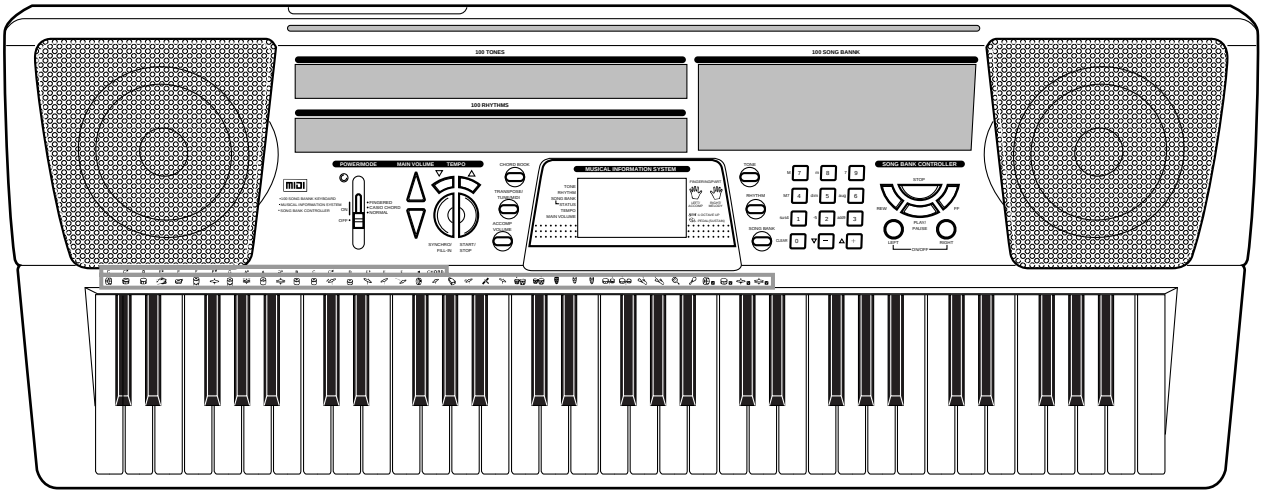
CASIO®

Service Manual

(without price)

CTK-501



CTK-501

INDEX

ELECTRONIC KEYBOARD

CONTENTS

SPECIFICATIONS

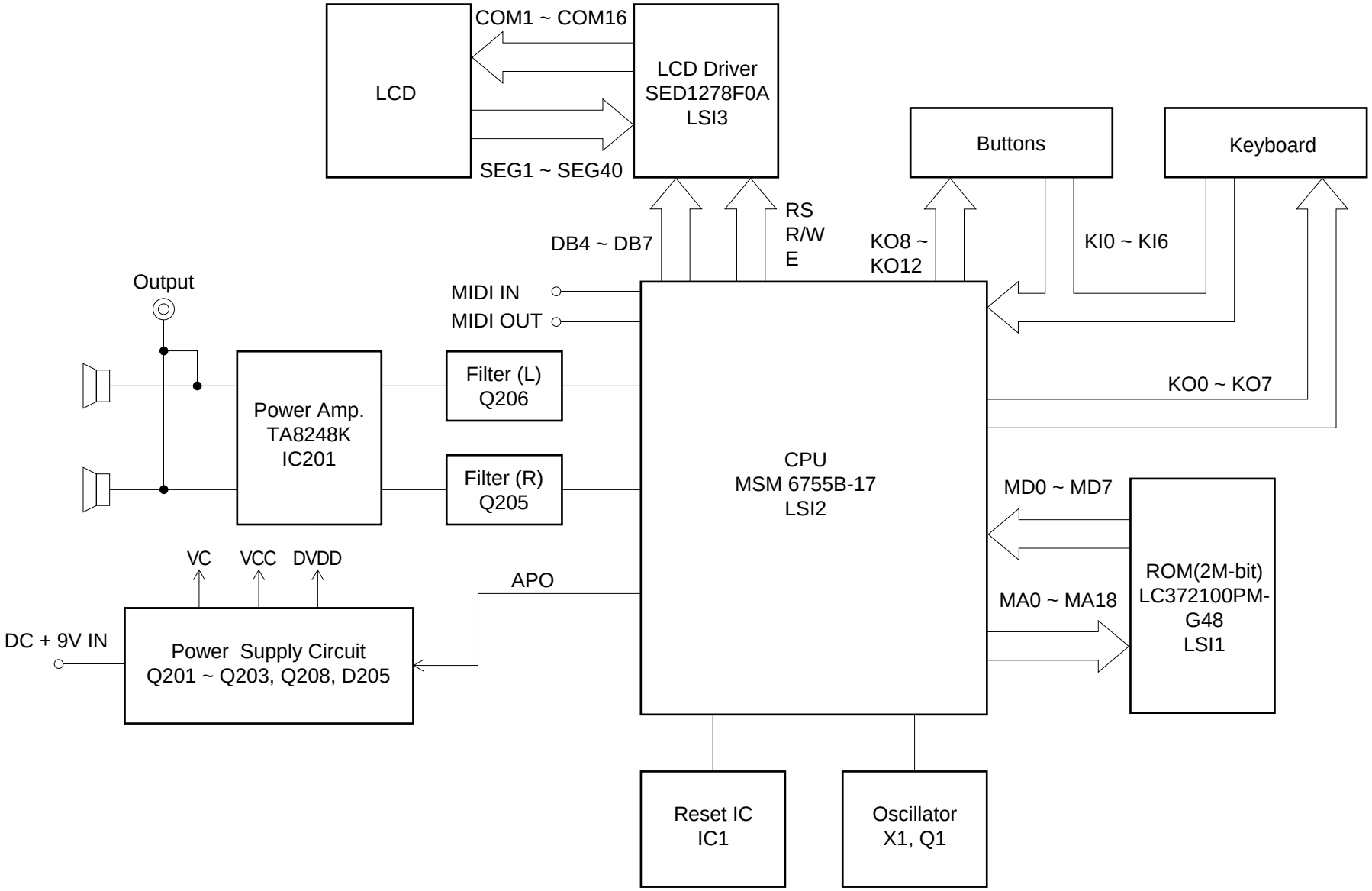
GENERAL

Keyboard:	61 standard-size keys, 5 octaves
Tones:	100
Polyphony:	12 notes maximum (6 for certain tones)
Auto accompaniment	
Rhythm patterns:	100
Tempo:	Variable (236 steps, ♩ = 20 to 255)
Chords:	2 fingering methods (CASIO CHORD, FINGERED)
Rhythm controller:	START/STOP, SYNCHRO/FILL-IN
Accomp volume:	0 to 9 (10 steps)
Song bank	
Tunes:	100
Controllers:	PLAY/PAUSE, STOP, REW, FF, LEFT (ON/OFF), RIGHT (ON/OFF)
Musical information	
Name display:	TONE, RHYTHM, SONG BANK name/number
Tempo:	Tempo value, metronome, synchro standby, beat indicator
Chord:	Chord name, Chord form
Fingering:	Fingering indcators, parts, pedal
Song bank status:	PLAY, PAUSE, REW, FF
Staff:	5 octaves with sharp and flat indications
Keyboard:	5 octaves
MIDI:	5 multi-timbre receive
Other functions	
Transpose:	12 steps (–6 semitones to +5 semitones)
Tuning:	Variable (A4 = approximately 440 Hz ± 50 cents)
Volume:	0 to 9 (10 steps)
Terminals	
MIDI terminals:	IN, OUT
Sustain terminal:	Standard jack
Phones/Output terminal:	Stereo standard jack Output Impedance: 78 Ω Output Voltage: 4 V (RMS) MAX
Power supply terminal:	9 V DC
Power supply	Dual power supply system
Batteries:	Six D-size batteries
Battery life:	Approximately 10 hours on manganese batteries
AC adaptor:	AD-5
Auto power off:	Turns power off approximately six minutes after last key operation. Enabled under battery power only, can be disabled manually.
Speaker output:	2.0 W + 2.0 W
Power consumption:	9 V ⎓ 7.7 W
Dimensions (HWD):	961 × 381 × 139 mm (37-7/8 × 15-1/16 × 5-1/2 inches)
Weight:	Approximately 5.4 kg (11.91 lbs) (without batteries)

ELECTRICAL

Current drain with 9 V DC:	
No sound output	120 mA ± 20%
Maximum volume	750 mA ± 20%
with 12 keys C1 to B1 pressed in Synth-Lead 1 Volume: Maximum	
Phone output level (Vrms with 8 Ω load each channel):	
with key G2 pressed in Synth-Lead 1	78 mV ± 20%
Speaker output level (Vrms with 4 Ω load each channel):	
with key G1 pressed in Synth-Lead 1	1250 mV ± 20%
Minimum operating voltage:	6.0 V

BLOCK DIAGRAM

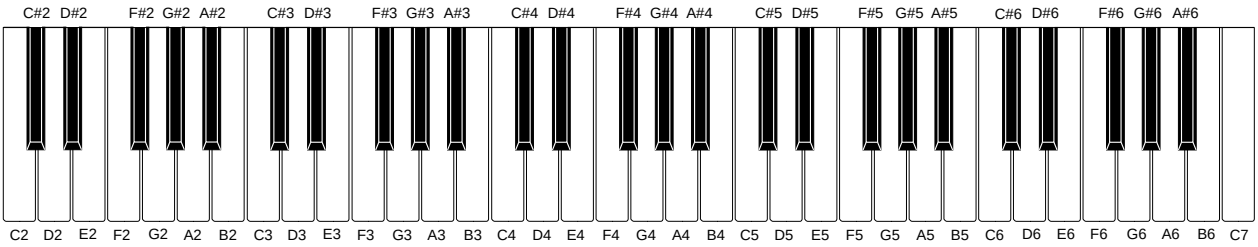


CIRCUIT DESCRIPTION

KEY MATRIX

	KI0	KI1	KI2	KI3	KI4	KI5	KI6	KI7
KO0	C2	G#2	E3	C4	G#4	E5	C6	G#6
KO1	C#2	A2	F3	C#4	A4	F5	C#6	A6
KO2	D2	A#2	F#3	D4	A#4	F#5	D6	A#6
KO3	D#2	B2	G3	D#4	B4	G5	D#6	B6
KO4	E2	C3	G#3	E4	C5	G#5	E6	C7
KO5	F2	C#3	A3	F4	C#5	A5	F6	
KO6	F#2	D3	A#3	F#4	D5	A#5	F#6	
KO7	G2	D#3	B3	G4	D#5	B5	G6	
KO8	—	+	0	Tempo Down	Tempo Up	Volume Down	Volume Up	
KO9	3	2	1	Start/ Stop	Synchro/ Fill-In	Chord Book	Accomp Volume	
KO10	6	5	4	Transpose/ Tune/MIDI	Song Bank	Rhythm	Tone	
KO11	9	8	7	Fingered	CASIO Chord	Normal	Off	
KO12	FF	Right	Play/ Pause	Stop	Left	REW		

NOMENCLATURE OF KEYS



CPU (LSI2: MSM6755B-17)

The CPU reads sound data from the ROM in accordance with the pressed key and the selected tone; the CPU can read rhythm data simultaneously when a rhythm pattern is selected. Then it provides the left and the right channels' waveforms separately, by converting the data into the waveforms with two built-in DACs. The CPU also controls key and button input. The following table shows the pin functions of LSI2.

Pin No.	Terminal	In/Out	Function
1	MA14	Out	Address bus
2, 3	NCO	—	Not used
4 ~ 19	MA0 ~ MA13	Out	Address bus
13	MRDB	Out	Read enable signal
17	MCSB	—	Not used
20 ~ 27	MD0 ~ MD7	In/Out	Data bus
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	In	MIDI signal input
37	P25/TXD	Out	MIDI signal output
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
47	DAOL	Out	Left channel sound waveform output
48	REFL	Out	Terminal for the internal DAC and ADC
49	AGdac	In	Ground source for internal DAC
50	AGadc	In	Ground source for internal ADC
51	ANI	In	APO cancellation signal
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	Pedal signal input
58 ~ 64	KI0/P30 ~ KI7/P36	In	Terminals for key/button input signal
65	KI7/P37	—	Not used
66 ~ 73	KO0/P50 ~ KO7/P57	Out	Terminals for key scan signal

Pin No.	Terminal	In/Out	Function
74 ~ 77	DB4 ~ DB7	Out	Data bus for the LCD driver
78	NC9	—	Not used
79	LVCC	In	+5 V source
80 ~ 84	KO8 ~ KO12	Out	Terminals for button scan signal
85 ~ 87	P65 ~ P67	—	Not used
88	RS	Out	Control signal for the LCD driver
89	R/W	Out	Read/Write signal for the LCD driver
90	E	Out	Chip enable signal for the LCD driver
91 ~ 95	P73 ~ P77	—	Not used
96	LGND	In	Ground source
97, 100	MA18, MA15	Out	Address bus

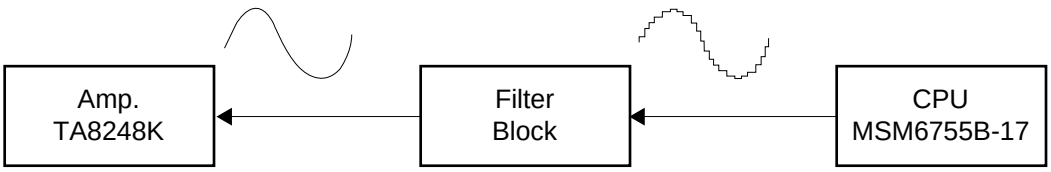
LCD DRIVER (LSI3: SED1278F0A)

The LCD driver can drive a dot matrix LCD having 40 segment and 16 common lines. The LSI contains 240 graphic symbols in the built-in character generator ROM, and stores 80 characters in the built-in display data RAM. In accordance with command from the CPU, the LSI is capable of displaying up to 16 characters simultaneously. The following table shows the pin functions of LSI3.

Pin No.	Terminal	In/Out	Function
1 ~ 22, 63 ~ 80	SEG1 ~ SEG40	Out	Segment signal output
23	VSS	—	GND (0 V) source
24, 25	OSC1, OSC2	In/Out	Terminals for the built-in clock pulse generator. The external resistor connected determines the oscillation frequency.
26 ~ 30	V1 ~ V5	In	LCD drive voltage input. Those voltages are used for generating the stepped pulse of the LCD drive signals.
31, 32	LP, XCLS	—	Not used
33	VDD	In	DVDD (+5 V) source
34, 35	FR, DO	—	Not used
36	RS	In	Data/command determination terminal. High: data, Low: command
37	R/W	In	Read/Write terminal. High: read, Low: write
38	E	In	Chip enable signal. High: enable, the writing is done at fall edge. Low: disenable
39 ~ 42	DB0 ~ DB3	—	Not used. Connected to GND (0 V)
43 ~ 46	DB4 ~ DB7	In/Out	Data bus
47 ~ 62	COM1 ~ COM16	Out	Common signal/output

FILTER BLOCK

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



POWER AMPLIFIER (IC201: TA8248K)

The power amplifier is a two-channel amplifier with standby switch.
The following table shows the pin function of IC201.

Pin No.	Terminal	In/Out	Function
1	NC	—	Not used
2	B.S.2	—	Terminal for a bootstrap capacitor
3	OUT2	Out	Channel 2 output
4	VCC	In	+9 V source
5	OUT1	Out	Channel 1 output
6	B.S.1	—	Terminal for a bootstrap capacitor
7	Power GND	In	Ground (0 V) source
8	Stand by	In	Power control signal input. 0 V: Off, +9 V: On
9	DC	—	Terminal for a decoupling capacitor
10	NF1	In	Negative feedback input
11	IN1	In	Channel 1 input
12	IN2	In	Channel 2 input
13	NF2	In	Negative feedback input
14, 15	Pre GND	In	Ground (0 V) source

ADJUSTMENT

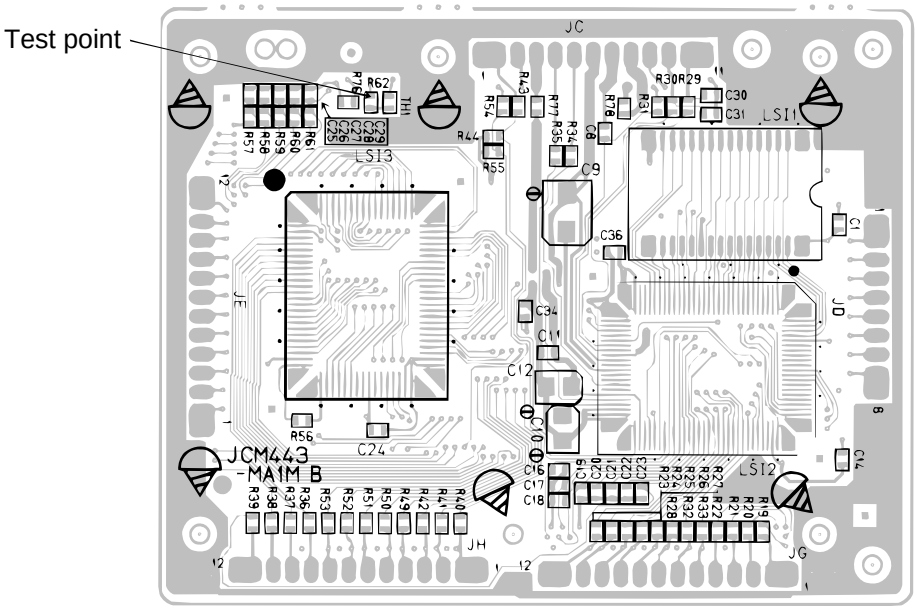
MAIN PCB

1) Items to be adjusted:

Item	Measuring Instrument
Vop voltage setting	Voltmeter

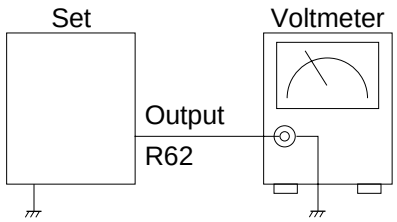
2) Adjustment and Test Point Locations

(TOP VIEW)

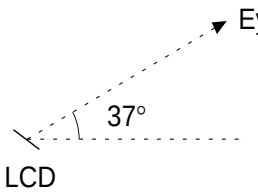


3) Equipment connection/Procedure

Vop voltage setting

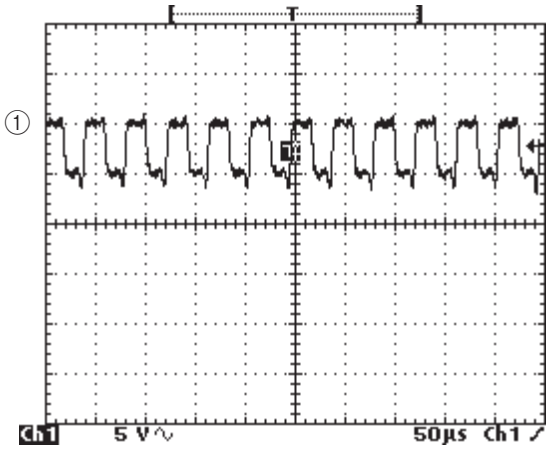


Input Connection	Input Point	Input Signal	Adjust	Output Connection	Output Point	Adjust for
————	———	———	VR1	Voltmeter	R62	Adjust for 4.4 ±0.1 V reading on voltmeter. Make fine adjustment according to the next instruction.

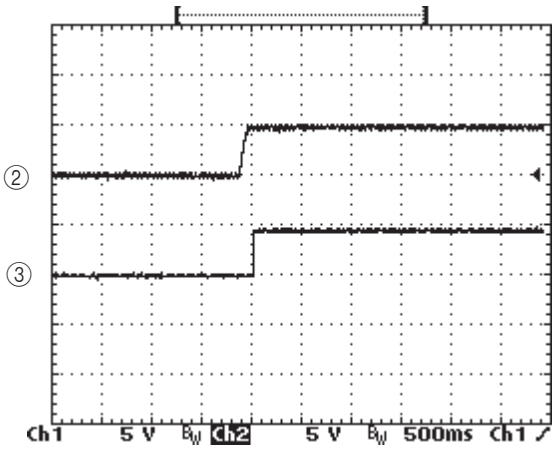


Watching the LCD at a 37° angle to the horizontal, adjust Vop voltage so that unenergized segments are seen dimly.

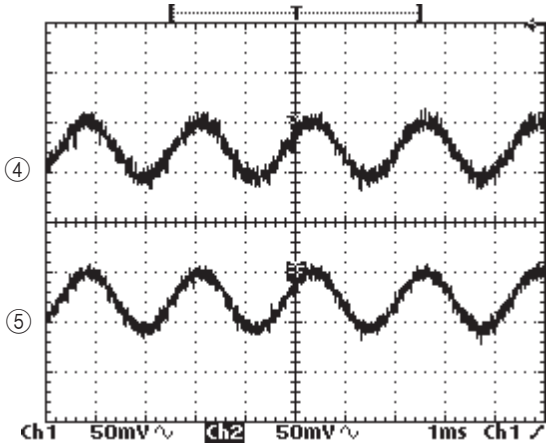
MAJOR WAVEFORMS



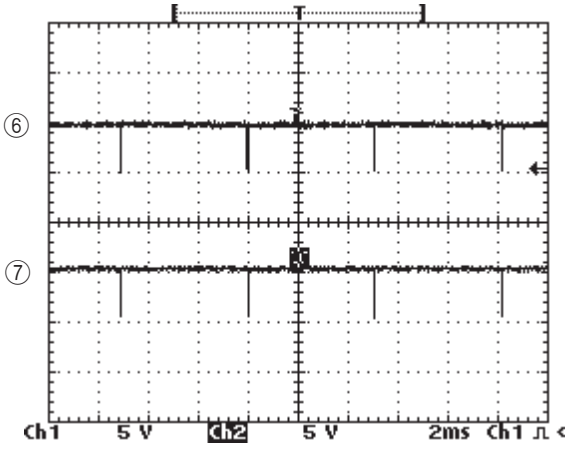
① Clock pulse
MSM6755B-17 pin 32



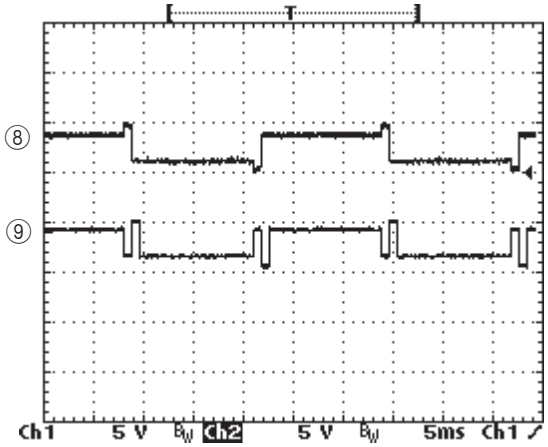
② Power source DVDD
JC connector pin 8
③ APO signal
JC connector pin 2



④ Sound waveform (R-ch) Tone: Whistle (59)
JC connector pin 5 Key: A4
⑤ Sound waveform (L-ch) Volume: Max.
JC connector pin 4



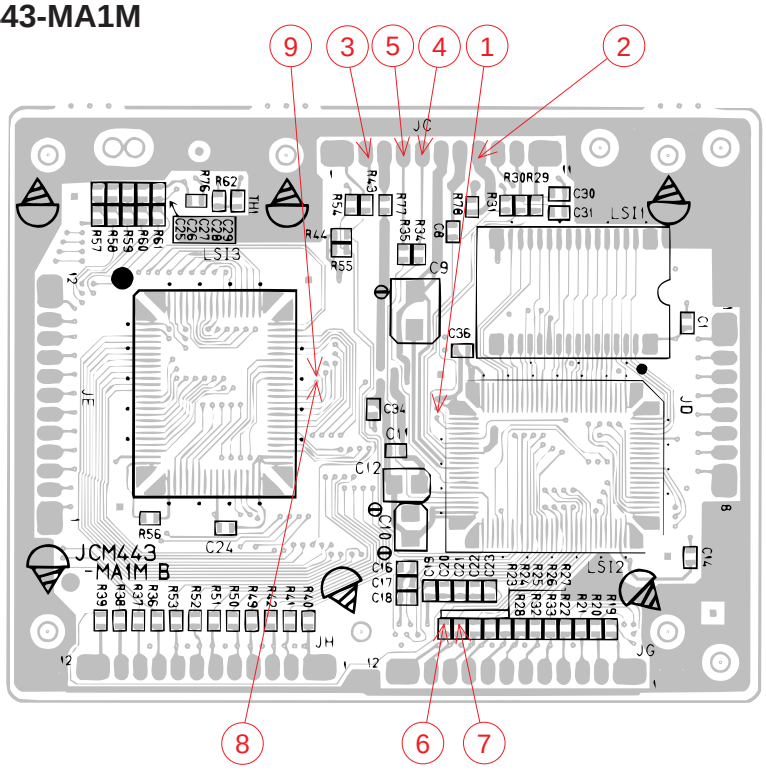
⑥ Button scan signal KO0
MSM6755B-17 pin 66
⑦ Button scan signal KO1
MSM6755B-17 pin 67



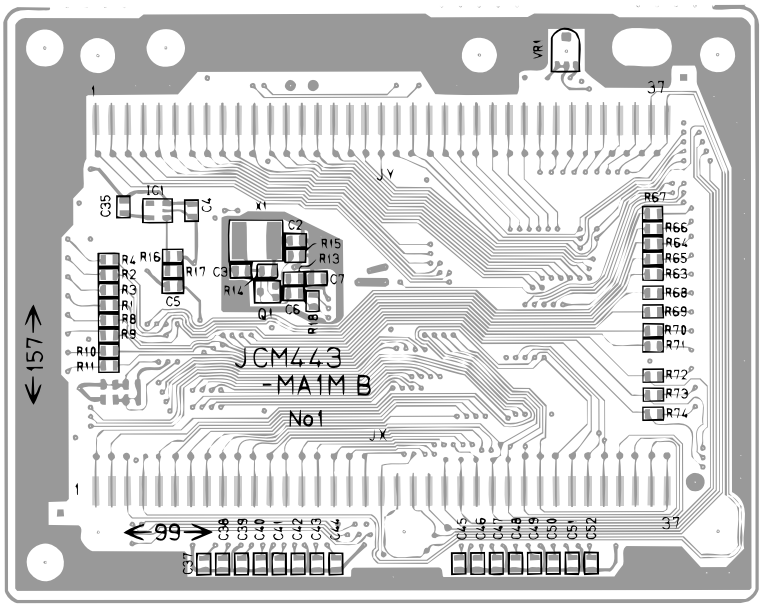
⑧ LCD common signal COM9
SED1278F0A pin 55
⑨ LCD common signal COM10
SED1278F0A pin 56

PRINTED CIRCUIT BOARDS

Main PCB JCM443-MA1M



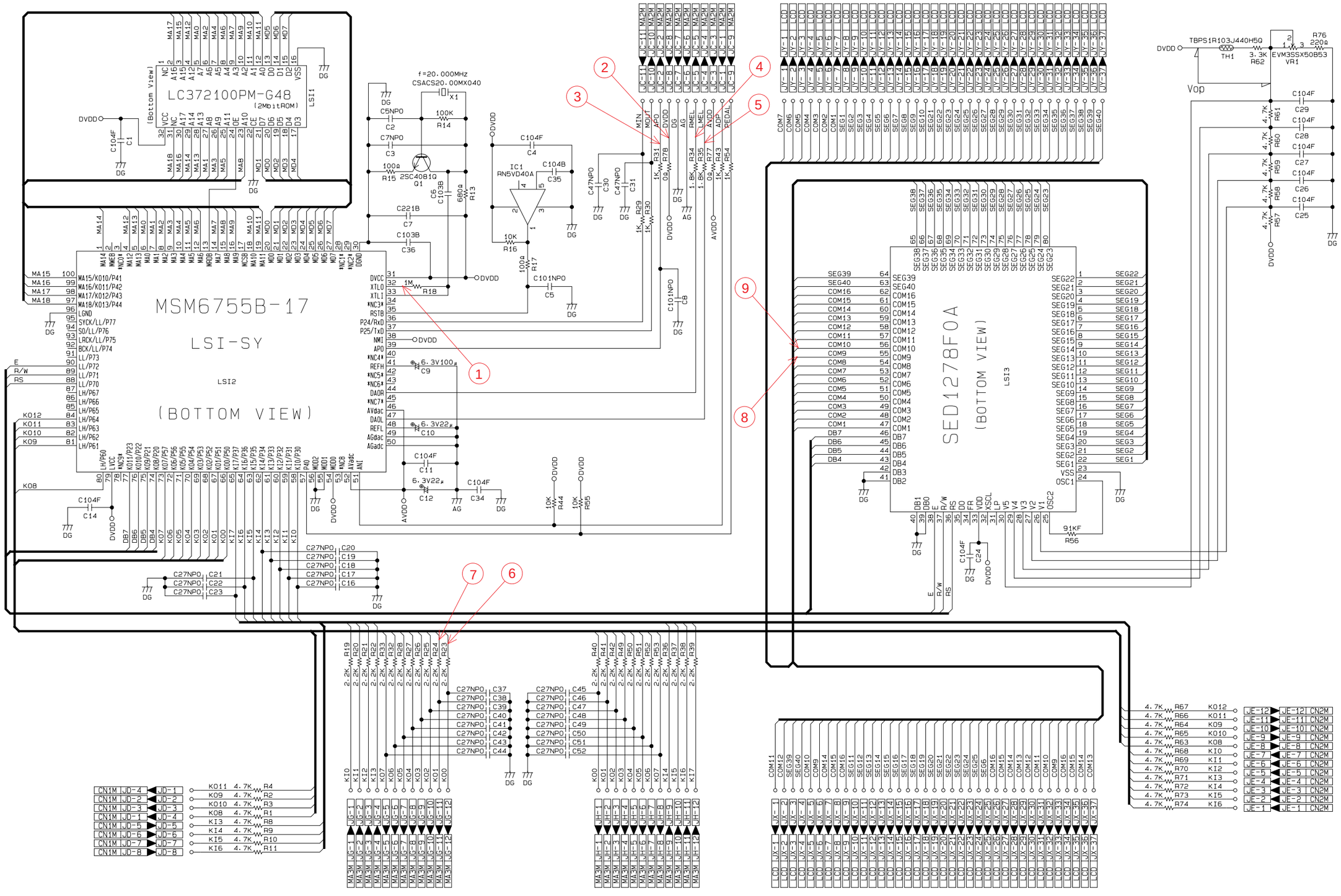
Top View



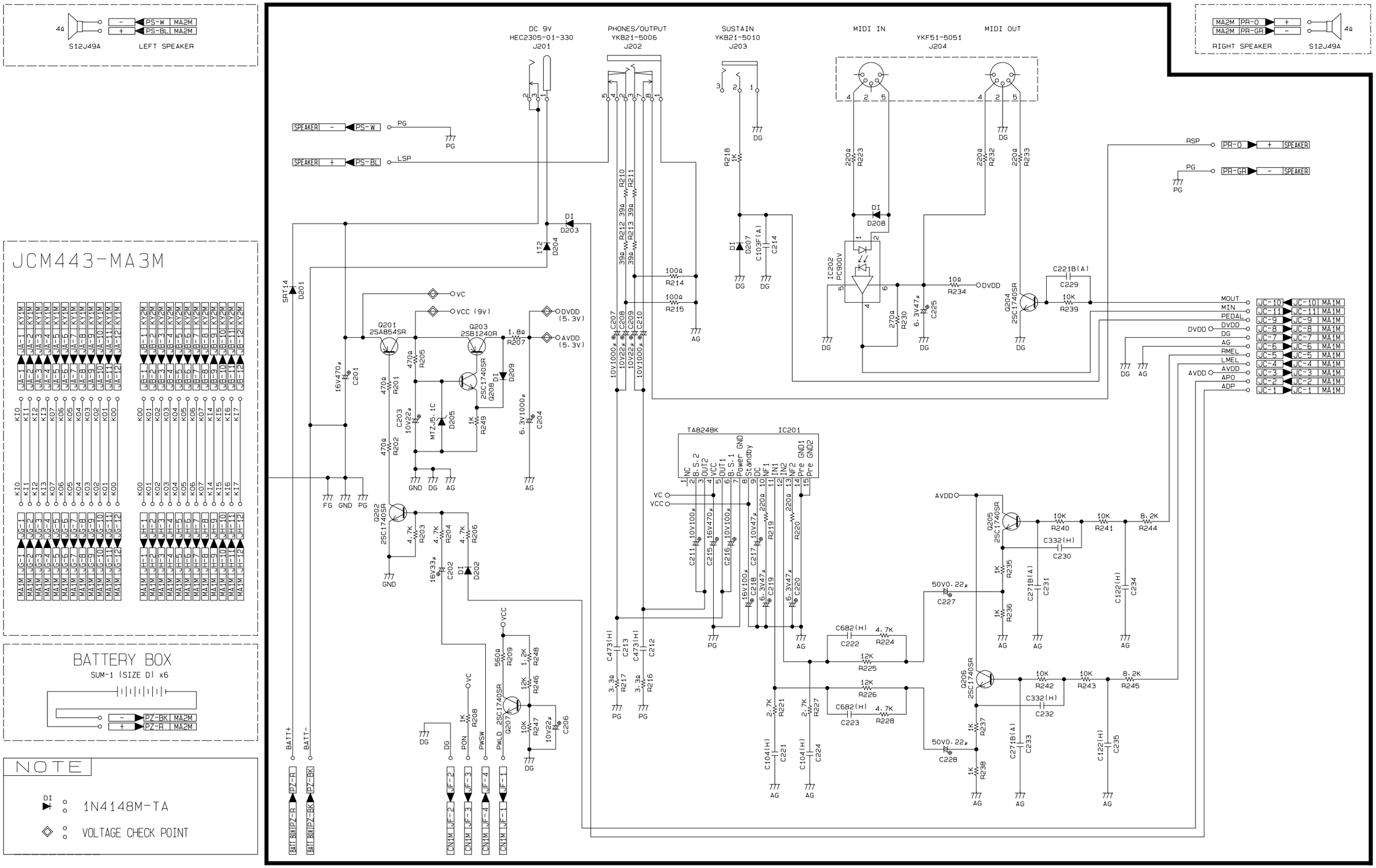
Bottom View

SCHEMATIC DIAGRAMS

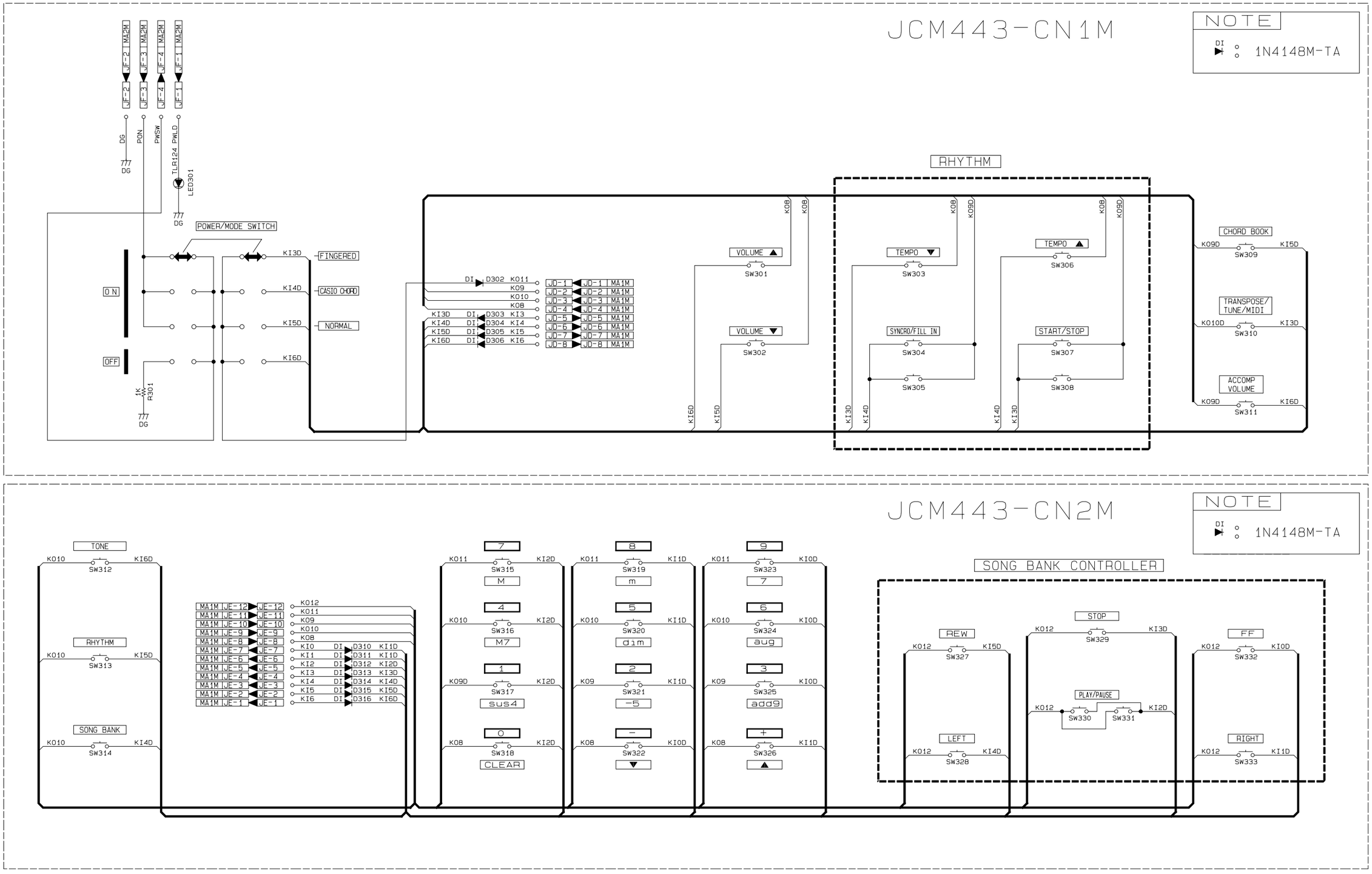
Main PCB JCM443-MA1M



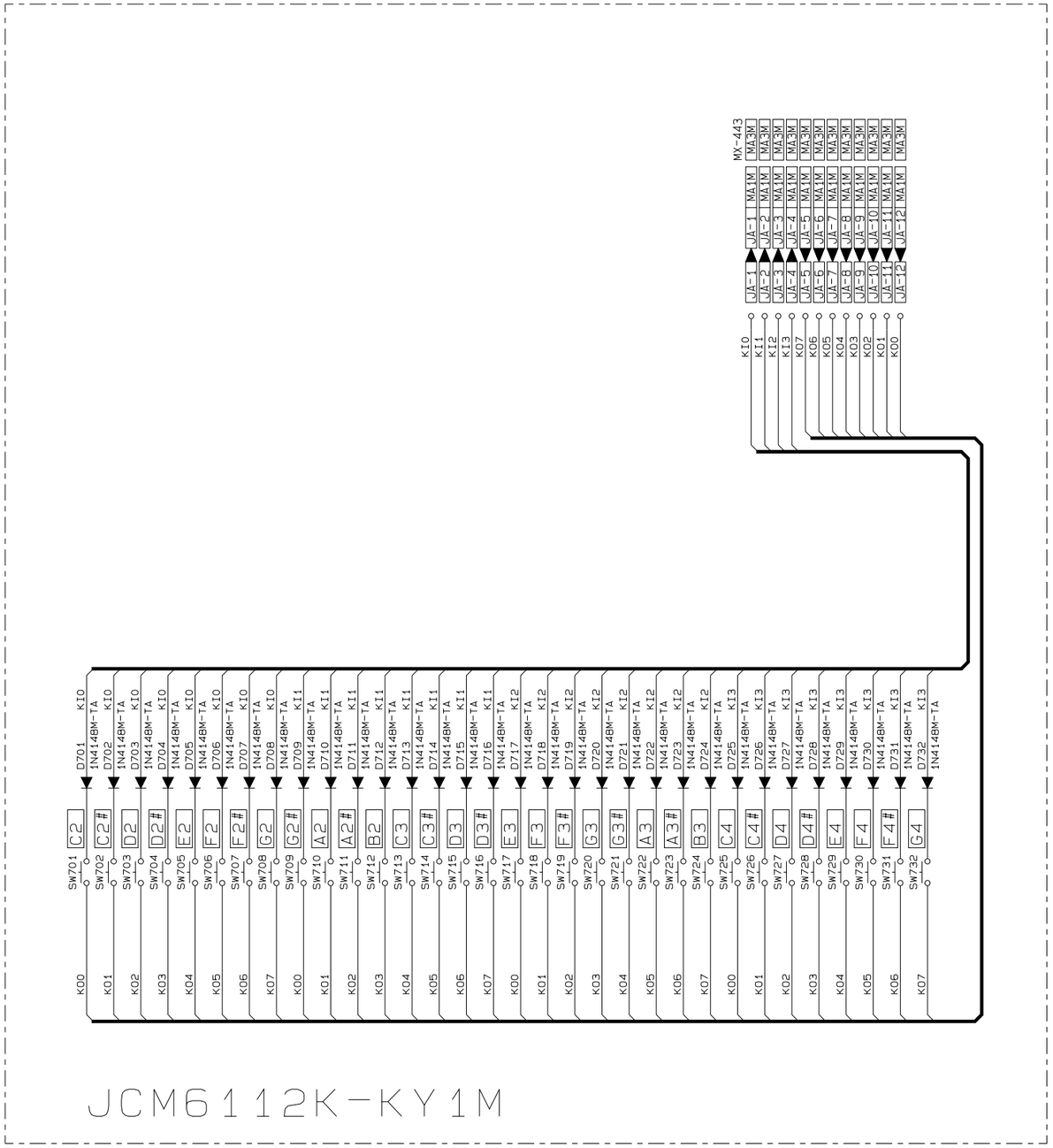
Sub PCB JCM443-MA2M



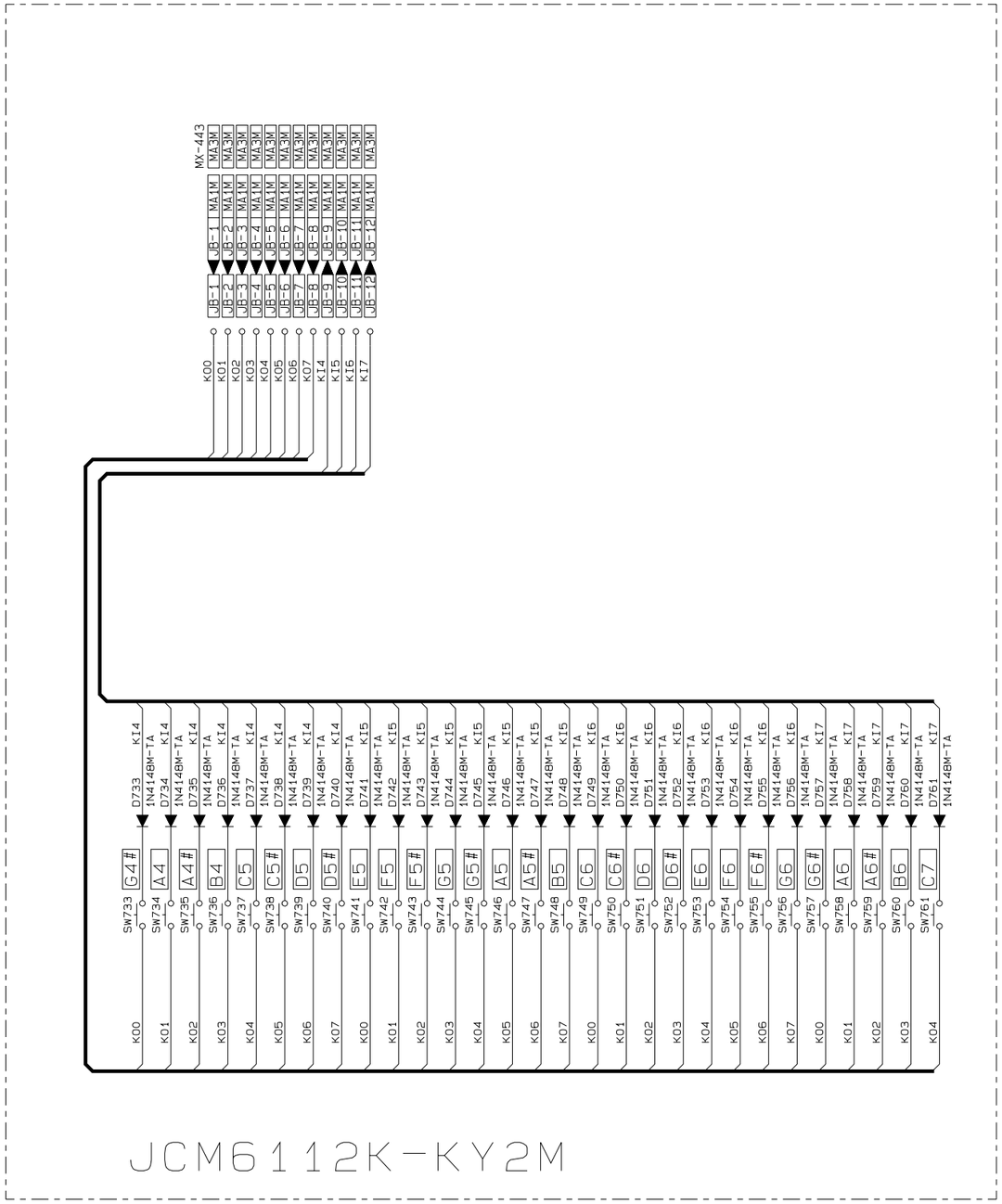
Console PCBs JCM443-CN1M/CN2M



Keyboard PCBs JCM6112K-KY1M/KY2M



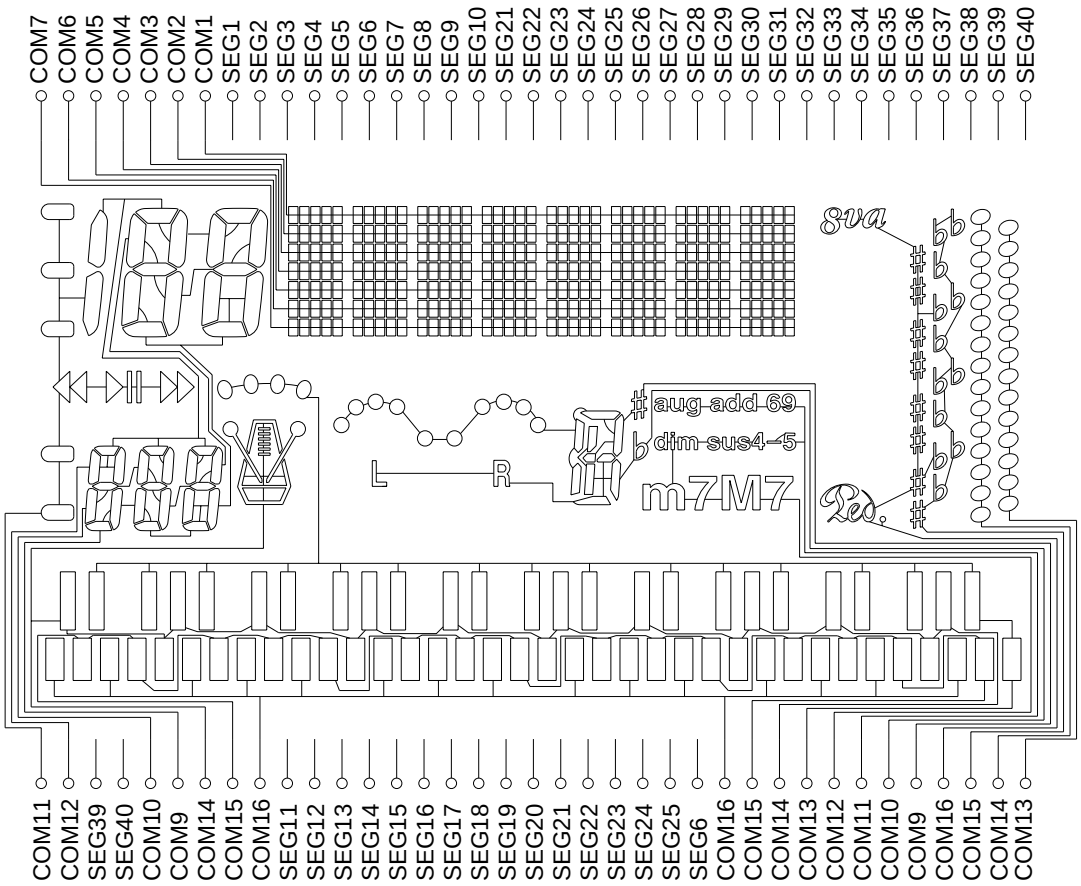
JCM6112K-KY1M



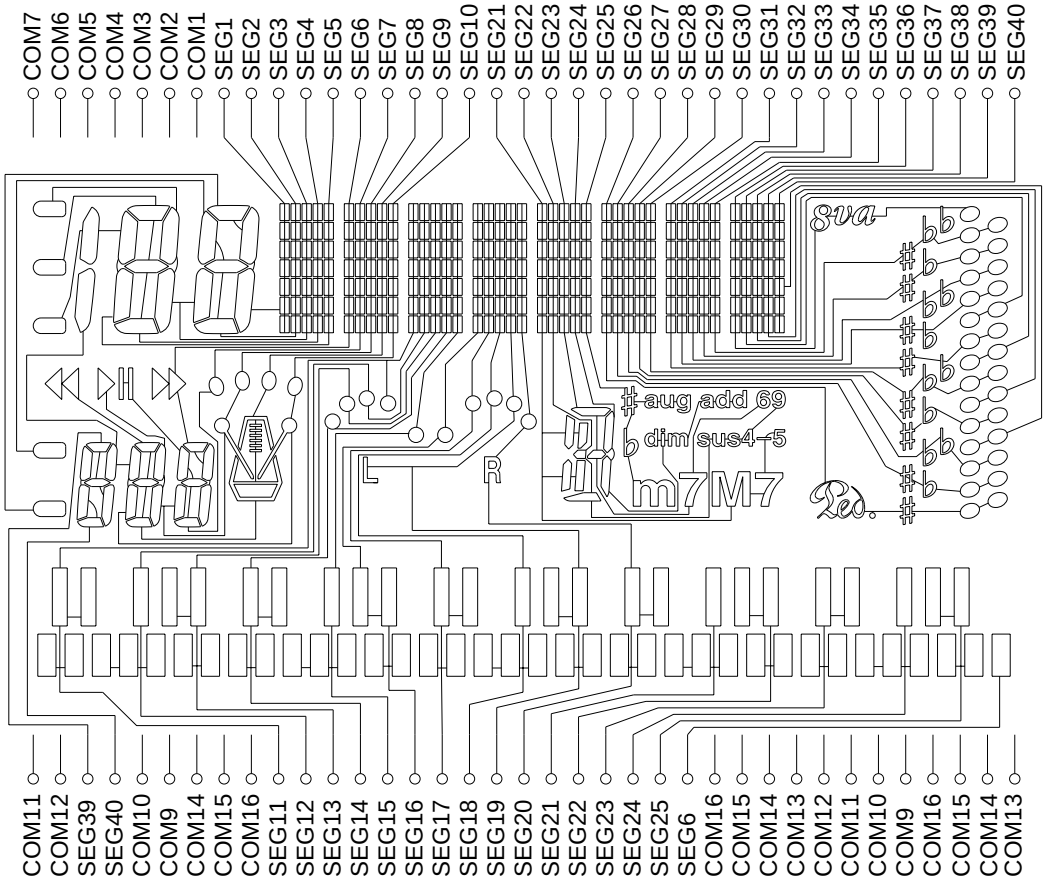
JCM6112K-KY2M

LCD

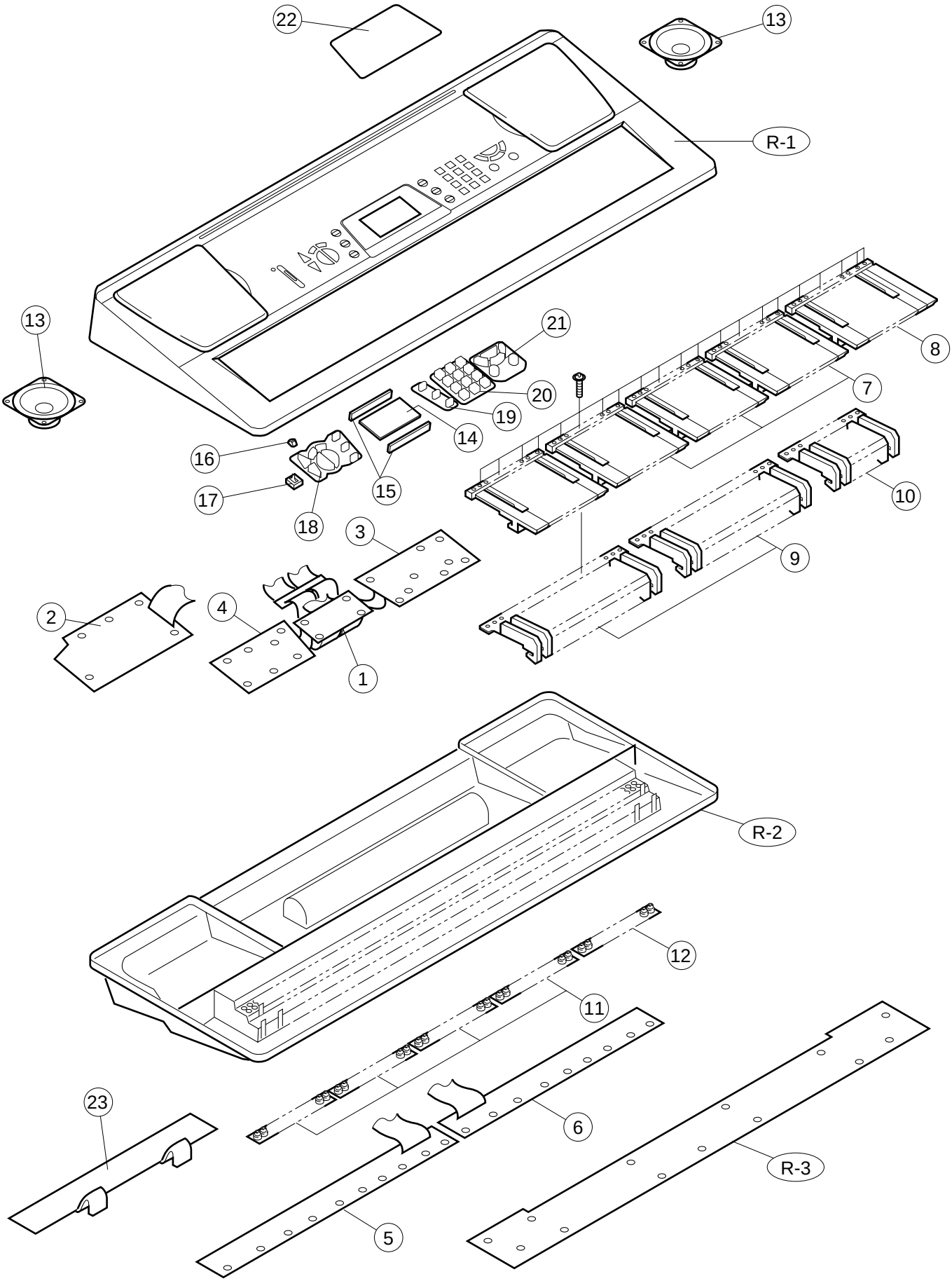
Common



Segment



EXPLODED VIEW



PARTS LIST

CTK-501

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 seperately.

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

Item	Code No.	Parts Name	Specification	Q	R
	Main PCB				
1	6926 0460	PCB/ASS'Y (MA1M)	M240626*1	1	B
LSI1	2012 5638	LSI/MASK-ROM	LC372100PM-G48TE-L	1	A
LSI2	2012 5603	LSI/MC	MSM6755B-17	1	A
LSI3	2012 5569	LSI/LCD DRIVER	SED1278F0A	1	A
IC1	2012 1883	IC/MOS	RN5VD40AA-TR	1	B
Q1	2252 1239	TRANSISTOR	2SC4081T106Q	1	B
VR1	2775 3286	POTENTIOMETER	EVM3SSX50B53	1	B
X1	2590 2100	OSCILLATOR/CERAMIC	CSACS20.00MX040-TC	1	B
	Sub PCB				
2	6926 0410	PCB/ASS'Y (MA2M)	M140572*1	1	B
IC201	2114 5775	IC/LINEAR (POWER AMP.)	TA8248K	1	A
IC202	2114 1421	IC/PHOTO COUPLER	PC900V	1	B
Q201	2250 0168	TRANSISTOR	2SA854-SR-TP-T	1	A
	2220 1409	TRANSISTOR	2SC1740SR-TP-T	6	B
Q203	2251 0921	TRANSISTOR	2SB1240R-TV2-T	1	A
D201	2390 1323	DIODE/SHOTTKY	RB100A-T32-T	1	B
	2390 1344	DIODE	1SS133T-77-T	5	C
D204	2390 3018	DIODE	1T2	1	C
D205	2360 1939	DIODE/ZENER	MTZJ5.1C-T77-T	1	A
J201	3501 7049	JACK (POWER)	HEC2305-01-330	1	A
J202	3612 0665	JACK (PHONE)	YKB21-5006	1	B
J203	3612 0789	JACK	YKB21-5010	1	B
J204	3501 4816	JACK/DIN	YKF51-5051	1	B
	Console PCBs				
3	6926 0440	PCB/ASS'Y (CN1M)	M240623*1	1	C
D302 - D306	2390 1344	DIODE	1SS133T-77-T	5	B
LED301	2370 1383	LED	TLR124(TPJ56,KT)	1	B
4	6926 0450	PCB/ASS'Y (CN2M)	M240624*1	1	C
D310 - D316	2390 1344	DIODE	1SS133T-77-T	7	B
	Keyboard PCBs				
5	6926 0490	PCB/ASS'Y (KY1M)	M240628*1	1	B
D701 - D732	2390 1344	DIODE	1SS133T-77-T	32	B
6	6926 0500	PCB/ASS'Y (KY2M)	M240629*1	1	B
D733 - D761	2390 1344	DIODE	1SS133T-77-T	29	B
	Keyboard unit				
7	6922 2720	KEY SET/LT WHITE	M312118*1	4	A
8	6922 2730	KEY SET/LT WHITE	M312118*2	1	A
9	6906 8481	KEY SET/LT BLACK 10P	M140369A-3	2	A
10	6906 8491	KEY SET/LT BLACK 5P	M140369A-4	1	A
11	6926 0670	RUBBER/CONTACT	M240549-1	4	A
12	6926 0680	RUBBER/CONTACT	M240550-1	1	A
	Panel unit				
13	3831 0833	SPEAKER	S12J49A	2	B
14	3335 6566	LCD	LD-B10114A	1	B
15	6926 0270	RUBBER/INTERCONNECTOR	M440435-2	2	B
16	6921 5031	KNOB	M311859A-1	1	B
17	6909 5890	SWITCH/SLIDE KONB	CSB-12D	1	B
18	6926 0590	RUBBER/BUTTON	M140524-1	1	B
19	6926 0600	RUBBER/BUTTON	M240560-1	1	B
20	6926 0610	RUBBER/BUTTON	M240561-1	1	B
21	6926 0620	RUBBER/BUTTON	M140525-1	1	B
22	6926 0650	PANEL/DISPLAY	M240574-1	1	C
23	6906 8647	COVER/BATTERY	M311164G*13	1	B

Notes: Q – Quantity per unit
R – Rank

Item	Code No.	Parts Name	Specification	Q	R
Accessory					
	6926 1541	STAND/NOTE	M340701A*1	1	B

Notes: Q – Quantity per unit
R – Rank

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MA0600571A