

Master Copy

ELECTRONIC MUSICAL INSTRUMENT

**ROLAND SYNTHESIZER
SH-3A**

**SERVICE
NOTES**

**THE 5th EDITION
Printed in Japan. '76. Apr.
APPLIED FROM SERIAL No.270800**

 **Roland**

ELECTRONIC MUSIC SYNTHESIZER MODEL SH - 3A

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/ \sphericalangle / \square / \sim /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 (TREMOLO)	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

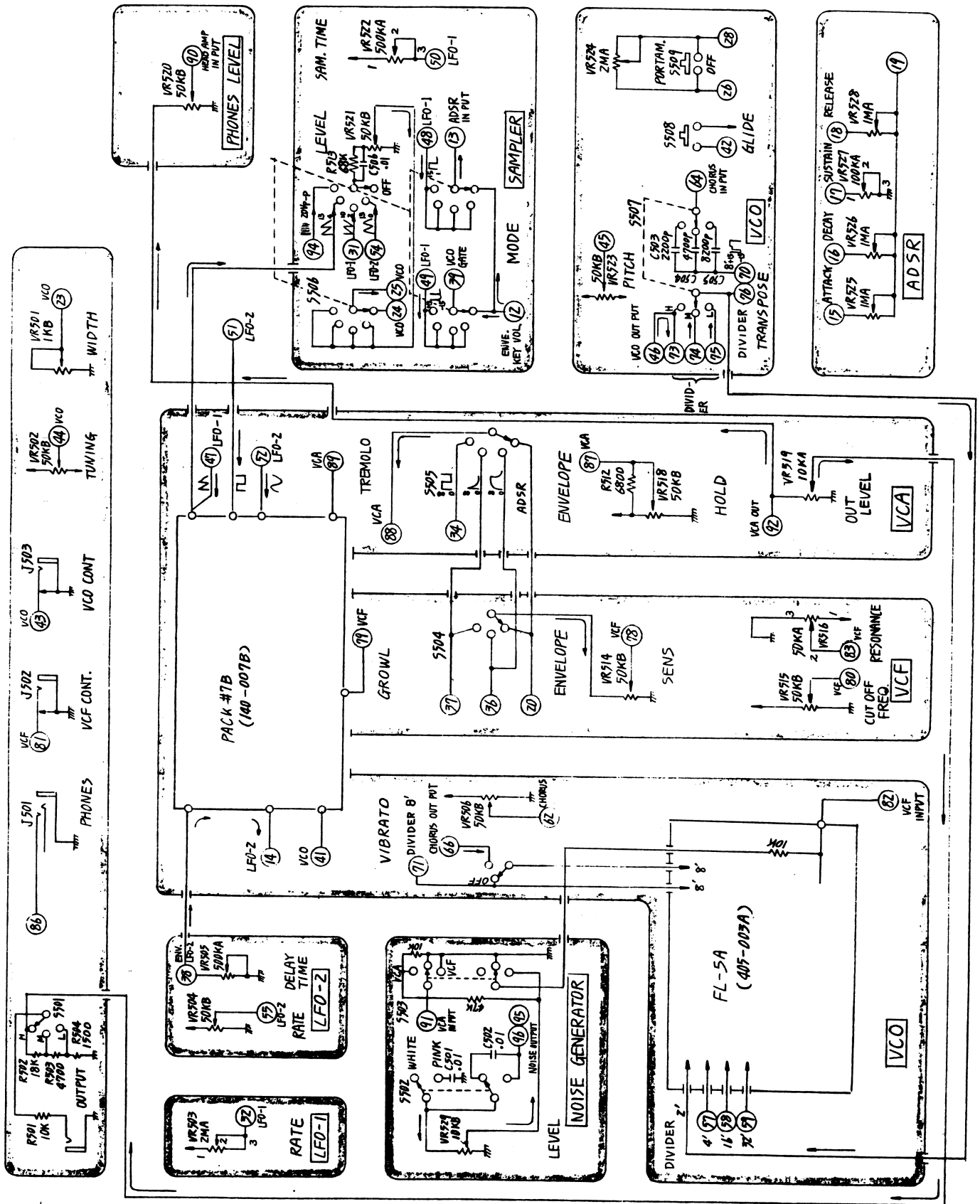
- * Power Source AC 100, 117, 220, 250V 50/60Hz
- * Power Consumption 9VA
- * Dimensions W ; 1005mm (40.2")
D ; 320mm (12.8")
H ; 150mm (6.0")
- * Weight(Net) 14.5 Kg (32 Lbs.)
- * Accessories Music Rack
Conection Cord
(2.5m with Pin-Plug Adaptor)
- ** Accessories(optional) Volume Control Pedal FV-1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

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

Note : Specifications changed from SH-3
VCF-VCA BOARD ASSEMBLY
Some Potentiometers
ADJUSTMENT

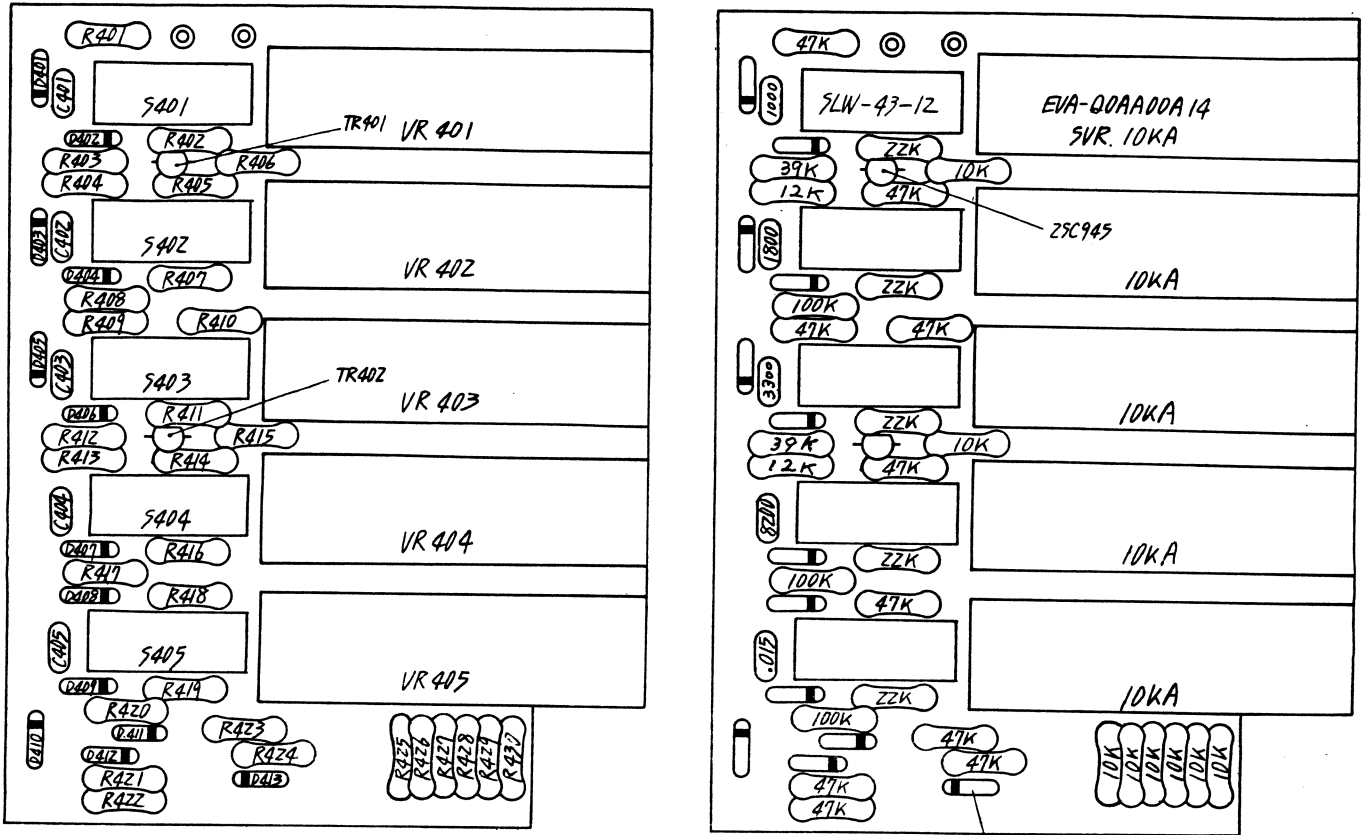
3. CONTROL CIRCUIT

3-1. Control Circuit Block Diagram

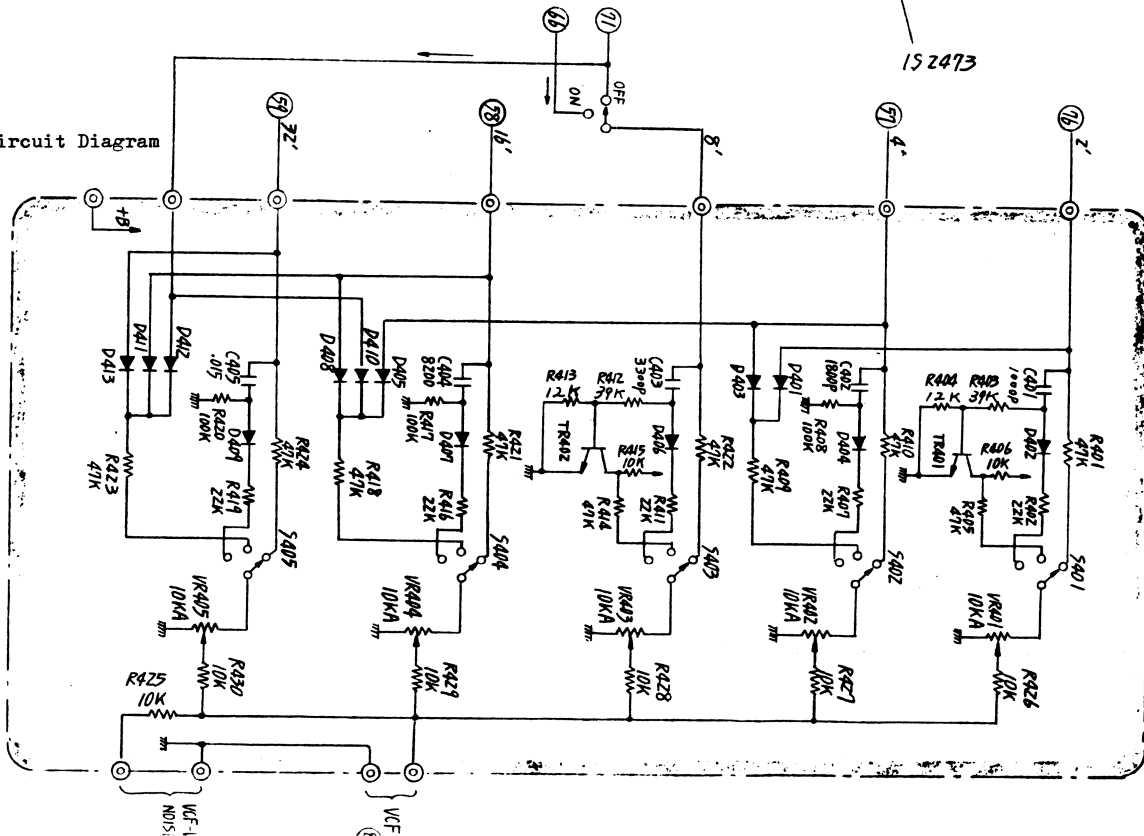


3-2 FILTER BOARD ASSEMBLY (FL-5) (Serial number XX2549 and below)

A. Parts Layout

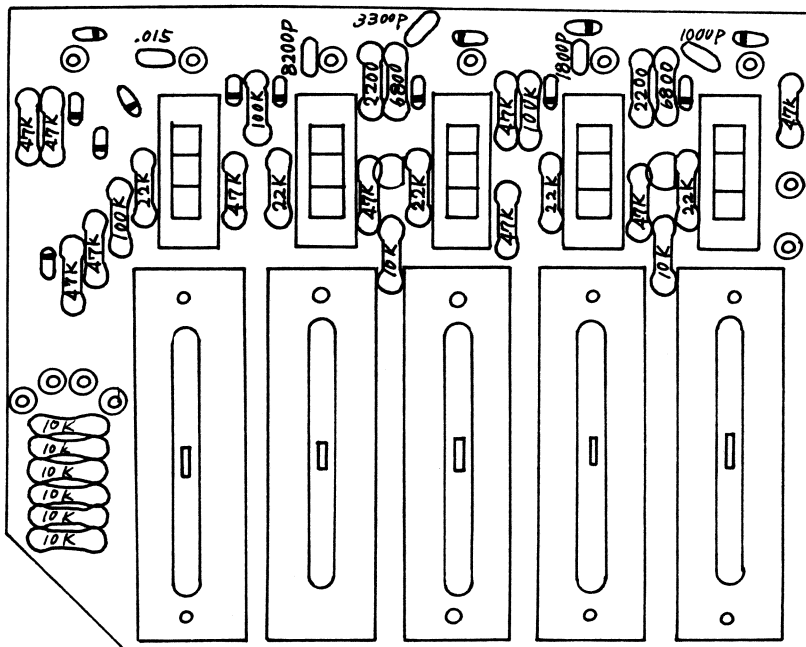
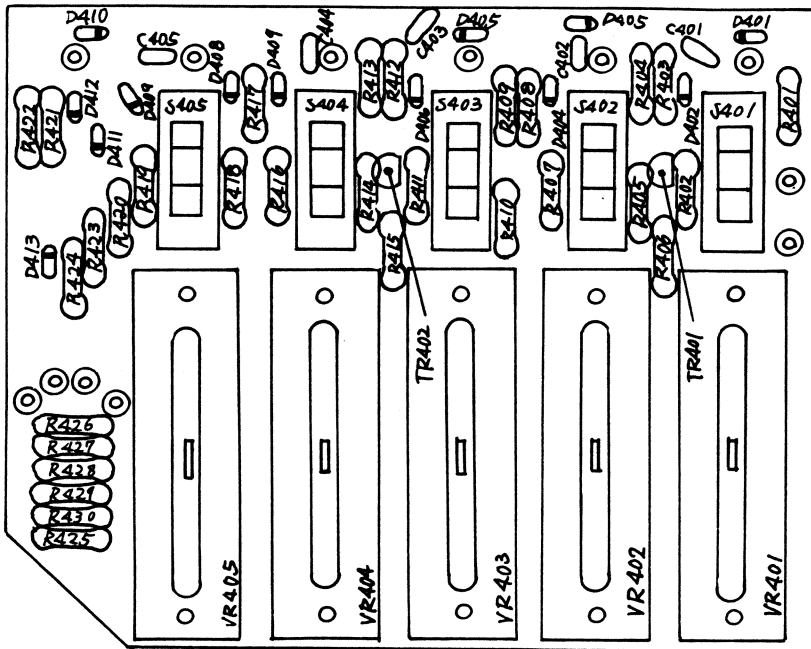


B. Circuit Diagram



3-2. FILTER BOARD ASSEMBLY (FL-5) (Serial number XX2550 and above)

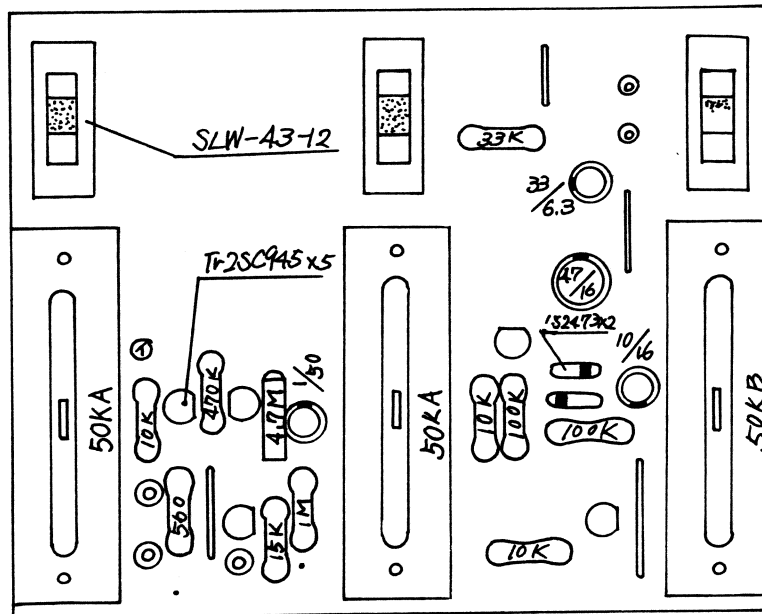
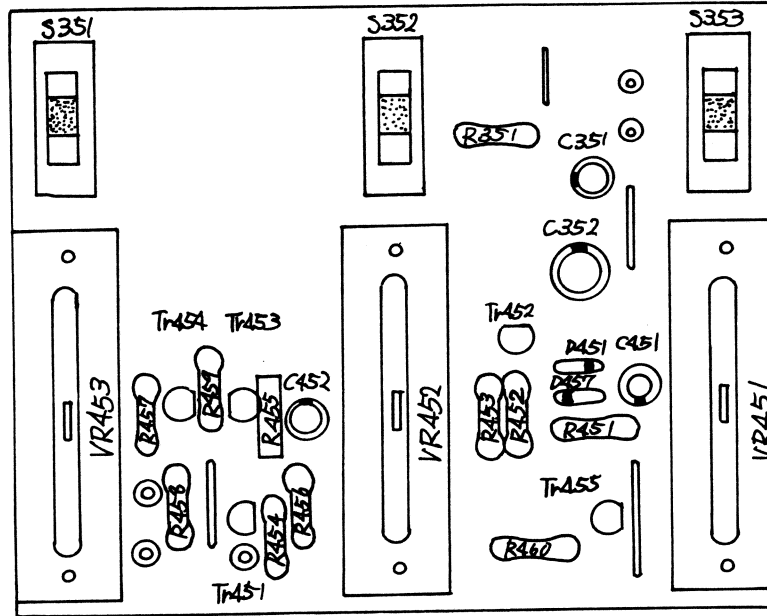
A. Parts Layout



Tr : 2SC945
 D : 1S2473
 SW : SLW-43-12
 VR : SVR 10K A
 EYA-Q0AA00A14

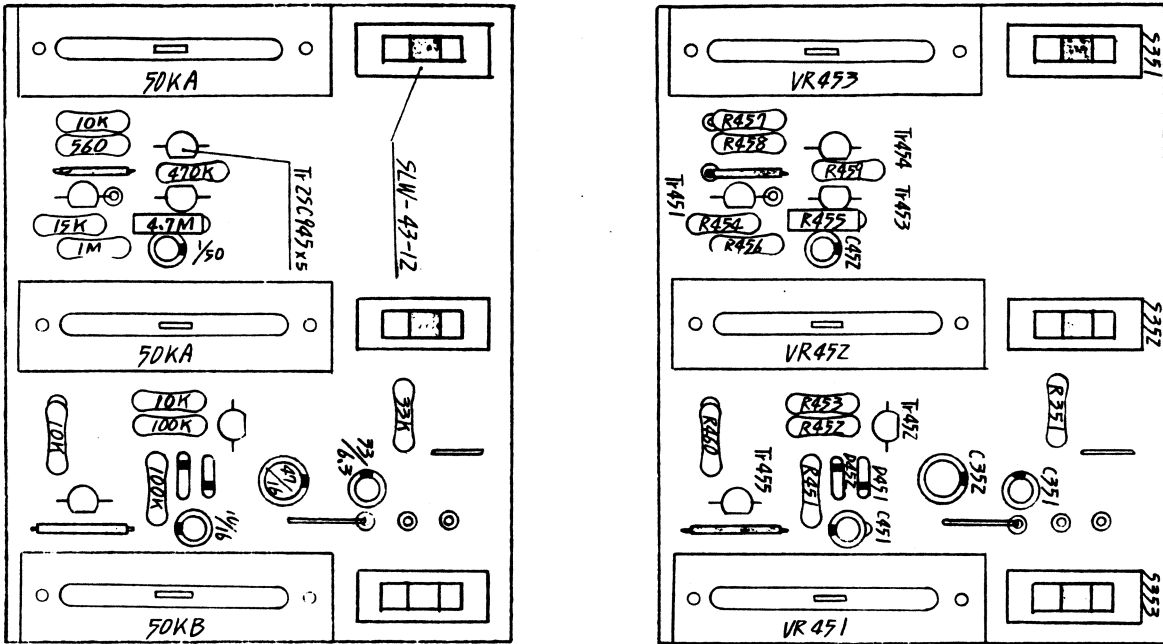
3-2. FILTER BOARD ASSEMBLY (FL-5) (Serial number XX2550 and above)

A. Parts Layout

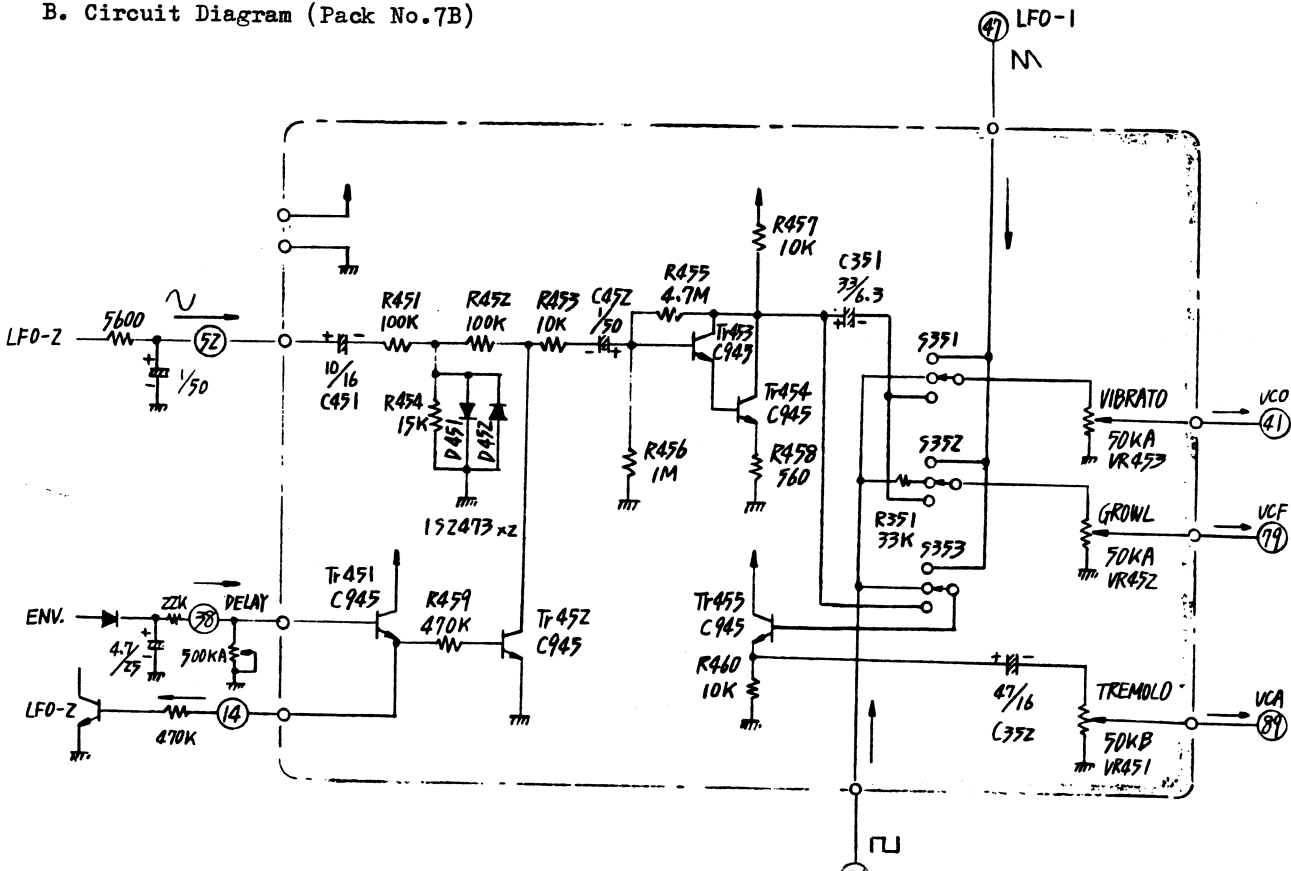


3-3. PACK No.7B ASSEMBLY (Serial Number XX2549 and below)

A. Parts Layout



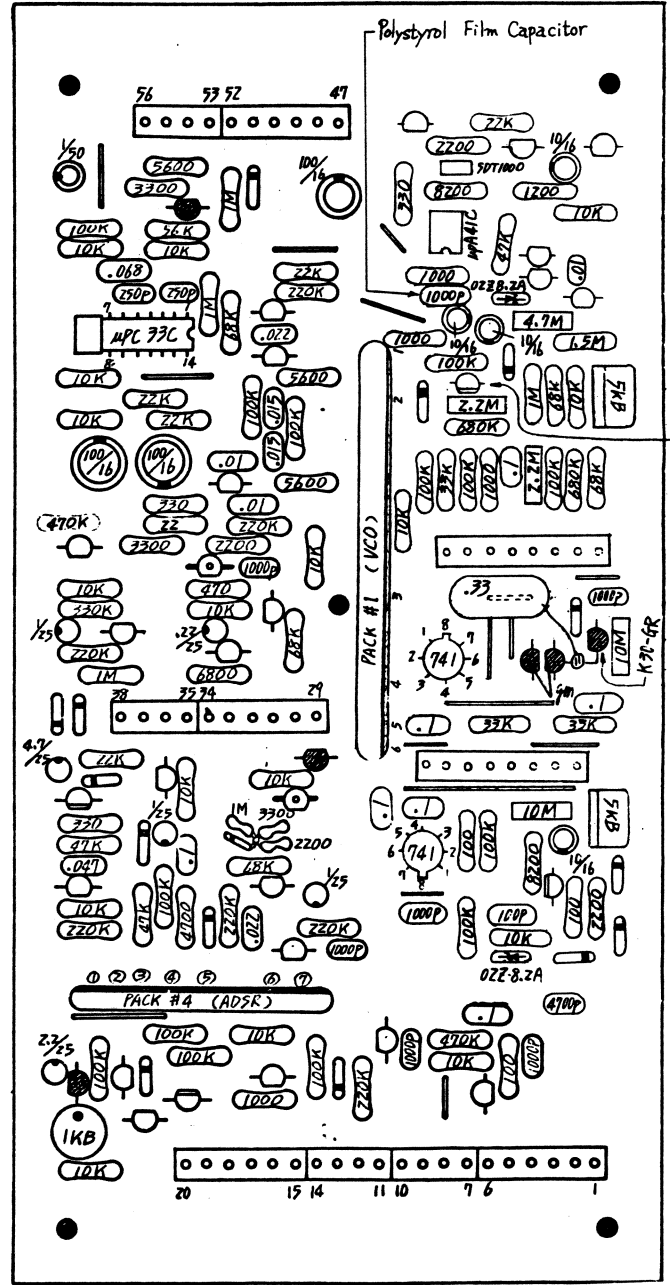
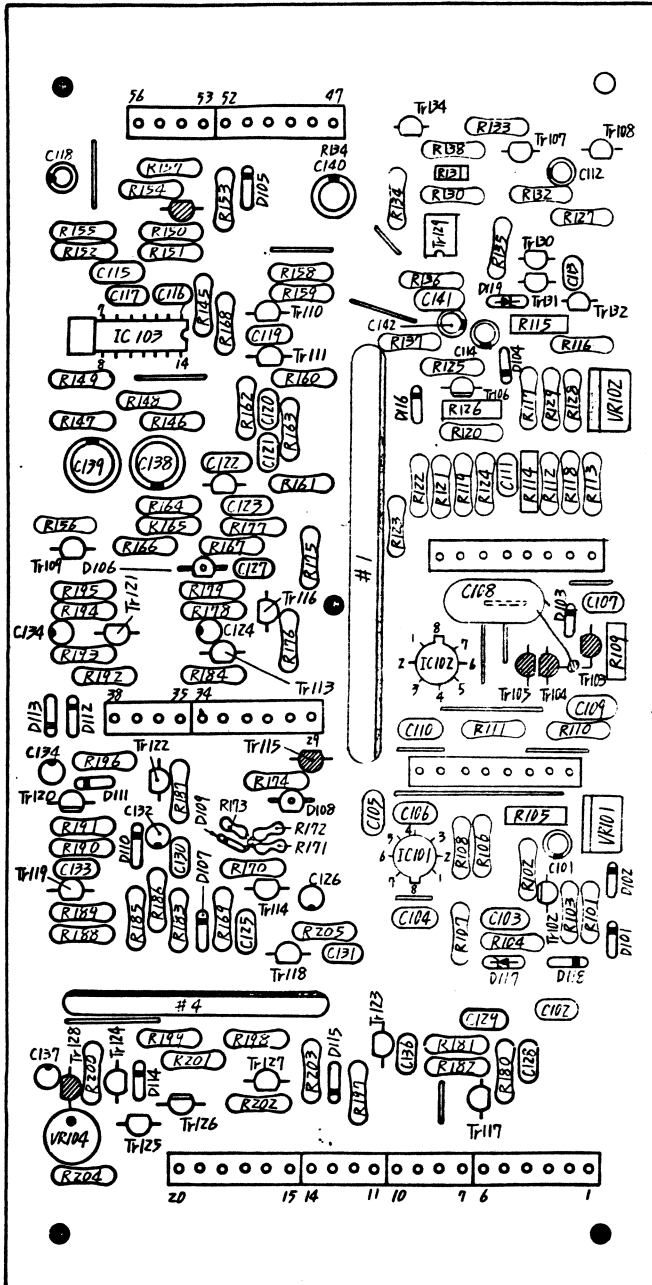
B. Circuit Diagram (Pack No.7B)



4. VCO CIRCUIT

4-1. VCO PULSE BOARD ASSEMBLY (OP-9A) (Serial Number XX2399 and below)

A. Parts Layout



- Tantalum Capacitor
- Tr. 25A733 P or Q
- Tr. 25C945 P or Q
- PUT. N13T Z
- FET. 25W30A-Y
- D. 152493
- Electrolytic Capacitor

OP-10 MODE GEN.

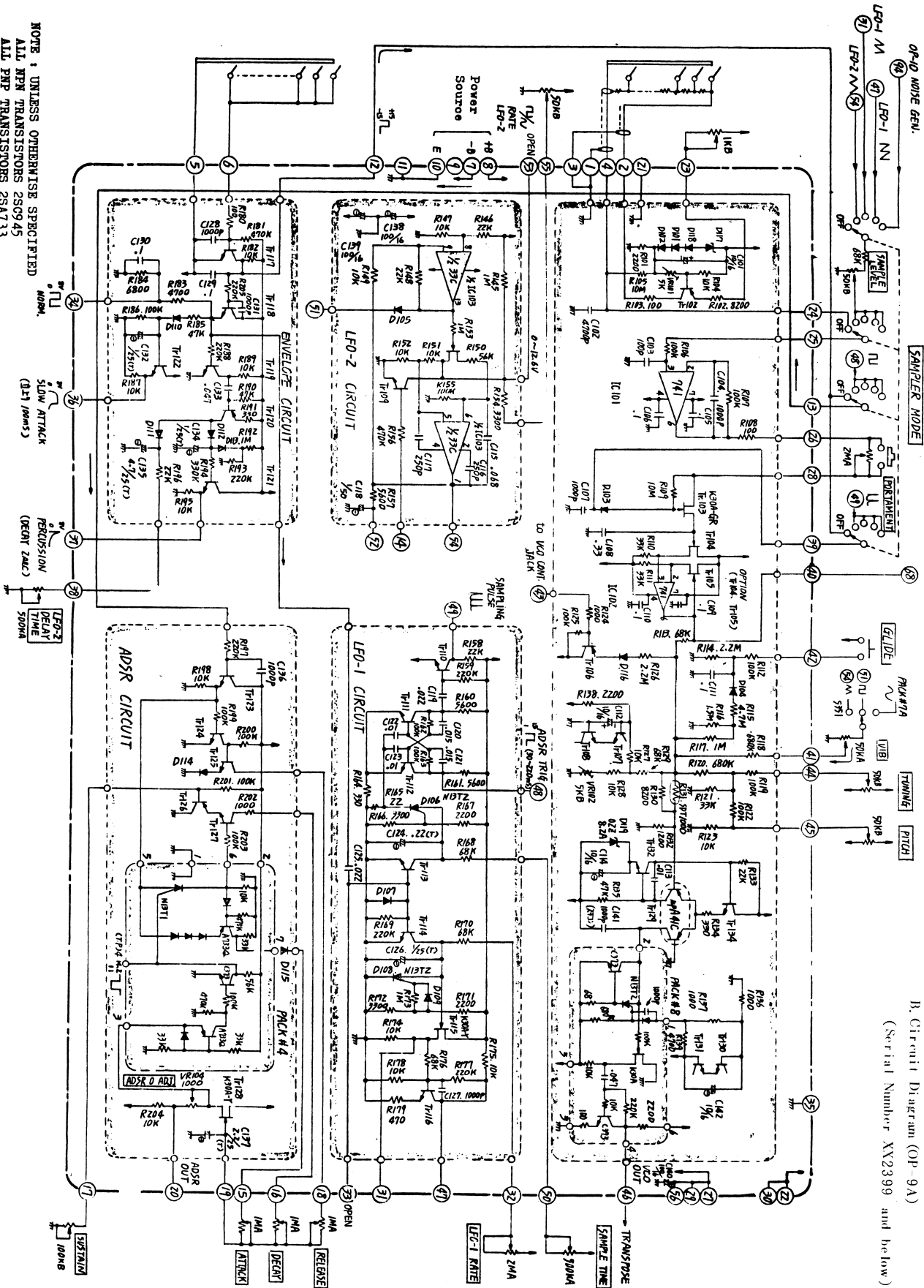
SAMPLER MODE

GLIDE

TUNING

B. Circuit Diagram (OP-9A)

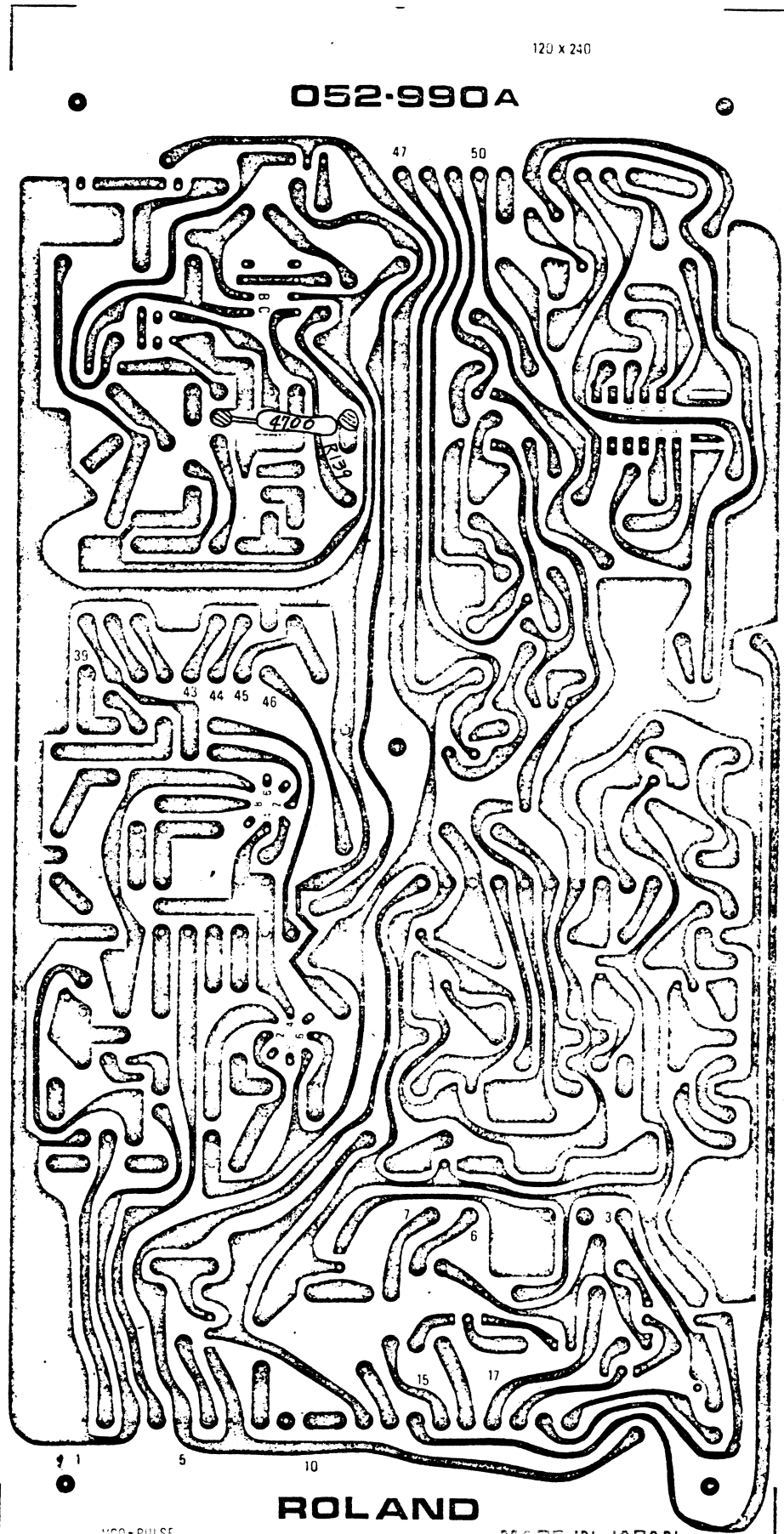
(Serial Number XY2399 and below)



NOTE: UNLESS OTHERWISE SPECIFIED
 ALL RPN TRANSISTORS 2SG945
 ALL PNP TRANSISTORS 2SA1733
 ALL DIODES 1S2473

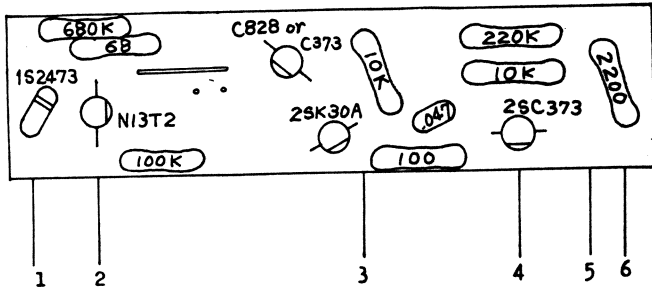
C. Rear side parts layout (OP-9A)

(Serial Number XX2549 and below)

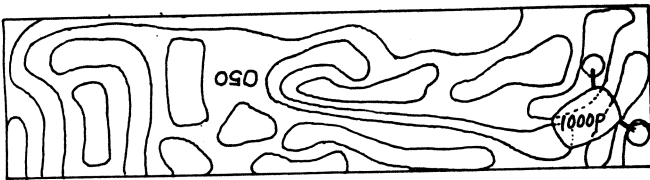


4-2. PACK No.8 ASSEMBLY

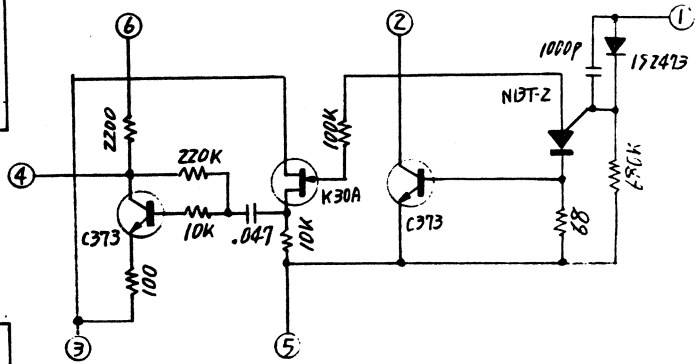
A. Parts Layout



B. Rear side (PACK No.8)



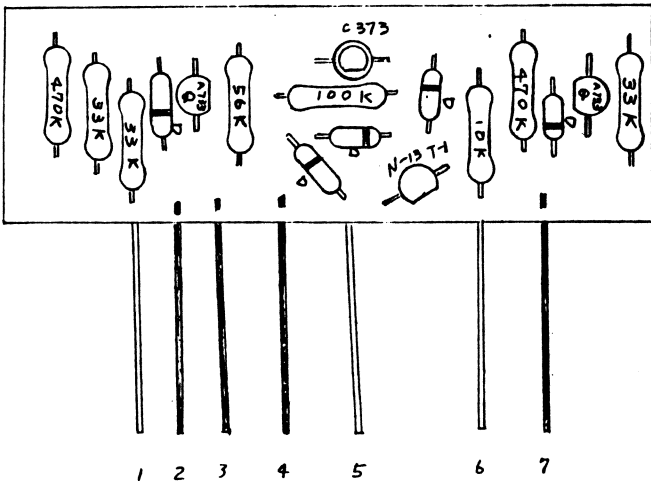
C. Circuit Diagram (PACK No.8)



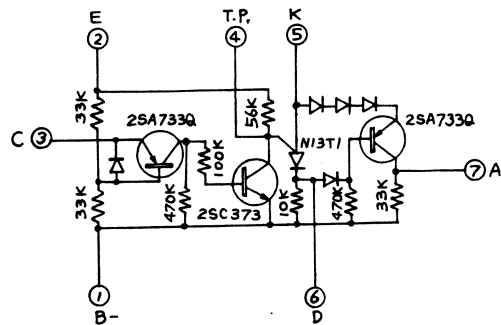
D : 1S2473

4-3. PACK No.4 ASSEMBLY

A. Parts Layout

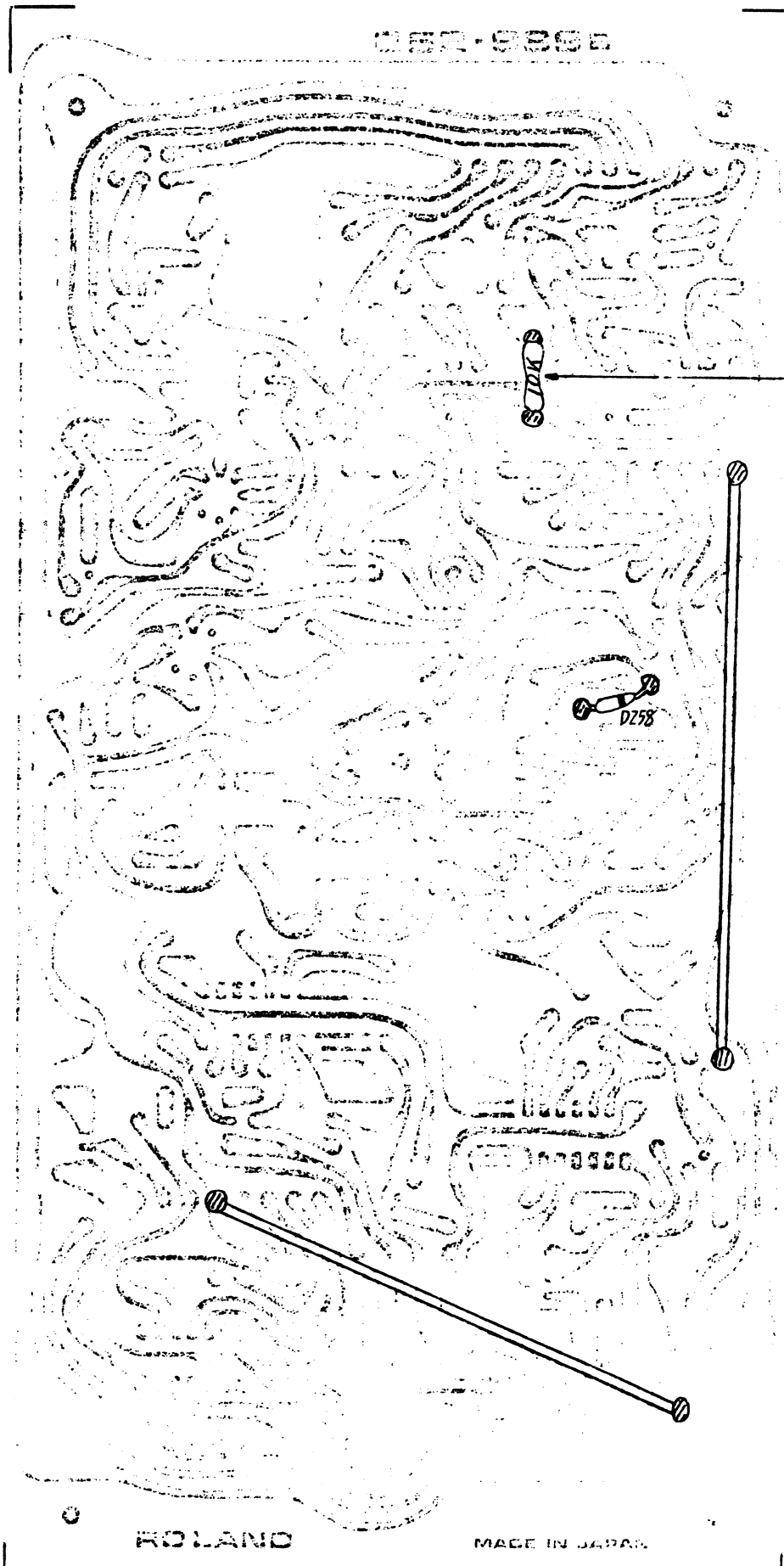


B. Circuit Diagram (PACK No.4)



D : 1S2473

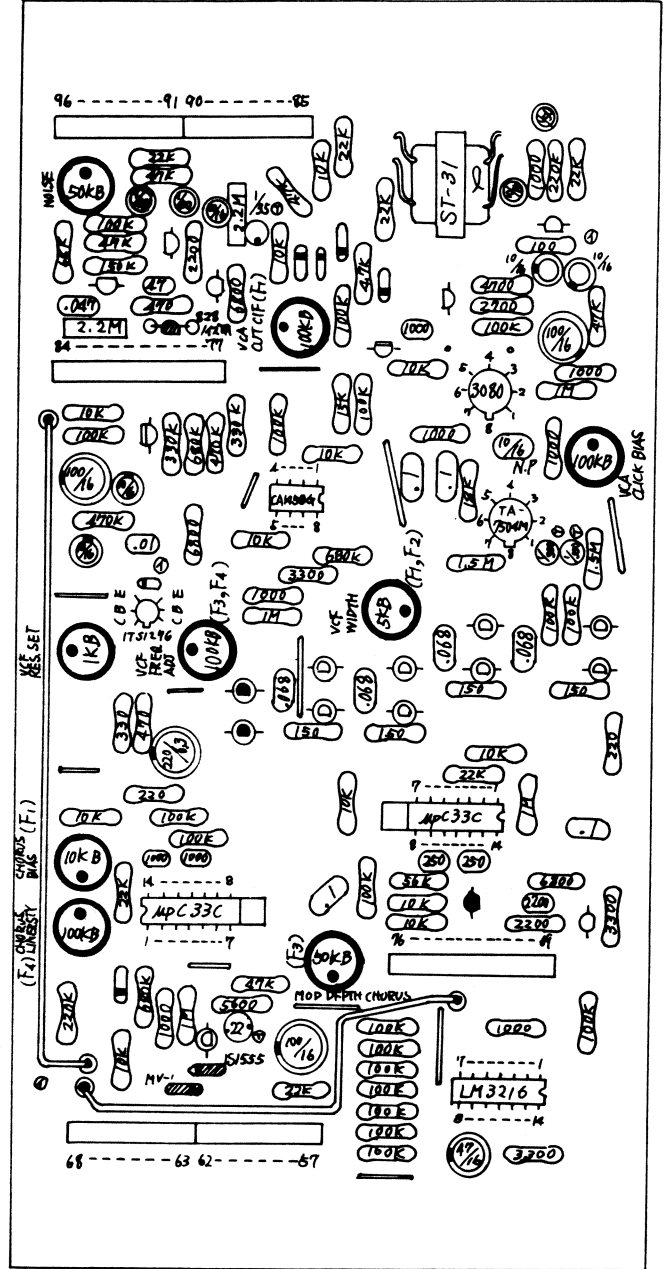
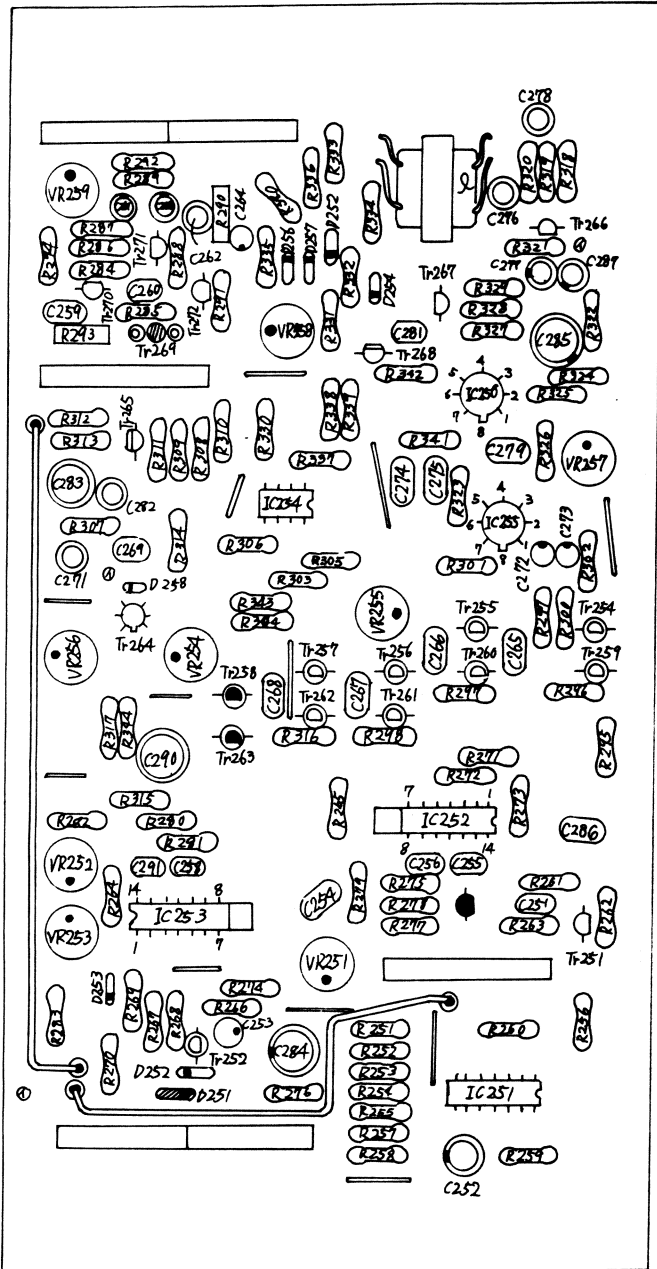
B. Rear parts layout(OP-10B) (Serial Number XX2549 and below)



5. VCF-VCA CIRCUIT

5-1. VCF-VCA BOARD ASSEMBLY (OP-10B) (Serial Number XX2550-XX3049 inclusive)

A. Parts Layout

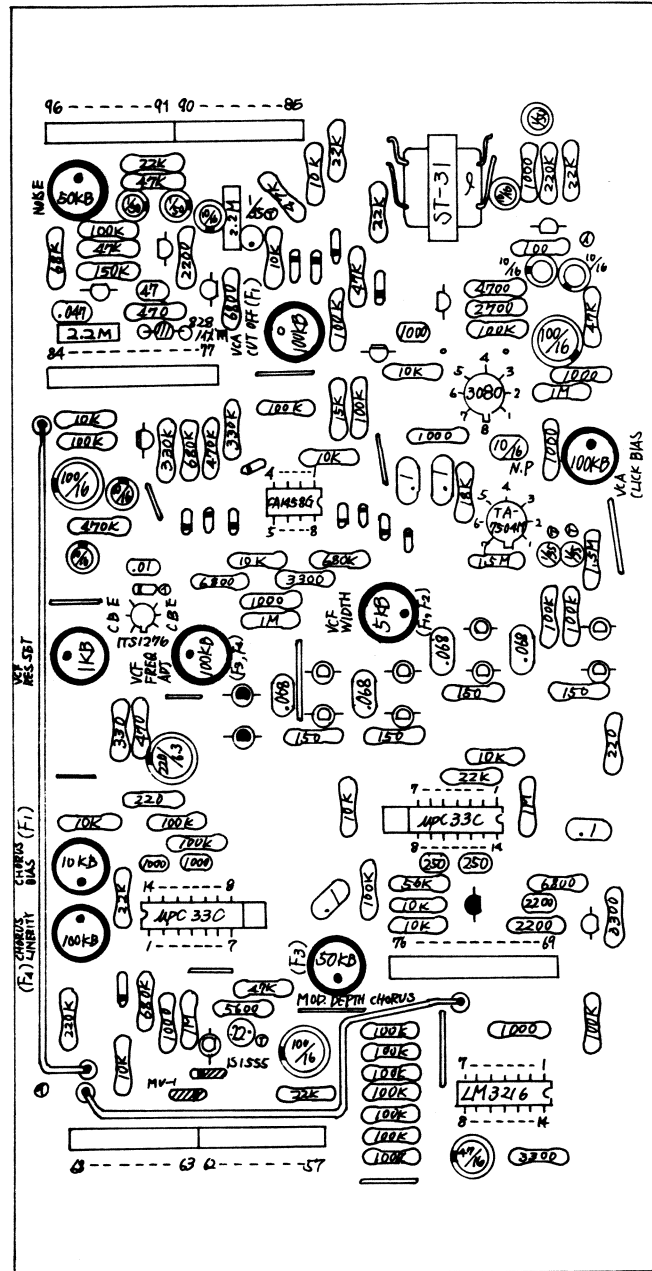
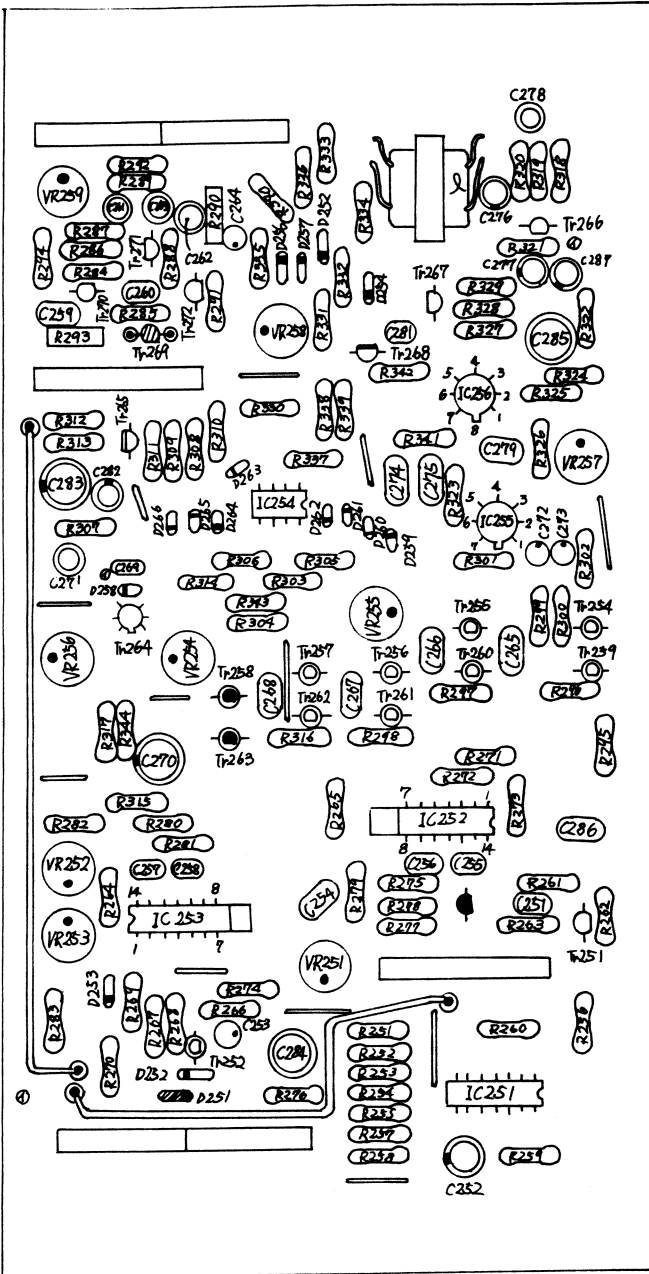


- | | | | |
|--|-------------|--|-------------------|
| | 25C 1000 GR | | 25A733 |
| | 25C 945 | | 152473 |
| | 25K39A-Y | | 25C1000 GR OPTION |

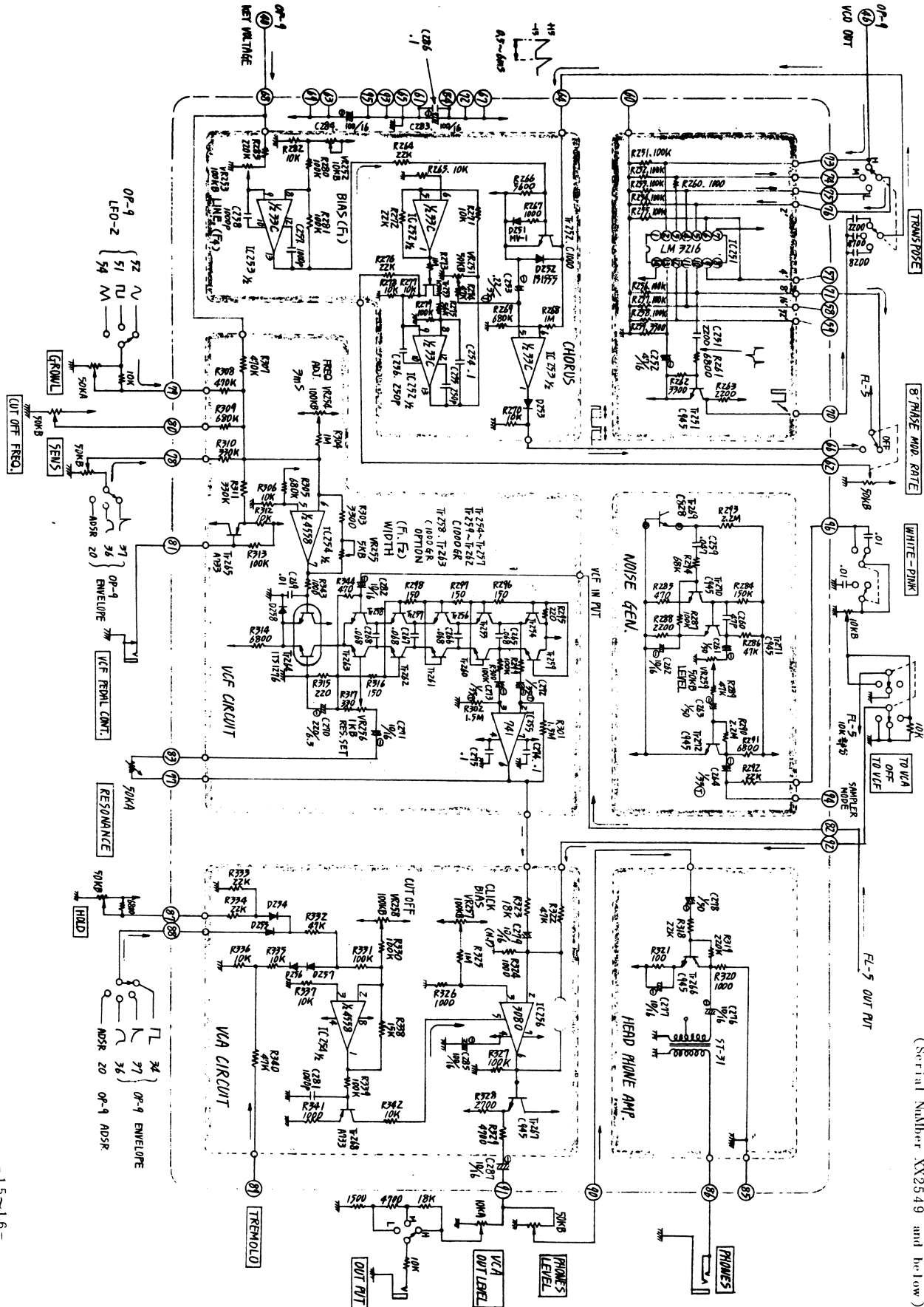
5. VCF-VCA CIRCUIT

5-1. VCF-VCA BOARD ASSEMBLY (OP-10B) (Serial Number XX3050 and above)

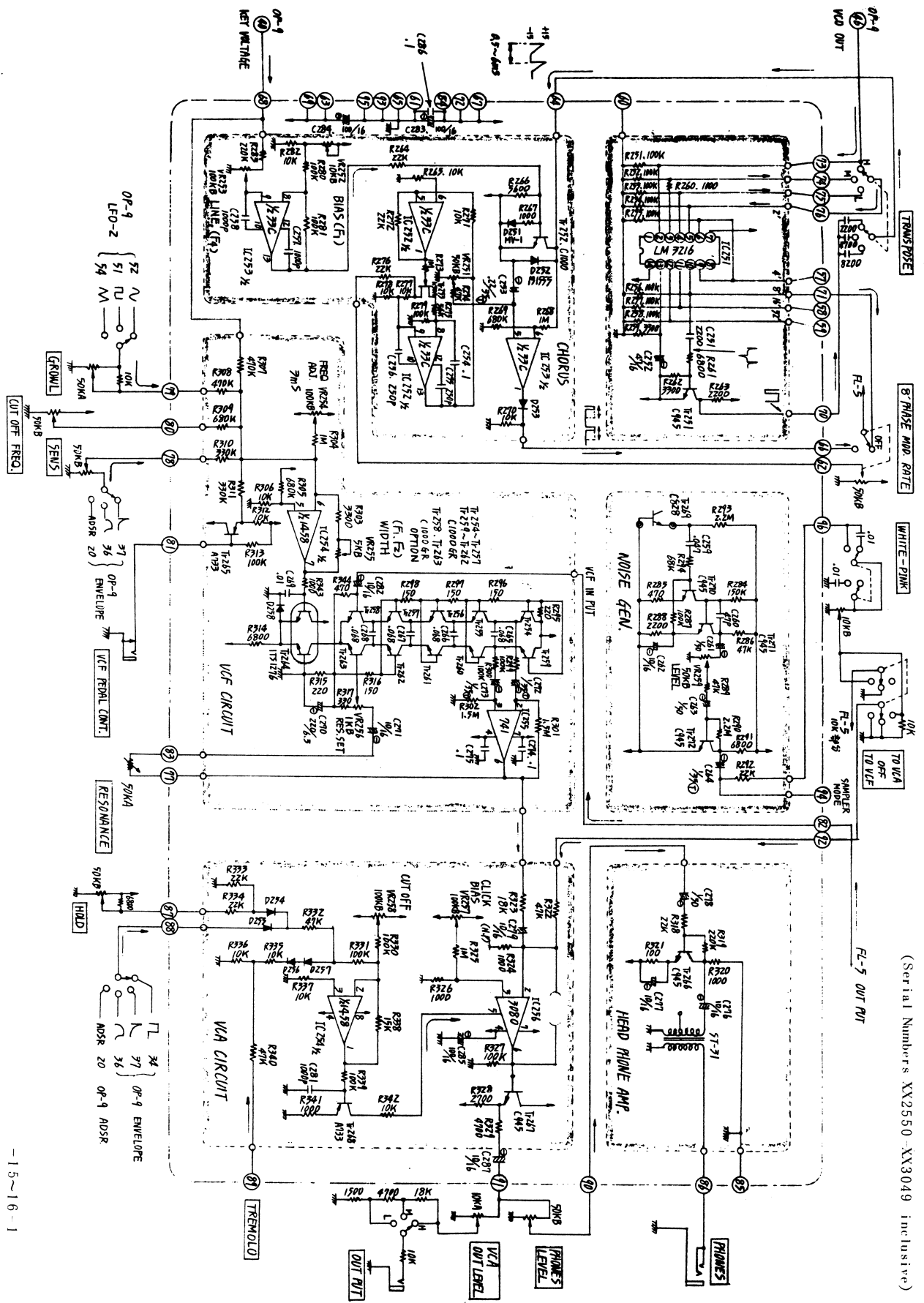
A. Parts Layout



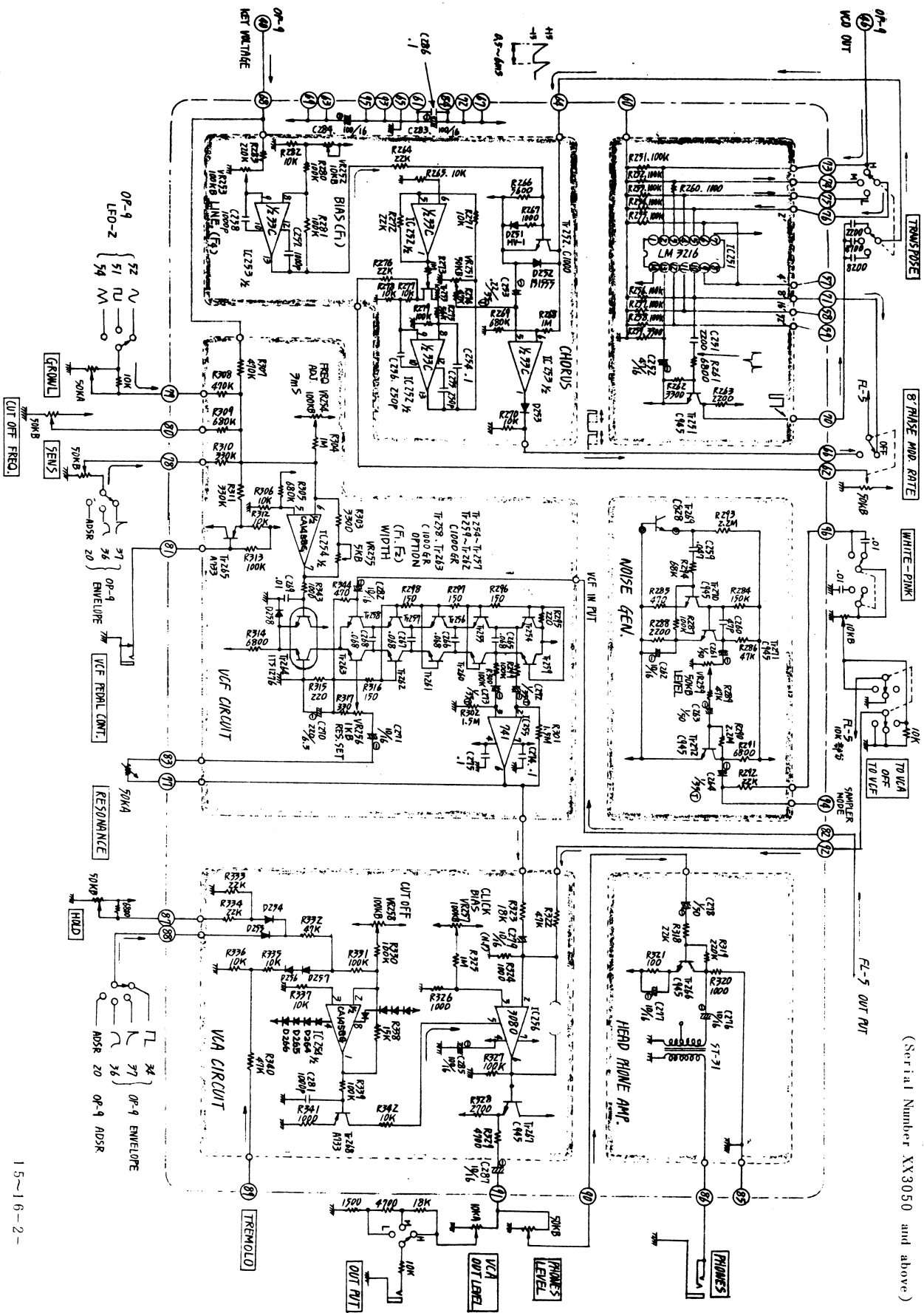
- ⊙ 25C 1000 GR
- ⊙ 25C 495
- 25K30A-Y
- ⊕ 25A733
- ⊕ 1S2473
- ⊕ 25C1000 GR OPTION



C. Circuit diagram (OP-10B)
 (Serial Number XX2549 and below)



C. Circuit diagram (OP-10B)
 (Serial Numbers XX2550-XX3049 inclusive)

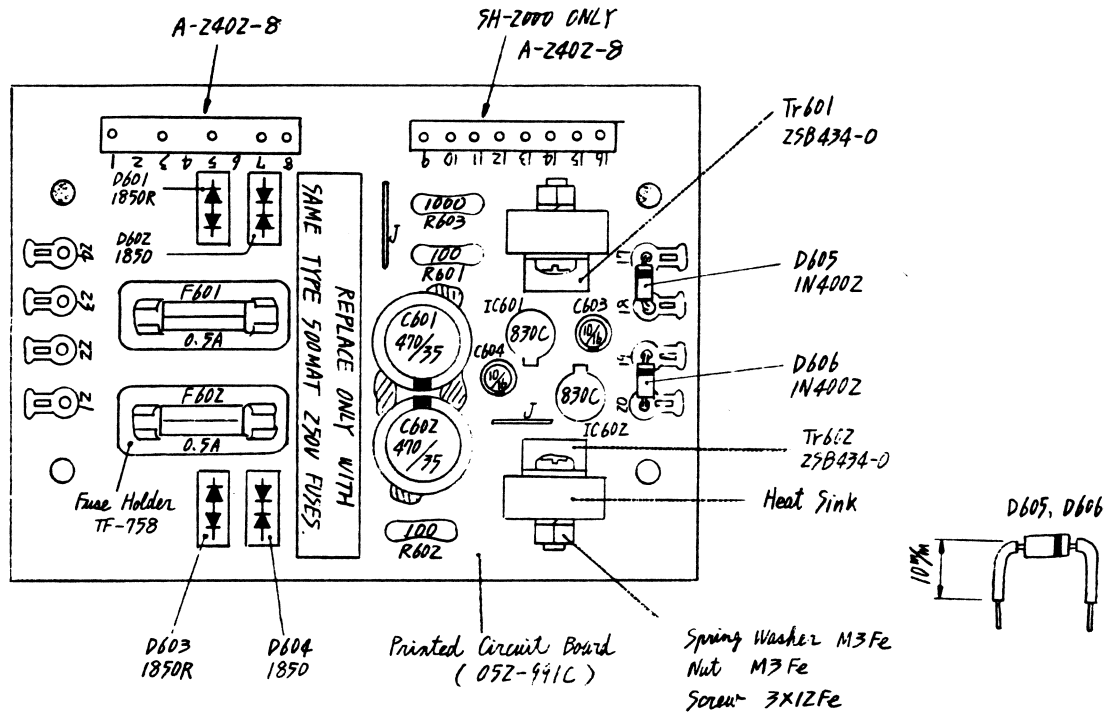


G. Circuit diagram (OP-10B)
 (Serial Number XX3050 and above)

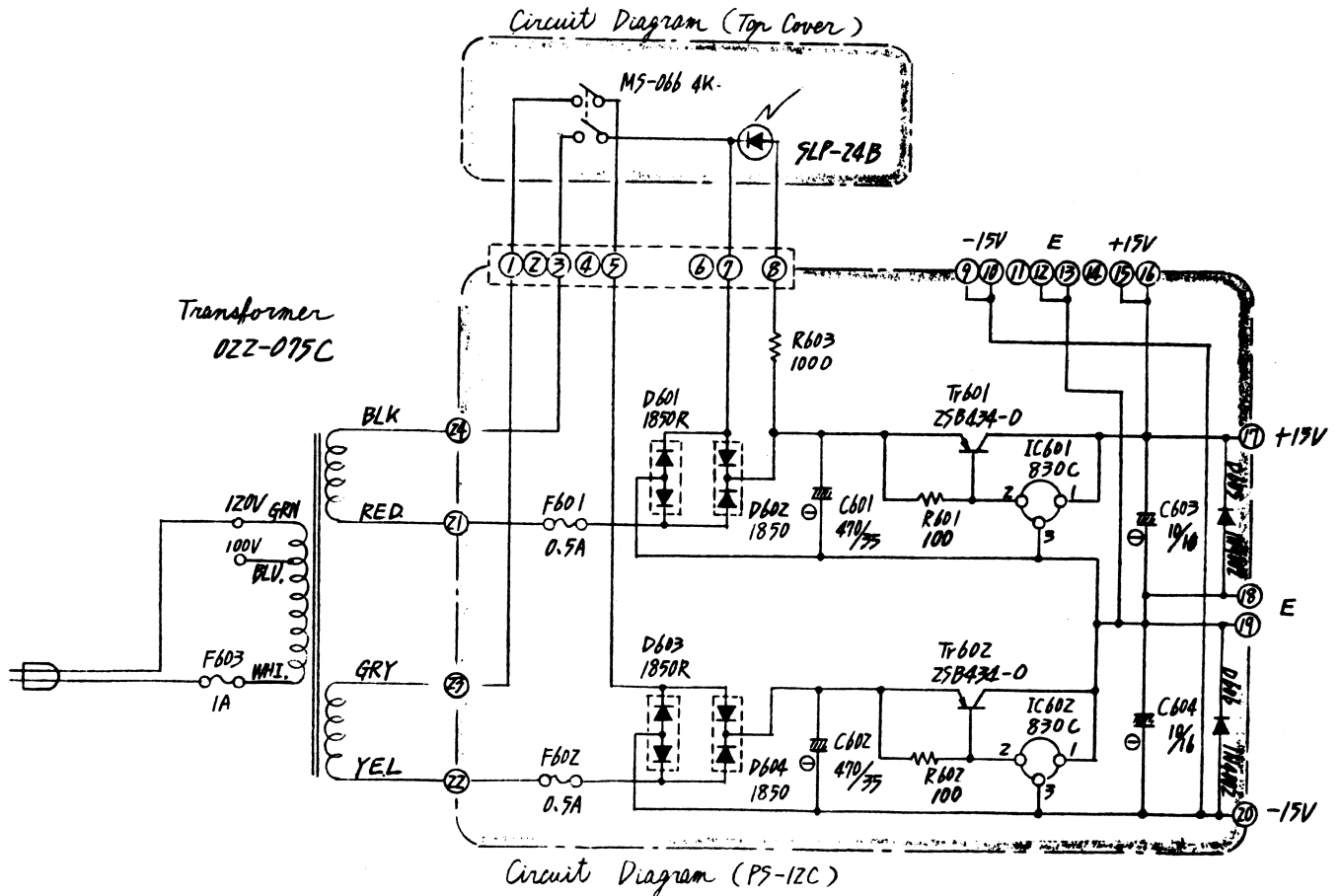
6. POWER SUPPLY CIRCUIT

6-1. POWER SUPPLY BOARD ASSEMBLY (PS -12C)

A. Parts Layout



B. Power Supply Circuit Diagram (PC-2B)



7. ADJUSTMENT

7-1. Preparation (Operation Check and Preadjustment)

(1) Position the control and switches as follows



VCO 8'	.....	10
VCF CUTOFF FREQ.	.....	10
VCA HOLD	.....	10
TRANSPOSE	.....	M
Phones Level	} Optimum Audio	
Output Level		

(2) If any note does not come out, adjust VR258(VCA CUTOFF) and VR254 (VCF FREQ.) so that the note is audible.


7-2. VCO TUNING

- (1) Connect a frequency counter to the 71st terminal on OP-10B.
- (2) Set the PITCH on the control panel at 0 position, and TUNING and WIDTH on the rear panel to the center position.
- (3) Depress the F1 key and tune its frequency to 174.61Hz by VR102.
- (4) Depress the F4 key and tune its frequency to 1396.9Hz by VR101.
- (5) Repeat steps (3) and (4).
- (6) Check the frequency of the F2(349.23Hz) and the F3(698.46Hz).
- (7) Check the following (effects)
 - a) PORTAMENTO ON/OFF
 - b) GLIDE Button and GLIDE PEDAL
 - c) PITCH, TUNING and WIDTH

7-3. VCA Adjustment

- (1) Adjust the HOLD control to set the 87th terminal(OP-10B) voltage at 1 volt.
- (2) Connect the oscilloscope to the 91st (OP-10B).
Set all the waveform selector switches at  position and VCO controls to maximum position.
- (3) Adjust VR258(CUTOFF) so as to get the no output waveform on the scope.
- (4) Turn the HOLD fullclockwise.
- (5) Lower the VCO  knobs except 8' to minimum position, and confirm the output level of 2Vp-p. If not, adjust VR258 within the condition of step(3).

7-4. CLICK BIAS adjustment

(1) Setting	VCO	.....	all 0
	HOLD	.....	10
	VCA ENVELOPE	.....

(2) Adjust VR257(CLICK BIAS) so that no pulse waveform is seen on the scope, repeating switch ON/OFF a key.

7-5. RESONANCE Adjustment

- (1) Setting VCO all 0
 CUTOFF FREQ. 5
 RESONANCE 8

Adjust VR256(RES SET) to get VCF oscillation, and then turn back the VR until the oscillation may just go off.

7-6. ADSR ZERO Adjustment

- (1) Adjust VR104(ADSR 0 ADJ.) to set the 20th terminal(OP-9A) voltage at 0 volt.

7-7. VCF OCTAVE Adjustment

- (1) Setting VCO all 0
 CUTOFF FREQ. 5
 RESONANCE 10

(2) While depress F2 key and F3 key alternately, adjust VR255(VCF WIDTH) to get one octave difference between F2 and F3.

- (3) Setting CUTOFF FREQ. 0
 Depressing the C4 key, adjust VR254(FREQ.ADJ.) to set its frequency at 348Hz.

(4) Stepping (2) affects one octave difference between F2 and F3, so repeat step (1) and (2).

7-8. CHORUS Adjustment

(1) Connect the scope to the 64th on OP-10B.

- (2) Setting 8' ON
 VCO 8' Control 10

(3) While holding the F1 key down, adjust VR252(BIAS) so that the output waveform looks like the figure.

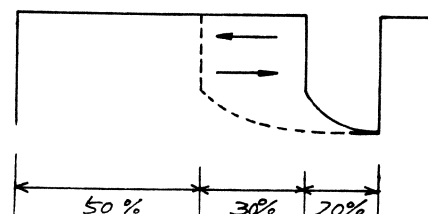
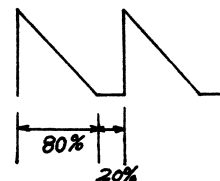
(4) While holding the C4 key down, adjust VR253(LINEARITY) as the same way as step (2).

(5) Connect the scope to the 66th on OP-10B.

- Setting CHORUS 2 - 3

Adjust VR251(MOD DEPTH) so that the waveform seen on the scope may be sailling and shuttling as shown in the figure.

However, the waveform height shouldn't be less than 1/2 of Max.



7-9. NOISE Adjustment

Connect the scope to the 91st on OP-10B.

Adjust VR259(NOISE) so as to get the NOISE output may reach 4Vp-p.



8. PARTS LIST

SH-3A PARTS LIST

*GENERAL ASSEMBLY

cabinet (Complete)
Control Chassis Assembly
Top Cover Assembly

004-002	Keyboard Assembly	SK-142A
	Connector Housing	2145-6C
064-030	Holder	No.30
064-024	"	No.24 (Common with EP-10)
101-018	Felt	No.18 30 x 610 x 1.5 Black
091-997A	Side Block	No.997A(Common to left and right)
*CABINET ASSEMBLY		
081-992	Cabinet	} including the following parts
081-993A	" (Lid)	
	Lock	P-11A(Cr)
	Hooking Hinge	T-32(Cr)
	Handle	H-26(Black)
	Foot-Rubber	G-7
065-007	Lid (Rear, Cord Box)	No.7
074-025	Badge	No.25
	Speed Nut (for Badge)	M2
047-018	Clamp	No.18

*CONTROL CHASSIS ASSEMBLY

145-005	Filter Board Assembly	FL-5A
149-009A	VCO Pulse Board Assembly	OP-9A
149-010B	VCF-VCA Board Assembly	OP-10B
140-007B	VIB Pack No.7B	BX-7B
072-060A	Panel	No.60A(Rear Panel)
072-960A	"	No.960A(Control Panel)
061-989	Chassis	No.989 1.0t SPC-1
064-996	Holder	No.996 " (for width)
064-993	"	No.993 " (for PCB)
065-996	Cover	No.996 2.0t Black Sponge
065-994	"	No.994 "
065-049	"	No.49 2.0t Grey Sponge
065-034	"	No.34 " Black
	Output Transformer	ST-45 or ST-31 (on OP-10B)
016-021	Knob	TK-1114 (serrated, screw fixing)
016-003	"	No.3 (for Slide Potentiometer)
063-001	Plate	No.1
001-018	Slide Switch	SW321
001-064	Lever Switch	ESL-2412 (on-off-on)
001-065	"	ESL-2411 (On-Off)
001-049	Push Switch	No.44 Red
009-001	Jack	SG7615 No.5
009-002	"	LJ-039-1-6
121-005	Jack Washer	BSP 1.6t Ni
068-005	Insulation Bushing	No.5 Black
042-009	Lug Terminal	2L-6P
120-007	Long Nut	No.7 M3 x 52
	Connector Housing	2145-4C
	"	2145-6C
	"	2145-8C
068-019	Rubber Bushing	No.19
121-001	Aluminum Washer	8d (for Potentiometer)

SH-3A PARTS LIST

*TOP COVER ASSEMBLY

065-997	Top Cover	No.997
001-053	Power Switch	MS0664K Black
	Light Emitting Diode	SLP-24B
062-004	Bracket lens	No.4
	Speed Nut spring nut	M8
068-011	Bushing(for Music Rack)	No.11
064-995	Holder	No.995
	Connector Housing	2145-8C

*POWER SUPPLY ASSEMBLY PC-2B

146-012C	Power Supply Board Assembly	PS-12C
061-988B	Chassis	1t SPC-1
022-075	Power Transformer	No.75C (100-120V) No.75D(220-250V)
053-021	AC Cord	(3M)
047-001	Cord Binder	No.11
047-019	Cord Bushing	R-5
121-031	Washer	No.31
042-004	Lug Terminal	2L-4P
008-037	Wired in Fuse (Pig tail)	1A
010-019	Connector Housing	2145-4C
064-033	P.C.B. Holder	LCBS-4N
	Heat Sink	No.18

*VCO PULSE BOARD ASSEMBLY OP-9A

140-008	VCO Pack	No.8
140-004A	ADSR Pack	No.4
	Connector Wafer Pin	A2461-4C
	"	" -6C
	"	" -8C

*OTHERS

001-057	Slide Switch	SLW43-12P
001-054	Rotary Switch	ESR-E123K(R)20A K- serrated shaft
001-055	"	ESR-E114K(R)20B
001-056	"	ESR-E245K(R)20B
008-024	Midget Fuse	.5A
012-003	Fuse Holder	TF-758
020-014	IC	830C
020-010	IC	741 or TA7504M
	IC	uPC33C (020-059 uPC-1016 substitutive)
	IC	uPA41C (IT-132 020-055 substitutive)
020-015	IC	CA3080
020-007	IC	LM3216
017-013	Silicon Transistor	2SC945 P or Q
017-012	"	2SA733 "
017-046	"	2SC828 (for Noise)
017-003	"	2SC1000 GR
017-048	"	2SC1000 (Selected)
017-011	"	2SC373
017-022	"	2SB434 0
020-021	Pair Transistor	ITS1276
017-018	PUT	N13T1
017-019	PUT	N13T2
017-014	FET	2SK30A Y
	FET	2SK30A GR or Y (Selected)
018-015	Thermister	SDT1000
018-018	Diode	1N4002
018-005	"	1S1555
018-014	"	1S2473
018-008	"	02Z8.2A

SH-3A PARTS LIST

018-020	Diode	MV-1	
018-003	"	1850	
018-004	"	1850R	
	Potentiometer	1 Kohm(B)	EVR2OAS15B13
	"	50 Kohm(B)	EVCBOAK20B54 (V24L5N20KC-)
	"	50 Kohm(B)	EVCBOAS15B54 (V24L5N15R-)
	"	50 Kohm(B)	EVCBOHK20B54
	"	2 Mohm(A)	EVCBOAK20A26
028-035	Slide Potentiometer	50 Kohm(A)	EVAQOAA00A54 (EVAQOAC16-)
028-024	"	50 Kohm(B)	EVAQOAA00B54
028-036	"	100Kohm(A)	EVAQOAA00A15
028-038	"	500Kohm(A)	EVAQOAA00A55
028-039	"	1 Mohm(A)	EVAQOAA00A16
028-040	"	2 Mohm(A)	EVAQOAA00A26
	Trim Potentiometer	500 ohm(B)	EVL4XA00B52
	"	1 Kohm	EVL4XA00B13
	"	5 Kohm	PNB04C3A502V (for OP-9A)
	"	5 Kohm(B)	EVL4XA00B53
	"	10 Kohm(B)	EVL4XA00B14
	"	50 Kohm(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	"
044-098	Carbon Solid Resistor	4.7 ohm	ERC12GK4R7
	"	1.5Mohm	1/4 R J or ERC12GK
	"	2.2Mohm	ERC12GK
	"	4.7Mohm	"

SH-3A PARTS LIST

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

*MISCELLANEOUS PARTS

130-999A	Interior Packing Case	No.999A
132-087	Pat	No.87
132-088	Pat	No.88
092-999	Music Rack	092-999

NOTE : Be sure to confirm the serial number of them shown below before requirement.

Potentiometer	Knob	Rotary Switch	Serial Number
EVCBO□Š...	TK-1114	ESR-E123Ř...	XXX800 - XX949
EVCBO□Ķ...	TK-1114A	ESR-E123Ķ...	XXX950 - XX1599
EVCBO□Ķ...	TK-1114A		XX1600 - XX1829
	TK-1114 (for Rotary SW.)	ESR-E123Ř...	XX1600 - XX1829
EVCBO□Ķ...	TK-1114A	ESR-E123Ķ...	XX1830 -

* P.C.B. OP-10B (SH-3A) is not interchangeable with OP-10 (SH-3).

