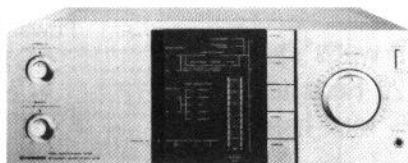


Service Manual



**ORDER NO.
ART-590-0**

**NON SWITCHING AMP
STEREO AMPLIFIER**

A-9

MODEL A-9 COMES IN SIX VERSIONS DISTINGUISHED AS FOLLOWS:

Type	Voltage	Remarks
KU	120V only	U.S.A. model
S	110V, 120V, 220V and 240V (Switchable)	General export model
S/G	110V, 120V, 220V and 240V (Switchable)	U.S. Military model
HE	220V and 240V (Switchable)	Europe model
HB	220V and 240V (Switchable)	United Kingdom model
KC	120V only	Canada model

- This service manual is applicable to the HE and HB types.
- Ce manuel d'instruction se réfère au mode de réglage, en français.
- Este manual de servicio trata del método de ajuste escrito en español.

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1. SPECIFICATIONS

Amplifier Section

Continuous Power Output is 110 watts* per channel, min., at 8 ohms from 20 Hertz to 20,000 Hertz with no more than 0.003% total harmonic distortion.

Continuous Power Output at 1 kHz (both channels driven)
T.H.D. 0.003%, 8 ohms 120 watts per channel
Total Harmonic Distortion (20 Hertz to 20,000 Hertz, 8 ohms, from TUNER)

continuous rated power output No more than 0.003%
55 watts per channel power output .. No more than 0.003%
Intermodulation Distortion (50 Hertz:7,000 Hertz = 4:1, 8 ohms, from TUNER)

continuous rated power output No more than 0.005%
55 watts per channel power output .. No more than 0.003%
Damping Factor (20 Hertz to 20,000 Hertz, 8 ohms)

..... 60
Input Sensitivity/Impedance

PHONO MM 2.5 mV/50 kilohms
cartridge load capacitance:

PHONO MM 100, 200, 300, 400 pF
PHONO MC 0.1 mV/100 ohms

cartridge load resistance:
PHONO MC 33, 100 ohms

TUNER, AUX, TAPE PLAY 1, 2 150 mV/50 kilohms
Phono Overload Level (T.H.D. 0.0015 %, 1,000 Hz)

PHONO MM 250 mV
PHONO MC 10 mV

Output Level/Impedance
TAPE REC 1, 2 150 mV/50 kilohms

Speaker A/OFF, B/OFF (4~16 Ω)
Frequency Response

PHONO (RIAA Equalization) 20 Hz to 20,000 Hz±0.2 dB
TUNER, AUX, TAPE PLAY 1, 2 5 Hz to 200,000 Hz±3 dB

Tone Control
BASS +10 dB/-10 dB (100 Hz, 50 Hz)

Turnover Frequency: 400 Hz/200 Hz
TREBLE +10 dB/-10 dB (10 kHz, 20 kHz)

Turnover Frequency: 2.5 kHz/5 kHz
Filter

LOW (SUBSONIC) 20 Hz (12 dB/oct.)
Loudness Contour (Volume control set at -40 dB position)

..... +6 dB (100 Hz), +3 dB (10 kHz)
Hum and Noise (IHF, short circuited A network)

PHONO MM 90 dB
PHONO MC 74 dB

TUNER, AUX, TAPE PLAY 1, 2 110 dB
Hum and Noise (DIN, continuous rated power output/50 mW)

PHONO MM 80 dB/68 dB
PHONO MC 75 dB/70 dB

TUNER, AUX, TAPE PLAY 1, 2 95 dB/70 dB
Muting -20 dB

Miscellaneous

Power Requirements

HE, HB models 220/240 V (switchable), 50/60 Hz
S, S/G models . 110/120/220/240 V (switchable), 50/60 Hz

Power Consumption

HE, HB models 820 W (max.)
S, S/G models 300 W (max.)

Dimensions 420 (W) x 150 (H) x 430 (D) mm
16-9/16 (W) x 5-15/16 (H) x 16-15/16 (D) in

Weight (without package) 16 kg (35 lb 4 oz)

Furnished Parts

Operating Instructions 1 (HE model only; 2)

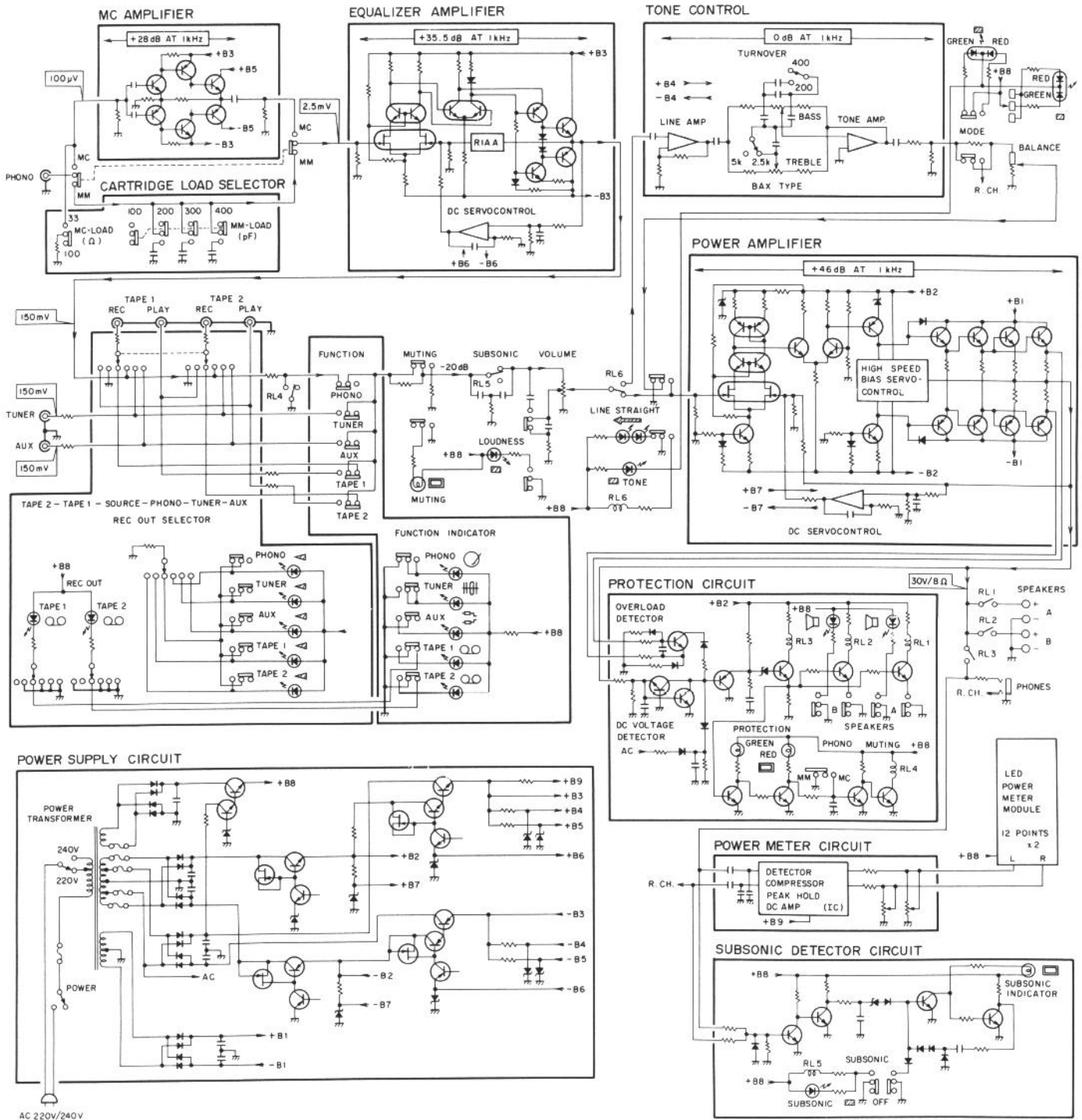
Fuse (S, S/G models only) 1 (10 A or 5 A)

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

NOTE:

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

3. BLOCK DIAGRAM



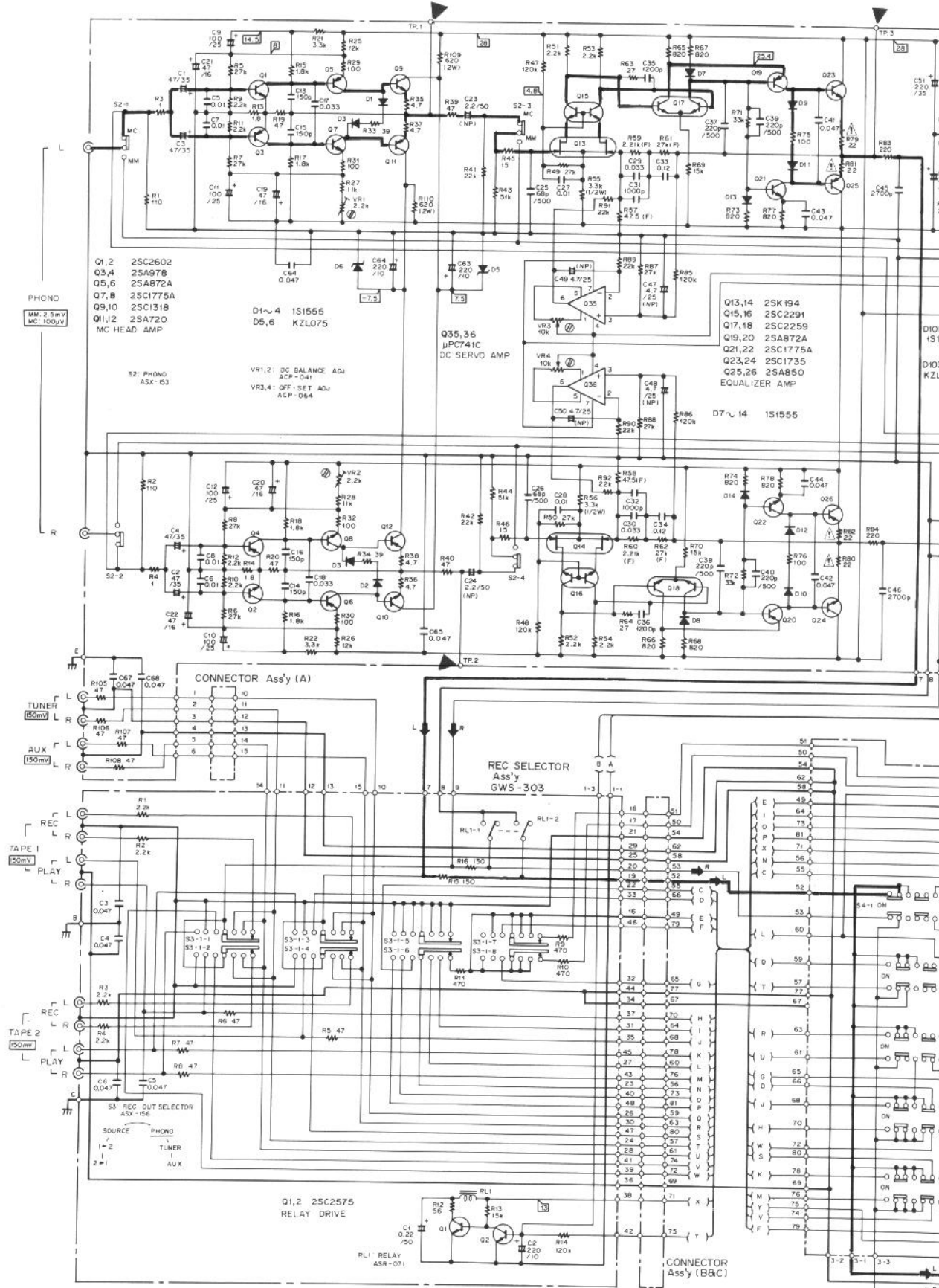
9. SCHEMATIC DIAGRAM

A

B

C

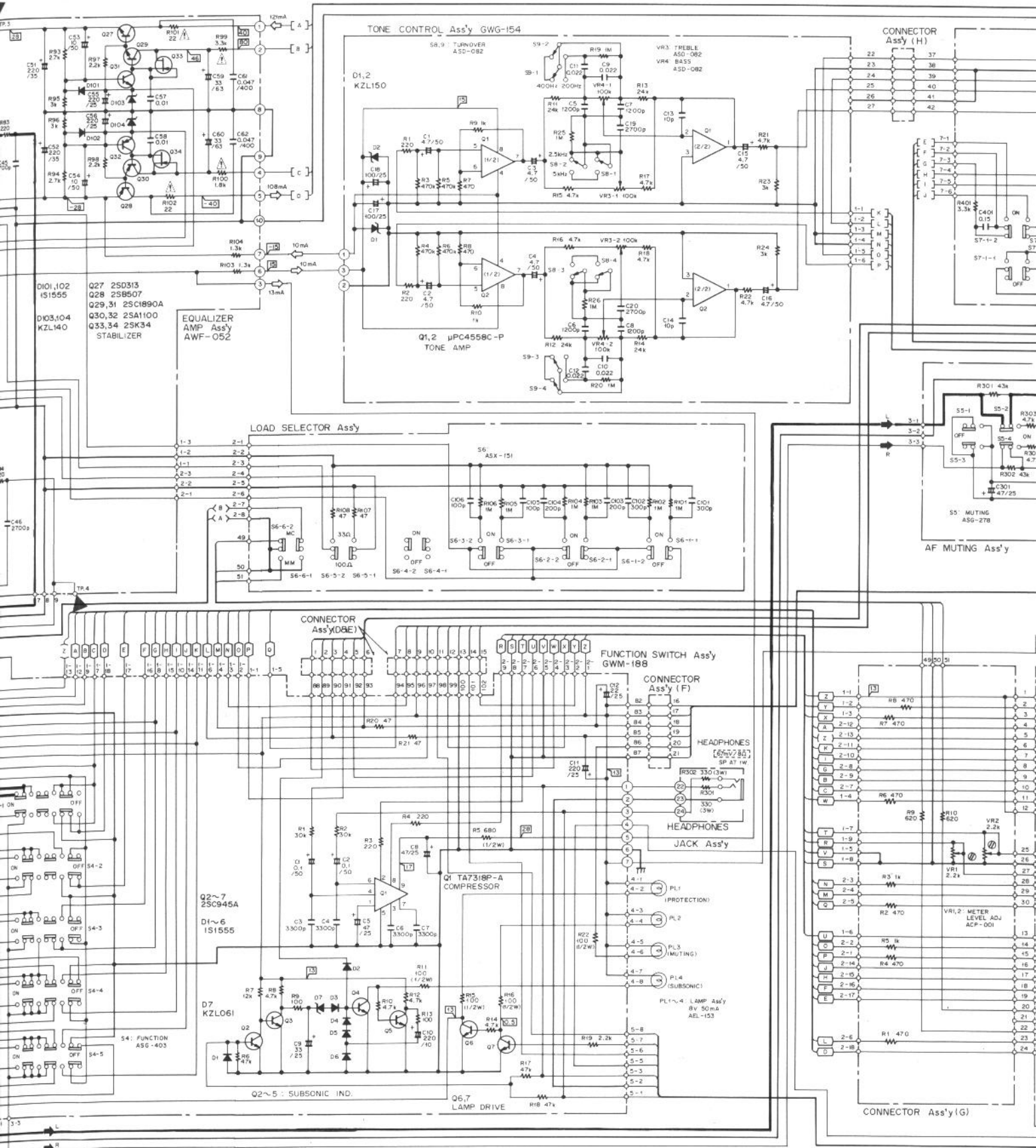
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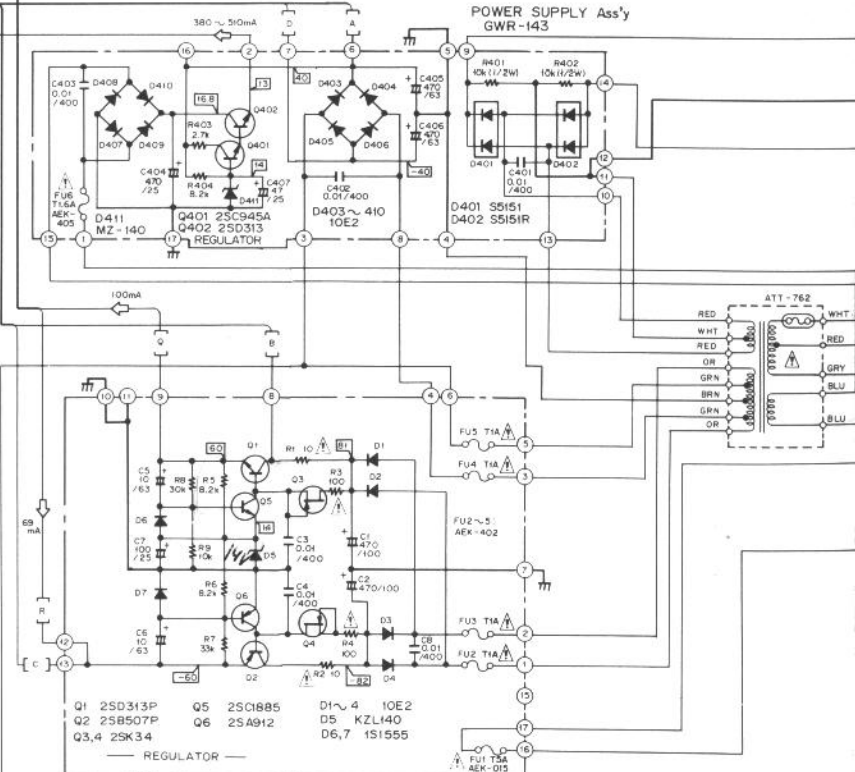
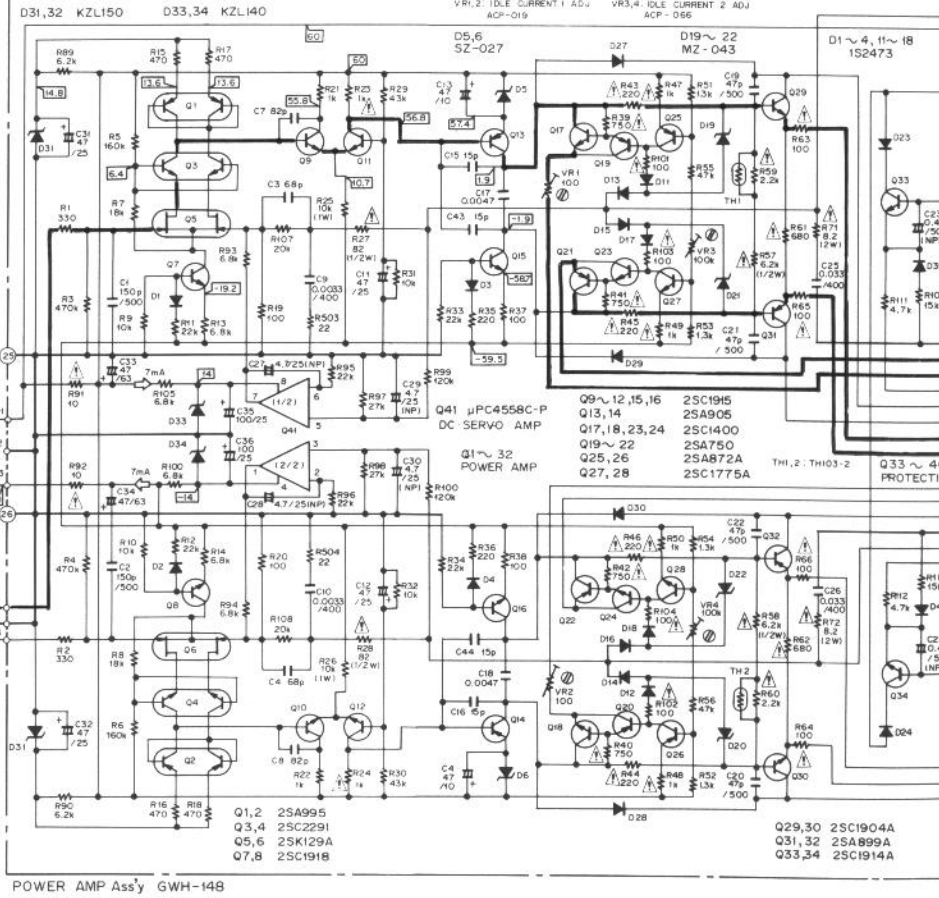
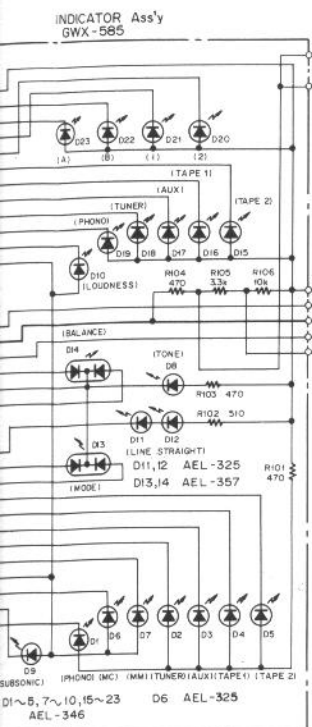
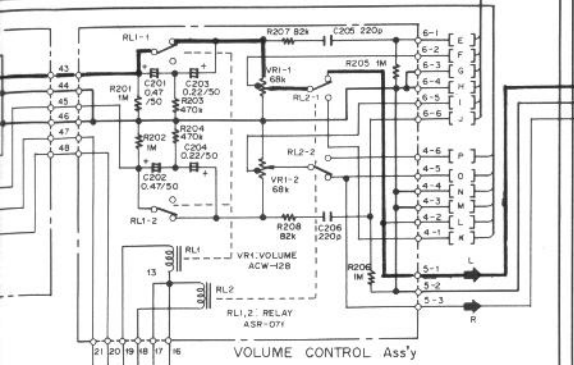
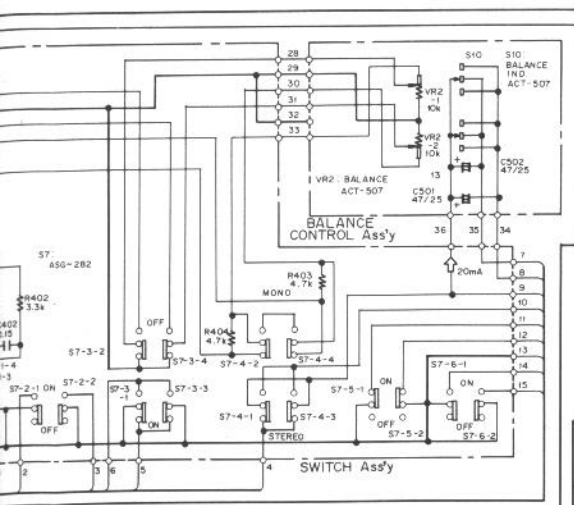


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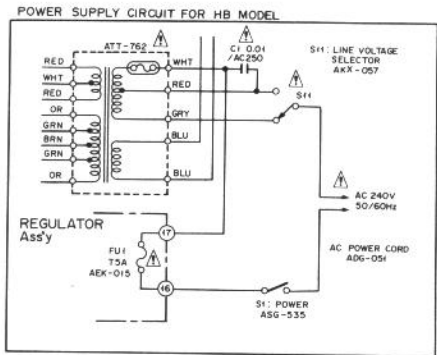
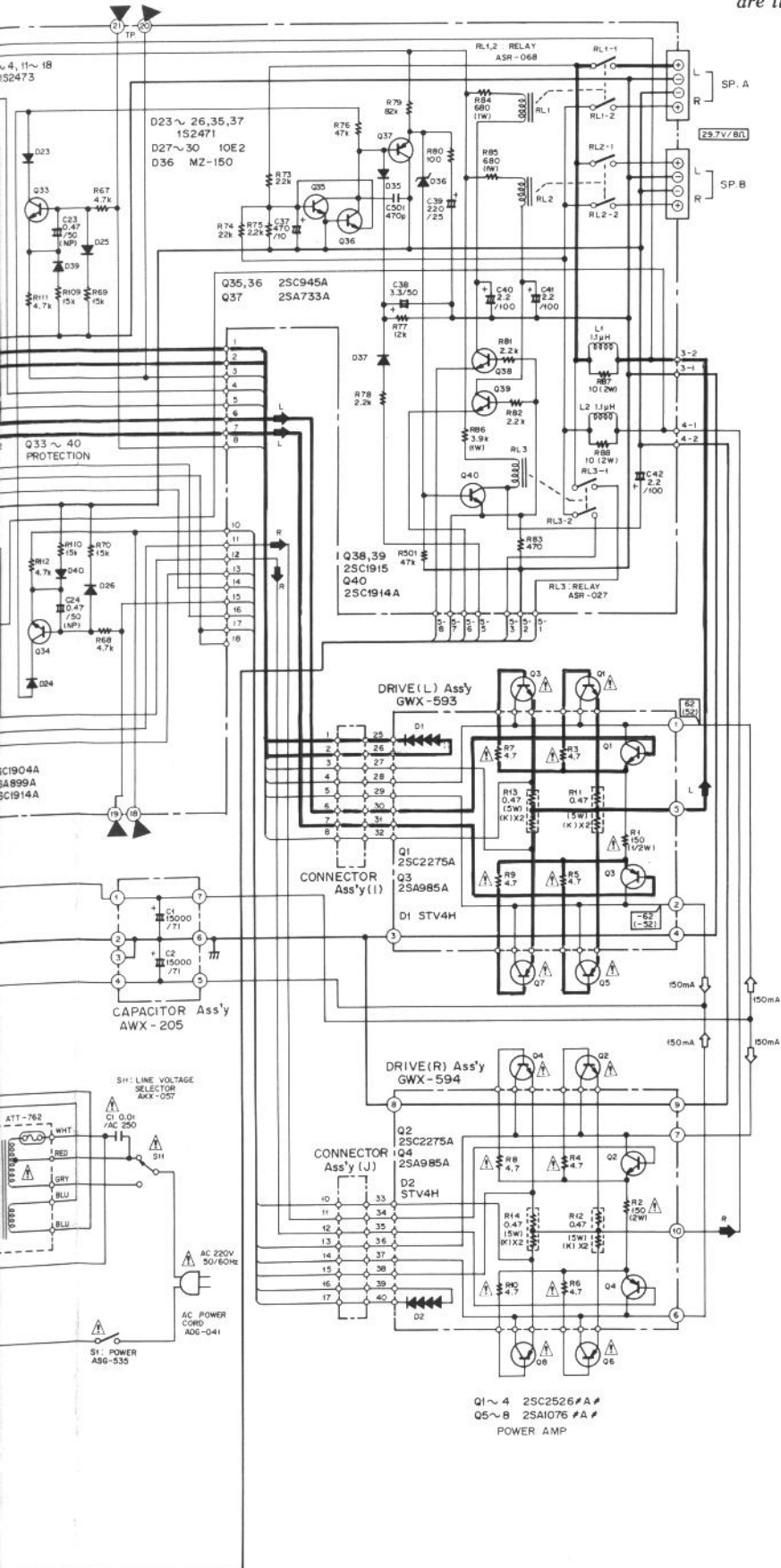
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NOTE:

The indicated semiconductors are representative ones only. Other alternative semiconductors may be used and are listed in the parts list.

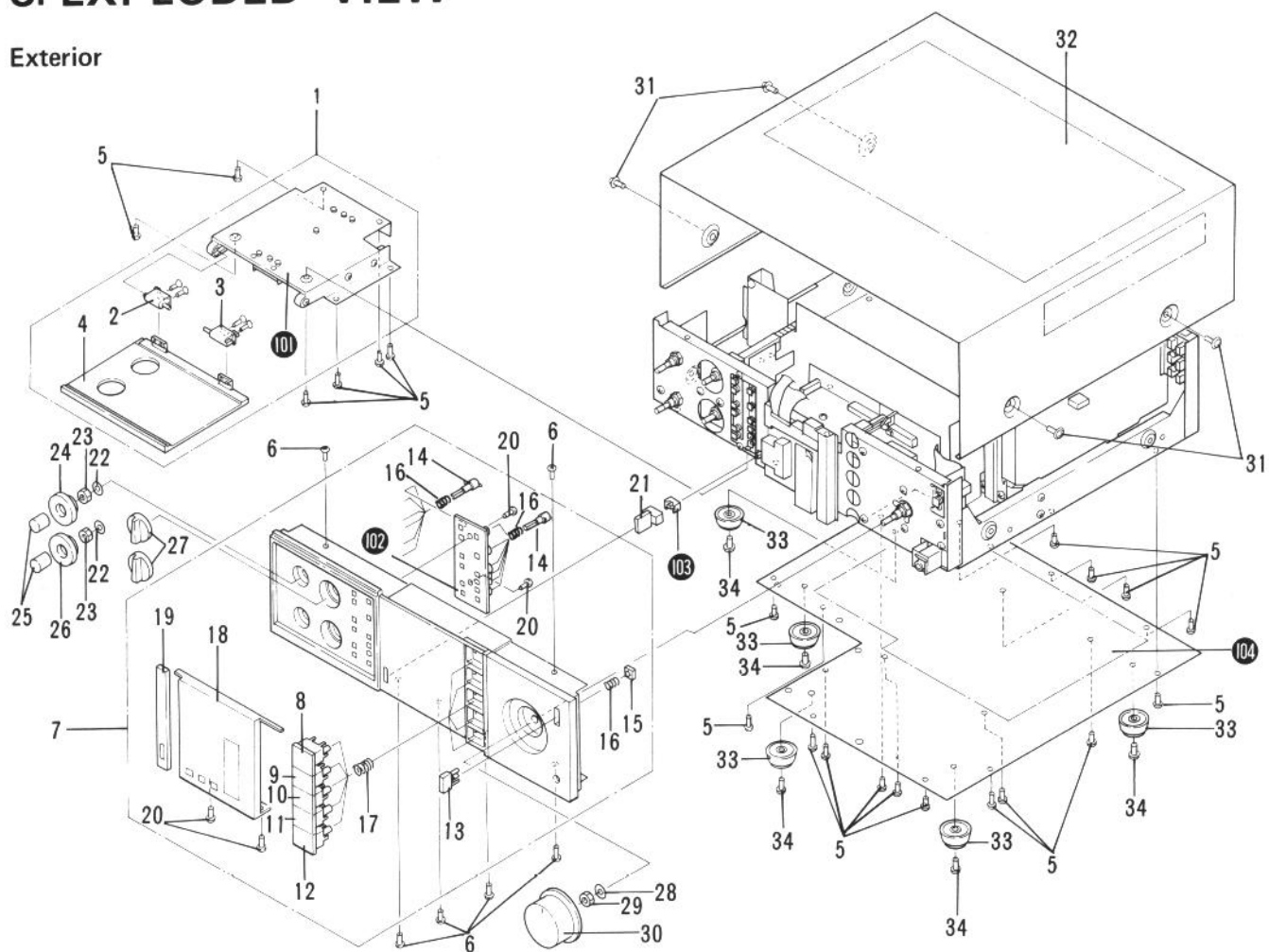


- RESISTORS:**
Indicated in (), %W, -5% tolerance unless otherwise noted k, k Ω , M, M Ω , (F) \pm 1%, (G) \pm 2%, (K) \pm 10%, (M) \pm 20% tolerance
 - CAPACITORS:**
Indicated in capacity (uF)/voltage (V) unless otherwise noted p, pF. Indication without voltage is 50V except electrolytic capacitor.
 - VOLTAGE, CURRENT:**
Signal voltage at 110 W + 110 W 8 Ω output (1kHz)
DC voltage (V) at no input signal
Value in () is DC voltage at rated power
 μ A, DC current at no input signal
 - OTHERS:**
Signal route
Adjusting point
The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- SWITCHES**
- | | | |
|------|------------------------|--|
| S1 | POWER | ON - OFF |
| S2 | PHONO (SIGNAL) | MC - MM |
| S3 | REC. OUT SELECTOR | 2-1 - 1-2 - SOURCE - PHONO - TUNER - AUX |
| S4-1 | FUNCTION (PHONO) | ON - OFF |
| S4-2 | FUNCTION (TUNER) | ON - OFF |
| S4-3 | FUNCTION (AUX) | ON - OFF |
| S4-4 | FUNCTION (TAPE 1) | ON - OFF |
| S4-5 | FUNCTION (TAPE 2) | ON - OFF |
| S5 | MUTING (-20dB) | ON - OFF |
| S6-1 | MM LOAD (400p) | ON - OFF |
| S6-2 | MM LOAD (300p) | ON - OFF |
| S6-3 | MM LOAD (200p) | ON - OFF |
| S6-4 | MM LOAD (100p) | ON - OFF |
| S6-5 | MC LOAD | 100 Ω - 33 Ω |
| S6-6 | PHONO (IND) | MC - MM |
| S7-1 | LOUDNESS | ON - OFF |
| S7-2 | SUBSONIC FILTER (15Hz) | ON - OFF |
| S7-3 | LINE - STRAIGHT | ON - OFF |
| S7-4 | MODE | STEREO - MONO |
| S7-5 | SPEAKERS (A) | ON - OFF |
| S7-6 | SPEAKERS (B) | ON - OFF |
| S8 | TURNOVER (TREBLE) | 2.5kHz - 5kHz |
| S9 | TURNOVER (BASS) | 400Hz - 200Hz |
| S10 | BALANCE (IND) | ON - OFF |
| S11 | LINE VOLTAGE SELECTOR | 220V - 240V |
- The underlined indicates the switch position.

This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

8. EXPLODED VIEW


Exterior

















Exterior Components

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	1.	AXC-003	Door mechanism assembly		21.	AAD-338	Knob(POWER)
	2.	ANR-340	Hinge L		22.	WAX1F160U050	Washer 11φ
	3.	ANR-341	Hinge R		23.	NKX1FUC	Nut M11
	4.	ANB-977	Door assembly		24.	AAB-262	Knob(5k/2.5k)
	5.	VBZ30P060FMC	Screw 3x6		25.	AAB-261	Knob(BASS, TREBLE)
	6.	VBZ30P080FMC	Screw 3x8		26.	AAB-263	Knob(200/400)
	7.	ANB-984	Front panel assembly		27.	AAB-260	Knob(BALANCE, REC OUT SELECTOR)
	8.	AAD-346	Knob(PHONO)		28.	WA92F140U100	Washer 9.2φ
	9.	AAD-347	Knob(TUNER)		29.	NK90FUC	Nut M9
	10.	AAD-348	Knob(AUX)		30.	AAB-258	Knob(VOLUME)
	11.	AAD-349	Knob(TAPE 1)		31.	ABA-193	Screw
	12.	AAD-350	Knob(TAPE 2)		32.	ANE-333	Top cover
	13.	AAD-339	Knob(MUTING)		33.	AEC-083	Cabinet bumper
	14.	AAD-340	Push knob C		34.	VTZ40P120FMC	Screw 4x12
	15.	AEC-564	Knob holder		101.		Door holder
	16.	ABH-045	Coiled spring		102.		Knob spacer
	17.	ABH-069	Coiled spring		103.		Flexible ring
	18.	ANR-334	Display cover		104.		Bottom plate
	19.	ANR-332	Center pillar				
	20.	VBZ30P080FZK	Screw 3x8				

NOTES:

- *Parts without part number cannot be supplied.*
- *The  mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks **★★** and **★**.*
★★ *GENERALLY MOVES FASTER THAN **★**.*
This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

Interior Components

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	1.	VBZ30P060FMC	Screw 3x6		101.		Side frame L
	2.	AEC-352	Nylon rivet		102.		Connector assembly
	3.	GWG-154	Tone control assembly		103.		Connector assembly
	4.	ABN-048	Washerfaced nut		104.		Holder
★★	5.	ASX-154	Remote rotary switch		105.		Remote belt
	6.	ABN-066	Union nut		106.		Balance control assembly
	7.	GWM-188	Function switch assembly		107.		Connector E assembly
	8.	ABA-261	Screw		108.		Switch assembly
	9.	ABN-046	Union nut		109.		Load selector assembly
 ★★	10.	ASG-535	Push switch (POWER)		110.		Holder
	11.	BBT30P080FZK	Screw 3x8		111.		Connector D assembly
	12.	ABA-214	Screw		112.		Remote belt
★★	13.	AEL-153	Lamp assembly (4 lamps)		113.		Volume control assembly
	14.	GWX-585	Indicator assembly		114.		Connector C assembly
	15.	VBZ30P080FMC	Screw 3x8		115.		Ground terminal 2-P
 ★★	16.	AWR-226	Regulator assembly		116.		Slide plate
 ★★	17.	AEK-015	Fuse (T5A250V)		117.		Sub-frame
 ★★	18.	AEK-402	Fuse (T1A250V)		118.		AF muting assembly
 ★	19.	VTZ40P080FMC	Screw 4x8		119.		Headphones jack assembly
 ★	20.	ATT-762	Power transformer		120.		Switch holder
 ★★	21.	GWR-143	Power supply assembly		121.		Panel stay
 ★★	22.	AEK-405	Fuse (T1.6A250V)		122.		Lamp holder A
	23.	WS50FMC	Spring washer 5φ		123.		Lamp holder B
	24.	ABA-100	Screw 5x12		124.		P.C.B. holder B
	25.	AWX-205	Capacitors assembly		125.		P.C.B. holder C
	26.	GWX-593	Driver L assembly		126.		P.C.B. holder D
	27.	GWX-594	Driver R assembly		127.		P.C.B. holder E
	28.	ABA-258	Screw		128.		Transformer frame
 ★★	29.	2SA1076/A/-B* (2SA1076/A/-G*)	*hfe should have the same value.		129.		Shield cover A
 ★★	30.	2SC2526/A/-B* (2SC2526/A/-G*)			130.		Capacitors holder
					131.		Shield cover B
					132.		Wire saddle
	31.	AEC-488	Insulator wafer		133.		Center frame
	32.	GWS-303	REC selector assembly		134.		Heat sink
	33.	AWF-052	EQ amplifier assembly		135.		Holder A
	34.	GWH-148	Power amplifier assembly				
 ★★	35.	AKX-057	Line voltage selector		136.		Holder B
					137.		Clamp plate
 ★	36.	VBZ30P120FMC	Screw 3x12		138.		Connector A assembly
 ★	37.	AEC-327	Strain relief		139.		Connector B assembly
 ★	38.	ADG-041	AC power cord (for HE type)		140.		P.C.B. holder A
		ADG-051	AC power cord (for HB type)				
	39.	WG70FMC	Locking washer		141.		Shield plate
	40.	B71-010	Nut M7		142.		Connector assembly

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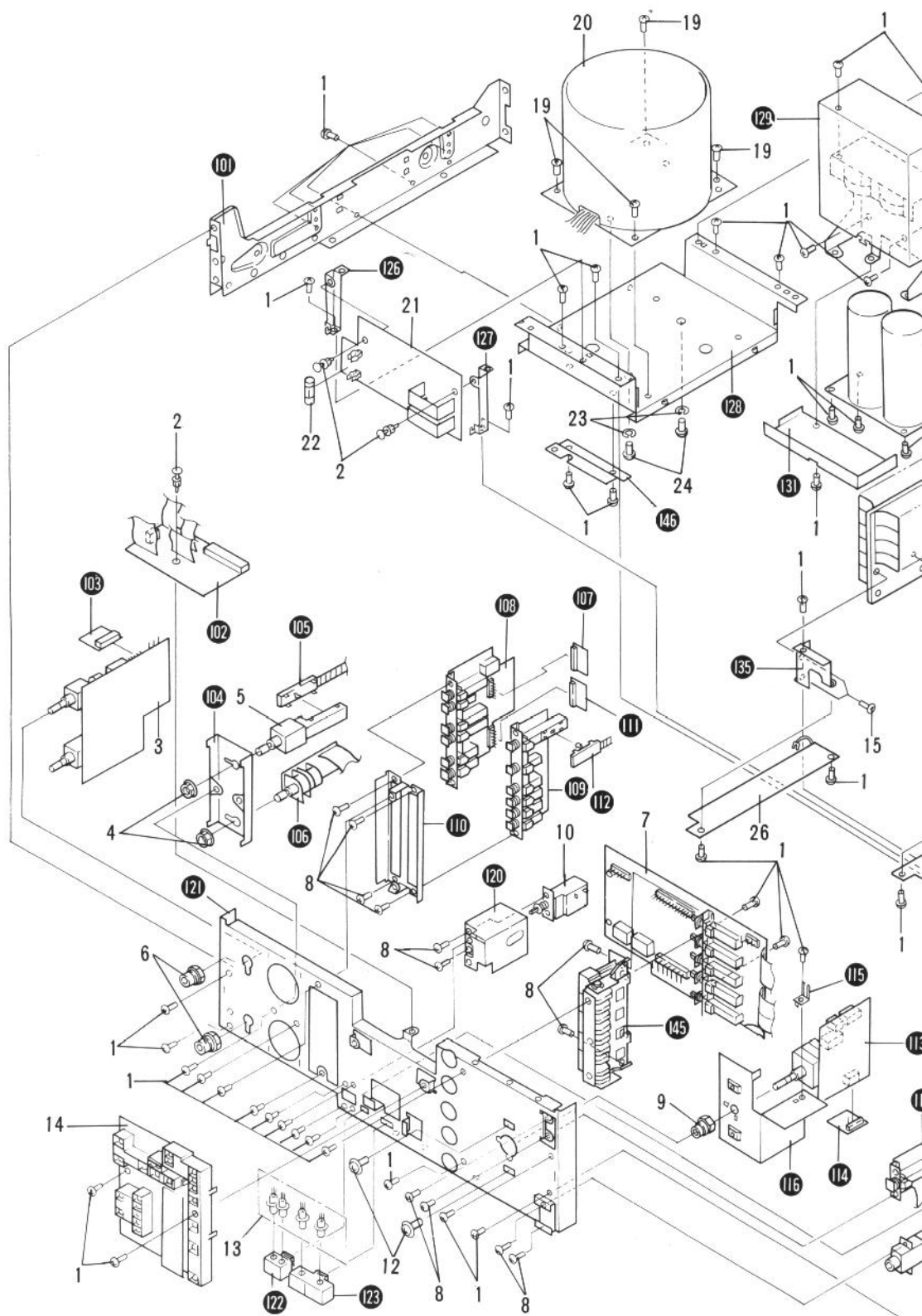
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A

B

C

D



Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	143.		Connector assembly		148.		Shelf
	144.		Connector assembly		149.		Rear panel
	145.		Lever assembly		150.		Terminal (GND)
	146.		Plate		151.		Grounding plate
	147.		Terminal strip 2-P		152.		Side frame R

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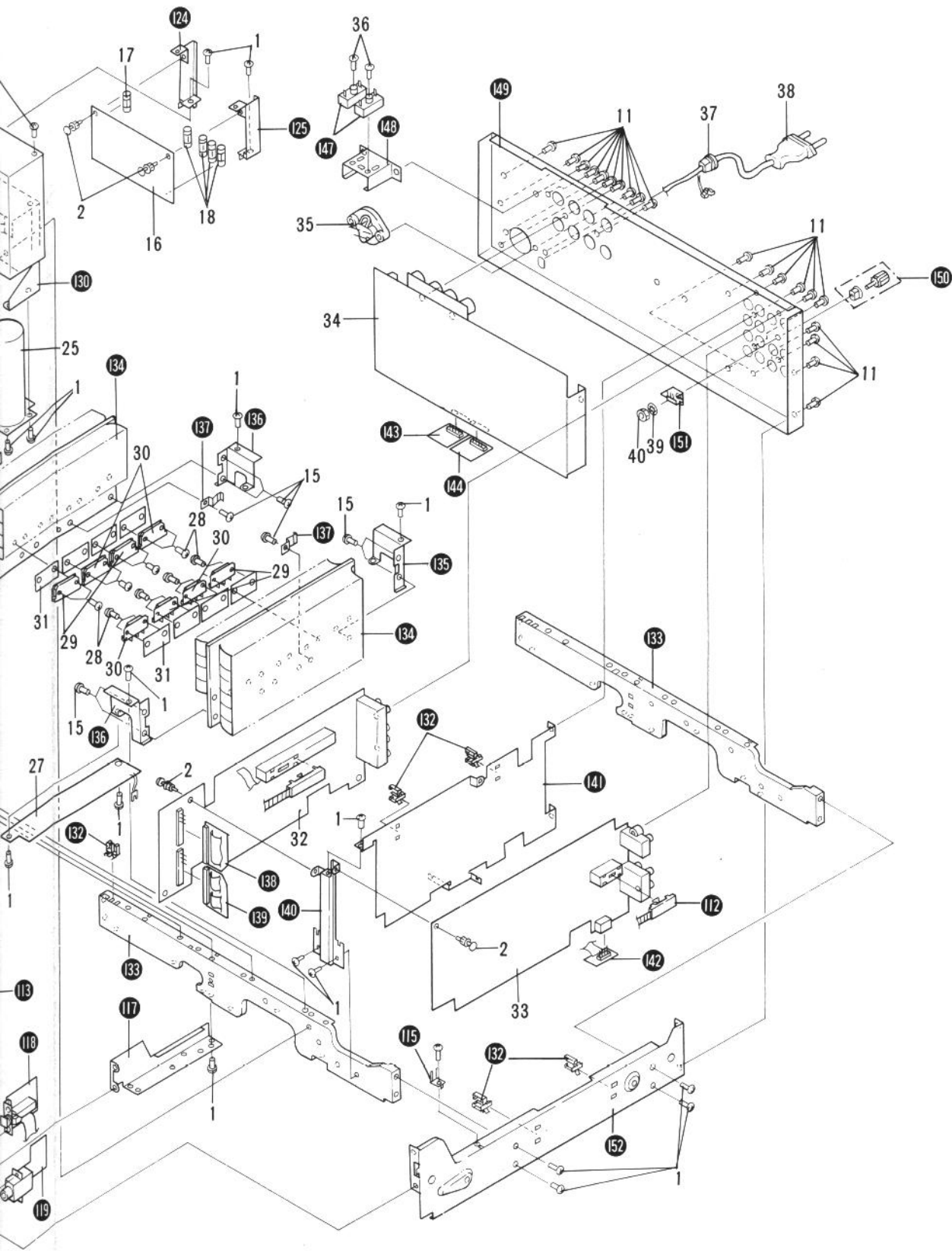
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6



A

B

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D

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11. ADJUSTMENTS

Power Amplifier

- Turn VR1, VR3 (L) and VR2, VR4 (R) fully around in the counter-clockwise direction.
- Without any load or input signal, turn the POWER switch ON.

Adjustment point	Prescribed value	Measuring terminals
VR1(L)	50mVDC	no. 21(+) and no. 20(-)
VR3(L)	75mVDC	
VR2(R)	50mVDC	no. 19(+) and no. 18(-)
VR4(R)	75mVDC	

Output Power Indicator Calibration

1. Set the LINE STRAIGHT OFF switch to OFF (LINE STRAIGHT) position.
2. Set the SPEAKERS selector to the A position, and connect an 8Ω resistor and AC voltmeter to the speaker output terminals.
3. Set the FUNCTION switch to the AUX position, and apply a 1kHz, 150mV signal to the AUX input terminals.

4. Adjust the VOLUME control for an AC voltmeter reading of 28V.
5. Adjust VR1 (L) and VR2 (R) on the connector assembly so that the all points of the output power indicators light at above 28V.

Preamplifier (EQ Amplifier Assembly)

- Without input signal, turn the POWER switch ON.

Adjustment point	Prescribed value	Measuring terminals
MC Amplifier DC Balance		
VR1(L)	0 ± 30mV DC	TP1 and ground
VR2(R)	0 ± 30mV DC	TP2 and ground
EQ Amplifier DC Balance		
VR3(L)	0 ± 1mV DC	TP3 and ground
VR4(R)	0 ± 1mV DC	TP4 and ground

