

SH09 SERVICE NOTES

SPECIFICATIONS

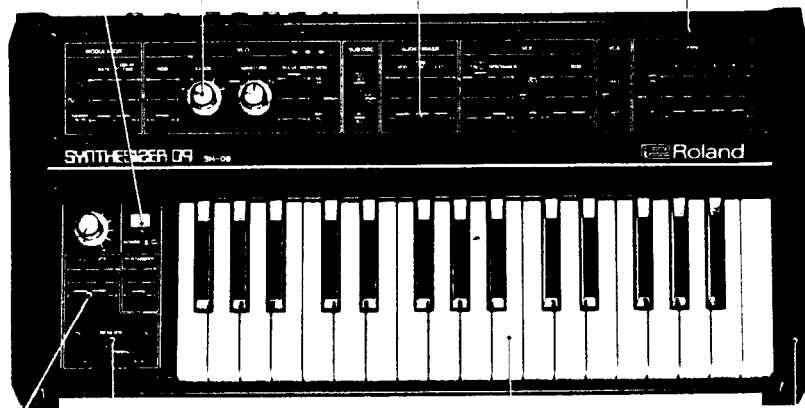
Keyboard ----- 32-key, F3-C6(8')	Jacks
Portamento ----- 0-5 s	Signal output -- -10 dBm
Tune range ----- ±65-cent	Phones ----- Stereo 8-ohm
VCF	cv output ----- 1 v/oct
Cutoff frequency -- 10 Hz-20 kHz	Gate output ---- Off:0 v: On:+14 v
Resonance ----- 0-oscillation	CV input ----- 1 v/oct
Envelope generator	Gate input ---- Threshold: +7.5 v
Attack time ----- 1 x3-2.5 s	Ext. sig. input- 0.5 vpp or less
Decay time ----- 2 ms-10 s	Power consumption -- 8-watt
Sustain level ---- 0-100 %	Weight ----- 6.1 kg
Release time ---- 2 ms-10 s	Dimensions
Modulator	605 (w) x 305 (d) x 100 (h) mm
Rate ----- 0.2 Hz-25 Hz	
Delay time ----- 0-1.5 s	

Button no.8
gray
(016-008)

Knob no.57
(016-057)

Knob no.33
(016-033)

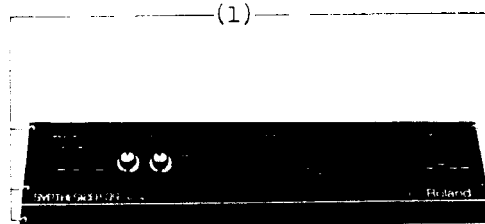
Panel H44
(072H044)



Endblock Bender unit Keyboard X132-F Side panel H21
H22(066H022) PS-4 (029-022) (004-014) R-L set (066H21)

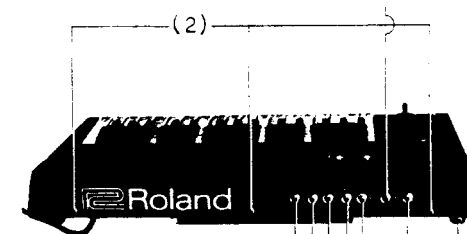
Panel H44 removal screws: (1). (2)

'Tap tight binding head
3 x 10 mm Fe, Br



Jack SG7713 no.4 stereo
(009-036)

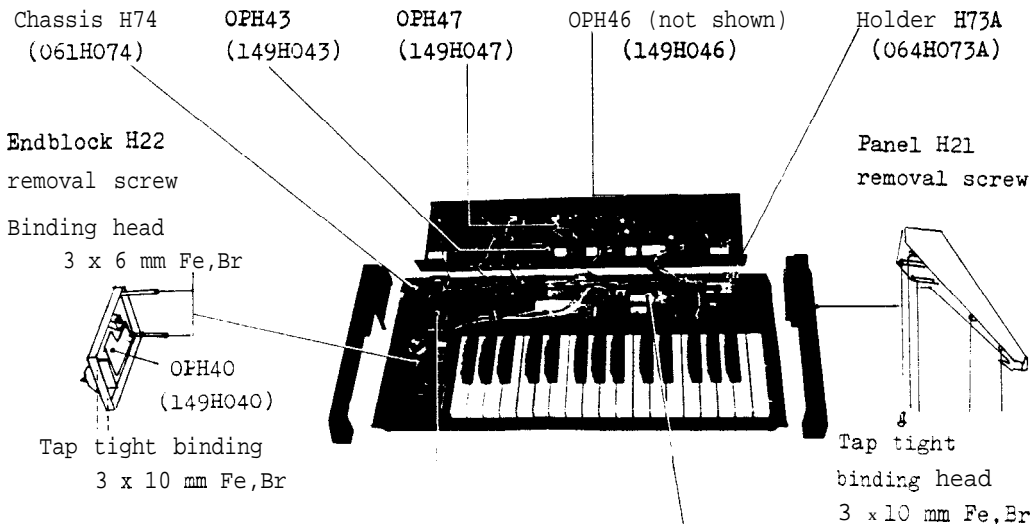
Self tapping binding head
3 x 6 mm Bl, Fe, Br



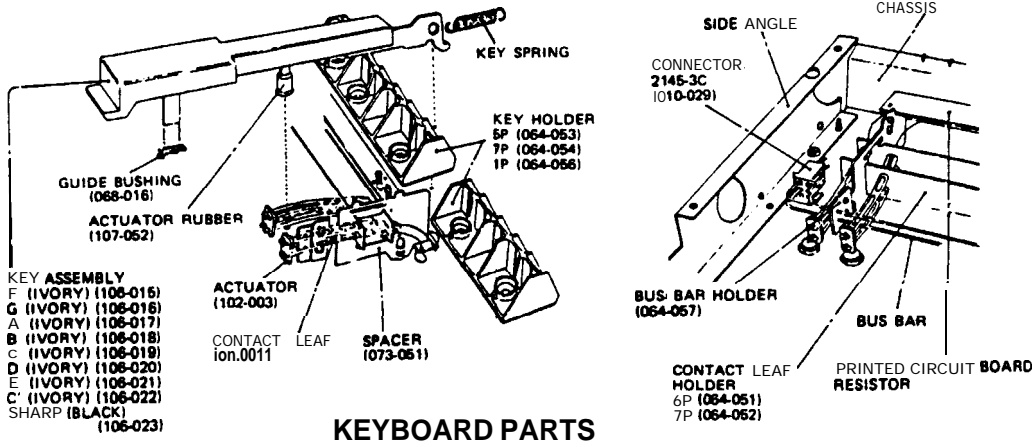
Suffix letter to part number
when ordering pc board.

Jack SG7622 no.8
(009-012)

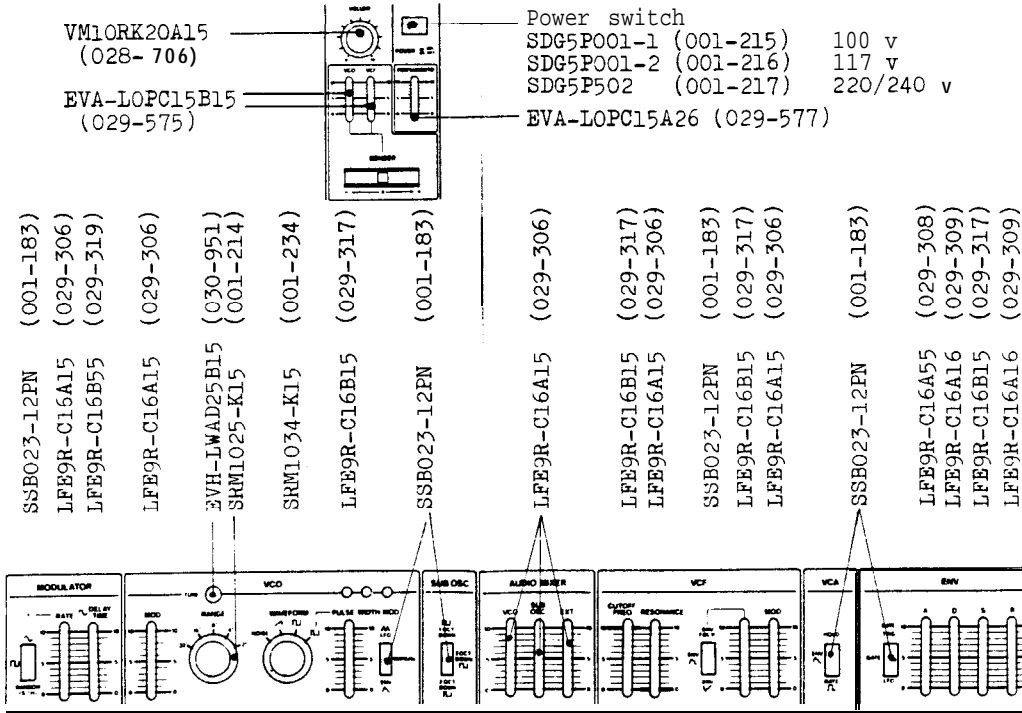
Rubber foot
G-5 (111-021)
G-7 front, not shown
(111-023)



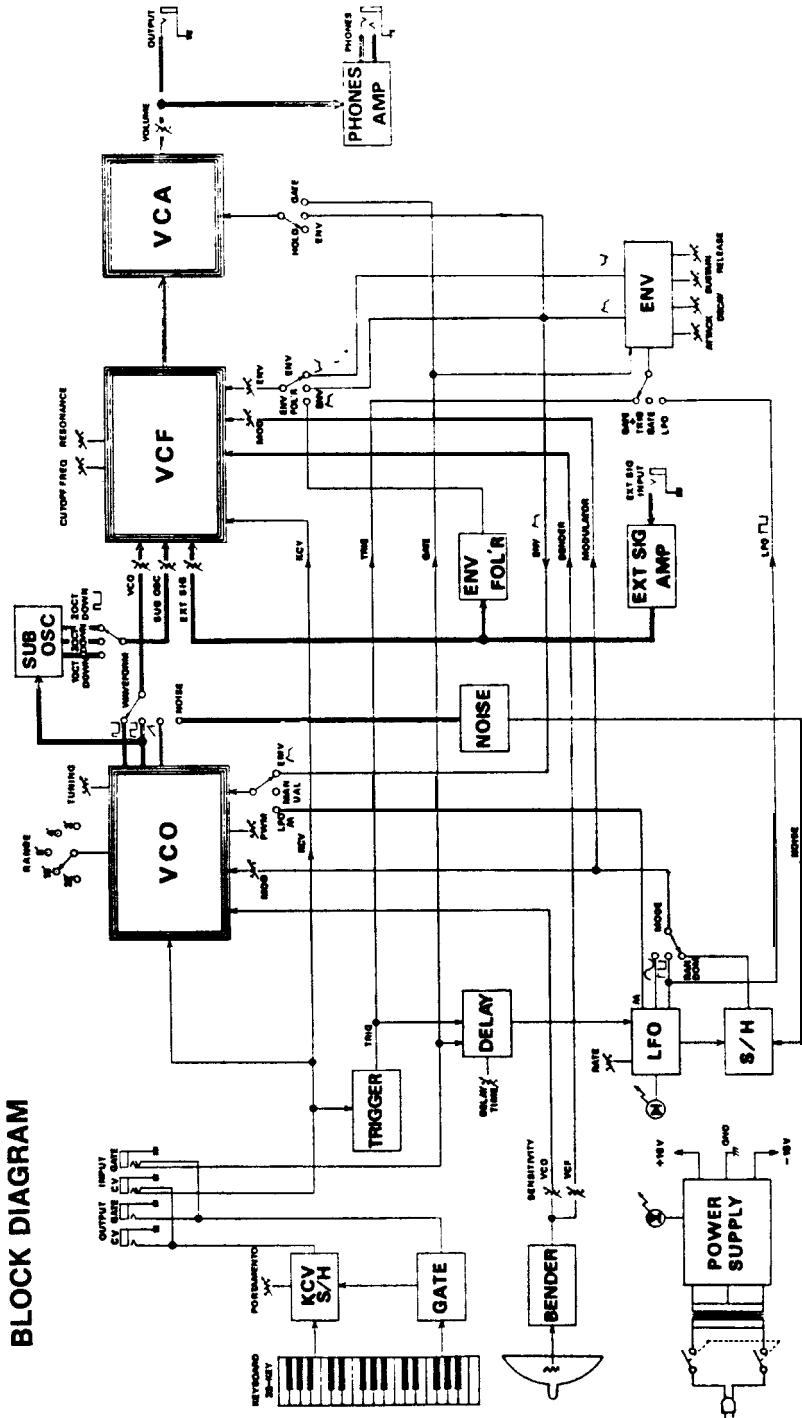
Power transformer	Power supply board
H20J (022H020J) 100 v	PSH31 (146H031) 100 v
H20C-B (022H020C-B) 117 v	PSH32 (146H032) 117 v
H20D (022H020D) 220/240 v	PSH33 (146H033) 220/240 v



INSTRUMENT MODEL	KEYS	KEYBOARD MODEL	KEY SPRING	BUS BAR	PCB		RESISTOR
					6 P	7 P	
SH-1	32	SK-132-D	070-052	C71H034	052-066	052-067	100 1/4W +1% CRB1/4FX
SH-09	32	SK-132-F	identical to SK-132D	identical to SK-132D	identical to SK-132D	identical to SK-132D	identical to SK-132D



BLOCK DIAGRAM



PARTS LIST

072H044 Panel (top) H44
 066H022 Endblock (bender) H22
 066H021 Side panel H21 a pair of R and L
 061H074 Chassis H74
 111-021 Foot G-5 rear
 111-023 Foot G-7 front
 068-020 Bushing no.20 panel

 004-014 Keyboard SK132-F
 029-022 Bender assy PB-4
 016-057 Knob no.57 rotary
 016-033 Knob no.33 slider
 063-012 Strip no.12 knob no.33
 016-008 Button no.8 gray,power switch

 009-012 Jack SG7622 no.8 mono
 009-036 Jack SG7713 no.4 stereo
 068-005 Bushing no.5 jack
 068-018 Bushing no.18 red,jack

 022H020J Power transformer H20J 100 v
 022H020C-B Power transformer H20C-B 117 v
 022H020D Power transformer H20D 220/240 v

SWITCH
 001-215 SDG5P001-1 power 100 V
 001-216 SDG5P001-2 power 117 V
 001-217 SDG5P502 power 220/240 V
 001-234 SRM1034-K15 rotary 3p-4t WAVEFORM
 001-214 SRM1025-K15 rotary 2p-5t RANGE
 001-183 SSB023-12FN slide 2p-3t

CAPACITOR
 035-156 ECQS1151KZ 150 pF polystyrene
 035-188 ECQS1102KZ 1000 pF polystyrene
 035-091 ECQF-2334M 0.33 mfd polypropylene

PCB ASSEMBLY

149H046C OPH46C (pcb 052H141-2-C)
 149H047C OPH47C (pcb 052H141-1-C)
 149H040B OPH40B (pcb 052H140B)
 149H043B OPH43B (pcb 052H150B)
 146H031A PSH31A (pcb 052H139A) 100 v
 146H032A PSH32A (pcb 052H139A) 117 V
 146H033A PSH33A (pcb 052H139A) 220/240V

SEMICONDUCTOR

IC
 020-097 μ PC4558C
 020-100 TLO82CP
 020-039 DN819
 020-032 μ A726HC
 020-160 BA662A

 020-189 TA7140P
 020-102 LF13741H
 020-103 TA7179P

TRANSISTOR

017-097 2SA826-Q
 017-118 2SC1740-Q
 017-046 2SC828 NZ (noise generator)
 017-022 2SB434-0
 017-010 2SD234-0
 017-014 2SK30A-Y FET
 017-016 2SK30A-GR FET

DIODE

018-014 132473
 018-078 1S2353 zener
 018-089 1B4B41 rectifier stack
 019-009 LR0601R LED

FUSE. FUSE HOLDER

008-029 MGP 0.25 A prim. 100/117 V
 008-060 SEMKO T250 mA prim. 220/240 V
 008-059 SEMKO T200 mA sec. 220/240 V
 012-003 TF758 fuse clip

POTENTIOMETER

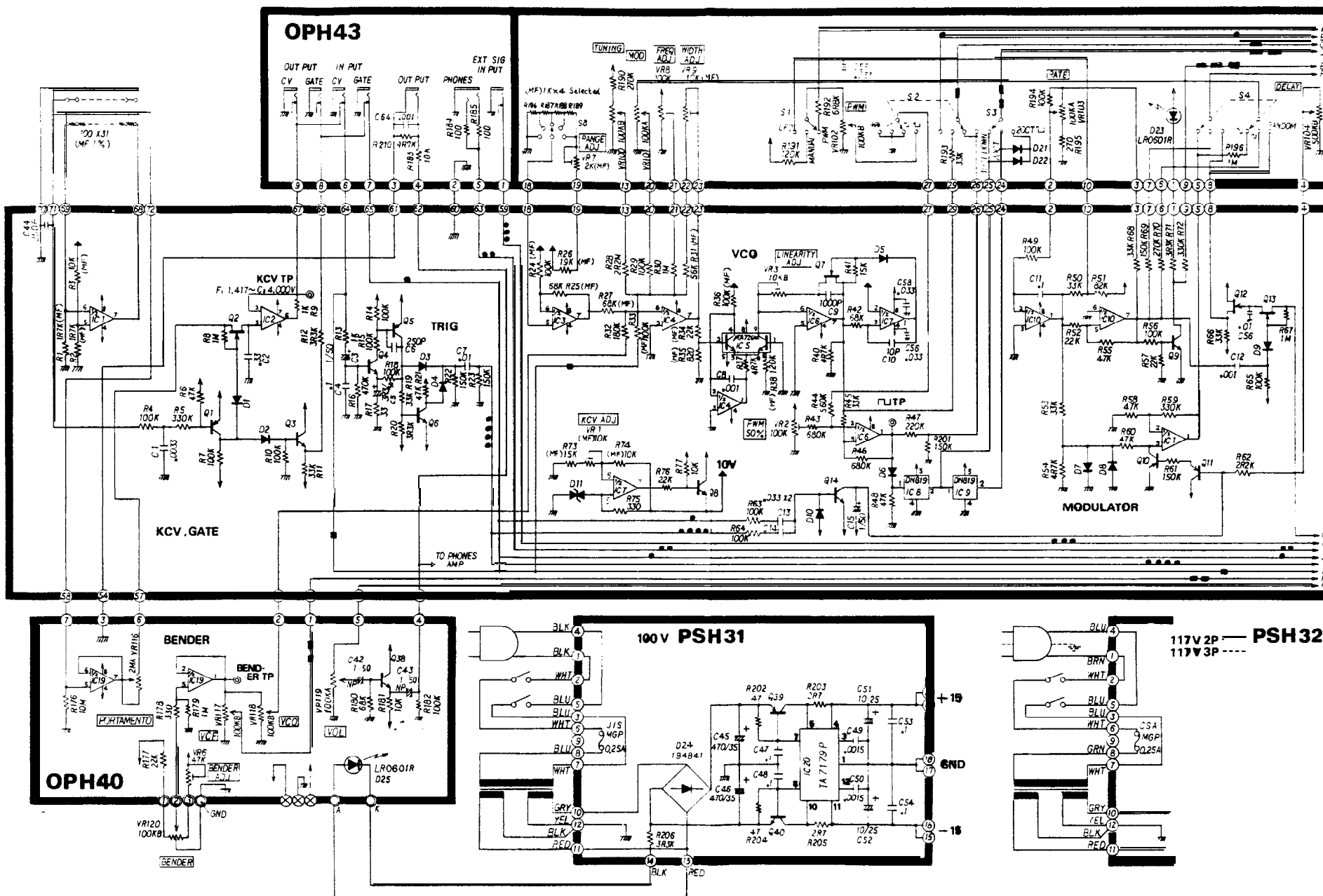
029-306 LFE9RC16A15 100 KA slide
 029-317 LFE9RC16B15 100 KB slide
 029-308 LFE9RC16A55 500 KA slide
 029-319 LFE9RC16B55 500 KB slide
 029-309 LFE9RC16A16 1 MA slide
 029-575 EVALOPC15B15 100 KB slide
 029-577 EVALOPC15A26 2 MA slide
 028-706 VM10RK20A15 100 KA rotary
 030-951 EVHLWAD25B15 100 KB rotary
 030-641 RJ6-202 2 KB trimmer, metal film
 030-643 RJ6-103 10 KB trimmer, metal film
 030-463 SR19R 4.7 KB trimmer
 030-465 SR19R 10 KB trimmer
 030-469 SR19R 47 KB trimmer
 030-471 SR19R 100 KB trimmer

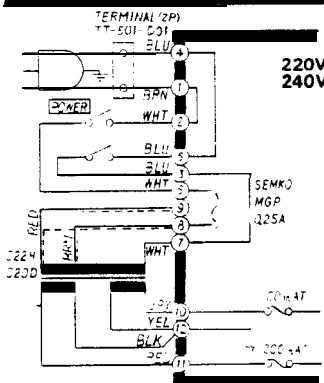
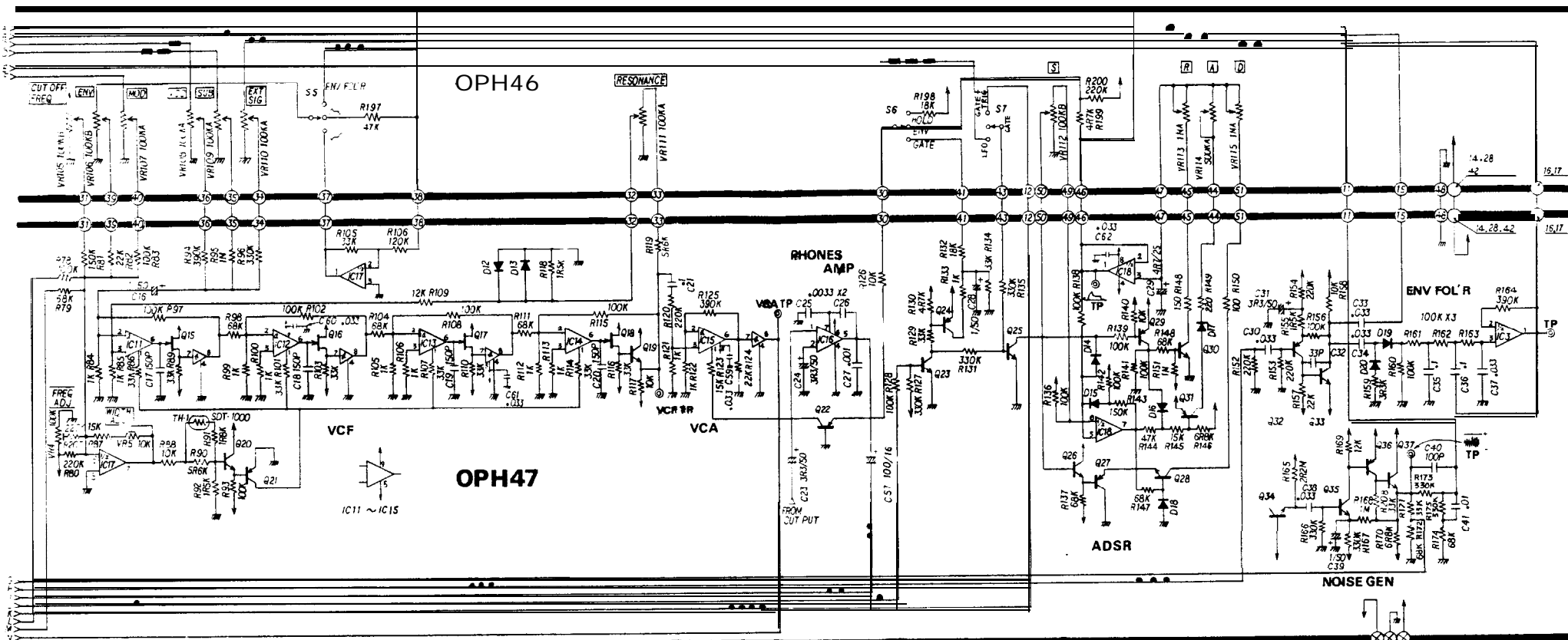
WAFER TERMINAL. WIRING ASSEMBLY

010-183 5045-03A Terminal 010-186 5045-05A
 010-218 EMCS 0750 010-220 EMCS 0950
 Wiring assy
 053H034 A
 053H035 B 010-226 EMCB 0730851 7p-30 cm
 053H036 C 010-228 EMCB 0920851 9p-20 cm

OTHERS

064H055A Holder H55A(pot.VOL.bracket)
 064H073A Holder H73A(chassis-top panel)
 064-264 PCB holder DLCBS-4N
 053H030 Flat cable H30
 053H031 Flat cable H31
 053H032 Flat cable H32
 048H001 Heat sink H1





PSH33

- Resistor : 1/4 ohm (MF-- metal oxide film, 1%)
- Capacitor : 1 microfarad (P-- picofarad)
- Diode : 1S2475 or 1S1555 (D11-- 182453)
- IC1, 5-4, 10, : uPC4558C
- IC11-19 : 74LS11H
- IC2 : 74LS11H
- IC3 : 74LS11H
- IC4 : 74LS11H
- IC5 : 74LS11H
- IC6 : 74LS11H
- IC7 : 74LS11H
- IC8 : 74LS11H
- IC9 : 74LS11H
- IC10 : 74LS11H
- IC11-14 : BA662 A B factory selected
- IC15 : 74LS11H
- IC16 : 74LS11H
- IC17 : 74LS11H
- IC18 : 74LS11H
- IC19 : 74LS11H
- IC20 : 74LS11H
- IC21 : 74LS11H
- IC22 : 74LS11H
- IC23 : 74LS11H
- IC24 : 74LS11H
- IC25 : 74LS11H
- IC26 : 74LS11H
- IC27 : 74LS11H
- IC28 : 74LS11H
- IC29 : 74LS11H
- IC30 : 74LS11H
- IC31 : 74LS11H
- IC32 : 74LS11H
- IC33 : 74LS11H
- IC34 : 74LS11H
- IC35 : 74LS11H
- IC36 : 74LS11H
- IC37 : 74LS11H
- IC38 : 74LS11H
- IC39 : 74LS11H
- IC40 : 74LS11H

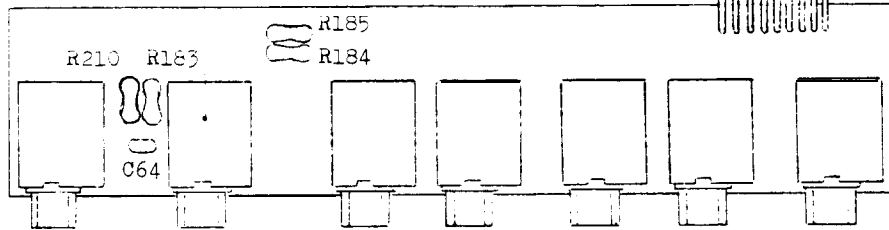
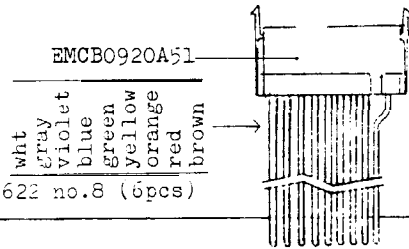
NOTES -- Replacing Selected IC, Transistor --
When replacing Q12, IC11-14, take the following procedures.

- | | |
|---|---|
| <p><u>Q12</u></p> <p>Choose 2SK30A-Y for minimum leakage.</p> <p>Check new Q12 for leakage with VCO being LFO modulated under the following settings:</p> <p>MOD--"10" RATE--"0"</p> <p>MODULATOR--RANDOM</p> <p>VCO should not drift before the next d/H pulse generates.</p> | <p><u>IC11-14</u></p> <p>The VCF, being a set of four BA662's of much the same characteristics in transconductance, requires a test of BA662 A/B in stock as a replacement.</p> <p>Solder BA662 tentatively after defective one is removed.</p> <p>Press C2 key with CUTOFF set at "0" and RESONANCE at "10" -- no input signal.</p> <p>Approximate 50Hz oscillation at VCF stage proves the IC adequate.</p> |
|---|---|

OPH43B 149H043B
(Etch mask 052H150B)

Jack
SG7713 no.8

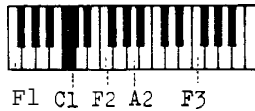
Jack SG7622 no.8 (6pcs)



View from the foil side

ADJUSTMENT

KEY DESIGNATION
only for the adjustments



BENDER

Panel setting and connection:
Digital voltmeter! at 10

1. Flip and hold Bender lever at the left (-). Note the reading.
2. Turn and hold the lever at the right (+). Adjust VR-6 on OPH40 for the same reading, but opposite polarity, as in step 1. (Difference between two readings must be within 30 mV.)

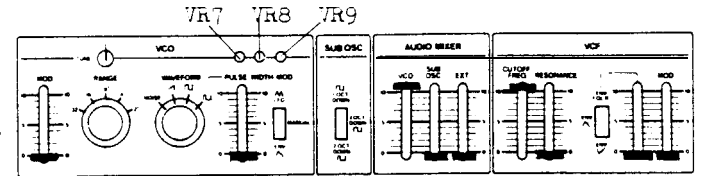
KCV

- Connect digital voltmeter to TP-2 on OPH47.
1. Press F1 key and note the reading, (F1-V).
 2. While pressing F3 key, adjust VR-1 on OPH-47 for F1-V + 2.000 V reading.
 3. Since turning VR-1 has an effect on F1-V, repeat steps 1 and 2 until F3-V becomes F1-V + 2.000 V + 1 mV.

SH09

VCO

Set panel controls as illustrated right.



Connect an oscilloscope to TP-3 on OPH47. Apply reference F note to the scope EXT. IN for Lissajous figures.

A) 'WIDTH

- Set RANGE at 8'.
1. With F3 key held down, adjust VR-8 for motionless figures.
 2. While pressing down F1 key, adjust VR-9 for motionless figures. F3 pitch will vary as VR-9 turned.
 3. Repeat steps 1 and 2 until F3 and F1 figures stand still.

B) LINEARITY

- details follow A) WIDTH --
- Set RANGE at 2'.
- Adjust the pots.
1. F1 key --- VR-8.
 2. F3 key --- VR-3.
 3. Repeat steps 1 and 2.

Adjustments A and B must be repeated because of cross interference between them.

C) RANGE

- refer to A)WIDTH for details--
- Set RANGE at 32'.
- Obtain stable Lissajous figures.
1. F1 key --- VR-8.
- Place RANGE at 2'.
- Obtain motionless figures.
1. F1 key --- W-7.

D) FREQUENCY

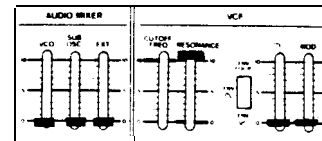
- Set RANGE at 8'.
- Set TUNE at its midpoint.
1. While playing A2 key, adjust VR-8 for 440 Hz.

E) DUTY CYCLE

- Set WAVEFORM at \square .
1. Adjust VR-2 for 1:1 mark/space.

VCF

Set Controls as shown below.



Connect oscilloscope to TP-3 on OPH47.

A) WIDTH

1. While pressing A2 key, set CUTOFF FREQ. for approximate 1 kHz.
2. While playing F2 and F3 keys alternately, turn VR-5 until F3 figure doubles F2 in cycle.

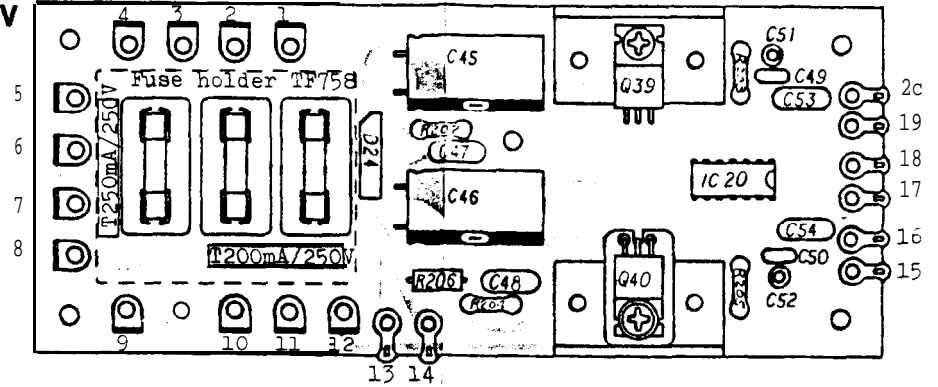
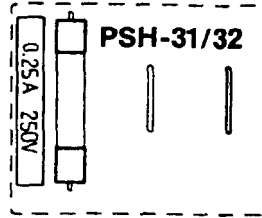
B) FREQUENCY

- Slide up CUTOFF knob to "10".
1. With F1 key held down, set VR-4 for 20 kHz.

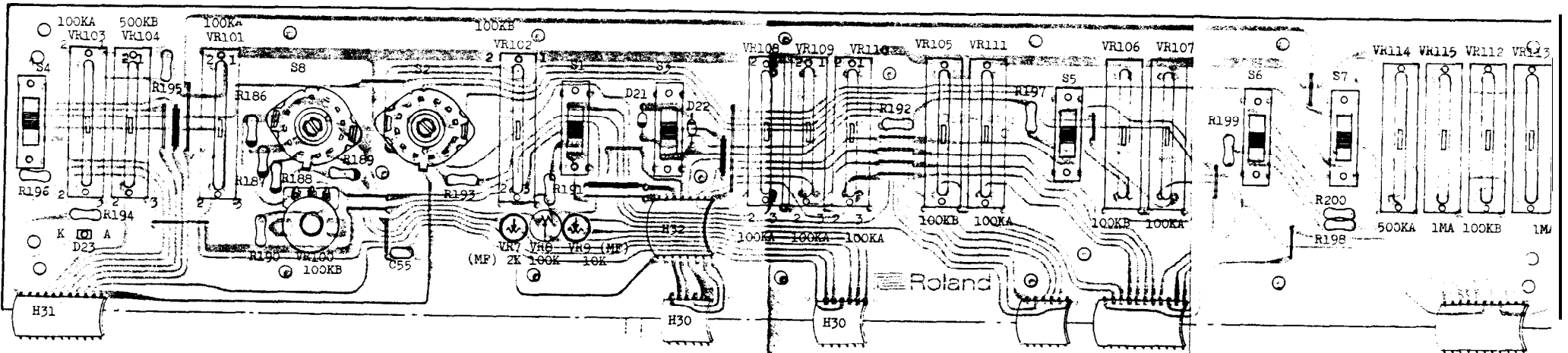
- OPH46 OPH47
- 2SK30A
 - 28C1740-Q or 2X945-4
 - 2SA826-Q or 2SA733-Q
 - 152473 or 1S1555
 - Metal oxide film CRB+FX
 - OPH46-- R186-189 : tailored for nearly equal resistance

- ECEA
- Mylar 50V K
- Ceramic 50V K
- Check point 59BS8806
- SR19R
- Metal film RJ6

PSH31A 100V, PSH32A 117V, PSH33A 220/240V
146H-31/32/33-A (Etch mask 052H139A)



OPH46C(149H046C) View from foil side



OPH47C(149H047C) (PCB 052H141(1)C)

For selected semiconductors, see NOTES on page 5.

IC11-14: BA662 selected.

