

16bit DIGITAL SYNTHESIZER (MODULE)

K4/K4r

SERVICE MANUAL

KAWAI

Kawai Musical Instrument
Manufacturing Co., Ltd.

CONTENTS

1.	P.W.B. INFORMATION	1
2.	SEMICONDUCTORS LIST	2
3.	PARTS LIST For K4	2
4.	DISASSEMBLY DRAWING For K4	3
5.	PARTS LIST For K4r	4
6.	DISASSEMBLY DRAWING For K4r	4
7.	K4 BLOCK DIAGRAM	5
8.	K4r BLOCK DIAGRAM	6
9.	MI-051 PRINTED WIRING BOARD For K4	7
10.	MI-051 CIRCUIT For K4	8
11.	MI-056 CIRCUIT For K4r	9
12.	MI-056 PRINTED WIRING BOARD For K4r	10
13.	MI-052, 053, 054, 055 PRINTED WIRING BOARDS	11
14.	MI-052, 053, 054, 055 CIRCUITS	12
15.	MI-057, 058, 059 PRINTED WIRING BOARDS	13
16.	MI-057, 058, 059 CIRCUITS	14
17.	K60PB161, 162 (KEYBOARD) CIRCUITS	15
18.	TROUBLESHOOTING	16

1. P.W.B. INFORMATION

K4

P.W.B. Name	Code No.	Description
MI-051 (1) : Japan 110V Markets 220/240V Markets (2) : U.S.A., Canada (3) : Australia, U.K., West Germany Europe	236283 236284 236285	MI-051 : MPU, CARD BUFFER, RESET, RAM, CODE ROM, ADDRESS DECODER, DCO, DCA, KEY SCAN, VELOCITY SENSOR, WAVE ROM, DCF, EFFECT, PAN POT, LINE GATE, MIDI, AUDIO, D/A, POWER SUPPLY
MI-052-055 (1) : All Markets	236286	MI-052 : PRESSURE SENSOR MI-053 : VOLUME MI-054 : DATA ENTRY (VALUE) MI-055 : PANEL SWITCHES

K4r

P.W.B. Name	Code No.	Description
MI-056-059 (1) : Japan 110V Markets 220/240V Markets (2) : U.S.A., Canada (3) : Australia, U.K., West Germany Europe	236290 236291 236292	MI-056 : MPU, CARD BUFFER, RESET, RAM, CODE ROM, ADDRESS DECODER, DCO, DCA, WAVE ROM, DCF, PAN POT, MIDI, AUDIO, D/A, POWER SUPPLY MI-057 : PANEL SWITCHES MI-058 : VOLUME MI-059 : DATA ENTRY (VALUE)

2. SEMICONDUCTORS LIST

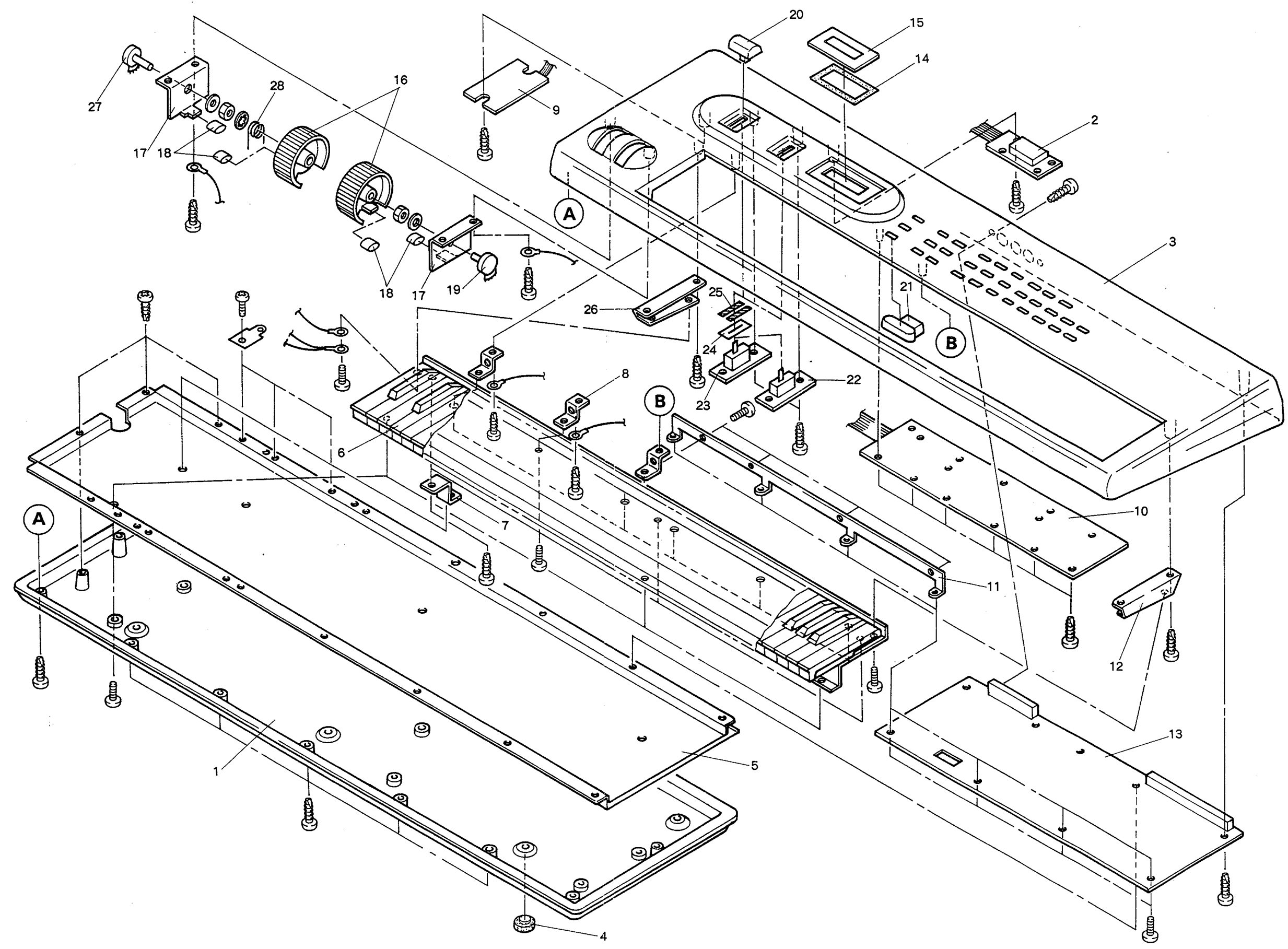
	Code No.	Name	Description	K4 Pieces	K4r Pieces	
IC	706939	SN74LS138	3-To 4 Line Decoder	1		
	706990	TA75558P	Dual OP AMP		3	
	707019	NJM-4556D	Dual OP AMP	1	1	
	801926	TC74HC08	Quad 2-Input AND Gate	1	1	
	802832	MSM74HC04	Hex Inverter	1	3	
	802835	MSM74HC139	Dual 2-To 4 Line Decoder	1	1	
	802837	MSM74HC174	Hex D-Type Flip Flop	1	3	
	802838	MSM74HC244	Octal 3-State Bus Buffer	2	2	
	802842	MSM74HC373	Octal D-Type Latch with 3-State Output		1	
	802931	MSM74HC02	Quad 2-Input NOR Gate	1		
	802935	MSM74HC245	Octal 3-State Bus Transceiver	1	1	
	803005	MSM74HC00	Quad 2-Input NAND Gate	1	5	
	804981	74HC4538	Dual Monostable Multivibrator	1		
	804982	MB3771	Reset	1	1	
	804984	TA7508P	Quad OP AMP	1	1	
	804986	PD78310G-36	Micro Processing Unit	1	1	
	805043	TA75358P	Dual OP AMP	2		
	805065	HM62256LP-15SL	8 x 32Kbits SRAM	1	1	
	805129	TC74LS03	Quad 2- input NAND Gate with Open Colector Output	1	1	
	805727	TLP513	PHOTO Coupler	1	1	
	805758	K005FP : FP64P	Key Scanner	1		
	805759	K007FP : FP100P	EFFECTOR	1		
	805760	TC51832SP-12	8 x 32Kbits PSRAM	2		
	805823	K002FP : FP100P	Tone Generater	2	2	
	805979	K004FP : FP80P	Pan Pot	1	1	
	805980	K008FP : FP80P	Digital Filter	1	1	
	805981	PCM66P : FP20P	D/A Converter	1	4	
	805982	MC7809CT	Regurator	1	1	
	805983	PC78L05J	Regurator	1	1	
	919345	TC534000P MASKROM : P202	8 x 512Kbits MASK ROM	1	1	
	919350	TC534000P MASKROM : P203	8 x 512Kbits MASK ROM	1	1	
	919355	TC534000P MASKROM : P204	8 x 512Kbits MASK ROM	1	1	
	919360	27C512-20 EPROM : P206	8 x 64Kbits EPROM ROM	1		
	919685	27C512-20 EPROM : P207	8 x 64Kbits EPROM ROM		1	
	Transistor	802508	2SC3331T	SiNPN : Epitaxial Planar Type	1	1
		805984	2SD1468SR		2	8
		805985	RN1202		1	
		806089	DTC114ES			1
	Fet	805986	2SK371GR		2	8
	Diode	800625	1SS133		33	32
		805987	HPG06D		2	2
		805988	MA700		5	3
Zenor Diode	805989	HZS4A-LL		1	8	
	806200	HZS3C3		1		
Crystal	803422	AT-51B	12MHz	1	1	

3. PARTS LIST For K4

K4

No.	Code No.	Name	Pieces	Country
	803349	AC Adapter PS-121 D	1	Japan
	803350	AC Adapter PS-121 U	1	U.S.A., CSA, 110V Markets
	803351	AC Adapter PS-121 N	1	200V Markets
	803352	AC Adapter PS-121 S	1	Australia
	804351	AC Adapter PS-121 G	1	U.K., 220/240V Markets
	804504	AC Adapter PS-121 W	1	West Germany
	803363	Power Jack	1	All Markets
	805123	Fuse TSC 1A 250V	1	Japan
	803622	Fuse MT4 1A 250V	1	U.S.A., Canada
	803628	Fuse SET 1A	1	Europe
	805000	Jack	3	All Markets
	805736	MIDI Connector	1	All Markets
	806046	Lithium Battery	1	All Markets
	805439	Power Supply Switch	1	All Markets
1	806017	Lower Case	1	All Markets
2	806008	LCD : DMC16205-NY-LY1	1	All Markets
3	806016	Upper Case	1	All Markets
4	806023	Rubber leg	5	All Markets
5	919380	Lower Base	1	All Markets
6	805040	Keyboard (61keys)	1	All Markets
7	915435	Keyboard support metal	3	All Markets
8	915430	Fixing metal for panel	6	All Markets
9	236286	MI-052 (1)	1	All Markets
10	236286	MI-055 (1)	1	All Markets
11	919385	Fixing metal for Main P.W.B.	1	All Markets
12	915405	Fixing metal for Keyboard (R)	1	All Markets
13	236283	MI-051 (1)	1	Japan, 110/220/240V
	236284	MI-051 (2)	1	U.S.A., Canada
	236285	MI-051 (3)	1	Australia, U.K., West Germany
14	805341	LCD tape	1	All Markets
15	804967	LCD cover	1	All Markets
16	805037	Wheel 3	2	All Markets
17	915415	Fixing metal for wheel	2	All Markets
18	805038	Rubber for stopper	3	All Markets
19	805995	Volume : RK163110 50K	1	All Markets
20	806018	Volume knob	2	All Markets
21		Knob 1	3	All Markets
		Knob 2	4	All Markets
		Knob 4	5	All Markets
22	236286	MI-054 (1)	1	All Markets
23	236286	MI-053 (1)	1	All Markets
24	806201	S.V. cover	2	All Markets
25	803498	Scotch tape	4	All Markets
26	915410	Fixing metal for Keyboard (L)	1	All Markets
27	805996	Volume T(C,T):RK163110 50K	1	All Markets
28	915955	Wheel spring 3	1	All Markets

4. DISASSEMBLY DRAWING For K4

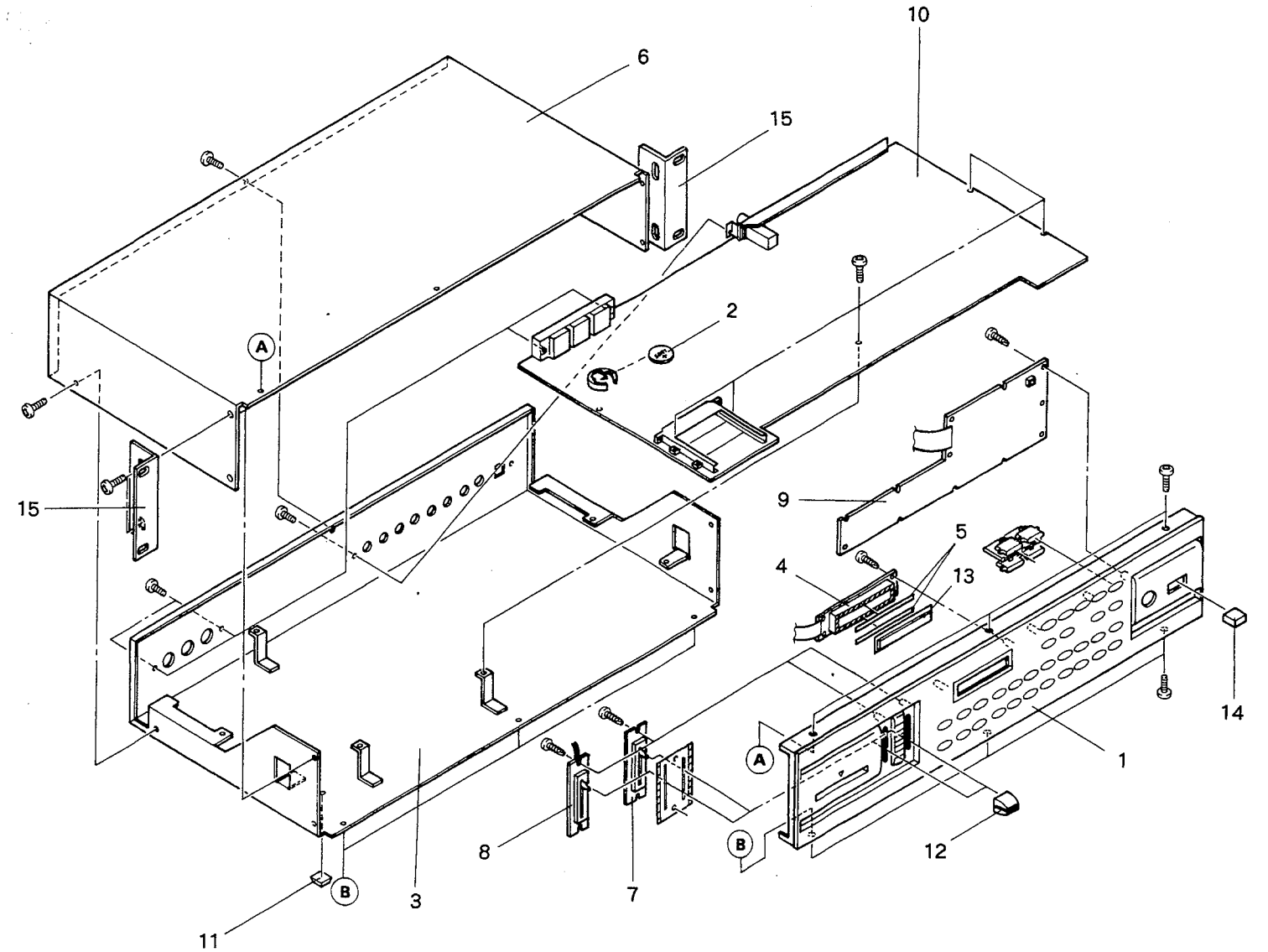


5. PARTS LIST For K4r

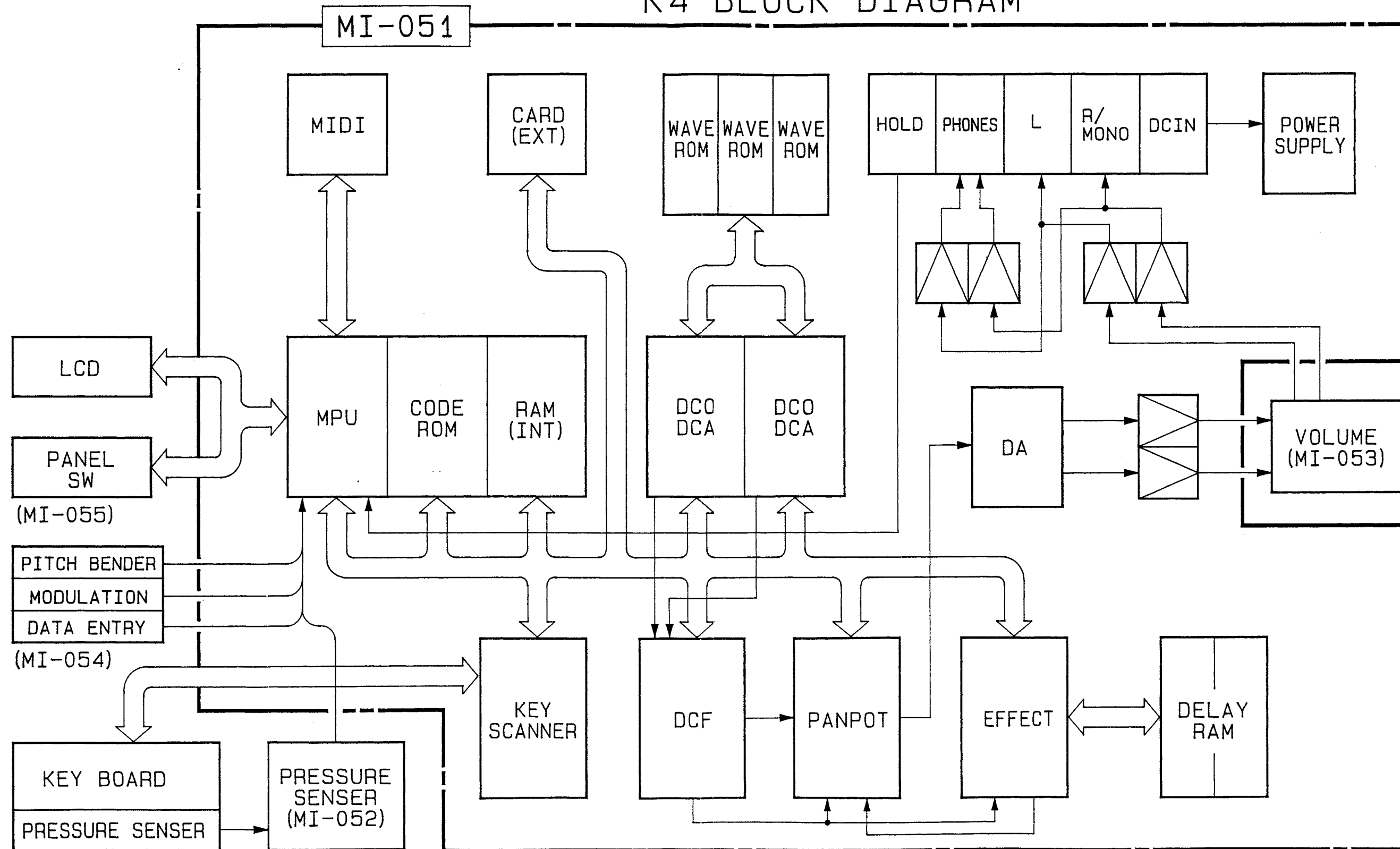
K4r

No.	Code No.	Name	Pieces	Country
	803349	AC Adapter PS-121 D	1	Japan
	803350	AC Adapter PS-121 U	1	U.S.A., CSA, 110V Markets
	803351	AC Adapter PS-121 N	1	200V Markets
	803352	AC Adapter PS-121 S	1	Australia
	804351	AC Adapter PS-121 G	1	U.K., 220/240V Markets
	804504	AC Adapter PS-121 W	1	West Germany
	803363	Power Jack	1	All Markets
	805123	Fuse TSC 1A 250V	1	Japan
	803622	Fuse MT4 1A 250V	1	U.S.A., Canada
	803628	Fuse SET 1A	1	Europe
	805000	Jack	8	All Markets
	805736	MIDI Connector	1	All Markets
	806070	Power Supply Switch	1	All Markets
1	806072	Front panel	1	All Markets
2	806046	Lithium Battery : CR2032	1	All Markets
3	919695	Lower Case	1	All Markets
4	806071	LCD : DMC16205-NY-LY1	1	All Markets
5	803501	Scotch tape	2	All Markets
6	919690	Upper Case	1	All Markets
7	236290	MI-059 (1)	1	Japan, 110/220/240V
	236291	MI-059 (2)	1	U.S.A., Canada
	236292	MI-059 (3)	1	Australia, U.K., West Germany
8	236290	MI-058 (1)	1	Japan, 110/220/240V
	236291	MI-058 (2)	1	U.S.A., Canada
	236292	MI-058 (3)	1	Australia, U.K., West Germany
9	236290	MI-057 (1)	1	Japan, 110/220/240V
	236291	MI-057 (2)	1	U.S.A., Canada
	236292	MI-057 (3)	1	Australia, U.K., West Germany
10	236290	MI-056 (1)	1	Japan, 110/220/240V
	236291	MI-056 (2)	1	U.S.A., Canada
	236292	MI-056 (3)	1	Australia, U.K., West Germany
11	806083	Foot (black)	4	All Markets
12	806080	Volume knob	2	All Markets
13	806081	LCD cover	1	All Markets
14	802715	Knob (black)	1	All Markets
15	909630	Rack Adapter	2	All Markets

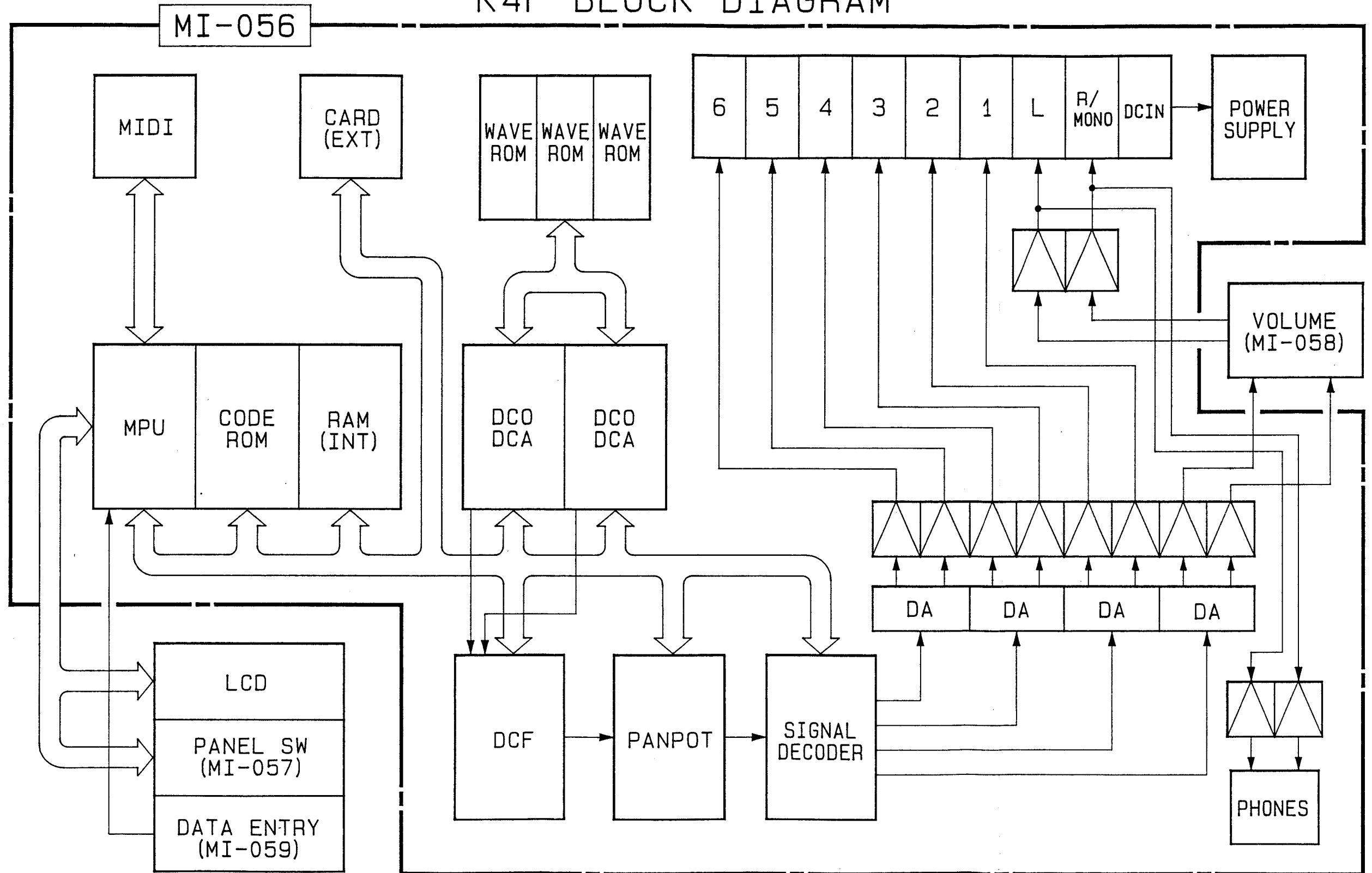
6. DISASSEMBLY DRAWING For K4r



K4 BLOCK DIAGRAM



K4r BLOCK DIAGRAM



A**B****C****D****E****F****G****H****I****9. MI-051 PRINTED WIRING BOARD For K4****6****6****5****5****4****4****3****3****2****2****1****1****0****0**

LCD MODULE	
GND	15
+ 5	14
VEF	13
RSEL	12
R/W	11
ECLK	10
PD0	8
PD1	8
PD2	7
PD3	6
PD4	5
PD5	4
PD6	3
PD7	2
K	1

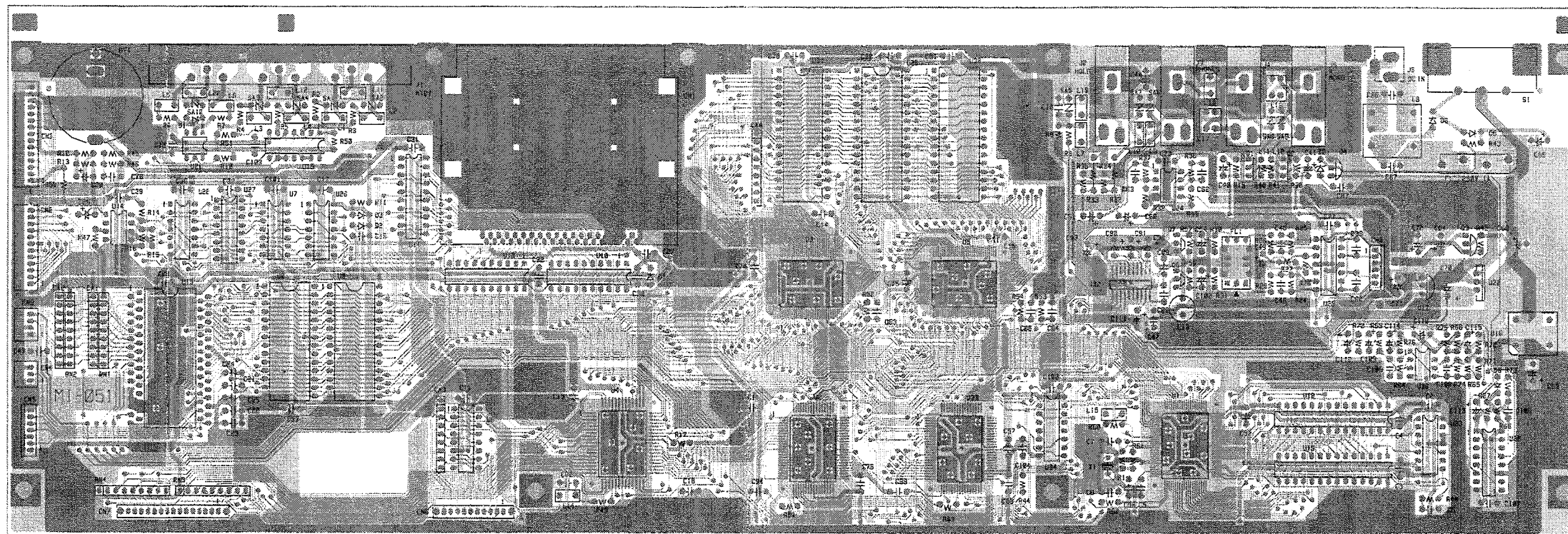
MI-055	
PA0	12
PA1	11
PA2	10
PA3	9
PD7	8
PD6	7
PD5	6
PD4	5
PD3	4
PD2	3
PD1	2
PD0	1

MI-052	
+ 9	4
AN3	3
+ 5	2
GND	1

MI-054	
+ 5	3
AN0	2
GND	1

PITH BENDER MODULATION WHEEL	
+ 5	7
P36	6
AN1	5
P37	4
+ 5	3
AN2	2
GND	1

< CN1 >																																																																											
1	GND	2	VDD	3	CARD	4	CRT	5	CWE	6	CDE	7	CD0	8	CD1	9	CD2	10	CD3	11	CD4	12	CD5	13	CD6	14	CD7	15	CA0	16	CA1	17	CA2	18	CA3	19	CA4	20	CA5	21	CA6	22	CA7	23	CA8	24	CA9	25	CA10	26	CA11	27	CA12	28	CA13	29	GND	30	GND	31	GND	32	GND	33	GND	34	GND	35	GND	36	VDD	37	CD1ET	38	GND

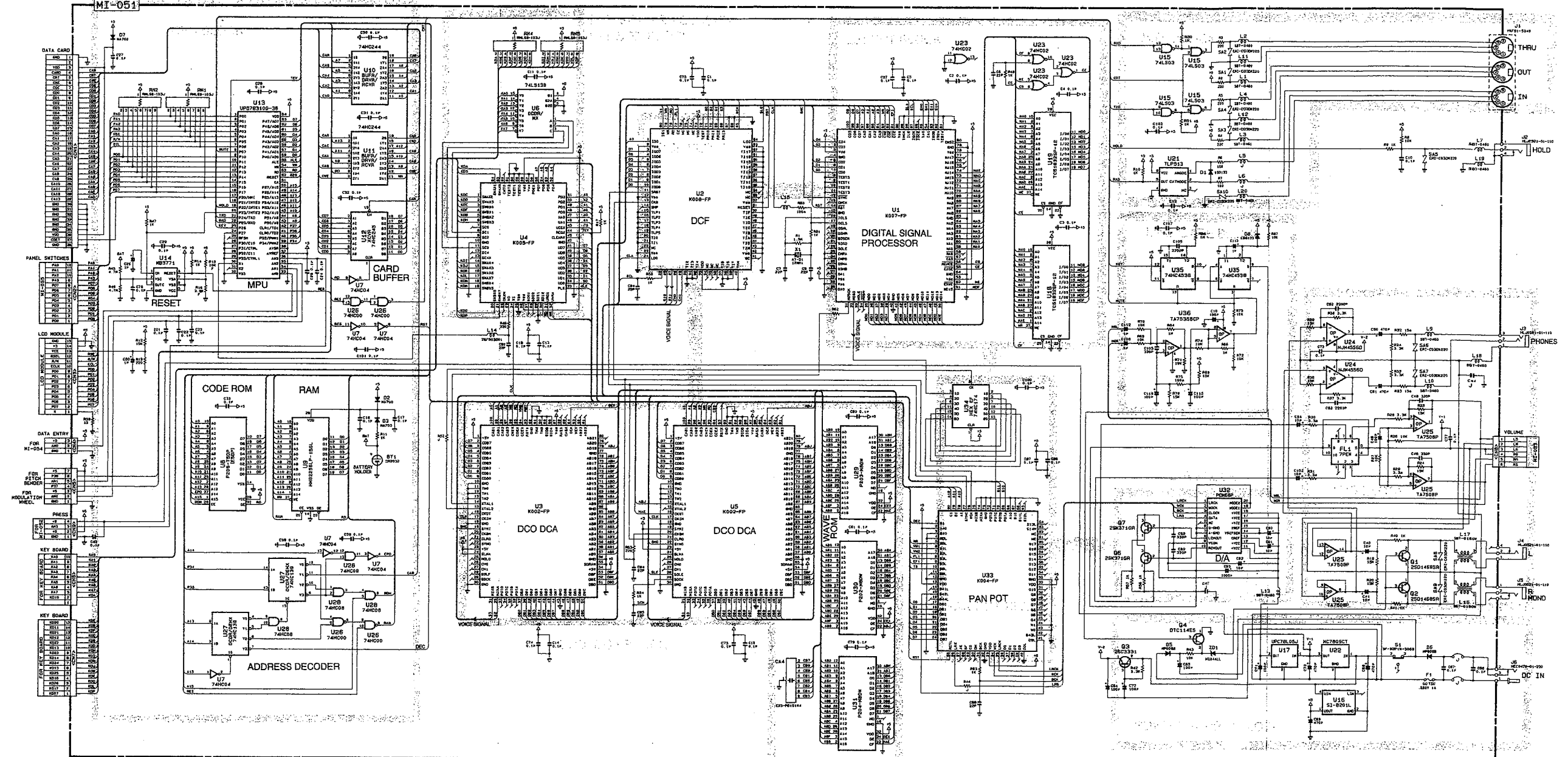


MI-053	
1	LS
2	LR
3	LG
4	RG
5	RR
6	RS

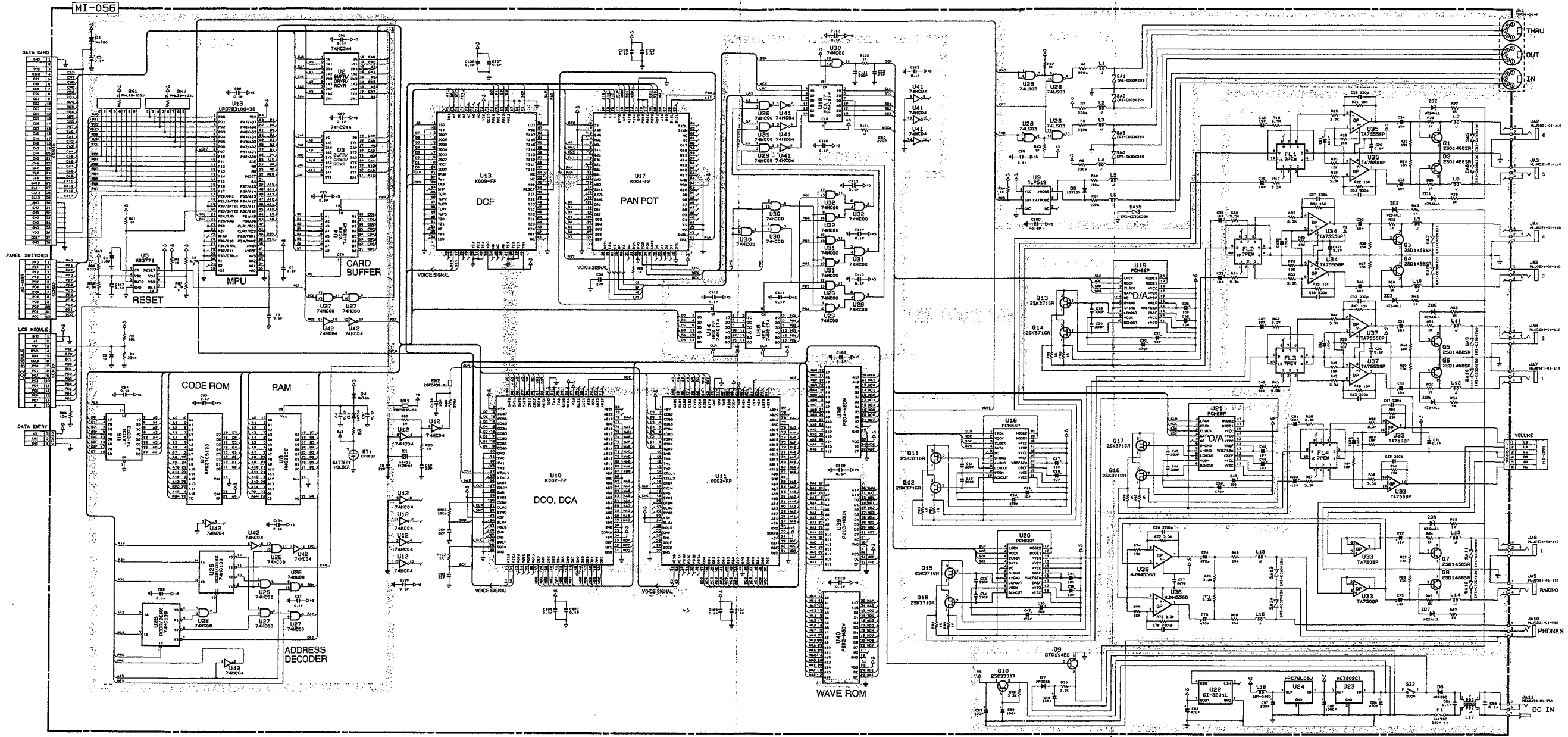
< CN7 >																													
KD20	15	KD11	14	KD21	13	KD12	12	KD22	11	KD13	10	KD23	9	KD14	8	KD24	7	KD15	6	KD25	5	KD16	4	KD26	3	KD17	2	KD27	1
KEY BOARD																													

< CN6 >																			
KA0	10	KA1	9	KA2	8	KA3	7	KA4	6	KA5	5	KA6	4	KA7	3	KD10	2		1
KEY BOARD																			

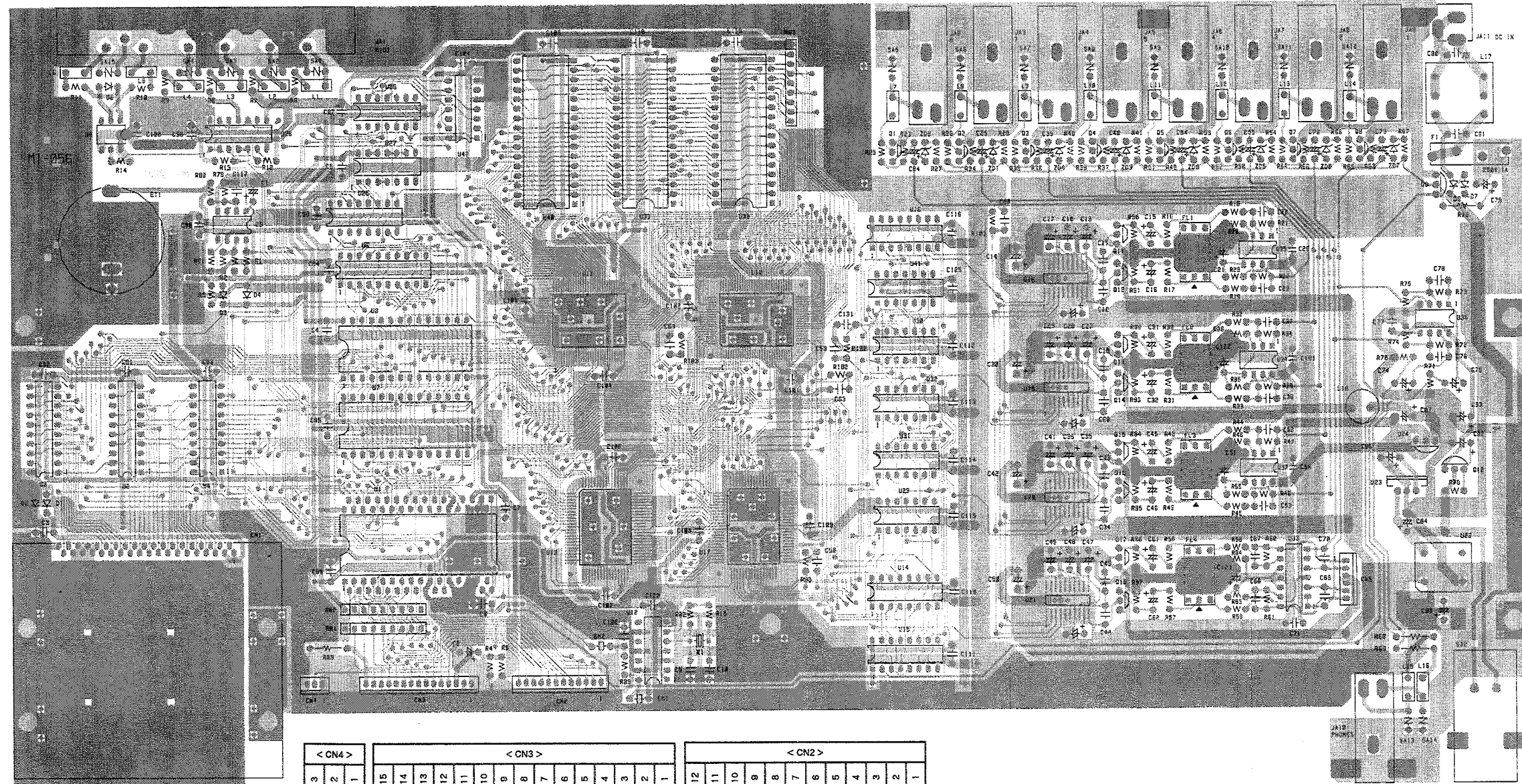
10. MI-051 CIRCUIT For K4



11. MI-056 CIRCUIT For K4r



12. MI-056 PRINTED WIRING BOARD For K4r



1	LS	MI-056
2	LR	
3	LG	
4	RG	
5	RR	
6	RS	

< CN4 >		
3	2	1
+6	ANO	GND
MI-054		

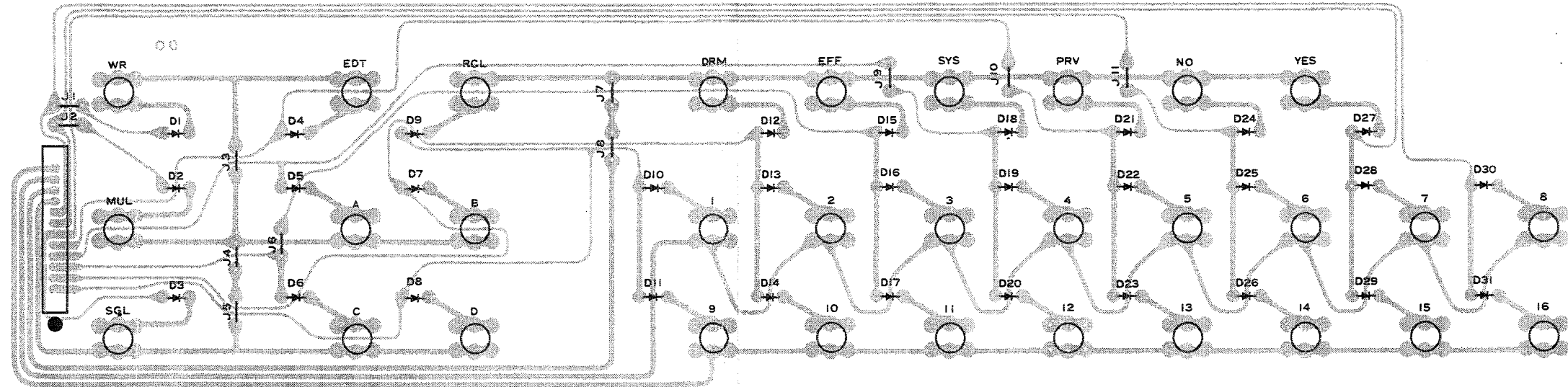
< CN3 >															
K	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
PD7	PD6	PD5	PD4	PD3	PD2	PD1	PD0	ECLK	R/W	RSEL	VEF	+5	GND		
LCD MODULE															

< CN2 >											
12	11	10	9	8	7	6	5	4	3	2	1
PD0	PD1	PD2	PA2	PD3	PD4	PD5	PD6	PD7	PA3	PA1	PA0
MI-055 < CN2 >											

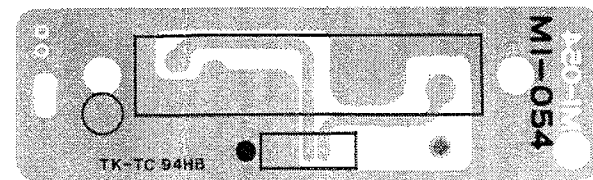
< CN1 >																																					
38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
GND	CDET	VDD	GND	GND	GND	GND	GND	CA13	CA12	CA11	CA10	CA8	CA8	CA7	CA6	CA5	CA4	CA3	CA2	CA1	CA0	CD7	CD6	CD5	CD4	CD3	CD2	CD1	CD0	CDE	CWE	CRT	CARD	VDD	GND	GND	GND

13. MI-052, 053, 054, 055 PRINTED WIRING BOARDS

PA0	12
PA1	11
PA2	10
PA3	9
PD7	8
PD6	7
PD5	6
PD4	5
PD3	4
PD2	3
PD1	2
PD0	1

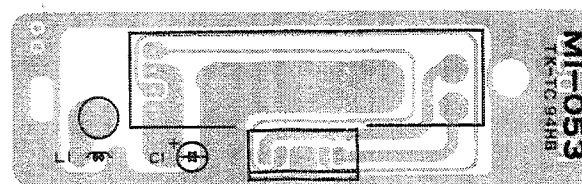


MI-054



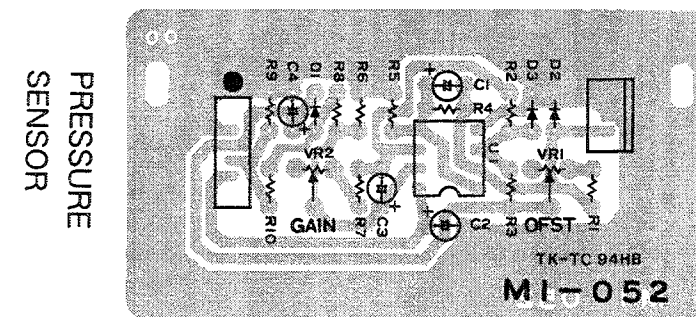
< CN >		
1	2	3
GND	AN3	+5
MI-057		
< CN4 >		

MI-053



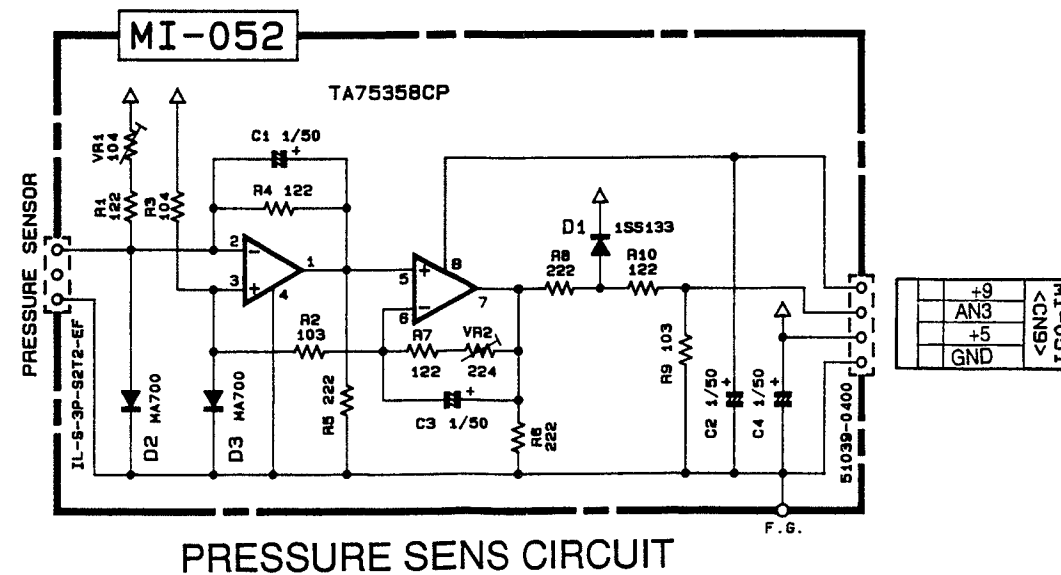
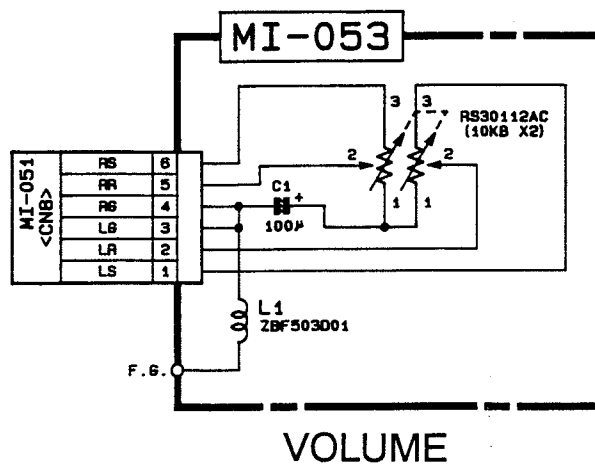
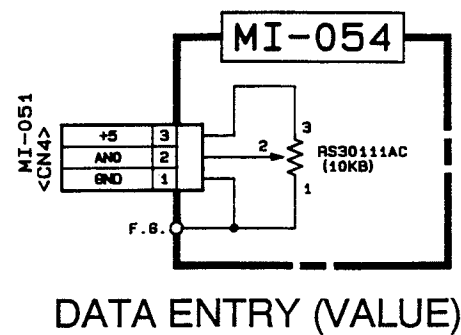
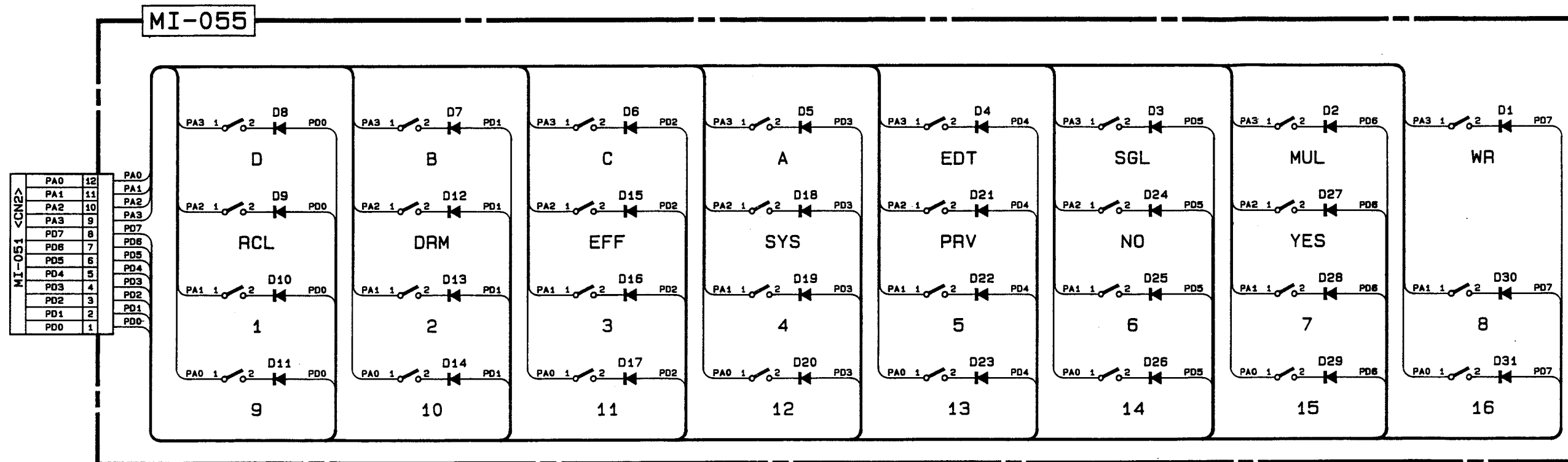
< CN >					
1	2	3	4	5	6
LS	LR	LG	RI	RR	RS
MI-051 < CN8 >					

MI-052



< CN >	
+9	MI-051
AN3	< CN8 >
+5	
GND	

14. MI-052, 053, 054, 055 CIRCUITS



15. MI-057, 058, 059 PRINTED WIRING BOARDS

6

5

4

3

2

1

0

A

B

C

D

E

F

G

H

I

6

5

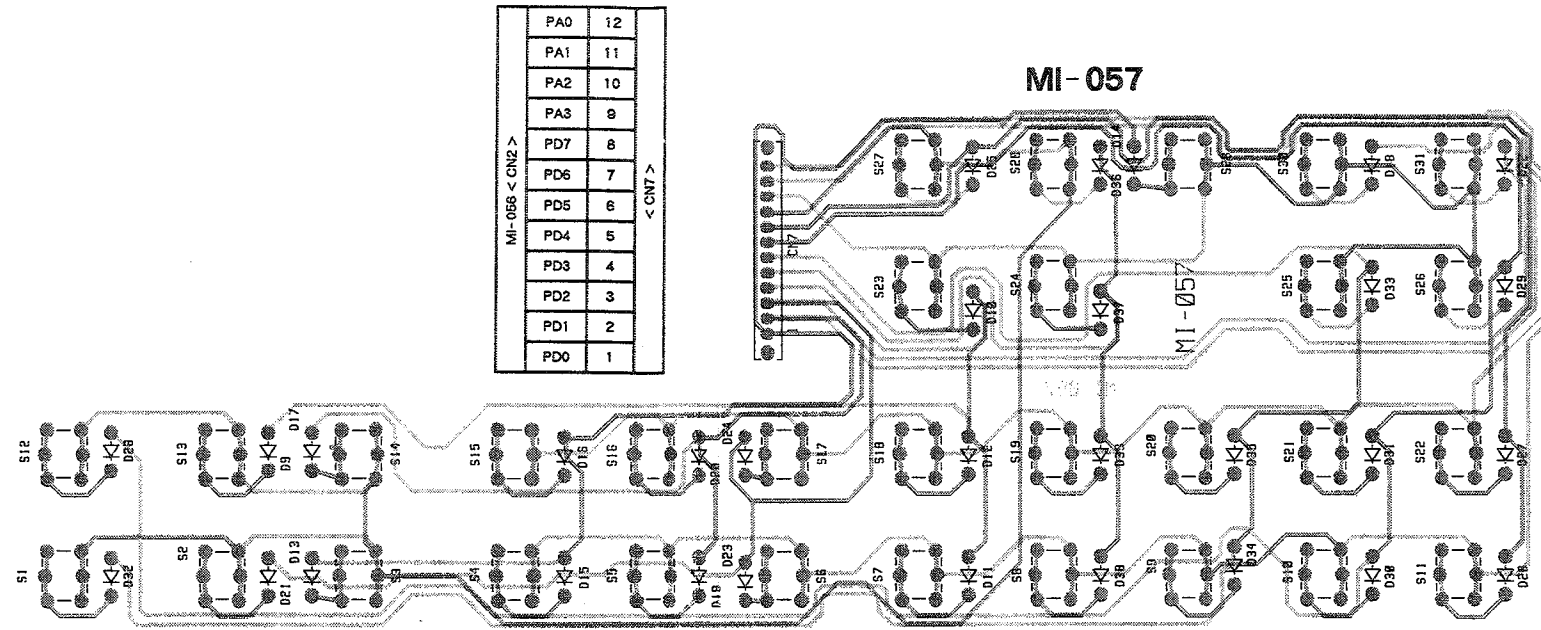
4

3

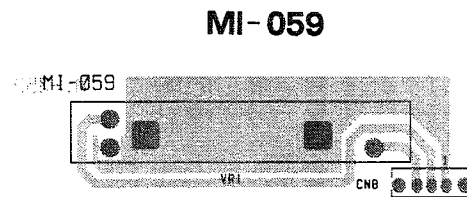
2

1

0

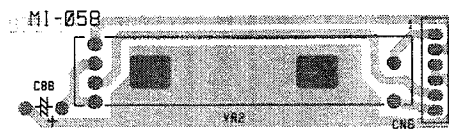


PA0	12
PA1	11
PA2	10
PA3	9
PD7	8
PD6	7
PD5	6
PD4	5
PD3	4
PD2	3
PD1	2
P00	1



MI-059

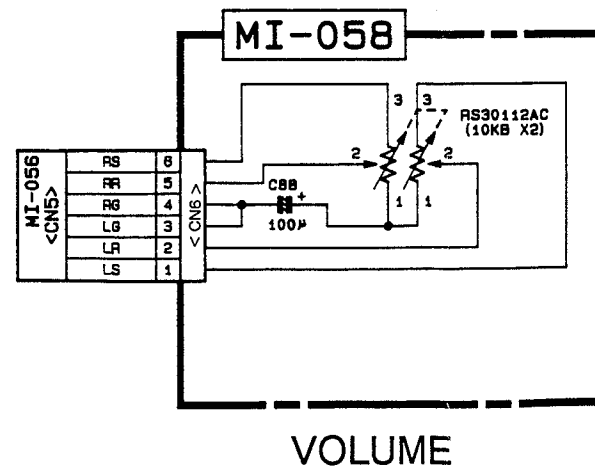
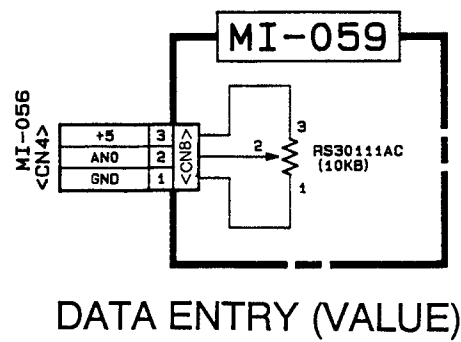
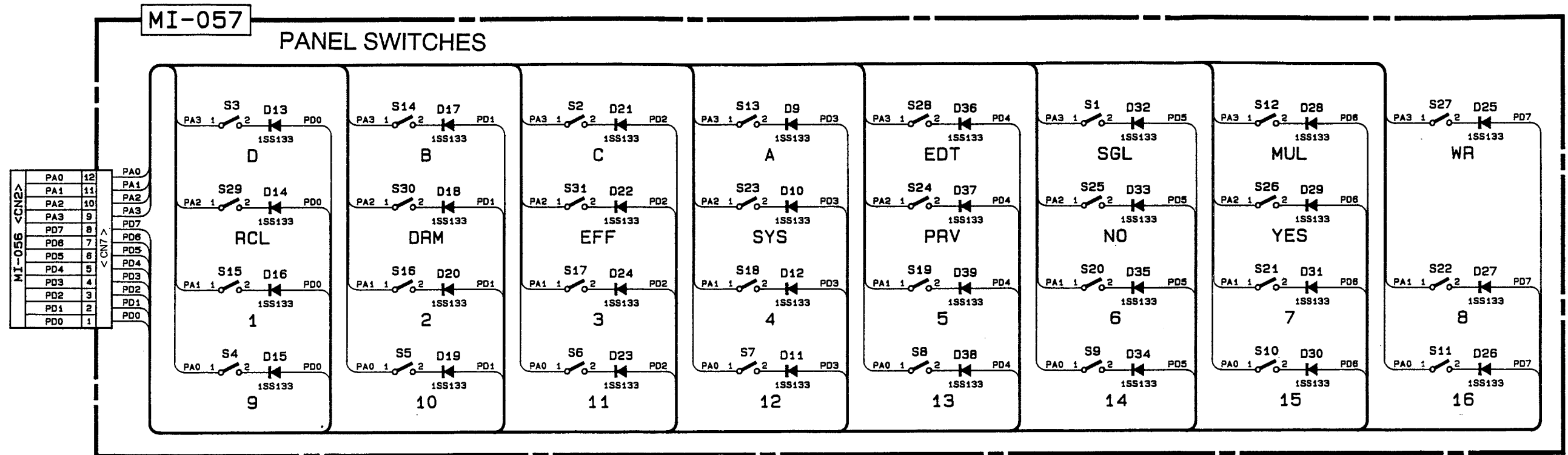
< CN8 >		
3	2	1
+5	AND	GND
MI-056		
< CN4 >		



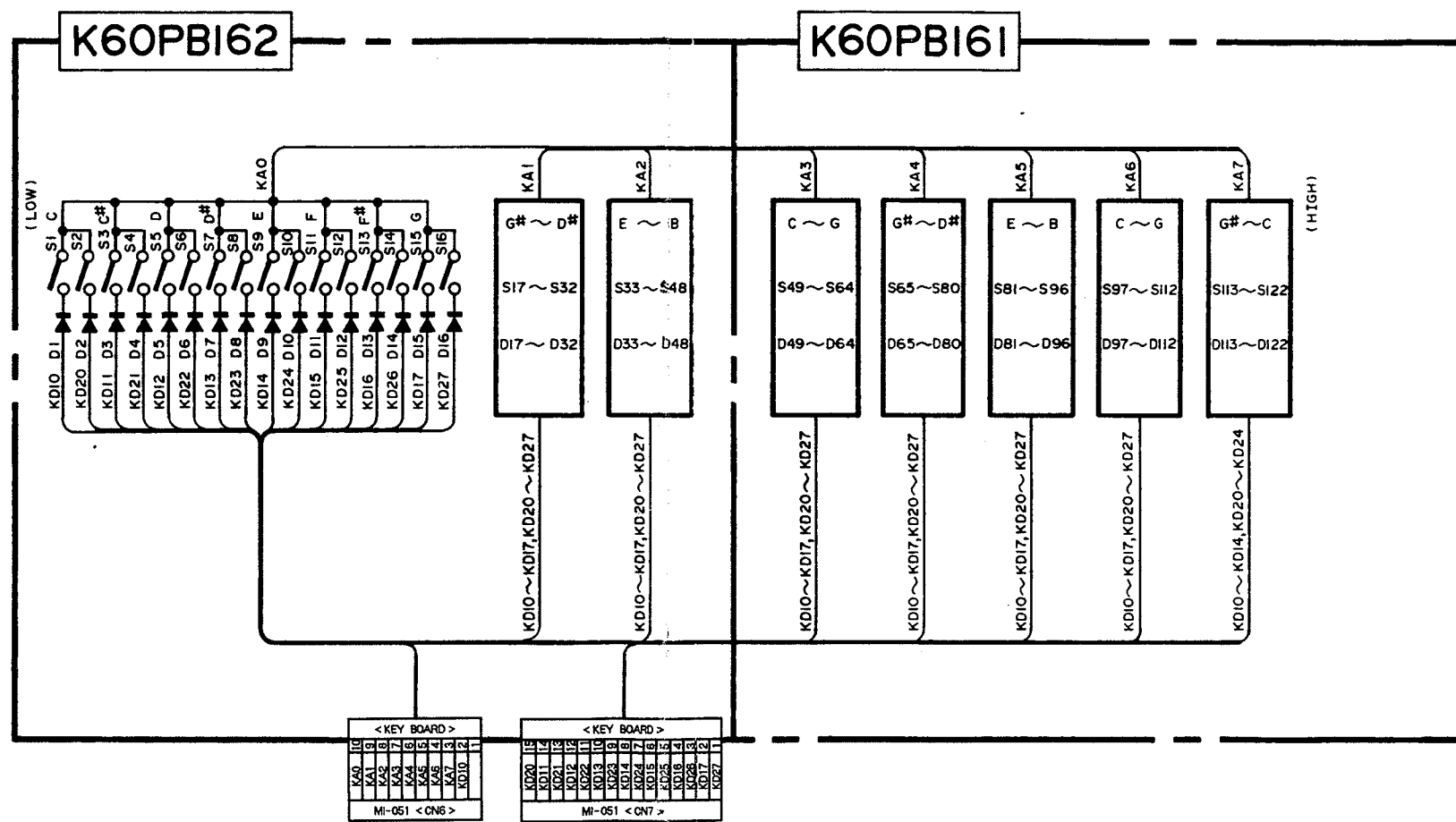
MI-058

1	LS
2	LR
3	LG
4	RG
5	RR
6	RS

16. MI-057, 058, 059 CIRCUITS

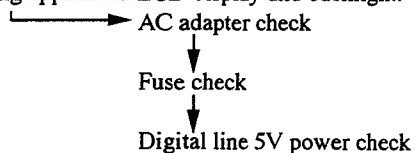


17. K60PB161, 162 (KEYBOARD) CIRCUITS

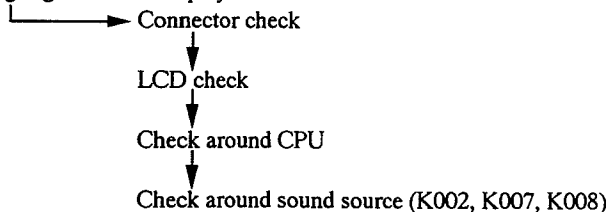


18. TROUBLESHOOTING

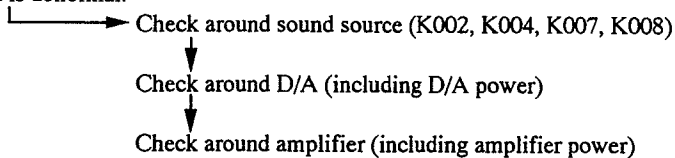
① Nothing appears on LCD display and backlight.



② Backlight goes on but display is abnormal.



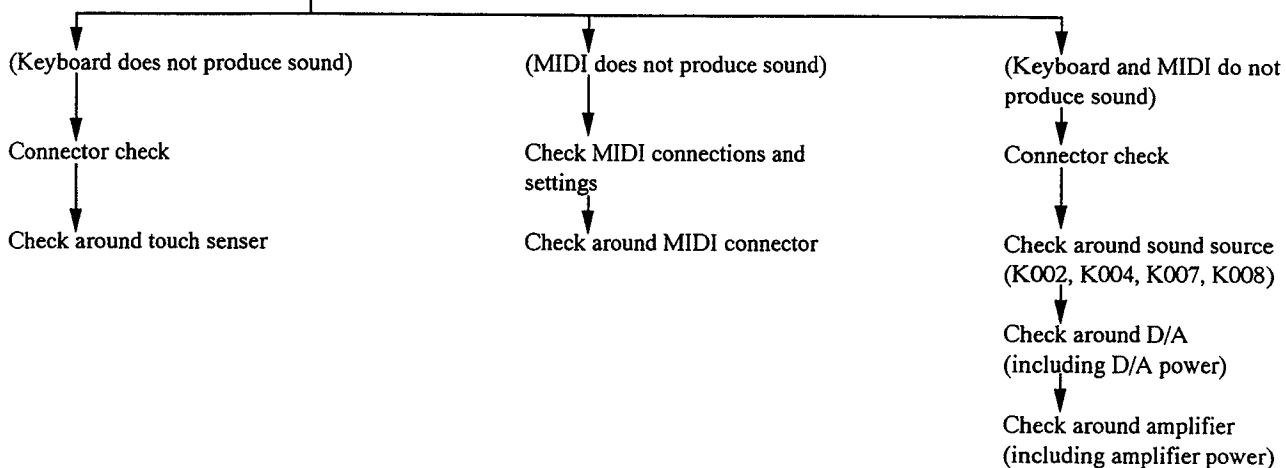
③ Sound is abnormal.



④ (Only K4)

No sound produced.

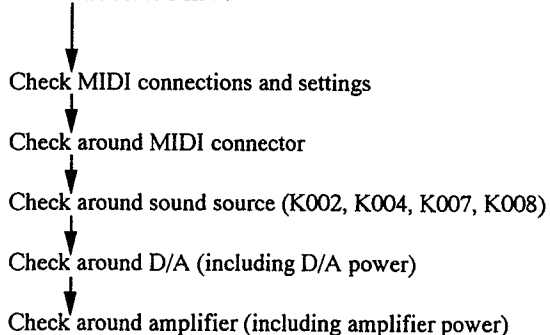
Is volume set to MIN ?



④ (Only K4r)

No sound produced.

Is volume set to MIN ?



SE606E

8911M