

MASTER

**ROLAND SYNTHESIZER**

**MODEL SH-3**

# **SERVICE NOTE**

THE SECOND EDITION

APPLIED TO SERIAL No.220100 - 220599



**Roland Corporation**



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ELECTRONIC MUSIC SYNTHESIZER MODEL SH - 3

ROLAND SYNTHESIZER

1. SPECIFICATIONS

\* 44Keys(F Scale)  
 Note can be raised or lowered by one octave via Transpose switch.

\* VCO Assembly(Voltage Controlled Oscillator)  
 5 Octave Combination(32', 16', 8', 4', 2') ..... 5  
 Waveform Selector ..... 5  
 Modulation Waveform Selector (  $\sphericalangle$  /  $\square$  /  $\sim$  ) ..... 1  
 Modulation Depth Control (VIBRATO) ..... 1  
 Pitch Control ..... 1  
 Glide Switch ..... 1  
 Portamento Time (PORTAMENTO) ..... 1  
 Portamento OFF Switch (OFF) ..... 1  
 Transpose Changeover Switch ( L/M/H ) ..... 1  
 8' Chorus Speed Control/OFF (8' CHORUS)..... 1  
 Sampler  
     Sampled Waveform Selector (MODE - OFF/M/M/N/RANDOM) ..... 1  
     Sampling Time (SAMPLE TIME) ..... 1  
     Sampling Level Control (LEVEL) ..... 1

\* VCF Assembly (Voltage Controlled Filter)  
 Filter Resonance Control  
     CUTOFF FREQ ..... 1  
     RESONANCE ..... 1  
 Modulation Waveform Selector (  $\sphericalangle$  /  $\square$  /  $\sim$  ) ..... 1  
 Modulation Depth Control (GROWL) ..... 1  
 Envelope Selector (ADSR/ $\sphericalangle$ / $\wedge$ ) ..... 1  
 Envelope Sensitivity Control (SENS) ..... 1

\* VCA Assembly (Voltage Controlled Amplifier)  
 Modulation Waveform Selector (  $\sphericalangle$  /  $\square$  /  $\sim$  ) ..... 1  
 Modulation Depth Control (TREMOLLO)..... 1  
 Envelope Selector (ADSR/ $\sphericalangle$ / $\wedge$  /  $\square$  ) ..... 1  
 Hold Control ..... 1  
 OUTPUT Level Control (OUT LEVEL) ..... 1

\* Others  
 Envelope Control ..... 4  
     Attack Time/Decay Time/Sustain Level/Release Time  
 Low Frequency Oscillator 1 Rate ..... 1  
 Low Frequency Oscillator 2 Rate ..... 1  
 Low Frequency Oscillator 2 Delay Time Control ..... 1  
 Noise Generator Level Control ..... 1  
 White/Pink Noise Changer ..... 1  
 Noise Input Selector ..... 1  
 Phones Level Control ..... 1  
 Tuning (on rear Panel) ..... 1  
 OUTPUT Jack ..... 1  
 OUTPUT VOLTAGE CHANGEOVER SWITCH (L/M/H) ..... 1  
 PHONES Jack ..... 1  
 Jack for VCO CONTROL ..... 1  
 Jack for VCF CONTROL ..... 1

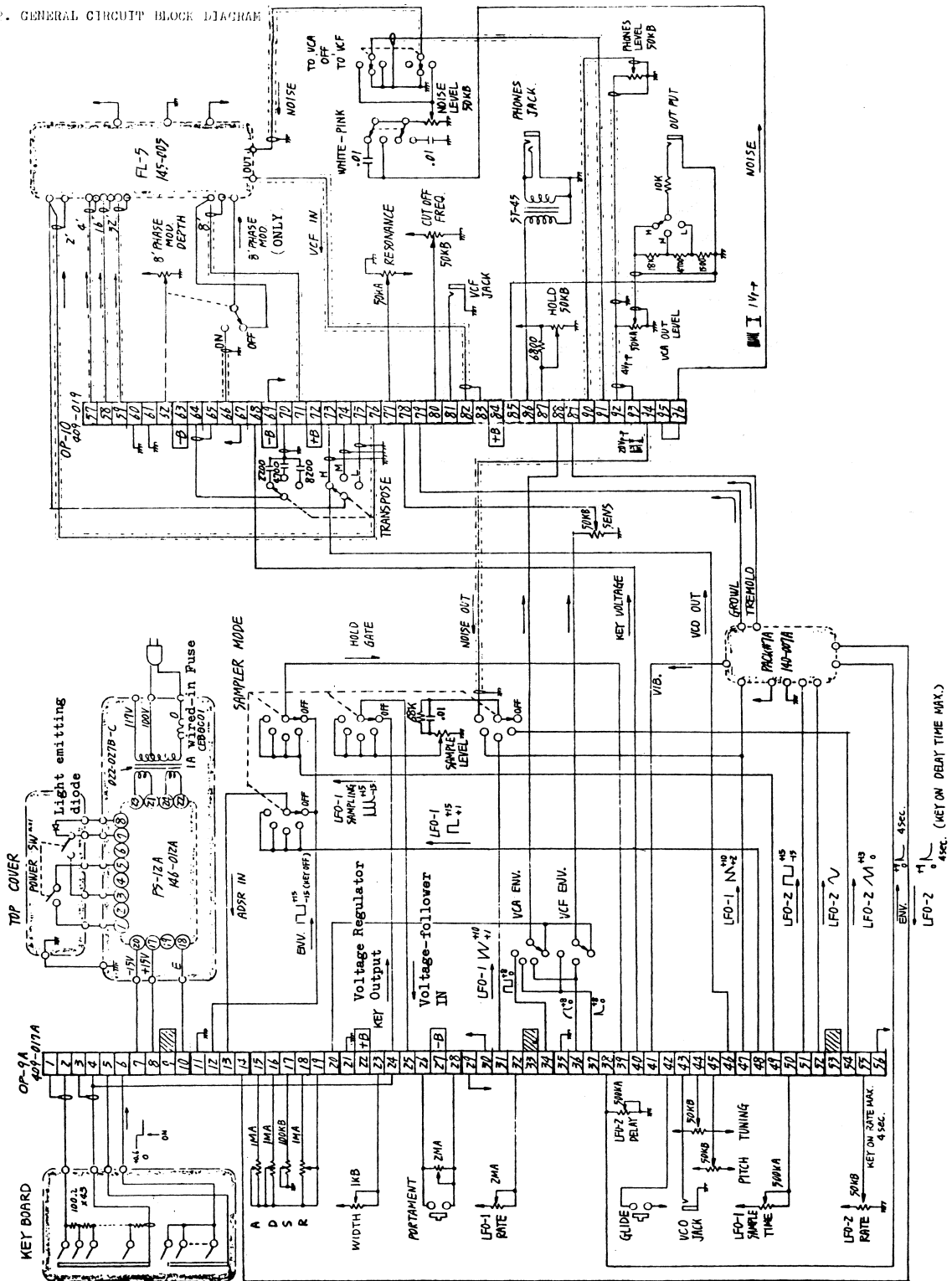
Voltage Changer (for changing AC voltage) ..... 1

- \* Power Source AC 100, 117, 220, 250V 50/60Hz
- \* Power Consumption 9VA
- \* Dimensions W ; 1005mm (40.2")  
D ; 320mm (12.8")  
H ; 150mm ( 6.0")
- \* Weight(Net) 14.5 Kg (32 Lbs.)
- \* Accessories Music Rack  
Conection Cord  
(2.5m with Pin-Plug Adaptor)
- \*\* Accessoriés(optional)  
Volume Control Pedal FV-1  
(for controlling Sound Volume, VCO  
GLIDE effect or VCF CUTOFF-  
FREQUENCY)

\*\*\*\*\*

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

2. GENERAL CIRCUIT BLOCK DIAGRAM

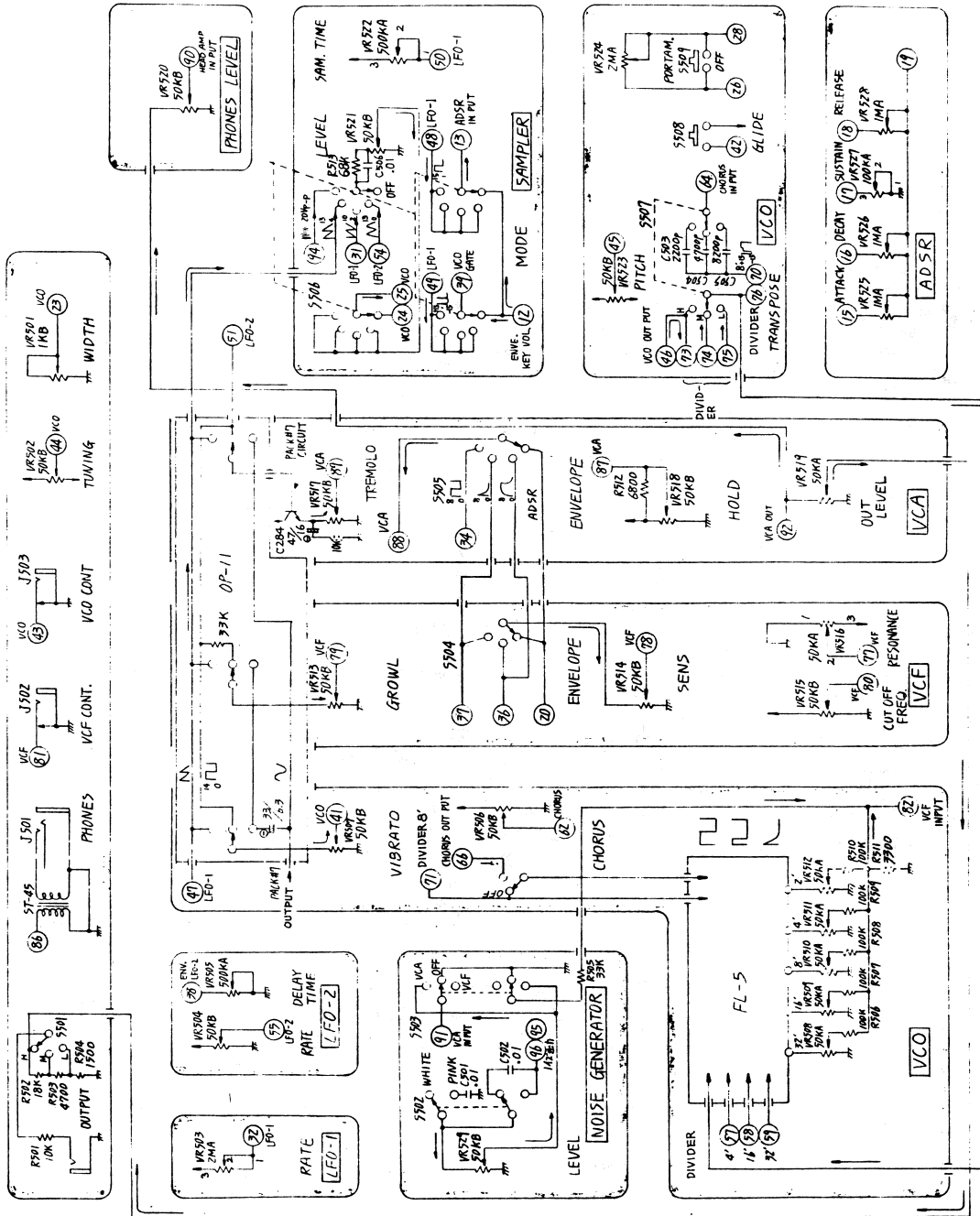


3. CONTROL CIRCUIT

3-1. Control Circuit Block Diagram

OP-9 : Added From SERIAL No.220400.

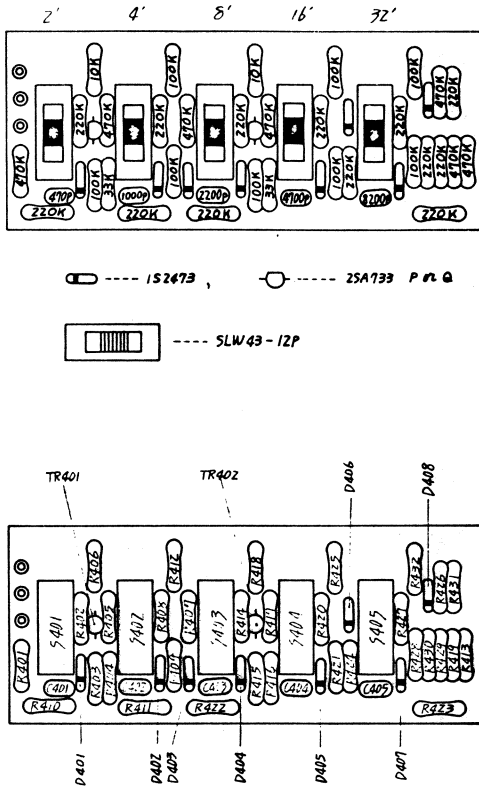
OP-10 : Added From SERIAL No.220150.



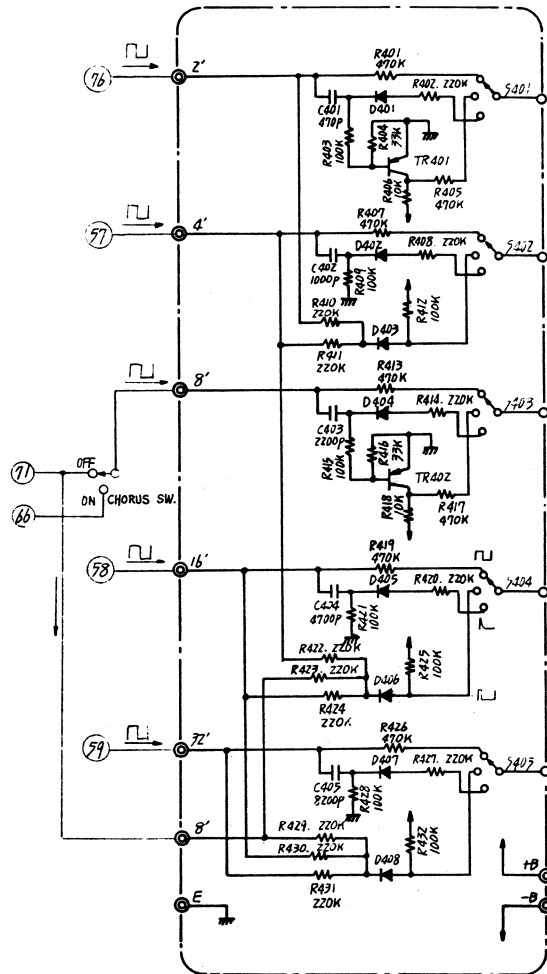
- (1) ~ (56) OP-9 VCO PULSE BOARD
- (57) ~ (96) OP-10 VCF-VCA BOARD

3-2. FILTER BOARD ASSEMBLY (PL - 5)

A. Parts Layout



B. Circuit Diagram

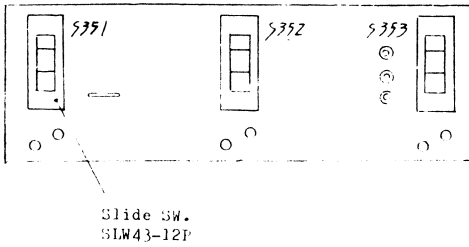


- D401 - D408 Diode 1S2473
- TR401, 402 Tr. 2SA733P or Q
- S401 - S405 Slide SW. SLW43-12P

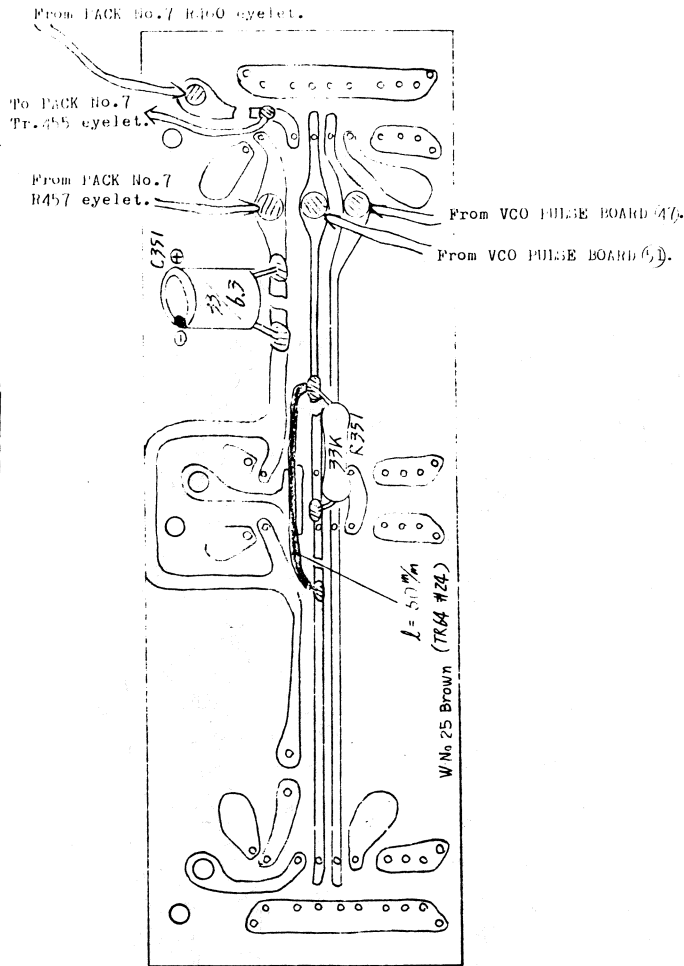


3-3. MODULATION BOARD ASSEMBLY (OP-11)

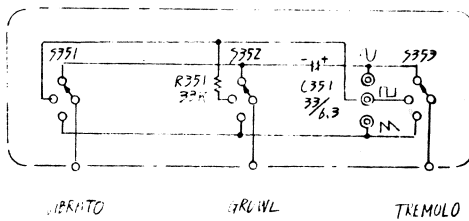
A. Parts Layout



B. Rear side of OP-11.

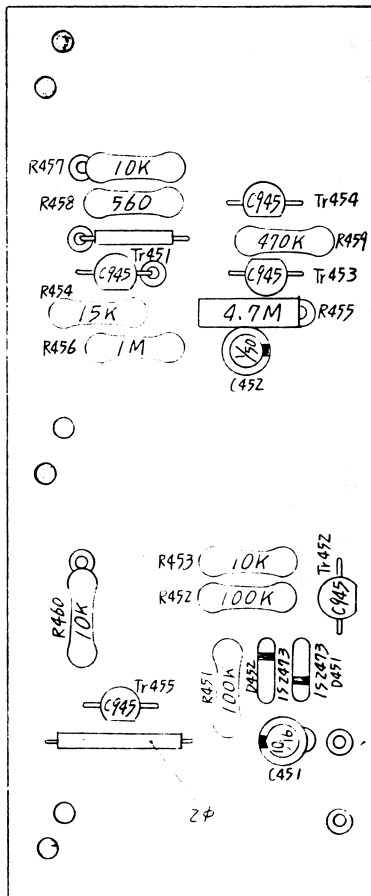


C. Circuit Diagram (OP-11)

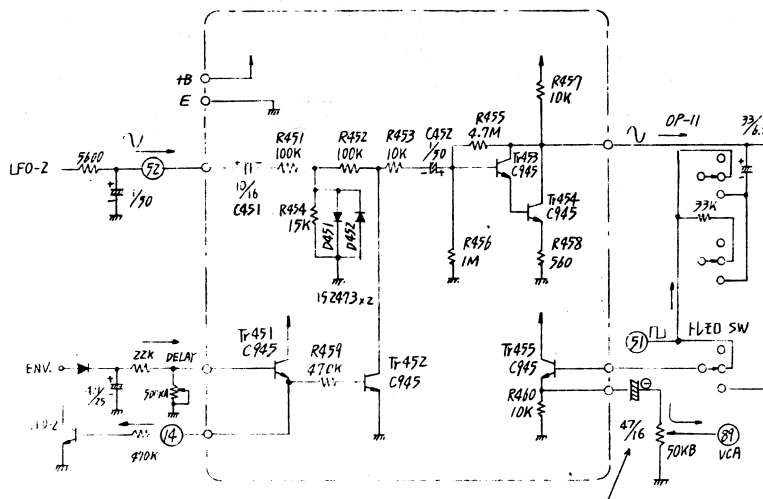


3-4. VIBRATO - PACK No.7

A. Parts Layout



B. Circuit Diagram (PACK No.7)

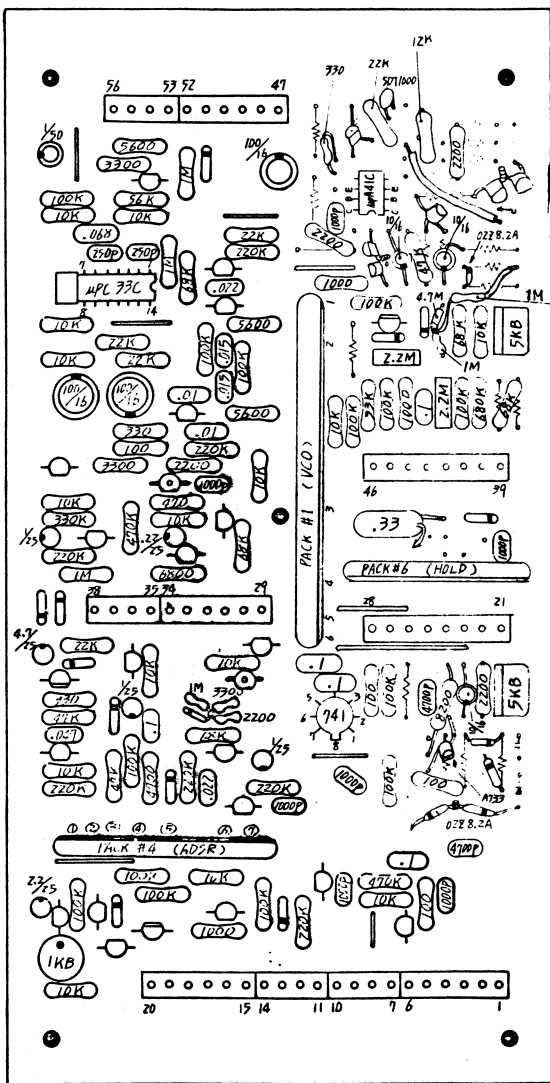
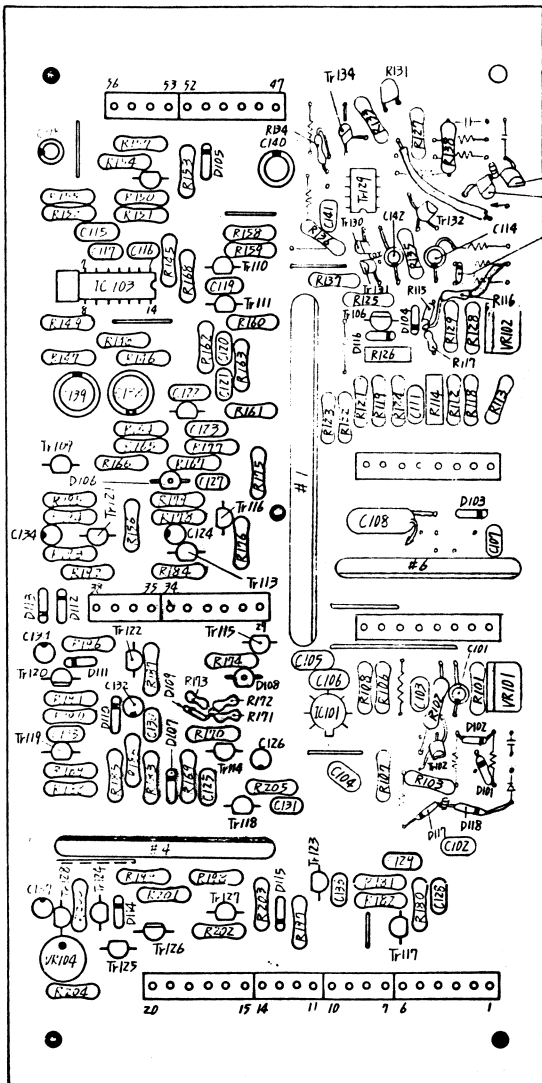


4. VCO CIRCUIT

4-1. VCO PULSE BOARD ASSEMBLY (OP-9)

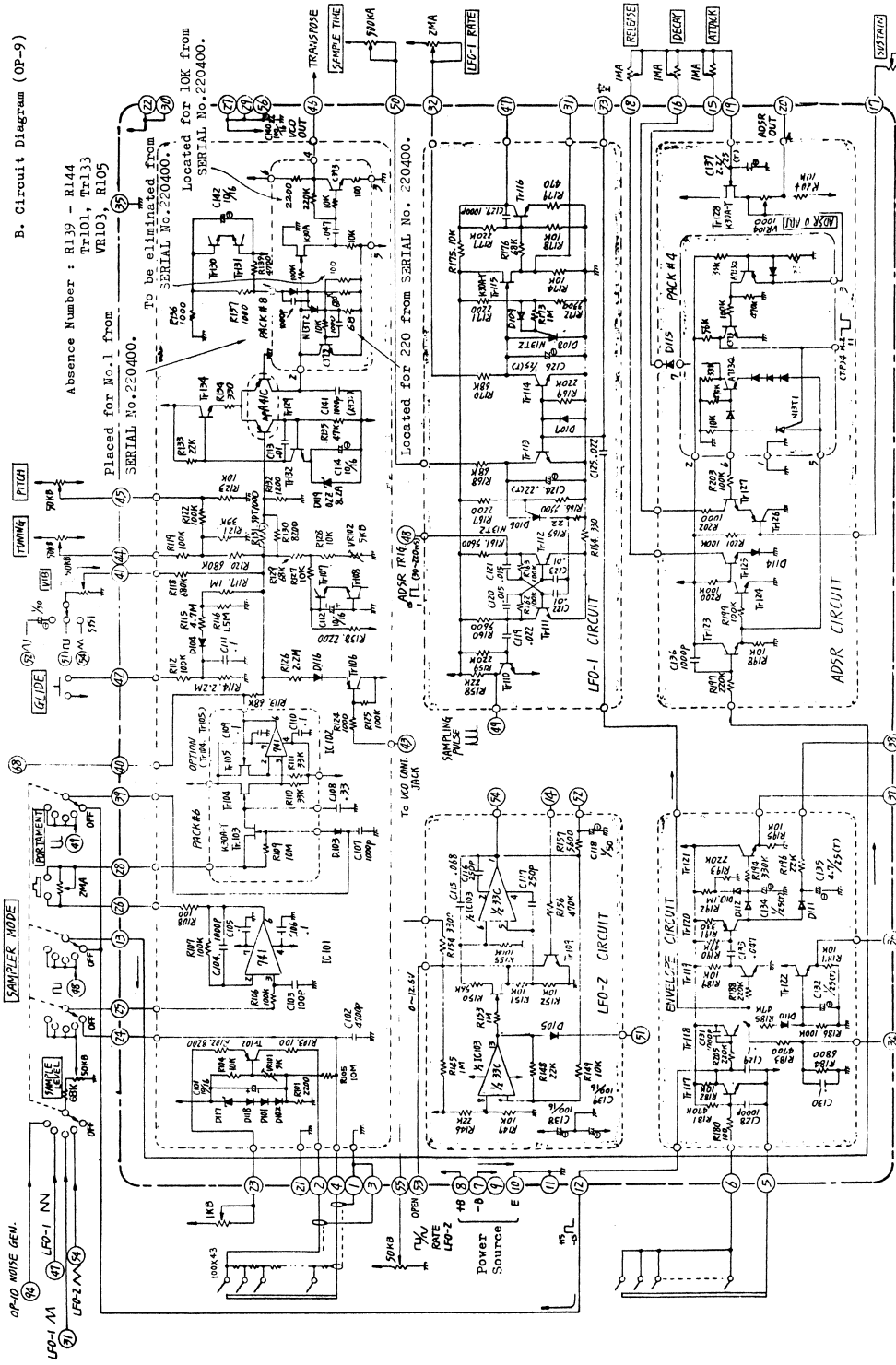
A. Parts Layout

VCO PACK NO. 8 : Placed for PACK No.1 from SERIAL No.220400.  
 R139(4700) : Added from SERIAL No.220350.  
 R136(1000) : Located for 1200 from SERIAL No.220350.  
 R137(10K) : Located for 12K from SERIAL No.220350.  
 R116(1.5K) : Located for 1K from SERIAL No.220400.  
 C103(100F) : Located for 4700F from SERIAL No.220150.  
 R165(17) : Located for 100 from SERIAL No.220400.



- Tantalum Capacitor
- Tr. 25A733P or Q
- Tr. 25C945P or Q
- PUT. N13TZ
- FET. 25K30A-Y
- D. 152473
- Electrolytic Capacitor

B. Circuit Diagram (OP-9)

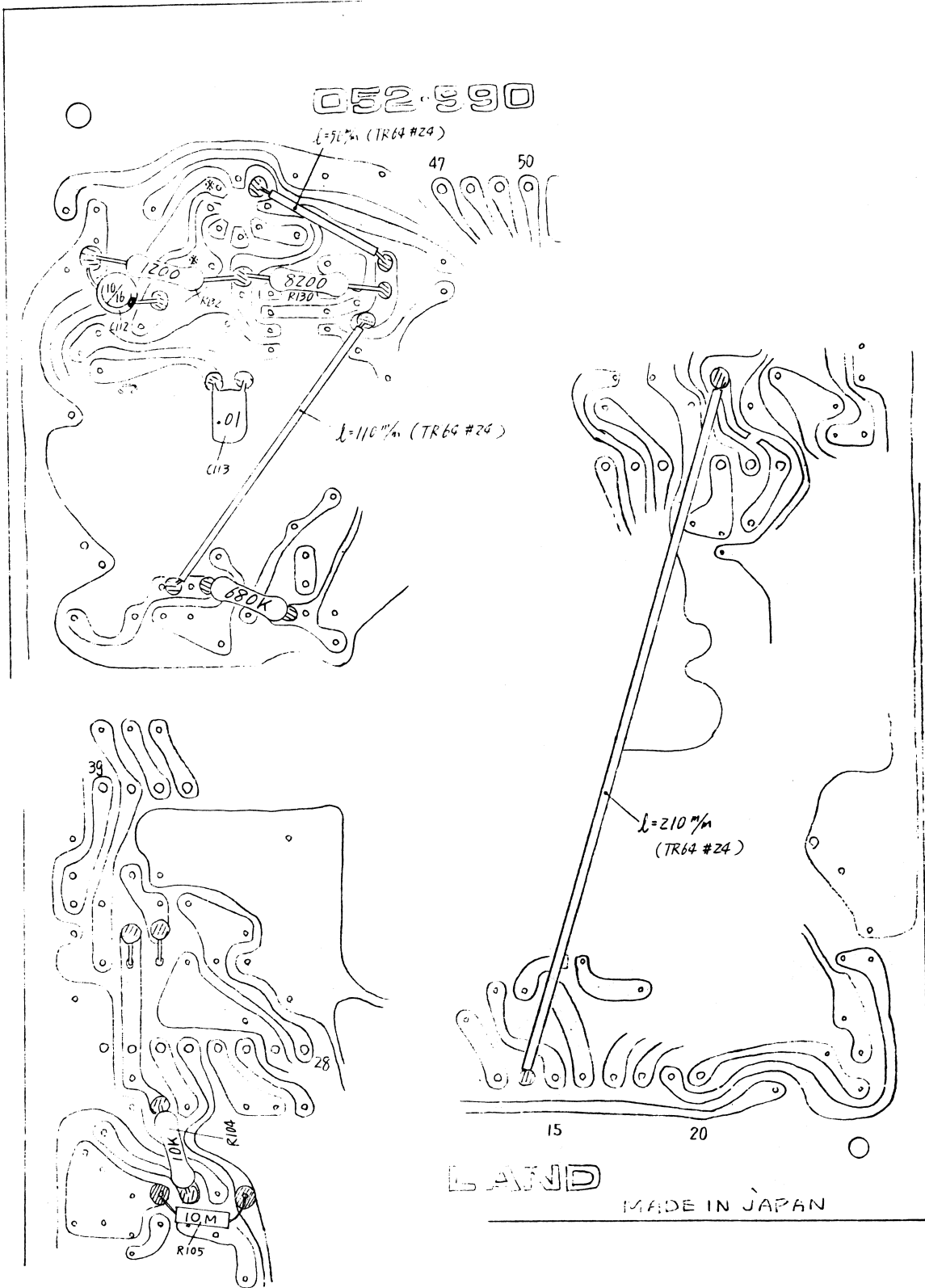


NOTE  
 ALL MPV TRANSISTORS 25C142 UNLESS SPECIFIED.  
 ALL PNP TRANSISTORS 25A133 UNLESS SPECIFIED.  
 ALL DIODES ARE 152A13 UNLESS SPECIFIED.

C103(100P): Located for 170P from SERIAL No. 220150.  
 R116(1.5K): Located for 1K from SERIAL No. 220400.  
 R127(10K): Located for 12K from SERIAL No. 220150.  
 R135(100K): Located for 220K from SERIAL No. 20150.  
 R139(470K): Added from SERIAL No. 220150.  
 R151(22): Located for 100 from SERIAL No. 220400.

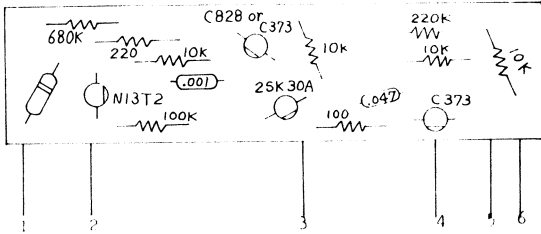


C. Rear side parts layout (01-9)

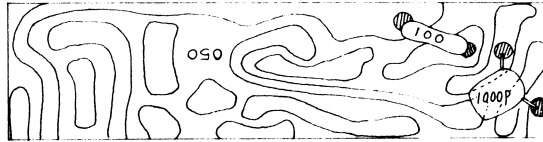


4-2. PACK No.1 and No.8 ASSEMBLY

A. Parts Layout



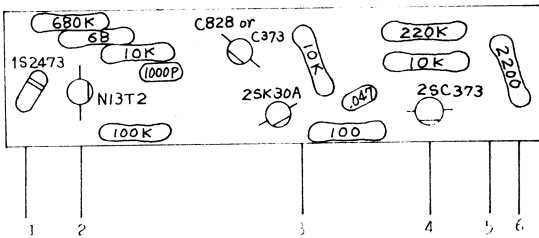
B. Rear side (PACK No.1)



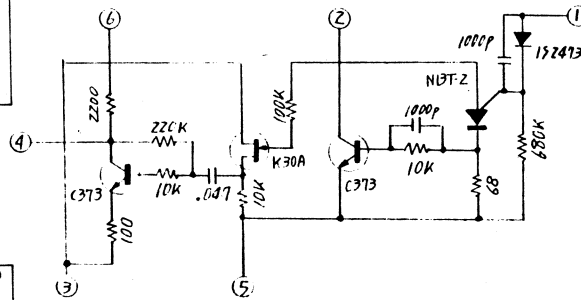
D : 1S2473

C. PACK No.8 ASSEMBLY : Placed for PACK No.1 from SERIAL No.220400.

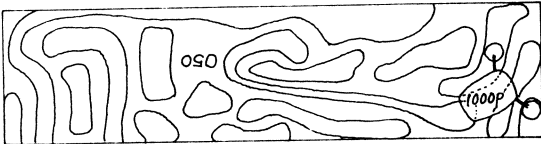
C-(a) Parts Layout



C-(c) Circuit Diagram (PACK No.8)

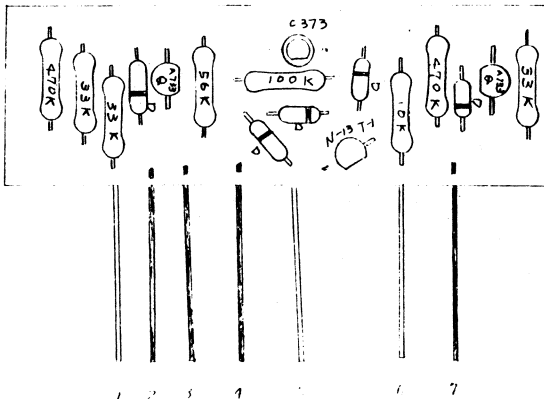


C-(b) Rear side (PACK No.8)

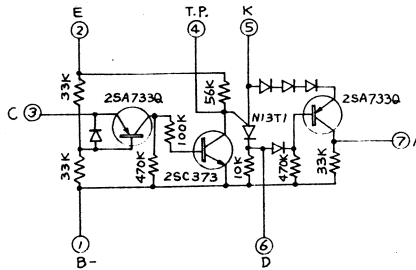


4-3. PACK No.4 ASSEMBLY

A. Parts Layout



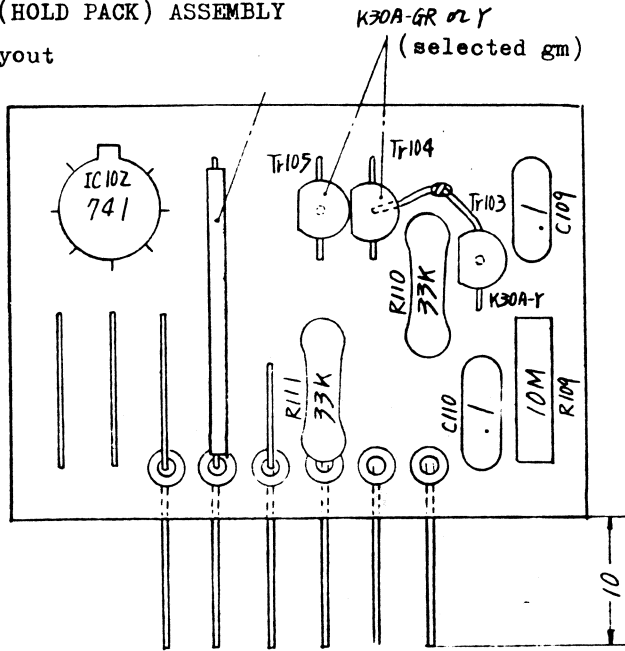
B. Circuit Diagram (PACK No.4)



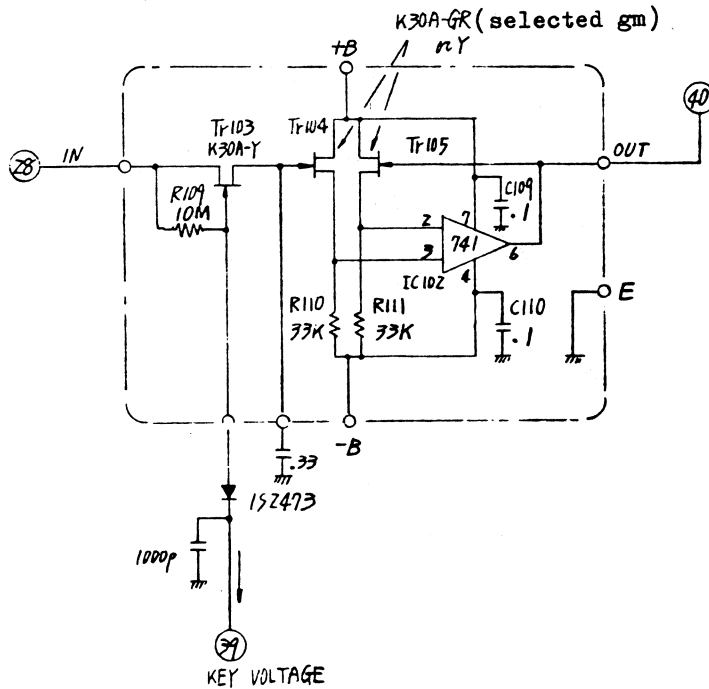
D : 1S2473

4-4. PACK No.6 (HOLD PACK) ASSEMBLY

A. Parts Layout



B. Circuit Diagram (PACK No.6)



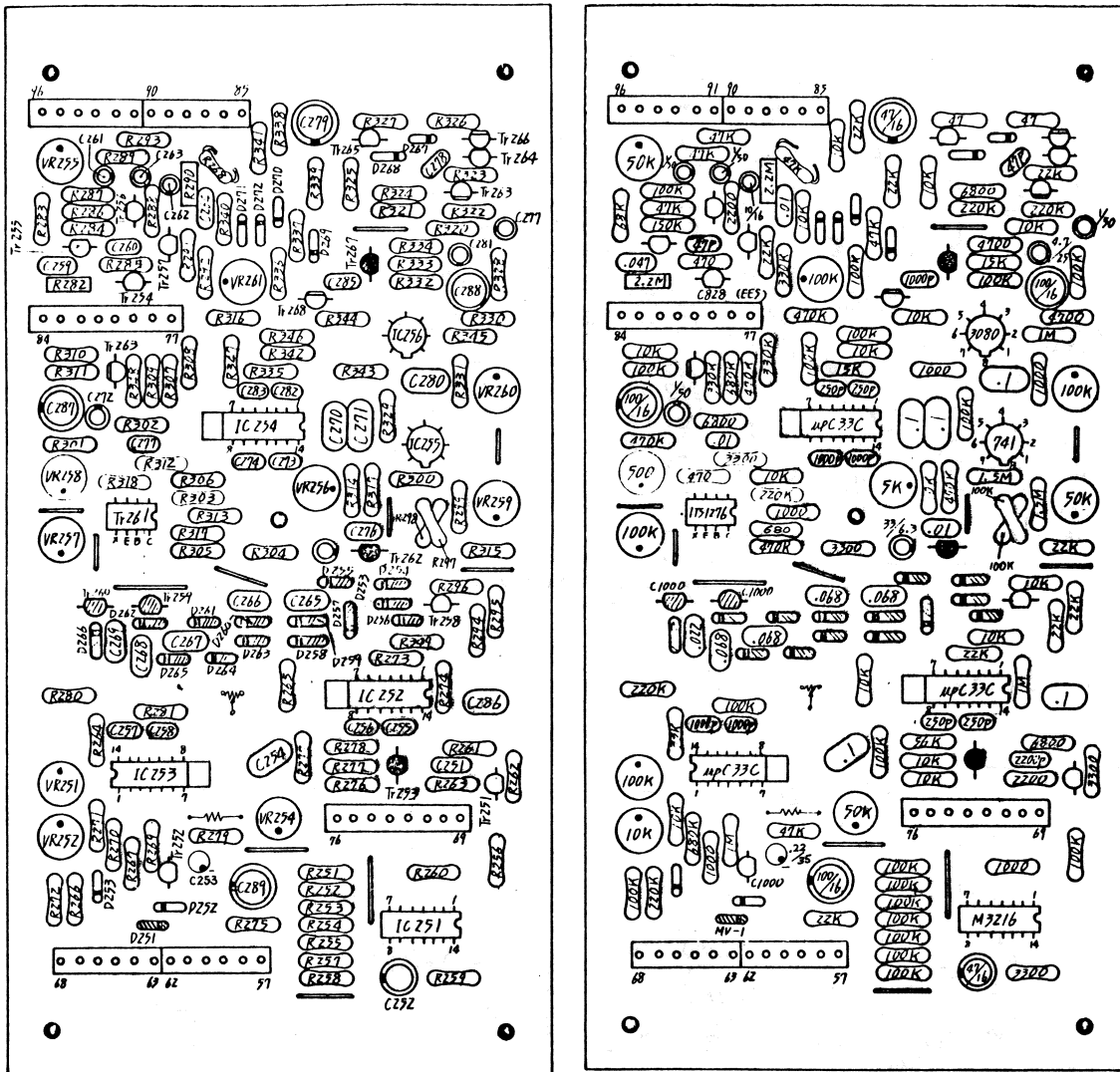








4. of 10a Pin Layout (0-10a) : Placed for 0-10 from (1171 2020000).



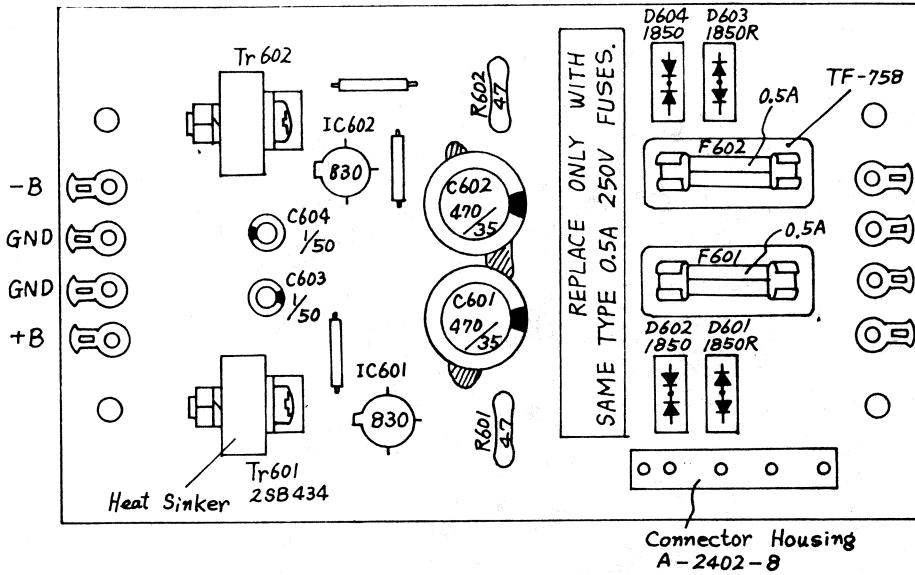
- 152473
- 152473 (selected)
- 25C-1000 GR (selected)
- 25C-945 Pwr Q
- 25A-733 Pwr Q
- 25K-30A Y
- Dipped Tantalum Capacitor

R268(47K): Placed for C-34(47/16) from SERIAL No.220400.  
 R319(680): Located for 100K from SERIAL No.220350.  
 C257, C258, C273 and C274(All 1000P): Located for 250Ps from SERIAL No.220400.  
 C253(.22/35): Placed for 1/50(Electrolytic) from SERIAL No.220350.  
 (Tantalum)

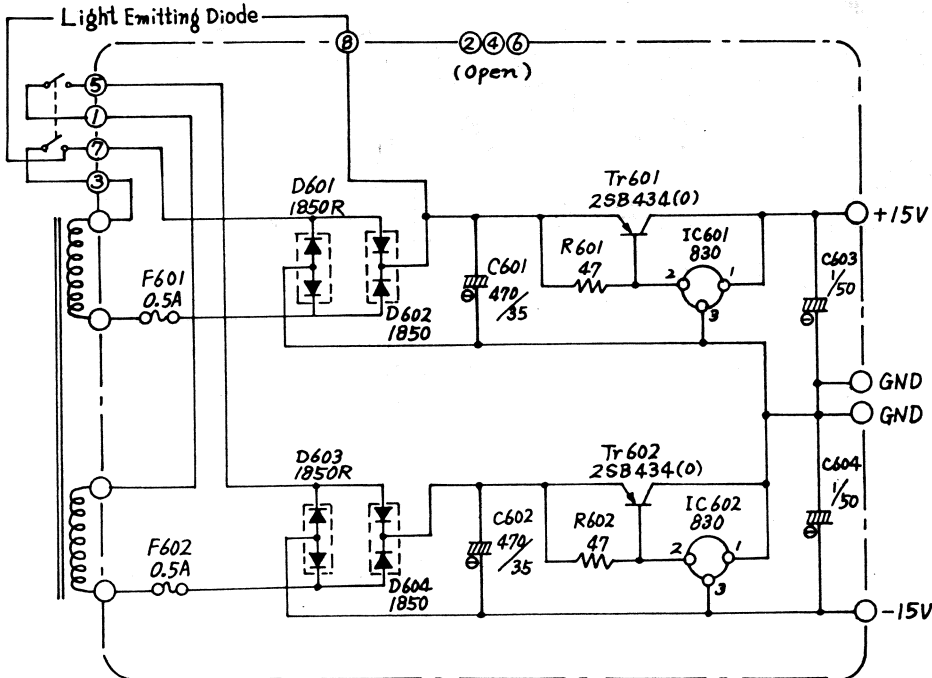
6. POWER SUPPLY CIRCUIT

6-1. POWER SUPPLY BOARD ASSEMBLY (PS-12A) (SERIAL No.220200 - 220799)

A. Parts Layout



B. Circuit Diagram (PS-12A)



## 7. ALIGNMENT PROCEDURE

### 7-1. Preparation (Check of Operation and Preadjustment)

#### (1) Setting of Controllers

VCO 8' ..... 10 on scale  
VCF Cutoff Frequency ..... 10 on scale  
VCA HOLD ..... 10 on scale  
TRANSPOSE ..... Position M  
\* Other Controllers ..... 0 on scale or OFF

#### (2) Adjusting Points

VCA VR261 (CUTOFF)  
VCF VR257 (FREQ.)

Adjust these semi-fixed resistors so that the sounds are audible, using a headphone or an amplifier.

### 7-2. Adjustment of VCO

- (1) Connect the digital frequency counter to the 71st terminal.
- (2) Check the 0 position of PITCH on the control panel, and the center position of TUNING and WIDTH on the rear panel.
- (3) Adjust VR102 so that the frequency shown on the digital counter may come to 174Hz, depressing the lowest Key F.
- (4) Likewise, adjust VR101 so that the frequency may come to 1760Hz, depressing the highest Key A.
- (5) Repeat abovementioned procedure (3) and (4).
- (6) Check the operations of following functions.
  - a. PORTAMENTO
  - b. PORTAMENTO OFF (Push Switch)
  - c. GLIDE Button (Semitone)
  - d. PITCH, TUNING and WIDTH
  - e. GLIDE PEDAL (One note)

### 7-3. Adjustment of VCF

Return the VCO 8' to 0 position, and raise the RESONANCE control to 10 on scale so as to get the oscillation.

- (1) Adjust the CUTOFF FREQ. control and VR257 properly.
- (2) Adjust VR256 to get Octave.
- (3) Adjust VR258 to get Octave independently of the position of CUTOFF FREQ. control.
- (4) Repeat abovementioned procedure (1), (2) and (3).
- (5) Set the CUTOFF FREQ. control at 0 position, and adjust VR 257 so as

to get the oscillated frequency may come to 358Hz, depressing the highest Key C.

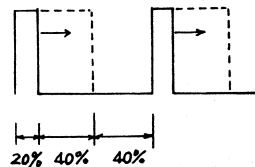
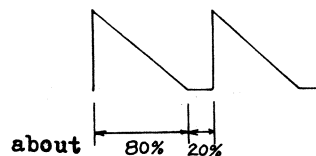
- (6) Set the RESONANCE control at 7 position on scale, and adjust VR259 so as to get the condition right before the oscillation.
- (7) Check the operation of the VCF PEDAL control.

7-4. Adjustment of VCA

- (1) Return the HOLD Control to 0 position.
- (2) Raise both the VCO 8' (or others feet) and the VCF CUTOFF FREQ. control to 10 on scale, and adjust VR261 so that the sounds may not be audible.

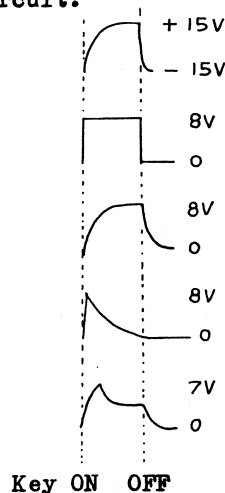
7-5. Adjustment of CHOROUS

- (1) Connect the synchroscope to the 64th terminal.
- (2) Adjust VR252 so that the wave-form shown on the figure may be obtained, depressing the lowest Key F.
- (3) Adjust VR264 so that the wave-form shown on the figure may be obtained, depressing the keys step by step from low to high.
- (4) Adjust VR279 so that the output from the 66th terminal may be modulated as shown on the figure.
- (5) Check the operation of 8' CHOROUS Control.
- (6) Check if the all keys' note will be modulated smoothly, changing the TRANSPOSE Changeover Switch in three stages.



7-6. Check the wave-form on Envelope Circuit.

- (1) at 12nd terminal
- at 34th terminal
- at 36th terminal
- at 37th terminal
- at 20th terminal

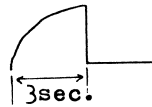


(2) 0 Adjustment of ADSR

Adjust VR104 so that the voltage of 20th terminal may reach 0V when all keys are at OFF position.

(3) Check the wave-forms via the ADSR Control at the 20th terminal.

Attack



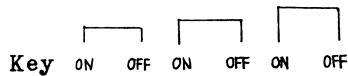
10 on scale  
(D, S, R are all at 0 position)

Decay



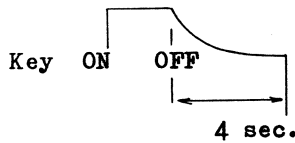
10 on scale  
(A, S, R are all at 0 position)

Sustain



10 on scale  
(A, D, R are all at 0 position)  
Varied in accordance with the position on scale.

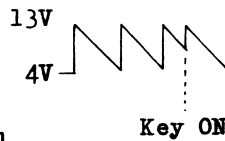
Release



10 on scale  
(A, D are at 0 position, and S only at 10 on scale)

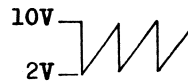
7-7. Check the wave-form of LFO-1.

47th terminal



Frequency range : 0.5 - 16Hz

31st terminal



Frequency range : 0.5 - 16Hz

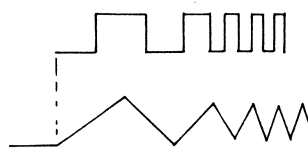
7-8. Check the wave-form of LFO-2. (Frequency range : 0.2 - about 36Hz)

51st terminal

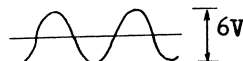


Delay

54th terminal



52nd terminal



Key ON

7-9. VCO MODULATION ; Check the operation of VIBRATO.

7-10. VCF MODULATION ; Check the operation of GROWL.

7-11. VCA MODULATION ; Check the operation of TREMOLO.

7-12. Check the operation of VCF Envelope Control.

7-13. Check the operation of VCA Envelope Control.

\* At the dial position of wave-form  $\square$  , adjust VR260 to eliminate DC factor from the output so that the crick noises are not produced.

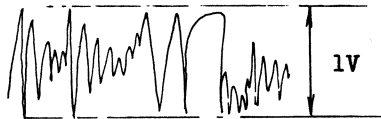
7-14. Check the operation of SAMPLER.

1) SAMPLE TIME

2) LEVEL

7-15. NOISE LEVEL

Check the output voltage of Noise signal at 95th terminal.



7-16. Check the operations and the wave-forms, operating controllers on the control panel.



## 8. PARTS LIST

### GENERAL ASSEMBLY

Cabinet (Complete)		
Control Chassis Assembly		
Top Cover Assembly		
Power Supply Assembly	PC-2	162-002
Keyboard	SK-142A	004-002
Connector Housing	2145-6C	
Holder	No.30	064-030
"	No.24 (Common with EP-10)	064-024
Felt	No.18            30x610x1.5t Black	101-018

### CABINET ASSEMBLY

Cabinet		081-992
"		081-993
Lock	P-11A(Ni)	
Hooking Hinge	T-32(Cr)	
Handle	H-26(Cr)	
Foot-Rubber	G-7	
Lid	No.7	065-007
Badge	No.25	074-025
Speed Nut	M2	
Clamp	No.18	047-018
Holder	No.995	064-995
Side Block	No.997 (Common to left and right)	091-997

### CONTROL CHASSIS ASSEMBLY

Filter Board Assembly	FL-5	145-005
Modulation Board Assembly	OP-11	149-011
VCO Pulse Board Assembly	OP-9	149-009
VCF-VCA Board Assembly	OP-10	149-010
VIB Pack No.7	BX-7	140-007
Panel	No.60A(Rear Panel - from SERIAL No.220400)	072-060A
"	No.960 (Control Panel)	072-960
Chassis	No.989 1.0t SPC-1	061-989
Holder	No.996 " (for WISE)	064-996
"	No.993 " (for PCB)	064-993
Cover	No.996 2.0t Black Sponge	065-996
"	No.994 "	065-994
"	No.49 2.0t Grey Sponge	065-049
"	No.34 " Black	065-034
Output Transformer	ST-45	
Knob	TK-1114	016-021
"	No.3 (for Slide Potentiometer)	016-003
Plate	No.1	063-001
Slide Switch	SW321	001-018
Lever Switch	LE2723-18 (Double-Pole, Double-Throw)	001-044
"	LE2742-18 (On-Off)	001-045
Push Switch	No.44 Red	001-049
Jack	SG7615            No.5	009-001
"	LJ-039-1-6	009-002
Jack Washer	BSP 1.6t Ni	121-005
Bush	No.5 Black (for insulation)	068-005
Lug	2L-6P	042-009
"	1L-3P	042-006
Long Nut	No.7            M3 x 52	120-007
Connector Housing	2145-4C	
"	2145-6C	
"	2145-8C	

Rubber Bush	No.19	068-019
Aluminum Washer	8 $\phi$ (for Potentiometer)	121-001
<b>TOP COVER ASSEMBLY</b>		
Top Cover	No.997	065-997
Power Switch	MSO664K Black	001-053
Light Emitting Diode	TLR-103	019-002
Bracket	No.2	062-002
Speed Nut	M8	
Bush	No.11	068-011
Connector Housing	2145-8C	
<b>POWER SUPPLY ASSEMBLY</b>		
Power Supply Board Assembly	PC-2	162-002
Chassis	PS-12	146-012
Power Transformer	1t SPC-1	061-988
"	No.27A-C	022-027A-C
"	or No.27B-D	022-027B-D
AC Cord	SVT-2No.18(3M)	053-021
Cord Binder	No.11	047-001
" Bush	R-5	047-019
Voltage Changer	XW-103-1-10	001-002
Lug	1L-4P	042-002
Wired in Fuse	1A	008-014
Long Nut	M3 x 10	120-001
Connector Housing	2145-4C	010-019
<b>VCO PULSE BOARD ASSEMBLY</b>		
VCO Pack	OP-9	149-009
ADSR Pack	No.1	
Hold Pack	No.4	
Connector Wafer Pin	No.6	
"	A-2402-4A	
"	" 6A	
"	" 8A	
<b>OTHERS</b>		
Slide-Switch	SLW43-12P	001-057
Rotary Switch	ESR-E123R20A	001-054
"	ESR-E114R20B	001-055
"	ESR-E245R20B	001-056
Midget Fuse	.5A	008-024
Fuse Holder	TF-758	012-003
IC	830 C	020-014
"	741	
"	$\mu$ PC33C	
"	$\mu$ PA41C	
"	CA3080	
"	LM3216	
Silicon Transistor	2SC945 P or Q	
"	2SA733 "	
"	2SC828 (for Noise)	
"	2SC1000 GR	
"	2SC1000 (Selected)	
"	2SC373	
"	2SB434 O	
Pair Transistor	ITS1276	
PUT	N13T2	017-019
FET	2SK30A Y	017-014
"	2SK30A GR or Y (Selected)	
Thermister	SDT1000	

Diode	1S2473		018-014
"	02Z8.2A		
"	MV-1		
"	1850		018-003
"	1850R		018-004
Potentiometer	1K ohm(B)	EVR20AS10B13	029-002
"	50Kohm(B)	EVCBOAS20B54	028-243
"	50Kohm(B)	EVCBOAS10B54	028-262
"	50Kohm(B)	EVCBOHS20B54	028-307
"	2 Mohm(A)	EVCBOAS20A26	028-238
Slide Potentiometer	50Kohm(A)	EVAQOAA00A54	028-035
"	50Kohm(B)	EVAQOAA00B54	028-024
"	100Kohm(A)	EVAQOAA00A15	028-036
"	500Kohm(A)	EVAQOAA00A55	028-038
"	1 Mohm(A)	EVAQOAA00A16	028-039
"	2 Mohm(A)	EVAQOAA00A26	028-040
Semi-fixed Resistor	500ohm(B)	EVL4XA00B52	
"	1 Kohm	EVL4XA00B13	
"	5 Kohm	PNB04C3A502V	
"	5 Kohm(B)	EVL4XA00B53	
"	10Kohm(B)	EVL4XA00B14	
"	50Kohm(B)	EVL4XA00B54	
"	100Kohm(B)	EVL4XA00B15	
Carbon Film Resistor	22 ohm	1/4 R J	
"	47 ohm	"	
"	68 ohm	"	
"	82 ohm	"	
"	100 ohm	"	
"	330 ohm	"	
"	470 ohm	"	
"	560 ohm	"	
"	1000ohm	"	
"	1200ohm	"	
"	1500ohm	"	
"	2200ohm	"	
"	3300ohm	"	
"	4700ohm	"	
"	5600ohm	"	
"	6800ohm	"	
"	8200ohm	"	
"	10 Kohm	"	
"	12 Kohm	"	
"	15 Kohm	"	
"	18 Kohm	"	
"	22 Kohm	"	
"	33 Kohm	"	
"	47 Kohm	"	
"	56 Kohm	"	
"	68 Kohm	"	
"	100Kohm	"	
"	150Kohm	"	
"	220Kohm	"	
"	330Kohm	"	
"	470Kohm	"	
"	680Kohm	"	
"	1 Mohm	"	
"	1.5Mohm	"	
Carbon Solid Resistor	4.7 ohm	ERC12GK4R7	044-098
"	1.5Mohm	1/4 R J or ERC12GK	
"	2.2Mohm	ERC12GK	
"	4.7Mohm	"	
"	10 Mohm	"	

Electrolytic Capacitor	1 mfd 50V	ECE-A50V1	
"	4.7mfd 25V	ECE-A25V4.7	
"	10 mfd 16V	ECE-A16V10	
"	33 mfd 6.3V	ECE-A6.3V33	
"	47 mfd 16V	ECE-A16V47	
"	100mfd 16V	ECE-A16V100	
"	1000mfd 16V	ECE-A16V1000	
"	1000mfd 25V	ECE-A25V1000	
Plastic Film Capacitor	470 pfd 50V V Type ( $\pm 10\%$ or $20\%$ )		
"	1000pfd "	"	035-005
"	2200pfd "	"	
"	4700pfd "	"	
"	8200pfd "	"	
"	.01 mfd "	"	
"	.015mfd "	"	
"	.022mfd "	"	
"	.047mfd "	"	035-024
"	.068mfd "	"	
"	.1 mfd "	"	
"	.33 mfd "	"	
Polystyrol Film Capacitor	1000pfd		
	47 pfd 50V V Type ( $\pm 20\%$ )		
Ceramic Capacitor	50 pfd 50V V Type ( $\pm 10\%$ or $20\%$ )		
"	250 pfd "	"	
"	470 pfd "	" ( $\pm 20\%$ )	
Diped Tantalume Capacitor	.22 mfd 25V V Type		
"	1 mfd 25V V Type		
"	2.2 mfd "	"	
"	4.7 mfd "	"	

#### MISCELLANEOUS PARTS

Interior Packing Case	No.999		130-999
Pat	No.87		132-087
"	No.88		132-088
Music Rack			092-999
Name Plate	No.12 (Common with SH-1000)		079-012
"	No.21		075-021
"	No.23	220V	075-023
"	No.24	230V	075-024
"	No.25	240V	075-025
Caution Mark	No.9		075-009
Cover	No.35		065-035



