<ART-101-0>

# SERVICE MANUAL

## STEREO AMPLIFIER

# SA-5300

**FV, GN**

**NOTE:**

THE MODEL SA-5300 CONES IN TWO VERSIONS DISTINGUISHED AS FOLLOWS:

| Round label on rear panel | Voltage | Type |
|---|---|---|
| FV | 110V, 120V, 130V, 220V, and 240V (switchable) | General export model. |
| GN | 220V only | SEMKO (Sweden), DEMKO (Denmark) NEMKO (Norway) and EI (Finland) approved. |

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# 1. SPECIFICATIONS

**SEMICONDUCTORS**

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**AMPLIFIER SECTION**

10 WATTS* PER CHANNEL, MIN. RMS, AT 8 OHMS FROM 40 HERTZ TO 20,000 HERTZ WITH NO MORE THAN 0.8% TOTAL HARMONIC DISTORTION.

Continuous Power Output
40Hz ~ 20kHz
(Both channels driven) . . . . . 10W + 10W (8Ω)
10W + 10W (4Ω)
1kHz (Both channels driven) . . . . . 12W + 12W (8Ω)
14W + 14W (4Ω)
Total Harmonic Distortion (40Hz ~ 20kHz)
(Continuous Power Output) . . . . . Less than 0.8%
(1W Power Output, 8Ω) . . . . . Less than 0.3%
Intermodulation Distortion
(Continuous Power Output) . . . . . Less than 0.8%
(1W Power Output, 8Ω) . . . . . Less than 0.3%
Power Bandwidth
(IHF, Both channels driven) . . . . . 15Hz ~ 100kHz (T.H.D. 0.8%)
Output: Speaker . . . . . A, B (4Ω ~ 16Ω)
A + B (8Ω ~ 16Ω)
Headphone . . . . . 4Ω ~ 16Ω
Damping Factor
(40Hz ~ 20kHz, 8Ω) . . . . . More than 30
Input Sensitivity/Impedance
PHONO . . . . . 2.5mV/50kΩ
TUNER . . . . . 150mV/50kΩ
AUX . . . . . 150mV/50kΩ
TAPE PB . . . . . 150mV/50kΩ
TAPE PB (DIN connector) . . . . . 150mV/50kΩ
PHONO Overload Level
(T.H.D. 0.1%) . . . . . 150mV
Output Level/Impedance
TAPE REC . . . . . 150mV
TAPE REC (DIN connector) . . . . . 30mV/80kΩ
Frequency Response
PHONO (RIAA equalization) . . . . 30Hz ~ 15kHz±0.5dB
TUNER, AUX, TAPE PB . . . . . 20Hz ~ 30kHz $^{+0.5}_{-1}$dB
Tone Control
BASS . . . . . +9dB, -8dB (100Hz)
TREBLE . . . . . +6dB, -6dB (10kHz)
Loudness Contour (Volume control
set at -40dB position) . . . . . +8dB (100Hz), +5dB (10kHz)
Hum & Noise (IHF, Short circuited, A Network)
PHONO . . . . . More than 70dB
TUNER, AUX, TAPE PB . . . . . More than 85dB



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## MISCELLANEOUS

| | |
|---|---|
| Power Requirements | 220V 50/60Hz or 110, 120, 130, 220and 240V (switchable) 50/60Hz |
| Power Consumption | 85W |
| Dimensions | 350(W) x 125(M) x 282(D)mm<br>13-3/4 x 4-15/16 x 11-1/8 in. |
| Weight: Without Package | 6.4kg (14 lb 1 oz) |
| With Package | 7.5kg (16 lb 8 oz) |

## FURNISHED PARTS

| | | |
|---|---|---|
| Operating Instructions | 1 | |
| Fuse 2A | 1 | 5 line voltage model only |
| Fuse 1A | 1 | 5 line voltage model only |

*Measured pursuant to Federal Trade Commission's Trade Regulation rule on Power Output Claims for Amplifiers.

*NOTE:*

*Specifications and the design subject to possible modification without notice due to improvements.*



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# 2. FRONT PANEL FACILITIES

### BASS & TREBLE Controls

Tone controls for low and high frequency sounds. Clockwise rotation from center enhances, while counter-clockwise rotation reduces bass or treble.

### POWER Switch

Switch for turning AC power ON-OFF.

### Pilot Lamp

Lights to indicate power on.

### VOLUME Control

Control for adjusting volume from speakers and headphones. Clockwise rotation increases volume.

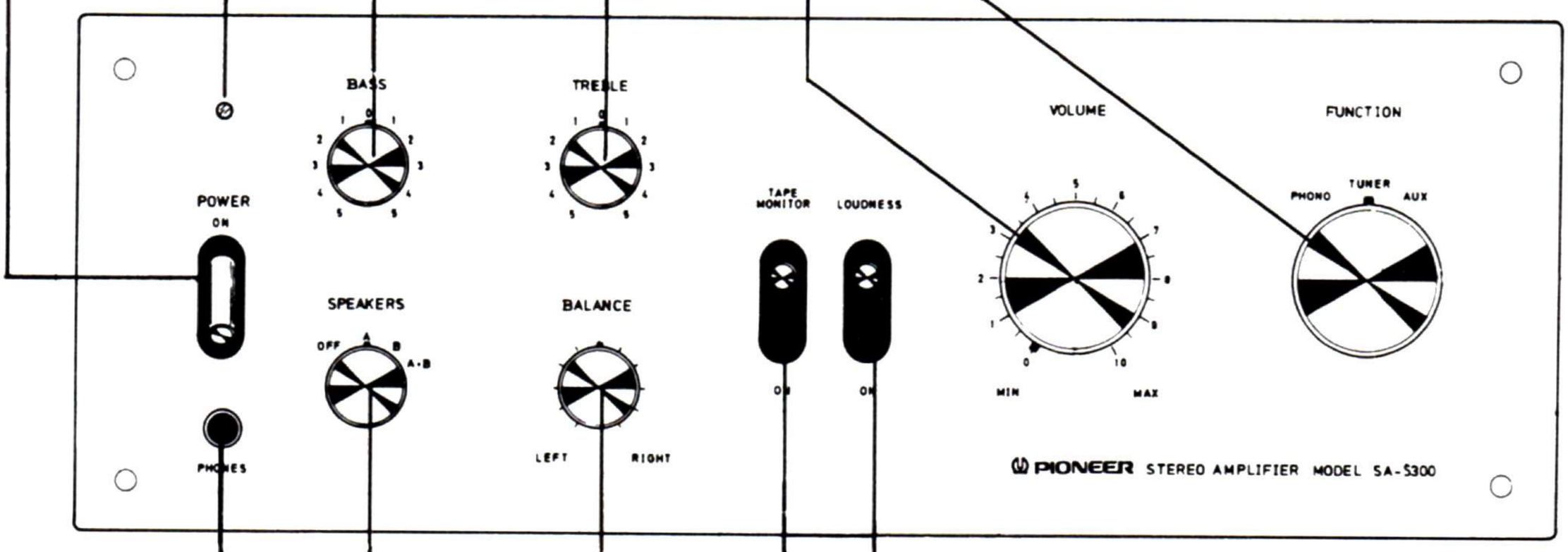
### FUNCTION Switch

Switch for selecting desired program source.

PHONO: To play record on turntable connected to the PHONO jacks

TUNER: To employ tuner connected to the TUNER jacks

AUX: To employ component connected to the AUX jacks




### LOUDNESS Switch

Set switch to ON to enhance low and high frequencies when listening at low volume.

The human ear possesses differing response to sound at high and low volume levels. This switch compensates for these characteristics.

### PHONES Jack

Stereo headphones can be plugged into this jack for private listening. Set the SPEAKERS switch to OFF when using headphones.

### TAPE MONITOR Switch

Set to ON when using a tape deck for tape playback, or when monitoring a tape during recording.

*NOTE:*
*Except for tape playback, keep this switch in the up (OFF) position.*

### SPEAKERS Switch

Switch for selecting speaker systems

OFF: Cuts off sound from speaker (when using headphones only)

A: Sound obtained from speaker system connected to the A speaker terminals

B: Sound obtained from speaker system connected to the B speaker terminals

A + B: Sound obtained from both A and B speaker systems.

### BALANCE Control

Control for adjusting volume balance between left and right speakers and headphones. Clockwise rotation from center increases right channel volume, while counter-clockwise rotation increases left channel volume.



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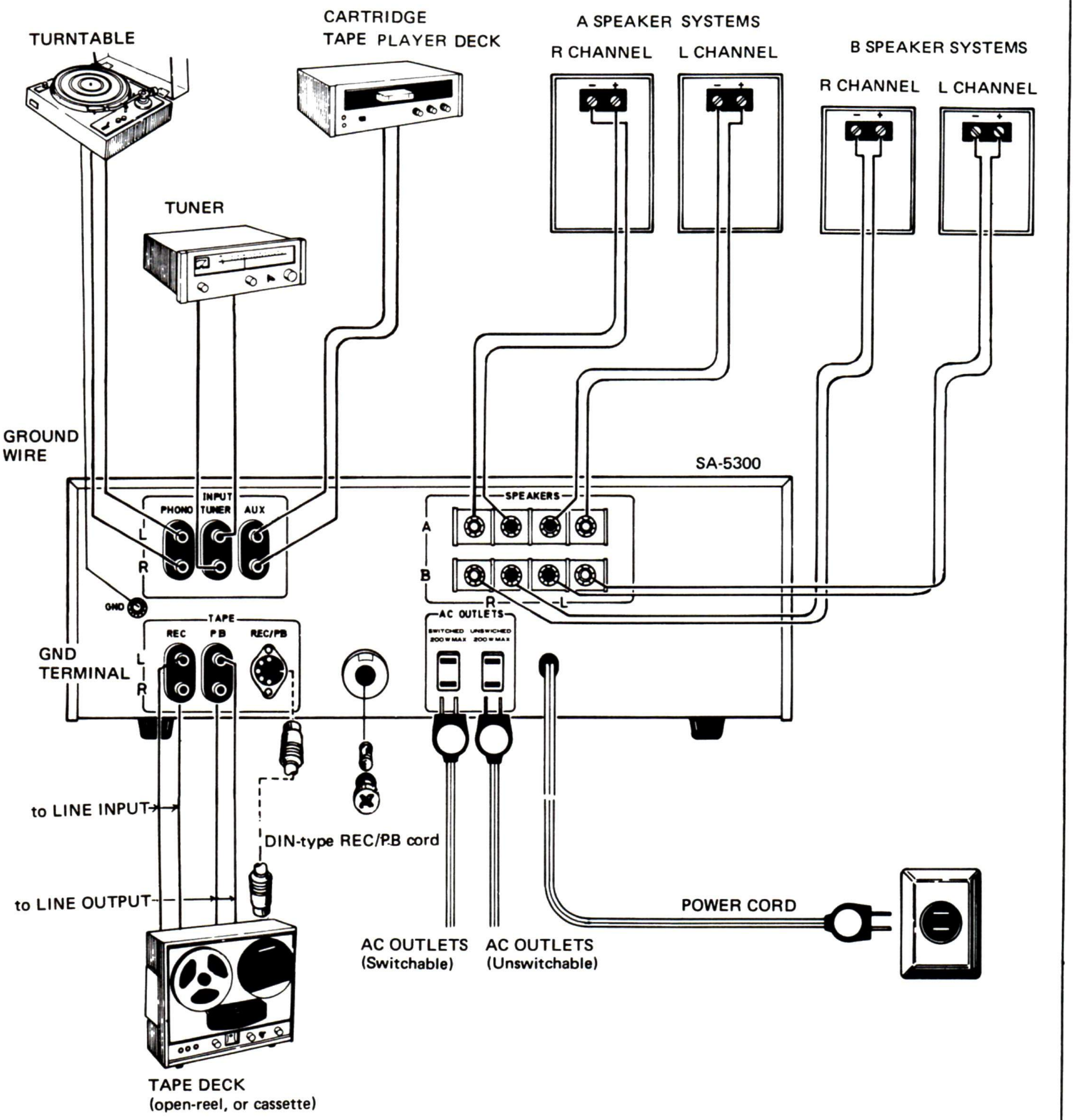
# 3. CONNECTION DIAGRAM




**CAUTIONS WHEN CONNECTING**

- Observe both the channels and polarities of the inputs and outputs of the components connected to the SA-5300. Be sure to connect L to L, R to R, + to +, and – to –.
- Make all connections securely.
  Loose connections can cause absence of sound or noise.

**USING AC CONVENIENCE OUTLETS**

These can be used to supply AC power to other components, such as turntable, tape deck, etc.
SWITCHED: AC power to component plugged into this outlet is coupled with the SA-5300 switch setting. Maximum 200W.
UNSWITCHED: AC power always present at this outlet regardless of POWER switch setting. Maximum 200W.



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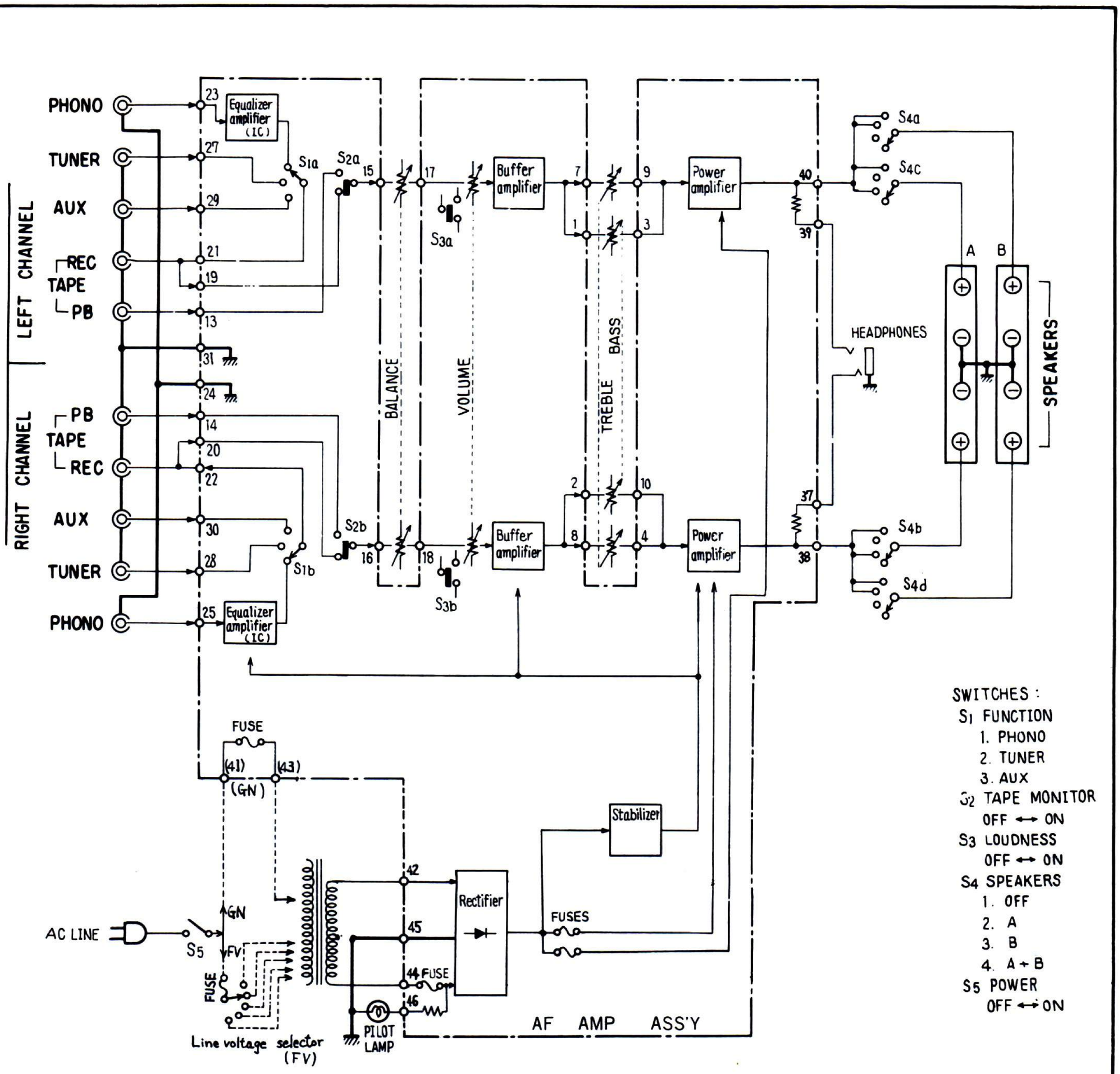
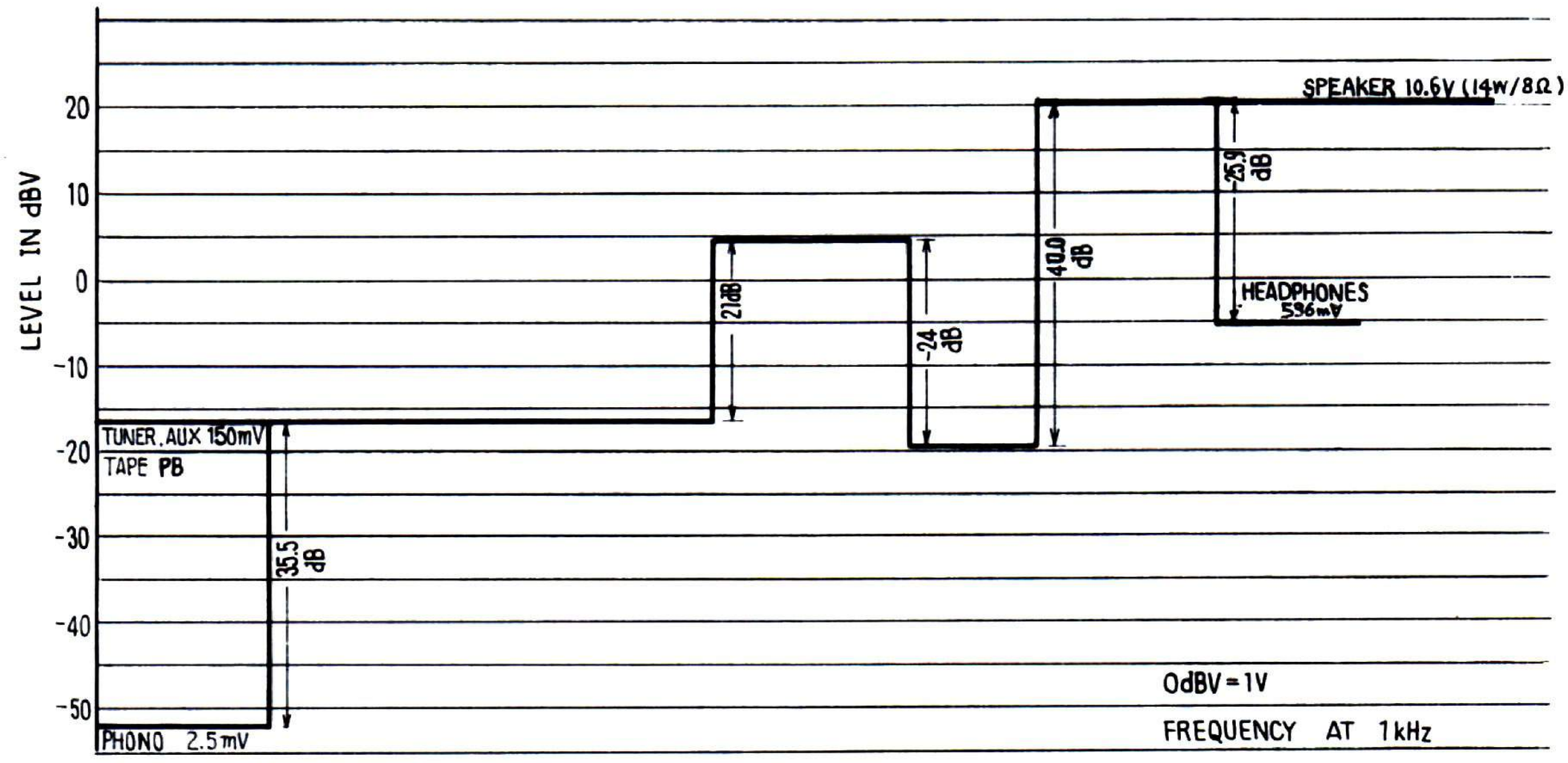
# 4. BLOCK DIAGRAM




SWITCHES :
S1 FUNCTION
1. PHONO
2. TUNER
3. AUX
S2 TAPE MONITOR
OFF ↔ ON
S3 LOUDNESS
OFF ↔ ON
S4 SPEAKERS
1. OFF
2. A
3. B
4. A + B
S5 POWER
OFF ↔ ON

## LEVEL DIAGRAM



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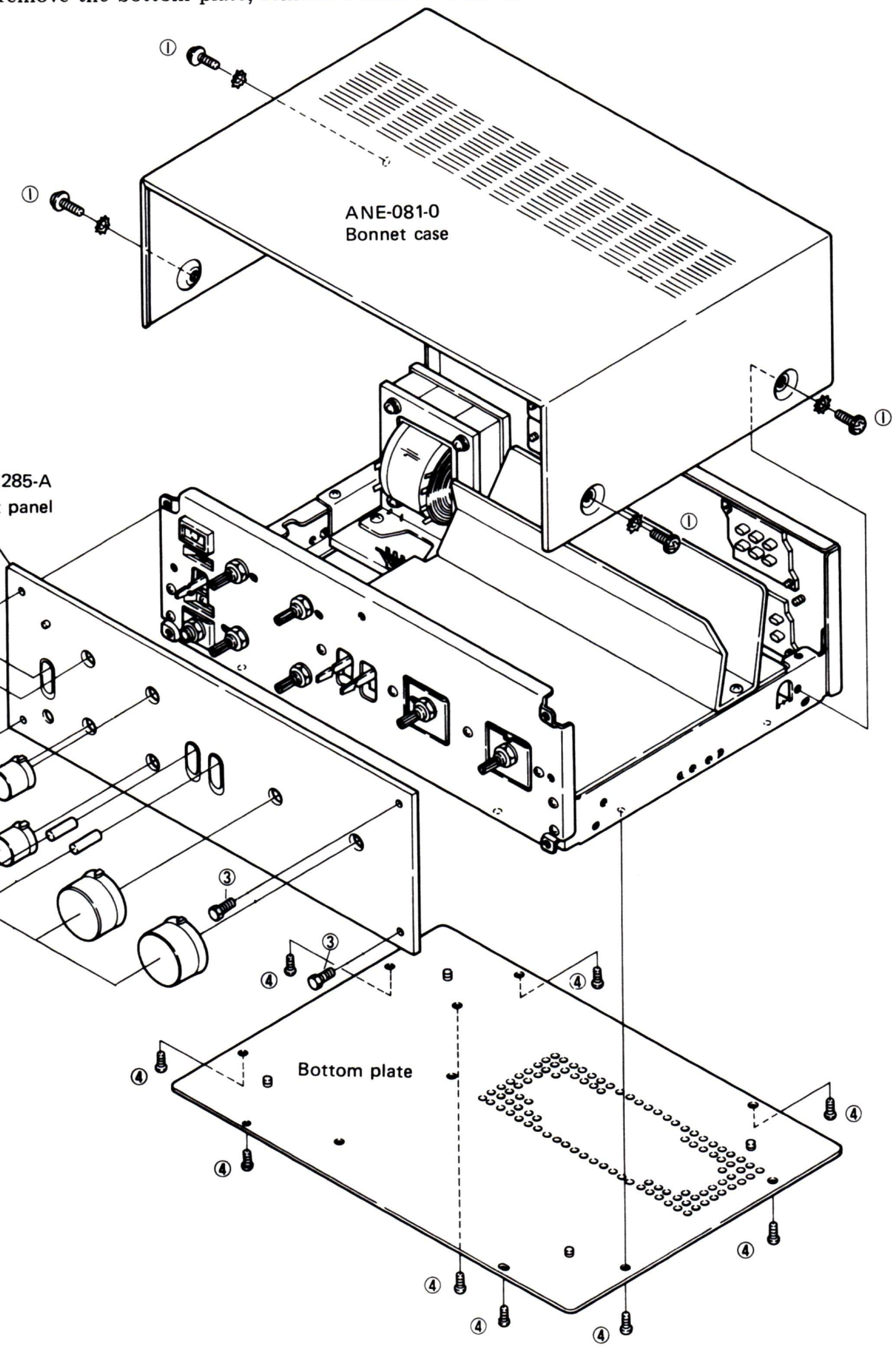
# 5. DISASSEMBLY

1. To remove the bonnet case, remove 2 screws each fastening either side and lift the bonnet case.
2. Pull off all the knobs.
3. To remove the front panel, remove 4 screws.
4. To remove the bottom plate, remove a total of 9 screws.



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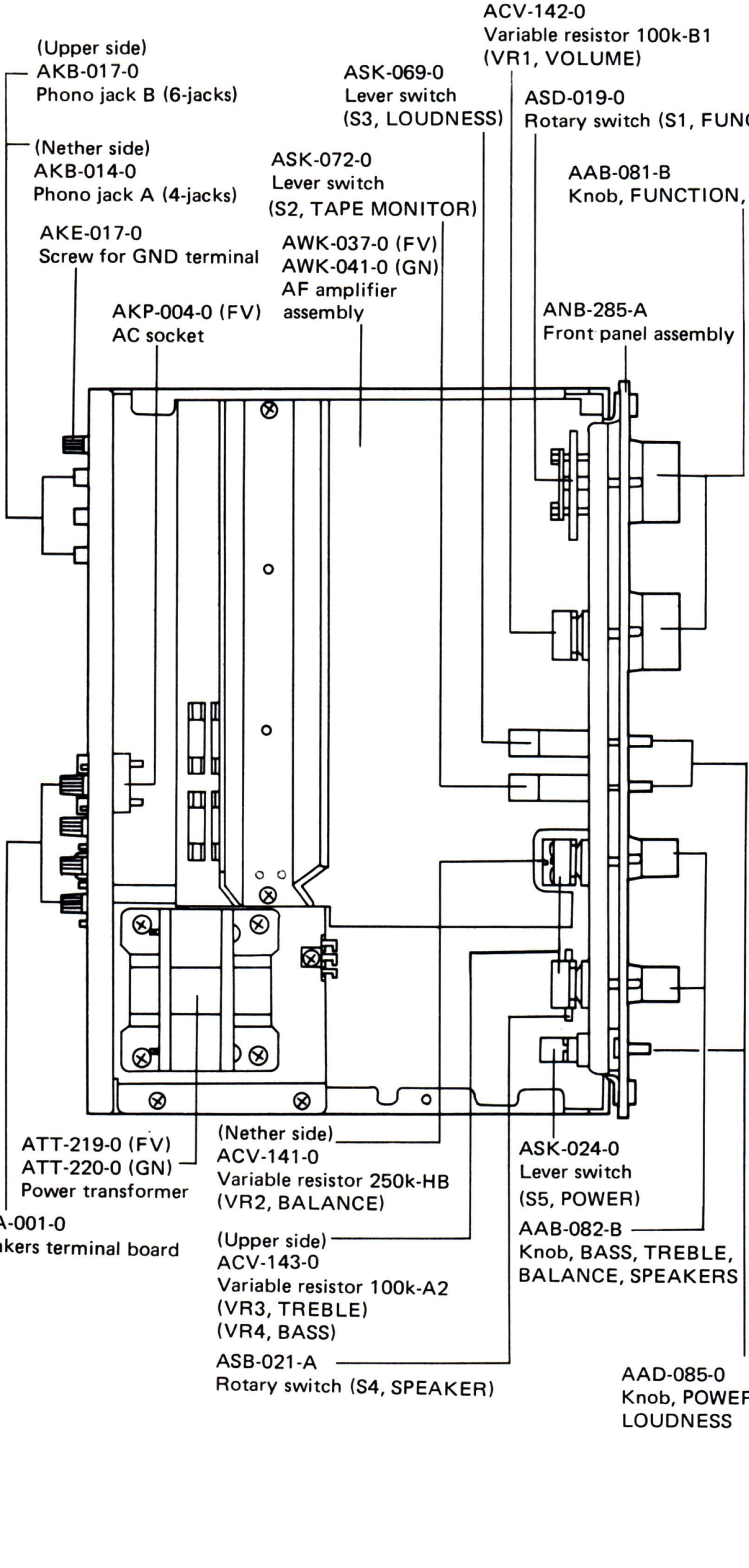
# 6. PARTS LOCATION



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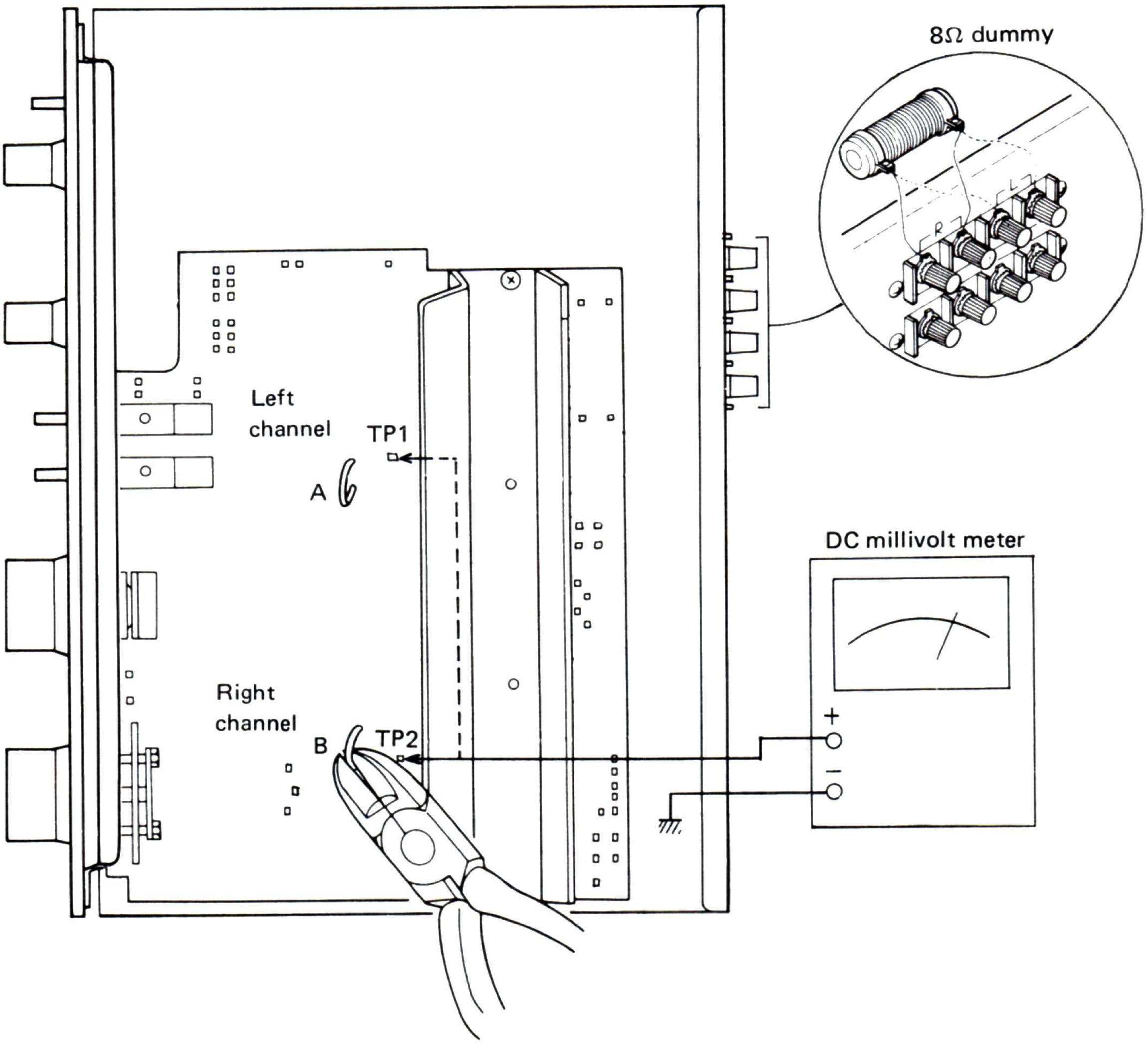
# 7. ALIGNING THE POWER AMPLIFIER

- Do this adjustment when any of the transistors in the power amplifier has been replaced.

1. Nothing should be connected to the input jacks of the SA-5300, and an 8Ω dummy load should be connected across the speaker terminals.
2. A DC millivolt meter should be connected across between terminal number TP.1 (left channel, TP.2: for right channel) and chassis.
3. Cut the jumper lead A(B), if the voltage is less than 5mV.



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# 8. EXPLODED VIEW AND PARTS LIST

NOTE
Parts number is subject to change for the purpose of improvement with notice of a service bulletin.
Service bulletin will be furnished whenever necessary and you are requested to amend parts number in this manual according to the instructions.

## Parts List of Exploded View

NOTICE: Any parts asterisked (*) are subject to being not supplied.

| Key No. | Description | Part No. | |
|---|---|---|---|
| 1 | AF amplifier assembly | AWK-037-0 | FV |
| | | AWK-041-0 | GN |
| 2 | Lever switch (S5, POWER) | ASK-024-0 | |
| 3* | Panel stay | AND-077-0 | |
| 4 | Lamp 8V 50mA, with leads (PL 1) | AEL-047-0 | |
| 5 | Rubber bracket | AEB-064-A | |
| 6 | Front panel assembly | ANB-285-A | Including 12 |
| 7 | Screw, Tapping, 3 x 8 | ABA-002-0 | |
| 8 | Screw, front panel | ABA-021-A | |
| 9 | Knob, POWER, TAPE MONITOR, LOUDNESS | AAD-085-0 | |
| 10 | Knob, BASS, TREBLE, SPEAKERS, BALANCE | AAB-082-B | |
| 11 | Knob, VOLUME, FUNCTION | AAB-081-B | |
| 12 | Spacer | AEC-166-A | Attached 6 |
| 13 | Nut (9$\phi$) | B71-004-0 | |
| 14 | Washer (t = 1mm) | M45-086-A | |
| 15 | Power transformer (T1) | ATT-219-0 | FV |
| | | ATT-220-0 | GN |
| 16* | Sub-chassis | ANF-269-A | |
| 17* | Ground terminal 4P | K13-047-0 | |
| 18* | Wire clip (B) | AEC-005-0 | |
| 19* | Side frame | ANF-270-B | |
| 20 | Variable resistor 100k-A2 (VR3, VR4, BASS, TREBLE) | ACV-143-0 | |
| 21 | Phone jack (PHONES) | K72-026-0 | |
| 22 | Variable resistor 250k-HB (VR2, BALANCE) | ACV-141-0 | |
| 23 | Rotary switch (S4, SPEAKERS) | ASB-021-A | |
| 24 | Screw, Tapping, 4 x 8 | ABA-079-A | |
| 25 | Claw washer | B21-011-0 | |
| 26 | Bonnet case | ANE-081-0 | |
| 27* | Rear panel | ANC-129-0 | FV |
| | | ANC-154-A | GN |
| 28 | AC power cord | ADG-004-0 | FV |
| 29 | Cord grommet | AEC-079-0 | FV |
| 30 | REC/PB connector (DIN-type, 5P) | K93-003-B | |
| 31 | Screw for GND terminal | AKE-017-0 | |
| 32 | Speakers terminal board | AKA-001-0 | |

Continued on the Next Page



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NOTICE: Any parts asterisked (*) are subject to being not supplied.

| Key No. | Description | Part No. | |
|---|---|---|---|
| 33 | AC socket | AKP-004-0 | FV |
| 34 | Phono jack B (6-jacks) | AKB-017-0 | |
| 35 | Phono jack A (4-jacks) | AKB-014-0 | |
| 36* | Bottom plate | ANE-060-0 | |
| 37 | Foot | AEC-083-A | |
| 38 | Fuse holder (line voltage selector) | AKR-027-0 | FV |
| 39 | Washer (t = 0.5mm) | ABE-005-0 | |
| 40 | Connector socket (AC inlet) | AKP-008-0 | GN |



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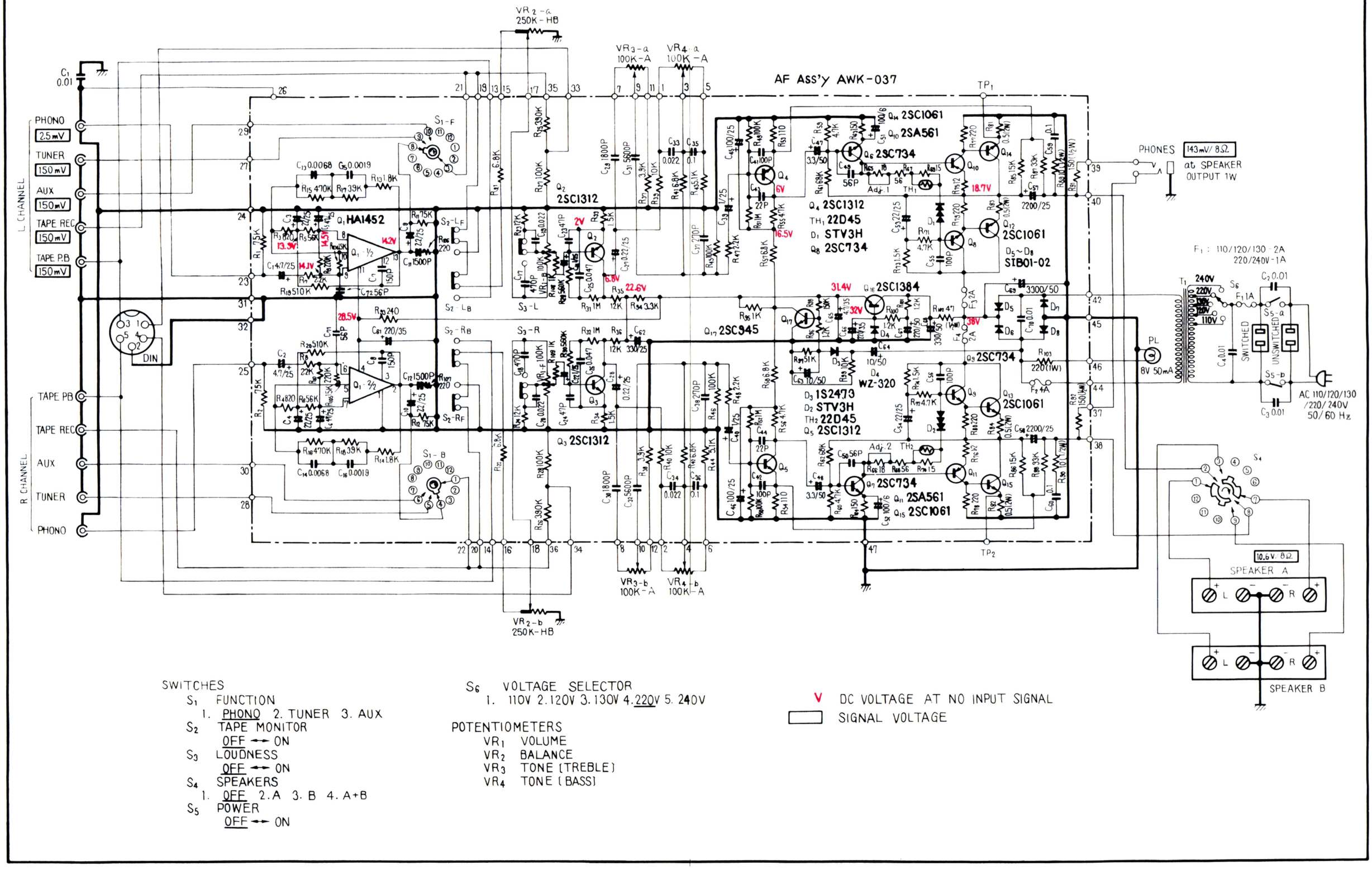
## 9.1 CIRCUIT CONNECTION DIAGRAM

### For "FV" type (5 line voltage)




SWITCHES

- $S_1$ FUNCTION
  1. PHONO 2. TUNER 3. AUX
- $S_2$ TAPE MONITOR
  OFF ⟷ ON
- $S_3$ LOUDNESS
  OFF ⟷ ON
- $S_4$ SPEAKERS
  1. OFF 2. A 3. B 4. A+B
- $S_5$ POWER
  OFF ⟷ ON
- $S_6$ VOLTAGE SELECTOR
  1. 110V 2. 120V 3. 130V 4. 220V 5. 240V

POTENTIOMETERS

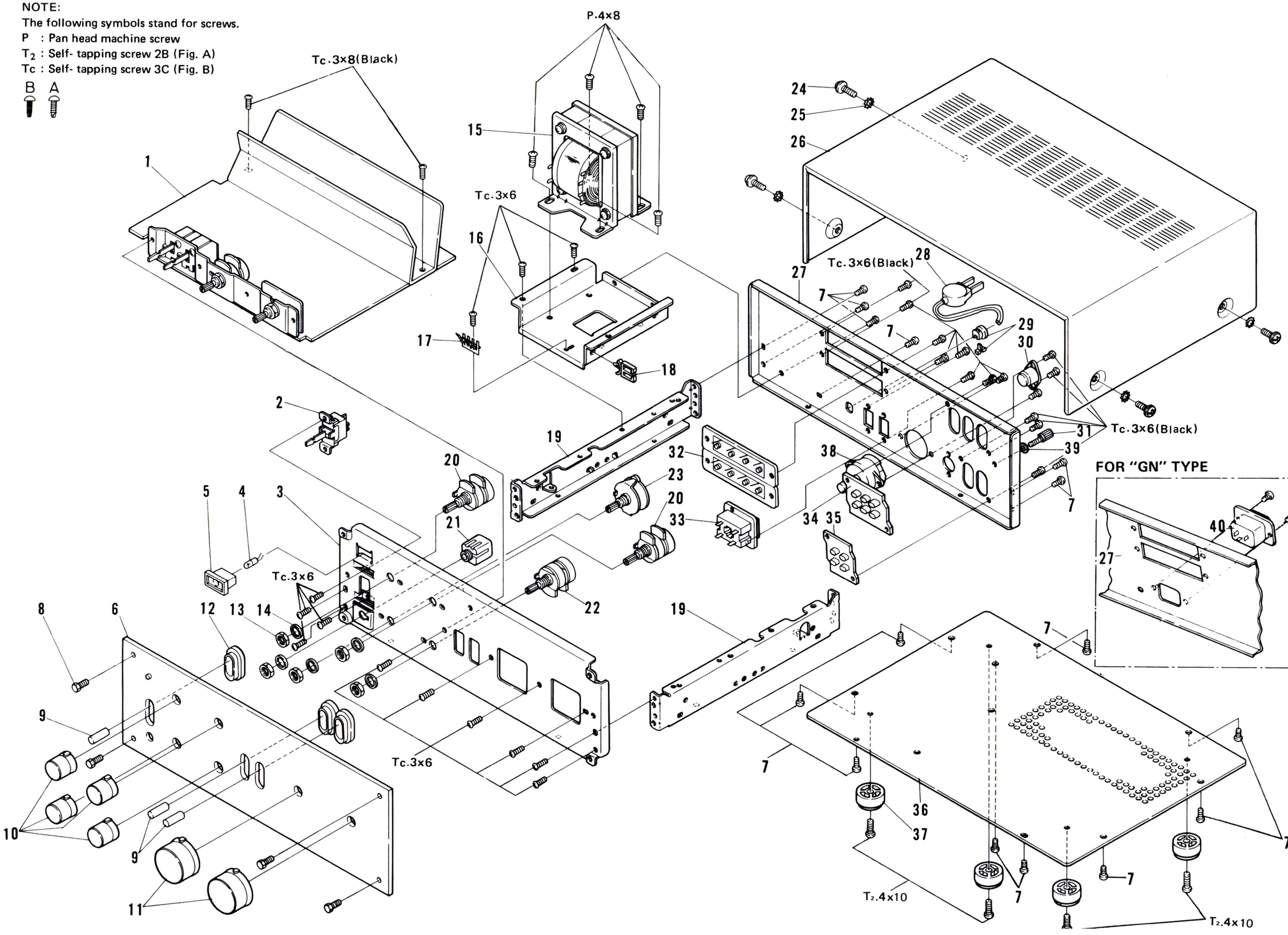
- $VR_1$ VOLUME
- $VR_2$ BALANCE
- $VR_3$ TONE (TREBLE)
- $VR_4$ TONE (BASS)

V DC VOLTAGE AT NO INPUT SIGNAL

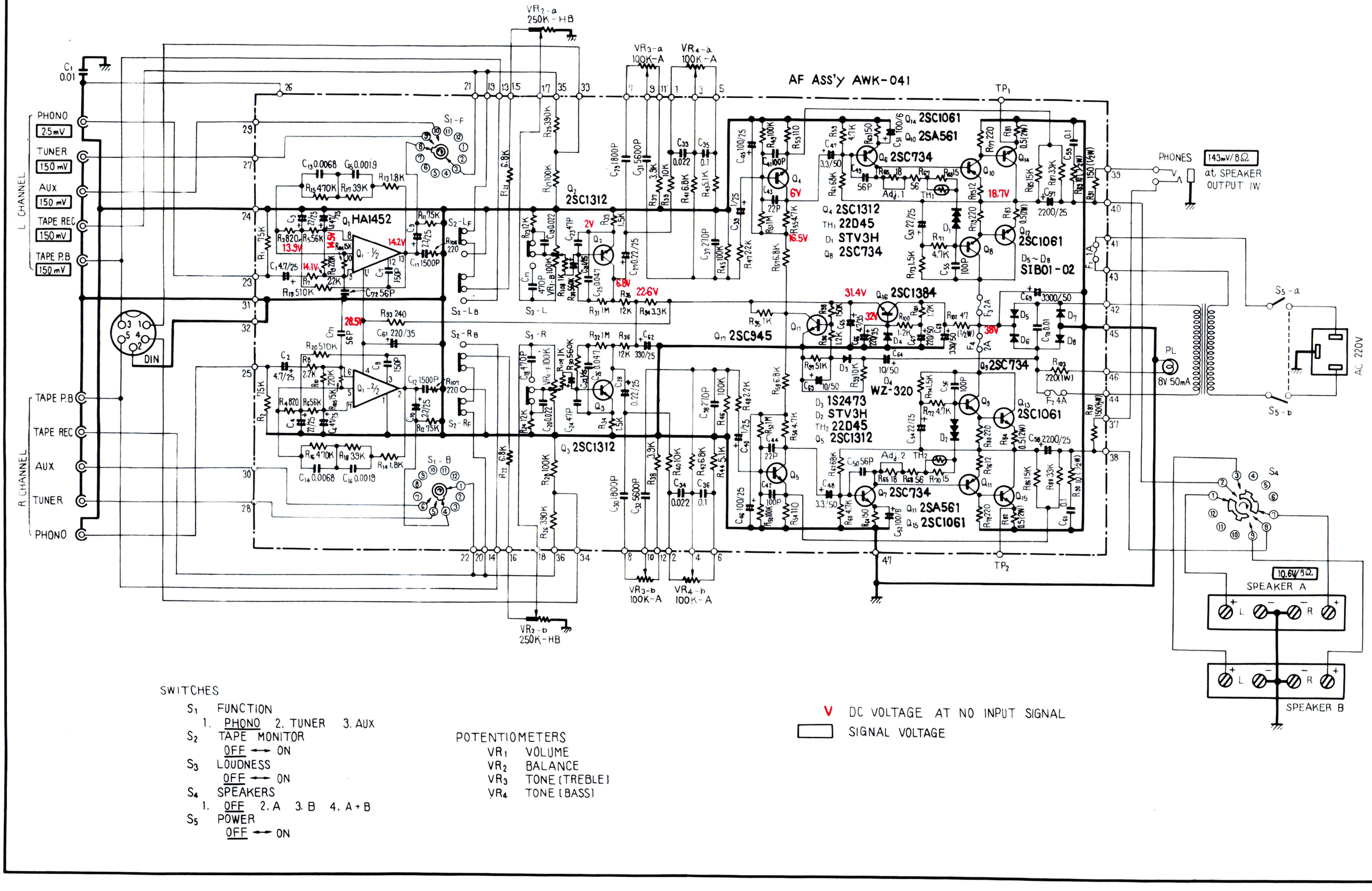
▭ SIGNAL VOLTAGE

NOTE:
The following symbols stand for screws.
P : Pan head machine screw
$T_2$ : Self- tapping screw 2B (Fig. A)
Tc : Self- tapping screw 3C (Fig. B)



## For "GN" type (220V only)




SWITCHES

- $S_1$ FUNCTION
  1. PHONO 2. TUNER 3. AUX
- $S_2$ TAPE MONITOR
  OFF ⟷ ON
- $S_3$ LOUDNESS
  OFF ⟷ ON
- $S_4$ SPEAKERS
  1. OFF 2. A 3. B 4. A+B
- $S_5$ POWER
  OFF ⟷ ON

POTENTIOMETERS

- $VR_1$ VOLUME
- $VR_2$ BALANCE
- $VR_3$ TONE (TREBLE)
- $VR_4$ TONE (BASS)

V DC VOLTAGE AT NO INPUT SIGNAL

▭ SIGNAL VOLTAGE

## 9.2 ELECTRO-PARTS

- CAPACITORS: IN μF UNLESS OTERWISE NOTED p: pF
- RESISTORS: INΩ, ¼W UNLESS OTHERWISE NOTED k: kΩ, M: MΩ

### CAPACITORS

| Symbol | Description | | Part No. | |
|---|---|---|---|---|
| C1 | Ceramic | 0.01 50V | CKDYF 103Z 50 | |
| C2 | Ceramic | 0.01 250V | ACG-001-0 | |
| C3 | Ceramic | 0.01 250V | ACG-001-0 | |
| C4 | Ceramic | 0.01 250V | ACG-001-0 | FV |

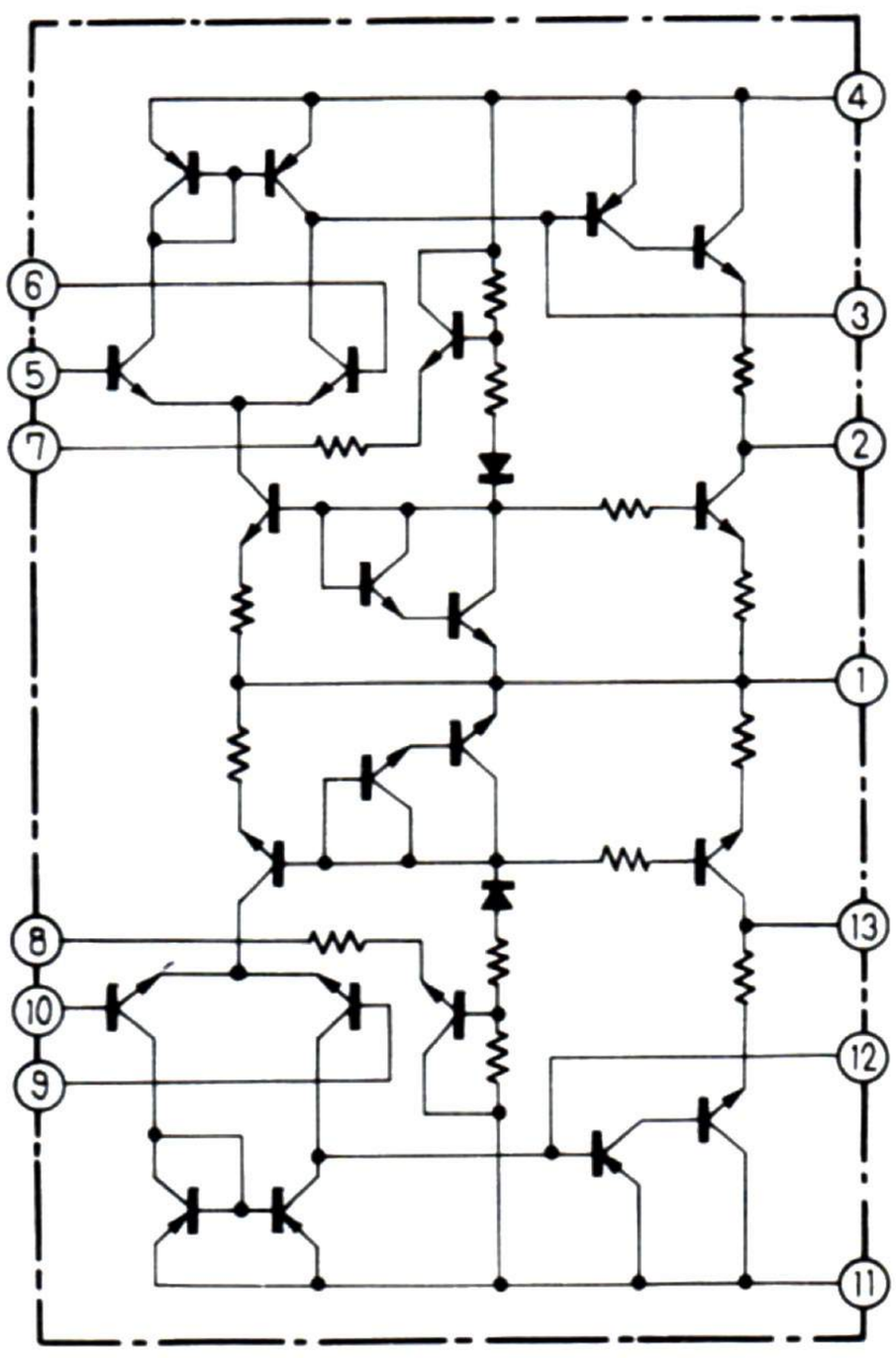
### RESISTORS

| Symbol | Description | Part No. | |
|---|---|---|---|
| VR2 | Variable 250k-HB (BALANCE) | ACV-141-0 | |
| VR3 | Variable 100k-A2 (TREBLE) | ACV-143-0 | |
| VR4 | Variable 100k-A2 (BASS) | ACV-143-0 | |

### OTHERS

| Symbol | Description | Part No. | |
|---|---|---|---|
| T1 | Power transformer | ATT-219-0 | FV |
| | Power transformer | ATT-220-0 | GN |
| S4 | Rotary switch (SPEAKERS) | ASK-024-0 | |
| S5 | Lever switch (POWER) | ASB-021-A | |
| PL1 | Lamp, 8V 50mA, with leads (pilot) | AEL-047-0 | |
| F1 | Fuse 1A (primary) | AEK-106-0 | FV |
| | Fuse 1A (primary) | AEK-402-0 | GN |
| F2 | Fuse 4A (secondary) | AEK-100-0 | FV |
| | Fuse 4A (secondary) | AEK-400-0 | GN |
| F3, F4 | Fuse 2A (power amp) | AEK-103-0 | FV |
| | Fuse 2A (power amp) | AEK-017-0 | GN |

HA1452



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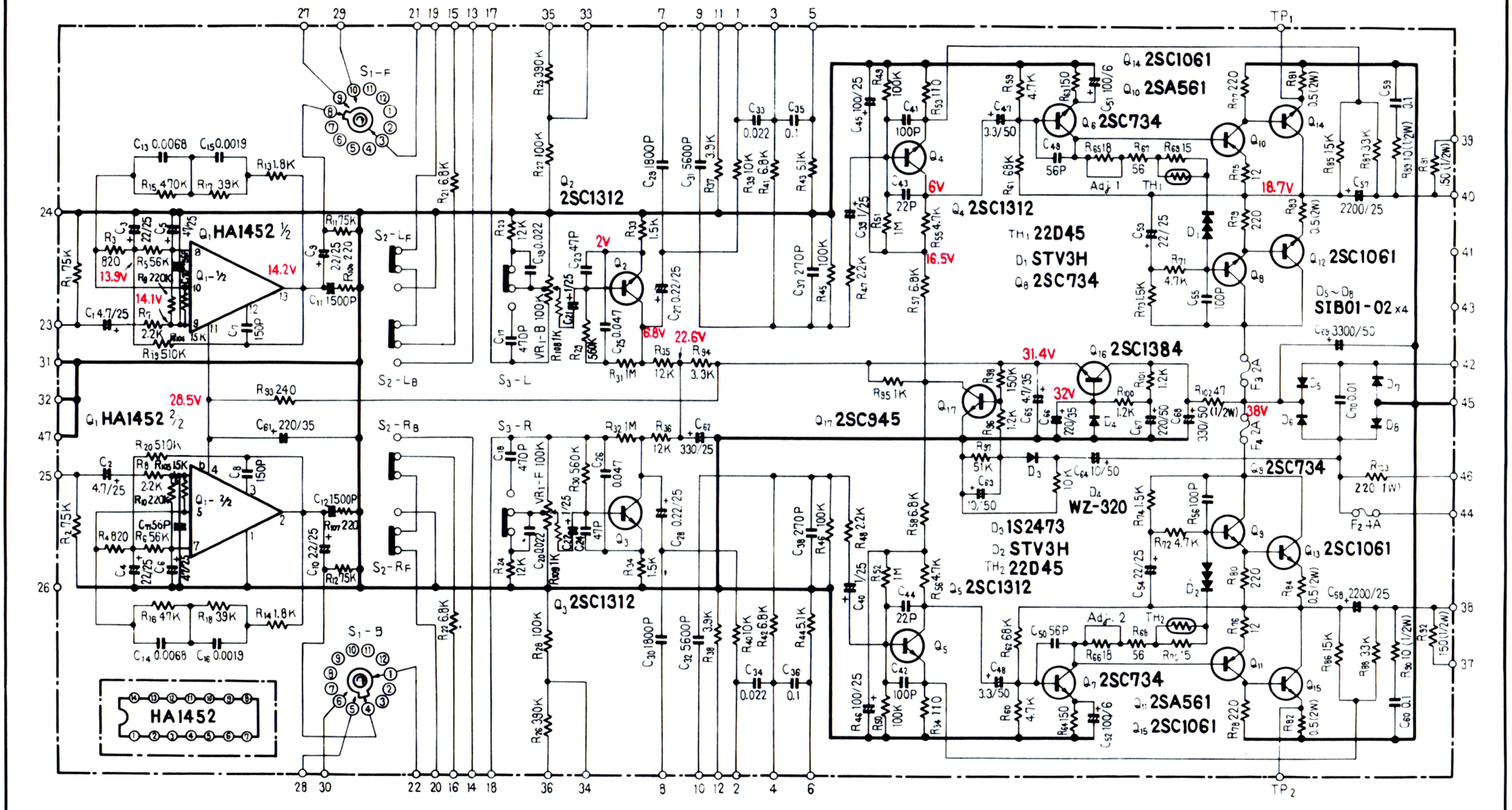
# 9.3 AF AMPLIFIER ASSEMBLY (AWK-037-0) FOR "FV" TYPE




SWITCHES
- $S_1$ : FUNCTION
- $S_2$ : TAPE MONITOR
- $S_3$ : LOUDNESS

VR CONTROL
- $VR_1$ : VOLUME

# Parts List AF Amplifier Assembly (AWK-037-0)

## CAPACITORS

| Symbol | Description | | | Part No. | |
|---|---|---|---|---|---|
| C1 | Electrolytic | 4.7 | 25V | CSZA 4R7K 25 | |
| C2 | Electrolytic | 4.7 | 25V | CSZA 4R7K 25 | |
| C3 | Electrolytic | 22 | 25V | ACH-045-0 | |
| C4 | Electrolytic | 22 | 25V | ACH-045-0 | |
| C5 | Electrolytic | 47 | 25V | CEA 470P 25 | |
| C6 | Electrolytic | 47 | 25V | CEA 470P 25 | |
| C7 | Ceramic | 150p | 50V | CCDSL 151K 50 | |
| C8 | Ceramic | 150p | 50V | CCDSL 151K 50 | |
| C9 | Electrolytic | 2.2 | 25V | CSZA 2R2M 25 | |
| C10 | Electrolytic | 2.2 | 25V | CSZA 2R2M 25 | |
| C11 | Ceramic | 0.0015 | 50V | CKDYB 152K 50 | |
| C12 | Ceramic | 0.0015 | 50V | CKDYB 152K 50 | |
| C13 | Styrol | 0.0068 | 50V | CQSA 682J 50 | |
| C14 | Styrol | 0.0068 | 50V | CQSA 682J 50 | |
| C15 | Styrol | 0.0014 | 50V | CQSA 142J 50 | |
| C16 | Styrol | 0.0014 | 50V | CQSA 142J 50 | |
| C17 | Ceramic | 470p | 50V | CKDYB 471K 50 | |
| C18 | Ceramic | 470p | 50V | CKDYB 471K 50 | |
| C19 | Ceramic | 0.022 | 50V | CKDYF 223Z 50 | |
| C20 | Ceramic | 0.022 | 50V | CKDYF 223Z 50 | |
| C21 | Electrolytic | 1 | 25V | CSSA 010M 25 | |
| C22 | Electrolytic | 1 | 25V | CSSA 010M 25 | |
| C23 | Ceramic | 47p | 50V | CCDSL 470K 50 | |
| C24 | Ceramic | 47p | 50V | CCDSL 470K 50 | |
| C25 | Ceramic | 0.047 | 50V | CKDYF 473Z 50 | |
| C26 | Ceramic | 0.047 | 50V | CKDYF 473Z 50 | |
| C27 | Electrolytic | 0.22 | 25V | CSSA R22M 25 | |
| C28 | Electrolytic | 0.22 | 25V | CSSA R22M 25 | |
| C29 | Ceramic | 0.0018 | 50V | CKDYB 182K 50 | |
| C30 | Ceramic | 0.0018 | 50V | CKDYB 182K 50 | |
| C31 | Ceramic | 0.0056 | 50V | CKDYB 562K 50 | |
| C32 | Ceramic | 0.0056 | 50V | CKDYB 562K 50 | |
| C33 | Mylar | 0.022 | 50V | CQMA 223J 50 | |
| C34 | Mylar | 0.022 | 50V | CQMA 223J 50 | |
| C35 | Mylar | 0.1 | 50V | CQMA 104J 50 | |
| C36 | Mylar | 0.1 | 50V | CQMA 104J 50 | |
| C37 | Ceramic | 270p | 50V | CCDSL 271K 50 | |
| C38 | Ceramic | 270p | 50V | CCDSL 271K 50 | |
| C39 | Electrolytic | 1 | 25V | CSSA 010M 25 | |
| C40 | Electrolytic | 1 | 25V | CSSA 010M 25 | |
| C41 | Ceramic | 100p | 50V | CCDSL 101K 50 | |
| C42 | Ceramic | 100p | 50V | CCDSL 101K 50 | |
| C43 | Ceramic | 22p | 50V | CCDSL 220K 50 | |
| C44 | Ceramic | 22p | 50V | CCDSL 220K 50 | |
| C45 | Electrolytic | 100 | 25V | CEA 101P 25 | |



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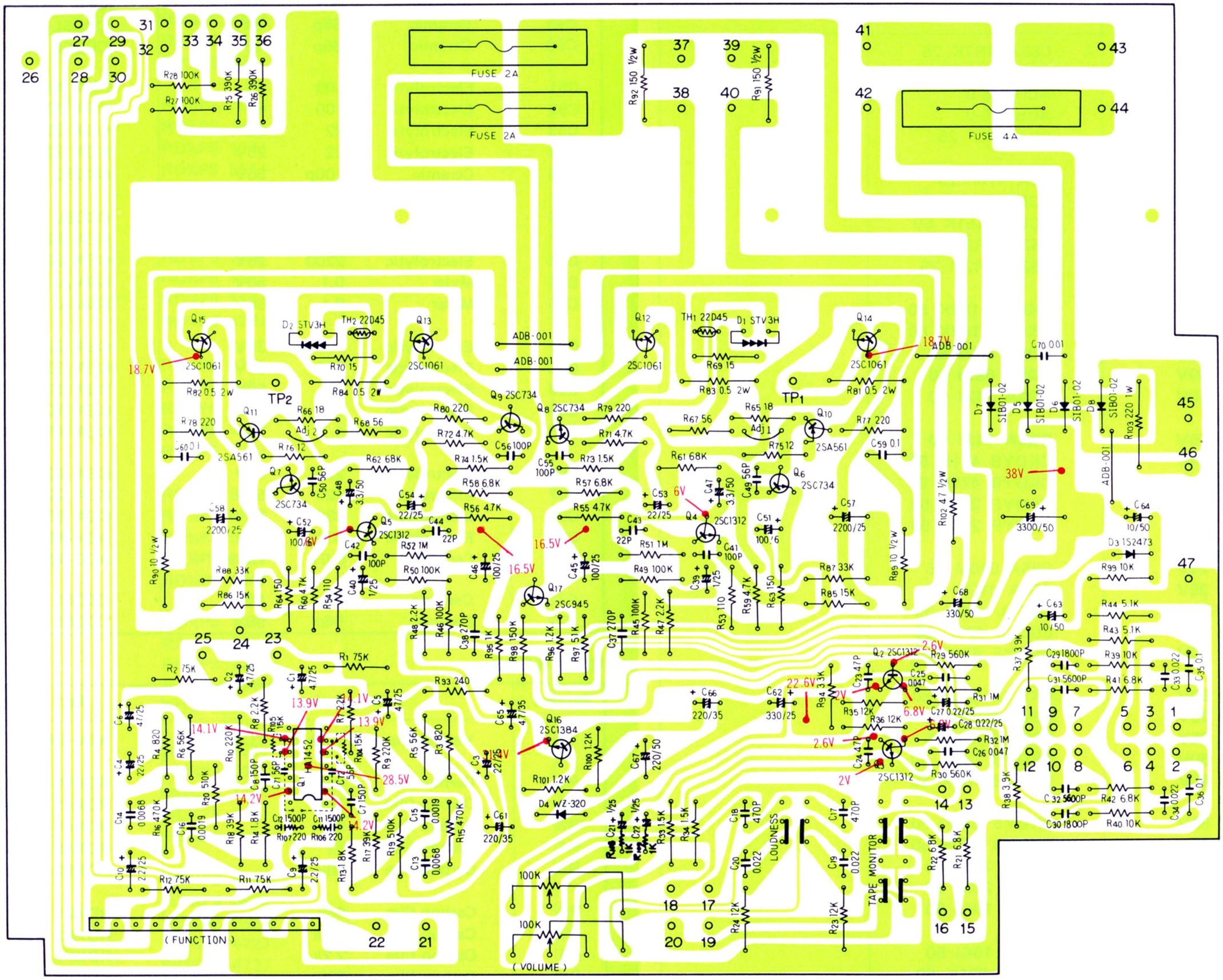
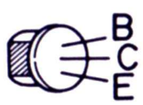
## Foil Side




2SA561
2SC734

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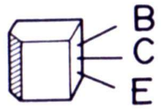
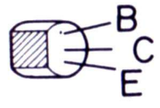
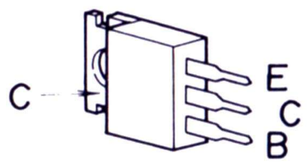
2SC1344




2SC945
2SC1318
2SA720

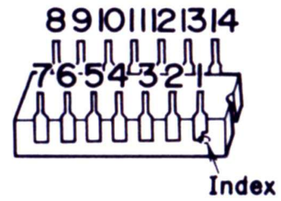



2SC1061




2SC1384

HA1452



| Symbol | Description | | | Part No. | |
|---|---|---|---|---|---|
| C46 | Electrolytic | 100 | 25V | CEA 101P 25 | |
| C47 | Electrolytic | 3.3 | 50V | CEA 3R3P 50 | |
| C48 | Electrolytic | 3.3 | 50V | CEA 3R3P 50 | |
| C49 | Ceramic | 56p | 50V | CCDSL 560K 50 | |
| C50 | Ceramic | 56p | 50V | CCDSL 560K 50 | |
| C51 | Electrolytic | 100 | 6V | CEA 101P 6 | |
| C52 | Electrolytic | 100 | 6V | CEA 101P 6 | |
| C53 | Electrolytic | 22 | 25V | CEA 220P 25 | |
| C54 | Electrolytic | 22 | 25V | CEA 220P 25 | |
| C55 | Ceramic | 100p | 50V | CCDSL 101K 50 | |
| C56 | Ceramic | 100p | 50V | CCDSL 101K 50 | |
| C57 | Electrolytic | 2200 | 25V | CEA 222P 25 | |
| C58 | Electrolytic | 2200 | 25V | CEA 222P 25 | |
| C59 | Mylar | 0.1 | 50V | CQMA 104J 50 | |
| C60 | Mylar | 0.1 | 50V | CQMA 104J 50 | |
| C61 | Electrolytic | 220 | 35V | CEA 221P 35 | |
| C62 | Electrolytic | 330 | 25V | CEA 331P 25 | |
| C63 | Electrolytic | 10 | 50V | CEA 100P 50 | |
| C64 | Electrolytic | 10 | 50V | CEA 100P 50 | |
| C65 | Electrolytic | 4.7 | 35V | CEA 4R7P 35 | |
| C66 | Electrolytic | 220 | 35V | CEA 221P 35 | |
| C67 | Electrolytic | 220 | 50V | CEA 221P 50 | |
| C68 | Electrolytic | 330 | 50V | CEA 331P 50 | |
| C69 | Electrolytic | 3300 | 50V | ACH-049-0 | |
| C70 | Ceramic | 0.01 | 150V | ACG-004-0 | |
| C71 | Ceramic | 56p | 50V | CCDSL 560K 50 | |
| C72 | Ceramic | 56p | 50V | CCDSL 560K 50 | |

## RESISTORS

| Symbol | Description | | Part No. | |
|---|---|---|---|---|
| VR1 | Variable resistor 100k-B1 (VOLUME) | | ACV-142-0 | |
| R1 | Carbon film | 75k | RD¼PS 753J | |
| R2 | Carbon film | 75k | RD¼PS 753J | |
| R3 | Carbon film | 82 | RD¼PS 820J | |
| R4 | Carbon film | 82 | RD¼PS 820J | |
| R5 | Carbon film | 56k | RD¼PS 563J | |
| R6 | Carbon film | 56k | RD¼PS 563J | |
| R7 | Carbon film | 2.2k | RD¼PS 222J | |
| R8 | Carbon film | 2.2k | RD¼PS 222J | |
| R9 | Carbon film | 220k | RD¼PS 224J | |
| R10 | Carbon film | 220k | RD¼PS 224J | |
| R11 | Carbon film | 75k | RD¼PS 753J | |
| R12 | Carbon film | 75k | RD¼PS 753J | |
| R13 | Carbon film | 1.8k | RD¼PS 182J | |
| R14 | Carbon film | 1.8k | RD¼PS 182J | |
| R15 | Carbon film | 470k | RD¼PS 474J | |
| R16 | Carbon film | 470k | RD¼PS 474J | |
| R17 | Carbon film | 39k | RD¼PS 393J | |
| R18 | Carbon film | 39k | RD¼PS 393J | |
| R19 | Carbon film | 510k | RD¼PS 514J | |
| R20 | Carbon film | 510k | RD¼PS 514J | |



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| Symbol | Description | | Part No. | |
|---|---|---|---|---|
| R21 | Carbon film | 6.8k | RD¼PS 682J | |
| R22 | Carbon film | 6.8k | RD¼PS 682J | |
| R23 | Carbon film | 12k | RD¼PS 123J | |
| R24 | Carbon film | 12k | RD¼PS 123J | |
| R25 | Carbon film | 390k | RD¼PS 394J | |
| R26 | Carbon film | 390k | RD¼PS 394J | |
| R27 | Carbon film | 100k | RD¼PS 104J | |
| R28 | Carbon film | 100k | RD¼PS 104J | |
| R29 | Carbon film | 560k | RD¼PS 564J | |
| R30 | Carbon film | 560k | RD¼PS 564J | |
| R31 | Carbon film | 1M | RD¼PS 105J | |
| R32 | Carbon film | 1M | RD¼PS 105J | |
| R33 | Carbon film | 1.5k | RD¼PS 152J | |
| R34 | Carbon film | 1.5k | RD¼PS 152J | |
| R35 | Carbon film | 12k | RD¼PS 123J | |
| R36 | Carbon film | 12k | RD¼PS 123J | |
| R37 | Carbon film | 3.9k | RD¼PS 392J | |
| R38 | Carbon film | 3.9k | RD¼PS 392J | |
| R39 | Carbon film | 10k | RD¼PS 103J | |
| R40 | Carbon film | 10k | RD¼PS 103J | |
| R41 | Carbon film | 6.8k | RD¼PS 682J | |
| R42 | Carbon film | 6.8k | RD¼PS 682J | |
| R43 | Carbon film | 5.1k | RD¼PS 512J | |
| R44 | Carbon film | 5.1k | RD¼PS 512J | |
| R45 | Carbon film | 100k | RD¼PS 104J | |
| R46 | Carbon film | 100k | RD¼PS 104J | |
| R47 | Carbon film | 2.2k | RD¼PS 222J | |
| R48 | Carbon film | 2.2k | RD¼PS 222J | |
| R49 | Carbon film | 100k | RD¼PS 104J | |
| R50 | Carbon film | 100k | RD¼PS 104J | |
| R51 | Carbon film | 1M | RD¼PS 105J | |
| R52 | Carbon film | 1M | RD¼PS 105J | |
| R53 | Carbon film | 110 | RD¼PS 111J | |
| R54 | Carbon film | 110 | RD¼PS 111J | |
| R55 | Carbon film | 4.7k | RD¼PS 472J | |
| R56 | Carbon film | 4.7k | RD¼PS 472J | |
| R57 | Carbon film | 6.8k | RD¼PS 682J | |
| R58 | Carbon film | 6.8k | RD¼PS 682J | |
| R59 | Carbon film | 4.7k | RD¼PS 472J | |
| R60 | Carbon film | 4.7k | RD¼PS 472J | |
| R61 | Carbon film | 68k | RD¼PS 683J | |
| R62 | Carbon film | 68k | RD¼PS 683J | |
| R63 | Carbon film | 150 | RD¼PS 151J | |
| R64 | Carbon film | 150 | RD¼PS 151J | |
| R65 | Carbon film | 18 | RD¼PS 180J | |
| R66 | Carbon film | 18 | RD¼PS 180J | |
| R67 | Carbon film | 56 | RD¼PS 560J | |
| R68 | Carbon film | 56 | RD¼PS 560J | |
| R69 | Carbon film | 15 | RD¼PS 150J | |
| R70 | Carbon film | 15 | RD¼PS 150J | |

Continued on the Next Page



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| Symbol | Description | | | Part No. | |
|---|---|---|---|---|---|
| R71 | Carbon film | 4.7k | | RD¼PS 472J | |
| R72 | Carbon film | 4.7k | | RD¼PS 472J | |
| R73 | Carbon film | 1.5k | | RD¼PS 152J | |
| R74 | Carbon film | 1.5k | | RD¼PS 152J | |
| R75 | Carbon film | 12 | | RD¼PS 120J | |
| R76 | Carbon film | 12 | | RD¼PS 120J | |
| R77 | Carbon film | 220 | | RD¼PS 221J | |
| R78 | Carbon film | 220 | | RD¼PS 221J | |
| R79 | Carbon film | 220 | | RD¼PS 221J | |
| R80 | Carbon film | 220 | | RD¼PS 221J | |
| R81 | Metal film | 0.5 | 2W | RN2H 0R5K | |
| R82 | Metal film | 0.5 | 2W | RN2H 0R5K | |
| R83 | Metal film | 0.5 | 2W | RN2H 0R5K | |
| R84 | Metal film | 0.5 | 2W | RN2H 0R5K | |
| R85 | Carbon film | 15k | | RD¼PS 153J | |
| R86 | Carbon film | 15k | | RD¼PS 153J | |
| R87 | Carbon film | 33k | | RD¼PS 333J | |
| R88 | Carbon film | 33k | | RD¼PS 333J | |
| R89 | Carbon film | 10 | ½W | RD½PS 100J | |
| R90 | Carbon film | 10 | ½W | RD½PS 100J | |
| R91 | Carbon film | 150 | ½W | RD½PS 151J | |
| R92 | Carbon film | 150 | ½W | RD½PS 151J | |
| R93 | Carbon film | 240 | | RD¼PS 241J | |
| R94 | Carbon film | 3.3k | | RD¼PS 332J | |
| R95 | Carbon film | 1k | | RD¼PS 102J | |
| R96 | Carbon film | 1.2k | | RD¼PS 122J | |
| R97 | Carbon film | 51k | | RD¼PS 513J | |
| R98 | Carbon film | 150k | | RD¼PS 154J | |
| R99 | Carbon film | 10k | | RD¼PS 103J | |
| R100 | Carbon film | 1.2k | | RD¼PS 122J | |
| R101 | Carbon film | 1.2k | | RD¼PS 122J | |
| R102 | Carbon film | 47 | ½W | RD½PS 470J | |
| R103 | Metal oxide film | 220 | 1W | RS1P 221J · | |
| R104 | Carbon film | 15k | | RD¼PM 153J | |
| R105 | Carbon film | 15k | | RD¼PM 153J | |
| R106 | Carbon film | 220 | | RD¼PM 221J | |
| R107 | Carbon film | 220 | | RD¼PM 221J | |
| R108 | Carbon film | 1k | | RD¼PM 102J | |
| R109 | Carbon film | 1k | | RD¼PM 102J | |

## SEMICONDUCTORS

| Symbol | Description | | Part No. | |
|---|---|---|---|---|
| Q1 | IC | HA1452 | | |
| Q2 | Transistor | 2SC1312-G or F (2SC1344-D or E) | | |
| Q3 | Transistor | 2SC1312-G or F (2SC1344-D or E) | | |



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| Symbol | Description | | Part No. | |
|---|---|---|---|---|
| Q4 | Transistor | 2SC1312-G or F (2SC1344-D or E) | | |
| Q5 | Transistor | 2SC1312-G or F (2SC1344-D or E) | | |
| Q6 | Transistor | 2SC734-GR or Y (2SC1318-R, Q or S) | | |
| Q7 | Transistor | 2SC734-GR or Y (2SC1318-R, Q or S) | | |
| Q8 | Transistor | 2SC734-Y or O (2SC1318-R or S) | | |
| Q9 | Transistor | 2SC734-Y or O (2SC1318-R or S) | | |
| Q10 | Transistor | 2SA561-Y or O (2SA720-R, Q or S) | | |
| Q11 | Transistor | 2SA561-Y or O (2SA720-R, Q or S) | | |
| Q12 | Transistor | 2SC1061-B or C | | |
| Q13 | Transistor | 2SC1061-B or C | | |
| Q14 | Transistor | 2SC1061-B or C | | |
| Q15 | Transistor | 2SC1061-B or C | | |
| Q16 | Transistor | 2SC1384-R or Q | | |
| Q17 | Transistor | 2SC945-R or Q | | |
| D1 | Varistor | STV-3H-G | | |
| D2 | Varistor | STV-3H-G | | |
| D3 | Diode | 1S2473 | | |
| D4 | Zener diode | WZ-320 | | |
| D5 | Diode | SIB01-02 (1S1866) | | |
| D6 | Diode | SIB01-02 (1S1866) | | |
| D7 | Diode | SIB01-02 (1S1866) | | |
| D8 | Diode | SIB01-02 (1S1866) | | |
| TH1 | Thermistor | 22D45 | | |
| TH2 | Thermistor | 22D45 | | |

## SWITCHES

| Symbol | Description | Part No. | |
|---|---|---|---|
| S1 | Rotary switch (FUNCTION) | ASD-019-0 | |
| S2 | Lever switch (TAPE MONITOR) | ASK-072-0 | |
| S3 | Lever switch (LOUDNESS) | ASK-069-0 | |

## OTHERS

| Symbol | Description | Part No. | |
|---|---|---|---|
| | Heat sink | ANH-224-0 | |
| | Transistor socket | AKH-002-0 | |
| | Insulating wafer | AEC-078-0 | |
| | Insulating spacer | ANG-108-0 | |
| | Fuse clip | AKR-013-0 | |
| | Nut (9$\phi$) | B71-004-0 | |
| | Washer (t=1mm) | M45-086-0 | |



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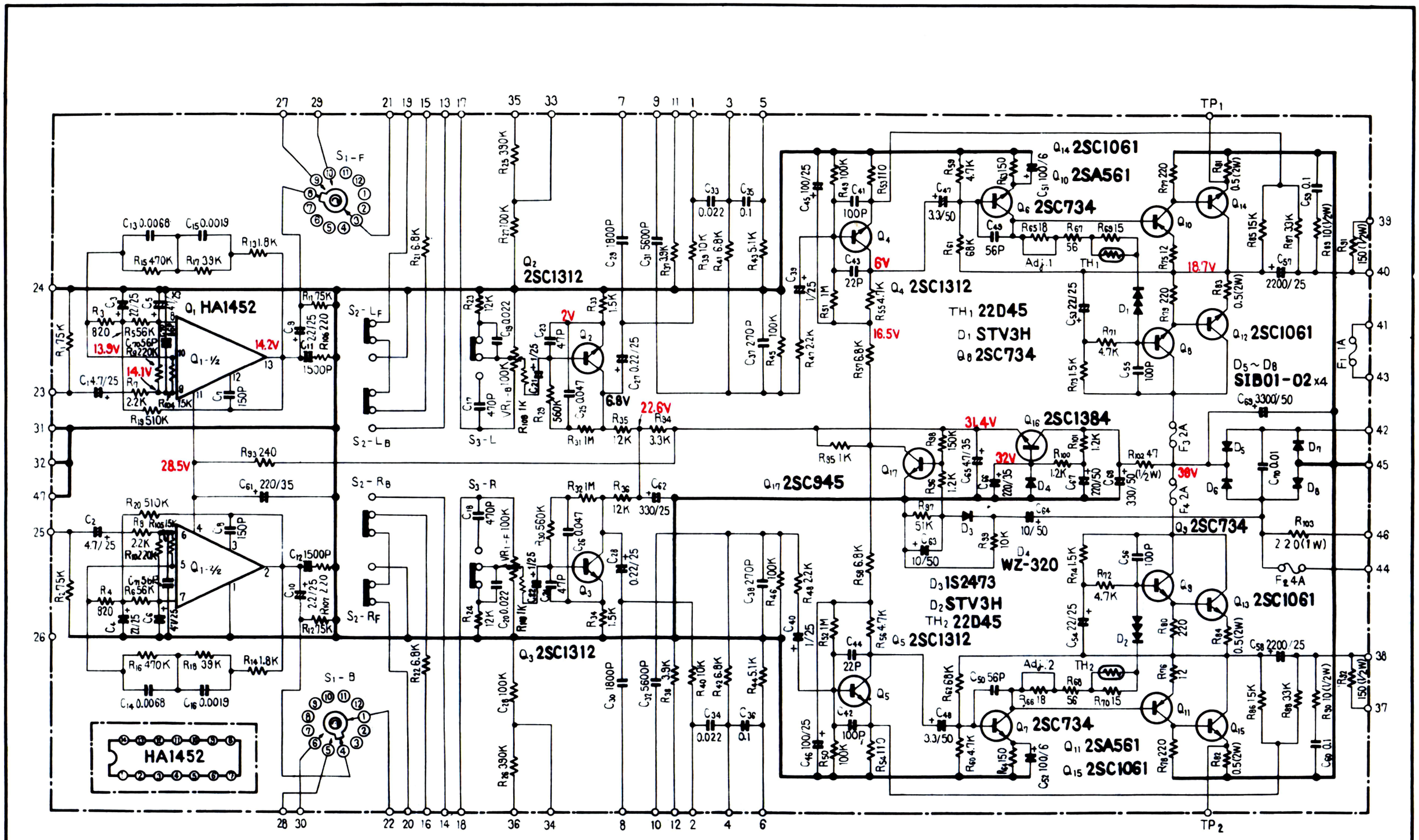
# 9.4 AF AMPLIFIER ASSEMBLY (AWK-041-0) FOR "GN" TYPE




SWITCHES
- $S_1$ : FUNCTION
- $S_2$ : TAPE MONITOR
- $S_3$ : LOUDNESS

VR CONTROL
- $VR_1$ : VOLUME

# Parts List of AF Amplifier Assembly (AWK-041-0)

## CAPACITORS

| Symbol | Description | | | Part No. | |
|---|---|---|---|---|---|
| C1 | Electrolytic | 4.7 | 25V | CSZA 4R7K 25 | |
| C2 | Electrolytic | 4.7 | 25V | CSZA 4R7K 25 | |
| C3 | Electrolytic | 22 | 25V | ACH-045-0 | |
| C4 | Electrolytic | 22 | 25V | ACH-045-0 | |
| C5 | Electrolytic | 47 | 25V | CEA 470P 25 | |
| C6 | Electrolytic | 47 | 25V | CEA 470P 25 | |
| C7 | Ceramic | 150p | 50V | CCDSL 151K 50 | |
| C8 | Ceramic | 150p | 50V | CCDSL 151K 50 | |
| C9 | Electrolytic | 2.2 | 25V | CSZA 2R2M 25 | |
| C10 | Electrolytic | 2.2 | 25V | CSZA 2R2M 25 | |
| C11 | Ceramic | 0.0015 | 50V | CKDYB 152K 50 | |
| C12 | Ceramic | 0.0015 | 50V | CKDYB 152K 50 | |
| C13 | Styrol | 0.0068 | 50V | CQSA 682J 50 | |
| C14 | Styrol | 0.0068 | 50V | CQSA 682J 50 | |
| C15 | Styrol | 0.0014 | 50V | CQSA 142J 50 | |
| C16 | Styrol | 0.0014 | 50V | CQSA 142J 50 | |
| C17 | Ceramic | 470p | 50V | CKDYB 471K 50 | |
| C18 | Ceramic | 470p | 50V | CKDYB 471K 50 | |
| C19 | Ceramic | 0.022 | 50V | CKDYF 223Z 50 | |
| C20 | Ceramic | 0.022 | 50V | CKDYF 223Z 50 | |
| C21 | Electrolytic | 1 | 25V | CSSA 010M 25 | |
| C22 | Electrolytic | 1 | 25V | CSSA 010M 25 | |
| C23 | Ceramic | 47p | 50V | CCDSL 470K 50 | |
| C24 | Ceramic | 47p | 50V | CCDSL 470K 50 | |
| C25 | Ceramic | 0.047 | 50V | CKDYF 473Z 50 | |
| C26 | Ceramic | 0.047 | 50V | CKDYF 473Z 50 | |
| C27 | Electrolytic | 0.22 | 25V | CSSA R22M 25 | |
| C28 | Electrolytic | 0.22 | 25V | CSSA R22M 25 | |
| C29 | Ceramic | 0.0018 | 50V | CKDYB 182K 50 | |
| C30 | Ceramic | 0.0018 | 50V | CKDYB 182K 50 | |
| C31 | Ceramic | 0.0056 | 50V | CKDYB 562K 50 | |
| C32 | Ceramic | 0.0056 | 50V | CKDYB 562K 50 | |
| C33 | Mylar | 0.022 | 50V | CQMA 223J 50 | |
| C34 | Mylar | 0.022 | 50V | CQMA 223J 50 | |
| C35 | Mylar | 0.1 | 50V | CQMA 104J 50 | |
| C36 | Mylar | 0.1 | 50V | CQMA 104J 50 | |
| C37 | Ceramic | 270p | 50V | CCDSL 271K 50 | |
| C38 | Ceramic | 270p | 50V | CCDSL 271K 50 | |
| C39 | Electrolytic | 1 | 25V | CSSA 010M 25 | |
| C40 | Electrolytic | 1 | 25V | CSSA 010M 25 | |
| C41 | Ceramic | 100p | 50V | CCDSL 101K 50 | |
| C42 | Ceramic | 100p | 50V | CCDSL 101K 50 | |
| C43 | Ceramic | 22p | 50V | CCDSL 220K 50 | |
| C44 | Ceramic | 22p | 50V | CCDSL 220K 50 | |
| C45 | Electrolytic | 100 | 25V | CEA 101P 25 | |



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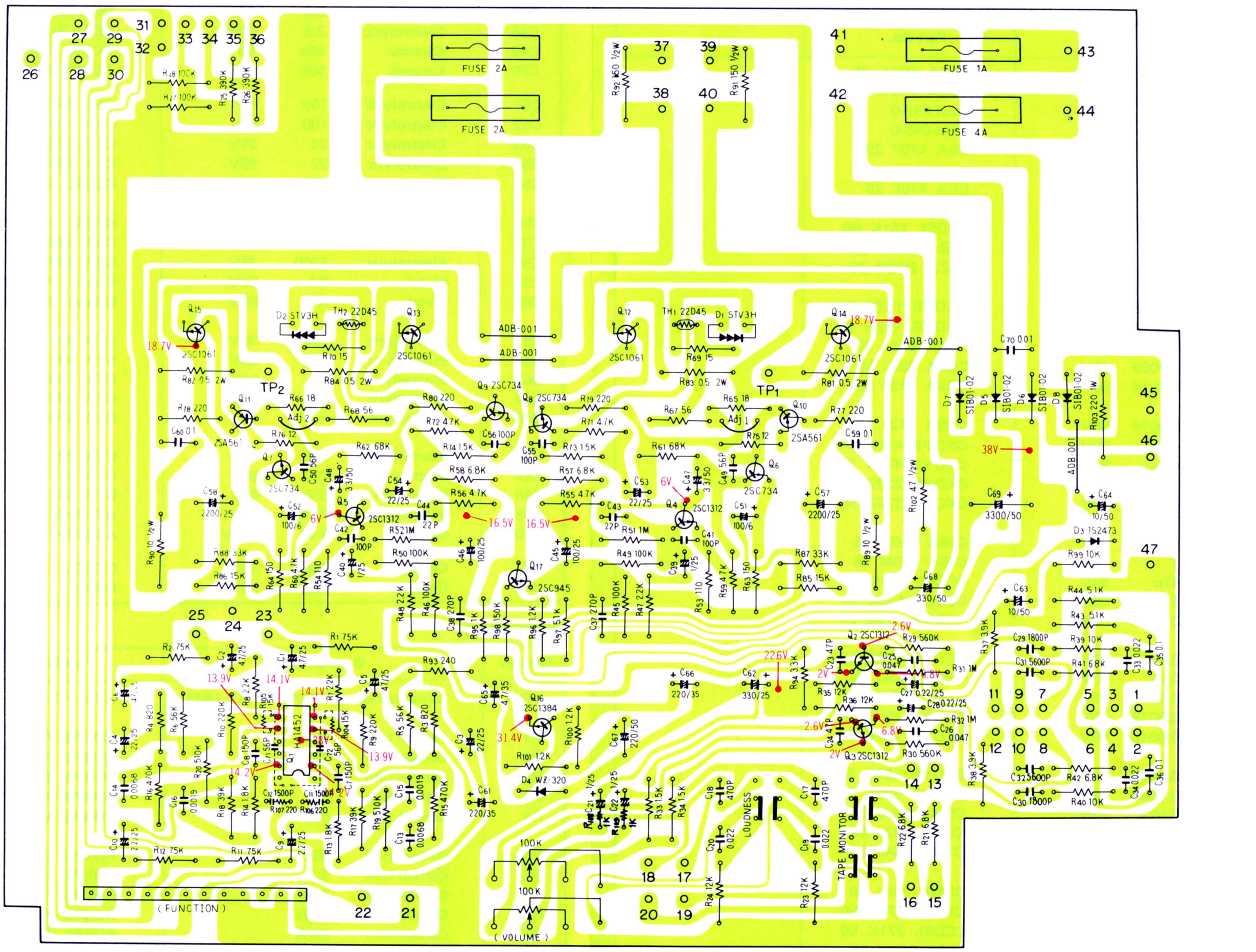
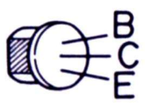
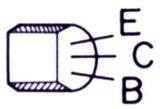
## Foil Side




### 2SA561
### 2SC734




### 2SC1312

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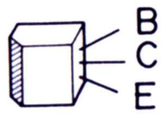
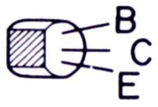



### 2SC945
### 2SC1318
### 2SA720

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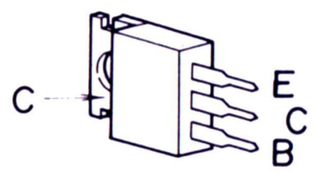


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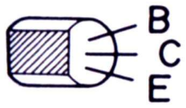
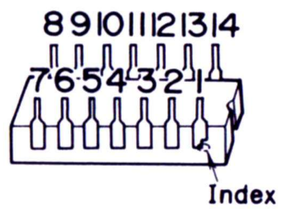



### HA1452



| Symbol | Description | | | Part No. | |
|---|---|---|---|---|---|
| C46 | Electrolytic | 100 | 25V | CEA 101P 25 | |
| C47 | Electrolytic | 3.3 | 50V | CEA 3R3P 50 | |
| C48 | Electrolytic | 3.3 | 50V | CEA 3R3P 50 | |
| C49 | Ceramic | 56p | 50V | CCDSL 560K 50 | |
| C50 | Ceramic | 56p | 50V | CCDSL 560K 50 | |
| C51 | Electrolytic | 100 | 6V | CEA 101P 6 | |
| C52 | Electrolytic | 100 | 6V | CEA 101P 6 | |
| C53 | Electrolytic | 22 | 25V | CEA 220P 25 | |
| C54 | Electrolytic | 22 | 25V | CEA 220P 25 | |
| C55 | Ceramic | 100p | 50V | CCDSL 101K 50 | |
| C56 | Ceramic | 100p | 50V | CCDSL 101K 50 | |
| C57 | Electrolytic | 2200 | 25V | CEA 222P 25 | |
| C58 | Electrolytic | 2200 | 25V | CEA 222P 25 | |
| C59 | Mylar | 0.1 | 50V | CQMA 104J 50 | |
| C60 | Mylar | 0.1 | 50V | CQMA 104J 50 | |
| C61 | Electrolytic | 220 | 35V | CEA 221P 35 | |
| C62 | Electrolytic | 330 | 25V | CEA 331P 25 | |
| C63 | Electrolytic | 10 | 50V | CEA 100P 50 | |
| C64 | Electrolytic | 10 | 50V | CEA 100P 50 | |
| C65 | Electrolytic | 4.7 | 35V | CEA 4R7P 35 | |
| C66 | Electrolytic | 220 | 35V | CEA 221P 35 | |
| C67 | Electrolytic | 220 | 50V | CEA 221P 50 | |
| C68 | Electrolytic | 330 | 50V | CEA 331P 50 | |
| C69 | Electrolytic | 3300 | 50V | ACH-049-0 | |
| C70 | Ceramic | 0.01 | 150V | ACG-004-0 | |
| C71 | Ceramic | 56p | 50V | CCDSL 560K 50 | |
| C72 | Ceramic | 56p | 50V | CCDSL 560K 50 | |

## RESISTORS

| Symbol | Description | | Part No. | |
|---|---|---|---|---|
| VR1 | Vaviable resistor 100K-B 1(VOLUME) | | ACV-142-0 | |
| R1 | Carbon film | 75k | RD¼PS 753J | |
| R2 | Carbon film | 75k | RD¼PS 753J | |
| R3 | Carbon film | 82 | RD¼PS 820J | |
| R4 | Carbon film | 82 | RD¼PS 820J | |
| R5 | Carbon film | 56k | RD¼PS 563J | |
| R6 | Carbon film | 56k | RD¼PS 563J | |
| R7 | Carbon film | 2.2k | RD¼PS 222J | |
| R8 | Carbon film | 2.2k | RD¼PS 222J | |
| R9 | Carbon film | 220k | RD¼PS 224J | |
| R10 | Carbon film | 220k | RD¼PS 224J | |
| R11 | Carbon film | 75k | RD¼PS 753J | |
| R12 | Carbon film | 75k | RD¼PS 753J | |
| R13 | Carbon film | 1.8k | RD¼PS 182J | |
| R14 | Carbon film | 1.8k | RD¼PS 182J | |
| R15 | Carbon film | 470k | RD¼PS 474J | |
| R16 | Carbon film | 470k | RD¼PS 474J | |
| R17 | Carbon film | 39k | RD¼PS 393J | |
| R18 | Carbon film | 39k | RD¼PS 393J | |
| R19 | Carbon film | 510k | RD¼PS 514J | |
| R20 | Carbon film | 510k | RD¼PS 514J | |



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| Symbol | Description | | Part No. | |
|---|---|---|---|---|
| R21 | Carbon film | 6.8k | RD¼PS 682J | |
| R22 | Carbon film | 6.8k | RD¼PS 682J | |
| R23 | Carbon film | 12k | RD¼PS 123J | |
| R24 | Carbon film | 12k | RD¼PS 123J | |
| R25 | Carbon film | 390k | RD¼PS 394J | |
| R26 | Carbon film | 390k | RD¼PS 394J | |
| R27 | Carbon film | 100k | RD¼PS 104J | |
| R28 | Carbon film | 100k | RD¼PS 104J | |
| R29 | Carbon film | 560k | RD¼PS 564J | |
| R30 | Carbon film | 560k | RD¼PS 564J | |
| R31 | Carbon film | 1M | RD¼PS 105J | |
| R32 | Carbon film | 1M | RD¼PS 105J | |
| R33 | Carbon film | 1.5k | RD¼PS 152J | |
| R34 | Carbon film | 1.5k | RD¼PS 152J | |
| R35 | Carbon film | 12k | RD¼PS 123J | |
| R36 | Carbon film | 12k | RD¼PS 123J | |
| R37 | Carbon film | 3.9k | RD¼PS 392J | |
| R38 | Carbon film | 3.9k | RD¼PS 392J | |
| R39 | Carbon film | 10k | RD¼PS 103J | |
| R40 | Carbon film | 10k | RD¼PS 103J | |
| R41 | Carbon film | 6.8k | RD¼PS 682J | |
| R42 | Carbon film | 6.8k | RD¼PS 682J | |
| R43 | Carbon film | 5.1k | RD¼PS 512J | |
| R44 | Carbon film | 5.1k | RD¼PS 512J | |
| R45 | Carbon film | 100k | RD¼PS 104J | |
| R46 | Carbon film | 100k | RD¼PS 104J | |
| R47 | Carbon film | 2.2k | RD¼PS 222J | |
| R48 | Carbon film | 2.2k | RD¼PS 222J | |
| R49 | Carbon film | 100k | RD¼PS 104J | |
| R50 | Carbon film | 100k | RD¼PS 104J | |
| R51 | Carbon film | 1M | RD¼PS 105J | |
| R52 | Carbon film | 1M | RD¼PS 105J | |
| R53 | Carbon film | 110 | RD¼PS 111J | |
| R54 | Carbon film | 110 | RD¼PS 111J | |
| R55 | Carbon film | 4.7k | RD¼PS 472J | |
| R56 | Carbon film | 4.7k | RD¼PS 472J | |
| R57 | Carbon film | 6.8k | RD¼PS 682J | |
| R58 | Carbon film | 6.8k | RD¼PS 682J | |
| R59 | Carbon film | 4.7k | RD¼PS 472J | |
| R60 | Carbon film | 4.7k | RD¼PS 472J | |
| R61 | Carbon film | 68k | RD¼PS 683J | |
| R62 | Carbon film | 68k | RD¼PS 683J | |
| R63 | Carbon film | 150 | RD¼PS 151J | |
| R64 | Carbon film | 150 | RD¼PS 151J | |
| R65 | Carbon film | 18 | RD¼PS 180J | |
| R66 | Carbon film | 18 | RD¼PS 180J | |
| R67 | Carbon film | 56 | RD¼PS 560J | |
| R68 | Carbon film | 56 | RD¼PS 560J | |
| R69 | Carbon film | 15 | RD¼PS 150J | |
| R70 | Carbon film | 15 | RD¼PS 150J | |

Continued on the Next Page



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| Symbol | Description | | | Part No. | |
|---|---|---|---|---|---|
| R71 | Carbon film | 4.7k | | RD¼PS 472J | |
| R72 | Carbon film | 4.7k | | RD¼PS 472J | |
| R73 | Carbon film | 1.5k | | RD¼PS 152J | |
| R74 | Carbon film | 1.5k | | RD¼PS 152J | |
| R75 | Carbon film | 12 | | RD¼PS 120J | |
| R76 | Carbon film | 12 | | RD¼PS 120J | |
| R77 | Carbon film | 220 | | RD¼PS 221J | |
| R78 | Carbon film | 220 | | RD¼PS 221J | |
| R79 | Carbon film | 220 | | RD¼PS 221J | |
| R80 | Carbon film | 220 | | RD¼PS 221J | |
| R81 | Metal film | 0.5 | 2W | RN2H 0R5K | |
| R82 | Metal film | 0.5 | 2W | RN2H 0R5K | |
| R83 | Metal film | 0.5 | 2W | RN2H 0R5K | |
| R84 | Metal film | 0.5 | 2W | RN2H 0R5K | |
| R85 | Carbon film | 15k | | RD¼PS 153J | |
| R86 | Carbon film | 15k | | RD¼PS 153J | |
| R87 | Carbon film | 33k | | RD¼PS 333J | |
| R88 | Carbon film | 33k | | RD¼PS 333J | |
| R89 | Carbon film | 10 | ½W | RD½PS 100J | |
| R90 | Carbon film | 10 | ½W | RD½PS 100J | |
| R91 | Carbon film | 150 | ½W | RD½PS 151J | |
| R92 | Carbon film | 150 | ½W | RD½PS 151J | |
| R93 | Carbon film | 240 | | RD¼PS 241J | |
| R94 | Carbon film | 3.3k | | RD¼PS 332J | |
| R95 | Carbon film | 1k | | RD¼PS 102J | |
| R96 | Carbon film | 1.2k | | RD¼PS 122J | |
| R97 | Carbon film | 51k | | RD¼PS 513J | |
| R98 | Carbon film | 150k | | RD¼PS 154J | |
| R99 | Carbon film | 10k | | RD¼PS 103J | |
| R100 | Carbon film | 1.2k | | RD¼PS 122J | |
| R101 | Carbon film | 1.2k | | RD¼PS 122J | |
| R102 | Carbon film | 47 | ½W | RD½PS 470J | |
| R103 | Metal oxide film | 220 | 1W | RS1P 221J | |
| R104 | Carbon film | 15k | | RD¼PM 153J | |
| R105 | Carbon film | 15k | | RD¼PM 153J | |
| R106 | Carbon film | 220 | | RD¼PM 221J | |
| R107 | Carbon film | 220 | | RD¼PM 221J | |
| R108 | Carbon film | 1k | | RD¼PM 102J | |
| R109 | Carbon film | 1k | | RD¼PM 102J | |

## SEMICONDUCTORS

| Symbol | Description | | Part No. | |
|---|---|---|---|---|
| Q1 | IC | HA1452 | | |
| Q2 | Transistor | 2SC1312-G or F (2SC1344-D or E) | | |
| Q3 | Transistor | 2SC1312-G or F (2SC1344-D or E) | | |



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| Symbol | Description | | Part No. | |
|---|---|---|---|---|
| Q4 | Transistor | 2SC1312-G or F (2SC1344-D or E) | | |
| Q5 | Transistor | 2SC1312-G or F (2SC1344-D or E) | | |
| Q6 | Transistor | 2SC734-GR or Y (2SC1318-R, Q or S) | | |
| Q7 | Transistor | 2SC734-GR or Y (2SC1318-R, Q or S) | | |
| Q8 | Transistor | 2SC734-Y or O (2SC1318-R or S) | | |
| Q9 | Transistor | 2SC734-Y or O (2SC1318-R or S) | | |
| Q10 | Transistor | 2SA561-Y or O (2SA720-R, Q or S) | | |
| Q11 | Transistor | 2SA561-Y or O (2SA720-R, Q or S) | | |
| Q12 | Transistor | 2SC1061-B or C | | |
| Q13 | Transistor | 2SC1061-B or C | | |
| Q14 | Transistor | 2SC1061-B or C | | |
| Q15 | Transistor | 2SC1061-B or C | | |
| Q16 | Transistor | 2SC1384-R or Q | | |
| Q17 | Transistor | 2SC945-R or Q | | |
| D1 | Varistor | STV-3H-G | | |
| D2 | Varistor | STV-3H-G | | |
| D3 | Diode | 1S2473 | | |
| D4 | Zener diode | WZ-320 | | |
| D5 | Diode | SIB01-02 (1S1866) | | |
| D6 | Diode | SIB01-02 (1S1866) | | |
| D7 | Diode | SIB01-02 (1S1866) | | |
| D8 | Diode | SIB01-02 (1S1866) | | |
| TH1 | Thermistor | 22D45 | | |
| TH2 | Thermistor | 22D45 | | |

## SWITCHES

| Symbol | Description | Part No. | |
|---|---|---|---|
| S1 | Rotary switch (FUNCTION) | ASD-019-0 | |
| S2 | Lever switch (TAPE MONITOR) | ASK-072-0 | |
| S3 | Lever switch (LOUDNESS) | ASK-069-0 | |

## OTHERS

| Symbol | Description | Part No. | |
|---|---|---|---|
| | Heat sink | ANH-224-0 | |
| | Transistor socket | AKH-002-0 | |
| | Insulating wafer | AEC-078-0 | |
| | Insulating spacer | ANG-108-0 | |
| | Fuse clip | AKR-010-0 | |
| | Nut (9$\phi$) | B71-004-0 | |
| | Washer (t=1mm) | M45-086-0 | |



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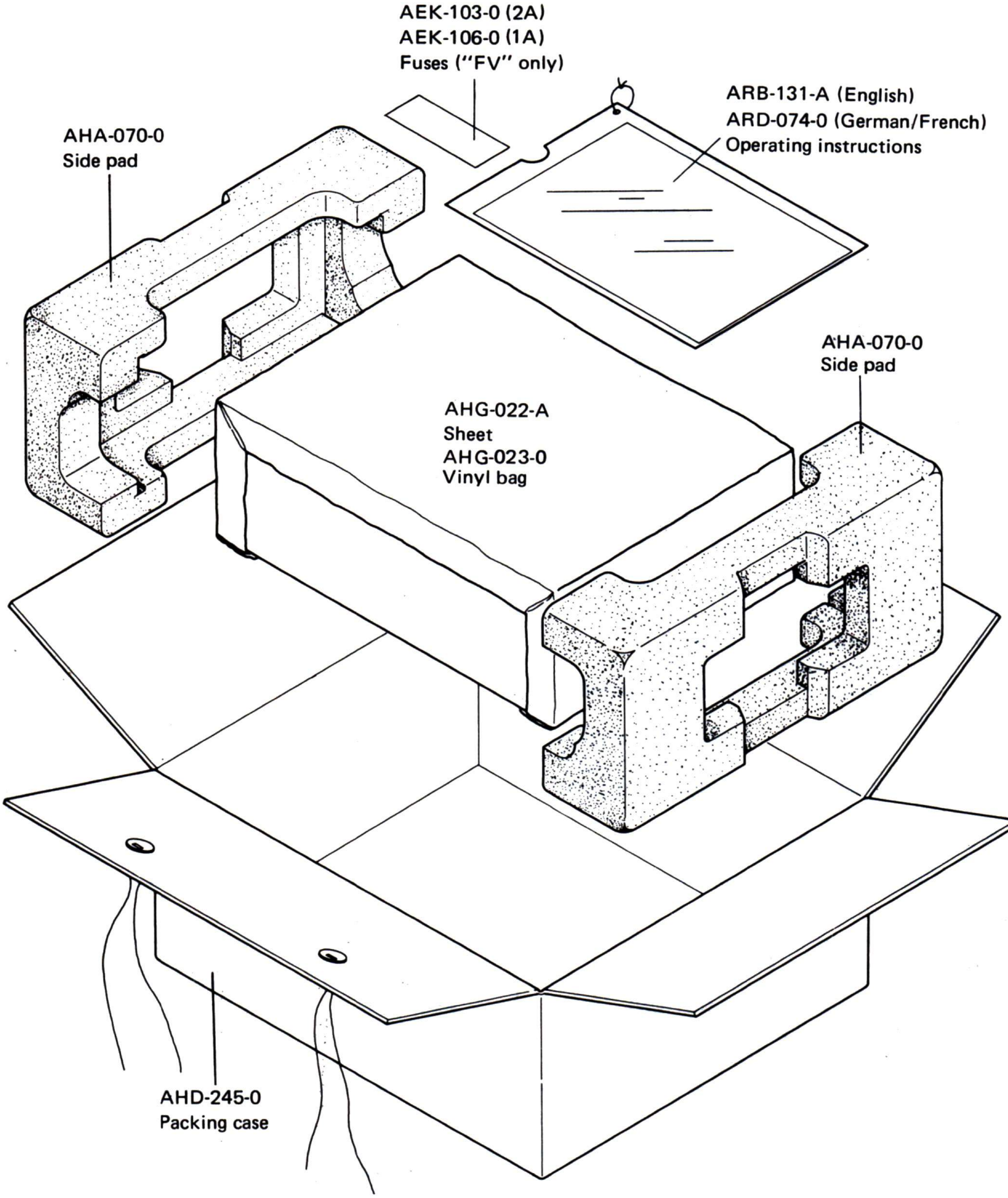
# 10. PACKING METHOD




**PIONEER ELECTRONIC CORPORATION**
4-1, 1-Chome, Meguro, Meguro-ku, Tokyo 153, Japan
**U.S. PIONEER ELECTRONICS CORPORATION**
75 Oxford Drive, Moonachie, New Jersey 07074,U.S.A.
**PIONEER ELECTRONIC (EUROPE) N.V.**
Meir-Center Meir 21, 2000 Antwerp, Belgium
**PIONEER ELECTRONICS AUSTRALIA PTY. LTD.**
256-8 City Road, South Melbourne, Victoria 3205, Australia

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