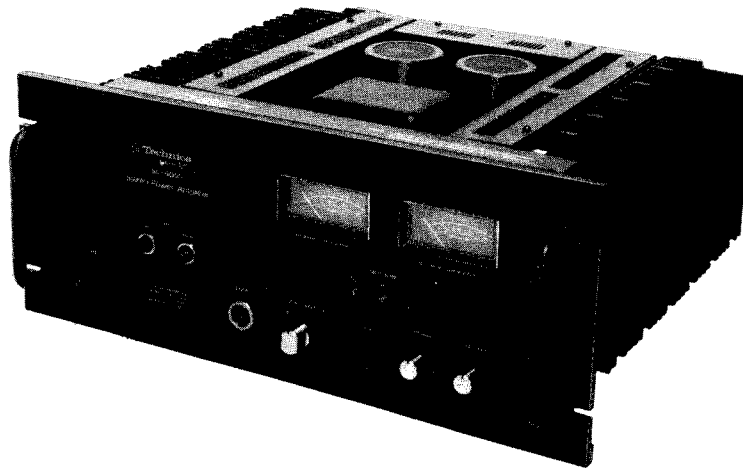


Technics
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Service Manual



(for European Military)

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 Ω) 110W/110W (8 Ω)
both channels driven	165W + 165W (4 Ω) 110W + 110W (8 Ω)
20Hz~20kHz continuous power both channels driven	165W + 165W (4 Ω) 110W + 110W (8 Ω)
Total harmonic distortion	0.08%
Intermodulation distortion	0.08%
Power bandwidth	
(both channels driven at 8 Ω)	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 Ω
Load impedance	
MAIN or REMOTE	4~ 16 Ω
MAIN + REMOTE	8~ 16 Ω

GENERAL

Power supply	110/120/220/240V	50/60Hz
Power consumption		960W
Dimensions (W x H x D)	17 $\frac{23}{32}$ " x 7 $\frac{19}{32}$ " x 16 $\frac{25}{32}$ " (450 x 193 x 426mm)	
Weight	52 lb. (23.6 kg)	

Matsushita Electric Corp. of America
 Matsushita Electric Corp. of Hawaii, Inc.
 Matsushita Electric of Canada Ltd.

Pan Am Bldg., 200 Park Ave., New York, N. Y. 10017
 320, Waiakamilo Road Honolulu, Hawaii 96817
 40 Ronson Drive, Rexdale, Ont.

REPLACEMENT PARTS LIST

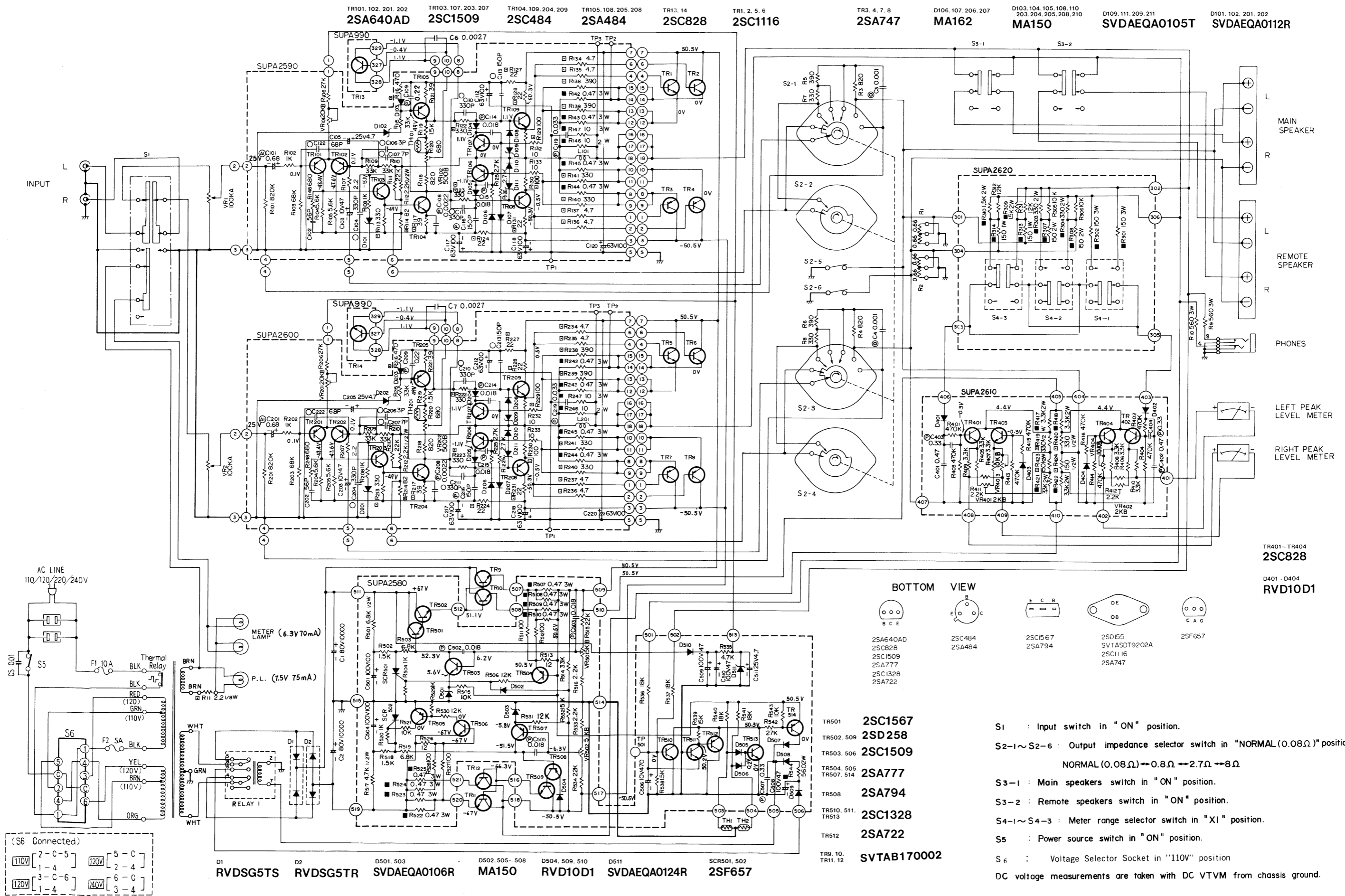
NOTES:

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
TRANSISTORS					R120, 148, 220, 248	ERD14TJ681	680Ω, ¼W, ±5%, Carbon	4	
TR1, 2, 5, 6	2SC1116	Power Amplifier	4		R3, 4, 118, 218	ERD14TJ821	820Ω, ¼W, ±5%, Carbon	4	
TR3, 4, 7, 8	2SA747	Power Amplifier	4		R102, 108, 202, 208, 504, 520, 529	ERD14TJ102	1kΩ, ¼W, ±5%, Carbon	7	
TR9, 10, 11, 12	SVTA8170002	DC Voltage Control	4		R119, 219, 502, 518, 538	ERD14TJ152	1.5kΩ, ¼W, ±5%, Carbon	5	
TR13, 14	2SC828R	Thermal Compensation	2		R107, 207, 411, 412, 516, 533	ERD14TJ222	2.2kΩ, ¼W, ±5%, Carbon	6	
TR101, 102, 201, 202	2SA640AD-R	Differential Amplifier	4		R125, 126, 225, 226	ERD14TJ272	2.7kΩ, ¼W, ±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, ¼W, ±5%, Carbon	6	
TR104, 109, 204, 209	2SC484Y	Driver Amplifier	4		R535	ERD14TJ472	4.7kΩ, ¼W, ±5%, Carbon	1	
TR105, 108, 205, 208	2SA484Y	Driver Amplifier	4		R104, 105, 204, 205	ERD14TJ562	5.6kΩ, ¼W, ±5%, Carbon	4	
TR106, 206, 504, 505, 507, 514	2SA777Q	Protection Circuit	6		R503, 519	ERD14TJ682	6.8kΩ, ¼W, ±5%, Carbon	2	
TR401, 402, 403, 404	2SC828S	VU Meter Amplifier	4		R305, 306, 505, 521, 543	ERD14TJ103	10kΩ, ¼W, ±5%, Carbon	5	
TR501	2SC1567R	DC Amplifier	1		R311, 312, 506, 530, 531	ERD14TJ123	12kΩ, ¼W, ±5%, Carbon	5	
TR508	2SA794R	DC Amplifier	1		R532, 539	ERD14TJ153	15kΩ, ¼W, ±5%, Carbon	2	
TR510, 511, 513	2SC1328T	Speaker Protection Switching	3		R536, 537, 540, 541	ERD14TJ183	18kΩ, ¼W, ±5%, Carbon	4	
TR502, 509	2SD258R	DC Amplifier	2		R111, 211, 515, 534	ERD14TJ223	22kΩ, ¼W, ±5%, Carbon	4	
TR512	2SA722T	Speaker Protection Switching Switching	1		R106, 206, 542	ERD14TJ273	27kΩ, ¼W, ±5%, Carbon	3	
SCR and DIODES					R109, 110, 115, 209, 210, 215, 514	ERD14TJ333	33kΩ, ¼W, ±5%, Carbon	7	
SCR501, 502	2SF657	Silicon Controlled Rectifier	2		R103, 203	ERD14TJ683	68kΩ, ¼W, ±5%, Carbon	2	
D1	RVDSG5TS	Rectifier	1		R401, 402, 403, 404, 413, 414, 415, 416	ERD14TJ474	470kΩ, ¼W, ±5%, Carbon	8	
D2	RVDSG5TR	Rectifier	1		R101, 201	ERD14TJ824	820kΩ, ¼W, ±5%, Carbon	2	
D101, 102, 201, 202	SVDAEQA0112R	12V Zener	4		R134, 135, 136, 137, 234, 235, 236, 237	ERD14FJ4R7	4.7Ω, ¼W, ±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, ¼W, ±5%, Carbon	8	
D106, 107, 206, 207	MA162	Protection	4		R117, 121, 217, 221	ERD14FJ390	39Ω, ¼W, ±5%, Carbon	4	
D109, 111, 209, 211	SVDAEQA0105T	5V Zener, Protection	4		R114, 214	ERD14FJ820	82Ω, ¼W, ±5%, Carbon	2	
D401, 402, 403, 404, 504, 509, 510	RVD10D1	Meter Detector	7		R129, 130, 229, 230	ERD14FJ101	100Ω, ¼W, ±5%, Carbon	4	
D501, 503	SVDAEQA0106R	6V Zener, Voltage Stabilizer	2		R113, 122, 123, 140, 141, 213, 222, 223, 240, 241	ERD14FJ331	330Ω, ¼W, ±5%, Carbon	10	
D511	SVDAEQA0124R	24V Zener, Shock Noise Silencer	1		R138, 139, 238, 239	ERD14FJ391	390Ω, ¼W, ±5%, Carbon	4	
TRANSFORMER and COIL					R116, 216	ERD14FJ471	470Ω, ¼W, ±5%, Carbon	2	
T1	SLTA5T5S	Power Transformer	1		R112, 212	ERD12TJ222	2.2kΩ, ½W, ±5%, Carbon	2	
L101, 201	ELQ22A1	High Character Stabilizer Coil	2		R517	ERD12TJ472	4.7kΩ, ¼W, ±5%, Carbon	1	
RESISTORS					R501	ERD12TJ682	6.8kΩ, ½W, ±5%, Carbon	1	
R132, 133, 232, 233	ERD14TJ100	10Ω, ¼W, ±5%, Carbon	4		R423, 424	ERD12FJ151	150Ω, ¼W, ±5%, Carbon	2	
R513, 526	ERD14TJ120	12Ω, ¼W, ±5%, Carbon	2		R419, 420	ERD12FJ331	330Ω, ¼W, ±5%, Carbon	2	
R511, 512, 527, 528	ERD14TJ101	100Ω, ¼W, ±5%, Carbon	4		R11	ERD18FJ2R2	2.2Ω, ½W, ±5%, Carbon	1	
R7, 8	ERD14TJ331	330Ω, ¼W, ±5%, Carbon	2		R313, 314	ERG1ANJ151	150Ω, 1W, ±5%, Metallic	2	
R5, 6	ERD14TJ391	390Ω, ¼W, ±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	

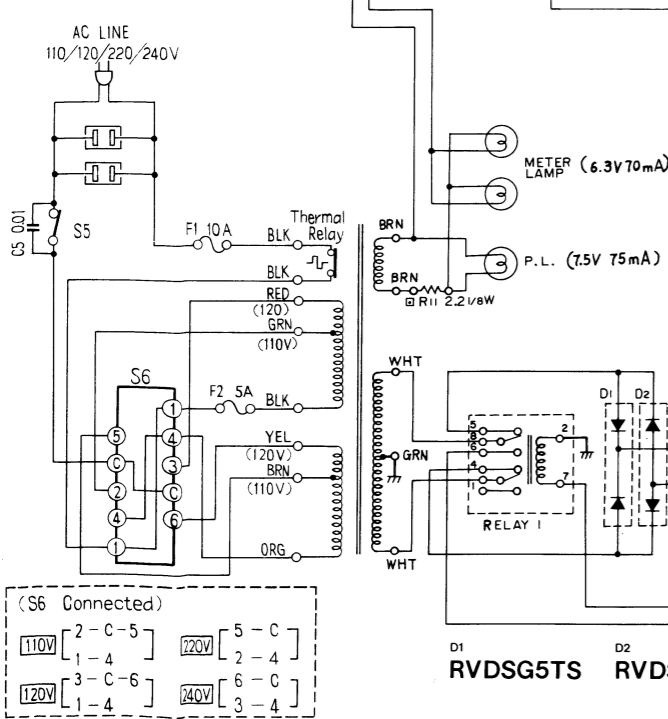
Schematic Diagram Model SE-9600

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



- TR101, 102, 201, 202
2SA640AD
- TR103, 107, 203, 207
2SC1509
- TR104, 109, 204, 209
2SC484
- TR105, 108, 205, 208
2SA484
- TR13, 14
2SC828
- TR1, 2, 5, 6
2SC1116
- TR3, 4, 7, 8
2SA747
- D106, 107, 206, 207
MA162
- D103, 104, 105, 108, 110, 203, 204, 205, 208, 210
MA150
- D109, 111, 209, 211
SVDAEQAO105T
- D101, 102, 201, 202
SVDAEQAO112R

- TR401 - TR404**
2SC828
- D401 - D404**
RVD10D1
- BOTTOM VIEW**
- | | | | | |
|----------|--------|---------|--------------|--------|
| | | | | |
| 2SA640AD | 2SC484 | 2SC1567 | 2SD155 | 25F657 |
| 2SC828 | 2SA484 | 2SA794 | SVTASDT9202A | |
| 2SC1509 | | | 2SC1116 | |
| 2SA777 | | | 2SA747 | |
| 2SC1328 | | | | |
| 2SA722 | | | | |

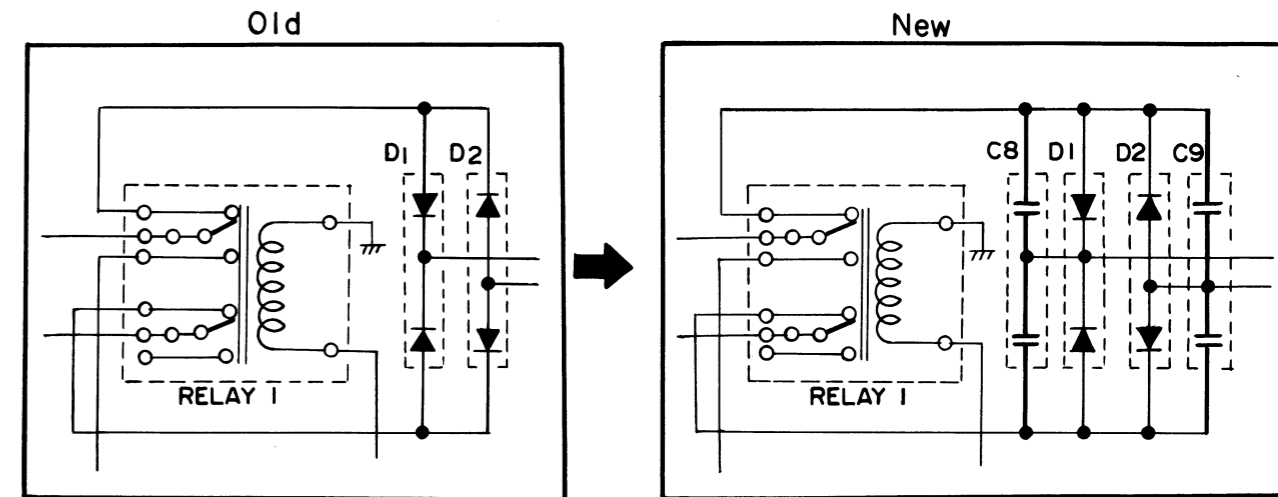


- S1 : Input switch in "ON" position.
 - S2-1 ~ S2-6 : Output impedance selector switch in "NORMAL (0.08Ω)" position.
NORMAL (0.08Ω) → 0.8Ω → 2.7Ω → 8Ω
 - S3-1 : Main speakers switch in "ON" position.
 - S3-2 : Remote speakers switch in "ON" position.
 - S4-1 ~ S4-3 : Meter range selector switch in "X1" position.
 - S5 : Power source switch in "ON" position.
 - S6 : Voltage Selector Socket in "110V" position
- DC voltage measurements are taken with DC VTVM from chassis ground.

- D1
RVDSG5TS
- D2
RVDSG5TR
- D501, 503
SVDAEQAO106R
- D502, 505 - 508
MA150
- D504, 509, 510
RVD10D1
- D511
SVDAEQAO124R
- SCR501, 502
2SF657

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				
VARIABLE RESISTORS					SBLA4-1		Knob, Power & Input Switch	2	
VR1, 2	EVC6BAF25A15	100kΩ (A), Input Level Control	2		SBSA9S		Knob, Output Impedance Switch	1	
VR102, 202	EVL50AA00B52	500 Ω (B), ICQ Adjustment	2		SBNA121S		Knob, Output Level Control	2	
VR401, 402	EVL50AA00B23	2kΩ (B), Meter Zero Point Adj.	2		SBCA52		Button, Meter Range Push Switch	3	
VR403, 404	EVL50AA00B14	10kΩ (B), Meter Adjustment	2		SBCA53		Button, Speaker Push Switch	2	
VR101, 201	EVL50AA00B24	20kΩ (B), DC Unbalance Adj.	2		SGWA1192		Front Panel, Complete	1	
VR501, 502	EVL53AA00B53	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		SGUA23		Plastic Plate, VU Meter	2	
TH1, 2	SRPX101E271K	Posistor, Thermal Protection	2		SGLA9		Panel Light, Plastic, Orange	1	
CAPACITORS					SKYA6		Handle, Front Panel	2	
C106, 206	ECCD1H030CC	3pF, 50 WV, ±0.25pF, Ceramic	2		SGXA64		Handle Bracket	4	
C107, 207	ECCD1H070DC	7pF, 50 WV, ±0.5 pF, Ceramic	2		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, 50 WV, ±10%, Ceramic	4		XSN4+25S		Screw, Leg M'tg.	4	
C314, 4	ECKD1H102PF	0.001μF, 50 WV, ±100%, Ceramic	2		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		SJA66		AC Cord	1	
C119, 219	ECQM05333KZ	0.033μF, 50 WV, ±10%, Polyester	2		SJRA107		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		SGTA2020		Name Plate	1	
C103, 203	ECEA10V47	47 μF, 10 WV, Electrolytic	2		CHASSIS PARTS				
C506	ECEA10V470	470 μF, 10 WV, Electrolytic	1		SSMA28		VU (Output Level) Meter	2	
C105, 205, 511	ECEA25V47	4.7μF, 25 WV, Electrolytic	3		SJFA1		Fuse Holder	1	
C112, 117, 118, 120, 212, 217, 218, 220	ECEA63V100LU	100μF, 63 WV, Electrolytic	8		SJJA10-1		Jack, Headphones	1	
C508, 509, 510	ECEA100V47	47μF, 100WV, Electrolytic	3		SJSA69		18pin Socket, Driver Amp p.c.b.	2	
C501, 504	ECEB100V100	100μF, 100WV, Electrolytic	2		SJSA70		10pin Socket, Driver Amp p.c.b.	2	
C1, 2	ECEM80R103X	10000μF, 80WV, Electrolytic	2		SJSA72		Socket, Speaker Protection Relay	1	
C8, 9	RXAF103P22HD	0.01μF (X2), Component Combination	2		SJVA1202S		Socket, Power Transistor	12	
LIGHT and FUSES					SUVA65		Plastic Cover, Power Transistor	12	
PL	XAM37K150	Pilot Lamp (7.5V 75mA)	1		SMYA47		Radiator, Power Transistor	12	
F1	XBA2E100NS5	Fuse, Power Source, 10A	1		XVE6B25K		Six Corner Box bolt, Heat Sink M'tg.	24	
F2	XBA2K50NS5	Fuse, Power Source, 5A	1		SMZA6091		Bracket, Pilot Lamp	1	
SWITCHES					SHRA520		Thermo Label	2	
S1	SSLA35S	Input Switch	1		SJEA4		Socket, Voltage Selector	1	
S2-1~2-6	ESRC244F25AP	Output Impedance Selector Switch	1		ACCESSORIES				
S3-1, 3-2	ESB707	Speakers Switch	2		SJP2129		Connector Cord	1	
S4-1~4-3	SSHA49S	Meter Range Switch	1		SHEA5		Six Corner Screw Driver	1	
S5	SSLA34S	Power Source Switch	1		RJP5		Pin Plug	4	
S6	-----	Socket, Voltage Selector	1		RJP74		Ae Plug	1	
					RJP75		Ac Plug	1	
PACKINGS					SPPA37		Soft Cover	1	
					SPHA6008		Polyethylene Sheet	1	
					SPSA99		Pad	1	
					SPSA100		Pad	1	
					SPSA101		Pad, Plate	2	
					SPGA581A		Carton Box	1	
					SQFA237		Printed Matter, Complete	1	

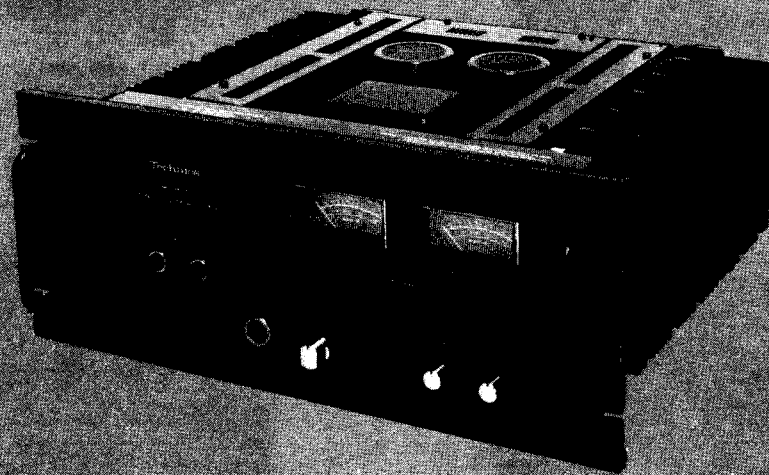
■ CHANGE OF SCHEMATIC DIAGRAM



 **Technics**
HI-FI COMPONENTS
 **Technics**

Service Manual

Supplementary - 1



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

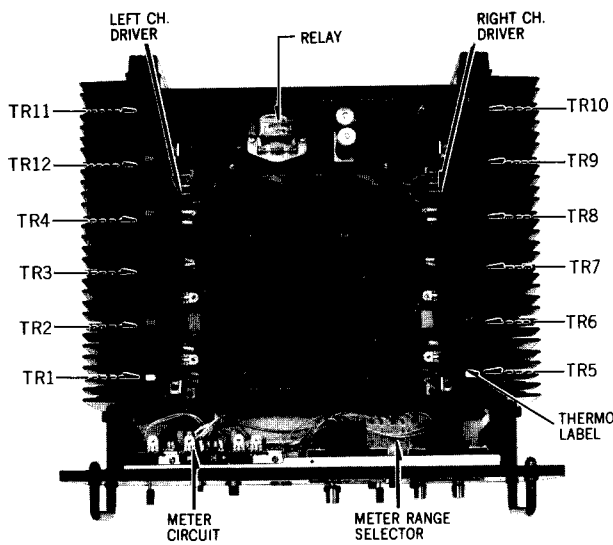
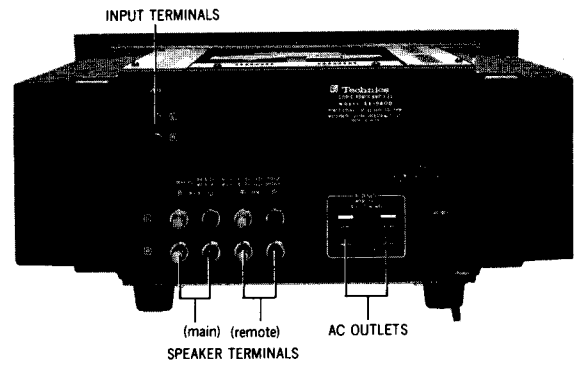
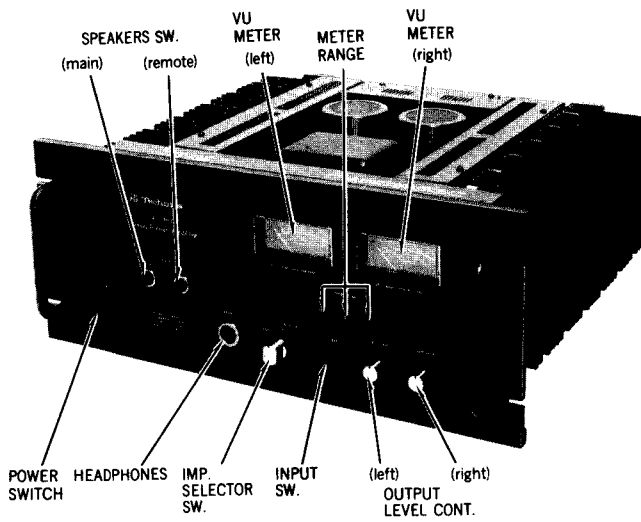
Residual hum & noise	0.3mV
Damping factor	
Load impedance 8 ohms	100, 10, 3, 1
Load impedance 4 ohms	50, 5, 1.5, 0.5
Input sensitivity impedance	1V/40k Ω
Load impedance	
MAIN or REMOTE	4~ 16 Ω
MAIN + REMOTE	8~ 16 Ω

GENERAL

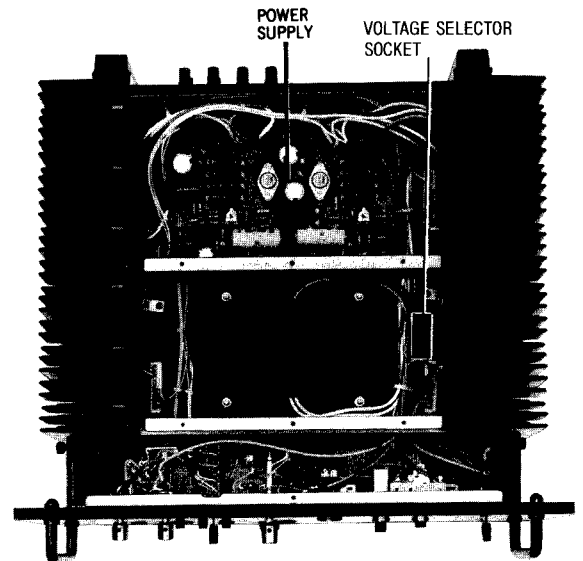
Power supply	110/120/220/240V	50/60Hz
Power consumption		960W
Dimensions (W x H x D)	17 $\frac{3}{8}$ " x 7 $\frac{1}{2}$ " x 16 $\frac{3}{8}$ " (450 x 193 x 426mm)	
Weight	52 lb. (23.6 kg)	

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

■ LOCATION OF CONTROLS

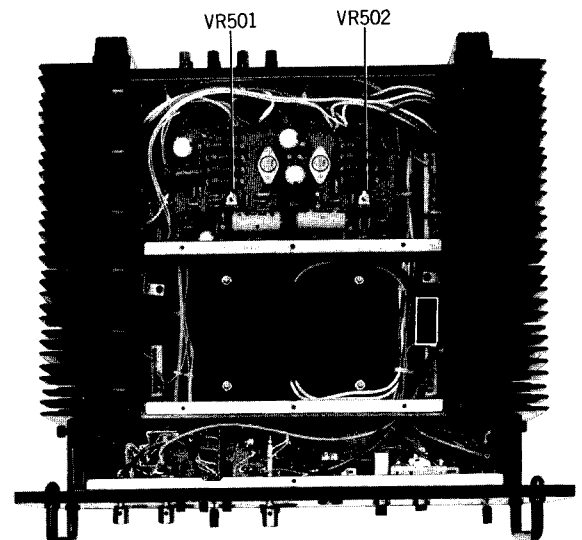
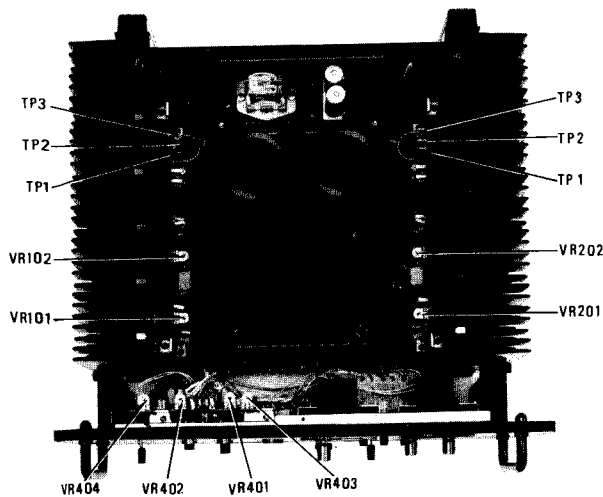


Top View



Bottom View

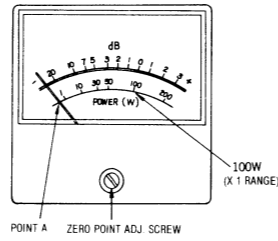
■ ALIGNMENT POINTS



ALIGNMENT INSTRUCTIONS

Notes:

- Output level control to "maximum" position.
- Speakers switch to "on" position.
- Impedance selector switch to "normal (0.08Ω)" position.
- Input switch to "on" position.
- Meter range selector switch to "X1" position.
- Before adjusting, I_{co} adjusting volume (VR102) should be turned to the left side completely, and volume (VR202) should be turned to the right side completely.
- The I_{co} adjustment should be started about 5 minutes after setting the power switch to the ON position.

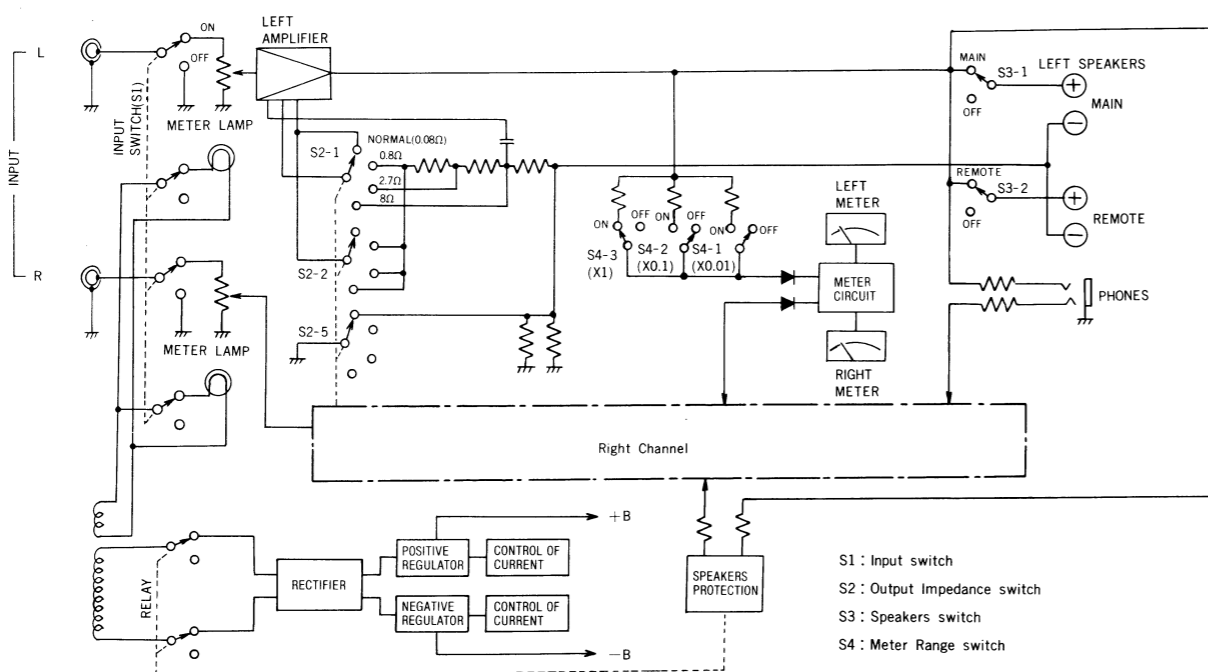


ALIGNMENT	DC VTVM CONNECTION	ALIGNMENT POINTS	REMARKS
1 NEGATIVE POWER VOLTAGE	Connect the VTVM to 514 terminal and 517 terminal.	VR502	Make sure that DC VTVM becomes negative (-) 50.5 volts
2 POSITIVE POWER VOLTAGE	Connect the VTVM to 510 terminal and 514 terminal.	VR501	Make sure that DC VTVM becomes positive (+) 50.5 volts
3 DC UNBALANCE	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 I _{co}	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.

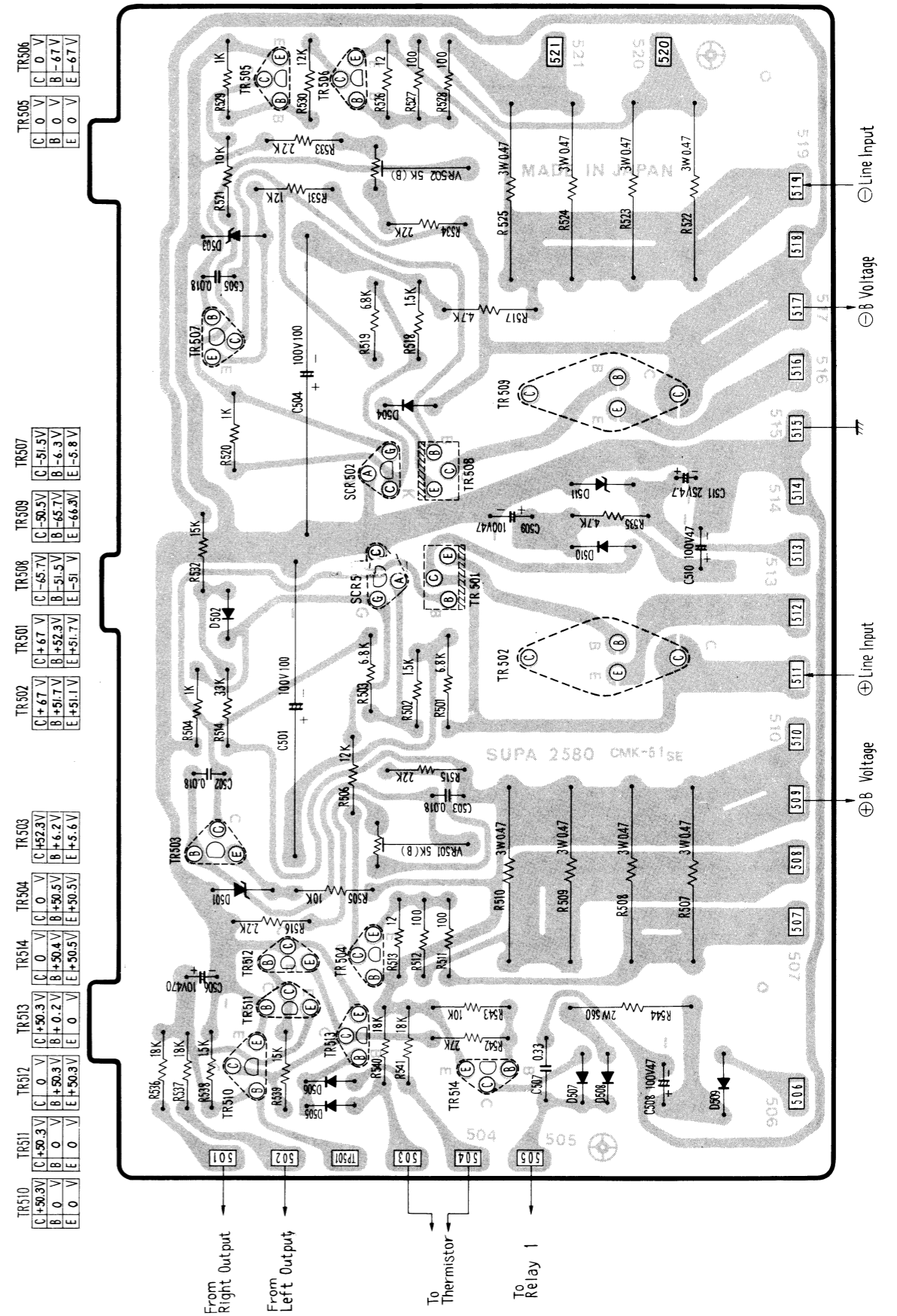
VU (OUTPUT LEVEL) METER ALIGNMENT

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 A 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 A as shown below.
7 METER SWING	① Input switch to "on" position ② Inputting 1kHz signal to input terminal. ③ Adjust output level to 28.3V (100W) 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 100W.

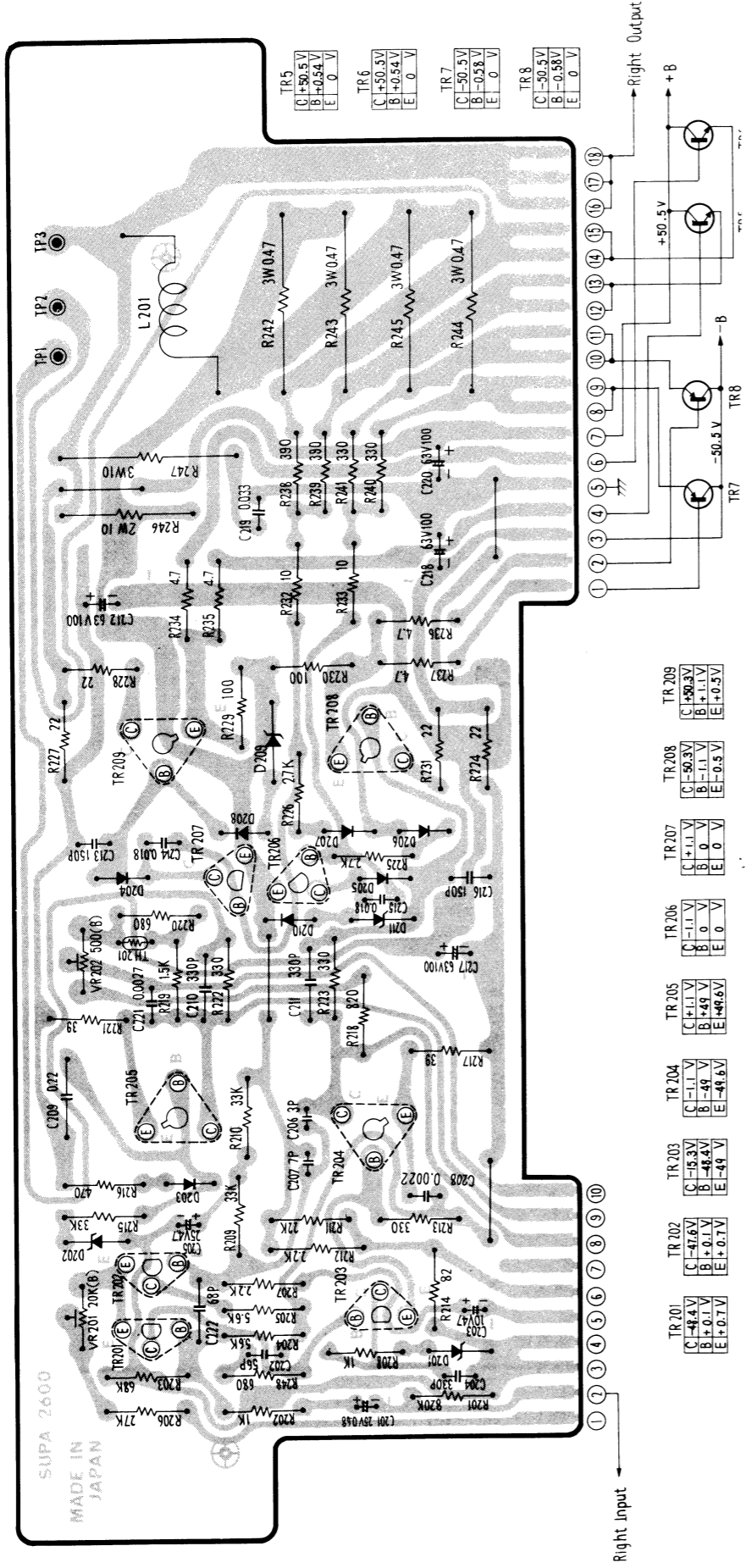
BLOCK DIAGRAM



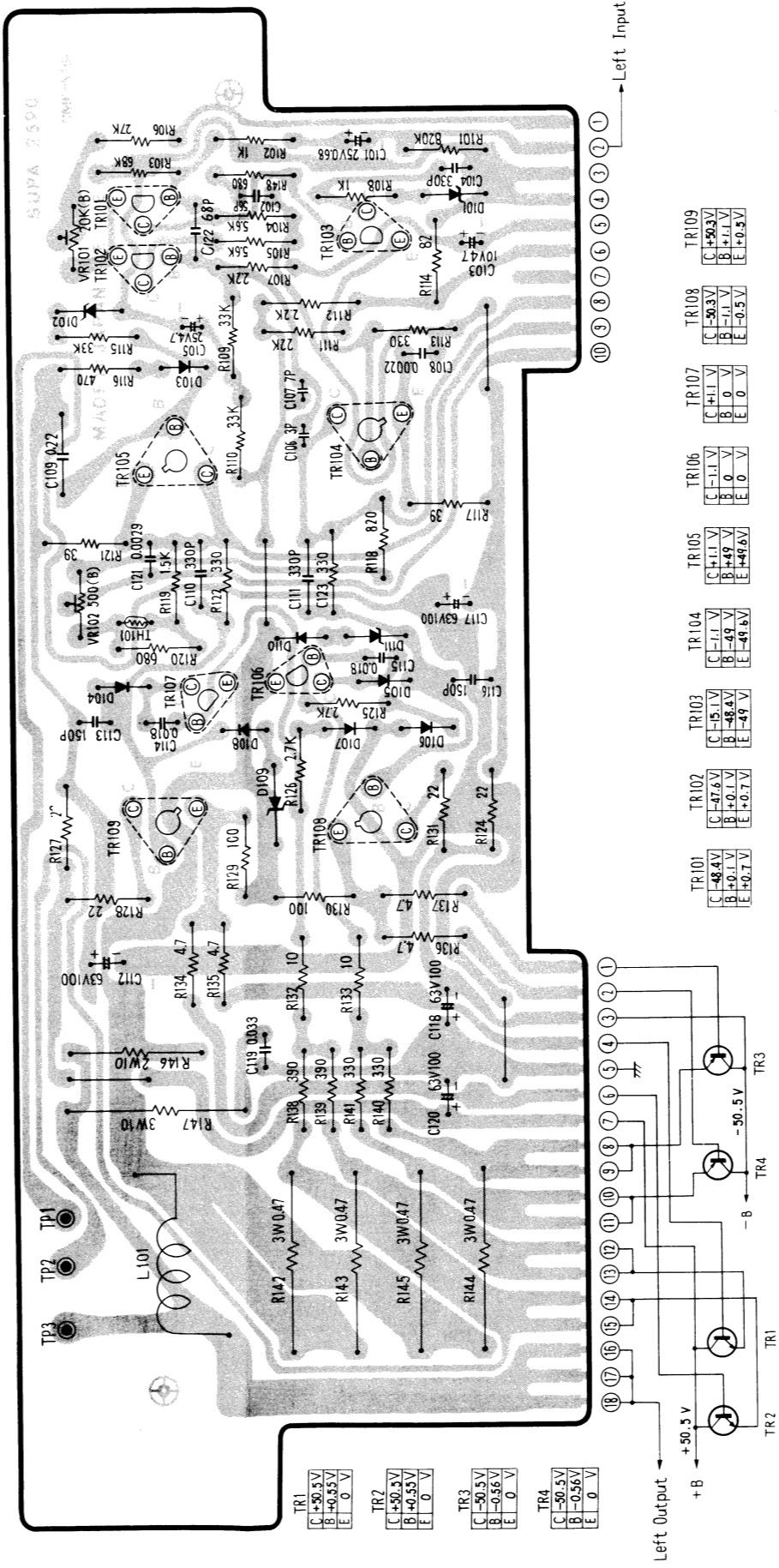
POWER SOURCE CIRCUIT BOARD



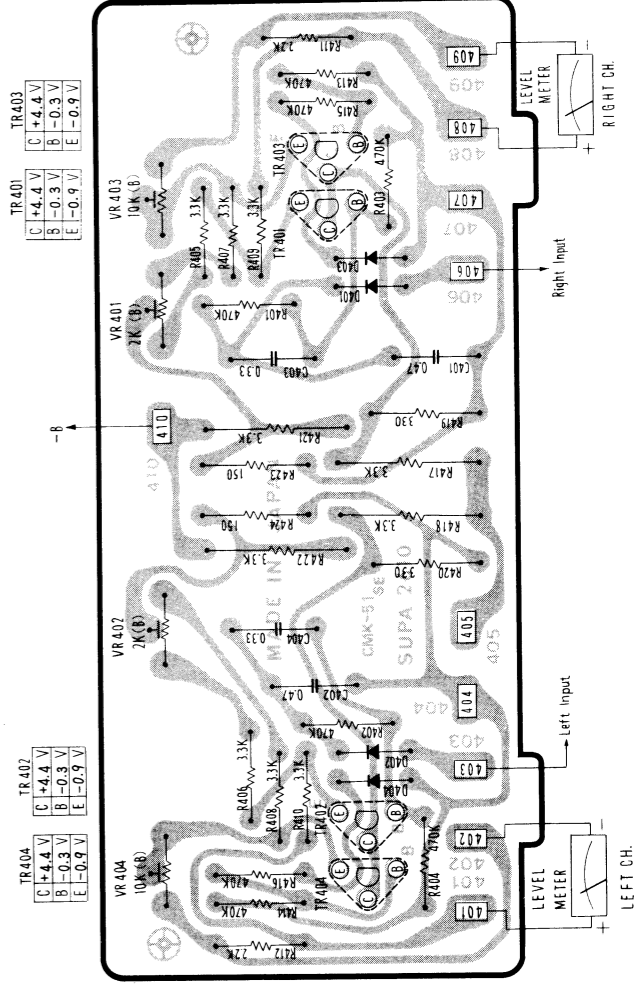
DRIVER CIRCUIT BOARD, RIGHT CHANNEL



DRIVER CIRCUIT BOARD, LEFT CHANNEL

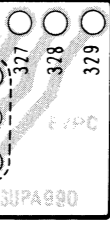


METER CIRCUIT BOARD

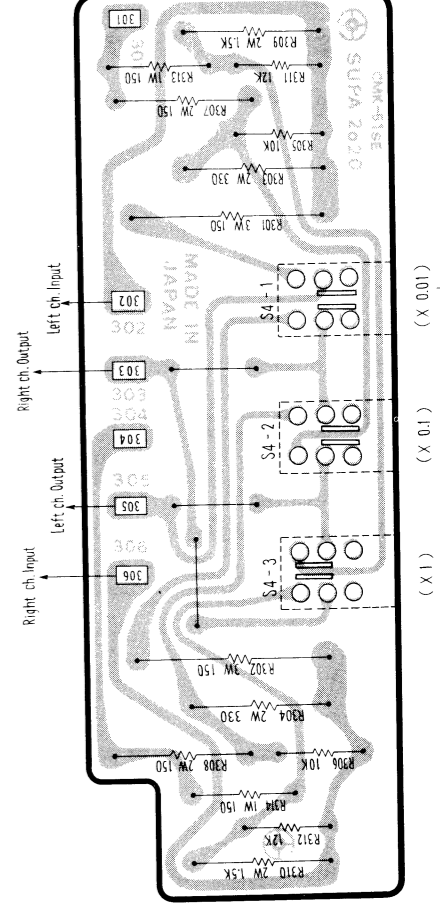


THERMO COMPENSATION CIRCUIT BOARD

Left and Right Channels

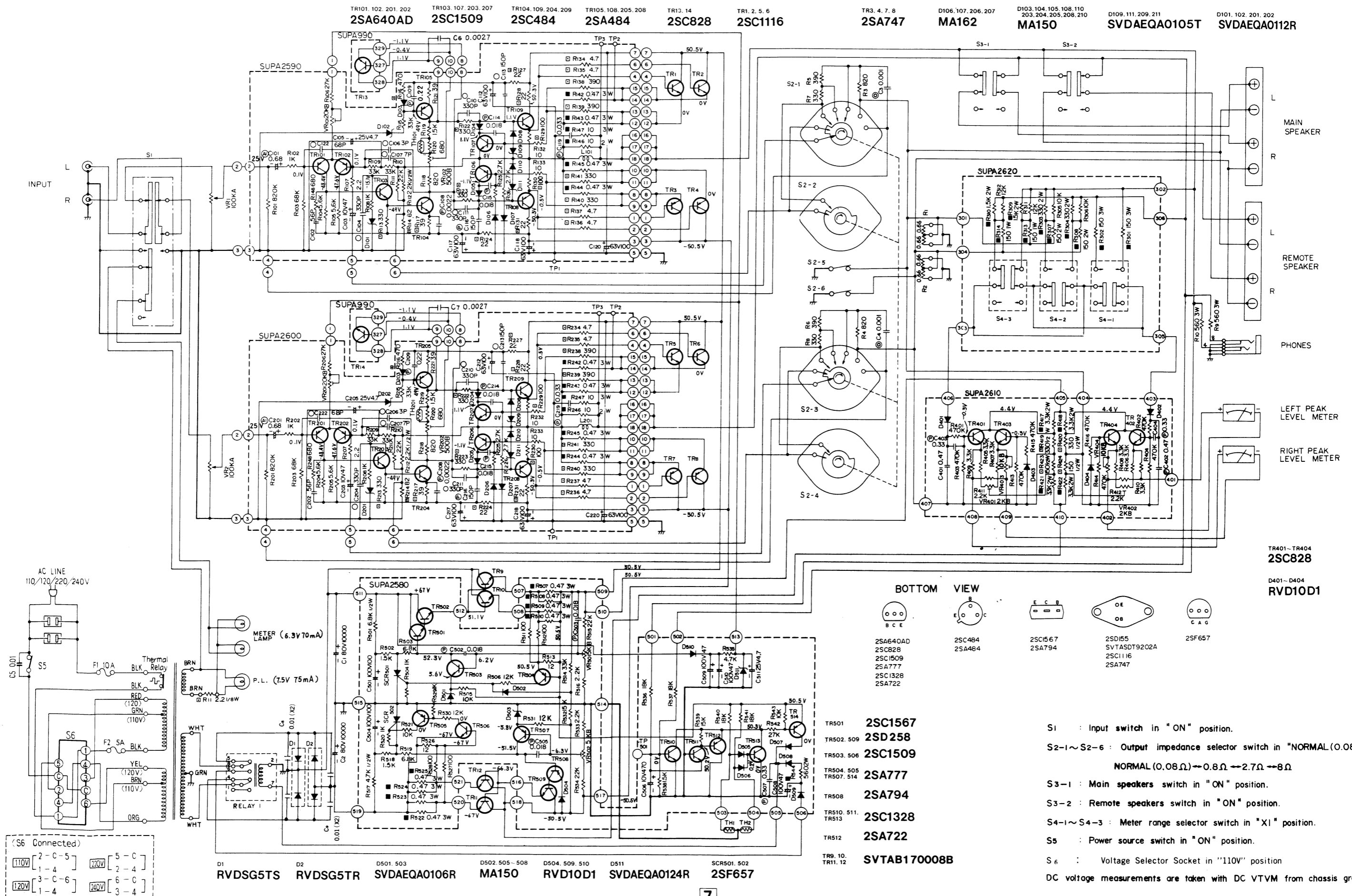


METER RANGE SELECTOR CIRCUIT BOARD

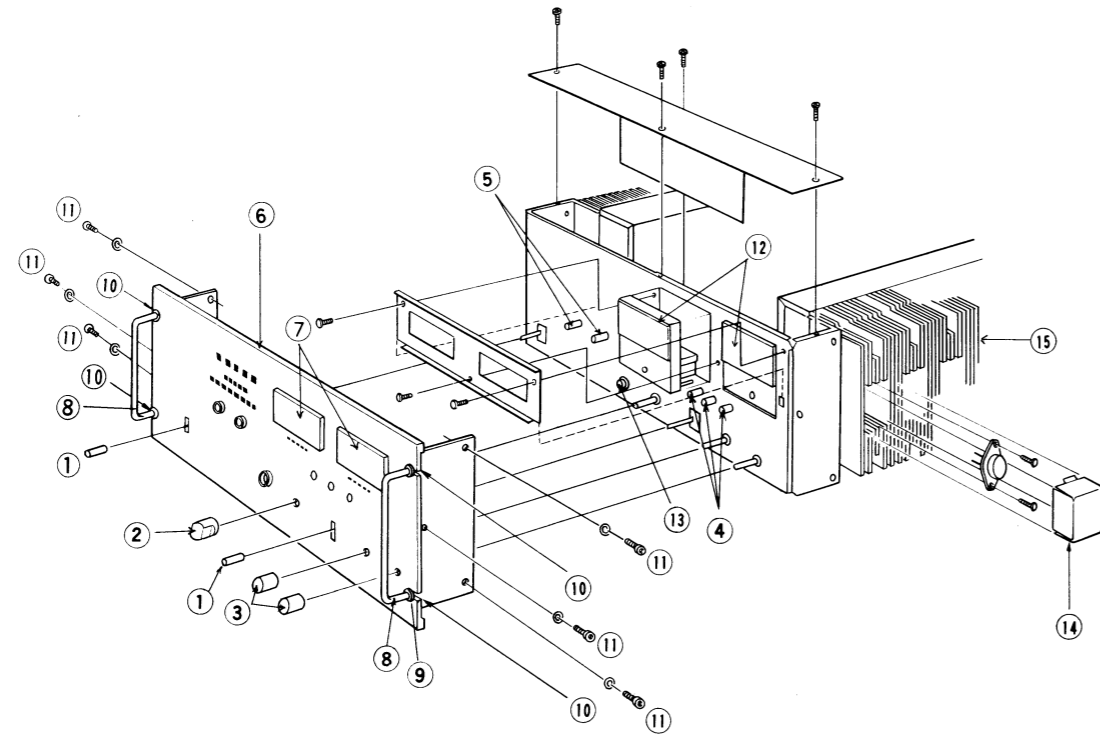


Schematic Diagram Model SE-9600

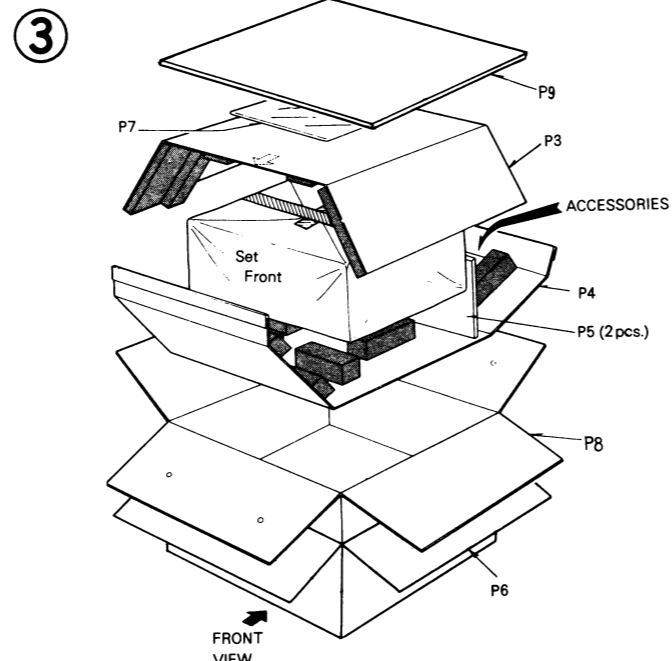
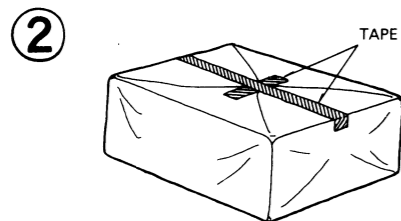
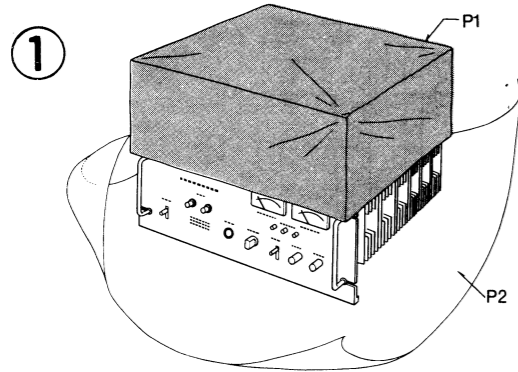
(This schematic diagram may be modified at any time with the development of new technology.)



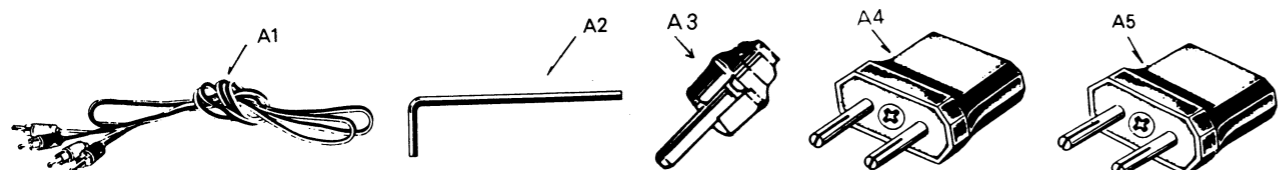
LOCATION OF CABINET PARTS



PACKING PARTS



ACCESSORIES



SE-9600

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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
TRANSISTORS									
TR1, 2, 5, 6	2SC1116	Power Amplifier	4	○	R120, 148, 220, 248	ERD14TJ681	680Ω, 1/4W, ±5%, Carbon	4	
TR3, 4, 7, 8	2SA747	Power Amplifier	4	○	R3, 4, 118, 218	ERD14TJ821	820Ω, 1/4W, ±5%, Carbon	4	
TR9, 10, 11, 12	SVTAB170008B	DC Voltage Control	4	○	R102, 108, 202, 208, 504, 520, 529	ERD14TJ102	1kΩ, 1/4W, ±5%, Carbon	7	
TR13, 14	2SC828R	Thermal Compensation	2						
TR101, 102, 201, 202	2SA640AD-R	Differential Amplifier	4		R119, 219, 502, 518, 538	ERD14TJ152	1.5kΩ, 1/4W, ±5%, Carbon	5	
TR103, 107, 203, 207, 503, 506	2SC1509Q	Power Amp Protection & An Error Voltage Detector	6		R107, 207, 411, 412, 516, 533	ERD14TJ222	2.2kΩ, 1/4W, ±5%, Carbon	6	
TR104, 109, 204, 209	2SC484Y	Driver Amplifier	4	○	R125, 126, 225, 226	ERD14TJ272	2.7kΩ, 1/4W, ±5%, Carbon	4	
TR105, 108, 205, 208	2SA484Y	Driver Amplifier	4	○	R405, 406, 407, 408, 409, 410	ERD14TJ332	3.3kΩ, 1/4W, ±5%, Carbon	6	
TR106, 206, 504, 505, 507, 514, 404	2SA777Q	Protection Circuit	6		R535	ERD14TJ472	4.7kΩ, 1/4W, ±5%, Carbon	1	
TR401, 402, 403, 404	2SC828S	VU Meter Amplifier	4		R104, 105, 204, 205	ERD14TJ562	5.6kΩ, 1/4W, ±5%, Carbon	4	
TR501	2SC1567R	DC Amplifier	1		R503, 519	ERD14TJ682	6.8kΩ, 1/4W, ±5%, Carbon	2	
TR508	2SA794R	DC Amplifier	1		R305, 306, 505, 521, 543	ERD14TJ103	10kΩ, 1/4W, ±5%, Carbon	5	
TR510, 511, 513	2SC1328T	Speaker Protection Switching	3		R311, 312, 506, 530, 531	ERD14TJ123	12kΩ, 1/4W, ±5%, Carbon	5	
TR502, 509	2SD258R	DC Amplifier	2	○	R532, 539	ERD14TJ153	15kΩ, 1/4W, ±5%, Carbon	2	
TR512	2SA722T	Speaker Protection Switching	1		R536, 537, 540, 541	ERD14TJ183	18kΩ, 1/4W, ±5%, Carbon	4	
SCR and DIODES									
SCR501, 502	2SF657	Silicon Controlled Rectifier	2	○	R111, 211, 515, 534	ERD14TJ223	22kΩ, 1/4W, ±5%, Carbon	4	
D1	RVDSG5TS	Rectifier	1	○	R106, 206, 542	ERD14TJ273	27kΩ, 1/4W, ±5%, Carbon	3	
D2	RVDSG5TR	Rectifier	1	○	R109, 110, 115, 209, 210, 215, 514	ERD14TJ333	33kΩ, 1/4W, ±5%, Carbon	7	
D101, 102, 201, 202	SVDAEQA0112R	12V Zener	4		R103, 203	ERD14TJ683	68kΩ, 1/4W, ±5%, Carbon	2	
D103, 104, 105, 108, 110, 203, 204, 205, 208, 210, 502, 505, 506, 507, 508	MA150	AOC	15		R401, 402, 403, 404, 413, 414, 415, 416	ERD14TJ474	470kΩ, 1/4W, ±5%, Carbon	8	
D106, 107, 206, 207	MA162	Protection	4	○	R101, 201	ERD14TJ824	820kΩ, 1/4W, ±5%, Carbon	2	
D109, 111, 209, 211	SVDAEQA0105T	5V Zener, Protection	4	○	R134, 135, 136, 137, 234, 235, 236, 237	ERD14FJ4R7	4.7Ω, 1/4W, ±5%, Carbon	8	
D401, 402, 403, 404, 504, 509, 510	RVD10D1	Meter Detector	7		R124, 127, 128, 131, 224, 227, 228, 231	ERD14FJ220	22Ω, 1/4W, ±5%, Carbon	8	
D501, 503	SVDAEQA0106R	6V Zener, Voltage Stabilizer	2		R117, 121, 217, 221	ERD14FJ390	39Ω, 1/4W, ±5%, Carbon	4	
D511	SVDAEQA0124R	24V Zener, Shock Noise Silencer	1		R114, 214	ERD14FJ820	82Ω, 1/4W, ±5%, Carbon	2	
TRANSFORMER and COIL									
T1	SLTAS75S	Power Transformer	1	○	R129, 130, 229, 230	ERD14FJ101	100Ω, 1/4W, ±5%, Carbon	4	
L101, 201	ELQ22A1	High Character Stabilizer Coil	2	○	R113, 122, 123, 140, 141, 213, 222, 223, 240, 241	ERD14FJ331	330Ω, 1/4W, ±5%, Carbon	10	
RESISTORS									
R132, 133, 232, 233	ERD14TJ100	10Ω, 1/4W, ±5%, Carbon	4		R138, 139, 238, 239	ERD14FJ391	390Ω, 1/4W, ±5%, Carbon	4	
R513, 526	ERD14TJ120	12Ω, 1/4W, ±5%, Carbon	2		R116, 216	ERD14FJ471	470Ω, 1/4W, ±5%, Carbon	2	
R511, 512, 527, 528	ERD14TJ101	100Ω, 1/4W, ±5%, Carbon	4		R112, 212	ERD12TJ222	2.2kΩ, 1/4W, ±5%, Carbon	2	
R7, 8	ERD14TJ331	330Ω, 1/4W, ±5%, Carbon	2		R517	ERD12TJ472	4.7kΩ, 1/4W, ±5%, Carbon	1	
R5, 6	ERD14TJ391	390Ω, 1/4W, ±5%, Carbon	2		R501	ERD12TJ682	6.8kΩ, 1/4W, ±5%, Carbon	1	
					R423, 424	ERD12FJ151	150Ω, 1/4W, ±5%, Carbon	2	
					R419, 420	ERD12FJ331	330Ω, 1/4W, ±5%, Carbon	2	
					R11	ERD18FJ2R2	2.2Ω, 1/4W, ±5%, Carbon	1	
					R313, 314	ERG1ANJ151	150Ω, 1W, ±5%, Metallic	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	

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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	100Ω, 3W, ±5% Metallic	2	○	RELAY1	SSYA9	Speakers Protection Relay	1	○
R1, 2	ERW20GA1R3	1.3Ω, 20W, ±10% Wire	2	○	CABINET PARTS				
VARIABLE RESISTORS								2	
VR1, 2	EVC6BAF25A15	100kΩ (A), Input Level Control	2	○	1	SBLA4-1	Knob, Power & Input Switch	2	
VR102, 202	EVL S0AA00B52	500 Ω (B), ICQ Adjustment	2		2	SBSA9S	Knob, Output Impedance Switch	1	
VR401, 402	EVL S0AA00B23	2kΩ (B), Meter Zero Point Adj.	2		3	SBNA121S	Knob, Output Level Control	2	○
VR403, 404	EVL S0AA00B14	10kΩ (B), Meter Adjustment	2		4	SBCA52	Button, Meter Range Push Switch	3	
VR101, 201	EVL S0AA00B24	20kΩ (B), DC Unbalance Adj	2		5	SBCA53	Button, Speaker Push Switch	2	
VR501, 502	EVL S3AA00B53	5kΩ (B), Voltage Stabilizer Adj	2		6	SGWA1192	Front Panel, Complete	1	○
THERMISTORS and POSISTORS									
TH101, 201	RRT251	Thermistor, Driver Circuit	2			SGXA65	Bracket, Speaker Push Switch	2	
TH1, 2	SRPX101E271K	Posistor, Thermal Protection	2	○		SGXA67	Bracket, Headphone	1	○
CAPACITORS									
C106, 206	ECCD1H030CC	3pF, 50 WV, ±0.25pF, Ceramic	2		7	SGUA23	Plastic Plate, VU Meter	2	○
C107, 207	ECCD1H070DC	7pF, 50 WV, ±0.5 pF, Ceramic	2			SGLA9	Panel Light, Plastic, Orange	1	
C102, 202	ECCD1H560K	56pF, 50 WV, ±10%, Ceramic	2		8	SKYA6	Handle, Front Panel	2	○
C122, 222	ECCD1H680K	68pF, 50 WV, ±10%, Ceramic	2		9	SGXA64	Handle Bracket	4	
C104, 110, 111, 204, 210, 211	ECCD1H331K	330pF, 50 WV, ±10%, Ceramic	6		10	XNA6FFZ	Nut, Handle M'tg	4	
C113, 116, 213, 216	ECCD2H151K	150pF, 500 WV, ±10%, Ceramic	4		11	XVE6B10K	Six Corner Box bolt, Front Panel M'tg.	6	○
C314	ECKD1H102PF	0.001μF, 50 WV, ±100% Ceramic	1			SKUA390	Bottom Board	1	○
C5	ECQU2A103MD	0.01μF, 250VAC, ±20%, Polyester	1			SHGA304	Leg	4	○
C108, 208	ECQM05222KZ	0.0022μF, 50 WV, ±10%, Polyester	2			XSN4+25S	Screw, Leg M'tg.	4	
C6, 7	ECQM05272KZ	0.0027μF, 50 WV, ±10%, Polyester	2			SGPA481B	Rear Panel	1	○
C114, 115, 214, 215, 502, 503, 505	ECQM05183KZ	0.018μF, 50 WV, ±10%, Polyester	7			SJFA4807	Terminal, Speakers	1	
C119, 219	ECQM05333KZ	0.033μF, 50 WV, ±10%, Polyester	2			SJFA3207	Terminal, Input	1	○
C109, 209	ECQM05224KZ	0.22μF, 50 WV, ±10%, Polyester	2			SJSA66	AC Outlet	2	
C403, 404, 507	ECQM05334KZ	0.33μF, 50 WV, ±10%, Polyester	3			SJAA6	AC Cord	1	
C401, 402	ECQM05474KZ	0.47μF, 50 WV, ±10%, Polyester	2			SHRA107	Bushing, AC Cord	1	
C103, 203	ECEA10V47	47 μF, 10 WV, Electrolytic	2			SHGA302	Rubber Cushion, Set Rear	2	
C506	ECEA10V470	470μF, 10 WV, Electrolytic	1			XTB4+8BR	Red Screw, Bottom Board M'tg.	9	
C105, 205, 511	ECEA25V4R7	4.7μF, 25 WV, Electrolytic	3		CHASSIS PARTS				
C112, 117, 118, 120, 212, 217, 218, 220	ECEA63V100LU	100μF, 63 WV, Electrolytic	8	○	12	SSMA28	VU (Output Level) Meter	2	○
C508, 509, 510	ECEA100V47	47μF, 100WV, Electrolytic	3	○		SJFA1	Fuse Holder	1	
C501, 504	ECEB100V100	100μF, 100WV, Electrolytic	2		13	SJJA10-3	Jack, Headphones	1	
C1, 2	ECEM80R103X	10000μF, 80WV, Electrolytic	2	○		SJSA69	18pin Socket, Driver Amp p.c.b.	2	○
C8, 9	RXAF103P22HD	0.01μF (X2), Component Combination	2			SJSA70	10pin Socket, Driver Amp. p.c.b.	2	○
LIGHT and FUSE									
PL	XAM37K150	Pilot Lamp (7.5V 75mA)	1			SJSA72	Socket, Speaker Protection Relay	1	○
F1	XBA2E100NS5	Fuse, Power Source, 10A	1	○		SJVA1202S	Socket, Power Transistor	12	
F2	XBA2K50NS5	Fuse, Power Source, 5A	1		14	SUVA65	Plastic Cover, Power Transistor	12	○
SWITCHES									
S1	SSLA35S	Input Switch	1	○		SMYA47	Radiator, Power Transistor	12	○
S2-1-2-6	ESRC244F25AP	Output Impedance Selector Switch	1	○		XVE6B25K	Six Corner Box bolt, Heat Sink M'tg.	24	
S3-1, 3-2	ESB707	Speakers Switch	2	○		SMZA6091	Bracket, Pilot Lamp	1	
S4-1-4-3	SSHA49S	Meter Range Switch	1	○		SHRA520	Thermo Label	2	○
S5	SSLA34S	Power Source Switch	1			SJEA4	Socket, Voltage Selector	1	
S6	-----	Socket, Voltage Selector	1		ACCESSORIES				
PACKINGS					A1	SJP2129	Connector Cord	1	
RELAY					A2	SHEA5	Six Corner Screw Driver	1	
CABINET PARTS					A3	RJP5	Pin Plug	4	
THERMISTORS and POSISTORS					A4	RJP74-1	AC Plug	1	
CAPACITORS					A5	RJP75	AC Plug	1	
LIGHT and FUSE					PACKINGS				
SWITCHES					P1	SPPA37	Soft Cover	1	○
RELAY					P2	SPHA6008	Polyethylene Sheet	1	
CABINET PARTS					P3	SPSA100	Pad	1	○
THERMISTORS and POSISTORS					P4	SPSA99	Pad	1	○
CAPACITORS					P5	SPSA101	Pad, Plate	2	○
LIGHT and FUSE					P6	SPGA582A	Carton Box (Outer)	1	○
SWITCHES					P7	SQFA208	Printed Matter, Complete	1	○
RELAY					P8	SPNA290B	Carton Box (Inner)	1	○
CABINET PARTS					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.

1. If the speaker terminal is short-circuited, current limiters (TR106, 107, 206 and 207) function to protect the power transistors.
2. 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.
3. 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.

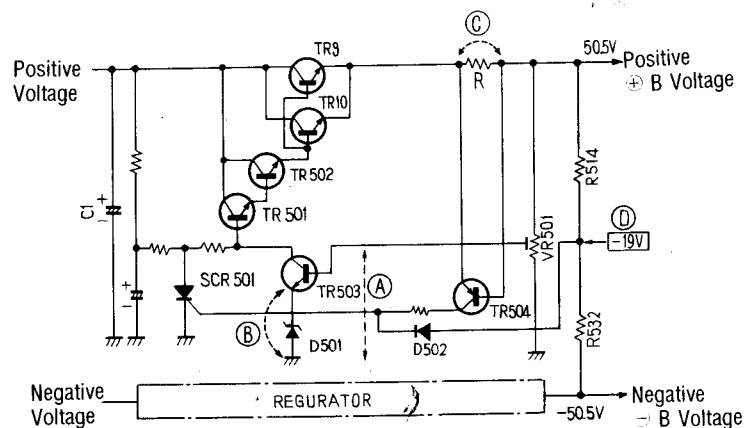


Fig. 1.