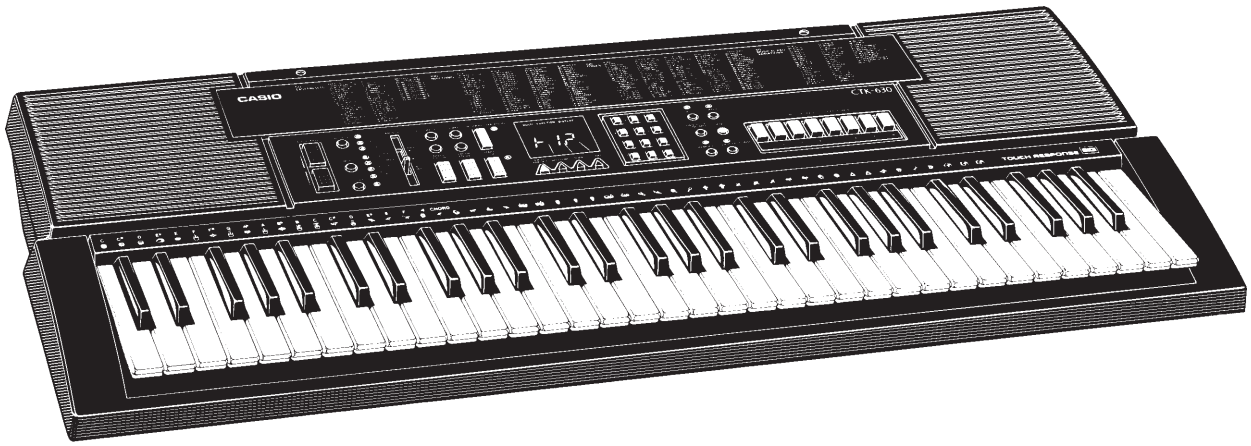
CASIO®

Service Manual

(without price)

CTK-630

CONTENTS



CTK-630

INDEX

ELECTRONIC KEYBOARD

SPECIFICATIONS

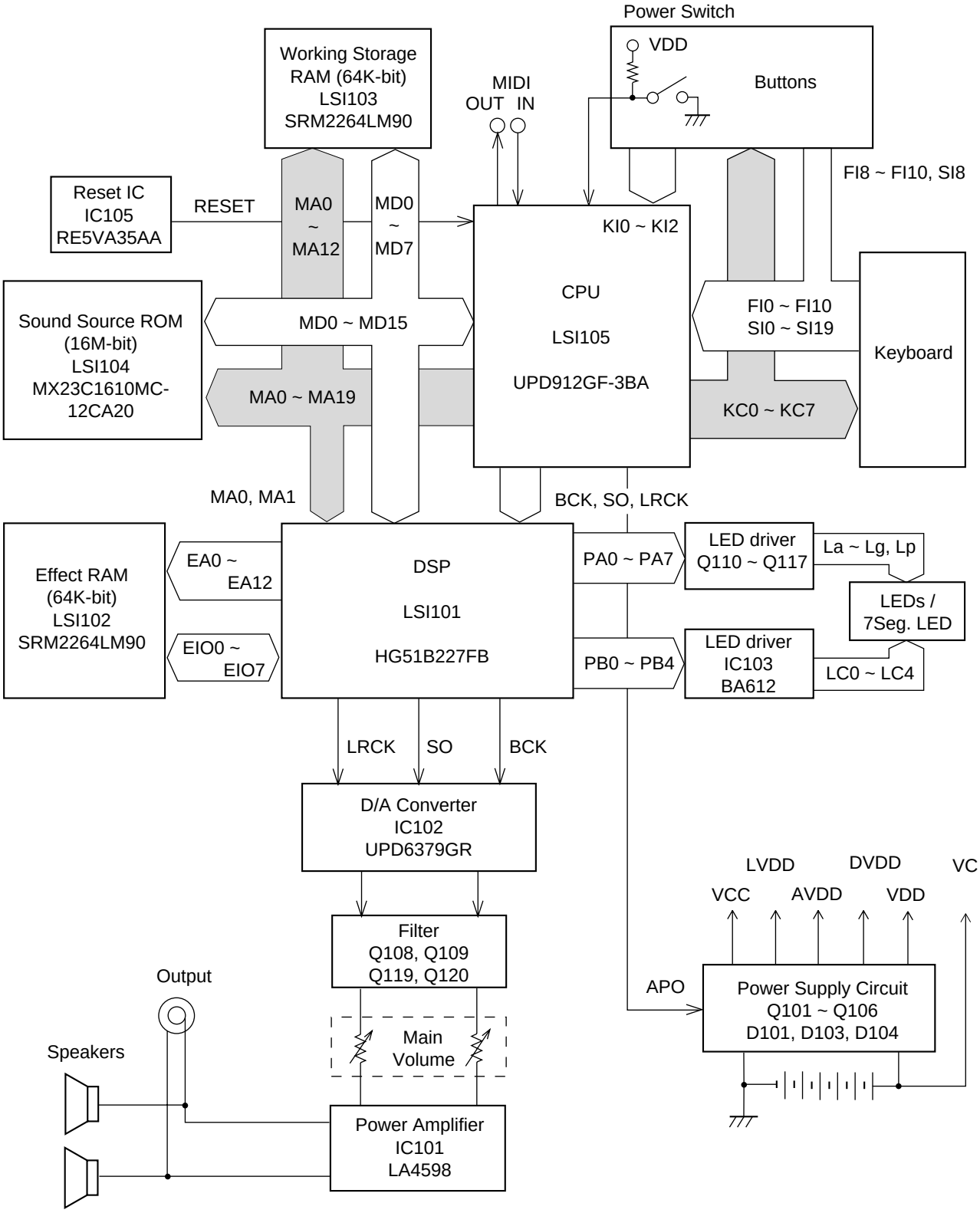
GENERAL

Number of keys:	61
Polyphonic:	24-note
Preset tones:	100, Tone expander: Layer On/Off, Split On/Off
Keyboard controls:	Touch response: On/Off, Key transpose: Range from F# to F by a semitone increment, Pitch bend: 12 steps up and down (a seminote at muximum)
Auto-rhythms:	100, Tempo control: 40 to 255
Auto-accompaniment:	Mode: CASIO Chord/Fingered/Full-Range Chord 1/ Full-Range Chord 2 Controller: Intro/Fill-In, Synchro/Ending, Normal/Variation
Easy presets:	50, including — Free Session (Chord): 30, Free Session (Song): 10, Melody Composition: 10
Reverb effects:	Hall/Stage/Room
Musical pads:	8
Pad variations:	50, including — Pops: 10, Rock: 10, Jazz/Fusion: 10, Dance/Funk: 10 European: 2, Latin/Various: 5, Drums/Percussion: 5
Song memory:	3, Real-time recording, Memory capacity: Approx. 1200 notes in total
Demo tunes:	3, including — A Night has 9000 Bars (arranged and programmed by Thomas Hirsch), Wanting This (Edward Alstrom), Supersonic Remorse (Edward Alstrom)
Demo tune program:	Repeat/Skip
Tuning control:	440Hz ± 50 cents
Built-in speakers:	12 cm dia. 2 W input rating: 2 pcs.
MIDI:	16 multi-channel reception
Terminals:	Phone Jack [Output impedance: 90 Ω, Output voltage: 4.6 V(rms) MAX], Sustain Jack, MIDI Jacks (IN, OUT), AC Adapter Jack (9 V)
Auto power off:	Approximately 6 minutes after the last operation
Power source:	2-way AC or DC source AC: AC adapter DC: 6 D size dry batteries
Power consumption:	7.7 W
Dimensions (HWD):	104 x 931 x 353 mm (4-1/16 x 36-5/8 x 13-7/8 inches)
Weight:	4.7 kg (10.4 lbs) including batteries

ELECTRICAL

	Nominal	Limit
Current drain with 9 V DC:		
No sound output	220 mA	220 mA ± 30 %
Maximum volume	900 mA	900 mA ± 30 %
with white keys C4 to G5 pressed in Recorder tone Volume: maximum, Touch response: maximum Layer: On, Reberv: Off		
Phone output level (Vrms with 8 Ω load each channel):		
with key C4 pressed in Recorder tone	125 mV	125 mV ± 30 %
Sound pressure (at 10 cm away from speaker):		
with key A3 pressed in Recorder tone	98 dB	98 dB ± 10 dB
Minimum operating voltage:	5.8 V	6.0 V

BLOCK DIAGRAM

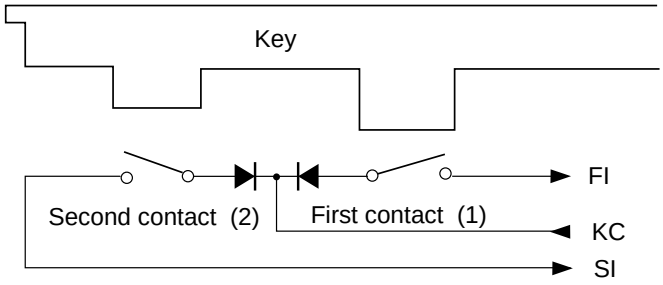


CIRCUIT DESCRIPTION

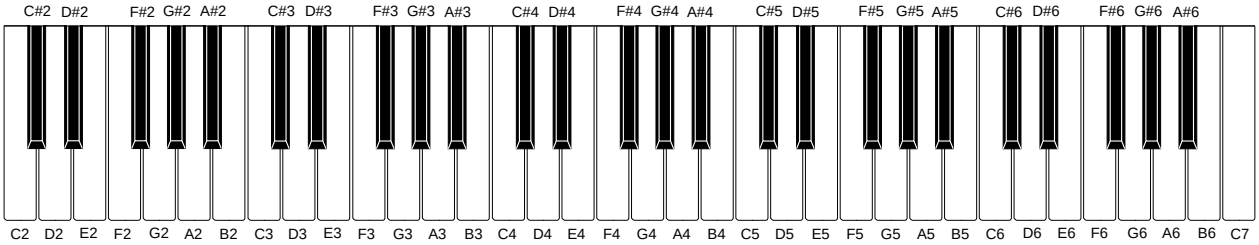
KEY MATRIX

	KC0	KC1	KC2	KC3	KC4	KC5	KC6	KC7
FI0	C2 (1)	C#2 (1)	D2 (1)	D#2 (1)	E2 (1)	F2 (1)	F#2 (1)	G2 (1)
SI0	C2 (2)	C#2 (2)	D2 (2)	D#2 (2)	E2 (2)	F2 (2)	F#2 (2)	G2 (2)
FI1	G#2 (1)	A2 (1)	A#2 (1)	B2 (1)	C3 (1)	C#3 (1)	D3 (1)	D#3 (1)
SI1	G#2 (2)	A2 (2)	A#2 (2)	B2 (2)	C3 (2)	C#3 (2)	D3 (2)	D#3 (2)
FI2	E3 (1)	F3 (1)	F#3 (1)	G3 (1)	G#3 (1)	A3 (1)	A#3 (1)	B3 (1)
SI2	E3 (2)	F3 (2)	F#3 (2)	G3 (2)	G#3 (2)	A3 (2)	A#3 (2)	B3 (2)
FI3	C4 (1)	C#4 (1)	D4 (1)	D#4 (1)	E4 (1)	F4 (1)	F#4 (1)	G4 (1)
SI3	C4 (2)	C#4 (2)	D4 (2)	D#4 (2)	E4 (2)	F4 (2)	F#4 (2)	G4 (2)
FI4	G#4 (1)	A4 (1)	A#4 (1)	B4 (1)	C5 (1)	C#5 (1)	D5 (1)	D#5 (1)
SI4	G#4 (2)	A4 (2)	A#4 (2)	B4 (2)	C5 (2)	C#5 (2)	D5 (2)	D#5 (2)
FI5	E5 (1)	F5 (1)	F#5 (1)	G5 (1)	G#5 (1)	A5 (1)	A#5 (1)	B5 (1)
SI5	E5 (2)	F5 (2)	F#5 (2)	G5 (2)	G#5 (2)	A5 (2)	A#5 (2)	B5 (2)
FI6	C6 (1)	C#6 (1)	D6 (1)	D#6 (1)	E6 (1)	F6 (1)	F#6 (1)	G6 (1)
SI6	C6 (2)	C#6 (2)	D6 (2)	D#6 (2)	E6 (2)	F6 (2)	F#6 (2)	G6 (2)
FI7	G#6 (1)	A6 (1)	A#6 (1)	B6 (1)	C7 (1)			
SI7	G#6 (2)	A6 (2)	A#6 (2)	B6 (2)	C7 (2)			
FI8	Pad A (1)	Pad B (1)	Pad C (1)	Pad D (1)	Pad E (1)	Pad F (1)	Pad G (1)	Pad H (1)
SI8	Pad A (2)	Pad B (2)	Pad C (2)	Pad D (2)	Pad E (2)	Pad F (2)	Pad G (2)	Pad H (2)
FI9	Intro/ Fill-In	Synchro/ Ending	Start/ Stop					
FI10	Bend Up	Bend Down		Normal/ Variation	Tempo Up	Tempo Down	Accomp. Volume Up	Accomp. Volume Down
KI0	Mode	Reverb	0	1	4	7	Layer	Split
KI1	Rhythm	Tone	–	2	5	8	Transpose Tune/MIDI	Demo
KI2	Easy Preset	Pad	+	3	6	9	Memory	Touch Response

Note: Each key has two contacts,
the first conatct (1) and second contact (2).



NOMENCLATURE OF KEYS



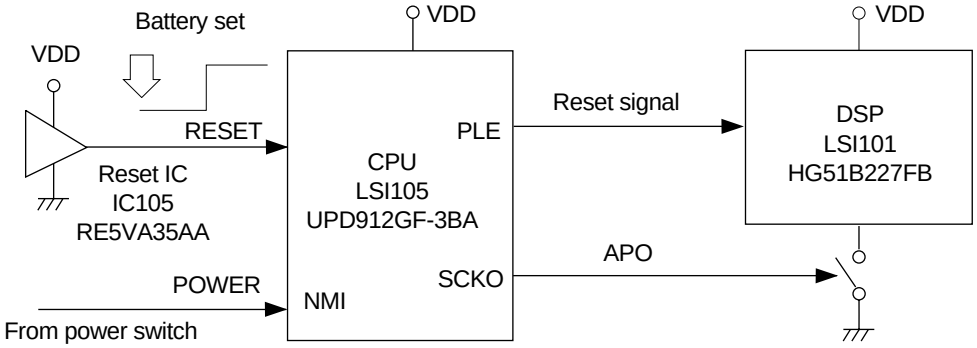
POWER SUPPLY CIRCUIT

The power supply circuit generates six voltages as shown in the following table. VDD voltage is always generated. The others are controlled by APO signal from the CPU.

Name	Voltage	For operation of
VDD	+5 V	CPU, Reset IC, DSP, Sound source ROM, Working storage RAM, Effect RAM
DVDD	+5 V	Power jack, Sustain jack, MIDI jack
AVDD	+5V	DAC, Filter
LVDD	+4.5 V	LED Driver
VCC	+9 V	Power amplifier, Pilot lamp
VC	+9 V	Power amplifier

RESET CIRCUIT

When batteries are set or an AC adapter is connected, the reset IC provides a low pulse to the CPU. The CPU then initializes its internal circuit, and clears the working storage RAM.
When the power switch is pressed, the CPU receives a low pulse of POWER signal. The CPU sends APO signal to supply ground source for the DSP, also sends a reset signal to the DSP.



CPU (LSI105: UPD912GF-3BA)

The 16-bit CPU contains a 1k-byte RAM, three 8-bit I/O ports, two timers, a keycontroller and serial interfaces. The CPU detects key velocity by counting the time between first-key input signal FI and second-key SI from the keyboard. The CPU reads sound data and velocity data from the sound source ROM in accordance with the selected tone; the CPU can read rhythm data simultaneously when a rhythm pattern is selected. Then the CPU provides 16-bit serial sound data to the DSP. The CPU also controls MIDI input/output and stores sequencer data into the working storage RAM.
The following table shows the pin functions of LSI105.

Pin No.	Terminal	In/Out	Function
1	TXD0	Out	MIDI signal input
2	RXD0	In	MIDI signal output
3	SCK0	Out	APO (Auto Power Off) signal output
4, 5	TXD1, RXD2	—	Not used. Connected to ground.
6	SCK1	Out	1 MHZ synchronizing pulse output
7	AVCC	In	Ground (0 V) source
8, 9	AN0, AN1	—	Not used. Connected to ground.
10	AGND	In	Ground (0 V) source
11	BCK	Out	Bit clock output
12	SO	Out	Serial sound data output
13	LRCK	Out	Word clock output
14	GND	In	Ground (0 V) source
15, 16	XLT0, XLT1	In/Out	20 MHz clock input/output
17	VCC	In	+5 V source
18, 19	MD0, MD1	In	Mode selection terminal
20	RSTB	In	Reset signal input
21	NMI	In	Power ON signal input
22	INT	—	Not used. Connected to ground.
23 ~ 30	FI0 ~ FI3 SI0 ~ SI3	In	Terminal for key input signal
31 ~ 38	KC0 ~ KC7	Out	Terminal for key scan signal
39 ~ 46	FI4 ~ FI7 SI4 ~ SI7	In	Terminal for key input signal
47, 48	FI8, SI8	In	Terminal for pad input signal
49	FI9	In	Terminal for button input signal
50	SI9	In	Sustain signal input
51	FI10	In	Terminal for button input signal
52	SI10	In	Not used
53 ~ 55	KI0 ~ KI2	In	Terminal for button input signal
56	MWNB	Out	Write enable signal output
57 ~ 76	MA0 ~ MA17	Out	Address bus
77	MCSB0	Out	Chip enable signal output for the sound source ROM
78	MCSB1	Out	Not used
79	MCSB2	Out	Chip enable signal output for the DSP

Pin No.	Terminal	In/Out	Function
80	VCC	In	+5 V source
81	GND	In	Ground (0 V) source
82	MRDB	Out	Read enable signal output for the sound source ROM
83 ~ 98	MD0 ~ MD15	In/Out	Data bus
99	PLE	Out	Reset signal output for the DSP
100	P17	In	APO cancellation signal input

DIGITAL SIGNAL PROCESSOR (LSI101: HG51B227FB)

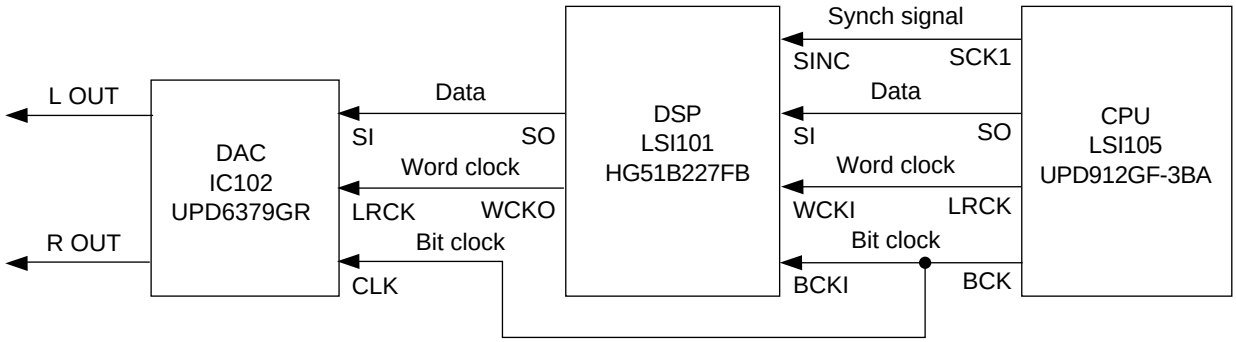
The DSP receives 16-bit serial sound data output from the CPU and adds the selected effect to the sound data using the effect RAM. Then the DSP provides the sound data to the DAC. The DSP contains two I/O ports, which controls LEDs.
The following table shows the pin functions of LSI101.

Pin No.	Terminal	In/Out	Function
1 ~ 4, 80	PB0 ~ PB4	Out	LED drive signal output
5	SO	Out	Serial sound data output for the DAC
6	WCKO	Out	Word clock output for the DAC
7	VDD3	In	+5 V source
8	TEST	—	Not used.
9	RESB	In	Reset signal input
10	VSS2	In	Ground (0 V) source
11, 12	XIN, XOUT	In/Out	16 MHz clock input/output
13	WCKI	In	Word clock input from the CPU
14	SI	In	Serial sound data input from the CPU
15	BCKI	In	Bit clock input from the CPU
16	SINC	In	1 MHz synchronizing pulse input
17	VDD2	In	+5 V source
18 ~ 25	IO0 ~IO7	In/Out	Data bus
26	RCEB	Out	Chip enable signal output for the working storage RAM
27	VSS3	In	Ground (0 V) source
28	AD1	In	Address bus
29	OEB	In	Not used. Connected to +5 V source.
30	WEB	In	Write enable signal input
31	VDD3	In	+5 V source
32	CE2	In	Chip enable signal input. High active.
33	AD0	In	Address bus
34	CE1B	In	Chip enable signal input. Low active.
35 ~ 41, 43	EIO0 ~EIO7	In/Out	Data bus for the effect RAM
42 , 44, 46 ~ 48, 51 ~57, 59	EA0 ~ EA12	Out	Address bus for the effect RAM
45	ECEB	Out	Chip enable signal output for the effect RAM
49	EOEB	Out	Read enable signal output for the effect RAM

Pin No.	Terminal	In/Out	Function
50	VSS3	In	Ground (0 V) source
58	EA13	Out	Not used
60	EWEB	Out	Write enable signal output for the effect RAM
61	EA14	Out	Not used
62, 66, 70, 74, 78	VSS2	In	Ground source
63, 67, 71, 75, 79	VDD2	In	+5 V source
64, 65, 68, 69, 72, 73, 76, 77	PA0 ~ PA7	Out	LED segment signal output

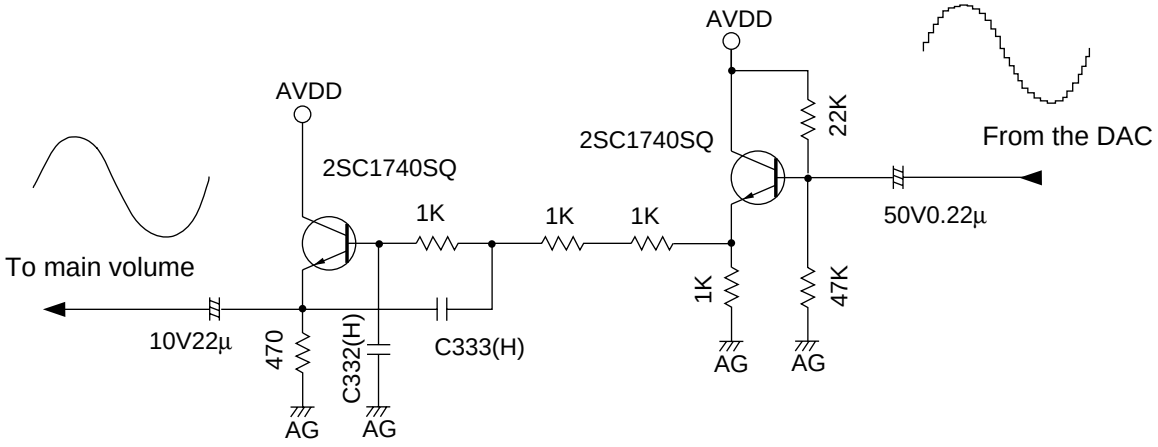
DAC (IC102: UPD6379GR)

The DAC receives 16-bit serial data output from the DSP. The data contains digital sound data of the melody, chord, bass, and percussion for the right and left channels. The DAC converts the data into analog waveforms and output them to each channel separately.



FILTER BLOCK

Since the sound signals from the DAC are stepped waveforms, the filter block is added to smooth the waveforms.

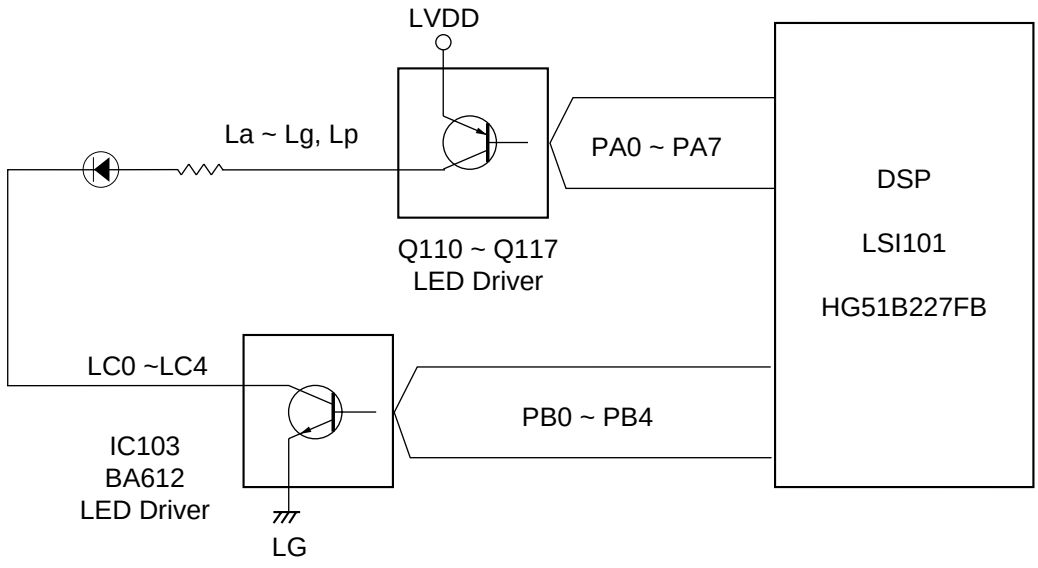


POWER AMPLIFIER (IC101: LA4598)

The power amplifier is a two-channel amplifier with standby switch.
The following table shows the pin function of IC101.

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

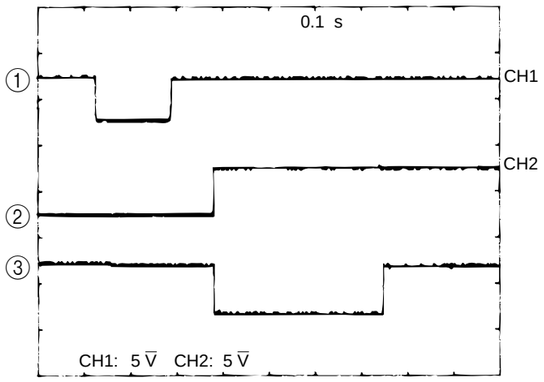
LED DRIVING



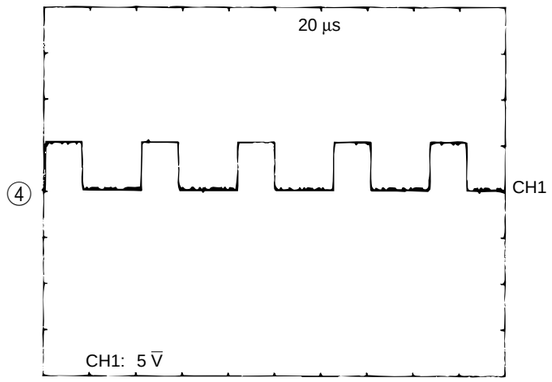
TROUBLESHOOTING

Nature of Trouble	Faulty Block	Cause/Remedy
No power	Power supply circuit	Faulty Q101 ~ Q106. Replace Q101 ~ Q105.
		Faulty D101 ~ D105. Replace D101 ~ D105.
	Power jack (J101)	Open J101 or poor soldering. Replace J101 or resolder.
	Reset IC (IC105)	Faulty IC105. Replace IC105.
	CPU (LSI105)	Faulty LSI105. Replace LSI105.
	Oscillator (X102)	Open X102. Replace X102.
No sound at all	Power amp (IC101)	Open or shorted IC101. Replace IC101.
	CPU (LSI105)	Faulty LSI105. Replace LSI105.
	Sound source ROM (LSI104)	Faulty LSI104. Replace LSI104.
	DSP (LSI101)	Faulty LSI101. Replace LSI101.
	Oscillator (X101)	Open X101. Replace X101.
	DAC (IC102)	Faulty IC102. Replace IC102.
	Working storage RAM (LSI103)	Faulty LSI103. Replace LSI103.
Distorted sound	Sound source ROM (LSI104)	Faulty LSI104. Replace LSI104.
	DSP (LSI101)	Faulty LSI101. Replace LSI101.
	Effect RAM (LSI102)	Faulty LSI102. Replace LSI102.
	Power amp (IC101)	Open or shorted IC101. Replace IC101.
Certain keys do not function	Key matrix	Open circuit on KC, FI or SI line. Replace keyboard PCB assembly.
Certain buttons do not function	Button matrix	Open circuit on KC, FI, SI or KI line. Replace console PCB assembly.
A certain button or key does not function	Key or button matrix	Dust on the contact. Clean the contact.

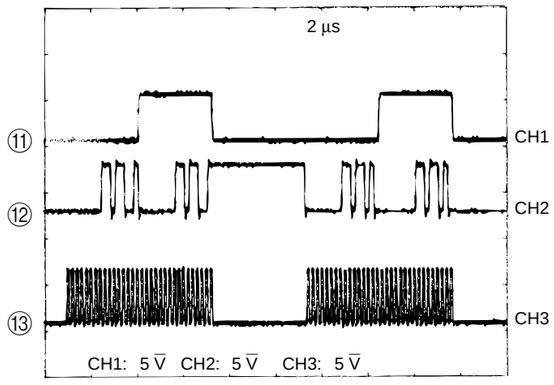
MAJOR WAVEFORMS



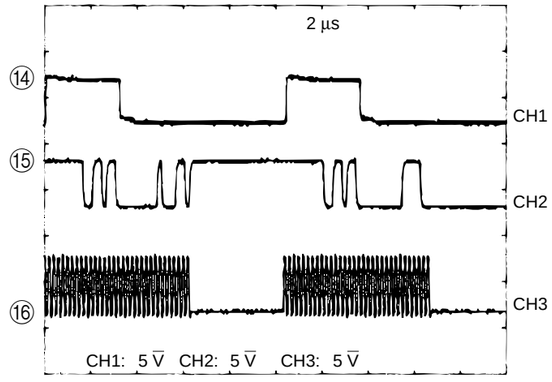
① POWER ON signal
UPD912GF-3BA pin 21
② APO signal
UPD912GF-3BA pin 3
③ Reset signal for the DSP
UPD912G-3BA pin 99



④ Synchronizing pulse
UPD912GF-3BA pin 6

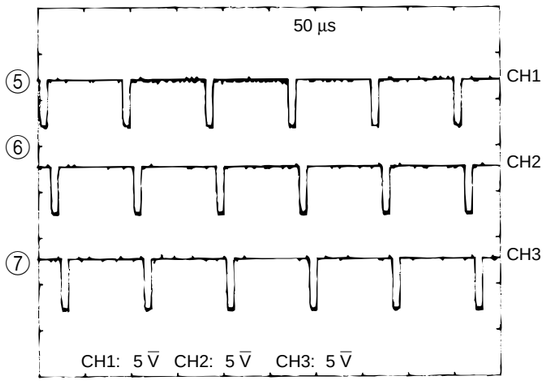


⑪ Word clock LRCK
UPD912GF-3BA pin 13
⑫ Data signal SO
UPD912GF-3BA pin 12
⑬ Bit clock BCK
UPD912GF-3BA pin 11

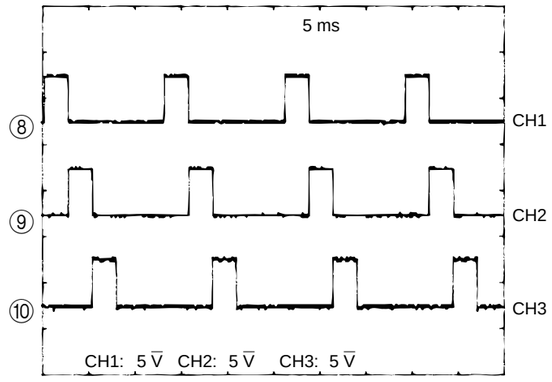


⑭ Word clock LRCK
UPD6379GR pin 1
⑮ Data signal SI
UPD6379GR pin 2
⑯ Bit clock CLK
UPD6379GR pin 3

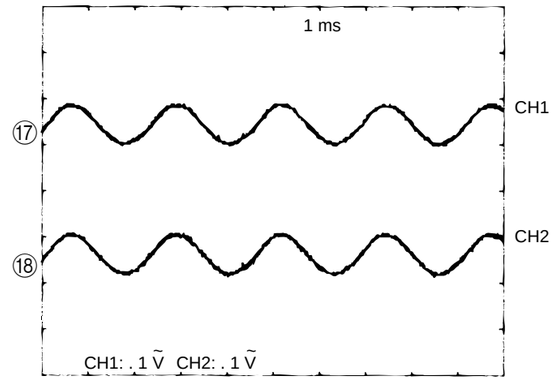
Note: On



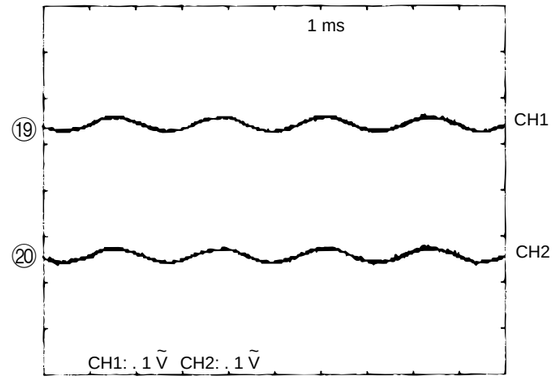
⑤ Key scan signal KC0
UPD912GF-3BA pin 31
⑥ Key scan signal KC1
UPD912GF-3BA pin 32
⑦ Key scan signal KC2
UPD912GF-3BA pin 33



⑧ LED drive signal PB0
HG51B227FB pin 80
⑨ LED drive signal PB1
HG51B227B pin 1
⑩ LED drive signal PB2
HG51B227FB pin 2



⑰ DAC output (R-ch)
UPD6379GR pin 5
⑱ DAC output (L-ch)
UPD6379GR pin 8

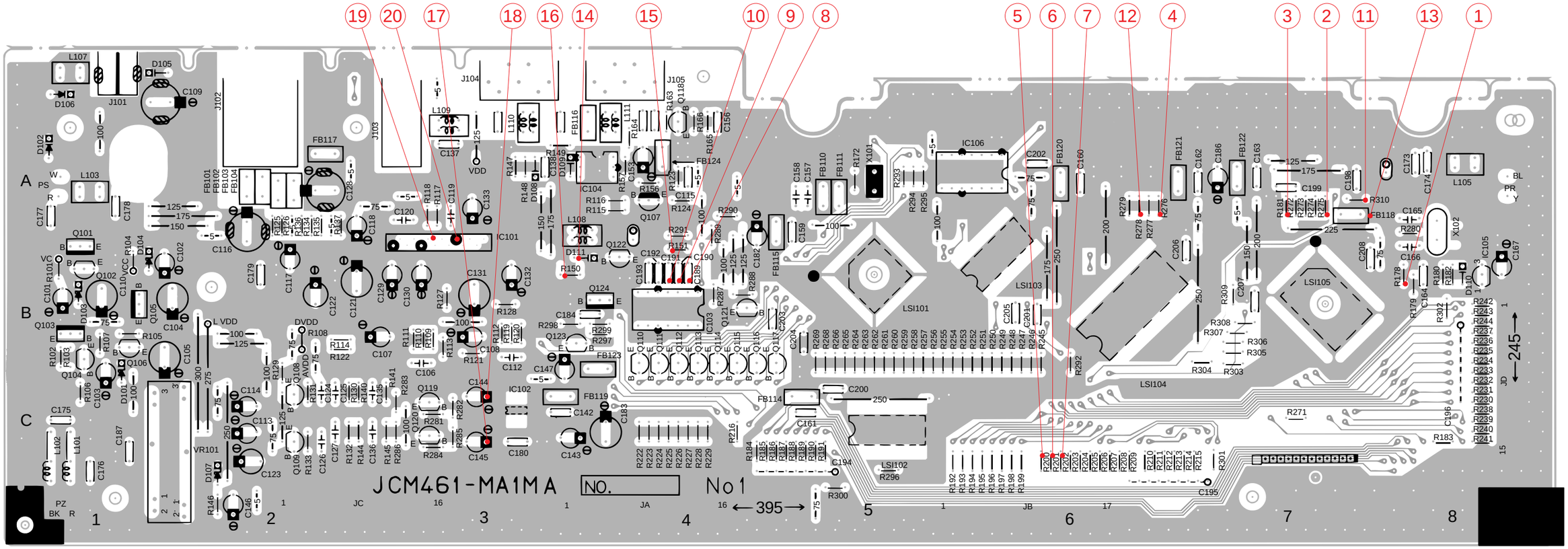


⑲ Amp. input (R-ch)
LA4598 pin 6
⑳ Amp. input (L-ch)
LA4598 pin 10

Tone : Whistle (70)
Key : A4
Touch response : Off
Reverb : Off
Volume : Maximum

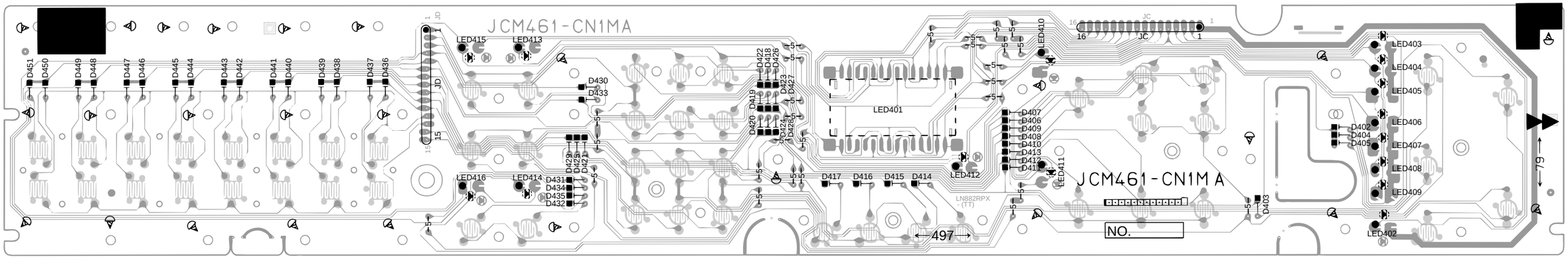
PRINTED CIRCUIT BOARDS

Main PCB JCM461-MA1M



Top View

Console PCB JCM461-CN1M



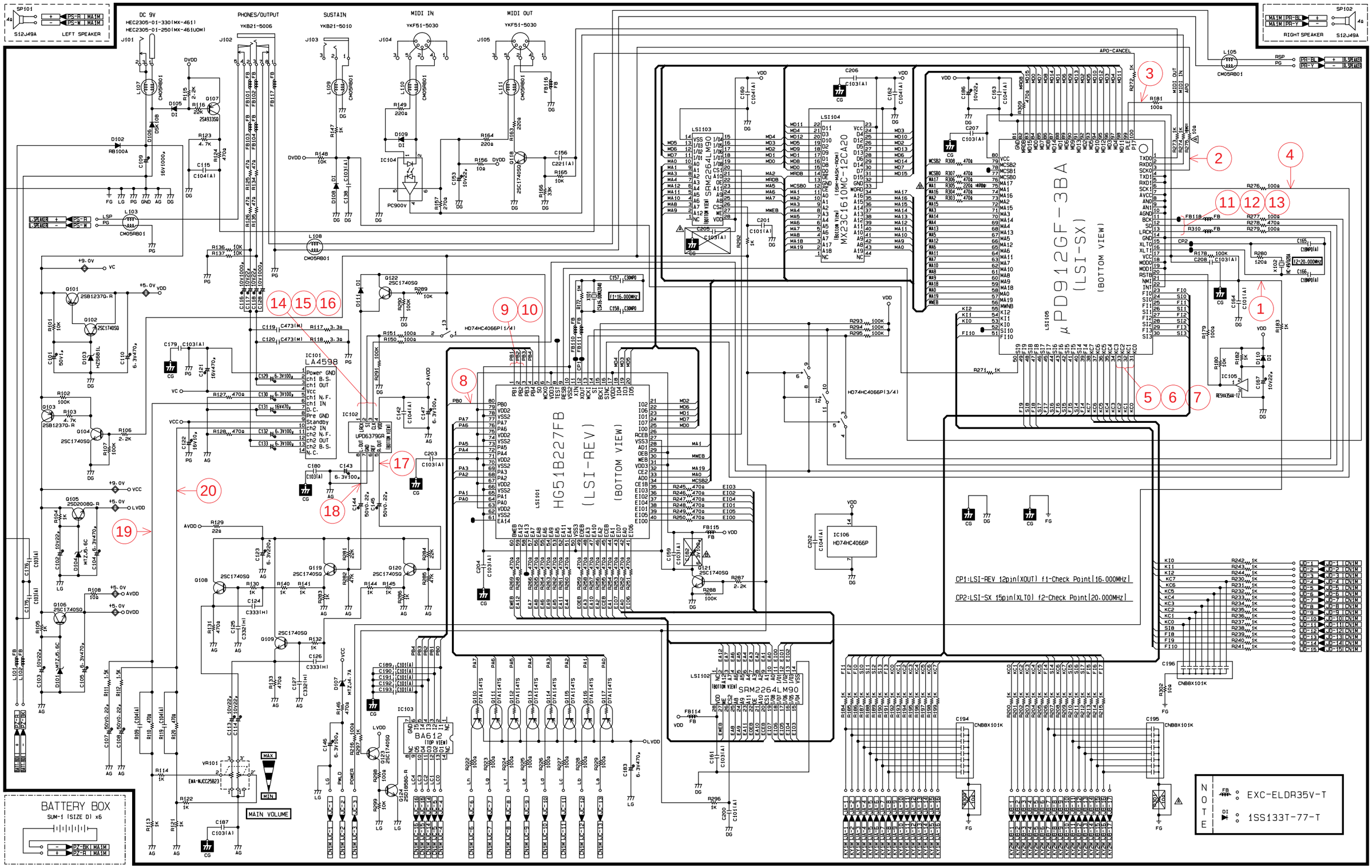
Top View

SCHEMATIC DIAGRAMS

Main PCB JCM461-MA1M

Notes:

1. All capacitance values are indicated in "μF" ($p=10^{-6}\,\mu F$).
2. All resistance values are indicated in "Ω" ($k=10^{3}\,\Omega$, $M=10^{6}\,\Omega$).

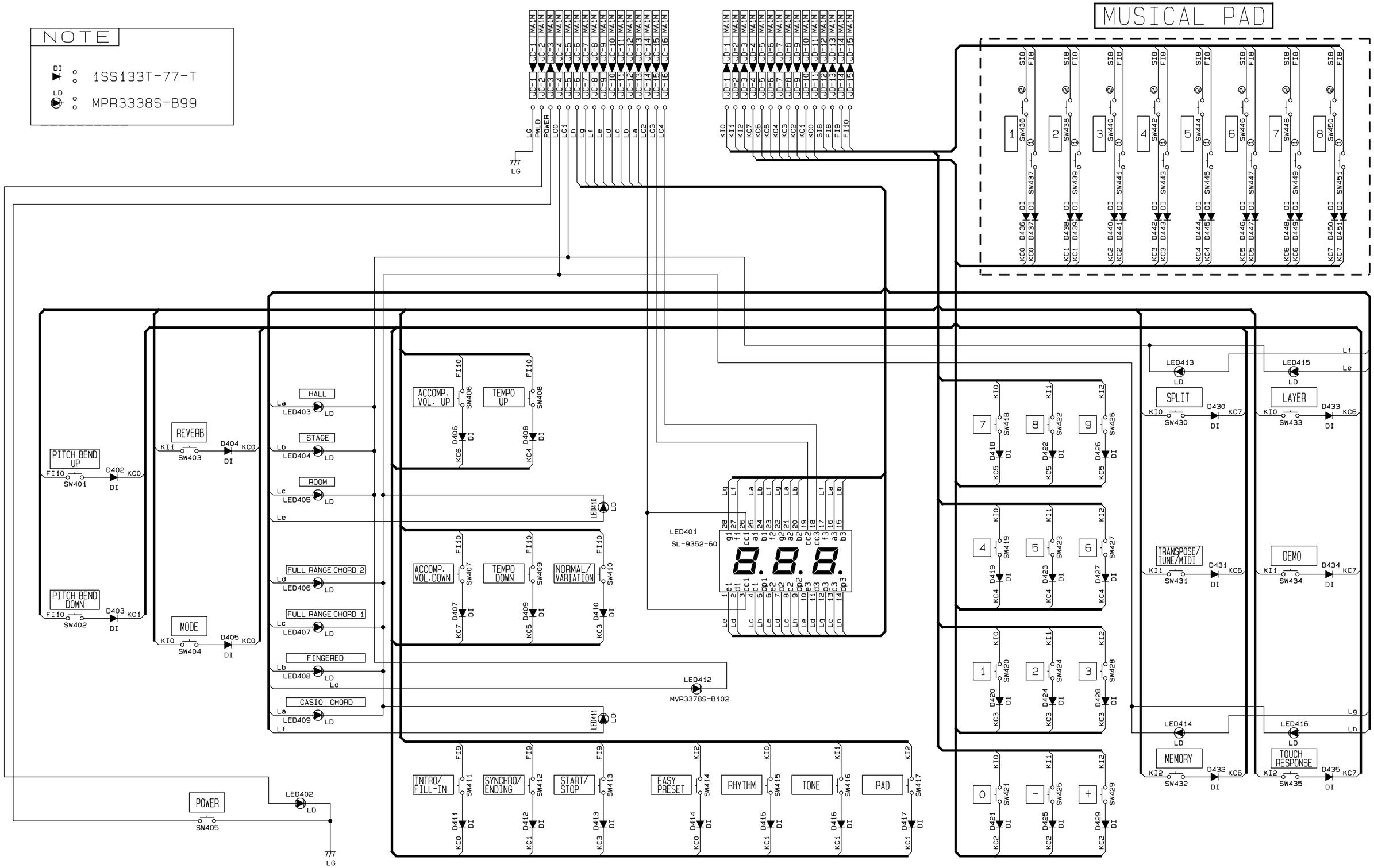


Console PCB JCM461-CN1M

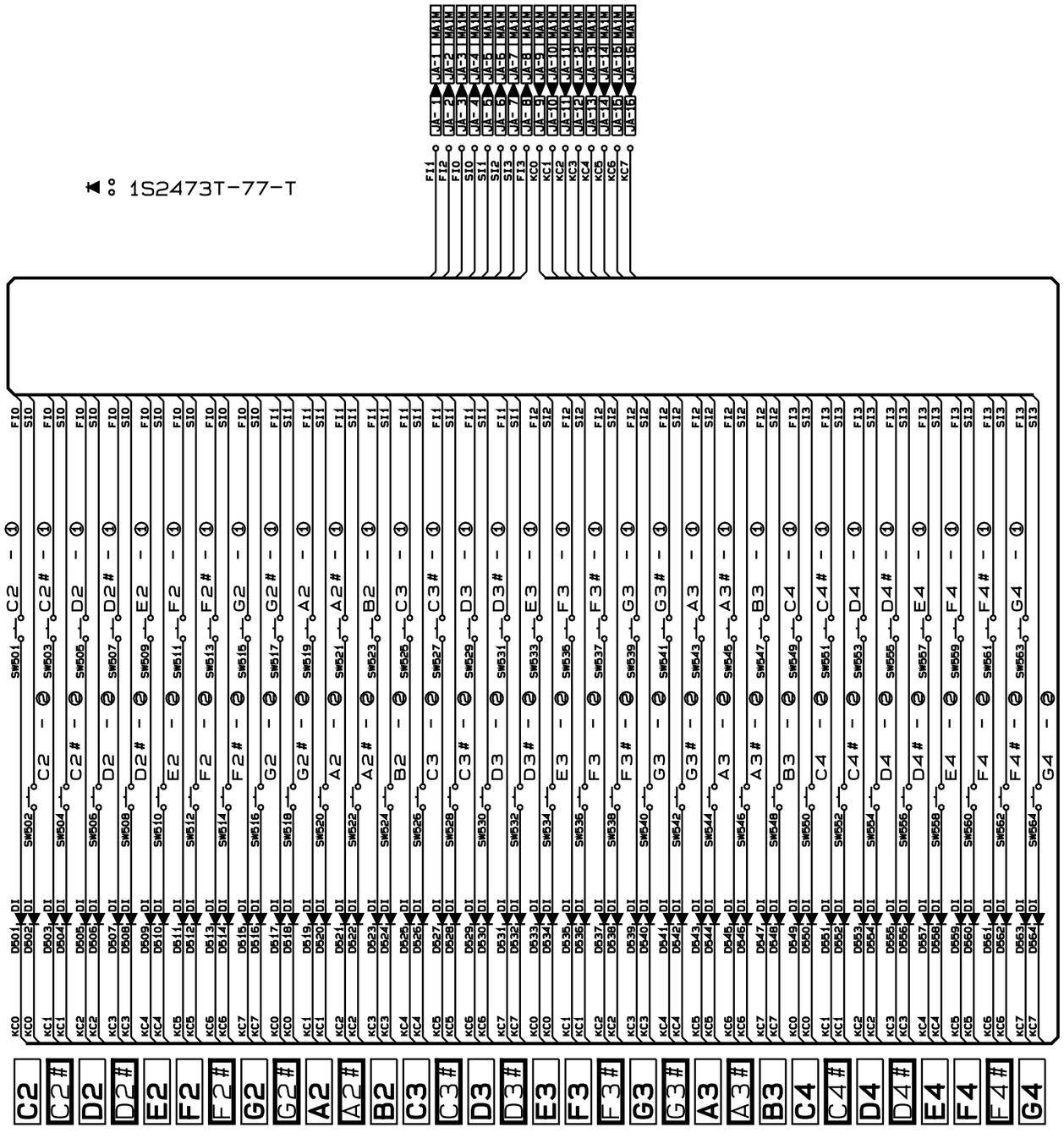
NOTE

DI : 1SS133T-77-T

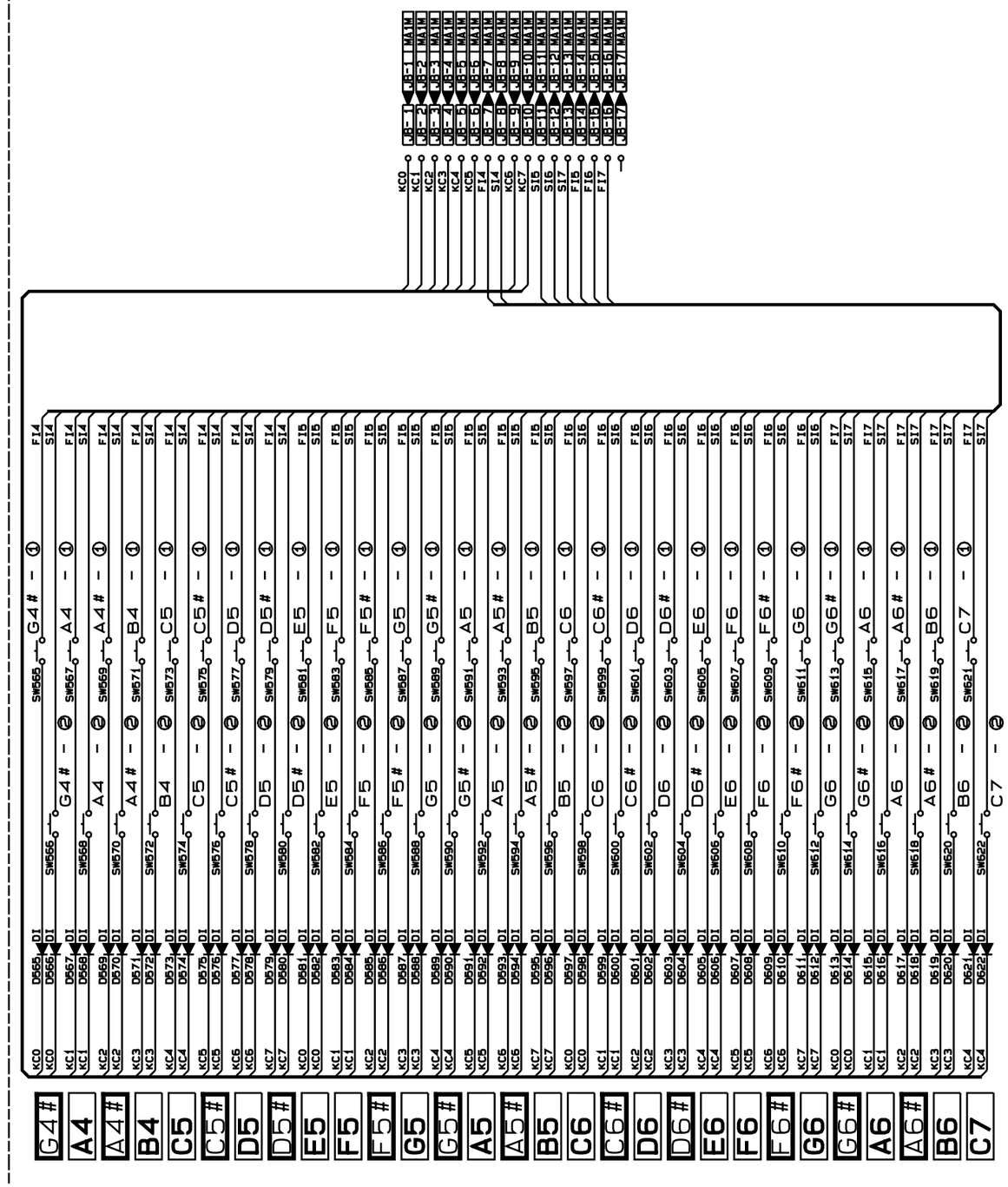
LD : MPR3338S-B99



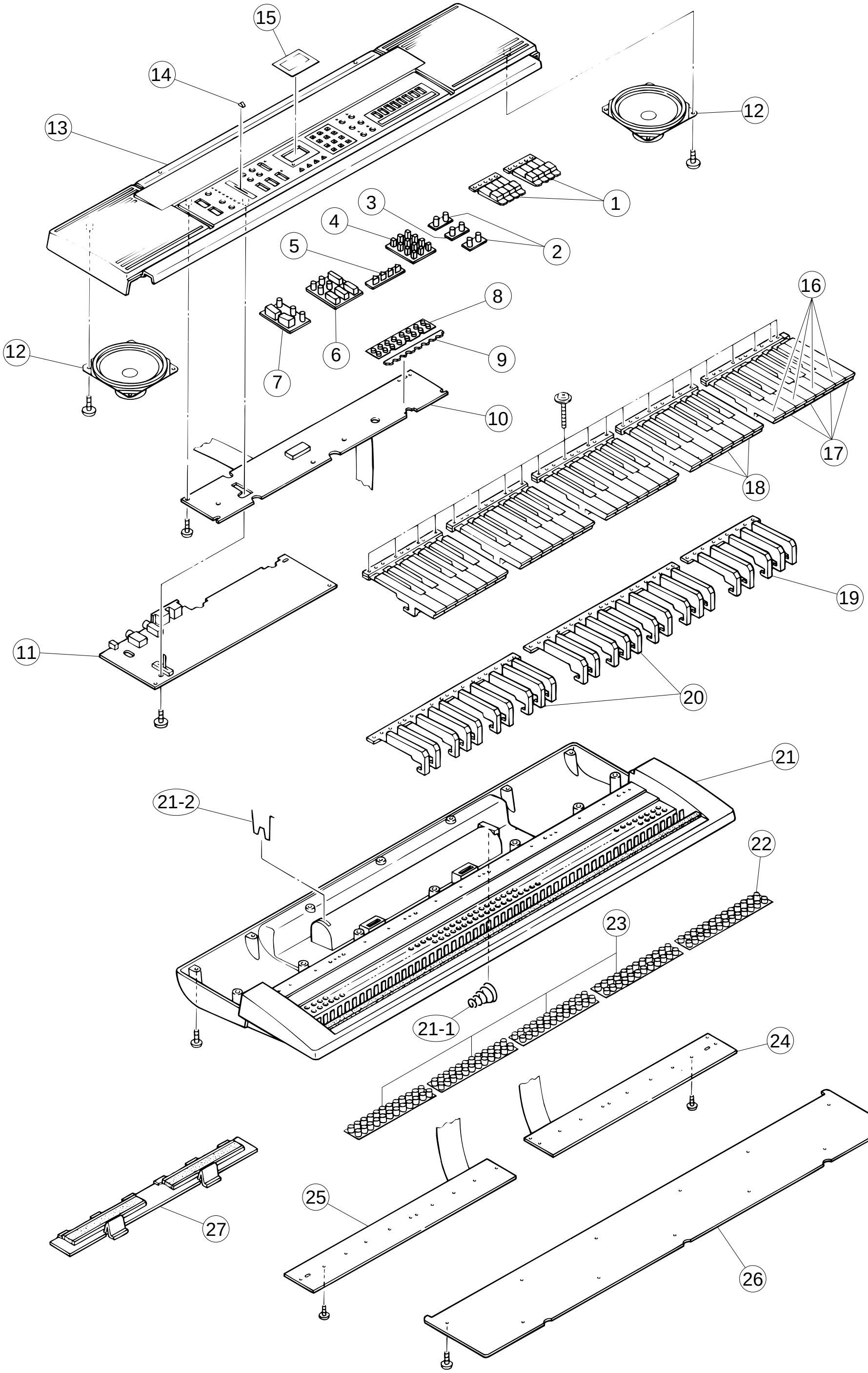
JCM617T-KY1M



JCM617T-KY2M



EXPLODED VIEW



PARTS LIST

CTK-630

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 seperately.
3. The numbers in item column correspond to the same numbers in drawing.

N	Item	Code No.	Parts Name	Specification	Q	R
		Main PCB				
N	11	6923 7120	PCB ass'y JCM461-MA1M	M140225*1	1	A
N	LSI101	2012 0441	LSI, DSP	HG51B227FB	1	A
N	LSI102/103	2012 0434	LSI, RAM	SRM2264LM90	2	A
N	LSI104	2012 0707	LSI, ROM	MX23C1610MC-12CA20	1	A
	LSI105	2012 0168	LSI, CPU	UPD912GF-3BA	1	A
	IC101	2114 2891	IC	LA4598	1	A
	IC102	2105 4249	LSI, DAC	UPD6379GR	1	A
	IC103	2114 3318	IC	BA612	1	B
	IC104	2114 1421	IC	PC900V	1	B
	IC105	2105 3941	IC	RE5VA35AA-TZ	1	B
	IC106	2105 2919	IC	HD74HC4066P	1	B
	Q101, Q103	2251 0469	Transistor	2SB1237Q.R-TV6-T	2	A
	Q102, Q104, Q106, Q108/109, Q118~123	2220 1387	Transistor	2SC1740SQ-TP-T	11	B
	Q105	2253 0357	Transistor	2SD2008Q.R-T105-T	1	A
	Q107	2200 4409	Transistor	2SA933-SQ-TP-T	1	B
	Q110~117	2259 1883	Digitasl transistor	DTA114TS-TP-T	8	B
	Q124	2253 0448	Transistor	2SD1858Q.R-TV6-T	1	A
	D101, D104	2360 1946	Zener diode	MTZJ5.6C-77-T	2	A
	D102	2390 1316	Diode	SB10-04A3-BT-T	1	B
	D103	2360 1085	Zener diode	HZS6B1LTD-T	1	B
	D105, D108~111	2390 1344	Diode	1SS133T	5	B
	D106	2390 0371	Diode	DSK10B-BT-T	1	B
	D107	2360 2079	Zener diode	MTZJ4.7A-77-T	1	A
	C194~196	2845 0168	Module capacitor	CNB8X101K	3	C
	J101	3501 7049	Jack, Power	HEC2305-01-330	1	A
	J102	3612 0517	Jack	YKB21-5005	1	B
	J103	3612 0789	Jack	YKB21-5010	1	B
	J104/105	3501 9506	Jack, DIN	YKF51-5030	1	C
	VR101	2765 1344	Volume	EWA-MJCC25B23	1	B
	X101	2590 0203	Ceramic oscillator	CSA16.00MX040	1	B
	X102	2590 2009	Crystal oscillator	HC-49/U20A	1	B
		Console PCB				
N	10	6923 7130	PCB ass'y, JCM461-CN1	M140227*1	1	B
	D402~451	2390 1344	Diode	1SS133T	50	C
	LED401	2370 1141	LED	SL-9352-60	1	C
	LED402~411, LED413~416	2370 1106	LED	MPR3338S-B99	14	C
	LED412	2370 1190	LED	MVR3378S-B102	1	C
		Keyboard PCBs				
	25	6923 6940	PCB ass'y M617T-KY1M	M140211*1	1	B
	D501~D564	2301 0101	Diode	1S2473-T-77-T	64	C
	24	6923 6950	PCB ass'y M617T-KY2M	M140212*1	1	B
	D565~D622	2301 0101	Diode	1S2473-T-77-T	58	C
		Mechanical Parts				
N	1	6923 7210	Plastic button	M240100-1	1	C
	2	6922 2680	Rubber button	M312082-2	1	B
	3	6923 4340	Rubber button	M312082-3	1	B
	4	6923 4331	Rubber button	M312088A-2	1	B
N	5	6923 5030	Rubber button	M312081-2	1	B

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

N	Item	Code No.	Parts Name	Specification	Q	R
N	6	6923 7200	Rubber button	M240099-1	1	B
N	7	6923 7190	Rubber button	M240098-1	1	B
N	8	6923 4740	Button contct rubber	M240152-1	1	B
	12	3831 0833	Speaker	S12J49A	1	B
N	13	6923 7181	Top panel	M240217A*1	1	C
	14	6921 5040	Volume knob	M311860-1	1	B
N	15	6923 7170	Window	M340085-1	1	C
	16	6922 2840	White key set, CEGB	M111723-1	5	A
	17	6922 2860	White key set, DFAS	M111725-1	1	A
	18	6922 2850	White key set, DFA	M111724-1	4	A
	19	6922 2750	Black key set, 5-Key	M111726-2	1	A
	20	6922 2740	Black key set,10-Key	M111726-1	2	A
	21	6923 7060	Case	M140171*1	1	C
	21-1	6902 6140	Battery spring, (-)	M41226-1	1	B
	21-2	6903 2150	Battery spring, (+)	M41330-1	1	B
	22	6922 2771	Contact rubber, 32-Contact	M211705A-1	1	B
	23	6922 2761	Contact rubber, 30-Contact	M211704A-1	1	B
	26	6923 7000	Bottom plate	M240116-1	1	C
	27	6918 1636	Battery cover	M311164F*1	1	B
		Accessory				
		6916 7880	Music stand	M310827-1	1	B

Notes: N – New parts
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CASIO COMPUTER CO.,LTD.
Service Division

8-11-10, Nishi-Shinjuku
Shinjuku-ku, Tokyo 160, Japan
Telephone: 03-3347-4926

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