

CASIO®

Service Manual

(without price)

CTK-50



CTK-50

ELECTRONIC KEYBOARD

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SPECIFICATIONS

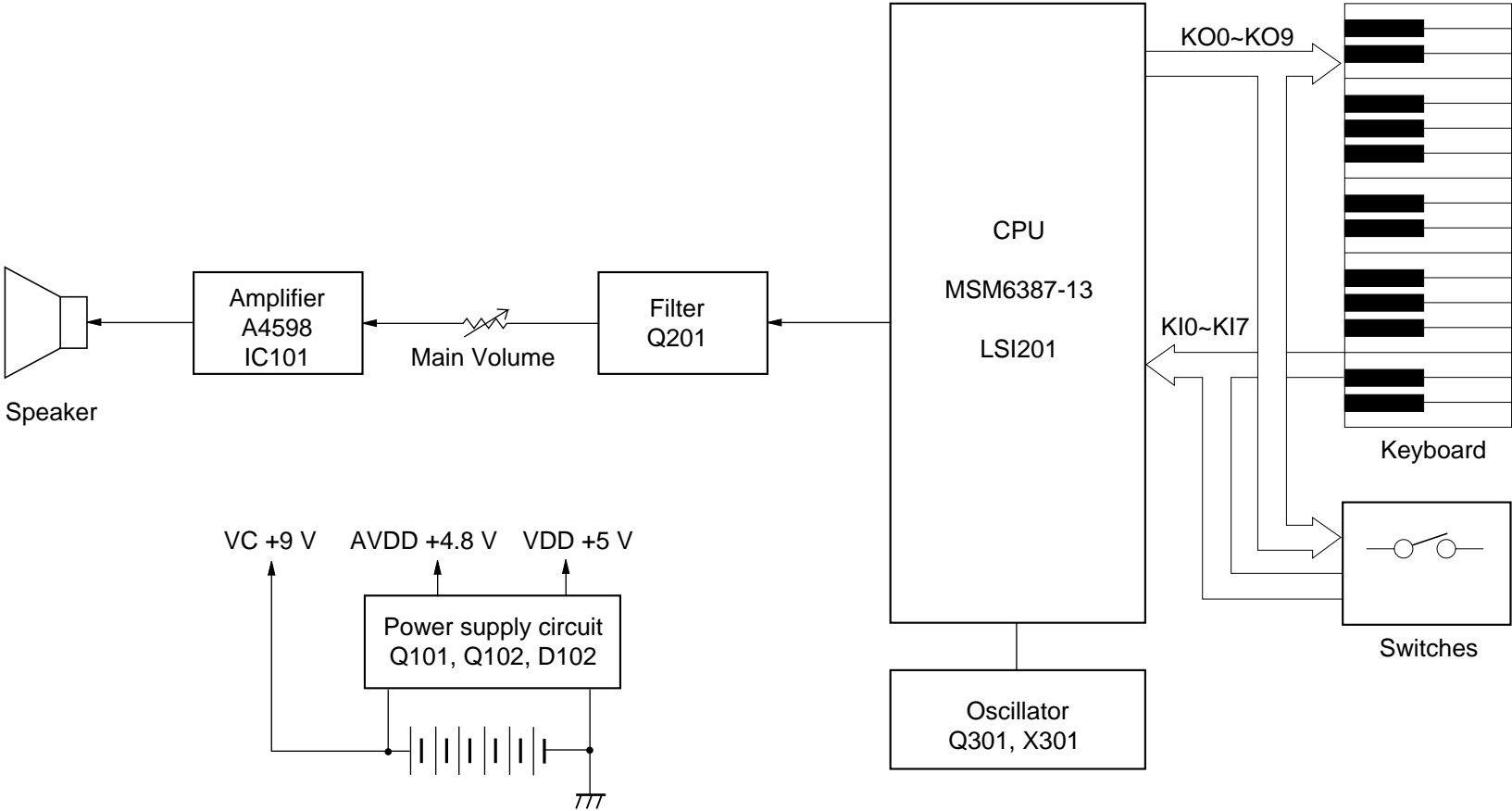
GENERAL

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. 2.0W Input Rating: 1 pc.
Terminal:	AC Adapter Jack (DC 9 V)
Power source:	2-way AC or DC source
	AC: AC adapter
	DC: 6 AA size dry batteries
Power consumption:	6.0 W
Dimensions:	79 x 766 x 269 mm (HWD)
	(3-1/8 x 33 x 10-5/8 inches) (HWD)
Weight:	2.8 kg (6.2 lbs) excluding batteries

ELECTRICAL

	Nominal	Limit
Current drain with 9V DC:		
No sound output	50 mA	50 mA ± 30%
Maximum volume	515 mA	515 mA ± 30%
with keys C1, D1, E1 and F1 pressed in Car-Horn tone, Volume; Maximum		
Sound Pressure Level at 10 cm away from speaker:	108 dB	108 ± 10 dB
with key C4 pressed in Car-Horn tone Volume; Maximum		
Minimum operating voltage:	5.8 V	6.0 V

BLOCK DIAGRAM

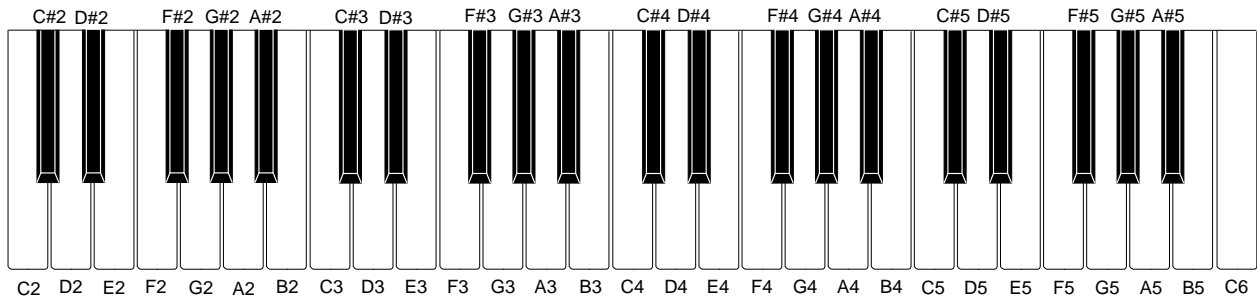


CIRCUIT DESCRIPTION

KEY AND SWITCH MATRIX

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

NOMENCLATURE OF KEYS



CPU (LSI201: MSM6387-13)

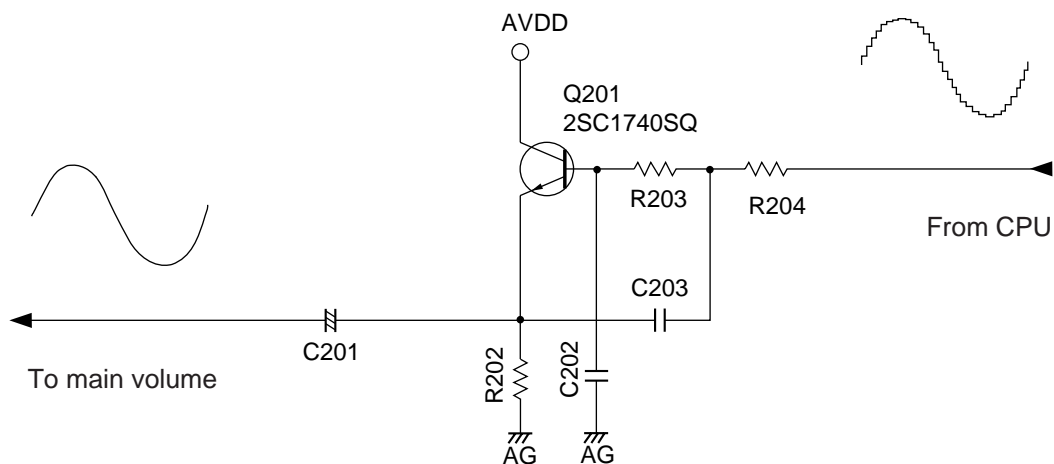
The CPU contains a sound data ROM and a DAC (Digital to Analog Converter), and it provides a sound waveform in accordance with the pressed key and the selected tone.

The following table shows the pin functions of LSI201.

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	COSI	In	21.725 MHz clock pulse input
9	COSO	—	Not used.
10	VDD	In	+5 V source
11 ~ 18	KI0 ~ KI7	In	Input terminals from keys and switches
19, 20	KO11, KO10	—	Not used.
21 ~ 30	KO9 ~ KO0	Out	Key and switch scan signal outputs

FILTER BLOCK

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

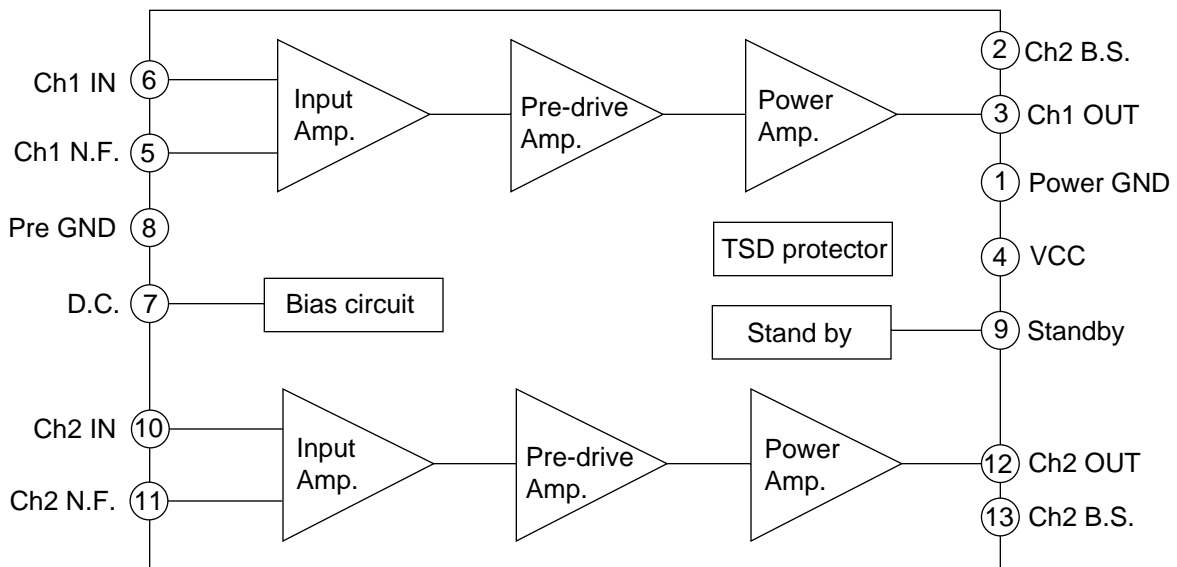


POWER AMPLIFIER (IC101: LA4598)

The following table shows the pin functions of IC101.

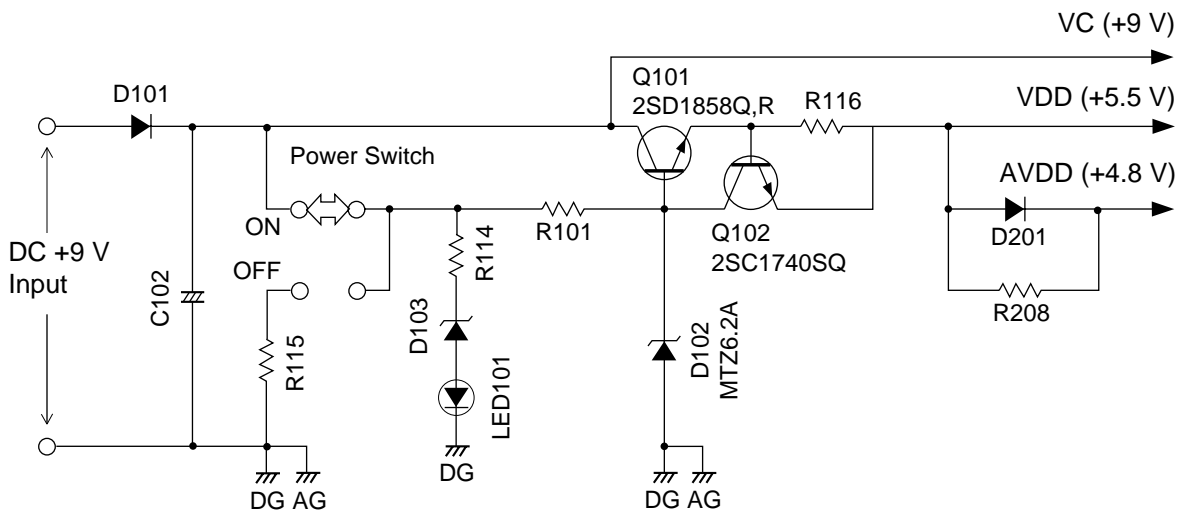
Pin No.	Terminal	In/Out	Function
1	Power GND	In	Ground (0 V) source
2	Ch1 B.S.	Out	Terminal for a bootstrap capacitor
3	Ch1 OUT	Out	Channel1 output
4	VCC	In	+9 V source. Connected to the power source directly.
5	Ch1 N.F.	In	Negative feedback input
6	Ch1 IN	In	Channel1 input
7	D.C.	Out	Terminal for a 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.	Out	Terminal for a bootstrap capacitor
14	NC	—	Not used.

Internal Block Diagram of IC101



POWER SUPPLY CIRCUIT

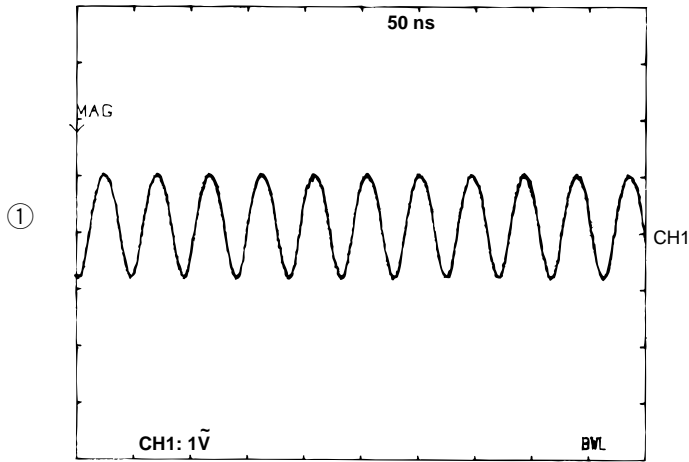
The power supply circuit regulates two constant output voltages VDD (+5.0 V) for the CPU and the oscillator, and AVDD (+4.8 V) for the analog circuit.



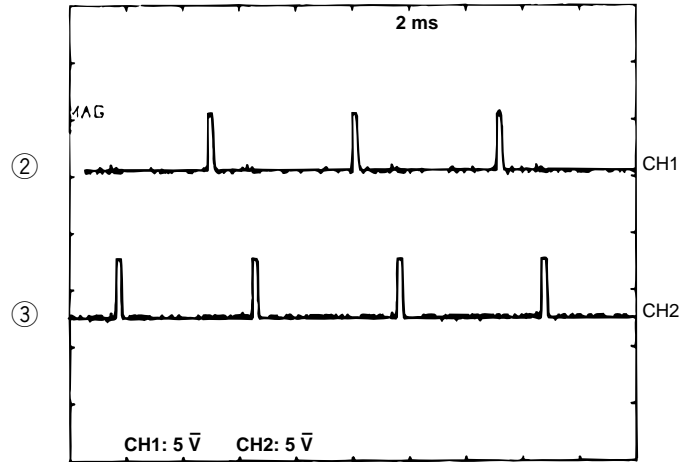
TROUBLESHOOTING

Nature of Trouble	Faulty Block	Cause/Remedy
No power	Power supply circuit	Faulty Q101. Replace Q101. Faulty D102. Replace D102.
	Power switch	Poor contact. Clean the contacts.
	Power jack (J101)	Open J101 or poor soldering. Replace J101 or resolder.
No sound at all	Power Amp (IC101: LA4598)	Open or shorted IC101. Replace IC101.
	CPU (LSI201: MSM6387-13)	Faulty LSI201. Replace LSI201.
	Oscillator	Faulty Q301. Replace Q301. Open X301. Replace X301.
Certain keys or switches do not function	Key and switch matrix	Open circuit on KO or KI line. Replace keyboard PCB assembly.
	CPU (LSI201: MSM6387-13)	Faulty LSI201. Replace LSI201.
A certain key or switch does not function	Key and switch matrix	Dust on the contact.

MAJOR WAVEFORMS

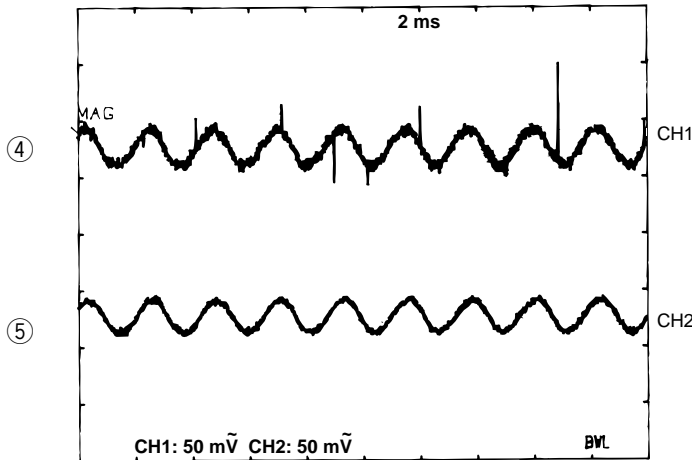


① Clock pulse COSI
MSM6387-13 pin 8



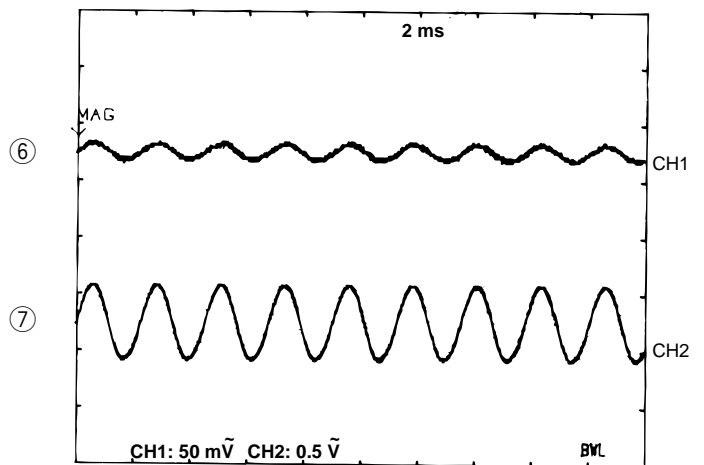
② Key scan signal KO0
MSM6387-13 pin 30

③ Key scan signal KO1
MSM6387-13 pin 29



④ Sound signal output
MSM6387-13 pin 5

⑤ Filter output
Emitter of Q201



⑥ Power amp input
LA4598 pin 6

⑦ Power amp output
LA4598 pin 3

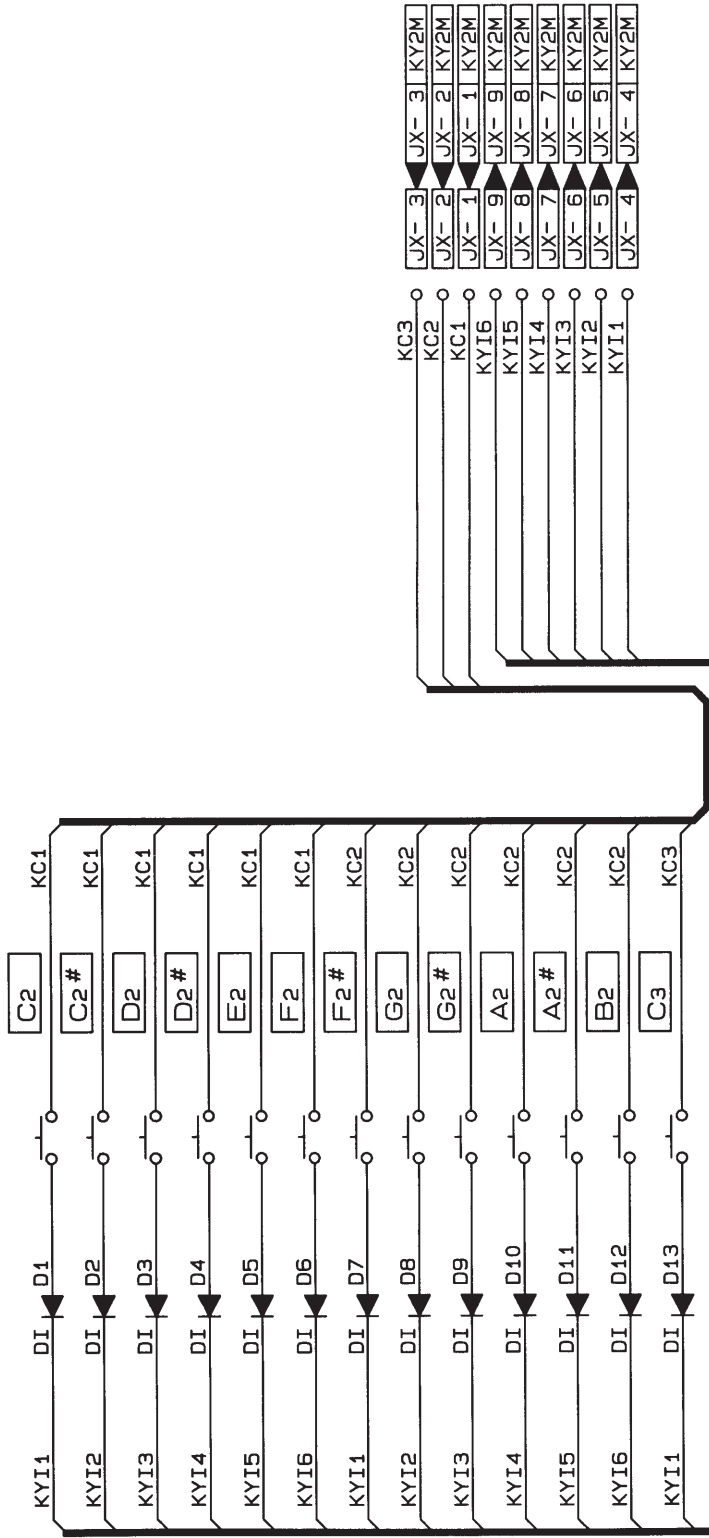
Tone : Flute (No.13)
Key : A3
Volume : Maximum

SCHEMATIC DIAGRAMS

Keyboard PCB

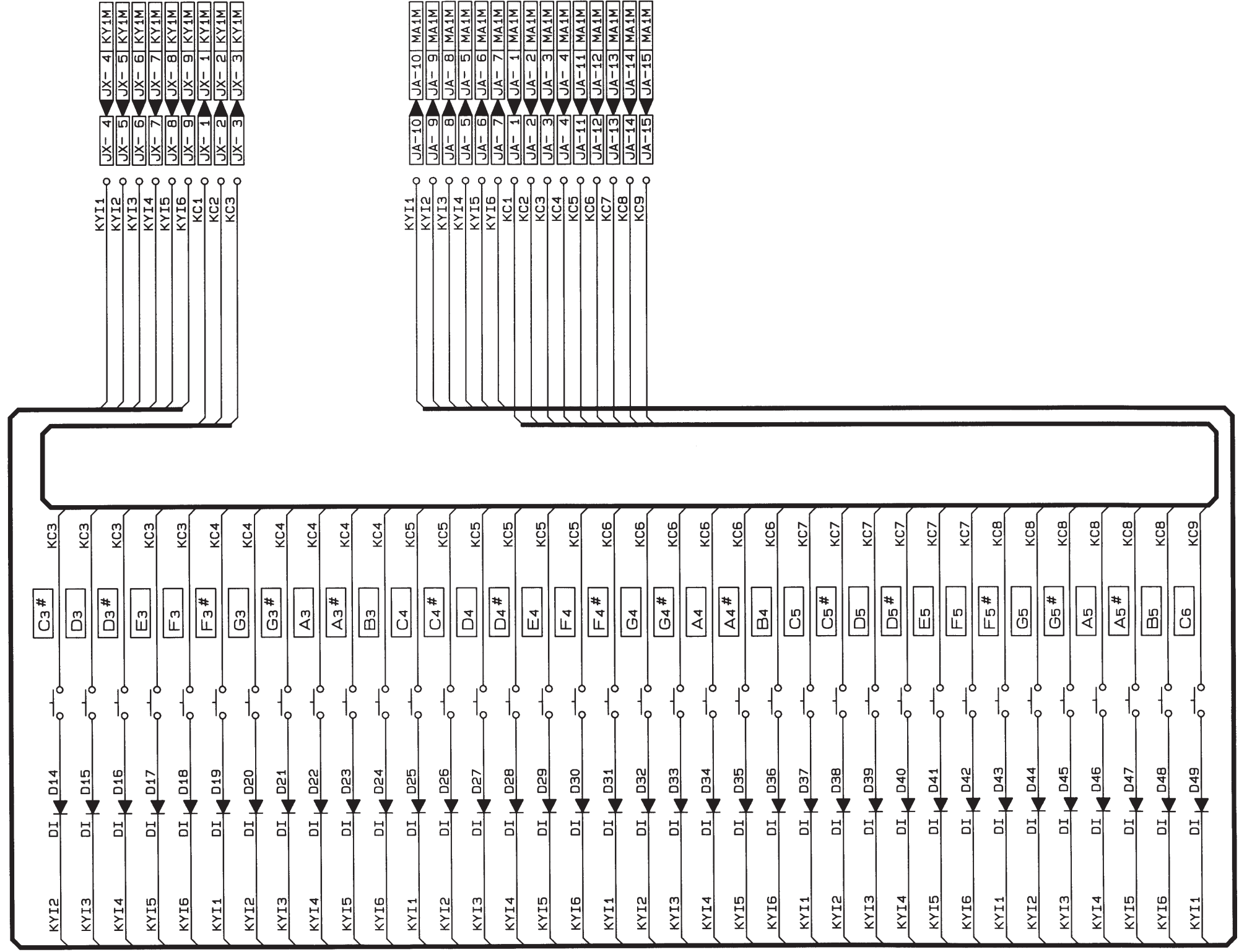
JCM498K-KY1M

DI
 1S2473T-77-T



JCM498K-KY2M

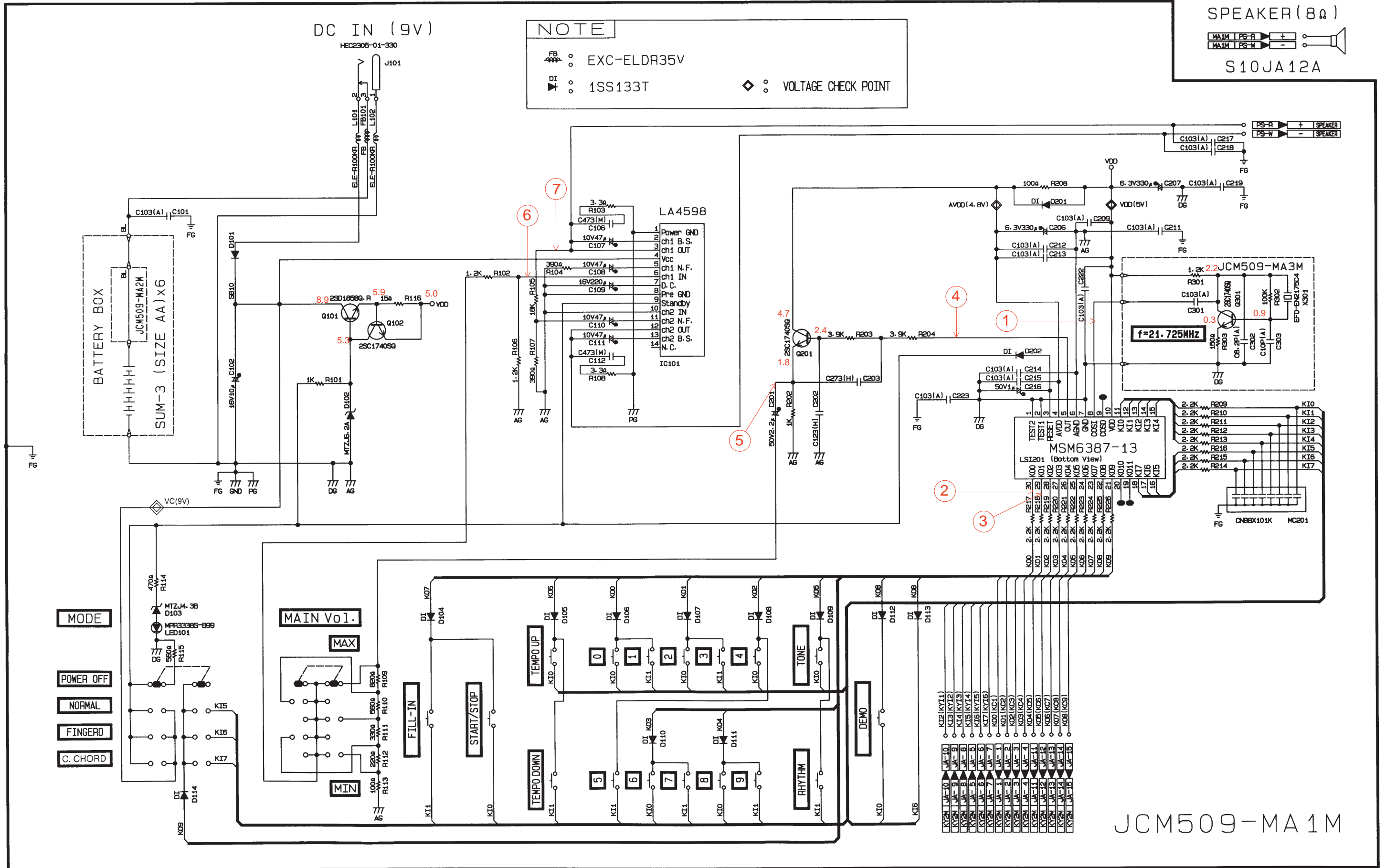
DI
 1S2473T-77-T



Main PCB

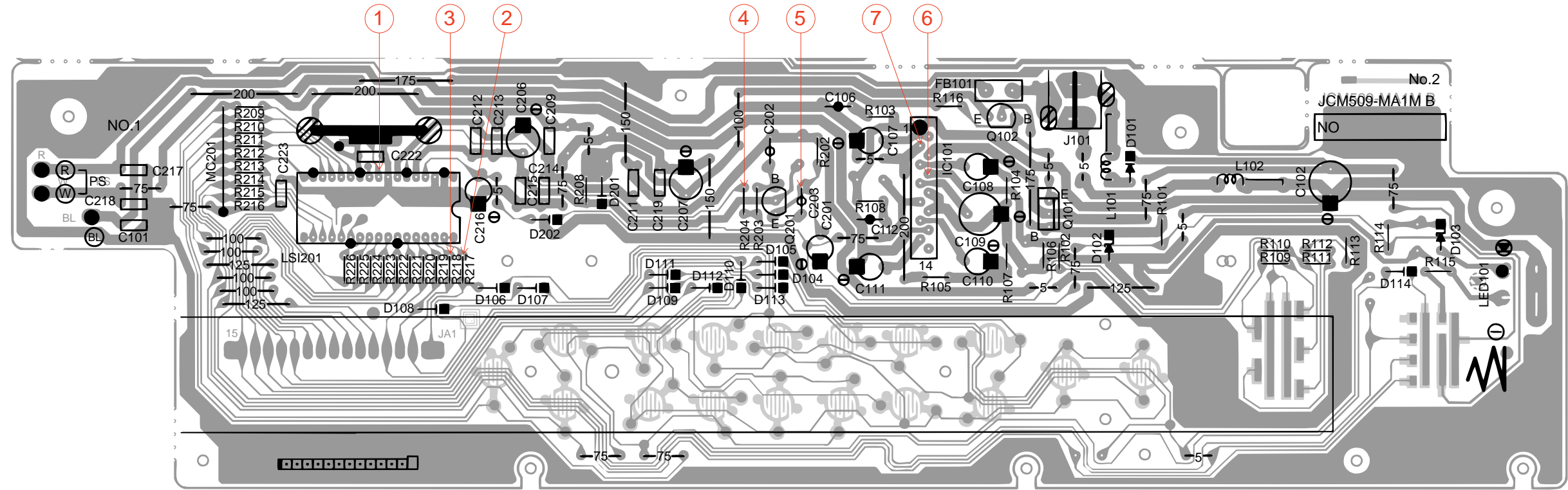
Notes:

1. All capacitance values are indicated in "μF" (p=10⁻⁶ μF).
2. All resistance values are indicated in "Ω" (k=10³Ω, M=10⁶Ω).

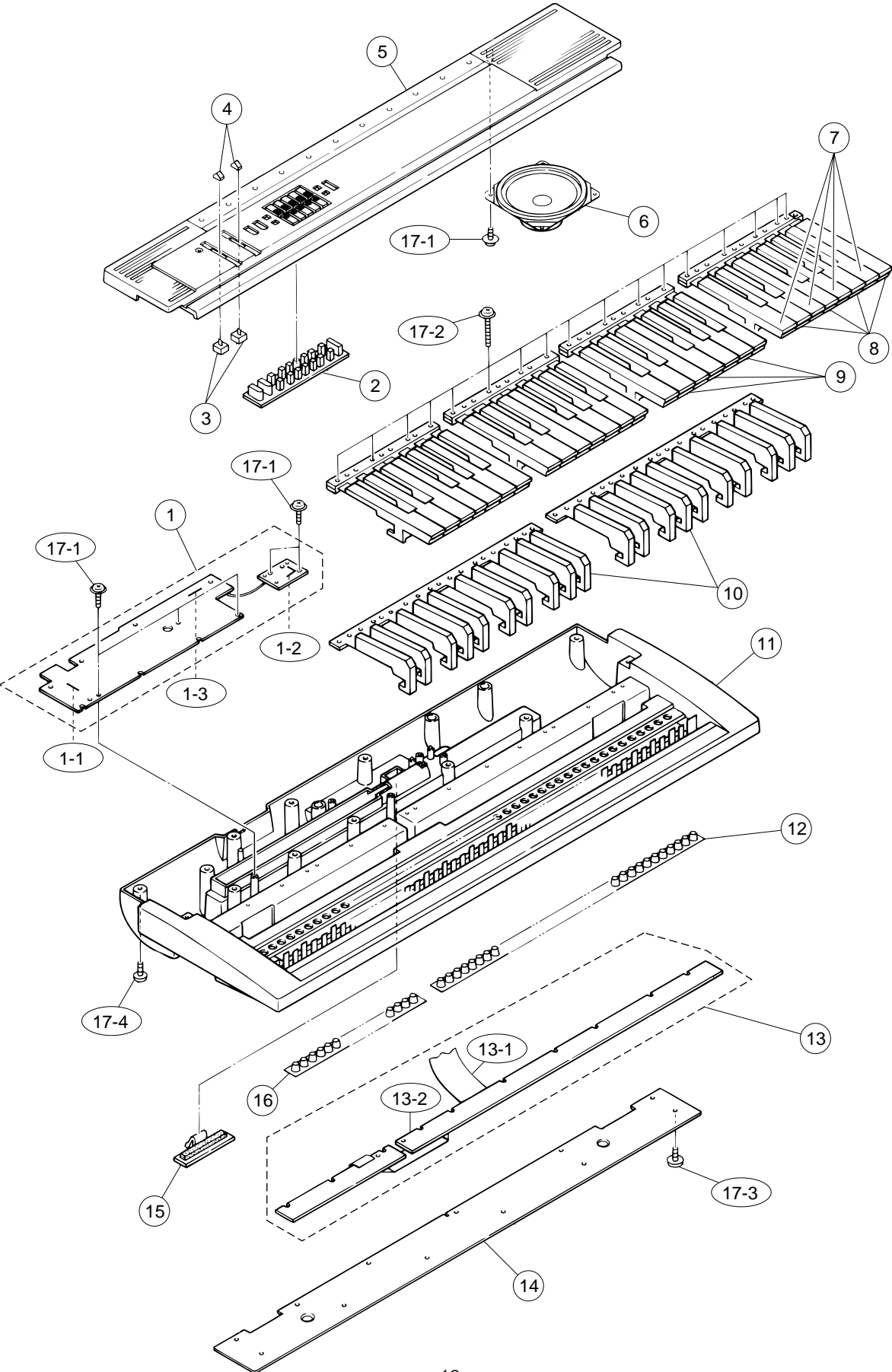


Main PCB

PCB VIEW



EXPLODED VIEW



PARTS LIST

CTK-50

- 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	FOB Japan N.R.Yen Unit Price	R	*
Electrical Parts								
N	1	6923 2810	PCB ass'y JCM509-MA123M	M240016*1	1		B	W
	D101	2390 1316	Diode	SB10-04A3-BT-T	1		B	A
	D102	2360 2044	Zener diode	MTZJ6.2AT-77-T	1		B	A
N	D103	2360 2429	Zener diode	MTZJ4.3B-T77-T	1		A	A
	D104~D114, D201,D202	2390 1344	Diode	1SS133T-77-T	13		C	A
	FB101	2845 3220	Ferrite beads	EXC-ELDR35V-T	1		C	A
	IC101	2114 2891	IC	LA4598	1		A	B
	J101	3501 7049	DC jack	HEC2305-01-330	1		A	A
N	JA	3665 0308	Terminal	IMSA-1068-03Z046PP	1		C	A
	L101,L102	3841 0959	Inductor	ELE-R100KR-T	2		C	A
	LED101	2370 1106	LED	MPR3338S-B99	1		C	A
	LSI201	2011 2961	LSI	MSM6387-13	1		A	F
	MC201	2845 0168	Module capacitor	CNB8X101K	1		C	B
	Q101	2253 0448	Transistor	2SD1858Q,R-TV6-T	1		A	A
	Q102,Q201, Q301	2220 1387	Transistor	2SC1740SQ-TP-T	3		B	A
	X301	2590 1897	Ceramic oscillator	EFO-EN2175C4	1		B	B
	1-1	6921 6210	Battery spring (-)	M412171-1	1		B	A
	1-2	6922 4940	Battery spring (+)	M412289-1	1		B	A
N	1-3	4317 5381	Blank PCB JCM509-MA2M	M140038A-2	1		C	A
N	1-4	4317 5451	Blank PCB JCM509-MA3M	M140038A-3	1		C	A
N	13	6923 2820	PCB ass'y JCM498-KY12M	M140023*1	1		C	K
	D1~D49	2301 0101	Diode	1S2473-T-77-T	49		C	A
N	13-1	3719 4417	Ribbon cable 15-pin	DF5H15180-MM	1		C	B
N	13-2	3719 4424	Ribbon cable 9-pin	DF5H09160-MM	1		C	A
		4317 5390	Blank PCB JCM498K-KY1M	M340015-1	1		C	E
N		4317 5400	Blank PCB JCM498K-KY2M	M140023-1	1		C	B
Mechanical Parts								
N	2	6923 2870	Rubber button	M240014A-1	1		B	B
	3	6909 5890	Slide contact	CSB-12D	2		B	A
	4	6921 5030	Slide knob	M311859-1	2		A	A
N	5	6923 2860	Panel	M140014-1	1		C	I
N	6	3831 0756	Speaker	S10JA12A	1		B	D
	7	6917 4474	White key set CEGB	M110589D-1	4		A	B
	8	6917 4484	White key set DFAS	M110590D-1	1		A	B
	9	6917 4494	White key set DFA	M110591D-1	3		A	B
	10	6917 4506	Black key set 10P	M110594F-1	2		A	B
N	11	6923 2890	Case	M240067A*1	1		C	T
	12	6922 4000	Key contact rubber TAC31A	M111765-1	1		A	C
N	14	6923 2850	Bottom plate	M240018-1	1		C	E
N	15	6906 7511	Battery cover	M312197A*3	1		B	C
N	16	6923 2390	Key contact rubber TAC18A	M240025-1	1		A	C
	17-1	1909 4589	Screw	2.6 x 8	9		C	A
	17-2	1909 4588	Screw	2.6 x 18	17		C	A
	17-3	1909 2680	Screw	4 x 8	12		C	A
	17-4	1908 6417	Screw	4 x 10	16		C	A
Accessory								
		6916 7880	Music stand	M310827-1	1		C	B

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

Description of Capacitors

A general description of capacitors is shown in the following table.

The description consists of Type, Value, Rated Voltage and Tolerance.

When you need a capacitor, please find a substitution in your country by yourselves referring to the description.

Ref. No of Capacitor	Description
C101, C209, C211~C215, C217~C219, C222, C223, C301	Ceramic, 1.01 μ F, 50 V, +/-20%
C102	Electrolytic, 10 μ F, 16 V, +/-20%
C106, C112	Mylar, 0.047 μ F, 50 V, +/-10%
C107, C108, C110, C111	Electrolytic, 47 μ F, 10 V, +/-20%
C109	Electrolytic, 220 μ F, 16 V, +/-20%
C201	Electrolytic, 2.2 μ F, 50 V, +/-20%
C202	Semiconductive, 0.012 μ F, 16 V, +/-10%
C203	Semiconductive, 0.027 μ F, 16 V, +/-10%
C206, C207	Electrolytic, 330 μ F, 6.3 V, +/-20%
C216	Electrolytic, 1 μ F, 50 V, +/-20%
C302	Ceramic, 8.2 pF, 50 V, +/-10%
C303	Ceramic, 10 pF, 50 V, +/-5%

Description of Resistors

A general description of resistors is shown in the following table.

The description consists of Type, Value, Rated Wattage and Tolerance.

When you need a resistor, please find a substitution in your country by yourselves referring to the description.

Note:

All resistors are carbon film, 1/5 watt, +/-5% otherwise specified.

Ref. No of Resistor	Description
R101, R202	1 K
R102, R106, R301	1.2 K
R103, R108	3.3
R104, R107	390
R105	18 K
R109	820
R110, R115	560
R111	330
R112	220
R113, R208	100
R114	470
R116	15
R203, R204	3.9 K
R209~R226	2.2 K
R302	100 K
R303	150

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Apr, 1995