3963

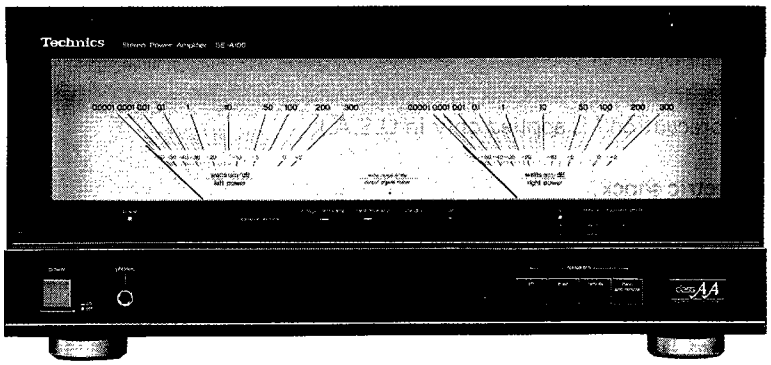
ORDER NO. HAD8603425C1
A3

Service Manual

Amplifier

SE-A100

Stereo Power Amplifier



Color

(K) . . . . Black Type

Color	Area
(K)	[M] . . . . U.S.A.
(K)	[MC] . . . Canada

SPECIFICATIONS

(IHF '78)

■ AMPLIFIER SECTION

Rated minimum sine wave RMS power output
20 Hz~20 kHz both channels driven
0.0007% total harmonic distortion
170W per channel (8 ohms)
20 Hz~20 kHz both channels driven
0.002% total harmonic distortion
240W per channel (4 ohms)

1 kHz continuous power output	
both channels driven	
0.0007% total harmonic distortion	170W per channel (8 ohms)
0.002% total harmonic distortion	240W per channel (4 ohms)
Dynamic headroom	0.7 dB (8 ohms)
	0.9 dB (4 ohms)
Total harmonic distortion	
rated power at 20 Hz~20 kHz	0.0007% (8 ohms)
rated power at 20 Hz~20kHz	0.002% (4 ohms)
half power at 20 Hz~20 kHz	0.0007% (8 ohms)
half power at 1 kHz	[less than 0.0002% (8 ohms)]
Power bandwidth	
both channels driven, −3 dB T.H.D. 0.01%	5 Hz~100 kHz (8 ohms)
Transient intermodulation distortion	unmeasurably small
SMPTE intermodulation distortion	0.002% (8 ohms)
Frequency response	20 Hz~20 kHz (+0 dB, −0.1 dB)
	0.8 Hz~150 kHz (+0 dB, −3 dB)
Input sensitivity	75 mV (1V, IHF '66)
S/N (IHF, A)	97 dB (120 dB, IHF '66)
Residual hum and noise	0.3 mV
Input impedance	47 kilohms
Low frequency damping factor	120 (8 ohms)
	60 (4 ohms)
Load impedance	
MAIN or REMOTE	4~16 ohms
MAIN and REMOTE	8~16 ohms
Meter	
reading range	0.0001W~300W
	−60 dB~+2 dB
	(logarithmic compression)
frequency response (reading accuracy)	
	20 Hz~20 kHz ±3 dB (more than −40 dB)
	20 Hz~20 kHz ±5 dB (less than −40 dB)
attack time	100μ sec
recovery time (0dB → −20dB)	300msec

■ GENERAL

Power consumption	770W, 980 VA
Power supply	AC 120V, 60 Hz
Dimensions (W×H×D)	430 x 209 x 475 mm
	(16-15/16" x 8-1/4" x 18-11/16")
Weight	31.2 kg
	(68.64 lb.)

Note:
Total harmonic distortion is measured by the digital spectrum analyzer (H.P. 3045 system).

Specifications are subject to change without notice for further improvement.

Technics

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■ SAFETY PRECAUTION

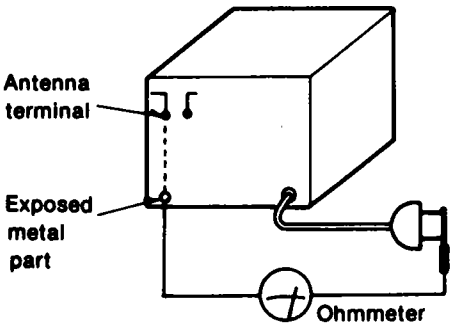
(This "safety precaution" is applied only in U.S.A.)

1. Before servicing, unplug the power cord to prevent an electric shock.
2. When replacing parts, use only manufacturer's recommended components for safety.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to make the following insulation resistance test to prevent the customer from being exposed to a shock hazard.

• INSULATION RESISTANCE TEST

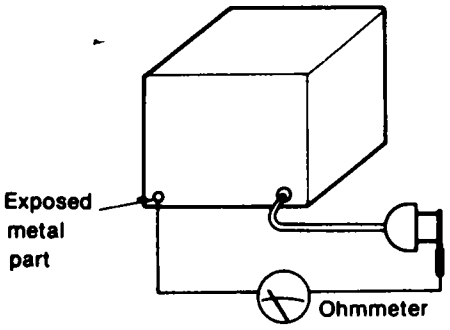
1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screwheads antenna, control shafts, handle brackets, etc. Equipment with antenna terminals should read between 3MΩ and 5.2MΩ to all exposed parts. (Fig. A) Equipment without antenna terminals should read approximately infinity to all exposed parts. (Fig. B)

Note: Some exposed parts may be isolated from the chassis by design. These will read infinity.



(Fig. A)

Resistance = 3MΩ—5.2MΩ



(Fig. B)

Resistance = Approx ∞

4. If the measurement is outside the specified limits, there is a possibility of a shock hazard. The equipment should be repaired and rechecked before it is returned to the customer.

Explanation on the New "class AA" Circuit Technology/Service hint

● Background of the "class AA" circuit development

A new approach to better characterisitics of an audio amplifier has been noted recently. It is shown as the measurement data where speakers may be used for the load of an amplifer instead of a conventional pure resistance load.

Some methods of evaluating the characteristics of an amplifier by changing the load conditions are being tried.

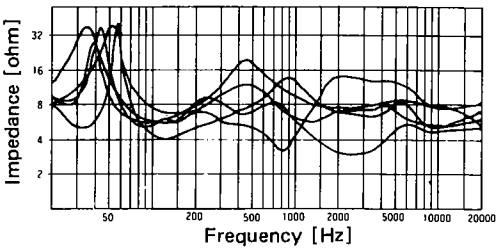
For instance, there are measurement data of the output (continuous output and instantaneous output) at load resistances of not only 8Ω but also 4Ω and 2Ω of lower resistance values.

There are also measurement data of the change of the output and distortion factor, when the phase of the drive voltage and current are changed by using a reactance load.

Furthermore, there are measurement data of the maximum drive power when various speakers are connected to an amplifier and a mixed signal of square wave and sine wave is applied to the input for sound reproduction by speakers.

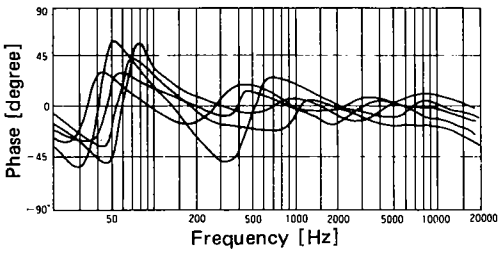
These methods are used because speakers used for reproducing music exhibit completely different characteristics from a pure resistance load which has been used for the measurement of amplifiers. That is, the impedance changes greatly according to the frequency (refer to Fig. 1), and therefore the phase difference between the drive voltage and the drive current changes complicatedly (refer to Fig. 2).

	Speaker	Pure Resistance
Impedance	The impedance change with the frequency (Fig. 1). There is a point of frequency where the impedance is considerably lower than the nominal impedance.	Does not change with the frequency.
Drive voltage-Drive current phase	Phase deviation occurs. The phase deviation changes with the frequency (Fig. 2).	No phase deviation occurs.
Drive voltage-Drive current waveform	Different (Fig. 4)	Same (Fig. 3)



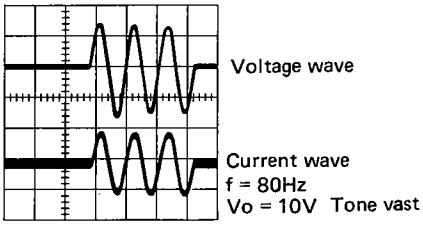
Frequency characteristic of speakers impedance

Fig. 1



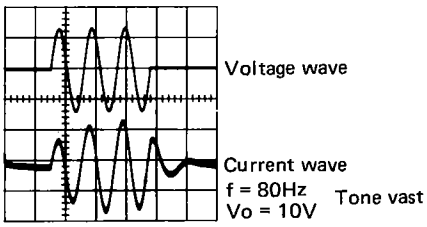
Frequency characteristic of phase of speaker

Fig. 2



Voltage and current wave-form at 8 ohms load

Fig. 3



Voltage and current wave-form at speaker load

Fig. 4

Also, the voltage waveform differs from the current waveform due to the inverse electromotive force of the speaker, thus the speaker is a very complex load to the amplifier (refer to Fig. 3 and Fig. 4). For the improvement of the reproducing performance, therefore, it is important to observe the characteristics of an amplifier under conditions closer to the actual operation by changing the load conditions.
Measurement data recently taken by such new methods show that there are differences in the capability of reproduction between amplifiers. This is because change of the output current according to the load condition influences the voltage amplification characteristics of the amplifier.
It is also because the degree of the influence of the voltage amplification characteristics, as well as the current supply capacity of the amplifier, on the output current differs according to the amplifier.
Also, for an class A amplifier, it is known that the output signal voltage distortion is minimum at no load, increasing as the output current increases by changing the resistance load to 16Ω, 8Ω and 4Ω. The change in the characteristic will be more complicated in the case of a speaker load which exhibits complex characteristics.
As a result, for the ideal power amplifier, it is most important that two necessary functions: distortionless voltage amplification and sufficiently large energy-supplying current amplification, be made co-existent under the condition of speaker operation.
The new "Class AA" circuit fully satisfies these condtions.

The circuit has been developed by combining two amplifiers: a class A amplifier of no-load condition which can exhibit the ideal voltage characteristic and an amplifier which has great current drive power.

• Principle of the "class AA" operation

The "Class AA" system, as described previously, consists of two types of amplifiers: the voltage control amplifier of pure class A operation and the current supply amplifier to supply current to the speaker. The voltage control amplifier, being released from the heavy load of "current supply", controls the voltage exactly in accordance with the input signal, while the current drive amplifier supplies the required current with a margin, so that excellent transmission characteristics are obtained with a speaker load.

w, a detailed explanation will be given using Fig. 5 about
e principle of the "Class AA" operation.
e "Class AA" system consists of two amplifiers of different
eration modes: a constant voltage amplifier and a constant
rrent amplifier. They are combined by means of the "Class
' bridge network.
e constant current amplifier, which is called the current
ve amplifier, receives the input signal from the voltage
ross both ends of the network bridge, and supplies the output
rrent to the other end of the bridge. Therefore, it operates
the constant current source to output the current which is
portional to the speaker output current as shown by Equation
in Fig. 5.
e voltage control amplifier of pure class A operation works
the constant voltage source where NFB is applied from the
eaker output terminals by connecting the amplifier output

one end of the "Class AA" bridge. The conventional
olifier, which is shown in Fig. 6, uses the same circuit
r the output circuit to supply the output current and for
e circuit to control the output voltage. Therefore, the
rrent from the output circuit influences the voltage
olifying stage, causing deterioration of the transmission
aracteristics, such as occurrence of distortion in the
tput signal.
the "Class AA" operation, all the speaker driving current
supplied from the current drive amplifier when the bridge
balaced as shown by Equation (3) in Fig. 5. Accordingly,
e voltage control amplifier is released from the heavy
ad of current supply, so that it controls the voltage to
tain an output exactly in accordance with the input signal
der the condition of "Zero" output current.
e current drive amplifier, which has sufficient capacity
th a margin to supply current required for driving the
eaker, together with the voltage control amplifier which
erates in the ideal condition of pure class A operation,
s achieved excellent transmission characteristics of
iginal pure class A operation which have never been obtained
the conventional class A amplifier.

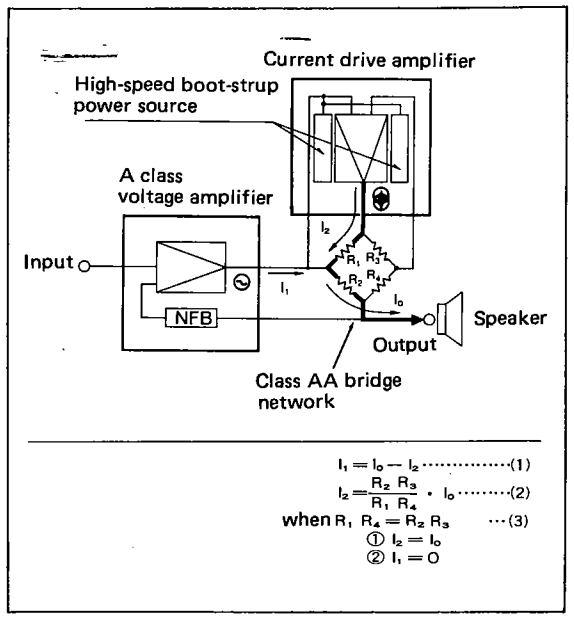
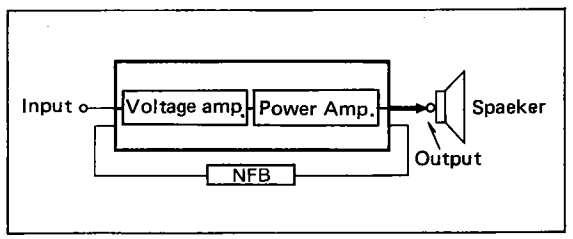
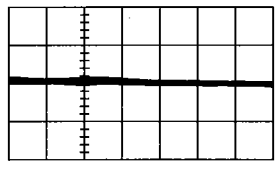


Fig. 5



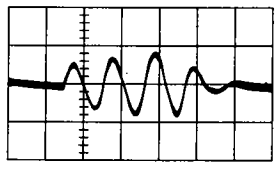
Conventional amplifier

Fig. 6



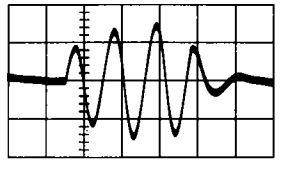
Class AA voltage amp.

Fig. 7



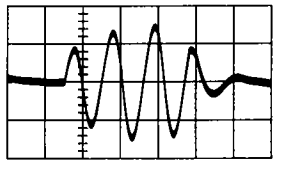
Conventional voltage amp.

Fig. 8



Class AA current drive amp.

Fig. 9



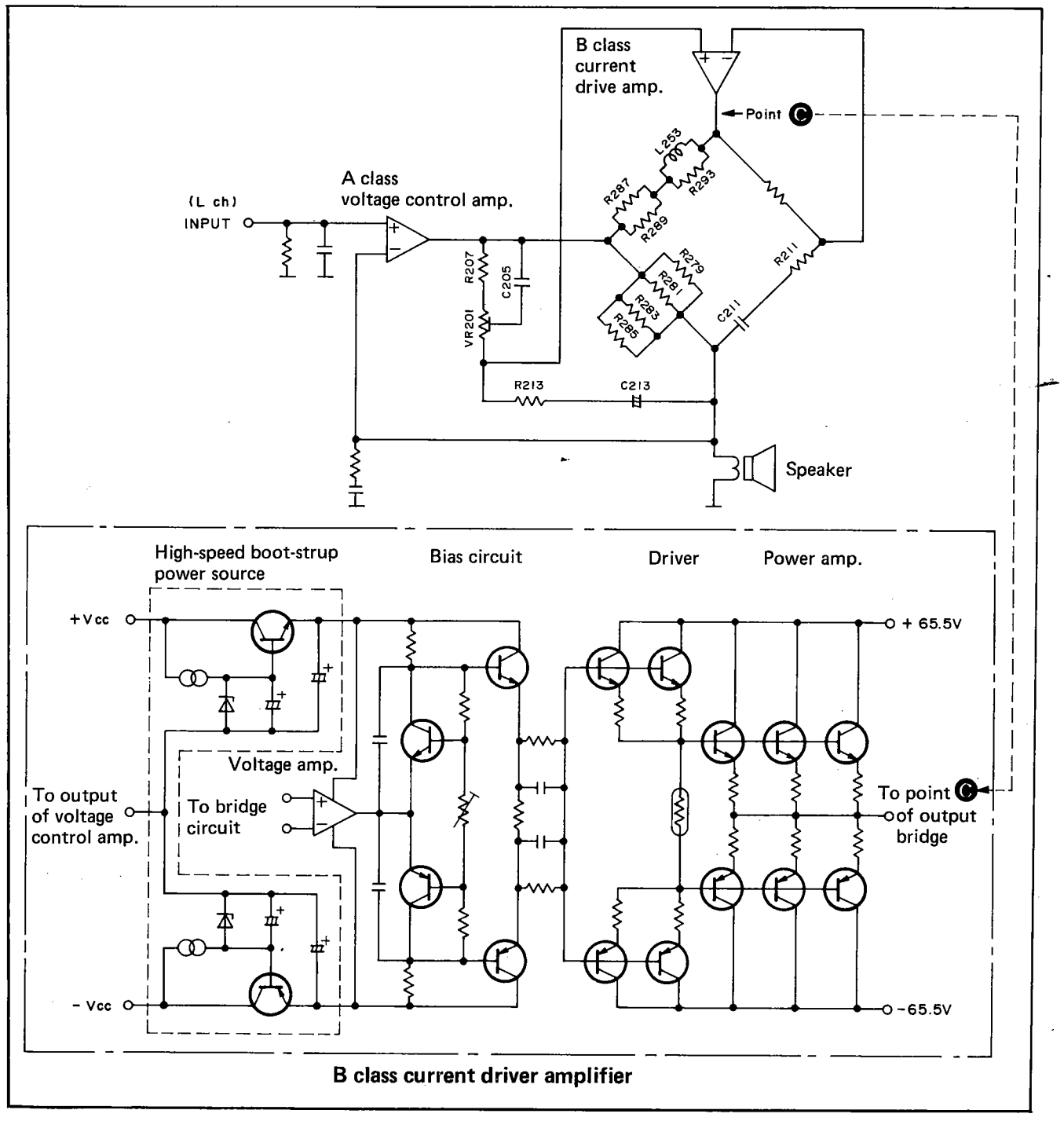
Conventional amp. output stage

Fig. 10

The SE-A100 amplifier has a current drive amplifier circuit consisting of a high through-rate input stage, a 4-stage Darlington output stage, and a newly developed feed-forward type bootstrap power source circuit. It is a high-power-output constant-current amplifier with 50A/μs high speed and ultra-low distortion.

Fig. 7 to Fig. 10 show the output current of the voltage control amplifier and current drive amplifier.

• Bridge Circuit



B class current driver amplifier

SERVICE HINT

uipment used

cilloscope
ltage controller (Variable AC power supply)
dio frequency oscillator (AF OSC)
electronic voltmeter (EVM)
mmy resistor (8Ω, 100W)
sistor (10Ω, 10W)

Check Procedure when Output Signal is Not Delivered or orted

witch off the power supply. (Set the voltage controller o 0 V.)

emove the top and bottom boards.

emove the PCBs F, G, E, and H.

aise the primary power supply voltage gradually and heck voltages at the pins (314), (316), (317), (310), (320), and (22).

heck if voltages at the pin (314), (317), and (320) are about 3 V and those at the pins (316), (319), and (322) are about 33 V when the primary power supply voltage is 60 V.

f yes, the PCBs A, B, and C are normal.

f voltages at the pins (314) and (316) are not about ±33 V, heck the PCB A and the power source.

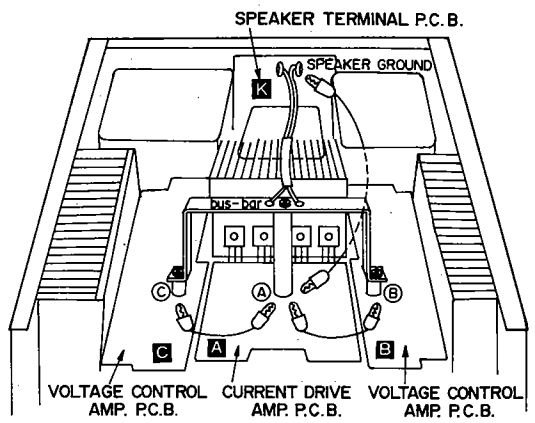
f voltages at the pins (317) and (319) are not about ±33 V, heck the PCB C and the power source.

f voltages at the pins (320) and (322) are not about ±33 V, heck the PCB B and the power source.

f the above step 5 check is satisfactory, set the rimary voltage to 0 V and discharge the capacitors C301 to C308, C309, and C310).

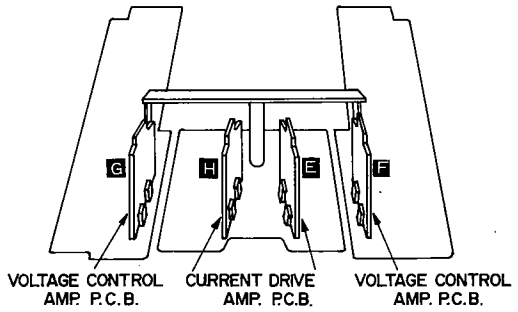
nstall the PCBs F and G.

aise the primary power supply voltage gradually to 60 V nd check voltages at the pins (314) and (316). If the voltages do not rise, check the PCBs E and A or G and A.

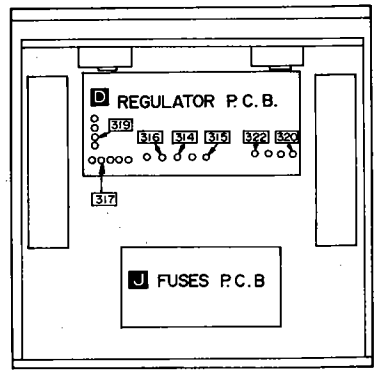


[Fig. 1]

Note: When the bus-bar is removed at checking, connect the Ⓐ, Ⓑ, Ⓒ, and the loudspeaker ground terminal with clips as shown in Fig. 1.



[Fig. 2]



[Fig. 3]

9. If the voltages at the pins (314) and (316) are about ±33 V, raise the primary power supply voltage to 120 V and apply a signal 1 kHz 0.3 V to the input terminal. Check waveforms at the loudspeaker terminals.
   (Output voltage: About 11 V)
   The PCBs A F and G are normal if the following waveforms are obtained.

   No load

   8-ohm load

10. Set the primary power supply voltage to 0 V and discharge the capacitors (C301 to C308, C309, and C310).
11. Instal the PCBs E and H.
12. Raise the primary power supply voltage gradually to 60 V, and check if the voltages at the pins (317) and (320) are about 33 V and those at the pins (310) and (322) are about -33 V. If the voltages do not rise, check the PCBs E and B or H and C.
13. If the step 12 check is satisfactory, apply a signal as in the step No. 9.
    The circuits are normal if the following waveforms are obtained.

    No load

    8-ohm load

    Check the PCBs E and B, or H and C again if the following waveform is developed.

Cautions: •Be sure that the earth (grounding) line (bus-bar) is positively connected when conducting the above checks.
•Don't install the PCBs E and H when the PCBs F and G are removed.

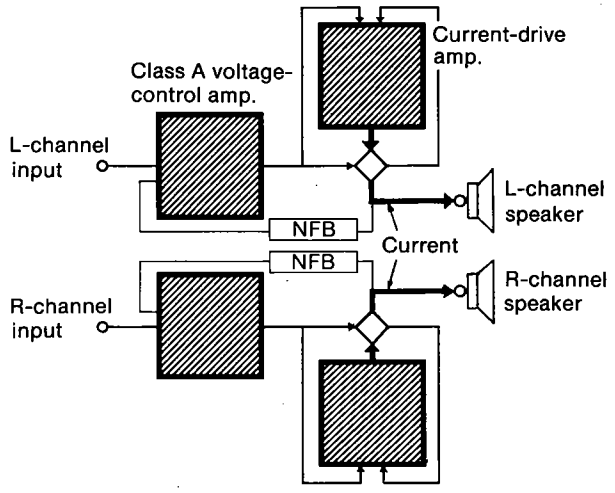
Printed in Japan
860301300 Ⓚ YY

■ FEATURE

The assigned mission of the power amplifier is to see that the speaker systems are driven exactly according to the input signals. This may seem simple, but in reality is all the more difficult for its seeming simplicity.
Moreover, this assignment has no real meaning unless it can be accomplished when sharp level fluctuations and various frequency components included in music signals are reproduced by speakers with various unstable elements.
Technics has cleared up these problems through the application of its vast technological resources and its new concepts.
The amazing answer is the class AA SE-A100 amplifier with its pure class A sound and its overwhelming speaker drive capacity.

VC4 amplifier composition. class AA equipped.

This unit has the VC4 amplifier composition ... with voltage-control amplification, class A operation in which the problems of switching distortion and crossover distortion are finally a thing of the past, plus current-drive amplification to supply the current necessary for dynamic drive of the connected speaker systems.
Thus, the voltage-control amplifier is freed of the burden of current supply, leaving it free to supply voltage faithful to incoming signals.
The characteristic of the amplification element is therefore displayed at its finest, and distortion is so low as to be virtually unmeasurable, even by highly precise instruments.
The current-drive amplifier is, on the other hand, free to supply all the current needed for speaker drive. Impedance fluctuations, phase shifts and reverse electromotive forces at every frequency point have no effect, all having been removed in order to assure a clear and stirring sound filled with high-fidelity power under any condition.



VC4 amplifier composition

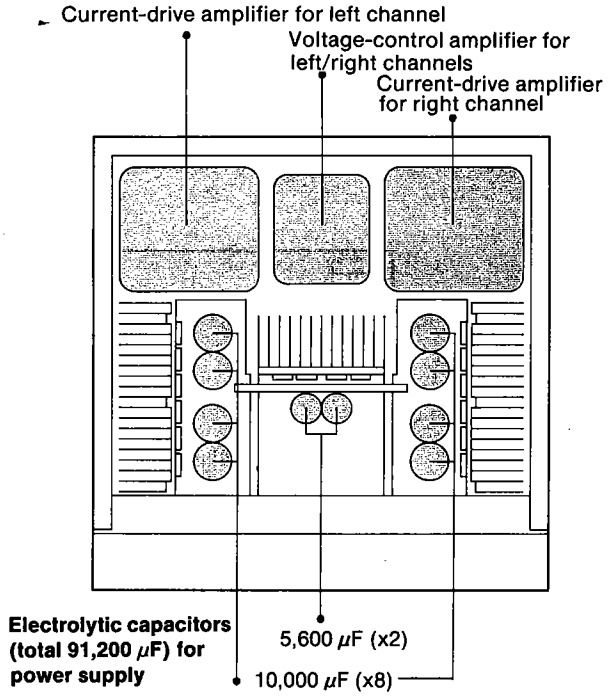
170W + 170W/0.0007% ... truly high performance

The high class AA performance is plainly expressed by the specs: high power of 170W + 170W (20 Hz ~ 20 kHz, 8Ω), and low distortion of 0.0007% (20 Hz ~ 20 kHz, 8Ω), an unrivalled rating that tells it all.
The dynamism of music can freely express itself until the whole body vibrates ... and the subtle nuances of music are expressed until covered by reverberations.

Luxuriously furnished as only the finest amplifiers would be

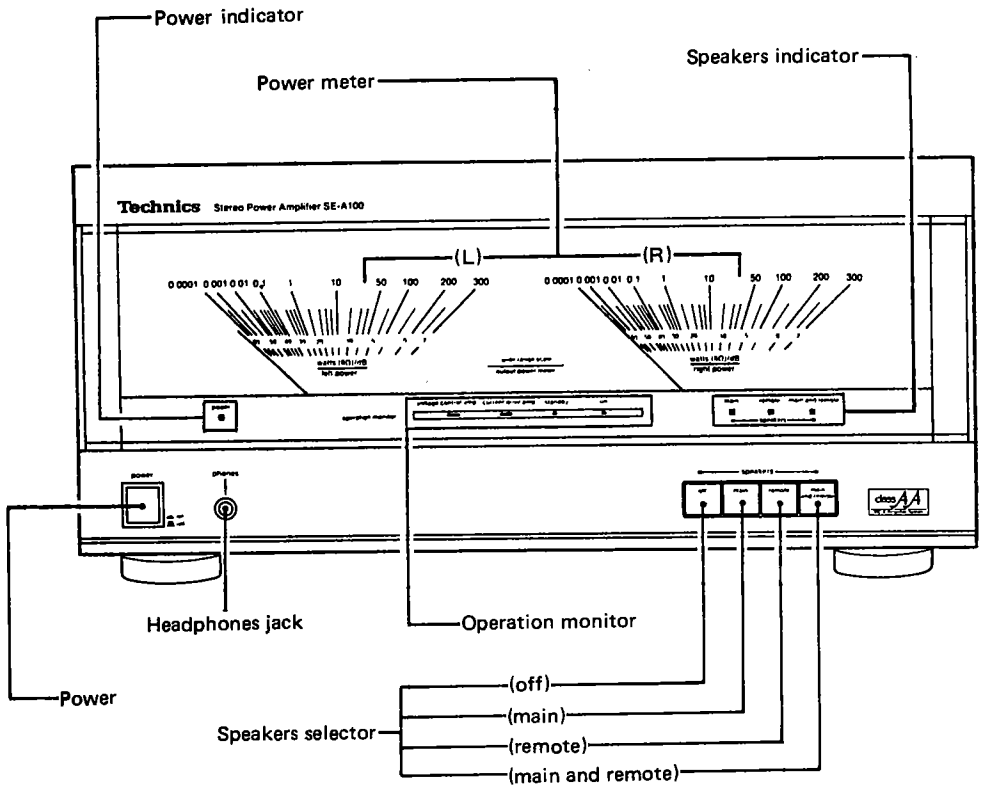
Beginning with the highly precise, large power meter traditional to Technics power amplifiers, and continuing with such features as the powerful power supply which uses three large transformers and high-capacity electrolytic capacitors, the LC-OFC internal wiring material, the gold clad contact relays for electronic speaker switching, and the heavy top panel for minimizing magnetic radiation and mechanical vibration ... every part of every circuit has been made to the finest possible specifications to make this the finest and most luxurious power amplifier you could want.

Three transformers

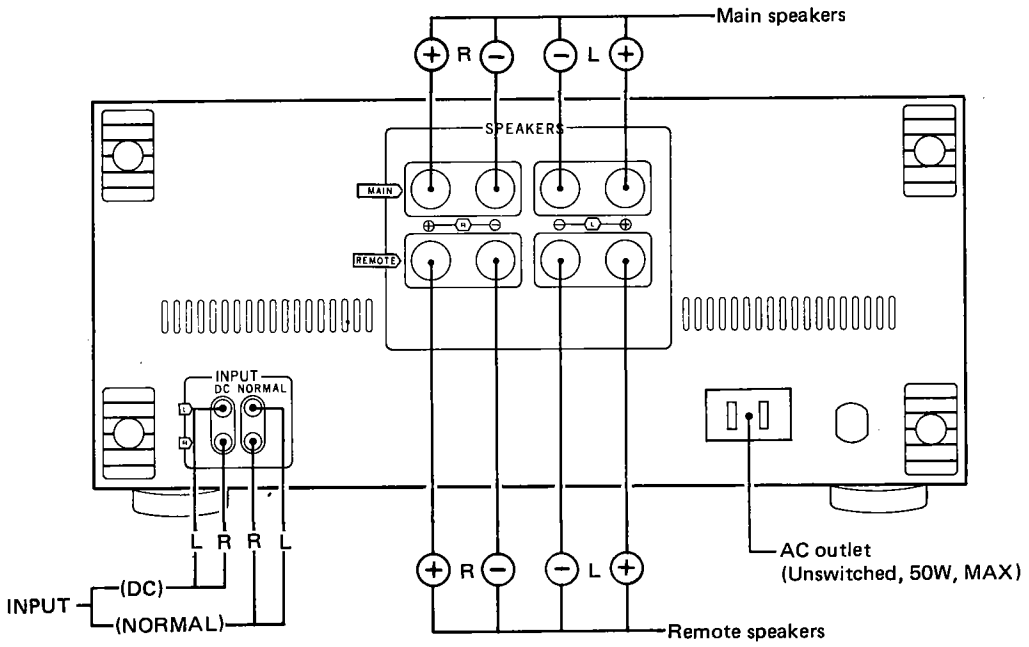


SE-A100 internal construction

■ LOCATION OF CONTROLS

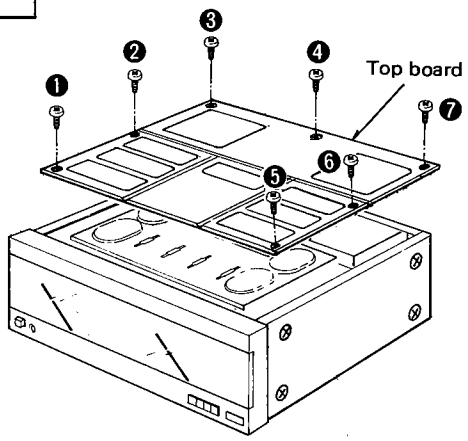


- If only the main or the remote speaker system is used (4 ~ 16Ω)
- If both the main and remote speaker system are used (8 ~ 16Ω)

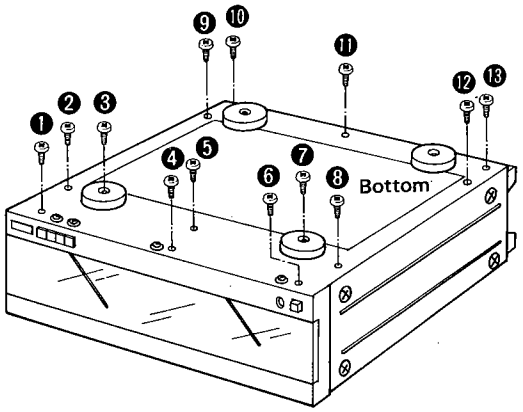


■ DISASSEMBLY INSTRUCTIONS

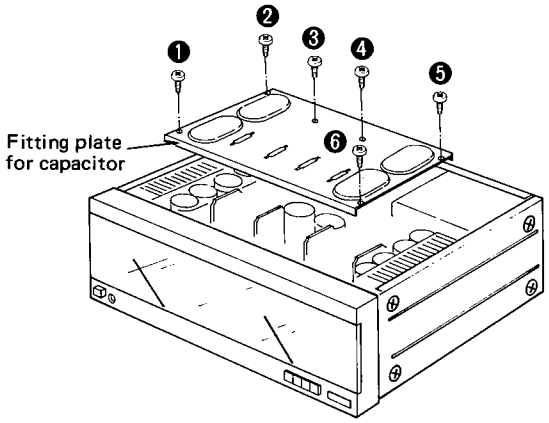
Ref. No. 1	How to remove the top boards
Procedure 1	• Remove the 7 setscrews (❶ ~ ❼).



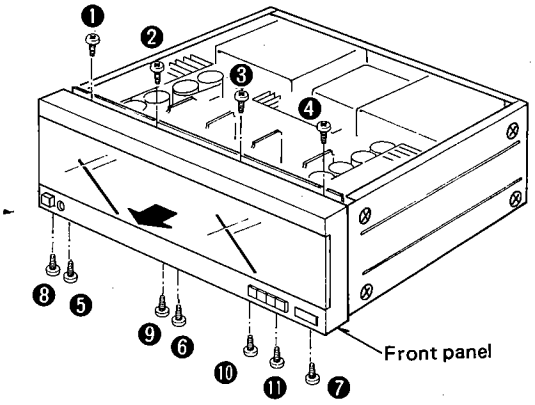
Ref. No. 2	How to remove the bottom board
Procedure 1 →2	• Remove the 13 screws (❶ ~ ⓭).



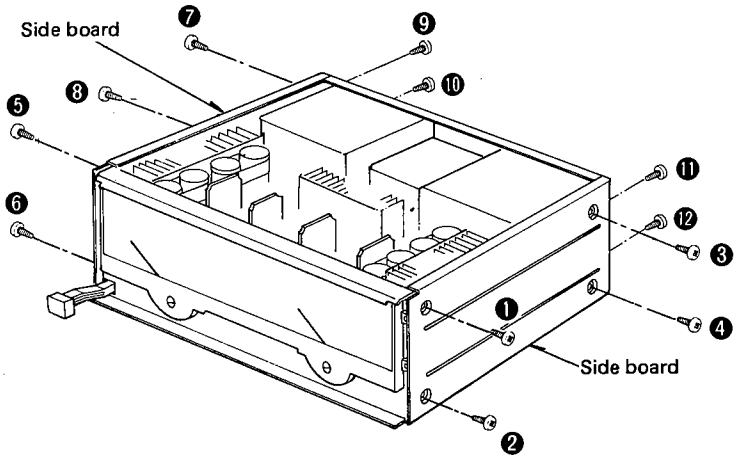
Ref. No. 3	How to remove the fitting plate for capacitor
Procedure 1 →2 →3	• Remove the 6 screws (❶ ~ ❻).

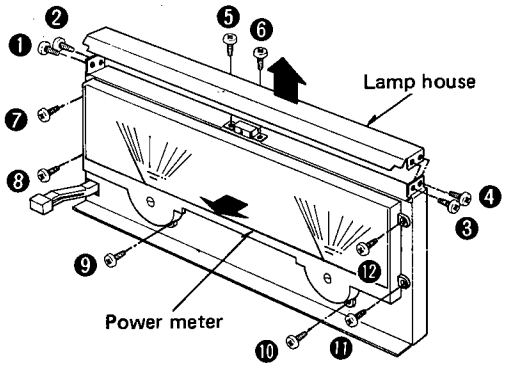


Ref. No. 4	How to remove the front panel
Procedure 1 →4	1. Remove the 11 screws (❶ ~ ⓫). 2. Remove the front panel.

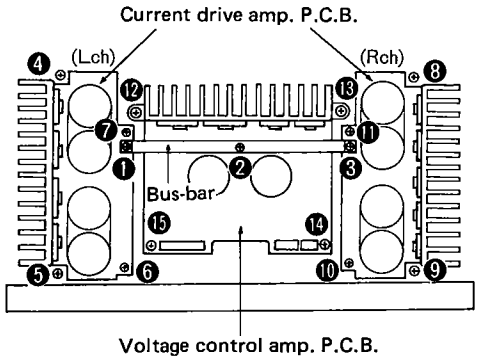


Ref. No. 5	How to remove the side board, lamp house and power meter
Procedure 1 →4 →5	1. Remove the 4 screws (❶ ~ ⓬). 2. Remove the 4 screws.(❶ ~ ❹). 3. Remove the lamp house. 4. Remove the 8 screws.(❺ ~ ⓬). 5. Remove the power meter.

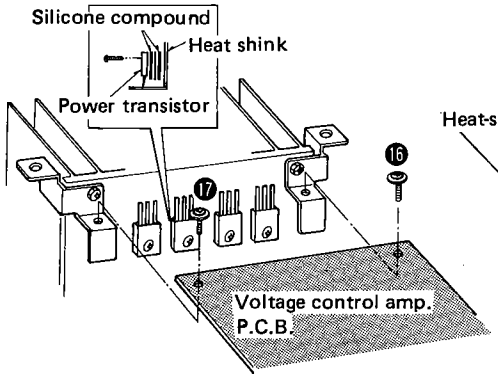




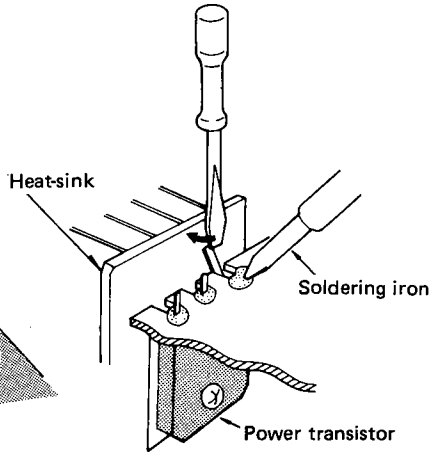
Ref. No. 6	How to remove the power transistor, voltage control amp. P.C.B. and current drive amp. P.C.B.
Procedure 1 →6	1. Remove the 3 screws. (❶ ~ ❸) 2. Remove the bus-bar. 3. Remove the 12 screws. (❹ ~ ⓯) 4. Remove the voltage control amp. block. and current drive amp. block. [Fig. 1] 5. Un solder the power transistor. [Fig. 3] 6. Remove the 2 screws. (⓰ ~ ⓱) 7. Remove the voltage control amp. P.C.B. 8. When mounting the power transistor apply silicone compound (SZZ0L15) to the rear side of power transistor.



[Fig. 1]



[Fig. 2]



[Fig. 3]

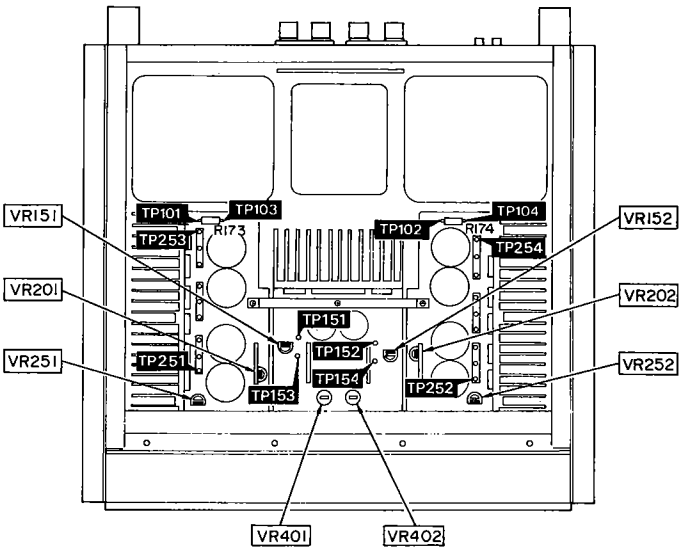
Note: When you check up with the bus bar disconnected, first connect ❶ , ❷ and ❸ to the ground point and turn on the machine.

■ BEFORE REPAIR AND ADJUSTMENT

(1) Turn off the power supply. Using a 10Ω, 10W resistor, shortcircuit both ends of power supply capacitors (C301~ C308, 10,000μF, C309, C310, 5600μF) in order to discharge the voltage.
(2) Before turning the power supply on, after completion of repair, slowly apply the primary voltage by using a power supply voltage controller to make sure that the consumed current at 120V, 60Hz in NO SIGNAL mode is 0.4 ~ 1.1A.

■ MEASUREMENTS AND ADJUSTMENTS

- **Adjustment points**



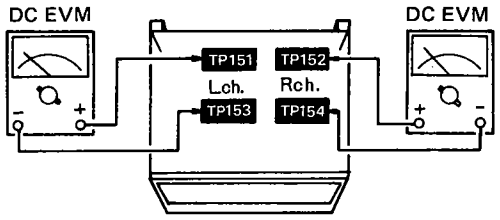
Adj. points	Adjustment
TP151, 153	Lch ICQ adj. of voltage control amp.
VR151	
TP152, 154	Rch ICQ adj. of voltage control amp.
VR152	
TP251, 253	Lch ICQ adj. of current drive amp.
VR251	
TP252, 254	Rch ICQ adj. of current drive amp.
VR252	
TP101, 103	Lch bridge-balance adj.
VR201	
TP102, 104	Rch bridge-balance adj.
VR202	
VR401	Lch power meter adj.
VR402	Rch power meter adj.

Equipment used

- AC and DC electronic voltmeter (EVM)
- Audio frequency oscillator (AF OSC)
- Dummy resistor or speaker (8Ω, 100W)

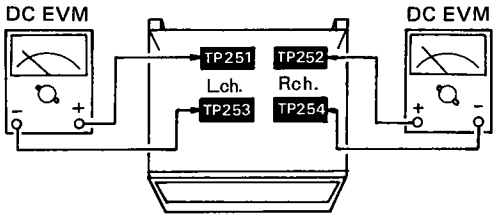
VOLTAGE CONTROL (V) AMP. IDLING (ICQ) ADJUSTMENT

1. Test equipment connection is shown in figure. (Connect the DC EVM. on both channels.)
2. Completely turn the (V) amp. adjusting volumes (**VR151, VR152**) counter-clockwise.
3. Turn ON the set when it is cold, and 30 sec. later, adjust **VR151** and **VR152** so that the voltage is **3mV**. Also, check that the voltage is **10 — 18mV** (standard: **12mV**) after lapse of **10 — 15 minutes.** (Below **50mV** after lapse of **60 min.**)



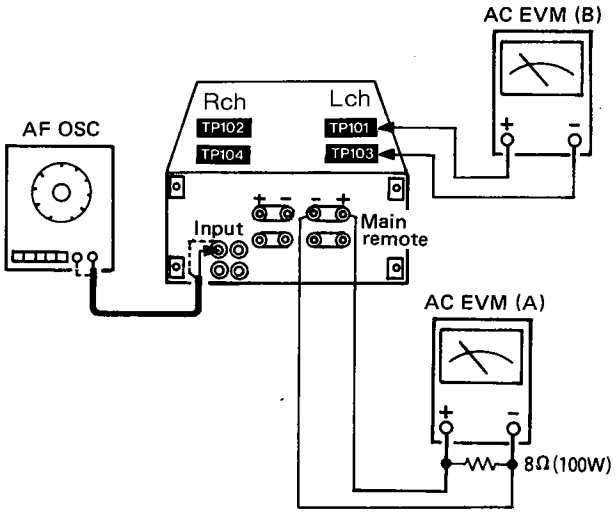
CURRENT DRIVE (C) AMP. IDLING (ICQ) ADJUSTMENT

1. Test equipment connection is shown in figure. (Connect the DC EVM. on both channels.)
2. Completely turn the (C) amp. adjusting volumes (**VR251, VR252**) counterclockwise.
3. Turn ON the set when it is cold, and 30 sec. later, adjust **VR251** and **VR252** so that the voltage is **0.7mV**.
   Also, check that the voltage is **2 — 4mV** (standard: **2.5mV**) after lapse of **10 — 15 minutes.** (Below **20mA** after lapse of **60 min.**)



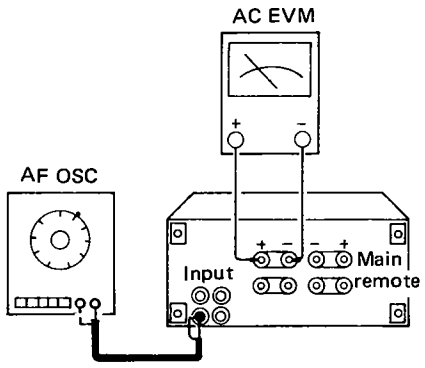
BRIDGE-BALANCE ADJUSTMENT

1. Test equipment connection is shown in figure.
2. Turn the **VR201** (Lch) and **VR202** (Rch) to the central positions before turning ON the set.
3. Apply 1kHz signal to the input terminal so that the output voltage of speaker terminal is **10V .**(It can be chenged by the attenuator of the AF OSC)
4. Adjust **VR201** so that the voltage is minimum in the 3mV range of AC EVM (B).
5. Also for **R** channel, change the connection and make the same adjustment by **VR202.**



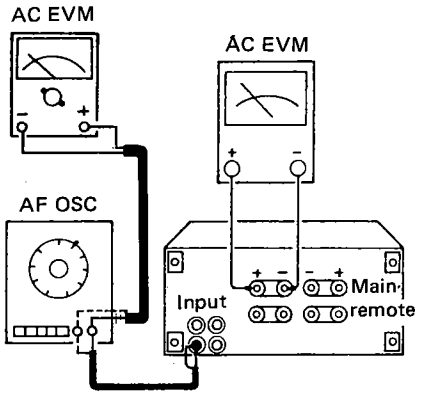
POWER METER ADJUSTMENT

1. Test equipment connection is shown in figure.
2. Turn the **VR401** (Lch) and **VR402** (Rch) to the central positions before turning **ON** the set.
3. Before adjusting make sure that the power meter is mechanically adjusted to **0** point.
4. Apply 1kHz signal to the input terminal so that the output voltage of speaker terminal is **28.3V** (It can be changed by the attenuator of the AF OSC.)
5. Adjust the **VR401** (Lch) and **VR402** (Rch) so that the power meter indicates **100W.**



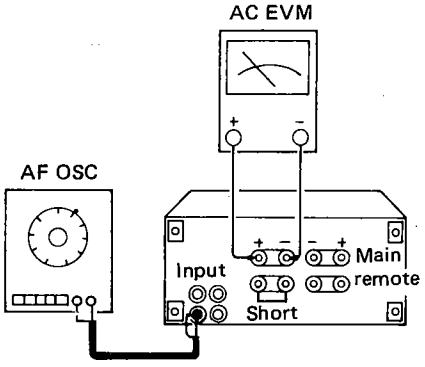
CHECK OF MUTING CIRCUIT DURING POWER "ON" – "OFF" OPERATION

1. Test equipment connection is shown in figure.
2. Apply **1kHz, 0.5V** signal to the input terminal.
3. Check that the output is given **7 – 8.5 sec.** after power **ON,** and that the output goes out immediately with power **OFF.**



CHECK OF OVERLOAD DETECTION AND PROTECTION CIRCUIT

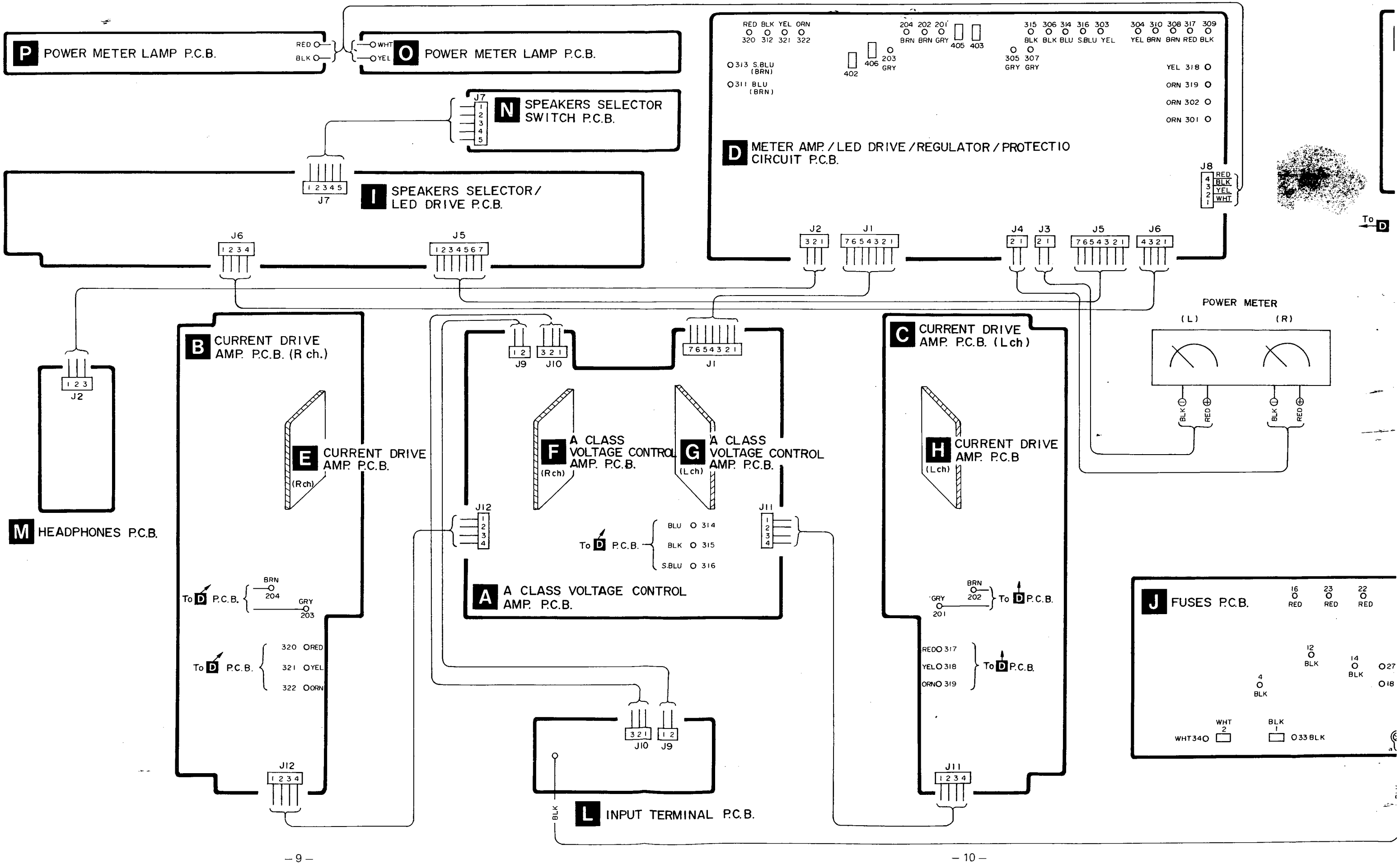
1. Test equipment connection is shown in figure.
2. Set the speaker select switch to **"main"**.
3. Short-circuit the speaker terminals on the **"remote"** side.
4. Apply 1kHz signal to the input terminal so that the output voltage of speaker terminal is **1.2V.**
   (It can be changed by the attenuator of the AF OSC.)
5. Check that the relay turns off and the output stops when the speaker select switch is shifted to **"remote",** and that the condition is held even with the speaker select switch is set to **"OFF".**
6. Perform the same check on **L** channel.



Note

* Check the protection circuit separately on each of the channels.
* The protection relay, if operated, will not reset itself. So, turn off the power supply and again turn it on.
* When the protection circuit is in operation, the indicator "stand by" is blinking.

■ CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM



METER LAMP P.C.B.

N SPEAKERS SELECTOR SWITCH P.C.B.

ELECTOR/
P.C.B.

D METER AMP./LED DRIVE/REGULATOR/PROTECTIO CIRCUIT P.C.B.

RED BLK YEL ORN
320 312 321 322

313 S.BLU (BRN)

311 BLU (BRN)

402 406 203 GRY

204 202 201
BRN BRN GRY
405 403

315 306 314 316 303
BLK BLK BLU S.BLU YEL

305 307
GRY GRY

304 310 308 317 309
YEL BRN BRN RED BLK

YEL 318
ORN 319
ORN 302
ORN 301

J8 4 RED 3 BLK 2 YEL 1 WHT

J2 3 2 1 | J1 7 6 5 4 3 2 1 | J4 2 1 | J3 2 1 | J5 7 6 5 4 3 2 1 | J6 4 3 2 1

J9 1 2 | J10 3 2 1 | J1 7 6 5 4 3 2 1

F A CLASS VOLTAGE CONTROL AMP. P.C.B. (Rch)

G A CLASS VOLTAGE CONTROL AMP. P.C.B. (Lch)

J12 1 2 3 4

To D P.C.B. — BLU 314 / BLK 315 / S.BLU 316

J11 1 2 3 4

A A CLASS VOLTAGE CONTROL AMP. P.C.B.

C CURRENT DRIVE AMP. P.C.B. (Lch)

H CURRENT DRIVE AMP. P.C.B (Lch)

GRY 201 — BRN 202 — To D P.C.B.

RED 317
YEL 318
ORN 319
To D P.C.B.

J11 1 2 3 4

POWER METER
(L) (R)
BLK RED BLK RED

K SPEAKER TERMINAL P.C.B.

GRY BRN BLK — 405 403 404
BLU ORN RED — 401 406 402

To D P.C.B.

To J P.C.B. — 23 RED / 27 (SHORT) BLK
To D P.C.B. — 308 BRN / 310 BRN / 309 BLK

FOR CURRENT DRIVE AMP. POWER TRANSFORMER

FOR VOLTAGE CONTROL AMP. POWER TRANSFORMER

To D P.C.B. — 303 YEL / 304 YEL / 305 GRY / 307 GRY / 306 BLK

To J P.C.B. — RED 16 / BLK 14 / ORN 301 / ORN 302
To D P.C.B.

J FUSES P.C.B.

16 RED | 23 RED | 22 RED
12 BLK | 14 BLK | 27 BLK | 18 BLK
4 BLK
WHT 2 — WHT 340
BLK 1 — 33 BLK

To J P.C.B — 22 RED / 18 (SHORT) BLK
To D P.C.B. — 311 BRN / 313 BRN / 312 BLK

FOR CURRENT DRIVE AMP. POWER TRANSFORMER

L INPUT TERMINAL P.C.B.

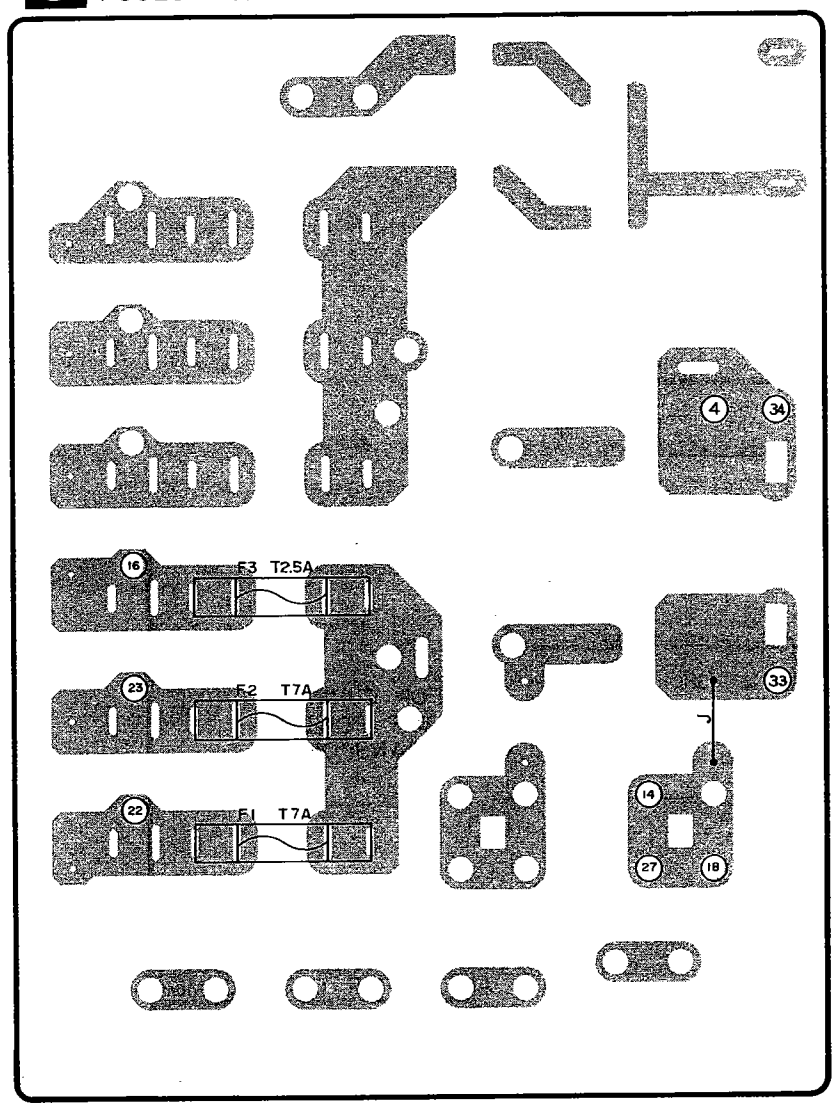
J10 3 2 1 | J9 1 2

BLK

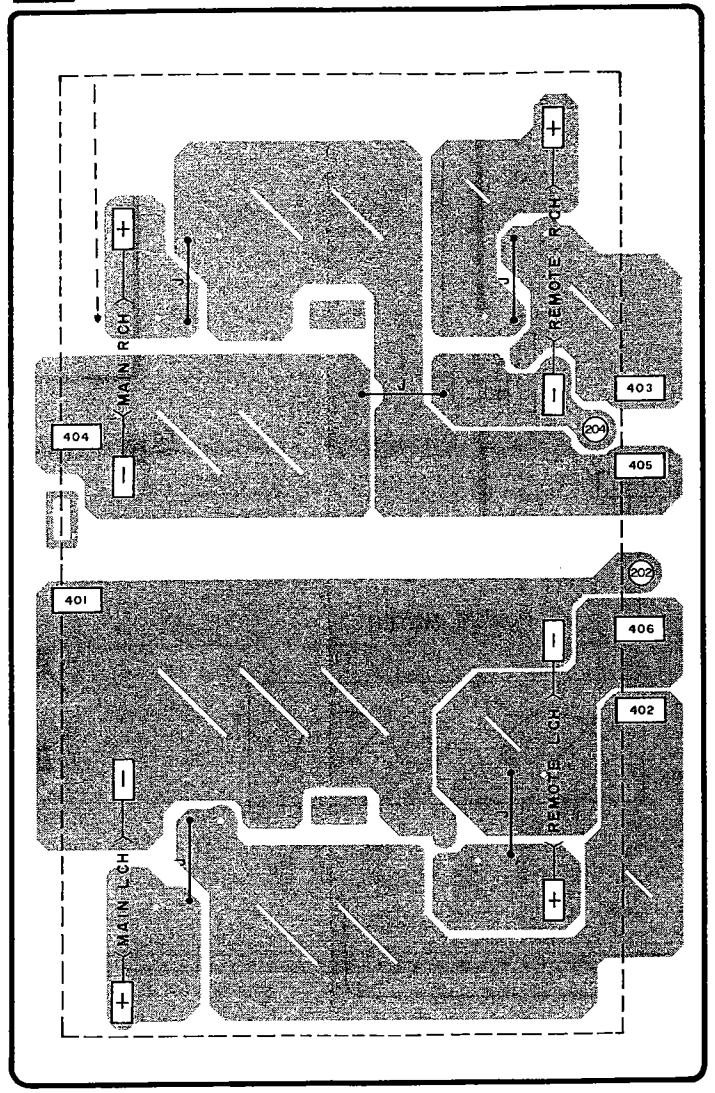
SE-A100 SE-A100

■ PRINTED CIRCUIT BOARDS

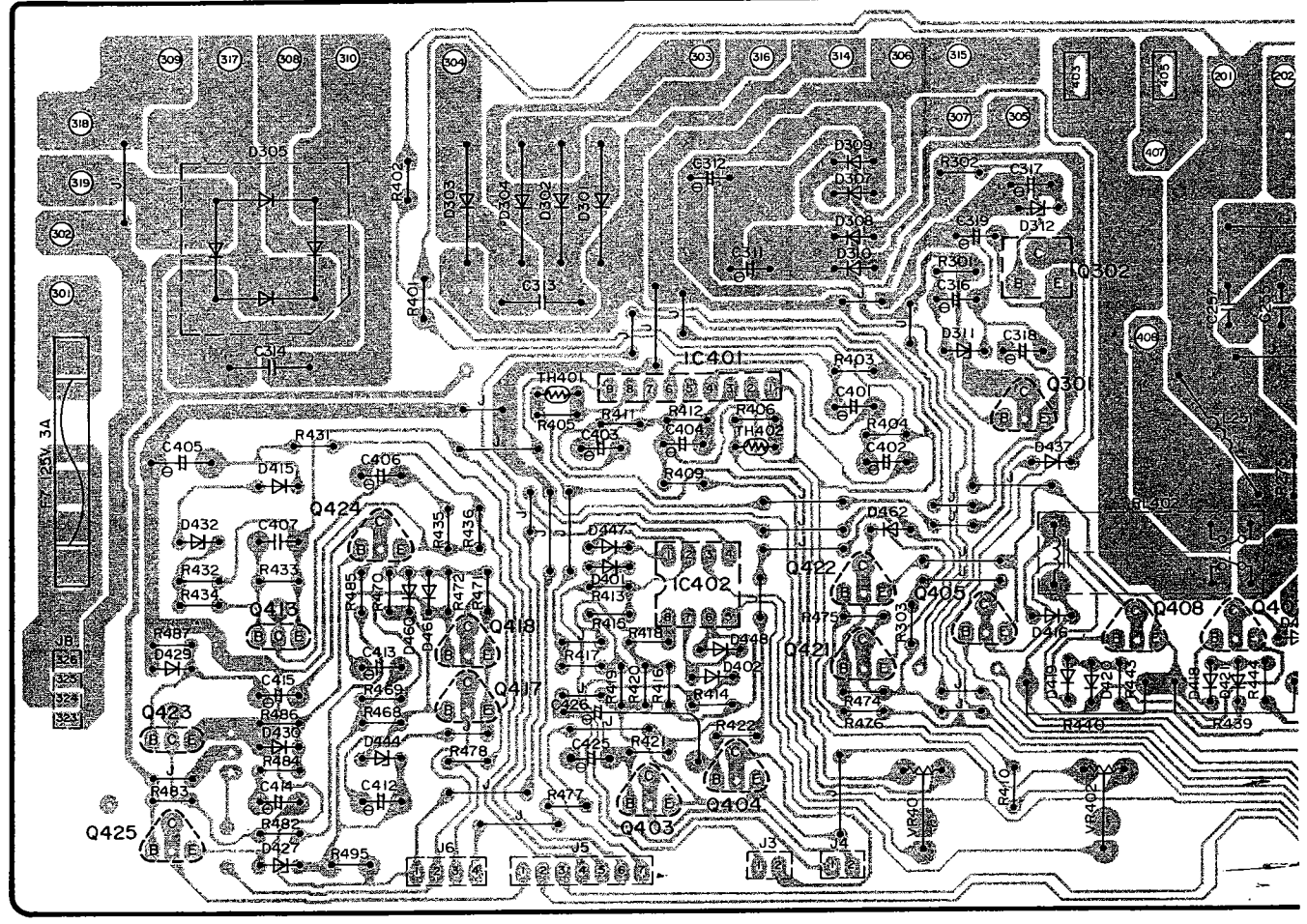
J FUSES P.C.B.



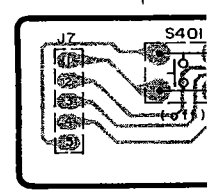
K SPEAKER TERMINAL P.C.B



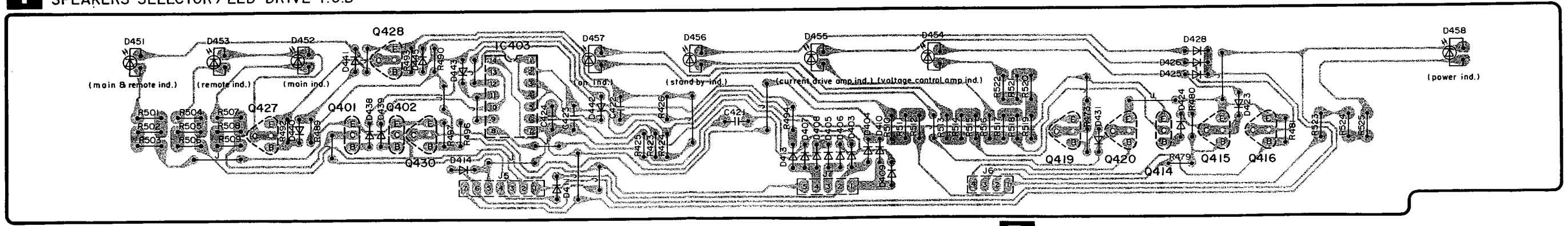
D METER AMP. / LED DRIVE / REGULATOR / PROTECTION CIRCUIT P.C.B.



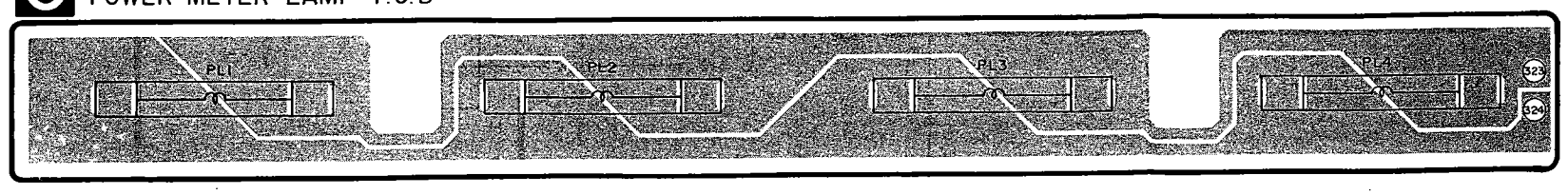
N SPEAKER



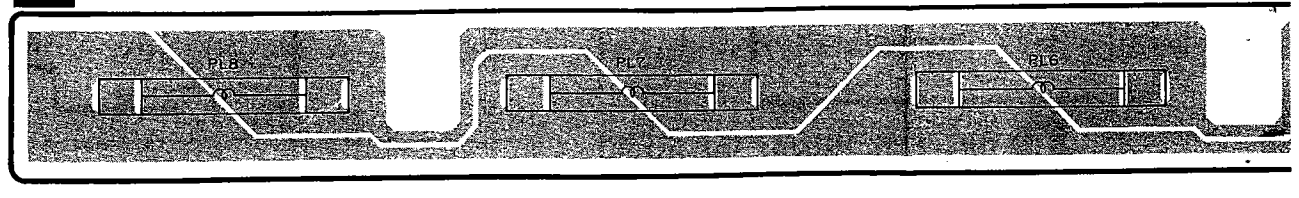
I SPEAKERS SELECTOR / LED DRIVE P.C.B



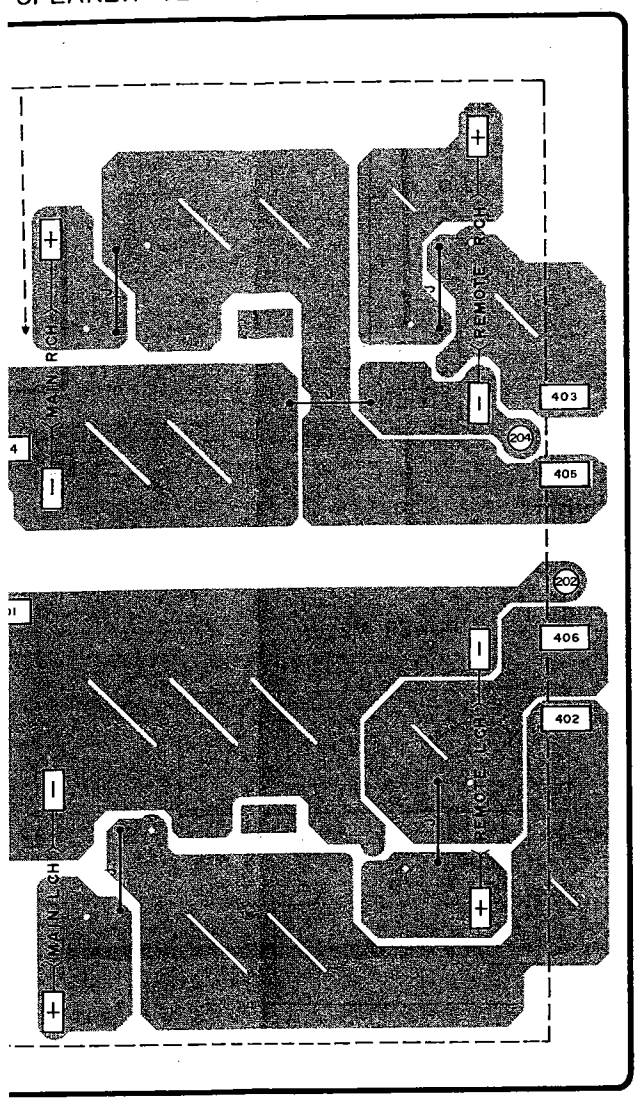
O POWER METER LAMP P.C.B



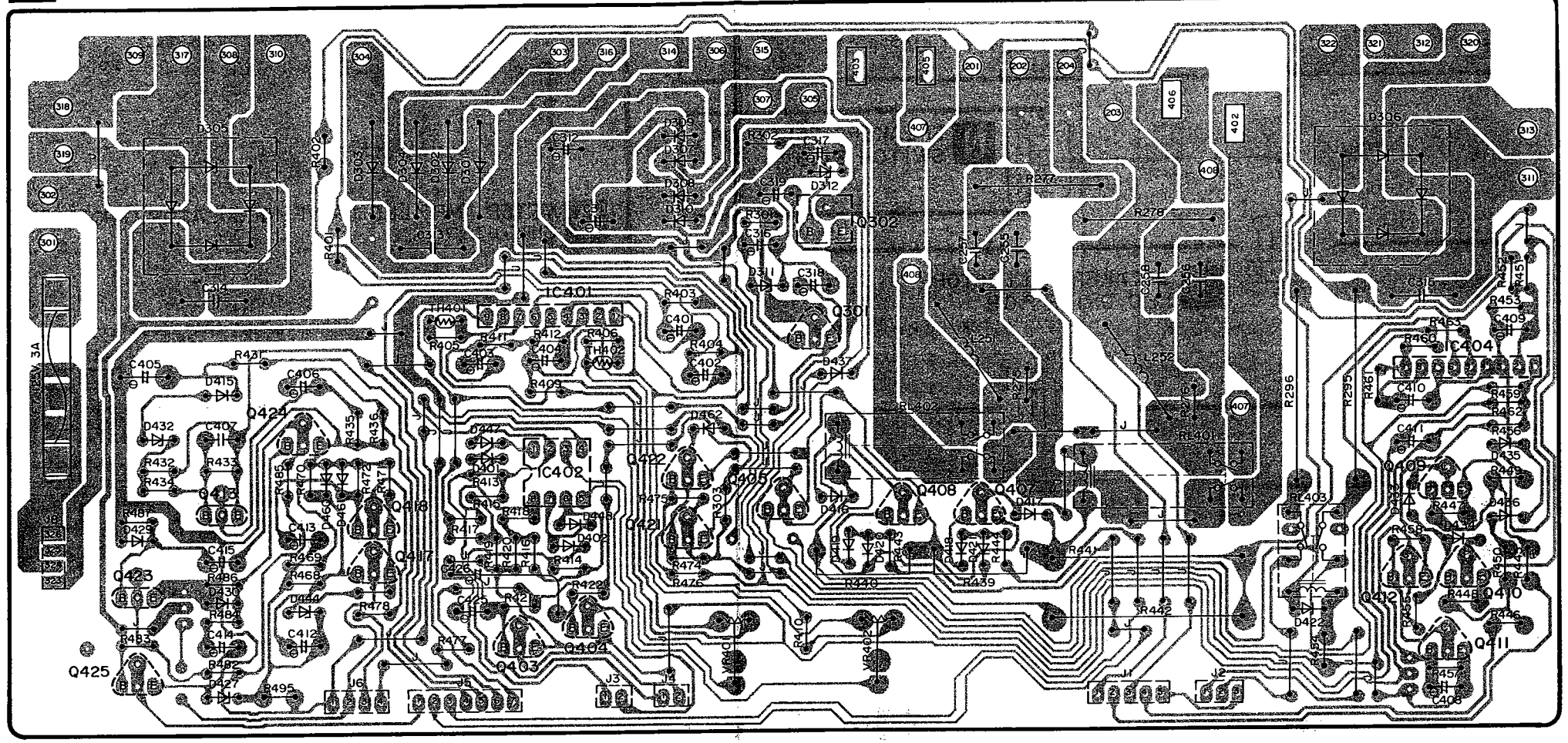
P POWER METER LAMP P.C.B



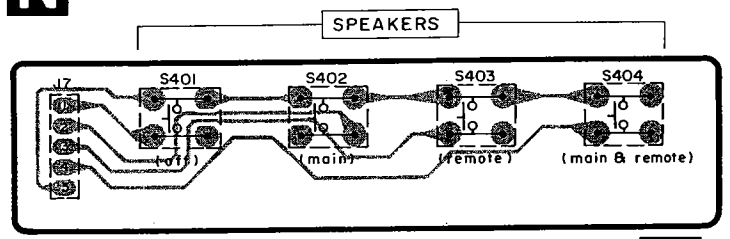
SPEAKER TERMINAL P.C.B



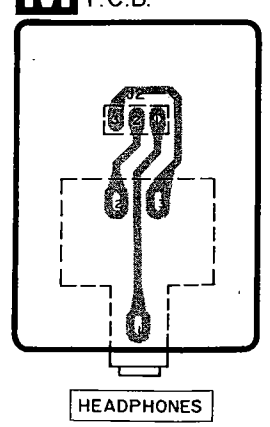
D METER AMP. / LED DRIVE / REGULATOR / PROTECTION CIRCUIT P.C.B.

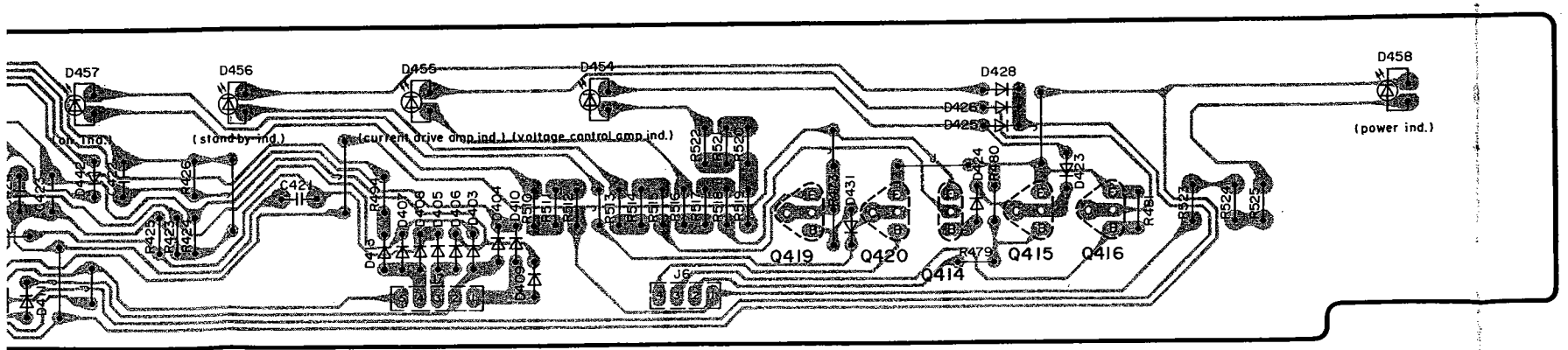


N SPEAKERS SELECTOR SWITCH P.C.B.

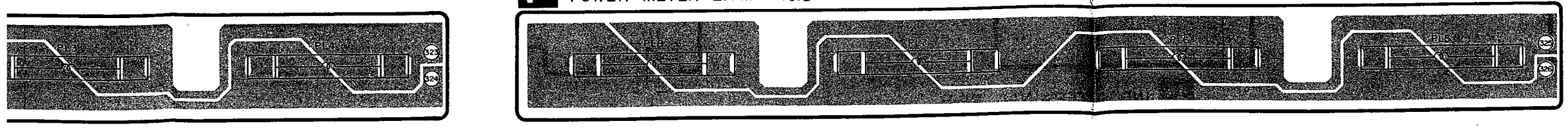


M HEADPHONES P.C.B.



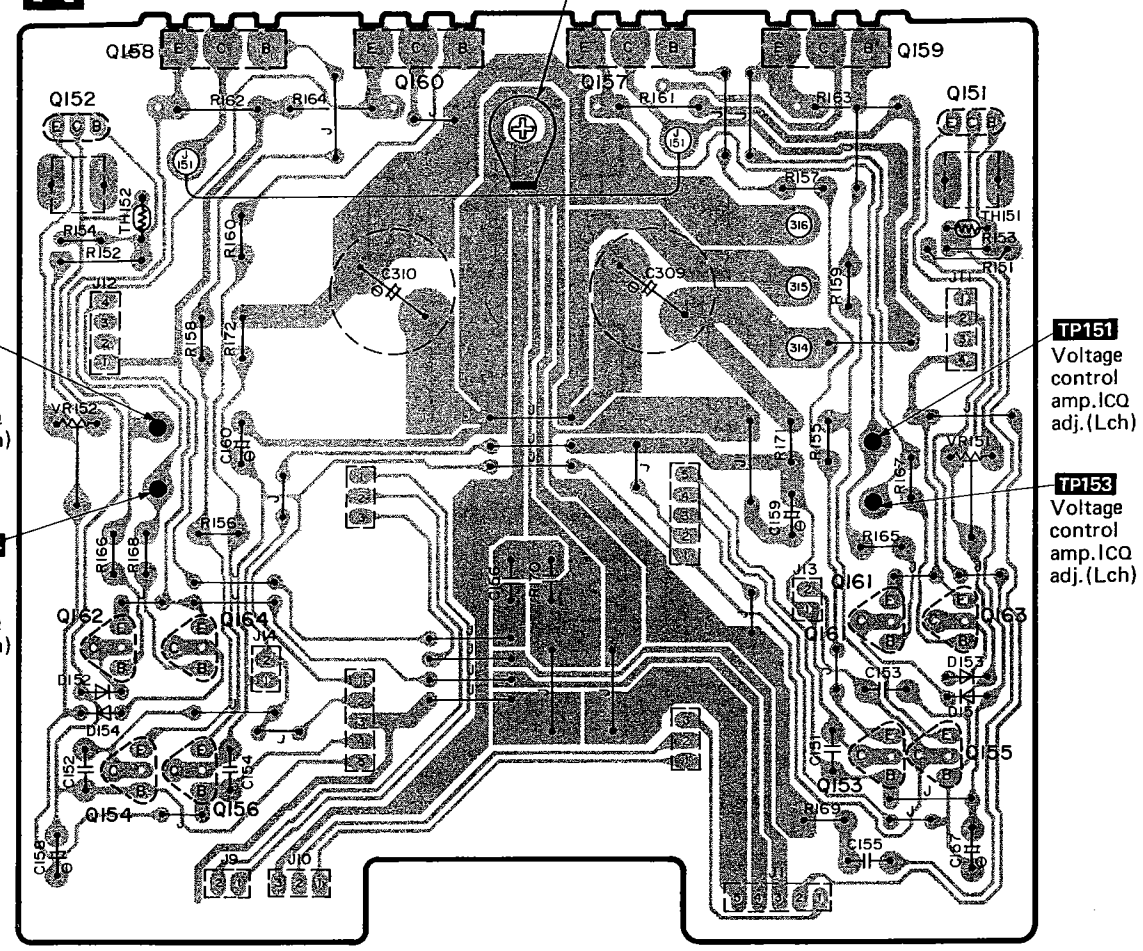


P POWER METER LAMP P.C.B

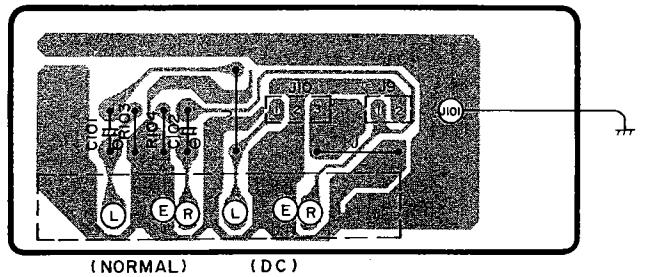


15 16 17 18 19 20 21 22 23 24

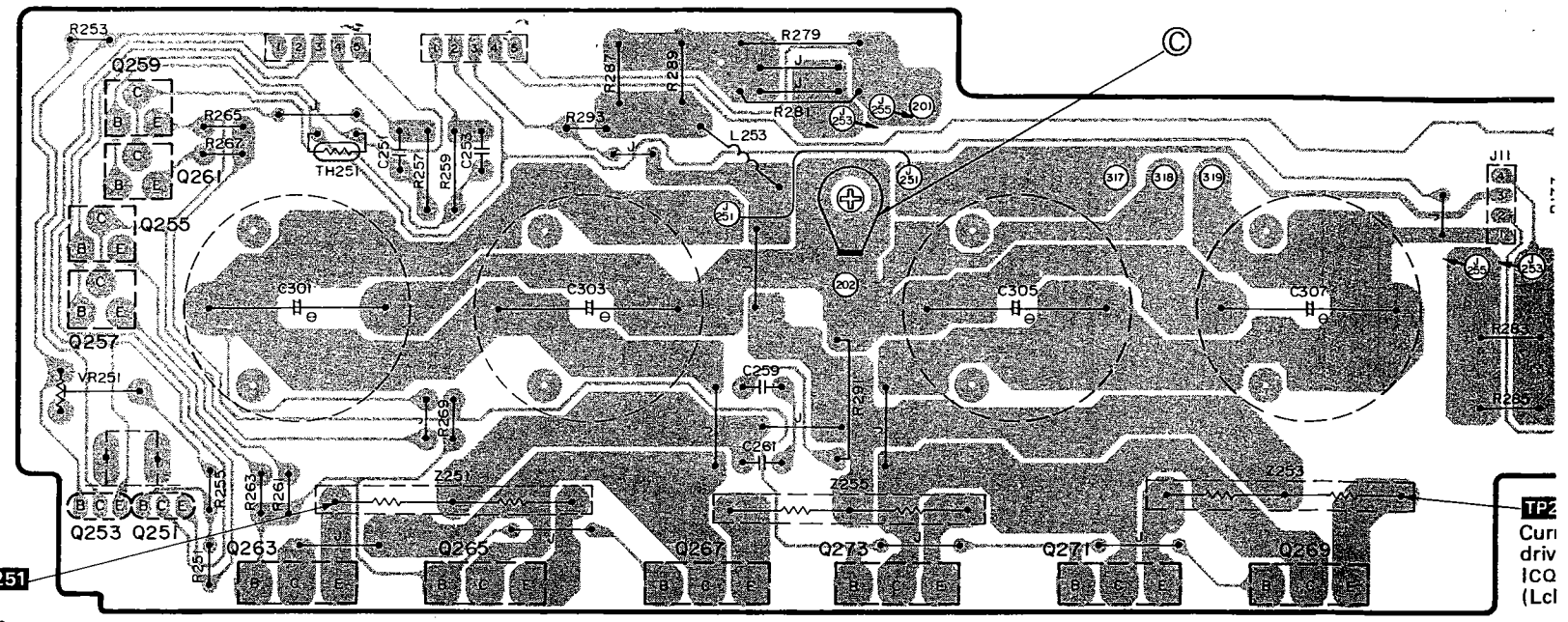
A A CLASS VOLTAGE CONTROL AMP. P.C.B



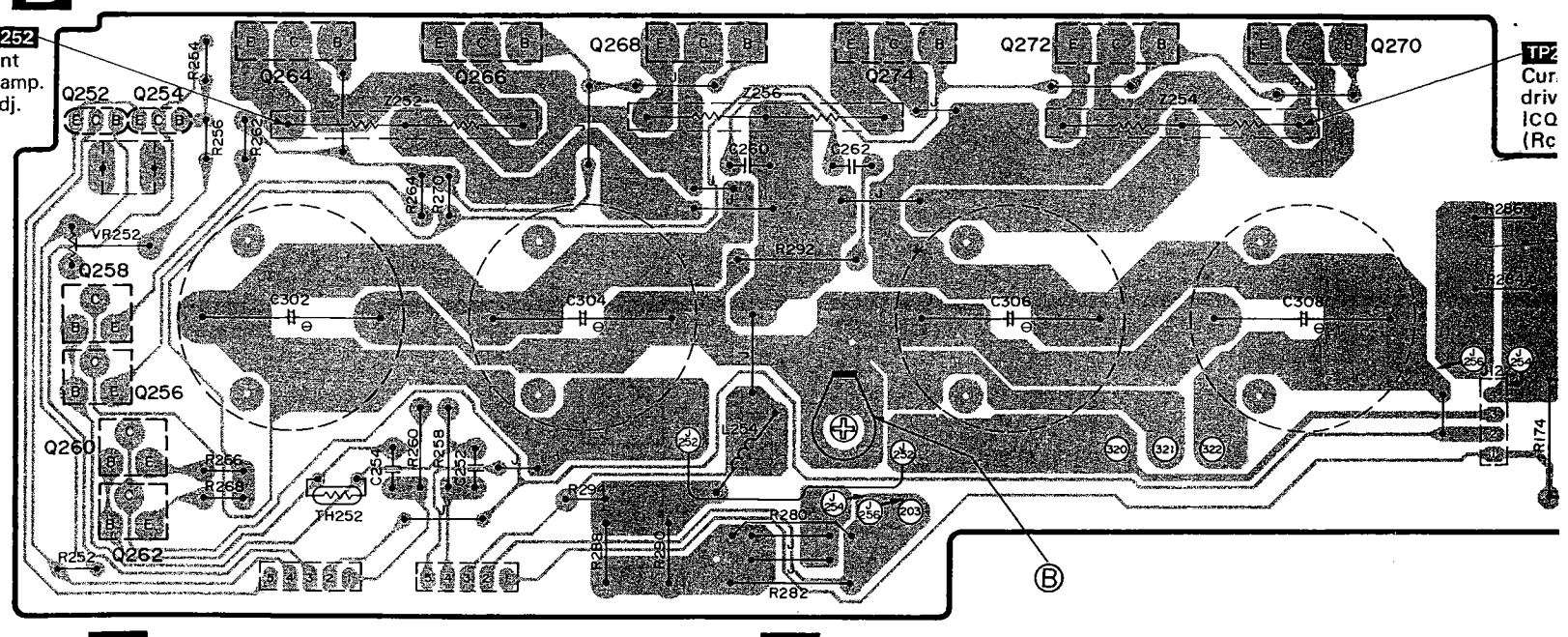
L INPUT TERMINAL P.C.B



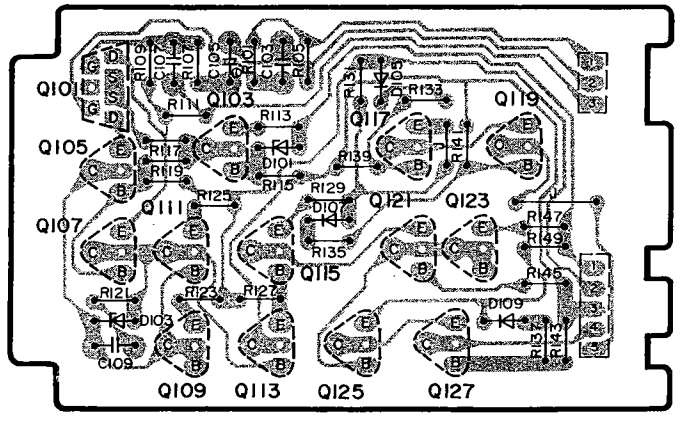
C CURRENT DRIVE AMP. P.C.B.



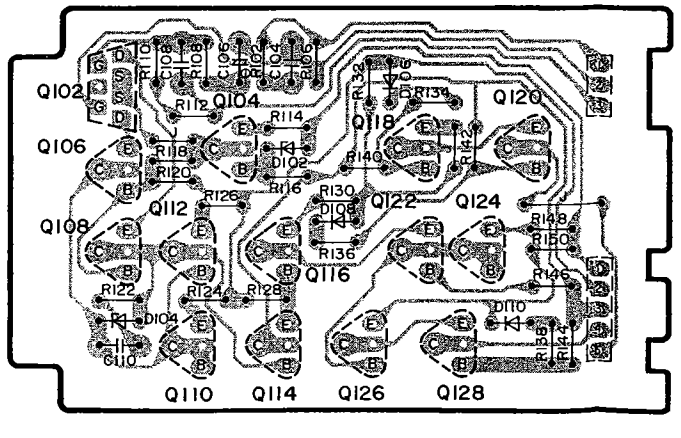
B CURRENT DRIVE AMP. P.C.B.



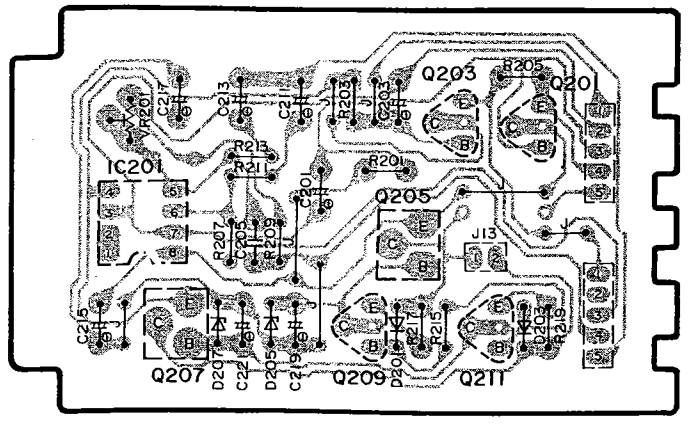
G A CLASS VOLTAGE CONTROL AMP. P.C.B.



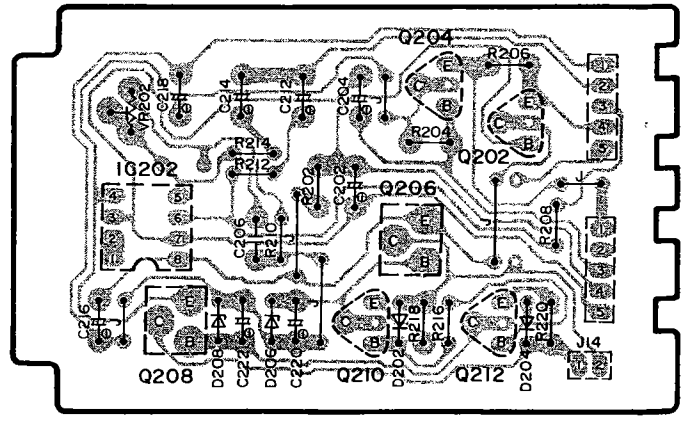
F A CLASS VOLTAGE CONTROL AMP. P.C.B.



H CURRENT DRIVE AMP. P.C.B.

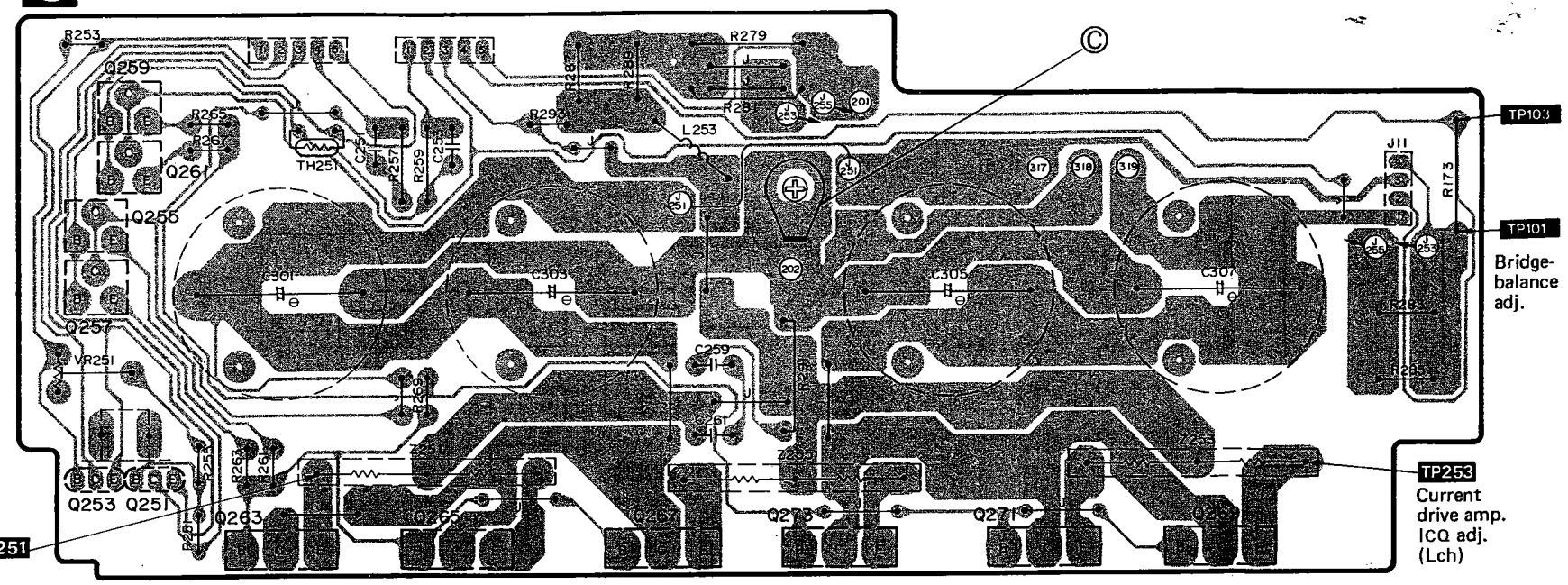


E CURRENT DRIVE AMP. P.C.B.

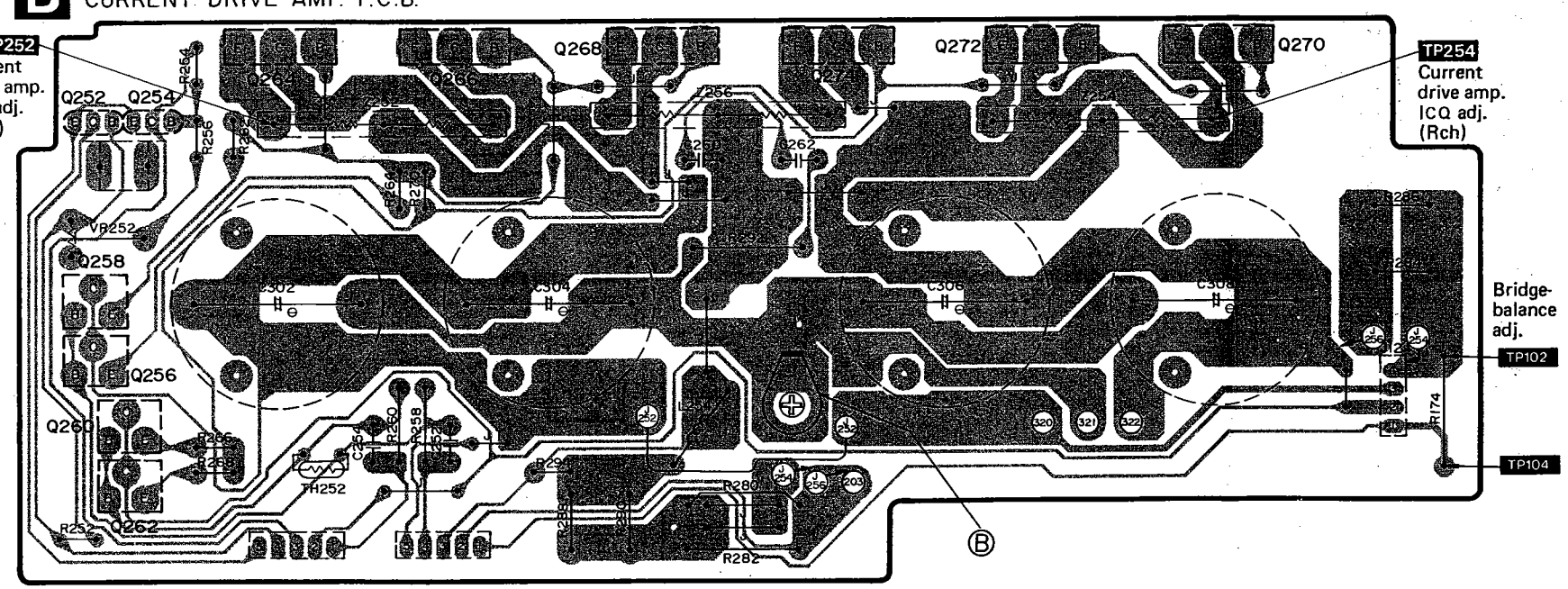


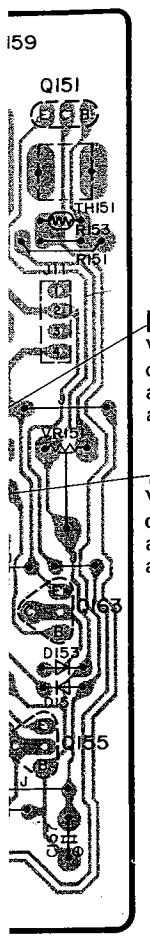
19 20 21 22 23 24 25 26 27 28

C CURRENT DRIVE AMP. P.C.B.

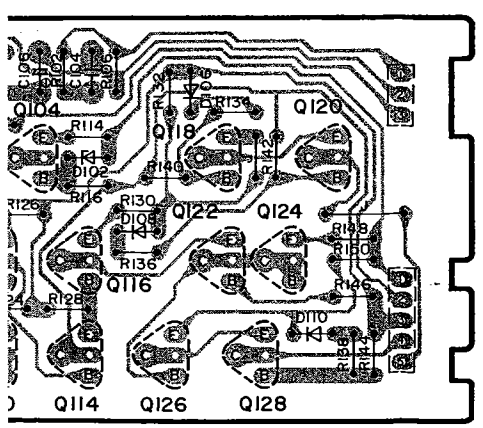


B CURRENT DRIVE AMP. P.C.B.

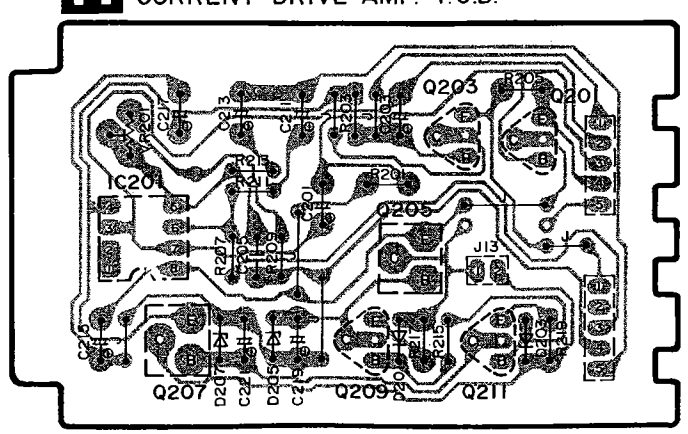




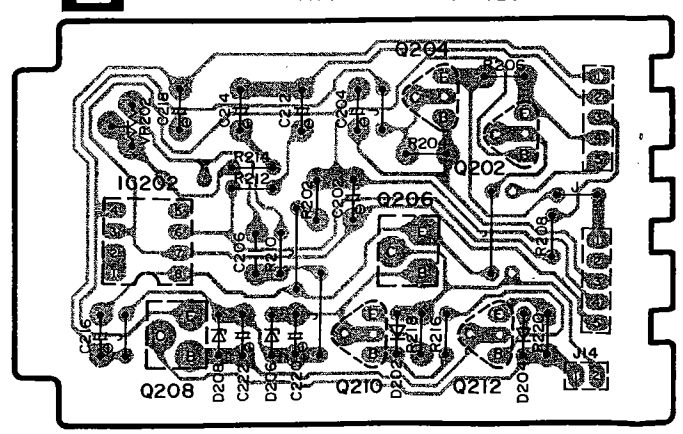
ASS VOLTAGE CONTROL AMP. P.C.B.



H CURRENT DRIVE AMP. P.C.B.



E CURRENT DRIVE AMP. P.C.B.



Note:
The ground points Ⓐ , Ⓑ and Ⓒ on P.C.B.s **A** , **B** and **C** are grounded with the bus bar. When and after checking up the machine, make sure the bus bar is connected in position and then turn on the machine.

■ RESISTORS & CAPACITORS

Notes:
- Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
- Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
- The unit of resistance is Ω(ohm), K = 1000Ω, M = 1000kΩ.
- The unit of capacitance is μF (microfarad). P = 10^{-6} μF
- Bracketed indications in Ref. No. columns spedify the area. Parts without these indications can be used for all areas.

Resistor Type	Wattage	Tolerance
ERD : Carbon ERG : Metal Oxide ERO : Metal Film ERF : Non-flammable ERX	1A : 1W 2F : 1/2W 2S : 1/4W 2A : 2W S1 : 1/2W 3A : 3W S2 : 1/4W 5A : 5W	J : ±5% G : ±5% K : ±10%

Capacitor Type	Voltage		Tolerance
	ECEA Type	Other	
ECEA : Electrolytic ECCD : Ceramic ECKD : Ceramic ECQM : Polyester ECET : Electrolytic	0J : 6.3V 1A : 10V 1C : 16V 1E : 25V 1V : 35V 1H : 50V 1K : 80V 2A : 100V	1H : 50V 2H : 500V KC : 400VAC	K : ±10% Z : +80%, −20% P : $^{+100\%}_{-0}$ J : ±5%

● RESISTORS

Ref. No.	Part No.	Value
R101, 102	ERDS2TJ332	3.3K
R103, 104	ERDS2TJ224	220K
R105, 106	ERDS2TJ473	47K
R107, 108	ER0S2TKG8200	820
R109, 110	ER0S2TKG2702	27K
R111, 112	ERDS2TJ272	2.7K
R113, 114	ERDS2TJ102	1K
R115, 116	ERDS2TJ563	56K
R117, 118	ERDS2TJ223	22K
R119, 120	ERDS2TJ124	120K
R121, 122	ERDS2TJ101	100
R123, 124	ERDS2TJ681	680
R125, 126	ERDS2TJ681	680
R127, 128	ERDS2TJ472	4.7K
R129, 130	ERDS2TJ221	220
R131, 132	ERDS2TJ470	47
R133, 134	ERDS2TJ821	820
R135, 136	ERDS2TJ102	1K
R137, 138	ERDS2TJ102	1K
R139, 140	ERDS2TJ563	56K
R141, 142	ERDS2TJ563	56K
R143, 144	ERDS2TJ563	56K
R145, 146	ERDS2TJ272	2.7K
R147, 148	ERDS2TJ101	100
R149, 150	ERDS2TJ101	100
R151, 152	ERD2FCG471	470
R153, 154	ERDS2TJ182	1.8K
R155, 156 ⚠	ERD25FJ391	390
R157, 158 ⚠	ERD25FJ2R2	2.2
R159, 160 ⚠	ERD25FJ2R2	2.2
R161, 162	ERX1SJR33	0.33
R163, 164	ERX1SJR33	0.33
R165, 166 ⚠	ERD25FJ151	150
R167, 168 ⚠	ERD25FJ151	150
R169, 170 ⚠	ERDS1FJ100	10
R171, 172 ⚠	ERD25FJ100	10
R173, 174	ERX1ANJR22	0.22

Ref. No.	Part No.	Value
R201, 202 ⚠	ERD25FJ332	3.3K
R203, 204 ⚠	ERD25FJ332	3.3K
R205, 206 ⚠	ERD25FJ391	390
R207, 208	ERDS2TJ392	3.9K
R209, 210	ERDS2TJ102	1K
R211, 212	ERDS2TJ221	220
R213, 214	ERDS2TJ221	220
R215, 216	ERDS2TJ224	220K
R217, 218 ⚠	ERD25FJ271	270
R219, 220 ⚠	ERD25FJ271	270
R251	ERDS2TJ472	4.7K
R252 ⚠	ERD25FJ472	4.7K
R253, 254	ERDS2TJ472	4.7K
R255, 256	ERDS2TJ472	4.7K
R257, 258	ERD2FCG681	680
R259, 260	ERD2FCG681	680
R261, 262 ⚠	ERD25FJ4R7	4.7
R263, 264 ⚠	ERD25FJ4R7	4.7
R265, 266 ⚠	ERD25FJ4R7	4.7
R267, 268 ⚠	ERD25FJ4R7	4.7
R269, 270 ⚠	ERD25FJ221	220
R275, 276 ⚠	ERDS1FJ4R7	4.7
R277, 278	ERG2ANJ100	10
R279, 280	ERX2SJR33	0.33
R281, 282	ERX2SJR33	0.33
R283, 284	ERF3AKR22	0.22
R285, 286	ERF3AKR22	0.22
R287, 288	ERF3AKR22	0.22
R289, 290	ERF3AKR22	0.22
R291, 292	ERG2SJ100	10
R293, 294 ⚠	ERDS1FJ4R7	4.7
R295, 296	ERG3ANJ331	330
R301, 302	ERDS2TJ222	2.2K
R303	ERDS2TJ222	2.2K
R401, 402 ⚠	ERDS1FJ392	3.9K
R403, 404	ERDS2TJ271	270
R405, 406	ERDS2TJ682	6.8K

Ref. No.	Part No.	Value
R409, 410	ERDS2TJ182	1.8K
R411, 412	ERDS2TJ155	1.5M
R413, 414	ERDS2TJ123	12K
R415, 416	ERDS2TJ154	150K
R417, 418	ERDS2TJ223	22K
R419, 420	ERDS2TJ102	1K
R421, 422	ERDS2TJ104	100K
R423, 424	ERDS2TJ473	47K
R425, 426	ERDS2TJ473	47K
R431	ERDS2TJ681	680
R432	ERDS2TJ332	3.3K
R433, 434	ERDS2TJ103	10K
R435	ERDS2TJ223	22K
R436	ERDS2TJ104	100K
R439, 440	ERG2ANJ272	2.7K
R441, 442	ERG3ANJ122	1.2K
R443, 444	ERDS2TJ183	18K
R445, 446 ⚠	ERD25FJ151	150
R447, 448 ⚠	ERD25FJ471	470
R449, 450	ERDS2TJ272	2.7K
R451	ERDS2TJ184	180K
R452	ERDS2TJ154	150K
R453	ERDS2TJ223	22K
R454 ⚠	ERD25FJ471	470
R455, 456	ERDS2TJ223	22K
R457	ERDS2TJ822	8.2K
R458	ERDS2TJ473	47K
R459	ERDS2TJ223	22K
R460	ERDS2TJ822	8.2K
R461	ERDS2TJ334	330K
R462	ERDS2TJ153	15K
R463	ERDS2TJ392	3.9K
R468	ERDS2TJ394	390K
R469	ERDS2TJ274	270K
R470	ERDS2TJ334	330K
R471	ERDS2TJ332	3.3K
R472	ERDS2TJ154	150K

Ref. No.	Part No.	Value
R473	ERDS2TJ682	6.8K
R474	ERDS2TJ392	3.9K
R475	ERDS2TJ223	22K
R476	ERDS2TJ153	15K
R477	ERDS2TJ103	10K
R478, 479	ERDS2TJ223	22K
R480, 481	ERDS2TJ473	47K
R482, 483	ERDS2TJ682	6.8K
R484, 485	ERDS2TJ682	6.8K
R486, 487	ERDS2TJ682	6.8K
R489, 490	ERDS2TJ223	22K
R492, 493	ERDS2TJ103	10K
R494	ERDS2TJ473	47K
R495 ⚠	ERDS1FJ821	820
R496	ERDS2TJ562	5.6K
R497	ERDS2TJ224	220K
R501, 502	ERDS2TJ331	330
R503	ERDS2TJ391	390
R504, 505	ERDS2TJ331	330
R506	ERDS2TJ391	390
R507, 508	ERDS2TJ331	330
R509	ERDS2TJ391	390
R510, 511	ERDS2TJ331	330
R512	ERDS2TJ331	330
R513	ERDS2TJ471	470
R514, 515	ERDS2TJ391	390
R516	ERDS2TJ471	470
R517, 518	ERDS2TJ391	390
R519	ERDS2TJ151	150
R520, 521	ERDS2TJ181	180
R522	ERDS2TJ181	180
R523	ERDS2TJ471	470
R524, 525	ERDS2TJ391	390

● CAPACITORS

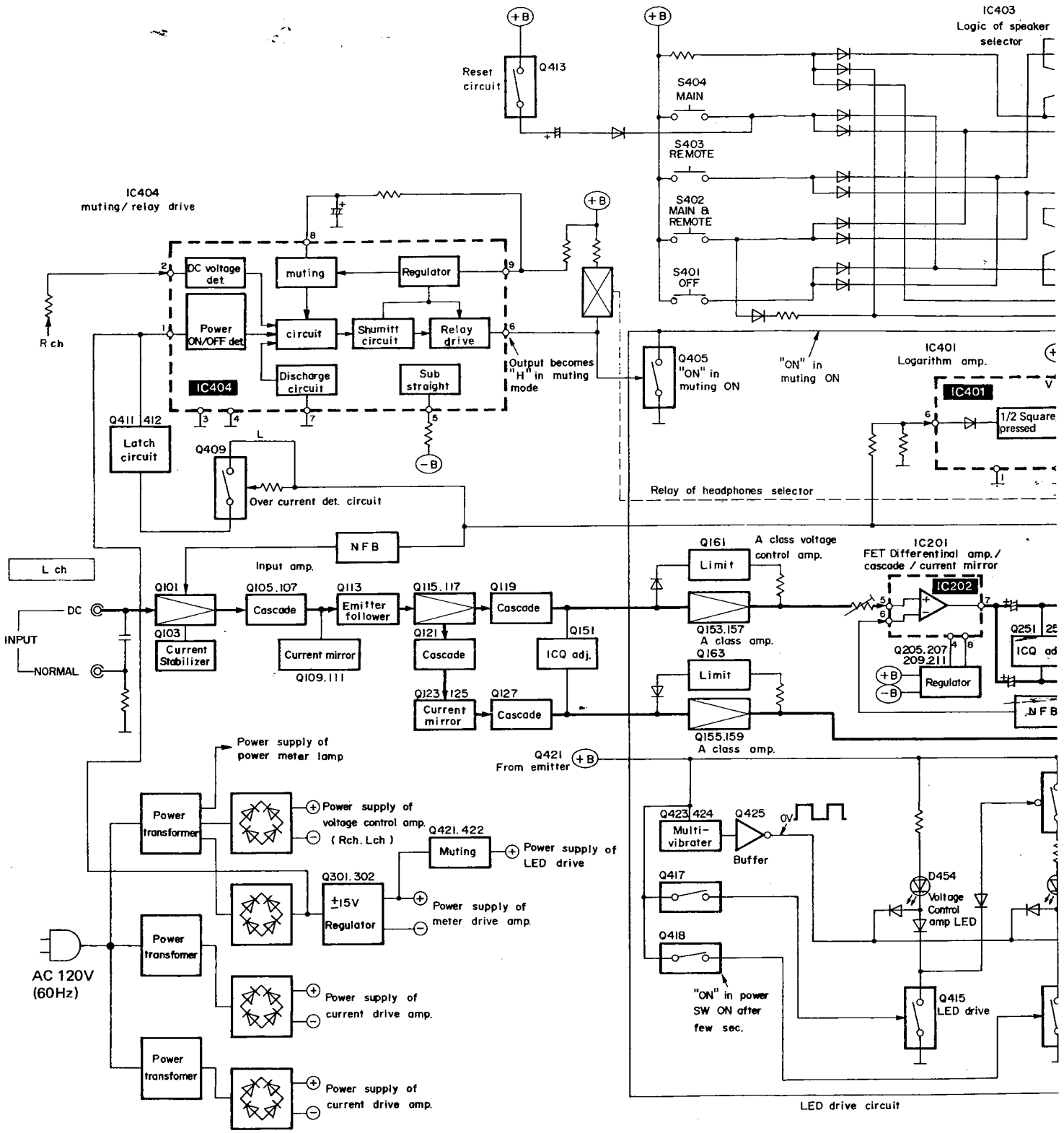
Ref. No.	Part No.	Value
C1 ⚠	ECKDKC103PF2	0.01
C101, 102	ECEA1HU2R2	2.2
C103, 104	ECCD1H221K	220P
C105, 106	ECEA1CU221	220
C107, 108	ECCD1H120KC	12P
C109, 110	ECKD1H391KB	390P
C151, 152	ECCD2H101K	100P
C153, 154	ECCD2H101K	100P
C155, 156	ECQM1H472JZ	0.0047
C157, 158	ECEA2AU100	10
C159, 160	ECEA2AU100	10
C201, 202	ECEA1EU3R3	3.3
C203, 204	ECEA1EU3R3	3.3
C205, 206	ECQM1H472JZ	0.0047

Ref. No.	Part No.	Value
C211, 212	ECEA1AU221	220
C213, 214	ECEA1AU221	220
C215, 216	ECEA1AU101	100
C217, 218	ECEA1AU101	100
C219, 220	ECEA1AU330	33
C221, 222	ECEA1AU330	33
C251, 252	ECKD1H681KB	680P
C253, 254	ECKD1H681KB	680P
C255, 256	ECQM1H104JZ	0.1
C257, 258	ECQM1H104JZ	0.1
C259, 260	ECQM1H104JZ	0.1
C261, 262	ECQM1H104JZ	0.1
C301, 302	ECET1KV103LU	10000
C303, 304	ECET1KV103LU	10000

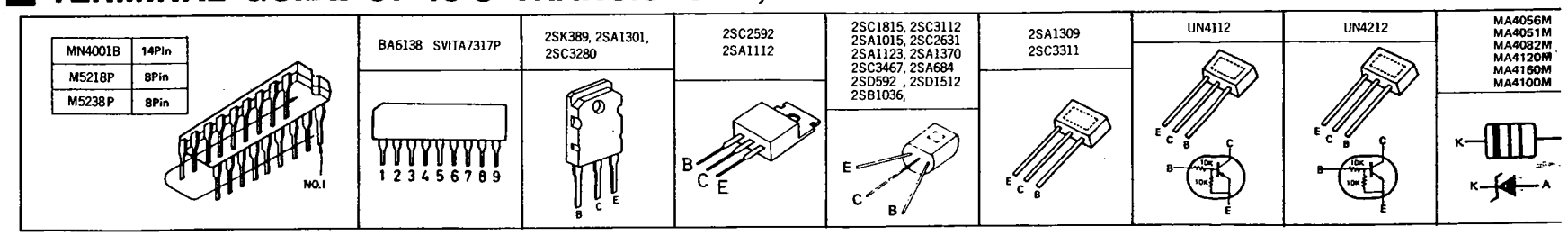
Ref. No.	Part No.	Value
C305, 306	ECET1KV103LU	10000
C307, 308	ECET1KV103LU	10000
C309, 310	ECES1KU562U	5600
C311	ECEA1VU102	1000
C312	ECEA1VU471	470
C313, 314	ECKD2H103PE	0.01
C315	ECKD2H103PE	0.01
C316, 317	ECEA1EU3R3	3.3
C318, 319	ECEA1EU3R3	3.3
C401, 402	ECEA1HU4R7	4.7
C403, 404	ECEA1HUR47	0.47
C405	ECEA1CU472	4700
C406	ECEA1HUR22	0.22
C407	ECKD1H103ZF	0.01

Ref. No.	Part No.	Value
C408	ECEA1EU3R3	3.3
C409	ECEA0JU101	100
C410	ECEA0JU330	33
C411	ECEA1VU100	10
C412	ECEA1CU100	10
C413	ECEA1CU470	47
C414, 415	ECEA1EU100	10
C421, 422	ECKD1H103ZF	0.01
C423, 424	ECKD1H103ZF	0.01
C425, 426	ECEA1AU220	22

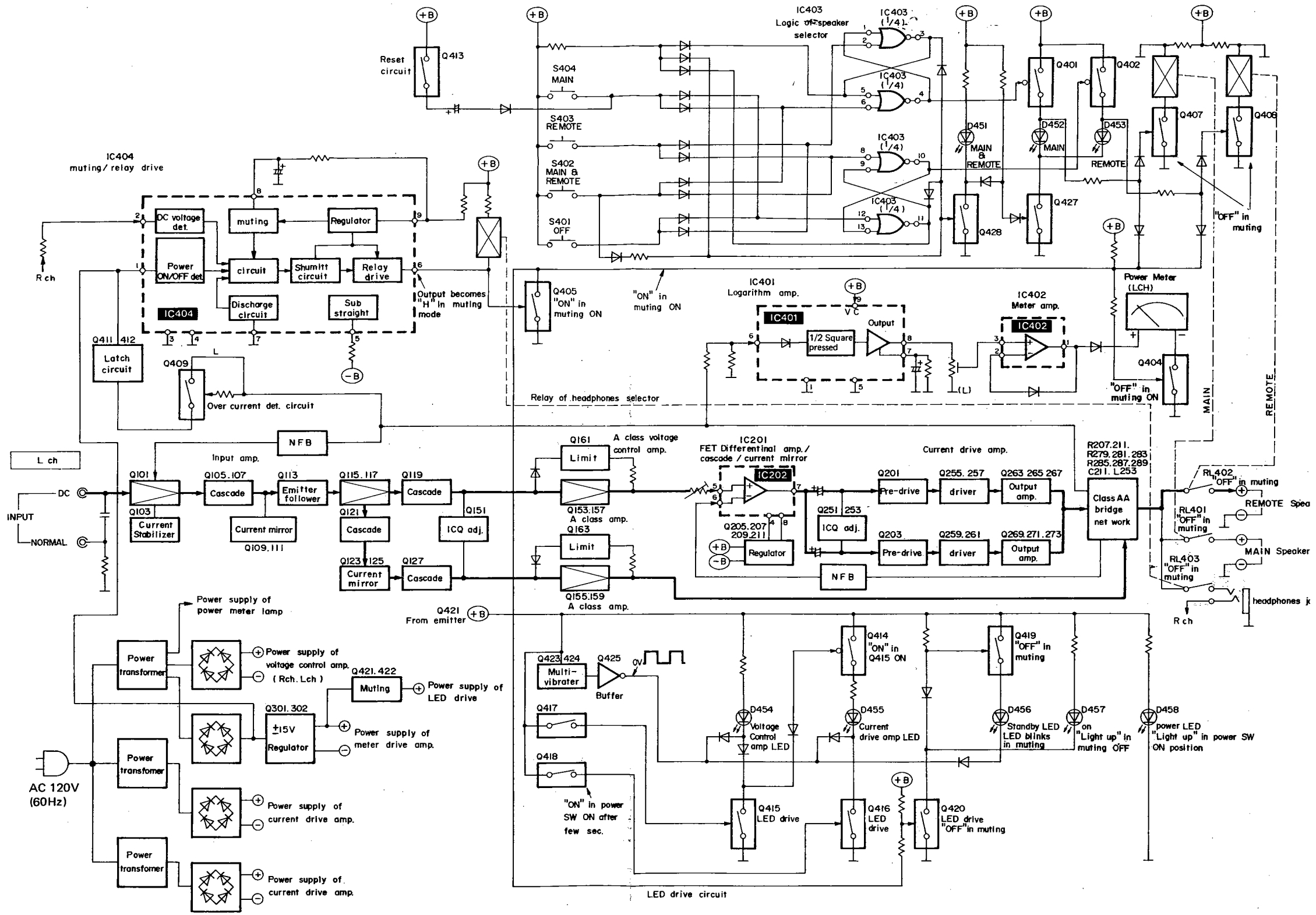
■ BLOCK DIAGRAM



■ TERMINAL GUIDE OF IC'S TRANSISTORS, AND DIODES



■ BLOCK DIAGRAM



).

s spedify the area.
d for all areas.

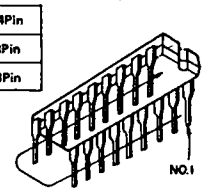
Tolerance
K : ±10%
Z : +80%, −20%
P : +100% −0%
J : ±5%

	Part No.	Value
	ERDS2TJ682	6.8K
	ERDS2TJ392	3.9K
	ERDS2TJ223	22K
	ERDS2TJ153	15K
	ERDS2TJ103	10K
	ERDS2TJ223	22K
	ERDS2TJ473	47K
	ERDS2TJ682	6.8K
	ERDS2TJ682	6.8K
	ERDS2TJ682	6.8K
	ERDS2TJ223	22K
	ERDS2TJ103	10K
	ERDS2TJ473	47K
	ERDS1FJ821	820
	ERDS2TJ562	5.6K
	ERDS2TJ224	220K
	ERDS2TJ331	330
	ERDS2TJ391	390
	ERDS2TJ331	330
	ERDS2TJ391	390
	ERDS2TJ331	330
	ERDS2TJ391	390
	ERDS2TJ331	330
	ERDS2TJ391	390
	ERDS2TJ331	330
	ERDS2TJ471	470
	ERDS2TJ391	390
	ERDS2TJ471	470
	ERDS2TJ391	390
	ERDS2TJ151	150
	ERDS2TJ181	180
	ERDS2TJ181	180
	ERDS2TJ471	470
	ERDS2TJ391	390

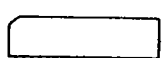
Part No.	Value
ECEA1EU3R3	3.3
ECEA0JU101	100
ECEA0JU330	33
ECEA1VU100	10
ECEA1CU100	10
ECEA1CU470	47
ECEA1EU100	10
ECKD1H103ZF	0.01
ECKD1H103ZF	0.01
ECEA1AU220	22

■ TERMINAL GUIDE OF IC'S TRANSISTORS, AND DIODES

MN4001B	14Pin
M5218P	8Pin
M5238P	8Pin



BA6138 SVITA7317P



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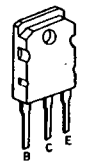
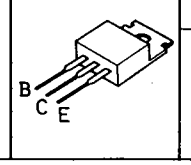


2SC2592 2SA1112



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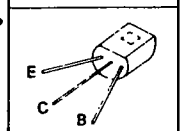
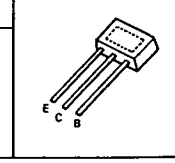
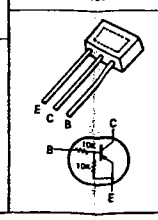


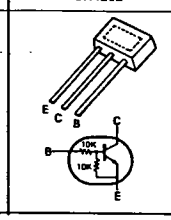
2SA1309 2SC3311



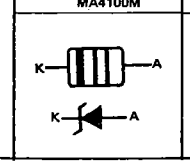
UN4112



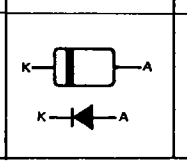
UN4212



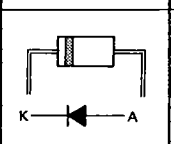
MA4056M MA4051M MA4082M MA4120M MA4160M MA4100M



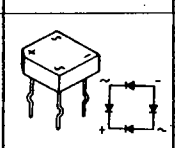
MA165 MA167 MA29WA



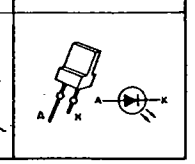
SVDS2V20 1SR35200

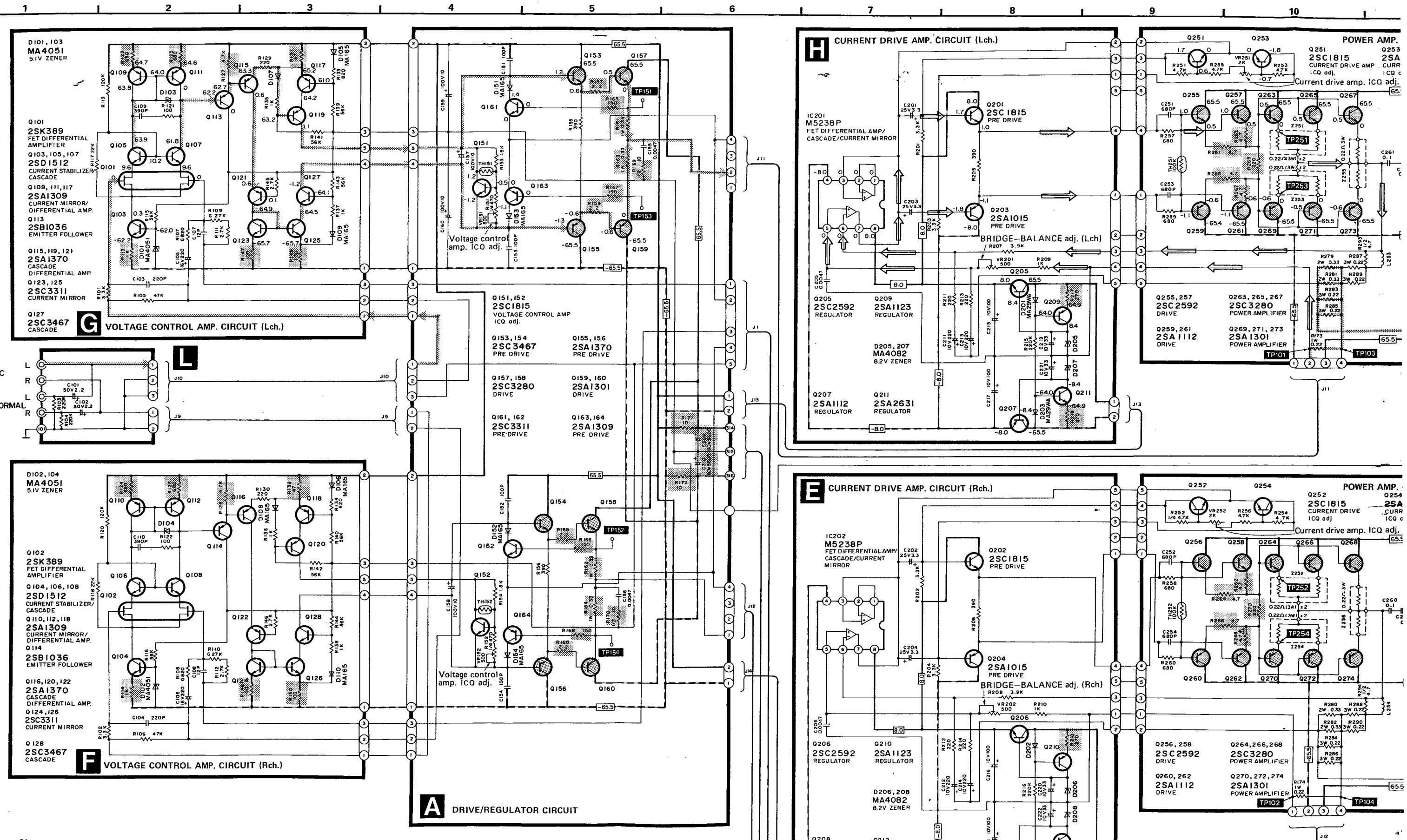


SVDS10VB20F



LN346GP LN446YP LN846RP





Note:

P.C.B.s **A** , **B** and **C** are grounded with the bus bar.

Before checking up these P.C.B.s, see Ref. No. 6 (Fig. 1 on page 6) in the disassembly instructions.

* Never turn on the machine with the bus bar disconnected. Otherwise the circuitry may be damaged.

H CURRENT DRIVE AMP. CIRCUIT (Lch.)

IC201
M5238P
FET DIFFERENTIAL AMP/
CASCADE/CURRENT MIRROR

Q201
2SC1815
PRE DRIVE

Q203
2SA1015
PRE DRIVE

BRIDGE–BALANCE adj. (Lch)
R207 3.9K

Q205
2SC2592
REGULATOR

Q209
2SA1123
REGULATOR

D205, 207
MA4082
8.2V ZENER

Q207
2SA1112
REGULATOR

Q211
2SA2631
REGULATOR

C POWER AMP. CIRCUIT

Q251
2SC1815
CURRENT DRIVE AMP
ICQ adj.

Q253
2SA1015
CURRENT DRIVE AMP
ICQ adj.

Current drive amp. ICQ adj.

Q255,257
2SC2592
DRIVE

Q259,261
2SA1112
DRIVE

Q263,265,267
2SC3280
POWER AMPLIFIER

Q269,271,273
2SA1301
POWER AMPLIFIER

D METER DRIVE/REGULATOR/PROTECTION/RELAY DRIVE/LED CONTROL CIRCUIT

IC401
BA6138
METER DRIVE AMP

IC402
M5218P
METER DRIVE
BUFFER AMP

D444
MA4051
5.1V ZENER

Q425
2SC3112
SWITCHING

Q423, 424
2SC3112
SWITCHING

Q417, 418
2SA1309
LED CONTROL

Q413
2SA1309
RESET

D432
MA4110
11V ZENER

Q409, 410
2SD1512

Q405
UN4212

Q407, 408
2SC3112
RELAY DRIVE

Q409
Q410
Q411
2SA1309

Q412
2SC3311

IC404
TA7317P
MUTING and RELAY
DRIVE

D311, 312
MA4160
16V ZENER

D305, 306
SVDS10VB20F
RECTIFIER

D307~
SVDIS
RECTIFI

D301~304
SVDS2V20
RECTIFIER

Remote speaker selector relay

Main speaker selector relay

E CURRENT DRIVE AMP. CIRCUIT (Rch.)

IC202
M5238P
FET DIFFERENTIAL AMP/
CASCADE/CURRENT
MIRROR

Q202
2SC1815
PRE DRIVE

Q204
2SA1015
PRE DRIVE

BRIDGE–BALANCE adj. (Rch)
R208 3.9K

Q206
2SC2592
REGULATOR

Q210
2SA1123
REGULATOR

D206, 208
MA4082
8.2V ZENER

Q208
2SA1112
REGULATOR

Q212
2SA2631
REGULATOR

B POWER AMP. CIRCUIT

Q252
2SC1815
CURRENT DRIVE
ICQ adj

Q254
2SA1015
CURRENT DRIVE
ICQ adj

Current drive amp. ICQ adj.

Q256, 258
2SC2592
DRIVE

Q260, 262
2SA1112
DRIVE

Q264,266,268
2SC3280
POWER AMPLIFIER

Q270, 272, 274
2SA1301
POWER AMPLIFIER

Q153 Q157 Q155 Q159 Q158 Q160

Q155, 156
2SA1370
PRE DRIVE

Q159, 160
2SA1301
DRIVE

Q163, 164
2SA1309
PRE DRIVE

C CIRCUIT

3
1015
RENT DRIVE AMP
adj.

R291 2W 10
C259 0.1

B P. CIRCUIT

:54
SA1015
URRENT DRIVE
Q adj

50
R292 2W 10
C262 0.1

D METER DRIVE/REGULATOR/PROTECTION/RELAY DRIVE/LED CONTROL CIRCUIT

IC401
BA6138
METER DRIVE AMP

IC402
M5218P
METER DRIVE BUFFER AMP

Q403, 404
2SC3112
MUTING

D444
MA4051
5.1V ZENER

Q425
2SC3112
SWITCHING

Q423, 424
2SC3112
SWITCHING

Q417, 418
2SA1309
LED CONTROL

D427
MA4120
12V ZENER

Q413
2SA1309
RESET

D432
MA4110
11V ZENER

Q405
UN4212

Q409, 410
2SD1512

Q407, 408
2SC3112
RELAY DRIVE

Q421
2SD592
MUTING

Q422
2SC3311
MUTING

Q302
2SC2592
REGULATOR

Q301
2SA684
REGULATOR

IC404
TA7317P
MUTING and RELAY DRIVE

D311, 312
MA4160
16V ZENER

D305, 306
SVDS10VB20F
RECTIFIER

D307~310
SVDISR35200
RECTIFIER

D301~304
SVDS2V20
RECTIFIER

Q409
Q410
Q411
Q412
2SA1309
2SC3311

POWER METER

Remote speaker selector relay

Main speaker selector relay

I LED DRIVE/SPEAKER SELECTOR LOGIC CIRCUIT

IC403
MN4001B
SPEAKER SWITCH LOGIC

Q414
UN4112
SWITCHING

Q419
2SC3311
SWITCHING

Q415,416,420,430
2SC3112
SWITCHING

Q401, 402
UN4112
SWITCHING

Q427, 428
2SC3112
SWITCHING

D457
LN3466P
MUT.ON IND.

D454
LN446YP
VOLTAGE CONTROL IND.

D455, 456, 458
LN846RP
CURRENT DRIVE STANDBY POWER IND.

D451~453
LN846R
SP SELECTO

MAIN & REMOTE
MAIN
REMOTE

N

S402
S403
S404
S401

O POWER METER LAMP

PL1 PL2 PL3 PL4
12V 240mA

P POWER METER LAMP

PL5 PL6 PL7 PL8
12V 240mA

MAIM
SPEAKERS
REMOTE

HEADPHONES

J FUSE CIRCUIT

AC 120V 60 Hz
POWER
S501
F1 125V 2.5A
F2 125V 1A
F3 125V 2.5A
F4 125V 1A

T1
T2
T3

SCHEMATIC DIAGRAM

(This schematic diagram may be modified at any time with the development of new technology.)

Notes:

1. **S401 ~ S404** : Speaker selector SW in "**main**" position.
   S401: Off, S402: **main**, S403: remote
   S404: main and remote
2. **S501** : Power switch in "**on**" position.
3. Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage voltage values, depending on the internal impedance of the DC circuit tester.
4. Phono signal lines of left channel.
5. Current drive amp. signal lines of left channel.
6. Positive (+B) voltage lines.
7. Negative (—B) voltage lines.

IMPORTANT SAFETY NOTICE

The shaded area on this schematic diagram incorporates special features important for protection from fire and electrical shock hazards. When servicing it is essential that only manufacturer's special parts be used for the critical components in the shaded areas of the schematic.

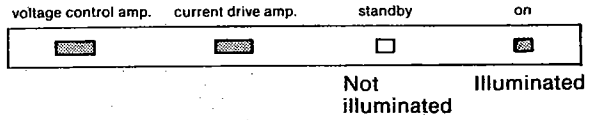
■ PROTECTION CIRCUITRY

The protection circuitry functions under the following conditions, the "on" operation indicator illumination stops, and the "standby" indicator flashes.

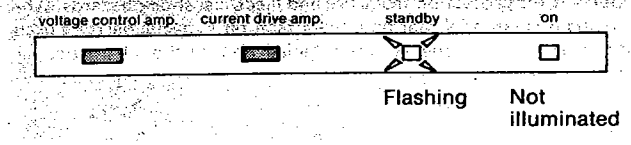
Probable causes: E08AA01C E08BB03A E08BD03A

1. The protection circuitry has functioned because the positive (+) and negative (−) speaker connection wires are short-circuited.
2. The protection circuitry has functioned due to a malfunction of other equipment (such as the control amplifier, etc.), thus resulting in a DC component being applied to the input of this unit.
3. The protection circuitry has functioned because of a malfunction of this unit.

During normal operation
(Sound is heard from speakers)



When protection circuitry functions
(No sound is heard from speakers)



If the protection circuitry functions, the following steps should be taken.

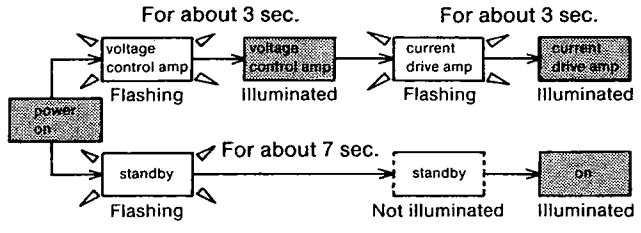
1. **First check whether or not speaker connection wires have short circuited.**
   If they have, be sure to first switch OFF the power. Then, after correcting the connections, once again switch ON the power.

2. **If the speaker connection wires are not short-circuited . . .**
   ① Turn off the power.
   ② Disconnect the control amplifier and speaker system connections.
   ③ Turn on the power once again.
   If at this time the "standby" indicator continues to flash, the problem is probably with this unit. Please consult with the store where the unit was purchased or with a nearby Authorized Service Center (list enclosed).

3. **If the steps taken in 2. above result in illumination of the "on" indicator . . .**
   ① Turn off the power.
   ② Reconnect the connections of the input terminals from "DC" to "NORMAL", and connect the speaker systems.
   ③ Turn on the power once again.
   If, at this time, the "on" indicator illuminates, there may be a malfunction of the control amplifier.
   If the "standby" indicator continues to flash, the problem is probably with the speaker system. Please consult with the store where the speaker systems were purchased or with a nearby Authorized Service Center (list enclosed).

■ HOW TO OPERATION INDICATORS

These indicators illuminate to indicate the operation condition of this unit.



voltage control amp:
When the power is switched ON, illumination begins after flashing for about three seconds.
This indicates that the voltage-control amplifier can be used.

current drive amp:
When the voltage-control amplifier indicator illuminates, illumination begins after flashing for about three seconds.
This indicates that the current-drive amplifier can be used.

standby:
This indicator flashes for about seven seconds after the power is switched ON; the flashing stops when the circuitry is in the normal operating condition.
Also flashes when the following abnormal conditions are detected.
① If, during the approximately seven seconds of flashing after the power is switched ON, a DC component is detected in the input, the protection circuitry is activated and the indicator flashes continuously.
② If, during use, the speaker connection wires become short-circuited. (Refer to page 8.)

on:
Illuminates simultaneously when the "standby" indicator stops illumination.
Indicates that the relay is in the ON condition and that there has been a change to the condition in which sound can be heard from the speaker systems.
Note that this indicator's illumination will stop if the "standby" indicator is flashing.

■ REPLACEMENT PARTS LIST (Electric, cabinet & chassis parts)

Notes:
1. Part numbers are indicated on most mechanical parts. Please use this part number for parts order.
2. Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
3. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.
4. The " Ⓢ " mark is service standard parts and may differ from production parts.
5. The parenthesized numbers in the column of description stand for the quantity per set.

Ref. No.	Part No.	Description
INTEGRATED CIRCUITS		
IC201, 202	M5238P	Integrated Circuit
IC401	BA6138	Integrated Circuit
IC402	M5218P	Integrated Circuit
IC403	MN4001B	Integrated Circuit
IC404	SVITA7317P	Integrated Circuit
TRANSISTORS		
Q101, 102	2SK389−GR	Transistor (FET)
Q103~108	2SD1512R	Transistor
Q109~112, 117, 118	2SA1309Q	Transistor
Q113, 114	2SB1036R	Transistor
Q115, 116, 119~122, 155, 156	2SA1370−D	Transistor
Q123~126, 419	2SC3311−Q	Transistor
Q127, 128, 153, 154	2SC3467−D	Transistor
Q151, 152, 201, 202, 251, 252	2SC1815Y	Transistor
Q157, 158, 263~268	2SC3280R	Transistor
Q159, 160, 269~274	2SA1301R	Transistor
Q161, 162, 412, 422	2SC3311−Q	Transistor
Q163, 164, 411, 413, 417, 418	2SA1309Q	Transistor
Q203, 204, 253, 254	2SA1015Y	Transistor
Q205, 206, 255~258	2SC2592−R	Transistor
Q207, 208, 259~262	2SA1112−R	Transistor
Q209, 210	2SA1123−R	Transistor
Q211, 212	2SC2631−R	Transistor
Q301	2SA684−QNC	Transistor
Q302	2SC2592−R	Transistor
Q401, 402, 414	UN4112	Transistor
Q403, 404, 407, 408, 415, 416, 420, 423~425, 427, 428, 430	2SC3112	Transistor
Q405	UN4212	Transistor
Q409, 410	2SD1512R	Transistor
Q421	2SD592ANCQ	Transistor
DIODES		
D101~104, 444	MA4051M	Diode
D105~110, 151~154, 401~411, 413~422, 423~426, 428, 429, 430, 431, 438~443, 445, 447, 448, 460~462	MA165	Diode
D201~204	MA29WA	Diode
D205~208	MA4082M	Diode
⚠ D301~304	SVDS2V20	Rectifier
⚠ D305, 306	SVDS10VB20F	Rectifier
⚠ D307~310	1SR35200	Rectifier
D311, 312	MA4160M	Diode
D427	MA4120−M	Diode
D432	MA4100M	Diode
D433~437	MA167	Diode
D451~453, 455, 456, 458	LN846RP	Diode (L.E.D.)
D454	LN446YP	Diode (L.E.D.)
D457	LN346GP	Diode (L.E.D.)
COILS		
L1, 2	ELQ050D15	Choke
L251, 252	SLQY18G−10	Choke
L253, 354	SLQY07G−30	Choke
TRANSFORMERS		
T1, 2	⚠ SLT5R66	Power Transformer
T3	⚠ SLT5N457	Power Transformer

Ref. No.	Part No.	Description
VARIABLE RESISTORS		
VR151, 152	EVNK6AA00B52	Variable Resistor, 500Ω (B)
VR201, 202	EVNK0AA00B52	Variable Resistor, 500Ω (B)
VR251, 252	EVNK6AA00B23	Variable Resistor, 2kΩ (B)
VR401, 402	EVNK6AA00B14	Variable Resistor, 10kΩ (B)
THERMISTORS		
TH251, 252, 401, 402	ERTD2ZHK104S	100kΩ
COMPONENT COMBINATIONS		
Z251~256	ERF3GBKR22N	0.22Ω×2
RELAYS		
RL401, 402	SSY126	Speaker
RL403	SFDYG5A237P	Headphone
LAMPS		
PL1~8	⚠ XAMS19P	Meter
FUSES		
F1, 2	XBA1F70NU14	125V, 7A
F3	XBA1F25NU14	125V, 2.5A
F7	XBA1F30NU14	125V, 3A
SWITCHES		
S401~404	SSG13	Speaker Selector
S501	⚠ ESB9939T	Power Source
METER		
	SSMEA100−KN	Power Meter

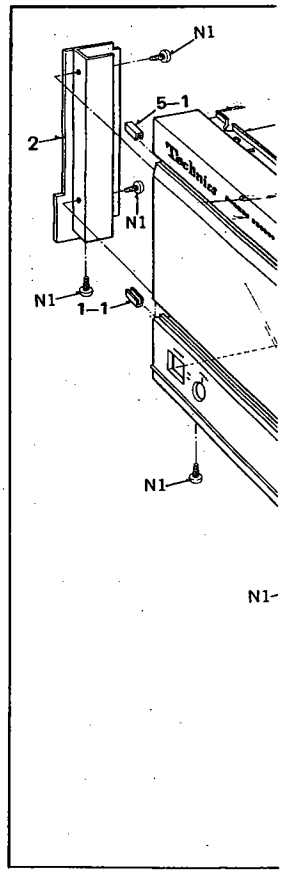
Ref. No.	Part No.	Description	
CABINET and CHASSIS PARTS			
1	SGWEA100−KM	Panel Ass'y (Down)	(1)
1-1	(SHG6379	Rubber	(2)
2	SGXEA100−KM	Ornament Ass'y (Left)	(1)
3	SGXEA100−KM1	Ornament Ass'y (Right)	(1)
4	SGUEA100−KN	Transparent Plate (Glass)	(1)
5	SGWEA100−KN1	Panel Ass'y (Upper)	(1)
5-1	(SHG6379	Rubber	(2)
6	SUWEA100−KN	Bracket	(1)
7	SGWEA100−KN2	Indicator Panel Ass'y	(1)
8	SUW2981	Bracket	(2)
9	SJJ63B	Jack	(1)
10	SBCEA100−KN	Button Ass'y	(1)
11	SUW2980	Bracket	(1)
12	SHG6382	Rubber	(3)
13	SBC666−3	Button, Power Switch	(1)
14	SUB161−1	Connection Rod, Power Switch	(1)
16	SUHEA100−KM	Side Plate (Left)	(1)
17	SMN1997	Net	(1)
18	SKCEA100−KK	Upper Cover	(1)
19	SUHEA100−KM1	Side Plate (Right)	(1)
25	SUW2987	Bracket	(1)
26	SKL295	Foot	(4)
27	SHG3018	Rubber	(4)
28	SKUEA100−KM	Bottom Board	(1)
29	SUW2977	Bracket	(1)
30	SUW2977−1	Bracket	(1)
31	SUW1621−1	Bracket	(1)
32	SMPEA100−KN	Plate	(1)
33	SMZ319	Plate	(1)
34	SHE181	Spacer	(24)

Ref. No.	Part No.	Description	
CABINET and CHASSIS PARTS			
35	SUW2827−2	Bracket	(1)
36	SUW2978−1	Bracket	(1)
37	SUW2905−1	Bracket	(2)
38	SUW2978	Bracket	(2)
39	SUW2977−1	Bracket	(1)
40	SUW2977	Bracket	(1)
41	SHS2445	Sheet	(4)
42	SHG6355−1	Rubber	(4)
43	SHG6137	Rubber	(6)
44	SUW2988	Bracket	(2)
45	SJF4817	Terminal Board (Speaker)	(1)
46	SJF3431−9A	Terminal Board (Input)	(1)
48	SGPEA100−KM	Rear Panel	(1)
49	SKL241	Foot	(4)
50 ⚠	SJA174	AC Cord	(1)
51	SHR129	Bushing AC Cord	(1)
52 ⚠	SJS9223	Socket, AC Outlet	(1)
53	SUX41	Spacer	(2)
54	SUX40	Spacer	(1)
55	SMT4	Bracket	(1)
59	SJT345	Lamp Holder	(16)
60	SHR301	Clamp	(15)
SCREWS, WASHERS and NUTS			
N1	XTB3+8FFZ	Tapping, ⊕3×8	(24)
N2	XSSS5+12F1S	⊕5×12	(8)
N3	XTBS3+8FFZ1	Tapping with Detent, ⊕3×8	(4)
N4	XTW3+8HFZ	Tapping with Washer, ⊕3×8	(6)
N5	XNS12	Nut, φ12	(1)
N6	SNE59−1	Washer (Headphone)	(1)
N7	SNE2095−6	Upper Cover	(7)
N10	XTB3+8FFZ	Tapping, ⊕3×8	(12)
N11	XTBS3+8FFZ1	Tapping with Detent, ⊕3×8	(4)
N12	XTB4+8FFZ	Tapping, ⊕4×8	(18)
N13	XYN3+C8FZS	⊕3×8	(6)
N14	XTB4+18FFZ	Tapping, ⊕4×18	(11)
N15	XTW3+8T	Tapping with Washer, ⊕3×8	(16)
N16	XTW3+8LFR	Tapping with Washer, ⊕3×8	(6)
N17	XTV3+20F	Tapping, ⊕3×20	(24)
N18	XTB4+16FFZ	Tapping, ⊕3×16	(4)
N19	XTB4+10FFZ	Tapping, ⊕4×10	(12)
N20	XTB3+8GFZ	Tapping, ⊕3×8	(6)
N21	XTB4+12FFZ	Tapping, ⊕4×12	(4)
N22	SNE2117−1	Transistor	(16)
N23	XNG4ES	Nut, φ4	(3)
N24	XWA4B	Washer, φ4	(3)
N25	XWC4B	Washer, φ4	(6)
N26	XWC3B	Washer, φ3	(3)
N27	XYN3+C8S	⊕3×8	(3)
ACCESSORIES			
A1	SFDHM03N02	Cord	(1)
A2	SPB4023	Driver Part Ass'y	(1)
A3 [M]	SQF12636	Instruction Book	(1)
A3 [MC]	SQF12637	Instruction Book	(1)
PACKING PARTS			
P1 [M]	SPG5510	Carton Box	(1)
P1 [MC]	SPG5511	Carton Box	(1)
P2	SPS4688	Pad	(1)
P3	SPS4689	Pad	(1)
P4	SPH219	Sheet	(1)
P5	SPH6279	Sheet	(1)
P6	SPJ15	Polyethylene Bag (AC Cord)	(1)
P7	SPB1035	Polyethylene Bag (Cord)	(1)

SE-A100

■ EXPLODED

Front Panel View

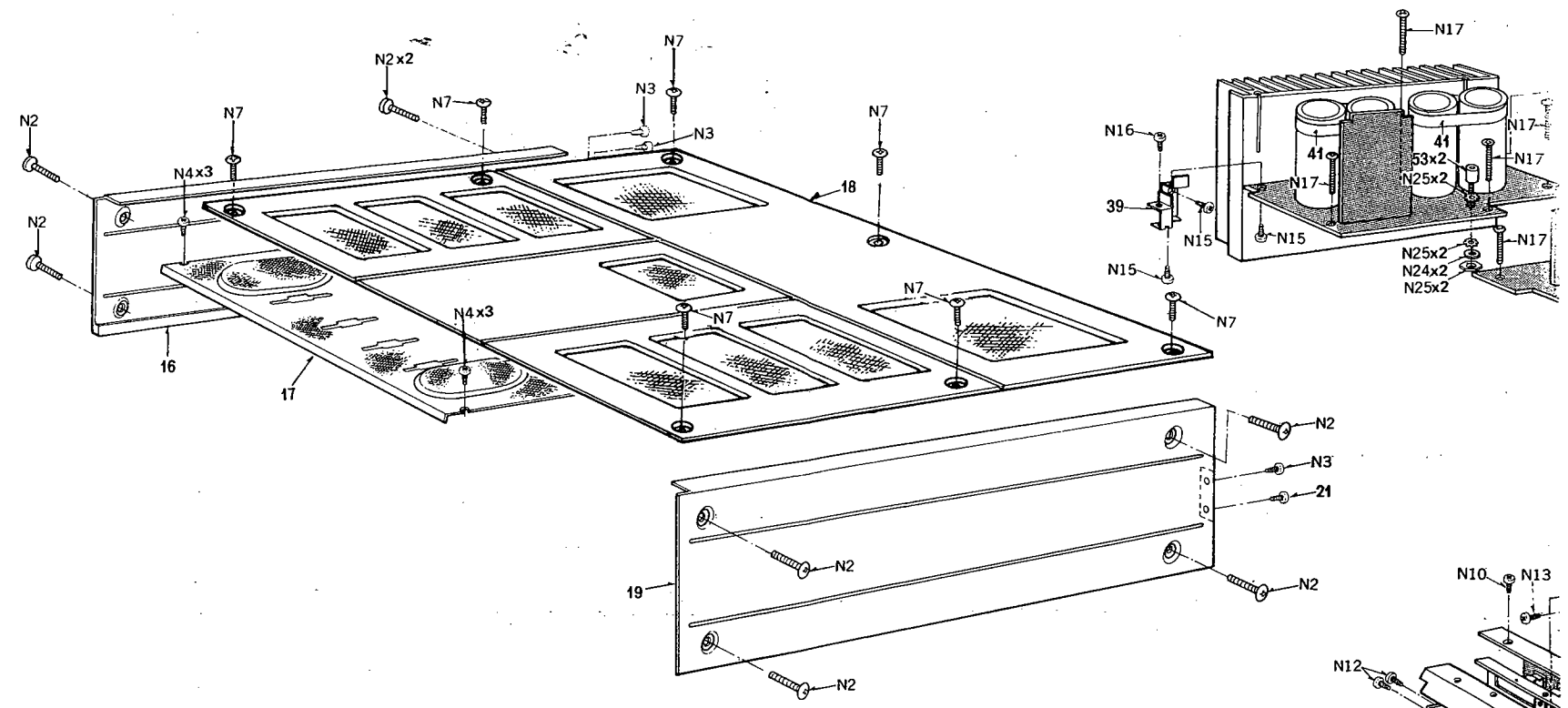


Ref. No.	Part No.	Description
VARIABLE RESISTORS		
VR151, 152	EVNK6AA00B52	Variable Resistor, 500Ω(B)
VR201, 202	EVNK0AA00B52	Variable Resistor, 500Ω(B)
VR251, 252	EVNK6AA00B23	Variable Resistor, 2kΩ(B)
VR401, 402	EVNK6AA00B14	Variable Resistor, 10kΩ(B)
THERMISTORS		
TH251, 252, 401, 402	ERTD2ZHK104S	100kΩ
COMPONENT COMBINATIONS		
Z251~256	ERF3GBKR22N	0.22Ω×2
RELAYS		
RL401, 402	SSY126	Speaker
RL403	SFDYG5A237P	Headphone
LAMPS		
PL1~8 ⚠	XAMS19P	Meter
FUSES		
F1, 2	XBA1F70NU14	125V, 7A
F3	XBA1F25NU14	125V, 2.5A
F7	XBA1F30NU14	125V, 3A
SWITCHES		
S401~404	SSG13	Speaker Selector
S501 ⚠	ESB9939T	Power Source
METER		
	SSMEA100-KN	Power Meter

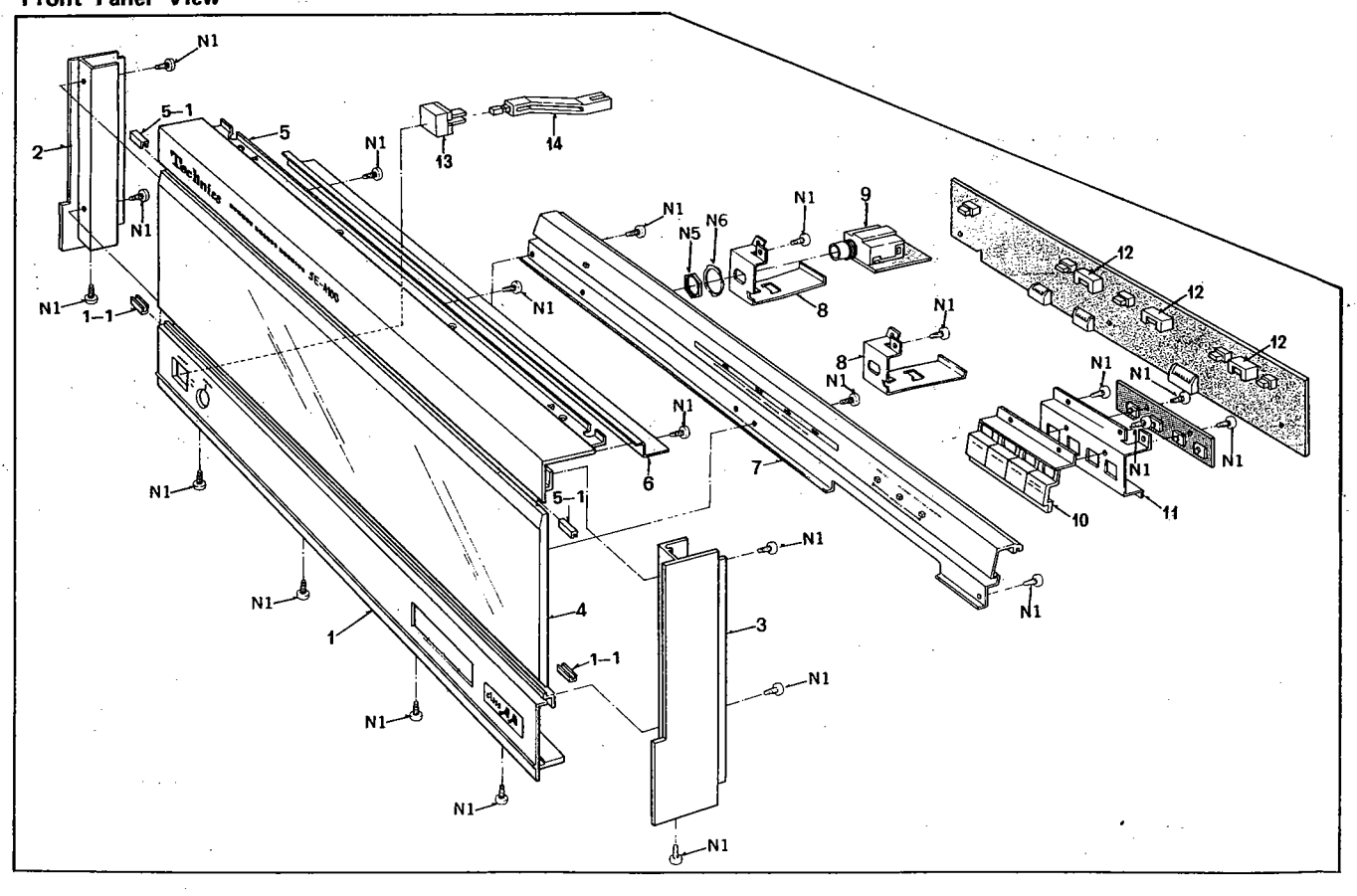
Ref. No.	Part No.	Description
CABINET and CHASSIS PARTS		
1	SGWEA100-KM	Panel Ass'y (Down) (1)
1-1	SHG6379	Rubber (2)
2	SGXEA100-KM	Ornament Ass'y (Left) (1)
3	SGXEA100-KM1	Ornament Ass'y (Right) (1)
4	SGUEA100-KN	Transparent Plate (Glass) (1)
5	SGWEA100-KN1	Panel Ass'y (Upper) (1)
5-1	SHG6379	Rubber (2)
6	SUWEA100-KN	Bracket (1)
7	SGWEA100-KN2	Indicator Panel Ass'y (1)
8	SUW2981	Bracket (2)
9	SJJ63B	Jack (1)
10	SBCEA100-KN	Button Ass'y (1)
11	SUW2980	Bracket (1)
12	SHG6382	Rubber (3)
13	SBC666-3	Button, Power Switch (1)
14	SUB161-1	Connection Rod, Power Switch (1)
16	SUHEA100-KM	Side Plate (Left) (1)
17	SMN1997	Net (1)
18	SKCEA100-KK	Upper Cover (1)
19	SUHEA100-KM1	Side Plate (Right) (1)
25	SUW2987	Bracket (1)
26	SKL295	Foot (4)
27	SHG3018	Rubber (4)
28	SKUEA100-KM	Bottom Board (1)
29	SUW2977	Bracket (1)
30	SUW2977-1	Bracket (1)
31	SUW1621-1	Bracket (1)
32	SMPEA100-KN	Plate (1)
33	SMZ319	Plate (1)
34	SHE181	Spacer (24)

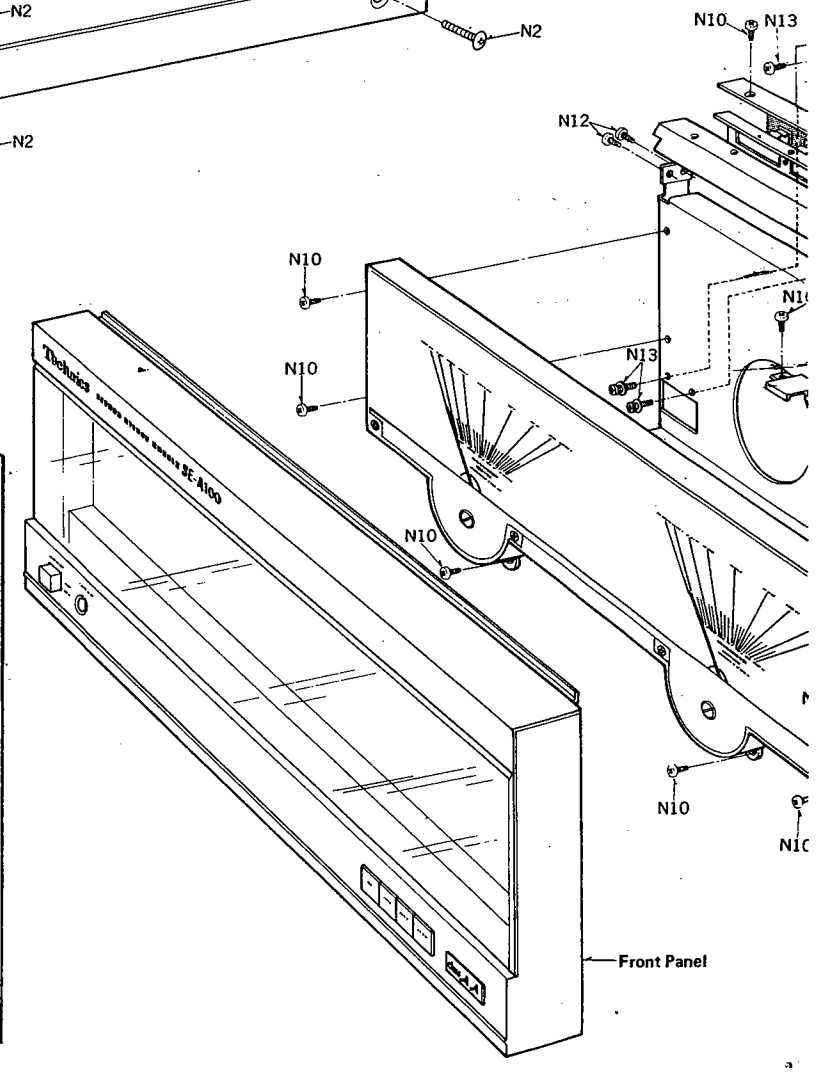
Ref. No.	Part No.	Description
CABINET and CHASSIS PARTS		
35	SUW2827-2	Bracket (1)
36	SUW2978-1	Bracket (1)
37	SUW2905-1	Bracket (2)
38	SUW2978	Bracket (2)
39	SUW2977-1	Bracket (1)
40	SUW2977	Bracket (1)
41	SHS2445	Sheet (4)
42	SHG6355-1	Rubber (4)
43	SHG6137	Rubber (6)
44	SUW2988	Bracket (2)
45	SJF4817	Terminal Board (Speaker) (1)
46	SJF3431-9A	Terminal Board (Input) (1)
48	SGPEA100-KM	Rear Panel (1)
49	SKL241	Foot (4)
50 ⚠	SJA174	AC Cord (1)
51	SHR129	Bushing AC Cord (1)
52 ⚠	SJS9223	Socket, AC Outlet (1)
53	SUX41	Spacer (2)
54	SUX40	Spacer (1)
55	SMT4	Bracket (1)
59	SJT345	Lamp Holder (16)
60	SHR301	Clamp (15)
SCREWS, WASHERS and NUTS		
N1	XTB3+8FFZ	Tapping, ⊕3×8 (24)
N2	XSSS5+12F1S	⊕5×12 (8)
N3	XTBS3+8FFZ1	Tapping with Detent, ⊕3×8 (4)
N4	XTW3+8HFZ	Tapping with Washer, ⊕3×8 (6)
N5	XNS12	Nut, φ12 (1)
N6	SNE59-1	Washer (Headphone) (1)
N7	SNE2095-6	Upper Cover (7)
N10	XTB3+8FFZ	Tapping, ⊕3×8 (12)
N11	XTBS3+8FFZ1	Tapping with Detent, ⊕3×8 (4)
N12	XTB4+8FFZ	Tapping, ⊕4×8 (18)
N13	XYN3+C8FZS	⊕3×8 (6)
N14	XTB4+18FFZ	Tapping, ⊕4×18 (11)
N15	XTW3+8T	Tapping with Washer, ⊕3×8 (16)
N16	XTW3+8LFR	Tapping with Washer, ⊕3×8 (6)
N17	XTV3+20F	Tapping, ⊕3×20 (24)
N18	XTB4+16FFZ	Tapping, ⊕3×16 (4)
N19	XTB4+10FFZ	Tapping, ⊕4×10 (12)
N20	XTB3+8GFZ	Tapping, ⊕3×8 (6)
N21	XTB4+12FFZ	Tapping, ⊕4×12 (4)
N22	SNE2117-1	Transistor (16)
N23	XNG4ES	Nut, φ4 (3)
N24	XWA4B	Washer, φ4 (3)
N25	XWC4B	Washer, φ4 (6)
N26	XWC3B	Washer, φ3 (3)
N27	XYN3+C8S	⊕3×8 (3)
ACCESSORIES		
A1	SFDHM03N02	Cord (1)
A2	SPB4023	Driver Part Ass'y (1)
A3 [M]	SQF12636	Instruction Book (1)
A3 [MC]	SQF12637	Instruction Book (1)
PACKING PARTS		
P1 [M]	SPG5510	Carton Box (1)
P1 [MC]	SPG5511	Carton Box (1)
P2	SPS4688	Pad (1)
P3	SPS4689	Pad (1)
P4	SPH219	Sheet (1)
P5	SPH6279	Sheet (1)
P6	SPJ15	Polyethylene Bag (AC Cord) (1)
P7	SPB1035	Polyethylene Bag (Cord) (1)

■ EXPLODED VIEWS

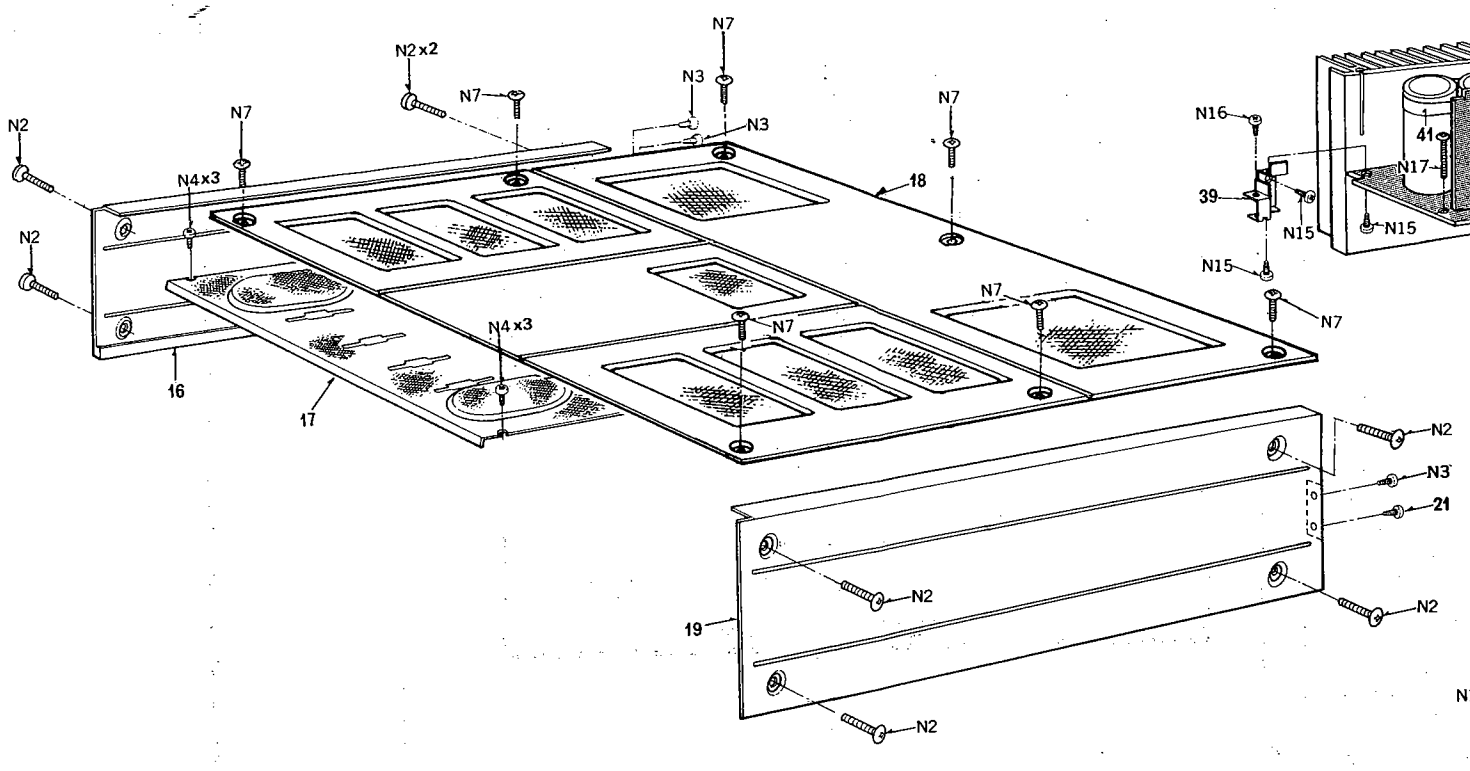


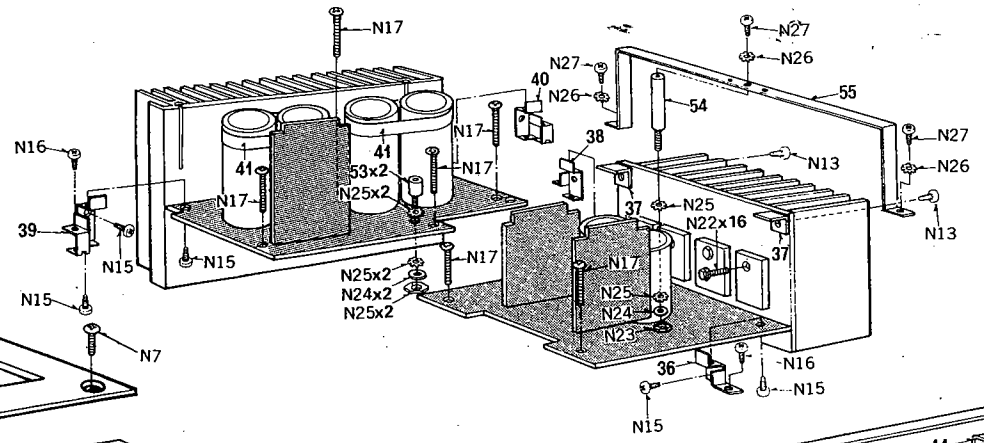
Front Panel View

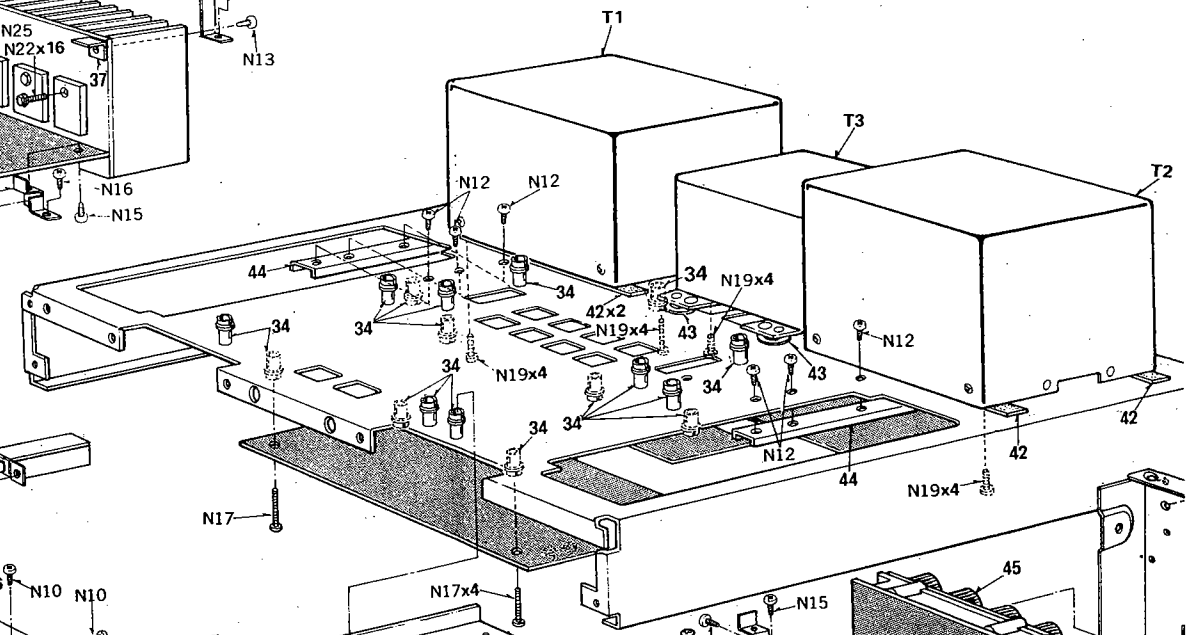


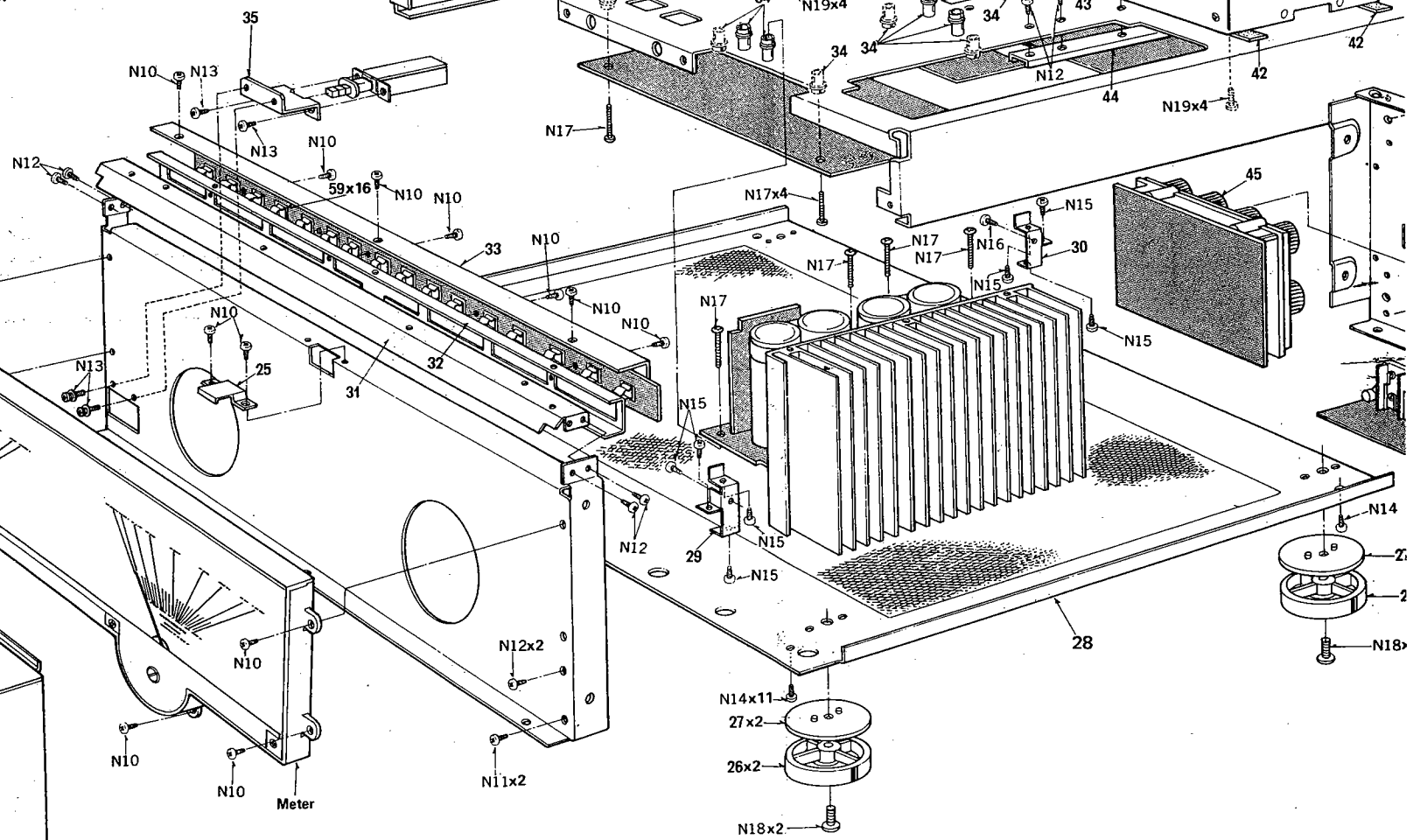


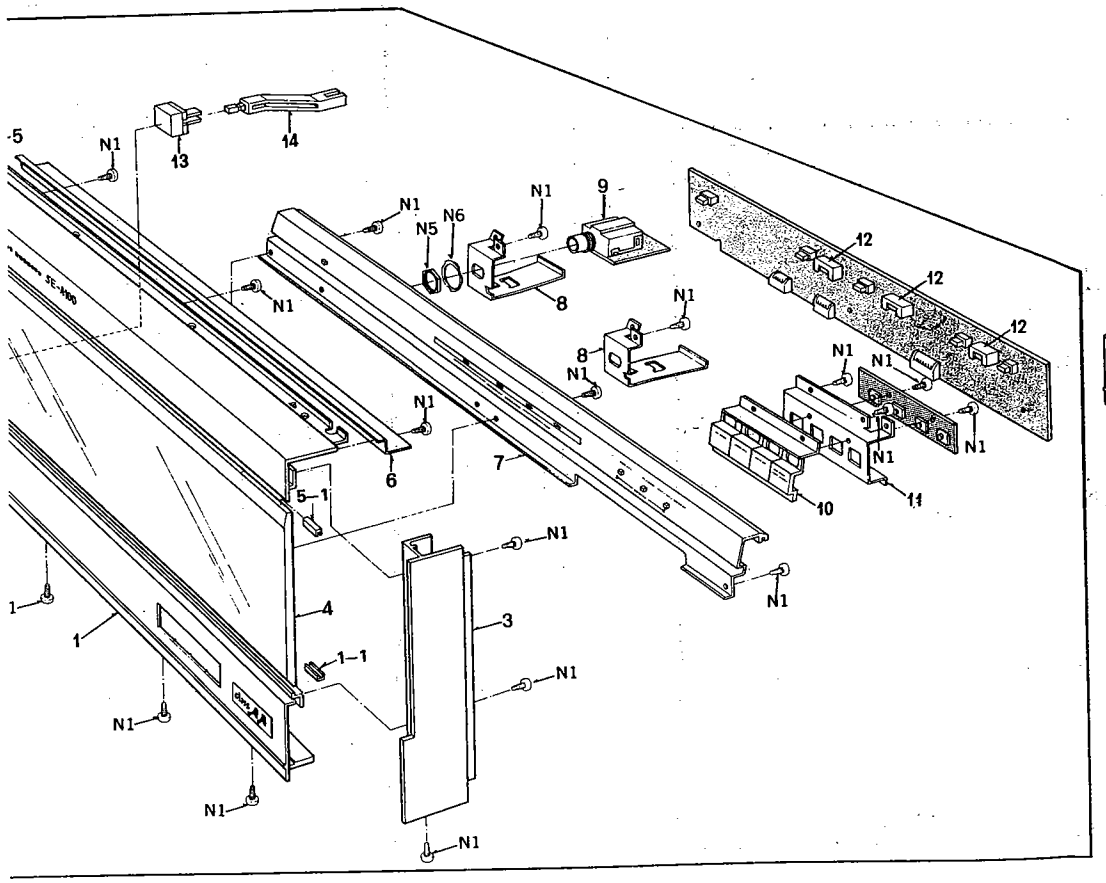
VIEWS

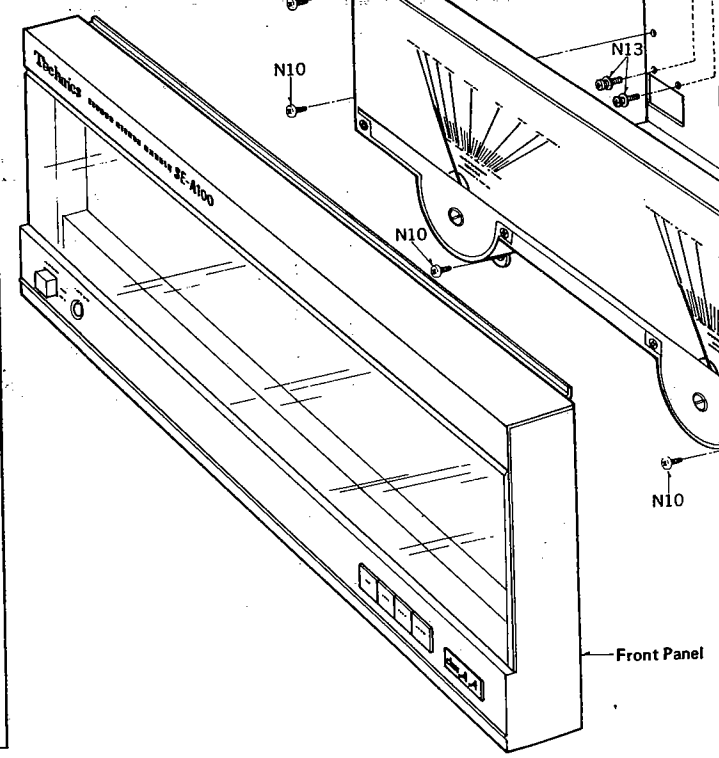

N2x2
N7
N3
N2
N4x3
16
17
18
19
21
N2
N3

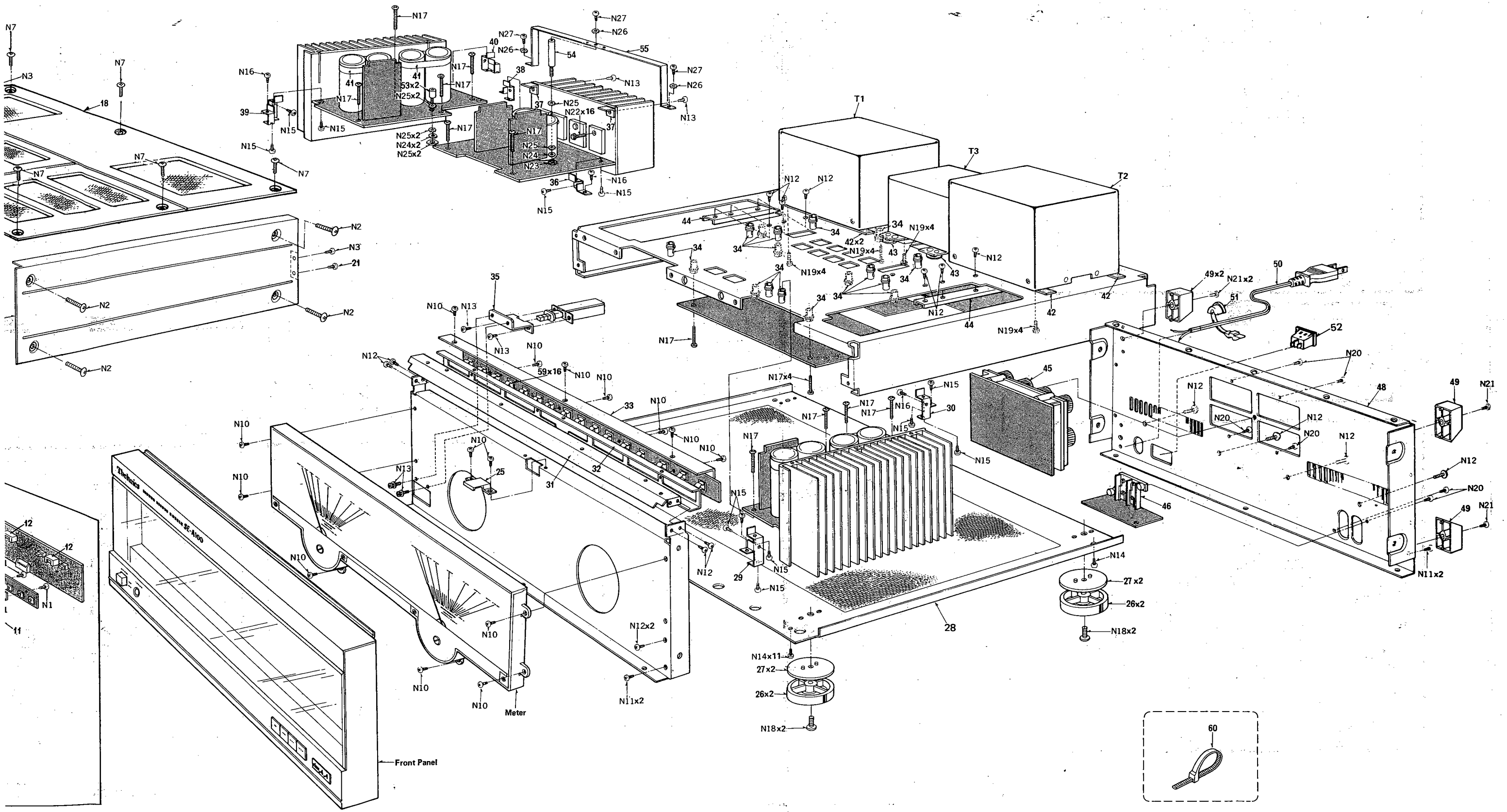

N17
N16
39
N15
41
53x2
N25x2
N24x2
40
N27
N26
54
55
38
N13
37
N25
N22x16
36
N23
N24
N25


T1
T3
T2
N12
44
34
N19x4
42x2
43
42


35
N10
N13
59x16
33
32
31
25
N17x4
N17
N16
N15
30
45
28
N14
N18x
N14x11
27x2
26x2
N18x2
N12x2
N11x2
29
Meter


N1
13
14
N5
N6
9
8
12
10
11
6
7
5
5-1
4
3
1
1-1


Front Panel



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