

# **CASIO<sup>®</sup>**

# **Service Manual**

(with price)

## **CTK-100**



CTK-100

**ELECTRONIC KEYBOARD**

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# SPECIFICATIONS

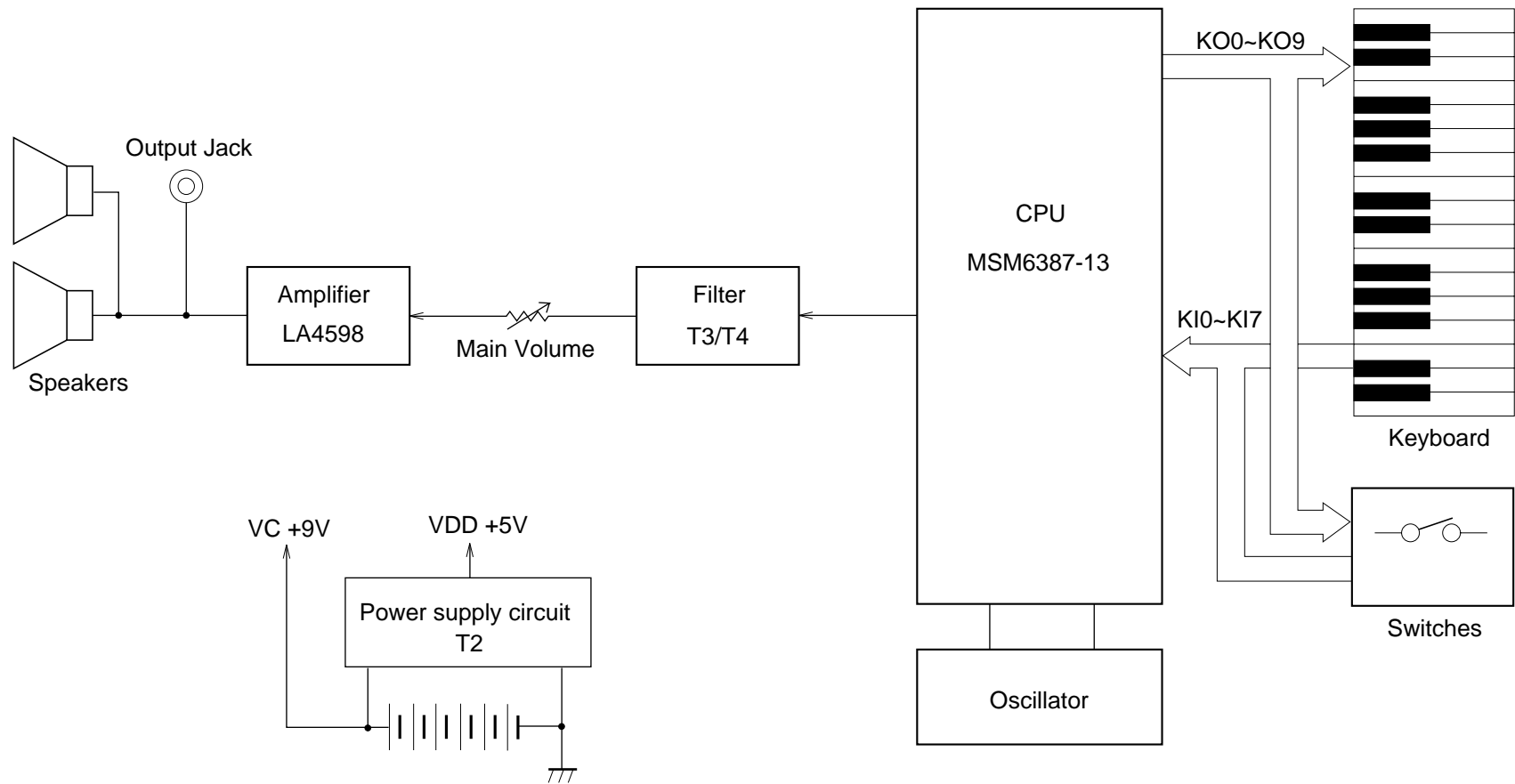
## General

Number of Keys:	49
Polyphonic:	8-note
Preset Tones:	100
Auto-Rhythms:	100
Auto-Accompaniment:	CASIO Chord/Fingered
Demonstration Tune:	Classical Medley
Built-In Speakers:	10 cm dia. 1.0W Input Rating: 2 pcs.
Terminals:	Output Jack [Output Impedance: 120 $\Omega$ , Output Voltage: 3 V (rms)MAX], AC Adapter Jack (DC 9 V)
Power Source:	3-way AC or DC source AC: AC adapter AD-5 DC: 6 AA size dry batteries Battery life: Approx. 3 hours (SUM-3/R6P) Approx. 6 hours (AM-3/LR6)
Power Consumption:	5.0 W
Dimensions:	86 x 857 x 285 mm (HWD) (3-3/8 x 33-3/4 x 11-1/4 inches) (HWD)
Weight:	3.2 kg (7.0 lbs) excluding batteries
Standard Accessory:	Music stand

## Electrical

Current Drain with 9V DC:	
No Sound Output	47 mA $\pm$ 20%
Maximum Volume	413 mA $\pm$ 20%
with keys C2, D2, E2 and F2 pressed in Car-Horn tone, Volume; Maximum	
Output Level (V <sub>rms</sub> with 8 $\Omega$ load each channel):	76 mV $\pm$ 20%
with key G2 pressed in Street Organ tone	
Speaker Input Level:	935 mV $\pm$ 20%
with key G2 pressed in Street Organ tone	
Minimum Operating Voltage:	6.0 V

# BLOCK DIAGRAM

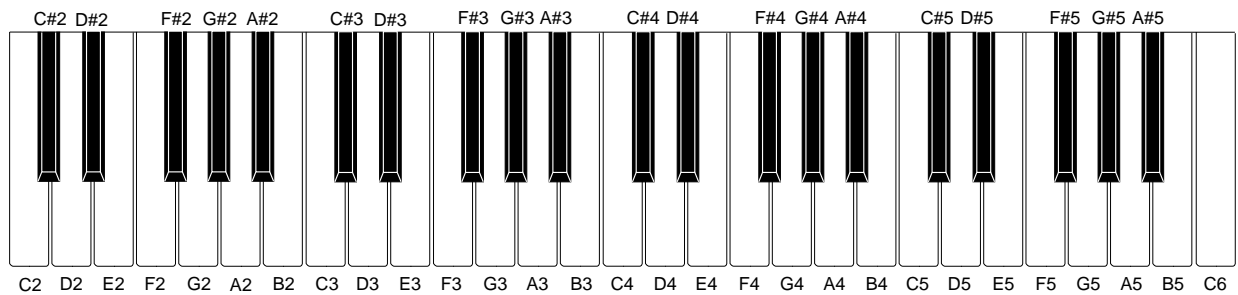


# CIRCUIT DESCRIPTION

## Key and Switch Matrix

	KI0	KI1	KI2	KI3	KI4	KI5	KI6	KI7
<b>KO0 (KC1)</b>	0	1	C2	C#2	D2	D#2	E2	F2
<b>KO1 (KC2)</b>	2	3	F#2	G2	G#2	A2	A#2	B2
<b>KO2 (KC3)</b>	4	5	C3	C#3	D3	D#3	E3	F3
<b>KO3 (KC4)</b>	6	7	F#3	G3	G#3	A3	A#3	B3
<b>KO4 (KC5)</b>	8	9	C4	C#4	D4	D#4	E4	F4
<b>KO5 (KC6)</b>	Tone	Rhythm	F#4	G4	G#4	A4	A#4	B4
<b>KO6 (KC7)</b>	Tempo Up	Tempo Down	C5	C#5	D5	D#5	E5	F5
<b>KO7 (KC8)</b>	Start/ Stop	Fill-In	F#5	G5	G#5	A5	A#5	B5
<b>KO8 (KC9)</b>	Demo		C6	Accomp. Volume 1 (Min)		Accomp. Volume 2	Accomp. Volume 3	Accomp. Volume 4 (Max)
<b>KO9</b>					Power OFF	Normal	Fingered	CASIO Chord

## Nomenclature of Keys



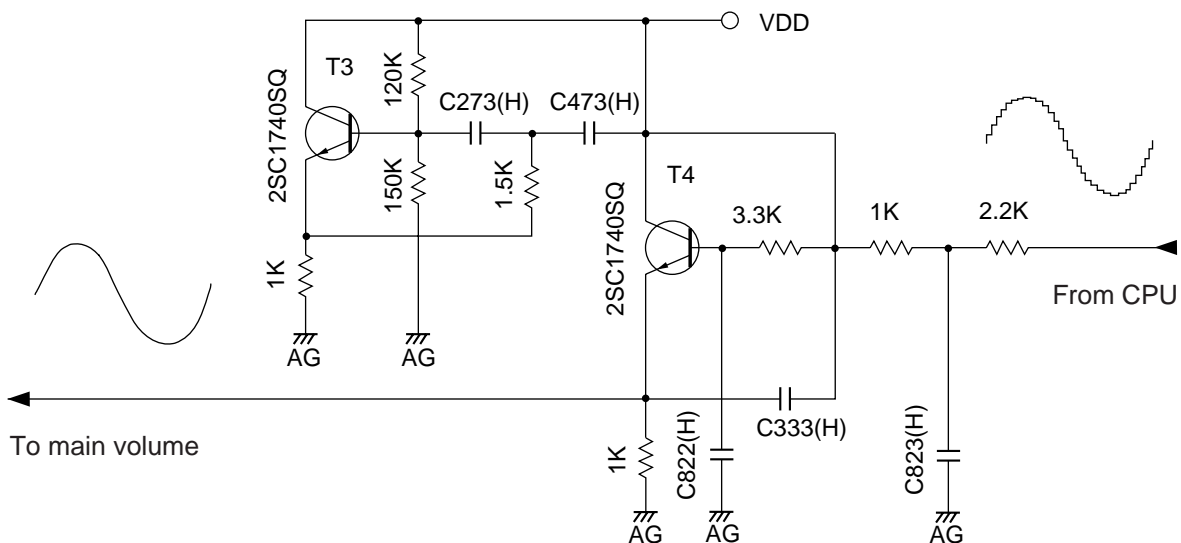
## CPU (MSM6387-13)

The CPU contains a sound data ROM and a DAC (Digital to Analog Converter), and it provides a sound waveform in accordance with the pressed key and the selected tone. The following table shows the pin functions of the CPU.

Pin No.	Terminal	In/ Out	Function
1, 2	TEST1, TEST2	—	Not used. Connected to ground.
3	RESET	In	Power ON reset terminal. When the power switch is turned on, the terminal receives a low level signal and the internal circuits of the LSI are initialized.
4	AVDD	In	+5 V source for the built-in DAC
5	OUT	Out	Sound waveform output
6	AGND	In	Ground (0 V) source for the built-in DAC
7	GND	In	Ground (0 V) source
8, 9	COSI, COSO	In/Out	21.725 MHz clock pulse input/output
10	VDD	In	+5 V source
11 ~ 18	KI0 ~ KI7	In	Input terminal from keys and switches
19, 20	KO11, KO10	—	Not used.
21 ~ 30	KO9 ~ KO0	Out	Key and switch scan signal output

## Filter Block

Since the sound signal from the CPU is a stepped waveform, the filter block is added to smooth the waveform.



## Power Amplifier (LA4598)

The power amplifier is a 2-channel power amplifier with a standby switch. The following table shows the pin functions of the power amplifier.

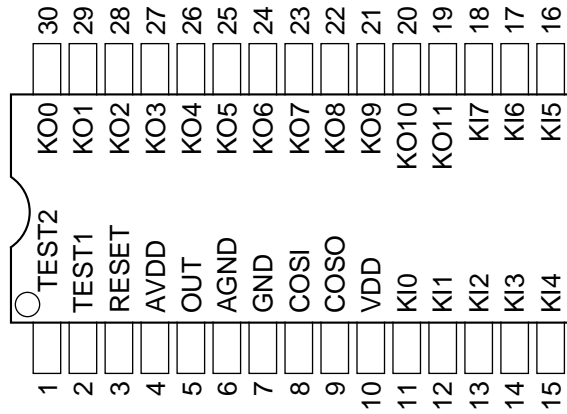
Pin No.	Terminal	In/Out	Function
1	Power GND	—	Ground (0 V) source
2	Ch1 B.S.	Out	Terminal for a bootstrap capacitor
3	Ch1 OUT	In	Channel1 output
4	VCC	In	+9 V source. Connected to the power source directly.
5	Ch1 N.F.	In	Negative feedback input
6	Ch1 IN	In	Channel1 input
7	D.C.	—	Terminal for a decoupling capacitor
8	Pre GND	In	Ground (0 V) source
9	Standby	In	Power control signal input. 0 V: OFF, +9 V: ON
10	Ch2 IN	In	Channel2 input
11	Ch2 N.F.	In	Negative feedback input
12	Ch2 OUT	Out	Channel2 output
13	Ch2 B.S.	—	Terminal for a bootstrap capacitor
14	NC	—	Not used.

## TROUBLESHOOTING

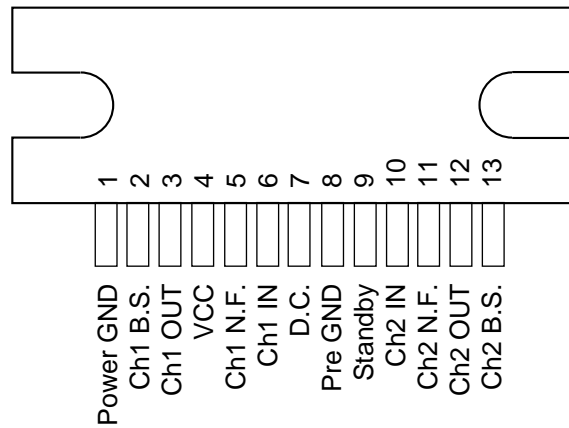
Nature of Trouble	Faulty Block	Checkpoint
No power	Power Supply Circuit	Emitter of T2 should provide +5.5 V. Base of T2 should receive +6 V.
	Power Jack	Jack contact.
No sound at all	Power Amp. (LA4598)	Pin 9 should receive +9 V when the power switch is turned on. Check output signals of pins 3 and 12.
	CPU (MSM6387-13)	Pins 21 ~ 30 should provide pulses. Pin 5 should have a sound signal when keys are pressed.
	Oscillator	Pins 8 and 9 of the CPU should receive an oscillation signal.
A certain key or switch does not function	Key and Switch Matrix	Dust on the contact.
Certain keys or switches do not function	Key and Switch Matrix	Open circuit on KC or KI line.

# IC AND TRANSISTOR LEAD IDENTIFICATION

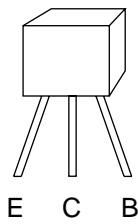
## MSM6387-13



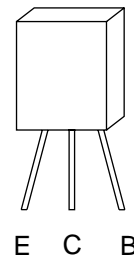
## LA4598



T3, T4: 2SC1740SQ



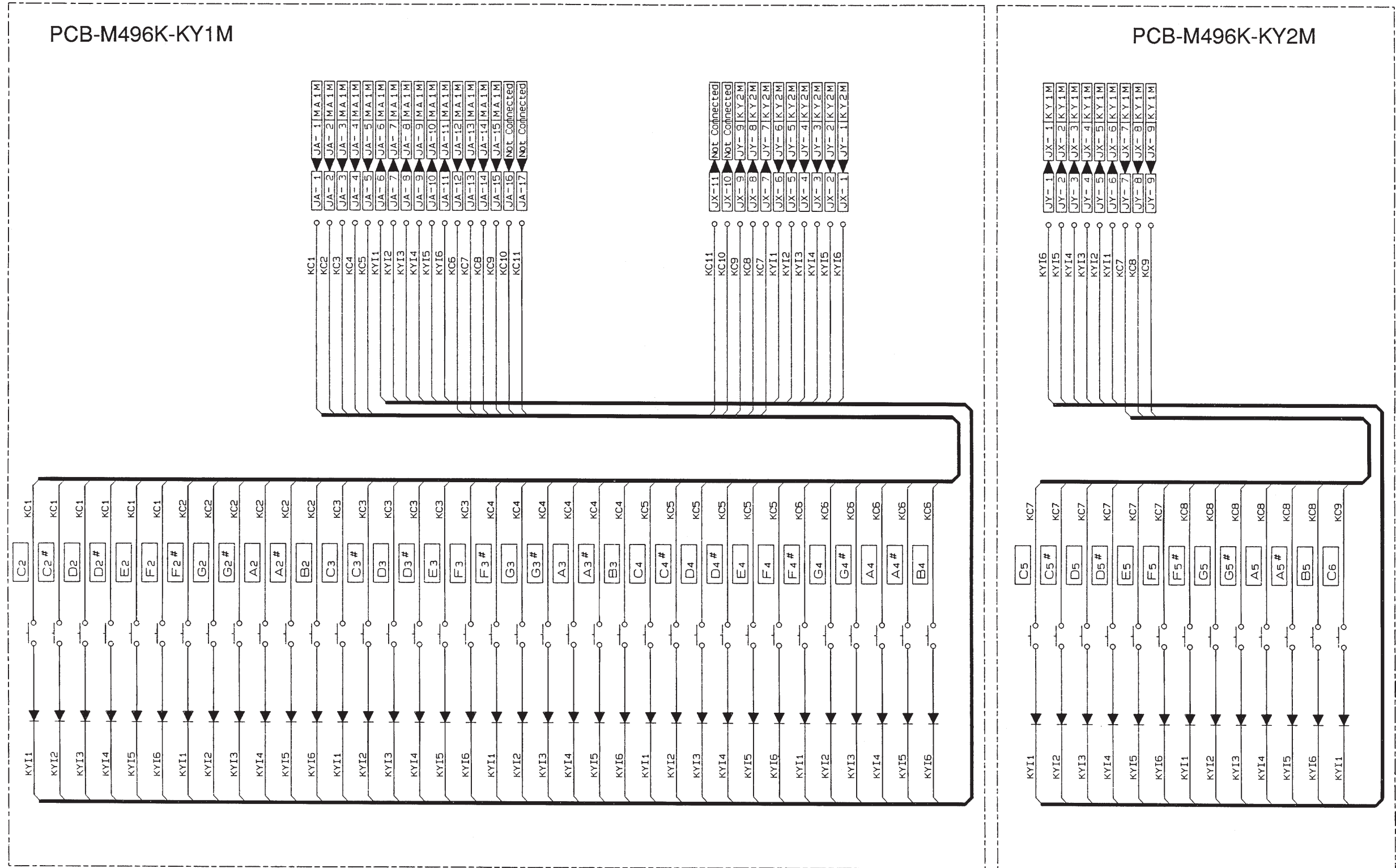
T2: 2SD2008Q,R



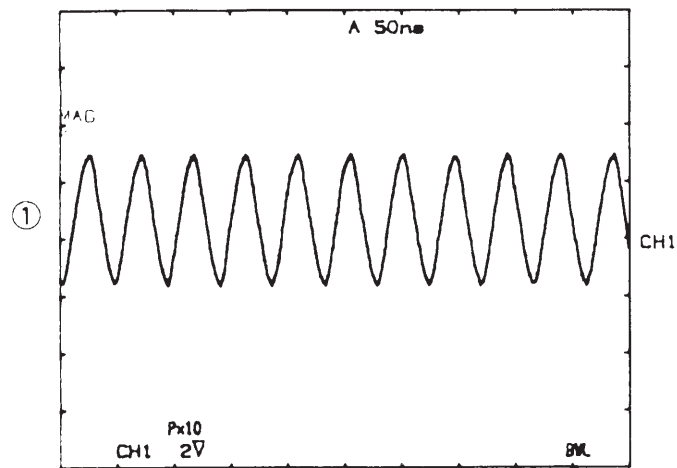
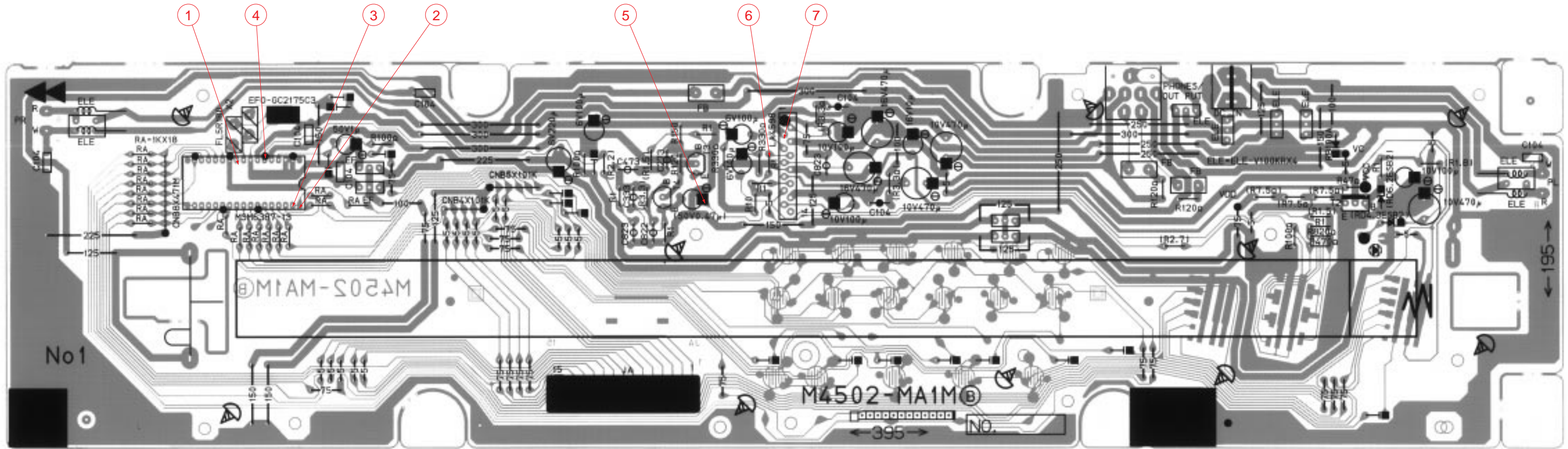


# SCHEMATIC DIAGRAMS

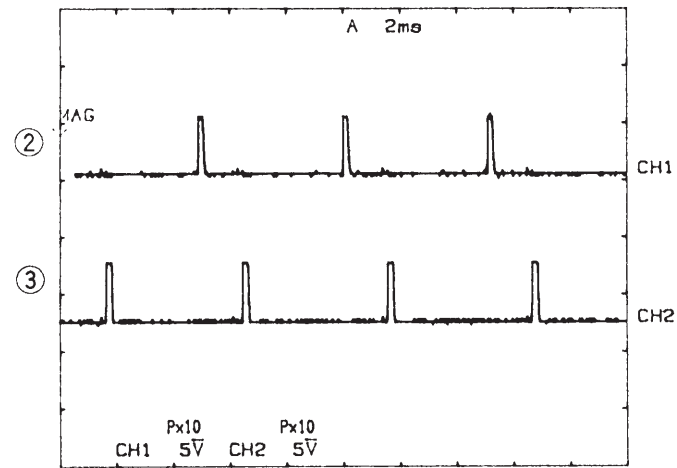
Keyboard PCBs M496K-KY1M, KY2M



# PCB VIEW and MAJOR WAVEFORMS

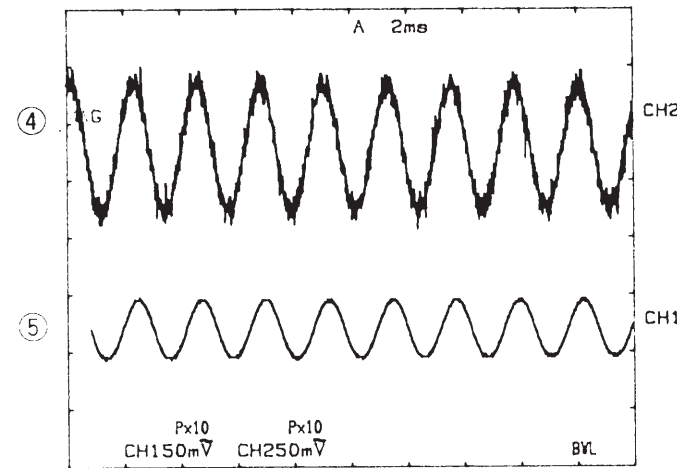


① Clock pulse COSO  
MSM6387-13 pin 9



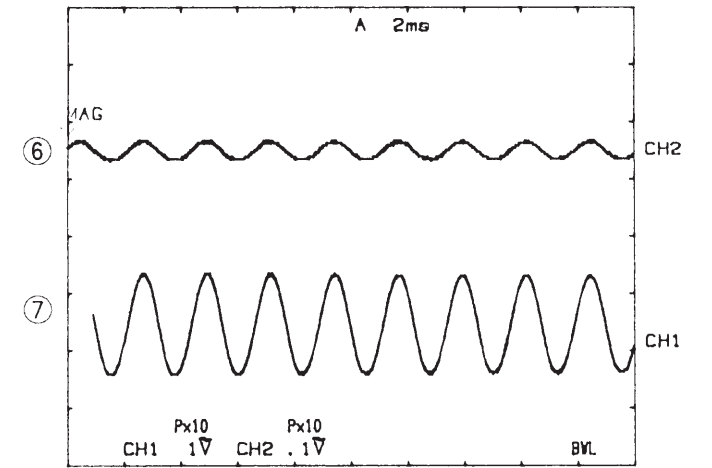
② Key scan signal KO0  
MSM6387-13 pin 30

③ Key scan signal KO1  
MSM6387-13 pin 29



④ Sound signal output  
MSM6387-13 pin 5

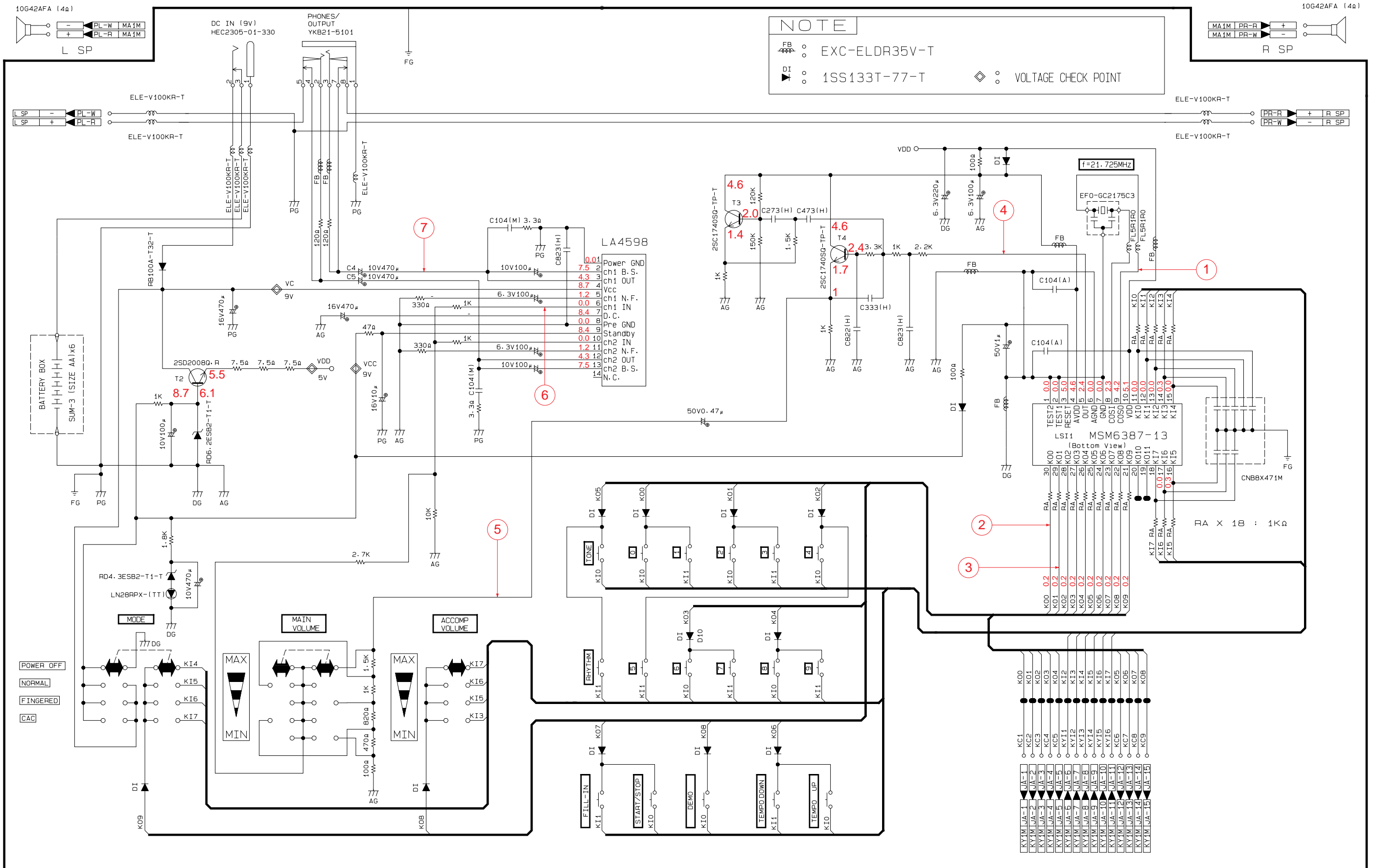
⑤ Filter output  
Tone: Flute (No.13)  
Key : A4  
Volume: Max



⑥ Power amp. input (R-ch)  
LA4598 pin 6

⑦ Power amp. output (R-ch)  
LA4598 pin 3

# Main PCB M4502-MA1M



**NOTE**  
 FB : EXC-ELDR35V-T  
 DI : 1SS133T-77-T  
 ◇ : VOLTAGE CHECK POINT

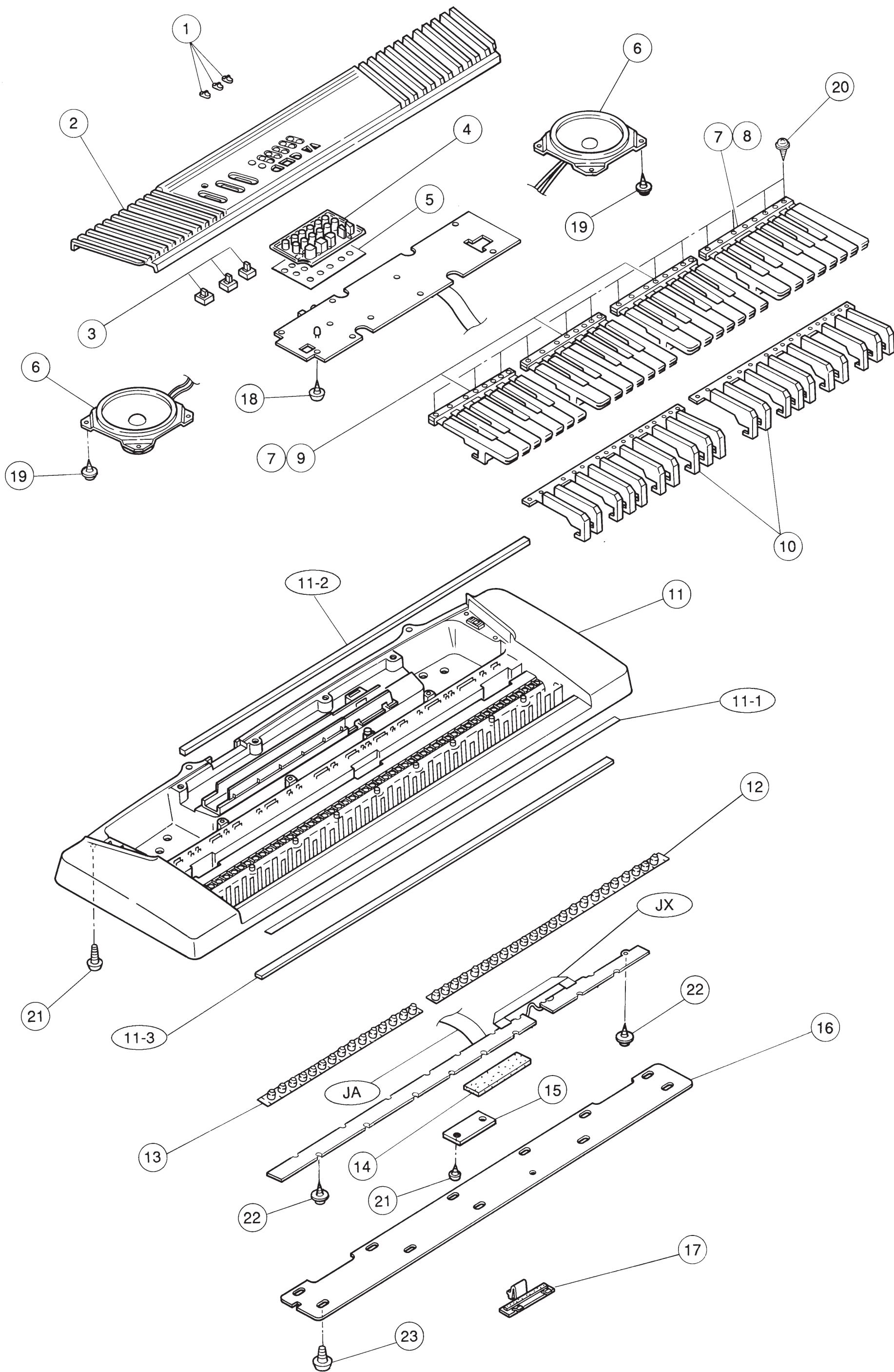
LA4598

0.01	Power GND
7.5	ch1 B.S.
4.3	ch1 OUT
8.7	Vcc
1.2	ch1 N.F.
0.0	ch1 IN
8.4	D.C.
0.0	Pre GND
8.4	Standby
0.0	ch2 IN
1.2	ch2 N.F.
4.3	ch2 OUT
7.5	ch2 B.S.
1.4	N.C.

MSM6387-13 LSI11 (Bottom View)

30	K00	RA	0.2
29	K01	RA	0.2
28	K02	RA	0.2
27	K03	RA	0.2
26	K04	RA	0.2
25	K05	RA	0.2
24	K06	RA	0.2
23	K07	RA	0.2
22	K08	RA	0.2
21	K09	RA	0.2
20	K10	RA	0.2
19	K11	RA	0.2
18	K12	RA	0.2
17	K13	RA	0.2
16	K14	RA	0.2
15	K15	RA	0.2
14	K16	RA	0.2
13	K17	RA	0.2
12	K18	RA	0.2
11	K19	RA	0.2
10	K20	RA	0.2
9	K21	RA	0.2
8	K22	RA	0.2
7	K23	RA	0.2
6	K24	RA	0.2
5	K25	RA	0.2
4	K26	RA	0.2
3	K27	RA	0.2
2	K28	RA	0.2
1	K29	RA	0.2

EXPLODED VIEW



# PARTS LIST

## CTK-100

- Notes:
1. Prices and specifications are subject to change without prior notice.
  2. As for spare parts order and supply, refer to the "GUIDEBOOK for Spare parts Supply", published separately.
  3. The numbers in item column correspond to the same numbers in drawing.

N	Item	Code No.	Parts Name	Specification	Q	M	FOB Japan N.R.Yen Unit Price	R	*
<b>PCB Ass'y M5505-MA1M</b>									
		2011 2961	LSI	MSM6387-13	1	1	580	A	F
		2114 2891	IC	LA4598	1	1	140	A	B
		2220 1387	Transistor	2SC1740SQ-TP-T	2	10	13	A	A
		2253 0357	Transistor	2SD2008Q,R-T105-T	1	10	30	A	A
		2310 7848	Zener diode	RD4.3ESB2-T1-T	1	20	12	A	A
		2360 0035	Zener diode	RD6.2ESB2-T1-T	1	10	10	B	A
		2370 0343	LED	LN28RPX-(TT)	1	20	16	C	A
		2390 1323	Diode	RB100A-T32-T	1	20	29	B	A
		2390 1344	Diode	1SS133T-77-T	15	20	3	C	A
		2590 0742	Ceramic oscillator	EFO-GC2175C3	1	5	64	B	B
		2606 1141	Carbon film resistor	R-20-1K-J-T23-T	25	20	2	C	A
		2606 1155	Carbon film resistor	R-20-330-J-T23-T	2	20	2	C	A
		2606 1169	Carbon film resistor	R-20-100-J-T23-T	3	20	2	C	A
		2606 1183	Carbon film resistor	R-20-10K-J-T23-T	1	20	2	C	A
		2606 1204	Carbon film resistor	R-20-3.3-J-T23-T	2	20	2	C	A
		2606 1274	Carbon film resistor	R-20-1.5K-J-T23-T	2	20	2	C	A
		2606 1288	Carbon film resistor	R-20-2.2K-J-T23-T	1	20	2	C	A
		2606 1295	Carbon film resistor	R-20-2.7K-J-T23-T	1	20	2	C	A
		2606 1309	Carbon film resistor	R-20-470-J-T23-T	1	20	2	C	A
		2606 1358	Carbon film resistor	R-20-3.3K-J-T23-T	1	20	2	C	A
		2606 1449	Carbon film resistor	R-20-150K-J-T23-T	1	20	2	C	A
		2606 1484	Carbon film resistor	R-20-820-J-T23-T	1	20	2	C	A
		2606 1498	Carbon film resistor	R-20-1.8K-J-T23-T	1	20	2	C	A
		2606 1554	Carbon film resistor	R-20-120K-J-T23-T	1	20	2	C	A
		2606 1617	Carbon film resistor	R-20-120-J-T23-T	2	20	2	C	A
		2606 1708	Carbon film resistor	R-20-47-J-T23-T	1	20	2	C	A
		2801 7910	Electrolytic capacitor	16RE3-470-T2-T	2	10	27	C	A
		2805 3061	Electrolytic capacitor	6.3RE2-220-T2-T	1	10	26	C	A
		2805 3142	Electrolytic capacitor	16RE2-10-T2-T	1	20	14	C	A
		2807 0926	Electrolytic capacitor	10RE2-470-T2-T	3	10	36	C	A
		2807 1023	Electrolytic capacitor	50RE2-1-T2-T	1	20	15	C	A
		2807 1091	Electrolytic capacitor	6.3RE2-100-T2-T	3	20	18	C	A
		2807 1112	Electrolytic capacitor	10RE2-100-T2-T	3	20	12	C	A
		2807 1139	Electrolytic capacitor	50RE2-R47-T2-T	1	20	12	C	A
		2813 0658	Semiconductive capacitor	RT-C50TKYR822K-T	1	20	6	C	A
		2813 1925	Semiconductive capacitor	RT-B70TKYR333K-T	1	20	8	C	A
		2813 1939	Semiconductive capacitor	RT-B70TKYR473K-T	1	20	9	C	A
		2813 1953	Semiconductive capacitor	RT-B90TKYR823K-T	2	20	8	C	A
		2813 3101	Semiconductive capacitor	RT-B70TKYR273K-T	1	20	6	C	A
		2813 3283	Ceramic capacitor	UP050F104Z-A-B	2	20	8	C	A
		2819 5443	Module capacitor	CNB8X471M	1	5	51	C	B
		2830 6229	Mylar capacitor	AMZV-104K50-T	2	10	13	C	A
		2845 3220	Ferrite beads	EXC-ELDR35V-T	5	20	12	C	A
		3501 7049	DC jack	HEC2305-01-330	1	10	29	A	A
		3612 0711	Miniature jack	YKB21-5101	1	5	90	B	B
		3665 0217	Terminal B	CT-00160D	1	10	26	C	A
		3841 0539	Inductor	ELE-V100KR-T	4	20	26	C	A
		3841 0910	Coil	FL5R1R0PNA	2	10	39	C	A
		3841 0959	Inductor	ELE-R100KR-T	4	10	25	C	A
N		4317 4271	Blank PCB M4502-MA1M	M111795A-1	1	1	230	C	C
N		6921 6200	Battery spring 700 (+)	M412124-1	1	20	17	B	A
N		6921 6211	Battery spring 700B (-)	M412171A-1	1	20	12	B	A
N		6921 8570	Felt 280X18	M412199-1	1	10	26	C	A
N		6922 4700	PCB ass'y M4502-MA1M	M111796*1	1	1	1700	B	P

Notes: N - New parts  
M - Minimum order/supply quantity  
R - Rank

N	Item	Code No.	Parts Name	Specification	Q	M	FOB Japan N.R.Yen Unit Price	R	*
<b>PCB Ass'y Keyboard</b>									
		2301 0101	Diode	1S2473-T-77-T	49	20	8	C	A
	JX	3725 2030	PC joiner MASKX	JSF50-9-140	1	10	34	C	A
	JA	3725 2401	PC joiner M283A	JSF50-15-240M	1	5	91	C	B
		4317 1610	Blank PCB M496K-KY1M	M110799-1	1	1	120	C	B
		4317 1621	Blank PCB M496K-KY2M	M210939A-1	1	5	53	C	B
N		6918 5500	Keyboard PCB ass'y	M110798*2	1	1	950	C	J
<b>Mechanical Parts</b>									
	1	6920 5572	SL knob 238	M311360B-1	3	10	14	B	A
N	2	6922 4780	Panel 502	M111763-1	1	1	810	C	I
	3	6909 5890	SL contact 12D	CSB-12D	3	10	35	B	A
N	4	6922 3980	Rubber button 700	M211536-2	1	1	140	B	B
N	5	6922 5750	Felt 502A	M412333-1	1	20	10	C	A
N		6908 6160	Felt 156G	M43073-1	1	20	7	C	A
N	6	3831 0665	Speaker	10G42AFA	2	1	200	B	C
	7	6917 4474	White key set CEGB	M110589D-1	4	1	120	A	B
	8	6917 4484	White key set DFAS	M110590D-1	1	1	110	A	B
	9	6917 4494	White key set DFA	M110591D-1	3	1	170	A	B
	10	6917 4506	Black key set 10P	M110594F-1	2	1	130	A	B
N	11	6922 4790	Case sub ass'y	M211760*1	1	1	1500	C	O
	11-1	6917 8462	Key damper 49	M411202B-1	1	5	33	C	A
	11-2	6918 2020	key stopper 4500	M411303-1	1	5	58	C	B
N	11-3	6921 9990	Key stopper M700	M412235-1	1	5	56	C	B
N		6921 9470	Felt 10X225	M411280-2	3	20	13	C	A
	12	6917 4453	TAC31	M110603C-1	1	1	190	B	C
	13	6917 4463	TAC18	M110605C-1	1	1	110	B	B
	14	6910 1130	Sponge A	M4630-1	1	20	14	C	A
N	15	6921 6231	Joiner cover	M412126A-1	1	10	24	C	A
	16	6921 6220	Bottom plate	M311898-1	1	1	200	C	C
N	17	6906 7092	Battery cover sub ass'y	M311200B*12	1	5	37	B	A
<b>Screws</b>									
	18	0009 2682	Screw	2.6 x 8	10	50	2	C	A
	19	0009 4589	Screw	2.6 x 8	8	50	2	C	A
	20	0009 4588	Screw	2.6 x 18	14	50	2	C	A
	21	0008 6417	Screw	4 x 10	14	50	2	C	A
	22	6918 1992	Screw	M411279B-1	18	50	2	C	A
	23	0009 2680	Screw	4 x 8	12	50	2	C	A
<b>Accessory</b>									
		6916 7880	Music stand	M310827-1	1	1	120	C	B

Notes: N – New parts  
M – Minimum order/supply quantity  
R – Rank

**CASIO COMPUTER CO.,LTD.**  
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