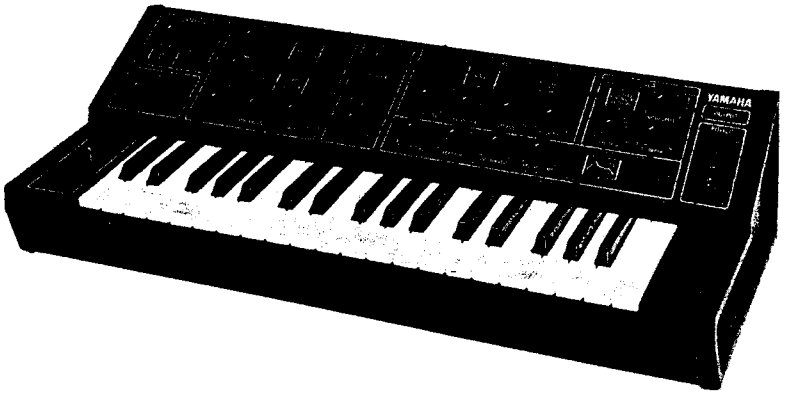
YAMAHA

COMBO SYNTHESIZER

CS-5



SERVICE MANUAL

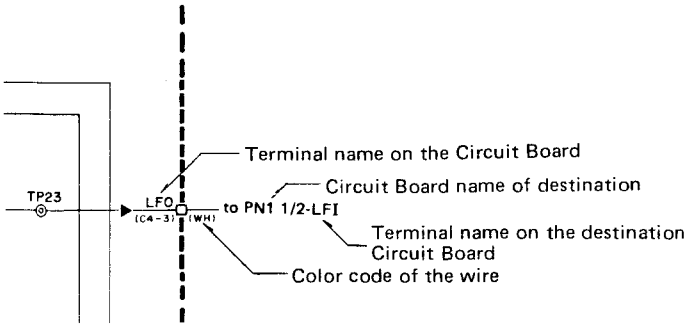
006398

'79.4 1.5K Y.S. ㊞ Printed in Japan

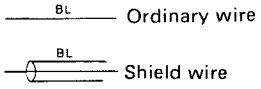
CONTENTS

CODING GUIDE

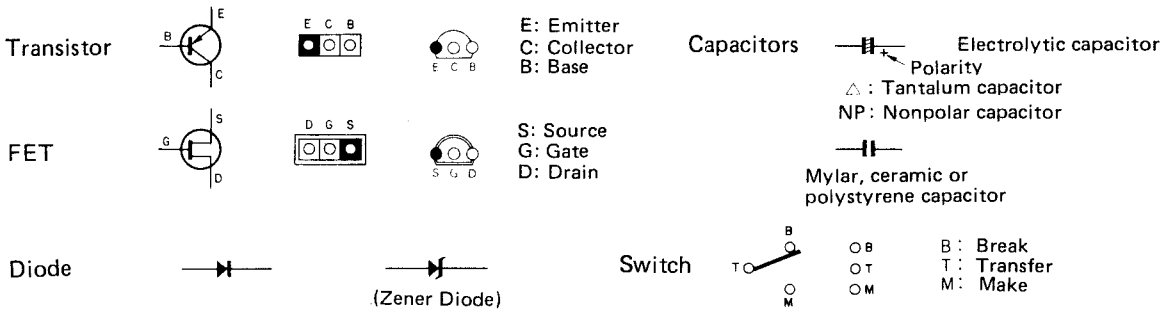
1 Wiring Notation



Note: Types of wire



2 Symbol Description



3 Abbreviations of Wire Color Codes

BLACK (クロ)……BL	BROWN (チャ)……BR	RED (アカ)……RE
ORANGE (ダイ)……OR	YELLOW (キイ)……YE	GREEN (ミド)……GR
BLUE (アオ)……BE	VIOLET (ムラ)……VI	GRAY (ハイ)……GY
WHITE (シロ)……WH	GRASS GREEN (クサ)……GG	SKY BLUE (ソラ)……SB
PINK (モモ)……PK	TRANSPARENT (トウメイ)……TR	

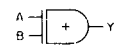
4 Relation of Color Coding and Notes

C	C♯	D	D♯	E	F	F♯	G	G♯	A	A♯	B
BR (チャ)	RE (アカ)	OR (ダイ)	YE (キイ)	GR (ミド)	BE (アオ)	VI (ムラ)	GY (ハイ)	WH (シロ)	GG (クサ)	SB (ソラ)	PK (モモ)

5 Logic Symbols

	MIL	YAMAHA
NOT		
NOR		
NAND		

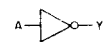
Exclusive OR (排他的論理和)



Truth Table

A	B	Y
L	L	L
H	L	H
L	H	H
H	H	L

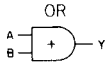
NOT (Inverter)



Truth Table

A	Y
L	H
H	L

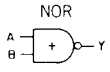
OR



Truth Table

A	B	Y
L	L	L
H	L	H
L	H	H
H	H	H

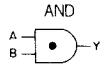
NOR



Truth Table

A	B	Y
L	L	H
H	L	L
L	H	L
H	H	L

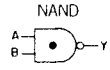
AND



Truth Table

A	B	Y
L	L	L
H	L	L
L	H	L
H	H	H

NAND

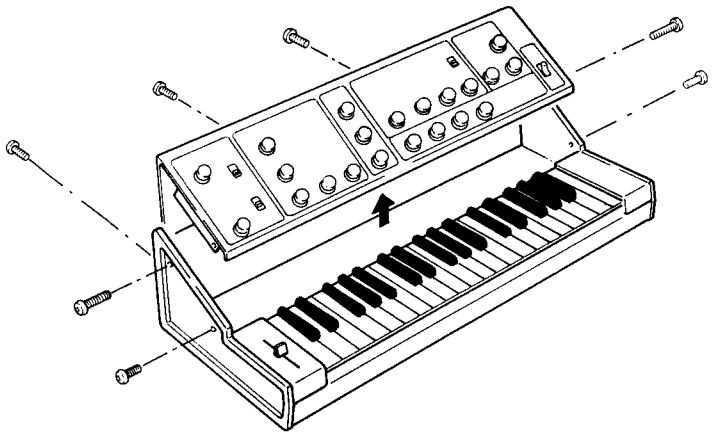


Truth Table

A	B	Y
L	L	H
H	L	H
L	H	H
H	H	L

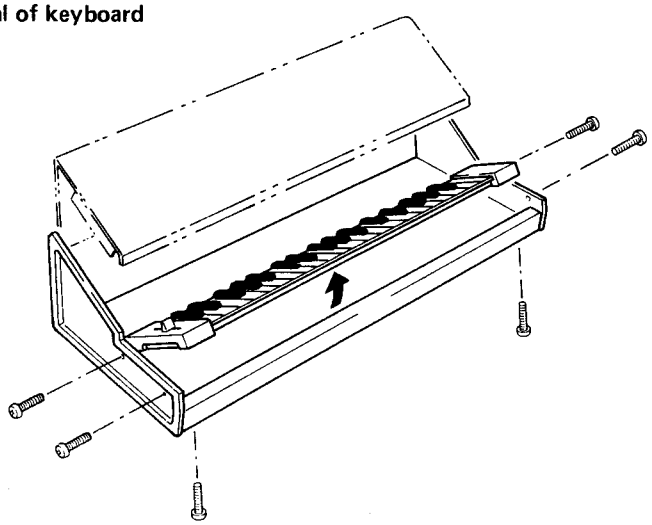
DISASSEMBLY PROCEDURE

1. Removal of panel



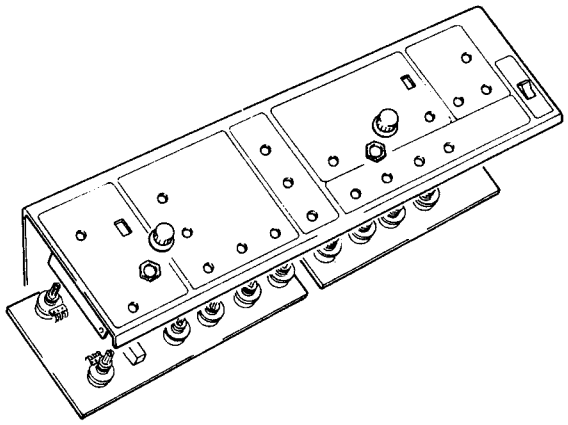
Remove the screws illustrated here. Then lift off the panel.

2. Removal of keyboard



Remove the screws illustrated after removing the panel. The keyboard can be now lifted up around.

3. Removal of Circuit Boards



Remove the knob and hex nut of each control carefully so that the panel will not be damaged. Then remove the Circuit Boards gently from the panel.

SPECIFICATIONS

KEYBOARD

37 keys, 3 octaves

CONTROLS

EXTERNAL . . . . . .TRIGGER LEVEL Control: Min. –35dBm
Function Switch: EXT/NOISE

LFO . . . . . .SPEED Control: 0.3 to 100Hz
Waveform Selector: ∿ / ◺ /S/H

VCO . . . . . .FEET Switch: 2', 4', 8', 16', 32', 64'
TUNE Control: –200 to +200 cents
LFO MOD Control: –200 to +200 cents
PWM Control: 50% to 90%
PORTAMENTO: Max. 3.5 sec.

MIXER . . . . . .EXT/NOISE Control
◺ : Sawtooth wave control
⊓ : Square wave control

VCF . . . . . .CUT OFF FREQ Control
RESONANCE Control
LFO MOD Control: ±3 octaves
EG DEPTH: +10 octaves
Filter Selector: HPF/BPF/LPF

VCA . . . . . .LFO MOD Control: AM modulation, max. 90%
INITIAL LEVEL Control
EG DEPTH Control

EG . . . . . .ATTACK TIME: 0.007 to 7 sec.
DECAY TIME: 0.018 to 18 sec.
SUSTAIN LEVEL: 0 to 10V
RELEASE TIME: 0.018 to 18 sec.

PITCH BEND ±1 octave

TERMINALS

EXTERNAL IN . . . .Sensitivity: –35dB (Min.)
TRIGGER OUT . . . .3V (OFF) to 7V (ON)
TRIGGER IN . . . . .+15V ~ +3V (OFF) to 0V ~ –10V (ON)
CONTROL VOLT OUT
. . . . . .125mV to 4V
CONTROL VOLT IN
. . . . . .125mV to 4V
OUTPUT . . . . . .–22dBm/600 ohms

OTHERS

POWER SOURCE . . .U.S. and Canadian models 120V 60Hz
General models
110, 130, 220 or 240V selectable, 50/60Hz

POWER CONSUMPTION
. . . . . .8 watts

DIMENSIONS . . . .641 x 290 x 157 mm
(W x D x H) (25-1/4 x 11-3/8 x 6-1/8")

WEIGHT . . . . . .7 kg (15.4 lbs)

FINISH . . . . . .Semi-gloss black

** Specifications subject to change without notice.*

Electrical Checks & Adjustments

1. ±15V Power Supply (REG Circuit Board)

a) Setting PITCH BEND SLIDER (PVR21) at the center position, adjust VR12 on the REG Circuit Board so that the voltage between terminal VE on the JK Circuit Board and terminal "+15" (PT36) on the PN1 2/2 Circuit Board reads +15±0.01V.

b) Similarly adjust VR13 on the REG board so that the voltage between terminals VE and "−15" (TP34) reads −15±0.01V.

2. Reference Voltage Supply (PN1 2/2 Circuit Board)

- Adjust VR11 so as to read 2±0.001V at terminal 2V (TP31).
- Check that $4\pm^{0}_{0.15}$V is read at terminal 4V (TP32) and $1\pm^{0.5}_{0}$V at terminal 1V (TP30).

3. +4.7V & −9.7V Power Supply (PN1 2/2 Circuit Board)

- TP21 should be +4.7 ± 1V.
- TP22 should be −9.7 ± 1V.

4. Clock Oscillator (PN1 2/2 Circuit Board)

The waveform shown below should be at TP15.

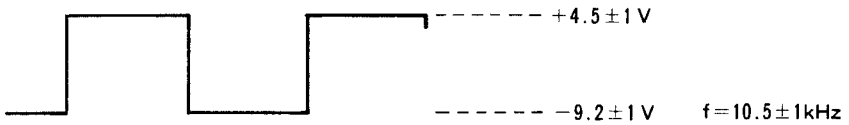


Fig. 4-1

5. Buffer Offset (PN1 2/2 Circuit Board)

Setting PORTAMENTO control at S and depressing C3 key, adjust VR1 on the PN1 2/2 Circuit Board so that 250 ± 1mV be read at terminal KVO (TP17).
Check that 2±0.001V is read at terminal KVO (TP17) while key C6 is depressed.

6. LFO (PN1 2/2 Circuit Board)

a) The waveform shown in Fig. 6-1 should be at terminal LFO (TP23) when LFO selector switch (PSW22) is set at " ∿ ". Adjust VR9 so that 100 ± 2Hz be read when LFO SPEED control is set at F.

b) When LFO selector switch (PSW22) is set at " ⋀ ", sawtooth waves of 100±2Hz should develop. When LFO SPEED is set at S, $0.3\pm^{0.5}_{0.2}$Hz should be read.
At this time the waveform should appear as in Fig. 6-2.

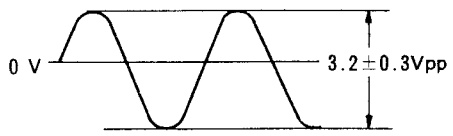


Fig. 6-1

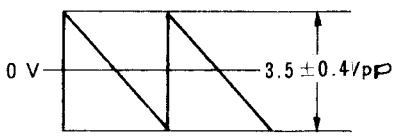


Fig. 6-2

7. VCO (PN1 2/2 Circuit Board)

a) Adjust TUNE (PVR3) so as to read 0±0.1 V at TP19.

b) Set LFO MOD (PVR4) at "0", the FEET switch (PSW23) at "2' ", and the adjusting POT (VR4) at the center. Depressing C6 key, adjust VR3 so as to read 8429 ± 2Hz at TP20. Then depressing C3 key, adjust VR2 so as to read 1053 ± 1Hz. Depressing C6 key again, adjust VR4 so as to read the specified frequency. Repeat these steps until the specified frequency is read at TP20.

c) Depressing key C6, the following values should be read with the FEET switch (PSW23) operated.

FEET	Frequency[Hz]	Cent [¢]	Tolerance[¢]
2	8429	C_8+12	±16
4	4215	C_7+12	±16
8	2107	C_6+12	±16
16	1053.6	C_5+12	±16
32	526.8	C_4+12	±16
64	263.4	C_3+12	±32

d) Next set FEET (PSW23) at "8' ", LFO SPEED (PVR2) at S, LFO selector switch (PSW22) at " ∿ ", and LFO MOD (PVR4) at "10". When C6 key is depressed, the reading of C6 + 12 should vary within the range of +200 ± 100 cents to −200 ± 100 cents at the speed determined by LFO SPEED (PVR2).

e) When LFO MOD (PVR4) is set at "0" and TUNE (PVR3) is turned fully to "+", +200±50 cents should be read. When TUNE is turned fully to "−", −200±50 cents should be read.

8. Noise Generator and S/H Circuit (PN1 2/2 Circuit Board)

a) Setting EXT/NOISE (PSW21) at NOISE, adjust VR10 so as to read +2±1 dBm at TP26 (Fig. 8-1).

b) When PSW22 is set at "S/H", voltage should vary stepwise and randomly at terminal LFO (TP23) at the speed determined by LFO SPEED (PVR2). (See Fig. 8-2).

Fig. 8-1

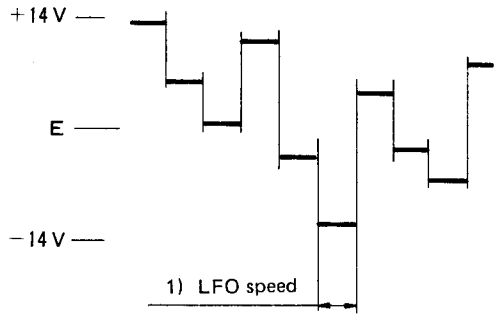


Fig. 8-2

9. Wave Shape Converter (PN1 2/2 Circuit Board)

a) Set the FEET switch (PSW23) at "8' ", TUNE (PVR3) at the center, LFO MOD (PVR4) at "0", the EXT/NOISE switch (PSW21) at NOISE, LFO selector switch (PSW22) at " ∿ ", PWM (PVR6) at "0", EXT/NOISE Control (PVR7) at "10", " ◺ " Control (PVR8) and " ⊓ " Control (PVR9) at "0". Then noise of −18 ± 3 dBm should be at terminal OUT (TP24). (See Fig. 8-1)

b) Set " ◺ " Control (PVR8) at "10" and EXT/MOISE Control (PVR7), to "0", " ⊓ " Control (PVR9) at "0". Now the waveform shown in Fig. 9-1 should be at TP24. Set EXT/NOISE Control (PVR7) to "0" and " ◺ " Control (PVR8) at "0" and " ⊓ " Control (PVR9) and "10". Now the waveform shown in Fig. 9-2 should be at TP24.

c) Vary the setting of PWM (PVR6) to "10" and LFO SPEED (PVR2) to "S". Then the waveform of Fig. 9-2 should vary continuously to that of Fig. 9-3 at terminal OUT (TP24).

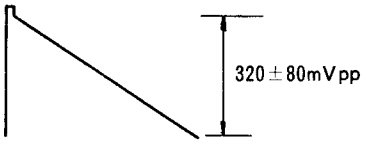


Fig. 9-1

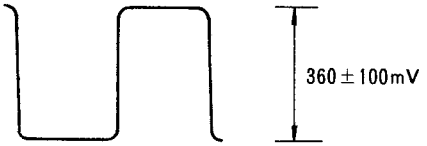
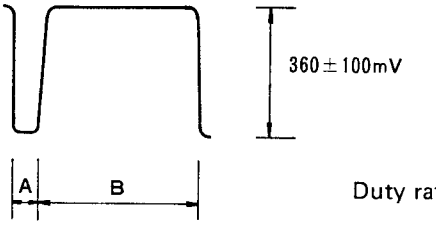


Fig. 9-2



$$\text{Duty ratio} = \frac{B}{A+B} \times 100 = 90\%$$

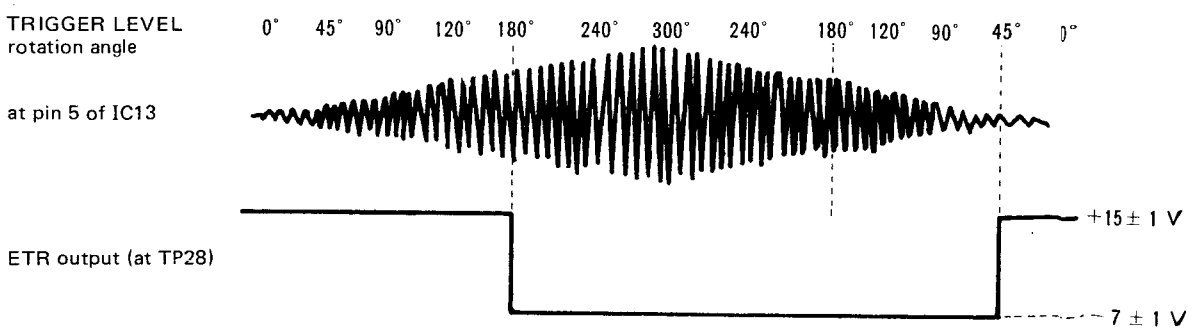
Fig. 9-3

10. EXT Pre-amplifier (PN1 2/2 Circuit Board)

Sine waves of 1kHz and −10 ± 3dBm should be at TP26 when the EXT/NOISE switch (PSW21) is set at "EXT" and 1kHz sine waves of −31±1 dBm are applied to terminal EXS (TP29).

11. EXT Trigger Circuit (PN1 2/2 Circuit Board)

Voltage should vary at terminal ETR (TP28) as shown below when 1kHz sine waves of −31±1dBm are applied to terminal EXS (TP29) and TRIGGER LEVEL (PVR1) is moved from "0" to "10".

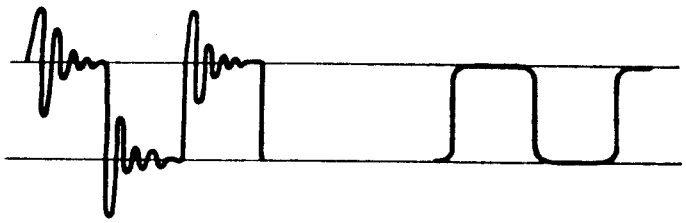


12. VCF (PN1 1/2 Circuit Board)

a) Adjust CUT OFF FREQ (PVR10) so as to read 5±0.1V at TP39. Adjust RESONANCE (PVR11) so as to read 5±0.1V also at TP40.

b) Set EXT/NOISE (PVR7) of the MIXER block and " ∧ " (PVR8) at "0", " ⊓ " (PVR9) at "10", LFO MOD (PVR12) and EG DEPTH (PVR13) at "0", FEET (PSW23) at "8' ", and the HPF/BPF/LPF switch (PSW24) at LPF. Depressing C3 key, adjust the peak level with VR5 and the 1.3V level with VR6 so that the waveform appears at TP14 just as shown below.

c) In the above setting, reset RESONANCE (PVR11) to L from H with CUT OFF FREQ (PVR10) set at H. Confirm that the waveform at TP41 varies as illustrated below.



13. VCA (PN1 1/2 Circuit Board)

a) Set " ⊓ " of the MIXER section at "10", RESONANCE (PVR11) at H, FEET at "2' ", and HPF/BPF/LPF switch (PSW24) at LPF. Depressing C3 key, adjust CUT OFF FRQ (PVR10) so that the waveform at TP41 becomes MAX.
Next, set ATTACK (PVR17), DECAY (PVR18), and RELEASE (PVR20) at S, SUSTAIN (PVR19) at "10", LFO MOD (PVR14) and INITIAL LEVEL (PVR15) at "0", and EG DEPTH (PVR16) at "10". Turning on key C3, adjust VR8 so that signal of 1.7V develop at SO (TP44).

b) In the above setting, reset EG DEPTH (PVR16) to "0", LFO MOD (PVR14) and INITIAL LEVEL (PVR15) to "10", MIXER block to "0", and LFO SPEED (PVR2) to F. Adjust VR7 so taht the waveform at terminal SO (TP45) becomes minimum.

14. Envelope Generator (PN1 1/2 Circuit Board)

a) Set ATTACK (PVR17), DECAY (PVR18), and RELEASE (PVR20) at S, and SUSTAIN (PVR19) at "0". When a key is depressed, the waveform of Fig. 14-1 should develop at TP42 on the PN1 1/2 Circuit Board.

b) Reset SUSTAIN (PVR19) to "10" and RELEASE (PVR20) to L. When a key is turned on and off, the wave-from of Fig. 14-2 should develop at TP42.

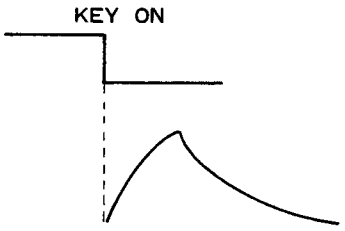


Fig. 14-1

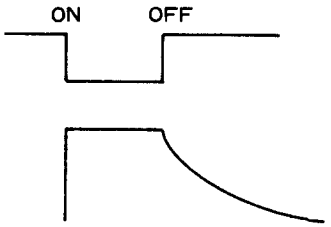


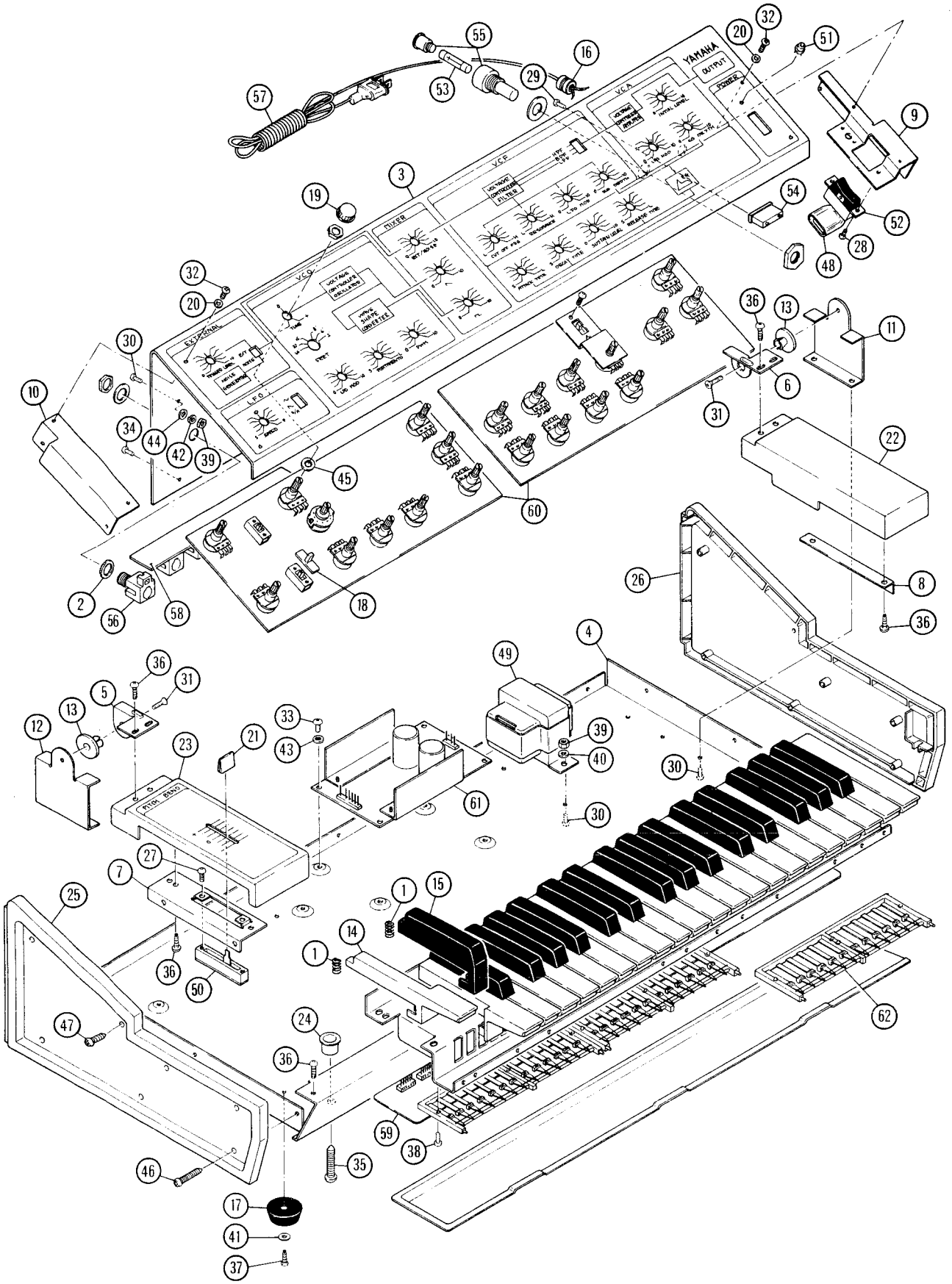
Fig. 14-2

15. LED Driver (PN1 2/2 Circuit Board)

a) When LFO SPEED (PVR2) is reset from S to F, the LED in the LFO section should blink at the LFO frequency.

b) The pilot lamp LED should go on lighting as long as the power switch is on.

PARTS LIST Exploded View



Mechanical Parts

	Ref. No.	Part No.	Description (部品名)			Remarks	Common Model		
	1	30 10 00 AA 04 37 20	Coil Spring		コイルスプリング				
	2	30 10 00 AA 80 58 20	Spacer		スペーサー				
※	3	30 10 00 AA 80 86 60	Panel		パネル	J			
※		30 10 00 AA 80 86 70	〃		〃	U, C			
※		30 10 00 AA 80 98 30	〃		〃	G			
※	4	30 10 00 AA 80 87 00	Bottom Board		底板				
※	5	30 10 00 AA 80 87 10	End Block Angle (L)		回転金具(左)				
※	6	30 10 00 AA 80 87 20	〃 (R)		〃 (右)				
※	7	30 10 00 AA 80 87 30	End Block Holder (L)		拍子木金具(左)				
※	8	30 10 00 AA 80 87 40	〃 (R)		〃 (右)				
※	9	30 10 00 AA 80 87 50	Side Board Angle (R)		側板金具(右)				
※	10	30 10 00 AA 80 87 60	〃 (L)		〃 (左)				
※	11	30 10 00 AA 80 87 80	End Block Angle Holder (R)		鍵盤受け(右)				
※	12	30 10 00 AA 80 93 70	〃 (L)		〃 (左)				
	13	30 10 00 CB 01 18 30	Bushing		ブッシュ				
	14	30 10 00 CB 03 22 10	White Key	C, F	白鍵				
		30 10 00 CB 03 22 20	〃	D	〃				
		30 10 00 CB 03 22 30	〃	B, E	〃				
		30 10 00 CB 03 22 40	〃	G	〃				
		30 10 00 CB 03 22 50	〃	A	〃				
		30 10 00 CB 03 22 60	〃	C'	〃				
	15	30 10 00 CB 03 22 70	Black Key		黒鍵				
	16	40 10 00 CB 07 27 50	Cord Stopper		コードストッパー	J			
		40 10 00 CB 81 12 30	〃		〃	U, C			
		40 10 00 CB 03 28 40	〃		〃	G			
	17	30 54 00 CB 80 12 70	Leg		ゴム脚				
	18	30 54 00 CB 80 52 30	Knob		ツマミ				
	19	30 10 00 CB 81 01 30	〃		〃				
	20	40 10 00 CB 81 12 70	Washer		ワッシャ				
	21	30 10 00 CB 81 12 80	Knob		ツマミ				
※	22	30 10 00 CB 81 27 50	End Block (Right)		拍子木(右)				
※	23	30 10 00 CB 81 27 60	〃 (Left)		〃 (左)				
※	24	30 10 00 CB 81 28 30	Spacer		スペーサー				
※	25	30 10 00 CB 81 28 90	Side Board (Left)		側板(左)				
※	26	30 10 00 CB 81 29 00	〃 (Right)		〃 (右)				
	27	40 10 00 EA 02 60 40	Pan Head Screw	M2.6 x 4	ナベ小ネジ				
	28	40 10 00 EA 03 00 50	〃	M3 x 5	〃				
	29	40 10 00 EA 33 00 50	〃	M3 x 5	〃				
	30	40 10 00 EA 34 01 00	〃	M4 x 10	〃				
	31	40 10 00 EB 04 01 20	Flat Head Screw	M4 x 12	サラ小ネジ				
	32	40 10 00 EC 33 00 50	Truss Head Screw	M3 x 5	トラス小ネジ				
	33	40 10 00 ED 33 00 50	Binding Screw	M3 x 5	バインド小ネジ				
	34	40 10 00 ED 33 00 60	〃	M3 x 6	〃				
	35	40 10 00 EG 35 03 00	Pan Head Screw	M5 x 30	尖先ナベ小ネジ				
	36	40 10 00 Ei 04 00 80	Self Tapping Screw	M4 x 8	バインドタッピングネジ				
	37	40 10 00 Ei 33 01 00	〃	M3 x 10	〃				
	38	40 10 00 EO 02 00 80	Flat Head Tapping Screw	M2 x 8	サラタッピングネジ				
	39	40 10 00 EV 10 00 40	Hexagonal Nut	4	六角ナット				
	40	40 10 00 EV 20 00 40	Flat Washer	4	平座金				
	41	40 10 00 EV 20 30 30	〃	3	〃				
	42	40 10 00 EV 30 00 40	Spring Washer	4	バネ座金				
	43	40 10 00 EV 41 00 30	Toothed Lock Washer	3	歯付座金				
	44	40 10 00 EV 43 00 40	〃	4	〃				

※New parts U : U.S.A. C : Canadian G : General

	Ref. No.	Part No.	Description (部 品 名)			Remarks	Common Model		
	45	40 10 00 EV 43 00 70	Toothed Lock Washer	9	〃				
	46	40 10 00 EZ 98 06 40	Binding Screw	M4 x 18	尖先バインド小ネジ				
	47	40 10 00 EZ 98 06 50	〃	M4 x 10	〃				
	48	40 10 00 FZ 00 01 10	Spark Killer	500V, 0.33μF	スパークキラー	J, U			
		40 10 00 FZ 00 09 50	〃		〃	C			
※	49	40 10 00 GA 81 39 10	Power Transformer		電源トランス	J			
※		40 10 00 GA 81 40 10	〃		〃	U, C			
※		40 10 00 GA 81 41 10	〃		〃	G			
※	50	40 10 00 HQ 42 01 00	Slide Variable Resistor	Z10kΩ	スライドボリューム				
※	51	40 10 00 iF 00 13 10	L E D	TLR-102KB	L E D				
※	52	40 10 00 KA 10 09 30	Power Switch		パワースイッチ	J			
※		40 10 00 KA 10 09 80	〃		〃	U, C			
※		40 10 00 KA 10 09 90	〃		〃	G			
	53	40 10 00 KB 00 03 10	Fuse	250V, 0.5A	ヒューズ	J, U, C			
		40 10 00 KB 00 07 10	〃		〃	G			
	54	40 10 00 LA 00 07 60	Terminal	CV-2P	カラー端子板				
	55	40 10 00 LB 20 04 90	Fuse Holder	SN2052	ヒューズホルダー	J, U, C			
		40 10 00 LB 20 05 90	〃		〃	G			
	56	40 10 00 LB 20 08 60	Jack		ジャック				
	57	40 10 00 MZ 80 05 50	AC Cord		電源コード	J			
		40 10 00 MZ 80 63 00	〃		〃	U, C			
		40 10 00 MZ 80 63 40	〃		〃	G			
	58	30 12 00 NA 80 28 20	EJ Board		EJシート				
	59	30 10 00 NA 80 43 90	MK 〃		MKシート				
	60	30 12 00 NA 80 44 20	PN1 〃		PN1シート				
	61	30 12 00 NA 80 44 30	REG 〃		REGシート				
※	62	30 10 00 NB 05 51 50	Switch Assembly	13 Key	スイッチ Ass'y				
※		30 10 00 NB 05 51 60	〃	12 Key	〃				
	63	40 10 00 LD 20 02 50	Voltage Selector		電圧切替器	G			

※ New parts U : U.S.A. C : Canadian G : General

Circuit Boards and Electrical Parts

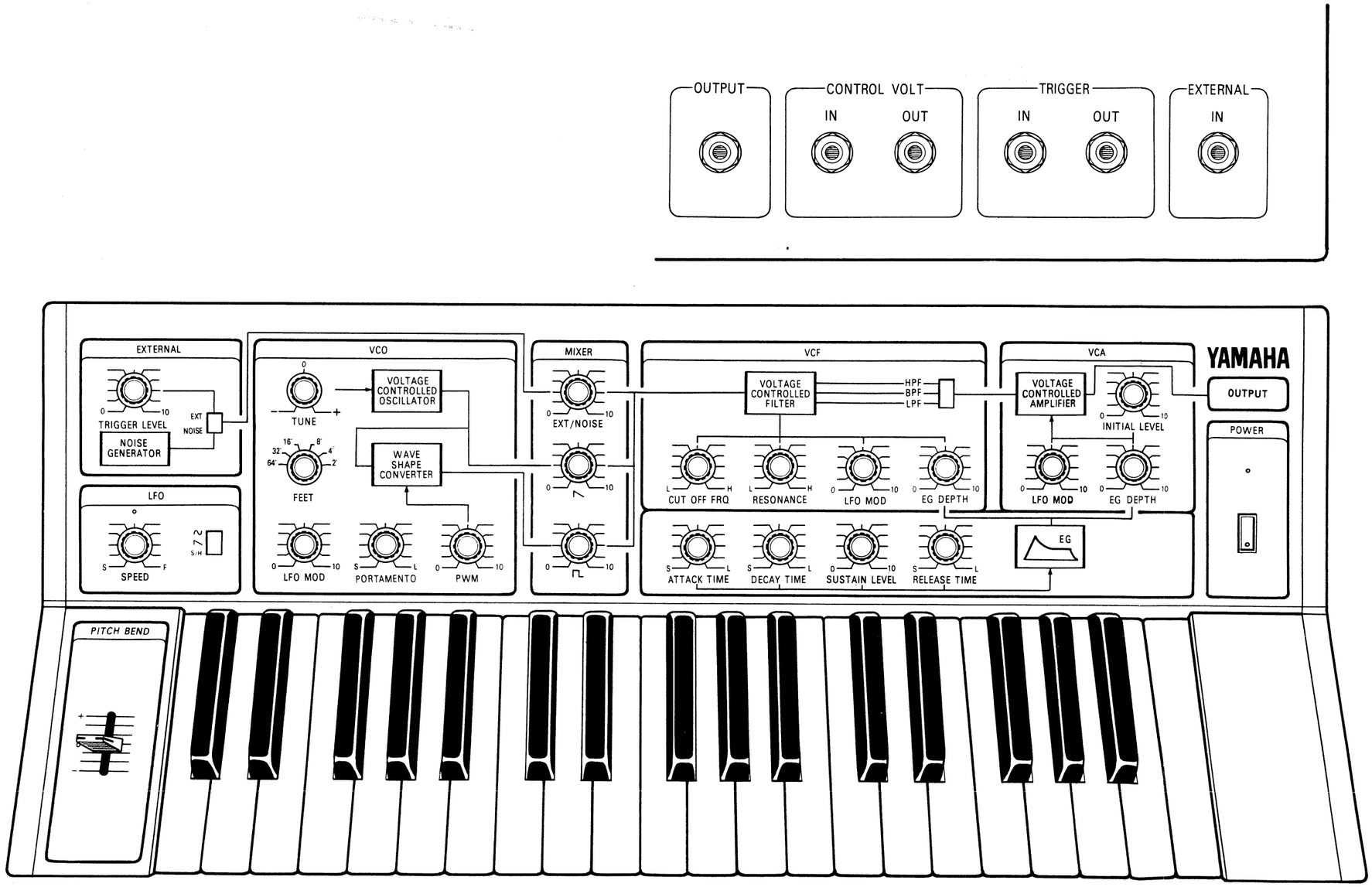
	Ref. No.	Part No.	Description (部 品 名)			Remarks	Common Model		
※		30 12 00 NA 80 44 20	PN1 Board	#81610	PN1 シート				
		30 10 00 AA 04 40 70	C.B Spacer		反り止め金具				
※		30 10 00 AA 80 87 70	Switch Holder		スイッチ取付金具				
		40 10 00 EA 02 60 40	Pan Head Screw	M2.6 x 4	ナベ小ネジ				
※		40 10 00 FF 04 31 20	Polystyrene Capacitor	1,200PF/50V	スチロールコンデンサ				
		40 10 00 FM 09 72 20	BP Electrolytic Capacitor	16V, 22μF	BPケミカルコンデンサ				
		40 10 00 FM 11 61 00	"	50V, 1μF	"				
		40 10 00 FP 33 63 30	Tantalum Capacitor	16V, 3.3μF	タンタルコンデンサ				
		40 10 00 FP 34 62 20	"	25V, 2.2μF	"				
		40 10 00 FA 11 52 20	Mylar Capacitor	50V, 0.22μF	マイラーコン				
		40 10 00 HS 31 04 40	Variable Resistor	B-50KΩ	ボリューム				
※		40 10 00 HS 31 05 50	"	A-10KΩ	"				
※		40 10 00 HS 31 05 70	"	B-10KΩ	"				
※		40 10 00 HS 31 06 00	"	A-2MΩ	"				
		40 10 00 HT 19 00 40	"	B-5KΩ	半固定ボリューム				
		40 10 00 HT 19 00 50	"	B-10KΩ	"				
		40 10 00 HT 19 00 80	"	B-100KΩ	"				
		40 10 00 HT 19 30 90	"	B-200KΩ	"				
		40 10 00 HT 19 01 00	"	B-500KΩ	"				
		40 10 00 HT 19 01 10	"	B-1MΩ	"				
※		40 10 00 HT 19 01 20	"	B-100M	"				
※		40 10 00 HT 19 01 40	"	B-200M	"				
		40 10 00 HU 57 48 20	Metal Film Resistor	82Ω	金属皮膜抵抗				
		40 10 00 HU 57 51 00	"	100Ω	"				
		40 10 00 HU 57 53 90	"	390Ω	"				
		40 10 00 HU 57 55 60	"	560Ω	"				
		40 10 00 HU 57 61 00	"	1KΩ	"				
		40 10 00 HU 57 61 60	"	1.6KΩ	"				
		40 10 00 HU 57 62 00	"	2KΩ	"				
		40 10 00 HU 57 62 70	"	2.7KΩ	"				
		40 10 00 HU 57 63 00	"	3KΩ	"				
		40 10 00 HU 57 68 20	"	8.2KΩ	"				
		40 10 00 HU 57 71 00	"	10KΩ	"				
		40 10 00 HU 57 71 20	"	12KΩ	"				
		40 10 00 HU 57 71 80	"	18KΩ	"				
		40 10 00 HU 57 72 00	"	20KΩ	"				
		40 10 00 HU 57 72 20	"	22KΩ	"				
		40 10 00 HU 57 73 00	"	30KΩ	"				
		40 10 00 HU 57 76 80	"	68KΩ	"				
		40 10 00 HU 57 81 60	"	160KΩ	"				
		40 10 00 iA 10 15 20	Transistor	2SA1015	トランジスタ				
		40 10 00 iC 18 15 20	"	2SC1815	"				
		40 10 00 iE 00 00 10	FET	2SK30A	FET				
		40 10 00 iF 00 00 40	Diode	1S1555	ダイオード				
		40 10 00 iF 00 03 00	"	1S1715P	"				
		40 10 00 iG 00 13 90	IC	NJM4558	IC				
		40 10 00 iG 00 15 00	"	iG00150	"				
		40 10 00 iG 00 15 10	"	iG00151	"				
		40 10 00 iG 00 15 30	"	iG00153	"				
		40 10 00 iG 00 15 60	"	iG00156	"				
		40 10 00 iG 00 17 20	"	TC4069P	"				
		40 10 00 iG 02 56 00	"	TA7505	"				
		30 10 00 YM 24 80 00	"	YM24800	"				

※ New parts U : U.S.A. C : Canadian G : General

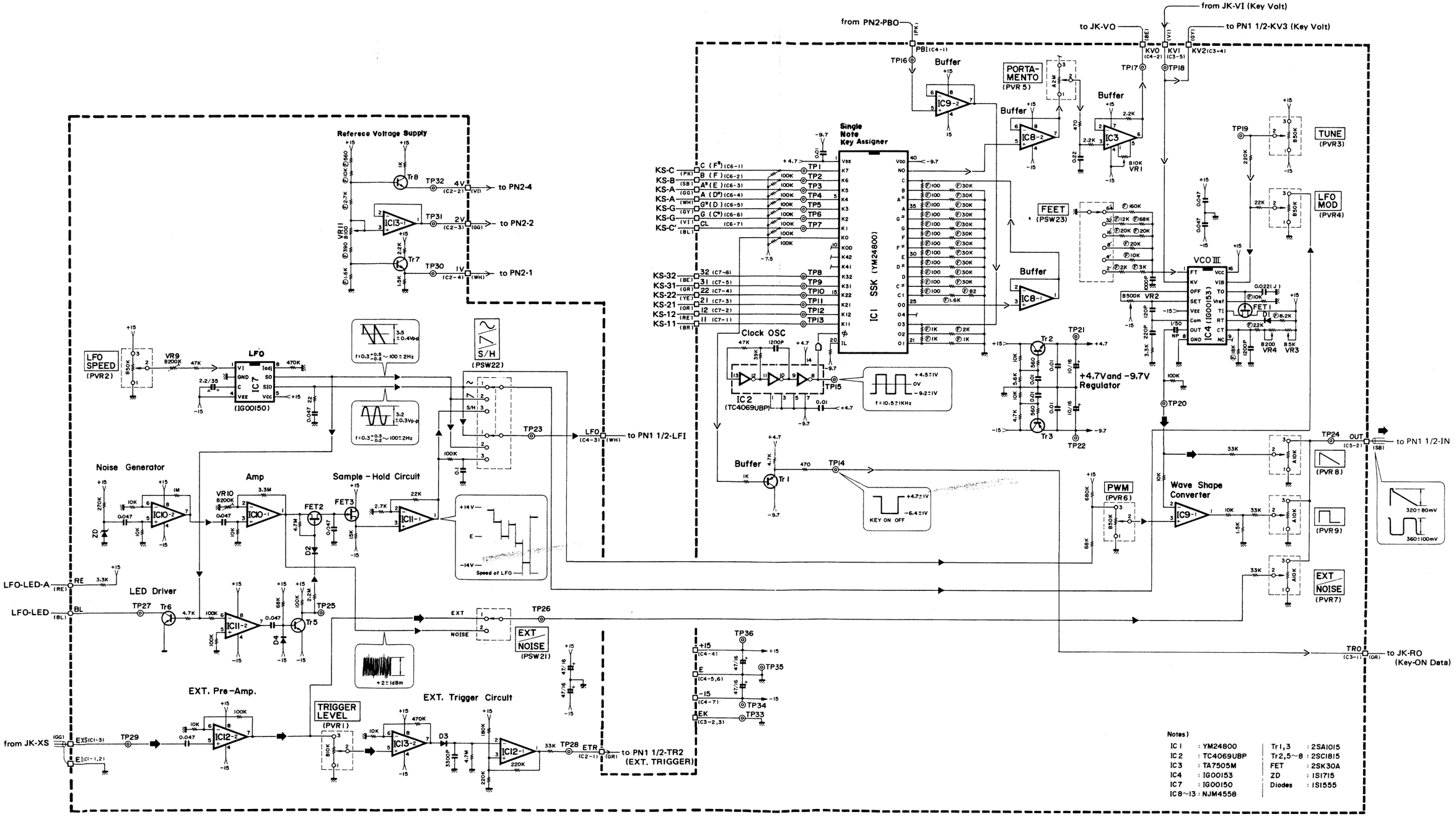
	Ref. No.	Part No.	Description (部 品 名)			Remarks	Common Model		
		40 10 00 KA 40 05 90	Slide Switch		スライドスイッチ				
		40 10 00 KA 40 06 00	〃		〃				
		40 10 00 KA 50 10 80	Rotary Switch		ロータリースイッチ				
		40 10 00 LB 30 09 60	Connector (Base Post)	3P	NHコネクター(ベースポスト)				
		40 10 00 LB 40 06 30	〃	4P	〃				
		40 10 00 LB 50 03 70	〃	5P	〃				
		40 10 00 LB 60 29 90	〃	6P	〃				
		40 10 00 LB 60 30 00	〃	7P	〃				
※		30 12 00 NA 80 40 30	REG Board	#83621	REG シート	J			
※		30 12 00 NA 80 52 30	〃		〃	U, C			
※		30 12 00 NA 80 52 40	〃		〃	G			
		30 10 00 BA 80 34 90			放 熱 板				
※		40 10 00 HL 31 23 30	Metal Oxide Film Resistor	0.33Ω 1P	酸 金 抵 抗				
		40 10 00 HT 19 00 70	Variable Resistor	B-50KΩ	半固定ボリューム				
※		40 10 00 HT 19 01 30	〃	B-2KΩ	〃				
		40 10 00 HU 57 71 00	Metal Film Resistor	10KΩ 1%	金属皮膜抵抗				
		40 10 00 HU 57 71 50	〃	15KΩ 1%	〃				
		40 10 00 HU 57 71 80	〃	18KΩ 1%	〃				
		40 10 00 iA 07 43 90	Transistor	2SA743	トランジスタ				
		40 10 00 iC 12 12 90	〃	2SC1212	〃				
※		40 10 00 iG 03 20 10	IC	TA7179	IC				
		40 10 00 iH 00 01 40	Diode	10DC-4	ダイオード				
		40 10 00 iH 00 01 50	〃	10DC-4R	〃				
		40 10 00 KB 00 02 00	Fuse	125V, 0.5A	ヒューズ	J			
		40 10 00 KB 00 11 50	Fuse	250V, 0.5A	〃	U, C			
		40 10 00 KB 00 07 10	Miniature Fuse	500MAT	ミニュチュアヒューズ	G			
		40 10 00 LB 20 05 70	Fuse Holder Pin		ヒューズホルダーピン				
		40 10 00 LB 60 13 80	Connector	6P	コネクター				
		40 10 00 LB 60 18 00	〃	3P	〃				
※		30 10 00 NA 80 43 90	MK Board	#83712	MK シート				
		40 10 00 iF 00 00 40		1S1555	ダイオード				
		40 10 00 LB 60 24 60	Connector	7P	トップ型ベースポスト				
		40 10 00 LB 60 29 40	〃	6P	〃				
		40 10 00 BB 00 44 30	Contact		コンタクト				
		40 10 00 LB 30 07 20	Connector Housing	3P	ハウジング				
		40 10 00 LB 40 05 60	〃	4P	〃				
		40 10 00 LB 50 02 40	〃	5P	〃				
		40 10 00 LB 60 13 90	Connector Terminal		コネクターターミナル				
		40 10 00 LB 60 14 00	Connector Housing	6P	コネクターハウジング				
		40 10 00 LB 60 17 90	Connector	3P	コネクター				
		40 10 00 LB 60 24 40	Connector Housing	7P	ハウジング				
		40 10 00 LB 60 28 10	〃	6P	〃				
		40 10 00 FP 35 51 00	Tantalum Capacitor		タンタルコンデンサ				

※ New parts U : U.S.A. C : Canadian G : General

PANEL LAYOUT



PN1 2/2 Circuit Diagram

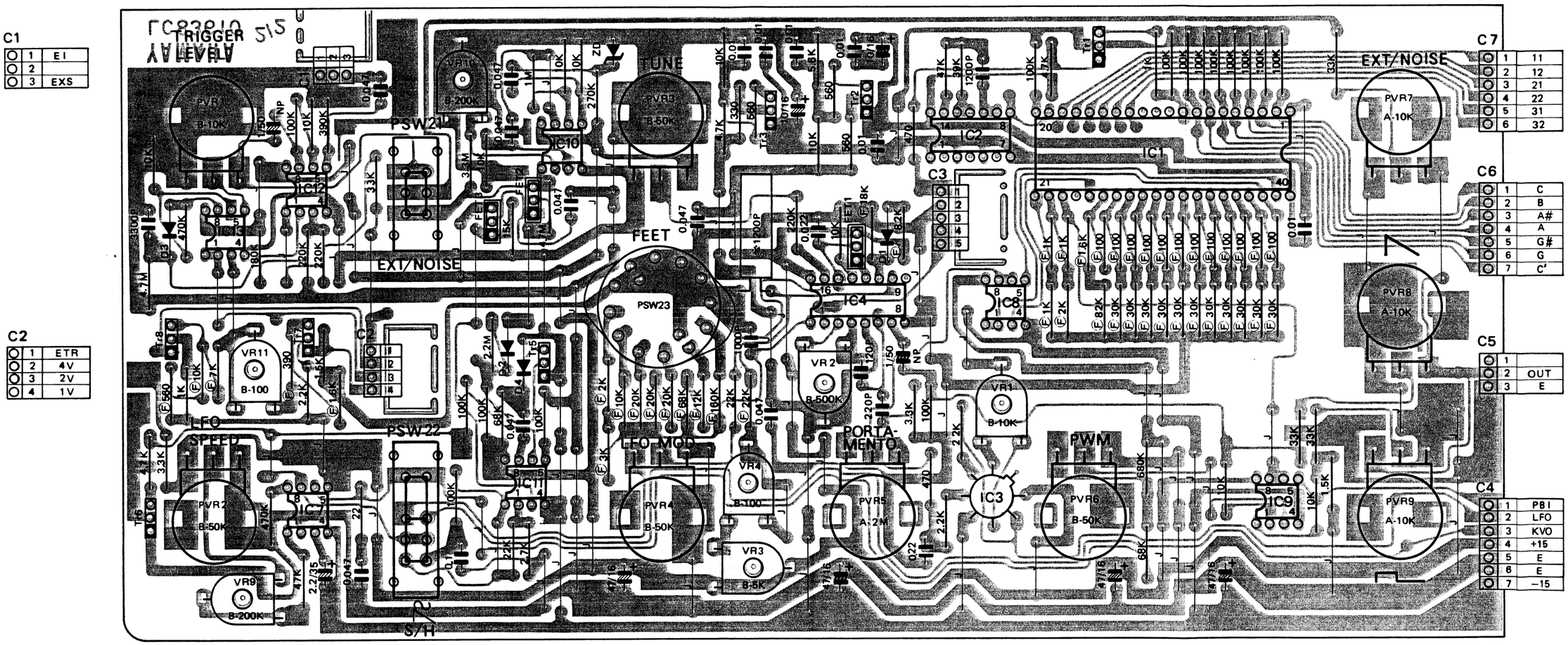


Notes)

IC 1	: YM24800	Tr1,3	: 2SA1015
IC 2	: TC4069UBP	Tr2,5～8	: 2SC1815
IC 3	: TA7505M	FET	: 2SK30A
IC 4	: IG00153	ZD	: 1S1715
IC 7	: IG00150	Diodes	: 1S1555
IC 8～13	: NJM4558		

PN1 2/2 Circuit Board

PN1 2/2



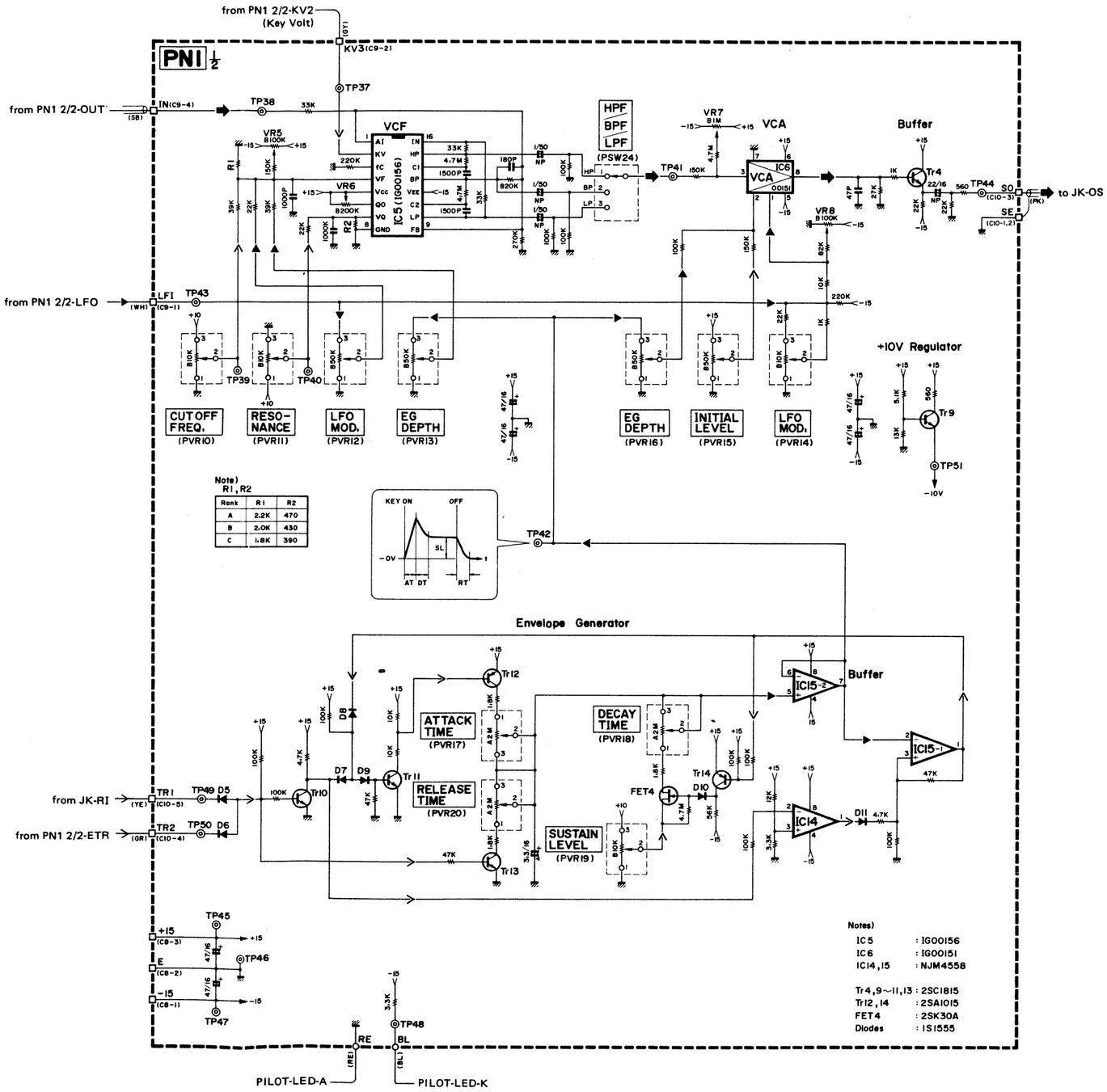
Notes)

1. Printed Circuit Board
   LC83611 2/2
2. IC
   IC1 : YM24800
   IC2 : TC4069UBP
   IC3 : TA7505M
   IC4 : IG00153
   IC7 : IG00150
   IC8 ～13 : NJM4558
3. Transistors
   Tr1, 3 : 2SA1015
   Tr2, 5 ～8 : 2SC1815
4. Diodes
   D1 ～4 : 1S1555
5. Zener diode
   ZD : 1S1715
6. Variable resistors
   PVR1 ～20 : 16 φ 300
   VR1 ～11 : V10K 8-4-2
7. Slide Switches (non-shorting type)
   PSW21 : 2-way, 2-contact
   PSW22, 24 : 2-way, 3-contact
8. Rotary Switch (shorting type)
   PSW23 : 2-way, 6 contact
9. FET
   FET1 ～3 : 2SK30A
10. Resistors
    Marked Ⓕ : 1% metal film
    No mark : Carbon

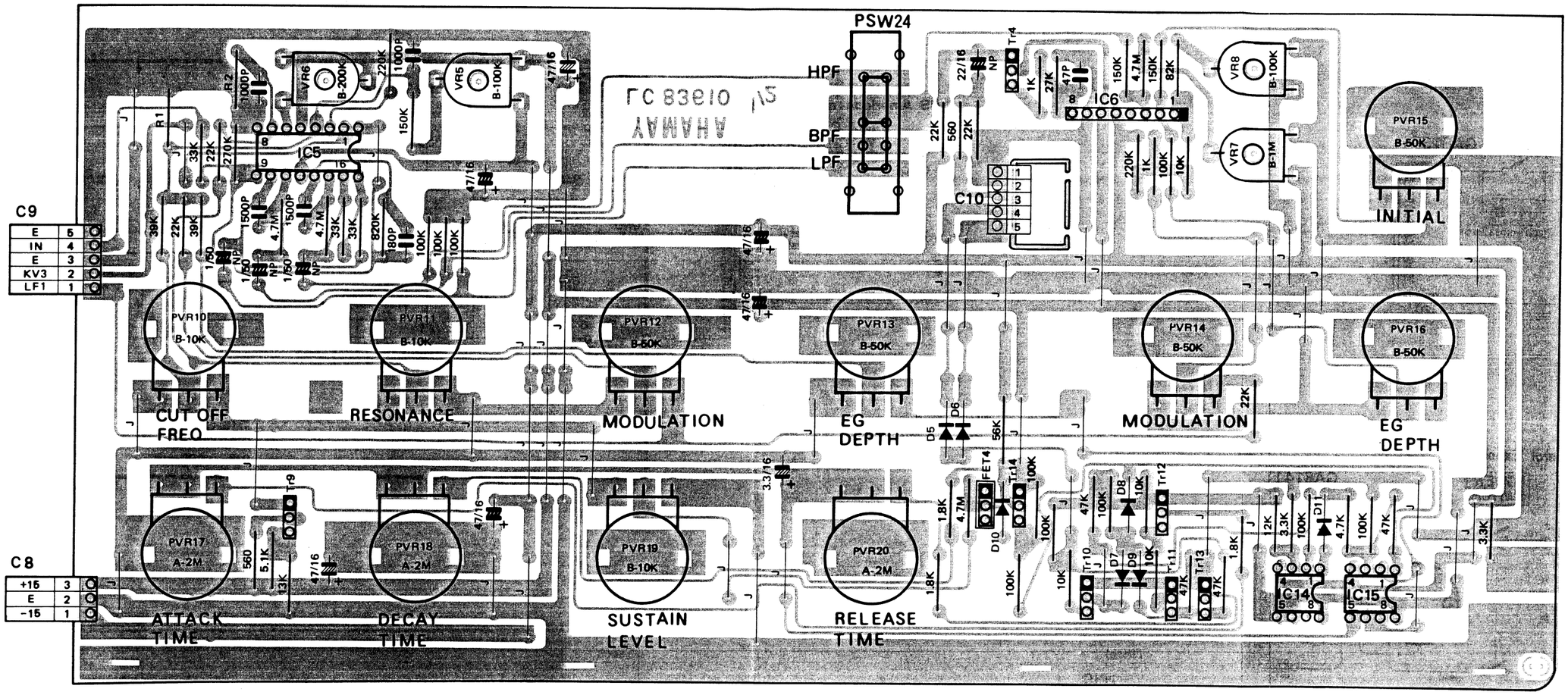
C3

○	1	TRO
○	2	EK
○	3	EK
○	4	2
○	5	KV

PN1 1/2 Circuit Diagram



PN1 1/2 Circuit Board



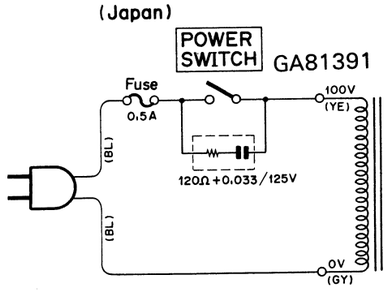
Notes)

1) Printed Circuit Board
   LC83611 1/2
2) IC
   IC5 : IG00156
   IC6 : IG00151
   IC14, 15 : NJM4558
3) Transistors
   Tr4, 9, ～11, 13 : 2SC1815
   Tr12, 14 : 2SA1015
4) Diodes
   D5 ～11 : 1S1555
5) Variable resistors
   PVR1 ～20 : 16 ϕ 300
   VR1 ～11 : V10K 8-4-2
6) Slide switches
   PSW21 : 2-way, 2 contact
   PSW22, 24 : 2-way, 3 contact
7) Rotary switch
   PSW23 : 2-way, 6 contact
8) FET
   FET4 : 2SK30A
9) Resistors
   Marked Ⓕ : 1% metal film
   No mark : Carbon
10) The valves of R1 and R2 depend on the rank of the IC (IG00156) as follows.

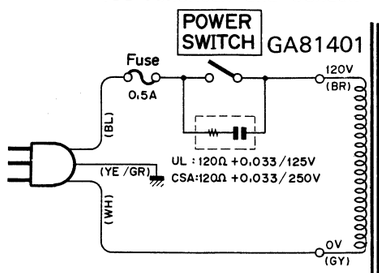
Rank	R1	R2
A	2.2K	470
B	2.0K	430
C	1.8K	390

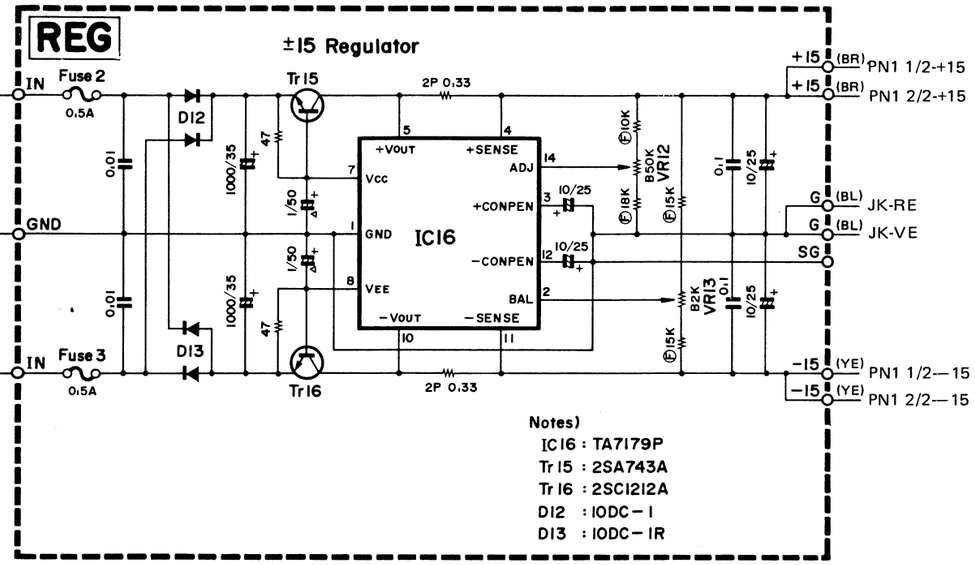
REG Circuit Diagram, Circuit Board

(Japan)



(US American and Canadit

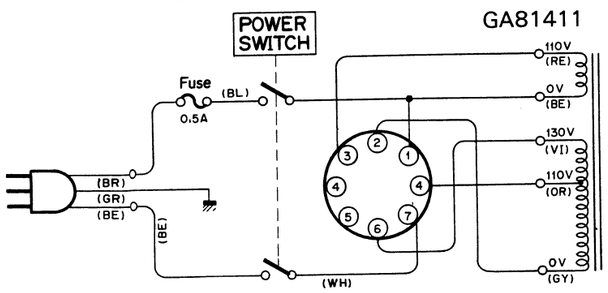




Notes)
IC16 : TA7179P
Tr15 : 2SA743A
Tr16 : 2SC1212A
D12 : 10DC-1
D13 : 10DC-1R

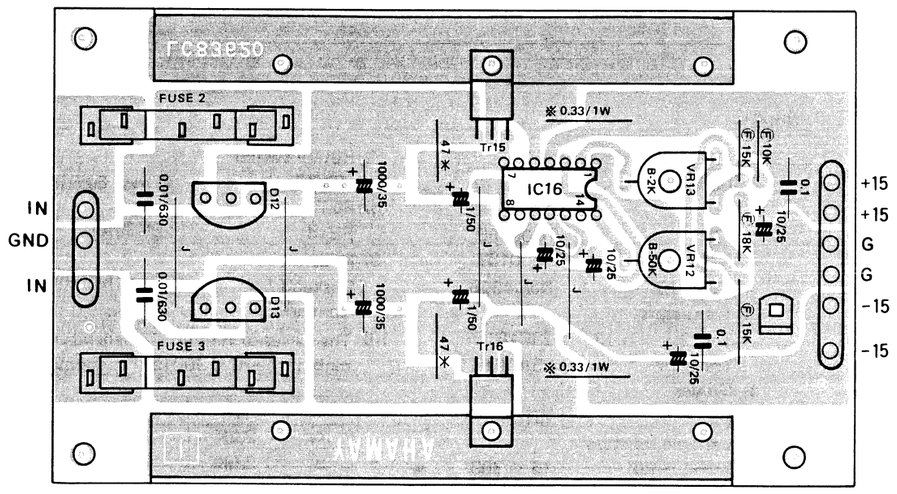
KEC-90205-89 ⚠

(General Export)



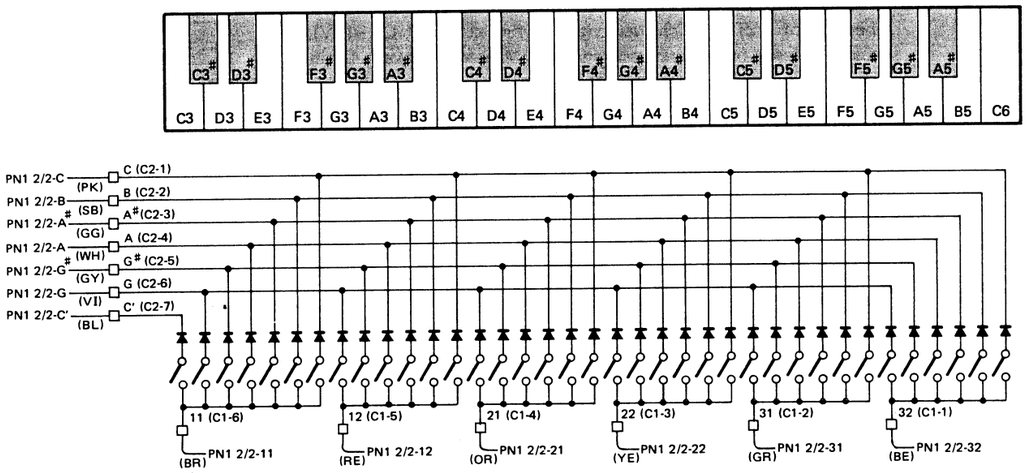
Note)

1) IC
   IC16 : TA7179P
2) Transistors
   Tr15 : 2SA743A(C)
   Tr16 : 2SC1212A(C)
3) Diodes
   D12 : 10DC-1
   D13 : 10DC-1R
4) Resistors
   Marked Ⓕ: Metal film
   Marked * : Metal oxide (nonflammable, 1W)
   Marked ⁎ : Carbon
5) Variable resistors
   VR12, 13 : V10K
6) Heat sink
   BA80349
7) Connector
   SMK (3P, 6P)



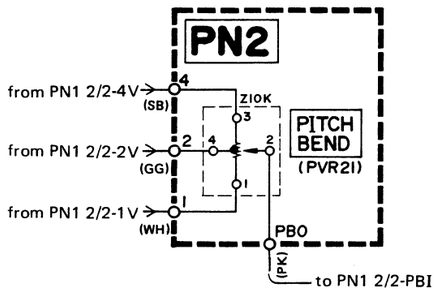
KEP-LC83621-88

Key Switch Circuit Diagram

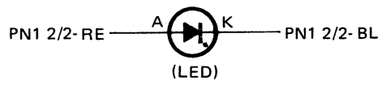


KEC-90206-86

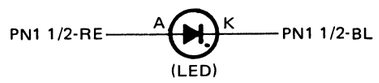
PN2 (Panel 2) Circuit Diagram



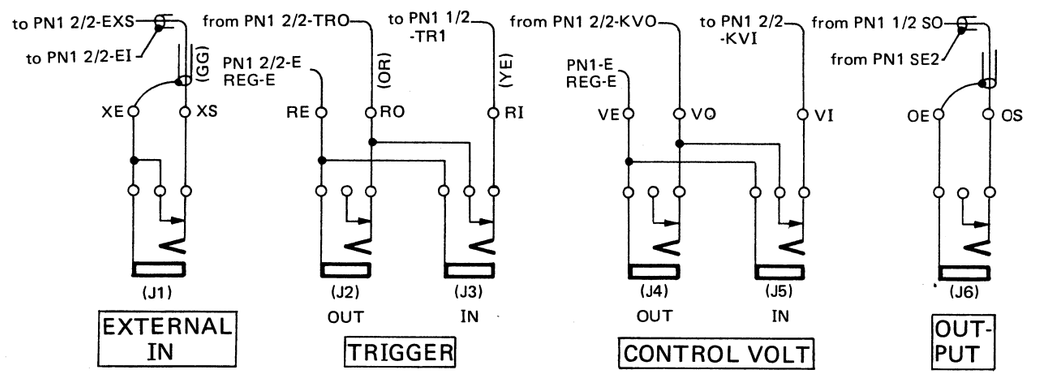
LFO SPEED



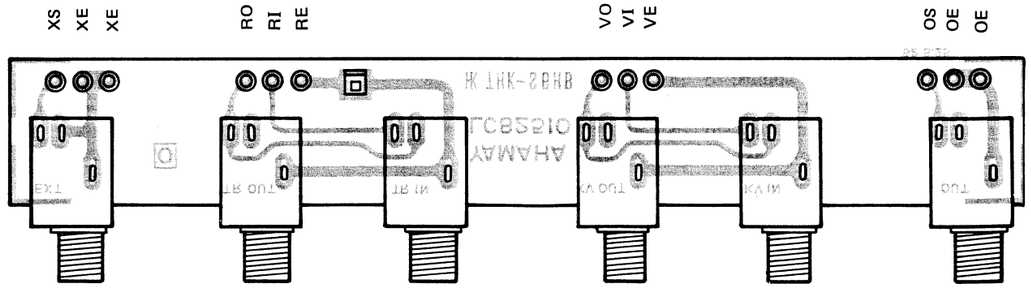
PILOT LAMP



REAR PANEL Circuit Diagram, Circuit Board & Wiring



KEC-90205-89 ⚠



Envelope Generator Circuit Description

The CS-5's envelope generator makes use of the time constants determined by a capacitor and resistors to generate envelope signal, controlled by a trigger voltage.

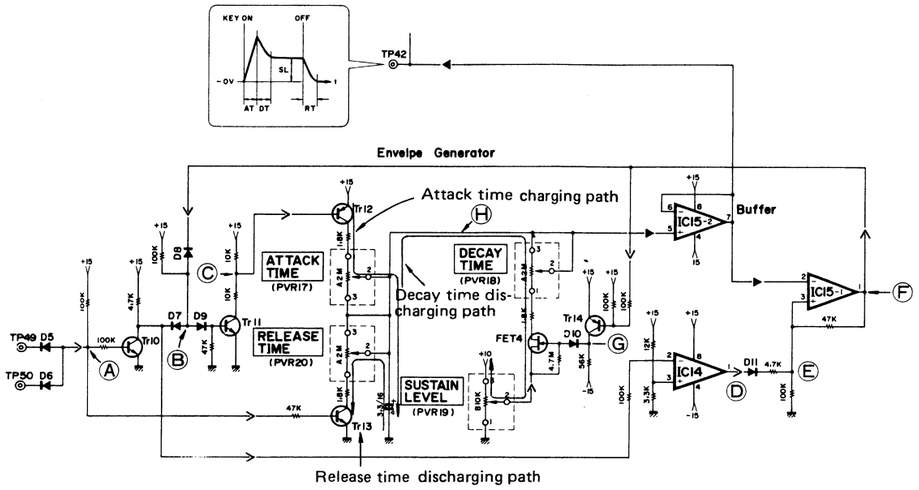


Fig. 1

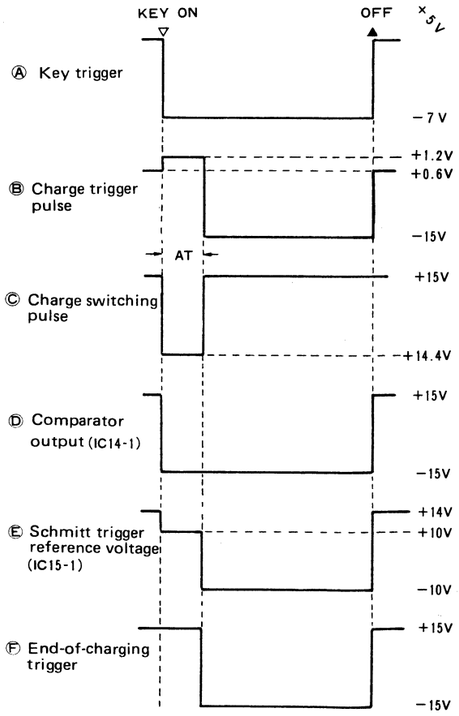
1. Attack time

1) When no key is depressed, Ⓐ is at +5V. Point Ⓑ is at +0.6V with Tr10 turned on. Point Ⓒ is at +15V with Tr11 turned off. Tr12 is turned off. Point Ⓗ is at 0V.

2) When a key is depressed, a trigger voltage (−7V) is applied to Ⓐ, turning off Tr10 and +1.2V is applied to Ⓑ, truning on Tr11. The voltage at Ⓒ goes to +14.4V and Tr12 turns on. Now the 3.3μF/16V capacitor begins charging to 15 volts through the charging path of attack time Pot, 1.8kohm resistor and Tr12. This voltage will be present at point Ⓗ.

3) At this time the comparator (IC14-1) output at point Ⓓ turns from H (+15V) to L (−15V) and, cut off by D11, it cannot control Ⓔ any more. The Schmitt trigger (IC15-1) output at point Ⓕ is H (+15V). The voltage at Ⓔ is 10V, divided by 47k- and 100k-ohm resistors.

4) As the voltage of Ⓗ reaches 10V, the comparator output turns from H (+15V) to L (−15V), Ⓑ also turns from H (+1.2V) to L (−15V), turning off Tr11. And finally Tr12 turns off, stopping charging.



2. Decay Time and Sustain Level

1) When the Schmitt trigger (IC15-1) output at point Ⓕ inverts, Tr14 turns on and point Ⓖ turns from L (−15V) to H (+15V). The gate of FET4, which was cut off when Ⓖ was at L (−15V), goes on, biased by its own resistance (4.7M ohms) between Drain and Gate. Now the 3.3μF/16V capacitor begins discharging through the discharging path of DT pot, 1.8kohm resistor, FET4 and SL pot.

2) Discharging ends when the voltage of Ⓗ reaches the level preset by SL pot. The sustain level of Ⓗ will be maintained while a key is depressed.

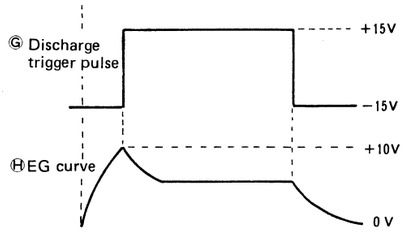


Fig. 2

3. Release Time

1) When a key is released, the ICs and transistors return to the initial state, attempting to reset the voltage of Ⓗ to zero. But the sustain level of Ⓗ preset by SL pot is maintained and the 3.3μF/16V capacitor starts discharging.

2) When no key is depressed, point Ⓐ is kept at 5V and Tr13 is on. So the 3.3μF/16V capacitor starts discharging through the discharging path of RT pot, 1.8kohm resistor and Tr13.

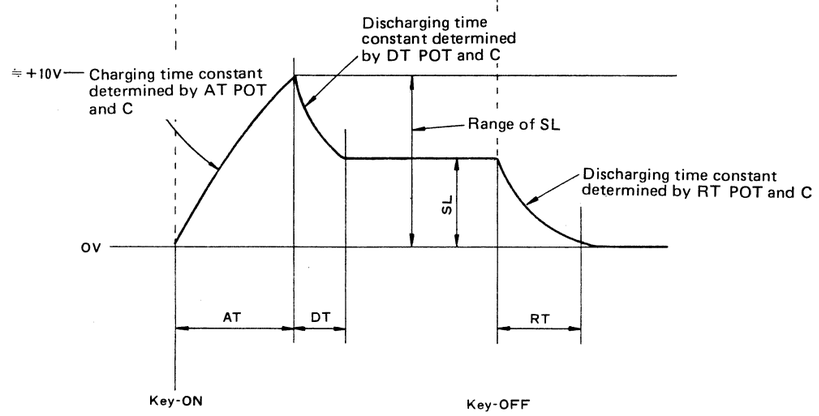


Fig. 3