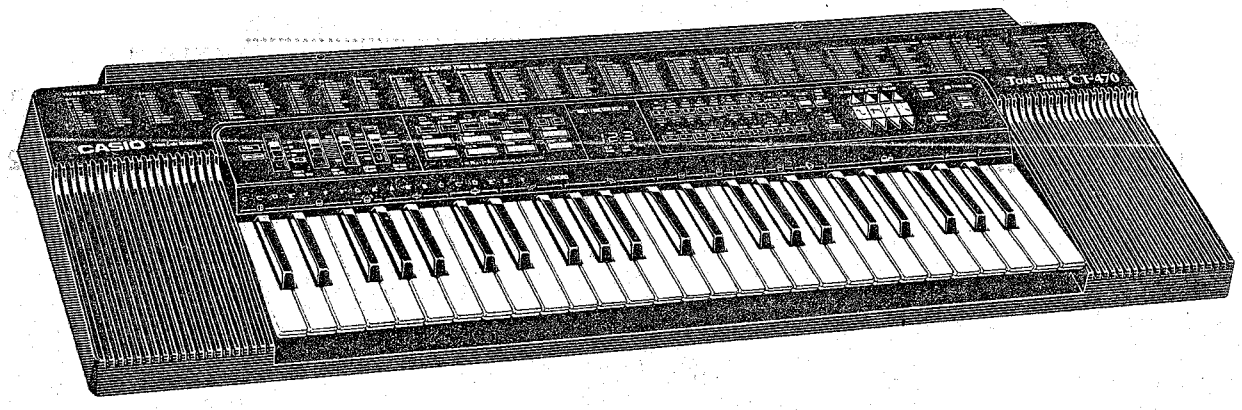
SERVICE MANUAL & PARTS LIST (without price)

ELECTRONIC KEYBOARD

CT-470

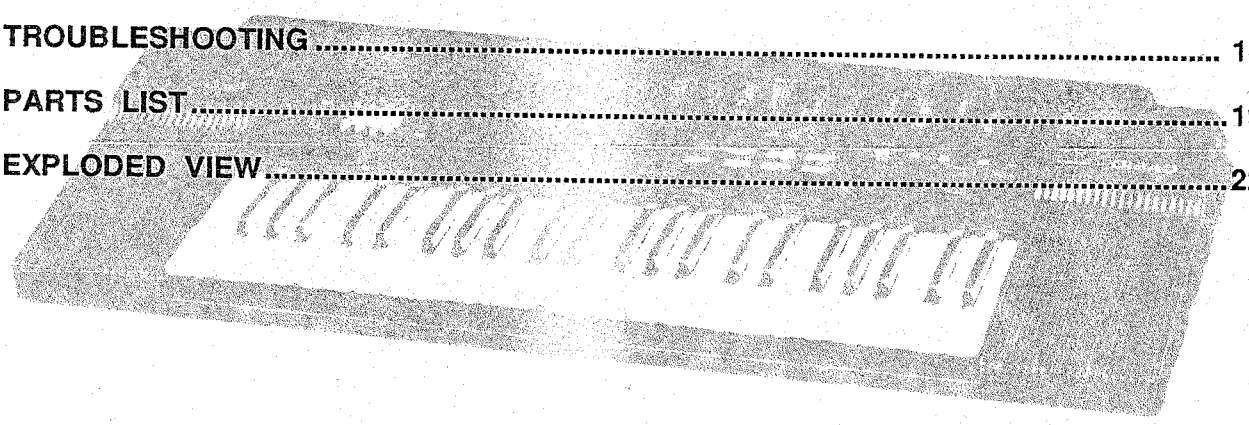
FEB. 1990



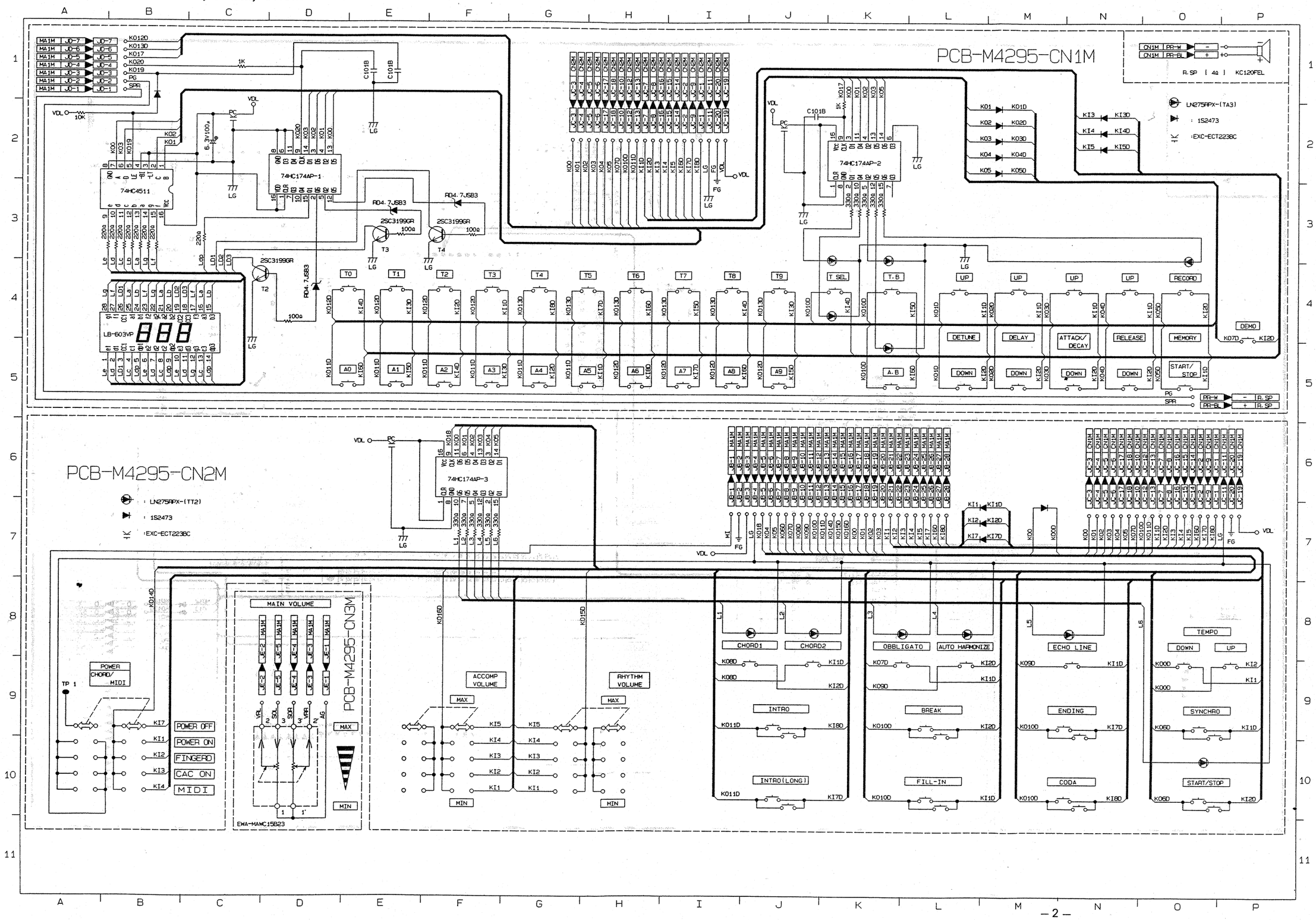
CT-470

CASIO®

CONTENS

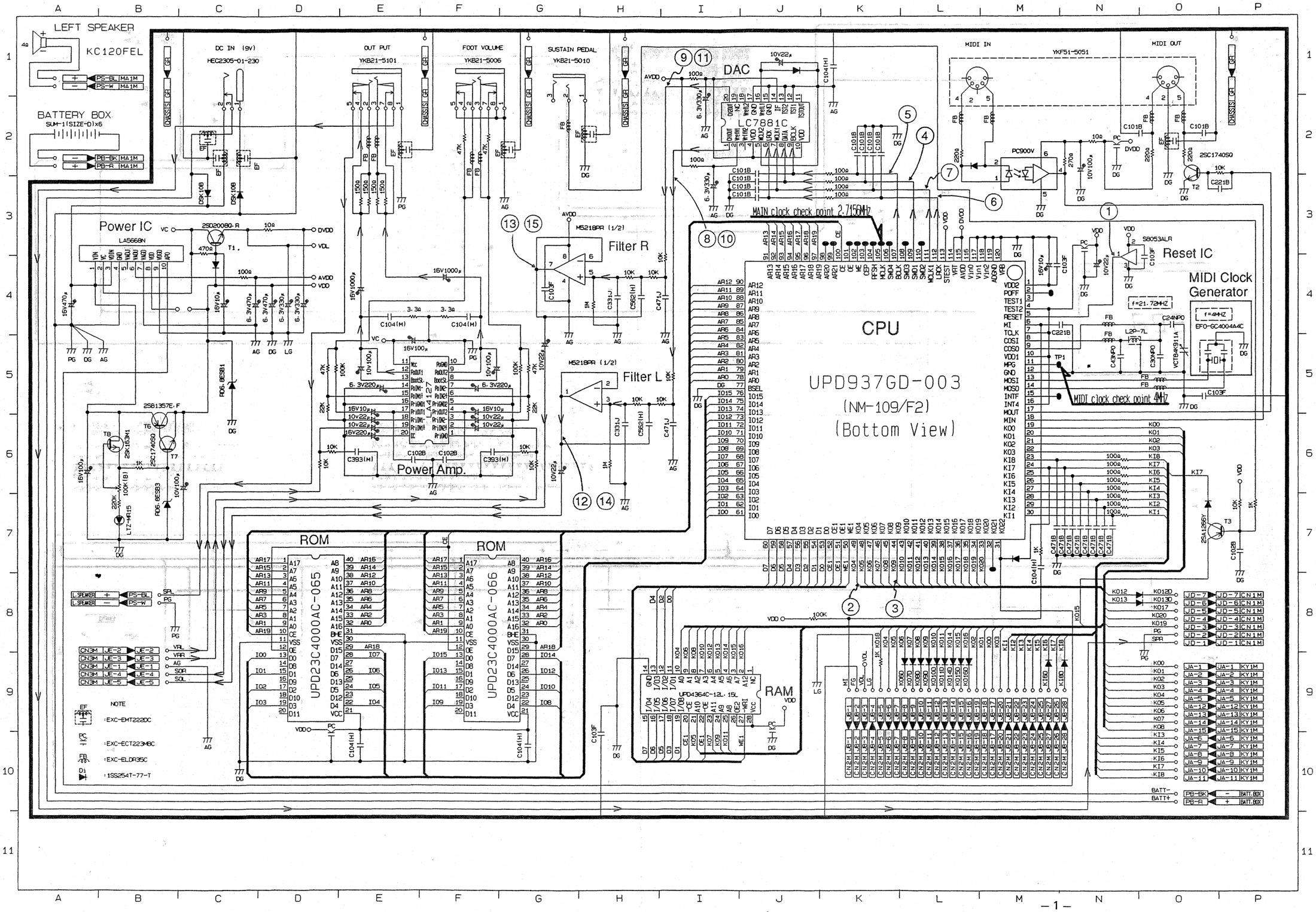


Console PCBs M4295-CN1, CN2M, CN3M

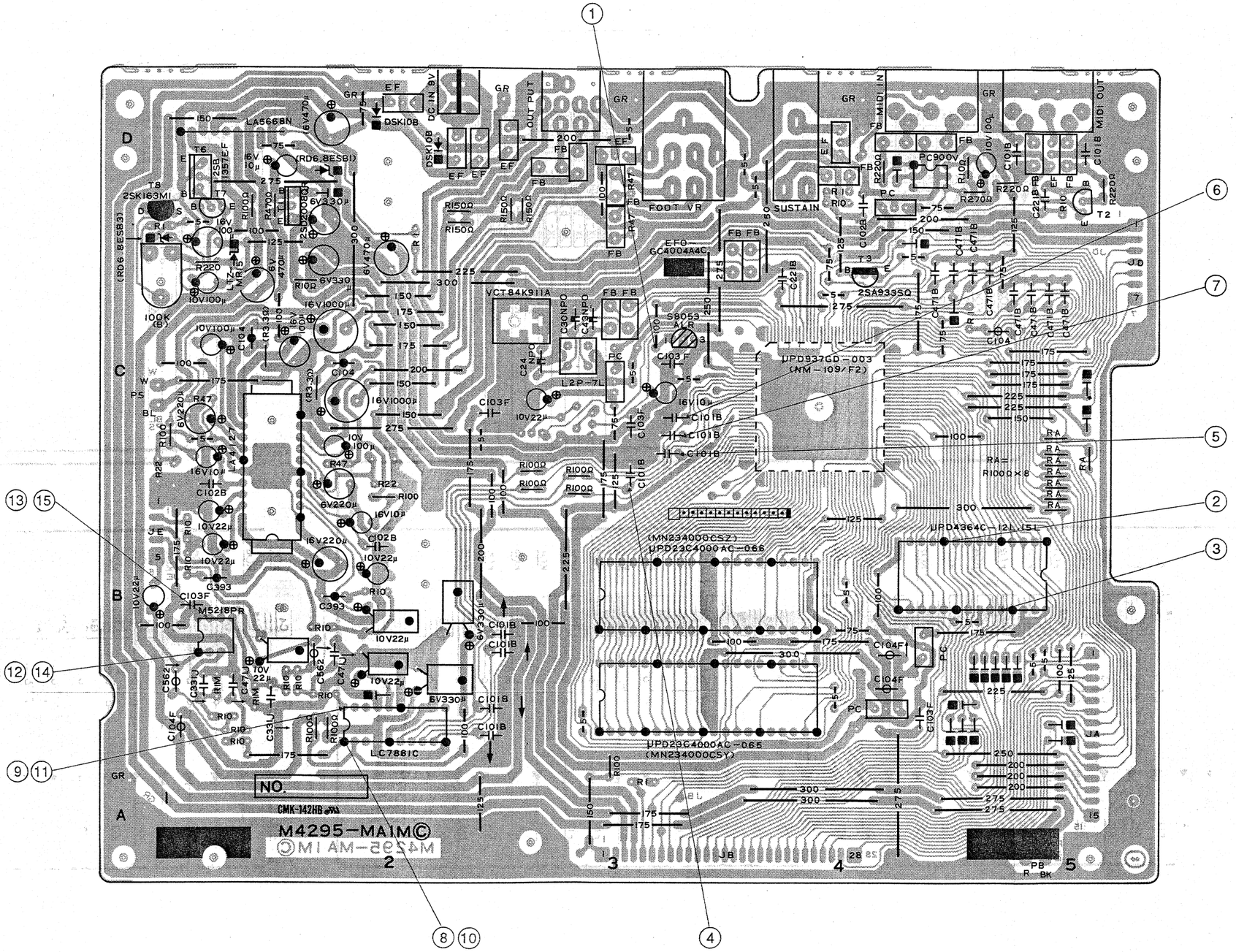


SCHEMATIC DIAGRAM

Main PCB M4295-MA1M



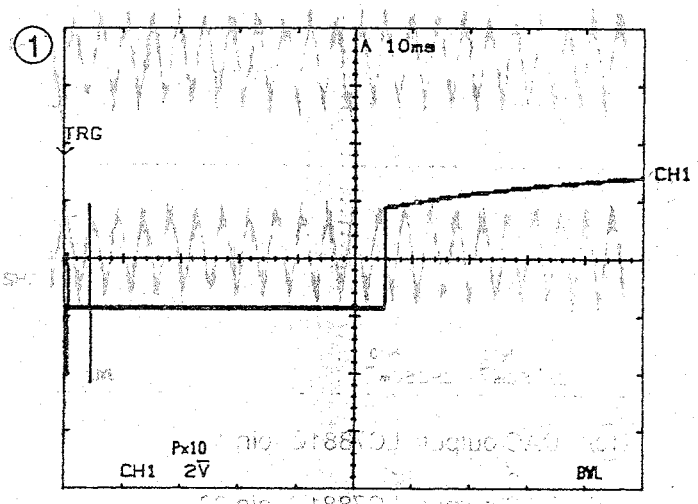
PCB VIEW & MAJOR CHECK POINT



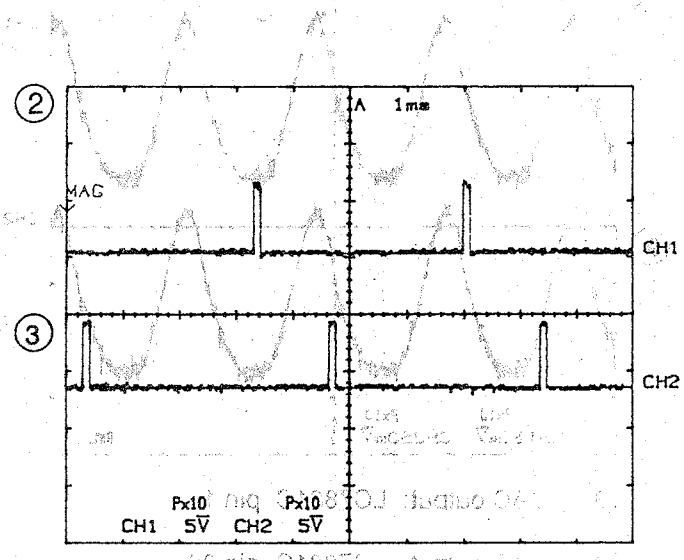
PCB-M495K-KY1M

PCB-M495K-KY2M

MAJOR WAVEFORMS

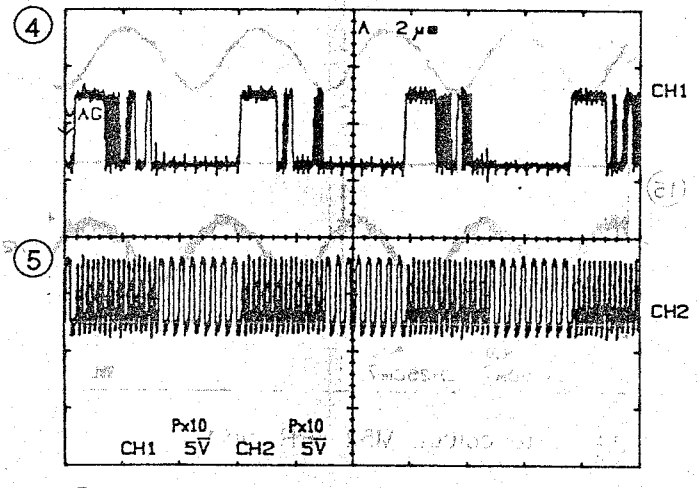


1 Signal RESET 1
µPD937G Pin 5



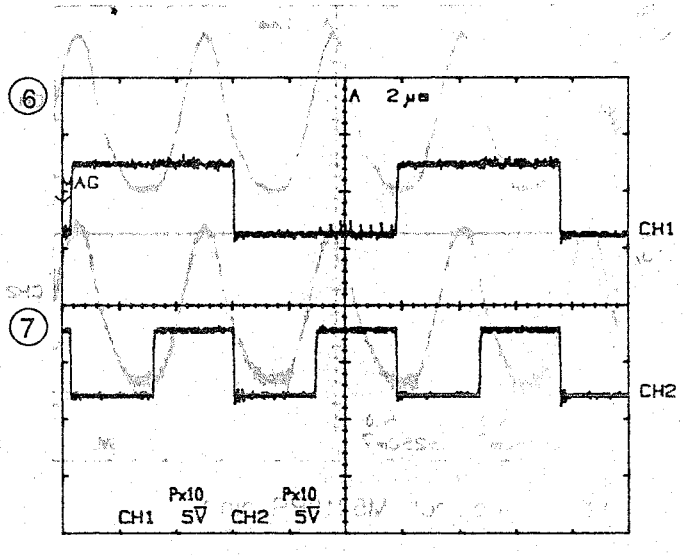
2 Key scan signal KO4
µPD937G pin 49

3 Key scan signal KO9
µPD937G pin 44



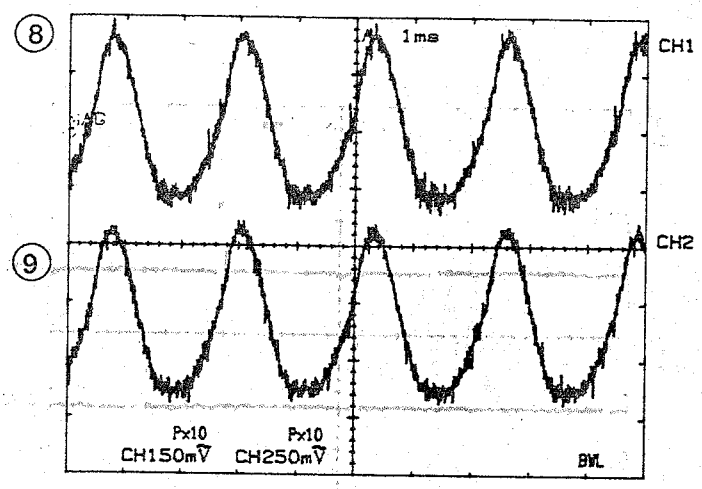
4 DATA (SWD1)
µPD937G pin 109

5 BCLK
µPD937G pin 107



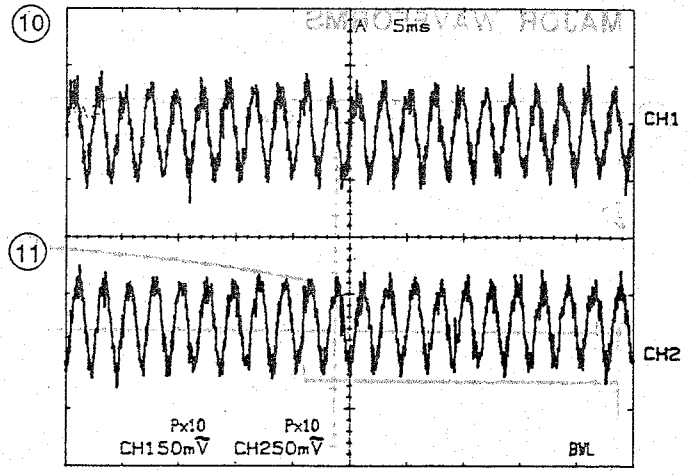
6 LRCK
µPD937G pin 112

7 WCK1
µPD937G pin 111



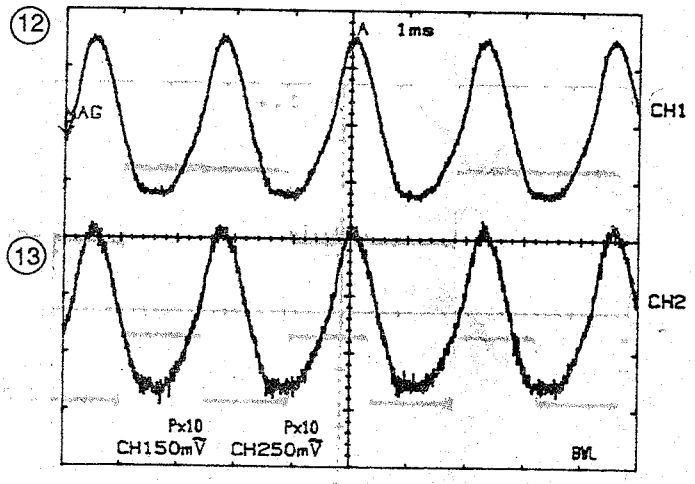
⑧ DAC output: LC7881C pin 1

⑨ DAC output: LC7881C pin 20
Tone: Flute 1
Key: A3



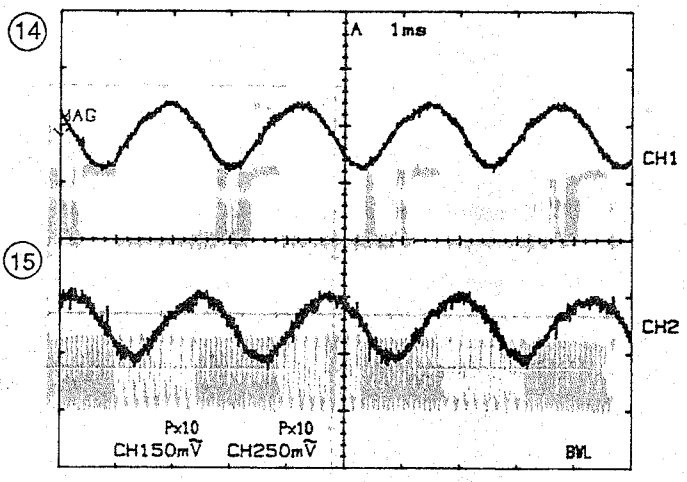
⑩ DAC output: LC7881C pin 1

⑪ DAC output: LC7881C pin 20
Tone: PIANO 1
Key: A3



⑫ Filter output: M5218PR pin 1

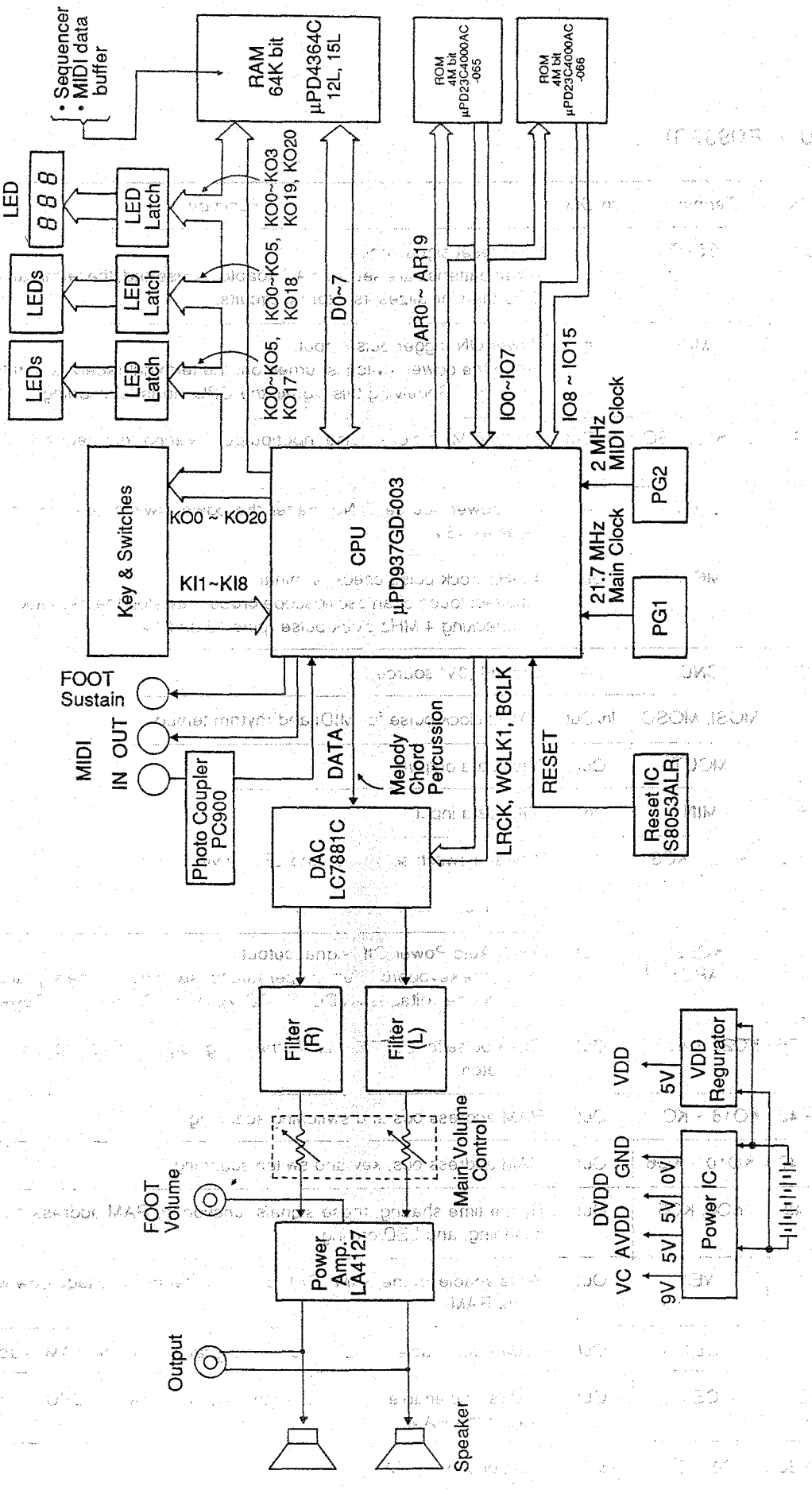
⑬ Filter output: M5218PR pin 7
Tone: PIANO 1
Key: A3



⑭ Filter output: M5218PR pin 1

⑮ Filter output: M5218P'R pin 20
Tone: Flute 1
Key: A3

BLOCK DIAGRAM

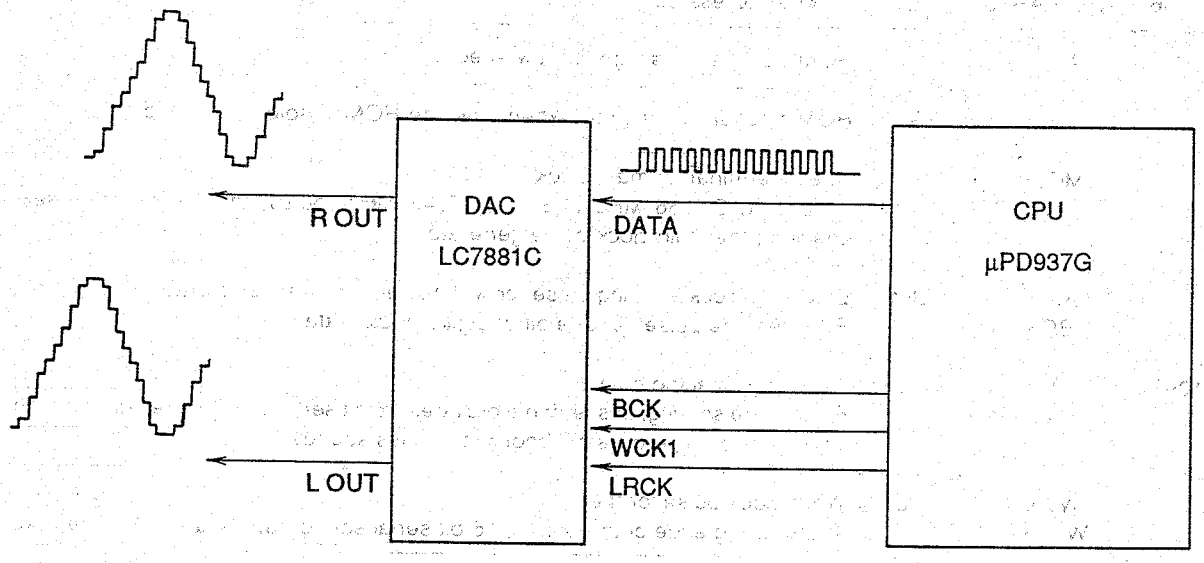


CPU (μPD937G)

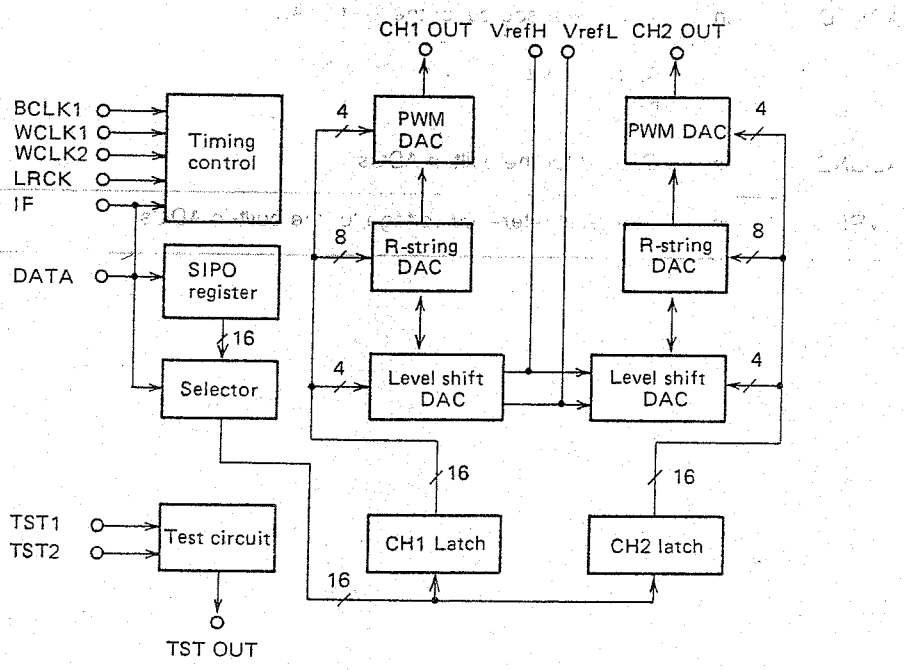
Pin No.	Terminal	In/Out	Function
5	RESET	In	CPU reset signal input. When batteries are set or an AC adaptor is inserted, the terminal receives a signal. CPU then initializes its internal circuits.
6	MI	In	Power ON trigger pulse input. When the power switch is turned on, the terminal receives a differential pulse (⌐V¬). Receiving this signal, the CPU starts functioning.
8, 9	COSI, COSO	In/Out	21.7248 MHz clock pulse input/output. Varing this frequency changes the tune (pitch).
10	VDD1	—	+5V power source. No matter the power switch position, the terminal always receives +5V.
11	MPG	Out	4 MHz clock pulse check terminal. As direct touch of an oscilloscope probe may stop the oscillation, use this terminal for checking 4 MHz clock pulse (pins 13 and 14).
12	GND	—	Ground (0V) source.
13, 14	MOSI, MOSO	In/Out	4 MHz clock pulse for MIDI and rhythm tempo
17	MOUT	Out	MIDI data output
18	MIN	In	MIDI data input
19 ~ 22	KO0 ~ KO3	Out	Key and switch scanning, and LED driving.
23 ~ 30	KI8 ~ KI1	In	Keys and switches input terminals
31	KO22 (APO)	Out	APO (Auto Power Off) signal output. When the keyboard is left unoperated for six minutes, the signal drops to Low level shutting the voltages AVDD, DVDD VC and VDL off in the Power IC LA5668.
33 ~ 36	KO20 ~ KO17	Out	Clock pulse for LED latches. At the rising edge of this pulse, LED data is kept in the LED latch.
37 ~ 42	KO16 ~ KO11	Out	RAM address bus and switching scanning.
43 ~ 47	KO10 ~ KO6	Out	RAM address bus, key and switch scanning.
48, 49	KO4, KO5	Out	By the time sharing, these signals function as RAM address bus, key and switch scanning, and LED driving.
50	WE1	Out	Write enable for the RAM. CPU drops this terminal voltage Low when it writes data in the RAM.
51	OE1	Out	RAM's out enable signal. When this signal is Low, the RAM is able to output data.
52	CE1	Out	RAM's chip enable signal. When this signal is Low, the CPU is able to read or write data in the RAM.
53 ~ 60	D0 ~ D7	In/Out	Data bus to the RAM.

61 ~ 76	IO0 ~ IO15	In	Data inputs from the ROM
78 ~ 96	AR0 ~ AR18	Out	ROM's address bus
97	AR19	Out	ROM's chip enable signal. Low effective.
100	CE	Out	ROM's out enable signal. When Low, the ROM is able to output data.
105	MCLK	Out	Check terminal for main clock. Outputting 2.7156 MHz (1/8 of 21.7248 MHz) pulse, this terminal is used for checking the main clock pulse generator.
107	BCLK (BCK)	Out	DAC's bit clock. Timing pulse for writing serial digital audio data in DAC. Provides one pulse per one bit of digital audio data.
109	SWD1 (DATA)	Out	Serial digital audio data. By the time sharing, this terminal provides 16-bit serial data for the right and the left channels' tone, percussion, chord, and bass sounds.
111	WCK1 (WCLK1)	Out	Word clock pulse for the DAC. At the falling edge of this signal, 16-bit serial sound data is latched in the DAC.
112	LRCK	Out	Left/Right channel separation signal. As the serial sound data contains right and left channels sounds, the voltage level of this signal determines the output channel of DAC. High: Left channel Low: Right channel
114	VRT	In	High level reference voltage for the built-in ADCs (Analog to Digital Converters). Connected to DVDD (+5V).
115	ADVDD	In	+5V power source for the built-in ADCs.
116~118	Vin0 ~ Vin2	In	Analog inputs for the built-in ADCs. Not used.
119	ADGND	In	Ground for the built-in ADCs
120	VRB	In	Low level reference voltage for the built-in ADCs

DAC (Digital to Analog Converter: LC7881C)



Data output from CPU is 16-bit serial signals containing digital sound data of melody, chord, bass, and percussion for the right and the left channels.
LC7881C converts the 16-bit serial sound data into analog waveforms and outputs the right and the left channels waveforms separately.



LC7881C Block Diagram

(1) Data reading

Digital audio data is 16-bit serial signals of 2's complement.

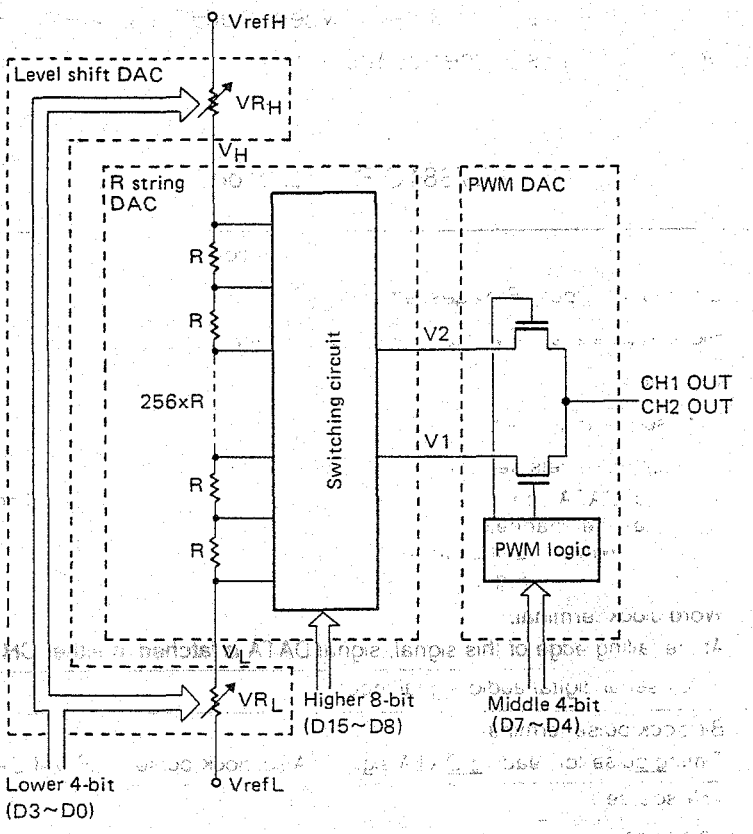
In accordance with the voltage level of terminal IF, LC7881C is able to read either MSB first data or LSB first data.

Since the CPU's DATA output is MSB first data, the terminal IF is connected to Hight level.

Synchronized with the rising edge of BCLK, digital audio signal from DATA terminal is stored in SIPO register.

At the falling edge of word clock WCLK1, the data is latched in either CH1 Latch or CH2 Latch. The channel selection is done by signal LRCK (High: CH1, Low: CH2).

(2) D/A conversion



LC7881C D/A Conversion Block for one channel

LC7881C contains two each of R-string DAC, PWM (Pulse Width Modulation DAC, and Level Shift DAC for the right and the left channels.)

After being latched, 16-bit digital audio signal is separated in three blocks and each block data is sent to a certain DAC.

Upper 8 bits (D15 ~ D8) . . . To R-string DAC
Middle 4 bits (D7 ~ D4) . . . . . To PWM DAC
Lower 4 bits (D3~ D0) . . . . . To Level Shift DAC

① R-string DAC

By means of connecting 256 (2^8) pieces of unit resistors in serial, voltages VH and VL applied to both ends of the resistors are divided in 256 steps. Potential difference at both ends of one unit resistor R is VH-VL/256. The upper 8 bits of signal DATA turn the switches in switching circuit and extracts a voltage level.

② PWM (Pulse Width Modulation) DAC

The potential difference V2-V1 of R-string DAC is further divided in 16 steps in PWM DAC. The division is controlled by the middle 4 bits (D7 ~ D4).

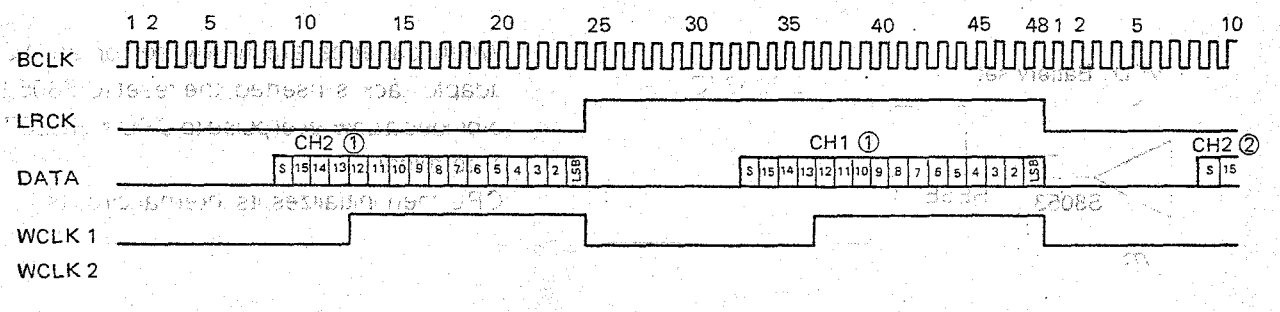
③ Level Shift DAC

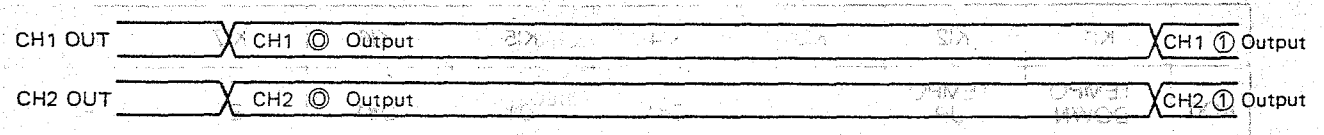
The resistances of variable resistors VRH and VRL are varied by the lower 4 bits of signal DATA (D3 ~ D0).

By means of varing the potential difference between VrefH1 and VrefL1, R-string DAC's output voltage for the minimum step is further controlled.

LC7881C Pin Function

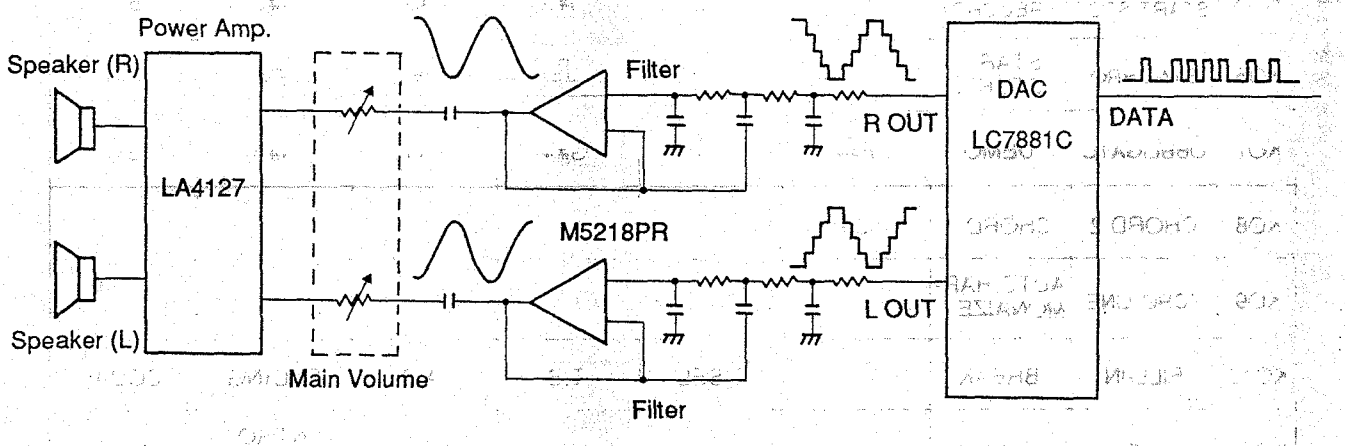
Pin No.	Thermal	Function
1	CH1 OUT	Channel 1 output. Provides left channel sounds.
2	Vref H1	High level reference voltage. Connected to AVDD (+5V)
4	VDD	+5V source
5	WCLK2	Not used. Connected to AG (0V).
6	LRCK	Left/right channels separation signal. As signal DATA contains both channels' sounds, the voltage level of this terminal separates the channels. High . . . Left channel Low . . . Right channel
7	WCLK1	Word clock terminal. At the falling edge of this signal, signal DATA is latched in either CH1 Latch or CH2 Latch.
8	DATA	16-bit serial digital audio signal input.
9	BCLK	Bit clock pulse terminal. Timing pulse for reading DATA signal. Also clock pulse for PWM DAC.
10	VDD	+5V source
14	IF	LSB/MSB first signal selection terminal. Voltage level of this terminal determines the format of signal DATA. High . . . MSB first data Low . . . LSB first data The format of DATA is MSB first on this model, this terminal is connected to AVDD (+5V).
15	GND	Ground (0V) source
16	Vref L1	Low level reference voltage. Connected to AG (0V).
17	GND	Ground (0V) source
20	CH2 OUT	Channel 2 output. Provides right channel sounds.





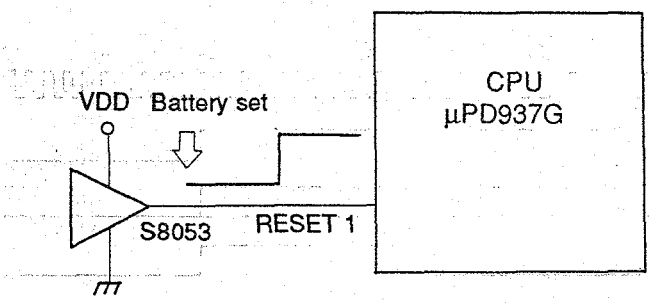
Timing Chart

LINEAR CIRCUITS



After filtered and amplified, the right and the left channels sounds are emanated from the speakers.

INITIAL RESET CIRCUIT



When batteries are newly set or an AC adaptor jack is inserted, the reset IC S8053 provides a Low level pulse to CPU's RESET 1 terminal.
CPU then initializes its internal circuits.

KEY & SWITCH MATRIX

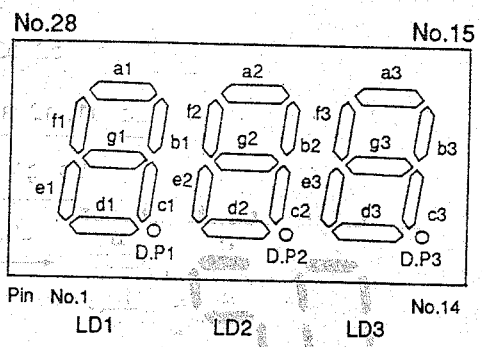
	KI1	KI2	KI3	KI4	KI5	KI6	KI7	KI8
KO0	TEMPO DOWN	TEMPO UP	C1	C#1	D1	D#1	E1	F1
KO1	DETUNE UP	DETUNE DOWN	F#1	G1	G#1	A1	A#1	B1
KO2	DELAY UP	DELAY DOWN	C2	C#2	D2	D#2	E2	F2
KO3	ATTACK/ DECAY UP	ATTACK/ DECAY DOWN	F#2	G2	G#2	A2	A#2	B2
KO4	RELEASE UP	RELEASE DOWN	C3	C#3	D3	D#3	E3	F3
KO5	MEMORY START/STOP	MEMORY RECORD	F#3	G3	G#3	A3	A#3	B3
KO6	SYNCHRO	START/ STOP	C4	C#4	D4	D#4	E4	F4
KO7	OBBLIGATO	DEMO	F#4	G4	G#4	A4	A#4	B4
KO8	CHORD 2	CHORD 1	C5					
KO9	ECHO LINE	AUTO HAR-MONAIZE						
KO10	FILL-IN	BREAK		T SEL	T.B	A.B	ENDING	CODA
KO11	A5	A4	A3	A2	A1	A0	INTRO (LONG)	INTRO
KO12	T3	T2	T1	T0	A9	A8	A7	A6
KO13			T9	T8	T7	T6	T5	T4
KO14	POWER ON	CHORD/MIDI FINGERD	CHORD/MIDI CHORD	CHORD/MIDI MIDI			POWER OFF	
KO15	RHYTHM VOLUME 0	RHYTHM VOLUME 1	RHYTHM VOLUME 2	RHYTHM VOLUME 3	RHYTHM VOLUME 4			
KO16	ACCOMP. VOLUME 0	ACCOMP. VOLUME 1	ACCOMP. VOLUME 2	ACCOMP. VOLUME 3	ACCOMP. VOLUME 4			

LED & IC

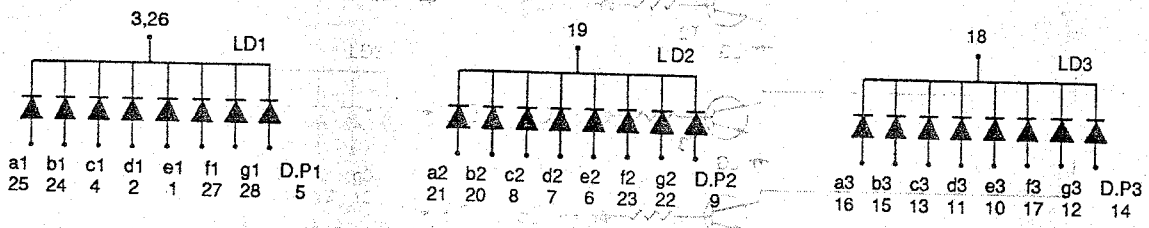
LED (LB603-VP)

Pin Function

Pin No.	Address	Pin No.	Address
1	Segment "el" Anode	15	Segment "b3" Anode
2	Segment "d1" Anode	16	Segment "a3" Anode
3	Digit.1 Common Cathode	17	Segment "f3" Anode
4	Segment "c1" Anode	18	Digit.3 Common Cathode
5	D.P 1 Anode	19	Digit.2 Common Cathode
6	Segment "e2" Anode	20	Segment "b2" Anode
7	Segment "d2" Anode	21	Segment "a2" Anode
8	Segment "c2" Anode	22	Segment "g2" Anode
9	D.P 2 Anode	23	Segment "f2" Anode
10	Segment "e3" Anode	24	Segment "b1" Anode
11	Segment "d3" Anode	25	Segment "a1" Anode
12	Segment "g3" Anode	26	Digit.1 Common Cathode
13	Segment "o3" Anode	27	Segment "f1" Anode
14	D.P 3 Anode	28	Segment "g1" Anode



Circuit Diagram



IC (74HC4511AP)

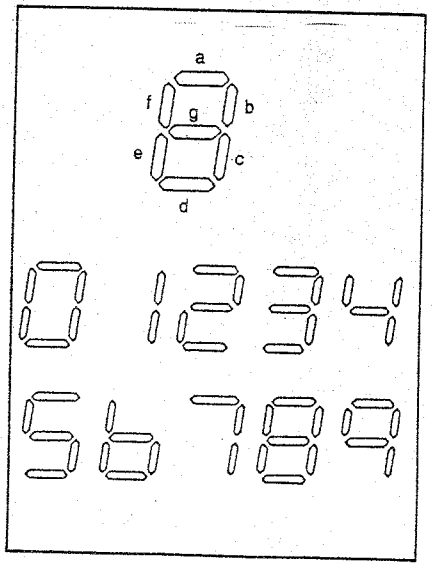
Control segment of LB603-VP

TRUTH TABLE

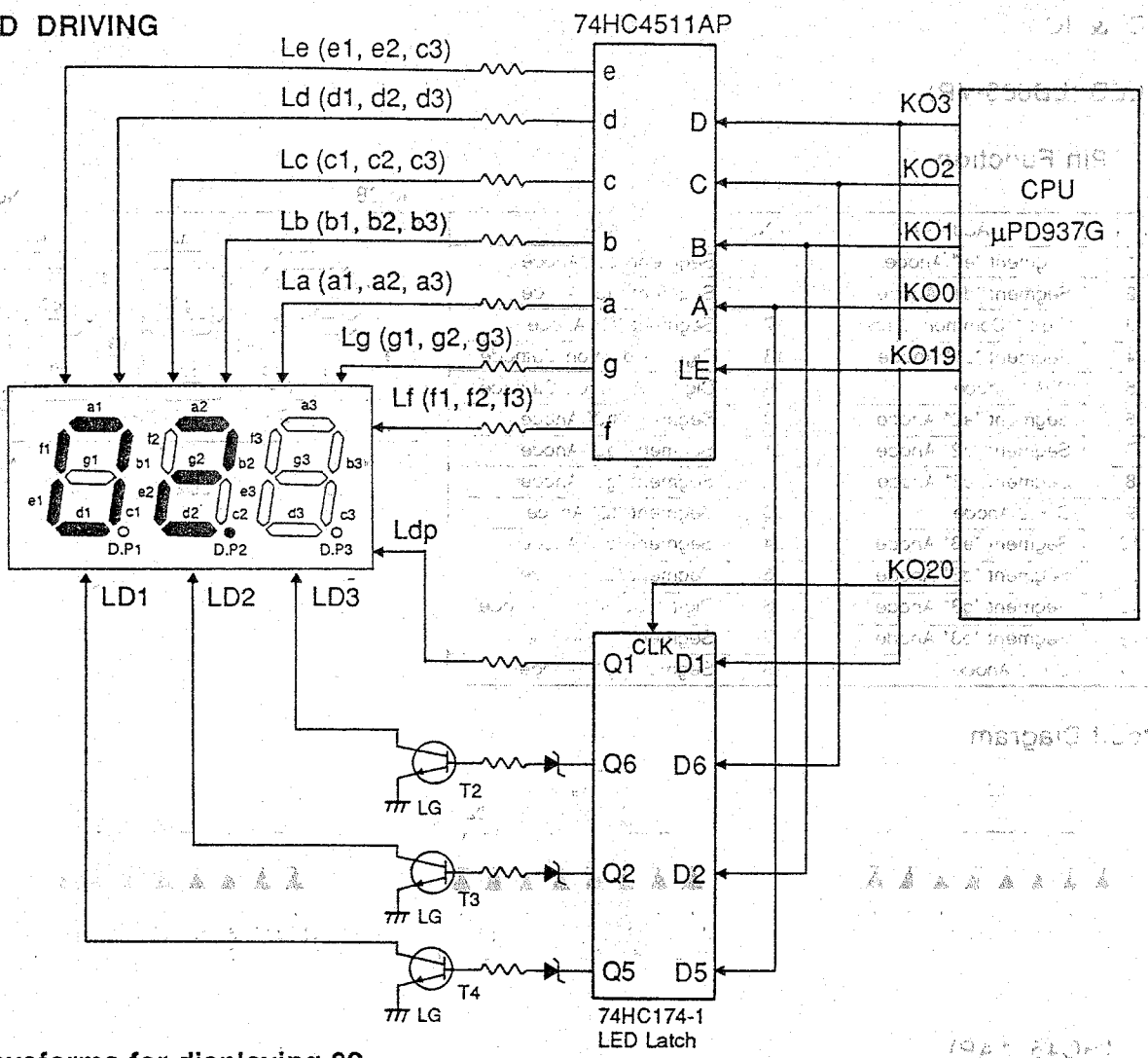
INPUT							OUTPUT							DISPLAY MODE
LE	BI	LT	D	C	B	A	a	b	c	d	e	f	g	
*	*	L	*	*	*	*	H	H	H	H	H	H	H	8
*	L	H	*	*	*	*	L	L	L	L	L	L	L	BLANK
L	H	H	L	L	L	L	H	H	H	H	H	H	L	0
L	H	H	L	L	L	H	L	H	H	L	L	L	L	1
L	H	H	L	L	H	L	H	H	L	H	H	L	H	2
L	H	H	L	L	H	H	H	H	H	H	L	L	H	3
L	H	H	L	H	L	L	L	H	H	L	L	H	H	4
L	H	H	L	H	L	H	H	L	H	H	L	H	H	5
L	H	H	L	H	H	L	L	L	H	H	H	H	H	6
L	H	H	L	H	H	H	H	H	H	L	L	L	L	7
L	H	H	H	L	L	L	H	H	H	H	H	H	H	8
L	H	H	H	L	L	H	H	H	H	L	L	H	H	9
L	H	H	H	L	H	L	L	L	L	L	L	L	L	BLANK
L	H	H	H	L	H	H	L	L	L	L	L	L	L	BLANK
L	H	H	H	H	*	*	L	L	L	L	L	L	L	BLANK
H	H	H	*	*	*	*				ΔΔ				ΔΔ

* : Don't care ΔΔ : Depends upon nthe BCD code
Previously applied when LE = "L"

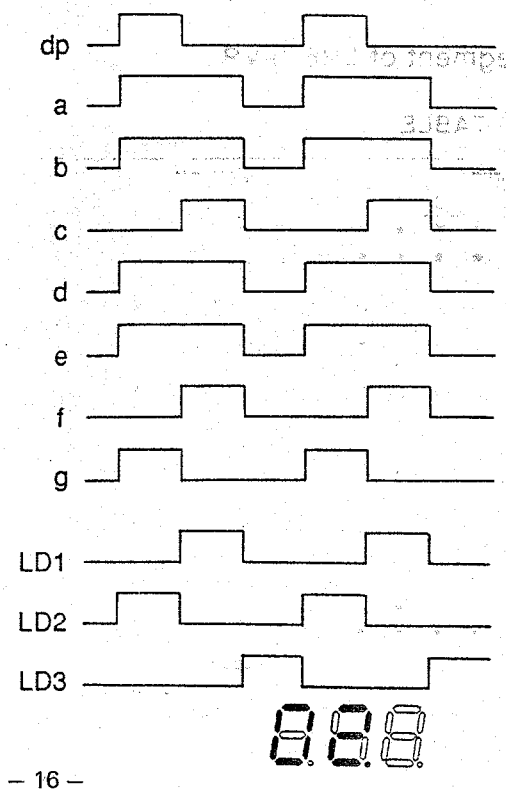
SEGMENT DISPLAY

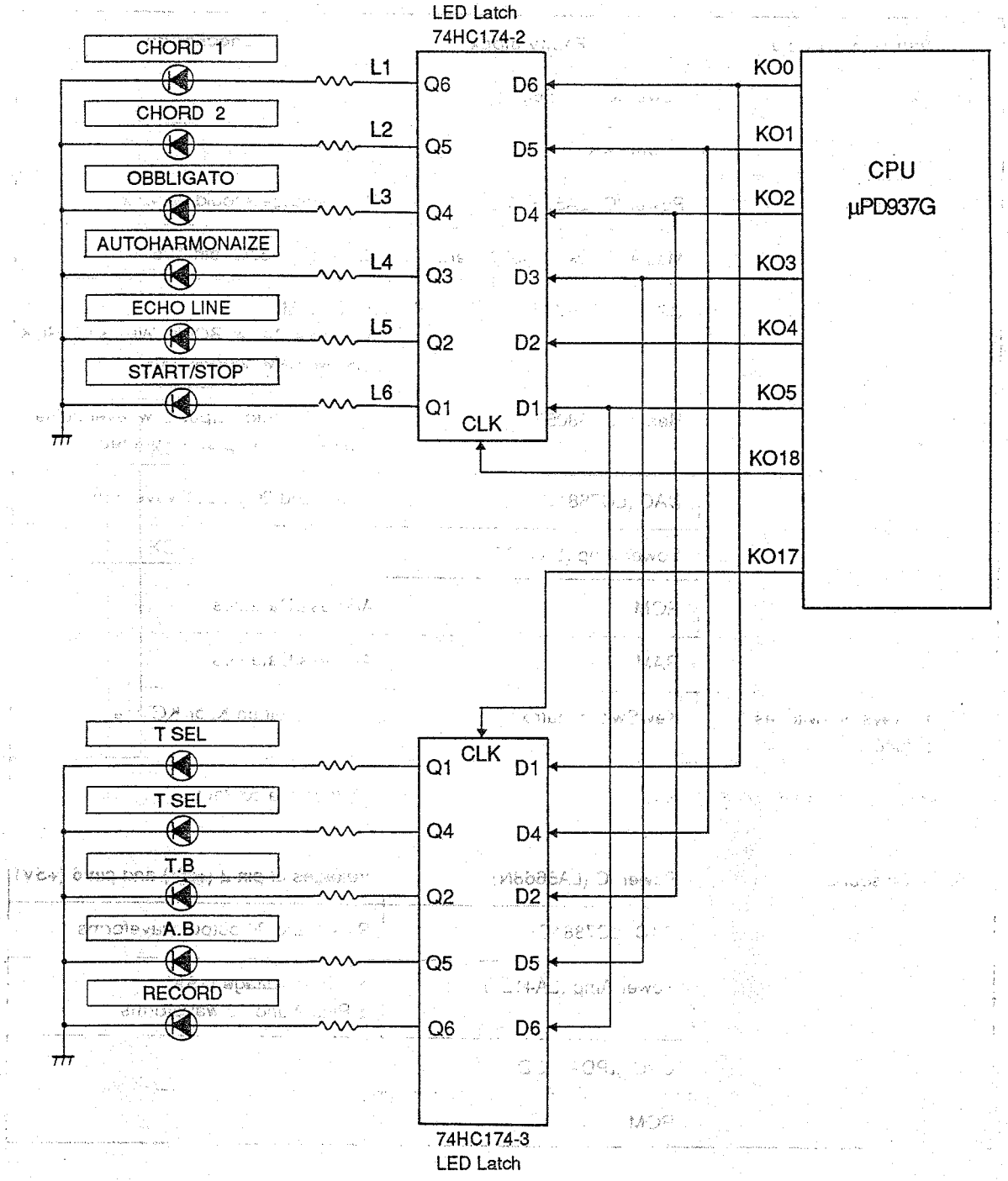


LED DRIVING



Waveforms for displaying 02.




LED Latch
74HC174-2
CHORD 1
CHORD 2
OBBLIGATO
AUTOHARMONAIZE
ECHO LINE
START/STOP
L1
L2
L3
L4
L5
L6
Q6
Q5
Q4
Q3
Q2
Q1
D6
D5
D4
D3
D2
D1
CLK
KO0
KO1
KO2
KO3
KO4
KO5
KO18
KO17
CPU
µPD937G
T SEL
T SEL
T.B
A.B
RECORD
CLK
Q1
Q4
Q2
Q5
Q6
D1
D4
D2
D5
D6
74HC174-3
LED Latch

TROUBLESHOOTING TABLE

Nature of trouble	Faulty block	Checkpoint
No power	Power IC (LA5668N)	
	Power jack	
No sound at all	Power IC (LA5668N)	Pin 6 voltage should be +5V
	Master Clock Pulse Generator	CPU (μPD937G) pin 105
	CPU (μPD937G)	o Signal MI o Signals DATA, BCLK, WCLK1, LRCK o ROM/RAM address bus
	Reset IC (S8053)	o Pin 1 should output Low level pulse when AC adapter is inserted.
	DAC (LC7881C)	Pins 1 and 20 output waveforms
	Power Amp (LA4127)	
	ROM	Address/Data bus
	RAM	Address/Data bus
Certain keys or switches do not function	Key/Switch matrix	Open circuit on KI or KO line
A certain key does not function	Key matrix	Dust on the contact
Distortion sound	Power IC (LA5668N)	Voltages of pin 2 (+9V) and pin 6 (+5V)
	DAC (LC7881C)	Pins 1 and 20 output waveforms
	Power Amp (LA4127)	o Pin 11 voltage (+9V) o Pins 9 and 12 waveforms
	CPU (μPD937GD)	
	ROM	

Item	Code No.	Parts Name	Spec. No.	Q	*	FOB Japan N. R. Yen Unit Price	RNK	
	MA1M PCB ASS'Y							
	2010 8708	LSI	µPD937GD-003	1			A	R
	2010 9100	LSI	µPD23C4000AC-65	1			A	P
	2010 9107	LSI	µPD23C4000AC-66	1			A	P
	2010 4914	LSI	µPD4364C-12L,15L	1			A	F
	2010 7294	LSI	LC7881C	1			A	D
	2114 0070	Monolithic IC	LA4127	1			A	C
	2114 1302	Monolithic IC	LA5668N	1			A	B
	2120 1146	Monolithic IC	M5218PR	1			A	B
	3850 1216	MOS IC	S8053ALR	1			A	B
	2114 1330	Photo coupler	NJL5127D	1			A	C
O*	2250 0238	Transistor	2SA1267GR-AT-T	1	20		A	A
	2252 0504	Transistor	2SC3199GR,BL-AT-T	1	10		A	A
	2253 0357	Transistor	2SD2008Q, R-T105-T	1			A	A
	2240 1068	FET	2SK163M-T	1			A	A
	2301 0275	Diode	1SS176-TPA7-T	18	20		C	A
	2390 0371	Diode	DSK10B-BT-T	2	20		C	A
	2360 0014	Zener diode	RD6.8ESB1-T1-T	1	20		C	A
	2370 0119	LED	LTZ-MR15T-77-T	1	20		C	A
	2590 0595	Ceramic oscillator	EFO-GC4004A4C	1			C	B
	2617 0028	Carbon film resistor	R-20-100-J-T24-T	15	20		C	A
	2617 0141	Carbon film resistor	R-20-100K-J-T24-T	3	20		C	A
	2617 0117	Carbon film resistor	R-20-47K-J-T24-T	4	20		C	A
	2617 0176	Carbon film resistor	R-20-1M-J-T24-T	2	20		C	A
	2617 0220	Carbon film resistor	R-20-150-J-T24-T	4	20		C	A
	2606 0315	Carbon film resistor	R-20-3.3-J-T24-T	2	20		C	A
	2617 0265	Carbon film resistor	R-20-10-J-T24-T	2	20		C	A
	2617 0249	Carbon film resistor	R-20-470-J-T24-T	1	20		C	A
	2617 0036	Carbon film resistor	R-20-220-J-T24-T	3	20		C	A
	2617 0231	Carbon film resistor	R-20-270-J-T24-T	1	20		C	A
	2617 0052	Carbon film resistor	R-20-1K-J-T24-T	4	20		C	A
	2617 0095	Carbon film resistor	R-20-10K-J-T24-T	12	20		C	A
	2617 0297	Carbon film resistor	R-20-22K-J-T24-T	2	20		C	A
	2617 0168	Carbon film resistor	R-20-220K-J-T24-T	1	20		C	A
	2801 7469	Electrolytic capacitor	ECE-A1CU471ZB-T	1	20		C	A
	2801 7595	Electrolytic capacitor	ECE-A1AU220BX-T	8	20		C	A
	2801 8197	Electrolytic capacitor	ECE-A1AU101B-T	3	20		C	A
	2801 8204	Electrolytic capacitor	ECE-A1CU221B-T	1	20		C	A
	2801 8449	Electrolytic capacitor	ECE-A1CU101B-T	1	20		C	A
	2801 8456	Electrolytic capacitor	ECE-A1CU100B-T	4	20		C	A
	2801 9121	Electrolytic capacitor	ECE-A0JU471B-T	2	20		C	A
	2801 9128	Electrolytic capacitor	ECE-A0JU221B-T	2	20		C	A
	2805 2279	Electrolytic capacitor	16RE2-1000-S1	2	10		C	B
	2801 9135	Electrolytic capacitor	ECE-A0JU331BX-T	4	20		C	A
	2818 0466	Ceramic capacitor	RT-HE40TKYB-101K-T	10	20		C	A
	2818 0365	Ceramic capacitor	RT-HE50TKYB102K-T	3	20		C	A
	2818 2082	Ceramic capacitor	RT-HE70TKYF103Z-T	5	20		C	A
	2813 2156	Ceramic capacitor	RT-HE90TKSL471J-T	2	20		C	A
O*	2818 0390	Ceramic capacitor	RT-HE40TKYB221K-T	2	20		C	A
	2813 0161	Ceramic capacitor	RT-HE60TKCH430J-T	1	20		C	A
	2818 3283	Ceramic capacitor	RT-HE50TKCH300J-T	1	10		C	A
	2818 0494	Ceramic capacitor	RT-HE80TKSL331J-T	2	20		C	A
	2818 0420	Ceramic capacitor	RT-HE40TKYB471K-T	8	20		C	A
	2813 1323	Ceramic capacitor	RT-HE40TKCH240J-T	1	20		C	A

Notes: O* – New parts
Q'ty – Quantity used per unit
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Rank A: Essential
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Item	Code No.	Parts Name	Spec. No.	Q	*	FOB Japan N. R. Yen Unit Price	RNK	
O*	2813 1225	Semiconductive capacitor	DD404SR562K16-T	2	20		C	A
O*	2813 1722	Semiconductive capacitor	DD407SR104K16-T	1	20		C	A
	2813 2100	Semiconductive capacitor	RT-B65TKYF104Z-T	3	20		C	A
	2830 6401	Mylar capacitor	AMZV-393K50-T	2	10		C	A
	2830 6229	Mylar capacitor	AMZV-104K50-T	2	20		C	A
	2845 0588	Three polarity capacitor	EXC-ECT223MBC	4	10		C	A
	2845 0280	Ferrite beads	EXC-ELDR35C	13	10		C	A
	3025 0203	EMI filter	EXC-EMT222DC	7	10		C	A
	2898 0021	Trimmer capacitor	VCT84K911A	1			C	B
	3501 4816	DIN jack	YKF51-5051	1			C	B
	3501 3731	DC jack	HEC2305-01-230	1	10		C	A
	3612 0665	Jack	YKB21-5006	1			C	B
	3612 0789	Jack	YKB21-5010	1			C	B
	3612 0711	Miniature jack	YKB21-5101	1			C	B
O*	3719 2576	Ribbon cable M295A-1	DF0H02225-80303530	1	20		C	A
	3841 0476	Coil	L2P-7L	1	10		C	A
	6910 3840	Sponge L	M4918-1	1	20		C	A
	6912 2900	Felting seal 10x30–2	M42397-2	1	20		C	A
	6913 8051	Wire	M32711A-8	1	20		C	A
	6915 2120	Tape 250J	MA410572-1	1	20		C	A
	6917 9391	Spacer 295A	M411221A-1	2	20		C	A
O*	4317 1362	Blank PCB-M4295-MA1M	M110726B-1	1			X	C
	CN1M PCB ASS'Y							
	2105 1071	C-MOS IC	TC74HC174AP	2	5		A	B
	2105 1757	C-MOS IC	TC74HC4511P	1			A	B
	2220 1409	Transistor	2SC1740SR-TP-T	3	10		A	A
	2301 0101	Diode	1S2473T-77-T	9	20		C	A
	2360 0903	Zener diode	RD-4.7JSB3-T1-T	3	20		C	A
	2370 0462	LED	LN275RPX-(TA3)	5	20		C	A
	2370 0497	LED	LB-603VP	1			C	C
	2614 0145	Carbon film resistor	R-25-100-J-T24-T	3	20		C	A
	2614 0307	Carbon film resistor	R-25-220-J-T24-T	8	20		C	A
	2614 0170	Carbon film resistor	R-25-330-J-T24-T	5	20		C	A
	2614 0234	Carbon film resistor	R-25-1K-J-T24-T	2	20		C	A
	2614 0013	Carbon film resistor	R-25-10K-J-T24-T	1	20		C	A
	2801 9149	Electrolytic capacitor	ECE-A0JU101BX-T	1	20		C	A
	2818 0446	Ceramic capacitor	RT-HE40TKYB101K-T	3	20		C	A
	2845 0588	Three polarity capacitor	EXC-ECT223MBC	2	20		C	A
	3410 1728	Tact switch	EVQ-QS205K	34	10		C	A
O*	3719 2583	Ribbon cable M295B-1	DF0H02180-80303530	1	20		C	A
	3719 2611	Ribbon cable M295D-1	DF5H07140-8000M	1	20		C	A
	6918 1120	Spacer 288	M411270-1	1	20		C	A
	6917 3120	Felting seal 20x6	M42931-4	1	20		C	A
	6910 0150	Felting seal H2	M4551-1	2	20		C	A
	4317 1371	Blank PCB-M4295-CN1M	M110727A-1	1			X	C
	CN2M PCB ASS'Y							
	2105 1071	CMOS IC	TC74HC174AP	1			A	B
	2301 0101	Diode	1S2473-T-77-T	4			C	A
	2370 0133	LED	LN275RPX-(TT2)	6			C	A
	2614 0170	Carbon film resistor	R-25-330-J-T24-T	6	20		C	A
	2845 0588	Three polarity capacitor	EXC-ECT223MBC	1			C	A
	3725 2107	PC joiner M295B	JSF00-28-220M	1			C	B
	3725 2114	PC joiner M295C	JSF00-20-250M	1			C	B
	6909 6340	Sponge 50x125	M43317-1	1	20		C	A

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	4317 1390	Blank PCB-M4295-CN2M	M110728-1	1			X	C
	CN3M PCB ASS'Y							
	2765 1050	Slide volume	EWA-NAWC15B23	1			C	B
	3719 2513	Ribbon cable M295E	DF5H05090-8000M	1	20		C	A
O*	4317 1381	Blank PCB-M4295-CN3M	M110727A-2	1			X	A
	KY1M, KY2M PCB ASS'Y							
	2305 5023	Diode	1S1588-TP3-T(=1S2473T-77-T)	49	20		C	A
	3725 2030	PC joiner MASKX	JSF50-9-140	1	10		C	A
	3725 2100	PC joiner M295A	JSF50-15-140M	1	5		C	B
	4317 1161	Blank PCB-M495K-KY1M	M110620A-1	1			C	B
	4317 1171	Blank PCB-M495K-KY2M	M210704A-1	1			C	B
	UPPER CASE BLOCK							
1	3831 0413	Speaker	KC120FEL	2			B	C
	6910 1140	Sponge B	M4630-2	2	20		C	A
	6911 0240	Sponge 84C	M41684-1	1	20		C	A
2	6917 9360	Key top set 295	M311100*1	1			C	C
3	6916 5391	Slide knob 285	M310725A-1	4	20		C	A
4	6917 9292	Display panel 295	M411207B-1	1			C	C
5	6917 9370	Rubber bottom 288	M370976-2	1			C	C
6	6909 5890	SL contact 120	CSB-12D	3	10		C	A
7	6917 4432	KB chassis 49GD	M110604B-1	1			C	H
8	6917 4452	TAC31	M110603B-1	1			C	C
9	6917 4462	TAC18	M110605B-1	1			C	B
10	6917 4471	White key CEGB	M110589A-1	4			C	C
11	6917 4481	White key DFAS	M110590A-1	1			C	C
12	6917 4491	White key DFA	M110591A-1	3			C	C
13	6917 4502	Black key 10P	M110594B-1	2			C	C
	6918 0002	Key dumper 49A	M411202B-2	1	10		C	A
14	6917 9351	Upper case sub ass'y	M210870A*1	1			C	P
	LOWER CASE BLOCK							
15	6902 6140	Battery spring 90	M41226-1	1	10		C	A
16	6903 2150	Battery spring B	M41330-1	1	10		C	A
	6905 7540	Spong 30x220	M42675-1	1	20		C	A
	6917 9300	Rubber foot	M41109-3	4	20		C	A
	6917 9320	Felting seal 10x140	M411239-1	4	20		C	A
	6917 9330	Seal 295	M411208-1	4	20		C	A
	6917 9340	Rating plate	M410757-15	1			C	A
17	6912 9525	Lower case sub ass'y	M210552E*3	1			C	K
	OTHERS							
18	6918 1631	Battery cover sub ass'y	M311164A*1	1			C	C
	6916 7880	Note stand u	M310827-1	1			C	B
	6917 9640	Dust cover 295	M311113-1	1			C	B

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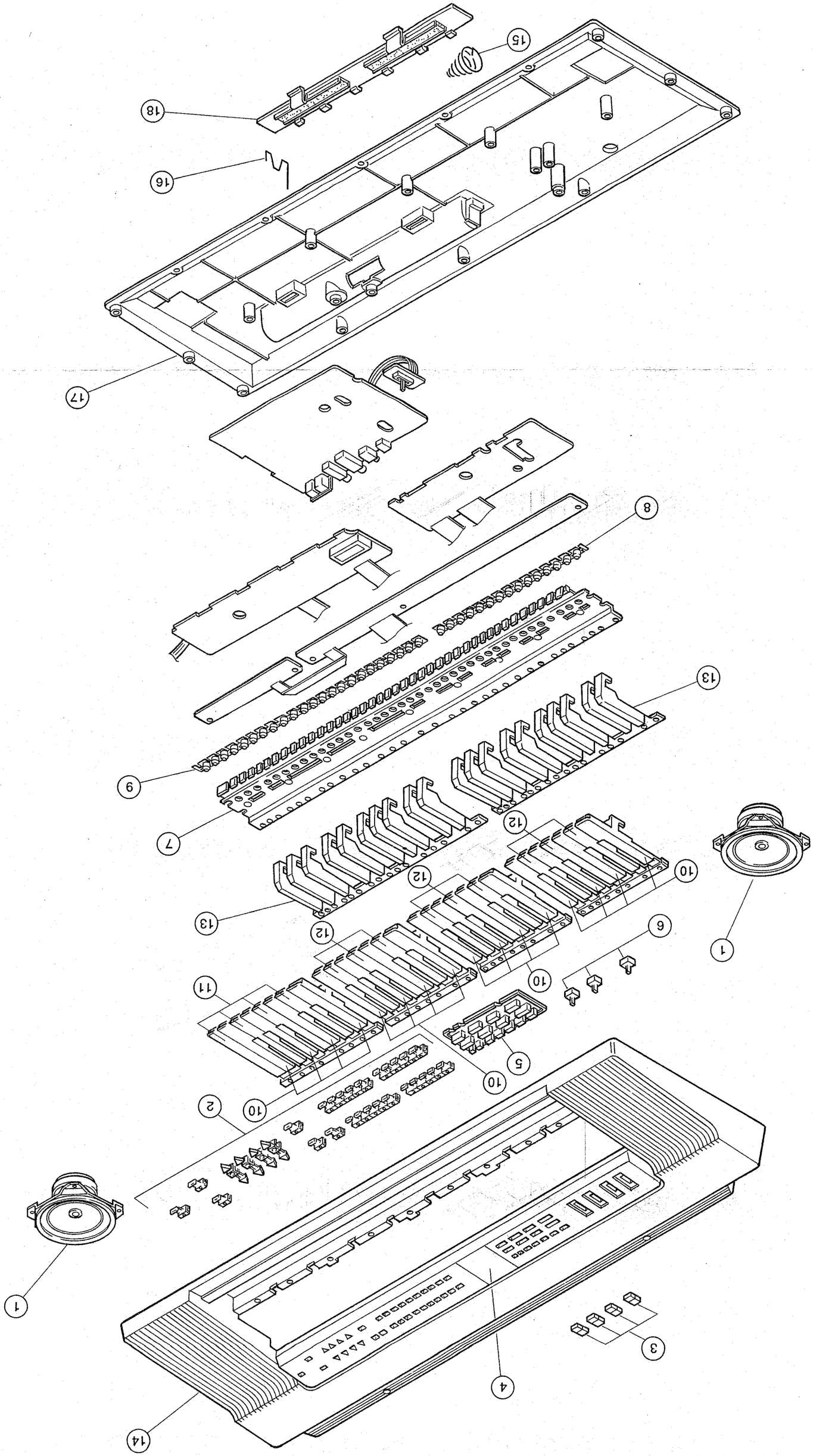

EXPLODED VIEW