INDEX

SPECIFICATIONS

KEYBOARD
61 keys C1 ~ c4 (5 octaves)

TONE SELECTORS

Channel I	Channel II
STRING 1	STRING 2
STRING 3	STRING 4
BRASS 1	BRASS 2
FLUTE	BRASS 3
ELECTRIC PIANO	BASS
CLAVICHORD 1	CLAVICHORD 2
HARPSICHORD 1	HARPSICHORD 2
ORGAN 1	ORGAN 2
GUITAR 1	GUITAR 2
FUNKY 1	FUNKY 2
FUNKY 3	FUNKY 4
MEMORY 1	MEMORY 2
MEMORY 3	MEMORY 4
PANEL	PANEL

TONE SLIDE CONTROLS
- VCO (Voltage Controlled Oscillator) Section
  - SPEED
  - PWM (Pulse Width Modulation)
  - PW (Pulse Width)
  - ⊓ (Square Wave) Switch (On/Off)
  - ⋀ (Sawtooth Wave) Switch (On/Off)
  - NOISE
- VCF (Voltage Controlled Filter) Section
  - HPF (High Pass Filter)
  - RES_H (Resonance High)
  - LPF (Low Pass Filter)
  - RES_L (Resonance High)
  - IL (Initial Level)
  - AL (Attack Level)
  - A (Attack Time)
  - D (Decay Time)
  - R (Release Time)
- VCA (Voltage Controlled Oscillator) Section
  - VCF LEVEL
  - ~ (Sine Wave)
  - A (Attack Time)
  - D (Decay Time)
  - S (Sustain Level)
  - R (Release Time)
  - LEVEL
- TOUCH RESPONSE Section
  - INITIAL Controls
    - BRILLIANCE
    - LEVEL
  - AFTER Controls
    - BRILLIANCE
    - LEVEL
- MEMORY BANKS (VCO, VCF, VCA, TOUCH RESPONSE)
  - Memory 1
  - Memory 2
  - Memory 3
  - Memory 4

EFFECT CONTROLS
- RING MODULATOR
  - ATTACK TIME
  - DECAY TIME
  - DEPTH
  - SPEED
  - MODULATION
- TOUCH RESPONSE
  - INITIAL Control
    - PITCH BEND
  - AFTER Controls
    - SUB. OSCILLATOR
      - SPEED
      - VCO
      - VCF
- SUB. OSCILLATOR
  - FUNCTION Selector (~, ⋀, ◺, ⊓ NOISE, EXTERNAL)
  - SPEED
  - VCO
  - VCF
  - VCA
- SUSTAIN
  - Select Switch (I/II)
  - SUSTAIN Time
- PORTAMENTO/GLISSANDO
  - Select Switch (PORTAMENTO/GLISSANDO)
  - PORTAMENTO/GLISSANDO Time
- FINGER BOARD
- RESONANCE
- BRILLIANCE
- KEYBOARD CONTROLS
  - BRILLIANCE
    - LOW
    - HIGH
  - LEVEL
    - LOW
    - HIGH
- ORCHESTRA EFFECT
  - Voice Selector (ON/OFF)
  - TREMOLO
  - CHORUS
  - SPEED
  - DEPTH
- FEET levers (Channels I & II)
  (16', 8', 5-1/3', 4', 2-2/3', 2')

OTHER CONTROLS
- PITCH (Coarse & Fine Controls)
- DETUNE (Channel II only)
- CH. I/CH. II MIX
- Master VOLUME
- FOOT CONTROLLER (Pedal)
- EXTERNAL IN LEVEL
- FOOT PEDAL Selectors
  (EXP./EXP. & WAH)
- FOOT SWITCH Selectors (On/Off)
  - SUSTAIN
  - PORTAMENTO/GLISSANDO
- POWER SWITCH (with Indicator)

OTHER FITTINGS
- EXTERNAL IN Jack
- OUTPUT Jacks with Selector (HIGH/LOW)
- Headphone Jack
- FOOT CONTROLLER Jack
- FOOT SWITCH Jack
- Carrying Straps
- Metal Corners
- Slip Fittings
- Power Cord Storage Space

OUTPUT SPECIFICATIONS
Nominal Levels
High: 0 dBm (800 mVrms)
Low: −20 dBm (80 mVrms)
Headphones: −10 dBm (250 mVrms)
Nominal Impedance
Output Jacks: 600 ohms
Headphone Jack: 8 ohms

CIRCUITRY
Solid State
Power Consumption: 180 Watts
Power Source: AC, 50/60 Hz

DIMENSIONS (W x H x D)
Assembled: 1,205 x 945 x 702 mm (47-1/2 x 37-1/4 x 27-5/8")
In Case: 1,205 x 290 x 702 mm (47-1/2 x 11-3/8 x 27-5/8")
Height to Keyboard: 842 mm (33-1/8")

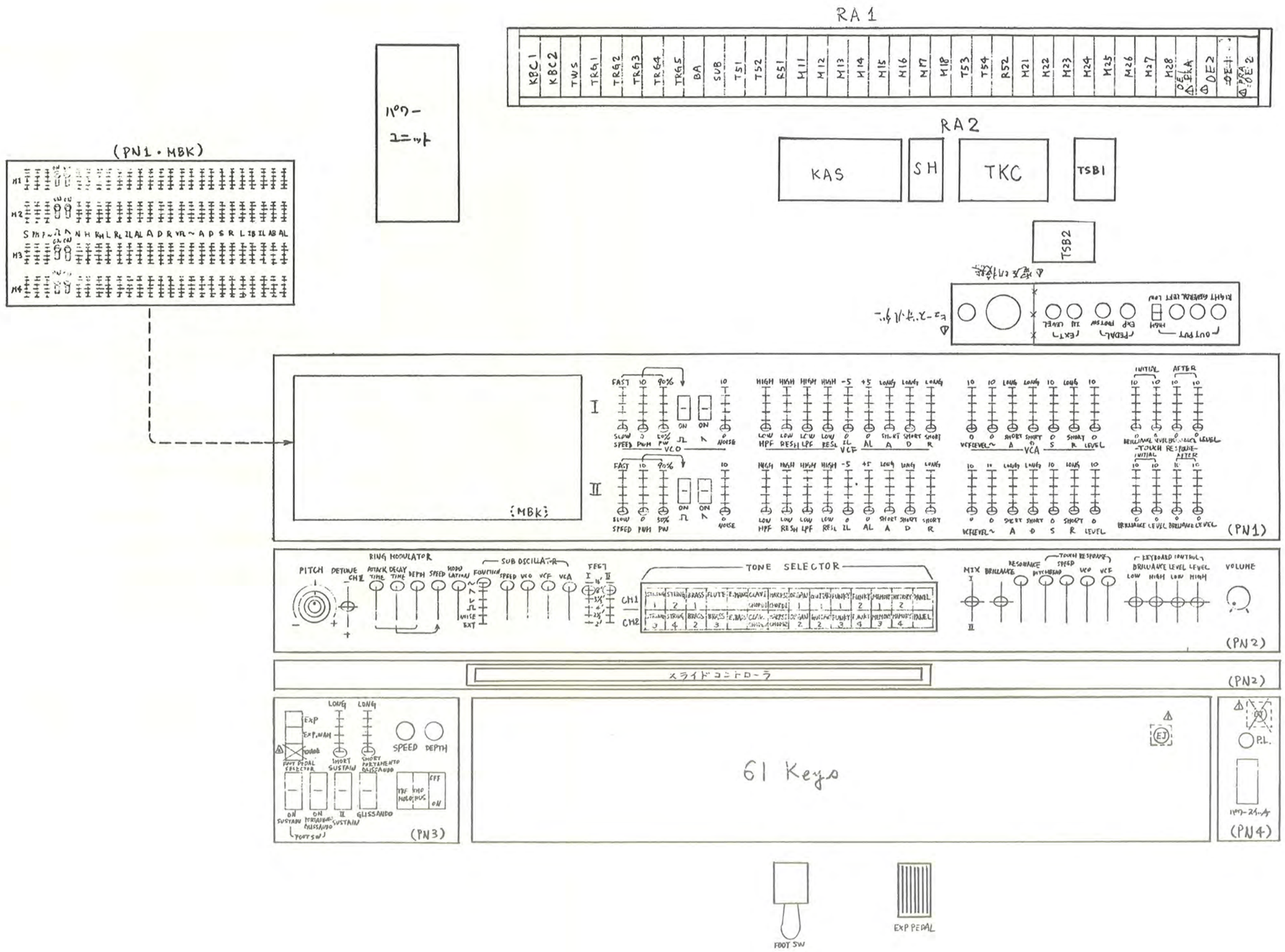
WEIGHT
100 kg (220.5 lbs) Including Standard Accessories

FINISH
Black Leatherette with Walnut Veneer Panel Siding

STANDARD ACCESSORIES
- Removable Cover
- Vinyl Carrying Bag
- Foot Controller (Expression Pedal)
- Foot Switch Pedal
- Music Rest
- Detachable Casters

Specification subject to change without notice.

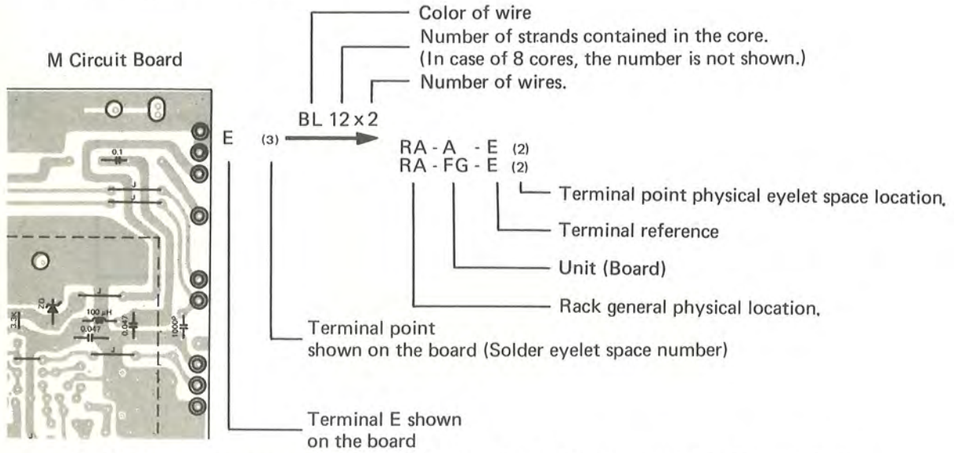
PANEL LAYOUT



CORDING GUIDE

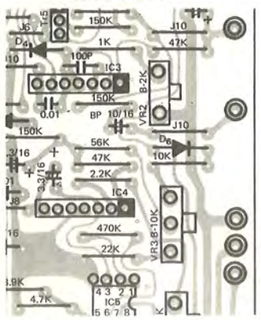
1) CIRCUIT BOARD AND WIRING

The coding system is as follows



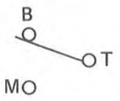
Two (2) black wires are connected to "E" on M circuit board. One goes to each "E" terminal of A and FG boards.

Circuit Board



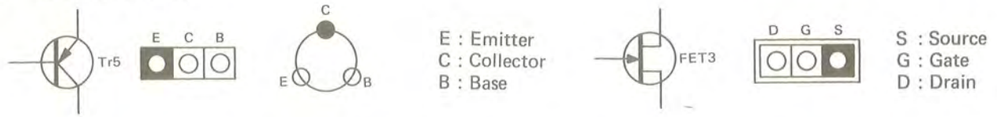
(View from the side points mounted)

2) SWITCH



B : Break
T : Transfer
M : Make

3) Transistor and FET



4) ABBREVIATIONS OF WIRE COLOR IN ELECTONE

BL	BLACK	BR	BROWN	RE	RED	OR	ORANGE
YE	YELLOW	GR	GREEN	BE	BLUE	VI	VIOLET
GY	GRAY	WH	WHITE	GG	GRASS GREEN	SB	SKY BLUE
PK	PINK	TR	TRANSPARENT	TP	TIN PLATED WIRE		

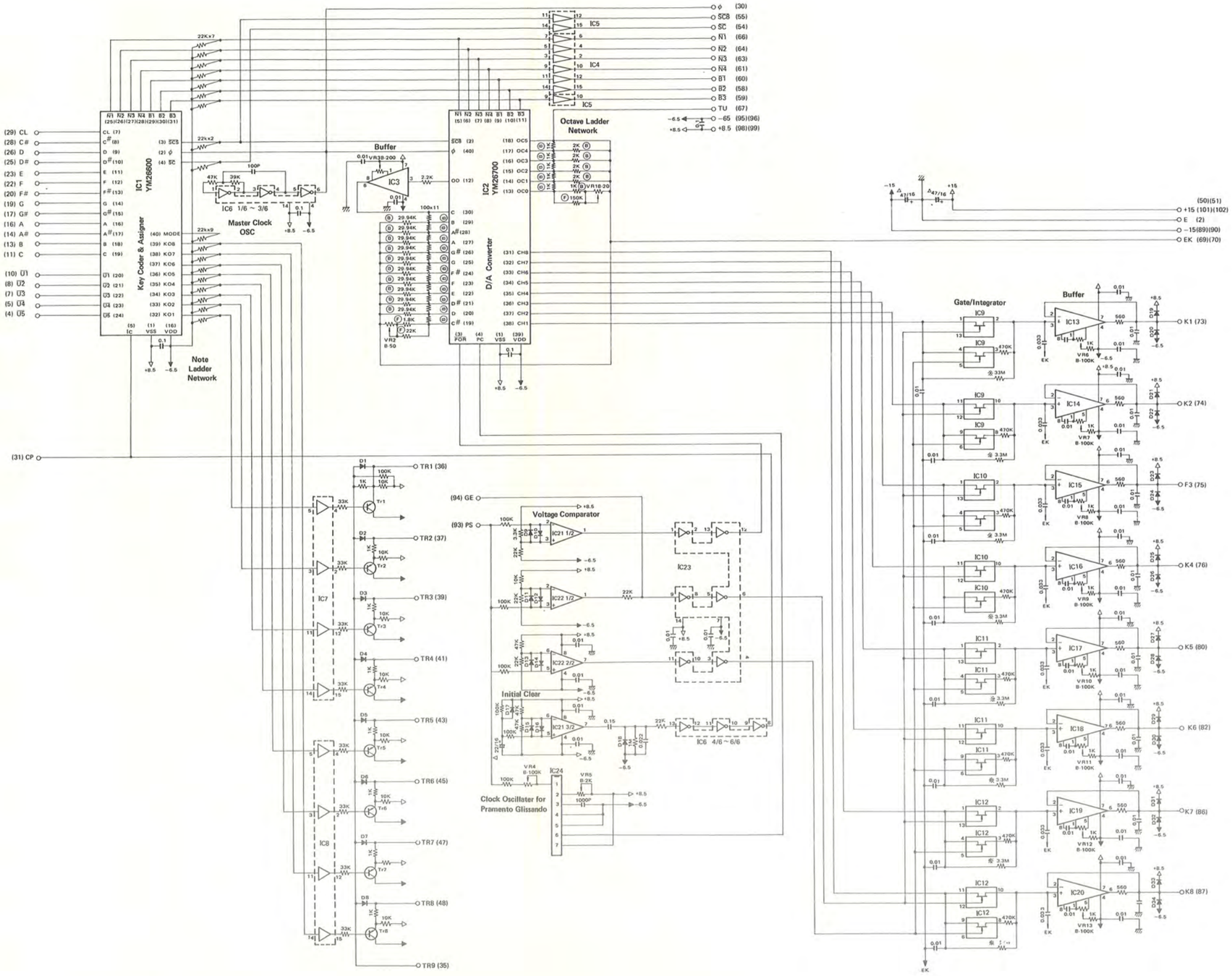
5) WIRE COLOR – Musical Note indication

C	C#	D	D#	E	F	F#	G	G#	A	A#	B
BR	RE	OR	YE	GR	BE	VI	GY	WH	GG	SB	PK

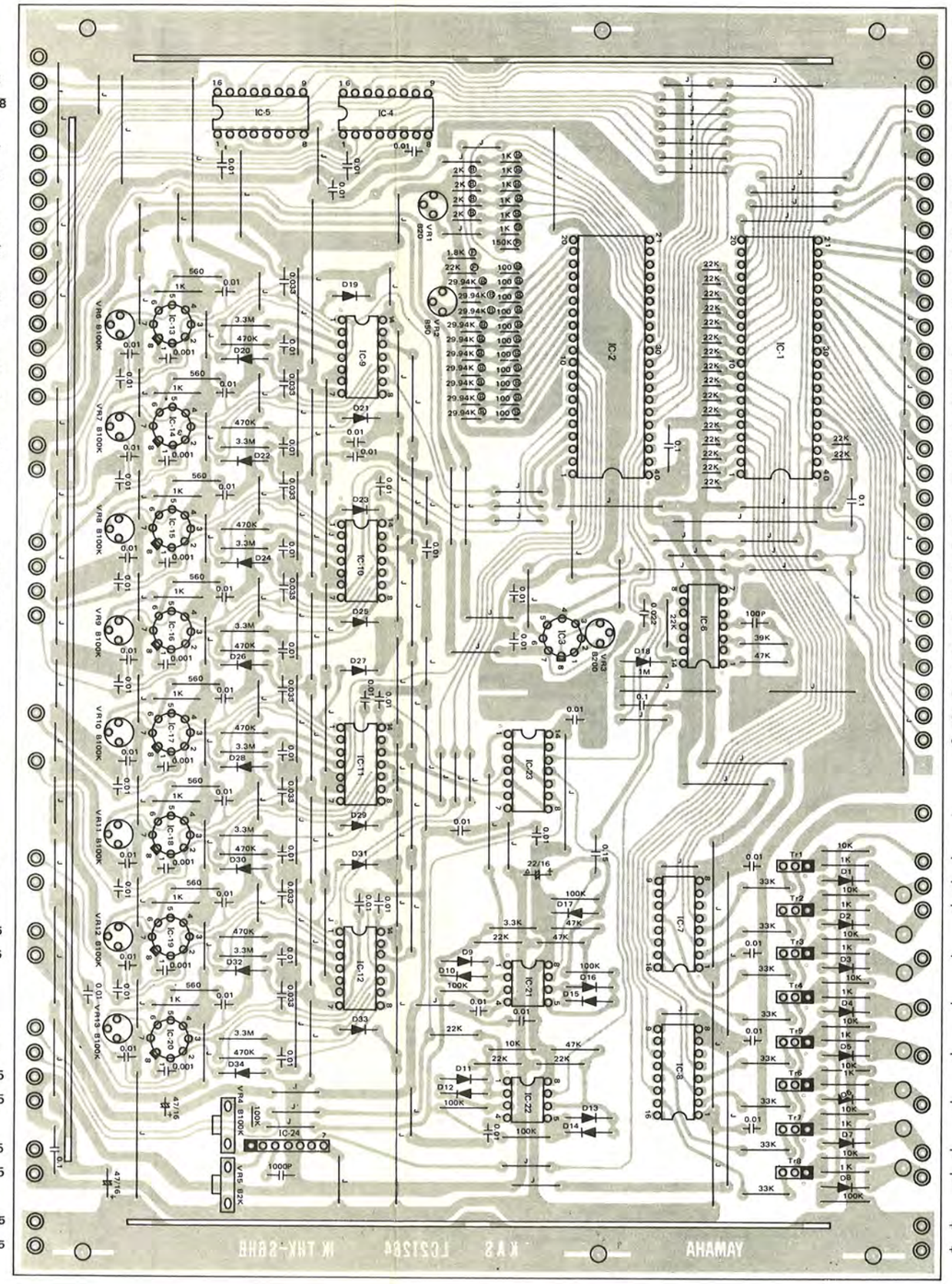
6) Logic Mark

FUNCTION	LOGIC MARK	
	MIL	YAMAHA
NOT (INVERTER)		
NOR		
NAND		

KAS Circuit Diagram



KAS Circuit Board & Wiring



RA1-KBC1-SC (52) — WHx2 — (53) E
RA2-TKC-SC (58) — (54) SC
RA1-KBC1-SC8 (32) — GYx2 — (55) SC8
RA2-TKC-SC8 (59)

RA1-KBC1-B3 (21) — VIx2 — (56) E
RA2-TKC-B3 (66) — (57) B3
RA1-KBC1-B2 (23) — BEx2 — (58) B2
RA2-TKC-B2 (65)

RA1-KBC1-B1 (24) — GRx2 — (59) E
RA2-TKC-B1 (64) — (60) B1
RA1-KBC1-N4 (26) — YEx2 — (61) N4
RA2-TKC-N4 (63)

RA1-KBC1-N3 (27) — ORx2 — (62) E
RA2-TKC-N3 (62) — (63) N3
RA1-KBC1-N2 (29) — REx2 — (64) N2
RA2-TKC-N2 (61)

RA1-KBC1-N1 (30) — BRx2 — (65) E
RA2-TKC-N1 (60) — (66) N1
RA1-BA-0 (69) — GY — (67) TU

RA1-EP — BL30
RA2-KAS-E (2) — BL12 — (69) EK
RA1-M11-EK (19) — BL — (70) EK
RA2-SH-E (36) — BL30

RA2-SH-KI1 (3) — BR — (73) K1
RA2-SH-KI2 (4) — RE — (74) K2
RA2-SH-KI3 (6) — OR — (75) K3
RA2-SH-KI4 (8) — YE — (76) K4

RA2-SH-KI5 (19) — GR — (80) K5
RA2-SH-KI6 (20) — BE — (82) K6

RA2-SH-KI7 (22) — VI — (86) K7
RA2-SH-KI8 (24) — GY — (87) K8

RA1-M11-—15 (39) — YE30
RA2-SH-—15 (35) — YE12 — (89) –15
RA2-KAS-—15 (33) — YE12 — (90) –15

RA1-SUB-PS (29) — SB — (93) PS
PN3-SW4-T1 — GY — (94) GE
PU-9C1P-9 — GG12x2
RA2-SH-—6.5 (34) — GG12x2 — (95) –6.5
PN3-VR2-3
RA1-KBC1-—6.5 (37) — (96) –6.5

PU-9C1P-7 — PK12x2
RA2-SH-+8.5 (1) — PK12x2 — (98) +8.5
PN3-VR2-1
RA1-KBC1-+8.5 (5) — (99) +8.5

(101) +15
(102) +15

E (2) — BL12x2 — RA2-KAS-EK (69) / RA2-TKC-E (3)
E (3)
U5 (4) — BE — K-T1-C#5
U4 (5) — GR — K-T1-C#4
E (6)
U3 (7) — YE — K-T1-C#3
U2 (8) — OR — K-T1-C#2
E (9)
U1 (10) — RE — K-T1-C1
C (11) — BR — K-M1-C2
E (12)
B (13) — PK — K-M1-B1
A# (14) — SB — K-M1-A#1
E (15)
A (16) — GG — K-M1-A1
G# (17) — WH — K-M1-G#1
E (18)
G (19) — GY — K-M1-G1
F# (20) — VI — K-M1-F#1
E (21)
F (22) — BE — K-M1-F1
E (23) — GR — K-M1-E1
E (24)
D# (25) — YE — K-M1-D#1
D (26) — OR — K-M1-D1
E (27)
C# (28) — RE — K-M1-C#1
CL (29) — BR — K-M1-C1
ϕ (30) — GGx2 — RA1-KBC1-ϕ (60) / RA2-TKC-ϕ (34)

–15 (33) — YE12 — RA2-KAS-—15 (90)

TR9 (35) — WH — RA1-PRA-TR (19)
TR1 (36) — BRx2 — RA1-TWS-T1 (31) / RA2-SH-TR1 (11)
TR2 (37) — REx2 — RA1-TWS-T2 (30) / RA2-SH-TR2 (12)
TR3 (39) — ORx2 — RA1-TWS-T3 (32) / RA2-SH-TR3-(14)
TR4 (41) — YEx2 — RA1-TWS-T4 (29) / RA2-SH-TR4 (16)
TR5 (43) — GRx2 — RA1-TWS-T5 (66) / RA2-SH-TR5 (27)
TR6 (45) — BEx2 — RA1-TWS-T6 (63) / RA2-SH-TR6 (28)
TR7 (47) — VIx2 — RA1-TWS-T7 (65) / RA2-SH-TR7 (30)
TR8 (48) — GYx2 — RA1-TWS-T8 (64) / RA2-SH-TR8 (32)

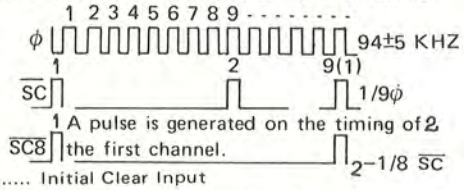
+15 (50) — BR30 — RA1-+15P
+15 (51) — BR12 — RA2-SH-+15 (70)

KEY CODER & KEY ASSIGNER LSI (YM26600)

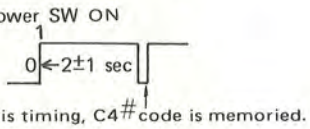
The LSI detects what keys are held down by judging the pulse combination of the octave and note.
It also generates the seven bit key code, which is processed by time sharing, in accordance with the key held down.

Pin. No. — Pin Name

1. VSS .....+8.5V Power Supply
2. ϕ ..... Master Clock Input
3. $\overline{SC}$ ..... Synchro-clock Output
4. $\overline{SC8}$ ..... Synchro-clock Output on the first channel.



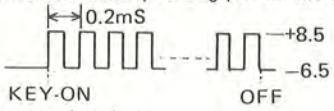
5. IC ..... Initial Clear Input



On this timing, C4# code is memoried.

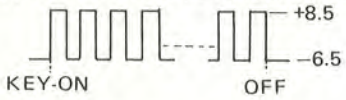
6. VDD .....–6.5V Power Supply Input
7. CL
8. C#
19. C .... Note on data input

When the key is depressed, the pulse is supplied the corresponding pin of the note.



20. V1
24. V5 .... Octave on data input

When the key is depressed, the pulse is supplied to the corresponding pin of the octave.



25. $\overline{N1}$
28. $\overline{N4}$ .... Note code data output

1: –6.5V 0: +8.5V

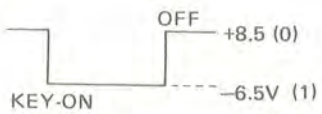
	C#	D	D#	E	F	F#	G	G#	A	A#	B	C
N1	1	0	1	1	0	1	1	0	1	1	0	1
N2	1	1	0	1	1	0	1	1	0	1	1	0
N3	1	1	1	0	0	0	1	1	1	0	0	0
N4	1	1	1	1	1	1	0	0	0	0	0	0

29. B1
31. B3 .... Octave Code Data Output

1: –6.5V 0: +8.5V

	C2	C2#~C3	C3#~C4	C4#~C5	C5#~C6
B1	0	1	0	1	0
B2	1	0	0	1	1
B3	1	1	1	0	0

32. KO1
39. KO8 .... Key on Data Output



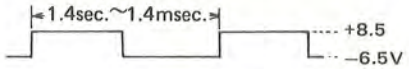
The number of note sounded is variable by using this pin.
i.e.) Up to 4 notes: Supply –6.5V to $\overline{KO5}$.
Up to 3 notes: Supply –6.5V to $\overline{KO4}$.

40. Mode .... Switching output for sound model
For 8 notes .... Supply –6.5V (1)
For 7 notes .... Supply +8.5V (0)

D-A CONVERTER LSI (YM26700)

The time shared key data is supplied to the LSI. Analog DC voltage is produced in corporation with key by the data and supplied to each channel.

1. VSS ..... +8.5V Power Supply
2. $\overline{SC8}$ ..... Synchro-clock input on the first channel.
3. $\overline{POR}$ ..... Portamento and Glissando operation. When the portament VR is turned on, +8.5V is supplied to the pin and actuate.
4. PC ..... Clock input for Portament and Glissando operation.



The frequency is variable by Changing the portamento VR.

5. $\overline{N1}$ ..... Note code data input
8. $\overline{N4}$ Note code data is supplied to the pins from key coder LSI.
9. $\overline{B1}$ ..... Octave code data input
11. $\overline{B3}$ Octave code data is supplied to the pins from key coder LSI.
12. OO ..... Output for octave key voltage. (8ch time sharing)
Provided the output key voltage for the octave selected from octave code.
13. OCT0 ..... Input for octave key voltage.
18. OCT5

* TU pin: 4.0V

	OCT0	OCT1	OCT2	OCT3	OCT4	OCT5
Voltage	0.25V	0.5V	1.0V	2.0V	4.0V	4.0V

The voltage of TU line is divided by the ladder composed resistors and supplied to each pin constantly.

19. C#
30. C .... Input for note key voltage

OO pin: 4.0V

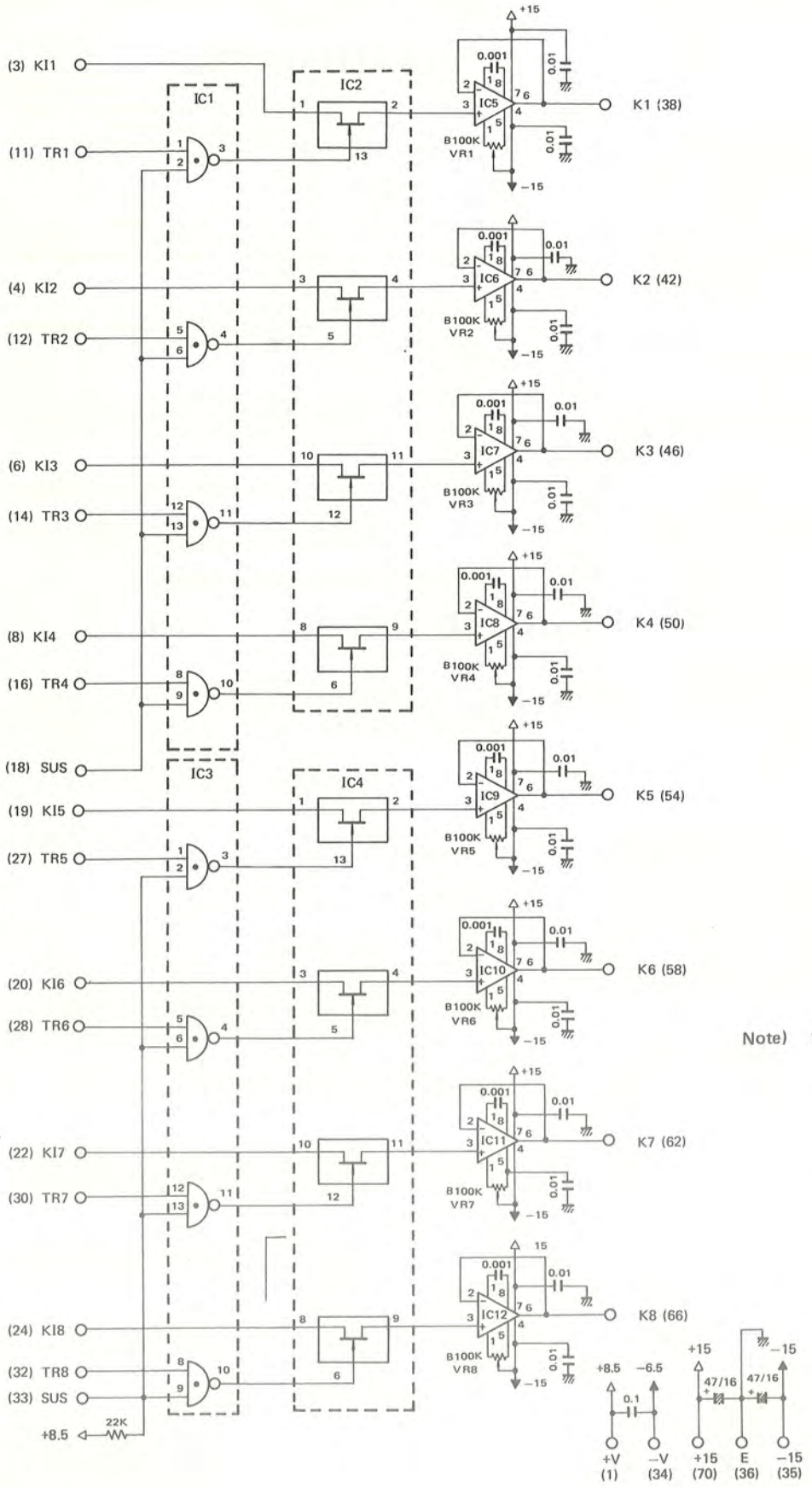
	C#	D	D#	E	F	F#
Voltage	2.119	2.245	2.378	2.520	2.670	2.828

	G	G#	A	A#	B	C
Voltage	2.997	3.175	3.364	3.564	3.775	4.0V

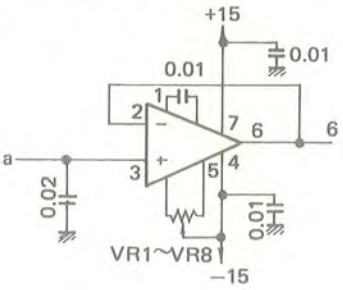
The voltage of OO line is divided by the ladder composed resistors and supplied to each pin constantly.

31. CH8 .... Key voltage output
38. CH1 The output of voltage determined by each key is provided in accordance with the channel key code.
39. VDD .... –6.5V Power Supply, Input
40. ϕ ..... Master Clock Input f=94±5KHz

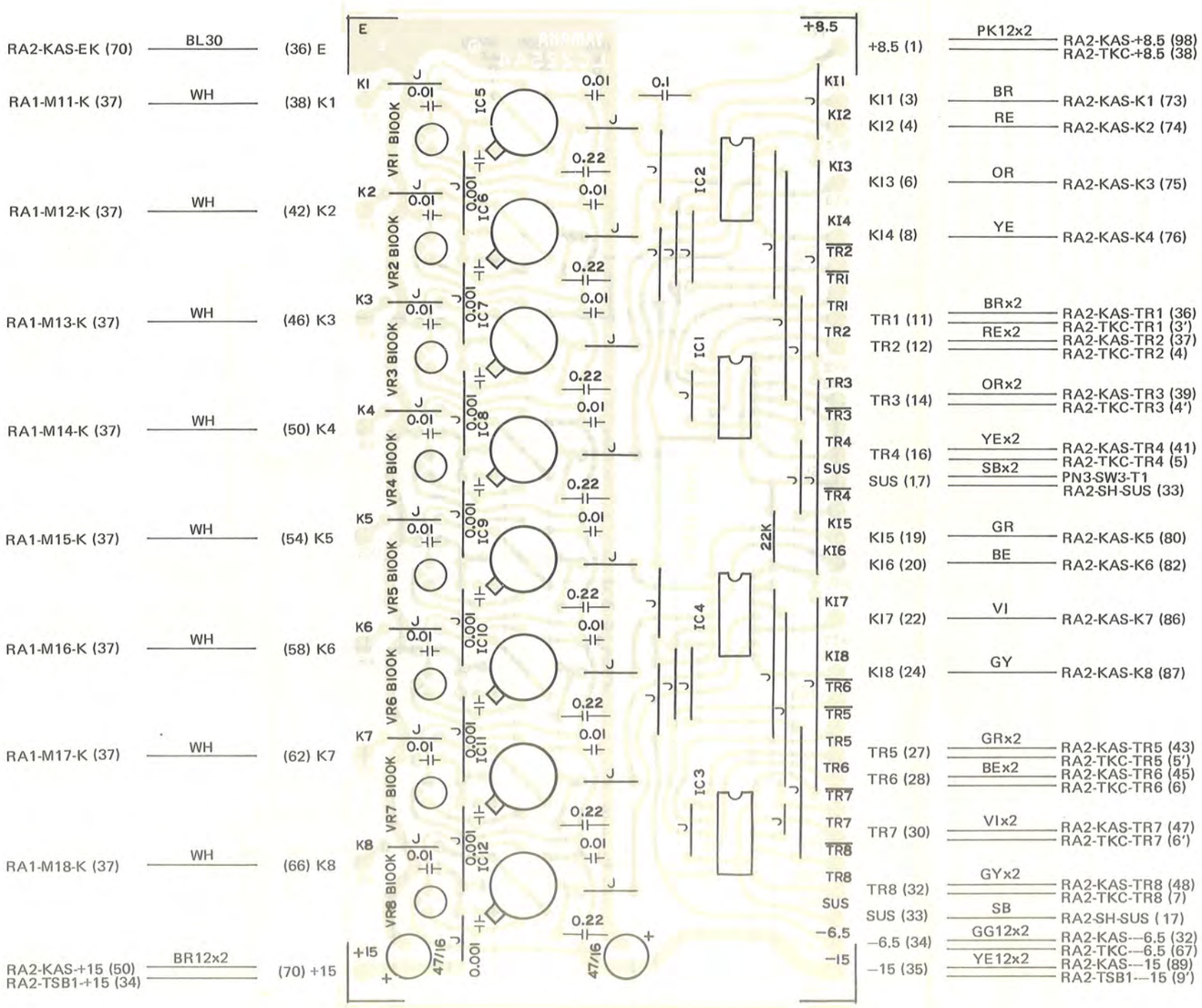
SH Circuit Diagram



Note) 1. IC5~IC12 :CA4016P

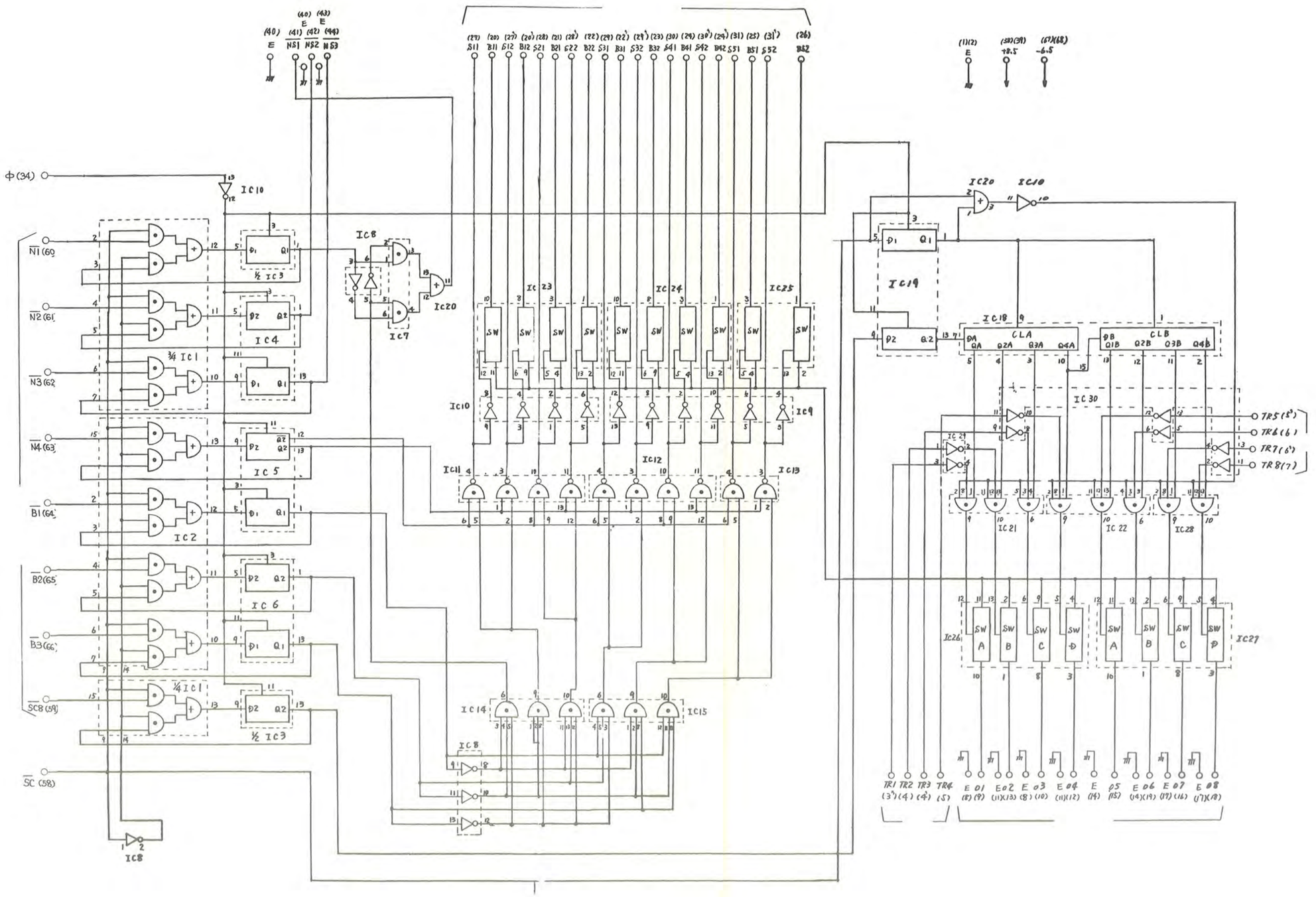


SH Circuit Board & Wiring

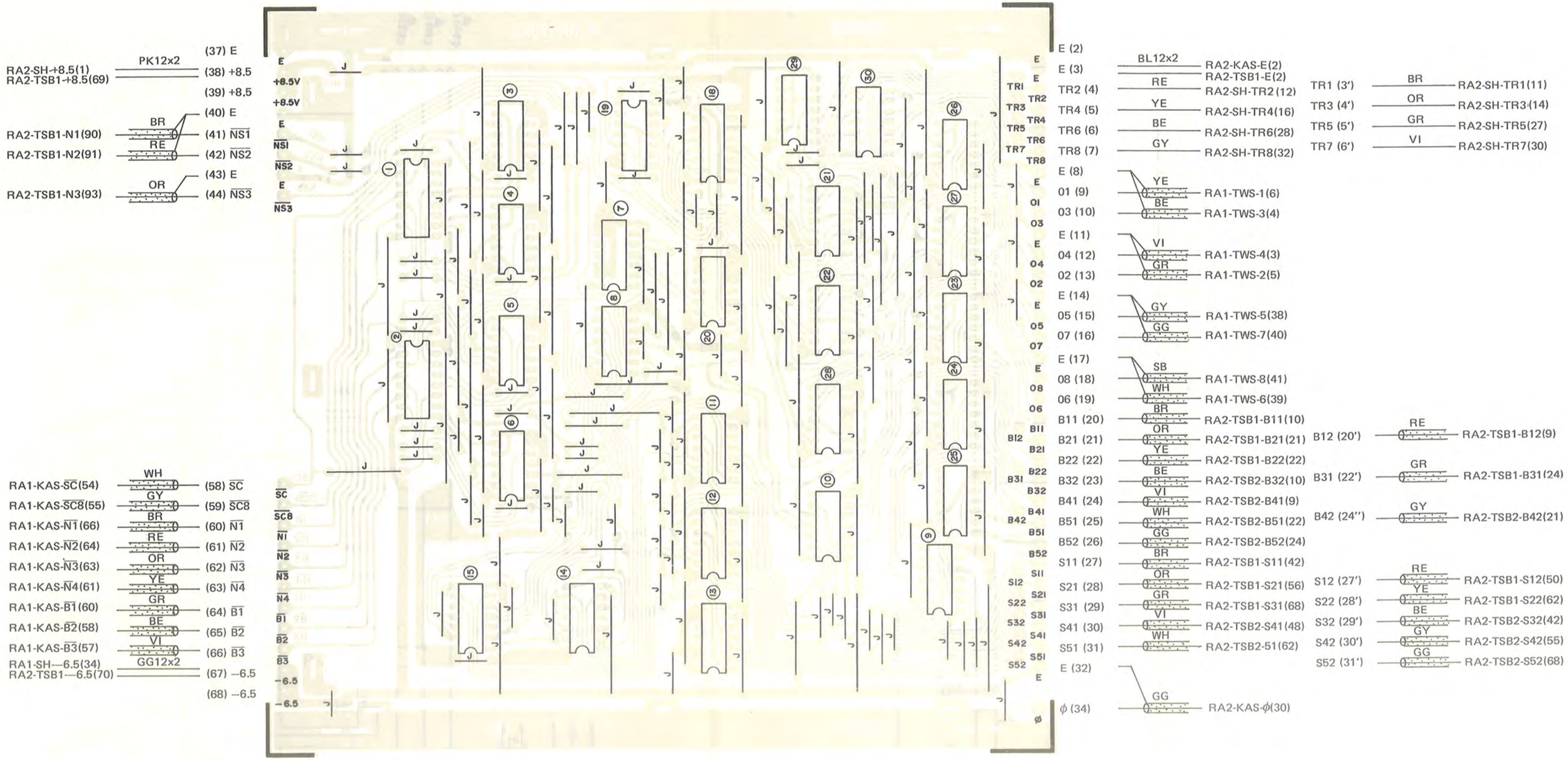


Note) 1. ※ Mark : Ceramic Capacitor 0.1
2. Volume : 332H
3. IC1,3 : TC4011P
IC2,4 : TC4016P
IC5~12 : CA3140T
4. Print Board #22544

TKC Circuit Diagram

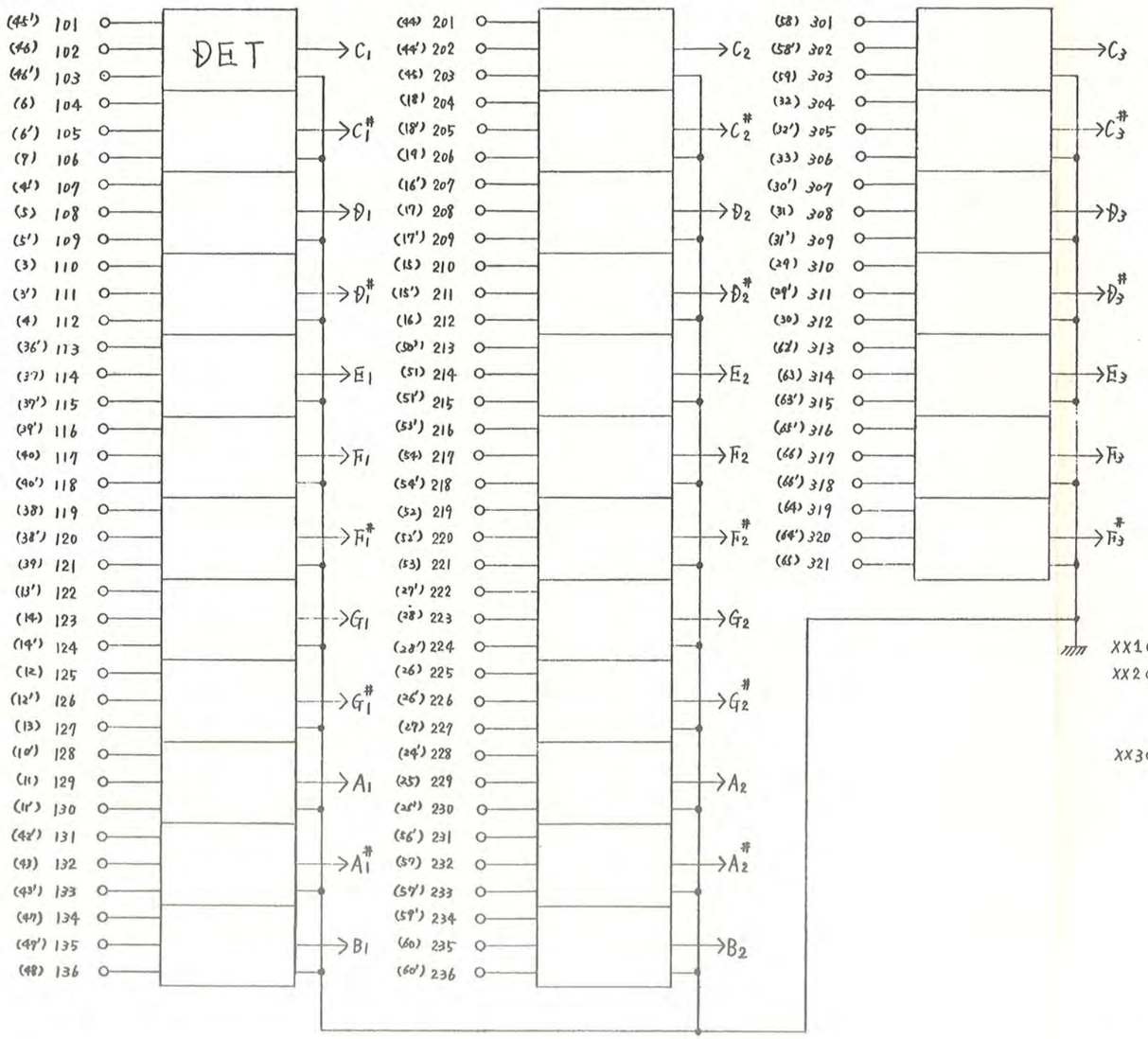


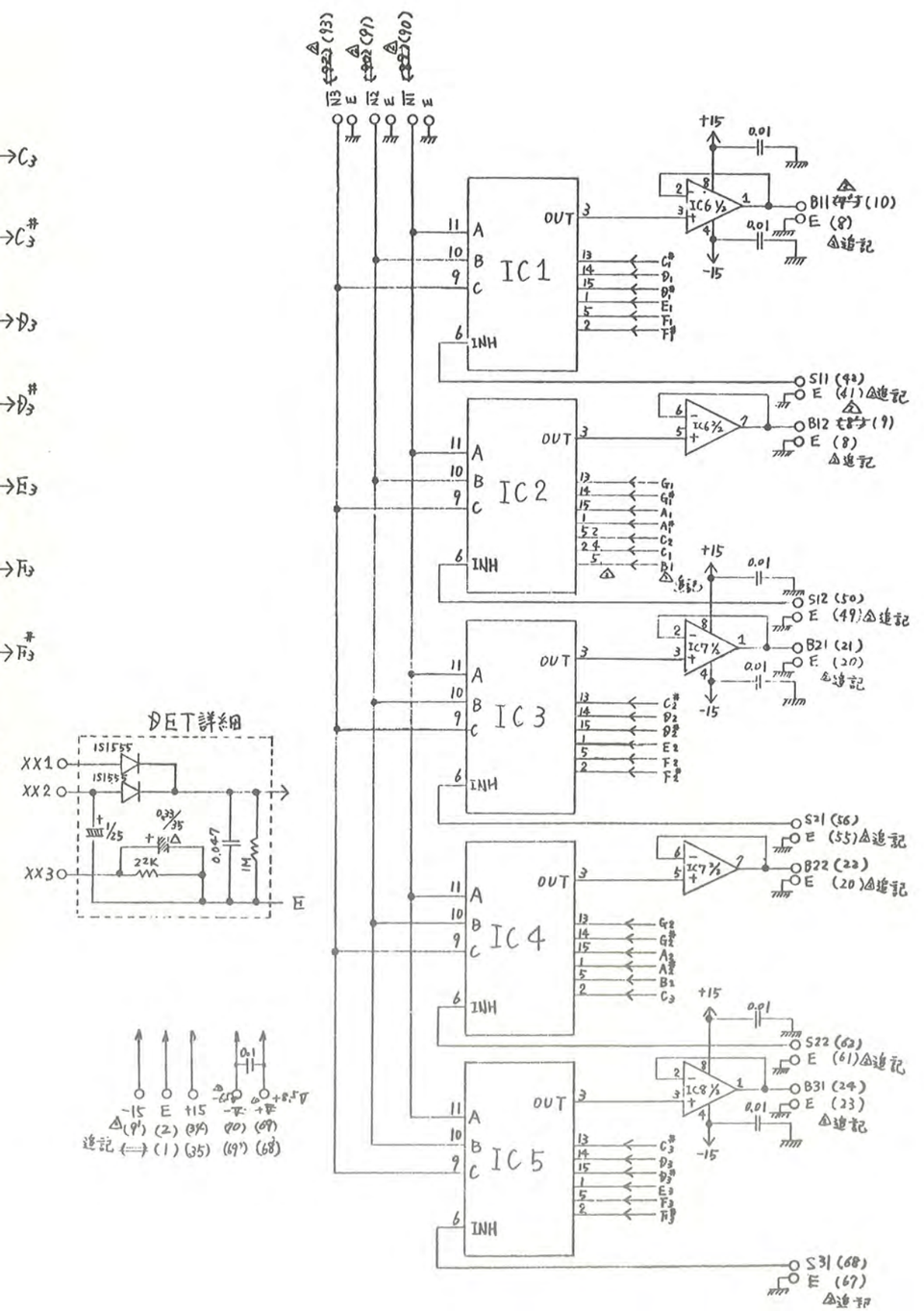
TKC Circuit Board & Wiring



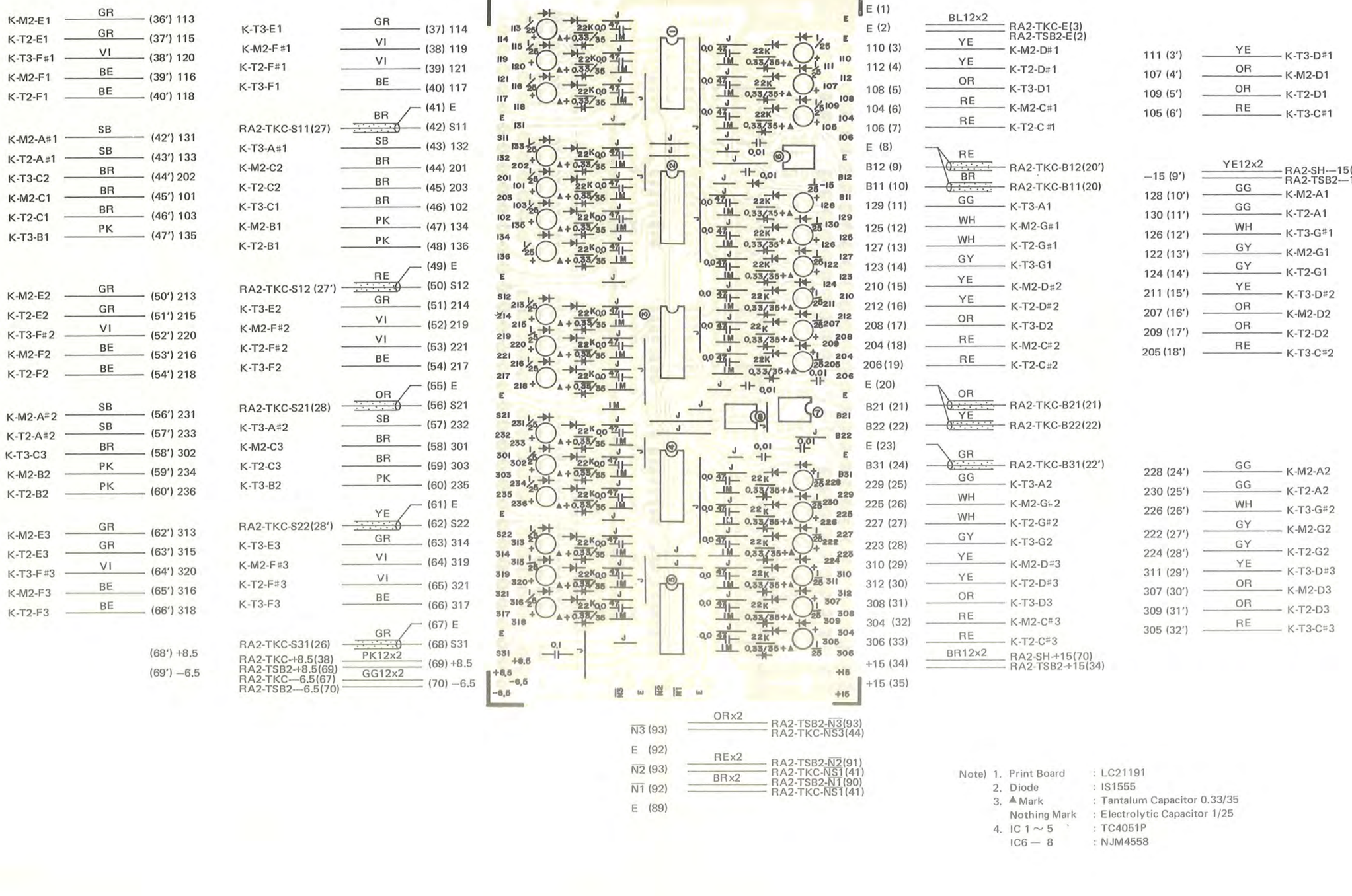
Note) 1. Print Board : LC21053
2. IC 1, 2 : TC4019P
IC 3 ~ 6, 19 : TC4013P
IC7 : TC4081P
IC 8 ~ 10, 29, 30 : TC4069P
IC 11 ~ 13 : TC4011P
IC 14, 15, 21, 22, 28 : TC4073P
IC 18 : TC4015P
IC 20 : TC4071P
IC 23 ~ 27 : TC4016P
3. Camber-stop Hardware : #03992

TSB 1 Circuit Diagram



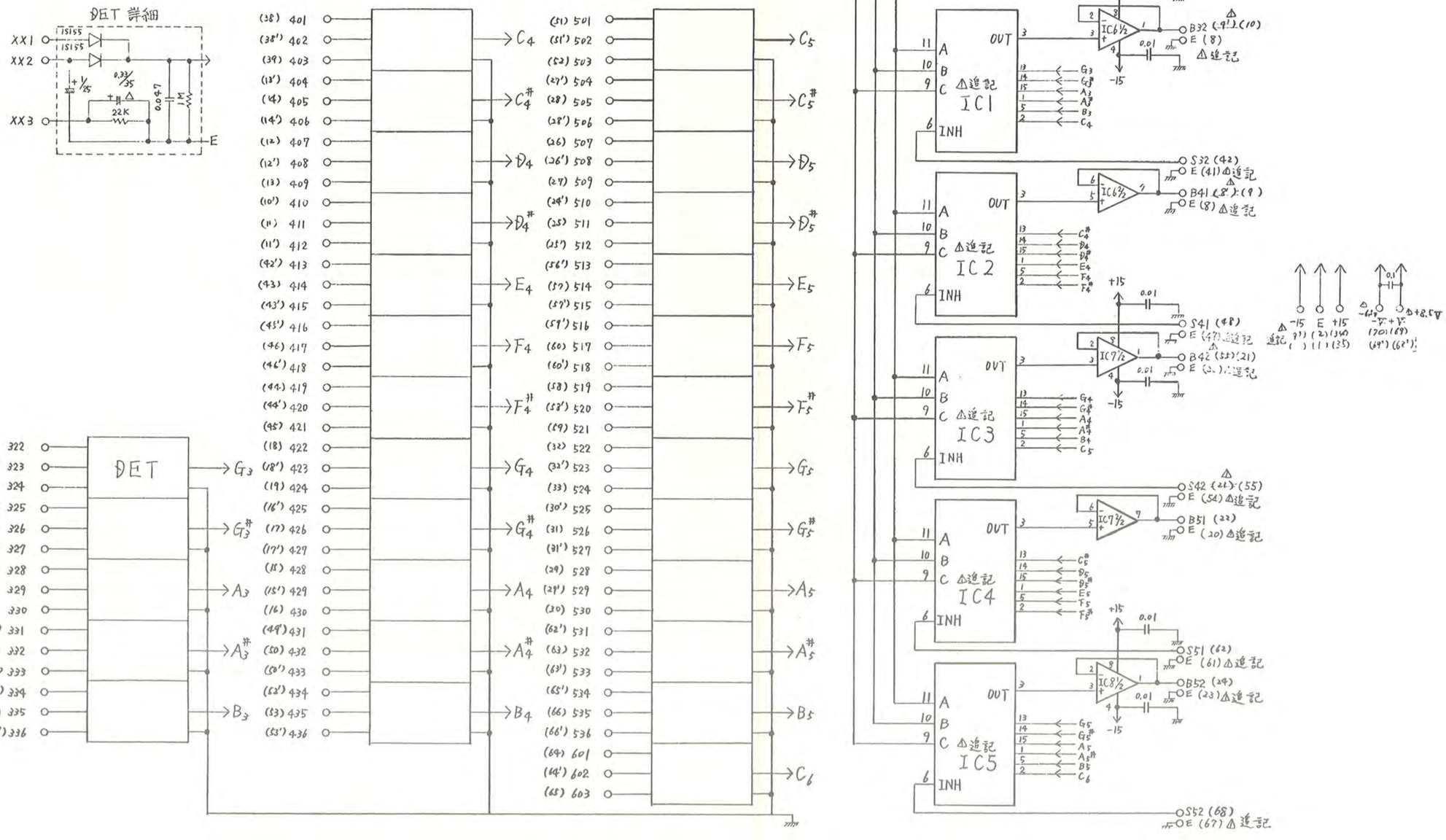


TSB 1 Circuit Board & Wiring

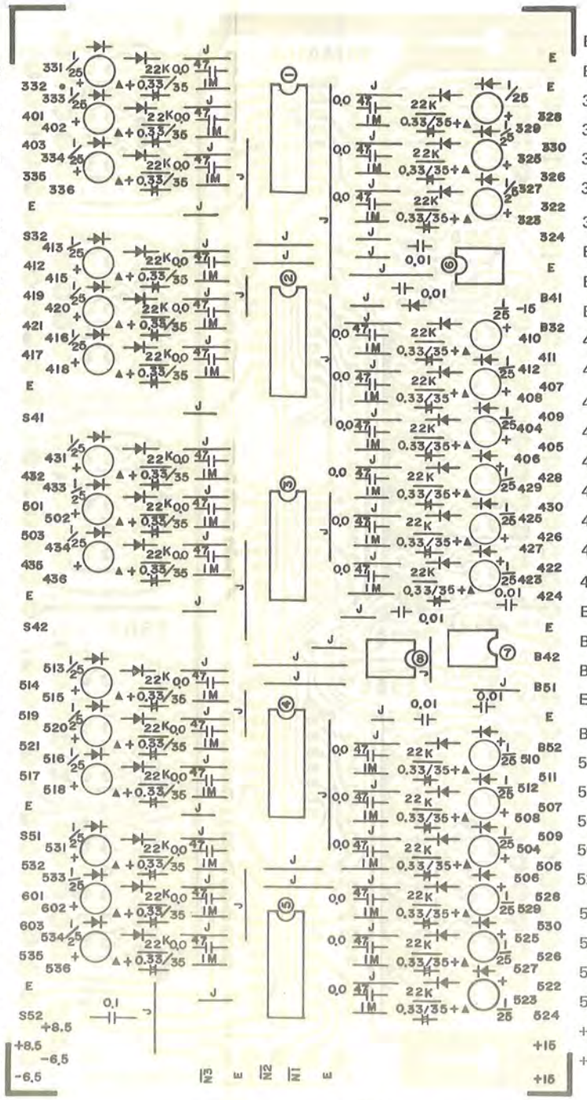


Note) 1. Print Board : LC21191
2. Diode : IS1555
3. ▲Mark : Tantalum Capacitor 0.33/35
Nothing Mark : Electrolytic Capacitor 1/25
4. IC 1 ～ 5 : TC4051P
IC6 — 8 : NJM4558

TSB 2 Circuit Diagram



TSB 2 Circuit Board & Wiring



K-M2-A#3 — SB — (36') 331
K-T2-A#3 — SB — (37') 333
K-T3-C4 — BR — (38') 402
K-M2-B3 — PK — (39') 334
K-T2-B3 — PK — (40') 336

K-M2-E4 — GR — (42') 413
K-T2-E4 — GR — (43') 415
K-T3-F#4 — VI — (44') 420
K-M2-F4 — BE — (45') 416
K-T2-F4 — BE — (46') 418

K-M2-A#4 — SB — (49') 431
K-T2-A#4 — SB — (50') 433
K-T3-C5 — BR — (51') 502
K-M2-B4 — PK — (52') 434
K-T2-B4 — PK — (53') 436

K-M2-E5 — GR — (56') 513
K-T2-E5 — GR — (57') 515
K-T3-F#5 — VI — (58') 520
K-M2-F5 — BE — (59') 516
K-T2-F5 — BE — (60') 518

K-M2-A#5 — SB — (62') 531
K-T2-A#5 — SB — (63') 533
K-T3-C6 — BR — (64') 602
K-M2-B5 — PK — (65') 534
K-T2-B5 — PK — (66') 536

K-T3-A#3 — SB — (37) 332
K-M2-C4 — BR — (38) 401
K-T2-C4 — BR — (39) 403
K-T3-B3 — PK — (40) 335
(41) E
RA2-TKC-S32(29') — BE — (42) S32
K-T3-E4 — GR — (43) 414
K-M2-F#4 — VI — (44) 419
K-T2-F#4 — VI — (45) 421
K-T3-F4 — BE — (46) 417
(47) E
RA2-TKC-S41(30) — VI — (48) S41

K-T3-A#4 — SB — (50) 432
K-M2-C5 — BR — (51) 501
K-T2-C5 — BR — (52) 503
K-T3-B4 — PK — (53) 435
(54) E
RA2-TKC-S42(30') — GY — (55) S42

K-T3-E5 — GR — (57) 514
K-M2-F#5 — VI — (58) 519
K-T2-F#5 — VI — (59) 521
K-T3-F5 — BE — (60) 517
(61) E
RA2-TKC-S51(31) — WH — (62) S51
K-T3-A#5 — SB — (63) 532
K-M2-C6 — BR — (64) 601
K-T2-C6 — BR — (65) 603
K-T3-B5 — PK — (66) 535
(67) E
RA2-TKC-S52(31') — GG — (68) S52
RA2-TSB1-+8.5(69) — PK12 — (69) +8.5
RA2-TSB1—6.5(70) — GG12 — (70) —6.5

E (1)
E (2)
328 (3)
330 (4)
326 (5)
322 (6)
324 (7)
E (8)
B41 (9)
B32(10)
411 (11)
407 (12)
409 (13)
405 (14)
428 (15)
430 (16)
426 (17)
422 (18)
424 (19)
E (20)
B42 (21)
B51 (22)
E (23)
B52 (24)
511 (25)
507 (26)
509 (27)
505 (28)
528 (29)
530 (30)
526 (31)
522 (32)
524 (33)
+15 (34)
+15 (35)

BL12 — RA2-TSB1-E(2)
GG — K-M2-A3
GG — K-T2-A3
WH — K-T3-G#3
GY — K-M2-G3
GY — K-T2-G3
VI — RA2-TKC-B41(24)
BE — RA2-TKC-B32(23)
YE — K-T3-D#4
OR — K-M2-D4
OR — K-T2-D4
RE — K-T3-C#4
GG — K-M2-A4
GG — K-T2-A4
WH — K-T3-G#4
GY — K-M2-G4
GY — K-T2-G4
GY — RA2-TKC-B42(24')
WH — RA2-TKC-B51(25)
GG — RA2-TKC-B52(26)
YE — K-T3-D#5
OR — K-M2-D5
OR — K-T2-D5
RE — K-T3-C#5
GG — K-M2-A5
GG — K-T2-A5
WH — K-T3-G#5
GY — K-M2-G5
GY — K-T2-G5
BR12 — RA2-TSB1-+15(34)

329 (3') — GG — K-T3-A3
325 (4') — WH — K-M2-G#3
327 (5') — WH — K-T2-G#3
323 (6') — GY — K-T3-G3

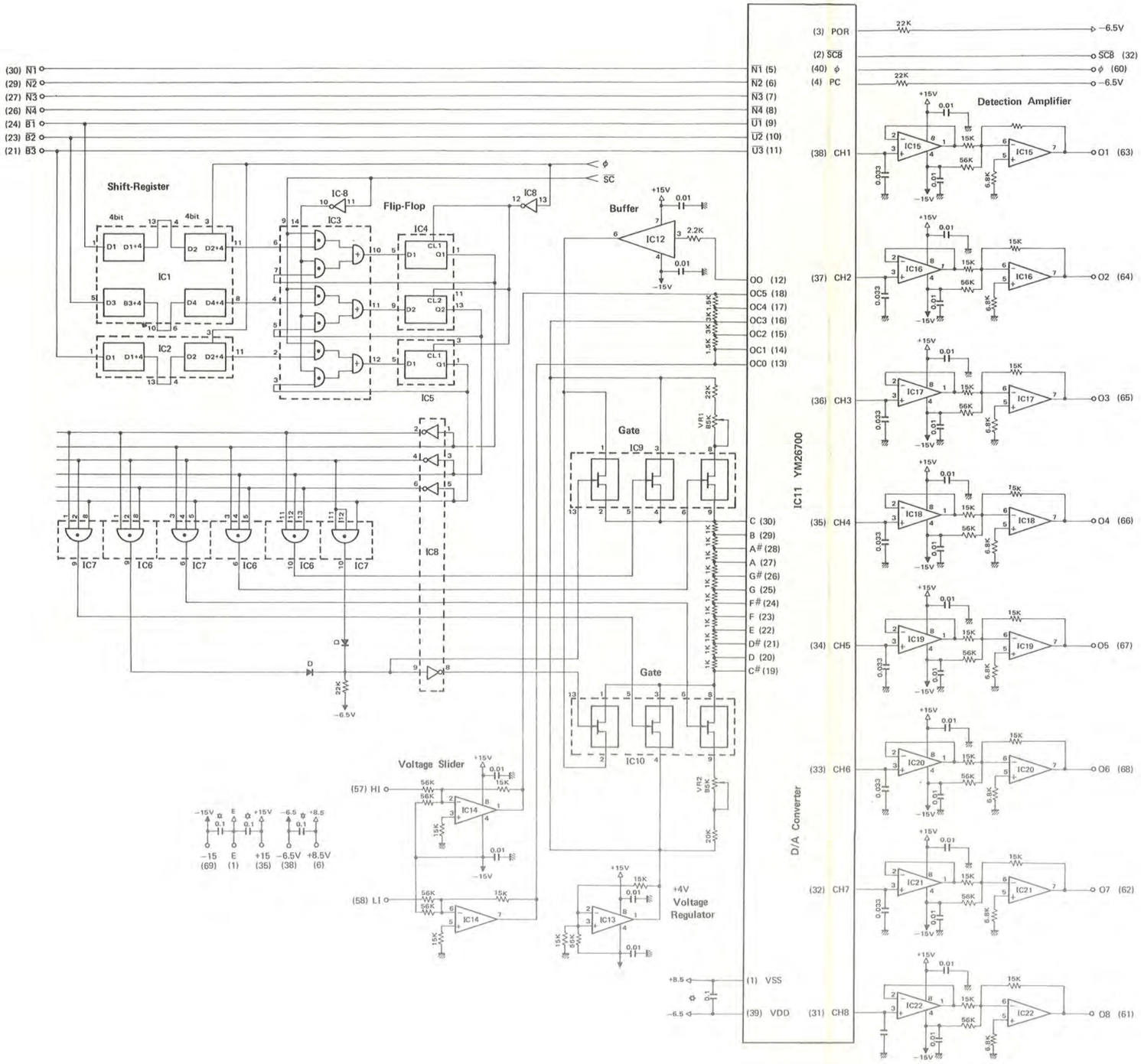
—15 (9') — YE12 — RA2-TSB1—15 (9')
410 (10') — YE — K-M2-D#4
412 (11') — YE — K-T2-D#4
408 (12') — OR — K-T3-D4
404 (13') — RE — K-M2-C#4
406 (14') — RE — K-T2-C#4
429 (15') — GG — K-T3-A4
425 (16') — WH — K-M2-G#4
427 (17') — WH — K-T2-G#4
423 (18') — GY — K-T3-G4

510 (24') — YE — K-M2-D#5
512 (25') — YE — K-T2-D#5
508 (26') — OR — K-T3-D5
504 (27') — RE — K-M2-C#5
506 (28') — RE — K-T2-C#5
529 (29') — GG — K-T3-A5
525 (30') — WH — K-M2-G#5
527 (31') — WH — K-T2-G#5
523 (32') — GY — K-T3-G5

$\overline{N3}$ (93) — OR — RA2-TSB1-$\overline{N3}$ (93)
E (92)
$\overline{N2}$ (91) — RE — RA2-TSB1-$\overline{N2}$ (91)
$\overline{N1}$ (90) — BR — RA2-TSB1-$\overline{N1}$ (90)
E (89)

Note) 1. Print Board : LC21201
2. Diode : IS1555
3. ▲Mark : Tantalum Capacitor 0.33/35
Nothing Mark : Electrolytic Capacitor 1/25
4. IC 1 ~ 5 : TC4051P
IC 6 ~ 8 : NJM4558

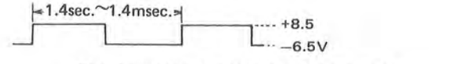
KBC 1 · 2 Circuit Diagram



D-A CONVERTER LSI (YM26700)

The time shared key data is supplied to the LSI. Analog DC voltage is produced in corporation with key by the data and supplied to each channel.

1. VSS ..... +8.5V Power Supply
2. $\overline{SC8}$ ..... Synchro-clock input on the first channel.
3. $\overline{POR}$ ..... Portamento and Glissando operation. When the portament VR is turned on, +8.5V is supplied to the pin and actuate.
4. PC ..... Clock input for Portament and Glissando operation.



The frequency is variable by Changing the portamento VR.

5. $\overline{N1}$ ..... Note code data input
8. $\overline{N4}$ Note code data is supplied to the pins from key coder LSI.

9. $\overline{B1}$ ..... Octave code data input
11. $\overline{B3}$ Octave code data is supplied to the pins from key coder LSI.

12. OO ..... Output for octave key voltage. (8ch time sharing)
Provided the output key voltage for the octave selected from octave code.

13. OCT0 ..... Input for octave key voltage.
18. OCT5

* TU pin: 4.0V

	OCT0	OCT1	OCT2	OCT3	OCT4	OCT5
Voltage	0.25V	0.5V	1.0V	2.0V	4.0V	4.0V

The voltage of TU line is divided by the ladder composed resistors and supplied to each pin constantly.

19. $C^{\#}$ .... Input for note key voltage
30. C

OO pin: 4.0V

	$C^{\#}$	D	$D^{\#}$	E	F	$F^{\#}$
Voltage	2.119	2.245	2.378	2.520	2.670	2.828

	G	$G^{\#}$	A	$A^{\#}$	B	C
Voltage	2.997	3.175	3.364	3.564	3.775	4.0V

The voltage of OO line is divided by the ladder composed resistors and supplied to each pin constantly.

31. CH8 .... Key voltage output
38. CH1 The output of voltage determined by each key is provided in accordance with the channel key code.

39. VDD .... −6.5V Power Supply, Input
40. φ ..... Master Clock Input f=94±5KHz

KBC 1 · 2 Circuit Board & Wiring

RA1-KBC1-—6.5(37) — GG12 — (37) –6.5
(38) –6.5

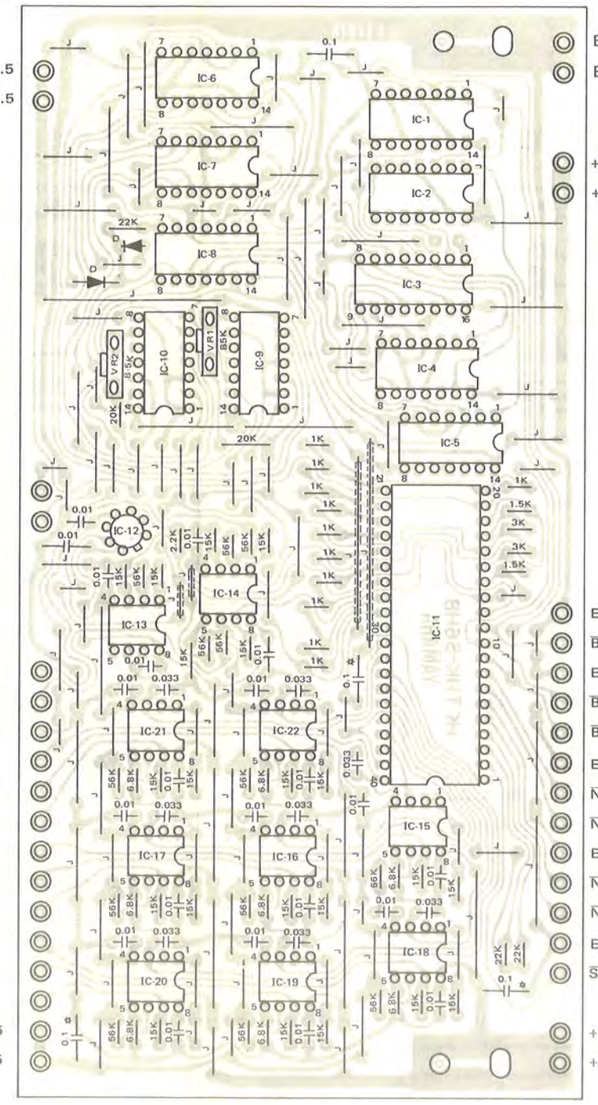
RA1-KBC1-$\overline{SC}$(52) — WH — (51) E / (52) $\overline{SC}$

PN2-VR22-2 — OR — (57) HI
PN2-VR21-2 — GR — (58) LI
(59) E
RA1-KBC1-ϕ(60) — GG — (60) ϕ
RA1-R51-KB8(69) — WH — (61) 08
RA1-R51-KB7(67') — GY — (62) 07
RA1-R51-KB1(58') — RE — (63) 01
RA1-R51-KB2(60) — OR — (64) 02
RA1-R51-KB3(61') — YE — (65) 03
RA1-R51-KB4(63) — GR — (66) 04
RA1-R51-KB5(64') — BE — (67) 05
RA1-K51-KB6(66) — VI — (68) 06
RA1-KBC1-–15(69) / RA1-TWS-—15(67) — BR12x2 — (69) –15 / (70) –15

RA2-KAS—6.5(96) / RA1-KBC2—6.5(37) — G12x2 — (37) –6.5 / (38) –6.5

RA2-KAS-$\overline{SC}$(54) / RA1-KBC2-$\overline{SC}$(52) — WHx2 — (51) E / (52) SC

PN2-VR20-2 — BE — (57) HI
PN2-VR19-2 — VI — (58) LI
(59) E
RA2-KAS-ϕ(30) / RA1-KBC2-ϕ(60) — GGx2 — (60) ϕ
RA1-R51-KC8(54') — GG — (61) O8
RA1-R51-KC7(52) — WH — (62) O7
RA1-R51-KC1(20') — OR — (63) O1
RA1-R51-KC2(15) — YE — (64) O2
RA1-R51-KC3(10') — GR — (65) O3
RA1-R51-KC4(5) — BE — (66) O4
RA1-R51-KC5(42) — VI — (67) O5
RA1-R51-KC6(47) — GY — (68) O6
PN3-SW2-B1 / RA1-KBC2—15(69) — YE12x2 — (69) –15 / (70) –15



E (1) — BL12 — RA1-KBC2-E(2)
E (2)

+8.5 (5) — PK12x2 — RA2-KAS-+8.5(99) / RA1-KBC2-+8.5(5)
+8.5 (6) — PK12 — K-BR2

E (20)
$\overline{B3}$ (21) — VIx2 — RA2-KAS-$\overline{B3}$(57) / RA1-KBC2-B3(21)
E (22)
$\overline{B2}$ (23) — BEx2 — RA2-KAS-$\overline{B2}$(58) / RA1-KBC2-$\overline{B2}$(23)
$\overline{B1}$ (24) — GRx2 — RA2-KAS-$\overline{B1}$(60) / RA1-KBC2-$\overline{B1}$(24)
E (25)
$\overline{N4}$ (26) — YEx2 — RA2-KAS-$\overline{N4}$(61) / RA1-KBC2-$\overline{N4}$(26)
$\overline{N3}$ (27) — ORx2 — RA2-KAS-$\overline{N3}$(63) / RA1-KBC2-$\overline{N3}$(27)
E (28)
$\overline{N2}$ (29) — REx2 — RA2-KAS-$\overline{N2}$(64) / RA1-KBC2-$\overline{N2}$(29)
$\overline{N1}$ (30) — BRx2 — RA2-KAS-$\overline{N1}$(66) / RA1-KBC2-$\overline{N1}$(30)
E (31)
$\overline{SC8}$(32) — GYx2 — RA2-KAS-$\overline{SC8}$(55) / RA1-KBC2-$\overline{SC8}$(32)
+15(34) — BR12x2 — PN3-SW9-T1 / RA1-KBC2-+15(34)
+15(35) — BR12 — K-T3-+15

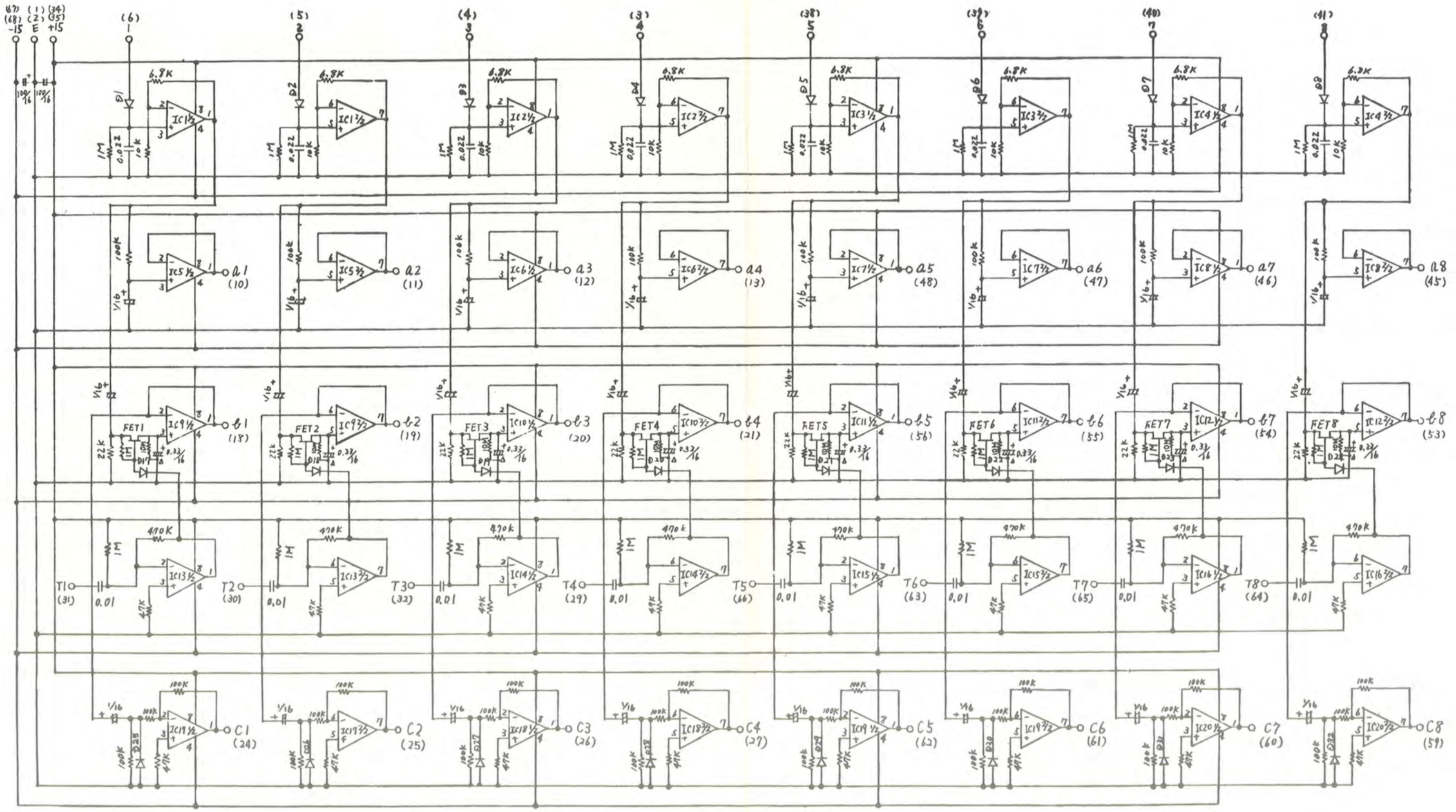
E (1)
E (2) — RA1-KBC1-E(2) / RA1-TWS-E(1)

+8.5 (5) — PK12x2 — RA1-KBC1-+8.5(5) / RA1-SUB-+8.5(27)
+8.5 (6)

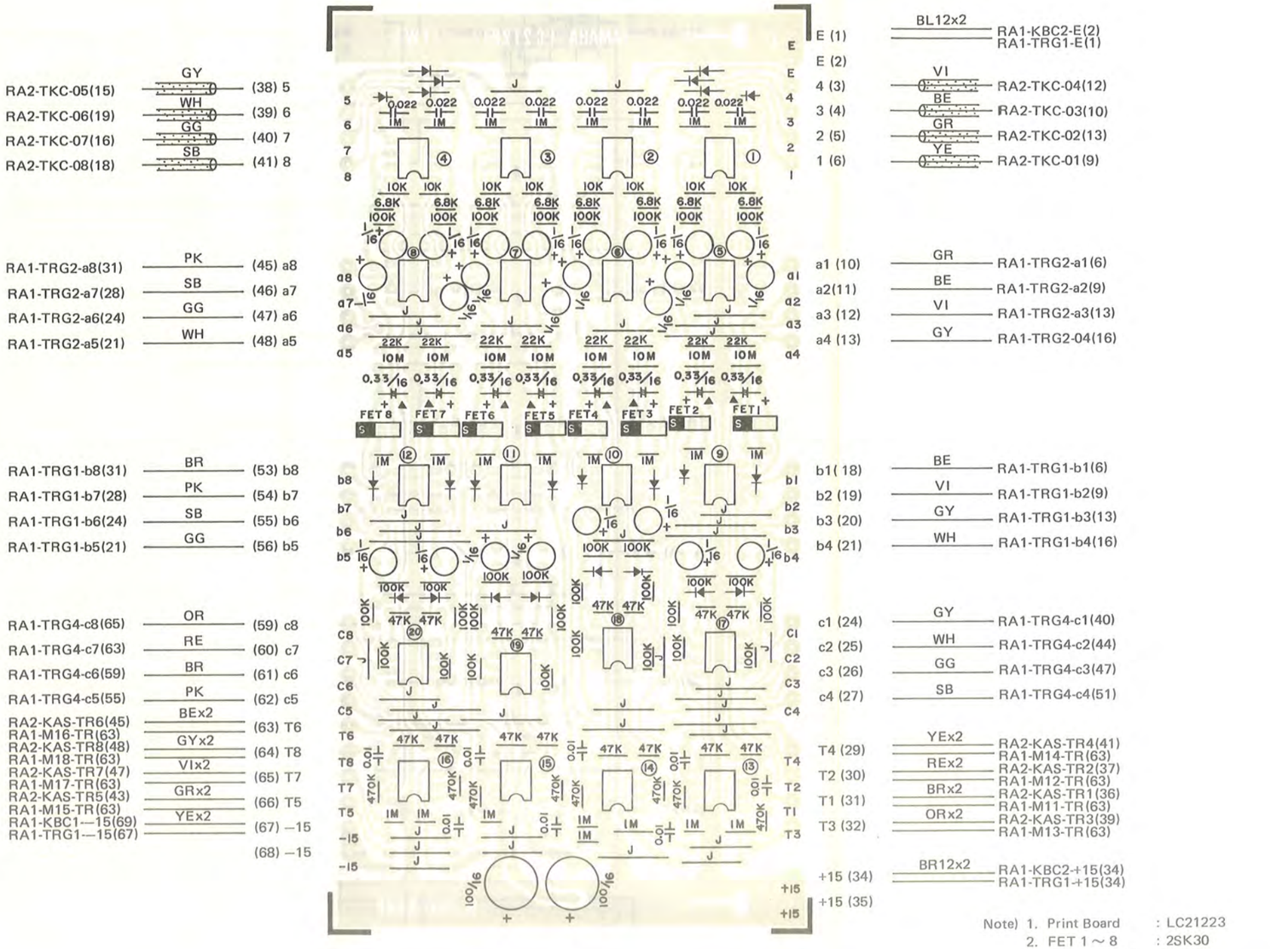
E (20)
$\overline{B3}$ (21) — VI — RA1-KBC1-$\overline{B3}$(21)
E (22)
$\overline{B2}$ (23) — BE — RA1-KBC1-$\overline{B2}$(23)
$\overline{B1}$ (24) — GR — RA1-KBC1-$\overline{B1}$(24)
E (25)
$\overline{N4}$ (26) — OR — RA1-KBC1-$\overline{N4}$(26)
$\overline{N3}$ (27) — YE — RA1-KBC1-$\overline{N3}$(27)
E (28)
$\overline{N2}$ (29) — RE — RA1-KBC1-$\overline{N2}$(29)
$\overline{N1}$ (30) — BR — RA1-KBC1-$\overline{N1}$(30)
E (31)
$\overline{SC8}$ (32) — GY — RA1-KBC1-$\overline{SC8}$(32)
+15 (34) — BR12x2 — RA1-KBC1-+15(34) / RA1-TWS-+15(34)
+15 (35)

Note) 1. Print Board LC21216
2. Resistor
22K : ±5%
Other : ±1%
3. Diode 1S1555
4. VR1,2 (V10K4A-5-2)
5. IC1, 2 : CD4006AE
IC3 : TC4019P
IC4,5 : TC4013P
IC6,7 : TC4073P
IC8 : TC4069P
IC9,10 : TC4016P
IC11 : YM26700
IC12 : LM310
IC13～22 : NJM4558
6. ☆Mark : Ceramic Capacitor
Other : Mylar Capacitor

TWS Circuit Diagram

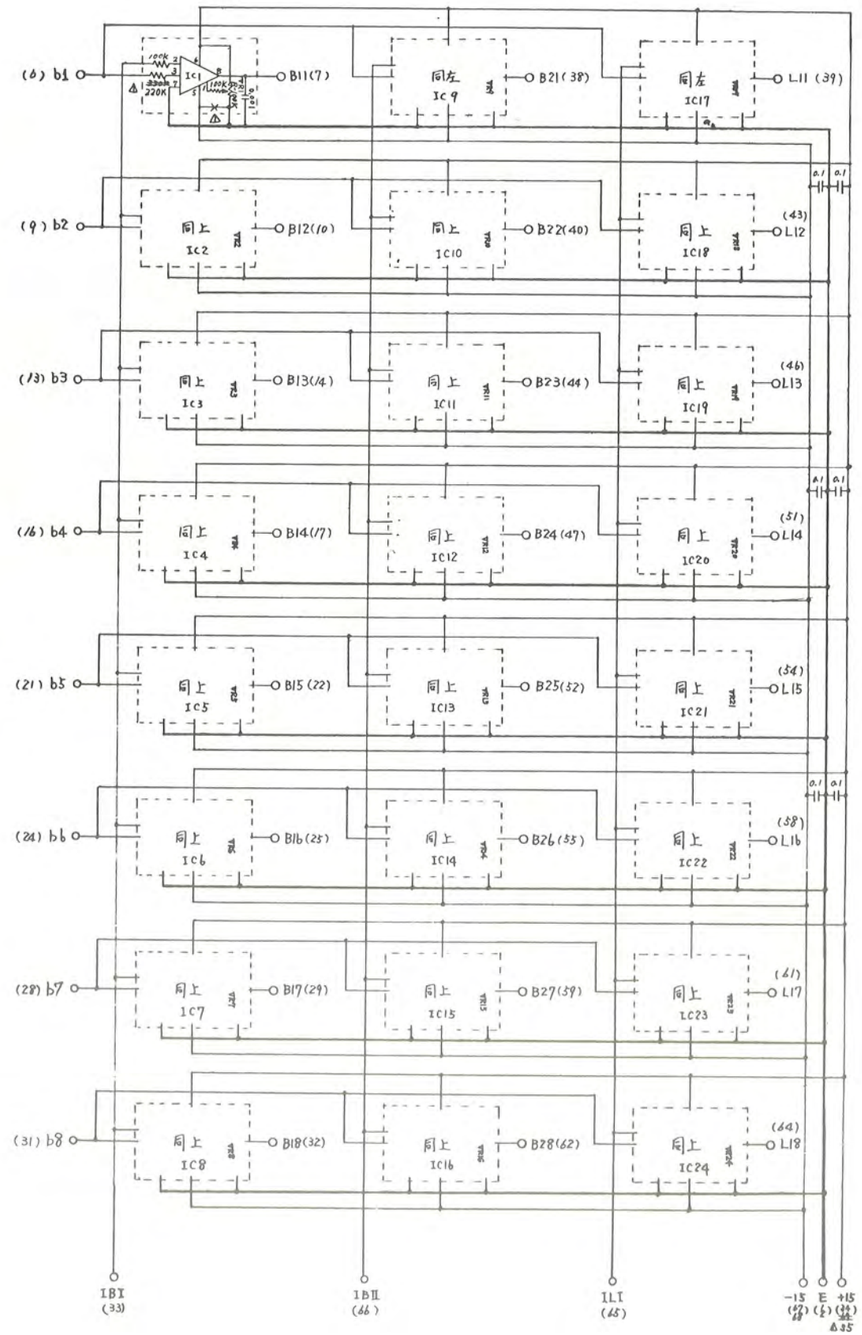


TWS Circuit Board & Wiring



Note) 1. Print Board : LC21223
2. FET 1 ～ 8 : 2SK30
3. Diode 1 ～ 32 : IS1555
4. IC 1 ～ 20 : NJM4558
5. △Mark : Tantalum Capacitor

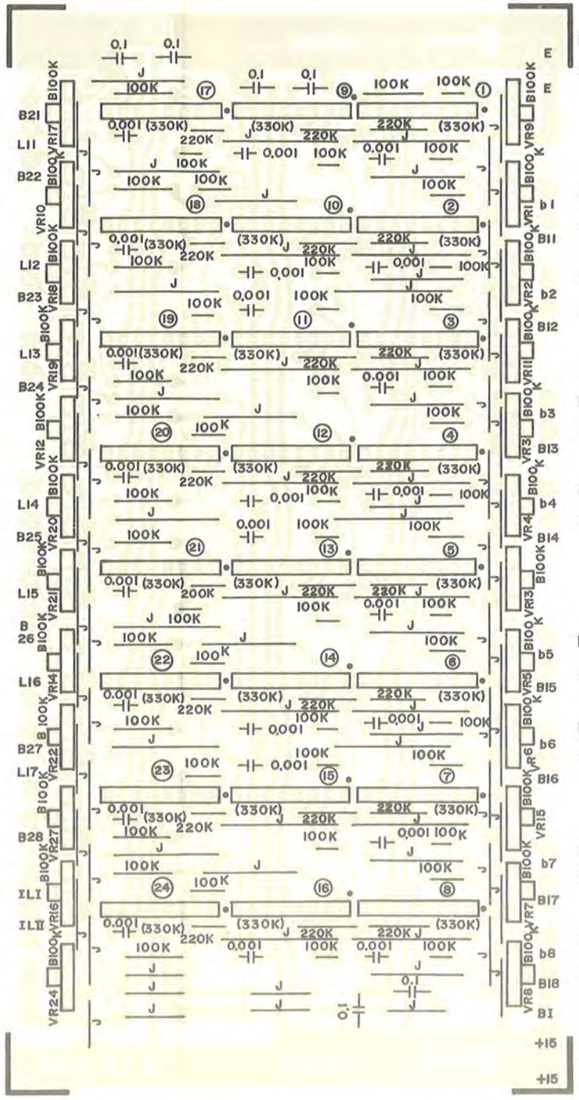
TRG 1·2 Circuit Diagram



TRG 1·2 Circuit Board & Wiring

RA1-R52-AB1(19)	OR	(38) B21
RA1-R51-TA1(58)	WH	(39) L11
RA1-R52-AB2(13')	YE	(40) B22
RA1-R51-TA2(59')	GG	(43) L12
RA1-R52-AB3(8')	GR	(44) B23
RA1-R51-TA3(61)	SB	(46) L13
RA1-R52-AB4(3')	BE	(47) B24
RA1-R51-TA4(62')	PK	(51) L14
RA1-R52-AB5(39)	VI	(52) B25
RA1-R51-TA5(64)	BR	(54) L15
RA1-R52-AB6(44)	GY	(55) B26
RA1-R51-TA6(65')	RE	(58) L16
RA1-R52-AB7(49)	WH	(59) B27
RA1-R51-TA7(67)	OR	(61) L17
RA1-R52-AB8(53)	GG	(62) B28
RA1-R51-TA8(68')	YE	(64) L18
RA1-T51-26(4)	RE	(65) ALI
RA1-T53-25(5)	BR	(66) ABII
RA1-TRG1—15(67)	YE12x2	(67) —15
RA1-TRG3—15(67)		(68) —15

RA1-R52-IB1(18')	GR	(38) B21
RA1-R51-TI1(57')	SB	(39) L11
RA1-R52-IB2(13)	BE	(40) B22
RA1-R51-TI2(59)	PK	(43) L12
RA1-R52-IB3(8)	VI	(44) B23
RA1-R51-TI3(60')	BR	(46) L13
RA1-R52-IB4(3)	GY	(47) B24
RA1-R51-TI4(62)	RE	(51) L14
RA1-R52-IB5(38)	WH	(52) B25
RA1-R51-TI5(63')	OR	(54) L15
RA1-R52-IB6(43)	GG	(55) B26
RA1-R51-TI6(65)	YE	(58) L16
RA1-R52-IB7(48)	SB	(59) B27
RA1-R51-TI7(66')	GR	(61) L17
RA1-R52-IB8(52')	PK	(62) B28
RA1-R51-TI8(68)	BE	(64) L18
RA1-T51-24(6)	PK	(65) ILI
RA1-T53-23(7)	SB	(66) IBII
RA1-TWS—15(67)	YE12x2	(67) —15
RA1-TRG2—15(67)		(68) —15

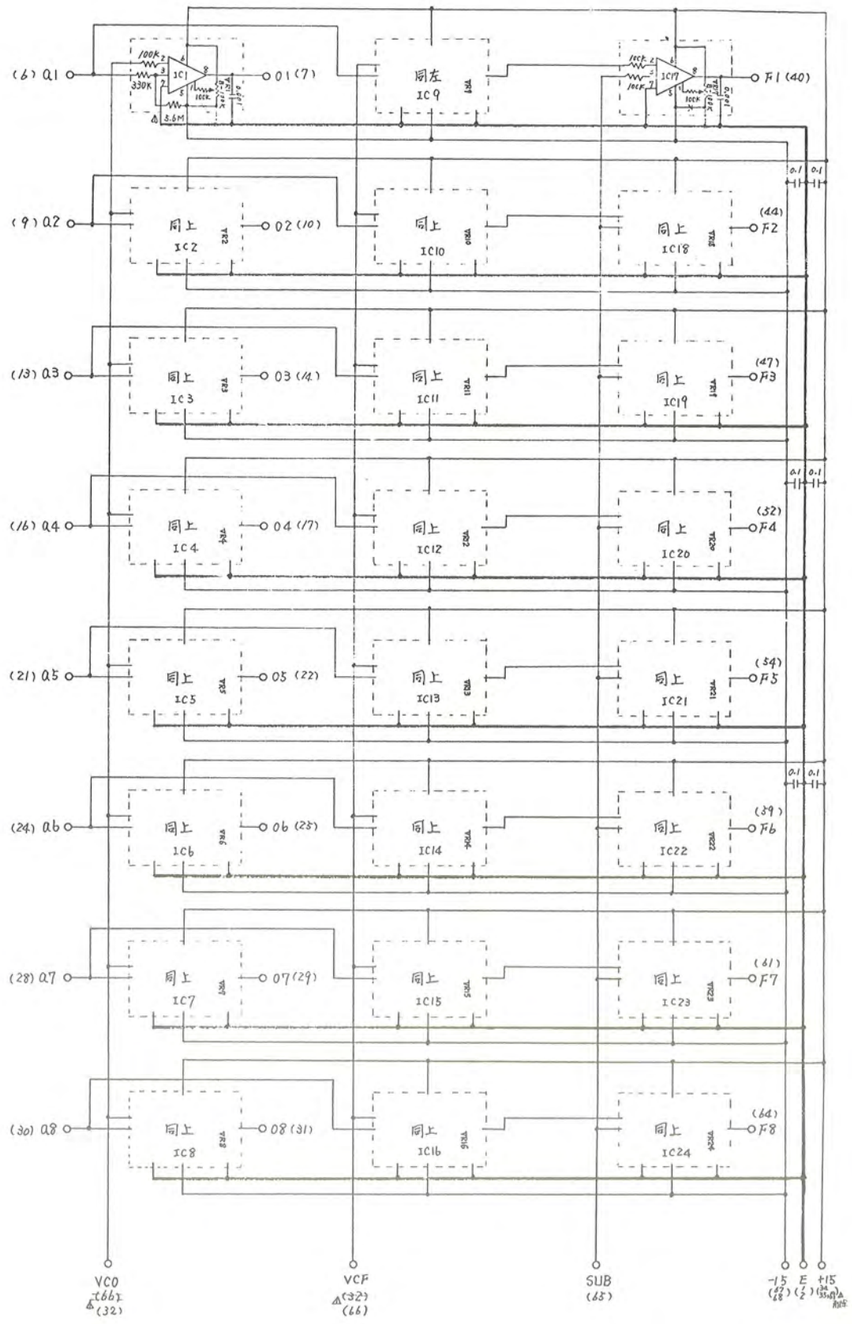


E (1)	BL12x2	RA1-TWS-E(1)
E (2)		RA1-TRG2-E(1)
b1 (6)	BEx2	RA1-TWS-b1(18)
B11 (7)	GR	RA1-TRG4-b1(5)
b2 (9)	VIx2	RA1-R51-IB1(18')
B12 (10)	BE	RA1-TWS-b2(19)
b3 (13)	GYx2	RA1-TRG4-b2(9)
B13 (14)	VI	RA1-R51-IB2(13)
b4 (16)	WHx2	RA1-TWS-b3(20)
B14 (17)	GY	RA1-TRG4-b3(2)
b5 (21)	GGx2	RA1-R51-IB3(8)
B15 (22)	WH	RA1-TWS-b4(21)
b6 (24)	SBx2	RA1-TRG4-b4(16)
B16 (25)	GG	RA1-R51-IB4(3)
b7 (28)	PKx2	RA1-TWS-b5(53)
B17 (29)	SB	RA1-TRG4-b5(20)
b8 (31)	BRx2	RA1-R51-IB5(38)
B18 (32)	PK	RA1-TWS-b6(54)
IBI (33)	SB	RA1-TRG4-b6(24)
+15 (34)	BR12x2	RA1-R51-IB6(43)
+15 (35)		RA1-TWS-b7(55)
		RA1-TRG4-b7(28)
		RA1-R51-IB7(48)
		RA1-TWS-b8(53)
		RA1-TRG4-b8(30)
		RA1-R51-IB8(52')
		RA1-T51-23(7)
		RA1-TWS-+15(34)
		RA1-TRG2-+15(34)

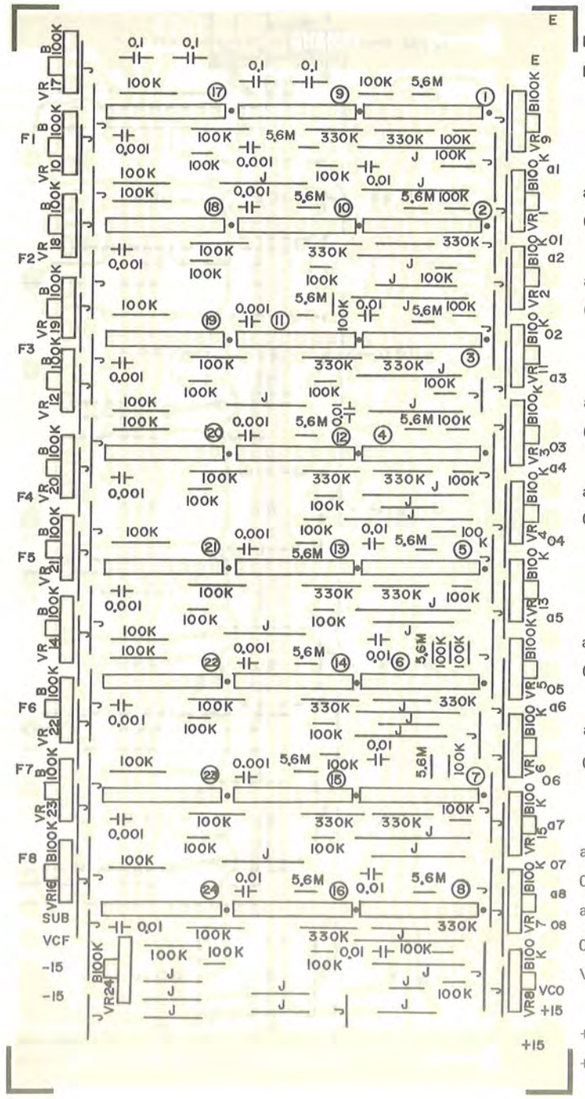
E (1)	BL12x2	RA1-TRG1-E(1)
E (2)		RA1-TRG3-E(1)
a1 (6)	GRx2	RA1-TWS-a1(10)
B11 (7)	OR	RA1-TRG3-a1(6)
a2 (9)	BEx2	RA1-R51-AB1(19)
B12 (10)	YE	RA1-TWS-a2(11)
a3 (13)	VIx2	RA1-TRG3-a2(9)
B13 (14)	GR	RA1-R51-AB2(13')
a4 (16)	GYx2	RA1-TWS-a3(12)
B14 (17)	BE	RA1-TRG3-a3(13)
a5 (21)	WHx2	RA1-R51-AB3(8')
B15 (22)	VI	RA1-TWS-a4(13)
a6 (24)	GGx2	RA1-TRG3-a4(16)
B16 (25)	GY	RA1-R51-AB4(3')
a7 (28)	SBx2	RA1-TWS-a5(48)
B17 (29)	WH	RA1-TRG3-a5(21)
a8 (31)	PKx2	RA1-R51-AB5(39)
B18 (32)	GG	RA1-TWS-a6(47)
ABI (33)	BR	RA1-TRG3-a6(24)
+15 (34)	BR12x2	RA1-R51-AB6(44)
+15 (35)		RA1-TWS-a7(46)
		RA1-TRG3-a7(28)
		RA1-R51-AB7(49)
		RA1-TWS-a8(45)
		RA1-TRG3-a8(30)
		RA1-R51-AB8(53)
		RA1-T51-25(5)
		RA1-TRG1-+15(34)
		RA1-TRG3-+15(34)

Note) 1. Print Board : LC21072
2. IC 1 ～ 24 : IG00151
3. Volume VR1～ 24 : 3 terminals (V10K8-1-2)

TRG 3 Circuit Diagram



TRG 3 Circuit Board & Wiring

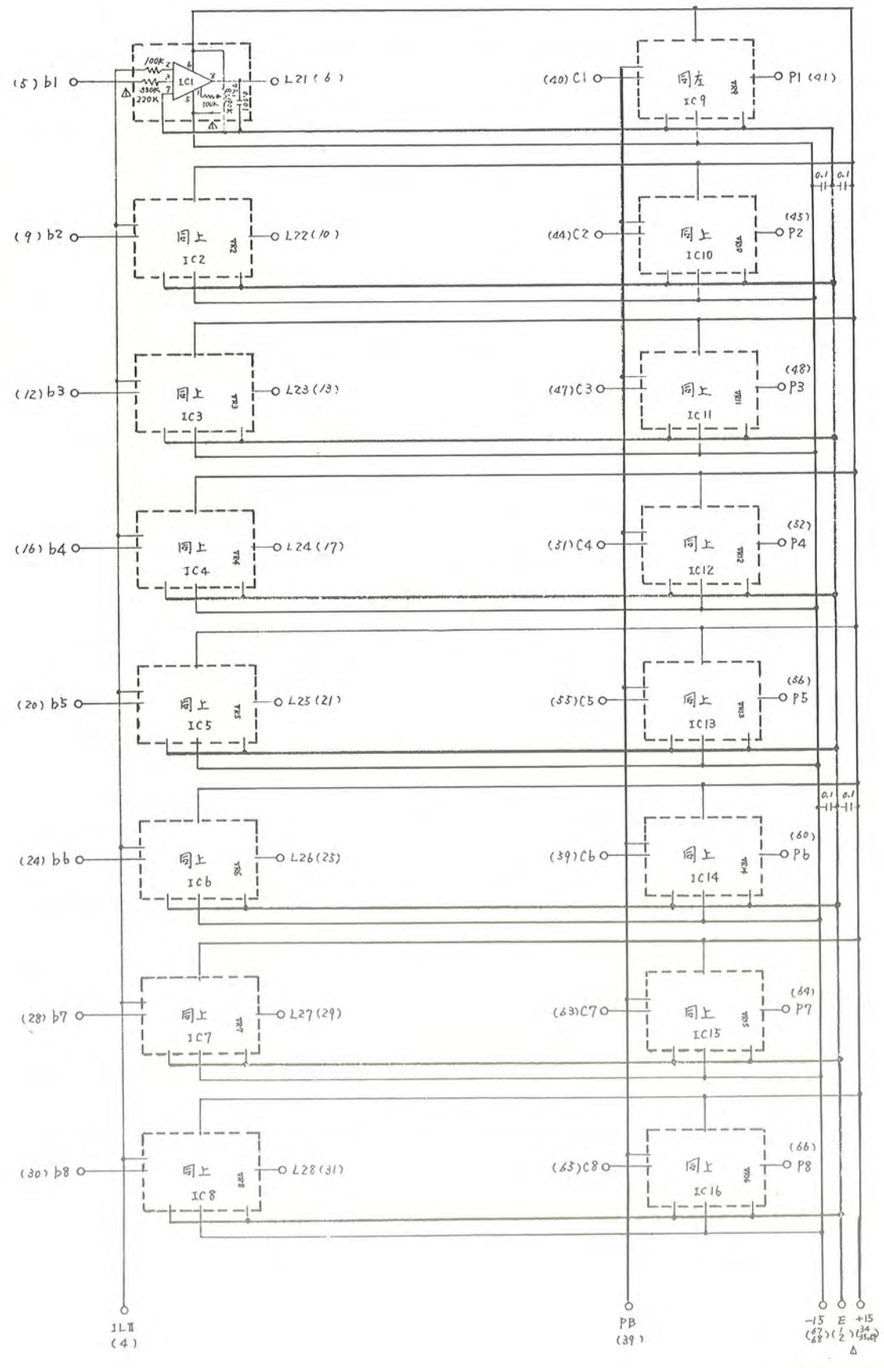


RA1-R51-TF1(19')	BR	F1 (40)
RA1-R51-TF2(14)	RE	F2 (44)
RA1-R51-TF3(9)	OR	F3 (47)
RA1-R51-TF4(4)	YE	F4 (52)
RA1-R51-TF5(40)	GR	F5 (54)
RA1-R51-TF6(45)	BE	F6 (59)
RA1-R51-TF7(50)	VI	F7 (61)
RA1-R51-TF8(53')	GY	F8 (64)
RA1-TRG5-SUB(5)	WH	SUB (65)
PN2-VR18-2	BE	VCF (66)
RA1-TRG2—15(67) RA1-TRG4—15(67)	YE12x2	–15 (67)
		–15 (68)

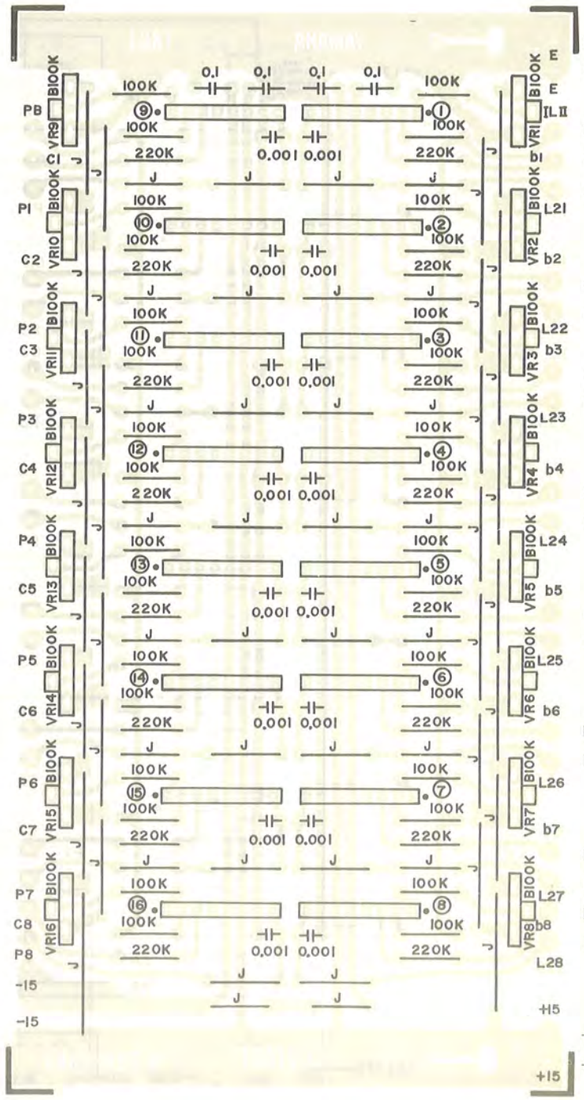
E (1)	BL12x2	RA1-TRG2-E(1) RA1-TRG4-E(1)
E (2)		
a1 (6)	GRx2	RA1-TRG2-a1(6) RA1-TRG5-a1(43)
01 (7)	OR	RA1-TRG5-I1(4)
a2 (9)	BEx2	RA1-TRG2-a2(9) RA1-TRG5-a2(47)
02 (10)	YE	RA1-TRG5-I2(9)
a3 (13)	VIx2	RA1-TRG2-a3(13) RA1-TRG5-a3(50)
03 (14)	GR	RA1-TRG5-I3(12)
a4 (16)	GYx2	RA1-TRG2-a4(16) RA1-TRG5-a4(54)
04 (17)	BE	RA1-TRG5-I4(16)
a5 (21)	WHx2	RA1-TRG2-a5(21) RA1-TRG5-a5(57)
05 (22)	VI	RA1-TRG5-I5(20)
a6 (24)	GGx2	RA1-TRG2-a6(24) RA1-TRG5-a6(61)
06 (25)	GY	RA1-TRG5-I6(24)
a7 (28)	SBx2	RA1-TRG2-a7(28) RA1-TRG5-a7(64)
07 (29)	WH	RA1-TRG5-I7(28)
a8 (30)	PKx2	RA1-TRG2-a8(30) RA1-TRG5-a8(67)
08 (31)	GG	RA1-TRG5-I8(30)
VCO (32)	WH	PN2-VR17-2
+15 (34)	BR12x2	RA1-TRG2-+15(34) RA1-TRG4-+15(34)
+15 (35)		

Note) 1. Print Board : LC21082
2. IC 1 ~ 24 : IG00151
3. Volume VR1 ~ 24 : 3 terminals (V10K8-1-2)

TRG 4 Circuit Diagram



TRG 4 Circuit Board & Wiring

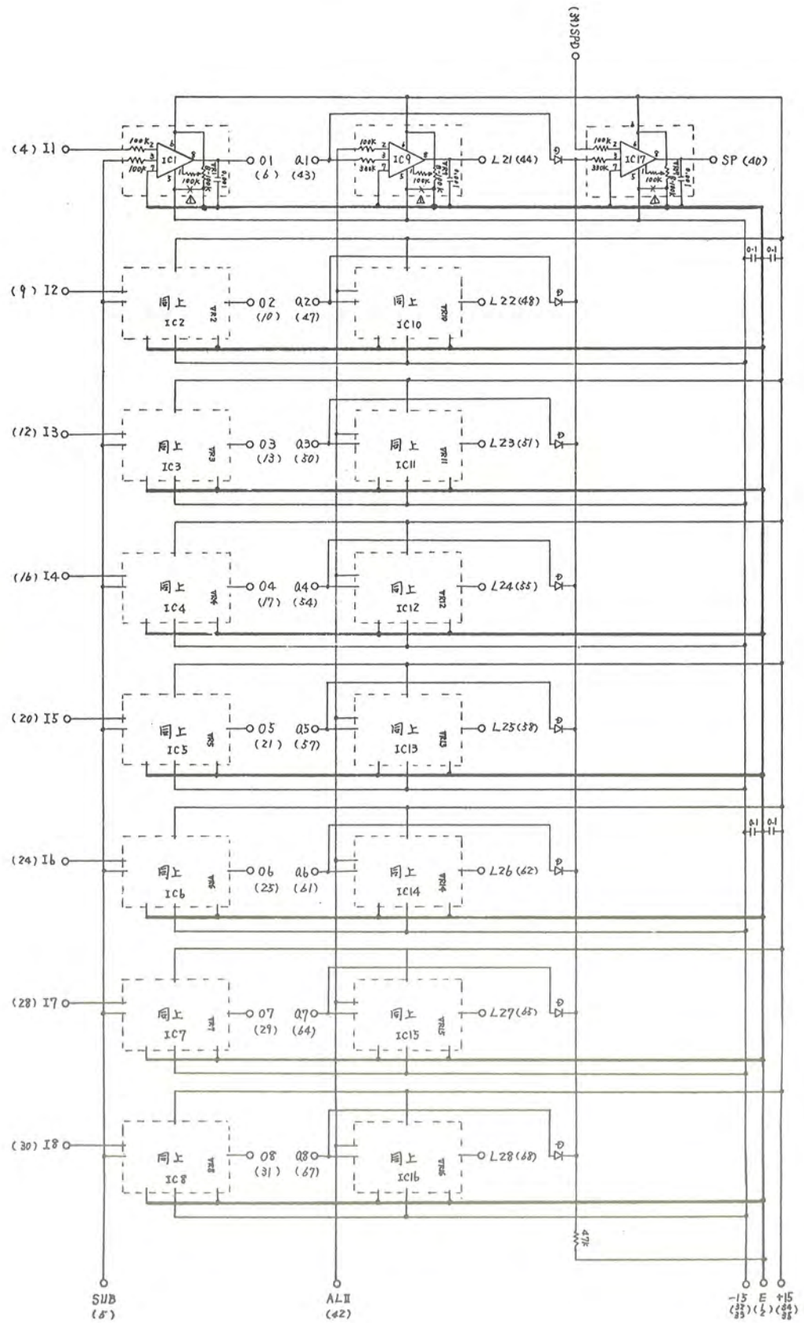


PN2-VR15-2	SB	(39) PB
RA1-TWS-C1(24)	GY	(40) C1
RA1-R51-TP1(26)	VI	(41) P1
RA1-TWS-C2(25)	WH	(44) C2
RA1-R51-TP2(27)	GY	(45) P2
RA1-TWS-C3(26)	GG	(47) C3
RA1-R51-TP3(28)	WH	(48) P3
RA1-TWS-C4(27)	SB	(51) C4
RA1-R51-PT4(29)	GG	(52) P4
RA1-TWS-C5(62)	PK	(55) C5
RA1-R51-TP5(30)	SB	(56) P5
RA1-TWS-C6(61)	BR	(59) C6
RA1-R51-TP6(31)	PK	(60) P6
RA1-TWS-C7(60)	RE	(63) C7
RA1-R51-TP7(32)	BR	(64) P7
RA1-TWS-C8(59)	OR	(65) C8
RA1-R51-TP8(33)	RE	(66) P8
RA1-TRG3-—15(67) RA1-TRG5-—15(32)	YE12x2	(67) —15
		(68) —15

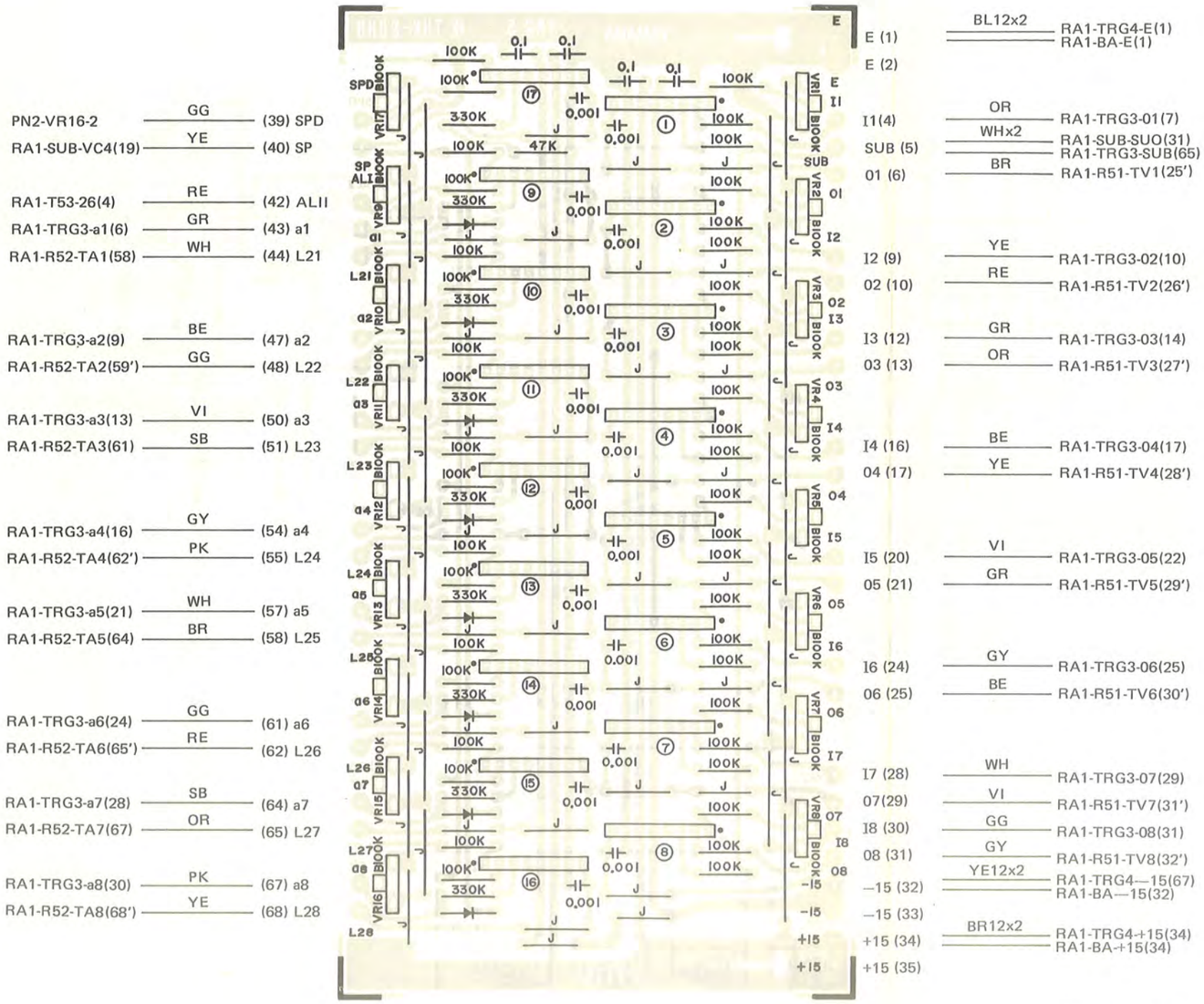
E (1)	BL12x2	RA1-TRG3-E(1) RA1-TRG5-E(1)
E (2)		
ILII (4)	PK	RA1-T53-24(6)
b1 (5)	BE	RA1-TRG1-b1(6)
L21 (6)	SB	RA1-R52-TI1(27')
b2 (9)	VI	RA1-TRG1-b2(9)
L22 (10)	PK	RA1-R52-TI2(59)
b3 (12)	GY	RA1-TRG1-b3(13)
L23 (13)	BR	RA1-T52-TI3(60')
b4 (16)	WH	RA1-TRG1-b4(16)
L24 (17)	RE	RA1-R52-TI4(62)
b5 (20)	GG	RA1-TRG1-b5(21)
L25 (21)	OR	RA1-R52-TI5(63')
b6 (24)	SB	RA1-TRG1-b6(24)
L26 (25)	YE	RA1-R52-TI6(65)
b7 (28)	PK	RA1-TRG1-b7(28)
L27 (29)	GR	RA1-R52-TI7(66')
b8 (30)	BR	RA1-TRG-b8(31)
L28 (31)	BE	RA1-R52-TI8(68)
+15 (34)	BR12x2	RA1-TRG3-+15(34) RA1-TRG5-+15(34)
+15 (35)		

Note) 1. Print Board : LC21091
2. IC 1 ～ 16 : IG00151
3. Volume VR1 ～ 16 : 3 ternimals (V10K8-1-2)

TRG 5 Circuit Diagram

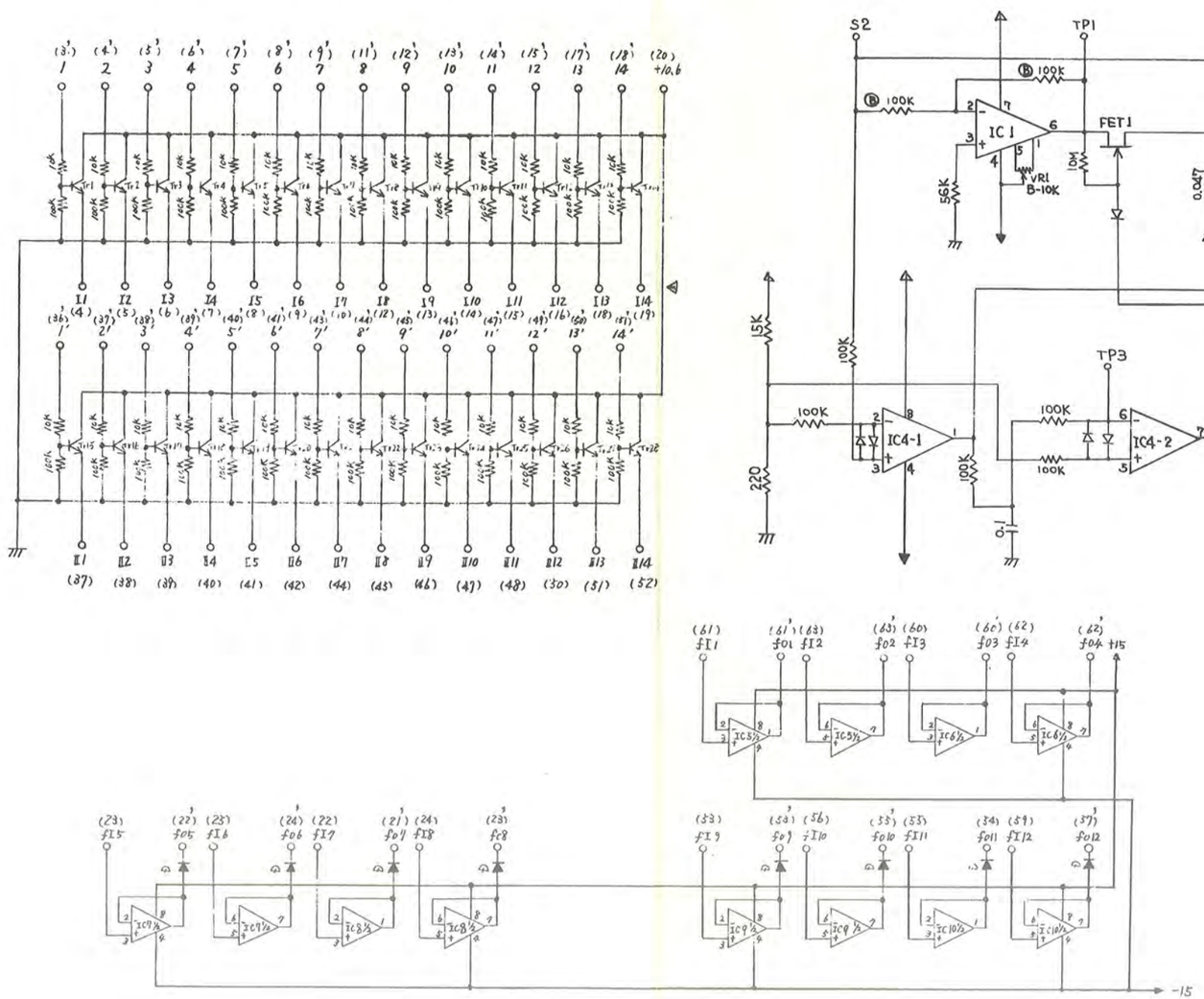


TRG 5 Circuit Board & Wiring



Note) 1. Print Board : LC21101
2. IC 1 ~ 17 : IG00151
3. Volume VR1 ~ 17 : 3 terminals (V10K8-1-2)
4. Diode : IS1555

BA Circuit Diagram



BA Circuit Board & Wiring

PN2-TS-1' —RE— (36') 1'
PN2-TS-2' —YE— (37') 2'
PN2-TS-3' —BE— (38') 3'
PN2-TS-4' —GY— (39') 4'
PN2-TS-5' —GG— (40') 5'
PN2-TS-6' —PK— (41') 6'

PN2-TS-7' —RE— (43') 7'
PN2-TS-8' —YE— (44') 8'
PN2-TS-9' —BE— (45') 9'
PN2-TS-10' —GY— (46') 10'
PN2-TS-11' —GG— (47') 11'

PN2-TS-12' —PK— (49') 12'
PN2-TS-13' —RE— (50') 13'
PN2-TS-14' —YE— (51') 14'

RA1-BA-f05(22') —OR— (53') f09
RA1-BA-f06(24') —YE— (55') fo10
RA1-BA-fo8(23') —RE— (57') fo12
RA1-T53-7'(26') —OR— (60') f03
RA1-T51-7'(26') —VI— (61') fo1
RA1-T53-9'(23') —BR— (62') fo4
RA1-T51-9'(23') —WH— (63') fo2

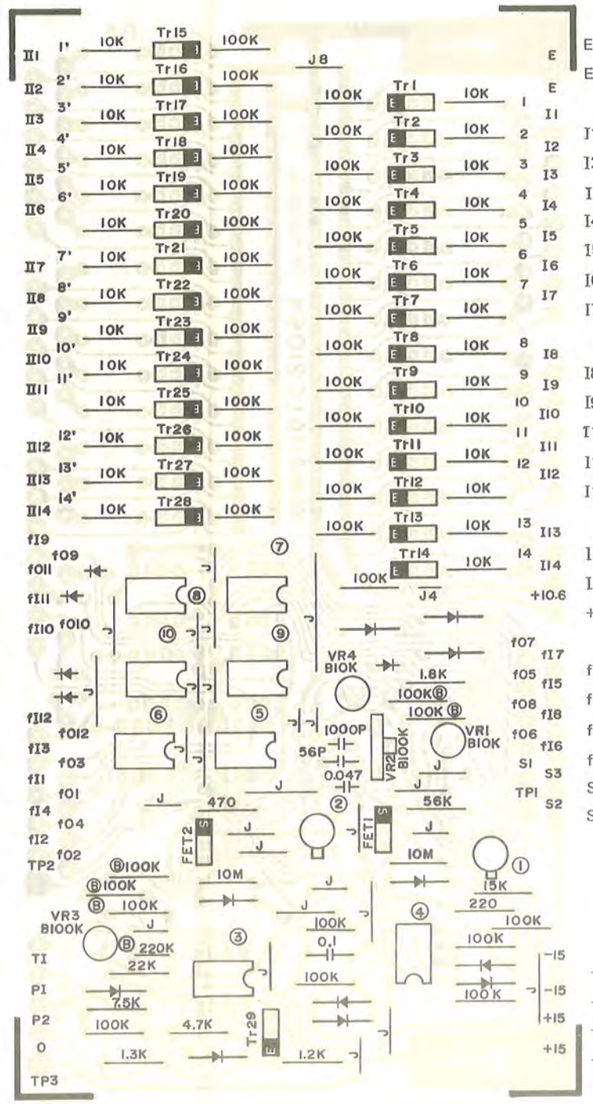
RA1-T53-A(91) —BR— (36) E
RA1-T53-B(92) —RE— (37) II1
RA1-T53-C(93) —OR— (38) II2
RA1-T53-D(94) —YE— (39) II3
RA1-T53-E(95) —GR— (40) II4
RA1-T53-F(96) —BE— (41) II5
(42) II6

RA1-T54-A(91) —BR— (44) II7
RA1-T54-B(92) —RE— (45) II8
RA1-T54-C(93) —OR— (46) II9
RA1-T54-D(94) —YE— (47) II10
RA1-T54-E(95) —GR— (48) II11

PN1-MBK-M2-VR24-3 —BE— (50) II12
PN1-MBK-M4-VR24-3 —VI— (51) II13
PN1-VR24'-3 —YE— (52) II14
PN1-MBK-M3-VR5-2 —VI— (53) fI9
RA1-BA-fo7(21') —BR— (54) fo11
PN1-MBK-M3-VR5-2 —GG— (55) fI11
PN1-MBK-M3-VR7-2 —WH— (56) fI10

PN1-MBK-M4-VR7-2 —SB— (59) fI12
PN1-VR5-2 —GG— (60) fI3
PN1-VR5-2 —VI— (61) fI1
PN1-VR7'-2 —SB— (62) fI4
PN1-VR7-2 —WH— (63) fI2
(64) TP2
(65) TP4

PN2-VRIA-3 —OR— (66) TI
PN2-VRIB-1 —BR— (67) PI
PN2-VRIB-2 —RE— (68) P2
RA2-KAS-TI(67) —GY— (69) 0
(70) TP3



E (1) —BL12x2— RA1-TRG5-E(1), PA1-SUB-E(1)
E (2)

I1 (4) —BR— RA1-T51-A(91)
I2 (5) —RE— RA1-T51-B(92)
I3 (6) —OR— RA1-T51-C(93)
I4 (7) —YE— RA1-T51-D(94)
I5 (8) —GR— RA1-T51-E(95)
I6 (9) —BE— RA1-T51-F(96)
I7 (10) —BR— RA1-T52-A(91)

I8 (12) —RE— RA1-T52-B(92)
I9 (13) —OR— RA1-T52-C(93)
I10 (14) —YE— RA1-T52-D(94)
I11 (15) —GR— RA1-T52-E(95)
I12 (16) —WH— PN1-MBK-M1-VR24-3

I13 (18) —GY— PN1-MBK-M3-VR24-3
I14 (19) —BE— PN1-VR24-3
+10.6 (20) —OR12x2— PN3-VR1-1, PN2-VR18-3

fI7 (22) —GG— PN1-MBK-M2-VR5-2
fI5 (23) —VI— PN1-MBK-M1-VR5-2
fI8 (24) —SB— PN1-MBK-M2-VR7-2
fI6 (25) —WH— PN1-MBK-M1-VR7-2
S3 (26) —OR— PN2-SK-3
S2 (27) —RE— PN2-SK-2

-15 (32) —YE12x2— RA1-TRG5—15(32), RA1-SUB—15(5)
-15 (33)
+15 (34) —BR12x2— RA1-TRG5-+15(34), RA1-SUB-+15(34)
+15 (35)

1 (3') —BR— PN2-TS-1
2 (4') —OR— PN2-TS-2
3 (5') —GR— PN2-TS-3
4 (6') —VI— PN2-TS-4
5 (7') —WH— PN2-TS-5
6 (8') —SB— PN2-TS-6
7 (9') —BR— PN2-TS-7

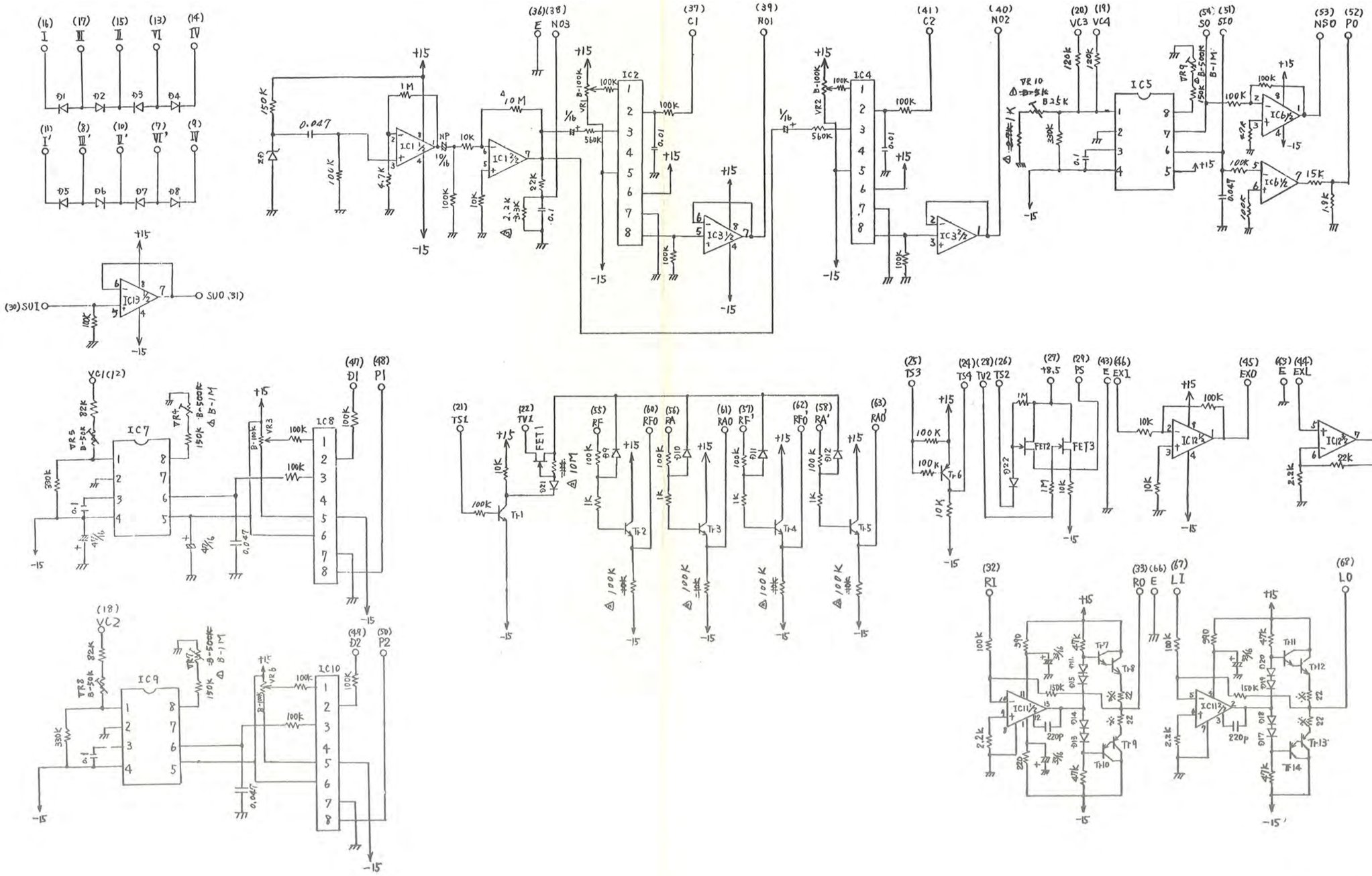
8 (11') —OR— PN2-TS-8
9 (12') —GR— PN2-TS-9
10 (13') —VI— PN2-TS-10
11 (14') —WH— PN2-TS-11
12 (15') —SB— PN2-TS-12

13 (17') —BR— PN2-TS-13
14 (18') —OR— PN2-TS-14

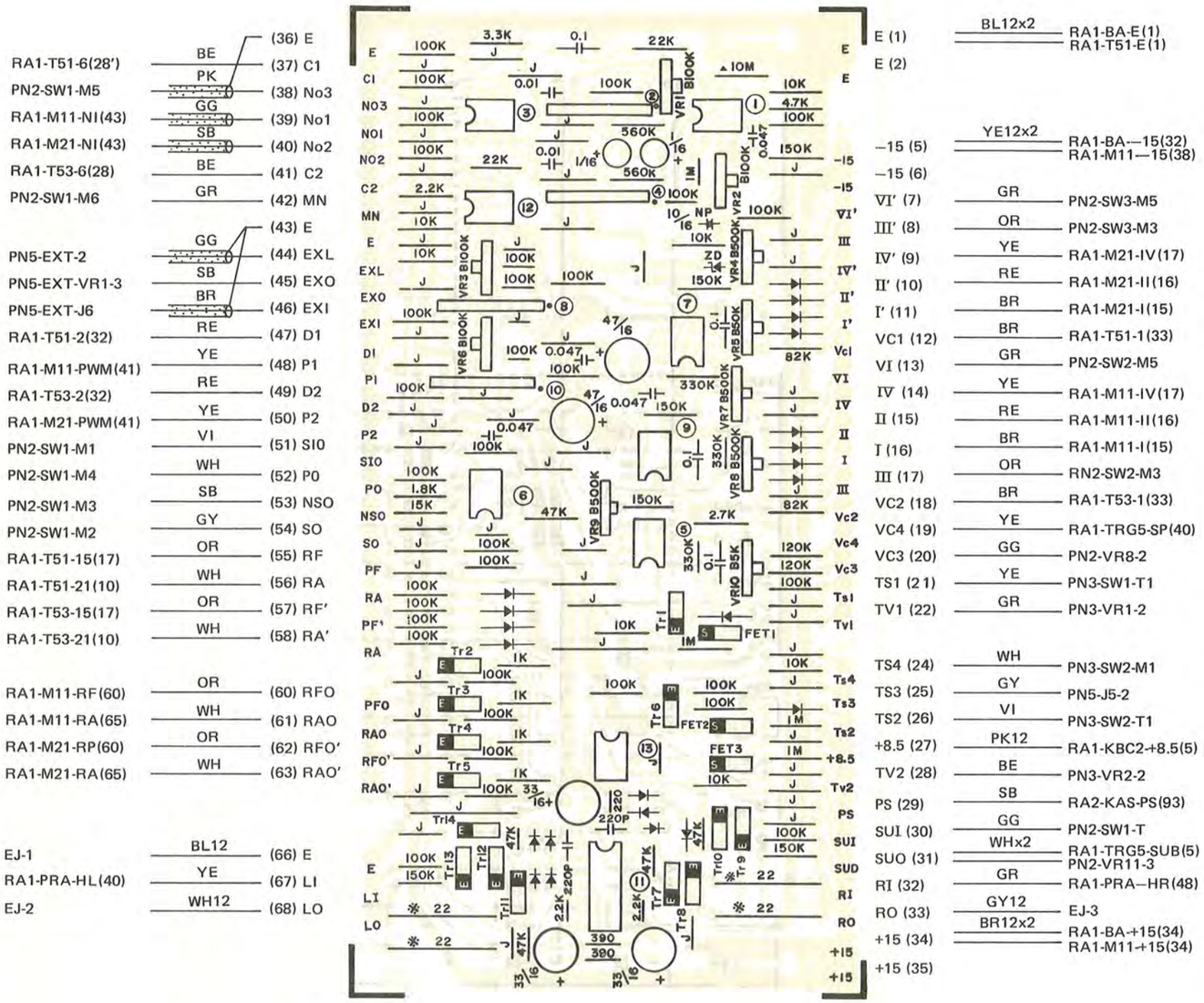
f07 (21') —BRx2— RA1-BA-fo11(54), RA1-T53-7(27)
f05 (22') —ORx2— RA1-BA-f09(53), RA1-T51-7(27)
f08 (23') —REx2— RA1-BA-fo12(57'), RA1-T53-9(24)
f06 (24') —YEx2— RA1-BA-fo10(55'), RA1-T51-9(24)
S1 (25') —BR— PN2-SK-1
TP1 (26')

Note) 1. Print Board : LC21063
2. Transistor
FET 1, 2 : 2SK30
Tr 1 ～ 29 : 2SC458
3. Diode : IS1555
4. Ⓑ Mark : Metal Film Resistor (0.1%)
5. Volume
VR1, 3, 4 : 3321H
VR2 : 3 terminals (V10K8-1-2)
6. IC
IC 1 : TA7504
IC 2 : CA3140T (RCA)
IC 3 ～ 10 : NJM4558

SUB Circuit Diagram



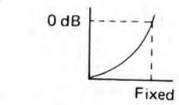
SUB Circuit Board & Wiring



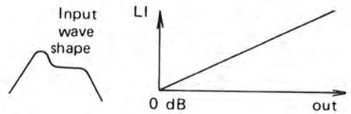
Note) 1. Print Board : LC20983
2. Transistor
Tr6, 10, 14 : 2SA561
Tr1 ~ 5, 7, 11 : 2SC828
Tr8, 12 : 2SD234
Tr9, 13 : 2SA490
FET1, 2, 3 : 2SK30
3. IC
IC 2, 4, 8, 10 : IG00151
IC 5, 7, 9 : IG00150
IC 11 : HA1452
IC 1, 3, 6, 12, 13 : NJM4558
4. * Mark : 2W Metal Oxide Resistor
5. Diode 1 ~ 22 : IS1555
6. ZD : IS1715P
7. Volume
VR 4, 5, 7 ~ 10 : 2 terminals (V10K4A-5-2)
VR 1 ~ 3, 6 : 3 terminals (V10K8-1-2)

VCA IC (IG00151)

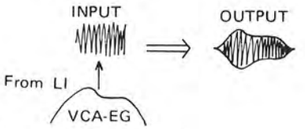
1. EI ..... Input voltage for level control.
Input of the control voltage is provided for changing the level expotenen tially.



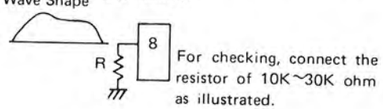
2. LI ..... Input of level control voltage.
Input of the control voltage is provided for linear change of the level.



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



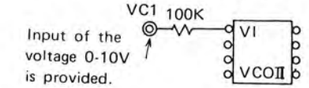
4. −IN ..... Negative feed back.
Normally unused.
5. Vee ..... −15V input power source.
6. Vcc ..... +15V input power source.
7. GND ..... Earth
8. OUT ..... Output
Output of the following wave shape is produced.



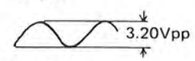
For checking, connect the resistor of 10K~30K ohm as illustrated.

VCOII IC (IG00150)

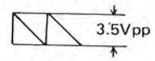
1. VI ..... Input of the control voltage.
The frequency is variable in accordance with the voltage supplied.



2. GND ..... Earth
3. C ..... Capacitor for determination of the frequency.
4. Vee ..... −15V input power source.
5. Vcc ..... +15V input power source.
6. SIO ..... Output of sine wave.

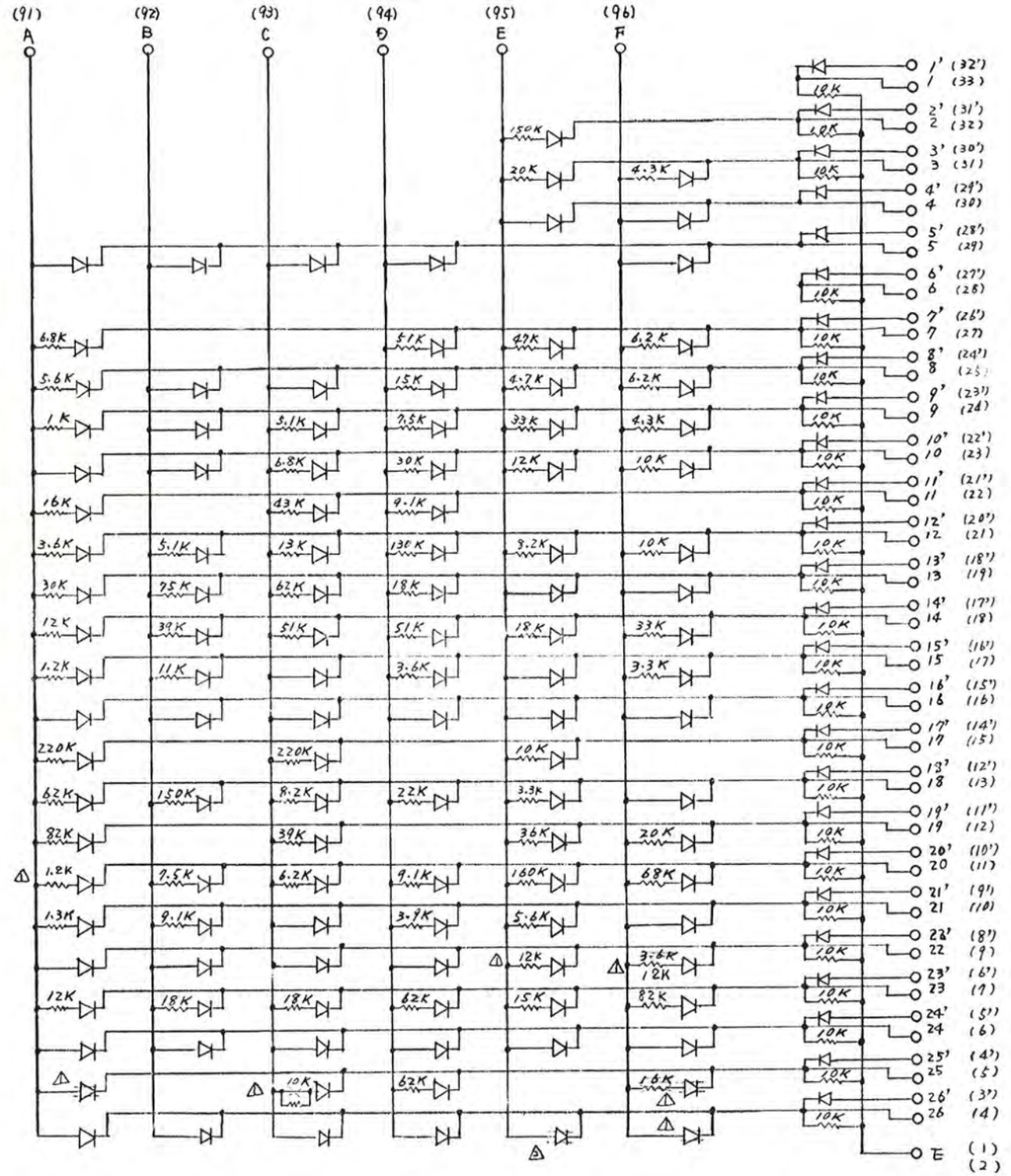


7. SO ..... Output of sawtooth wave

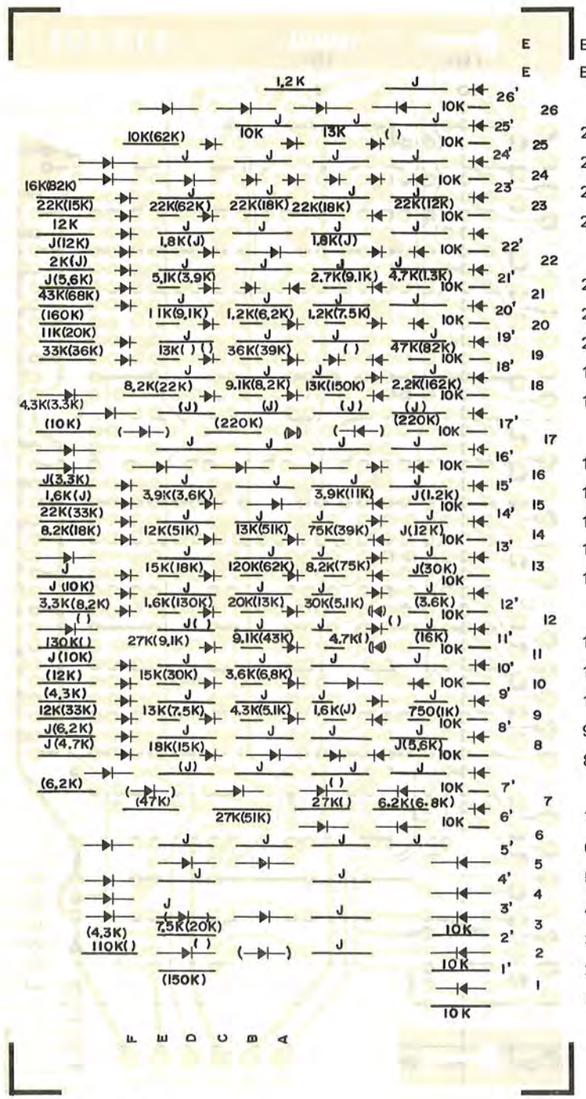


8. Iadj ..... Setting for standard electric current.
The standard electric current is set so as to be the output 200Hz when VC1 is 10V and VC2 is zero volt.

T51 Circuit Diagram



T51 Circuit Board & Wiring



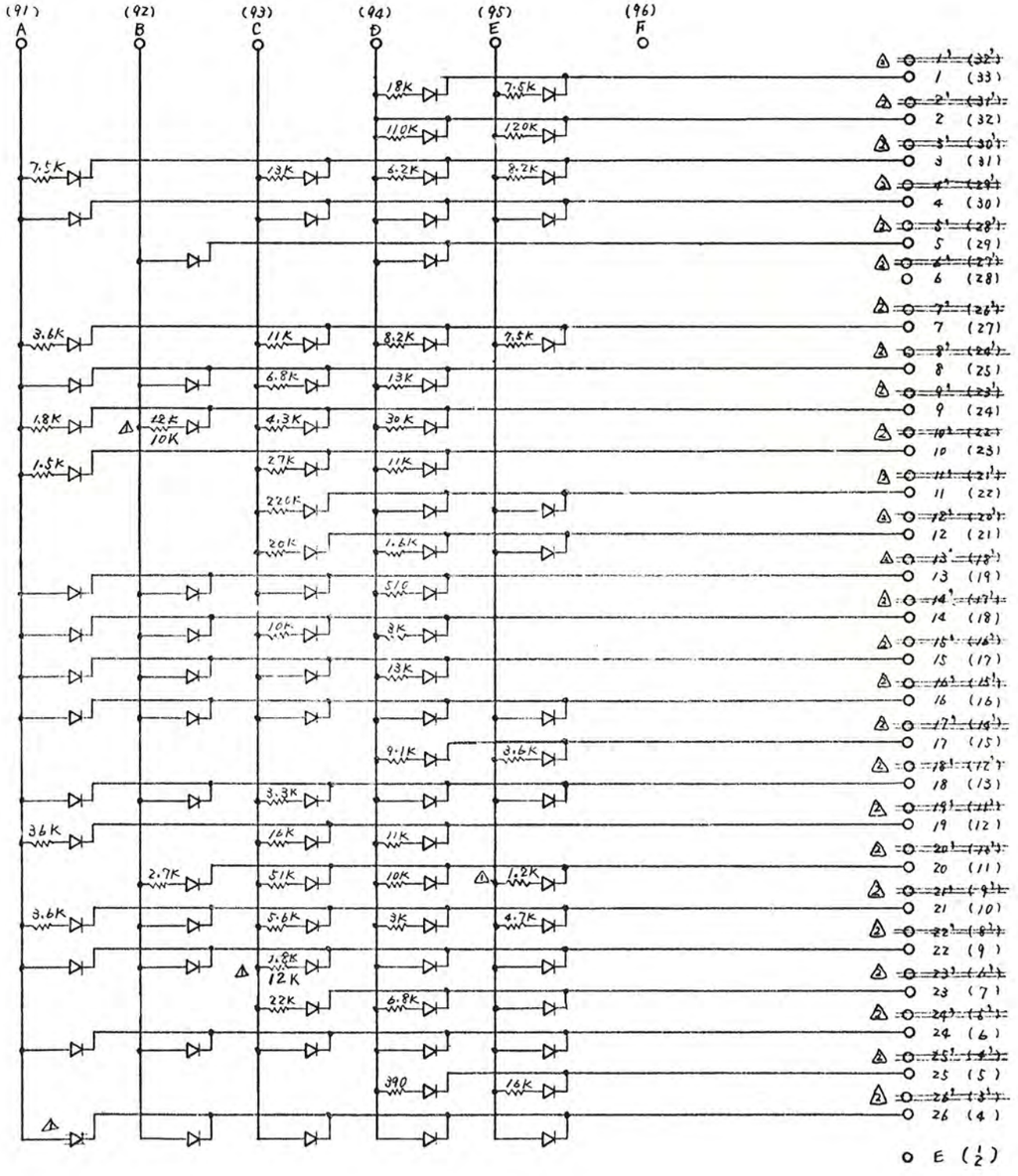
E (1)	BL12x2	RA1-SUB-E(1) RA1-T52-E(1)
E (2)		
26 (4)	REx2	RA1-TRG2-ALI(65) RA1-T52-26(4)
25 (5)	BRx2	RA1-TRG2-ABI(33) RA1-T52-25(5)
24 (6)	PKx2	RA1-TRG1-ILI(65) RA1-T52-24(6)
23 (7)	SBx2	RA1-TRG1-IBI(33) RA1-T52-23(7)
22 (9)	GG	RA1-T52-22(9)
21 (10)	WHx2	RA1-SUB-RA(56) RA1-T52-21(10)
20 (11)	GY	RA1-T52-20(11)
19 (12)	VI	RA1-T52-19(12)
18 (13)	BE	RA1-T52-18(13)
17 (15)	GR	RA1-T52-17(15)
16 (16)	YE	RA1-T52-16(16)
15(17)	ORx2	RA1-SUB-RF(55) RA1-T52-15(17)
14 (18)	RE	RA1-T52-14(18)
13 (19)	BR	RA1-T52-13(19)
12 (21)	PK	RA1-T52-12(21)
11(22)	SB	RA1-T52-11(22)
10 (23)	GG	RA1-T52-10(23)
9 (24)	YEx2	RA1-BA-f06(24') RA1-T52-9(24)
8 (25)	GY	RA1-T52-8(25)
7 (27)	ORx2	RA1-BA-f05(22') RA1-T52-7(27)
6 (28)	BEx2	RA1-SUB-C1(37) RA1-T52-6(28)
5 (29)	GR	RA1-T52-5(29)
4 (30)	YE	RA1-T52-4(30)
3 (31)	OR	RA1-T52-3(31)
2 (32)	REx2	RA1-SUB-D1(47) RA1-T52-2(32)
1 (33)	BRx2	RA1-SUB-VC1(12) RA1-T52-1(33)

26' (3')	RE	PN1-VR24-2
25' (4')	BR	PN1-VR23-2
24' (5')	PK	PN1-VR22-2
23' (6')	SB	PN1-VR21-2
22' (8')	GG	PN1-VR20-2
21' (9')	WH	PN1-VR19-2
20' (10')	GY	PN1-VR18-2
21' (11')	VI	PN1-VR17-2
20' (12')	BE	PN1-VR16-2
17' (14')	GR	PN1-VR15-2
16' (15')	YE	PN1-VR14-2
15' (16')	OR	PN1-VR13-2
14' (17')	RE	PN1-VR12-2
13' (18')	BR	PN1-VR11-2
12' (20')	PK	PN1-VR10-2
11' (21')	SB	PN1-VR9-2
10' (22')	GG	PN1-VR8-2
9' (23')	WH	PN1-BA-f02(63')
8' (24')	GY	PN1-VR6-2
7' (26')	VI	RA1-BA-f01(61')
6' (27')	BE	PN1-VR4-2
5' (28')	GR	PN1-SW2-T
4' (29')	YE	PN1-SW1-T
3' (30')	OR	PN1-VR3-2
2' (31')	RE	PN1-VR2-2
1' (32')	BR	PN1-VR1-2

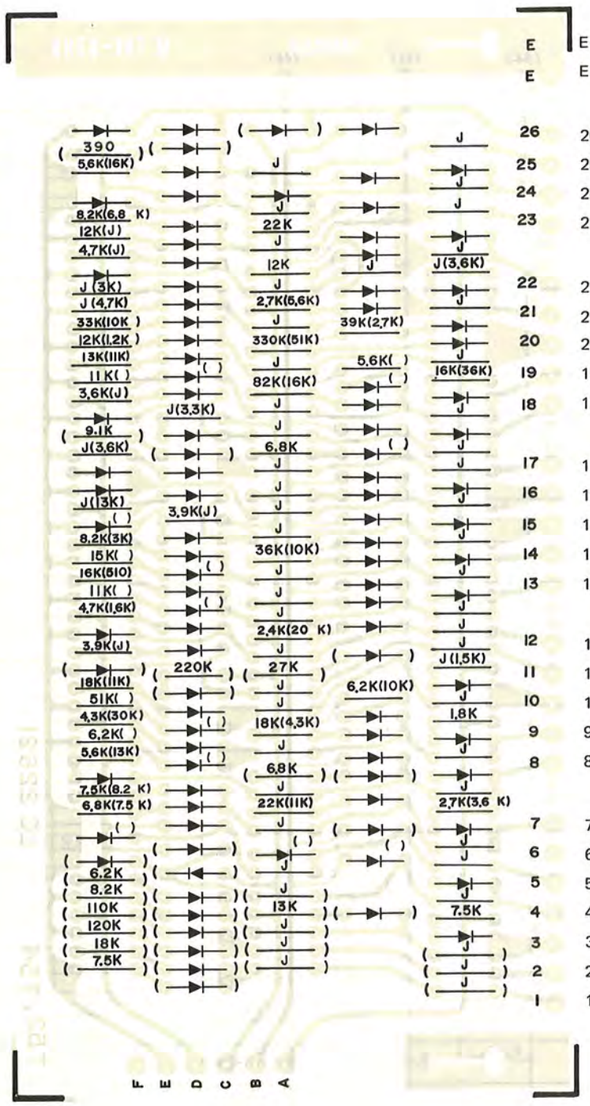
RA1-BA-I6(9)	BE	(96) F
RA1-BA-I5(8)	GR	(95) E
RA1-BA-I4(7)	YE	(94) D
RA1-BA-I3(6)	OR	(93) C
RA1-BA-I2(5)	RE	(92) B
RA1-BA-I1(4)	BR	(91) A

Note) 1. Print Board : LC22612
2. Diode : IS1555

T52 Circuit Diagram



T52 Circuit Board & Wiring

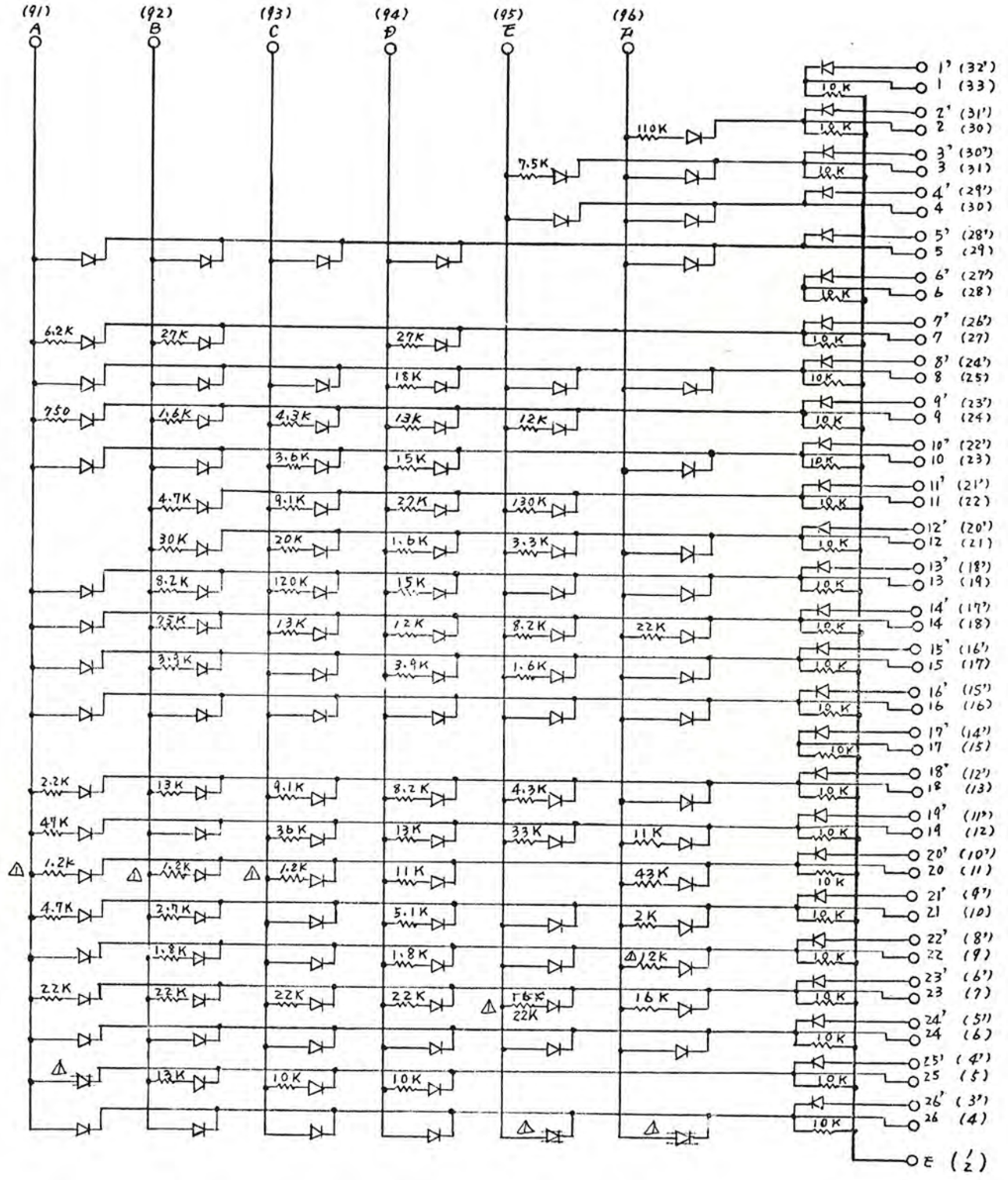


E	E (1)	BL12x2	RA1-T51-E(1) / RA1-M11-E(1)
E	E (2)		
26	26 (4)	REx2	RA1-T51-26(4) / PN1-MBK-M3-VR24
25	25 (5)	BRx2	RA1-T51-25(5) / PN1-MBK-M3-VR23
24	24 (6)	PKx2	RA1-T51-24(6) / PN1-MBK-M3-VR22
23	23 (7)	SBx2	RA1-T51-23(7) / PN1-MBK-M3-VR21
22	22 (9)	GGx2	RA1-T51-22(9) / RA1-R51-LV(93')
21	21 (10)	WHx2	RA1-T51-21(10) / PN1-MBK-M3-VR19-4
20	20 (11)	GYx2	RA1-T51-20(11) / RA1-M11-SL(64)
19	19 (12)	VIx2	RA1-T51-19(12) / RA1-M11-1A(66)
18	18 (13)	BEx2	RA1-T51-18(13) / RA1-M11-AA(67)
17	17 (15)	GRx2	RA1-T51-17(15) / RA1-M11-LP2(24)
16	16 (16)	YEx2	RA1-T51-16(16) / RA1-M11-LP1(27)
15	15 (17)	ORx2	RA1-T51-15(17) / PN1-MBK-M3-VR13-4
14	14 (18)	REx2	RA1-T51-14 (18) / RA1-M11-DF(61)
13	13 (19)	BRx2	RA1-T51-13(19) / RA1-M11-AF(62)
12	12 (21)	PKx2	RA1-T51-12(21) / RA1-M11-AL(59)
11	11 (22)	SBx2	RA1-T51-11(22) / RA1-M11-IL(58)
10	10 (23)	GGx2	RA1-T51-10(23) / RA1-R51-QL(15')
9	9 (24)	YEx2	RA1-R51-FL(55') / RA1-T51-9(24)
8	8 (25)	GYx2	RA1-T51-8(25) / RA1-R51-QH(57)
7	7 (27)	ORx2	RA1-R51-FH(55) / RA1-T51-7(27)
6	6 (28)	BEx2	RA1-T51-6(28) / PN1-MBK-M3-VR4
5	5 (29)	GRx2	RA1-T51-5(29) / RA1-M11-G2(44)
4	4 (30)	YEx2	RA1-T51-4(30) / RA1-M11-G1(45)
3	3 (31)	ORx2	RA1-T51-3(31) / RA1-M11-PW(40)
2	2 (32)	REx2	RA1-T51-2(32) / PN1-MBK-M3-VR2
1	1 (33)	BRx2	RA1-T51-1(33) / PN1-MBK-M3-VR1

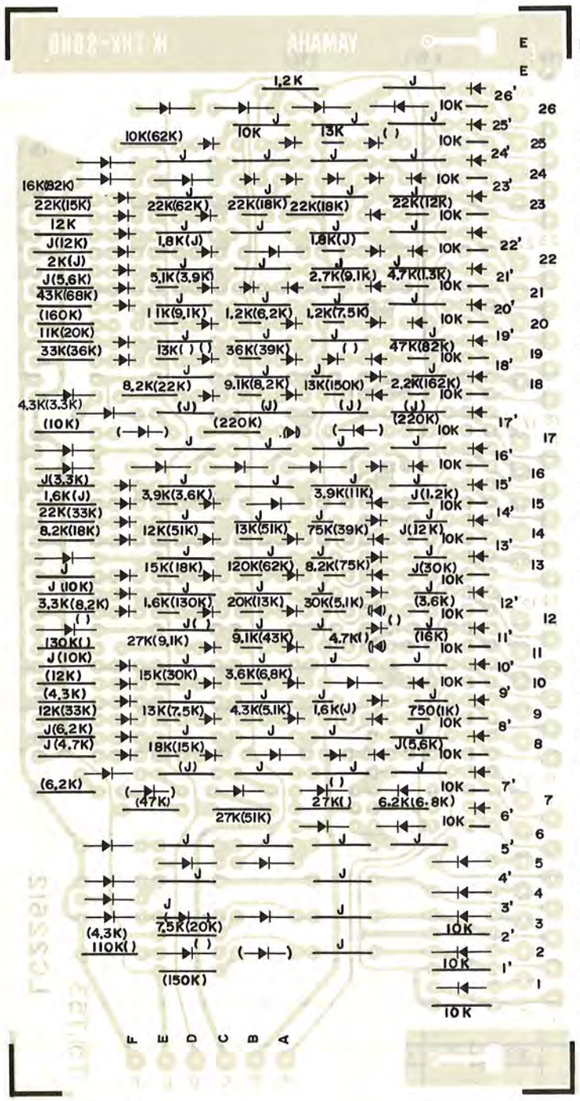
		(96) F
RA1-BA-I11(15)	GR	(95) E
RA1-BA-I10(14)	RE	(94) D
RA1-BA-I9(13)	OR	(93) C
RA1-BA-I8(12)	RE	(92) B
RA1-BA-I7(10)	BR	(91) A

Note) 1. Print Board : LC22621
2. Diode : IS1555
3. J : J10

T53 Circuit Diagram



T53 Circuit Board & Wiring



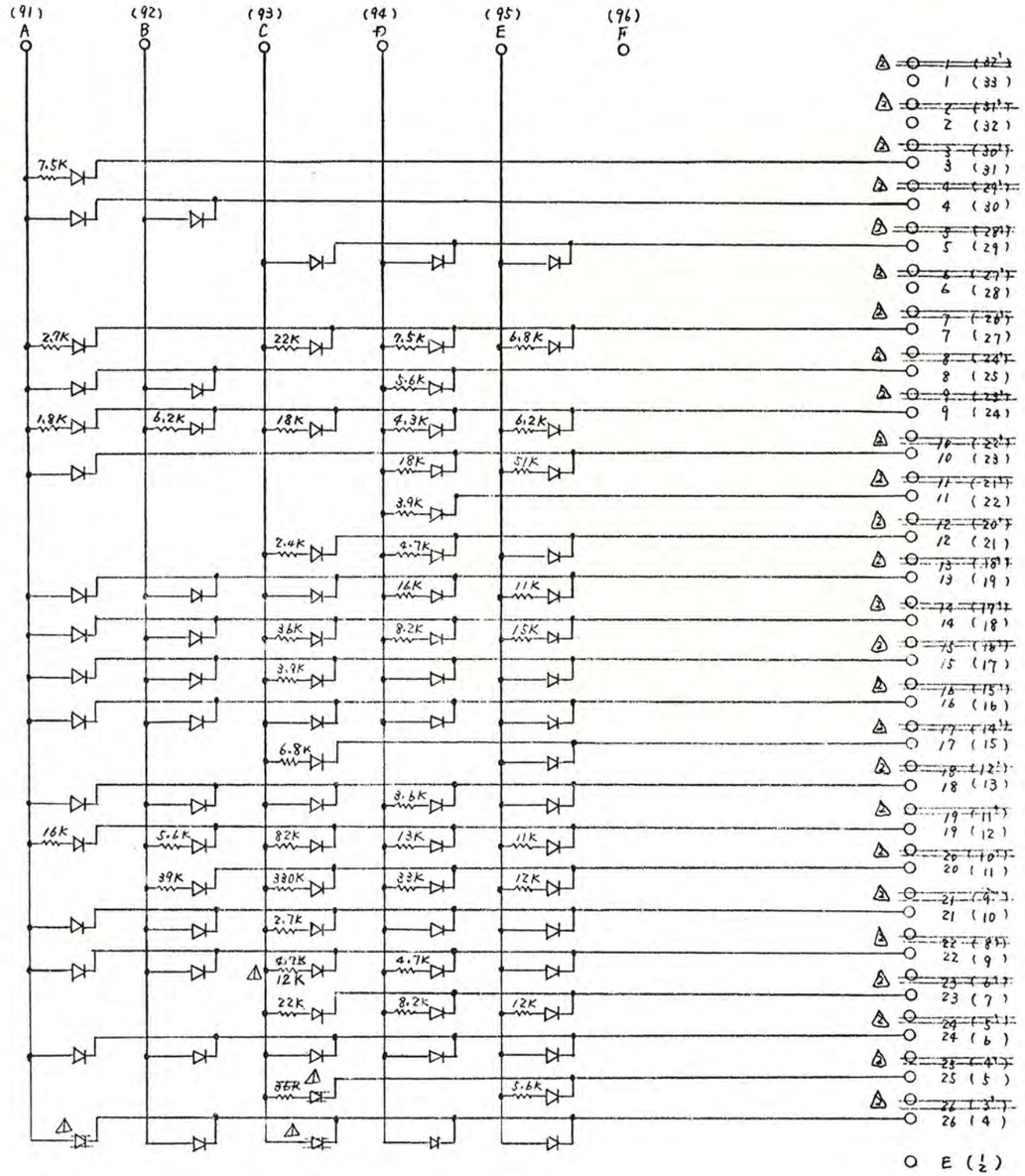
E (1)	BL12x2	RA1-M18-E(1) RA1-T54-E(1)
E (2)		
26 (4)	REx2	RA1-TRG5-ALII(42) RA1-T54-26(4)
25 (5)	BRx2	RA1-TRG2-ABII(66) RA1-T54-25(5)
24 (6)	PKx2	RA1-TRG4-ILII(4) RA1-T54-24(6)
23 (7)	SBx2	RA1-TRG1-IBII(66) RA1-T54-23(7)
22 (9)	GG	RA1-T54-22(9)
21 (10)	WHx2	RA1-SUB-RA'(58) RA1-T54-21(10)
20 (11)	GY	RA1-T54-20(11)
19 (12)	VI	RA1-T54-19(12)
18 (13)	BE	RA1-T54-18(13)
17 (15)	GR	RA1-T54-17(15)
16 (16)	YE	RA1-T54-16(16)
15 (17)	ORx2	RA1-SUB-RF'(57) RA1-T54-15(17)
14 (18)	RE	RA1-T54-14(18)
13 (19)	BR	RA1-T54-13(19)
12 (21)	PK	RA1-T54-12(21)
11 (22)	SB	RA1-T54-11(22)
10 (23)	GG	RA1-T54-10(23)
9 (24)	REx2	RA1-BA-f08(23') RA1-T54-9(24)
8 (25)	GY	RA1-T54-8(25)
7 (27)	BRx2	RA1-BA-f07(21') RA1-T54-7(27)
6 (28)	BEx2	RA1-SUB-C2(41) RA1-T54-6(28)
5 (29)	GR	RA1-T54-5(29)
4 (30)	YE	RA1-T54-4(30)
3 (31)	OR	RA1-T54-3(31)
2 (32)	REx2	RA1-SUB-D2(49) RA1-T54-2(32)
1 (33)	BRx2	RA1-SUB-VC2(18) RA1-T54-1(33)

26' (3')	RE	PN1-VR24'-2
25' (4')	BR	PN1-VR23'-2
24' (5')	PK	PN1-VR22'-2
23' (6')	SB	PN1-VR21'-2
22' (8')	GG	PN1-VR20'-2
21' (9')	WH	PN1-VR19'-2
20' (10')	GY	PN1-VR18'-2
19' (11')	VI	PN1-VR17'-2
18' (12')	BE	PN1-VR16'-2
17' (14')	GR	PN1-VR15'-2
16' (15')	YE	PN1-VR14'-2
15' (16')	OR	PN1-VR13'-2
14' (17')	RE	PN1-VR12'-2
13' (18')	BR	PN1-VR11'-2
12' (20')	PK	PN1-VR10'-2
11' (21')	SB	PN1-VR9'-2
10' (22')	GG	PN1-VR8'-2
9' (23')	BR	RA1-BA-f04(62')
8' (24')	GY	PN1-VR6'-2
7' (26')	OR	RA1-BA-f03(60')
6' (27')	BE	PN1-VR4'-2
5' (28')	GR	PN1-SW2'-T
4' (29')	YE	PN1-SW1'-T
3' (30')	OR	PN1-VR3'-2
2' (31')	RE	PN1-VR2'-2
1' (32')	BR	PN1-VR1'-2

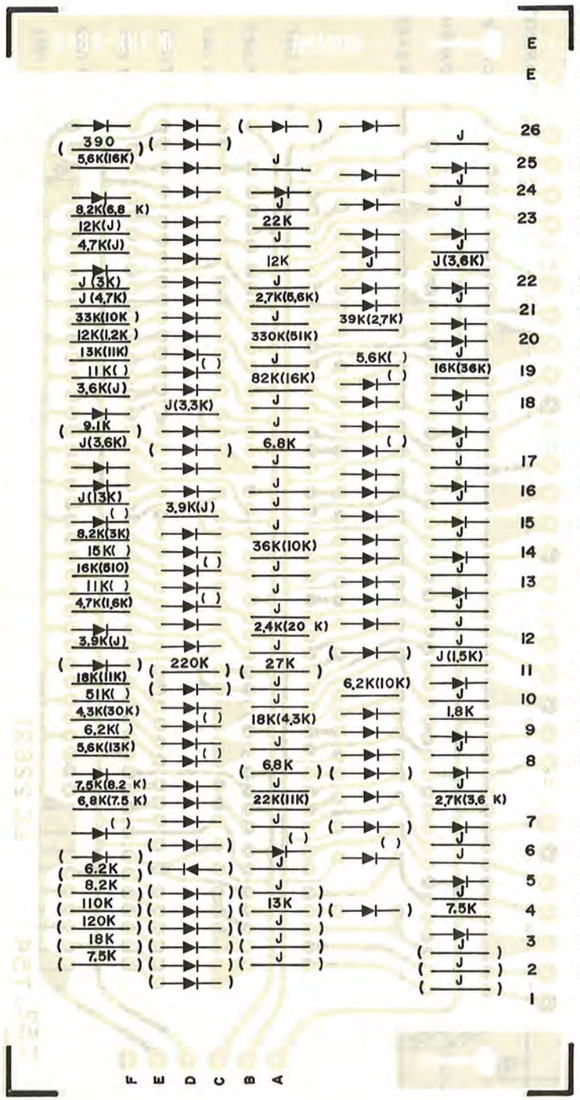
RA1-BA-I16(42)	BE	(96) F
RA1-BA-I15(41)	GR	(95) E
RA1-BA-I14(40)	YE	(94) D
RA1-BA-I13(39)	OR	(93) C
RA1-BA-I12(38)	RE	(92) B
RA1-BA-I11(37)	BR	(91) A

Note) 1. Print Board : LC22612
2. Diode : IS1555

T54 Circuit Diagram



T54 Circuit Board & Wiring

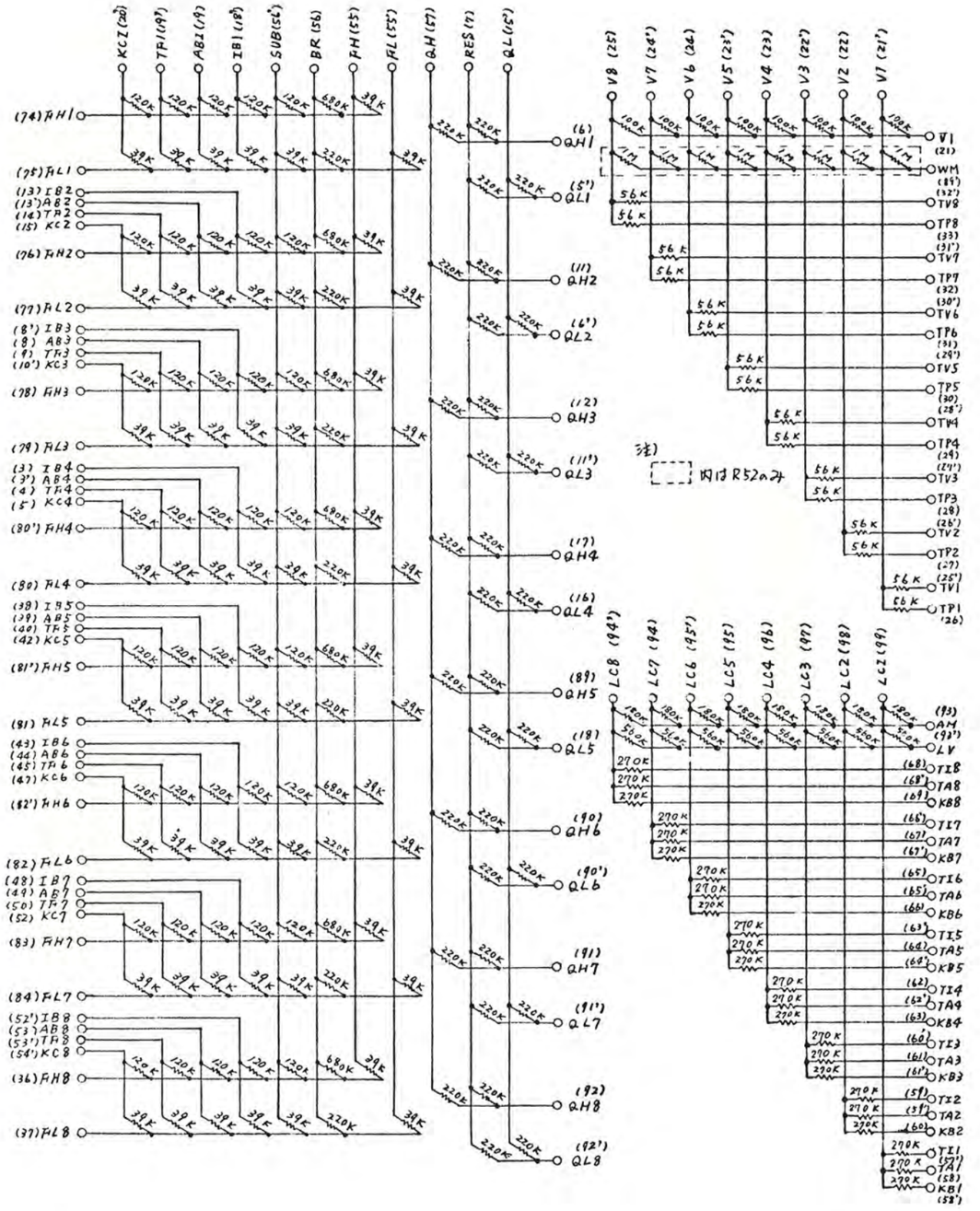


E	E (1)	BL12x2	RA1-T53-E(1)
			RA1-M21-E(1)
E	E (2)		
26	26 (4)	REx2	RA1-T53-26(4)
			PN1-MBK-M44-VR24'
25	25 (5)	BRx2	RA1-T53-25(5)
			PN1-MBK-M4-VR23'
24	24 (6)	PKx2	RA1-T53-24(6)
			PN1-MBK-M4-VR22'
23	23 (7)	SBx2	RA1-T53-23(7)
			PN1-MBK-M4-VR21'
22	22 (9)	GGx2	RA1-T53-22(9)
			RA1-R52-LV(93')
21	21 (10)	WHx2	RA1-T53-21(10)
			PN1-MBK-M4-VR19'-4
20	20 (11)	GYx2	RA1-T53-20(11)
			RA1-M21-SL(64)
19	19 (12)	VIx2	RA1-T53-19(12)
			RA1-M21-1A(66)
18	18 (13)	BEx2	RA1-T53-18(13)
			RA1-M21-AA(67)
17	17 (15)	GRx2	RA1-T53-17(15)
			RA1-M21-LP2(24)
16	16 (16)	YEx2	RA1-T53-16(16)
			RA1-M21-LP1(27)
15	15 (17)	ORx2	RA1-T53-15(17)
			PN1-MBK-M4-VR13'(4)
14	14 (18)	REx2	RA1-T53-14(18)
			RA1-M21-DF(61)
13	13 (19)	BRx2	RA1-T53-13(19)
			RA1-M21-AF(62)
12	12 (21)	PKx2	RA1-T53-12(21)
			RA1-M21-AL(59)
11	11 (22)	SBx2	RA1-T53-11(22)
			RA1-M21-IL(58)
10	10 (23)	GGx2	RA1-T53-10(23)
			RA1-R52-QL(15')
9	9 (24)	REx2	RA1-R52-FL(55')
			RA1-T53-9(24)
8	8 (25)	GYx2	RA1-T53-8(25)
			RA1-R52-QH(57)
7	7 (27)	BRx2	RA1-R52-FH(55)
			RA1-T53-7(27)
6	6 (28)	BEx2	RA1-T53-6(28)
			PN1-MBK-M4-VR4'
5	5 (29)	GRx2	RA1-T53-5(29)
			RA1-M21-G2(44)
4	4 (30)	YEx2	RA1-T53-4(30)
			RA1-M21-G1(45)
3	3 (31)	ORx2	RA1-T53-3(31)
			RA1-M21-PW(40)
2	2 (32)	REx2	RA1-T53-2(32)
			PN1-MBK-M4-VR2'
1	1 (33)	BRx2	RA1-T53-1(33)
			PN1-MBK-M4-VR1'

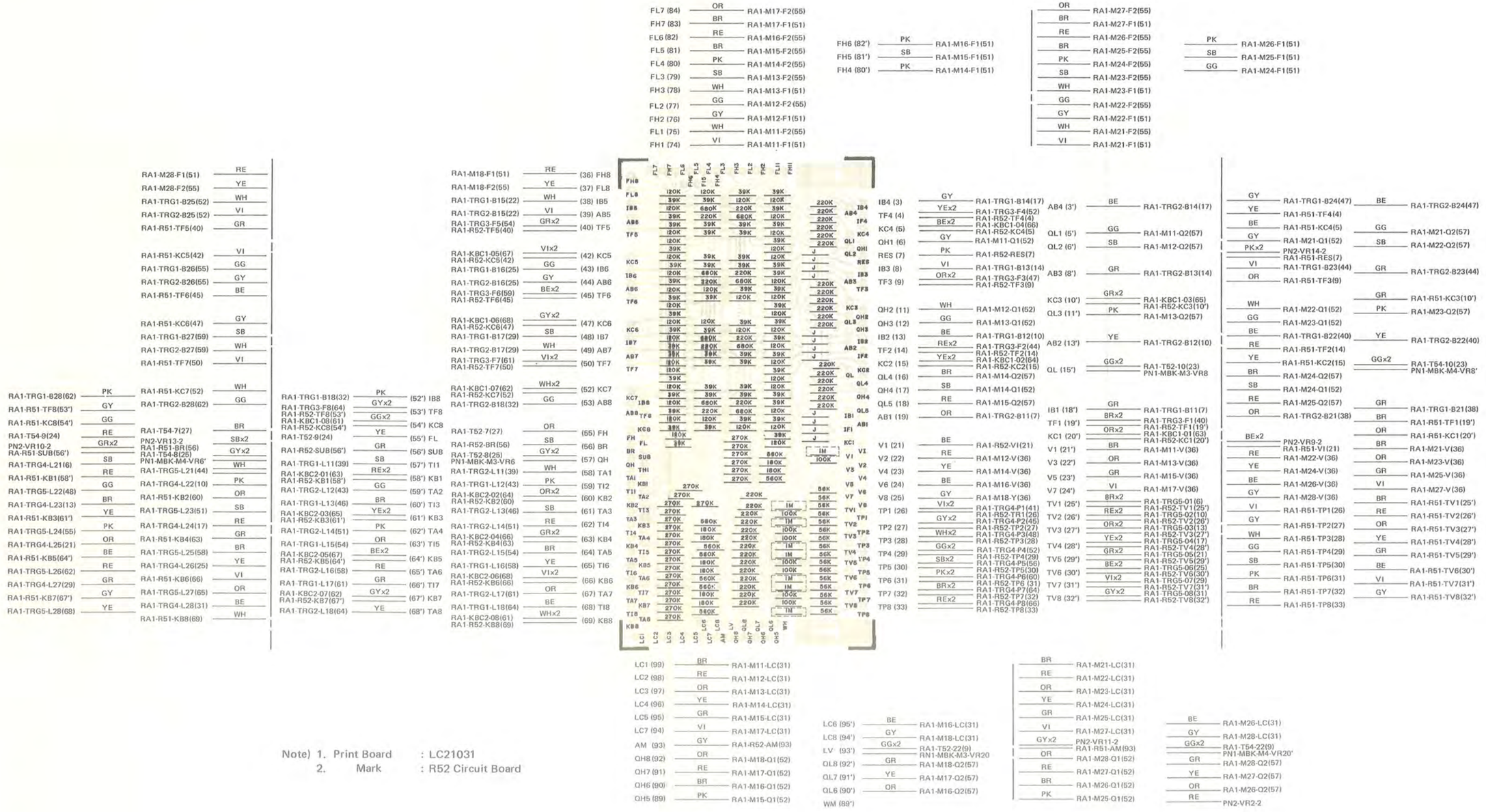
		(96) F
RA1-BA-II11(48)	GR	(95) E
RA1-BA-II10(47)	YE	(94) D
RA1-BA-II9(46)	OR	(93) C
RA1-BA-II8(45)	RE	(92) B
RA1-BA-II7(44)	BR	(91) A

Note) 1. Print Board :LC22621
2. Diode : IS1555
3. J : J10

R51·52 Circuit Diagram

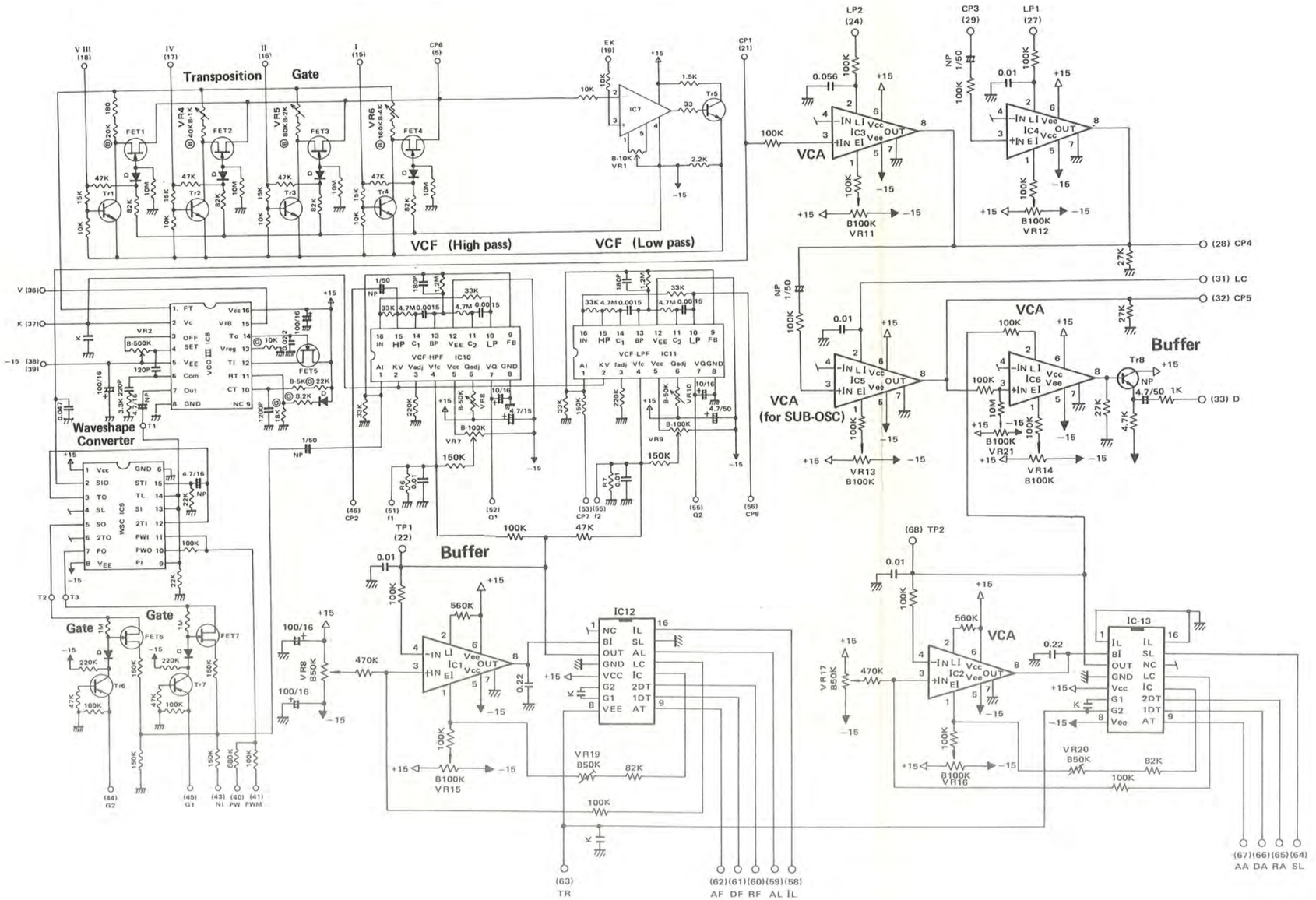


R51·52 Circuit Board & Wiring



Note) 1. Print Board : LC21031
2. Mark : R52 Circuit Board

M Circuit Diagram



	CS-80	CS-60,50
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

Note)

1. Tr1～Tr5,Tr8 : 2SC458
   Tr6, Tr7 : 2SA561
   FET1～7 : 2SK30
2. D : IS1555
3. VR1 : 3321H type
   VR3 : 3006 type
   Other VR : V10K8-1-2 (3 terminals)
   : V10K4A-5-2 (2 terminals)
4. Ⓖ Mark : Metal Film Resistor (2%)
   Ⓑ Mark : 〃 (0.1%)
5. K Mark : Ceramic Capacitor (1000P)
6. IC
   IC views show the pin disposition looked from upper. (Opposite to Pattern)
7. IC
   IC1～6: IG00151 (VCA)
   IC7 : TA7504M (VCOIII)
   IC8 : IG00153
   IC9 : IG00158
   IC10,11: IG00156
   IC12 : IG00152
   IC13 : IG00159

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	

VCO III IC (IG00153)

This IC is used for voltage controlled oscillator.
Many defferent frequencies are produced by the voltage supplied.

1. FT ..... Resistor for determination of the feet. The electric current is provided to the pin from transposition changing circuit so that the octave can be determined.

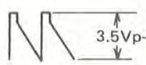
2. KV ..... Input of the key voltage
The input of the voltage is provided to the pin in corporation with the keys held down.

High voltage ..... High frequency
Low voltage ..... Low frequency

Input Voltage	Output Frequency
0.250V	130.8Hz (C2)
0.500V	261.6Hz (C3)
1.000V	523.2Hz (C4)
2.000V	1046.0Hz (C5)
4.000V	2093.0Hz (C6)

Transposition "normal"

3.
4. } OFF-SET .... Zero adjustment of input buffer circuit
5. Vee ..... −15V input power source.
6. Com .... Phase compensation for input buffer amplifier.
Normally, the output (KV + 1V) is supplied to the pin.
7. OUT .... Output

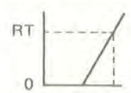


As to the frequency, refer to the Pin No.2 (KV).

8. GND ..... Earth
9. Vref ..... Input of the standard voltage.
10. CT ..... Circuit for time constant.

The following wave shape is produced.

11. RT ..... Circuit for time constant.

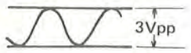


Determines the discharging voltage level.

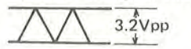
12. T1..... Input for the comparator.
Input of the wave shape (⋀⋀) is provided. from the pin no. 14 (TO).
13. Iref ····· Input of the standard electronic current
14. TO ..... Output from time constant circuit.
⋀⋀ The following wave shape is produced.
15. VIB ..... Input for vibrato control wave.
Input of the control wave is provided by VCO lever of SUB-OSC.
16. Vcc ..... +15V input power source.

WSC IC (IG00158)

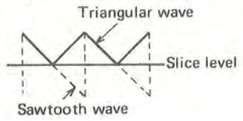
1. Vcc ..... +15V input power source
2. SIO ..... Output of the sine wave



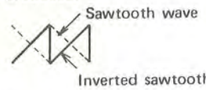
3. TO ..... Output of triangular wave.



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.



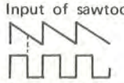
5. $\overline{SO}$ ..... Output of the inverter wave
Output of inverted sawtooth wave is produced.



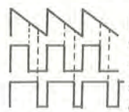
6. 2TO ..... Output of double triangle wave
Double triangle wave is produced from triangle wave.

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.



Input of the voltage is provided for determination of the sensitivity of PWM lever so that the pulse width is changed.

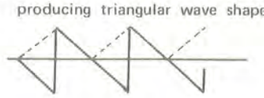
12. 2TI ..... Input of triangular wave for producing double triangular wave shape.

Input of triangular wave (TO) is provided for making double triangular wave shape.

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

Input of the sawtooth wave is provided from VCO III for producing inverted sawtooth wave shape.

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



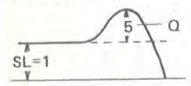
15. STI ..... Input of the wave for producing sine wave.

Input of the triangular wave (TO) is provided for producing sine wave.

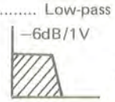
16. GND ..... Earth

VCF IC (IG00156)

1. AI ..... Signal Input
Input signals from VCO and WSC are provided to this pin.
2. KV ..... Key voltage input
In order to change the tone color according to the tone range of keyboard, the degignated voltage of the key will supplied to the pin. (0.25-4.0V)
3. fc ..... Adjustment of the cut off frequency.
Set the control currency of the cut off frequency.
4. Vf ..... Input of the cut off voltage.
Input voltage of cut off frequency is supplied to this pin so that the tone color can be changed. The center point of the cut off frequency can be also set.
When the VK is 0.25V and Vf is 5V, the cut off frequency is set to just 1KHz.
5. Vcc ..... +15V input power source
6. Q0 ..... Q adjustment.
The Q control current sets the Q equal to 5, when VQ is 0 volt.

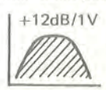


7. VQ ..... Input of the voltage for Q control.
Q is variable according to the control voltage supplied.
When the control voltage is
0V (Max.), Q=5
When the control voltage is
10V (Min.), Q=0.5
8. GND .... Earth
9. FB ..... Q feed back
This is the feed back output pin for the Q control by which the Q is determined.
10. LP ..... Low-pass output



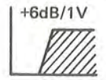
The output of lower frequencies are produced.

11. C2 ..... C pin for determination of the cut off frequency.
12. Vee ..... −15V power source.
13. BP ..... Band-pass output.



The output of intermediate frequences are produced.

14. C1 ..... C pin for determination of the cut off frequency.
15. HP ..... Hi-pass output



The output of higher frequencies are produced.

16. IN ..... Input of feed back
The input signal for determination of cut off frequency.

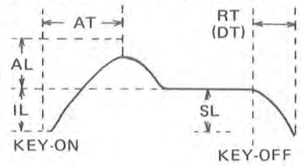
VCF-EG IC (IG00152)

This IC generates envelope wave shape which is supplied to VCF and control the tone color.

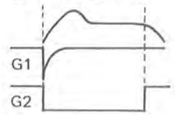
1. NC ..... Not connected
2. BI ..... Input of buffer amplifier.
3. OUT .... Output of buffer amprifier.

The buffer amplifier is built in for the purpose of matching inpedance.

Output wave shape



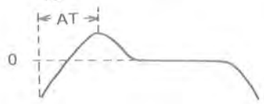
4. GND .... Earth
5. Vcc ..... +15V input power source.
6. G1 ..... Gate 1
7. G2 ..... Gate 2



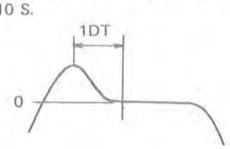
AT starting data

Key ON-OFF data

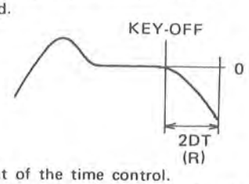
8. Vee ..... −15V input power source.
9. AT ..... Input of buffer voltage for determination of the attack time.
Input of the voltage between zero V and 10V is provided and the attack time is controlled from 1 mS until 1S.



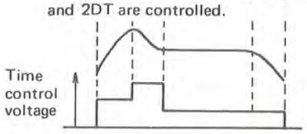
10. 1DT ..... Input of buffer voltage for determination of the decay time.
Input of the voltage between zero V and 10V is provided and the first decay time is controlled from 10mS until 10 S.



11. 2DT ..... Input of buffer voltage for determination of the release time.
Input of the voltage between zero V to 10V is provided and the time from KEY-ON until release is controlled from 10m second until 10 second.

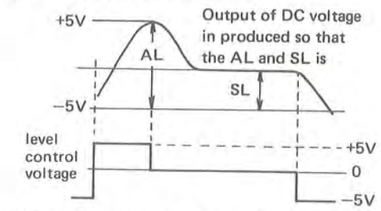


12. TC ..... Output of the time control.
Output of DC voltage is produced so that the each time of attack, 1DT and 2DT are controlled.



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

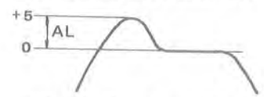
13. LC ..... Output of level control.



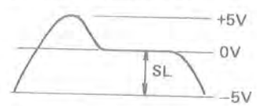
Output of DC voltage in produced so that the AL and SL is

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

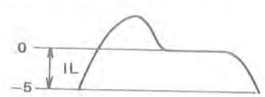
14. AL..... Input of butter voltage for determination of attack level.
Input of the voltage between (0V~ 10V is provided and the attack level is controlled from 0V until +5V.



15. SL ..... Input of buffer voltage for determination of the sustain level.
Normally fixed to zero(0) volt.



16. IL ..... Input of buffer voltage for determination of the initial level.
Input of the voltage between zero 0V and ten 10V is provided and the initial level is controlled from zero to minus 5 volt.



Pitch Adjustment

*Before carring out pitch adjustment, be sure to stabilize electrical circuits of your synthesizer more than 10 minutes after power switch is turned on.

1. Adjust the following variable resistors, when tuning knob on the panel is in the center position, so that the voltage of TU terminal is +4V ± 0.1% between the terminals TU (67) and E on KAS circuit board.

	Circuit Board	VR No.	
CS-50	SUB	VR11	B-200Ω
CS-60	SUB	VR14	B-100KΩ
CS-80	BA	VR3	B-100KΩ

*Make sure, all the levers on the panel are in "OFF" position.

2. Short circuit terminals EK (19) and E (1)(2) on M circuit board when tone selector is set to "FLUTE" and transposition lever is in OCT-UP (2' on CS-80) (+15V, terminal VIII on M circuit board) position. Then, adjust VR1 (B-10K) on M circuit board so that the voltage of terminal Cp (5) is within 0V ±120μV.

3. With checking the output frequency from the 9th pin of IC9 (WSC) on M circuit board, adjust the VR3 (B-5K) to have the certain highest note.

CS-50, 60 ..... C7 to be 4186 Hz ± 1 cent when C6 key is depressed.
CS-80 ..... C8 to be 8372 Hz ± 1 cent when C6 key is depressed.

In the same manner, set the lowest note by adjusting the VR2 (B-500) as follows.
CS-50 ..... C3 to be 261.6Hz ± 1 cent when C2 key is depressed.
CS-60 ..... C2 to be 130.8Hz ± 1 cent when C1 key is depressed.
CS-80 ..... C3 to be 261.6Hz ± 1 cent when C1 key is depressed.

Note:
(1) You can easily find out which M circuit board is corresponding to the key depressed by hearing the subtle change of the tone with hum modulation when you are adjusting VR2 on A M circuit board.
(2) The order the possible sounds when keys are depressed in turn is:
① → ② → ③ → ④ → ⑤ → ⑥ → ⑦ → ①
When keys are depressed at a time:
① → ② → ③ → ④ → ⑤ → ⑥ → ⑦ → ⑧ → ①
Therefore, when you adjust the M8 circuit board, depress the 8th key while 7th key is holding down, then release the 7th key. In this way, you can take out the sound of 8th key depressed.

4. Adjust the following variable resisters, when transposition lever is in "NORMAL" ("4'" on CS-80) position (+15V at terminal IV) as below.

CS-50, 60 ..... VR4 (B-1K); C6 to be 2093Hz ± 1 cent when C6 key is depressed.
CS-80 ..... VR4 (B-500): C7 to be 4186Hz ± 1 cent when C6 key is depressed.

5. Adjust the following variable resistors, when transposition lever is in "1 OCT-DOWN" ("8'" on CS-80) position (+15V at terminal II) as below.

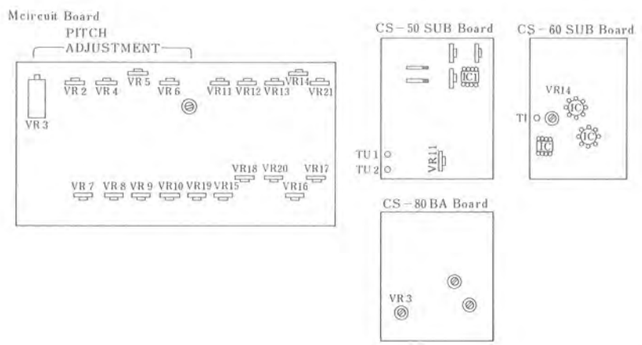
CS-50, 60 ..... VR5 (B-2K); C5 to be 1046Hz ± 1 cent when C6 key is depressed.
CS-80 ..... VR5 (B-1K); C6 to be 2093Hz ± 1 cent when C6 key is depressed.

6. Likewise, adjust the followings, when transposition lever is in "2 OCT-DOWN" ("16'" on CS-80) position (+15V at terminal I) as below.

CS-50, 60 ..... VR6 (B-5K); C4 to be 523.2Hz ± 1 cent when C6 key is depressed.
CS-80 ..... VR6 (B-2K); C5 to be 1046.4Hz ± 1 cent when C6 key is depressed.

7. Finally, adjust the generating circuit for tuning standard voltage, when A3 key is depressed, so that the output is 443 Hz.

	Circuit Board	VR. No.	
CS-50	SUB	VR11	B-200Ω
CS-60	SUB	VR14	B-100Ω
CS-80	BA	VR3	B-100KΩ



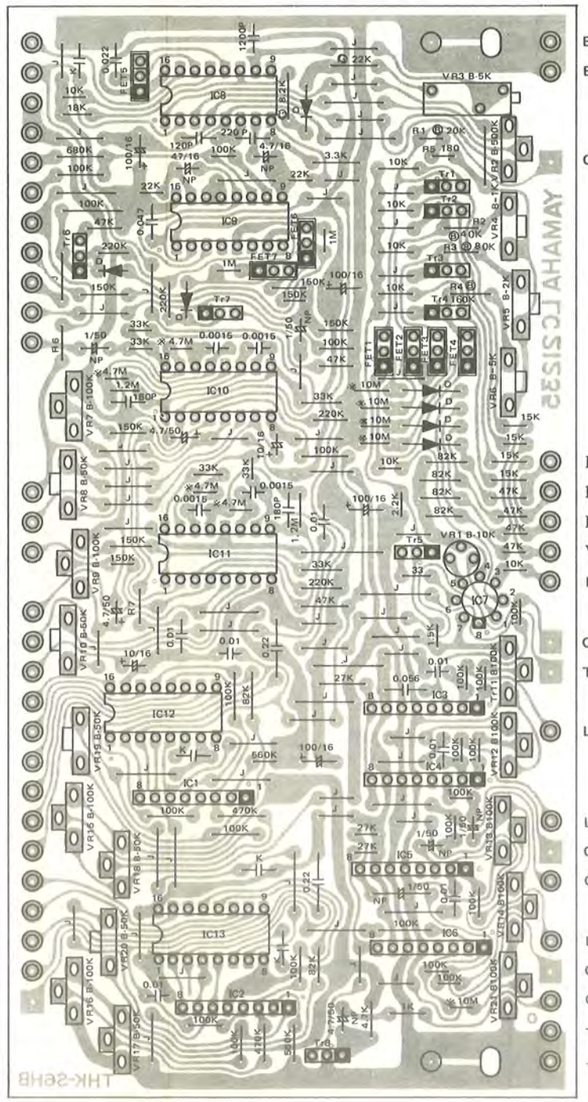
M11·12 Circuit Board & Wiring

M12

RA1-R51-V2 (22)	RE	(36) V
RA2-SH-K2 (42)	WHx2	
RA1-M22-K (37)	YE12	(37) K
RA1-M11-–15 (38)	YE30	(38) –15
RA1-M16-–15 (38)	YE12	
RA1-M13-–15 (38)	YE30	(39) –15
PU-9C1P-5	ORx2	
RA1-M11-PW (40)		(40) PW
RA1-M13-PW (40)	YEx2	
RA1-M11-PWM (41)		(41) PWM
RA1-M13-PWM (41)		
		(42) E'
RA1-M11-NI (43)	GGx2	
RA1-M13-NI (43)		(43) NI
RA1-M11-G2 (44)	GRx2	
RA1-M13-G2 (44)		(44) G2
RA1-M11-G1 (45)	YEx2	
RA1-M13-G1 (45)		(45) G1
RA1-M12-CP7 (53)	BE	(46) CP2
RA1-R51-FH2 (76)	GY	(51) F1
RA1-R51-QH2 (11)	WH	(52) Q1
RA1-M12-CP2 (46)	BE	(53) CP7
RA1-R51-FL2 (77)	GG	(55) F2
RA1-M12-CP3 (29)	VI	(56) CP8
RA1-R51-QL2 (6')	SB	(57) Q2
RA1-M11-IL (58)	SBx2	
RA1-M13-IL (58)	PKx2	(58) IL
RA1-M11-AL (59)	ORx2	
RA1-M13-AL (59)	REx2	(59) AL
RA1-M11-RF (60)	BRx2	
RA1-M13-RF (60)	GYx2	(60) RF
RA1-M11-DF (61)	WHx2	
RA1-M13-DF (61)	VIx2	(61) DF
RA1-M11-AF (62)	BEx2	
RA1-M13-AF (62)		(62) AF
RA1-TWS-T2 (30)		(63) TR
RA1-M22-TR (63)		
RA1-M11-SL (64)		(64) SL
RA1-M13-SL (64)		
RA1-M11-RA (65)		(65) RA
RA1-M13-RA (65)		
RA1-M11-DA (66)		(66) DA
RA1-M13-DA (66)		
RA1-M11-AA (67)		(67) AA
RA1-M13-AA (67)		
		(68) TP2

M11

RA1-R51-V1 (21')	BR	(36) V
RA2-SH-K1 (38)	WHx2	
RA1-M21-K (37)	YE12x2	(47) K
RA1-SUB-–15 (5)		(38) –15
RA1-M12-–15 (38)	YE30	
RA2-KAS-–15 (89)		(39) –15
RA1-T52-3 (31)	ORx2	
RA1-M12-PW (40)	YEx2	(40) PW
RA1-SUB-P1 (48)		
RA1-M12-PWM (41)		(41) PWM
	GGx2	(42) E
RA1-SUB-NO1 (39)		(43) NI
RA1-M12-NI (43)	GRx2	
RA1-T52-5 (29)		(44) G2
RA1-M12-G2 (44)	YEx2	
RA1-T52-4 (30)		(45) G1
RA1-M12-G1 (45)	BE	
RA1-M11-CP7 (53)		(46) CP2
RA1-R51-FH1 (74)	VI	(51) F1
RA1-R51-QH1 (6)	GY	(52) Q1
RA1-M11-CP2 (46)	BE	(53) CP7
RA1-R51-FL1 (75)	WH	(55) F2
RA1-M11-CP3 (29)	VI	(56) CP8
RA1-R51-QL1 (5')	GG	(57) Q2
RA1-T52-11 (22)	SBx2	
RA1-M12-IL (58)	PKx2	(58) IL
RA1-T52-12 (21)		(59) AL
RA1-M12-AL (59)	ORx2	
RA1-SUB-RE0 (60)	REx2	(60) RF
RA1-M12-RF (60)		
RA1-T52-14 (18)	BRx2	(61) DF
RA1-M12-DF (61)		
RA1-T52-13 (19)	GYx2	(62) AF
RA1-M12-AF (62)		
RA1-TWS-T1 (31)	WHx2	(63) TR
RA1-M21-TR (63)		
RA1-T52-20 (11)	VIx2	(64) SL
RA1-M12-SL (64)		
RA1-SUB-RA0 (61)	BEx2	(65) RA
RA1-M12-RA (65)		
RA1-T52-19 (12)		(66) DA
RA1-M12-DA (66)		
RA1-T52-18 (13)		(67) AA
RA1-M12-AA (67)		
		TP2



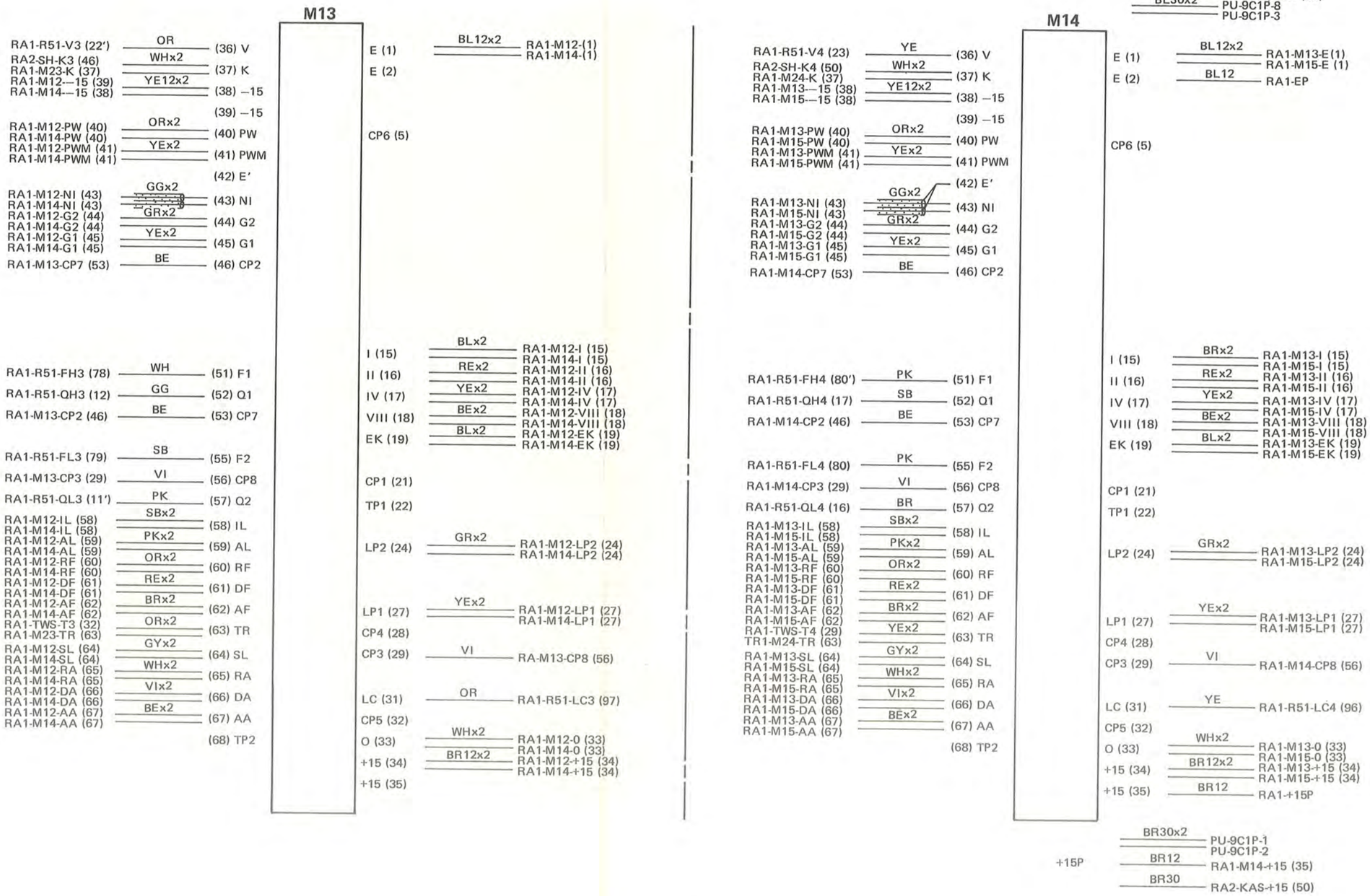
M11

E (1)	BL12x2	RA1-T52-E (1)
E (2)		RA1-M12-E (1)
CP6		
I (15)	BRx2	RA1-SUB-I (16)
III (16)	REx2	RA1-M12-I (15)
IV (17)	YEx2	RA1-SUB-II (15)
VIII(18)	BE	RA1-M12-II (16)
EK (19)	BLx2	RA1-SUB-IV (14)
		RA1-M12-IV (17)
		RA1-M12-VIII (18)
		RA2-KAS-EK (70)
		RA1-M12-EK (19)
CP1		
TP1		
LP2 (24)	GRx2	RA1-T52-17 (15)
		RA1-M12-LP2 (24)
LP1 (27)	YEx2	RA1-T52-16 (16)
		RA1-M12-LP1 (27)
CP4 (28)		
CP3 (29)	VI	RA1-M11-CP8 (56)
LC (31)	BR	RA1-R51-LC1 (99)
CP5		
O (33)	WH	RA1-M12-0 (33)
+15 (34)	BR12x2	RA1-SUB-+15 (34)
		RA1-M12-+15 (34)
+15 (35)		

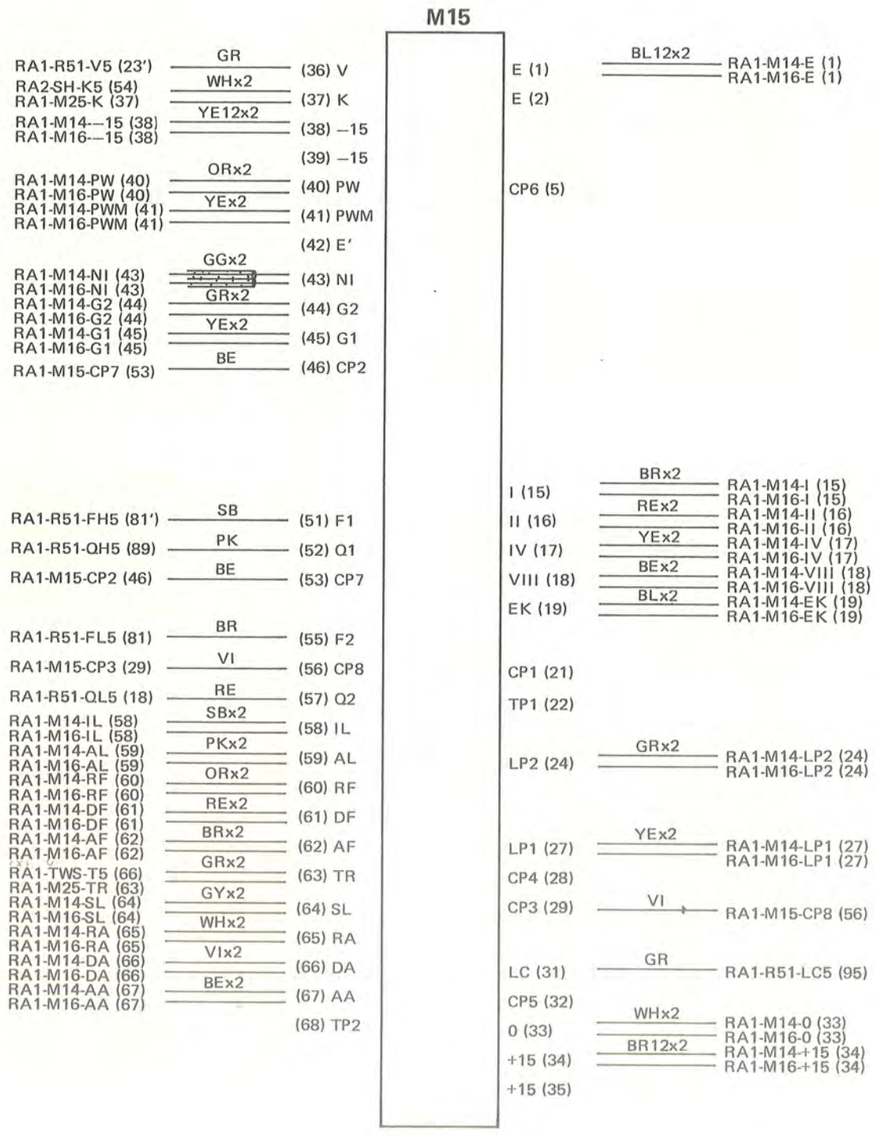
M12

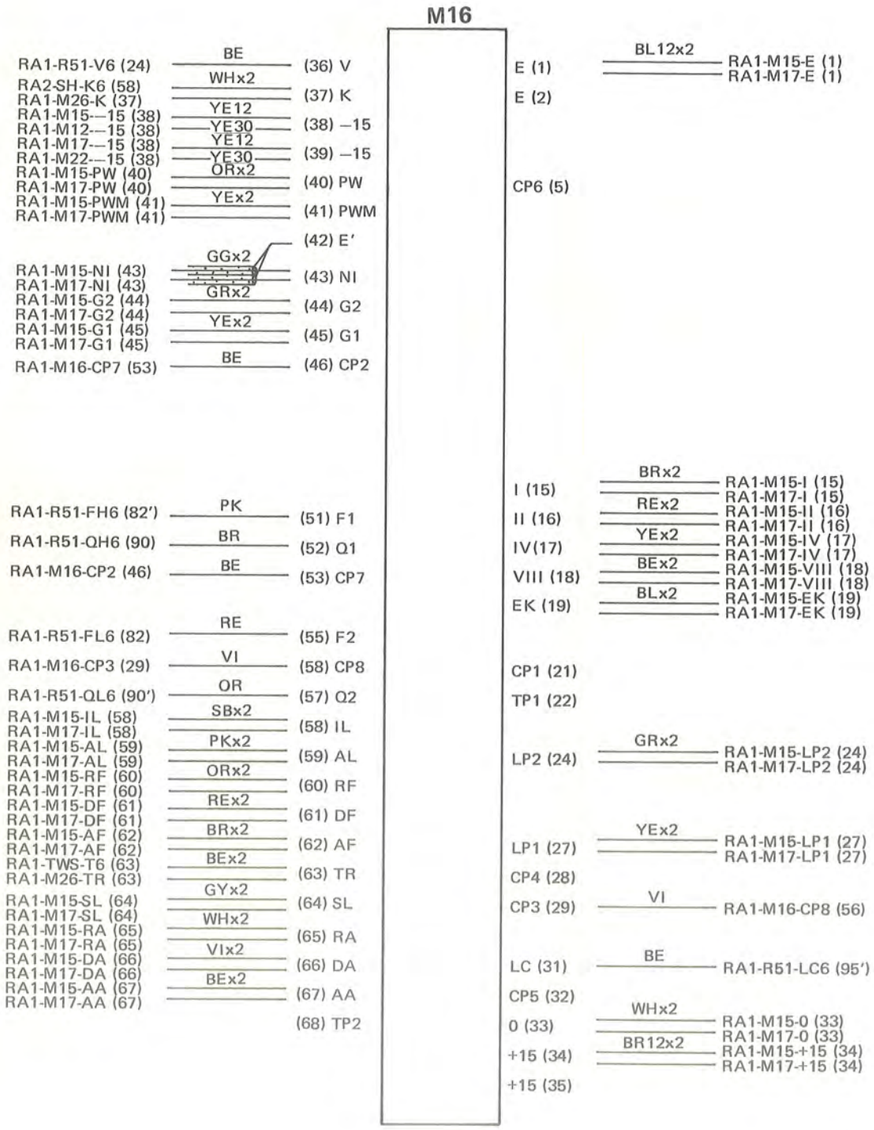
E (1)	BL12x2	RA1-M11-E (1)
E (2)		RA1-M13-E (1)
CP6 (5)		
I (15)	BRx2	RA1-M11-I (15)
II (16)	REx2	RA1-M13-I (15)
IV (17)	YEx2	RA1-M11-II (16)
VIII (18)	BEx2	RA1-M13-II (16)
EK (19)	BLx2	RA1-M11-IV (17)
		RA1-M13-IV (17)
		RA1-M11-VIII (18)
		RA1-M13-VIII (18)
		RA1-M11-EK (19)
		RA1-M13-EK (19)
CP1 (21)		
TP1 (22)		
LP2 (24)	GRx2	RA1-M11-LP2 (24)
		RA1-M13-LP2 (24)
LP1 (27)	YEx2	RA1-M11-LP1 (27)
		RA1-M13-LP1 (27)
CP4 (28)		
CP3 (29)	VI	RA-M12-CP8 (56)
LC (31)	RE	RA-R51-LC2 (98)
CP5 (32)		
O (33)	WHx2	RA1-M11-0 (33)
		RA1-M13-0 (33)
+15 (34)	BR12x2	RA1-M11-+15 (34)
		RA1-M13-+15 (34)
+15 (35)		

M13·14 Circuit Board & Wiring

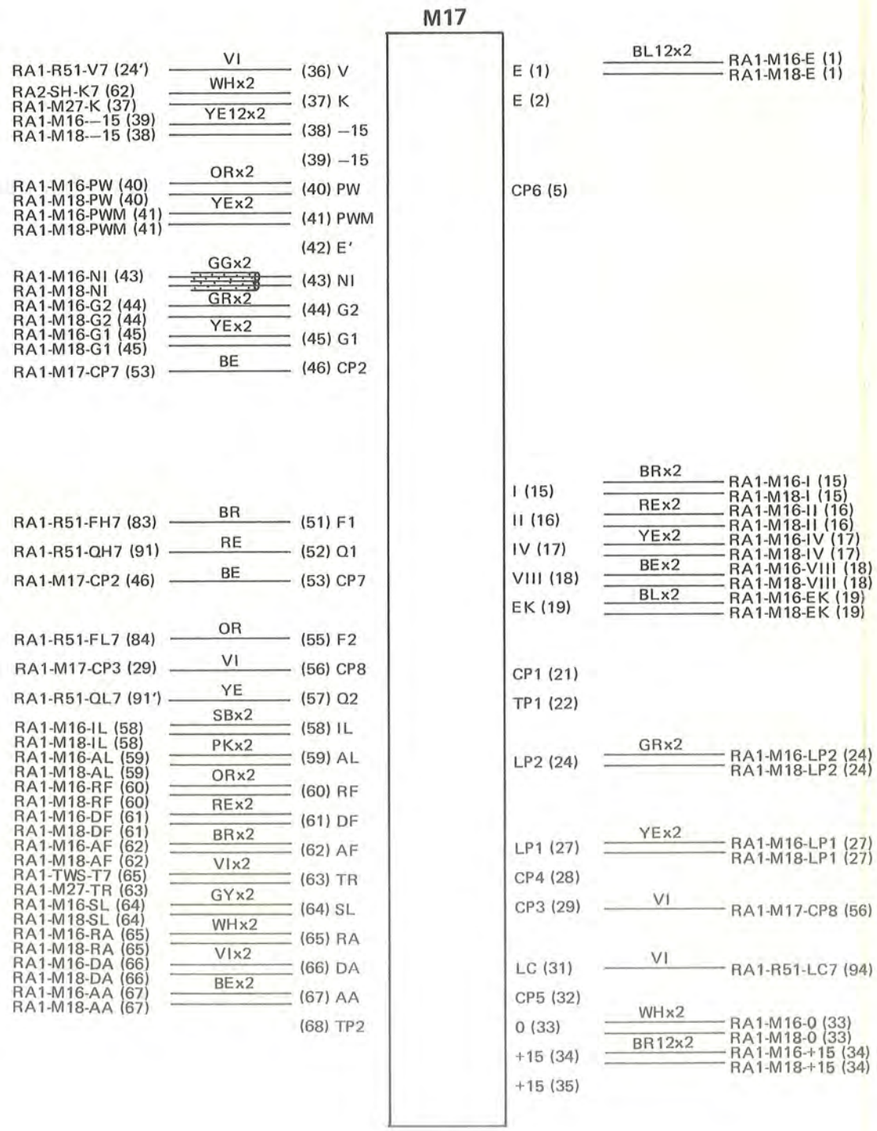


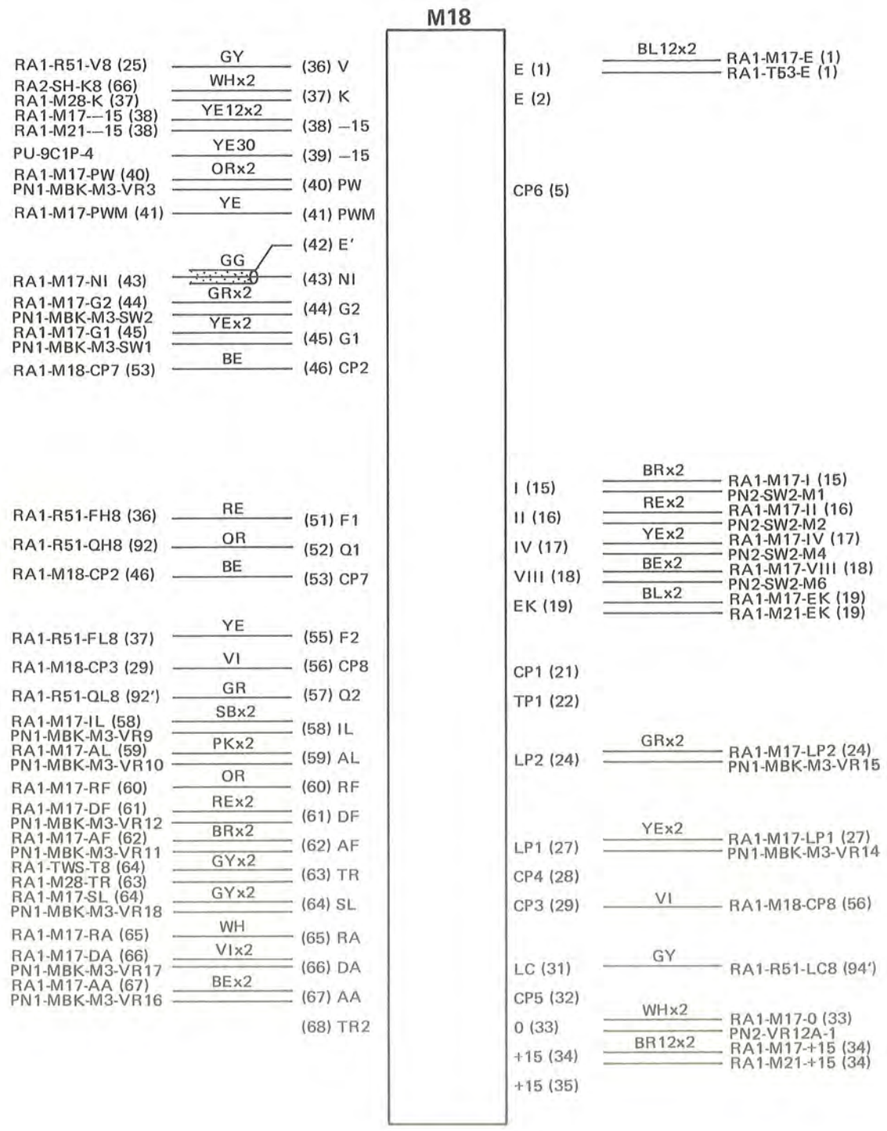
M15·16 Circuit Board & Wiring



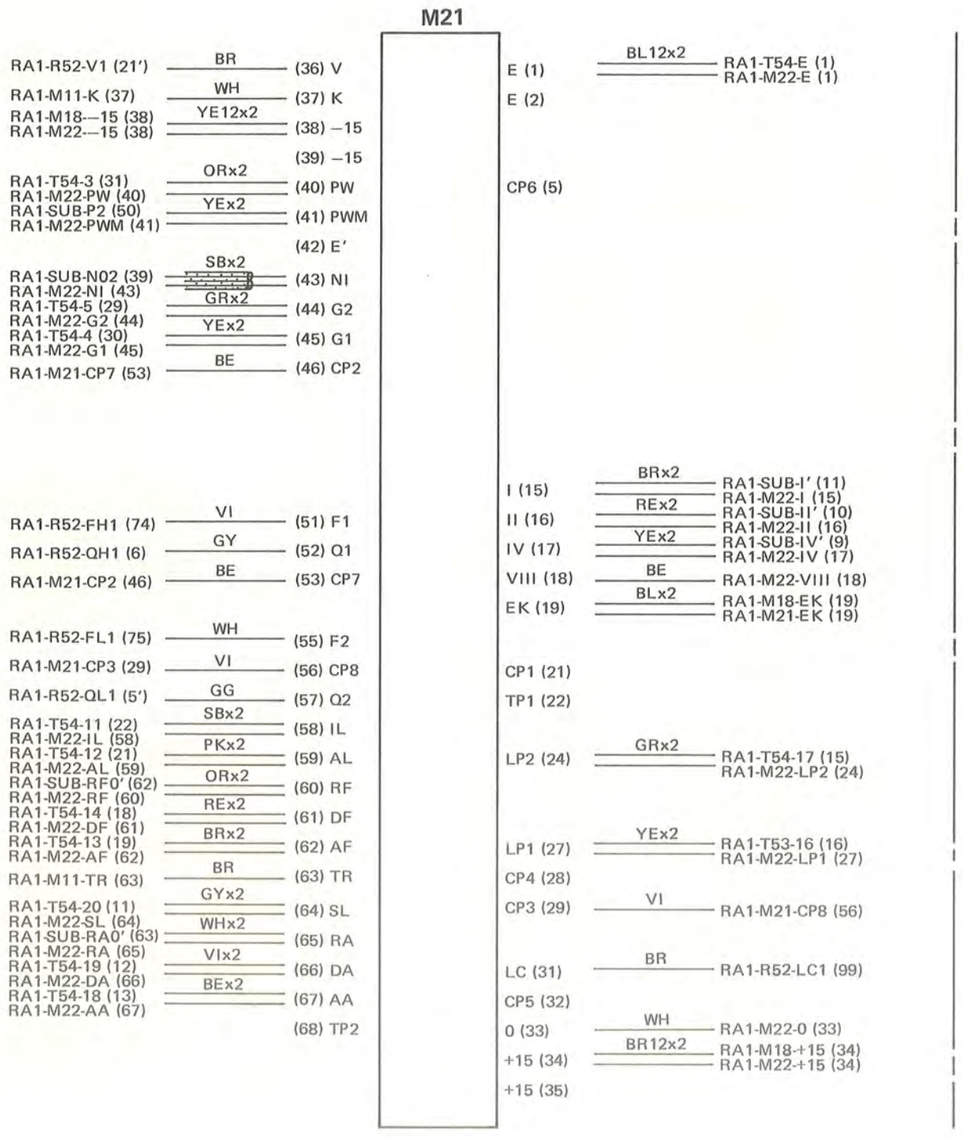


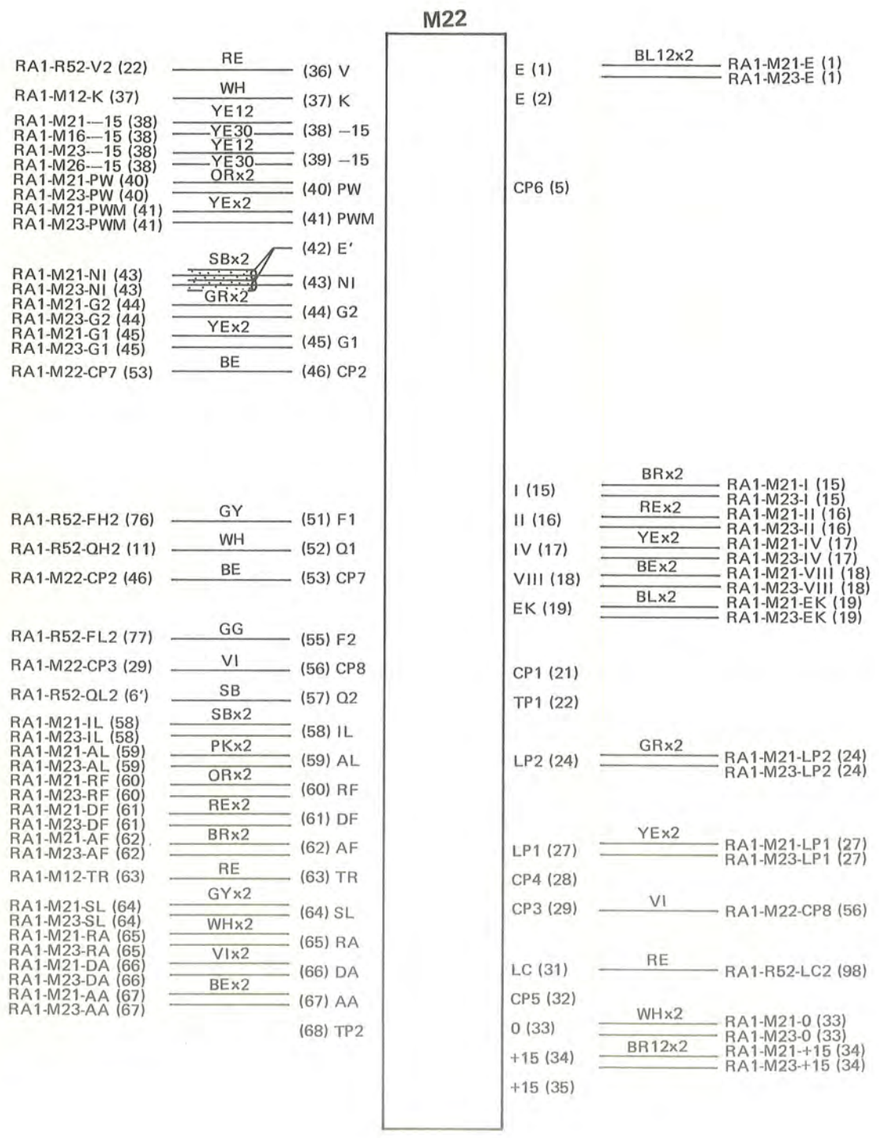
M17·18 Circuit Board & Wiring



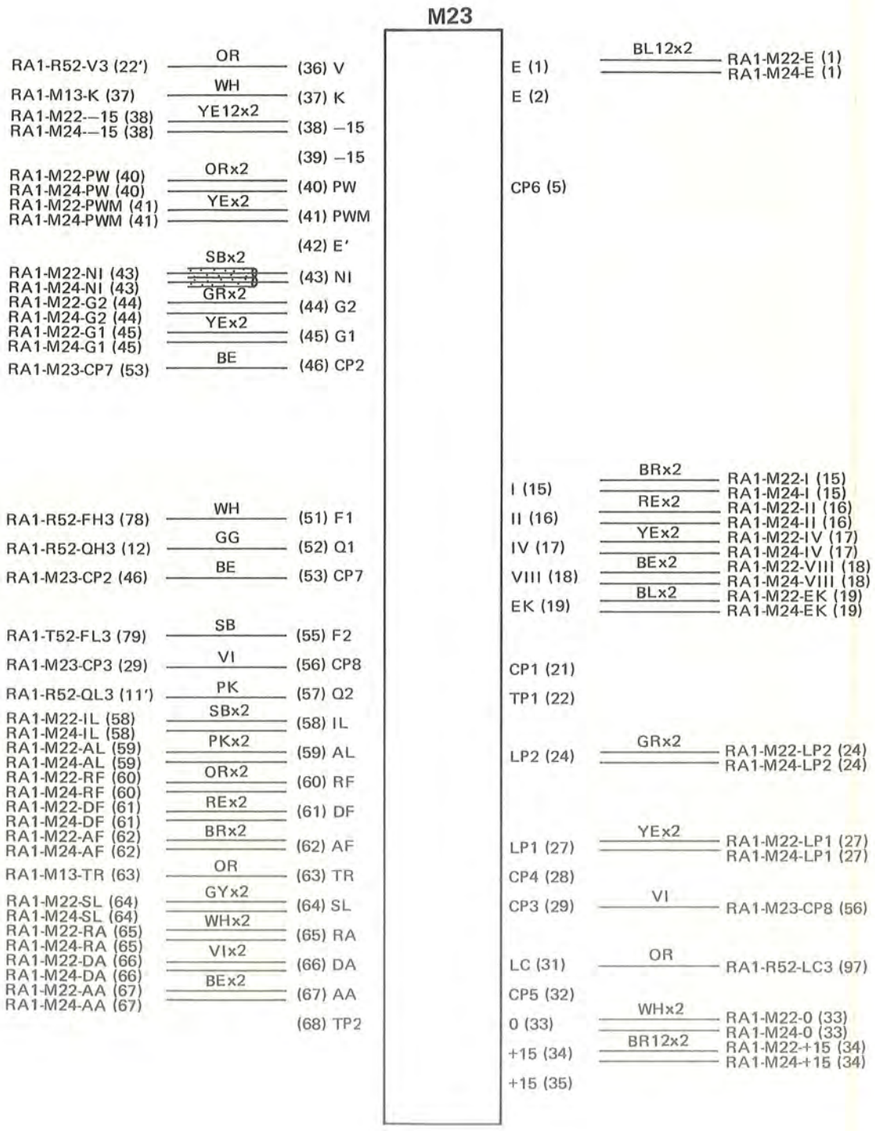


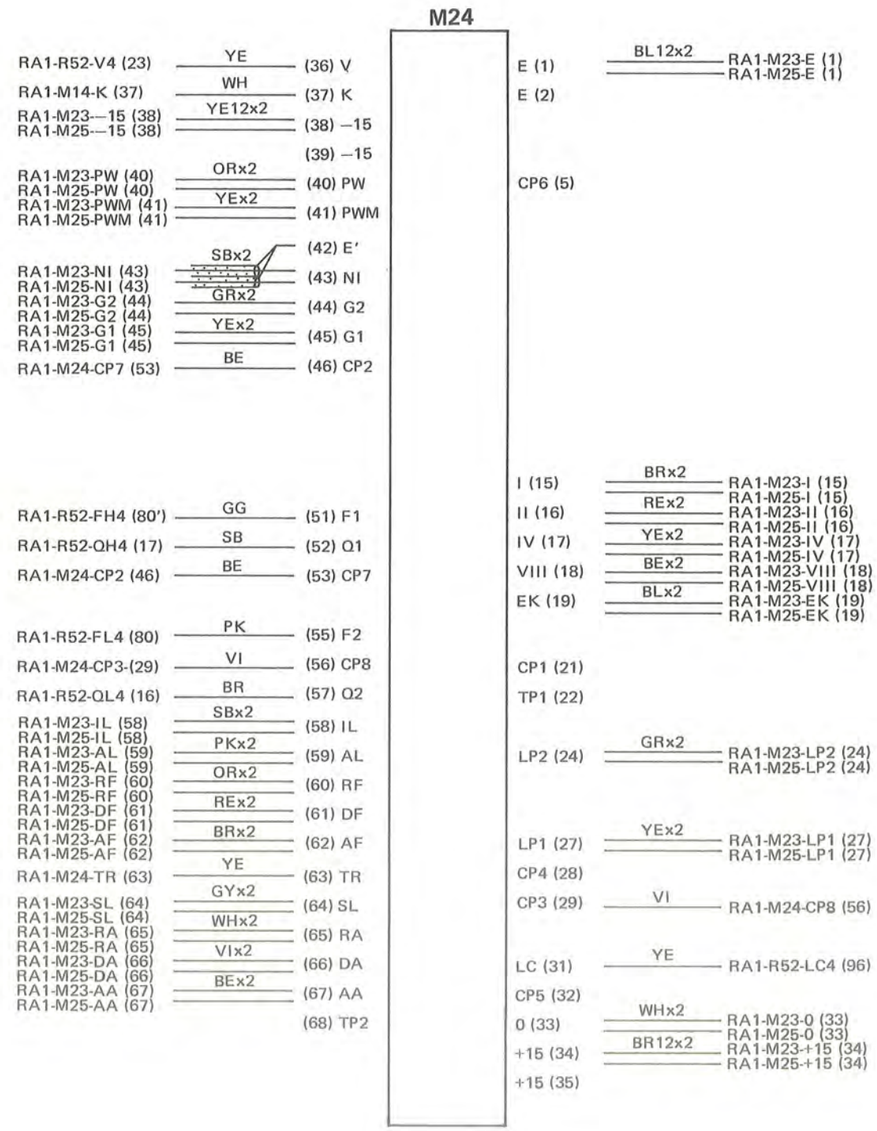
M21·22 Circuit Board & Wiring



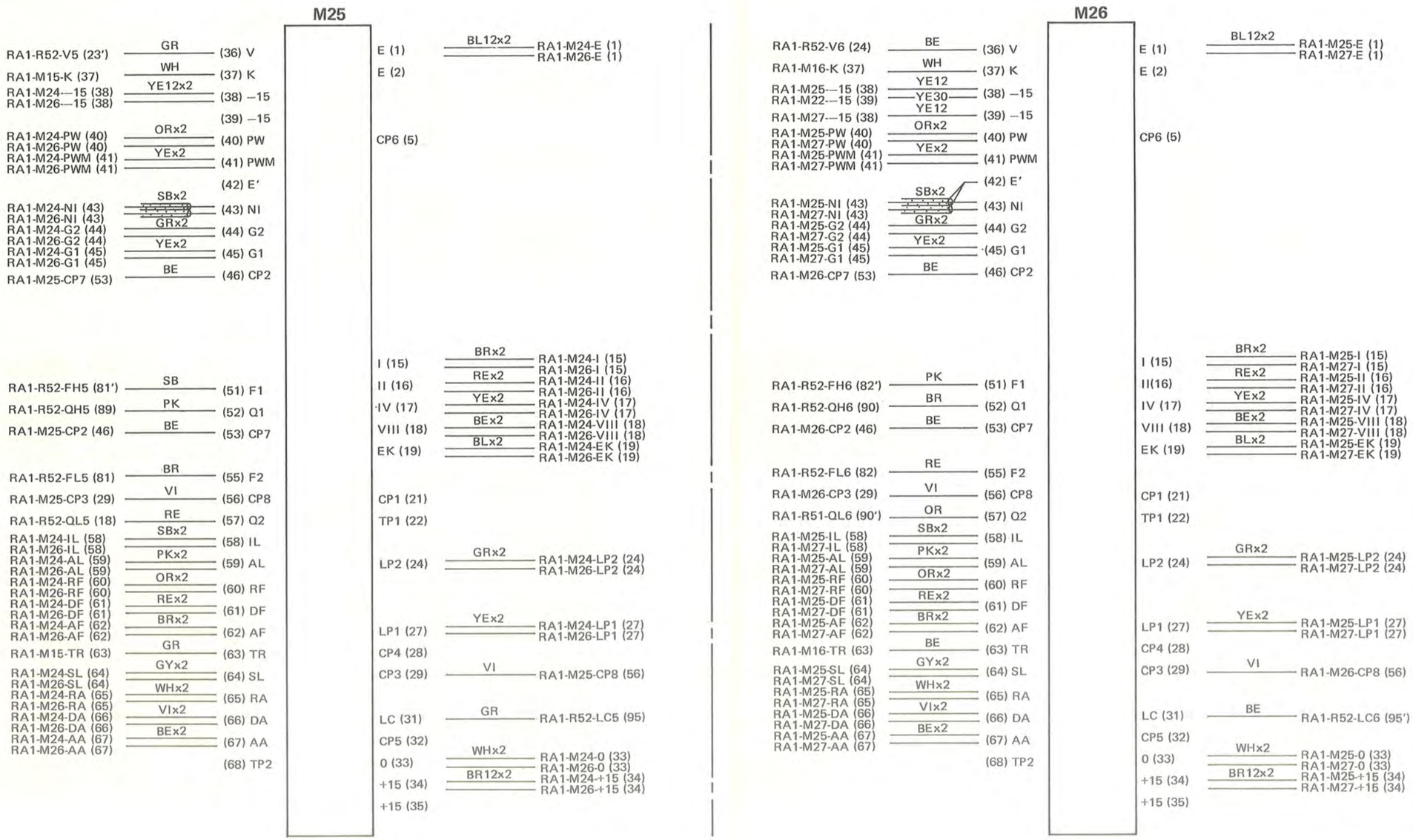


M 23·24 Circuit Board & Wiring

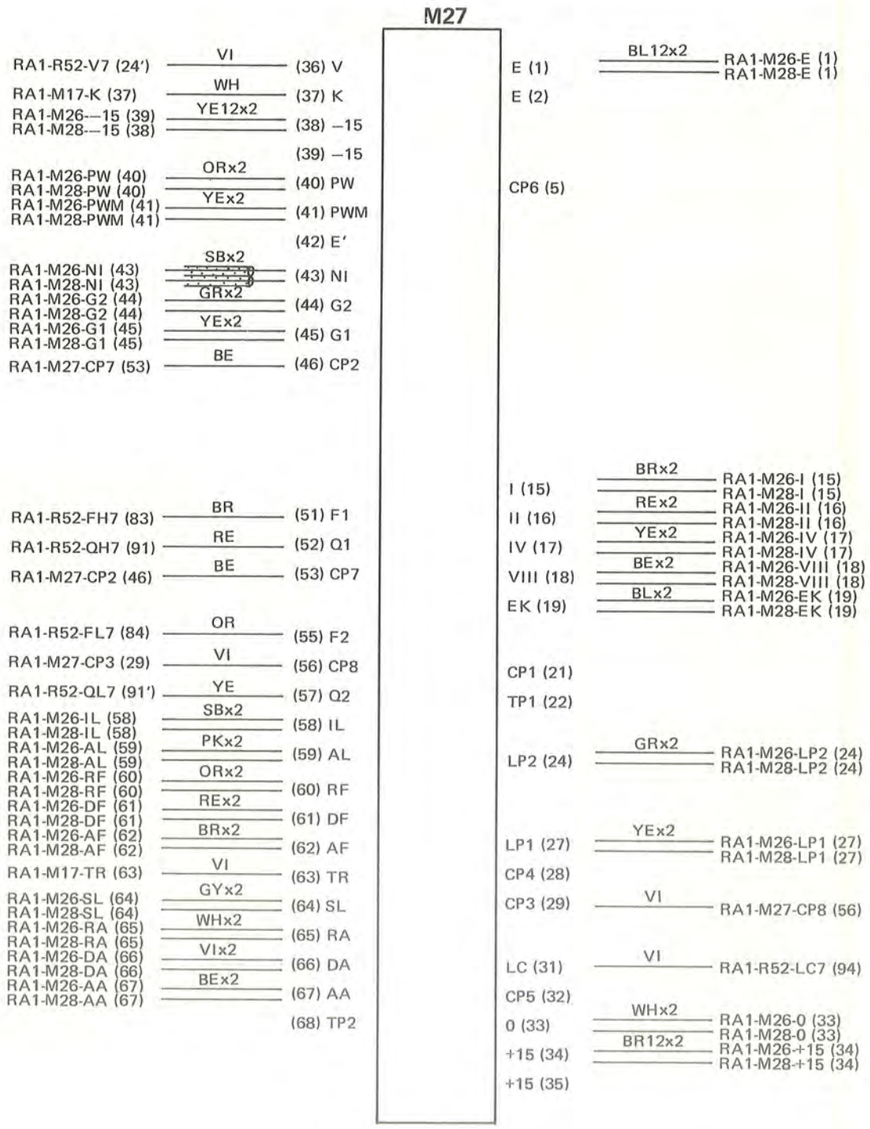


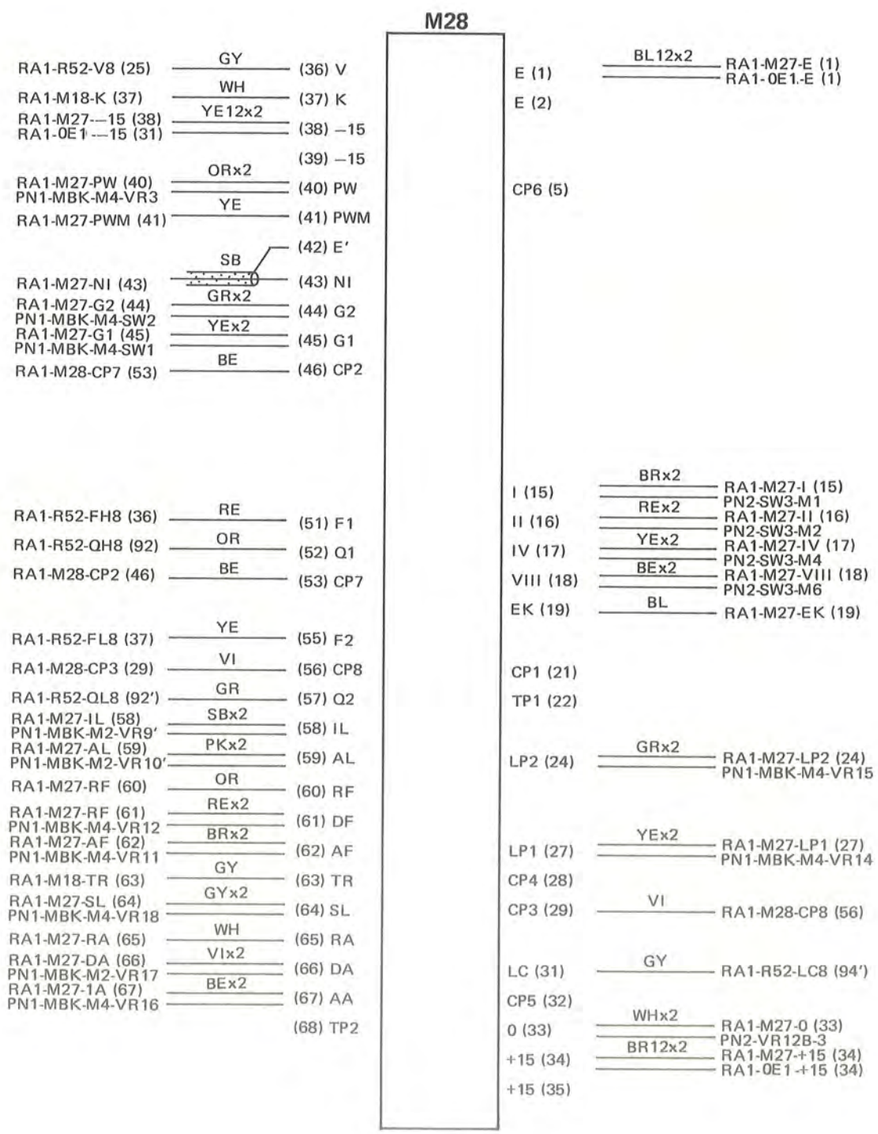


M25·26 Circuit Board & Wiring



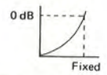
M 27·28 Circuit Board & Wiring



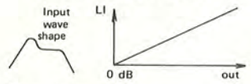


VCA IC (IG00151)

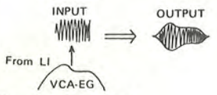
1. EI ..... Input voltage for level control.
   Input of the control voltage is provided for changing the level expotenentially.



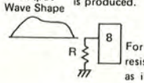
2. LI ..... Input of level control voltage.
   Input of the control voltage is provided for linear change of the level.



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



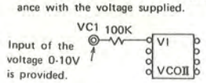
4. −IN ..... Negative feed back.
   Normally unused.
5. Vee ..... −15V input power source.
6. Vcc ..... +15V input power source.
7. GND ..... Earth
8. OUT ..... Output
   Output of the following wave shape is produced.



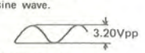
For checking, connect the resistor of 10K~30K ohm as illustrated.

VCOII IC (IG00150)

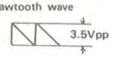
1. VI ..... Input of the control voltage.
   The frequency is variable in accordance with the voltage supplied.



2. GND ..... Earth
3. C ..... Capacitor for determination of the frequency.
4. Vee ..... −15V input power source.
5. Vcc ..... +15V input power source.
6. SIO ..... Output of sine wave.



7. SO ..... Output of sawtooth wave

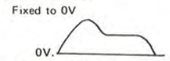


8. Iadj ..... Setting for standard electric current.
   The standard electric current is set so as to be the output 200Hz when VC1 is 10V and VC2 is zero volt.

VCA-EG IC (IG00159)

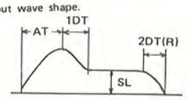
This IC generates envelope wave shape which is supplied to VCA and control the tone volume.

1. IL ..... Input of initial level.

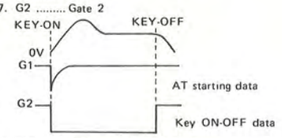


2. BI ..... Input of buffer amplifier.
3. OUT .... The buffer amplifier is built in for the purpose of matching inpedance.

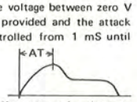
Output wave shape.



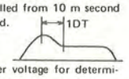
4. GND ..... Earth
5. Vcc ..... +15V input power source.
6. G1 ..... Gate 1
7. G2 ..... Gate 2



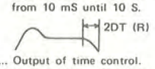
8. Vee ..... +15V input power source.
9. AT ..... Input of buffer voltage for determination of attack time.
   Input of the voltage between zero V and 10V is provided and the attack time is controlled from 1 mS until 1S.



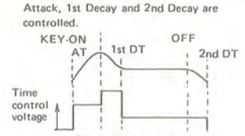
10. 1DT ..... Input of buffer voltage for determination of decay time.
    Input of the voltage between zero V and 10V is provided and the decay time is controlled from 10 m second until 10 second.



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 untill release is controlled from 10 mS until 10 S.

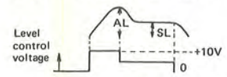


12. TC ..... Output of time control.
    Output of the DC voltage is produced so that the each time of Attack, 1st Decay and 2nd Decay are controlled.



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

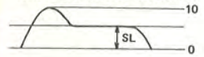
13. LC ..... Output of level control



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

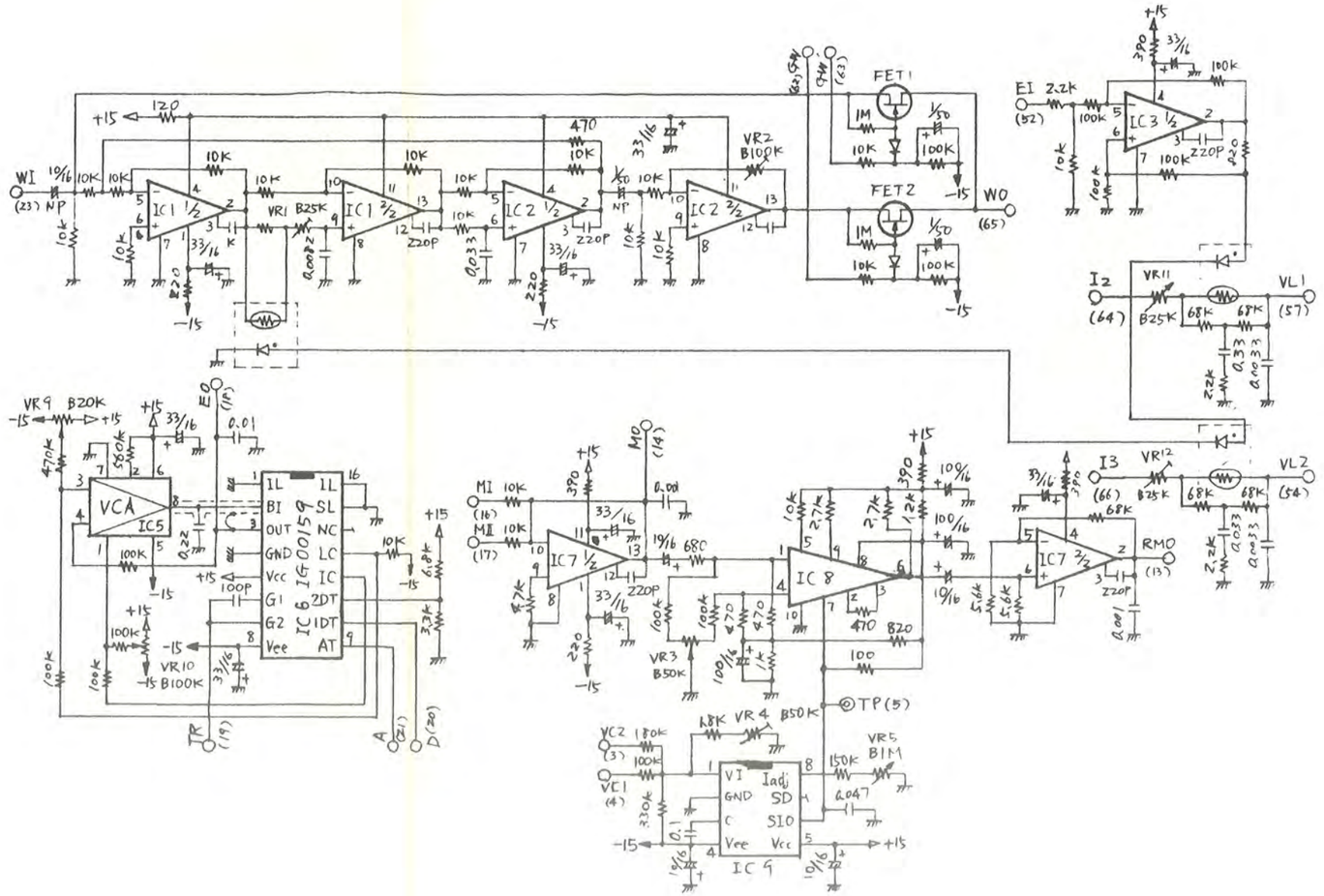
The higher the voltage , the higher the level and the lower the voltage, the lower the level.

14. NC..... Not connected.
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.

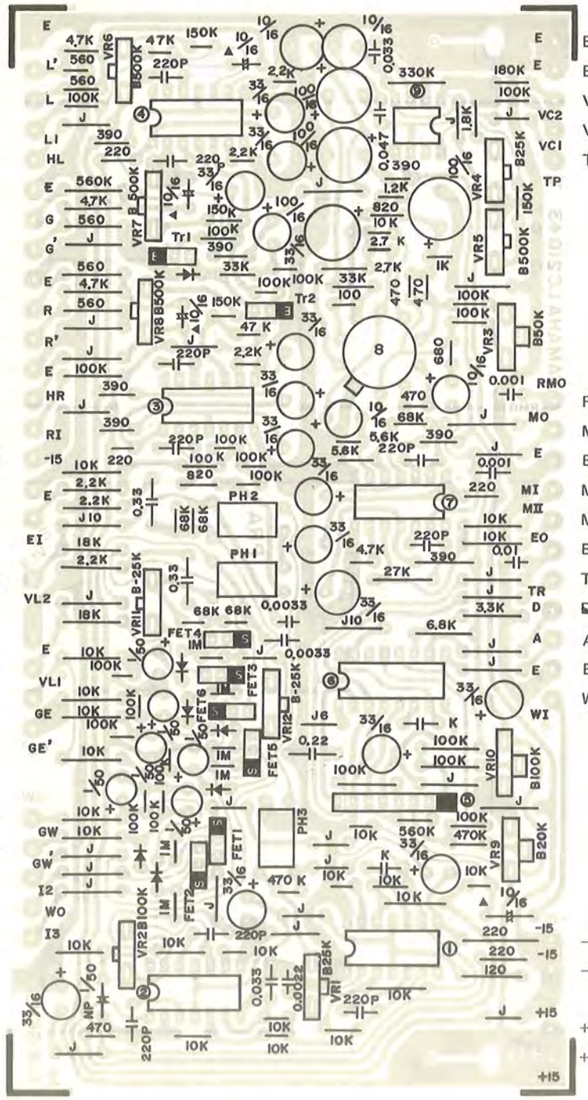


16. NC..... Not connected.

PRA Circuit Diagram



PRA Circuit Board & Wiring



PN5-J3-1	RE	(36) E
PN5-J3-1	VI	(37) L'
PN2-VR23A-2	BR	(38) L
RA1-SUB-LI(67)	YE	(39) LI
PN5-J2-1	OR	(40) HL
PN5-J2-1	YE	(41) E
PN5-J1-1	GR	(42) G
PN5-J1-1	BE	(43) G'
PA1-SUB-RI(32)	GR	(44) E
PN2-VR23B-2	SB	(45) R
PN5-J4-3	YE12	(46) R'
PN5-J4-1	BL12	(47) E
PN5-J4-2	VI	(48) HR
PN2-VR23B-3	PK	(49) RI
PN2-VR23A-3	RE	(50) –15
		(51) E
		(52) EI
		(54) VL2
		(56) E
		(57) VL1
PN3-SW9-M1	GR	(62) GW
PN3-SW9-B1	YE	(63) GW'
RA1-OE1-02(55)	OR	(64) I2
RA1-OE1-I1(38)	VI	(65) WO
RA1-OE1-03(60)	YE	(66) I3

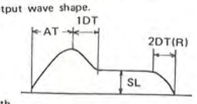
E (1)	BL12x2	RA1-OE1-E(1)
E (2)		
VC2 (3)	YE	PN2-VR5-2
VC1 (4)	GR	PN2-VR6-2
TP (5)		
RMO (13)	BE	PN2-VR7-3
MO(14)	GR	PN2-VR7-1
E (15)		
MI (16)	GG	PN2-VR12A-2
MII (17)	PK	PN2-VR12B-2
EO (18)	BR	PN2-VR5-3
TR (19)	WH	RA2-KAS-TR9(35)
D (20)	RE	PN2-VR4-2
A (21)	OR	PN2-VR3-2
E (22)		
WI (23)	VI	PN2-VR7-2
–15 (31)	YE12x2	PN2-VR22-1 RA1-OE1—15(69)
–15 (32)		
+15 (34)	BR12x2	PN2-VR22-3 RA1-OE1-+15(34)
+15 (35)	BR12	EJT

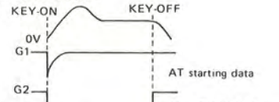
Note) 1. Print Board : LC21043
2. Transistor
Tr 1, 2 : 2SC828
FET 1 ～ 6 : 2SK30A
3. IC
IC 1 ～ 4, 7 : HA1452T
IC 5 : IG00151
IC 6 : IG00159
IC 8 : MA796HC
IC 9 : IG00150
4. Diode : IS1555
5. Volume
VR 3, 9, 10 : V10K8-1-2
VR 1, 2, 4 ～ 8, 11, 12 : V10K4A-5-2

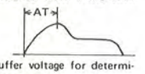
VCA-EG IC (IG00159)

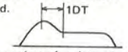
This IC generates envelope wave shape which is supplied to VCA and control the tone volume.

1. IL ..... Input of initial level.
Fixed to 0V

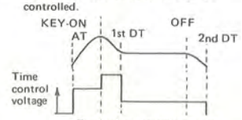
2. BI ..... Input of buffer amplifier.
3. OUT ... The buffer amplifier is built in for the purpose of matching inpedance.
Output wave shape.


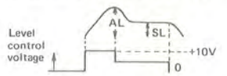
4. GND ..... Earth
5. Vcc ..... +15V input power source.
6. G1 ..... Gate 1
7. G2 ..... Gate 2


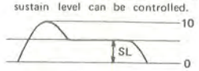
8. Vee ..... +15V input power source.
9. AT ..... Input of buffer voltage for determination of attack time.
Input of the voltage between zero V and 10V is provided and the attack time is controlled from 1 mS until 1S.


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 untill release is controlled from 10 mS until 10 S.

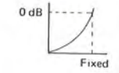

12. TC ..... Output of time control.
Output of the DC voltage is produced so that the each time of Attack, 1st Decay and 2nd Decay are controlled.


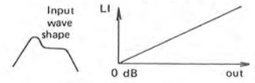
The higher the voltage, the shorter the time and the lower the voltage, the longer the time.
13. LC ..... Output of level control


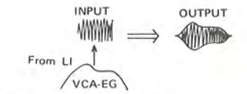
Output of the DC voltage for AL and SL control is provided.
The higher the voltage , the higher the level and the lower the voltage, the lower the level.
14. NC..... Not connected.
15. SL ..... Input of buffer voltage for determination of the sustain level.
Input of the voltage between zero V and 10V is provided so that the sustain level can be controlled.


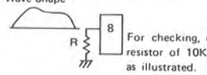
16. NC..... Not connected.

VCA IC (IG00151)

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


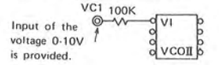
2. LI ..... Input of level control voltage.
Input of the control voltage is provided for linear change of the level.


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


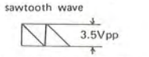
4. –IN ..... Negative feed back.
Normally unused.
5. Vee ..... –15V input power source.
6. Vcc ..... +15V input power source.
7. GND ..... Earth
8. OUT ..... Output
Output of the following wave shape is produced.


For checking, connect the resistor of 10K～30K ohm as illustrated.

VCOII IC (IG00150)

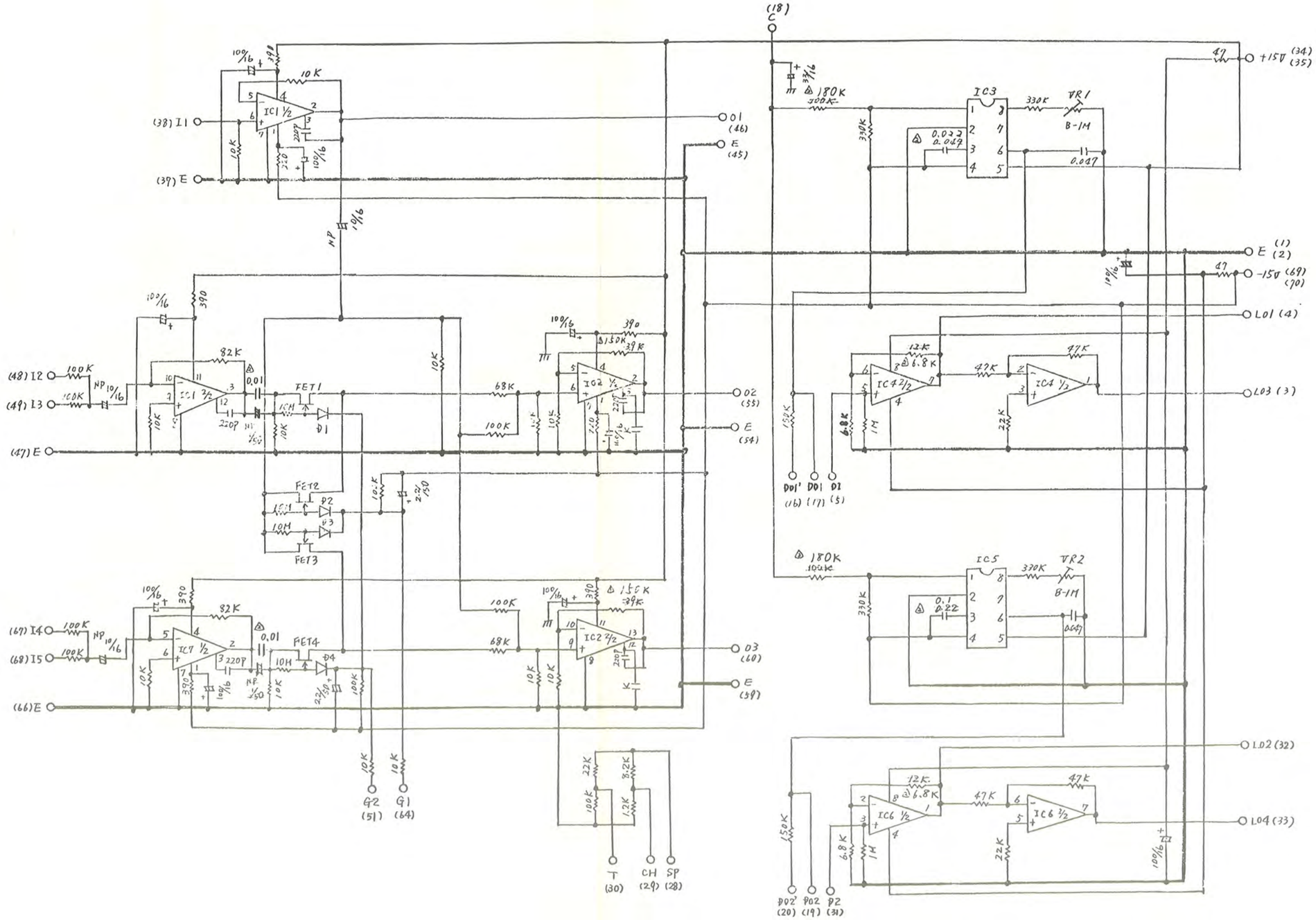
1. VI ..... Input of the control voltage.
The frequency is variable in accordance with the voltage supplied.


2. GND ..... Earth
3. C ..... Capacitor for determination of the frequency.
4. Vee ..... –15V input power source.
5. Vcc ..... +15V input power source.
6. SIO ..... Output of sine wave.


7. SO ..... Output of sawtooth wave


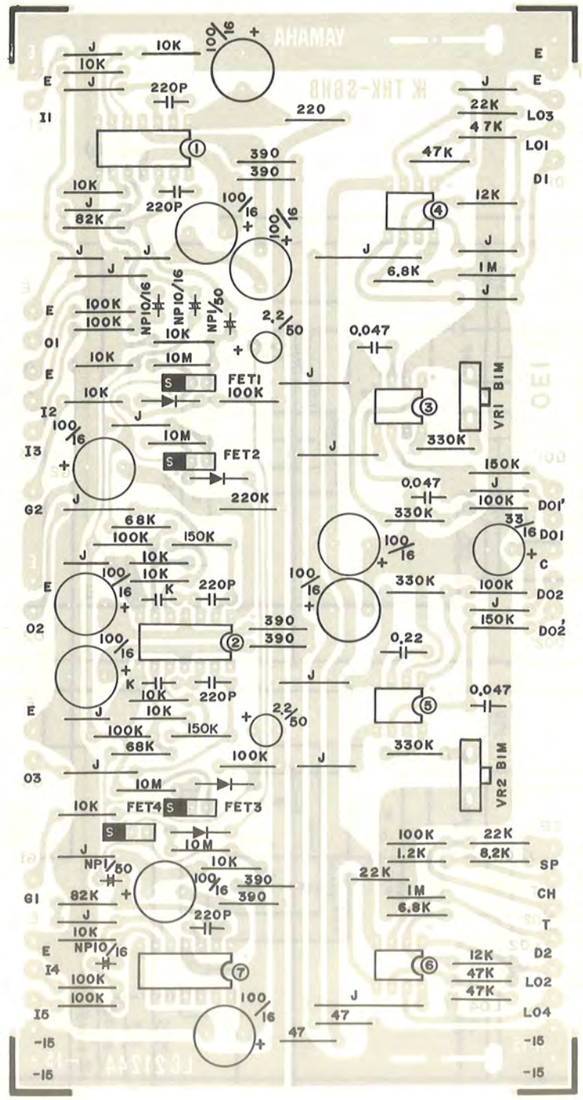
8. Iadj ..... Setting for standard electric current.
The standard electric current is set so as to be the output 200Hz when VC1 is 10V and VC2 is zero volt.

OE1 Circuit Diagram



KEC-4453-6Z

OE1 Circuit Board & Wiring



RA1-PRA-WO(65) — GR — (37) E / (38) I1

RA1-OE2-I(53) — GR — (45) E / (46) O1

RA1-OE2-01(43) — BE — (47) E / (48) I2

RA1-OE2-02(38) — GY — (49) I3

PN3-SW7-M1 — WH — (51) G2

RA1-PRA-I2(64) — OR — (54) E / (55) O2

RA1-PRA-I3(66) — YE — (59) E / (60) O3

PN3-SW7-B1 — GY — (64) G1

RA1-OE2-03(8) — BR — (66) E / (67) I4

RA1-OE2-04(3) — RE — (68) I5

RA1- M28—15(38) / RA1-OE2—15(69) — YE12x2 — (69) –15 / (70) –15

E (1) — BL12x2 — PA1- M28-E(1) / PA1-OE2-E(1)

E (2)

L03 (3) — OR — RA1-OE2-L3(33)

L01 (4) — BR — RA1-OE2-L1(68)

D1 (5) — GR — PN3-VR4A-2

D01 (16) — RE — PN3-SW5-M2

D01 (17) — VI — PN3-SW6-M2

C (18) — YE — PN3-SW5-T1

D02 (19) — WH — PN3-SW6-M3

D02′ (20) — PK — PN3-SW5-M3

SP(28) — GR — PN3-VR3-2

CH (29) — GY — PN3-SW6-M1

T (30) — OR — PN3-SW5-M1

D2 (31) — VI — PN3-VR4B-2

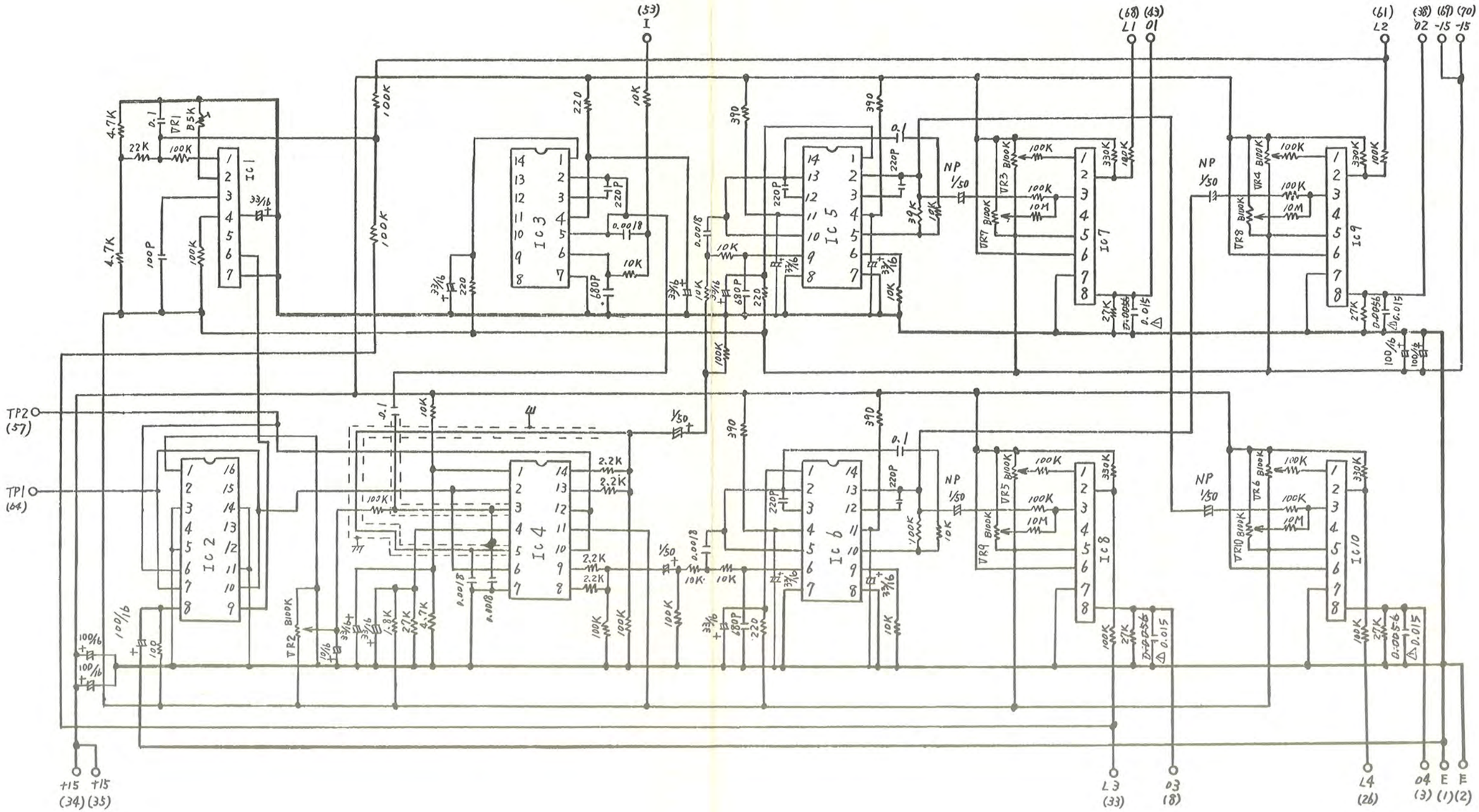
L02 (32) — RE — RA1-OE2-L2(61)

L04 (33) — YE — RA1-OE2-L4(26)

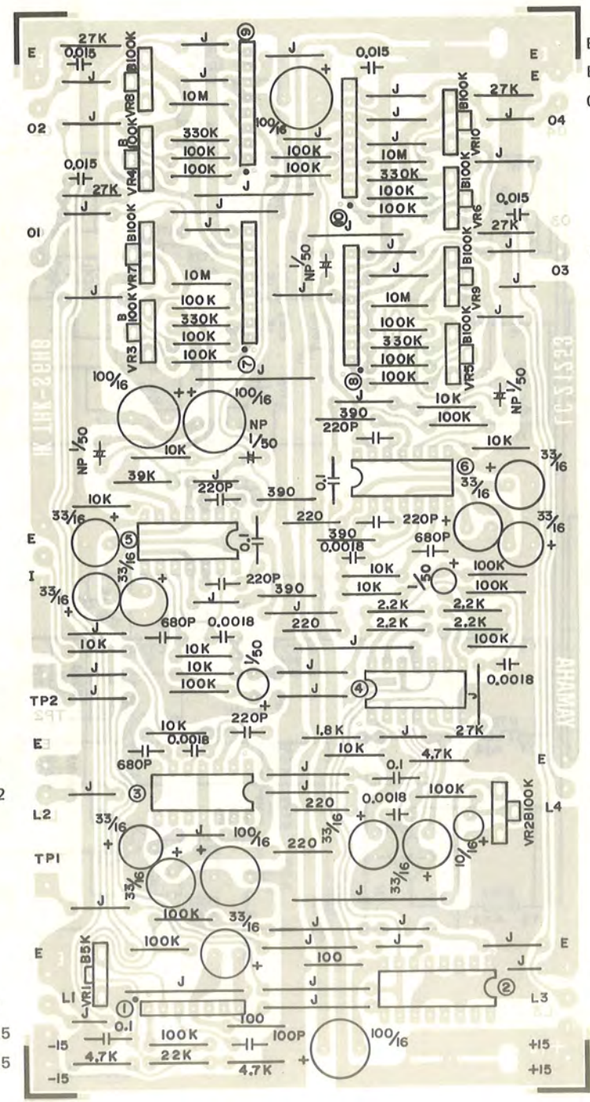
+15 (34) / +15 (35) — BR12x2 — RA1- M28-+15(34) / RA1-OE2+15(34)

Note) 1. Print Board : LC21244
2. Transistor
FET : 2SK30Y
3. Diode : IS1555
4. IC
IC 1, 2, 7 : HA1452D
IC 3, 5 : IG00150
IC 4, 6 : NJM4558
5. VR : 2 terminals (V10K4A-5-2)

OE2 Circuit Diagram



OE2 Circuit Board & Wiring



RA1-OE1-I3(49) — GY — (37) E / (38) 02

RA1-OE1-I2(48) — BE — (43) 01

RA1-OE1-01(46) — GR — (52) E / (53) I

RA1-OE1-L02(32) — RE — (60) E / (61) L2

RA1-OE1-L01(4) — BR — (67) E / (68) L1

RA1-PRA-—15(31) — YE12x2 — (69) —15

RA1-OE1-—15(69) — YE12x2 — (70) —15

E (1) — BL12x2 — RA1-PRA-E(1) / RA1-OE1-E(1)

E (2)

04 (3) — RE — RA1-OE1-I5(68)

03 (8) — BR — RA1-OE1-I4(67)

E (25)

L4 (26) — YE — RA1-OE1-L04(33)

E (32)

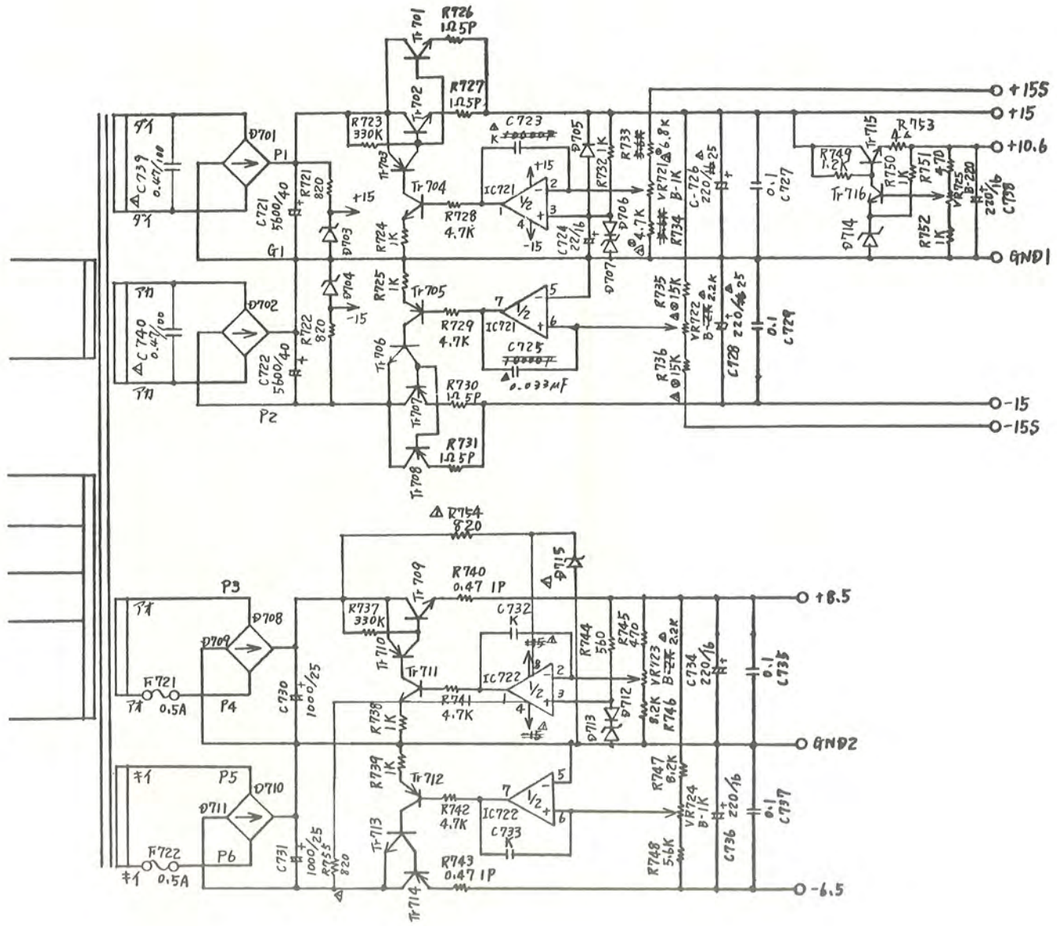
L3 (33) — OR — RA1-OE1-L03(3)

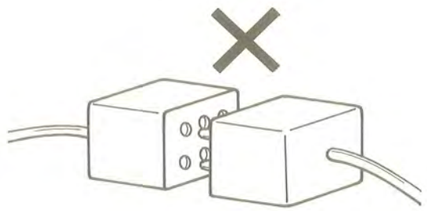
+15 (34) — BR12x2 — RA1-PRA-+15(34) / RA1-OE1-+15(34)

+15 (35)

Note) 1. Print Board : LC21253
2. IC
IC 1 : BA617
IC 2 : TC4049
IC 3, 5, 6 : HA1452D
IC 4 : MN3001
IC 7 ～ 10 : IG00151
3. VR : 2 terminals (V10K4A-5-2)
: 3 terminals (V8K8A-1-2)

SVU Circuit Diagram





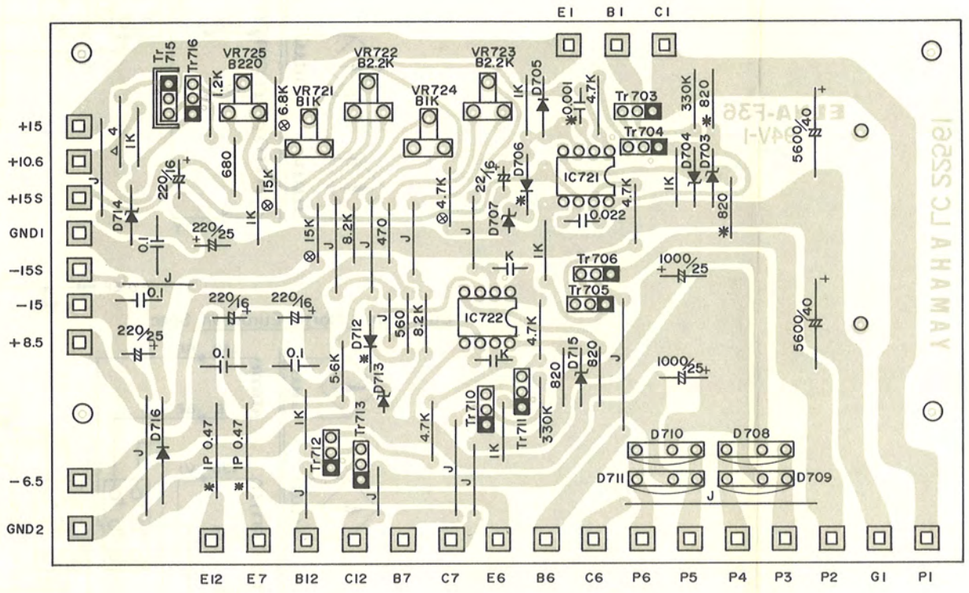
[Caution]

When you carry out inspection on Power Supply Unit, be sure to make complete connection of the connector or Short Circuit both +15 ↔ +15S and −15 ↔ −15S. Otherwise, the circuit can break with the power on.

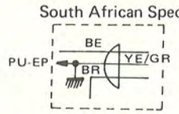
〔注意〕

電源ユニットの点検などで、コネクターを取外したままで電源を入れますと回路を壊わす恐れがありますのでコネクターを取付けたまま、又は＋15↔＋15Ｓ、－15↔－15Ｓをショートさせて点検を行なう様お願いします。

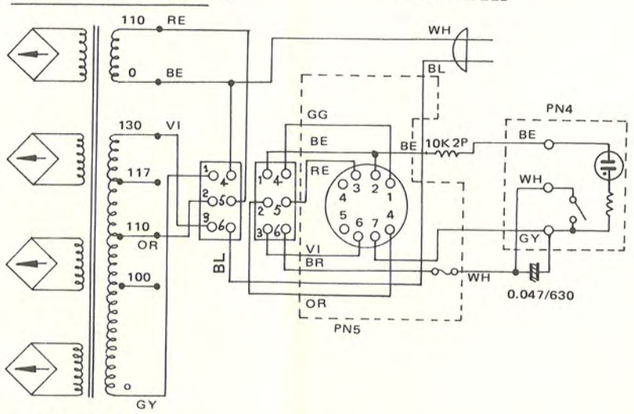
SVU Circuit Board & Wiring



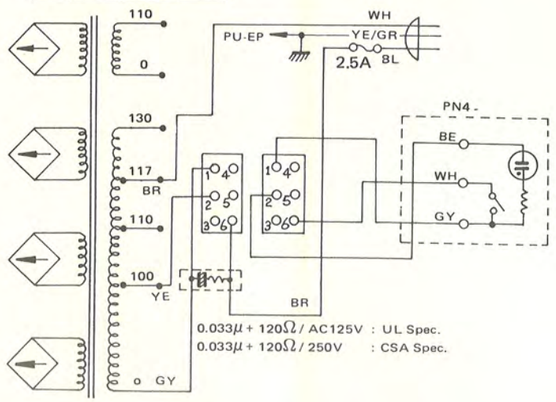
South African Spec.



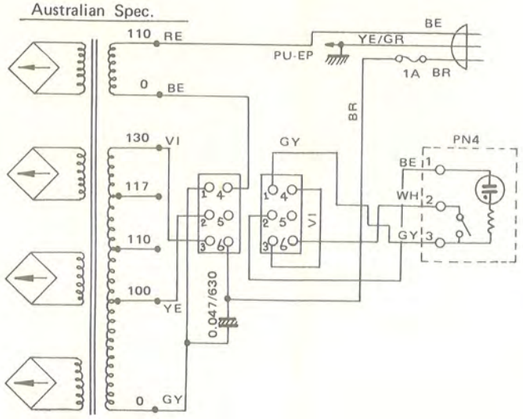
General · South African Spec.



UL · CSA Spec.

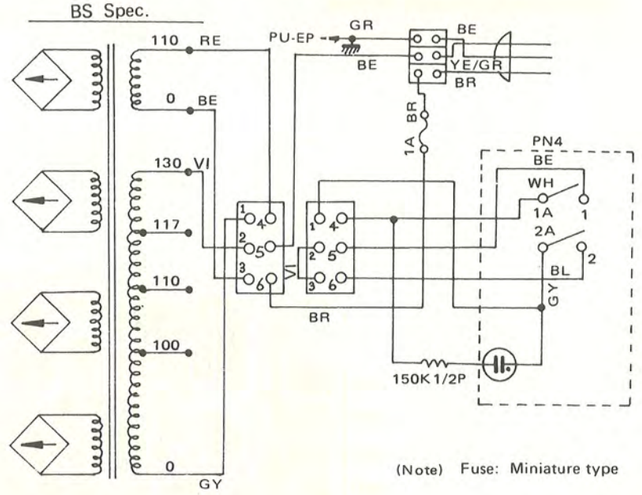


Australian Spec.



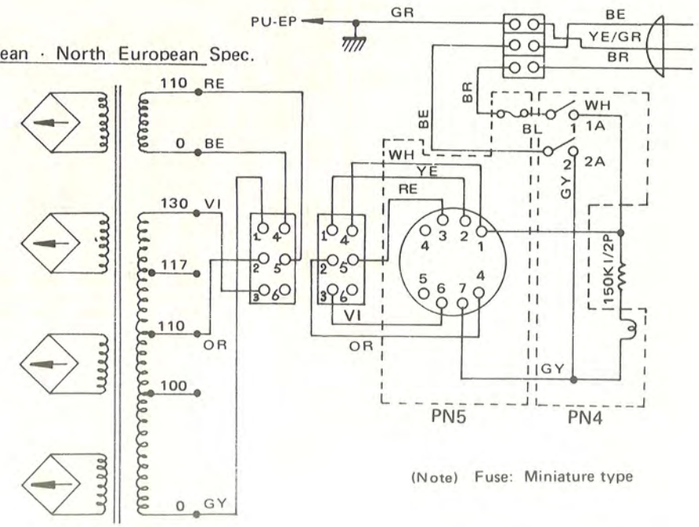
Power Supply NP0018Z (Primary) Circuit Diagram

BS Spec.



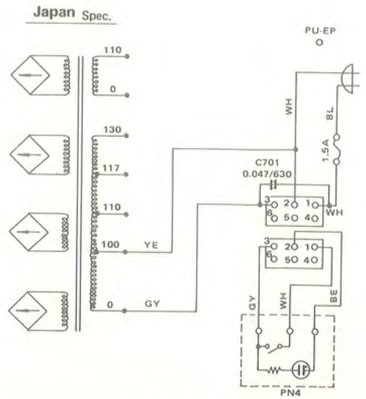
(Note) Fuse: Miniature type

European · North European Spec.

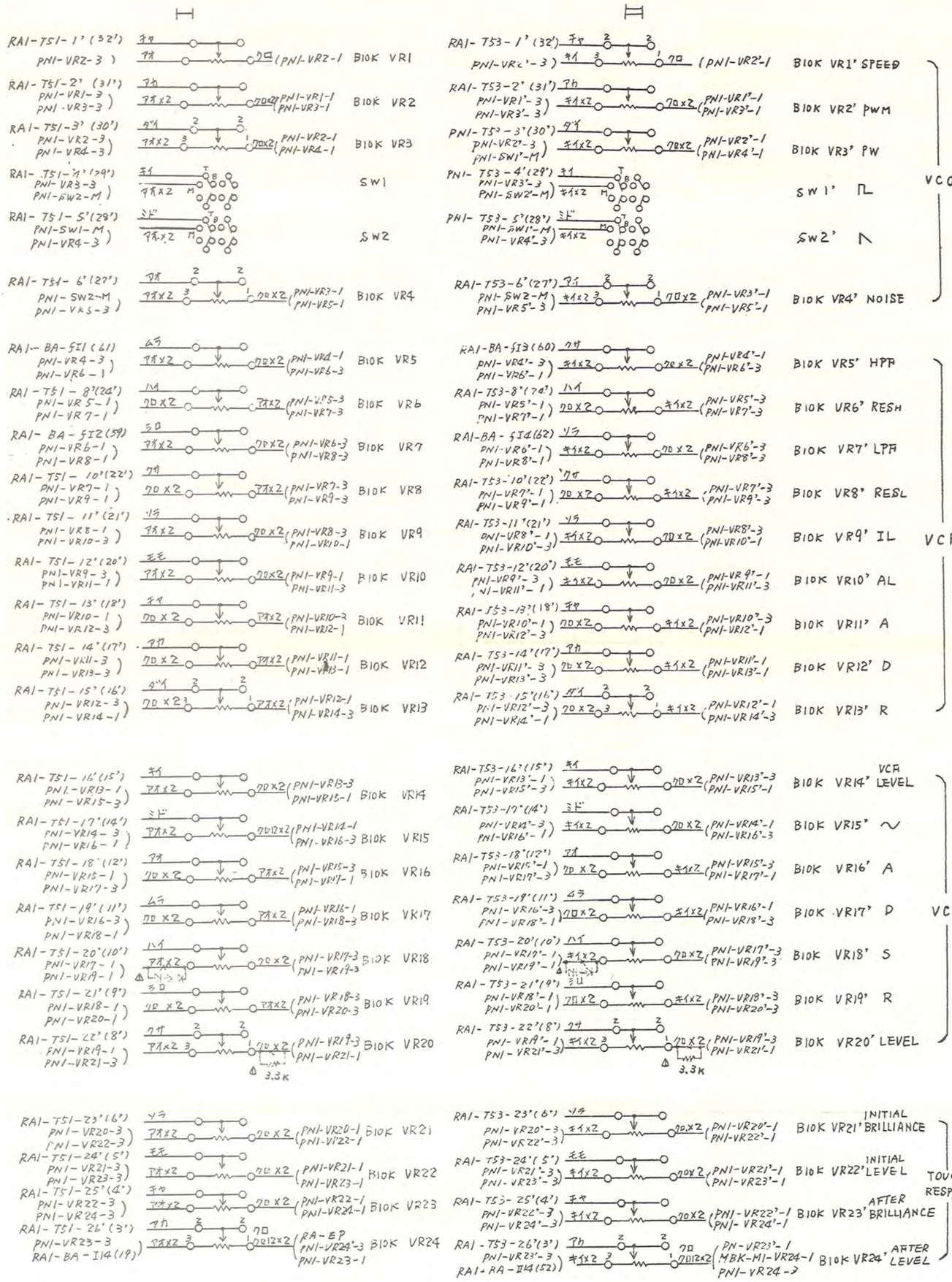


(Note) Fuse: Miniature type

Japan Spec.



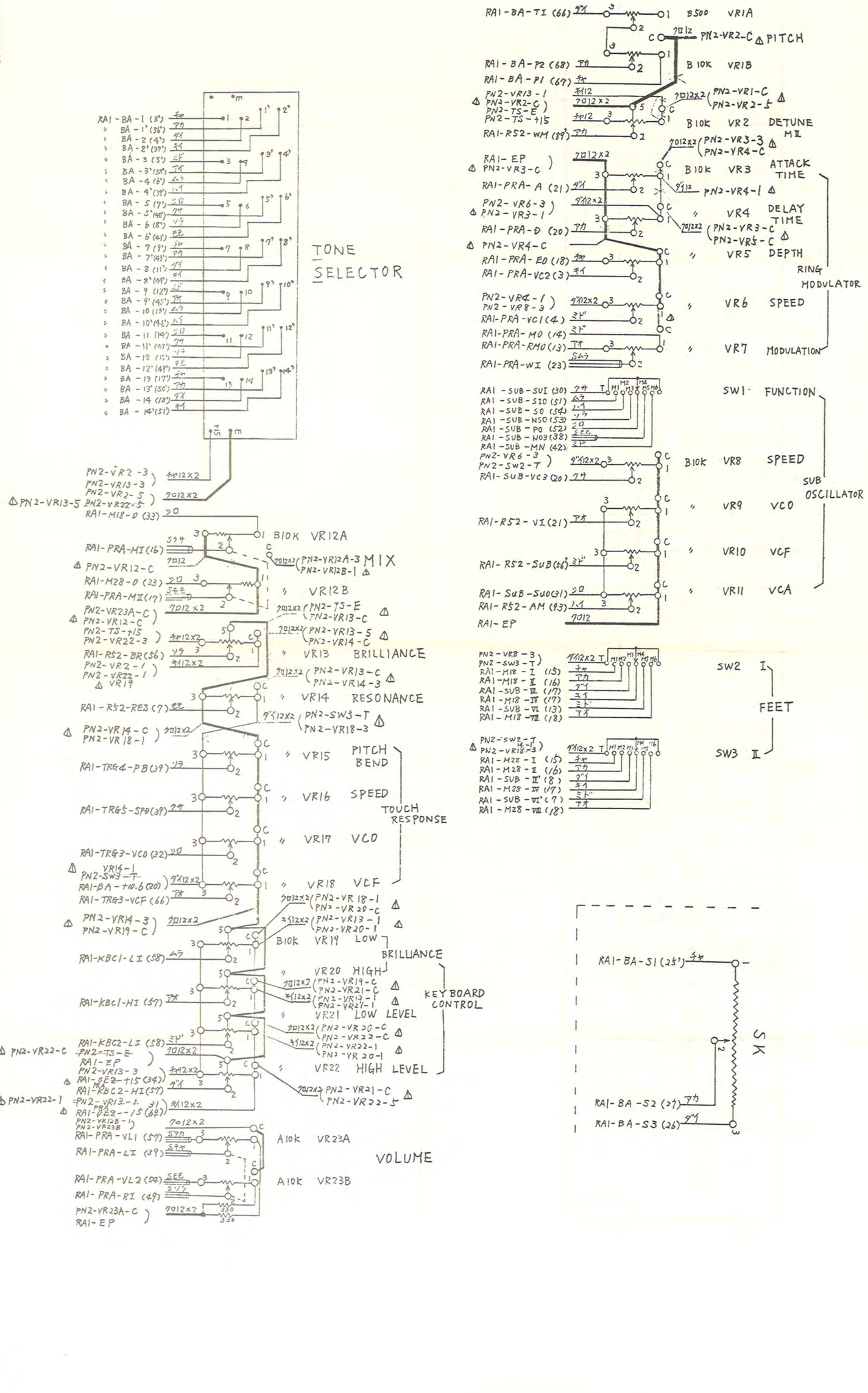
(Note) Fuse: Miniature type


RAI-TS1-1'(32') PN1-VR2-3 PN1-VR2-1 B10K VR1
RAI-TS1-2'(31') PN1-VR1-3 PN1-VR3-3 PN1-VR1-1 PN1-VR3-1 B10K VR2
RAI-TS1-3'(30') PN1-VR2-3 PN1-VR4-3 PN1-VR2-1 PN1-VR4-1 B10K VR3
RAI-TS1-4'(29') PN1-VR3-3 PN1-SW2-M SW1
RAI-TS1-5'(28') PN1-SW1-M PN1-VR4-3 SW2
RAI-TS1-6'(27') PN1-SW2-M PN1-VR5-3 PN1-VR3-1 PN1-VR5-1 B10K VR4
RAI-BA-5I1(61) PN1-VR4-3 PN1-VR6-1 PN1-VR4-1 PN1-VR6-3 B10K VR5
RAI-TS1-8'(24') PN1-VR5-1 PN1-VR7-1 PN1-VR5-3 PN1-VR7-3 B10K VR6
RAI-BA-5I2(59) PN1-VR6-1 PN1-VR8-1 PN1-VR6-3 PN1-VR8-3 B10K VR7
RAI-TS1-10'(22') PN1-VR7-1 PN1-VR9-1 PN1-VR7-3 PN1-VR9-3 B10K VR8
RAI-TS1-11'(21') PN1-VR8-1 PN1-VR10-3 PN1-VR8-3 PN1-VR10-1 B10K VR9
RAI-TS1-12'(20') PN1-VR9-3 PN1-VR11-1 PN1-VR9-1 PN1-VR11-3 B10K VR10
RAI-TS1-13'(18') PN1-VR10-1 PN1-VR12-3 PN1-VR10-3 PN1-VR12-1 B10K VR11
RAI-TS1-14'(17') PN1-VR11-3 PN1-VR13-3 PN1-VR11-1 PN1-VR13-1 B10K VR12
RAI-TS1-15'(16') PN1-VR12-3 PN1-VR14-1 PN1-VR12-1 PN1-VR14-3 B10K VR13
RAI-TS1-16'(15') PN1-VR13-1 PN1-VR15-3 PN1-VR13-3 PN1-VR15-1 B10K VR14
RAI-TS1-17'(14') PN1-VR14-3 PN1-VR16-1 PN1-VR14-1 PN1-VR16-3 B10K VR15
RAI-TS1-18'(12') PN1-VR15-1 PN1-VR17-3 PN1-VR15-3 PN1-VR17-1 B10K VR16
RAI-TS1-19'(11') PN1-VR16-3 PN1-VR18-1 PN1-VR16-1 PN1-VR18-3 B10K VR17
RAI-TS1-20'(10') PN1-VR17-1 PN1-VR19-1 PN1-VR17-3 PN1-VR19-3 B10K VR18
RAI-TS1-21'(9') PN1-VR18-1 PN1-VR20-1 PN1-VR18-3 PN1-VR20-3 B10K VR19
RAI-TS1-22'(8') PN1-VR19-1 PN1-VR21-3 PN1-VR19-3 PN1-VR21-1 B10K VR20
3.3K
RAI-TS1-23'(6') PN1-VR20-3 PN1-VR22-3 PN1-VR20-1 PN1-VR22-1 B10K VR21
RAI-TS1-24'(5') PN1-VR21-3 PN1-VR23-1 PN1-VR21-1 PN1-VR23-1 B10K VR22
RAI-TS1-25'(4') PN1-VR22-3 PN1-VR24-3 PN1-VR22-1 PN1-VR24-1 B10K VR23
RAI-TS1-26'(3') PN1-VR23-3 RAI-BA-I14(19) RA-EP PN1-VR24-3 PN1-VR23-1 B10K VR24
RAI-TS3-1'(32') PN1-VR2'-3 PN1-VR2'-1 B10K VR1' SPEED
RAI-TS3-2'(31') PN1-VR1'-3 PN1-VR3'-3 PN1-VR1'-1 PN1-VR3'-1 B10K VR2' PWM
RAI-TS3-3'(30') PN1-VR2'-3 PN1-SW1'-M PN1-VR2'-1 PN1-VR4'-1 B10K VR3' PW
PN1-TS3-4'(29') PN1-VR3'-3 PN1-SW2'-M SW1' ⊓
PN1-TS3-5'(28') PN1-SW1'-M PN1-VR4'-3 SW2' ∩
RAI-TS3-6'(27') PN1-SW2-M PN1-VR5'-3 PN1-VR3'-1 PN1-VR5'-1 B10K VR4' NOISE
VCO
RAI-BA-5I3(60) PN1-VR4'-3 PN1-VR6'-1 PN1-VR4'-1 PN1-VR6'-3 B10K VR5' HPF
RAI-TS3-8'(24') PN1-VR5'-1 PN1-VR7'-1 PN1-VR5'-3 PN1-VR7'-3 B10K VR6' RESH
RAI-BA-5I4(62) PN1-VR6'-1 PN1-VR8'-1 PN1-VR6'-3 PN1-VR8'-3 B10K VR7' LPF
RAI-TS3-10'(22') PN1-VR7'-1 PN1-VR9'-1 PN1-VR7'-3 PN1-VR9'-3 B10K VR8' RESL
RAI-TS3-11'(21') PN1-VR8'-1 PN1-VR10'-3 PN1-VR8'-3 PN1-VR10'-1 B10K VR9' IL
RAI-TS3-12'(20') PN1-VR9'-3 PN1-VR11'-1 PN1-VR9'-1 PN1-VR11'-3 B10K VR10' AL
RAI-TS3-13'(18') PN1-VR10'-1 PN1-VR12'-3 PN1-VR10'-3 PN1-VR12'-1 B10K VR11' A
RAI-TS3-14'(17') PN1-VR11'-3 PN1-VR13'-3 PN1-VR11'-1 PN1-VR13'-1 B10K VR12' D
RAI-TS3-15'(16') PN1-VR12'-3 PN1-VR14'-1 PN1-VR12'-1 PN1-VR14'-3 B10K VR13' R
VCF
RAI-TS3-16'(15') PN1-VR13'-1 PN1-VR15'-3 PN1-VR13'-3 PN1-VR15'-1 B10K VR14' VCA LEVEL
RAI-TS3-17'(14') PN1-VR14'-3 PN1-VR16'-1 PN1-VR14'-1 PN1-VR16'-3 B10K VR15' ∼
RAI-TS3-18'(12') PN1-VR15'-1 PN1-VR17'-3 PN1-VR15'-3 PN1-VR17'-1 B10K VR16' A
RAI-TS3-19'(11') PN1-VR16'-3 PN1-VR18'-1 PN1-VR16'-1 PN1-VR18'-3 B10K VR17' D
RAI-TS3-20'(10') PN1-VR17'-1 PN1-VR19'-1 PN1-VR17'-3 PN1-VR19'-3 B10K VR18' S
RAI-TS3-21'(9') PN1-VR18'-1 PN1-VR20'-1 PN1-VR18'-3 PN1-VR20'-3 B10K VR19' R
RAI-TS3-22'(8') PN1-VR19'-1 PN1-VR21'-3 PN1-VR19'-3 PN1-VR21'-1 B10K VR20' LEVEL
3.3K
VCA
RAI-TS3-23'(6') PN1-VR20'-3 PN1-VR22'-3 PN1-VR20'-1 PN1-VR22'-1 B10K VR21' INITIAL BRILLIANCE
RAI-TS3-24'(5') PN1-VR21'-3 PN1-VR23'-3 PN1-VR21'-1 PN1-VR23'-1 B10K VR22' INITIAL LEVEL
RAI-TS3-25'(4') PN1-VR22'-3 PN1-VR24'-3 PN1-VR23'-1 PN1-VR24'-1 B10K VR23' AFTER BRILLIANCE
RAI-TS3-26'(3') PN1-VR23'-3 RAI-RA-II4(52) PN-VR23'-1 MBK-MI-VR24-1 PN1-VR24-2 B10K VR24' AFTER LEVEL
TOUCH RESPONSE

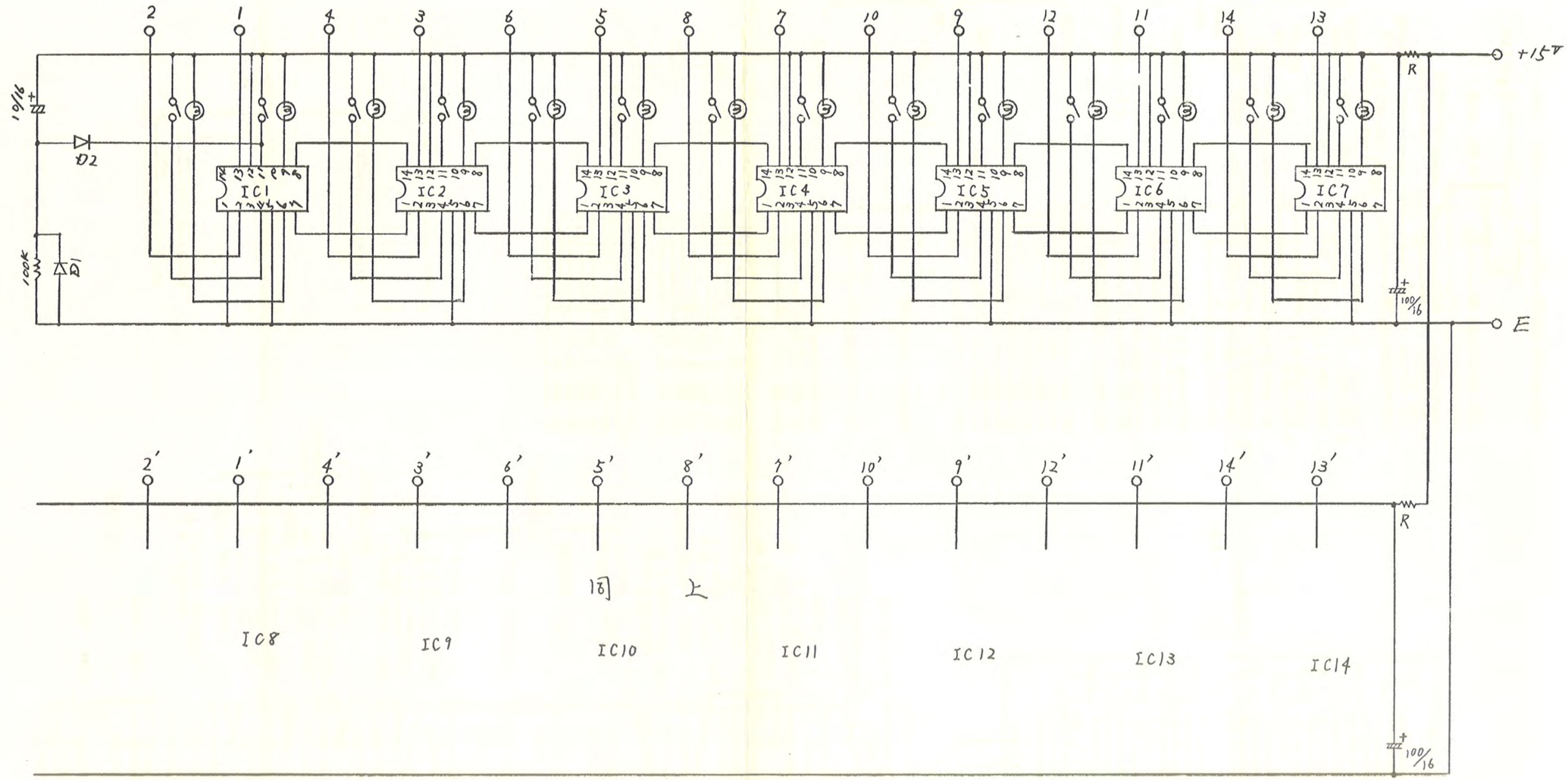
Panel 1 (MBK) Circuit Diagram

KEC-4477-65

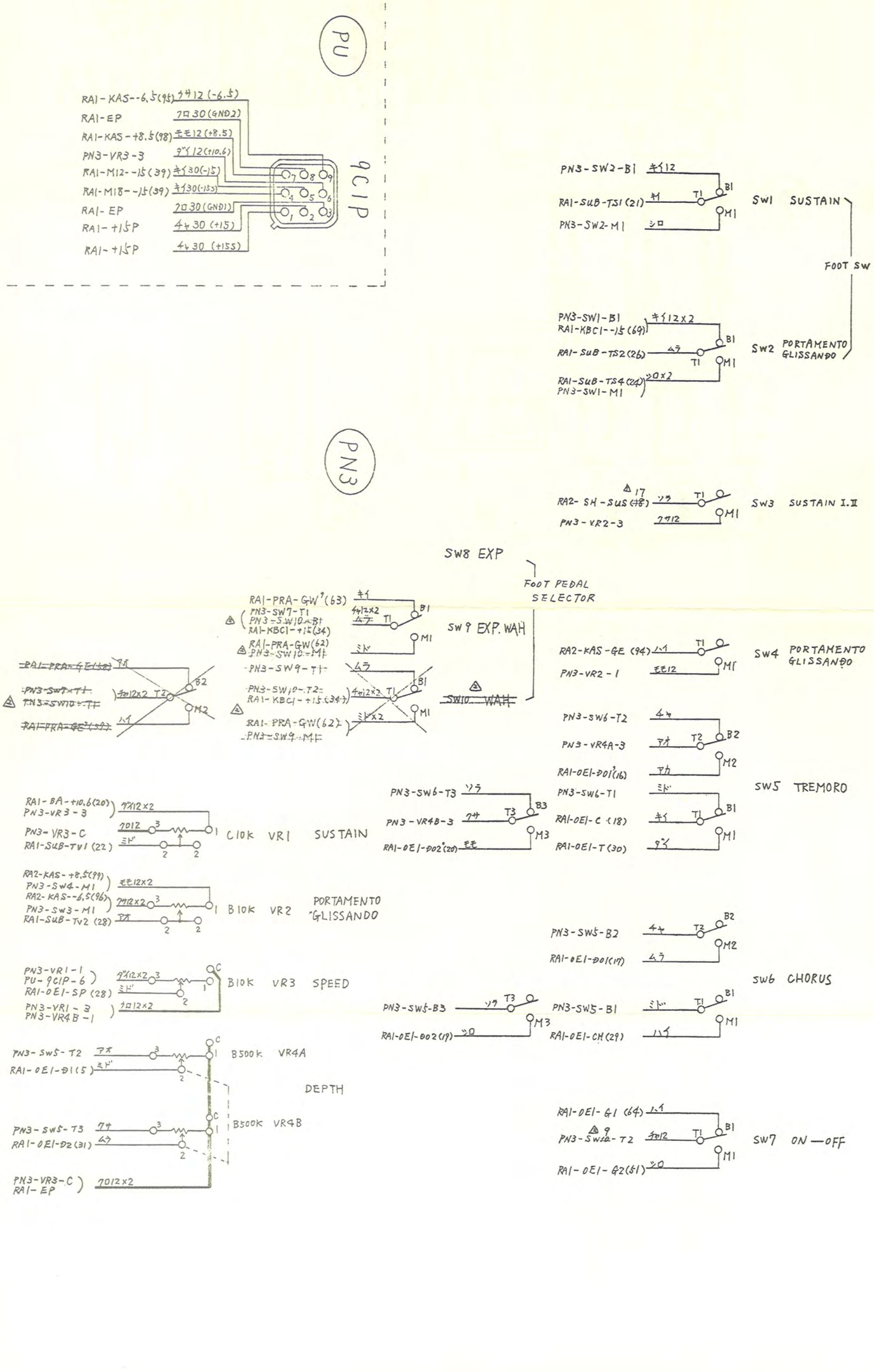
Panel 2 Circuit Diagram



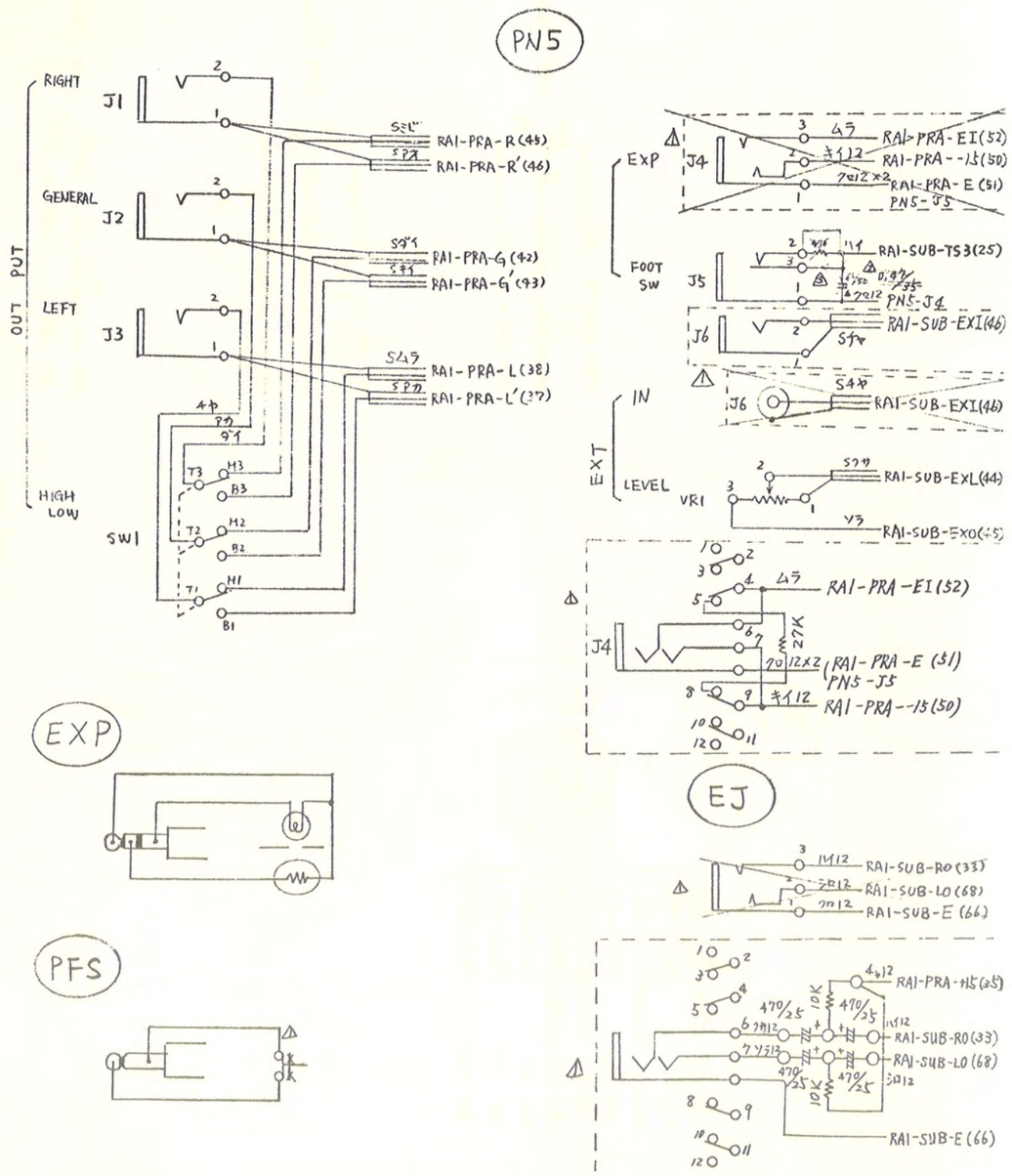
Panel 2 (Tone Selector) Circuit Diagram



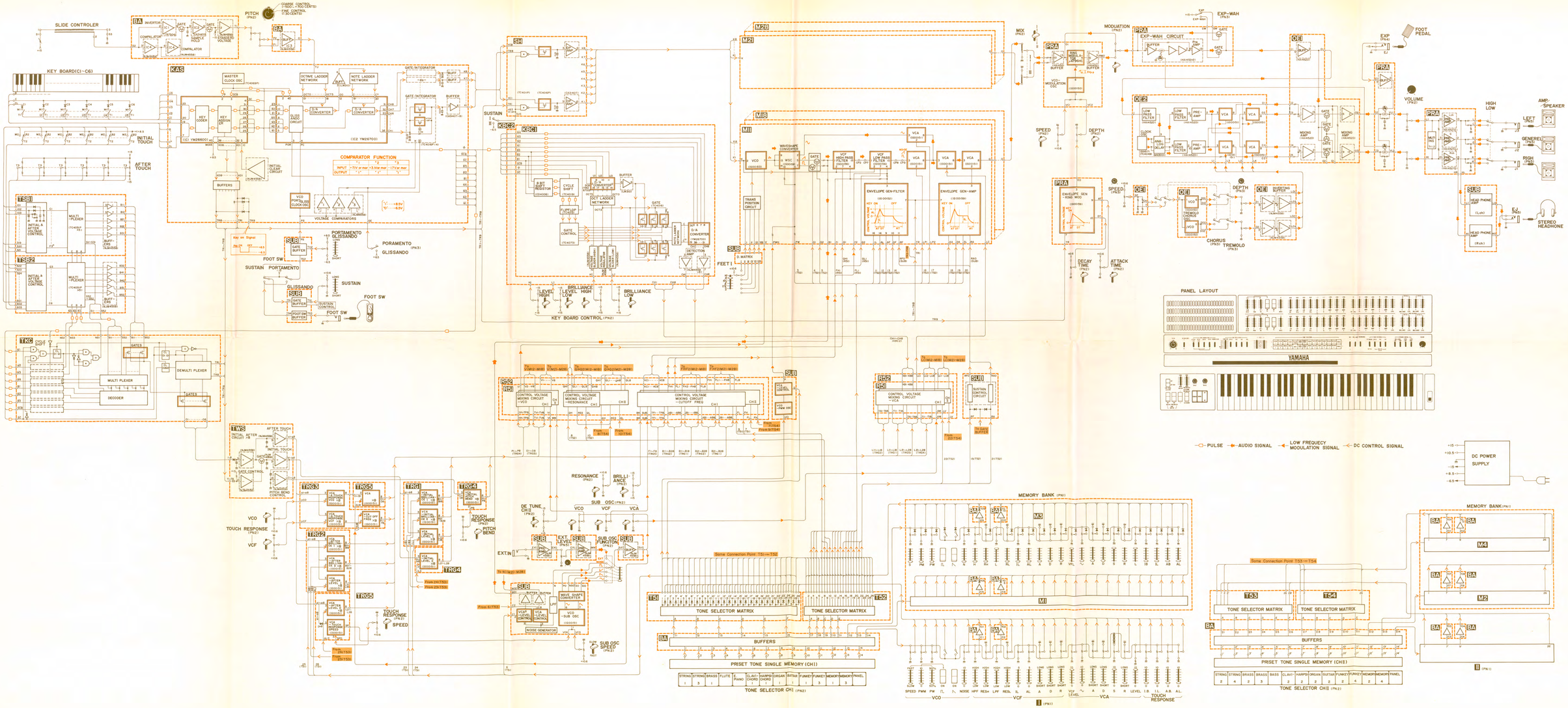
注) IC1~14 ; IG00157
D ; 1S1555
R ; 12Ω/0.5W


PU
9CIP
RA1-KAS--6.5(95)
RA1-EP
RA1-KAS-+8.5(98)
PN3-VR3-3
RA1-M12--15(39)
RA1-M18--15(39)
RA1-EP
RA1-+15P
RA1-+15P
PN3
PN3-SW2-B1
RA1-SUB-TS1(21)
PN3-SW2-M1
SW1 SUSTAIN
FOOT SW
PN3-SW1-B1
RA1-KBC1--15(69)
RA1-SUB-TS2(26)
RA1-SUB-TS4(24)
PN3-SW1-M1
SW2 PORTAMENTO GLISSANDO
RA2-SH-SUS(18)
PN3-VR2-3
SW3 SUSTAIN I.II
SW8 EXP
FOOT PEDAL SELECTOR
SW9 EXP. WAH
SW10 WAH
RA1-PRA-GW(63)
PN3-SW7-T1
PN3-SW10-B1
RA1-KBC1-+15(34)
RA1-PRA-GW(62)
PN3-SW10-M1
PN3-SW9-T1
PN3-SW10-T2
RA1-KBC1-+15(34)
RA1-PRA-GW(62)
PN3-SW9-M1
RA2-KAS-GE(94)
PN3-VR2-1
SW4 PORTAMENTO GLISSANDO
PN3-SW6-T2
PN3-VR4A-3
RA1-0E1-D01(16)
PN3-SW6-T1
RA1-0E1-C(18)
RA1-0E1-T(30)
SW5 TREMORO
PN3-SW6-T3
PN3-VR4B-3
RA1-0E1-D02(20)
RA1-BA-+10.6(20)
PN3-VR3-3
PN3-VR3-C
RA1-SUB-TV1(22)
C10k VR1 SUSTAIN
RA2-KAS-+8.5(99)
PN3-SW4-M1
RA2-KAS-6.5(96)
PN3-SW3-M1
RA1-SUB-TV2(28)
B10k VR2 PORTAMENTO GLISSANDO
PN3-SW5-B2
RA1-0E1-D01(17)
PN3-VR1-1
PU-9CIP-6
RA1-0E1-SP(28)
PN3-VR1-3
PN3-VR4B-1
B10k VR3 SPEED
SW6 CHORUS
PN3-SW5-B3
RA1-0E1-D02(19)
PN3-SW5-B1
RA1-0E1-CH(29)
PN3-SW5-T2
RA1-0E1-D1(5)
B500k VR4A DEPTH
PN3-SW5-T3
RA1-0E1-D2(31)
B500k VR4B
PN3-VR3-C
RA1-EP
RA1-0E1-G1(64)
PN3-SW10-T2
RA1-0E1-G2(61)
SW7 ON—OFF

Panel 5 (EJ, EXP, PFS) Circuit Diagram



CS-80 SYNTHESIZER BLOCK DIAGRAM



CS-80 SYNTHESIZER BLOCK DIAGRAM

CS-80 OVERALL CIRCUIT DIAGRAM

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