHONO-1, 2: 200 mV 1 kHz
RIAA Deviation: less than ±0.2 dB (20 Hz to 20 kHz)

Signal to Noise Ratio (IHF, A network)
PHONO-1, 2: Better than 86 dB (input terminal shorted)
Tuner, Tape, Aux: Better than 112 dB (input terminal shorted)

Filter Characteristic
Subsonic: 20 Hz, 6 dB/oct
40 Hz, 6 dB/oct

Loudness Control Characteristic
Low range: 100 Hz ±9 dB
High range: 10 kHz + 5 dB

POWER SOURCE: AC 220 V, 50 Hz
POWER CONSUMPTION: 445 W (MAX OUTPUT)

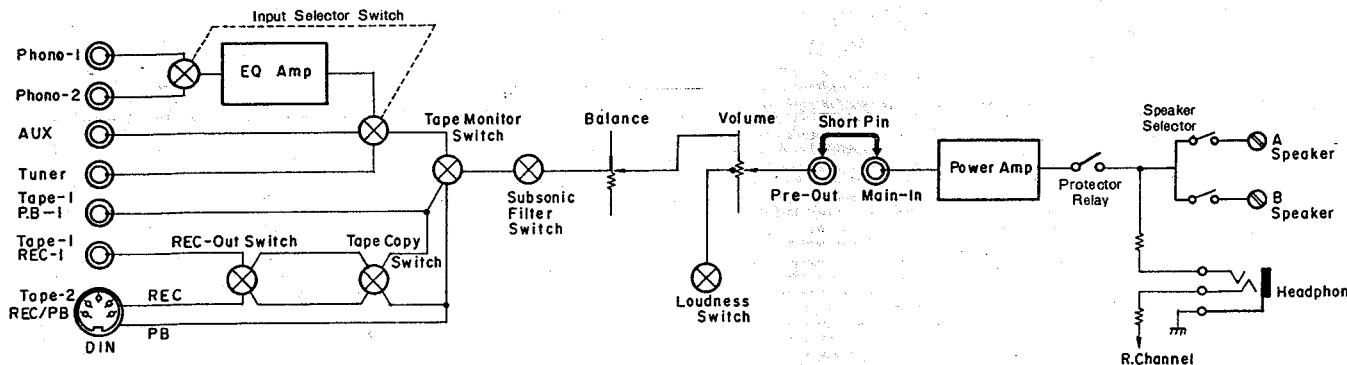
AC OUTLET (for USA and Canada):
UNSWITCHED: 250 W Max. (Total)
SWITCHED: 100 W Max.

DIMENSIONS: 434 mm(W) x 145 mm(H) x 390 mm(D)
17-5/64"(W)x5-45/64"(H)x15-23/64"(D)

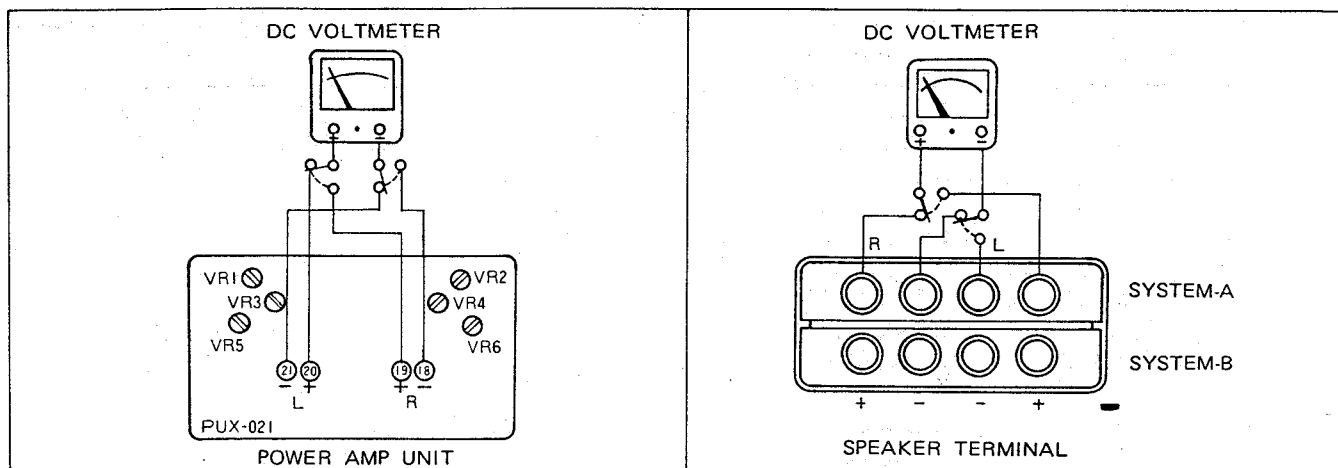
WEIGHT: 16 kg, 35.3 lbs.

These contents are subject to alternation without prior notice.

BLOCK DIAGRAM



METHOD OF ADJUSTMENTS



1. Set the switches of the set as specified below.
 1. Set the SPEAKER changeover switch to A SPEAKER SYSTEM.
 2. Set the VOLUME CONTROL knob to minimum.
 3. Turn the POWER switch off.
 4. Confirm that a U-shaped shortcircuiting pin is inserted between the OUTPUT terminal of the preamplifier and INPUT terminal of the main amplifier.
- 2-1. Connect a DC voltmeter to the A SPEAKER terminal. (for both the L- and R-channels)
 2. Connect the DC voltmeter to the test points, 18, 19, 20 and 21 on PUX-021 (power amplifier printed board) (for both L- and R-channels). The voltage polarities of the test point will be + for 20 of the L-channel, - for 21, and - for 18 of the R channel and + for 19.
- 3-1. With the Sliduck set to 0 V, turn on the set's POWER switch.
 2. While keeping an eye on the DC voltmeter, rise the AC power supply by means of the Sliduck from 0 V to Rated V. Then, carry out the preliminary adjustments described in steps 3 through 5 in a swift manner.
 3. Adjust VR3 (L-channel) and VR4 (R-channel) located on PUX-021 (power amplifier circuit board) so as to bring the speaker output voltage to the range within $0\text{ V} \pm 10\text{ mV}$.
 4. Pull out the U-shaped shortcircuiting pin inserted between the OUTPUT terminal of the preamplifier and INPUT terminal of the main amplifier.
Adjust VR1 (L-channel) and VR2 (R-channel) on PUX-021 (power amplifier printed board) so as to bring the speaker output voltage to the range within $0\text{ V} \pm 10\text{ mV}$.
 5. Insert the U-shaped shortcircuiting pin between the OUTPUT terminal of the preamplifier and INPUT terminal of the main amplifier.
Adjust VR5 (L-channel) and VR6 (R-channel) located on PUX-021 (power amplifier printed board) so as to bring the voltage at test points 18, 19, 20 and 21) to 12 mV ($10 \sim 14\text{ mV}$) (Collector current: 26 mA ($22 \sim 30\text{ mA}$)).
- 4-1. After completing the preliminary adjustments, the following main adjustments are to be carried out, but only after aging of 15 minutes has taken place following completion of the preliminary adjustments.
 2. Again, adjust VR3 (L-channel) and VR4 (R-channel) so as to bring the speaker terminal voltage to the range within $0\text{ V} \pm 10\text{ mV}$.
 3. Pull out the U-shaped shortcircuiting pin inserted between in OUTPUT terminal of the preamplifier and INPUT terminal of the main amplifier.
Adjust VR1 (L-channel) and VR2 (R-channel) in a manner to bring the speaker output voltage to the range within $0\text{ V} \pm 10\text{ mV}$.
With this, all necessary adjustments for the speaker terminal voltage have been completed.
 4. Insert the U-shaped shortcircuiting pin between the OUTPUT terminal of the preamplifier and the INPUT terminal of the main amplifier.
Again, adjust VR5 (L-channel) and VR6 (R-channel) so as to bring the test point voltages to the range within $17 \pm 1\text{ mV}$ (Collector current: $36\text{ mA} \pm 2\text{ mA}$).
With this, all necessary adjustments for the idling current have been completed.

CAUTION: Particular attention should be paid to the subradiator section of PUX-021 (power amplifier printed board) as a voltage of approximately 50 V is being applied to that section.

CAUTIONS REGARDING SERVICING WORK AND SERVICING POINTS

1. Cautions regarding sub-radiator 16 of power transistors 15 and 34

Unlike other models, in this model, the radiator of the power transistors 15 and 34 is composed of the sub-radiator 16 that is directly attached to the power transistors and the main radiator 13.

As a voltage similar to the collector voltage of the power transistors (-52 V for the outer side and $+52\text{ V}$ for the inner side AC Rated V) is being impressed on the sub-radiator, be careful not to touch the chassis with such objects as a screw driver. (The sub-radiator may be easily discerned from the main radiator (coated in black) as no coating aluminum has been applied to it.)

2. Removal of protective circuit printed board (ETC-307B-1) 41

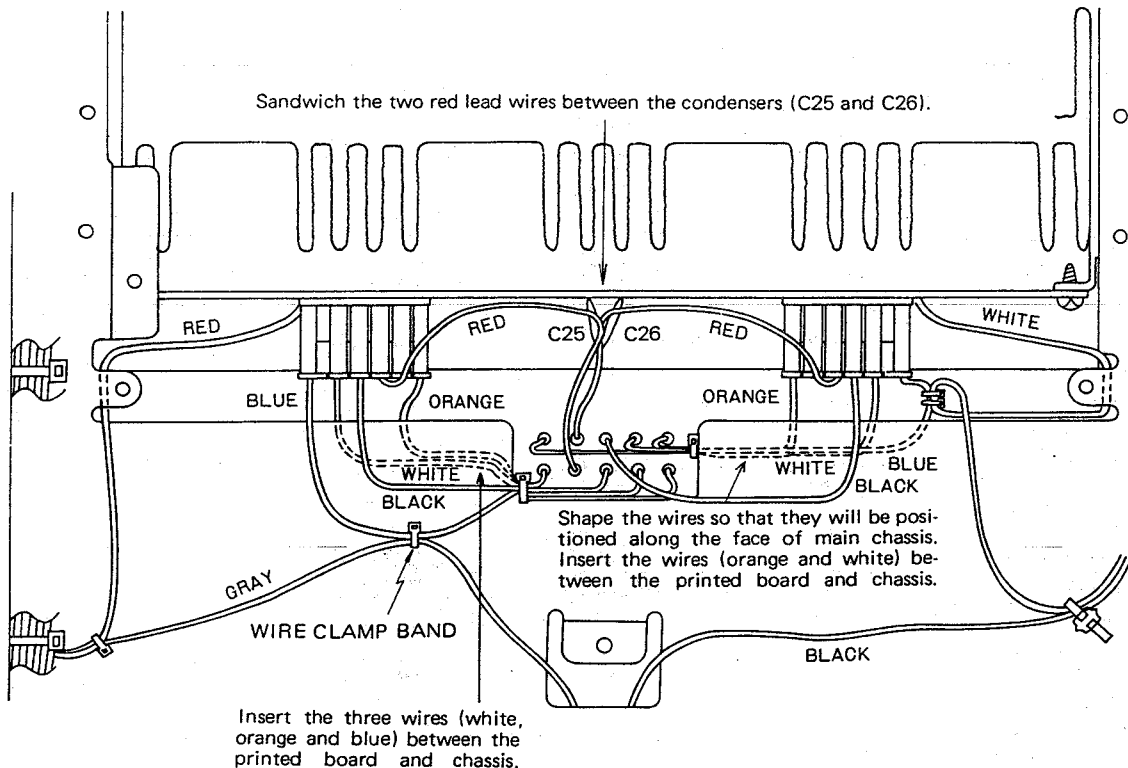
Although voltage checks of the protective circuit printed board can be carried out without removing the printed board, it will be necessary to remove it from the printed board support 42 first when replacing the parts.

The protective circuit printed board can be readily removed by unscrewing the 4 assembly screws 32 of the speaker terminal 50 and by moving the speaker terminal to the inside of the set.

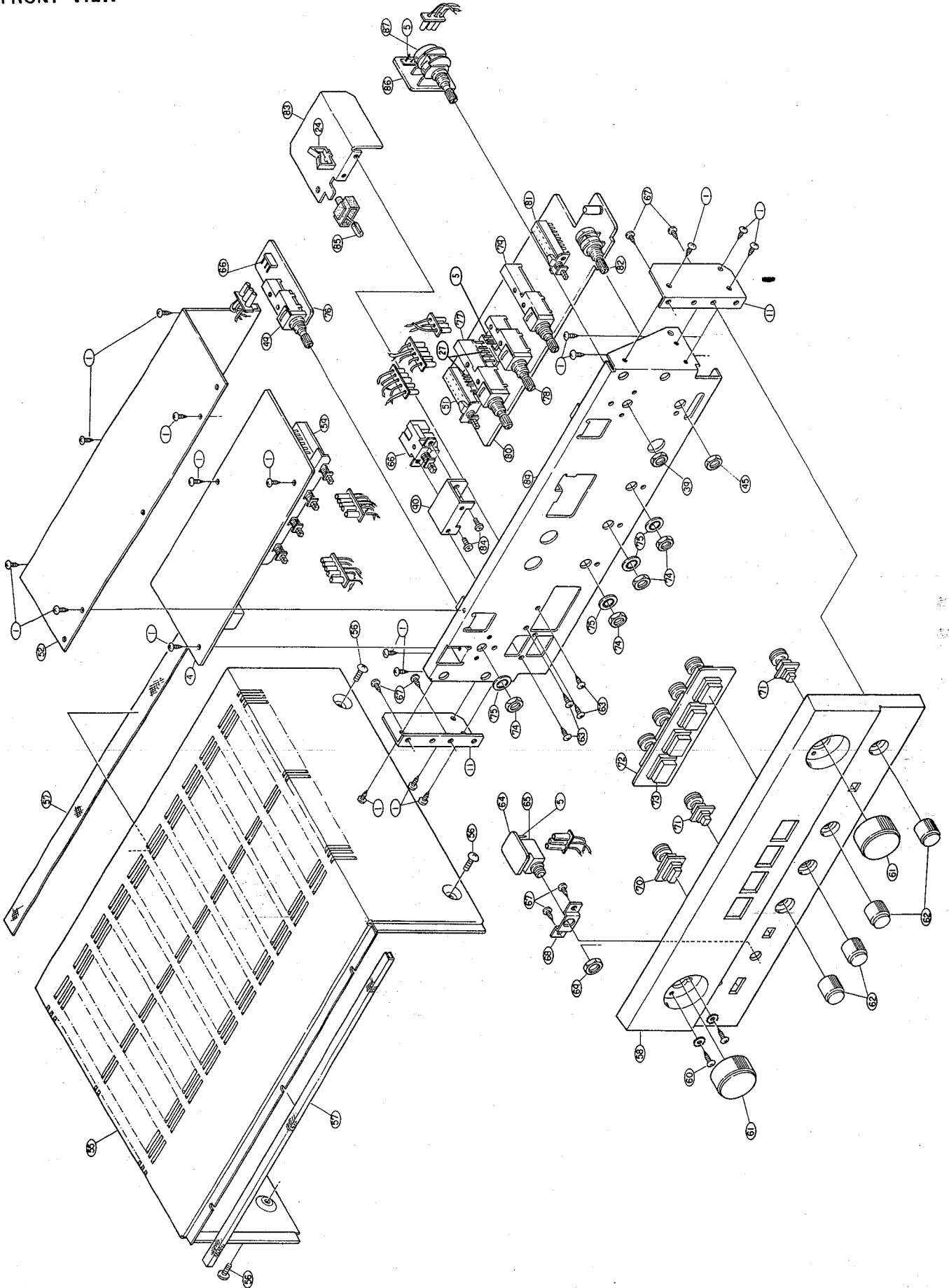
3. Shaping of wires during servicing of power amplifier printed board (PUX-021)

Please refer to the following drawing which illustrates the shaping of wires for the power amplifier printed board. On completion of servicing, the wires are to be shaped as shown in the drawing.

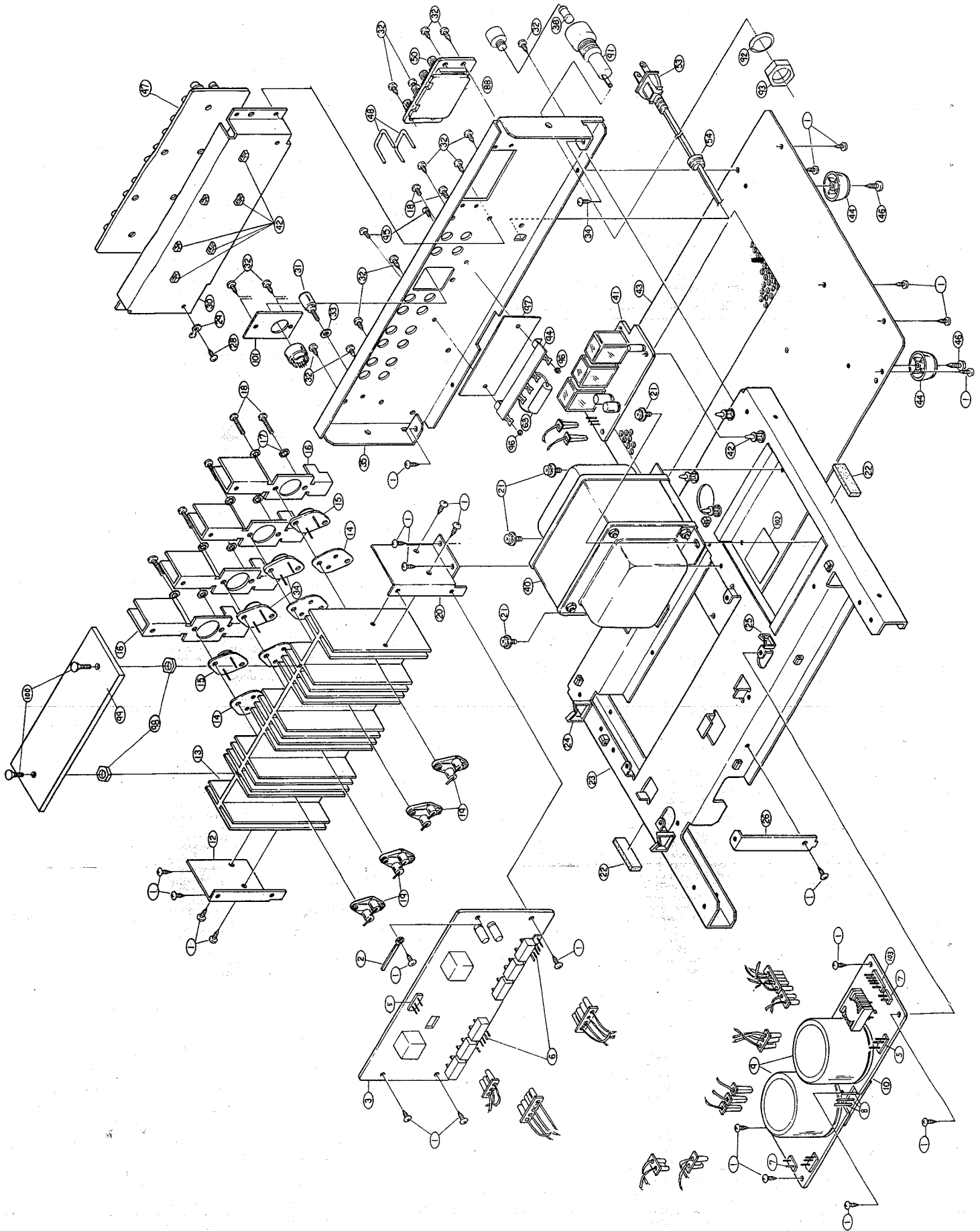
(NOTE: This method of wire shaping is designed so as to produce the best condition for the harmonics distortion factor, crosstalk, and the like.)



EXPLODED VIEW OF CHASSIS AND CABINET FRONT VIEW



BACK VIEW



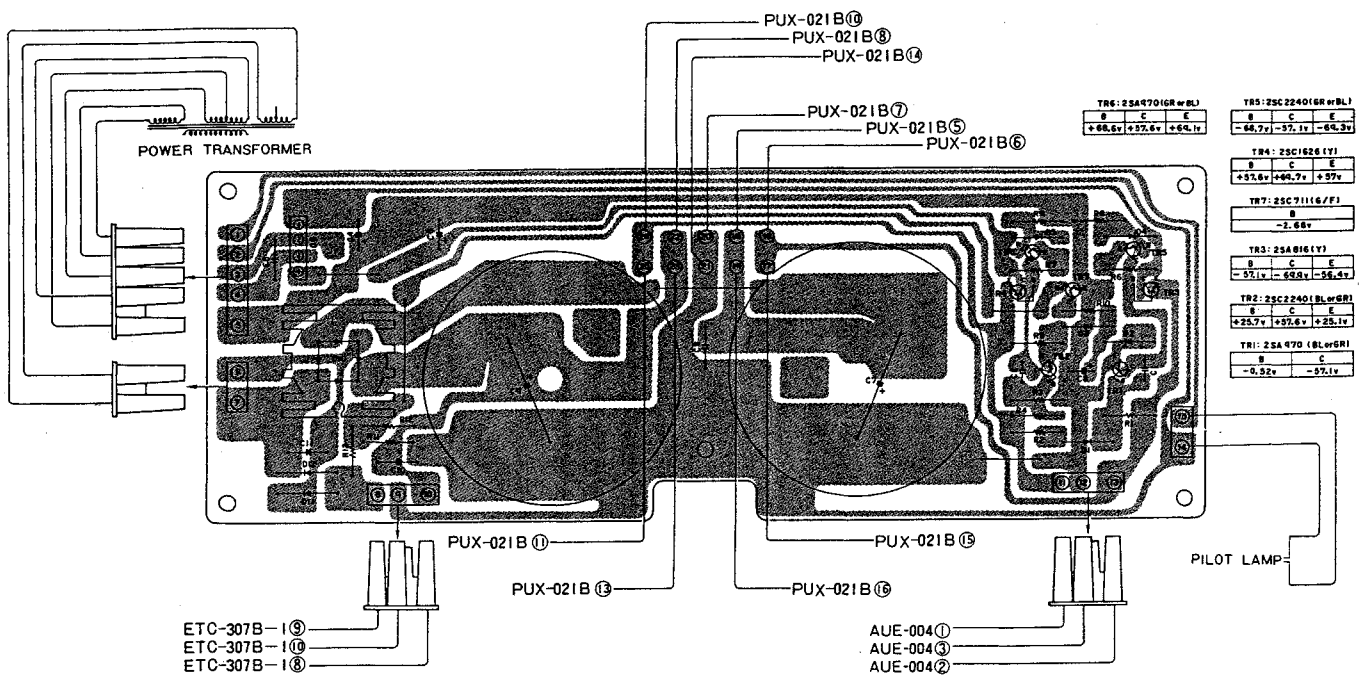
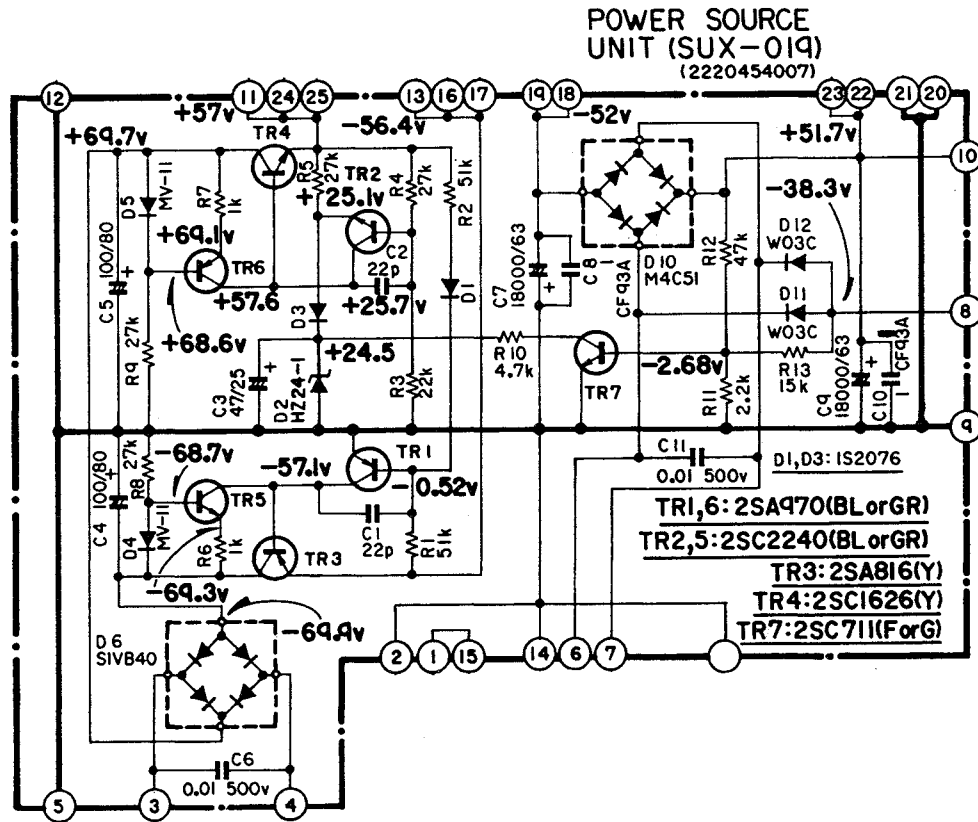
PARTS LIST FOR EXPLODED VIEW

| Ref. No. | Part No. | Part Name & Descriptions | Ref. No. | Part No. | Part Name & Descriptions |
|----------|------------|-----------------------------|----------|------------|---------------------------------|
| 1 | 4730354019 | 3 x 8 CBRTS | 46 | 4730456014 | 4 x 12 CBRTS |
| 2 | EP-4772 | CORD HOLDER | 47 | ETC-142 | INPUT UNIT |
| 3 | PUX-021B | POWER AMP UNIT | 48 | 2050109001 | SHORT PIN |
| 4 | AUE-004 | CONTROL UNIT (A) | 49 | 2120134016 | ROTARY SWITCH (SPEAKERS) |
| 5 | 2050112030 | 3P CONNECTOR PIN | 50 | 2050070004 | 8P SPEAKER TERMINAL |
| 6 | 2050112069 | 6P CONNECTOR PIN | 51 | 2124137006 | PUSH SWITCH (REC. OUT) |
| 7 | 2050112030 | CONNECTOR PIN | 52 | 4140116106 | SHIELD COVER |
| 8 | EP-6071 | BASE PIN | 55 | 1020080300 | TOP COVER |
| 9 | 2546034004 | CAPACITOR 18000 μ F 63V | 56 | 4714404053 | 4 x 8 CTS |
| 10 | SUX-019 | POWER SOURCE UNIT | 57 | 1220007057 | SPACER |
| 11 | 4120467105 | PANEL BRACKET | 58 | | |
| 12 | 4120469006 | RADIATOR BRACKET (L) | 59 | 2124138102 | 4P PUSH SWITCH (INPUT) |
| 14 | - | INSULATING SHEET | 60 | 4700026018 | 3 x 8 CBRTS (TWB) |
| 15 | 2720044014 | 2SB539C(S) TRANSISTOR | 61 | 1120215004 | KNOB (A) |
| 16 | 4170100108 | SUB RADIATOR | 62 | 1120216100 | KNOB (B) |
| 17 | 4753001051 | 3TWA | 64 | ETC-307-4 | HEAD PHONE BOARD |
| 18 | 4711809033 | 3 x 18 CPS | 65 | 2048047007 | HEAD PHONE JACK |
| 19 | 2070002007 | TRANSISTOR SOCKET | 67 | 4730404011 | 4 x 8 CBRTS |
| 20 | 4120470008 | RADIATOR BRACKET (R) | 68 | 4120484007 | HEAD PHONE BRACKET |
| 21 | 4700018000 | 4 x 8 CPS (SW) | 69 | - | 11 mm NUT |
| 22 | - | RUBBER SHEET | 70 | 1130134052 | PUSH KNOB ASS'Y |
| 23 | 4110182209 | MAIN CHASSIS | 71 | 1130134049 | PUSH KNOB ASS'Y |
| 24 | MD-4232 | WIRE CLIP (D) | 72 | 1190012402 | PANEL BUSHING |
| 25 | MD-4368 | WIRE CLIP | 73 | 1130128107 | PUSH KNOB (A) |
| 26 | 4120468104 | SUPPORT BRACKET | 74 | - | 7 mm NUT |
| 27 | 2050112056 | 5P CONNECTOR PIN | 75 | - | 7 TWA |
| 28 | 4730353010 | 3 x 6 CBRTS | 76 | AUX-025-3 | SPEAKER SWITCH UNIT |
| 29 | 2030170005 | 1P CONTACT ASS'Y | 77 | 2120133004 | ROTARY SWITCH (TAPE COPY) |
| 30 | 4140151103 | INPUT BRACKET | 78 | 2120133004 | ROTARY SWITCH (TAPE MONITOR) |
| 31 | 2050071016 | TERMINAL | 79 | 2120135015 | ROTARY SWITCH (SUBSONIC) |
| 32 | 4770064107 | FIXING SCREW | 80 | AUX-025-1 | CONTROL UNIT (B) |
| 33 | 4770018001 | WASHER | 81 | 2124137019 | PUSH SWITCH (LOUDNESS) |
| 34 | 2740062018 | 2SD287C(S) TRANSISTOR | 82 | 2110190002 | VR 100 KOHM (BALANCE CONTROL) |
| 39 | - | 8NSP | 83 | 4120465408 | SHIELD PLATE |
| 41 | ETC-307-1 | PROTECTOR UNIT | 85 | 3930032006 | PILOT LAMP 6.3V 0.15A |
| 42 | MD-5271 | PCB SUPPORT | 86 | AUX-025-1 | MAIN VOLUME CONTROL UNIT |
| 43 | 1050241300 | BOTTOM COVER | 87 | 2110192000 | VR50 KOHM (MAIN VOLUME CONTROL) |
| 44 | 1040040003 | FOOT | 89 | 4110181307 | FRONT CHASSIS |
| 45 | - | 7NSP | 90 | 4120464302 | SWITCH BRACKET |
| | | | 103 | 2038004005 | 5P CONNECTOR PIN |

| Ref. No. | Part Name | Parts No. | |
|----------|-----------------------|-----------------------|-----------------------|
| | | For Europe | For Germany |
| 35 | BACK PANEL | 1050251002 | 1050293002 |
| 36 | FUSE | 2061015074 (3.15A) | 2061015074 (3.15A) |
| 37 | AC OUTLET | NONE | NONE |
| 40 | POWER TRANSFORMER | 2335151004 | 2335151004 |
| 53 | POWER CORD | 2062016001 | 2062016001 |
| 54 | CORD BUSHING | 4450020005 | 4450020005 |
| 63 | CAPACITOR | 2518001007 | 2518001007 |
| 66 | PUSH SWITCH (POWER) | 2124049055 | 2124049055 |
| 91 | FUSE HOLDER | 2020012005 | 2020012005 |
| 92 | WASHER | USE | USE |
| 93 | NUT | USE | USE |
| 94 | 7P WIRING TERMINAL | 2050089008 | 2050089008 |
| 95 | 3 x 8 CPS (SW) | 4700042005 | 4700042005 |
| 96 | 3 mm NUT | 4756006008 | 4756006008 |
| 97 | INSULATING SHEET | 4150088004 | 4150088004 |
| 98 | 6 mm NUT | 4756012005 | 4756012005 |
| 99 | F. BOARD | 4140174106 | 4140174106 |
| 100 | 3 x 12 CFTS | 4032356031 | 4032356031 |
| 101 | DIN PLATE | NONE | 4410316005 |
| 58 | FRONT PANEL | 1440421109 | 1440421112 |
| 102 | INSULATING SHEET | 4150139021 | 4150139021 |
| 13 | POWER RADIATOR (MAIN) | 4170097211 | 4170097211 |

PRINTED CIRCUIT BOARD PATTERNS AND PARTS LIST

SUX-019 POWER SOURCE UNIT

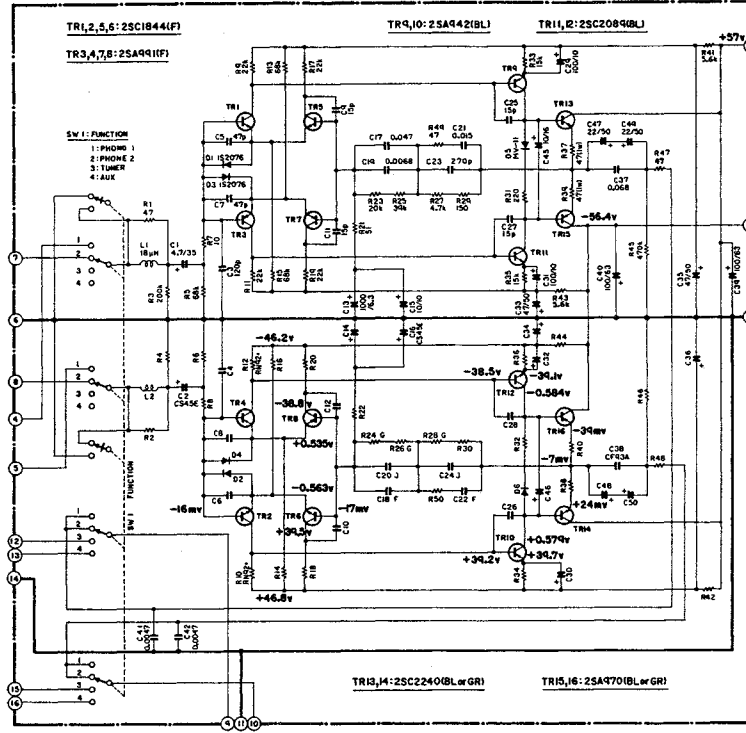


SUX-019 PARTS LIST

| Ref. No. | Part No. | Part Name & Descriptions | | | |
|-----------------------|---------------|-----------------------------------|----------|------|--|
| SEMICONDUCTORS | | | | | |
| TR1,6 | 2710094016 or | 2SA970 (BL) | | | TRANSISTOR |
| TR1,6 | 2710094003 | 2SA970 (GR) | | | TRANSISTOR |
| TR2,5 | 2730187013 or | 2SC2240 (BL) | | | TRANSISTOR |
| TR2,5 | 2730187000 | 2SC2240 (GR) | | | TRANSISTOR |
| TR3 | 2710088006 | 2SA816 (Y) | | | TRANSISTOR |
| TR4 | 2730177007 | 2SC1626 (Y) | | | TRANSISTOR |
| TR7 | 2730064068 or | 2SC711 (G) | | | TRANSISTOR |
| TR7 | 2730064055 | 2SC711 (F) | | | TRANSISTOR |
| D1,3 | 2760049008 | 1S2076 | | | DIODE |
| D2 | 2760220018 | HZ24-1 | | | DIODE |
| D4,5 | 2760200009 | MV-11 | | | DIODE |
| D6 | 2760248003 | SIVB40 | | | DIODE |
| D10 | 2760233005 | M4C-51 | | | DIODE |
| D11,12 | 2760191008 | W03C | | | DIODE |
| RESISTORS | | | | | |
| R6,7 | 2410314009 | 1 k ohm | ±5% | 1/4W | FIXED CARBON FILM RESISTOR |
| R11 | 2410322004 | 2.2 k ohm | ±5% | 1/4W | FIXED CARBON FILM RESISTOR |
| R10 | 2410330009 | 4.7 k ohm | ±5% | 1/4W | FIXED CARBON FILM RESISTOR |
| R13 | 2410342000 | 15 k ohm | ±5% | 1/4W | FIXED CARBON FILM RESISTOR |
| R3 | 2410346006 | 22 k ohm | ±5% | 1/4W | FIXED CARBON FILM RESISTOR |
| R4,5,8,9 | 2410348004 | 27 k ohm | ±5% | 1/4W | FIXED CARBON FILM RESISTOR |
| R12 | 2410354001 | 47 k ohm | ±5% | 1/4W | FIXED CARBON FILM RESISTOR |
| R1,2 | 2462003025 | 51 k ohm | ±1% | 1/4W | FIXED METAL COMPOSITION RESISTOR |
| CAPACITORS | | | | | |
| C1,2 | 2533649004 | 22pF | ±10% | 50V | FIXED CERAMIC CAPACITOR |
| C6,11 | 2531053003 | 0.01μF | +100,-0% | 500V | FIXED CERAMIC CAPACITOR |
| C8,10 | 2561014009 | 1μF | ±10% | 250V | FIXED METALIZED PLASTIC FILM CAPACITOR |
| C3 | 2544027000 | 47μF | | 25V | FIXED ELECTROLYTIC CAPACITOR |
| C4,5 | 2544063006 | 100μF | | 80V | FIXED ELECTROLYTIC CAPACITOR |
| C7,9 | 2546034004 | 18000μF | | 63V | FIXED ELECTROLYTIC CAPACITOR |
| OTHER PARTS | | | | | |
| | 2220454007 | P.C. BOARD | | | |
| | EP-6071 | BASE PIN USED 3 | | | |
| | 2050106101 | EARTH PLATE | | | |
| | 2050087026 | 2P. TERMINAL | | | |
| | 2050112027 | 2P. CONNECTOR BASE | | | |
| | 2050112030 | 3P. CONNECTOR BASE | | | |
| | 2050112056 | 5P. CONNECTOR BASE | | | |
| | 2050112008 | 6P. CONNECTOR BASE | | | |
| | 2090008104 | JUMPER SHORTLEAD USED 2 P=12.5 mm | | | |

AUE-004 CONTROL (A) UNIT

CONTROL AMP UNIT(A) (AUE-004)
12201-630006



| TR15,16: 25A4701(BL or GR) | B | C | E |
|----------------------------|---------|--------|-------|
| | -0.584v | -56.4v | -39mv |

| TR13,14: 25C2240(BL or GR) | B | C | E |
|----------------------------|---------|------|-------|
| | +0.374v | +37v | +24mv |

| TR11,12: 25C2089(BL) | B | C | E |
|----------------------|--------|---------|--------|
| | -38.5v | -0.584v | -39.1v |

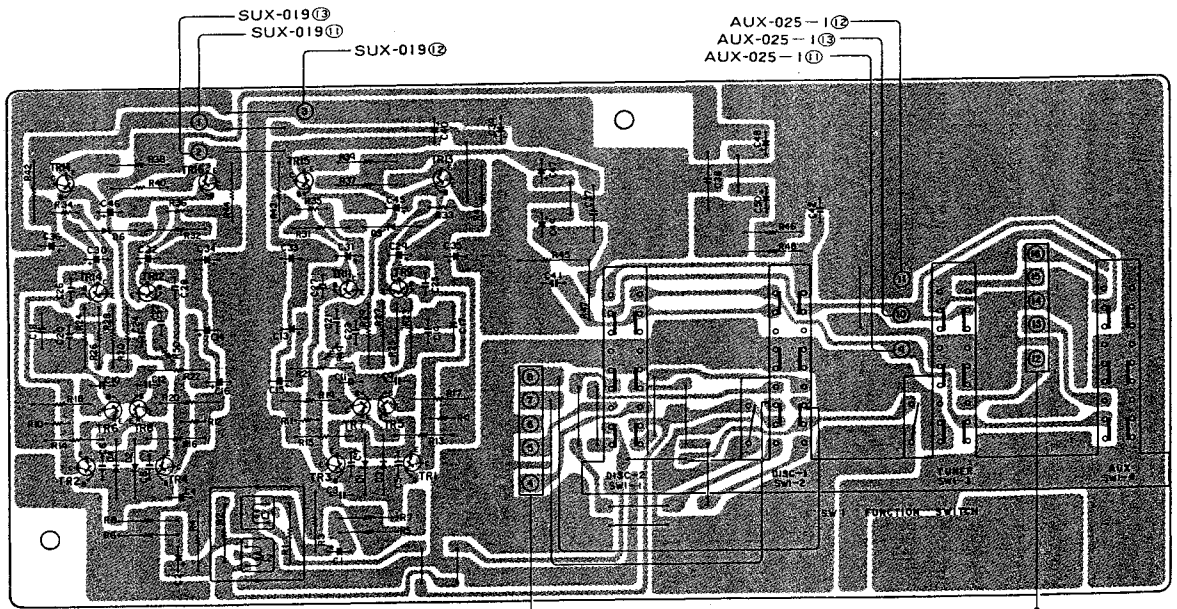
| TR9,10: 25A442(BL) | B | C | E |
|--------------------|--------|---------|--------|
| | +39.2v | +0.374v | +39.7v |

| TR7,8: 25A991(F) | B | C | E |
|------------------|-------|--------|---------|
| | -17mv | -38.5v | +0.535v |

| TR5,6: 25C1844(F) | B | C | E |
|-------------------|-------|--------|---------|
| | -17mv | +39.5v | -0.563v |

| TR3,4: 25A991(F) | B | C | E |
|------------------|-------|--------|---------|
| | -16mv | -38.5v | +0.535v |

| TR1,2: 25C1844(F) | B | C | E |
|-------------------|-------|--------|---------|
| | -16mv | +39.2v | -0.563v |



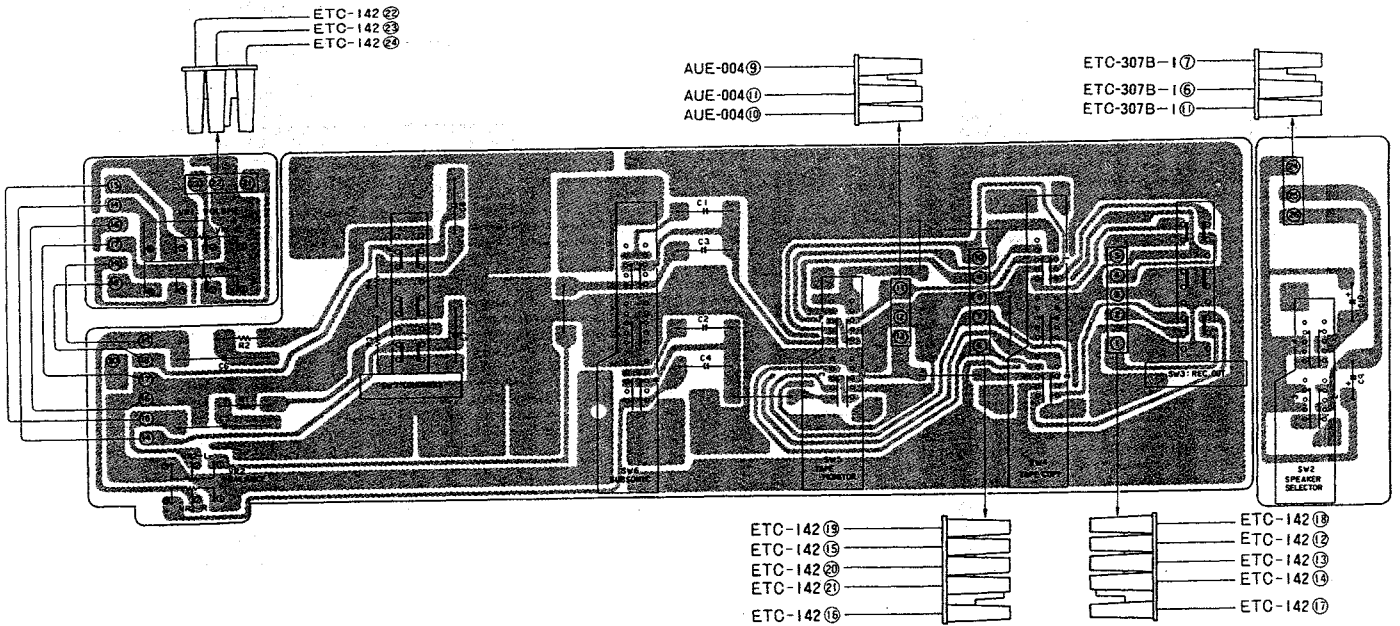
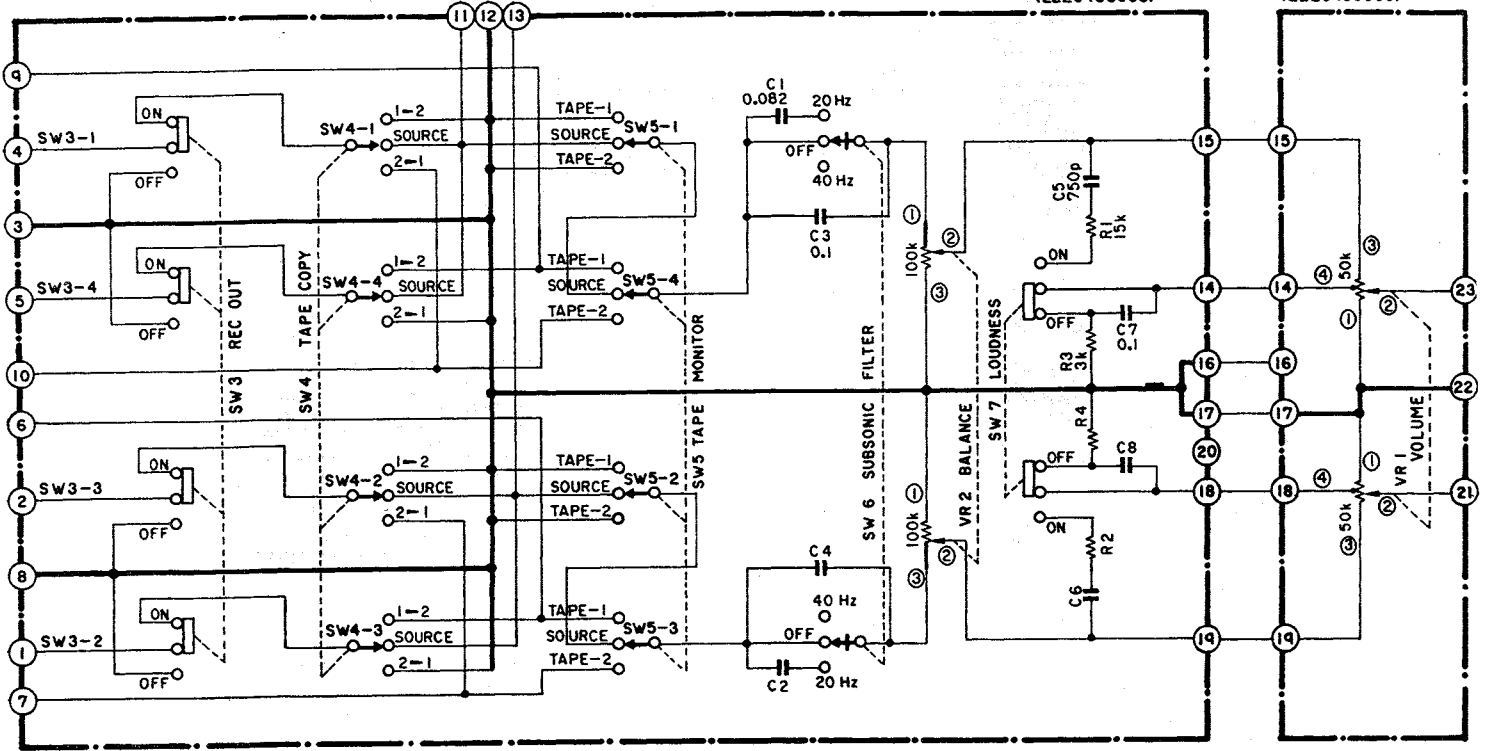
AUE-004 PARTS LIST

| Ref. No. | Part No. | Part Name & Descriptions | | | |
|----------------------------|---------------|------------------------------------|------|------|--|
| SEMICONDUCTOR | | | | | |
| TR1,2,5,6 | 2730188009 | 2SC1844 (F) | | | TRANSISTOR |
| TR3,4,7,8 | 2710095002 | 2SA991 (F) | | | TRANSISTOR |
| TR9,10 | 2710092005 | 2SA942 (BL) | | | TRANSISTOR |
| TR11,12 | 2730184003 | 2SC2089 (BL) | | | TRANSISTOR |
| TR13,14 | 2730187013 or | 2SC2240 (BL) | | | TRANSISTOR |
| TR13,14 | 2730187000 | 2SC2240 (GR) | | | TRANSISTOR |
| TR15,16 | 2710094016 | 2SA970 (BL) | | | TRANSISTOR |
| TR15,16 | 2710094003 | 2SA970 (GR) | | | TRANSISTOR |
| D1,2,3,4 | 2760049008 | 1S2076 | | | DIODE |
| D5,6 | 2760200009 | MV-11 | | | DIODE |
| COILS | | | | | |
| L1,2 | 2318017001 | INDUCTOR (18mH) | | | |
| RESISTORS | | | | | |
| R7,8 | 2410266005 | 10 ohm | ±5% | 1/4W | FIXED CARBON FILM RESISTOR |
| R1,2,47,48 | 2410282005 | 47 ohm | ±5% | 1/4W | FIXED CARBON FILM RESISTOR |
| R21,22 | 2410283004 | 51 ohm | ±5% | 1/4W | FIXED CARBON FILM RESISTOR |
| R29,30 | 2410294006 | 150 ohm | ±5% | 1/4W | FIXED CARBON FILM RESISTOR |
| R31,32 | 2410298002 | 220 ohm | ±5% | 1/4W | FIXED CARBON FILM RESISTOR |
| R41,42,43,44 | 2410332007 | 5.6 k ohm | ±5% | 1/4W | FIXED CARBON FILM RESISTOR |
| R17,18,19,20 | 2410346006 | 22 k ohm | ±5% | 1/4W | FIXED CARBON FILM RESISTOR |
| R33,34,35,36 | 2412022014 | 15 k ohm | ±5% | 1/4W | FIXED CARBON FILM RESISTOR STANDING TYPE |
| R5,6 | 2410358007 | 68 k ohm | ±5% | 1/4W | FIXED CARBON FILM RESISTOR |
| R3,4 | 2410369009 | 200 k ohm | ±5% | 1/4W | FIXED CARBON FILM RESISTOR |
| R45,46 | 2410378003 | 470 k ohm | ±5% | 1/4W | FIXED CARBON FILM RESISTOR |
| R13,14,15,16 | 2410358007 | 68 k ohm | ±5% | 1/4W | FIXED CARBON FILM RESISTOR |
| R49,50 | 2412001022 | 47 k ohm | ±5% | 1/4W | FIXED CARBON FILM RESISTOR |
| R27,28 | 2412032046 | 4.7 k ohm | ±2% | 1/4W | FIXED CARBON FILM RESISTOR |
| R23,24 | 2412012053 | 20 k ohm | ±2% | 1/4W | FIXED CARBON FILM RESISTOR |
| R25,26 | 2412032059 | 39 k ohm | ±2% | 1/4W | FIXED CARBON FILM RESISTOR |
| R9,10,11,12 | 2452011085 | 22 k ohm | | 1/4W | FIXED METAL OXIDE COMPOSITION RESISTOR |
| R37,38,39,40 | 2440025025 | 47 k ohm | ±5% | 1W | FIXED METAL OXIDE FILM RESISTOR |
| CAPACITORS | | | | | |
| C9,10,11,12 25,26,27,28 | 2533647006 | 15pF | ±10% | 50V | FIXED CERAMIC CAPACITOR |
| C5,6,7,8 | 2533653003 | 47pF | ±10% | 50V | FIXED CERAMIC CAPACITOR |
| C3,4 | 2533658008 | 120pF | ±10% | 50V | FIXED CERAMIC CAPACITOR |
| C23,24 | 2533637003 | 270pF | ±10% | 50V | FIXED CERAMIC CAPACITOR |
| C41,42 | 2554078065 | 0.0047μF | ±5% | 100V | FIXED PLASTIC FILM CAPACITOR |
| C21,22 | 2554073086 | 0.015μF | ±5% | 100V | FIXED PLASTIC FILM CAPACITOR |
| C19,20 | 2554079006 | 0.0068 | ±5% | 100V | FIXED PLASTIC FILM CAPACITOR |
| C17,18 | 2554075000 | 0.047μF | ±5% | 100V | FIXED PLASTIC FILM CAPACITOR |
| C37,38 | 2561016007 | 0.068μF | ±10% | 630V | FIXED PLASTIC FILM CAPACITOR |
| C45,46 | 2544015009 | 10μF | | 16V | FIXED ELECTROLYTIC CAPACITOR |
| C15,16 | 2541048105 | 10μF | | 10V | FIXED TANTALUM SOLID CAPACITOR |
| C1,2 | 2541050009 | 4.7μF | | 35V | FIXED TANTALUM SOLID CAPACITOR |
| C47,48,49,50 | 2544066016 | 22μF | | 50V | FIXED ELECTROLYTIC CAPACITOR |
| C13,14 | 2544007004 | 1000μF | | 6.3V | FIXED ELECTROLYTIC CAPACITOR |
| C29,30,31,32 | 2544010004 | 100μF | | 10V | FIXED ELECTROLYTIC CAPACITOR |
| C33,34,35,36 | 2544049004 | 47μF | | 50V | FIXED ELECTROLYTIC CAPACITOR |
| C39,40 | 2544059007 | 100μF | | 63V | FIXED ELECTROLYTIC CAPACITOR |
| OTHER PARTS | | | | | |
| SW1 | 2220455103 | P.W. BOARD | | | |
| | 2050112056 | 5P. CONN. BASE USED 2 | | | |
| | 2034111002 | 3P. CONNECTOR | | | |
| | 2034118005 | 3P. CONNECTOR | | | |
| | 2090008117 | JUMPER SHORTLEAD USED 13 P=12.5 mm | | | |
| | 2090008133 | JUMPER SHORTLEAD USED 4 P= 7.5 mm | | | |
| | 2124138102 | 4P. PUSH SWITCH | | | |
| | 4140116106 | SHIELD COVER | | | |

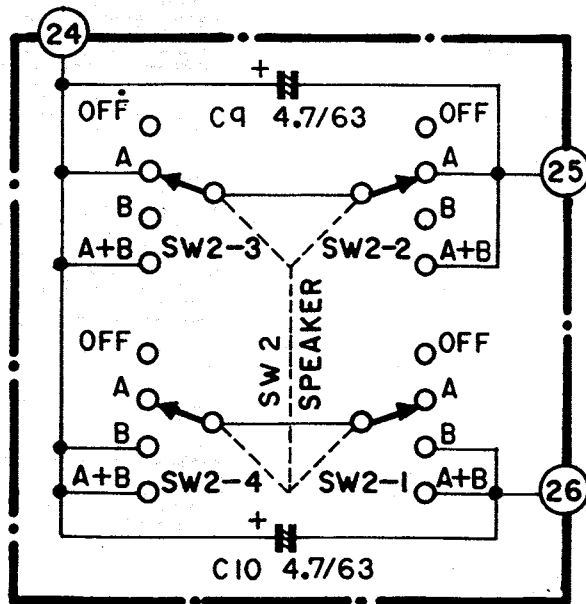
AUX-025

CONTROL UNIT(B)(AUX-025-1)
(2220456005)

MAIN VOLUME CONTROL UNIT
(AUX-025-2)
(2220456005)



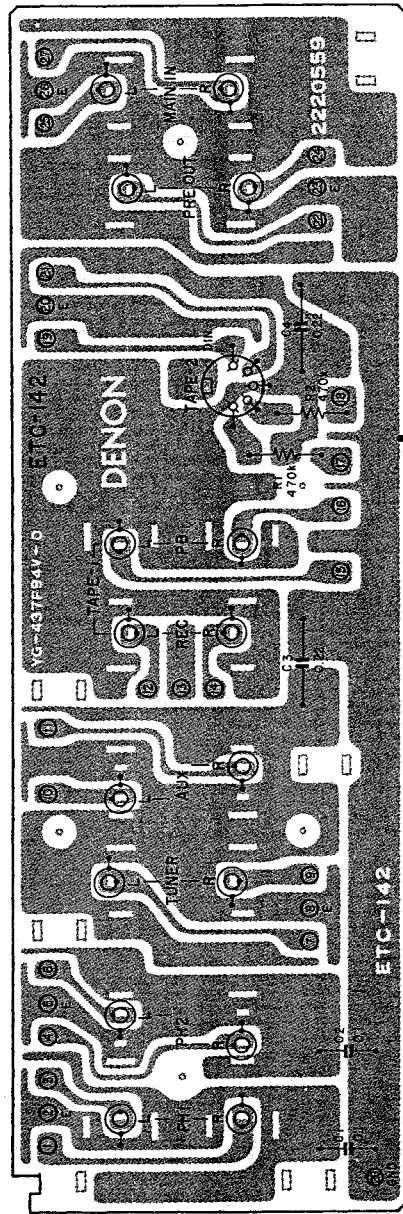
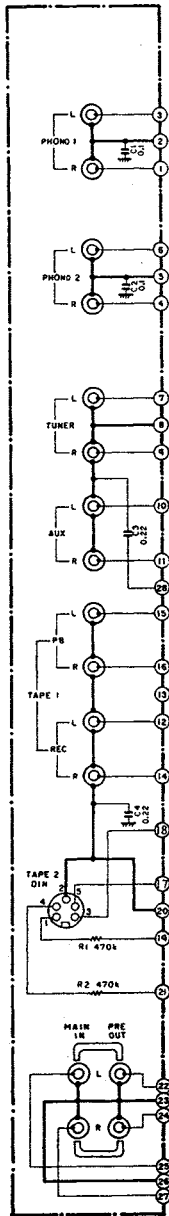
SP SW UNIT (AUX-025-3) (2220456005)



AUX-025-1 CONTROL(B) UNIT; AUX-025-2 MAIN VR UNIT; AUX-025-3 SP SW UNIT;

| Ref. No. | Part No. | Part Name & Descriptions | | | |
|--------------------|------------|--------------------------|-------------|---------------------|------------------------------|
| RESISTORS | | | | | |
| R3,4 | 2410325001 | 3 k ohm | ±5% | 1/4W | FIXED CARBON FILM RESISTOR |
| R1,2 | 2410342000 | 15 k ohm | ±5% | 1/4W | FIXED CARBON FILM RESISTOR |
| CAPACITORS | | | | | |
| C5,6 | 2556022006 | 750pF | ±5% | 50V | FIXED PLASTIC FILM CAPACITOR |
| C3,4,7,8 | 2554081081 | 0.1µF | ±5% | 100V | FIXED PLASTIC FILM CAPACITOR |
| C1,2 | 2554081065 | 0.082µF | ±5% | 100V | FIXED PLASTIC FILM CAPACITOR |
| C9,10 | 2544059036 | 4.7µF | | 63V | FIXED ELECTROLYTIC CAPACITOR |
| OTHER PARTS | | | | | |
| | 2220456102 | P.W. BOARD | | | |
| | 2034117006 | 3P. CON BASE | | | |
| | 2050112030 | 3P. CON BASE | | | |
| | 2050112056 | 5P. CON BASE | | | |
| | 2090008117 | JUMPER | | | |
| | 2090008104 | JUMPER | | | |
| | 2120134016 | ROTARY SWITCH | | | |
| | 2120135002 | ROTARY SWITCH | | | |
| | 2120133004 | ROTARY SWITCH | | | |
| | 2120135015 | ROTARY SWITCH | | | |
| | 2124137019 | 1P. PUSH SWITCH | | | |
| | 2124137006 | 7P. PUSH SWITCH | | | |
| | 2110192000 | V2420V25KA503 | VR50 k ohm | FOR MAIN VOLUME | |
| | 2110190002 | V1620V25KW104K | VR100 k ohm | FOR BALANCE CONTROL | |
| | 3930017021 | PILOT LAMP 6.3V 0.15A | | | |
| | MD-4232 | WIRE CLIP | | | |

ETC-142 INPUT TERMINAL UNIT

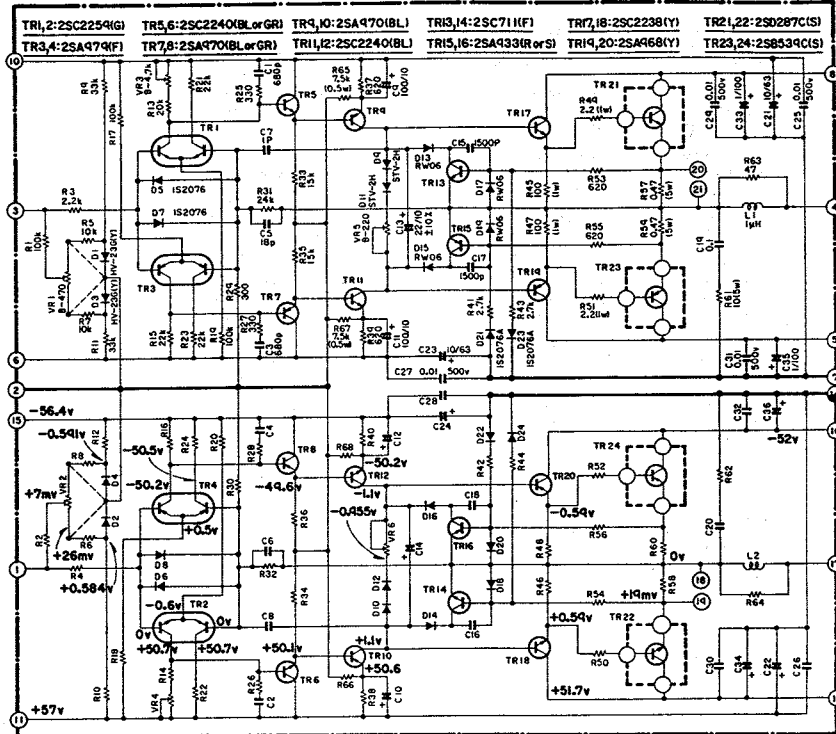


ETC-142 PARTS LIST

| Ref. No. | Part No. | Part Name & Descriptions | | | |
|------------------------------|------------|--------------------------|----------|-----------------|------------------------------|
| RESISTORS, CAPACITORS | | | | | |
| R1,2 | 2410378003 | 470 k ohm | ±5% | 1/4W | CARBON FILM RESISTOR |
| C1,2 | 2531027000 | 0.1μF | +80,-20% | 50V | FIXED CERAMIC CAPACITOR |
| C3,4 | 2551088003 | 0.22μF | ±10% | 50V | FIXED PLASTIC FILM CAPACITOR |
| OTHER PARTS | | | | | |
| | 2220559009 | P.W. BOARD | | | |
| | 2048009003 | 1P. JACK | | | |
| | 2048007005 | 1P. JACK | | | |
| | 2030170005 | 1P. CONTACT | | FOR GND | |
| | 2034089082 | 3P. CONN. | | FOR VOL. | |
| | 2034089037 | 3P. CONN. | | FOR POWER AMP | |
| | 2038066001 | 5P. CONN. | | FOR TAPE PB1,2 | |
| | 2038067000 | 5P. CONN. | | FOR TAPE REC1,2 | |
| | 2038060023 | 5P. CONN. | | FOR PHONO | |
| | 2038068009 | 5P. CONN. | | FOR TU, AUX | |
| | 4450033005 | WIRE CLAMP BAND | | USED 5 | |
| | 2040046006 | 5P. DIN SOCKET | | | |
| | MD-5271 | P.C.B. SUPPORT | | USED 6 | |
| | 4140151103 | INPUT BRACKET | | | |
| | 4730353010 | TAPPING SCREW (2) 3 x 6 | | | |
| | 4770064107 | FIXING SCREW | | | |

PUX-021B POWER AMP UNIT

POWER AMP UNIT (PUX-021B)
(222043802B)



ETC-142 ①
ETC-142 ②
ETC-142 ③

ETC-307B-1 ②

ETC-307B-1 ①

TR7,8: 2SA470 (GR or BL)

| B | C | E |
|--------|--------|--------|
| -50.2v | -56.4v | -44.6v |

TR1,2: 2SC2254 (G)

| C1 | C2 | E |
|--------|--------|-------|
| +50.7v | +50.7v | -0.6v |

TR9,10: 2SA470 (BL)

| B | C | E |
|--------|-------|--------|
| +50.7v | +1.1v | +50.6v |

TR5,6: 2SC2240 (GR or BL)

| B | C | E |
|--------|------|--------|
| +50.7v | +57v | +50.7v |

TR3,4: 2SA479 (F)

| C1 | C2 | E |
|--------|--------|-------|
| -50.2v | -50.5v | +0.5v |

TR11,12: 2SC2240 (BL)

| B | C | E |
|--------|-------|--------|
| -44.6v | -1.1v | -50.2v |

TR15,16: 2SA433 (Rev S)

| E |
|----|
| 0v |

TR13,14: 2SC71 (F)

| E |
|----|
| 0v |

TR19,20: 2SA468 (Y)

| B | C | E |
|-------|------|--------|
| -1.1v | -52v | -0.59v |

TR17,18: 2SC2238 (Y)

| B | C | E |
|-------|--------|--------|
| +1.1v | +51.7v | +0.59v |

TR23,24: 2SB539C (S)

| C |
|------|
| -52v |

TR21,22: 2SD287C (S)

| C | E |
|--------|-------|
| +51.7v | +14mv |

SUX-019 ①
SUX-019 ⑦

SUX-019 ⑤
SUX-019 ③
SUX-019 ②

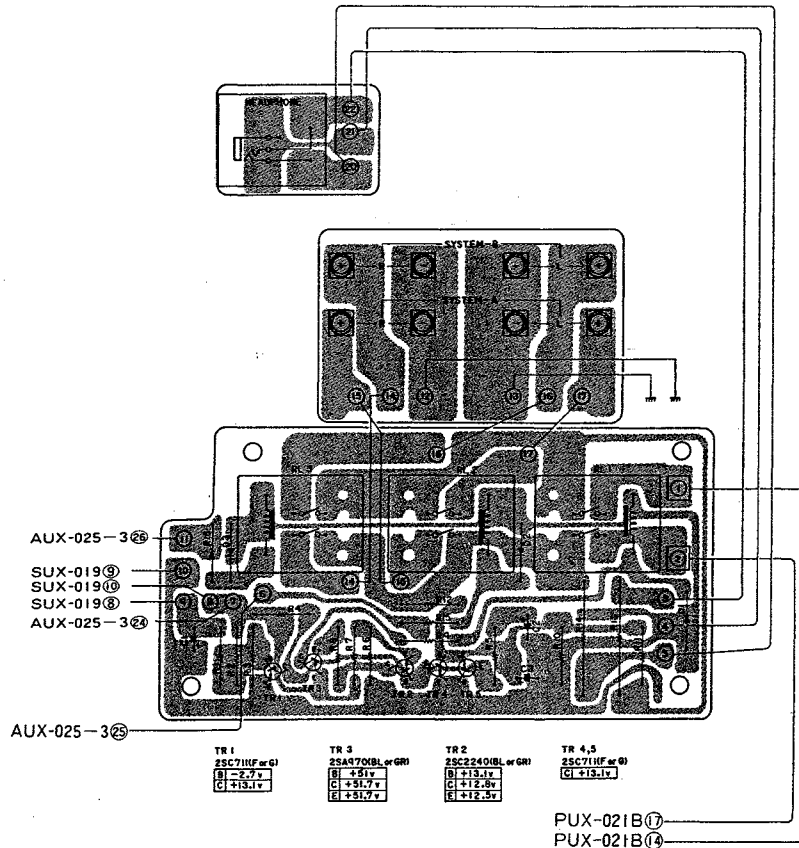
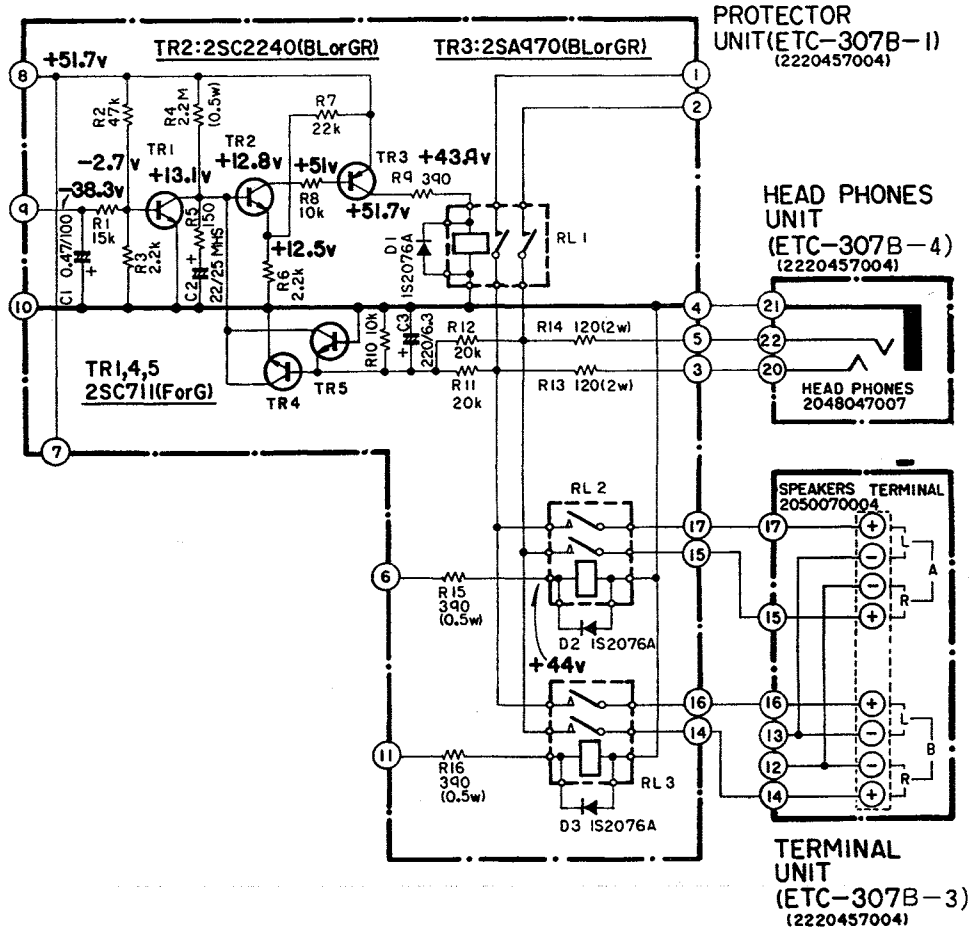
SUX-019 ④
SUX-019 ②

SUX-019 ⑧
SUX-019 ⑥
SUX-019 ②

PUX-021B PARTS LIST

| Ref. No. | Part No. | Part Name & Descriptions | | | |
|-----------------------------|---------------|-----------------------------|----------|------|--|
| SEMICONDUCTORS | | | | | |
| TR1,2 | 2730191012 | 2SC2259 (G) Wt | | | TRANSISTOR |
| TR3,4 | 2710098025 | 2SA979 (F) Wt | | | TRANSISTOR |
| TR5,6 | 2730187000 or | 2SC2240 (GR) | | | TRANSISTOR |
| TR5,6 | 2730187013 | 2SC2240 (BL) | | | TRANSISTOR |
| TR7,8 | 2710094003 or | 2SA970 (GR) | | | TRANSISTOR |
| TR7,8 | 2710094016 | 2SA970 (BL) | | | TRANSISTOR |
| TR9,10 | 2710094016 | 2SA970 (BL) | | | TRANSISTOR |
| TR11,12 | 2730187013 | 2SC2240 (BL) | | | TRANSISTOR |
| TR13,14 | 2730064055 | 2SC711 (F) | | | TRANSISTOR |
| TR15,16 | 2710101006 or | 2SA933 (R) | | | TRANSISTOR |
| TR15,16 | 2710101019 | 2SA933 (S) | | | TRANSISTOR |
| TR17,18 | 2730199001 or | 2SC2238 (Y) | | | TRANSISTOR |
| TR17,18 | 2730199019 | 2SC2238 (F) | | | TRANSISTOR |
| TR19,20 | 2710104003 | 2SA968 (Y) | | | TRANSISTOR |
| TR19,20 | 2710104016 | 2SA968 (O) | | | TRANSISTOR |
| TR21,22 | 2740062018 | 2SD287C (S) | | | TRANSISTOR |
| TR23,24 | 2720044014 | 2SB539C (S) | | | TRANSISTOR |
| D1,2,3,4 | 2760171028 | HV-23G (YL) | | | DIODE |
| D5,6,7,8 | 2760049008 | 1S2076 | | | DIODE |
| D9,10,11,12 | 2760217005 | STV-2H | | | DIODE |
| D13,14,15,16 17,18,19,20 | 2760214008 | RW06 | | | DIODE |
| D21,23,24,25 | 2760049011 | 1S2076A | | | DIODE |
| COILS | | | | | |
| L1,2 | 2320017001 | INDUCTOR (1mH) | | | |
| RESISTORS | | | | | |
| R13,14 | 2410345007 | 20 k ohm | ±5% | 1/4W | FIXED CARBON FILM RESISTOR |
| R63,64 | 2410282005 | 47 ohm | ±5% | 1/4W | FIXED CARBON FILM RESISTOR |
| R25,26,27,28 | 2410302008 | 330 ohm | ±5% | 1/4W | FIXED CARBON FILM RESISTOR |
| R29,30 | 2410301009 | 300 ohm | ±5% | 1/4W | FIXED CARBON FILM RESISTOR |
| R37,38,39,40 | 2410309001 | 620 ohm | ±5% | 1/4W | FIXED CARBON FILM RESISTOR |
| R41,42,43,44 | 2410324002 | 2.7 k ohm | ±5% | 1/4W | FIXED CARBON FILM RESISTOR |
| R3,4 | 2410322004 | 2.2 k ohm | ±5% | 1/4W | FIXED CARBON FILM RESISTOR |
| R5,6,7,8 | 2410338001 | 10 k ohm | ±5% | 1/4W | FIXED CARBON FILM RESISTOR |
| R21,22,23,24 | 2410346006 | 22 k ohm | ±5% | 1/4W | FIXED CARBON FILM RESISTOR |
| R33,34,35,36 | 2410342000 | 15 k ohm | ±5% | 1/4W | FIXED CARBON FILM RESISTOR |
| R31,32 | 2410347005 | 24 k ohm | ±5% | 1/4W | FIXED CARBON FILM RESISTOR |
| R9,10,11,12 | 2410350005 | 33 k ohm | ±5% | 1/4W | FIXED CARBON FILM RESISTOR |
| R17,18,19,20 | 2412032088 | 100 k ohm | ±2% | 1/4W | FIXED CARBON FILM RESISTOR |
| R53,54,55,56 | 2410309001 | 620 ohm | ±5% | 1/4W | FIXED CARBON FILM RESISTOR |
| R65,66,67,68 | 2410206007 | 7.5 k ohm | ±5% | 1/2W | FIXED CARBON FILM RESISTOR |
| R1,2 | 2410362006 | 100 k ohm | ±5% | 1/4W | FIXED CARBON FILM RESISTOR |
| R15,16 | 2412032075 | 22 k ohm | ±2% | 1/4W | FIXED CARBON FILM RESISTOR |
| R45,46,47,48 | 2440029021 | 100 ohm | ±5% | 1W | FIXED METAL OXIDE FILM RESISTOR FORMING TYPE |
| R49,50,51,52 | 2440009025 | 2.2 ohm | ±5% | 1W | FIXED METAL OXIDE FILM RESISTOR FORMING TYPE |
| R57,58,59,60 | 2430037007 | 0.47 ohm | ±10% | 5W | FIXED WIRE WOUND RESISTOR |
| R61,62 | 2430045002 | 10 ohm | ±10% | 5W | FIXED WIRE WOUND RESISTOR |
| CAPACITORS | | | | | |
| C7,8 | 2533594007 | 1pF | ±0.25pF | 50V | FIXED CERAMIC CAPACITOR |
| C5 | 2533609002 | 18pF | ±5% | 50V | FIXED CERAMIC CAPACITOR |
| C1,2,3,4 | 2531003008 | 680pF | ±10% | 50V | FIXED CERAMIC CAPACITOR |
| C15,16,17,18 | 2531005006 | 0.0015μF | ±10% | 50V | FIXED CERAMIC CAPACITOR |
| C25,26,27,28 29,30,31,32 | 2531053003 | 0.01μF | +100,-0% | 500V | FIXED CERAMIC CAPACITOR |
| C19,20 | 2554081081 | 0.1μF | ±5% | 100V | FIXED PLASTIC FILM CAPACITOR |
| C9,10,11,12 | 2544010004 | 100μF | | 10V | FIXED ELECTROLYTIC CAPACITOR |
| C13,14 | 2549015004 | 22μF | ±10% | 10V | FIXED ELECTROLYTIC CAPACITOR |
| C33,34,35,36 | 2544060025 | 1μF | | 100V | FIXED ELECTROLYTIC CAPACITOR |
| C21,22,23,24 | 2544059081 | 10μF | | 63V | FIXED ELECTROLYTIC CAPACITOR |
| OTHER PARTS | | | | | |
| | 2220453105 | P.C. BOARD | | | |
| | 2050075025 | 2P. TERMINAL | | | |
| | 2050112030 | 3P. CONN. BASE | | | |
| | 2030079067 | 1P. CONNECTOR | | | |
| | 2030196005 | 1P. CONNECTOR | | | |
| | 2050112069 | 6P. CONN. BASE | | | |
| | 2116003025 | V10QB221 | | | |
| VR5,6 | 2116003041 | V10QB471 | | | |
| VR1,2 | 2116001001 | V10QB472 | | | |
| VR3,4 | 4170097211 | POWER RADIATOR | | | |
| | 4120469006 | RADIATOR BRACKET | | | |
| | 4120470008 | RADIATOR BRACKET | | | |
| | 4730354019 | TAPPING SCREW (2) 3 x 8 | | | |
| | 4170100108 | RADIATOR | | | |
| | 2070002007 | TRANSISTOR SOCKET | | | |
| | 4753001051 | 3 mm TOOTH WASHER | | | |
| | 4711809033 | CROSS PAN SCREW 3 x 18 | | | |
| | | USED 2 | | | |
| | | USED 2 | | | |
| | | VARIABLE RESISTOR 200 ohm | | | |
| | | VARIABLE RESISTOR 470 ohm | | | |
| | | VARIABLE RESISTOR 4.7 k ohm | | | |
| | | USED 4 | | | |
| | | USED 4 FOR TR21 ~ 24 | | | |
| | | USED 4 | | | |
| | | USED 8 | | | |
| | | USED 8 | | | |

ETC-307B PROTECTOR UNIT

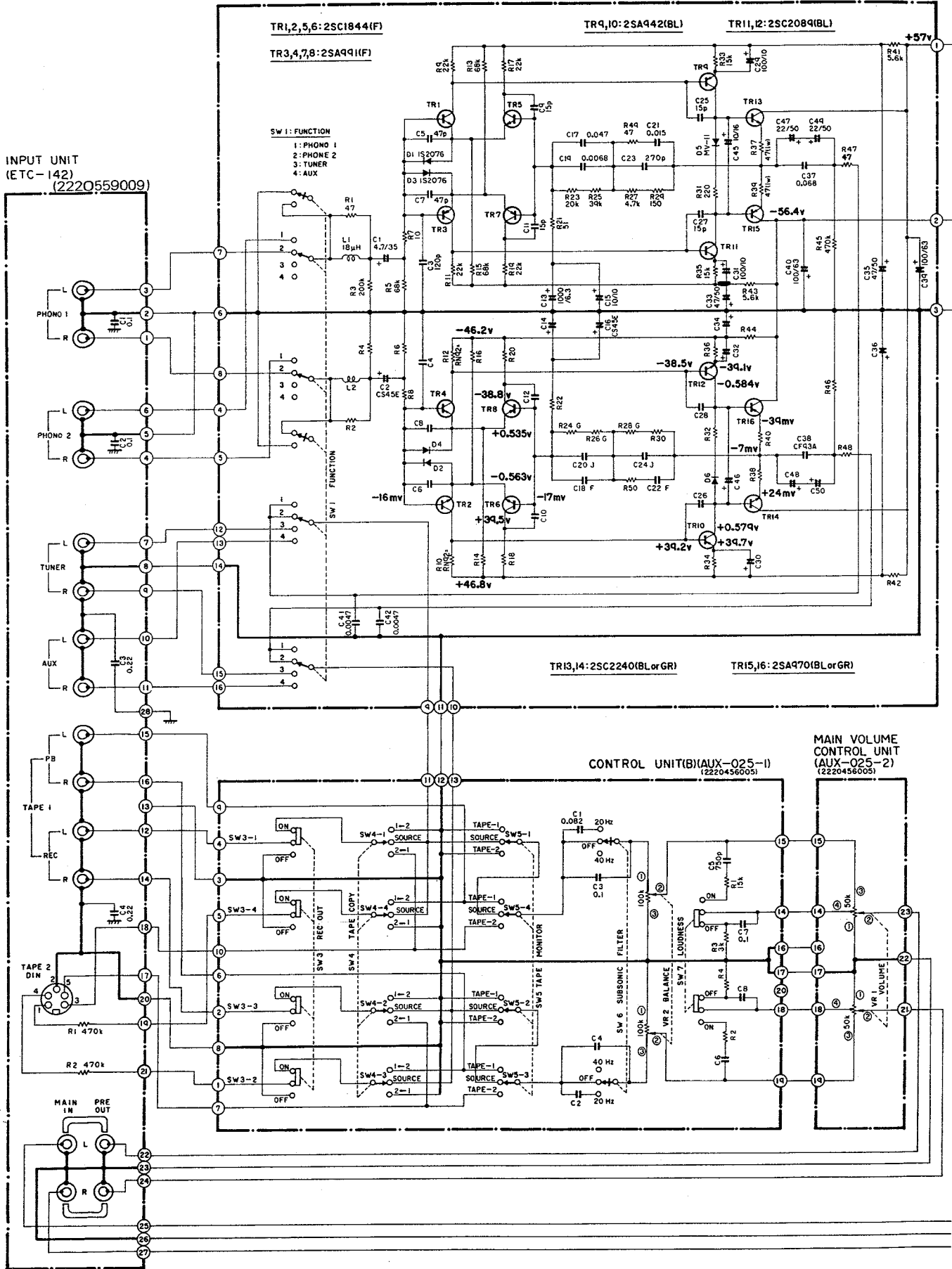


ETC-307B PARTS LIST

| Ref. No. | Part No. | Part Name & Descriptions | | | |
|-----------------------|------------|--------------------------|------------|------|--|
| SEMICONDUCTORS | | | | | |
| TR1,4,5 | 2730064068 | 2SC711 (G) | TRANSISTOR | | |
| TR2 | 2730187000 | 2SC2240 (GR) | TRANSISTOR | | |
| TR3 | 2710094003 | 2SA970 (GR) | TRANSISTOR | | |
| D1,2,3 | 2760049011 | 1S2076A | DIODE | | |
| RESISTORS | | | | | |
| R5 | 2410294006 | 150 ohm | ±5% | 1/4W | FIXED CARBON FILM RESISTOR |
| R9 | 241304006 | 390 ohm | ±5% | 1/4W | FIXED CARBON FILM RESISTOR |
| R3,6 | 2410322004 | 2.2 k ohm | ±5% | 1/4W | FIXED CARBON FILM RESISTOR |
| R11,12 | 2410345007 | 20 k ohm | | 1/4W | FIXED CARBON FILM RESISTOR |
| R8,10 | 2410338001 | 10 k ohm | | 1/4W | FIXED CARBON FILM RESISTOR |
| R1 | 2410342000 | 15 k ohm | | 1/4W | FIXED CARBON FILM RESISTOR |
| R7 | 2410346006 | 22 k ohm | | 1/4W | FIXED CARBON FILM RESISTOR |
| R2 | 2410354001 | 47 k ohm | | 1/4W | FIXED CARBON FILM RESISTOR |
| R4 | 2410757006 | 2.2 M ohm | | 1/2W | FIXED CARBON FILM RESISTOR |
| R15,16 | 2410175002 | 390 ohm | | 1/2W | FIXED CARBON FILM RESISTOR |
| R13,14 | 2440087018 | 120 ohm | | 2W | FIXED METAL OXIDE FILM RESISTOR FORMING TYPE |
| CAPACITORS | | | | | |
| C1 | 2544060038 | 0.47μF | | 100V | FIXED ELECTROLYTIC CAPACITOR |
| C3 | 2544004007 | 2.20μF | | 6.3V | FIXED ELECTROLYTIC CAPACITOR |
| C2 | 2549005027 | 22μF | | 25V | FIXED ELECTROLYTIC CAPACITOR |
| OTHER PARTS | | | | | |
| | 2220457101 | P.W. BOARD | | | |
| | EP-6071 | BASE PIN | | | |
| | 2050112030 | 3P. CONN. BASE | | | |
| | 2048047007 | HEAD PHONE JACK | | | |
| | 4450033005 | WIRE CLAMP BAND | | | |
| | 2140037009 | RELAY | | | |
| | 2050070004 | 8P. TERMINAL | | | |
| | 2034118018 | 3P. CONN. | | | FOR H/PHONE |
| | 2034118021 | 3P. CONN. | | | FOR SW. |
| | 2034114038 | 3P. CONN. | | | FOR +B |
| | 2030195006 | 1P. CONN. | | | FOR SP TERMINAL (L) |
| | 2030078013 | 1P. CONN. | | | FOR SP TERMINAL (R) |
| | 4770064107 | FIXING SCREW | | | FOR SP TERMINAL FIXED |
| | 2050071016 | TERMINAL | | | FOR GND TERMINAL |

WIRING DIAGRAM

CONTROL AMP UNIT(A) (AUE-004) (2220455006)



POWER AMP UNIT (PUX-021B)

(2220453008)

