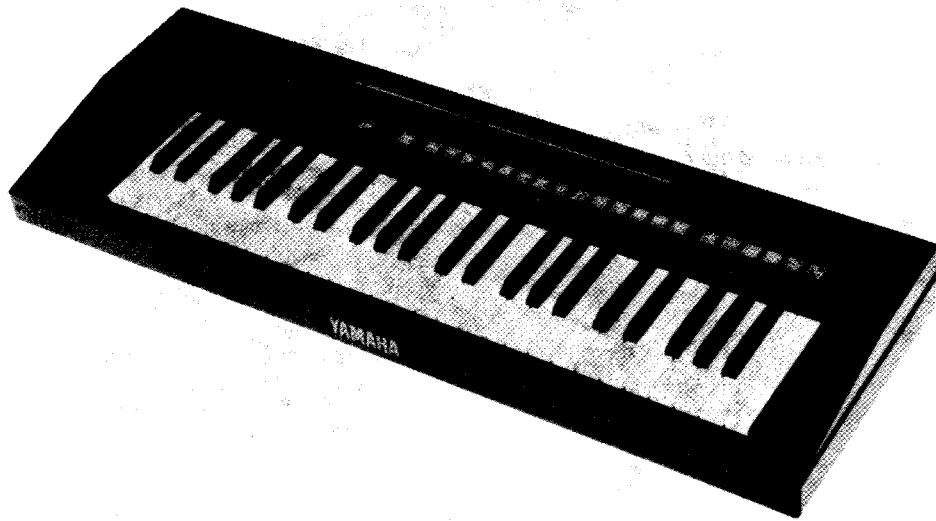


YAMAHA

COMBO ENSEMBLE

CE20



SERVICE MANUAL

CONTENTS(目次)

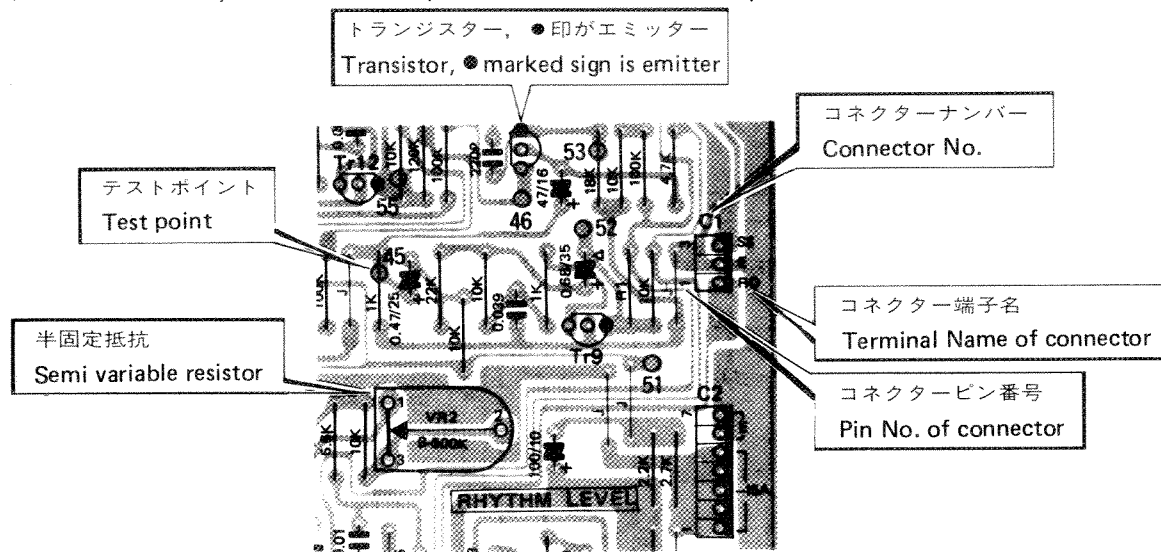
CODING GUIDE	1
DISASSEMBLY PROCEDURE.....	2
SPECIFICATIONS	3
PANEL LAYOUT	4
LSI DATA TABLES	6
TUNING	14
DM & DMS CIRCUIT BOARDS.....	15
SA CIRCUIT BOARD.....	18
CPA CIRCUIT BOARD.....	20
CPB CIRCUIT BOARD.....	22
JK, PSW, PL, SCW, SCS & TS CIRCUIT BOARDS	24
FU CIRCUIT BOARD.....	26
PARTS LIST	

CODING GUIDE(活用の手引)

基板図の見方 CIRCUIT BOARD

* 断りのない場合は部品側からの表記です。

All circuit board layouts are from component side unless otherwise specified.



コネクターの接続はコネクター表にて表示しております。

Show the Connection Table about the connection.

DMシート(ユニット)のコネクターナンバー
Connector No. of DM circuit board (unit)

DM C1

No.	Pin Name	Wire Color	Destination
1	A1C	GY	PU A1C (C3-8)
2	VE	YE	PN1 VE (C6-3)
3	VI	WH	PN1 VI (C6-4)

DM C2

No.	Pin Name	Wire Color	Destination
1	VSS	BL 12	PU E (C3-2)
2	VSS	BL 12	PU 3 (C3-3)
3	VSS	GR 12	PN1 EC2 (C5-1)
4	VSS	BL 12	PN1 VSS (C4-7)
5	VSS	BL 12	PN3 VSS (C3-3)
6	VSS	BL 12	EXP VSS (C1-3)
7	VSS		
8	15D	RE 12	PU 15 (C3-5)
9	15D	RE 12	PN4 15 (C1-6)
10	15D	RE 12	EXP LA (C1-5)

行先ユニット名
Connected unit name

行先端子名
Connected terminal name

行先コネクターナンバー及ピン番号
Connected connector and pin No.

DISASSEMBLY PROCEDURE(分解手順)

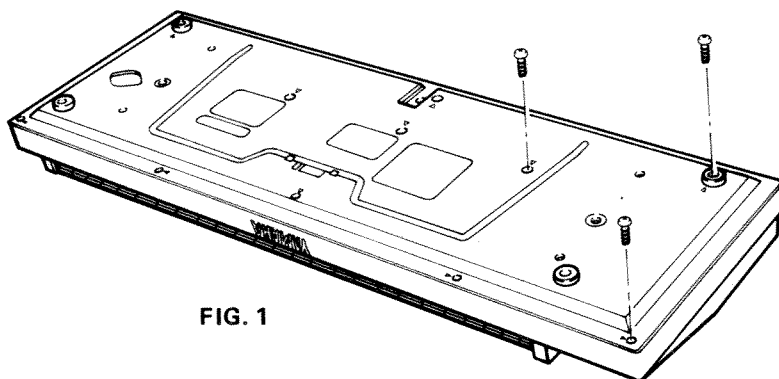


FIG. 1

- Loosen the screws installed at the 11 places, marked "▽", on the bottom plate and remove the lower case as shown in Fig. 1.

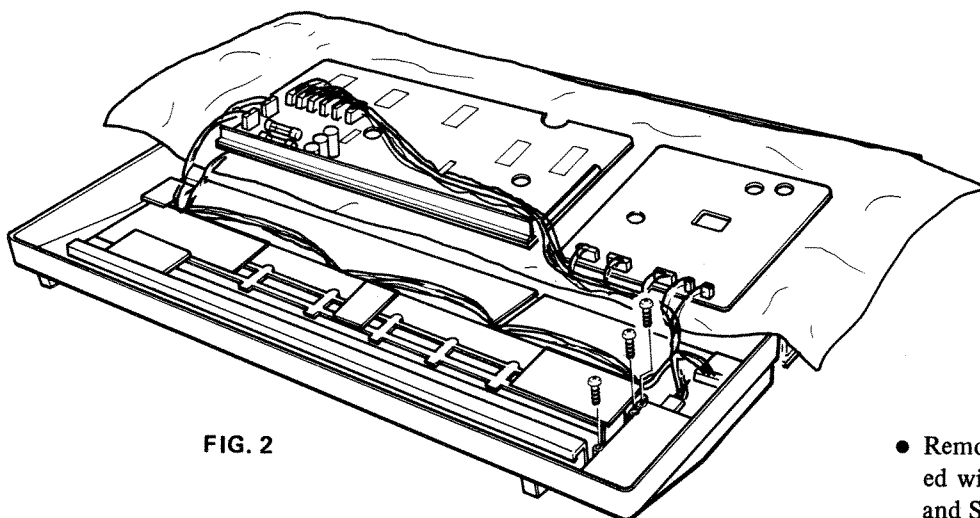


FIG. 2

- Remove eleven screws (each installed with a fiber washer) holding DM and SA boards in place. After the screws are removed the DM and SA boards can be removed as shown in Fig. 2.

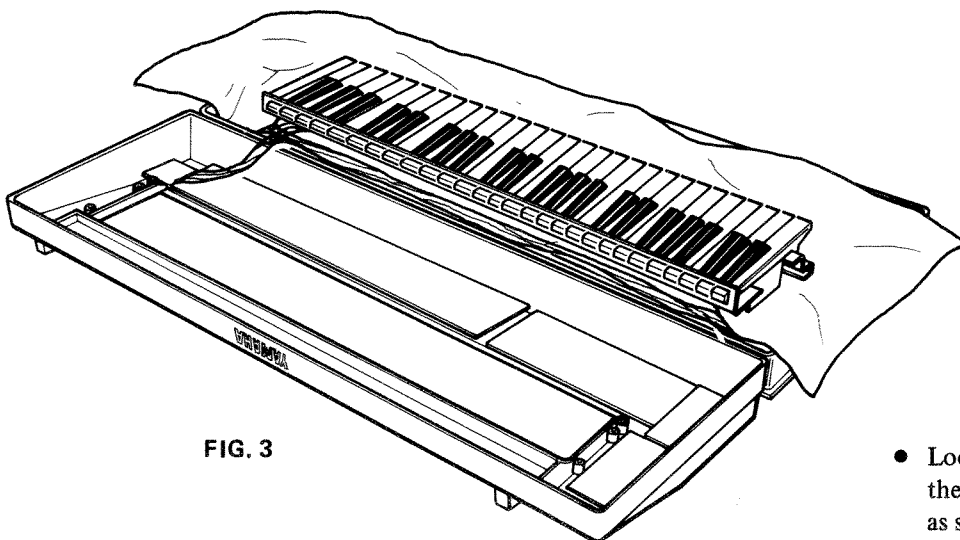


FIG. 3

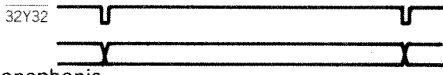
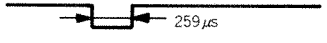
- Loosen the eight screws that fasten the keyboard and it can be removed as shown in Fig. 3.

SPECIFICATIONS(総合仕様)

Keyboard.	49 keys, C2 ~ C6
Simultaneous Output Notes.	Polyphonic : 8 Notes (first notes played) Monophonic : 1 Note (high-note priority)
Voice Selector	
Monophonic.	PICCOLO, FLUTE, OBOE, CLARINET, SAXOPHONE, TRUMPET 1, TRUMPET 2, TROMBONE, VIOLIN, CELLO, CONTRA BASS 1, CONTRA BASS 2, ELECTRIC BASS 1, ELECTRIC BASS 2
Polyphonic.	BRASS, HORN, ORGAN, ELECTRIC PIANO, HARPSICHORD, STRINGS
Touch Controls	PRESET switch SENSITIVITY: TONE INITIAL lever TONE AFTER lever VIBRATO AFTER lever VIBRATO : DEPTH lever SPEED lever 4 ~ 10Hz DELAY lever
Controls	SYMPHONIC switch BRILLIANCE lever PITCH control 436 ~ 447Hz (A3) SLIDE CONTROL : switch, wheel (functions with monophonic voices) TOTAL VOLUME control
Jacks.	LINE OUT : 600 Ω , unbalanced HEADPHONE : 8 Ω , MONO (stereo headphones can be used) EXP. PEDAL : For Expression Pedal EP-1 SUSTAIN PEDAL: For Sustain Pedal FC-5
Others	
Power Source	U.S. & Canadian Models : 100V, 120V selectable, 60Hz General Model : 100, 120, 220 or 240V selectable, 50/60Hz
Power Consumption.	30W : U.S. & Canadian Models 35W : General Model
Dimension (W x H x D)	33-1/8" x 3-3/8" x 11-5/8" (841 x 86 x 294 mm)
Weight.	19 lbs. 12 oz. (9 kg)
Standard Accessories	Expression Pedal EP-1, Sustain Pedal FC-5, Music Stand

*Specifications are subject to change without notice.

KAS (YM20080)

PIN NO.	NAME	I/O	FUNCTION	WAVEFORM
31	B3	O	Key code output	 32Y32 Monophonic sound Polyphonic sound 1CH 8CH 8CH x 4 times repeated
32	B2	O		
33	B1	O		
34	N4	O		
35	N3	O		
36	D1	I	Data lines for voice register	
37	D2	I		
38	D3	I		
39	D4	I		
40	D5	I		
41	D6	I		
42	D7	I		
43	D8	I		
44	E	I	Voice register write enable Operates when voice is changed	 259 μs
45	F17	O	Frequency data output $2^{17} - 1 = 131071$ Corresponds to pitch 0 ~ 131071 $A_4(880\text{Hz})$ 13292 $A_3(440\text{Hz})$ 6646 $A_2(220\text{Hz})$ 3323 0.0662Hz/bit	 32Y32 Monophonic sound With no variation with time like vibrato, attack pitch, and random Polyphonic sound 8CH x 4 times repeated
46	F16	O		
47	F15	O		
48	F14	O		
49	F13	O		
50	F12	O		
51	F11	O		
52	F10	O		
53	F9	O		
54	F8	O		
55	F7	O		
56	F6	O		
57	F5	O		
58	F4	O		
59	F3	O		
60	F2	O		
61	F1	O		
62	VDD	—	Supply power + 5V	
63	φ1	I	System clock 2.22MHz	
64	φ2	I		

VROM (YM20090)

PIN NO.	NAME	I/O	FUNCTION	WAVEFORM
1	VSS	—	Supply power 0V	
2	32Y32	I	System sync signal	$\frac{1}{222M} = 0.45\mu s$
3	SCE	I	KAS sync signal	$0.45 \times 21 = 13.96\mu s$
4	KAS	O	Voice register write enable	
5	OP1	O		
6	OP2	O		
7	A8	O	Address line used when external ROM is used	
8	A7	O	(Unused normally)	
9	A6	O		
10	A5	O	Holds contents of address counter at all times	
11	A4	O		
12	A3	O		
13	A2	O		
14	A1	O		
15	H0	O	Voice select LED drive	DC
16	H1	O		//
17	VSS	—	Ground of plastic package	
18	H2	O	Voice select LED drive	DC
19	H3	O		//
20	H4	O		//
21	L0	O	Voice select LED drive	//
22	L1	O		//
23	L2	O		//
24	L3	O		//
25	D1	O	Voice register data lines	
26	D2	O		
27	D3	O		
28	D4	O		
29	D5	O		
30	D6	O		
31	D7	O		
32	D8	O		

VROM (YM20090)

PIN NO.	NAME	I/O	FUNCTION	WAVEFORM
33	$\overline{E}$	I	Internal ROM enable	"0" ... Internal ROM "1" ... External ROM
34	V5	O	Voice select decoder output	
35	V4	O		
36	V3	O		
37	V2	O		
38	V1	O		
39	AGND	O	Analog ground	DC
40	Fi	I	Initial touch voltage for presetting	0V ~ 2.66V
41	F6	I	After touch voltage for presetting	
42	F3	I	After vibrato voltage for presetting	
43	A	O	Analog voltage data output (time division)	
44	Pi	I	Initial touch voltage	0V ~ 2.66V
45	P7	I	Sustain volume voltage	
46	P6	I	After touch voltage	
47	P5	I	Slide speed voltage	
48	P4	I	Delay time voltage	
49	P3	I	After vibrato voltage	
50	P2	I	Vibrato depth voltage	
51	P1	I	Vibrato speed voltage	
52	$\overline{iS}$	I	Initial touch sensing signal	
53	$\overline{F}$	O	Function data output PRO: portamento SVE:SUS VR ENABLE ENS: MONO POLY DMP:SUS MVB: DEL VIB FDC: FORCING DECAY KVB: KEY VIB	
54	POR	O	Slide LED drive	
55	$\overline{FAC}$	O	Preset LED drive	
56	$\overline{BBD}$	O	Synphonic selector LED drive	
57	$\overline{iC}$	I	Initial clear	
58	$\overline{N1}$	I	Function & voice select scan	
59	$\overline{N3}$	I		
60	$\overline{N5}$	I		
61	$\overline{N7}$	I		
62	VDD	—	Supply power + 5V	
63	$\phi 1$	I	System clock	
64	$\phi 2$	I		

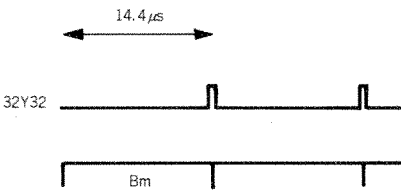
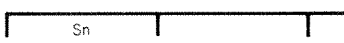
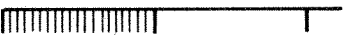
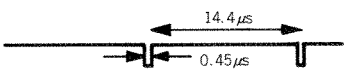
PA (YM20100)

PIN NO.	NAME	I/O	FUNCTION	WAVEFORM
1	VSS	—	Supply power 0V	
2	F1	I	Frequency data from KAS 17 bits	
3	F2	I		
4	F3	I		
5	F4	I		
6	F5	I		
7	F6	I		
8	F7	I		
9	F8	I		
10	F9	I		
11	F10	I		
12	F11	I		
13	F12	I		
14	F13	I		
15	F14	I		
16	F15	I		
17	VSS		Connected to stage if plastic package is used	
18	F16	I		
19	F17	I		
20	D1	I	Voice register data lines	
21	D2	I		
22	D3	I		
23	D4	I		
24	D5	I		
25	E1	I	Voice register write enable for operator 1	
26	E2	I	Voice register write enable for operator 2	
27	V5	I	Monophonic/Polyphonic mode select *0*...MONO *1*...POLY	
28	32Y32	I	System sync signal	
29	KD1	I	Key OFF signal	
30	—			
31	T1	I	For test	
31	T2	I	For test	

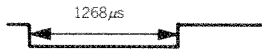
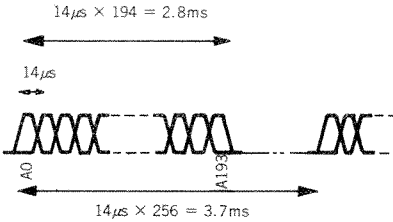
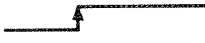
PA (YM20100)

PIN NO.	NAME	I/O	FUNCTION	WAVEFORM
33	W12B	O	Phase data for operator 2 12 bits	32Y32 Monophonic Polyphonic 1CH 8CH 14.4 μs
34	W11B	O		
35	W10B	O		
36	W9B	O		
37	W8B	O		
38	W7B	O		
39	W6B	O		
40	W5B	O		
41	W4B	O		
42	W3B	O		
43	W2B	O		
44	W1B	O		
45	W12A	O	Phase data for operator 1 12 bits	Monophonic Polyphonic
46	W11A	O		
47	W10A	O		
48	W9A	O		
49	W8A	O		
50	W7A	O		
51	W6A	O		
52	W5A	O		
53	W4A	O		
54	W3A	O		
55	W2A	O		
56	W1A	O		
57	TW5	O	Test output	
58	TW4	O		
59	TW3	O		
60	TW2	O		
61	TW1	O		
62	VDD	—	Supply power + 5V	
63	$\phi 1$	I	System clock	
64	$\phi 2$	I		

OP (YM20110)

PIN NO.	NAME	I/O	FUNCTION	WAVEFORM
1	VSS	—	Supply power 0V	
2	B1	O	Output to DAC Mantissa 10 bits	Repetition period $0.45 \times 32 = 14.4 \mu\text{s}$ 
3	B2	O		
4	B3	O		
5	B4	O		
6	B5	O		
8	B6	O		
8	B7	O		
9	B8	O		
10	B9	O		
11	B10	O		
12	B11	O	Sign bit	
13	S1	O	Output to DAC Exponent 3 bits	
14	S2	O		
15	S3	O		
16	Y	O	Sampling signal	
17	VSS	—	Connected to stage if plastic package is used	
18	SO	O	Serial output of final waveform data 16-bit data repeated twice	
19	Si	I	Serial input of waveform data coming from other OP	Same as above
20	W1	I	Phase data from PA 12 bits	
21	W2	I	$2^{12} - 1 = 4095$	
22	W3	I	Variation of data from 0 to 4095 corresponds to 2π of phase	
23	W4	I		
24	W5	I		
25	W6	I		
26	W7	I		
27	W8	I		
28	W9	I		
29	W10	I		
30	W11	I		
31	W12	I		
32	32Y32	I	System sync signal	

OP (YM20110)

PIN NO.	NAME	I/O	FUNCTION	WAVEFORM
33	I / II	I	Selects OP1 or OP2 "0" ... OP1, "1" ... OP2	
34	V5	I	Monophonic/Polyphonic mode select "0" ... MONO "1" ... POLY	
35	ENABLE	I	Voice register write enable Generated when voice is changed	
36	D1	I	Voice register data lines 8 bits	
37	D2	I		
38	D3	I		
39	D4	I		
40	D5	I		
41	D6	I		
42	D7	I		
43	D8	I		
44	KD1	I	Key OFF signal	 Monophonic sound key ON Polyphonic sound 1CH key ON
45	N3	I	Key code note	 Monophonic sound DC Polyphonic sound 8CH x 4 times repeated
46	N4	I		
47	B1	I		
48	B2	I		
49	B3	I	Key code block	
50	IC	I	Initial clear	
51	—			
52	TS5	I	Test terminals	
53	TS4	I		
54	TS3	I		
55	TS2	I		
56	TS1	I		
57	SD	I	EG serial data 32 bits Initial touch level (8) After touch level (8) Portamento rate (7) Portamento ON (1) Damp/sustain (1) Other Bit counts are given in parentheses.	
58	TO4	O	Test terminals	
59	TO3	O		
60	TO2	O		
61	TO1	O		
62	VDD		Supply power +5V	
63	φ1	I	System clock 2.22MHz	
64	φ2	I		

TUNING

ITEM	CONTROL SETTING	TEST POINT	ADJUSTMENTS / READINGS	WHERE TO ADJUST	REMARKS
DM SHEET MASTER CLOCK	PITCH.....CENTER	Tr.2...Emitter Tr.4...Emitter	2.22 ± 0.01 MHz SINE WAVE MAX	L1 L2	Turn the DM board upside down.
SA SHEET BBD	Connect IC1—10 to E. Set at FLUTE	IC1-5 IC2-8 IC3-8 IC4-8 Tr.2...Emitter Tr.4...Emitter Tr.6...Emitter	6.4 ± 0.2 Hz 66 ± 2 KHz 66 ± 2 KHz 66 ± 2 KHz Adjust for minimum distortion.	VR1 VR2 VR3 VR4 VR5 VR6 VR7	Turn the SA board upside down.
TS SHEET	Turn VR2 fully counterclockwise. Depress key deeply until it stops.	DM C9-7	0 ± 20 mV 3V	VR1 VR2	

YAMAHA

COMBO ENSEMBLE

CE20

PARTS LIST

CONTENTS

A. Electronic Components(電気部品).....	1
B. Top Case Assembly & Keyboard Assembly (上ケースAss'y及び鍵盤).....	4
C. Bottom Case Assembly (下ケースAss'y).....	7
D. Stand(スタンド).....	9
E. Expression Pedal Assembly (EXP ペダル).....	11
F. Foot Switch (フットペダル).....	13

A. Electronic Components(電気部品)

Ref. No.	Part No.	Description	部 品 名	Remarks	Common Model	Markets
	NA:10:44:40	Circuit Board, MK	M K シ ー ト			
	NA:10:68:40	- do. - , DM	D M シ ー ト			J
	NA:10:68:50	- do. - , - do. -	"			U,C
	NA:10:68:60	- do. - , - do. -	"			G
	NA:10:68:70	- do. - , SA	S A シ ー ト			
	NA:10:68:80	- do. - , CPA	C P A シ ー ト			
	NA:10:68:90	- do. - , CPB	C P B シ ー ト			
	NA:10:69:00	- do. - , JK	J K シ ー ト			J,U,G
	NA:10:80:80	- do. - , - do. -	"			C
	NA:10:72:70	- do. - , TS	T S シ ー ト			
	NA:10:80:40	- do. - , FU	F U シ ー ト			J
	NA:10:80:50	- do. - , - do. -	"			U
	NA:10:80:60	- do. - , - do. -	"			C
	NA:10:80:70	- do. - , - do. -	"			G
	NA:10:86:00	- do. - , DMS	D M S シ ー ト			
	iG:00:13:90	IC	NJM4558DV	I C	Dual OP Amp.	
	iG:00:14:40	- do. -	TC4071BP	"	OR	
	iG:00:16:90	- do. -	TC4016BP	"	Quand Bilateral Switch	
	iG:00:17:20	- do. -	TC4069UBP	"	HEX Inverter	
	iG:00:17:70	- do. -	TC4051BP	"	MULTIPLEXER	
	iG:02:56:00	- do. -	TA7505M	"	OP Amp.	
	iG:02:70:10	- do. -	HD74LS04P	"	HEX Inverter	
	iG:03:29:00	- do. -	iG03290	"	BBD Driver	
*	iG:03:33:50	- do. -	μPC7805H	"	Regulator	
	iG:03:34:00	- do. -	μPC311C	"	Converter	
	iG:03:35:00	- do. -	μPC610D	"	10 bit DAC	
	iG:04:42:00	- do. -	HD74LS138P	"	3 to 8 Demultiplexer	GS1
*	iG:05:27:00	- do. -	TC4528BP	"		
*	iG:05:46:00	- do. -	HD14053BP	"	Multiplexer	
*	iG:05:47:00	- do. -	μPC78M15H	"	Regulator	
	iG:05:92:00	- do. -	HD74LS10P	"	Nand	
*	iT:20:08:00	- do. -	YM20080	"	KAS	
*	iT:20:09:00	- do. -	YM20090	"	VROM	
*	iT:20:10:00	- do. -	YM20100	"	PA	
*	iT:20:11:00	- do. -	YM20110	"	OP	
	iT:35:10:00	- do. -	YM35100	"	BBD	
	iT:60:80:00	- do. -	YM60800	"	SEC	
	iA:05:09:10	Transistor	2SA509(Y)	ト ラ ン ジ ス タ		
	iA:09:50:00	- do. -	2SA950(Y)	"		
	iA:10:15:20	- do. -	2SA1015(Y)	"		
	iA:10:15:70	- do. -	2SA1015(O,Y)	"		
	iA:11:64:00	- do. -	2SA1164(Y)	"		
	iC:04:59:00	- do. -	2SC458(C,D)	"		
	iC:07:52:20	- do. -	2SC752(Y)	"		
	iC:21:20:00	- do. -	2SC2120(Y)	"		
	iC:23:20:40	- do. -	2SC2320L(F)	"		
	iE:00:00:10	FET	2SK30A(Y)	F E T		
	iE:10:12:00	- do. -	2SK105(F)	"		
	iF:00:00:40	Diode	1S1555	ダ イ オ ー ド		

* New Parts (新規部品) (J: Japanese, U: U.S., C: Canadian, G: General)

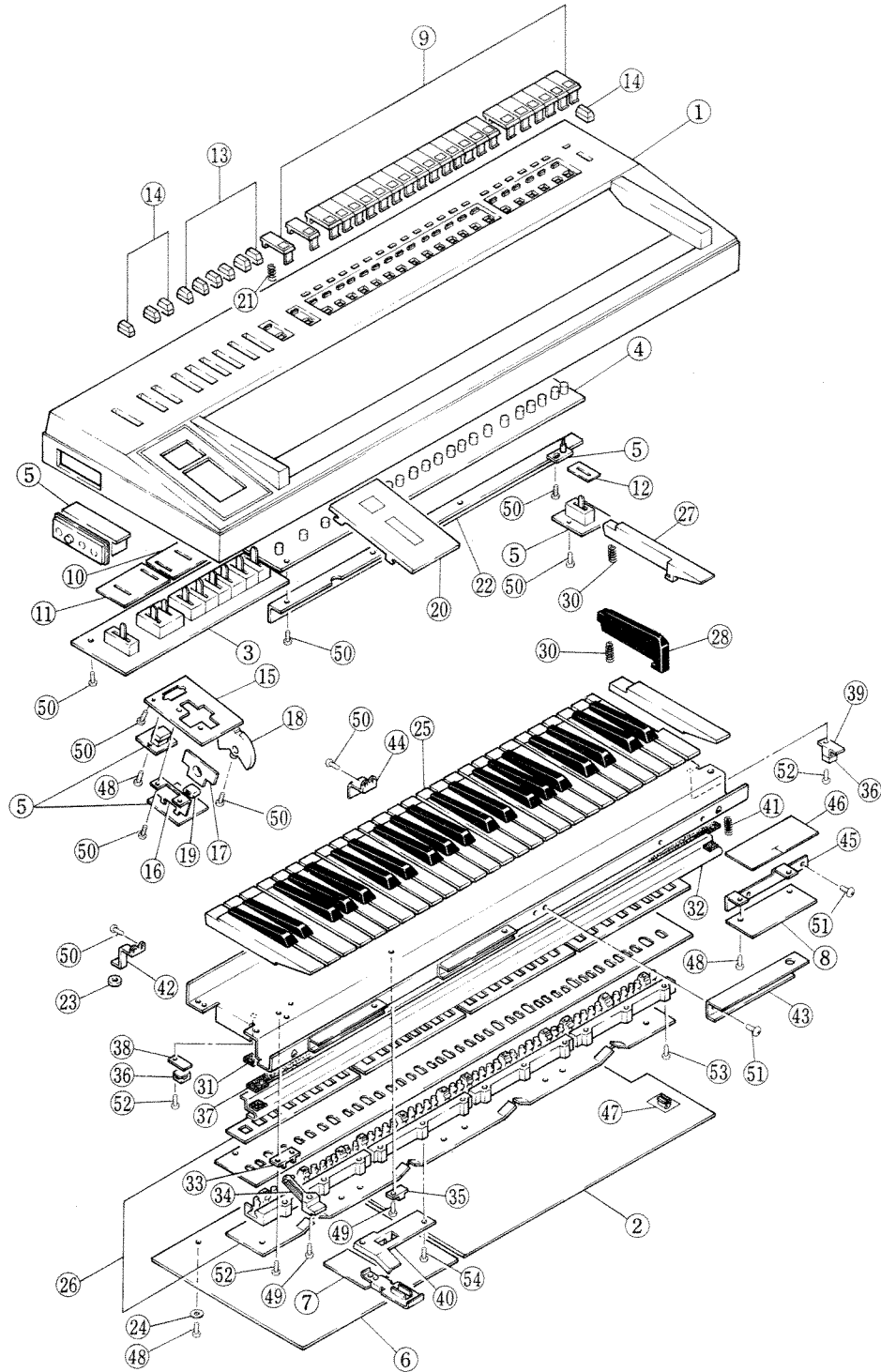
Ref. No.	Part No.	Description	部 品 名	Remarks	Common Model	Markets
	i H:00:04:70	Diode	1D4B1	ダイオード		
	i F:00:08:80	Zener Diode	WZ050	ツェナーダイオード		
*	i F:00:33:40	— do. —	RD8.2EB2	"		
*	i F:00:33:50	— do. —	RD39EB1	"		
	i F:00:12:80	LED	SLB-26UR	L E D		
*	HQ:45:00:10	Slide Variable Resistor	B10K Ω /SW	スライドボリューム	VIBRATO AFTER, DELAY	
*	HQ:45:00:20	— do. —	B10K Ω /CC, CT	"	BRILLIANCE	
*	HQ:45:00:30	— do. —	B10K Ω	"	tone IN/AF, DEPTH, SPEED	
*	HQ:45:00:40	— do. —	A10K Ω	"	TOTAL VOLUME	
*	HR:10:02:30	Variable Resistor	B10K Ω /90°	ボ リ ュ ム	SLIDE CONTROL	
	HT:19:00:50	Semi Variable Resistor	B10K Ω	半 固 定 抵 抗		
*	HT:77:00:60	— do. —	B10K Ω	"		
*	HT:77:01:10	— do. —	B500K Ω	"		
	HL:31:24:70	Metal Oxide Film Resistor	0.47 Ω 1P	酸化金属皮膜抵抗		
	HL:32:51:20	— do. —	120 Ω 2P	"		
	HL:41:44:70	— do. —	47 Ω 1P	"		
	HZ:00:17:30	Metal Film Resistor	1K Ω	金属被膜抵抗		
	HZ:00:17:40	— do. —	1K Ω	"		
	HV:55:51:00	Flame Proof Carbon Resistor	100 Ω	不燃性カーボン抵抗		
	HV:55:52:20	— do. —	220 Ω	"		
	HW:49:43:30	Fuse Resistor	33 Ω	ヒューズ抵抗		
	FL:63:71:00	Nonpolar Capacitor	10 μ F/16V	ノンポーラコンデンサ		
	FL:64:64:70	— do. —	4.7 μ F/25V	"		
	FL:66:61:00	— do. —	1 μ F/50V	"		
	FN:83:64:70	Tantalum Capacitor	4.7 μ F/16V	タンタルコンデンサ		
	FN:84:61:00	— do. —	1 μ F/25V	"		
	FD:15:15:60	Polystyrene Capacitor	56P	スチロールコンデンサ		
	FD:65:21:20	— do. —	125P	"		
	FD:65:22:70	— do. —	270P	"		
	FZ:00:10:20	MM Capacitor	0.047 μ F/125V	メタライズドマイラーコンデンサ		J,G
	FZ:00:21:50	— do. —	0.047 μ F/125V	"		U,C
	UW:82:82:20	Electrolytic Capacitor	220 μ F/10V	ケミカルコンデンサ		
	UW:63:71:00	— do. —	10 μ F/16V	"		
	UW:63:72:20	— do. —	22 μ F/16V	"		
	UW:63:74:70	— do. —	47 μ F/16V	"		
	UW:83:81:00	— do. —	100 μ F/16V	"		
	UW:85:72:20	— do. —	22 μ F/35V	"		
	UW:56:54:70	— do. —	0.47 μ F/50V	"		
	UW:86:64:70	— do. —	4.7 μ F/5V	"		
	UW:54:92:20	— do. —	2200 μ F/25V	"		

* New Parts (新規部品) (J: Japanese, U: U.S., C: Canadian, G: General)

Ref. No.	Part No.	Description	部 品 名	Remarks	Common Model	Markets
	UW: 85:92:20	Electrolytic Capacitor	2200 μ F/35V	ケミカルコンデンサ		
	UW: 82:84:70	— do. —	470 μ F/10V	"		
	GE: 30:01:20	Choke Coil	100 μ H	高周波コイル		
	GE: 30:01:60	— do. —	60 μ H	チョークコイル		
	GE: 30:03:50	— do. —	68 μ H	"		
	GE: 90:05:30	— do. —	"		GS1	
	GE: 90:04:90	SN Coil	SN8S309	S N コイル		
※	GE: 90:05:40	Master Coil	85 μ H	マスターコイル		
	KA: 40:08:50	Slide Switch		スライドスイッチ	POWER	
※	KA: 90:27:30	Push Switch	LED 付	プッシュスイッチ	SLIDE CONTROL	
※	KA: 90:27:20	Switch	KEF10904	タクトスイッチ		
	LB: 20:02:50	Voltage Selector		電圧切替器		G
※	GA: 03:80:00	Power Transformer		電源トランス		
※	GA: 03:81:00	— do. —	"			U,C
※	GA: 03:83:00	— do. —	"			G
	IK: 00:02:60	Photo Coupler	P873-G35-201B	フォトカブラー		
※	IK: 00:03:40	— do. —	P1501	"	HTV	
※	KC: 00:13:00	Relay	RZ-12	リレー		
	KB: 00:03:10	Fuse	0.5A/250V	ヒューズ		J
	KB: 00:03:20	— do. —	0.75A/250V	"		J
	KB: 00:03:30	— do. —	1.0A/250V	"		J
	KB: 00:03:50	— do. —	2.0A/250V	"		J
	KB: 00:10:60	— do. —	1.0A/250V	"		U,C
	KB: 00:12:20	— do. —	0.75A/250V	"		U,C
	KB: 00:17:70	— do. —	T1A	"		G
	KB: 00:26:10	— do. —	T800mA	"		G
	KB: 00:11:50	Fuse, UL Type	0.5A/250V	ヒューズ (UL 型)		U,C
	KB: 00:12:40	— do. —	2A/250V	"		U,C
	KB: 00:06:40	Fuse (Miniature Type)	T250mA/250V	ヒューズ (ミニチュア型)		G
	KB: 00:07:50	— do. —	T2A/250V	"		G
	LB: 20:15:30	Fuse Holder Pin		ヒューズホルダーピン		
※	MG: 00:08:10	AC Cord With Plug		電源コード		J
※	MG: 00:01:00	— do. —	"	"		U
※	MG: 00:07:70	— do. —	"	"		G
※	MG: 00:02:70	— do. —	"	"		C
※	IT: 43:90:20	PC Sensor		PC センサー		

※ New Parts (新規部品) (J: Japanese, U: U.S., C: Canadian, G: General)

B. Top Case Assembly & Keyboard Assembly (上ケースAss'y及び鍵盤)



Ref. No.	Part No.	Description	部 品 名	Remarks	Common Model	Markets
* 1	CB:03:96:20	Top Case	上 ケ ー ス			J,C,G
*	CB:04:18:10	-- do. --	"			U
* 2	NA:10:68:40	Circuit Board, DM	D M シ ー ト			J
	NA:10:68:50	-- do. -- , -- do. --	"			U,C
	NA:10:68:60	-- do. -- , -- do. --	"			G

* New Parts (新規部品) (J: Japanese, U: U.S., C: Canadian, G: General)

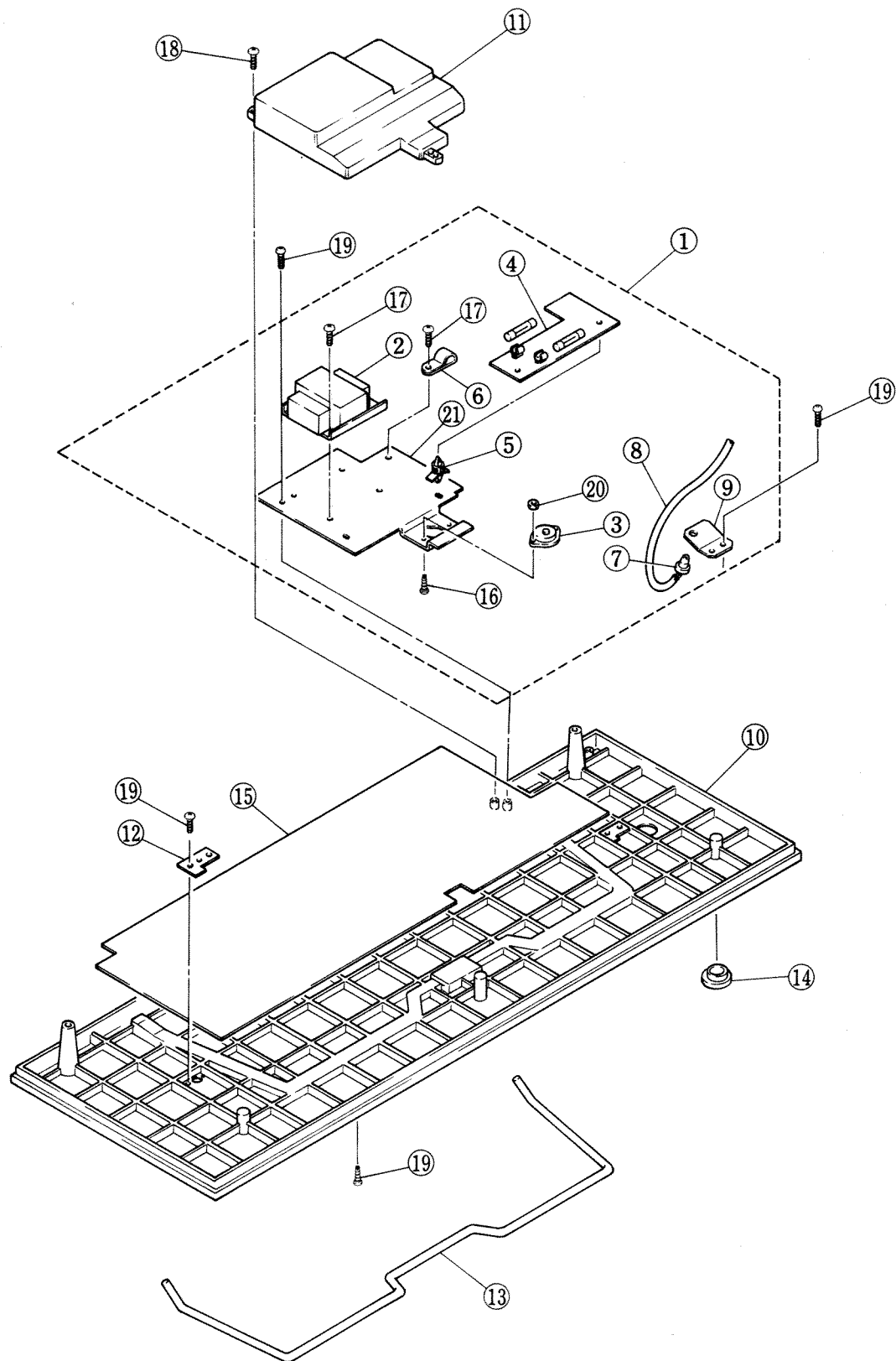
Ref. No.	Part No.	Description	部 品 名	Remarks	Common Model	Markets
※ 3	NA 10 68 80	Circuit Board Assembly, CPA	C P A シ ー ト Ass'y			
※ 4	NA 10 68 90	— do. — , CPB	C P B シ ー ト Ass'y			
※ 5	NA 10 69 00	Circuit Board, JK	J K シ ー ト			J,U,G
※	NA 10 80 80	— do. — , — do. —	"			C
※ 6	NA 10 68 70	Circuit Board, SA	S A シ ー ト			
※ 7	NA 10 72 70	— do. — , TS	T S シ ー ト			
※ 8	NA 10 86 00	— do. — , DMS	D M S シ ー ト			
※ 9	NK 00 67 90	Button	Preset	ボ タ ン		
※	NK 00 68 00	— do. —	Symphonic	"		
※	NK 00 68 10	— do. —	Piccolo	"		
※	NK 00 68 20	— do. —	Flute	"		
※	NK 00 68 30	— do. —	Oboe	"		
※	NK 00 68 40	— do. —	Clarinet	"		
※	NK 00 68 50	— do. —	Saxophone	"		
※	NK 00 68 60	— do. —	Trumpet 1	"		
※	NK 00 68 70	— do. —	— do. — 2	"		
※	NK 00 68 80	— do. —	Trombone	"		
※	NK 00 68 90	— do. —	Violin	"		
※	NK 00 69 00	— do. —	Cello	"		
※	NK 00 69 10	— do. —	Contra Bass 1	"		
※	NK 00 69 20	— do. —	Contra Bass 2	"		
※	NK 00 69 30	— do. —	Electric Bass 1	"		
※	NK 00 69 40	— do. —	Electric Bass 2	"		
※	NK 00 69 50	— do. —	Brass	"		
※	NK 00 69 60	— do. —	Horn	"		
※	NK 00 69 70	— do. —	Organ	"		
※	NK 00 69 80	— do. —	Electric Piano	"		
※	NK 00 69 90	— do. —	Harpsichord	"		
※	NK 00 70 00	— do. —	Strings	"		
※ 10	CA 01 34 00	Dust-Proof-Cloth	防 塵 シ ー ト			
※ 11	CA 01 34 10	— do. —	"			
※ 12	CA 01 34 20	— do. —	"			
※ 13	CB 03 95 70	Knob	White	ツ マ ミ (白)		
※ 14	CB 03 96 40	— do. —	Orange	" (橙)		
※ 15	AA 05 21 00	Holder	取 付 板			
※ 16	AA 05 21 10	Variable Holder	ボリューム取付金具			
※ 17	AA 05 21 20	Wheel Holder	ホイール受け金具			
※ 18	CB 03 95 30	Wheel	ホ イ ー ル			
※ 19	CB 03 95 50	Wheel Tube	ホイールチューブ			
※ 20	AA 05 20 90	Controller Panel	コントローラ化粧板			J,U,G
	AA 05 42 80	— do. —	"			C
※ 21	AA 05 27 50	Coil-Spring	コ イ ル バ ネ			
※ 22	AA 05 22 60	Printed Circuit Board Angle	基板押え金具			
※ 23	CB 03 98 90	Rubber Washer	ゴムワッシャー			
※ 24	CA 01 31 60	Fiber Washer	ファイバーワッシャー			

※ New Parts (新規部品) (J: Japanese, U: U.S., C: Canadian, G: General)

[illegible]

※ New Parts (新規部品)

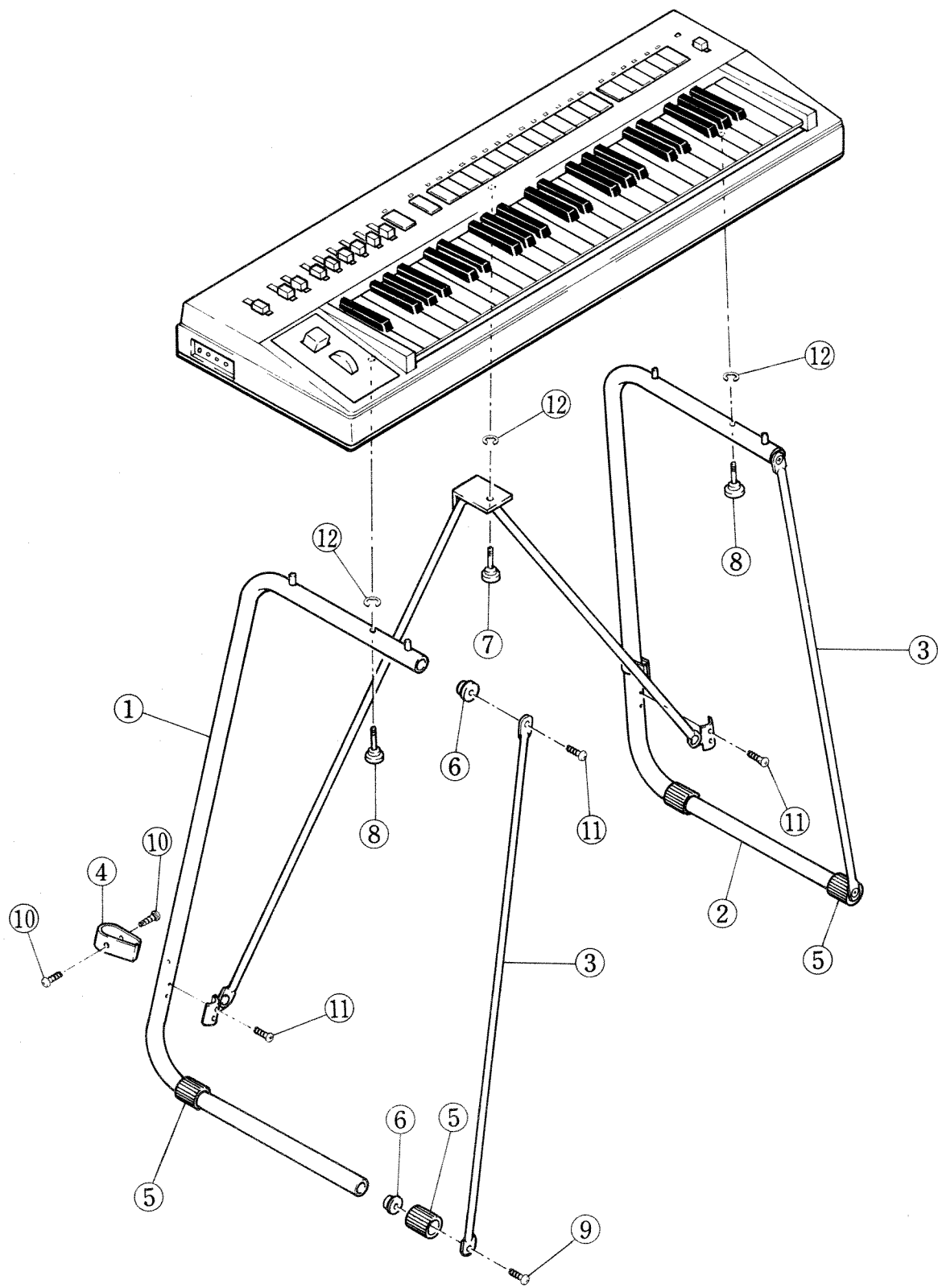
C. Bottom Case Assembly (下ケースAss'y)



Ref. No.	Part No.	Description	部 品 名	Remarks	Common Model	Markets
※ 1	NB 10 45 30	Power Supply Unit	電 源 ユ ニ ッ ト			J
※	NB 10 45 40	— do. —	〃			U
※	NB 10 45 50	— do. —	〃			C
※	NB 10 45 60	— do. —	〃			G
※ 2	GA 03 80 00	Power Transformer	電 源 ト ラ ン ス			J
※	GA 03 81 00	— do. —	〃			U,C
※	GA 03 83 00	— do. —	〃			G
3	LB 20 02 50	Voltage Selector	電 圧 切 替 器			G
※ 4	NA 10 80 40	Circuit Board, FU	F U シ ー ト			J
※	NA 10 80 50	— do. — , — do. —	〃			U
※	NA 10 80 60	— do. — , — do. —	〃			C
※	NA 10 80 70	— do. — , — do. —	〃			G
※ 5	CB 03 97 00	Support	LCBS-3NS	サ ポ ー ト		
6	CB 00 07 10	Cord Clamp	コ ー ド 押 え			U,C
	CB 06 55 20	— do. —	〃			J,G
7	CB 03 28 40	Stopper, AC Cord	コ ー ド ス ト ッ パ ー			J
	CB 07 27 50	— do. —	〃			G
	CB 81 12 30	— do. —	〃			U,C
8	MG 00 08 10	AC Cord with Plug	電 源 コ ー ド			J
	MG 00 01 00	— do. —	〃			U
	MG 00 07 70	— do. —	〃			G
	MG 00 02 70	— do. —	〃			C
※ 9	AA 05 20 60	Bracket	ブ ラ ケ ッ ト			J,G
※	AA 05 20 70	— do. —	〃			U,C
※ 10	CB 03 96 30	Bottom Case	下 ケ ー ス			J
※	CB 03 99 80	— do. —	〃			G
※	CB 04 18 20	— do. —	〃			U
※ 11	CB 04 18 50	Cover, Power Supply	電 源 カ バ ー			U,G
※ 12	AA 05 41 50	Leg Holder	脚 取 付 金 具			
13	AA 04 89 80	Music Panel Wire	譜 面 ワ イ ヤ ー		PS-20	
14	CB 03 80 00	Leg	ゴ ム 脚			
15	CA 01 34 90	Circuit Board	絶 縁 シ ー ト			U
16	ED 33 00 80	Bind Screw	M3 x 8	バ イ ン ド 小 ネ ジ	Black	
17	Ei 03 01 00	Bind Tapping Screw	3 x 10	バ イ ン ド タ ッ ピ ン グ ネ ジ 2 種	Yellow	
18	Ei 33 01 20	— do. —	3 x 12	〃	Black	
19	Ei 34 01 00	— do. —	M4 x 10	〃	— do. —	
20	EV 10 33 00	Hexagonal Nut	M3	六 角 ナ ッ ト	— do. —	
21	AA 05 42 90	Power Supply Plate	電 源 シ ャ ー シ			

※ New Parts (新規部品) (J: Japanese, U: U.S., C: Canadian, G: General)

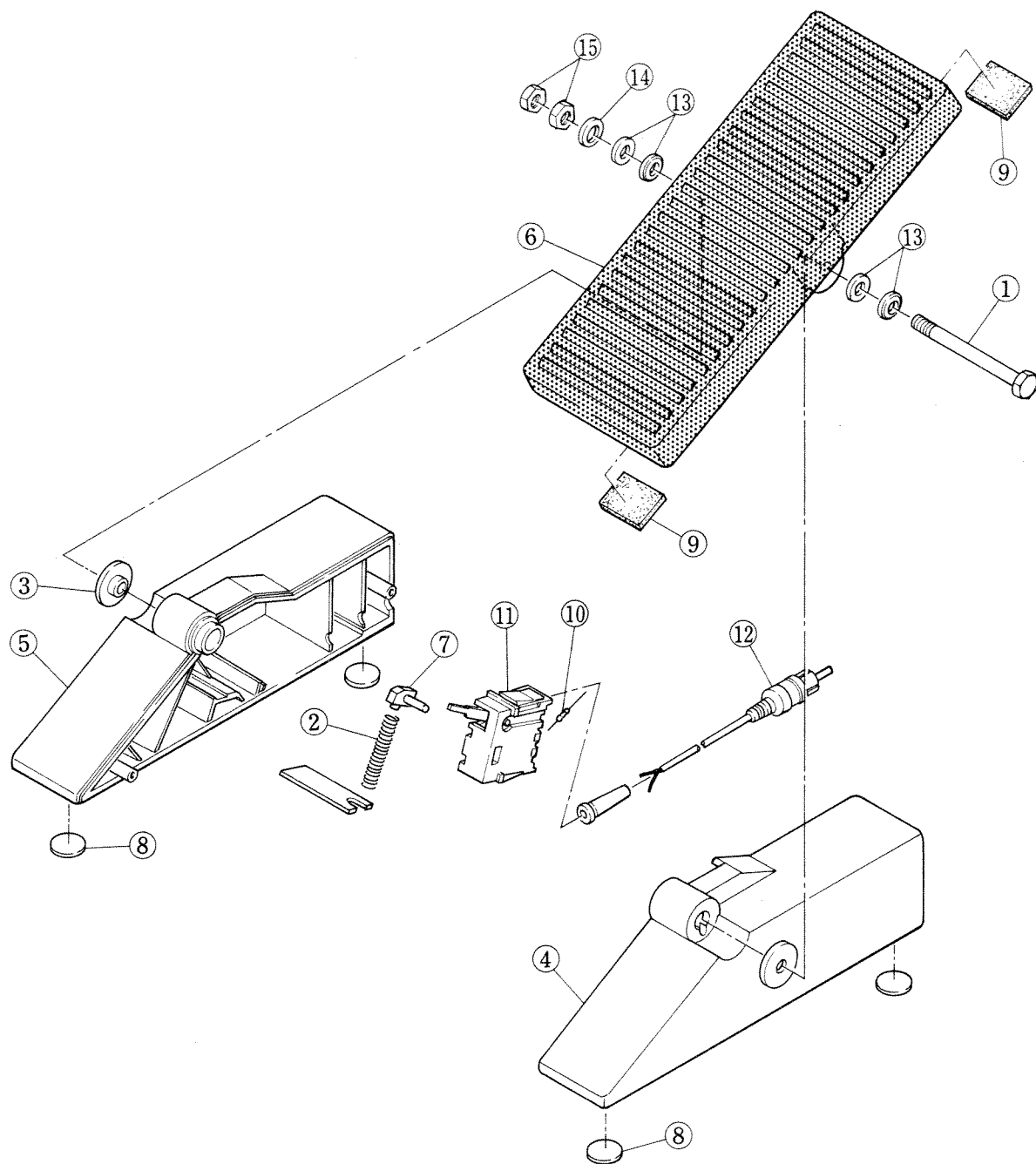
D. Stand(スタンド)



[illegible]

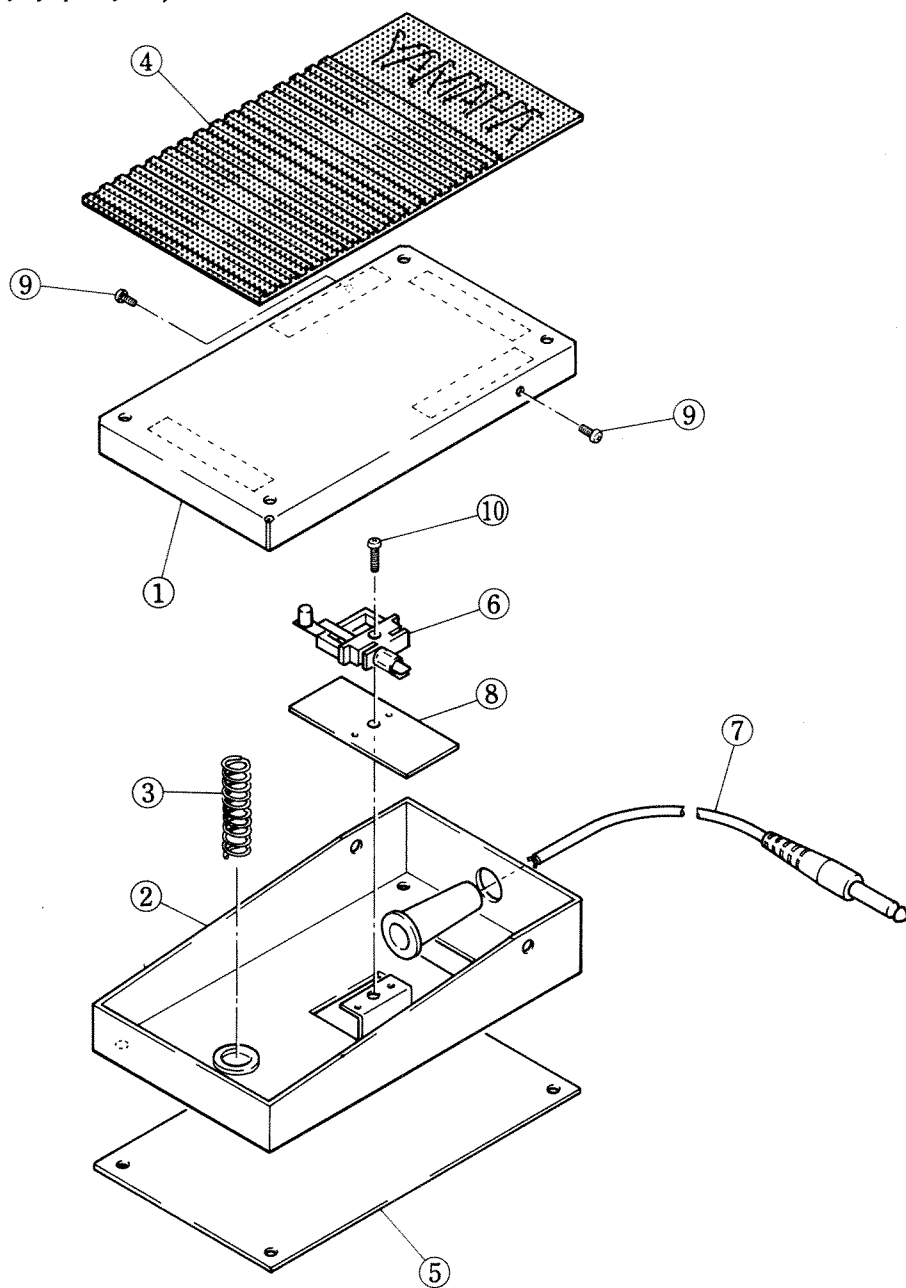
※ New Parts (新規部品)

E. Expression Pedal Assembly (EXP ペダル)



※ New Parts (新規部品)

F. Foot Switch (フットペダル)



Ref. No.	Part No.	Description	部 品 名	Remarks	Common Model	Markets
		Foot Switch	FC-5	フットペダル	CP10	
1	AA:81:28:80	Upper Case, Foot Switch		ペダル 上 蓋		
2	AA:81:28:90	Bottom Case, Foot Switch		ペダル 底 蓋		
3	AA:81:29:00	Spring		ペダル パネ		
4	CB:81:51:40	Rubber Mat, Upper		上 蓋 マット		
5	CB:81:51:50	Rubber Mat, Bottom		底 蓋 マット		
6	NB:03:71:50	Switch Assembly	1B	スイッチアッセンブリー		
7	MI:80:11:20	Cord With Y4' Phone Plug		プラグ付コード		
8	CA:80:04:50	Washer		ファイバーワッシャー		
9	EK:00:35:20	Pan Head Screw	M3 x 4 (6.5)	段付小ネジ	Black	
10	EA:03:01:20	— do. —	M3 x 12	ナベ小ネジ	Yellow	

※ New Parts (新規部品)

DM & DMS CIRCUIT BOARDS

C8

Pin No.	Pin Name	Wire Color	Destination
1	+15S	VI	PSW+15S (C1-7)
2	E	BL	PSW-EC (C1-1)
3	E	BL	SA-EC (C1-1)
4	E	BL	SA-E (C2-5)
5	E	BL	SA-E (C2-6)
6	E	BL	CPB-EC (C2-7)
7	E	BL	MK-EP
8	+5S	YE	PSW+5S (C2-2)
9	+5S	YE	PSW+5S (C2-3)
10	-15S	BR	PSW-15S (C1-2)

C9

Pin No.	Pin Name	Wire Color	Destination
1	KON	GY	SA-KON (C4-6)
2	SKON	BR	CPA-SKON (C2-9)
3	SY	YE	SA-SY (C4-3)
4	SUS	SB	SA-SUS (C4-4)
5	AIC	WH	SA-AIC (C3-1)
6	PC	GG	CPA-PC (C3-1)
7	TS	BE	TS-TSO (C1-3)

C10

Pin No.	Pin Name	Wire Color	Destination
1	+5IC	OR	PSW+5IC (C2-1)
2	+5I	OR	PSW+5 (C2-4)
3	+5	OR	CPB+5 (C2-1)
4	+5	YE	DMS-VDD(C1-1)
5	-15	RE	PSW-15 (C1-3)
6	-15	RE	SA-15B (C1-3)
7	+15	PK	PSW+15 (C1-5)
8	SO	S BR	SA-SI (C4-2)
9	E	GR	DMS-Vss(C1-7)
10	E	-	-

C11

Pin No.	Pin Name	Wire Color	Destination
1	V1	BE	DMS-V1(C1-4)
2	V2	V1	DMS-V2(C1-3)
3	V3	GY	DMS-V3(C1-6)
4	V4	WH	DMS-V4(C1-2)
5	V5	GG	DMS-V5(C1-5)

CN1

Pin No.	Pin Name	Wire Color	Destination
1	E	BL	PU-EP
2	10B	OR	FU-S1
3	10A	OR	PT-S4

CN2

Pin No.	Pin Name	Wire Color	Destination
1	-19A	RE	PT-S2
2	-19B	RE	PT-S3
3	+19B	BE	PT-S1
4	+19A	BE	PT-S6

Notes)

1. Circuit Board: LC28771 ③

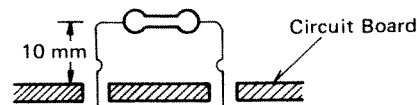
2. Integrated Circuits
- IC1 : YM20080
IC2 : YM20090
IC3 : YM20100
IC4, 5 : YM20110
IC6 : μ PC610D
IC7 : TC4051BP
IC8 : HD14053BP
IC9 : μ PC311C
IC10 : TC4069UBP
IC11, 12 : TC4071BP
IC13 : TC4528BP
IC14, 15 : μ PC78M15H
IC16 : μ PC7805H

3. Transistors
Tr1, 11 ~ 13, 18 : 2SA1015
Tr2, 8, 10 : 2SC752
Tr3 ~ 7, 9 : 2SA1164
Tr14 ~ 17, 19, 20 : 2SC458

- #### 4. Field Effect Transistors
- FET1.2 : 2SK105

5. Diodes
D1 ~ 3 : 1D4B1
D4 ~ 18 : 1S1555

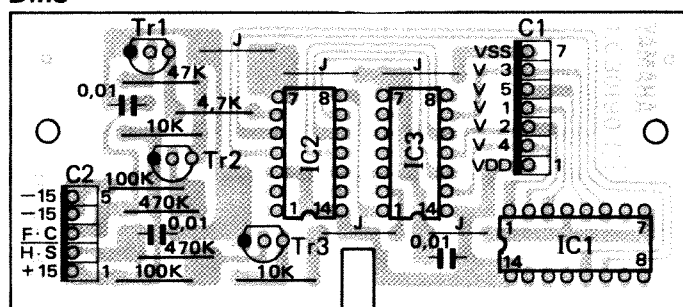
6. Resistors Marked *
Flame Proof Carbon Film Resistor
Mount as shown below.



- ## 7. FUSE

Model \	F 1	F 2	NA Number
Japanese	0.75A (KB00032)	1A (KB00033)	NA10684
U.S.& Canadian	0.75A (KB00122)	1A (KB00106)	NA10685
European	T800mA (KB00261)	T1A (KB00177)	NA10686

DMS



View from the printed pattern side of the circuit board.

C1

Pin No.	Pin Name	Wire Color	Destination
1	VDD	YE	DM- +5(C10-4)
2	V4	WH	DM-V4(C11-4)
3	V2	VI	DM-V2(C11-2)
4	V1	BE	DM-V1(C11-1)
5	V5	GG	DM-V5(C11-5)
6	V3	GY	DM-V3(C11-3)
7	Vss	GR	DM-E(C10-9)

C2

Pin No.	Pin Name	Wire Color	Destination
1	+15	PK	SA +15(C1-4)
2	H-S	SB	SA-H-S(C3-8)
3	F-C	BR	SA-F-C(C4-5)
4	-15		
5	-15	RE	SA- -15(C2-4)

Notes)

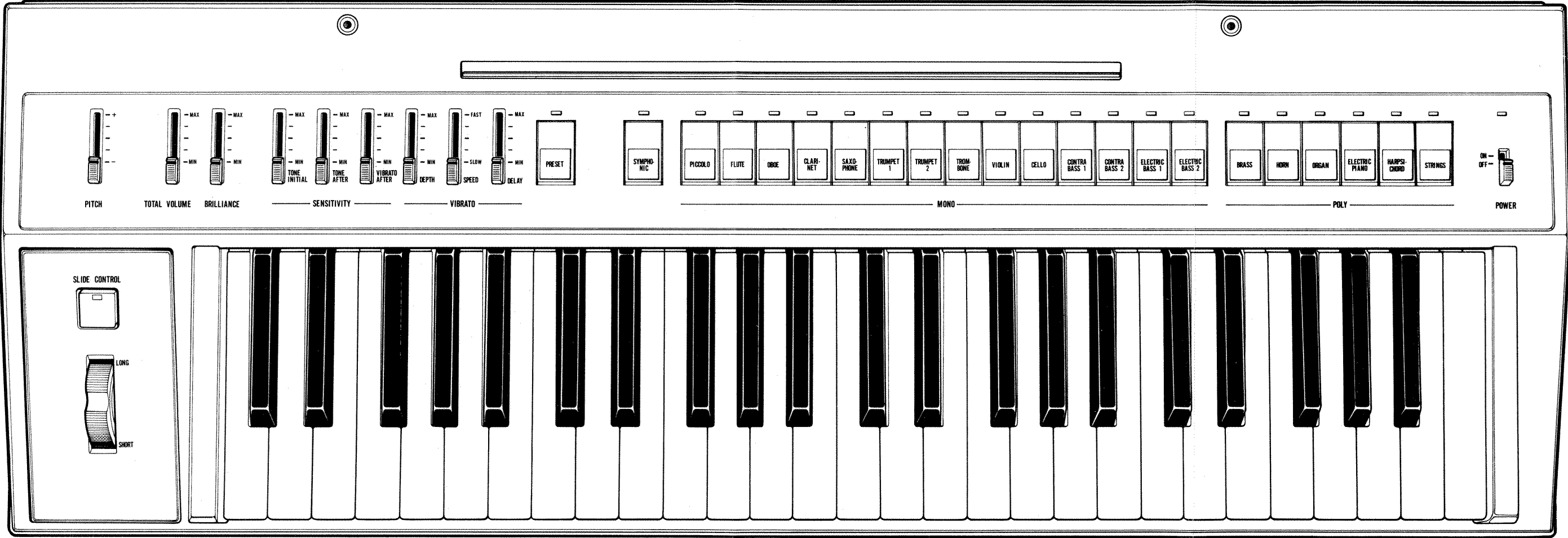
1. Circuit Board: LC30190 [1].

2. Integrated Circuits
IC1 : HD74LS138P
IC2 : HD74LS10P
IC3 : HD74LS04P

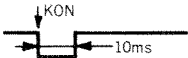
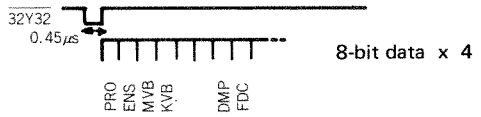
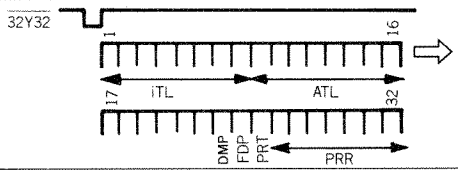
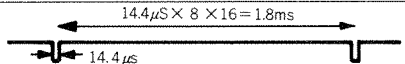
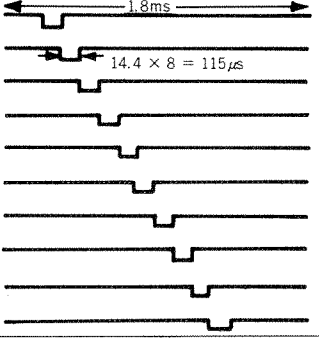
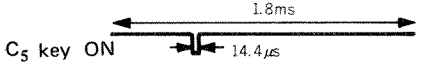
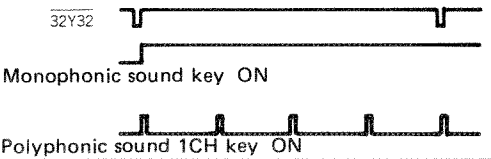
3. Transistors
Tr1, 3 : 2SC458
Tr2 : 2SA1015

KEP-NA10860-1Y

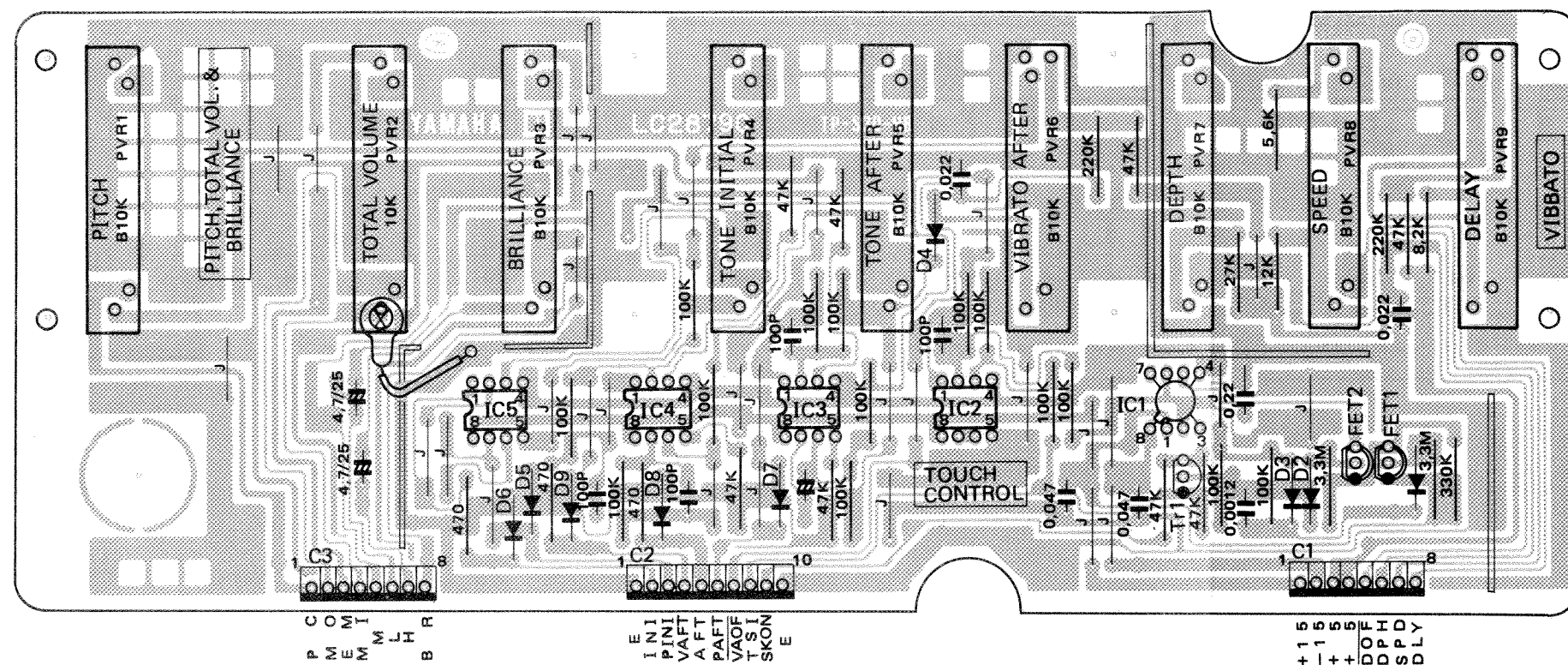
PANEL LAYOUT



LSI DATA TABLES
KAS (YM20080)

PIN NO.	NAME	I/O	FUNCTION	WAVEFORM
1	VSS	—	Supply power 0V	
2	IC	I	Initial clear	
3	AO	O	A—D conversion reference voltage (100~2650mV) 10mV steps 8-bit ADC	
4	TEST	I	Test terminal	
5	CiN	I	A—D conversion comparator input	
6	REG	I/O	A—D conversion data output, test input	
7	IS	O	Initial touch sensing signal	
8	F	I	Function data serial input, 8 bits Portamento ON, Polyphonic sound, Delay vib OFF, After damp/sustain, Forcing decay vib ON	
9	SD	O	EG serial data output, 32 bits Initial touch level (8), After touch level (8), damp sustain, Forcing damp, Portamento Portamento rate ON	
10	32Y32	O	System sync signal	
11	SCE	O	VROM sync signal (for key scanning) SCAN END . . generated at the end of key scanning	
12	6H	O	Keyboard scan C ₆ ~G ₅	
13	6L	O	Drive side F ₅ ~C ₅	
14	5H	O	C ₅ ~G ₄	
15	5L	O	F ₄ ~C ₄	
16	4H	O	C ₄ ~G ₃	
17	4L	O	F ₃ ~C ₃	
18	3H	O	C ₃ ~G ₂	
19	3L	O	F ₂ ~C ₂ , C ₂	
20	2H	O	C ₂ ~G ₁	
21	2L	O	F ₁ ~C ₁ , C ₁	
22	KON	O	Keyboard key ON data	
23	CL	I	Keyboard scan	For example, B₄ and F₃ keys ON 
24	GC#	I	Receive side	
25	G#D	I		
26	AD#	I		
27	A#D	I		
28	BF	I		
29	CF#	I		
30	KD1	O	Key OFF signal	

CPA CIRCUIT BOARD



View from the printed pattern side of the circuit board.

C1			
Pin No.	Pin Name	Wire Color	Destination
1	+15	PK	SA-+15 (C1-6)
2	-15	RE	SA- -15 (C2-2)
3	+5	OR	PSW-+5 (C2-5)
4	+5	OR	SCS-+5A (C1-3)
5	DOF	GG	DM-DOF (C3-2)
6	DPH	RE	DM-DPH (C4-9)
7	SPD	BR	DM-SPD (C4-10)
8	DLY	YE	DM-DLY (C4-7)

PIN No.	PIN Name	Wire Color	Destination
1	E	BL	SA-E (C2-7)
2	INI	VI	DM-INI (C4-1)
3	PINI	WH	DM-PINI (C4-3)
4	VAFT	OR	DM-VAFT (C4-8)
5	AFT	BE	DM-AFT (C4-5)
6	PAFT	GY	DM-PAFT (C4-2)
7	VAOF	PK	DM-VAOF (C3-1)
8	TSI	SB	TS-TSO (C1-2)
9	SKON	BR	DM-SKON (C9-2)
10	E	—	—

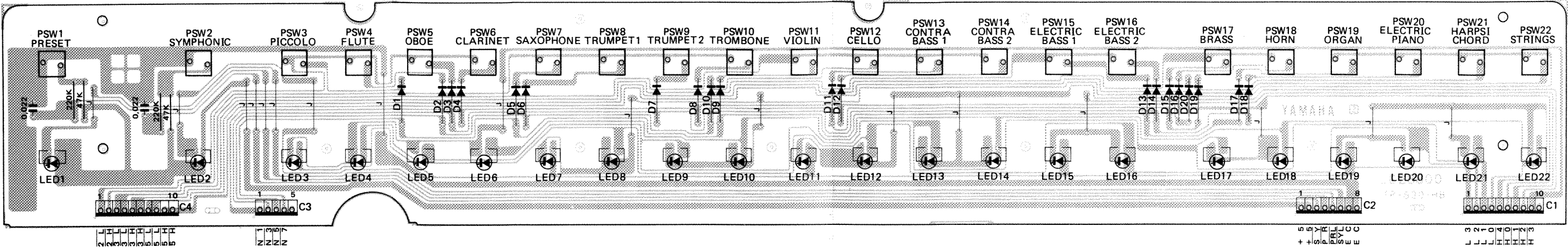
C3

Pin No.	Pin Name	Wire Color	Destination
1	PC	GG	DM-PC (C9-6)
2	MO	S GR	SA-MI (C3-3)
3	EM	S GR S	SA-E (C3-2)
4	MI	S VI	SA-MO (C4-10)
5	M	RE	SA-M (C5-5)
6	L	BR	SA-L (C5-4)
7	H	OR	SA-H (C5-3)
8	RR	S YE	SA-RR (C6-2)

Notes)

1. Circuit Board: LC28790 [1]
2. Integrated Circuits
IC1 : TA7505M
IC2 ~ 5 : NJM4558
3. Transistor
Tr1 : 2SA1015
4. Field Effect Transistors
FET1, 2 : 2SK30A
5. Diodes
D1 ~ 9 : 1S1555

CPB CIRCUIT BOARD



View from the printed pattern side of the circuit board.

C1

Pin No.	Pin Name	Wire Color	Destination
1	L3	YE	DM-L3 (C1-9)
2	L2	OR	DM-L2 (C1-8)
3	L1	RE	DM-L1 (C1-7)
4	L0	BR	DM-L0 (C1-6)
5	H4	WH	DM-H4 (C1-5)
6	H0	GR	DM-H0 (C1-3)
7	H1	BE	DM-H1 (C1-2)
8	H2	VI	DM-H2 (C1-1)
9	H3	GY	DM-H3 (C1-4)
10	-	-	-

C4

Pin No.	Pin Name	Wire Color	Destination
1	2L	BR	DM-2L (C6-3)
2	2H	RE	DM-2H (C6-4)
3	3L	OR	DM-3L (C6-5)
4	3L	OR	MK-3L (C1-1)
5	3H	YE	DM-3H (C6-6)
6	3H	YE	MK-3H (C1-2)
7	5L	VI	DM-5L (C5-2)
8	5L	VI	MK-5L (C1-5)
9	5H	GY	DM-5H (C5-3)
10	5H	GY	MK-5H (C1-6)

C2

Pin No.	Pin Name	Wire Color	Destination
1	+5	OR	DM-+5 (C10-3)
2	+5	OR	JK-+5D (C1-5)
3	SY	GR	DM-SY (C3-3)
4	PR	BE	DM-PR (C3-4)
5	PRL	OR	DM-PRL (C2-3)
6	SYL	YE	DM-SYL (C2-4)
7	EC	BL	DM-E (C8-6)
8	EC	BL	SCS-EC (C1-6)

C3

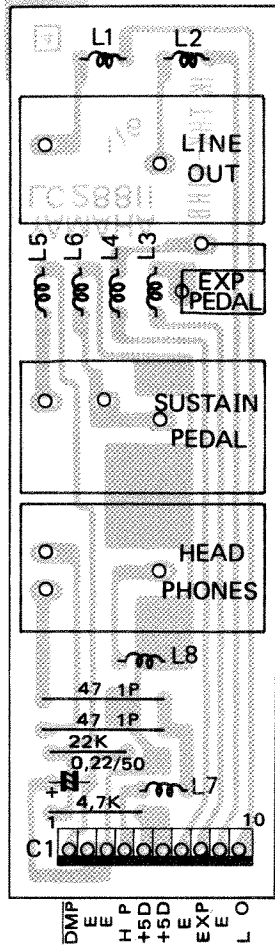
Pin No.	Pin Name	Wire Color	Destination
1	N1	VI	DM-N1 (C2-5)
2	N3	GY	DM-N3 (C2-6)
3	N5	WH	DM-N5 (C2-7)
4	N7	GG	DM-N7 (C2-8)
5	-	-	-

Notes)

- 1. Circuit Board : LC28800 ②
- 2. Diodes
D1 ~ D20 : 1S1555

JK, PSW, PL, SCW, SCS & TS CIRCUIT BOARDS

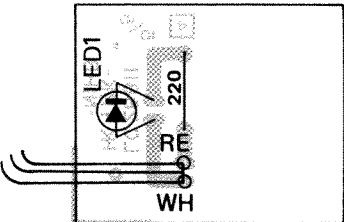
JK



C1			
Pin No.	Pin Name	Wire Color	Destination
1	DMP	GY	DM-DMP (C3-6)
2	E	—	—
3	E	BL	SA-E (C3-6)
4	HP	YE	SA-HP (C3-7)
5	+5D	OR	CPB+5 (C2-2)
6	+5D	YE	SCS+5D (C1-4)
7	E	S BE S	SA-E (C4-7)
8	EXP	S BE	SA-EXP (C4-8)
9	E	S OR S	SA-E (C3-4)
10	LO	S OR	SA-LO (C3-5)

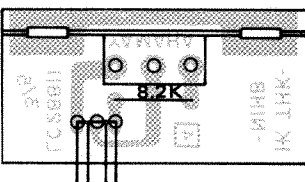
Note)
1. Circuit Board : LC28811 ㉔

PL



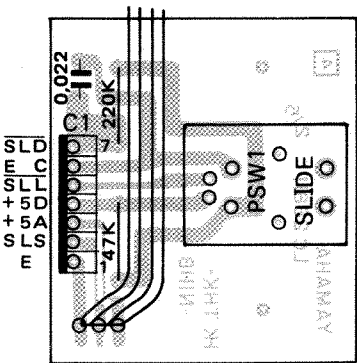
Note)
1. Circuit Board : LC28811 ㉔

SCW



Note)
1. Circuit Board : LC28811 ㉔

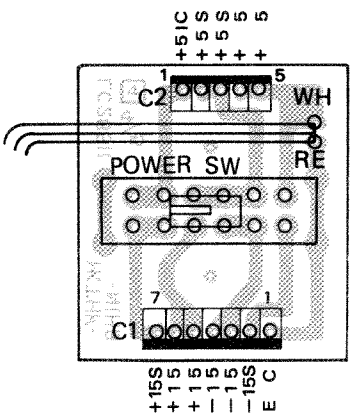
SCS



C1			
Pin No.	Pin Name	Wire Color	Destination
1	E	BL	SA-E (C2-9)
2	SLS	GR	DM-SLS (C4-6)
3	+5A	OR	CPA+5 (C1-4)
4	+5D	YE	JK+5D (C1-6)
5	SLL	RE	DM-SLL (C2-2)
6	EC	BL	CPB-EC (C2-8)
7	SLD	VI	DM-SLD (C3-5)

Note)
1. Circuit Board : LC28811 ㉔

PSW

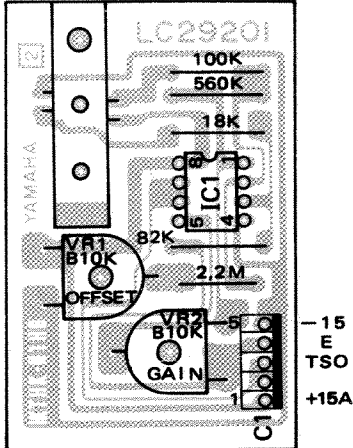


C1			
Pin No.	Pin Name	Wire Color	Destination
1	EC	BL	DM-E (C8-2)
2	-15S	BR	DM- -15S (C8-10)
3	-15	RE	DM- -15 (C10-5)
4	-15	RE	SA- -15 (C2-1)
5	+15	PK	DM+15 (C10-7)
6	+15	PK	SA+15 (C1-5)
7	+15S	VI	DM+15S (C8-1)

C2			
Pin No.	Pin Name	Wire Color	Destination
1	+5IC	OR	DM+5IC (C10-1)
2	+5S	YE	DM+5S (C8-8)
3	+5S	YE	DM+5S (C8-9)
4	+5	OR	DM+5 (C10-2)
5	+5	OR	CPA+5 (C1-3)

Note)
1. Circuit Board : LC28811 ㉔

TS



C1			
Pin No.	Pin Name	Wire Color	Destination
1	+15	PK	SA+15 (C1-7)
2	TSO	SB	CPA-TSI (C2-8)
3	TSO	BE	DM-TS (C9-7)
4	E	BL	SA-E (C2-8)
5	-15	RE	SA- -15 (C2-3)

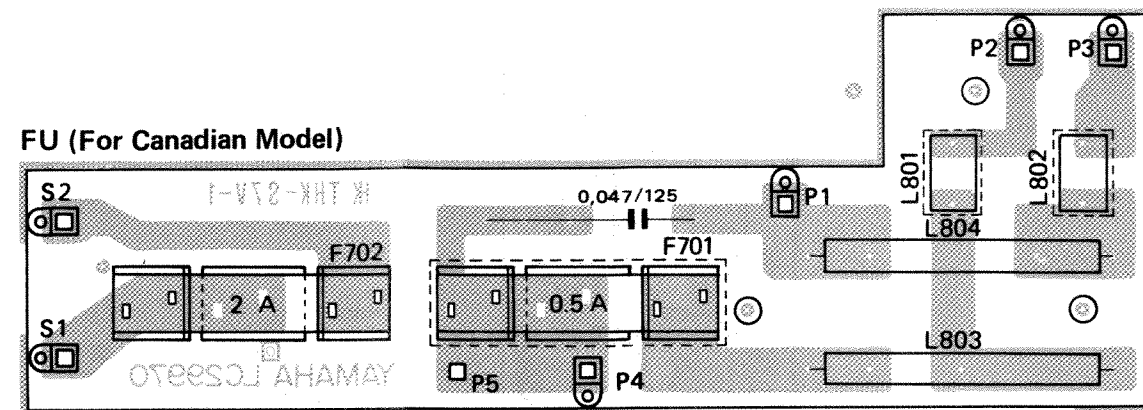
Note)
1. Circuit Board : LC29201 ㉔
2. Integrated Circuit
IC1 : NJM4558DV

View from the printed pattern side of the circuit board.

KEP-NA10727-19 ㉔

View from the component side of the circuit board.

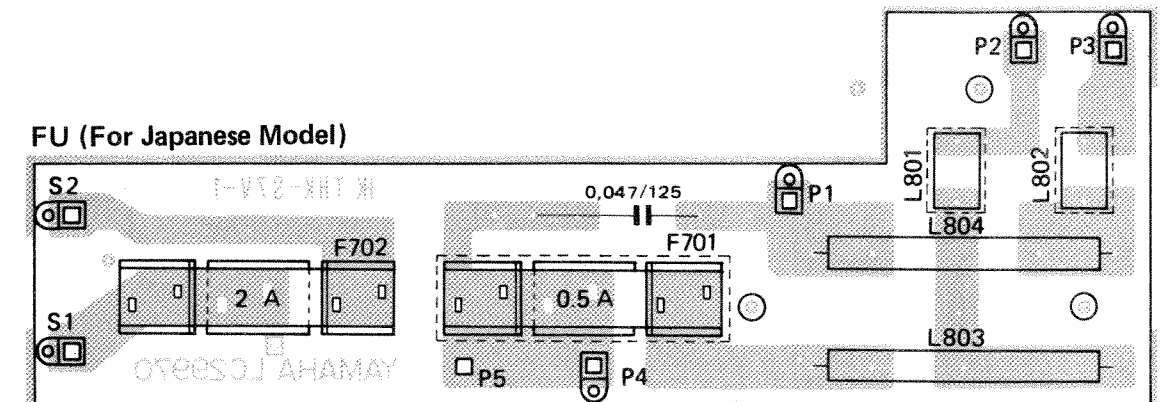
FU CIRCUIT BOARD



KEP-NA10806-19 △

Notes)

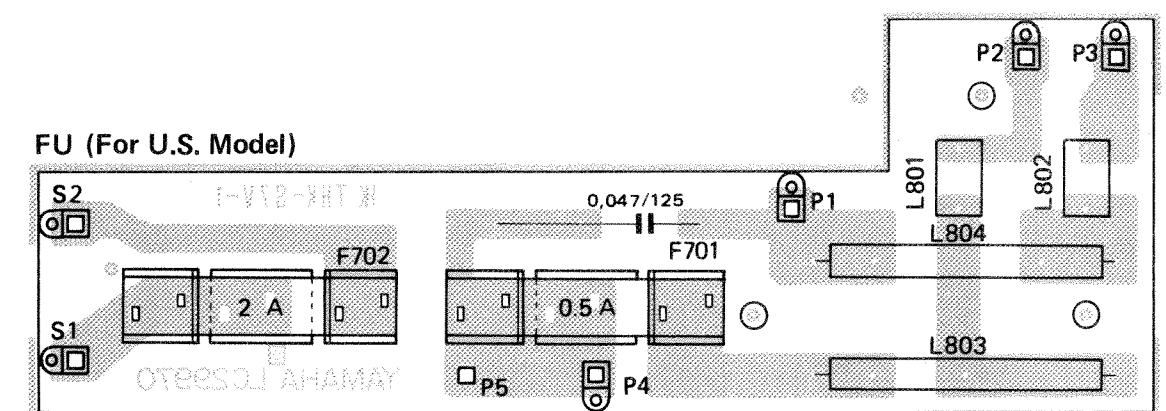
1. Circuit Board : LC29970 □
2. Fuse
 F701 : 0.5A/250V (ST4)
 F702 : 2.0A/250V (ST4)



KEP-NA10804-19 △

Notes)

1. Circuit Board : LC29970 □
2. Fuse
 F701 : 0.5A/125V
 F702 : 2.0A/125V



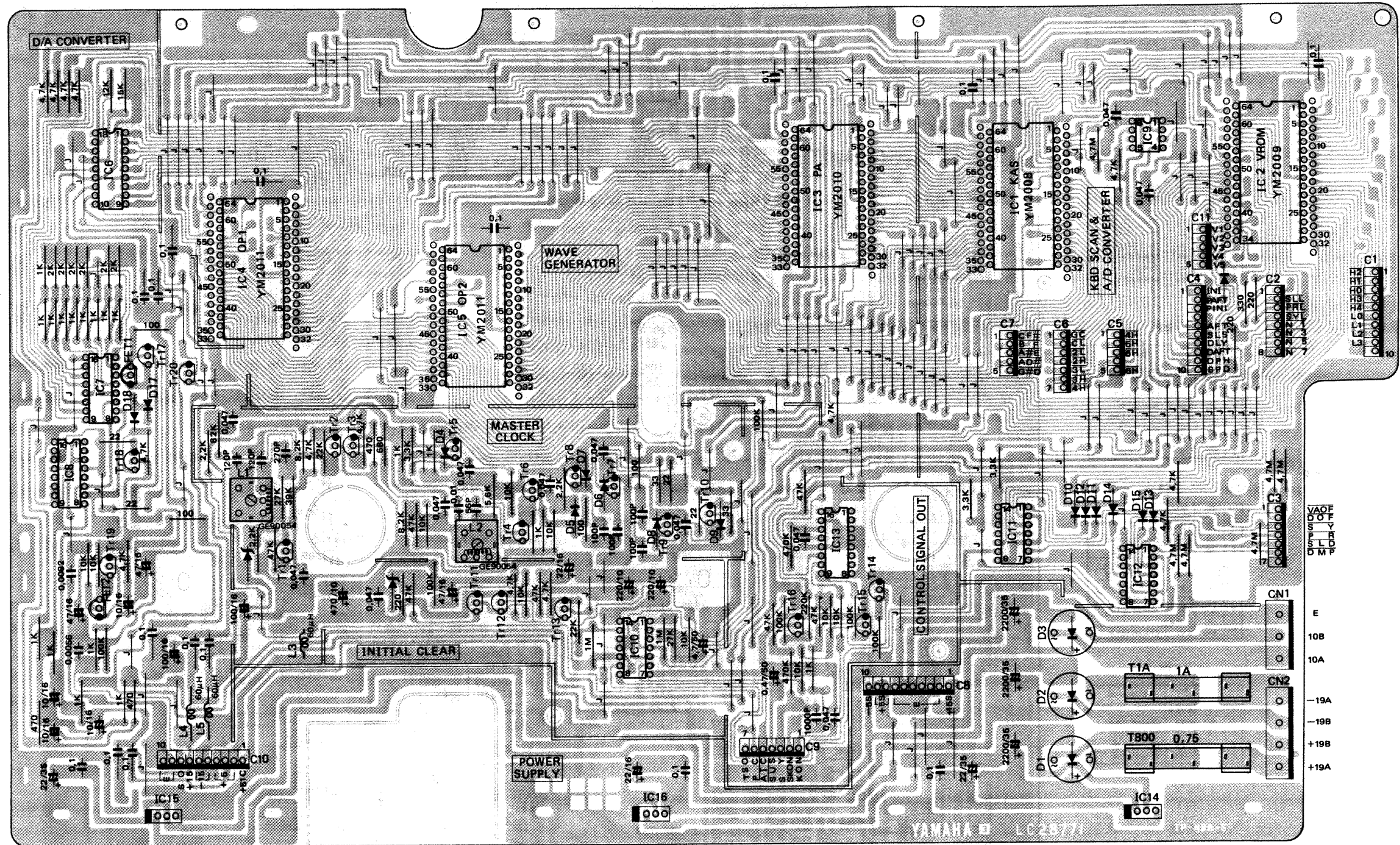
KEP-NA10805-19 △

Notes)

1. Circuit Board : LC29970 □
2. Fuse
 F701 : 0.5A/250V (ST4)
 F702 : 2.0A/250V (ST4)

View from the component side of the circuit board.

DM



View from the printed pattern side of the circuit board.

C1			
Pin No.	Pin Name	Wire Color	Destination
1	H2	VI	CPB-H2 (C1-8)
2	H1	BE	CPB-H1 (C1-7)
3	H0	GR	CPB-H0 (C1-6)
4	H3	GY	CPB-H3 (C1-9)
5	H4	WH	CPB-H4 (C1-5)
6	L0	BR	CPB-L0 (C1-4)
7	L1	RE	CPB-L1 (C1-3)
8	L2	OR	CPB-L2 (C1-2)
9	L3	YE	CPB-L3 (C1-1)
10	-	-	-

C2			
Pin No.	Pin Name	Wire Color	Destination
1	Vss	-	-
2	SLL	RE	SCS-SLL (C1-5)
3	PRL	OR	CPB-PRL (C2-5)
4	SYL	YE	CPB-SYL (C2-6)
5	N1	VI	CPB-N1 (C3-1)
6	N3	GY	CPB-N3 (C3-2)
7	N5	WH	CPB-N5 (C3-3)
8	N7	GG	CPB-N7 (C3-4)

C3			
Pin No.	Pin Name	Wire Color	Destination
1	VAOP	PK	CPA-VAOP (C2-7)
2	DOF	GG	CPA-DOF (C1-5)
3	SY	GR	CPB-SY (C2-3)
4	PR	BE	CPB-PR (C2-4)
5	SLO	VI	SCS-SLO (C1-7)
6	DMP	GY	JK-DMP (C1-1)
7	Vss	-	-

C4			
Pin No.	Pin Name	Wire Color	Destination
1	INI	VI	CPA-INI (C2-2)
2	PAFT	GY	CPA-PAFT (C2-6)
3	PINI	WH	CPA-PINI (C2-3)
4	-	-	-
5	AFT	BE	CPA-AFT (C2-5)
6	SLS	GR	SCS-SLS (C1-2)
7	DLY	YE	CPA-DLY (C1-8)
8	VAFT	OR	CPA-VAFT (C2-4)
9	DPH	RE	CPA-DPH (C1-6)
10	SPD	BR	CPA-SPD (C1-7)

C5			
Pin No.	Pin Name	Wire Color	Destination
1	4H	BE	MK-4H (C1-4)
2	5L	VI	CPB-5L (C4-7)
3	5H	GY	CPB-5H (C4-9)
4	6L	WH	MK-6L (C1-7)
5	6H	GG	MK-6H (C1-8)

C6			
Pin No.	Pin Name	Wire Color	Destination
1	GC#	PK	MK-GC# (C2-2)
2	CL	SB	MK-CL (C2-1)
3	2L	BR	CPB-2L (C4-1)
4	2H	RE	CPB-2H (C4-2)
5	3L	OR	CPB-3L (C4-3)
6	3H	YE	CPB-3H (C4-5)
7	4L	GR	MK-4L (C1-3)

C7			
Pin No.	Pin Name	Wire Color	Destination
1	CF#	VI	MK-CF# (C2-7)
2	BF	BE	MK-BF (C2-6)
3	A#E	GR	MK-A#E (C2-5)
4	AD#	YE	MK-AD# (C2-4)
5	G#D	OR	MK-G#D (C2-3)

C8			
Pin No.	Pin Name	Wire Color	Destination
1	+15S	VI	PSW-+15S (C1-7)
2	E	BL	PSW-EC (C1-1)
3	E	BL	SA-EC (C1-1)
4	E	BL	SA-E (C2-5)
5	E	BL	SA-E (C2-6)
6	E	BL	CPB-EC (C2-7)
7	E	BL	MK-EP
8	+5S	YE	PSW-+5S (C2-2)
9	+5S	YE	PSW-+5S (C2-3)
10	-15S	BR	PSW- -15S (C1-2)

C9			
Pin No.	Pin Name	Wire Color	Destination
1	KON	GY	SA-KON (C4-6)
2	SKON	BR	CPA-SKON (C2-9)
3	SY	YE	SA-SY (C4-3)
4	SUS	SB	SA-SUS (C4-4)
5	AIC	WH	SA-AIC (C3-1)
6	PC	GG	CPA-PC (C3-1)
7	TS	BE	TS-TSO (C1-3)

C10			
Pin No.	Pin Name	Wire Color	Destination
1	+5IC	OR	PSW-+5IC (C2-1)
2	+5	OR	PSW-+5 (C2-4)
3	+5	OR	CPB-+5 (C2-1)
4	+5	YE	DMS-VDD (C1-1)
5	-15	RE	PSW- -15 (C1-3)
6	-15	RE	SA- -15B (C1-3)
7	+15	PK	PSW-+15 (C1-5)
8	SO	SBR	SA-SI (C4-2)
9	E	GR	DMS-Vss (C1-7)
10	E	-	-

C11			
Pin No.	Pin Name	Wire Color	Destination
1	V1	BE	DMS-V1 (C1-4)
2	V2	VI	DMS-V2 (C1-3)
3	V3	GY	DMS-V3 (C1-6)
4	V4	WH	DMS-V4 (C1-2)
5	V5	GG	DMS-V5 (C1-5)

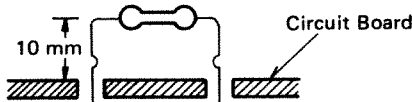
CN1			
Pin No.	Pin Name	Wire Color	Destination
1	E	BL	PU-EP
2	10B	OR	FU-S1
3	10A	OR	PT-S4

CN2			
Pin No.	Pin Name	Wire Color	Destination
1	-19A	RE	PT-S2
2	-19B	RE	PT-S3
3	+19B	BE	PT-S1
4	+19A	BE	PT-S6

SA CIRCUIT BOARD

Notes)

1. Circuit Board: LC28780 2
2. Integrated Circuits
 IC1 : YM60800
 IC2 ~ 4 : iG03290
 IC5 ~ 7 : YM35100
 IC8 ~ 12 : NJM4558
 IC13 : TC4016BP
3. Transistors
 Tr1 ~ 6 : 2SC2320L (Low Noise Type)
 Tr7, 9, 14 : 2SC458
 Tr8, 15 : 2SA509
 Tr10 : 2SA1015
 Tr11 : 2SA1015
 Tr12 : 2SC2120
 Tr13 : 2SA950
4. Field Effect Transistor
 FET1 : 2SK105
5. Diodes
 D1 ~ 4 : 1S1555
6. Resistors Marked *
 Flame Proof Carbon Film Resistor
 Mount as shown below



C1

Pin No.	Pin Name	Wire Color	Destination
1	EC	BL	DM-E (C8-3)
2	EC	—	—
3	-15B	RE	DM-15 (C10-6)
4	+15	PK	DMS+15 (C2-1)
5	+15	PK	PSW+15 (C1-6)
6	+15	PK	CPA+15 (C1-1)
7	+15	PK	TS+15 (C1-1)

C2

Pin No.	Pin Name	Wire Color	Destination
1	-15	RE	PSW-15 (C1-4)
2	-15	RE	CPA-15 (C1-2)
3	-15	RE	TS-15 (C1-5)
4	-15	RE	DMS-15 (C2-5)
5	E	BL	DM-E (C8-4)
6	E	BL	DM-E (C8-5)
7	E	BL	CPA-E (C2-1)
8	E	BL	TS-E (C1-4)
9	E	BL	SCS-E (C1-1)
10	E	—	—

C3

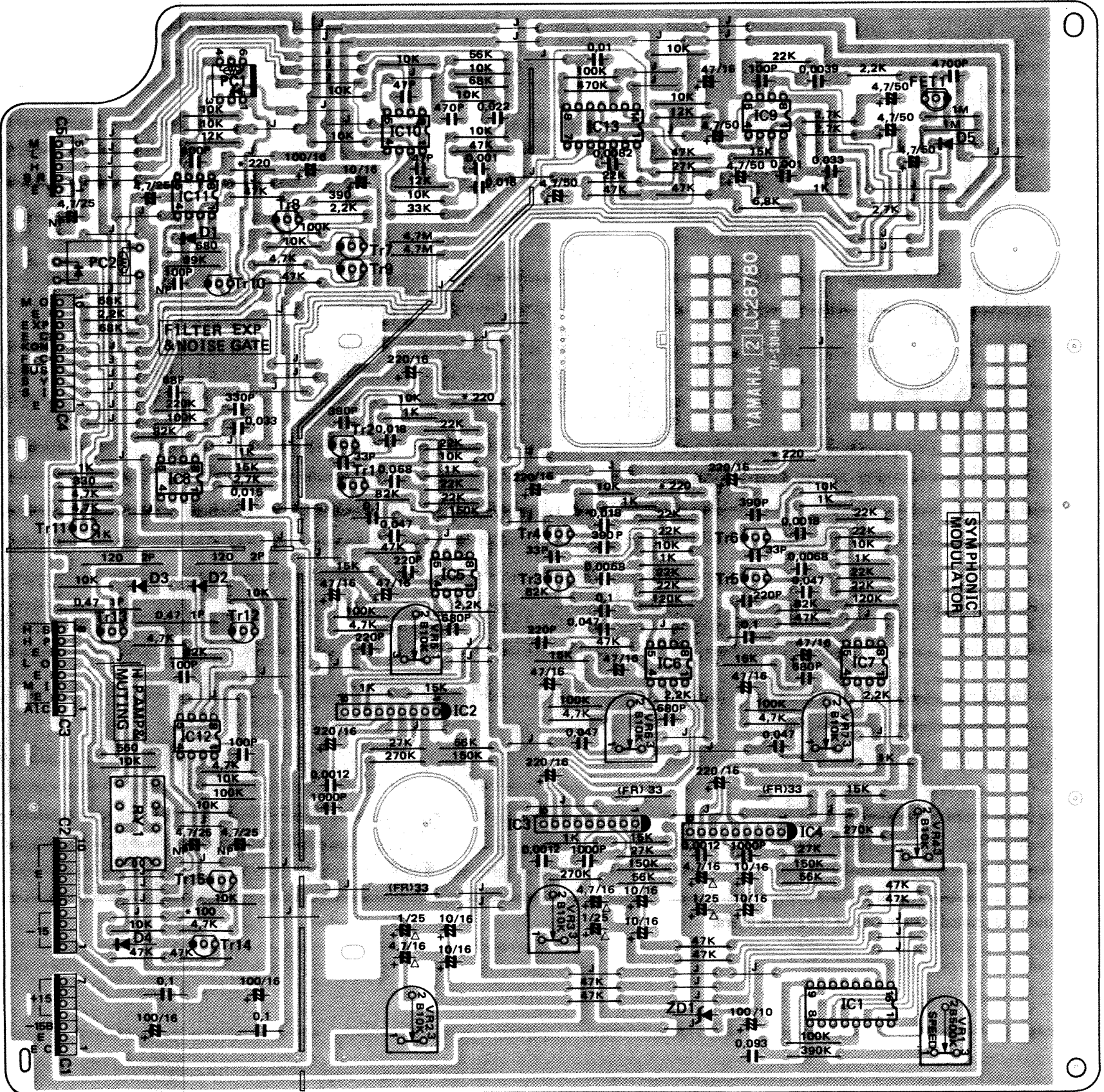
Pin No.	Pin Name	Wire Color	Destination
1	AIC	WH	DM-AIC (C9-5)
2	E	S GR S	CPA-EM (C3-3)
3	MI	S GR	CPA-MO (C3-2)
4	E	S OR S	JK-E (C1-9)
5	LO	S OR	JK-LO (C1-10)
6	E	BL	JK-E (C1-3)
7	HP	YE	JK-HP (C1-4)
8	H-S	SB	DMS-H-S (C2-2)

C4

Pin No.	Pin Name	Wire Color	Destination
1	E	S BR S	DM-SO (C10-8)
2	SI	S BR	DM-SY (C9-3)
3	SY	YE	DM-SY (C9-3)
4	SUS	SB	DM-SUS (C9-4)
5	F-C	BR	DMS-F-C (C2-3)
6	KON	GY	DM-KON (C9-1)
7	E	S BE S	JK-E (C1-7)
8	EXP	S BE	JK-EXP (C1-8)
9	E	S VI S	—
10	MO	S VI	CPA-MI (C3-4)

C5

Pin No.	Pin Name	Wire Color	Destination
1	E	S YE S	CPA-BR (C3-8)
2	BR	S YE	CPA-H (C3-7)
3	H	OR	CPA-L (C3-6)
4	L	BR	CPA-M (C3-5)
5	M	RE	—



View from the printed pattern side of the circuit board.