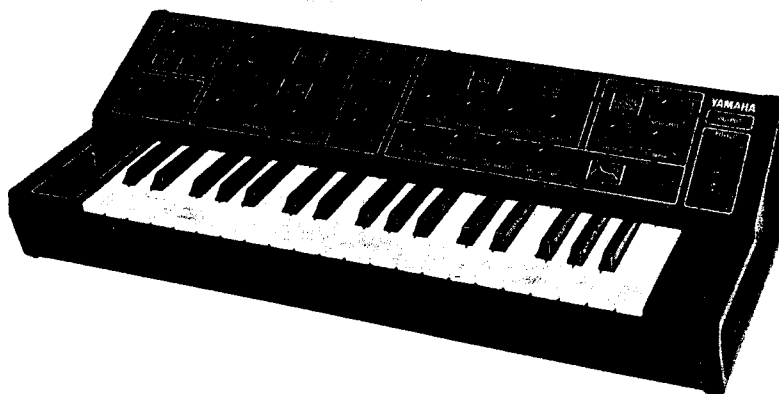


YAMAHA

COMBO SYNTHESIZER

CS-5



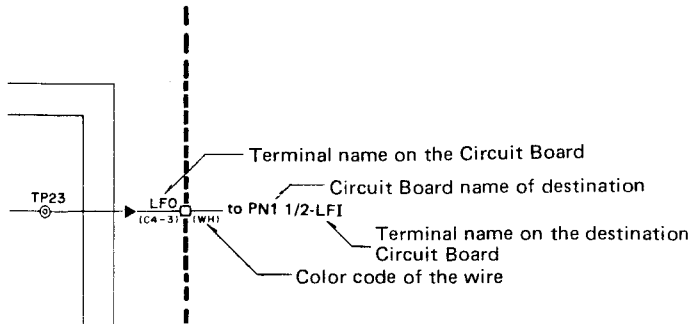
SERVICE MANUAL

CONTENTS

CS-5	Coding Guide	2
CS-5	Disassembly Procedure	3
CS-5	Specifications	4
CS-5	Panel Layout	5
PN1 2/2	Circuit Diagram	6
PN1 2/2	Circuit Board	7
PN1 1/2	Circuit Diagram	8
PN1 1/2	Circuit Board	9
REG	Circuit Diagram, Circuit Board	10
Key Switch/PN2 (Panel 2)	Circuit Diagrams	11
REAR PANEL	Circuit Diagram, Circuit Board & Wiring	11
	Envelope Generator Circuit Description	12
	Electrical Checks & Adjustments	13
PARTS LIST	Exploded View	18
	Mechanical Parts	19
	Circuit Boards and Electrical Parts	21

CODING GUIDE

1 Wiring Notation

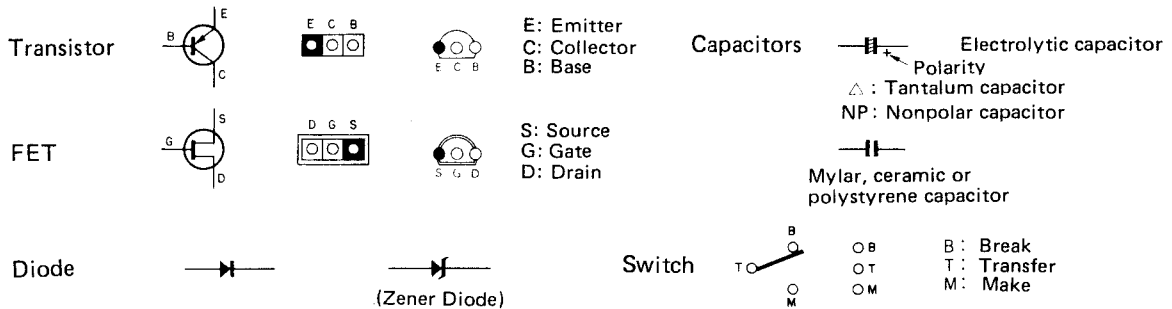


Note: Types of wire

—^{BL}— Ordinary wire

—^{BL}— Shield wire

2 Symbol Description



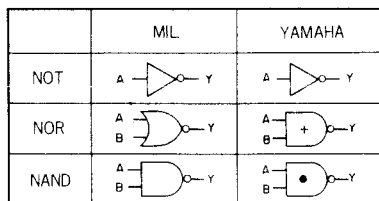
3 Abbreviations of Wire Color Codes

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	RE	OR	YE	GR	BE	VI	GY	WH	GG	SB	PK
(チャ)	(アカ)	(ダイ)	(キイ)	(ミド)	(アオ)	(ムラ)	(ハイ)	(シロ)	(クサ)	(ソラ)	(モモ)

5 Logic Symbols



Exclusive OR (排他的論理和)



Truth Table

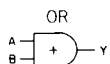
A	B	Y
L	L	L
H	L	H
L	H	H
H	H	L

NOT (Inverter)



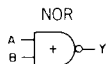
Truth Table

A	Y
L	H
H	L



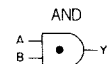
Truth Table

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



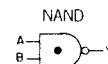
Truth Table

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



Truth Table

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

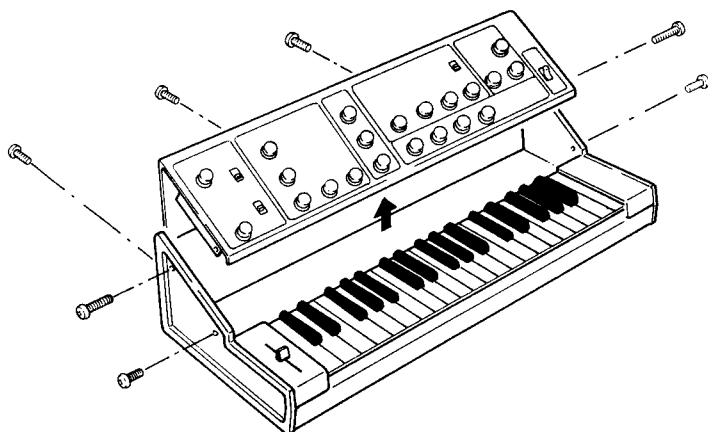


Truth Table

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

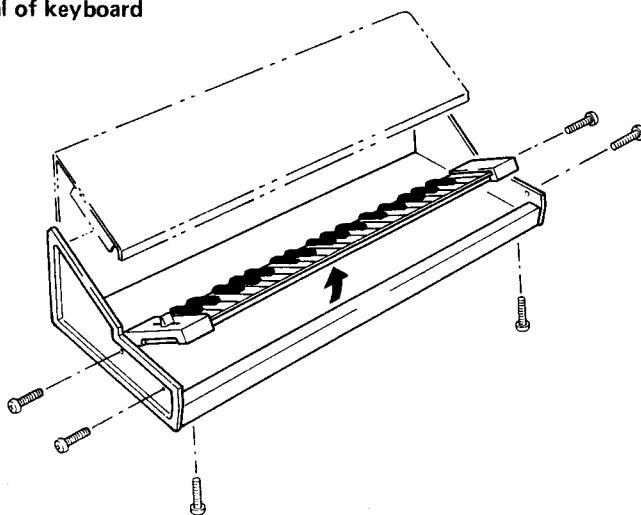
DISASSEMBLY PROCEDURE

1. Removal of panel



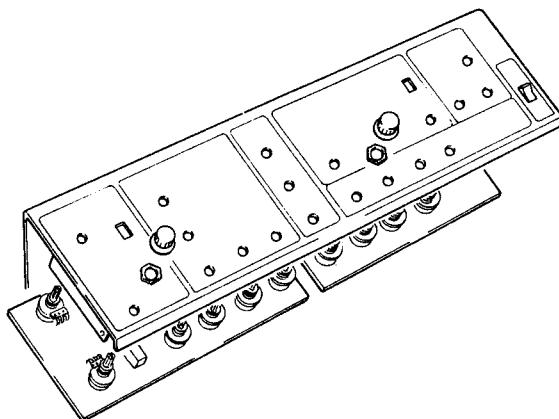
Remove the screws illustrated here. Then lift off the panel.

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	TERMINALS
37 keys, 3 octaves	EXTERNAL INSensitivity: -35dB (Min.) TRIGGER OUT3V (OFF) to 7V (ON) TRIGGER IN+15V ~ +3V (OFF) to 0V ~ -10V (ON) CONTROL VOLT OUT125mV to 4V CONTROL VOLT IN125mV to 4V OUTPUT-22dBm/600 ohms
CONTROLS	OTHERS
EXTERNALTRIGGER LEVEL Control: Min. -35dBm Function Switch: EXT/NOISE LFOSPEED Control: 0.3 to 100Hz Waveform Selector: ~ / ▽ /S/H VCOFEET 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. MIXEREXT/NOISE Control ▽ : Sawtooth wave control ▭ : Square wave control VCFCUT OFF FREQ Control RESONANCE Control LFO MOD Control: ±3 octaves EG DEPTH: +10 octaves Filter Selector: HPF/BPF/LPF VCALFO MOD Control: AM modulation, max. 90% INITIAL LEVEL Control EG DEPTH Control EGATTACK 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	POWER SOURCE . . .U.S. and Canadian models 120V 60Hz General models 110, 130, 220 or 240V selectable, 50/60Hz POWER CONSUMPTION8 watts DIMENSIONS641 x 290 x 157 mm (W x D x H) (25-1/4 x 11-3/8 x 6-1/8") WEIGHT7 kg (15.4 lbs) FINISHSemi-gloss black
	* Specifications subject to change without notice.

Electrical Checks & Adjustments

1. $\pm 15\text{V}$ Power Supply (REG Circuit Board)

- 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 $+15 \pm 0.01\text{V}$.
- Similarly adjust VR13 on the REG board so that the voltage between terminals VE and "-15" (TP34) reads $-15 \pm 0.01\text{V}$.

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

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

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

- TP21 should be $+4.7 \pm 1\text{V}$.
- TP22 should be $-9.7 \pm 1\text{V}$.

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

The waveform shown below should be at TP15.

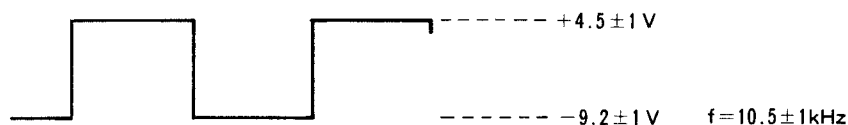


Fig. 4-1

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 $250 \pm 1\text{mV}$ be read at terminal KVO (TP17).

Check that $2 \pm 0.001\text{V}$ is read at terminal KVO (TP17) while key C6 is depressed.

6. LFO (PN1 2/2 Circuit Board)

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

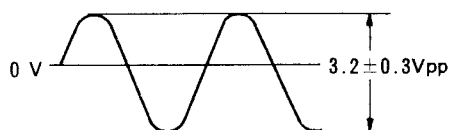


Fig. 6-1

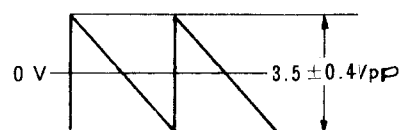


Fig. 6-2

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 ± 2 Hz at TP20. Then depressing C3 key, adjust VR2 so as to read 1053 ± 1 Hz. 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 [ϕ]	Tolerance[ϕ]
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 "Λ", and LFO MOD (PVR4) at "10". When C6 key is depressed, the reading of C6 + 12 should vary within the range of $+200 \pm 100$ 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 "+", $+200 \pm 50$ 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 $+2 \pm 1$ 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

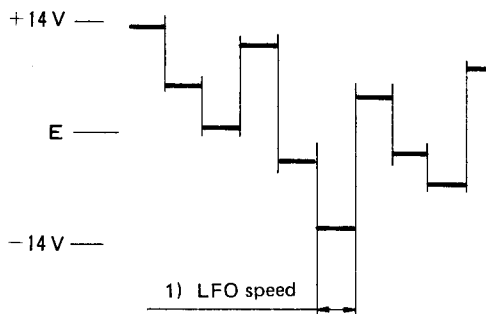
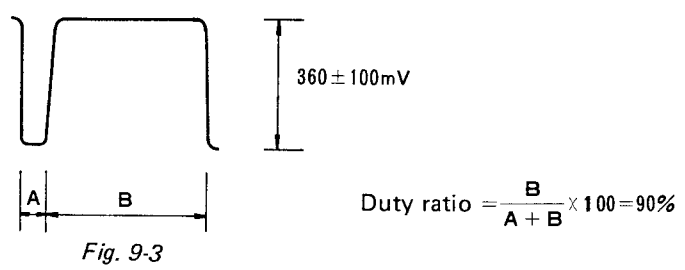
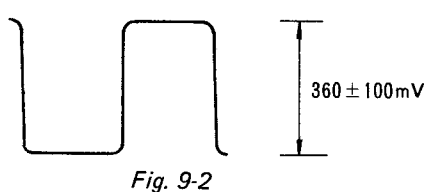
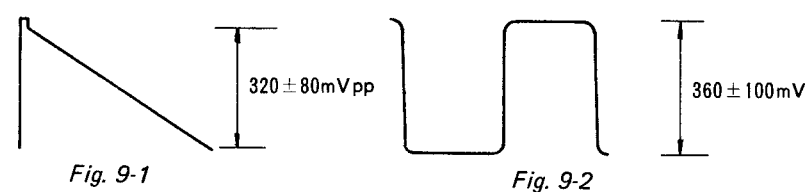


Fig. 8-2

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/NOISE 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).

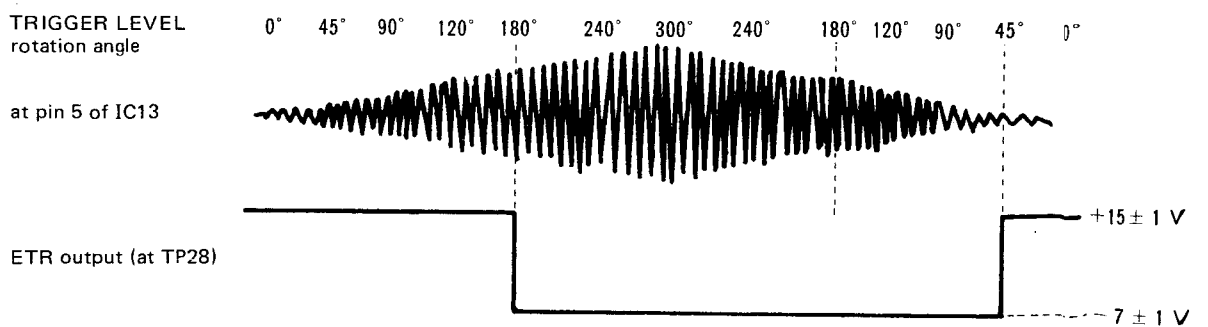


10. EXT Pre-amplifier (PN1 2/2 Circuit Board)

Sine waves of 1kHz and -10 ± 3 dBm 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 ± 1 dBm are applied to terminal EXS (TP29) and TRIGGER LEVEL (PVR1) is moved from "0" to "10".

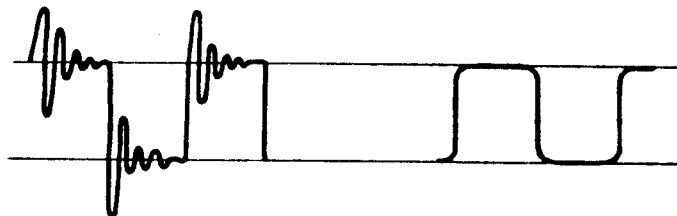


12. VCF (PN1 1/2 Circuit Board)

- a) Adjust CUT OFF FREQ (PVR10) so as to read $5 \pm 0.1V$ at TP39. Adjust RESONANCE (PVR11) so as to read $5 \pm 0.1V$ also at TP40.
- b) Set EXT/NOISE (PVR7) of the MIXER block and "Λ" (PVR8) at "0", "Γ" (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 "Γ" 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 that 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 waveform of Fig. 14-2 should develop at TP42.

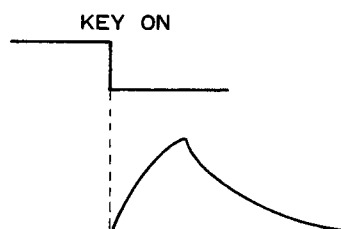


Fig. 14-1

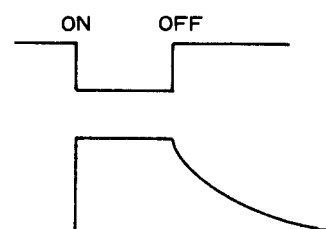
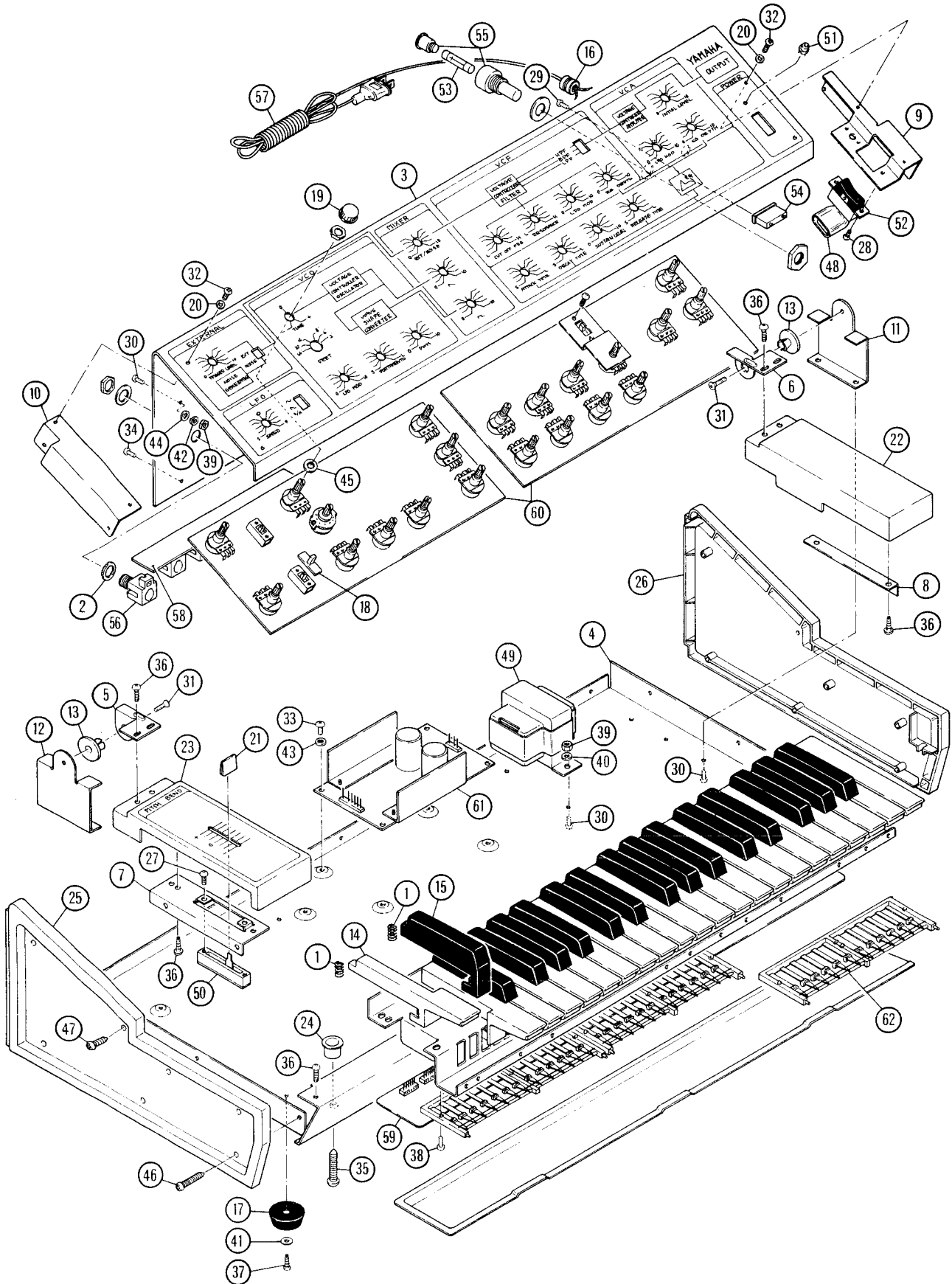


Fig. 14-2

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
40 10 00 CB 81 12 30	"			"
40 10 00 CB 03 28 40	"			"
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	パネ座金
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	E J シ ー ト	
	59	30:10:00:NA:80:43:90	MK "	M K シ ー ト	
	60	30:12:00:NA:80:44:20	PN1 "	P N 1 シ ー ト	
	61	30:12:00:NA:80:44:30	REG "	R E G 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

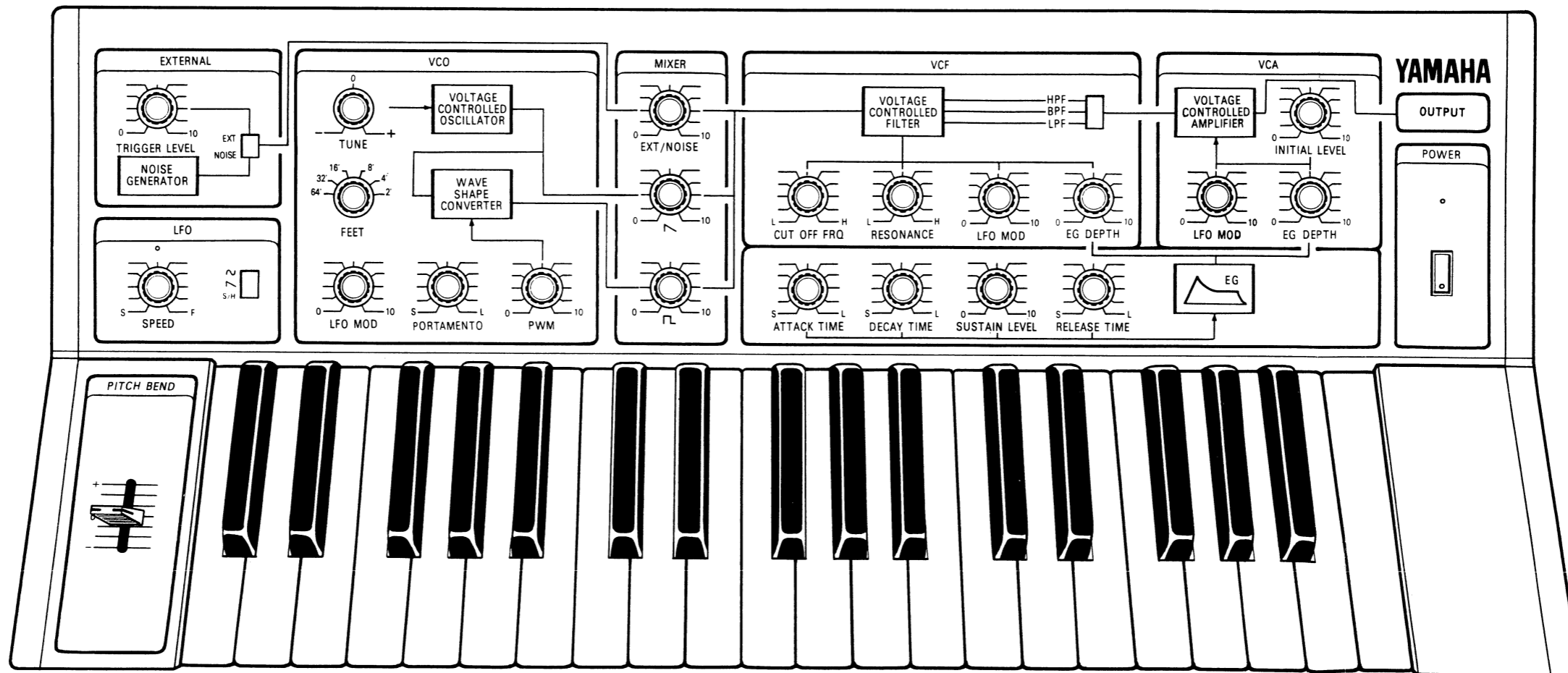
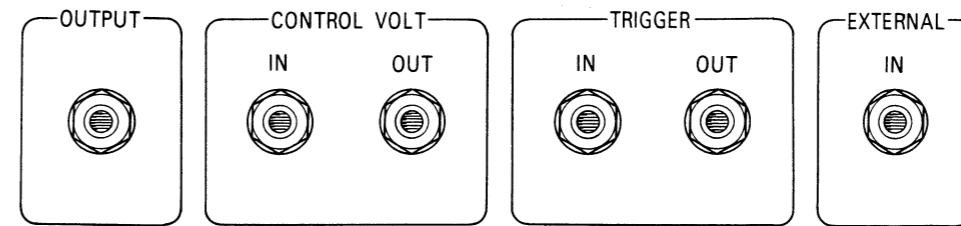
Ref. No.	Part No.	Description (部 品 名)		Remarks	Common Model
※	30 12 00 NA 80 44 20	PN1 Board	#81610	PN1 シート	
	30 10 00 AA 04 40 70	C.B Spacer		反り止め金具	
※	30 10 00 AA 80 87 70	Switch Holder		スイッチ取付金具	
	40 10 00 EA 02 60 40	Pan Head Screw	M2.6 x 4	ナベ小ネジ	
※	40 10 00 FF 04 31 20	Polystyrene Capacitor	1,200PF/50V	スチロールコンデンサ	
	40 10 00 FM 09 72 20	BP Electrolytic Capacitor	16V, 22 μ F	BPケミカルコンデンサ	
	40 10 00 FM 11 61 00	"	50V, 1 μ F	"	
	40 10 00 FP 33 63 30	Tantalum Capacitor	16V, 3.3 μ F	タンタルコンデンサ	
	40 10 00 FP 34 62 20	"	25V, 2.2 μ F	"	
	40 10 00 FA 11 52 20	Mylar Capacitor	50V, 0.22 μ F	マイラーコン	
	40 10 00 HS 31 04 40	Variable Resistor	B-50K Ω	ボリューム	
※	40 10 00 HS 31 05 50	"	A-10K Ω	"	
※	40 10 00 HS 31 05 70	"	B-10K Ω	"	
※	40 10 00 HS 31 06 00	"	A-2M Ω	"	
	40 10 00 HT 19 00 40	"	B-5K Ω	半固定ボリューム	
	40 10 00 HT 19 00 50	"	B-10K Ω	"	
	40 10 00 HT 19 00 80	"	B-100K Ω	"	
	40 10 00 HT 19 30 90	"	B-200K Ω	"	
	40 10 00 HT 19 01 00	"	B-500K Ω	"	
	40 10 00 HT 19 01 10	"	B-1M Ω	"	
※	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	82 Ω	金属皮膜抵抗	
	40 10 00 HU 57 51 00	"	100 Ω	"	
	40 10 00 HU 57 53 90	"	390 Ω	"	
	40 10 00 HU 57 55 60	"	560 Ω	"	
	40 10 00 HU 57 61 00	"	1K Ω	"	
	40 10 00 HU 57 61 60	"	1.6K Ω	"	
	40 10 00 HU 57 62 00	"	2K Ω	"	
	40 10 00 HU 57 62 70	"	2.7K Ω	"	
	40 10 00 HU 57 63 00	"	3K Ω	"	
	40 10 00 HU 57 68 20	"	8.2K Ω	"	
	40 10 00 HU 57 71 00	"	10K Ω	"	
	40 10 00 HU 57 71 20	"	12K Ω	"	
	40 10 00 HU 57 71 80	"	18K Ω	"	
	40 10 00 HU 57 72 00	"	20K Ω	"	
	40 10 00 HU 57 72 20	"	22K Ω	"	
	40 10 00 HU 57 73 00	"	30K Ω	"	
	40 10 00 HU 57 76 80	"	68K Ω	"	
	40 10 00 HU 57 81 60	"	160K Ω	"	
	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	F E T	2SK30A	F E T	
	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	I C	NJM4558	I C	
	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

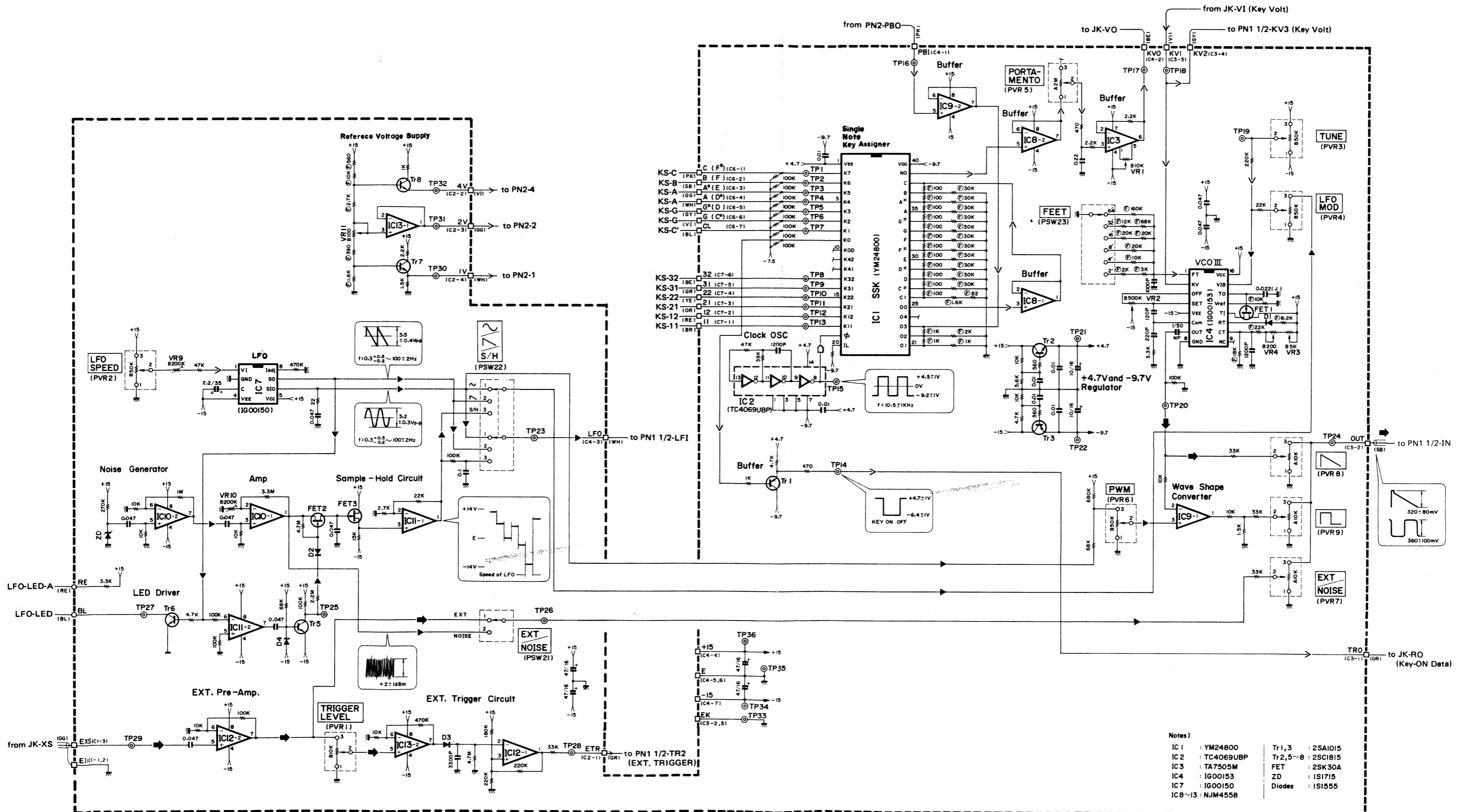
Ref. No.	Part No.	Description (部 品 名)	Remarks	Common Model
	40 10 00 KA 40 05 90	Slide Switch	スライドスイッチ	
	40 10 00 KA 40 06 00	"	"	
	40 10 00 KA 50 10 80	Rotary Switch	ロータリースイッチ	
	40 10 00 LB 30 09 60	Connector (Base Post) 3P	NHコネクター(ベースポスト)	
	40 10 00 LB 40 06 30	" 4P	"	
	40 10 00 LB 50 03 70	" 5P	"	
	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	R E G 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	I C	
	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	M K 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

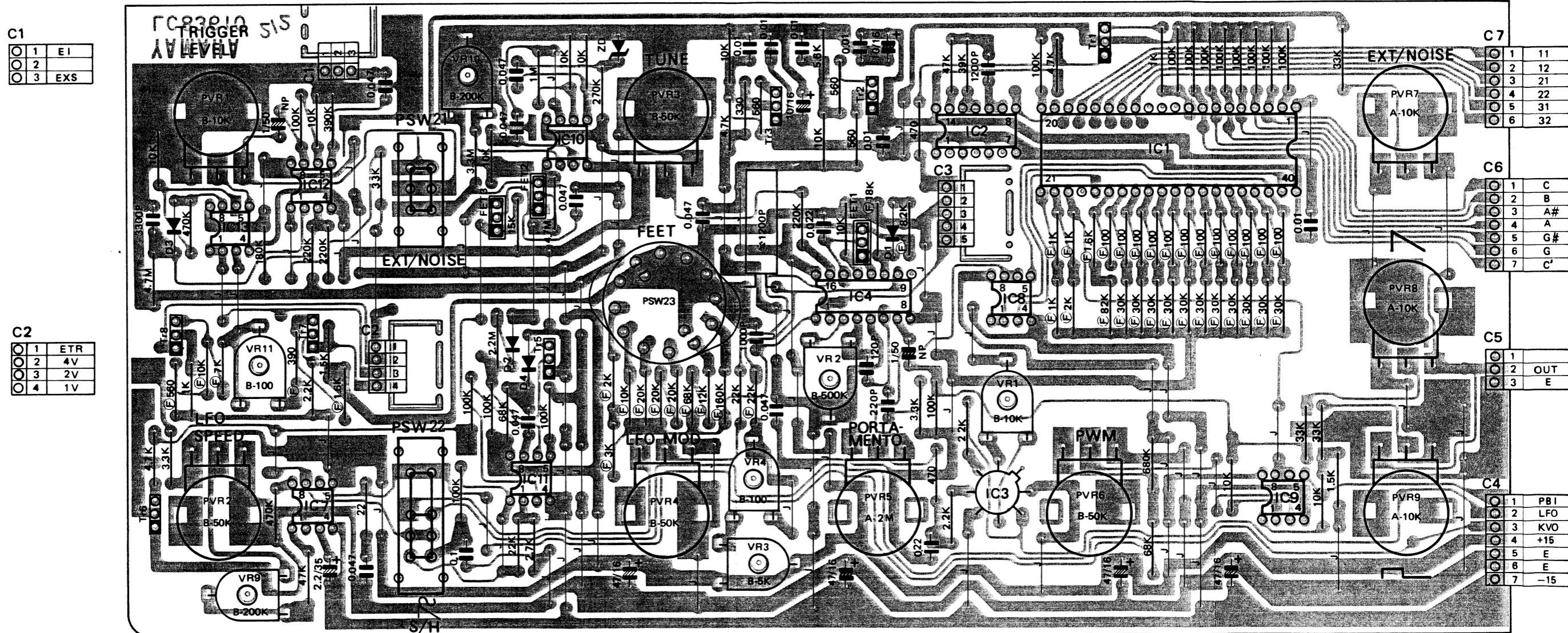


PN1 2/2 Circuit Diagram



PN1 2/2 Circuit Board

PN1 2/2



C1

○ 1	EI
○ 2	
○ 3	EXS

C2

○ 1	ETR
○ 2	4V
○ 3	2V
○ 4	1V

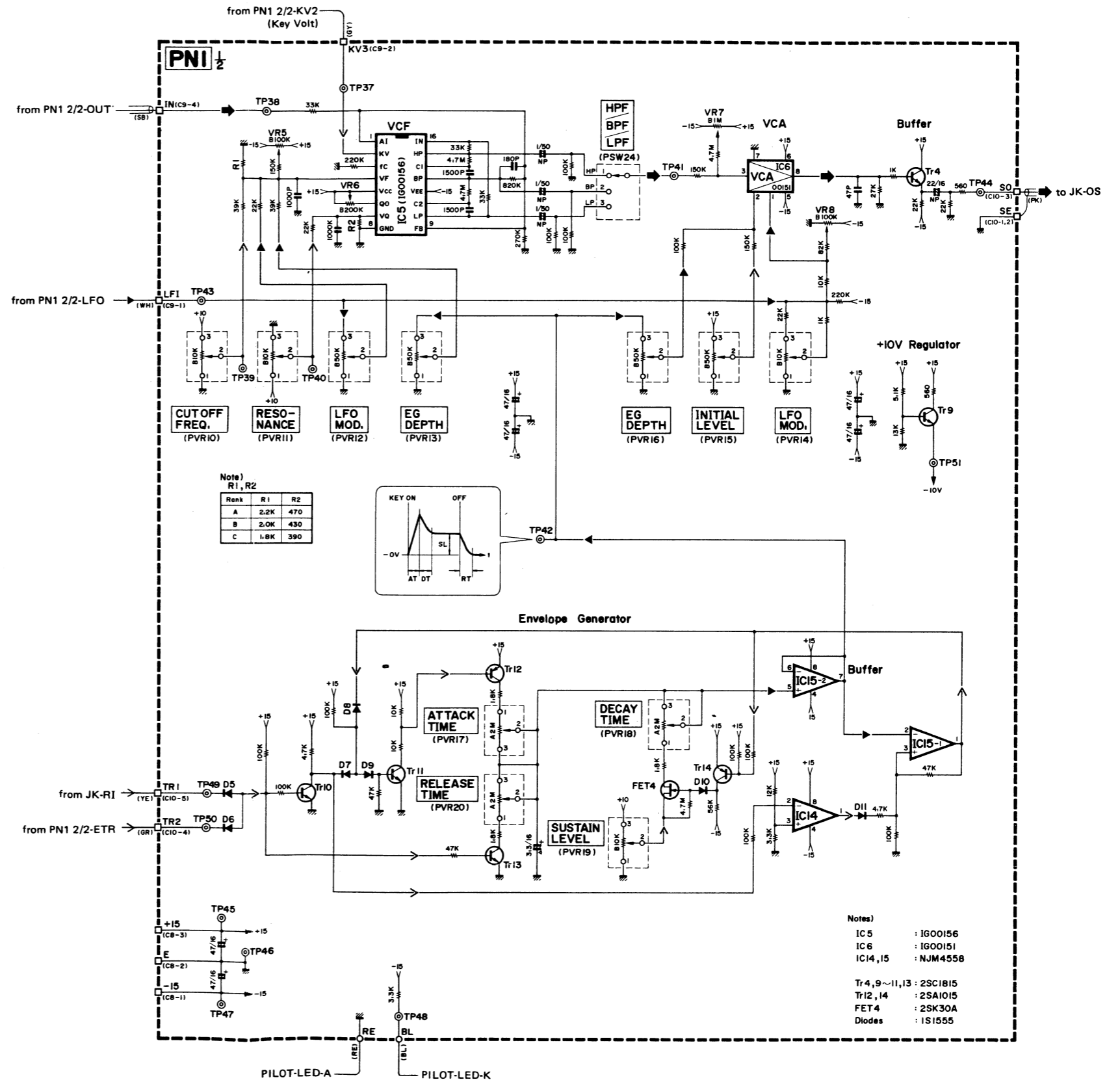
Notes)

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

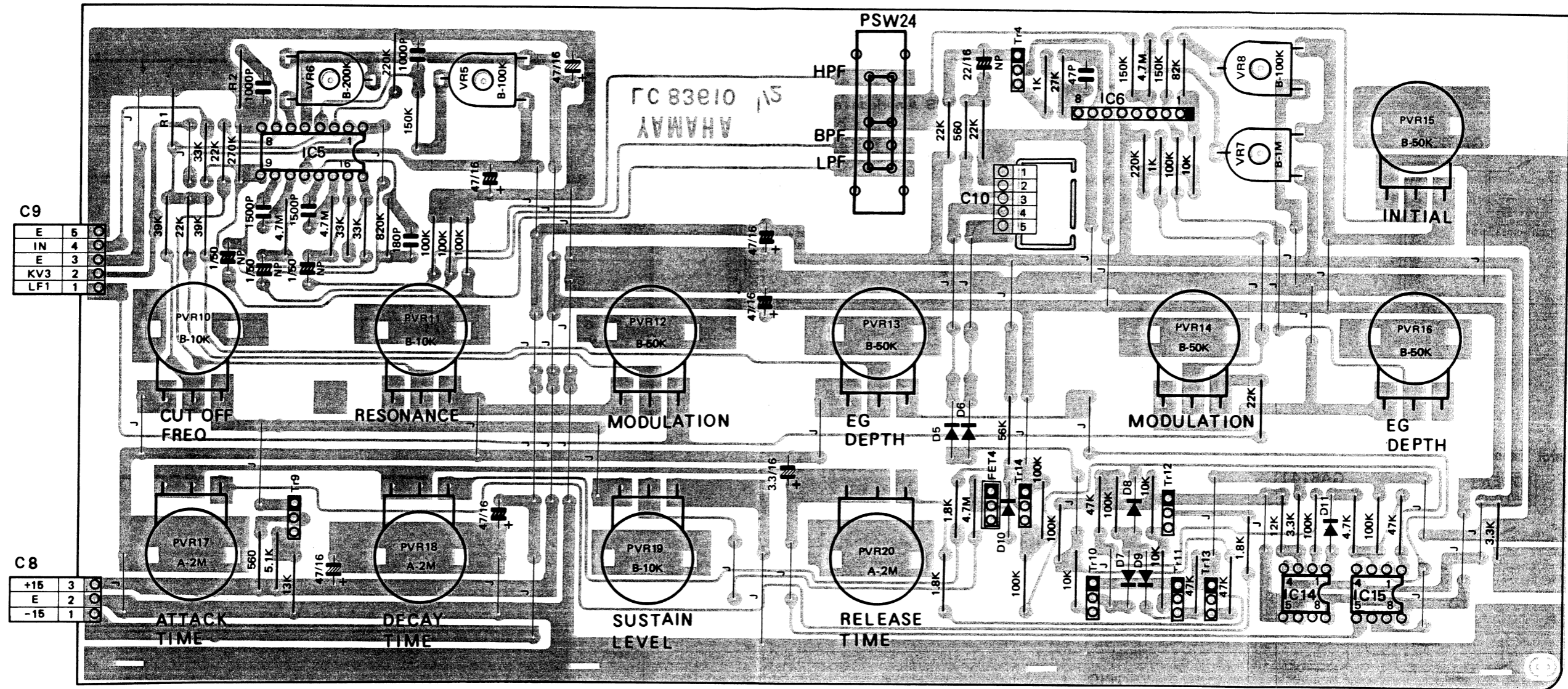
C3

○ 1	TRO
○ 2	EK
○ 3	EK
○ 4	2
○ 5	KV

PN1 1/2 Circuit Diagram



PN1 1/2 Circuit Board



C10

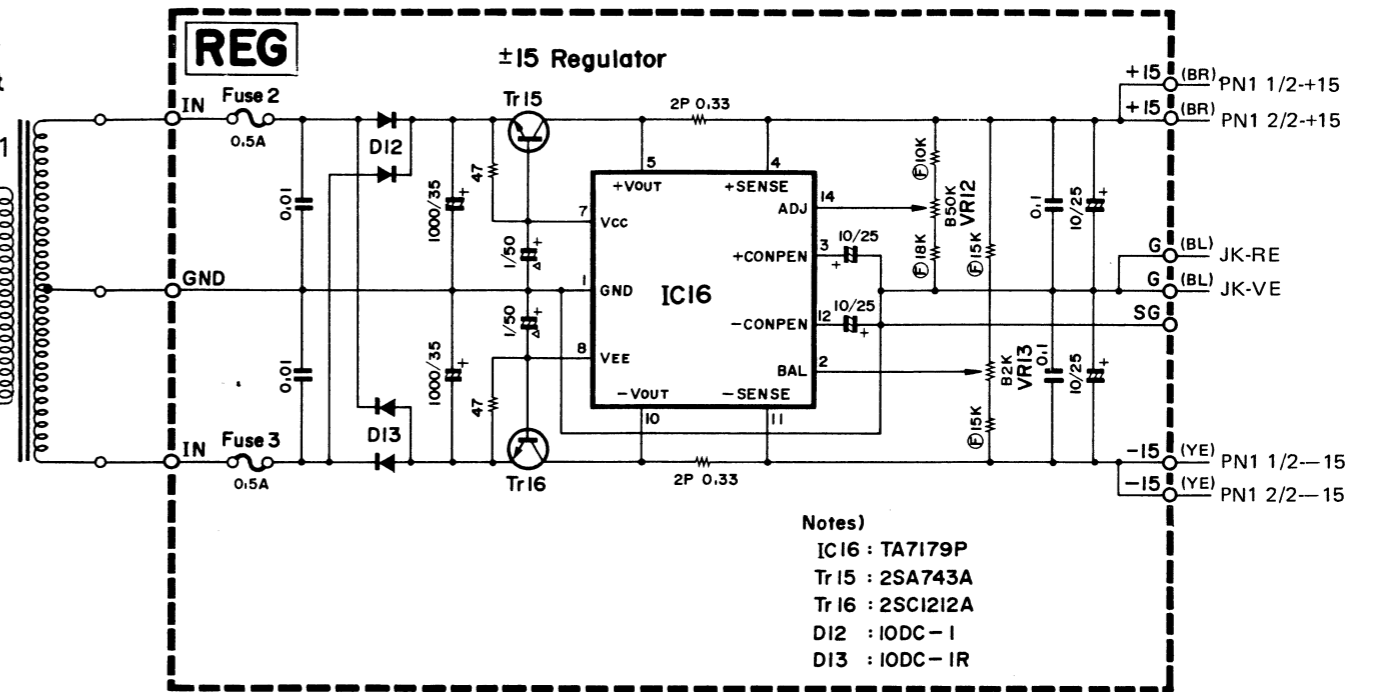
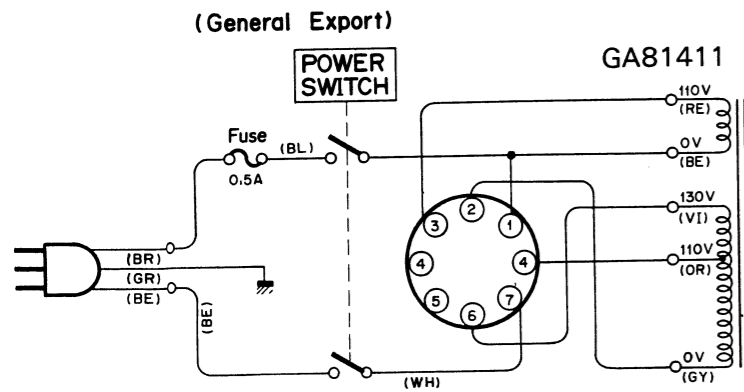
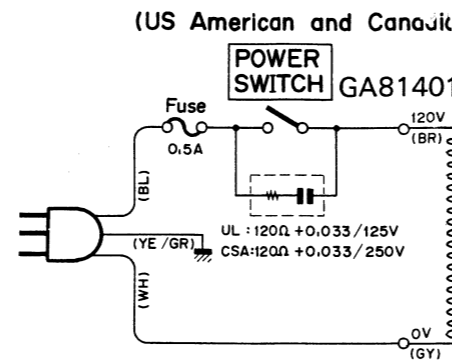
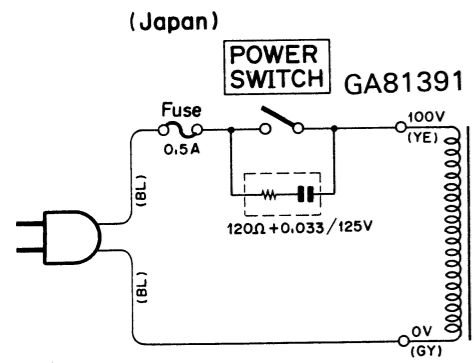
○ 1	SE1
○ 2	SE2
○ 3	SO
○ 4	Tr2
○ 5	Tr1

Notes)

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

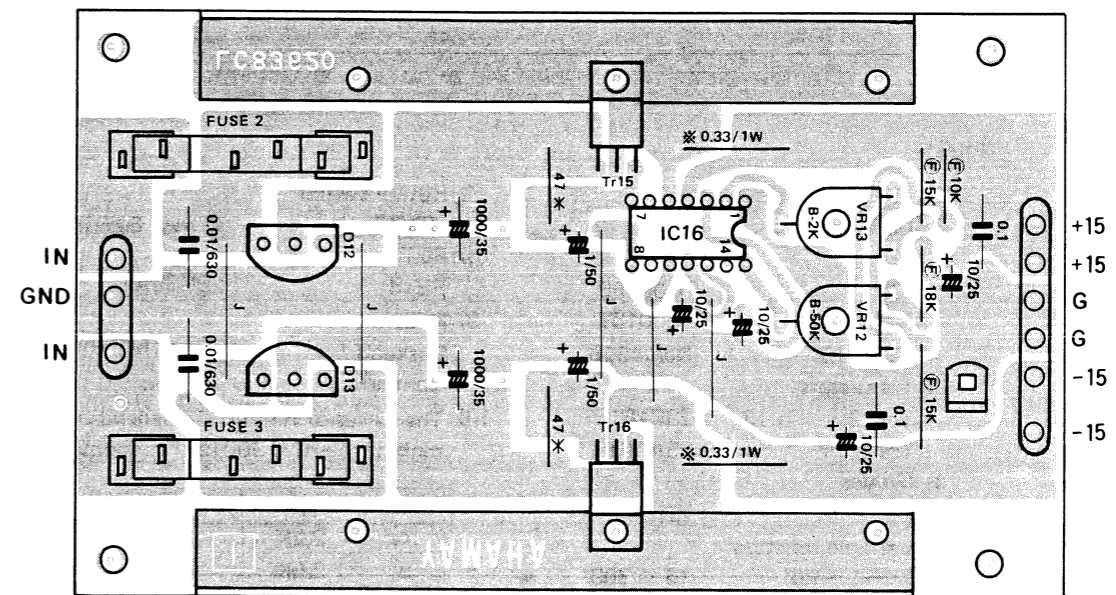
Rank	R1	R2
A	2.2K	470
B	2.0K	430
C	1.8K	390

REG Circuit Diagram, Circuit Board



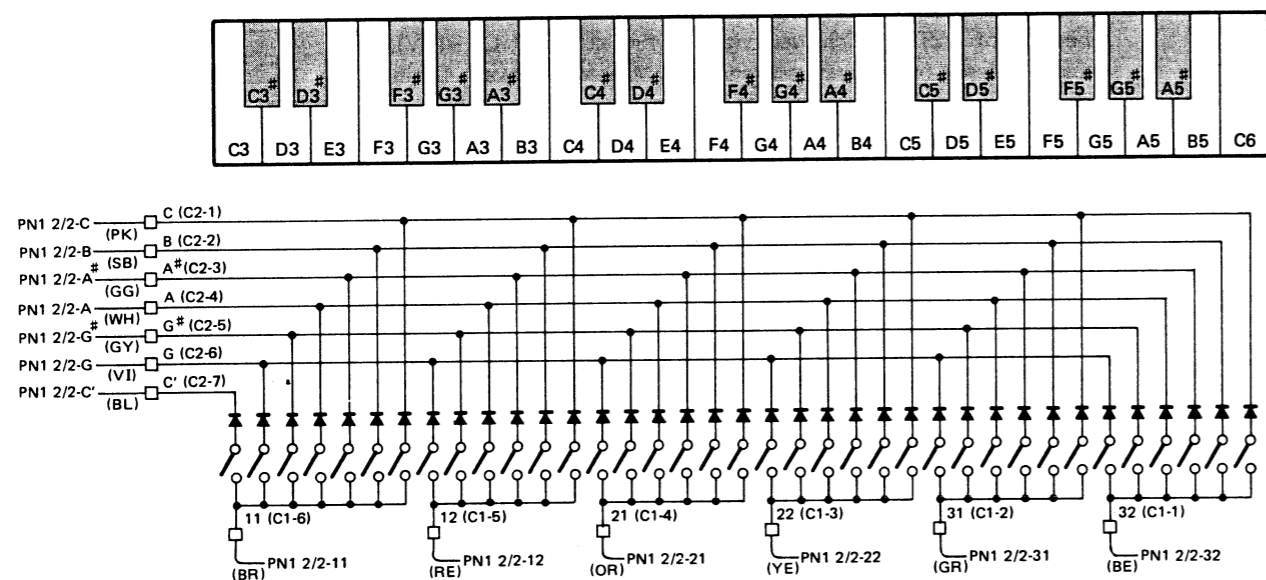
KEC-90205-89 ▲

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



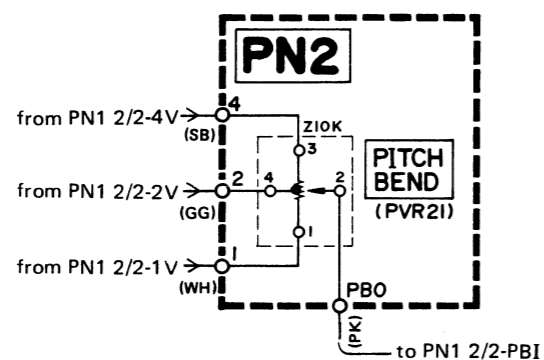
Key Switch Circuit Diagram

REAR PANEL Circuit Diagram, Circuit Board & Wiring

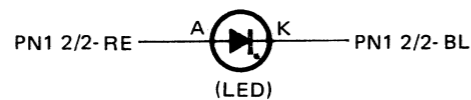


KEC-90206-86

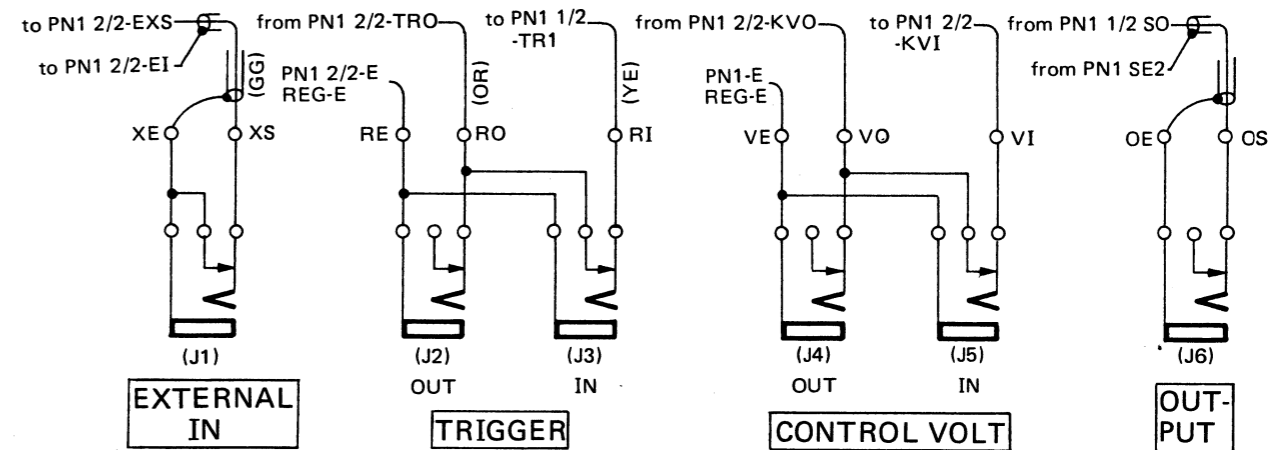
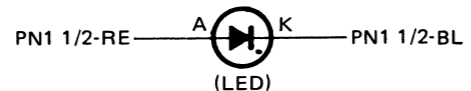
PN2 (Panel 2) Circuit Diagram



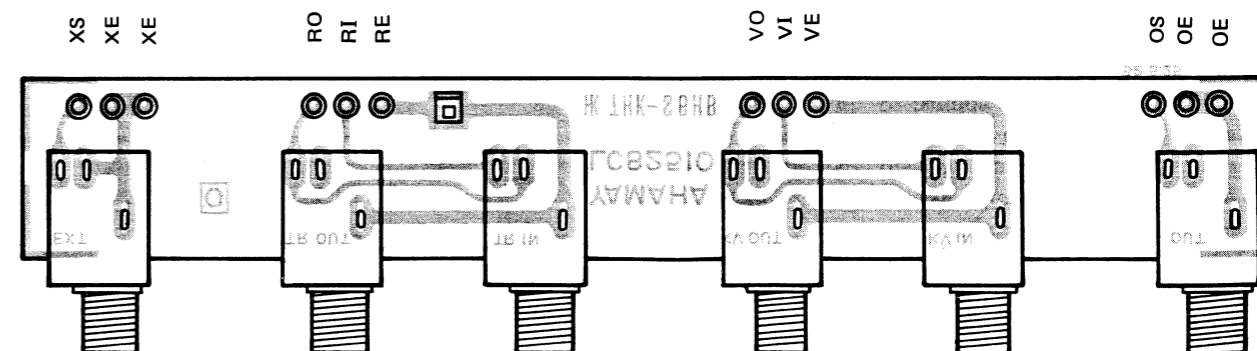
LFO SPEED



PILOT LAMP



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.

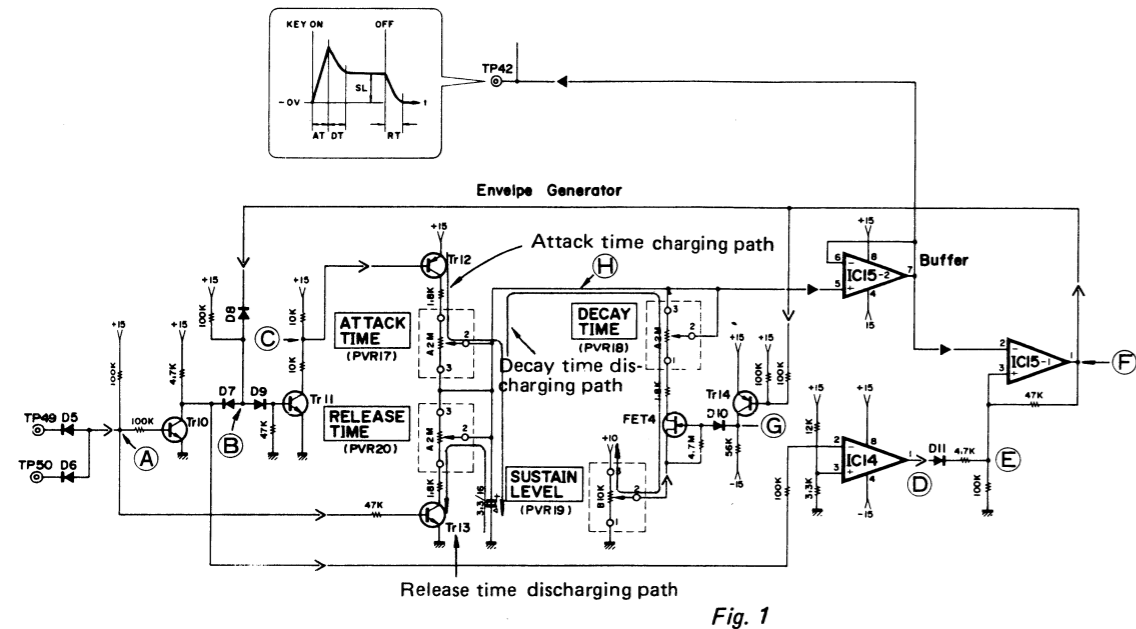
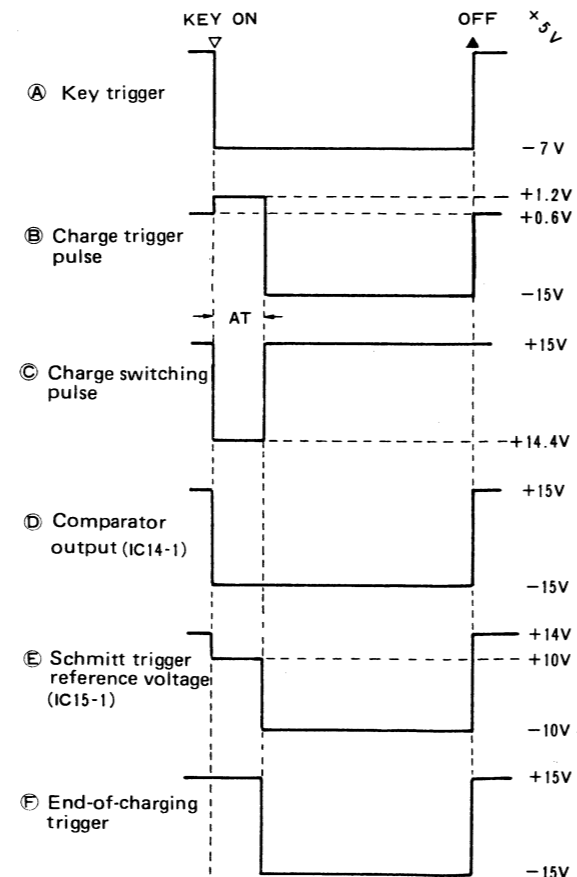


Fig. 1

1. Attack time

- 1) When no key is depressed, **A** is at +5V. Point **B** is at +0.6V with Tr10 turned on. Point **C** is at +15V with Tr11 turned off. Tr12 is turned off. Point **H** is at 0V.
- 2) When a key is depressed, a trigger voltage (-7V) is applied to **A**, turning off Tr10 and +1.2V is applied to **B**, turning on Tr11. The voltage at **C** 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 **H**.
- 3) At this time the comparator (IC14-1) output at point **D** turns from H (+15V) to L (-15V) and, cut off by D11, it cannot control **E** any more. The Schmitt trigger (IC15-1) output at point **F** is H (+15V). The voltage at **E** is 10V, divided by 47k- and 100k-ohm resistors.
- 4) As the voltage of **H** reaches 10V, the comparator output turns from H (+15V) to L (-15V), **B** 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 **F** inverts, Tr14 turns on and point **G** turns from L (-15V) to H (+15V). The gate of FET4, which was cut off when **G** 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 **H** reaches the level preset by SL pot. The sustain level of **H** will be maintained while a key is depressed.

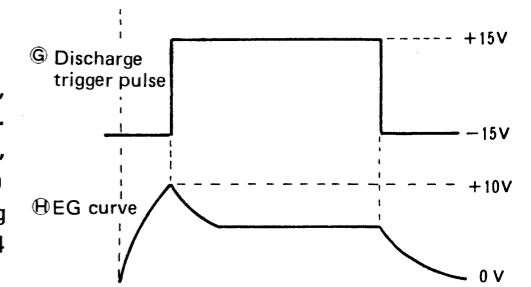


Fig. 2

3. Release Time

- 1) When a key is released, the ICs and transistors return to the initial state, attempting to reset the voltage of **H** to zero. But the sustain level of **H** preset by SL pot is maintained and the 3.3µF/16V capacitor starts discharging.
- 2) When no key is depressed, point **A** 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.

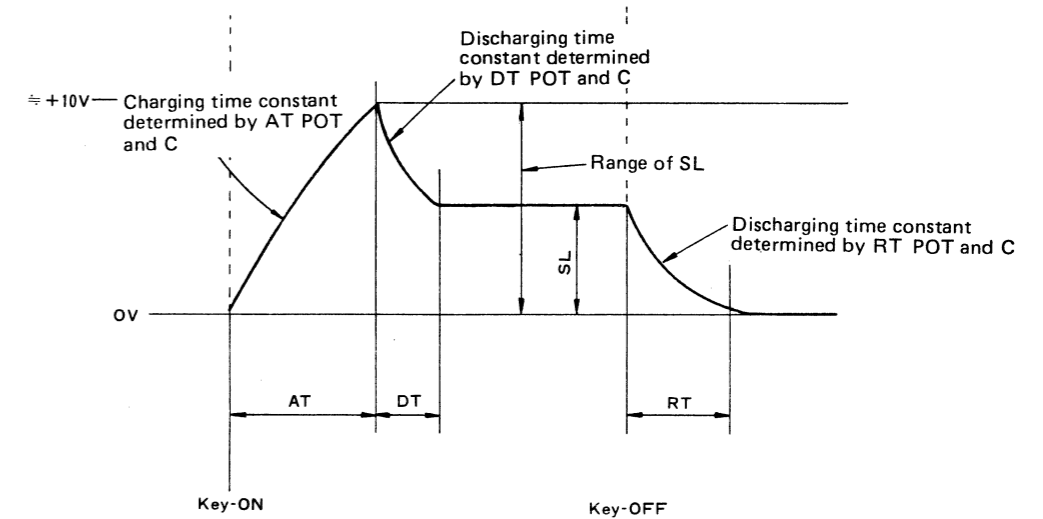


Fig. 3