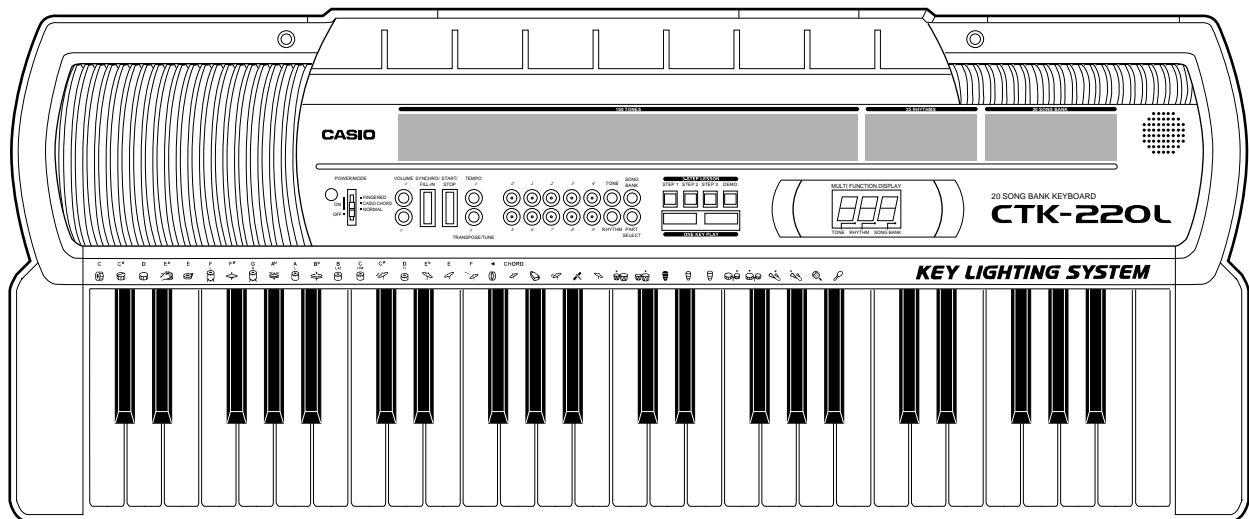


CASIO®

Service Manual

(without price)

CTK-220L



CTK-220L

INDEX

ELECTRONIC KEYBOARD

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SPECIFICATIONS

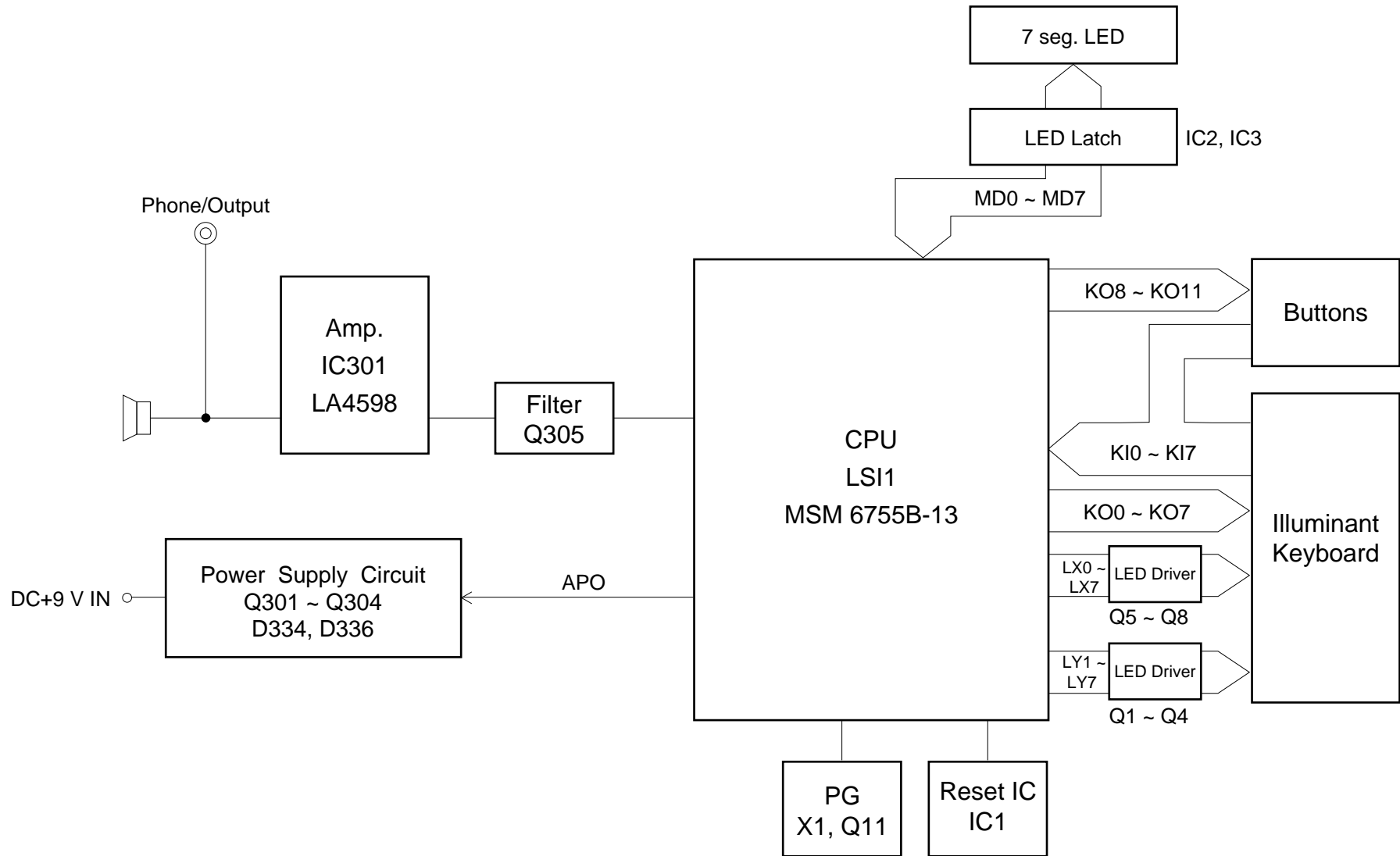
GENERAL

Number of keys:	49
Polyphonic:	12-note
Preset tones:	100
Transpose:	F# ~ C ~ F: half-note
Auto-rhythms:	25, Tempo: Adjustable, 216 steps (40 ~ 255), initial value: 120
Accompaniment:	CASIO Chord, Fingered, Fill-in pattern, Synchro start
Song bank:	20-tune
Digital volume control:	10 steps (0 ~ 9), initial value: 7
Tuning control:	440 Hz \pm 50 cents
Built-in speakers:	10 cm dia. \times 1 (Output: 2 W)
Terminals:	Headphone Jack, Stereo mini Jack [Output impedance: 70 Ω , Output voltage: 3.6 V (rms) MAX]
Auto power off:	Approximately 6 minutes after the last operation
Power source:	2-way AC or DC source AC: Required optional AD-5 AC adaptor DC: 6 AA size batteries
Power consumption:	7.7 W
Dimensions (HWD):	85 \times 771 \times 324 mm (3-3/8 \times 30-3/8 \times 12-3/4 inches)
Weight:	3.4 kg (7.5 lbs) excluding batteries

ELECTRICAL

Current drain with 9 V DC:	
No sound output	160 mA \pm 20 %
Maximum volume	840 mA \pm 20 %
with white keys C1 to G2 pressed in Synth-Lead 1	
Volume: Maximum	
Phone output level (Vrms with 8 ohm load):	
with key C2 pressed in Synth-Lead 1	98 mV \pm 20 %
Speaker output level (Vrms with 4 ohm load):	
with key F4 pressed in Synth-Lead 1	2000 mV \pm 20 %
Minimum operating voltage:	6.3 V

BLOCK DIAGRAM



CIRCUIT DESCRIPTION

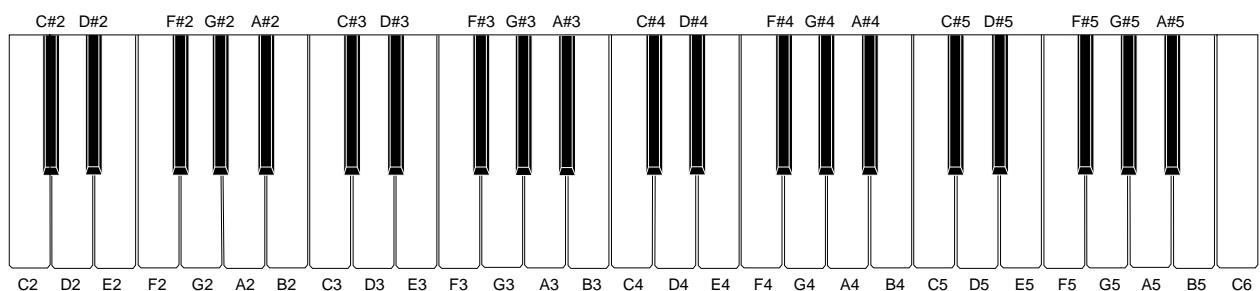
KEY MATRIX

	KI0	KI1	KI2	KI3	KI4	KI5	KI6	KI7
KO0		C2	G#2	E3	C4	G#4	E5	C6
KO1		C#2	A2	F3	C#4	A4	F5	
KO2		D2	A#2	F#3	D4	A#4	F#5	
KO3		D#2	B2	G3	D#4	B4	G5	
KO4		E2	C3	G#3	E4	C5	G#5	
KO5		F2	C#3	A3	F4	C#5	A5	
KO6		F#2	D3	A#3	F#4	D5	A#5	
KO7		G2	D#3	B3	G4	D#5	B5	
KO8	0	1	2	3	4	Start/ Stop	Up	Volume Down
KO9	5	6	7	8	9	Down	Volume Down	Synchro/ Fill-In
K10	Tone	Rhythm	Song Bank	Part Select	One Key	One Key		Demo
K11	Step-1	Step-2	Step-3		Fingered	Casio Chord	Normal	Off

LED MATRIX

	LX0	LX1	LX2	LX3	LX4	LX5	LX6	LX7
LY1	D4	D3	C3	C2	G#2	F#2	D#2	C#2
LY2	C4	E3	B2	D2	A#2	C#3	D#3	F#3
LY3	B3	F3	A2	E2	D#4	C#4	A#3	G#3
LY4	A3	G3	G2	F2	C#5	A#4	G#4	F#4
LY5	E4	C5	D5	B5	D#5	F#5	G#5	A#5
LY6	F4	B4	E5	A5	C6			
LY7	G4	A4	F5	G5				

NOMENCLATURE OF KEYS



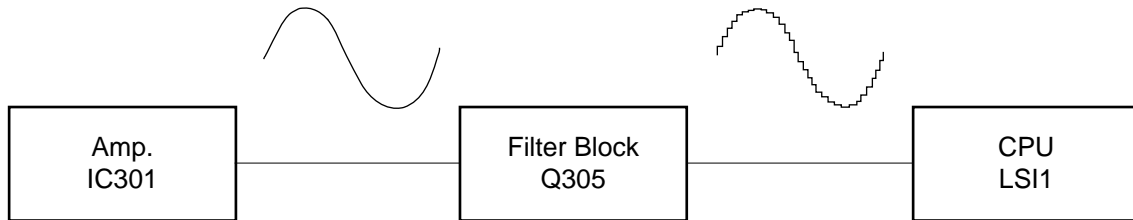
CPU (LSI1: MSM6755B-13)

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 CPU also controls key input, button input and LED driving. The following table shows the pin functions of LSI1.

Pin No.	Terminal	In/Out	Function
1	MA14	—	Not used.
2	MWEB	Out	Clock for LED latches
3 ~ 5	—	—	Not used.
6	MA0	Out	7-seg. LED drive signal
7 ~ 19	MA1 ~ MA11	—	Not used.
20 ~ 27	MD0 ~ MD7	Out	7-seg. LED drive signal
28, 29	NC1, NC2	—	Not used.
30	DGND	In	Ground (0 V) source
31	DVCC	In	+5 V source
32, 33	XTLO, XTLI	In/Out	20 MHz clock input/output
34	NC3	—	Not used.
35	RSTB	In	Reset signal input
36	P24/RXD	—	Not used. Connected to +5 V.
37	P25/TXD	—	Not used.
38	NMI	In	Power ON signal input. Connected to +5 V.
39	APO	Out	APO (Auto Power Off) signal output
40	NC4	—	Not used.
41	REFH	Out	Terminal for the internal DAC
42, 43	NC5, NC6	—	Not used.
44	DAOR	Out	Right channel sound waveform output
45	NC7	—	Not used.
46	AVdac	In	+5 V source for the internal DAC and ADC
47	DAOL	Out	Left channel sound waveform output
48	REFL	Out	Terminal for the internal DAC and ADC
49	AGdac	In	Ground source for the internal DAC
50	AGadc	In	Ground source for the internal ADC
51	ANI	—	Not used. Connected to ground.
52	AVadc	In	+5 V source for the internal ADC
53	NC8	—	Not used.
54	MOD0	In	Mode selection terminal. Connected to +5 V.
55, 56	MOD1, MOD2	In	Mode selection terminal. Connected to ground.
57	P40	In	APO cancellation signal
58 ~ 65	KI0/P30 ~ KI7/P37	In	Terminals for key/button input signal
66 ~ 73	KO0/P50 ~ KO7/P57	Out	Terminals for key scan signal
74 ~ 77	KO8/P20 ~ KO11/P23	Out	Terminals for button input signal
78	NC9	—	Not used.
79	LVCC	In	+5 V source
80 ~ 95	LX0 ~ LX7, LY0 ~ LY7	Out	LED drive signal
96	LGND	In	Ground source
97 ~ 100	MA18 ~ MA15	—	Not used.

FILTER BLOCK

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



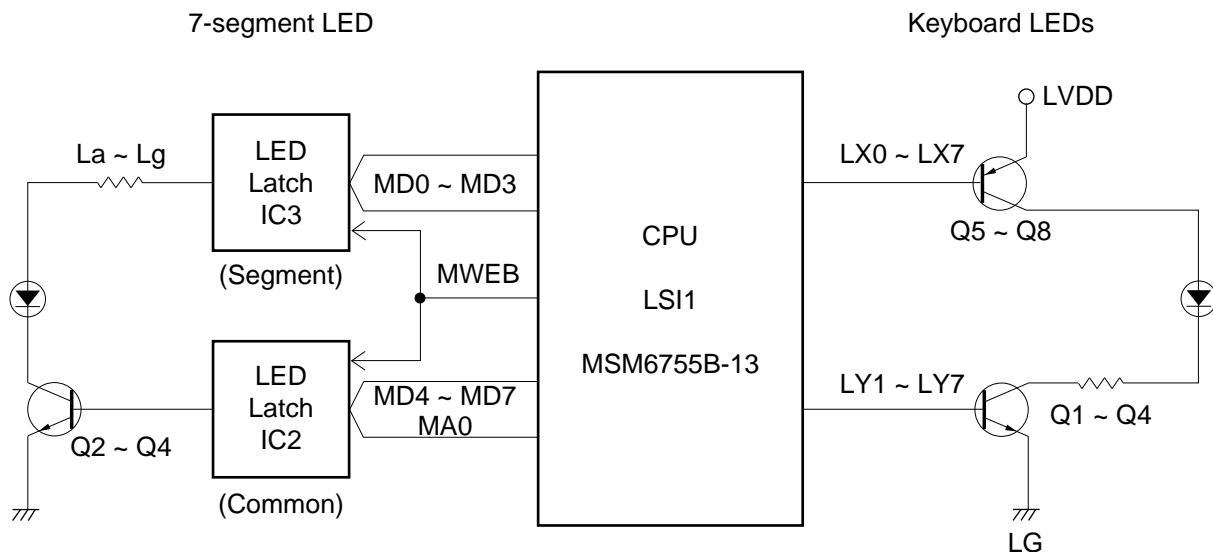
POWER AMPLIFIER (IC301: LA4598)

The power amplifier is a two-channel amplifier with standby switch.

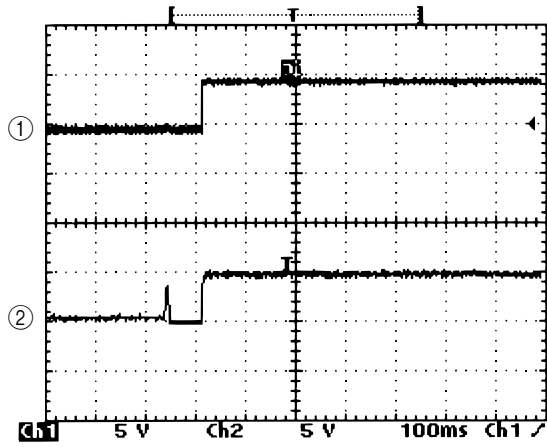
The following table shows the pin function of IC301.

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

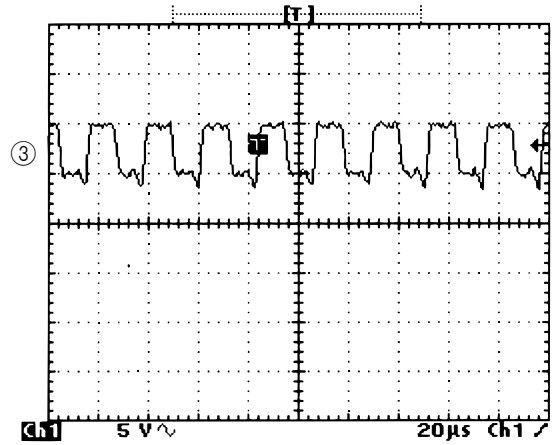


MAJOR WAVEFORMS

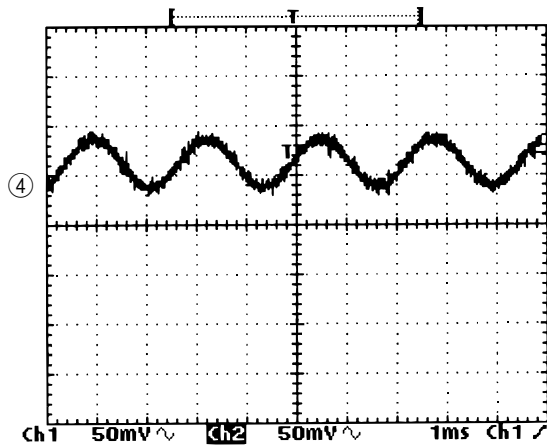


① APO signal
MSM6755B-13 pin 39

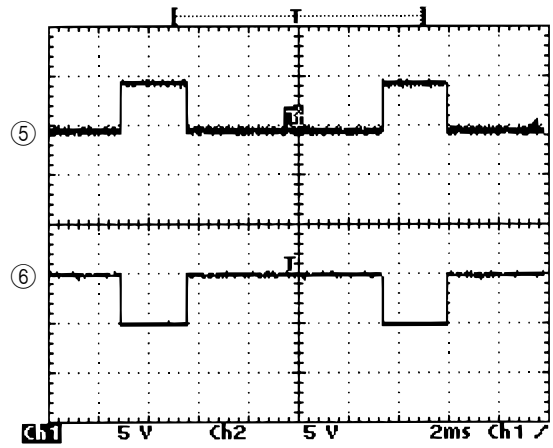
② Reset signal
RH5VL40AA pin 1



③ Clock
MSM6755B-13 pin 32



④ Sound signal
JH connector pin 2



⑤ LED drive signal LX0
MSM6755B-13 pin 88

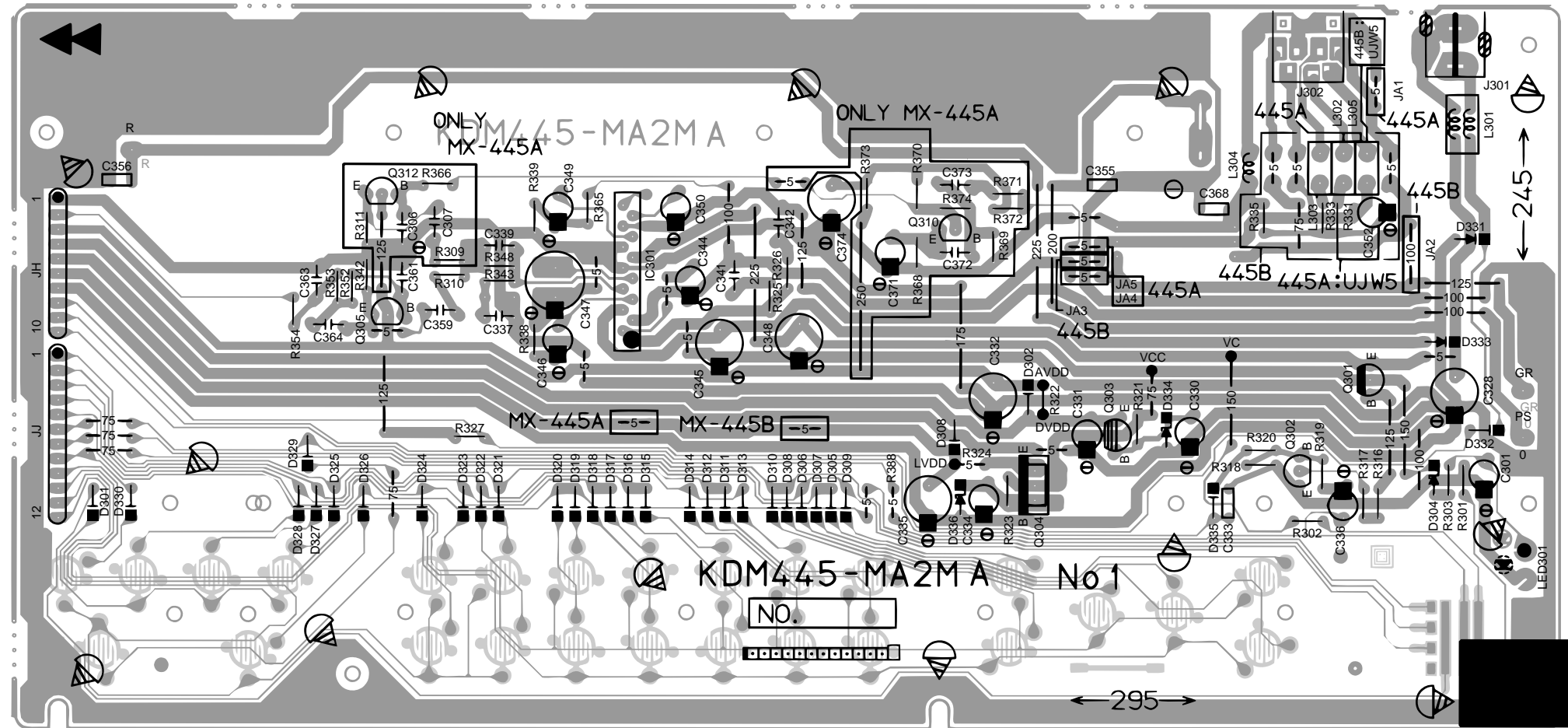
⑥ LED drive signal LY1
MSM6755B-13 pin 81

Tone: Whistle (59)
Key : A4

Key: D4

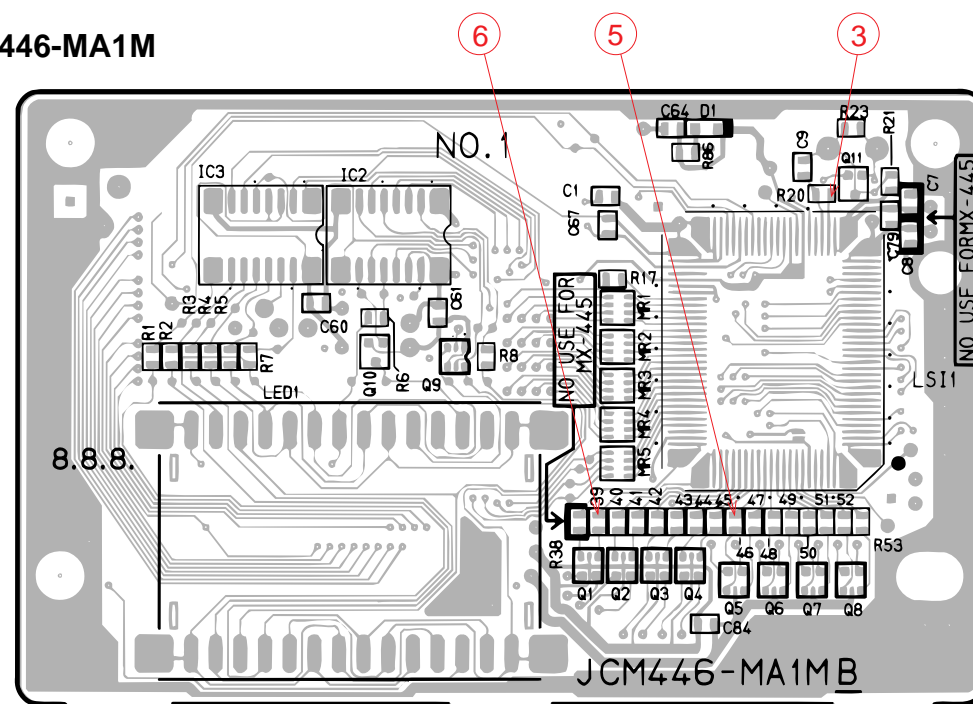
PRINTED CIRCUIT BOARDS

Sub PCB KDM445-MA2M

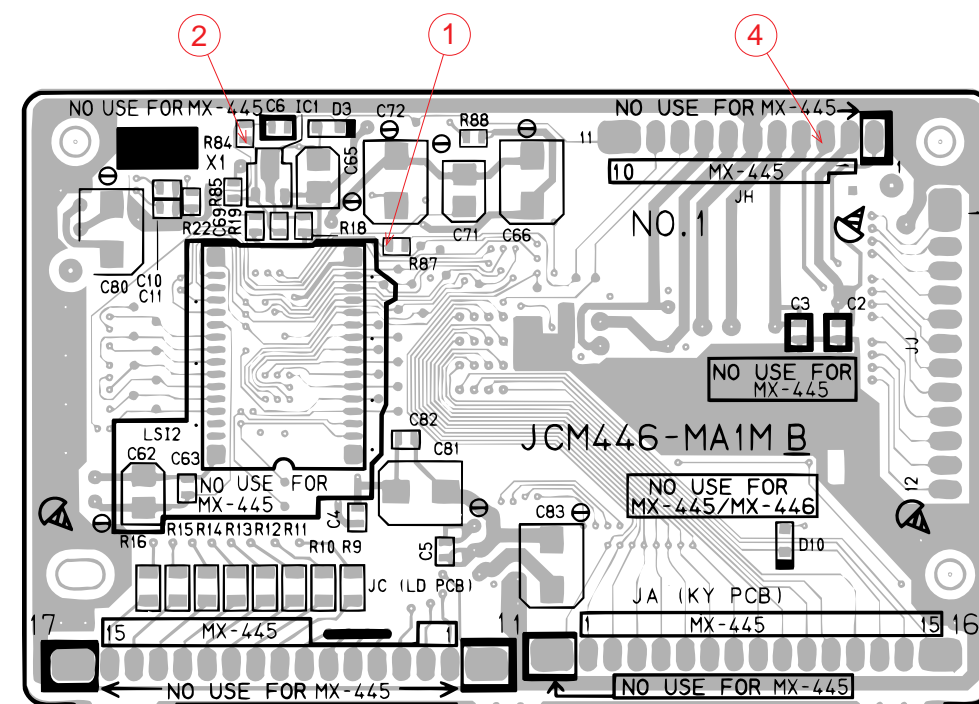


Top view

Main PCB JCM446-MA1M



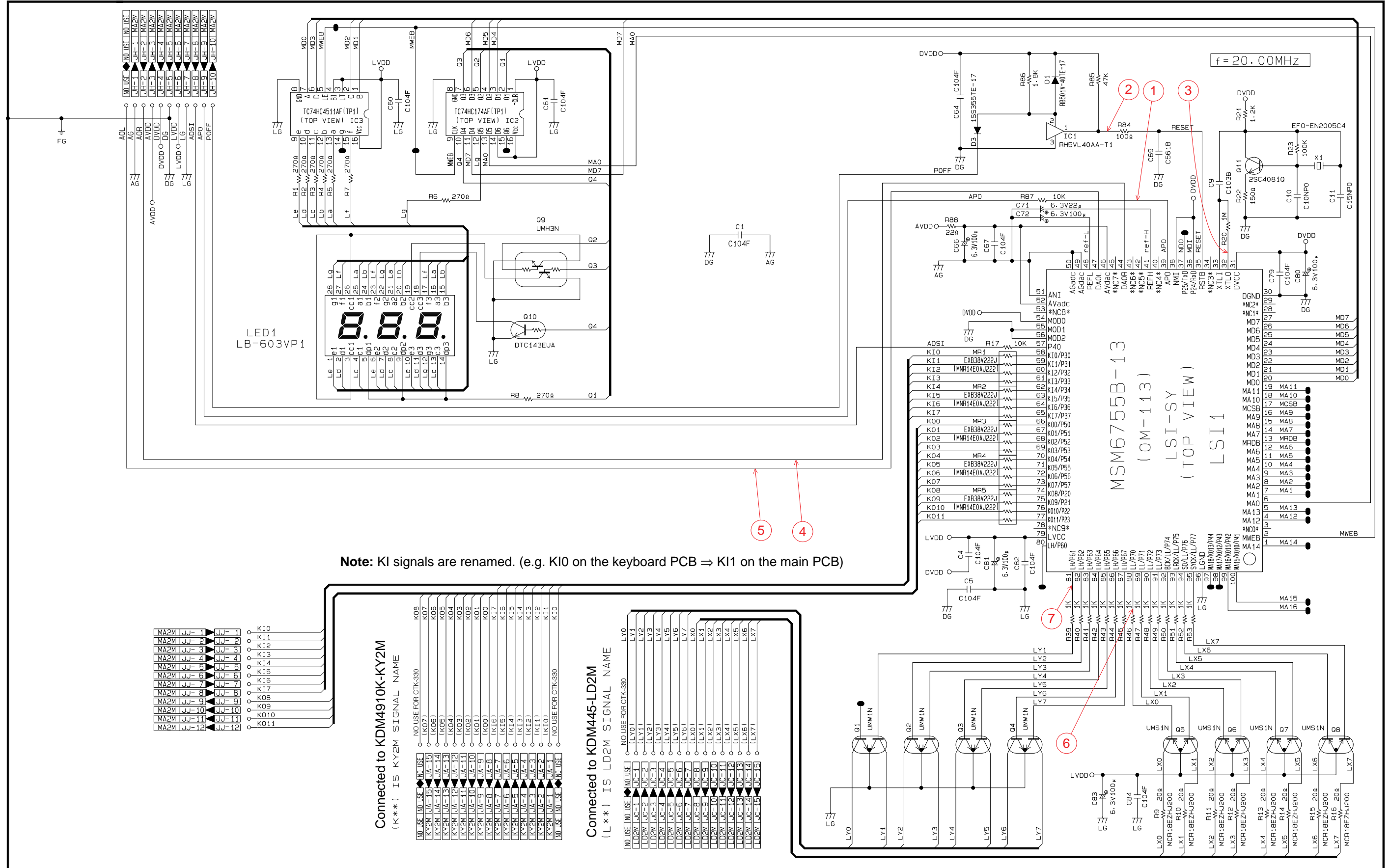
Bottom view



Top view

SCHEMATIC DIAGRAMS

Main PCB JCM446-MA1M



Sub PCBs KDM445-MA2M/MA3M

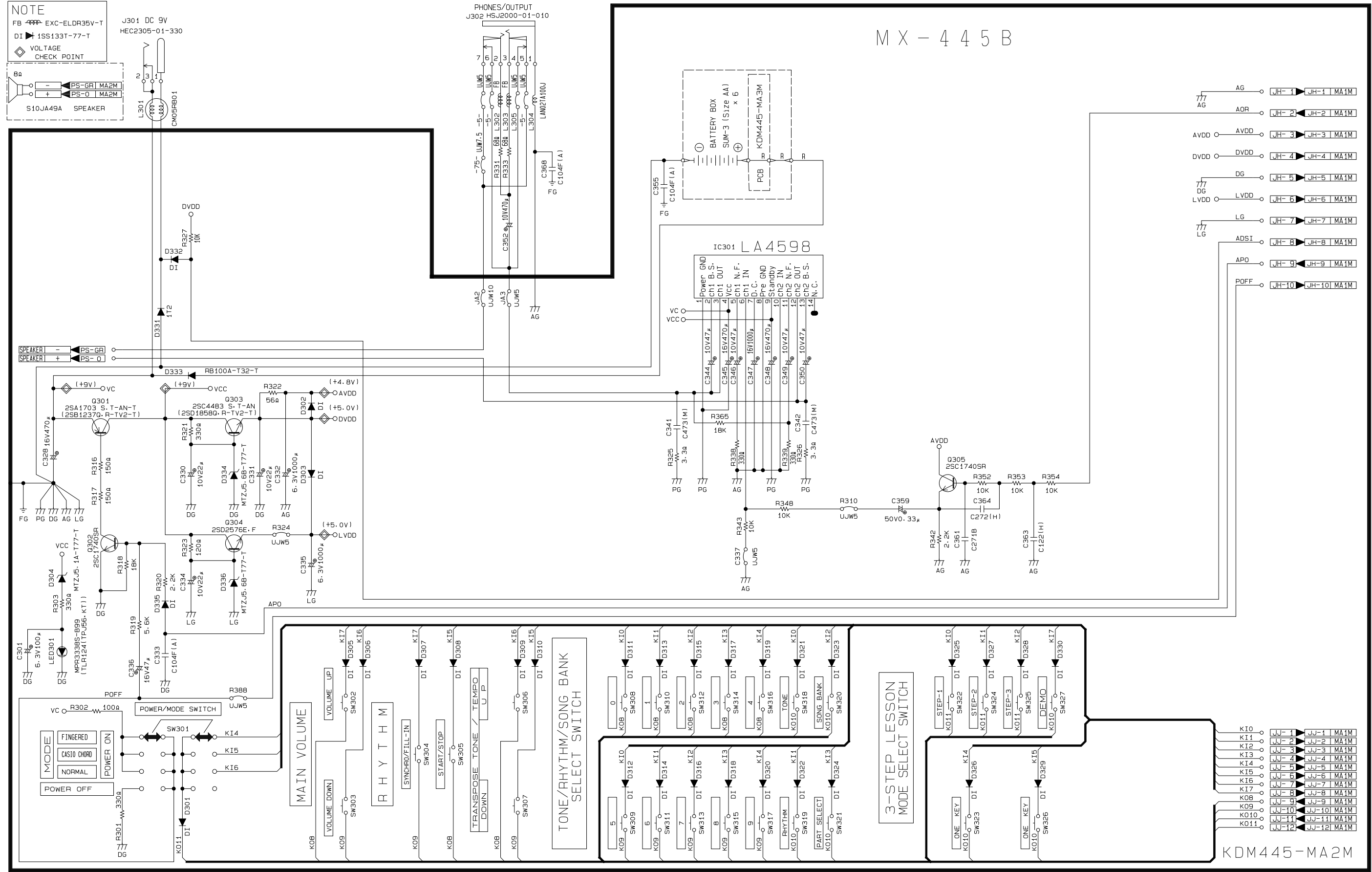
NOTE
 FB EXC-ELDR35V-T
 DI 1SS133T-77-T
 VOLTAGE CHECK POINT

Ba PS-GR MA2M
 PS-O MA2M
 S10JA49A SPEAKER

J301 DC 9V
 HEC2305-01-330

PHONES/OUTPUT
 J302 HSJ2000-01-010

MX-445B



- AG JH-1 MA1M
- AOR JH-2 MA1M
- AVDD JH-3 MA1M
- DVDD JH-4 MA1M
- DG JH-5 MA1M
- LVDD JH-6 MA1M
- LG JH-7 MA1M
- ADSI JH-8 MA1M
- APO JH-9 MA1M
- POFF JH-10 MA1M

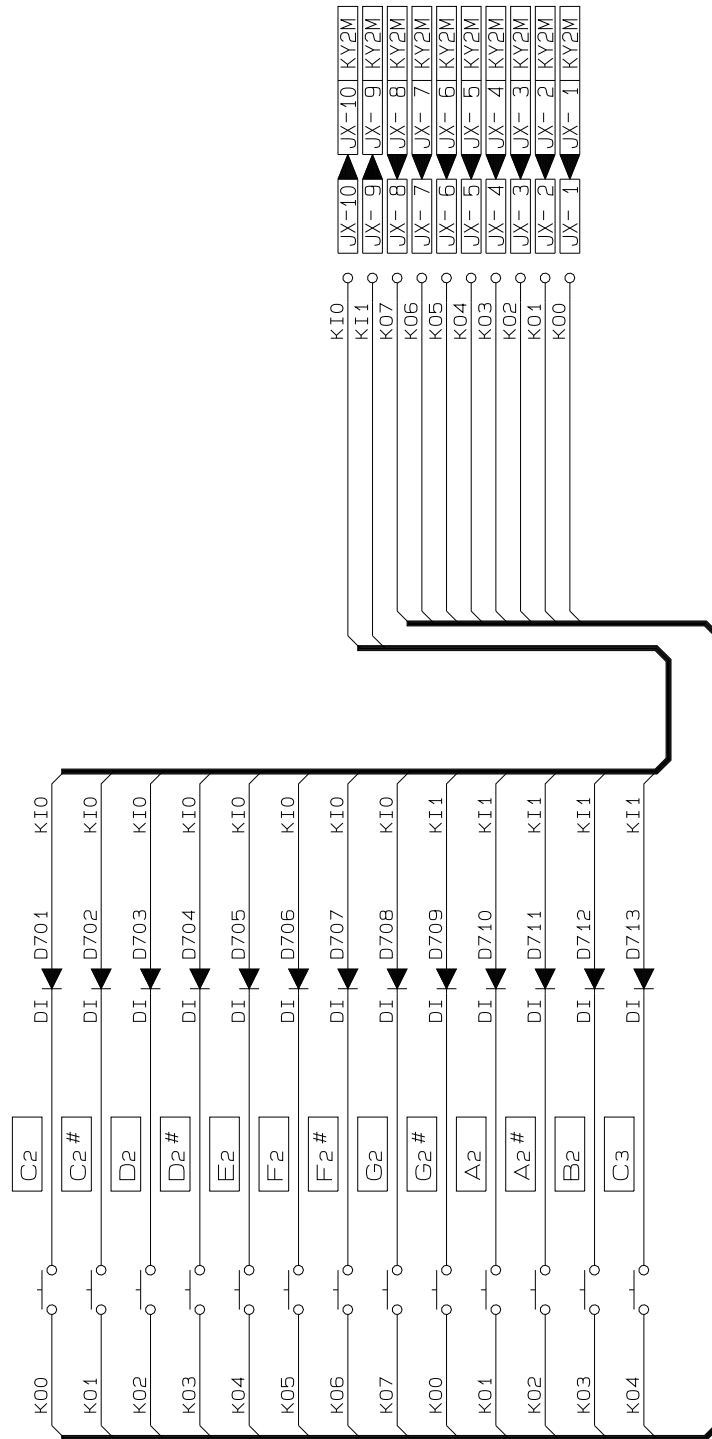
- KI0 JU-1 MA1M
- KI1 JU-2 MA1M
- KI2 JU-3 MA1M
- KI3 JU-4 MA1M
- KI4 JU-5 MA1M
- KI5 JU-6 MA1M
- KI6 JU-7 MA1M
- KI7 JU-8 MA1M
- KI8 JU-9 MA1M
- KI9 JU-10 MA1M
- KI10 JU-11 MA1M
- KI11 JU-12 MA1M

KDM445-MA2M

Keyboard PCBs KDM4910K-KY1M/KY2M

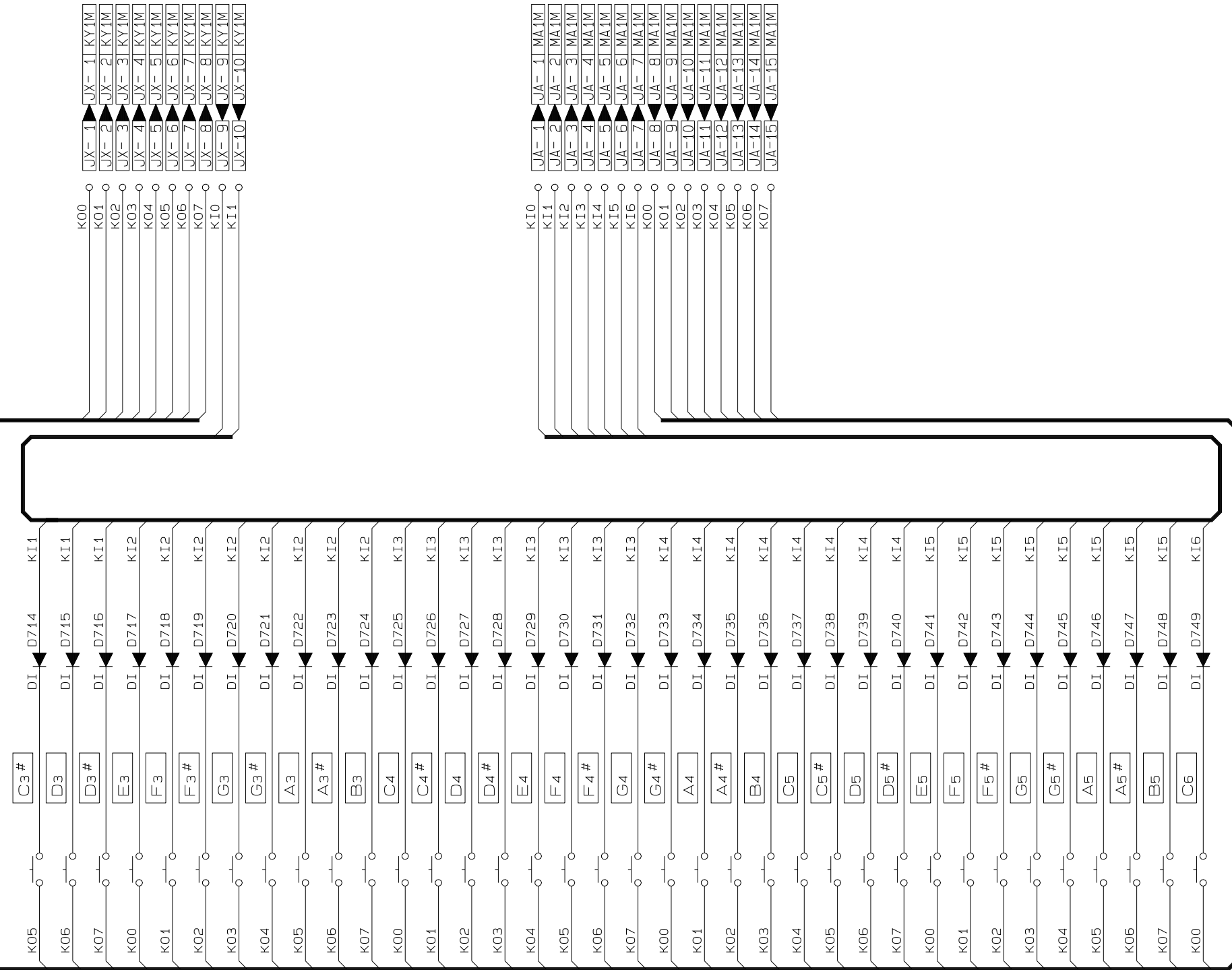
KDM4910K-KY1M

DI
▲ 1S2473T-77-T

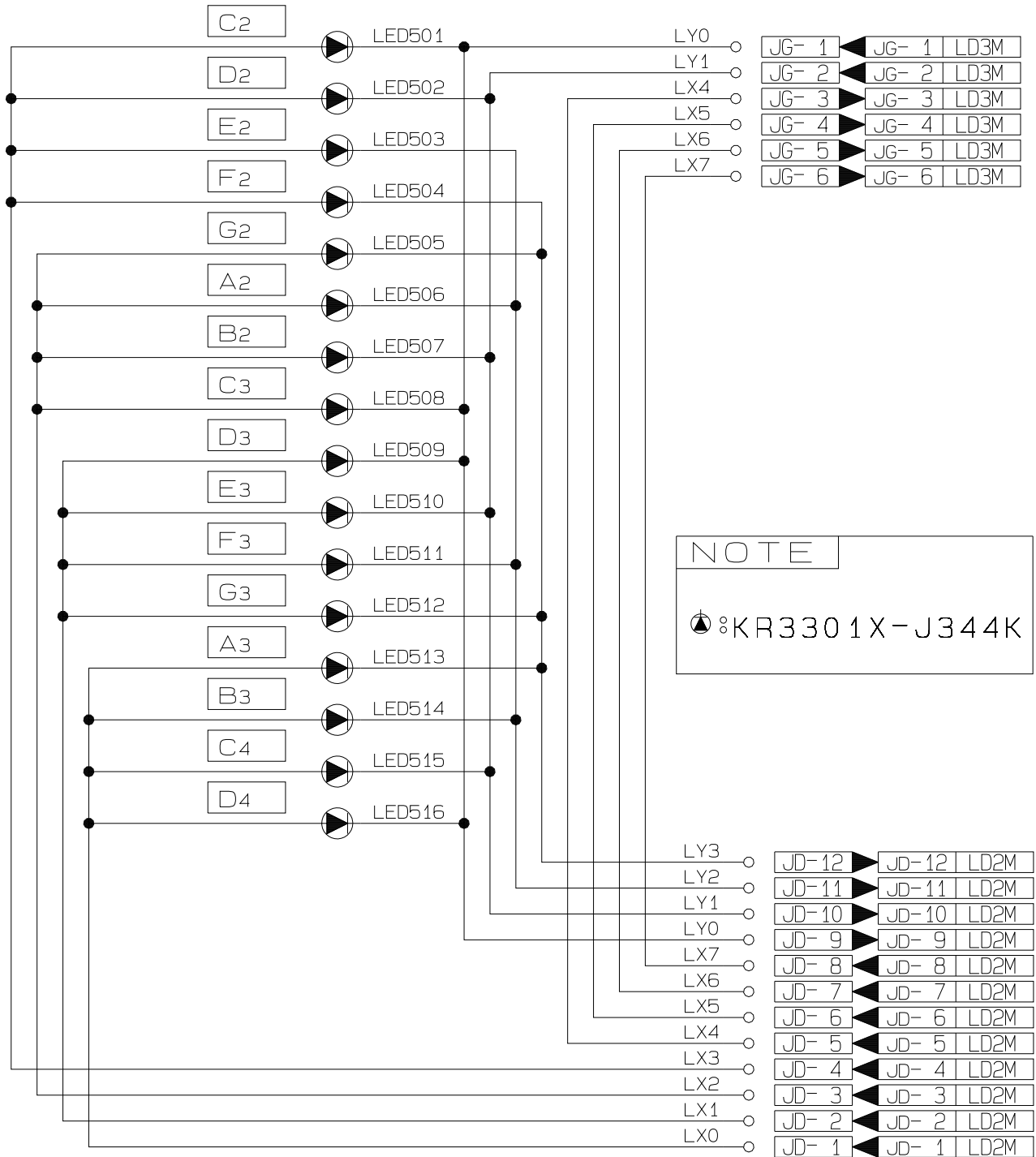


KDM4910K-KY2M

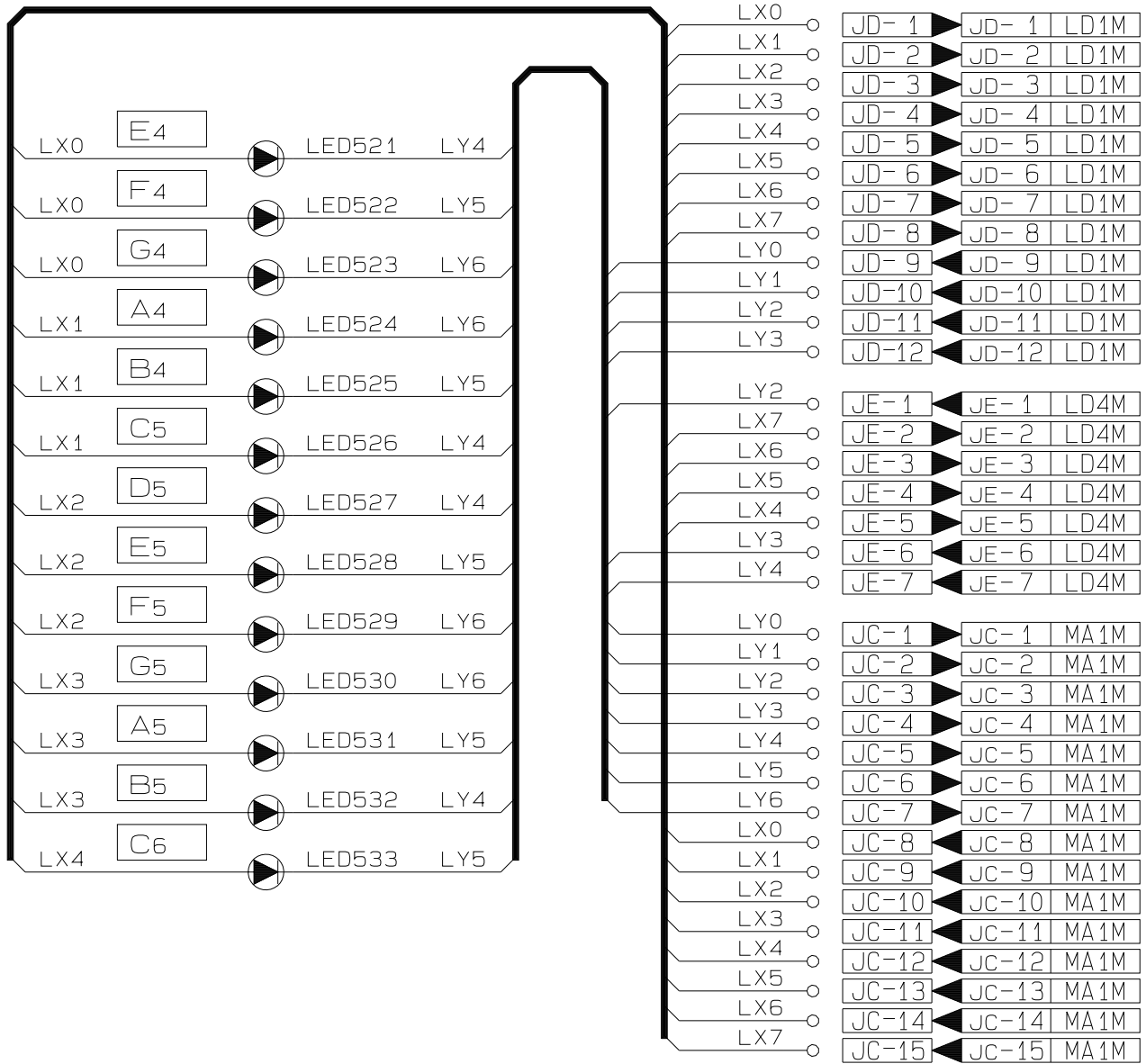
DI
▲ 1S2473T-77-T



LED PCB KDM446-LD1M



LED PCB KDM445-LD2M

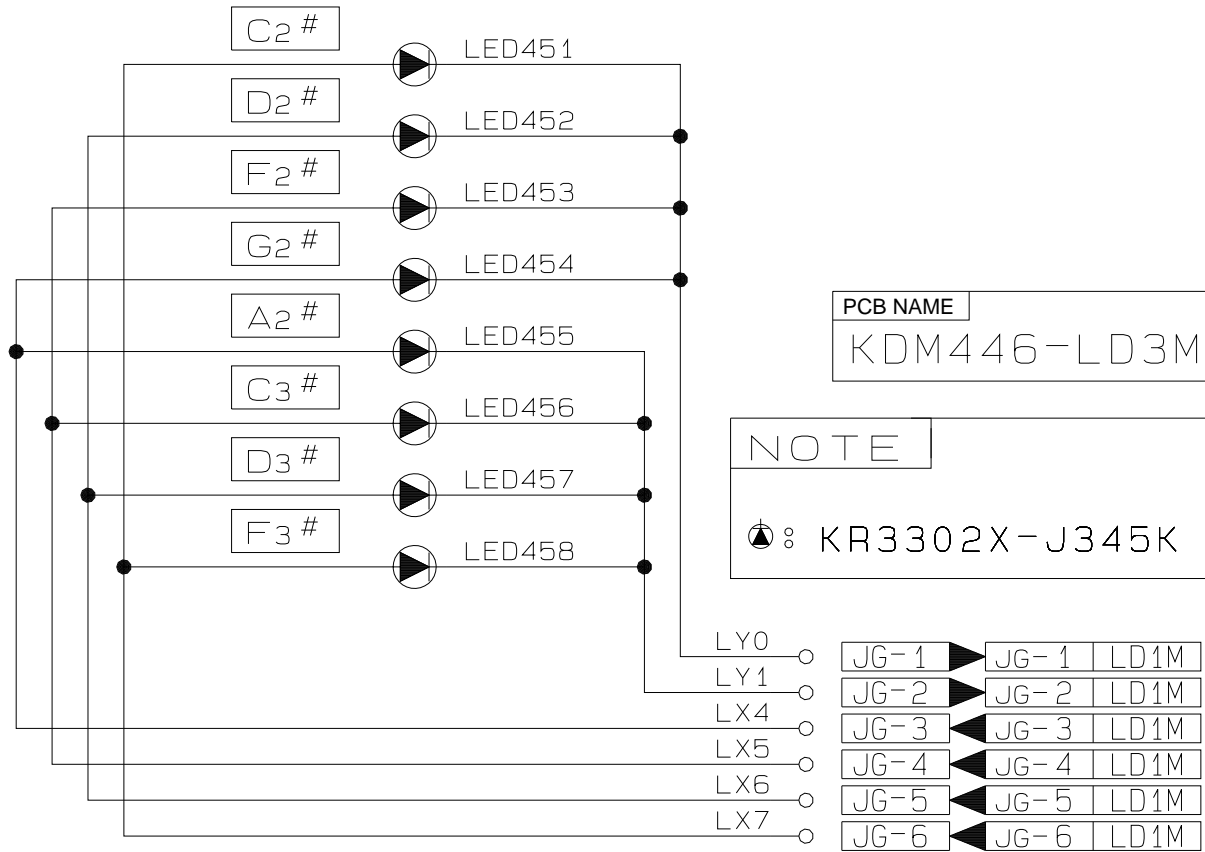


NOTE

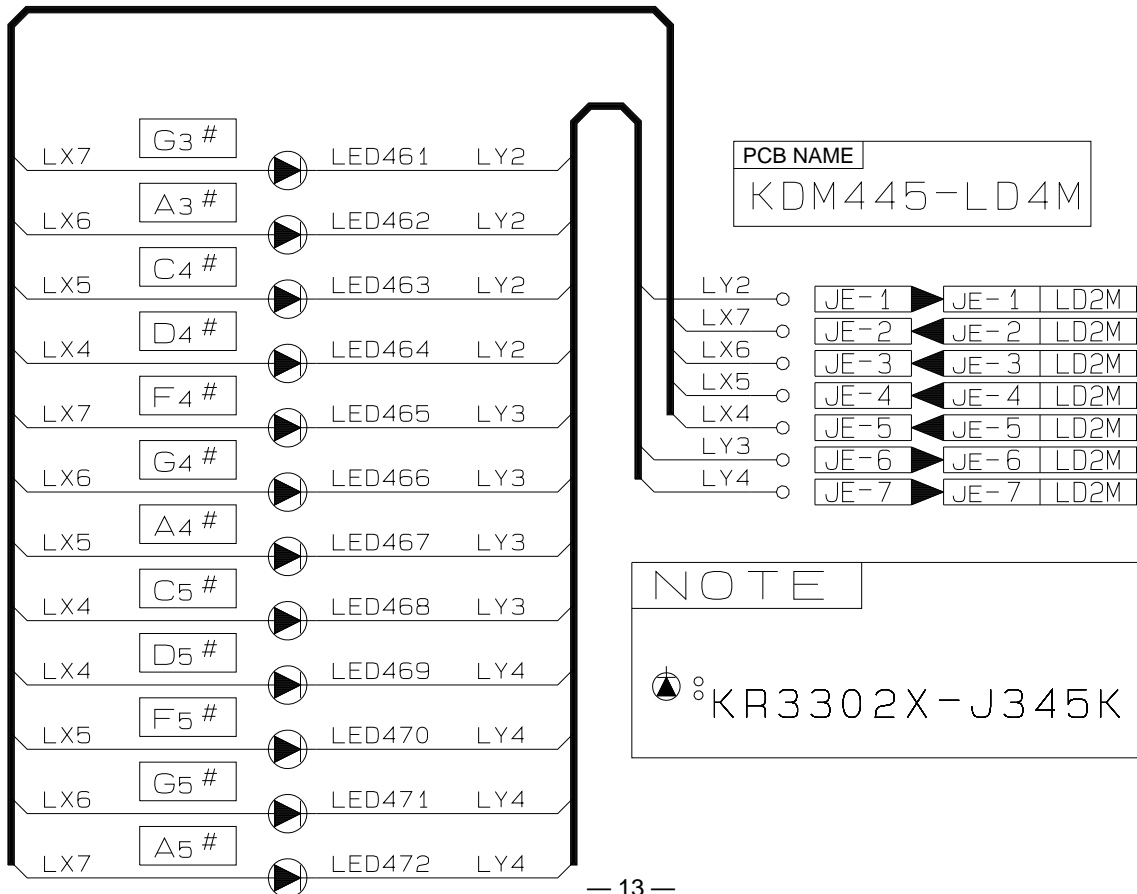
⬤ : KR330 1X-J344K

PCB NAME
KDM445-LD2M

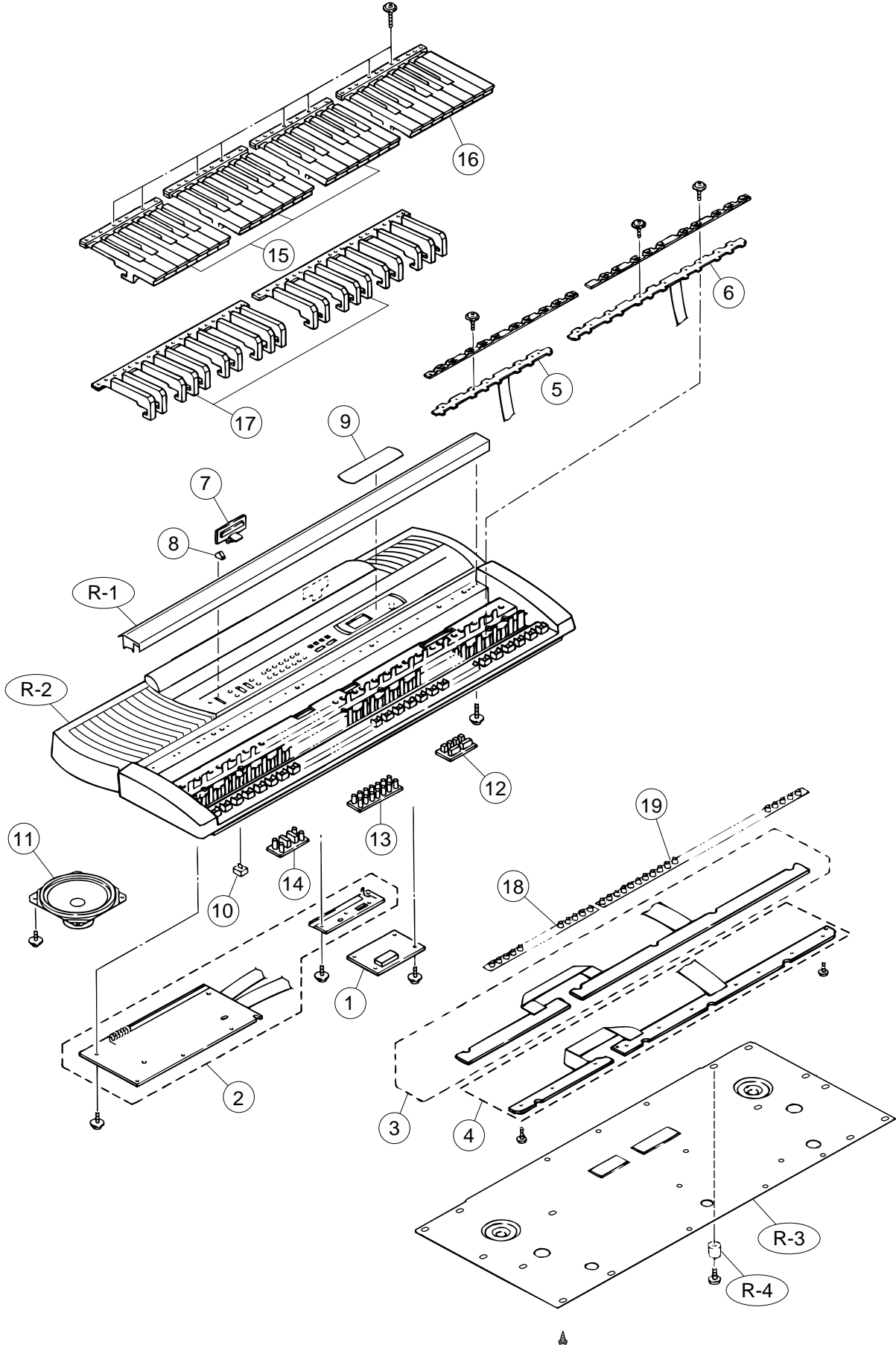
LED PCB KDM446-LD3M



LED PCB KDM445-LD4M



EXPLODED VIEW



PARTS LIST

CTK-220L

Notes: This parts list does not include the cosmetic parts, which parts are marked with item No. "R-X" in the exploded view.

Contact our spare parts department if you need these parts for refurbish.

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.

Item	Code No.	Parts Name	Specification	Q	R
Main PCB					
1	6925 6160	Main PCB ass'y (MA1M)	M240438*3	1	B
LSI1	2012 4690	LSI, CPU	MSM6755B-13	1	A
IC1	2105 5922	IC	RH5VL40AA-T1	1	A
IC2	2105 4452	IC	HD74HC174FPTR	1	A
IC3	2105 5796	IC	HD74HC4511FPTR	1	A
Q1 - Q4	2259 2555	Transistor, Chip, Digital	UMW1NTL	4	A
Q5 - Q8	2259 2562	Transistor, Chip, Digital	UMS1NTL	4	A
Q9	2259 2646	Transistor, Chip, Digital	UMH3NTN	1	A
Q10	2259 2548	Transistor, Chip, Digital	DTC143EUAT106	1	A
Q11	2252 1239	Transistor, Chip	2SC4081-T106Q	1	A
D1	2390 2576	Diode, Chip, Schottky	RB501V-40TE-17	1	B
D3	2390 1820	Diode, Chip	1SS355TE-17	1	B
X1	2590 1526	Oscillator, Ceramic	EFO-EN2005C4	1	B
LED1	2370 1141	LED, 7-seg.	SL-9352-60	1	B
Sub PCB ass'y					
2	6925 6173	Sub PCB ass'y	M140476*2	1	B
IC301	2114 2891	IC	LA4598	1	A
Q301	2250 0742	Transistor	2SA1703S,T-AN-T	1	A
Q302, Q305	2220 1409	Transistor	2SC1740SR-TP-T	2	A
Q303	2253 0581	Transistor	2SD1858R,S-TV6-T	1	A
Q304	2253 0455	Transistor	2SD1762E.F	1	A
	2390 1344	Diode	1SS133T-77-T	31	B
D304	2360 1729	Diode, Zener	MTZJ5.1A-T77-T	1	B
D331	2390 0378	Diode	1SR139-100T-32-T	1	B
D333	2390 1323	Diode	RB100A-T32-T	1	B
D334, D336	2360 2002	Diode, Zener	MTZJ5.6B-T77-T	2	B
LED301	2370 1106	LED	MPR3338S-B99	1	B
J301	3501 7049	Jack, Power	HEC2305-01-330	1	B
J302	3501 4382	Jack, Phone	HSJ2000-01-010	1	B
Keyboard PCBs					
3	2301 0101	Diode	1S2473T-77-T	49	B
	6925 6180	Keyboard PCB ass'y	M140449*2	1	B
LED PCBs					
4	2370 1323	LED (for white key)	KR3301X-J344K	29	B
	6925 6183	LED PCB ass'y LD1,2M	M140473*1	1	C
5	2370 1330	LED (for black key)	KR3302X-J345K	20	B
	6925 1340	LED PCB ass'y LD3M	M240428*1	1	C
6	6925 6184	LED PCB ass'y LD4M	M240500*1	1	C
Mechanical Parts					
7	6925 2160	Battery cover	M340490*1	1	B
8	6925 6261	Slide knob	M311859A-6	1	B
9	6925 5380	Display plate	M340534-2	1	C
10	6909 5890	Slide contact	CSB-12D	1	B
11	3831 1072	Speaker	S10JA49A	1	B
12	6925 6370	Rubber button	M240374-3	1	B
13	6906 8371	Rubber button	M240414-2	1	B
14	6925 6300	Rubber button	M240413-2	1	B
15	6925 1700	White key set, LSK-CB	M340489*1	3	A
16	6925 1710	White key set, LSK-CS	M340489*2	1	A
17	6925 1720	Black key set, LSK-10P	M140369-1	2	A
18	6923 2390	Key contact rubber, 18	M240025-1	1	A
19	6922 4000	Key contact rubber, 31	M111765-1	1	A
Other					
	6916 7880	Music stand	M310827-1	1	C

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