

CASIO®

Service Manual

(with price)

ML-1



ML-1

ELECTRONIC KEYBOARD

INDEX

CONTENTS

Specifications	1
Block Diagram	2
Circuit Description	3
Troubleshooting	5
IC and Transistor Lead Identification	5
PCB View and Major Waveforms	6
Schematic Diagram	7
Exploded View	8
Parts List	9

SPECIFICATIONS

General

Number of Keys:	24
Illuminated keys:	White keys
Polyphonic:	2-note
Preset Tones:	25
Auto-Rhythms:	12
Demonstration Tunes:	10
Lesson Functions:	3 modes; Demo, Any-Key Play, Melody Guide
Built-In Speaker:	6.5 cm dia. 0.5 W Input Rating: 1 pce.
Terminal:	AC Adapter Jack (DC 7.5 V)
Power Source:	DC: 5 AA size dry batteries Battery life: Approx. 7 hours (SUM-3/R6P) AC: AC adapter AD-1
Power ON Reminder*:	3 minutes after the last operation
Power Consumption:	1.1 W
Dimensions:	36 x 326 x 137 mm (HWD) (1-3/8 x 12-7/8 x 5-3/8 inches) (HWD)
Weight:	0.55 kg (1.2 lbs) including batteries

Electrical

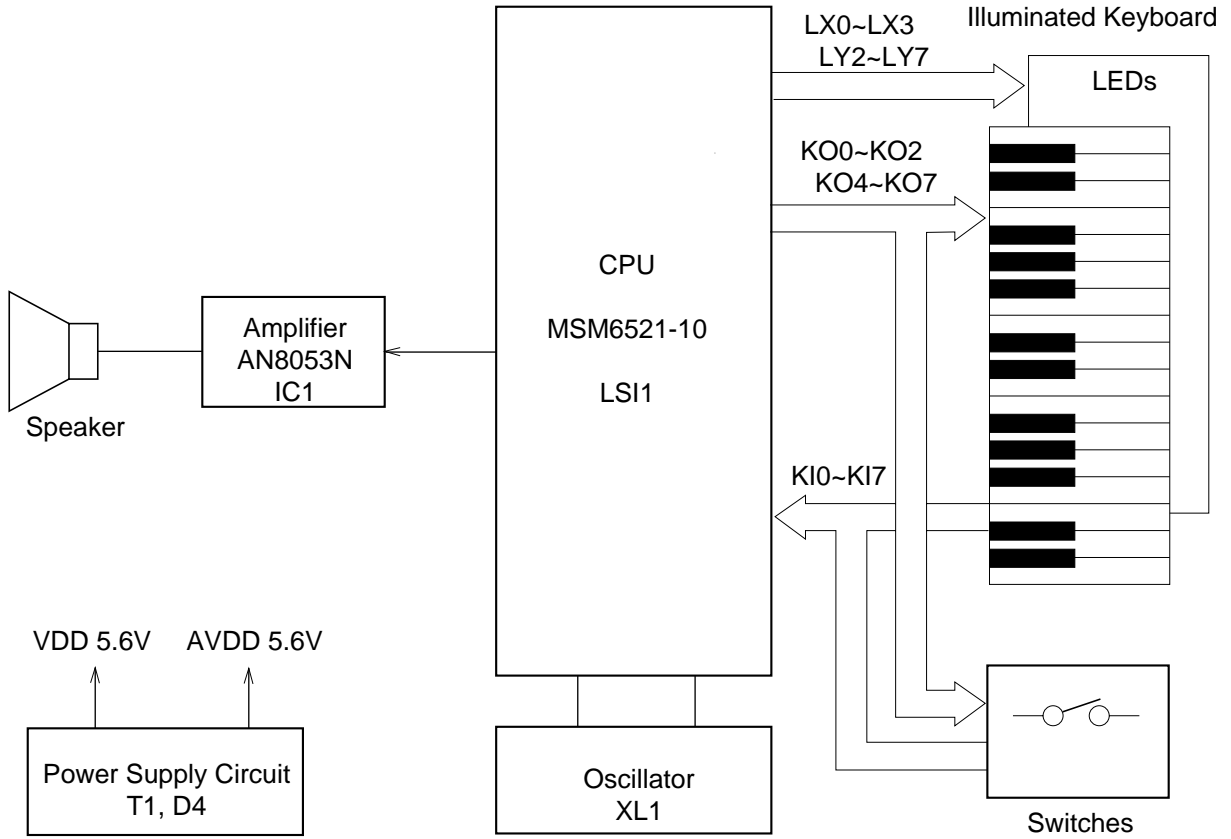
Current Drain with 7.5 V DC:	
No Sound Output	45 mA \pm 20%
Maximum Volume	135 mA \pm 20%
with keys D3 and E4 pressed in Flute tone	
Volume: Maximum, Rhythm: Pops,	
Tempo: Maximum	
Speaker Input Level (Vrms with 8 Ω load):	680 mV \pm 20%
with key E4 pressed in Flute tone	
Volume: Maximum	
Minimum Operating Voltage:	6.2 V

*Power ON Reminder

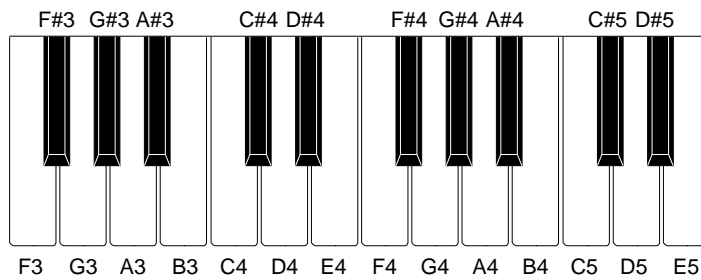
Power ON reminder is sudden audible and light signals, a short melody at maximum volume and lighting up the illuminated keyboard for a few seconds.

Power ON reminder functions three minutes after the last operation, and it repeats every three minutes until turning the switch off or restarting operations.

BLOCK DIAGRAM



Nomenclature of Keys



CIRCUIT DESCRIPTION

Key Matrix

	KI0	KI1	KI2	KI3	KI4	KI5	KI6	KI7
KO0	F3	F#3	G3	G#3	A3	A#3	B3	C4
KO1	C#4	D4	D#4	E4	F4	F#4	G4	G#4
KO2	A4	A#4	B4	C5	C#5	D5	D#5	E5
KO3								
KO4						Volume Down	Volume Up	
KO5	Tone 1					Rhythm Stop	Tempo Down	
KO6		Tone 2	Tone 3	Tone 4	Tone 5		Rhythm Select	Tempo Up
KO7				Melody Guide	Any Key Play	Demo	Play	

Keyboard LED Matrix

	LY0	LY1	LY2	LY3	LY4	LY5	LY6	LY7
LX0			E5	A4			C4	F3
LX1					G4	D4	B3	
LX2			D5	B4				G3
LX3				C5	F4	E4	A3	

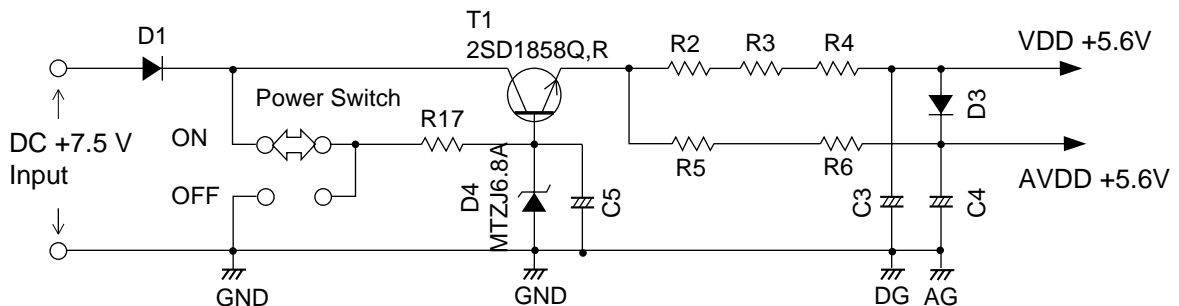
CPU (LSI1: MSM6521-10)

Containing a sound data ROM and a DAC (Digital to Analog Converter), the CPU provides sound waveform in accordance with the pressed key and selected tone. The CPU also drives LEDs in the illuminated keyboard directly. The following table shows the pin functions of LSI1.

Pin No.	Terminal	In/Out	Function
1	LY1	Out	Not used.
2 ~ 7	LY2 ~ LY7	Out	Keyboard LED drive signal output
8	LVDD1	In	+5V source for the built-in LED driver
9	LGND2	In	Ground (0V) source for the built-in LED driver
10 ~ 13	LX0 ~ LX3	Out	Keyboard LED drive signal output
14 ~ 17	LX4 ~ LX7	Out	Not used.
18	LVDD2	In	+5V source for the built-in LED driver
19	GND2	In	Ground (0V) source
20, 21	COSI, COSO	In/Out	21.725 MHz clock pulse input/output
22	VDD	In	+5V source
23	GND1	In	Ground (0V) source
24 ~ 26	TEST1 ~ TEST3	In	Not used. Connected to ground.
27	RESET	In	Reset signal input. Power OFF: 0V, Power ON: +5V
28	AVDD	In	+5V source for the built-in DAC
29	OUT	Out	Sound waveform output
30	AGND	In	Ground (0V) source for the built-in DAC
31 ~ 38	KI0 ~ KI7	In	Input terminal for keys and switches
39 ~ 41	KO0 ~ KO2	Out	Key and switch scan signal input
42	KO3	Out	Not used.
43 ~ 46	KO4 ~ KO7	Out	Key and switch scan signal input
47 ~ 58			Not used.
59	LGND1	In	Ground (0V) source for the built-in LED driver
60	LY0	In	Not used.

Power Supply Circuit

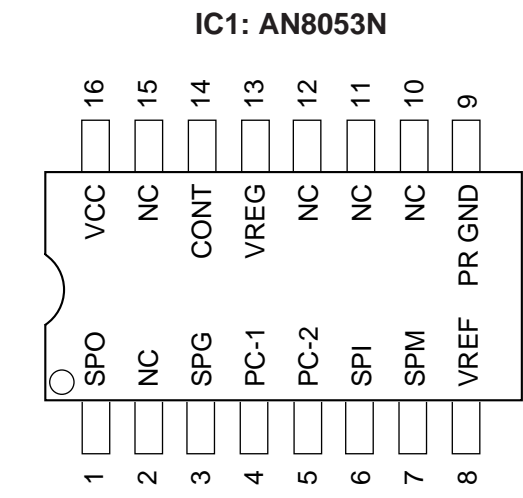
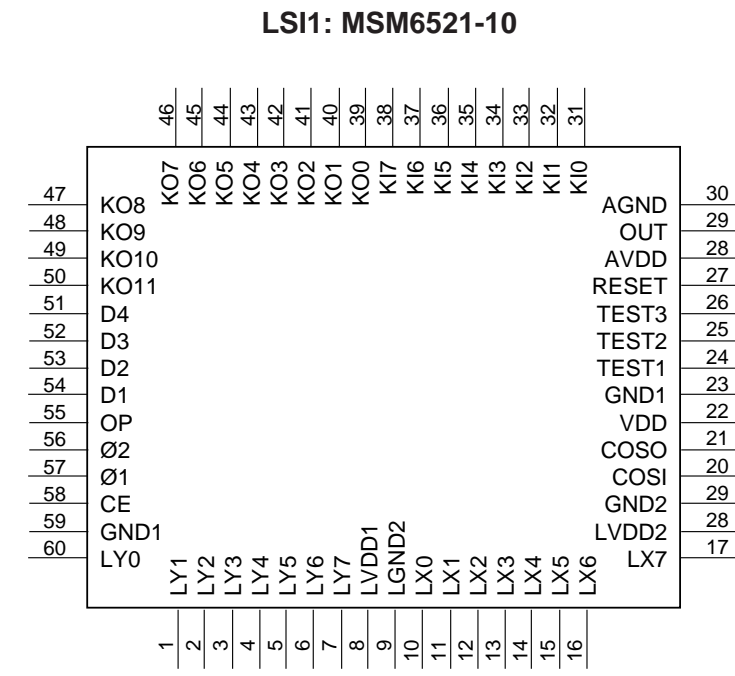
The power supply circuit regulates a constant output voltage +5.6V by T1 and D4.



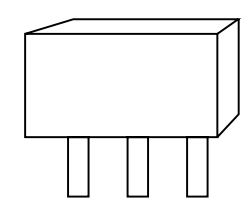
TROUBLESHOOTING

Nature of Trouble	Faulty Block	Checkpoint
No power	Power Supply Circuit	Base of T1 should receive +6 V.
		Emitter of T1 should provide +5.6 V.
	Power Jack (J1)	Jack contact.
No sound at all	Power Amp. (IC1: AN8053N)	Pin 16 should receive +7.5 V when the power switch is turned on.
		Voltage at pin 14 should drop at 0V when the power switch is turned on.
		Check output signal of pin 1.
	CPU (LSI1: MSM6521-10)	Voltage at pin 27 should rise 0V to 5.6V when the power switch is turned on.
		Pins 39 ~ 41 and 43 ~ 46 should provide pulses. Pin 29 should have a sound signal when a key is pressed.
Oscillator (XL1)	Pins 20 and 21 of the CPU should receive an oscillation signal.	
Keyboard LEDs don't light up	Keyboard LED	
	Keyboard LED Matrix	Open circuit on LX or LY line.
A certain key or switch does not function	Key and Switch Matrix	Dust on the contact.
Certain keys or switches do not function	Key and Switch Matrix	Open circuit on KC or KI line.

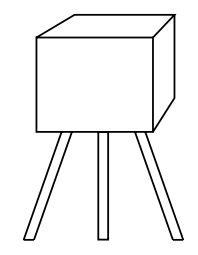
IC LEAD IDENTIFICATION



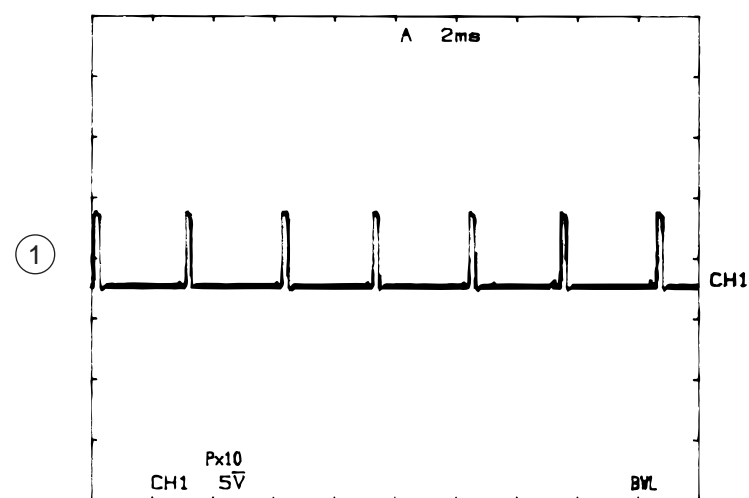
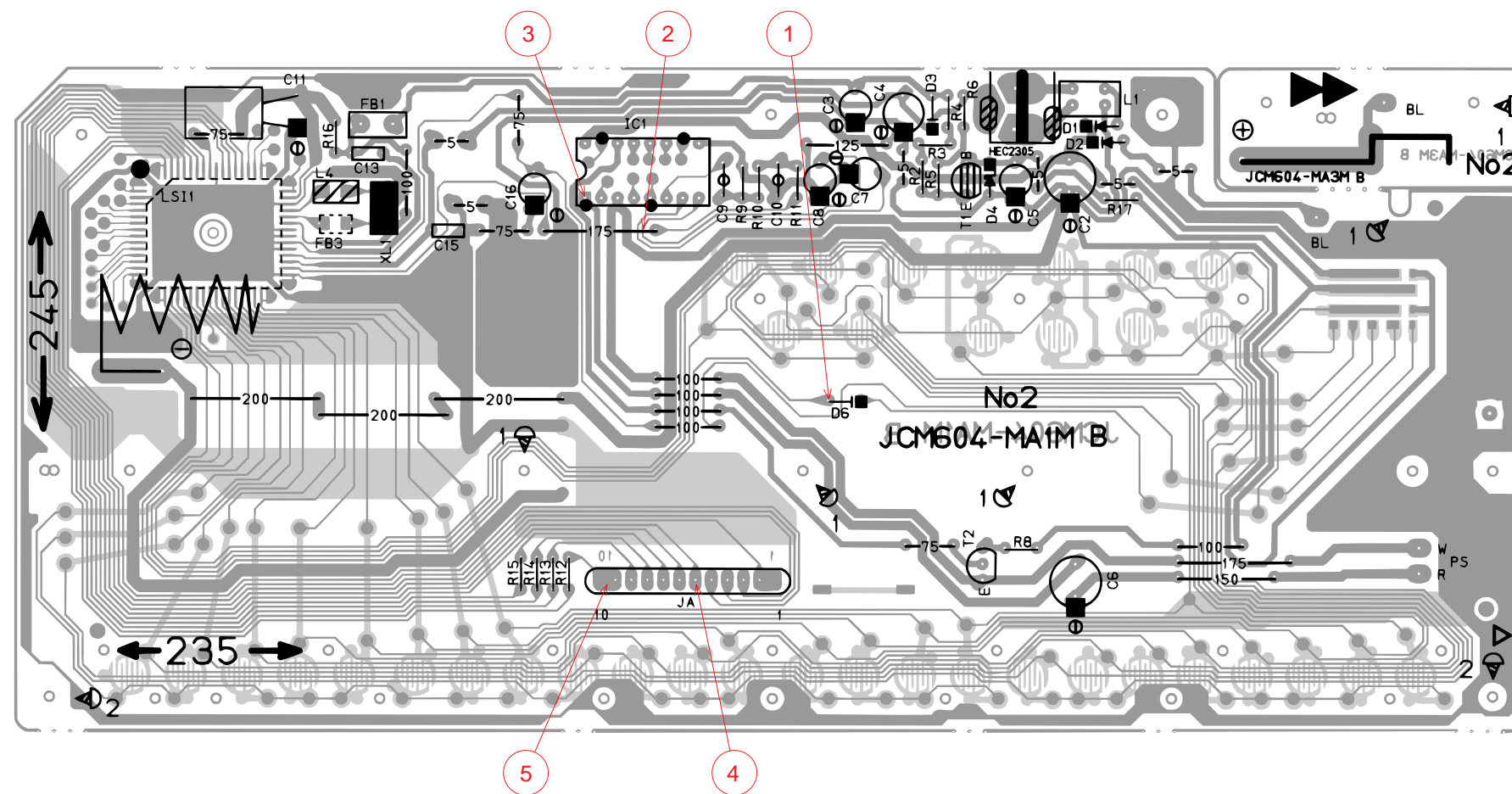
T1: 2SD1858Q, R



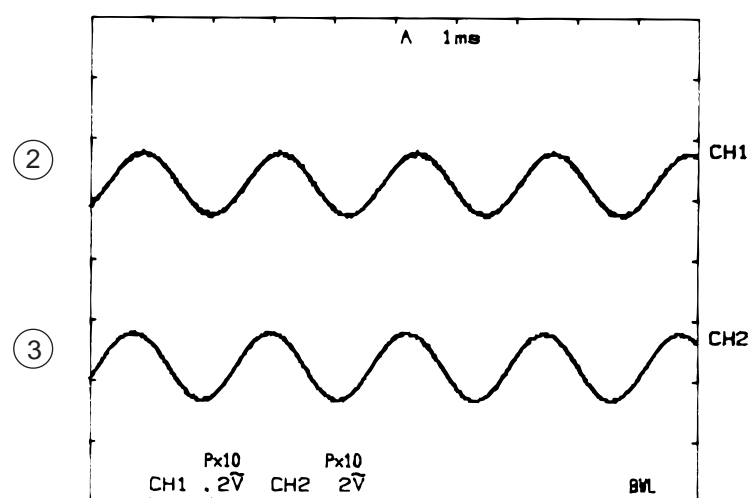
T2: 2SC1740SQ



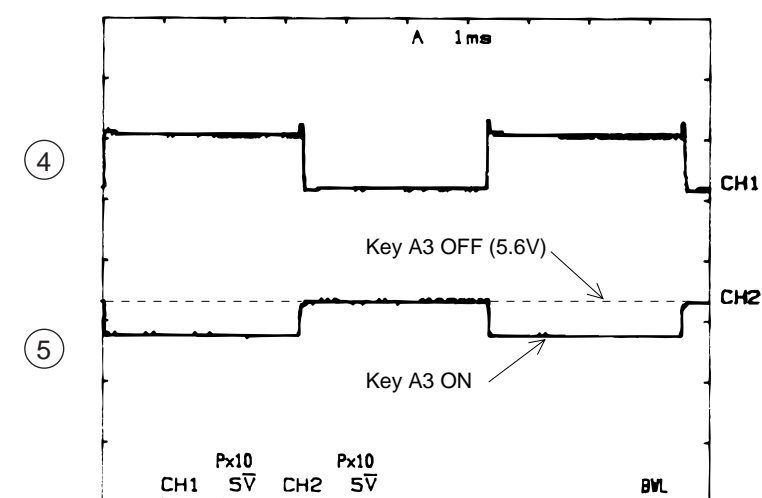
PCB VIEW AND MAJOR WAVEFORMS



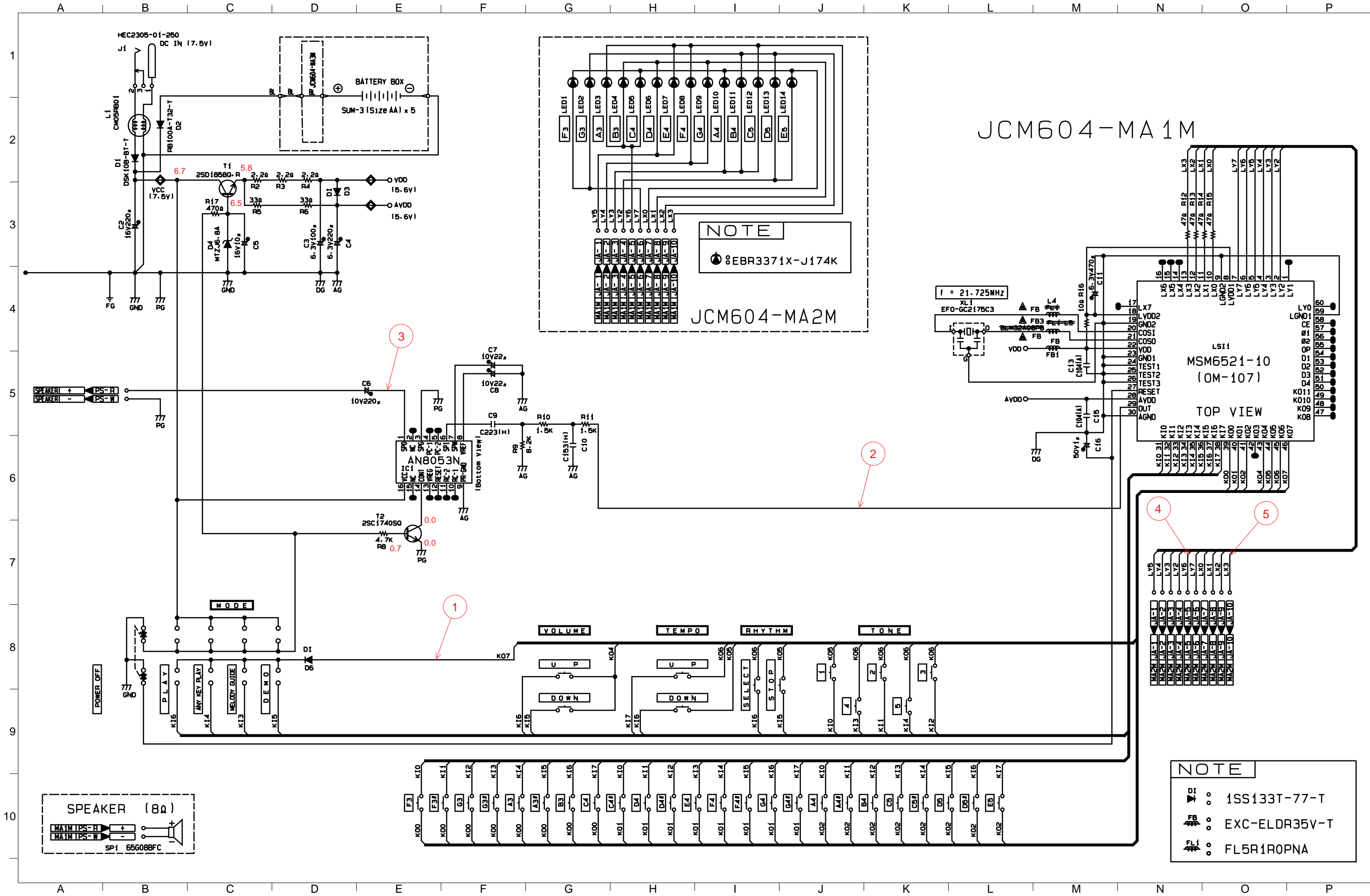
① Key scan signal KO7
MSM6521-10 pin 46



② Sound signal output
MSM6521-10 pin 29
③ Power amp output
AN8053N pin 1
Key: A3
Tone: Flute (No.21)
Volume: Maximum



④ LED drive signal LY6
JA connector pin 5
⑤ LED drive signal LX3
JA connector pin 10



JCM604-MA1M

NOTE
 8EBR3371X-J174K
 JCM604-MA2M

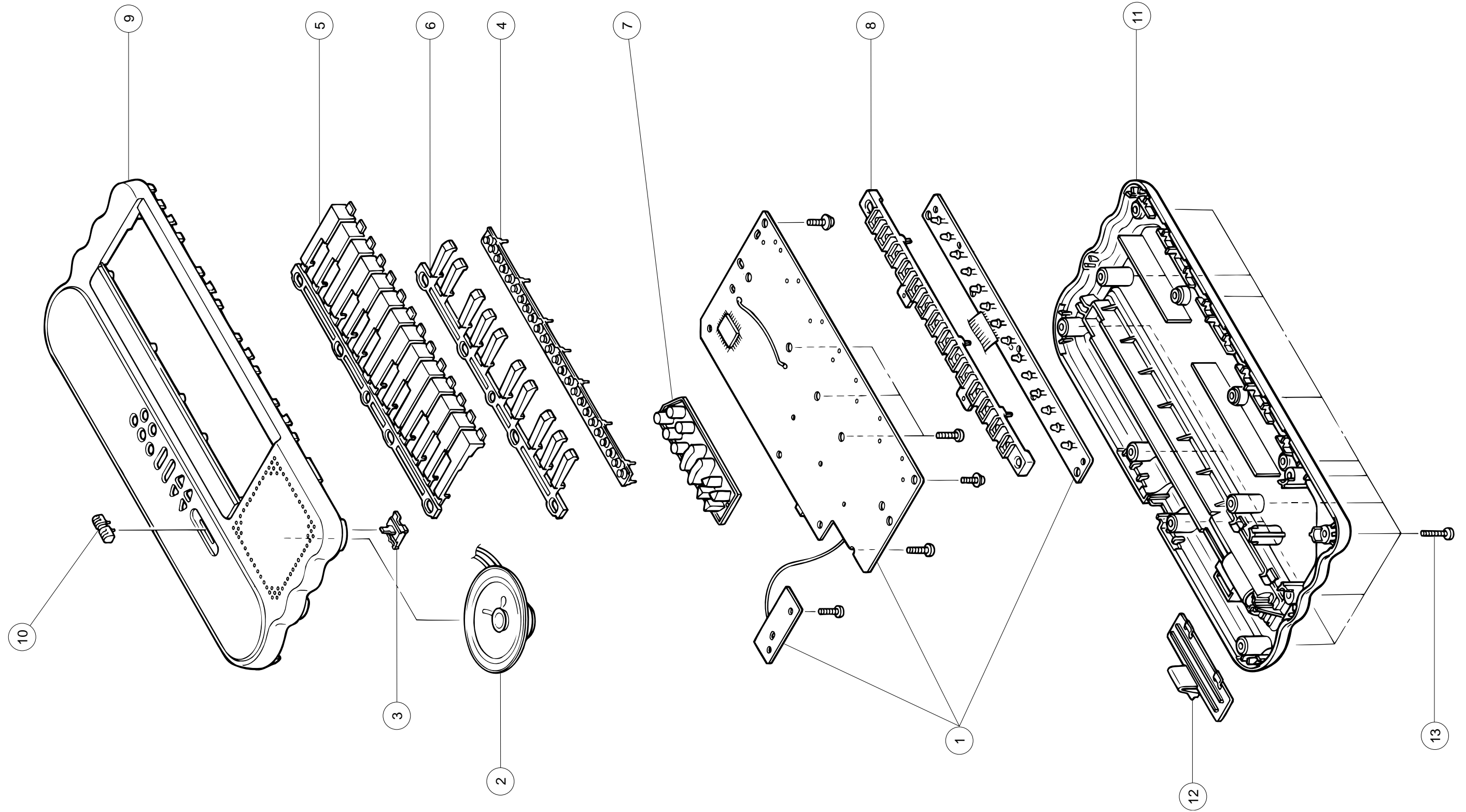
f = 21.725MHZ
 EFO-GC2175C3

MSM6521-10
 (OM-107)

TOP VIEW

NOTE
 1SS133T-77-T
 EXC-ELDR35V-T
 FL5R1R0PNA

EXPLODED VIEW



PARTS LIST

ML-1

- 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	M	FOB Japan N.R.Yen Unit Price	R	*
Electrical Parts									
N	LSI1	2011 7504	LSI	MSM6521-10	1	1	730	A	H
	IC1	2114 3269	IC	AN8053N	1	1	120	A	B
	T1	2253 0448	Transistor	2SD1858Q,R-TV6-T	1	1	24	A	A
	T2	2220 1387	Transistor	2SC1740SQ-TP-T	1	10	13	B	A
	D1	2390 0371	Diode	DSK10B-BT-T	1	10	11	B	A
	D2	2390 1323	Diode	RB100A-T32-T	1	10	29	C	A
	D3, 6	2390 1344	Diode	1SS133T-77-T	2	10	3	C	A
	D4	2360 1519	Zener diode	MTZJ6.8A-T77-T	1	10	8	A	A
	LED1~14	2370 1036	LED	EBR3371X-J174K	14	10	25	B	A
	XL1	2590 0742	Ceramic oscillator	EFO-GC2175C3	1	1	64	B	B
	R2~4	2606 1722	Carbon film resistor	R-20-2.2-J-T23-T	3	20	2	C	A
	R5/6	2606 1477	Carbon film resistor	R-20-33-J-T23-T	2	20	2	C	A
	R8	2606 1253	Carbon film resistor	R-20-4.7K-J-T23-T	1	20	2	C	A
	R9	2606 1239	Carbon film resistor	R-20-8.2K-J-T23-T	1	20	2	C	A
	R10/11	2606 1274	Carbon film resistor	R-20-1.5K-J-T23-T	2	20	2	C	A
	R12~15	2606 1708	Carbon film resistor	R-20-47-J-T23-T	4	20	2	C	A
	R16	2606 1162	Carbon film resistor	R-20-10-J-T23-T	1	20	2	C	A
	R17	2606 1309	Carbon film resistor	R-20-470-J-T23-T	1	20	2	C	A
	C2	2807 0985	Electrolytic capacitor	16RE2-220-T2-T	1	10	30	C	A
	C3	2801 9611	Electrolytic capacitor	6.3RC2-100-T2-T	1	10	17	C	A
	C4	2801 9618	Electrolytic capacitor	6.3RC2-220-T2-T	1	10	26	C	A
	C5	2805 3142	Electrolytic capacitor	16RE2-10-T2-T	1	10	14	C	A
	C6	2807 1121	Electrolytic capacitor	10RE2-220-T2-T	1	10	26	C	A
	C7/8	2805 3134	Electrolytic capacitor	10RE2-22-T2-T	2	10	14	C	A
	C9	2813 1932	Semiconductive capacitor	RT-B50TKYR223K-T	1	20	5	C	A
	C10	2813 2415	Semiconductive capacitor	RT-B50TKYR153K-T	1	20	4	C	A
	C11	2804 6002	Electrolytic capacitor	6.3RE2-470-T14-T	1	10	27	C	A
	C13, 15	2813 3283	Ceramic capacitor	UP050F104Z-A-B	2	20	8	C	A
	C16	2807 1023	Electrolytic capacitor	50RE2-1-T2-T	1	10	15	C	A
	FB1~3	3035 0266	Ferrite beads	BL02RN2-R62T4-T	3	10	13	C	A
	J1	3501 3731	DC jack	HEC2305-01-250	1	1	30	B	A
N		3719 4312	Ribbon cable M604A	DF5H10075-50005000	1	10	24	C	A
	L1	3841 1057	Common mode coil	CM05RB01	1	1	63	C	B
N		4317 5051	Blank PCB JCM604-MA1M	M211784A-1	1	1	170	C	B
N		4317 5061	Blank PCB JCM604-MA3M	M211784A-2	1	1	21	C	A
N		4317 5091	Blank PCB JCM604-MA2M	M211784A-3	1	1	16	C	A
		6922 1750	Battery spring (+) 522A	M412225-1	1	20	7	B	A
		6922 1760	Battery spring (+) 522B	M412226-1	1	20	10	B	A
N	1	6922 6730	PCB ass'y M604-MA123M	M111822*1	1	1	1,790	B	Q
Mechanical Parts									
	2	3831 0644	Speaker	65G08BFC	1	1	120	B	B
	3	6909 7380	Slide contact 09D	CSB-09D	1	10	26	B	A
	4	6922 1800	Key contact rubber MM24	M211669-1	1	1	80	B	B
N	5	6922 6630	White key set MM24	M211665-2	1	10	49	A	A
N	6	6922 6640	Black key set MM24	M211666-1	1	10	41	A	A
N	7	6922 6650	Rubber button 604	M312191-1	1	10	41	B	A
N	8	6922 6670	LED holder LMM24	M211776-1	1	10	38	C	A
N	9	6922 6620	Upper case 604 (Light gray)	M111813-1	1	1	260	C	C
N	9	6922 6681	Upper case 604 (Black)	M111813A-2	1	1	260	C	C
N	10	6922 6660	Slide knob 541	M311913-2	1	10	11	B	A
N	10	6922 7660	Slide knob 541	M311913-3	1	10	11	B	A
N	11	6922 7881	Lower case sub ass'y	M312246A*1	1	1	260	C	C
N	12	6906 7261	Battery cover (Gray)	M312197A*1	1	10	32	B	A

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

N	Item	Code No.	Parts Name	Specification	Q	M	FOB Japan N.R.Yen Unit Price	R	*
N	12	6906 7273	Battery cover (Dark gray)	M311200C*16	1	10	32	B	A
N		6922 6750	Rating label	M312199-1	1	10	8	C	A
	13	0009 5573	Screw	2.6x10	14	50	2	C	A
		0009 5574	Screw, washer head	2.6x6	2	50	2	C	A
		0009 2682	Screw	2.6x8	5	50	2	C	A

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

CASIO COMPUTER CO.,LTD.
Service Division

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