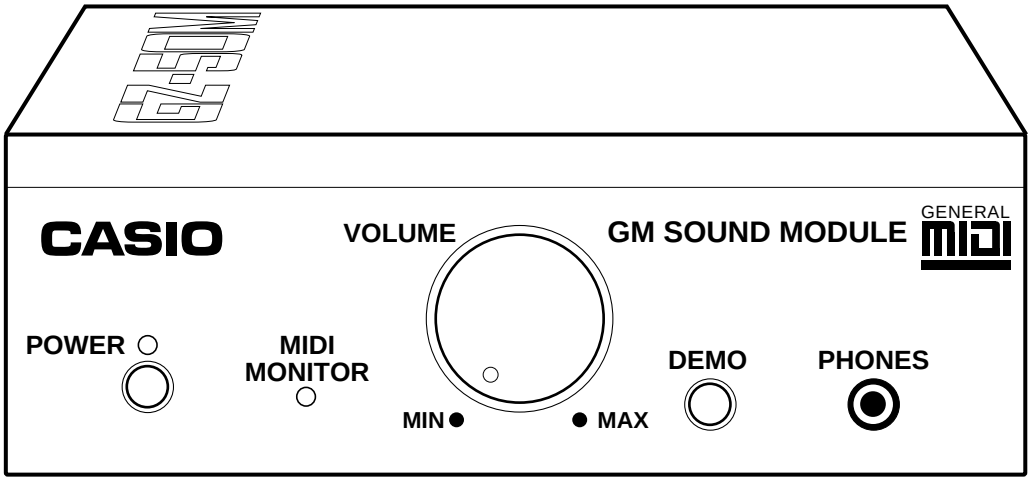
CASIO®

Service Manual

(with price)

GZ-50M



INDEX

GM SOUND MODULE

CONTENTS

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 KΩ, 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 ± 20%
Maximum volume	230 mA ± 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 ± 20%
Line output level (Vrms with 47 KΩ load each channel):	
with keys C6 and F6 in tone No.078	300 mV ± 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 Loundness
- [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 setteings

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)

Model **GZ-50M** **MIDI Implementation Chart**

Version: 1.0

Function ...		Transmitted	Recognized	Remarks
Basic	**Default**	X	1-16 channel	
Channel	**Changed**	X	1-16 channel	
	Default	X	Mode 3	
Mode	**Messages**	X	X	
	Altered	**********	**********	
Note		X	0 ~ 127	
Number:	**True voice**	**********	12 ~ 108 *1	*1:Different per tones.
Velocity	**Note ON**	X	O 9nH v = 1~127	
	Note OFF	X	X 9nH v = 0, 8nH V=**	** = No relation
After	**Key's**	X	X	
Touch	**Ch's**	X	O *2	
Pitch Bender		X	O	
	01	X	O *2	Modulation
	06, 38	X	O *3	Data entry
Control	**07**	X	O	Volume
Change	**10**	X	O	Pan
	11	X	O	Expression
	64	X	O	Hold 1
	66	X	O	Sostenuto
	67	X	O	Soft
	91	X	O	External effect depth
	100, 101	X	O *3	RPN LSB • MSB
	120	X	O	All sounds off
	121	X	O	Reset all controllers
Program		X	O 0 ~ 127	
Change :	**True #**	**********	**********	
System Exclusive		X	O *4	
System	**: Song Pos**	X	X	
Common	**: Song Sel**	X	X	
	: Tune	X	X	
System	**: Clock**	X	X	
Real Time	**: Commands**	X	X	
Aux	**: Local ON/OFF**	X	X	
Messages	**: All notes OFF**	X	O	
	: Active Sense	X	O	
	: Reset	X	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 2 : OMNI ON, MONO
Mode 3 : OMNI OFF, POLY
Mode 4 : OMNI OFF, MONO

O : Yes
X : No

LIST OF TONES AND OCTAVE RANGES

TONE NO./TONE NAME	GM OCTAVE RANGE	TONE NO./TONE NAME	GM OCTAVE RANGE
PIANO		**BASS**	
000 PIANO	A0 – C8	**032 WOOD BASS**	E1 – G3
001 HARD PIANO	A0 – C8	**033 ELEC BASS 1**	E1 – G3
002 STUDIO PIANO	A0 – C8	**034 ELEC BASS 2**	E1 – G3
003 HONKY-TONK	A0 – C8	**035 FRETLESS BASS**	E1 – G3
004 ELEC PIANO 1	E1 – G7	**036 SLAP BASS 1**	E1 – G3
005 ELEC PIANO 2	E1 – G7	**037 SLAP BASS 2**	E1 – G3
006 HARPSICHORD	F2 – F6	**038 SYNTH-BASS 1**	E1 – G3
007 CLAVELECTRO	C2 – C7	**039 SYNTH-BASS 2**	E1 – G3
CHROMATIC PERCUSSION		**STRING/ORCHESTRA**	
008 CELESTA	C4 – C8	**040 VIOLIN**	G3 – C7
009 GLOCKENSPIEL	C5 – C8	**041 VIOLA**	C3 – C6
010 MUSIC BOX	C4 – C6	**042 CELLO**	C2 – C5
011 VIBRAPHONE	F3 – F6	**043 CONTRABASS**	E1 – G3
012 MARIMBA	C3 – C6	**044 TREMOLO STR**	E1 – C7
013 XYLOPHONE	F4 – C7	**045 PIZZICATO STR**	E1 – C7
014 TUBULAR BELLS	C4 – F5	**046 HARP**	B0 – G7
015 DULCIMER	C4 – C6	**047 TIMPANI**	C2 – A3
ORGAN		**ENSEMBLE**	
016 ELEC ORGAN	C2 – C7	**048 STRINGS 1**	E1 – C7
017 JAZZ ORGAN	C2 – C7	**049 STRINGS 2**	E1 – C7
018 ROCK ORGAN	C2 – C7	**050 SYNTH-STR 1**	C2 – C7
019 CHURCH ORGAN	A0 – C8	**051 SYNTH-STR 2**	C2 – C7
020 REED ORGAN	C2 – C7	**052 CHOIR**	C3 – G5
021 ACCORDION	F3 – F6	**053 MOON VOICE**	C3 – G5
022 HARMONICA	C4 – C6	**054 SYNTH-VOICE**	C3 – C6
023 BANDNEON	F3 – F6	**055 ORCHESTRA HIT**	C3 – C5
GUITAR		**BRASS**	
024 GUT GUITAR	E2 – C6	**056 TRUMPET**	A#3 – A#6
025 ACOUS GUITAR	E2 – C6	**057 TROMBONE**	A#1 – D#5
026 JAZZ GUITAR	E2 – D6	**058 TUBA**	F1 – G3
027 ELEC GUITAR	E2 – D6	**059 MUTE TRUMPET**	A#3 – A#5
028 MUTE GUITAR	E2 – D6	**060 FRENCH HORN**	F2 – F5
029 DIST GUITAR 1	E2 – D6	**061 BRASS**	C2 – C7
030 DIST GUITAR 2	E2 – D6	**062 SYNTH-BRASS 1**	C2 – C7
031 GT HARMONICS	E2 – D6	**063 SYNTH-BRASS 2**	C2 – C7

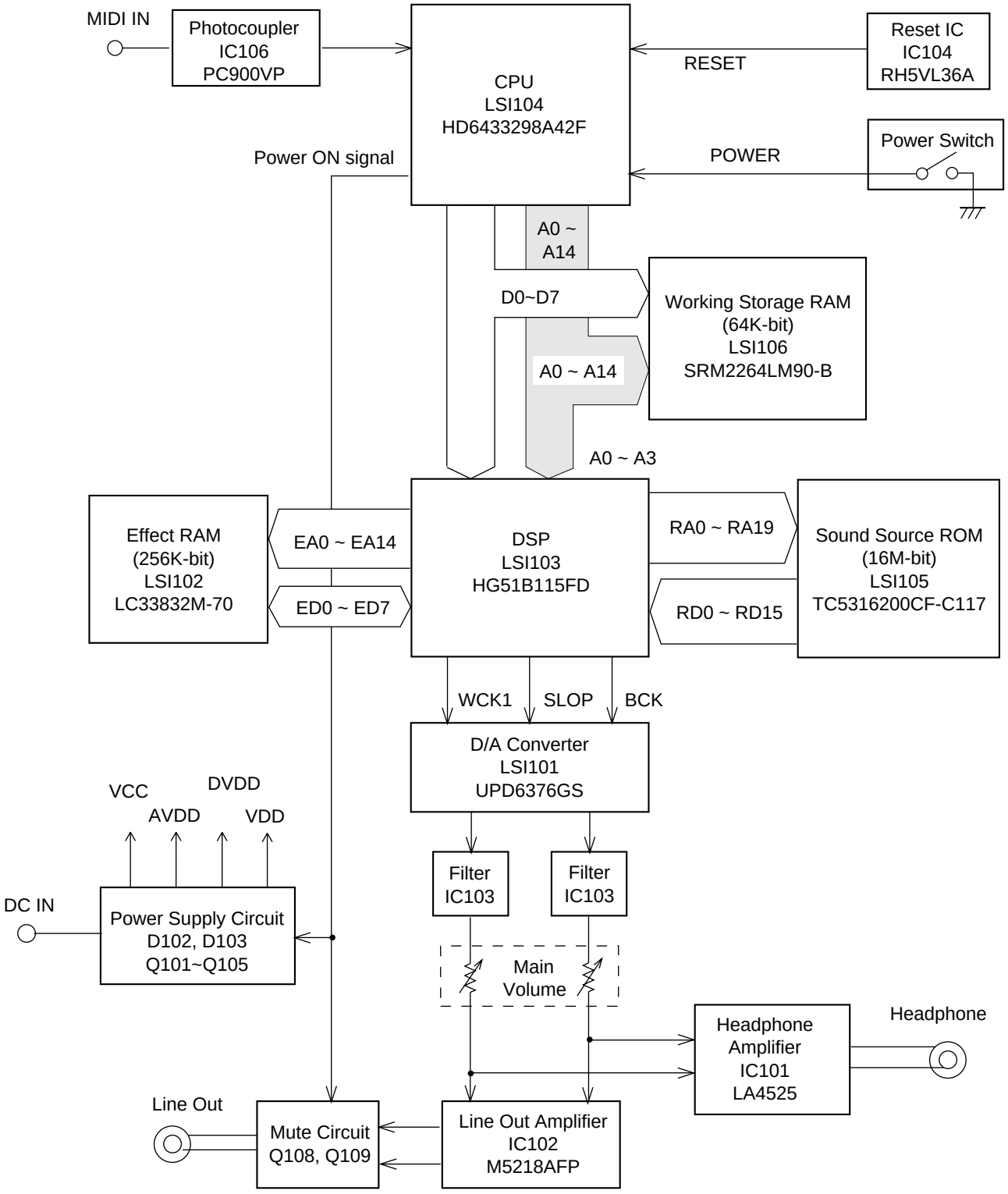
TONE NO./TONE NAME	GM OCTAVE RANGE	TONE NO./TONE NAME	GM OCTAVE RANGE
REED		**SYNTH-SFX**	
064 SOPRANO SAX	F#3 – D#6	**096 PEARL DROP**	C2 – C7
065 ALTO SAX	C#3 – G#5	**097 SOUNDTRACK**	C2 – C7
066 TENOR SAX	F#2 – D#5	**098 CRYSTAL**	C2 – C7
067 BARITONE SAX	C#2 – G#4	**099 ATMOSPHERE**	C2 – C7
068 OBOE	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
B1	35	Acoustic Bass Drum
C2	36	Bass Drum 1
C#2	37	Side Stick
D2	38	Acoustic Snare
D#2	39	Hand Clap
E2	40	Electric Snare
F2	41	Low Floor Tom
F#2	42	Closed Hi Hat
G2	43	High Floor Tom
G#2	44	Pedal Hi Hat
A2	45	Low Tom
A#2	46	Open Hi Hat
B2	47	Low Mid Tom
C3	48	High Mid Tom
C#3	49	Crash Cymbal 1
D3	50	High Tom
D#3	51	Ride Cymbal 1
E3	52	Chinese Cymbal
F3	53	Ride Bell
F#3	54	Tambourine
G3	55	Splash Cymbal
G#3	56	Cowbell
A3	57	Crash Cymbal 2
A#3	58	Vibraslap
B3	59	Ride Cymbal 2
C4	60	High Bongo
C#4	61	Low Bongo
D4	62	Mute High Conga
D#4	63	Open High Conga
E4	64	Low Conga
F4	65	High Timbale
F#4	66	Low Timbale
G4	67	High Agogo
G#4	68	Low Agogo
A4	69	Cabasa
A#4	70	Maracas
B4	71	Short Whistle
C5	72	Long Whistle
C#5	73	Short Guiro
D5	74	Long Guiro
D#5	75	Claves
E5	76	High Wood Block
F5	77	Low Wood Block
F#5	78	Mute Cuica
G5	79	Open Cuica
G#5	80	Mute Triangle
A5	81	Open Triangle
A#5	82	Shaker
B5	83	Suzu
C6	84	Sticks

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.

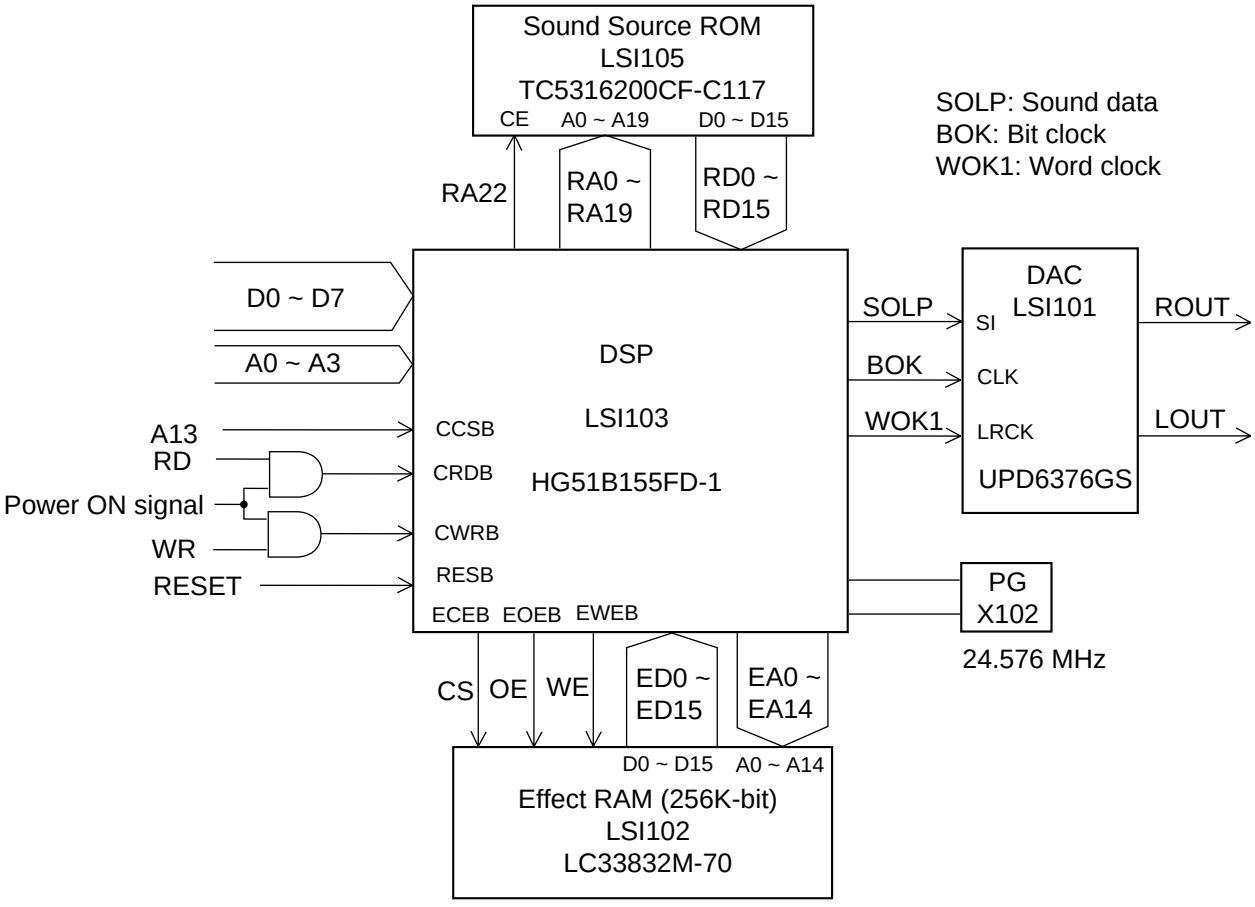
DIGITAL SIGNAL PROCESSOR (LSI03: HG51B155FD-1)

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 sued
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 (LSI101: 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 LSI101.

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

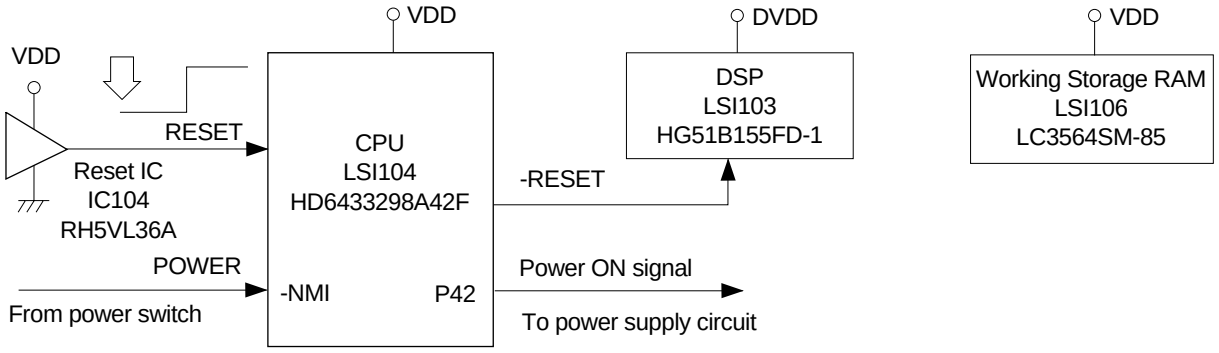
POWER SUPPLY CIRCUIT

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.

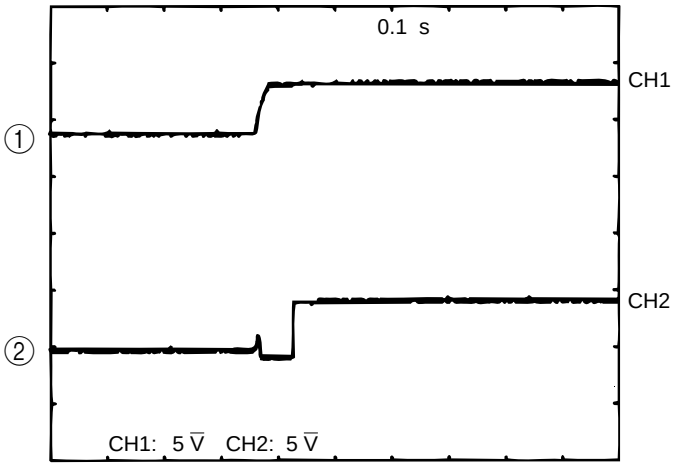
Name	Voltage	For operation of
VDD	+5 V	CPU, Reset IC, Working strage RAM
DVDD	+5 V	DSP, Effect RAM, DAC, Pilot lamp
AVDD	+5V	DAC, Filter
AVCC	+7 V	Headphone amplifier, Line ount amplifier
VCC	+8 V	Mute circuit

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.

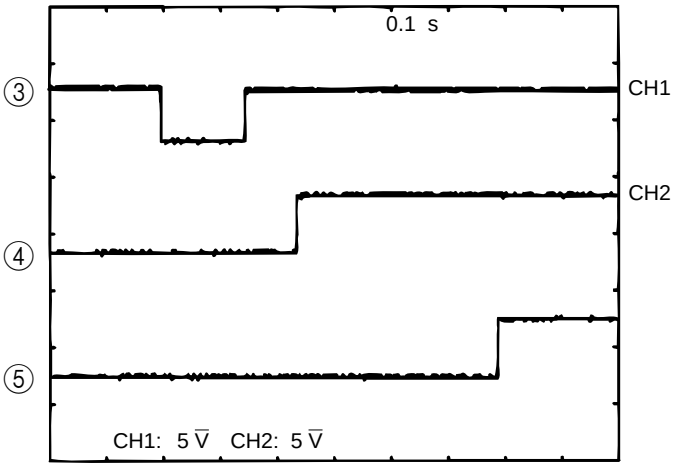


MAJOR WAVEFORMS



① Voltage VDD
Emitter of Q105

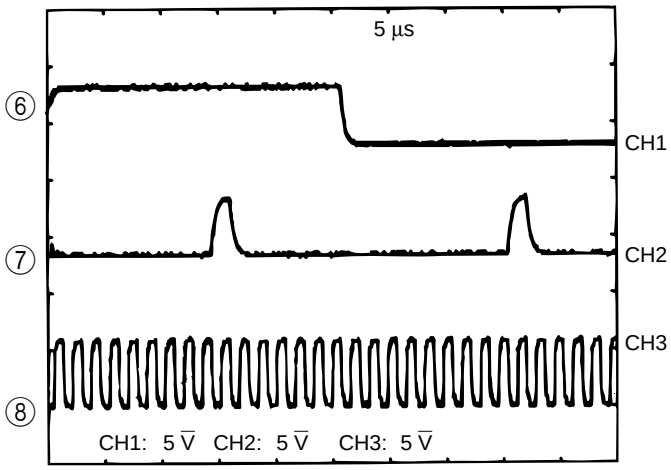
② Initial reset signal
RH5VL36A pin 1



③ Power ON trigger -NMI
HD6433298A42F pin 5

④ Power ON signal
HD6433298A42F pin 59

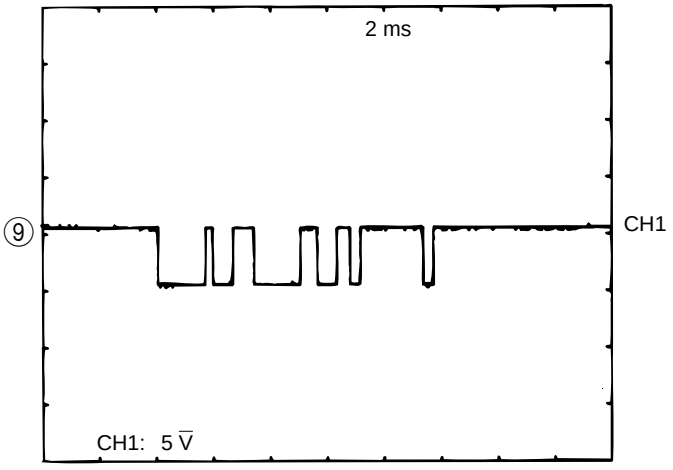
⑤ Reset signal
HD6433298A42F pin 3



⑥ Word clock WOK1
UPD6376GS pin 13

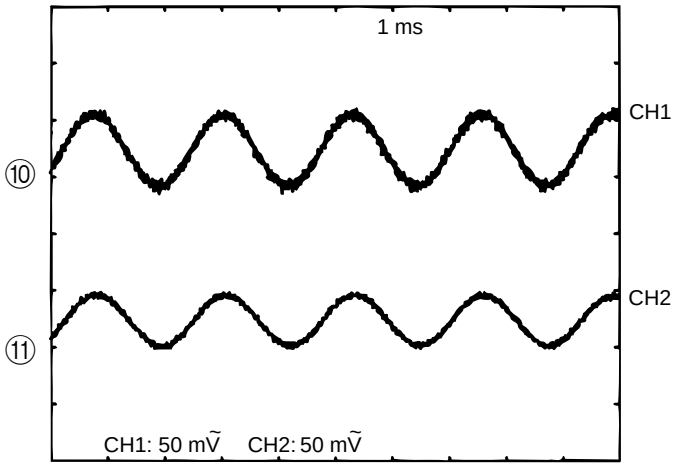
⑦ Data SI (Note OFF)
UPD6376GS pin 15

⑧ Bit clock BOK
UPD6376GS pin 16



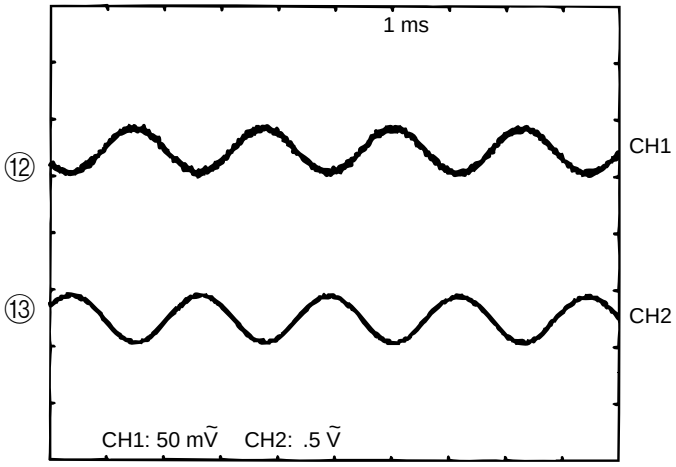
⑨ MIDI data
PC900VP pin 4

Basic channel : 1
Note No. : 60 (C3)
Velocity : 127 (Maximum)



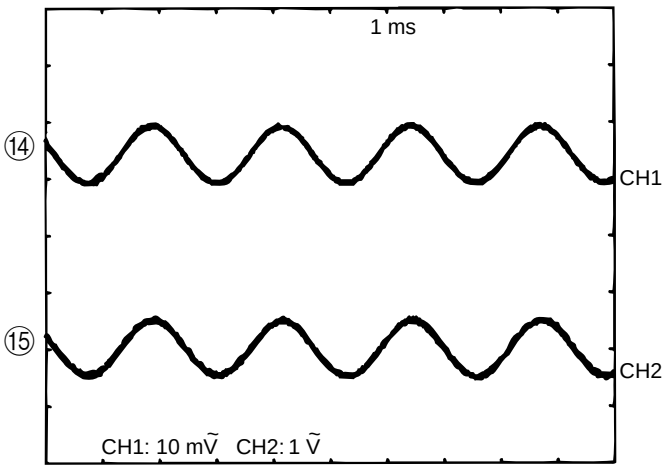
⑩ DAC output
UPD6376GS pin 11

⑪ Filter output
M5218AFP pin 1



⑫ Line out amp. input (L-ch)
C111

⑬ Line out amp. output (L-ch)
C161

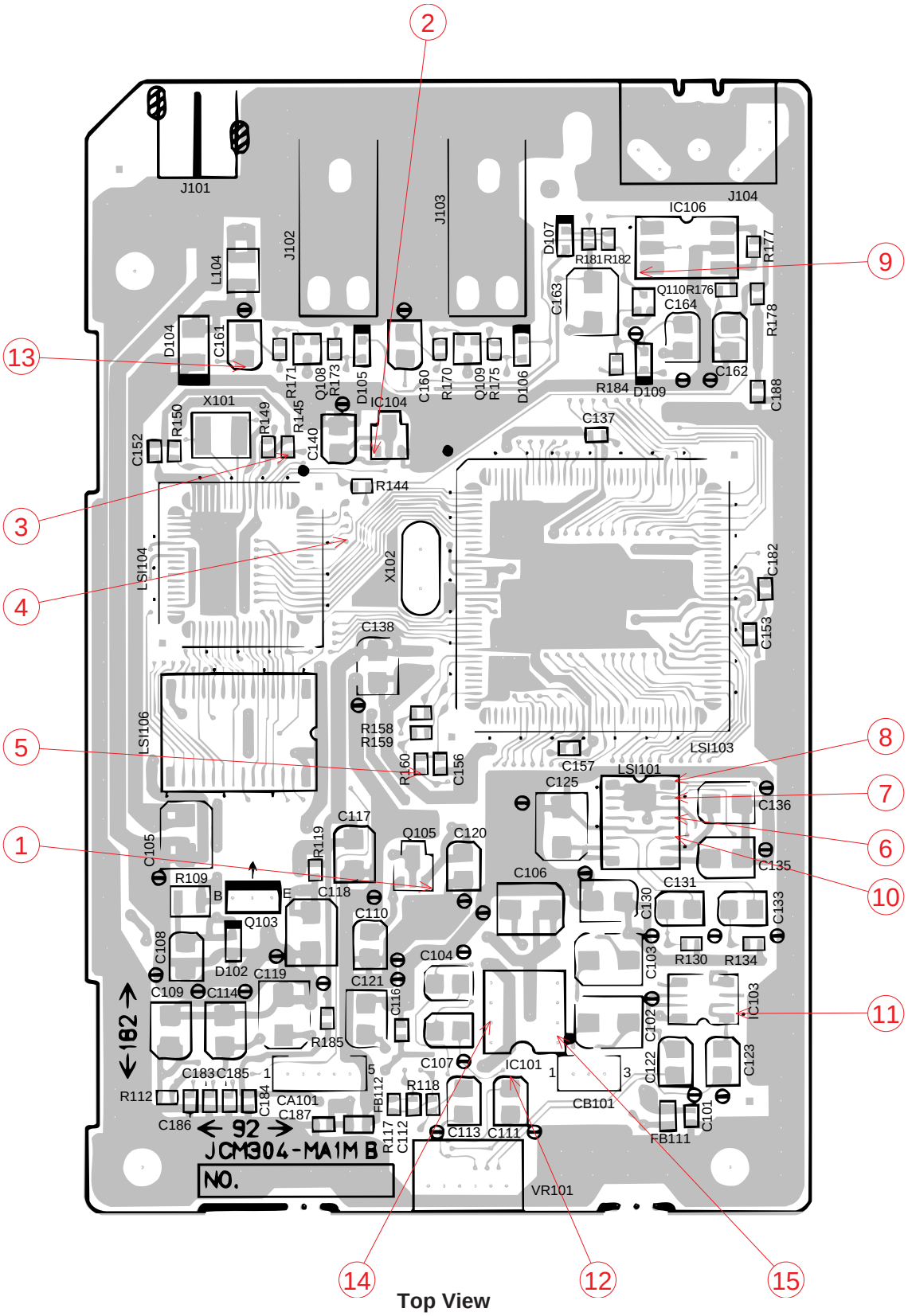


⑭ Headphone amp. input
LA4525 pin 7

⑮ Headphone amp. output
LA4525 pin 1

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

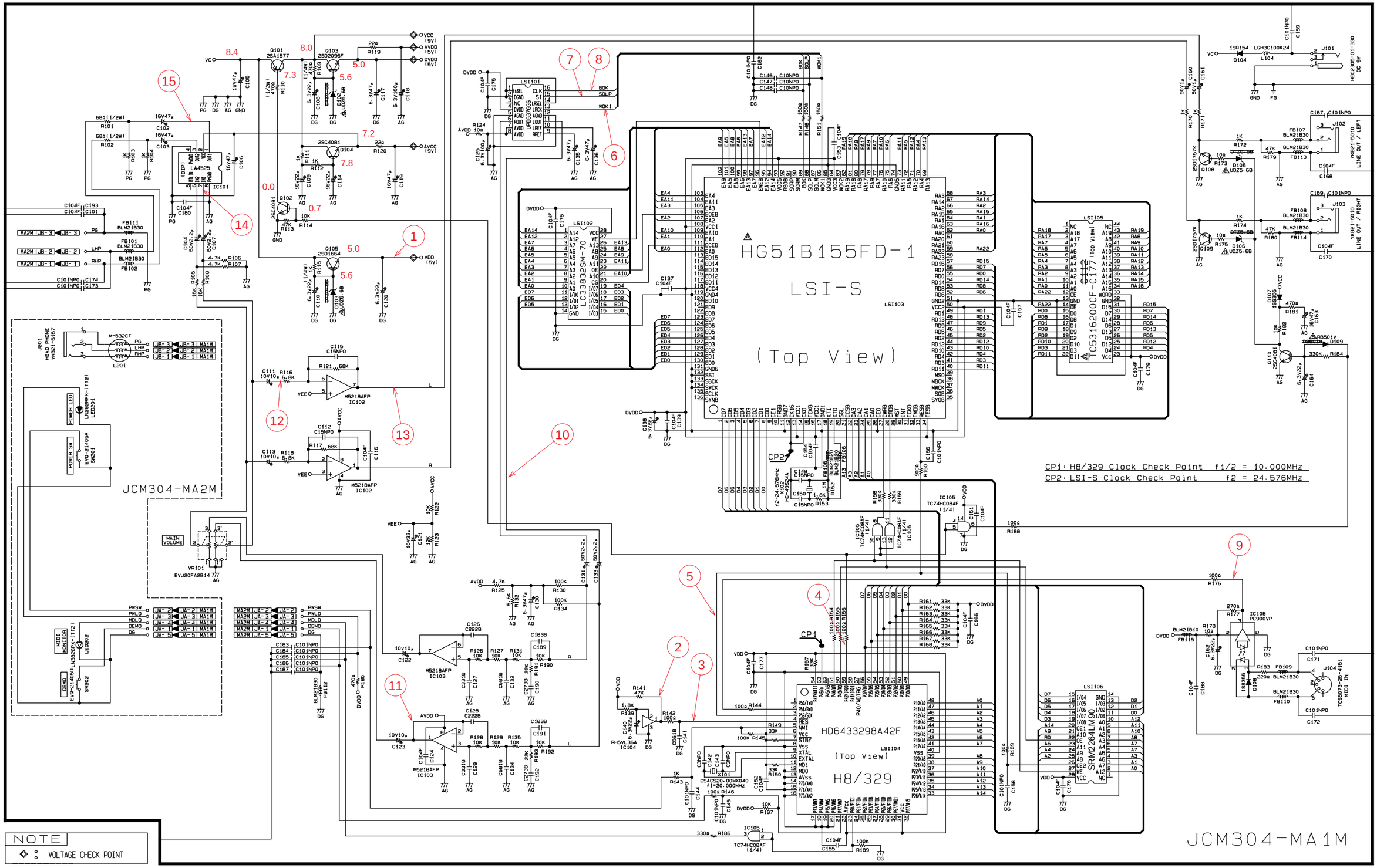
PCB VIEW AND CHECK POINTS



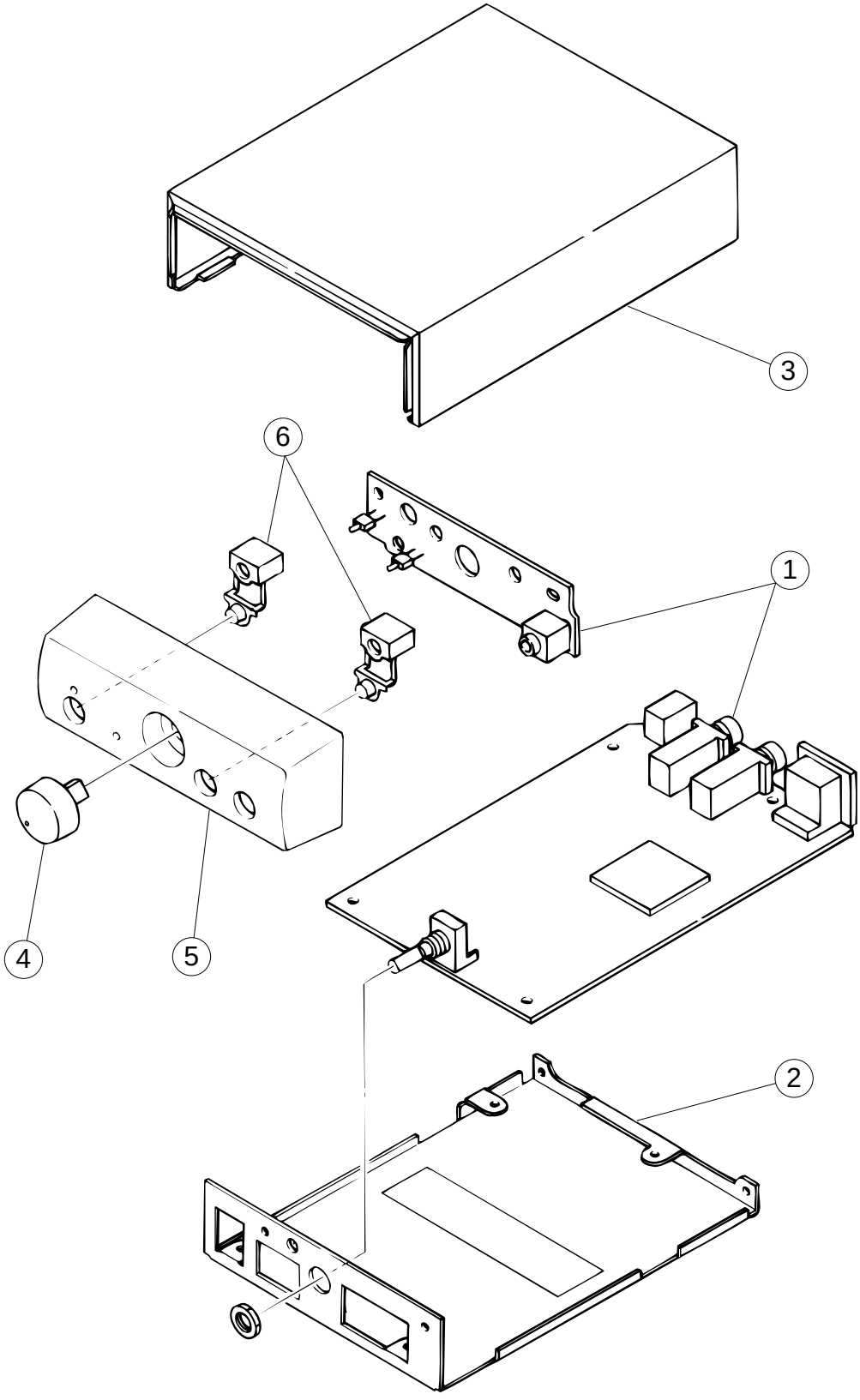
Top View

SCHEMATIC DIAGRAM

PCBs JCM304-MA1M/MA2M



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 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 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

CASIO COMPUTER CO.,LTD.
Service Division

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

MA0700951A