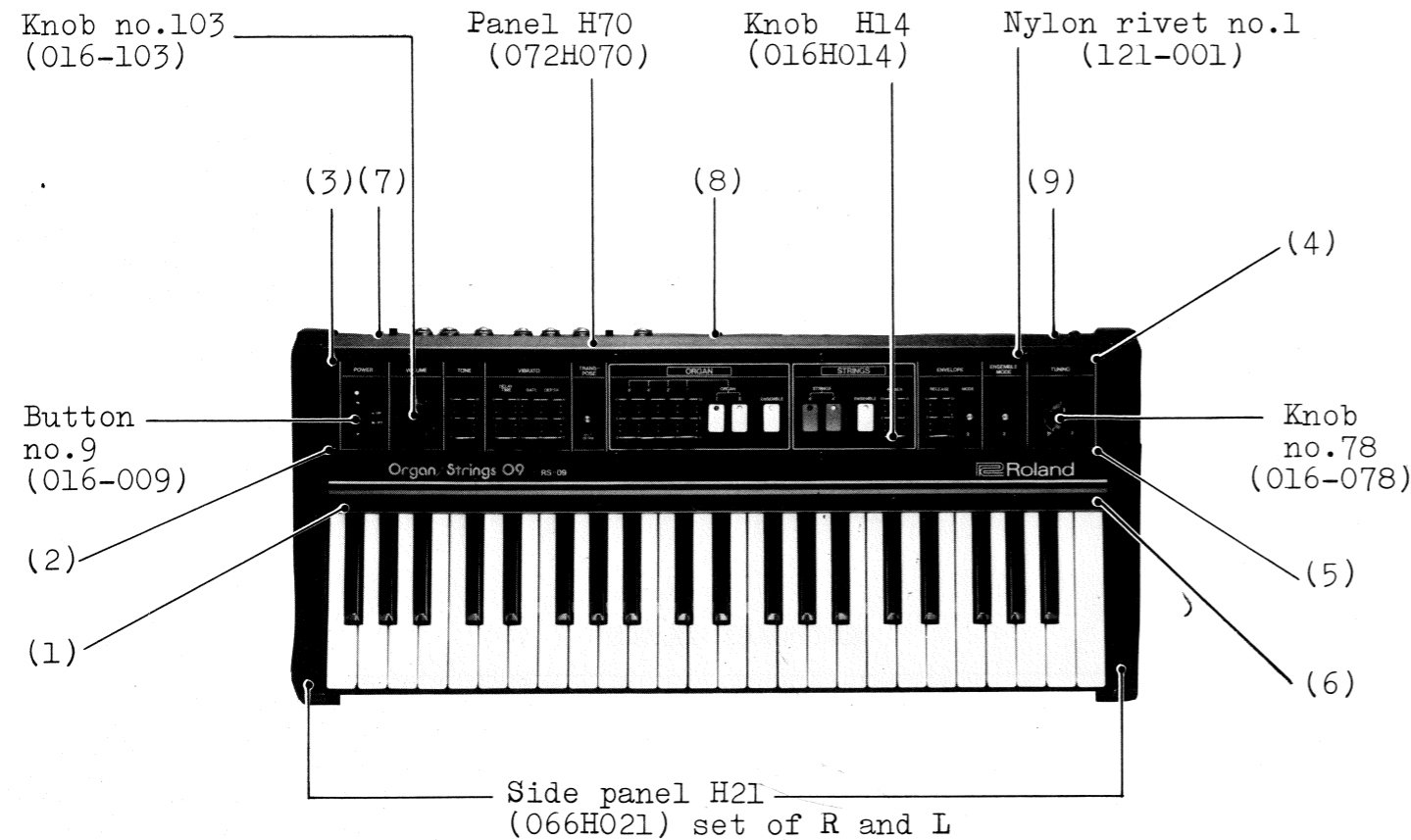


RS-09 SERVICE NOTES

Second Edition

APPLICABLE TO SERIAL NUMBERS with 947450 and SUBSEQUENT
(Guide on design change, pages 2, 3.)



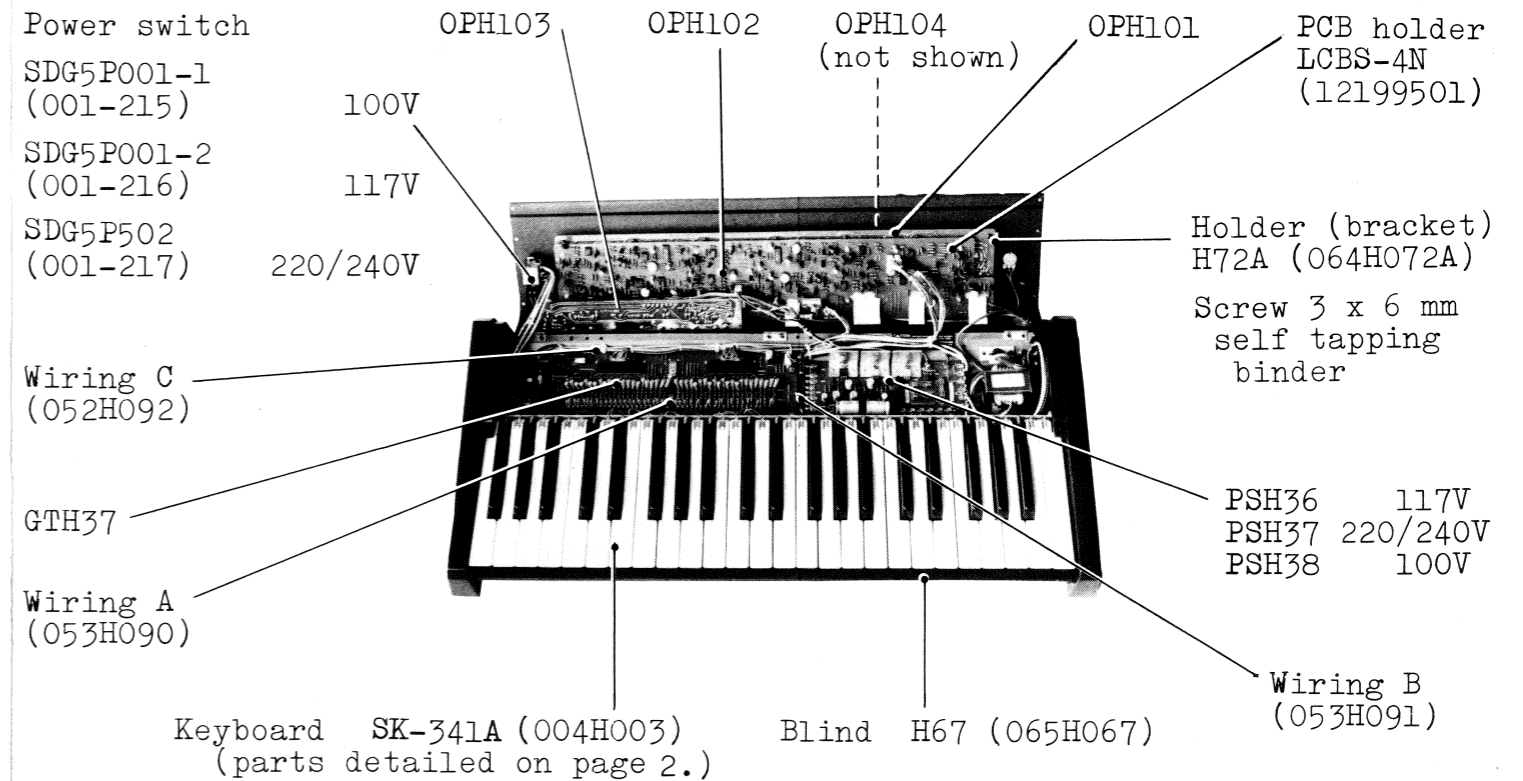
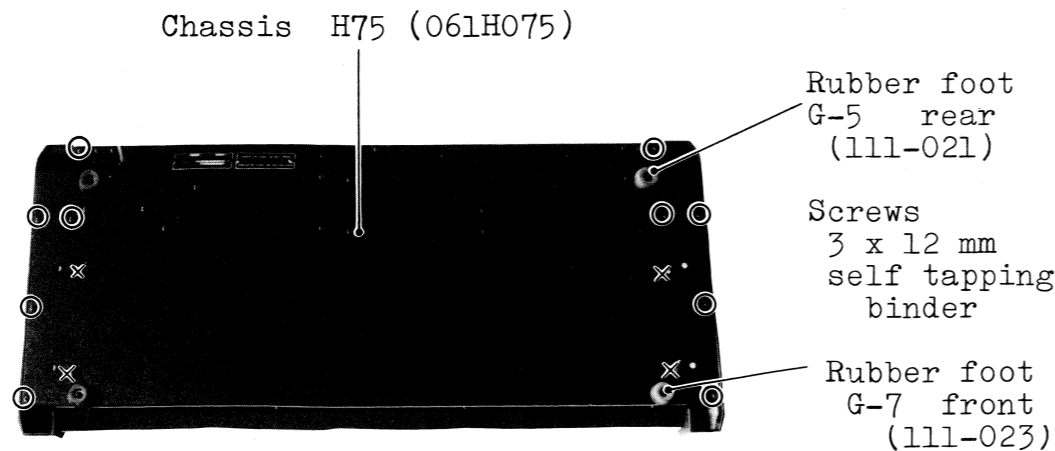
Top cover removal screws

- (1) through (6) 3 x 10 mm tap-tight binder Br
- (7) through (9) 3 x 6 mm self tapping binder Br

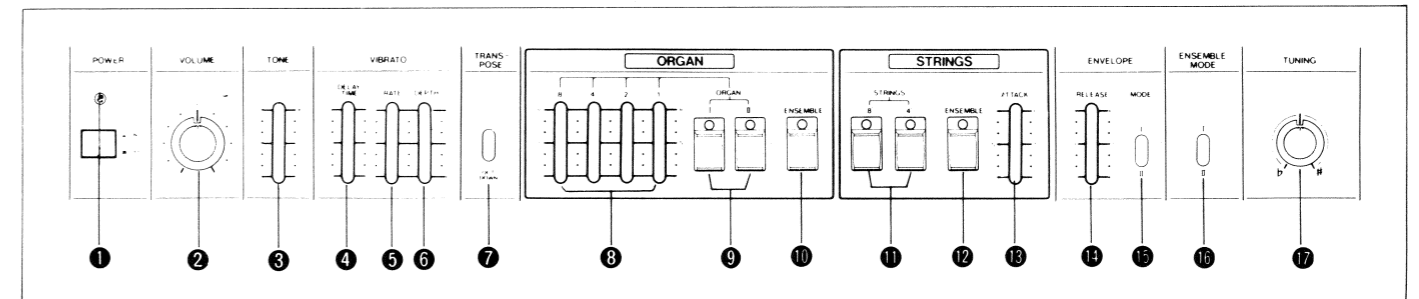
Side panel removal screws

(encircled)
3 x 10 mm tap-tight B binder Br

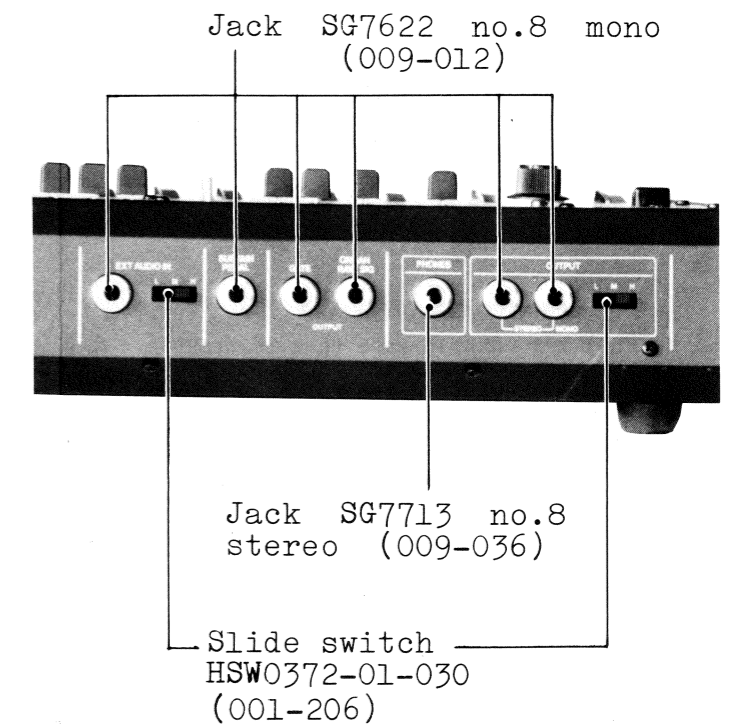
Keyboard removal screws
(crossed)
5 x 16 mm self tapping binder Br



WHEN ORDERING CIRCUIT BOARD, SUFFIX alphabet to the part name, if any.



- | | | | |
|--------|------------------------|-----------|------------|
| 1 | TLR-124 | | (019-028) |
| 2 | GM70RK20A14P | 10KA x 2 | (026-010) |
| 3 | MFE9R-C16A15 | 100KA x 2 | (029-416) |
| 4,5 | LFE9R-C16A15 | 100KA | (029-306) |
| 6 | LFE9R-C16B14 | 10KB | (029-314) |
| 7 | SLE-622-18PS | | (001-268) |
| 8 | LFE9R-C16B14 | 10KB | (029-314) |
| Tablet | | | |
| 9 | H17 | yellow | (016H017) |
| 10 | H10 | white | (016H010) |
| 11 | H13 | blue | (016H013) |
| 12 | H10 | white | (016H010) |
| | Switch KHC11901 | | (13129712) |
| | (includes LED AR3432S) | | |
| 13 | LFE9R-C16A16 | 1MA | (029-309) |
| 14 | LFE9R-C16B15 | 100KB | (029-317) |
| 15 | SLE-622-18PS | | (001-268) |
| 16 | | | |
| 17 | EVHCOAK15B15 | 100KB | (026-005) |



PARTS LIST

GUIDE on DESIGN CHANGE

Major differences in circuit configuration, and components and their arrangements between versions.

SELECT SWITCH (ORGAN I, II)	Rocker (Changeover switch)	S/N with 947450 Key with LED (Independent) (OPH104)
KEYBOARD	SK-141A	SK-341A
MODULATION (Bias Adjust)	BBD SAD512 (Common to four)	BBD MN3004 (Individual)
SUSTAIN PEDAL CLICK NOISE	. . .	Q317, Q318 (OPH102) Reduction circuit
STRINGS VCA BALANCE	. . .	PM301 (DC adj.)
MUTING CIRCUIT	. . .	Q331-333 (OPH101)
PHONE AMP	OPH45, OUTPUT BRD.	OPH101, CONTROL BOARD

Prior to above, power transformers have been changed to those which deliver 2 volts lower secondary output at full load for less heat dissipation. - 23V to 21V DC -

NOTES:

"*" : indicates parts first introduced into RS09 from serial number 947450, or parts different from those on the parts list of previously issued (DEC. 15, 1978) Service Notes.
Of above, followed by "*" can replace predecessors.

POTENTIOMETER

026-005	EVHCOAK15B15	100KB	TUNING
026-010	GM70RK20A14P(L)	10KA x 2	ganged, VOL
029-314	LFE9RC16B14	10KB	slide
029-306	LFE9RC16A15	100KA	slide
029-317	LFE9RC16B15	100KB	slide
029-309	LFE9RC16A16	1MA	slide
029-416	MFE9RC16A15	100KA x 2	slide, TONE
*030-465	SR19R	10KB	trimmer
*030-471	SR19R	100KB	trimmer
045-024	Resistor	3.3K-ohm	carbon 1/4w

SEMICONDUCTOR

Transistor			
*15119805	2SB834-0		
*017-105	2SA1015-Y		
*017-139	2SD880-0		
*017-012	2SA733-	Q or P	
*017-013	2SC945-	Q or P	
017-016	2SK30A-	GR or Y	
Diode			
*018-075	05Z5.1L	zener	
018-035	05Z5.6U	zener	
018-014	1S2473		
018-094	1S2473FV	vertical mount	
018-089	1B4B41	rectifier	bridge
*019-028	TLR124	LED	
IC			
020-191	S10430	divider	keyer
020-156	AY-3-0214	chromatic	divider
020-041	TC4013BP		
020-097	μPC4558		
020-160	BA662A		
020-080	HA1457		
*15159124TO	TC4093BP		
*020-063	MN3004	BBD	
*020-224	MN3101	BBD driver	
*020-083	TC4016BP		

CONNECTOR, TERMINAL, CABLE

Wafer Terminal			
*010-188	5045-08A	010-185	5045-07A
010-183	5045-03A	010-193	5046-03A
010-186	5045-05A	*010-194	5046-04A
Wiring Assembly			
*053H090	A	*053H092	C
*053H091	B	*053H093	D, E
053H030	Flat cable H30	PCB-PCB	
053H031	Flat cable H31		
*053H083	Flat cable H83	PCB-MWP	
*13439509	Connector MWP 5P-1B	flat cable	

OTHERS

065H050	Dust cover H50	slide sw/pots. jack
048-001	Heat sink no.1	
120-014	Long nut(spacer or stand off) no.14	3 x 6 mm
120-009	Long nut no.9	3 x 13 mm
*120-042	Long nut no.42	3 x 8 mm
064H072A	Holder H72A	bracket-OPH101
064H076	Holder H76	LED
121-001	Nylon river no.1	
*12199501	Pcb holder LCBS-4N	
*Some components are called out in new numbering.		

PANEL, CASING

*072H070	Panel (top)	H70
066H021	Sidepanel H21	set of R and L
061H075	Chassis H75	(main)
111-021	Rubber foot G-5	rear
111-023	Rubber foot G-7	front

*004H003	Keyboard	SK341A
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SWITCH, BUTTON, KNOB

001-215	Power switch SDG5P001-1	100V
001-216	SDG5P001-2	117V
001-217	SDG5P502	220/240V
*016-009	Button no.9	black, power sw.
001-268	Lever switch SLB-622-18PS	
001-206	Slide switch HSW0372-01-030	
*13129712	Tablet switch KHC11901	
*016H010	Tablet H10	white
*016H013	Tablet H13	blue
*016H017	Tablet H17	yellow
*016-078	Knob no.78	TUNING
*016-103	Knob no.103	VOL
*016H004	Knob H4	slider

TRANSFORMER (WINDING)

*022H021J **	PT-H21J	100V
*022H021C-B**	PT-H21C-B	117V
*022H021D-A**	PT-H21D-A	220/240V
022-135	Coil 40M-067-018	10μH

JACK

009-012	SG7622 no.8	mono
009-036	SG7713 no.8	stereo
068-005	Bushing no.5	
121-005	Washer no.5	

FUSE

008-040	MGP 0.5000 (CSA) prim.	117V
*008-063	SEMKO T500mA sec.	
	(also 220/240V prim.)	
012-003	Fuse clip TF758 or F-6	

PRINTED CIRCUIT BOARD

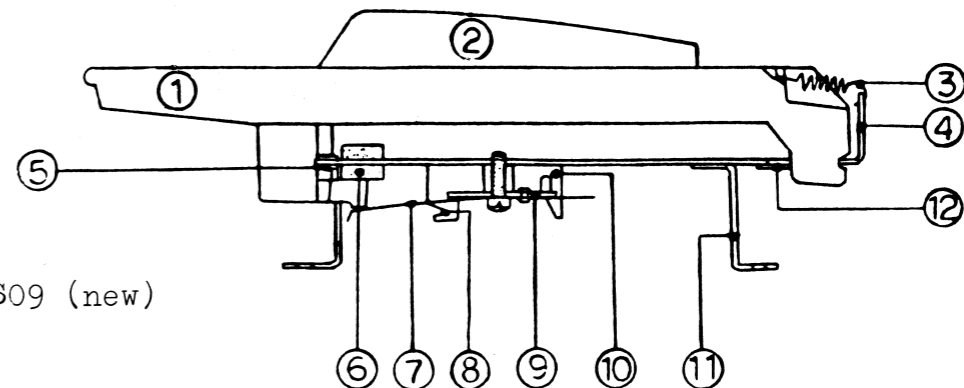
*147H037B**	GTH37B gate (pcb 052H149B)
*147H101A	OPH101A control (pcb 052H246A-1)
*149H102A	OPH102A control (pcb 052H246A-2)
*149H103	OPH103 output (pcb 052H248)
*149H104B	OPH104B select (pcb 052H247B)
*146H036C **	PSH36C pwr supply (pcb 052H146C) 117V
*146H037C **	PSH37C (052H146C) 220/240V
*146H038C **	PSH38C (052H146C) 100V

CAPACITOR

035-320	ECQS1101K 100pF 125V polystyrene
035-279	ECQS1102K 1000pF 125V
032-270	1μF/50V electro. M type
032-275	0.47μF/50V electro. M type

KEYBOARD PARTS

NO	PART NO	DESCRIPTION	NO	PART NO	DESCRIPTION
1	106H026	Natural key C, F	5	068H004	Guide bushing H4
1	106H027	Natural key D	6	101H141	Level felt H141
1	106H028	Natural key E, B	7	071H044	Contact leaf H44
1	106H029	Natural key G	8	071H047	Bus bar 44p H47
1	106H030	Natural key A	9	043H007	Switch unit 12p H7
1	106H031	Natural key C', F'	9	043H006	Switch unit 8p H6
2	106H032	Sharp key black	10	104H029	Busbar holder H29
3	070H029	Key spring H29	11	062H024	Chassis bracket H24
4	061H084	Chassis H84	12	098H006	Key stopper H6



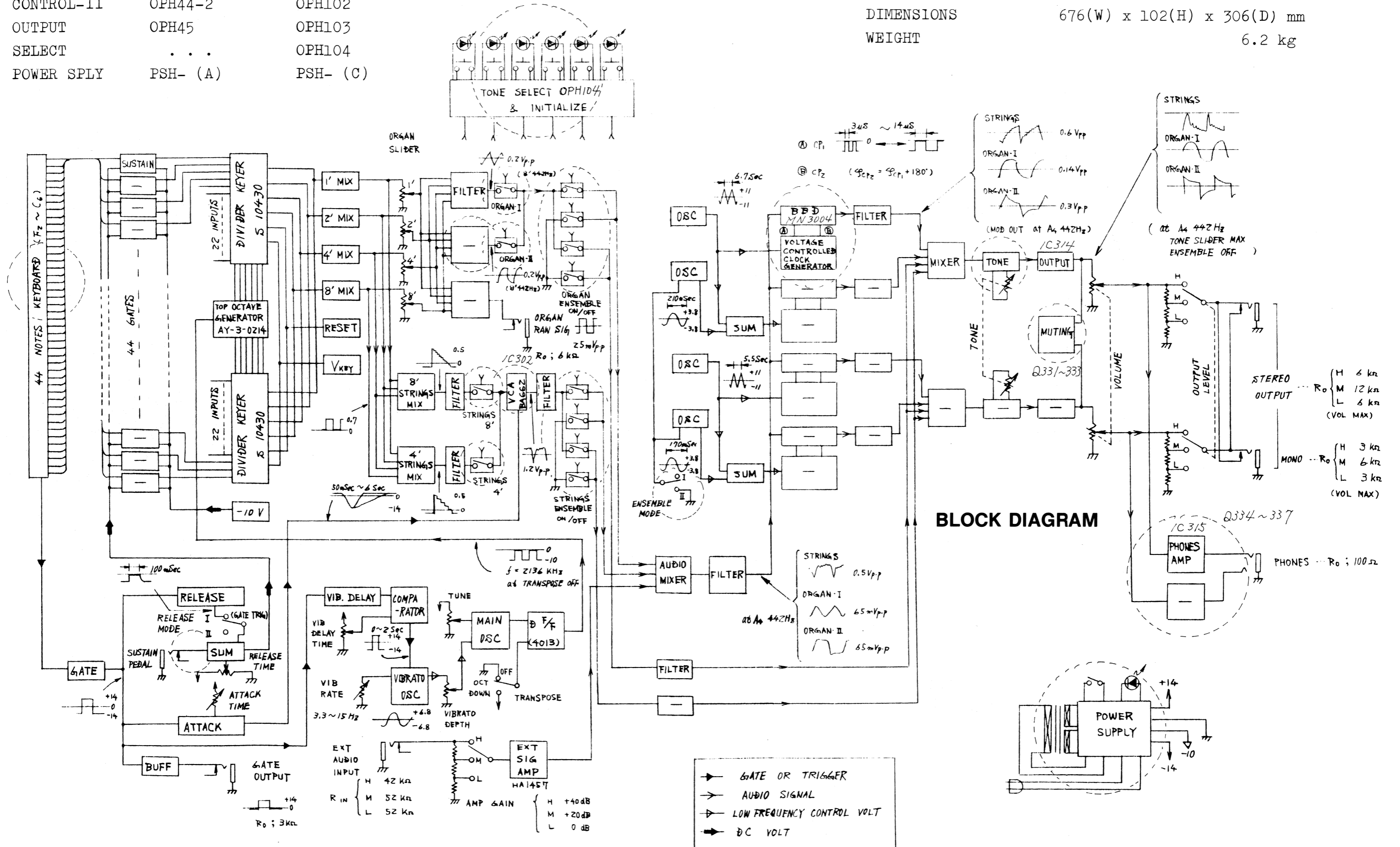
PRINTED CIRCUIT BOARDS

	S/N up to 937449	S/N with 947450
GATE	GTH37(A)	GTH37(B)
CONTROL-I	OPH44-1	OPH101
CONTROL-II	OPH44-2	OPH102
OUTPUT	OPH45	OPH103
SELECT	...	OPH104
POWER SPLY	PSH- (A)	PSH- (C)

DOTTED CIRCLES show circuits and parts different from those in previously issued Service Notes, not mentioned in Guide, inclusive.

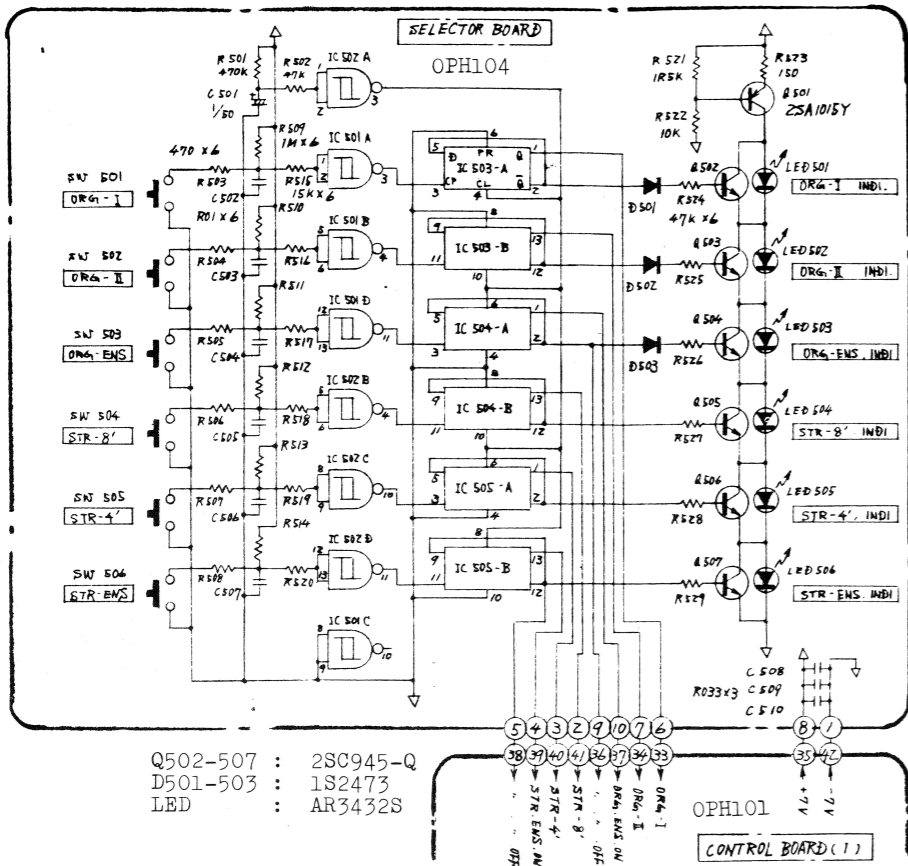
SPECIFICATIONS

ENVELOPE RELEASE TIME	3.5s max.
PITCH CONTROLLABLE RANGE	± 50 cents
POWER CONSUMPTION	15W
DIMENSIONS	676(W) x 102(H) x 306(D) mm
WEIGHT	6.2 kg



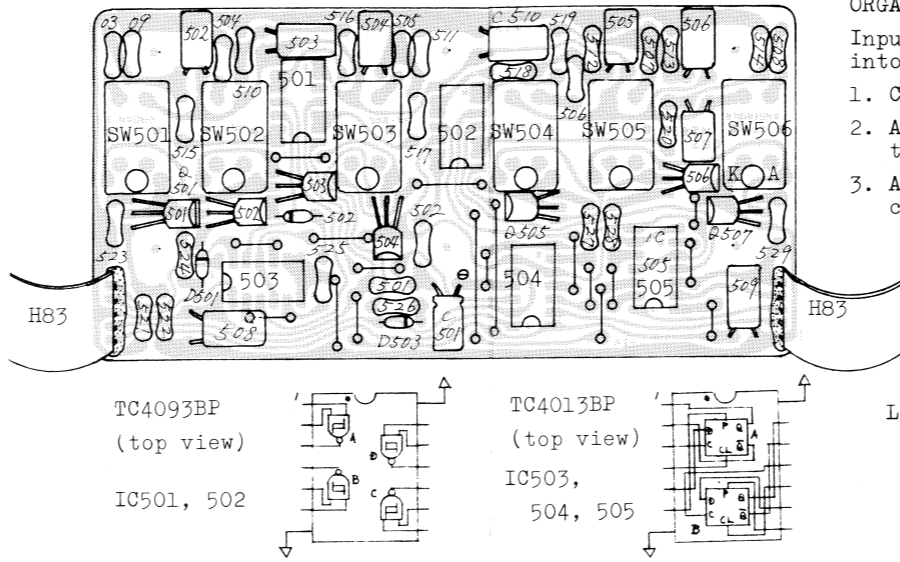
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
T
U
V



OPH104B (149H104B) (pcb 052H247B)

View from the foil side



TC4093BP
(top view)

IC501, 502

TC4013BP
(top view)

IC503,
504, 505

OPH101A (149H101A) (pcb 052H246A-1)

View from the foil side

ADJUSTMENT

BBD BIAS - OPH102 -

SETUP

ORGAN/STRINGS ENSEMBLE : off

Input signal : Sine wave, 442Hz, -26dBm into EXT AUDIO IN (level switch, H)

1. Connect oscilloscope to TP5 on OPH102.
2. Adjust PM302 for centering waveform on the screen.
3. Apply similar steps to the other MOD channels:

TP6 - PM303 TP7 - PM304

TP8 - PM305

4. Verify the following:

- a) Output level stays constant as the Input signal and the Input Level are set for, the following combinations.

INPUT SIGNAL	EXT AUDIO IN
-40dB	H
-20dB	M
0dB	L

- b) Distortion is not appreciable when four keys (in chord) are played simultaneously with the following control setting: ORGAN sliders 8', 4', 2', 1' - "10". ORGAN tab - I. TONE - "10". ORGAN ENSEMBLE - "on"

VCA DC BALANCE - OPH101 -
(Strings)

SETUP

Tablet switches: All off

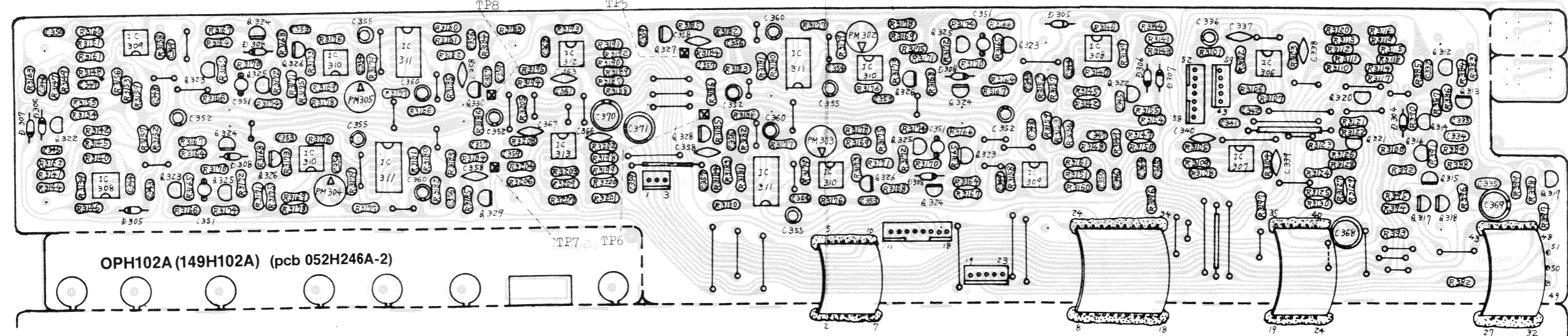
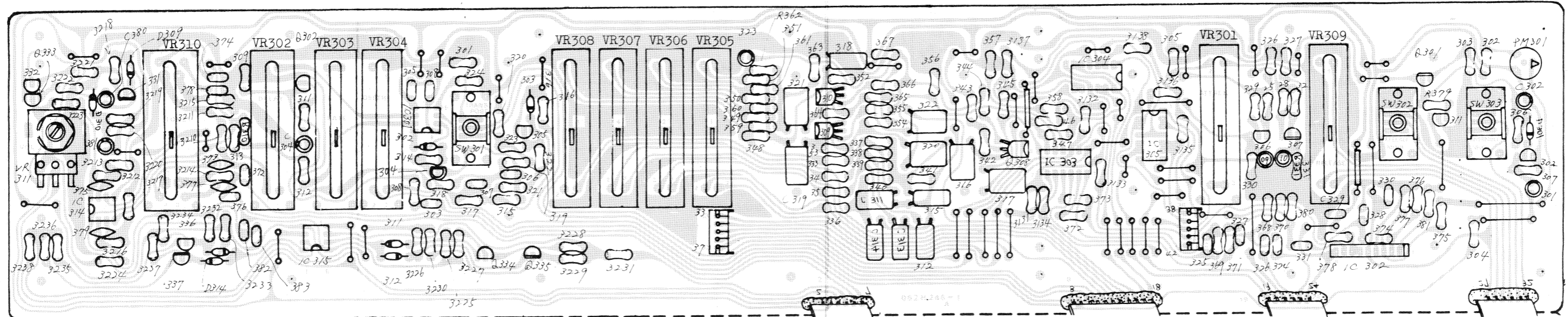
ATTACK: "0"

VOLUME: "10"

OUTPUT MONO Jack:

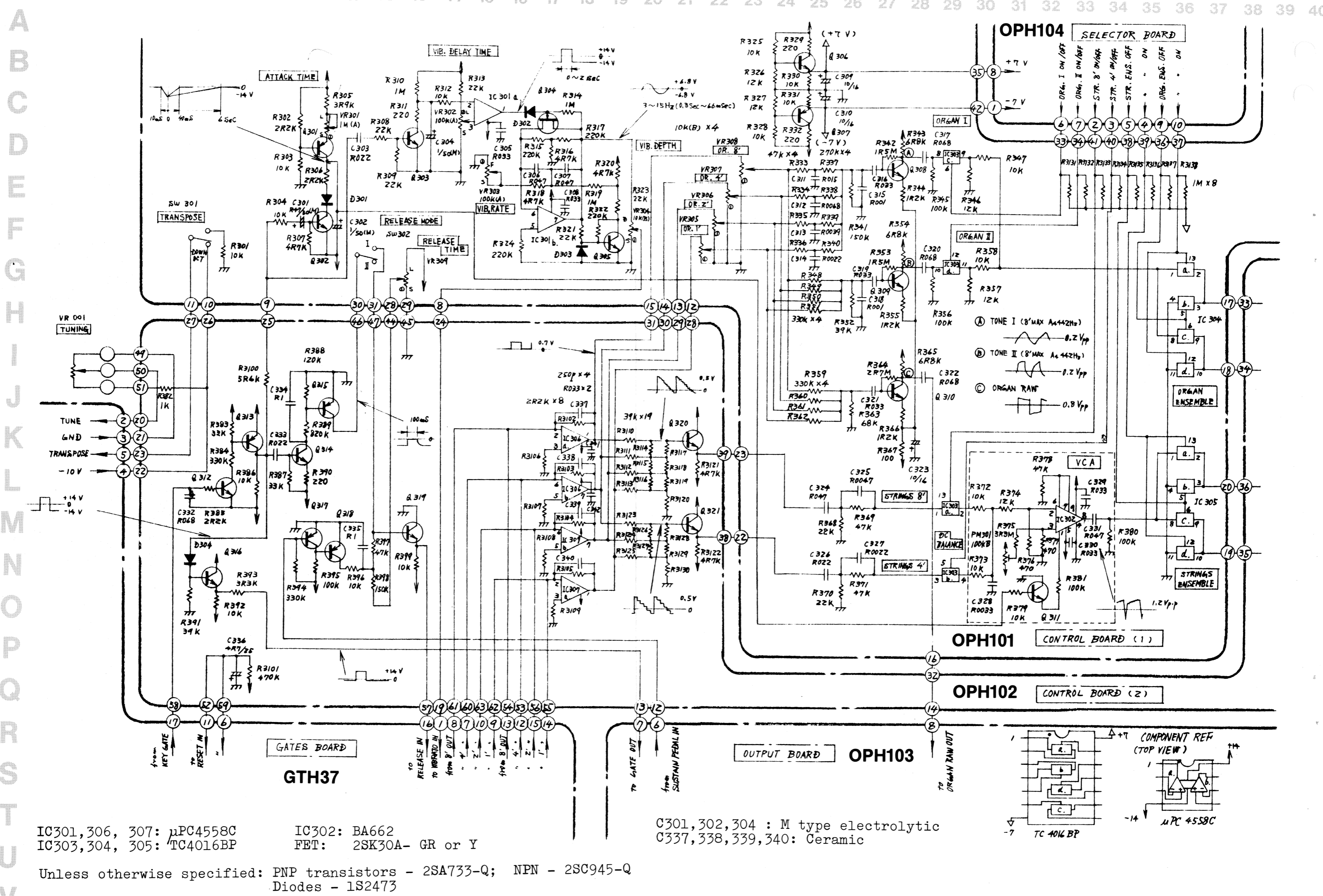
to an amplifier and speaker
(Level switch - H)

- a) While tapping a key, adjust PM301 for the least click noise.



OPH102A (149H102A) (pcb 052H246A-2)

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

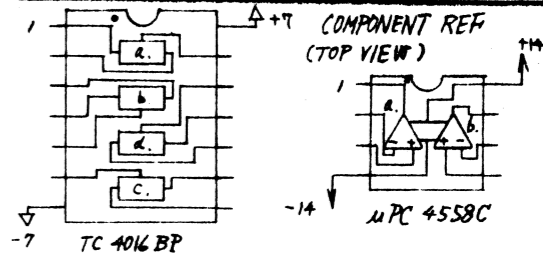


IC301, 306, 307: μ PC4558C
 IC303, 304, 305: TC4016BP

IC302: BA662
 FET: 2SK30A- GR or Y

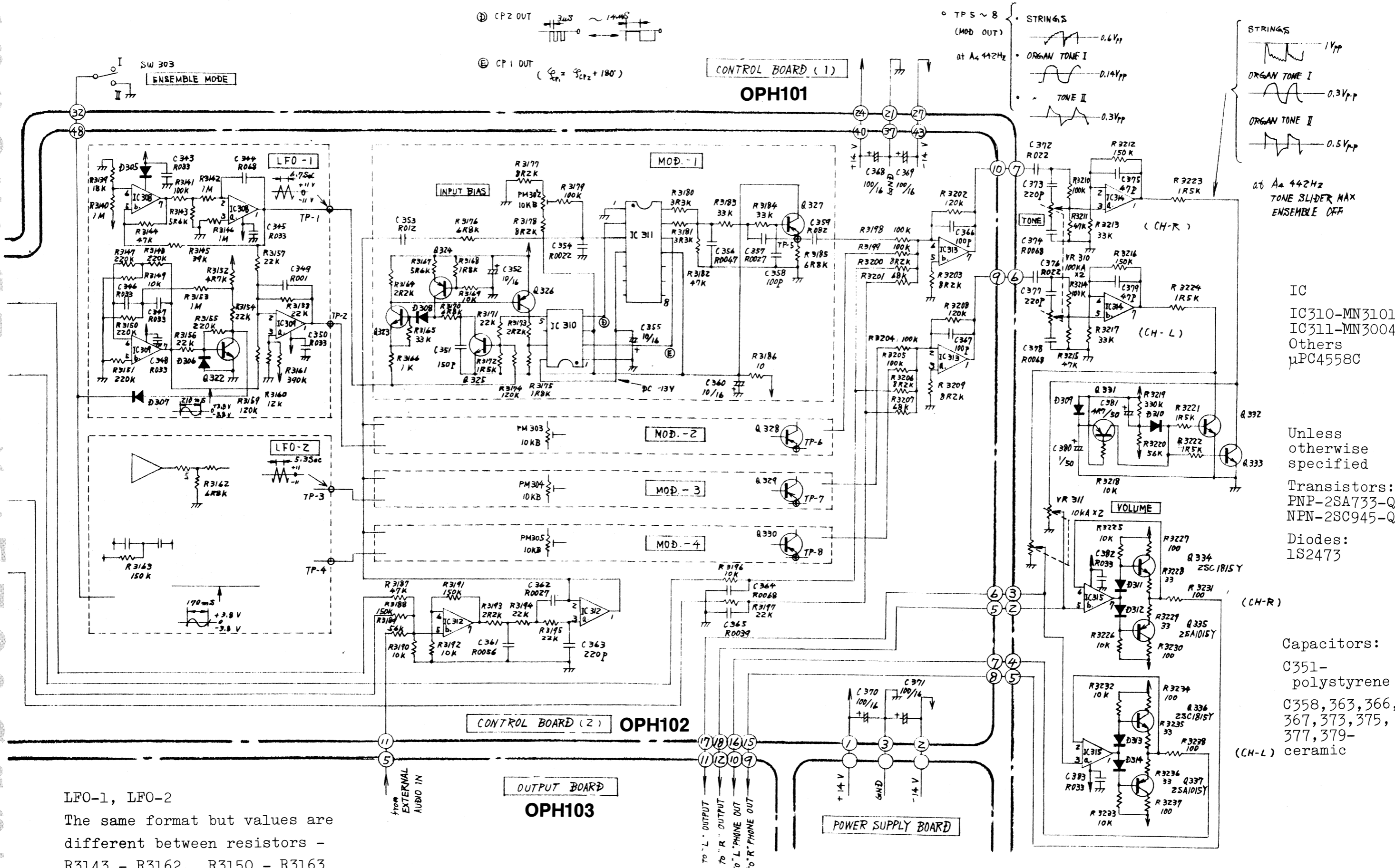
C301, 302, 304 : M type electrolytic
 C337, 338, 339, 340: Ceramic

Unless otherwise specified: PNP transistors - 2SA733-Q; NPN - 2SC945-Q
 Diodes - 1S2473



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41

A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
T
U
V

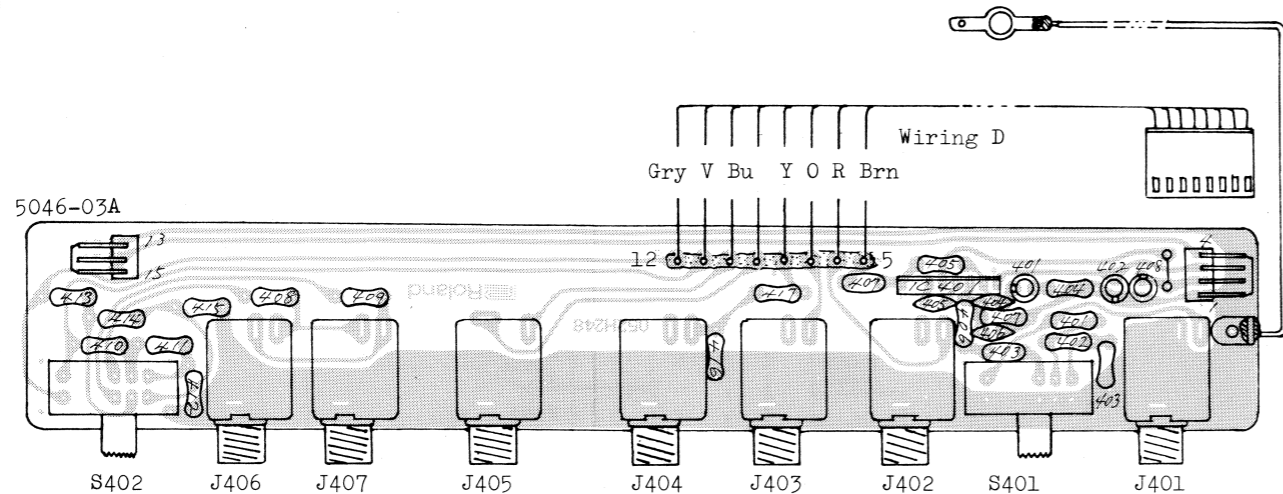


LFO-1, LFO-2
 The same format but values are different between resistors - R3143 - R3162, R3150 - R3163

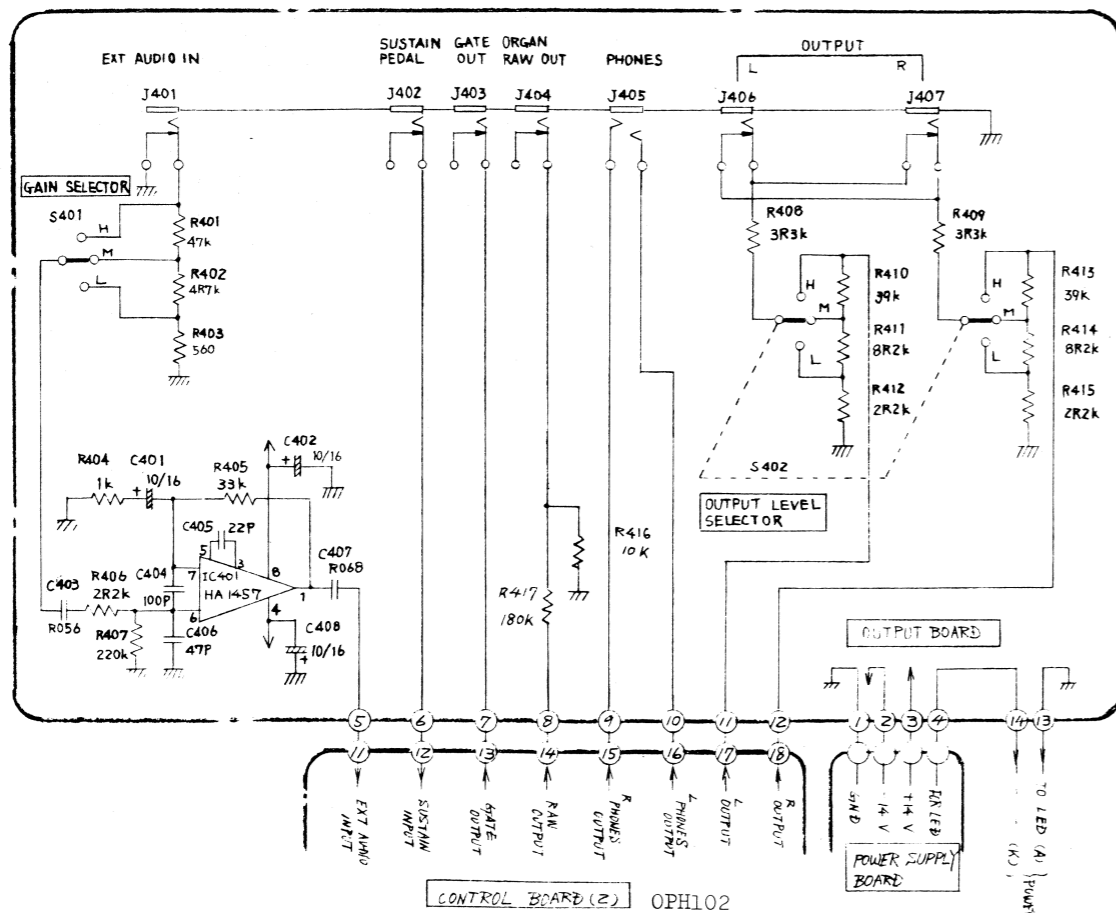
Unused numbers for terminal designation: 1, 25, 26 - OPH101 , 4, 41, 42 - OPH102

OPH103 (149H103) (pcb 052H248)

View from the foil side



HSW0372-01-030 SG7622 no.08 SG7713 no.08 S G 7 6 2 2 n o . 0 8 HSW SG7622 no.08 0372-01-030

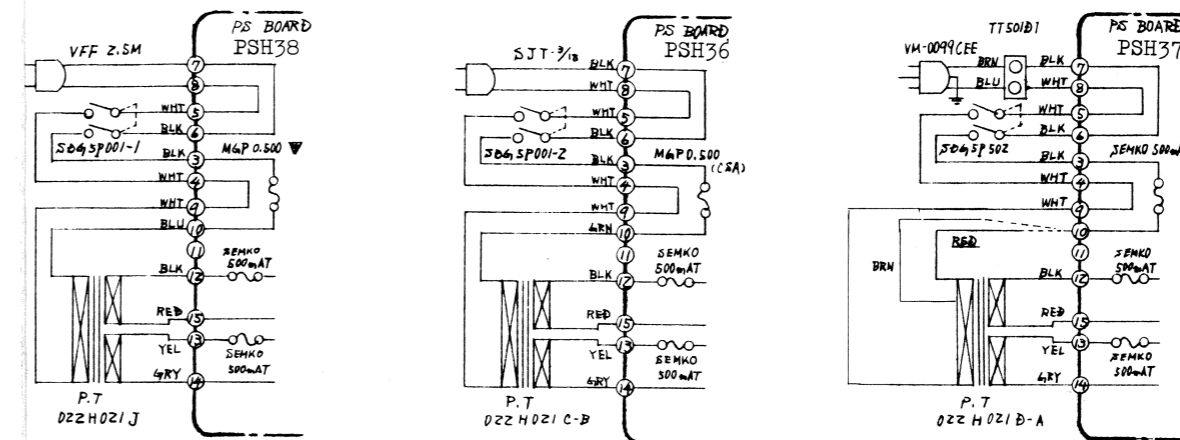


CONTROL BOARD (2) OPH102

100V

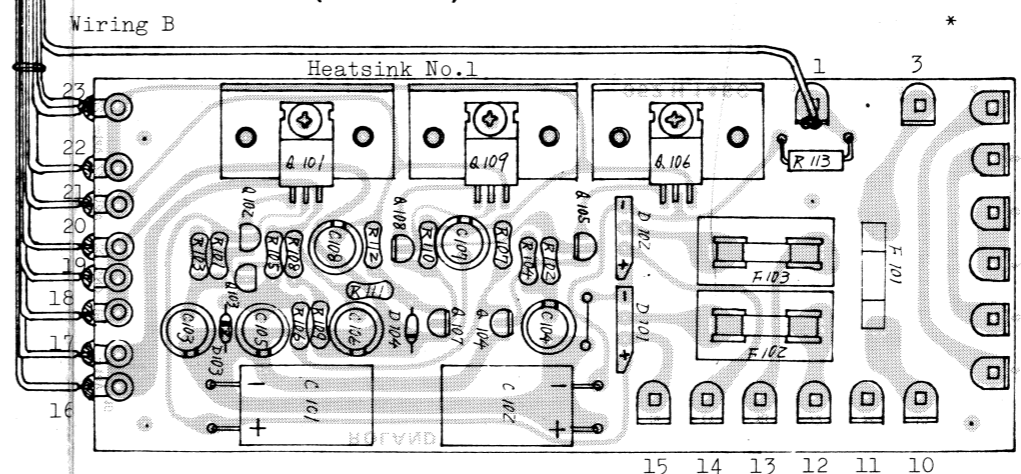
117V

220/240V



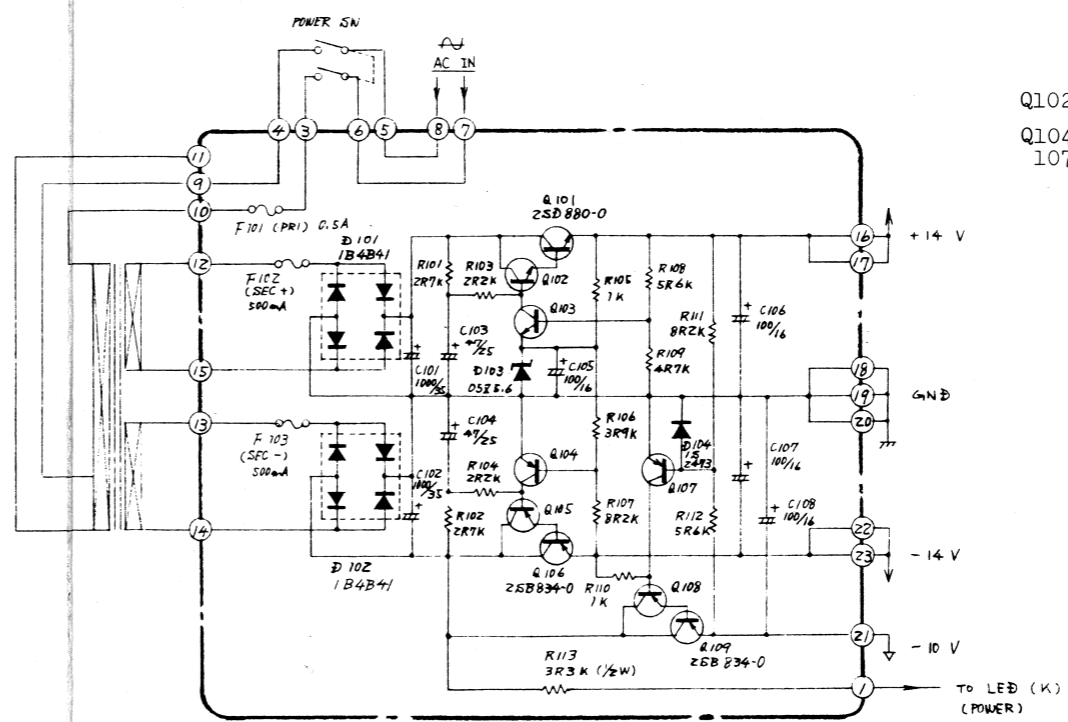
**PSH36C (146H036C)
PSH37C (146H037C)
PSH38C (146H038C)**

**117V
220/240V (pcb 052H146C)
100V**



DIFFERENCE AMONG VERSIONS:
Type of F101
PSH38 - MGP 0.5A
PSH36 - MGP 0.5A (CSA)
PSH37 - SEMKO T500mA

Q102, 103 - 2SC945-Q
Q104, 105 - 2SA733-Q
107, 108



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