

Service Manual

RTV servis Horvat

Kešinci, 31402 Semeljci

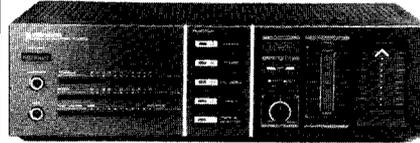
031-856-139

031-856-637

098-788-319

rtv-servis-horvat@os.tel.hr

Croatia

**CIRCUIT DESCRIPTIONS
REPAIR & ADJUSTMENTS**

**ORDER NO.
ARP-651-0**
STEREO AMPLIFIER

A-X500

MODEL A-X500 COMES IN THREE VERSIONS DISTINGUISHED AS FOLLOWS:

Type	Voltage	Remarks
HE	AC220V, 240V (switchable)	European continent model
HB	AC220V, 240V (switchable)	United Kingdom model
S	AC110V, 120V, 220V, 240V (switchable)	General export model

- This service manual is applicable to the HE, HB, & S types. For servicing of the HB, S types, please refer to pp. 19 ~ 20.

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PIONEER ELECTRONIC CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan

PIONEER ELECTRONICS (USA) INC. P.O. Box 1760, Long Beach, California 90801 U.S.A.

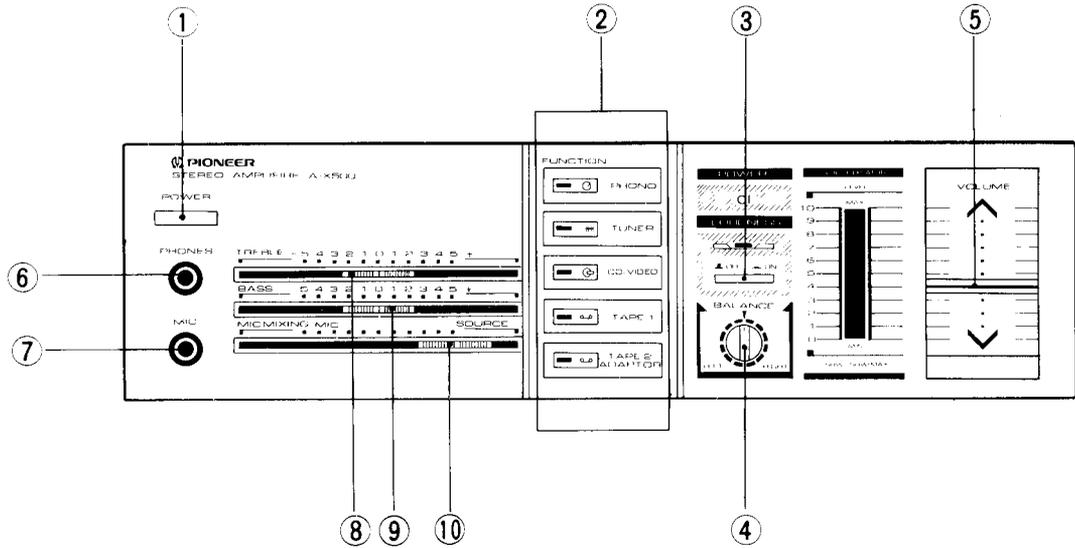
TEL: (800) 421-1404, (800) 237-0424

PIONEER ELECTRONIC (EUROPE) N.V. Keetberglaan 1, 2740 Beveren, Belgium TEL: 03/775-2808

PIONEER ELECTRONICS AUSTRALIA PTY. LTD. 178-184 Boundary Road, Braeside, Victoria 3195, Australia

TEL: (03) 580-9911

1. FRONT PANEL FACILITIES



① POWER switch

Press to turn power to the unit ON and OFF.
Depressed position (ON):
Power is supplied to the unit.
Released position (OFF):
Power to the unit is disconnected.

② FUNCTION switches/indicators

[PHONO] — Press when listening to record playback on a turntable.
[TUNER] — Press when listening to AM or FM broadcasts with a tuner.
[CD/VIDEO] — Press when listening to programs from a component connected to the CD/VIDEO terminals.
[TAPE 1] — Press when listening to tape playback with a tape deck.
[TAPE 2/ADAPTOR] — Press when using a component (sound processor, graphic equalizer) connected to the TAPE 2/ADAPTOR terminals. Also can be used during tape playback when a tape deck is connected to these terminals.

NOTE:

When a component is not connected to the TAPE 2/ADAPTOR terminals, or when the component connected is not being used, be sure to set the (TAPE 2/ADAPTOR) switch to the OFF position (the indicator will go out). If set to the ON position, no sound will be heard.

③ LOUDNESS switch/indicator

Use when listening at low volume levels.
Low and high frequencies are boosted to give punch to playback, even at low volumes.

④ BALANCE control

Should normally be left in the center position. Adjust balance if the sound is louder from one of the speakers. If the right side is louder, turn toward the (L) position and if the left side is louder, turn toward the (R) position.

⑤ VOLUME control

Use to adjust volume level.
Move up to increase volume.
Move down to lower volume.

⑥ PHONES jack

When using headphones, insert their plug into this jack. The sound from the speakers will automatically be disconnected.

⑦ MIC jack

When using a microphone, insert its plug into this jack.

⑧ TREBLE tone control

Use for adjusting the high-frequency tone. The central "0" position is the flat (normal) position. When moved to the right, high-frequency tones are emphasized; when moved to the left, high-frequency tones are deemphasized.

⑨ BASS tone control

Use to adjust the low-frequency tone. The central "0" position is the flat (normal) position. When moved to the right, low-frequency tones are emphasized; when moved to the left, low-frequency tones are deemphasized.

⑩ MIC MIXING

Use to adjust the sound balance between the microphone connected to the MIC jack, and components (tuner, tape deck, turntable, CD player, etc.) connected to the rear panel.

When the control is moved to the MIC side, the sound from the microphone will be at a maximum, while the sound from the other components will not be heard.

When moved to the SOURCE side, the sound from components will be at a maximum, and the microphone sound will not be heard.

NOTE:

When performing playback of source components only, leave the control set to the SOURCE side.

2. SPECIFICATIONS

Amplifier Section

Continuous average power output is 30 watts* per channel, min., at 8 ohms from 20 Hertz to 20,000 Hertz with no more than 0.1% total harmonic distortion.

DIN, Continuous Power Output at 1 kHz (both channels driven)

T.H.D. 1%, 8Ω 37 W per channel

Input (Sensitivity/Impedance)

PHONO 2.5 mV/50 kΩ

TUNER, CD/VIDEO, TAPE PLAY,

ADAPTOR 150 mV/50 kΩ

Phono Overload Level (T.H.D. 0.1%, 1 kHz)

. 150 mV

Output (Level/Impedance)

TAPE REC 150 mV/2.2 kΩ

Frequency Response

PHONO (RIAA Equalization)

. 20 Hz to 20 kHz ±0.3 dB

TUNER, CD/VIDEO, TAPE PLAY,

ADAPTOR 10 Hz to 100 kHz ±3 dB

Tone Control

BASS ±10 dB (100 Hz)

TREBLE ±10 dB (10 kHz)

Loudness Control (Volume control set at -40 dB

position)

100 Hz + 7 dB

10 kHz + 4 dB

Hum and Noise (IHF, short circuited, A network)

PHONO 72 dB

CD/VIDEO, ADAPTOR, TUNER,

TAPE PLAY 97 dB

Hum and Noise (DIN, continuous power 150 mW)

PHONO 67 dB/61 dB

CD/VIDEO, ADAPTOR, TUNER,

TAPE PLAY 85 dB/62 dB

Miscellaneous

Power Requirements

HE model a.c. 220 V ~, 50/60 Hz

HB model a.c. 240 V ~, 50/60 Hz

S model ~AC 110 V/120 V/220 V/240 V
(switchable), 50/60 Hz

Power Consumption

HE model 200 W

HB, YP models 200 W

S model 100 W

Dimensions 320 (W) x 98 (H) x 226(D) mm

12-5/8 (W) x 3-7/8 (H) x 8-7/8(D) in

Weight (without package) 4.2 kg (9lb 5oz)

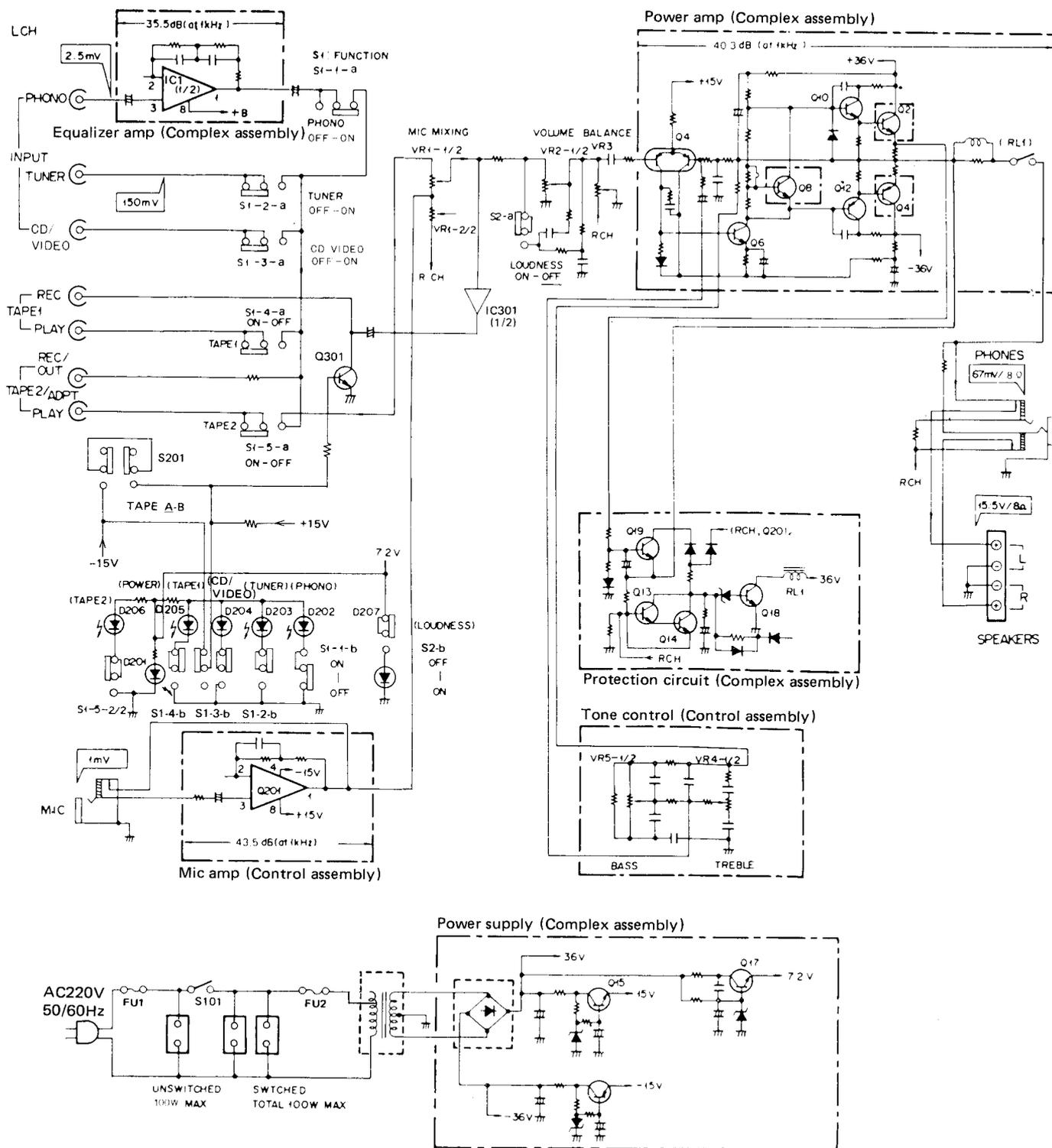
Furnished Part

Operating Instructions 1

NOTE:

- Specifications and design subject to possible modification without notice due to improvements.
- *Measured pursuant to the Federal Trade Commission's Trade Regulation rule on Power Claims for Amplifier.

3. BLOCK DIAGRAM



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4. CIRCUIT DESCRIPTIONS 5. PACKING

Equalizer Amplifier

The equalizer amp uses a low-noise IC (NJM 4558DXC) that contains both the left and right channel circuits.

Power Amplifier

This all-stage direct-coupled pure complementary SEPP circuit features a differential amplifier in the first stage, and incorporates the tone control circuits in the NFB loop.

The power stage is a complementary 2-stage Darlington connection, resulting in an output power rating of 30W+30W (8Ω, 20Hz~20kHz), harmonic distortion of less than 0.1%.

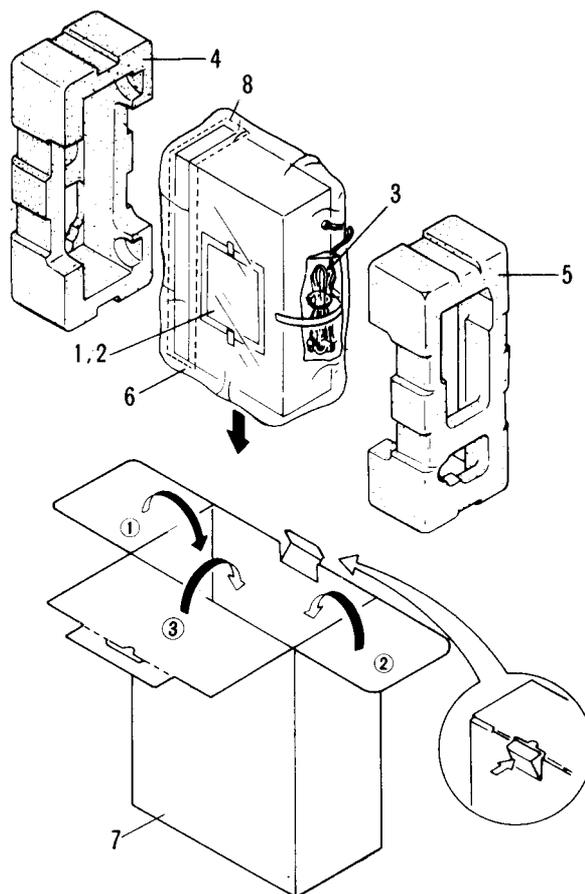
Mic Amplifier

The low-noise operation amplifier NJM4558-DXC serves as the mic amplifier.

Protection Circuit

The protection circuit includes muting when the power switch is switched on and off, speaker protection if a DC voltage is generated at the power amplifier output, and power amplifier protection if an overload is applied to the output stage of the circuit.

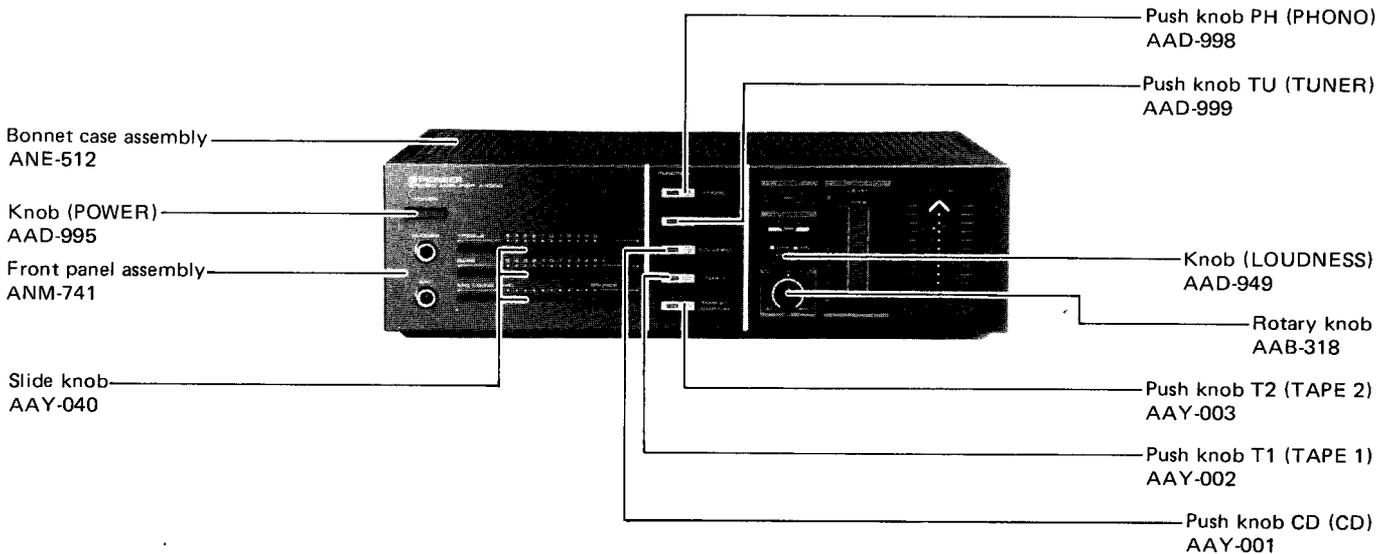
Mark	No.	Part No.	Description
	1.	ARE-117	Operating instructions
	2.	ARH-068	Sub instruction manual
	3.	AHG-153	Vinyl Pouch
	4.	AHA-324	Front pad
	5.	AHA-325	Rear pad
	6.	AHG-125	Sheet
	7.	AHE-460	Packing case assembly
	8.	AHG-187	Sheet



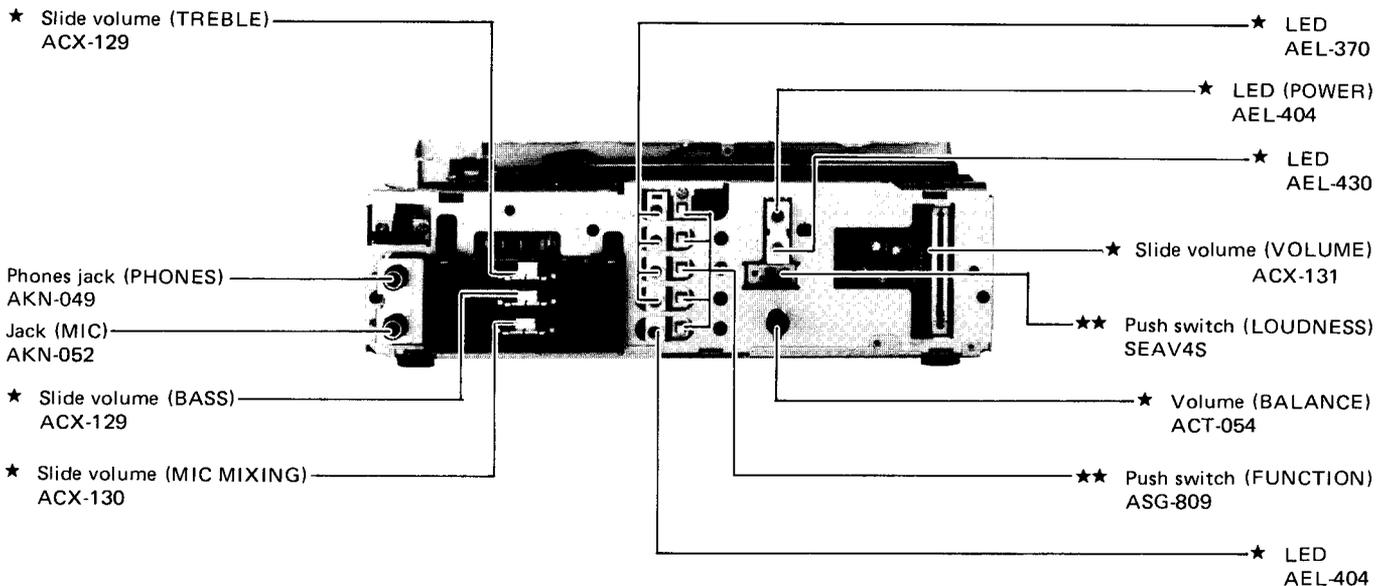
6. PARTS LOCATION

- *Parts without part number cannot be supplied.*
- *The \triangle 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.

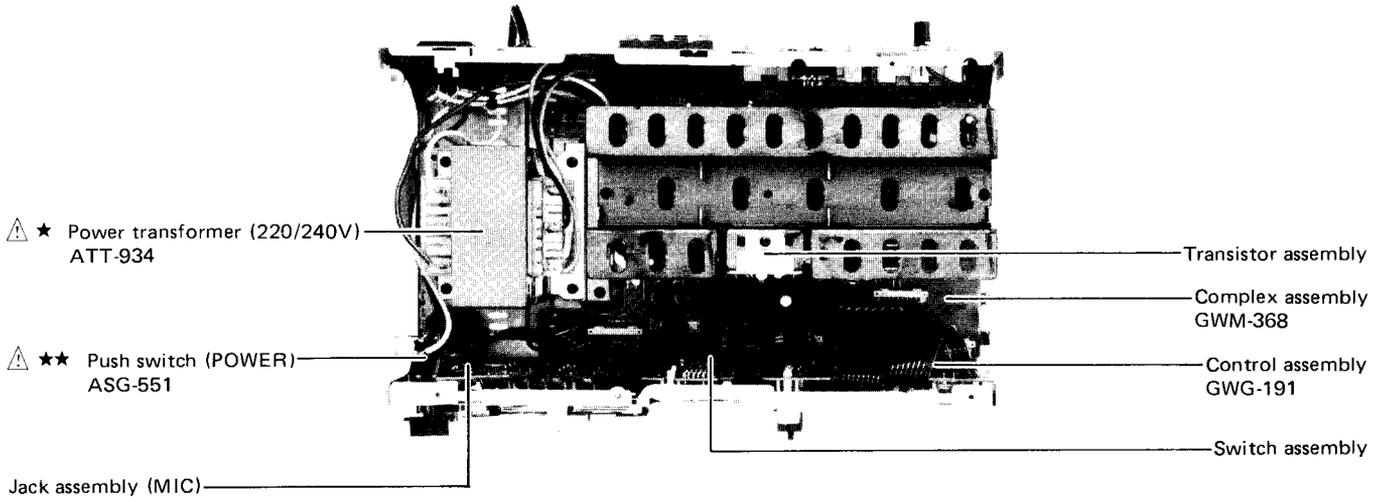
Front Panel View



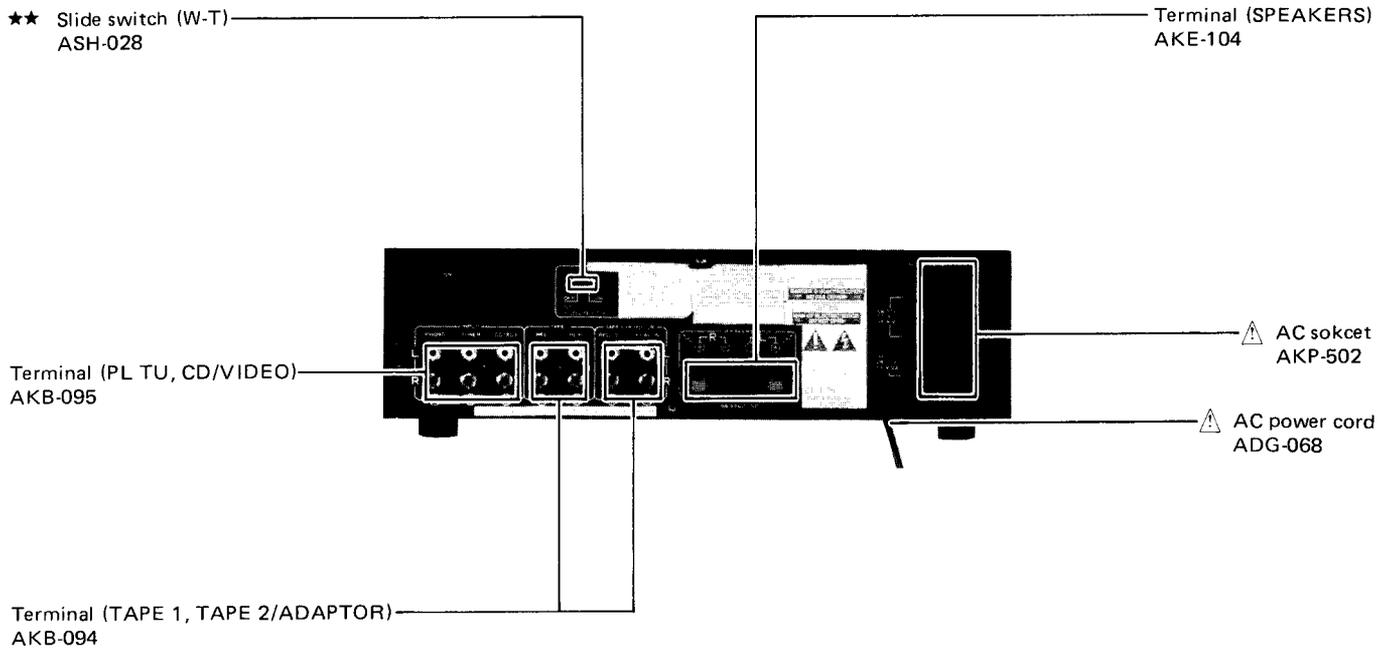
Front View with Panel Removed



Top View



Rear Panel View



1

2

3

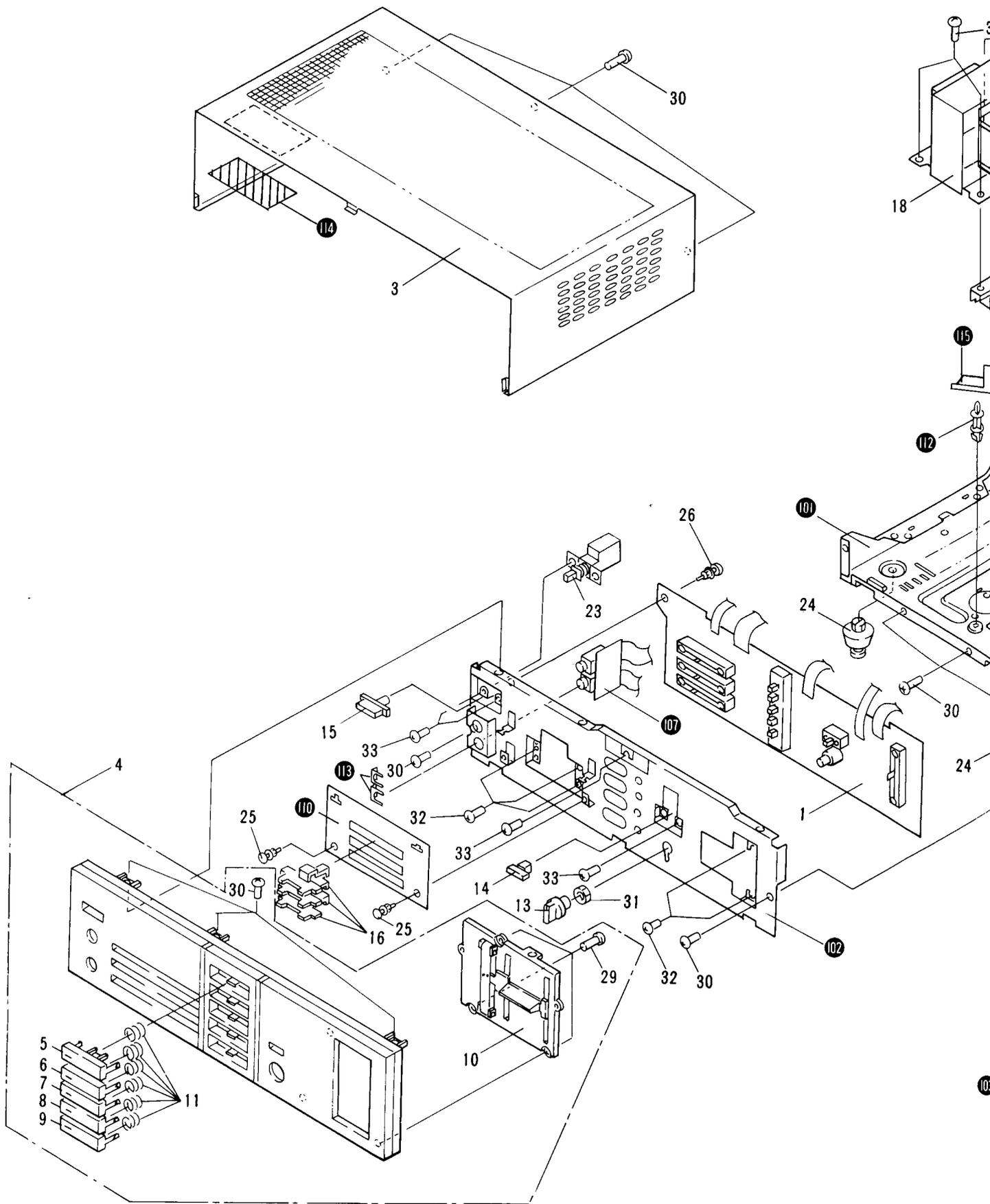
7. EXPLODED VIEW

A

B

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D

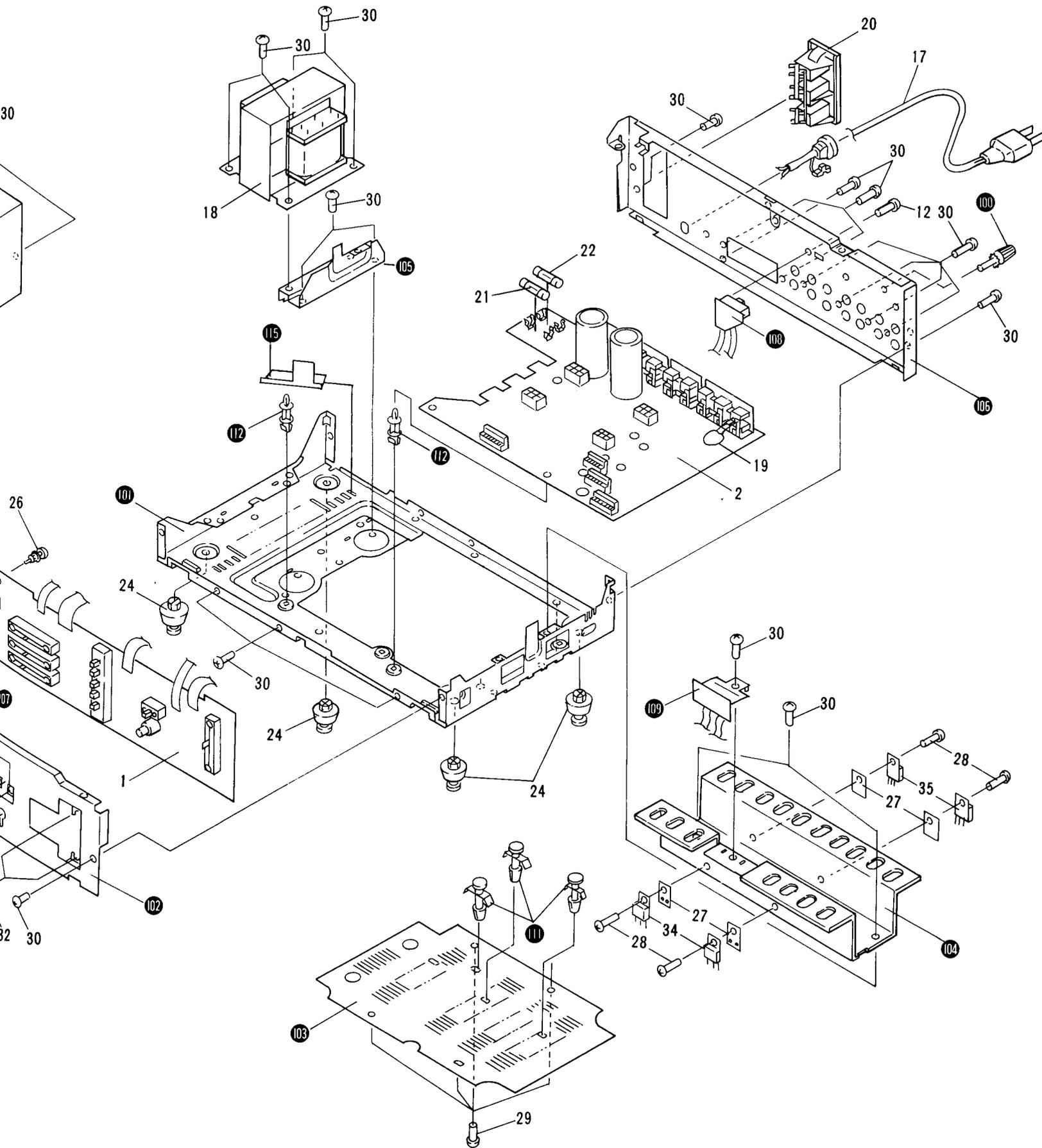


3

4

5

6



3

4

5

6

NOTES:

- Parts without part number cannot be supplied.
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- 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.

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	1	GWG-191	Control assembly		100		Terminal (GND)
	2	GWM-368	Complex assembly		101		Chassis
	3	ANE-512	Bonnet case assembly		102		Panel stay
	4	ANM-741	Front panel assembly		103		Bottom plate
	5	AAD-998	Push knob PH (PHONO)		104		Heat sink
	6	AAD-999	Push knob TU (TUNER)		105		Heat sink holder
	7	AAV-001	Push knob CD (CD)		106		Blind sheet
	8	AAV-002	Push knob T1 (TAPE 1)		107		Mic jack assembly
	9	AAV-003	Push knob T2 (TAPE 2)		108		Switch assembly
	10	AXC-024	Slide knob assembly		109		Transistor assembly
	11	ABH-137	Coil spring		110		Print sparser
	12	PMZ30P060FZB	Screw (3 x 6)		112		PCB holder
	13	AAB-318	Rotary knob		113		Mount plate
	14	AAD-949	Knob (LOUDNESS)		114		Sheet
	15	AAD-995	Knob (POWER)		115		PVC sheet
	16	AAV-040	Slide knob				
\triangle	17	ADG-068	AC power cord				
\triangle ★	18	ATT-934	Power transformer				
\triangle	19	CKDYF473Z50	Ceramic capacitor				
\triangle	20	AKP-502	AC socket				
\triangle ★★	21	AEK-403	Fuse (FU1)				
\triangle ★★	22	AEK-402	Fuse (FU2)				
\triangle ★★	23	ASG-551	Push switch (POWER)				
	24	AEP-016	Leg assembly				
	25	AEC-471	Rivet				
	26	.....	.....		
	27	AEC-818	Mica sheet				
	28	ABA-258	Screw				
	29	VBZ30P060FMC	Screw (3 x 6)				
	30	BBZ30P080FZK	Screw (3 x 8)				
	31	NK70FUC	Nut				
	32	PMZ20P030FZK	Screw (2 x 3)				
	33	VMZ30P060FMC	Screw (3 x 6)				
★★	34	2SC3181N-O/R*					
★★	35	2SA1264N-O/R*					

* hfe should have the same value.

A

B

C

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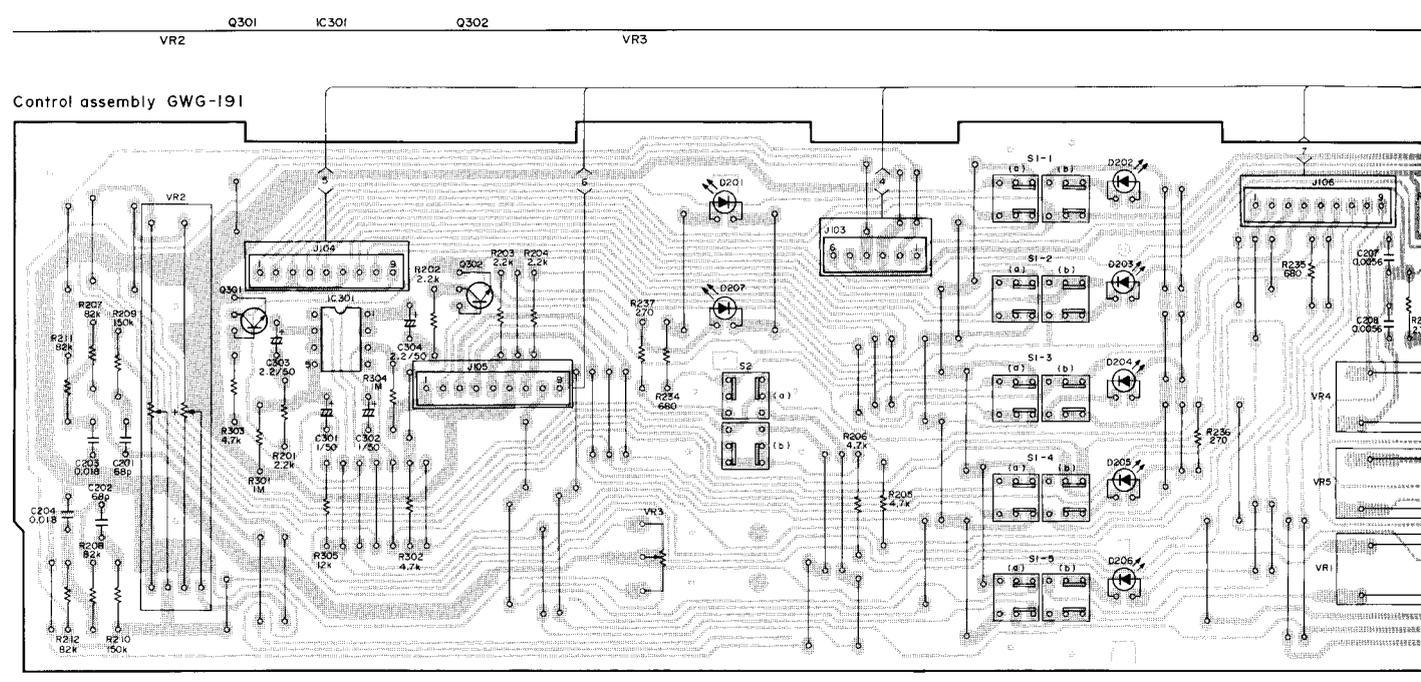
8. P.C. BOARDS CONNECTION DIAGRAM

A

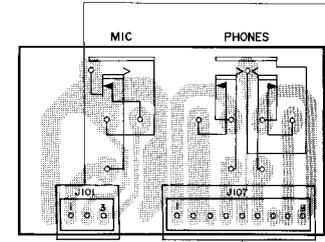
B

C

D



IC201, 301	NJM4558DXC	VR1	ACX-130	S1	ASG-809
Q301, 302	2SC2878	VR2	ACX-131	S2	SE AV4S
D201, 206	AEL-404	VR3	ACT-054		
D202~205	AEL-370	VR4,5	ACT-129		
D207	AEL-430				



MIC jack assembly

External Appearance of Transistors and ICs

2SC3181N
2SA1264N

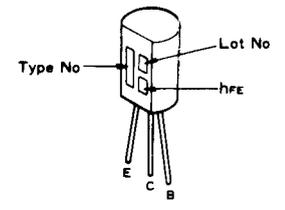
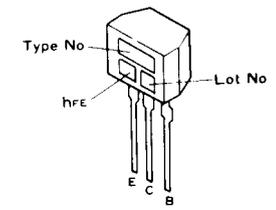
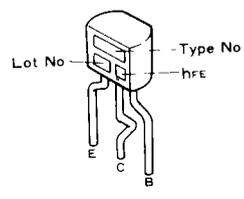
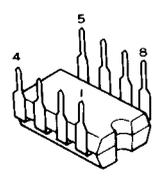
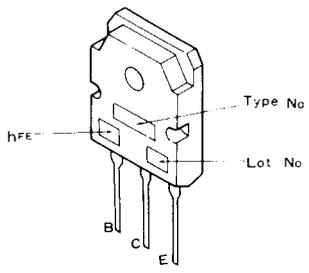
NJM4558DXC

2SC2603 (A)

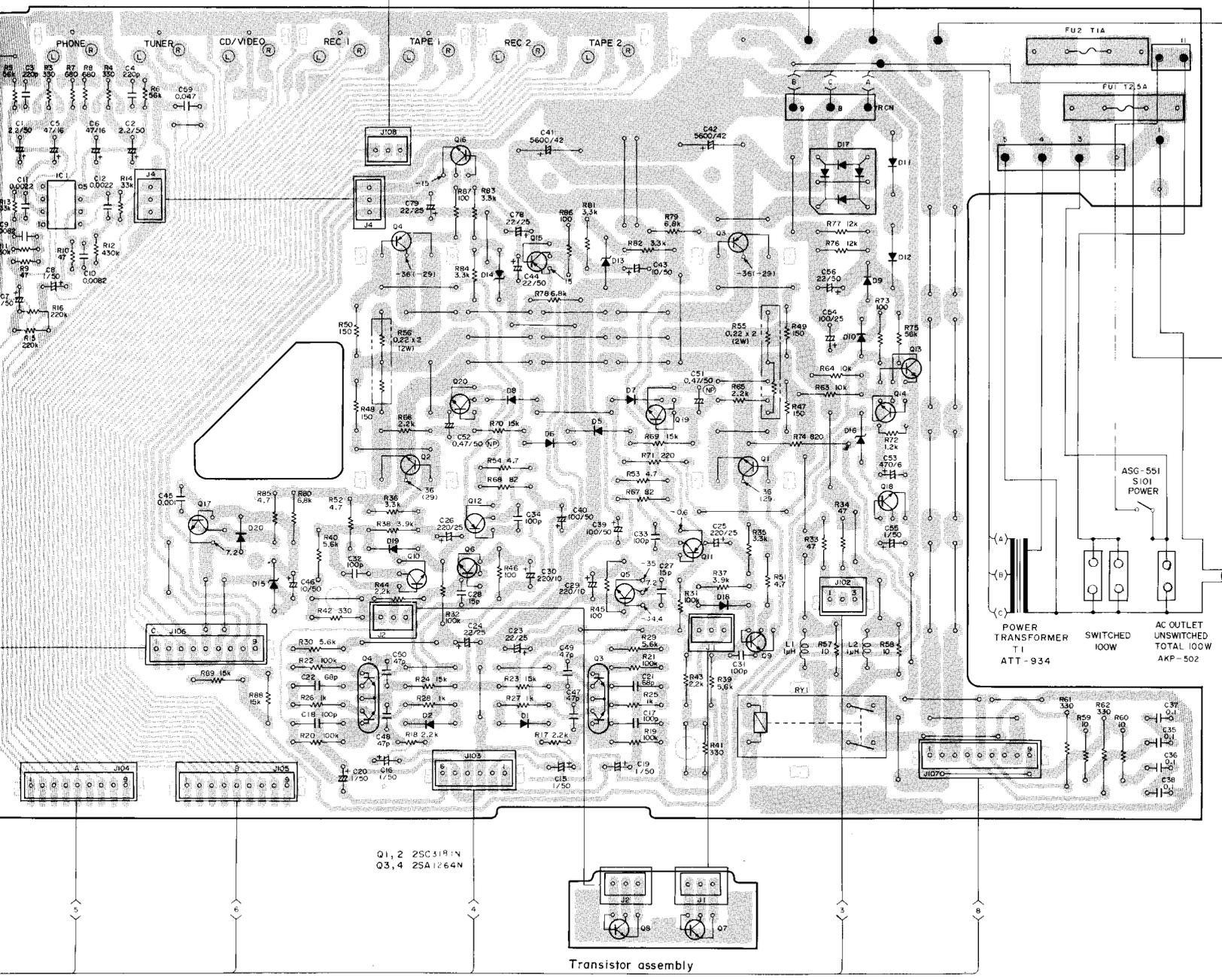
2SC1740S

2SB560

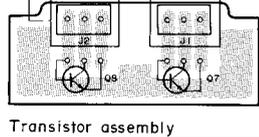
2SC...



Complex assembly GWM-368



Q1, 2 2SC3191N
 Q3, 4 2SA1264N

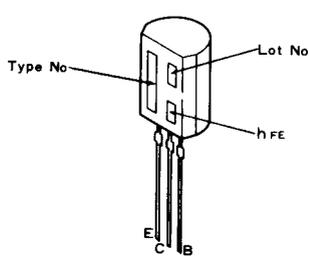
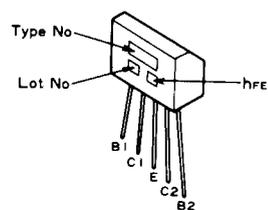
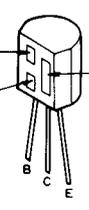


Transistor assembly

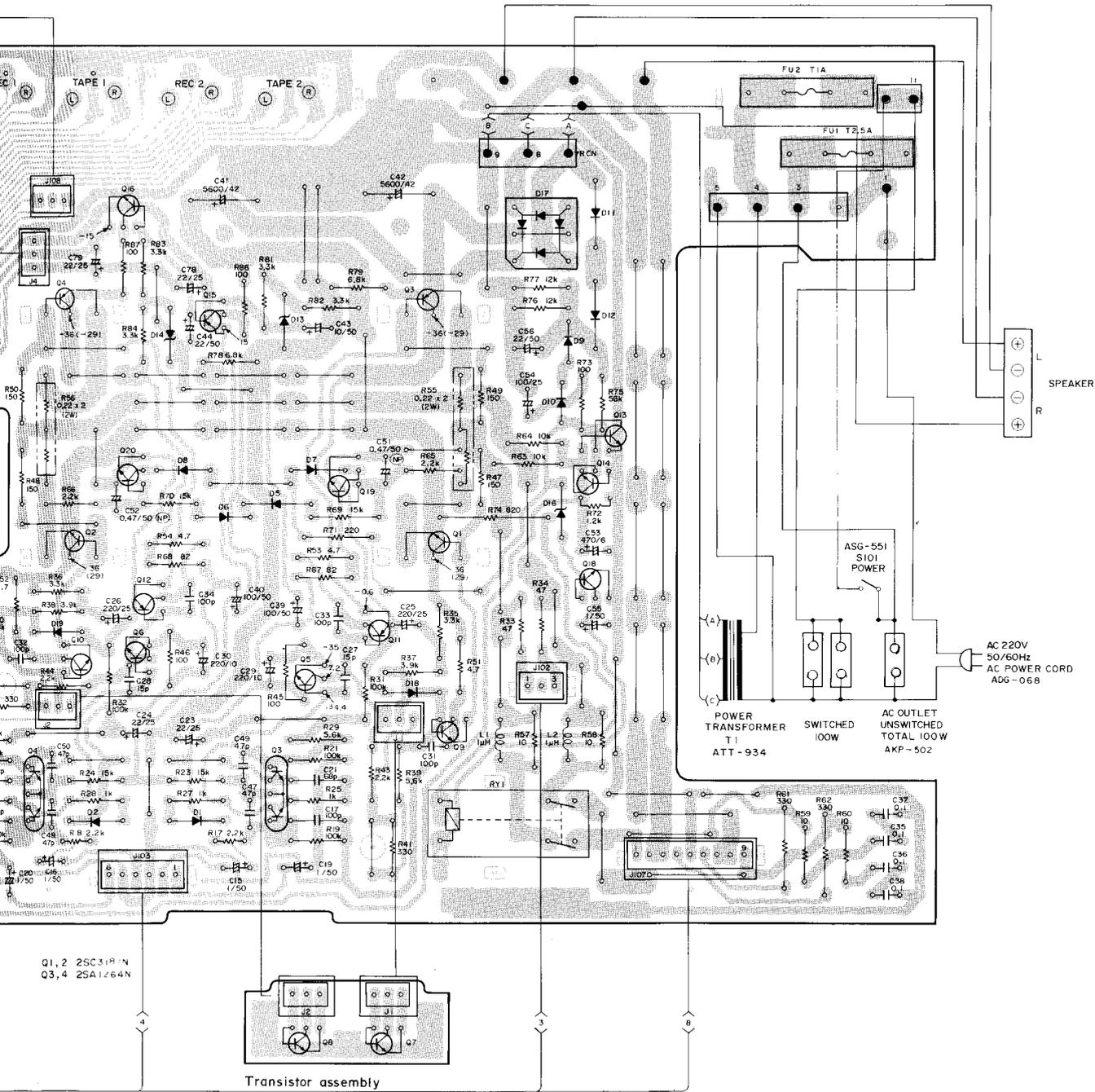
02
14

2SA979

2SD438



Q10 Q16 Q20 Q12 Q15 Q5 Q19 Q11 Q14 Q13
 Q4 Q6 Q3 Q9 Q18



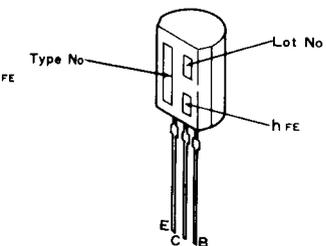
A

B

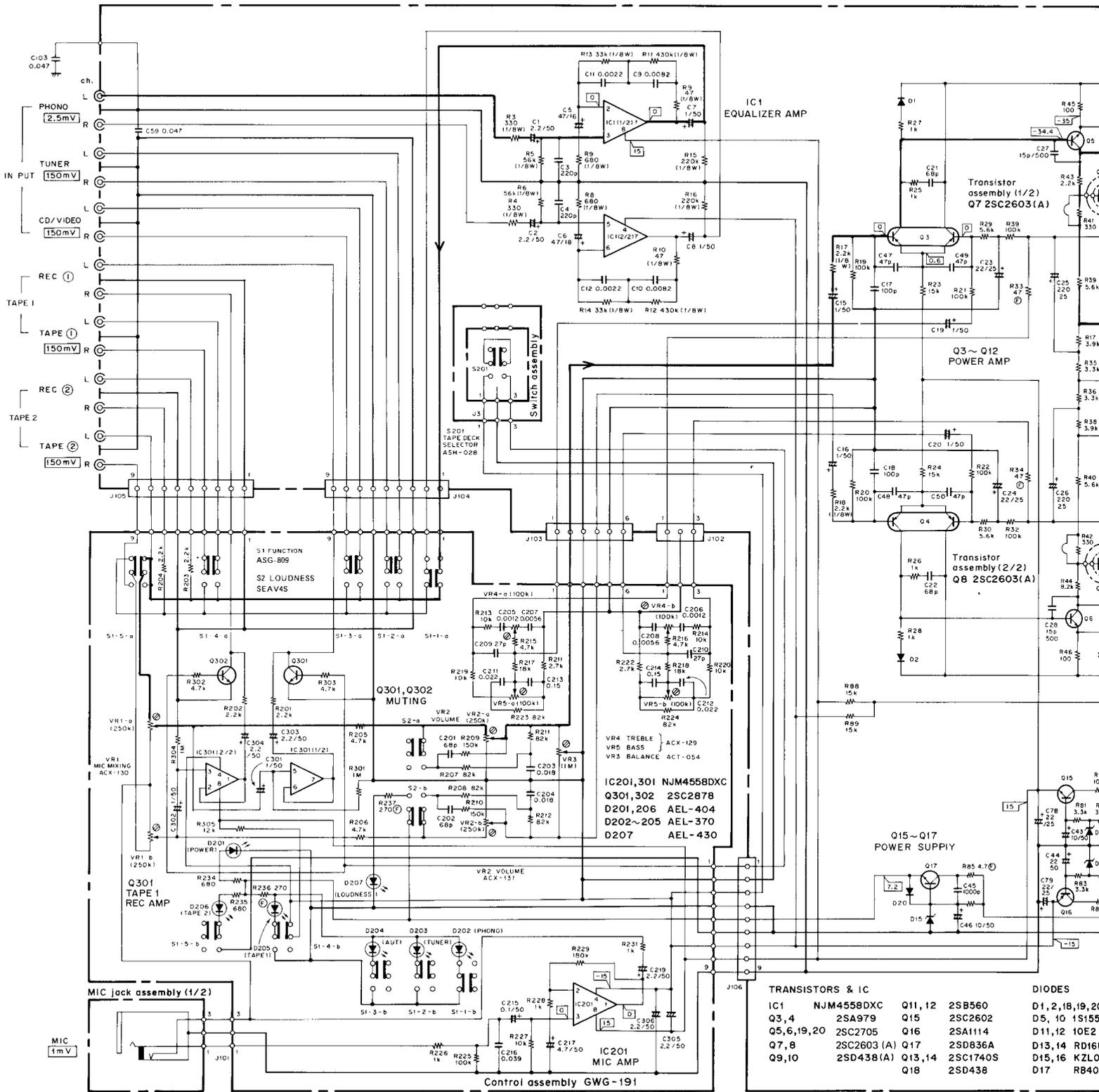
C

D

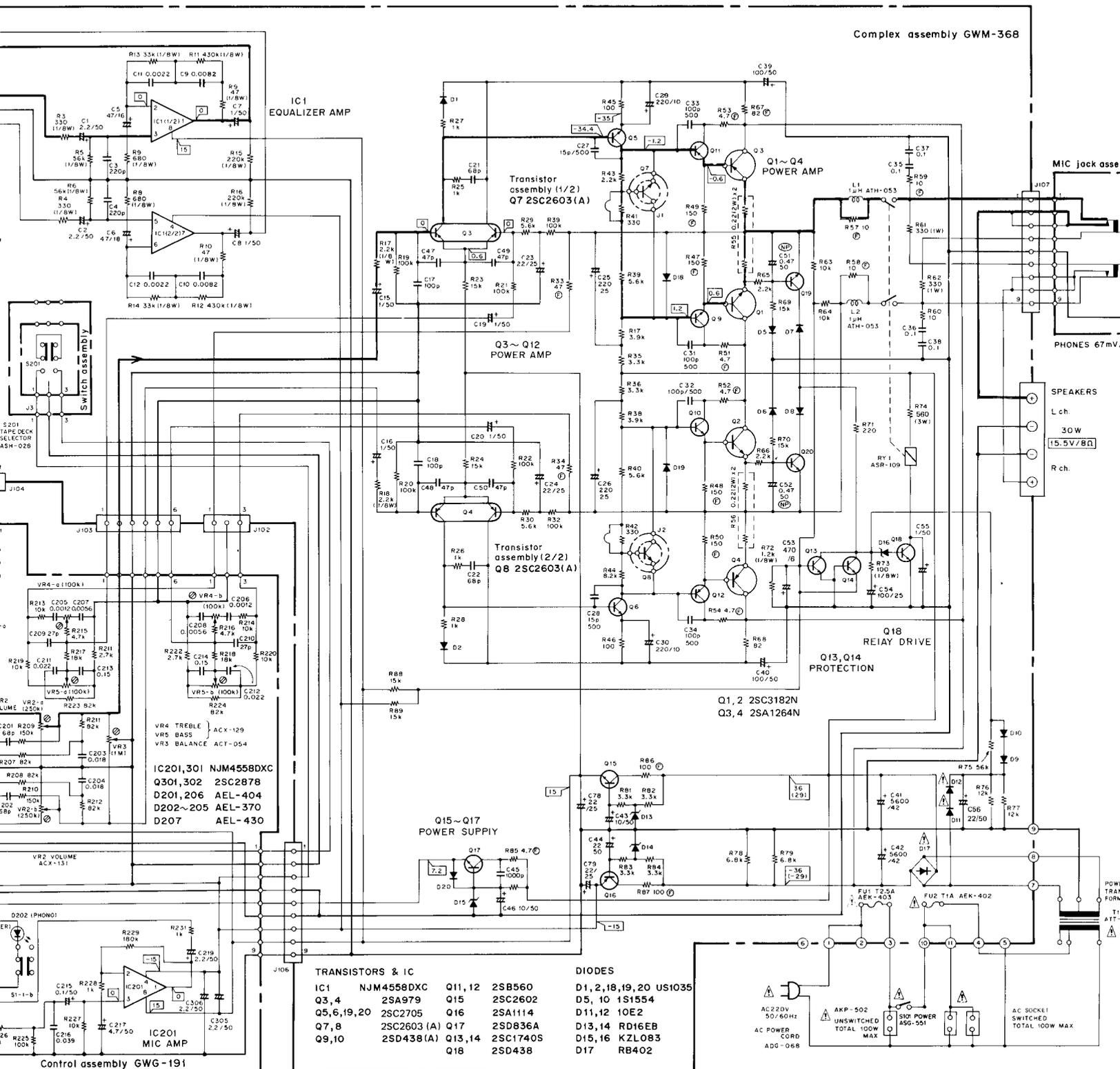
2SD438



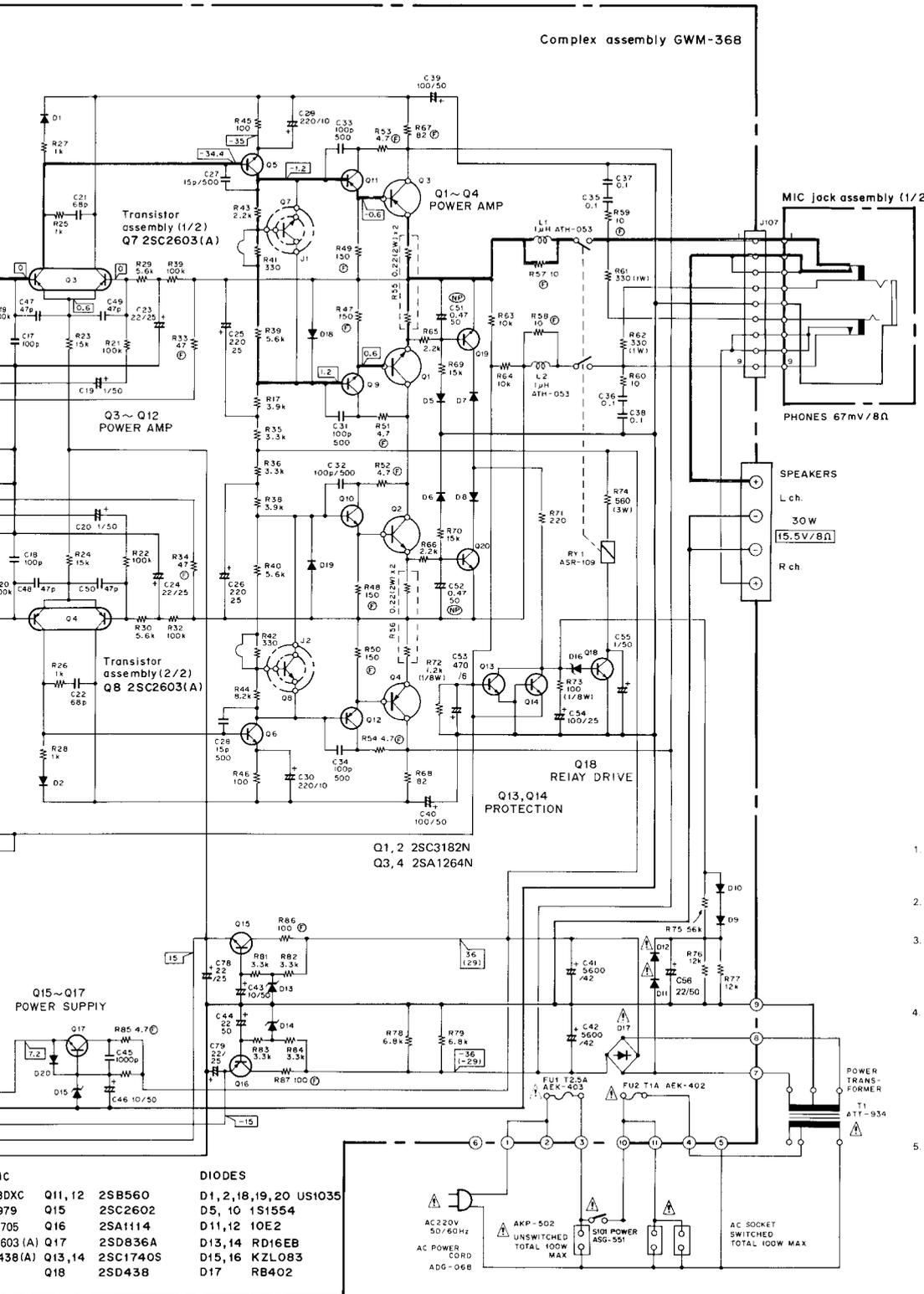
9. SCHEMATIC DIAGRAM



NOTE:
The indicated
Other alternat
listed in the pa



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



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- RESISTORS:**
 Indicated in Ω, 1/4W, 1/6W and 1/8W, 15% tolerance unless otherwise noted; k: kΩ, M: MΩ, (F): +1%, (G): 1.2%, (K): +10%, (M): ±20% tolerance.
 - CAPACITORS:**
 Indicated in capacity (μF)/voltage (V) unless otherwise noted; p: pF. Indication without voltage is 50V except electrolytic capacitor.
 - VOLTAGE, CURRENT:**
 □: Signal voltage at (30W + 30W, 8Ω) output (1kHz)
 ∟: DC voltage (V) at no input signal
 Value in () is DC voltage at rated power.
 mA: 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.
 ⊗ marked capacitors and resistors have parts numbers.
 The underlined indicates the switch position.
- This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.
- SWITCHES:**

S101	S101 : POWER SWITCH	ON -- OFF
FUNCTION	S1-1 : PHONO	ON -- OFF
	S1-2 : TUNER	ON -- OFF
	S1-3 : CD/VIDEO	ON -- OFF
	S1-4 : TAPE 1	ON -- OFF
MONITOR	S1-5 : TAPE 2	ON -- OFF
	S2 : LOUDNESS	ON -- OFF

A

B

C

D

10. ELECTRICAL PARTS LIST

NOTES:

- When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).

560Ω	56 × 10 ¹	561	.....	RD¼PS	561J
47kΩ	47 × 10 ³	473	.....	RD¼PS	473J
0.5Ω	0R5	.....	.....	RN2H	0R5K
1Ω	010	.....	.....	RS1P	010K

Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ	562 × 10 ¹	5621	RN¼SR	5621F
--------	-----------------------	------	-------	-------	-------

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This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

P.C.B. Assemblies

Mark	Symbol & Description	Part No.
	Complex assembly	GWM-368
	Control assembly	GWG-191
	Switch assembly	
	Transistor assembly	
	Microphone jack assembly	

SWITCHES

Mark	Symbol & Description	Part No.
★★	S2 (LOUDNESS)	SEAV4S
★★	S1 (FUNCTION)	ASG-809

CAPACITORS

Mark	Symbol & Description	Part No.
	C209, C210	CCDSL 270J 50
	C201, C202	CCDSL 680J 50
	C215	CEANL 0R1M 50
	C219	CEA 2R2M 50L
	C217	CEA 4R7M 50L
	C305, C306	CEJA 2R2M 50
	C301, C302	CEJANL 010M 50
	C303, C304	CEJANL 2R2M 50
	C205, C206	CQMA 122K 50
	C213, C214	CQMA 154K 50
	C203, C204	CQMA 183K 50
	C211, C212	CQMA 223K 50
	C216	CQMA 393K 50
	C207, C208	CQMA 562K 50

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	Q1, Q2	2SC3181N-O/R*
★★	Q3, Q4	2SA1264N-O/R*

*hfe should have the same value.

OTHERS

Mark	Symbol & Description	Part No.
	C103 Ceramic capacitor	CKDYF473Z50
 ★	T1 Power transformer	ATT-934
 ★	AC outlet	AKP-502
 ★★	S101 Push switch	ASG-551
 ★★	FU1 Fuse (2.5A)	AEK-403
 ★★	FU2 Fuse (T1A)	AEK-402
 ★	Power cord	ADG-068
	Mica sheet	AEC-818

Control Assembly (GWG-191)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC201, IC301	NJM4558DXC
★★	Q301, Q302	2SC2878
★	D202-D205	AEL-370
★	D201, D206	AEL-404
★	D207	AEL-430

RESISTORS

Note: When placing orders for resistors, fill in the spot with the code and enter the original part number.

Mark	Symbol & Description	Part No.
★	VR3 (BALANCE)	ACT-054
★	VR4, VR5 (BASS, TREBLE)	ACX-129
★	VR1 (MIC MIXING)	ACX-130
★	VR2 (VOLUME)	ACX-131
	R236, R237	RD¼ PMFL 271J
	R201-R229, R231, R234-R235,	RD¼, PM <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> J
	R301-R305	

Microph

Mark S

Complex

SEMICON

Mark S

★★

★★

★★

★★

★★

★★

★★

★★

★★

★★

★★

★

★

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COILS

Mark S

RELAY

Mark S

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CAPACIT

Mark S

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Microphone Jack Assembly

Mark	Symbol & Description	Part No.
	Headphones jack	AKN-049
	Microphone jack	AKN-052

Complex Assembly (GWM-368)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC1	NJM4558DXC
★★	Q16	2SA1114
★★	Q3, Q4	2SA979
★★	Q11, Q12	2SB560(A)-E/F*
★★	Q13, Q14	2SC1740S (2SC2603)
★★	Q15	2SC2602
★★	Q5, Q6, Q19, Q20	2SC2705
★★	Q9, Q10	2SD438(A)-E/F*
★★	Q18	2SD438
★★	Q17	2SD836A
★	D15, D16	KZL083
△	★ D17	RB402
★	D13, D14	RD16EB (HZ16EB)
★	D1, D2, D18, D19, D20	US1035 (IS1555)
★	D5-D10	IS1554
△	★ D11, D12	10E2

*hfe should have the same value.

COILS

Mark	Symbol & Description	Part No.
	L1, L2 (1μH)	ATH-053

RELAY

Mark	Symbol & Description	Part No.
★★	RY1	ASR-109 (ASR-107)

CAPACITORS

Mark	Symbol & Description	Part No.
	C41, C42 (5600/42V)	ACH-239
	C31-C34	CCDSL 101K 500
	C27, C28	CCDSL 220K 500
	C3, C4	CCDSL 221J 50
	C47-C50	CCDSL 470J 50
	C17, C18	CCPSL 101J 50
	C21, C22	CCPSL 680J 50
	C7, C8	CEANL 010M 50
	C1, C2	CEANL 2R2M 50
	C5, C6	CEANL 470M 16
	C51, C52	CEANPR 47M 50
	C25, C26	CEAS 221M 25
	C55	CEA 010M 50L
	C43, C46	CEA 100M 50L
	C54	CEA 101M 25L

Mark	Symbol & Description	Part No.
	C39, C40	CEA 101M 50L
	C78	CEA 220M 25L
	C79	CEA 220M 25L
	C44, C56	CEA 220M 50L
	C29, C30	CEA 221M 10L
	C53	CEA 471M 6L
	C15, C16, C19, C20	CEXA 010M 50
	C23, C24	CEAX 220M 25
	C45	CKDYB 102K 50
	C59	CKDYF 473Z 50
	C35-C38	CQMA 104K 50
	C11, C12	CQMA 222J 50
	C9, C10	CQMA 822J 50

RESISTORS

Note: When placing orders for resistors, fill in the □□□ spot with the code and enter the original part number.

Mark	Symbol & Description	Part No.
	R55, R56 (0.22Ω, 2W)	ACN-131
	R59, R60	RD¼PMFL 100J
	R33, R34	RD¼PMFL 470J
	R71	RD¼PMF 221J
	R57, R58	RFA¼PS 100J
	R86, R87	RFA¼PS 101J
	R47-R50	RFA¼PS 151J
	R51-R54, R85	RFA¼PS 4R7J
	R67, R68	RFA¼S 820J
	R61, R62	RS1PMF 331J
	R74	RS3LMF 561J
	R19-R32, R35-R46, R63, R66	RD¼PM □□□ J
	R69, R70, R75-R84, R88, R89	Resistors other than above
		RD1/8PM □□□ J

OTHERS

Mark	Symbol & Description	Part No.
	Terminal (4P)	AKB-094
	Terminal (SPEAKERS)	AKE-104
	Transistor socket	AKH-017

Switch Assembly

SWITCH

Mark	Symbol & Description	Part No.
★★	S201 (TAPE A/B)	ASH-028

Transistor Assembly

SEMICONDUCTORS

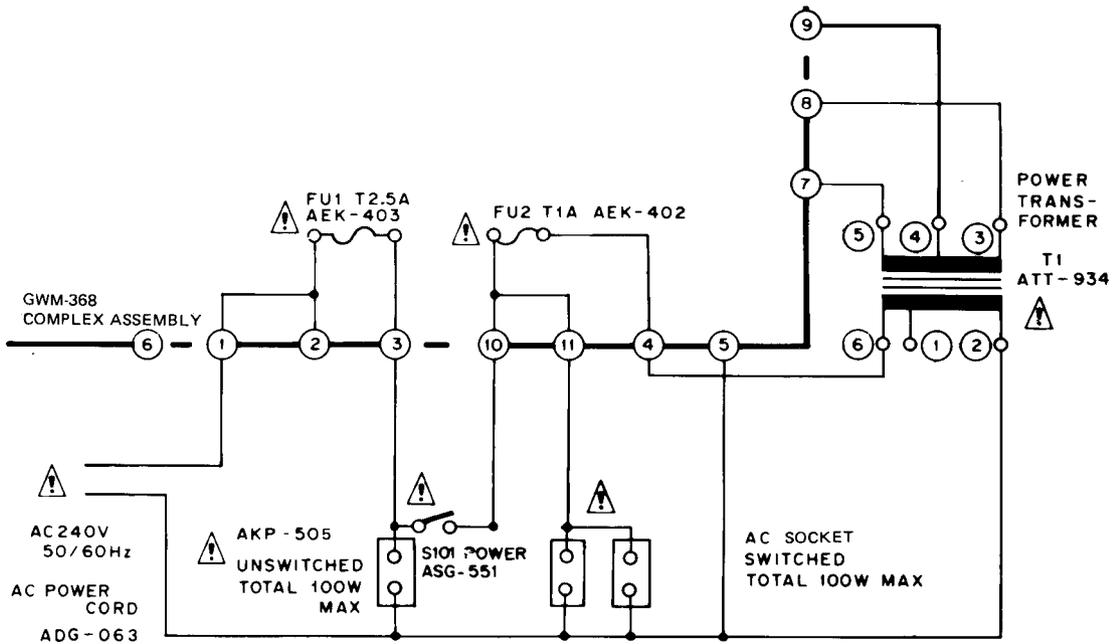
Mark	Symbol & Description	Part No.
★★	Q7, Q8	2SC2603 (A)

11. FOR HB TYPE

The HB type is the same as the HE type with the exception of the following sections.

Contrast of Miscellaneous Parts

Mark	Symbol & Description	Part No.		Remarks
		HE type	HB type	
⚠	AC socket	AKP-502	AKP-505	
⚠	AC power cord	ADG-068	ADG-063	
	Nylon rivet	.....	AEC-525	
	Operating instructions (English/French/German/Italian) (English)	ARE-117	.....
	Sub instructions	ARH-068	ARB-638	
	Packing case assembly	AHE-460	ARH-069	
			AHE-461	



Line voltage selection(FOR HE, HB TYPES)

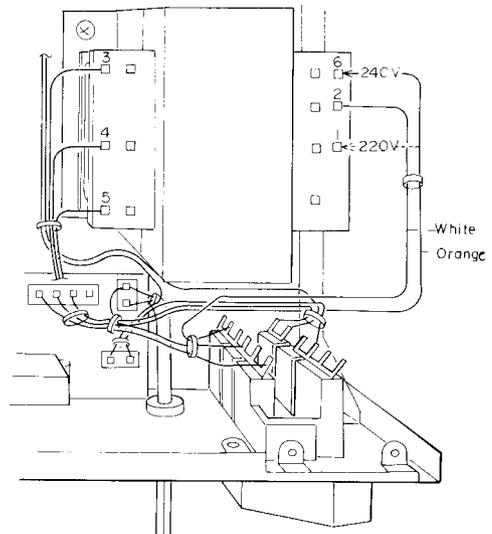
Line voltage can be changed with following steps.

1. Descomment the AC power cord.
2. Remove the top cover.
3. Change the connection wire (To power transformer) of terminal No. 1 (ORANGE) as follows:

Voltage	Terminal No. 1	Terminal No. 6
220V	Orange wire	.....
240V	.....	Orange wire

4. Stick the line voltage label on the rear panel.

Part No.	Description
AAX-192	220V label
AAX-192	240V label



12. FOR S TYPE

The S type is the same as the HE type with the exception of the following section.
 Contrast of Miscellaneous parts

Mark	Symbol & Description	Part No.		Remarks
		HE type	S type	
⚠	C101 (0.01/250V)	ACG-001	RTV servis Horvat Kešinci, 31402 Semeljci 031-856-139 031-856-637 098-788-319 rtv-servis-horvat@os.tel.hr Croatia
⚠ ★	T1	ATT-934	ATT-965	
⚠	AC Socket	AKP-502	AKP-504	
⚠ ★★	S102 Line voltage selector	.....	AKX-504
⚠ ★★	FU1 (T2.5A)	AEK-403	.....
	(T1.6A)	.....	AEK-121
⚠ ★★	FU2 (T1A)	AEK-402	.....
	(T1.6A)	.....	AEK-121
⚠	Power cord	ADG-068	ADG-060	
⚠ ★★	S101 Push switch (POWER)	ASG-551	ASG-551	
		(.....)	(ASG-549)	
	Operating instructions (English/French/German/Italian) (English)	ARE-117	.....
	Sub instructions	ARH-068	ARB-638	
	Sub instructions	.....	ARH-073
	Packing case assembly	AHE-460	ARC-081	
		.....	AHE-461

