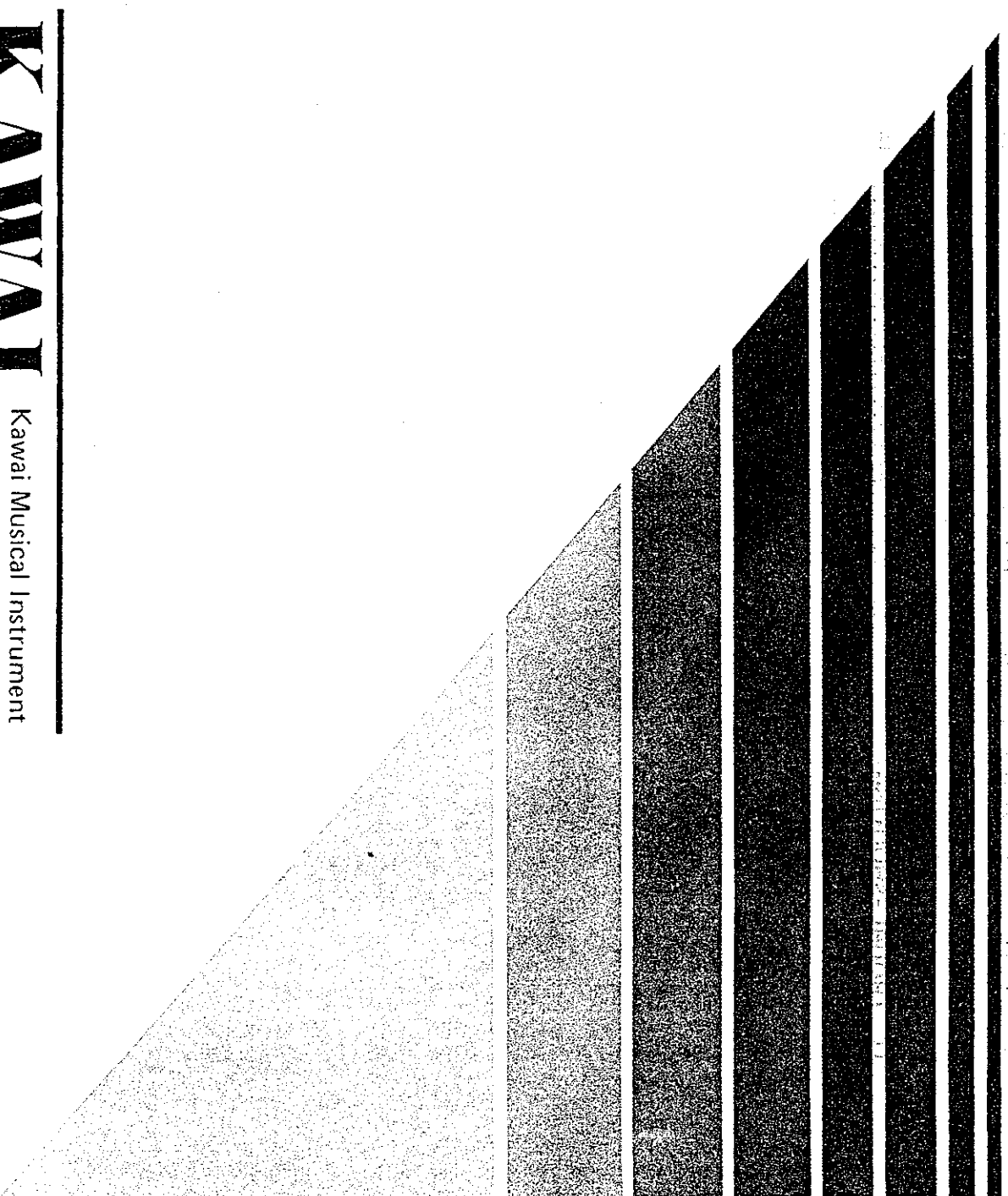


DIGITAL SYNTHESIZER/MODULE

# K1/K1m

## SERVICE MANUAL



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# KAWAI

Kawai Musical Instrument  
Manufacturing Co., Ltd.

1. P.W.B. INFORMATION

K1

P.W.B. Name	Description	Code No.
M1-032 (1): All markets	Joy Stick	236177
M1-033 (2): All markets	Volume	236178
M1-034 (1): Japan	CPU, Amplifier, Tone Generator, POWER Supply ROM, RAM, Filter & Mixer, D/A Converter, MIDI I/O Jack, Joy Stick IN, CARD I/O, LINE Gates, System Reset, Velocity Sensor, Pressure, Hold, Bender	236173
(2): U.S.A. (3): Canada (4): Europe		236174 236175 236176

K1m

P.W.B. Name	Description	Code No.
M1-031 (1): Japan	CPU, Amplifier, Tone Generator, POWER Supply ROM, RAM, Filter & Mixer, D/A Converter, MIDI I/O Jack, Joy Stick IN, CARD I/O, LINE Gates, System Reset	236159
(2): U.S.A. (3): Canada (4): Europe		236161 236162 236163
M1-033 (1): All markets	Volume	236160

2. SPECIFICATION

Pitch range Number of keys Voices Tone patches	C-4~G8 61 (K1 only) 16 max. (32 SOURCES) 96 internal (64 SINGLE, 32 MULTI) 96 external (64 SINGLE, 32 MULTI) per DC-8 card (available separately)																		
SINGLE EDIT	<table border="0"> <tr> <td><input type="checkbox"/> EDIT</td> <td>VOLUME, NAME</td> </tr> <tr> <td><input type="checkbox"/> A COMMON</td> <td>SOURCE2/4</td> </tr> <tr> <td colspan="2">(Shared by all SOURCES)</td> </tr> <tr> <td><input type="checkbox"/> B FREQ</td> <td>VIBRATO DEPTH·SPEED·SHAPE·PRS→DEPTH, WHEEL ASSIGN, AUTO BEND DEPTH·TIME·VEL→DEPTH·KS→TIME, PRS→FREQ, PITCH BEND, KS CURVE, POLY MODE</td> </tr> <tr> <td><input type="checkbox"/> C WAVE</td> <td>COARSE (FIXED KEY), FINE, KEY TRACK, VIBRATO/AUTO BEND on off, PRS→FREQ on off, KS→FREQ on off</td> </tr> <tr> <td colspan="2">(For each SOURCE)</td> </tr> <tr> <td><input type="checkbox"/> D ENV</td> <td>WAVE SELECT, AM S1.S2 AM S3.S4, COPY FROM</td> </tr> <tr> <td colspan="2">(For each SOURCE)</td> </tr> <tr> <td></td> <td>LEVEL, DELAY, ATTACK, DECAY, SUSTAIN RELEASE, VEL CURVE, LEVEL MOD VEL·PRS·KS, TIME MOD VEL·KS</td> </tr> </table>	<input type="checkbox"/> EDIT	VOLUME, NAME	<input type="checkbox"/> A COMMON	SOURCE2/4	(Shared by all SOURCES)		<input type="checkbox"/> B FREQ	VIBRATO DEPTH·SPEED·SHAPE·PRS→DEPTH, WHEEL ASSIGN, AUTO BEND DEPTH·TIME·VEL→DEPTH·KS→TIME, PRS→FREQ, PITCH BEND, KS CURVE, POLY MODE	<input type="checkbox"/> C WAVE	COARSE (FIXED KEY), FINE, KEY TRACK, VIBRATO/AUTO BEND on off, PRS→FREQ on off, KS→FREQ on off	(For each SOURCE)		<input type="checkbox"/> D ENV	WAVE SELECT, AM S1.S2 AM S3.S4, COPY FROM	(For each SOURCE)			LEVEL, DELAY, ATTACK, DECAY, SUSTAIN RELEASE, VEL CURVE, LEVEL MOD VEL·PRS·KS, TIME MOD VEL·KS
<input type="checkbox"/> EDIT	VOLUME, NAME																		
<input type="checkbox"/> A COMMON	SOURCE2/4																		
(Shared by all SOURCES)																			
<input type="checkbox"/> B FREQ	VIBRATO DEPTH·SPEED·SHAPE·PRS→DEPTH, WHEEL ASSIGN, AUTO BEND DEPTH·TIME·VEL→DEPTH·KS→TIME, PRS→FREQ, PITCH BEND, KS CURVE, POLY MODE																		
<input type="checkbox"/> C WAVE	COARSE (FIXED KEY), FINE, KEY TRACK, VIBRATO/AUTO BEND on off, PRS→FREQ on off, KS→FREQ on off																		
(For each SOURCE)																			
<input type="checkbox"/> D ENV	WAVE SELECT, AM S1.S2 AM S3.S4, COPY FROM																		
(For each SOURCE)																			
	LEVEL, DELAY, ATTACK, DECAY, SUSTAIN RELEASE, VEL CURVE, LEVEL MOD VEL·PRS·KS, TIME MOD VEL·KS																		
MULTI EDIT The functions in parentheses are available only on the K1.	<table border="0"> <tr> <td><input type="checkbox"/> EDIT</td> <td>VOLUME, NAME</td> </tr> <tr> <td><input type="checkbox"/> A WINDOW1</td> <td>SINGLE ASSIGN</td> </tr> <tr> <td><input type="checkbox"/> B WINDOW2</td> <td>ZONE LO·HI, VEL SW</td> </tr> <tr> <td><input type="checkbox"/> C WINDOW3</td> <td>POLY, (MODE), RCV CH</td> </tr> <tr> <td><input type="checkbox"/> D WINDOW4</td> <td>TRANSPOSE, TUNE, LEVEL, OUTPUT</td> </tr> </table>	<input type="checkbox"/> EDIT	VOLUME, NAME	<input type="checkbox"/> A WINDOW1	SINGLE ASSIGN	<input type="checkbox"/> B WINDOW2	ZONE LO·HI, VEL SW	<input type="checkbox"/> C WINDOW3	POLY, (MODE), RCV CH	<input type="checkbox"/> D WINDOW4	TRANSPOSE, TUNE, LEVEL, OUTPUT								
<input type="checkbox"/> EDIT	VOLUME, NAME																		
<input type="checkbox"/> A WINDOW1	SINGLE ASSIGN																		
<input type="checkbox"/> B WINDOW2	ZONE LO·HI, VEL SW																		
<input type="checkbox"/> C WINDOW3	POLY, (MODE), RCV CH																		
<input type="checkbox"/> D WINDOW4	TRANSPOSE, TUNE, LEVEL, OUTPUT																		
WRITE	WRITE LINK 1ST~8TH																		
SYSTEM The functions in parentheses are available only on the K1.	<table border="0"> <tr> <td><input type="checkbox"/> SYS</td> <td>TUNE, TRANSPOSE, INT PROTECT, CARD PROTECT, CARD FORMAT, SAVE, LOAD</td> </tr> <tr> <td><input type="checkbox"/> TRS</td> <td>CH, PGM, (PRS), (BEND), (MOD), (HOLD), DATA DUMP</td> </tr> <tr> <td><input type="checkbox"/> RCV</td> <td>CH, OMNI, PGM, PRS, BEND, MOD, VOL, HOLD, VEL, EXCLUSIVE</td> </tr> </table>	<input type="checkbox"/> SYS	TUNE, TRANSPOSE, INT PROTECT, CARD PROTECT, CARD FORMAT, SAVE, LOAD	<input type="checkbox"/> TRS	CH, PGM, (PRS), (BEND), (MOD), (HOLD), DATA DUMP	<input type="checkbox"/> RCV	CH, OMNI, PGM, PRS, BEND, MOD, VOL, HOLD, VEL, EXCLUSIVE												
<input type="checkbox"/> SYS	TUNE, TRANSPOSE, INT PROTECT, CARD PROTECT, CARD FORMAT, SAVE, LOAD																		
<input type="checkbox"/> TRS	CH, PGM, (PRS), (BEND), (MOD), (HOLD), DATA DUMP																		
<input type="checkbox"/> RCV	CH, OMNI, PGM, PRS, BEND, MOD, VOL, HOLD, VEL, EXCLUSIVE																		
STICK CONTROL	STICK CONTROL																		
Controls The functions in parentheses are available only in the K1.	(PITCHBEND WHEEL), (MODULATION WHEEL), STICK, VOLUME, PATCH SELECT Switch, WRITE Switch, SYSTEM Switch, STICK Switch, POWER Switch, DC IN, OUTPUT R/MONO-L, PHONES JACK, CARD SLOT, MIDI IN·OUT·THRU																		
Display Dimensions (W x D x H)	16 x 2 LCD back lit K1 936 mm (36.9") x 260 mm (10.3") x 80 mm (3.2") K1m 370 mm (14.6") x 201 mm (7.9") x 58 mm (2.3")																		
Weight	K1 6.8 kg (15.1 lbs) K1m 1.3 kg (2.8 lbs)																		
Power consumption	K1 4.2 w K1m 4.1 w																		
Accessories	K1 AC adapter Owner's Manual Data format Audio cable K1m AC adapter Owner's Manual Data format MIDI cable																		

Note: Appearance and specifications subject to change without prior notice.

3. SEMICONDUCTORS LIST

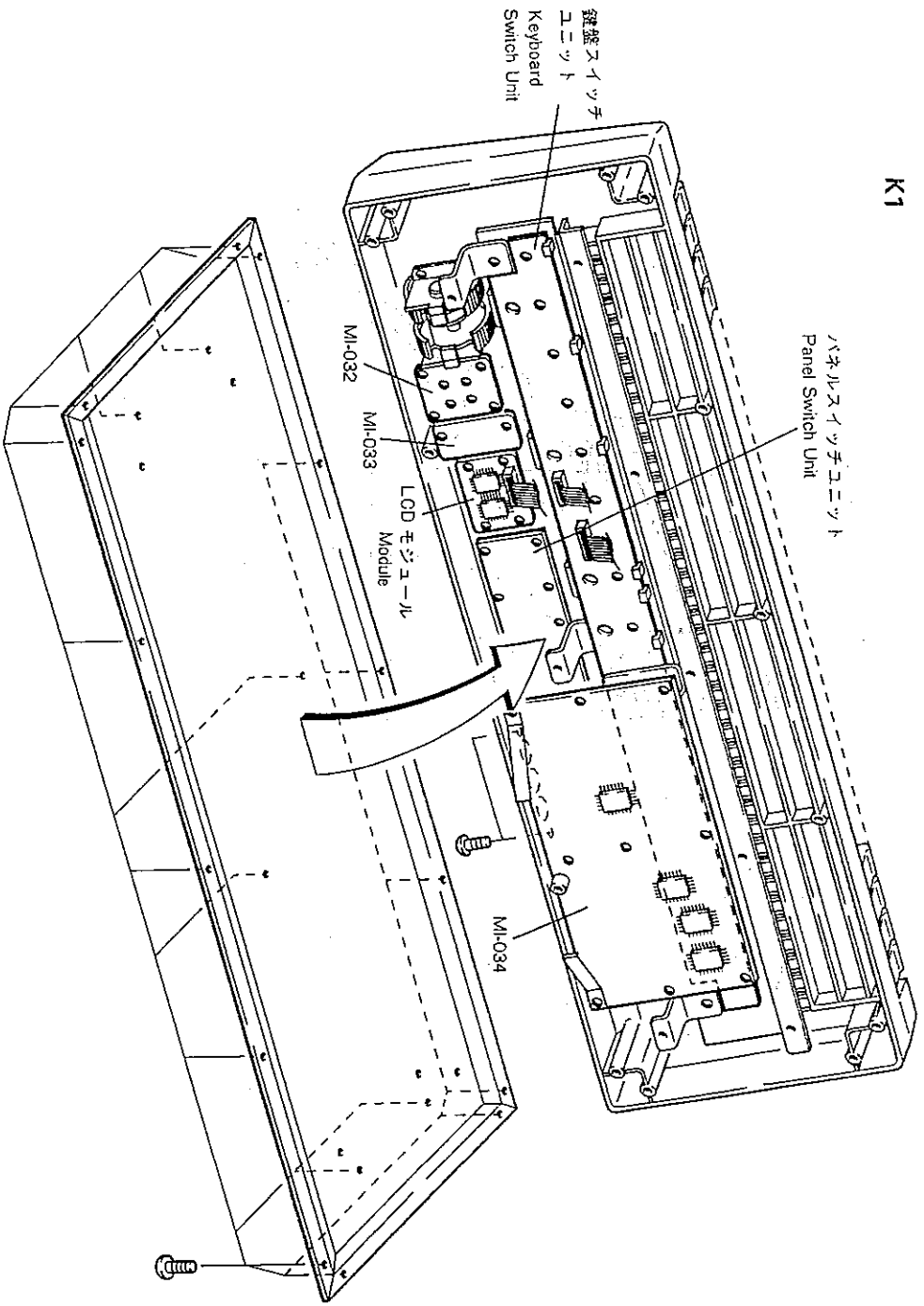
K1

IC	Code No.	Name	Pieces	Description
IC	803577	74HC352	2	Dual 4 To 1 Data Selectors
	803586	MB63H158FP	1	Touch Sensor
	804798	LC3564PL	2	8x8Kbits SRAM
	804920	M5F7805	1	Voltage Regulator
	804980	74HC107	2	Dual J-K Flipflop
	804981	74HC4538	1	Dual One Shot Multivibrator
	804982	MB3771	1	Reset
	804983	PD6355G	2	D/A Converter
	804984	TA7508P	1	Quard OP AMP
	804985	M5F7808L	1	Voltage Regulator
	804986	PD78310G-36	1	Micro Processing Unit
	804987	KTG-003	1	Tone Generator
	805026	LC3517BSL-15	2	8x2Kbits SRAM
	805043	TA75358P	1	Dual OP AMP
	915210	HM62304BP (MASKROM: P106)	1	8x512Kbits EPROM
	915450	27C256 (EPROM: P104)	1	8x32Kbits EPROM
TRANSISTOR	804988	ZSD1468SR	2	SINPN: Epitaxial Planar Type
ZENOR DIODE	803592	HZS-4ALL	1	
COIL	804831	SU10VD-10010	1	EMI Coil
FILTER	804999	5406	4	Low Pass Filter (16 KHZ)
LITHIUM BATTERY	802369	CR2032 (T14-1)	1	
CRYSTAL GENERATOR	803422	AT51 12 MHZ	1	
	804995	AT-51 12.8 MHZ	1	

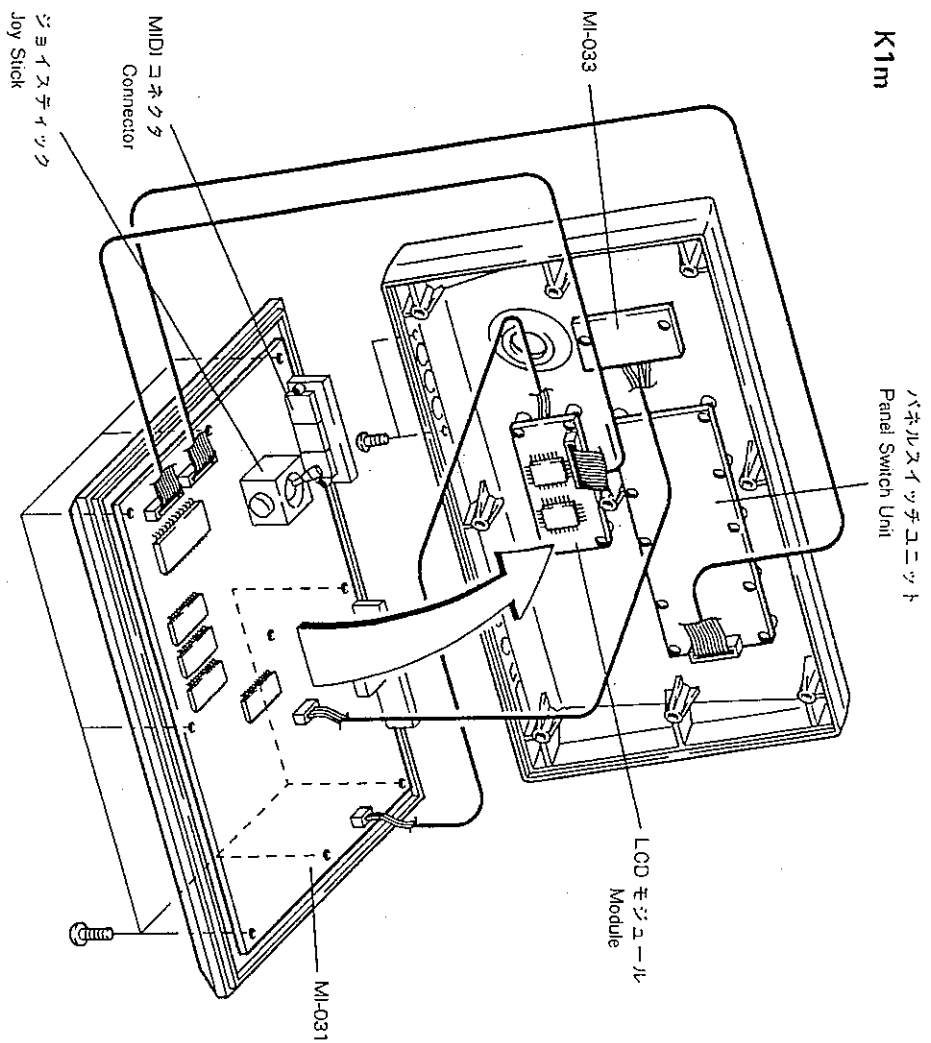
K1m

IC	Code No.	Name	Pieces	Description
IC	706951	SN74LS03N	1	Quadruple 2 Input Positive-NAND
	802361	TLP952	1	Gates with Open-Collector Outputs
	802835	MSM74HC139	1	Photo Coupler
	802842	MSM74HC373	1	Dual 2-To 4 Line Decoder
	803011	PCA556	1	Octal D-Type Latch with 3-State
	803394	KTG001	1	Output Non-Inverting
	803395	KTG002	1	Dual OP AMP
	804798	LC3564PL	1	Dual OP AMP
	804920	M5F7805	1	Tone Generator
	804980	74HC107	2	8x8Kbits SRAM
	804981	74HC4538	1	Voltage Regulator
	804982	MB3771	2	Dual J-K Flip-Flop with Clear
	804983	PD6355G	1	Dual Monostable Multivibrator
	804984	TA7508P	1	Reset
	804985	M5F7808L	1	D/A Converter
	804986	PD78310G-36	1	Quard OP AMP
	804987	KTG-003	1	Voltage Regulator
	915205	27C256 (EPROM: P105)	1	Micro Processing Unit
	915210	HM62304 (MASKROM: P106)	1	Tone Generator
TRANSISTOR	802508	ZSC3331T	2	8x32Kbits EPROM
	804988	ZSD1468SR	2	8x512Kbits MASKROM
DIODE	706301	IS2473	1	SINPN: Epitaxial Planar Type
	800625	1SS133	1	SINPN: Epitaxial Planar Type
	802364	MA-700	4	
	802898	DSK-10B	2	
ZENOR DIODE	803592	HZS-4ALL	1	
COIL	804831	SU10VD-10010	1	
FILTER	804999	5406	4	Low Pass Filter (16 KHZ)
LITHIUM BATTERY	802369	CR2032 (T14-1)	1	
CRYSTAL GENERATOR	803422	AT51 12 MHZ	1	
	804995	AT-51 12.8 MHZ	1	

4. PARTS LIST



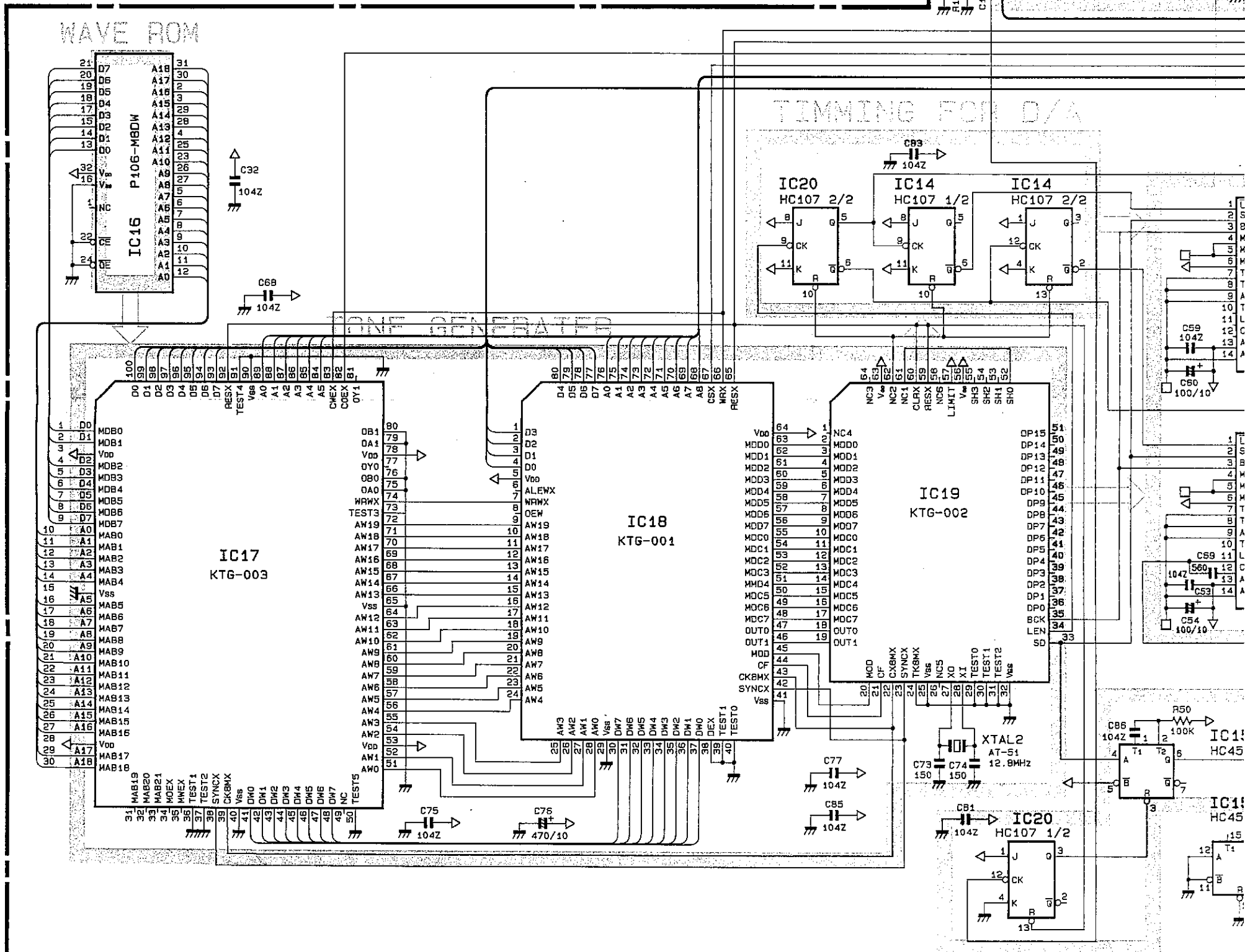
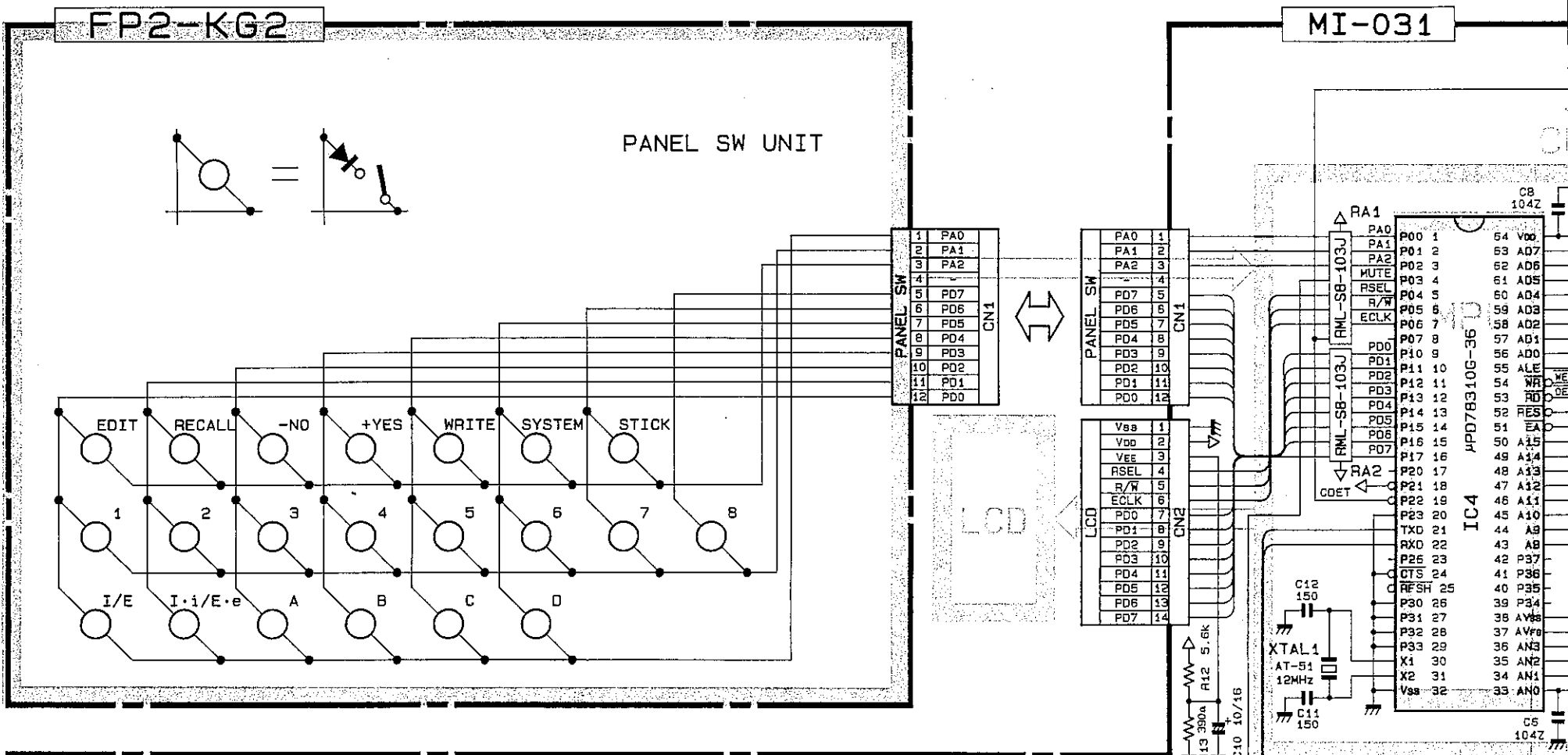
Code No.	Name	Pieces
804973	LCD DMC16202-LY1	1
804997	Power Switch SF-W2P1A-30BB	1
804998	DC/DC Converter SI-8201L	1
805040	Keyboard Assy (61key) ESK-8012C	1

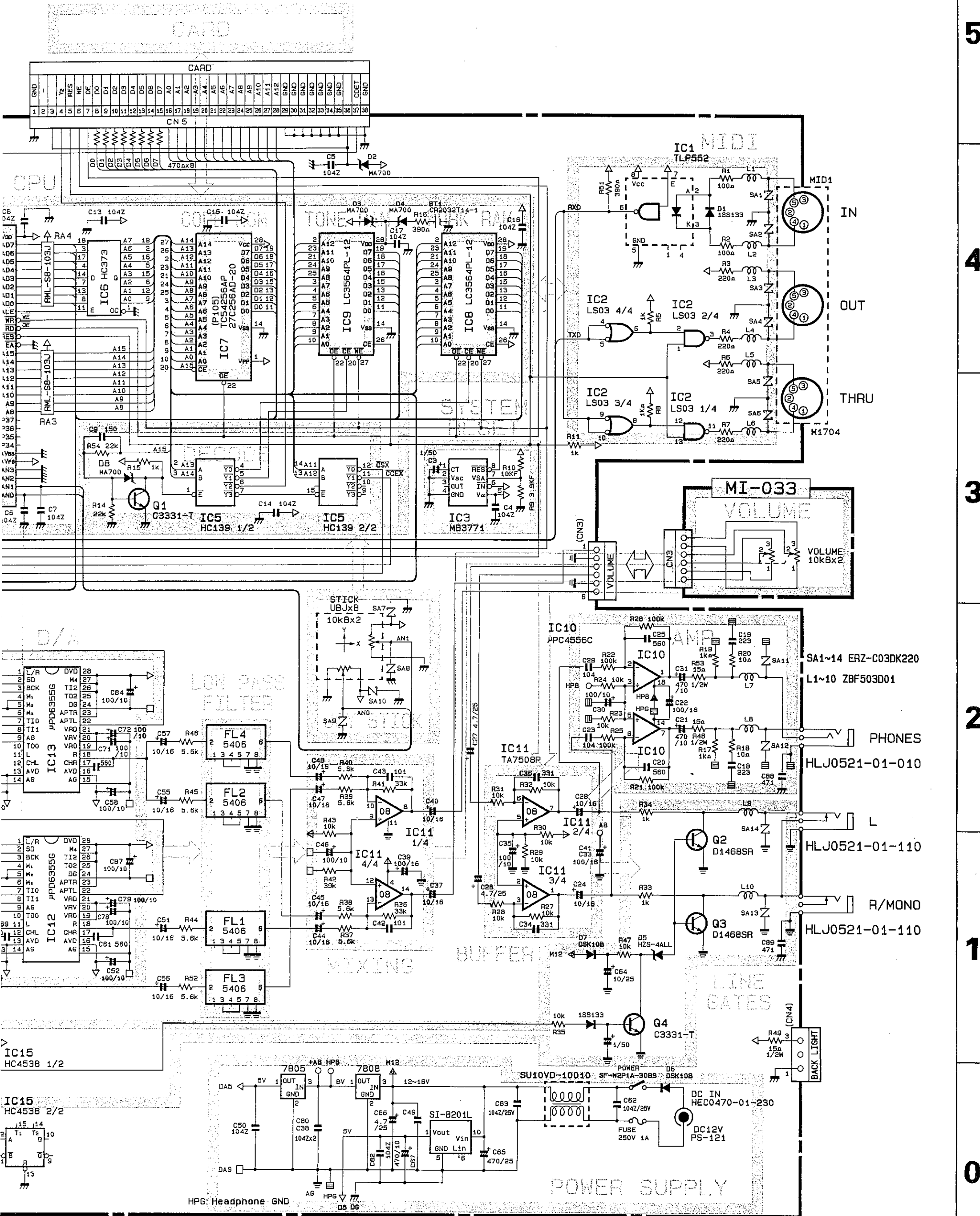


Code No.	Name	Pieces
804970	K1m Upper Case EMFD-1029&30	1
804971	K1m Lower Case EMFD-1031	1
804973	LCD DMC16202-LY1	1
804997	Power Switch SF-W2P1A-30BB	1

5. MI-031, FP2-KG2 CIRCUITS

K1m BLOCK DIAGRAM





IC15 HC4538 1/2

IC15 HC4538 2/2

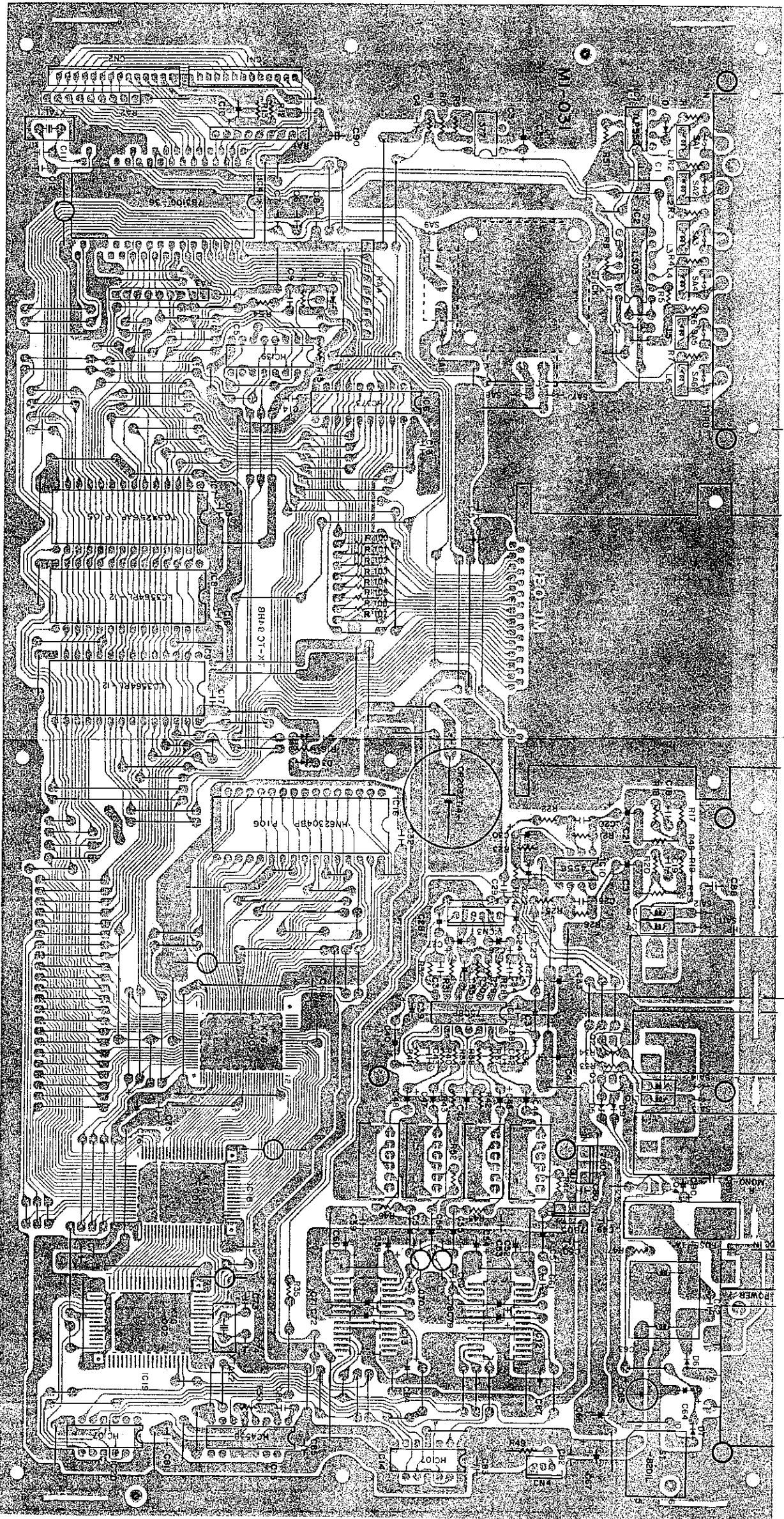
HPG: Headphone - GND

POWER SUPPLY

A B C D E F G H I

7. MI-034 PRINTED WIRING BOARD

FOR CARD	
1	GND
2	-
3	-
4	Y <sub>1</sub>
5	RES
6	WE
7	DE
8	D0
9	D1
10	D2
11	D3
12	D4
13	D5
14	D6
15	D7
16	A0
17	A1
18	A2
19	A3
20	A4
21	A5
22	A6
23	A7
24	A8
25	A8
26	A10
27	A11
28	A12
29	GND
30	GND
31	GND
32	GND
33	GND
34	GND
35	GND
36	-
37	COET
38	GND



PANEL SW	
PA0	12
PA1	11
PA2	10
-	9
PD7	8
PD6	7
PD5	6
PD4	5
PD3	4
PD2	3
PD1	2
PD0	1

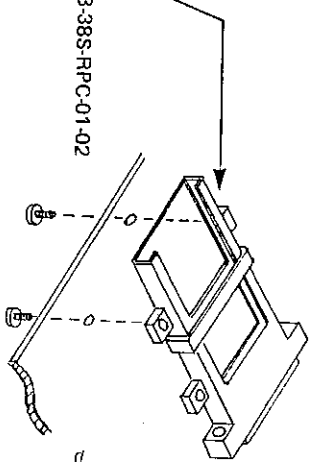
FOR LCD	
VSS	14
VDD	13
VEE	12
RSEL	11
R/W	10
EOLK	9
PD0	8
PD1	7
PD2	6
PD3	5
PD4	4
PD5	3
PD6	2
PD7	1

<CN4>	
1	308
2	NC
3	GND

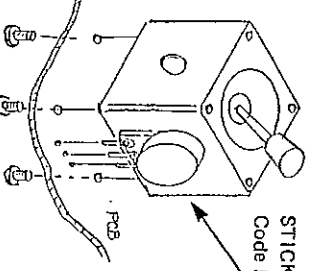
  

<CN3>	
1	
2	
3	
4	
5	
6	

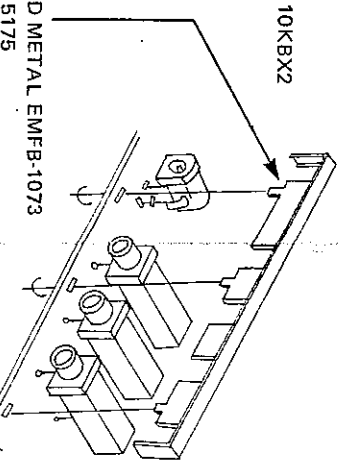
CONNECTOR DICM3-38S-RPC-01-02  
Code No. 804996



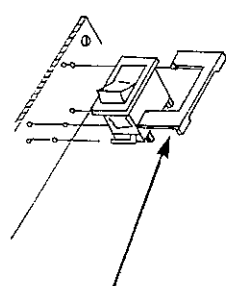
STICK VOLUME UBXXB 10KBX2  
Code No. 804994



JACK FIXED METAL EMFB-1073  
Code No. 915175



FIXED METAL 220228A  
Code No. 915225



FUSE	
MI-031 (1) Japan	TSC 1A
MI-031 (2) U.S.A.	MT4 1A
MI-031 (3) Canada	MT4 1A
MI-031 (4) Europe	SET 1A
	TO.1 EFZ0535

0

1

2

3

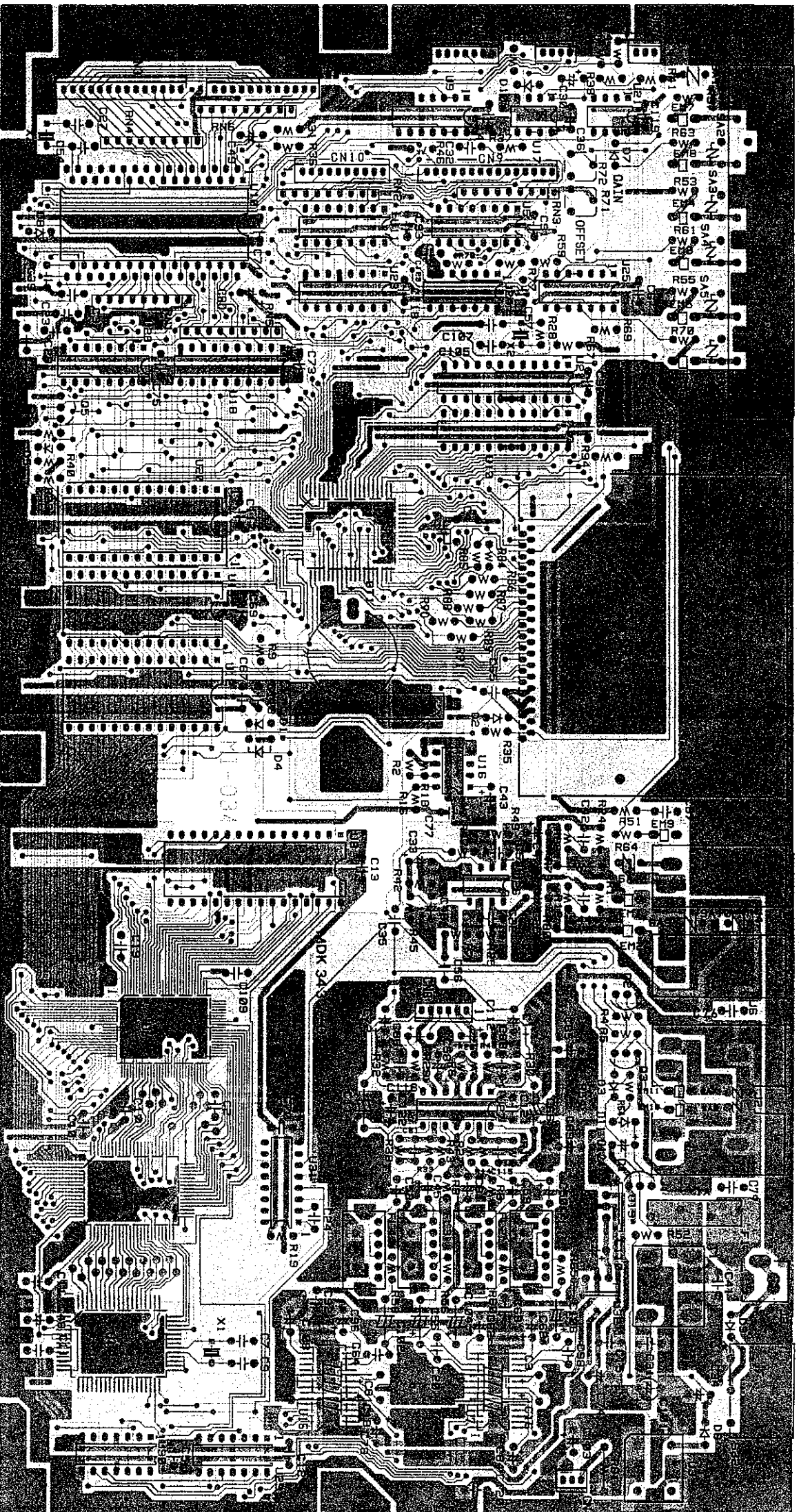
4

5

6

A B C D E F G H I

6. MI-031 PRINTED WIRING BOARD



FORM KEYBOARD														
KD20	15													
KD11	14													
KD21	13													
KD12	12													
KD22	11													
KD13	10													
KD23	9													
KD14	8													
KD24	7													
KD15	6													
KD25	5													
KD16	4													
KD26	3													
KD17	2													
KD27	1													

FOR PRESS			STICK			FOR BEND			PANEL SW FP2-KG-2			FOR LCD		
2B1	3		+5	4		+5	7		PA0	12		VSS	14	
NC	2		ANI	3		267	5		PA1	11		VDD	13	
GND	1		AND	2		268	4		PA2	10		VEE	12	
			GND	1		269	3		PD7	8		ISEL	11	
						GND	2		PD6	7		R/W	10	
							1		PD5	6		ECLK	9	
									PD4	5		P00	8	
									PD3	4		P01	7	
									PD2	3		P02	6	
									PD1	2		P03	5	
									P00	1		P04	4	
												P05	3	
												P06	2	
												P07	1	

FOR CARD	
1	GND
2	-
3	11B
4	Y <sub>2</sub>
5	RES
6	WE
7	OE
8	DO
9	D1
10	D2
11	D3
12	D4
13	D5
14	D6
15	D7
16	A0
17	A1
18	A2
19	A3
20	A4
21	A5
22	A6
23	A7
24	A8
25	A9
26	A10
27	A11
28	A12
30	GND
31	GND
32	GND
33	GND
34	GND
35	GND
36	
37	CDET
38	GND

POWER JACK HEC0470-01-230  
Code No. 803363

CONNECTOR DICM3-38S-RPC-01-02  
Code No. 804996

JACK FIXED METAL EMFB-1073  
Code No. 915175

FUSE

MI-034 (1) Japan	TSC 1A	
MI-034 (2) U.S.A.	MT4 1A	1A 250V EFZ-0201
MI-034 (3) Canada	MT4 1A	1A 250V EFZ-0201
MI-034 (4) Europe	SET 1A	T0.1 EFZ-0535

POWER SWITCH SF-W2P1A-30BB  
Code No. 804997

FIXED METAL 220228A  
Code No. 915225

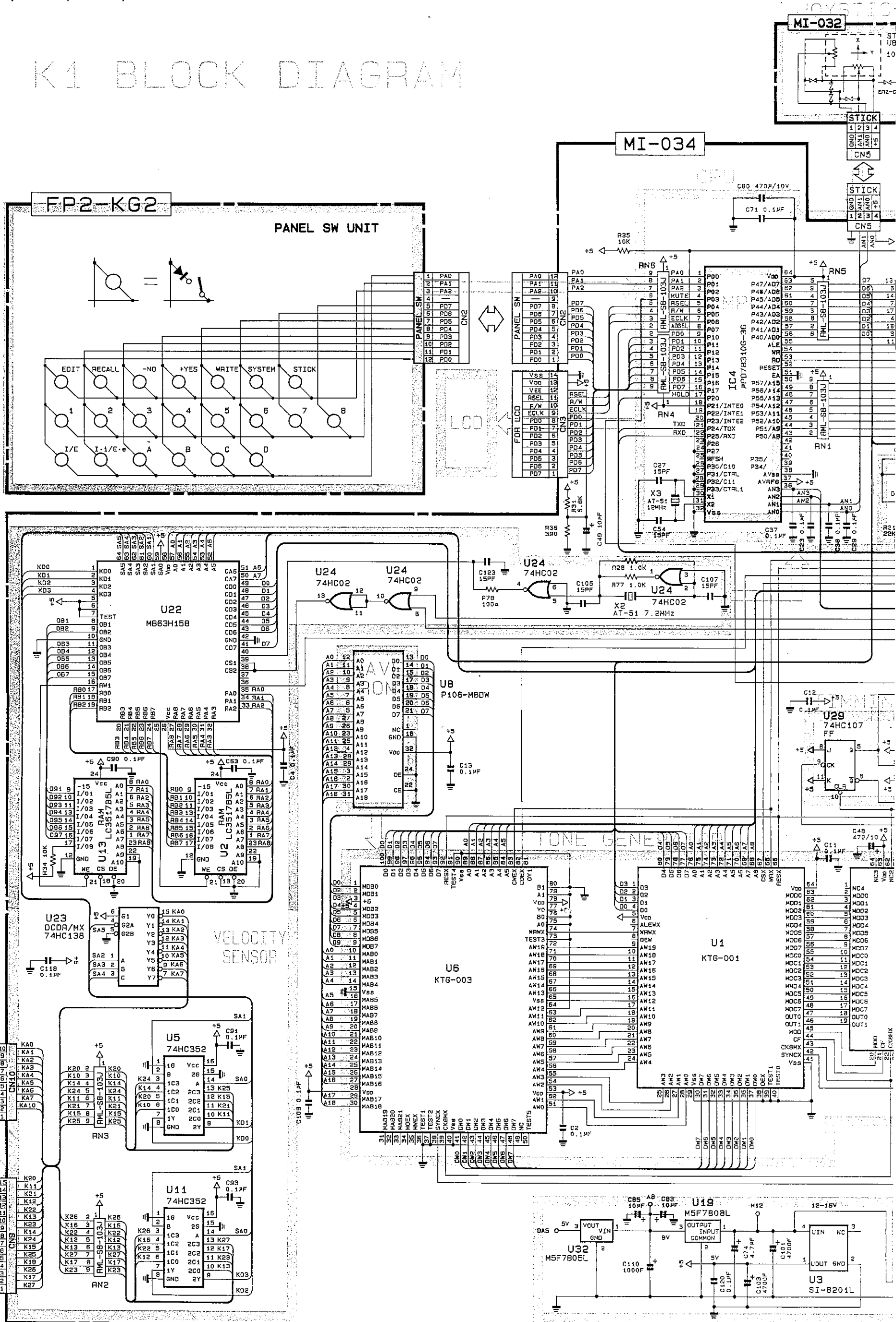
<CN4>		
1	30B	
2	NC	
3	GND	

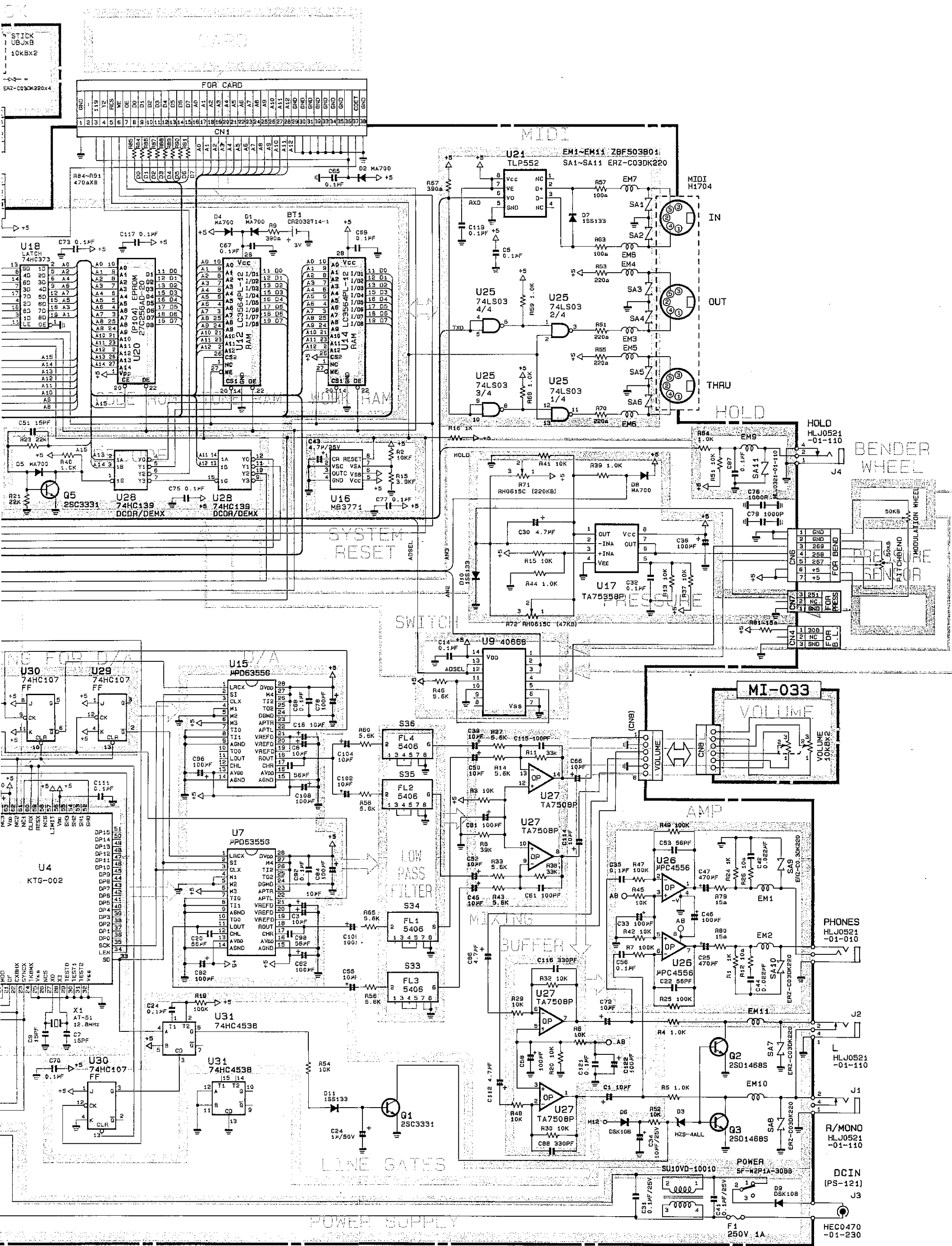


8. MI-032, MI-033, MI-034, FP2-KG2 CIRCUITS

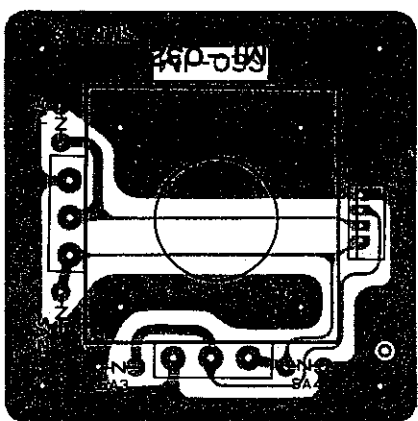
K1 BLOCK DIAGRAM

5  
4  
3  
2  
1  
0

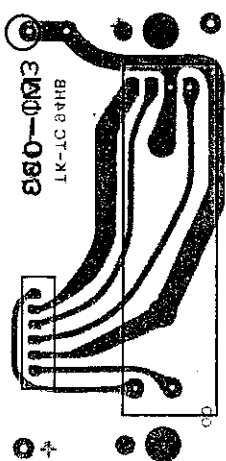




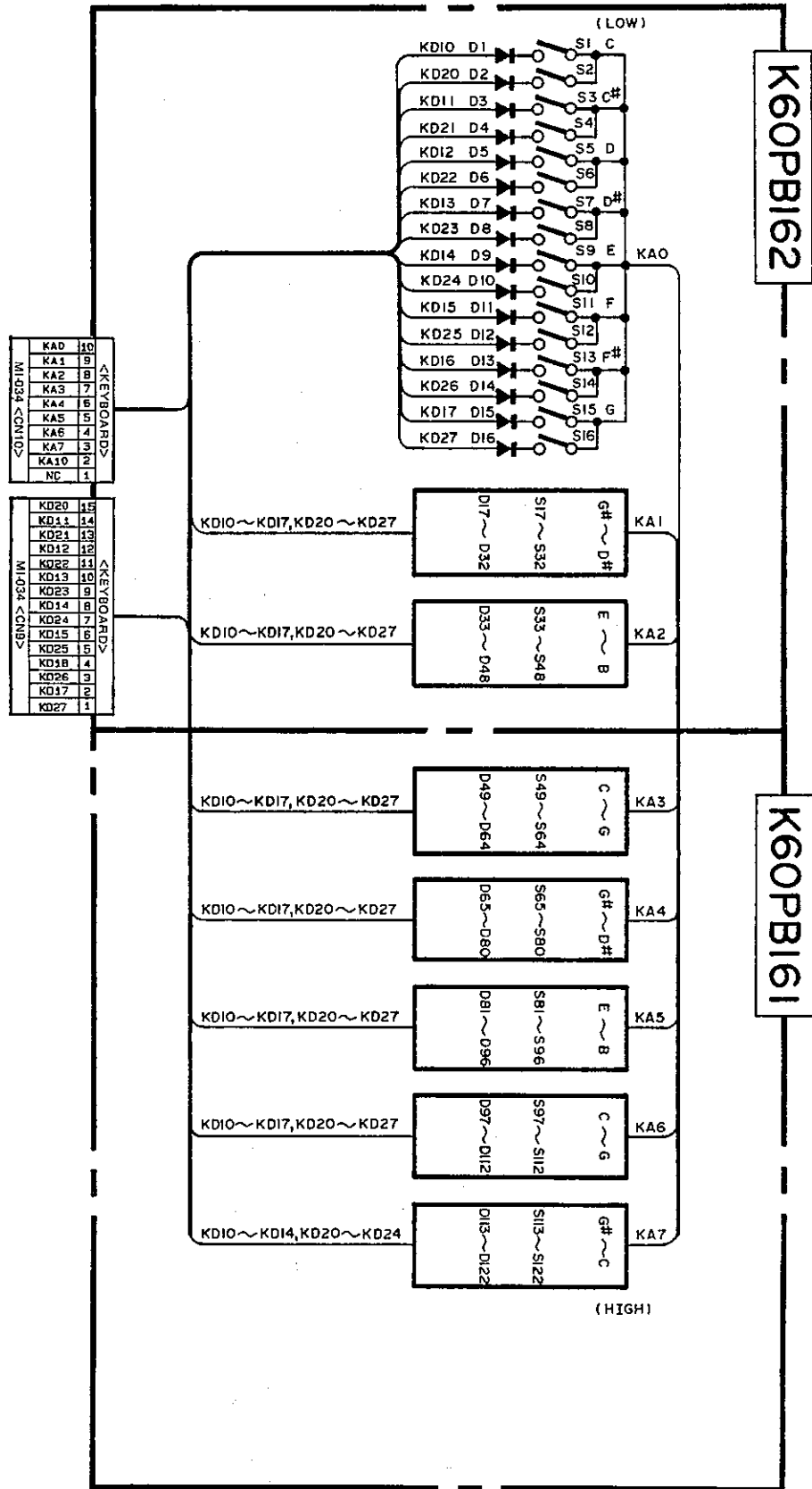
9. MI-032, MI-033 PRINTED WIRING BOARDS



	1	GND	<CNS>
	2	AN1	
	3	AN0	
STICK	4	+5	

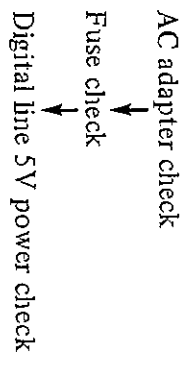


	1	<CNS>
	2	
	3	
	4	
	5	
VOLUME	6	

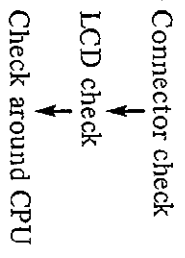


11. TROUBLESHOOTING

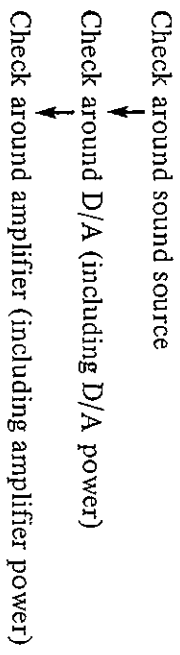
① Noting appears on LCD display And backlight does not go on.



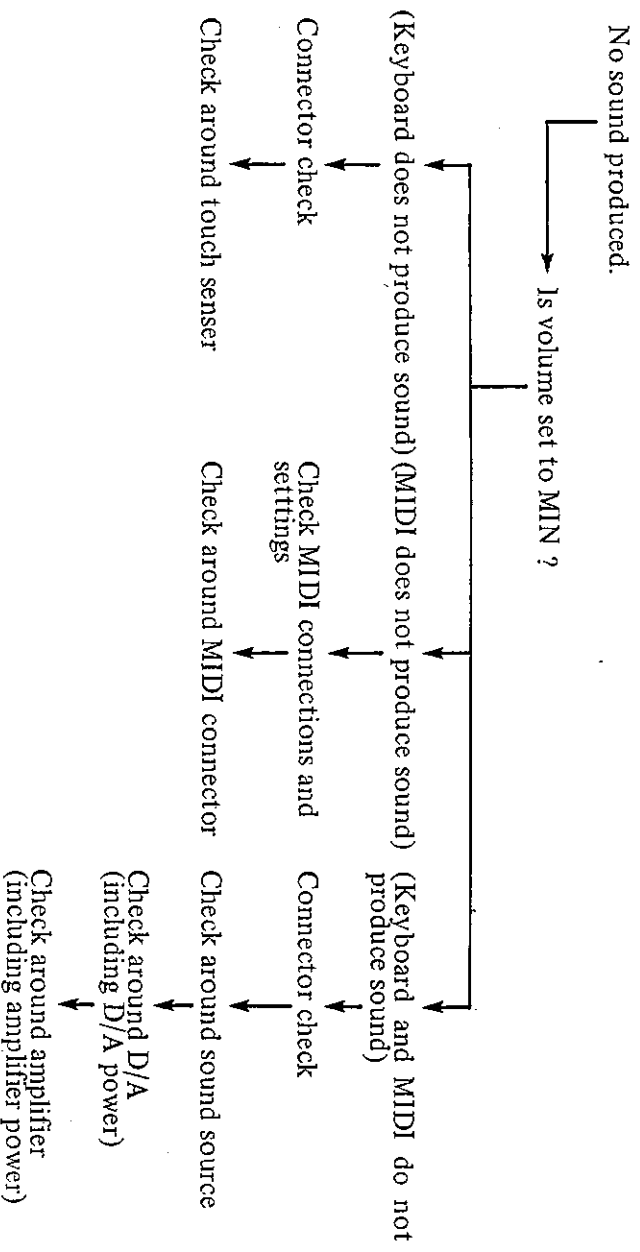
② Backlight goes on but display is abnormal.



③ Sound is abnormal

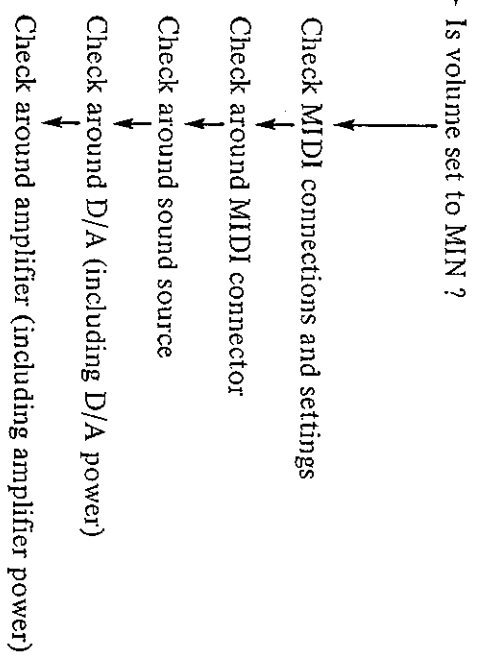


④ K1



K1m

No sound produced.



13. TERMINAL DESCRIPTION

	DESCRIPTION	MODEL		DESCRIPTION	MODEL
119	Power of Card		KD11		
251	Pressure Input		KD12		
267	Bender Input		KD13		
268	Pitch Bender Center Tap	K1	KD14	Keyboard Scan Address Bass (First Terminal)	
269	Modulation Wheel Input		KD15		
308	Power Source of LCD Back Light		KD17		
+5	Digital 5V		KD18		
A0	Address Bass	K1	KD20	Keyboard Scan Address Bass (Second Terminal)	
A1			KD21		
A10			KD22		
A11			KD23		
A12			KD24		
A2			KD25		
A3			KD26		
A4			KD27		
A5			NC		
A6			OE		
A7			OE		
A8			OE		
A9	PA0	K1&K1m	PA1	Panel Scan Address Bass	
AN0	A/D Input (JOY STICK X-axis)		PA2		
AN1	A/D Input (JOY STICK Y-axis)				
CDET	Card Detect				
D0	Date Bass	K1&K1m	PD0	Panel Data Bass	
D1			PD1		
D2			PD2		
D3			PD3		
D4			PD4		
D5			PD5		
D6			PD6		
D7	PD7				
ECLK	Latch Enable Clock		R/W	Read/Write	
GND	Ground		RES	Reset	
KA0	Key Board Scan Address Bass	K1	RSEL	Register Select	
KA1			VDD	Power Source of MOS IC	
KA10			VEE	Power Source of MOS IC	
KA2			VOLUME	Volume	
KA3			VSS	GND of MOS IC	
KA4			WE	Write Enable	
KA5			Y2	Chip Enable	
KA6					
KA7					