

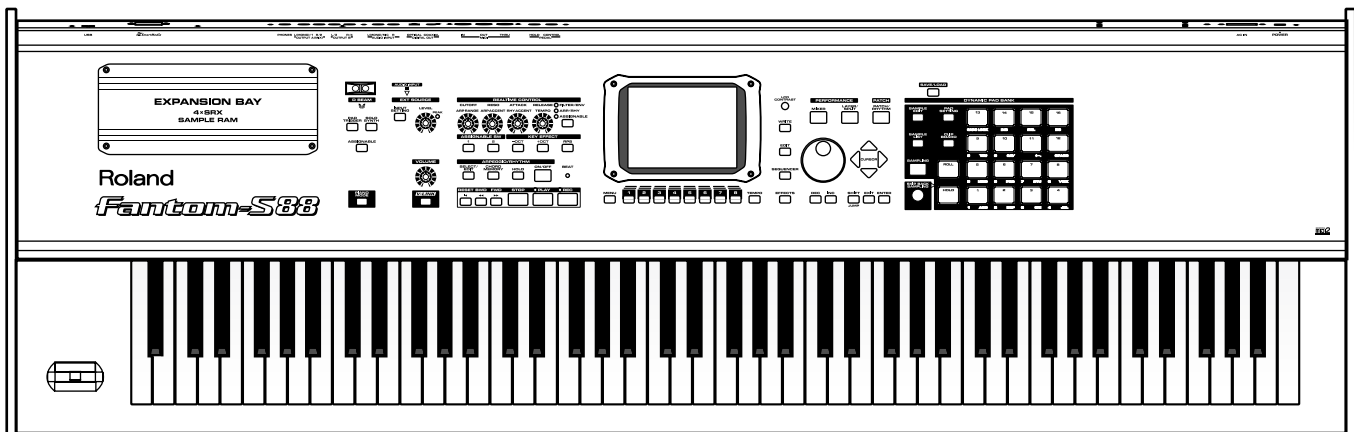
# SERVICE NOTES

## Issued by RJA

# Fantom-S88

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# SPECIFICATIONS

## Fantom-S88: Synthesizer Keyboard (Conforms to General MIDI 2 System)

### Keyboard

88 keys (Progressive Hammer action mechanism and channel aftertouch)

### ■Sound Generator Section

#### Maximum Polyphony

64 voices (shared with the sampling section)

#### Parts

16 parts

#### Wave Memory

64 M bytes (16-bit linear equivalent)

Waveforms: 1,228

#### Preset Memory

Patches: 648 + 256 (GM2)

Rhythm Sets: 32 + 9 (GM2)

Performances: 64

#### User Memory

Patches: 256, Rhythm Sets: 32, Performances: 64

#### Card Memory (SmartMedia)

Patches: 256, Rhythm Sets: 32, Performances: 64

### Sampling Section

#### Data Format

16-bit linear (File Type: .WAV/.AIFF)

#### Sampling Frequency

44.1 kHz (fixed)

#### Maximum Sampling Time

When DIMM has not been expanded (32 MB)

mono: 360 sec. approx., stereo: 180 sec. approx.

with DIMM (288 MB) \*1

mono: 54 min. approx., stereo: 27 min. approx.

#### Number of Samples

User memory: 2,000 (maximum total approximately 16 M bytes)

Card memory: 7,000 (128 M bytes SmartMedia)

### ■Sequencer Section

#### Tracks

Phrase tracks (16 MIDI channels per track): 16

Pattern track (16 MIDI channels per track): 1

Tempo track: 1

Beat track: 1

\* The Pattern Track can hold up to 100 patterns.

#### Resolution

480 TPQN

#### Tempo

5-300

#### Note Capacity

approx. 400,000 notes

#### Song Length

9,998 measures

### Recording Method

Realtime recording, Step recording

### Effects

Multi-Effects: 3 systems, 78 types

Chorus: 3 types

Reverb: 5 types

Input Effect: 6 types

Mastering Effect: 3-bands Compressor

### Expansion Slot

Internal sound generator expansion waveforms, Patch expansion/

SRX expansion boards: 4 slots \*1

Sampling memory expansion

DIMM: 1 slot

Number of pins: 168-pin

Speed: 100 MHz (PC100 CL=2)

133 MHz (PC133 CL=3)

Voltage: 3.3 V

Capacity: 128 MB

256 MB

512 MB \*2

Board height: 38 mm or less

Memory card expansion

SmartMedia card: 1 slot (supports 8 M bytes/16M bytes/32M bytes/

64M bytes/128M bytes (3.3V))

### ■Others

#### Arpeggio

Preset: 128, User: 128

#### Rhythm Pattern

Preset: 256 (32 groups), User: 256 (32 groups)

#### Chord Memory

Preset: 64, User: 64

#### Display

320 x 240 dots, four-shade graphic LCD (QVGA)

#### Pads

16 pads, Velocity and Aftertouch sensitive

#### Controllers

Pitch Bend/Modulation Lever

Control Knobs x 4

Assignable Switch x 2

D Beam Controller

#### Connectors

Headphones Jack

A (MIX) Output Jacks (L (MONO), R) (1/4 inch TRS phone type)

B Output Jacks (L, R) (1/4 inch phone type)

Input Jacks (L (MONO)/MIC, R) (1/4 inch phone type)

Hold Pedal Jack (Half Pedal possible)

Control Pedal Jack (assignable)

MIDI Connectors (IN, OUT, THRU)

USB Connector (supports file transfer (mass storage class))

Digital Audio Interface (COAXIAL/OPTICAL OUTPUT only)

AC Inlet

#### Power Supply

AC 117 V, AC 230 V, AC 240 V

#### Power Consumption

17 W

#### Dimensions

1,408 (W) 455 (D) x 151 (H) mm

55-7/16 (W) x 17-15/16 (D) x 6 (H) inches

**Weight**

29.5 kg / 65 lbs 1 oz

**Accessories**

Owner's Manual English (#72238645)  
Japanese (#72238423)  
Sample Data (Audio) CD (#\*\*\*\*\*)  
CD-ROM (Editor) (#03235778)  
Power Cord 100 V (#03340956)  
120 V (#00894378)  
230 V (#00894389)  
240 VA (#23495124)  
240 VE (#00907001)

**Options**

Wave Expansion Board: SRX Series  
Keyboard Stand: KS-17  
Pedal Switch: DP series  
Foot Switch: BOSS FS-5U  
Expression Pedal: EV-5

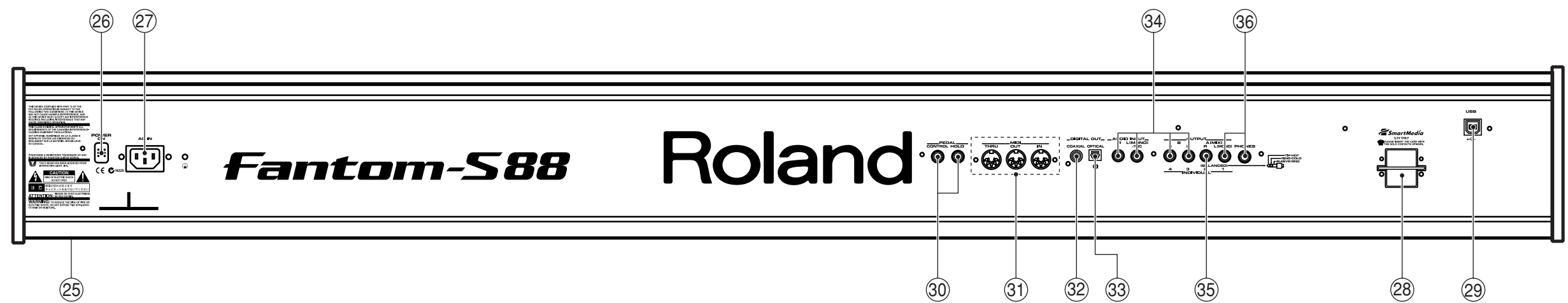
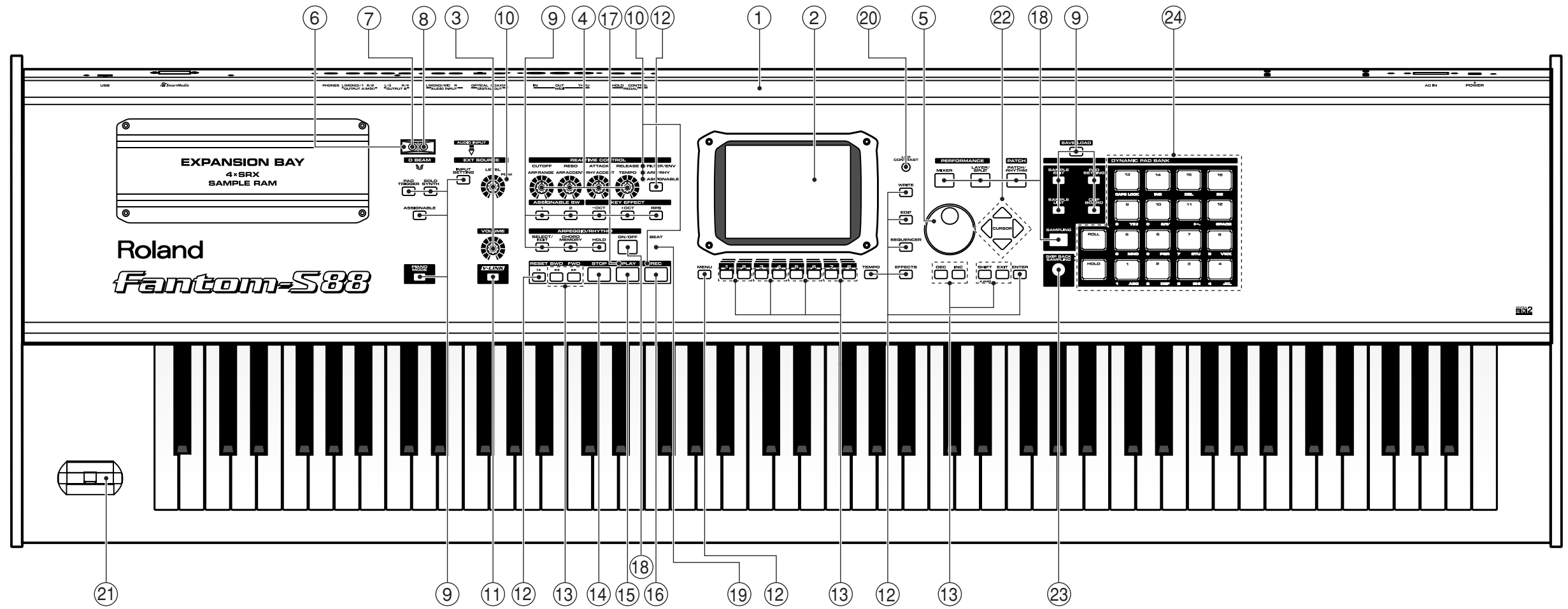
*\*1 If the maximum DIMM expansion is installed, only two SRX slots will be available.*

*\*2 If a 512 MB DIMM is installed, the result will be the same as if a 256 MB DIMM were installed.*

*\* SmartMedia is a trademark of Toshiba Corp.*

*\* In the interest of product improvement, the specifications and/or appearance of this unit are subject to change without prior notice.*

# LOCATION OF CONTROLS

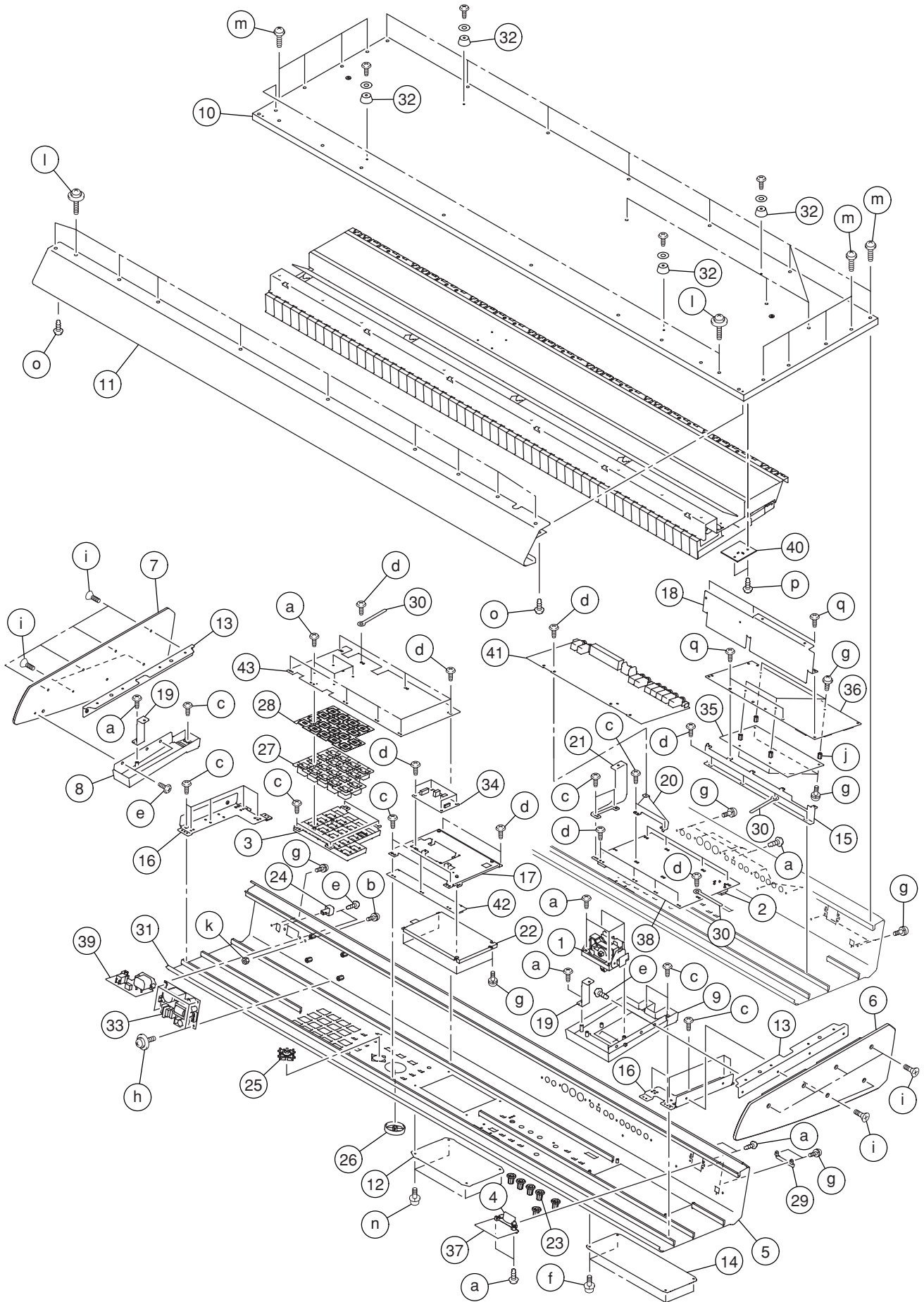


# LOCATION OF CONTROLS PARTS LIST

No.	Part Code	Part Name	Description	Q'ty
1	03127678	TOP PANEL		1
2	03125867	DISPLAY COVER		1
	01124234	LCD UNIT	LM320191	1
3	02452912	J R-KNOB	SF-A BLK/LCG	2
	03126167	12M/M ROTARY POTENTIOMETER	EVJY10FB6A24	2
4	02452912	J R-KNOB	SF-A BLK/LCG	4
	03126178	9M/M ROTARY POTENTIOMETER	EVUF2JFK3B14	4
5	22485303	D R-KNOB (ALPHA-DIAL)	L BLK 248-303	1
	01905467	ROTARY ENCODER	EVE GC1 F20 24B	1
6	01343089	ESCUTCHEON	D-BEAM CONTROLLER ESCT BLK	1
7	01900612	DIODE	TPS611	1
	12169368	LED SPACER	LDS-40B	1
8	03126134	LED	TLN233	1
	02230578	LED SPACER	LDS-50R	1
9	03120890	D S-KEYTOP	SX1H-B GRS	18
	02125167	LED (AMBER)	SLI-343DCT32W	18
	01340290	TACT SWITCH	EVQ11A H=5.0	18
10	01011656	LED (RED)	SLR-332VR3F	5
	12169406	LED SPACER		5
11	03120890	D S-KEYTOP	SX1H-B GRS	1
	03122112	LED	SLR-343BBT3F	1
	01340290	TACT SWITCH	EVQ11A H=5.0	1
12	03120890	D S-KEYTOP	SX1H-B GRS	9
	01340290	TACT SWITCH	EVQ11A H=5.0	9
13	03120889	D S-KEYTOP	SX2H-B GRS	7
	01340290	TACT SWITCH	EVQ11A H=5.0	14
14	00901390	KEYTOP	STOP (WHIT GREY)	1
	00894645	TACT SWITCH	SKECAF WITHOUT LED	1
15	00901401	KEYTOP	PLAY (WHIT GREY)	1
	00894645	TACT SWITCH	SKECAF WITHOUT LED	1
16	00901412	KEYTOP	REC (RED)	1
	00894645	TACT SWITCH	SKECAF WITHOUT LED	1
17	01012078	LED (GREEN)	SLR-332MG3F	1
	12169406	LED SPACER		1
18	01783923	N S-KEYTOP	MD1H	5
	02894090	LED (ORNG)	SLR-343DUT32	5
19	00127367	LED (RED/GREEN)	SPR-39MWV	1
	01455901	LED SPACER	LH-36-9	1
20	03126189	9M/M ROTARY POTENTIOMETER	EVUF2AE17B14	1
21	71905023	BENDER TURBOLESS	PB-H0203	1
22	01234090	D T-KEYTOP	MX4B BLK	1
	01340290	TACT SWITCH	EVQ11A H=5.0	4
23	02013090	F C-KEYTOP	MX1H CLR	1
	03122112	LED	SLR-343BBT3F	1
	01340290	TACT SWITCH	EVQ11A H=5.0	1
24	03122078	RUBBER SW		1
	03122067	RUBBER SW ESCT		1
	03128767	PRESSURE SENSOR SHEET		1
25	72238445	BOTTOM BOARD		1
26	32490595	P S-KEY	MX BLK	1
	01676512	PUSH SWITCH	SDKLA1-B	1
27	02675701	WIRING ASSY	WIRING W3 (AC INLET+GND)	1
28	01343101	D C-ESCT	D C-ESCT BX1H BLK	1
	01780712	CARD CONECTR	CN015P-3013-0	1
29	02781101	USB CONNECTOR	YKF45-0020	1
30	13449275	JACK	YKB21-5074	2
31	13429274	MIDI SOCKET	YKF51-5041	1
32	01343723	RCA (PIN) JACK	YKC21-3117 (ORANGE)	1
33	02565390	IC (OPTICAL CONNECTOR)	GP1FA501TZ TX	1
34	13449283	6.5MM JACK	HLJ7101-01-3010	4
35	13449258	6.5MM JACK	HLJ4306-01-3080	1
36	13449284	6.5MM JACK	HLJ7001-01-3010	2



# EXPLODED VIEW



# EXPLODED VIEW PARTS LIST

## [PARTS]

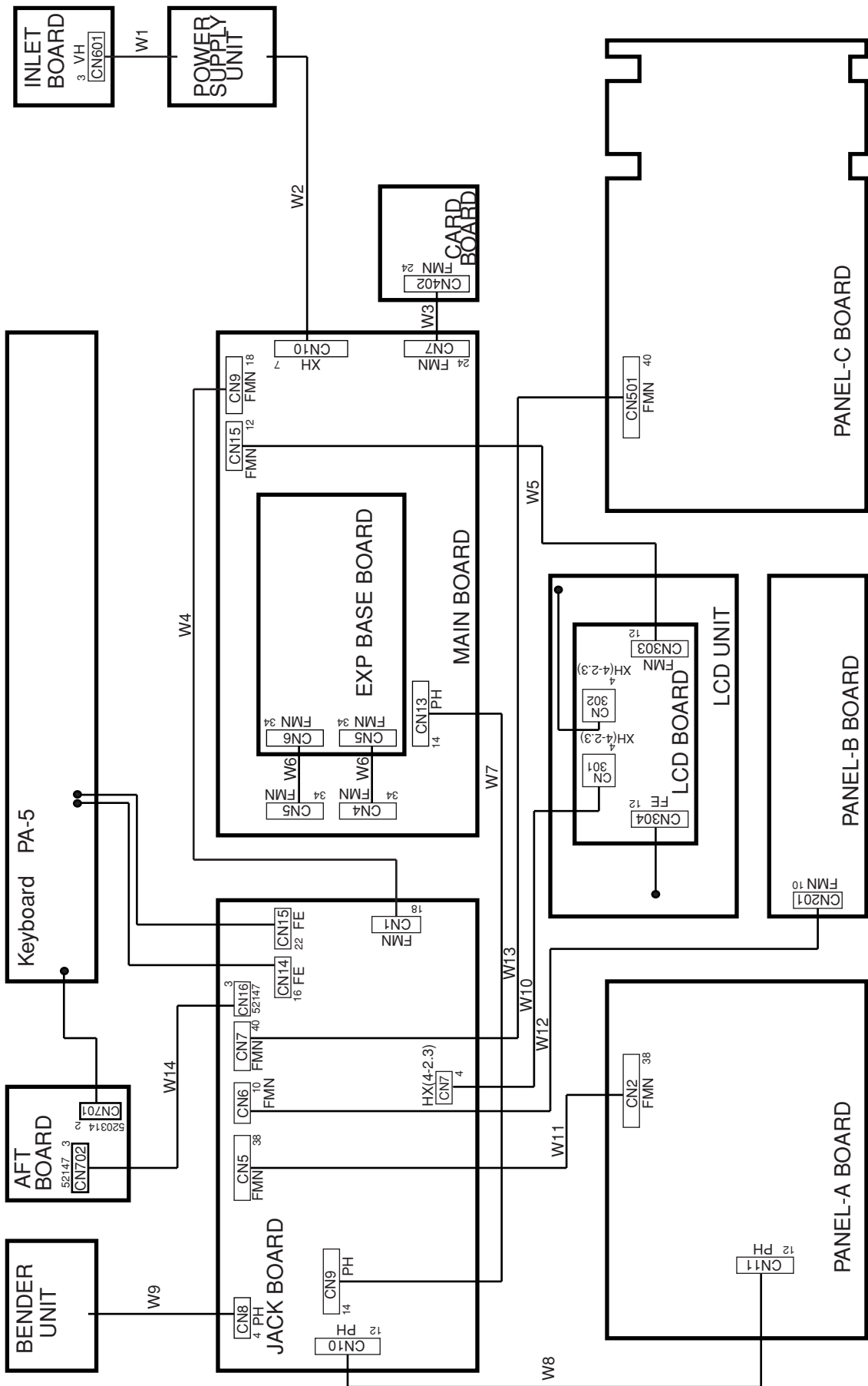
No.	Part Code	Part Name	Description	Q'ty
1	71905023	PB-H0203	BENDER TURBOLESS	1
2	01343089	ESCUTCHEON	D-BEAM CONTROLLER ESCT BLK	1
3	03122067	RUBBER SW ESCT		1
4	01343101	D C-ESCT	D C-ESCT BX1H BLK	1
5	03127678	TOP PANEL		1
6	03128289	SIDE PANEL L		1
7	03128290	SIDE PANEL R		1
8	00788912	END BLOCK R		1
9	00788901	END BLOCK L		1
10	72238445	BOTTOM BOARD		1
11	03230023	BLIND		1
12	03125867	DISPLAY COVER		1
13	03230034	SIDE ANGLE		2
14	03230090	EXP COVER		1
15	03230067	PWB HOLDER MAIN		1
16	03230045	PANEL ANGLE		2
17	03230089	DISPLAY HOLDER		1
18	03236401	MAIN BOARD HOLDER		1
19	03230056	END BLOCK HOLDER		2
20	03230078	PWB HOLDER JACK		1
21	03234878	STAY		1
22	01124234	LM320191	LCD UNIT	1
23	02452912	J R-KNOB	SF-A BLK/LCG	6
24	32490595	P S-KEY	MX BLK	1
25	01234090	D T-KEYTOP	MX4B BLK	1
26	22485303	D R-KNOB (ALPHA-DIAL)	L BLK 248-303	1
27	03122078	RUBBER SW		1
28	03128767	PRESSURE SENSOR SHEET		1
29	01346312	CARD PROTECTOR		1
30	40342856	COATING CLIP	CP-1S	4
31	22265286	KEY FELT	226-286	1
32	12359105	RUBBER FOOT W	RS-09 235-105	4
33	01785823	A1DU2L3B034	SWITCHING REGULATOR	1
34	72235189	LCD BOARD ASSY		1
35	72235090	EXP BASE BOARD ASSY		1
36	72238456	MAIN BOARD ASSY		1
37	72235178	CARD BOARD ASSY		1
38	72238501	PANEL-A KEYTOP ASSY		1
39	72235190	INLET BOARD ASSY		1
40	72238556	AFT BOARD ASSY		1
41	72239745	JACK BOARD ASSY		1
42	72235134	PANEL-B KEYTOP ASSY		1
43	72235156	PANEL-C KEYTOP ASSY		1

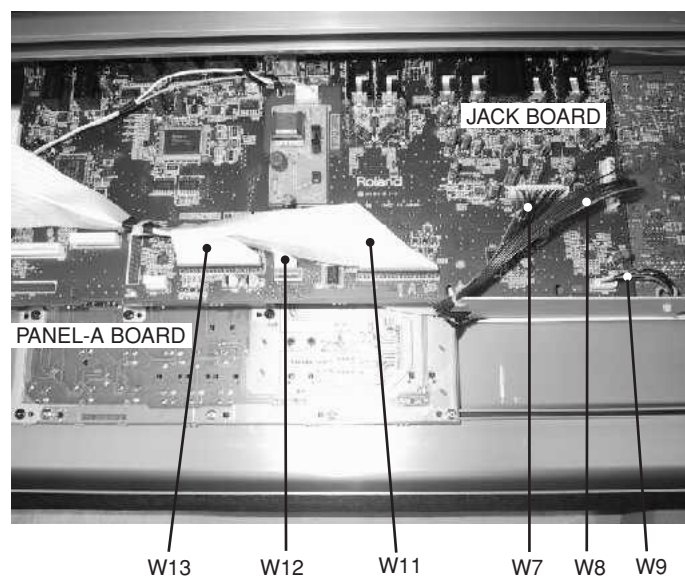
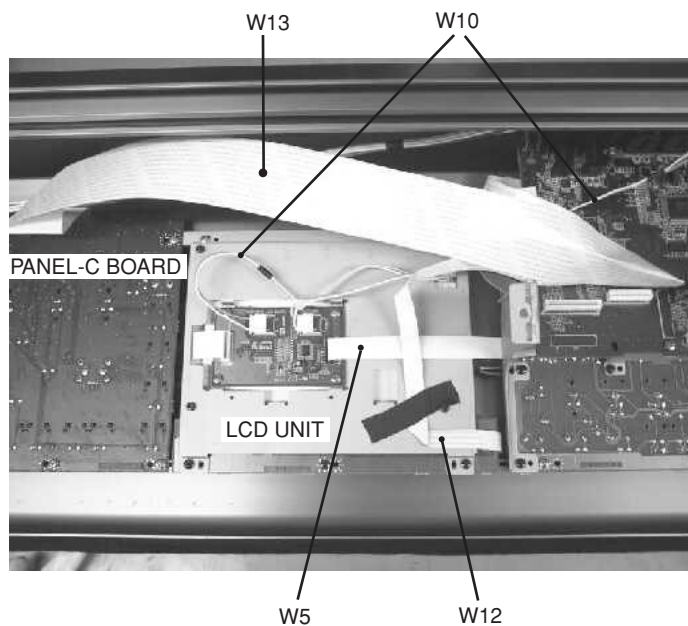
## [SCREWS]

No.	Part Code	Part Name	Description	Q'ty
a	40011312	SCREW 3X8	BINDING TAPTITE P BZC	18
b	40010334	SCREW 4X8	BINDING BZC	1
c	40011101	SCREW 3X8	BINDING TAPTITE B BZC	25
d	40011056	SCREW 3X6	BINDING TAPTITE B ZC	29
e	40011123	SCREW 4X8	BINDING TAPTITE B BZC	6
f	40561190	SCREW M3X10	HEX SOCKET HEAD SPW NI	4
g	40011490	SCREW M3X6	PAN MACHINE W/SW BZC	22
h	40017934	SCREW M3X6	PAN MACHINE W/SW+PW FE ZC	4
i	40346289	SCREW 4X12	OVAL HEAD TAPTITE B NI	12
j	22150501	STAND OFF	M3 L10C	4
k	40011745	HEX NUT M4	SPRING NUT FE ZC	1
l	40013023	SCREW M4X25	PAN HEAD DOUBLE SEMS FE BZC	12
m	40128512	SCREW 4X25X20	PAN WASHER HEAD TAPTITE B BZC	18
n	40561090	SCREW M3X6	HEX SOCKET HEAD SPW NI	4
o	40012145	SCREW 4X14	TRUSS TAPPING A BZC	2
p	40010734	SCREW 3X12	BINDING HEAD TAPPING A1 FE ZC	2
q	40013690	SCREW 3X8	BINDING TAPTITE B VWH ZC	5



# WIRING DIAGRAM





No.	Part Code	Part Name	Description	Q'ty
W1	03120801	WIRING W3	CN601 on INLET to POWER SUPPLY UNIT	1
W2	03234667	WIRING W1	CN10 on MAIN to POWER SUPPLY UNIT	1
W3	03234678	BAN CARD	BNCD-P=1.00-K-24-120 CN7 on MAIN to CN402 on CARD	1
W4	03234689	BAN CARD	BNCD-P=1.00-K-18-650 CN9 on MAIN to CN1 on JACK	1
W5	03234690	BAN CARD	BNCD-P=1.00-K-12-650 CN15 on MAIN to CN303 on LCD	1
W6	03129323	BAN CARD	BNCD-P=1.00-K-34-60 CN4,5 on MAIN to CN5,6 on EXP BASE	2
W7	02344167	WIRING	14X300-P2.0-PHR-PHR-F CN13 on MAIN to CN9 on JACK	1
W8	02344034	WIRING	12X250-P2.0-PHR-PHR-F CN10 on JACK to CN11 on PANEL-A	1
W9	02342067	WIRING	4X450-P2.0-PHR-PHR-F CN8 on JACK to BENDER UNIT	1
W10	02679412	WIRING	WIRING W2 CN17 on JACK to CN301 on LCD	1
W11	03236423	BAN CARD	BNCD-P=1.00-K-38-450 CN5 on JACK to CN2 on PANEL-A	1
W12	03129301	BAN CARD	BNCD-P=1.00-K-10-400 CN6 on JACK to CN201 on PANEL-B	1
W13	03236412	BAN CARD	BNCD-P=1.00-K-40-550 CN7 on JACK to CN501 on PANEL-C	1
W14	03234712	RIBBON CABLE	JWFW 3X850-P2.0 CN16 on JACK to CN702 on AFT	1

# PARTS LIST

**SAFETY PRECAUTIONS:**

The parts marked  $\Delta$  have safety-related characteristics. Use only listed parts for replacement.

**CONSIDERATION ON PARTS ORDRING**

When ordering any parts listed in the parts list, please specify the following items in the order sheet.

	QTY	PART NUMBER	DESCRIPTION	MODEL NUMBER
Ex.	10	22575241	Sharp Key	C-20/50
	15	2247017300	Knob (orange)	DAC-15D

Failure to completely fill the above items with correct number and description will result in delayed or even undelivered replacement.

NOTE: The parts marked # are new. (initial parts)

					Q'ty
<b>CASING</b>					
#	03230034	SIDE ANGLE			2
#	03230023	BLIND			1
	03125867	DISPLAY COVER			1
#	03230090	EXP COVER			1
	03122067	RUBBER SW ESCT			1
	01343101	D C-ESCT	D C-ESCT BX1H BLK		1
	00788901	END BLOCK L			1
	00788912	END BLOCK R			1
#	03128289	SIDE PANEL L			1
#	03128290	SIDE PANEL R			1
#	03127678	TOP PANEL			1
	01343089	ESCU TCHEON	D-BEAM CONTROLLER ESCT BLK		1
#	72238445	BOTTOM BOARD			1
<b>CHASSIS</b>					
#	03230045	PANEL ANGLE			2
#	03230089	DISPLAY HOLDER			1
#	03230056	END BLOCK HOLDER			2
#	03236401	MAIN BOARD HOLDER			1
#	03230067	PWB HOLDER MAIN			1
#	03230078	PWB HOLDER JACK			1
#	03234878	STAY			1
<b>KNOB, BUTTON</b>					
	01234090	D T-KEYTOP	MX4B BLK		1
	32490595	P S-KEY	MX BLK		1
	02452912	J R-KNOB	SF-A BLK/LCG		6
	22485303	D R-KNOB (ALPHA-DIAL)	L BLK 248-303		1
	03122078	RUBBER SW			1
<b>SWITCH</b>					
	01340290	EVQ11A H=5.0	TACT SWITCH	SW2,SW10,SW3,SW4,SW5,SW6,SW7,SW8,SW1, SW19,SW11,SW20,SW18,SW17,SW16,SW15, SW14,SW13,SW12 on PANEL-A Board,SW209, SW210,SW205,SW206,SW207,SW208,SW201, SW202,SW203,SW204, on PANEL-B Board, SW521,SW522,SW523,SW501,SW502,SW503, SW504,SW517,SW518,SW519,SW520,SW513, SW514,SW515,SW516,SW509,SW510,SW511, SW512,SW505,SW506,SW507,SW508, on PANEL-C Board	23 +10 +19
$\Delta$	01676512	SDKLA1-B	PUSH SWITCH	SW601 on INLET Board	1
	00894645	SKECAF WITHOUT LED	TACT SWITCH	SW21,SW22,SW23 on PANEL-A Board	3
<b>JACK, EXT TERMINAL</b>					
	01343723	YKC21-3117 (ORANGE)	RCA (PIN) JACK	JK5 on JACK Board	1
	01780712	CN015P-3013-0	CARD CONECTR	CN401 on CARD Board	1
	02781101	YKF45-0020	USB CONNECTOR	JK1 on Main board	1
	13429274	YKF51-5041	MIDI SOCKET	JK1 on JACK Board	1
	13449258	HLJ4306-01-3080	6.5MM JACK	JK7 on JACK Board	1
	13449275	YKB21-5074	JACK	JK3,JK2 on JACK Board	2
	13449283	HLJ7101-01-3010	6.5MM JACK	JK11,JK10,JK8,JK9 on JACK Board	4
	13449284	HLJ7001-01-3010	6.5MM JACK	JK4,JK6 on JACK Board	2
<b>DISPLAY UNIT</b>					
	01124234	LM320191	LCD UNIT		1
NOTE: Replacement LM320191 should be made on a unit base.					

POWER SUPPLY UNIT				
△	01785823	A1DU2L3B034	SWITCHING REGULATOR	1
	NOTE: Replacement A1DU2L3B034 should be made on a unit base.			
BENDER UNIT				
	71905023	PB-H0203	BENDER TURBOLESS	1
	NOTE: Replacement PB-H0203 should be made on a unit base.			
KEYBOARD ASSY				
#	72349667	KEYBOARD-AFT ASSY	PA-588-F	1
	NOTE: See 'KEYBOARD PARTS LIST' for details.			
PCB ASSY				
	72235090	EXP BASE BOARD ASSY		1
	NOTE: 'EXP BASE BOARD ASSY' includes the following parts.			
	01902756	PWB SPACER	RSPS-12L	4
	02019034	PWB SPACER	RSPLS-12L	4
#	72238456	MAIN BOARD ASSY		1
	72235156	PANEL-C KEYTOP ASSY		1
	NOTE: 'PANEL-C KEYTOP ASSY' includes the following parts.			
	03120890	D S-KEYTOP	SX1H-B GRS	10
	03120889	D S-KEYTOP	SX2H-B GRS	2
	01783923	N S-KEYTOP	MD1H	4
	02013090	F C-KEYTOP	MX1H CLR	1
	02123012	ENCODER HOLDER		1
	72235178	CARD BOARD ASSY		1
	72235189	LCD BOARD ASSY		1
△	72235190	INLET BOARD ASSY		1
	NOTE: 'INLET BOARD ASSY' includes the following parts.			
	02675701	WIRING ASSY	WIRING W3 (AC INLET+GND)	JK601 on INLET Board
	12199584	GROUNDING TERMINAL	M1698	TER601 on INLET Board
#	72238556	AFT BOARD ASSY		1
#	72239745	JACK BOARD ASSY		1
	NOTE: 'JACK BOARD ASSY' includes the following parts.			
	12199584	GROUNDING TERMINAL	M1698	TER3,TER2,TER1 on JACK Board
	40342856	COATING CLIP	CP-1S	4
	72235134	PANEL-B KEYTOP ASSY		1
	NOTE: 'PANEL-B KEYTOP ASSY' includes the following parts.			
	03120890	D S-KEYTOP	SX1H-B GRS	2
	03120889	D S-KEYTOP	SX2H-B GRS	4
#	72238501	PANEL-A KEYTOP ASSY		1
	NOTE: 'PANEL-A KEYTOP ASSY' includes the following parts.			
	01343089	ESCUTCHEON	D-BEAM CONTROLLER ESCT BLK	1
	00901390	KEYTOP	STOP (WHIT GREY)	1
	00901401	KEYTOP	PLAY (WHIT GREY)	1
	00901412	KEYTOP	REC (RED)	1
	03120889	D S-KEYTOP	SX2H-B GRS	1
	03120890	D S-KEYTOP	SX1H-B GRS	16
	01783923	N S-KEYTOP	MD1H	1
	12169406	LED SPACER	LDS-100Y	6
	01455901	LED SPACER	LH-36-9	1
	02230578	LED SPACER	LDS-50R	1
	12169368	LED SPACER	LDS-40B	1
IC				
	02675689	HD74LV245ATELL	IC (CMOS)	IC29,IC51,IC44,IC40,IC39,IC35,IC34,IC30,IC23, IC8,IC7,IC32 on Main Board,IC1,IC2,IC3 on EXP BASE Board
	01455956	TC223C660CF-503	IC (RA08-503)	IC27 on Main board
	02231767	RA0A-101 (TC223C080AF-101)	IC (DSP)	IC22 on Main board
	02782778	TC200E06 (PPC)	IC (I/F)	IC4 on Main board
	02900456	TC200E1005AF-11 (BA)	IC (I/F)	IC21 on Main board
	03124978	UPD23C128040ALGY-536-MJH	IC (MASK ROM)	IC28 on Main board
	03017601	TC58256AFT	IC (FLASH MEMORY)	IC53 on Main board
	*****	MBM29LV/160B	IC (FLASH MEMORY)	IC19 on Main board
	01783589	HD74HC4052FPEL	IC (CMOS)	IC14 on JACK Board,IC501,IC503 on PANEL-C Board

IC				
00458312	NJM2360M	IC (REGULATOR)	IC504 on PANEL-C Board	1
01783523	TC74VHCT245AFT (EL)	IC (CMOS)	IC301 on LCD Board	1
01783656	HD74HC4053FPEL	IC CMOS	IC23 on JACK Board	1
02451712	HD74LV14ATELL	IC (CMOS)	IC1 on JACK Board	1
02565390	GP1FA501TZ TX	IC (OPTICAL CONNECTOR)	CN11 on JACK Board	1
01785012	HA17324	IC (BIPOLAR OP AMP)	IC1 on PANEL-A Board	1
03019523	K4S281632D-TC75	IC (SDRAM)	IC2,IC20,IC6,IC24 on Main board	4
00129278	SSC1080F0B	IC	IC5 on JACK Board	1
00232634	TC7W74F (TE12L)	IC	IC6 on JACK Board	1
00344390	TA7805F (TE16L)	IC (REGULATOR)	IC58 on Main board	1
00567534	TC74VHC138F (EL)	IC (CMOS)	IC8,IC9 on JACK Board	2
01348912	TC7SH08FU (TE85L)	IC (CMOS)	IC45,IC84 on Main board	2
01348945	TC7SH32FU (TE85L)	IC (CMOS)	IC41,IC81 on Main board	2
01349590	TC7WU04FU (TE12L)	IC (CMOS)	IC16,IC26 on Main board	2
01455956	TC223C660CF-503	IC (RA08-503)	IC27 on Main board	1
01783656	HD74HC4053FPEL	IC CMOS	IC23 on JACK Board	1
01785178	TC9271FS	IC (DIGITAL OUT IF)	IC62 on Main board	1
01890367	TC74VHC175FT (EL)	IC (COMS)	IC52,IC48 on Main board	2
02451690	HD74LV08ATELL	IC (CMOS)	IC12 on Main board	1
02454878	M62220FP-600C	IC (REGULATOR) DC-DC IC	IC55 on Main board	1
02568478	M66273FP	LCD-DRIVER	IC49 on Main board	1
02568489	GM71V18163CT-6	IC (DRAM)	IC25 on Main board	1
02671378	LC324260BJ-60-TLM	IC (DRAM)	IC37 on Main board	1
02675645	HD74LV04ATELL	IC (CMOS)	IC10,IC17 on Main board	2
02675656	HD74LV11ATELL	IC (CMOS)	IC31,IC13,IC11 on Main board	3
02675678	HD74LV139ATELL	IC (CMOS)	IC79,IC15,IC38,IC43,IC42 on Main board	5
02892334	TC74LCX245FT (EL)	IC (CMOS)	IC3,IC5 on Main board	2
02894301	HA17324ARPEL (FP-14DN)	IC (CMOS OP)	IC502 on PANEL-C Board	1
02900545	PC410LKNIPI	IC (PHOTO COUPLER)	IC11 on JACK Board	1
02900690	P2027A-08TR	IC	IC89 on Main board	1
02903723	HD6417706	IC (32BIT CPU)	IC1 on Main board	1
03015390	TC74HCT273AF (EL)	IC (CMOS)	IC54 on Main board	1
03124978	UPD23C128040ALGY-536-MJH	IC (MASK ROM)	IC28 on Main board	1
03124989	UPD23C128040ALGY-535-MJH	IC (MASK ROM)	IC33 on Main board	1
03127267	HD6433061G45FP	IC (16BIT CPU)	IC2 on JACK Board	1
03231701	AK4527BVQ	IC (AD/DA)	IC60 on Main board	1
03231712	PQ1CZ21H2ZZ	IC (REGULATOR)	IC57 on Main board	1
15189186	UPC4570C	IC (BIPOLAR OP AMP)	IC2,IC3,IC4 on PANEL-A Board	3
15189261	M5218AFP-600E	IC (BIPOLAR OP AMP)	IC68,IC61,IC59,IC70 on Main Board,IC18,IC16,IC19,IC24,IC25 on JACK Board	9
15199937	M51953BFP-600C	IC (RESET)	IC18 on Main board	1
15249104	TC7S04F (TE85L)	IC (CMOS)	IC22 on JACK Board	1
15259706T0	TC74HCU04AF (EL)	IC (HS-CMOS)	IC17 on JACK Board	1
15269219H0	HD74LS05FPEL	IC (TTL)	IC12 on JACK Board	1
15289105	UPC4570G2-E2	IC (BIPOLAR OP AMP)	IC20 on JACK Board	1
15289151	NJM2904M-TE3	IC (OP AMP)	IC21,IC15,IC10,IC7 on JACK Board	4

TRANSISTOR				
00239801	DTA114EU T-106	TRANSISTOR	Q20 on JACK Board	1
00239812	DTC114EUT106	TRANSISTOR	Q12,Q16,Q10,Q11,Q13,Q14,Q15,Q17 on JACK Board	8
00901523	2SA1681 (SC-62) (POW SW)	TRANSISTOR	Q34 on JACK Board	1
01121289	2SC4081 T106 QRS	TRANSISTOR	Q23,Q19,Q18,Q24 on JACK Board,Q501 on PANEL-C Board	5
02017512	PW MOSFET 2SJ325-Z-E1	TRANSISTOR	Q6 on Main board	1
02451378	RN2427	TRANSISTOR	Q7,Q8,Q6,Q5,Q4,Q3,Q9 on JACK Board	7
02671023	2SC3052-T12-1E	TRANSISTOR	Q41,Q35 on JACK Board	2
02671267	RT1N141C-T12-1	TRANSISTOR	Q14 on Main Board,Q29,Q36 on JACK Board	1+2
03126145	2SA933ASTPR	TRANSISTOR	Q2 on PANEL-A Board	1
15129626	2SD1468S TP Q	TRANSISTOR	Q3 on PANEL-A Board	1
15309101	2SA1037AKT146R	TRANSISTOR	Q28 on JACK Board	1
15319101	2SC2412KR T146	TRANSISTOR	Q301 on LCD Board	1
15319105	2SC3326-A	TRANSISTOR	Q40,Q26,Q39,Q38,Q37,Q33,Q32,Q27,Q25,Q30 on JACK Board	10
15329103T0	2SK880-GR (TE85R)	FET	Q31 on JACK Board	1
15329531	RN1308-TE85R	TRANSISTOR	Q22 on JACK Board	1
15329533	RN2307 (TE85R)	TRANSISTOR	Q21 on JACK Board	1

DIODE				
00127367	SPR-39MVW	LED (RED/GREEN)	LED22 on PANEL-A Board	1
00129767	RD10M-T1B B2	ZENER DIODE	D1 on JACK Board	1
01011656	SLR-332VR3F	LED (RED)	LED12,LED6,LED13,LED20,LED21 on PANEL-A Board	5
01012078	SLR-332MG3F	LED (GREEN)	LED19 on PANEL-A Board	1
01017512	RB411D T146	SCHOTTKY DIODE	D501 on PANEL-C Board	1
01897189	MA147-(TX)	ARRAY DIODE	DA5,DA2,DA3,DA4 on Main board,DA401 on CARD Board,DA13,DA14,DA12,DA11,DA9,DA8,DA7,DA6,DA15,DA5 on JACK Board	4+1 +10

DIODE				
01897190	TLOU1002 (ORANGE)	LED	LED513,LED514,LED517,LED507,LED511,LED512,LED526,LED527,LED528,LED521,LED524,LED525,LED518,LED519,LED520,LED504,LED505,LED506, on PANEL-C Board	18
01900612	TPS611	DIODE	Q1 on PANEL-A Board	1
02125167	SLI-343DCT32W	LED (YELLOW)	LED17,LED3,LED16,LED15,LED11,LED10,LED8,LED4,LED2,LED1,LED9,LED5,LED7 on PANEL-A Board,LED510,LED516,LED502,LED503,LED509, on PANEL-C Board	13 +5
02781290	RB161L-40 TE25	SCHOTTKY DIODE	D3,D2 on Main board	2
02894090	SLR-343DUT32	LED (ORNG)	LED18 on PANEL-A Board,LED523,LED501,LED508,LED515, on PANEL-C Board	5
03122112	SLR-343BBT3F	LED	LED14 on PANEL-A Board,LED522 on PANEL-C Board	1+1
03126134	TLN233	LED	LED23 on PANEL-A Board	1
15019126	1SS133 T-77	SWITCHING DIODE	D15,D19,D29,D28,D27,D26,D25,D24,D23,D22,D13,D20,D1,D18,D5,D2,D21,D4,D17,D6,D7,D8,D10,D11,D12,D14,D16,D3 on PANEL-A Board,D206,D207,D208,D209,D210,D201,D202,D203,D204,D205, on PANEL-B Board	38
15339105	DAN202K T146 (CHIP)	ARRAY DIODE	DA10 on JACK Board	1
15339130	MA142WK-(TX)	ARRAY DIODE	DA2,DA3,DA4,DA1 on JACK Board,DA513,DA509,DA510,DA511,DA512,DA505,DA506,DA507,DA508,DA501,DA502,DA503,DA504, on PANEL-C Board	17
RESISTOR				
01906678	MNR14 EOAB J 103	RESISTOR-ARRAY		8+2
02457790	R-ARRAY MNR14 EOAB J 330	RESISTOR-ARRAY		2
01906667	MNR14 EOAB J 100	RESISTOR-ARRAY		22 +6
01906656	MNR14 EOAB J 000	RESISTOR-ARRAY		2
00126134	EXB-A10E103J	RESISTOR ARRAY	RA11,RA17,RA12,RA21,RA9,RA7,RA5,RA14 on JACK Board	8
00346134	MCR25 JZH J 1R0	MTL.FILM RESISTOR	R515 on PANEL-C Board	1
00566867	RPC05T 100 J	MTL.FILM RESISTOR	R263,R262,R261,R260 on Main board	4
00566912	RPC05T 220 J	MTL.FILM RESISTOR	R102,R340,R34,R100,R104,R270,R339,R281,R324,R130,R45 on Main board	11
00566923	RPC05T 270 J	MTL.FILM RESISTOR	R146,R145 on Main board	2
00566934	RPC05T 330 J	MTL.FILM RESISTOR	R334,R325,R326,R333,R335,R336,R323,R298,R329,R63,R1,R2,R3,R4,R6,R7,R8,R302,R62,R314,R70,R71,R72,R74,R75,R76,R297,R332,R300,R10,R328 on Main board	31
00566956	RPC05T 390 J	MTL.FILM RESISTOR	R70,R69 on JACK Board	2
00566967	RPC05T 470 J	MTL.FILM RESISTOR	R327,R290,R337,R294,R293,R292,R291,R79,R81,R131,R282,R289,R288,R338,R287,R286,R285,R284,R283 on Main board,R513 on PANEL-C Board	19 +1
00566989	RPC05T 560 J	MTL.FILM RESISTOR	R514 on PANEL-C Board	1
00566990	RPC05T 680 J	MTL.FILM RESISTOR	R277 on Main board	1
00567001	RPC05T 750 J	MTL.FILM RESISTOR	R126 on JACK Board	1
00567023	RPC05T 101 J	MTL.FILM RESISTOR	R57,R126,R124,R123,R122,R274,R58,R127,R54,R51,R32,L15,R331,R321,R320,R121,R315,R187,R183,R182,R181,R129,R125,R280,R316,R317,R128,R318,R330,R278 on Main Board,R45,R184,R177,R156,R31,R77,R71,R35,R231 on JACK Board,R501,R502,R504,R505,R507,R508,R510,R511 on PANEL-C Board	30 +9 +8
00567034	RPC05T 121 J	MTL.FILM RESISTOR	R75 on JACK Board	1
00567056	RPC05T 181 J	MTL.FILM RESISTOR	R516 on PANEL-C Board	1
00567067	RPC05T 221 J	MTL.FILM RESISTOR	R125,R79,R80,R82,R81 on JACK Board	5
00567078	RPC05T 271 J	MTL.FILM RESISTOR	R72,R90 on JACK Board	2
00567089	RPC05T 331 J	MTL.FILM RESISTOR	R153,R140,R168,R206,R211,R130 on JACK Board	6
00567112	RPC05T 471 J	MTL.FILM RESISTOR	R169,R179,R167,R177 on Main Board,R108,R25,R21,R92,R91,R84,R30,R29,R28,R26,R20,R27,R100 on JACK Board	4 +13
00567134	RPC05T 681 J	MTL.FILM RESISTOR	R101,R158,R55 on Main Board,R129,R139,R152,R167,R74,R213,R212 on JACK Board	3+7
00567156	RPC05T 102 J	MTL.FILM RESISTOR	R319,R233,R143,R322,R226,R198,R91,R206 on Main Board,R120,R4,R7,R113,R155,R176,R225,R85,R224 on JACK Board,R301 on LCD Board,R519 on PANEL-C Board	8+9 +1 +1
00567178	RPC05T 152 J	MTL.FILM RESISTOR	R148 on Main Board,R186 on JACK Board,R520 on PANEL-C Board	1+1 +1
00567190	RPC05T 222 J	MTL.FILM RESISTOR	R133 on Main Board,R110,R102 on JACK Board	2+1
00567201	RPC05T 272 J	MTL.FILM RESISTOR	R197,R205,R225,R232 on Main Board,R223,R174,R173,R150 on JACK Board	4+4
00567212	RPC05T 332 J	MTL.FILM RESISTOR	R128,R210,R170,R166,R158,R151,R143,R215,R132,R214,R122,R115,R34,R137,R205 on JACK Board,R303 on LCD Board	15 +1
00567245	RPC05T 472 J	MTL.FILM RESISTOR	R53,R228,R218,R200,R196,R171,R163,R161,R159 on Main Board,R87 on JACK Board,R517 on PANEL-C Board	9+1 +1
00567256	RPC05T 562 J	MTL.FILM RESISTOR	R111,R112,R118,R119 on JACK Board	4
00567267	RPC05T 682 J	MTL.FILM RESISTOR	R32 on JACK Board	1

RESISTOR

00567289	RPC05T 103 J	MTL.FILM RESISTOR	R174,R166,R165,R164,R139,R134,R175,R118,R119, R176,R43,R112,R242,R188,R243,R244,R264,R311, R313,R238,R22,R93,R92,R90,R84,R82,R80,R44, R94,R17,R33,R23,R24,R25,R27,R111,R35,R241, R39,R40,R42,R13,R36,R107,R105,R103,R95 on Main Board,R2,R6,R10 on EXP BASE Board, R12,R2,R5,R208,R207,R203,R11,R202,R13,R14, R38,R86,R96,R127,R135,R148,R165,R106,R182, R10,R88 on JACK Board	47 +3 +21
00567312	RPC05T 183 J	MTL.FILM RESISTOR	R106 on Main board,R518 on PANEL-C Board	1+1
00567323	RPC05T 223 J	MTL.FILM RESISTOR	R164,R163,R180,R181 on JACK Board	4
00567345	RPC05T 333 J	MTL.FILM RESISTOR	R94,R107,R101,R98,R104 on JACK Board	5
00567367	RPC05T 393 J	MTL.FILM RESISTOR	R521 on PANEL-C Board	1
00567378	RPC05T 473 J	MTL.FILM RESISTOR	R229,R187,R146,R138,R136,R105,R230,R78 on JACK Board	8
00567389	RPC05T 563 J	MTL.FILM RESISTOR	R149 on JACK Board	1
00567390	RPC05T 683 J	MTL.FILM RESISTOR	R109 on JACK Board	1
00567401	RPC05T 823 J	MTL.FILM RESISTOR	R93 on JACK Board	1
00567412	RPC05T 104 J	MTL.FILM RESISTOR	R168,R199,R208,R227,R236,R172 on Main Board, R161,R89,R76,R183,R209,R172,R169,R204,R157,R 142,R131,R123,R95,R145,R83,R116,R134 on JACK Board	6 +17
00567423	RPC05T 124 J	MTL.FILM RESISTOR	R103 on JACK Board	1
00567501	RPC05T 474 J	MTL.FILM RESISTOR	R503,R506,R509,R512 on PANEL-C Board	4
00567556	RPC05T 105 J	MTL.FILM RESISTOR	R50,R99,R156 on Main Board,R141 on JACK Board	3+1
01011856	RPC05T 0R0 J	MTL.FILM RESISTOR	R147,R258,R41,R306,R98,R305,R140,R68,R144, R73,R150,R157,R162,R304,R178,R265,R237,R239, R141,L17,R310,R309,R308,R120,R113,R136,L18, R97,L16,R96,R30,R87,R307,R83 on Main board, R97,R227,R33,R217,R160,R178,R99,R73,R58,R185, R37,R19,R6,R18,R16,R15,R3,R52 on JACK Board	34 +18
01013890	RR1220P-221-D 220 OHM 1/10W	MTL.FILM RESISTOR	R153,R154 on Main board	2
01455856	RR1220Q-680-D	MTL.FILM RESISTOR	R152 on Main board	1
01457145	EXBE10C103J	RESISTOR ARRAY	RA51,RA61,RA87,RA78,RA42,RA63,RA1,RA59, RA55,RA47,RA39,RA29,RA7,RA74,RA24,RA5, RA11,RA13,RA14,RA16,RA17,RA19,RA22 on Main board	23
02456878	EXB2HV220JV	RESISTOR-ARRAY	RA31,RA27,RA9,RA67,RA20,RA60,RA3,RA8, RA62,RA37,RA56,RA54,RA52,RA50,RA43,RA64, RA40,RA33,RA36,RA34,RA57,RA84,RA77,RA73, RA86,RA85 on Main board	26
02678534	EXB2HV103V	RESISTOR-ARRAY	RA69 on Main board	1
02679290	RA4C1632-103-J	RESISTOR-ARRAY	RA49,RA90,RA25,RA66,RA71,RA72,RA88,RA65, RA48,RA26,RA70,RA68,RA30 on Main Board, RA29,RA30,RA31,RA32,RA33,RA34,RA35, RA36 on EXP BASE Board,RA1,RA16 on JACK Board	13 +8 +2
02679323	RA4C1632-330-J	RESISTOR-ARRAY	RA45,RA6,RA2 on Main Board,RA37,RA38 on EXP BASE Board	3+2
02780312	RA4C1632-0R0-J	RESISTOR-ARRAY	RA18,RA19 on JACK Board	2
02780323	RA4C1632-220-J	RESISTOR-ARRAY	RA58,RA53 on Main board	2
02891701	RA4C1632-100-J	RESISTOR-ARRAY	RA1,RA3,RA5,RA7,RA9,RA11,RA12,RA13,RA14, RA15,RA17,RA18,RA19,RA20,RA21,RA22,RA23, RA24,RA25,RA26,RA27,RA28 on EXP BASE Board,RA2,RA3,RA6,RA24,RA25,RA4 on JACK Board	22 +6
02904445	R-ARRAY EXB2HV330JV	RESISTOR-ARRAY	RA4,RA10,RA28,RA21 on Main board	4
03128889	EXBV8V222JV	RESISTOR-ARRAY	RA501,RA502,RA503,RA504 on PANEL-C Board	4
13749190	SR50TR 100 J	CARBON RESISTOR	R8,R7 on PANEL-A Board	2
13749765T0	SR25TRE 470 J	CARBON RESISTOR	R23 on PANEL-A Board	1
13749771T0	SR25TRE 820 J	CARBON RESISTOR	R22 on PANEL-A Board	1
13749773T0	SR25TRE 101 J	CARBON RESISTOR	R13,R2,R1,R3,R4 on PANEL-A Board	5
13749779T0	SR25TRE 181 J	CARBON RESISTOR	R17 on PANEL-A Board	1
13749781T0	SR25TRE 221 J	CARBON RESISTOR	R16,R21 on PANEL-A Board	2
13749797T0	SR25TRE 102 J	CARBON RESISTOR	R14,R19 on PANEL-A Board	2
13749799T0	SR25TR 122J	CARBON RESISTOR	R15 on PANEL-A Board	1
13749805T0	SR25TRE 222 J	CARBON RESISTOR	R6 on PANEL-A Board	1
13749811T0	SR25TRE 392 J	CARBON RESISTOR	R10,R5 on PANEL-A Board	2
13749821T0	SR25TRE 103 J	CARBON RESISTOR	R26,R24,R18,R30,R11,R28 on PANEL-A Board	6
13749837T0	SR25TRE 473 J	CARBON RESISTOR	R12 on PANEL-A Board	1
13749839T0	SR25TRE 563 J	CARBON RESISTOR	R20 on PANEL-A Board	1
13749859T0	SR25TRE 394 J	CARBON RESISTOR	R9 on PANEL-A Board	1
15229941	10KD-5	THERMISTOR RESISTOR	R302 on LCD Board	1
15399301	RPC10T 0R0 J	MTL.FILM RESISTOR	C302,C313,C326,C330 on Main board	4
15399501	RPC18T 0R0 J	MTL.FILM RESISTOR	R66 on JACK Board	1
15399561	RPC18T 330 J	CARBON RESISTOR	R61 on JACK Board	1
15399565	RPC18T 470 J	CARBON RESISTOR	R64,R62,R63,R65 on JACK Board	4
15399567	RPC18T 560 J	CARBON RESISTOR	R219,R221,R222,R220 on JACK Board	4
15399573	RPC18T 101 J	CARBON RESISTOR	R226 on JACK Board	1
15399583	RPC18T 271 J	CARBON RESISTOR	R68,R67 on JACK Board	2
15399952	MCR50JZH470 1/2W	CHIP RESISTOR	R114,R188,R121,R189 on JACK Board	4
15419702	RR1220P-102-D 1K OHM 1/10W	MTL.FILM RESISTOR	R155 on Main board	1

POTENTIOMETER				
03126167	EVJY10FB6A24	12M/M ROTARY POTENTIOMETER	VR3,VR1 on PANEL-A Board	2
03126178	EVUF2JFK3B14	9M/M ROTARY POTENTIOMETER	VR2,VR4,VR6,VR5 on PANEL-A Board	4
03126189	EVUF2AE17B14	9M/M ROTARY POTENTIOMETER	VR501 on PANEL-C Board	1
CAPACITOR				
01674701	ECJ1VF1E104Z 0.1UF/16VK	CERAMIC CAPACITOR	C190,C179,C134,C182,C184,C185,C189,C199, C202,C197,C196,C186,C157,C374,C138,C140, C141,C142,C143,C144,C153,C154,C181,C156, C178,C158,C159,C160,C161,C162,C163,C169, C170,C171,C173,C176,C177,C155,C334,C200, C270,C272,C275,C276,C279,C280,C297,C261, C333,C259,C340,C342,C343,C344,C350,C352, C353,C355,C371,C372,C373,C299,C236,C203, C222,C224,C225,C226,C227,C228,C229,C230, C267,C233,C201,C237,C238,C241,C242,C245, C246,C247,C248,C252,C256,C257,C231,C51, C137,C39,C40,C41,C42,C43,C45,C47,C48, C37,C50,C36,C52,C53,C54,C55,C56,C57,C63, C64,C65,C136,C67,C49,C14,C1,C2,C3,C5,C6, C7,C8,C9,C10,C38,C12,C68,C15,C16,C17, C18,C19,C20,C21,C23,C30,C33,C34,C35,C11, C121,C66,C109,C110,C111,C112,C113,C114, C115,C116,C106,C120,C105,C122,C123,C124, C125,C127,C128,C129,C130,C131,C132,C133, C119,C87,C70,C73,C74,C76,C77,C78,C79, C82,C83,C107,C86,C69,C88,C89,C90,C91, C93,C96,C97,C98,C100,C101,C102,C103,C84, C381,C385,C135,C378 on Main board,C402, C403 on CARD Board,C34,C1,C7,C8,C9,C10, C11,C12,C13,C14,C15,C16,C18,C19,C20,C21, C22,C23,C26,C27,C28,C29,C30,C31,C32,C33, on EXP BASE Board,C8,C171,C174,C172, C183,C7,C176,C178,C181,C144,C6,C206, C180,C64,C136,C101,C73,C72,C70,C68,C66, C108,C65,C107,C30,C29,C26,C194,C205, C222,C220,C213,C211,C185,C114,C115,C131, C10,C12,C128,C120,C25,C116,C111,C99 on JACK Board,C301 on LCD Board,C519,C520, C521 on PANEL-C Board	193 +2 +26 +45 +1 +3
00568456	ECJ1VF1C474Z	CERAMIC CAPACITOR	C106 on JACK Board	1
00674423	ECA0JM102B 1000U/6.3V	CHEMICAL CAPACITOR	C9 on JACK Board	1
01120301	ECEV1CA221P 220UF	CHEMICAL CAPASITOR	C253,C258 on Main board	2
01127078	ECA0JM471B	CHEMICAL CAPACITOR	C3,C11 on JACK Board	2
01450189	ECEA1VKS470B 47UF/35V	CHEMICAL CAPACITOR	C525,C524 on PANEL-C Board	2
01454889	RA2-16V470MT2 470UF/16V	CHEMICAL CAPACITOR	C164,C155 on JACK Board	2
01674167	ECUV1H100DCV	CERAMIC CAPACITOR	C138 on JACK Board	1
01674190	ECUV1H150JCV	CERAMIC CAPACITOR	C26,C264,C71,C164,C165,C72,C263,C27 on Main board	8
01674212	ECUV1H220JCV	CERAMIC CAPACITOR	C22,C110,C23 on JACK Board	3
01674334	ECUV1H101JCV	CERAMIC CAPACITOR	C234,C265,C240,C232,C198,C139,C117,C32, C99,C243 on Main board,C404 on CARD Board,C97,C88,C93,C158,C84,C85,C75,C87, C94,C89,C90,C91,C80,C81,C82,C83,C86, C203,C76,C77,C78,C79,C92,C204,C95,C193, C192,C191,C190,C166,C143,C96 on JACK Board	10 +1 +32
01674389	ECUV1H221JCV	CERAMIC CAPACITOR	C507,C509,C510,C511,C512,C513,C514,C515, C516,C517,C518,C502,C503,C504,C505,C506, on PANEL-C Board	16
01674423	ECUV1H471JCV	CERAMIC CAPACITOR	C24,C25 on Main Board,C140 on JACK Board	2+1
01674434	ECUV1H561JCV	CERAMIC CAPACITOR	C523 on PANEL-C Board	1
01674512	ECJ1VB1H222K	CERAMIC CAPACITOR	C174 on Main board	1
01674612	ECJ1VB1H103K	CERAMIC CAPACITOR	C124,C187,C2,C5,C13,C15,C139,C125,C16, C17,C18,C126,C14,C19,C121,C123,C119, C113,C109,C63,C20 on JACK Board	21
01674712	ECJ1VF1A105Z	CERAMIC CAPACITOR	C147,C290,C195,C194,C148,C146,C75,C193 on Main Board,C104 on JACK Board	8+1
01896589	SK4-0J106MZ4-RA	TANTALUM CAPACITOR	C46,C384,C126,C118,C104,C59,C44,C29,C22, C13,C95 on Main board	11
01899223	ECHU1H102JX5	POLYEST. CAPACITOR	C277,C285 on Main board	2
01900823	RA2-16V100M-T2	CHEMICAL CAPACITOR	C401 on CARD Board,C117 on JACK Board	1+1
01900834	RA2-16V101M-T2	CHEMICAL CAPACITOR	C212 on JACK Board	1
01902867	RA2-25V101M-T2	CHEMICAL CAPACITOR	C154,C161,C208,C207,C146,C167,C127,C149, C135,C132,C130 on JACK Board	11
01906501	RA2-16V220M-T2	CHEMICAL CAPACITOR	C137,C156,C165 on JACK Board	3
02014356	ECEV1CA101WP	CHEMICAL CAPACITOR	C100,C98 on JACK Board	2
02014912	RA2-25V100MT2	CERAMIC CAPACITOR	C184,C209,C105,C186,C177,C182,C210,C170, C175,C173,C179 on JACK Board	11
02018690	R2A-16V101M-T2	CHEMICAL CAPACITOR	C8,C32,C33,C17,C19 on PANEL-A Board, C522 on PANEL-C Board	5+1
02018701	DD104-989SL680J50	CERAMIC CAPACITOR	C16,C26,C18,C28 on PANEL-A Board	4
02126434	ECHU1H821JX5	POLYEST. CAPACITOR	C310,C328,C323,C300 on Main board	4
02129534	ECJ1VB1H102K	CERAMIC CAPACITOR	C386 on Main Board,C188,C189,C44,C21, C224 on JACK Board	1+5



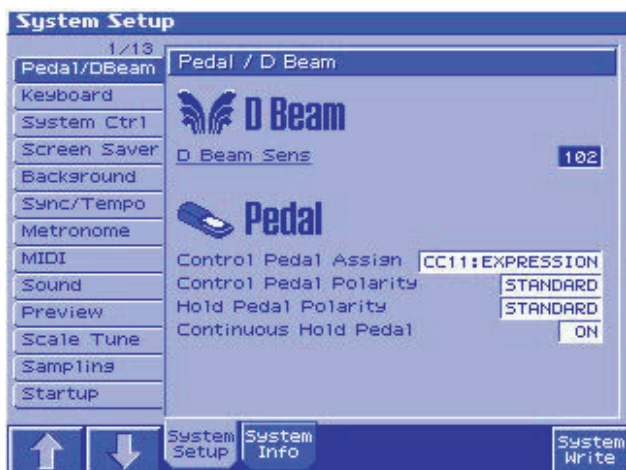
CAPACITOR					
	02783412	6SVP150 OS-CON	CHEMICAL CAPACITOR	C244,C254,C262 on Main board	3
	02894390	RA2-25V330MC-T2	CHEMICAL CAPACITOR	C169,C215,C214,C219,C217 on JACK Board	5
	13519641	DD308-959F104Z50	CERAMIC CAPACITOR	C13,C12,C5,C2,C30,C4,C15,C20,C21,C1,C25,C3,C31,C24 on PANEL-A Board	14
	13519661	DD104-989SL150J50	CERAMIC CAPACITOR	C10,C11 on PANEL-A Board	2
	13529509	DD106-999F103Z50	CERAMIC CAPACITOR	C14 on PANEL-A Board	1
	13639150M0	ECEA1CK5100B 10UF/16V	CHEMICAL CAPACITOR	C302 on LCD Board,C6 on PANEL-A Board,C508 on PANEL-C Board	1+1
	13639552M0	ECEA1CU331B 16V/330UF CHEMICAL	CHEMICAL CAPACITOR	C67,C69,C195,C71 on JACK Board	4
	13639569M0	ECEA1EKA470B	CHEMICAL CAPACITOR	C23,C22 on PANEL-A Board	2
	13669266	ECEA1EKS100B	CAPACITOR	C7,C9 on PANEL-A Board,C501 on PANEL-C Board	2+1
	15369152	ECEV1CA100SR	CHEMICAL CAPACITOR	C145,C255,C239,C188,C180,C172,C168,C152,C151,C149,C266,C108,C94,C85,C4,C31,C354,C150,C335,C356,C351,C349,C345,C271,C339,C298,C296,C292,C282,C281,C278,C273,C341 on Main Board,C2,C3,C4,C5,C6,C17,C25 on EXP BASE Board	33 +7
	15369153	ECEV1CA220P	CAPACITOR	C274,C284 on Main board	2
INDUCTOR, COIL, FILTER					
	00903167	N2012Z601T02 (CHIP)	FERRITE-BEAD	L24,L25 on JACK Board	2
	01565578	N1608Z601T01	FERRITE-BEAD	L14,L8,L6,L7,L5,L9,L10,L11,L13,L20,L12 on Main board,L411,L412,L413,L414,L415,L406,L407,L408,L409,L410,L401,L402,L403,L404,L405, on CARD Board,L1,L3,L7,L5,L10,L11,L6,L12,L4,L26,L16,L17,L18,L19,L20,L21,L22,L23,L33,L2,L37,L27,L34,L14,L28,L29,L30,L13,L31,L32,L15,L36,L35 on JACK Board,L306,L307,L308,L301,L302,L303,L304,L305, on LCD Board	11 +15 +33 +8
	01672889	SBC3-221-681	CHOKE COIL	L501 on PANEL-C Board	1
	01909645	EXCML16A270U	FERRITE-BEAD	L3,L4 on Main board	2
	02783478	SLF10145T-101M1R0	CHOKE COIL	L2 on Main board	1
CRYSTAL, RESONATOR					
	00894023	MA-406 20.000MHZ TE24	CRYSTAL	X1 on JACK Board	1
	00894034	MA-406 16.000MHZ TE24	CRYSTAL	X2 on Main board	1
	01340745	MA-406 12MHZ	CRYSTAL	X4 on Main board	1
	02673134	MA-406 16.9344MHZ	CRYSTAL	X3 on Main board	1
	15299170	MC-406 32.768KHZ	CRYSTAL	X1 on Main board	1
ENCODER					
	01905467	EVE GC1 F20 24B	ROTARY ENCODER	EN501 on PANEL-C Board	1
CONNECTOR					
	03126045	34FMN-STK-A	CONNECTOR	CN5,CN6 on EXP BASE Board	2
	02010078	TX25-80P-6ST-E1	CONNECTOR	CN1,CN2,CN3,CN4 on EXP BASE Board	4
	03126090	40FMN-SMT-A-TF	CONNECTOR	CN501 on PANEL-C Board	1
	03126056	24FMN-BMTTN-A-TFT	CONNECTOR	CN7 on Main board,CN402 on CARD Board	1+1
	01349645	S2 (4-2.3)B-XH-A	CONNECTOR	CN302,CN301 on LCD Board	2
	01909601	12FE-BT-VK-N	CONNECTOR	CN304 on LCD Board	1
	03015245	12FMN-BMTTN-TF	CONNECTOR	CN15 on Main Board,CN303 on LCD Board	2+1
	13369898	B2P3-VH 7A/250V	CONNECTOR	CN601 on INLET Board	1
	13439311	520314-2	CONNECTOR	CN401 on JACK Board,CN701 on AFT BOARD	1+1
	13369598	52147-0310 3PIN	WIRE TRAP	CN16 on JACK Board,CN702 on AFT BOARD	1+1
	01908667	22FE-BT-VK-N	CONNECTOR	CN15 on JACK Board	1
	01908645	16FE-BT-VK-N	CONNECTOR	CN14 on JACK Board	1
	02782467	10FMN-BTK	CONNECTOR	CN6 on JACK Board	1
	03126067	18FMN-BMTTN-A-TFT	CONNECTOR	CN9 on Main Board,CN1 on JACK Board	1+1
	03126089	40FMN-BMTTN-A-TFT	CONNECTOR	CN7 on JACK Board	1
	03126078	38FMN-BMTTN-A-TFT	CONNECTOR	CN5 on JACK Board	1
	02673145	B2 (4-2.3)B-XH-A	CONNECTOR	CN17 on JACK Board	1
	13369567	B4B-PH-K-S JST (4P)	CONNECTOR	CN8 on JACK Board	1
	13369564	B12B-PH-K-S JST	CONNECTOR	CN10 on JACK Board,CN11 on PANEL-A Board	1+1
	13369563	B14B-PH-K-S JST	CONNECTOR	CN13 on Main Board,CN9 on JACK Board	1+1
	02782478	10FMN-STK	CONNECTOR	CN201 on PANEL-B Board	1
	03126034	38FMN-STK-A	CONNECTOR	CN2 on PANEL-A Board	1
	13369592	B7B-XH-A (7P) JST	CONNECTOR	CN10 on Main board	1
WIRING, CABLE					
	02342067	WIRING	4X450-P2.0-PHR-PHR-F	CN8 on JACK to BENDER UNIT	1
	02344167	WIRING	14X300-P2.0-PHR-PHR-F	CN13 on MAIN to CN9 on JACK	1
	02679412	WIRING	WIRING W2	CN17 on JACK to CN301 on LCD	1
△	03120801	WIRING W3		CN601 on INLET to POWER SUPPLY UNIT	1
	02344034	WIRING	12X250-P2.0-PHR-PHR-F	CN10 on JACK to CN11 on PANEL-A	1
#	03234667	WIRING W1		CN10 on MAIN to POWER SUPPLY UNIT	1
#	03234712	RIBBON CABLE	JWFV 3X850-P2.0	CN16 on JACK to CN702 on AFT	1

WIRING, CABLE					
#	03236412	BAN CARD	BNCD-P=1.00-K-40-550	CN7 on JACK to CN501 on PANEL-C	1
#	03236423	BAN CARD	BNCD-P=1.00-K-38-450	CN5 on JACK to CN2 on PANEL-A	1
	03129301	BAN CARD	BNCD-P=1.00-K-10-400	CN6 on JACK to CN201 on PANEL-B	1
	03129323	BAN CARD	BNCD-P=1.00-K-34-60	CN4,5 on MAIN to CN5,6 on EXP BASE	2
#	03234678	BAN CARD	BNCD-P=1.00-K-24-120	CN7 on MAIN to CN402 on CARD	1
#	03234689	BAN CARD	BNCD-P=1.00-K-18-650	CN9 on MAIN to CN1 on JACK	1
#	03234690	BAN CARD	BNCD-P=1.00-K-12-650	CN15 on MAIN to CN303 on LCD	1
	02675701	WIRING ASSY	WIRING W3 (AC INLET+GND)	JK601 on INLET Board	1
TRANSFORMER					
△	02457412	DHE1105-5VB	INVERTOR MODULE	MOD1 on JACK Board	1
	02019478	(7KQ5) 19832A	PULSE TRANS	T1 on JACK Board	1
SCREW					
	40010334	SCREW 4X8	BINDING BZC		1
	40561090	SCREW M3X6	HEX SOCKET HEAD SPW NI		4
#	40561190	SCREW M3X10	HEX SOCKET HEAD SPW NI		4
	40010734	SCREW 3X12	BINDING HEAD TAPPING A1 FE ZC		2
	40346201	SCREW 4X20	TRUSS TAPPING TWIN BZC		15
	40012145	SCREW 4X14	TRUSS TAPPING A BZC		2
	40346289	SCREW 4X12	OVAL HEAD TAPTITE B NI		12
	40128512	SCREW 4X25X20	PAN WASHER HEAD TAPTITE B BZC		20
	40011123	SCREW 4X8	BINDING TAPTITE B BZC		6
	40011056	SCREW 3X6	BINDING TAPTITE B ZC		29
	40011101	SCREW 3X8	BINDING TAPTITE B BZC		30
	40011312	SCREW 3X8	BINDING TAPTITE P BZC		18
	40013023	SCREW M4X25	PAN HEAD DOUBLE SEMS FE BZC		10
	40017934	SCREW M3X6	PAN MACHINE W/SW+PW FE ZC		4
	40011490	SCREW M3X6	PAN MACHINE W/SW BZC		22
	40012912	SCREW M4X20	PAN HEAD DOUBLE SEMS FE ZC		2
	22150501	STAND OFF	M3 L10C		4
	40011745	HEX NUT M4	SPRING NUT FE ZC		1
	40011734	WOOD ANCHOR NUT B M4X11.5	BZC		2
	40013690	SCREW M3X8	VWH TAPTITE B ZC		5
PACKING					
#	03235889	SIDE PAD L			1
#	03235890	SIDE PAD R			1
#	03235901	PAD LOWER PAD CENTER			1
#	03235912	UPPER PAD CENTER			1
#	03235923	ACCESSORY PAD			1
#	03235878	PACKING CASE			1
#	40561978	LEAFLET CONTENTS LIST LEAF	LEAFLET		1
MISCELLANEOUS					
#	03236623	HEXAGON WRENCH (2.5MM)			1
	40122812	ACETATE TAPE	NITTO NO.5 BLK W15MM 30M		40
	40122901	DOUBLE-FACED TAPE	#501F W10MM 20M 20P (CM)		2
#	03236612	HARNESS CLIP	HC-6		1
	22265286	KEY FELT	226-286		1
	01346312	CARD PROTECTOR			1
	03128767	PRESSURE SENSOR SHEET			1
	00670734	PWB SPACER	WLS-12-0		1
	40120967	COATING CLIP	CS-3		3
	40016512	INSULOK TIE	80M/M T-18S		4
	12359105	RUBBER FOOT W	RS-09 235-105		4
	40231845	STRAIGHT PIN 6X20	FOR WOOD		2
	02457812	DIMM SOCKET	91145-61103	CN2 on Main board	1
	12199584	GROUNDING TERMINAL	M1698	TER1,TER3,TER2 on Main Board,TER601 on INLET Board,TER3,TER2,TER1 on JACK Board	7
ACCESSORIES (STANDARD)					
△	03340956	AC CORD SET	100V YA-101/YP-3NB		1
△	00894378	AC CORD SET	120V SP301+IS14 SJT18/3		1
△	00894389	AC CORD SET	230V SP22+IS14 H05VV-F3G1.0		1
△	23495124	AC CORD SET	240VA SC-144-JO1 ES303-10HMA		1
△	00907001	AC CORD SET	240VE KP-610 GTTBS-3 KS-31A		1
	03235778	EDITOR CD-ROM			1
	72238423	OWNER'S MANUAL	JAPANESE		1
	72238645	OWNER'S MANUAL	ENGLISH		1
	*****	SAMPLING CD			1
	40232334	WARRANTY CARD	MOCHIKOMI JAPAN ONLY		1

## CHECKING THE VERSION NUMBER

### Procedure

1. Turn on the power of the Fantom-S.
2. Press the [MENU] button to access the Menu window.
3. Use the [CURSOR] up/down buttons to select "System," and then press the [ENTER] button.
4. The System Setup screen will appear, and the LCD display will show as follows.



5. Press the [4] button "System Info".
6. Use [1 (↑)] [2 (↓)] to select "Version Info." The Version Info screen will appear, and the LCD display will show the program version number.



## USERS DATA SAVE AND LOAD

### Backing Up User Data (User Backup)

Here's how all user data in the user area can be saved on a memory card.

The following user data will be saved.

- Performances
- Patches
- Rhythm sets
- Rhythm Patterns
- Rhythm Groups
- Multisamples
- Songs
- Samples
- Pattern sets
- RPS sets
- Arpeggio styles
- Chord forms
- System settings

\* In order to execute User Backup, the memory card must have approximately 16 MB or more free area.

1. Insert a memory card into the slot.
2. In the Utility screen, press [1 (User Backup)]. A message will ask you for confirmation.
3. To execute the backup, press [8 (Exec)].

\* To cancel, press [7 (Cancel)].

### Restoring User Data that You Backed Up (User Restore)

Here's how user data saved on a memory card by the User Backup operation can be reloaded back into the user memory of the Fantom-s.

When you execute User Restore, the current contents of the user area will be completely erased.

1. Into the slot, insert the memory card on which user data has been saved.
  2. In the Utility screen, press [2 (User Restore)]. A message will ask you for confirmation.
  3. To proceed with the restoration, press [8 (Exec)].
- \* To cancel, press [7 (Cancel)].
4. When the display indicates "Please Power Off," turn the power off, then on again.

# TEST MODE

## Required equipment

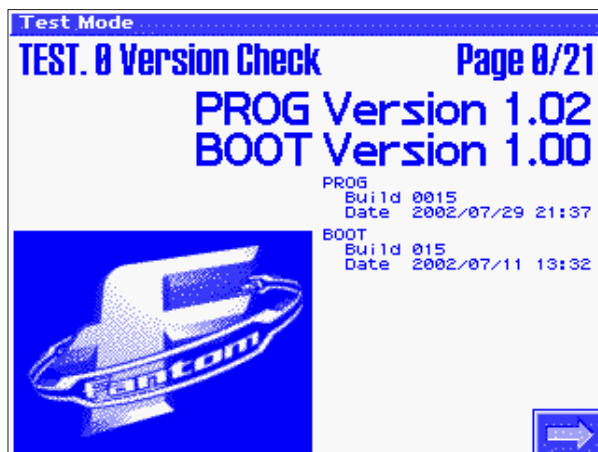
1. Monitor speakers
2. MIDI cables
3. Audio cables
4. PCS-31 (stereo phone plug <=> monaural phone plug x 2)
5. Optical (angular) cable
6. Coaxial (PIN) cable
7. USB cable
8. SmartMedia (formatted; with protect label affixed)
9. SmartMedia (formatted; without protect label)
10. 256 MB DIMM (for DIMM specifications, refer to Main Specifications)
11. Wave expansion boards: SRX series, 4 pcs.
12. Computer (with USB connector; OS may be Windows Me, Windows 2000, or Windows XP)
13. Expression pedal (e.g., EV-5)
14. A device with digital audio I/F
15. Test device for applying a force of 3(kgf) (e.g., push-pull gauge) or Weight (3 kg)

## Starting up Test Mode

1. Turn on the power of the Fantom.
2. Press the [MENU] button to display the Menu window.
3. Turn the [VALUE] dial to select "Librarian," and then press the [ENTER] button.
4. Press the buttons in the order of [SHIFT],[4],[5],[1],[8], and the LCD display will show as follows.



5. When you press the [2] button (LINE TEST), the LCD display will show as follows, and Test mode will start up.

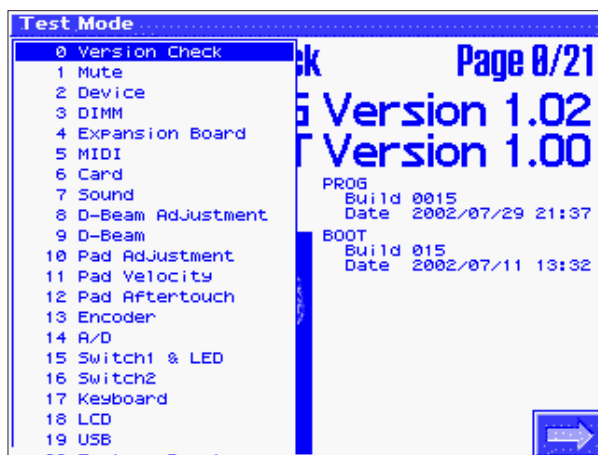


Basic operation in Test mode

Basic operation of the controls will be as follows.

- [8] To the next test screen
- [1] To the previous test screen
- [SHIFT]+[8] Forcibly move to the next test screen
- [SHIFT]+[1] Forcibly move to the previous test screen
- [MENU] Select test items

When you enter the test item select screen, the LCD display will show as follows.



Use the [VALUE] dial, [INC][DEC] buttons, or [CURSOR] up/down buttons to select a test item, and press the [ENTER] button.

Test items

Test the following twenty items.

0. Version Check
1. Mute
2. Device
3. DIMM
4. Expansion Board
5. MIDI
6. Card
7. Sound
8. D-Beam Adjustment
9. D-Beam
10. Pad Adjustment
11. Pad Velocity
12. Pad Aftertouch
13. Encoder
14. A/D

- 15. Switch1 & LED
- 16. Switch2
- 17. Keyboard
- 18. LCD
- 19. USB
- 20. Factory Reset

## Test mode procedure

Before you begin Test mode, make sure that the power is turned off, detach the EXP COVER from the bottom panel of the Fantom, and insert the DIMM and expansion boards you provided.

### 0. VERSION check

When you enter Test mode, you will begin from the VERSION check item.



The LCD display shows the program version number. All LEDs will light. Press the [8] button to proceed to the next test item.

### 1. MUTE test

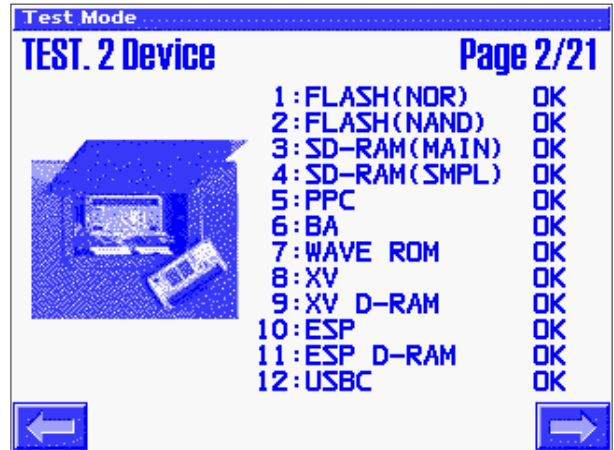
This tests the mute circuit on the jack board. The LCD display will show as follows, and a built-in pattern will begin playing.



Verify that an audio signal is being output from the [PHONES] jack and the [OUTPUT A L/R] jacks. Then verify that the audio signal is muted while you press the [4] button. Press the [8] button to proceed to the next test item.

## 2. DEVICE test

This tests various devices located on the main board. When you enter the DEVICE test, the LCD display will show as follows, and device testing will begin automatically.



Devices corresponding to LCD display indications

LCD display indication	Corresponding main board device
1: FLASH (NOR)	IC19
2: FLASH (NAND)	IC53
3: SD-RAM (MAIN)	IC2,6
4: SD-RAM (SMPL)	IC20,24
5: PPC	IC4
6: BA	IC21
7: WAVE ROM	IC28
8: XV	IC27
9: XV D-RAM	IC37
10: ESP	IC22
11: ESP D-RAM	IC23
12: USBC	IC56

If all test results are OK, you will automatically proceed to the next test item.

### 3. DIMM test

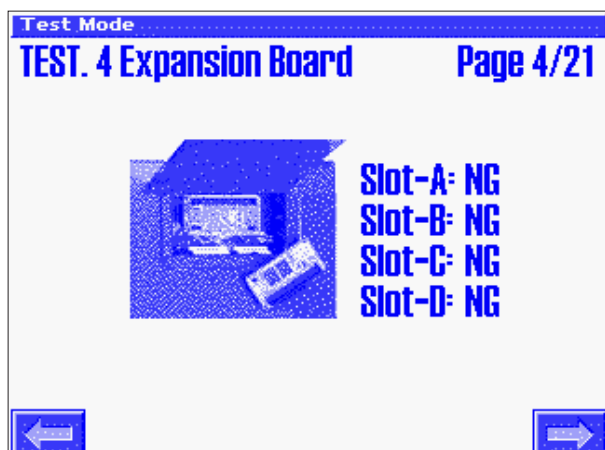
This tests the DIMM socket and peripheral circuits. When you enter the DIMM test, the LCD display will show as follows, and the DIMM test will begin automatically.



If the test result is OK, you will automatically proceed to the next test item.

### 4. Expansion Board test

This tests the Expansion Board socket and peripheral circuits. When you enter the Expansion Board test, the LCD display will show as follows, and the Expansion Board test will begin automatically.



If the test result is OK, you will automatically proceed to the next test item.

### 5. MIDI test

This tests MIDI connectivity. When you enter the MIDI test without any MIDI cable connected between MIDI IN and MIDI OUT, the LCD display will show as follows.



Use a MIDI cable to connect the MIDI IN and MIDI OUT. If the test result is OK, you will automatically proceed to the next test item.

### 6. Card

This tests the SmartMedia connector and peripheral circuits. When you enter the Card test, the LCD display will show as follows.



Insert the SmartMedia you provided (formatted; with protect label affixed) into the SmartMedia slot.

When the test result is OK, the display will indicate "Protect=OK Please, Remove The Card".

When you remove the inserted SmartMedia, the display will indicate "Insert The Card (Protect=OFF)".

Next insert the SmartMedia (formatted; no protect label) into the SmartMedia card slot.

When the test result is OK, the display will indicate "Read/Write=OK Please, Remove The Card".

When you remove the inserted SmartMedia, you will automatically proceed to the next test item.

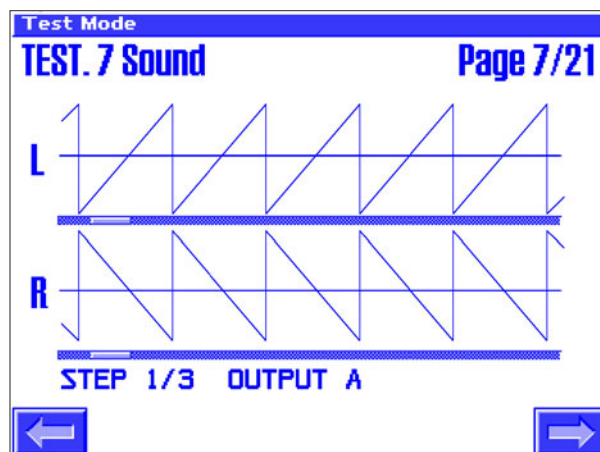
### 7. Sound test

This tests the audio input/output circuitry.

First you will test the [OUTPUT A L (MONO)] jack and [INPUT L/R] jack circuitry.

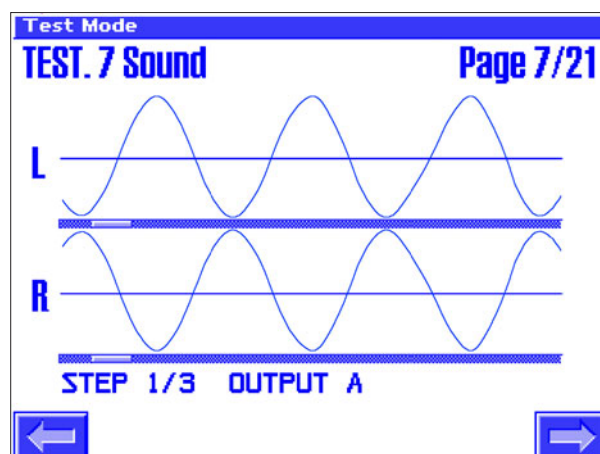
Connect the stereo side of the PCS-31 to the [OUTPUT A L (MONO)] jack, connect the PCS-31's monaural L channel to the [INPUT L] jack, and the PCS-31's monaural R channel to the [INPUT R] jack. Insert a dummy plug into the [OUTPUT A R] jack, and turn the [VOLUME OUTPUT] knob and [VOLUME INPUT] knob all the way toward the right (MAX).

Verify that the LCD display shows a sawtooth wave and another sawtooth wave (of inverted phase relative to the upper one) below, as follows.



Next you will test the circuitry of the [OUTPUT A R] jack.

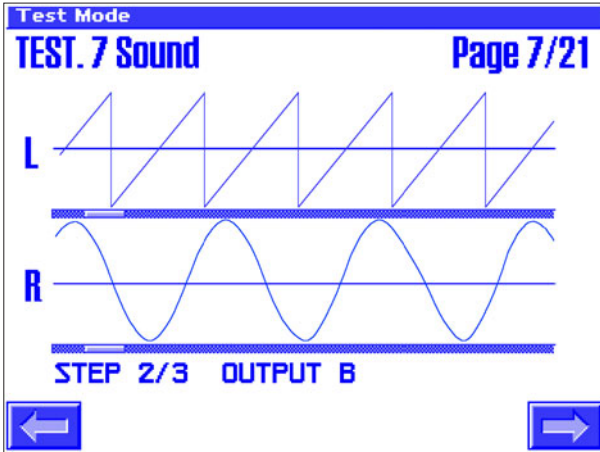
Connect the stereo side of the PCS-31 to the [OUTPUT A R] jack, connect the PCS-31's monaural L channel to the [INPUT L] jack, and connect the PCS-31's monaural R channel to the [INPUT R] jack. Turn the [VOLUME OUTPUT] knob and the [VOLUME INPUT] knob all the way toward the right (MAX). Verify that the LCD display shows a sine wave above and another sine wave (of inverted phase relative to the upper one) below, as follows.



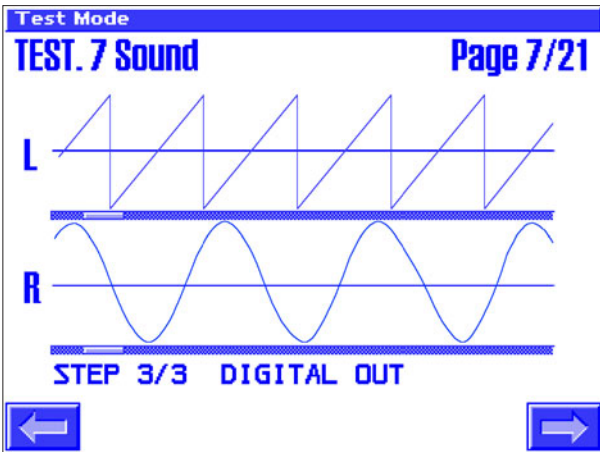
When you press the [8] button you will proceed to the test of the [OUTPUT B L/R] jack circuit.

Use an audio cable to connect the [OUTPUT B L] jack to the [INPUT L] jack, and the [OUTPUT B R] jack to the [INPUT R] jack. Turn the [VOLUME INPUT] knob all the way toward the right (MAX).

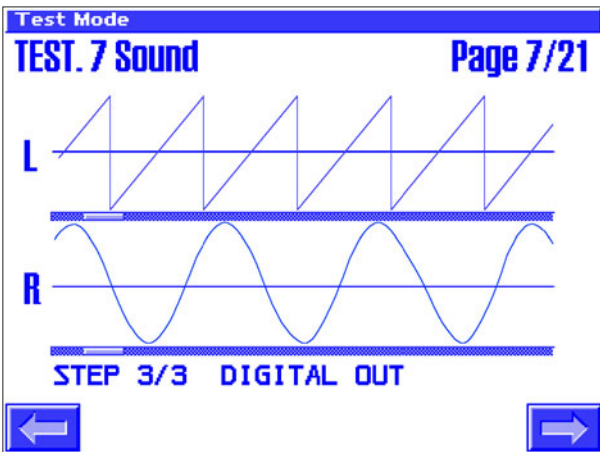
Verify that the LCD display shows a sawtooth wave above and a sine wave below, as follows.



When you press the [8] button you will proceed to the test of the [DIGITAL AUDIO INTERFACE OPTICAL/COAXIAL OUTPUT] jacks. Use an Optical (angular connector) to connect the [DIGITAL AUDIO INTERFACE OPTICAL OUT] jack to a device that has digital audio input -> line out jacks. Use an audio cable to connect the line out of the connected device to the [INPUT L] jack and [INPUT R] jack, and adjust the [VOLUME INPUT] knob. Verify that the LCD display shows a sawtooth wave above and a sine wave below, as follows.



Use a COAXIAL (pin) cable to connect the [DIGITAL AUDIO INTERFACE COAXIAL OUT] jack to a device that has digital audio input -> line out jacks. Use an audio cable to connect the line out of the connected device to the [INPUT L] jack and [INPUT R] jack, and adjust the [VOLUME INPUT] knob. Verify that the LCD display shows a sawtooth wave above and a sine wave below, as follows.



Press the [8] button to proceed to the next test item.

## 8. D-Beam Adjustment test

This adjusts the sensitivity of the [D BEAM] controller.

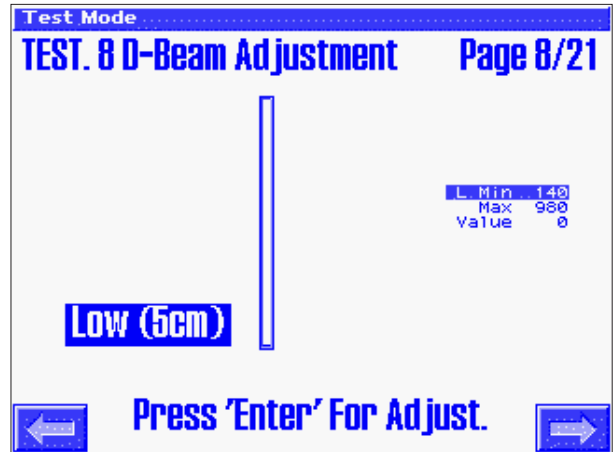
This adjustment sets the optimal sensitivity for the controller by making adjustments for two distances from the [D BEAM] controller; at 5 cm and at 45 cm. Before you begin this test: The location of the Fantom must satisfy the following conditions.

Do not place objects nearby the Fantom. (It must be at least 30 cm from surrounding objects.)

Place the Fantom at a distance from large flat surfaces such as ceiling or walls. (It must be at least 100 cm away from such surfaces.)

Do not place the Fantom where strong light, such as direct sunlight or electric light, can fall on it.

When you enter the D-Beam Adjustment test, the LCD display will show as follows.



First make the "5 cm" setting for the [D BEAM] controller.

The LCD display will indicate "Low (5cm)."

Place your hand in parallel with the panel surface at a vertical distance of 5 cm from the [D BEAM] controller, and press the [ENTER] button.

Do not move your hand while the lower part of the LCD display shows "Now Adjusting..."

When the setting has been completed, you will automatically proceed to the next setting.

Make the "45 cm" setting for the [D BEAM] controller.

The LCD display will indicate "High (45cm)."

Place your hand in parallel with the panel surface at a vertical distance of 45 cm from the [D BEAM] controller, and press the [ENTER] button.

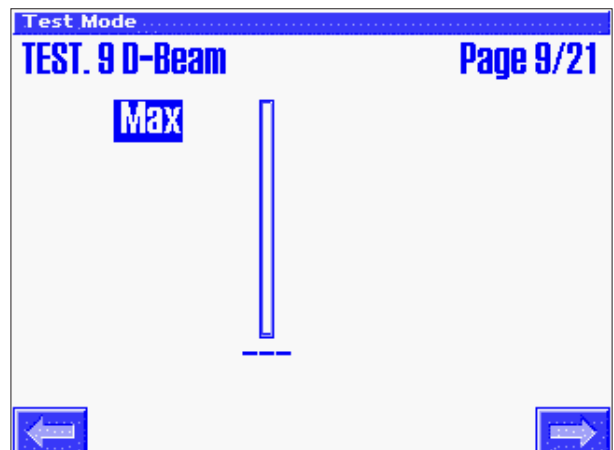
Do not move your hand while the lower part of the LCD display shows "Now Adjusting..."

When the setting has been completed, you will automatically proceed to the next test item.

## 9. D-Beam test

This tests the operation of the [D BEAM] controller.

When you begin the D-Beam test, the LCD display will show as follows.



First you will test the [D BEAM] controller.

The LCD display will show "Max."

Place your hand above the [D BEAM] controller, and move that hand downward.

Verify that the LCD display shows the maximum value (L 127) when your hand is approximately 5 cm from the surface of the panel.

If the test result is OK, the LCD display will show "Min."

Place your hand above the [D BEAM] controller, and move that hand upward.

Verify that the LCD display shows the minimum value (L 0) when your hand is approximately 45 cm from the surface of the panel.

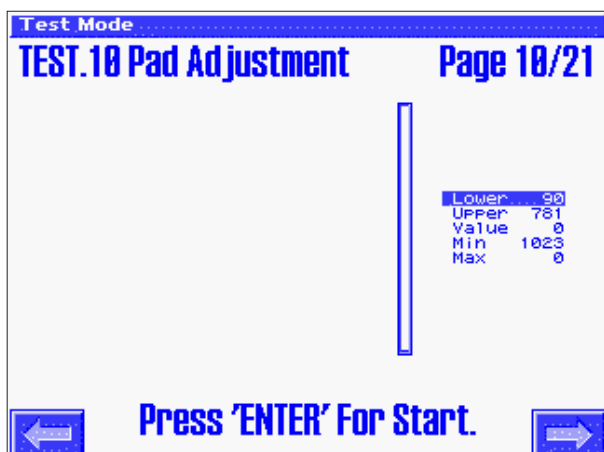
If the test result is OK, you will automatically proceed to the next test item.

### 10. Pad Adjustment

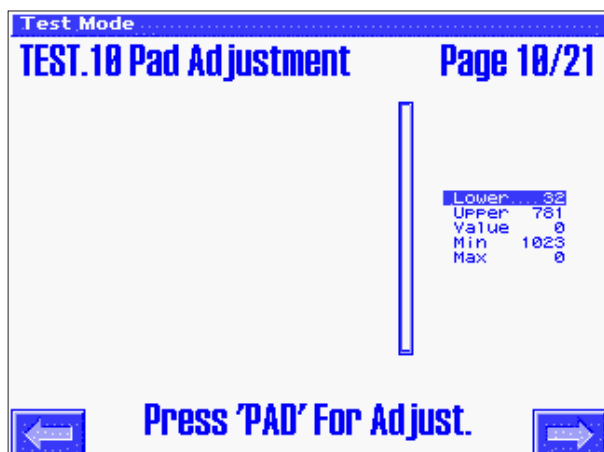
This adjusts the [DYNAMIC PAD] sensitivity.

This adjustment sets the optimal [DYNAMIC PAD] sensitivity relative to a force of 3 (kgf) applied to the [DYNAMIC PAD].

When you enter the Pad Adjustment test, the LCD display will show as follows.



When you press the [ENTER] button, every [DYNAMIC PAD] will blink, and the LCD display will show as follows.



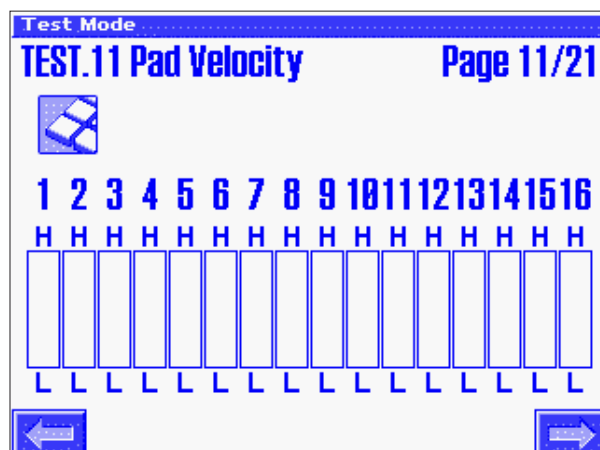
Using the push-pull gauge you provided, apply pressure of 3 (kgf) to [DYNAMIC PAD 4].

When you press the [ENTER] button, the setting will be saved and you will automatically proceed to the next test item.

### 11. Pad Velocity

This tests [DYNAMIC PAD] operation.

When you enter the Pad Velocity test, every [DYNAMIC PAD] will blink, and the LCD display will show as follows.



Lightly press each [DYNAMIC PAD] from [1] through [16].

Verify that the LED of the [DYNAMIC PAD] you press changes from blinking to lit, and that in the LCD display the "L" indication for the corresponding button becomes lighter.

Strongly press each [DYNAMIC PAD] from [1] through [16].

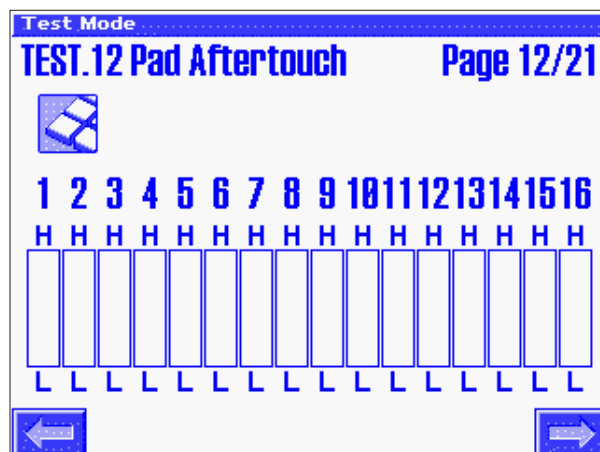
Verify that the LED of the [DYNAMIC PAD] you press changes from lit to dark, and that in the LCD display the "H" indication for the corresponding button becomes lighter.

If the test result is OK, you will automatically proceed to the next test item.

### 12. Pad Aftertouch

This tests [DYNAMIC PAD] operation.

When you enter the Pad Aftertouch test, every [DYNAMIC PAD] will blink, and the LCD display will show as follows.



Strongly and slowly press each [DYNAMIC PAD] from [1] through [16].

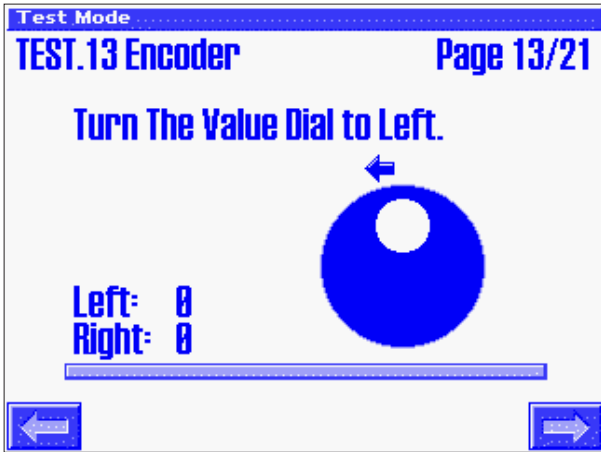
Verify that the LED of the [DYNAMIC PAD] you press changes from blinking to dark, and that in the LCD display the bar graph for the corresponding button becomes lighter.

If the test result is OK, you will automatically proceed to the next test item.



### 13. Encoder

When you enter the Encoder test, the LCD display will show as follows.



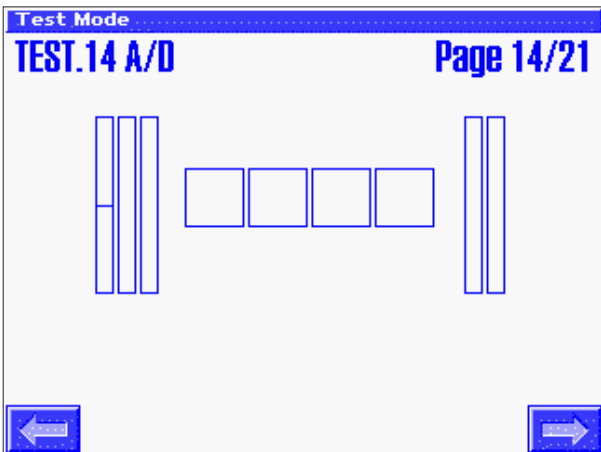
Continue turning the [VALUE] dial toward the left, and verify that the LCD display indicates "Left: 72 OK."

Next, continue turning the [VALUE] dial toward the right, and verify that the LCD display indicates "Right: 72 OK." You will then automatically proceed to the next test item.

### 14. A/D

This tests the operation of each rotary control and slide control.

When you enter the A/D test, the LCD display will show as follows.



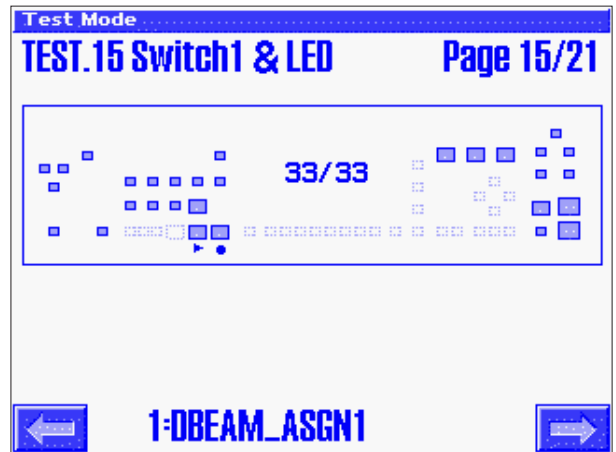
One by one, operate all controls (other than the [VOLUME OUTPUT] knob and the [VOLUME INPUT] knob), including the bender, aftertouch, [CONTROL] jack (connect an expression pedal such as the EV-5), and [HOLD] jack (connect an expression pedal such as the EV-5), to adjust through their variable range from MAX to MIN.

Verify that the corresponding indicator in the LCD display becomes lighter. When all indicators have become light, and the test results are OK, you will automatically proceed to the next test item.

### 15. Switch1 & LED

This tests the operation of LED-equipped switches.

When you enter the Switch 1 & LED test, the LCD display will show as follows.



One LED-equipped panel switch will light.

When you press that switch, the next LED-equipped switch will light.

Repeat this until all switches are OK, and you will automatically proceed to the next test item.

Pressing two or more switches simultaneously is not valid.

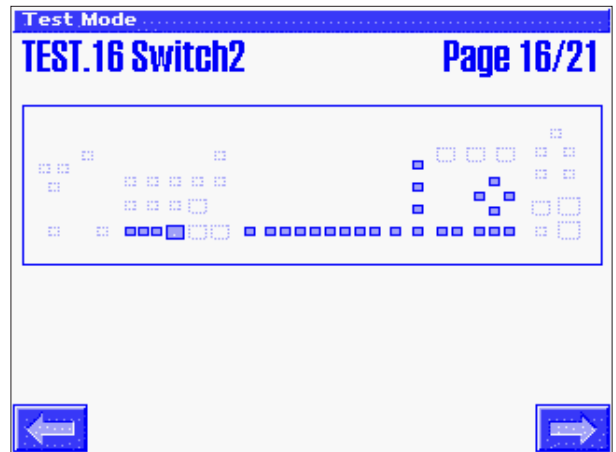
Switches with an LED window will produce the OK result when they are pressed once. In the case of switches (without a window) located next to exposed LEDs, the OK result will be produced when you press the switch the number of times corresponding to the number of exposed LEDs.

When the display for all switches has become lighter, and the test results are OK, you will automatically proceed to the next test item.

### 16. Switch2

This tests the operation of switches that were not checked in the Switch1 & LED test.

When you enter the Switch2 test, the LCD display will show as follows.



One by one, press each switch shown in the LCD display.

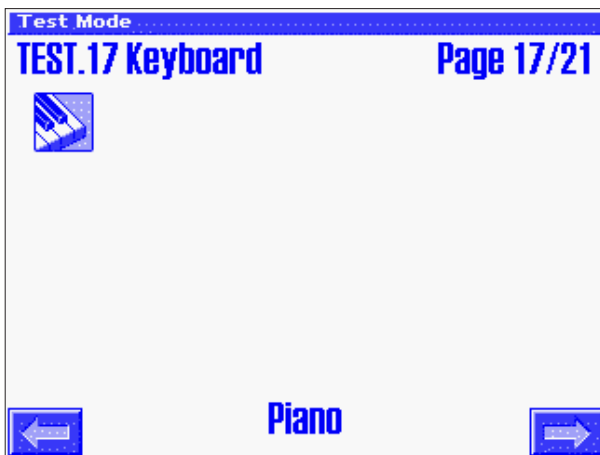
Verify that the indication in the LCD display for the corresponding switch becomes lighter.

When the indications of all switches have become lighter and the test results are OK, you will automatically proceed to the next test item.

## 17. Keyboard

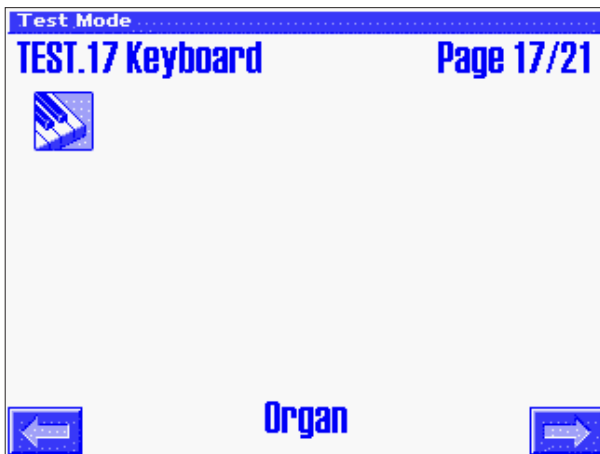
This tests the keyboard.

When you enter the keyboard test, the LCD display will show as follows.



Perform the eight-note check. Play the keyboard to check. Also verify that the volume changes according to the strength with which you press the key.

When you press the [8] button, the sound will change, and the LCD display will show as follows.

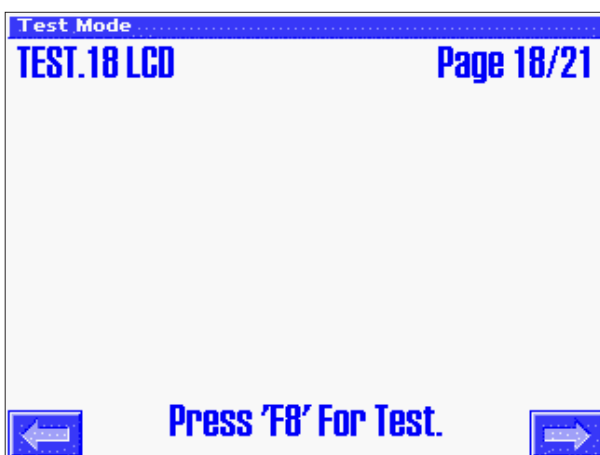


Perform the two-note check. Play the keyboard to check. Press the [8] button to proceed to the next test item.

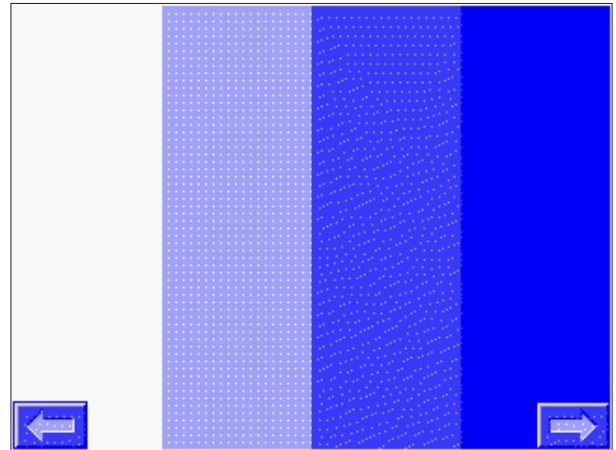
## 18. LCD

This tests the operation of the LCD display.

When you enter the LCD test, the LCD display will show as follows.

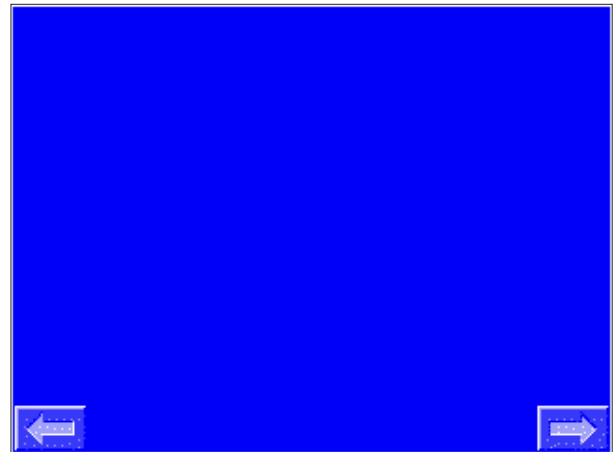


When you press the [8] button you will proceed to the four-level grayscale test. The LCD display will show as follows.

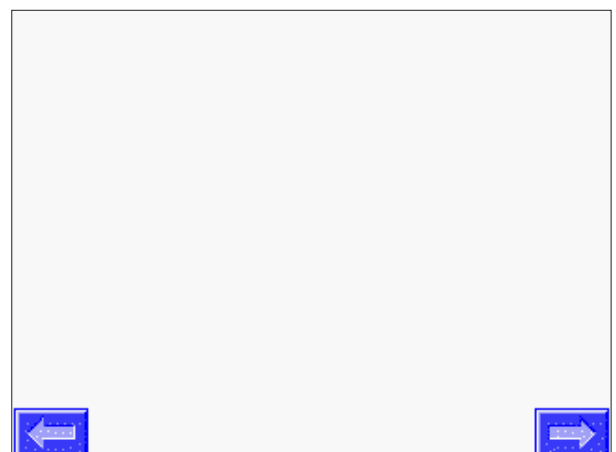


Turn the [LCD CONTRAST] knob, verify that four levels of grayscale are displayed, and set the knob to the optimal contrast.

When you press the [8] knob, you will proceed to the all-pixels-displayed test. The LCD display will show as follows.



Verify that there are no missing dots, and that the darkness is consistent. When you press the [8] button, you will proceed to the all-pixels-off test. The LCD display will show as follows.



Verify that there is no obtrusive dirt or dust. Press the [8] button to proceed to the next test item.

## 19. USB

This tests USB operation.

When you enter the USB test, the LCD display will show as follows.



Connect a USB cable to your computer (one that has a USB connector; the OS can be either Windows Me, Windows 2000, or Windows XP).

If the test result is OK, the display will indicate "Status: Connect USB Test Completed!"

On your computer, use the Safely Remove Hardware icon shown in the taskbar at the lower right of the screen to break the connection with the FANTOM-S.

Press the [8] button to proceed to the next test item.

## 20. Factory Reset

This perform a Factory Reset.

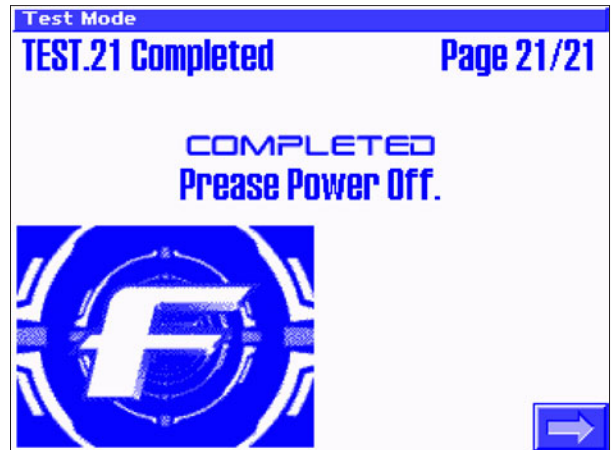
The LCD display will show as follows.



When you press the [ENTER] button, the LCD display will show as follows, and the factory reset will be executed automatically.



When the factory reset is completed, the LCD display will show as follows, and you will exit Test mode.



Turn off the power of the Fantom.

## RESTORING THE FACTORY SETTINGS

This restores all data in the Fantom-S to the factory-set condition (**Factory Reset**).

### NOTE

If there is important data you've created that's stored in the Fantom-As's internal memory, all such data is discarded when a Factory Reset is performed (**the data of the internal user memory will be lost**). If you want to keep the existing data, save it on a SmartMedia or save it on via USB to your computer

1. Press [MENU] to open the Menu window.
2. Press ▲ or ▼ to select "Utility," and then press [ENTER].
3. Press [3 (Factory Reset)].  
A message will ask confirmation.
4. Press [8 (Exec)] to execute the Factory Reset.  
\* To cancel, press [7 (Cancel)].
5. When the display indicates "Please Power Off," turn the power off, then on again.

## SYSTEM SOFTWARE UPDATE PROCEDURE

The FANTOM-S uses flash memory as its program ROM, and can be updated using either of the following two methods.

### 1. Updating from a computer via a USB cable

(Time required: approximately 3 minutes)

### 2. Updating from SmartMedia via the Fantom's SmartMedia card slot

(Time required: approximately 3 minutes)

## 1. Updating from a computer via a USB cable

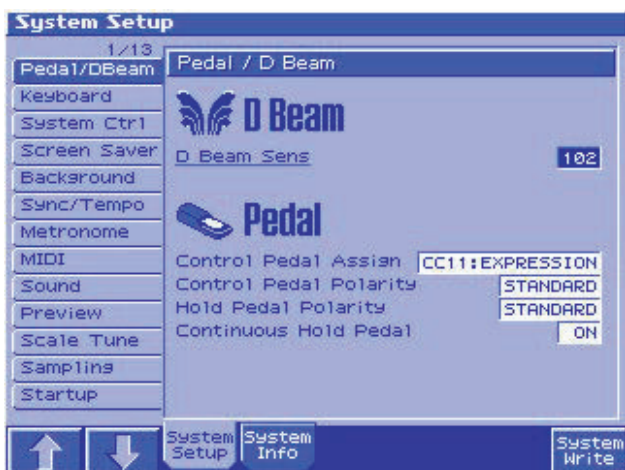
### Required items

- UPDATE DATA FOR SERVICE CD-ROM (#17041312)
- A computer (with a USB connector; the OS can be either Windows Me, Windows 2000, or Windows XP)
- You cannot use a Mac under any circumstances.
- One SmartMedia card (64 MB or more free space) or PC
- \* Used to back up user data
- USB cable

If user memory contains important data, save the data (refer to Saving and Loading User Data) before you perform the update procedure.

### Procedure

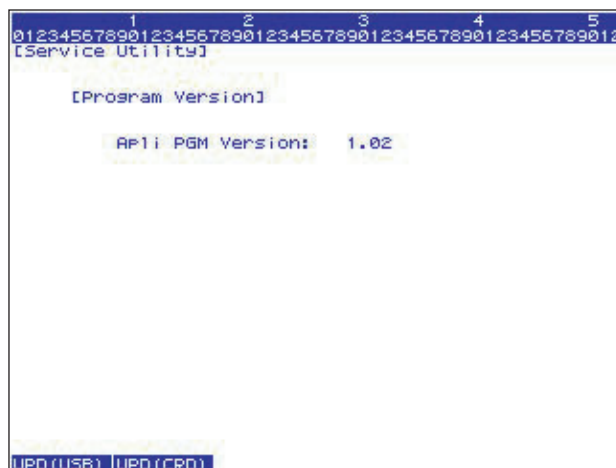
1. Turn on the power of the Fantom-S.
2. Press the [MENU] button to access the Menu window.
3. Use the [CURSOR] up/down buttons to select "System," and then press the [ENTER] button.
4. The System Setup screen will appear, and the LCD display will show as follows.



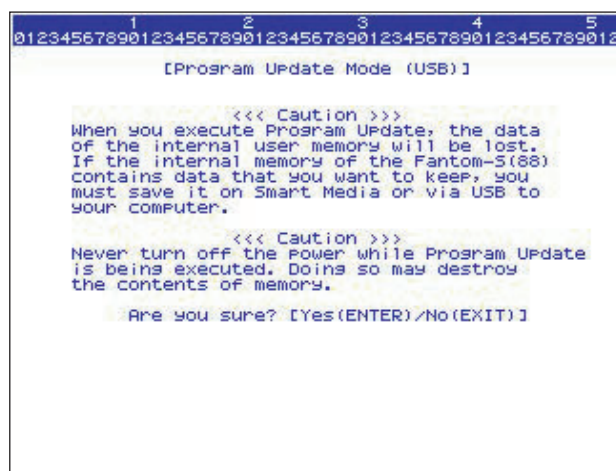
5. Press the [4] button "System Info".
6. Use [1 (↑)] [2 (↓)] to select "Version Info." The Version Info screen will appear, and the LCD display will show as follows.



7. Press buttons in the order of [SHIFT] → [7] → [8] → [7] → [8].
8. The "Service Utility" screen will appear, and the LCD display will show as follows.



9. When you press the [1] button, the [Program Update Mode (USB)] screen will appear, and the LCD display will show as follows.



10. Press the [ENTER] button. The LCD display will show "Initializing...." and will then show as follows.
11. If you decide to cancel the update, press the [EXIT] button before you press the [ENTER] button. (If you execute the update, all user data will be erased.)



At this time " [USB STATUS] " will indicate the status of the USB connection.

[USB STATUS] Disconnected. The computer is not connected.

[USB STATUS] connected. The Fantom-S is connected to the computer.

[USB STATUS] Receiving..Data is being received from the computer.

12. Turn on the power of the computer.
13. Use a USB cable to connect the computer to the Fantom-S. (The computer will detect the Fantom-S as a removable disk drive.)  
Verify that the LCD display of the Fantom-S indicates " [USB STATUS] connected. "
14. Insert the UPDATE CD-ROM (#17041312) into your computer, and navigate to the "Roland" folder of the CD-ROM.
15. Copy the file "fans.bin" file (located within the "Roland" folder) to the Fantom-S (removable disk).  
The Fantom-S will receive the data from the computer.  
Verify that the LCD display of the Fantom-S indicates " [USB STATUS] Receiving.. "  
When the LCD display of the Fantom-S shows the " [USB STATUS] Connected. " indication for ten seconds or longer, this indicates that the copy has been completed.
16. On your computer, use the Safely Remove Hardware icon in the taskbar at the lower right of the screen to disconnect the Fantom-S from your computer.
17. Press the [ENTER] button. After a time, the display will indicate "Completed. Please, PowerOff." The update procedure has been completed.
18. Turn the power of the Fantom-S off and then on again, and perform the version check and execute Test mode.

### Cautions when updating via USB

After you have pressed the [ENTER] button at the end of the procedure described above, never turn off the power of the Fantom-S until the indication of "Completed. Please, PowerOff." has appeared. If the power is turned off during this time, the program will be erased.  
You must restart your computer before you begin the update procedure.

## 2. Updating from SmartMedia via the Fantom's SmartMedia card slot

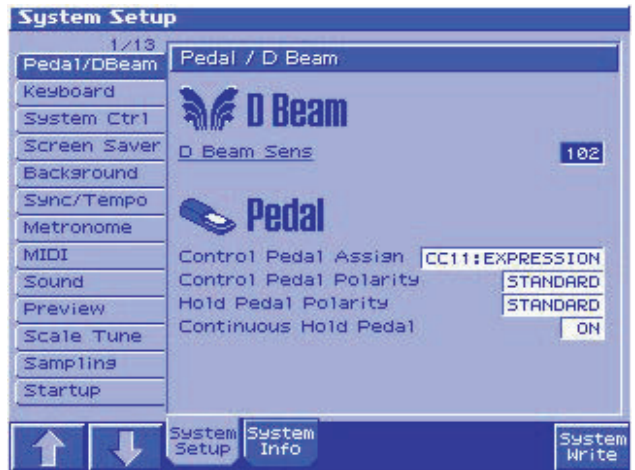
### Required items

- UPDATE DATA FOR SERVICE CD-ROM (#17041312)
- Computer (the OS can be either Windows Me, Windows 2000, or Windows XP)
- You cannot use a Mac under any circumstances.
- Two SmartMedia cards (one with 32 MB or more free space, one with 64 MB or more free space (used to back up user data))
- \* *In addition, substitution to PC is possible for user data back up.*
- SmartMedia reader/writer

If user memory contains important data, save the data (refer to Saving and Loading User Data) before you perform the update procedure.

### Procedure

1. Create an update card.
2. Turn on the power of your computer.
3. Insert a 32 MB or larger SmartMedia card into the SmartMedia reader/writer connected to your computer, and format it.
4. Insert the UPDATE CD-ROM (#17041312) into your computer, and navigate to the "Roland" folder within the CD-ROM.
5. Copy the entire "Roland" folder with its contents onto the SmartMedia card.
6. Turn on the power of the Fantom-S.
7. Press the [MENU] button to access the Menu window.
8. Use the [CURSOR] up/down buttons to select "System," and then press the [ENTER] button.
9. The System Setup screen will appear, and the LCD display will show as follows.

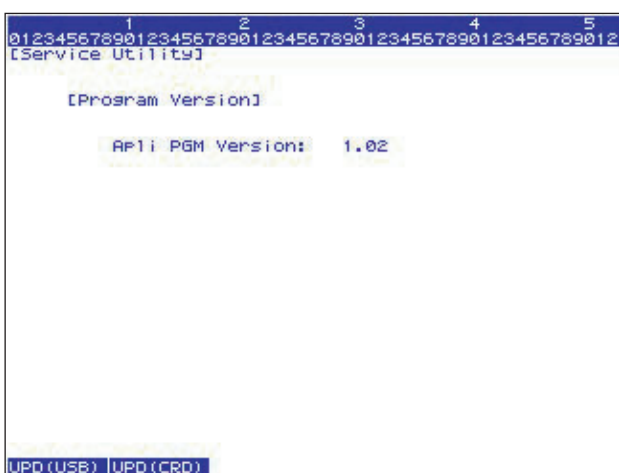


10. Press the [4] button "System Info."

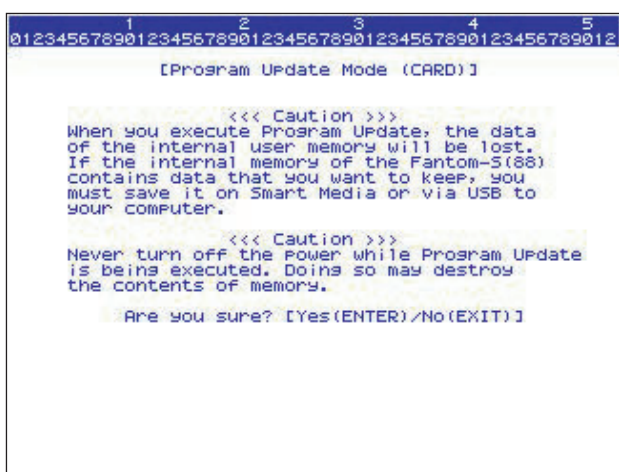
- Use [1 (↑)] [2 (↓)] to select "Version Info." The Version Info screen will appear, and the LCD display will show as follows.



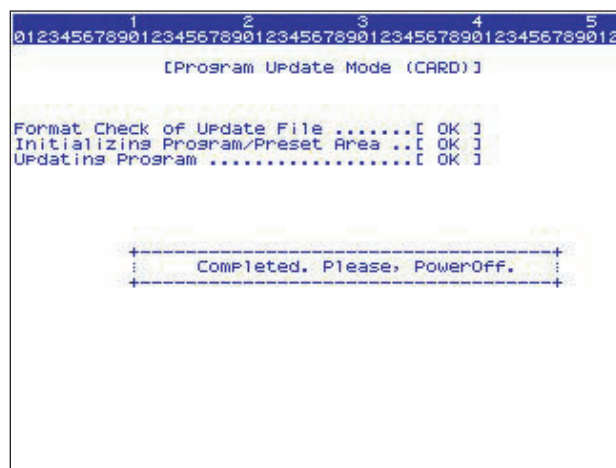
- Press the buttons in the order of [SHIFT] → [7] → [8] → [7] → [8].
- The "Service Utility" screen will appear, and the LCD display will show as follows.



- Press the [2] button to access the [Program Update Mode (CARD)] screen. The LCD display will show as follows.



- Press the [ENTER] button. After a time, the display will indicate "Completed. Please, PowerOff." The update procedure has been completed.



- If you decide to cancel the update procedure, press the [EXIT] button before you press the [ENTER] button.
- Turn the power of the Fantom-S off and then on again, and perform the version check and execute Test mode.

### Cautions when updating via SmartMedia card

After you have pressed the [ENTER] button at the end of the procedure described above, never turn off the power of the Fantom-S until the indication of "Completed. Please, PowerOff." has appeared. If the power is turned off during this time, the program will be erased.

You must restart your computer before you begin the update procedure.

# KEYBOARD PARTS LIST

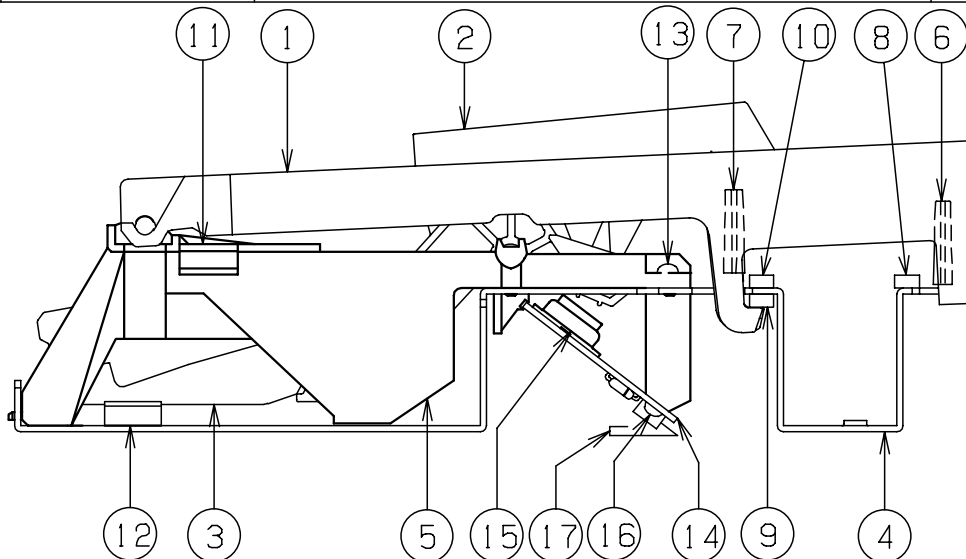
Fantom-S88  
PA-5 AFT-SERVICE ASSY PARTS LIST

No.	PARTS No.	PARTS NAME	Qty.
1	01894234	PA-5 N-KEY A	7
	01894245	PA-5 N-KEY B	8
	01894256	PA-5 N-KEY C	7
	01894267	PA-5 N-KEY D	7
	01894278	PA-5 N-KEY E	7
	01894289	PA-5 N-KEY F	7
	01894290	PA-5 N-KEY G	7
	01894312	PA-5 N-KEY A'	1
	01894323	PA-5 N-KEY C'	1
2	01894334	PA-5 SHARP-KEY	36
3	01906756	PA-5 HAMMER-1	22
	01906767	PA-5 HAMMER-2	22
	01906778	PA-5 HAMMER-3	22
	01906789	PA-5 HAMMER-4	22
	72238601	PA-5 CHASSIS 88P-B ASSY	1
4	01894412	PA-5 CHASSIS 88P	1
5	01894434	PA-5 SUB CHASSIS 12P	7
	01894445	PA-5 SUB CHASSIS 4P	1
6	01894923	PA-4A GUIDE BUSHING C	52
7	00019912	PA-4 GUIDE BUSHING S-KEY	36
8	02016901	PA-5 KEY CUSHION A	1
9	02904401	PA-5 KEY CUSHION B	1
10	03128178	PA-5 AFTERTOUCHE 88P	1
11	02016945	PA-5 HAMMER CUSHION B	1
12	02904390	PA-5 HAMMER CUSHION D	1
13	40012256	SCREW M3X10 BINDING B-TITE FE ZC	37
14	71564612	PA-5 PWB LOW ASSY	1
	71564623	PA-5 PWB MID ASSY	1
	71564634	PA-5 PWB HI ASSY	1
* 15	01898956	PA-5 RUBBER SWITCH 12P	8
16	40011267	SCREW 3X6 BINDING TAPTITE P FE ZC	22
17	02016989	BNCD-P=1.25-K-16-80	1

\* : \* :Item 15 marked \* is included in each unit of 14.

The following parts are not included the Keyboard Assy.

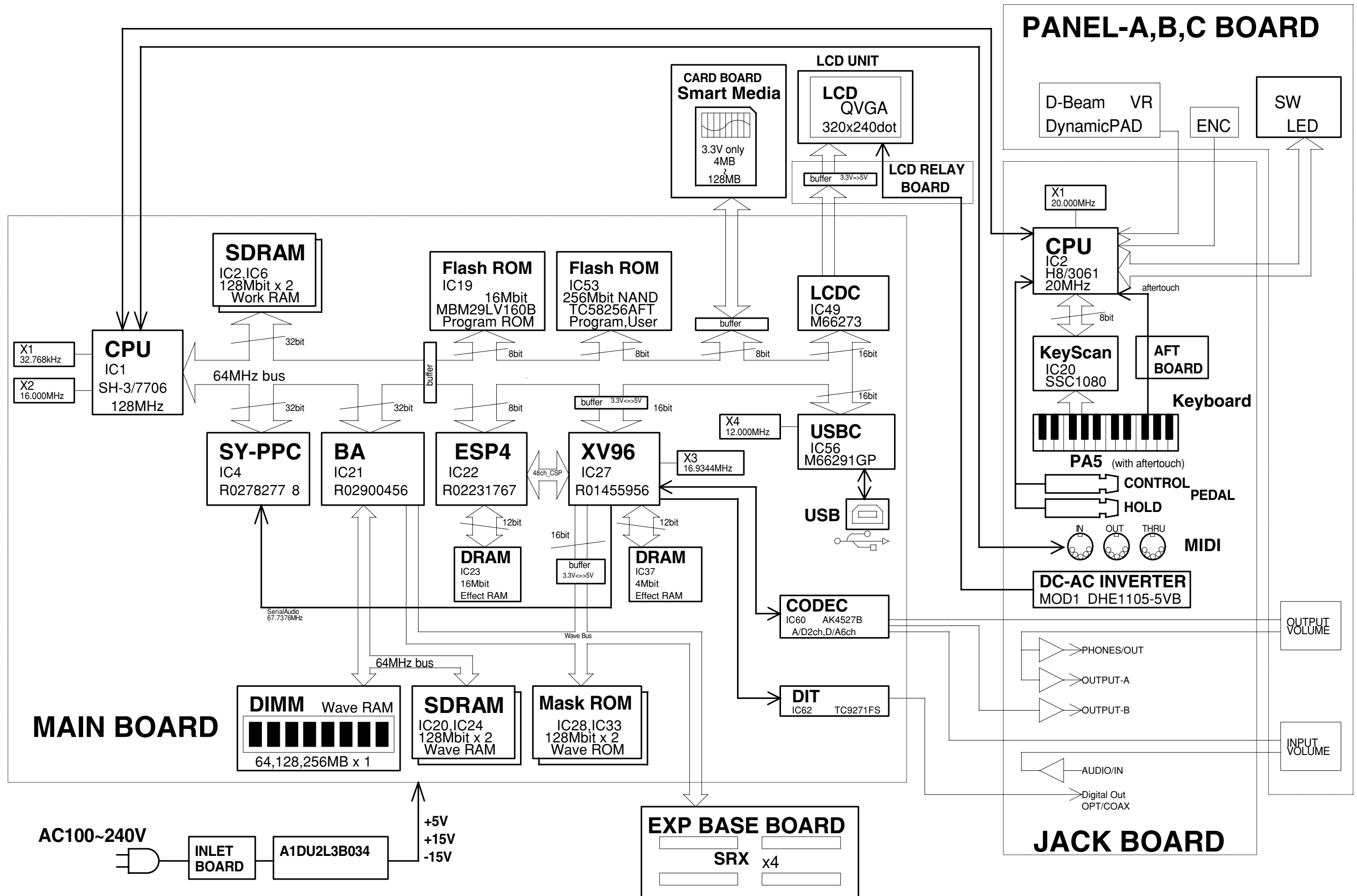
	02565078	BNCD-P=1.25-K-16-700	1
	02565089	BNCD-P=1.25-K-22-650	1



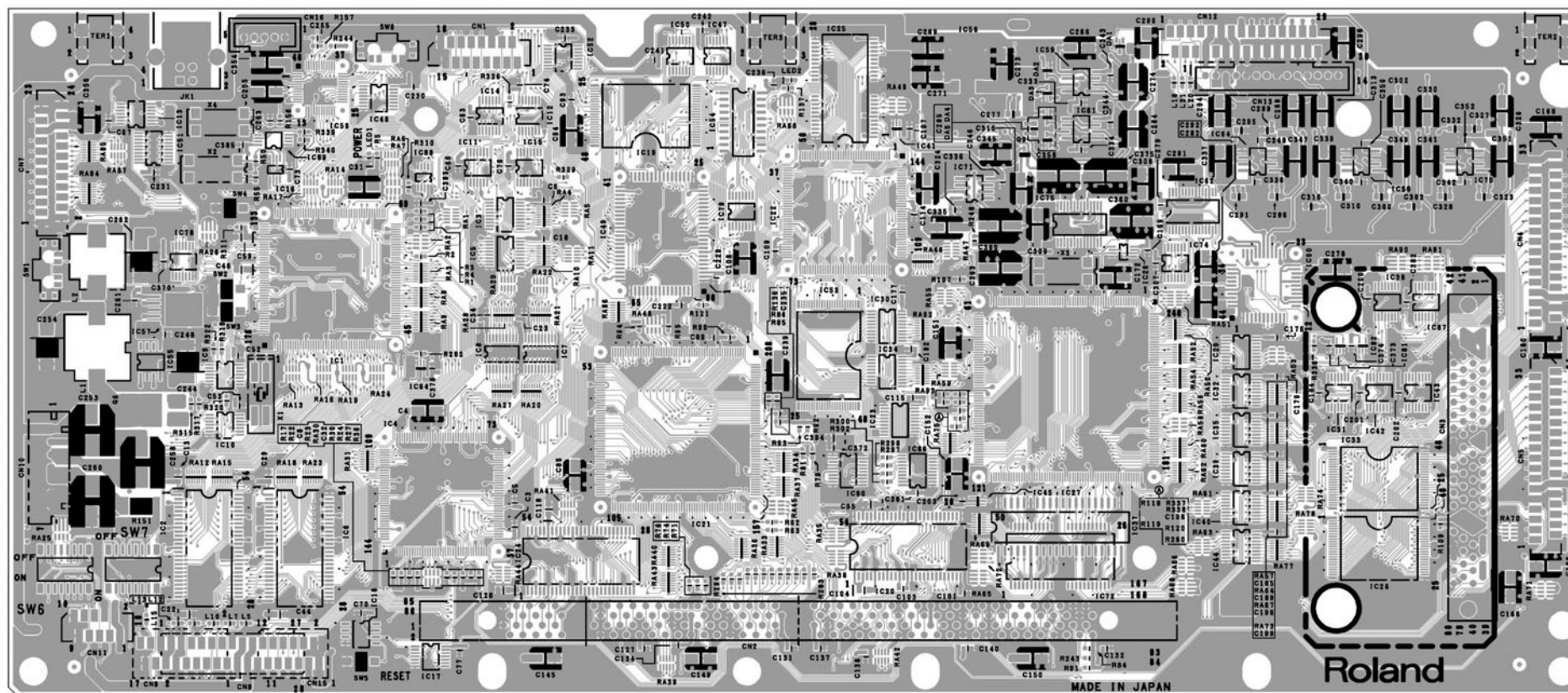




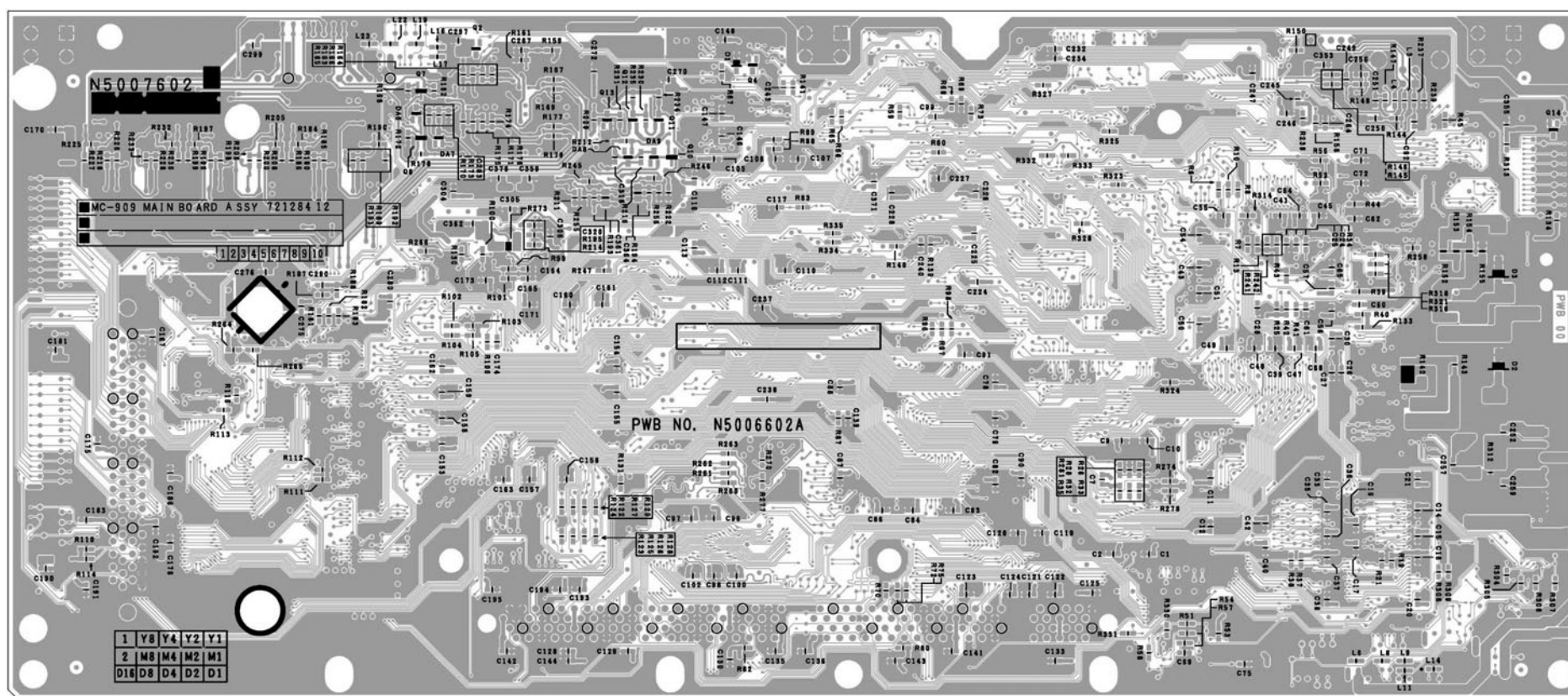
**BLOCK DIAGRAM**



# CIRCUIT BOARD (MAIN)

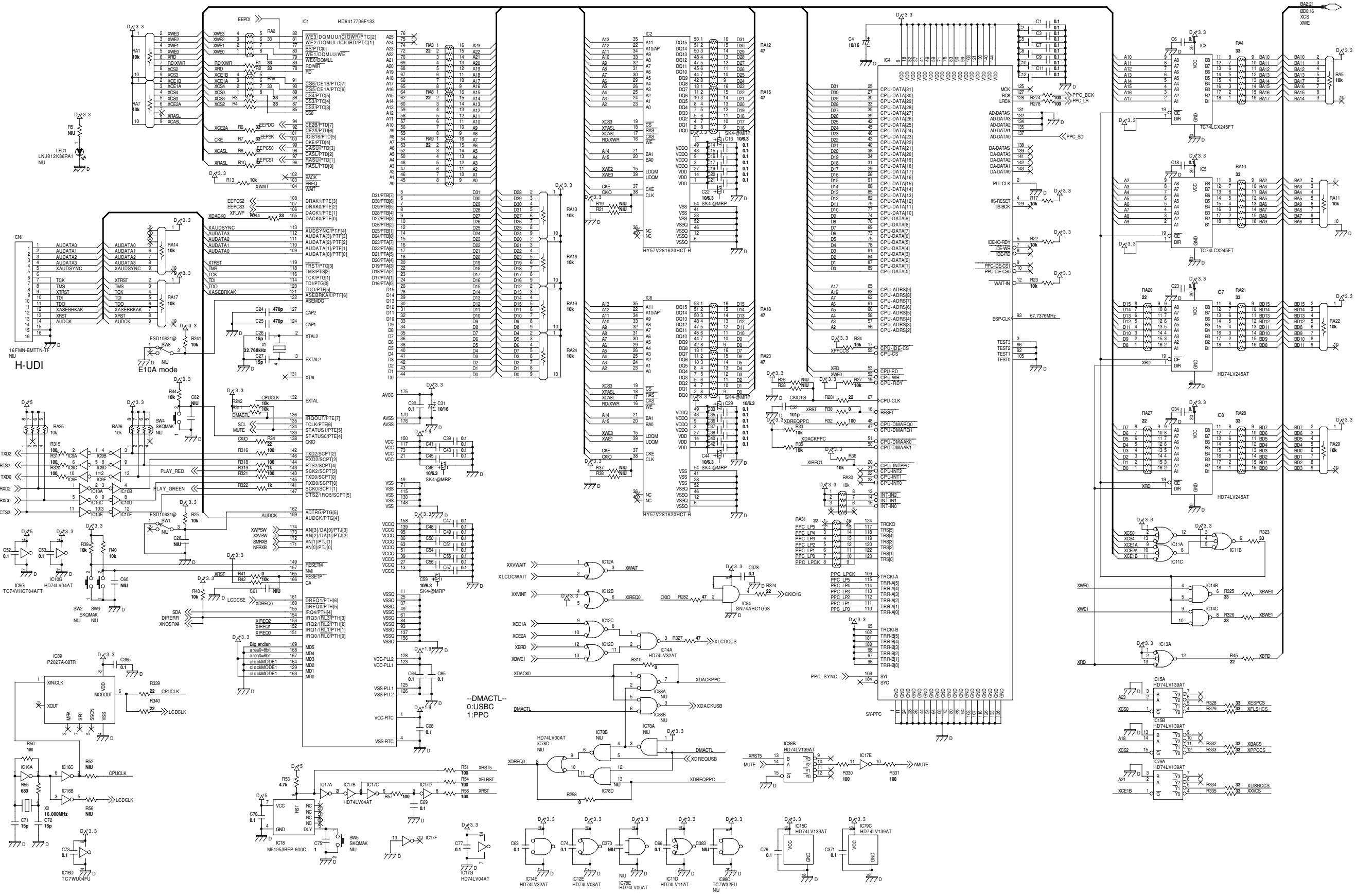


View from components side

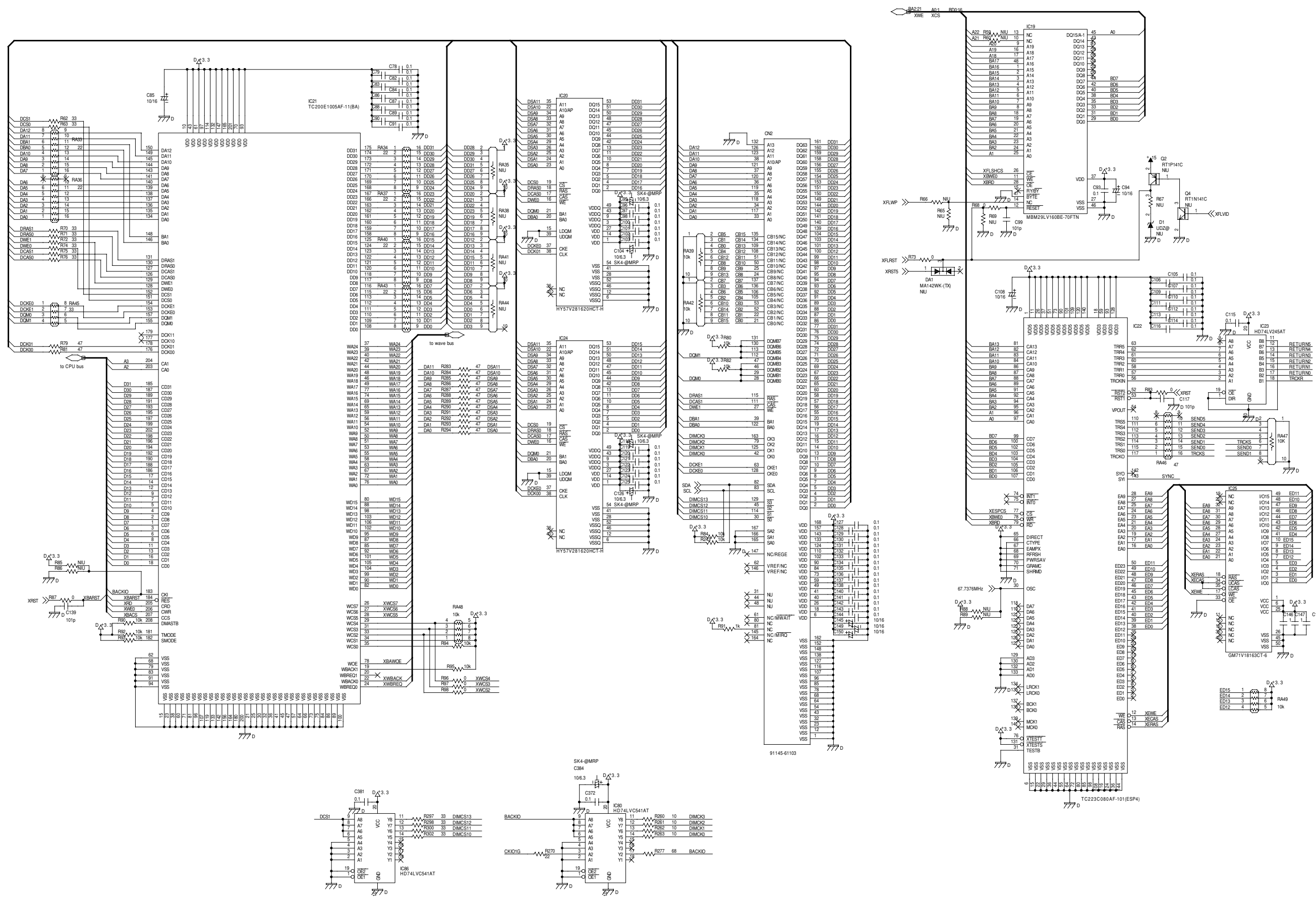


View from foil side

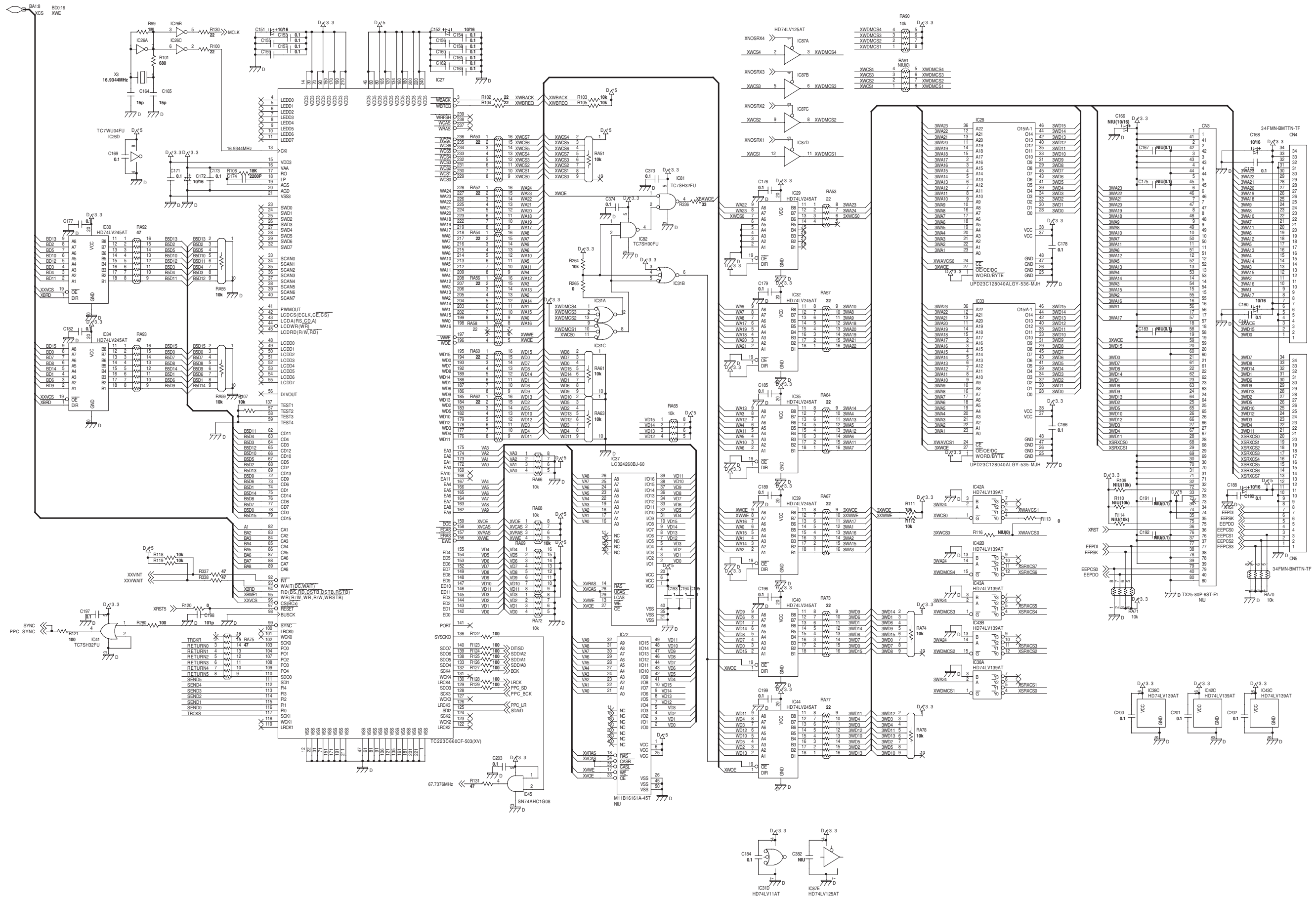
# CIRCUIT DIAGRAM (MAIN1)



# CIRCUIT DIAGRAM (MAIN2)

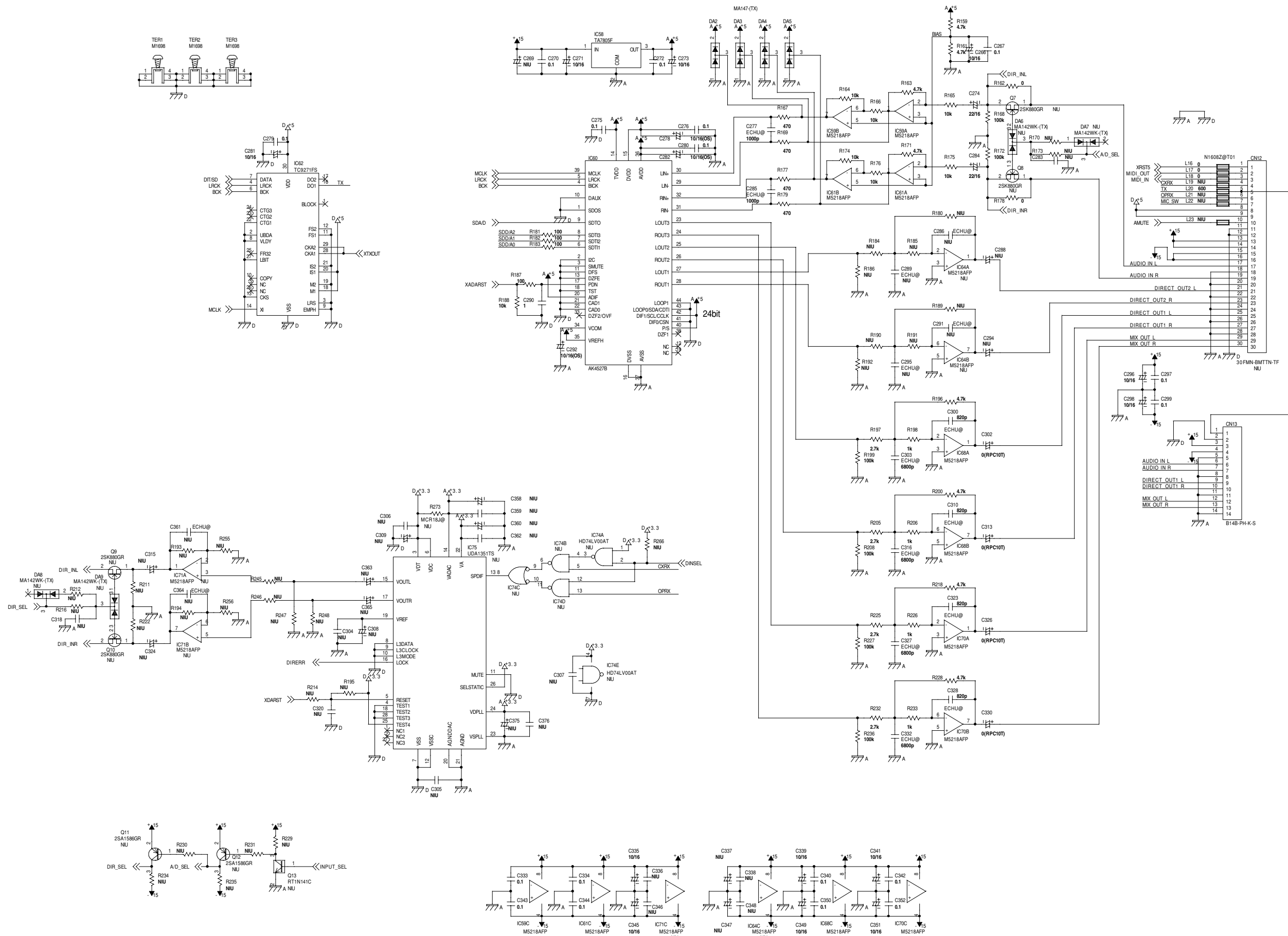


# CIRCUIT DIAGRAM (MAIN3)

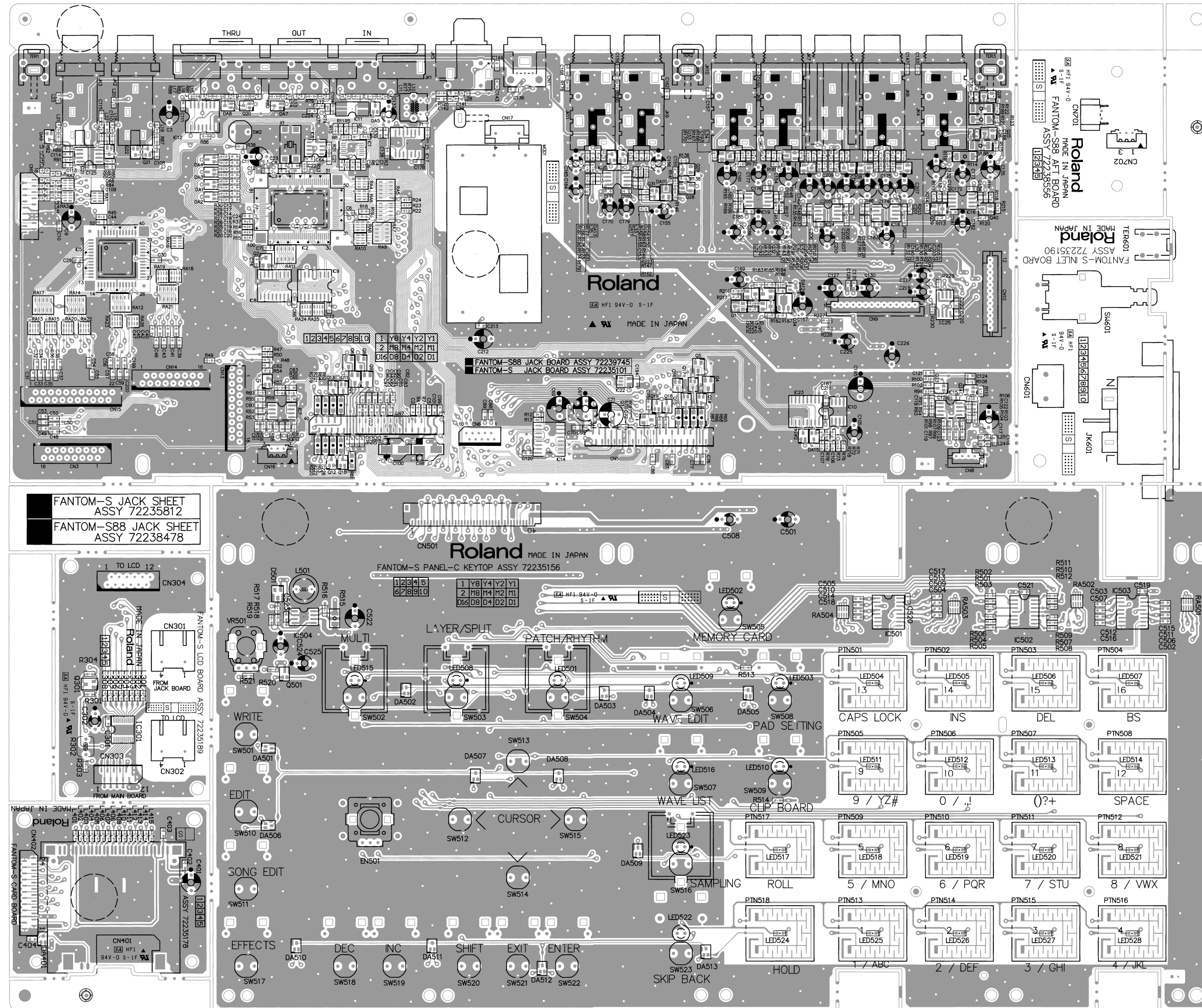




# CIRCUIT DIAGRAM (MAIN5)



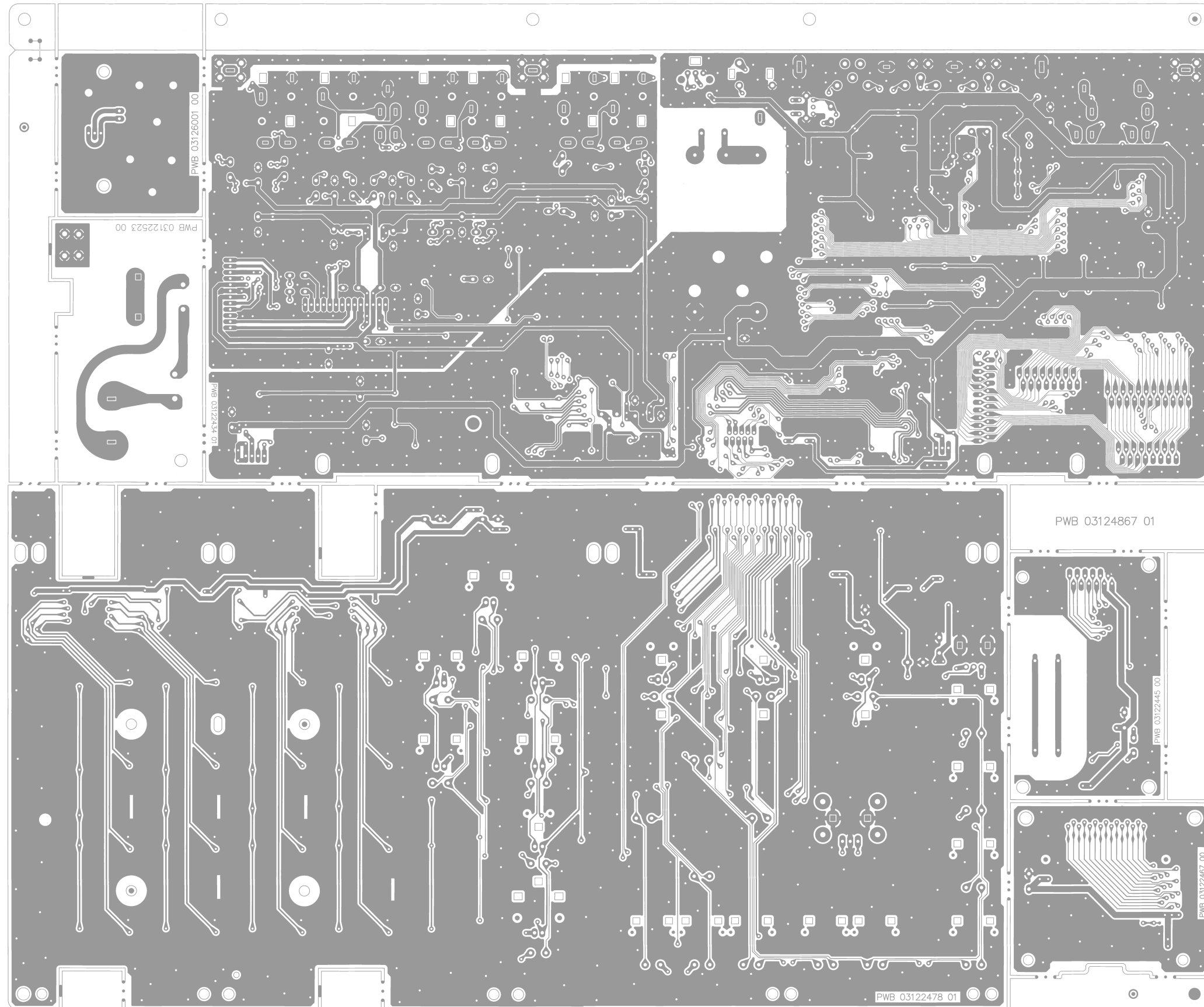
# CIRCUIT BOARD (JACK)



View from components side



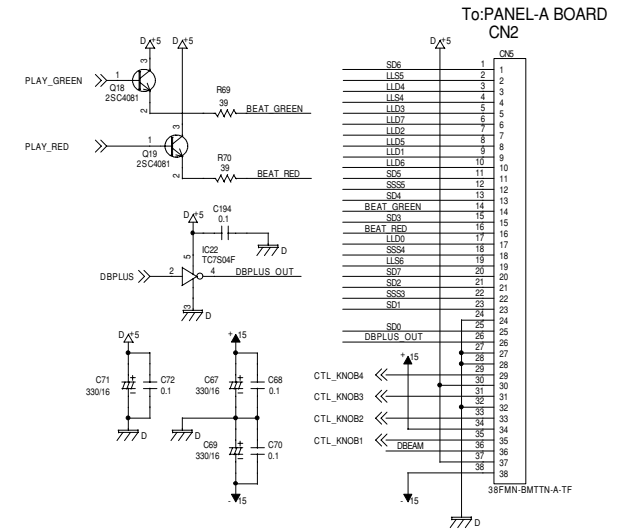
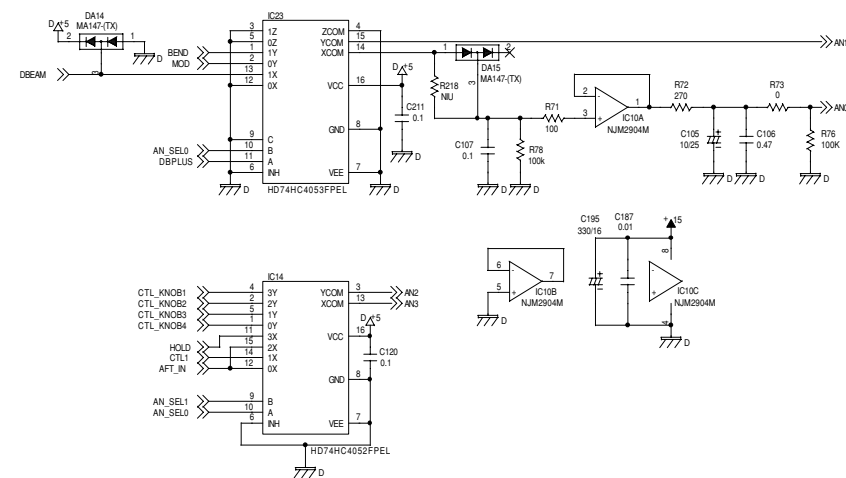
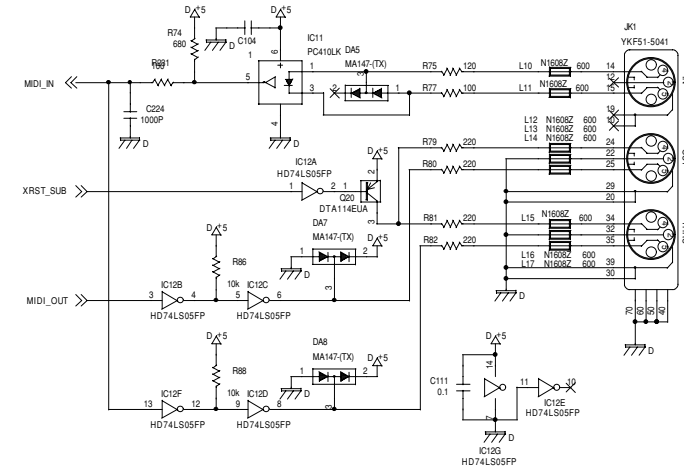
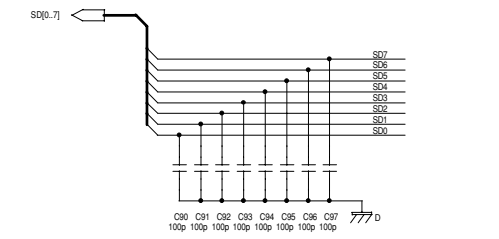
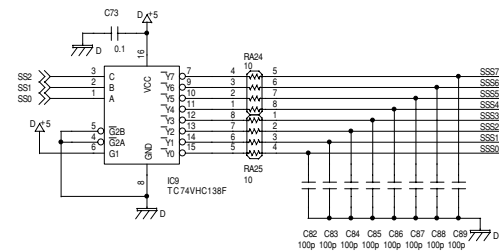
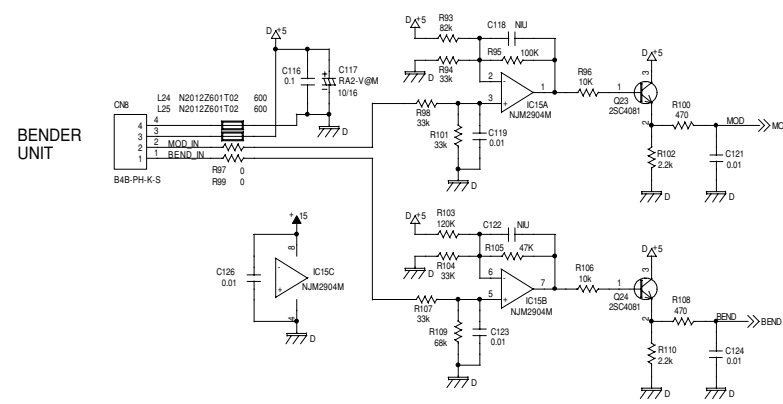
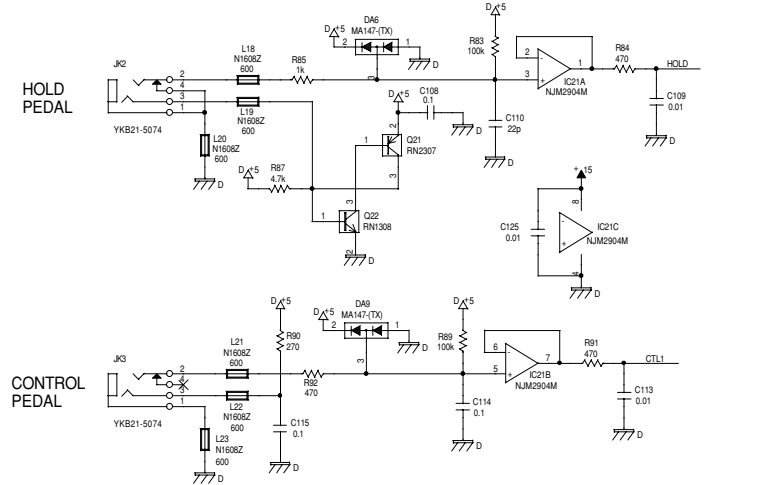
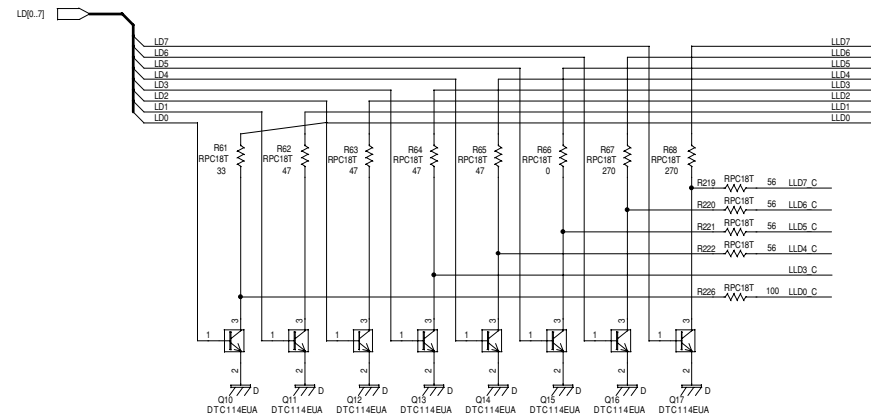
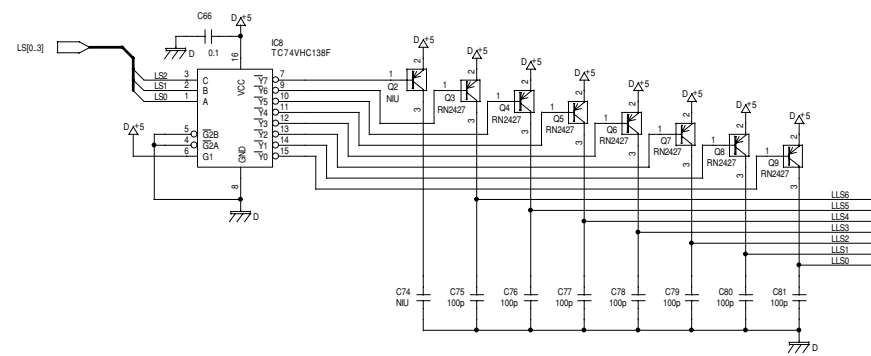
# CIRCUIT BOARD (JACK)



View from foil side

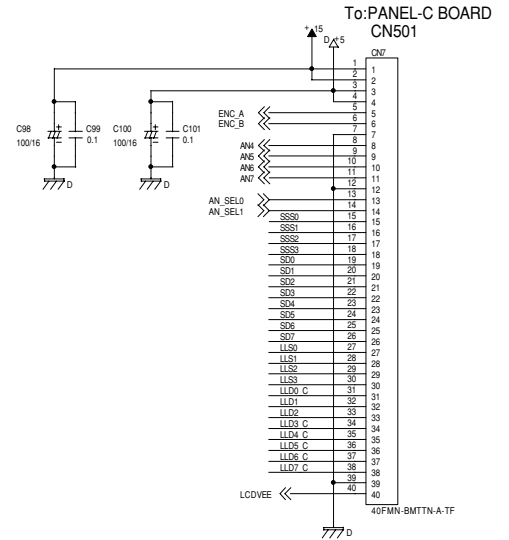


# CIRCUIT DIAGRAM (JACK-2)



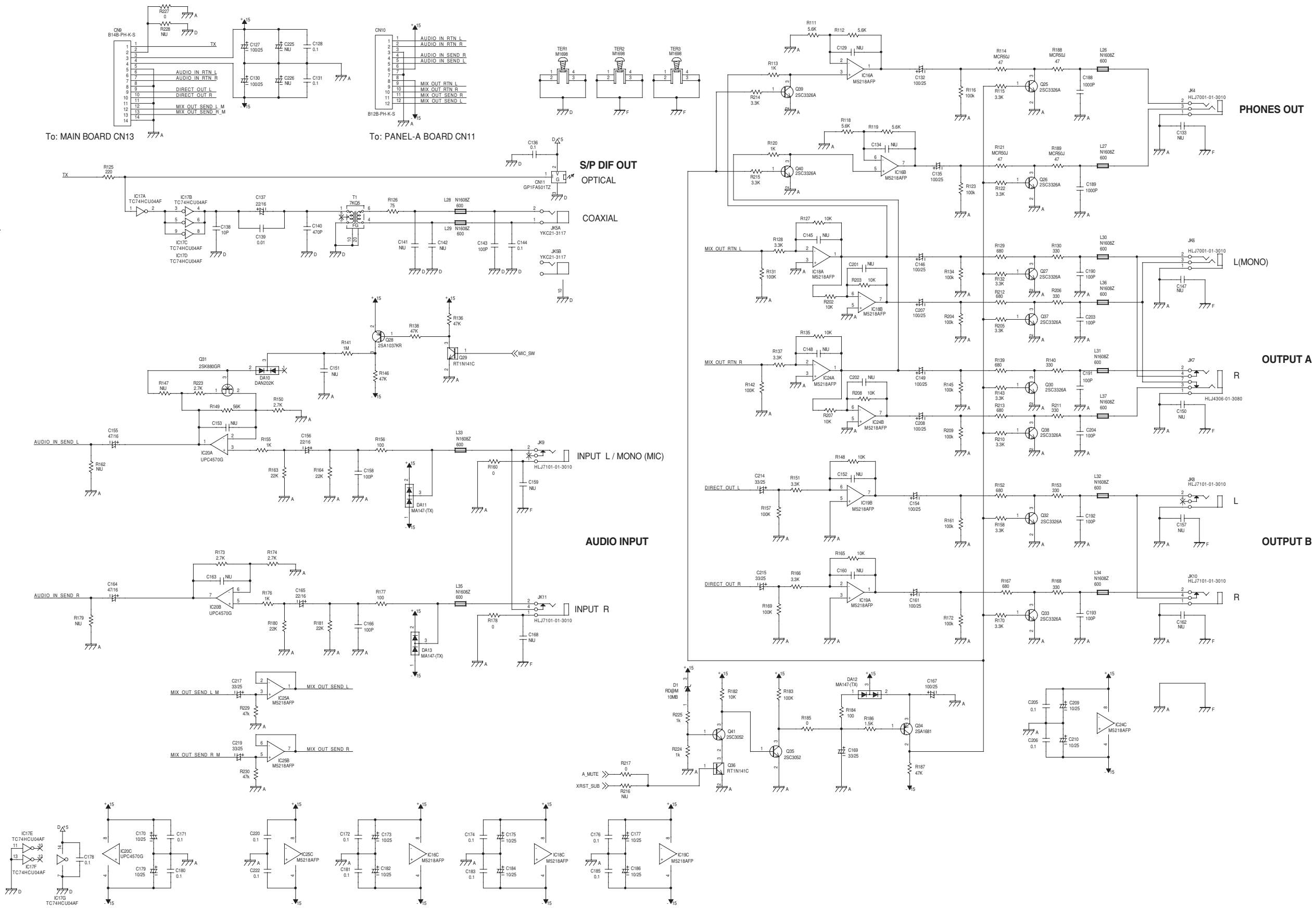
Pin	Signal
1	SS0
2	SS1
3	SS2
4	SS3
5	SS4
6	SS5
7	SS6
8	SS7
9	SS8
10	SS9
11	SS0
12	SS1
13	SS2
14	SS3
15	SS4
16	SS5
17	SS6
18	SS7
19	SS8
20	SS9
21	SS0
22	SS1
23	SS2
24	SS3
25	SS4
26	SS5
27	SS6
28	SS7
29	SS8
30	SS9
31	SS0
32	SS1
33	SS2
34	SS3
35	SS4
36	SS5
37	SS6
38	SS7

Pin	Signal
1	SS0
2	SS1
3	SS2
4	SS3
5	SS4
6	SS5
7	SS6
8	SS7
9	SS8
10	SS9

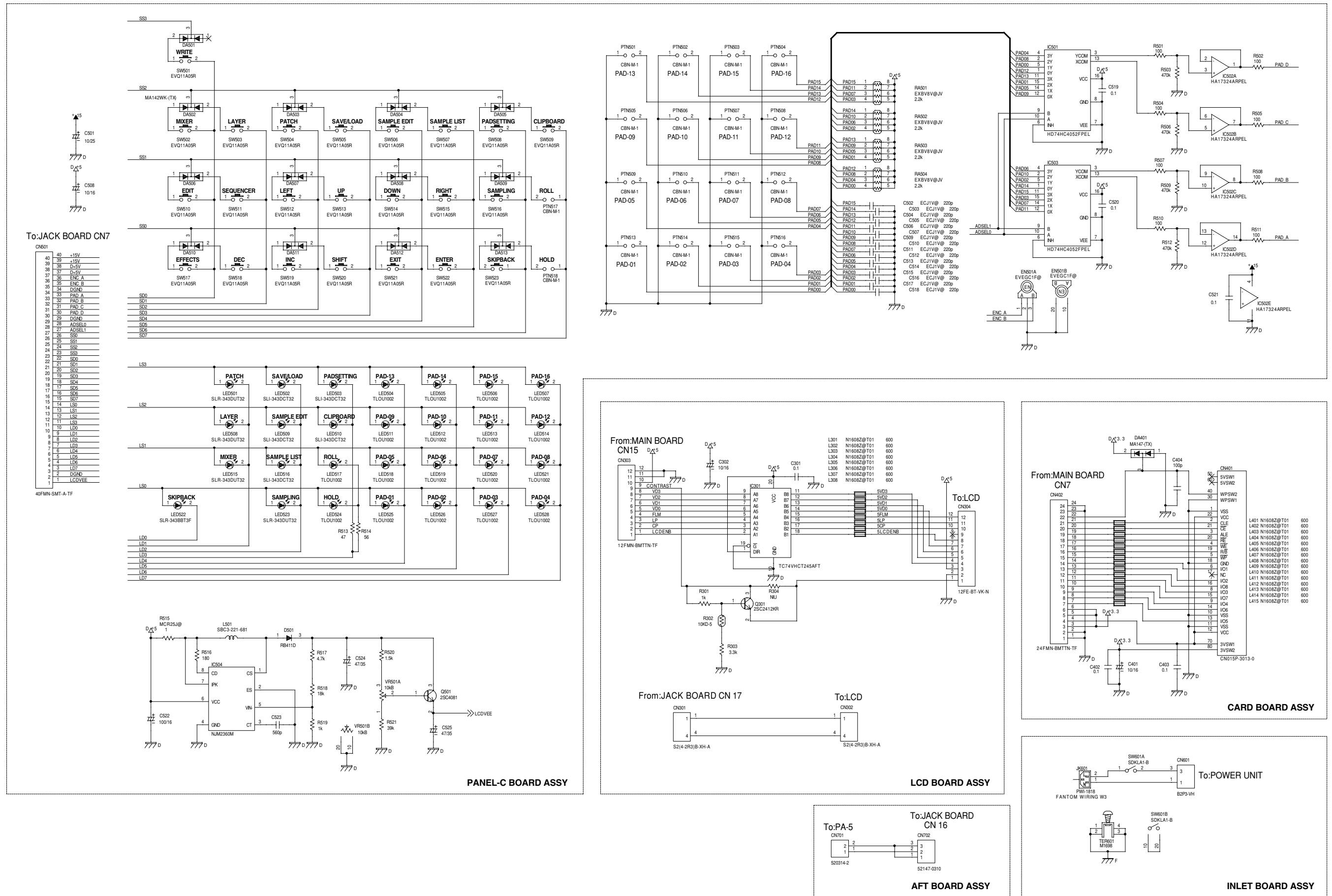


Pin	Signal
1	SS0
2	SS1
3	SS2
4	SS3
5	SS4
6	SS5
7	SS6
8	SS7
9	SS8
10	SS9
11	SS0
12	SS1
13	SS2
14	SS3
15	SS4
16	SS5
17	SS6
18	SS7
19	SS8
20	SS9
21	SS0
22	SS1
23	SS2
24	SS3
25	SS4
26	SS5
27	SS6
28	SS7
29	SS8
30	SS9
31	SS0
32	SS1
33	SS2
34	SS3
35	SS4
36	SS5
37	SS6
38	SS7
39	SS8
40	SS9

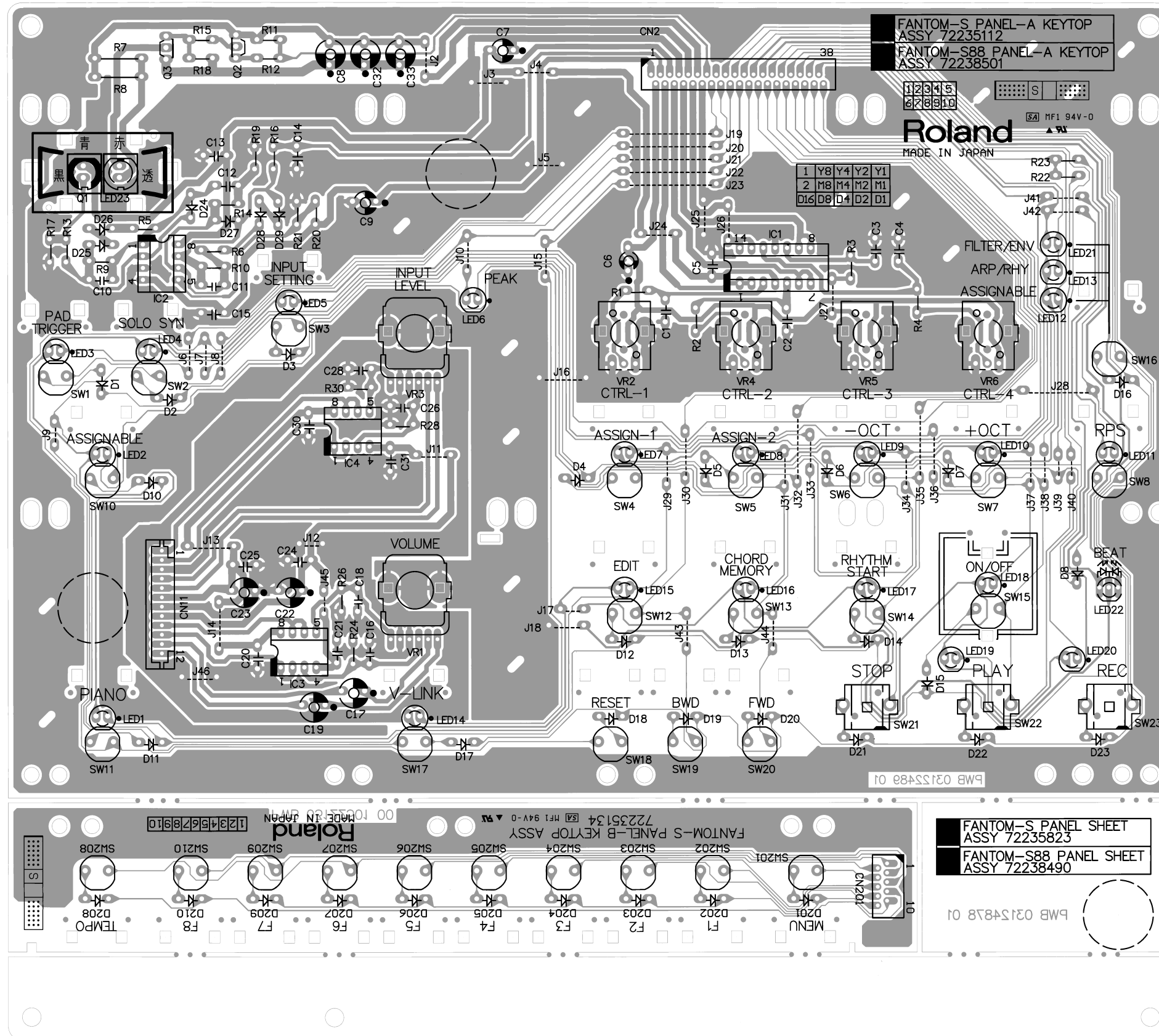
# CIRCUIT DIAGRAM (JACK-3)



# CIRCUIT DIAGRAM (PANEL-C)



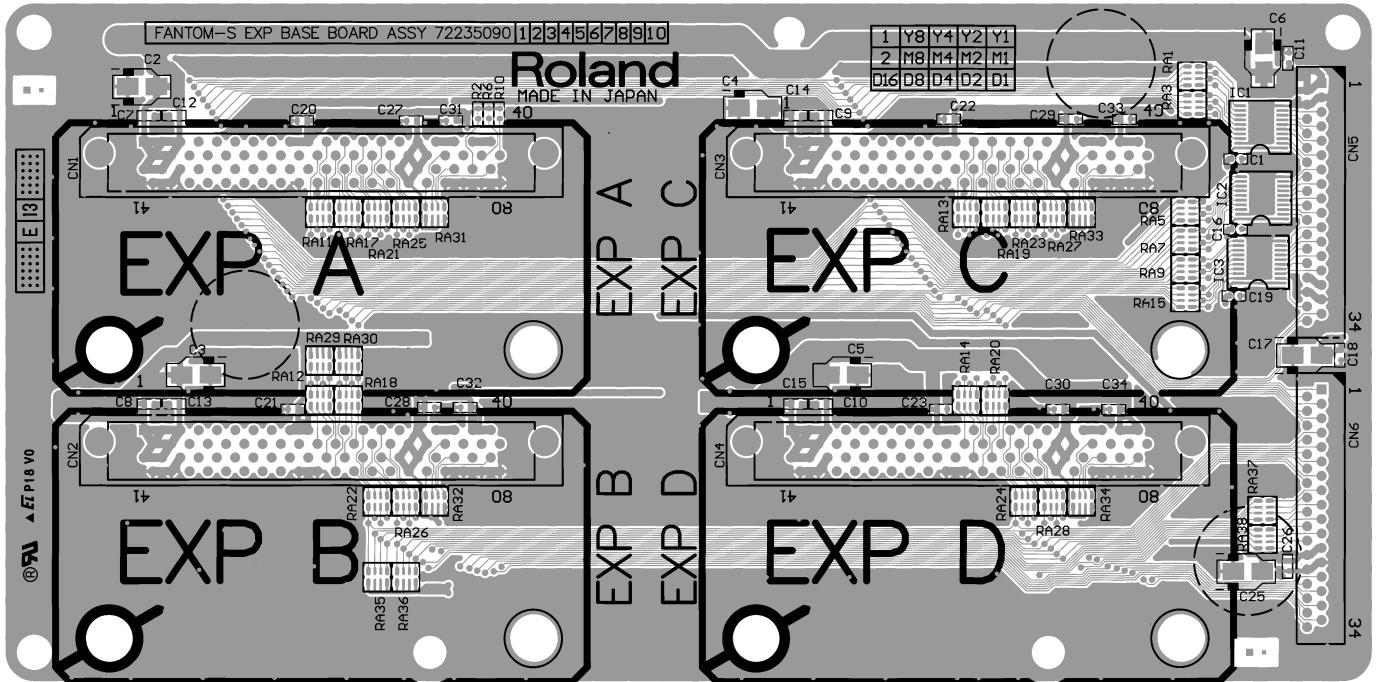
# CIRCUIT BOARD (PANEL)



View from components side

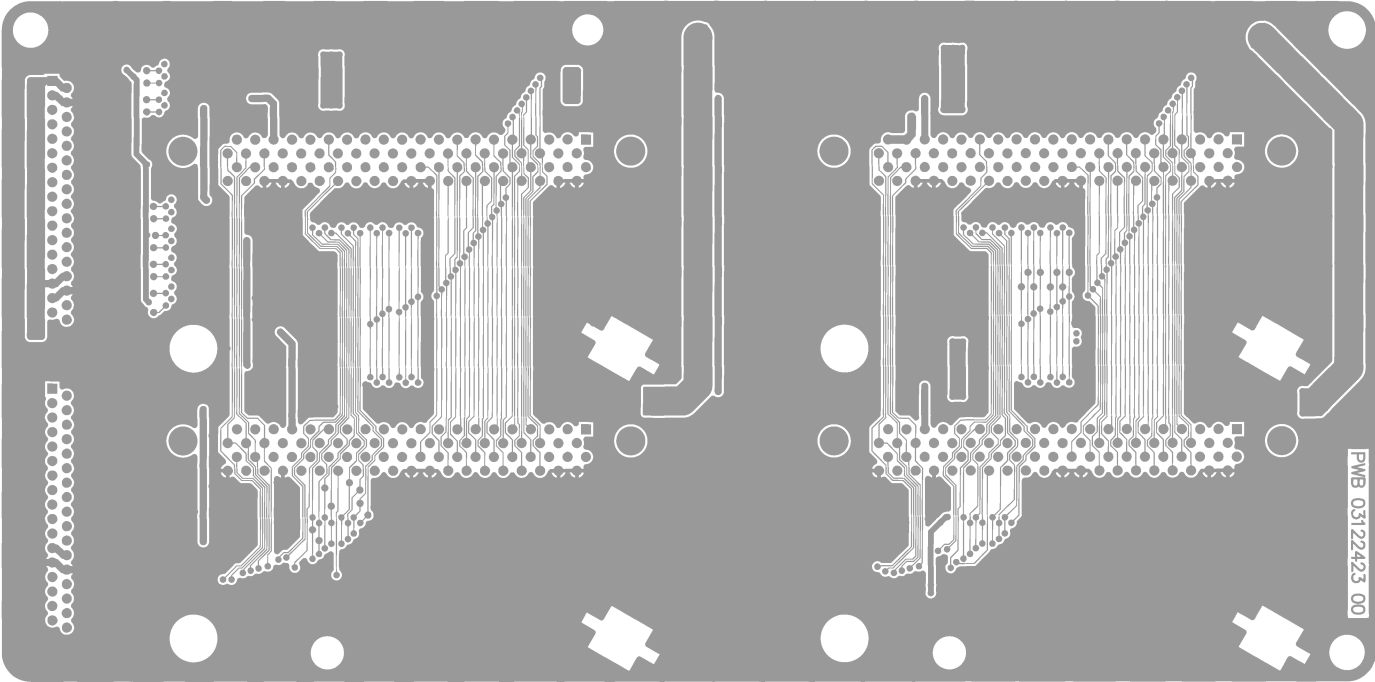


# CIRCUIT BOARD (EXP)



View from components side

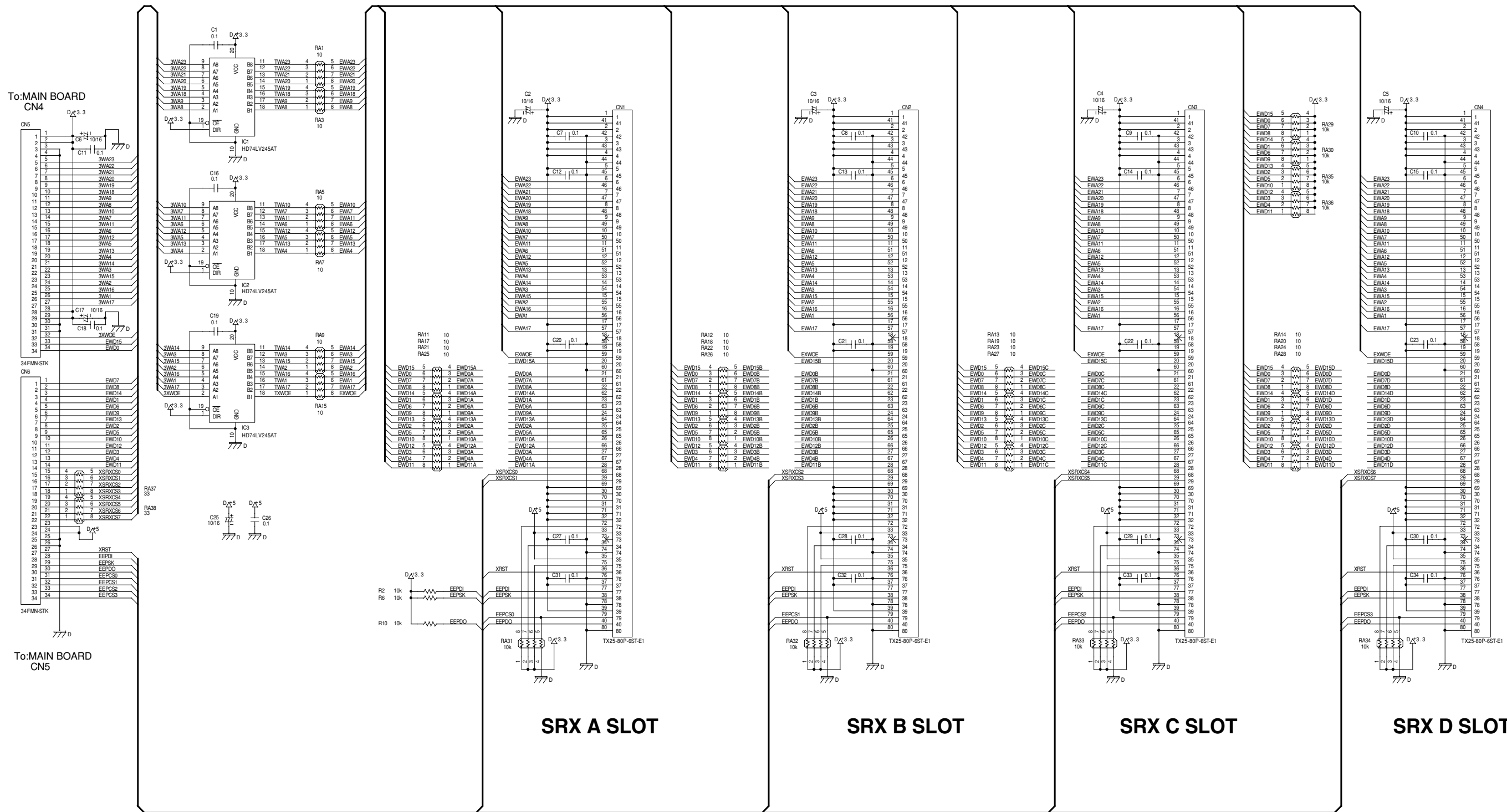




PWB 03122423 00

View from foil side

# CIRCUIT DIAGRAM (EXP)



EXP BASE BOARD ASSY

## ERROR MESSAGES

If an incorrect operation is performed, or if processing could not be performed as you specified, an error message will appear. Refer to the explanation for the error message that appears, and take the appropriate action.

Message	Meaning	Action
<b>Cannot Edit Preset Sample!</b>	This is a preset sample, and therefore cannot be edited.	—
<b>Card Not Ready!</b>	A memory card is not inserted in the slot.	Insert a memory card into the slot.
<b>Card Protected!</b>	The write-protect sticker is affixed to the card.	—
<b>Data not found</b>	The data for placement is not specified.	—
<b>Empty Pattern</b>	The Pattern has no data in it, so the Pattern Call message cannot be recorded in Step Recording.	—
<b>Empty Sample!</b>	The sample contains no data.	Select a sample that contains data.
<b>Empty Song!</b>	The song has not been recorded, and therefore cannot be played.	Select a song that contains data.
<b>File Name Duplicate</b>	A file with the same name already exists.	Delete the file bearing the same name from the disk, and if overwriting and saving the data, merely save the file. If you do not want to delete the file with the same name from the disk, either save the file with a different name.
<b>Illegal File!</b>	The Fantom-S cannot use this file.	—
<b>Memory Damaged!</b>	The contents of memory may have been damaged.	Please perform the Factory Reset operation. If this does not resolve the problem, please contact your dealer or the nearest Roland Service Center.
<b>Memory Full!</b>	Saving is not possible because there is insufficient space in the user area or memory card.	Delete unneeded data.
<b>MIDI Offline!</b>	There is a problem with the MIDI cable connection.	Check that the MIDI cable has not been disconnected or broken.
<b>No More Note Numbers!</b>	A maximum of 16 different note numbers can be used in one style of the arpeggio/rhythm function.	Please delete unneeded notes.
<b>No More Sample Numbers!</b>	The sample cannot be divided any further. Since fewer than 256 consecutive sample numbers are vacant, no further sampling is possible.	Erase unneeded samples in order to allocate 256 or more consecutive sample numbers.
<b>No More Song Numbers!</b>	No more songs can be saved. A maximum of 256 songs can be handled simultaneously for both the user bank and card bank.	Please delete unneeded songs.
<b>Now Playing!</b>	Since the Fantom-S is playing, this operation cannot be executed.	Stop playback before you execute the operation.
<b>Permission Denied!</b>	The file is protected.	—
<b>Playback Tempo Range Over</b>	Tempo values exceed the allowable limit, and data is created in which the closest time available within the allowable range is specified.	—
<b>Recording Parameter Error</b>	You are attempting to begin recording after a looped segment.	You are attempting to begin recording within or before a looped segment.
<b>Rec Over Flow</b>	Since a large amount of recorded data was input all at once, it could not be processed correctly.	Reduce the amount of recorded data.
<b>Sample Length Too Short!</b>	The sample is too short, and cannot be edited correctly.	If the sample is extremely short, editing may not produce the desired result.
<b>Sample Memory Full!</b>	Since there is insufficient sample memory, no further sampling or sample editing is possible.	Erase unneeded samples.
<b>Song Full</b>	Since the maximum number of notes that can be recorded in a song or pattern has been exceeded, no further recording/editing is possible.	Use the track edit Delete or Erase commands to remove unneeded data from the song/pattern that you are recording/editing.
<b>Song Format Error</b>	This song is damaged.	This song cannot be used.
<b>Song Not Found</b>	The selected song cannot be found.	—
<b>Too Many Sample Selected!</b>	The operation cannot be executed, since marks are assigned to more than one sample.	Either clear the marks, or mark only one sample.
<b>Unformatted!</b>	The memory card is in an unsupported format.	Format the memory card.
<b>You Cannot Assign</b>	The sample cannot be assigned to a pad.	Assign To Pad requires that all pads be playing a rhythm set. Assign a rhythm set to the Pad part. Turn off the RPS function. Turn off the rhythm switch. Turn off the ARPEGGIO/RHYTHM function.
<b>You Cannot Copy This Message</b>	This message cannot be copied.	—
<b>You Cannot Erase This Message</b>	This message cannot be erased.	—
<b>You Cannot Move This Message</b>	This message cannot be moved.	—
<b>You Cannot Quick Play S-MRC Song</b>	This is a SuperMRC song; it cannot be played back in Quick Play.	Save the data as an MRC Pro song.