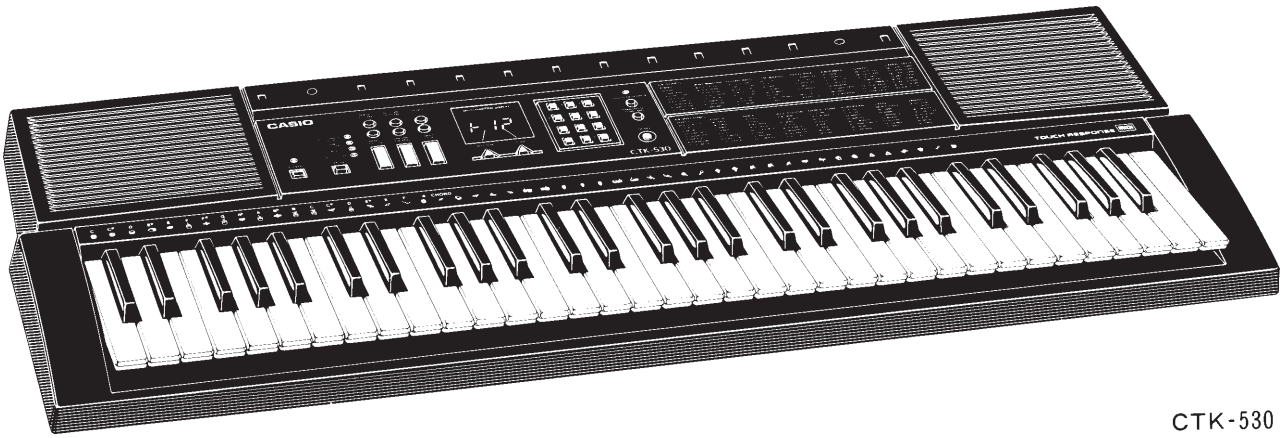
CASIO®

Service Manual

(with price)

CTK-530



CTK-530

INDEX

ELECTRONIC KEYBOARD

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SPECIFICATIONS

GENERAL

Number of keys:	61
Polyphonic:	24-note
Preset tones:	64
Keyboard controls:	Touch response: On/Off, Key transpose: Range from F# to F by a semitone increment
Auto-rhythms:	64, Tempo control: 40 to 255
Auto-accompaniment:	Mode: CASIO Chord/Fingered/Full-Range Chord 1/Full-Range Chord 2 Controller: Fill-In, Synchro/Ending
Digital volume controls:	Main volume: 10 steps Accompaniment volume: 100 steps
Demo tunes:	3, A Night has 9000 Bars (arranged and programmed byThomas Hirsch) Wanting This (Edward Alstrom) Supersonic Remorse (Edward Alstrom)
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: 50 Ω, Output voltage: 4.0 V(rms) MAX], 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 AD-5 DC: 6 D size dry batteries Battery life: approx. 5 hours by manganese batteries R20P/SUM-1
Power consumption:	7.7 W
Dimensions (HWD):	99 x 931 x 326 mm (3-7/8 x 36-5/8 x 12-13/16 inches)
Weight:	4.4 kg (9.7 lbs) excluding batteries

ELECTRICAL

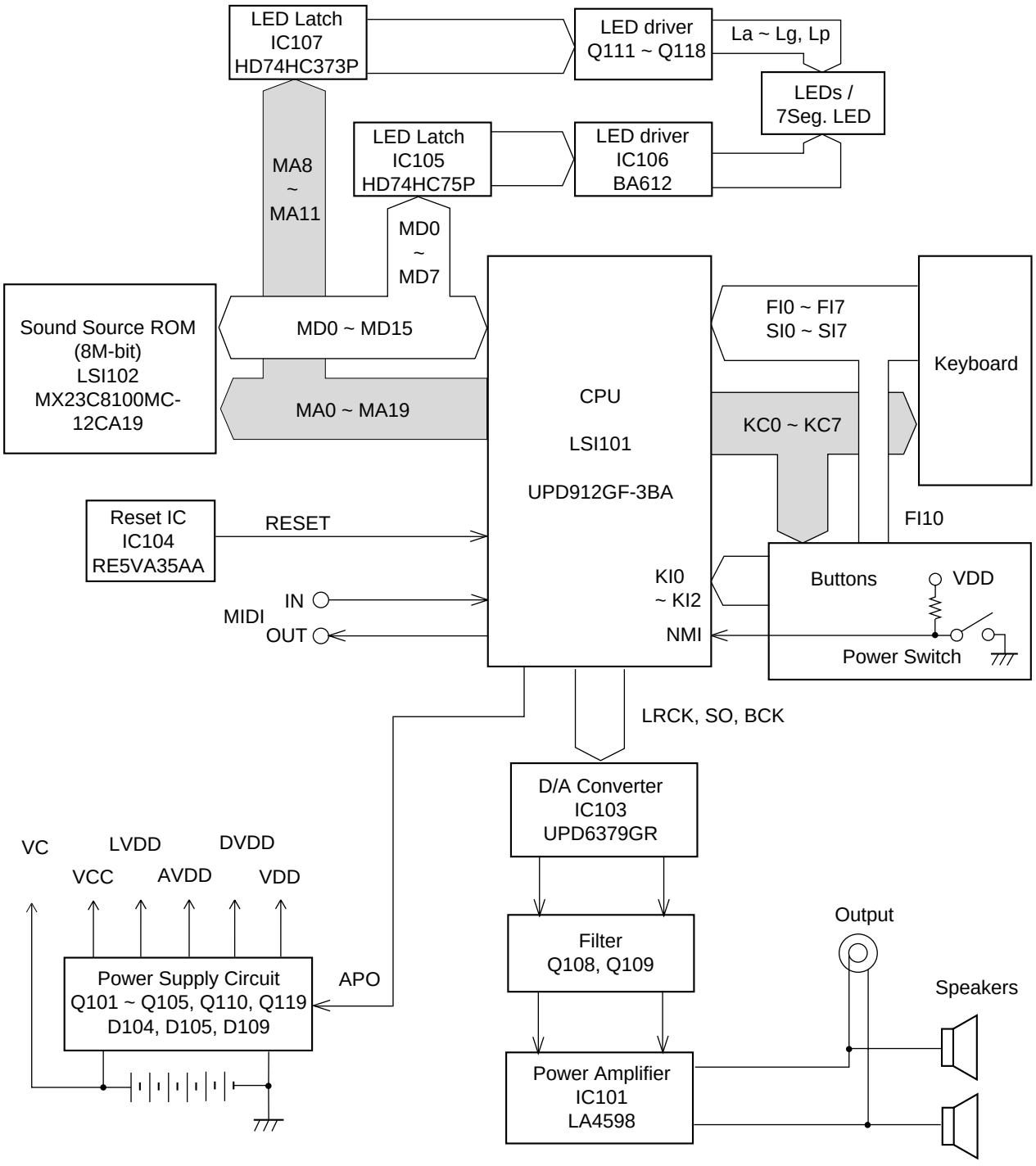
Current Drain with 9 V DC:

No Sound Output	180 mA ± 20%
Maximum Volume	825 mA ± 20%

with keys C3 to E4 pressed in Synth-Lead 1 tone
Volume: maximum, Touch response: maximum

Headphone output level (Vrms with 8 Ω load each channel):
with key C3 pressed in Pan Flute tone 210 mV ± 20%
Output level (Vrms with 47 kΩ load each channel):
with key C2 pressed in Pan Flute tone 2000 mV ± 20%
Speaker output level (Vrms with 4 Ω load each channel):
with key A1 pressed in Pan Flute tone 2150 mV ± 20%
Minimum operating voltage: 6.3 V

BLOCK DIAGRAM

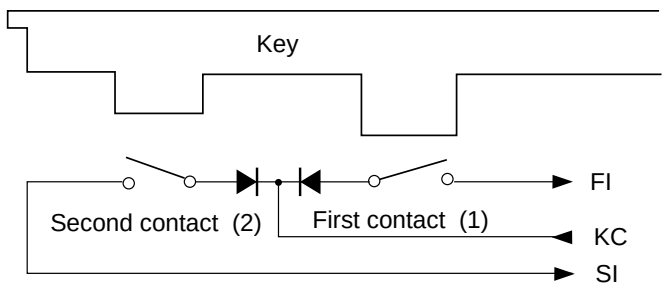


CIRCUIT DESCRIPTION

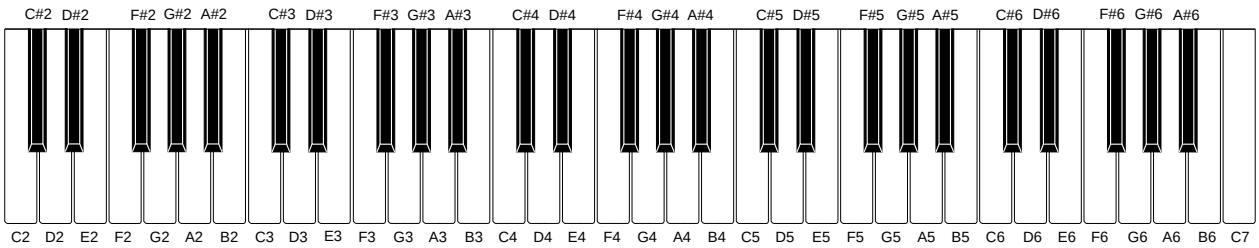
KEY MATRIX

	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)			
FI10		+	-	0	Accomp. Volume Up	Main Vol. Up	Mode	
KI0	Demo	3	2	1	Tempo Up	Main Vol. Down	Intro/ Fill-In	
KI1	Transpose Tune/MIDI	6	5	4	Rhythm	Accomp. Vol. Down	Synchro/ Ending	
KI2	Touch Response	9	8	7	Tone	Tempo Down	Start/ Stop	

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

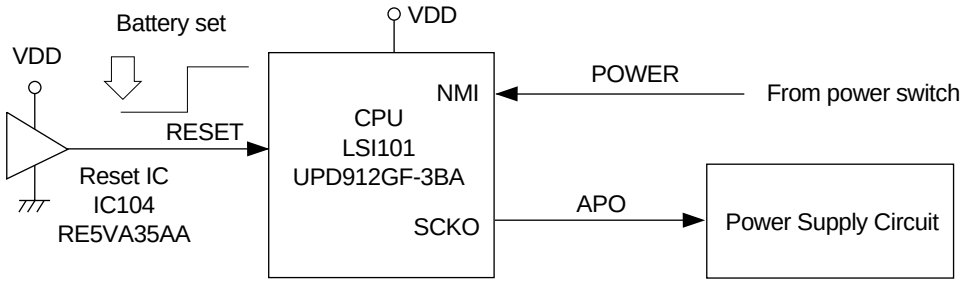


NOMENCLATURE OF KEYS



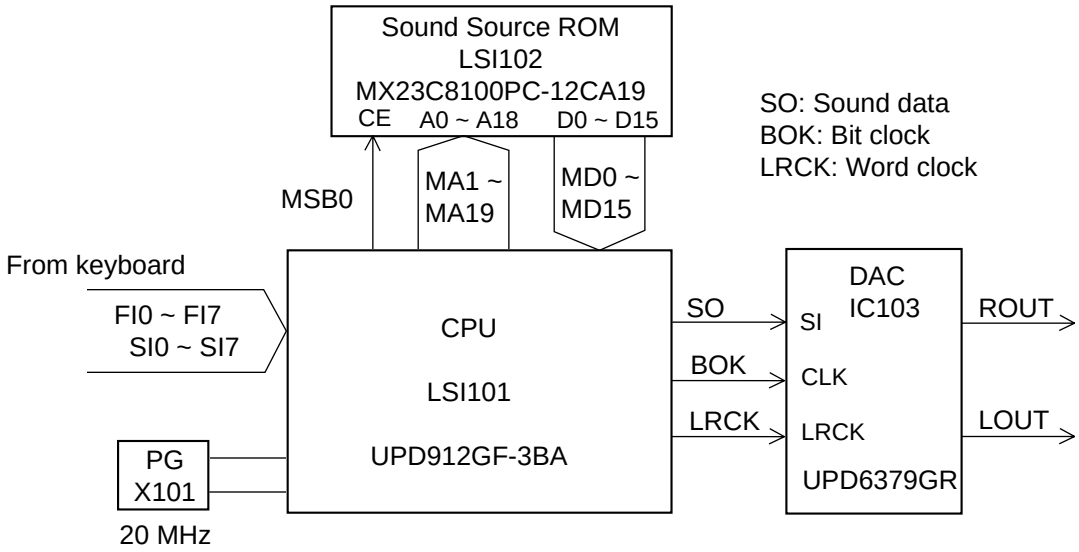
RESET CIRCUIT

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.
When the power switch is pressed, the CPU receives a low pulse of POWER signal.The CPU raises APO signal to +5 V to turn power on.



CPU (LSI101: 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 DAC.The CPU also controls MIDI input/output and LED driving.



The following table shows the pin functions of LSI101.

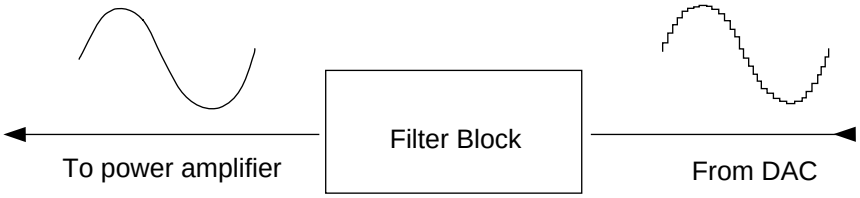
Pin No.	Terminal	In/Out	Function
1	TXD0	Out	MIDI signal input
2	RXD0	In	MIDI signal output
3	SCK0	Out	APO (Auto Power Off) signal output
4 ~ 6	——	——	Not used. Connected to ground.
7	AVCC	In	Ground (0 V) source
8, 9	AN0, AN1	——	Not used. Connected to ground.
10	AGND	In	Ground (0 V) source
11	BCK	Out	Bit 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. Connected to ground.
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	Key input signal
31 ~ 38	KC0 ~ KC7	Out	Key scan signal output
39 ~ 46	FI4 ~ FI7 SI4 ~ SI7	In	Key input signal
47 ~ 50	——	In	Not used.
51	FI10	In	Button input signal input
52	SI10	In	Not used
53 ~ 55	KI0 ~ KI2	In	Button input signal input
56	MWNB	Out	Not used.
57 ~ 76	MA1 ~ MA17	Out	Address bus
77	MCSB0	Out	Chip enable signal output for the sound source ROM
78, 79	——	Out	Not used
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	Latch enable signal output for LED latches
100	P17	In	APO cancellation signal input

DAC (IC103: UPD6379GR)

The DAC receives 16-bit serial data output from the CPU. 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 (IC102: LA4598)

The power amplifier is a two-channel amplifier with standby switch.
The following table shows the pin function of IC102.

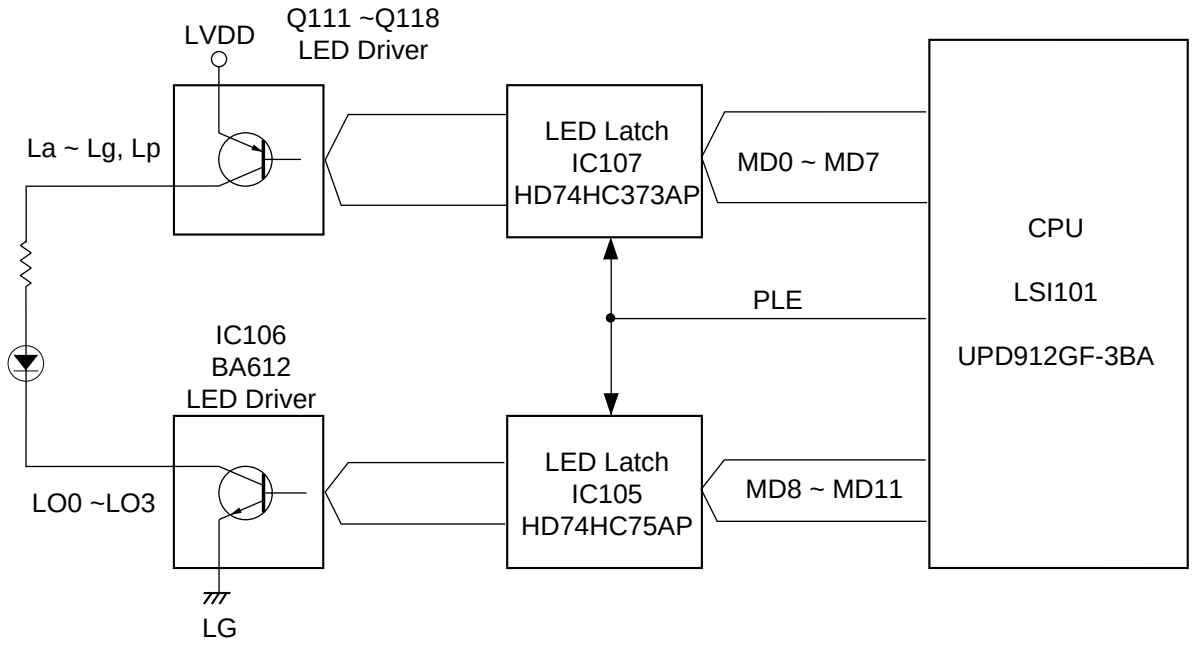
Pin No.	Terminal	In/Out	Function
1	Power GND	In	Ground (0V) source
2	Ch1 B.S.	——	Terminal for a bootstrap capacitor
3	Ch1 OUT	Out	Channel 1 output
4	VCC	In	+9V source
5	Ch1 N.F.	In	Negative feedback input
6	Ch1 IN	In	Channel 1 input
7	D.C.	——	Terminal for a decoupling capacitor
8	Pre GND	In	Ground (0V) 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

POWER SUPPLY CIRCUIT

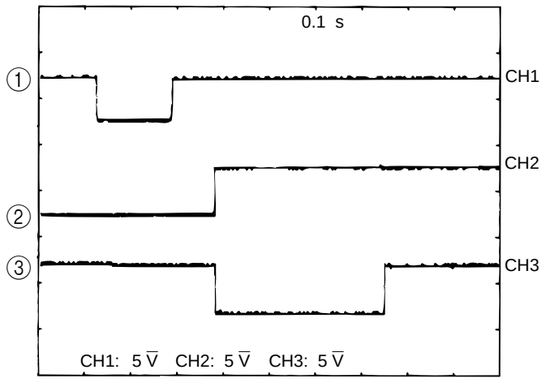
The power supply circuit generates six voltages as shown in the following table. VDD voltage is always generated. The others are controlled by APO signal from the CPU.

Name	Voltage	For operation of
VDD	+5 V	CPU, Reset IC, Sound source ROM, LED Latches
DVDD	+5 V	Power jack, Photocoupler
AVDD	+5V	DAC, Filter
LVDD	+5 V	LED Drivers
VCC	+9 V	Power amplifier, Pilot lamp
VC	+9 V	Power amplifier

LED DRIVING


LVDD
Q111 ~Q118
LED Driver
La ~ Lg, Lp
LED Latch
IC107
HD74HC373AP
MD0 ~ MD7
CPU
LSI101
UPD912GF-3BA
PLE
IC106
BA612
LED Driver
LED Latch
IC105
HD74HC75AP
MD8 ~ MD11
LO0 ~LO3
LG

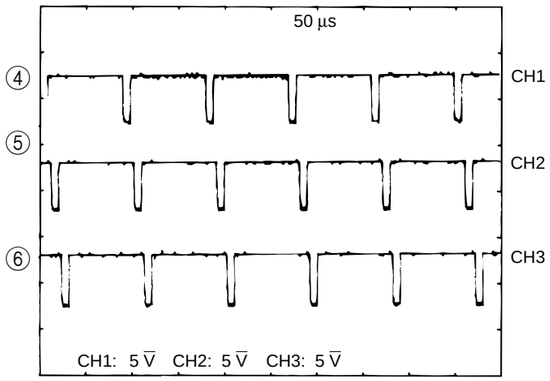
MAJOR WAVEFORMS



① POWER ON signal
UPD912GF-3BA pin 21

② APO signal
UPD912GF-3BA pin 3

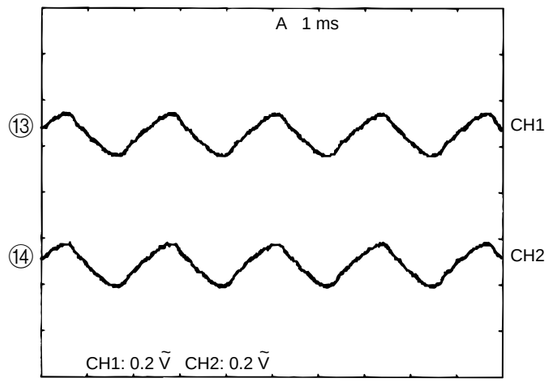
③ Reset signal for the DSP
UPD912G-3BA pin 99



④ Key scan signal KC0
UPD912GF-3BA pin 31

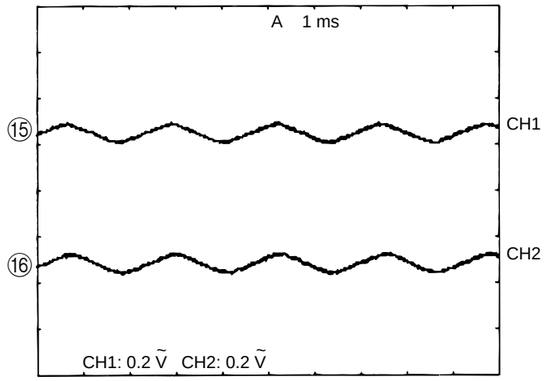
⑤ Key scan signal KC1
UPD912GF-3BA pin 32

⑥ Key scan signal KC2
UPD912GF-3BA pin 33



⑬ DAC output (R-ch)
UPD6379GR pin 5

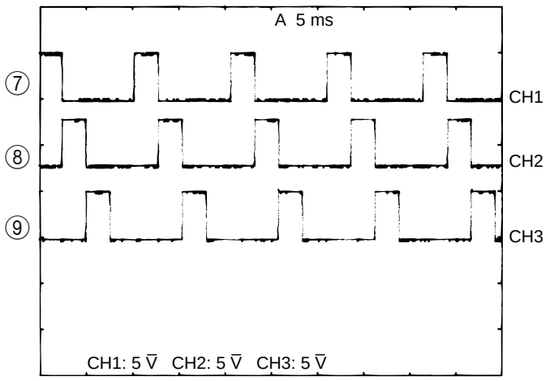
⑭ DAC output (L-ch)
UPD6379GR pin 8



⑮ Amp. input (R-ch)
LA4598 pin 6

⑯ Amp. input (L-ch)
LA4598 pin 10

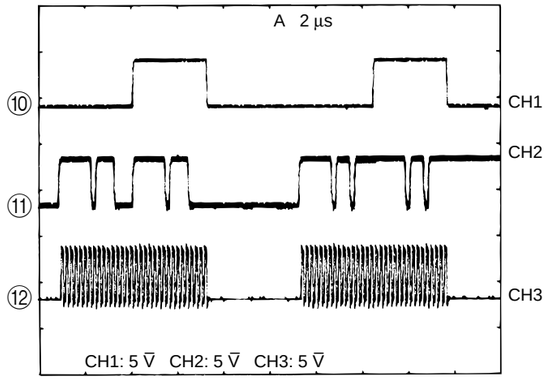
Tone: Pan Flute (39)
Key: A4
Touch response: Off
Volume: Maximum



⑦ LED drive signal
BA612 pin 13

⑧ LED drive signal
BA612 pin 12

⑨ LED drive signal
BA612 pin 11



⑩ Word clock LRCK
UPD912GF-3BA pin 13

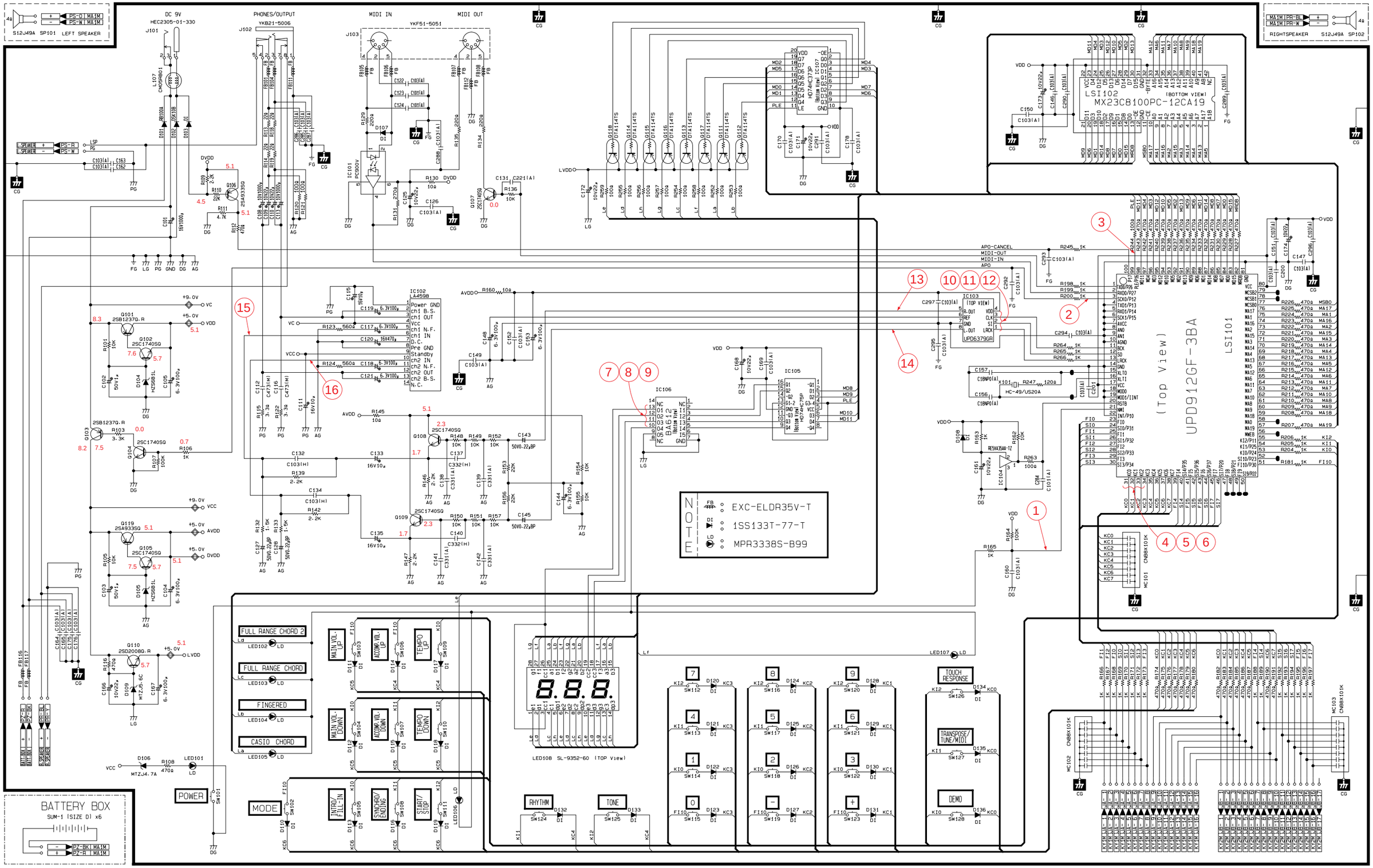
⑪ Data signal SO
UPD912GF-3BA pin 12

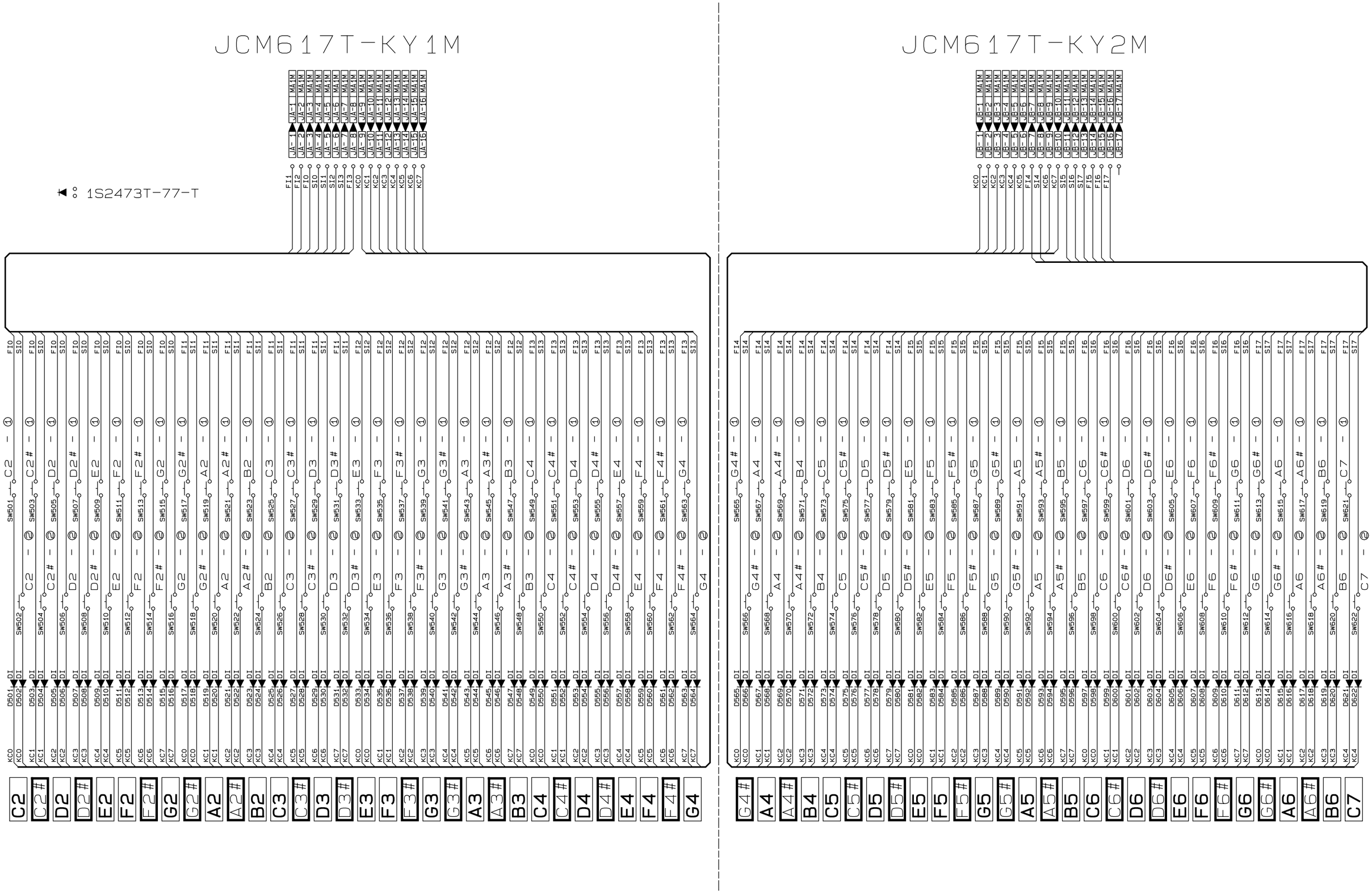
⑫ Bit clock BCK
UPD912GF-3BA pin 11

PCB VIEW AND CHECK POINTS

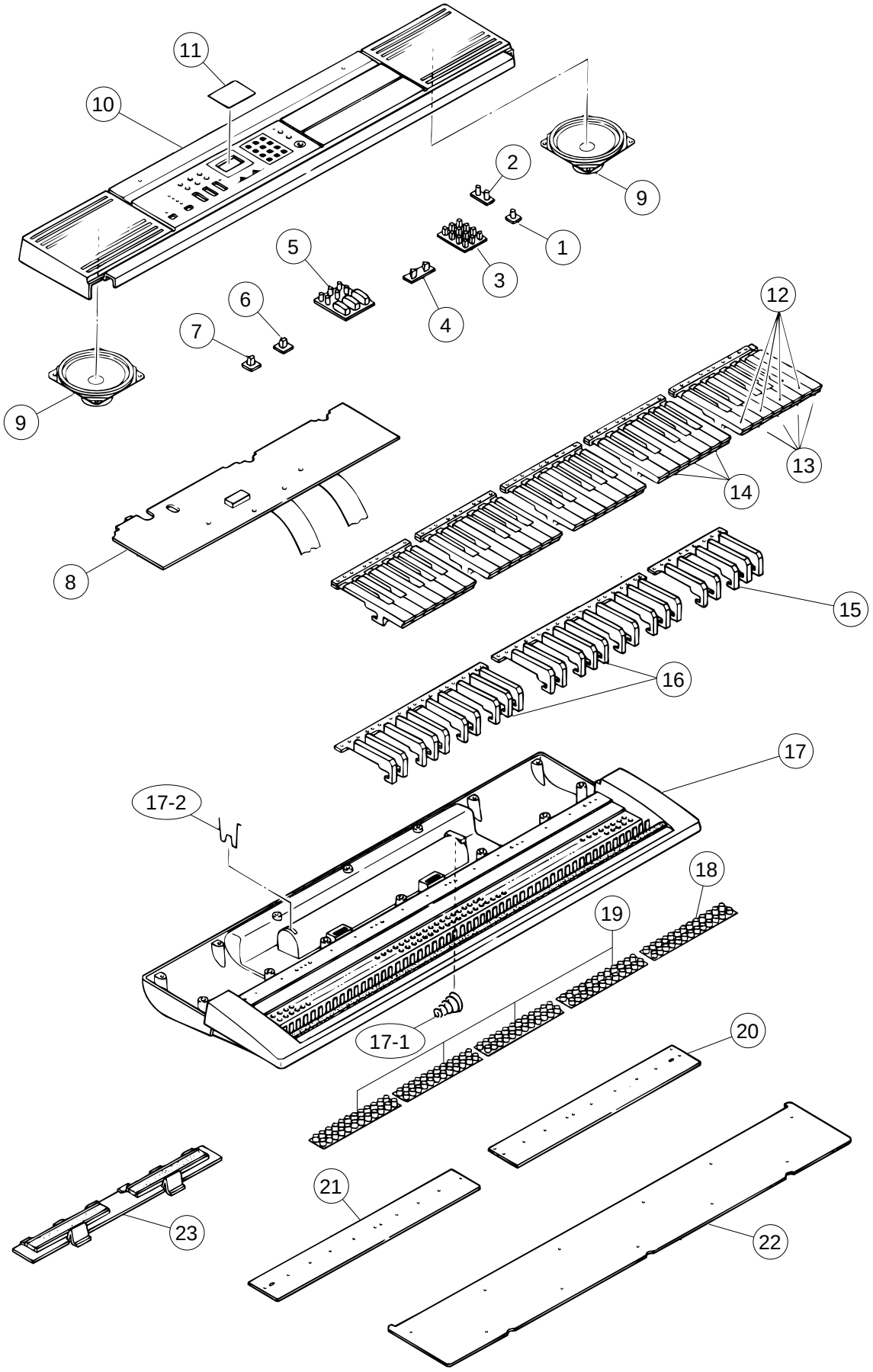
SCHEMATIC DIAGRAMS

JCM460-MA1M




JCM617T-KY1M
JCM617T-KY2M
1S2473T-77-T

EXPLODED VIEW



PARTS LIST

CTK-530

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	FOB Japan N.R.Yen Unit Price	R
		Main PCB					
N	8	6923 6930	PCB ass'y JCM460-MA1M	M140198*1	1	5,550	B
N	LSI101	2012 0168	LSI	UPD912GF-3BA	1	750	A
N	LSI102	2012 0686	LSI	MX23C8100PC-12CA19	1	840	A
	IC101	2114 1421	IC	PC900V	1	210	B
	IC102	2114 2891	IC	LA4598	1	140	A
N	IC103	2105 4249	LSI	UPD6379GR	1	150	A
	IC104	2105 3941	IC	RE5VA35AA-TZ	1	44	A
N	IC105	2105 4438	IC	HD74HC75P	1	44	B
	IC106	2114 3318	IC	BA612	1	98	A
N	IC107	2105 4431	IC	HD74HC373P	1	85	B
	Q101, Q103	2251 0469	Transistor	2SB1237Q,R-TV6-T	2	24	A
	Q102, Q104, Q105, Q107~Q109	2220 1387	Transistor	2SC1740SQ-TP-T	6	13	B
	Q106, Q119	2200 4409	Transistor	2SA933-SQ-TP-T	2	14	B
	Q110	2253 0357	Transistor	2SD2008Q,R-T105-T	1	30	A
	Q111~Q118	2259 1883	Digital transistor	DTA114TS-TP-T	8	10	B
N	X101	2590 2009	Cryatal oscillator	HC-49/US20A	1	110	A
	D101	2390 1316	Diode	SB10-04A3-BT-T	1	28	B
	D102	2390 0371	Diode	DSK10B-BT-T	1	11	B
	D103, D107, D108, D110~D136	2390 1344	Diode	1SS133T-77-T	30	3	B
	D104, D105	2360 1085	Zener diode	HZS6B1LTD-T	2	10	A
	D106	2360 2079	Zener diode	MTZJ4.7AT-77-T	1	8	A
	D109	2360 1946	Zener diode	MTZJ5.6CT-77-T	1	8	A
	LED101~ LED107	2370 1106	LED	MPR3338S-B99	7	24	B
	LED108	2370 1141	LED	SL-9352-60	1	200	B
	J101	3501 7049	Jack, Power	HEC2305-01-330	1	29	A
	J102	3612 0665	Jack, Phone	YKB21-5006	1	60	B
	J103	3501 4816	Jack, DIN	YKF51-5051	1	110	B
	L107	3841 1057	Coil	CM05RB01	1	63	C
	MC101~ MC103	2845 0168	Module capacitor	CNB8X101K	3	58	C
		Keyboard PCBs					
	20	6923 6940	PCB ass'y M617T-KY1M	M140211*1	1	750	B
	D501~D564	2301 0101	Diode	1S2473-T-77-T	64	8	C
	21	6923 6950	PCB ass'y M617T-KY2M	M140212*1	1	710	B
	D565~D622	2301 0101	Diode	1S2473-T-77-T	58	8	C
		Mechanical Parts					
N	1	6923 7050	Rubber button	M340082-1	1	75	B
	2	6922 2680	Rubber button	M312082-2	1	29	B
N	3	6923 4331	Rubber button	M312088A-2	1	97	B
N	4	6923 7040	Rubber button	M240127-1	1	95	B
N	5	6923 7030	Rubber button	M240096-1	1	160	B
N	6	6923 4990	Rubber button, MODE	M312123-2	1	28	B
N	7	6923 4980	Rubber button, POWER	M312122-2	1	28	B
N	9	3831 0833	Speaker	S12J49A	2	450	B
N	10	6923 7020	Panel	M140046-1	1	1,300	B
N	11	6923 7010	Display plate	M340157-1	1	120	B
	12	6922 2840	White key set, CEGB	M111723-1	5	100	A
	13	6922 2860	White key set, DFAS	M111725-1	1	100	A

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

N	Item	Code No.	Parts Name	Specification	Q	FOB Japan N.R.Yen Unit Price	R
	14	6922 2850	White key set, DFA	M111724-1	4	100	A
	15	6922 2750	Black key set, 5-key	M111726-2	1	86	A
	16	6922 2740	Black key set, 10-key	M111726-1	2	120	A
N	17	6923 7060	Case	M140171*1	1	2,470	C
	17-1	6902 6140	Battery spring (-)	M41226-1	1	27	B
	17-2	6903 2150	Battery spring (+)	M41330-1	1	18	B
	18	6922 2771	Key contact rubber	M211704A-1	4	89	A
	19	6922 2761	Key contact rubber	M211705A-1	1	91	A
N	22	6923 7000	Bottom plate	M240116-1	1	630	C
	23	6918 1636	Battery cover	M311164F*1	1	200	B
		Accessory					
		6916 7880	Music stand	M310827-1	1	120	B

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

Description of Capacitors

A general description of capacitors is shown in the following table.
The description consists of Type, Value, Rated Voltage and Tolerance.
When you need a capacitor, please find a substitution in your country by yourselves referring to the description.

Ref. No of Capacitor	Description
C101, C107, C125, C211	Electrolytic, 16 V, 470 µF, +/-20%
C110, C153	Electrolytic, 6.3 V, 220 µF, +/-20%
C103, C104, C113, C114, C121, C137~C139, C145, C167, C171, C193, C197	Electrolytic, 10 V, 22 µF, +/-20%
C108	Electrolytic, 16 V, 10 µF, +/-20%
C152, C162	Electrolytic, 50 V, 1 µF, +/-20%
C111, C182	Electrolytic, 6.3 V, 470 µF, +/-20%
C102, C124, C126, C134, C159~C161	Electrolytic, 6.3 V, 100 µF, +/-20%
C123, C127	Electrolytic, 10 V, 100 µF, +/-20%
C144, C165	Semiconductive, 16 V, 2200 pF, +/-10%
C147, C164	Semiconductive, 16 V, 0.033 µF, +/-10%
C130, C131	Semiconductive, 16 V, 0.047 µF, +/-10%
C128, C129, C154, C174	Semiconductive, 16 V, 0.01 µF, +/-10%
C118, C119	Semiconductive, 16 V, 0.018 µF, +/-10%
C140, C155, C166, C170, C175~C179, C181, C185, C186, C188, C189, C192, C194~C196, C198, C200	Ceramic, 50 V, 0.1 µF, +80/-20%
C105, C120, C132, C133, C135, C136, C141, C142, C146~C150, C163, C172, C173, C180, C184, C187, C212~C214	Ceramic, 50 V, 100 pF, +/-10%
C122, C199	Ceramic, 50 V, 1000 pF, +/-10%
C168	Ceramic, 50 V, 0.01 µF, +/-20%
C191	Semiconductive, 16 V, 33 pF, +/-10%
C156, C157	Semiconductive, 16 V, 4 pF, +/-0.5 pF
C190	Semiconductive, 16 V, 22 pF, +/-10%
C116, C117	Mylar, 50 V, 0.047 µF, +/-10%
C112, C115	Electrolytic, 10 V, 1000 µF, +/-20%

Description of Resistors

A general description of resistors is shown in the following table.
The description consists of Type, Value, Rated Wattage and Tolerance.
When you need a resistor, please find a substitution in your country by yourselves referring to the description.

Note:
All resistors are carbon film, 1/5 watt, +/-5% otherwise specified.

Ref. No of Resistor	Description
R107, R137, R145~R147, R150, R163, R164, R168~R170, R189	1 KΩ
R102, R103, R133, R135, R142	220 Ω
R220~R230	330 Ω
R132, R143, R159, R185, R292	10 Ω
R115, R116, R127, R139~R141, R149, R158, R166, R171~R173, R186~R188, R206, R208~R211, R213, R215	100 Ω
R175, R212, R214	100 KΩ
R105, R138, R148, R161, R274, R293, R295	10 KΩ
R110, R291	22 Ω
R117, R118	3.3 Ω
R111~R114	82 Ω
R125, R126, R160	4.7 KΩ
R207	1.5 KΩ
R134	2.2 KΩ
R136	270 Ω
R106, R108, R151~R157, R165, R251~R273, R275~R283	470 Ω
R104, R294	47 KΩ
R178~R184, R218, R219, R231~R250	56 KΩ
R216	1 MΩ
R174, R176, R177, R192~R199	33 KΩ
R123, R124, R130, R131	15 KΩ
R128, R129	5.6 KΩ
R217	560 Ω
R162, R167	18 KΩ
R190, R191, R200~R205	33 Ω
R120, R121, R144	47 Ω

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