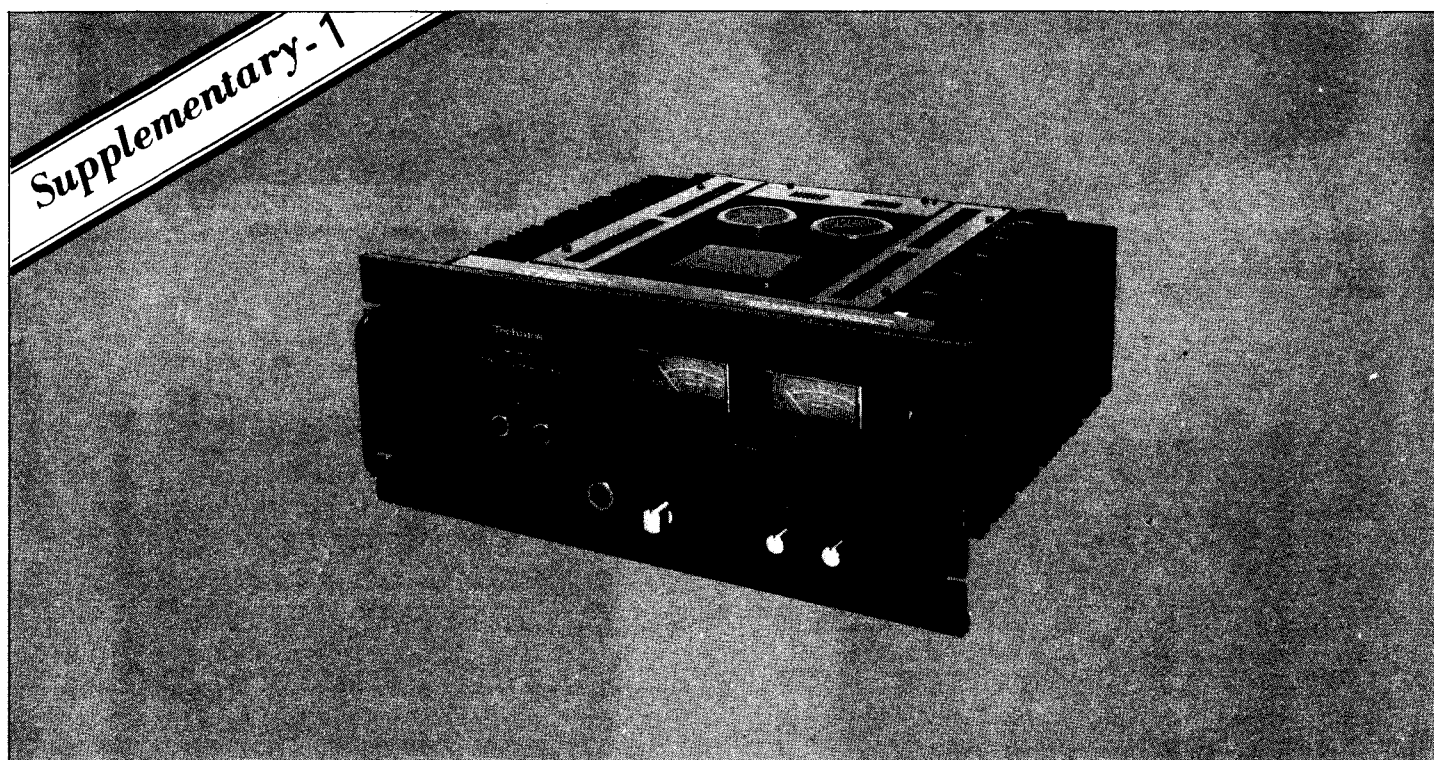




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 **Technics**
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# Service Manual



## Stereo Power Amplifier MODEL SE-9600

### TECHNICAL SPECIFICATIONS (For accommodating future improvements, specifications are subject to change without notice.)

#### AMPLIFIER SECTION (IHF)

1kHz continuous power each channel driven	165W/165W (4 $\Omega$ )
	110W/110W (8 $\Omega$ )
both channels driven	165W + 165W (4 $\Omega$ )
	110W + 110W (8 $\Omega$ )
20Hz~20kHz continuous power both channels driven	165W + 165W (4 $\Omega$ )
	110W + 110W (8 $\Omega$ )
Total harmonic distortion	0.08%
Intermodulation distortion	0.08%
Power bandwidth	
(both channels driven at 8 $\Omega$ )	5Hz~60kHz, -3dB
Frequency response	5Hz~150kHz, +0dB, -3dB
Signal-to-noise ratio	110dB

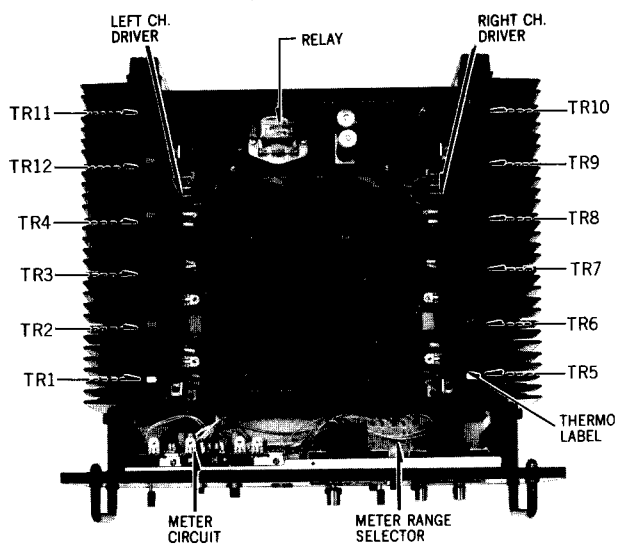
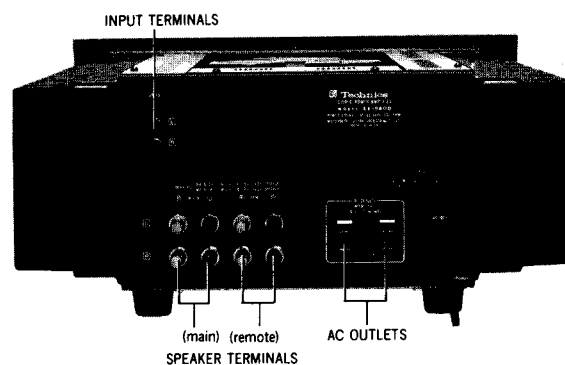
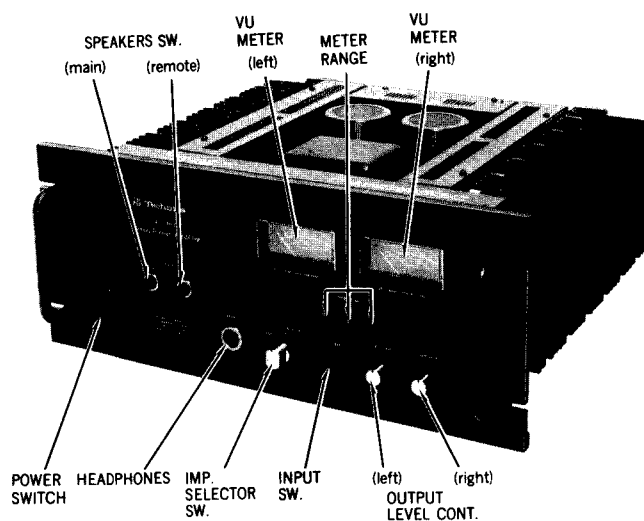
Residual hum & noise	0.3mV
Damping factor	
Load impedance 8 ohms	100, 10, 3, 1
Load impedance 4 ohms	50, 5, 1.5, 0.5
Input sensitivity impedance	1V/40k $\Omega$
Load impedance	
MAIN or REMOTE	4~ 16 $\Omega$
MAIN + REMOTE	8~ 16 $\Omega$

#### GENERAL

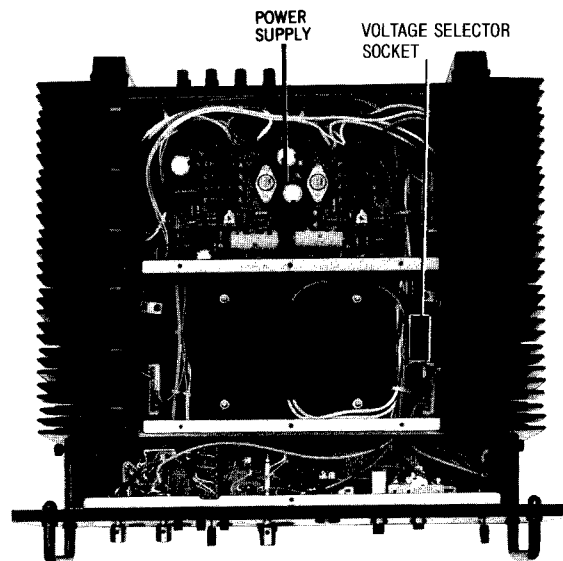
Power supply	110/120/220/240V	50/60Hz
Power consumption		960W
Dimensions (W x H x D)	17 $\frac{3}{8}$ " x 7 $\frac{1}{2}$ " x 16 $\frac{3}{4}$ " (450 x 193 x 426mm)	
Weight	52 lb. (23.6 kg)	

**Matsushita Electric**  
Matsushita Electric Trading Co., Ltd.  
P. O. Box 288, Central Osaka, Japan

## ■ LOCATION OF CONTROLS

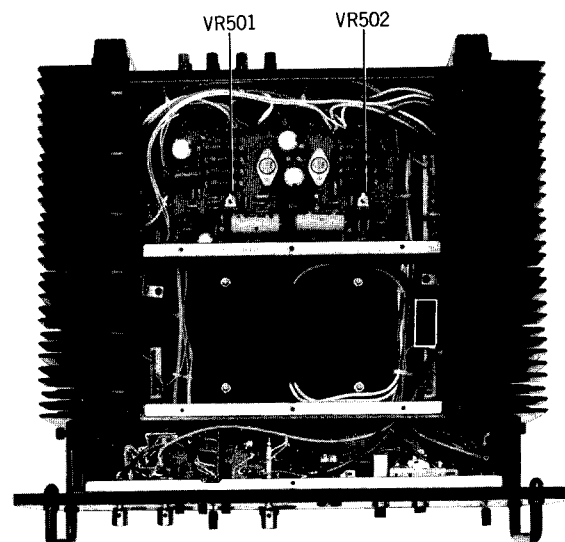
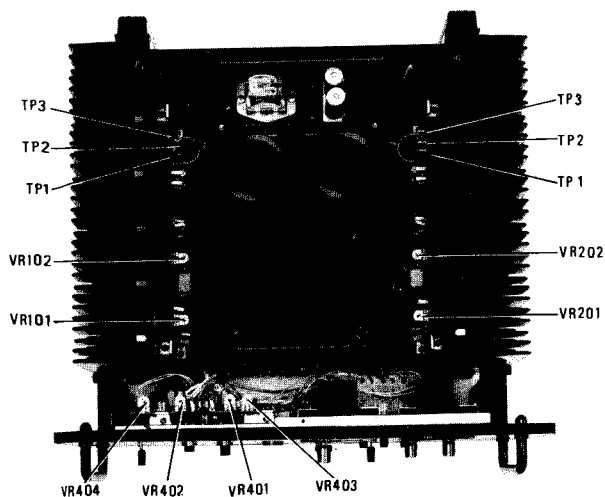


Top View



Bottom View

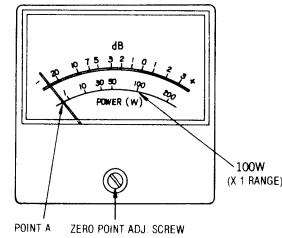
## ■ ALIGNMENT POINTS



## ■ ALIGNMENT INSTRUCTIONS

**Notes:**

1. Output level control to "maximum" position.
2. Speakers switch to "on" position.
3. Impedance selector switch to "normal ( $0.08\Omega$ )" position.
4. Input switch to "on" position.
5. Meter range selector switch to "X1" position.
6. Before adjusting,  $I_{cq}$  adjusting volume (VR102) should be turned to the left side completely, and volume (VR202) should be turned to the right side completely.
7. The  $I_{cq}$  adjustment should be started about 5 minuts after setting the power switch to the ON position.

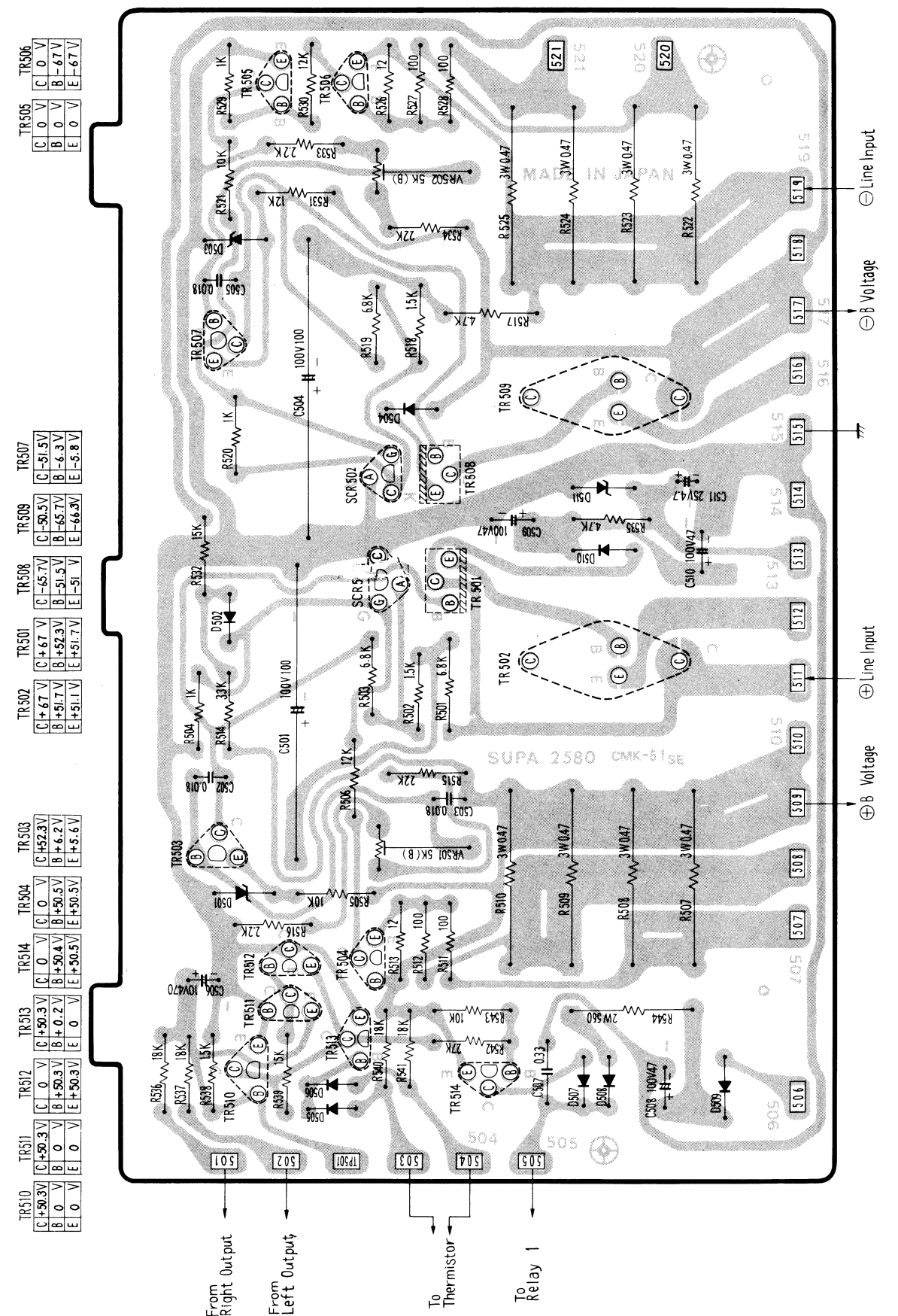
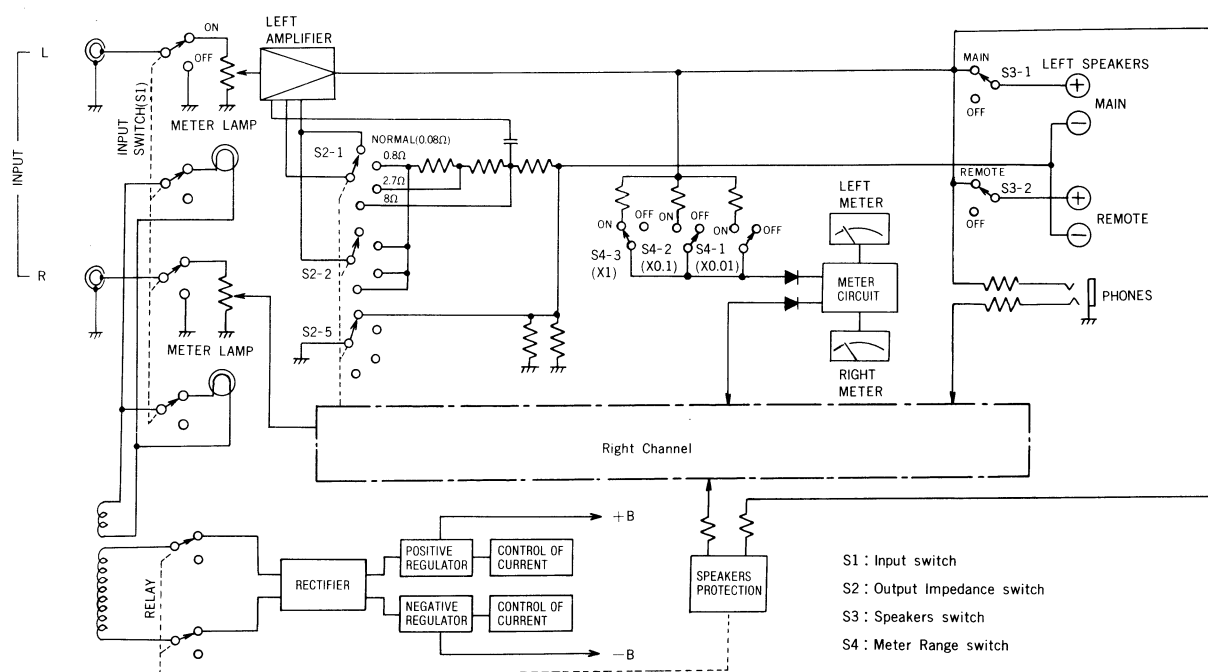


	ALIGNMENT	DC VTVM CONNECTION	ALIGNMENT POINTS	REMARKS
1	<b>NEGATIVE POWER VOLTAGE</b>	Connect the VTVM to 514 terminal and 517 terminal.	VR502	Make sure that DC VTVM becomes negative (–) 50.5 volts.
2	<b>POSITIVE POWER VOLTAGE</b>	Connect the VTVM to 510 terminal and 514 terminal.	VR501	Make sure that DC VTVM becomes positive (+) 50.5 volts.
3	<b>DC UNBALANCE</b>	Across the speaker terminals. (Left channel and Right channel)	VR101 (L ch.) VR201 (R ch.)	Make sure that DC VTVM becomes zero (0) mV.
4	<b>ICQ</b>	Connect the VTVM ⊕ terminal to TP2 terminal, common to TP3 terminal. (Left channel and Right channel)	VR102 (L ch.) VR202 (R ch.)	Make sure that DC VTVM becomes 5 mV.

- **VU (OUTPUT LEVEL) METER ALIGNMENT**

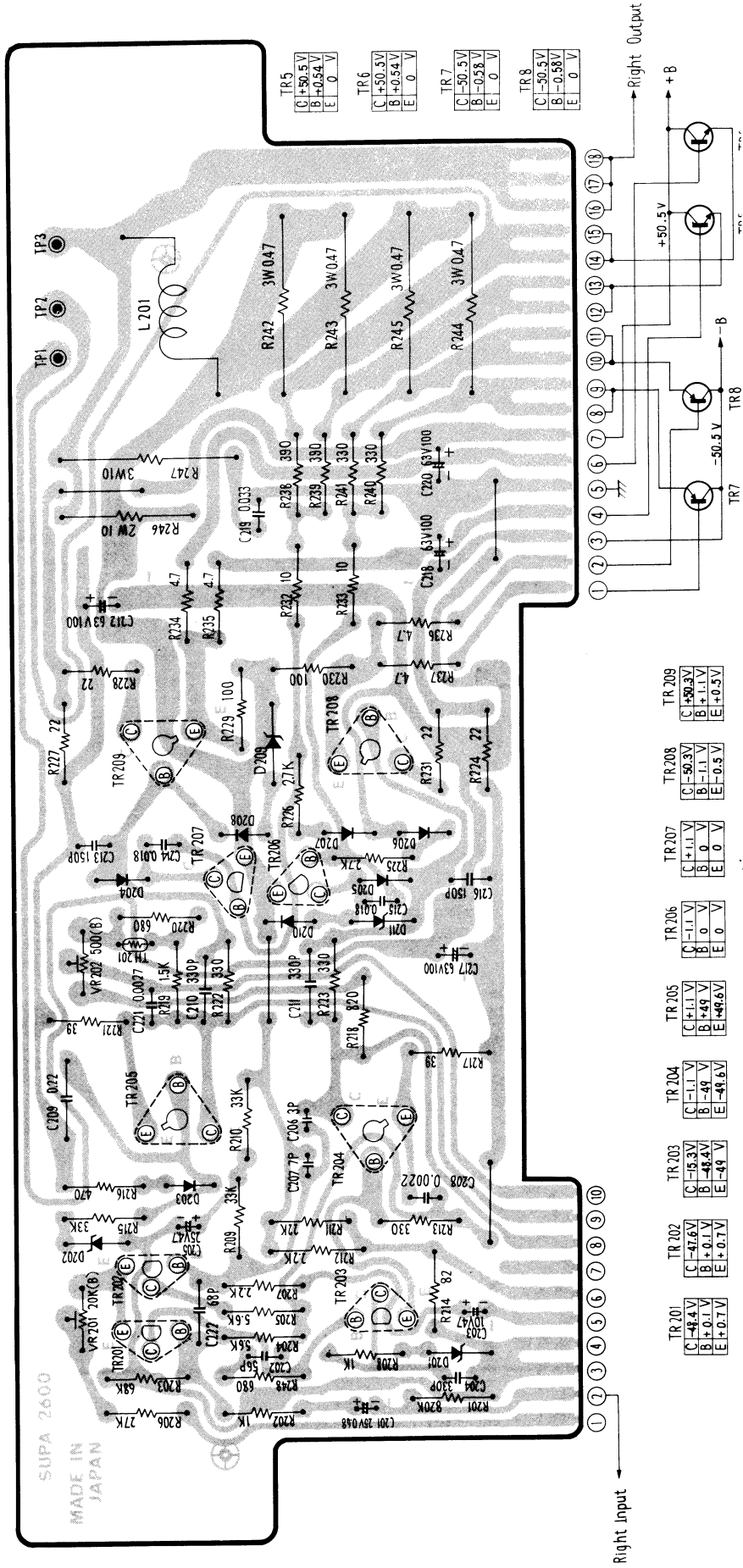
	ALIGNMENT	CONDITION OF SET	ALIGNMENT POINTS	REMARKS
5	WHEN CHANGE THE METER	Power source switch to "off" position.	Zero point adjustment screw	Adjust the screw to point <b>A</b> as shown below.
6	ZERO POINT	Power source switch to "on" position, and input switch to "off" position.	VR402 (L ch.) VR401 (R ch.)	Adjust the zero adjusting volume to point <b>A</b> as shown below.
7	METER SWING	① Input switch to "on" position ② Inputting 1kHz signal to input terminal. ③ Adjust output level to 28.3 V (100 W) by input signal level.	VR404 (L ch.) VR403 (R ch.)	① Connect dummy load (8Ω) and VTVM to speaker terminals. ② Make sure that the VU meter becomes the 100 W.

## ■ BLOCK DIAGRAM

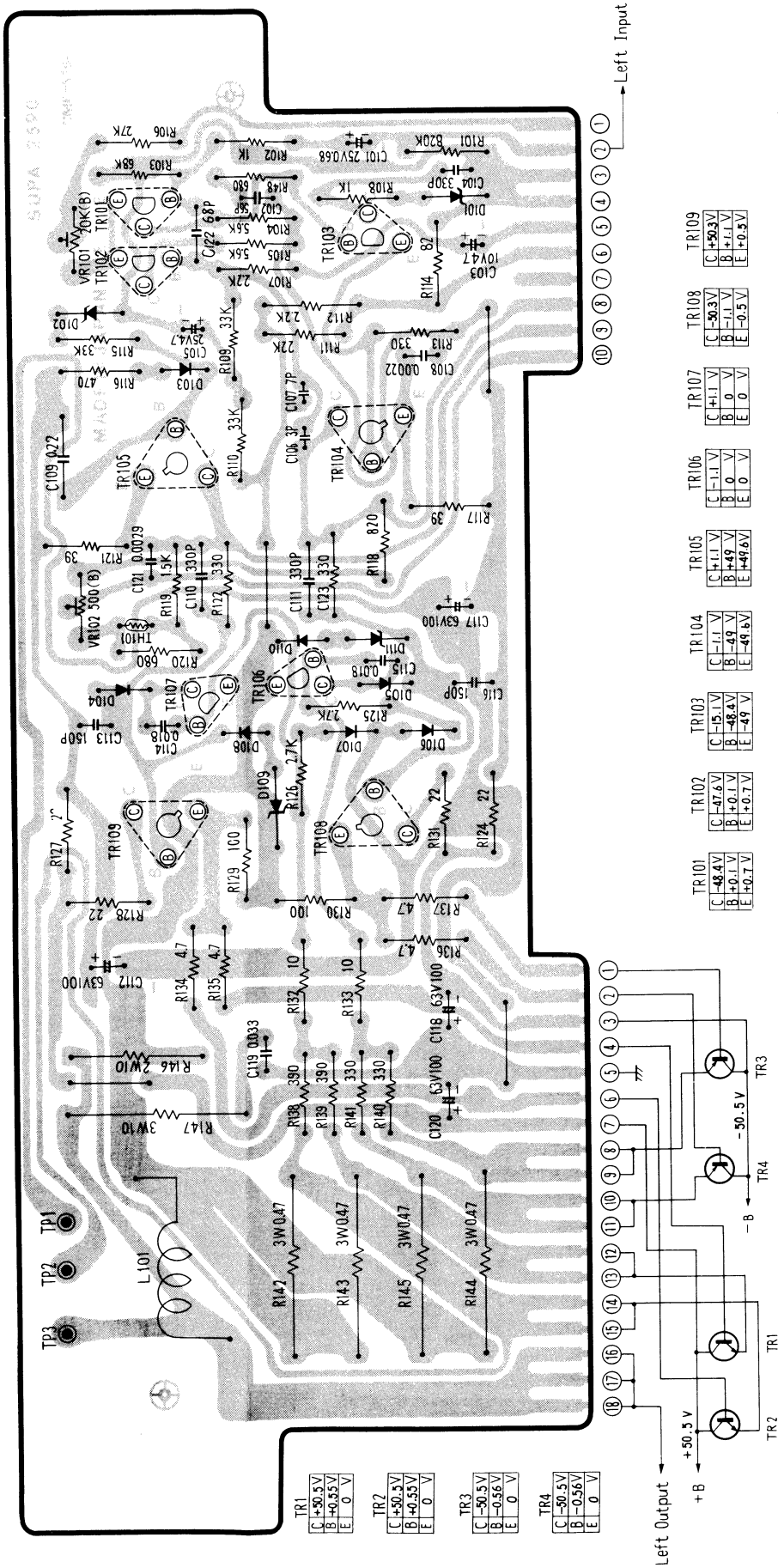




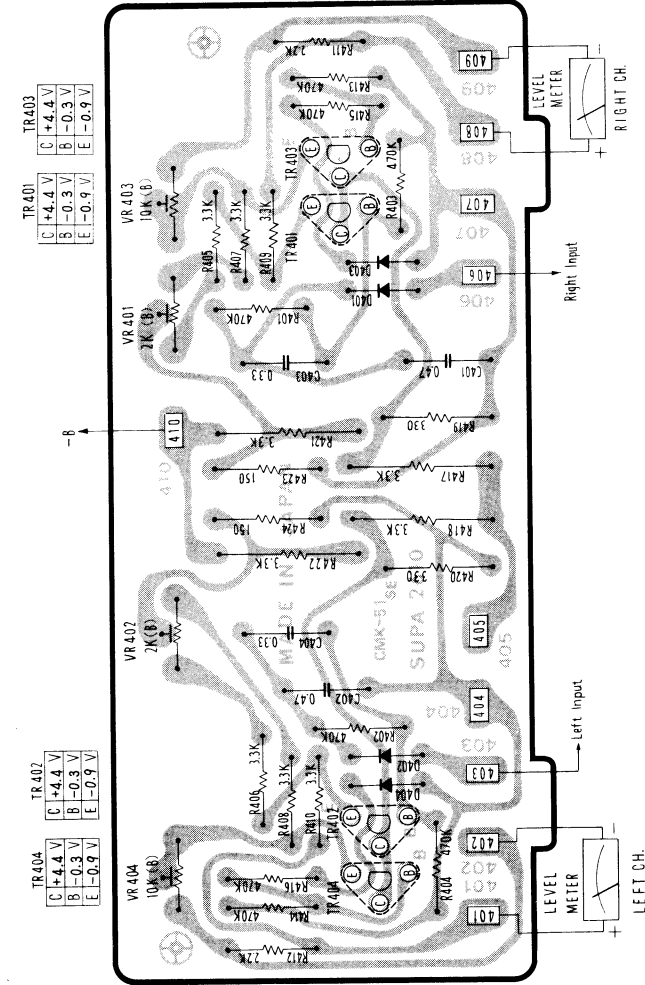
# DRIVER CIRCUIT BOARD, RIGHT CHANNEL



# DRIVER CIRCUIT BOARD, LEFT CHANNEL



# METER CIRCUIT BOARD

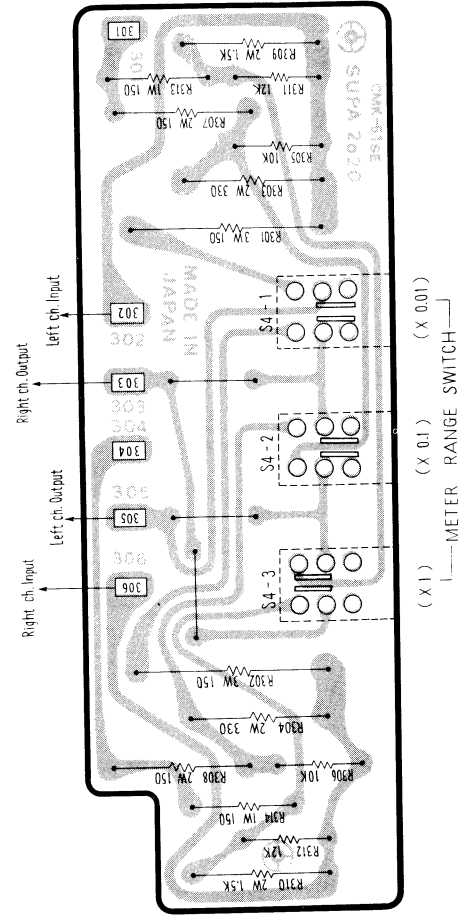


# THERMO COMPENSATION CIRCUIT BOARD

Left and Right Channels

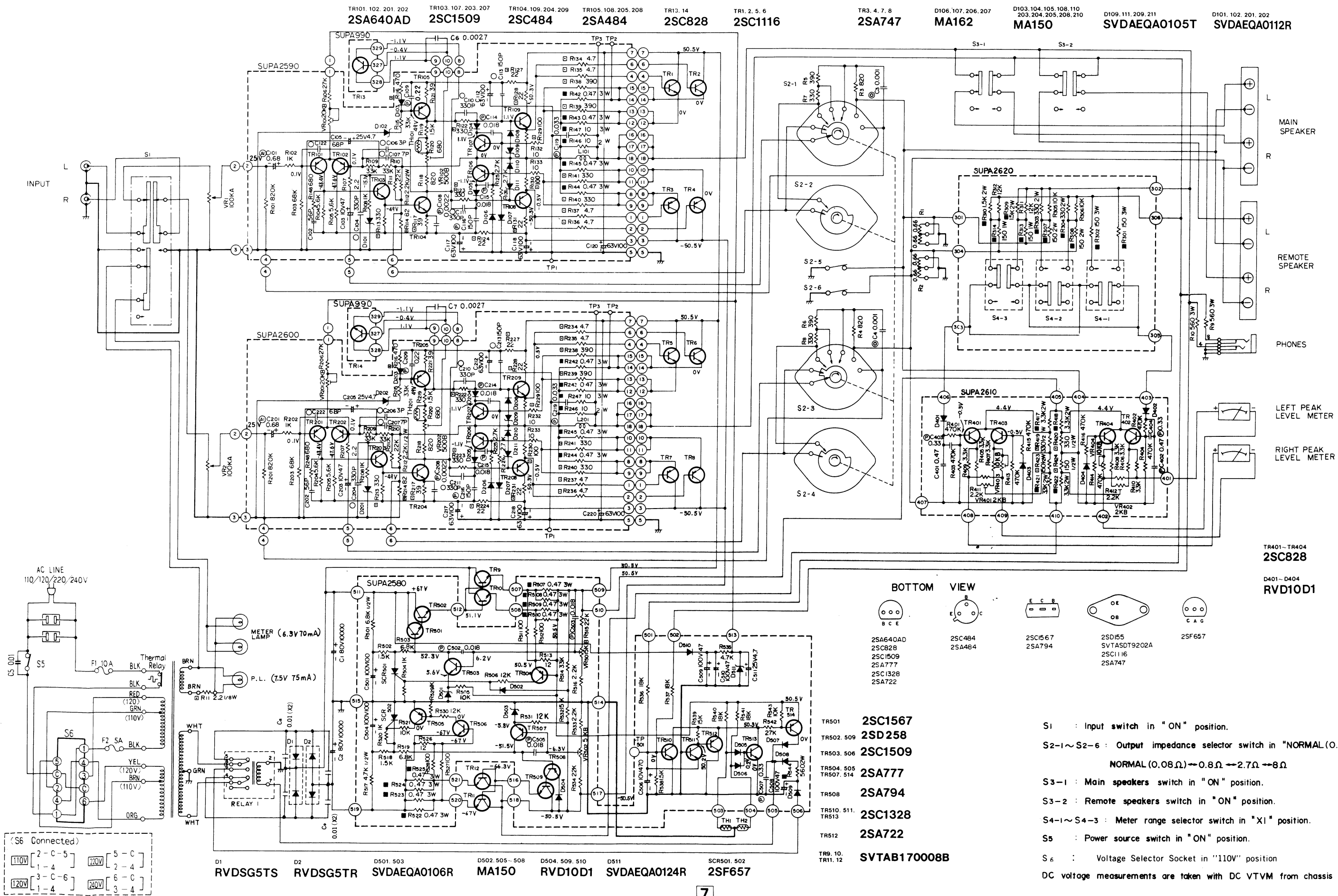


# METER RANGE SELECTOR CIRCUIT BOARD

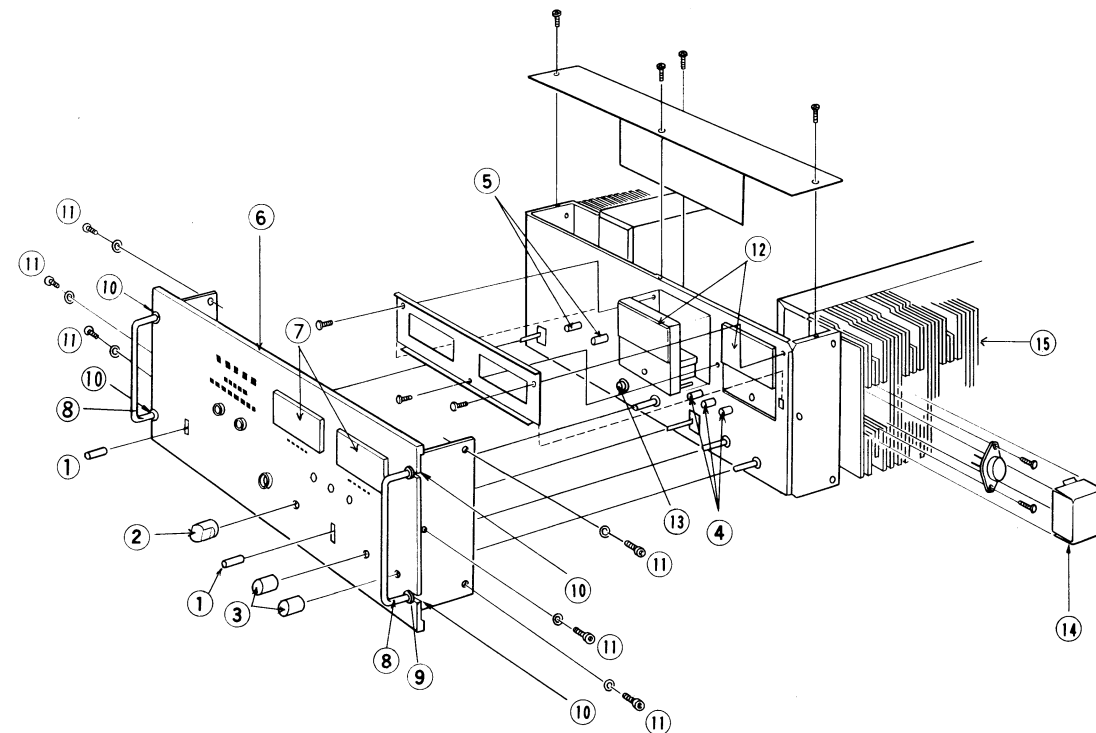


## Schematic Diagram .....Model SE-9600

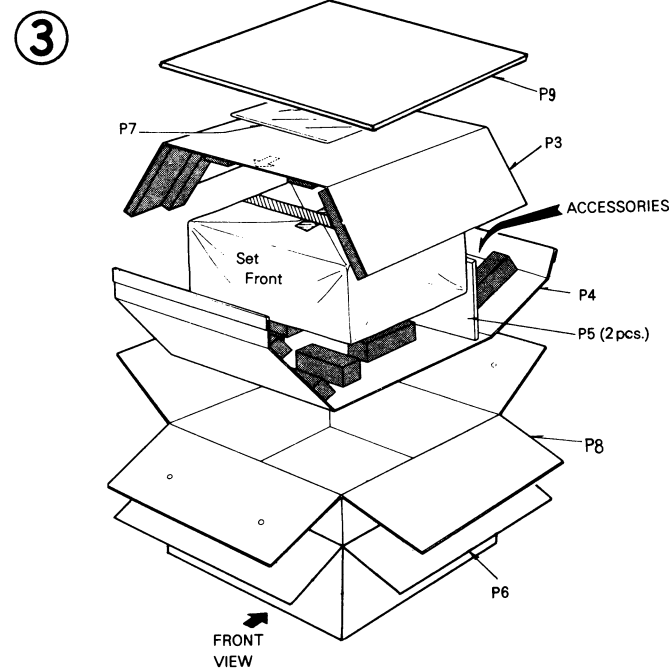
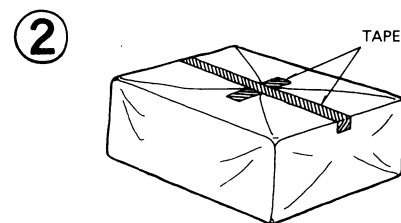
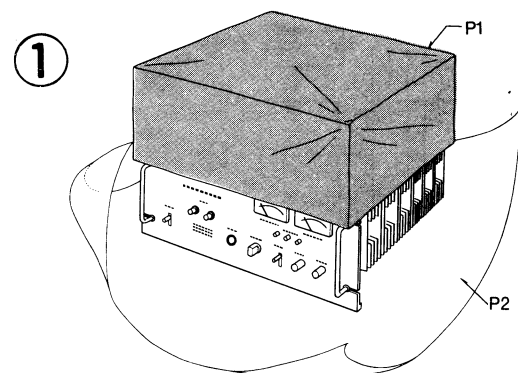
(This schematic diagram may be modified at any time with the development of new technology.)



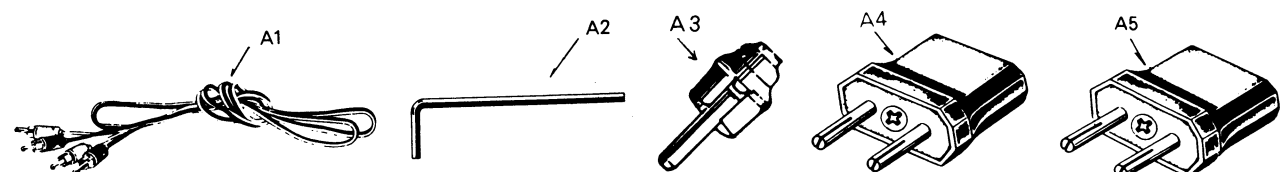
## LOCATION OF CABINET PARTS



## PACKING PARTS



## ACCESSORIES



SE-9600

9

## REPLACEMENT PARTS LIST

### NOTES:

1. Part numbers are indicated on most mechanical parts.  
Please use this part number, for parts orders.

Ref. No.	Part No.	Description	Per Set (Pcs.)	Remarks	Ref. No.	Part No.	Description	Per Set (Pcs.)	Remarks
<b>TRANSISTORS</b>					R120, 148, 220, 248	ERD14TJ681	680Ω, 1/4W, ±5%, Carbon	4	
TR1, 2, 5, 6	2SC1116	Power Amplifier	4	○	R3, 4, 118, 218	ERD14TJ821	820Ω, 1/4W, ±5%, Carbon	4	
TR3, 4, 7, 8	2SA747	Power Amplifier	4	○	R102, 108, 202, 208, 504, 520, 529	ERD14TJ102	1kΩ, 1/4W, ±5%, Carbon	7	
TR9, 10, 11, 12	SVTAB170008B	DC Voltage Control	4	○	R119, 219, 502, 518, 538	ERD14TJ152	1.5kΩ, 1/4W, ±5%, Carbon	5	
TR13, 14	2SC828R	Thermal Compensation	2		R107, 207, 411, 412, 516, 533	ERD14TJ222	2.2kΩ, 1/4W, ±5%, Carbon	6	
TR101, 102, 201, 202	2SA640AD-R	Differential Amplifier	4		R125, 126, 225, 226	ERD14TJ272	2.7kΩ, 1/4W, ±5%, Carbon	4	
TR103, 107, 203, 207, 503, 506	2SC1509Q	Power Amp Protection & An Error Voltage Detector	6		R405, 406, 407, 408, 409, 410	ERD14TJ332	3.3kΩ, 1/4W, ±5%, Carbon	6	
TR104, 109, 204, 209	2SC484Y	Driver Amplifier	4	○	R535	ERD14TJ472	4.7kΩ, 1/4W, ±5%, Carbon	1	
TR105, 108, 205, 208	2SA484Y	Driver Amplifier	4	○	R104, 105, 204, 205	ERD14TJ562	5.6kΩ, 1/4W, ±5%, Carbon	4	
TR106, 206, 504, 505, 507, 514, 509	2SA777Q	Protection Circuit	6		R503, 519	ERD14TJ682	6.8kΩ, 1/4W, ±5%, Carbon	2	
TR401, 402, 403, 404	2SC828S	VU Meter Amplifier	4		R305, 306, 505, 521, 543	ERD14TJ103	10kΩ, 1/4W, ±5%, Carbon	5	
TR501	2SC1567R	DC Amplifier	1		R311, 312, 506, 530, 531	ERD14TJ123	12kΩ, 1/4W, ±5%, Carbon	5	
TR508	2SA794R	DC Amplifier	1		R532, 539	ERD14TJ153	15kΩ, 1/4W, ±5%, Carbon	2	
TR510, 511, 513	2SC1328T	Speaker Protection Switching	3		R536, 537, 540, 541	ERD14TJ183	18kΩ, 1/4W, ±5%, Carbon	4	
TR502, 509	2SD258R	DC Amplifier	2	○	R111, 211, 515, 534	ERD14TJ223	22kΩ, 1/4W, ±5%, Carbon	4	
TR512	2SA722T	Speaker Protection Switching Switching	1		R106, 206, 542	ERD14TJ273	27kΩ, 1/4W, ±5%, Carbon	3	
<b>SCR and DIODES</b>					R109, 110, 115, 209, 210, 215, 514	ERD14TJ333	33kΩ, 1/4W, ±5%, Carbon	7	
SCR501, 502	2SF657	Silicon Controlled Rectifier	2	○	R103, 203	ERD14TJ683	68kΩ, 1/4W, ±5%, Carbon	2	
D1	RVDSG5TS	Rectifier	1	○	R401, 402, 403, 404, 413, 414, 415, 416	ERD14TJ474	470kΩ, 1/4W, ±5%, Carbon	8	
D2	RVDSG5TR	Rectifier	1	○	R101, 201	ERD14TJ824	820kΩ, 1/4W, ±5%, Carbon	2	
D101, 102, 201, 202	SVDAEQA0112R	12V Zener	4		R134, 135, 136, 137, 234, 235, 236, 237	ERD14FJ4R7	4.7Ω, 1/4W, ±5%, Carbon	8	
D103, 104, 105, 108, 110, 203, 204, 205, 208, 210, 502, 505, 506, 507, 508	MA150	AOC	15		R124, 127, 128, 131, 224, 227, 228, 231	ERD14FJ220	22Ω, 1/4W, ±5%, Carbon	8	
D106, 107, 206, 207	MA162	Protection	4	○	R117, 121, 217, 221	ERD14FJ390	39Ω, 1/4W, ±5%, Carbon	4	
D109, 111, 209, 211	SVDAEQA0105T	5V Zener, Protection	4	○	R114, 214	ERD14FJ820	82Ω, 1/4W, ±5%, Carbon	2	
D401, 402, 403, 404, 504, 509, 510	RVD10D1	Meter Detector	7		R129, 130, 229, 230	ERD14FJ101	100Ω, 1/4W, ±5%, Carbon	4	
D501, 503	SVDAEQA0106R	6V Zener, Voltage Stabilizer	2		R113, 122, 123, 140, 141, 213, 222, 223, 240, 241	ERD14FJ331	330Ω, 1/4W, ±5%, Carbon	10	
D511	SVDAEQA0124R	24V Zener, Shock Noise Silencer	1		R138, 139, 238, 239	ERD14FJ391	390Ω, 1/4W, ±5%, Carbon	4	
<b>TRANSFORMER and COIL</b>					R116, 216	ERD14FJ471	470Ω, 1/4W, ±5%, Carbon	2	
T1	SLTA5T5S	Power Transformer	1	○	R112, 212	ERD12TJ222	2.2kΩ, 1/2W, ±5%, Carbon	2	
L101, 201	ELQ22A1	High Character Stabilizer Coil	2	○	R517	ERD12TJ472	4.7kΩ, 1/2W, ±5%, Carbon	1	
<b>RESISTORS</b>					R501	ERD12TJ682	6.8kΩ, 1/2W, ±5%, Carbon	1	
R132, 133, 232, 233	ERD14TJ100	10Ω, 1/4W, ±5%, Carbon	4		R423, 424	ERD12FJ151	150Ω, 1/2W, ±5%, Carbon	2	
R513, 526	ERD14TJ120	12Ω, 1/4W, ±5%, Carbon	2		R419, 420	ERD12FJ331	330Ω, 1/2W, ±5%, Carbon	2	
R511, 512, 527, 528	ERD14TJ101	100Ω, 1/4W, ±5%, Carbon	4		R11	ERD18FJ2R2	2.2Ω, 1/4W, ±5%, Carbon	1	
R7, 8	ERD14TJ331	330Ω, 1/4W, ±5%, Carbon	2		R313, 314	ERG1ANJ151	150Ω, 1W, ±5%, Metallic	2	
R5, 6	ERD14TJ391	390Ω, 1/4W, ±5%, Carbon	2		R307, 308	ERG2ANJ151	150Ω, 2W, ±5%, Metallic	2	
					R303, 304	ERG2ANJ331	330Ω, 2W, ±5%, Metallic	2	
					R544	ERG2ANJ561	560Ω, 2W, ±5%, Metallic	1	
					R309, 310	ERG2ANJ152	1.5kΩ, 2W, ±5%, Metallic	2	
					R417, 418, 421, 422	ERG2ANJ332	3.3kΩ, 2W, ±5%, Metallic	4	
					R301, 302	ERG3ANJ151	150Ω, 3W, ±5%, Metallic	2	
					R9, 10	ERG3ANJ561	560Ω, 3W, ±5%, Metallic	2	
					R146, 246	ERX2ANJ100	10Ω, 2W, ±5%, Metallic	2	

10 SE-9600

Ref. No.	Part No.	Description	Per Set (Pcs.)	Remarks	Ref. No.	Part No.	Description	Per Set (Pcs.)	Remarks
R142,143,144,145,242,243,244,245,507,508,509,510,522,523,524,525	ERX3ANJR47	0.47Ω, 3W, ±5%, Metallic	16		RELAY				
R147,247	ERX3ANJ100	10Ω, 3W, ±5% Metallic	2	○	RELAY1	SSYA9	Speakers Protection Relay	1	○
R1,2	ERW20GA1R3	1.3Ω, 20W, ±10% Wire	2	○	CABINET PARTS 2				
VARIABLE RESISTORS					1	SBLA4-1	Knob, Power & Input Switch	2	
VR1,2	EVC6BAF25A15	100kΩ (A), Input Level Control	2	○	2	SBSA9S	Knob, Output Impedance Switch	1	
VR102,202	EVL S0AA00B52	500 Ω (B), ICQ Adjustment	2		3	SBNA121S	Knob, Output Level Control	2	○
VR401,402	EVL S0AA00B23	2kΩ (B), Meter Zero Point Adj.	2		4	SBCA52	Button, Meter Range Push Switch	3	
VR403,404	EVL S0AA00B14	10kΩ (B), Meter Adjustment	2		5	SBCA53	Button, Speaker Push Switch	2	
VR101,201	EVL S0AA00B24	20kΩ (B), DC Unbalance Adj	2		6	SGWA1192	Front Panel, Complete	1	○
VR501,502	EVL S3AA00B53	5kΩ (B), Voltage Stabilizer Adj	2			SGXA65	Bracket, Speaker Push Switch	2	
THERMISTORS and POSISTORS						SGXA67	Bracket, Headphone	1	○
TH101,201	RRT251	Thermistor, Driver Circuit	2		7	SGUA23	Plastic Plate, VU Meter	2	○
TH1,2	SRPX101E271K	Posistor, Thermal Protection	2	○	8	SGLA9	Panel Light, Plastic, Orange	1	
CAPACITORS					9	SKYA6	Handle, Front Panel	2	○
C106,206	ECCD1H030CC	3pF, 50 WV, ±0.25pF, Ceramic	2		10	SGXA64	Handle Bracket	4	
C107,207	ECCD1H070DC	7pF, 50 WV, ±0.5 pF, Ceramic	2		11	XNA6FFZ	Nut, Handle M'tg	4	
C102,202	ECCD1H560K	56pF, 50 WV, ±10%, Ceramic	2			XVE6B10K	Six Corner Box bolt, Front Panel M'tg.	6	○
C122,222	ECCD1H680K	68pF, 50 WV, ±10%, Ceramic	2			SKUA390	Bottom Board	1	○
C104,110,111,204,210,211	ECCD1H331K	330pF, 50 WV, ±10%, Ceramic	6			SHGA304	Leg	4	○
C113,116,213,216	ECCD2H151K	150pF, 500 WV, ±10%, Ceramic	4			XSN4+25S	Screw, Leg M'tg.	4	
C314	ECKD1H102PF	0.001μF, 50 WV, ±10%, Ceramic	1			SGPA481B	Rear Panel	1	○
C5	ECQU2A103MD	0.01μF, 250VAC, ±20%, Polyester	1			SJFA4807	Terminal, Speakers	1	○
C108,208	ECQM05222KZ	0.0022μF, 50 WV, ±10%, Polyester	2			SJFA3207	Terminal, Input	1	○
C6,7	ECQM05272KZ	0.0027μF, 50 WV, ±10%, Polyester	2			SJSA66	AC Outlet	2	
C114,115,214,215,502,503,505	ECQM05183KZ	0.018μF, 50 WV, ±10%, Polyester	7			SJAA6	AC Cord	1	
C119,219	ECQM05333KZ	0.033μF, 50 WV, ±10%, Polyester	2			SHRA107	Bushing, AC Cord	1	
C109,209	ECQM05224KZ	0.22μF, 50 WV, ±10%, Polyester	2			SHGA302	Rubber Cushion, Set Rear	2	
C403,404,507	ECQM05334KZ	0.33μF, 50 WV, ±10%, Polyester	3			XTB4+8BR	Red Screw, Bottom Board M'tg.	9	
C401,402	ECQM05474KZ	0.47μF, 50 WV, ±10%, Polyester	2		CHASSIS PARTS				
C103,203	ECEA10V47	47 μF, 10 WV, Electrolytic	2		12	SSMA28	VU (Output Level) Meter	2	○
C506	ECEA10V470	470μF, 10 WV, Electrolytic	1			SJFA1	Fuse Holder	1	
C105,205,511	ECEA25V4R7	4.7μF, 25 WV, Electrolytic	3		13	SJJA10-3	Jack, Headphones	1	
C112,117,118,120,212,217,218,220	ECEA63V100LU	100μF, 63 WV, Electrolytic	8	○		SJSA69	18pin Socket, Driver Amp p.c.b.	2	○
C508,509,510	ECEA100V47	47μF, 100WV, Electrolytic	3	○		SJSA70	10pin Socket, Driver Amp. p.c.b.	2	○
C501,504	ECEB100V100	100μF, 100WV, Electrolytic	2			SJSA72	Socket, Speaker Protection Relay	1	○
C1,2	ECEM80R103X	10000μF, 80WV, Electrolytic	2	○		SJVA1202S	Socket, Power Transistor	12	
C8,9	RXAF103P22HD	0.01μF (X2), Component Combination	2		14	SUYA65	Plastic Cover, Power Transistor	12	○
LIGHT and FUSE						SMYA47	Radiator, Power Transistor	12	○
PL	XAM37K150	Pilot Lamp (7.5V 75mA)	1			XVE6B25K	Six Corner Box bolt, Heat Sink M'tg.	24	○
F1	XBA2E100NS5	Fuse, Power Source, 10A	1	○		SMZA6091	Bracket, Pilot Lamp	1	
F2	XBA2K50NS5	Fuse, Power Source, 5A	1			SHRA520	Thermo Label	2	○
SWITCHES						SJEA4	Socket, Voltage Selector	1	
S1	SSLA35S	Input Switch	1	○	ACCESSORIES				
S2-1-2-6	ESRC244F25AP	Output Impedance Selector Switch	1	○	A1	SJP2129	Connector Cord	1	
S3-1,3-2	ESB707	Speakers Switch	2	○	A2	SHEA5	Six Corner Screw Driver	1	
S4-1-4-3	SSHA49S	Meter Range Switch	1	○	A3	RJP5	Pin Plug	4	
S5	SSLA34S	Power Source Switch	1		A4	RJP74-1	AC Plug	1	
S6	-----	Socket, Voltage Selector	1		A5	RJP75	AC Plug	1	
					PACKINGS				
					P1	SPPA37	Soft Cover	1	○
					P2	SPHA6008	Polyethylene Sheet	1	
					P3	SPSA100	Pad	1	○
					P4	SPSA99	Pad	1	○
					P5	SPSA101	Pad, Plate	2	○
					P6	SPGA582A	Carton Box (Outer)	1	○
					P7	SQFA208	Printed Matter, Complete	1	○
					P8	SPNA290B	Carton Box (Inner)	1	○
					P9	SPSA32	Pad, Carton Box	1	



## SERVICE AID

### Power circuitry of model SE-9600

The power circuitry of this unit consists of independent constant voltage circuits for both positive and negative power sources, assuring a voltage supply (to the main amplifier) which is constantly stable. In addition, a protection circuit is incorporated in order to protect the circuitry when, for some reason or other, excessive current flows, or when excessive voltage is applied to the main amplifier because of a power cut-off on the minus side. The following is an explanation of the principles of this circuitry.

Although figure 1 shows only the circuit diagram of the positive power source, the operation principles of the negative power source are exactly the same as those of the positive power source, and their explanation is omitted here.

- When the output voltage (50.5V) becomes high as a result of a voltage variation from the power source, the voltage at point (A) in figure 1 becomes high.

Because the voltage at point (B) becomes constant as a result of the zener diode, the base voltage of TR503 becomes high, the collector current of TR503 increases, and the potential decreases. As a result, the base voltage of TR501 decreases and the collector current of TR501 becomes low. Because TR501, TR502 and TR10 connections are the Darlington type, the emitter voltage of TR10 will decrease if the base voltage of TR501 decreases, and the unit returns to the standard voltage (50.5V).

If the standard output voltage decreases, the voltage will be increased because operation will be the opposite of that described above.

- If excessive current flows to the main amplifier, the voltage drop (R in figure 1) is increased, and TR504 is activated by that voltage (C). When TR504 functions, voltage is generated in the collector, and SCR501 is activated by the bias applied to it. As a result, the base potential of TR501 is decreased to the "cut-off" condition, and, therefore, TR10 does not function and output is not emitted.

- D502, shown in figure 1, is to prevent damage to the main amplifier in the event of an interruption of the negative power.

The voltage applied at point (D) is generally -19V, although a positive voltage is applied to point (D) and the current flows to D502 in the event of an interruption of the negative power. This voltage flow (to D502) activates SCR501, and then no output is emitted, in the same way as the operation of the TR504 protection circuit.

**This unit also includes many other protection circuits, in addition to those described above.**

- If the speaker terminal is short-circuited, current limiters (TR106, 107, 206 and 207) function to protect the power transistors.
- If DC voltage is generated at the speaker terminal, the speaker is protected by relay. In the protection circuits TR510~TR514 which operate to cut off the power supply.
- If the temperature of the radiator increases as a result of excessive output, pistors TH1 and TH2 as well as TR513 and TR514 function to operate the relay, thus cutting off the power supply, and thereby protecting the power transistors.

- When the power supply is cut off by the operation of the relay, be sure to first turn off the power switch before searching for the cause. If the power switch is not turned off, the relay will not return to the original position even if the trouble is remedied.

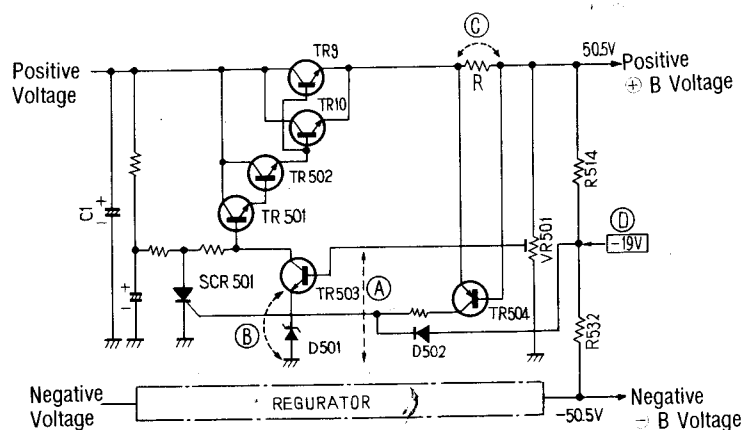


Fig. 1.