16bit DIGITAL SYNTHESIZER (MODULE)

K4/K4r

SERVICE MANUAL

KAWAI Kawai Musical Instrument Manufacturing Co., Ltd.

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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

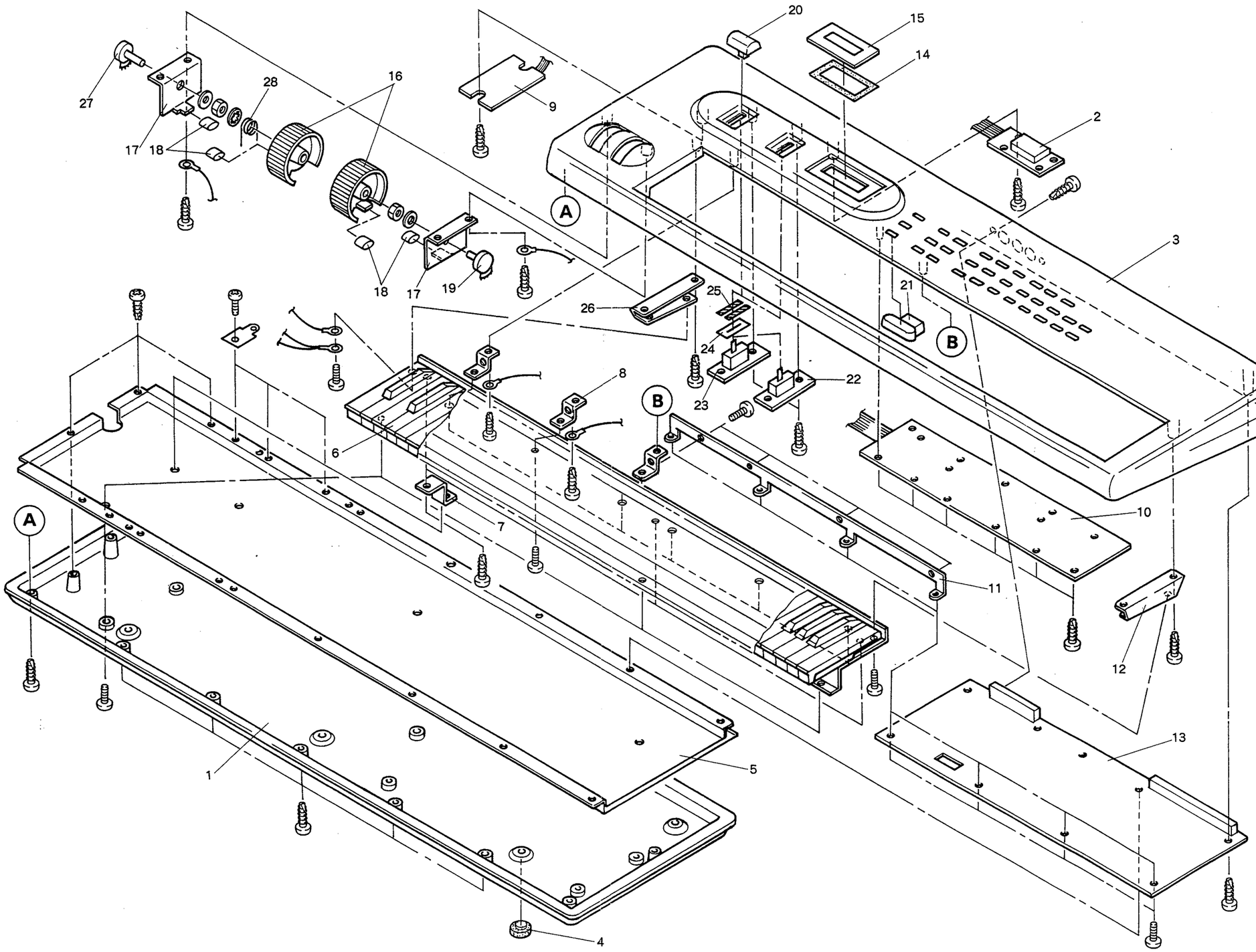
	Code No.	Name	Description	K4 Pieces	K4r Pieces
IC	706939	SN74LS138	3-To 4 Line Decoder	1	
	706990	TA75558P	Dual OP AMP		3
	707019	NJM-4556D	Dual OP AMP	1	1
	801926	TC74HC08	Quad 2-Input AND Gate	1	1
	802832	MSM74HC04	Hex Inverter	1	3
	802835	MSM74HC139	Dual 2-To 4 Line Decoder	1	1
	802837	MSM74HC174	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 × 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 × 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 × 512Kbits MASK ROM	1	1
	919350	TC534000P MASKROM : P203	8 × 512Kbits MASK ROM	1	1
	919355	TC534000P MASKROM : P204	8 × 512Kbits MASK ROM	1	1
	919360	27C512-20 EPROM : P206	8 × 64Kbits EPROM ROM	1	
	919685	27C512-20 EPROM : P207	8 × 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

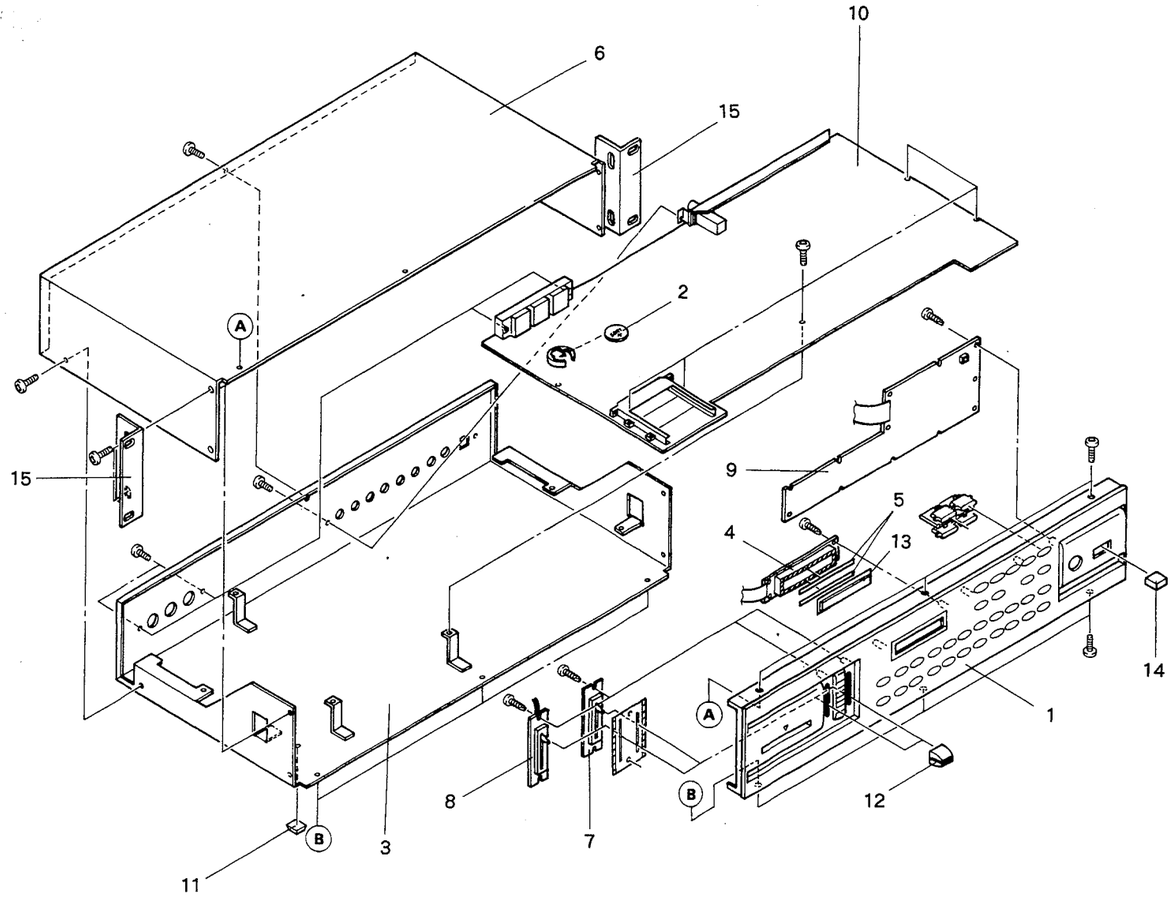


5. PARTS LIST For K4r

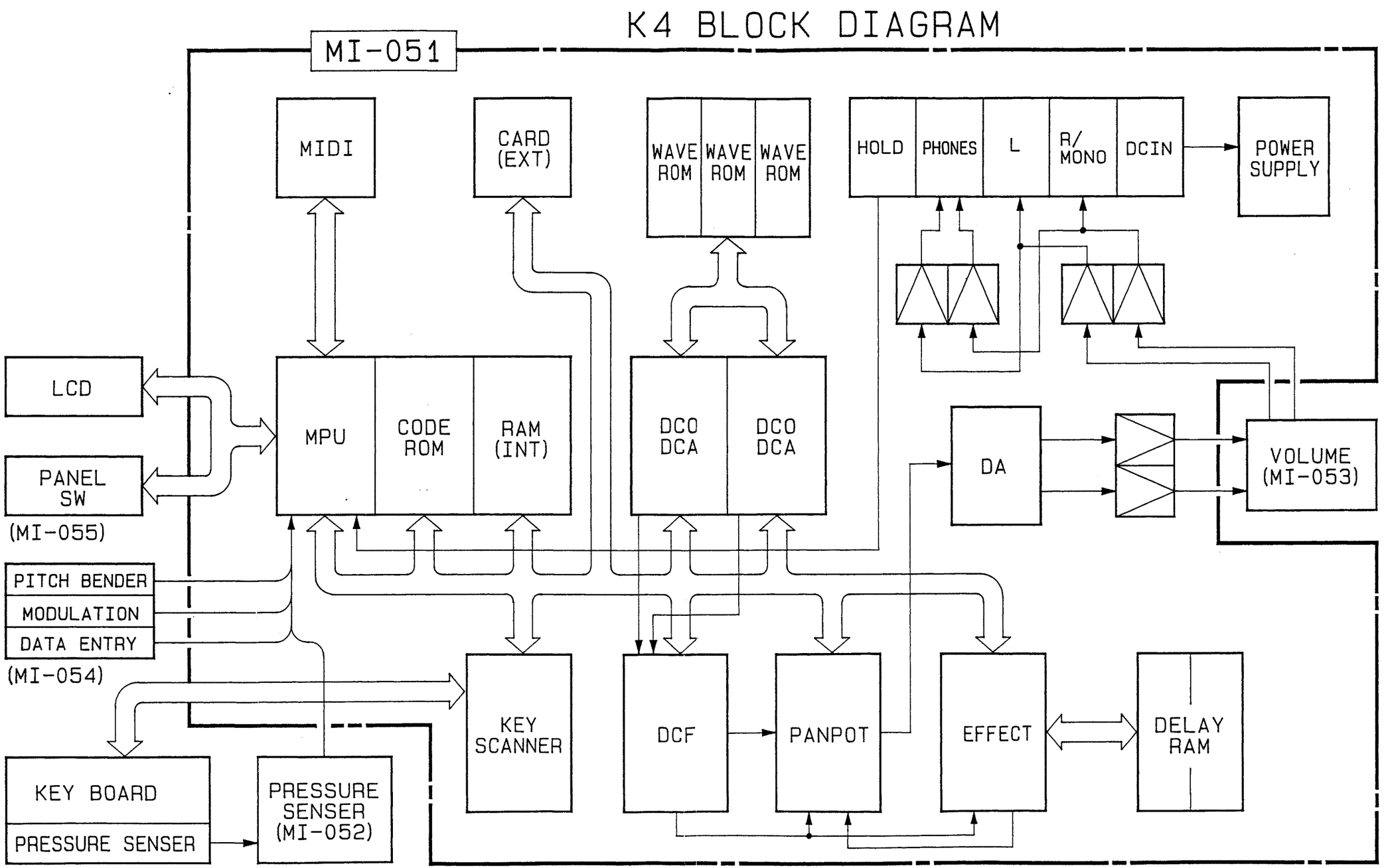
K4r

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

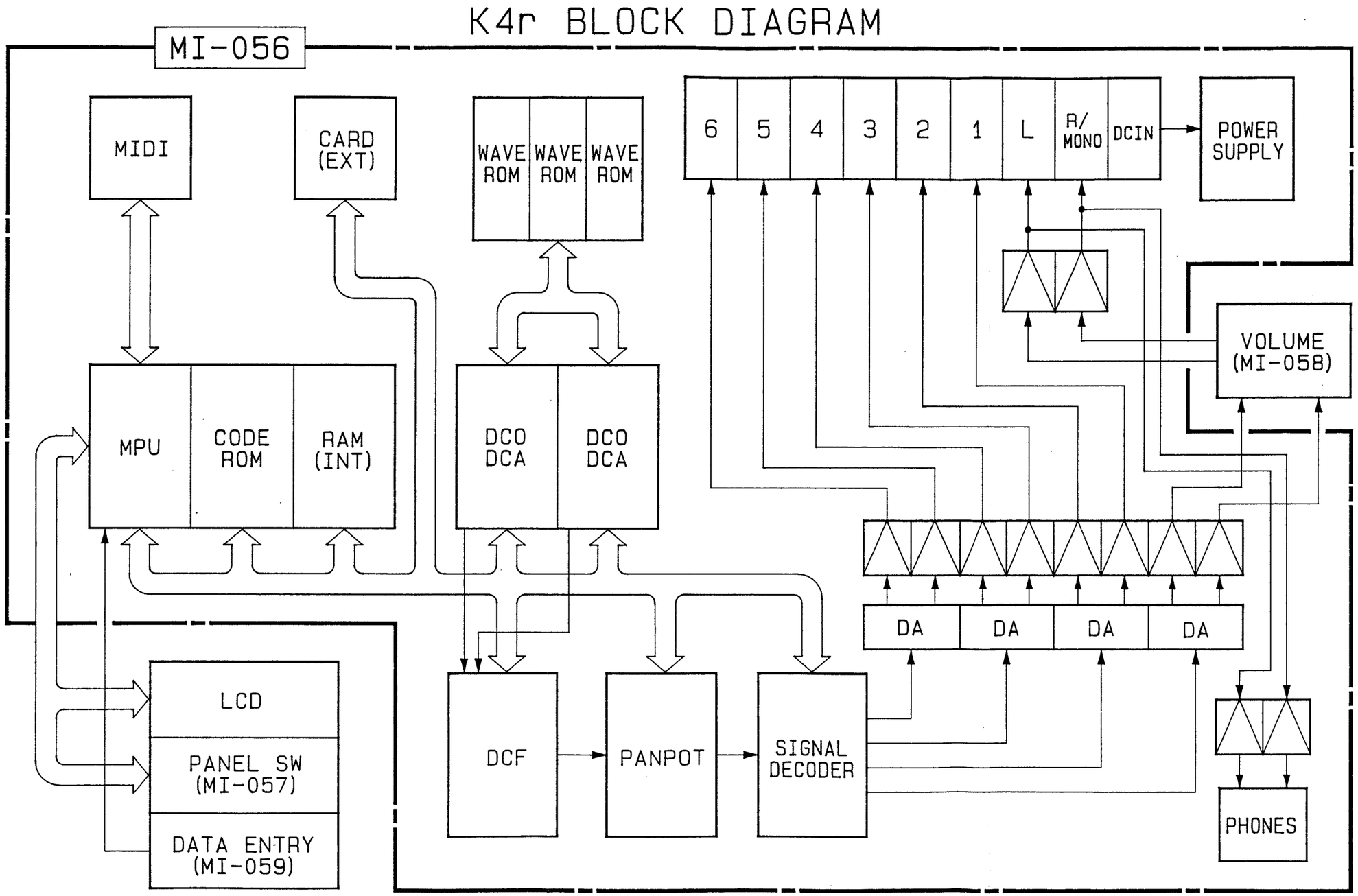
6. DISASSEMBLY DRAWING For K4r



7. K4 BLOCK DIAGRAM



8. K4r BLOCK DIAGRAM



9. MI-051 PRINTED WIRING BOARD For K4

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

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

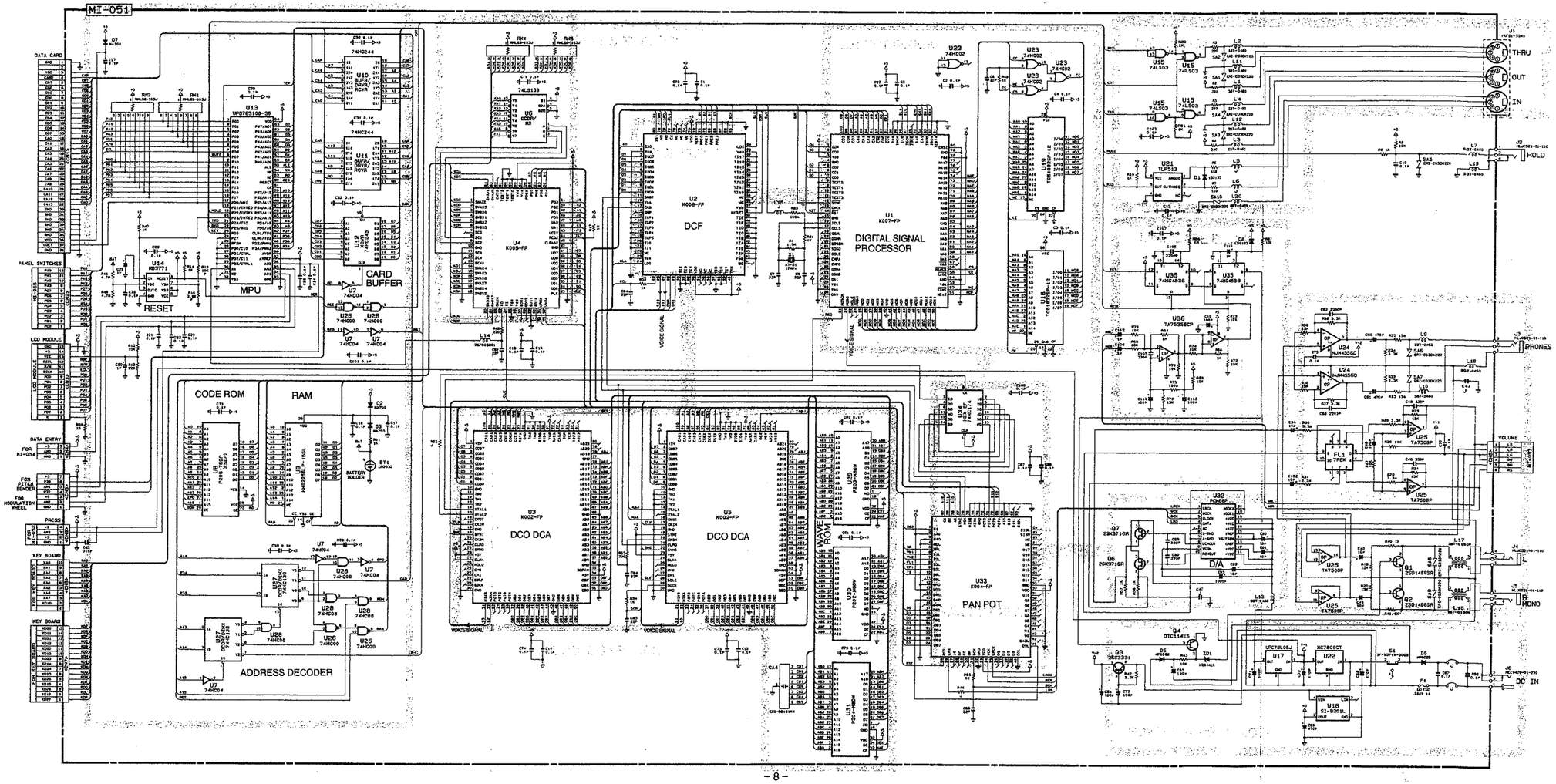
MI-052			
	+9	4	< CN9 >
	AN3	3	
	+5	2	
	GND	1	

MI-054			
	+5	3	< CN4 >
	AN0	2	
	GND	1	

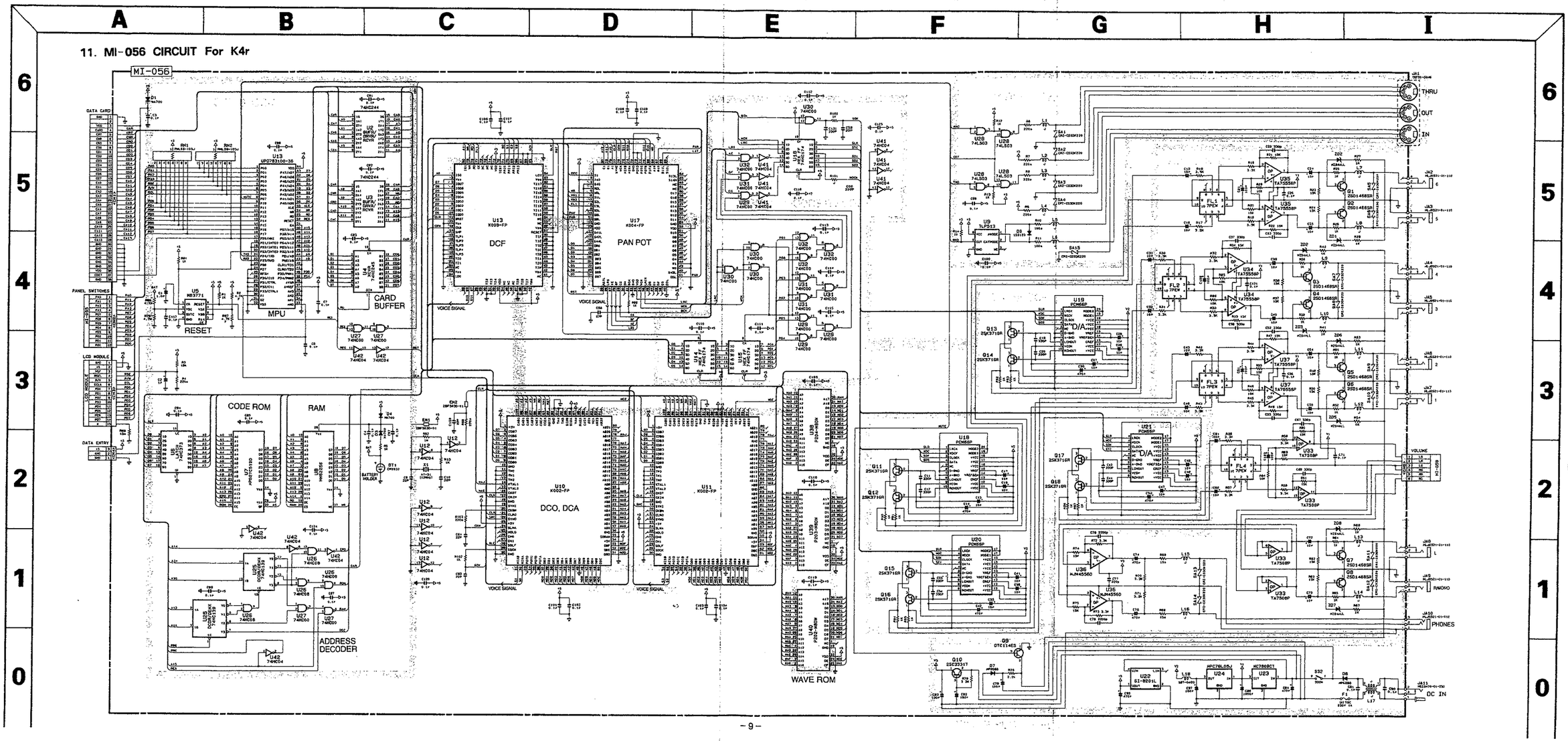
PITH BENDER MODULATION WHEEL			
	+5	7	< CN5 >
	P36	6	
	AN1	5	
	P37	4	
	+5	3	
	AN2	2	
	GND	1	

| < CN1 > | | |

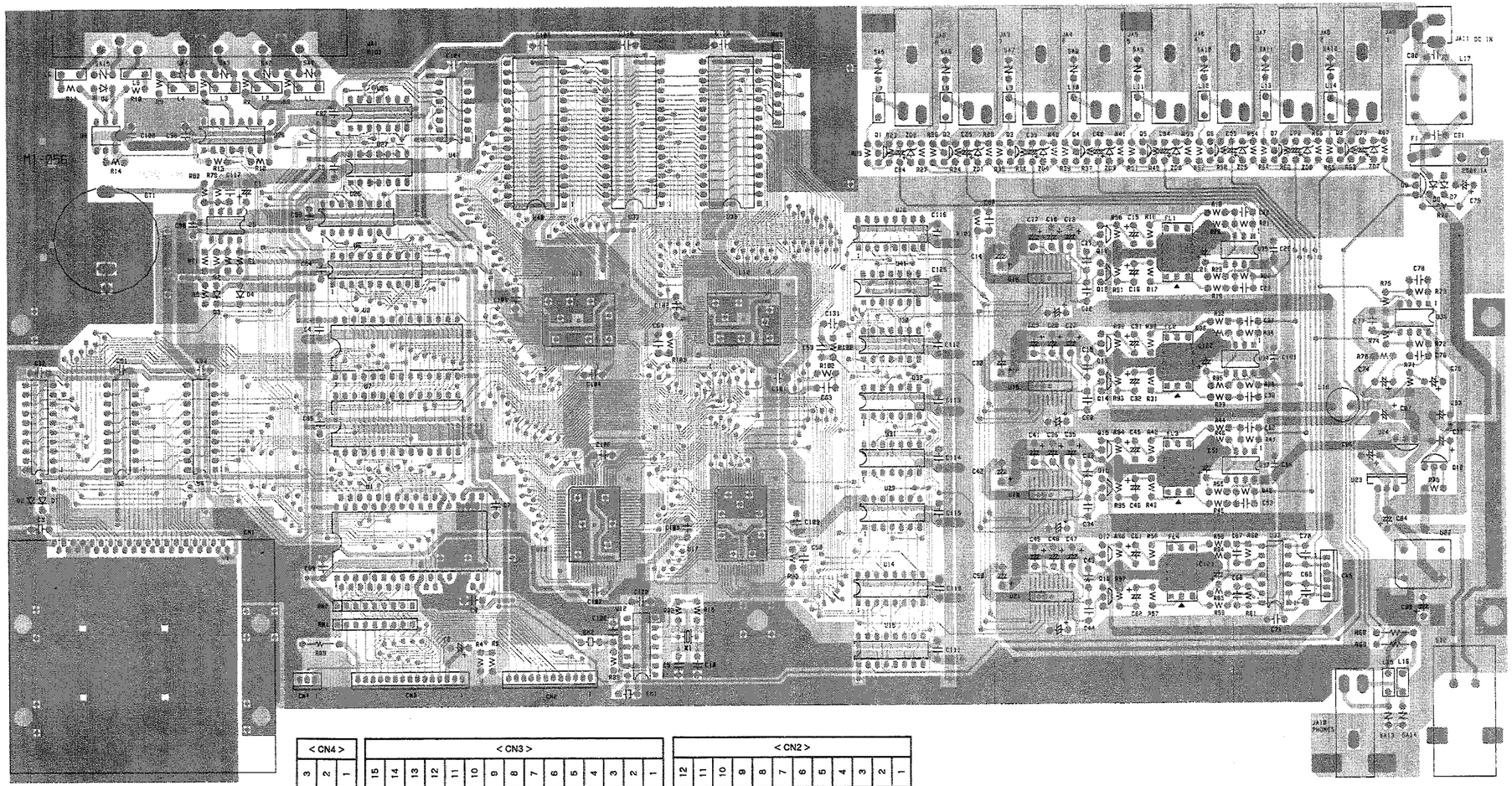
10. MI-051 CIRCUIT For K4



11. MI-056 CIRCUIT For K4r



12. MI-056 PRINTED WIRING BOARD For K4r



< CN4 >		
3	2	1
+5	AN0	GND
MI-054		

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

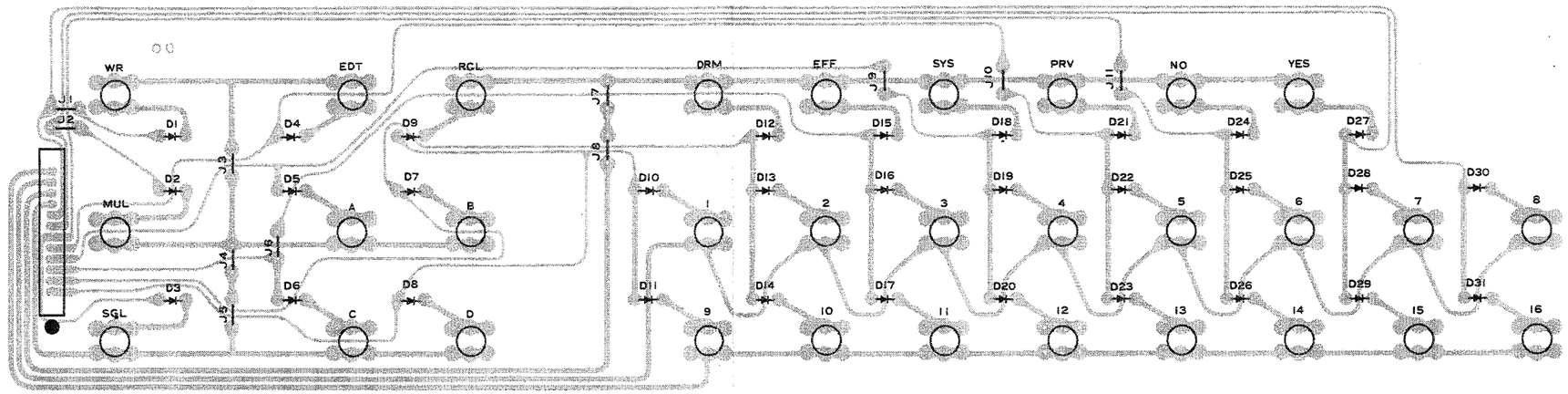
< CN2 >												
12	11	10	9	8	7	6	5	4	3	2	1	
PD0	PD1	PD2	PA2	PD3	PD4	PD5	PD6	PD7	PA3	PA1	PA0	
MI-055 < CN2 >												

< CN5 >		
1	LS	MI-058
2	LR	
3	LG	
4	RG	
5	RR	
6	RS	

| < CN1 > | | | | | | | | | | | | | |

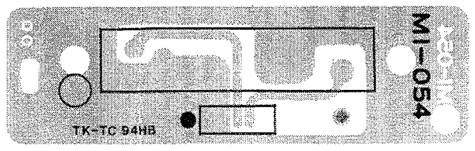
13. MI-052, 053, 054, 055 PRINTED WIRING BOARDS

MI-055



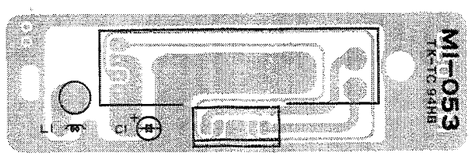
MI-051 < CN2 >		< CN >
PA0	12	
PA1	11	
PA2	10	
PA3	9	
PD7	8	
PD6	7	
PD5	6	
PD4	5	
PD3	4	
PD2	3	
PD1	2	
PD0	1	

MI-054



< CN >		
1	2	3
GND	AI0	+5
MI-057 < CN4 >		

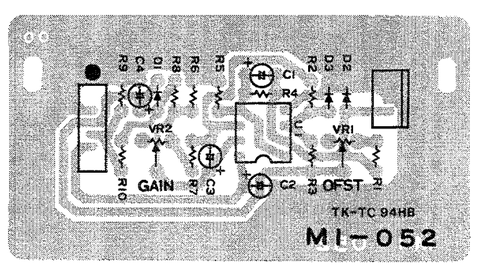
MI-053



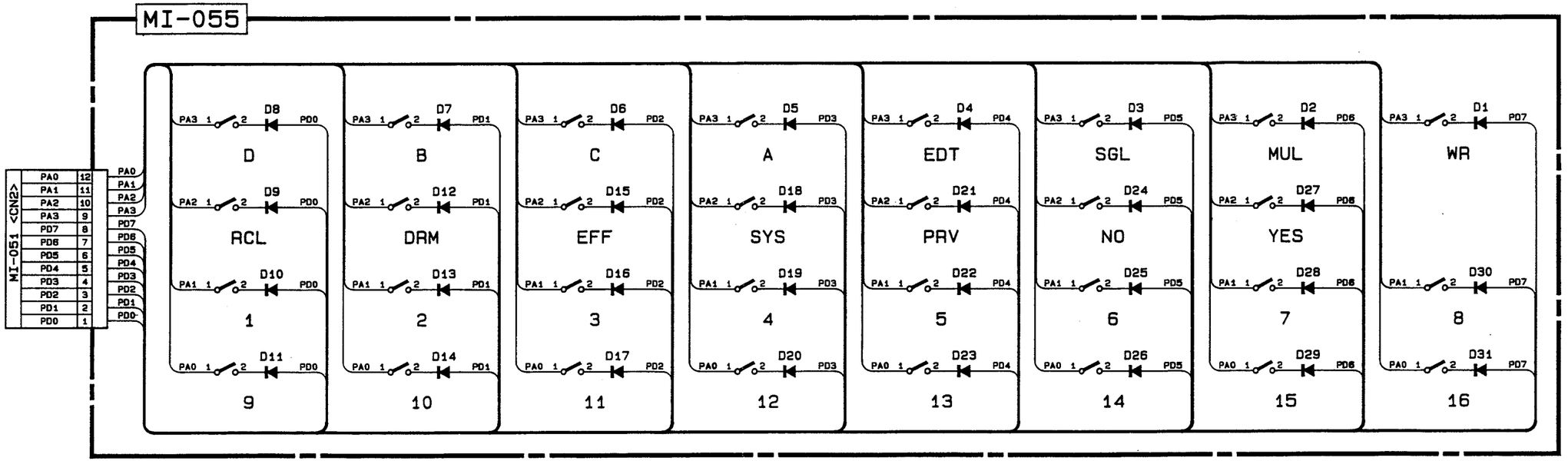
< CN >					
1	2	3	4	5	6
LS	LR	LG	RG	RR	RS
MI-051 < CN8 >					

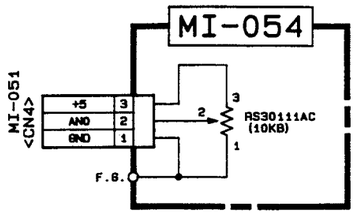
MI-052

PRESSURE SENSOR

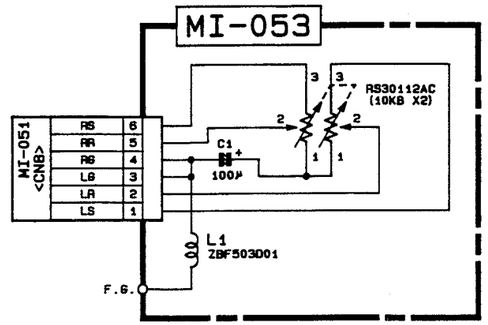


< CN >		MI-051 < CN3 >
	+9	
	AN3	
	+5	
	GND	

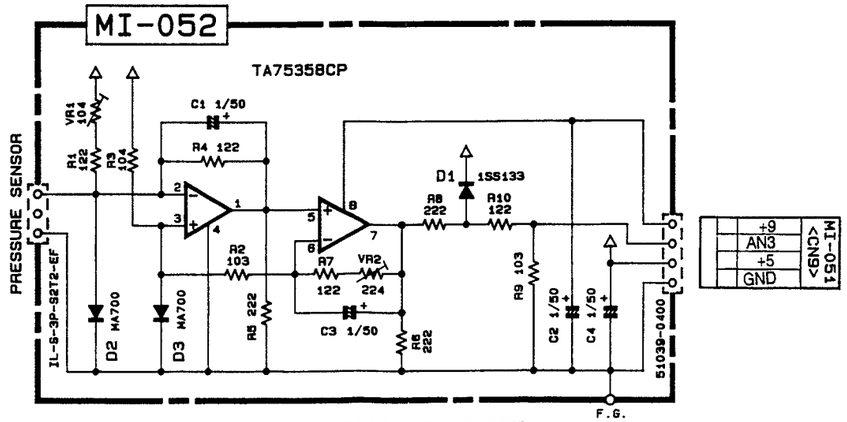




DATA ENTRY (VALUE)



VOLUME

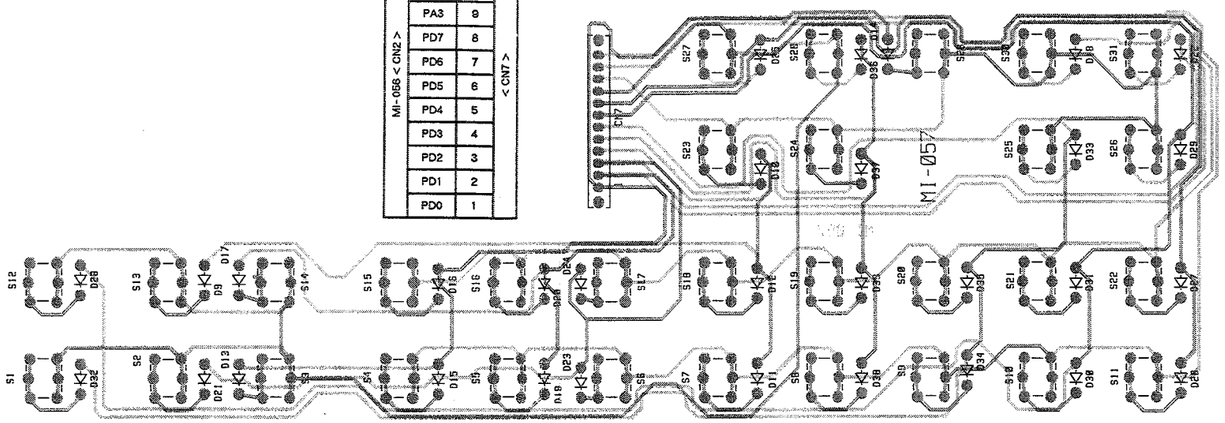


PRESSURE SENS CIRCUIT

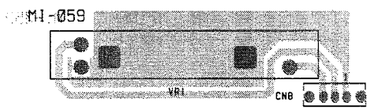
15. MI-057, 058, 059 PRINTED WIRING BOARDS

MI-056 < CN2 >		< CN7 >
	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-057

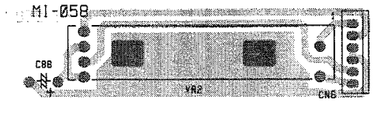


MI-059

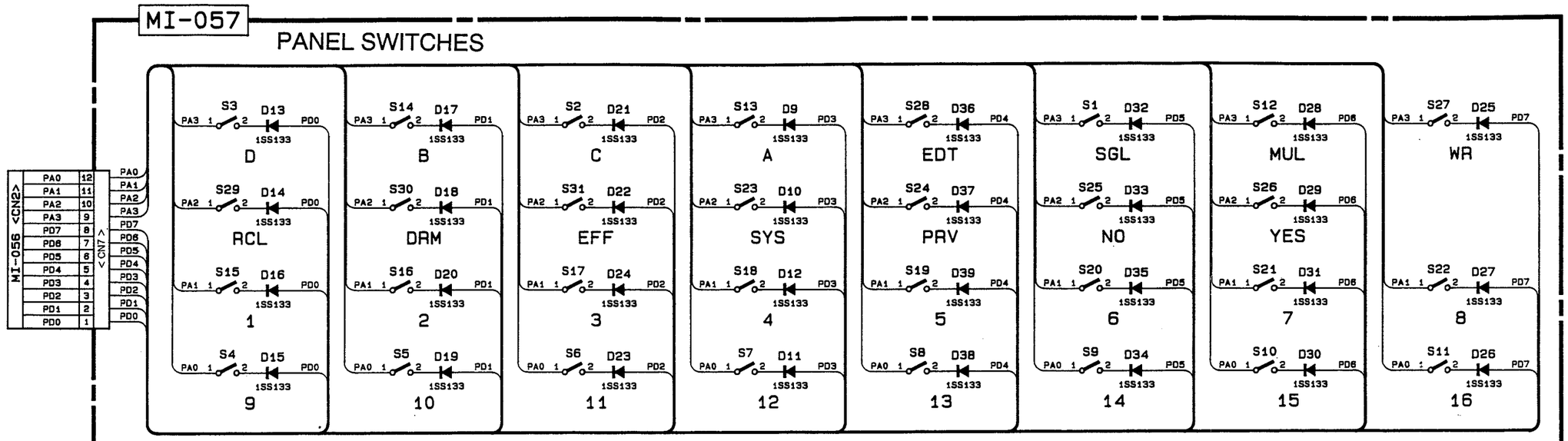


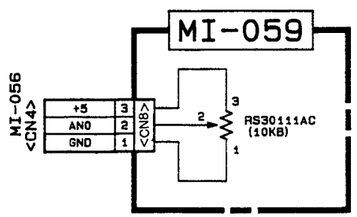
< CN8 >		
3	2	1
+5	AN0	GND
MI-056 < CN4 >		

MI-058

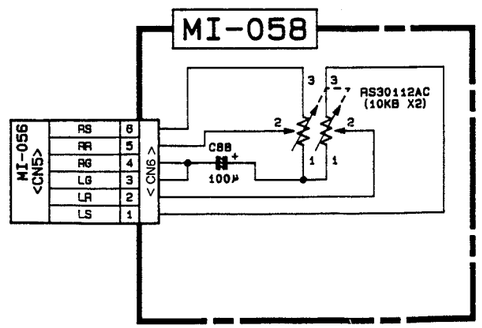


< CN6 >		MI-058 < CN5 >
1	LS	
2	LR	
3	LG	
4	RG	
5	RR	
6	RS	



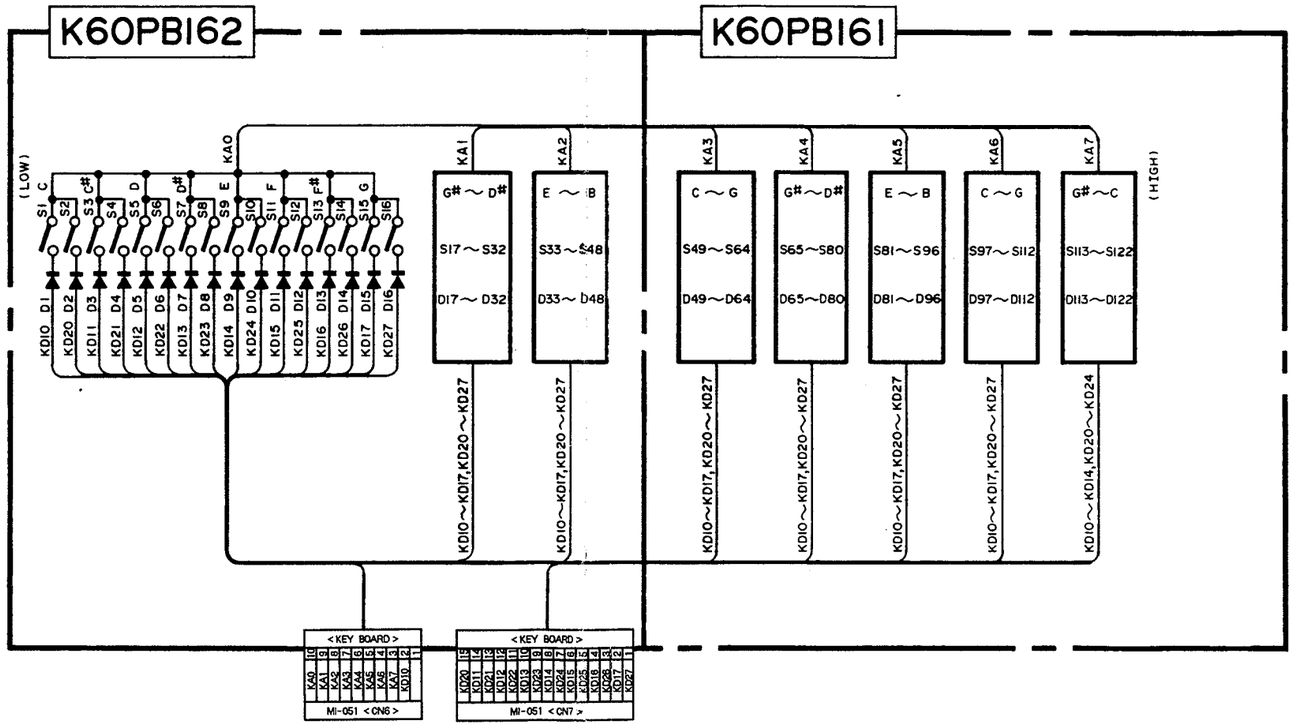


DATA ENTRY (VALUE)



VOLUME

17. K60PB161, 162 (KEYBOARD) CIRCUITS



18. TROUBLESHOOTING

①Nothing appears on LCD display and backlight.

- AC adapter check
- Fuse check
- Digital line 5V power check

②Backlight goes on but display is abnormal.

- Connector check
- LCD check
- Check around CPU
- Check around sound source (K002, K007, K008)

③Sound is abnormal.

- Check around sound source (K002, K004, K007, K008)
- Check around D/A (including D/A power)
- Check around amplifier (including amplifier power)

④(Only K4)

No sound produced.

- Is volume set to MIN ?
  - (Keyboard does not produce sound)
    - Connector check
    - Check around touch senser
  - (MIDI does not produce sound)
    - Check MIDI connections and settings
    - Check around MIDI connector
  - (Keyboard and MIDI do not produce sound)
    - Connector check
    - Check around sound source (K002, K004, K007, K008)
    - Check around D/A (including D/A power)
    - Check around amplifier (including amplifier power)

④(Only K4r)

No sound produced.

- Is volume set to MIN ?
- Check MIDI connections and settings
- Check around MIDI connector
- Check around sound source (K002, K004, K007, K008)
- Check around D/A (including D/A power)
- Check around amplifier (including amplifier power)