

Service Manual

**CIRCUIT DESCRIPTIONS
REPAIR & ADJUSTMENTS**



**ORDER NO.
ARP1184-A**

STEREO CONTROL AMPLIFIER

C-90(BK)

MODEL C-90 (BK) COMES IN FIVE VERSIONS DISTINGUISHED AS FOLLOWS:

Type	Power requirement	Export destination
KU	AC120V only	U.S.A.
HE	AC220V, 240V (switchable)	European continent
HEZ	AC220V, 240V (switchable)	West Germany
HB	AC220V, 240V (switchable)	United Kingdom
S/G	AC110V, 120V, 220V, 240V (switchable)	U.S. Military

- This service manual is applicable to the HEZ type.
- As to the HE and HB types, please refer to the additional service manual (ARP1212).
- As to the KU and S/G types, please refer to C-90 (BK)/KU and S/G service manual (APR1205).

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1. SPECIFICATIONS

Amplifier section

Rated power	
20 Hz—20 kHz, 0.01%	8 V
Harmonic distortion	
20 Hz—20 kHz, 1 V	0.002%
Cross modulation distortion (50 Hz: 7 kHz = 4 : 1)	
1 V	0.002%
Input terminals (sensitivity/impedance)	
PHONO MM	2.5 mV/50 k Ω
PHONO MC	250 μ V/40 Ω
	125 μ V/3 Ω
TUNER, CD, TAPE PLAY, ADAPTOR	150 mV/50 k Ω
Output terminals (output level/output impedance)	
TAPE REC	150 mV/1 k Ω
PRE OUT	1 V/600 Ω
Frequency response	
PHONO MM 20 Hz—20 kHz	\pm 0.2 dB
TUNER, CD, AUX, 20 Hz—20 kHz	+ 0 dB
	-0.2 dB
Tone control	
BASS	\pm 9 dB, 100 Hz
TREBLE	\pm 9 dB, 10 kHz
Filter	
LOW (SUBSONIC)	7 Hz, 6 dB/oct
HIGH	10 kHz, 6 dB/oct
MUTING	-20 dB
SN ratio (short-circuit, A network)	
PHONO MM	96 dB
PHONO MC	86 dB
TUNER, CD, TAPE PLAY, ADAPTOR	109 dB

Power section, etc.

Power requirements	AC 220 V \sim , 50/60 Hz
Power consumption	26 W
AC outlets	
Linked to power switch (x2)	250 W
Unlinked to power switch (x1)	250 W
External dimensions	457 (W) x 405 (D) x 125 (H)
Weight	9.0 kg

Accessories

Operating Instructions	1
Pin-plug cord	1

The specifications and appearance noted above may change without notice due to improvements.

Precautions for installation

To ensure optimum sound quality, observe the following precautions.

- This unit is heavy. Be sure to install it on a firm base which can support its weight. Also, to prevent the flow of cooling air from being blocked off, do not place the unit on soft material such as a carpet or cushion, or install it in a confined space. When installing the unit in a rack, provide adequate space around it to allow heat to dissipate.
- To prevent the control amplifier from picking up noise due to leakage flux from the power amplifier when the control amplifier and power amplifier are installed adjacent to each other, install the control amplifier on the right of the power amplifier. Also, if you install the control amplifier above or below the power amplifier, place a partition between them to separate them by at least 10 cm from each other.
- Install the unit on a level surface so that the feet of the unit are all touching the installation surface.

2. FRONT PANEL FACILITIES

FRONT PANEL

POWER switch/indicator

Press this switch to turn this unit's power ON/OFF. When you switch the unit ON, the muting function will be activated, and the indicator will flash. Once the flashing indication changes to a steady indication, the unit will operate normally.

VOLUME control

Use to adjust the sound volume. At the [∞] position, sound will not be heard, while at the [0] position, sound volume will be at its maximum.

MUTING switch/indicator

Use to temporarily -20 dB audio signals. When this switch is pressed so that the indicator lights, the muting circuit operates to reduce the level of all audio signals by 20 dB. When set to the OFF position, the volume is returned to its previous level.

INPUT SELECTOR switch/indicator

Use to select playback audio components (indicator lights).

[CD]— Compact disc player.

[Phono]— Stereo turntable.

[Tuner]— Tuner for listening to FM/AM broadcasts.

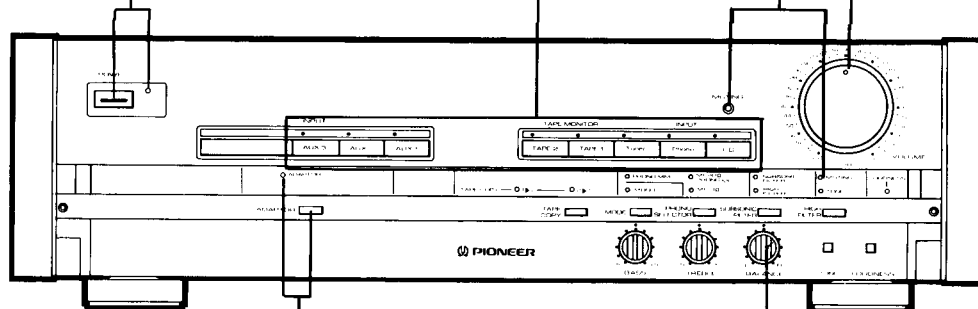
[TAPE 1]— The tape deck connected to the rear panel Tape 1 terminals.

[TAPE 2]— The tape deck connected to the rear panel Tape 2 terminals.

[AUX 1]— The audio component connected to the rear panel AUX 1 terminals.

[AUX 2]— The audio component connected to the rear panel AUX 2 terminals.

[AUX 3]— The audio component connected to the rear panel AUX 3 terminals.



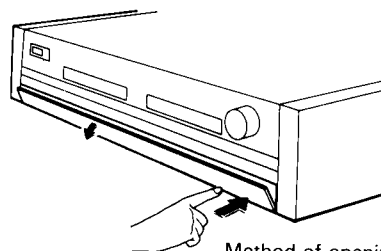
ADAPTOR switch/indicator

Normally, set this switch OFF.

Set to ON when using a surround processor or graphic equalizer connected to the rear panel adaptor terminals AUDIO IN/OUT.

BALANCE control

Normally, leave in the center position; use it to adjust the right-left sound volume when it seems to be unevenly balanced. When the sound is too loud on the right side, turn the control in the LEFT direction; when too loud on the left side, turn the control in the RIGHT direction.



Method of opening cover

TAPE COPY switch/indicator

Use this switch when you are using two tape decks and copying one tape to another tape.

- [1 ► 2]— When copying a tape in the tape deck connected to the TAPE 1 PLAY terminals to the tape deck connected to the TAPE 2 REC terminals.
- [2 ► 1]— When copying a tape in the tape deck connected to the TAPE 2 PLAY terminals to the tape deck connected to the TAPE 1 REC terminals.

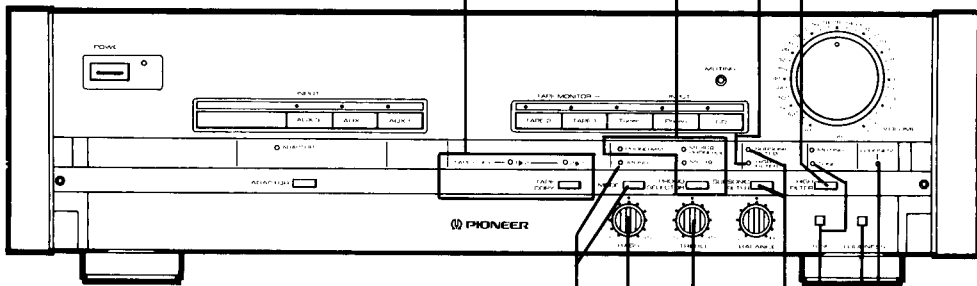
HIGH FILTER switch/indicator

When this switch is pressed to the ON position, the indicator lights and a high-cut filter (cutoff frequency 10 kHz) is activated.

PHONO SELECTOR switch/indicator

Set in accordance with the type of cartridge used on your turntable (the corresponding indicator will light).

- [MM]— Set here when using a moving magnet cartridge, or a high-output (1mV or more) moving coil (MC) cartridge.
- [MC 40 Ω]— Set here when using a moving coil cartridge with impedance of 40 Ω.
- [MC 3 Ω]— Set here when using a MC cartridge with impedance of 3 Ω.



MODE switch/indicator

Use to select the stereo or monaural audio playback mode. Normally, this switch is not used. When the monaural playback mode is selected, press this switch; the MODE MONO indicator will light.

SUBSONIC FILTER switch/indicator

When this switch is pressed to the ON position, the indicator lights and a subsonic filter (cutoff frequency 7 Hz) is activated. Use to remove low-frequency noise due to warped records, etc.

Tone controls

These controls can be used only when the TONE indicator is lighted.

- [BASS]— Use to adjust low-frequency sounds. The center indicates the standard (flat) position. When the control is rotated to the right, low-frequency sounds are augmented; when rotated to the left, low-frequency sounds are attenuated.
- [TREBLE]— Use to adjust high-frequency sounds. The center indicates the standard (flat) position. When the control is rotated to the right, high-frequency sounds are augmented; when rotated to the left, high-frequency sounds are attenuated.

TONE switch/indicator

- [ON]— The TONE indicator lights, and audio inputs from all components are played back after passing through the tone control circuits. In this condition, the tone controls (BASS, TREBLE) can be used to adjust sound quality.
- [OFF]— The TONE indicator goes out, and signals are played back without passing through the tone control circuits.

LOUDNESS switch/indicator

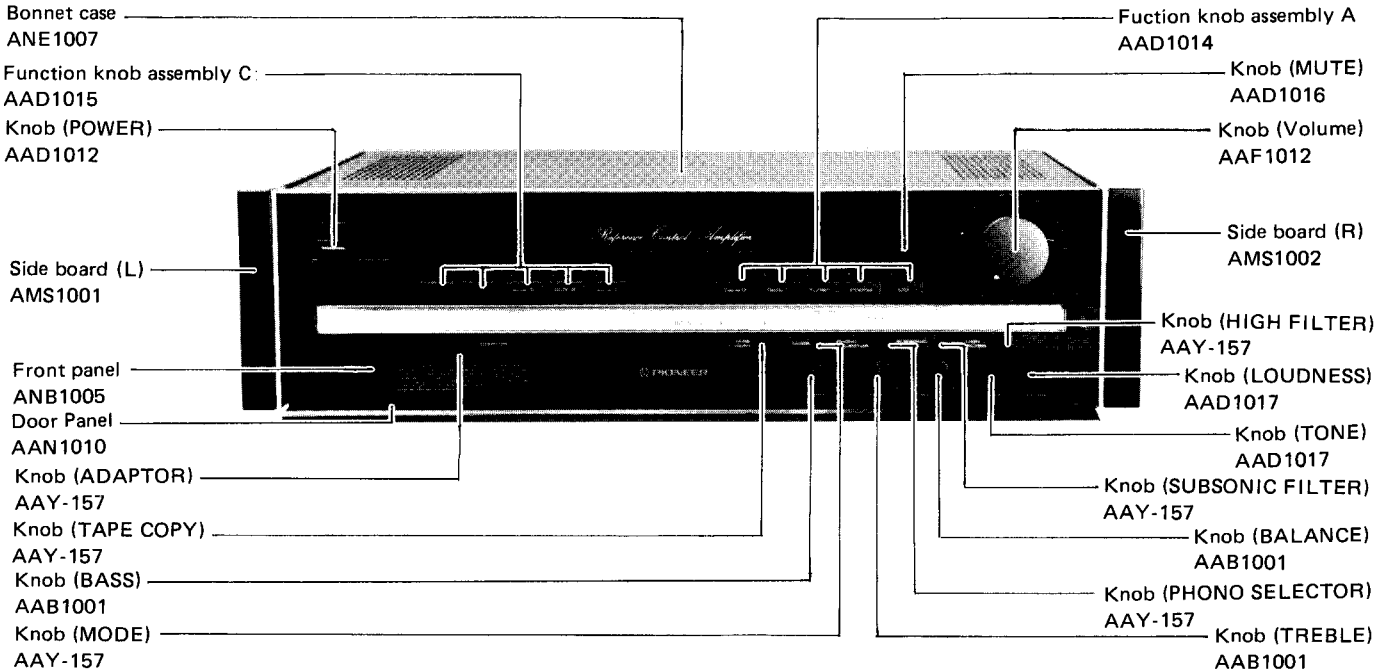
Use this switch when you wish to listen at low volume. Normally, leave it OFF. When you turn this switch ON (indicator lights), the bass and treble will be accentuated, providing dynamic reproduction even at low volume.

3. PARTS LOCATION

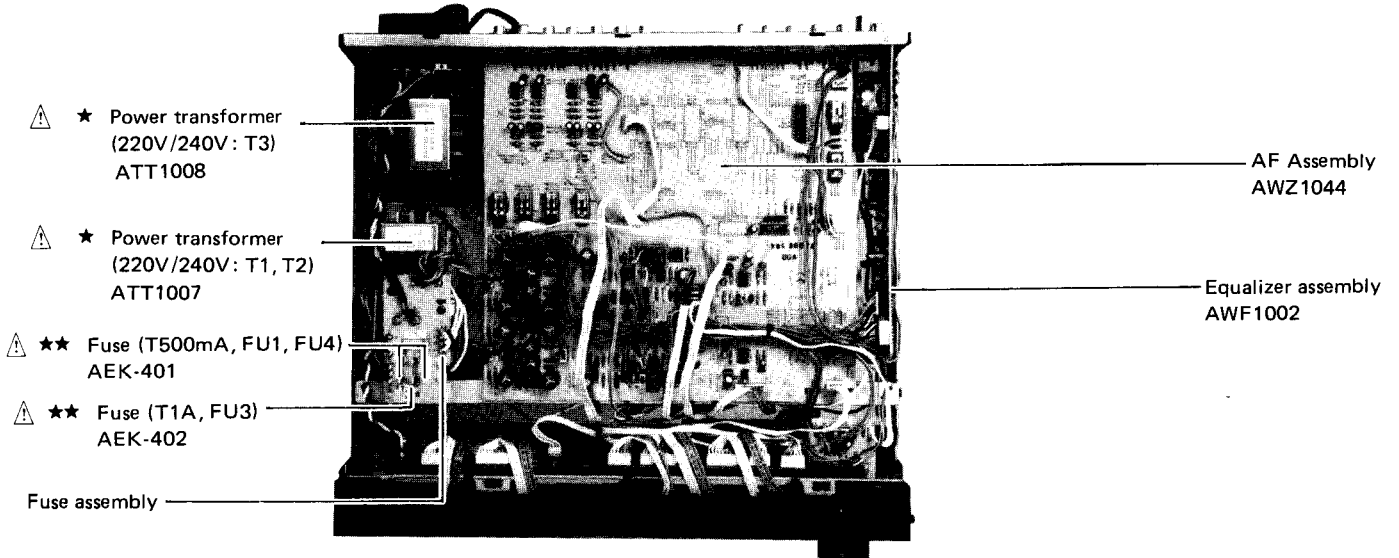
NOTES:

- Parts without part number cannot be supplied.
- 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.
- 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.
- Parts marked by " \odot " are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

Front Panel View with Front Panel Removed



Top View with Bonnet Case Removed



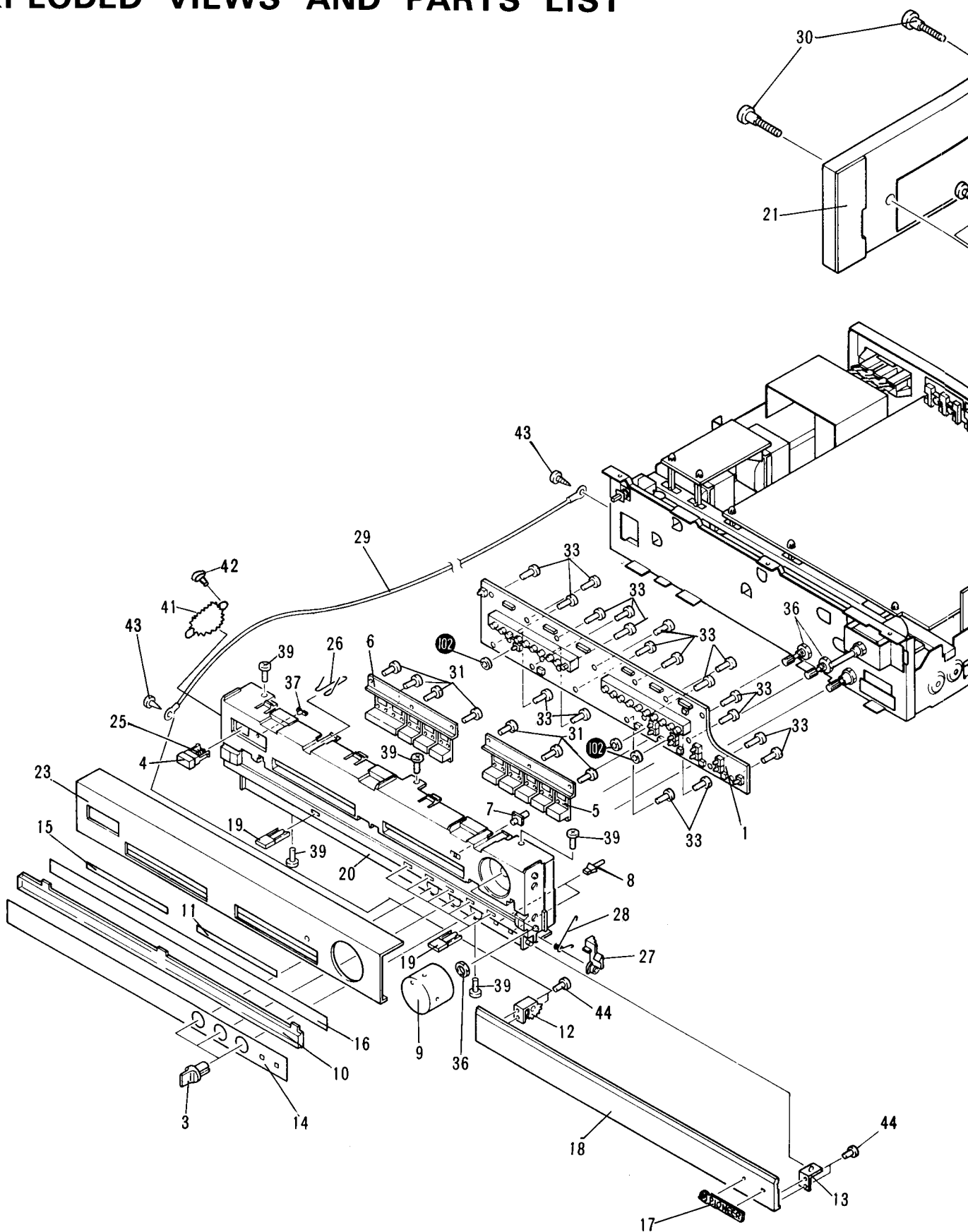
4. EXPLODED VIEWS AND PARTS LIST

A

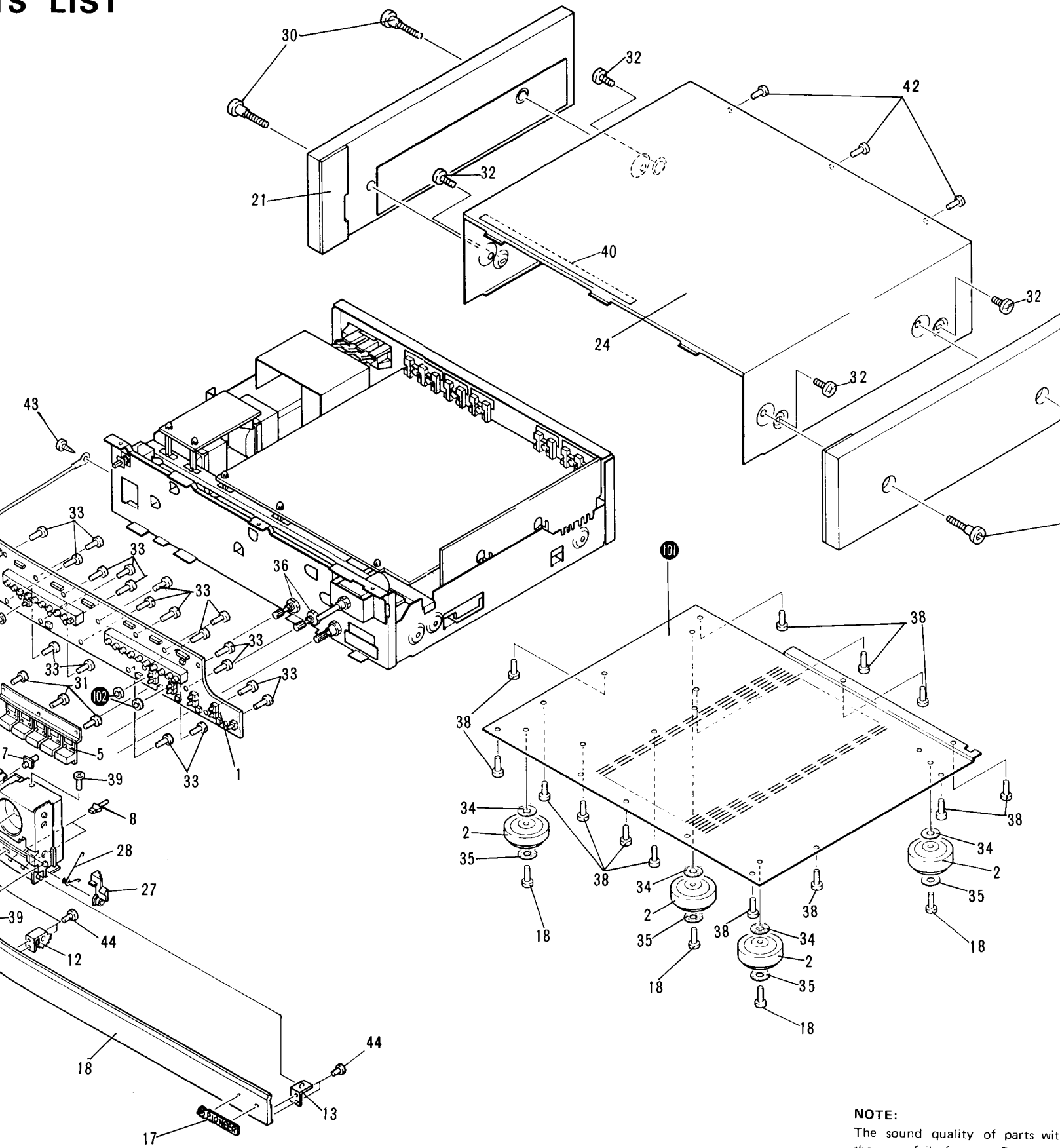
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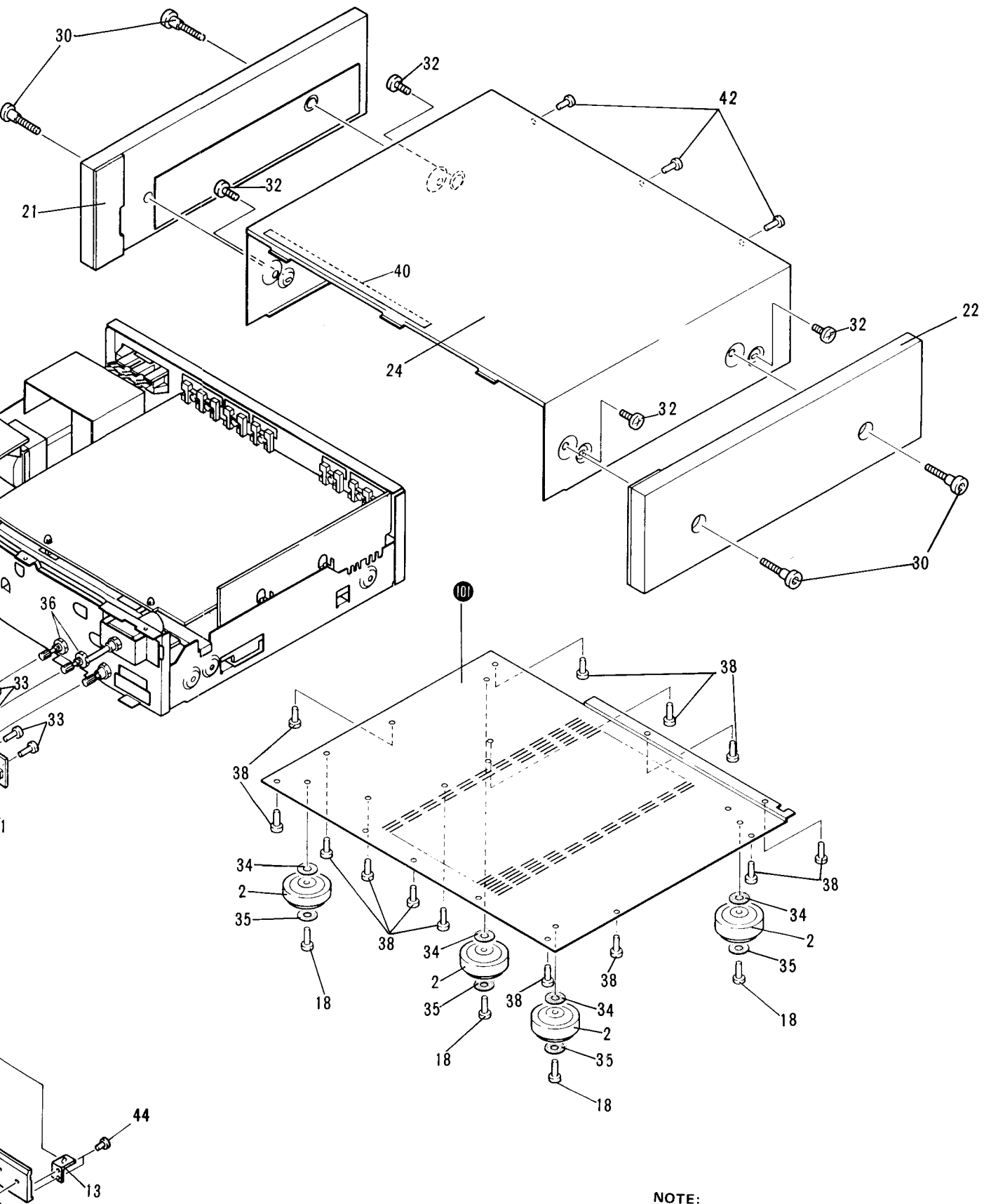
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PARTS LIST



NOTE:
The sound quality of parts with these are failsafe parts. Be sure the positions prescribed.



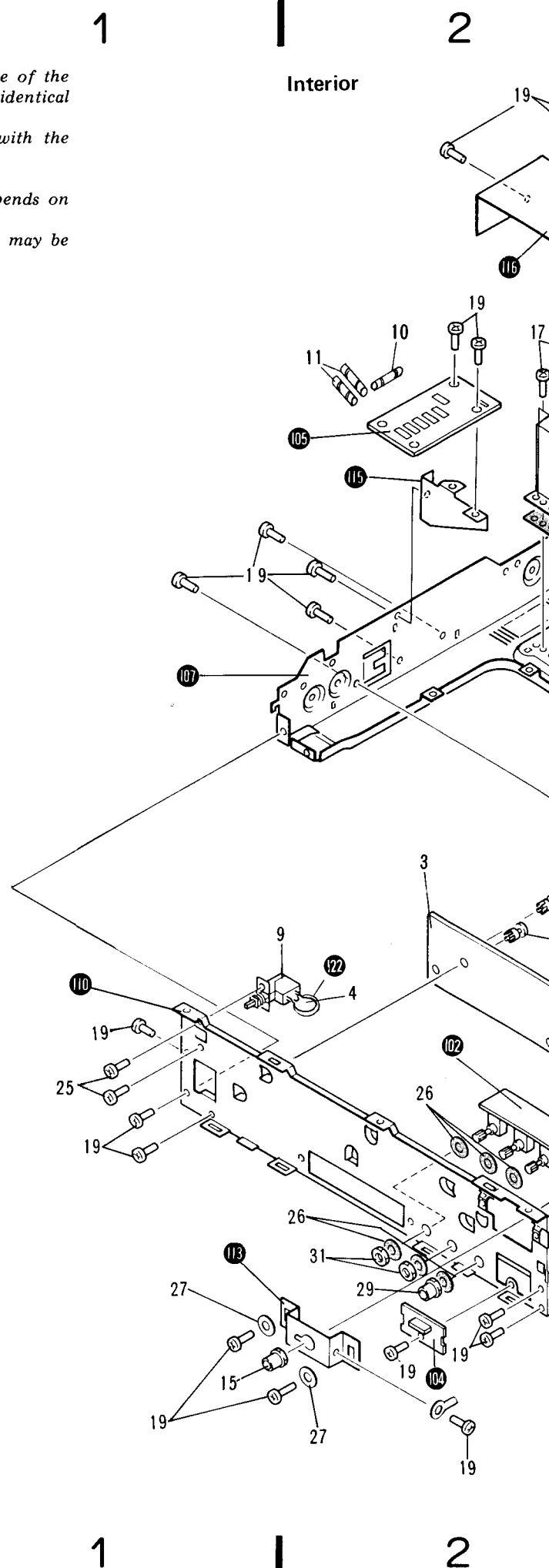
NOTE:
 The sound quality of parts with the  mark denotes that these are failsafe parts. Be sure that the designated parts are in the positions prescribed.

NOTES:

- Parts without part number cannot be supplied.
- 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.
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 This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- Parts marked by " \odot " are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

Parts List of Exterior

Mark	No.	Part No.	Description
	1	AWZ1059	Switch A assembly
	2	AMR1047	Leg assembly
	3	AAB1001	Knob (BALANCE, TREBLE, BASS)
	4	AAD1012	Knob (POWER)
	5	AAD1014	Function knob assembly A
	6	AAD1015	Function knob assembly C
	7	AAD1016	Knob (MUTE)
	8	AAD1017	Knob (TONE, LOUDNESS)
	9	AAF1012	Knob (VOLUME)
	10	AAK1022	Acrylic panel
	11	AAK1023	Indicator seat A
	12	AAK1024	Arm L
	13	AAK1025	Arm R
	14	AAK1027	Hear seat
	15	AAK1035	Indicator seat B
	16	AAK1064	Seat panel
	17	AAM1001	Name plate
	18	AAN1010	Door panel
	19	AAZ-157	Knob (ADAPTOR, TAPE COPY, MODE, PHONO SERECTOR, SUBSONIC FILTER, HIGH FILTER)
	20	AMB1015	Panel base
	21	AMS1001	Side board L
	22	AMS1002	Side board R
	23	ANB1005	Front panel
	24	ANE1007	Bonnet case
	25	ABH1005	Coil spring
	26	ABH1011	Earth spring
	27	AMR1020	Hook
	28	ABH1004	Hook spring
	29	ADH1003	Wire (EARTH)
	30	ABA1002	Decorative screw
	31	BBZ30P080FZK	Screw
	32	FBT40P080FZK	Screw
	33	BBZ26P080FMC	Screw
	34	ABE1002	Washer
	35	ABE1003	Washer
	36	NK90FUC	Nut
	37	AAK1075	Lens
	38	ABA1009	Screw
	39	ABA1011	Screw
	40	AED1007	Sheet
	41	ANZ-255	Damper
	42	ABA1006	Screw
	43	PMZ30P060FZB	Screw
	44	PMZ30P050FZB	Screw
101			Bottom plate
102			Spacer ring

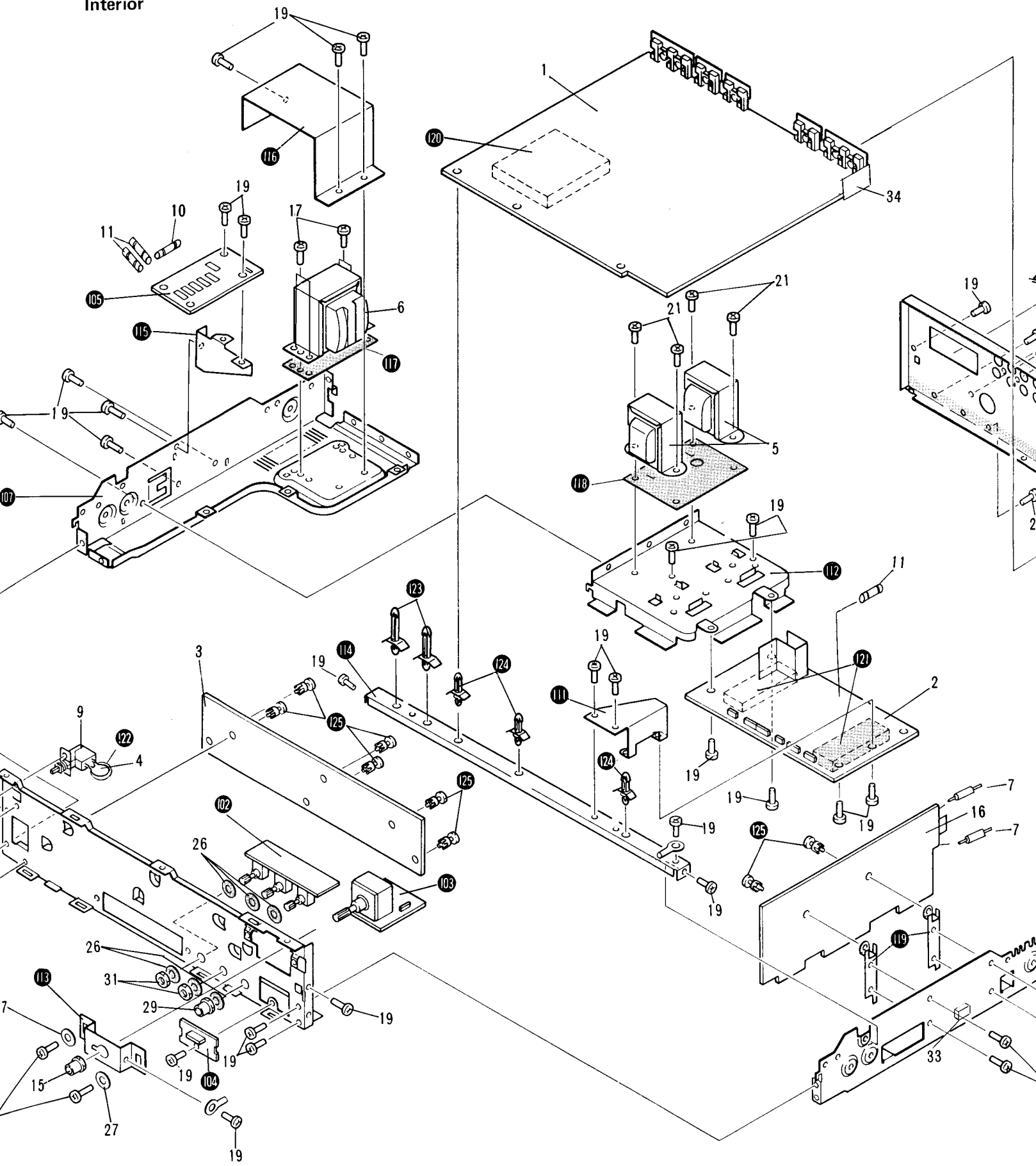


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3

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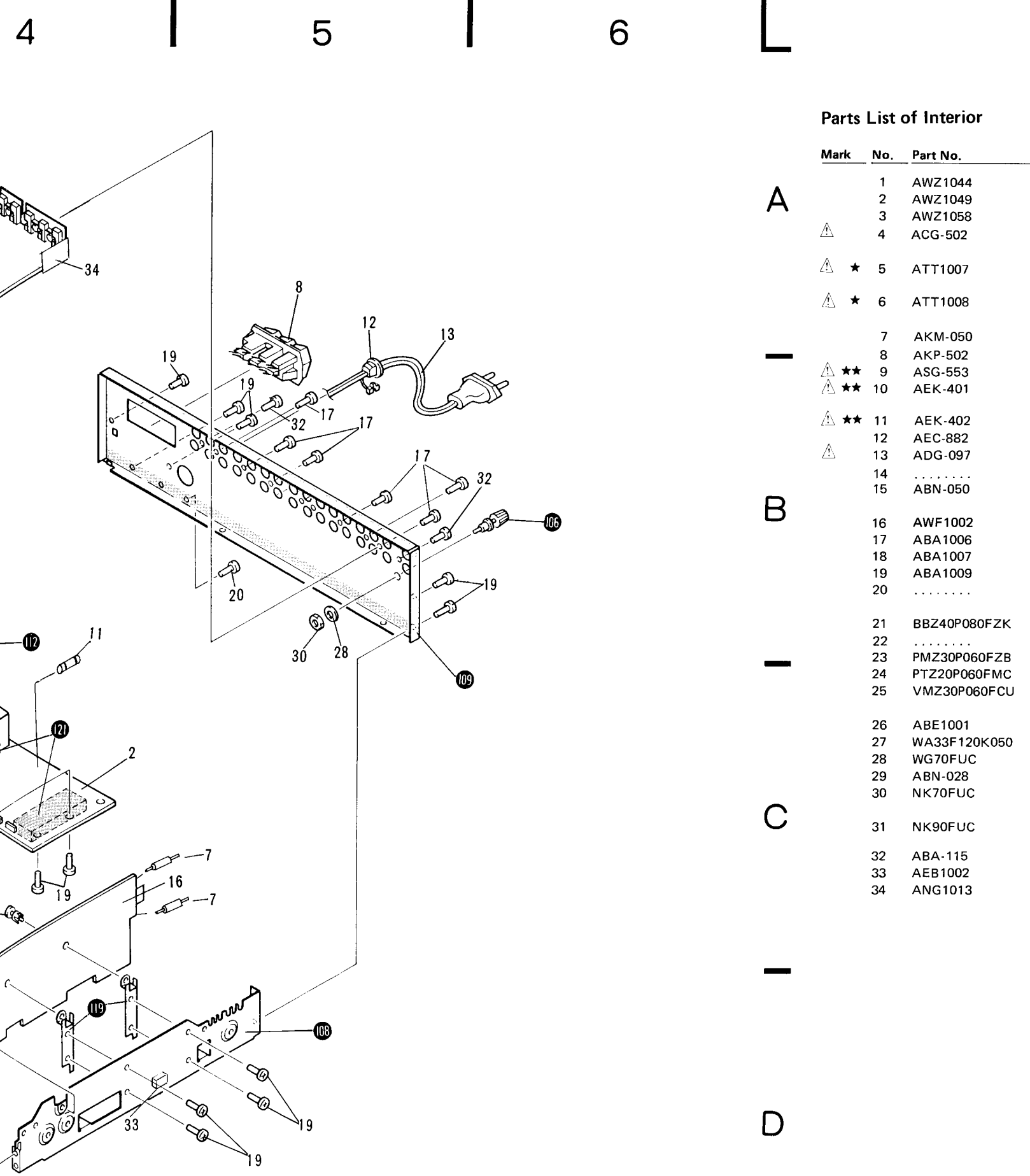
Interior



2

3


4



Parts List of Interior

Mark	No.	Part No.
	1	AWZ1044
	2	AWZ1049
	3	AWZ1058
⚠	4	ACG-502
⚠ ★	5	ATT1007
⚠ ★	6	ATT1008
	7	AKM-050
—	8	AKP-502
⚠ ★★	9	ASG-553
⚠ ★★	10	AEK-401
⚠ ★★	11	AEK-402
	12	AEC-882
⚠	13	ADG-097
	14	.....
	15	ABN-050
B	16	AWF1002
	17	ABA1006
	18	ABA1007
	19	ABA1009
	20	.....
	21	BBZ40P080FZK
	22	.....
	23	PMZ30P060FZB
	24	PTZ20P060FMC
	25	VMZ30P060FCU
	26	ABE1001
	27	WA33F120K050
	28	WG70FUC
	29	ABN-028
	30	NK70FUC
C	31	NK90FUC
	32	ABA-115
	33	AEB1002
	34	ANG1013

NOTE:

The sound quality of parts with the  mark denotes that these are failsafe parts. Be sure that the designated parts are in the positions prescribed.

Parts List of Interior

	Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
A		1	AWZ1044	AF Assembly		101		.....
		2	AWZ1049	Power supply assembly		102		VR A Assembly
		3	AWZ1058	Control assembly		103		VR C Assembly
	⚠	4	ACG-502	Capacitor (POWER, 0.01/400V)		104		SW B Assembly
	⚠ ★	5	ATT1007	Power transformer (T1, T2) (220V, 240V)		105		Fuse assembly
	⚠ ★	6	ATT1008	Power transformer (T3) (220V/240V)		106		Terminal (EARTH)
		7	AKM-050	Plug		107		Transformer frame
	—	8	AKP-502	AC Socket (AC OUTLET)		108		Right frame
	⚠ ★★	9	ASG-553	Switch (POWER, S1)		109		Rear panel
	⚠ ★★	10	AEK-401	Fuse (FU4, T500mA)		110		Panel stay
	⚠ ★★	11	AEK-402	Fuse (FU1, FU2, FU3, T1A)		111		P.C.B. Holder
		12	AEC-882	Strain relief		112		Transformer frame
	⚠	13	ADG-097	AC Power cord		113		Volume holder
		14	.....	.....		114		Center frame
	B		15	ABN-050	Spacer		115		P.C.B. Holder-C
		16	AWF1002	Equalizer assembly		116		Shield cover
		17	ABA1006	Screw		117		Damper plate A
		18	ABA1007	Screw		118		Damper plate B
		19	ABA1009	Screw		119		P.C.B. Holder-B
		20	.....	.....		120		Cushion rubber
		21	BBZ40P080FZK	Screw		121		Cushion rubber
		22	.....	.....		122		Capacitor cover
—		23	PMZ30P060FZB	Screw		123		P.C.B. Support
		24	PTZ20P060FMC	Screw		124		P.C.B. Support
		25	VMZ30P060FCU	Screw		125		Pin grommet
		26	ABE1001	Washer		126		Cushion
		27	WA33F120K050	Washer		127		Lavel
		28	WG70FUC	Washer		128		Terminal
		29	ABN-028	Nut				
	30	NK70FUC	Nut					
C		31	NK90FUC	Nut				
		32	ABA-115	Screw				
		33	AEB1002	Cushion				
		34	ANG1013	Shield plate				

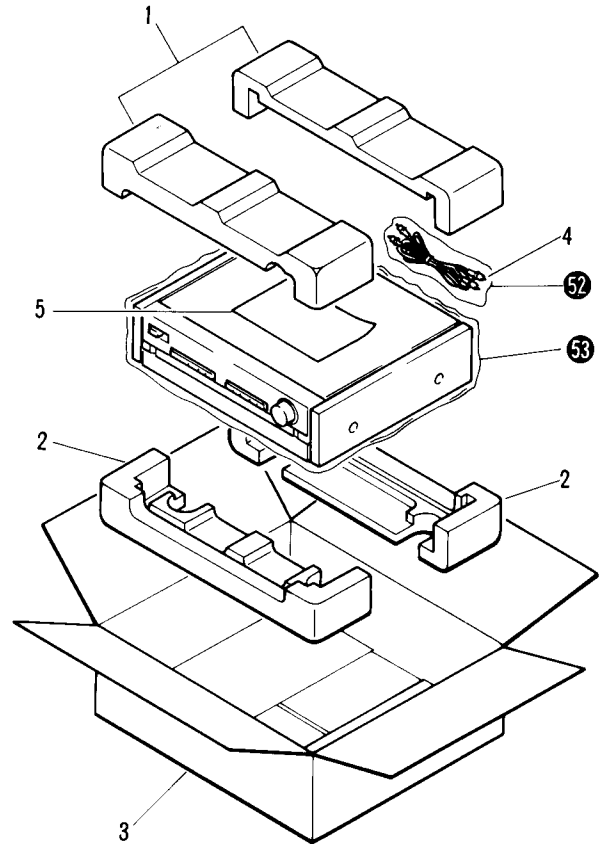
D

5. PACKING

Mark	No.	Part No.	Description
	101		.....
ply assembly	102		VR A Assembly
sembly	103		VR C Assembly
	104		SW B Assembly
0.01/400V)	105		Fuse assembly
nsformer (T1, T2)			
0V)	106		Terminal (EARTH)
nsformer	107		Transformer frame
/240V)	108		Right frame
	109		Rear panel
t (AC OUTLET)	110		Panel stay
OWER, S1)			
1, T500mA)	111		P.C.B. Holder
	112		Transformer frame
, FU2, FU3, T1A)	113		Volume holder
ef	114		Center frame
cord	115		P.C.B. Holder-C
	116		Shield cover
	117		Damper plate A
assembly	118		Damper plate B
	119		P.C.B. Holder-B
	120		Cushion rubber
	121		Cushion rubber
	122		Capacitor cover
	123		P.C.B. Support
	124		P.C.B. Support
	125		Pin grommet
	126		Cushion
	127		Level
	128		Terminal

Parts List of Packing

Mark	No.	Part No.	Description
	1	AHA1003	Top pad
	2	AHA1004	Bottom pad
	3	ADE1012	Packing case
	4	ADE-081	Connection cord with plug
	5	ARC1003	Operating instruction
	51		.....
	52		Vinyl bag
	53		Seat



6. P.C. BOARDS CONNECTION DIAGRAM

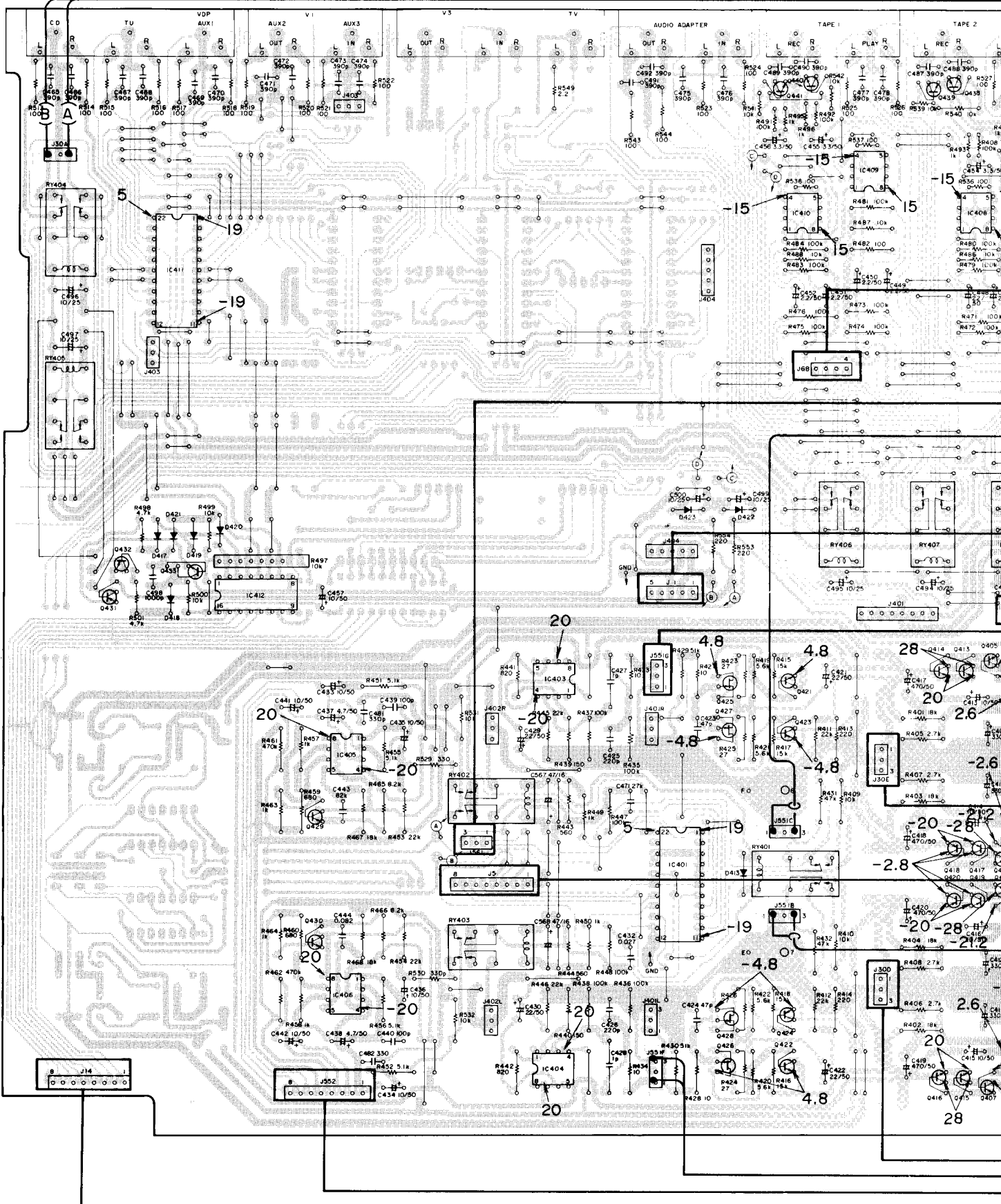
AF ASSEMBLY AWZ1044

A

B

C

D



Q431 Q432 Q435

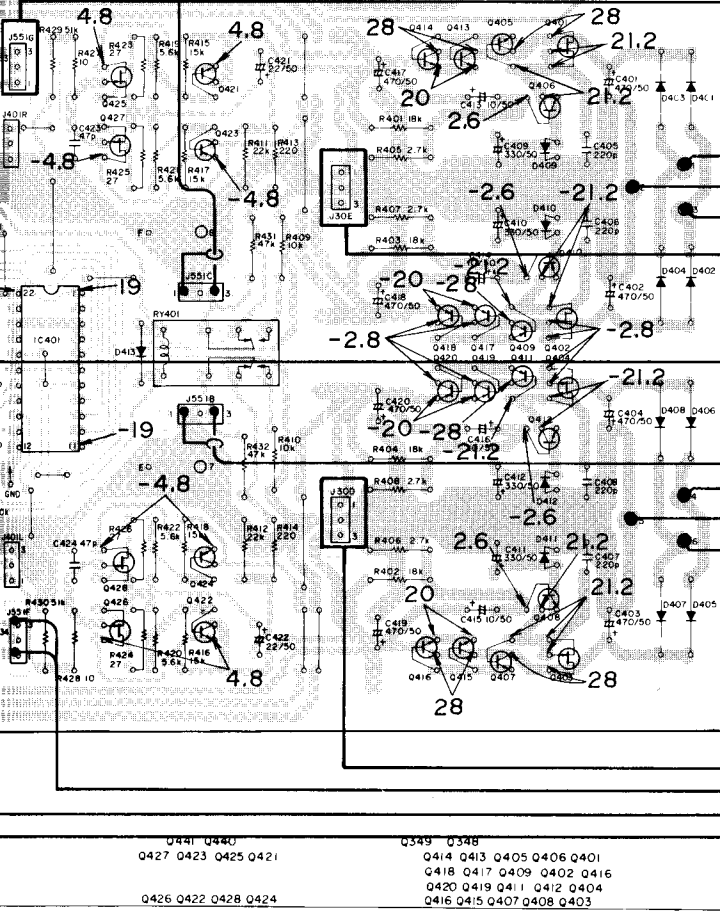
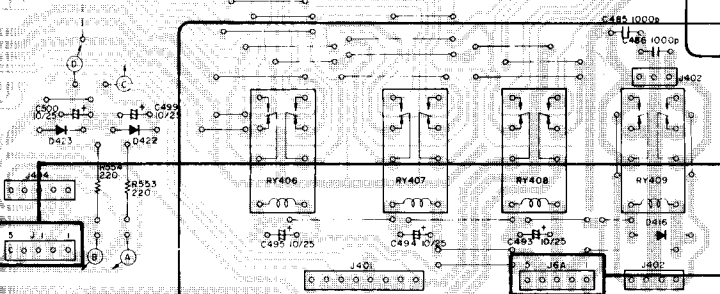
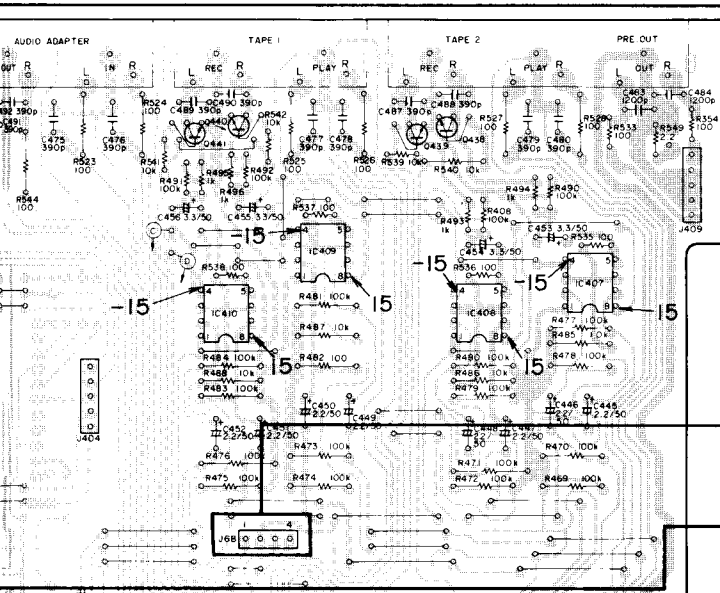
Q429
Q430

Q441 Q440
Q427 Q423 Q425 Q421

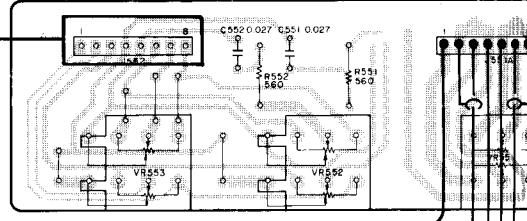
Q349 Q348
Q414 Q413 Q405
Q418 Q417 Q409
Q420 Q419 Q411
Q416 Q415 Q407

Q426 Q422 Q428 Q424

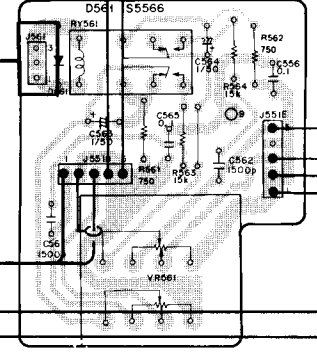
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VR A ASSEMBLY

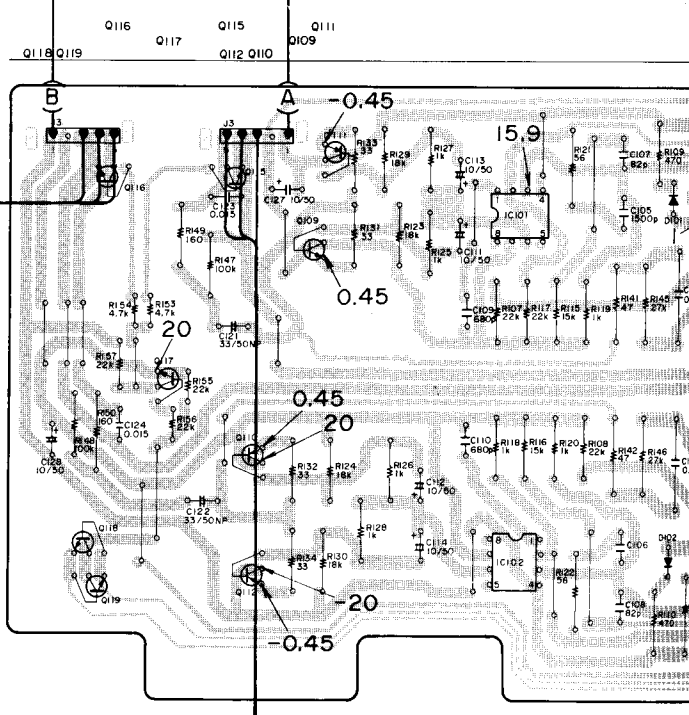


VR C ASSEMBLY



- IC401, 411
- IC403, 404
- IC405, 406
- IC407~410
- IC412
- Q401~404
- Q405~408, 421, 422, 429, 430
- Q409~412, 423, 424
- Q413~416
- Q417~420, 431, 432
- Q425, 426
- Q427, 428
- Q433
- Q438~441
- D401~408
- D409~412
- D413~416
- D417~418
- D419~421
- D422, 423

EQUALIZER ASSEMBLY AWF1002



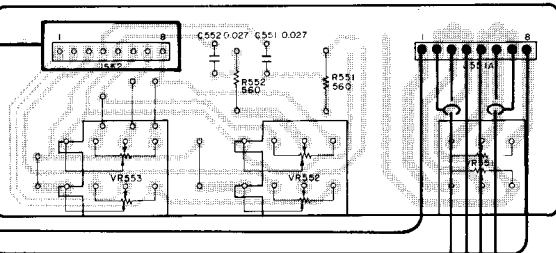
- JPD6362C
- NJM55340D
- M5210P
- M5200P
- M74S42P
- PSK246
- PSC445
- PSA992
- PSC2705
- PSA1146
- PSK770
- PSJ741
- PS20613
- PS20878
- 1D(2F)
- AEL-39B
- S5566
- RDE2E8
- S1555
- RD16EB

- Q101~104
- Q105~108, 113, 114
- Q109, 110
- Q111, 112
- Q115, 116
- Q118, 119
- Q101, 102
- 133.15

- Q441 Q440
- Q427 Q423 Q425 Q421
- Q426 Q422 Q428 Q424

- Q349 Q348
- Q414 Q413 Q405 Q406 Q401
- Q418 Q417 Q409 Q402 Q416
- Q420 Q419 Q411 Q412 Q404
- Q416 Q415 Q407 Q408 Q403

VR A ASSEMBLY



RTV servis Horvat

Kešinci, 31402 Semeljci

031-856-139

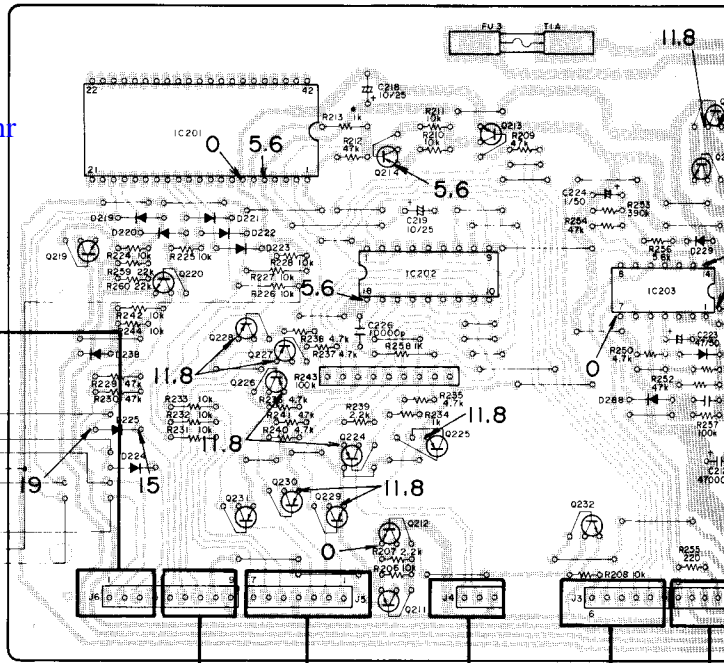
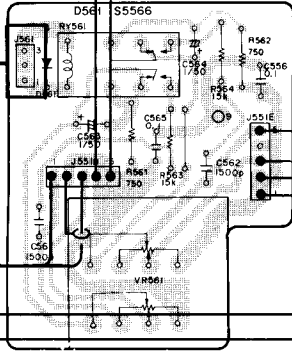
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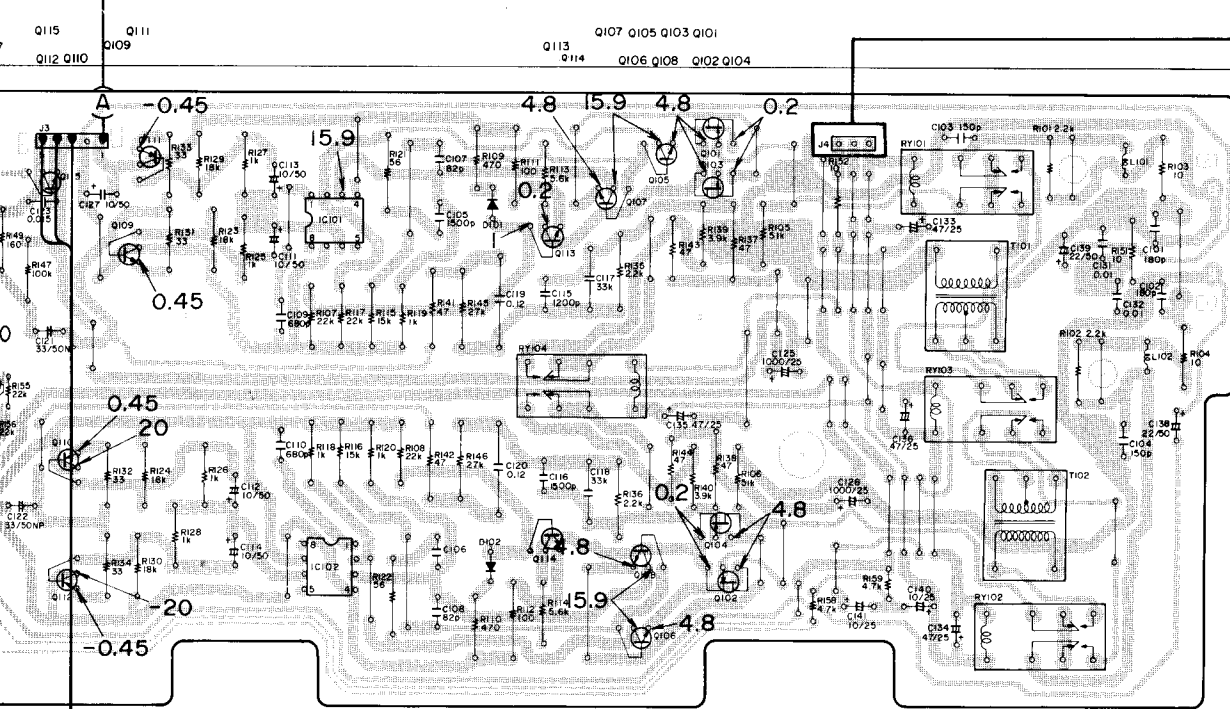
rtv-servis-horvat@os.tel.hr

Croatia

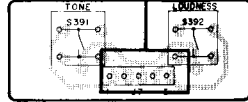
VR C ASSEMBLY



AWF1002 ASSEMBLY

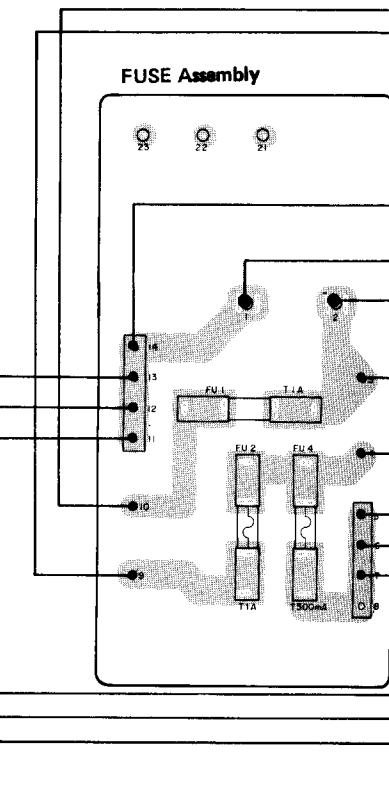
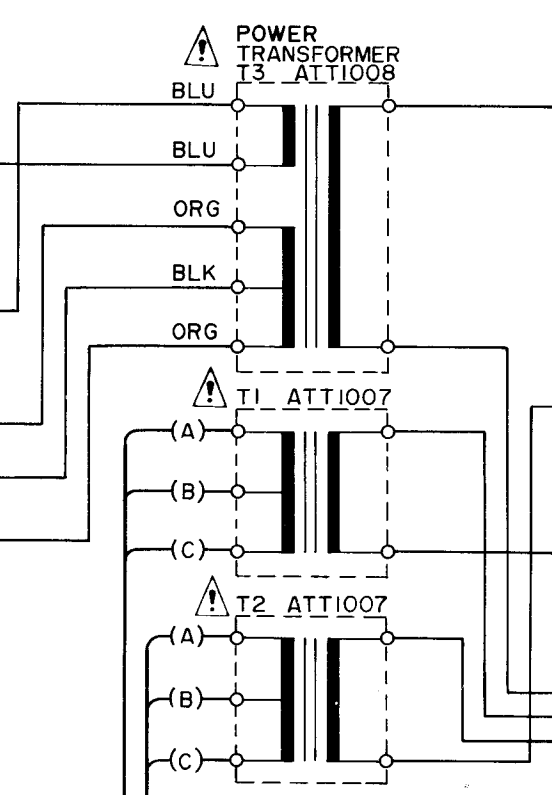
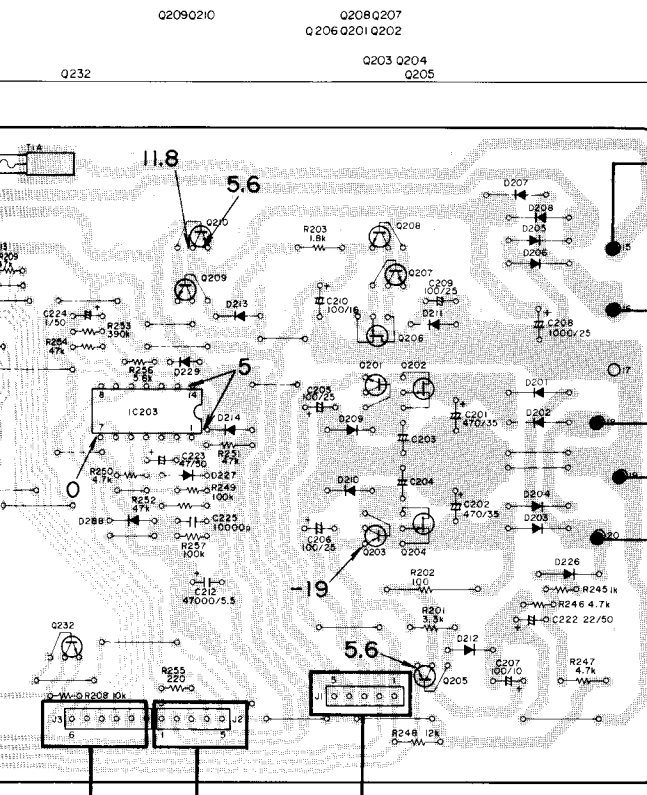


SWITCH B ASSEMBLY



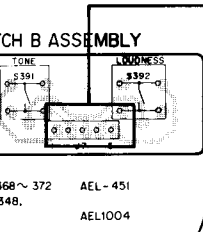
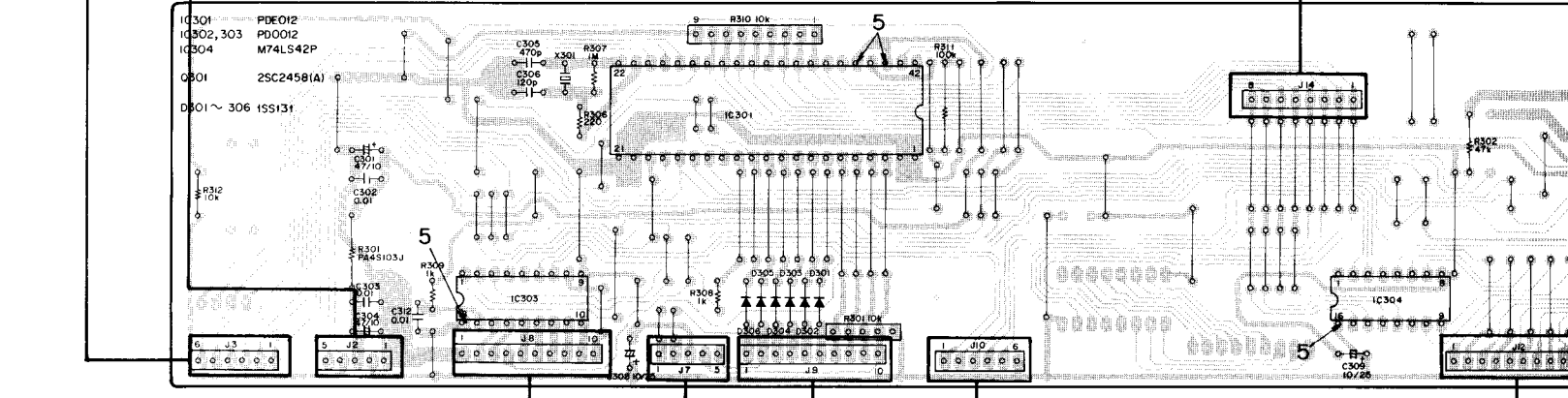
D353, 355, 357, 368 ~ 372 AEL-451
 0341, 343, 344, 348, AEL1004
 0359 ~ 367

- NJM5534DD
- ~ 104 25K369
- ~ 108,113,114 25C1845
- ~ 110 25C2235
- ~ 112 25A965(A)
- ~ 116 25C2878
- ~ 118 25C2878
- ~ 120 25C2878
- ~ 122 25C2878
- ~ 124 25C2878
- ~ 126 25C2878
- ~ 128 25C2878
- ~ 130 25C2878
- ~ 132 25C2878
- ~ 134 25C2878
- ~ 136 25C2878
- ~ 138 25C2878
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- ~ 146 25C2878
- ~ 148 25C2878
- ~ 150 25C2878

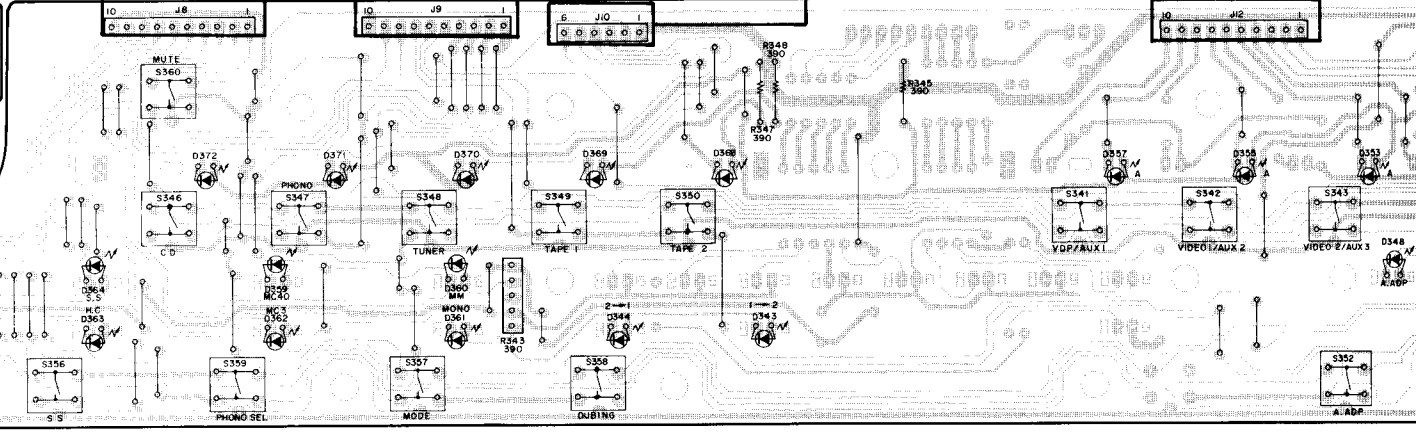


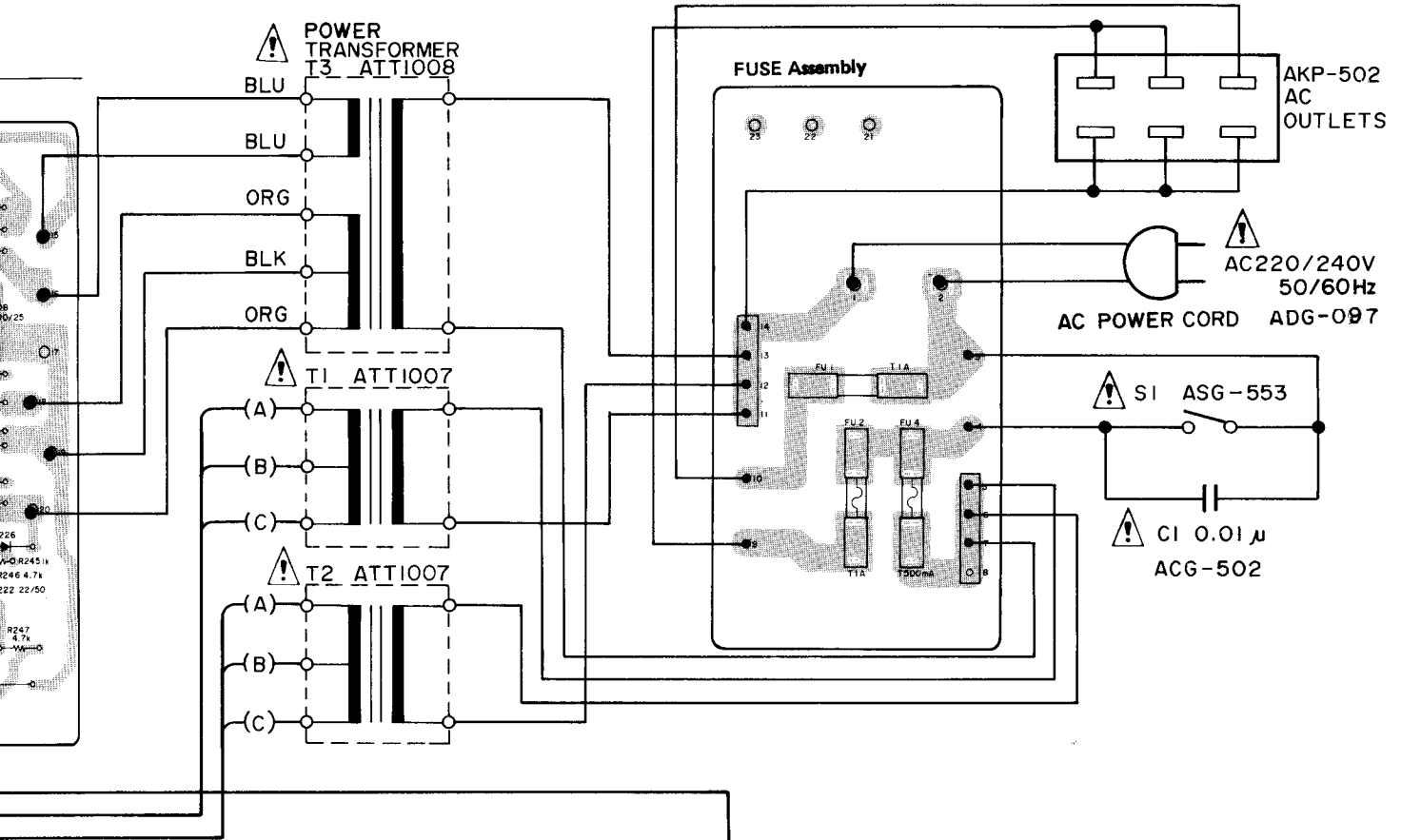
D201	Z06,226	S5966
D209	Z10	RD20ESB2
D211		RD13EB
D212		RD6.8EB
D213		RD6.8EB
D214, 221 ~ 223, 227 ~ 229	TSS131	
D219, 220, 224, 225	RD18EB	
D236	RD3.9EB	

CONTROL ASSEMBLY AWZ1058



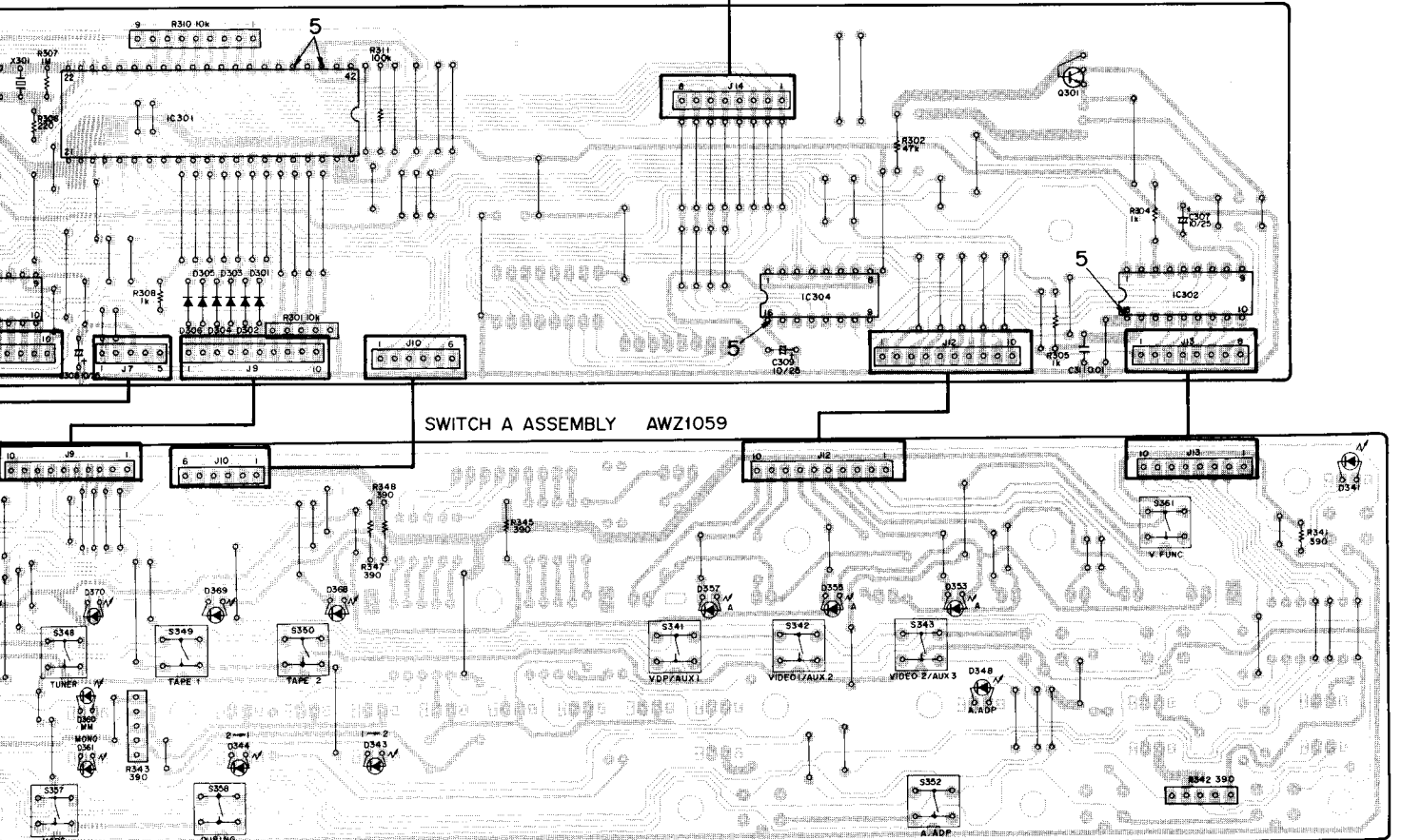
SWITCH A ASSEMBLY AWZ1059





A

B



C

D

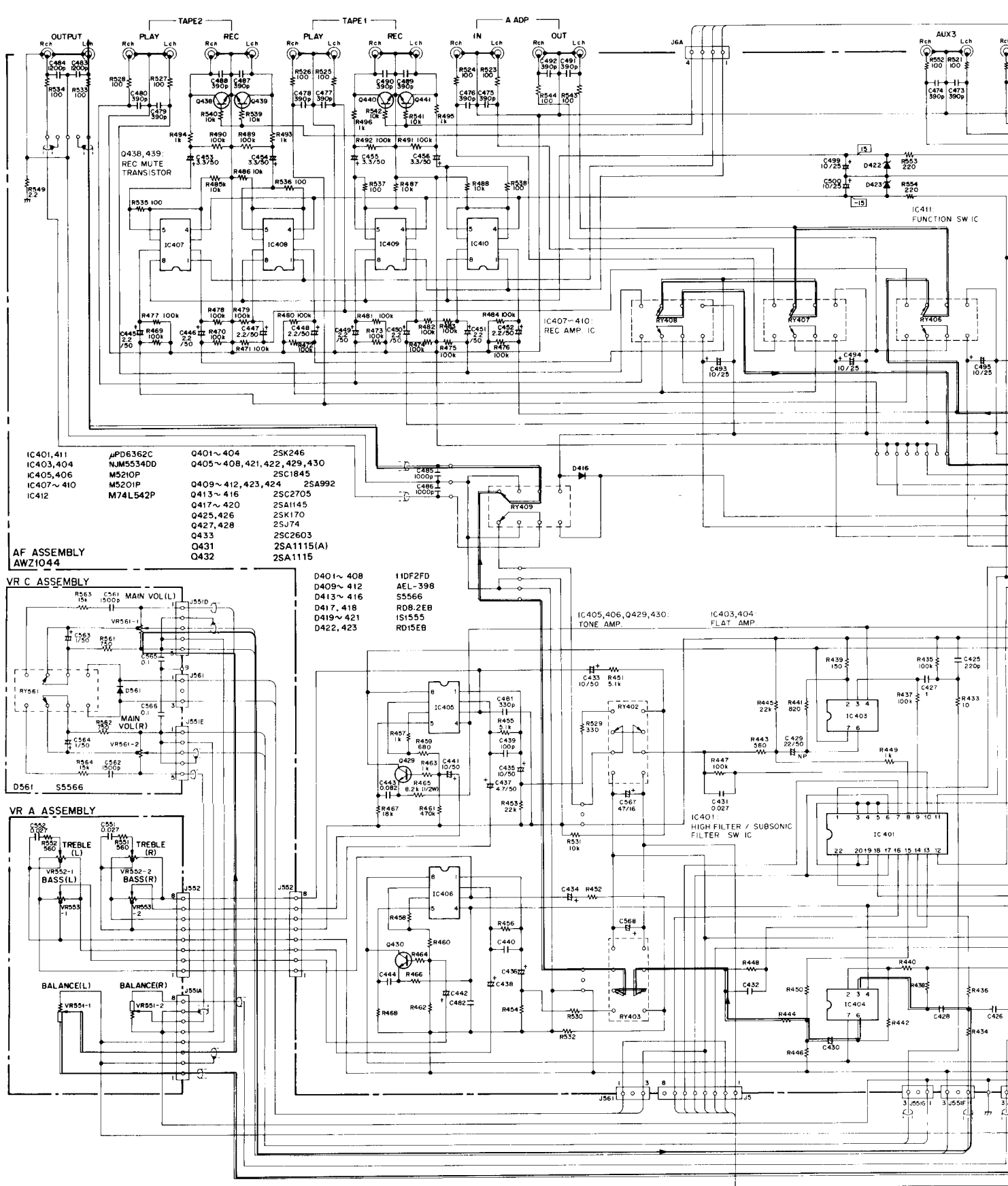
7. SCHEMATIC DIAGRAM

A

B

C

D



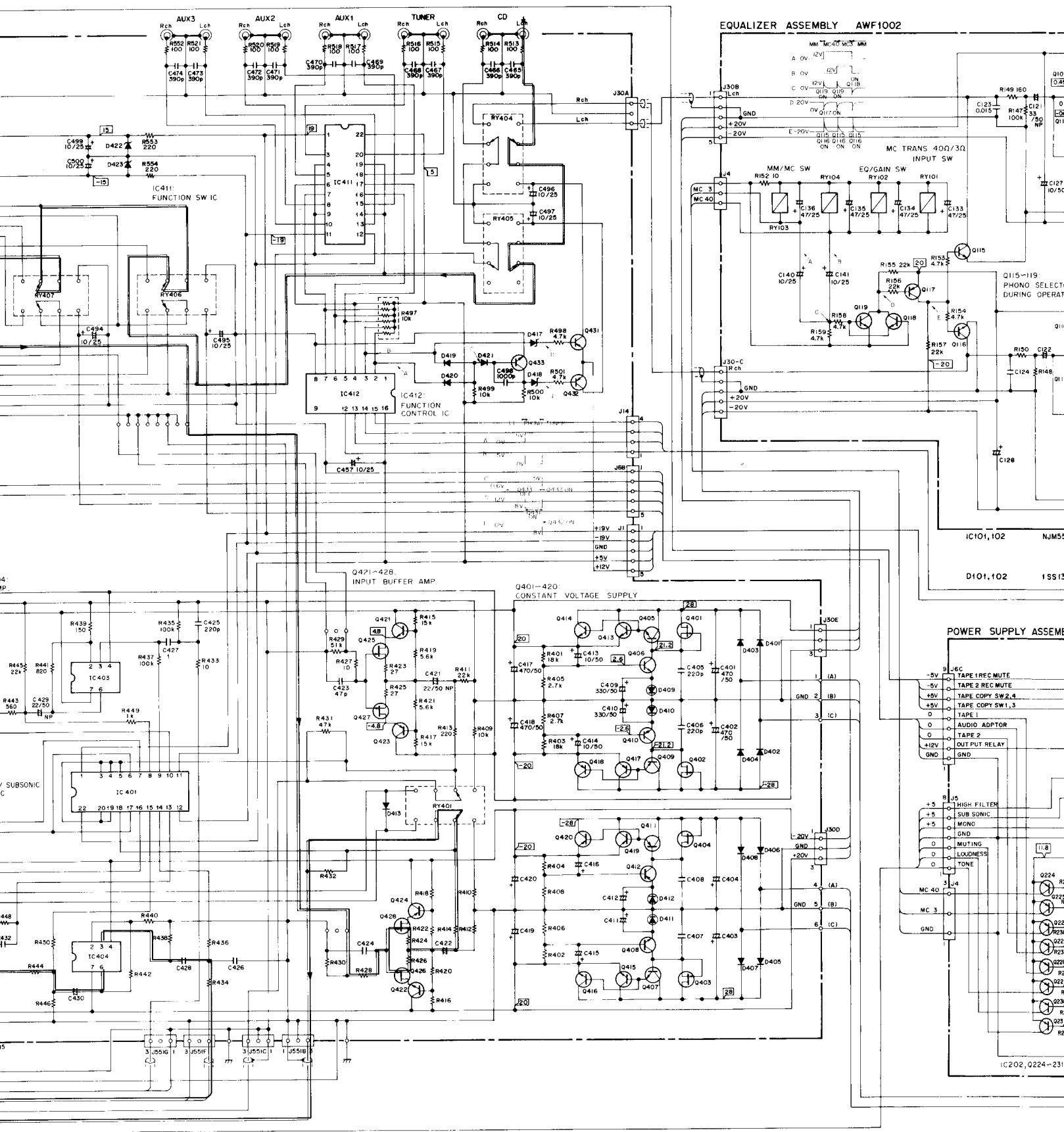
- | | | | |
|-----------|-----------|------------------------------|------------|
| IC401,411 | μPD6362C | Q401~404 | 2SK246 |
| IC403,404 | NJM5534DD | Q405~408, 421, 422, 429, 430 | |
| IC405,406 | MS201P | Q409~412, 423, 424 | 2SC1845 |
| IC407~410 | MS201P | Q413~416 | 2SC2705 |
| IC412 | M74L542P | Q417~420 | 2SA1145 |
| | | Q425, 426 | 2SK170 |
| | | Q427, 428 | 2SJ74 |
| | | Q433 | 2SC2603 |
| | | Q431 | 2SA1115(A) |
| | | Q432 | 2SA1115 |

- | | |
|-----------|---------|
| D401~408 | 11DF2FD |
| D409~412 | AEL-39B |
| D413~416 | S5566 |
| D417, 418 | RDB-2EB |
| D419~421 | IS1555 |
| D422, 423 | RD15EB |

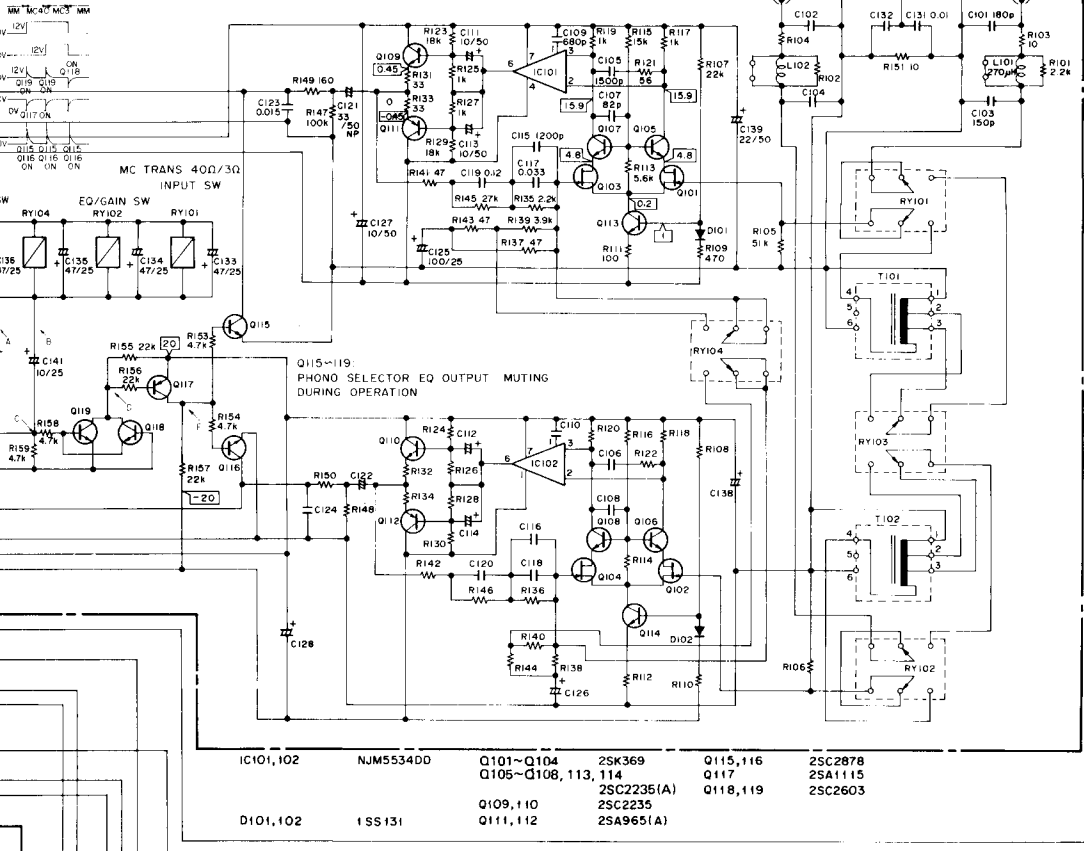
IC 405, 406, 0429, 430: TONE AMP.

IC403, 404: FLAT AMP.

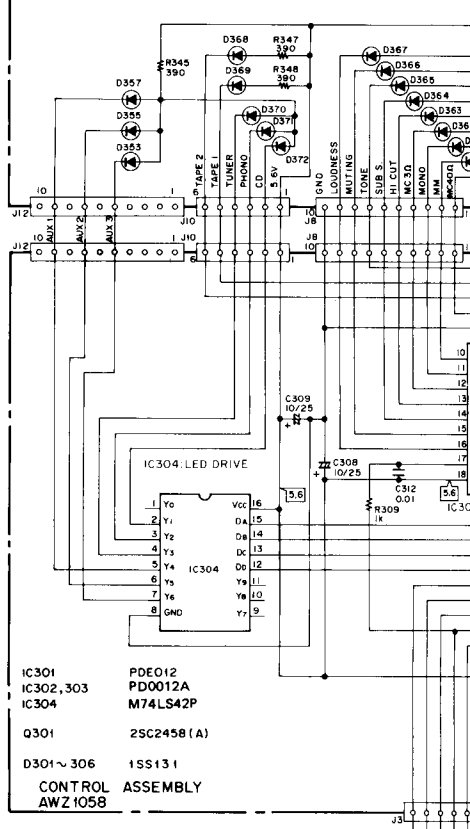
IC401: HIGH FILTER / SUBSONIC FILTER SW IC



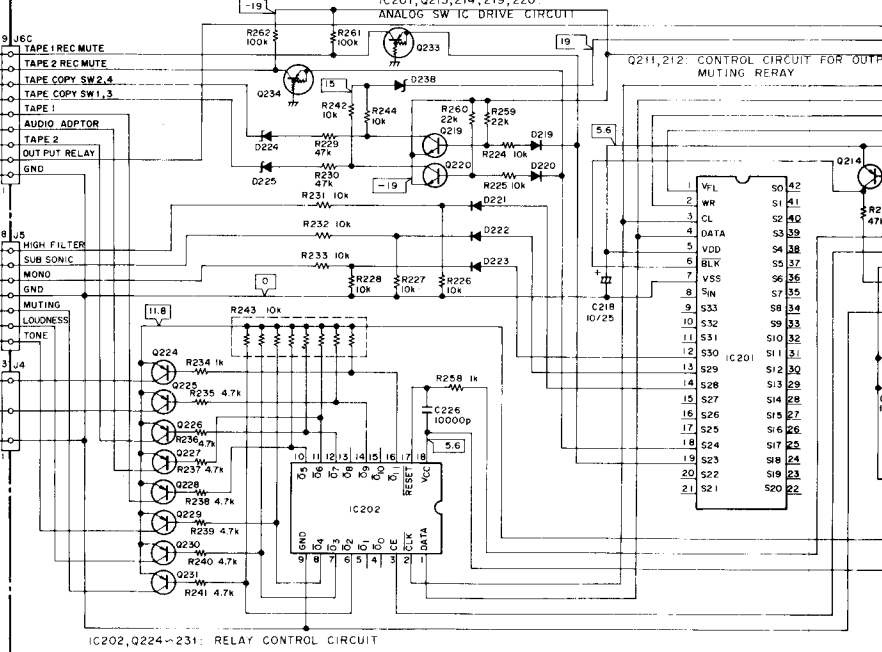
ASSEMBLY AWF1002



SWITCH A ASSEMBLY AWZ1059

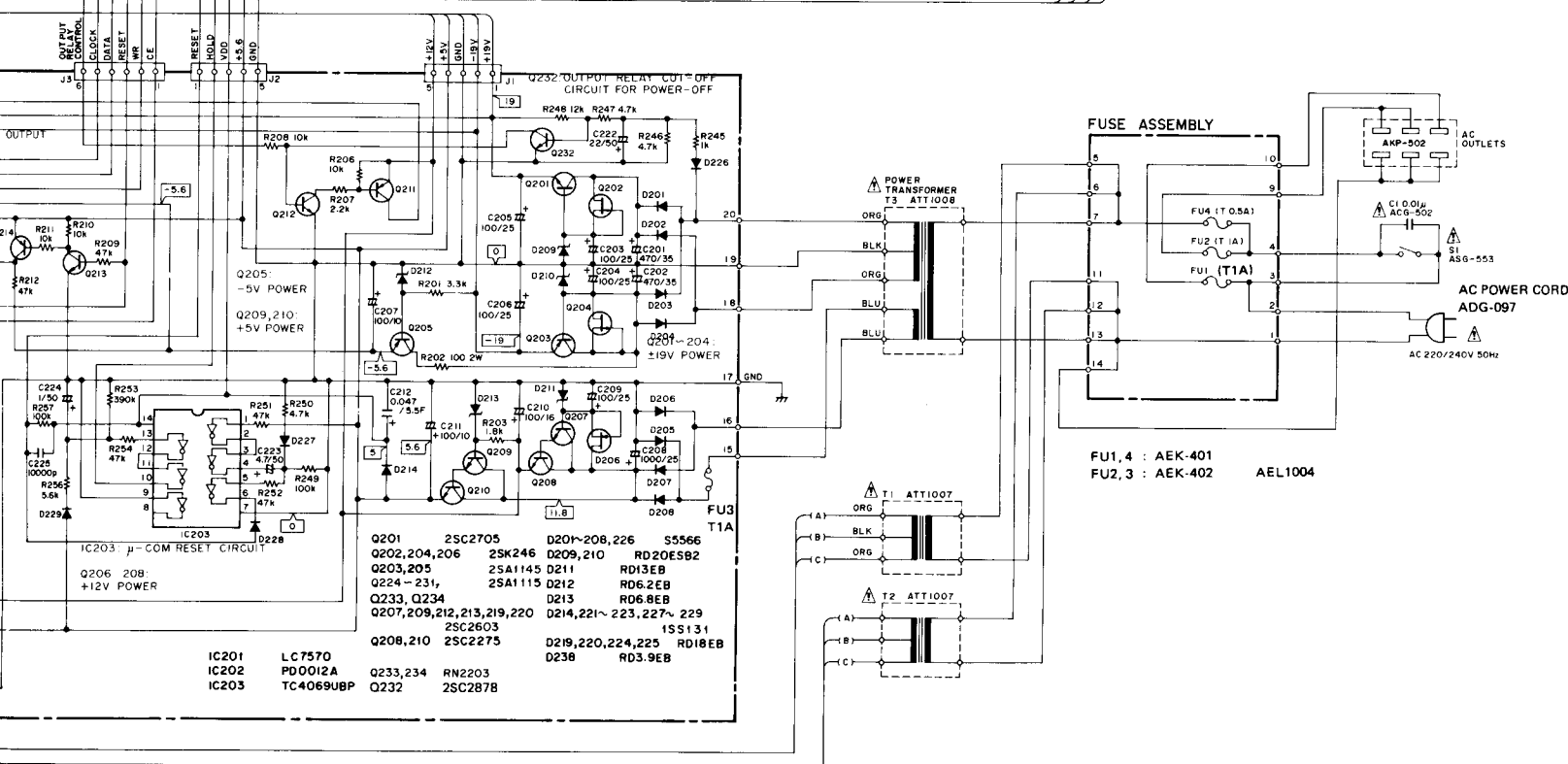
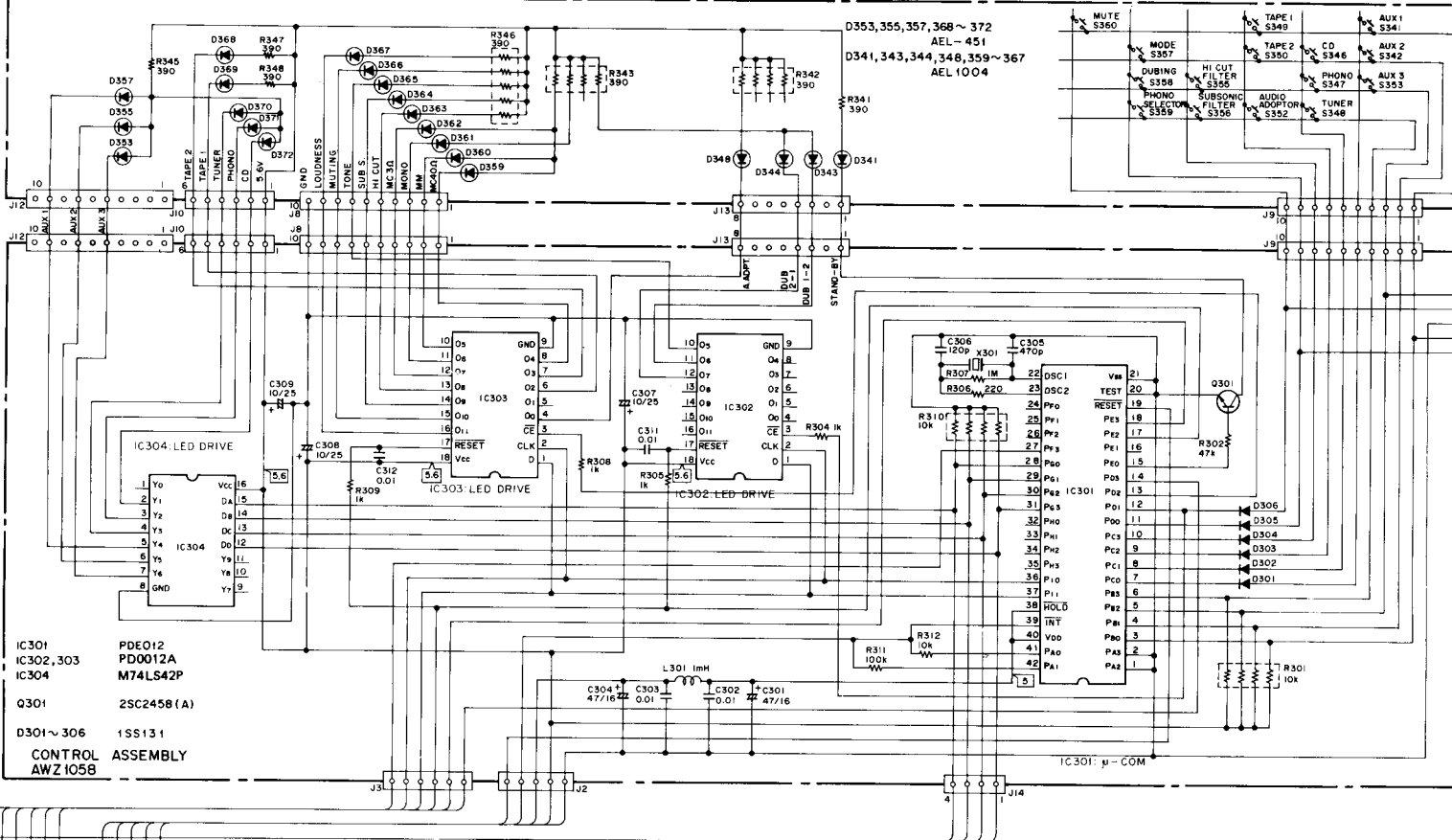


POWER SUPPLY ASSEMBLY AWZ1049

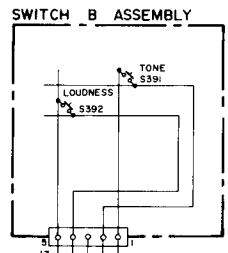
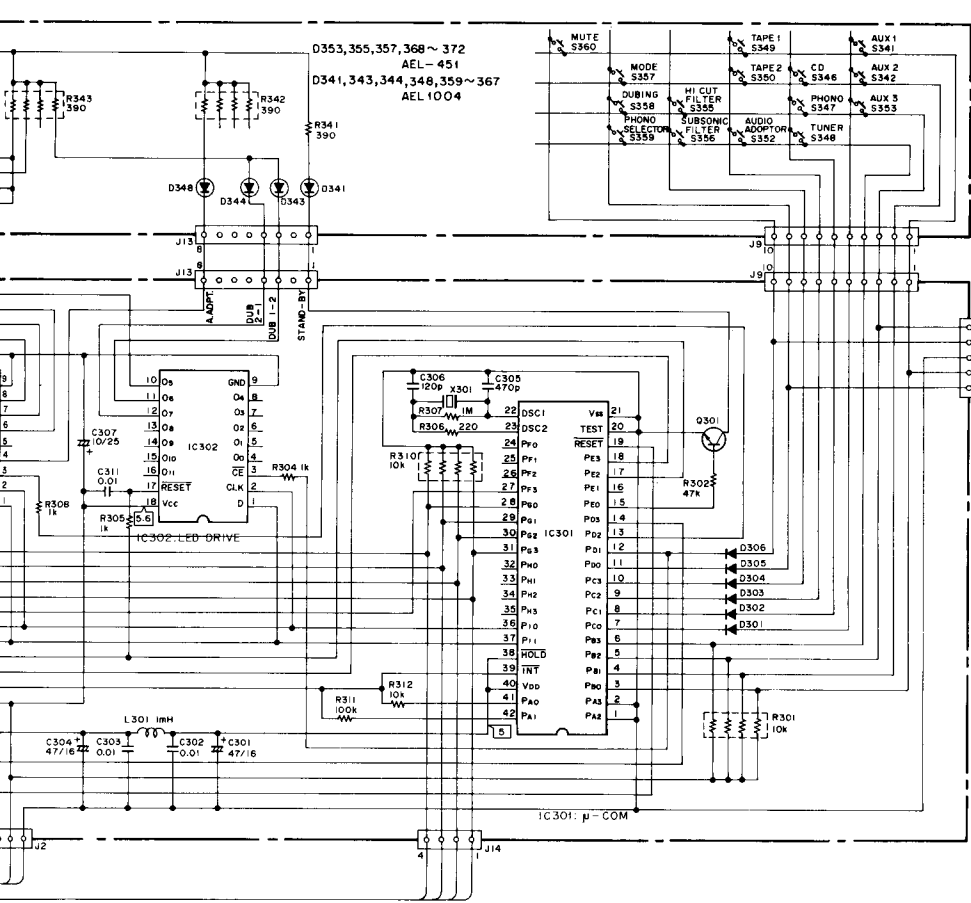


NOTE:
The ind
Other c
listed in

SWITCH A ASSEMBLY AWZ1059



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



- RESISTORS:**
 Indicated in Ω, kΩ, MΩ, % tolerance unless otherwise noted k: kΩ, M: MΩ, (F): ±1%, (G): ±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:**
 □ 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

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

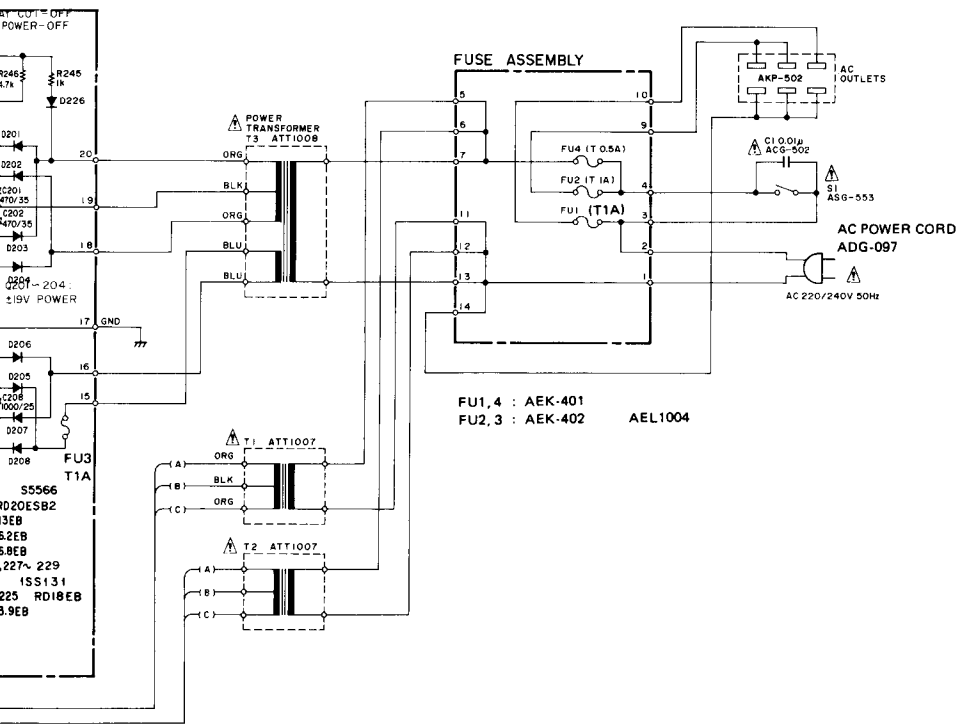
SWITCH & RELAY

AF ASSEMBLY	
RY401	MUTING ON-OFF
RY402,403	TONE ON-OFF
RY404	FUNCTION ON-OFF
RY405	FUNCTION ON-OFF
RY406	TAPE 1 ON-OFF
RY407	ADAPTOR ON-OFF
RY408	TAPE 2 ON-OFF
RY409	OUTPUT ON-OFF
RY561	LOUDNESS ON-OFF

EQUALIZER ASSEMBLY	
RY101	MM-MC
RY102	MM-MC
RY103	MC4Q-MC3
RY104	MM-MC

OTHERS	
S1	POWER ON-OFF

The underlined indicates the switch position.



FU1,4 : AEK-401
 FU2,3 : AEK-402
 AEL1004

RTV servis Horvat
 Kešinci, 31402 Semeljci
 031-856-139
 031-856-637
 098-788-319
 rtv-servis-horvat@os.tel.hr
 Croatia

A

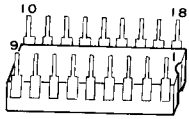
B

C

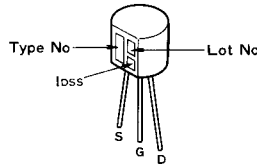
D

External Appearances of Transistor and ICs

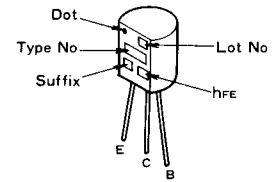
PD0012A



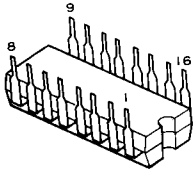
2SK246



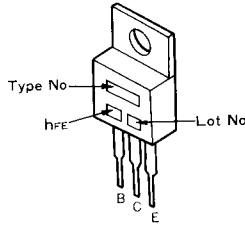
2SK369



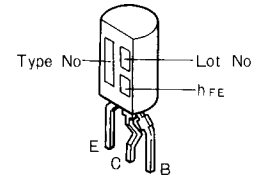
M74LS42P



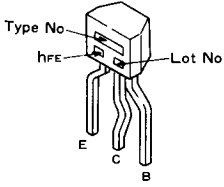
2SC2275A



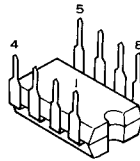
2SC2235(A)
2SA965(A)



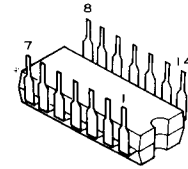
2SC2458(A)



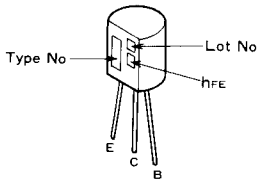
M5210P



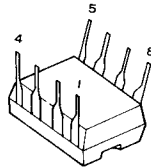
TC4069UBP



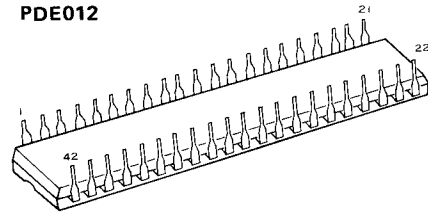
2SC2705
2SA1145
2SC2878



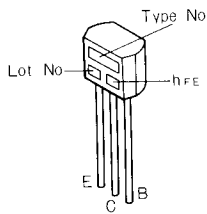
M5201P



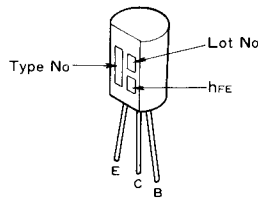
PDE012



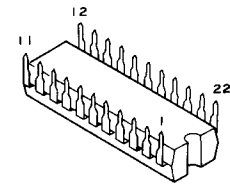
2SC2603
2SA1115



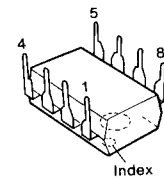
2SC1845
2SA992



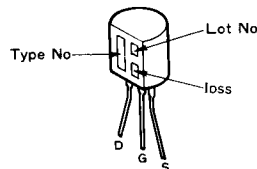
UPD6362C



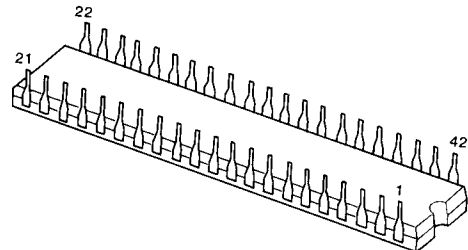
NJM5534DD



2SK170
2SJ74

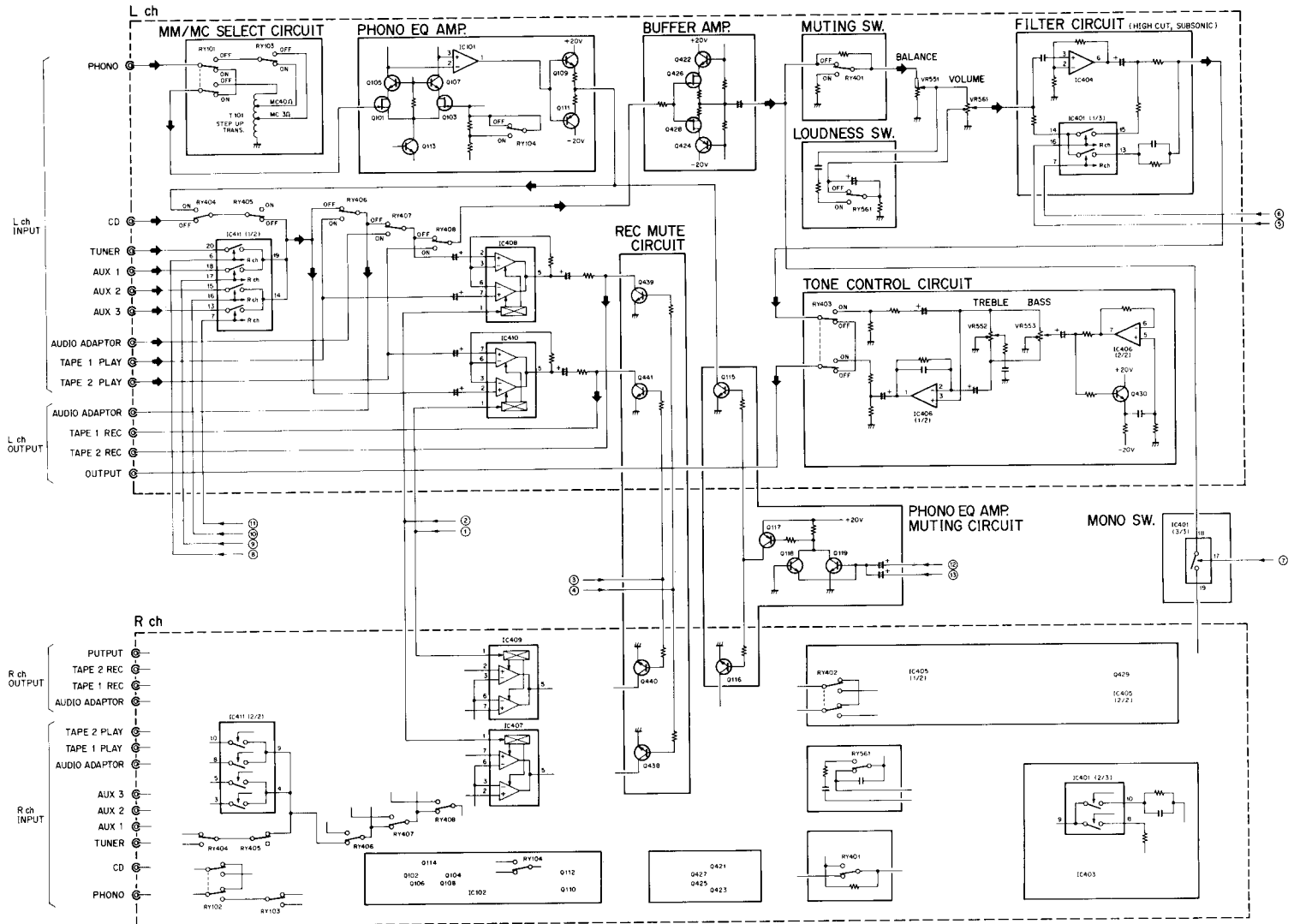


LC7570

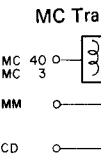


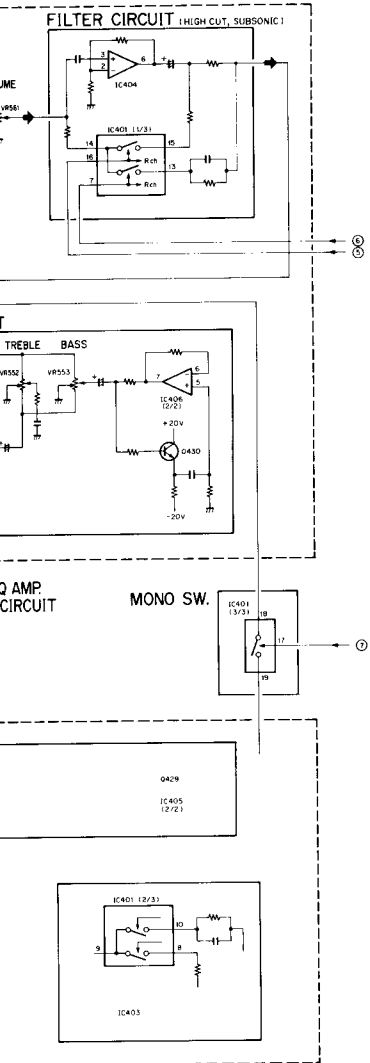
PHONO
L ch INPUT
CD
TUNER
AUX 1
AUX 2
AUX 3
AUDIO ADAPTOR
TAPE 1 PLAY
TAPE 2 PLAY
AUDIO ADAPTOR
L ch OUTPUT
TAPE 1 REC
TAPE 2 REC
OUTPUT
R ch OUTPUT
PUTPUT
TAPE 2 REC
TAPE 1 REC
AUDIO ADAPTOR
TAPE 2 PLAY
TAPE 1 PLAY
AUDIO ADAPTOR
AUX 3
AUX 2
AUX 1
TUNER
CD
PHONO

8. BLOCK DIAGRAM

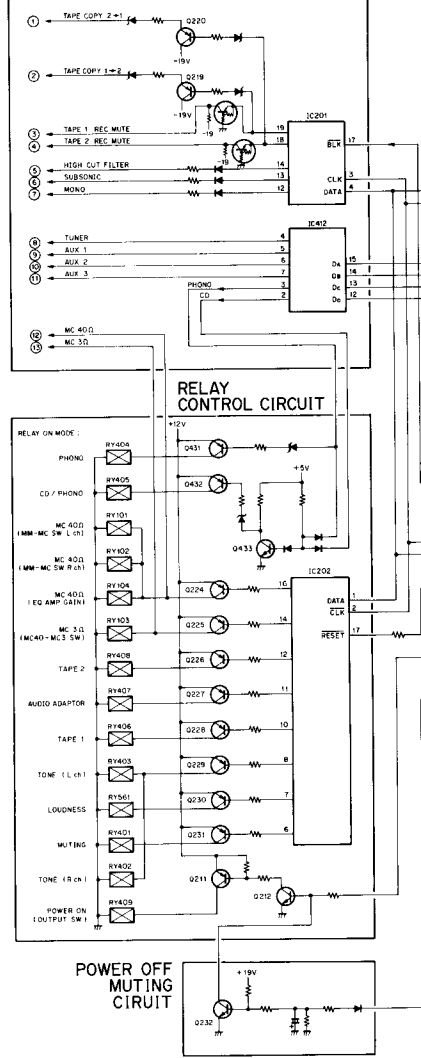


Level Diagram (Frequency)

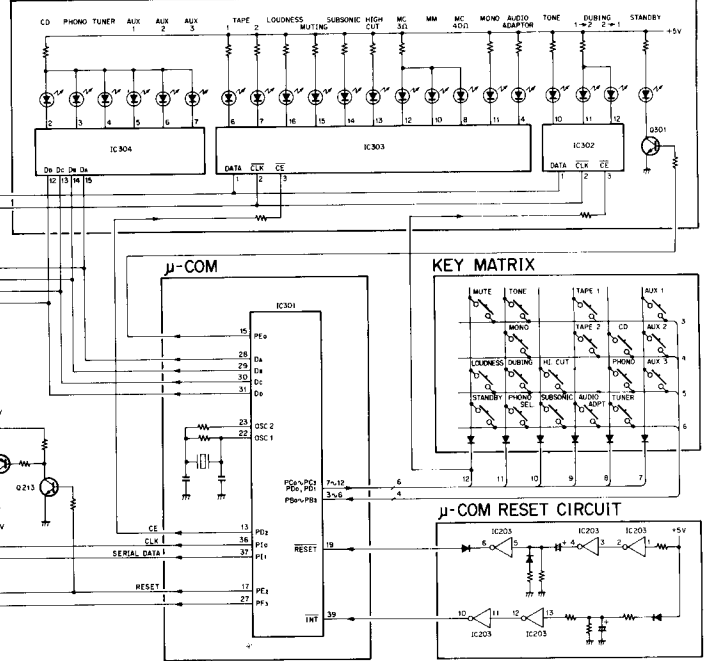




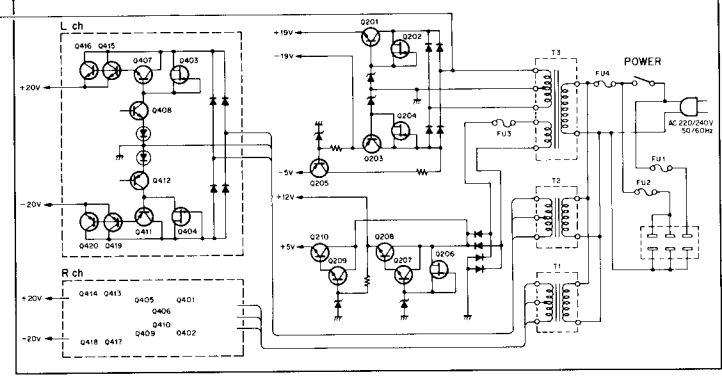
ANALOGUE SWITCH CONTROL CIRCUIT



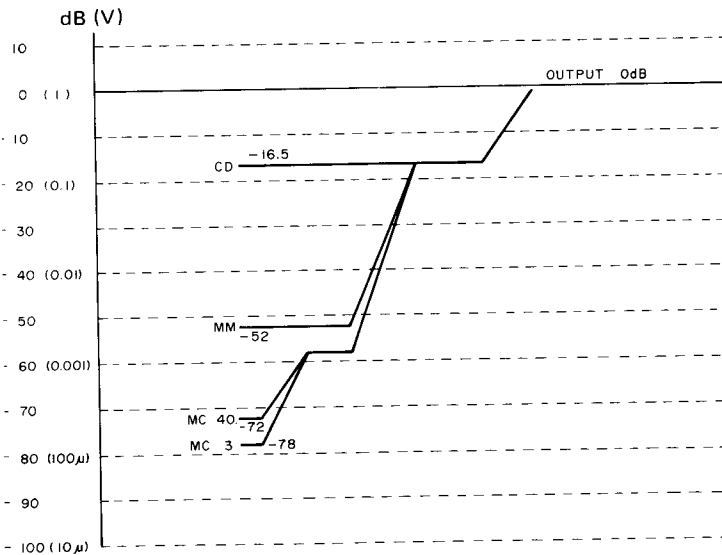
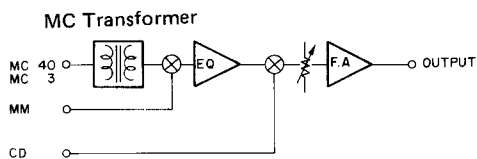
INDICATOR CIRCUIT



POWER SUPPLY CIRCUIT



Level Diagram (Frequency: 1kHz. Voltage level display for each stage)



9. CIRCUIT DESCRIPTIONS

9.1 BLOCK DIAGRAM EXPLANATION

- A step up transformer is installed in the previous stage as the EQ amp section for MC response.
- The INPUT SELECTOR enables recording on TAPE 2 of signals routed through the AUDIO ADAPTER between TAPES 1 and 2.
- Due to aciton of the BUFFER amp which receives signals at high impedance and outputs at low impedance there is no effect transmitted to the connecting BAL VOL. MAIN VOL of the next stage.
- MUTING is fixed at -20dB (Resistance divider system).
- The FLAT amp has an input sensitivity of 150 mV and output GAIN is 16.5dB. The amp is a DC couple type DC amp (output is C couple).
- The SUBSONIC and HIGH FILTER are each set for 6dB/OCT according to the CR. f_c is 10 Hz and 10kHz respectively.
- TONE has a 100Hz, 10kHz turnover frequency. It is a positive phase amp of 0dB GAIN.
- OUTPUT MUTING switches OFF the output at the time of power ON/OFF.

9.2 EQ AMP SECTION

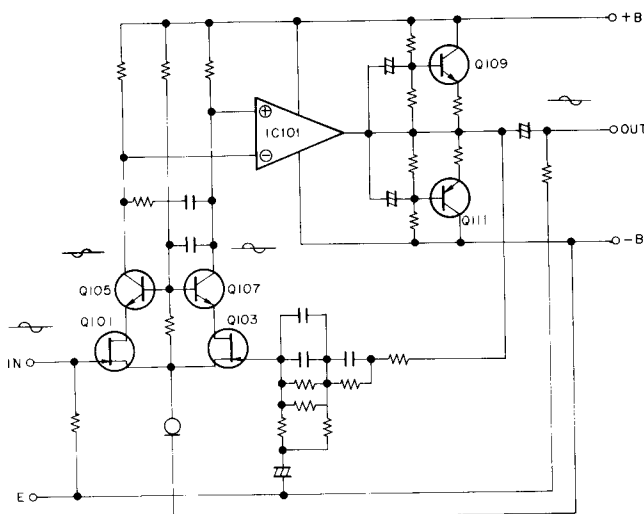


Fig. 9-1 EQ Amp Section

The EQ amp section comprises the differential FET input section, the OP amp voltage amplifier section, the SEPP output section and the feedback circuit (RIAA) of CR.

The FET differential input section receives signals directly by DC couple. Reverse output from the input section is transmitted to the reverse input of the OP amp. The non-reversible output is applied to non-reverse input, amplified and applied to the SEPP output section. The output stage contains class A circuitry to drive the low impedance feedback circuit and give low distortion output.

9.3 FLAT AMP.

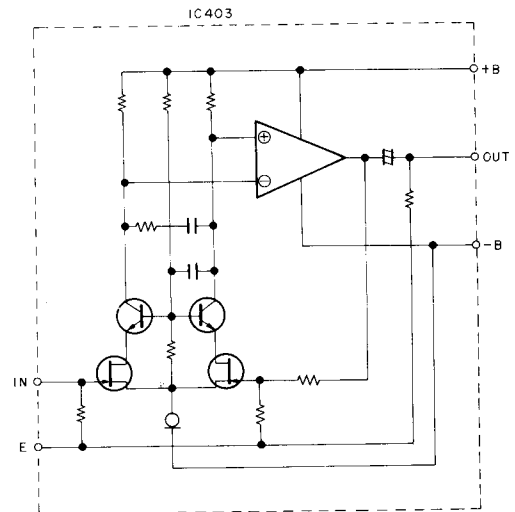


Fig. 9-2 FLAT Amp Section

This is basically the same as the EQ amp. Differences are due only to a non-SEPP output section and the resistance of the feedback circuit. The resistance of the FLAT amp feedback circuit isn't of the same low value as for the EQ amp so it has sufficient drive for the OP amp and gives low distortion. The FLAT amp is a DC construction.

9.4 TONE AMP SECTION

The TONE amp section is the same as the A-150D.

10. IC DESCRIPTION

■ **μPD6362C (C MOS)**
Electron Switch

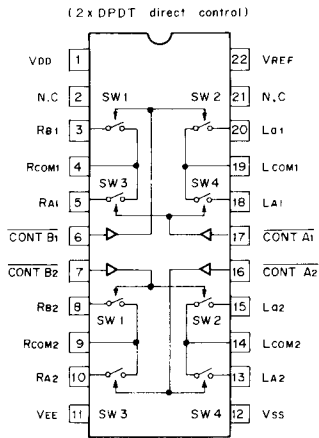


Fig.. 10-1 Micro μPD6362C Block diagram with pin distribution

μPD6362C Truth Value Chart

Control Input		SW1, SW2	SW3, SW4
CONT A	H	—	OFF
	L	—	ON
CONT B	H	OFF	—
	L	ON	—

(Note)

H : High level.
L : Low level.

■ **NJM5534DD (Operation amp IC)**

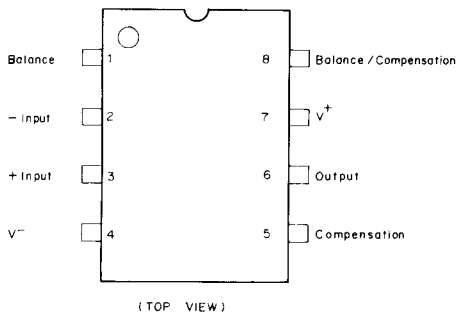
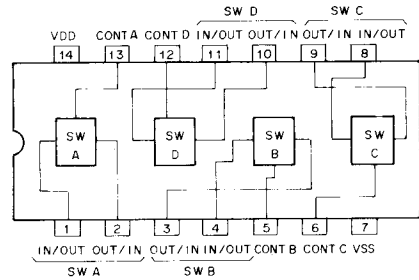


Fig. 10-2 Pin distribution chart for NJM5534DD

■ **LC4966 (C MOS) Logic bilateral switch**



Control input for the switch is ON with H levels.

Fig. 10-3 LC4966 Block diagram

■ **LC7570 (C MOS) Display storage tube static driver**

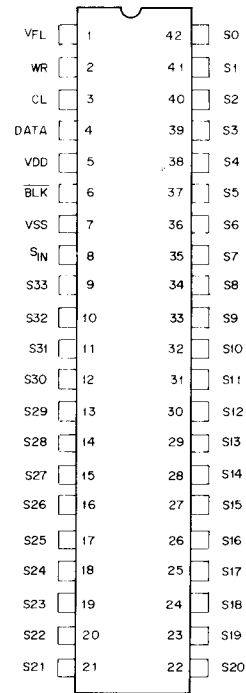


Fig. 10-4 LC7570 Pin distribution chart

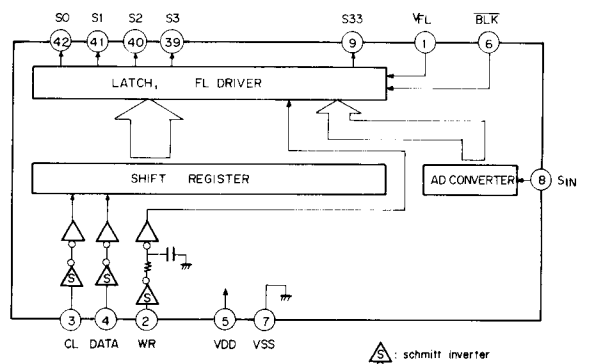


Fig. 10-5 LC7570 Block diagram

■ PD0012A
Output Expander

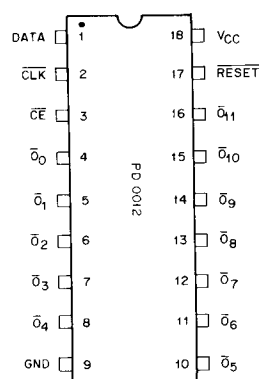


Fig. 10-6 PD0012A Pin distribution chart

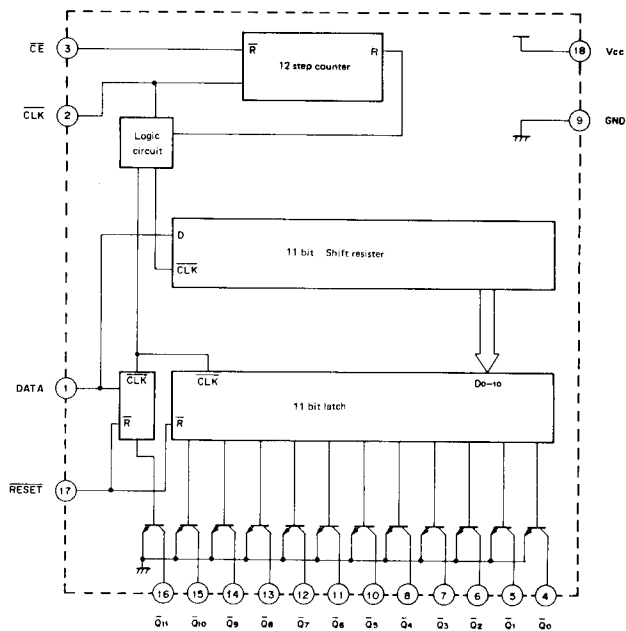


Fig. 10-7 PD0012A Block diagram

Pin names for PD0012A

No.	Code	Function	No.	Code	Function
1	DATA	Data Input	10	O ₅	Data Output
2	CLK	Clock Input	11	O ₆	Data Output
3	CE	Counter Reset Input	12	O ₇	Data Output
4	O ₀	Data Output	13	O ₈	Data Output
5	O ₁	Data Output	14	O ₉	Data Output
6	O ₂	Data Output	15	O ₁₀	Data Output
7	O ₃	Data Output	16	O ₁₁	Data Output
8	O ₄	Data Output	17	RESET	Latch Reset Input
9	GND	Earth Terminal	18	V _{CC}	Power Terminal

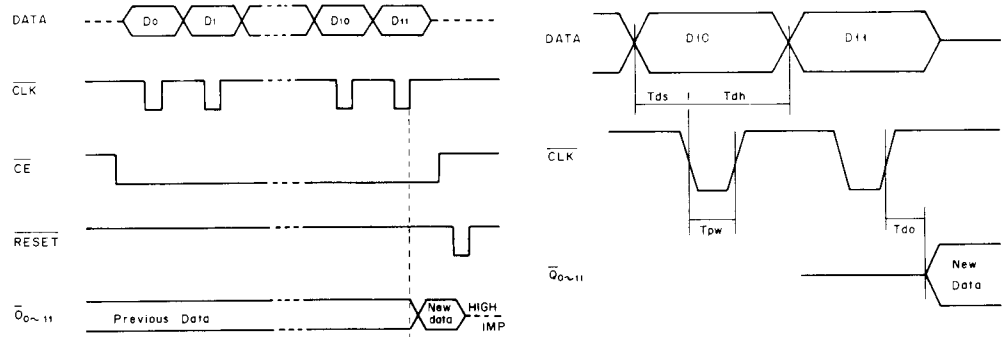


Fig. 10-8 Input data timing chart

11. 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	5	6	1	J
47kΩ	47 × 10 ³	473	RD¼PS	4	7	3	J
0.5Ω	0R5		RN2H	0	5		K
1Ω	010		RS1P	0	1	0	K

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

5.62kΩ	562 × 10 ¹	5621	RN¼SR	5	6	2	1	F
--------	-----------------------	------	-------	---	---	---	---	---
- 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.
- Parts marked by “ \odot ” are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

Miscellaneous Parts

P.C. BOARD ASSEMBLIES

Mark	Symbol & Description	Part No.
	AF assembly	AWZ1044
	Control assembly	AWZ1058
	Switch A assembly	AWZ1059
	Power supply assembly	AWZ1049
	Equalizer assembly	AWF1002
	VR A assembly	Non supply
	VR C assembly	Non supply
	Fuse assembly	Non supply
	Switch B assembly	Non supply

OTHERS

Mark	Symbol & Description	Part No.
\triangle	C1 Power capacitor (0.01μF/400V)	ACG-502
\triangle ★	T1, T2 Power transformer (220V/240V)	ATT1007
\triangle ★	T3 Power transformer (220V/240V) Plug (Terminal)	ATT1008 AKM-050
\triangle ★★	S1 AC socket 3P (AC OUTLETS) Push switch (POWER)	AKP-502 ASG-553
\triangle ★★	FU4 Fuse (T500mA)	AEK-401
\triangle ★★	FU1, FU2, FU3 Fuse (T1A)	AEK-402
\triangle	AC Power cord	ADG-097

AF Assembly (AWZ1044)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC401, IC411 E-SW IC	UPD6362C
★★	IC403, IC404	NJM5534DD
★★	IC405, IC406 OP-AMP IC	M5210P
★★	IC407-IC410 OP-AMP IC	M5201P
★★	IC412 Logic IC	M74LS42P
★★	Q401-Q404	2SK246
★★	Q405-Q408, Q421, Q422, Q429, Q430	2SC1845
★★	Q409-Q412, Q423, Q424	2SA992
★★	Q413-Q416	2SC2705
★★	Q417-Q420	2SA1145
★★	Q431, Q432	2SA1115(A)
★★	Q425, Q426	2SK170
★★	Q427, Q428	2SJ74
★★	Q433	2SC2603
★★	Q438-Q441	2SC2878
★★	Q432	2SA1115
★	D401-D408	11DF2FD
★	D409-D412 LED	AEL-398
★	D413, D416	S5566
★	D417, D418	RD8.2EB
★	D419-D421	1S1555
★	D422, D423	RD15EB

RELAIES

Mark	Symbol & Description	Part No.
★★	RY401-RY409 Relays MUTING, TONE, INPUT, CD/PHONO, TAPE1, ADAPTOR, TAPE2, OUTPUT	ASR1004

CAPACITORS

Mark	Symbol & Description	Part No.
	C401—C404, C417—C420 C405—C408, C425, C426 C409—C412 C413—C416, C433—C436, C441, C442 C421, C422, C429, C430	CEXA471M50 CMA221J500 CEXA331M50 CEYA100M50 CEYANP220M50
	C423, C424 C427, C428 C431, C432 C437, C438 C439, C440	CMA470J500 ACE-217 CQMXA273J100 CEYA4R7M50 CMA101J500
	C443, C444 C445—C452 C453—C456 C457, C493—C497, C499, C500 C465, C466	CQMA823J50 CEYA2R2M50 CEYA3R3M50 CEAS100M25 CQSXA391J160
	C467—C480, C487—C492 C481, C482 C483, C484 C498 C567, C568 C485, C486	CKDYB391K50 CKDYB331K50 CQSXA122J160 CKDYB102K50 CEAS470M16 CQSXA102J160

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
	R549 R465, R466 R469—R496, R498—R501, R535— R542 R497 Resistor array R553, R554	RD1/4PM2R2J RD1/2PM822J RD1/8PM□□□J RA6S103J RS1LMF221J
	R513—R534, R544 Other resistors	RDR1/4PM□□□J RDR1/4PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
	Terminal 4P (ADAPTOR, TAPE1, CD, TUNER)	AKB-115
	Terminal 6P (TAPE2, OUTPUT)	AKB1002
	Terminal 6P (AUX1, AUX2, AUX3)	AKB1005

Control Assembly (AWZ1058)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC301	PDE012
★★	IC302, IC303	PD0012A
★★	IC304	M74LS42P
★★	Q301	2SC2458(A)
★	D301—D306	1SS131

COIL

Mark	Symbol & Description	Part No.
	L301 (1mH)	ATH-098

CAPACITORS

Mark	Symbol & Description	Part No.
	C301, C304 C302, C303 C305 C306 C307—C309 C311, C312	CEANL470M16 CKDYB103K50 CKDYB471K50 CCDCH121J50 CEAS100M25 CKDYF103Z50

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
	R301, R310 Resistor array Other resistors	RA4S103J RD1/8PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
★	X301 Ceramic resonator	ASS-046

Switch A Assembly (AWZ1059)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★	D353, D355, D357, D368—D372 LED (AUX3, AUX2, AUX1, TAPE2, TAPE1, TUNER, PHONO, CD)	AEL-451
★	D341, D343, D344, D348, D359— D367 LED (MC, MM, MONO, HIGH CUT, FILTER, SUBSONIC FILTER, TONE, MUTE, LOUDNESS)	AEL1004

RELAYS SWITCHES

Mark	Symbol & Description	Part No.
★★	S341—S343, S346—S350, S352, S355—S360 Tact switch (INPUT, TAPE MONITOR, ADAPTOR, HIGH CUT FILTER, SUBSONIC FILTER, MODE, TAPE COPY, PHONO SEL, MUTE)	ASG-711

RESISTORS

Mark	Symbol & Description	Part No.
	R341, R345, R347, R348	RD1/8PM391J
	R342, R343 Resistor array	RA4S391J
	R346 Resistor array	RA5S391J

Switch B Assembly

SWITCHES

Mark	Symbol & Description	Part No.
★★	S391, S392 Tact switch (TONE, LOUDNESS)	ASG-711

Power Supply Assembly (AWZ1049)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC201 FL Static driver IC	LC7570
★★	IC202 Output expander IC	PD0012A
★★	IC203 Logic IC	TC4069UBP
★★	Q201	2SC2705
★★	Q202, Q204, Q206	2SK246
★★	Q211, Q214, Q224—Q231	2SA1115
★★	Q207, Q209, Q212, Q213, Q219, Q220	2SC2603
★★	Q208, Q210	2SC2275A
★★	Q203, Q205	2SA1145
★★	Q232	2SC2878
	Q233, Q234	RN2203
★	D201—D208, D226	S5566
★	D209, D210	RD20ESB2
★	D211	RD13EB
★	D212	RD6.2EB
★	D213	RD6.8EB
★	D214, D221—D223, D227—D229	1SS131
★	D219, D220, D224, D225	RD18EB
★	D238	RD3.9ESB

CAPACITORS

Mark	Symbol & Description	Part No.
	C201, C202	CEAS471M35
	C203—C206, C209	CEAS101M25
	C207, C211	CEAS101M10
	C208	CEAS102M25
	C210	CEAS101M16
	C212 (0.047F/5.5V)	ACH-902
	C218, C219	CEAS100M25
	C220, C221, C224	CEAS010M50
	C222	CEAS220M50
	C223	CEAS4R7M50
	C225, C226	CKDYF103Z50

RESISTORS

Note: When ordering resistors, convert the resistance value into code from, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
	R202	RS2LMF101J
	R243 Resistor array	RA8S103J
	Other resistors	RD1/8PM□□□J

EQUALIZER Assembly (AWF1002)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC101, IC102	NJM5534DD
★★	Q101—Q104	2SK369
★★	Q105—Q108, Q113, Q114	2SC1845
★★	Q109, Q110	2SC2235(A)
★★	Q111, Q112	2SA965(A)
★★	Q115, Q116	2SC2878
★★	Q117	2SA1115
★★	Q118, Q119	2SC2603
★	D101, D102	1SS131

COILS AND TRANSFORMERS

Mark	Symbol & Description	Part No.
	L101, L102 Inductor (270μH)	ATH-132
	T101, T102 MC Transformer	ATV1002

RELAYS

Mark	Symbol & Description	Part No.
★★	RY101—RY104 Relay (MM/MC, MC40Ω/3Ω)	ASR1004

CAPACITORS

Mark	Symbol & Description	Part No.
	C101, C102	CMA181J500
	C103, C104	CMA151J500
	C105, C106	CQSXA152J160
	C107, C108	CMA820J500
	C109, C110	CQSXA681J160
	C111—C114, C127, C128	CEYA100M50
	C115, C116	CQSXA122J160
	C117, C118 (0.03μF/100V)	ACE-094
	C119, C120 (0.12μF/100V)	ACE-095
	C121, C122	CEYANP330M50

Mark	Symbol & Description	Part No.
	C123, C124	CQMXA153J100
	C125, C126	CEXA102M25
	C131, C132	CKCYF103Z50
	C133–C136	CEAS470M25
	C138, C139	CEYA220M50
	C140, C141	CEAS100M25

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
	R135, R136–R138, R141, R142, R145, R146	RDR1/2PM□□□J
	R151, R152	RD1/4PM100J
	R153–R159	RD1/8PM□□□J
	Other resistors	RDR1/4PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
	Terminal 2P (PHONO, PHONO DIRECT OUT)	AKB1001

VR A Assembly**CAPACITORS**

Mark	Symbol & Description	Part No.
	C551, C552	CQMXA273J100

RESISTORS

Mark	Symbol & Description	Part No.
★	VR551 Variable resistor (BALANCE)	ACT1002
★	VR552, VR553 Variable resistor (BASS, TREBLE)	ACT1007
	R551, R552	RDR1/4PM561J

VR C Assembly**SEMICONDUCTOR**

Mark	Symbol & Description	Part No.
★	D561	S5566

RELAY

Mark	Symbol & Description	Part No.
★★	RY561 Relay (LOUDNESS)	ASR1004

CAPACITORS

Mark	Symbol & Description	Part No.
	C561, C562	CQSA152J160
	C563, C564	CEYA010M50
	C565, C566	CKCYX104M25

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
★	VR561 Variable resistor (VOLUME)	ACW1001
	R563, R564	RDR1/4PM153J
	R561, R562	RD1/4PM751J

FUSE Assembly

No replaceable parts available for Fuse assembly.

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