

# DENON

Hi-Fi Pre Amplifier

## SERVICE MANUAL MODEL PRA-1000 STEREO PRE-AMPLIFIER



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**NIPPON COLUMBIA CO., LTD.**

AUG. 1983

## SPECIFICATIONS

## EQUALIZER AMPLIFIER (PHONO IN ~ REC OUT)

|                                   |  |
|-----------------------------------|--|
| Input level/input impedance:      | PHONO-1 MC: 0.1 mV/100 ohm<br>PHONO-2 MM: 2.5 mV/47 k ohm                            |
| Max. allowable input:             | PHONO-1 MC: 12 mV/1 kHz<br>PHONO-2 MM: 320 mV/1 kHz                                  |
| Max. output/rated output:         | 20 V/150 mV  |
| Total higher harmonic distortion: | Below 0.001% over a range of 20 Hz to 20 kHz (5 V OUT)                               |
| RIAA deviation:                   | PHONO-1 MC: 20 Hz ~ 100 kHz $\pm 0.2$ dB<br>PHONO-2 MM: 20 Hz ~ 100 kHz $\pm 0.2$ dB |
| SN ratio:                         | PHONO-1 MC: 77 dB<br>PHONO-2 MM: 90 dB (IHF "A") 0.25 mV or the equivalent           |
| Separation:                       | 20 Hz, 1 kHz, over 80 dB, 20 kHz over 70 dB  |
| Gain:                             | 35.6 dB (1 kHz) . . . . .PHONO-2 MM<br>63.5 dB (1 kHz) . . . . .PHONO-1 MC           |

## HIGH-LEVEL AMPLIFIER (AUX IN ~ PRE OUT)

|                                   |  |
|-----------------------------------|--|
| Input level/input impedance:      | TUNER, DAD, AUX, PB-1, PB-2 150 mV/47 k ohm  |
| Max. output/rated output:         | 10 V/1.0 V   |
| Total higher harmonic distortion: | Below 0.002% over a range of 20 Hz to 20 kHz (5 V OUT)   |
| Frequency response:               | 2 Hz ~ 300 kHz $\begin{matrix} +0 \\ -3 \end{matrix}$ dB (10 Hz ~ 100 kHz $\begin{matrix} +0 \\ -0.3 \end{matrix}$ dB) |
| SN ratio:                         | 105 dB   |
| Separation:                       | 100 dB Vol max 20 Hz, 1 kHz, 80 dB 20 kHz  |
| Muting:                           | PRE OUT off Muting (indication by LED)   |
| Filters:                          | HIGH FILTER 7 kHz 6 dB/OCT<br>LOW FILTER 16 Hz 6 dB/OCT  |
| Tone controls:                    | TREBLE 10 kHz $\pm 8$ dB<br>BASS 100 Hz $\pm 8$ dB   |

## OTHERS

|  |   |
|--|---|
| AC outlets<br>(For U.S.A., Canada, Singapore and<br>Hong Kong) | 2 AC outlets (700 W — total) unswitched<br>3 AC outlets (210 W — total) switched                          |
| Power source voltage and power<br>supply frequency:            | AC 120 V, 60 Hz<br>or AC 110/120/220/240 V 50 Hz/60 Hz (Multiple)<br>or AC 220V 50 Hz<br>or AC 240V 50 Hz |
| Power consumption:   | 20 W  |
| Dimensions:  | W x H x D (mm) (including control knobs and stand)<br>464 x 124 x 312                                     |
| Weight:  | 6.0 kg  |

Design and specifications of the PRA-1000 are subject to change without notice.

NOTE: The following codes correspond to the appropriate models.  
E3 for U.S.A., EC for Canada, E2 for Europe, E1 for Hong Kong and Singapore.  
This Service Manual is prepared based on E3.

DESCRIPTION OF EACH SECTION AND FUNCTION

FRONT PANEL VIEW

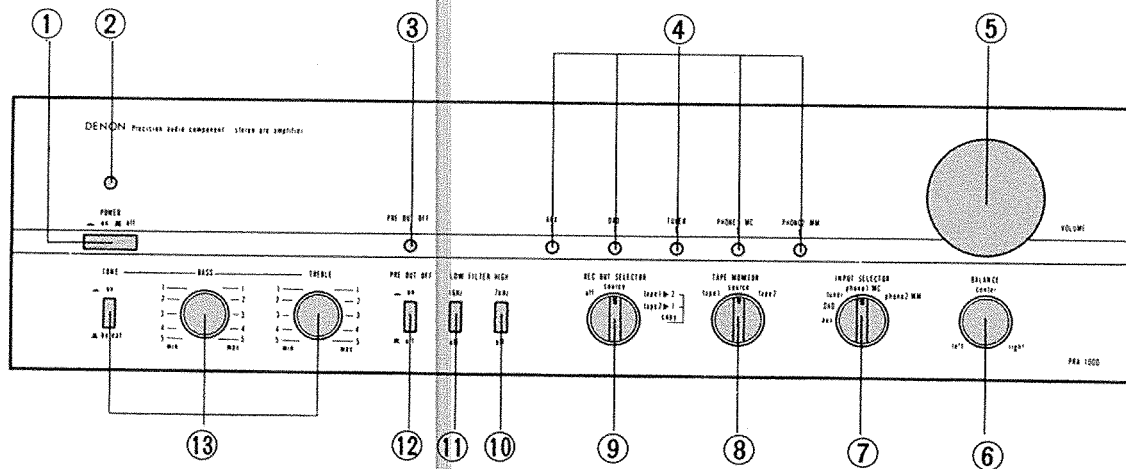


Fig. 1

- |   |  |
|---|--|
| <p>1 POWER (power switch)</p> <p>2 POWER INDICATOR LAMP (power supply pilot lamp)</p> <p>3 PRE-OUT OFF PILOT LAMP</p> <p>4 INPUT SELECTOR PILOT LAMP (input select pilot lamp)</p> <p>5 VOLUME (volume control)</p> <p>6 BALANCE (left-right volume balancing control)</p> <p>7 INPUT SELECTOR (input selector switch)</p> <p>● PHONO-1, ● PHONO-2, ● TUNER, ● DAD, MC MM ● AUX</p> | <p>8 TAPE MONITOR (tape monitor switch)</p> <p>● SOURCE, ● TAPE-1, ● TAPE-2</p> <p>9 REC OUT SELECTOR (REC OUT selector switch)</p> <p>● OFF, ● SOURCE, ● COPY TAPE 1 ▶ 2, ● COPY TAPE 2 ▶ 1</p> <p>10 HIGH FILTER (high-frequency cutoff filter switch)</p> <p>11 LOW FILTER (low-frequency cutoff filter switch – subsonic filter switch)</p> <p>12 TONE (tone controls)</p> <p>● TREBLE, ● BASS, ● DEFEAT</p> |
|---|--|

BACK PANEL VIEW

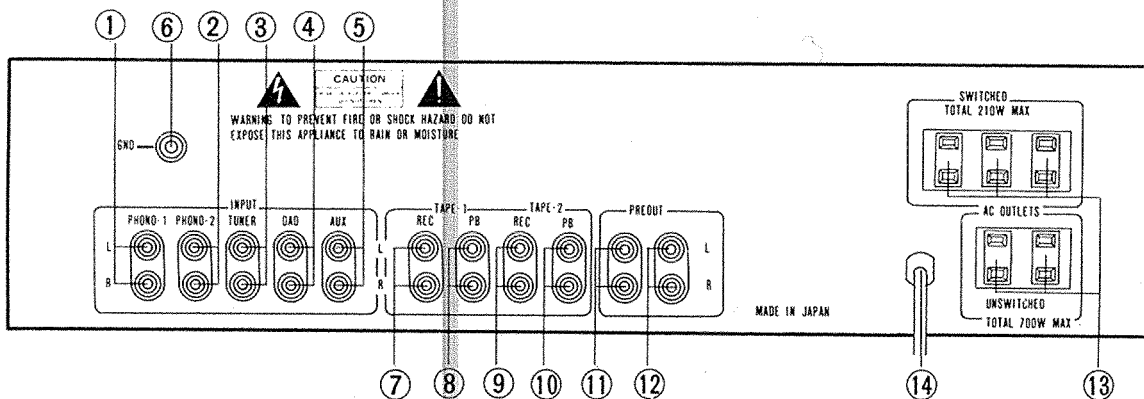
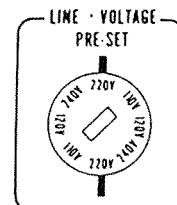


Fig. 2

- |   |   |
|---|---|
| <p>① PHONO-1 (phono-1 input terminal) (for MC type)</p> <p>② PHONO-2 (phono-2 input terminal) (for MM type)</p> <p>③ TUNER (tuner input terminal)</p> <p>④ DAD (digital audio disc input terminal)</p> <p>⑤ AUX (auxiliary input terminal)</p> <p>⑥ GND (grounding terminal)</p> <p>⑦ ⑧ ⑨ ⑩ TAPE-1 AND TAPE-2 (tape recording and playback terminals)</p> <p>⑪ ⑫ PRE OUT (pre-amplifier output terminals)</p> <p>⑬ AC OUTLET (AC power supply outlets) (NOT INCLUDED IN SYSTEMS FOR EUROPEAN USE)</p> <p>⑭ POWER CORD</p> | <p>● LINE VOLTAGE (voltage changeover switch) (NOT INCLUDED IN SYSTEMS FOR EUROPE OR CANADA, U.S.A. USE)</p> <p>* It is possible to change the voltage by turning the VOLTAGE SELECTOR on the back panel using a screw driver.</p> <p>* Do not twist the VOLTAGE SELECTOR with abnormal force.</p> <p>* If the voltage switch is not easy, contact your local DENON dealer.</p> |
|---|---|



PRA-1000 Back Panel Fig. 3

## CONNECTIONS

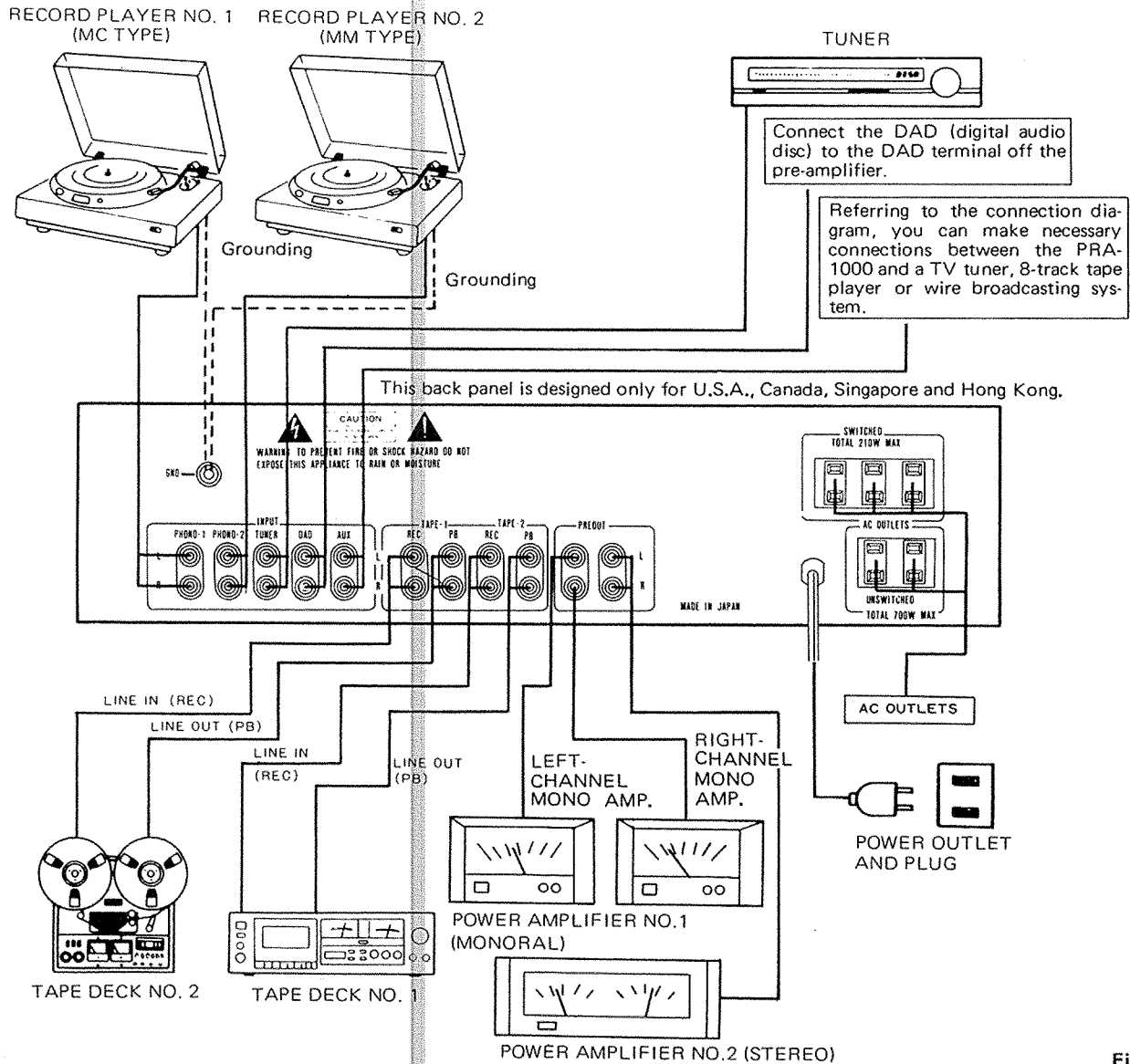


Fig. 4

## PRECAUTIONS ON CONNECTION

- Do not connect the power cord to the outlet until all necessary connections are completed.
- After confirming the right and left channels, connect L with L and R with R.
- Every plug must be inserted firmly into its jack; an incomplete connection will often be the cause of noise.
- Do not connect any other electrical device to the AC outlets of the PRA-1000; these outlets are provided only for audio equipment.
- Avoid bundling the power cord together with the pin plugs, and also keep the pin cord away from the power transformer. Otherwise, humming or other noise will occur.

## AC OUTLETS

The AC outlets are to supply power to other audio equipment such as a tuner, record player, tape deck, and others which are connected to the PRA-1000 pre-amplifier.

- AC outlets marked SWITCHED (total capacity 210 W):  
The power supply from each outlet is turned on and off with the PRA-1000's power switch.
- AC outlets marked UNSWITCHED (total capacity 700 W):  
The power supply at each of these outlets is always on, regardless of operation of the power switch. Therefore, you can connect the power cord of the DENON power amplifier, POA-1500, for example to each outlet.

BLOCK DIAGRAM

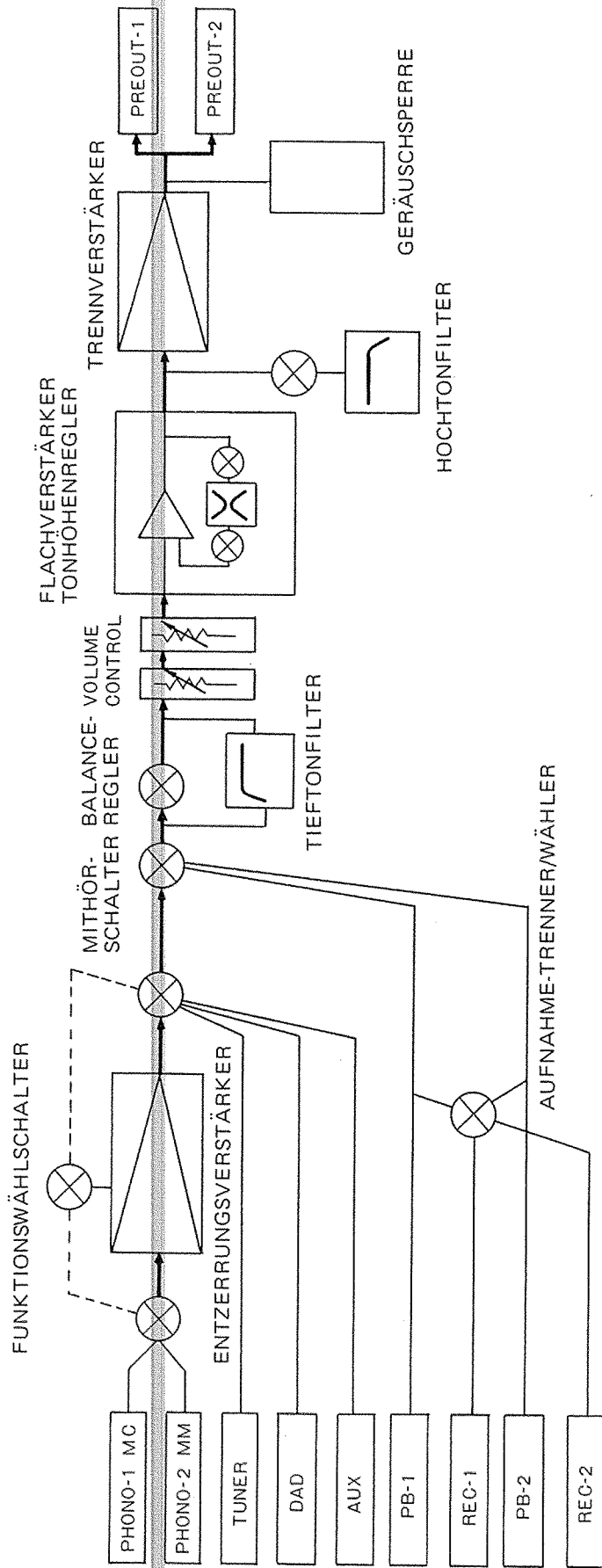


Fig. 5

## TROUBLESHOOTING

Prior to anything, be sure whether or not your audio system is really in trouble.

1. Check all connections for correctness.
2. See to it that your audio system is operated properly according to the instruction manual.
3. Check that the speakers and turntable are working properly.

If your PRA-1000 pre-amplifier does not provide normal performance, check it referring to the following trouble-shooting chart.

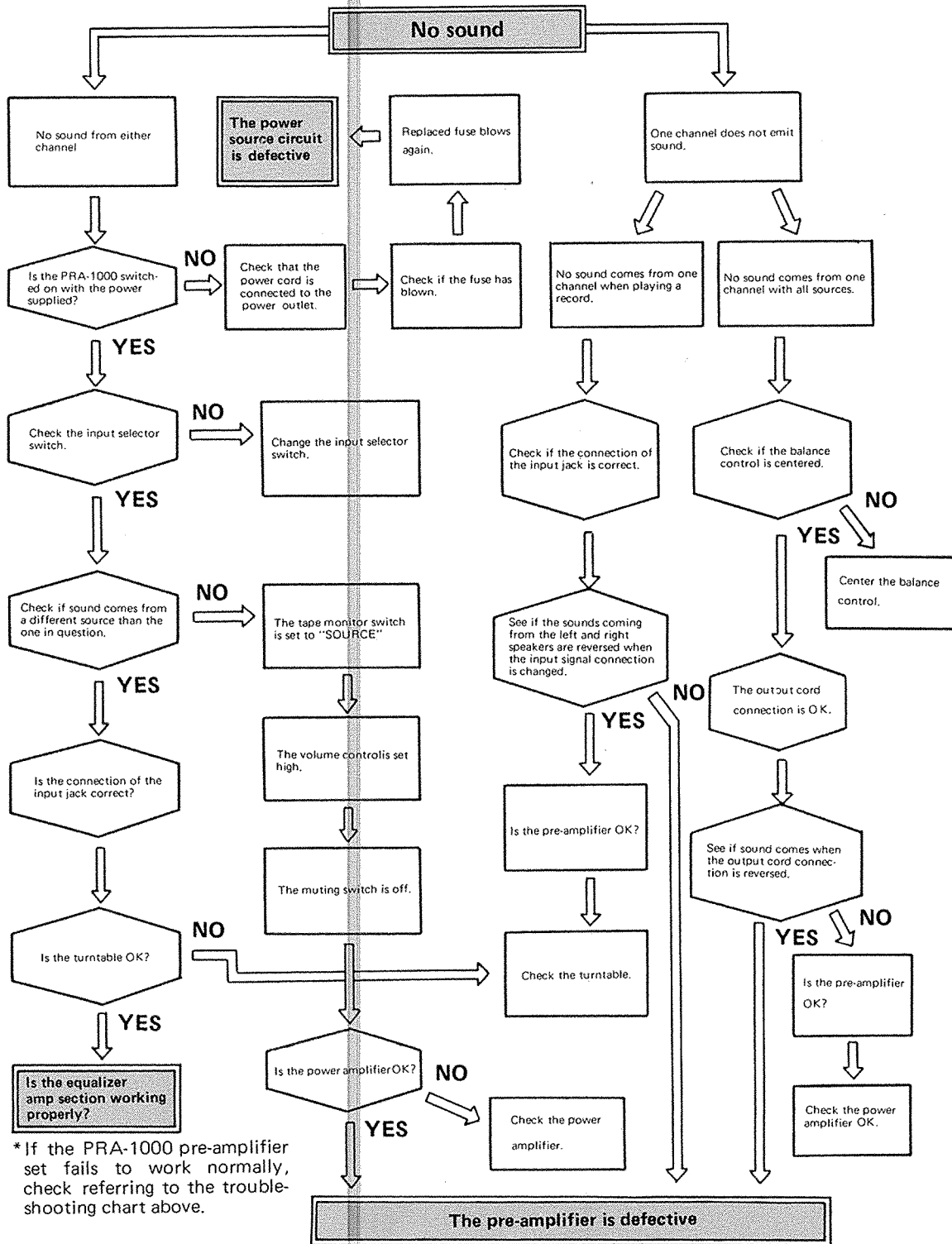
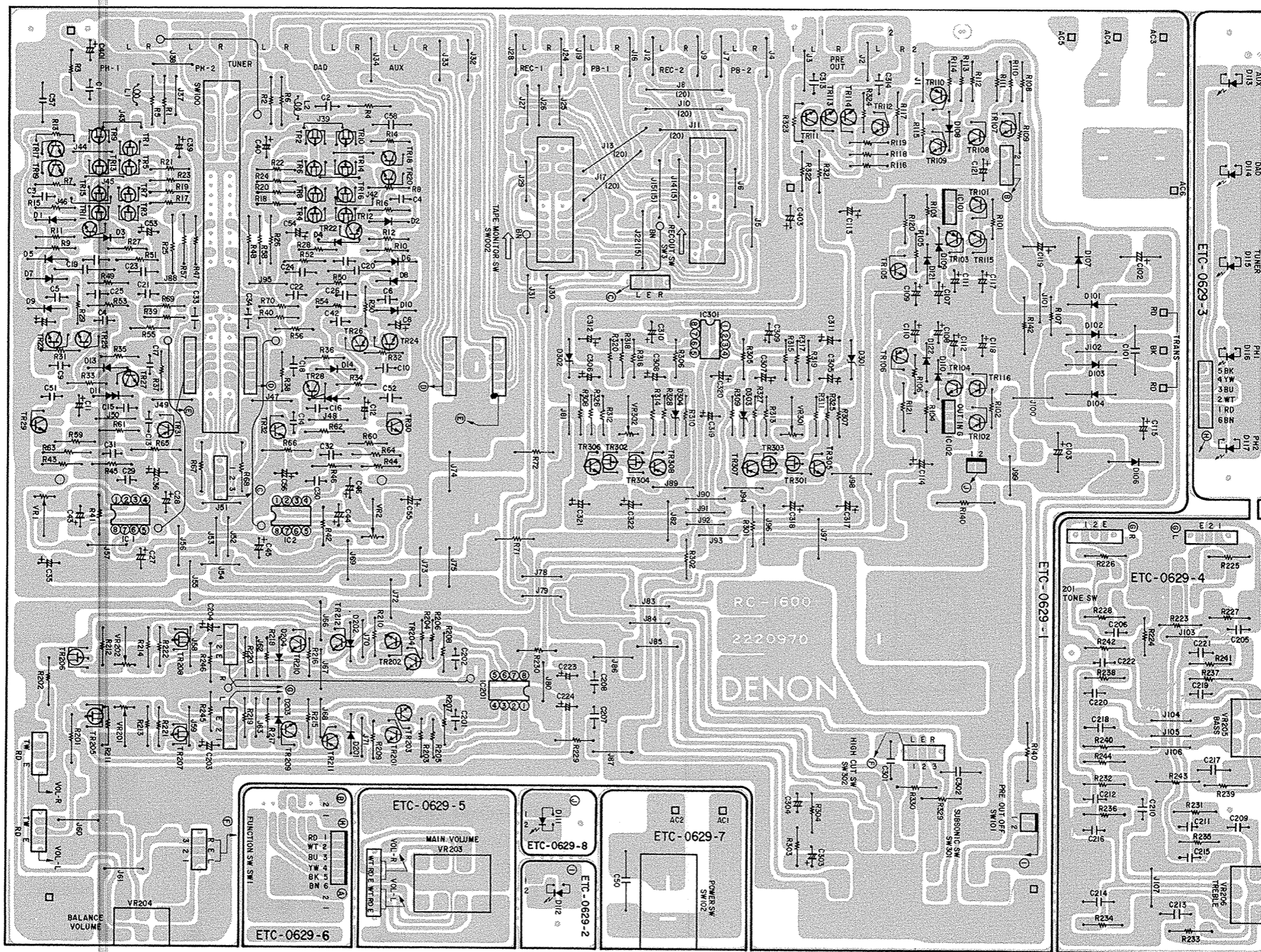


Fig. 6

PRINTED WIRING BOARD PATTERNS AND PARTS LIST  
 ETC0629D  
 MAIN BOARD UNIT



ETC0629B For E2 only

Except those listed below all other parts are same as ETC0629D.

| Ref. No.     | Part No.   | Part Name & Descriptions | Remarks |
|--------------|------------|--------------------------|---------|
| OTHER PARTS. |            |                          |         |
|              | 5130817003 | VOLTAGE LABEL            | ADD.    |
|              | 5130815005 | FUSE LABEL               | ADD.    |

METHOD OF ADJUSTMENT

NEUTRAL POINT

Equalizer Amp Section

- Set controls as follows.  
 MAIN VR → MIN.  
 REC OUT SELECTOR → SOURCE  
 TAPE MONITOR → SOURCE  
 INPUT SELECTOR → PHONO-2 (MM)
- Connect digital voltmeter to REC OUT terminal of Lch (Rch) on rear panel.
- Turn power switch "on".
- Adjust VR1 (VR2) so that the digital voltmeter reads  $0 \pm 5mV$ .

Flat Amp Section

- Set controls as follows.  
 INPUT SELECTOR → TUNER  
 MAIN VR → MAX.
- Connect digital voltmeter to REC OUT terminal of Lch (Rch) on rear panel.
- Turn power switch "on".
- Adjust VR201 (VR202) so that the digital voltmeter reads  $0 \pm 5mV$ .

DISTORTION

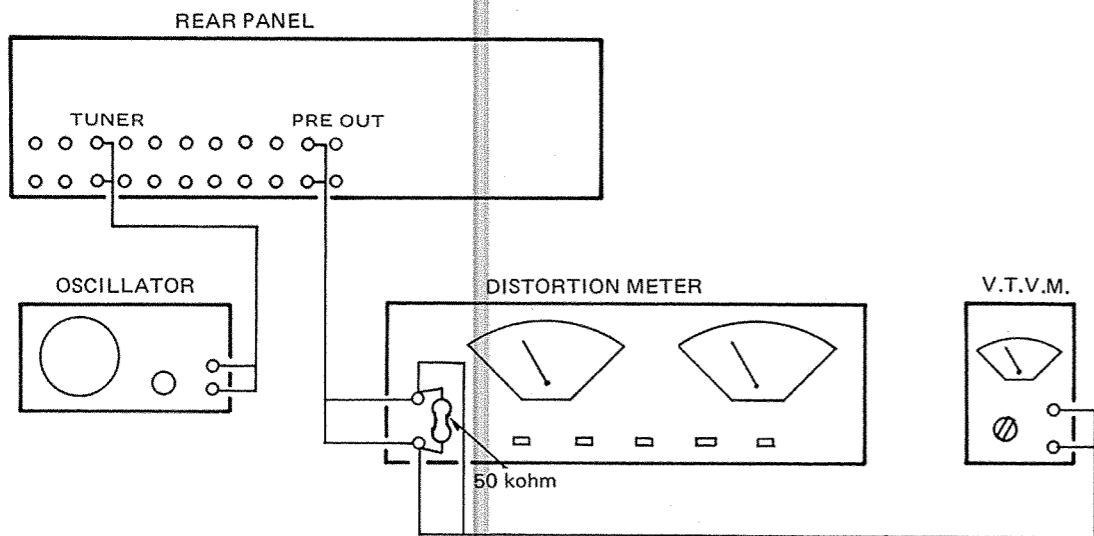


Fig. 7

Flat Amp Section

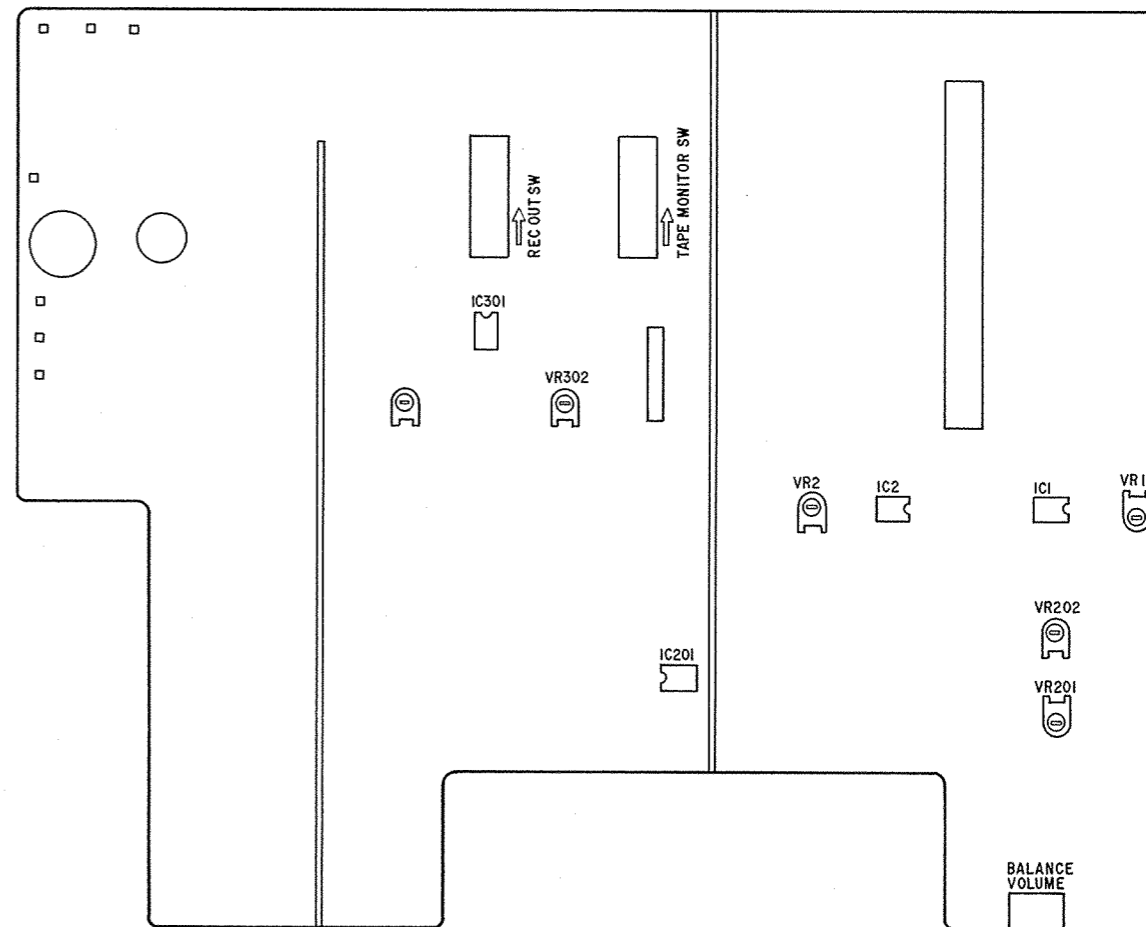
Set controls of front panel as follows.

- |                  |          |
|------------------|----------|
| TONE             | → def    |
| PREOUT OFF       | → OFF    |
| LOW FILTER       | → OFF    |
| HIGH FILTER      | → OFF    |
| REC OUT SELECTOR | → SOURCE |
| TAPE MONITOR     | → SOURCE |
| BALANCE          | → CENTER |
| INPUT SELECTOR   | → TUNER  |
| MAIN VR          | → MAX.   |

- Connect oscillator to TUNER input terminal on rear panel. Connect Distortion meter with V.T.V.M. to PRE OUT terminal on rear panel.
- Turn power switch "on".
- Set the oscillator frequency to 20 kHz, and adjust the oscillator output level so that the pre output level to 5 V.
- Adjust VR301 (VR302) for minimum distortion.

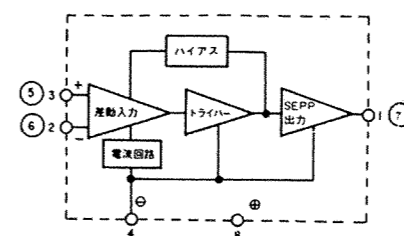
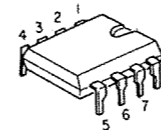
ALIGNMENT POINTS

ETC0629D MAIN BOARD UNIT(Component Side)

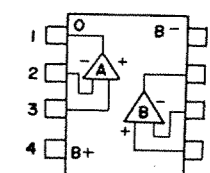
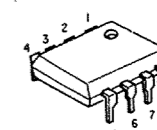


• IC

μPC741C(NEC)  
(Mitsubishi)



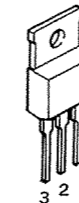
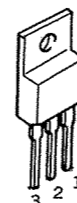
NJM4560D (JRC)  
NJM4558D-D (JRC)



• DIODES(include LED,Thermistor & Posistor)

• TRANSISTOR(inciude FET)

NJM79M15A(JRC) NJM78M15A(JRC)



2SC1815(BL)(Y)  
2SC1841(E/F)

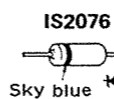


2SA988(E/F)  
2SC2878(A/B)  
2SA970(BL)

2SC1940(L)  
2SA915(L)



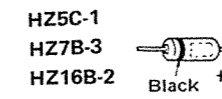
FET  
2SK369(BU/GH/V)  
2SK163(M)  
2SJ45(M)



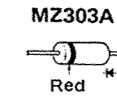
Sky blue \*



銀色 \*



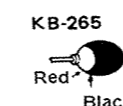
Black \*



Red \*



TLG206(Green)  
TLY206(Yellow)



Red  
Black \*



ETC06290D/C MAIN BOARD UNIT

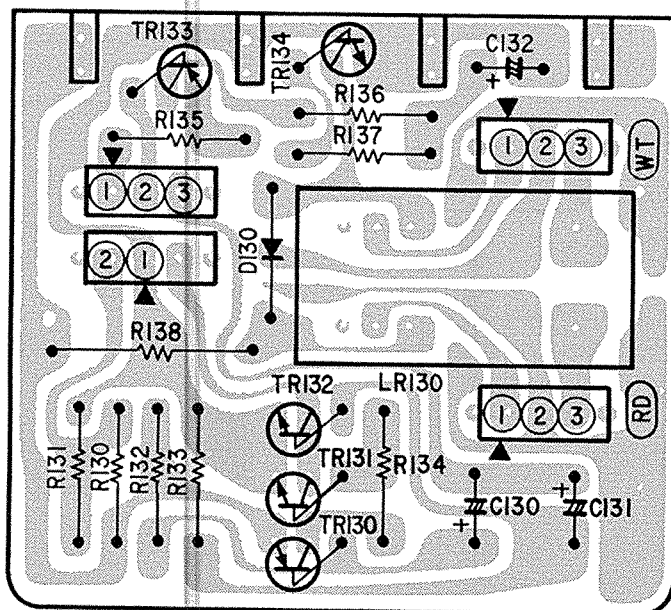
| Ref. No.              | Part No.   | Part Name & Descriptions |            |
|-----------------------|------------|--------------------------|------------|
| <b>SEMICONDUCTORS</b> |            |                          |            |
| IC001                 | 2630133002 | μPC741C                  | IC         |
| IC002                 | 2630133002 | μPC741C                  | IC         |
| IC101                 | 2680217004 | NJM78M15A                | IC         |
| IC102                 | 2630259009 | NJM79M15A                | IC         |
| IC201                 | 2630118014 | NJM4560DD                | IC         |
| IC301                 | 2650030004 | NJM4558DD                | IC         |
| TR001<br>~016         | 2750038045 | 2SK369(BL)/(GR)-C        | FET        |
| TR017<br>~020         | 2730198015 | 2SC1815(BL)              | TRANSISTOR |
| TR021<br>~024         | 2710170024 | 2SA1316(BL)/(GR)         | TRANSISTOR |
| TR025<br>~026         | 2710131021 | 2SA988(E/F)              | TRANSISTOR |
| TR027<br>~030         | 2730235020 | 2SC1841(E/F)             | TRANSISTOR |
| TR031<br>~032         | 2710131021 | 2SA988(E/F)              | TRANSISTOR |
| TR101                 | 2730212001 | 2SC2655(Y)               | TRANSISTOR |
| TR102                 | 2710117003 | 2SA1020(Y)               | TRANSISTOR |
| TR103                 | 2710102005 | 2SA1015(Y)               | TRANSISTOR |
| TR104<br>~105         | 2730198002 | 2SC1815(Y)               | TRANSISTOR |
| TR106                 | 2710102005 | 2SA1015(Y)               | TRANSISTOR |
| TR107<br>~109         | 2730198015 | 2SC1815(BL)              | TRANSISTOR |
| TR110                 | 2710102021 | 2SA1015(GR)              | TRANSISTOR |
| TR111<br>~114         | 2730253015 | 2SC2878(A/B)             | TRANSISTOR |
| TR115                 | 2730198002 | 2SC1815(Y)               | TRANSISTOR |
| TR116                 | 2710102005 | 2SA1015(Y)               | TRANSISTOR |
| TR201<br>~204         | 2730198002 | 2SC1815(Y)               | TRANSISTOR |
| TR205<br>~208         | 2750038045 | 2SK369(BL)/(GR)          | FET        |
| TR209<br>~210         | 2730198015 | 2SC1815(BL)              | TRANSISTOR |
| TR211<br>~212         | 2730102005 | 2SC1015(Y)               | TRANSISTOR |
| TR301<br>~302         | 2750020008 | 2SK163(M)                | TRANSISTOR |
| TR303<br>~304         | 2750025003 | 2SJ45(M)                 | TRANSISTOR |
| TR305<br>~306         | 2730186001 | 2SC1940(L)               | TRANSISTOR |
| TR307<br>~308         | 2710093004 | 2SA915(L)                | TRANSISTOR |
| D001<br>~008          | 2760049008 | 1S2076                   | DIODE      |
| D009<br>~010          | 2760024007 | MZ303A                   | DIODE      |
| D011<br>~012          | 2760216019 | KB-265                   | DIODE      |
| D013<br>~014          | 2760049008 | 1S2076                   | DIODE      |
| D101<br>~105          | 2760358003 | EP-01Z                   | DIODE      |
| D106<br>~107          | 2760053023 | HZ16B-2                  | ZENER      |
| D108<br>~110          | 2760049008 | 1S2076                   | DIODE      |
| D111                  | 2760358003 | EP-01Z                   | DIODE      |
| D201<br>~202          | 2760236031 | HZ5C-1                   | ZENER      |
| D203<br>~204          | 2760049008 | 1S2076                   | DIODE      |
| D301<br>~304          | 2760254000 | HZ7B-3                   | ZENER      |

| Ref. No.   | Part No.   | Part Name & Description     |          |                  |
|--|------------|-----------------------------|----------|------------------|
| <b>RESISTORS (not included Carbon Film ±5%, ¼W Type)</b>     |            |                             |          |                  |
| VR001<br>~002  | 2116016054 | SEMI FIXED RESISTOR 50 kohm |          |                  |
| VR201<br>~202  | 2116016009 | SEMI FIXED RESISTOR 100 ohm |          |                  |
| VR301<br>~302  | 2116016009 | SEMI FIXED RESISTOR 100 ohm |          |                  |
| R009<br>~012   | 2412321061 | 47 ohm                      | ±5% ¼W   | CARBON FILM (NB) |
| R025<br>~026   | 2440036027 | 390 ohm                     | ±5% 1W   | METAL OXIDE (NB) |
| R029<br>~030   | 2412321003 | 1 kohm                      | ±5% ¼W   | CARBON FILM (NB) |
| R037<br>~038   | 2412314023 | 470 ohm                     | ±5% ¼W   | CARBON FILM (NB) |
| R049<br>~050   | 2412318016 | 47 kohm                     | ±2% ¼W   | CARBON FILM      |
| R051<br>~052   | 2412318003 | 3.9 kohm                    | ±2% ¼W   | CARBON FILM      |
| R059<br>~062   | 2412321016 | 22 ohm                      | ±5% ¼W   | CARBON FILM (NB) |
| R120<br>~121   | 2410177000 | 470 ohm                     | ±5% ¼W   | CARBON FILM      |
| R140<br>~141   | 2440043023 | 1.5 kohm                    | ±5% 1W   | METAL OXIDE (NB) |
| R142   | 2440045021 | 2.2 kohm                    | ±5% 1W   | METAL OXIDE (NB) |
| R311<br>~314   | 2412321016 | 22 ohm                      | ±5% ¼W   | CARBON FILM (NB) |
| R325<br>~328   | 2412314065 | 270 ohm                     | ±5% ¼W   | CARBON FILM (NB) |
| <b>CAPACITORS (not included Ceramic ±5%, ±10%, 50V Type)</b> |            |                             |          |                  |
| C001<br>~002   | 2554137003 | 470pF                       | ±5% 50V  | PLASTIC FILM     |
| C003<br>~004   | 2554151005 | 0.0018μF                    | ±5% 50V  | PLASTIC FILM     |
| C005<br>~006   | 2521026008 | 47pF                        | ±5% 50V  | MICA             |
| C007<br>~008   | 2544146004 | 1μF                         |          | 50V ELECTROLYTIC |
| C009<br>~010   | 2554169000 | 470pF                       | ±5% 50V  | PLASTIC FILM     |
| C011<br>~012   | 2544146004 | 1μF                         |          | 50V ELECTROLYTIC |
| C013<br>~014   | 2554137003 | 220pF                       | ±5% 50V  | PLASTIC FILM     |
| C015<br>~016   | 2521018003 | 22pF                        | ±5% 50V  | MICA             |
| C017<br>~018   | 2554137003 | 470pF                       | ±5% 50V  | PLASTIC FILM     |
| C019<br>~020   | 2554083047 | 0.068μF                     | ±2% 100V | PLASTIC FILM     |
| C021<br>~022   | 2554147006 | 0.0012μF                    | ±5% 50V  | PLASTIC FILM     |
| C023<br>~024   | 2554083034 | 0.018μF                     | ±2% 100V | PLASTIC FILM     |
| C025<br>~026   | 2554137003 | 470pF                       | ±5% 50V  | PLASTIC FILM     |
| C027<br>~028   | 2544146004 | 1μF                         |          | 50V ELECTROLYTIC |
| C029<br>~030   | 2554169000 | 0.01μF                      | ±5% 50V  | PLASTIC FILM     |
| C031<br>~032   | 2554166003 | 0.0075μF                    | ±5% 50V  | PLASTIC FILM     |
| C033<br>~034   | 2554166003 | 0.0075μF                    | ±5% 50V  | PLASTIC FILM     |

| Ref. No.     | Part No.   | Part Name & Descriptions |                        |
|--------------|------------|--------------------------|------------------------|
| C035<br>~036 | 2544089022 | 47μF                     | 50V ELECTROLYTIC       |
| C037<br>~038 | 2549013006 | 3.3μF                    | 50V ELECTROLYTIC       |
| C039<br>~040 | 2544159004 | 100μF                    | 35V ELECTROLYTIC       |
| C039<br>~040 | 2521026008 | 47pF                     | ±5% 50V MICA           |
| C041<br>~042 | 2521010001 | 10pF                     | ±0.5pF 50V MICA        |
| C041<br>~042 | 2544153000 | 47μF                     | 50V ELECTROLYTIC       |
| C043<br>~044 | 2544130007 | 100μF                    | 10V ELECTROLYTIC       |
| C045<br>~046 | 2544146004 | 1μF                      | 50V ELECTROLYTIC       |
| C50          | 2558000042 | 0.01μF                   | ±20% 160V PLASTIC FILM |
| C055<br>~056 | 2544089022 | 100μF                    | 50V ELECTROLYTIC       |
| C057<br>~058 | 256103025  | 0.22μF                   | ±5% 100V ELECTROLYTIC  |
| C101         |            |                          |                        |
| C102<br>~103 | 2561017019 | 0.01μF                   | ±10% 630V METALIZED    |
| C107<br>~108 | 2544141009 | 10μF                     | 35V ELECTROLYTIC       |
| C109<br>~110 | 2544146004 | 1μF                      | 50V ELECTROLYTIC       |
| C111<br>~112 | 2544145005 | 0.47μF                   | 50V ELECTROLYTIC       |
| C113<br>~114 | 2544153000 | 47μF                     | 50V ELECTROLYTIC       |
| C115         |            |                          |                        |
| C115         | 2544127007 | 220μF                    | 6.3V ELECTROLYTIC      |
| C117         | 2544060038 | 0.47μF                   | 100V ELECTROLYTIC      |
| ~118         | 2544153000 | 47μF                     | 50V ELECTROLYTIC       |
| C119         |            |                          |                        |
| C201<br>~202 | 2544051005 | 220μF                    | 50V ELECTROLYTIC       |
| C203<br>~204 | 2554145008 | 0.001μF                  | ±5% 50V PLASTIC FILM   |
| C205<br>~206 | 2549011008 | 1μF                      | 50V ELECTROLYTIC       |
| C207<br>~208 | 2521026008 | 47pF                     | ±5% 50V MICA           |
| C209<br>~210 | 2554131009 | 270pF                    | ±5% 50V PLASTIC FILM   |
| C211<br>~212 | 2554149004 | 0.0015μF                 | ±5% 50V PLASTIC FILM   |
| C213<br>~214 | 2521030007 | 68pF                     | ±5% 50V MICA           |
| C215<br>~216 | 2554171001 | 0.012μF                  | ±5% 50V PLASTIC FILM   |
| C217<br>~218 | 2521014007 | 15pF                     | ±5% 50V MICA           |
| C219<br>~220 | 2554191007 | 0.082μF                  | ±5% 50V PLASTIC FILM   |
| C221<br>~222 | 2554171001 | 0.012μF                  | ±5% 50V PLASTIC FILM   |
| C223<br>~224 | 252101700  | 20pF                     | ±5% 50V MICA           |
| C301<br>~302 | 2544135002 | 47μF                     | 16V ELECTROLYTIC       |
| C303<br>~304 | 2561030067 | 0.18μF                   | ±5% 100V METALIZED     |
| C305<br>~308 | 2544315002 | 0.22μF                   | ±20% 50V ELECTROLYTIC  |
| C309<br>~310 | 2544129005 | 47μF                     | 10V ELECTROLYTIC       |
|              | 2544146004 | 1μF                      | 50V ELECTROLYTIC       |

| Ref. No.     | Part No.   | Part Name & Description      |                      |
|--------------|------------|------------------------------|----------------------|
| C311<br>~312 | 2544132005 | 10μF                         | 16V ELECTROLYTIC     |
| C313<br>~314 | 2544121006 | 100μF                        | 50V ELECTROLYTIC     |
| C315<br>~316 | 2554131009 | 270pF                        | ±5% 50V PLASTIC FILM |
| C317<br>~318 | 2544153000 | 47μF                         | 50V ELECTROLYTIC     |
| C319<br>~320 | 2544146004 | 1μF                          | 50V ELECTROLYTIC     |
| C321<br>~322 | 2544153000 | 47μF                         | 50V ELECTROLYTIC     |
| C401<br>~403 | 2544145005 | 0.47μF                       | 50V ELECTROLYTIC     |
| COILS        |            |                              |                      |
| L001<br>~002 | 2350009005 | INDUCTOR                     |                      |
| OTHER PARTS  |            |                              |                      |
|              | 2220970002 | P.W BOARD                    |                      |
|              | 2090047903 | 0.6 JUMPER WIRE USED 50      |                      |
|              | 2050134908 | TERMINAL PIN USED 10         |                      |
|              | 2050141001 | COMMON PLATE USED 2          |                      |
|              | 4170204017 | RADIATOR 20mm USED 2         |                      |
|              | 2050145007 | 4P CONNECTOR BASE USED 5 ↑   |                      |
|              | 2050184000 | 2P CONNECTOR BASE USED 1 ↑   |                      |
|              | 2124405000 | POWER SW USED 1              |                      |
|              | 2124447000 | 1P PUSH SW USED 1            |                      |
|              | 2124446001 | 3P PUSH SW USED 1            |                      |
|              | 2120237007 | ROTARY REMOTE SW USED 1      |                      |
|              | 2124187001 | SLIDE SW (4-4) REMOTE USED 2 |                      |
|              | 2124448009 | SLIDE SW (REMOTE) USED 1     |                      |
|              | 2110385008 | VARIABLE RESISTOR 100 kohm   |                      |
|              |            | BALANCE                      |                      |
|              | 2110276007 | VARIABLE RESISTOR 55 kohm    |                      |
|              |            | VOLUME                       |                      |
|              | 2110386007 | VARIABLE RESISTOR 100 kohm   |                      |
|              |            | BASS, TREBLE                 |                      |
|              | 2050185038 | 3P WIRE HOLDER USED 16       |                      |
|              | 2050185041 | 4P WIRE HOLDER USED 4        |                      |
|              | 2050185067 | 6P WIRE HOLDER USED 1        |                      |
|              | 2050133022 | 2P NH CONNECTOR BASE ↑       |                      |
|              | 2050122033 | 3P CONNECTOR PIN ASS'Y       |                      |
|              | 3939040002 | TLG206 (GREEN) LED           |                      |
|              | 3939218009 | TLY206 LED                   |                      |
|              | 2032108046 | 2P CONNECTOR CORD            |                      |
|              | 3939221009 | LN49YP LED                   |                      |
|              | 2020014003 | FUSE CLIP USED 4             |                      |

ETC0657 MUTING UNIT

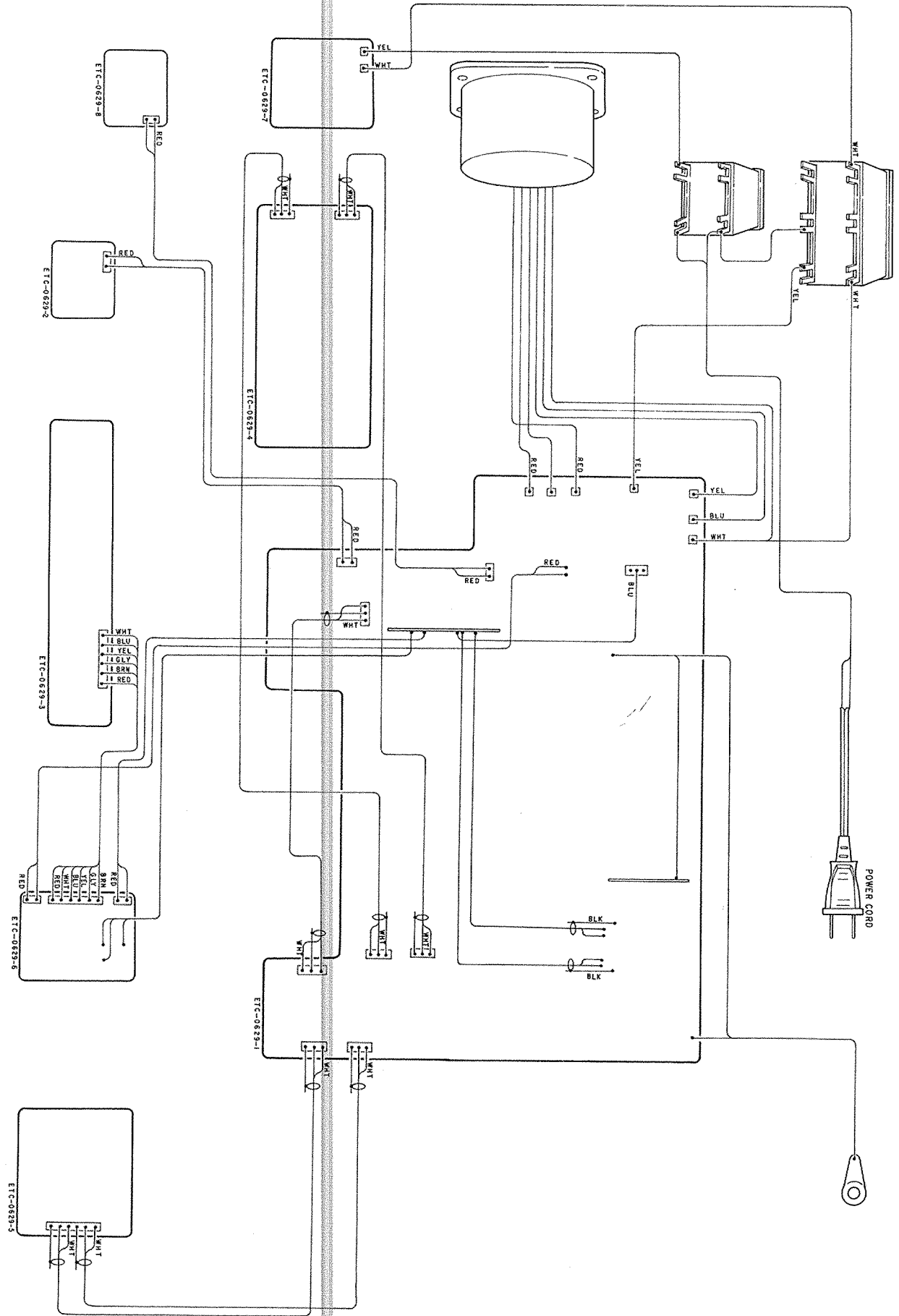


ETC0657 MUTING UNIT PARTS LIST

| Ref. No.   | Part No.   | Part Name & Descriptions         |
|--|------------|----------------------------------|
| <b>SEMICONDUCTORS</b>                                      |            |                                  |
| TR130  | 2710094016 | 2SA970(BL) TRANSISTOR            |
| TR130  | 2710102005 | 2SA1015(Y) TRANSISTOR            |
| TR131  | 2730198015 | 2SC1815(BL) TRANSISTOR           |
| TR132  | 2730198015 | 2SC1815(BL) TRANSISTOR           |
| TR134  | 2730198015 | 2SC1815(BL) TRANSISTOR           |
| D130   | 2760049008 | 1S2076 DIODE                     |
| <b>RESISTORS (not included Carbon Film ±5%, 1/4W Type)</b> |            |                                  |
| R138   | 2440042024 | 1.2 kohm ±5% 1W METAL OXIDE (NB) |

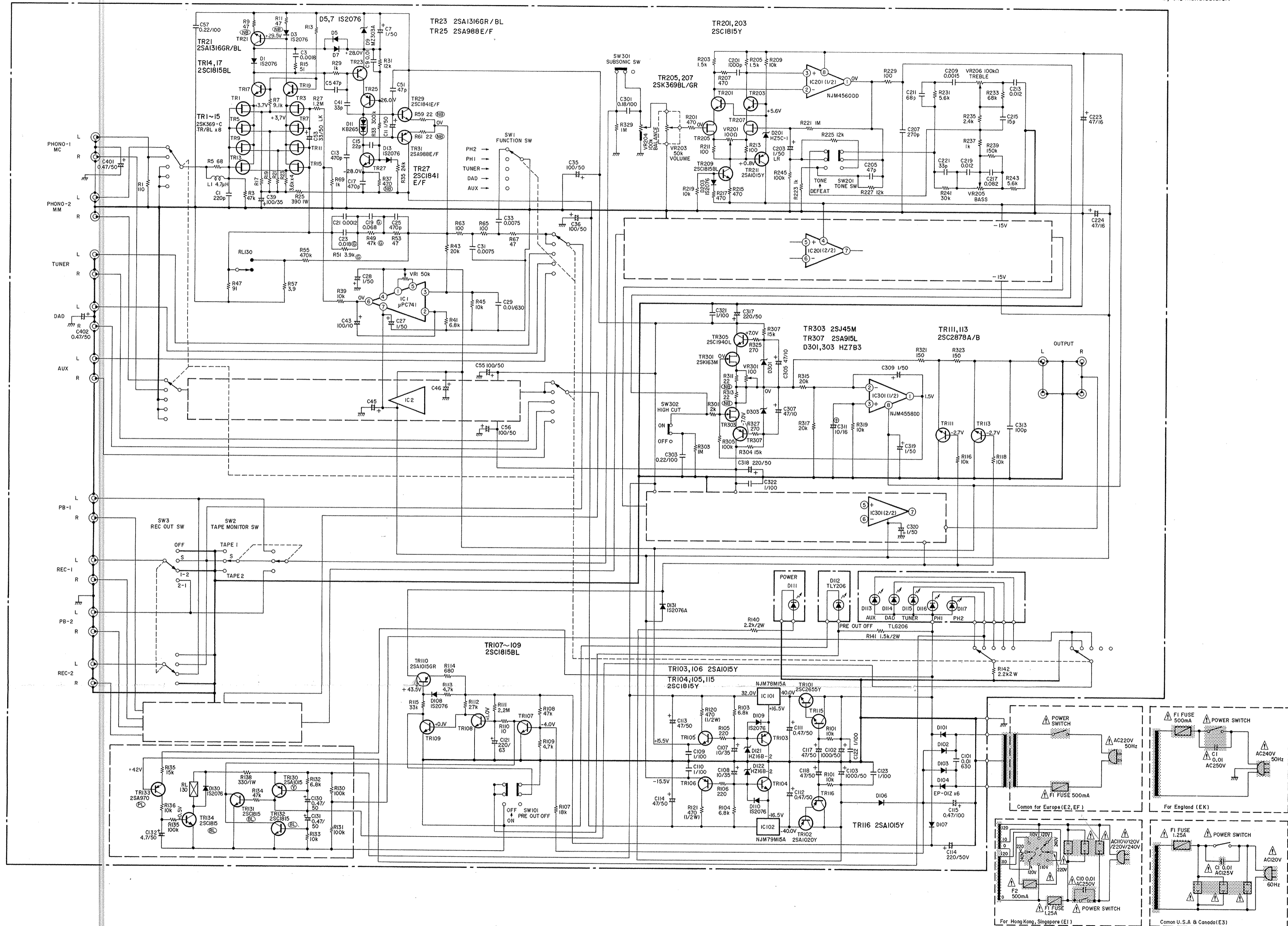
| Ref. No.           | Part No.   | Part Name & Description   |
|--------------------|------------|---------------------------|
| <b>CAPACITORS</b>  |            |                           |
| C130               | 2544145005 | 0.47μF 50V ELECTROLYTIC   |
| C131               | 2544145005 | 0.47μF 50V ELECTROLYTIC   |
| C132               | 2544147003 | 2.2μF 50V ELECTROLYTIC    |
| <b>OTHER PARTS</b> |            |                           |
| LR130              | 2221002005 | P.W. BOARD                |
|                    | 2050185038 | 3P WIRE HOLDER USED 4     |
|                    | 2140036000 | REED RELAY CONNECTOR BASE |

# CONNECTION DIAGRAM



WIRING DIAGRAM

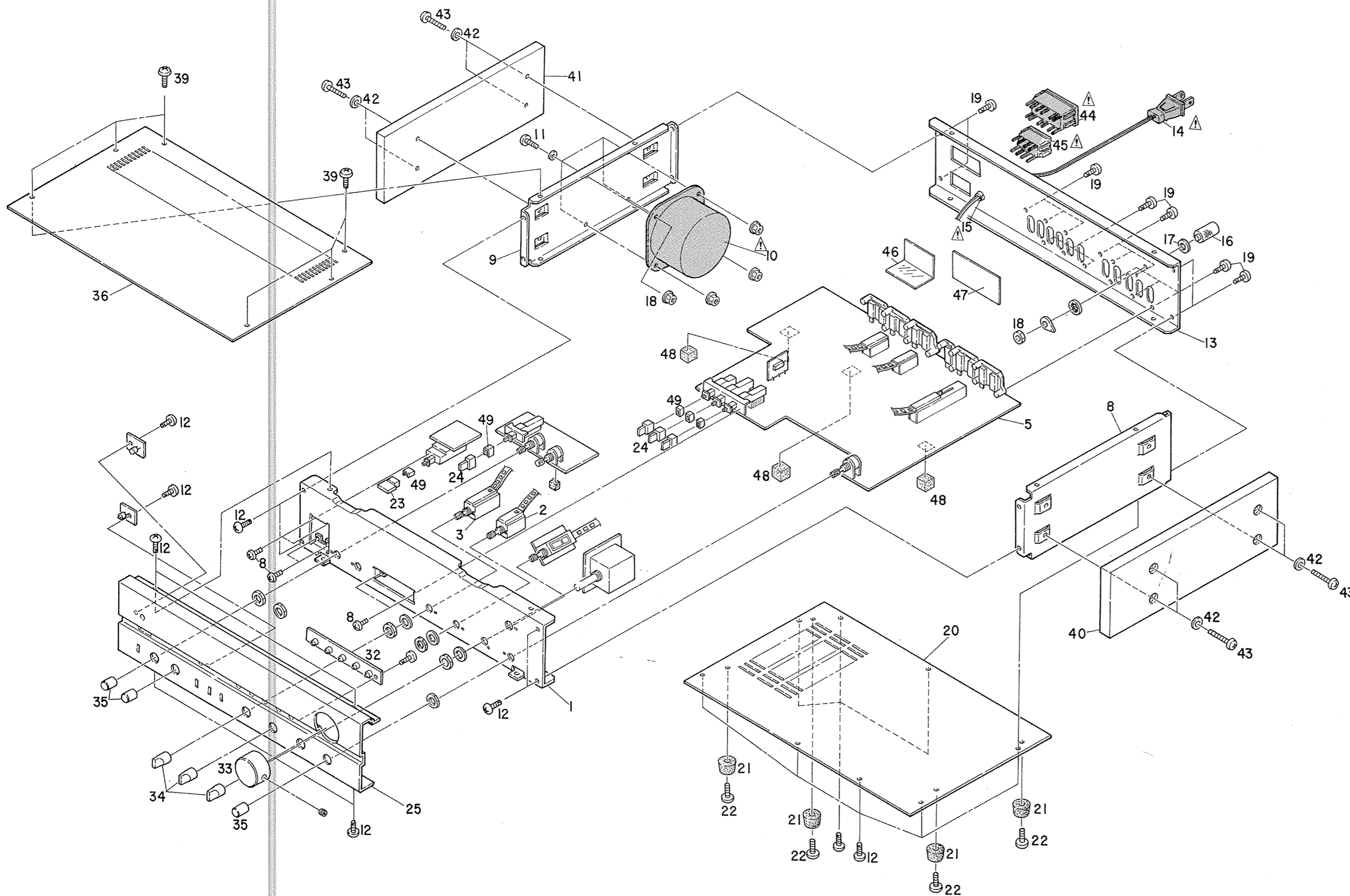
⚠ Means important safety item, which must be replaced, when necessary, by a part specified or meeting the specification by the manufacturer.



NOTES:  
 ALL RESISTANCE VALUES IN OHM, K = 1,000 OHM, M = 1,000,000 OHM.  
 ALL CAPACITANCE VALUES IN MICROFARAD, P = MICRO-MICRO FARAD.  
 EVERY VOLTAGES AND CURRENTS IS MEASURED AT NO SIGNAL INPUT CONDITION.  
 CIRCUIT AND PARTS ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.

EXPLODED VIEW OF CHASSIS AND CABINET (FOR E3 MODEL)

⚠ Means important safety item, which must be replaced, when necessary, by a part specified or meeting the specification by the manufacturer.



WARNING

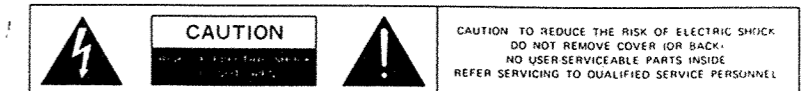
1. Component parts

Parts marked with ⚠ and/or shading in this service manual have special characteristics important to safety. Be sure to use the specified parts for replacement.

2. Leakage current

Before returning the appliance to customer, test the leakage current when the power plug is connected. Use a calibrated (with an error of not more than 5%) leakage current tester and measure the leakage current from any exposed metal to the earth ground. Reverse the power plug polarity and test the above again.

Any current measured MUST NOT EXCEED 0.5 milliamps. Corrective measure must be taken if it exceeds the limit.



The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user of the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user of the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

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Printed in Japan

EXPLODED VIEW OF CHASSIS AND CABINET

NOTES: 1. See addendum list below for the parts with asterisk (\*) on the Ref. No. and other parts not included in the list.  
2. ★ Marked not included EXPLODED VIEW.  
3. This list is prepared based on E3.

| Ref. No. | Part No.   | Part Name & Descriptions      |
|----------|------------|-------------------------------|
| 1        | 4110395106 | FRONT CHASSIS                 |
| 2        | 2120238006 | ROTARY REMOTE                 |
| 3        | 2120238019 | ROTARY REMOTE                 |
| 4        | —          | NUT M9                        |
| *5       | ETC0629D-1 | M. BOARD UNIT                 |
| 6        | —          | NUT M8                        |
| 7        | —          | NUT M7                        |
| 8        | 4711303018 | PAN SCREW 3x6                 |
| 9        | 4110396105 | SIDE CHASSIS                  |
| 10       | 2330231000 | POWER TRANS                   |
| *11      | 4700040007 | PAN SCREW WITH S. WASHER 4x10 |
| 12       | 4730354019 | TAPPING SCREW (2) 3x8         |
| *13      | 1050560201 | BACK PANEL                    |
| ▲ *14    | 2006029009 | AC CORD                       |
| ▲ *15    | 4450020005 | CORD BUSH                     |
| 16       | 2050043109 | GND TERMINAL                  |
| 17       | 4770088002 | WASHER φ4.1 (N1)              |
| 18       | 4756114000 | φ4 NUT WASHER                 |

| Ref. No. | Part No.   | Part Name & Descriptions    |
|----------|------------|-----------------------------|
| 19       | 4730354035 | TAPPING SCREW (2) 3x8       |
| 20       | 1050561200 | BOTTOM COVER                |
| 21       | 1040027107 | FOOT                        |
| 22       | 4730459001 | TAPPING SCREW (2) 4x16      |
| 23       | 1130478103 | PUSH KNOB ASS'Y (POWER)     |
| 24       | 1130479102 | PUSH KNOB ASS'Y (TONE)      |
| 25       | 1441137104 | FRONT PANEL                 |
| 26       | 1140044006 | KNOB GUIDE (A) POWER        |
| 27       | 1140076003 | KNOB GUIDE (1P)             |
| 28       | 1140077002 | KNOB GUIDE (3P)             |
| 29       | 1460619108 | LED HOLDER (1 HOOL)         |
| 30       | 1460620100 | LED HOLDER (5 HOOL)         |
| *31      | ETC0629D-2 | LED UNIT (1P)               |
| *32      | ETC0629D-3 | LED UNIT (5P)               |
| 33       | 1120234108 | KNOB ASS'Y (VR)             |
| 34       | 1120432104 | KNOB ASS'Y (VR)             |
| 35       | 1120432103 | KNOB ASS'Y (TONE & BALANCE) |
| 36       | 1020170207 | TOP COVER                   |

| Ref. No. | Part No.   | Part Name & Description       |
|----------|------------|-------------------------------|
| 37       | 1220094044 | SPACER (340x16)               |
| 38       | 1220094060 | SPACER (150x16)               |
| 39       | 4770064107 | FIXING SCREW                  |
| 40       | 1011505001 | WOOD BOARD (R)                |
| 41       | 1011506000 | WOOD BOARD (L)                |
| 42       | 4751006018 | WASHER φ5 (BLACK)             |
| 43       | 4734460035 | TAPPING SCREW 4x20            |
| ▲ *44    | 2033920003 | AC OUTLET (3P)                |
| ▲ *45    | 2033921002 | AC OUTLET (3P)                |
| 46       | 4150253004 | INSULATING SHEET              |
| 47       | 4610178098 | RUBBER SHEET                  |
| 48       | 4610121029 | CUSHION                       |
| 49       | 1140056007 | FLEXIBLE RING                 |
| ▲ *50    | ETC0629D-7 | P.S.W UNIT                    |
| 51       | 4753100004 | TOOTH WASHER φ4               |
| 52       | 4730353036 | TAPPING SCREW (2) 3x6 (BLACK) |
| 53       | 4770224002 | SP WASHER                     |
| 54       | 4150164054 | SPACER (12x12x0.5t)           |

| Ref. No.   | Part No.   | Part Name & Description |
|--|------------|-------------------------|
| 55   | 1220007073 | SPACER (420x16x0.5t)    |
| ▲ 56   | 2061035025 | FUSE (1.25A)            |
| *57  | 5130675067 | SERIAL NO. PLATE        |
| *58  | 4770126016 | RIVET                   |
| *59  | 5130808009 | RATING SHEET            |
| *60  | 4450033005 | WIRE CLAMP BAND USED 8  |
| PACKING & ACCESSORIES (not included EXPLODED VIEW) |            |                         |
| a.   | 5040052013 | CABINET COVER           |
| b.   | 5040077027 | PROTECTOR SHEET         |
| c.   | 5030406006 | CUSHION                 |
| d.   | 5010924016 | CARTON CASE             |
| e.   | 5050061007 | ENVELOPE                |
| f.   | 5111146007 | INST. MANUAL            |
| g.   | 2048121004 | 2P. PIN CORD            |
| h.   | 5158053001 | WARRANTY IN ENVELOPE    |
|  | 5130784000 | INDICATION SHEET        |

| Ref. No. | Part Name & Descriptions | Part No.      |   |   |                              |
|----------|--------------------------|---------------|---|---|------------------------------|
|          |                          | E2 for Europe | E | E | E1 for Hong Kong & Singapore |
| 5        | M. BOARD UNIT            | ETC0629B-1    |   |   | ETC0629C-1                   |
| ▲ 10     | POWER TRANS              | 2335434006    |   |   | 2335441002                   |
| 13       | BACK PANEL               | 1050566001    |   |   | 1050571009                   |
| ▲ 14     | AC CORD                  | 2062016001    |   |   | 2006031026                   |
| ▲ 15     | CORD BUSH                | 4450020005    |   |   | 4450020005                   |
| 31       | LED UNIT (1P)            | ETC0629B-2    |   |   | ETC0629C-2                   |
| 32       | LED UNIT (5P)            | ETC0629B-3    |   |   | ETC0629C-3                   |
| ▲ 44     | AC OUTLET (3P)           | —             |   |   | 2033920003                   |
| ▲ 45     | AC OUTLET (2P)           | —             |   |   | 2033921002                   |
| 46       | INSULATING SHEET         | —             |   |   | —                            |
| ▲ 50     | P. SW. UNIT              | ETC0629B-7    |   |   | ETC0629C-7                   |
| ▲ 56     | FUSE (1.25A)             | 2061015003    |   |   | —                            |
|          |                          | (500mA)       |   |   |                              |
| 57       | SERIAL NO. PLATE         | —             |   |   | —                            |
| 58       | RIVET                    | —             |   |   | —                            |
| 59       | RATING SHEET             | —             |   |   | —                            |
| ▲ 100    | VOLTAGE SEL SWIT         | —             |   |   | 2120186006                   |
| 101      | PAN SCREW 3x6 (BLACK)    | —             |   |   | 4711303034                   |
| 102      | PRE SET LABEL            | —             |   |   | 5150290008                   |
| h        | WARRANTY IN ENVELOPE     | —             |   |   | 5158053001                   |