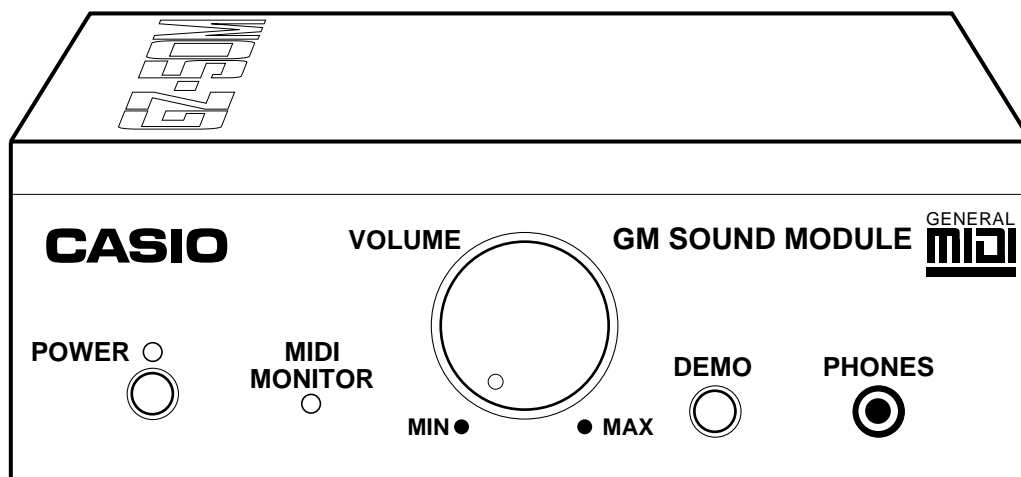


CASIO®

Service Manual

(with price)

GZ-50M



INDEX

GM SOUND MODULE

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SPECIFICATIONS

GENERAL

Sound source:	The General MIDI system 1
	Number of tones: 128
	Number of drum sets: 8
	Number of layer voice: 32
Digital effects:	10, including Reverb-1, Reverb-2, Reverb-3, Chorus, Tremolo, Phase Shifter, Organ SP, Enhancer, Flanger, EQ Loudness
Demonstration tune:	Suite for Rebecca (Arranged and programmed by Wojtek Gogoleski)
Volume control:	Analog volume
MIDI monitor:	LED
Tuning:	Center: 440 Hz
Terminals:	Headphone Jack [Output impedance: 68 Ω , Output voltage: 0.3 V(rms)MAX], Line Out Jack [Output impedance: 2 K Ω , Output voltage: 1.5 V8rms) MAX], MIDI IN Jack, AC Adapter Jack (9 V)
Power source:	AC source only: AC adapter
Power consumption:	2.8 W
Dimensions (HWD):	35 x 113 x 169 mm (1-3/8 x 4-7/16 x 6-5/8 inches)
Weight:	450 g (1 lbs)

ELECTRICAL

Current drain with 9 V DC:	
No sound output	210 mA \pm 20%
Maximum volume	230 mA \pm 20%
with 32 polyphonic in tone No.078	
Volume; maximum, Touch response: maximum	
Phone output Level (Vrms with 8 Ω load each channel):	
with keys C6 and F6 in tone No.078	85 mV \pm 20%
Line output level (Vrms with 47 K Ω load each channel):	
with keys C6 and F6 in tone No.078	300 mV \pm 20%
Minimum operating voltage:	4.0 V

MIDI messages receivable with GZ-50M

MIDI channel:	1 - 16 channel		
Note On/Off:	Note number	0 - 127	
	Velocity	1 - 127	
Program change:	0 - 127 on channel 1 -9 & 11 - 16		
	0 - 7 on channel 10		
Pitch bend:	00H/00H - 7FH/7FH		
Control change:	Modulation	Control No. 1	0 - 127
	Volume	Control No. 7	0 - 127
	Pan	Control No. 10	0 (left) - 64 (center) - 127 (right)
	Expression	Control No. 11	0 - 127
	Hold	Control No. 64	0 - 63: Off, 64 - 127: On
	Sostenuto	Control No. 66	0 - 63: Off, 64 - 127: On
	Soft	Control No. 67	0 - 63: Off, 64 - 127: On
	Effect depth	Control No. 91	0 - 127
	All sounds off	Control No. 120	
	Reset all controllers	Control No. 121	
	* See next page for information about the initial settings.		
	Local control On/Off	Control No. 122	0: Off, 127: On
	All notes off	Control No. 123	
	Registered Parameter Number (RPN)	Control No. 36: LSB, No.37: MSB	
	Pitch bend sense	Control No. 100	00H
		Control No. 101	00H
	Data entry	Control No. 6	00H - 0CH
		Control No. 36	00H
	Fine tuning	Control No. 100	01H
		Control No. 101	00H (20H: -50 cents)
	Data entry	Control No. 6	20H - 40H - 60H (40H: center)
		Control No. 36	00H (60H: +50 cents)
	Coarse tuning	Control No. 100	02H
		Control No. 101	00H (34H: -12 seminotes)
	Data entry	Control No. 6	34H - 40H - 4CH (40H: center)
		Control No. 36	00H (4CH: +12 seminotes)
	RPN null	Control No. 100	7FH
		Control No. 101	7FH

Active sensing:

Channel pressure: Reconized as modulation

System exclusive: Effect change [F0][44][0B][09][xx][F7]

[xx]: [00] - [09], [0F]

[00]: Reverb1 (Stage)

[01]: Reverb2 (Hall)

[02]: Reverb3 (Room)

[03]: Chorus

[04]: Tremolo

[05]: Phase shifter

[06]: Organ speaker

[07]: Enhance

[08]: Flanger

[09]: EQ Loudness

[0F]: Effect OFF

GM system on [F0][7E][7F][09][01][F7]

* See next page for information about the initial settings in The General MIDI system.

The initial settings

Pitch bend:	0
Modulation:	0 (Off)
Expression:	127 (Maximum)
Sustain:	0 (Off)
Sostenuto:	0 (Off)
Soft:	0 (Off)
Channel pressure:	0 (Off)
RPN:	Null

The initial settings in The General MIDI system

Channel 1 - 9 & 11 - 16

Program change:	000 (Piano)
Pitch bend:	LSB: 40H, MSB: 00H
Modulation:	0 (Off)
Volume:	100
Pan:	64 (Center)
Expression:	127 (Maximum)
Sustain:	0 (Off)
Soft:	0 (Off)
Effect depth:	127 (Maximum)
Pitch bend sense:	02 (2 seminotes)
Coarse tune:	LSB:40H, MSB:00H
Fine tune:	LSB:40H, MSB:00H
RPN:	Null
Channel pressure:	0 (Off)

Channel 10

Drum set No.:	0
Volume:	100
Pan:	64 (Center)
Expression:	127 (Maximum)
Effect depth:	127 (Maximum)
Soft:	0 (Off)

Function ...		Transmitted	Recognized	Remarks
Basic Channel	Default Changed	X X	1-16 channel 1-16 channel	
Mode	Default Messages Altered	X X *****	Mode 3 X *****	
Note Number:	True voice	X *****	0 ~ 127 12 ~ 108 *1	*1:Different per tones.
Velocity	Note ON Note OFF	X X	O 9nH v = 1~127 X 9nH v = 0, 8nH V=**	** = No relation
After Touch	Key's Ch's	X X	X O *2	
Pitch Bender		X	O	
Control Change	01 06, 38 07 10 11 64 66 67 91 100, 101 120 121	X X X X X X X X X X X X	O *2 O *3 O O O O O O O *3 O O	Modulation Data entry Volume Pan Expression Hold 1 Sostenuto Soft External effect depth RPN LSB • MSB All sounds off Reset all controllers
Program Change :	True #	X *****	O 0 ~ 127 *****	
System Exclusive		X	O *4	
System Common	: Song Pos : Song Sel : Tune	X X X	X X X	
System Real Time	: Clock : Commands	X X	X X	
Aux Messages	: Local ON/OFF : All notes OFF : Active Sense : Reset	X X X X	X O O X	
Remarks	*2: Vibrato effect is obtained when received either message of modulation or channel after touch. *3: Reception of pitch bend sense, fine tune, coarse tune, and RPN Null. *4: GM system on [F0][7E][7F][09][01][F7] Effect Change [F0][44][0B][09][xx][F7] [xx]: E_0[00] - E_9[09], Off[0F]			

Mode 1 : OMNI ON, POLY
Mode 3 : OMNI OFF, POLY

Mode 2 : OMNI ON, MONO
Mode 4 : OMNI OFF, MONO

O : Yes
X : No



TONE NO./TONE NAME	GM OCTAVE RANGE	TONE NO./TONE NAME	GM OCTAVE RANGE
REED		SYNTH-SFX	
064 SOPRANO SAX	F#3 – D#6	096 PEARL DROP	C2 – C7
065 ALTO SAX	C#3 – G#5	097 SOUNDTRACK	C2 – C7
066 TENOR SAX	F#2 – D#5	098 CRYSTAL	C2 – C7
067 BARITONE SAX	C#2 – G#4	099 ATMOSPHERE	C2 – C7
068 OBOE	A#3 – G6	100 BRIGHTNESS	C2 – C7
069 ENGLISH HORN	E3 – A5	101 LABYRINTH	C2 – C7
070 BASSOON	A#1 – C5	102 ECHOES	C2 – C7
071 CLARINET	D3 – G6	103 COSMIC SOUND	C2 – C7
PIPE		ETHNIC	
072 PICCOLO	D5 – C8	104 SITAR	C3 – F5
073 FLUTE	C4 – C7	105 BANJO	C3 – C6
074 RECORDER	C4 – C7	106 SHAMISEN	D3 – G5
075 PAN FLUTE	C4 – C7	107 KOTO	G3 – C6
076 BOTTLE BLOW	C4 – C7	108 THUMB PIANO	C3 – G5
077 SHAKUHACHI	G3 – C6	109 BAG PIPE	C2 – F5
078 WHISTLE	C4 – C7	110 FIDDLE	G3 – C7
079 OCARINA	C4 – C6	111 SHANAI	C3 – C5
SYNTH-LEAD		PERCUSSION	
080 SYNTH - LEAD 1	A0 – C8	112 BELLS	C5 – C6
081 SYNTH - LEAD 2	A0 – C8	113 AGOGO	C4 – C5
082 CALLIOPE	C2 – C7	114 STEEL DRUM	E3 – E5
083 POWER LEAD	C2 – C7	115 WOOD BLOCK *1	C4 – C5
084 METAL LEAD	C2 – C7	116 TAIKO *1	C4 – C5
085 ANGEL CHOIR	C2 – C7	117 TOM *1	C4 – C5
086 FIFTH LEAD	C2 – C7	118 ELEC TOM *1	C4 – C5
087 BASS+LEAD	A0 – C8	119 REVERSE CYMBAL *1	C4 – C5
SYNTH-PAD		SFX	
088 FANTASY	C2 – C7	120 GT FRET NOISE *1	C4 – C5
089 WARM STRINGS	C2 – C7	121 BREATH NOISE *1	C4 – C5
090 SYNTH-ENS	C2 – C7	122 SEASHORE *1	C4 – C5
091 SPACE CHORUS	C2 – C7	123 BIRD *1	C4 – C5
092 GLASS HARMONICA	C2 – C7	124 TELEPHONE *1	C4 – C5
093 ILLUSION	C2 – C7	125 HELICOPTER *1	C4 – C5
094 COUNTRY FARM	C2 – C7	126 APPLAUSE *1	C4 – C5
095 SYNTH-PAD	C2 – C7	127 GUNSHOT *1	C4 – C5

*1 Tone without scale.

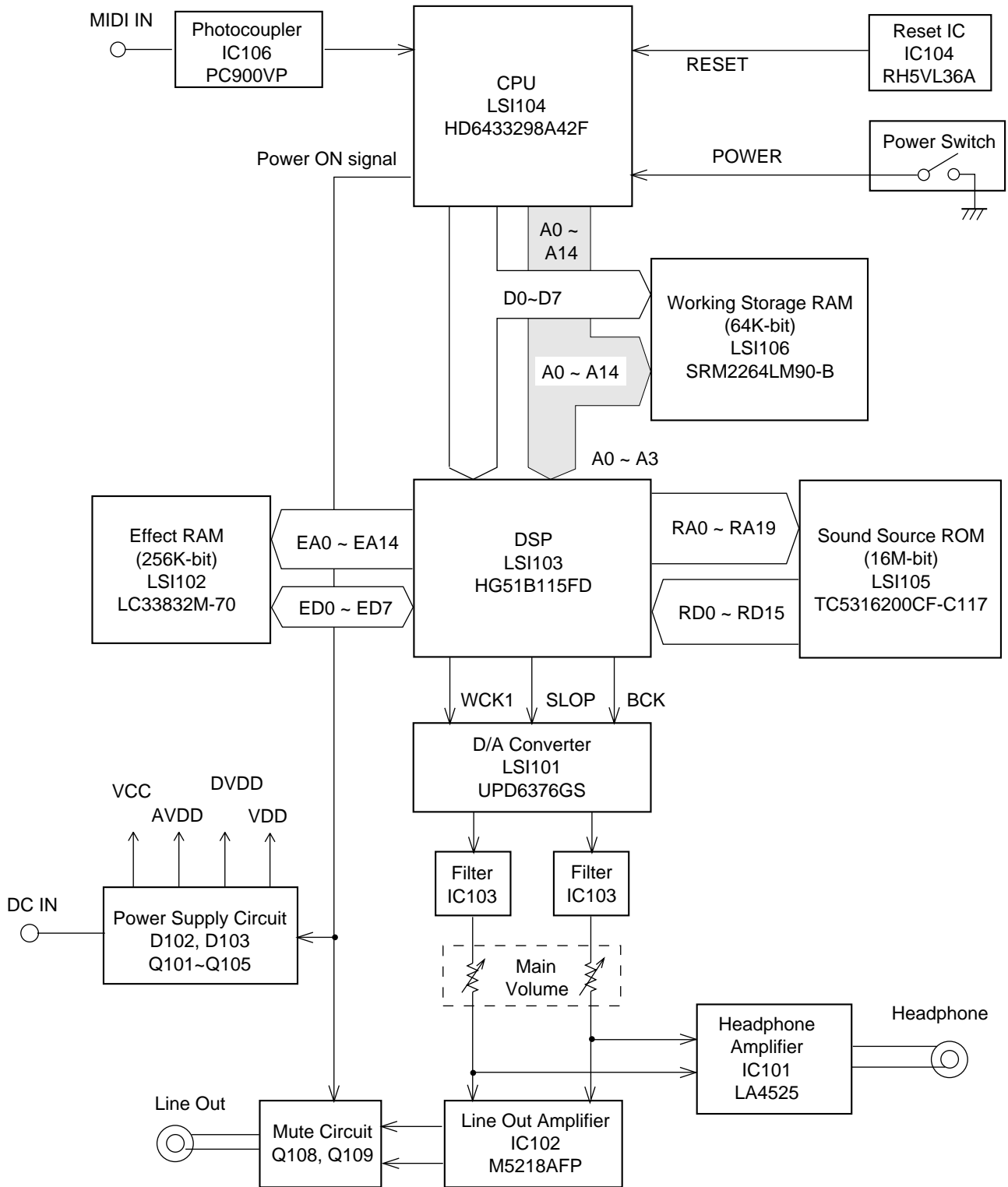
LIST OF DRUM SOUNDS

	NOTE NO.	DRUM INSTRUMENT NAME
	35	Acoustic Bass Drum
	36	Bass Drum 1
C#2	37	Side Stick
	38	Acoustic Snare
D#2	39	Hand Clap
	40	Electric Snare
	41	Low Floor Tom
F#2	42	Closed Hi Hat

44Tj /F9 1 Tf 8 0 0 8401 340.507 5748.799 Tm (Pedal Hi Ha

Blank musical staff lines with blacked-out note boxes for editing.

BLOCK DIAGRAM



CIRCUIT DESCRIPTION

CPU (LSI104: HD6433298A42F)

The 16-bit CPU contains a 32k-bit ROM, a 1k-bit RAM, seven 8-bit I/O ports and MIDI interfaces. The CPU receives MIDI message and interprets it using the working storage RAM. For instance, when receiving NOTE ON message, the CPU sends the note number and its velocity to the DSP in order to produce sound of that note.

The following table shows the pin functions of LSI104.

Pin No.	Terminal	In/Out	Function
1	P50/TXD	—	Not used
2	P51/RXD	In	MIDI signal input
3	P52/SCK	Out	Reset signal output
4	-RESET	In	Reset signal input
5	-NMI	In	Power ON trigger signal input
6	VCC	In	+5V source
7	-STBY	In	Standby signal input. Connected to +5V.
8	VSS	In	Ground (0V) source
9, 10	XTAL, EXTAL	In	20MHz clock input
11, 12	MD1, MD0	In	Mode selection input
13	AVSS	In	Ground (0V) source
14 ~ 20	P70 ~ P76	In	Not used. Connected to ground.
21	P77	In	DEMO button input signal
22	AVCC	In	+5V source
23	P60	Out	LED drive signal output
24 ~30	P61 ~ P67	—	Not used
31	VCC	In	+5V source
32	P27	—	Not used
33 ~ 48	A0 ~ A14	Out	Address bus
40	VSS	In	Ground (0V) source
49 ~ 56	D0 ~ D7	In/Out	Data bus
57, 58	P40, P41	—	Not used.
59	P42	Out	Power ON signal output
60	P43	Out	Read enable signal output
61	P44	In	Write enable signal output
62	P45	—	Not used
63	P46	Out	Terminal for 10 MHz clock check point
64	P47	—	Not used. Connected to +5 V source.

DIGITAL SIGNAL PROCESSOR (LSI03: HG51B155FD-1)

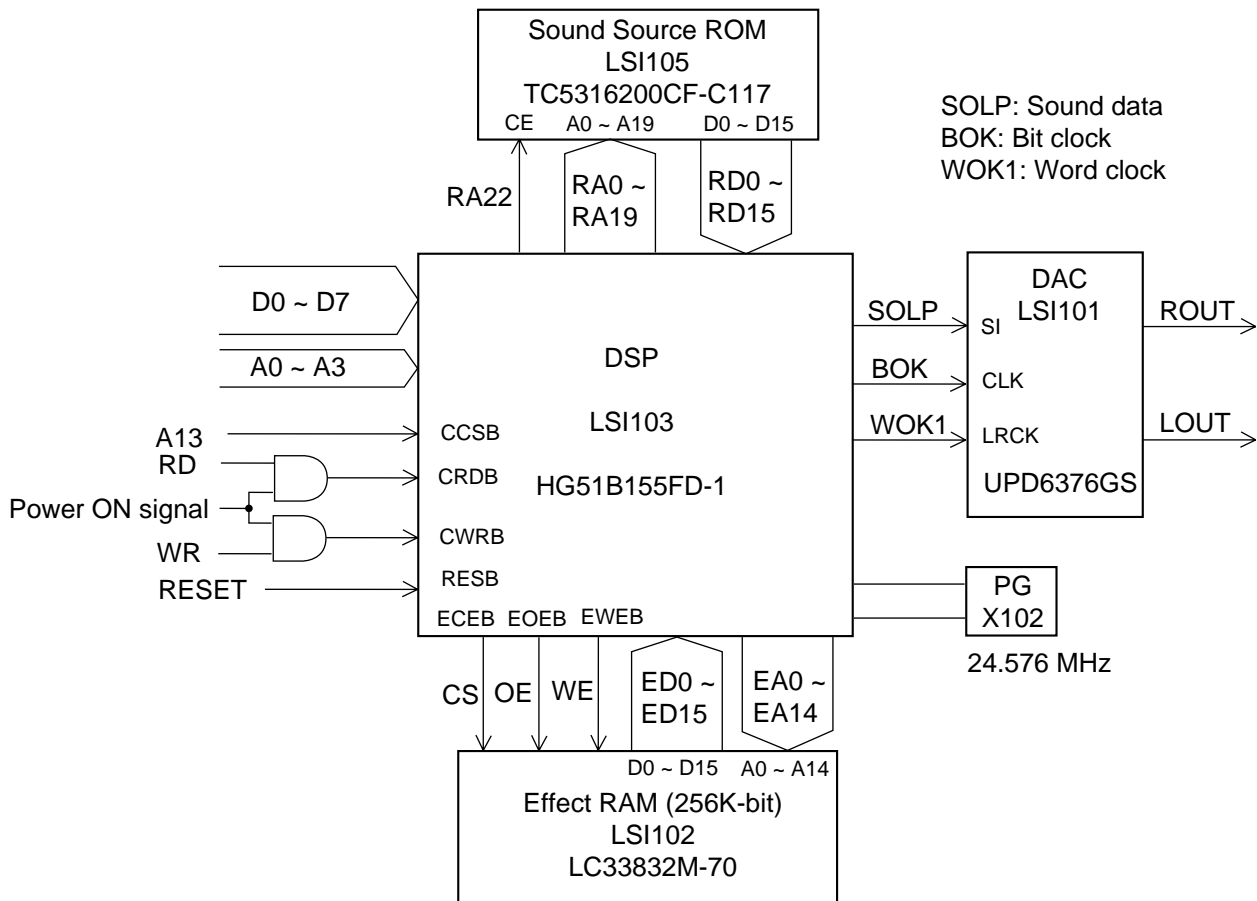
Upon receipt of a note number and its velocity, the DSP reads sound and velocity data from the sound source ROM in accordance with the received MIDI message. Then it provides 16-bit serial signal to the DAC. If a control change message or "an effect change" of exclusive message has been received, the DSP adds the effect to the sound data using the effect RAM.

The following table shows the pin functions of LSI103.

Pin No.	Terminal	In/Out	Function
1 ~ 8	CD0 ~ CD7	In/Out	Data bus
9, 10	CE1, TRSB	—	Not used
11	GND7	In	Ground (0V) source
12	CK16	Out	Terminal for 24.576 MHz clock check point
13	VCC1	In	+5V source
14	CK0	In	Clock input. Connected to terminal CK16.
15	TCKB	—	Not used
16	VCC1	In	+5V source
17	GND1	In	Ground (0V) source
18, 19	XT0, XT1	In/Out	24.576 MHz clock input/output
20	SGL	In	System control terminal. Single chip system: Open
21	CCSB	In	Chip select signal input
22 ~ 25	CA0 ~ CA3	In	Address bus
26	CE0	In	Not used. Connected to ground.
27	CWRB	In	Write enable signal
28	CRDB	In	Read enable signal
29 ~ 32	—	—	Not used
33	RESB	In	Reset signal input
34	TESB	In	Not used. Connected to +5V.
35 ~ 39	—	—	Not used
40 ~ 49 52 ~ 57	RD0 ~ RD15	In	Data bus for the sound source ROM
50	VCC2	In	+5V source
51	GND2	In	Ground (0V) source
58	RA23	Out	Not used
59	RA22	Out	Chip select signal for the sound source ROM
60, 61	RA20, RA21	Out	Not used
62 ~ 73 75 ~ 82	RA0 ~ RA19	Out	Address bus for the sound source ROM
74	GND5	In	Ground (0V) source
83	WOK2	Out	Not used
84	VCC3	In	+5V source
85	GND3	In	Ground (0V) source
86	WOK1	Out	Word clock for the DAC
87	SOLM	Out	Not used
88	SOLP	Out	Serial sound data output
89	BOK	Out	Bit clock output
90 ~ 92	—	—	Not used
93	VCC5	In	+5V source
94, 95 97 ~ 105 107, 109 110, 112	EA0 ~ EA12	Out	Address bus for the effect RAM
96	EWEB	Out	Write enable signal for the effect RAM

Pin No.	Terminal	In/Out	Function
106	EOEB	Out	Read enable signal output for the effect RAM
108	VCC7	In	+5V source
111	ECEB	Out	Chip select signal output for the effect RAM
113 ~ 117	ED11 ~ ED15	—	Not used
118	VCC4	In	+5V source
119	GND4	In	Ground (0V) source
120 ~ 122	ED8 ~ ED10	—	Not used
123 ~ 130	ED0 ~ ED7	In/Out	Data bus for the effect RAM
131	GND5	In	Ground (0V) source
132 ~ 134	—	—	Not used. Connected to ground.
135, 136	—	—	Not used

Block diagram of DSP and DAC circuit



DAC (LSI01: UPD6376GS)

The DAC receives 16-bit serial data and two clocks output from the DSP. The DAC converts the data into analog waveforms by each channel and output them separately. The following table shows the pin functions of LSI01.

Pin No.	Terminal	In/Out	Function
1	SEL	In	Mode selection terminal. Connected to ground.
2	D.GND	In	Ground (0V) source for the internal digital circuit
3	NC	—	Not used.
4	DVDD	In	+5V source for the internal digital circuit
5	A.GND	In	Ground (0V) source for the right channel
6	R.OUT	Out	Right channel sound waveform output
7, 8	A.VDD	In	+5V source for the internal analog circuit
9	R.REF	In	Right channel reference voltage terminal
10	L.REF	In	Left channel reference voltage terminal
11	L.OUT	Out	Left channel sound waveform output
12	A.GND	In	Ground (0V) source for the left channel
13	LRCK	In	Word clock input
14	LRSEL	In	Not used. Connected to ground.
15	SI	In	Sound data input
16	CLK	In	Bit clock input

POWER SUPPLY CIRCUIT

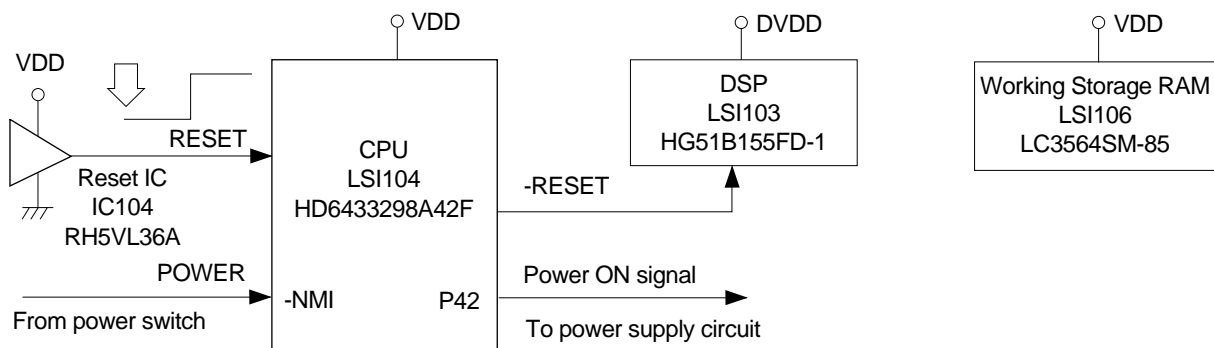
The power supply circuit generates five voltages as shown in the following table. VDD voltage is always generated. The others are controlled by the power ON signal output from the CPU.

Name	Voltage	For operation of
VDD	+5 V	CPU, Reset IC, Working storage RAM
DVDD	+5 V	DSP, Effect RAM, DAC, Pilot lamp
AVDD	+5V	DAC, Filter
AVCC	+7 V	Headphone amplifier, Line out amplifier
VCC	+8 V	Mute circuit

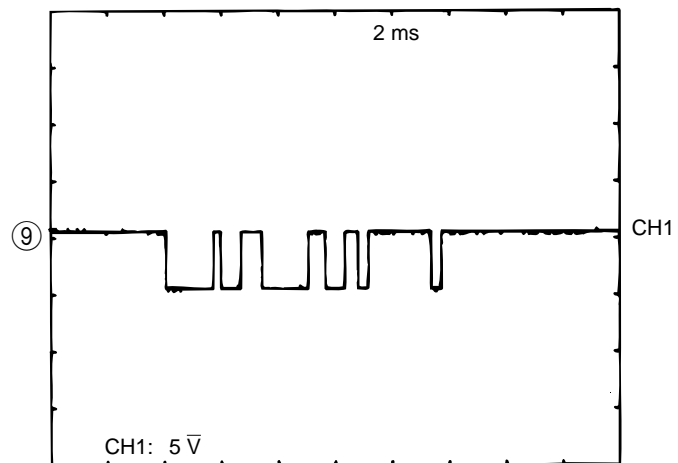
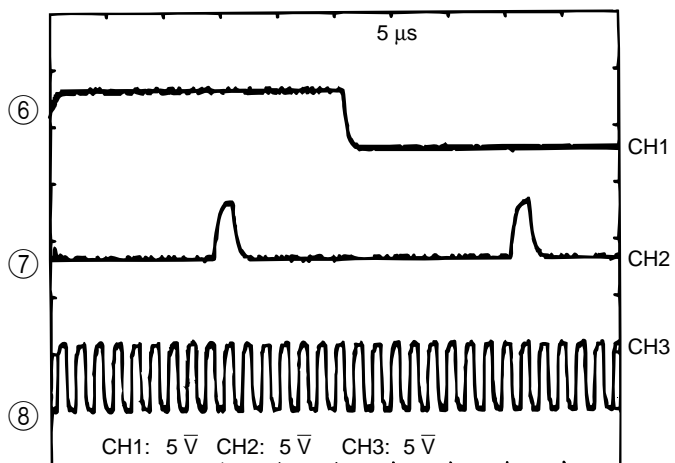
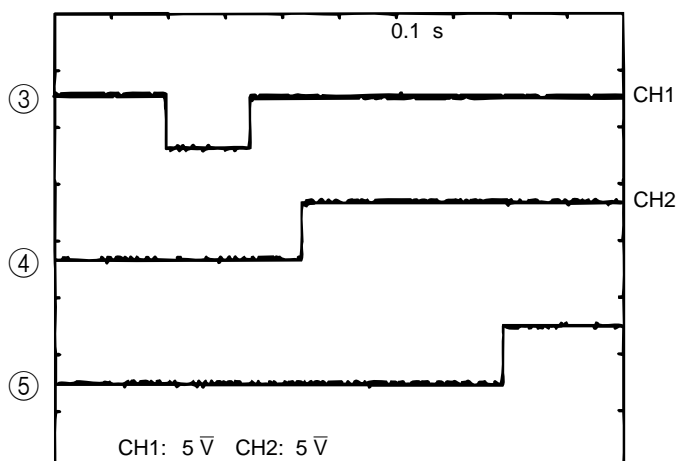
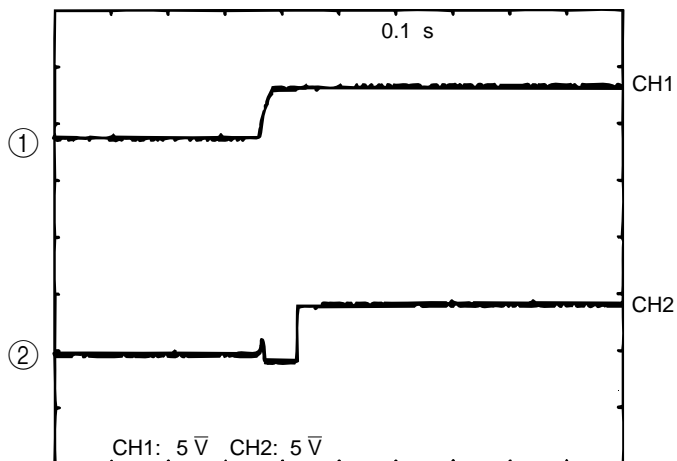
RESET CIRCUIT

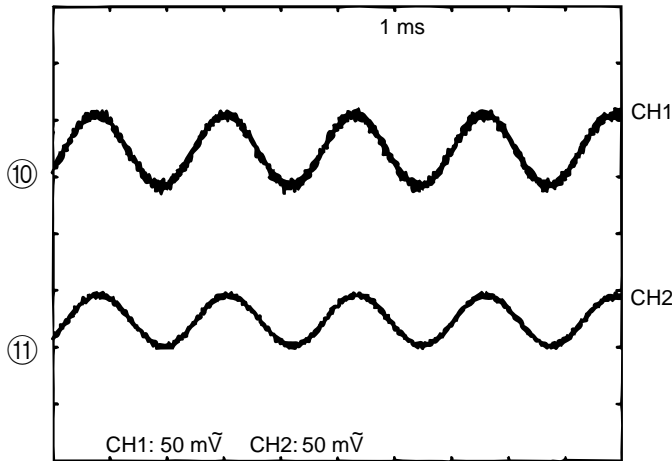
When an AC adapter is connected, the reset IC provides a low pulse to the CPU. The CPU then initializes its internal circuit and clears the working storage RAM.

When the power switch is pressed, the CPU receives a low pulse of POWER signal. The CPU provides the power ON signal to the power supply circuit and raises RESET signal to +5V to reset the DSP.

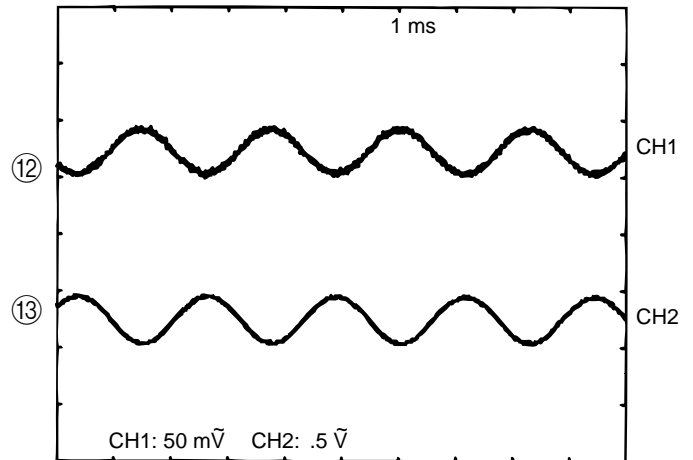


MAJOR WAVEFORMS

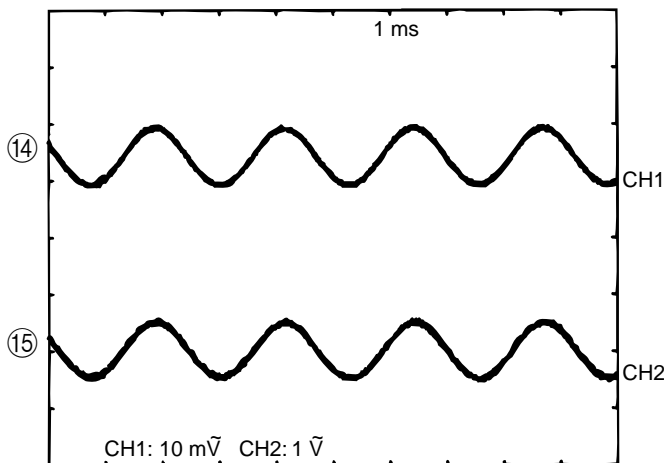




- ⑩ DAC output
UPD6376GS pin 11
- ⑪ Filter output
M5218AFP pin 1



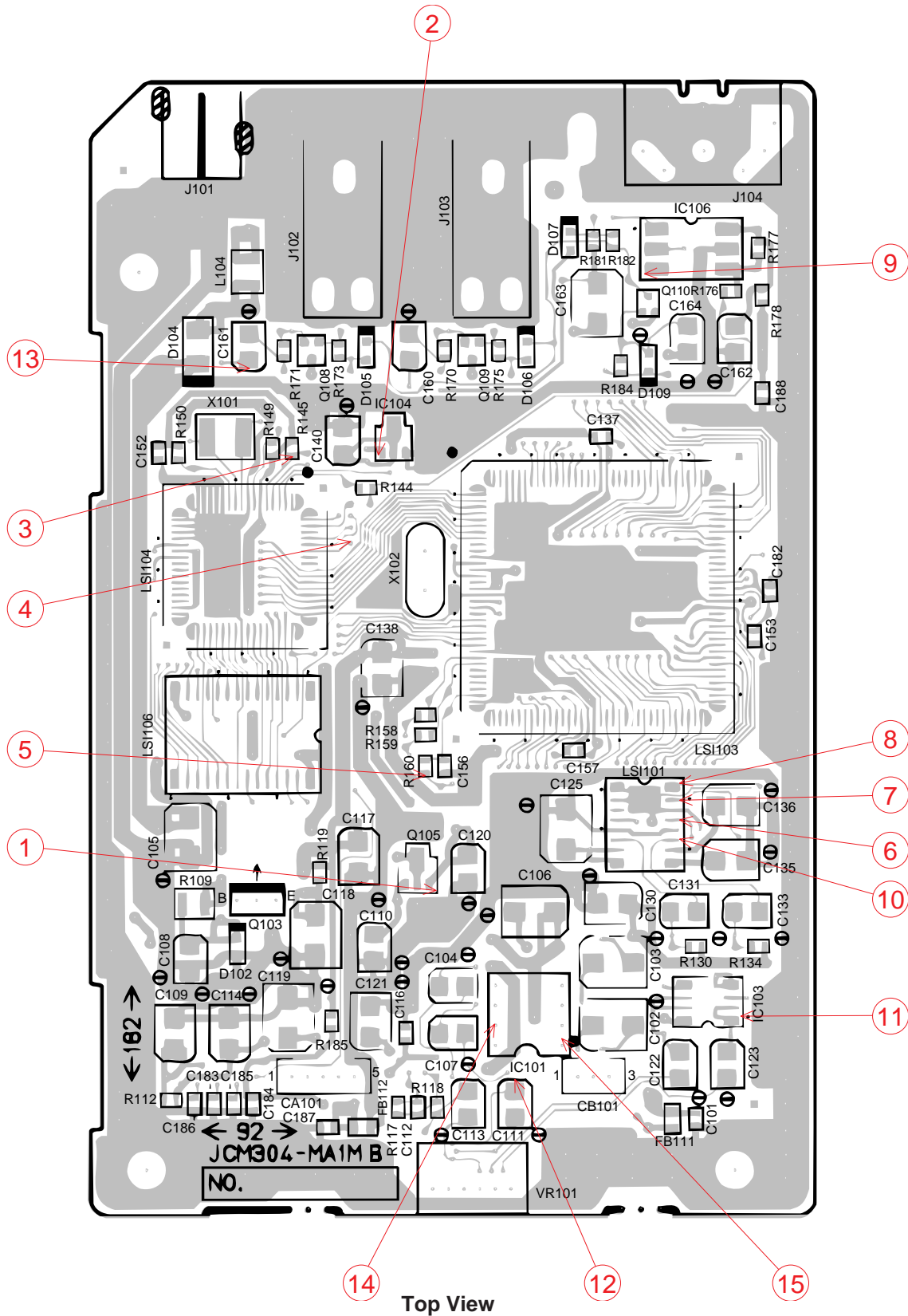
- ⑫ Line out amp. input (L-ch)
C111
- ⑬ Line out amp. output (L-ch)
C161



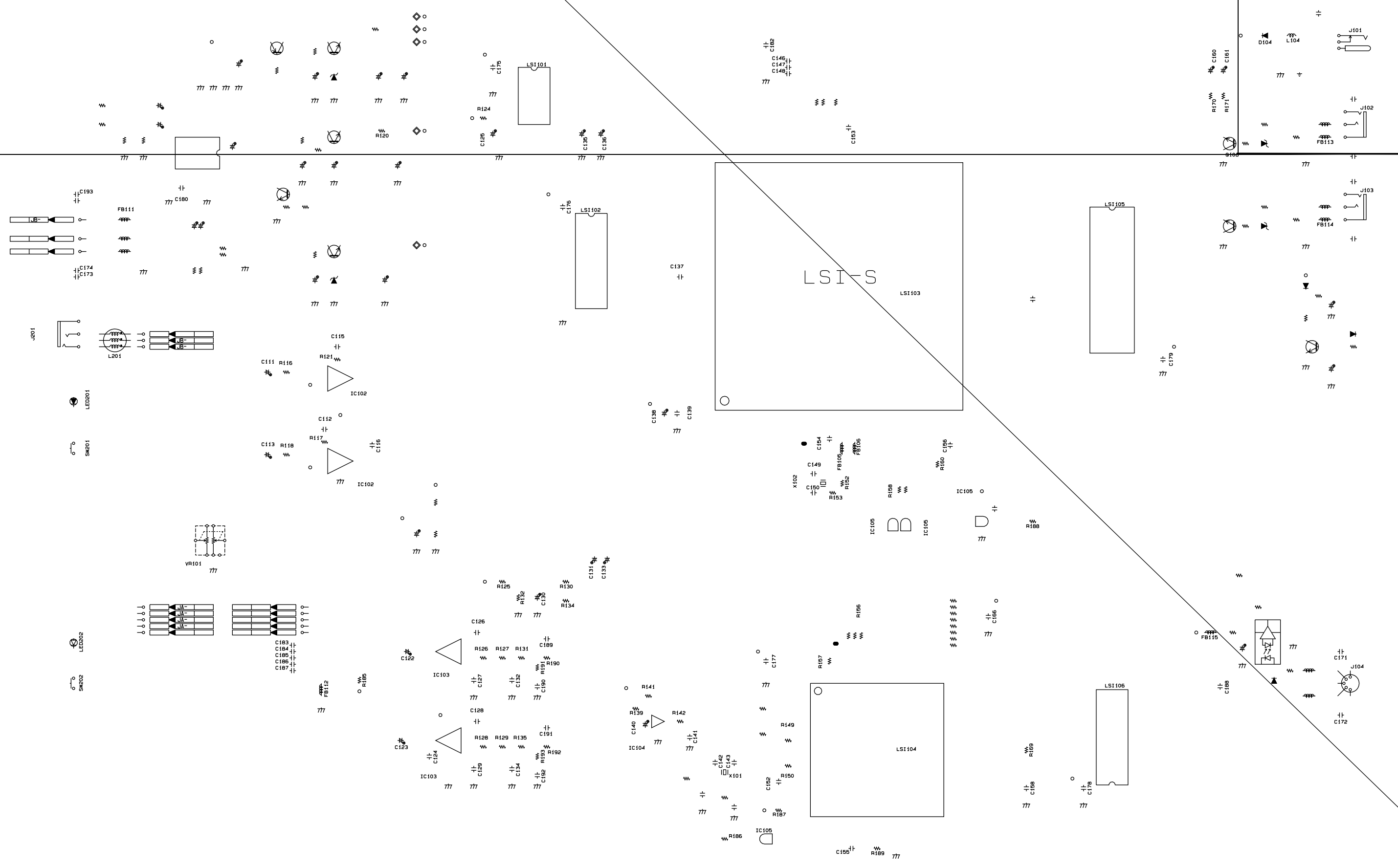
- ⑭ Headphone amp. input
LA4525 pin 7
- ⑮ Headphone amp. output
LA4525 pin 1

Program change (Tone No) : 078 (Whistle)
 Note No. (Key) : 81 (A4)
 Velocity : 127 (Maximum)

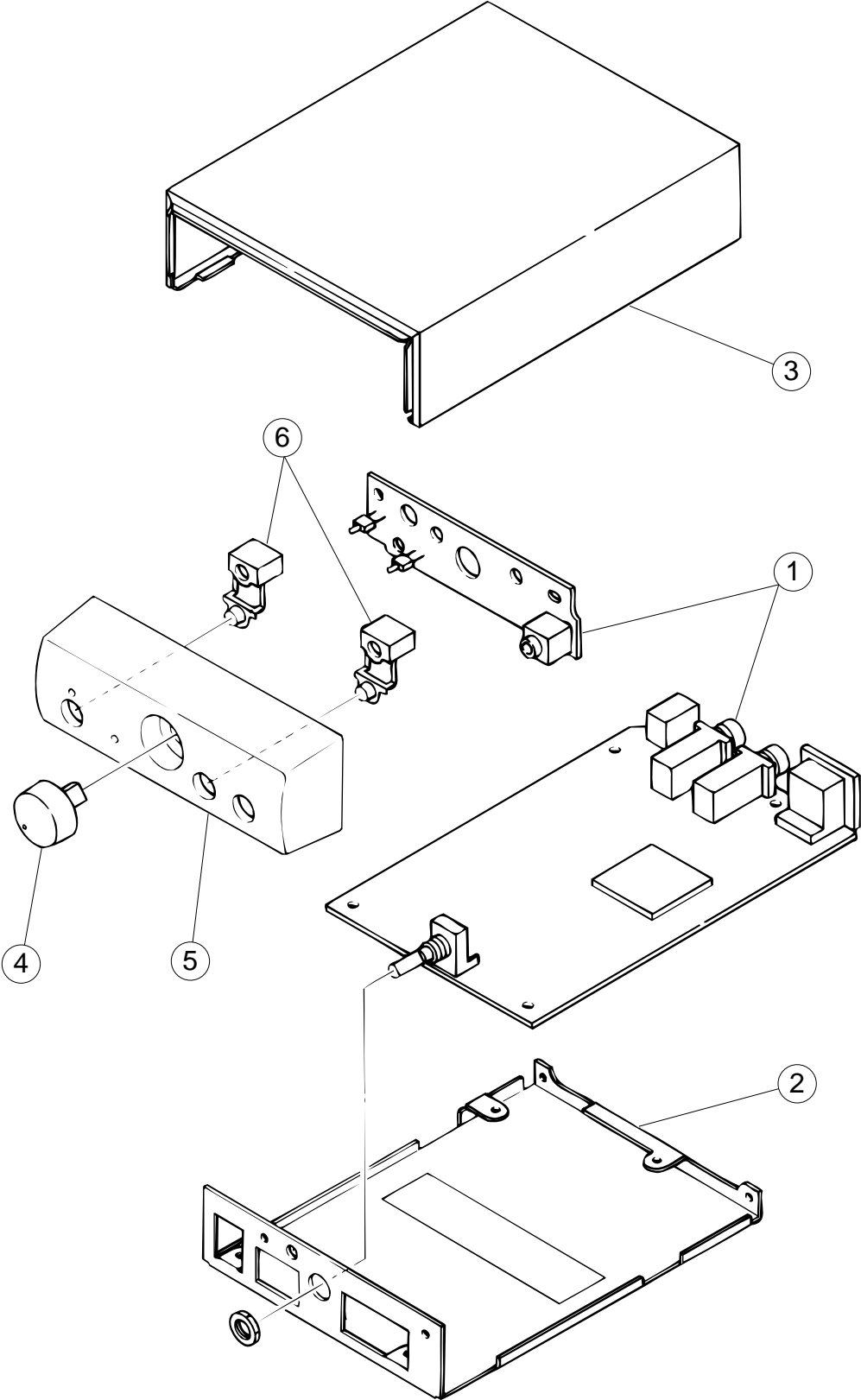
PCB VIEW AND CHECK POINTS



Top View



EXPLODED VIEW



PARTS LIST

GZ-50M

- 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	FOB Japan N.R.Yen Unit Price	R
Main PCB M304-MA1M							
N	1	6923 7150	PCB ass'y M304-MA1M with M304-MA2M	M140210*1	1	7,880	A
N	LSI101	2114 4221	LSI	UPD6376GS-E1	1	200	A
N	LSI102	2012 0777	LSI	LC33832M-70-TLM	1	410	A
N	LSI103	2012 1316	LSI	HG51B155FD-1	1	1,160	A
N	LSI104	2012 0462	LSI	HD6433298A42F	1	860	A
N	LSI105	2012 1498	LSI	TC5316200CF-C117	1	990	A
N	LSI106	2012 0770	LSI	SRM2264LM90-B	1	280	A
	IC101	2114 2632	IC	LA4525	1	89	A
N	IC102, IC103	2114 4214	IC	M5218AFP-600C	2	39	A
N	IC104	2105 4536	IC	RH5VL36AA-T1	1	44	A
N	IC105	2105 4445	IC	HD74HC08FPTR	1	34	A
N	IC106	2114 4326	IC, Photocoupler	PC900VP	1	140	A
N	Q101	2250 1176	Chip transistor	2SA1577T106R	1	13	B
N	Q102, Q104, Q110	2252 1169	Chip transistor	2SC4081-T106S	3	8	B
N	Q103	2250 1183	Transistor	2SD2096T114F	1	60	B
N	Q105	2253 0644	Transistor	2SD1664T101R	1	23	B
N	Q108, Q109	2253 0651	Chip transistor	2SD1757KT146S	2	18	B
N	D102, D103, D105, D106	2360 2541	Chip zener diode	DTZTT115.6B	4	15	B
N	D104	2390 2058	Chip diode	1SR154-400TE25	1	20	C
N	D107, D108	2390 1820	Chip diode	1SS355TE-17	2	9	C
N	D109	2390 2310	Chip schottky diode	RB501H-TT11	1	22	B
	J101	3501 7049	Power jack	HEC2305-01-330	1	29	A
	J102, J103	3612 0789	Jack	YKB21-5010	2	60	A
N	J104	3501 9786	DIN jack	TCS5073-25-4151	1	130	B
N	VR101	2765 1778	Volume, with nut	EVJC20F03B14	1	110	A
N	X101	2590 2100	Ceramic oscillator	CSACS20.00MX040-TC	1	71	B
N	X102	2590 2107	Crystal oscillator	HC-49S24A	1	130	B
Sub PCB M304-MA2M							
N	J201	3501 9793	Phone jack	YKB21-5157	1	57	A
	LED201	2370 0686	LED	LN282RPX-(TT2)	1	22	C
	LED202	2370 0889	LED	LN382GPX-(TT2)	1	26	C
	SW201, SW202	3412 0903	Tact switch	EVQ-21405R	2	15	B
Cabinet							
N	2	6923 7480	Lower case	M240162-1	1	210	C
N	3	6923 7440	Upper case	M240161-1	1	570	C
N	4	6923 7450	Rotary knob	M340189-1	1	21	C
N	5	6923 7460	Front panel	M240160-1	1	110	C
N	6	6923 7470	Button	M311687-7	2	11	C

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

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