

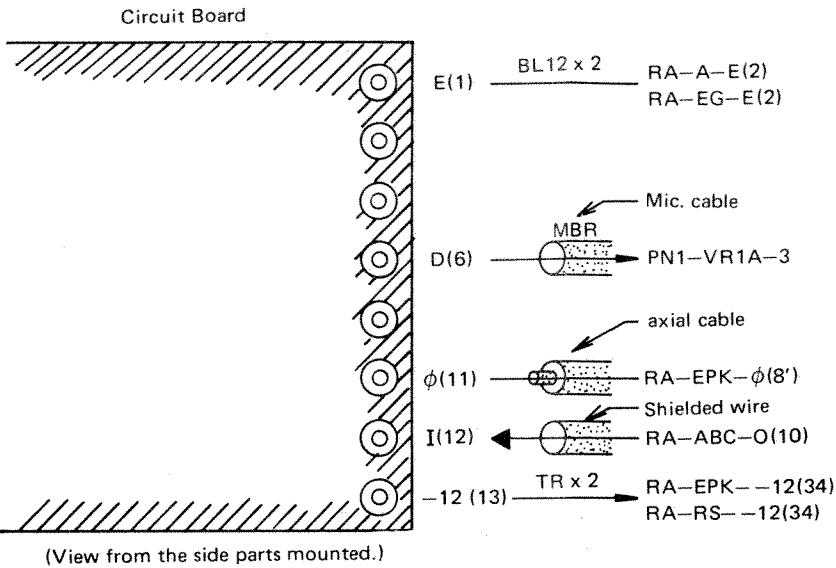
EXP PEDAL



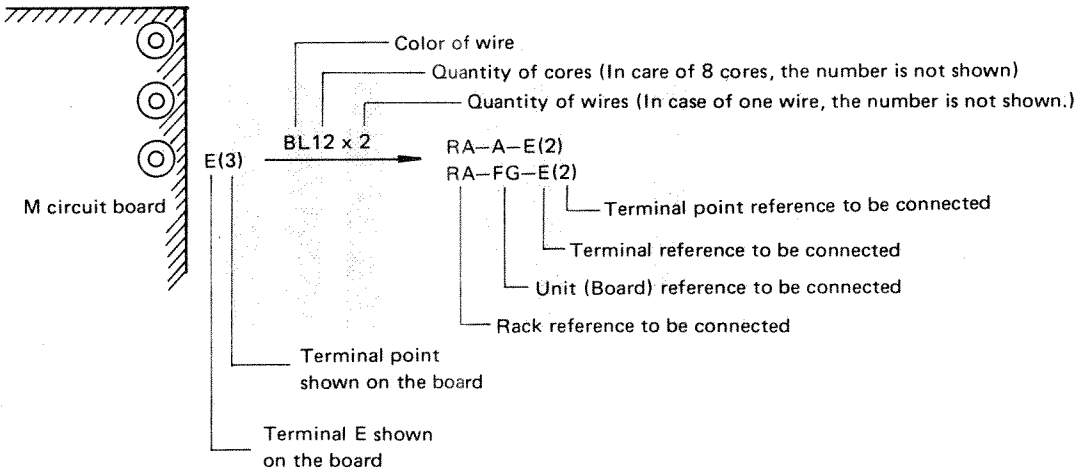
HEAD PHONE

CORDING GUIDE

CIRCUIT BOARD AND WIRING

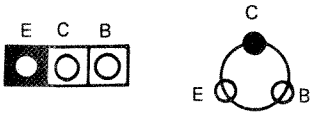


The coding system is as follows.



Two (2) black wires go from "E" of M circuit board to each "E" terminal of A and FG boards.

NOTE; Transistor.



E : Emitter
C : Collector
B : Base

NOTE: ABBREVIATIONS OF WIRE COLOR IN ELECTONE

BLBLACK	BRBROWN	RERED	ORORANGE
YEYELLOW	GRGREEN	BEBLUE	VIVIOLET
GYGRAY	WHWHITE	GGGRASS GREEN	SBSKY BLUE
PKPINK	TRTRANSPARENT	TP.TIN PLATED WIRE	

← CORDING GUIDE

SPECIFICATIONS

KEYBOARD

49 keys

TONE SELECTORS

String 1	Harpichord
String 2	Guitar 1
Brass 1	Guitar 2
Brass 2	Funky 1
Flute	Funky 2
Electric Piano	Funky 3
Clavichord	(Panel)

TONE CONTROLS

VCO Section

	(Saw tooth wave)
	(Pulse wave)
PW	(Pulse width)
PWM	(Pulse width modulation)
SPEED	
NOISE	

VCF Section

HPF	(High pass filter)
LPF	(Low pass filter)
RESH	(Resonance, high)
RESL	(Resonance, low)
IL	(Initial level)
AL	(Attach level)
A	(Attack time)
D	(Decay time)

VCA Section

VCA Level

~	(Sine wave)
A	(Attack time)
D	(Decay time)
S	(Sustain level)
R	(Release time)

EFFECT CONTROLS

Ring Modulator

Modulation
Speed
Attack Time
Decay Time
Depth

Touch Response

VCO
VCF
Brilliance
Level
Sub Oscillator
Function (, , , NOISE, EXTERNAL)
Speed
VCO
VCF
VCA
Sustain 1
Sustain 2
Portamento
Glissando
Resonance
Brilliance
Pitch
Transposition
Normal
1 oct up
1 oct down
2 oct down

OTHER FITTINGS

Head Phone Jack
EXT, IN

LEVEL CONTROL

OUT PUT JACK
(FOOT CONTROLLER)

CIRCUITRY

Power Consumption:	56W
Power Source	: 50/60 Hz, AC

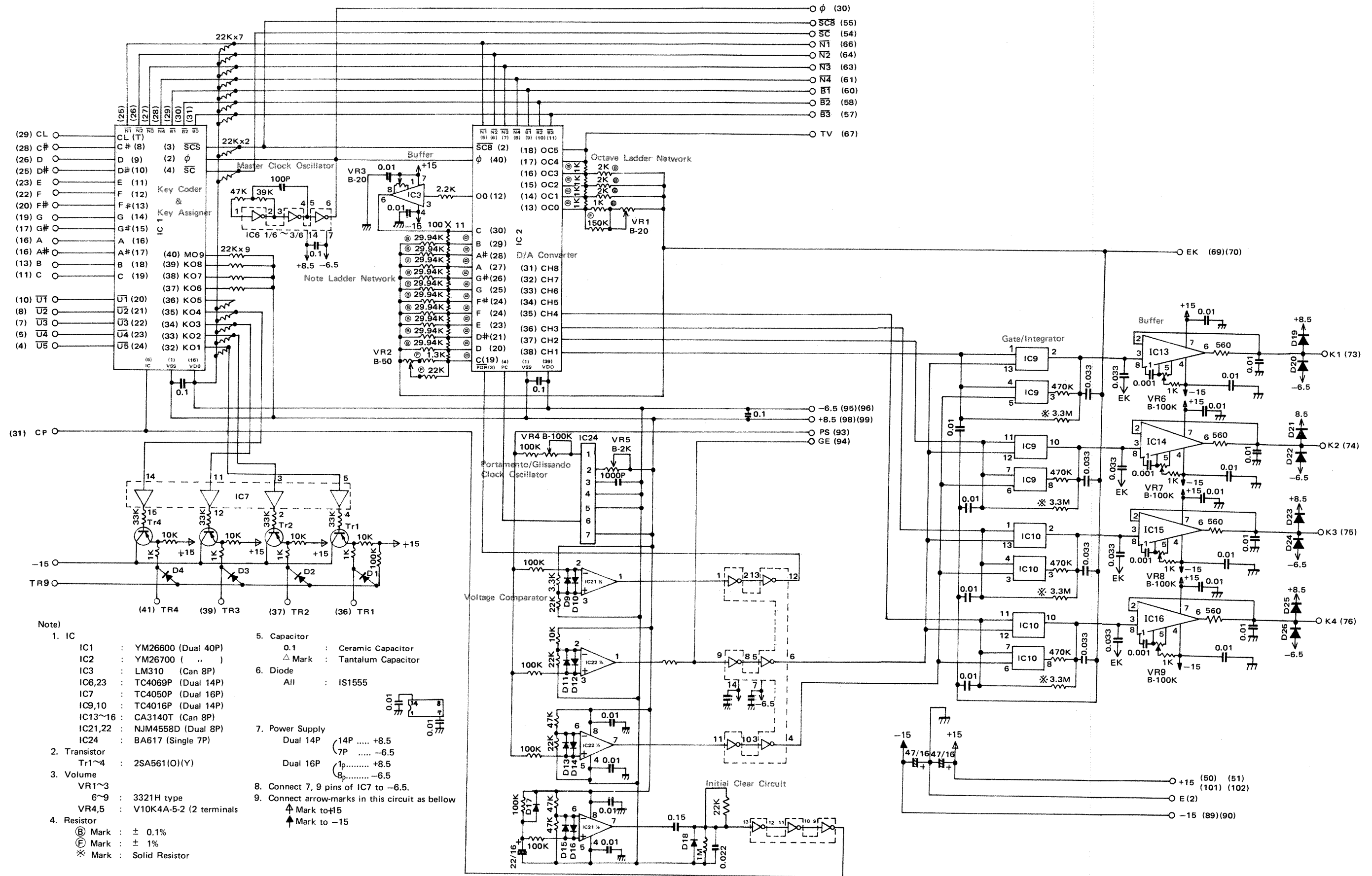
DIMENSIONS

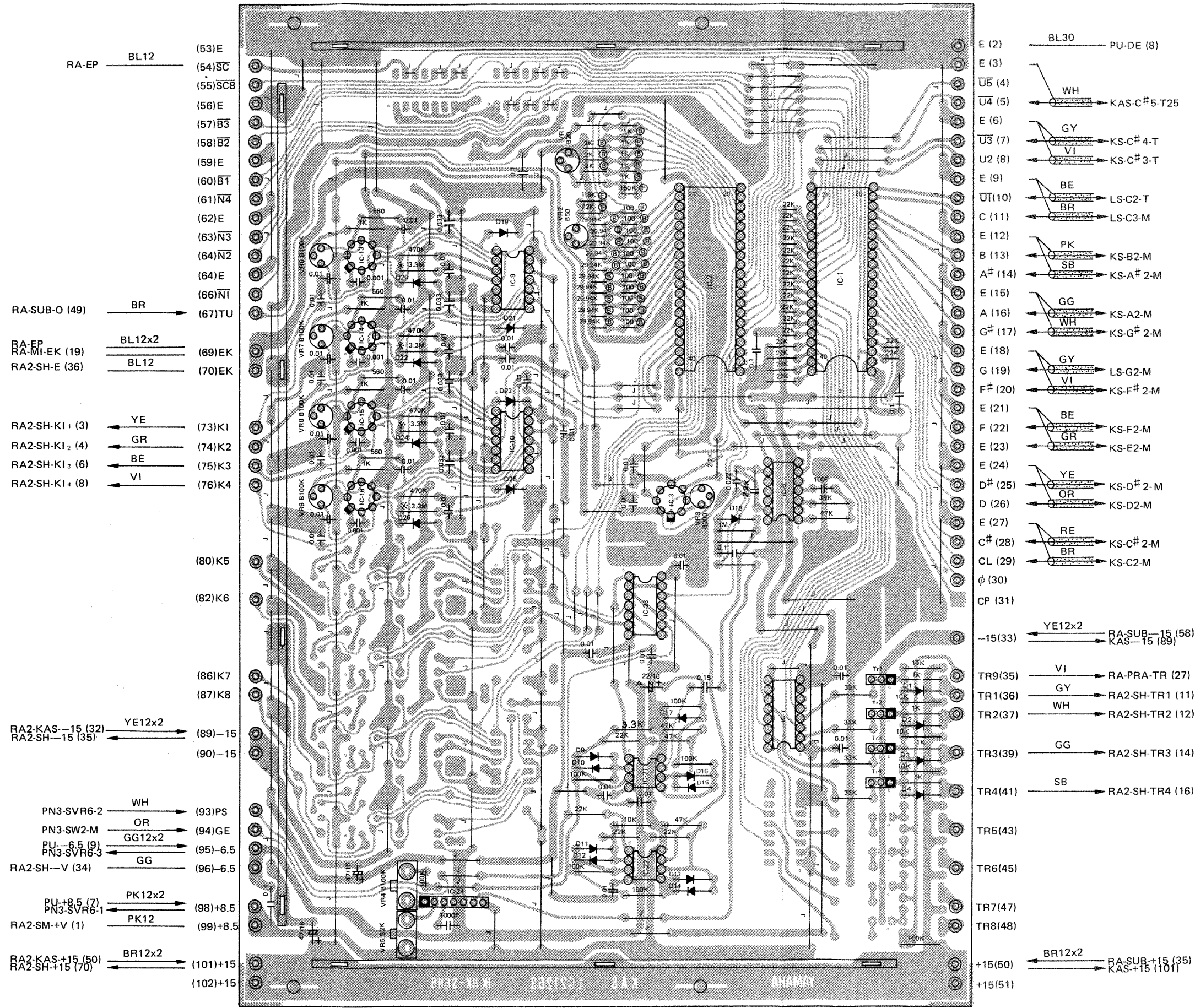
Width	: 98 cm (38-1/2")
Depth	: 49 cm (19")
Height	: 106 cm (41-1/2")

WEIGHT 35 kg (77 Lbs)

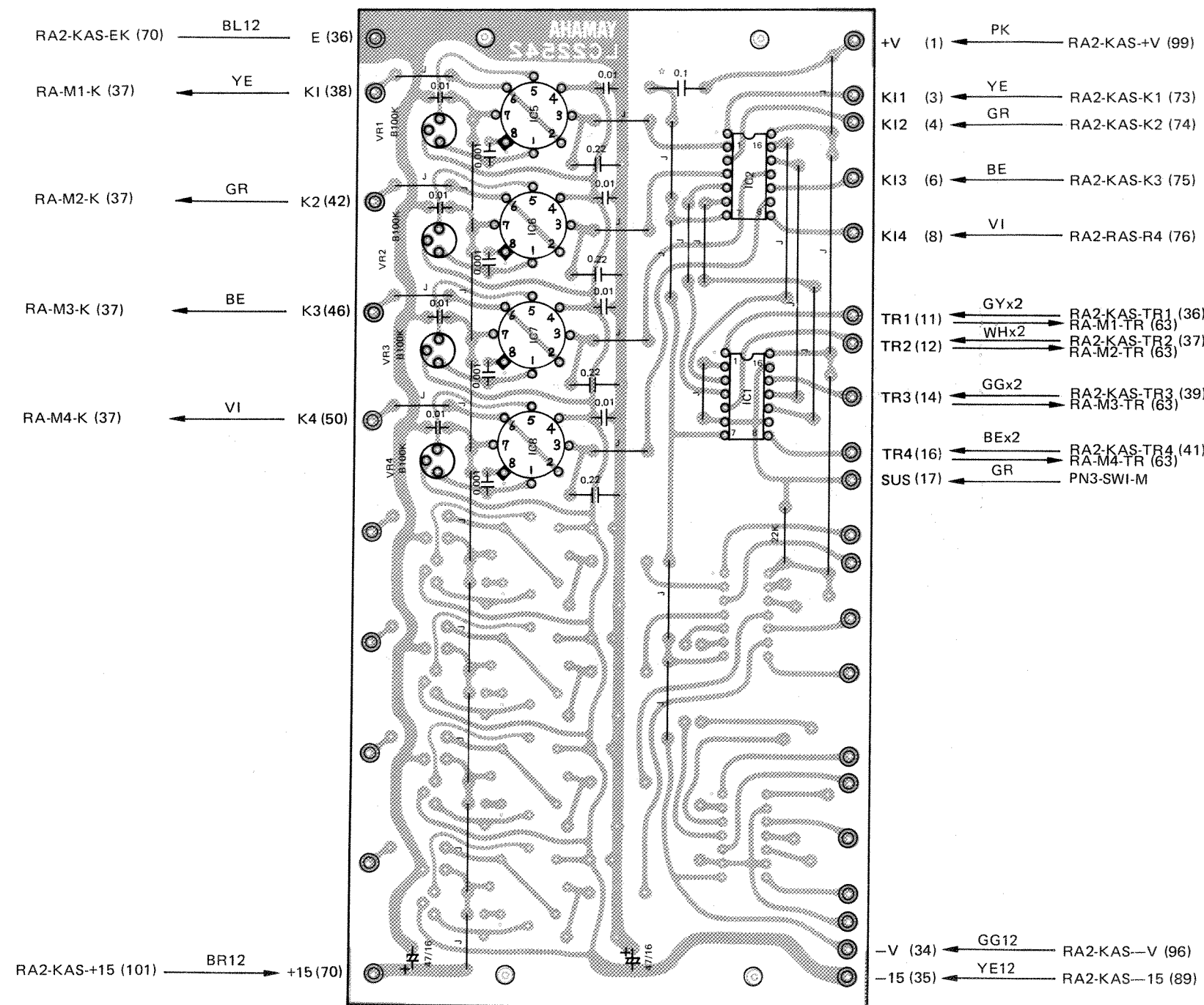
Specification subject to change without notice.

KAS (Key Assgner) Circuit





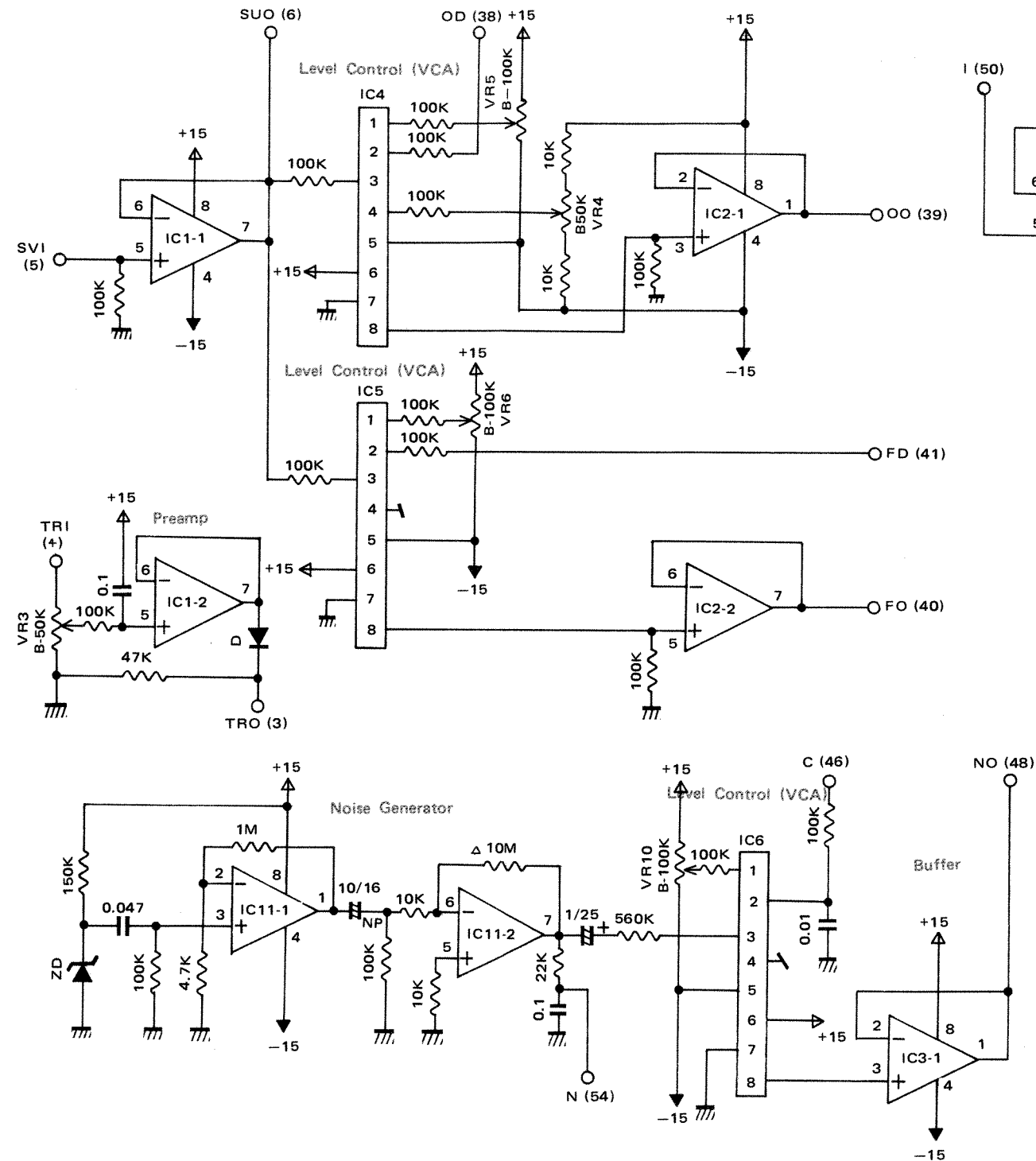
- Note)
1. IC1 : YM26600 (Dual 40P)
IC2 : YM26700 (")
IC3 : LM310 (Can 8P)
IC7 : TC4050P (Dual 16P)
IC6,23 : IC4069P (Dual 14P)
IC9,10 : TC4016P (")
IC13~16 : CA3140T (Can 8P)
IC21,22 : NJM4558D (Dual 8P)
IC24 : BA617 (Single 7P)
 2. Transistor
Tr1~4 : 2SA561 (O)(Y)
 3. Volume
VR1~3, 6~9 : 3321M type
VR4, 5 : V10K4A-5-2 (2 terminals)
 4. Resistor
Ⓟ : ± 0.1%
Ⓢ : ± 1%
※ : Solid Resistor
 5. Capacitor
△ marked : Tantalum Capacitor
0.1 : Ceramic Capacitor
 6. Diode
All D : 1S1555
 7. Camber-stop Hardware
AA03991
 8. Camber-stop Hardware
AA03992



Note)

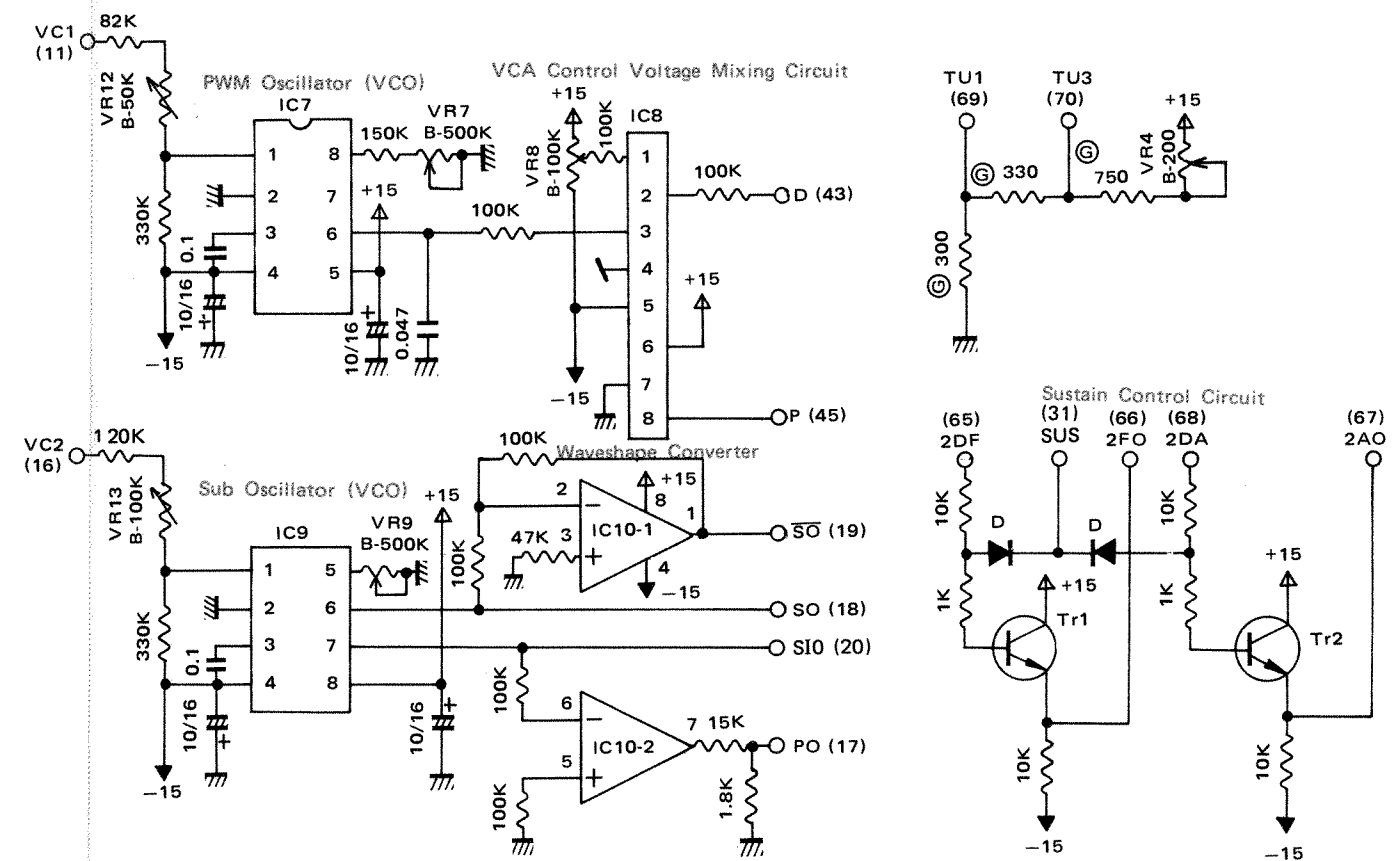
- Capacitor
 - ☆ Mark : Ceramic Capacitor
 - Others : Mylar Capacitor
- Volume
 - 3321H
- IC
 - IC1 : TC4011P
 - IC2 : TC4016P
 - IC5~8 : CA3140T
- Print Board
 - # 2259 2

SUB (Sub Oscillator) Circuit

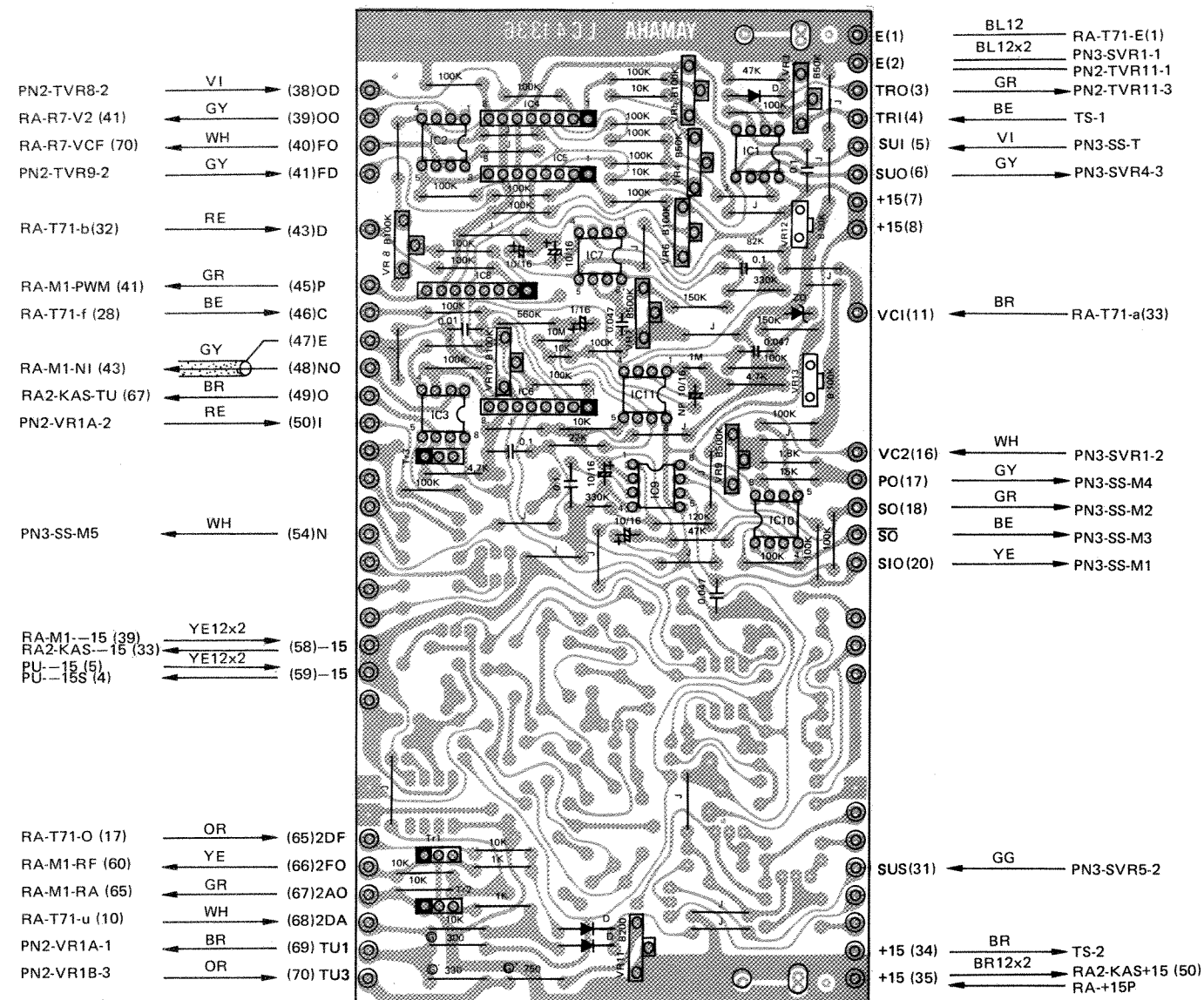


Note)

- Diode
D : IS1555
ZD : IS1715P
- All VR : V-10K
- Resistor
△ Mark : Solid Resistor
Nothing Mark : (1/4W)
Horizontal-type carbon
Ⓢ Mark : 2% Resistor
- Transistor
Tr1, 2, 3 : 2SC458(C) or (D)
- IC
IC1,2,3,10,11: NJM4558
(JRC) pair
IC4,5,6,8 : IG00151(A)(B)
IC7,9 : IG00150



SUB Circuit Board

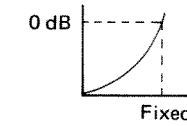


Note)

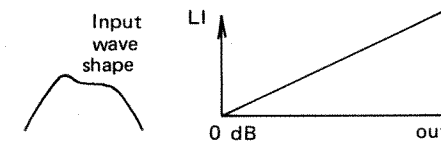
1. Print Board : LC41336
2. Transistor
Tr1,2,3 : 2SC458(C) or (D)
3. IC1,2,3,10,11 : NJM4558
IC4,5,6,8 : IGO0151(A)(B)
IC7,9 : IGO0150
4. Diode : IS1555
ZD : IS1715
5. \triangle Mark : S1id Resistor
Ⓢ Mark : 2% Resistor
6. All Volume : V-10K

VCOII IC (IG00151)

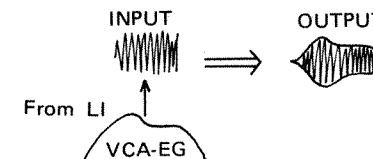
1. EI Input voltage for level control.
Input of the control voltage is provided for changing the level exponentially.



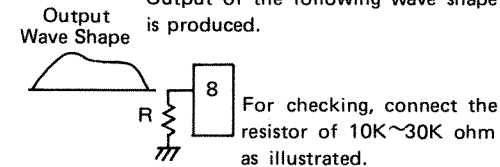
2. LI Input of level control voltage.
Input of the control voltage is provided for linear change of the level.



3. +IN Input
Input of the level modulated signal
is provided.

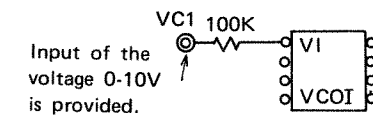


4. -IN Negative feed back.
Normally unused.
 5. Vee -15V input power source.
 6. Vcc +15V input power source.
 7. GND Earth
 8. OUT Output
- Output of the following wave shape is produced.

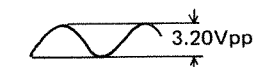


VCO I IC (IG00150)

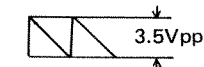
1. VI Input of the control voltage.
The frequency is variable in accordance with the voltage supplied.



2. GND Earth
3. C Capacitor for determination of the frequency.
4. Vee -15V input power source.
5. Vcc $+15\text{V}$ input power source.
6. SIO Output of sine wave.

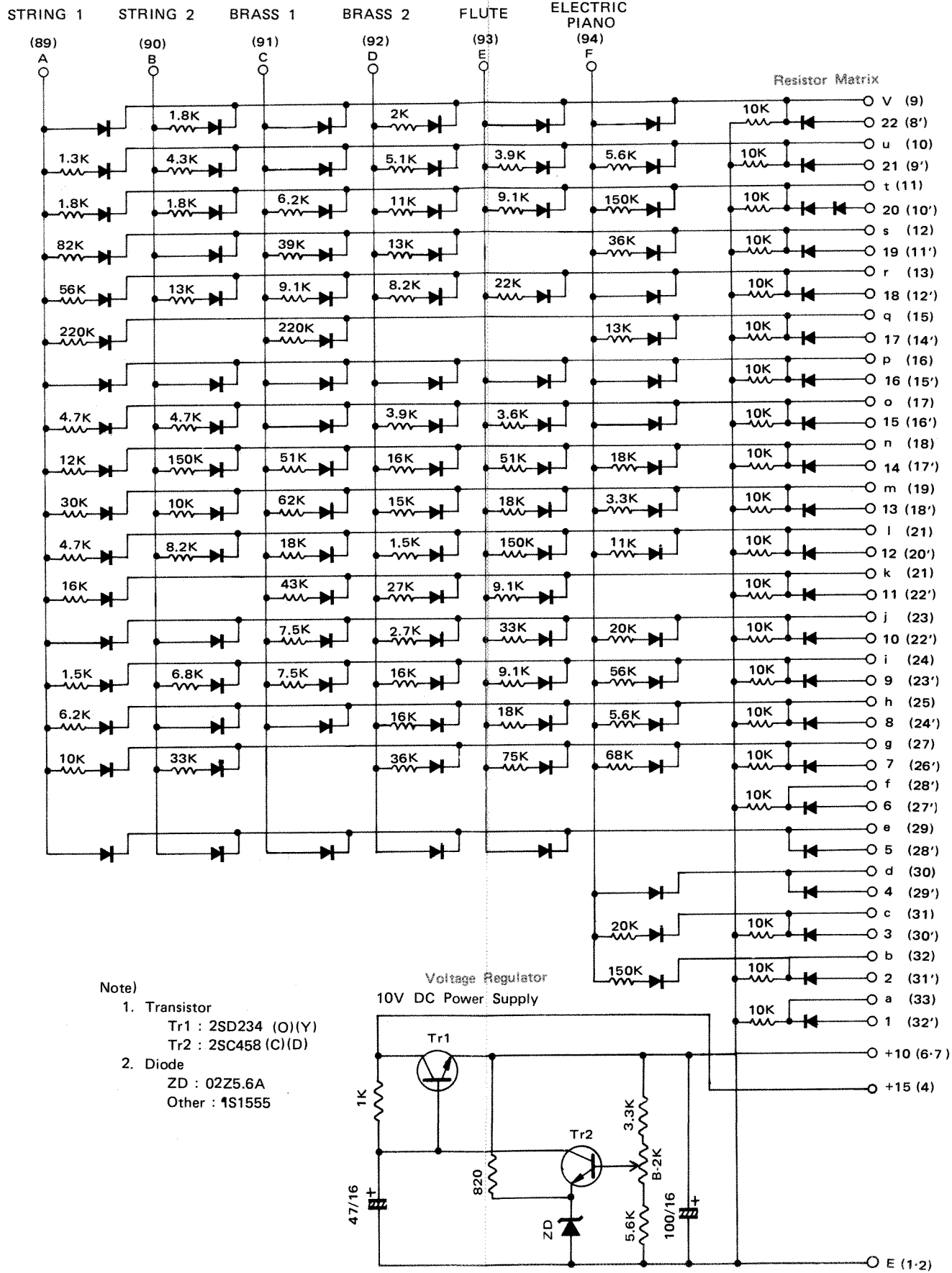


7. SO Output of sawtooth wave



8. Iadj Setting for standard electric current.
The standard electric current is set
so as to be the output 200Hz when
VC1 is 10V and VC2 is zero volt.

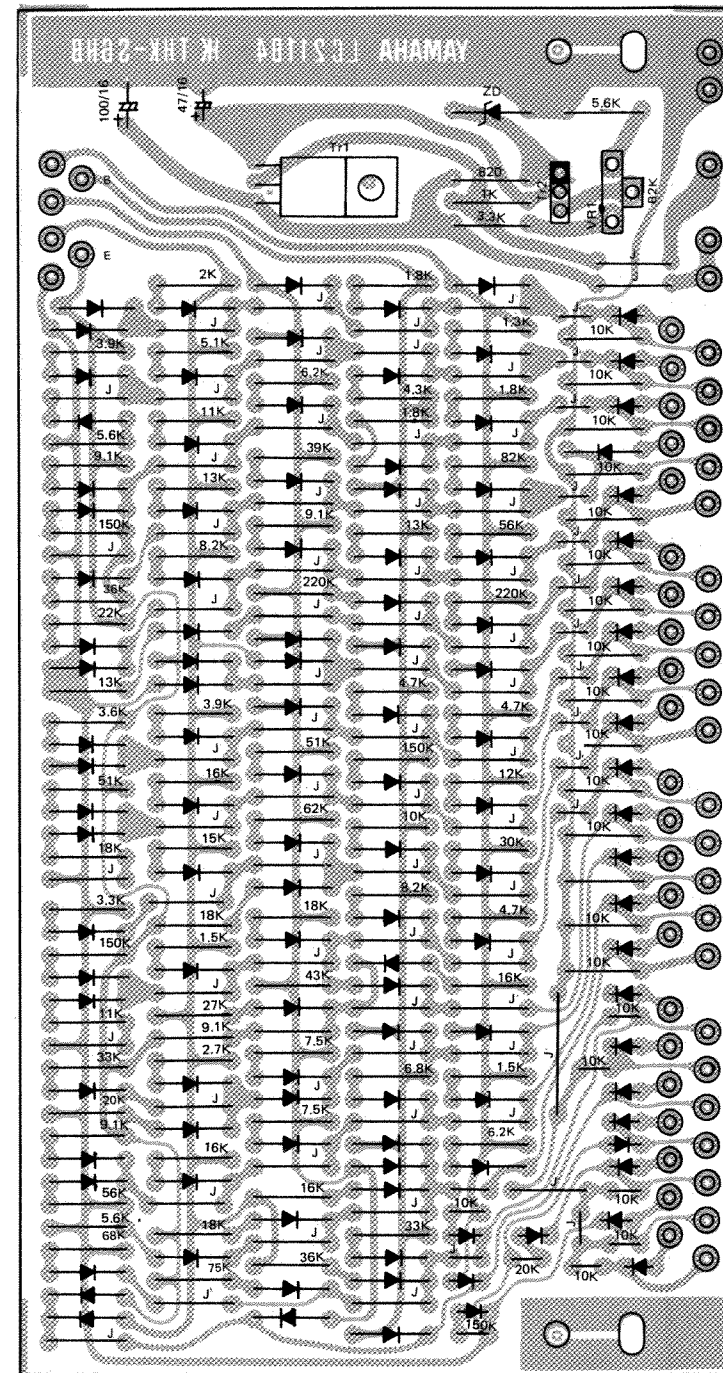
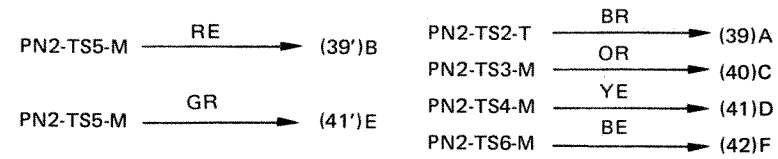
T71 (Tone Preset 1) Circuit



(Unit: V)

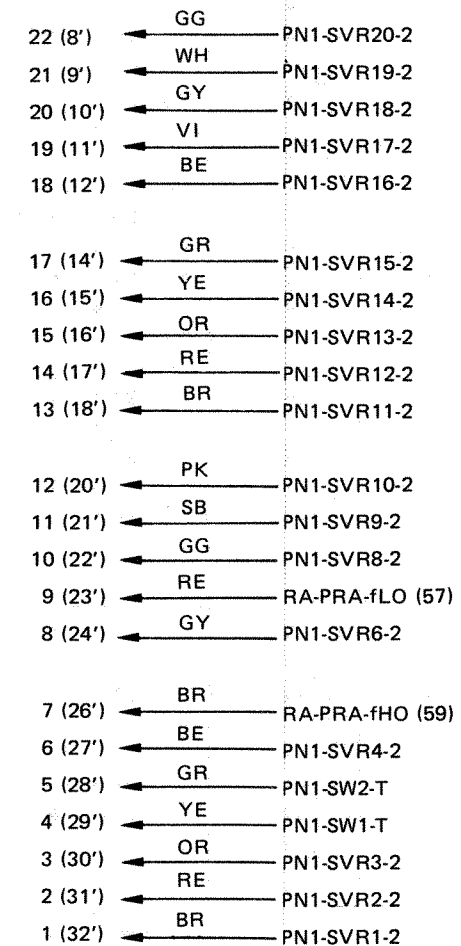
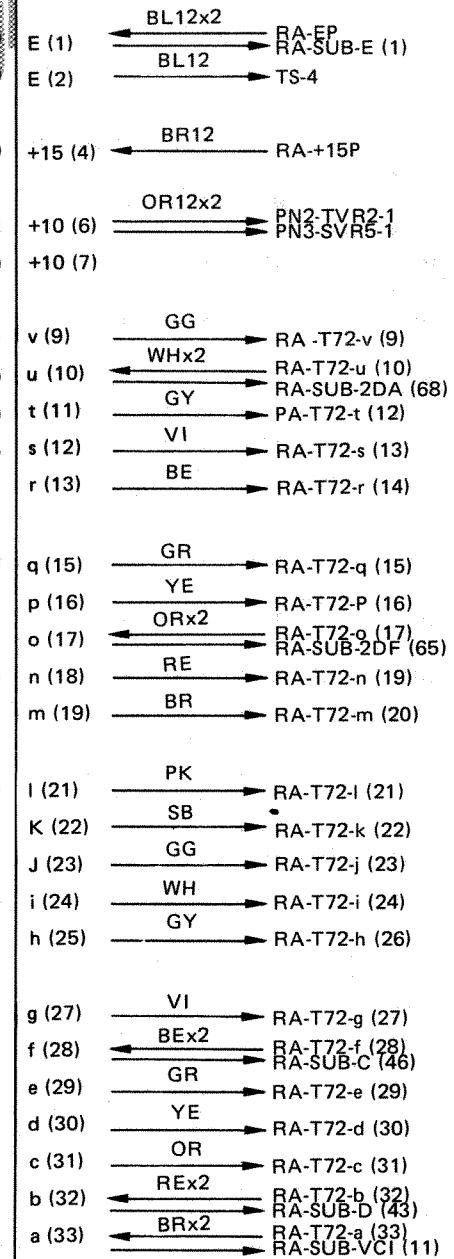
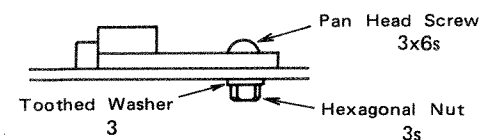
Output	Input	String 1	String 2	Brass 1	Brass 2	Flute	Electric Piano
v	A	10	8.47	8.47	10	10	8.33
u	B	8.85	6.99	6.17	6.62	7.19	6.41
t	C	8.47	6.17	4.76	5.24	0.63	2.17
s	D	1.09	10	2.04	4.35	0	2.17
r	E	1.52	4.35	5.24	5.49	3.13	10
q	F	0.45	0	0.43	0	0	4.35
p	A	10	10	10	10	10	10
o	B	6.80	6.80	10	7.19	7.35	10
n	C	4.55	0.63	1.64	3.85	1.64	3.57
m	D	2.50	5.00	1.39	4.00	3.57	7.52
i	E	6.80	5.49	3.57	8.70	0.63	4.76
k	F	3.85	0	1.89	2.70	5.24	0
j	A	10	10	5.71	7.87	2.33	3.33
i	B	8.70	5.95	5.71	3.85	5.24	1.52
h	C	6.17	10	10	3.85	3.57	6.41
g	D	5.00	2.33	0	2.17	1.18	1.28
f	E	0	0	0	0	0	0
e	F	10	10	10	10	10	0
d	A	0	0	0	0	0	10
c	B	0	0	0	0	0	3.33
b	C	0	0	0	0	0	0.63
a	D	0	0	0	0	0	0
+10	E	6.7					
+15	F	4					

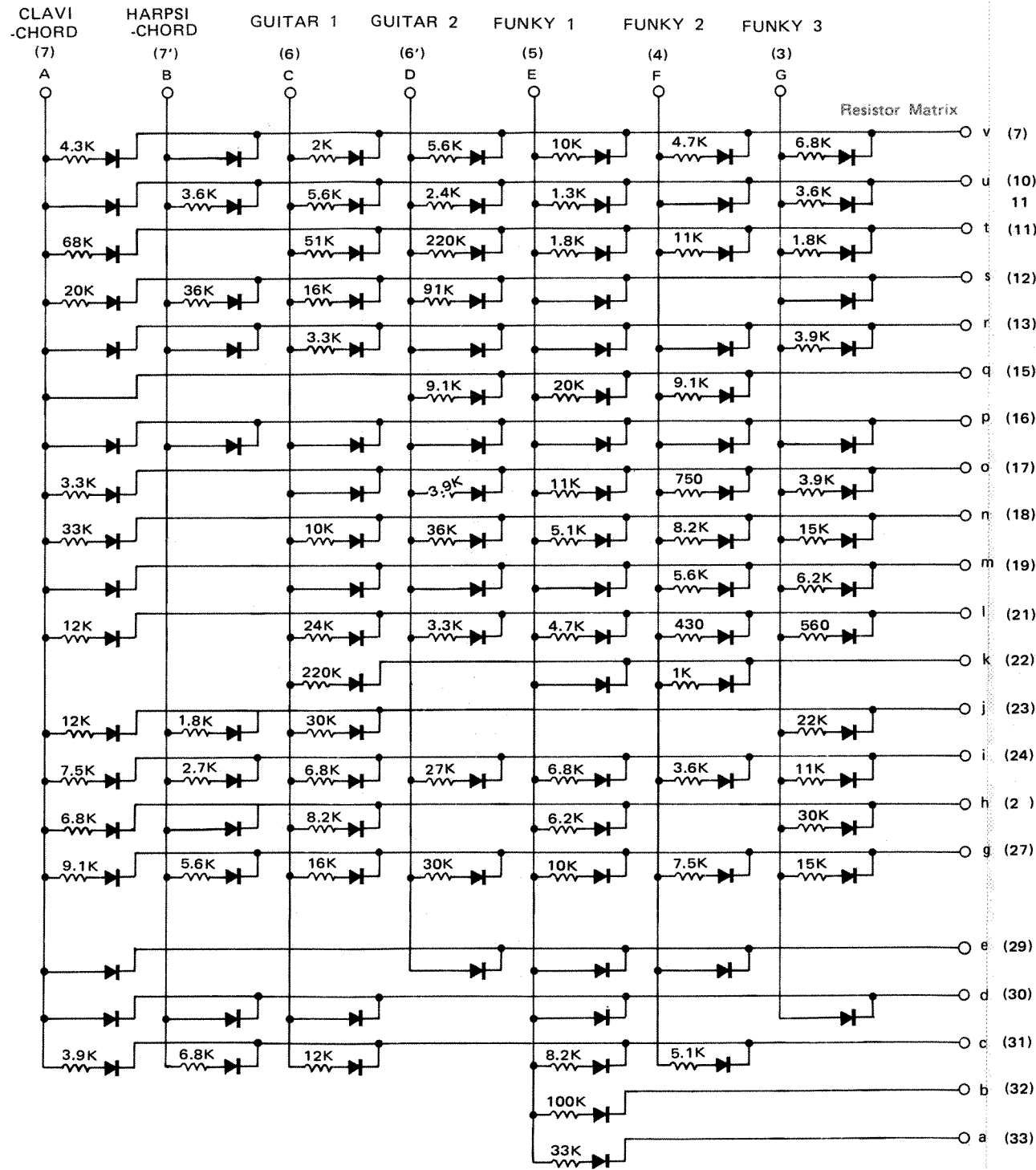
T71 Circuit Board



Note)

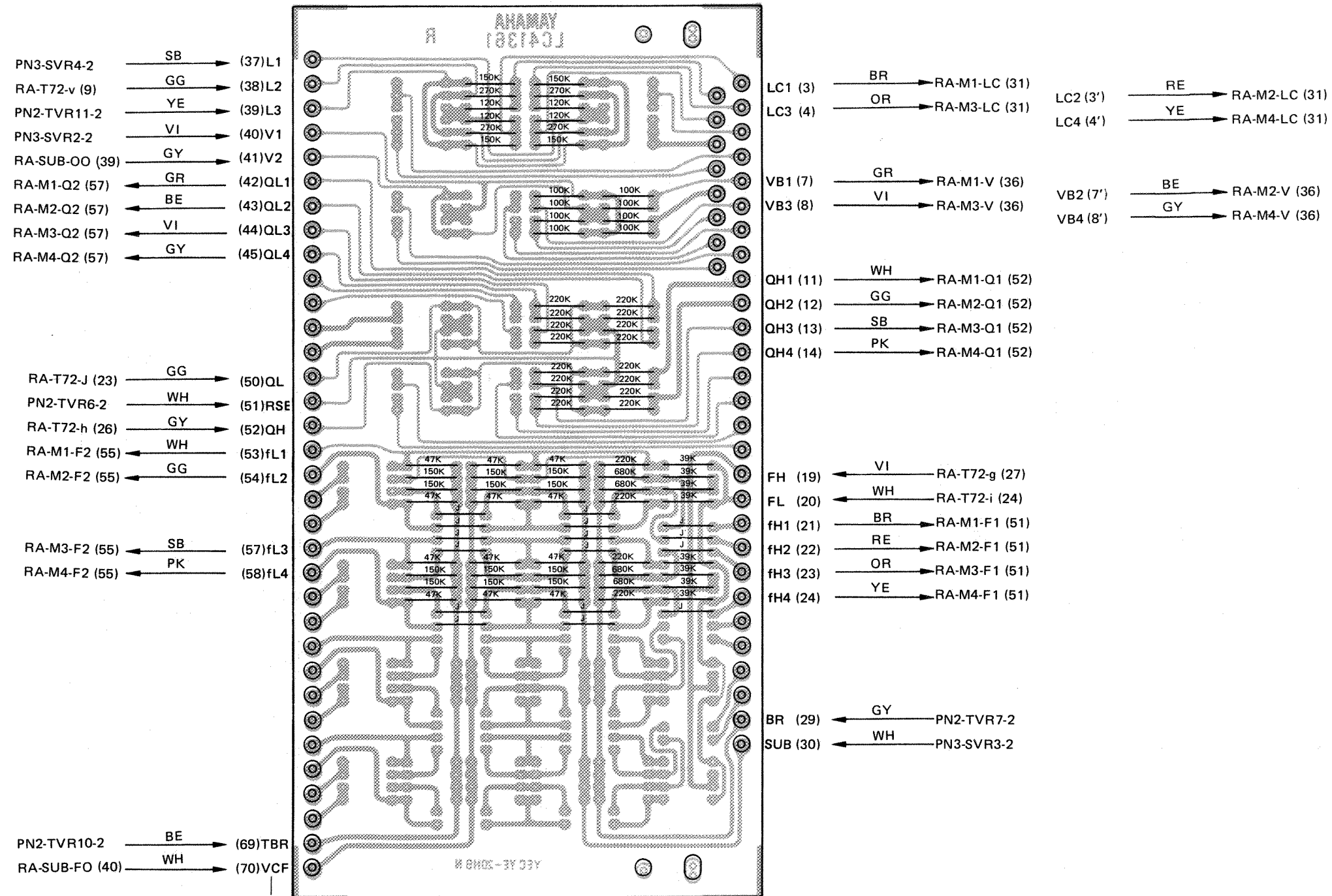
1. Print Board : LC21183
2. Transistors
Tr1 : 2SD234 (O)(Y)
Tr2 : 2SC458 (C)(O)
3. Diode
ZD : 02Z5.6A
Others : IS1555
4. Tr1 Install method





Output Input							
	A	B	C	D	E	F	G
Clavi-chord	6.79	10	7.35	6.41	8.33	6.41	5.00
Harpsi-chord	1.28	0	1.64	0.43	8.47	4.76	8.47
Guitar 1	3.33	2.17	3.85	0.99	10	0	10
Guitar 2	10	10	7.52	10	3.33	10	7.19
Funky 1	0	0	0	5.24	10	5.24	0
Funky 2	10	10	10	10	10	10	10
Funky 3	7.52	0	0	7.19	4.76	9.30	7.19
	2.33	0	5.00	2.17	6.62	5.49	4.00
	10	0	10	10	10	6.41	6.17
	4.55	0	2.94	7.52	6.80	9.59	9.47
	0	0	0.43	0	10	9.09	0
	4.55	8.47	2.50	10	0	0	3.13
	5.71	7.87	5.95	2.70	5.95	7.35	4.76
	5.95	10	5.49	0	6.17	0	2.50
	5.24	6.41	3.85	2.50	5.00	5.71	4.00
	0	0	0	0	0	0	0
	10	0	0	10	10	10	0
	10	10	10	0	10	0	10
	7.19	5.95	4.55	0	5.49	6.62	0
	0	0	0	0	0.91	0	0
	0	0	0	0	0	0	0

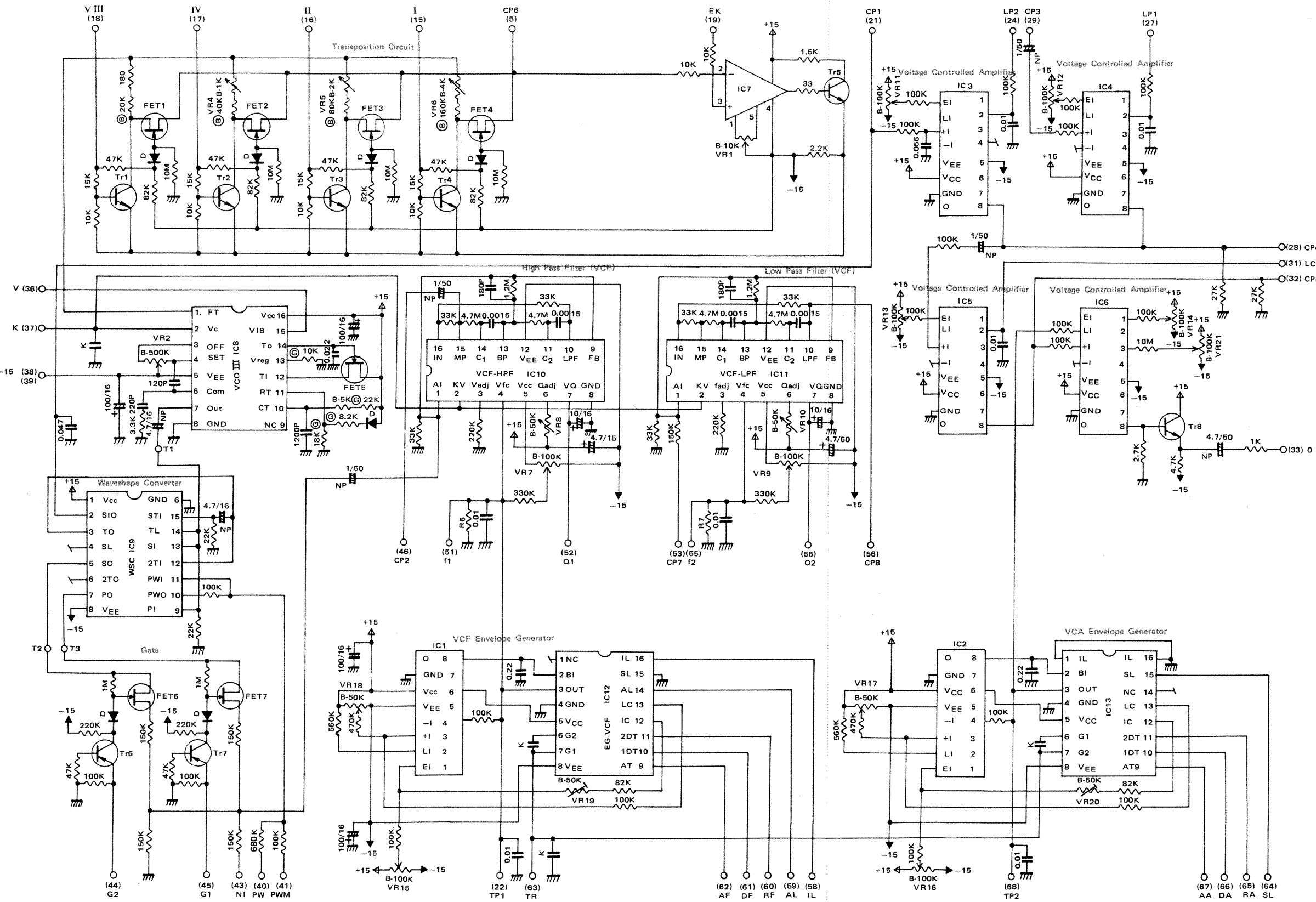
R7 Circuit Board



Note)

1. Print Board : LC41360
2. Transistor

M (Master) Circuit

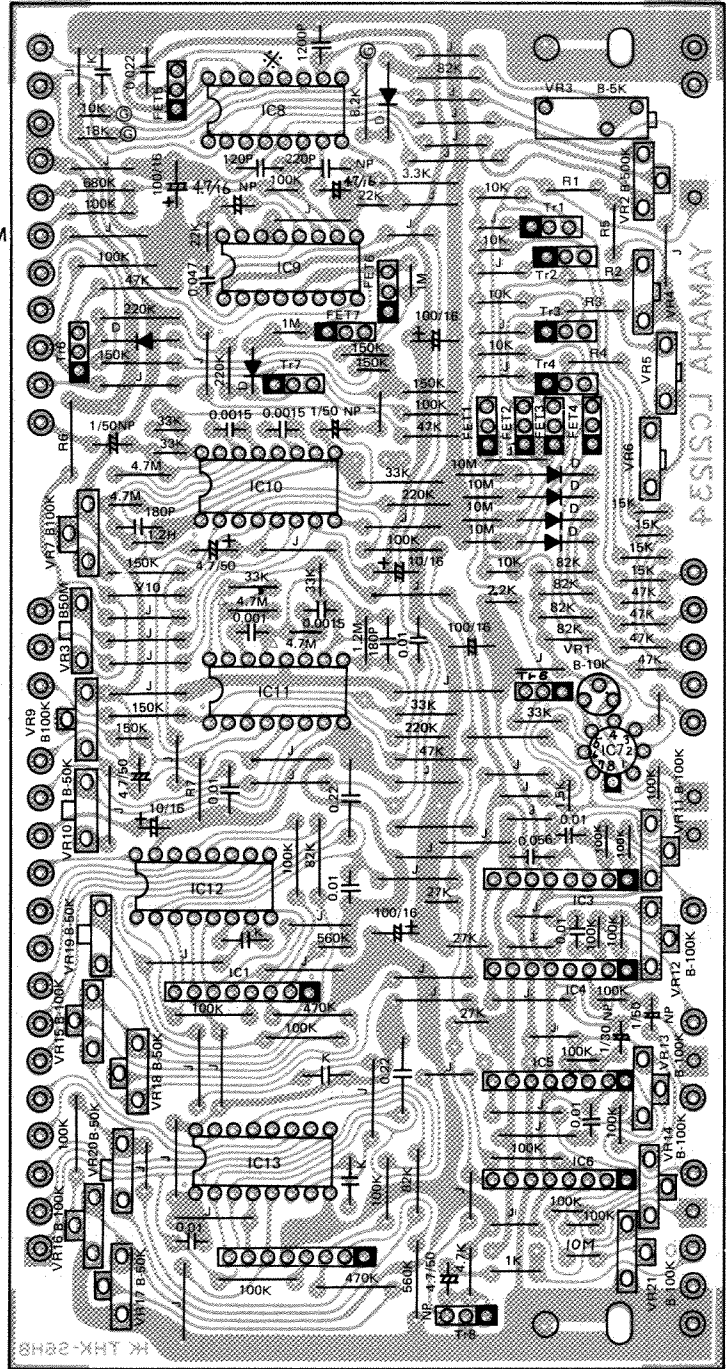
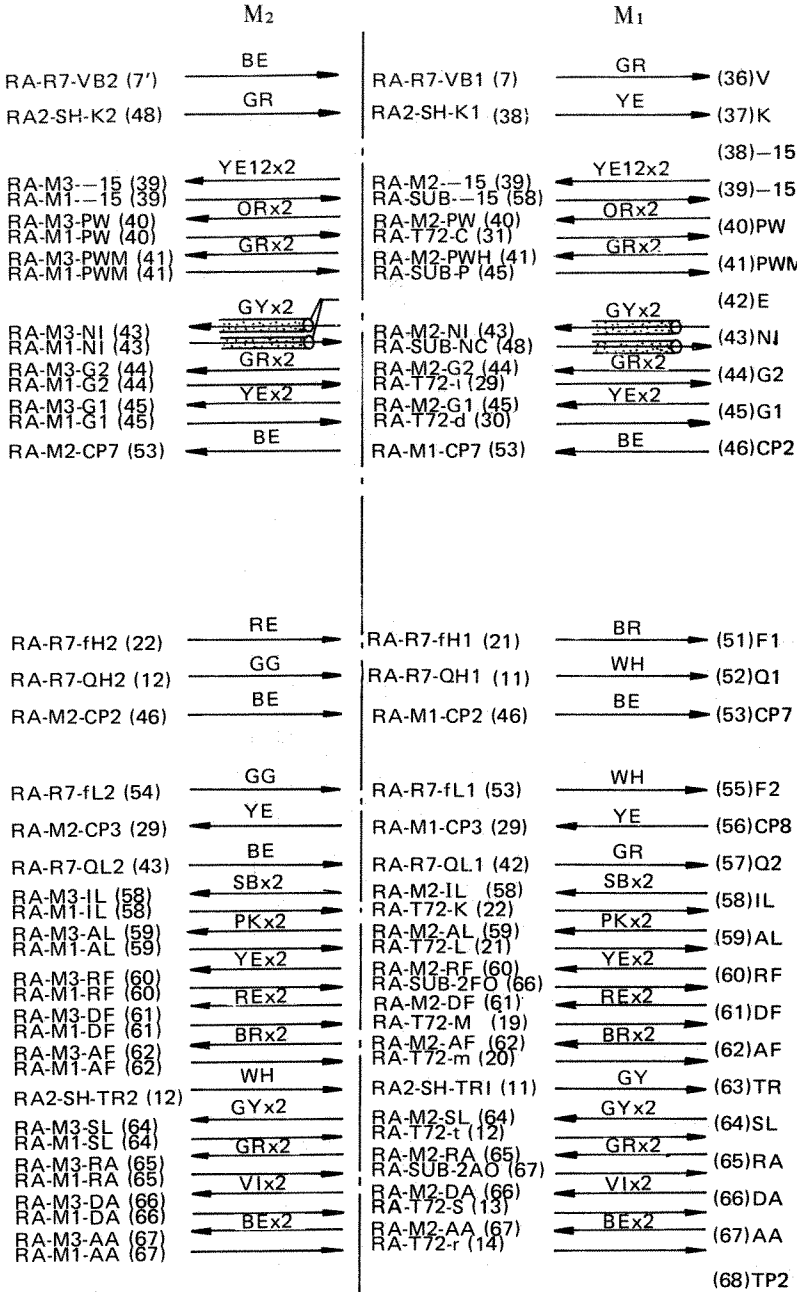


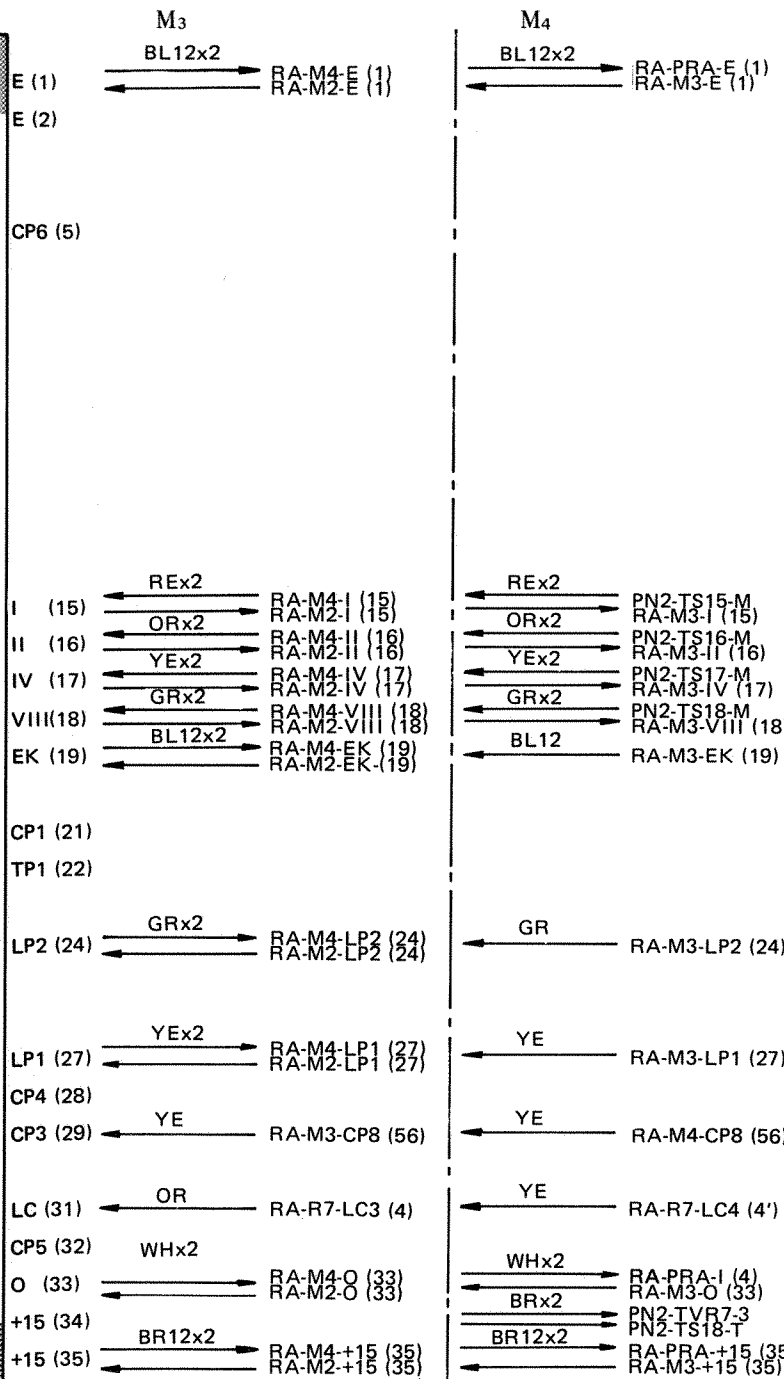
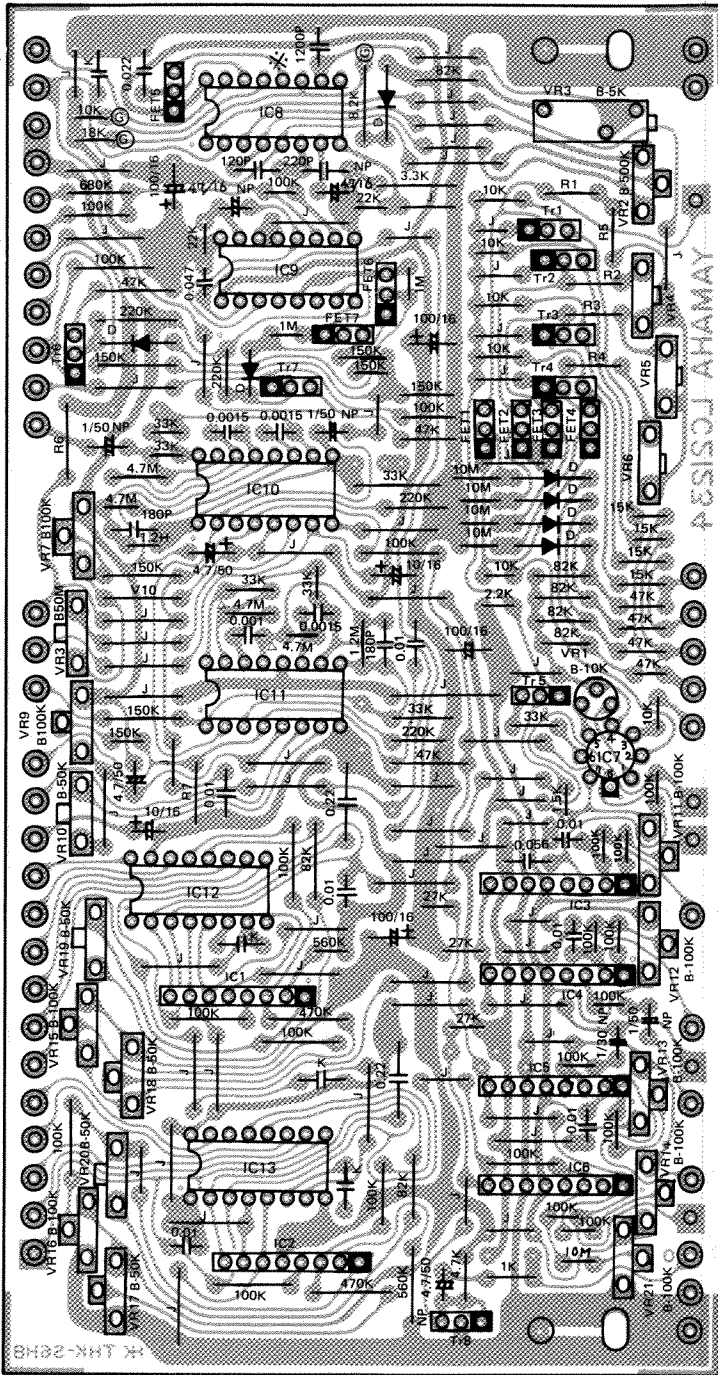
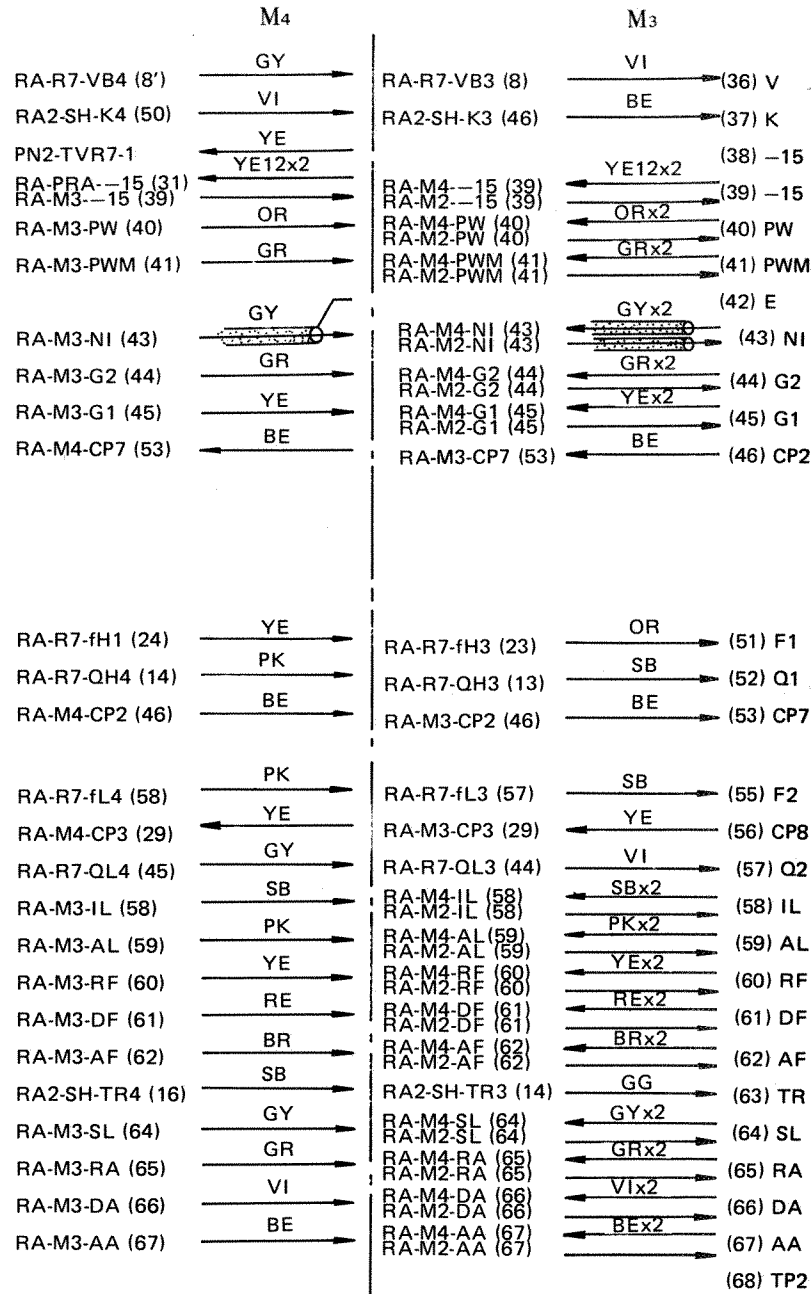
	CS-80	CS-60,50
R1	(B) 10K	(B) 20K
R2	(B) 20K	(B) 40K
R3	(B) 40K	(B) 80K
R4	(B) 80K	(B) 160K
R5	100	180
VR4	B-500	B-1K
VR5	B-1K	B-2K
VR6	B-2K	B-5K

- Note)
- Tr1~Tr5,Tr8: 2SC458(C) or (D)
Tr6, Tr7 : 2SA561(Y) or (O)
FET1~7 : 2SK30(Y)
 - D : IS1555
 - VR1 : 3321H type
VR3 : 3006 type
Other VR : V10K8-1-2 (3 terminals)
 : V10K4A-5-2 (2 terminals)
 - (B) Mark : Metal Film Resistor (1%)
(B) Mark : " (0.1%)
 - K Mark : Ceramic Capacitor (1000P)
 - IC
IC views show the pin disposition
looked from upper. (Opposite to Pattern)
 - Surround the parts of [] with the pattern
of 3 terminal.
 - IC
IC1~6: IG00151(A)(B)
IC7 : TA7504M
IC8 : IG00153
IC9 : IG00158
IC10,11: IG00156(A)(B)(C)
IC12 : IG00152(A)(B)(C)(D)
IC13 : IG00159(A)(B)(C)(D)
 - *Mark : Styrol Capacitor 1200P
- Constant value of R6, R7 in IC10,11 according to rank

	CS80	CS50,60	
A	2.7K	2.7K	R6
B	2.2K	2.2K	
C	1.8K	1.8K	
A	3.3K	3.0K	R7
B	2.7K	2.4K	
C	2.2K	2.0K	

M₁, M₂ Circuit Board





- Note)
- Print Board
 - Transistor
 - Tr1~5, 8 : 25C458(C) or (D)
 - Tr6,7 : 2SA561(O) or (Y)
 - FE1~7 : 2SK30A(Y)
 - D : IS1555
 - VR1 : 3321H type
 - VR3 : 3006P type
 - Others: V10K8-1-2 (3 terminals)
 - V10K4A-5-2 (2 terminals)
 - K Mark: Ceramic Capacitor (1000P)
 - IC
 - IC1~6 : IG00151(A)(B)
 - IC7 : IA7504M
 - IC8 : IG00153
 - IC9 : IG00158
 - IC10,11 : IG00156(A)(B)(C)
 - IC12 : IG00152(A)(B)(C)(D)
 - IC13 : IG00159(A)(B)(C)(D)
 - Ⓢ Mark : Metal Film Resistor(2%)
 - Ⓟ Mark : " "
 - △ Mark : Solid Resistor

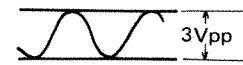
Resistor	NA03574	NA03645
R1	Ⓟ 10K	Ⓟ 20K
R2	Ⓟ 20K	Ⓟ 40K
R3	Ⓟ 40K	Ⓟ 80K
R4	Ⓟ 80K	Ⓟ 160K
R5	100	180
VR4	B-500	B-1K
VR5	B-1K	B-2K
VR6	B-2K	B-5K

- Mark : Cover J-wire with insulating tube
- Value of R6,R7 in IG00156 according to rank.

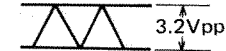
NA rank	NA03574	NA03655	
A	2.7K	2.7K	R6
B	2.2K	2.2K	
C	1.8K	1.8K	
A	3.3K	3.0K	R7
B	2.7K	2.4K	
C	2.2K	2K	

WSC IC (IG00158)

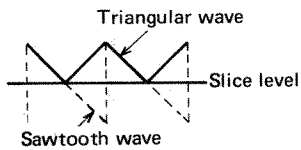
1. Vcc +15V input power source
2. SIO Output of the sine wave



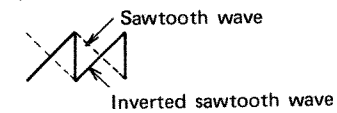
3. TO Output of triangular wave.



4. SL Input of slice level.
Input of the DC voltage is provided to the pin for determination of the inverting level which makes triangular wave from sawtooth wave.

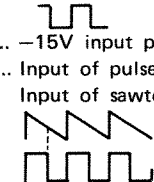


5. \overline{SO} Output of the inverter wave
Output of inverted sawtooth wave is produced.



6. 2TO Output of double triangle wave
Double triangle wave is produced from triangle wave.

7. PO Output of pulse wave.



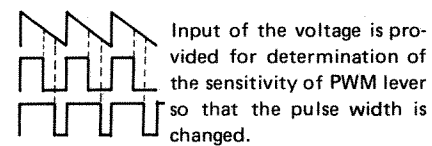
8. Vee -15V input power source.

9. PI Input of pulse wave
Input of sawtooth wave is provided.

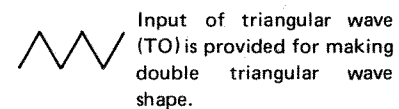


10. PWO Output of OP amplifier.

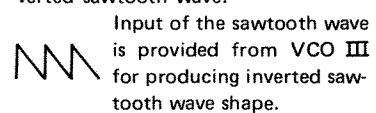
11. PWI Input of OP amplifier.



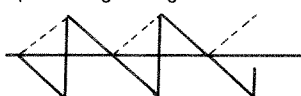
12. 2TI Input of triangular wave for producing double triangular wave shape.



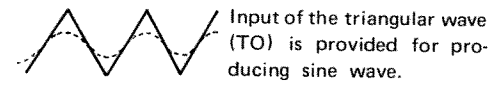
13. \overline{ST} Input of the pulse for producing inverted sawtooth wave.



14. TI Input of the wave is provided for producing triangular wave shape.



15. STI Input of the wave for producing sine wave.



16. GND Earth

VCA-EG IC (IG00159)

This IC generates envelope wave shape which is supplied to VCA and control the tone volume.

1. IL Input of initial level.

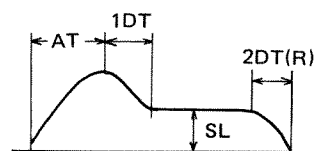
Fixed to 0V



2. BI Input of buffer amplifier.

3. OUT The buffer amplifier is built in for the purpose of matching impedance.

Output wave shape.

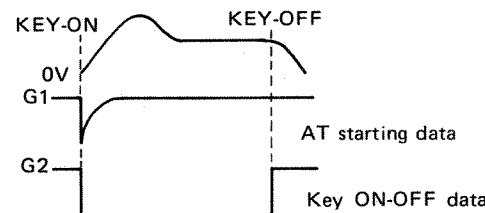


4. GND Earth

5. Vcc +15V input power source.

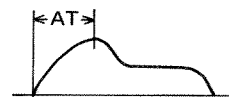
6. G1 Gate 1

7. G2 Gate 2



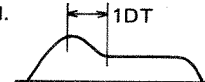
8. Vee +15V input power source.

9. AT Input of buffer voltage for determination of attack time.
Input of the voltage between zero V and 10V is provided and the attack time is controlled from 1 mS until 1S.

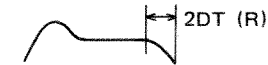


10. 1DT Input of buffer voltage for determination of decay time.

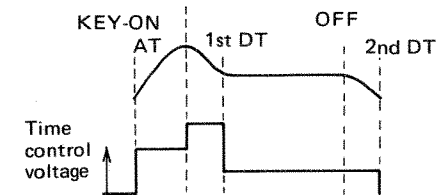
Input of the voltage between zero V and 10V is provided and the decay time is controlled from 10 m second until 10 second.



11. 2DT Input of buffer voltage for determination of release time.
Input of the voltage between zero V and 10V is provided and the time key-off until release is controlled from 10 mS until 10 S.

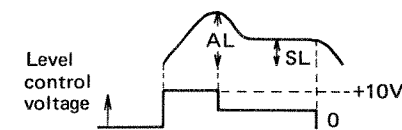


12. TC Output of time control.
Output of the DC voltage is produced so that the each time of Attack, 1st Decay and 2nd Decay are controlled.



The higher the voltage, the shorter the time and the lower the voltage, the longer the voltage.

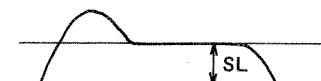
13. LC Output of level control

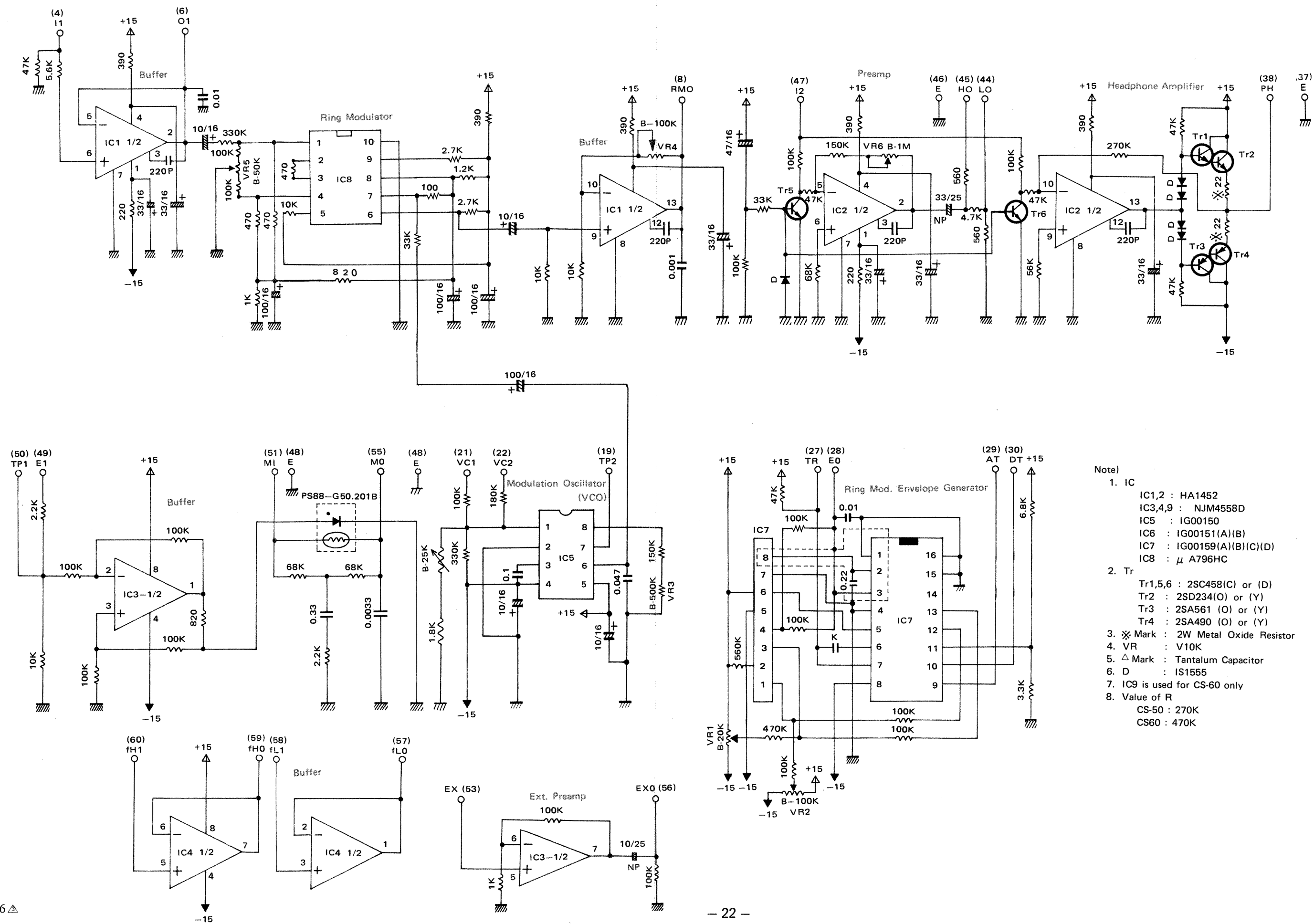


Output of the DC voltage for AL and SL control is provided.

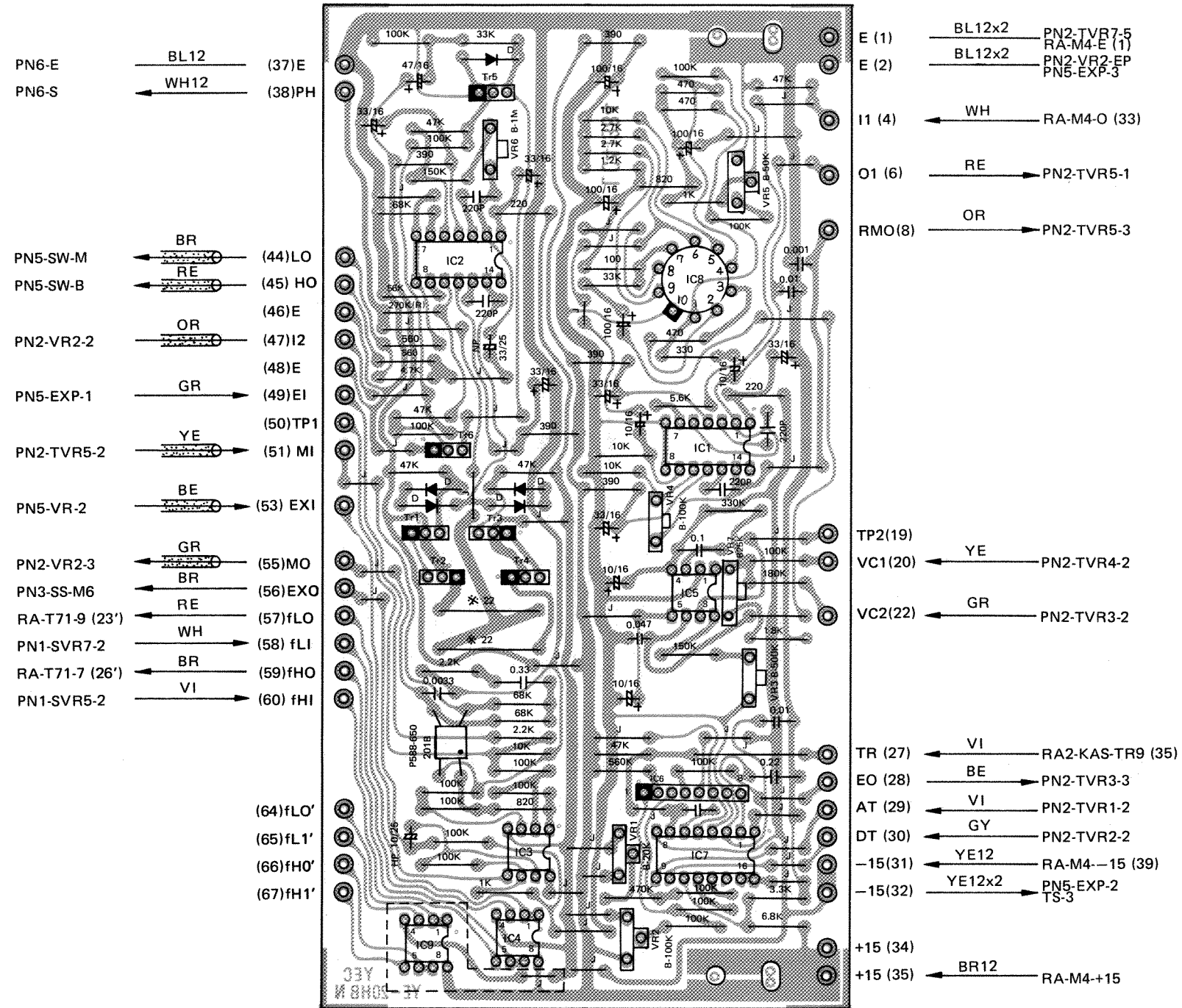
The higher the voltage, the higher the level and the lower the voltage, the lower the level.

15. SL Input of buffer voltage for determination of the sustain level.
Input of the voltage between zero V and 10V is provided so that the sustain level can be controlled.





PRA Circuit Board



Note)

1. Print Board : LC41384

2. Transistor

Tr1,5,6 : 2SC458(C) or (D)

Tr2 : 2SD234(O) or (Y)

Tr3 : 2SA561(O) or (Y)

Tr4 : 2SA490(O) or (Y)

3. IC

IC1,2 : HA1452

IC3,4,9 : NJM4555D

IC5 : IG00150

IC6 : IG00151 (A)(B)

IC7 : IG00149(A)(B)(C)(D)

IC8 : μ A796HC

4. Diode D : IS1555

5. Others

✱ Mark : 2W Metal Oxide Resistor

VR : V10K

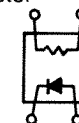
△ Mark : Tantalum Capacitor

NP : Non-polar Capacitor

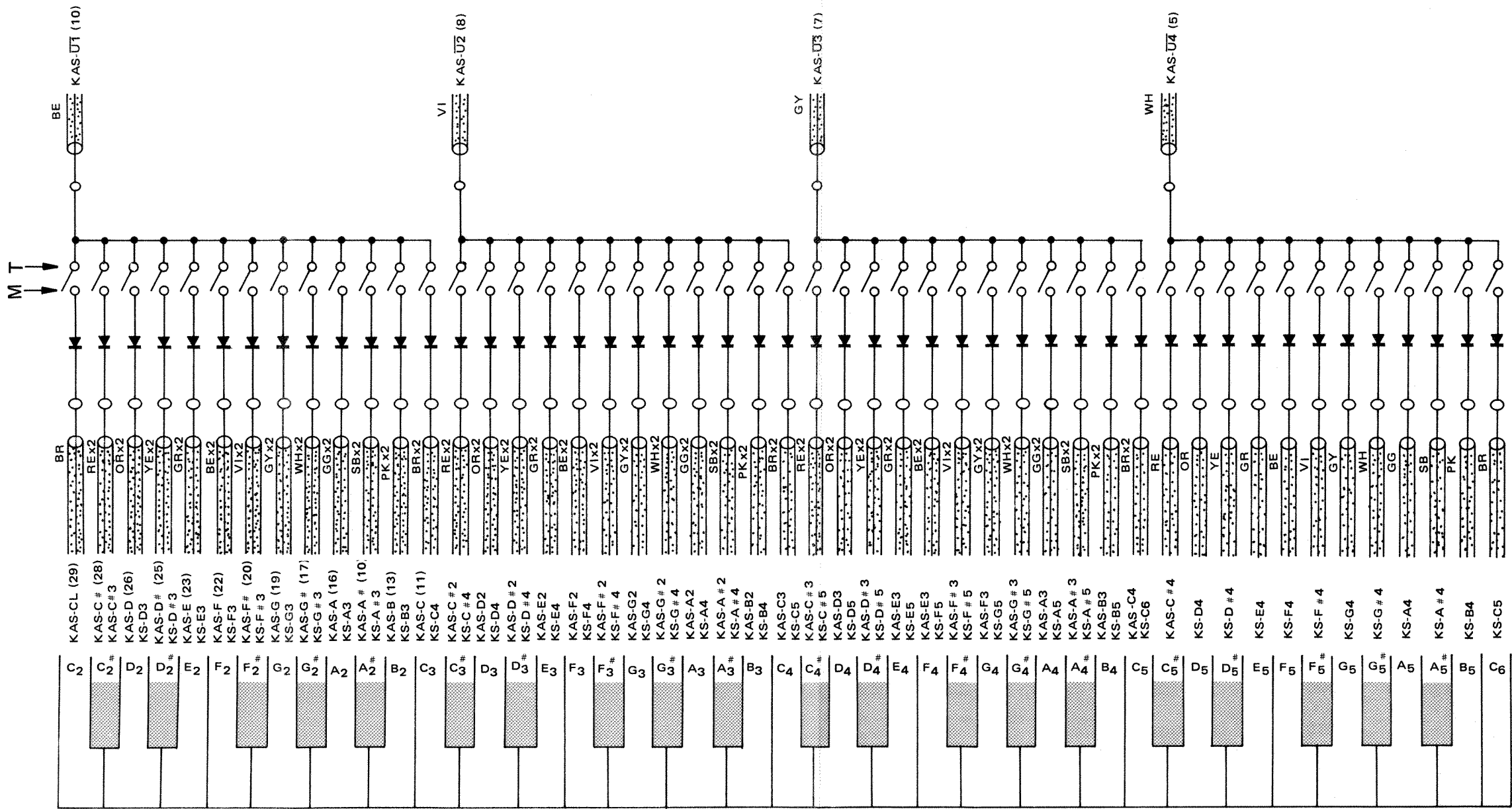
Install P588-G50-210B as below.

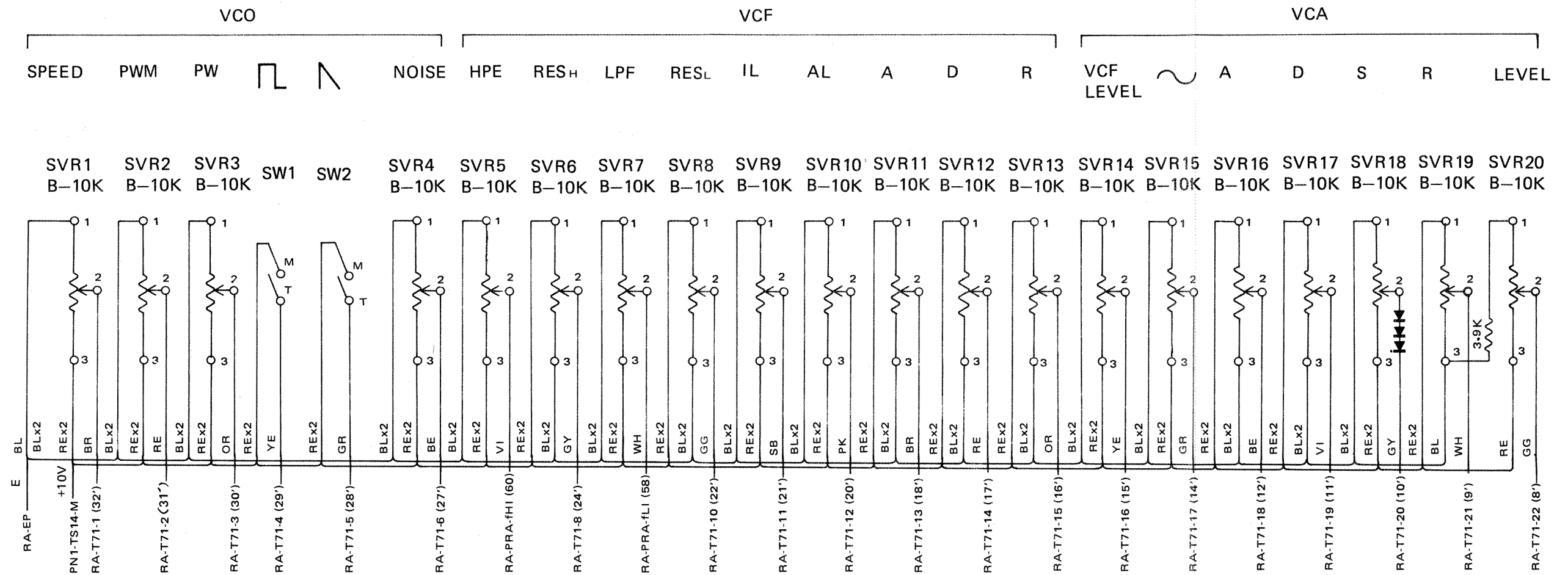
6. Use only NA03704 in []

7. Constant value of R

NA03704 \Rightarrow 470KNA04486 \Rightarrow 270K

KS (Key Switch) Circuit

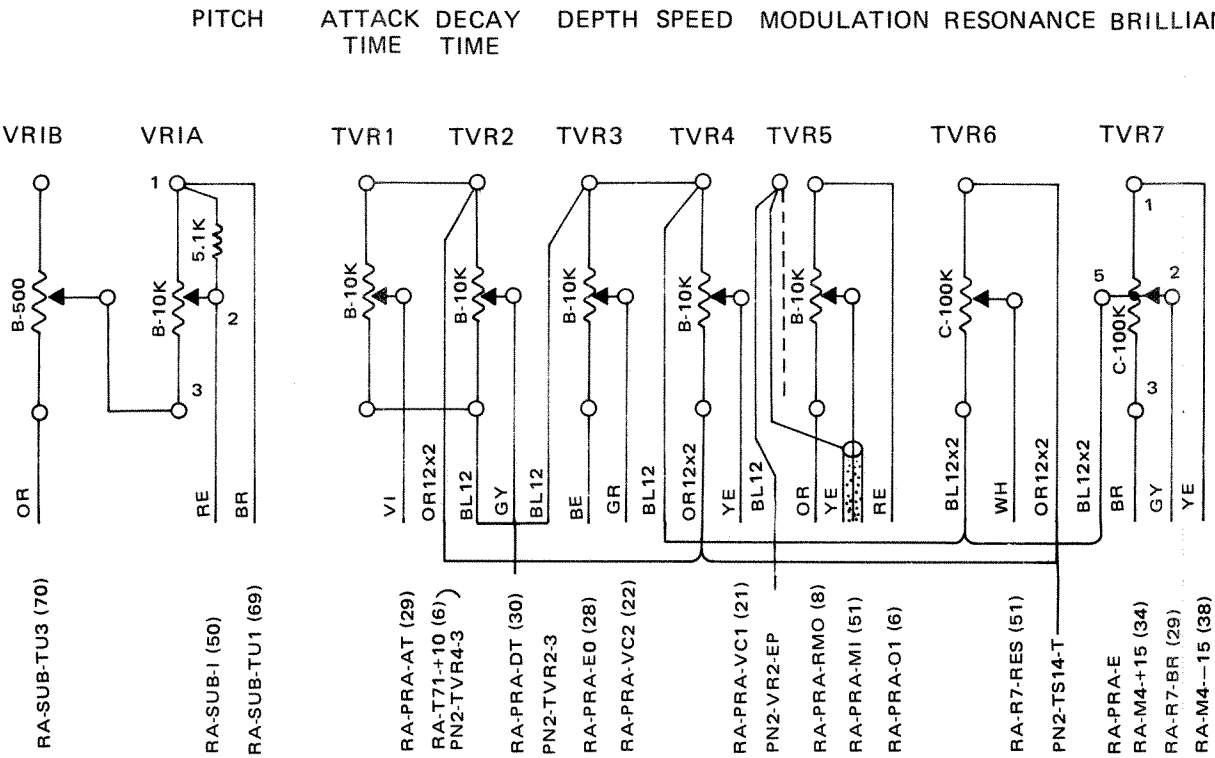




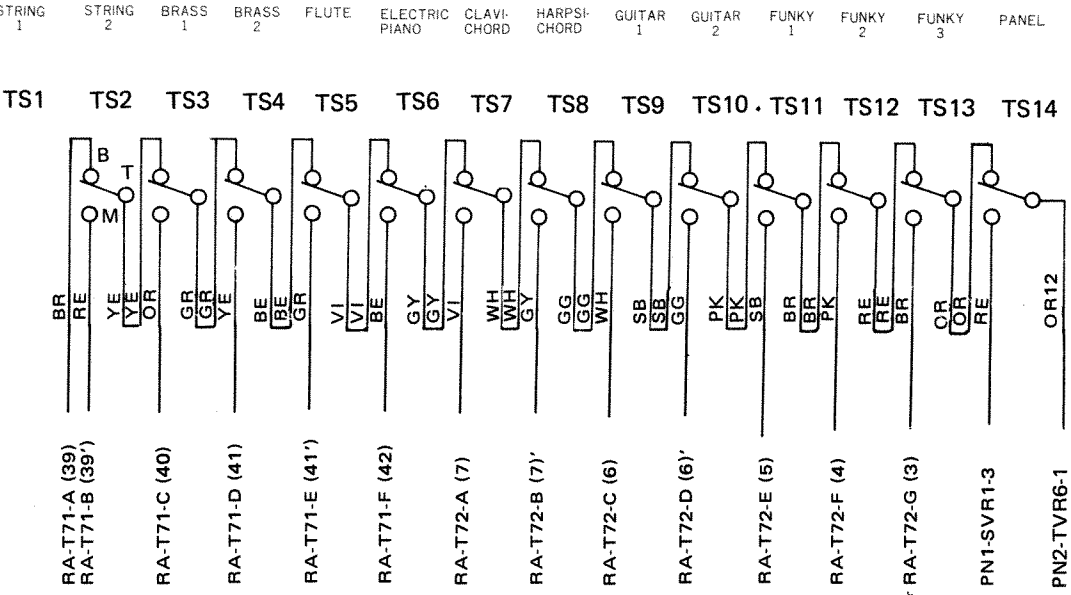
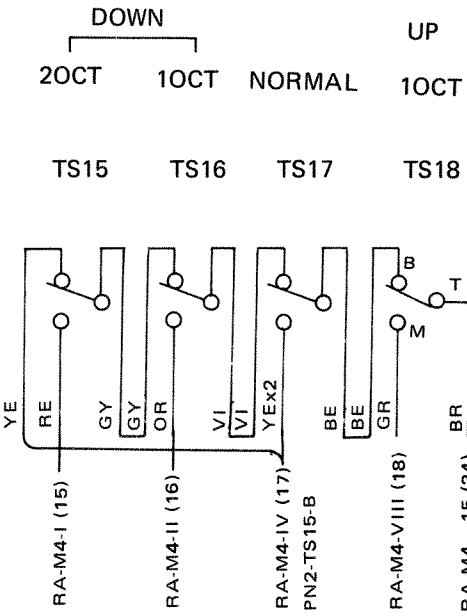
Note)

1. Diode : IS1555
2. Adjust three wires and cover then with insulating tube

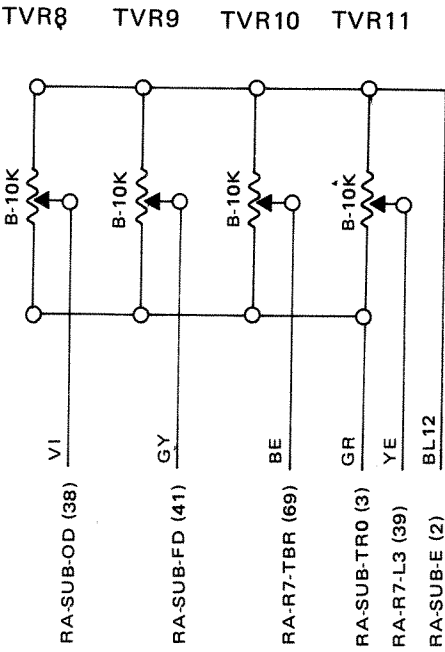
PN₂ (Pannel 2) Circuit



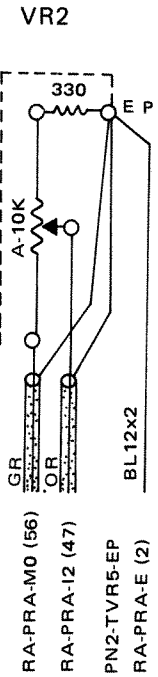
TRANSPOSITION

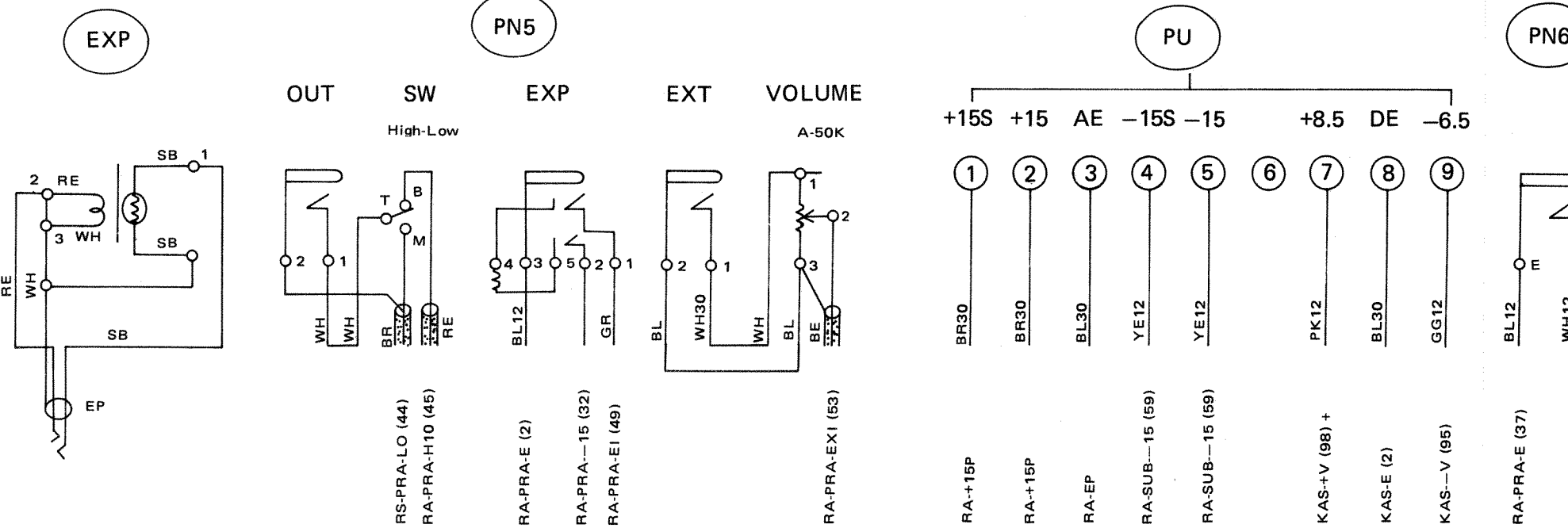
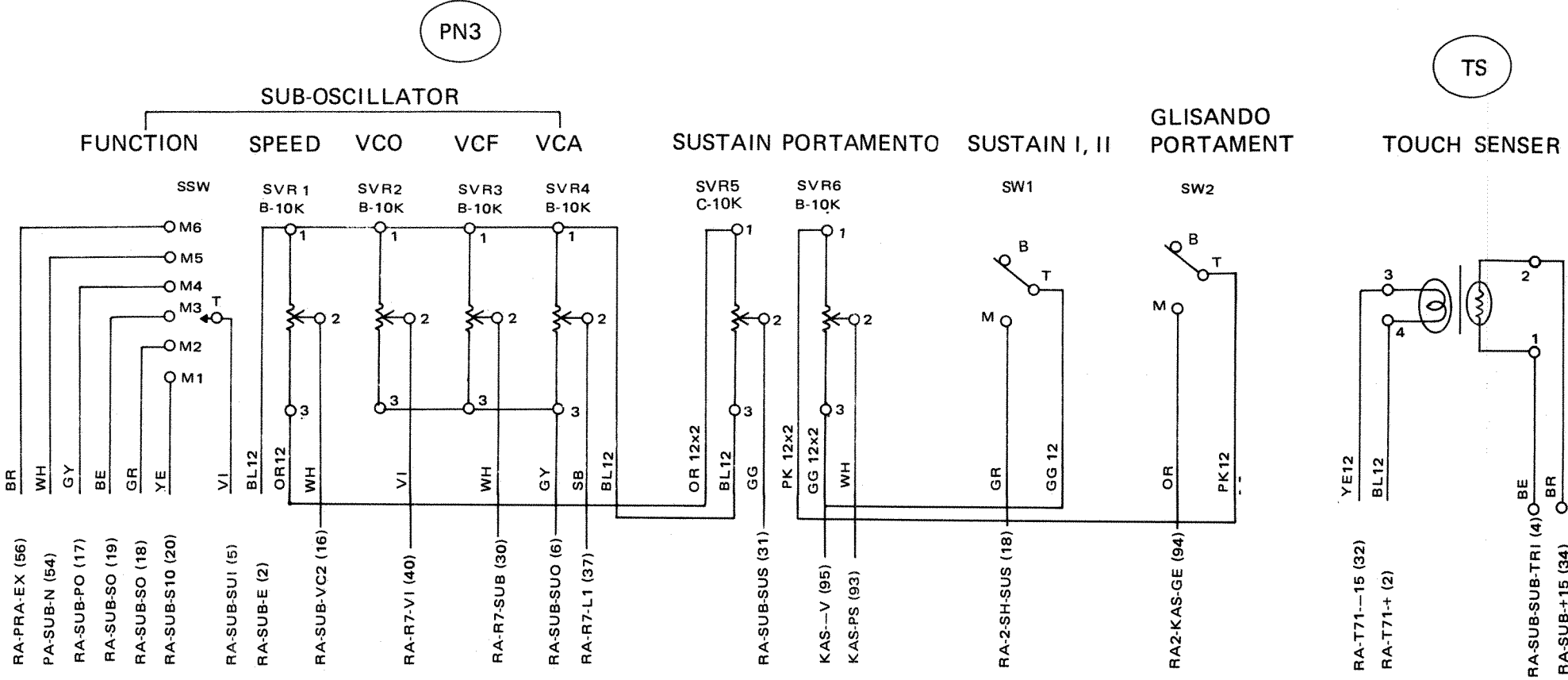


TOUCH RESPONSE



VOLUME

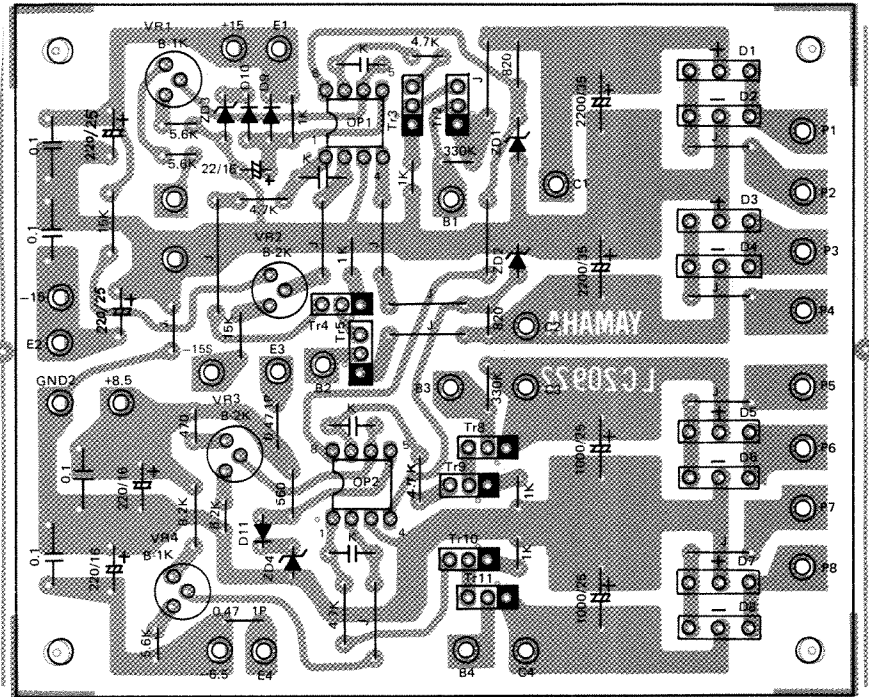
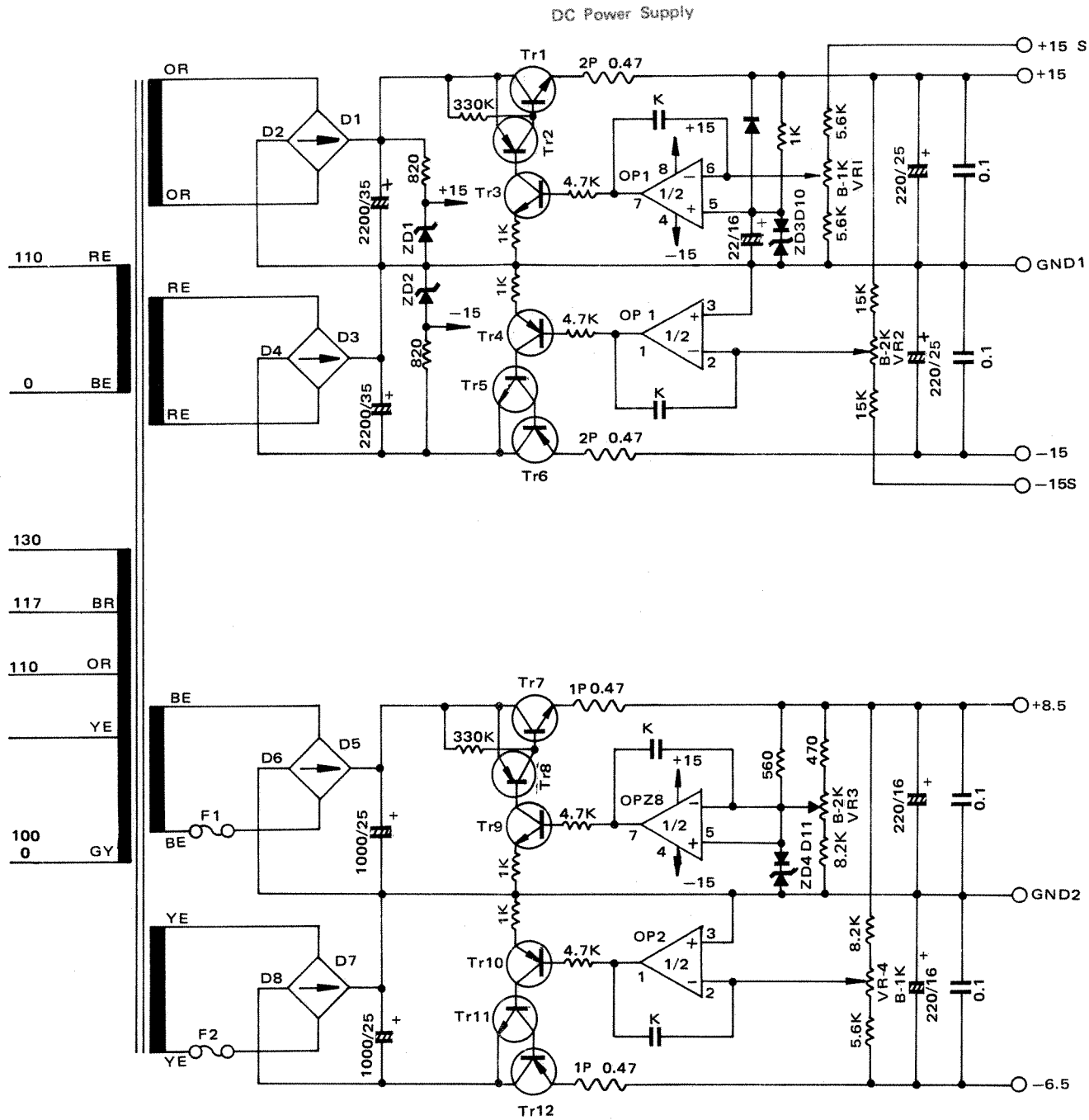




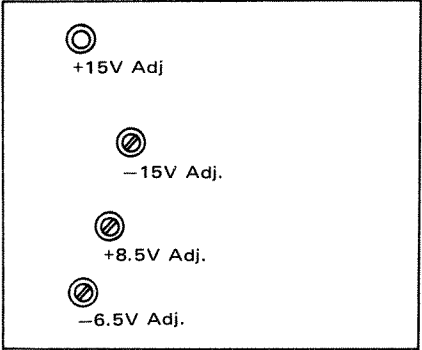
SVU Circuit

SVU Circuit

SVU Circuit Board



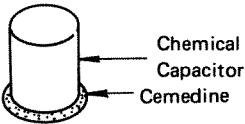
Adjustment



Note)

- 1. Print Board : LC20922
- 2. Transistor
 - Tr2 : 2SA490 (Y)
 - Tr4,8,10 : 2SA561 (Y)
 - Tr3,9,11 : 2SC828 (Y)
 - Tr5 : 2SD234 (O)
- 3. Diode
 - D1,3,5,7 : 10DC-4
 - D2,4,6,8 : 10DC-4R
 - D9,10,11 : 1S1555
- 4. Zener Diode
 - ZD1,2 : WZ150
 - ZD3,4 : 1S1715
- 5. K Mark : Ceramic Capacitor
- 6. OP Amplifier
 - OP1, 2 : RC4558

- 7. Volume
 - VR1~4 : 3321H type
- 8. Application Sketch of Cemedine
 - Apply cemedine to the peripheral end surface of chemical capacitor completely as below.



Power Supply NP0013Z (Primary) Circuit

