

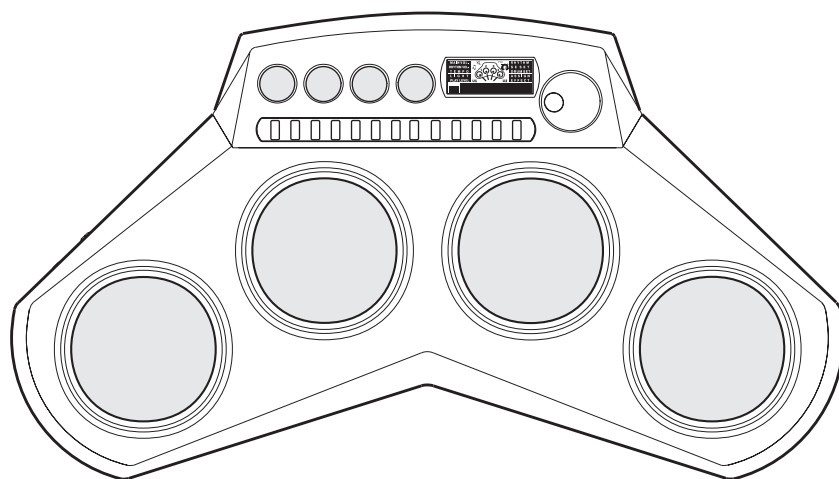
**CASIO®**

# Service Manual

(without price)

**LD-50**

**AUG. 2001**



LD-50

**ELECTRONIC DRUM**

# CONTENTS

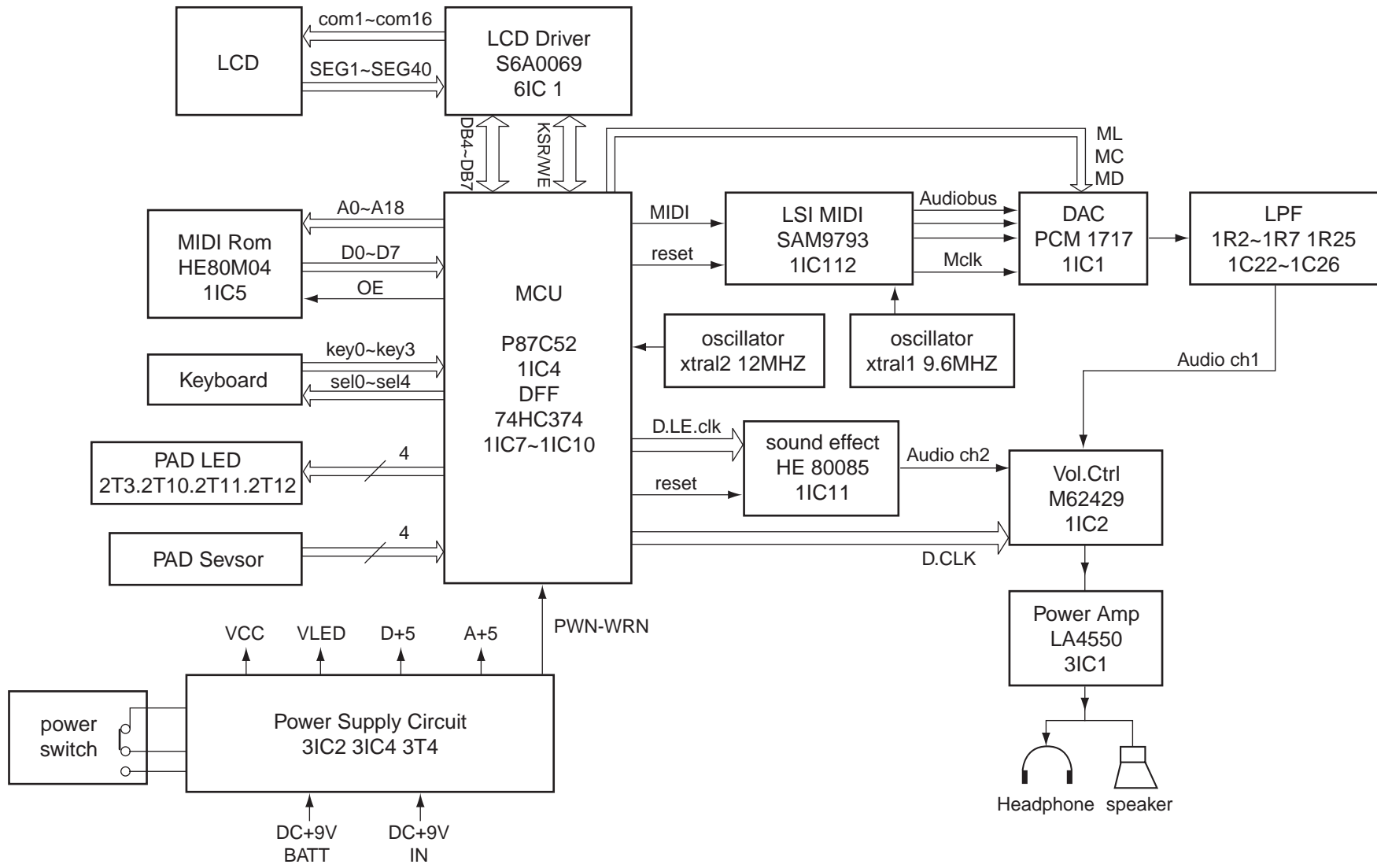
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## SPECIFICATIONS

### GENERAL

Percussion Pads:	4 (with touch response)								
Lighting Guide System:	Lesson, Dual Light, Synchro								
Sounds:	47 assignable percussion sounds + 20 assignable sound effects								
Display:	MAIN VOL., RHYTHM VOL., TEMPO, LIGHT, PLAY LEVEL, RHYTHM, SE SET, DRUM SET, ASSIGN, EFFECT, U1/U2 indicators; note icon; mute icon; low battery icon; dial icon; drum animation								
Main volume:	10 levels								
Rhythm volume:	10 levels								
Rhythms:	50								
Demos:	1								
Auto Percussion Set:	In accordance with rhythms and demo								
Preset Percussion Sets:	7								
User Percussion Sets:	2 (Cleared by power off.)								
Play Level:	Rhythm or Demo (during Lesson or Dual Light mode in Auto Percussion Set)								
Tempo:	±50 levels from default value of selected rhythm or demo								
Effects:	3 types (for percussion sounds only)								
Sound Effects:	4 x 5 sets								
Rhythm Controllers:	START/STOP, SYNCHRO START, TEMPO								
Speaker:	10 cm diameter (Output: 3.0W)								
Dial:	Controls Main Vol., Rhythm Vol., Tempo, Light, Play Level, Rhythm, SE Set, Drum Set, Assign, and Effect settings.								
I/O Terminals:	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding-right: 20px;">Power Supply:</td> <td>DC 9V jack</td> </tr> <tr> <td>Headphones/Output:</td> <td>Stereo standard jack (Output is monaural.)</td> </tr> <tr> <td>Output impedance:</td> <td>220Ω</td> </tr> <tr> <td>Output voltage:</td> <td>3.5V (RMS) MAX</td> </tr> </table>	Power Supply:	DC 9V jack	Headphones/Output:	Stereo standard jack (Output is monaural.)	Output impedance:	220Ω	Output voltage:	3.5V (RMS) MAX
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Batteries	6 AA-size								
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AC adaptor	AD-5								
Power Consumption:	9 V $\approx$ 7.7 W								
Dimensions:	49.5 x 28.0 x 17.0 cm (19 <sup>8</sup> / <sub>16</sub> " x 11 <sup>5</sup> / <sub>16</sub> " x 6 <sup>11</sup> / <sub>16</sub> ")								
Weight:	Approximately 2.0 kg (4.4 lbs) (without batteries)								

\* Designs and specifications are subject to change without notice.



**BLOCK DIAGRAM**

## CIRCUIT DESCRIPTION

### Power Amplifier (LA4550)

The power amplifier is a two channel amplifier which connected in BTL mode. The following table shows the pin function of the LSI.

Pin. No.	Terminal	In/Out	Function
1	NC	---	Not used
2	OUT2	Out	Channel 2 Output
3	BS2	---	Terminal for a bootstrap capacitor
4	NF2	In	Negative feedback input
5	IN2	In	Channel 2 Input
6	DC	---	Terminal for a decoupling capacitor
7	PREGND		Ground (0V) source
8	IN1	In	Channel 1 Input
9	NF1	In	Negative feedback input
10	BS1	---	Terminal for a bootstrap capacitor
11	OUT1	Out	Channel 2 Output
12	VCC	In	+9V source
G0	PWGND	GND	In Ground (0V source)
G1	TAB	GND	In Ground (0V source)

## LCD DRIVER (S6A0069)

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 function of the LSI.

Pin. No.	Terminal	In/Out	Function
1 ~ 22, 63 ~ 80	SEG1 ~ SEG40	Out	Segment signal output
23	GND	---	GND (0V) source
24 ~ 25	OSC1, OSC2	In/Out	Terminal for the built-in clock pulse generator. The external resistor connected determines the oscillation frequency.
26 ~ 30	V1 ~ V5	In	Bias voltage level for LCD driving
31 ~ 32	CLK1, CLK2	---	Not used. Connected to extension driver clock
33	VDD	---	DVDD (+5V) source
34	M	---	Not used. Connected to extension driver.
35	D	---	Not used. Connected to extension driver.
36	RS	In	Register selection Input. RS= "High". Data register is selected. RS="Low", Instruction register is selected.
37	R/W	In	Read/Write selection Input. When R/W=High, read operation. When R/W=Low, write operation.
38	E	In	Read/Write enable signal.
39 ~ 42	DB0 ~ DB3	---	Not used. Connected to GND (0V)
43 ~ 46	DB4 ~ DB7	In/Out	Data Bus.
47 ~ 62	COM1 ~ COM16	Out	Common signal/output. Pin 54 (COM8) and Pin 62 (COM16) are not used.

## Sound Engine (Dream SAM9773)

The sound engine read MIDI message from the MCU and convert them into digital audio data to the external DAC of sound drum output. The following table shows the pin function of the LSI.

Pin. No.	Terminal	In/Out	Function
1	CLBD	Out	Digital Audio Bit clock
2	CKOUT	Out	Buffered X2 output Terminal
3, 4, 12, 13, 15, 24 ~ 26, 28 ~ 42, 44, 50, 53, 59 ~ 66, 69, 71, 72, 74, 75, 77 ~ 79, 81 ~ 83,	NC	---	Not used. (No connection)
5, 7, 14, 18, 19, 21, 48, 54, 58, 67, 84, 86	GND	---	Terminals connected to Digital Ground
6, 16, 46, 57, 76, 85, 94	VCC	In	Terminals connected to +3V source
8	DACSEL	In	DAC type selection Input terminal. DAC = 0: 12S, 16 to 20 bits; DAC = 1: Japanese 16 bits.
9	DABD0	Out	Digital audio main stereo output terminal.
10	DABD1	---	Not used. Auxillary digital stereo output terminal. Surround or 3DMIDI output.
11	WSBD	Out	Digital audio left/right select.
17, 20, 22, 23, 55	Test0 ~ Test4	In	Test Pins that should be grounded.
27, 52, 56, 80, 86	VC3	In	Terminals connected to nominal +2.7V source.
43	IRQ	---	Not used. Terminal for indicated that a MIDI byte is available for read on D0 ~ D7.
45	MIDI OUT	---	Not used. Serial TTL MIDI Output terminal.
47	WR	In	D0 ~ D7 data write control terminal.
49	CS	In	Chip select, active low.
51	RD	In	D0 ~ D7 data read control terminal.
68, 70, 73, 92, 93, 95, 97, 100	D0 ~ D7	---	Not used. 8-bit di-directional bus under control of CS, RD, WR
87	LFT	---	PLL external RC network.
88, 89	X1, X2	---	Terminal connected to 9.6Mhz crystal.
90	RESET	In	Reset Input terminal, active low.
91	PDWN	In	Power-down, active low. When power-down is active, then all output pins will be floated. The crystal will be stopped. To exit from power-down, PDWN should be high and RESET applied.
98	MIDI IN	In	Serial TTL MIDI Input terminal.
99	RUN	---	Not used. Terminal indicates that the synthesizer is up and running.

## MCU (87C58UBA)

The MCU controls all key and button output, sound output, LCD display. It read data from the external ROM when a drum pad is hit and the selected tone; the MCU can read rhythm data simultaneously when a rhythm pattern is selected. Then it convert the data into MIDI message and send to the sound engine for sound output. The following table shows the pin function of the LSI.

Pin. No.	Terminal	In/Out	Function
1	NC	---	Not used. No Connection.
2~5	PAD4_HIT~ PAD1_HIT	In	Input Terminals for Piezzo electric sensor.
6~9	KI0~KI3	In	Terminals for key scan signal.
10	#RST	In	Reset signal input.
11	LCD-CK	Out	Clock for LCD Driver chip
12	NC	---	Not used. No Connection.
13	MIDI-OUT	Out	MIDI message output terminal
14	N.U.	---	Not used.
15	SE-LE	Out	Sound Effect LE signal output terminal.
16	VOL-CK	Out	Clock for Electronic Volume Control chip
17	DATA	Out	Data bus for SE chip, DAC and Electronic volume control chip.
18	CLK	Out	Clock output for SE chip, DAC and Electronic volume control chip.
19	DA-ML	Out	Signal ML for DAC
20, 21	XTAL1, XTAL2	---	Connected to 12.0MHz crystal
22	VSS	In	Ground (0V) source
23	NC	---	Not used. No Connection.
24	RESET	Out	Reset signal output
25	N.U.	---	Not used.
26	PWR-WRN	In	Power Warning signal Input Terminal
27	MOE	Out	OE signal for MIDI data ROM
28	LEL	Out	Latch output for the low byte address
29	LEH	Out	Latch output for the high byte address
30	CTR-LE0	Out	Latch output for the low byte address
31	CTR-LE1	Out	Latch output for the high byte address
32	#PSEN	Out	Program Store Enable
33	ALE	Out	Address Latch Enable
34	NC	---	Not used. No Connection.
35	#EA/VPP	In	External Access Enable
36~43	P0.7~P0.0	In/Out	Data I/O
44	VCC	In	+5V source

## Sound Effect Chip (HE80085)

The Sound effect chip read sound data from the built-in ROM in accordance with the pressed SE key (or hitting the drum pad) and the selected tone. Then it provide the sound waveforms to the Power amp. For sound output, by converting the data into waveforms with the built-in DACs and Op-Amp. The following table shows the pins functions of the LSI.

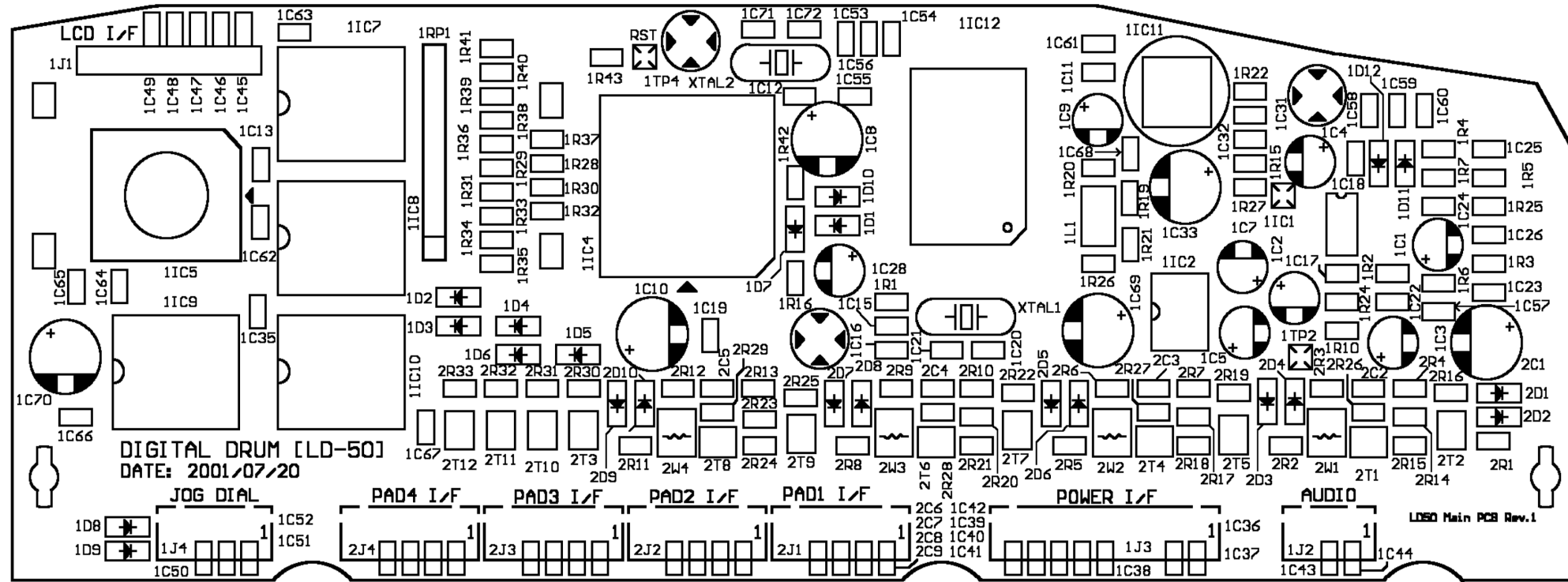
Pin. No.	Terminal	In/Out	Function
1~7, 9~12, 14, 16~18, 20~23, 25, 28~37	---	---	Not Used.
8	VO	Out	Voice Output terminal
13	#RST	In	Reset signal in terminal
15	FXI	---	External fast clock pin. Connect to RC to generate system clock.
19	VDD	In	+5V source
24	CLK	In	Data clock
26	LE	In	Latch Enable
27	DATA	In	Data bus
38	GND	In	Ground (0V) source

## TROUBLE SHOOTING

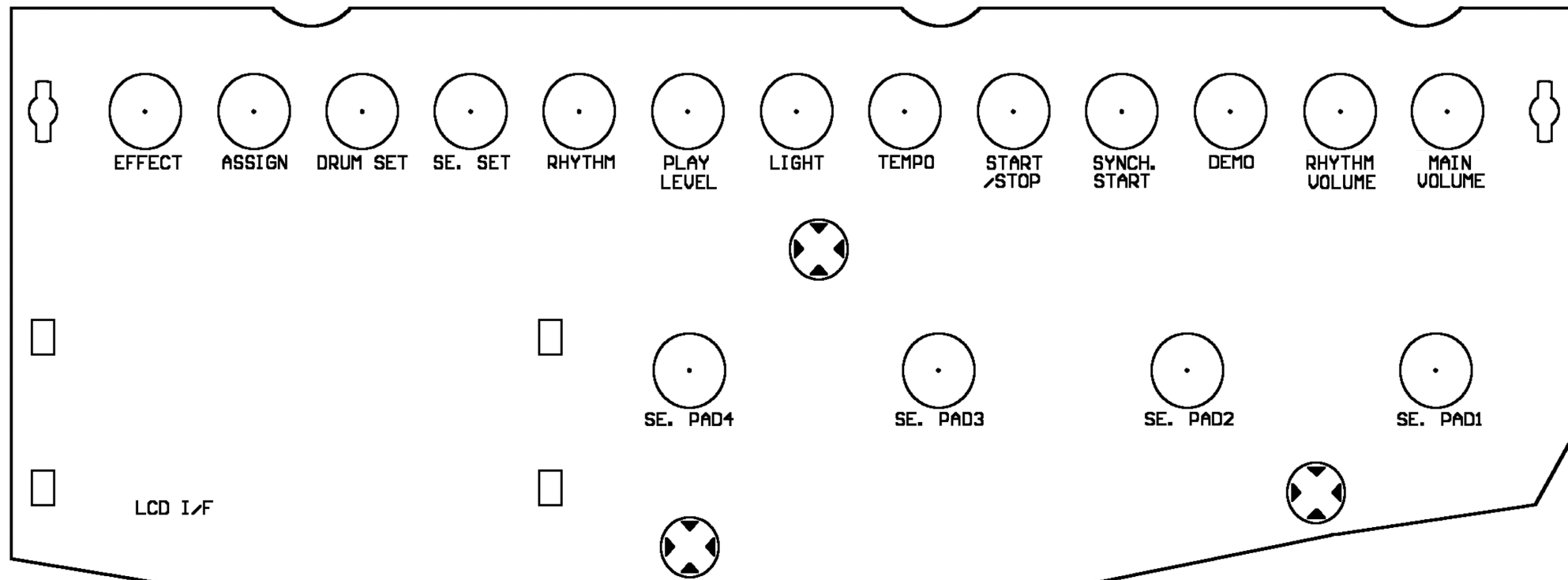
Nature of Trouble	Faulty Block	Cause/Remedy
No Power	Power supply circuit	Faulty 3IC2, 3IC4. Replace 3IC2, 3IC4
		Faulty 3T4. Replace 3T4.
		Faulty 3D1~3. Replace 3D1~3.
	Power switch	Poor contact. Clean the contacts.
	Power (DC in) jack	Open or poor soldering. Replace the jack or resolder.
No Sound at all	Power Amp.	Faulty 3IC1. Replace 3IC1
	CPU	Faulty 1IC4. Replace 1IC4.
	Electronic Volume control	Faulty 1IC2. Replace 1IC2.
	Oscillator	Faulty XTAL2. Replace XTAL2.
No music	Sound Engine	Faulty 1IC12. Replace 1IC12.
	CPU	Faulty 1IC4. Replace 1IC4.
	DAC	Faulty 1IC1. Replace 1IC1.
	Oscillator	Faulty XTAL1. Replace XTAL1.
	I/O buffer	Faulty 1IC7, 1IC8. Replace 1IC7, 1IC8.
	MIDI ROM	Faulty 1IC5. Replace 1IC5.
No drum pad sound	Piezzo sensor	Faulty piezzo sensor. Replace piezzo sensor.
	Cable	Check cable.
	I/O buffer	Faulty 1IC9. Replace 1IC9.
No sound effect	Sound Effect Chip	Faulty 1IC11. Replace 1IC11.
Certain key or switch do not function	Key and switch matrix	Dust on the contact.
	I/O buffer	Faulty 1IC10. Replace 1IC10.
	CPU	Faulty 1IC4. Replace 1IC4.
LED on drum pad do not light	Drum pad LED	Faulty LED. Replace LED.
	Cable	Check cables.

DIGITAL PCB

PCB LAYOUT

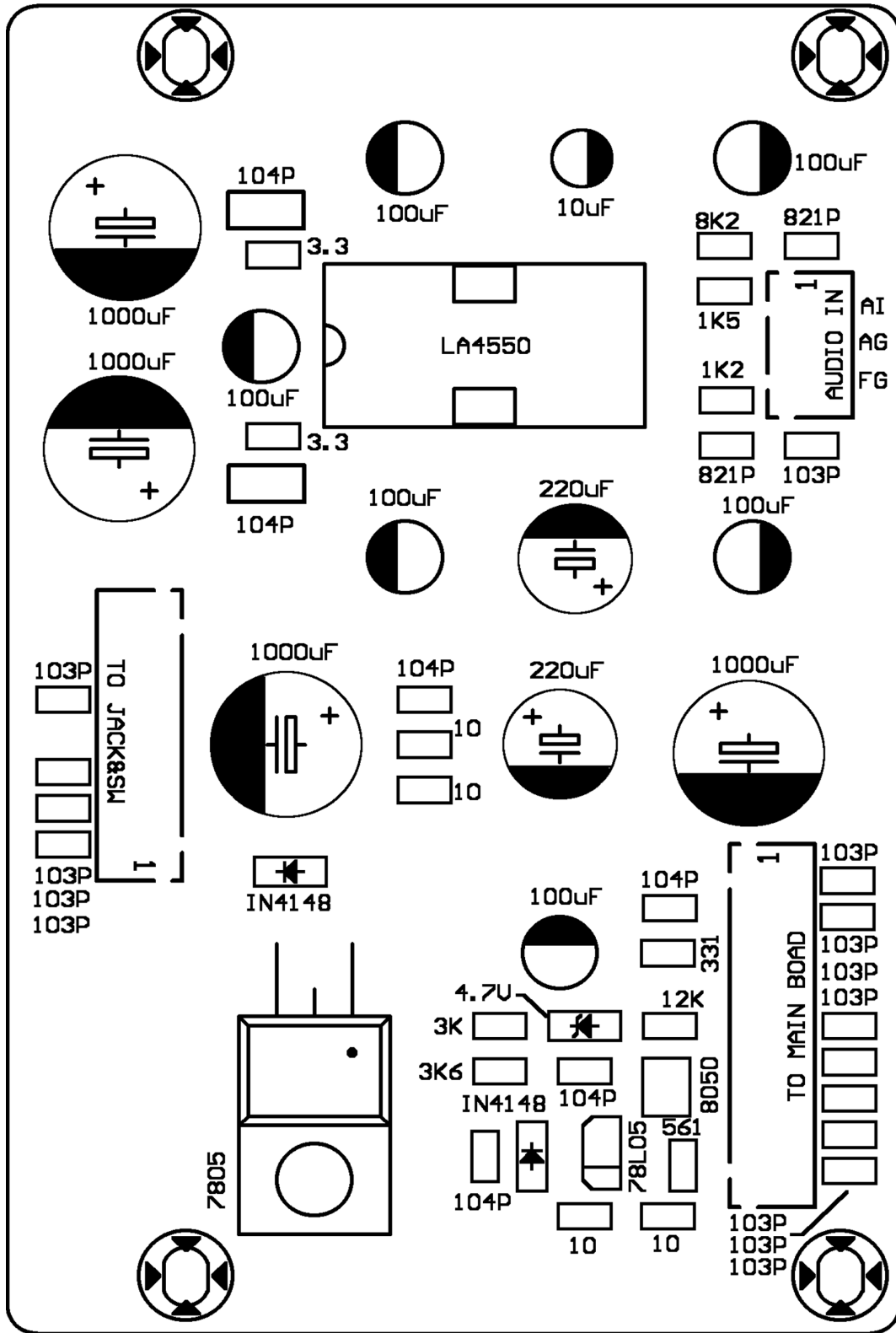


Top View



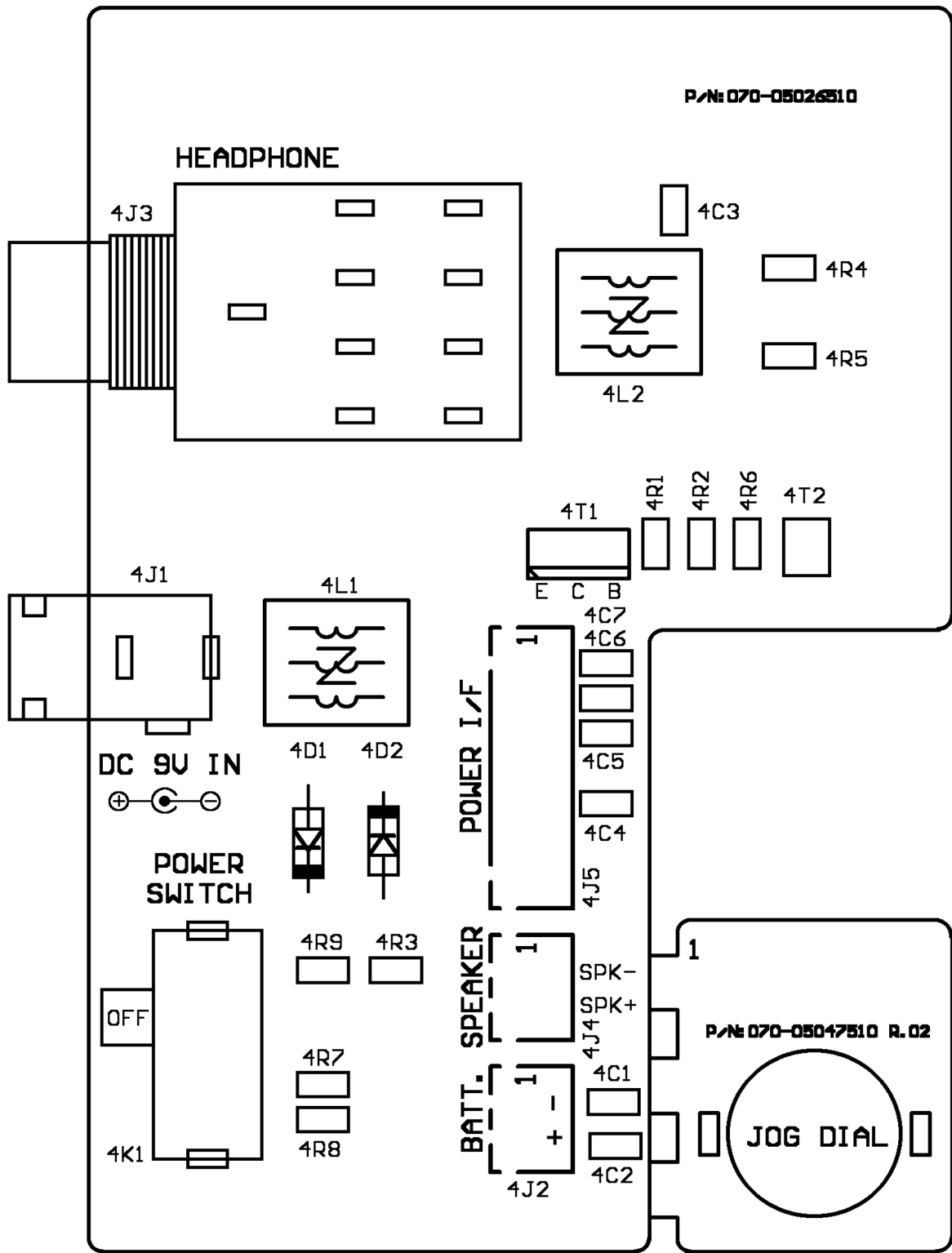
Bottom View

POWER/AMP PCB

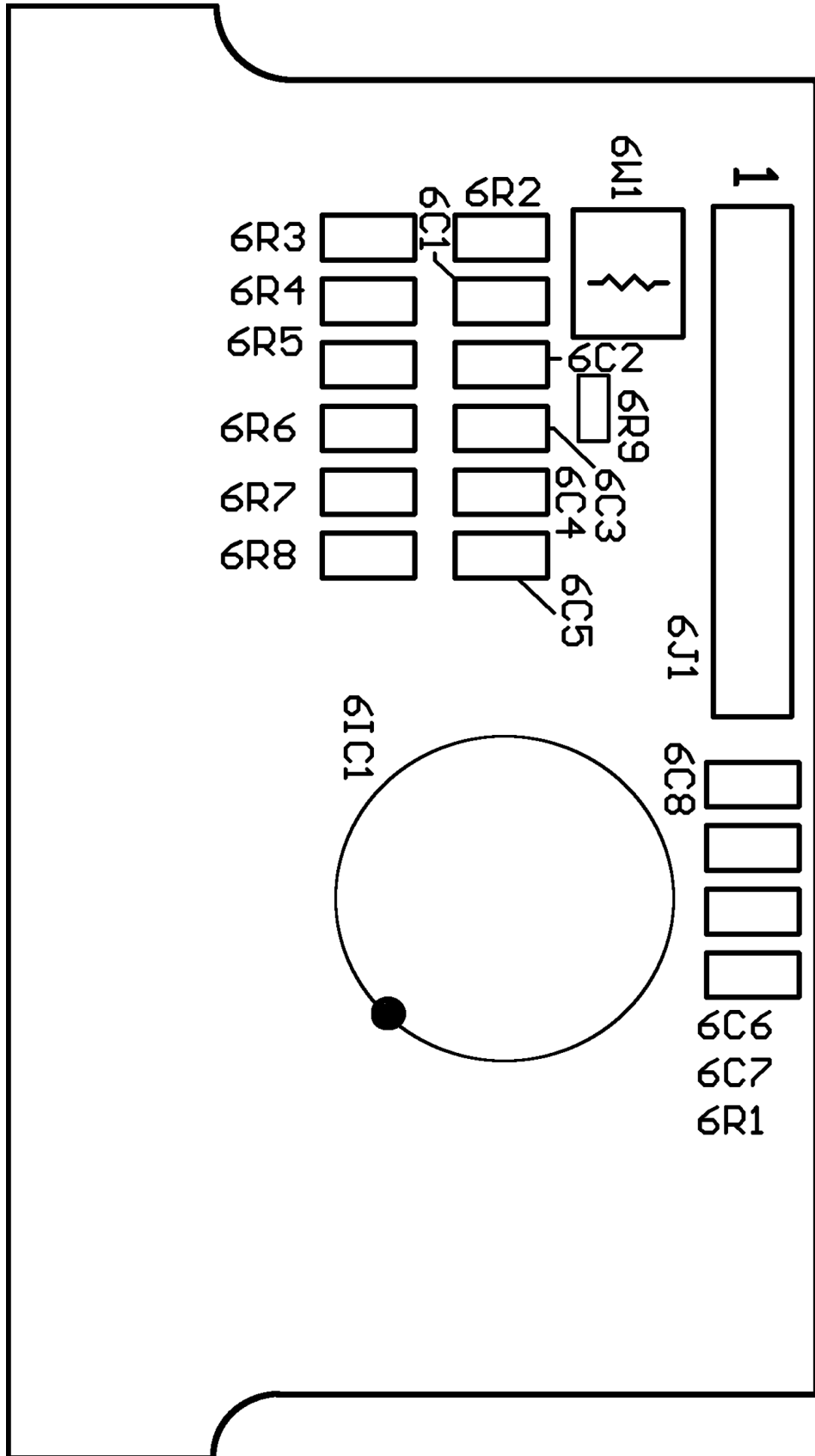


Top View

JACK/SW PCB

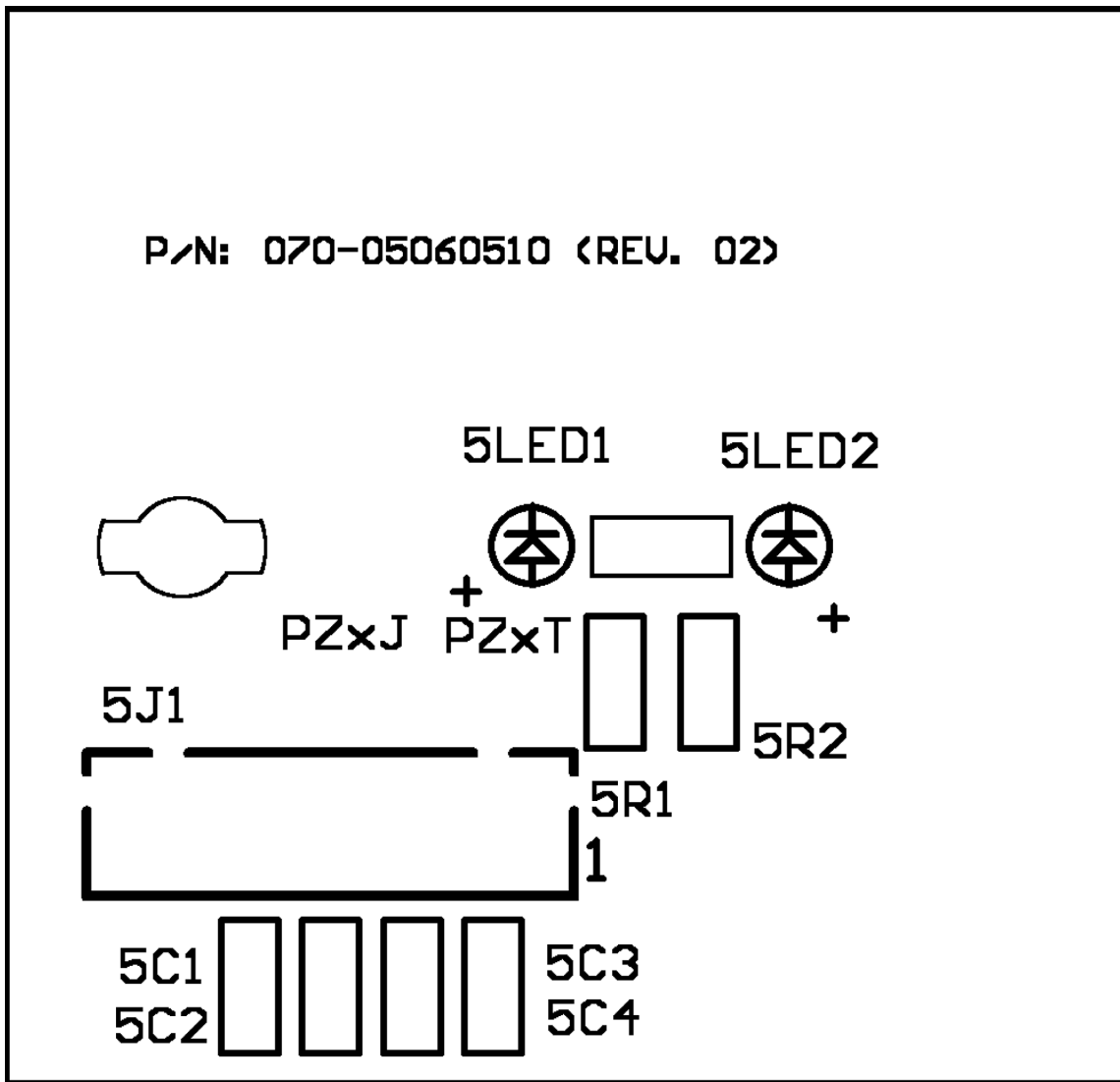


Top View



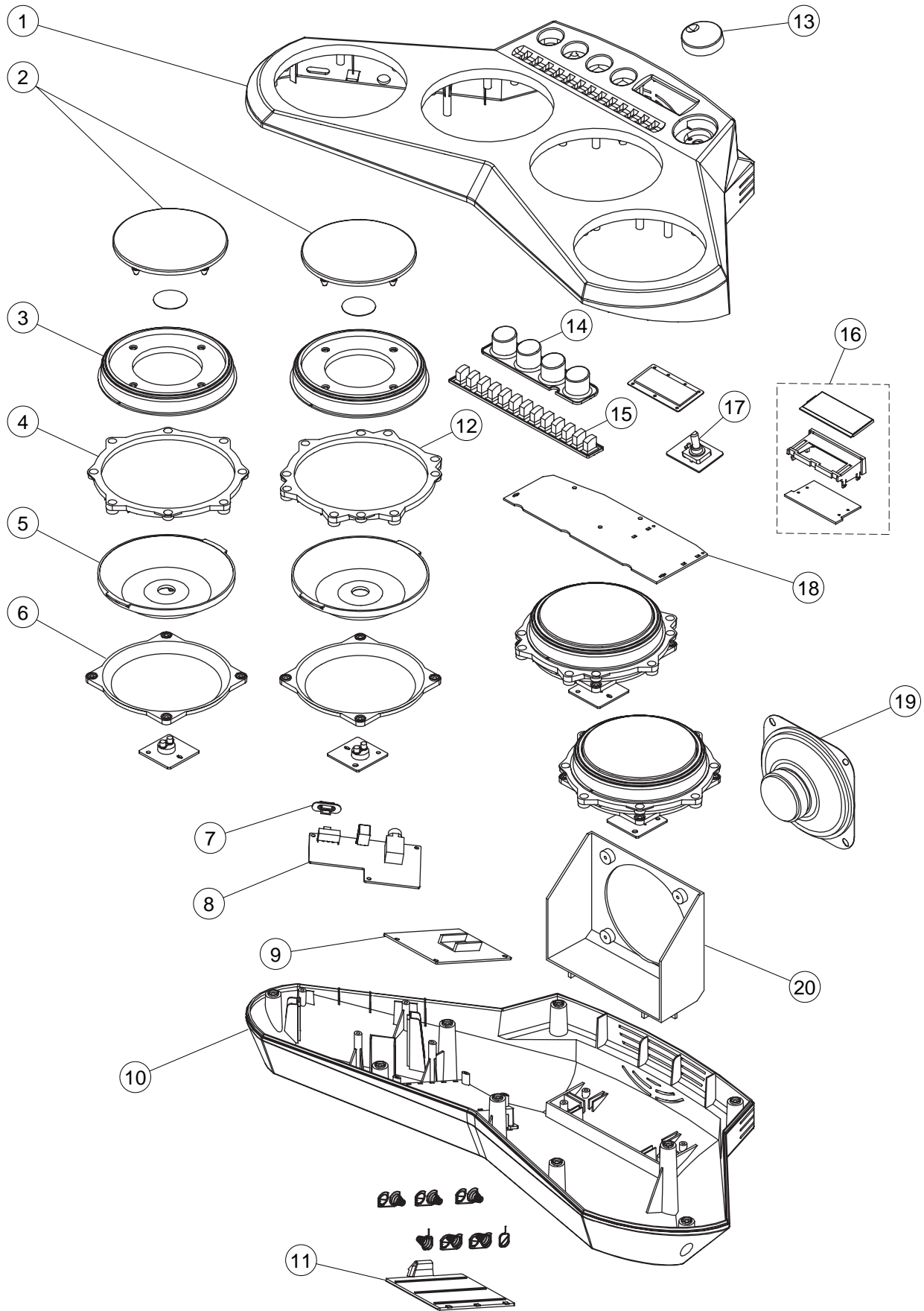
LED PCB

P/N: 070-05060510 (REV. 02)



Top View

# EXPLODED DRAWING



# PARTS LIST

## LD-50

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.

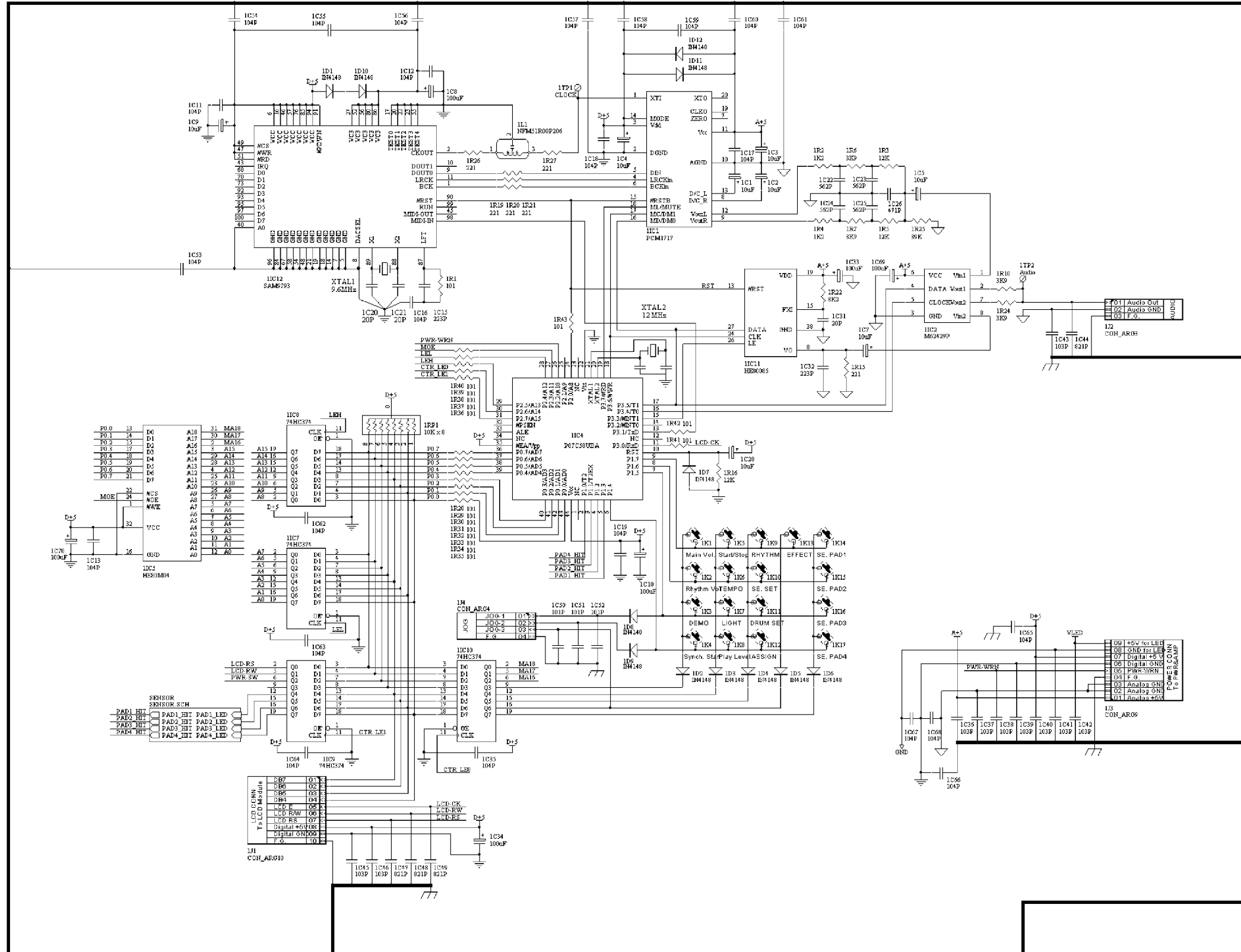
**PARTS PRICE LIST**

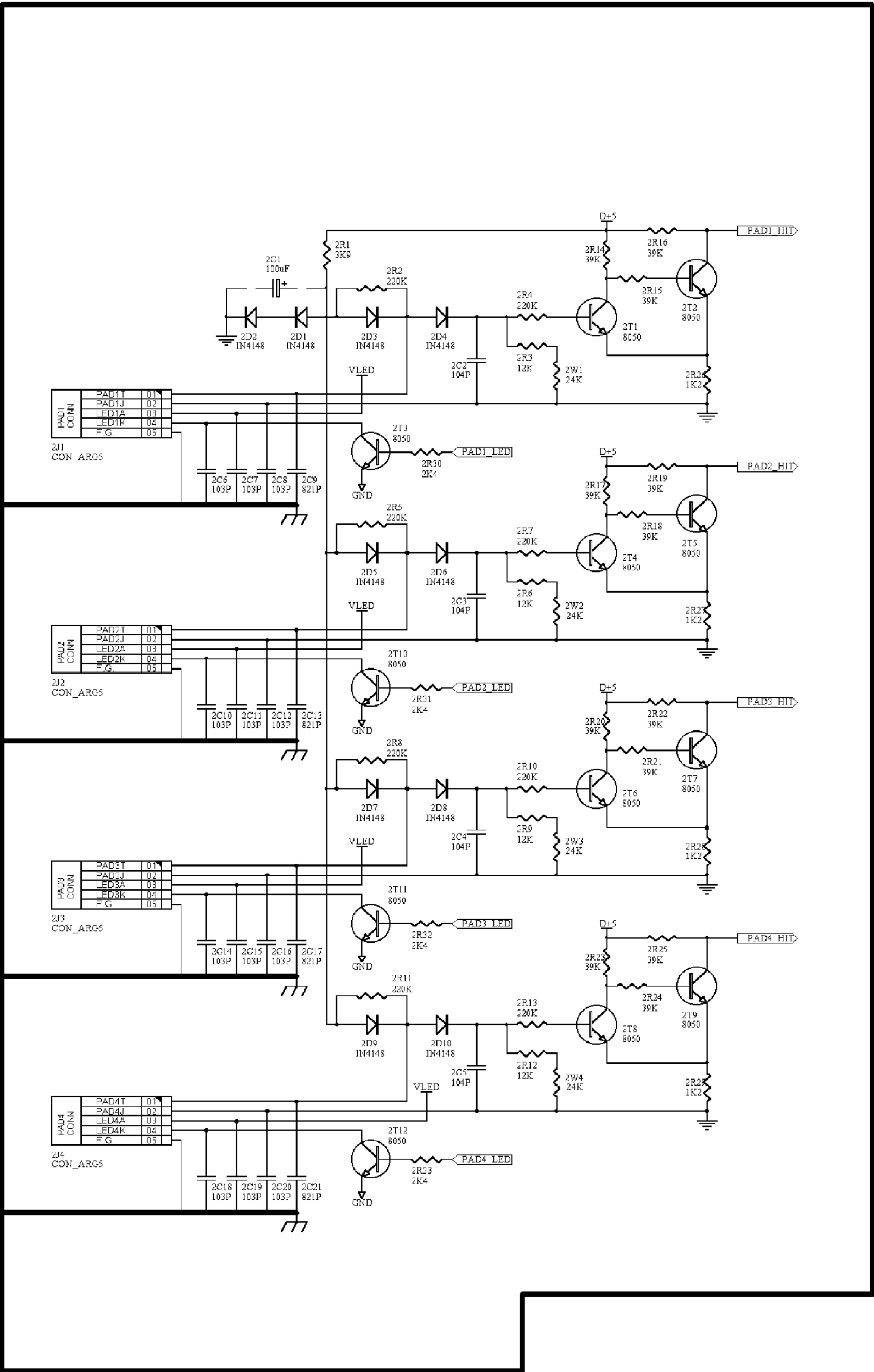
**LD-50**

<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	1	10076480	CABINET/UPPER	8CA-130-05002000	1	BD	C
N	2	10076481	PAD ASSY/DRUM	8CA-130-05001000	1	AV	B
N	3	10076482	LENS/DRUM PAD	##073-05003000	4	AU	C
N	4	10076483	SPACER/A/DRUM LENS	##073-05007000	2	AE	C
N	5	10076484	REFLECTOR	##073-05004000	4	AJ	C
N	6	10076485	RETAINER/REFLECTOR	##073-05005000	4	AF	C
N	7	10076486	CAP/POWER SWITCH	##073-05013000	1	AA	B
N	8	10076487	PCB ASSY/JACK	8CA-120-05003000	1	BD	A
N	9	10076488	PCB/POWER AMP	8CA-120-05002000	1	BP	A
N	10	10076489	CABINET/LOWER	8CA-130-05003000	1	BD	C
N	11	10076490	COVER/BATTERY	8CA-130-05004000	1	AB	B
N	12	10076491	SPACER/B/DRUM LENS	##073-05008000	2	AE	C
N	13	10076492	CAP/JOG DIAL	##073-05010000	1	AH	B
N	14	10076493	KEYPAD/SE	##072-05002000	1	AM	B
N	15	10076494	KEYPAD/FUNCTION	##072-05001000	1	AH	B
N	16	10076495	UNIT/LCD	8CA-120-05005000	1	BF	A
N	17	10076496	PCB/ENCODER	8CA-120-05004000	1	AM	A
N	18	10076497	PCB/MAIN	8CA-120-05001000	1	DJ	A
N	19	10076498	SPEAKER	##056-10854000	1	AS	B
N	20	10076499	BRACKET/SPEAKER	##073-05006000	1	AE	C
N		10075720	STICK/DRUM	##073-05016000	1	AX	B

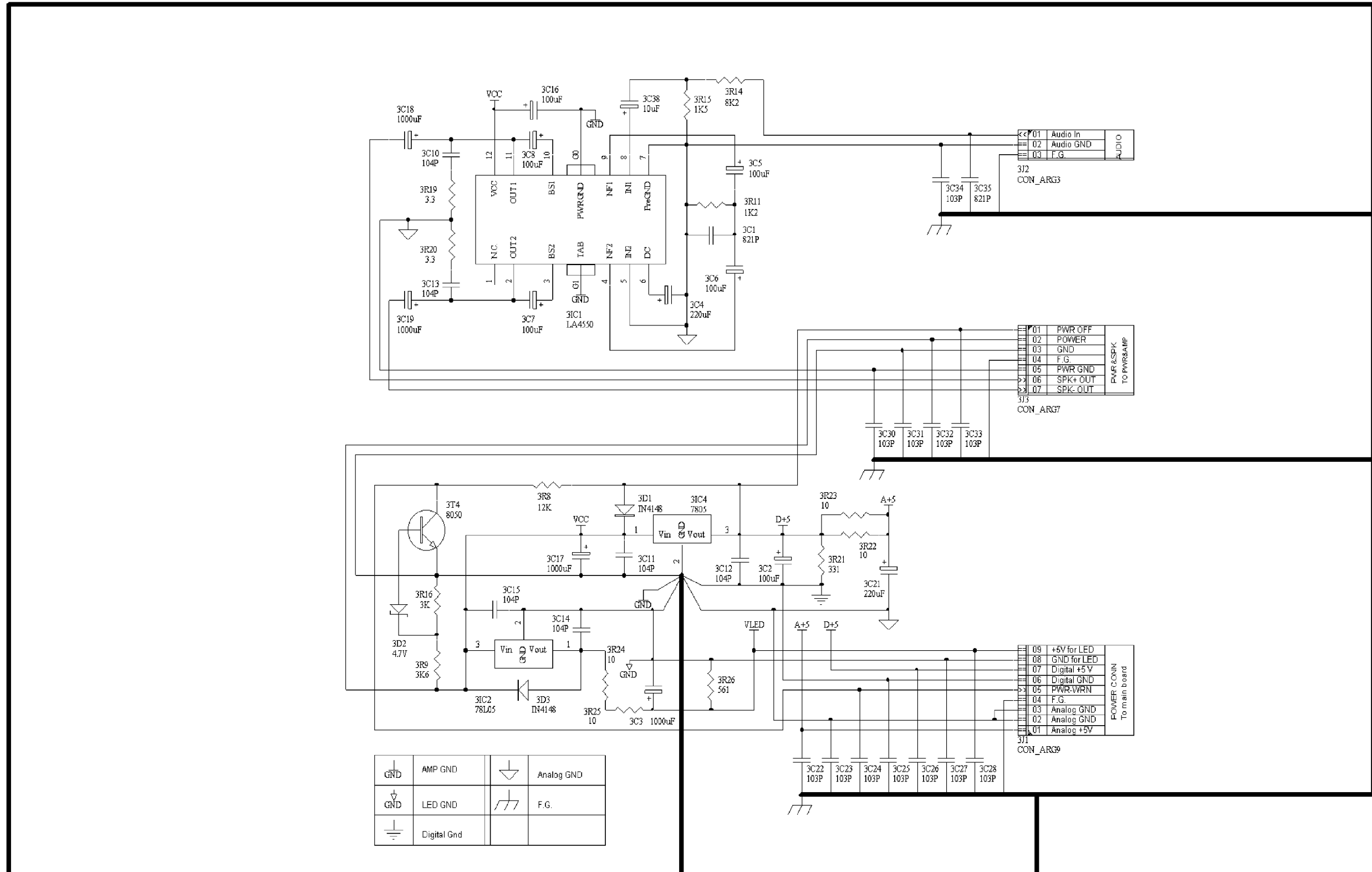
DIGITAL PCB

SCHEMATIC DIAGRAM

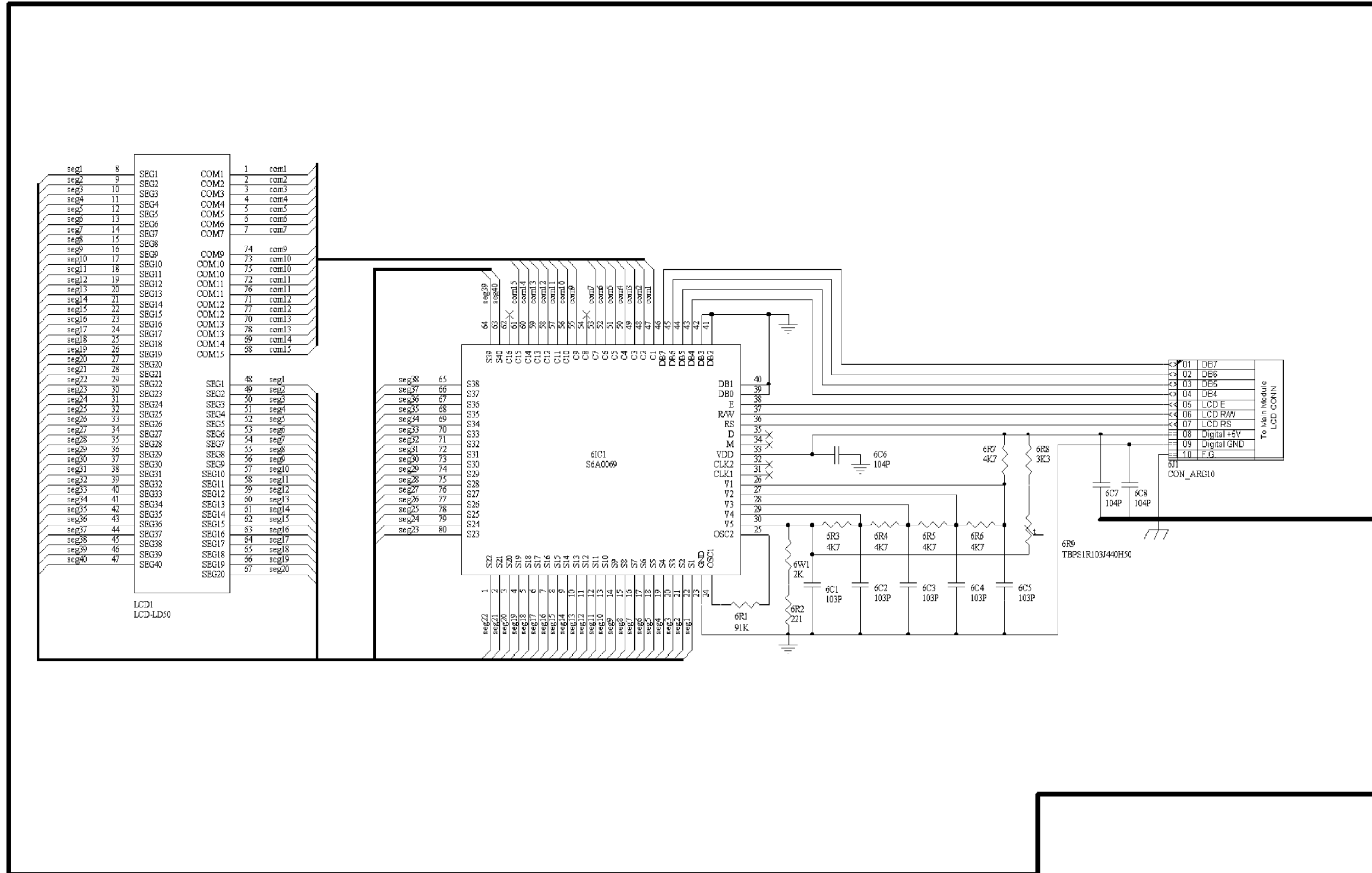




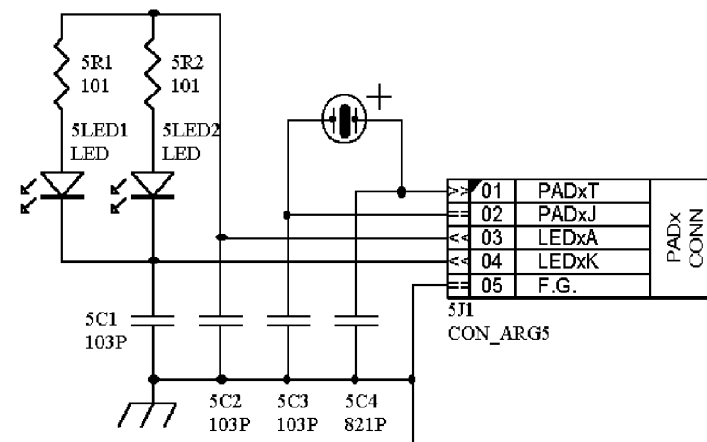
Power/Amp PCB



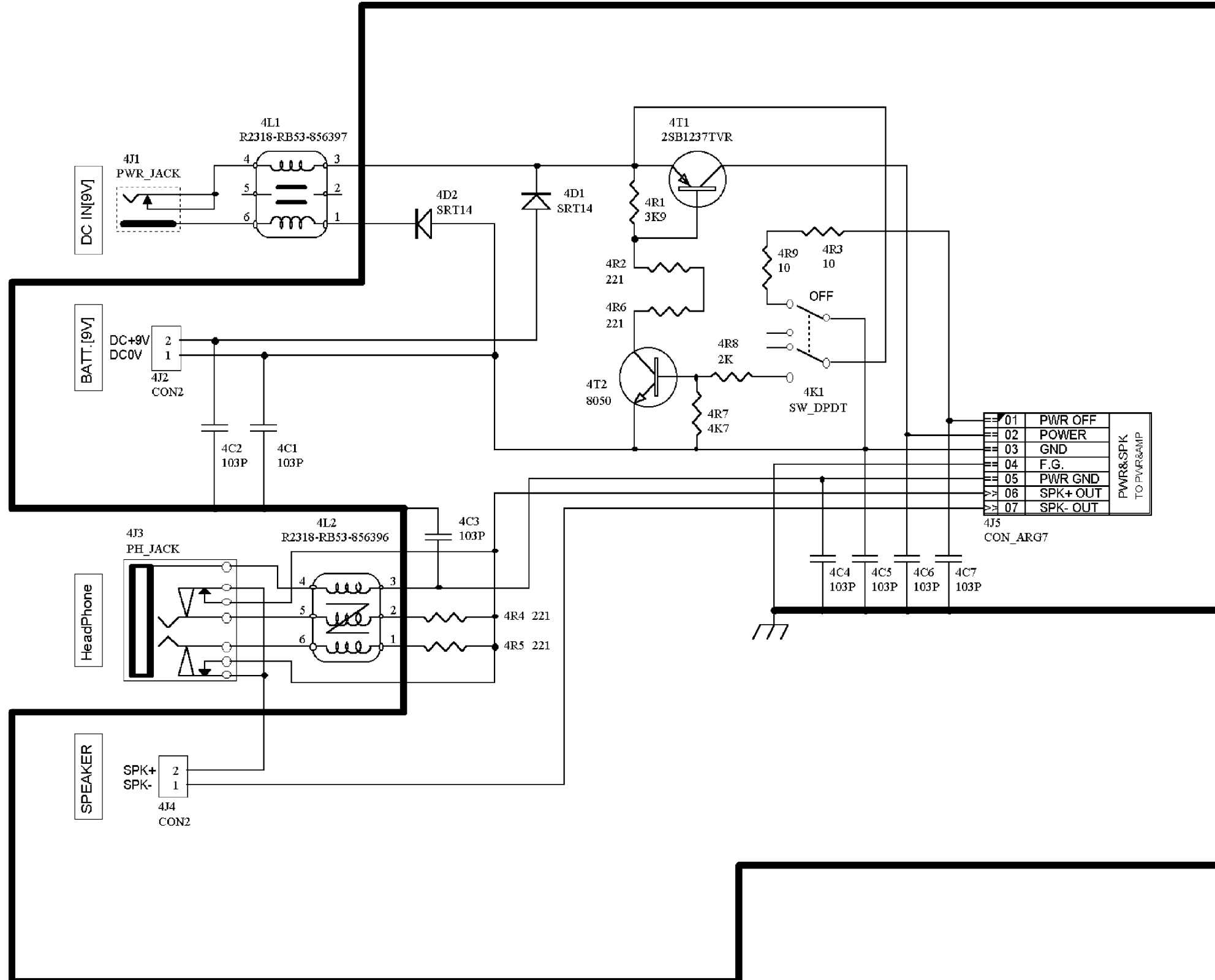
LCD PCB



LED/SENSOR PCB



JACK/SWITCH PCB



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

Nishi-Shinjuku Kimuraya Bldg. 1F  
5-25, Nishi-Shinjuku 7-Chome  
Shinjuku-ku, Tokyo 160-0023, Japan