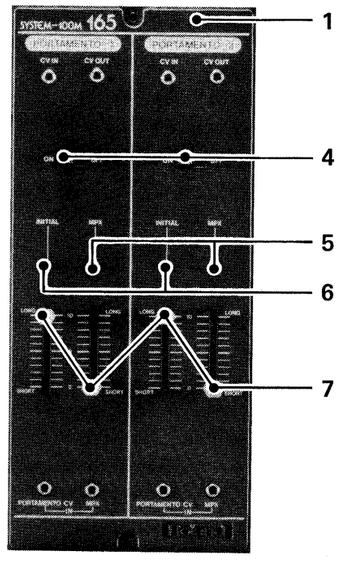
SYSTEM-100M 165/173/174

SERVICE NOTES *First Edition*

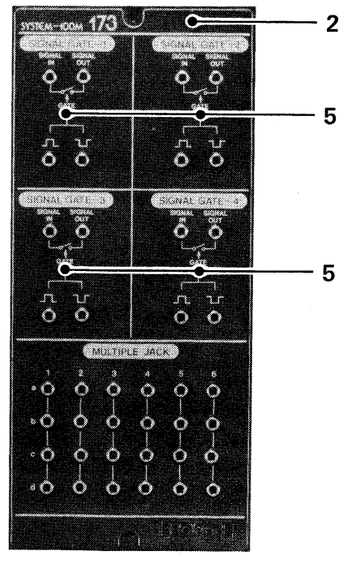
SPECIFICATIONS

	165	173	174
	Portamento Time: 2 msec to 5 sec	SIGNAL GATE Frequency Response: DC to 20kHz S/N Ratio: better than 100dBm (IHF-A)	Gain: unity S/N Ratio: better than 90dBm (IHF-A)
Input	CV IN, PORTAMENTO CV IN . . . 10V max Imp: more than 50kΩ MPX IN . . . ON: 3.5-12V OFF: 0V	⎍ GATE IN . . . more than 3.5V Imp: more than 50kΩ ⎎ GATE IN . . . less than 3.5V Imp: more than 50kΩ SIGNAL IN . . . 10Vp-p max Imp: more than 50kΩ	IN . . . 12Vp-p max Imp: more than 100kΩ
Output	CV OUT . . . 10V max Imp: more than 1kΩ	SIGNAL OUT . . . 10Vp-p max Imp: less than 1kΩ	OUT 1, OUT 2 . . . Imp: less than 1kΩ
Power Requirement	+15V @ 55mA −15V @ 40mA	+15V @ 40mA −15V @ 20mA	+15V @ 50mA −15V @ 50mA −23V @ 15mA (LED)
Dimensions	104(W) x 230(H) x 199(D) mm, 4-1/16(W) x 9-1/16(H) x 7-13/16(D) in		
Weight	1.2kg, 2 lb. 10 oz.	1.15kg, 2 lb. 9 oz.	1.2kg, 2 lb. 10 oz.

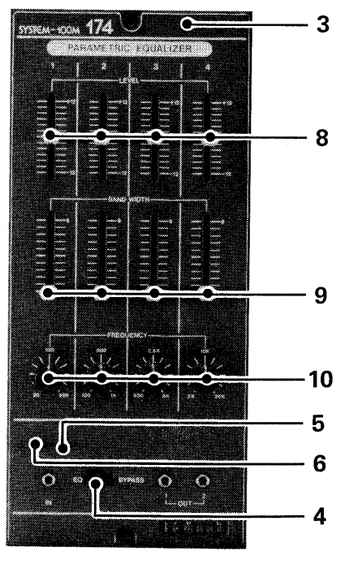
165



173

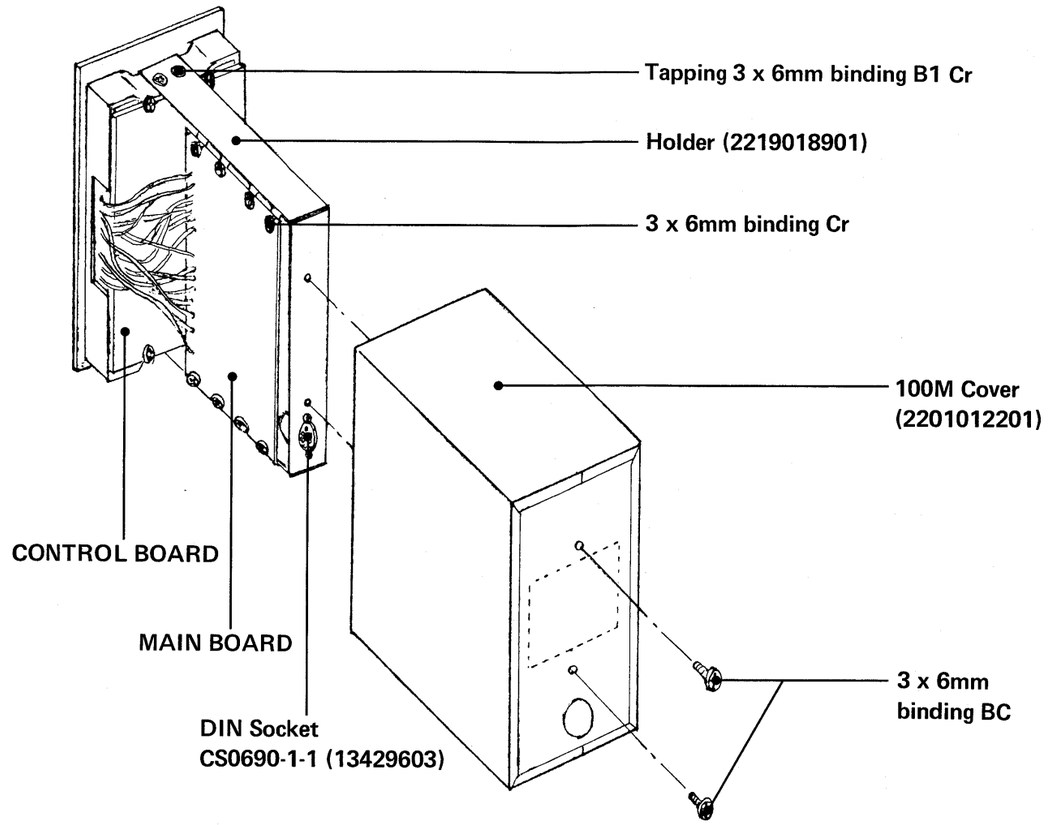


174



Roland

COMMON PARTS

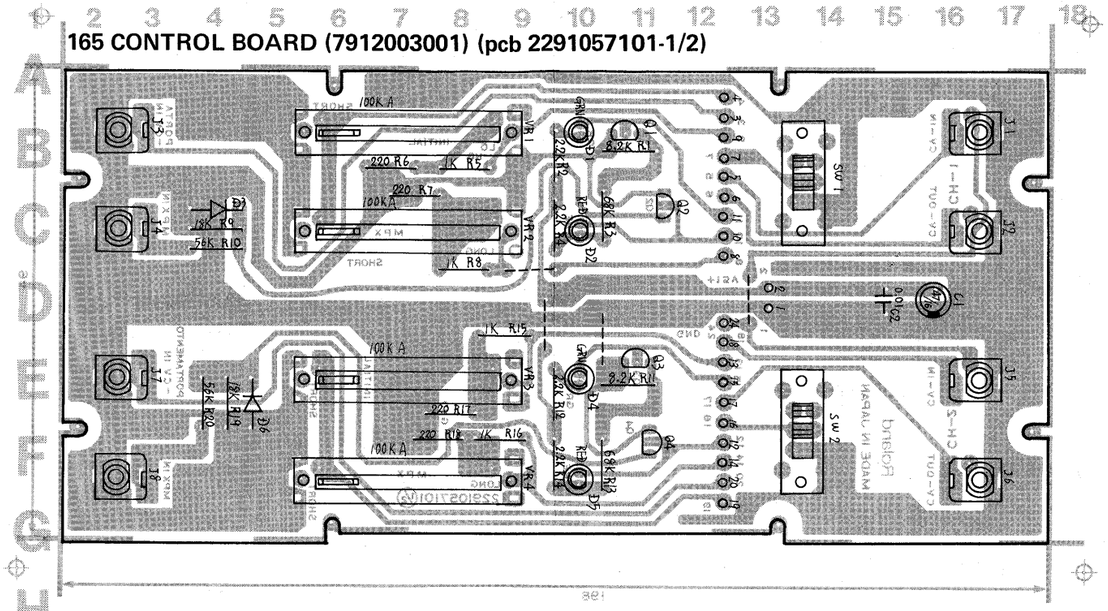


No	Part Name	Part Number
1	M-165 Front Panel	(2221030800)
2	M-173 Front Panel	(2221030900)
3	M-174 Front Panel	(2221031000)
4	Slide Switch SSB-02242	(13159103)
5	LED (red) GL-3AR-2	(15029109)
6	LED (green) GL-3PG-2	(15029112)
7	Slide Pot EVA-TOA-C15A15 100kA	(13339401)
8	Slide Pot EVA-T5K-C15B15 100kB	(13339862)
9	Slide Pot EVA-TOA-C15B15 100kB	(13339402)
10	Rotary Pot EWK-77A320-15D 100kRD	(13219780)

All Jacks SJ-409-1-2 (13449402)
All Slide Knobs (2247012900)
All Rotary Knobs (2247012700)

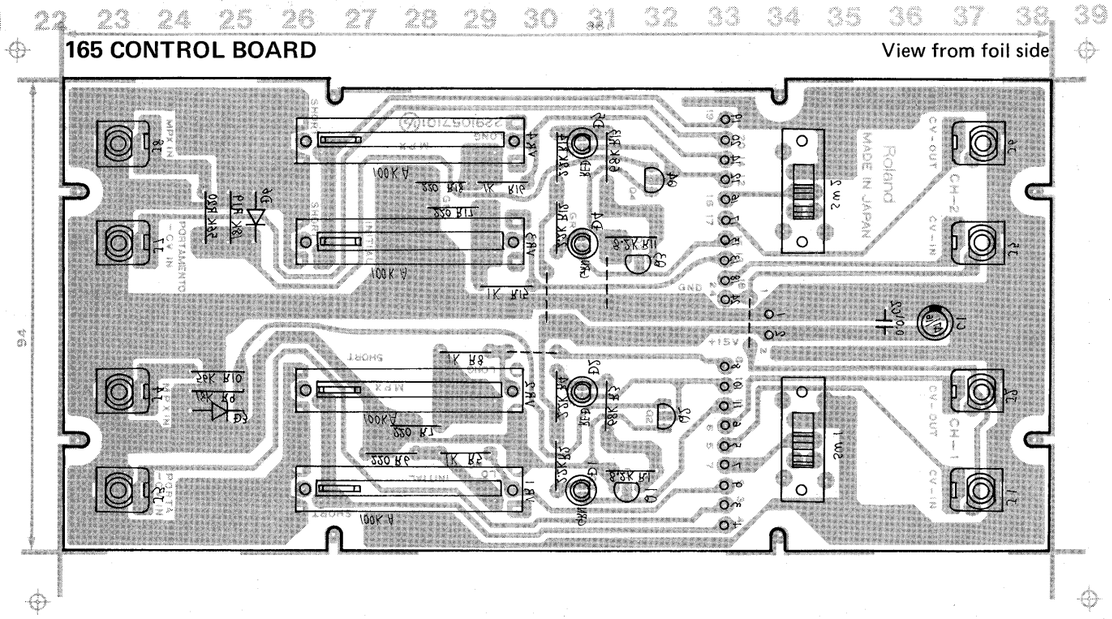
165

165 CONTROL BOARD (7912003001) (pcb 2291057101-1/2)

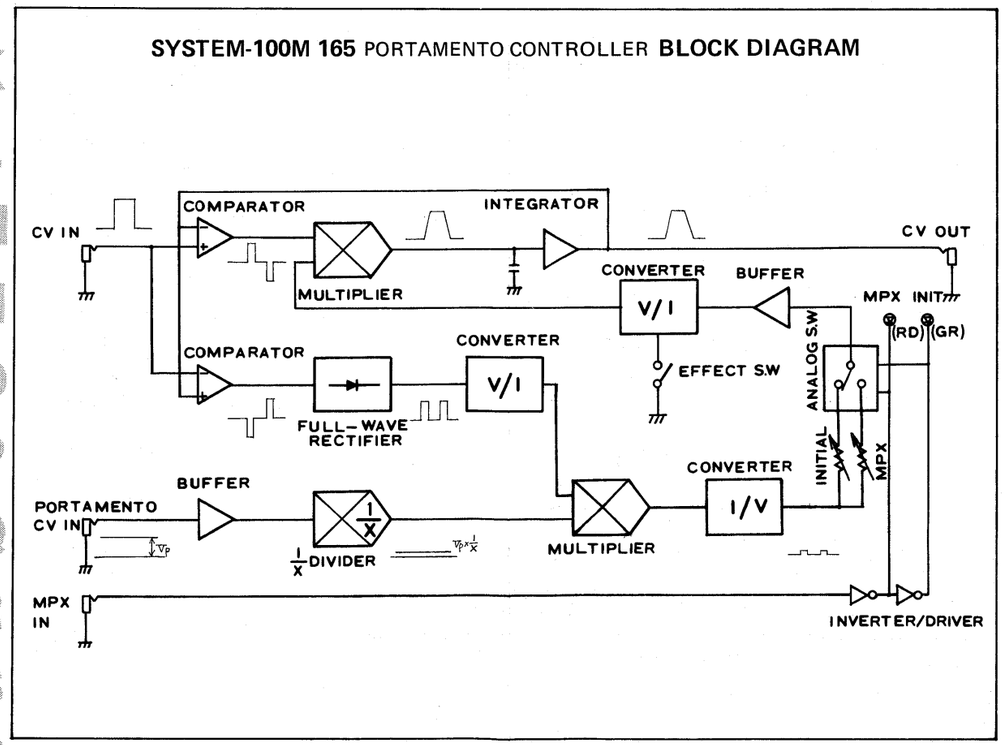


165 CONTROL BOARD

View from foil side

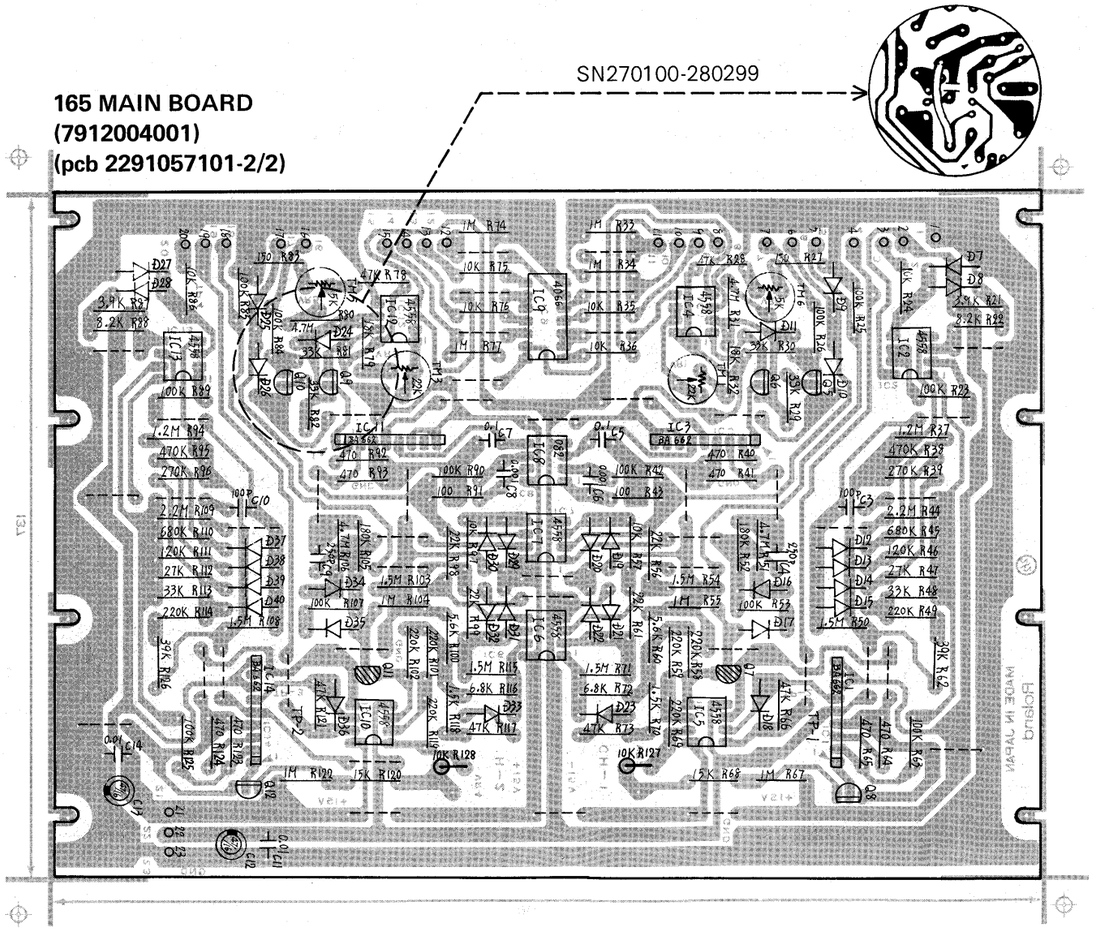


SYSTEM-100M 165 PORTAMENTO CONTROLLER BLOCK DIAGRAM



165 MAIN BOARD (7912004001) (pcb 2291057101-2/2)

SN270100-280299



165

CONTROL BOARD

MAIN BOARD
CH-1

CV IN
J1
KEYBOARD CV
YEL
PORTAMENTO CV
J3
+15V
RED
BLU
-15V
GND
BLK
DIN
MPX
J4

CV OUT
J2
SW1
ON
OFF
MIN TIME
TM1
22K(B)
MAX TIME
TM6
5K(B)
TP-1
4066
MPX (RED)
INITIAL
(GREEN)
VR1
100K(A) INITIAL
VR2 100K(A)
MPX

CH-2

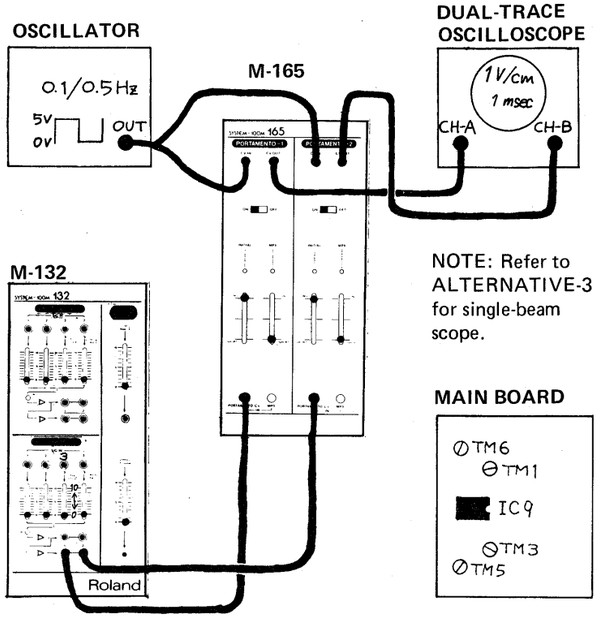
CV IN
J5
KEYBOARD CV
PORTAMENTO CV
J7
MPX
J8

CV OUT
J6
SW2
ON
OFF
MIN TIME
TM3
22K(B)
MAX TIME
TM5
5K(B)
TP-2
4066
MPX (RED)
INITIAL
(GREEN)
VR3
100K(A) INITIAL
VR4 100K(A)
MPX

All OP Amp	: 4558C
All PNP Tr	: 2SA1015GR
All NPN Tr	: 2SC1815GR
All FET	: 2SK246GR
All Diode	: 1S2473
LED (RED)	: GL-3AR-2
LED (GREEN)	: GL-3PG-2

SYSTEM-100M **165**
PORTAMENTO CONTROLLER

165 ADJUSTMENT



NOTE: Refer to ALTERNATIVE-3 for single-beam scope.

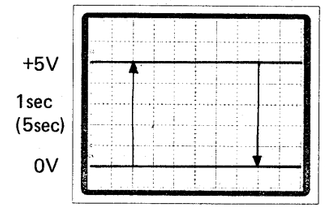
This adjustment needs ultra low frequency (0.1-0.5Hz) square waveforms of TTL level (0V and 5V), which may not be available from ordinary test oscillators and dual-trace osilloscope. Consequently, some possible alternatives are illustrated.

PORTAMENTO TIME

The same procedures are applicable to both CH-1 and CH-2. First, adjust CH-1, then CH-2 looking CH-1 waveforms as standerd.
More to the point, synchronize all phases of CH-1 and CH-2 overlapped on the screen.

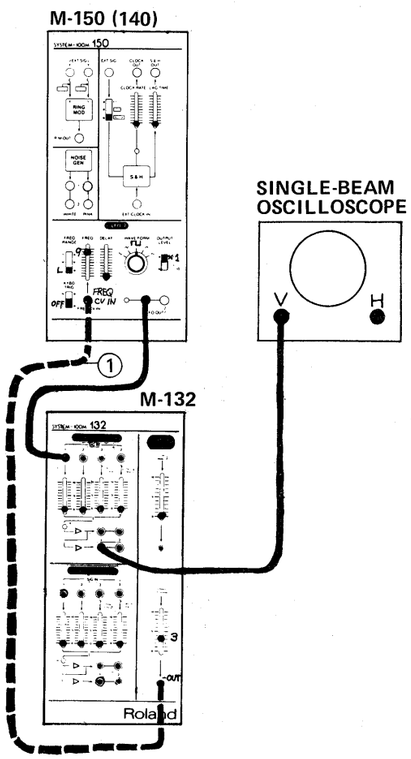
- **ONE SECOND**

  Patch Instruments and set M-132 and M-165 as shown. M-132 MIXER-2 SIG IN 3 to 0 (0V).
  Set test oscillator to 0.5Hz.
  Adjust TM-1 (TM-3) on MAIN BOARD so that the times required for horizontal line on the scope to reach from 0V to +5V and from +5V to 0V are one second each. (see below)



- **FIVE SECOND**

  Set oscillator to 0.1Hz.
  Set M-132 MIXER-2 SIG IN 3 to 10 (10V).
  Adjust TM-6 (TM-5) on MAIN BOARD so that the time required for horizontal line to reach +5V or to return to 0V is five seconds.
  TM-1 (TM-3) and TM-6 (TM-5) interact. Repeat the adjustments, maybe 3-5 times.



ALTERNATIVE-1 TEST OSCILLATOR

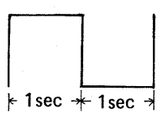
If the MC-4 is available, use its CV output.

CV DATA: 0 = 0V STEP TIME: 2000 = 0.1Hz
60 = 5V 400 = 0.5Hz
120 = 10V Other paremeters: Initial setting

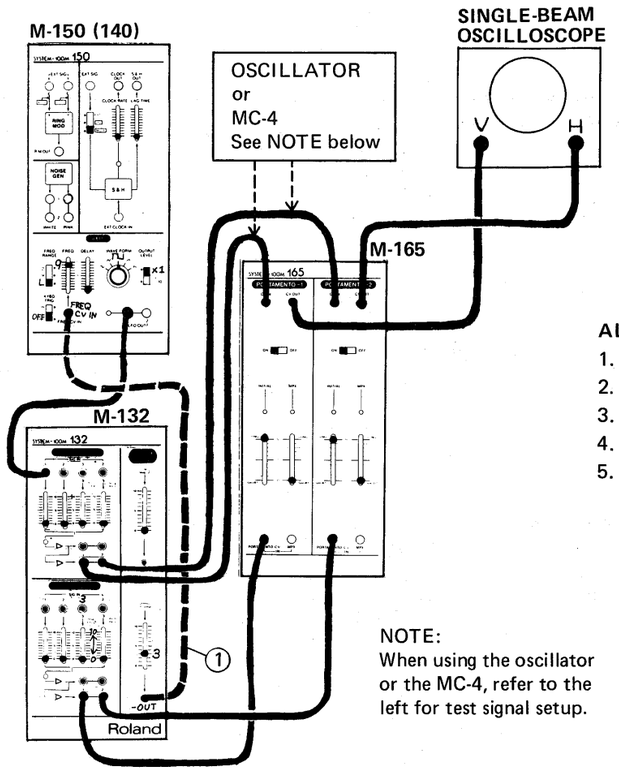
ALTERNATIVE-2 TEST OSCILLATOR

This setup makes SYSTEM-100M 150 and 132 a test oscillator.

1. (Do not connect Patch ① yet)
   Adjust M-132 MIXER-1 out for 5Vp-p.
2. (scope time base 0.2s/cm)
   Adjust M-150 FREQ (approx. at 9) for 0.5Hz.



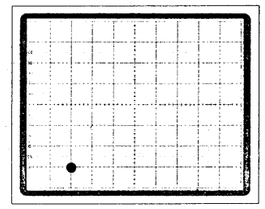
3. Add Patch ①.
   (scope time base 0.5s/cm)
4. Adjust M-132 −OUT (approx. at 3) for 0.1Hz.



NOTE:
When using the oscillator or the MC-4, refer to the left for test signal setup.

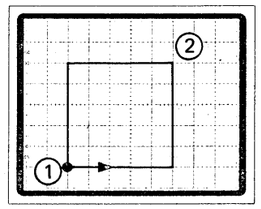
ALTERNATIVE-3 USING SINGLE-BEAM SCOPE

1. Do not connect H IN yet.
2. Set scope V IN to GND and RANGE to 1V/cm.
3. Position scope spot as shown below.
4. Connect scope H IN to M-165 PORTA-2 CV OUT.
5. Set scope V IN to DC.



PORTAMENTO-1

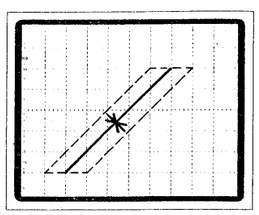
- **ONE SECOND**
  1. Disconnect Patch ① (dotted line).
  2. Set M-132 MIXER-2 SIG IN 3 knob to 0 (0V).
  3. Set M-165 changeover switches:
     PORTAMENTO-1 to ON and PORTAMENTO-2 to OFF
  4. Turn TM-1 CW until display stops (foldover) for a period at points ① and ②, then reverse TM-1 slightly just enough for smooth beam running without reducing displayed V amplitude (5Vp-p).



- **FIVE SECOND**
  1. Connect Patch①(dotted line).
  2. Set M-132 MIXER-2 SIG IN 3 to 10 (10V).
  3. Similarly, adjust TM-6 for smooth sweep running without reducing vertical amplitude.
  4. TM-1 and TM-6 will interact. Repeat these adjustments until no improvement is noted.

PORTAMENTO-2

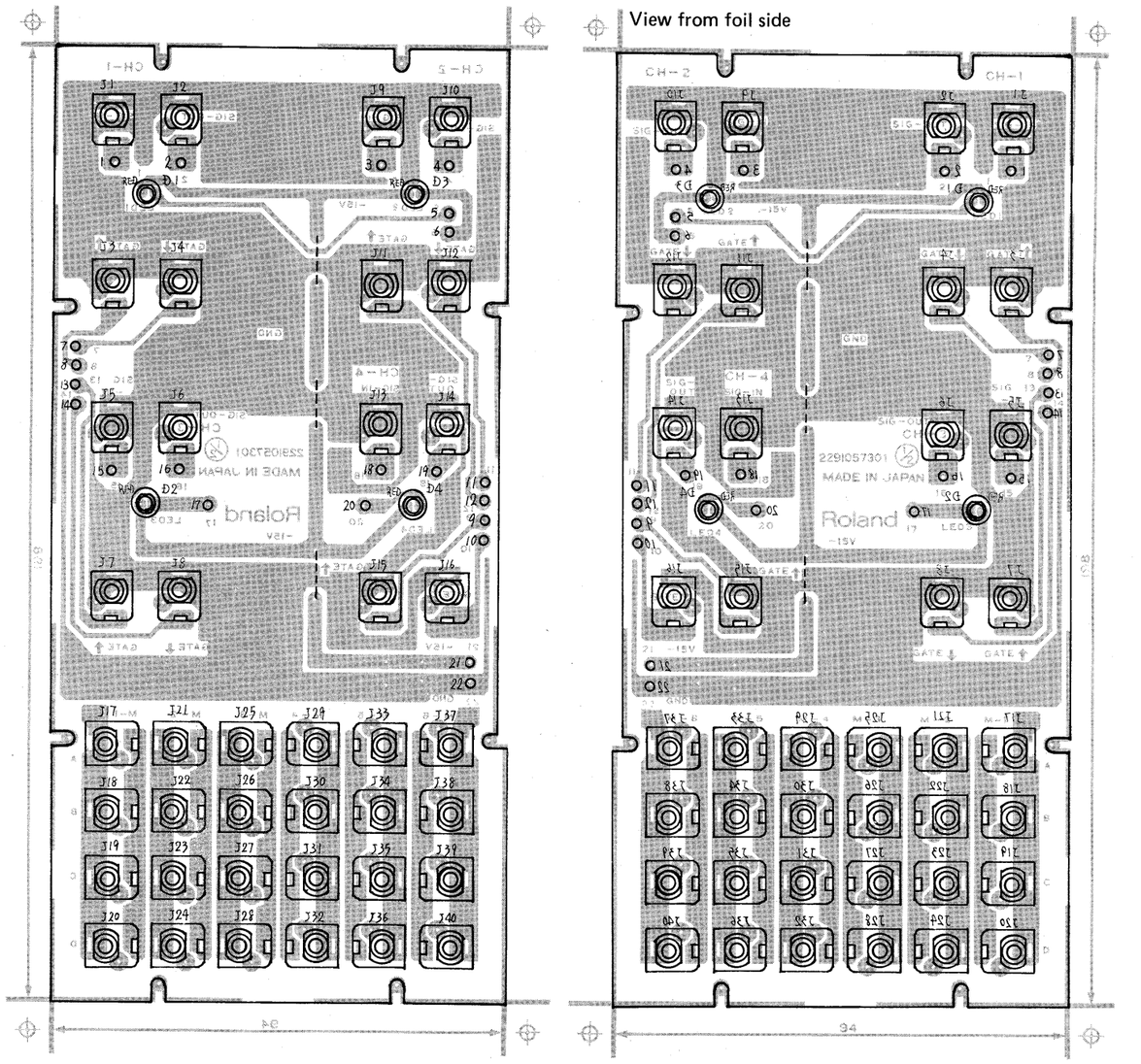
- **ONE SECOND**
  1. Disconnect Patch①(dotted line).
  2. Set M-165 PORTAMENTO-2 to ON.
  3. Set M-132 MIXER-2 SIG IN 3 to 0.
  4. Adjust TM-3 so that Lissajous is single line as possible.



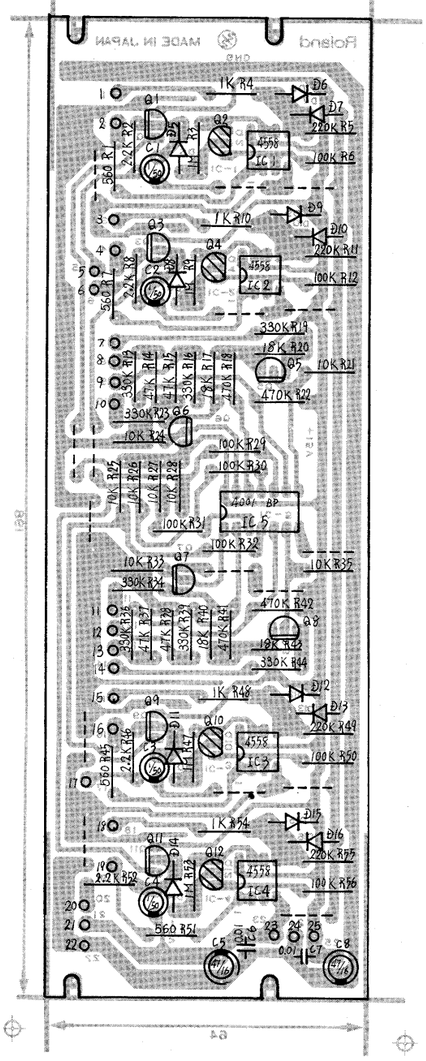
- **FIVE SECOND**
  1. Connect Patch①(dotted line).
  2. Set M-132 MIXER-2 SIG IN 3 to 10.
  3. Similarly, adjust TM-5 for single line trace.
  4. TM-3 and TM-5 will interact. Repeat these adjustments until no improvement is noted.

173 CONTROL BOARD (7913003001) (pcb 2291057301-1/2)

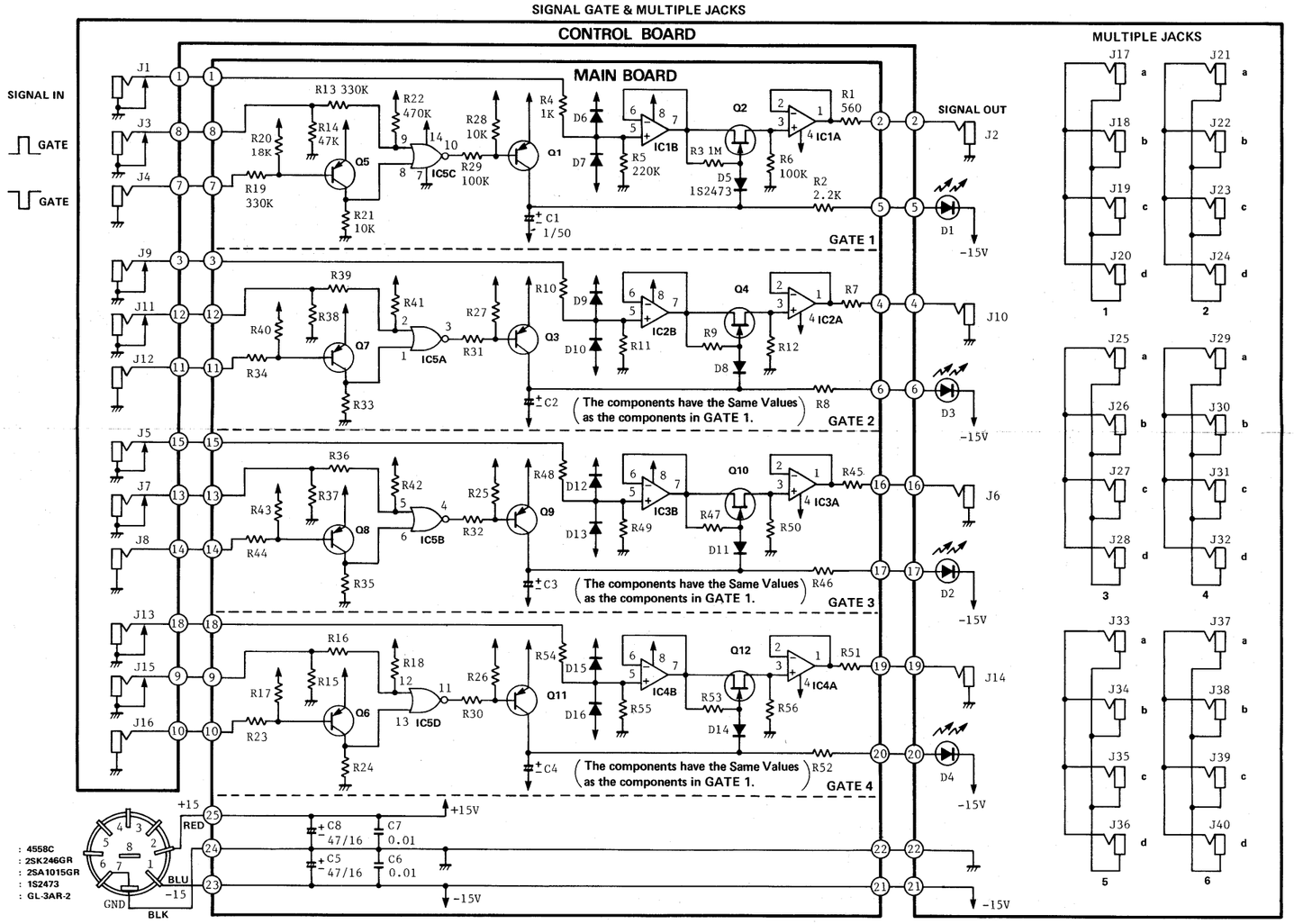
View from foil side



173 MAIN BOARD (7913004001) (pcb 2291057301-2/2)

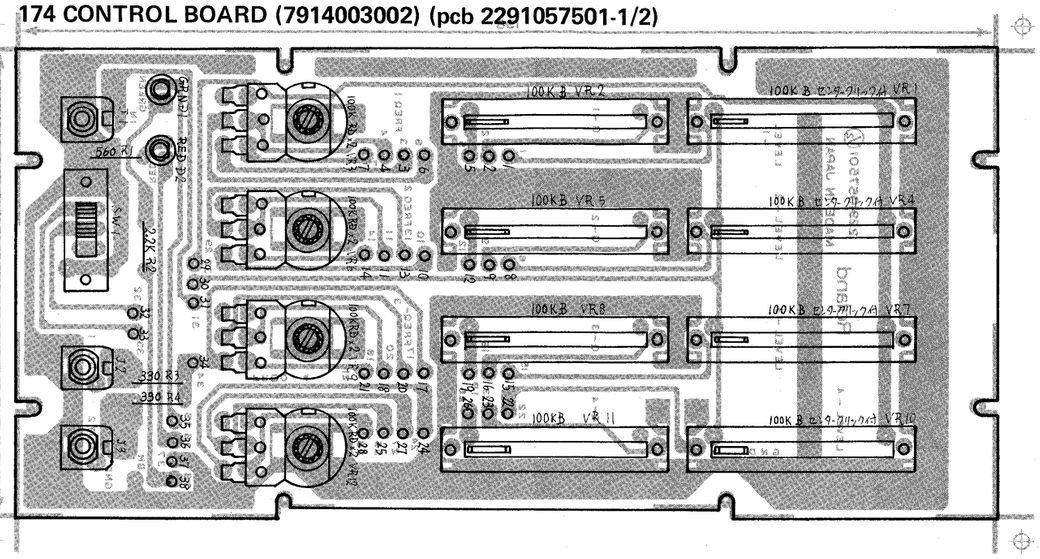


SYSTEM-100M 173
SIGNAL GATE & MULTIPLE JACKS



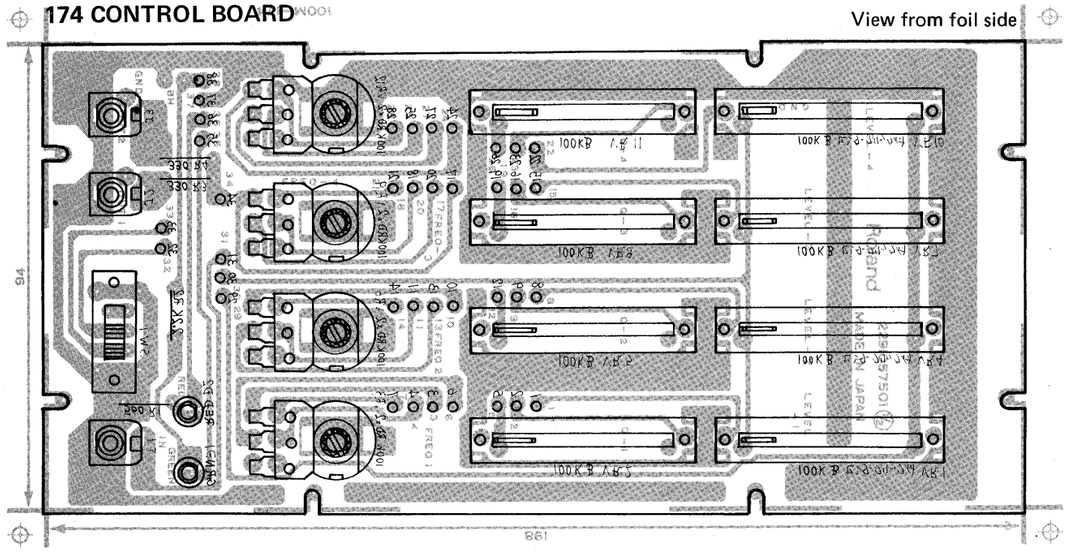
All OP Amp : 4558C
All FET : 2SK246GR
All Tr : 2SA1015GR
All Diode : 1S2473
LED (RED) : GL-3AR-2

174 CONTROL BOARD (7914003002) (pcb 2291057501-1/2)

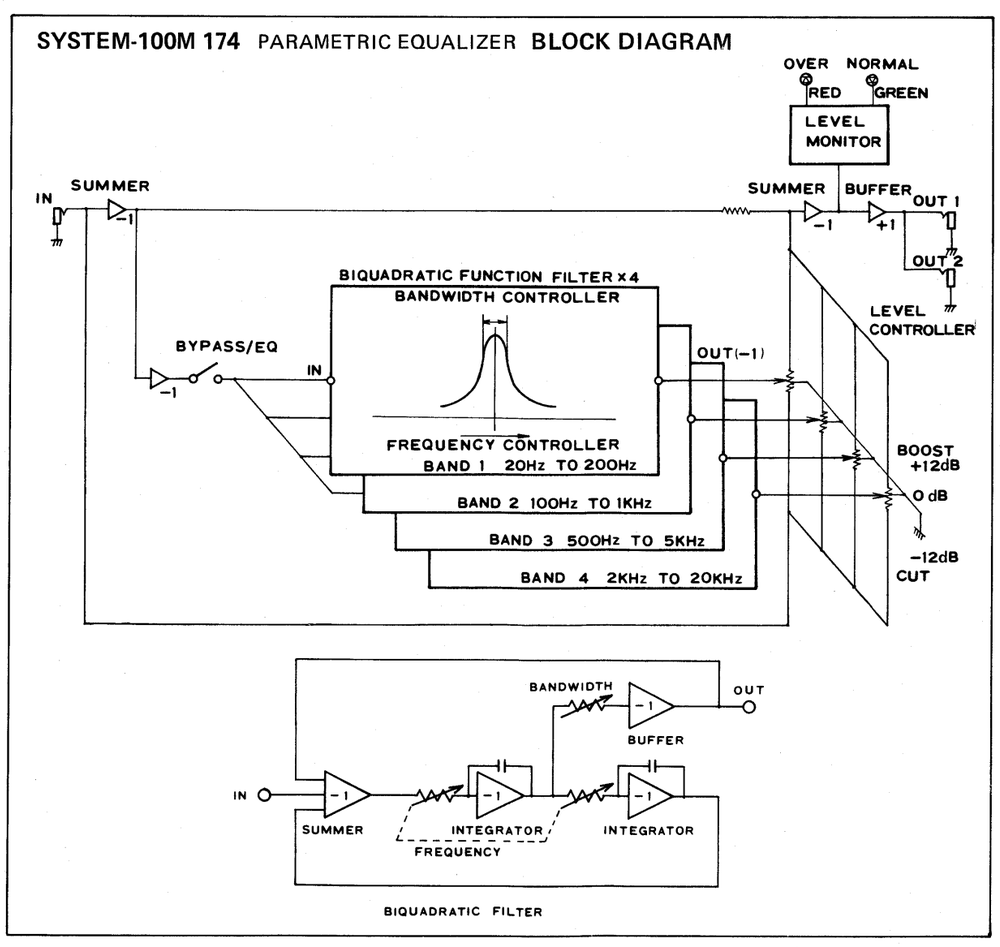


174 CONTROL BOARD

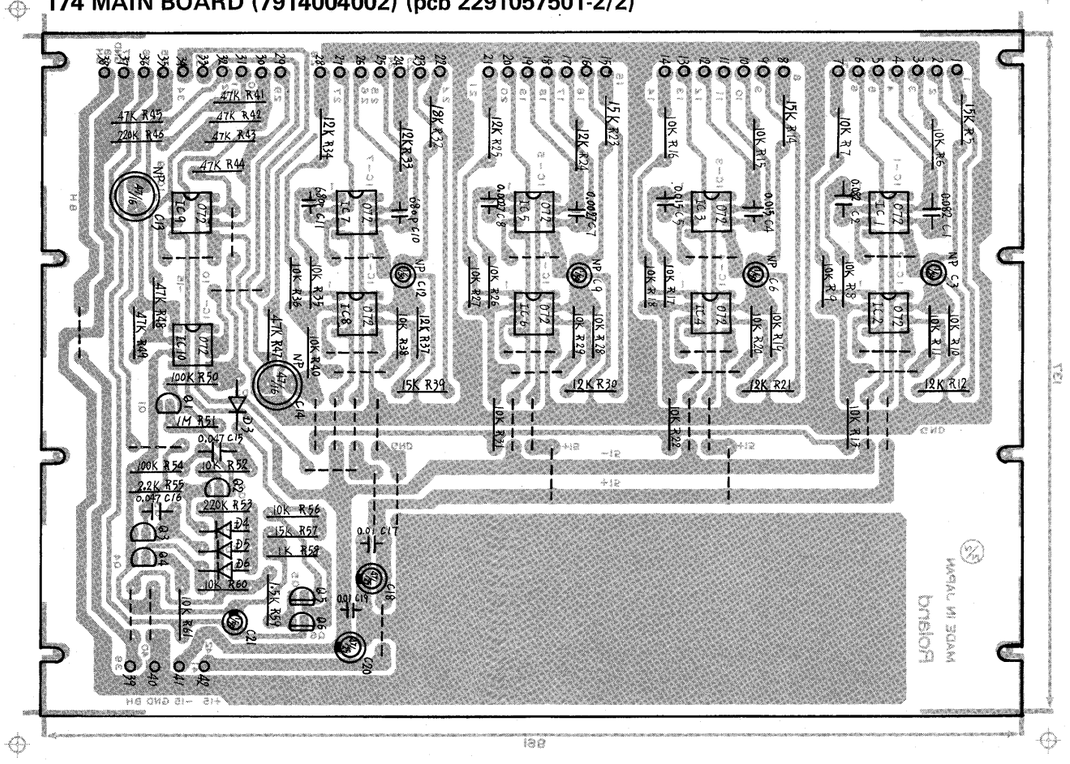
View from foil side



SYSTEM-100M 174 PARAMETRIC EQUALIZER BLOCK DIAGRAM



174 MAIN BOARD (7914004002) (pcb 2291057501-2/2)



174

CONTROL BOARD

MAIN BOARD

LEVEL

VR1 100K(B)

CUT −12dB

BOOST +12dB

C3 NP 1/50V

R5 15K

R10 10K

R11 10K

R13 10K

R12 12K

R9 10K

R8 10K

R7 10K

R6 10K

C1 0.082

C2 0.082

IC2B

IC2A

IC1B

IC1A

FREQUENCY 20-200Hz

VR3 100K(RD)x2

BANDWIDTH (Q) 0.9-9

VR2 100K(B)

BAND 1

VR4

R14

C6 R19

R20

R22

R18

R21

R16

C4 0.015 R17

R15

C5 0.015

IC4B

IC4A

IC3B

IC3A

100-1kHz

VR6

VR5

BAND 2

R.C values not specified are identical to the R. C values in BAND 1.

VR7

R23

C9 R28

R29

R31

R27

R25 12K

C7 0.0027 R26

R24 12K

C8 0.0027

IC6B

IC6A

IC5B

IC5A

500-5kHz

VR9

VR8

BAND 3

R. C values not specified are identical to the R. C values in BAND 1.

VR10

R32 18K

C12 R37 12K

R38

R40

R36

R34 12K

C10 680P R35

R33 12K

C11 680P

IC8B

IC8A

IC7B

IC7A

2k-20kHz

VR12

VR11

BAND 4

R. C values not specified are identical to the R. C values in BAND 1.

R39 15K

SIGNAL IN

J1

SW1 E Q

BYPASS

C14 NP 47/16V

R46 220K

R41 47K

R42 47K

R43 47K

R44 47K

R47 47K

C13 NP 47/16V

R49 47K

R48 47K

R45 47K

IC9A

IC9B

IC10A

IC10B

SIGNAL OUT

R3 330

R4 330

J2

J3

BH +22V

R59 1.5K

D3

Q5

Q6

R56 10K

R57 15K

R58 1K

C21 1/50V

R60 10K

Q4

R61 10K

D6

R52 10K

Q2

R51 1M

Q1

C15 0.047

R54 100K

D4

R53 220K

D5

C16 0.047

Q3

R50 100K

R55 2.2K

RED

OVER LOAD

D2

R1 560

GREEN

NORMAL LOAD

D1

R2 2.2K

DIN

ORN +22V

RED +15V

-15V BLU

GND

BLK

BH +22V

+15V

C17

C18

C19

C20

0.01 X2

47/25V X2

-15V

All OP Amp : TL072
All PNP Tr : 2SA1015GR
All NPN Tr : 2SC1815Y
All Diode : 1S2473
LED (RED) : GL-3AR-2
LED (GREEN) : GL-3PG-2

SYSTEM-100M 174
PARAMETRIC EQUALIZER

PARTS LIST

2221030800	M-165 Front panel	165
2221030900	M-173 Front panel	173
2221031000	M-174 Front panel	174
2201012201	100M Cover	
2219018901	Holder	
2247012900	Knob (slide pot)	165/174
2247012700	Knob (rotary pot)	174

DIN SOCKET

13429603	CS0690-1-1 8P	

JACK

13449402	SJ-409-1-2	

SWITCH

13159103	SSB-02242 (slide)	165/174

PCB

7912003001	165 CONTROL BOARD (pcb 2291057101-1/2)	
7912004001	165 MAIN BOARD (pcb 2291057101-2/2)	
7913003001	173 CONTROL BOARD (pcb 2291057301-1/2)	
7913004001	173 MAIN BOARD (pcb 2291057301-2/2)	
7914003002	174 CONTROL BOARD (pcb 2291057501-1/2)	
7914004002	174 MAIN BOARD (pcb 2291057501-2/2)	

POTENTIOMETER (slide)

13339401	EVA-TOA-C15A15 100kA	165
13339402	EVA-TOA-C15B15 100kB	174
13339862	EVA-T5K-C15B15 100kB	174

POTENTIOMETER (rotary)

13219780	EWK-77A320-15D 100kRD	174

POTENTIOMETER (trimmer)

13299544	H1021A015-22kB 22kB	165
13299106	EVT-R4SA00B53 5kB	165

IC (CMOS)

15159115H0	HD14066BP Quad Bilateral Switch	165	
15159101H0	HD14001BP Quad 2-Input NOR Gate	173	

IC (OP-AMP)

15189105	μPC4558C	173	
15189118	TL082CP	165	Bi-FET
15189147	NJM-072DP	174	

IC (CUSTOM)

15229802	BA662	165	VCA

TRANSISTOR

15119113	2SA1015-GR	
15129114	2SC1815-GR	165
15129115	2SC1815-Y	174

FET

15139103	2SK30ATM-GR	165/173
15139112	2SK246-GR	165/173

DIODE

15019103	1S2473	
15019125	1SS133	165

LED

15029109	GL-3AR-2 (red)	
15029112	GL-3PG-2 (green)	165/174

CAPACITOR

13639933M0	ECEA1EN470S 47μF/25V (bi-polar)	174
13639942M0	ECEA1HN010S 1μF/50V (bi-polar)	174

OTHERS

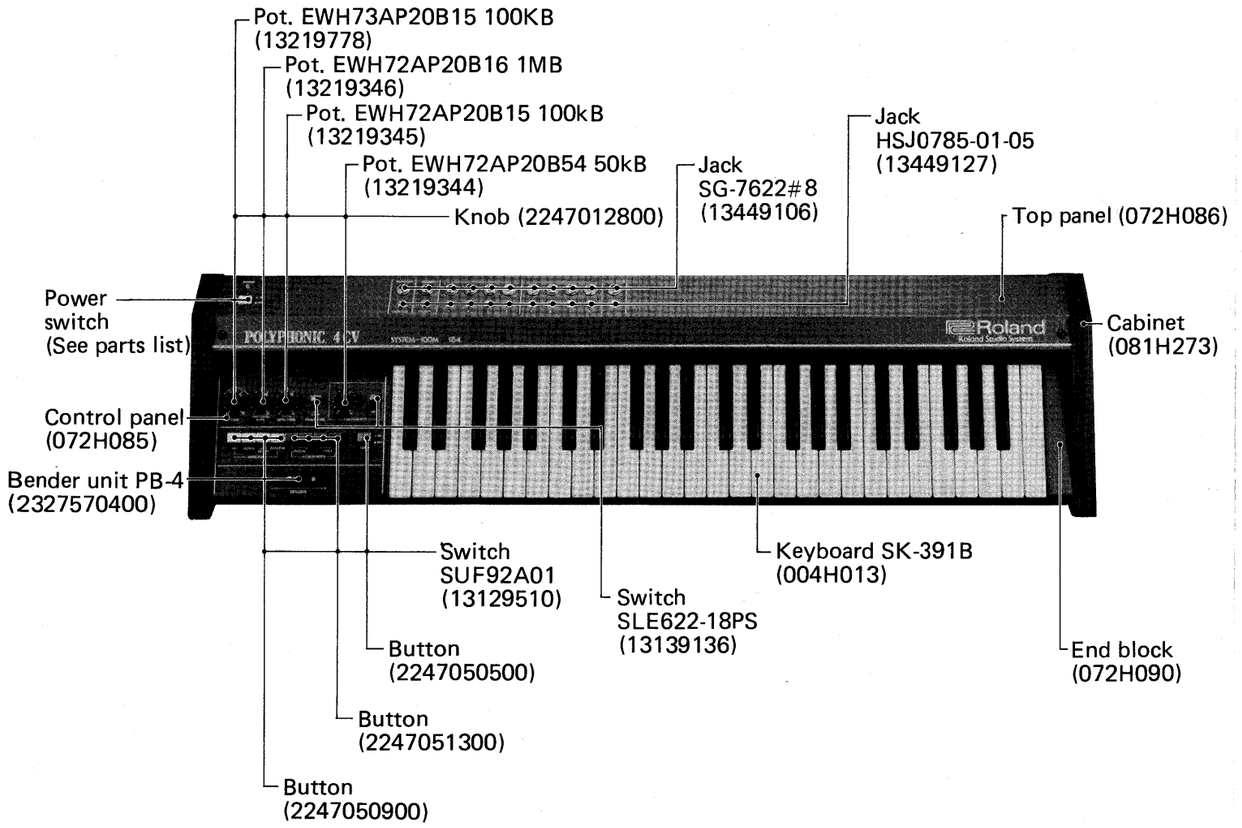
13429603	8p DIN cord (30cm)	
2224010900	Slide pot mask	165/174

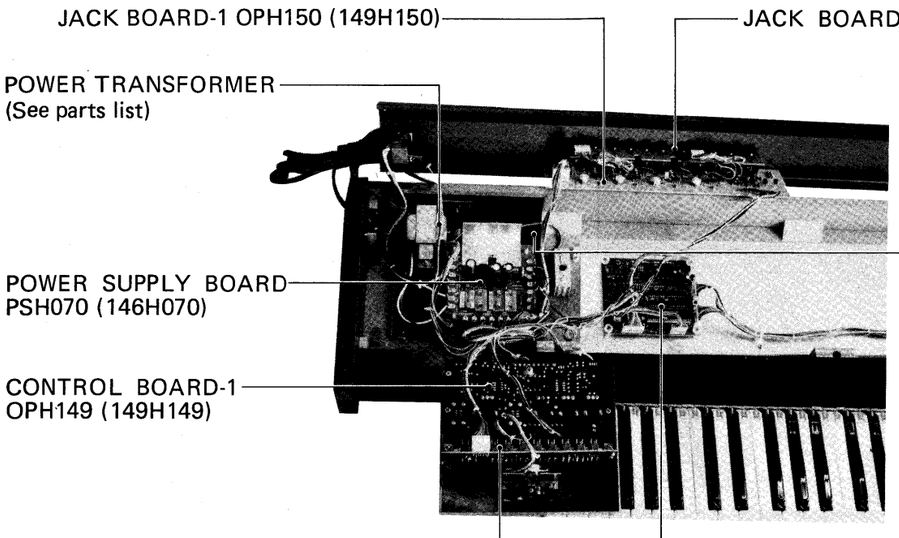
SYSTEM-100M-184 SERVICE NOTES

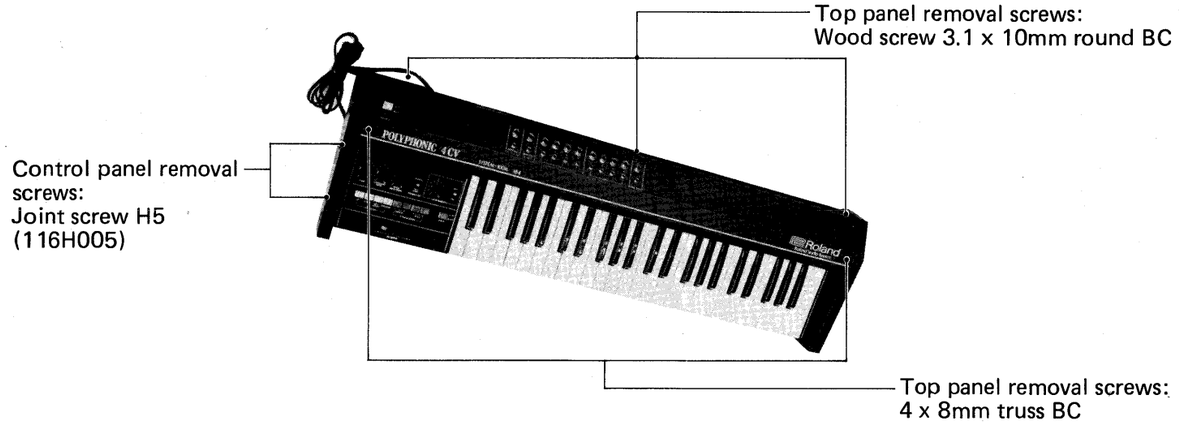
First Edition

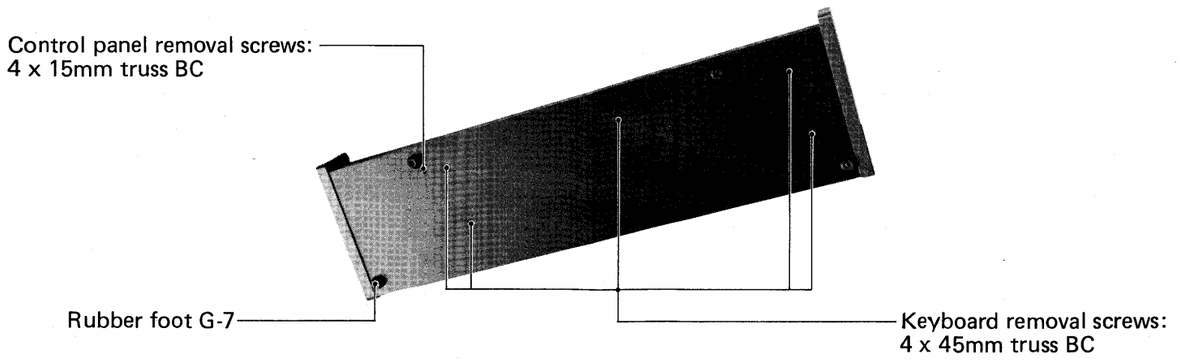
SPECIFICATIONS

Keyboard	61 keys, 4 octaves (C-C)
Tunable range	±100 cents
Pitch bend sens	±1300 cents (max.)
Portamento time	0-1 s/oct
CV out	1 V/oct
Gate out	+15V
Bender CV out	±1V
Arpeggio clock in	+1V (min.)
Dimensions	938(W) x 235(D) x 95(H)mm
Power consumption	8W
Weight	8.5 kg









PARTS LIST

004H013	Keyboard SK-391B	
081H273	Cabinet	
	Rubber foot G-7	
072H085	Control panel	
072H086	Top panel	
072H090	End block	
061H127	Chassis	power supply
2327570400	Bender unit PB-4	

KNOB. BUTTON

2247012800	Knob	(016-078)
2247050900	Button white	(016-085)
2247051300	Button blue	(016-089)
2247050500	Button gray	(016-008)

SWITCH

13129101	SDG5P001-1 power 100V	
13129102	SDG5P001-2 (CSA) 117V	
13129103	SDG5P-502 (DNS) 220/240V	
13129510	SUF92A01 push (001-227)	
13139136	SLE622-18PS lever	

JACK

13449106	SG-7622#8	(009-008)
13449127	HSJ0785-01-05	mini.

TRANSFORMER. COIL

022H045J	Power 100V	
022H045C	Power 117V	
022H045D	Power 220/240V	
2244021100	Coil 24M-067-333	(022-136)

PCB ASSEMBLY

149H151	KEY ASSIGNER BOARD OPH151 (pcb 052H032C)	
149H149	CONTROL BOARD-1 OPH149 (pcb 052H314A)	
149H147	CONTROL BOARD-2 OPH147 (pcb 052H335)	
145H150	JACK BOARD-1 OPH150 (pcb 052H315A)	
149H148	JACK BOARD-2 OPH148 (pcb 052H321)	
146H070	POWER SUPPLY BOARD PSH070 (pcb 052H172B)	
052H195	LED BOARD less parts	

IC

15179101	μPD8048-C11	(179-020)
	Single-Chip 8-Bit Microcomputer	
15159105T0	TC4013BP	(020-041)
	Dual D-Flip Flop	
15159112T0	TC4049BP	(020-075)
	Hex Inverter/buffer	
15159116T0	TC4069UBP	(020-176)
	Hex Inverter	
15159114H0	MC14052BP	(020-175)
	Dual 4-Channel Multiplexer	
15169301X0	SN74LS00	
	Quad 2-Input NAND Gate	
15169322X0	SN74LS174	
	Hex D-Flip Flop	
15169111X0	SN74LS175	
	Quad D-Flip Flop	
15189118	TL082CP	(020-100)
	OP Amp	
15229801	IR3109	(020-209)
	VCF	
15189105	μPC4558	(020-097)
	OP Amp	
15199106N0	μPC14305H or TA7805	(020-205)
	3-Terminal Regulator	
15199118	TA78015	
	3-Terminal Regulator	

TRANSISTOR

15119802	2SB596-Y	(017-128)
15119113	2SA1015-Y or GR	(017-116)
15129114	2SC1815-Y or GR	(017-106)

DIODE

15019103	1S2473	(018-059)
15019108	1S2473FV	(018-094)
151019243	1B4B1	(018-098)
	rectifier stack	
15019245	1B4B41	
	rectifier stack	
15019624	1SZ52	(018-113)
	zener	
15029103	TLR-124	(019-028)
	LED	

POTENTIOMETER

13219344	EWH72AP20B54 50kB PORTAMENTO	
13219778	EWH73AP20B15 100kB TUNE	
13219345	EWH72AP20B15 100kB PITCH BEND SENS	
13219346	EWH72AP20B16 1MB ARPEGGIO RATE (trimmer)	
13299116	SR19R	47kB (030-469)
13299138	RJ6P2K	2kB (030-641)
13299139	RJ6P10K	10kB (030-643)
13299131	RJ6P20K	20kB

POSISTOR

15229909	ERS-B33G561 560Ω	(030-680)

RESISTOR

044-927	CRB25BY	11k
044-928	CRB25BY	62.5k
044-929	CRB25BY	125k
044-930	CRB25BY	250k
044-931	CRB25BY	500k

FUSE

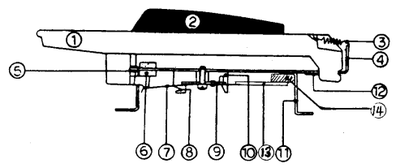
12559133	MGP 1A pri. 100V	(008-014)
12559513	SEMKO T1A (5 x 20mm) sec. 100/220/240V	(008-066)
12559507	SEMKO T200mA sec. 100/220/240V	(008-059)
12559311	MGP 1A CSA pri. 117V	(008-041)
12559333	GGS 1-1/4 1.25A/250V CSA (5x20mm) sec. 117V	
12559334	GGS 1/4 250mA/250V CSA sec. 117V	
12559532	SEMKO T630mA pri. 220/240V	

FUSE HOLDER

12199519	TF-758	(012-003)

MISCELLANEOUS

048H017	Heat sink	
064H076	Holder	power switch



SYS-184 SK-391B (004H013) KEYBOARD PARTS

NO	PART NO	DESCRIPTION	NO	PART NO	DESCRIPTION	
1	106H026	Natural key C F	7	071H044	Contact leaf	H44
1	106H027	Natural key D	8	071H051	Busbar 8P	H51
1	106H028	Natural key D B		071H057	Busbar 1P	H57
1	106H029	Natural key G	9	043H007	Switch unit 12P	H7
1	106H030	Natural key A		043H008	Switch unit 13P	H8
1	106H031	Natural key C'F'		043H011	Switch unit 13P-B	H11
2	106H032	Sharp key black	10	064H093	Busbar holder	H93
3	070H029	Key spring H29	11	062H024	Chassis bracket	H24
4	061H086A	Chassis H86A	12	098H006	Key stopper	H6
5	068H004	Guide bushing H4	13	052H283-4	Matrix board	H283-4
6	101H142	Level felt H142	14	107H059	Cushion	H59

ADJUSTMENT

ALLOW APPROXIMATELY 20 MINUTES FOR WARMUP PERIOD.

BENDER UNIT PB-4

1. Connect digital voltmeter (DVM) across wiper and center tap of the Bender potentiometer.

If the meter reads other than 0.00V,

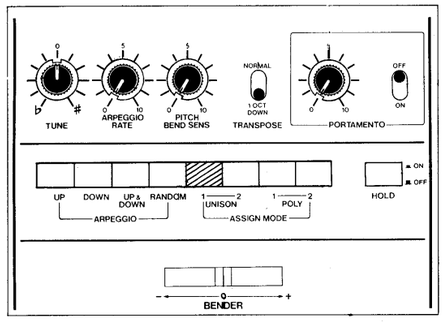
2. Loosen screw that lockes Bender lever to the Pot's shaft.
   Turn the shaft for 0.000V reading.
3. Tighten the screw. Jog the lever and confirm 0V when the lever stands neutral.

D/A REFERENCE VOLTAGE OPH149

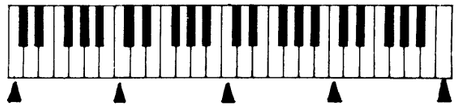
1. Connect DVM to CP-1 of OPH149 (or terminal 15 or Q1 collector of the board). (Ground DVM at terminal 20 of PSH70.)
2. Adjust VR1 for −15.000V reading.

BASIC SET-UP

for the remaining adjustments



KEY DESIGNATION & KCV OUT



TRANSPOSE	C0	C1	C2	C3	C4
NORMAL	1.000V	2.000V	3.000V	4.000V	5.000V
DOWN	0.000V	1.000V	2.000V	3.000V	4.000V

KCV WIDTH (A) OPH151

1. Disconnect connector (terminals 27-36).
   Caution: Do not turn the power on/off once connector is separated — no reset signal for CPU.
2. Connect DVM to terminal 36. (Ground DVM at terminal 20 of PSH70.)
3. Holding C0 key down, adjust TUNE for 0.000V.
4. Holding C4 key, adjust WIDTH VR2 for 4.000V.

Leave the connector disconnected for the next para.

PORTAMENTO TIME OPH151

Reset: PORTAMENTO — ON PORTAMENTO Knob — 10

Others: the same as for above para.

1. Strike C0 key, then hold C4 key. The meter reading will follow the increasing ramp voltage. Time the period required for the CV to reach 4.000V.
2. Adjust VR1 for 4 sec period, or 1 sec/V.

KCV WIDTH (B) OPH150

Settings: Replug The connector housing on OPH151.
Set TUNE at its center.

OFFSET

1. Connect DVM to one of CH1 KCV jacks.
2. While depressing C0 key, adjust VR5 for 0.0mV reading.

WIDTH

1. Adjust VR1 so that KCV changes in 1V/oct steps as C note is depressed on different octaves.
   Retain DVM connection for the next para.

TRANSPOSE OPH149

Setting: Set TRANSPOSE into NORMAL.

1. Adjust VR6 so that every KCV jack delivers, on different keys, a voltage 1V higher when compared with the one produced at TRANSPOSE in DOWN.

Leave the DVM connection for the next para.

BENDER SENS OPH149

Setting: BEND SENS — 10

1. Move then holding BENDER lever at "+", adjust VR2 for more than 1.084V (1300 cents) above the voltage at neutral. (Pressing key for 2V or 3V KCV is preferable for easier calculation.)
2. While holding the lever at "−", adjust VR1 for the same amount of voltage change (negative going) as at step 1.
3. Confirm voltage changes at BENDER CV OUT jack.

TUNE SHIFT RANGE

1. Confirm that KCV is shiftable up to ±74mV relative to the center.

KEY ASSIGNER BOARD ASSY

PCB 052-032

49 KEY BOARD ASSY
PCB 052H283-4

8048-011 IC1

LS174 IC3

74LS175 IC4

74LS175 IC5

IC2,7 74LS00

IC8,9 4049BP

D/A

CRB25BY

CRB25FX

IC6 TC4013BP

IC10,17,18 TL082

C8~C11 : 0.1±2%
C16~C19 : 250P
R42~R45 : 56K
R36~R39 : 560Ω

4052BP IC11

IC13 IR3109

IC12 TC4069UBP

CPU CLOCK 3~6MHZ

POWER ON — CPU RESET & RAM CHIP ENABLE — POWER OFF

1.5S±20%

CP: 95~100mV

CP1

2.8V

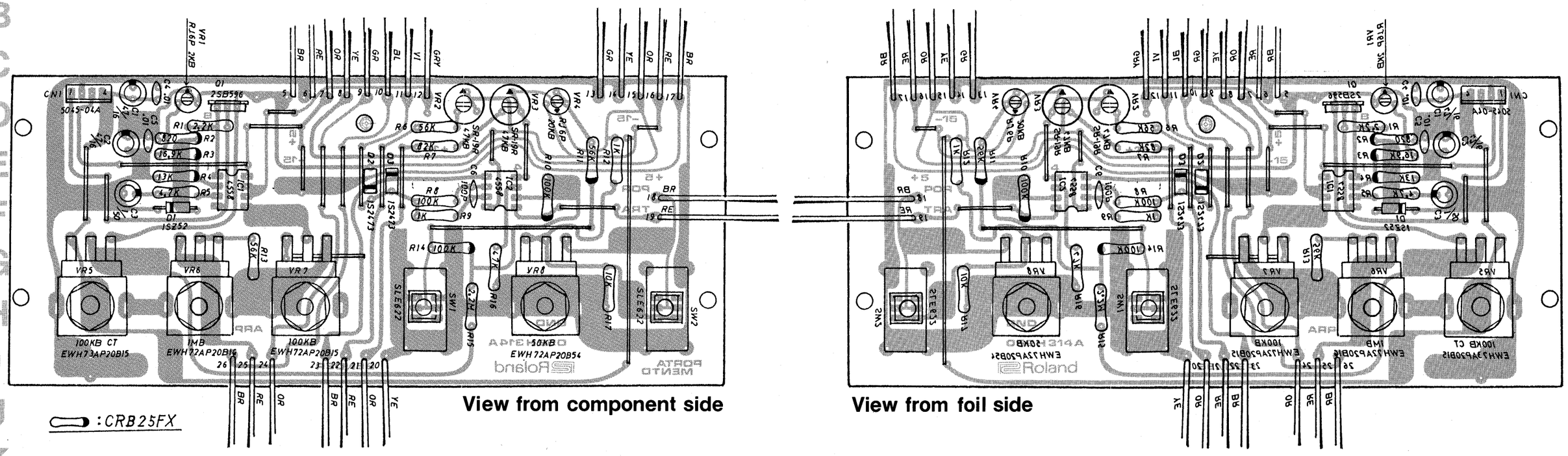
4KCVS WILL VARY WITH KEYING

970μS±30%

KEYBOARD SCANNING

MAX 4V (ARP) 5V

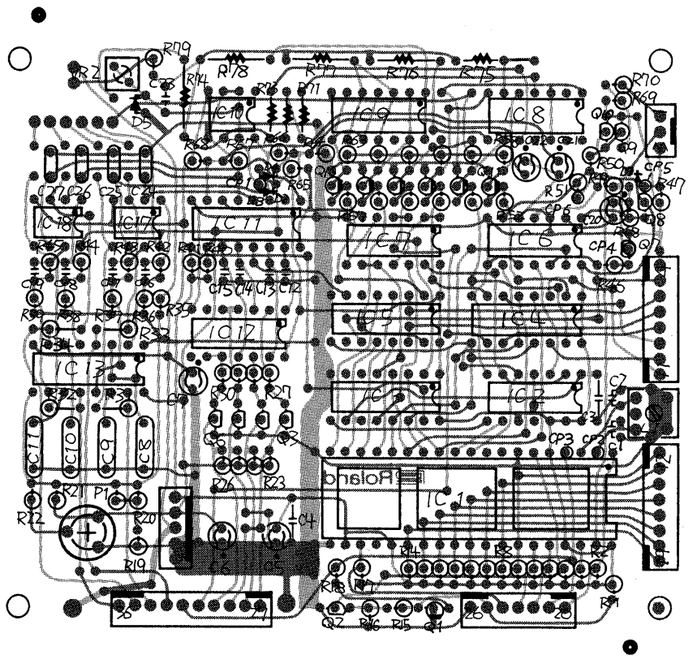
CONTROL BOARD-1 OPH149
(149H149) (pcb 052H314A)



View from component side

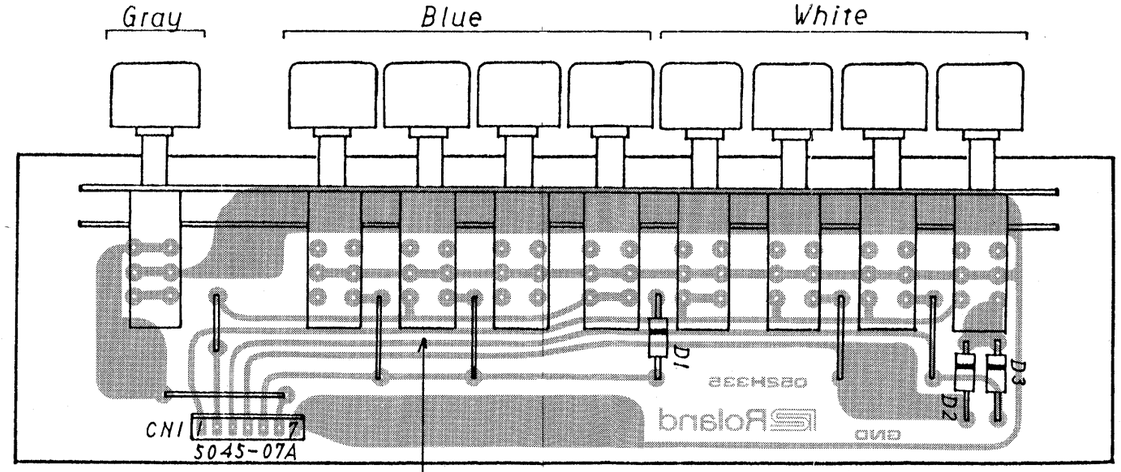
View from foil side

KEY ASSIGNER BOARD
OPH151
(149H151)
(pcb 052H032C)



R71~R73 : CRB25FX
R74~R78 : CRB25BY
: 2SA1015Y
: 2SC1815Y
: 1S2473FV

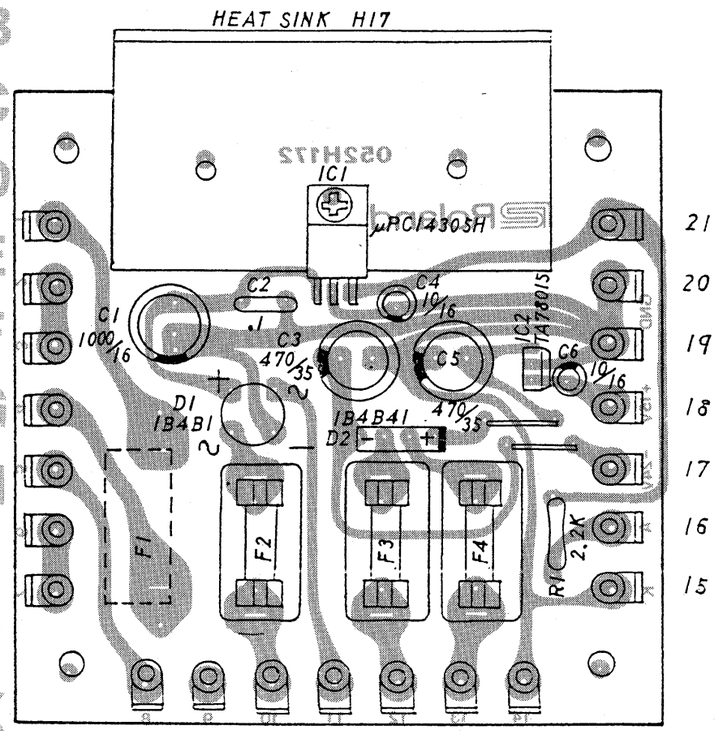
CONTROL BOARD-2 OPH147
(149H147) (pcb 052H335)

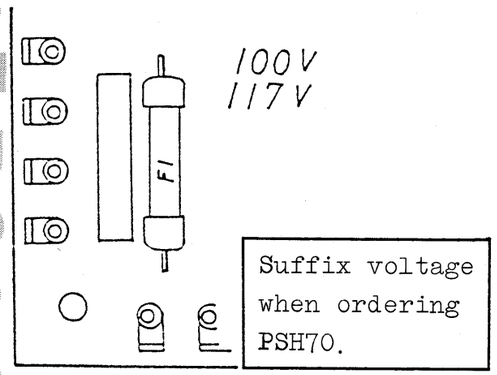


SW1
Push SW SUF92A01

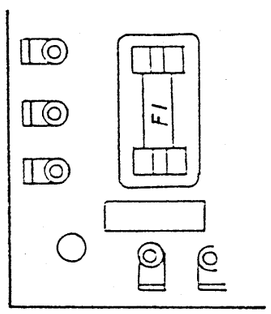
D1~D3 : Diode 1S2473

POWER SUPPLY BOARD PSH070 (146H070) (pcb 052H172B)





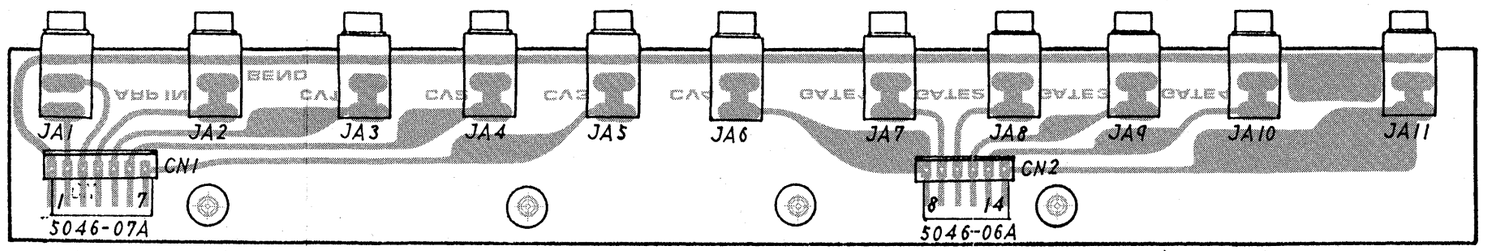
Suffix voltage when ordering PSH70.



	F1	F2	F3,4
100V	MGP1A	(S) 1AT	(S) 200mAT
117V	MGP1A CSA	GGS 1¼	GGS ¼
220/240V	(S) 630mAT	(S) 1AT	(S) 200mAT

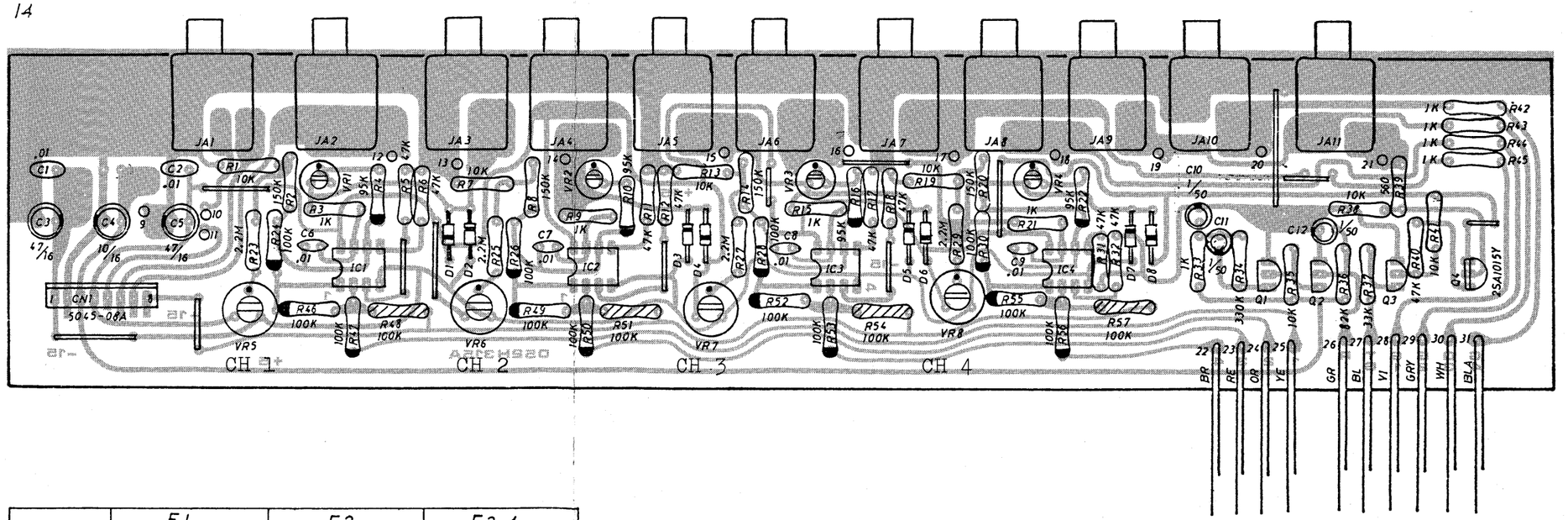
FUSE HOLDER : TF758

JACK BOARD-2 OPH148 (149H148) (pcb 052H321)



JA1~JA11 : JACK HSJ0785-01

JACK BOARD-1 OPH150 (149H150) (pcb 052H315A)



Q1~Q3 : 2SC1815Y
D1~D8 : 1S2473
IC1~IC4 : μPC4558
JA1~JA11 : Jack SG7622-08

VR1~VR4 : RJ6P 10KB
VR5~VR8 : SR-19 47KB
: CRB25FX
: CRB25FX selected (±0.1%)

CONTROL BOARD 1
OPH149

OPH147
CONTROL BOARD2

KEY ASSIGNER BOARD
OPH151

KEY BOARD SK-391-B (49KEYS C-SCALE)

POWER SUPPLY
PSH070

JACK BOARD 1 OPH150

JACK BOARD 2
OPH148

PNP:2SA1015Y
NPN:2SC1815Y
▲:CRB25FX
▮:CRB25FX SELECTED (±0.1%)

	100V	117V	220/240V
P·T	022H045J	022H045C	022H045D
P·SW	SDGSP001-1	SDGSP001-2	SDGSP-502