MUSIC SYNTHESIZER

S03

SERVICE MANUAL

CONTENTS

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YAMAHA

HAMAMATSU, JAPAN

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IMPORTANT NOTICE

This manual has been provided for the use of authorized Yamaha Retailers and their service personnel. It has been assumed that basic service procedures inherent to the industry, and more specifically Yamaha Products, are already known and understood by the users, and have therefore not been restated.

WARNING : Failure to follow appropriate service and safety procedures when servicing this product may result in personal injury, destruction of expensive components and failure of the product to perform as specified. For these reasons, we advise all Yamaha product owners that all service required should be performed by an authorized Yamaha Retailer or the appointed service representative.

IMPORTANT : This presentation or sale of this manual to any individual or firm does not constitute authorization certification, recognition of any applicable technical capabilities, or establish a principal-agent relationship of any form.

The data provided is belived to be accurate and applicable to the unit(s) indicated on the cover. The research engineering, and service departments of Yamaha are continually striving to improve Yamaha products. Modifications are, therefore, inevitable and changes in specification are subject to change without notice or obligation to retrofit. Should any discrepancy appear to exist, please contact the distributor's Service Division.

WARNING : Static discharges can destroy expensive components. Discharge any static electricity your body may have accumulated by grounding yourself to the ground bus in the unit (heavy gauge black wires connect to this bus.)

IMPORTANT : Turn the unit OFF during disassembly and parts replacement. Recheck all work before you apply power to the unit.

LITHIUM BATTERY HANDLING

This product uses a lithium battery for memory back-up.

WARNING : Lithium batteries are dangerous because they can be exploded by improper handling. Observe the following precautions when handling or replacing lithium batteries.

- Leave lithium battery replacement to qualified service personnel.
- Always replace with batteries of the same type.
- When installing on the PC board by soldering, solder using the connection terminals provided on the battery cells.
- Never solder directly to the cells. Perform the soldering as quickly as possible.
- Never reverse the battery polarities when installing.
  Do not short the batteries.
- Do not attempt to recharge these batteries.
- Do not disasemble the batteries.
- Never heat batteries or throw them into fire.

ADVARSEL!
Lithiumbatteri-Eksplosionsfare ved fejlagtig handtering. Udskiftning ma kun ske med batteri af samme fabrikat og type. lever det brugte batteri tilbage til leverandren.

VARNING
Explosionsfara vid felaktigt batteribyte.
Anvand samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren.
Kassera anvant batteri enligt fabrikantens instruktion.

VAROITUS
Paristo voi rajahtaa, jos se on virheellisesti asennettu.
Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin.
Havita kaytetty paristo valmistajan ohjeiden mukaisesti.

The following information complies with Dutch official Gazette 1995. 45; ESSENTIALS OF ORDER ON THE COLLECTION OF BATTERIES.

- Please refer to the diassembly procedure for the removal of Back-up Battery.
- Leest u voor het verwijderen van de backup batterij deze beschrijving.

WARNING: CHEMICAL CONTENT NOTICE!

The solder used in the production of this product contains LEAD. In addition, other electrical/electronic and/or plastic (Where applicable) components may also contain traces of chemicals found by the California Health and Welfare Agency (and possibly other entities) to cause cancer and/or birth defects or other reproductive harm.

DO NOT PLACE SOLDER, ELECTRICAL/ELECTRONIC OR PLASTIC COMPONENTS IN YOUR MOUTH FOR ANY REASON WHAT SO EVER!

Avoid prolonged, unprotected contact between solder and your skin! When soldering, do not inhale solder fumes or expose eyes to solder/flux vapor!

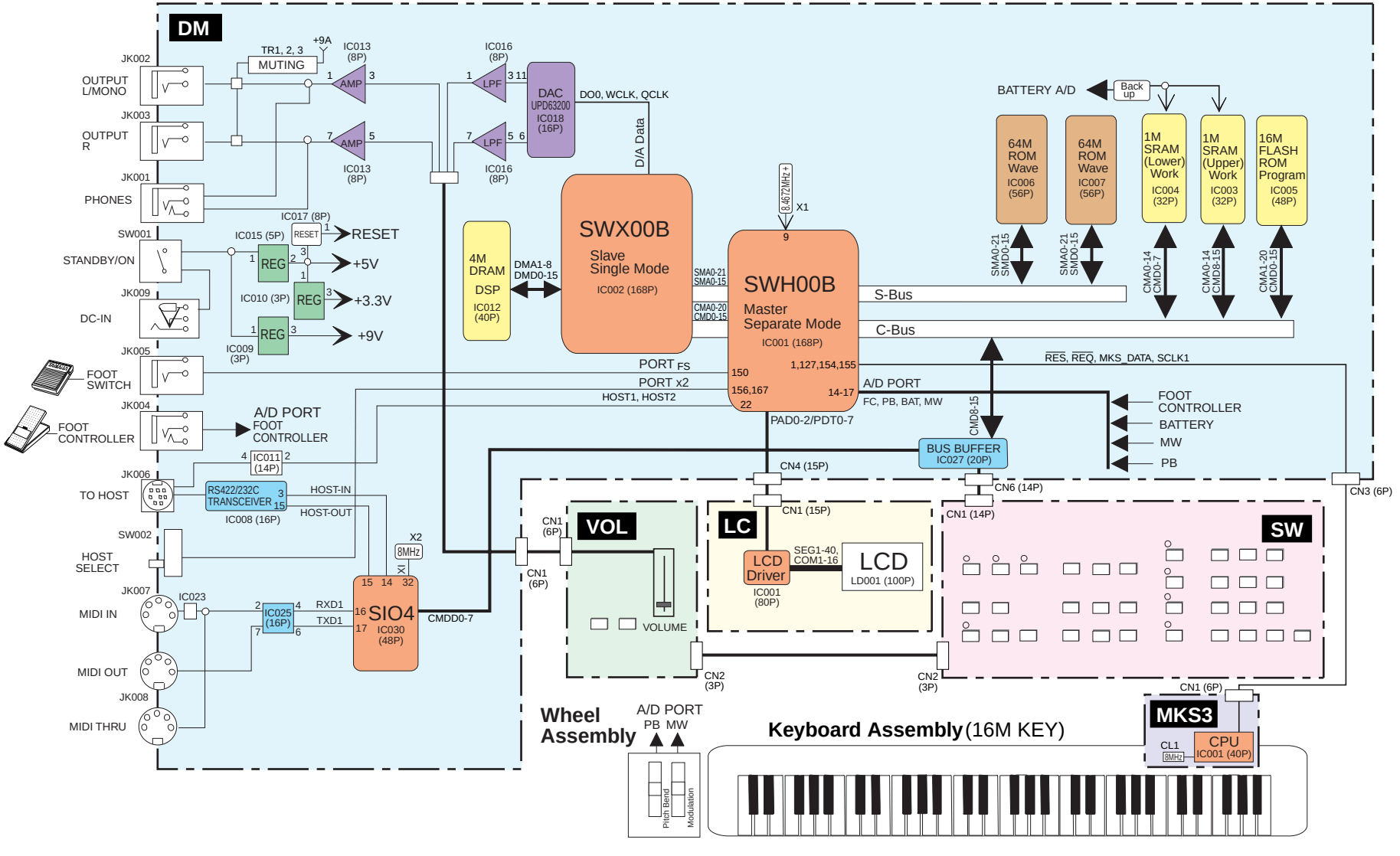
If you come in contact with solder or components located inside the enclosure of this product, wash your hands before handling food.

WARNING

Components having special characteristics are marked ⚠ and must be replaced with parts having specification equal to those originally installed.

SPECIFICATIONS

KEYBOARD	61 keys with Initial Touch		
TONE GENERATOR	AWM2		
POLYPHONY	64 notes		
MULTI TIMBRE	16		
VOICE	Normal Voice	Preset	128
		User	128
		XG	480
	Drum Voice	User	2
		XG	20 (including 8 Original Voices)
MULTI		User	32
EFFECT	Reverb		11
	Chorus		11
	Variation		42
CONTROLS	STANDBY/ON, HOST SELECT, VOLUME, Pitch Bend, Modulation, MULTI, VOICE, DEMO, UTILITY, MIDI, EDIT/COMPARE, JOB, STORE, EXIT, ◀ / ▶ , ▲ / ▼, PART (ELEMENT/KEY) –/+, MUTE, OCTAVE UP/ DOWN, INC/YES, DEC/NO, PRESET, USER, XG/GM, CATEGORY SEARCH, Numeric Keypad, ENTER		
CONNECTORS & TERMINALS	PHONES (Stereo Phone), OUTPUT (Phone): L (MONO)/R, DC IN, FOOT CONTROLLER, FOOT SWITCH, TO HOST, MIDI IN/OUT/THRU		
DISPLAY	LCD (Back Lit)		
POWER SUPPLY	Yamaha AC adaptor PA-3B (included)		
POWER CONSUMPTION	7W (120V), 8W (230V)		
MAXIMUM OUTPUT LEVEL	OUTPUT: +9 ±2dbm (10k ohms), PHONES: +0 ±2dbm (33 ohms)		
DIMENSIONS	976 (W) x 285 (D) x 87 (H) mm		
WEIGHT	6kg		



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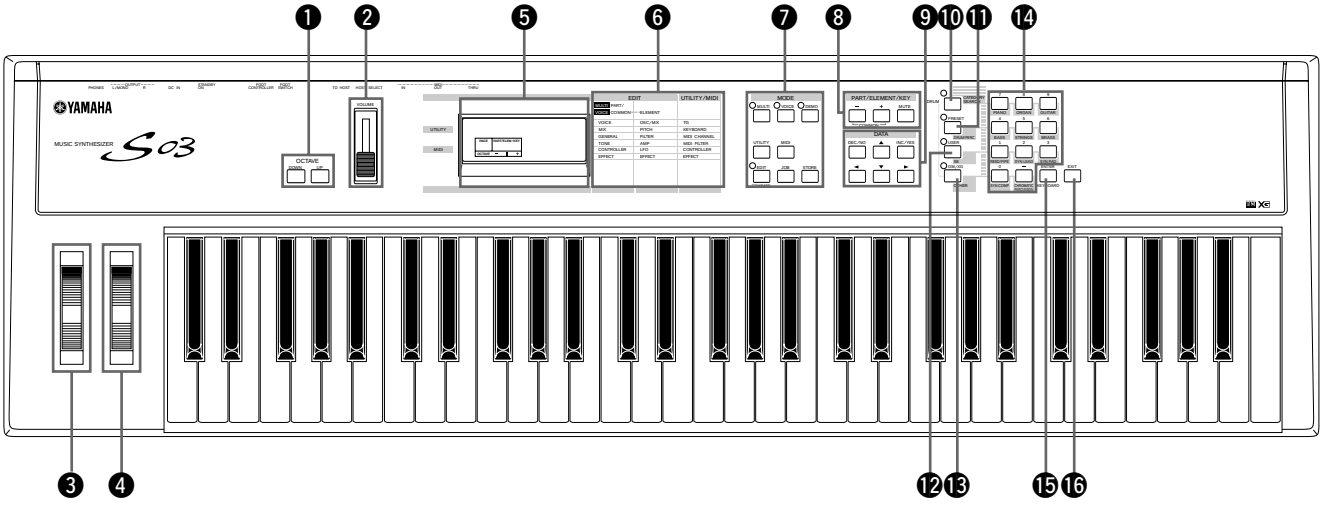
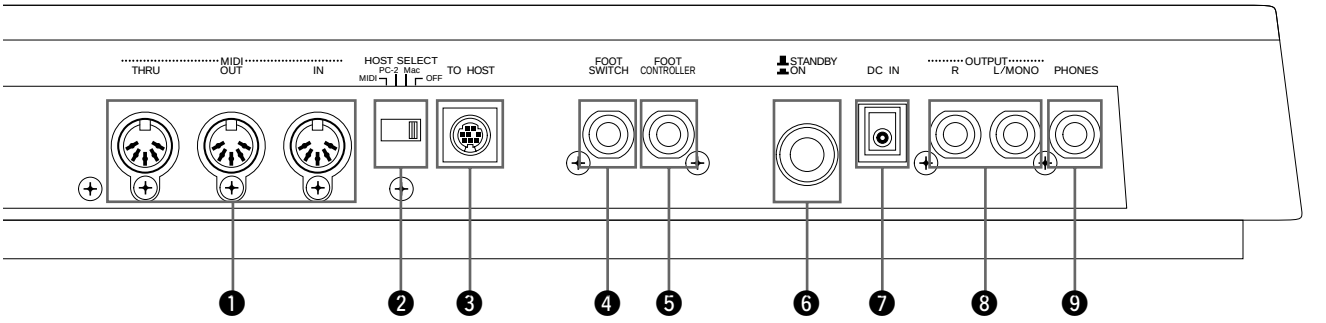
■ PANEL LAYOUT

• Front Panel



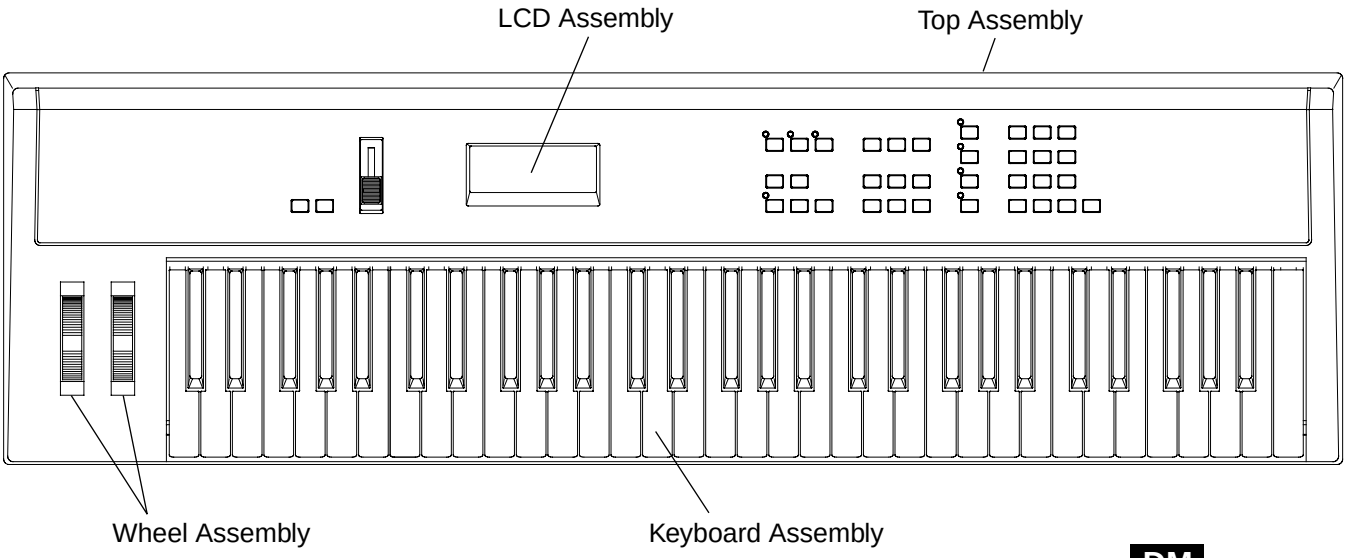
❶ **OCTAVE [UP] and [DOWN] buttons**
❷ **[VOLUME] slider**
❸ **PITCH BEND wheel**
❹ **MODULATION wheel**
❺ **LCD**
❻ **Parameter Type List**
❼ **MODE buttons**
([MULTI], [VOICE], [DEMO], [UTILITY], [MIDI], [EDIT/(COMPARE)], [JOB], [STORE])
❽ **[PART/ELEMENT/KEY] buttons**
([+], [–], [MUTE])
❾ **DATA buttons**
([DEC/NO], [INC/YES], [▲] / [▼], [◄] / [►])
❿ **[CATEGORY SEARCH/DRUM] button**
⓫ **[PRESET/(DRUM/PERC)] button**
⓬ **[USER/(SE)] button**
⓭ **[GM/XG/(OTHER)] button**
⓮ **Numeric keypad**
⓯ **[ENTER/KEYBOARD] button**
⓰ **[EXIT] button**

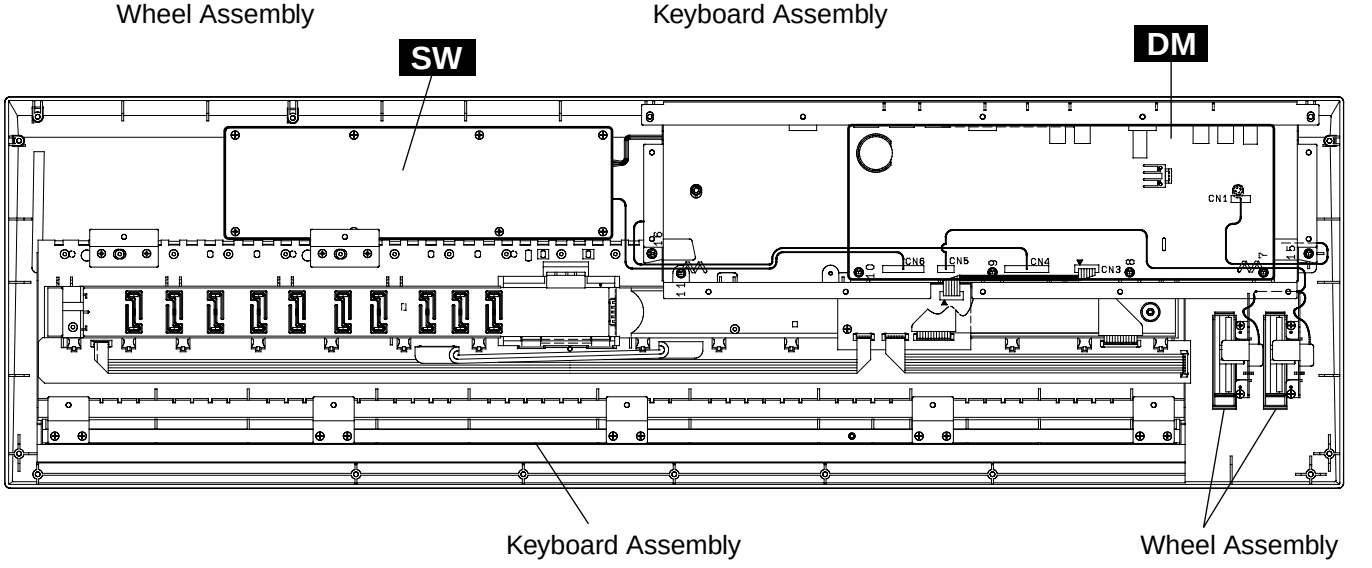
• Rear Panel

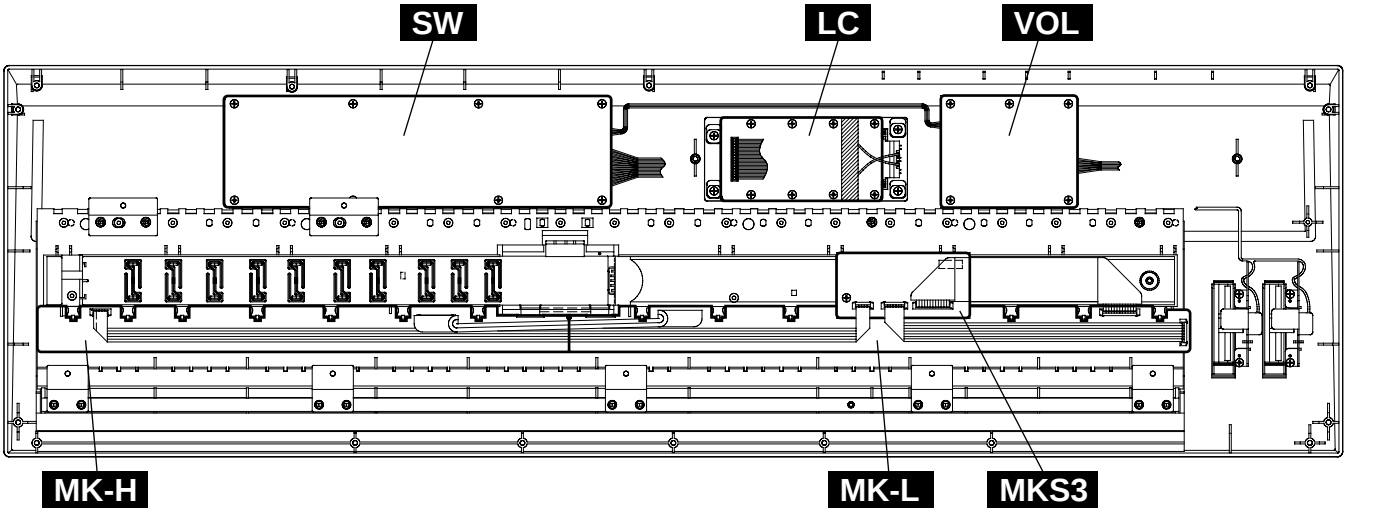


❶ MIDI IN/OUT/THRU terminals
❷ HOST SELECT switch
❸ TO HOST terminal
❹ FOOT SWITCH jack
❺ FOOT CONTROLLER jack
❻ STANDBY/ON switch
❼ DC IN terminal
❽ OUTPUT L/MONO and R jacks
❾ PHONES jack

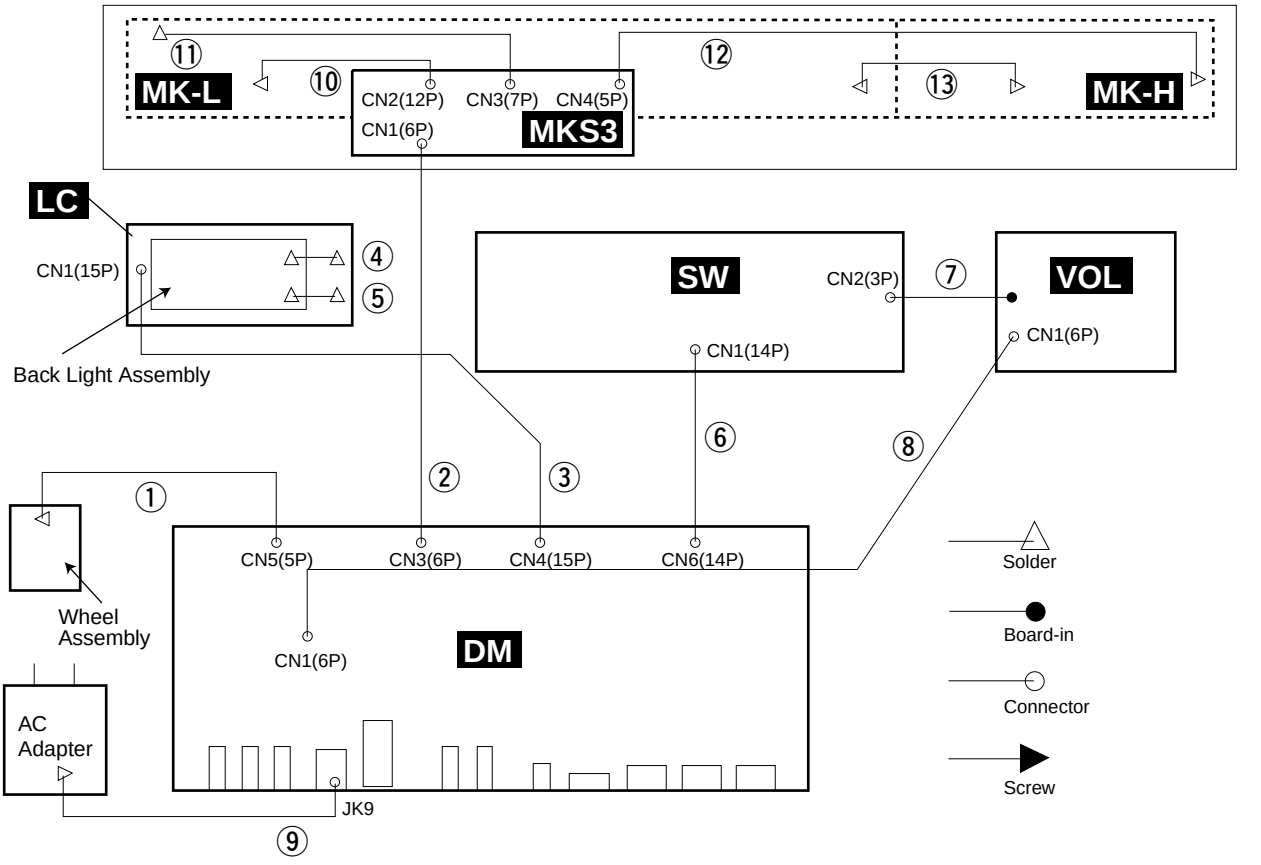
CIRCUIT BOARD LAYOUT







WIRING



Location	Parts List REF NO.	Part No.	Connector Assembly	Destination		Remarks	Availability
①	W80	(VU55440)	WHEEL	Wheel Assembly	DM-CN5	5P-300L,110L	
②	110	(V361090)	JUMPER WIRE	MKS3-CN1	DM-CN3	6P-110L	
③	L70	(VK11170)	KRD-KRD	LC-CN1	DM-CN4	15P-450L	
④	L80	(V675990)	A (+)	LC	Back Light Assembly	1P-45L	
⑤	L90	(V676000)	B (-)	LC	Back Light Assembly	1P-45L	
⑥	S90	(VK10900)	KRD-KRD	SW-CN1	DM-CN6	14P-350L	
⑦	CN002	(V675250)	KR-DS	VOL-CN2	SW-CN2	3P-260L	
⑧	60c	(V668970)	KR-KR	VOL-CN1	DM-CN1	6P-320L	
⑨		VT368600	AC ADAPTER	AC Adapter	DM-JK9	Japanese	○
		VT368700				U.S.A	
		VT368800				European	
⑩	S4	VV583100	MK-A	MK-L	MKS3-CN2	12P-300L	○
⑪	S6	VV583500	MK-C	MK-L	MKS3-CN3	7P-260L	○
⑫	S7	VV583700	MK-D	MK-H	MKS3-CN4	5P-640L	○
⑬	S5	VV583600	MK-B	MK-H	MK-L	12P-230L	○

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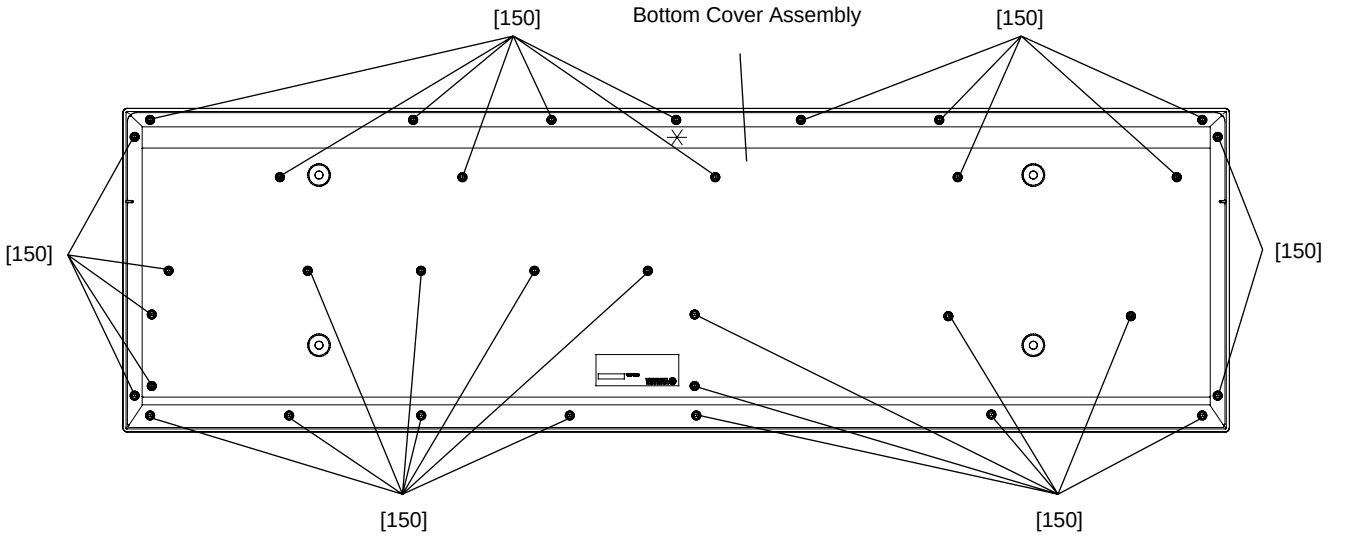
DISASSEMBLY PROCEDURE

1. Bottom Cover Assembly (Time required: About 10 min.)

1-1 Remove the thirty-four (34) screws marked [150]. The bottom cover assembly can then be removed. (Fig.1)



[150]: Bind Head Tapping Screw-B 4.0X8 MFZN2BL (EG340190)

Fig.1

2. DM Circuit Board (Time required: About 15 minutes)

2-1 Remove the bottom cover assembly. (See procedure 1.)

2-2 Remove the seven (7) screws marked [90A] and the six (6) screws marked [90B]. The DM circuit board can then be removed. (Fig.2, 3)

3. Replacing the Lithium Battery (Time required: About 10 min.)

3-1 Remove the bottom cover assembly. (See procedure 1.)

3-2 You can replace the lithium battery from the DM circuit board. (Fig.3)

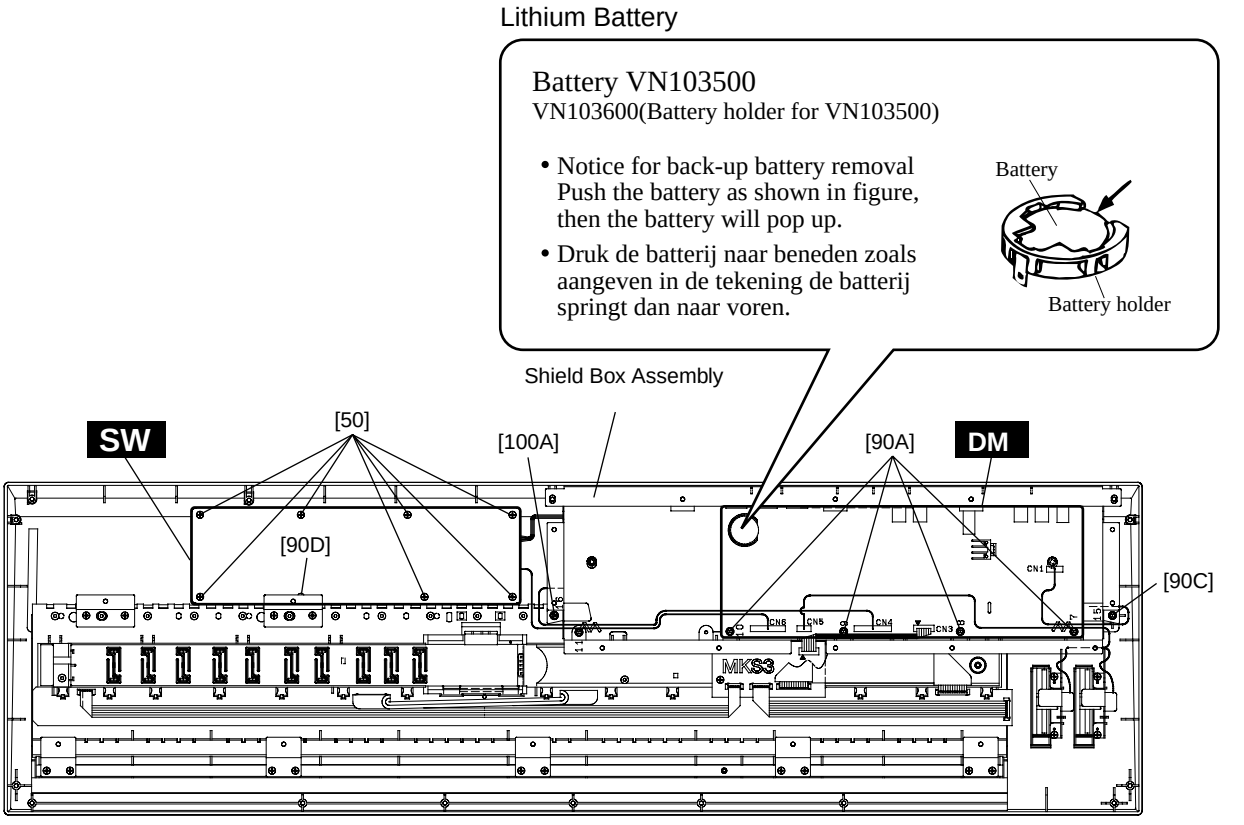
* The lithium battery is not part of the DM circuit board. When you replace the DM circuit board, you should remove the lithium battery from the board, and install in the holder on the new circuit board.

4. SW Circuit Board (Time required: About 15 minutes)

4-1 Remove the bottom cover assembly. (See procedure 1.)

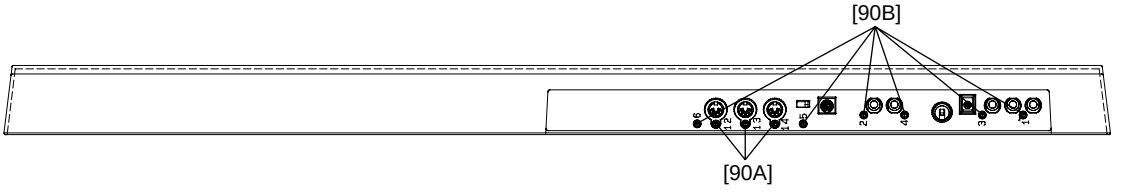
4-2 Remove the seven (7) screws marked [50] and the screw marked [90D]. The SW circuit board can then be removed. (Fig.2)

4-3 Pull out the function buttons from the SW circuit board.



[50]:	Bind Head Tapping Screw-B	3.0X8 MFZN2BL (EP600190)
[90]:	Bind Head Tapping Screw-B	3.0X8 MFZN2BL (EP600190)
[150]:	Bind Head Tapping Screw-B	3.0X20 MFZN2BL (VJ999700)

Fig.2



[90]:	Bind Head Tapping Screw-B	3.0X8 MFZN2BL (EP600190)

Fig.3

5. VOL Circuit Board, LC Circuit Board and Back Light Assembly (Time required: About 15 minutes each)

5-1 Remove the bottom cover assembly. (See procedure 1.)

5-2 Remove the six (6) screws marked [90B], the screw marked [90C] and the screw marked [100A]. The shield box assembly can then be removed with the DM circuit board. (Fig.2, 3)

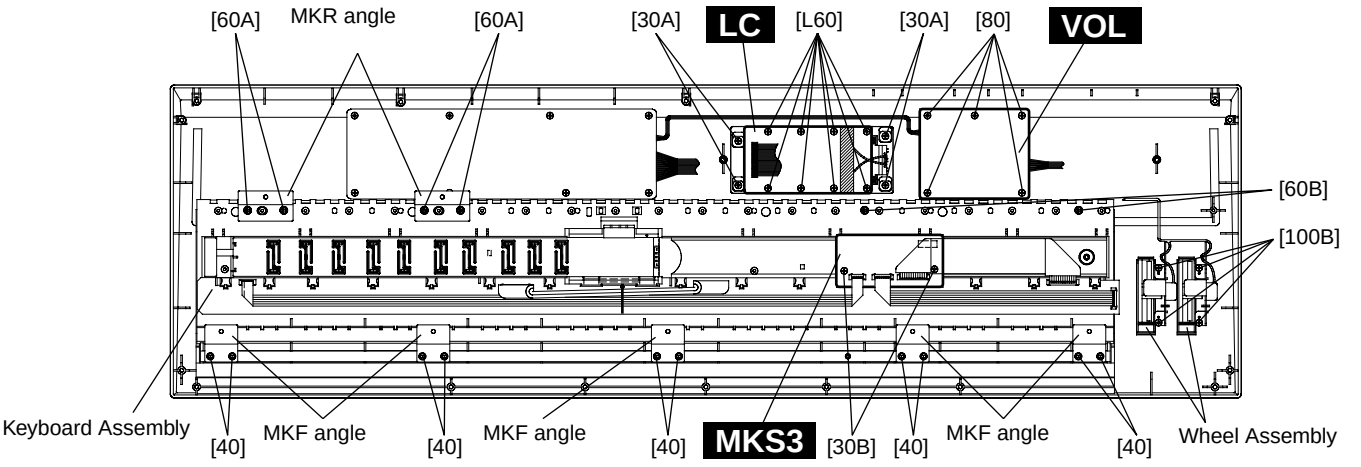
5-3 **VOL Circuit Board:**

Pull out the VR knob in the control panel side.

Remove the five (5) screws marked [80]. The VOL circuit board can then be removed. (Fig.4)

5-4 **LC Circuit Board and Back Light Assembly:**

Remove the eight (8) screws marked [L60]. The LC circuit board can then be removed with the back light assembly. (Fig.4, 5)



[30A]:	Bind Head Tapping Screw-B	3.0X8 MFZN2BL (EP600190)
[30B]:	Bind Head Tapping Screw-P	3.0X8 MFZN2Y (EP600280) or
[30B]:	Bind Head Tapping Screw-P	3.0X8 MFZN2BL (EP630220)
[40]:	Bind Head Tapping Screw-B	3.0X8 MFZN2BL (EP600190)
[60]:	Bind Head Tapping Screw-B	3.0X20 MFZN2BL (VJ999700)
[L60]:	Bind Head Tapping Screw-P	3.0X8 MFZN2Y (EP600280)
[80]:	Bind Head Tapping Screw-B	3.0X8 MFZN2BL (EP600190)
[100B]:	Bind Head Tapping Screw-B	3.0X8 MFZN2BL (EP600190)

Fig.4

6. LCD and LCD Panel (Time required: About 20 minutes)

6-1 Remove the bottom cover assembly. (See procedure 1.)

6-2 Remove the shield box assembly. (See procedure 5-2.)

6-3 Remove the LC circuit board and the back light assembly. (See procedure 5-4.)

6-4 Remove the two (2) rubber connectors from the LCD panel. (Fig.5)

6-5 Lift the left end of the LCD first, and then remove it. (Fig.5)

6-6 Remove the four (4) screws marked [30A]. The LCD Panel can then be removed. (Fig.4, 5)

* When re-install the rubber connector, place it so that the conductor faces the inside. (Fig.6)

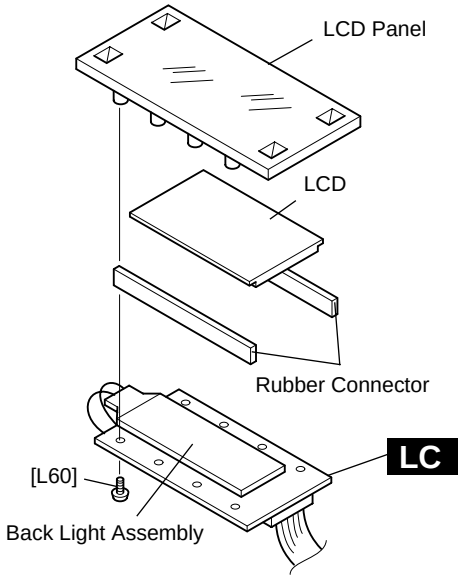


Fig.5

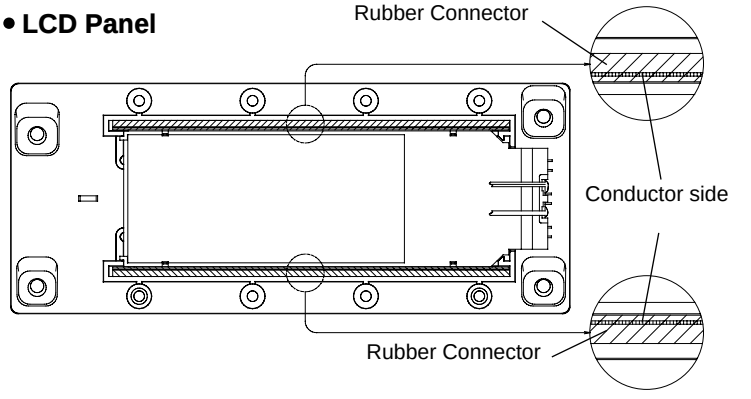


Fig.6

7. Wheel Assembly (Time required: About 10 minutes)

7-1 Remove the bottom cover assembly. (See procedure 1.)

7-2 Remove the four (4) screws marked [100B]. The wheel assembly can then be removed. (Fig.4)

8. Keyboard Assembly (Time required: About 20 minutes)

8-1 Remove the bottom cover assembly. (See procedure 1.)

8-2 Remove the shield box assembly. (See procedure 5-2.)

8-3 Remove the four (4) screws marked [60A]. The two (2) MKR angles can then be removed. (Fig.4)

8-4 Remove the two (2) screws marked [60B]. The keyboard assembly can then be removed. (Fig.4)

8-5 Remove the ten (10) screws marked [40]. The five (5) MKF angles can then be removed from the keyboard assembly. (Fig.4)

9. Disassembling the keyboard assembly
(Time required: About 30 minutes)

9-1 Remove the keyboard assembly. (See procedure 8.)

9-2 Remove the two (2) screws marked [30B]. The MK3 circuit board can then be removed. (Fig.4)

9-3 Remove the MK-L and MK-H circuit boards while pressing the fifteen (15) hooks A inward, and then remove the rubber contact. (Fig.7)

9-4 Remove the twenty-one (21) screws marked [140], then remove the black keys from the lower notes. Afterwards, remove the white keys DFA and C' and then remove the white keys CEGB from the higher notes. At this time, lift the keys from the front and slide them towards you. The keys can then be removed from the assembly. (Fig.8)

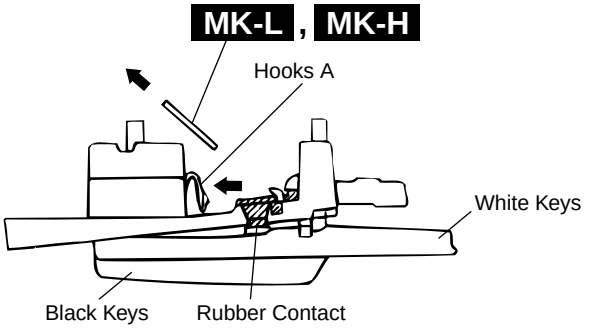


Fig.7

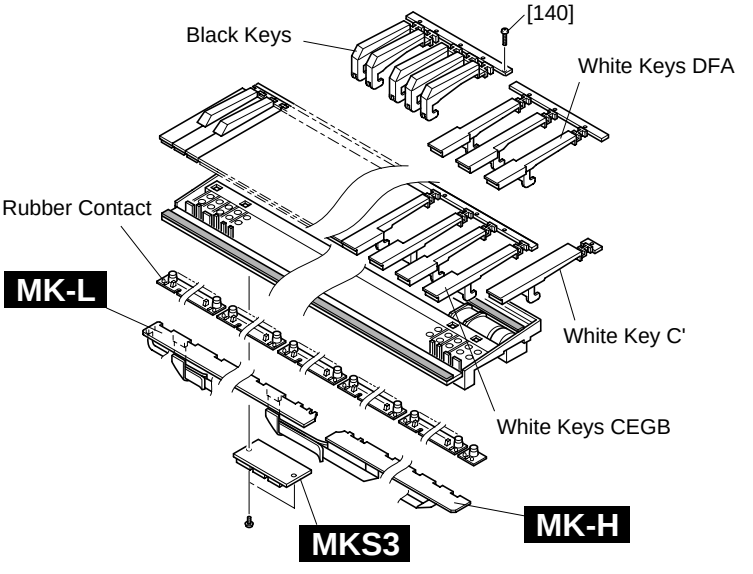


Fig.8

[140]: Bind Head Tapping Screw-P 3.0X16 MFZN2Y (EP600310) or
[140]: Bind Head Tapping Screw-P 3.0X16 MFZN2BL (VB205200) or
[140]: Bind Head Tapping Screw-P 3.0X16 MFZN2B (VS756700)

10. Assembling the keyboard assembly

(Time required: About 30 minutes)

10-1 Install the white keys CEGB from the lower notes, and then install the DFA keys and C' key. Afterwards install the black keys from the higher notes, and tighten the twenty-one (21) screws marked [140]. (Fig.8)

10-2 Install the rubber contacts in the assembly while pressing the keys as shown in Figure 9. Check that the rubber contact has been firmly placed into position in the area indicated by the arrow in Figure 10. (Fig.9, 10)

* When fitting the rubber contacts, raise both ends of the frame so that keys do not push the rubber contact up.

10-3 Install the MK-L and MK-H circuit boards in the assembly so that the hooks B hold it as shown in Figure 11. (Fig.11)

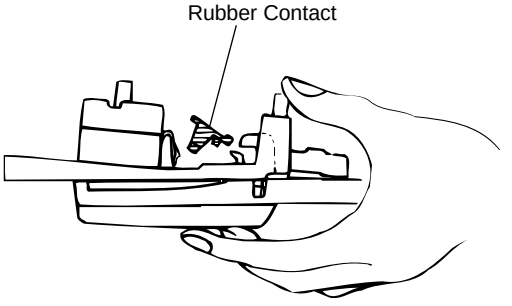


Fig.9

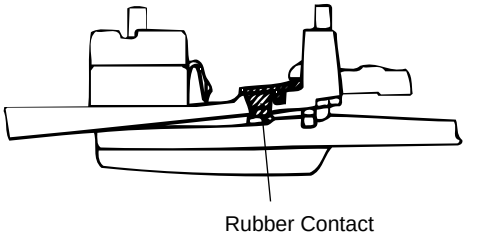


Fig.10

MK-L , MK-H

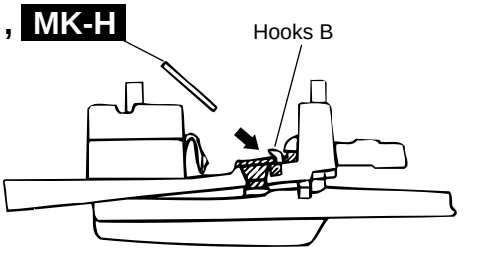


Fig.11

LSI PIN DESCRIPTION

● **HG73C205AFD** (XU947C00) **SWX00B** (Tone Generator)

DM: IC001, 002

PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	ICN	I	Initial clear	85	CMA3	O	Program address bus
2	RFCLKI	I	PLL Clock	86	CMA8	O	Program address bus
3	TM2	I	PLL Control	87	CMA2	O	Program address bus
4	AVDD_PLL		Power supply	88	CRD	O	read signal
5	AVSS_PLL		Ground	89	CMA1	O	Program address bus
6	MODE0	I	SWX dual mode	90	CUB	O	high byte effective signal
7	VCC7		Power supply	91	VCC91		Power supply
8	GND8		Ground	92	GHND92		Ground
9	XIN	I	crystal oscillator	93	CS1	O	CS signal
10	XOUT	O	crystal oscillator	94	CMA0	O	Program address bus
11	MODE1	I	SWX separate mode	95	CLB	O	low byte effective signal
12	TEST0	I	TEST pin	96	CMA12	O	Program address bus
13	TESTON	I	TEST pin	97	CMA11	O	Program address bus
14	AN0-P40	I	A/D converter	98	CMA10	O	Program address bus
15	AN1-P41	I	A/D converter	99	CMA9	O	Program address bus
16	AN2-P42	I	A/D converter	100	GND100		Ground
17	AN3-P43	I	A/D converter	101	CWE	O	write signal
18	AVDD_AN		Power supply	102	CMA16	O	Program address bus
19	AVSS_AN		Ground	103	CMA15	O	Program address bus
20	TXD0	O	for MIDI or TO-HOST	104	CMA14	O	Program address bus
21	TXD1	O	for MIDI	105	CMA13	O	Program address bus
22	EXCLK	I	Crystal oscillator	106	CMD8	I/O	Program memory Data bus
23	SMD11	I/O	Wave memory data bus	107	CMD7	I/O	Program memory Data bus
24	SMD4	I/O	Wave memory data bus	108	CMD9	I/O	Program memory Data bus
25	SMD3	I/O	Wave memory data bus	109	CMD6	I/O	Program memory Data bus
26	SMD12	I/O	Wave memory data bus	110	CMD10	I/O	Program memory Data bus
27	SMD10	I/O	Wave memory data bus	111	CMD5	I/O	Program memory Data bus
28	SMD5	I/O	Wave memory data bus	112	CMD11	I/O	Program memory Data bus
29	SMD2	I/O	Wave memory data bus	113	CMD4	I/O	Program memory Data bus
30	SMD13	I/O	Wave memory data bus	114	CMD12	I/O	Program memory Data bus
31	SMD9	I/O	Wave memory data bus	115	CMD3	I/O	Program memory Data bus
32	SMD6	I/O	Wave memory data bus	116	CMD13	I/O	Program memory Data bus
33	SMD1	I/O	Wave memory data bus	117	CMD2	I/O	Program memory Data bus
34	SMD14	I/O	Wave memory data bus	118	CMD14	I/O	Program memory Data bus
35	VCC35		Power supply	119	VCC119		Power supply
36	GND36		Ground	120	GND115		Ground
37	SMD8	I/O	Wave memory data bus	121	CMD1	I/O	Program memory Data bus
38	SMD7	I/O	Wave memory data bus	122	CMD15	I/O	Program memory Data bus
39	SMD0	I/O	Wave memory data bus	123	CMD0	I/O	Program memory Data bus
40	SMD15	I/O	Wave memory data bus	124	CMA21	O	Program address bus
41	SOE	O	read signal	125	PDT15	I/O	SWX access data bus
42	SWE	O	write signal	126	PDT14	I/O	SWX access data bus
43	SRAS	O	RAS signal	127	PDT13	I/O	SWX access data bus
44	SCAS	O	CAS signal	128	PDT12	I/O	SWX access data bus
45	REFRESH	O	REFRESH signal	129	PDT11	I/O	SWX access data bus
46	CS0	O	CS signal	130	PDT10	I/O	SWX access data bus
47	SMA0	O	Memory address bus	131	PDT9	I/O	SWX access data bus
48	SMA16	O	Memory address bus	132	PDT8	I/O	SWX access data bus
49	VCC49		Power supply	133	VCC133		Power supply
50	GND50		Ground	134	GND134		Ground
51	SMA1	O	Memory address bus	135	PDT7	I/O	SWX access data bus
52	SMA15	O	Memory address bus	136	PDT6	I/O	SWX access data bus
53	SMA2	O	Memory address bus	137	PDT5	I/O	SWX access data bus
54	SMA14	O	Memory address bus	138	PDT4	I/O	SWX access data bus
55	SMA3	O	Memory address bus	139	PDT3	I/O	SWX access data bus
56	SMA13	O	Memory address bus	140	PDT2	I/O	SWX access data bus
57	SMA4	O	Memory address bus	141	PDT1	I/O	SWX access data bus
58	SMA12	O	Memory address bus	142	PDT0	I/O	SWX access data bus
59	SMA5	O	Memory address bus	143	VCA143		Power supply
60	GND60		Ground	144	GND144		Ground
61	VCC61		Power supply	145	PAD2	I	SWX access address bus
62	SMA11	O	Memory address bus	146	PAD1	I	SWX access address bus
63	SMA6	O	Memory address bus	147	PAD0	I	SWX access address bus
64	SMA10	O	Memory address bus	148	VCC148		Power supply
65	SMA7	O	Memory address bus	149	GND149		Ground
66	SMA9	O	Memory address bus	150	PCS	I	Chip select
67	SMA17	O	Memory address bus	151	PWR	I	write enable
68	SMA8	O	Memory address bus	152	PRD	I	read enable
69	SMA18	O	Memory address bus	153	RXD0	I	for Midi or TO-HOST
70	SMA19	O	Memory address bus	154	RXD1	I	for Midi or Key scan
71	SMA20	O	Memory address bus	155	SCLKI	I	EXT Clock
72	SMA21	O	Memory address bus	156	ADIN	I	A/D converter
73	SMA22	O	Memory address bus	157	ADLR	O	A/D converter LR clock
74	SMA23	O	Memory address bus	158	DO0	O	DAC
75	CMA20	O	Program address bus	159	DO1	O	DAC
76	CMA19	O	Program address bus	160	SYSCLK	O	1/2 clock
77	VCC77		Power supply	161	VCC161		Power supply
78	GND78	O	Ground	162	GND162		Ground
79	CMA18	O	Program address bus	163	WCLK	O	for DAC LR clock
80	CMA17	O	Program address bus	164	QCLK	O	1/12 clock
81	CMA5	O	Program address bus	165	BCLK	O	IIS-DAC clock
82	CMA6	O	Program address bus	166	SYI	I	Synch signal
83	CMA4	O	Program address bus	167	IRQ0	I	Interrupt request
84	CMA7	O	Program address bus	168	NMI	I	Interrupt request

● HD63B05V0F073P (XR951A00) CPU

MKS3: IC1

PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	/RES	I	Reset	21	C7	I/O	
2	/INT	I	Interrupt request	22	C6	I/O	
3	NUM	I	Non-maskable interrupt	23	C5	I/O	
4	A7	I/O		24	C4	I/O	Port C
5	A6	I/O		25	C3	I/O	
6	A5	I/O		26	C2	I/O	
7	A4	I/O	Port A	27	C1	I/O	
8	A3	I/O		28	C0	I/O	
9	A2	I/O		29	D0	I/O	
10	A1	I/O		30	D1	I/O	Port D
11	A0	I/O		31	D2	I/O	
12	B0	I/O		32	D3/TX	O	(Serial data output)
13	B1	I/O		33	D4/RX	I	(Serial data input)
14	B2	I/O		34	D5//CK	O	(Clock for serial operation)
15	B3	I/O	Port B	35	D6//INT2	I	(Interrupt request 2)
16	B4	I/O		36	/STBY	I	(Standby mode signal)
17	B5	I/O		37	TIMER	I	Timer
18	B6	I/O		38	XTAL	O	Clock
19	B7	I/O		39	EXTAL	I	
20	VSS		Ground	40	VCC		Power supply

● LC7985ND (XN859A00) LCD Controller & Driver

LC: IC001

PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	OS22	O		41	DB2	I/O	
2	OS21	O		42	DB3	I/O	
3	OS20	O		43	DB4	I/O	
4	OS19	O		44	DB5	I/O	Data Bus
5	OS18	O		45	DB6	I/O	
6	OS17	O		46	DB7	I/O	
7	OS16	O		47	OC1	O	
8	OS15	O		48	OC2	O	
9	OS14	O		49	OC3	O	
10	OS13	O		50	OC4	O	
11	OS12	O		51	OC5	O	
12	OS11	O	Segment Signal	52	OC6	O	
13	OS10	O		53	OC7	O	
14	OS9	O		54	OC8	O	
15	OS8	O		55	OC9	O	
16	OS7	O		56	OC10	O	
17	OS6	O		57	OC11	O	
18	OS5	O		58	OC12	O	
19	OS4	O		59	OC13	O	
20	OS3	O		60	OC14	O	
21	OS2	O		61	OC15	O	
22	OS1	O		62	OC16	O	
23	VSS		GND	63	OS40	O	
24	OSCI		Oscillator	64	OS39	O	
25	OSCO		Oscillator	65	OS38	O	
26	V1			66	OS37	O	
27	V2			67	OS36	O	
28	V3		Display Drive Power Supply	68	OS35	O	
29	V4			69	OS34	O	
30	V5			70	OS33	O	
31	LOAD	O	Clock for Sirial Data Latch	71	OS32	O	Segment Signal
32	CP	O	Clock for Sirial Data shift	72	OS31	O	
33	VDD		Power supply +5V	73	OS30	O	
34	M	O	Select Sibnal	74	OS29	O	
35	D	O	Common Signal	75	OS28	O	
36	RS	I	Register Select Signal	76	OS27	O	
37	R/W	I	Read Write Select Signal	77	OS26	O	
38	E	I	Setup Start trigger	78	OS25	O	
39	DB0	I/O	Data Bus	79	OS24	O	
40	DB1	I/O		80	OS23	O	

● **MBCG46183-129** (XV833A00) **SIO4** (Gate Array) DM: IC030

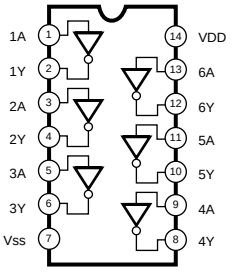
PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	D5	I/O	Data Bus	25	TX31	O	Transmit Data 31
2	D6	I/O		26	RX32	I	Receive Data 32
3	D7	I/O		27	TX32	O	Transmit Data 32
4	/IRQ0	I/O	Interrupt Request Port 0	28	RX33	I	Receive Data 33
5	/IRQ1	I/O	Interrupt Request Port 1	29	TX33	I/O	Transmit Data 33
6	Vss		Ground	30	/IC	I	Initial Clear
7	/IRQ2	I/O	Interrupt Request Port 2	31	Vss		Ground
8	/IRQ3	I/O	Interrupt Request Port 3	32	XI	I	Quartz Crystal Input
9	/RD	I	Read Signal Input	33	Vss		Ground
10	/WR	I	Wright Signal Input	34	XO	I/O	Quartz Crystal Output
11	/CE	I	Chip Enable Input	35	A0	I	Address Bus
12	/ASTB	I	Address Strobe (Not used: to ground)	36	A1	I	
13	TESTSIO	I	Input with Pull-down Resistor (50k)	37	A2	I	
14	RX0	I	Receive Data 0	38	A3	I	
15	TX0	O	Transmit Data 0	39	A4	I	
16	RX1	I	Receive Data 1	40	A5	I	
17	TX1	O	Transmit Data 1	41	CPUCLK	I	CPU Clock
18	Vss		Ground	42	Vss		Ground
19	V_{DD}		Power Supply	43	V_{DD}		Power Supply
20	RX2	I	Receive Data 2	44	D0	I/O	Data Bus
21	TX2/BO2	O	Transmit Data 2	45	D1	I/O	
22	RX30	I	Receive Data 30	46	D2	I/O	
23	TX30	O	Transmit Data 30	47	D3	I/O	
24	RX31	I	Receive Data 31	48	D4	I/O	

● **µPD63200GS-E1** (XP867A00) **DAC** (Digital to Analog Converter) DM: IC018

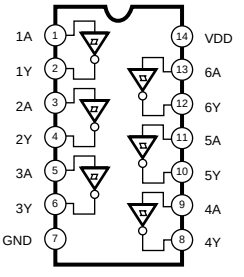
PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	4/8F	I	4/8 Fs selection	9	R. REF		Channel R voltage reference
2	D. GND		Digital ground	10	L. REF		Channel L voltage reference
3	16 BIT	I	16 bit/18 bit selection	11	L. OUT	O	Channel L output
4	D. VDD		Digital power supply	12	A. GND		Analog ground
5	A. GND		Analog ground	13	WDCK	I	Word clock
6	R. OUT	O	Channel R output	14	RSI	I	Channel R series input
7	A. VDD		Analog power supply	15	SI/LSI	I	Series input/Channel L series input
8	A. VDD			16	CLK	I	Clock

■ IC BLOCK DIAGRAM

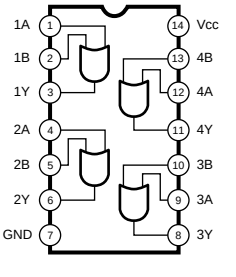
● **SC7SU04FEL** (XI348A00)
TC74HCT04AF-T1 (XI297A00)
Hex Inverter
DM: IC011, 024



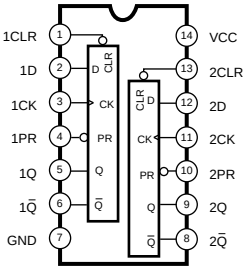
● **MM74HC14SJK** (XW104A00)
Hex Inverter
DM: IC029



● **TC74HCT32AF(EL)** (XY096A00)
SN74HC32N (IR003250)
Quad 2 Input OR
DM: IC031
SW: IC004

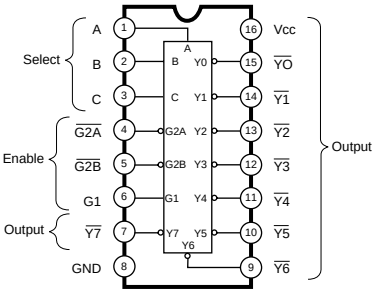


- **TC74VHC74FT** (XV892A00)
  Dual D-Type Flip-Flop
  SB: IC001

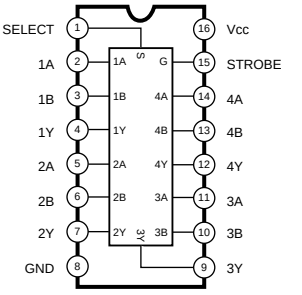


INPUTS				OUTPUTS	
PR	CLR	CLK	D	Q	Q
L	H	X	X	H	L
H	L	X	X	L	H
L	L	X	X	H	H
H	H	f	H	H	L
H	H	f	L	L	H
H	H	L	X	Q o	Q o

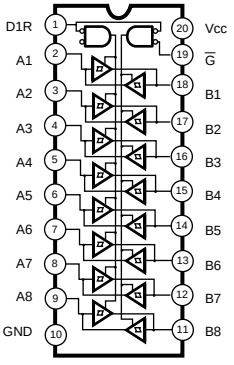
- **SN74HC138NSR** (XW793A00)
  3 to 8 Demultiplexer
  DM: IC028



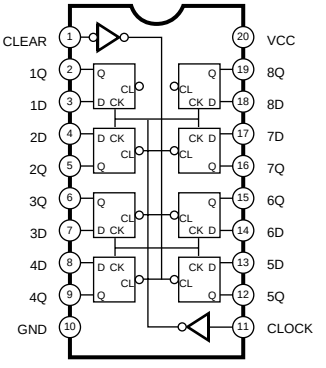
- **TC74VHC157F(EL)** (XT475A00)
  74VHC157SJX (XY870A00)
  Quad 2 to 1 Multiplexer
  DM: IC025



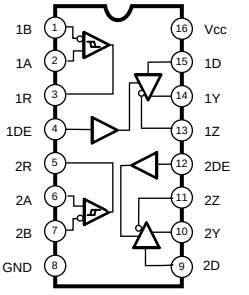
- **MM74HC245ASJX** (XW107A00)
  SN74HC245N (IR024550)
  Octal 3-State Bus Transceiver
  DM: IC027
  SW: IC002



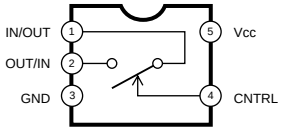
- **SN74HC273N** (IR027350)
  Octal D-Type Flir Flop
  SW: IC001, 003



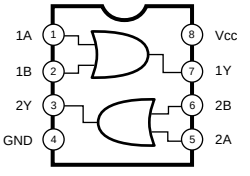
- **HD29051FP** (XV708A00)
  Line Transceiver
  DM: IC008



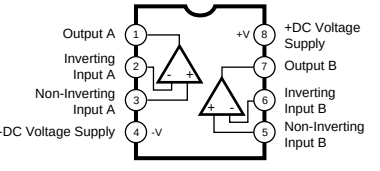
- **TC7S66F** (XR682A00)
  Bilateral Switch
  DM: IC021



- **TC7WH32FU(TE12L)** (XY364A00)
  Dual 2 Input OR Gate
  SB: IC002



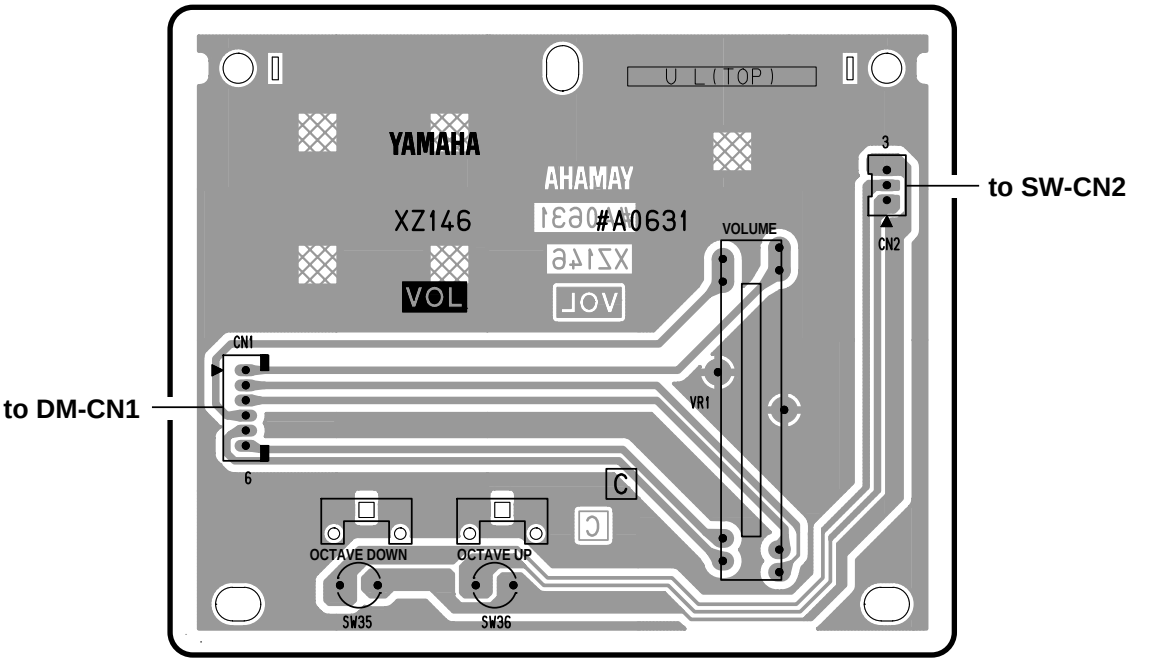
- **µPC4570G2** (XF291A00)
  NJM4556AMT1 (XQ138A00)
  NJM3414AM(T1) (XR294A00)
  Dual Operational Amplifier
  DM: IC013, 016, 019, 020



■ CIRCUIT BOARDS

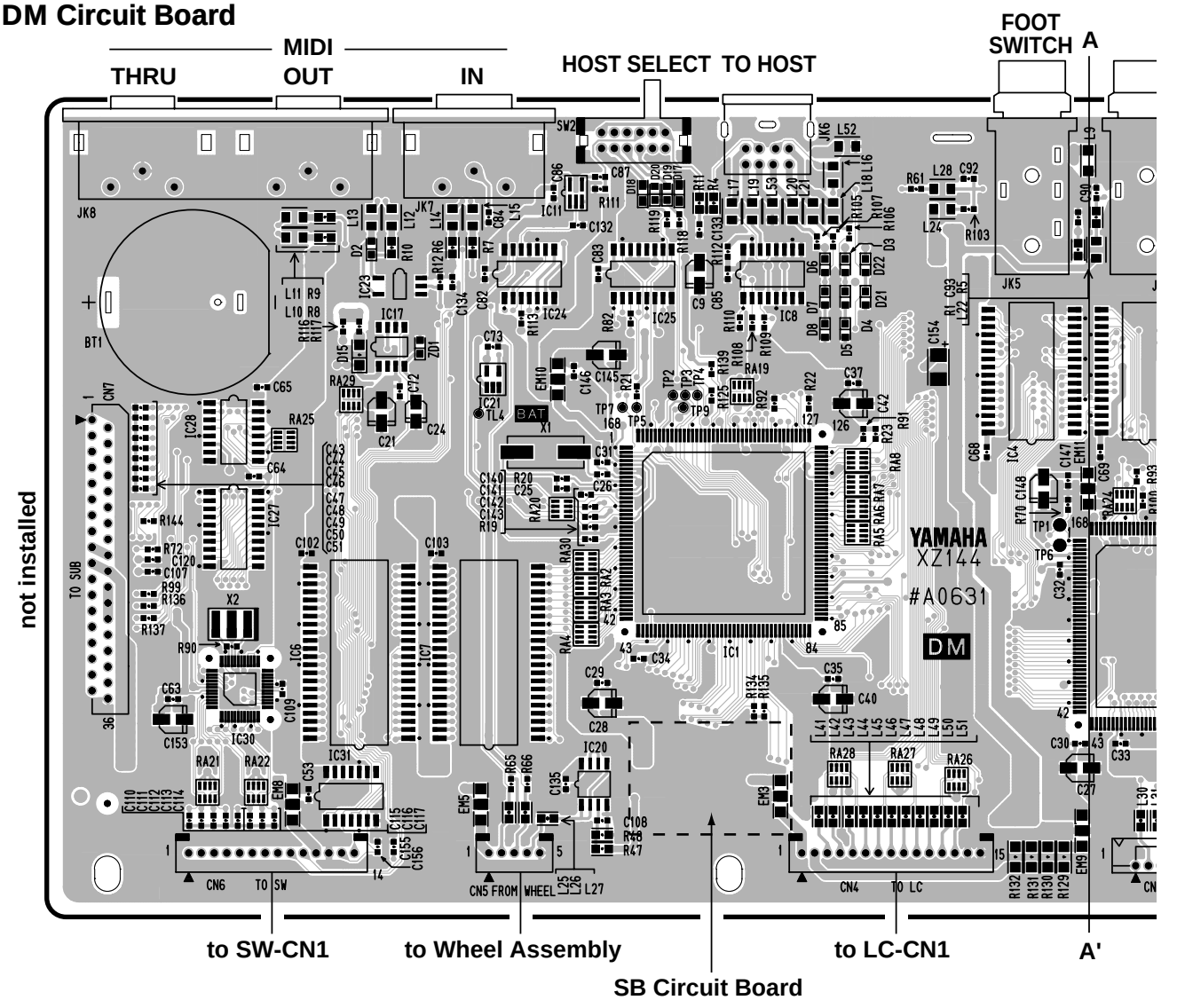
Note: See parts list for details of circuit board component parts.

• VOL Circuit Board



Component side

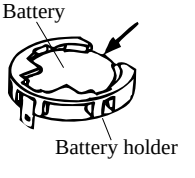
• DM Circuit Board



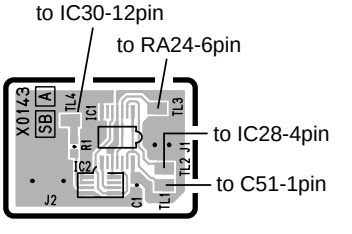
Battery VN103500

VN103600(Battery holder for VN103500)

- Notice for back-up battery removal
  Push the battery as shown in figure, then the battery will pop up.
- Druk de batterij naar beneden zoals aangeven in de tekening de batterij springt dan naar voren.

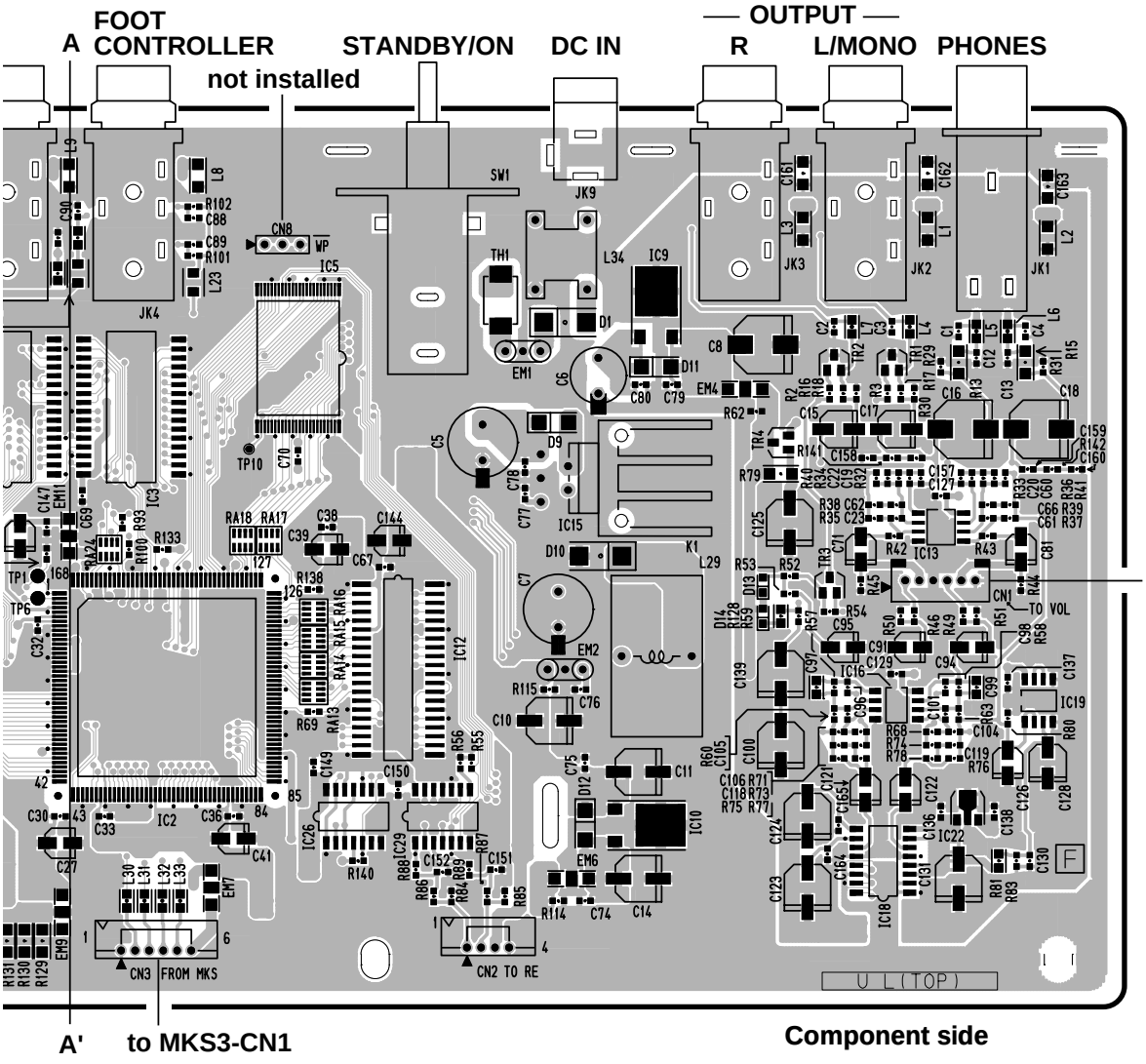


• SB Circuit Board

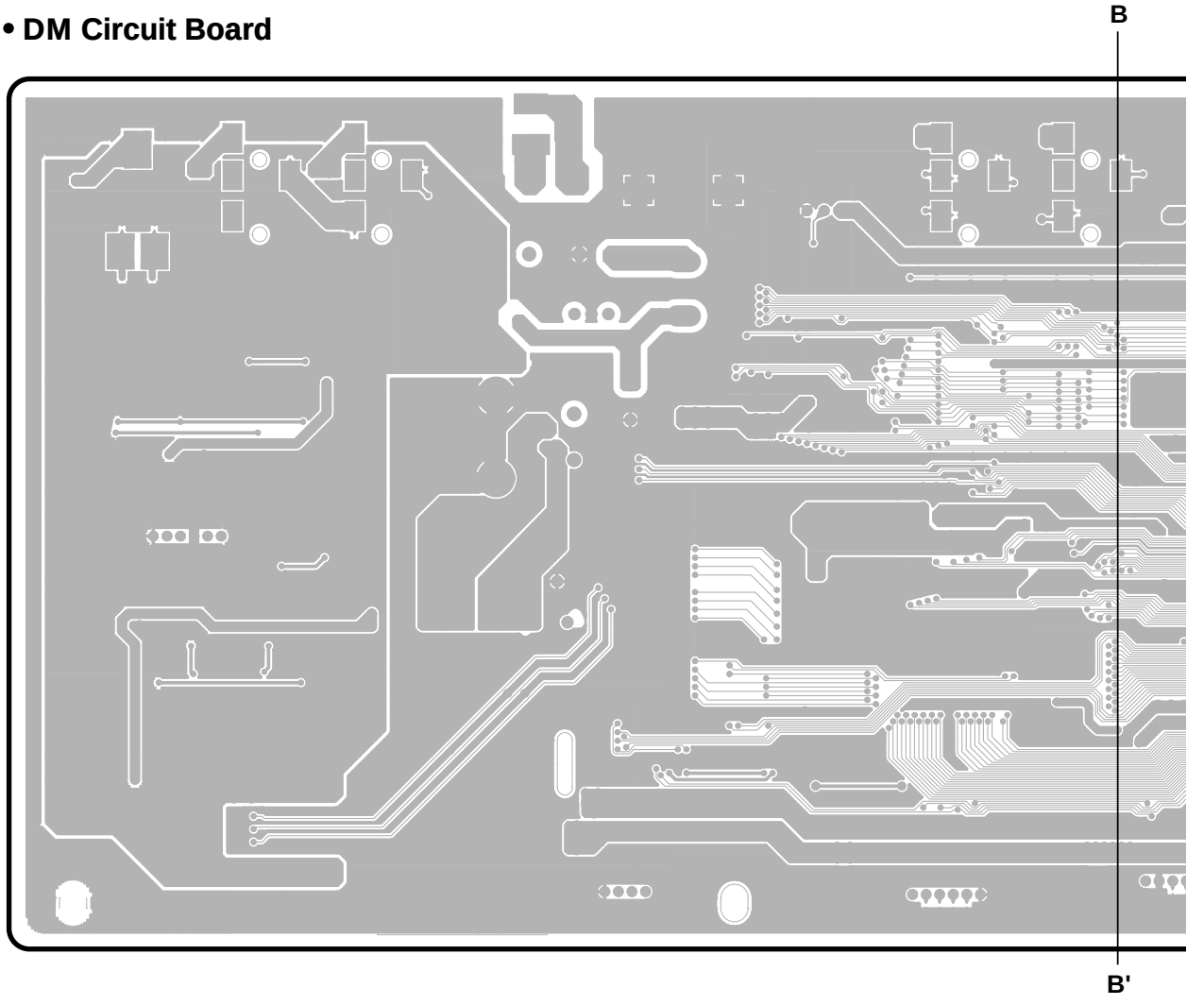


Component side

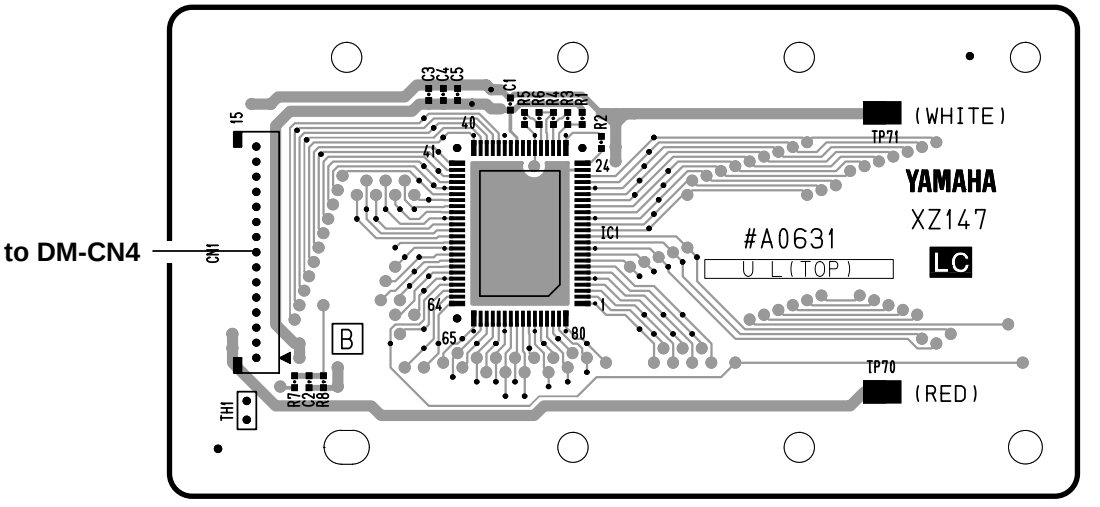
DM: 2NA-V583600 4
SB: 2NA-V755340


A
FOOT CONTROLLER
not installed
STANDBY/ON
DC IN
OUTPUT
R
L/MONO
PHONES
to VOL-CN1
A'
to MKS3-CN1
Component side
U L (TOP)
CN3 FROM MKS
CN2 TO RE
TO VOL

• DM Circuit Board

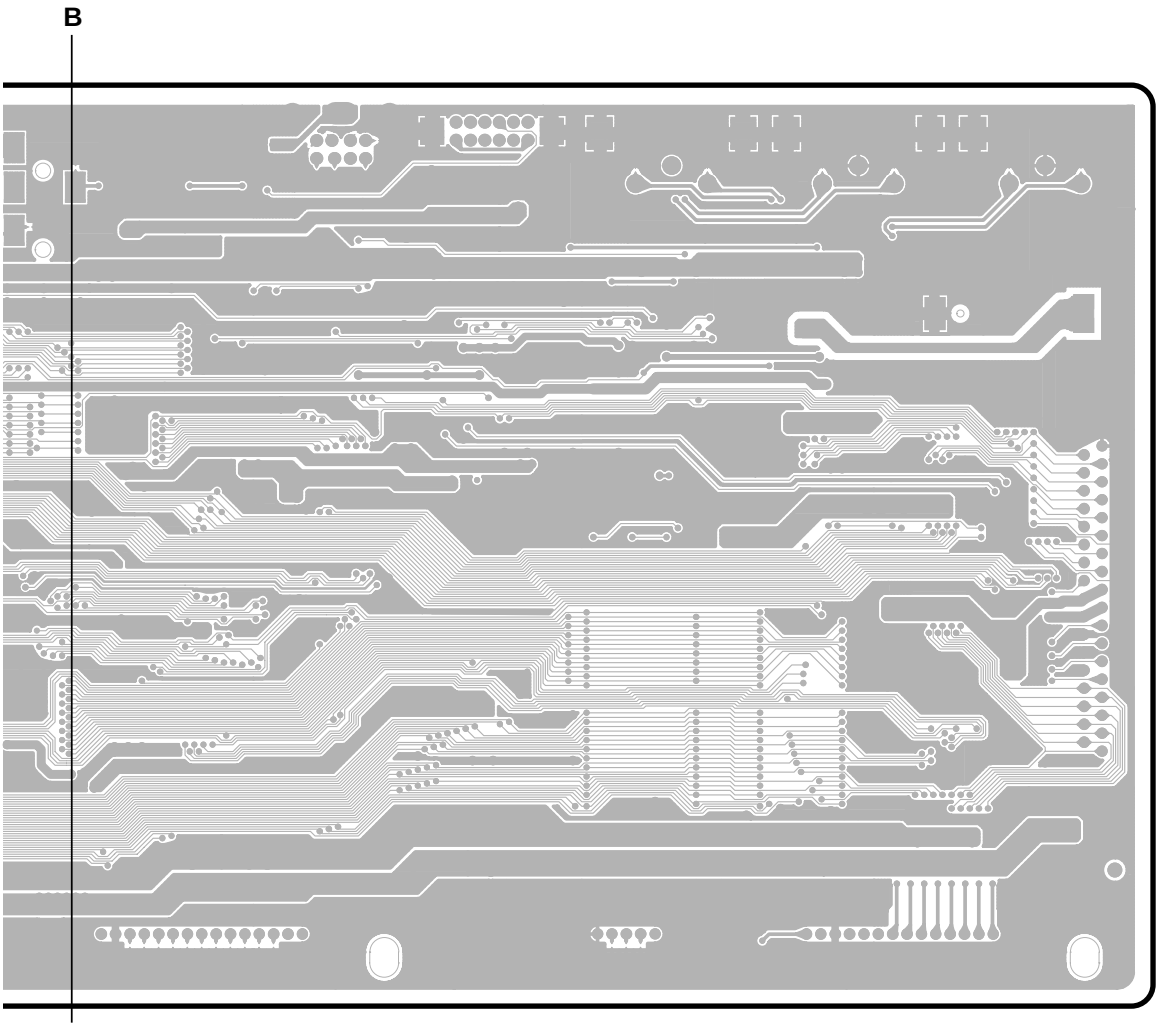


• LC Circuit Board



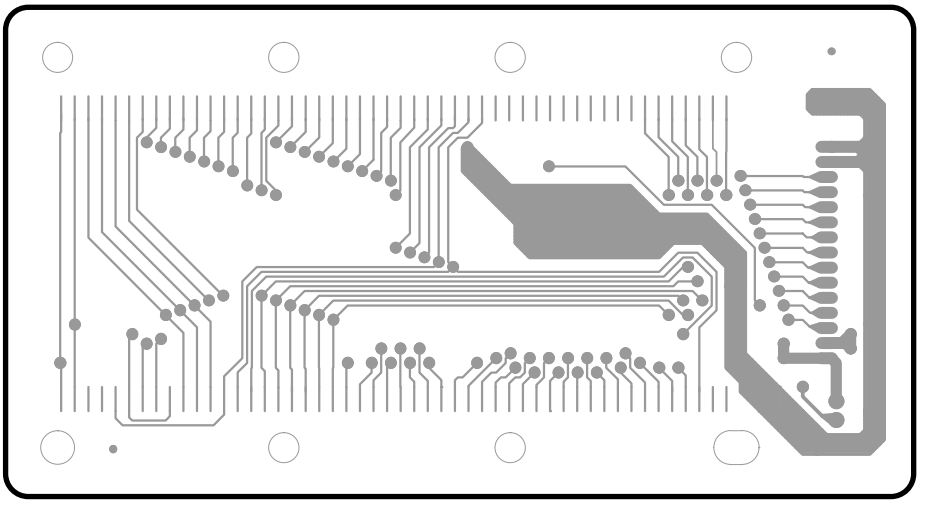
Component side

DM: 2NA-V583600 ⚠4
LC: 2NA-V626840



Pattern side

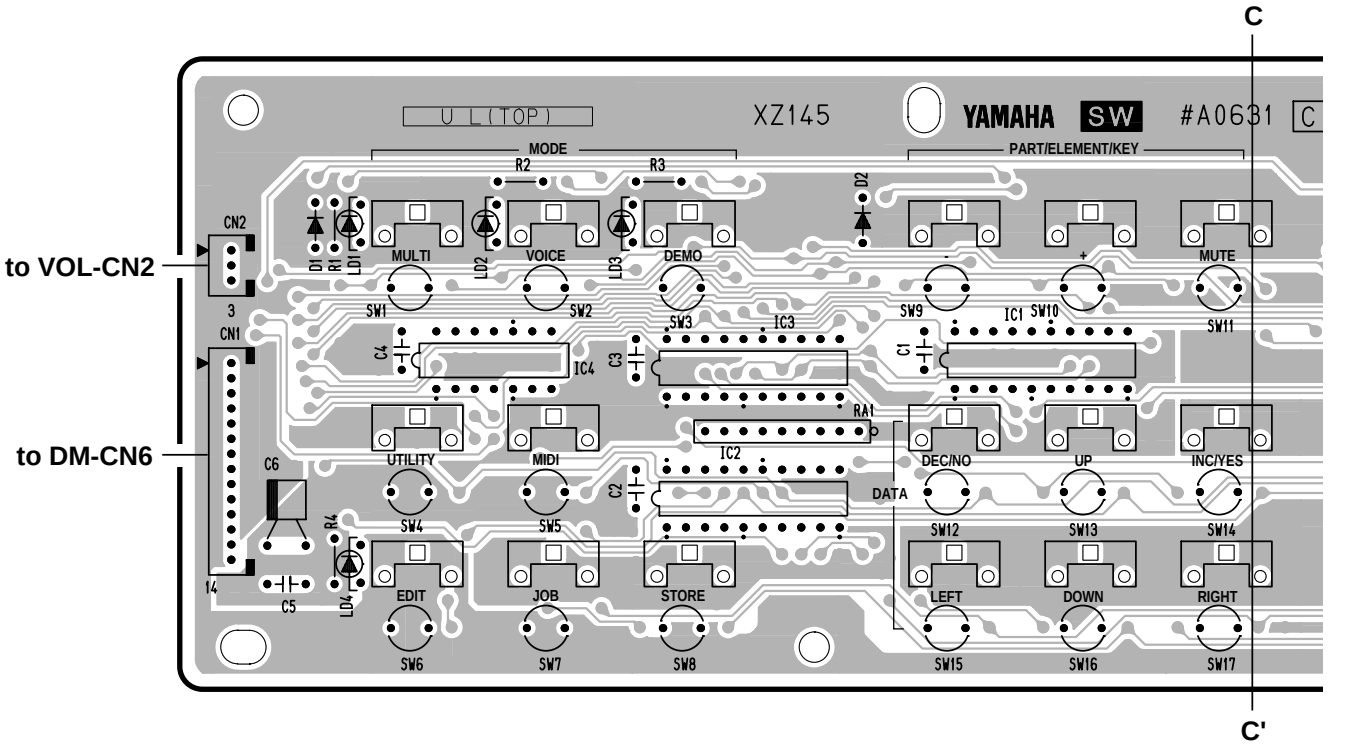
• **LC Circuit Board**

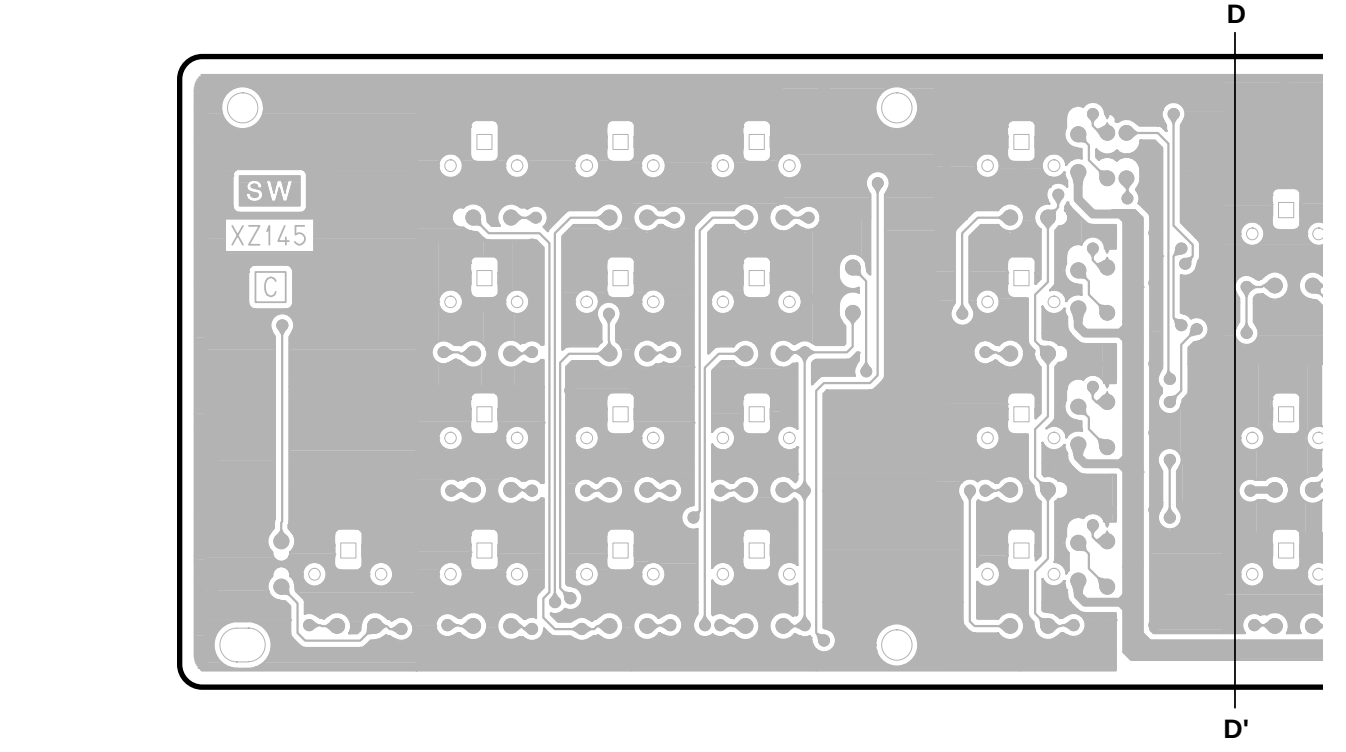


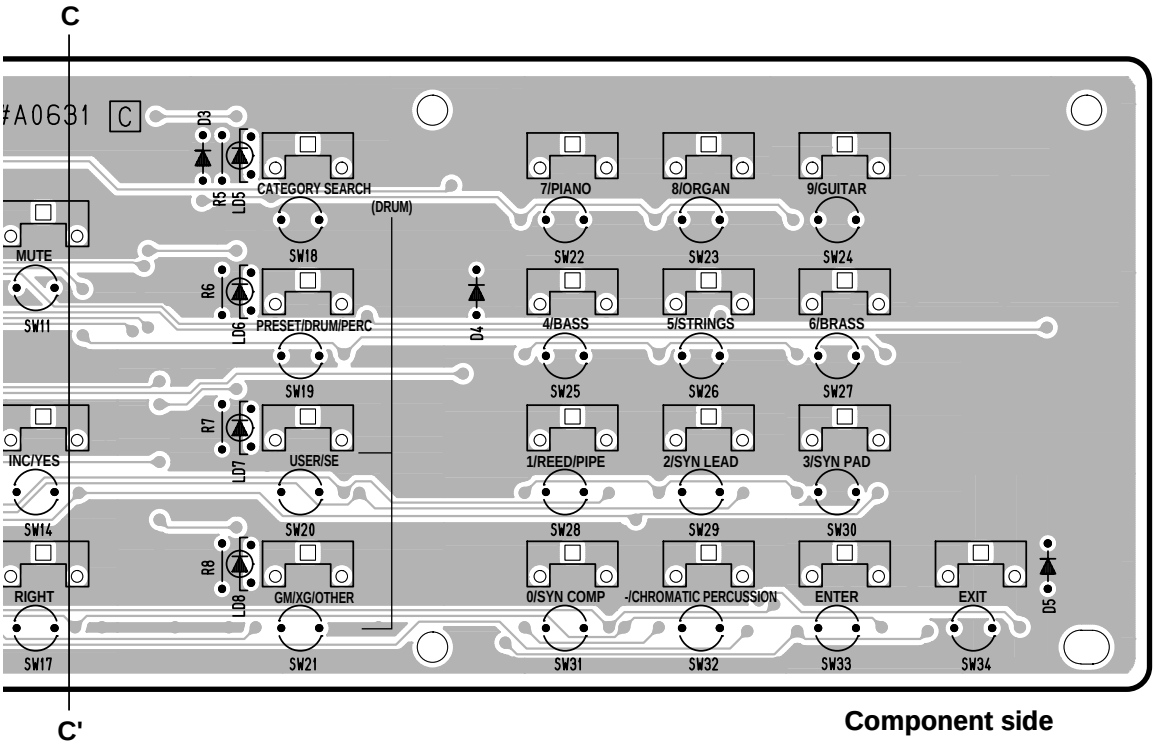
Pattern side

DM: 2NA-V583600 △4
LC: 2NA-V626840

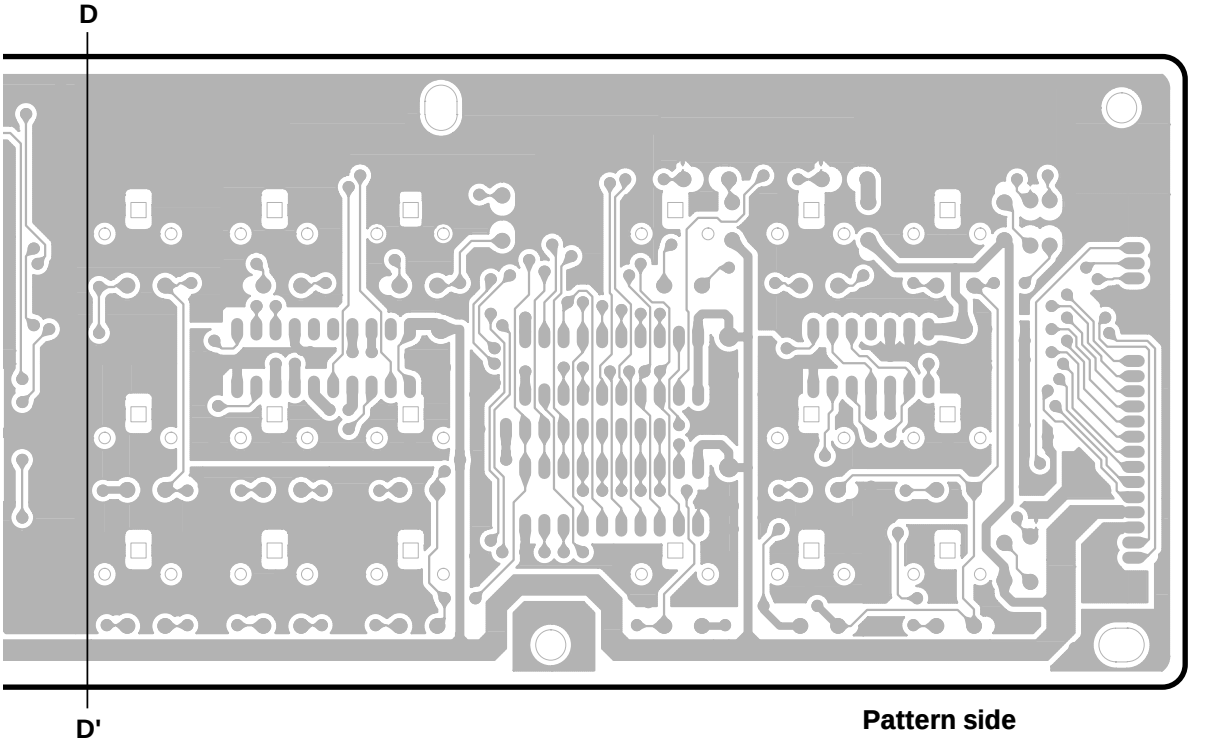
• SW Circuit Board





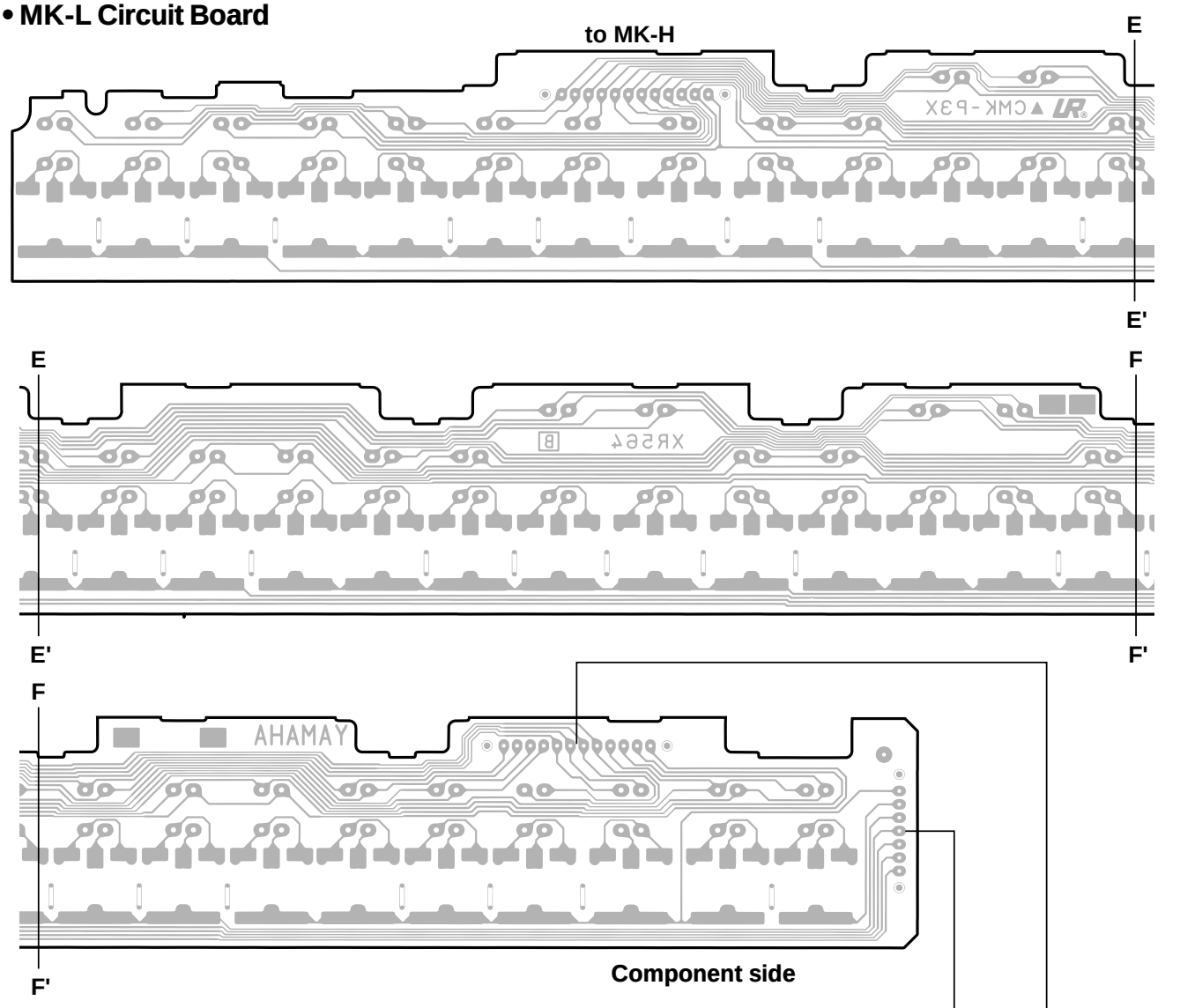


Component side

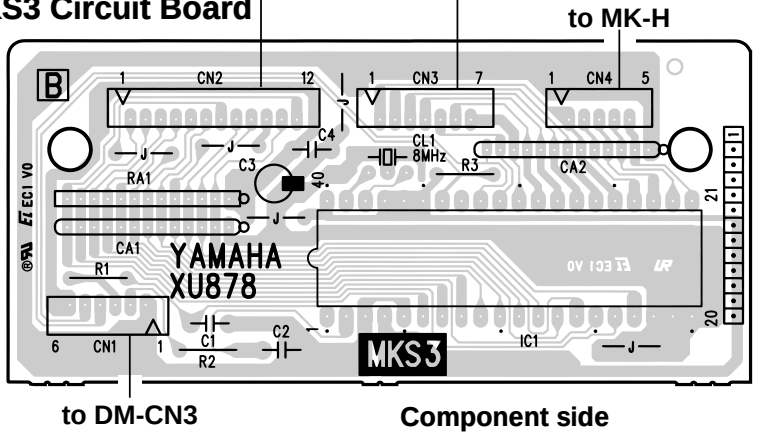


Pattern side

• MK-L Circuit Board

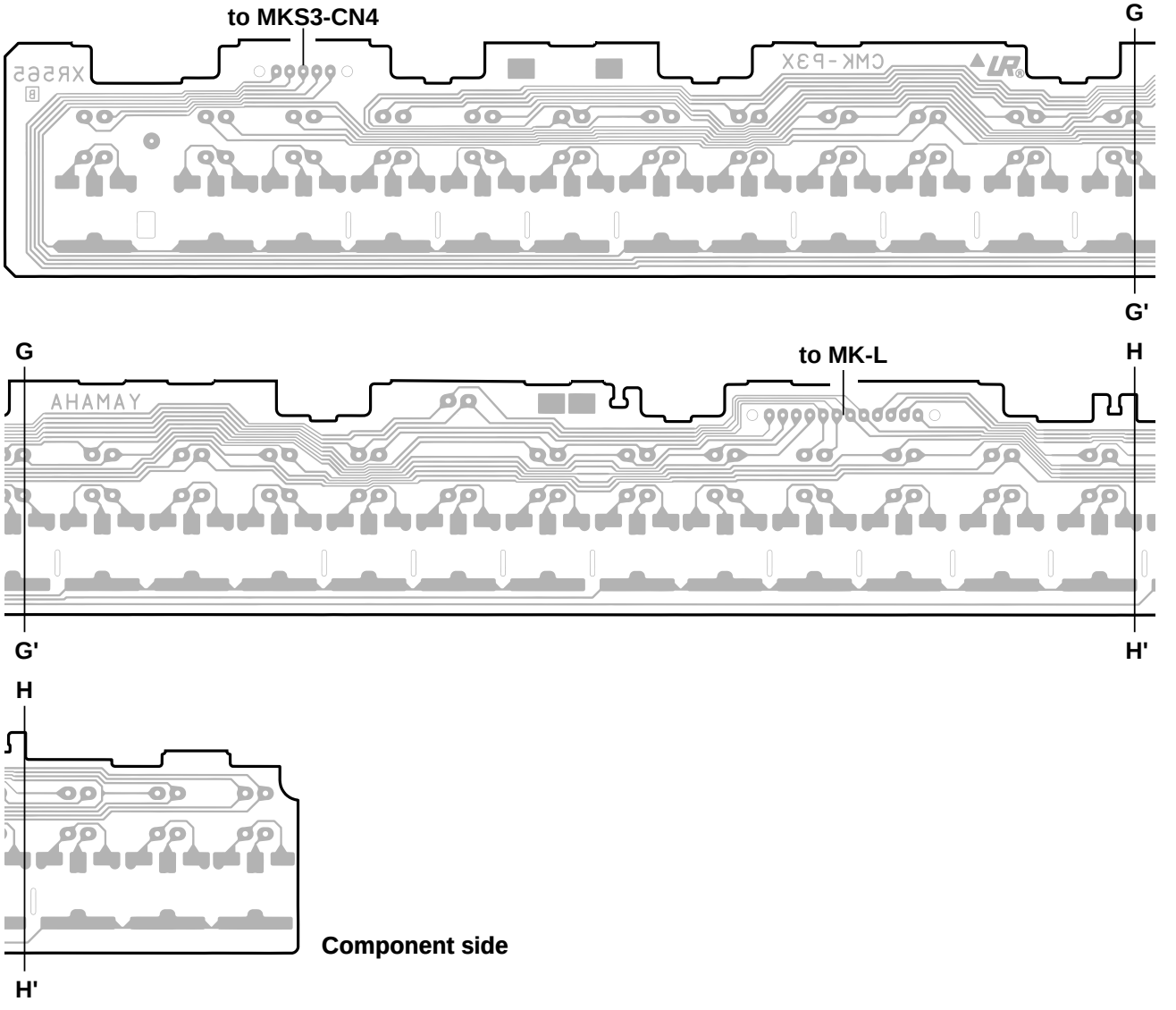


• MKS3 Circuit Board



MK-L: 2NA-VV58380
MKS3: 2NA-V240490

• MK-H Circuit Board



TEST PROGRAM

(A) TEST PROGRAM LIST

TEST No.	TEST NAME
1	RAM Battery
2	LCD
3	Panel Switch & LED
4	1Key On
5	Keyboard
6	Pitch Bend
7	Modulation Wheel
8	Foot Controller
9	Foot Switch
10	MIDI IN/OUT/THRU
11	HOST SELECT
12	TO HOST
13	OUTPUT L
14	OUTPUT R
20	RAM(SRAM)
21	ROM(ProgramROM)
22	Wave ROM
23	Factory Set
24	Exit

(B) PREPARATION

The following measuring instruments and jigs are required to test the unit.

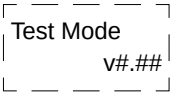
Measuring instruments:

Frequency counter, oscilloscope, AC voltmeter (JIS-C curve), distortion gauge (Flat), keyboard amplifier etc.

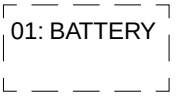
Jigs: MIDI cable, expansion board, HOST test jig etc.

(C) HOW TO ENTER THE TEST PROGRAM

Hold down buttons [1], [2], and [3] while turning on the power. The unit comes on, and the following screen appears briefly on the LCD.

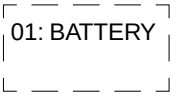


After a while the display changes to the following. When you see this screen, you can begin to select and execute tests as described in "Proceeding Through the Tests" below.



(D) PROCEEDING THROUGH THE TESTS

The test program begins by displaying the following.



You can now select and execute tests using the [DEC/NO], [INC/YES], [ENTER], and [EXIT] buttons.

Press [INC/YES] to select and display the name of the next test in the test list.

Press [DEC/NO] to select and display the name of the preceding test in the test list.

Press [ENTER] to start execution of the selected test.

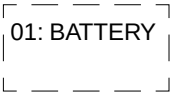
Press [EXIT] to return to the test selection process (when a test result is shown on the screen) or to close the program (when at the test selection process).

(E) TEST SELECTION WHEN AN ERROR IS DETECTED

If the test returns an error, you can carry out error processing and move on to another test as follows.

- If the test returns an error, the screen displays the error condition and the test terminates. Press [EXIT] to carry out error processing. You can then select and execute another test as described above (using [INC/YES or [DEC/NO] to select the test, and [ENTER] to execute).

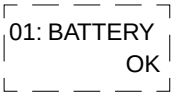
1. RAM Battery



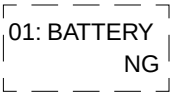
This test checks that the RAM backup battery voltage is more than 2.7V. The LCD displays the result (OK or NG), and the test terminates.

(Judgment result display)

OK

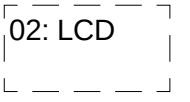


NG



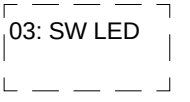
Note: Please wait at least 20 seconds after power-on before executing this test, as it takes the voltage a certain amount of time to stabilize.

2. LCD



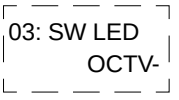
Visually check that all dots on the LCD blink ON/OFF (black/white). After completing the check, press [EXIT] to terminate the test.

3. Panel Switch & LED



Check that all panel switches operate correctly, and that LEDs switch on and off accordingly.

(Testing method)
The LCD displays switch names one by one, from [OCTAVE DOWN] to [EXIT] (see list below). As you see each name, set the corresponding on and then off.



* Switches are checked in the following order.
[OCTV DOWN], [OCTV UP], [MULTI], [VOICE], [DEMO], [UTLTY], [MIDI], [EDIT], [JOB], [STORE], [-], [+], [MUTE], [DEC/NO], [▲], [INC/YES], [◀], [▼], [▶], [CATEGORY SEARCH], [PRESET], [USER], [GM/XG], [7], [8], [9], [4], [5], [6], [1], [2], [3], [0], [-], [ENTER], [EXIT]

If the following switches are operating normally, the LED will come on and the unit will start emitting a sine-wave sound when you set the switch to ON, and the LED and the sound will both go off when you set the switch to OFF: [MULTI], [VOICE], [DEMO], [EDIT], [CATEGORY SEARCH], [PRESET], [USER], [GM/XG].

For all other switches, the switch is normal if the unit emits a sine-wave sound when you set the switch ON, and stops emitting the sound when you set the switch OFF.

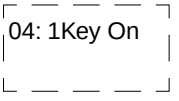
The unit will not respond if you press the wrong switch (a switch other than the switch indicated on the LCD). When all switches have passed the test, the LCD displays OK and the test terminates.

(Judgment result display)

OK

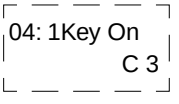
NG No change in display message

4. 1Key On



Check that the keyboard is working correctly.

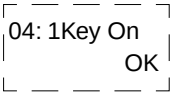
(Testing method)



Press each key as its name appears on the LCD. (The unit will not respond if you press a key other than the one indicated on the LCD.) If the key is operating normally, the unit will emit a sine-wave sound while you hold the key down, and the sound will stop when you release the key, If the check completes normally, the LCD displays OK and the test terminates.

(Judgment result display)

OK



NG No change in display message

5. Keyboard

Check that the keyboard is working correctly.

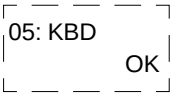
(Testing method)
Play keys C1 to C6 (61 keys in total) sequentially, moving chromatically up the keyboard.

(e.g. the next key switch check is G#3)

Press each key as its name appears on the LCD. (The unit will not respond if you press a key other than the one indicated on the LCD.) If the key is operating normally, the unit will emit a sine-wave sound while you hold the key down, and the sound will stop when you release the key, When all keys have passed the test, the LCD displays OK and the test terminates.

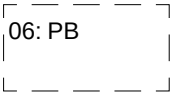
(Judgment result display)

OK



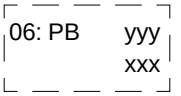
NG No change in display message

6. Pitch Bend



Check that the pitch-bend is working correctly.

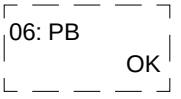
(Testing method)
Slide the pitch bend smoothly from middle to top to bottom (64 to 127 to 00) in accordance with the LCD display.

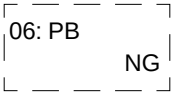


yyy: next target value
xxx: current data value

Check that the values change smoothly, with no snags. When the test is completed, the LCD displays the result (OK or NG).

(Judgment result display)

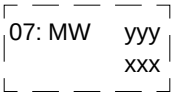
OK 

NG 

7. Modulation Wheel

Check that the modulation wheel is working correctly.

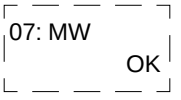
(Testing method)
Slide the modulation wheel smoothly from low to high (00 to 127) in accordance with the LCD display.



yyy: next target value
xxx: current data value

Check that the values change smoothly. If operation is normal, the LCD displays OK and the test terminates.

(Judgment result display)

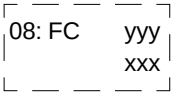
OK 

NG No change in display message

8. Foot Controller

Check that the foot controller is operating correctly.

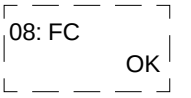
(Testing method)
Connect a foot controller to the [FOOT CONTROLLER] jack, and move the controller smoothly from lowest to highest (00 to 127) in accordance with the LCD display.



yyy: next target value
xxx: current data value

Check that the values change smoothly. If operation is normal, the LCD displays OK and the test terminates.

(Judgment result display)

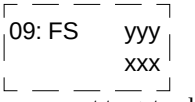
OK 

NG No change in display message

9. Foot Switch

Check that footswitch input is working correctly.

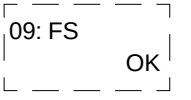
(Testing method)
Connect a footswitch to the [FOOT SWITCH] jack, and confirm that the data value on the LCD changes when you turn the footswitch ON/OFF.



yyy: next target value (on/off)
xxx: current data value (on/off)

If operation is normal, the LCD displays OK and the test terminates.

(Judgment result display)

OK 

NG No change in display message

10. MIDI IN/OUT/THRU

This test uses a test pattern (AA FF 00 55) to check MIDI IN/OUT/THRU operation.

(Testing method)
Connect a MIDI cable to the [MIDI IN] and [MIDI OUT] connectors, and connect a MIDI monitor to the [MIDI THRU] connector. Then start the test. If the test is successful, the MIDI THRU terminal will output the AA FF 00 55 test pattern to the monitor. The LCD displays the results as shown below.

(Judgment result display)

OK
```
10: MIDI
        OK
```

NG
```
10: MIDI
        NG
```

11. HOST SELECT

```
11: HST SEL
```

Check that the [HOST SELECT] switch is working correctly.

(Testing method)
Change the switch to each setting that appears on the LCD display ([OFF], [Mac], [PC-2], [MIDI]).

```
11: HST SEL
       OFF
```

If operation is correct, the unit will emit a sine-wave sound each time you change the setting. Note that when checking the [OFF] switch you must begin with the switch set to a value other than [OFF], so that you can move the switch to the [OFF] position when instructed to do so by the LCD.

Also carry out the following additional checks for each setting.
[Mac]: Turn the target switch of the To Host test jig to "MAC", and confirm that the 1M OUT terminal is outputting 1MH+/-1.0%, with clock duty from 3:7 to 5:5 (1MHz clock low-level width of 300 to 500 nS).
Then turn the target switch to "Others", and confirm that the Open/Short LED goes OFF.
[MIDI]: Turn the target switch of the To Host test jig to "Others", and confirm that the Open/Short LED goes OFF.
[PC-2]: Turn the target switch of the To Host test jig to "Others", and confirm that the Open/Short LED comes ON.

If all switch settings are operating normally, the LCD displays OK and the test terminates.

(Judgment result display)

OK
```
11: HST SEL
        OK
```

NG No change in display message

12. TO HOST

```
12: TO HOST
```

This test checks uses a test pattern (AA 50 5F) to check that [TO HOST] In/Out operation is normal.

(Testing method)
Connect the To Host test jig to the [TO HOST] connector, and set the target switch to "MAC". If the [HOST SELECT] switch to is set to anything other than [Mac], the LCD will display the ">MAC" message. You can start the test by turning switch to [Mac].
If the test result is normal (OK), the LCD then displays the ">PC-2" message. When you see this switch to message, change the [HOST SELECT] to [PC-2] to start the [PC-2] check.
If the [PC-2] operation is normal (OK), turn the [HOST SELECT] switch back to [MIDI]. The LCD displays the test result, and the test terminates.

(Judgment result display)

OK
```
12: TO HOST
        OK
```

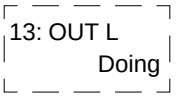
NG
```
12: TO HOST
        NG
```

13. OUTPUL L

```
13: OUT L
```

Check that the [OUTPUT L] and [PHONES (L)] jacks are outputting a normal signal.

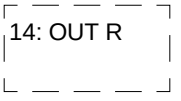
(Testing method)
Using a frequency counter, oscilloscope, and AC voltmeter (with a JIS-C filter), observe the frequency, the output waveform, and the output level of the [OUTPUT L], [OUTPUT R], [PHONES (L)], and [PHONES (R)] jacks. Leave the master volume set to maximum when carrying out these checks. The LCD displays the following to indicate that sound output is in progress.



(Check items)
OUTPUT L: 880Hz +/- 3Hz, sine wave, +6.0 +/- 2dbm (10kohm load)
(reference value: distortion not above 1.0%)
OUTPUT R: Not above -80dbm (10kohm load)
PHONES (L): 880Hz +/- 3Hz, sine wave, -1.0 +/- 2dbm (33ohm load)
(reference value: distortion not above 1.0%)
PHONES (R): Not above -58dbm (33ohm load)

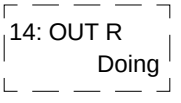
When you are finished, press [EXIT] to stop the sound output and return to the test selection process.

14. OUTPUT R



Check that the [OUTPUT R] and [PHONES (R)] jacks are outputting a normal signal.

(Testing method)
Using an oscilloscope and an AC voltmeter (with a JIS-C filter), observe the waveform and output level of the [OUTPUT L], [OUTPUT R], [PHONES (L)], and [PHONES (R)] jacks. Leave the master volume set to maximum when carrying out these checks. The LCD displays the following to indicate that sound output is in progress.



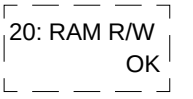
(Check items)
OUTPUT L: Not above -80dbm (10kohm load)
OUTPUT R: 880Hz +/- 3Hz, sine wave, +6.0 +/- 2dbm (10kohm load)
(reference value: distortion not above 1.0%)
PHONES (L): Not above -58dbm (33ohm load)
PHONES(R): 880Hz +/- 3Hz, sine wave, -1.0 +/- 2dbm (33ohm load)
(reference value: distortion not above 1.0%)

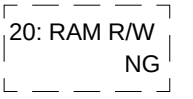
When you are finished, press [EXIT] to stop the sound output and return to the test selection process.

20. RAM(SRAM)

This test executes an SRAM Write/Read/Verify check. The LCD displays the result (OK or NG), and the test terminates.

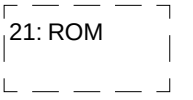
(Judgment result display)

OK 

NG 

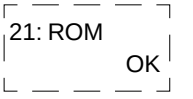
* All original RAM data is preserved: the original data is saved out before each check, then written back afterwards.

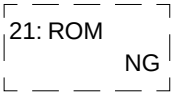
21. ROM(ProgramROM)



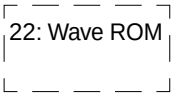
This test checks the Program ROM's ID (RY/BY_ operation check (write to specified address)). The LCD displays the result (OK or NG), and the test terminates.

(Judgment result display)

OK 

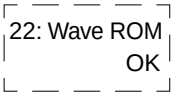
NG 

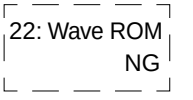
22. Wave ROM



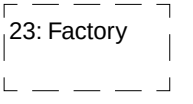
This test checks the data in Wave ROM addresses. The LCD displays the result (OK or NG), and the test terminates.

(Judgment result display)

OK 

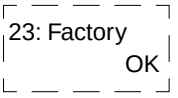
NG 

23. Factory Set



Press [ENTER] to restore the unit to its factory settings and terminate test mode.

(Judgment result display)



24. Exit

Press [ENTER] to exit from test mode.

* On termination of test mode, the unit carries out its normal power-up sequence.
* If you have restored factory settings (Factory Set operation, above), then after exiting test mode please confirm that the noise level (with all notes off) meets the following conditions. (Use an AC voltmeter with a JIS-C filter to make the check.)

  OUTPUT L: Not above -87.0dbm (10kohm load)
  OUTPUT R: Not above -87.0dbm (10kohm load)
  PHONES (L): Not above -94.0dbm (33ohm load)
  PHONES (R): Not above -94.0dbm (33ohm load)

* Consumed current: 290mA +/- 10% (as measured at the [DC IN] connector)
* To initialize: To force reinitialization, hold down buttons [7], [8], and [9] while turning the power on.

FACTORY SET

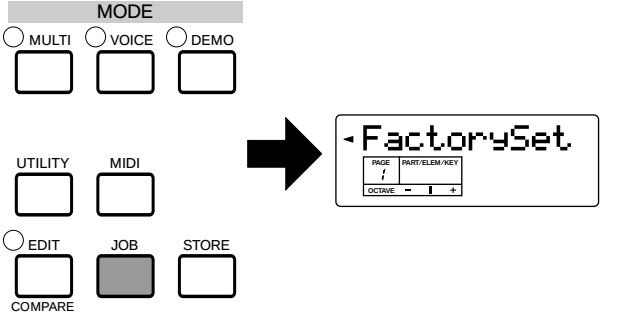
This lets you restore the synthesizer's default Internal Voices (User Memory) and Multis, as well as its System and other settings.

Once you edit any settings, the corresponding factory defaults will be overwritten and lost.

Use the procedure below to restore the factory default settings.

⚠ When you restore the factory default settings, all the current settings for the all the Multis and User Voices will be overwritten with the factory defaults. Make sure you are not overwriting any important data. You should back up any important data to your computer or to some external device beforehand.

❶ Press the [JOB] button in Utility Mode. The Factory Set display appears.



❷ Press the [ENTER] button. A confirmation message appears.

❸ Press the [INC/YES] button to execute the Factory Set job. After the job has been completed, a "Completed!" message appears. To cancel a job while it is being executed, press the [DEC/NO] button.

❹ Press the [EXIT] button to return to the Utility mode.

DISPLAY MESSAGES

Message	Meaning
Bulk Tx...	MIDI Bulk data being transmitted.
Bulk Rx...	MIDI Bulk data being received.
Excuting..	Operation is being executed.
Completed!	Operation has been completed.
!Buff Full	Failed to process the MIDI data because too much data was received at once.
!MIDI Data	Error occurred when receiving MIDI data.
!Checksum	Error occurred when receiving bulk data.
!DeviceNum	Bulk data cannot be transmitted/received because the device number does not match or is set to “off.”
Sure?	Final confirmation.
Host:MIDI	HOST SELECT switch has been set to “MIDI.”
Host:PC2	HOST SELECT switch has been set to “PC2.”
Host:Mac	HOST SELECT switch has been set to “Mac.”
Host:off	HOST SELECT switch has been set to “off.”
!BatteryLo	The memory-backup battery is low; memory cannot be backed up. Store the necessary data to a MIDI data storage device such as Yamaha MIDI Data Filer MDF3, and have the battery changed.

Function...		Transmitted	Recognized	Remarks
Basic	Default	1 - 16	1 - 16	Memorized
Channel	Changed	1 - 16	1 - 16	
Mode	Default	3	3	Memorized
	Messages	×	1 - 4(m=1) *2	
	Altered	**********	×	
Note Number : True voice		0 - 127 **********	0 - 127 0 - 127	
Velocity	Note ON	○ 9nH,v=1-127	○ 9nH,v=1-127	
	Note OFF	× 9nH,v=0	×	
After Touch	Key's	×	○ *1	
	Ch's	○ *3	○ *1	
Pitch Bend		○	○ 0-24 semi *1	
Control Change	0,32	○	○ *1	Bank Select
	1,5,7,10,11	×	○ *1	
	6,38	×	○ *1	Data Entry
	64-67	×	○ *1	
	71-74	×	○ *1	Sound Controller
	84	×	○ *1	Portamento Cntrl
	91,93,94	×	○ *1	Effect Depth
	96-97	×	○ *1	RPN Inc,Dec
	98-99	×	○ *1	NRPN LSB,MSB
	100-101	×	○ *1	RPN LSB,MSB
	1-31,33-95	○	○ *1	Assignable Cntrl
Prog Change : True #		○ 0 - 127 **********	○ 0 - 127 0 - 127	
System Exclusive		○	○	
Common	: Song Pos.	×	×	
	: Song Sel.	×	×	
	: Tune	×	×	
System	: Clock	×	×	
Real Time	: Commands	×	×	
Aux Mes-sages	: All Sound Off	×	○ (120,126,127)	
	: Reset All Cntrls	×	○ (121)	
	: Local ON/OFF	×	×	
	: All Notes OFF	×	○ (123-125)	
	: Active Sense	○	○	
	: Reset	×	×	

Notes:
*1 receive if switch is on.
*2 m is always treated as "1" regardless of its value.
*3 though the keyboard itself has no after touch, after touch data can be transmitted from MW and FC when after touch is assigned to the controllers.

Mode 1 : OMNI ON , POLY Mode 2 : OMNI ON ,MONO ○ : Yes
Mode 3 : OMNI OFF, POLY Mode 4 : OMNI OFF,MONO × : No

MIDI DATA FORMAT

1. Channel messages

1.1 Note on/note off

These messages convey keyboard performance data.

Range of note numbers received = 0 (C-2)...60 (C3)...127 (G8)
Velocity range = 1...127 (Velocity is received only for note-on)

When the Multi Part parameter "Rcv NOTE MESSAGE" = OFF, that part will not receive these messages.
For a drum part*, key-off is not received if the DrumSetup parameter Rcv NOTE OFF = OFF.
For a drum part, key-on is not received if the DrumSetup parameter Rcv NOTE ON = OFF.

* Drum Part indicates that the Multi Part parameter PART MODE is "set to DRUM, DRUMS1, DRUMS2."

1.2 Control changes

These messages control volume or pan etc.

Their functions are differentiated by the control number (Ctrl#).
If the Multi Part parameter Rcv CONTROL CHANGE = OFF, that part will not receive control changes.

1.2.1 Bank Select

This message selects the voice bank.

Control#	Parameter	Data Range
0	Bank Select MSB	0, 63, 64, 126, 127 (Normal voice, Native voice, SFX voice, SFX kit, Drum kit)
32	Bank Select LSB	0...127

The Bank Select data will be processed only after a Program Change is received, and then voice bank will change at that time.
If you wish to change the voice bank as well as the voice, you must transmit Bank Select and Program Change messages as a set, in the order of Bank Select MSB, LSB, and Program Change.

Not received when Receive Bank Select in Native System Parameters is set to off.

1.2.2 Modulation

This message is used primarily to control the depth of vibrato, but the depth of the following 7 types of effect can be controlled.

The effect of this message can be changed by the following parameters.
- Multi Part Parameter
  1. MW PITCH CONTROL
  2. MW FILTER CONTROL
  3. MW AMPLITUDE CONTROL
  4. MW LFO PMOD DEPTH
  5. MW LFO FMOD DEPTH
  6. MW LFO AMOD DEPTH
- Effect1 Parameter
  7. MW VARIATION CONTROL DEPTH
     (Valid when Variation Effect is assigned to a part as Insertion)

Control#	Parameter	Data Range
1	Modulation	0...127

If the Multi Part parameter Rcv MODULATION = OFF, that part will not receive Modulation.
If the receive channel is a drum part, effects 5 and 6 will not apply.

1.2.3 Portamento Time

This message controls the degree of Portamento (refer to 1.2.9).

Control#	Parameter	Data Range
5	Portamento Time	0...127

When Portamento (control number 065) is ON, this regulates the speed of the pitch change.
A value of 0 is the shortest portamento time, and 127 is the longest portamento time.
If the receive channel is a drum part, Portamento Time is not received.

1.2.4 Data Entry

This message sets the value of the parameter which was specified by RPN MSB/LSB (see 1.2.22) and NRPN MSB/LSB (see 1.2.21).

Control#	Parameter	Data Range
6	Data Entry MSB	0...127
38	Data Entry LSB	0...127

1.2.5 Main Volume

This message controls the volume of each part.
This is used to adjust the volume balance between parts.

Control#	Parameter	Data Range
7	Main Volume	0...127

When the Multi Part parameter Rcv VOLUME = OFF, that part will not receive Main Volume.
With a value of 0 there will be no sound, and a value of 127 will be the maximum volume.

1.2.6 Panpot

This message control the panning (stereo location) of each part.

Control#	Parameter	Data Range
10	Pan	0...64...127

When the Multi Part parameter Rcv PAN = OFF, that part will not receive Panpot.
0 is left, 64 is center, and 127 is right.

1.2.7 Expression

This message controls expression (dynamics within a musical line) for each part.
It is used to create volume changes during a song.

Control#	Parameter	Data Range
11	Expression	0...127

If the Multi Part parameter Rcv EXPRESSION = OFF, that part will not receive Expression.

1.2.8 Hold1

This message controls sustain pedal on/off.

Control#	Parameter	Data Range
64	Hold1	0...63,64...127 (OFF, ON)

When this is ON, currently-sounding notes will continue to sound even if note-off messages are received.
If the Multi Part parameter Rcv HOLD1 = OFF, that part will not receive Hold1.

1.2.9 Portamento

This message controls portamento on/off.

Control#	Parameter	Data Range
65	Portamento	0...63,64...127 (OFF, ON)

When this is ON, the pitch will change smoothly between notes. The time over which the pitch changes is adjusted by Portamento Time (see 1.2.3). Also, when the Multi Part parameter MONO/POLY MODE = MONO, the tone will also change smoothly (legato) if Portamento = ON.
If any of the following Multi Part parameter settings apply, that part will not receive Portamento.
- Rcv PORTAMENTO = OFF
- PART MODE=DRUM, DRUMS1, 2

1.2.10 Sostenuto

This message controls sostenuto pedal on/off.

Control#	Parameter	Data Range
66	Sostenuto	0...63,64...127 (OFF, ON)

If sostenuto is turned on while a note is sounding, that note will be sustained until sostenuto is turned OFF.
Sostenuto for the specified part is not received when Rcv SOSTENUTO of the part in Multi Part Parameters is set to off.

1.2.11 Soft Pedal

This message controls soft pedal on/off.

Control#	Parameter	Data Range
67	Soft Pedal	0...63,64...127 (OFF, ON)

The sound will become mellower when Soft Pedal is ON.
If any of the following Multi Part parameter settings apply, that part will not receive the Soft Pedal.
- Rcv SOFT PEDAL=OFF
- PART MODE=DRUM, DRUMS1, 2

1.2.12 Harmonic Content

This message adjusts the resonance of the filter that is specified for the sound.

Control#	Parameter	Data Range
71	Harmonic Content	0...64...127 (-64...0...+63)

Since this is a relative change parameter, it specifies a boost or cut relative to 64.
Higher values will produce a more distinctive sound.
For some sounds, the effective range may be less than the possible range of settings.

1.2.13 Release Time

This message adjusts the EG release time that was specified by the sound data.

Control#	Parameter	Data Range
72	Release Time	0...64...127 (-64...0...+63)

Since this is a relative change parameter, it specifies an increase or decrease relative to 64.
Increasing this value will lengthen the release that follows a note-off.

1.2.14 Attack Time

This message adjusts the EG attack time that was specified by the sound data.

Control#	Parameter	Data Range
73	Attack Time	0...64...127 (-64...0...+63)

Since this a relative change parameter, it specifies an increase or decrease relative to 64.
Increasing this value will make the attack more gradual, and decreasing this value will make the attack sharper.

1.2.15 Brightness

This message adjusts the cutoff frequency of the low pass filter specified by the sound data.

Control#	Parameter	Data Range
74	Brightness	0...64...127 (-64...0...+63)

Since this is a relative change parameter, it specifies an increase or decrease relative to 64.
Lower values will produce a more mellow sound.
For some sounds, the effective range may be less than the possible range of settings.

1.2.16 Portamento Control

This message specifies the portamento source key number (the key number at which portamento will begin).
Data of 0...127 specifies the portamento source key.
When Portamento Control is received, the currently-sounding pitch will change at a Portamento Time of 0 to the key of the next-received note-on of the same channel.

Control#	Parameter	Data Range
84	Portamento Control	0...127 (C-2...G8)

This is received even if Rcv PORTAMENTO = OFF.

1.2.17 Effect1 Depth (Reverb Send Level)

This message specifies the send level for the reverb effect.

Control#	Parameter	Data Range
91	Effect1 Depth	0...127

Increasing this value will produce a richer reverb. The effect of the value will depend on the state of the reverb effect.

1.2.18 Effect3 Depth (Chorus Send Level)

This message specifies the send level for the chorus effect.

Control#	Parameter	Data Range
93	Effect3 Depth	0...127

Raising this value will increase the modulation or spaciousness. The effect of the value will depend on the state of the chorus effect.

1.2.19 Effect4 Depth (Variation Effect Send Level)

This message specifies the send level for the variation effect.

Control#	Parameter	Data Range
94	Effect4 Depth	0...127

However, this is not received if the Variation Effect parameter Variation Connection = 0 (Insertion).

1.2.20 Data Increment/Decrement (for RPN)

This message increases or decreases the parameter value specified for RPN (see 1.2.22), by increments of 1.

Control#	Parameter	Data Range
96	RPN Increment	--
97	RPN Decrement	--

The data byte is ignored.

1.2.21 NRPN (Non-registered parameter number)

This message is used to specify a sound parameter (such as vibrato, filter, EG, drum setup etc.) as an offset value.
Use NRPN MSB and NRPN LSB to specify the parameter that you wish to modify, and then use Data Entry (see 1.2.4) to set the value for the specified parameter.

Control#	Parameter	Data Range
98	NRPN LSB	0...127
99	NRPN MSB	0...127

If the Multi Part parameter Rcv NRPN = OFF, that part will not receive NRPN.

The following NRPN messages can be received.

NRPN MSB LSB	Data Entry*1 MSB LSB	Parameter name and value range
01H 08H	mm -- *2	Vibrato rate mm : 00H - 40H - 7FH (-64...0...+63)
01H 09H	mm --	Vibrato depth mm : 00H - 40H - 7FH (-64...0...+63)
01H 0AH	mm -- *3	Vibrato delay mm : 00H - 40H - 7FH (-64...0...+63)
01H 20H	mm --	Low pass filter cutoff frequency mm : 00H - 40H - 7FH (-64...0...+63)
01H 21H	mm --	Low pass filter resonance mm : 00H - 40H - 7FH (-64...0...+63)
01H 63H	mm --	EG attack time mm : 00H - 40H - 7FH (-64...0...+63)
01H 64H	mm --	EG decay time mm : 00H - 40H - 7FH (-64...0...+63)
01H 66H	mm --	EG release time mm : 00H - 40H - 7FH (-64...0...+63)
14H rr	mm --	Drum low pass filter cutoff frequency rr : drum instrument note number mm : 00H - 40H - 7FH (-64...0...+63)
15H rr	mm --	Drum low pass filter resonance rr : drum instrument note number mm : 00H - 40H - 7FH (-64...0...+63)
16H rr	mm --	Drum EG attack rate rr : drum instrument note number mm : 00H - 40H - 7FH (-64...0...+63)
17H rr	mm --	Drum EG decay rate rr : drum instrument note number mm : 00H - 40H - 7FH (-64...0...+63) The effect will apply both to Decay 1 and 2.
18H rr	mm --	Drum instrument pitch coarse rr : drum instrument note number mm : 00H - 40H - 7FH (-64...0...+63)
19H rr	mm --	Drum instrument pitch fine rr : drum instrument note number mm : 00H - 40H - 7FH (-64...0...+63)
1AH rr	mm --	Drum instrument level rr : drum instrument note number mm : 00H - 7FH (0...maximum)
1CH rr	mm --	Drum instrument panpot rr : drum instrument note number mm : 00H, 01H-40H-7FH (RND, L63...C...R63)
1DH rr	mm --	Drum instrument reverb send level rr : drum instrument note number mm : 00H - 7FH (0...maximum)
1EH rr	mm --	Drum instrument chorus send level rr : drum instrument note number mm : 00H - 7FH (0...maximum)
1FH rr	mm --	Drum instrument variation send level rr : drum instrument note number mm : 00H - 7FH (0...maximum) (when Variation Connection = SYSTEM) mm : 00H, 01H-7FH (OFF, ON) (when Variation Connection = INSERTION)

MSB 14H - 1FH (for drums) is received when Multi Part parameter PART MODE = DRUMS1, 2.

*1 Refer to 1.2.4
*2 '--' indicates that the setting value is ignored.
*3 Adjusts the time after the note is played until vibrato begins to take effect. The effect will begin more quickly for higher values, and more slowly for higher values.

1.2.22 RPN (Registered parameter number)

This message is used to specify part parameters such as Pitch Bend Sensitivity or Tuning etc. as an offset value.
Use RPN MSB and RPN LSB to specify the parameter that you wish to modify, and then use Data Entry (see 1.2.4) to set the value of the specified parameter.

Control#	Parameter	Data Range
100	RPN LSB	0...127
101	RPN MSB	0...127

If the Multi Part parameter Rcv RPN = OFF, that part will not receive this message.

The following RPN messages can be received.

NRPN MSB LSB	Data Entry*1 MSB LSB	Parameter name and value range
00H 00H	mm -- *2	Pitch bend sensitivity mm:00-18H (0...+24 semitones) Specify up to 2 octaves in semitone steps\
00H 01H	mm ll	Fine tuning mm ll: 00H 00H -100 cents : : mm ll: 40H 00H 0 cents : : mm ll: 7FH 7FH +100 cents [Note] mm ll: 00H 7FH (= -87.5) cents is followed by 01H 00H (= -87.4) cents.
00H 02H	mm --	Coarse tuning mm:28H - 40H - 58H (-24...0...+24 semitones)
7FH 7FH	-- --	RPN Null This sets RPN and NRPN numbers to an unset state. Internal data is not affected.

*1 Refer to 1.2.4
*2 '--' indicates that the setting value is ignored.

1.2.23 Assignable controller

By assigning a control change number of 0...95 to a part, the specified effect can be controlled.
This device allows two control change numbers (AC1 and AC2) to be specified for each part.
The following parameters specify the effect of AC1 and AC2.

- Multi Part Parameter
  1. AC1, AC2 PITCH CONTROL
  2. AC1, AC2 FILTER CONTROL
  3. AC1, AC2 AMPLITUDE CONTROL
  4. AC1, AC2 LFO PMOD DEPTH
  5. AC1, AC2 LFO FMOD DEPTH
  6. AC1, AC2 LFO AMOD DEPTH
- Effect1 Parameter
  7. AC1, AC2 VARIATION CONTROL DEPTH
     (Valid if Variation Effect is assigned to a part as Insertion)

The AC1 control change number is specified by the Multi Part parameter AC1 CONTROLLER NUMBER, and the AC2 control change number is specified by the Multi Part parameter AC2 CONTROLLER NUMBER.

1.3 Channel mode messages

These messages specify the basic operation of a part.

1.3.1 All Sound Off

This message silences all currently-sounding notes on the corresponding channel. However, the settings of channel messages such as Hold 1 and Sostenuto will be maintained.

Control#	Parameter	Data Range
120	All Sound Off	0

1.3.2 Reset All Controllers

This message resets the following controllers to their default values.

Controller	Value
Pitch bend change	±0 (center)
Channel Aftertouch	0 (off)
Polyphonic Aftertouch	0 (off)
Modulation	0 (off)
Expression	127 (maximum)
Hold	0 (off)
Portamento	0 (off)
Sostenuto	0 (off)
Soft pedal	0 (off)
Portamento control	Reset the portamento source note number that was received.
RPN	Number unset, internal data is not affected.
NRPN	Number unset, internal data is not affected.

The following data is not changed.
Parameter values specified by program change, bank select MSB/LSB, volume, pan, effect send levels 1, 3, 4, RPN and NRPN.

Control#	Parameter	Data Range
121	Reset All Controllers	0

1.3.3 All Note Off

This message turns off all notes which are currently on for the corresponding part. However, if Hold 1 or Sostenuto are on, notes will continue to sound until these are turned off.

Control#	Parameter	Data Range
123	All Note Off	0

1.3.4 Omni Off

Perform the same processing as when All Note Off is received.

Control#	Parameter	Data Range
124	Omni Off	0

1.3.5 Omni On

Perform the same processing as when All Note Off is received.

Control#	Parameter	Data Range
125	Omni On	0

1.3.6 Mono

Perform the same processing as when All Sound Off is received, and if the value (mono number) is in the range of 0...16, set the corresponding channel to Mode4* (m = 1).

Control#	Parameter	Data Range
126	Mono	0...16

*Mode4 is a state in which only channel messages on the specified channel will be received, and notes will be sounded individually (monophonically).

1.3.7 Poly

Perform the same processing as when All Sound Off is received, and set the corresponding channel to Mode3*.

Control#	Parameter	Data Range
127	Poly	0

*Mode3 is when channel messages will be received only on the specified channel, and will be sounded polyphonically.

1.4 Program change

This message reports sound selection changes and changes the program number of the receiving channel.

In order to include changes to the voice bank, Program Change and Bank Select messages must be sent as a set (see 1.2.1).
When RevPROGRAM CHANGE = OFF for Multi Part Parameter, the program change for that part is not received.
Not received when Receive Program Change in Native System Parameters is set to off.

1.5 Pitch bend

This message conveys movements of the pitch bender.

This message is generally used to modify the pitch of a part, but the depth of the following seven effects can be controlled.
The effect of this message can be modified by the following parameters.
• Multi Part Parameter
1. BEND PITCH CONTROL
2. BEND FILTER CONTROL
3. BEND AMPLITUDE CONTROL
4. BEND LFO PMOD DEPTH
5. BEND LFO FMOD DEPTH
6. BEND LFO AMOD DEPTH
• Effect1 Parameter
7. BEND VARIATION CONTROL DEPTH
(Valid when Variation Effect is assigned to a part as Insertion)
By default, the Pitch Control effect is applied.
If the receive channel is a drum part, effects 5 and 6 will not apply.
If the Multi Part parameter Rcv PITCH BEND CHANGE = OFF, that part will not receive pitch bend messages.

1.6 Channel aftertouch (Receive only)

This message conveys the pressure which is applied to the keyboard after playing a note in order to create tonal changes (for an entire MIDI channel).

The pressure can be controlled for each part. This message will affect the currently-sounding notes.
The effect of this message will be determined by the settings of the following parameters.
• Multi Part Parameter
1. CAT PITCH CONTROL
2. CAT FILTER CONTROL
3. CAT AMPLITUDE CONTROL
4. CAT LFO PMOD DEPTH
5. CAT LFO FMOD DEPTH
6. CAT LFO AMOD DEPTH
• Effect1 Parameter
7. CAT VARIATION CONTROL DEPTH
(Valid when the Variation Effect is assigned to a part as Insertion)
By default, there will be no effect.
If the receive channel is a drum part, effects 5 and 6 will not apply.
If the Multi Part parameter Rcv CHANNEL AFTER TOUCH = OFF, that part will not receive Channel Aftertouch.

1.7 Polyphonic aftertouch (Receive only)

This message conveys the pressure that is applied to the keyboard after playing a note (for individual note numbers).

The pressure can be controlled independently for each note. This message will affect currently-sounding notes.
The effect of this message is determined by the following Multi Part parameters.
1. PAT PITCH CONTROL
2. PAT FILTER CONTROL
3. PAT AMPLITUDE CONTROL
4. PAT LFO PMOD DEPTH
5. PAT LFO FMOD DEPTH
6. PAT LFO AMOD DEPTH
By default, there will be no effect.
The effect will apply to note numbers 36...97.
In the case of either of the following Multi Part parameter settings, that part will not receive Polyphonic Aftertouch.
Rcv CHANNEL AFTER TOUCH = OFF
PART MODE = DRUM, DRUMS1, 2

2. System exclusive messages

2.1 Parameter changes

This devices uses the following parameter changes.

[UNIVERSAL REALTIME MESSAGE]
1) Master Volume

[UNIVERSAL NON REALTIME MESSAGE]
1) General MIDI System On

[XG PARAMETER CHANGE]
1) XG System on
2) XG System parameter change
3) Multi Effect1 parameter change
4) Multi Part parameter change
5) Drums Setup parameter change

[NATIVE PARAMETER CHANGE]
1) Native System parameter change
2) Remote Switch parameter change
3) Normal Voice parameter change
4) Drum Voice parameter change

[Others]
1) Master tuning

2.1.1 Universal realtime messages

2.1.1.1 Master Volume

```
11110000        F0H         = Exclusive status
01111111        7FH         = Universal Real Time
01111111        7FH         = ID of target device
00000100        04H         = Sub-ID #1=Device Control Message
00000001        01H         = Sub-ID #2=Master Volume
*0sssssss       SSH         = Volume LSB
0ttttttt        TTH         = Volume MSB
11110111        F7H         = End of Exclusive
```

or,

```
11110000        F0H         = Exclusive status
01111111        7FH         = Universal Real Time
0xxxnnnn        XNH         = n:Device Number, x=don't care
00000100        04H         = Sub-ID #1=Device Control Message
00000001        01H         = Sub-ID #2=Master Volume
0sssssss        SSH         = Volume LSB
0ttttttt        TTH         = Volume MSB
11110111        F7H         = End of Exclusive
```

When this is received, the Volume MSB will be reflected by the System parameter MASTER VOLUME.

*The binary expression 0sssssss is expressed in hexadecimal as SSH. The same applies elsewhere.

2.1.2 Universal non-realtime messages

2.1.2.1 General MIDI System On

```
11110000        F0H         = Exclusive status
01111110        7EH         = Universal Non-Real Time
01111111        7FH         = ID of target device
00001001        09H         = Sub-ID #1=General MIDI Message
00000001        01H         = Sub-ID #2=General MIDI On
11110111        F7H         = End of Exclusive
```

or,

```
11110000        F0H         = Exclusive status
01111110        7EH         = Universal Non-Real Time
0xxxnnnn        XNH         = n:Device Number, x:don't care
00001001        09H         = Sub-ID #1=General MIDI Message
00000001        01H         = Sub-ID #2=General MIDI On
11110111        F7H         = End of Exclusive
```

When this message is received, the SOUND MODULE MODE is set to XG, and all MIDI messages defined by GM will be received.
All data except for MIDI Master Tuning will be restored to the default value.
Since approximately 50[ms] is required in order to process this message, be sure to allow an appropriate interval before sending the next message.

2.1.2.2 Identity Request

```
11110000        F0H         = Exclusive status
01111110        7EH         = Universal Non-Real Time
0mmmmmmm        MMH         = Device Number
00000110        06H         = Sub-ID #1=General Information
00000001        01H         = Sub-ID #2=Identity Request
11110111        F7H         = End of Exclusive
```

When this message is received, this device will transmit an Identity Reply message as described in the following section2.1.2.3.

2.1.2.3 Identity Reply

```
11110000        F0H         = Exclusive status
01111110        7EH         = Universal Non-Real Time
0mmmmmmm        MMH         = Device Number
00000110        06H         = Sub-ID #1=General Information
00000010        02H         = Sub-ID #2=Identity Reply
01000011        43H         = YAMAHA ID
00000000        00H         = Device Family Code LSB S03 ID #1
01000001        41H         = Device Family Code MSB S03 ID #2
01110111        77H         = Device Number Code LSB S03 ID #3
00000100        04H         = Device Number Code MSB S03 ID #4
00000000        00H
00000000        00H
00000000        00H
00000001        01H         = Tone Generator Code=XG
11110111        F7H         = End of Exclusive
```

This device will transmit this message when it receives the Identity Request message of 2.1.2.2.

2.1.3 XG parameter change

This message sets XG-related parameters. Each message can set a single parameter.
The message format is as follows.

```
11110000        F0H         Exclusive status
01000011        43H         YAMAHA ID
0001nnnn        1NH         N:device Number
01001100        4CH         Model ID
0ggggggg        GGH         Address High
0mmmmmmm        MMH         Address Mid
0lllllll        LLH         Address Low
0sssssss        SSH         Data
    :            :
11110111        F7H         End of Exclusive
```

For parameters whose Data Size is 2 or 4, the appropriate amount of data will be transmitted as indicated by Size

2.1.3.1 XG System On

```
11110000        F0H         Exclusive status
01000011        43H         YAMAHA ID
0001nnnn        1NH         N:device Number
01001100        4CH         Model ID
00000000        00H         Address High
00000000        00H         Address Mid
01111110        7EH         Address Low
00000000        00H         Data
11110111        F7H         End of Exclusive
```

When On is received, the SOUND MODULE MODE will be set to XG.
Since approximately 50[ms] are required in order to execute this message, please allow an appropriate interval before transmitting the next message.

2.1.3.2 XG System parameter change

This message sets the XG SYSTEM block (refer to tables <1-1>, <1-2>).

2.1.3.3 Multi Effect1 parameter change

This message sets the MULTI EFFECT1 block (refer to tables <1-1>, <1-4>).
The S03 responds to this message only when it is set to the Multi mode.

2.1.3.4 Multi Part parameter change

This message sets the MULTI PART block (refer to tables <1-1>, <1-5>).
The S03 responds to this message only when it is set to the Multi mode.

2.1.3.5 Drums Setup parameter change

This message sets the DRUMS SETUP block (refer to tables <1-1>, <1-6>).
The S03 responds to this message only when it is set to the Multi mode.

2.1.4 S03 native parameter change

This message sets parameters unique to the S03. Each message sets a single parameter.
Each message modifies a single parameter.
The message format is as follows.

```
11110000        F0H         Exclusive status
01000011        43H         YAMAHA ID
0001nnnn        1NH         N:device Number
01101100        6CH         Model ID
0ggggggg        GGH         Address High
0mmmmmmm        MMH         Address Mid
0lllllll        LLH         Address Low
0sssssss        SSH         Data
    :            :
11110111        F7H         End of Exclusive
```

For parameters whose Data Size is 2 or 4, the number of data bytes indicated by Size are transmitted.

2.1.4.1 Native System parameter change

This message sets the NATIVE SYSTEM block (refer to tables <2-1>, <2-3>).

2.1.4.2 Remote Switch parameter change

This message sets the REMOTE SWITCH block(refer to tables <2-1>, <2-5>).

2.1.4.3 Normal Voice parameter change

This message sets the NORMAL VOICE (Edit Buffer) block (refer to tables <2-1>, <2-9>, <2-10>).
The S03 responds to this message only when it is set to the Voice mode.

2.1.4.4 Drum Voice parameter change

This message sets the Drum VOICE (Edit Buffer) block (refer to tables <2-1>, <2-11>, <2-12>).
The S03 responds to this message only when it is set to the Voice mode.

2.1.5 Other parameter changes

2.1.5.1 Master tuning

This message simultaneously modifies the tuning of all channels.

```
11110000        F0H         Exclusive status
01000011        43H         YAMAHA ID
0001nnnn        1NH         N:device Number
00100111        27H         Model ID
00110000        30H         Address High
00000000        00H         Address Mid
00000000        00H         Address Low
0000mmmm        0MH         Master Tune MSB
0000llll        0LH         Master Tune LSB
0xxxxxxx        XXH         don't care
11110111        F7H         End of Exclusive
```

Normally, the XG SYSTEM message MASTER TUNE should be used (refer to table <1-2>).

2.2 Bulk dump

This device uses the following bulk dump messages.

[XG BULK DUMP]
1) XG System bulk dump
2) System Information bulk dump
3) Multi Effect1 bulk dump
4) Multi Part bulk dump
5) Drums Setup bulk dump

[NATIVE BULK DUMP]
1) Native System bulk dump
2) Bulk Control bulk dump
3) Native Multi bulk dump
4) Normal Voice bulk dump
5) Drum Voice bulk dump

2.2.1 XG bulk dump

This message sets XG-related parameters. Unlike parameter change messages, a single message can modify multiple parameters. The message format is as follows.

11110000	F0H	Exclusive status
01000011	43H	YAMAHA ID
0000nnnn	0NH	N:Device Number
01001100	4CH	Model ID
0sssssss	SSH	ByteCountMSB
0ttttttt	TTH	ByteCountLSB
0ggggggg	GGH	Address High
0mmmmmmm	MMH	Address Mid
0lllllll	LLH	Address Low
0vvvvvvv	VVH	Data
:	:	
0kkkkkkk	KKH	Check-sum
11110111	F7H	End of Exclusive

Address and Byte Count are given in tables 1-n. Byte Count is indicated by the total size of the Data in tables 1-n.
Bulk dump and dump request messages are received when the beginning of the block is specified as the 'Address'.
'Block' indicates the unit of the data string that is indicated in tables 1-n as 'Total size'.
Check sum is the value that produces a lower 7 bits of 0 when the Start Address, Byte Count, Data, and the Check-sum itself are added.

2.2.1.1 XG System bulk dump

This message sets the XG SYSTEM block (refer to tables <1-1>, <1-2>).

2.2.1.2 System Information bulk dump

This message indicates the contents of the SYSTEM INFORMATION block (refer to tables <1-1>, <1-3>).
This message is transmitted in response to a Dump Request, but this message will be ignored if it is received.

2.2.1.3 Multi Effect1 bulk dump

This message sets the MULTI EFFECT1 block (refer to tables <1-1>, <1-4>).

2.2.1.4 Multi Part bulk dump

This message sets the MULTI PART block (refer to tables <1-1>, <1-5>).

2.2.1.5 Drums Setup bulk dump

This message sets the DRUMS SETUP block (refer to tables <1-1>, <1-6>).

2.2.2 S03 native bulk dump

This message modifies parameters unique to the S03.Unlike parameter change messages, a single message will modify multiple parameters.
The message format is as follows.

11110000	F0H	Exclusive status
01000011	43H	YAMAHA ID
0000nnnn	0NH	N:Device Number
01101100	6CH	Model ID
0sssssss	SSH	ByteCountMSB
0ttttttt	TTH	ByteCountLSB
0ggggggg	GGH	Address High
0mmmmmmm	MMH	Address Mid
0lllllll	LLH	Address Low
0vvvvvvv	VVH	Data
:	:	
0kkkkkkk	KKH	Check-sum
11110111	F7H	End of Exclusive

Address and Byte Count are given in tables x-n. Byte Count is indicated by the total size of the Data in tables x-n.
Bulk dump and dump request messages are received when the beginning of the block is specified as the 'Address'.
Block indicates the unit of the data string that is indicated in tables x-n as 'Total size'.
Check sum is the value that produces a lower 7 bits of 0 when the Start Address, Byte Count, Data, and the Check-sum itself are added.

2.2.2.1 Native System bulk dump

This message sets the NATIVE SYSTEM block (refer to tables <2-1>, <2-2>, <2-3>).

2.2.2.2 Bulk Control bulk dump

Bulk Control bulk dump This message sets the parameters such as Multi Number, Memory Bank and Voice Number when the Native Multi bulk dump, Normal Voice bulk dump or Drum Voice Bulk dump is received (refer to tables <2-1>, <2-2>, <2-4>).

2.2.2.3 Native Multi bulk dump

This message sets the NATIVE MULTI block (refer to tables <2-1>, <2-2>, <2-6>, <2-7>, <2-8>).
To receive this message, the Bulk Header and Bulk Footer of Bulk Control must be received before and after reception, respectively.
The Bulk Header determines the Multi number to which the data is stored.

2.2.2.4 Normal Voice bulk dump

This message sets the NORMAL VOICE block (refer to tables <2-1>, <2-2>, <2-9>, <2-10>).
To receive this message, the Bulk Header and Bulk Footer of Bulk Control must be received before and after reception, respectively.
The Bulk Header determines the Memory Bank/Voice number to which the data is stored.

2.2.2.5 Drum Voice bulk dump

This message sets the NORMAL VOICE block (refer to tables <2-1>, <2-2>, <2-11>, <2-12>).
To receive this message, the Bulk Header and Bulk Footer of Bulk Control must be received before and after reception, respectively.
The Bulk Header determines the Memory Bank/Voice number to which the data is stored.

2.3 Parameter request

This message requests transmission of a parameter value.
The output is transmitted in the Parameter Change message format (refer to 2.1.x).

2.3.1 XG parameter request

This message requests transmission of XG parameter settings.
Settings are transmitted in the format of an XG parameter change (refer to 2.1.3).

11110000	F0H	Exclusive status
01000011	43H	YAMAHA ID
0001nnnn	3NH	N:device Number
01001100	4CH	Model ID
0ggggggg	GGH	Address High
0mmmmmmm	MMH	Address Mid
0lllllll	LLH	Address Low
11110111	F7H	End of Exclusive

2.3.2 S03 native parameter request

This message requests transmission of a parameter value unique to the S03.
The output is transmitted in the format of a S03 native parameter change (refer to 2.1.4).

11110000	F0H	Exclusive status
01000011	43H	YAMAHA ID
0001nnnn	3NH	N:device Number
01101100	6CH	Model ID
0ggggggg	GGH	Address High
0mmmmmmm	MMH	Address Mid
0lllllll	LLH	Address Low
11110111	F7H	End of Exclusive

2.4 Dump request

This message requests transmission of a specific block of parameter values.
The output is the same as the bulk dump format.

2.4.1 XG dump request

This message requests transmission of all parameters of the specified block of XG parameters.
The output is the same as the format of XG bulk dump (refer to 2.2.1).

11110000	F0H	Exclusive status
01000011	43H	YAMAHA ID
0001nnnn	2NH	N:device Number
01001100	4CH	Model ID
0ggggggg	GGH	Address High
0mmmmmmm	MMH	Address Mid
0lllllll	LLH	Address Low
11110111	F7H	End of Exclusive

Address is valid only when the beginning of the block has been specified.

2.4.2 S03 native dump request

This message requests transmission of all parameters of the specified block of S03 native parameters.
The output is in the same format as an S03 native bulk dump (refer to 2.2.2).

11110000	F0H	Exclusive status
01000011	43H	YAMAHA ID
0001nnnn	2NH	N:device Number
01101100	6CH	Model ID
0ggggggg	GGH	Address High
0mmmmmmm	MMH	Address Mid
0lllllll	LLH	Address Low
11110111	F7H	End of Exclusive

Address is valid only when the beginning of the block has been specified.

No System Exclusive Message is received when the Compare function is active.

3. Realtime messages

3.1 Active sensing

a) Transmission
Transmitted at every 270 msec.

b) Receive
Once FE has been received, failure to receive any MIDI message for an interval longer than approximately 300 msec will cause processing to be performed as if ALL SOUND OFF, ALL NOTE OFF, and RESET ALL CONTROLLERS messages were received, and the unit will reset to a condition in which FE was never received.

MIDI DATA TABLE

Bank Select

Available Bank Select/Program Change

MSB	(HEX)	LSB	(HEX)	Program No.	Type	Memory	Description
0	00	*1		0 - 127	Normal Voice	GM/XG	
64	40	0	00	*1			
126	7E	0	00	0 - 1	Drum Voice		
127	7F	0	00	*1			
63	3F	0	00	0 - 127	Normal Voice	Preset	
63	3F	8	08	0 - 127		User	
63	3F	40	28	0 - 1	Drum Voice	User	
63	3F	64	40	0 - 127	Multi	User	Effective only when in the Multi mode

*1 Refer to Voice List

<Table 1 - 1>

XG Parameter Base Address

MODEL ID = 4C

Parameter	Address (H)	Address (M)	Address (L)	Description	Remarks
XG SYSTEM	00	00	00	XG System	
	00	00	7D	Drum Setup Reset	Receives parameter change only
	00	00	7E	XG System On	Receives parameter change only
	00	00	7F	All Parameter Reset	Receives parameter change only
INFORMATION	01	00	00	System Information	Receives dump request only
EFFECT 1	02	01	00	Effect1 (Reverb, Chorus, Variation)	
MULTI PART	08	00	00	Multi Part 1	
	:	:	:	:	
	08	0F	00	Multi Part 16	
DRUM	30	0D	00	Drum Setup 1	
	31	0D	00	Drum Setup 2	

The S03 responds to the message "MODEL ID = 4C" only when in the Multi mode.

Address			Parameter
3n	0D	00	note number 13
3n	0E	00	note number 14
	:		:
3n	5B	00	note number 91

<Table 1 - 2>

MIDI Parameter Change table (XG SYSTEM)

Address (H)			Size (H)	Data (H)	Parameter	Description	Default value (H)
00	00	00	4	00 - 0F	MASTER TUNE	-102.4...0...+102.3[cent]	00 04 00 00
		01		00 - 0F		1st bit3-0→bit15-12	
		02		00 - 0F		2nd bit3-0→bit11-8	
		03		00 - 0F		3rd bit3-0→bit7-4	
						4th bit3-0→bit3-0	
		04	1	00 - 7F	MASTER VOLUME	0...127	7F
		05	1		not used		
		06	1	28 - 58	TRANSPOSE	-24...0...+24 [semitones]	40
		7D	1	N	DRUM SETUP RESET	N: Drum setup number (0,1)	--
		7E	1	00	XG SYSTEM ON	00=XG system ON (receive only)	--
		7F	1	00	ALL PARAMETER RESET	00=ON (receive only)	--

TOTAL SIZE 07

<Table 1 - 3>

MIDI Parameter Change table (SYSTEM INFORMATION)

Address (H)			Size (H)	Data (H)	Parameter	Description
01	00	00	E	20 - 7F	Model Name 1	32...127(ASCII CHARACTER)
					:	:
		0D		20 - 7F	Model Name 14	32...127 (ASCII CHARACTER)
		0E	1	00 - 7F	XG Level 1	
		0F	1	00 - 7F	XG Level 2	

TOTAL SIZE 10

Transmitted in response to Dump Request. Not received.

<Table 1 - 4>

MIDI Parameter Change table (EFFECT)

Address (H)			Size (H)	Data (H)	Parameter	Description	Default value (H)
02	01	00	2	00 - 7F	REVERB TYPE MSB	Refer to Effect Type List	01(=HALL1)
				00 - 7F	REVERB TYPE LSB	"	00
		02	1	00 - 7F	REVERB PARAMETER 1	"	12(depends on reverb type)
		03	1	00 - 7F	REVERB PARAMETER 2	"	0A(*)
		04	1	00 - 7F	REVERB PARAMETER 3	"	08(*)
		05	1	00 - 7F	REVERB PARAMETER 4	"	0D(*)
		06	1	00 - 7F	REVERB PARAMETER 5	"	31(*)
		07	1	00 - 7F	REVERB PARAMETER 6	"	00(*)
		08	1	00 - 7F	REVERB PARAMETER 7	"	00(*)
		09	1	00 - 7F	REVERB PARAMETER 8	"	00(*)
		0A	1	00 - 7F	REVERB PARAMETER 9	"	00(*)
		0B	1	00 - 7F	REVERB PARAMETER 10	"	00(*)
		0C	1	00 - 7F	REVERB RETURN	-∞dB...0dB...+6dB(0...96...127)	40
		0D	1	01 - 7F	REVERB PAN	L63...C...R63	40

TOTAL SIZE 0E

02	01	10	1	00 - 7F	REVERB PARAMETER 11	Refer to Effect Parameter List	00(depends on reverb type)
		11	1	00 - 7F	REVERB PARAMETER 12	"	04(*)
		12	1	00 - 7F	REVERB PARAMETER 13	"	32(*)
		13	1	00 - 7F	REVERB PARAMETER 14	"	08(*)
		14	1	00 - 7F	REVERB PARAMETER 15	"	40(*)
		15	1	00 - 7F	REVERB PARAMETER 16	"	00(*)

TOTAL SIZE 6

02	01	20	2	00 - 7F	CHORUS TYPE MSB	Refer to Effect Type List	41(=CHORUS1)
				00 - 7F	CHORUS TYPE LSB	"	00
		22	1	00 - 7F	CHORUS PARAMETER 1	"	06(depends on chorus type)
		23	1	00 - 7F	CHORUS PARAMETER 2	"	36(*)
		24	1	00 - 7F	CHORUS PARAMETER 3	"	4D(*)
		25	1	00 - 7F	CHORUS PARAMETER 4	"	6A(*)
		26	1	00 - 7F	CHORUS PARAMETER 5	"	00(*)
		27	1	00 - 7F	CHORUS PARAMETER 6	"	1C(*)
		28	1	00 - 7F	CHORUS PARAMETER 7	"	40(*)
		29	1	00 - 7F	CHORUS PARAMETER 8	"	2E(*)
		2A	1	00 - 7F	CHORUS PARAMETER 9	"	40(*)
		2B	1	00 - 7F	CHORUS PARAMETER 10	"	40(*)
		2C	1	00 - 7F	CHORUS RETURN	-∞dB...0dB...+6dB(0...96...127)	40
		2D	1	01 - 7F	CHORUS PAN	L63...C...R63(1...64...127)	40
		2E	1	00 - 7F	SEND CHORUS TO REVERB	-∞dB...0dB...+6dB(0...96...127)	00

TOTAL SIZE 0F

02	01	30	1	00 - 7F	CHORUS PARAMETER 11	Refer to Effect Type List	2E(depends on chorus type)
		31	1	00 - 7F	CHORUS PARAMETER 12	"	40(*)
		32	1	00 - 7F	CHORUS PARAMETER 13	"	0A(*)
		33	1	00 - 7F	CHORUS PARAMETER 14	"	00(*)
		34	1	00 - 7F	CHORUS PARAMETER 15	"	00(*)
		35	1	00 - 7F	CHORUS PARAMETER 16	"	00(*)

TOTAL SIZE 6

02	01	40	2	00 - 7F	VARIATION TYPE MSB	Refer to Effect Type List	05(=DELAY L, C, R)
				00 - 7F	VARIATION TYPE LSB	"	00
		42	2	00 - 7F	VARIATION PARAMETER 1 MSB	"	1A(depends on variation type)
				00 - 7F	VARIATION PARAMETER 1 LSB	"	05(*)
		44	2	00 - 7F	VARIATION PARAMETER 2 MSB	"	0D(*)
				00 - 7F	VARIATION PARAMETER 2 LSB	"	03(*)
		46	2	00 - 7F	VARIATION PARAMETER 3 MSB	"	27(*)
				00 - 7F	VARIATION PARAMETER 3 LSB	"	08(*)
		48	2	00 - 7F	VARIATION PARAMETER 4 MSB	"	27(*)
				00 - 7F	VARIATION PARAMETER 4 LSB	"	08(*)
		4A	2	00 - 7F	VARIATION PARAMETER 5 MSB	"	00(*)
				00 - 7F	VARIATION PARAMETER 5 LSB	"	4A(*)
		4C	2	00 - 7F	VARIATION PARAMETER 6 MSB	"	00(*)
				00 - 7F	VARIATION PARAMETER 6 LSB	"	64(*)
		4E	2	00 - 7F	VARIATION PARAMETER 7 MSB	"	00(*)
				00 - 7F	VARIATION PARAMETER 7 LSB	"	0A(*)
		50	2	00 - 7F	VARIATION PARAMETER 8 MSB	"	00(*)
				00 - 7F	VARIATION PARAMETER 8 LSB	"	00(*)
		52	2	00 - 7F	VARIATION PARAMETER 9 MSB	"	00(*)
				00 - 7F	VARIATION PARAMETER 9 LSB	"	00(*)
		54	2	00 - 7F	VARIATION PARAMETER 10 MSB	"	00(*)
				00 - 7F	VARIATION PARAMETER 10 LSB	"	20(*)
		56	1	00 - 7F	VARIATION RETURN	-∞dB...0dB...+6dB(0...96...127)	40
		57	1	01 - 7F	VARIATION PAN	L63...C...R63(1...64...127)	40
		58	1	00 - 7F	SEND VARIATION TO REVERB	-∞dB...0dB...+6dB(0...96...127)	00
		59	1	00 - 7F	SEND VARIATION TO CHORUS	-∞dB...0dB...+6dB(0...96...127)	00
		5A	1	00 - 01	VARIATION CONNECTION	INSERTION, SYSTEM	00
		5B	1	00 - 7F	VARIATION PART NUMBER	Part1	7F
						OFF(127)	
		5C	1	00 - 7F	MW VARIATION CONTROL DEPTH	-64...0...+63	40
		5D	1	00 - 7F	BEND VARIATION CONTROL DEPTH	-64...0...+63	40
		5E	1	00 - 7F	CAT VARIATION CONTROL DEPTH	-64...0...+63	40
		5F	1	00 - 7F	AC1 VARIATION CONTROL DEPTH	-64...0...+63	40
		60	1	00 - 7F	AC2 VARIATION CONTROL DEPTH	-64...0...+63	40

TOTAL SIZE 21

02	01	70	1	00 - 7F	VARIATION PARAMETER 11	Refer to Effect Parameter List	00(depends on variation type)
		71	1	00 - 7F	VARIATION PARAMETER 12	"	3C(*)
		72	1	00 - 7F	VARIATION PARAMETER 13	"	1C(*)
		73	1	00 - 7F	VARIATION PARAMETER 14	"	40(*)
		74	1	00 - 7F	VARIATION PARAMETER 15	"	2E(*)
		75	1	00 - 7F	VARIATION PARAMETER 16	"	40(*)

TOTAL SIZE 6

<Table 1 - 5>

MIDI Parameter Change table (MULTI PART)

Address (H)			Size (H)	Data (H)	Parameter	Description	Default value (H)
08	nn	00	1	00 - 20	ELEMENT RESERVE	0...64	part10 = 0 other parts = 2
		01	1	00 - 7F	BANK SELECT MSB	0...127	part10 = 7F other parts =0
		02	1	00 - 7F	BANK SELECT LSB	0...127	00
		03	1	00 - 7F	PROGRAM NUMBER	1...128	00
		04	1	00-0F, 7F	Rcv CHANNEL	A1...A16, OFF	Part No.
		05	1	00 - 01	MONO/POLY MODE	MONO, POLY	01
		06	1	00 - 02	SAME NOTE NUMBER KEY ON ASSIGN	SINGLE, MULTI, INST (for DRUM)	01
		07	1	00 - 03	PART MODE	NORMAL, DRUM, DRUMS1	Part10=2 other parts=0
		08	1	28 - 58	NOTE SHIFT	-24...0...+24[semitones]	40
		09	2	00 - 0F	DETUNE	-12.8...0...+12.7[Hz]	08 00
		0A		00 - 0F		1st bit3-0→bit7-4	
						2nd bit3-0→bit3-0	
		0B	1	00 - 7F	VOLUME	0...127	64
		0C	1	00 - 7F	VELOCITY SENSE DEPTH	0...127	40
		0D	1	00 - 7F	VELOCITY SENSE OFFSET	0...127	40
		0E	1	00 - 7F	PAN	RND, L63...C...R63	40
		0F	1	00 - 7F	NOTE LIMIT LOW	C-2...G8	00
		10	1	00 - 7F	NOTE LIMIT HIGH	C-2...G8	7F
		11	1	00 - 7F	DRY LEVEL	0...127	7F
		12	1	00 - 7F	CHORUS SEND	0...127	00
		13	1	00 - 7F	REVERB SEND	0...127	28
		14	1	00 - 7F	VARIATION SEND	0...127	00
		15	1	00 - 7F	VIBRATO RATE	-64...0...+63	40
		16	1	00 - 7F	VIBRATO DEPTH	-64...0...+63	40(drum part ignores)
		17	1	00 - 7F	VIBRATO DELAY	-64...0...+63	40(drum part ignores)
		18	1	00 - 7F	LOW PASS FILTER CUTOFF FREQUENCY	-64...0...+63	40
		19	1	00 - 7F	LOW PASS FILTER RESONANCE	-64...0...+63	40
		1A	1	00 - 7F	EG ATTACK TIME	-64...0...+63	40
		1B	1	00 - 7F	EG DECAY TIME	-64...0...+63	40
		1C	1	00 - 7F	EG RELEASE TIME	-64...0...+63	40
		1D	1	28 - 58	MW PITCH CONTROL	-24...0...+24[semitones]	40
		1E	1	00 - 7F	MW LOW PASS FILTER CONTROL	-9600…0…+9450[cent]	40
		1F	1	00 - 7F	MW AMPLITUDE CONTROL	-100...0...+100[%]	40
		20	1	00 - 7F	MW LFO PMOD DEPTH	0...127	0A
		21	1	00 - 7F	MW LFO FMOD DEPTH	0...127	00
		22	1	00 - 7F	MW LFO AMOD DEPTH	0...127	00
		23	1	28 - 58	BEND PITCH CONTROL	-24...0...+24[semitones]	42
		24	1	00 - 7F	BEND LOWPASS FILTER CONTROL	-9600...0...+9450[cent]	40
		25	1	00 - 7F	BEND AMPLITUDE CONTROL	-100...0...+100[%]	40
		26	1	00 - 7F	BEND LFO PMOD DEPTH	0...127	00
		27	1	00 - 7F	BEND LFO FMOD DEPTH	0...127	00
		28	1	00 - 7F	BEND LFO AMOD DEPTH	0...127	00

TOTAL SIZE 29

08	nn	30	1	00 - 01	Rcv PITCH BEND	OFF, ON	01
		31	1	00 - 01	Rcv CH AFTER TOUCH(CAT)	OFF, ON	01
		32	1	00 - 01	Rcv PROGRAM CHANGE	OFF, ON	01
		33	1	00 - 01	Rcv CONTROL CHANGE	OFF, ON	01
		34	1	00 - 01	Rcv POLY AFTER TOUCH(PAT)	OFF, ON	01
		35	1	00 - 01	Rcv NOTE MESSAGE	OFF, ON	01
		36	1	00 - 01	Rcv RPN	OFF, ON	01
		37	1	00 - 01	Rcv NRPN	OFF, ON	XGmode=01, GMmode=00
		38	1	00 - 01	Rcv MODURATION	OFF, ON	01
		39	1	00 - 01	Rcv VOLUME	OFF, ON	01
		3A	1	00 - 01	Rcv PAN	OFF, ON	01
		3B	1	00 - 01	Rcv EXPRESSION	OFF, ON	01
		3C	1	00 - 01	Rcv HOLD1	OFF, ON	01
		3D	1	00 - 01	Rcv PORTAMENTO	OFF, ON	01
		3E	1	00 - 01	Rcv SOSTENUTO	OFF, ON	01
		3F	1	00 - 01	Rcv SOFT PEDAL	OFF, ON	01
		40	1	00 - 01	Rcv BANK SELECT	OFF, ON	XGmode=01, GMmode=00
		41	1	00 - 7F	SCALE TUNING C	-64...0...+63[cent]	40
		42	1	00 - 7F	SCALE TUNING C#	-64...0...+63[cent]	40
		43	1	00 - 7F	SCALE TUNING D	-64...0...+63[cent]	40
		44	1	00 - 7F	SCALE TUNING D#	-64...0...+63[cent]	40
		45	1	00 - 7F	SCALE TUNING E	-64...0...+63[cent]	40
		46	1	00 - 7F	SCALE TUNING F	-64...0...+63[cent]	40
		47	1	00 - 7F	SCALE TUNING F#	-64...0...+63[cent]	40
		48	1	00 - 7F	SCALE TUNING G	-64...0...+63[cent]	40
		49	1	00 - 7F	SCALE TUNING G#	-64...0...+63[cent]	40
		4A	1	00 - 7F	SCALE TUNING A	-64...0...+63[cent]	40
		4B	1	00 - 7F	SCALE TUNING A#	-64...0...+63[cent]	40
		4C	1	00 - 7F	SCALE TUNING B	-64...0...+63[cent]	40
		4D	1	28 - 58	CAT PITCH CONTROL	-24...0...+24[semitones]	40
		4E	1	00 - 7F	CAT LOW PASS FILTER CONTROL	-9600...0...+9450[cent]	40
		4F	1	00 - 7F	CAT AMPLITUDE CONTROL	-100...0...+100[%]	40
		50	1	00 - 7F	CAT LFO PMOD DEPTH	0...127	00
		51	1	00 - 7F	CAT LFO FMOD DEPTH	0...127	00
		52	1	00 - 7F	CAT LFO AMOD DEPTH	0...127	00
		53	1	28 - 58	PAT PITCH CONTROL	-24...0...+24[semitones]	40
		54	1	00 - 7F	PAT LOW PASS FILTER CONTROL	-9600...0...+9450[cent]	40
		55	1	00 - 7F	PAT AMPLITUDE CONTROL	-100...0...+100[%]	40
		56	1	00 - 7F	PAT LFO PMOD DEPTH	0...127	00
		57	1	00 - 7F	PAT LFO FMOD DEPTH	0...127	00
		58	1	00 - 7F	PAT LFO AMOD DEPTH	0...127	00
		59	1	00 - 5F	AC1 CONTROLLER NUMBER	0...95	10
		5A	1	28 - 58	AC1 PITCH CONTROL	-24...0...+24[semitones]	40
		5B	1	00 - 7F	AC1 LOW PASS FILTER CONTROL	-9600...0...+9450[cent]	40
		5C	1	00 - 7F	AC1 AMPLITUDE CONTROL	-100...0...+100[%]	40
		5D	1	00 - 7F	AC1 LFO PMOD DEPTH	0...127	00
		5E	1	00 - 7F	AC1 LFO FMOD DEPTH	0...127	00
		5F	1	00 - 7F	AC1 LFO AMOD DEPTH	0...127	00
		60	1	00 - 5F	AC2 CONTROLLER NUMBER	0...95	11
		61	1	28 - 58	AC2 PITCH CONTROL	-24...0...+24[semitones]	40
		62	1	00 - 7F	AC2 LOW PASS FILTER CONTROL	-9600...0...+9450[cent]	40
		63	1	00 - 7F	AC2 AMPLITUDE CONTROL	-100...0...+100[%]	40
		64	1	00 - 7F	AC2 LFO PMOD DEPTH	0...127	00
		65	1	00 - 7F	AC2 LFO FMOD DEPTH	0...127	00
		66	1	00 - 7F	AC2 LFO AMOD DEPTH	0...127	00
		67	1	00 - 01	PORTAMENTO SWITCH	OFF, ON	00
		68	1	00 - 7F	PORTAMENTO TIME	0...127	00
		69	1	00 - 7F	PITCH EG INITIAL LEVEL	-64...0...+63	40
		6A	1	00 - 7F	PITCH EG ATTACK TIME	-64...0...+63	40
		6B	1	00 - 7F	PITCH EG RELEASE LEVEL	-64...0...+63	40
		6C	1	00 - 7F	PITCH EG RELEASE TIME	-64...0...+63	40
		6D	1	01 - 7F	VELOCITY LIMIT LOW	1...127	01
		6E	1	01 - 7F	VELOCITY LIMIT HIGH	1...127	7F

TOTAL SIZE 3F

nn = PART NUMBER(00 - 0F)

In the case of DRUM PART, the following parameters will have no effect.

- BANK SELECT LSB
- MONO/POLY MODE
- SCALE TUNING
- PORTAMENTO

<Table 1 - 6>

MIDI Parameter Change table (DRUM SETUP)

Address (H)			Size (H)	Data (H)	Parameter	Description	Default value (H)
3n	rr	00	1	00 - 7F	PITCH COARSE	-64...0...+63	40
		01	1	00 - 7F	PITCH FINE	-64...0...+63[cent]	40
		02	1	00 - 7F	LEVEL	0...127	depend on the note
		03	1	00 - 7F	ALTERNATE GROUP	OFF, 1...127	"
		04	1	00 - 7F	PAN	RND, L63...C...R63	"
		05	1	00 - 7F	REVERB SEND	0...127	"
		06	1	00 - 7F	CHORUS SEND	0...127	"
		07	1	00 - 7F	VARIATION SEND	0...127	7F
		08	1	00 - 01	KEY ASSIGN	SINGLE, MULTI	00
		09	1	00 - 01	Rcv NOTE OFF	OFF, ON	depend on the note
		0A	1	00 - 01	Rcv NOTE ON	OFF, ON	01
		0B	1	00 - 7F	LOW PASS FILTER CUTOFF FREQUENCY	-64...0...63	40
		0C	1	00 - 7F	LOW PASS FILTER RESONANCE	-64...0...63	40
		0D	1	00 - 7F	EG ATTACK RATE	-64...0...63	40
		0E	1	00 - 7F	EG DECAY1 RATE	-64...0...63	40
		0F	1	00 - 7F	EG DECAY2 RATE	-64...0...63	40

TOTAL SIZE 10

n = DRUM SETUP NUMBER(0 - 1)
rr = NOTE NUMBER(0D - 5B)

In the following cases, the S03 will initialize all Drum Setups.
XG SYSTEM ON received
GM SYSTEM ON received
DRUM SETUP RESET received (the designated Drum Setup only when in XG mode)

[Note]
When a part to which a Drum Setup is assigned receives a program change, the assigned Drum Setup will be initialized.

If the same Drum Setup is assigned to two or more parts, changes in Drum Setup parameters (including program changes) will apply to all parts to which it is assigned.

<Table 2 - 1>

Native Parameter Base Address

MODEL ID = 6C

Parameter	Address (H)	Address (M)	Address (L)	Description	Remarks
NATIVE SYSTEM	00	00	00	Native System	
REMOTE SWITCH	0A	00	00	Remote Switch	Receives parameter change only
BULK CONTROL	0E	00	00	Header	Bulk dump only
	0F	00	00	Footer	
MULTI COMMON	30	00	00	Multi Common	
MULTI EFFECT	30	01	00	Multi Effect	Bulk dump only
MULTI PART	31	00	00	Multi Part 1	Bulk dump only
	:	:	:	:	
	31	0F	00	Multi Part 16	
NORMAL VOICE COMMON	40	00	00	Normal Voice Common	
NORMAL VOICE ELEMENT	41	00	00	Normal Voice Element 1	
	:	:	:	:	
	41	03	00	Normal Voice Element 4	
DRUM VOICE COMMON	46	00	00	Drum Voice Common	
DRUM VOICE KEY	47	0D	00	Drum Voice Key	

Address			Parameter
47	0D	00	note number 13
47	0E	00	note number 14
:	:	:	:
47	5B	00	note number 91

<Table 2 - 2>

Bulk Dump Block

Parameter Block	Description	Byte Count Dec	Byte Count Hex	Top Address H	Top Address M	Top Address L
NATIVE SYSTEM	Native System	22	16	00	00	00
NATIVE MULTI	Bulk Header	0	00	0E	mm	nn
COMMON	Common	13	0B	30	00	00
EFFECT	Reverb Parameter	20	14	30	01	00
	Chorus Parameter	53	35	30	01	20
	Variation Parameter	103	67	30	01	40
PART	Multi Part1	43	2B	31	00	00
	:	16 Blocks	:	:	:	:
	Multi Part16	43	2B	31	0F	00
	Bulk Footer	0	00	0F	mm	nn
NATIVE NORMAL VOICE	Bulk Header	0	00	0E	mm	nn
COMMON	Common1	12	0C	40	00	00
	Common2	33	21	40	00	10
ELEMENT	Element1	106	6A	41	00	00
	Element2	106	6A	41	01	00
	Element3	106	6A	41	02	00
	Element4	106	6A	41	03	00
ELEMENT OPTION	Element Option1	52	34	42	00	00
	Element Option2	52	34	42	01	00
	Element Option3	52	34	42	02	00
	Element Option4	52	34	42	03	00
	Bulk Footer	0	00	0F	mm	nn
NATIVE DRUM VOICE	Bulk Header	0	00	0E	mm	nn
COMMON	Common	10	0A	46	00	00
KEY	Key C#-1	16	10	47	0D	00
	:	79 Blocks	:	:	:	:
	Key G5	16	10	47	5B	00
	Bulk Footer	0	00	0F	mm	nn

<Table 2 - 3>

MIDI Parameter Change table (NATIVE SYSTEM)

Address (H)			Size (H)	Data (H)	Parameter	Description	Default value (H)
00	00	00	1	00 - 60	MW Transmit Control Number	0...95(0,32=off), AT(96)	01
		01	1	00 - 60	FC Transmit Control Number	0...95(0,32=off), AT(96)	10
		02	1	00 - 61	FS Transmit Control Number	0...95(0,32=off), PC INC(96), PC DEC(97)	40
		03	1	00 - 01	Voice Mode Controller Reset	Hold, Reset	01
		04	1	00 - 01	Local Switch	off, on	01
		05	1	00 - 10	Receive Channel	1...16, omni	10
		06	1	00 - 0F	Transmit Channel	1...16	00
		07	1	00 - 01	Receive Program Change	off, on	01
		08	1	00 - 01	Receive Bank Select	off, on	01
		09	1	00 - 01	Transmit Program Change	off, on	01
		0A	1	00 - 01	Transmit Bank Select	off, on	01
		0B	1	3D - 43	Octave Shift	-3 ...+3	40
		0C	1	35 - 4B	Keyboard Transpose	-11... +11	40
		0D	1	00 - 05	Velocity Curve	normal, soft1, soft2, easy, wide, hard	03
		0E	1	00 - 7F	Fixed Velocity	off,1...127	00
		0F	1	00 - 01	Voice Effect Bypass	off, on	00
		10	1	00 - 5F	Voice Mode AC1 Control Number	0...95	00
		11	1	00 - 07	Thru Port	1...8	00
		12	4	00	MASTER TUNE	-102.4...0...+102.3[cent]	00 04 00 00
		13		00 - 07		1st bit3-0→bit15-12	
		14		00 - 0F		2nd bit3-0→bit11-8	
		15		00 - 0F		3rd bit3-0→bit7-4	
						4th bit3-0→bit3-0	

TOTAL SIZE 16

<Table 2 - 4>

MIDI Parameter Change table (BULK CONTROL)

Address (H)			Size (H)	Data (H)	Parameter	Description
0E	00	nn	0	-	Bulk Header	Normal Voice PRESET (nn = 0 - 127)
	08	nn	0	-		Normal Voice USER (nn = 0 - 127)
	0F	nn	0	-		Normal Voice Edit Buffer (nn = 0)
	28	nn	0	-		Drum Voice USER (nn = 0 - 1)
	2F	nn	0	-		Drum Voice Edit Buffer (nn = 0)
	40	nn	0	-		Multi USER (nn = 0 - 31)
	41	nn	0	-		Multi Edit Buffer (nn=0)
	7F	nn	0	-		Drum Voice S03 Kit (nn = 120 - 127)
0F	00	nn	0	-	Bulk Footer	Normal Voice PRESET (nn = 0 - 127)
	08	nn	0	-		Normal Voice USER (nn = 0 - 127)
	0F	nn	0	-		Normal Voice Edit Buffer (nn = 0)
	28	nn	0	-		Drum Voice USER (nn = 0 - 1)
	2F	nn	0	-		Drum Voice Edit Buffer (nn = 0)
	40	nn	0	-		Multi USER (nn = 0 - 31)
	41	nn	0	-		Multi Edit Buffer (nn=0)
	7F	nn	0	-		Drum Voice S03 Kit (nn = 120 - 127)

<Table 2 - 5>

MIDI Parameter Change table (REMOTE SWITCH)

Address (H)			Size (H)	Data (H)	Parameter	Description
0A	00	00	1	01	MULTI	on
		01	1	01	VOICE	on
		02	1	01	DEMO	on
		03	1	01	UTILITY	on
		04	1	01	MIDI	on
		05	1	01	EDIT	on
		06	1	01	JOB	on
		07	1	01	STORE	on
		08	1	01	PART PLUS	on
		09	1	01	PART MINUS	on
		0A	1	01	PART PLUS + MINUS	on
		0B	1	01	INC/YES	on
		0C	1	01	DEC/NO	on
		0D	1	01	PAGE UP	on
		0E	1	01	PAGE DOWN	on
		0F	1	01	LEFT	on
		10	1	01	RIGHT	on
		11	1	01	OCT DOWN	on
		12	1	01	OCT UP	on
		13	1	01	OCT DOWN + UP	on
		14	1	01	ENTER	on
		15	1	01	EXIT	on
		16	1	01	CATEGORY SEARCH	on
		17	1	01	PRESET	on
		18	1	01	USER	on
		19	1	01	GM/XG	on
		1A	1	01	DRUM + USER	on
		1B	1	01	DRUM + GM/XG	on
		1C	1	01	0	on
		1D	1	01	1	on
		1E	1	01	2	on
		1F	1	01	3	on
		20	1	01	4	on
		21	1	01	5	on
		22	1	01	6	on
		23	1	01	7	on
		24	1	01	8	on
		25	1	01	9	on
		26	1	01	MINUS	on
		27	1	01	MUTE	on

<Table 2 - 6>

MIDI Parameter Change table (NATIVE MULTI COMMON)

Address (H)			Size (H)	Data (H)	Parameter	Description	Default value (H)
30	00	00	1	20 - 7F	Multi Name 1	32...127(ASCII)	49 ('I')
		01	1	20 - 7F	Multi Name 2	32...127(ASCII)	6E ('n')
		02	1	20 - 7F	Multi Name 3	32...127(ASCII)	69 ('i')
		03	1	20 - 7F	Multi Name 4	32...127(ASCII)	74 ('t')
		04	1	20 - 7F	Multi Name 5	32...127(ASCII)	20 (' ')
		05	1	20 - 7F	Multi Name 6	32...127(ASCII)	4D ('M')
		06	1	20 - 7F	Multi Name 7	32...127(ASCII)	6C ('l')
		07	1	20 - 7F	Multi Name 8	32...127(ASCII)	74 ('t')
		08	1	00 - 10	Multi Category	0, 2...16(--, PF, OR, GT, BA, ST, BR, RP, LD, PD, SC, CP, DR, SE, ME, CO)	00 ('--')
		09	1	00 - 7F	Multi Volume	0...127	7F
		0A	1	28 - 58	Multi Transpose	-24...+24	40

TOTAL SIZE 0B

<Table 2 - 7>

MIDI Parameter Change table (NATIVE MULTI EFFECT)

Address (H)			Size (H)	Data (H)	Parameter	Description	Default value (H)
30	01	00	2	00 - 7F	REVERB TYPE MSB	Refer to Effect Program List	01(=HALL1)
				00 - 7F	REVERB TYPE LSB	"	00
		02	1	00 - 7F	REVERB PARAMETER 1	"	12(depends on reverb type)
		03	1	00 - 7F	REVERB PARAMETER 2	"	0A(*)
		04	1	00 - 7F	REVERB PARAMETER 3	"	08(*)
		05	1	00 - 7F	REVERB PARAMETER 4	"	0D(*)
		06	1	00 - 7F	REVERB PARAMETER 5	"	31(*)
		07	1	00 - 7F	REVERB PARAMETER 6	"	00(*)
		08	1	00 - 7F	REVERB PARAMETER 7	"	00(*)
		09	1	00 - 7F	REVERB PARAMETER 8	"	00(*)
		0A	1	00 - 7F	REVERB PARAMETER 9	"	00(*)
		0B	1	00 - 7F	REVERB PARAMETER 10	"	00(*)
		0C	1	00 - 7F	REVERB RETURN	-∞dB...0dB...+6dB(0...96...127)	40
		0D	1	01 - 7F	REVERB PAN	L63...C...R63	40
		0E	1	00 - 7F	REVERB PARAMETER 11	Refer to Effect Parameter List	00(depends on reverb type)
		0F	1	00 - 7F	REVERB PARAMETER 12	"	04(*)
		10	1	00 - 7F	REVERB PARAMETER 13	"	32(*)
		11	1	00 - 7F	REVERB PARAMETER 14	"	08(*)
		12	1	00 - 7F	REVERB PARAMETER 15	"	40(*)
		13	1	00 - 7F	REVERB PARAMETER 16	"	00(*)

TOTAL SIZE 14

30	01	20	2	00 - 7F	CHORUS TYPE MSB	Refer to Effect Program List	41(=CHORUS1)
				00 - 7F	CHORUS TYPE LSB	"	00
		22	1	00 - 7F	CHORUS PARAMETER 1	"	06(depends on chorus type)
		23	1	00 - 7F	CHORUS PARAMETER 2	"	36(*)
		24	1	00 - 7F	CHORUS PARAMETER 3	"	4D(*)
		25	1	00 - 7F	CHORUS PARAMETER 4	"	6A(*)

		26	1	00 - 7F	CHORUS PARAMETER 5	"	00(')
		27	1	00 - 7F	CHORUS PARAMETER 6	"	1C(')
		28	1	00 - 7F	CHORUS PARAMETER 7	"	40(')
		29	1	00 - 7F	CHORUS PARAMETER 8	"	2E(')
		2A	1	00 - 7F	CHORUS PARAMETER 9	"	40(')
		2B	1	00 - 7F	CHORUS PARAMETER 10	"	40(')
		2C	1	00 - 7F	CHORUS RETURN	-∞dB...0dB...+6dB(0...96...127)	40
		2D	1	01 - 7F	CHORUS PAN	L63...C...R63(1...64...127)	40
		2E	1	00 - 7F	SEND CHORUS TO REVERB	-∞dB...0dB...+6dB(0...96...127)	00
		2F	1	00 - 7F	CHORUS PARAMETER 11	Refer to Effect Parameter List	2E(depends on chorus type)
		30	1	00 - 7F	CHORUS PARAMETER 12	"	40(')
		31	1	00 - 7F	CHORUS PARAMETER 13	"	0A(')
		32	1	00 - 7F	CHORUS PARAMETER 14	"	00(')
		33	1	00 - 7F	CHORUS PARAMETER 15	"	00(')
		34	1	00 - 7F	CHORUS PARAMETER 16	"	00(')

TOTAL SIZE 35

30	01	40	2	00 - 7F	VARIATION TYPE MSB	Refer to Effect Program List	05(=DELAY L, C, R)
				00 - 7F	VARIATION TYPE LSB	"	00
		42	2	00 - 7F	VARIATION PARAMETER 1 MSB	"	1A(depends on variation type)
				00 - 7F	VARIATION PARAMETER 1 LSB	"	05(')
		44	2	00 - 7F	VARIATION PARAMETER 2 MSB	"	0D(')
				00 - 7F	VARIATION PARAMETER 2 LSB	"	03(')
		46	2	00 - 7F	VARIATION PARAMETER 3 MSB	"	27(')
				00 - 7F	VARIATION PARAMETER 3 LSB	"	08(')
		48	2	00 - 7F	VARIATION PARAMETER 4 MSB	"	27(')
				00 - 7F	VARIATION PARAMETER 4 LSB	"	08(')
		4A	2	00 - 7F	VARIATION PARAMETER 5 MSB	"	00(')
				00 - 7F	VARIATION PARAMETER 5 LSB	"	4A(')
		4C	2	00 - 7F	VARIATION PARAMETER 6 MSB	"	00(')
				00 - 7F	VARIATION PARAMETER 6 LSB	"	64(')
		4E	2	00 - 7F	VARIATION PARAMETER 7 MSB	"	00(')
				00 - 7F	VARIATION PARAMETER 7 LSB	"	0A(')
		50	2	00 - 7F	VARIATION PARAMETER 8 MSB	"	00(')
				00 - 7F	VARIATION PARAMETER 8 LSB	"	00(')
		52	2	00 - 7F	VARIATION PARAMETER 9 MSB	"	00(')
				00 - 7F	VARIATION PARAMETER 9 LSB	"	00(')
		54	2	00 - 7F	VARIATION PARAMETER 10 MSB	"	00(')
				00 - 7F	VARIATION PARAMETER 10 LSB	"	20(')
		56	1	00 - 7F	VARIATION RETURN	-∞dB...0dB...+6dB(0...96...127)	40
		57	1	01 - 7F	VARIATION PAN	L63...C...R63(1...64...127)	40
		58	1	00 - 7F	SEND VARIATION TO REVERB	-∞dB...0dB...+6dB(0...96...127)	00
		59	1	00 - 7F	SEND VARIATION TO CHORUS	-∞dB...0dB...+6dB(0...96...127)	00
		5A	1	00 - 01	VARIATION CONNECTION	INSERTION, SYSTEM	00
		5B	1	00 - 7F	VARIATION PART NUMBER	Part1...16(0...15) OFF(127)	7F
		5C	1	00 - 7F	MW VARIATION CONTROL DEPTH	-64...0...+63	40
		5D	1	40	not used		40
		5E	1	40	not used		40
		5F	1	00 - 7F	AC1 VARIATION CONTROL DEPTH	-64...0...+63	40
		60	1	40	not used		40
		61	1	00 - 7F	VARIATION PARAMETER 11	Refer to Effect Parameter List	00(depends on variation type)
		62	1	00 - 7F	VARIATION PARAMETER 12	"	3C(')
		63	1	00 - 7F	VARIATION PARAMETER 13	"	1C(')
		64	1	00 - 7F	VARIATION PARAMETER 14	"	40(')
		65	1	00 - 7F	VARIATION PARAMETER 15	"	2E(')
		66	1	00 - 7F	VARIATION PARAMETER 16	"	40(')

TOTAL SIZE 67

<Table 2 - 8>

MIDI Parameter Change table (NATIVE MULTI PART)

Address (H)			Size (H)	Data (H)	Parameter	Description	Default value (H)
31	nn	00	1	00 - 7F	BANK SELECT MSB	0...127	part10 = 7F
							other parts=0
		01	1	00 - 7F	BANK SELECT LSB	0...127	00
		02	1	00 - 7F	PROGRAM NUMBER	1...128	00
		03	1	00-0F, 7F	Rcv CHANNEL	A1...A16, OFF	Part No.
		04	1	00 - 01	MONO/POLY MODE	MONO , POLY	01
		05	1	00 - 03	PART MODE	NORMAL, DRUM, DRUMS1...2	Part10=2 other parts=0
		06	1	28 - 58	NOTE SHIFT	-24...0...+24[semitones]	40
		07 08	2	00 - 0F 00 - 0F	DETUNE	-12.8...0...+12.7[Hz] 1st bit3-0→bit7-4 2nd bit3-0→bit3-0	08 00
		09	1	00 - 7F	VOLUME	0...127	64
		0A	1	00 - 7F	VELOCITY SENSE DEPTH	0...127	40
		0B	1	00 - 7F	VELOCITY SENSE OFFSET	0...127	40
		0C	1	00 - 7F	PAN	RND, L63...C...R63	40
		0D	1	00 - 7F	NOTE LIMIT LOW	C-2...G8	00
		0E	1	00 - 7F	NOTE LIMIT HIGH	C-2...G8	7F
		0F	1	00 - 7F	CHORUS SEND	0...127	00
		10	1	00 - 7F	REVERB SEND	0...127	28
		11	1	00 - 7F	VARIATION SEND	0...127	00
		12	1	00 - 7F	VIBRATO RATE	-64...0...+63	40
		13	1	00 - 7F	VIBRATO DEPTH	-64...0...+63	40(drum part ignores)
		14	1	00 - 7F	VIBRATO DELAY	-64...0...+63	40(drum part ignores)
		15	1	00 - 7F	LOW PASS FILTER CUTOFF FREQUENCY	-64...0...+63	40
		16	1	00 - 7F	LOW PASS FILTER RESONANCE	-64...0...+63	40
		17	1	00 - 7F	EG ATTACK TIME	-64...0...+63	40
		18	1	00 - 7F	EG DECAY TIME	-64...0...+63	40
		19	1	00 - 7F	EG RELEASE TIME	-64...0...+63	40
		1A	1	00 - 7F	MW LOW PASS FILTER CONTROL	-9600...0...+9450[cent]	40
		1B	1	00 - 7F	MW LFO PMOD DEPTH	0...127	0A
		1C	1	00 - 7F	MW LFO FMOD DEPTH	0...127	00
		1D	1	00 - 7F	MW LFO AMOD DEPTH	0...127	00
		1E	1	28 - 58	BEND PITCH CONTROL	-24...0...+24[semitones]	42

Address (H)			Size (H)	Data (H)	Parameter	Description	Default value (H)
		1F	1	00 - 5F	AC1 CONTROLLER NUMBER	0...95	10
		20	1	00 - 7F	AC1 LOW PASS FILTER CONTROL	-9600...0...+9450[cent]	40
		21	1	00 - 7F	AC1 LFO FMOD DEPTH	0...127	00
		22	1	00 - 7F	AC1 LFO AMOD DEPTH	0...127	00
		23	1	00 - 01	PORTAMENTO SWITCH	OFF, ON	00
		24	1	00 - 7F	PORTAMENTO TIME	0...127	00
		25	1	00 - 7F	PITCH EG INITIAL LEVEL	-64...0...+63	40
		26	1	00 - 7F	PITCH EG ATTACK TIME	-64...0...+63	40
		27	1	00 - 7F	PITCH EG RELEASE LEVEL	-64...0...+63	40
		28	1	00 - 7F	PITCH EG RELEASE TIME	-64...0...+63	40
		29	1	01 - 7F	VELOCITY LIMIT LOW	1...127	01
		2A	1	01 - 7F	VELOCITY LIMIT HIGH	1...127	7F

TOTAL SIZE 2B

nn = PART NUMBER(00 - 0F)

<Table 2 - 9>

MIDI Parameter Change table (NATIVE NORMAL VOICE COMMON)

Address (H)			Size (H)	Data (H)	Parameter	Description	Default value (H)
40	00	00	2	00 - 01	Total Level	01 7F(0:Min)...00 00(127:Max)	00 00
		01		00 - 7F			
		02	1	00 - 0F	Element Switch	bit0: element1... bit3: element4 (0:off, 1:on)	01
		03	1	20 - 7F	Voice Name 1	32...127(ASCII)	49 ('I')
		04	1	20 - 7F	Voice Name 2	32...127(ASCII)	6E ('n')
		05	1	20 - 7F	Voice Name 3	32...127(ASCII)	69 ('i')
		06	1	20 - 7F	Voice Name 4	32...127(ASCII)	74 ('t')
		07	1	20 - 7F	Voice Name 5	32...127(ASCII)	20 (' ')
		08	1	20 - 7F	Voice Name 6	32...127(ASCII)	56 ('V')
		09	1	20 - 7F	Voice Name 7	32...127(ASCII)	63 ('c')
		0A	1	20 - 7F	Voice Name 8	32...127(ASCII)	65 ('e')
		0B	1	00 - 10	Voice Category	0, 2...16(--, PF, OR, GT, BA, ST, BR, RP, LD, PD, SC, CP, DR, SE, ME, CO)	00 ('--')

TOTAL SIZE 0C

40	00	10	2	00 - 7F	Variation Type MSB	Refer to Effect Program List	05(=DELAY L, C, R)
				00 - 7F	Variation Type LSB	"	00
		12	2	00 - 7F	Variation Param 1 MSB	"	1A(depends on variation type)
				00 - 7F	Variation Param 1 LSB	"	05(')
		14	2	00 - 7F	Variation Param 2 MSB	"	0D(')
				00 - 7F	Variation Param 2 LSB	"	03(')
		16	2	00 - 7F	Variation Param 3 MSB	"	27(')
				00 - 7F	Variation Param 3 LSB	"	08(')
		18	2	00 - 7F	Variation Param 4 MSB	"	27(')
				00 - 7F	Variation Param 4 LSB	"	08(')
		1a	2	00 - 7F	Variation Param 5 MSB	"	00(')
				00 - 7F	Variation Param 5 LSB	"	4A(')
		1c	2	00 - 7F	Variation Param 10 MSB	"	00(')
				00 - 7F	Variation Param 10 LSB	"	20(')
		1e	1	00 - 7F	MW Variation Control	-64...0...+63	40
		1f	1	00 - 7F	AC1 Variation Control	-64...0...+63	40
		20	1	00 - 7F	Send Chorus To Reverb	0...127	00
		21	1	00 - 01	Mono/Poly	MONO, POLY	01
		22	1	00 - 7F	Total Volume	0...127	7F
		23	1	00 - 7F	Velocity Sense Depth	0...127	40
		24	1	00 - 7F	Velocity Sense Offset	0...127	40
		25	1	00 - 7F	Chorus Send	0...127	00
		26	1	00 - 7F	Reverb Send	0...127	28
		27	1	00 - 7F	MW Filter Control	-64...0...+63	40
		28	1	00 - 7F	MW PMod Depth	0...127	0A
		29	1	00 - 7F	MW FMod Depth	0...127	00
		2a	1	00 - 7F	MW AMod Depth	0...127	00
		2b	1	28 - 58	Pitch Bend Range	-24...0...+24	42
		2c	1	00 - 7F	AC1 Filter Control	-64...0...+63	40
		2d	1	00 - 7F	AC1 FMod Depth	0...127	00
		2e	1	00 - 7F	AC1 AMod Depth	0...127	00
		2f	1	00 - 01	Portament Switch	OFF, ON	00
		30	1	00 - 7F	Portamento Time	0...127	00

TOTAL SIZE 21

<Table 2 - 10>

MIDI Parameter Change table (NATIVE NORMAL VOICE ELEMENT)

Address (H)			Size (H)	Data (H)	Parameter	Description	Default value (H)
41	ee	00	2	00 - 01	Element Level	0...255	00
		01		00 - 7F			7F
		02	2	00 - 02	Wave Number	1...453	00
		03		00 - 7F			1D
		04	1	00 - 7F	Pan	Scale, L63...C...R63	40
		05	1	00 - 01	Level Scaling Flag	Brk.p, Table	00
		06	1	00 - 7F	Level Scaling BP1	C-2...G8	18
		07	1	00 - 7F	Level Scaling BP2	C-2...G8	30
		08	1	00 - 7F	Level Scaling BP3	C-2...G8	60
		09	1	00 - 7F	Level Scaling BP4	C-2...G8	6C
		0A	2	00 - 01	Level Scaling Offset1	-128...+0...+127	00
		0B		00 - 7F			00
		0C	2	00 - 01	Level Scaling Offset2	-128...+0...+127	00
		0D		00 - 7F			00
		0E	2	00 - 01	Level Scaling Offset3	-128...+0...+127	00
		0F		00 - 7F			00

Address (H)			Size (H)	Data (H)	Parameter	Description	Default value (H)
		10	2	00 - 01	Level Scaling Offset4	-128...+0...+127	00
		11		00 - 7F			00
		12	1	00 - 7F	Note Limit Low	C-2...G8	00
		13	1	00 - 7F	Note Limit High	C-2...G8	7F
		14	1	01 - 7F	Velocity Limit Low	1...127	01
		15	1	01 - 7F	Velocity Limit High	1...127	7F
		16	1	01 - 7F	Note Shift	-63...0...+63	40
		17	1	01 - 7F	Detune	-63...0...+63	40
		18	1	00 - 05	Pitch Scaling Sensitivity	100%, 50%, 20%, 10%, 5%, 0%	00
		19	1	00 - 7F	Pitch Scaling Center	C-2...G8	3C
		1A	1	00 - 02	LFO Wave	Saw, Tri, S&H	01
		1B	1	00 - 01	LFO Phase Init	OFF, ON	01
		1C	1	00 - 3F	LFO Speed	0...63	1F
		1D	1	00 - 7F	PLFO Delay	0...127	00
		1E	1	00 - 7F	PLFO Fade Time	0...127	00
		1F	1	00 - 7F	LFO Pmod Depth	0...127	00
		20	1	00 - 7F	LFO Fmod Depth	0...127	00
		21	1	00 - 7F	LFO Amod Depth	0...127	00
		22	1	39 - 47	PEG Level Velocity Sensitivity	-7...+0...+7	40
		23	1	39 - 47	PEG Rate Velocity Sensitivity	-7...+0...+7	40
		24	1	39 - 47	PEG Rate Scaling Sensitivity	-7...+0...+7	40
		25	1	00 - 7F	PEG Rate Scaling Center Note	C-2...G8	3C
		26	1	00 - 3F	PEG Attack Rate	0...63	00
		27	1	00 - 3F	PEG Decay1 Rate	0...63	00
		28	1	00 - 3F	PEG Decay2 Rate	0...63	00
		29	1	00 - 3F	PEG Release Rate	0...63	00
		2A	2	2D - 52	PEG Initial Level	-2400...+0...+2400	40
		2B		00 - 7F			00
		2C	2	2D - 52	PEG Attack Level	-2400...+0...+2400	40
		2D		00 - 7F			00
		2E	2	2D - 52	PEG Decay1 Level	-2400...+0...+2400	40
		2F		00 - 7F			00
		30	2	2D - 52	PEG Decay2 Level	-2400...+0...+2400	40
		31		00 - 7F			00
		32	2	2D - 52	PEG Release Level	-2400...+0...+2400	40
		33		00 - 7F			00
		34	2	00 - 0F	Filter Cutoff Frequency	0...2047	0F
		35		00 - 7F			7F
		36	1	00 - 3F	Filter Resonance	0...63	06
		37	1	00 - 01	Filter Cutoff Scaling Flag	Brk.p, Table	00
		38	1	00 - 7F	Filter Cutoff Scaling BP1	C-2...G8	18
		39	1	00 - 7F	Filter utoff Scaling BP2	C-2...G8	30
		3A	1	00 - 7F	Filter Cutoff Scaling BP3	C-2...G8	60
		3B	1	00 - 7F	Filter Cutoff Scaling BP4	C-2...G8	6C
		3C	2	00 - 01	Filter Cutoff Scaling Offset1	-128...+0...+127	00
		3D		00 - 7F			00
		3E	2	00 - 01	Filter Cutoff Scaling Offset2	-128...+0...+127	00
		3F		00 - 7F			00
		40	2	00 - 01	Filter Cutoff Scaling Offset3	-128...+0...+127	00
		41		00 - 7F			00
		42	2	00 - 01	Filter Cutoff Scaling Offset4	-128...+0...+127	00
		43		00 - 7F			00
		44	1	00 - 0f	Filter Cutoff Scaling Sensitivity	0...15	00
		45	1	00 - 0f	Cutoff Velocity Sensitivity	0...15	00
		46	1	00 - 7F	FEG Hold Rate	0...127	00
		47	1	00 - 7F	FEG Attack Rate	0...127	00
		48	1	00 - 7F	FEG Decay1 Rate	0...127	00
		49	1	00 - 7F	FEG Decay2 Rate	0...127	00
		4A	1	00 - 7F	FEG Release Rate	0...127	00
		4B	2	30 - 4F	FEG Initial Level	-2047...+0...+2047	40
		4C		00 - 7F			00
		4D	2	30 - 4F	FEG Attack Level	-2047...+0...+2047	40
		4E		00 - 7F			00
		4F	2	30 - 4F	FEG Decay1 Level	-2047...+0...+2047	40
		50		00 - 7F			00
		51	2	30 - 4F	FEG Decay2 Level	-2047...+0...+2047	40
		52		00 - 7F			00
		53	2	30 - 4F	FEG Release Level	-2047...+0...+2047	40
		54		00 - 7F			00
		55	1	00 - 0F	FEG Rate Scaling Sensitivity	0...15	00
		56	1	00 - 0F	Filter Scaling Velocity Sensitivity	0...15	00
		57	1	00 - 0F	Resonance Velocity Sensitivity	0...15	00
		58	1	39 - 47	FEG Attack Rate Velocity Sensitivity	-7...+0...+7	40
		59	1	39 - 47	FEG Other Rate Velocity Sensitivity	-7...+0...+7	40
		5A	1	00 - 0f	Keyon Delay	0...15	00
		5B	1	00 - 7F	AEG Attack Rate	0...127	7F
		5C	1	00 - 7F	AEG Decay1 Rate	0...127	00
		5D	1	00 - 7F	AEG Decay2 Rate	0...127	00
		5E	1	-	not used	-	-
		5F	1	00 - 7F	AEG Release Rate	0...127	50
		60	2	00 - 01	AEG Initial Level	01 7F(0:Min)...00 00(255:Max)	00
		61		00 - 7F			00
		62	2	00 - 01	AEG Decay Level	01 7F(0:Min)...00 00(255:Max)	00
		63		00 - 7F			00
		64	2	00 - 01	AEG Sustain Level	01 7F(0:Min)...00 00(255:Max)	00
		65		00 - 7F			00
		66	1	00 - 0F	Level Scaling Sensitivity	0...15	00
		67	1	00 - 0F	AEG Rate Scaling Sensitivity	0...15	00
		68	1	00 - 0F	AEG Level Velocity Sensitivity	0...15	00
		69	1	00 - 0F	AEG Attack Rate Velocity Sensitivity	0...15	00

TOTAL SIZE 6A

42	ee	00	4	00 - 0F	Level Scaling Table Number	0...65535, 1st bit3-0→bit15-12	00
		01		00 - 0F		2nd bit3-0→bit11-8	00
		02		00 - 0F		3rd bit3-0→bit7-4	06
		03		00 - 0F		4th bit3-0→bit3-0	00
		04	4	00 - 0F	Scaling Pan Table Number	0...65535, 1st bit3-0→bit15-12	00
		05		00 - 0F		2nd bit3-0→bit11-8	00
		06		00 - 0F		3rd bit3-0→bit7-4	00
		07		00 - 0F		4th bit3-0→bit3-0	05
		08	4	00 - 0F	Tuning Curve Table Number	0...65535, 1st bit3-0→bit15-12	0f
		09		00 - 0F		2nd bit3-0→bit11-8	0f
		0A		00 - 0F		3rd bit3-0→bit7-4	0f
		0B		00 - 0F		4th bit3-0→bit3-0	0f
		0C	4	00 - 0F	Cutoff Scaling Table Number	0...65535, 1st bit3-0→bit15-12	0f
		0D		00 - 0F		2nd bit3-0→bit11-8	0f
		0E		00 - 0F		3rd bit3-0→bit7-4	0f
		0F		00 - 0F		4th bit3-0→bit3-0	0f
		10	4	00 - 0F	Cutoff Velocity Curve Table Number	0...65535, 1st bit3-0→bit15-12	00
		11		00 - 0F		2nd bit3-0→bit11-8	00
		12		00 - 0F		3rd bit3-0→bit7-4	00
		13		00 - 0F		4th bit3-0→bit3-0	01
		14	4	00 - 0F	FEG Rate Scaling Table Number	0...65535, 1st bit3-0→bit15-12	00
		15		00 - 0F		2nd bit3-0→bit11-8	00
		16		00 - 0F		3rd bit3-0→bit7-4	00
		17		00 - 0F		4th bit3-0→bit3-0	07
		18	4	00 - 0F	FEG Depth Velocity Curve Table Number	0...65535, 1st bit3-0→bit15-12	00
		19		00 - 0F		2nd bit3-0→bit11-8	00
		1A		00 - 0F		3rd bit3-0→bit7-4	00
		1B		00 - 0F		4th bit3-0→bit3-0	01
		1C	4	00 - 0F	Resonance Velocity Curve Table Number	0...65535, 1st bit3-0→bit15-12	00
		1D		00 - 0F		2nd bit3-0→bit11-8	00
		1E		00 - 0F		3rd bit3-0→bit7-4	00
		1F		00 - 0F		4th bit3-0→bit3-0	02
		20	4	00 - 0F	FEG Rate Velocity Table Number	0...65535, 1st bit3-0→bit15-12	00
		21		00 - 0F		2nd bit3-0→bit11-8	00
		22		00 - 0F		3rd bit3-0→bit7-4	00
		23		00 - 0F		4th bit3-0→bit3-0	03
		24	4	00 - 0F	AEG Level Scaling Table Number	0...65535, 1st bit3-0→bit15-12	00
		25		00 - 0F		2nd bit3-0→bit11-8	00
		26		00 - 0F		3rd bit3-0→bit7-4	06
		27		00 - 0F		4th bit3-0→bit3-0	00
		28	4	00 - 0F	AEG Rate Scaling Table Number	0...65535, 1st bit3-0→bit15-12	00
		29		00 - 0F		2nd bit3-0→bit11-8	00
		2A		00 - 0F		3rd bit3-0→bit7-4	00
		2B		00 - 0F		4th bit3-0→bit3-0	07
		2C	4	00 - 0F	AEG Level Velocity Table Number	0...65535, 1st bit3-0→bit15-12	00
		2D		00 - 0F		2nd bit3-0→bit11-8	00
		2E		00 - 0F		3rd bit3-0→bit7-4	00
		2F		00 - 0F		4th bit3-0→bit3-0	01
		30	4	00 - 0F	AEG Rate Velocity Table Number	0...65535, 1st bit3-0→bit15-12	00
		31		00 - 0F		2nd bit3-0→bit11-8	00
		32		00 - 0F		3rd bit3-0→bit7-4	00
		33		00 - 0F		4th bit3-0→bit3-0	01

TOTAL SIZE 34

ee = ELEMENT NUMBER(00 - 03)

<Table 2 - 11>

MIDI Parameter Change table (NATIVE DRUM VOICE COMMON)

Address (H)			Size (H)	Data (H)	Parameter	Description	Default value (H)
46	00	00	1	20 - 7F	Voice Name 1	32...127(ASCII)	49 ('I')
		01	1	20 - 7F	Voice Name 2	32...127(ASCII)	6E ('n')
		02	1	20 - 7F	Voice Name 3	32...127(ASCII)	69 ('i')
		03	1	20 - 7F	Voice Name 4	32...127(ASCII)	74 ('t')
		04	1	20 - 7F	Voice Name 5	32...127(ASCII)	20 (' ')
		05	1	20 - 7F	Voice Name 6	32...127(ASCII)	4B ('K')
		06	1	20 - 7F	Voice Name 7	32...127(ASCII)	69 ('i')
		07	1	20 - 7F	Voice Name 8	32...127(ASCII)	74 ('t')
		08	1	00 - 10	Voice Category	0, 2...16(--, PF, OR, GT, BA, ST, BR, RP, LD, PD, SC, CP, DR, SE, ME, CO)	00 ('--')
		09	1	00 - 13	Original Kit	01(StandKit) ...20(SFX Kit2)	00

TOTAL SIZE 0A

<Table 2 - 12>

MIDI Parameter Change table (NATIVE DRUM VOICE KEY)

Address (H)			Size (H)	Data (H)	Parameter	Description	Default value (H)
47	rr	00	1	00 - 7F	Pitch Coarse	-64...0...+63(semitones)	40
		01	1	00 - 7F	Pitch Fine	-64...0...+63(cent)	40
		02	1	00 - 7F	Level	0...127	depend on the note
		03	1	00 - 7F	Alternate Group	0ff, 1..127	depend on the note
		04	1	00 - 7F	Pan	Random, L63..C..R63	depend on the note
		05	1	00 - 7F	Reverb Send	0...127	depend on the note
		06	1	00 - 7F	Chorus Send	0...127	depend on the note
		07	1	-	not used	-	--
		08	1	00 - 01	Key Assign	Single, Multi	00
		09	1	00 - 01	Receve Note Off	OFF, ON	depend on the note
		0a	1	00 - 01	Receive Note On	OFF, ON	01
		0b	1	00 - 7F	Filter Cutoff Frequency	0...127	7F
		0c	1	00 - 7F	Filter Resonance	0...63	10
		0d	1	00 - 7F	EG Attack Rate	0...127	7F
		0e	1	00 - 7F	EG Decay1 Rate	0...127	40
		0f	1	00 - 7F	EG Decay2 Rate	0...127	40

TOTAL SIZE 10

rr = NOTE NUMBER(0D - 5B)

MUSIC SYNTHESIZER

S03

PARTS LIST

CONTENTS

Notes : DESTINATION ABBREVIATIONS

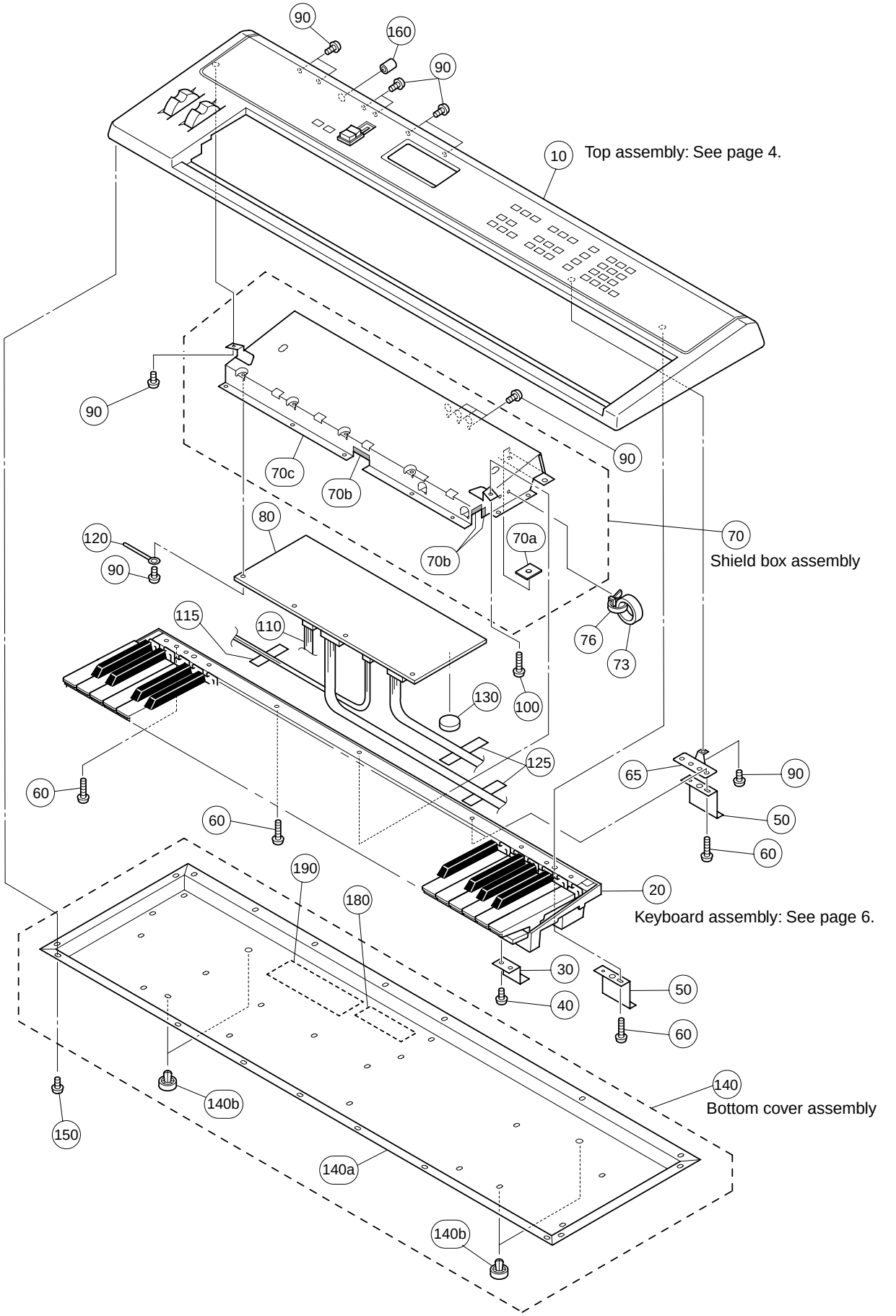
A : Australian model	M : South African model
B : British model	O : Chinese model
C : Canadian model	Q : South-east Asia model
D : German model	T : Taiwan model
E : European model	U : U.S.A. model
F : French model	V : General export model (110V)
H : North European model	W: General export model (220)
I : Indonesian model	N,X: General export model
J : Japanese model	Y : Export model

WARNING

Components having special characteristics are marked ⚠ and must be replaced with parts having specification equal to those originally installed.

- The numbers “QTY” show quantities for each unit.
- The parts with “--” in “PART NO.” are not available as spare parts.
- This mark “ } ” in the REMARKS column means these parts are interchangeable.
- The second letter of the shaded ( ) part number is O, not zero.
- The second letter of the shaded ( ) part number is I, not one.

OVERALL ASSEMBLY



	REF NO.	PART NO.	DESCRIPTION			REMARKS	QTY	RANK
		--	OVERALL ASSEMBLY			S03 (V654520)		
	10	--	Top Assembly			(V654650)		
	20	**V2386100**	Keyboard Assembly	16M C61 MKS3				23
	30	**VU540700**	Angle Bracket	MK-FRONT			5	03
	40	**EP600190**	Bind Head Tapping Screw-B	3.0X8 MFZN2BL			10	01
	50	**VU540900**	Angle Bracket	MK-REAR			2	04
	60	**VJ999700**	Bind Head Tapping Screw-B	3.0X20 MFZN2BL			6	01
	65	--	Shield Sheet	S		(V762600)		
*	70	**V6773400**	Shield Box Assembly					07
	70a	--	Cushion Rubber	C-4405		(V677310)	3	
	70b	**V0014500**	Adhesive Tape	ECT 590F 10X30M				08
	70c	--	Shield Box			(V654660)		
	73	**VC362700**	Ferrite Core	FR25/15/12-1400L				04
	76	**CB069250**	Cord Holder	BK-1				01
*	80	**V5836000**	Circuit Board	DM				
	90	**EP600190**	Bind Head Tapping Screw-B	3.0X8 MFZN2BL			15	01
	100	**VJ999700**	Bind Head Tapping Screw-B	3.0X20 MFZN2BL				01
	110	--	Jumper Wire	P=2.0-C-26SB-6-160		(V361090)		
	115	**VA119300**	Adhesive Tape	12X25				01
	120	**CB829850**	Cord Binder	S-34Z				03
	125	--	Adhesive Tape	12X60		(VM72270)	2	
⚠	130	**VN103500**	Lithium Battery	CR203				03
*	140	**V6546700**	Bottom Cover Assembly					10
	140a	--	Bottom Cover			(V654740)		
	140b	**VC999400**	Foot	205Y4179			4	02
	150	**EG340190**	Bind Head Tapping Screw-B	4.0X8 MFZN2BL			34	01
	160	**CB825380**	Push Button			STANDBY/ON		03
	180	--	Name Plate			(V654680)		
	190	--	FCCC Label			(V328720)		
			ACCESSORIES					
		VT368600	AC Adapter	PA-3B JP		J		09
		VT368700	AC Adapter	PA-3B UC		U		
		VT368800	AC Adapter	PA-3B CEE		E		08
		--	Compact Disc	12cm		(XZ455A0)		

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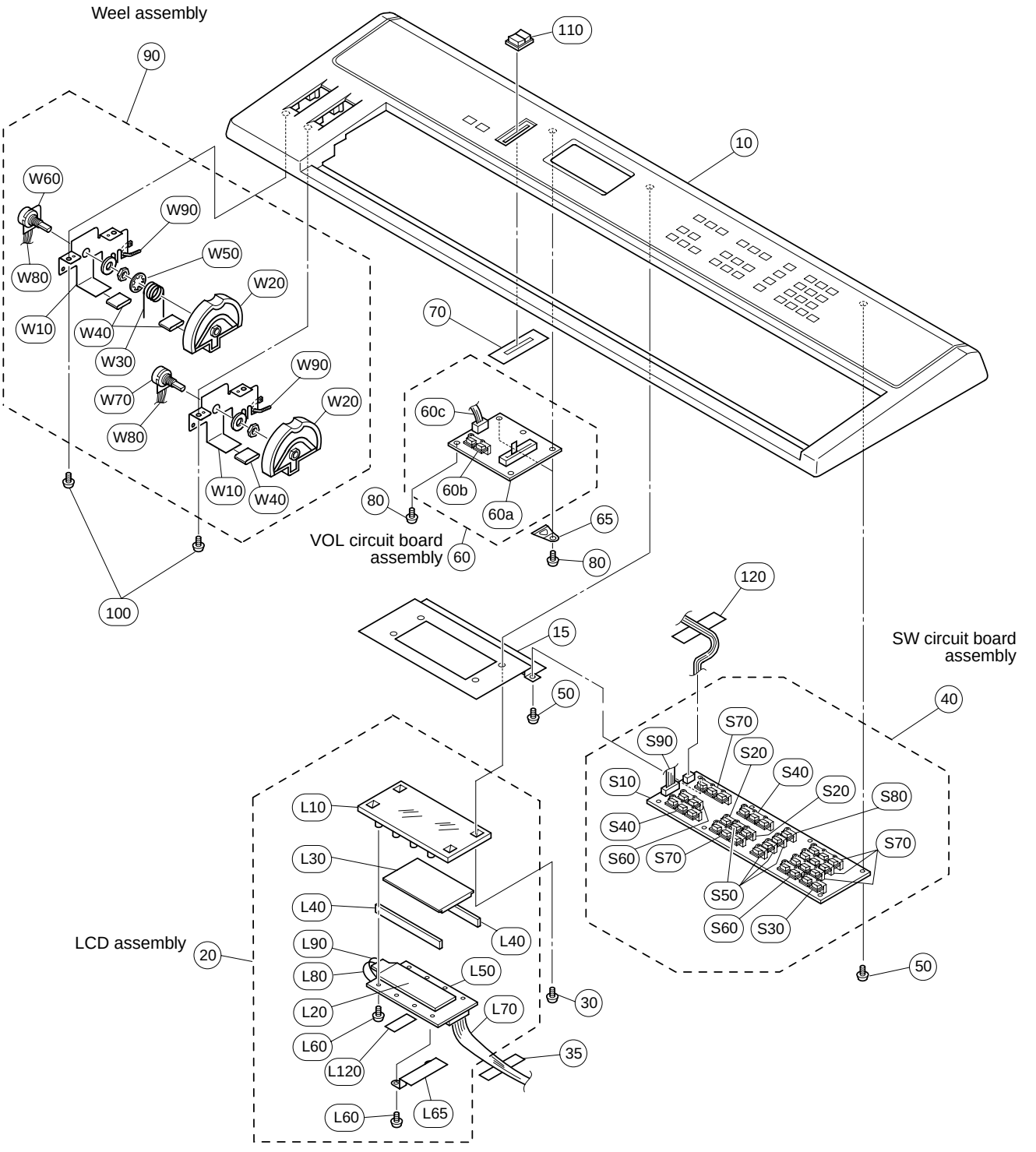
TOP ASSEMBLY



	REF NO.	PART NO.	DESCRIPTION			REMARKS	QTY	RANK
		--	TOP ASSEMBLY			S03 (V654650)		
*	10	V6547600	Top Cover					13
	15	--	Shield Sheet			(V763320)		
	20	--	LCD Assembly			(V654690)		
	30	EP600190	Bind Head Tapping Screw-B	3.0X8 MFZN2BL			4	01
	35	--	Adhesive Tape	12X60		(VM72270)		
	40	--	SW Circuit Board Assembly			(V654710)		
	50	EP600190	Bind Head Tapping Screw-B	3.0X8 MFZN2BL			7	01
	60	--	VOL Circuit Board Assembly			(V654720)		
*	60a	V6760200	Circuit Board	VOL				
*	60b	V6747400	Function Button	2B		OCTAVE DOWN,OCTAVE UP		01
	60c	--	Connector Assembly	KR-KR 6P 320L		(V668970)		
	65	VH467500	Contact				2	03
	70	VZ856100	Cloth, VR					03
	80	EP600190	Bind Head Tapping Screw-B	3.0X8 MFZN2BL			5	01
	90	--	Wheel Assembly			(VU64090)		
	100	EP600190	Bind Head Tapping Screw-B	3.0X8 MFZN2BL			4	01
	110	VB774000	Knob, VR			VOLUME		01
	120	VA119300	Adhesive Tape	12X25				01
		--	LCD Assembly			(V654690)		
*	L10	V6547000	LCD Panel					03
	L20	V5264900	Back Light Assembly	PT A				07
*	L30	V6754500	LCD	TTR5110 DPTDCN-C1				
	L40	V3755900	Rubber Connector	SS-105L			2	01
*	L50	V6760100	Circuit Board	LC				
	L60	EP600280	Bind Head Tapping Screw-P	3.0X8 MFZN2Y			8	01
	L65	--	Insulation sheet			(V756170)		
	L70	--	Connector Assembly	KRD-KRD 15P-450		(VK11170)		
	L80	--	Wire Red	A + RE		(V675990)		
	L90	--	Wire White	B - WH		(V676000)		
	L120	--	Adhesive Tape	12X60		(VM72270)		
		--	SW Circuit Board Assembly			(V654710)		
*	S10	V6760300	Circuit Board	SW				
*	S20	V6747500	Function Button Black	1B BL		DEC/NO,INC/YES	2	01
*	S30	V6747400	Function Button Black	2B BL		ENTER,EXIT		01
*	S40	V6747300	Function Button Black	3B BL		EDIT,JOB,STORE,-,+,MUTE	2	02
*	S50	V6754000	Function Button Glay	1G GY		UP,PRESET,USER,GM/XG	4	01
*	S60	V6754100	Function Button Glay	2G GY		UTILITY,MIDI,SYN COMP,	2	01
*	S70	V6754200	Function Button Glay	3G GY		CHROMATIC PERCUSSION MULTI,VOICE,DEMO,<,DOWN,> ,7/PIANO,8/ORGAN,9/GUITAR ,4/BASS,5/STRINGS,6/BRASS ,1/REED/PIPE,2/SYN LEAD, 3/SYN PAD	5	02
*	S80	V6754300	Function Button Light Gray	1LG L-GY		CATEGORY SEARCH		01
	S90	--	Connector Assembly	KRD-KRD 14P-350		(VK10900)		
		--	Wheel Assembly			(VU64090)		
	W10	VQ561400	Frame	M			2	04
	W20	VF537400	Wheel Black	BL		PITCH BEND,MODULATION	2	03
	W30	VC792800	Spring	SP				01
	W40	CB819020	Wheel Tube				3	04
	W50	EW600110	Stop Ring	CS 12.0				01
	W60	VQ764300	Rotary Variable Resistor	RK1631110T54A 10K		PICH BEND		03
	W70	VN245400	Rotary Variable Resistor	10.0K K161100S		MODULATION		03
	W80	--	Connector Assembly	PH5P-5F 300L+110L		(VU55440)		
	W90	CB069250	Cord Holder	BK-1			2	01

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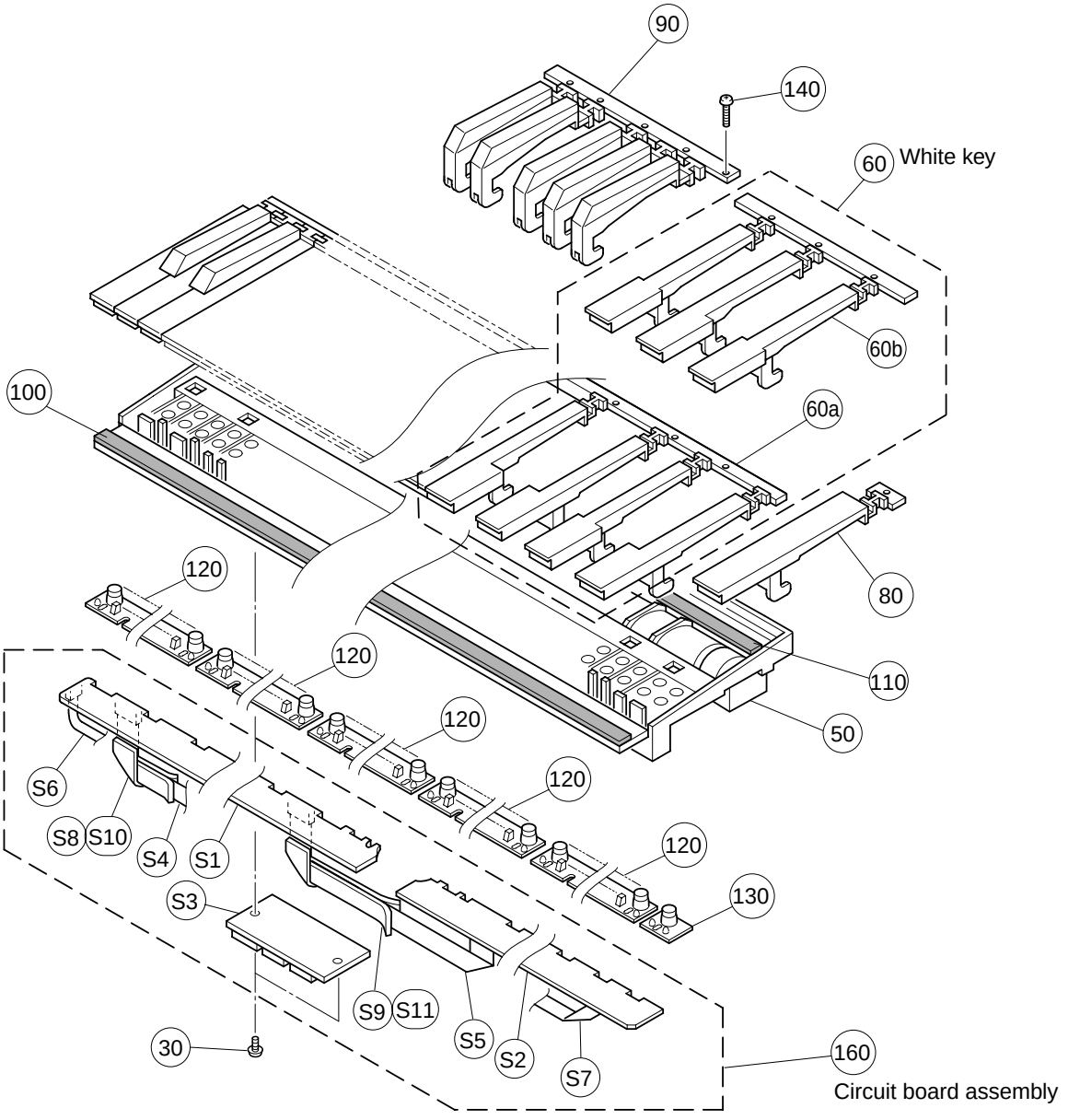
KEYBOARD ASSEMBLY



NOTE: Refer to the WIRING section of this manual regarding (S4), (S5), (S6), (S7) connector assemblies.

REF NO.	PART NO.	DESCRIPTION			REMARKS	QTY	RANK
	V2386100	KEYBOARD ASSEMBLY	16M C61 MKS3		S03		23
30	**EP600280**	Bind Head Tapping Screw-P	3.0X8 MFZN2Y			2	01
30	**EP630220**	Bind Head Tapping Screw-P	3.0X8 MFZN2BL			2	01
50	**VU328600**	Frame	C61 16M				10
60	**VH1809C0**	White Key	16L CEGBDFA			5	05
60a	**--**	White Key	16L CEGB		(VH18090)	5	
60b	**--**	White Key	16L DFA		(VH18100)	5	
80	**VH181100**	White Key	16L C'				01
90	**VH181200**	Black Key	16L #			5	03
100	**VH181300**	Felt					03
110	**VH181400**	Rubber Sheet					01
120	**VU328400**	Rubber Contact	16M OCT 2M 12Keys			5	06
130	**VU328500**	Rubber Contact	16M C' 2M 1Key				05
140	**EP600310**	Bind Head Tapping Screw-P	3.0X16 MFZN2Y			21	01
140	**VB205200**	Bind Head Tapping Screw-P	3.0X16 MFZN2BL			21	01
140	**VS756700**	Bind Head Tapping Screw-P	3.0X16 MFZN2B			21	01
150	**TX920280**	Grease	G-31KA				10
160	**--**	Circuit Board Assembly	KBD SW MKS3		(V240470)		
	--	Circuit Board Assembly	KBD SW MKS3		(V240470)		
S1	**VV583800**	Circuit Board	MK-L				09
S2	**VV583900**	Circuit Board	MK-H				09
S3	**V2404900**	Circuit Board	MKS3				10
S4	**VV583100**	Cable	MK-A 12P				03
S5	**VV583600**	Cable	MK-B 12P				03
S6	**VV583500**	Cable	MK-C 7P				03
S7	**VV583700**	Cable	MK-D 5P				03
S8	**--**	Sponge	A 16M		(VV61890)	2	
S9	**--**	Sponge	B 16M		(VV61900)	2	
S10	**--**	Adhesive Tape	C 12		(VV61910)		
S11	**--**	Adhesive Tape	D 12		(VV61920)	3	

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ELECTRICAL PARTS

	REF NO.	PART NO.	DESCRIPTION			REMARKS	QTY	RANK
			ELECTRICAL PARTS			S03		
*		**V5836000**	Circuit Board	DM		(XZ144F0)		
		--	Circuit Board	SB		(V759920)(X0143A0)		
*		**V6760100**	Circuit Board	LC		(XZ147B0)		
		VV583900	Circuit Board	MK-H		(XR565C0)		09
		VV583800	Circuit Board	MK-L		(XR564C0)		09
		V2404900	Circuit Board	MKS3		(XU878B0)		10
*		**V6760300**	Circuit Board	SW		(XZ145C0)		
*		**V6760200**	Circuit Board	VOL		(XZ146C0)		
*		**V5836000**	Circuit Board	DM		(XZ144F0)		
		VU540600	Holder, Jack					05
		BA808520	Heat Sink	T220M 25L				03
		EG330360	Bind Head Screw	3.0X6 MFZN2BL				01
		--	Copper Tape	CHO-FOIL 25.4		(V747530)		
		--	Circuit Board	SB		(V759920)(X0143A0)		
		--	Wire	1 #30 L=145		(V759930)		
		--	Wire	2 #30 L=150		(V759940)		
		--	Wire	3 #30 L=110		(V759950)		
		--	Wire	4 #30 L=70		(V759960)		
		--	Spacer			(V760480)		
	BT001	**VN103600**	Battery Holder	CR2032				03
	C0001	**US064100**	Ceramic Capacitor-B (chip)	0.0100 50V K				01
	C0002	**US063220**	Ceramic Capacitor-B (chip)	2200P 50V K				01
	C0003	**US063220**	Ceramic Capacitor-B (chip)	2200P 50V K				01
	C0004	**US064100**	Ceramic Capacitor-B (chip)	0.0100 50V K				01
	C0005	**VH340500**	Electrolytic Cap.	470.00 25.0V				01
	C0006	**UI548100**	Electrolytic Cap.	100.00 25.0V				01
	C0007	**VH340500**	Electrolytic Cap.	470.00 25.0V				01
	C0008	**UF138220**	Electrolytic Cap. (chip)	220 16V UUR1C2				01
	C0009	**UF037100**	Electrolytic Cap. (chip)	10 16V				01
	C0010	**UF038100**	Electrolytic Cap. (chip)	100 16V				01
	C0011	**UF037470**	Electrolytic Cap. (chip)	47 16V				01
	C0012	**US063100**	Ceramic Capacitor-B (chip)	1000P 50V K				01
	C0013	**US063100**	Ceramic Capacitor-B (chip)	1000P 50V K				01
	C0014	**UF037470**	Electrolytic Cap. (chip)	47 16V				01
	C0015	**UF037220**	Electrolytic Cap. (chip)	22 16V				01
	C0016	**UF138220**	Electrolytic Cap. (chip)	220 16V UUR1C2				01
	C0017	**UF037220**	Electrolytic Cap. (chip)	22 16V				01
	C0018	**UF138220**	Electrolytic Cap. (chip)	220 16V UUR1C2				01
	C0019	**US062470**	Ceramic Capacitor-SL(chip)	470P 50V J				01
	C0020	**US062470**	Ceramic Capacitor-SL(chip)	470P 50V J				01
	C0021	**UF037100**	Electrolytic Cap. (chip)	10 16V				01
	C0022	**US062100**	Ceramic Capacitor-SL(chip)	100P 50V J				01
	C0023	**US062100**	Ceramic Capacitor-SL(chip)	100P 50V J				01
	C0024	**UF056330**	Electrolytic Cap. (chip)	3.3 35V				01
	C0025	**US061270**	Ceramic Capacitor-CH(chip)	27P 50V J				01
	C0026	**US061270**	Ceramic Capacitor-CH(chip)	27P 50V J				01
	C0027	**UF037100**	Electrolytic Cap. (chip)	10 16V				01
	C0028	**UF037100**	Electrolytic Cap. (chip)	10 16V				01
	C0029	**US064100**	Ceramic Capacitor-B (chip)	0.0100 50V K				01
	-0038	**US064100**	Ceramic Capacitor-B (chip)	0.0100 50V K				01
	C0039	**UF037100**	Electrolytic Cap. (chip)	10 16V				01
	-0042	**UF037100**	Electrolytic Cap. (chip)	10 16V				01
	C0053	**US064100**	Ceramic Capacitor-B (chip)	0.0100 50V K				01
	C0060	**US062100**	Ceramic Capacitor-SL(chip)	100P 50V J				01
	C0061	**US062100**	Ceramic Capacitor-SL(chip)	100P 50V J				01
	C0062	**US062820**	Ceramic Capacitor-B (chip)	820P 50V K				01
	C0063	**US064100**	Ceramic Capacitor-B (chip)	0.0100 50V K				01
	-0065	**US064100**	Ceramic Capacitor-B (chip)	0.0100 50V K				01
	C0066	**US062820**	Ceramic Capacitor-B (chip)	820P 50V K				01
	C0067	**US064100**	Ceramic Capacitor-B (chip)	0.0100 50V K				01
	-0070	**US064100**	Ceramic Capacitor-B (chip)	0.0100 50V K				01
	C0071	**UF037100**	Electrolytic Cap. (chip)	10 16V				01
	C0072	**US064100**	Ceramic Capacitor-B (chip)	0.0100 50V K				01
	-0080	**US064100**	Ceramic Capacitor-B (chip)	0.0100 50V K				01
	C0081	**UF037100**	Electrolytic Cap. (chip)	10 16V				01
	C0082	**US064100**	Ceramic Capacitor-B (chip)	0.0100 50V K				01
	-0090	**US064100**	Ceramic Capacitor-B (chip)	0.0100 50V K				01
	C0091	**UF037100**	Electrolytic Cap. (chip)	10 16V				01

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REF NO.	PART NO.	DESCRIPTION			REMARKS	QTY	RANK
C0092	**US064100**	Ceramic Capacitor-B (chip)	0.0100 50V K				01
C0093	**US064100**	Ceramic Capacitor-B (chip)	0.0100 50V K				01
C0094	**UF037100**	Electrolytic Cap. (chip)	10 16V				01
C0095	**UF037100**	Electrolytic Cap. (chip)	10 16V				01
C0096	**US062680**	Ceramic Capacitor-SL(chip)	680P 50V J				01
C0097	**UB052100**	Monolithic Ceramic Cap.	SL 100P 50V J				01
C0098	**US062680**	Ceramic Capacitor-SL(chip)	680P 50V J				01
C0099	**UB052100**	Monolithic Ceramic Cap.	SL 100P 50V J				01
C0100	**UF038100**	Electrolytic Cap. (chip)	100 16V				01
C0101	**US062100**	Ceramic Capacitor-SL(chip)	100P 50V J				01
C0102	**US064100**	Ceramic Capacitor-B (chip)	0.0100 50V K				01
C0103	**US064100**	Ceramic Capacitor-B (chip)	0.0100 50V K				01
C0104	**US062680**	Ceramic Capacitor-SL(chip)	680P 50V J				01
C0105	**US062100**	Ceramic Capacitor-SL(chip)	100P 50V J				01
C0106	**US062680**	Ceramic Capacitor-SL(chip)	680P 50V J				01
C0108	**US064100**	Ceramic Capacitor-B (chip)	0.0100 50V K				01
C0109	**US064100**	Ceramic Capacitor-B (chip)	0.0100 50V K				01
C0110	**US061470**	Ceramic Capacitor-CH(chip)	47P 50V J				01
-0117	**US061470**	Ceramic Capacitor-CH(chip)	47P 50V J				01
C0118	**US063560**	Ceramic Capacitor-B (chip)	5600P 50V K				01
C0119	**US063560**	Ceramic Capacitor-B (chip)	5600P 50V K				01
C0121	**UF037100**	Electrolytic Cap. (chip)	10 16V				01
C0122	**UF037100**	Electrolytic Cap. (chip)	10 16V				01
C0123	**UF037470**	Electrolytic Cap. (chip)	47 16V				01
C0124	**UF037470**	Electrolytic Cap. (chip)	47 16V				01
C0125	**UF038100**	Electrolytic Cap. (chip)	100 16V				01
C0126	**UF037100**	Electrolytic Cap. (chip)	10 16V				01
C0127	**US064100**	Ceramic Capacitor-B (chip)	0.0100 50V K				01
C0128	**UF037220**	Electrolytic Cap. (chip)	22 16V				01
C0129	**US064100**	Ceramic Capacitor-B (chip)	0.0100 50V K				01
C0130	**US064100**	Ceramic Capacitor-B (chip)	0.0100 50V K				01
C0131	**UF037470**	Electrolytic Cap. (chip)	47 16V				01
C0132	**US061220**	Ceramic Capacitor-CH(chip)	22P 50V J				01
C0133	**US062100**	Ceramic Capacitor-SL(chip)	100P 50V J				01
C0134	**US135100**	Ceramic Capacitor-F (chip)	0.1000 16V Z				01
C0135	**US064100**	Ceramic Capacitor-B (chip)	0.0100 50V K				01
-0138	**US064100**	Ceramic Capacitor-B (chip)	0.0100 50V K				01
C0139	**UF038100**	Electrolytic Cap. (chip)	100 16V				01
C0140	**US135100**	Ceramic Capacitor-F (chip)	0.1000 16V Z				01
-0143	**US135100**	Ceramic Capacitor-F (chip)	0.1000 16V Z				01
C0144	**UF037100**	Electrolytic Cap. (chip)	10 16V				01
C0145	**UF037100**	Electrolytic Cap. (chip)	10 16V				01
C0146	**US135100**	Ceramic Capacitor-F (chip)	0.1000 16V Z				01
C0147	**US064100**	Ceramic Capacitor-B (chip)	0.0100 50V K				01
C0148	**UF037100**	Electrolytic Cap. (chip)	10 16V				01
C0149	**US064100**	Ceramic Capacitor-B (chip)	0.0100 50V K				01
C0150	**US064100**	Ceramic Capacitor-B (chip)	0.0100 50V K				01
C0151	**RD350000**	Carbon Resistor (chip)	0 63M J				01
C0152	**RD350000**	Carbon Resistor (chip)	0 63M J				01
C0153	**UF037100**	Electrolytic Cap. (chip)	10 16V				01
C0154	**VD989700**	Tantalum Cap.	4.70 16V M				03
C0155	**US061470**	Ceramic Capacitor-CH(chip)	47P 50V J				01
C0156	**US061470**	Ceramic Capacitor-CH(chip)	47P 50V J				01
C0157	**US063220**	Ceramic Capacitor-B (chip)	2200P 50V K				01
-160	**US063220**	Ceramic Capacitor-B (chip)	2200P 50V K				01
C0161	**VR813200**	Monolithic Ceramic Cap.	1.0 16V K				01
-0163	**VR813200**	Monolithic Ceramic Cap.	1.0 16V K				01
C0164	**US135100**	Ceramic Capacitor-F (chip)	0.1000 16V Z				01
C0165	**US135100**	Ceramic Capacitor-F (chip)	0.1000 16V Z				01
CN001	**VB390200**	Connector Base Post	PH 6P TE				01
CN003	**VF728300**	Wire Trap	52147 6P TE				01
CN004	**VF283300**	Connector Base Post	PH-15P TE				01
CN005	**VB390100**	Connector Base Post	PH 5P TE				01
CN006	**VE352600**	Connector Base Post	PH 14P TE				01
D0001	**VZ016600**	Diode	D3FP3				03
D0002	**VT332900**	Diode	1SS355 TE-17				01
-0008	**VT332900**	Diode	1SS355 TE-17				01
D0009	**VS201100**	Diode	D1F60				01
D0010	**VZ016600**	Diode	D3FP3				03
D0011	**VS201100**	Diode	D1F60				01

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	REF NO.	PART NO.	DESCRIPTION		REMARKS	QTY	RANK
	D0012	**VS201100**	Diode	D1F60			01
	D0013	**VT332900**	Diode	1SS355 TE-17			01
	D0014	**VT332900**	Diode	1SS355 TE-17			01
	D0015	**VV925900**	Diode	RLS-73 TE-11			01
	D0017	**VV617300**	Diode	RB751V-40 TE17			01
	D0018	**VV617300**	Diode	RB751V-40 TE17			01
	D0019	**VT332900**	Diode	1SS355 TE-17			01
	-0022	**VT332900**	Diode	1SS355 TE-17			01
	EM001	**VR193800**	LC Filter	STF-104ZB-TBM			01
	EM002	**VR193800**	LC Filter	STF-104ZB-TBM			01
	EM003	**V6196600**	EMI Filter (chip)	NFM4516P13C204FT1			01
	-011	**V6196600**	EMI Filter (chip)	NFM4516P13C204FT1			01
	IC001	**XU947C00**	IC	HG73C205AFD	SWX00B		09
	IC002	**XU947C00**	IC	HG73C205AFD	SWX00B		09
	IC003	**XT138A00**	IC	UPD431000AGW-70LL	SRAM 1M (UPPER)		07
	IC003	**XV976A00**	IC	M5M51008CFP-70H			07
	IC004	**XT138A00**	IC	UPD431000AGW-70LL	SRAM 1M (LOWER)		07
	IC004	**XV976A00**	IC	M5M51008CFP-70H			07
*	IC005	**XZ587C00**	IC	MBM29F160BE-90TN	FLASH ROM 16M V1.0		
*	IC006	**XZ193100**	IC	28F640J5	WAVE FLASH ROM1 64M		10
*	IC007	**XZ194100**	IC	28F640J5	WAVE FLASH ROM2 64M		10
	IC008	**XV708A00**	IC	HD29051FP	LINE TRANSCEIVER		05
	IC009	**XT441A00**	IC	UPC2909T-E1	REGULATOR +9V		03
	IC010	**XS516A00**	IC	UPC2933T-E1	REGULATOR +3.3V		03
	IC011	**XI348A00**	IC	SC7SU04FEL	INVERTER		01
	IC012	**XV077A00**	IC	MSM514260C-60JS	DRAM 4M (DSP)		07
	IC012	**XV839A00**	IC	SDM4260CLU-6S			08
	IC013	**XQ138A00**	IC	NJM4556AMT1	OP AMP		03
	IC015	**XT442A00**	IC	SI-8050S	REGULATOR +5V		05
	IC016	**XF291A00**	IC	UPC4570G2	OP AMP		03
	IC017	**XI686A00**	IC	M62021FP	SYSTEM RESET		04
	IC018	**XP867A00**	IC	UPD63200GS-E1	DAC		07
	IC019	**XF291A00**	IC	UPC4570G2	OP AMP		03
	IC020	**XR294A00**	IC	NJM3414AM(T1)	OP AMP		02
	IC021	**XR682A00**	IC	TC7S66F	ANALOG SWITCH		01
	IC022	**XJ598A00**	IC	NJM78L05UA	REGULATOR +5V		02
	IC023	**VN686000**	Photo Coupler	PC410T			04
	IC024	**XI297A00**	IC	TC74HCT04AF-T1	INVERTER		01
	IC025	**XT475A00**	IC	TC74VHC157F(EL)	DATA SELECTOR		02
	IC025	**XY870A00**	IC	74VHC157SJX			
	IC027	**XW107A00**	IC	MM74HC245ASJX	BUFFER		03
	IC028	**XW793A00**	IC	SN74HC138NSR	DECODER		
	IC029	**XW104A00**	IC	MM74HC14SJX	INVERTER		01
	IC030	**XV833A00**	IC	MBCG46183-129	SIO4		06
*	IC031	**XY096A00**	IC	TC74HCT32AF(EL)	OR		01
	J0001	**VA078900**	Jumper Wire	0.55			
	J0002	**VA078900**	Jumper Wire	0.55			
	JK001	**VE382300**	Phone Jack	YKB21-5010	PHONES		01
	JK002	**VS115400**	Phone Jack Black	LGR4609-7000 BL	OUTPUT L/MONO		01
	JK003	**VS115400**	Phone Jack Black	LGR4609-7000 BL	OUTPUT R		01
	JK004	**VS115400**	Phone Jack Black	LGR4609-7000 BL	FOOT CONTROLLER		01
	JK005	**VS115400**	Phone Jack Black	LGR4609-7000 BL	FOOT SWITCH		01
	JK006	**VM761000**	DIN Connector	8P MD-S810	TO HOST		03
	JK007	**VT033600**	DIN Connector	3P YKF51-5067	MIDI IN		03
	JK008	**VJ885500**	DIN Connector	3P YKF51-5054	MIDI OUT/THRU		04
	JK009	**LB302260**	Connector	HEC0470-01-630	DC IN		02
	L0001	**VL139800**	Chip Solid Inductance	BLM31A700SPT 70ohm			01
	-0003	**VL139800**	Chip Solid Inductance	BLM31A700SPT 70ohm			01
	L0004	**VR579900**	Chip Inductance	BK2125HS601-T			01
	-0007	**VR579900**	Chip Inductance	BK2125HS601-T			01
	L0008	**VL139800**	Chip Solid Inductance	BLM31A700SPT 70ohm			01
	L0009	**VL139800**	Chip Solid Inductance	BLM31A700SPT 70ohm			01
	L0016	**VR243700**	Chip Inductance	56U LEM2520 T 560J			01
	-0021	**VR243700**	Chip Inductance	56U LEM2520 T 560J			01
	L0025	**VR579900**	Chip Inductance	BK2125HS601-T			01
	-0027	**VR579900**	Chip Inductance	BK2125HS601-T			01
	L0029	**VZ017900**	Coil	HP-022J 180uH			05
	L0030	**VR579900**	Chip Inductance	BK2125HS601-T			01
	-0033	**VR579900**	Chip Inductance	BK2125HS601-T			01
	L0034	**VG238200**	LC Filter	PLT2003C			04

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RANK: Japan only

REF NO.	PART NO.	DESCRIPTION			REMARKS	QTY	RANK
L0041	**VR579900**	Chip Inductance	BK2125HS601-T				01
-0051	**VR579900**	Chip Inductance	BK2125HS601-T				01
R0001	**RD256470**	Carbon Resistor (chip)	4.7K 0.1 J				01
R0002	**RD356100**	Carbon Resistor (chip)	1.0K 63M J				01
R0003	**RD356100**	Carbon Resistor (chip)	1.0K 63M J				01
R0004	**RD254560**	Carbon Resistor (chip)	56.0 0.1 J				01
R0005	**RD255220**	Carbon Resistor (chip)	220.0 0.1 J				01
-0010	**RD255220**	Carbon Resistor (chip)	220.0 0.1 J				01
R0011	**RD254560**	Carbon Resistor (chip)	56.0 0.1 J				01
R0012	**RD357100**	Carbon Resistor (chip)	10K 63M J				01
R0013	**RD154470**	Carbon Resistor (chip)	47.0 1/4 J				01
R0015	**RD154470**	Carbon Resistor (chip)	47.0 1/4 J				01
R0016	**RD356100**	Carbon Resistor (chip)	1.0K 63M J				01
R0017	**RD356100**	Carbon Resistor (chip)	1.0K 63M J				01
R0018	**RD357100**	Carbon Resistor (chip)	10K 63M J				01
R0019	**RD356150**	Carbon Resistor (chip)	1.5K 63M J				01
R0020	**RD355560**	Carbon Resistor (chip)	560 63M J				01
R0021	**RD356100**	Carbon Resistor (chip)	1.0K 63M J				01
R0022	**RD357100**	Carbon Resistor (chip)	10K 63M J				01
R0023	**RD357100**	Carbon Resistor (chip)	10K 63M J				01
R0029	**RD357100**	Carbon Resistor (chip)	10K 63M J				01
-0031	**RD357100**	Carbon Resistor (chip)	10K 63M J				01
R0032	**RD357120**	Carbon Resistor (chip)	12K 63M J				01
R0033	**RD357120**	Carbon Resistor (chip)	12K 63M J				01
R0034	**RD350000**	Carbon Resistor (chip)	0 63M J				01
R0035	**RD357470**	Carbon Resistor (chip)	47K 63M J				01
R0036	**RD350000**	Carbon Resistor (chip)	0 63M J				01
R0037	**RD357470**	Carbon Resistor (chip)	47K 63M J				01
R0038	**RD357220**	Carbon Resistor (chip)	22K 63M J				01
R0039	**RD357220**	Carbon Resistor (chip)	22K 63M J				01
R0040	**RD356680**	Carbon Resistor (chip)	6.8K 63M J				01
R0041	**RD356680**	Carbon Resistor (chip)	6.8K 63M J				01
R0042	**RD355100**	Carbon Resistor (chip)	100 63M J				01
R0043	**RD355100**	Carbon Resistor (chip)	100 63M J				01
R0044	**RD358100**	Carbon Resistor (chip)	100K 63M J				01
R0045	**RD358100**	Carbon Resistor (chip)	100K 63M J				01
R0046	**RD356100**	Carbon Resistor (chip)	1.0K 63M J				01
R0047	**VV310300**	Carbon Resistor (chip)	10K 0.1 D				01
R0048	**VV310300**	Carbon Resistor (chip)	10K 0.1 D				01
R0049	**RD356100**	Carbon Resistor (chip)	1.0K 63M J				01
R0050	**RD358100**	Carbon Resistor (chip)	100K 63M J				01
R0051	**RD358100**	Carbon Resistor (chip)	100K 63M J				01
R0052	**RD357470**	Carbon Resistor (chip)	47K 63M J				01
R0053	**RD355220**	Carbon Resistor (chip)	220 63M J				01
R0054	**RD358100**	Carbon Resistor (chip)	100K 63M J				01
R0055	**RD357100**	Carbon Resistor (chip)	10K 63M J				01
-0058	**RD357100**	Carbon Resistor (chip)	10K 63M J				01
R0059	**RD355100**	Carbon Resistor (chip)	100 63M J				01
R0060	**RD357100**	Carbon Resistor (chip)	10K 63M J				01
R0061	**RD356100**	Carbon Resistor (chip)	1.0K 63M J				01
R0062	**RD357100**	Carbon Resistor (chip)	10K 63M J				01
R0063	**RD357100**	Carbon Resistor (chip)	10K 63M J				01
R0065	**RD357470**	Carbon Resistor (chip)	47K 63M J				01
R0066	**RD357470**	Carbon Resistor (chip)	47K 63M J				01
R0068	**RD356680**	Carbon Resistor (chip)	6.8K 63M J				01
R0069	**RD354470**	Carbon Resistor (chip)	47 63M J				01
R0070	**RD357100**	Carbon Resistor (chip)	10K 63M J				01
R0071	**RD356680**	Carbon Resistor (chip)	6.8K 63M J				01
R0073	**RD356680**	Carbon Resistor (chip)	6.8K 63M J				01
R0074	**RD356680**	Carbon Resistor (chip)	6.8K 63M J				01
R0075	**RD358100**	Carbon Resistor (chip)	100K 63M J				01
R0076	**RD358100**	Carbon Resistor (chip)	100K 63M J				01
R0077	**RD356100**	Carbon Resistor (chip)	1.0K 63M J				01
R0078	**RD356100**	Carbon Resistor (chip)	1.0K 63M J				01
R0079	**RD155470**	Carbon Resistor (chip)	470.0 1/4 J				
R0080	**RD357100**	Carbon Resistor (chip)	10K 63M J				01
R0081	**RD256150**	Carbon Resistor (chip)	1.5K 0.1 J				01
R0082	**RD357220**	Carbon Resistor (chip)	22K 63M J				01
R0083	**RD357100**	Carbon Resistor (chip)	10K 63M J				01
R0088	**RD350000**	Carbon Resistor (chip)	0 63M J				01

✻: New Parts

RANK: Japan only

	REF NO.	PART NO.	DESCRIPTION			REMARKS	QTY	RANK
	R0089	**RD350000**	Carbon Resistor (chip)	0 63M J				01
	R0090	**RD359100**	Carbon Resistor (chip)	1.0M 63M J				01
	R0091	**RD357100**	Carbon Resistor (chip)	10K 63M J				01
	R0092	**RD357100**	Carbon Resistor (chip)	10K 63M J				01
	R0093	**RD350000**	Carbon Resistor (chip)	0 63M J				01
	R0101	**RD356270**	Carbon Resistor (chip)	2.7K 63M J				01
	R0102	**RD356100**	Carbon Resistor (chip)	1.0K 63M J				01
	R0103	**RD358100**	Carbon Resistor (chip)	100K 63M J				01
	R0105	**RD357100**	Carbon Resistor (chip)	10K 63M J				01
	R0106	**RD356100**	Carbon Resistor (chip)	1.0K 63M J				01
	R0107	**RD356100**	Carbon Resistor (chip)	1.0K 63M J				01
	R0108	**RD357220**	Carbon Resistor (chip)	22K 63M J				01
	R0109	**RD357220**	Carbon Resistor (chip)	22K 63M J				01
	R0110	**RD357100**	Carbon Resistor (chip)	10K 63M J				01
	R0111	**RD356470**	Carbon Resistor (chip)	4.7K 63M J				01
	R0112	**RD357220**	Carbon Resistor (chip)	22K 63M J				01
	R0113	**RD357220**	Carbon Resistor (chip)	22K 63M J				01
	R0114	**RD357100**	Carbon Resistor (chip)	10K 63M J				01
	-0119	**RD357100**	Carbon Resistor (chip)	10K 63M J				01
	R0125	**RD356100**	Carbon Resistor (chip)	1.0K 63M J				01
	R0128	**RD254100**	Carbon Resistor (chip)	10.0 0.1 J				01
	R0129	**RD155120**	Carbon Resistor (chip)	120.0 1/4 J				01
	-0132	**RD155120**	Carbon Resistor (chip)	120.0 1/4 J				01
	R0133	**RD357100**	Carbon Resistor (chip)	10K 63M J				01
	-0135	**RD357100**	Carbon Resistor (chip)	10K 63M J				01
	R0138	**RD357100**	Carbon Resistor (chip)	10K 63M J				01
	R0139	**RD356100**	Carbon Resistor (chip)	1.0K 63M J				01
	R0140	**RD356100**	Carbon Resistor (chip)	1.0K 63M J				01
	R0141	**RD355220**	Carbon Resistor (chip)	220 63M J				01
	R0142	**RD355220**	Carbon Resistor (chip)	220 63M J				01
	RA002	**RE044000**	Resistor Array (chip)	0X4				01
	-008	**RE044000**	Resistor Array (chip)	0X4				01
	RA013	**RE044000**	Resistor Array (chip)	0X4				01
	-018	**RE044000**	Resistor Array (chip)	0X4				01
	RA019	**RE047220**	Resistor Array	22KX4				01
	RA020	**RE046100**	Resistor Array	1KX4				01
	RA021	**RE047220**	Resistor Array	22KX4				01
	RA022	**RE047220**	Resistor Array	22KX4				01
	RA024	**RE045100**	Resistor Array	100X4				01
	RA026	**RE047220**	Resistor Array	22KX4				01
	-029	**RE047220**	Resistor Array	22KX4				01
	RA030	**RE044000**	Resistor Array (chip)	0X4				01
⚠	SW001	**VP691000**	Push Switch	SDDLB1		STANDBY/ON		03
	SW002	**VN210700**	Slide Switch	SSSF124-S06N-0		HOST SELECT		03
	TH001	**VV111400**	Poly Switch	SMD075-2 SMD		Overcurrent protection		03
	TR001	**VD303700**	Transistor	2SC3326 A,B TE85R				01
	TR002	**VD303700**	Transistor	2SC3326 A,B TE85R				01
	TR003	**VJ927200**	Transistor	2SA1162 O,Y				01
	TR004	**VD303700**	Transistor	2SC3326 A,B TE85R				01
	X0001	**VZ703600**	Quartz Crystal Unit	8.4672MHz SMD-49				03
	X0002	**VY681200**	Ceramic Resonator	8MHz CSTCC8.00MG				01
	ZD001	**VU171500**	Zener Diode	UDZ 3.6BTE-17 3.6V				01
		--	Circuit Board	SB		(V759920)(X0143A0)		
	C0001	**US064100**	Ceramic Capacitor-B (chip)	0.0100 50V K				01
	IC001	**XV892A00**	IC	TC74VHC74FT		D-FF		01
	IC002	**XY364A00**	IC	TC7WH32FU(TE12L)		OR (SSOP8)		01
	R0001	**RD354680**	Carbon Resistor (chip)	68 63M J				01
*		**V6760100**	Circuit Board	LC		(XZ147B0)		
	C0001	**US145100**	Ceramic Capacitor-F (chip)	0.1000 25V Z				01
	C0002	**US145100**	Ceramic Capacitor-F (chip)	0.1000 25V Z				01
	CN001	**VF283300**	Connector Base Post	PH-15P TE				01
	IC001	**XN859A00**	IC	LC7985ND		LCD CONTROLLER		06
	R0001	**RD356220**	Carbon Resistor (chip)	2.2K 63M J				01
*	R0002	**RD357910**	Carbon Resistor (chip)	91K 63M J				01
	R0003	**RD356220**	Carbon Resistor (chip)	2.2K 63M J				01
	-0006	**RD356220**	Carbon Resistor (chip)	2.2K 63M J				01
*	R0007	**RD355200**	Carbon Resistor (chip)	200 63M J				01
	R0008	**RD354680**	Carbon Resistor (chip)	68 63M J				01

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	REF NO.	PART NO.	DESCRIPTION			REMARKS	QTY	RANK
	TH001	**VR346900**	Thermistor	ERTD2FGJ801S 800				03
		VV583800	Circuit Board	MK-L		(XR564C0)		09
		VV437800	Diode	1N4148(DO-34)				01
		VK025600	Wire Trap	52147 12P TE				01
		VK025100	Wire Trap	52147 7P TE				01
		VV583900	Circuit Board	MK-H		(XR565C0)		09
		VV437800	Diode	1N4148(DO-34)				01
		VK025600	Wire Trap	52147 12P TE				01
		VK024900	Wire Trap	52147 5P TE				01
		V2404900	Circuit Board	MKS3		(XU878B0)		10
		--	Vibration-proof Tape	10X64X0.5		(VK34680)		
		VA078900	Jumper Wire	0.55				
	C1	**FG651220**	Ceramic Capacitor-SL	22P 50V J				01
	C1	**VR027400**	Ceramic Capacitor-SL	22P 63V J				01
	C2	**FG651220**	Ceramic Capacitor-SL	22P 50V J				01
	C2	**VR027400**	Ceramic Capacitor-SL	22P 63V J				01
	C3	**UR828100**	Electrolytic Cap.	100.00 10.0V				01
	C4	**VD930900**	Semiconductive Cera. Cap.	0.1000 25V M				01
	C4	**VM902400**	Semiconductive Cera. Cap.	0.1000 25V Z				01
	CA1	**VP755200**	Ceramic Capacitor Array	100P 50V K				02
	CA2	**VT487100**	Ceramic Capacitor Array	470P X12				02
	CL1	**VN002100**	Ceramic Resonator	CST8.00MTW140				02
	CL1	**VQ305500**	Ceramic Resonator	8.00M EFOEC8004T3				02
	CN1	**VF728300**	Wire Trap	52147 6P TE				01
	CN2	**VK025600**	Wire Trap	52147 12P TE				01
	CN3	**VK025100**	Wire Trap	52147 7P TE				01
	CN4	**VK024900**	Wire Trap	52147 5P TE				01
	IC1	**XR951A00**	IC	HD63B05V0F07P		CPU		06
	R1	**HF456470**	Carbon Resistor	4.7K 1/4 J				01
	R1	**VL631400**	Carbon Resistor	4.7K 1/6 J				01
	R2	**HF456470**	Carbon Resistor	4.7K 1/4 J				01
	R2	**VL631400**	Carbon Resistor	4.7K 1/6 J				01
	R3	**HF457470**	Carbon Resistor	47.0K 1/4 J				01
	R3	**VL632600**	Carbon Resistor	47.0K 1/6 J				01
	RA1	**VH373200**	Resistor Array	RGLE12X473J				01
*		**V6760300**	Circuit Board	SW		(XZ145C0)		
	C0001	**FG644100**	Ceramic Capacitor-F	0.0100 50V Z				01
	-0005	**FG644100**	Ceramic Capacitor-F	0.0100 50V Z				01
	C0006	**UM397100**	Electrolytic Cap.	10.00 16.0V				01
	C0006	**VP473900**	Electrolytic Cap.	10.00 16.0V				
	CN001	**VE352600**	Connector Base Post	PH 14P TE				01
	CN002	**VB389900**	Connector Base Post	PH 3P TE				01
	D0001	**VB941200**	Diode	1SS133,1SS176				01
	-0005	**VB941200**	Diode	1SS133,1SS176				01
	IC001	**IR027350**	IC	SN74HC273N		D-FF		05
	IC002	**IR024550**	IC	SN74HC245N		TRANSCEIVER		06
	IC003	**IR027350**	IC	SN74HC273N		D-FF		05
	IC004	**IR003250**	IC	SN74HC32N		OR		03
	LD001	**VT022900**	LED Green	SEL2410G TP8		MULTI		01
	LD002	**VT022900**	LED Green	SEL2410G TP8		VOICE		01
	LD003	**VT022900**	LED Green	SEL2410G TP8		DEMO		01
	LD004	**VT022800**	LED Red	SEL2210R TP8		EDIT		01
	LD005	**VT022800**	LED Red	SEL2210R TP8		CATEGORY SEARCH		01
	LD006	**VT022900**	LED Green	SEL2410G TP8		PRESET		01
	LD007	**VT022900**	LED Green	SEL2410G TP8		USER		01
	LD008	**VT022900**	LED Green	SEL2410G TP8		GM/XG		01
	R0001	**HF455330**	Carbon Resistor	330.0 1/4 J				01
	-0008	**HF455330**	Carbon Resistor	330.0 1/4 J				01
	RA001	**VE445200**	Resistor Array	RGLD8X103J				01
	SW001	**VV439800**	Tact Switch	SKQNAJ		MULTI		01
	SW002	**VV439800**	Tact Switch	SKQNAJ		VOICE		01
	SW003	**VV439800**	Tact Switch	SKQNAJ		DEMO		01
	SW004	**VV439800**	Tact Switch	SKQNAJ		UTILITY		01
	SW005	**VV439800**	Tact Switch	SKQNAJ		MIDI		01
	SW006	**VV439800**	Tact Switch	SKQNAJ		EDIT		01
	SW007	**VV439800**	Tact Switch	SKQNAJ		JOB		01

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	REF NO.	PART NO.	DESCRIPTION			REMARKS	QTY	RANK
	SW008	**VV439800**	Tact Switch	SKQNAJ		STORE		01
	SW009	**VV439800**	Tact Switch	SKQNAJ		-		01
	SW010	**VV439800**	Tact Switch	SKQNAJ		+		01
	SW011	**VV439800**	Tact Switch	SKQNAJ		MUTE		01
	SW012	**VV439800**	Tact Switch	SKQNAJ		DEC/NO		01
	SW013	**VV439800**	Tact Switch	SKQNAJ		UP		01
	SW014	**VV439800**	Tact Switch	SKQNAJ		INC/YES		01
	SW015	**VV439800**	Tact Switch	SKQNAJ		LEFT		01
	SW016	**VV439800**	Tact Switch	SKQNAJ		DOWN		01
	SW017	**VV439800**	Tact Switch	SKQNAJ		RIGHT		01
	SW018	**VV439800**	Tact Switch	SKQNAJ		CATEGORY SEARCH		01
	SW019	**VV439800**	Tact Switch	SKQNAJ		PRESET		01
	SW020	**VV439800**	Tact Switch	SKQNAJ		USER		01
	SW021	**VV439800**	Tact Switch	SKQNAJ		GM/XG		01
	SW022	**VV439800**	Tact Switch	SKQNAJ		7/PIANO		01
	SW023	**VV439800**	Tact Switch	SKQNAJ		8/ORGAN		01
	SW024	**VV439800**	Tact Switch	SKQNAJ		9/GUITAR		01
	SW025	**VV439800**	Tact Switch	SKQNAJ		4/BASS		01
	SW026	**VV439800**	Tact Switch	SKQNAJ		5/STRINGS		01
	SW027	**VV439800**	Tact Switch	SKQNAJ		6/BRASS		01
	SW028	**VV439800**	Tact Switch	SKQNAJ		1/REED/PIPE		01
	SW029	**VV439800**	Tact Switch	SKQNAJ		2/SYN LEAD		01
	SW030	**VV439800**	Tact Switch	SKQNAJ		3/SYN PAD		01
	SW031	**VV439800**	Tact Switch	SKQNAJ		0/SYN COMP		01
	SW032	**VV439800**	Tact Switch	SKQNAJ		-/CHROMATIC PERCUSSION		01
	SW033	**VV439800**	Tact Switch	SKQNAJ		ENTER		01
	SW034	**VV439800**	Tact Switch	SKQNAJ		EXIT		01
*		**V6760200**	Circuit Board	VOL		(XZ146C0)		
	CN001	**VB390200**	Connector Base Post	PH 6P TE				01
	CN002	**--**	Connector Assembly	KR-DS 3P 260L		(V675250)		
	SW035	**VV439800**	Tact Switch	SKQNAJ		OCTAVE DOWN		01
	SW036	**VV439800**	Tact Switch	SKQNAJ		OCTAVE UP		01
	VR001	**VL445700**	Slide Variable Resistor	A10K EWA-NNDCH1A14		VOLUME		03
⚠		**VN103500**	Lithium Battery	CR203				03
*		**V6754500**	LCD	TTR5110 DPTDCN-C1				
		VQ764300	Rotary Variable Resistor	RK1631110T54A 10K		PICH BEND		03
		VN245400	Rotary Variable Resistor	10.0K K161100S		MODULATION		03

*: New Parts

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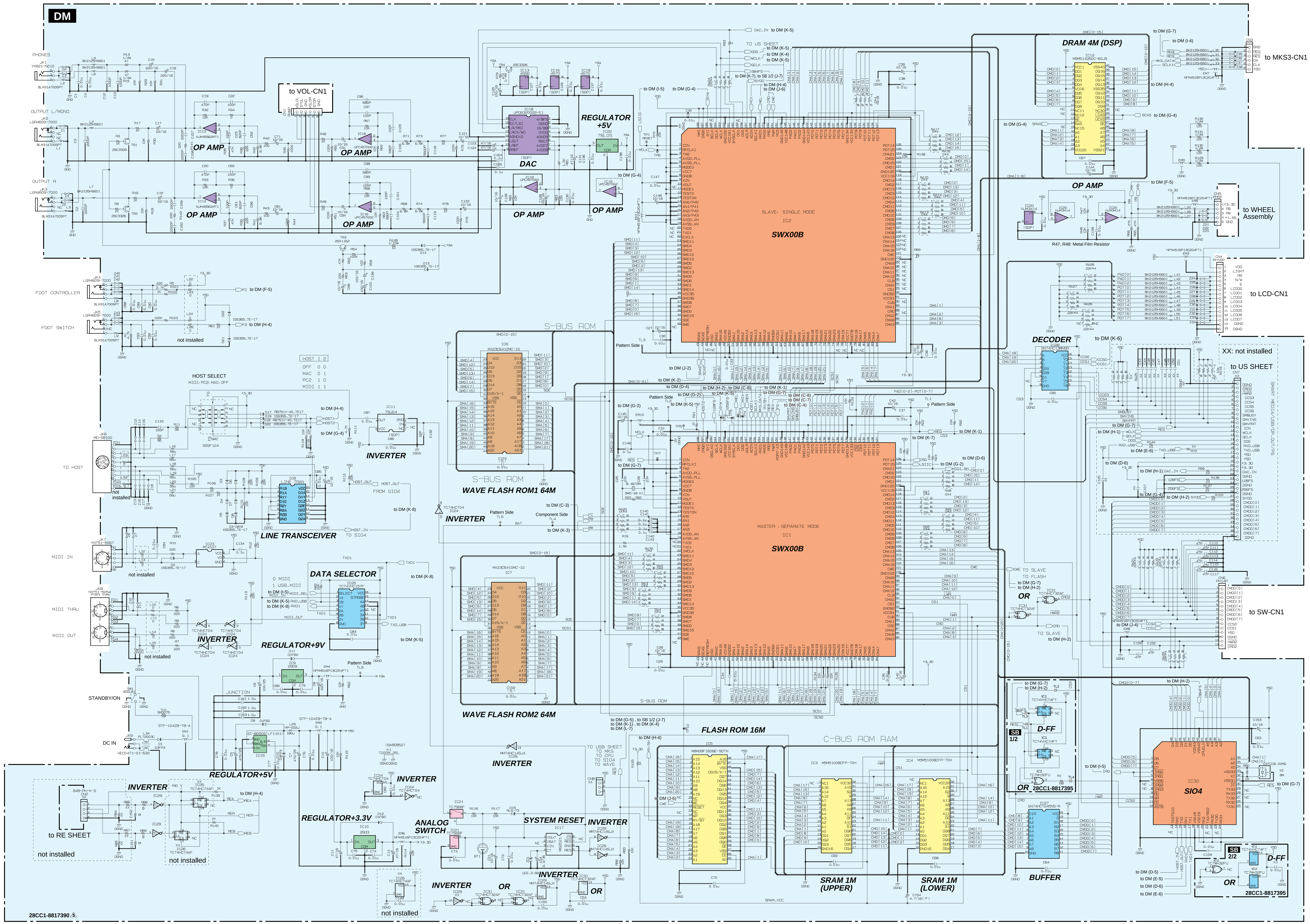
■S03 OVERALL CIRCUIT DIAGRAM 1/2 (DM, SB)



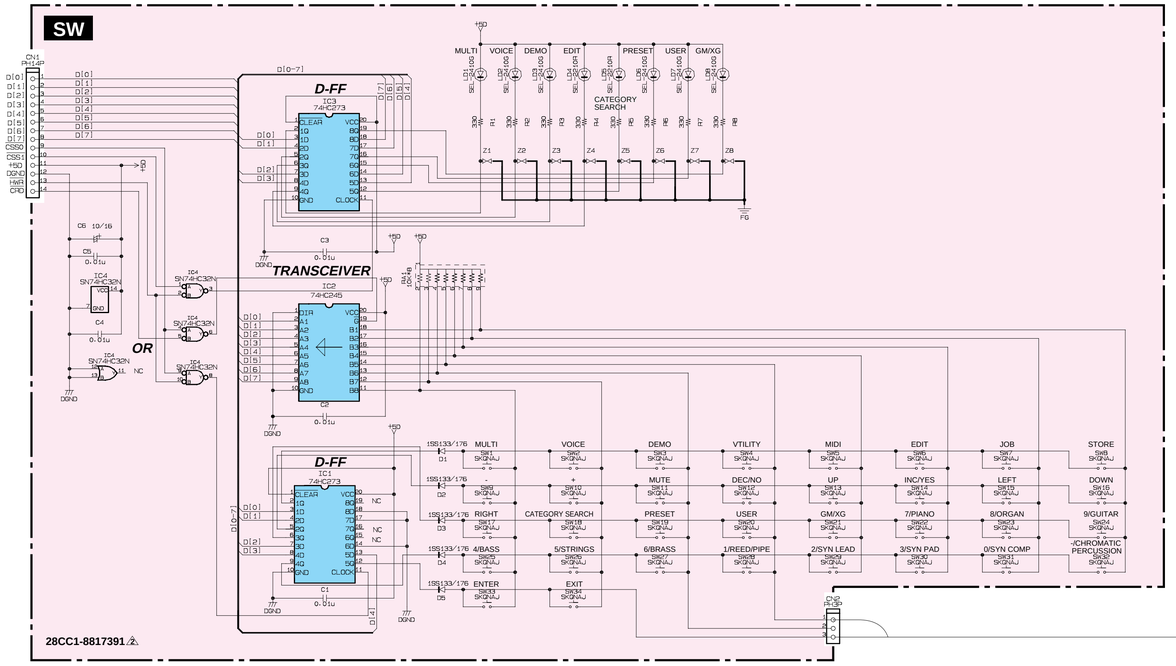
DM
OP AMP
DAC
REGULATOR +5V
to VOL-CN1
DRAM 4M (DSP)
to MKS3-CN1
to WHEEL Assembly
R47, R48: Metal Film Resistor
to LCD-CN1
SLAVE: SINGLE MODE
IC2
SWX00B
MASTER: SEPARATE MODE
IC1
SWX00B
S-BUS ROM
WAVE FLASH ROM1 64M
WAVE FLASH ROM2 64M
DECODER
XX: not installed
to US SHEET
to SW-CN1
HOST SELECT
INVERTER
LINE TRANSCEIVER
DATA SELECTOR
REGULATOR+9V
REGULATOR+5V
REGULATOR+3.3V
ANALOG SWITCH
SYSTEM RESET
FLASH ROM 16M
C-BUS ROM RAM
SRAM 1M (UPPER)
SRAM 1M (LOWER)
BUFFER
SIO4
D-FF
OR
to RE SHEET
not installed
PHONES
OUTPUT L/MONO
OUTPUT R
FOOT CONTROLLER
FOOT SWITCH
TO HOST
MIDI IN
MIDI THRU
MIDI OUT
STANDBY/ON
DC IN
28CC1-8817395
28CC1-8817390

(タ) : Tantalum Capacitor
XX : not installed

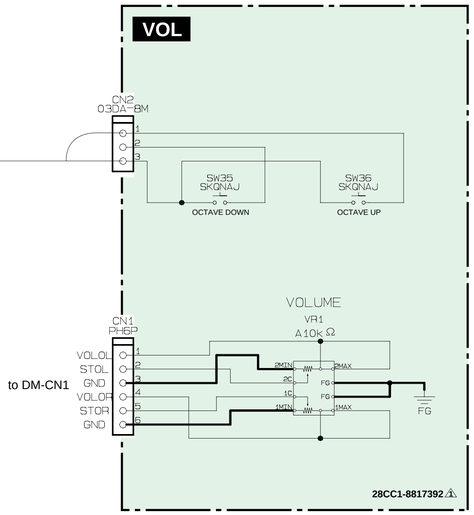
Note: See parts list for details of circuit board component parts.

■S03 OVERALL CIRCUIT DIAGRAM 2/2 (LC, MKS3, MK-H, MK-L, SW, VOL)

SW

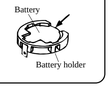


VOL



Battery VN103500
VN103600(Battery holder for VN103500)

- Notice for back-up battery removal
  Push the battery as shown in figure, then the battery will pop up.
- Druk de batterij naar beneden zoals aangeven in de tekening de batterij springt dan naar voren.



- D1F60 (VS201100)
- D3FP3 (VZ016600) DIODE

- NJM78L05UA(XJ598A00) REGULATOR +5V

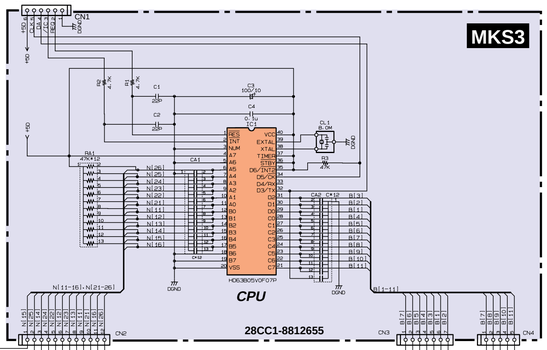
- SI-8050S(XT442A00) REGULATOR +5V

- µPC2909T-E1(XT441A00) REGULATOR +9V

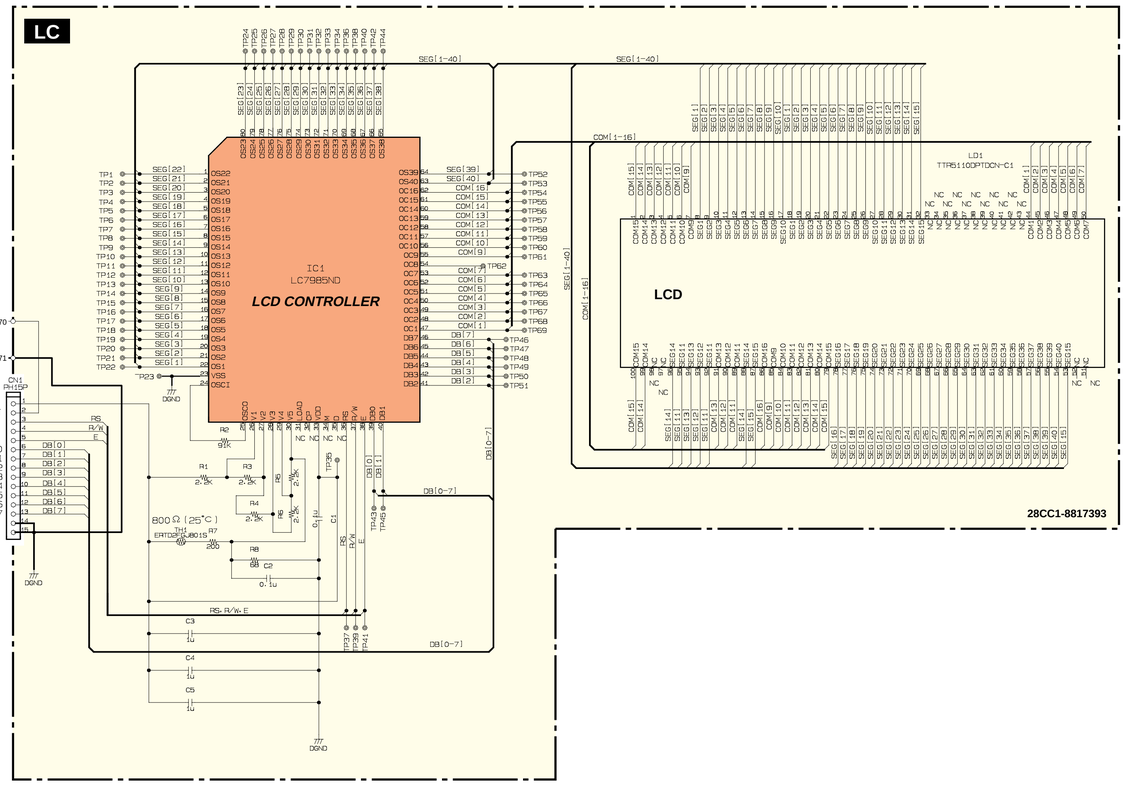
- µPC2933T-E1 (XS516A00) REGULATOR +3.3V

Note: See parts list for details of circuit board component parts.

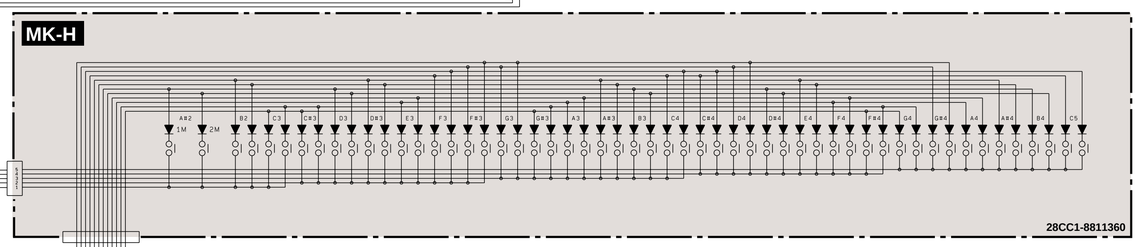
MKS3



LC



MK-H



MK-L