SH-32 SYNTHESIZER

SERVICE NOTES
Issued by RJA

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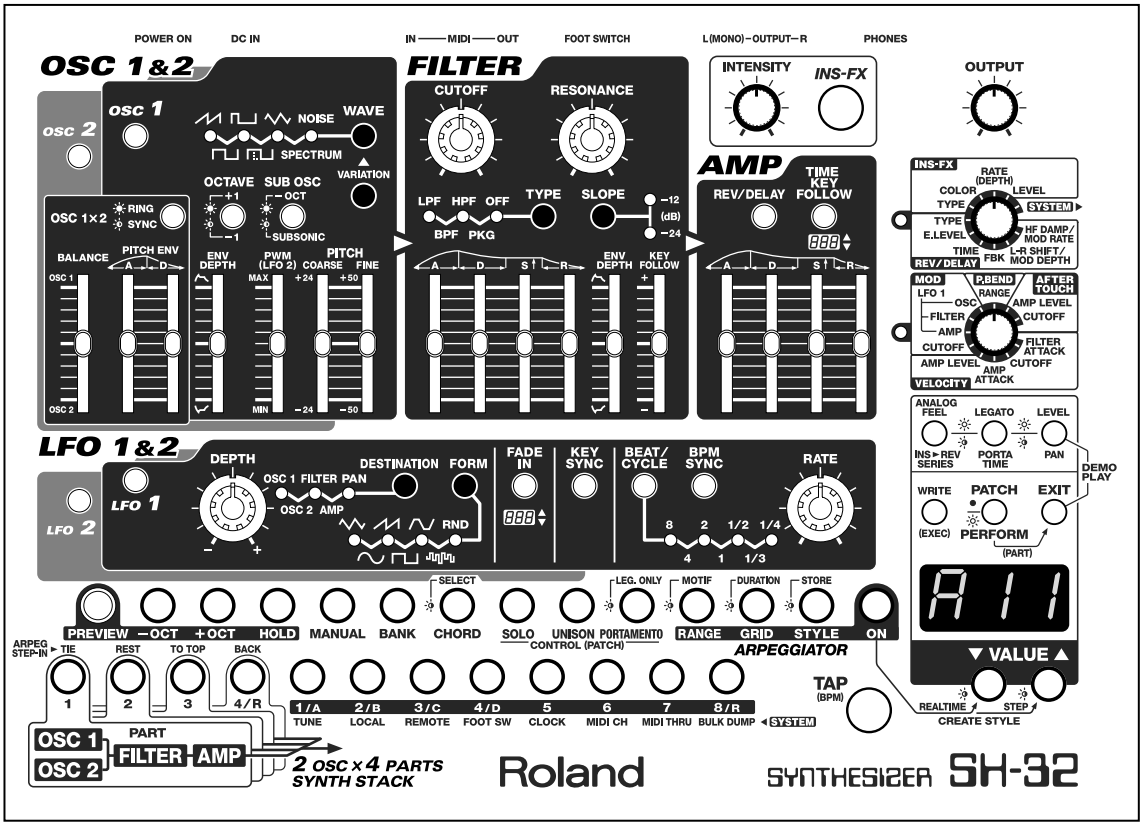

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SPECIFICATIONS

SH-32: Synthesizer

- Parts
  4 parts

- Maximum Polyphony
  32 voices

- Sound Generator
  Organization2 Oscillators + 1 Filter + 1 Amp + 2 LFOsSuboscillator (with subsonic mode; can be switched on and off independently of the oscillators), PWM function (can be switched on and off independently of the oscillators), Oscillator Sync function, Ring Modulator function (only one of the above functions may be selected at any one time; Patches in Oscillator Sync are played in mono)LFO: 7 Waveforms, Tap Teach enabled in BPM Sync

- Synth Oscillator
  Waveforms7 groups, 67 types (SAW: 12, SQUARE: 10, PULSE: 9, PWM: 1, TRIANGLE/SINE: 5, SPECTRUM: 20, NOISE: 10)

- Waveforms for Use in Rhythm Sets
  63 Waveforms (Pre-installed waveforms include TR-909 and TR-808 kick, snare, hi-hat, and other waves)

- Effects
  Insertion Effects: 35
  Reverb/Delay: 10

- Preset Memory
  Patches: 128
  Rhythm Sets: 2

- User Memory
  Patches: 128
  Rhythm Sets: 2
  Performances: 64

* *The Patches in User memory are identical to those in the Preset memory.*

- Arpeggiator
  Arpeggio Styles: 64
  Rhythm Styles: 64
  Tempo: 20 -50 BPM
  Programmable (Realtime, Step)Parameters: Grid Type, Duration, Octave Range, Motif

* *Styles can be overwritten by the user.*

- Chord Memory
  Chord Forms: 64

- Display
  8 segments x 3 characters LED

- ConnectorsMIDI Connectors
  (IN, OUT)Output Jacks (L, R) (1/4 inch phone type)
  Headphones
  JackFoot
  Switch Jack
  DC In Jack

- Power Supply
  AC Adaptor (DC 9 V)

- Current Draw
  1000 mA

- Dimensions
  303 (W) x 228 (D) x 91.5 (H) mm
  11-15/16 (W) x 9 (D) x 3-5/8 (H) inches

- Weight
  1.9 kg / 4 lbs 4 oz (excluding AC Adaptor)

- Accessories
  Owner's Manual English (#71908945)
  AC Adaptor (ACI series or PSB-1U)

- Options
  Foot Switch: BOSS FS-5UPedal
  Switch: DP-2Foot Switch Cable: PCS-31

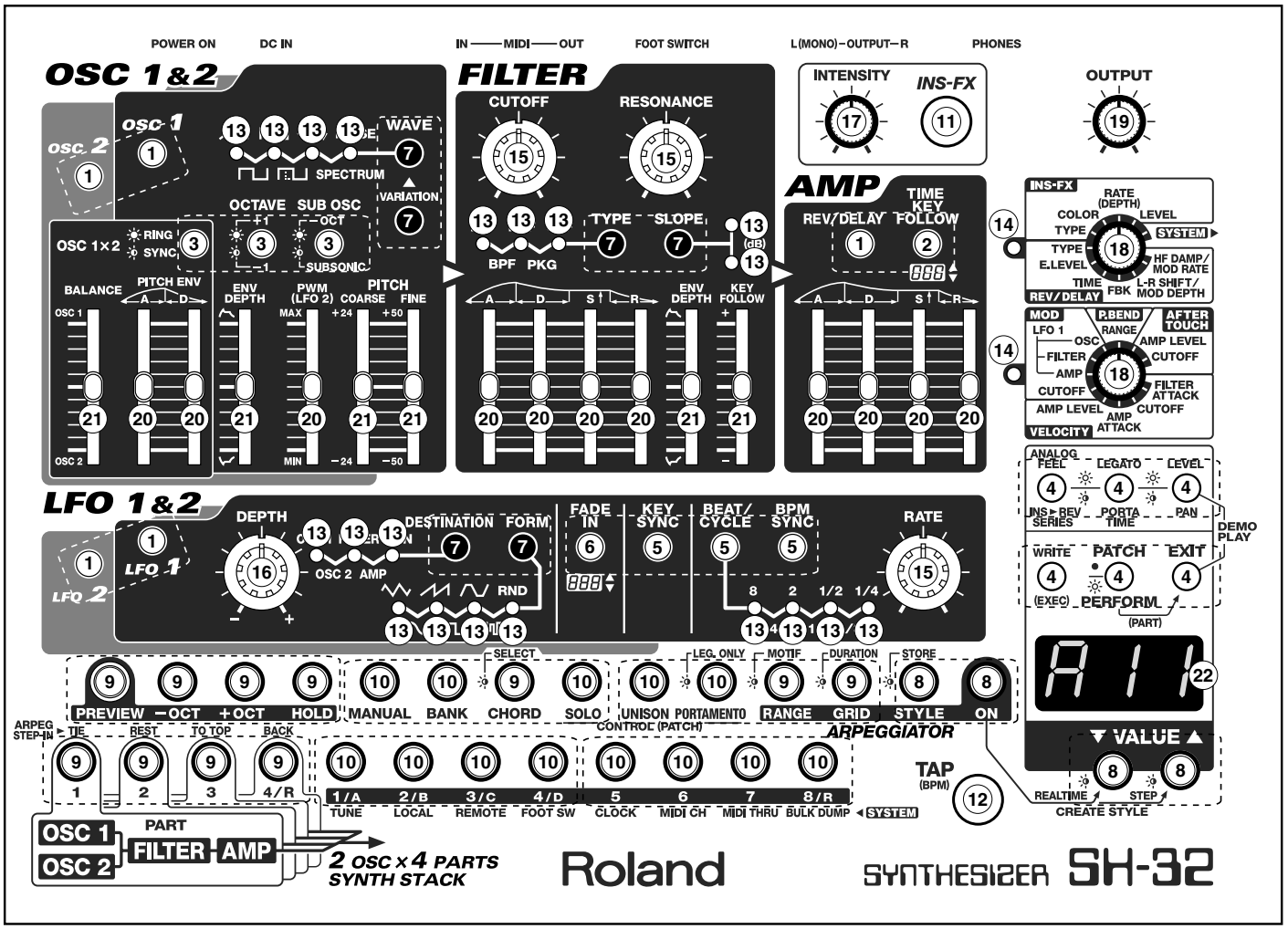
* *In the interest of product improvement, the specifications and/or appearance of this unit are subject to change without prior notice.*

LOCATION OF CONTROLS PARTSLIST

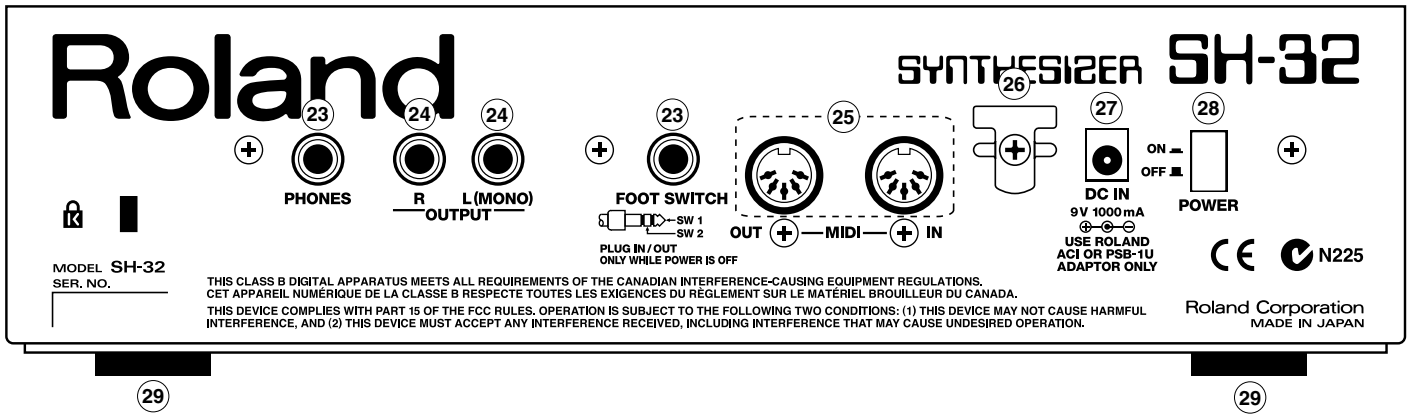
No.	Part Code	Part Name	Description	Q'ty
1	01670489	F C-KEYTOP	SX2H CLR	3
	02891789	TACT SWITCH	SKRGADD010 H=5.0	5
	02239567	LED	SLR-342VRT32	5
2	01670489	F C-KEYTOP	SX2H CLR	1
	02891789	TACT SWITCH	SKRGADD010 H=5.0	1
	02894090	LED	SLR-343DUT32	1
3	01670478	F C-KEYTOP	SX3H CLR	1
	02891789	TACT SWITCH	SKRGADD010 H=5.0	3
	02239567	LED	SLR-342VRT32	3
4	01670478	F C-KEYTOP	SX3H CLR	2
	02891789	TACT SWITCH	SKRGADD010 H=5.0	6
	02894090	LED	SLR-343DUT32	6
5	01780834	F C-KEYTOP	SX4H CLR	1
	02891789	TACT SWITCH	SKRGADD010 H=5.0	4
	02239567	LED	SLR-342VRT32	3
6	01780834	F C-KEYTOP	SX4H CLR	1
	02891789	TACT SWITCH	SKRGADD010 H=5.0	1
	02894090	LED	SLR-343DUT32	1
7	01902734	F C-KEYTOP	SX2H BLK	1
	02891789	TACT SWITCH	SKRGADD010 H=5.0	2
8	02239701	Y C-KEYTOP	MX2H CLR	2
	02891789	TACT SWITCH	SKRGADD010 H=5.0	6
	02239567	LED	SLR-342VRT32	6
9	02450201	Y C-KEYTOP	MX4H CLR	2
	02891789	TACT SWITCH	SKRGADD010 H=5.0	7
	02239567	LED	SLR-342VRT32	7
10	02450201	Y C-KEYTOP	MX4H CLR	3
	02891789	TACT SWITCH	SKRGADD010 H=5.0	13
	02894090	LED	SLR-343DUT32	13
11	02013090	F C-KEYTOP	MX1H CLR	1
	02891789	TACT SWITCH	SKRGADD010 H=5.0	1
	02239567	LED	SLR-342VRT32	1
12	02013090	F C-KEYTOP	MX1H CLR	1
	02891789	TACT SWITCH	SKRGADD010 H=5.0	1
13	02126912	LED	SLR-342VR-TG7	20
14	02784867	LED	SLR-342DU-TG7	2
15	02452912	J R-KNOB	SF-A BLK/LCG	3
	01787545	9M/M ROTARY POT.	EVUF2KFK3B14 10KB	3
16	02452912	J R-KNOB	SF-A BLK/LCG	1
	02891889	9M/M ROTARY POT.	EVUFEKFK3B14 10KB CC	1
17	22485188	M R-KNOB	MF BLK	1
	02891878	9M/M ROTARY POT.	RK09D1130 10KB	1
18	22485188	M R-KNOB	MF BLK	2
	02891867	9M/M ROTARY POT.	RK0971110 11CLK D CUT	2
19	22485188	M R-KNOB	MF BLK	1
	02891812	12M/M ROTARY POT.	RK12L12C0C08	1
20	02239723	KNOB	LCG	11
	02239523	30M/M SLIDE POT.	EWAN1AC15B14	11
21	02239723	KNOB	LCG	6
	02891834	30M/M SLIDE POT.	EWAN13C15B14 W/CC	6
22	02239690	DISPLAY COVER		1
	01342534	LED	SL-9351S	1
23	13449284	6.5MM JACK	HLJ7001-01-3010	2
24	13449283	6.5MM JACK	HLJ7101-01-3010	2
25	13429825	MIDI Connector	YKF51-5054	1
26	22360712	CORD HOOK	236-712	1
27	13449720	DC JACK	HEC2305-01-250	1
28	01676512	PUSH SWITCH	SDKLA1-B	1
	12499175	G S-BUTTON	S1H BLK	1
29	01235378	FOOT		4

LOCATION OF CONTROLS

FRONT



REAR



EXPLODED VIEW PARTSLIST

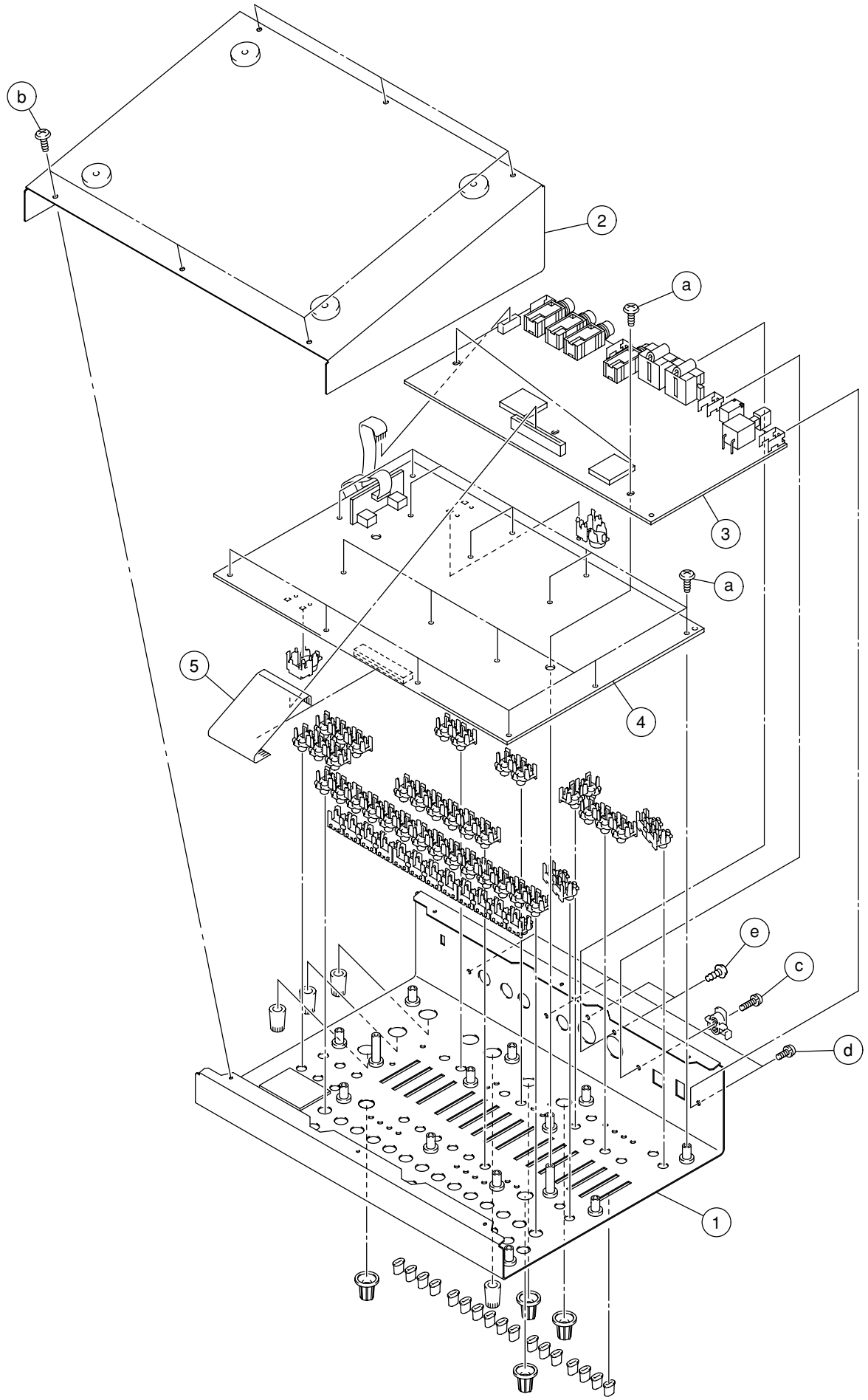
[Parts]

No.	Part Code	Part Name	Description	Q'ty
1	02891945	TOP PANEL		1
2	02239678	BOTTOM CHASSIS (EF-303)		1
3	71908590	MAIN BOARD ASSY		1
4	71908612	PANEL BOARD ASSY		1
5	02891934	BAN CARD BNCD-P=1.25-K-36-100		1

[Screw]

No.	Part Code	Part Name	Description	Q'ty
a	40011056	SCREW 3x6	BINDING TAPTITE B ZC	18
b	40011090	SCREW 3x6	BINDING TAPTITE B BZC	6
c	40340812	SCREW M3x10	PAN MACHINE W/SW BZC	1
d	40011490	SCREW M3x6	PAN MACHINE W/SW BZC	3
e	40011312	SCREW 3x8	BINDING TAPTITE P FE BZC	2

EXPLODE VIEW



PARTSLIST

SAFETY PRECAUTIONS:
The parts marked ⚠ 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)

MB -> MAIN BOARD ASSYÀCPB -> PANEL BOARD ASSY

					Q'ty
CASING					
	02239678	BOTTOM CHASSIS			1
KNOB, BUTTON					
	12499175	G S-BUTTON	S1H BLK 249-175		1
SWITCH					
	01676512	SDKLA1-B	PUSH SWITCH	SW2 on MB	1
	02891789	SKRGADD010 H=5.0	TACT SWITCH	SW4,SW13,SW12,SW11,SW10,SW9,SW8,SW7,SW34,SW5,SW14,SW3,SW2,SW33,SW31,SW6,SW24,SW29,SW28,SW54,SW30,SW35,SW26,SW25,SW15,SW23,SW22,SW21,SW20,SW19,SW18,SW17,SW16,SW27,SW1,SW52,SW55,SW36,SW53,SW32,SW51,SW50,SW49,SW48,SW47,SW45,SW44,SW43,SW42,SW41,SW40,SW39,SW38,SW37,SW46 on PB	55
JACK, EXT TERMINAL					
	13449284	HLJ7001-01-3010	6.5MM JACK	JK4,JK2 on MB	2
	13449283	HLJ7101-01-3010	6.5MM JACK	JK6,JK5 on MB	2
	13449720	HEC2305-01-250	DC JACK	JK3 on MB	1
	13429825	YKF51-5054 2PZ	MIDI CONNECTOR	JK1 on MB	1
DISPLAY UNIT					
	01342534	SL-9351S	LED 7 SEGMENT	LED72 on PB	1
	NOTE: Replacement SL-9351S should be made on a unit base.				
PCB ASSY					
#	71908590	MAIN BOARD ASSY			1
	NOTE: 'MAIN BOARD ASSY' includes the following parts.				
	22465224	HEATSINK	246-224	HS1 on MB	1
	12199584	GROUNDING TERMINAL	M1698	TER4,TER1,TER3,TER2 on MB	4
	40011501	SCREW M3x8	PAN MACHINE W/SW+PW BZC		1
#	71908601	PANEL ASSY			1
	NOTE: 'PANEL ASSY' includes the following parts.				
#	02891934	BAN CARD	BNCD-P=1.25-K-36-100	CN1 on MB to CN2 on PB	1
	22360712	CORD HOOK	236-712		1
	02239690	DISPLAY COVER			1
#	02450201	Y C-KEYTOP	MX4H CLR		6
	02239701	Y C-KEYTOP MX2H CLR			2
	01670478	F C-KEYTOP	SX3H CLR		3
	01780834	F C-KEYTOP	SX4H CLR		1
	01902734	F C-KEYTOP SX2H BLK			3
	01670489	F C-KEYTOP	SX2H CLR		3
	02239723	KNOB	LCG		17
	02452912	J R-KNOB	SF-A BLK/LCG		4
	22485188	M R-KNOB	248-188 MF BLK		4
#	02891945	TOP PANEL			1
	40011056	SCREW 3x6	BINDING TAPTITE B ZC		16
#	*******	PANEL BOARD ASSY			1
	NOTE: 'PANEL BOARD ASSY' includes the following parts.				
#	02891901	RIBBON CABLE	JWFV 4x70-P2.0	CN3 on PB to CN4 on PB	1
#	02891912	RIBBON CABLE	JWFV 6x90-P2.0	CN4 on MB to CN1 on PB	1
	02013090	F C-KEYTOP	MX1H CLR		2
IC					
#	02893689	HD6437016E24F V1.00	IC (32BIT CPU)	IC5 on MB	1
#	02677490	RA0C-003XP7TC203C180AF003	IC (CUSTOM)	IC17 on MB	1
	01342978	TC160G22AF-1253	IC (CUSTOM)	IC3 on MB	1
	02672378	UPD431000AGW-A10	IC (SRAM)	IC7 on MB	1

IC

	02343090	M11B416256A-35J(T)	IC (DRAM)	IC6 on MB	1
#	02784856	M11L416256SA-35T	IC (DRAM)	IC27 on MB	1
#	02893678	MX23L3210 TKO22 WAVE	IC (MASK ROM)	IC13 on MB	1
#	02676256	TC58FVB160FT-85	IC (FLASH MEMORY)	IC1 on MB	1
	15289714	UPD63200GS-E2	IC (D/A CONVERTER)	IC28 on MB	1
	01458401	TC74LVX4245FS(EL)	IC (TTL)	IC505,IC506 on MB	2
	01783589	HD74HC4052FPEL	IC (CMOS)	IC9,IC7,IC6 on PB	3
	02675667	HD74LV21ATELL	IC (CMOS)	IC501 on MB	1
	02675689	HD74LV245ATELL	IC (CMOS)	IC502,IC507,IC504,IC503 on MB	4
	15259823T0	TC74HC574AF(EL)	IC (CMOS)	IC4 on PB	1
	01783523	TC74VHCT245AFT(EL)	IC (CMOS)	IC508 on MB	1
	15249104	TC7S04F(TE85L)	IC (CMOS)	IC2 on MB	1
	15259884	TC7S08F(TE85L)	IC (CMOS)	IC20 on MB	1
	15259885	TC7S32F(TE85L)	IC (CMOS)	IC12 on MB	1
	01455301	TC7WH04FU(TE12L)	IC (CMOS)	IC509 on MB	1
	02234245	TC7WHU04FU(TE12L)	IC (CMOS)	IC24 on MB	1
	15259704H0	HD74HC138FPEL	IC (HS-CMOS)	IC3,IC1,IC2 on PB	3
	15289111	TL062CPS ELL2000	IC (OP AMP) JFET	IC10 on MB	1
#	02894301	HA17324ARPEL(FP-14DN)	IC (CMOS OP)	IC5,IC8 on PB	2
	15289105	UPC4570G2-E2	IC (BIPOLAR OP AMP)	IC29 on MB	1
	15189261	M5218AFP-600E	IC (BIPOLAR OP AMP)	IC30,IC26 on MB	2
	02014645	BA17805T	IC (REGULATOR)	IC16 on MB	1
	00458312	NJM2360M	IC (REGULATOR)	IC21 on MB	1
	00344390	TA7805F(TE16L)	IC (REGULATOR)	IC18 on MB	1
	01458445	UPC29M33T-T1	IC (REGULATOR)	IC14 on MB	1
	15199937	M51953BFP-600C	IC (RESET)	IC22 on MB	1
	15289125	PC-410KT 178FAY	IC (PHOTO COUPLER)	IC4 on MB	1

TRANSISTOR

	15309101	2SA1037AKT146R	TRANSISTOR	Q11 on MB	1
	01121278	2SA1576A T106 QRS	TRANSISTOR	Q5 on MB	1
	15319101	2SC2412KR T146	TRANSISTOR	Q13,Q12 on MB	2
	15329507	DTA114EKT146	DIGITAL TRANSISTOR	Q1 on MB	1
	15329511	DTC114TKT146	DIGITAL TRANSISTOR	Q2,Q3 on MB	2
	15329516	DTC114EKT146	DIGITAL TRANSISTOR	Q14 on MB	1
	15329521	RN1307(TE85R)	TRANSISTOR	Q6 on MB	1
	00679312	RN1402(TE85L)	TRANSISTOR	Q16,Q20,Q19,Q18,Q17,Q15,Q13,Q14 on PB	8
	15329536	RN1442-A(TE85L)	TRANSISTOR	Q8,Q9,Q10,Q7 on MB	4
	15119163	RN2227(TPE4)	TRANSISTOR	Q1,Q2,Q3,Q4,Q5,Q6,Q7,Q8,Q9,Q10,Q12,Q11 on PB	12

DIODE

	15039142	S5688G(TPB5) 1A/400V	RECTIFIER DIODE	D2 on MB	1
	01017512	RB411D T146	SCHOTTKY DIODE	D3 on MB	1
	01565678	RD5.1M-T2B	ZENER DIODE	D5 on MB	1
#	02784867	SLR-342DU-TG7	LED	LED66,LED65 on PB	2
	02239567	SLR-342VRT32	LED	LED36,LED4,LED16,LED43,LED24,LED23,LED22, LED21,LED20,LED15,LED14,LED13,LED12,LED8, LED7,LED5,LED45,LED71,LED6,LED53,LED54,LE D56,LED57,LED59,LED62,LED51,LED64 on PB	27
	02126912	SLR-342VR-TG7	LED	LED42,LED11,LED18,LED58,LED19,LED49,LED26 ,LED41,LED35,LED34,LED10,LED33,LED27,LED2 5,LED50,LED17,LED3,LED2,LED1,LED9 on PB	20
#	02894090	SLR-343DUT32	LED		22
	15339105	DAN202K T146 (CHIP)	DIODE ARRAY	DA27,DA26,DA25,DA24,DA21,DA22,DA10,DA1 ,DA2,DA3,DA4,DA5,DA6,DA7,DA23,DA9,DA20 ,DA11,DA12,DA13,DA14,DA15,DA16,DA17,DA 18,DA19,DA8 on PB	27
	01121334	DAN202U T106	DIODE ARRAY	DA6 on MB	1
	02233890	DCB010-TB	DIODE ARRAY	D1,D4 on MB	2
	15339138	DCC010-TB	DIODE ARRAY	DA501,DA1 on MB	2
	15339130	MA142WK-(TX)	DIODE ARRAY	DA5,DA4,DA3,DA2 on MB	4

RESISTOR

	15399952	MCR50JZH470 1/2W	CHIP RESISTOR	R80,R91 on MB	2
	01011856	RPC05T 0R0 J	MTL.FILM RESIST0R	L503,L504,L506,L507,L502,R508,L508,L509,R36,R 42,L505 on MB	11
	00566867	RPC05T 100 J	MTL.FILM RESISTOR	R13,R510,R512,R515,R45 on MB	5
	00567023	RPC05T 101 J	MTL.FILM RESISTOR	R107,R511,R100,R19,R15,R513,R8,R5,R17 on MB. R28,R36,R30,R38,R27,R201,R26,R25,R24,R23,R22, R21,R32,R34 on PB	9+ 14
	00567156	RPC05T 102 J	MTL.FILM RESISTOR	R63,R52,R66,R71,R115,R118,R501,R90,R79,R16 on MB	10
	00567289	RPC05T 103 J	MTL.FILM RESISTOR	R77,R105,R113,R98,R93,R72,R50,R49,R3,R46 on MB	10
	00567412	RPC05T 104 J	MTL.FILM RESISTOR	R82,R111,R110,R102,R92,R53,R101 on MB	7
	00567034	RPC05T 121 J	MTL.FILM RESISTOR	R4 on MB	1
	00566912	RPC05T 220 J	MTL.FILM RESISTOR	R9,R8,R7,R6,R5,R4,R3,R2 on PB	8
	00567067	RPC05T 221 J	MTL.FILM RESISTOR	R28,R1,R2 on MB. R16,R10,R11,R12,R13,R15,R17,R14 on PB	3+8
	00567190	RPC05T 222 J	MTL.FILM RESISTOR	R70 on MB	1
	00567323	RPC05T 223 J	MTL.FILM RESISTOR	R94,R103 on MB	2

RESISTOR

	00567078	RPC05T 271 J	MTL.FILM RESISTOR	R39 on MB	1
	00567201	RPC05T 272 J	MTL.FILM RESISTOR	R9 on MB	1
	00567089	RPC05T 331 J	MTL.FILM RESISTOR	R19,R20,R18 on PB	3
	00567212	RPC05T 332 J	MTL.FILM RESISTOR	R32 on MB	1
	00567345	RPC05T 333 J	MTL.FILM RESISTOR	R76,R87,R95,R104 on MB	4
	00566967	RPC05T 470 J	MTL.FILM RESISTOR	R43 on MB	1
	00567112	RPC05T 471 J	MTL.FILM RESISTOR	R54,R30,R44,R75,R59,R25,R37 on MB	7
	00567245	RPC05T 472 J	MTL.FILM RESISTOR	R74,R114 on MB	2
	00567378	RPC05T 473 J	MTL.FILM RESISTOR	R21,R112,R117,R119,R502 on MB	5
	00567501	RPC05T 474 J	MTL.FILM RESISTOR	R11,R6,R12,R10 on MB. R37,R35,R33,R31,R29,R39 on PB	4+6
	00567256	RPC05T 562 J	MTL.FILM RESISTOR	R109,R78,R89,R97 on MB	4
	00566990	RPC05T 680 J	MTL.FILM RESISTOR	R120,R514 on MB	2
	00567134	RPC05T 681 J	MTL.FILM RESISTOR	R99,R106 on MB	2
	00567267	RPC05T 682 J	MTL.FILM RESISTOR	R69,R64,R73 on MB	3
	00567278	RPC05T 822 J	MTL.FILM RESISTOR	R108,R96 on MB	2
	01011256	SR73K2ETD 0.47JOHM 1/2W	MTL.FILM RESISTOR	R67 on MB	1
	01457145	EXBE10C103J	RESISTOR ARRAY	RA13,RA1,RA501,RA502,RA2,RA8 on MB	6
#	02891701	RA4C1632-100-J	RESISTOR ARRAY	RA509,RA503,RA504,RA505,RA506,RA510,RA508,RA6,RA15,RA511,RA512,RA513,RA514,RA507,RA12,RA11,RA10,RA7,RA5,RA4,RA3,RA14,RA9 on MB	23
	02679290	RA4C1632-103-J	RESISTOR ARRAY	RA21,RA17,RA20,RA18,RA16 on MB	5

POTENTIOMETER

	01787545	EVUF2KFK3B14 10KB	9M/M ROTARY POTENTIOMETER	VR21,VR23,VR24 on PB	3
#	02891889	EVUFEKFK3B14 10KB CC	9M/M ROTARY POTENTIOMETER	VR25 on PB	1
#	02891867	RK0971110 11CLK D CUT	9M/M ROTARY POTENTIOMETER	VR20,VR19 on PB	2
#	02891878	RK09D1130 10KB	9M/M ROTARY POTENTIOMETER	VR22 on PB	1
#	02891812	RK12L12C0C08	12M/M ROTARY POTENTIOMETER	VR1 on PB	1
#	02891834	EWAN13C15B14 W/CC	30M/M SLIDE POTENTIOMETER	VR12,VR14,VR10,VR7,VR3,VR18 on PB	6
	02239523	EWAN1AC15B14	30M/M SLIDE POTENTIOMETER	VR9,VR16,VR15,VR11,VR8,VR6,VR5,VR2,VR4,VR17,VR13 on PB	11

CAPACITOR

	01674712	ECJ1VF1A105Z	CERAMIC CAPACITOR	C126,C159,C157,C53,C52,C51,C158 on MB. C29,C62,C61,C59,C60,C54,C58,C53,C31,C19 on PB	7+10
	01674167	ECUV1H100DCV	CERAMIC CAPACITOR	C142,C136,C150,C161,C134 on MB	5
	01674334	ECUV1H101JCV	CERAMIC CAPACITOR	C21,C166,C73,C79,C82,C139,C156,C67 on MB	8
	01674189	ECUV1H120JCV	CERAMIC CAPACITOR	C135 on MB	1
	01674223	ECUV1H270JCV	CERAMIC CAPACITOR	C76,C77 on MB	2
	00567823	GRM39B102K50PT	CERAMIC CAPACITOR	C29,C34,C33,C32,C30,C47,C31,C35,C149,C140,C38,C37,C48,C45,C46,C131,C36,C44,C43,C42,C40,C39,C41 on MB	23
	00567945	GRM39B103K50PT	CERAMIC CAPACITOR	C58,C61,C62,C60,C90,C59,C57,C27 on MB. C51,C71,C57,C32,C13,C68 on PB	8+6
	01675323	GRM39CH271J50PT	CERAMIC CAPACITOR	C130 on MB	1
	01675367	GRM39CH471J50PT	CERAMIC CAPACITOR	C68 on MB	1
	00567978	GRM39F104Z25PT	CERAMIC CAPACITOR	C112,C115,C103,C508,C503,C107,C505,C506,C114,C507,C113,C509,C110,C111,C502,C106,C104,C504,C109,C183,C194,C181,C192,C191,C190,C189,C188,C187,C186,C117,C184,C195,C182,C180,C18,C178,C176,C173,C171,C160,C146,C141,C124,C120,C185,C319,C116,C522,C519,C517,C516,C511,C510,C501,C322,C193,C320,C196,C318,C317,C316,C315,C310,C309,C307,C306,C304,C303,C302,C197,C321,C19,C92,C85,C71,C66,C56,C28,C26,C23,C22,C94,C119,C17,C16,C15,C14,C13,C11,C10,C9,C8,C7,C6,C5,C3,C20,C2,C101,C99,C98,C96,C102 on MB. C45,C14,C11,C50,C48,C41,C46,C44,C49,C43,C10,C8,C7,C5,C4,C1,C47,C66,C34,C33,C102,C70,C69,C52,C36,C37,C38,C39,C35,C67,C65,C64,C63,C56,C55,C42,C40 on PB	103+37
	13629624S0	6SC10M+T (OS) 6.3V10	CHEMICAL CAPACITOR	C132 on MB	1
	01900823	RA2-16V100M-T2	CHEMICAL CAPACITOR	C164,C55,C78,C97,C152,C175,C100 on MB	7
	01900834	RA2-16V101M-T2	CHEMICAL CAPACITOR	C170,C118,C122,C123,C138,C143 on MB	6
	02014923	RA2-35V470MT2	CHEMICAL CAPACITOR	C153,C154,C163,C165 on MB	4
	01902590	RA2-6V101MC-T2	CHEMICAL CAPACITOR	C12,C4,C93,C24,C520,C54,C1,C518,C179,C127,C523,C521 on MB	12
#	02891767	RC2-16V100M-T2	CHEMICAL CAPACITOR	C12 on PB	1
#	02891745	RC2-16V101M-T2	CHEMICAL CAPACITOR	C101,C6 on PB	2
#	02891756	RC2-6V331M-T2	CHEMICAL CAPACITOR	C9 on PB	1
	02781423	RC3-6V101M-T2	CHEMICAL CAPACITOR	C3,C2 on PB	2
	02784812	RE3-16V102M-T2	CHEMICAL CAPACITOR	C108 on MB	1
#	02891667	RE3-6V102M-T2	CHEMICAL CAPACITOR	C105 on MB	1
#	02891678	RE3-6V331M-T2	CHEMICAL CAPACITOR	C133 on MB	1
	02239601	AMZV0050J101 0200	POLYEST. CAPACITOR	C162,C151 on MB	2
	00239434	AMZV0050J182 0200	POLYEST. CAPACITOR	C169,C155 on MB	2

INDUCTOR, COIL, FILTER

	01346089	SBC3-331-551	CHOKE COIL	L26,L25 on MB	2
	01565612	DSS310-93D223S50	EMI FILTER	FL1 on MB	1

INDUCTOR, COIL, FILTER

	01783601	BLM21B601SPT	FERRITE-BEAD	L30,L501,L33,L32,L1,L2,L31,L27,L6,L5,L4,L29,L28,L3 on MB	14
	01340834	EXCML20A390	FERRITE-BEAD	L24 on MB	1
	01787056	N1608Z102T01	FERRITE-BEAD	L11,L18,L23,L22,L21,L9,L19,L17,L16,L15,L14,L13,L12,L10,L7,L20,L8 on MB	17

CRYSTAL, RESONATOR

	01126267	MA-406 7.056MHZ	CRYSTAL	X1 on MB	1
	02561323	MA-406 33.8688MHZ TE24	CRYSTAL	X2 on MB	1

CONNECTOR

	13429293	51048-0400(4P)	CABLE HOLDER	CN4,CN3 on PB	2
	13429295	51048-0600(6P)	CABLE HOLDER	CN1 on PB	1
#	02891734	52044-3645	CONNECTOR	CN2 on PB	1
	01788878	52045-3645	CONNECTOR	CN1 on MB	1
	13369601	52147-0610(6P)	WIRE TRAP	CN4 on MB	1

SCREW

	40011056	SCREW 3x6	BINDING TAPTITE B ZC		2
	40011090	SCREW 3x6	BINDING TAPTITE B BZC		6
	40011490	SCREW M3x6	PAN MACHINE W/SW BZC		3
	40011312	SCREW 3x8	BINDING TAPTITE P BZC		2
	40340812	SCREW M3x10	PAN MACHINE W/SW BZC		1

PACKING

	02239789	ADAPTOR PAD			1
#	02897256	OUTER PACKING CASE		for PACKING CASE	1
#	02891978	PACKING CASE			1
	02239756	PAD L			1
	02239778	PAD R			1

MISCELLANEOUS

	02567267	BATRY HOLDER	BCR20H4	BT1 on MB	1
	01235378	FOOT			4
	02567234	LITHIUM BATTERY	CR2032		1

ACCESSORIES (STANDARD)

#	71908578	OWNER'S MANUAL SET	JAPANESE		1
#	71908945	OWNER'S MANUAL SET	ENGLISH		1
⚠	00905756	AC ADAPTOR	ACI-100C		1
⚠	00905767	AC ADAPTOR	ACI-120C		1
⚠	01018312	AC ADAPTOR	ACI-230C		1
⚠	01901578	AC ADAPTOR WITHOUT AC CORD	PSB-1U UNIVERSAL		1
⚠	01903356	AC CORD SET	230V 1.0M FOR PSB		1
⚠	01903367	AC CORD SET	240V 1.0M FOR PSB		1
⚠	00905234	EURO CONVERTER PLUG	ECP01-5A (PLUG for 230 VE)		1
	40232334	WARRANTY CARD	MOCHIKOMI JAPAN ONLY		1

IDENTIFYING VERSION NUMBER

NOTE

After Version Number checking is completed, you must execute "RESTORING THE FACTORY SETTINGS".
Since this operation resets the user data, be sure to backup the data before executing factory reset.
For details, refer to the section covering "SAVING USER DATA & RELOADING SAVED DATA".

1. Power on the unit while pressing down the [LEGATO] and [EXIT] buttons.
2. The version number appears after “roland SH-32” is displayed.
3. Press the [PREVIEW] buttons to check the checksum.
   “---” appears and calculation starts.
4. Several seconds later, “CPU” is displayed, indicating that display scrolling is enabled.
   Check results are displayed in the “CPU X.XX XXXX FLASH X.XX XXXX” format as shown below. Press the [+OCT] button to scroll down, and the [-OCT] button to scroll up.
5. The CPU’s version number, its checksum, the version number of the program (stored in the flash memory) and its checksum are displayed, in this order.
6. Confirm the data and power off the unit.
   Whenever an Version Number checking is performed, a "RESTORING THE FACTORY SETTINGS" must be performed.

SAVING USER DATA & RELOADING SAVED DATA

Recording All SH-32 Data into External Sequencer

Connect MIDI OUT of the SH-32 and MIDI IN of the MC-80 with a MIDI cable beforehand.

Operating procedure

1. Rotate the [FX/SYSTEM] knob to set it to “SYSTEM.”
2. Press the [8/R(BULK DUMP)] button and “ALL” is displayed.
3. Start real-time recording on the external MIDI sequencer.
4. Press the [WRITE] button of the SH-32.
   “tnS” appears and bulk data are transmitted from MIDI OUT.
   After data transmission is completed, “OK” appears, then “ALL” is displayed again.
5. Stop recording on the external MIDI sequencer.
   The bulk data are transmitted with the device ID number set for “Device ID.”

Transferring All SH-32 Data from MIDI Sequencer Back to the SH-32

Follow the steps below to transfer the saved bulk data back into the SH-32.
Connect MIDI IN of the SH-32 and MIDI OUT of the external sequencer with a MIDI cable beforehand.

Operating procedure

1. Send the bulk data from the external sequencer.
   * *This operation requires no additional settings on the SH-32.*
2. This procedure is completed when the external sequencer completes data transmission.

RESTORING THE FACTORY SETTINGS

Operating procedure

1. Power on the unit while pressing down the [1/A(TUNE)] button.
2. “ALL” appears after “roland SH-32” is displayed.
3. Press the [WRITE] button to start Factory Reset with “bSY” displayed.
4. Factory Reset is completed when “End” is displayed.
   Power off the unit.

PROCEDURE FOR UPDATING THE SOFTWARE

Overview:

The SH-32 uses a 16-Mbit flash memory for its programs.
The update data in the flash memory (the control program) are stored in the update data block of the flash memory.
The update data are normally supplied divided into multiple SMF files.
To update the program version, connect a sequencer supporting SMF data playback (such as an MC-80) to the SH-32 and load the data into the latter.

NOTE

Updating the system requires Factory Reset to be performed.
You should make a backup of the user data beforehand since they are reset when Factory Reset is performed.
Refer to "How to Save and Load Data" for details.

Required items

- A MIDI sequencer which can playback SMF data (such as an MC-80)
- A MIDI cable
- Updating data (in SMF format): two 2HD diskettes (P/No.17041127)

The respective diskettes contain the files listed below:
Note: The filenames stay the same after version update.

SH-32 Update Disk #1(1/2)

PRG4MC_1.SVC (chained files for the MC-80)
PRG4XP_1.SVC (chained files for the XP-50, 60 and 80)
PRG00001.MID
PRG00002.MID
PRG00003.MID
PRG00004.MID
PRG00005.MID
PRG00006.MID
PRG00007.MID
PRG00008.MID
PRG00009.MID
PRG00010.MID

SH-32 Update Disk #2(2/2)

PRG4MC_2.SVC (chained files for the MC-80)
PRG4XP_2.SVC (chained files for the XP-50, 60 and 80)
PRG00011.MID
PRG00012.MID
PRG00013.MID
PRG00014.MID
PRG00015.MID
PRG00016.MID
PRG00017.MID
PRG00018.MID
PRG00019.MID

Updating Procedure

Updating the program

Operating procedure

1. Plug in the power cord of each unit to be used and check that the power can be turned on.
2. As required, check the version of the SH-32 before updating.
3. Connect MIDI OUT of the sequencer and MIDI IN of the SH-32 with a MIDI cable.
4. Turn on the unit's power while pressing down the [ANALOG FEEL], [LEVEL] and [VALUE DOWN] buttons.
5. When "y-n" is displayed, press the [VALUE DOWN] button and check that "rdy" is displayed, indicating that the system is ready.
6. Load the update SMF data from the sequencer.
   Play back the 19 files, PRG00001.MID through PRG00019.MID, sequentially.

Panel operation during updating

While loading the data, self-illuminating switches associated with the respective files blink and "rCv" is displayed.
For each loaded, "brn" appears and data are written.
Those self-illuminating switches associated with files already written stay lit.
When writing of all the files is completed, "End" is displayed.
Loading one SMF file takes about 60 seconds.

After completing updating, perform Factory Reset and check the version number as well as the checksum.

Updating with chained files

If any of the following sequencer models is available for playing back SMF files, you can use the chain-play feature to perform updating more efficiently by automatically playing back files in the respective disks.

MC-80 or XP-50/60/80

Use the chained files contained in the respective disks that are relevant to the specific model used.
These SMF files are prepared so that they can be chain-played.
For the operating instructions, see the Owner's Manual for the relevant model.

TEST MODE

Required items

- MIDI Cable
- Foot Switch (BOSS FS-5U x 2 or equivalent)
- Foot Switch connection cable (PCS-31 or equivalent)
- Monitor Speaker

NOTE

After Version Number checking is completed, you must execute "RESTORING THE FACTORY SETTINGS".

Since this operation resets the user data, be sure to backup the data before executing factory reset.

For details, refer to the section covering "SAVING USER DATA & RELOADING SAVED DATA".

How to Activate the Test Mode

1. Connect a monitor speaker to OUTPUT.
2. Connect a foot switch to the FOOT SWITCH jack via a foot switch cable.
3. Power on the unit while pressing down the [LEGATO] and [EXIT[EFX] buttons.
   The test mode program will start, displaying its version number.

How to Exit the Test Mode

Power off the unit.

Whenever an Testmode is performed, a "RESTORING THE FACTORY SETTINGS" must be performed.

For details, refer to the section covering "SAVING USER DATA & RELOADING SAVED DATA".

Test Items

The following eight items will be tested.

1. VERSION TEST: Checks the version.
2. DEVICE TEST: Checks if each memory device operates correctly.
3. MIDI TEST: Checks the MIDI connection.
4. SWITCH / LED TEST: Checks operations of the switches and LEDs.
5. VOLUME 1 TEST: Checks operations of the sliding and rotary volume controls.
6. VOLUME 2 TEST: Checks operations of the parameter setting volume control.
7. DEVICE TEST: Checks output sounds.
8. EFFECT TEST: Checks effect sounds.

Basic Test Mode Operation

1. The following shows the basic operations of the controllers.

[EXIT] + [1(TIE)]:	Performs VERSION TEST.
[EXIT] + [3(TO TOP)]:	Performs DEVICE TEST.
[EXIT] + [4(BACK)]:	Performs MIDI TEST.
[EXIT] + [1/A(TUNE)]:	Performs SWITCH / LED TEST.
[EXIT] + [2/B(LOCAL)]:	Performs VOLUME 1 TEST.
[EXIT] + [3/C(REMOTE)]:	Performs VOLUME 2 TEST.
[EXIT] + [4/D(FOOT SW)]:	Performs SOUND TEST.
[EXIT] + [5(CLOCK)]:	Performs EFFECT TEST.

Proceeding with the Test Mode

1. VERSION TEST
   Entering the test mode automatically starts VERSION TEST.
   VERSION TEST is completed when the version number is displayed.
   Press the [EXIT] and [1(TIE)] buttons to perform VERSION TEST again.

2. DEVICE TEST
   After VERSION TEST is completed, press the [EXIT] and [3(TO TOP)] buttons to start DEVICE TEST.
   DEVICE TEST takes about 30 seconds.
   When this test item has been ended normally, the program automatically proceeds to the next one.

   Abnormal termination displays an error message.
   Er1: CPU ROM
   Er2: CPU RAM
   Er3: FLASH ROM
   Er4: DRAM
   Er5: SRAM
   Er6: BATTERY
   Er7: WAVE ROM
   Er8: DSP INTERNAL RAM
   Er9: DSP EXTERNAL RAM

   * *Press the [EXIT] and [1(TIE)] buttons perform DEVICE TEST again.*

3. MIDI TEST
   Prior to MIDI TEST, do not connect anything to MIDI IN or MIDI OUT.
   When DEVICE TEST is completed, the program automatically enters MIDI TEST.
   * *Press the [EXIT] and [4(BACK)] buttons to perform MIDI TEST again.*
   Upon entering MIDI TEST, “MIdA” appears, followed by “---”.
   When MIDI IN and MIDI OUT are connected with a MIDI cable, “OOO” appears.
   When the open condition (with “---” displayed) and the short-circuited condition (with “OOO”
   displayed) are detected, the program automatically proceeds to the next test item.
   * *Press the [EXIT] and [4(BACK)] buttons to perform MIDI TEST again.*

4. SWITCH / LED TEST
   Connect a foot switch before entering SWITCH / LED TEST.
   Completing MIDI TEST automatically starts SWITCH / LED TEST, displaying “S_L”.
   Check that all of the LEDs are lit up.
   Press the [TAP] button to turn off its self-illuminating LED.
   Then check that eight-segment LED display entirely lights up.
   Press all the other switches including the foot switch to turn off all the associated LEDs.
   When all the switches are pressed, the program automatically proceeds to the next test item.
   * *Press the [EXIT] and [1/A(TUNE)] buttons to perform SWITCH / LED TEST again.*

5. VOLUME 1 TEST

When SWITCH / LED TEST is completed, the program automatically enters VOLUME 1 TEST.

Entering VOLUME 1 TEST automatically turns on the LEDs for the respective volume controls.

Operating a volume control displays a numerical value between 0 and 127.

Check that the LED in the PREVIEW column lights up at the minimum value (0), the maximum value (127) and the median (64).

Detecting the minimum or maximum value (0 or 127) of each volume control causes the associated LED to go off.

When all the LEDs have gone off, the program automatically proceeds to the next test item.

* *Press the [EXIT] and [2/B(LOCAL)] buttons to perform VOLUME 1 TEST again.*

6. VOLUME 2 TEST

When VOLUME 1 TEST is completed, the program automatically enters VOLUME 2 TEST.

Rotating the parameter setting volume controls (with an 11-point click), the LED associated with the relevant position comes on.

When checking of all the volume controls (two) is completed, the program automatically proceeds to the next test item.

* *Press the [EXIT] and [3/C(REMOTE)] buttons to perform VOLUME 2 TEST again.*

7. SOUND TEST

When VOLUME 2 TEST is completed, the program automatically enters SOUND TEST.

The [ON] button on the left-hand side of the display allows you to switch the output setting to the L channel only, to the R channel only, and to both L and R channels, in this order.

Proceed to the next test item after completing the output sound check.(The program does not proceed to the next automatically.)

* *Press the [EXIT] and [4/D(FOOT SW)] buttons to perform SOUND TEST again.*

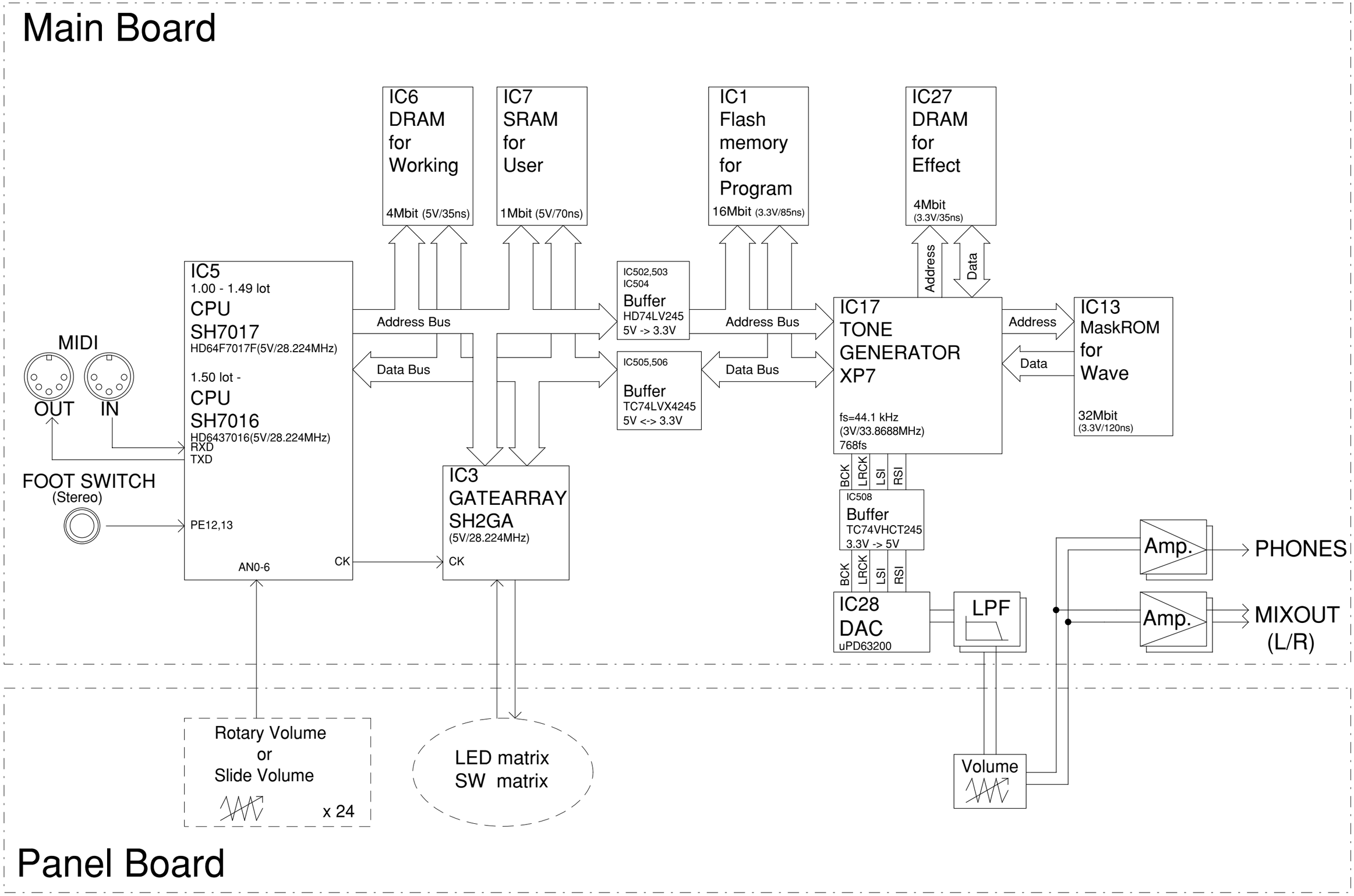
8. EFFECT TEST

Each time the [ON] button on the left-hand side of the display is pressed, an effect sound is output.

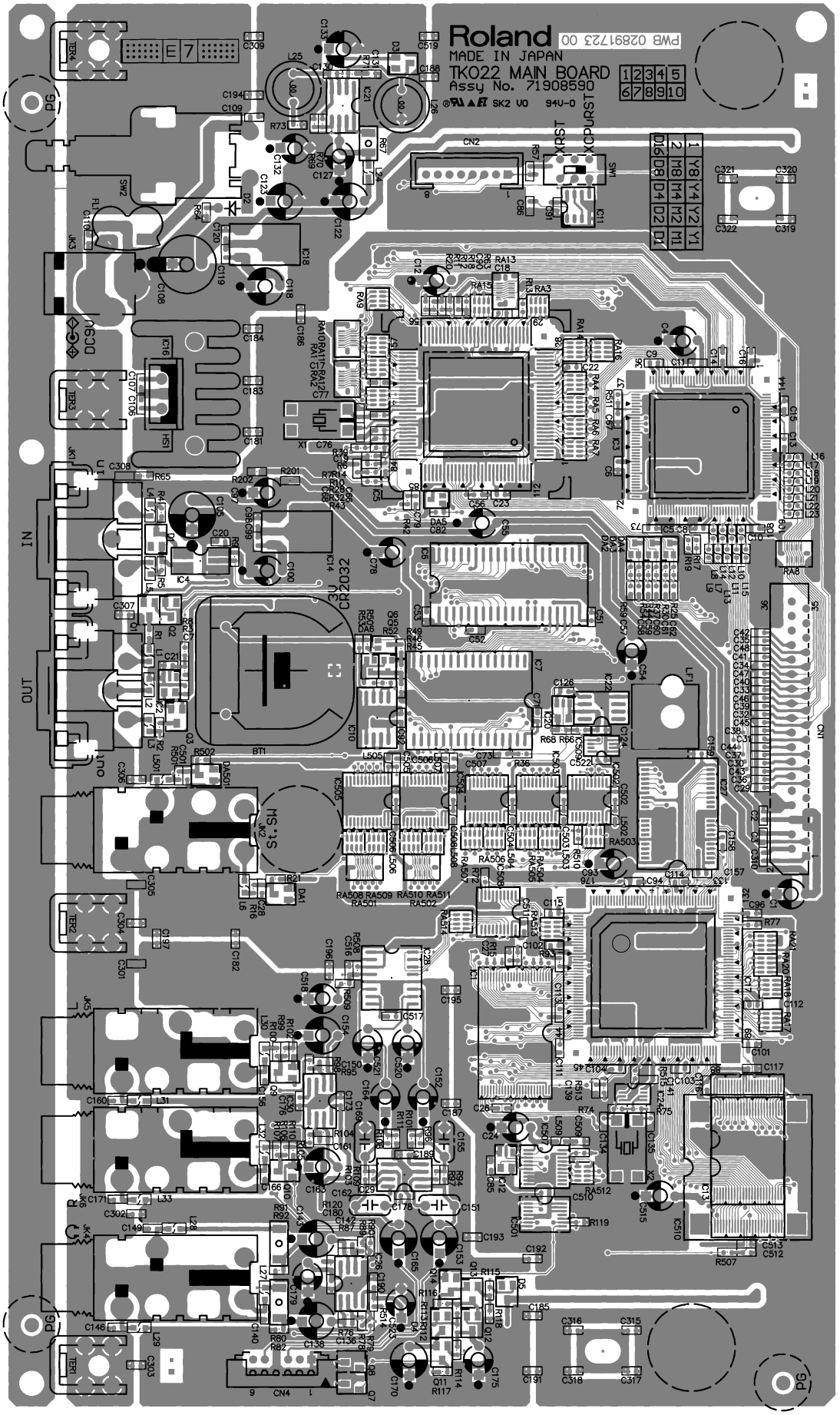
Check that delay sounds are output.

* *Press the [EXIT] and 5(CLOCK)] buttons to perform EFFECT TEST again.*

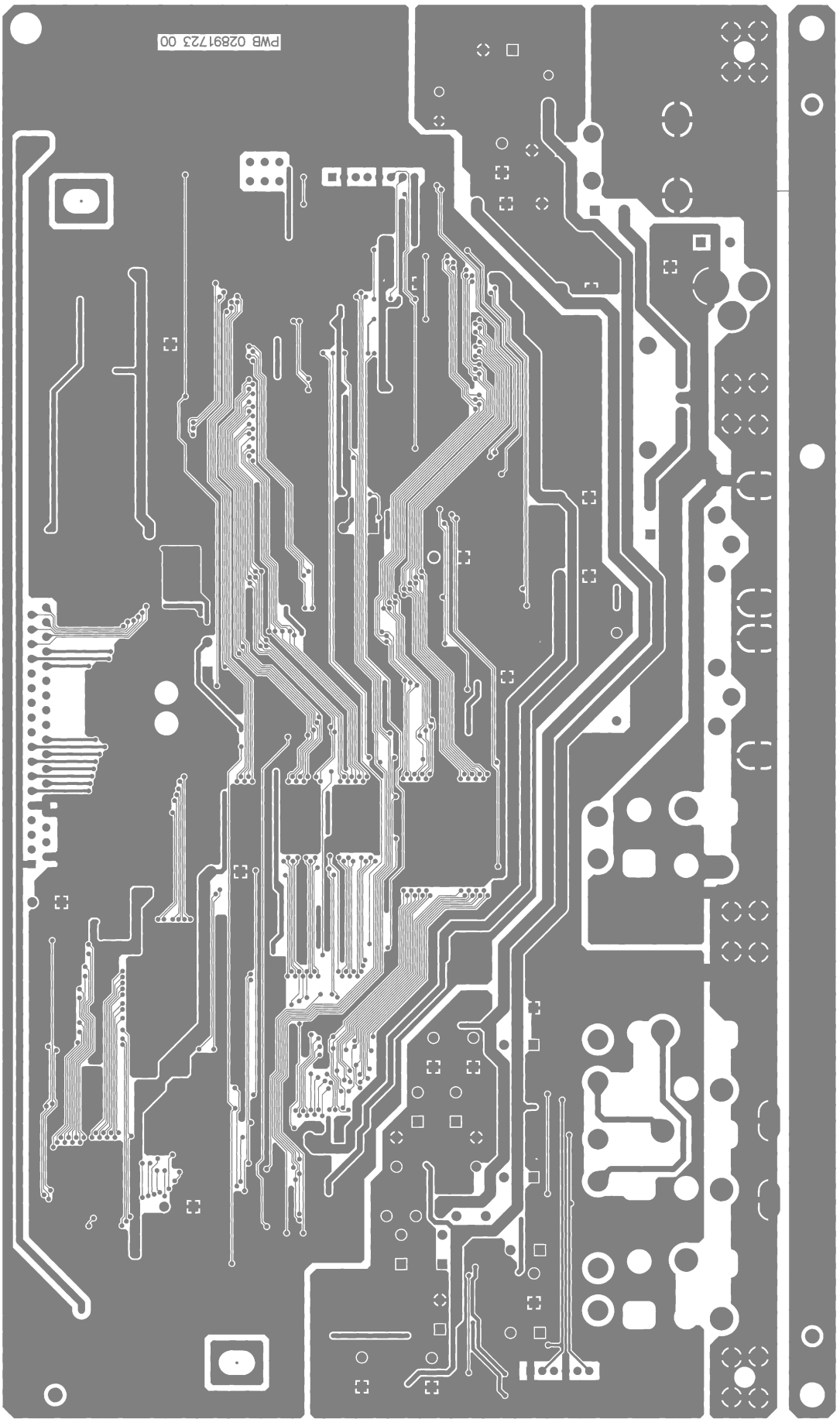
BLOCK DIAGRAM



CIRCUIT BOARD (MAIN)

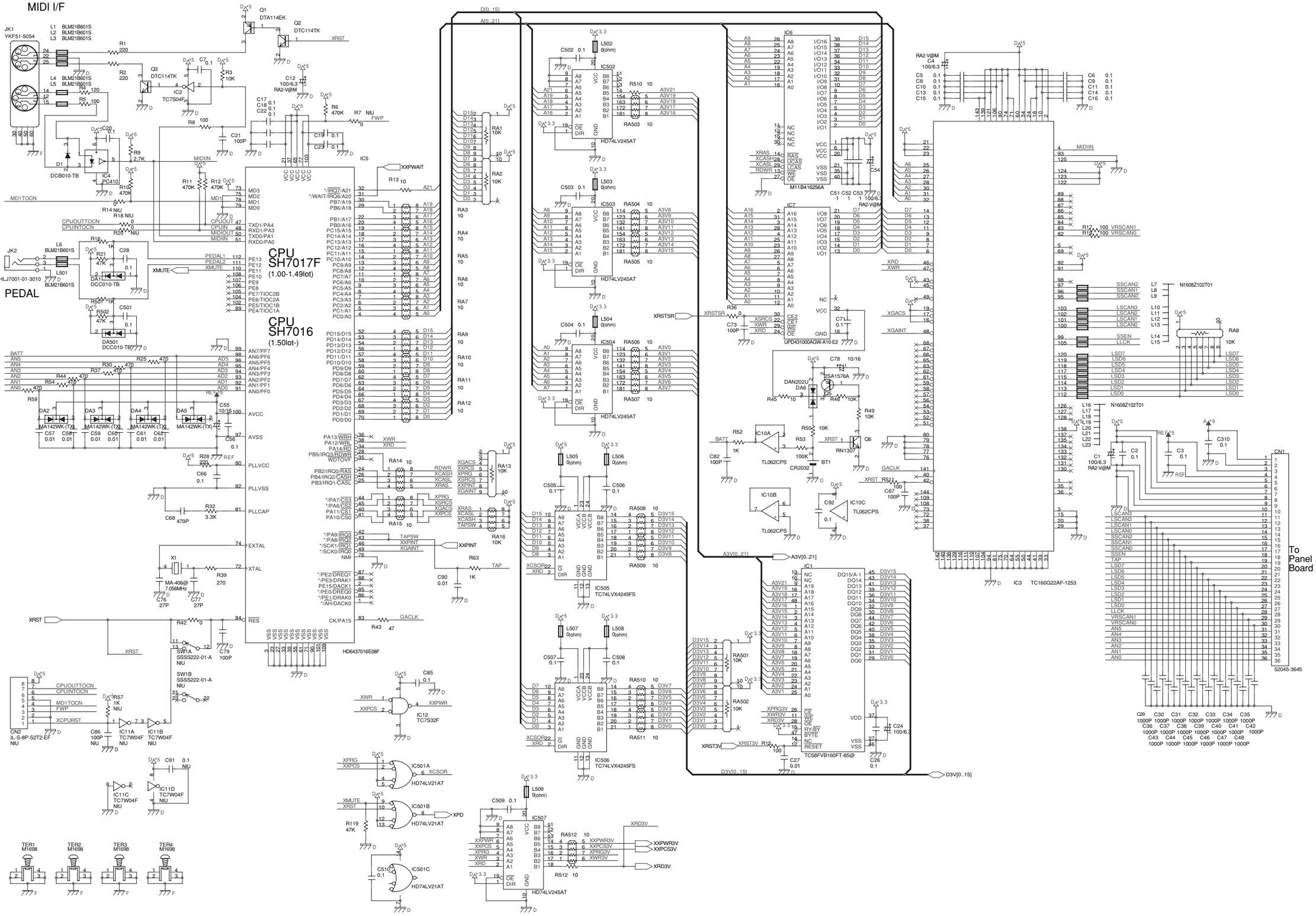


View form components side

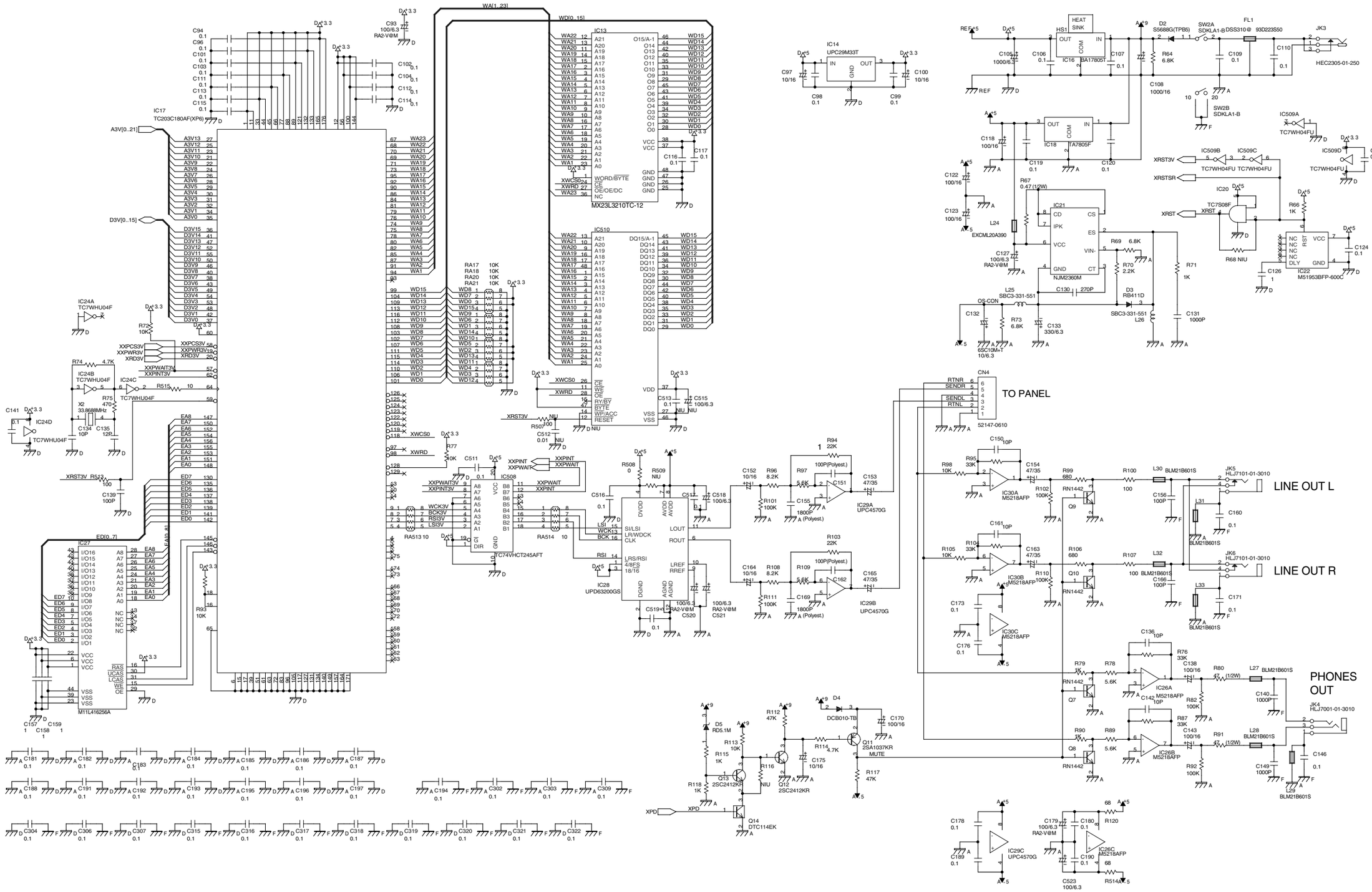


View form foil side

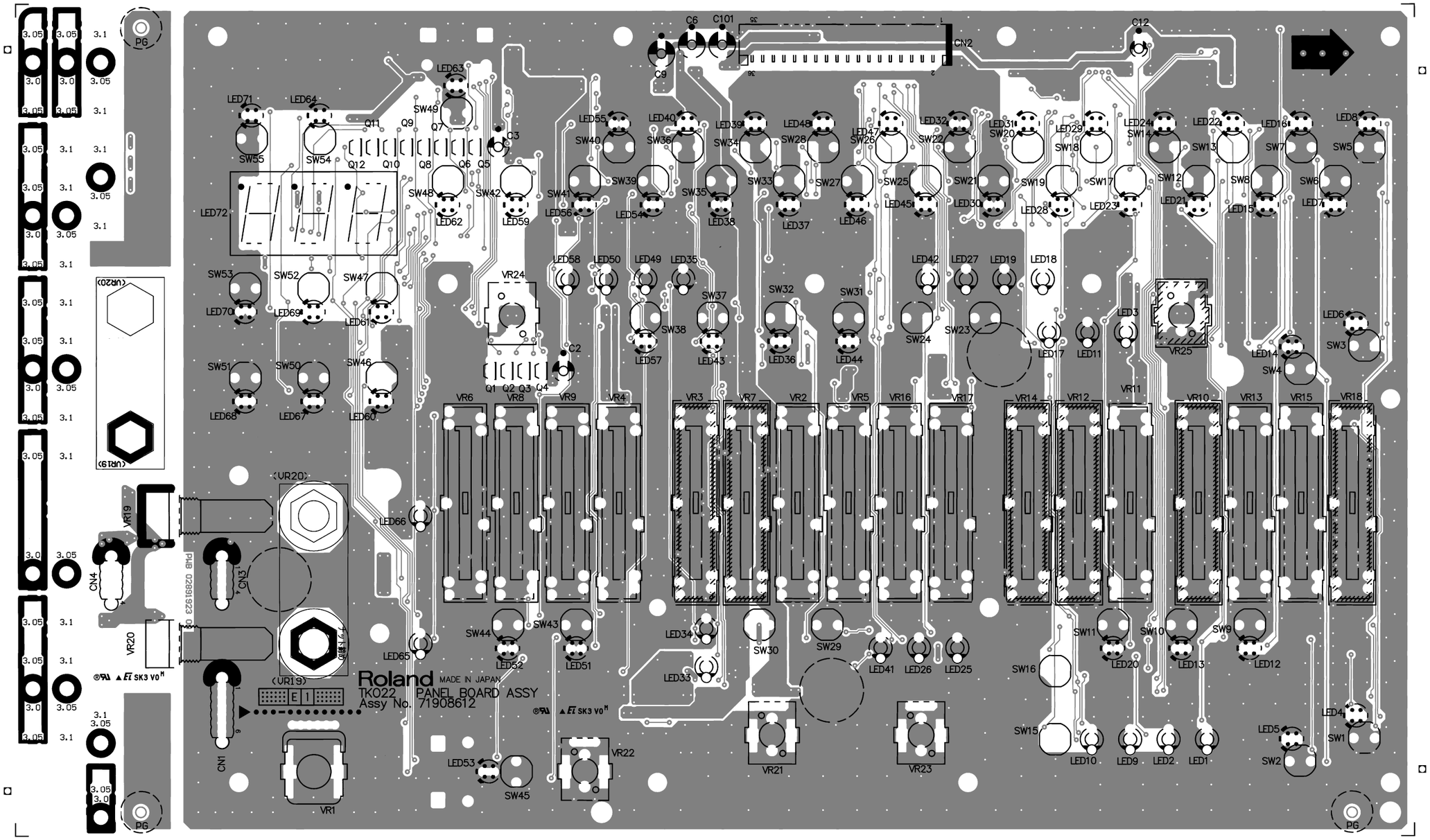
CIRCUIT DIAGRAM (MAIN 1/2)



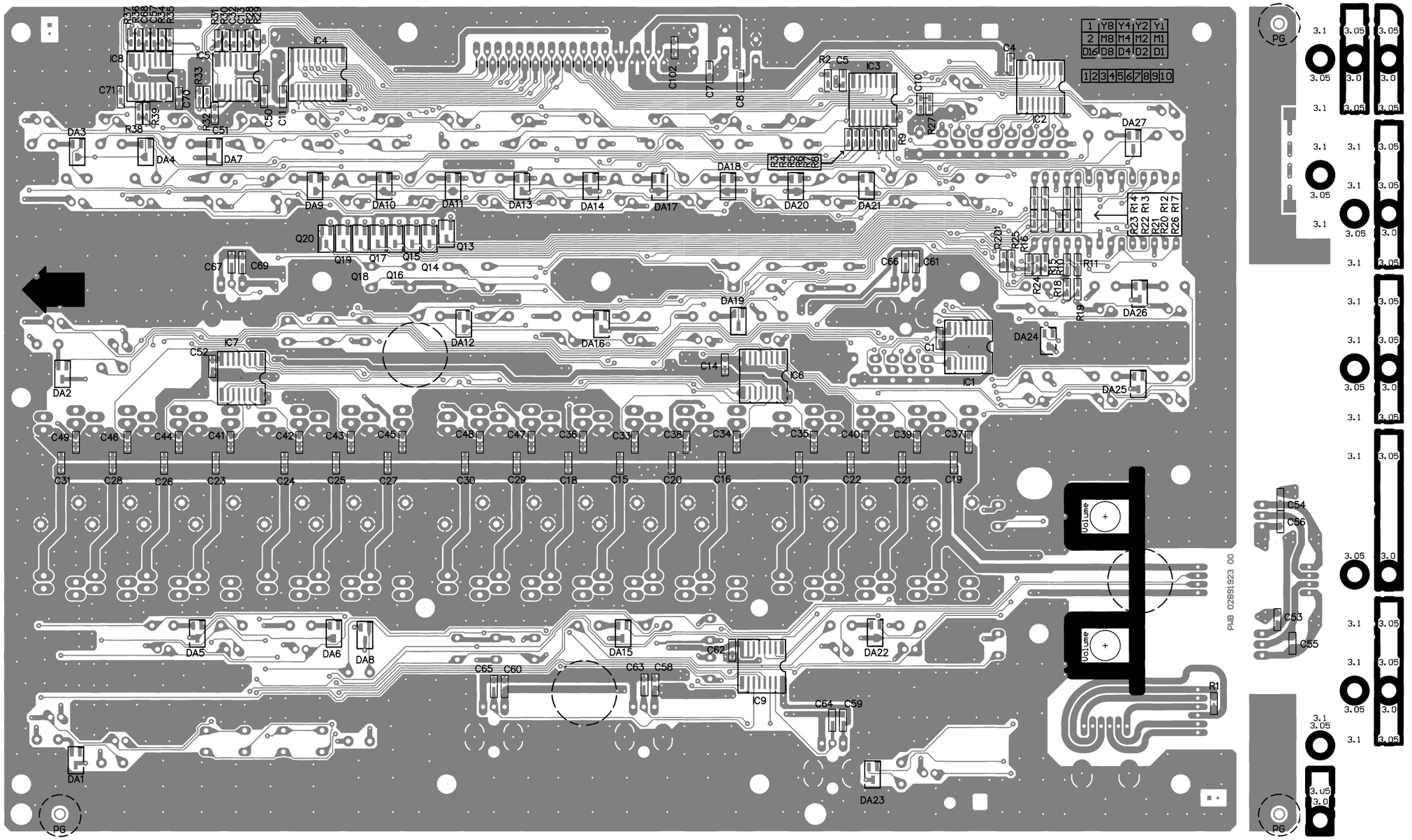
CIRCUIT DIAGRAM (MAIN 2/2)



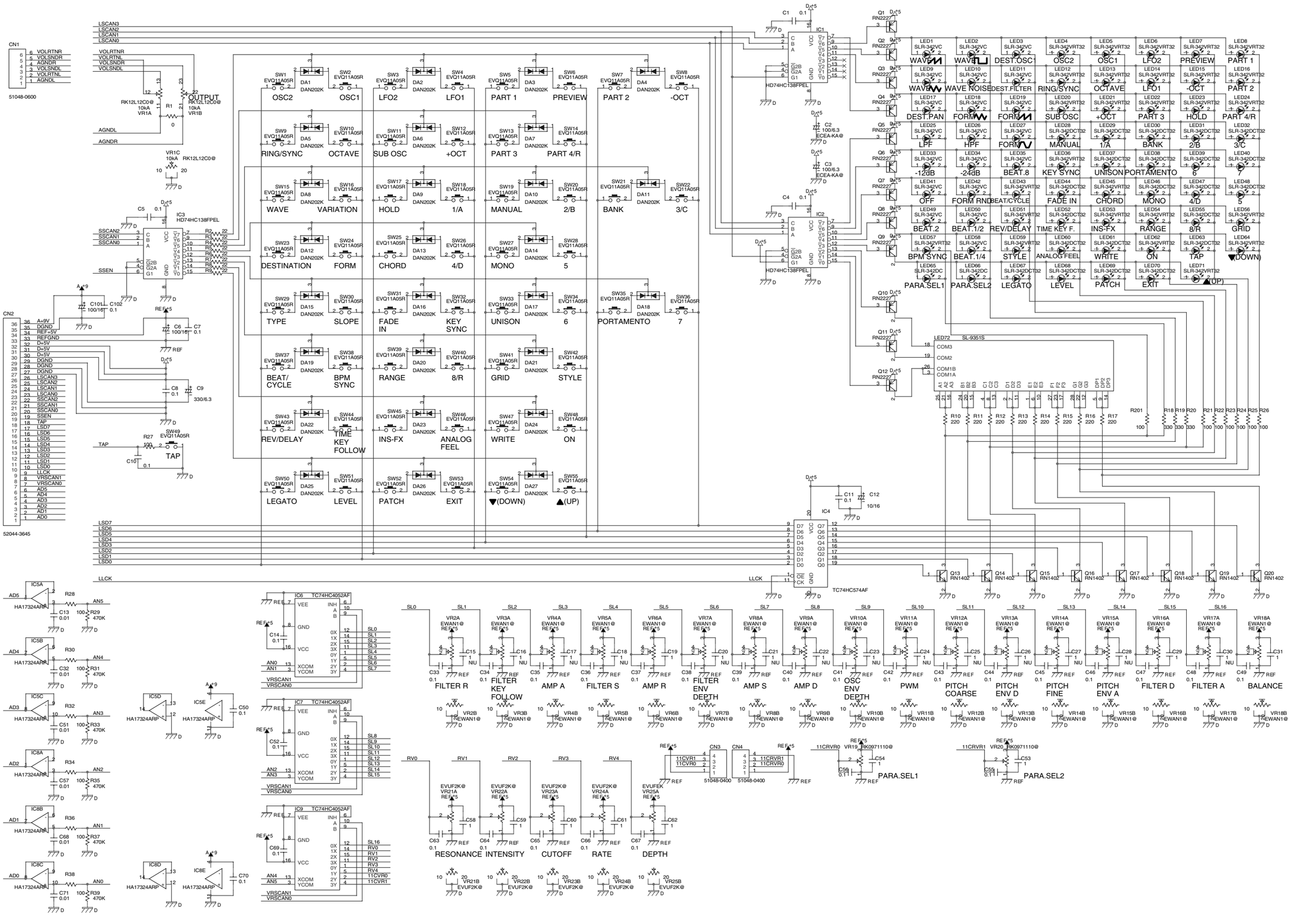
CIRCUIT BOARD (PANEL)



CIRCUIT BOARD (PANEL)



CIRCUIT DIAGRAM (PANEL)



ERROR MESSAGES

b.Lo : Battery Low

Cause: The life of the backup battery in a SH-32(The battery for keeping the data of a user memory.).

Action: Please exchange batteries.

E.Md : MIDI Comunication Error

Cause: It is possible that a MIDI cable has been pulled out or has a short.

Action: Check the MIDI cables.

E.AS : MIDI Active Sence Error

Cause: It is possible that a MIDI cable has been pulled out or has a short.

Action: Check the MIDI cables.

E.FL : MIDI Buffer Full Error

Cause: Too much MIDI data was reveived by the SH-32 all at once, so it could not be correctly processed.

Action: Make sure that excessive amounts of MIDI data are not transmitted all at once.

E.rc : MIDI Receive Data Error

Cause: The received Exclusive message is incorrect.

Action: Check the data which was transmitted to the SH-32, and transmit it once again.

Also make sure that the MIDI cable is not broken.

E.cS : MIDI Check Sum Error

Cause: The check sum of the received Exclusive message is incorrect.

Action: Check the data which was transmitted to the SH-32, and transmit it once again.