

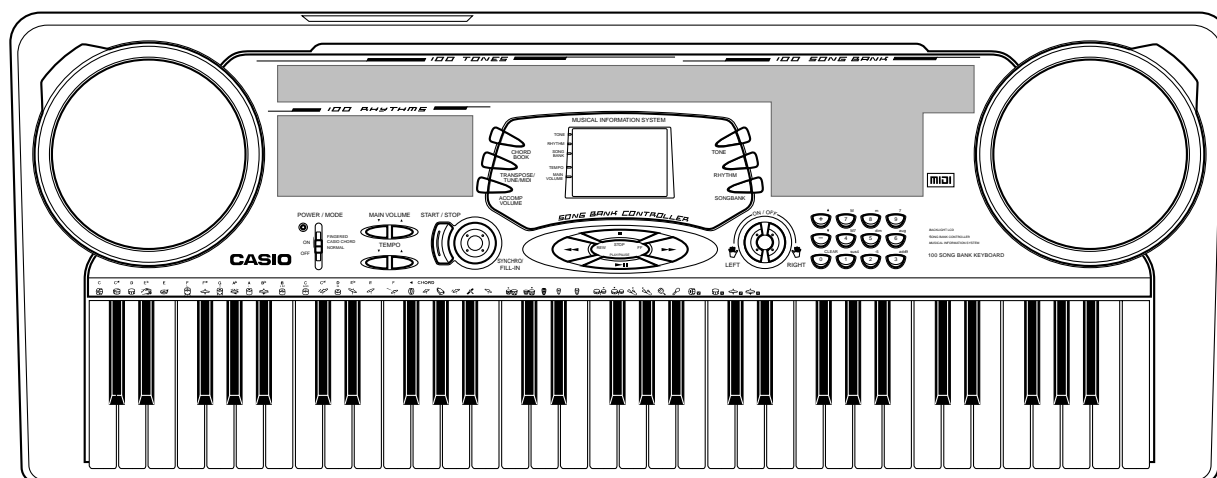
# CASIO®

# Service Manual

(without price)

## CTK-531

## CTK-533



CTK-531

### ELECTRONIC KEYBOARD

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# SPECIFICATIONS

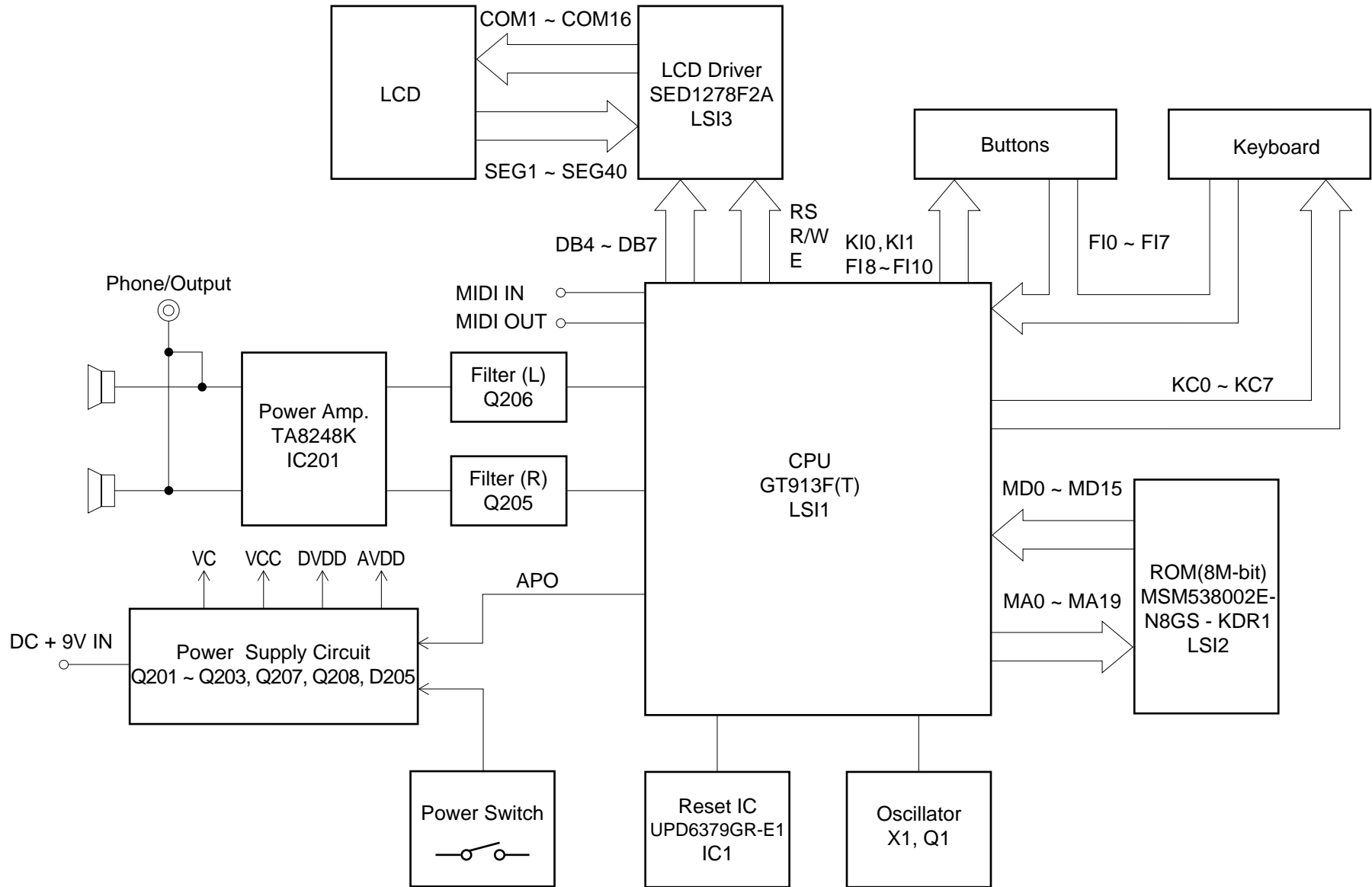
## GENERAL

Keyboard:	61 standard-size keys, 5 octaves
Tones:	100
Polyphony:	16 notes maximum (8 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 (ACCOMP), RIGHT ON/OFF (MELODY)
Display	
Name display:	TONE, RHYTHM, SONG BANK name/number, keyboard settings name/value
Tempo:	Tempo value, metronome, synchro standby, beat indicator
Chord:	Chord name, Chord form
Fingering:	Fingering indicators, 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:	6 D-size batteries
Battery life:	Approximately 5 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 $\overline{\text{---}}$ 7.7 W
Dimensions (HWD):	961 × 376 × 143 mm (37-7/8 × 14-13/16 × 5-5/8 inches)
Weight:	Approximately 5.7 kg (12.6 lbs) (without batteries)

## ELECTRICAL

Current drain with 9 V DC:	
No sound output	330 mA ± 20%
Maximum volume	900 mA ± 20%
	with 16 keys C1 to D3 pressed in Synth-Lead 1
	Volume: Maximum
Phone output level (V <sub>rms</sub> with 8 Ω load each channel):	
with key C3 pressed in Synth-Lead 1	96 mV ± 20%
Speaker output level (V <sub>rms</sub> with 4 Ω load each channel):	
with key G1 pressed in Synth-Lead 1	1130 mV ± 20%
Output level (V <sub>rms</sub> with 47 KΩ load each channel):	
with key C2 pressed in Synth-Lead 1	980 mV ± 20%
Minimum operating voltage:	6.0 V

# BLOCK DIAGRAM

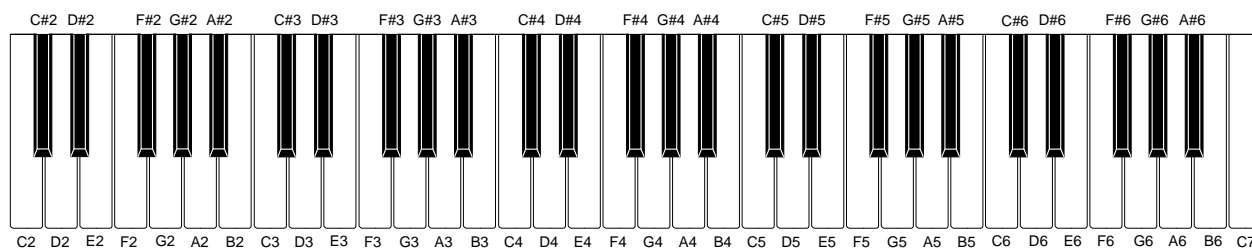


# CIRCUIT DESCRIPTION

## 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 (LSI1: GT-913F)

The 16-bit CPU contains a 1k-byte RAM, three 8-bit I/O ports, two timers, a key controller 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 LSI1.

Pin No.	Terminal	In/Out	Function
1	TXD0	Out	MIDI signal output
2	RXD0	In	MIDI signal input
3	SCK0	Out	APO (Auto Power Off) signal output
4, 5	TXD/P13, RXD/P14	In/Out	Data bus for the LCD driver
6	SCK1	Out	1 MHz synchronizing pulse output
7	AVCC	In	CVDD (+5 V) source
8	AN0	In	AC adaptor detection terminal. +5 V when the keyboard is powered by batteries and becomes 0 V to cancel the APO function when AC adaptor is connected.
9	AN1	In	Input from pitch bender
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	30 MHz clock input/output
17	VCC	In	+5 V source
18, 19	MOD0, MOD1	In	Mode selection terminal
20	RSTB	In	Reset signal input
21	NMI	In	Power ON signal input
22	INT/P10	In/Out	Data bus for the LCD driver
23 ~ 30	FI0 ~ FI3 SI0 ~ SI3	In	Terminal for key input signal
31 ~ 38	KC0 ~ KC7	Out	Terminal for key scan signal
39 ~ 50	FI4 ~ FI9 SI4 ~ SI9	In	Terminal for key input signal
51	FI10	In	Terminal for button input signal
52	SI10/P23	Out	Chip enable signal for the LCD driver
53 ~ 55	KI0 ~ KI2	In	Terminal for button input signal
56	MWNB	Out	Write enable signal for the DSP
57 ~ 76	MA0 ~ MA19	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/Out	Data bus for the LCD driver

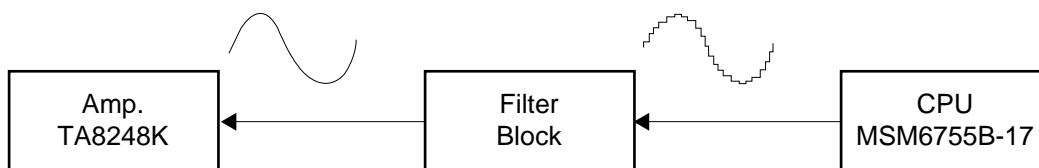
## LCD DRIVER (LSI3: SED1278F2A)

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



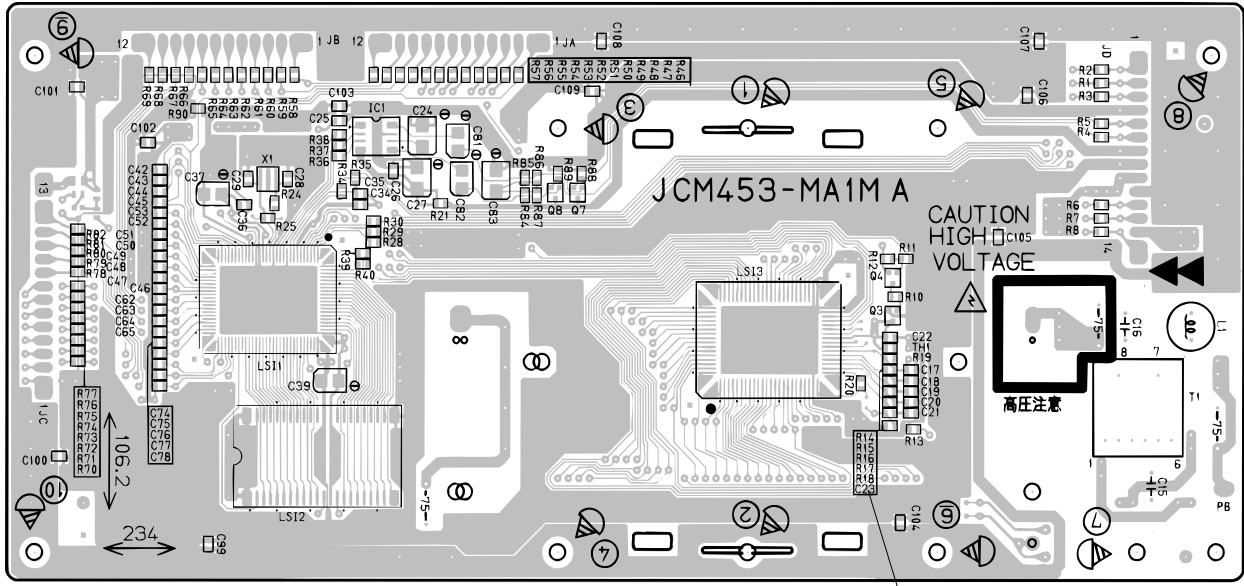
# ADJUSTMENT

## MAIN PCB

1) Items to be adjusted:

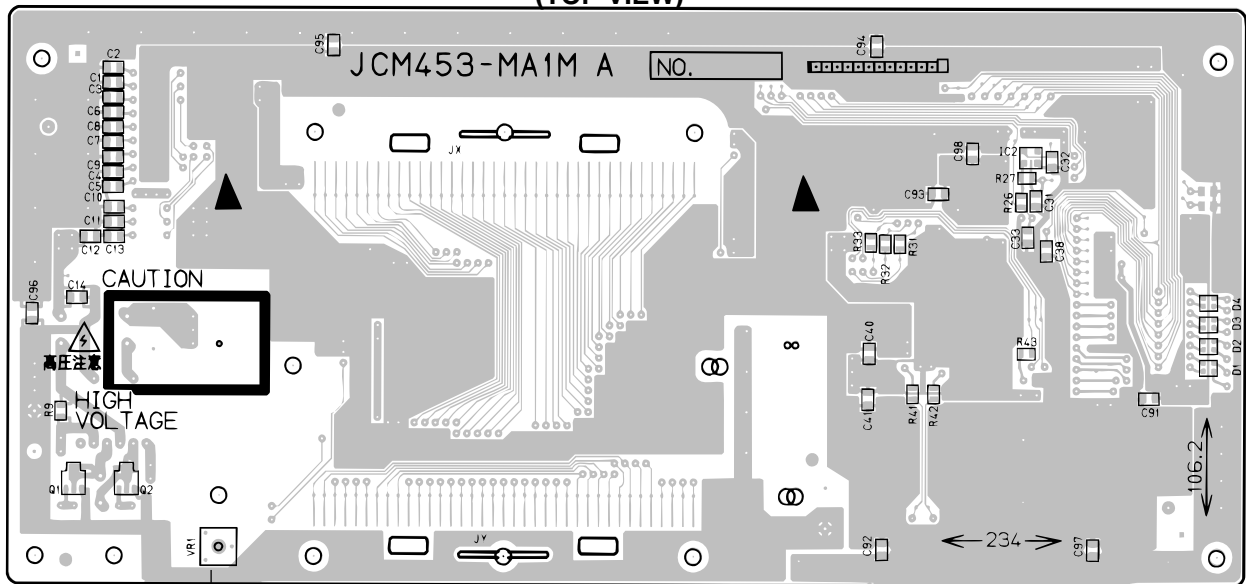
Item	Measuring Instrument
Vop voltage setting	Voltmeter

2) Adjustment and Test Point Locations



Test point

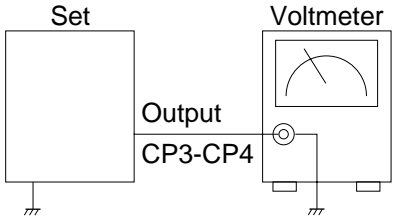
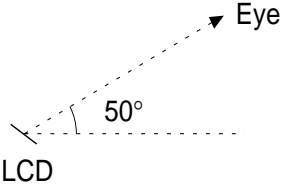
(TOP VIEW)



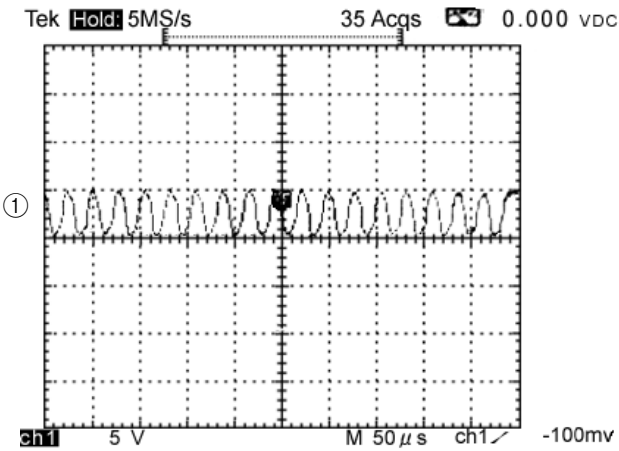
(BOTTOM VIEW)

VR1

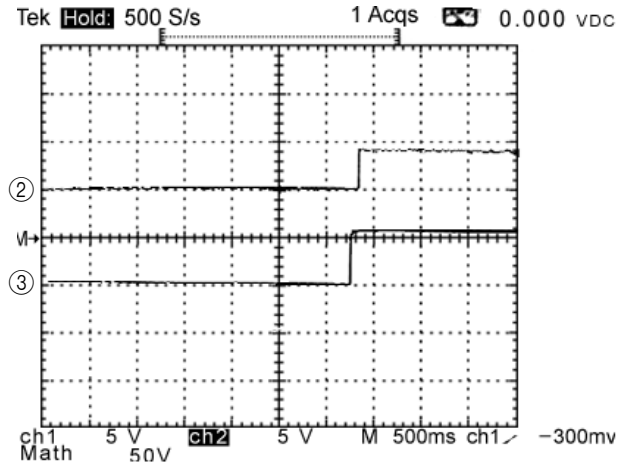
3) Equipment connection/Procedure

<b>Vop voltage setting</b>						
						
Input Connection	Input Point	Input Signal	Adjust	Output Connection	Output Point	Adjust for
—	—	—	VR1	Voltmeter	CP3-CP4	Adjust for 3.90 ~ 4.00V reading on voltmeter under the temperature 20 ~ 25 °C. Make fine adjustment according to the following instruction.
<div style="display: flex; align-items: flex-start;"> <div style="margin-right: 20px;">  <p style="margin-top: 10px;">Watching the LCD at a 50° angle to the horizontal, adjust Vop voltage so that unenergized segments are seen dimly.</p> </div> </div>						

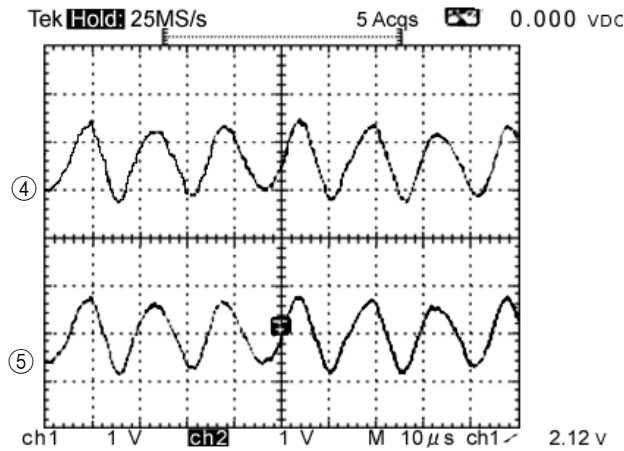
# MAJOR WAVEFORMS



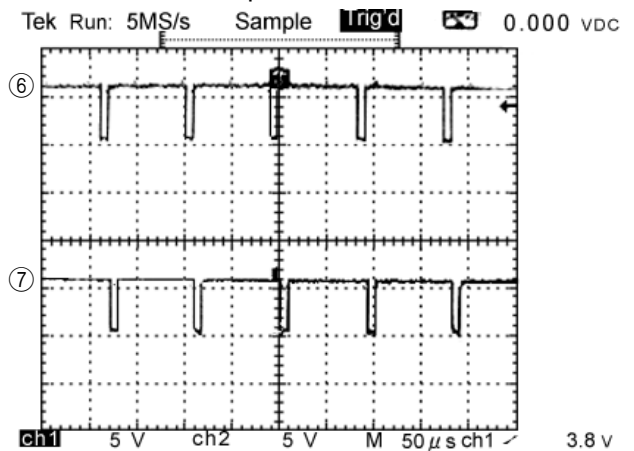
① Clock pulse  
GT913F(T) pin 15



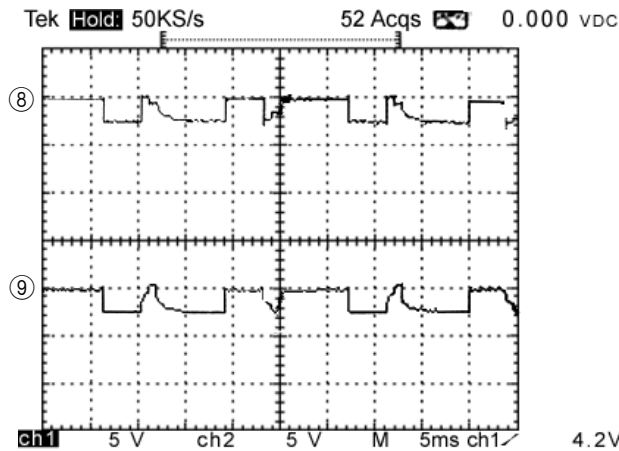
② Power source CVDD  
JD connector pin 13  
③ APO signal  
JD connector pin 12



④ Sound waveform (R-ch) Tone: Whistle (59)  
JD connector pin 6 Key: A4  
⑤ Sound waveform (L-ch) Volume: Max.  
JD connector pin 5



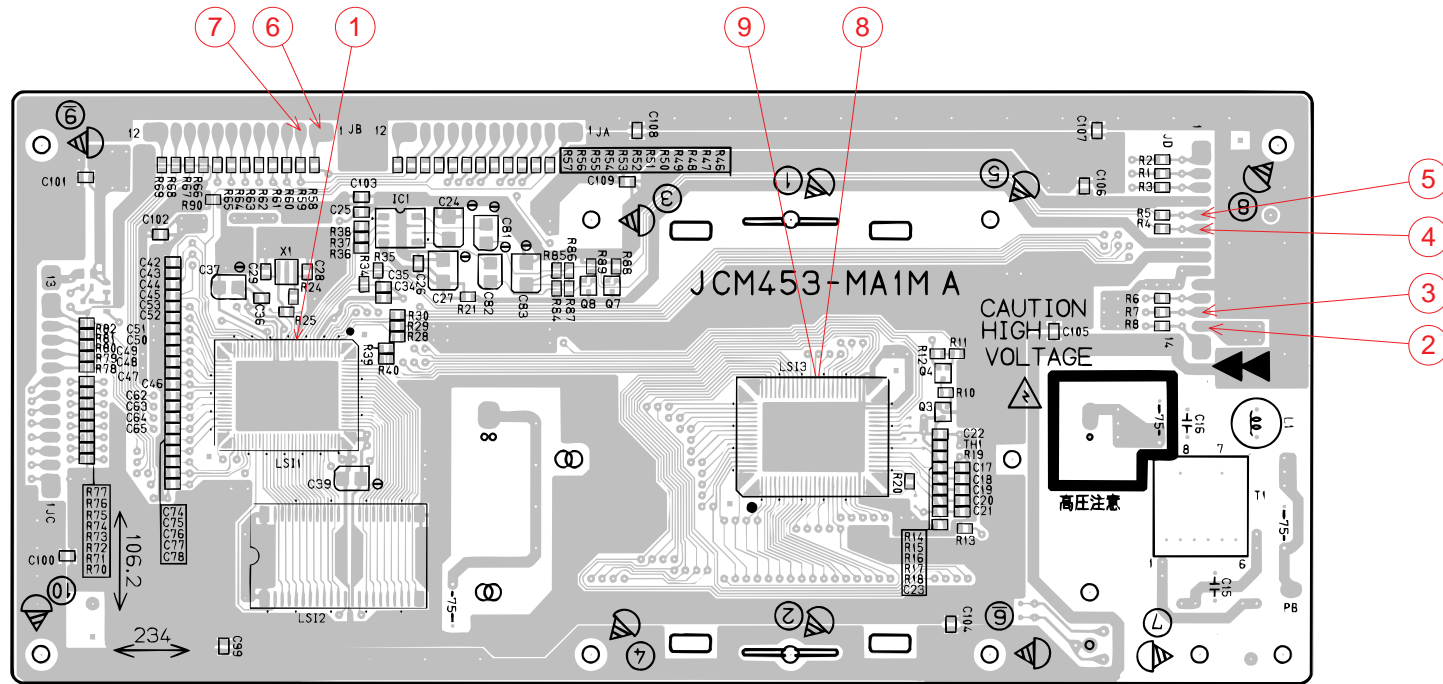
⑥ JB connector pin 1  
⑦ JB connector pin 2



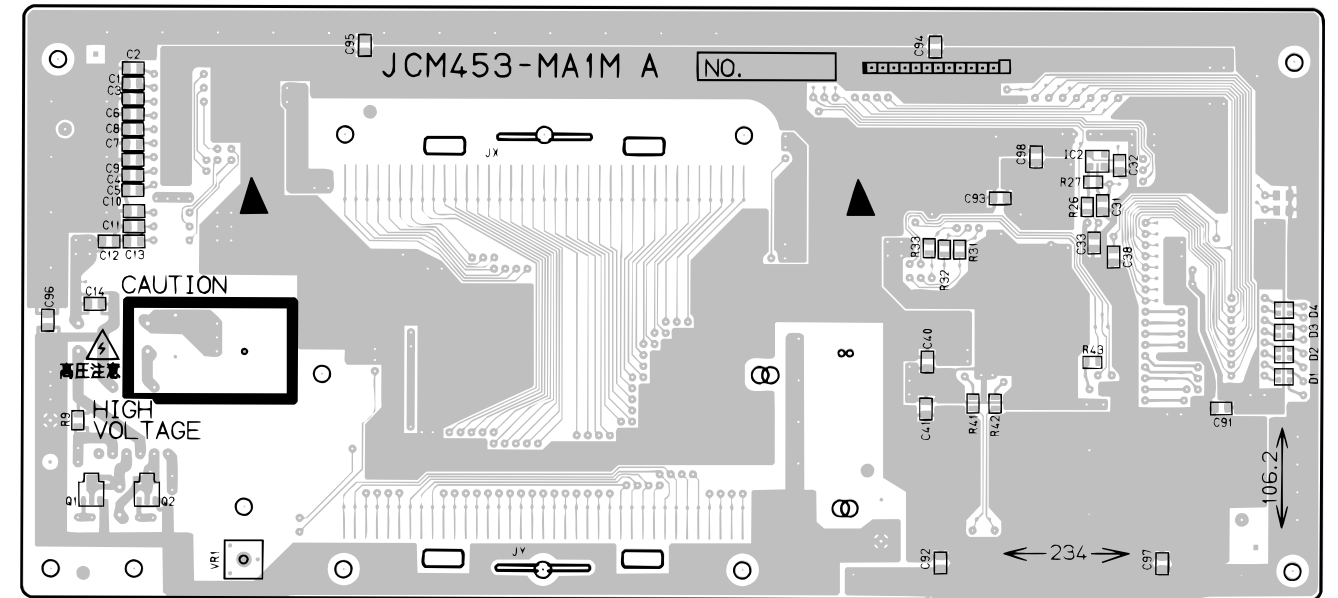
⑧ LCD common signal COM6  
KS0066U-10B pin 52  
⑨ LCD common signal COM7  
KS0066U-10B pin 53

## PRINTED CIRCUIT BOARDS

Main PCB JCM453-MA1M

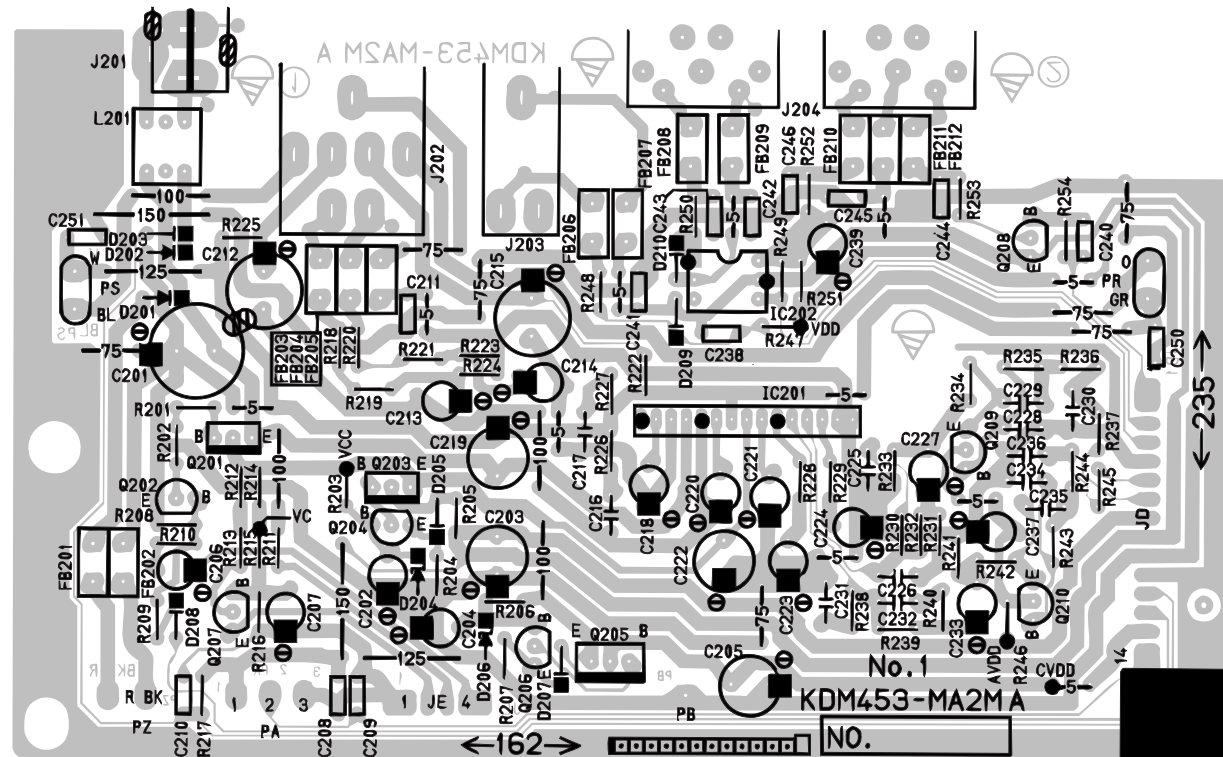


Top View

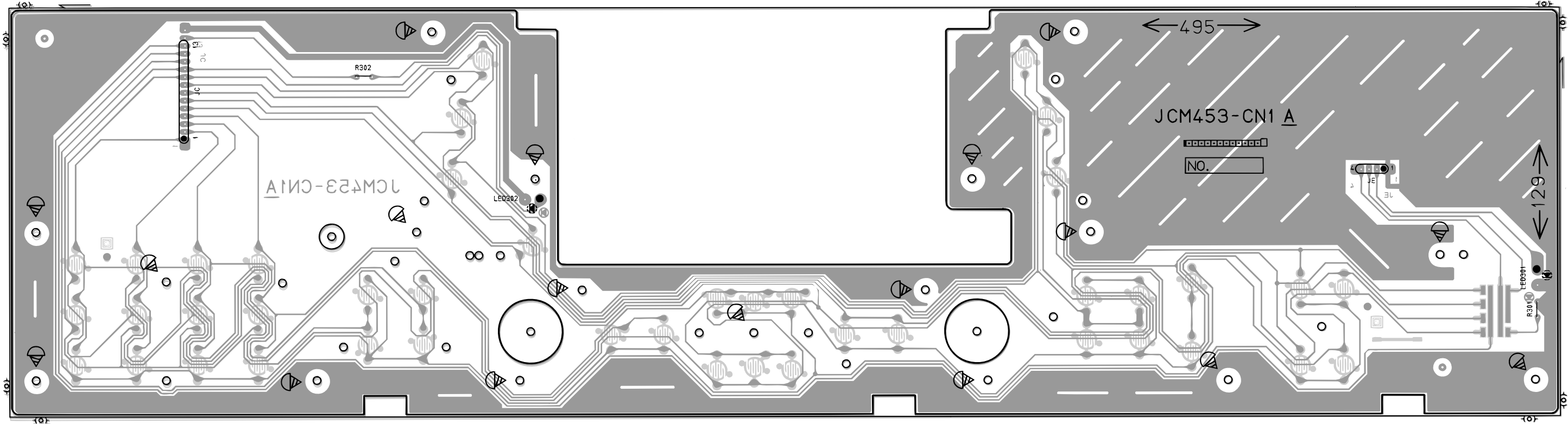


Bottom View

Main PCB JCM453-MA2M

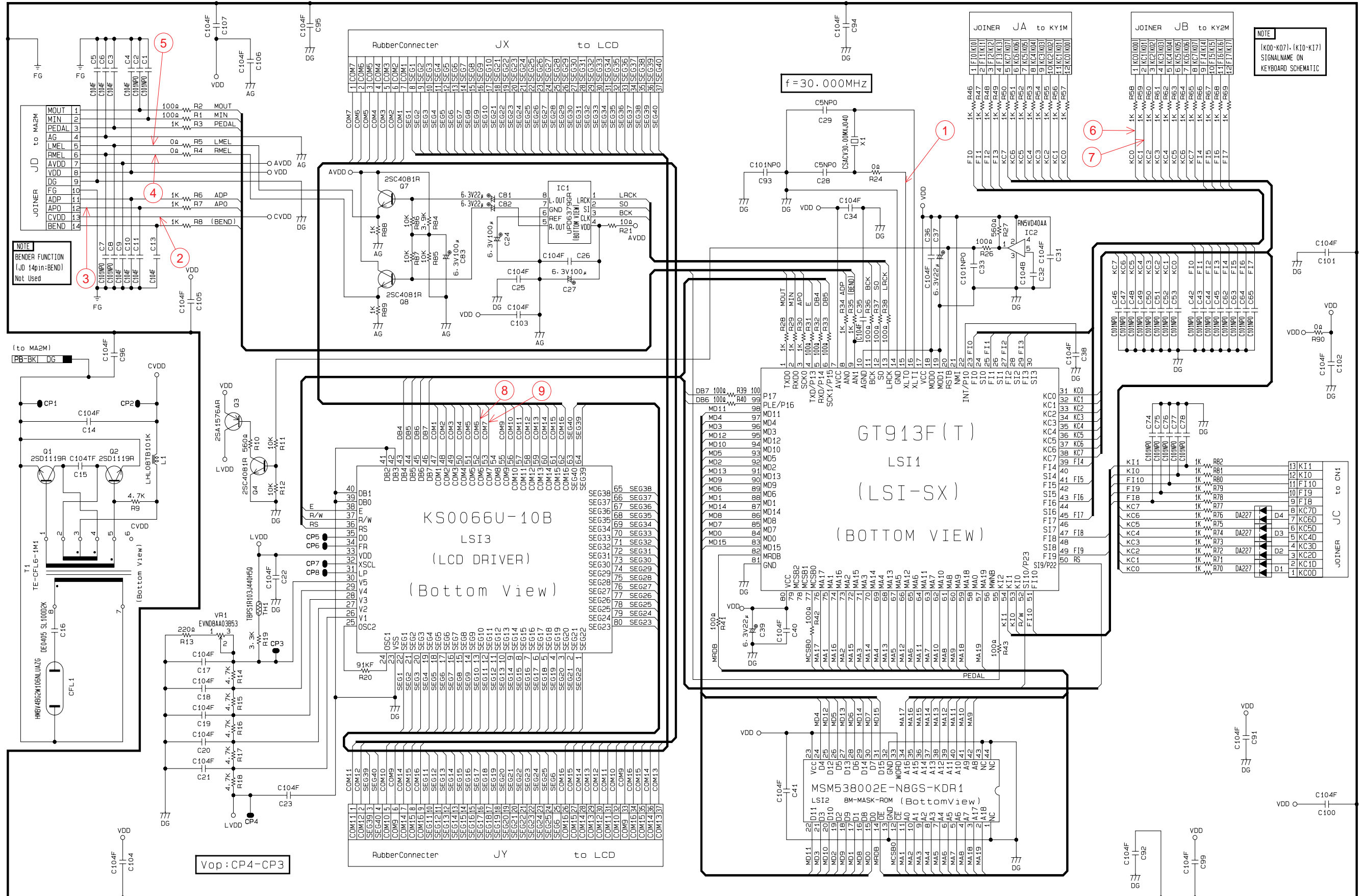


Main PCB JCM453-CN1

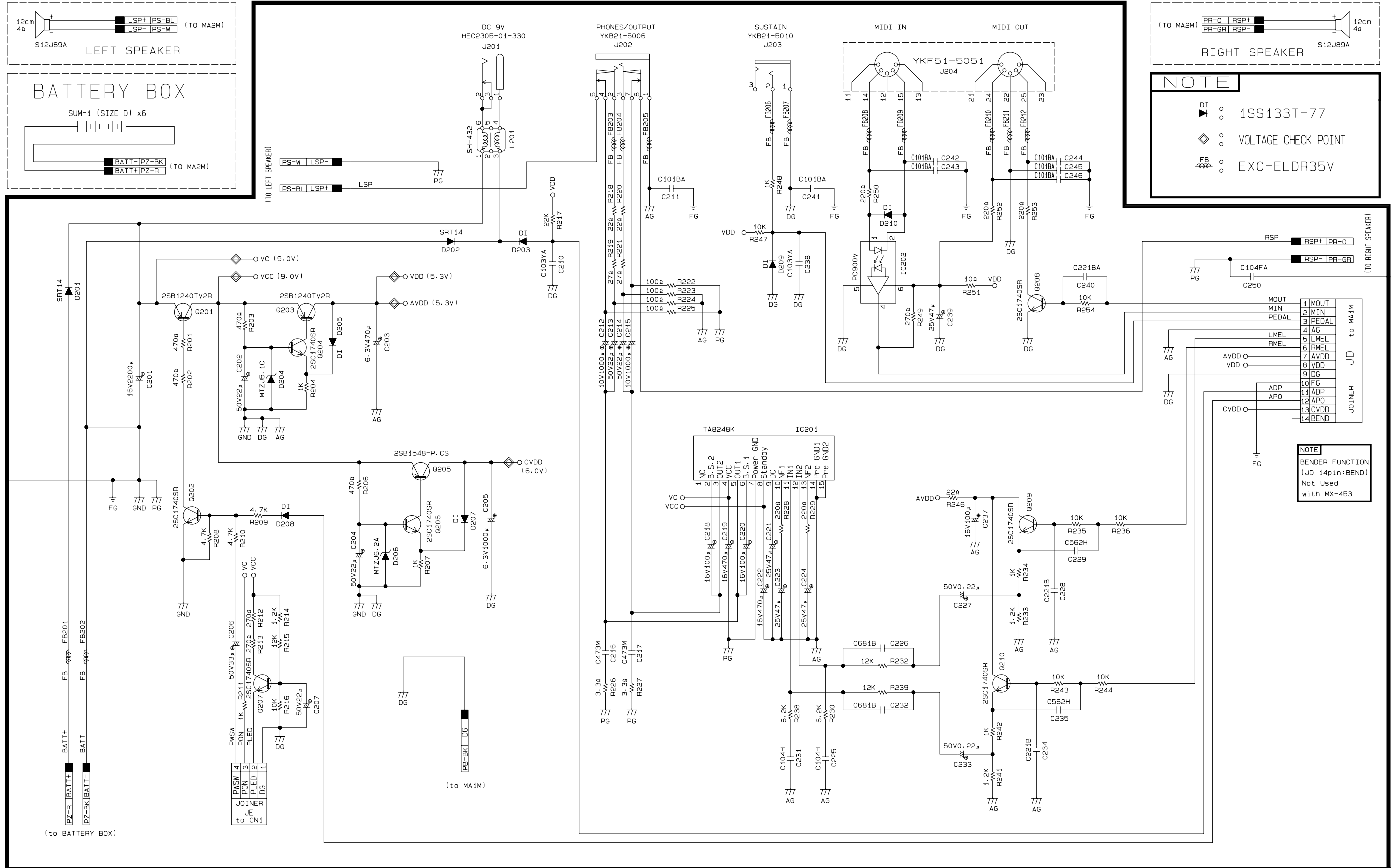


# SCHEMATIC DIAGRAMS

## Main PCB JCM453-MA1M



Sub PCB KDM453-MA2M



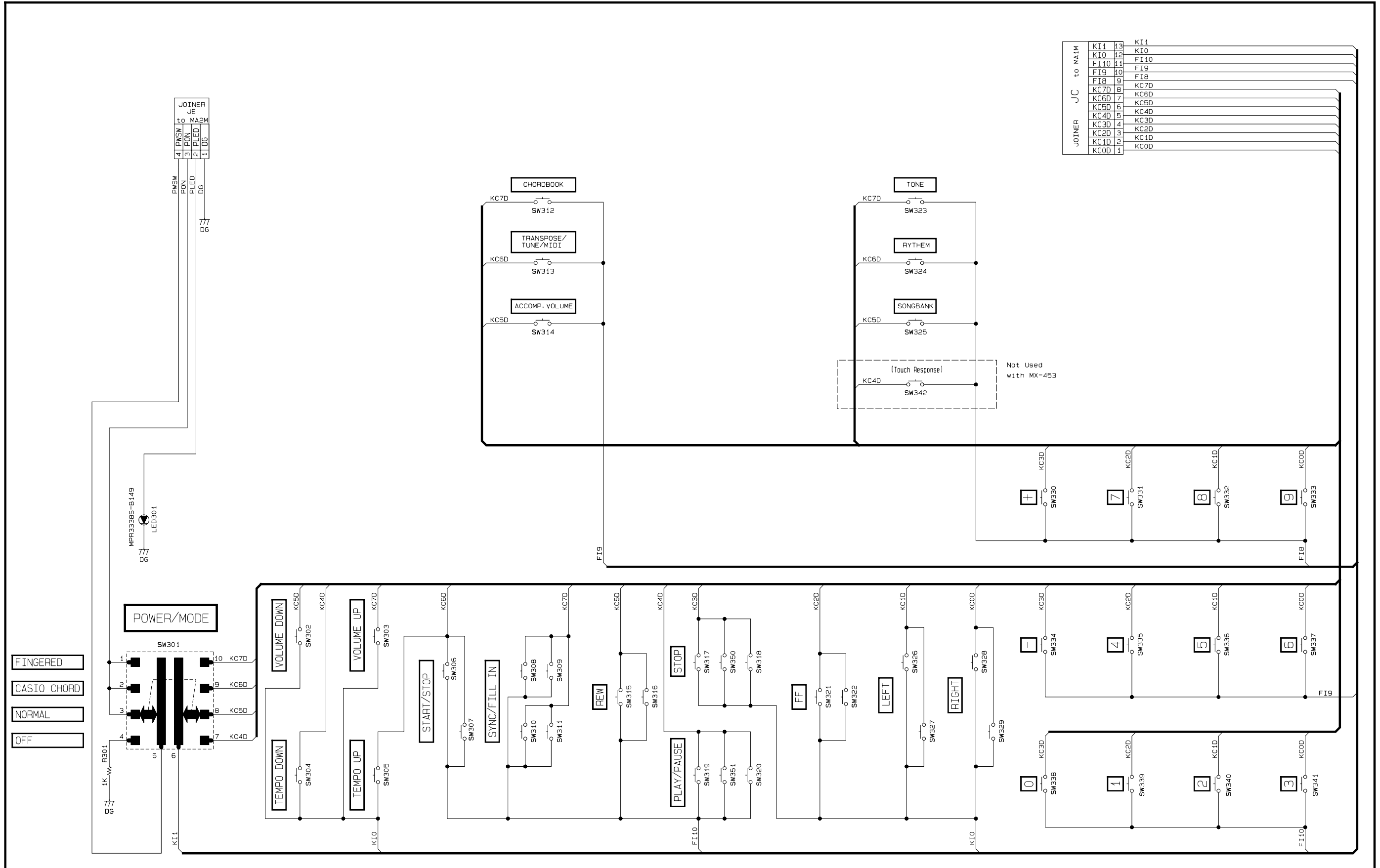
**NOTE**

- ◀ DI : 1SS133T-77
- ◇ : VOLTAGE CHECK POINT
- FB : EXC-ELDR35V

**NOTE**

BENDER FUNCTION (JD 14pin:BEND) Not used with MX-453

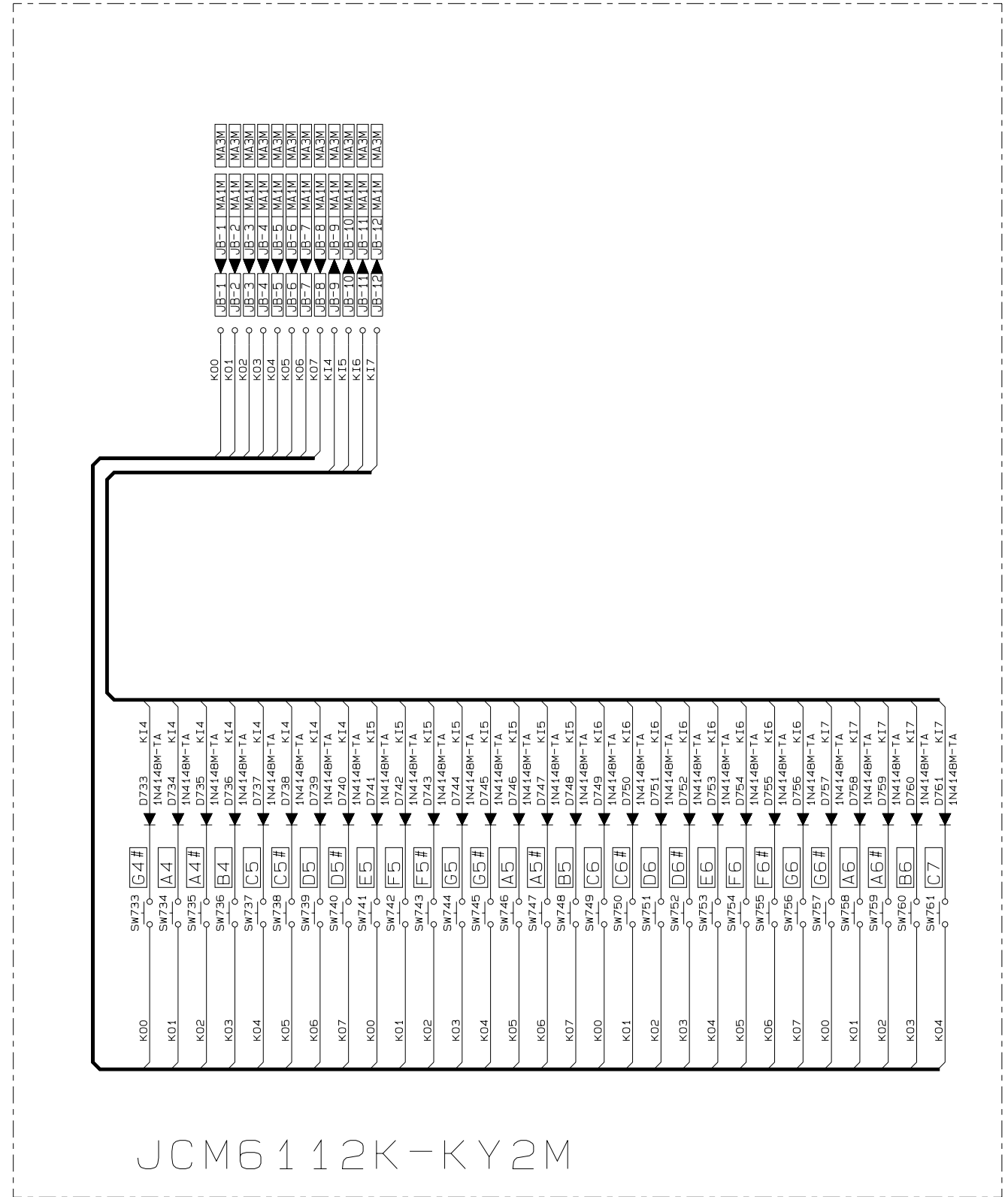
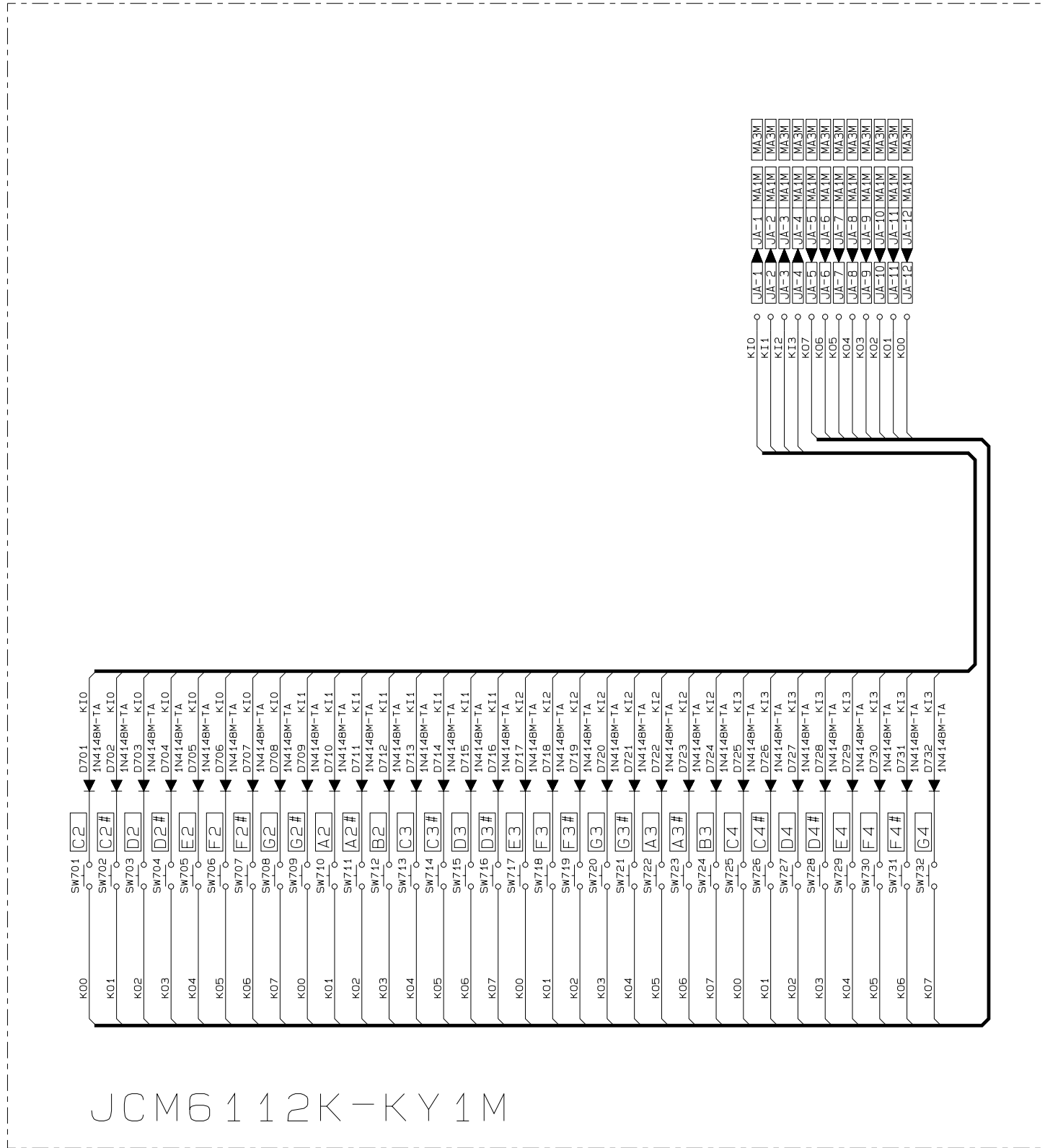
Console PCBs JCM453-CN1



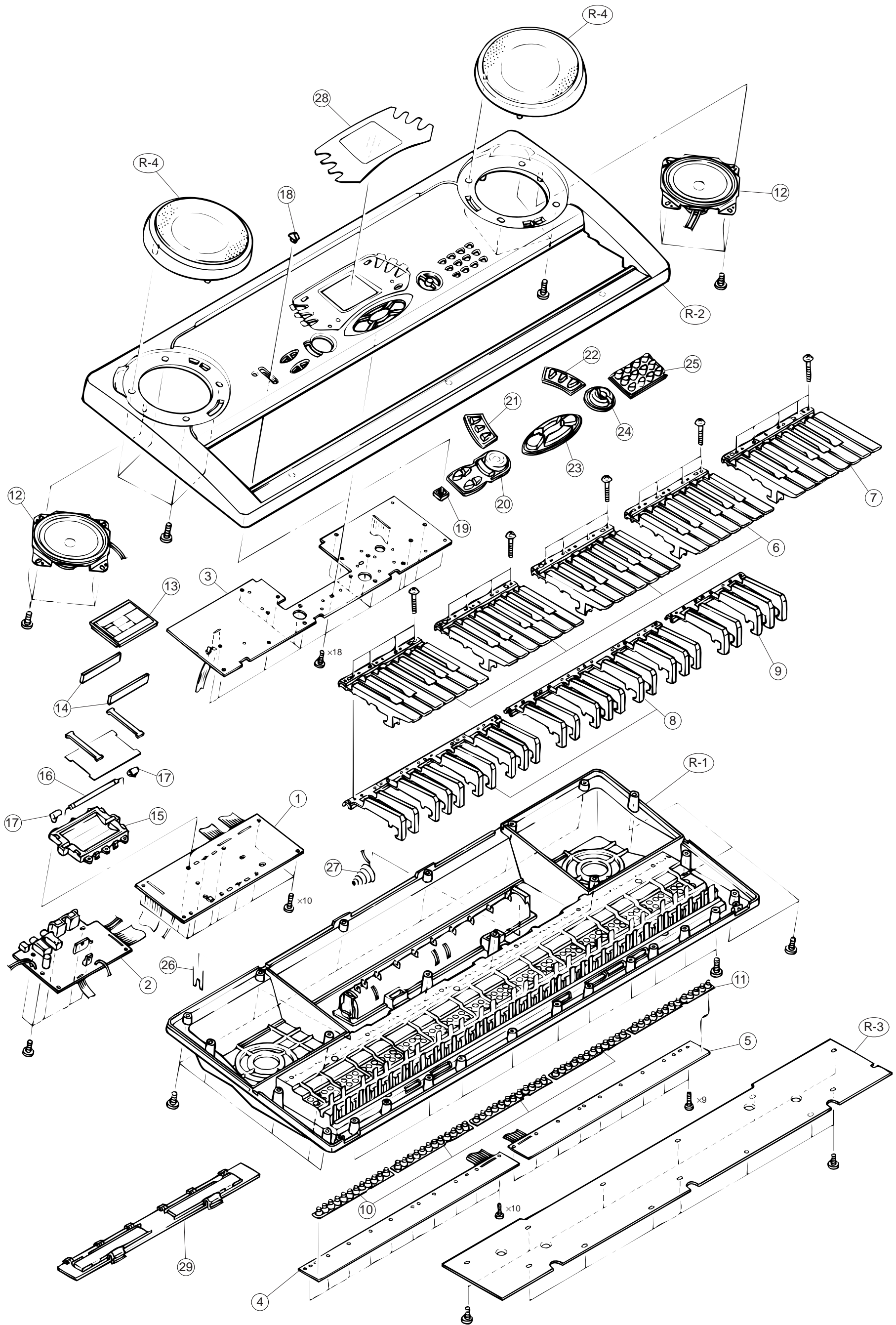
JOINER	KI1	13	KI1
	KI0	12	KI0
	FI10	11	FI10
	FI9	10	FI9
	FI8	9	FI8
	KC7D	8	KC7D
	KC6D	7	KC6D
	KC5D	6	KC5D
	KC4D	5	KC4D
	KC3D	4	KC3D
	KC2D	3	KC2D
	KC1D	2	KC1D
	KC0D	1	KC0D



Keyboard PCBs JCM6112K-KY1M/KY2M



# EXPLODED VIEW



# PARTS LIST

**CTK-531**

**CTK-533**

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.

**PARTS PRICE LIST**  
**CTK-531**

N	Item	Code No.	Part Name	Specification	Q	Price Code	R
<b>Main PCB</b>							
N	1	6927 3710	PCB/ASSY (MA1M)	M240970*1	1	DW	B
	D1-D4	2775 2079	DIODE/CHIP	DA227TL	4	AA	C
	LSI1	2012 5005	LSI	GT913F(T)	1	BO	A
	LSI2	2012 6303	LSI/MC	MSM538002E-N8GS-KDR1	1	AW	A
	LSI3	2012 5935	LSI/LCD DRIVER	KS0066U-10B	1	AV	A
	IC1	2105 4746	LSI	UPD6379GR-E1	1	AO	B
	IC2	2012 1883	IC/MOS	RN5VD40AA-TR	1	AE	B
	Q1,Q2	2253 0308	TRANSISTOR	2SD1119-R(TX)	2	AC	B
	Q3	2250 1169	TRANSISTOR	2SA1576AT106R	1	AA	B
	Q4,Q7,Q8	2252 0637	TRANSISTOR	2SC4081T106R	3	AA	B
	VR1	2775 0994	POTENTIOMETER	EVND8AA03B53	1	AA	B
N	X1	2590 2774	OSCILLATOR/CERAMIC	CSACV30.00MXJ040	1	AE	B
<b>SUB PCB ASS'Y</b>							
N	2	6927 3690	PCB/ASSY (MA2M)	M140841*1	1	DB	B
	IC201	2114 5775	IC/LINEAR (POWER AMP)	TA8248K	1	BB	A
	IC202	2114 1421	IC/PHOTO COUPLER	PC900V	1	AK	B
	Q201,Q203	2250 1595	TRANSISTOR	2SB1240TV2R	2	AB	B
	Q205	2251 0672	TRANSISTOR	2SB1548-P.CS	1	AD	B
	Q202, Q204, Q206-Q210	2250 1592	TRANSISTOR	2SC1740STPR	7	AA	B
	D201, D202	2390 3021	DIODE	SRT14	2	AF	B
	D203, D205, D207-D210	2390 1344	DIODE	1SS133T-77-T	6	AA	C
	D206	2360 2044	DIODE/ZENER	MTZJ6.2A-T77-T	1	AA	C
	D204	2360 1939	DIODE/ZENER	MTZJ5.1C-T77-T	1	AA	A
	J201	3501 7049	JACK (POWER)	HEC2305-01-330	1	AC	A
	J202	3612 0665	JACK (PHONE)	YKB21-5006	1	AG	B
	J203	3612 0789	JACK	YKB21-5010	1	AC	B
	J204	3501 4816	JACK/DIN	YKF51-5051	1	AH	B
<b>Console PCBs</b>							
N	3	6927 3590	PCB/ASSY (CN1M)	M140842*1	1	CK	C
	LED301	2370 1414	LED	MPR3338S-B149	1	AA	B
<b>Keyboard PCBs</b>							
	4	6926 0490	PCB/ASSY (KY1M)	M240628*1	1	BX	B
	D701 - D732	2390 1344	DIODE	1SS133T-77-T	32	AA	B
	5	6926 0500	PCB/ASSY (KY2M)	M240629*1	1	BX	B
	D733 - D761	2390 1344	DIODE	1SS133T-77-T	29	AA	B
<b>Keyboard unit</b>							
	6	6922 2720	KEY SET/LT WHITE	M312118*1	4	AP	A
	7	6922 2730	KEY SET/LT WHITE	M312118*2	1	AR	A
	8	6906 8481	KEY SET/LT BLACK 10P	M140369A-3	2	AL	A
	9	6906 8591	KEY SET/LT BLACK 5P	M140369A-4	1	AT	A
	10	6926 0670	RUBBER/CONTACT	M240549-1	4	AK	A
	11	6926 0680	RUBBER/CONTACT	M240550-1	1	AL	A
<b>Panel unit</b>							
	12	3831 1096	SPEAKER	S12J89A	2	BH	B
	13	3335 6804	LCD	LD-B10427E	1	BO	B
N	14	6927 3890	RUBBER/INTERCONNECTOR	M440759-1	2	AV	B
N	15	6927 3920	REFLECTOR	M240922-1	1	AM	C
	16	3122 3698	CFL	HMBV4BG2W106NLUAZG	1	AX	C
	17	6927 3420	HOLDER/CFL	M440758-1	2	AA	C
	18	6921 5031	KNOB	M311859A-1	1	AA	B
N	19	6927 0510	SWITCH/SLIDE KNOB	CSB-08D	1	AD	B
N	20	6927 3820	RUBBER/BUTTON	M140821-1	1	AI	B
N	21	6927 3830	RUBBER/BUTTON	M240928-1	1	AD	B
N	22	6927 3840	RUBBER/BUTTON	M240929-1	1	AD	B
N	23	6927 3850	RUBBER/BUTTON	M140824-1	1	AG	B
N	24	6927 3860	RUBBER/BUTTON	M240931-1	1	AC	B

**PARTS PRICE LIST**  
**CTK-531**

<b>N</b>	<b>Item</b>	<b>Code No.</b>	<b>Part Name</b>	<b>Specification</b>	<b>Q</b>	<b>Price Code</b>	<b>R</b>
N	25	6927 3870	RUBBER/BUTTON	M240932-1	1	AK	B
	26	6903 2150	SPRING/BATTERY(+)	M41330-1	1	AA	B
	27	6902 6141	SPRING/BATTERY(-)	M41226A-1	1	AB	B
N	28	6927 3790	PLATE/DISPLAY	M240927-1	1	BE	C
	29	6906 9218	COVER/BATTERY	M311164H*17	1	AW	B
<b>Accessory</b>							
	30	6906 9043	STAND/NOTE	M340701*2	1	BK	B

**CASIO TECHNO CO.,LTD.**  
Overseas Service Division

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Shinjuku-ku, Tokyo 160-0023, Japan