

PROFESSIONAL SAMPLER

A5000/A4000

SERVICE MANUAL



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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 believed 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 buss in the unit (heavy gauge black wires connect to this buss).

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

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 WHATSOEVER!

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 \triangle and must be replaced with parts having specification equal to those originally installed.

SPECIFICATION

Tone generation method

AWM2 tone generator

Maximum Polyphony

126 notes (64 notes on the A4000), 32 multi-timbre parts (16 parts on the A4000)

A/D conversion

20 bit 64-times oversampling

D/A conversion

24 bit 8-times oversampling

Digital I/O (only when AIEB1 I/O expansion board is installed)

Input/output	DIGITAL connectors	S/P-DIF (coaxial)
	OPTICAL connectors	S/P-DIF (optical)

Input frequency 48 kHz, 44.1 kHz, 32 kHz

Output frequency 44.1 kHz

Sampling frequency

Analog input 44.1, 22.05, 11.025 kHz, 5.5125 kHz (mono and stereo)

Digital input (only when AIEB1 I/O expansion board is installed)
48 kHz, 44.1 kHz, 32 kHz external synchronized recording
(stereo only)

1/2, 1/4 and 1/8 undersampling is supported

Internal sample memory capacity

Standard 4 Mbytes (installed on-board)

Maximum 128 Mbytes

(When four 32 Mbyte 72 pin SIMM modules are installed. The on-board 4 Mbytes are unused only if memory has been expanded to the maximum.)

Sampling time

Maximum sample length

32 Mbytes monaural

64 Mbytes stereo

Maximum sampling time (mono or stereo)

6 minutes 20 seconds (44.1 kHz)

12 minutes 40 seconds (22.05 kHz)

25 minutes 21 seconds (11.025 kHz)

50 minutes 43 seconds (5.5125 kHz)

Effects

6 effect blocks (3 on the A4000)

Total equalizer (4 bands)

Sample equalizer

Program

128 program

Sequencer

Real-time recording and playback

Front panel

POWER switch

INPUT L,R jacks (phone x 2)

REC VOLUME (L& R shared)

MASTER VOLUME (L&R shared, STEREO OUT & PHONES shared)

PHONES OUTPUT jack

Knobs (1 - 5)

Mode buttons (PLAY, EDIT, REC, DISK, UTILITY)

Function buttons (six buttons)

COMMAND/EXIT button

ASSIGNABLE button

AUDITION button

LCD (320 x 80 dot, LED backlight)

LCD contrast control

3.5" 2HD/2DD dual mode floppy disk drive

Rear panel

STEREO OUT L/MONO, R (phone jack x 2)

ASSIGNABLE OUT L, R (phone jack x 2)

MIDI IN-A/B, OUT, THRU-A/B (IN, OUT, THRU on the A4000)

SCSI (half-pitch, 50-pin)

Expansion board slot

Power supply connector (AC inlet)

Fan

Dimensions

Two-space rackmount unit

W 480 mm x D 461 mm x H 90 mm (18-7/8" x 18-1/8" x 3-9/16")

Weight

8.0 kg (171 bs 10 oz)

Included items

Power cable x 1

CD-ROM set

(See the separate "Guide for the Accompanying Disks" booklet)

FD x 4

Power Cable for Internal Hard Disk (long) x 1

Power Cable for ZIP Drive (short) x 1

SCSI Cable for Internal Hard Disk x 1

IDE Cable for Internal Hard Disk x 1

Owner's manual x 1

Options (made by Yamaha)

AIEB1: I/O expansion board

Internal expansion devices (made by other manufacturers)

Expansion memory

(use a pair of identical-size 72pin SIMM modules of the following types)

Access time 70 ns or less

Bit Width x 32 (no parity) or x 36 bit (parity)

Fast Page or EDO, JEDEC standard.

Capacity 4 megabyte/8 megabyte/16 megabyte/32 megabyte

Internal hard disk drive (3.5 inch) performance requirements

Interface 50-pin SCSI or 40-pin IDE

Power supply +5 V maximum 840 mA

+12 V maximum 2400 mA

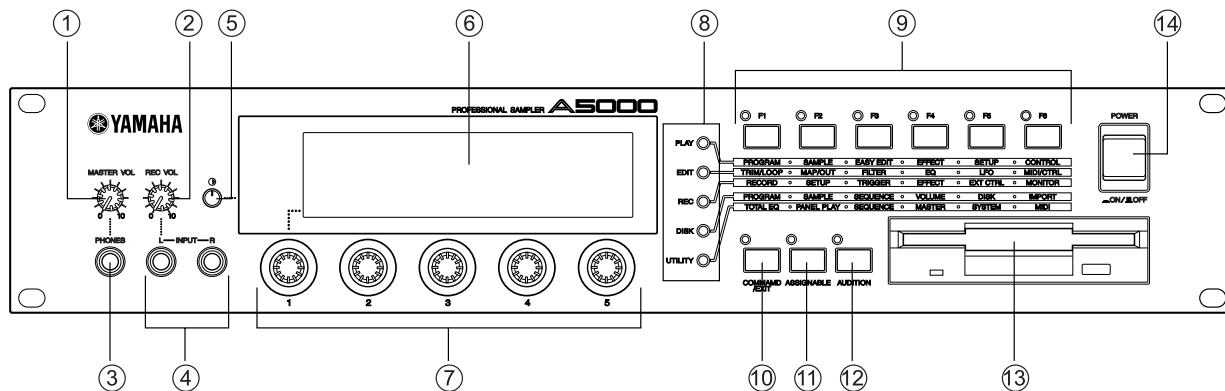
Internal ZIP Drive

Interface 40-pin IDE (ATAPI)

Power supply +5 V 0.8 A

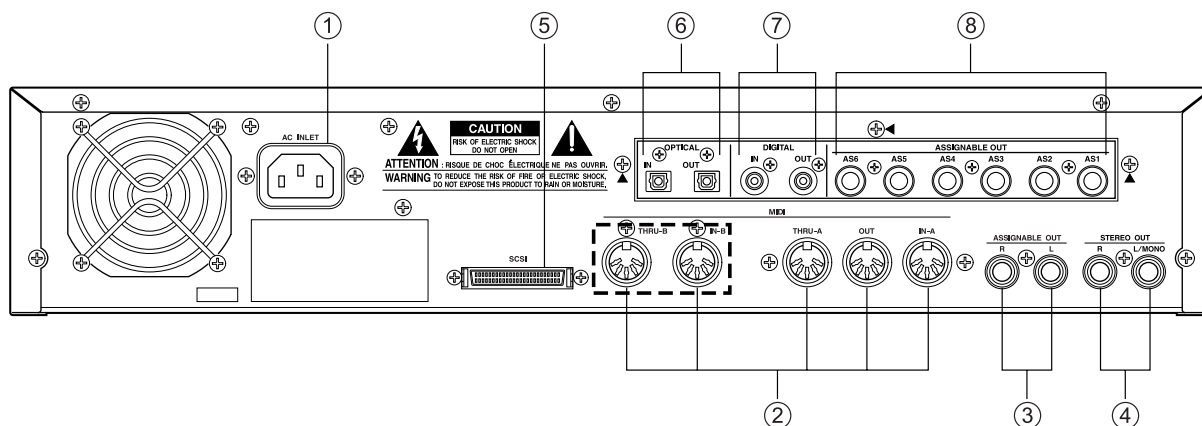
PANEL LAYOUT

● Front Panel



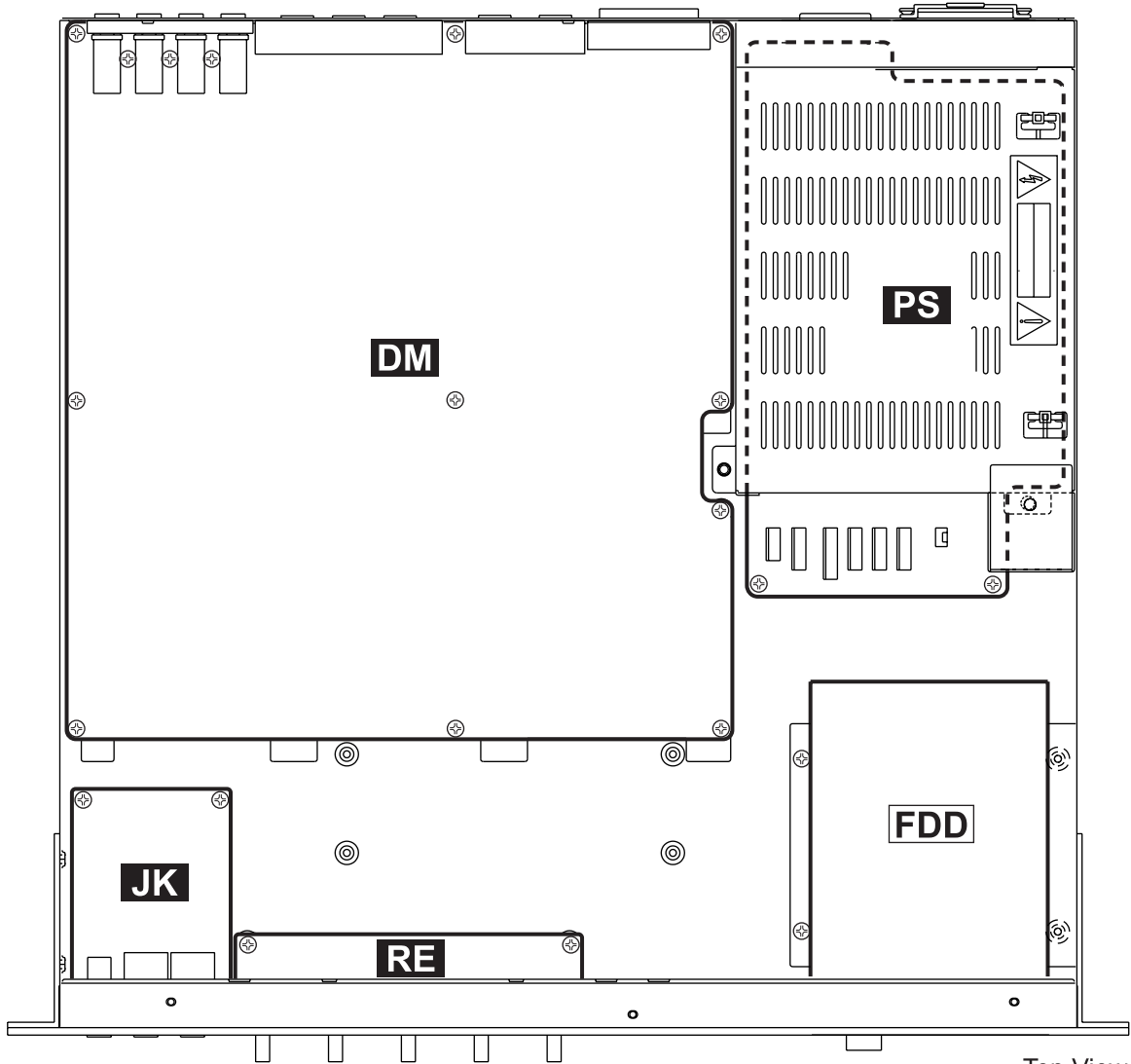
- ① Master Vol [Master Volume]
- ② Rec Vol [Recording Volume]
- ③ Phones jack
- ④ Input L, Input R jacks
- ⑤ LCD Contrast
- ⑥ Display
- ⑦ Knobs 1-5
- ⑧ Mode buttons
- ⑨ Function buttons [F1]-[F6]
- ⑩ Command Exit button
- ⑪ Assignable button
- ⑫ Audition button
- ⑬ Floppy Disk Drive
- ⑭ Power switch

● Rear Panel

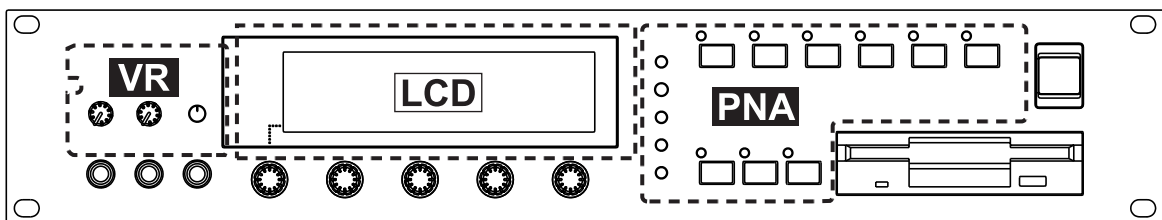


- ① AC inlet
- ② Midi In-A, In-B, Out, Thru-A, Thru-B (A5000) connectors / Midi In, Out, Thru (A4000) connectors
- ③ Assignable Out L, R jacks
- ④ Stereo Out L/Mono, R jacks
- ⑤ SCSI connector
- ⑥ Optical In, Out connectors
- ⑦ Digital In, Out connectors
- ⑧ Assignable Out jacks 1-6

■ CIRCUIT BOARD LAYOUT

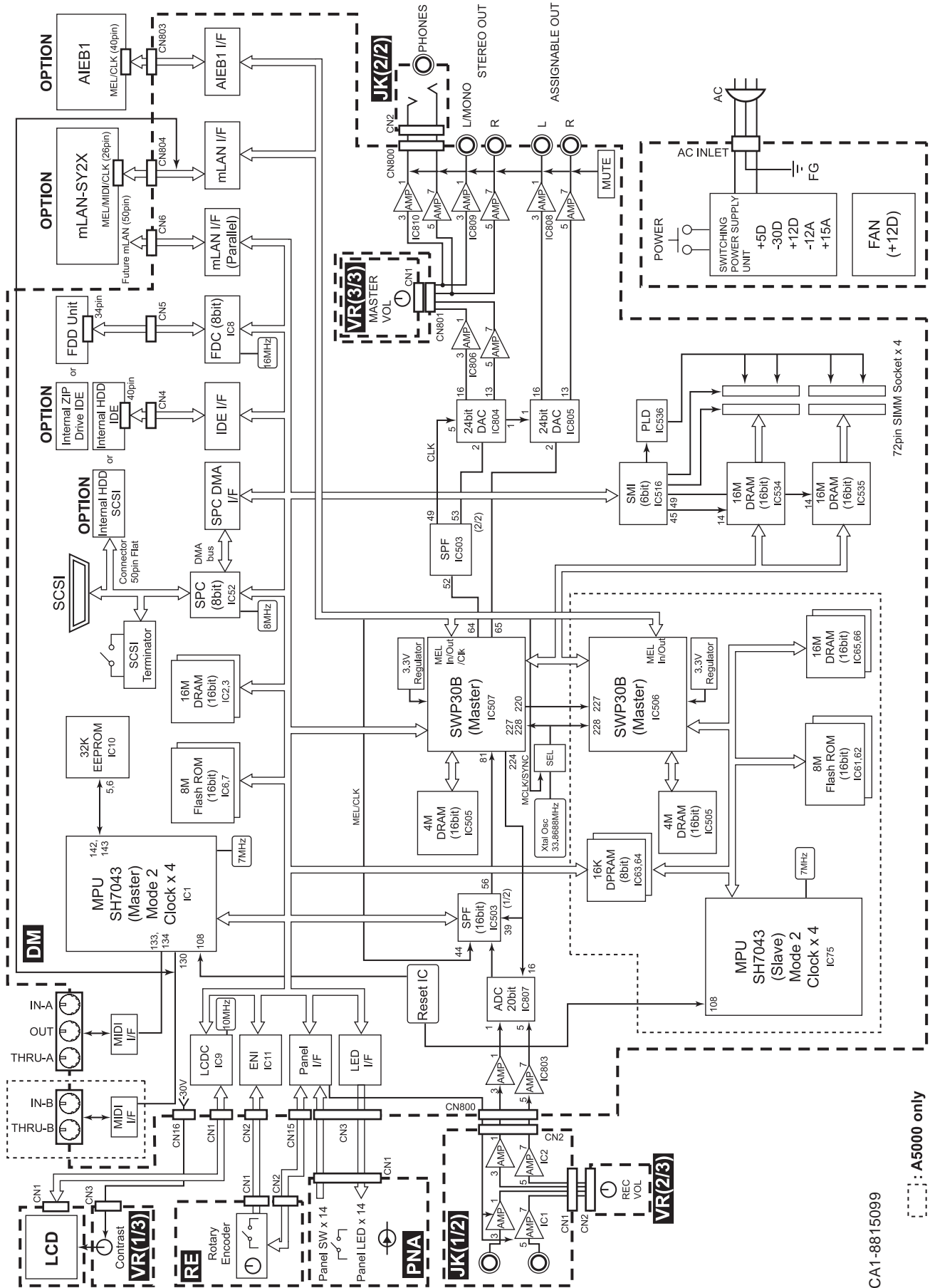


Top View
(上面図)



Front View
(前面図)

BLOCK DIAGRAM



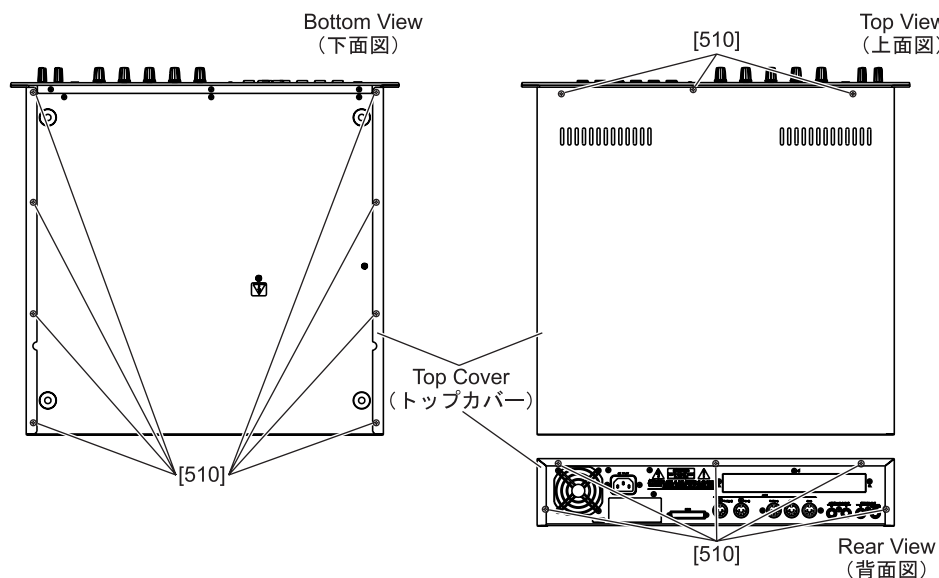
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28CA1-8815099

■ DISASSEMBLY PROCEDURE

1. Top Cover

- 1-1 Remove the sixteen (16) screws marked [510] and slide the Top Cover to the back side. The top cover can be then removed.



(Fig.1)

2. Circuit Boards and Unit

After removing the top cover, remove the following screws. Each circuit board can then be removed.

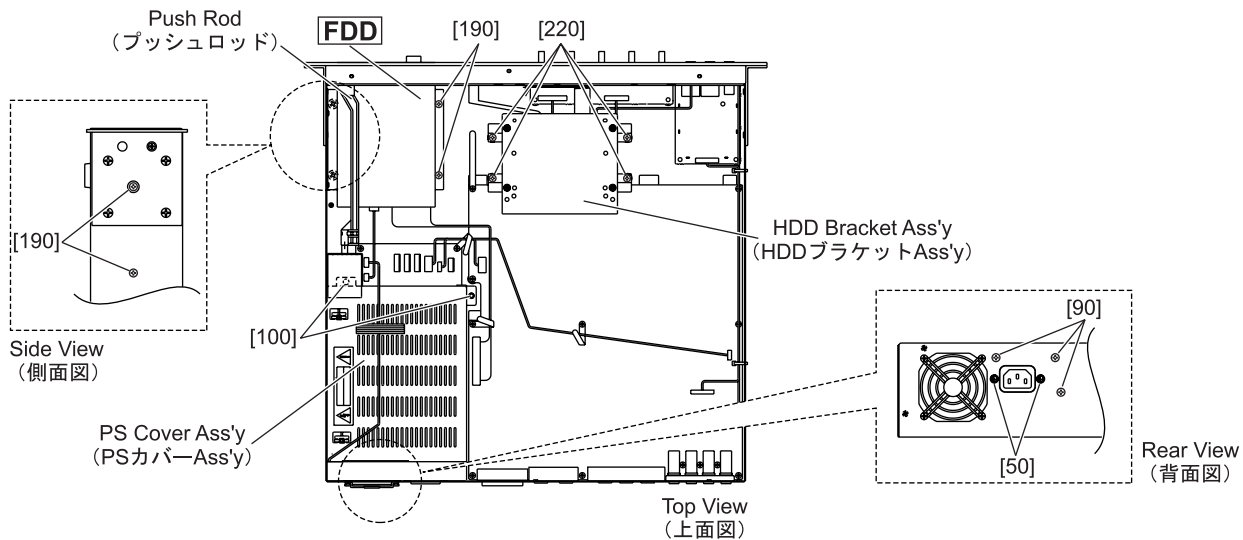
Circuit Boards and Unit	Ref.No.	Screw		Qty
HDD Bracket	[220]	Bind Head Tapping Screw-B 3.0X6 MFZN2Y	(EP600130) (fig.2)	4
DM*1	[120]	Bind Head Tapping Screw-B 3.0X6 MFZN2Y	(EP600130) (fig.3)	13
	[130]	Bonding Head Screw-B 3.0X10 MFZN2BL	(VQ049800)(fig.3)	2
	[140]	Bind Head Tapping Screw-P 3.0X8 MFZN2BL	(EP630220) (fig.3)	4(2)*2
	[150]	Pan Head Screw 2.5X6 SUS	(VV342700)(fig.3)	2
FDD Bracket*3	[190]	Bind Head Tapping Screw-B 3.0X6 MFZN2Y	(EP600130) (fig.2)	4
PS Cover Ass'y	[90]	Bonding Head Screw-B 3.0X10 MFZN2BL	(VQ049800)(fig.2)	3
PS*4	[100]	Bind Head Tapping Screw-B 4.0X8 MFZN2BL	(EG340190) (fig.2)	2
	[30]	Bind Head Tapping Screw-B 3.0X6 MFZN2Y	(EP600130) (fig.3)	7
	[50]	Bind Head Tapping Screw-P 3.0X8 MFZN2BL	(EP630220) (fig.2)	2
	[60]	Bind Head Tapping Screw-B 4.0X8 MFZN2BL	(EG340190) (fig.3)	1
Fan Ass'y*4	[L40]	Flat Head Screw 3.0X25 MFN133	(V4814400) (fig.3)	4
	[L50]	Hexagonal Nut 3.0 MFZN2Y	(VA211900) (fig.3)	4

Note: *1 Before removing the DM, remove the HDD Ass'y.

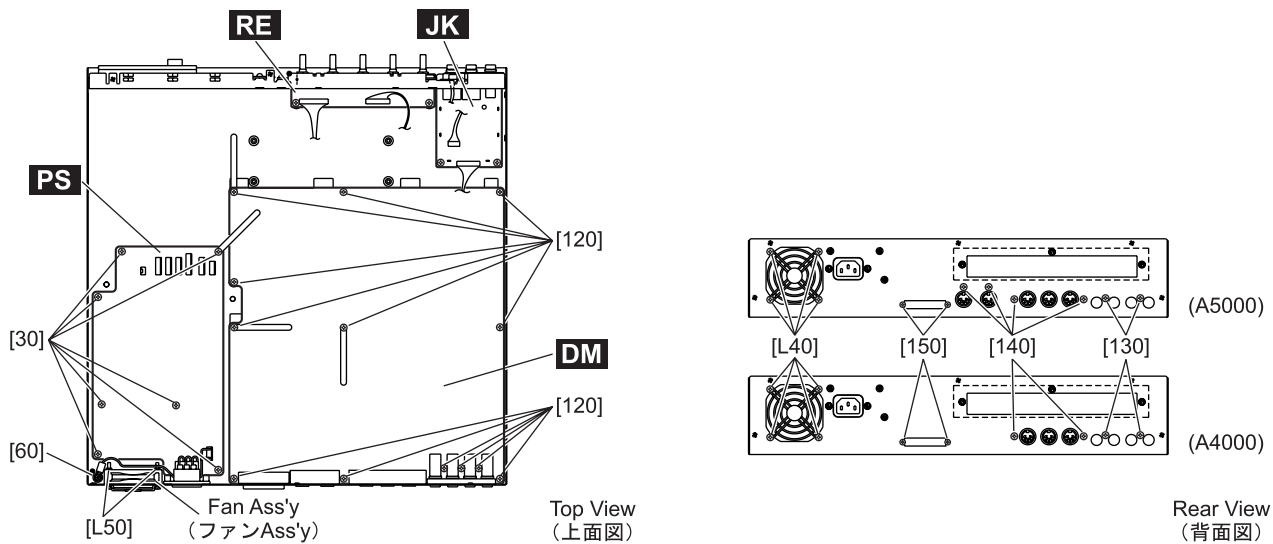
*2 Two for A4000.

*3 Before removing the FDD Ass'y and the PS cover Ass'y, remove the Push Rod.

*4 Before removing the PS and Fan Ass'y, remove the PS cover Ass'y.



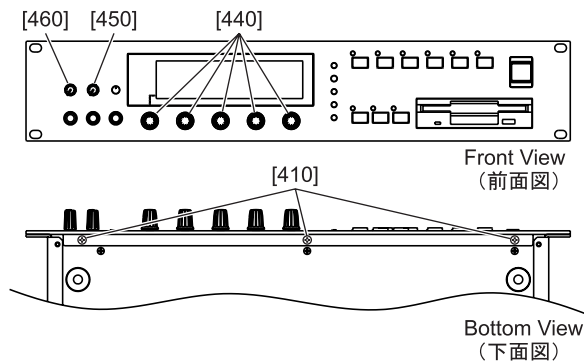
(Fig.2)



(Fig.3)

3. Front Panel

- 3-1 Remove the knob marked [440], [450], [460].
- 3-2 Remove the three (3) screws marked [410]. And remove the Front Panel from the Lower Case Assembly.

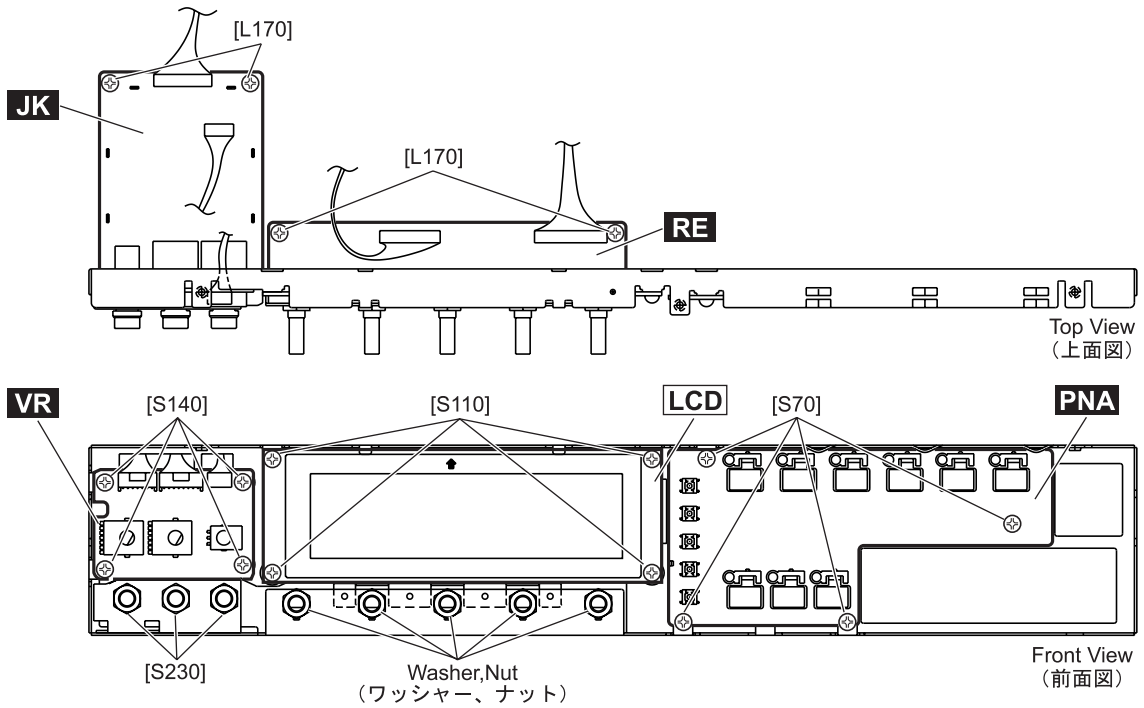


(Fig.4)

4. Circuit Boards and Unit

After removing the front panel, remove the following screws. Each circuit board can then be removed.(Fig.5)

Circuit Boards and Unit	Ref.No.	Screw	Qty
JK	[S230]	Hexagonal Nut 14X2 M12 (ES200210)	3
	[L170]	Bind Head Tapping-B 3.0X6 MFZN2Y (EP600130)	2
RE	-	Washer	5
	-	Nut	5
	[L170]	Bind Head Tapping-B 3.0X6 MFZN2Y (EP600130)	2
VR	[S140]	Bind Head Tapping-B 3.0X6 MFZN2Y (EP600130)	4
PNA	[S70]	Cup Tapping Screw-B 3.0X6 MFZN2Y (V2644100)	4
LCD	[S110]	Bind Head Tapping-B 3.0X6 MFZN2Y (EP600130)	4



(Fig.5)

LSI PIN DESCRIPTION

● TC203C760HF-002 (XS725A00) SWP30B (AWM Tone Generator coped with MEG) Standard Wave Processor (IC507)

PIN No.	NAME	I/O	FUNCTION	PIN No.	NAME	I/O	FUNCTION	
1	VSS	-	(Ground)	121	VSS	-	(Ground)	
2	CA0	I	Address bus of internal register	122	HMD0	I/O	Wave memory data bus (Upper 16 bits)	
3	CA1	I		123	HMD1	I/O		
4	CA2	I		124	HMD2	I/O		
5	CA3	I		125	HMD3	I/O		
6	CA4	I		126	HMD4	I/O		
7	CA5	I		127	HMD5	I/O		
8	CA6	I		128	HMD6	I/O		
9	CA7	I		129	HMD7	I/O		
10	CA8	I		130	HMD8	I/O		
11	CA9	I		131	HMD9	I/O		
12	CA10	I	132	HMD10	I/O			
13	CA11	I	133	HMD11	I/O			
14	VSS	-	(Ground)	134	HMD12	I/O		
15	CD0	I/O	Data bus of internal register	135	HMD13	I/O		
16	CD1	I/O		136	HMD14	I/O		
17	CD2	I/O		137	HMD15	I/O		
18	CD3	I/O		138	VSS	-	(Ground)	
19	CD4	I/O		139	HMA0	O	Wave memory address bus	
20	CD5	I/O		140	HMA1	O		
21	CD6	I/O		141	HMA2	O		
22	CD7	I/O		142	HMA3	O		
23	CD8	I/O		143	HMA4	O		
24	CD9	I/O		144	HMA5	O		
25	CD10	I/O	145	HMA6	O			
26	CD11	I/O	146	HMA7	O			
27	CD12	I/O	147	HMA8	O			
28	CD13	I/O	148	HMA9	O			
29	CD14	I/O	149	HMA10	O			
30	VDD	-	(Power supply)	150	VDD	-		(Power supply)
31	VSS	-	(Ground)	151	VSS	-		(Ground)
32	CD15	I/O	152	HMA11	O	Wave memory address bus		
33	CSN	I	153	HMA12	O			
34	WRN	I	154	HMA13	O			
35	RDN	I	155	HMA14	O			
36	VDD	-	(Power supply)	156	HMA15		O	
37	SYSH0	O	157	HMA16	O			
38	SYSH1	O	158	HMA17	O			
39	SYSH2	O	159	HMA18	O			
40	SYSH3	O	160	HMA19	O			
41	SYSH4	O	161	HMA20	O			
42	SYSH5	O	162	HMA21	O			
43	SYSH6	O	163	HMA22	O			
44	SYSH7	O	164	HMA23	O			
45	KONO0	O	165	HMA24	O			
46	KONO1	O	166	VSS	-		(Ground)	
47	KONO2	O	167	MRASN	O	RAS when DRAM(s) is connected to wave memory		
48	KONO3	O	168	MCASN	O	CAS when DRAM(s) is connected to wave memory		
49	VSS	-	(Ground)	169	MOEN	O	Wave memory output enable	
50	SYSL0	I/O	NSYS/LNSYS upper 16 bits output	170	MWEN	O	Wave memory write enable	
51	SYSL1	I/O		171	VSS	-	(Ground)	
52	SYSL2	I/O		172	LMD0	I/O	Wave memory data bus (Lower 16 bits)	
53	SYSL3	I/O		173	LMD1	I/O		
54	SYSL4	I/O		174	LMD2	I/O		
55	SYSL5	I/O		175	LMD3	I/O		
56	SYSL6	I/O		176	LMD4	I/O		
57	SYSL7	I/O		177	LMD5	I/O		
58	KONI0	I		178	LMD6	I/O		
59	KONI1	I		179	LMD7	I/O		
60	VDD	-	(Power supply)	180	VDD	-		(Power supply)
61	VSS	-	(Ground)	181	VSS	-		(Ground)
62	KONI2	I	182	LMD8	I/O			
63	KONI3	I	183	LMD9	I/O			
64	DAC0	O	184	LMD10	I/O			
65	DAC1	O	185	LMD11	I/O			
66	WCLK	O	186	LMD12	I/O			
67	MELO0	O	187	LMD13	I/O			
68	MELO1	O	188	LMD14	I/O			
69	MELO2	O	189	LMD15	I/O			
70	MELO3	O	190	VSS	-	(Ground)		
71	MELO4	O	191	LMA0	O	Wave memory address bus (Lower data memory)		
72	MELO5	O	192	LMA1	O			
73	MELO6	O	193	LMA2	O			
74	MELO7	O	194	LMA3	O			
75	VDD	-	(Power supply)	195	LMA4		O	
76	ADLR	O	196	LMA5	O			
77	MELI0	I	197	LMA6	O			
78	MELI1	I	198	LMA7	O			
79	MELI2	I	199	LMA8	O			
80	MELI3	I	200	LMA9	O			
81	MELI4	I	201	LMA10	O			
82	MELI5	I	202	LMA11	O			
83	MELI6	I	203	VSS	-		(Ground)	
84	MELI7	I	204	LMA12	O			
85	VSS	-	(Ground)	205	LMA13		O	
86	RCASN	O	206	LMA14	O			
87	RA8	O	207	LMA15	O			
88	RA7	O	208	LMA16	O			
89	RA6	O	209	LMA17	O			
90	VDD	-	(Power supply)	210	VDD	-	(Power supply)	
91	VSS	-	(Ground)	211	VSS	-	(Ground)	
92	RA5	O	212	LMA18	O			
93	RA4	O	213	LMA19	O			
94	RA3	O	214	LMA20	O			
95	RA2	O	215	LMA21	O			
96	RA1	O	216	LMA22	O			
97	RA0	O	217	LMA23	O			
98	RRASN	O	218	LMA24	O			
99	RWEN	O	219	VSS	-	(Ground)		
100	VSS	-	(Ground)	220	SYO	O	Sync. signal for master clock	
101	RD7	I/O	DRAM data bus	221	SYOD	O	Sync. signal for HCLK/QCLK	
102	RD6	I/O		222	QCLK	O	1/12 master clock (64Fs)	
103	RD5	I/O		223	HCLK	O	1/6 master clock (128Fs)	
104	RD4	I/O		224	CK256	O	1/3 master clock (256Fs)	
105	RD3	I/O		225	SYSCLK	O	1/2 master clock (384Fs)	
106	RD2	I/O		226	VDD	-	(Power supply)	
107	RD1	I/O		227	SYI	I	Sync. clock	
108	RD0	I/O		228	MCLKI	I	Master clock input	
109	VSS	-		(Ground)	229	MCLKO	O	Master clock output
110	RD17	I/O		230	VDD	-	(Power supply)	
111	RD16	I/O	231	XIN	I	Crystal osc. input		
112	RD15	I/O	232	XOUT	O	Crystal osc. output		
113	RD14	I/O	233	VSS	-	(Ground)		
114	RD13	I/O	234	ICN	I	Initial clear		
115	RD12	I/O	235	CHIP2	I	2 chips mode enable		
116	RD11	I/O	236	SLAVE	I	Master/Slave select when 2 chips mode		
117	RD10	I/O	237	TESTON	I	Test pin		
118	RD9	I/O	238	ACIN	I			
119	RD8	I/O	239	DCTEST	I			
120	VDD	-	(Power supply)	240	VDD	-	(Power supply)	

● D65621GF-028-3B9 (XS370A00) SMI

(IC516)

PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	LMA24	I	Low Memory Address	41	VDD	-	Power Supply
2	LMA23	I		42	L1RAS2	O	RAS2 for LoMem SIMM 1
3	LMA22	I		43	L1RAS3	O	RAS3 for LoMem SIMM 1
4	LMA21	I		44	GND	-	Ground
5	LMA20	I		45	HDRAS0	O	RAS for HiMem DRAM 0
6	LMA19	I		46	HDRAS1	O	RAS for HiMem DRAM 1
7	LMA18	I		47	GND	-	Ground
8	HMA24	I	High Memory Address	48	VDD	-	Power Supply
9	HMA23	I		49	LDRAS0	O	RAS for LoMem DRAM 0
10	HMA22	I		50	LDRAS1	O	RAS for LoMem DRAM 1
11	HMA21	I	Ground	51	LMA1	I	Low Memory Address
12	GND	-		52	LMA0	I	
13	HMA20	I	High Memory Address	53	GND	-	No.53
14	HMA19	I		54	LMA1X	O	Low Memory Address Exchanged
15	HMA18	I		55	LMA0X	O	
16	RASN	I	Row Address Strobe	56	GND	-	Ground
17	H0RAS0	O	RAS0 for HiMem SIMM 0	57	VDD	-	Power Supply
18	H0RAS1	O	RAS1 for HiMem SIMM 0	58	HMA1	I	High Memory Address
19	GND	-	Ground	59	HMA0	I	
20	H0RAS2	O	RAS2 for HiMem SIMM 0	60	HMA1X	O	High Memory Address Exchanged
21	H0RAS3	O	RAS3 for HiMem SIMM 0	61	HMA0X	O	
22	GND	-	Ground	62	D0	I	Data Input
23	VDD	-	Power Supply	63	D1	I	
24	L0RAS0	O	RAS0 for LoMem SIMM 0	64	GND	-	Ground
25	L0RAS1	O	RAS1 for LoMem SIMM 0	65	D2	I	Data Input
26	GND	-	Ground	66	D3	I	
27	L0RAS2	O	RAS2 for LoMem SIMM 0	67	D4	I	
28	L0RAS3	O	RAS3 for LoMem SIMM 0	68	D5	I	Address
29	GND	-	Ground	69	A2	I	
30	VDD	-	Power Supply	70	WRN	I	Write
31	H1RAS0	O	RAS0 for HiMem SIMM 1	71	GND	-	Ground
32	H1RAS1	O	RAS1 for HiMem SIMM 1	72	VDD	-	Power Supply
33	GND	-	Ground	73	CSN	I	Chip Select
34	VDD	-	Power Supply	74	A0	I	Address
35	H1RAS2	O	RAS2 for HiMem SIMM 1	75	A1	I	
36	H1RAS3	O	RAS3 for HiMem SIMM 1	76	MCLK	I	Clock (37MHz)
37	GND	-	Ground	77	SYI	I	Sync Clock (48kHz)
38	L1RAS0	O	RAS0 for LoMem SIMM 1	78	HBANK	O	HiMem Bank Select 01/23
39	L1RAS1	O	RAS1 for LoMem SIMM 1	79	LBANK	O	LoMem Bank Select 01/23
40	GND	-	Ground	80	REFRN	O	Refresh Timing

● D65611GB-039-3B (XS323A00) ENI

(IC11)

PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	CLRN	I	Clear Status	23	P3	I/O	I/O Port
2	E1A	I	Rotary Encoder 1 Input A	24	P4	I/O	
3	E1B	I	Rotary Encoder 1 Input B	25	P5	I/O	
4	E2A	I	Rotary Encoder 2 Input A	26	P6	I/O	
5	E2B	I	Rotary Encoder 2 Input B	27	P7	I/O	
6	E3A	I	Rotary Encoder 3 Input A	28	D0	I/O	
7	E3B	I	Rotary Encoder 3 Input B	29	D1	I/O	
8	E4A	I	Rotary Encoder 4 Input A	30	GND	-	Ground
9	E4B	I	Rotary Encoder 4 Input B	31	D2	I/O	CPU Data Bus
10	E5A	I	Rotary Encoder 5 Input A	32	D3	I/O	
11	E5B	I	Rotary Encoder 5 Input B	33	D4	I/O	Ground
12	E6A	I	Rotary Encoder 6 Input A	34	GND	-	
13	E6B	I	Rotary Encoder 6 Input B	35	D5	I/O	CPU Data Bus
14	E7A	I	Rotary Encoder 7 Input A	36	D6	I/O	
15	E7B	I	Rotary Encoder 7 Input B	37	D7	I/O	
16	VDD	-	Power Supply	38	GND	-	Ground
17	GND	-	Ground	39	VDD	-	Power Supply
18	E8A	I	Rotary Encoder 8 Input A	40	A0	I	Address Bus
19	E8B	I	Rotary Encoder 8 Input B	41	A1	I	Address Bus
20	P0	I/O	I/O Port	42	WRN	I	Write Enable
21	P1	I/O		43	RDN	I	Read Enable
22	P2	I/O		44	CSN	I	Chip Select

● D65636GF-104-3B9 (XS369A00) SPF

(IC11)

PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	ICN	I	Initial Clear	41	SYNIO	I	Serial Input0 Sync Clock(48kHz)
2	VDD	-	Power Supply	42	VDD	-	Power Supply
3	GND	-	Ground	43	GND	-	Ground
4	D0	I/O	Data Bus	44	DIN0	I	Serial Input0 Data Input(1.6MHz)
5	D1	I/O		45	CK2561	I	Serial Input1 256fs Clock(12.8MHz)
6	GND	-	Ground	46	BCKI1	I	Serial Input1 Bit Clock(3.2MHz)
7	D2	I/O	Data Bus	47	SYNI1	I	Serial Input1 Sync Clock(48kHz)
8	D3	I/O		48	DIN1	I	Serial Input1 Data Input(1.6MHz)
9	GND	-	Ground	49	DAC256O	O	256fs Clock for DAC(12.8MHz)
10	VDD	-	Power Supply	50	DAC64O	O	256fs Clock for DAC(3.2MHz)
11	D4	I/O	Data Bus	51	DACWCKO	O	Word Clock for DAC(48kHz)
12	D5	I/O		52	DACDTI	I	DAC Data Input(1.6MHz)
13	GND	-	Ground	53	DACDTO	O	DAC Data Output(1.6MHz)
14	D6	I/O	Data Bus	54	VDD	-	Power Supply
15	D7	I/O		55	GND	-	Ground
16	A4	I	Address	56	MONMELO	O	Monitor MEL Output(1.6MHz)
17	CSN	I	Chip Select	57	DIT128O	O	128fs Clock for DIT(6.4MHz)
18	WRN	I	Write	58	DITWCKO	O	Word Clock for DIT(48kHz)
19	RDN	I	Read	59	MUTEI	I	Mute Request Input(from CPU)
20	DREQN	O	DMA Request	60	MUTENO	O	Mute Request Output(to DAC&DIT)
21	DACKN	I	DMA Acknowledge	61	ERRI	I	PLL Error Input(from DIR)
22	GND	-	Ground	62	GND	-	Ground
23	VDD	-	Power Supply	63	VDD	-	Power Supply
24	D8	I/O	Data Bus	64	ERRIRQN	O	PLL Error IRQ
25	D9	I/O		65	TGRESN	O	TG Reset Signal
26	GND	-	Ground	66	P7	I/O	I/O Port
27	D10	I/O	Data Bus	67	P6	I/O	
28	D11	I/O		68	P5	I/O	
29	GND	-	Ground	69	P4	I/O	
30	VDD	-	Power Supply	70	P3	I/O	
31	D12	I/O	Data Bus	71	P2	I/O	
32	D13	I/O		72	P1	I/O	
33	GND	-	Ground	73	P0	I/O	
34	D14	I/O	Data Bus	74	OCSN	I	Option Chip Select0
35	D15	I/O		75	ODACKN	I	Option DMA Acknowledge
36	A1	I	Address	76	ODDIR	I	Option DMA Direction
37	A2	I		77	OBOEN	O	Option Bus Buffer Output Enable
38	A3	I		78	OBDIR	O	Option Bus Buffer Direction
39	CK256IO	I	Serial Input0 256fs Clock(12.8MHz)	79	CSOUTN	O	Chip Select Out at A4=1, A3=1
40	BCKIO	I	Serial Input0 Bit Clock(3.2MHz)	80	ASSIGN	O	Write Pulse Out at A4=1, A3=0, WR=0

● PCM1800 (XU770A00) A/D Converter

(IC807)

PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	VINL	I	Analog input (L ch.)	13	LRCK	I/O	Sampling clock input/ output
2	VREF1		Reference 1 decoupling cap.	14	BCK	I/O	Bit clock input/ output
3	REFCOM		Reference decoupling common	15	DOUT	O	Audio data output
4	VREF2		Reference 2 decoupling cap.	16	SYSCK	I	System clock input
5	VINR	I	Analog input (R ch.)	17	DGND		Digital ground
6	RSTB	I	Reset input active "L"	18	VDD		Power supply +5V
7	BYPAS	I	LCF bypass control	19	CINNR		Anti-aliasing filter cap. (-) R ch.
8	FMT0	I	Audio data format 0	20	CINPR		Anti-aliasing filter cap. (+) R ch.
9	FMT1	I	Audio data format 1	21	CINNL		Anti-aliasing filter cap. (-) L ch.
10	MODE0	I	Master/ Slave mode selection 0	22	CINPL		Anti-aliasing filter cap. (+) L ch.
11	MODE1	I	Master/ Slave mode selection 1	23	VCC		Analog power supply
12	FSYNC	I/O	Frame sync. Input/ output	24	AGND		Analog Ground

● HD63266F (X1939A00) FDC (Floppy Disk Controller)

(IC8)

PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	8"/5"	I	Data transmission speed	33	/TRKO	I	Track 00 signal
2	XTALSET	I	Clock select	34	/INDEX	I	Index signal
3	/RESET	I	Rest	35	/RDATA	I	Read data input from FDD
4	E//RD	I	Enable/Read	36	XTAL2	I	Clock
5	RW//WR	I	Read/write/Write	37	EXTAL2	I	Clock
6	/CS	I	Chip select	38	NC	-	
7	/DACK	I	DMA acknowledge	39	XTAL1	I	Clock
8	RS0	I	Register select	40	EXTAL1	I	Clock
9	RS1	I		41	VSS4	-	Ground
10	VSS1	-	Ground	42	VSS5	-	Ground
11	VSS2	-		43	NC	-	
12	D0	I/O	Data bus	44	VCC2	-	Power supply
13	D1	I/O		45	VCC3	-	
14	D2	I/O		46	VCC4	-	
15	D3	I/O		47	/WGATE	O	
16	D4	I/O		48	/WDATA	O	Write data to FDD
17	D5	I/O		49	VSS6	-	Ground
18	D6	I/O		50	/STEP	O	Step signal to control head of FDD
19	D7	I/O		51	/HDIR	O	Direction
20	/DREQ	O	DMA request	52	/HLOAD	O	Head load
21	/IRQ	O	Interrupt request	53	/HSEL	O	Head select
22	/DEND	I	Data end	54	VSS7	-	Ground
23	VSS3	-	Ground	55	/DS0	O	Drive select
24	1/2 EX1	I		56	/DS1	O	
25	VCC1	-	Power supply	57	/DS2	O	
26	NUM1	I		58	/DS3	O	
27	NUM3	I		59	VSS8	-	Ground
28	IFS	I	Host interface select	60	/MON0	O	Motor on
29	SFORM	I	Format data	61	/MON1	O	
30	/INP	I	Index pulse	62	/MON2	O	
31	/READY	I	Ready from FDD	63	/MON3	O	
32	/WPRT	I	Write control signal	64	VSS9	-	Ground

● SED1335F0B (XQ595A00) LCDC (LCD Controller)

(IC9)

PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	VA5	O	VRAM address bus	31	XD2	O	X driver data bus
2	VA4	O		32	XD1	O	
3	VA3	O		33	XD0	O	
4	VA2	O		34	XECL	O	X driver enable chain clock
5	VA1	O		35	XSCL	O	X driver shift clock
6	VA0	O		36	VSS	-	Ground
7	VR/W	O	VRAM write strobe	37	LP	O	Latch pulse
8	/VCE	O	VRAM chip enable	38	WF	O	Frame signal
9	NC	-		39	YDIS	O	LCD power down
10	/RES	I	Reset	40	YD	O	Scan start pulse
11	NC	-		41	YSCL	O	Scan shift clock
12	NC	-		42	VD7	I/O	VRAM data bus
13	/RD	I	80: Read strobe, 68: E clock	43	VD6	I/O	
14	/WR	I	80: Write strobe, 68: Read/Write	44	VD5	I/O	
15	SEL2	I	CPU 80/68 bus select	45	VD4	I/O	
16	SEL1	I		46	VD3	I/O	
17	OSC1	I	Clock	47	VD2	I/O	
18	OSC2	O		48	VD1	I/O	
19	/CS	I	Chip select	49	VD0	I/O	
20	A0	I	Data bus signal discrimination	50	VA15	O	VRAM address bus
21	VDD	-	Power supply	51	VA14	O	
22	D0	I/O	Data bus	52	VA13	O	
23	D1	I/O		53	VA12	O	
24	D2	I/O		54	VA11	O	
25	D3	I/O		55	VA10	O	
26	D4	I/O		56	VA9	O	
27	D5	I/O		57	VA8	O	
28	D6	I/O		58	VA7	O	
29	D7	I/O		59	VA6	O	
30	XD3	O	X driver data bus	60	NC	-	

● HD6437043AE00F (XW795A00) CPU

(IC1)

PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	/WRHH	O	HH write	73	D15	I/O	Data bus
2	DACK0	O	DMA transfer strobe	74	D14	I/O	
3	PA22	O	Port A	75	D13	I/O	
4	/CASHH	O	HH Column address strobe	76	D12	I/O	Power supply
5	PE15	I/O	Port E	77	VCC	I	
6	VSS	-	Ground	78	D11	I/O	Data bus
7	A0	O	Address bus	79	VSS	I	Ground
8	A1	O					
9	A2	O					
10	A3	O					
11	A4	O					
12	VCC	-	Power supply	84	D6	I/O	Data bus
13	A5	O	Address bus	85	VCC	I	
14	VSS	-	Ground	86	D5	I/O	Data bus
15	A6	O	Address bus	87	VSS	-	Ground
16	A7	O					
17	A8	O					
18	A9	O					
19	A10	O					
20	A11	O	Address bus	91	D1	I/O	Data bus
21	A12	O					
22	A13	O					
23	A14	O					
24	A15	O					
25	A16	O	Power supply	92	D0	I/O	Data bus
26	VCC	-		Power supply	93	VSS	
27	A17	O	Address bus	94	XTAL	I	Crystal oscillator
28	VSS	-	Ground	95	MD3	I	Mode select 3
29	/CASHL	O	HL Column address strobe	96	EXTAL	I	Crystal oscillator
30	PA19	I/O	Port A	97	MD2	I	Mode select 2
31	/RAS	O	Row address strobe	98	NMI	I	Non-maskable interrupt
32	/CASL	O	Column address strobe (low)	99	VCC	I	Power supply
33	PA18	I/O	Port A	100	PA16	I/O	Port A
34	/CASH	O	Column address strobe (high)	101	/WAIT	I/O	Wait
35	VSS	-	Ground	102	MD1	I	Mode select 1
36	RDWR	O	DRAM read/write	103	MD0	I	Mode select 0
37	A18	O	Address bus	104	PLL VCC	I	PLL power supply
38	A19	O					
39	A20	O					
40	VCC	I	Power supply	105	PLL CAP	I	PLL capacitor
41	A21	O	Address bus	106	PLL VSS	I	PLL ground
42	VSS	I	Ground	107	CK	I/O	Clock
43	/RD	O	Read	108	/RES	I	Reset
44	/WDTOVF	O	Watch dog timer overflow	109	/DREQ0	I	DMA transfer request
45	D31	I/O	Data bus	110	DRAK0	I/O	DMA transfer strobe
46	D30	I/O					
47	/WRH	O	High write	111	/DREQ1	I/O	DMA transfer request 1
48	/WRL	O	Low write	112	VCC	I	Power supply
49	/CS1	O	Chip select 1	113	PE3	I/O	Port E
50	/CS0	O	Chip select 0	114	PE4	I/O	
51	/IRQ3	I	Interrupt request 3	115	PE5	I/O	
52	/IRQ2	I	Interrupt request 2	116	PE6	I/O	Ground
53	/CS3	O	Chip select 3	117	VSS	-	
54	/CS2	O	Chip select 2	118	PF0	I/O	Port F
55	VSS	-	Ground	119	PF1	I/O	
56	D29	I/O	Data bus	120	PF2	I/O	
57	D28	I/O					
58	D27	I/O					
59	D26	I/O					
60	D25	I/O					
61	VSS	-	Ground	121	PF3	I/O	Port F
62	D24	I/O	Data bus	122	PF4	I/O	
63	VCC	-	Power supply	123	PF5	I/O	
64	D23	I/O	Data bus	124	AVSS	I	Analog ground
65	D22	I/O					
66	D21	I/O					
67	D20	I/O					
68	D19	I/O					
69	D18	I/O	Ground	125	PF6	I/O	Port F
70	D17	I/O					
71	VSS	-	Ground	126	PF7	I/O	Analog reference voltage
72	D16	I/O	Data bus	127	AVREF	I	
				128	AVCC	-	Ground
				129	VSS	-	Ground
				130	RxD0	I	Receive data
				131	PA1	I/O	Part A
				132	/IRQ0	I	Interrupt request 0
				133	RxD1	I	Receive data
				134	TXD1	I/O	Transmit data
				135	VCC	-	Power supply
				136	IRQ1	I/O	Interrupt request 1
				137	PE7	I/O	Port E
				138	PE8	I/O	
				139	PE9	I/O	
				140	PE10	I/O	Ground
				141	VSS	-	
				142	PE11	I/O	Port E
				143	PE12	I/O	
				144	PE13	I/O	

● **MB87034PF (XK851A00) SPC (SCSI Protocol Controller)**

(IC52)

PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION	
1	/RESET	I	Reset	41	/CLK	I	Clock	
2	VSS	-	Ground	42	VSS	-	Ground	
3	NC	-		43	NC	-		
4	NC	-		44	NC	-		
5	NC	-		45	NC	-		
6	/DBP	I/O	SCSI data bus	46	/I/O	I/O	Data direction	
7	VSS	-	Ground	47	VSS	-	Ground	
8	/DB7	I/O	SCSI data bus	48	/REQ	I/O	Request	
9	/DB6	I/O			49	/C/D	I/O	Command/Data
10	/DB5	I/O			50	/SEL	I/O	Select
11	VDD	-		Power supply	51	VDD	-	Power supply
12	VSS	-	Ground	52	VSS	-	Ground	
13	VSS	-		53	VSS	-		
14	/DB4	I/O	SCSI data bus	54	/MSG	I/O	Message	
15	/DB3	I/O			55	/RST	I/O	Reset
16	/DB2	I/O			56	/ACK	I/O	Acknowledge for REQ
17	/DB1	I/O			57	/BSY	I/O	Busy
18	VSS	-	Ground	58	VSS	-	Ground	
19	/DB0	I/O	SCSI data bus	59	/ATN	I/O	Attention condition	
20	NC	-		60	NC	-		
21	NC	-		61	NC	-		
22	TEST	-		62	INT2	O	Non-maskable interrupt request	
23	VSS	-	Ground	63	VSS	-	Ground	
24	DRESP	I	Response signal for DREQ	64	/CS	I	Chip select	
25	DREQ	O	Data transfer request	65	/WT	I	Write strobe	
26	HIN	I	Output control of HDB0-7,HDBP	66	/WTG	I	Data bus write control (to HDB0-7,HDBP)	
27	HDB0	I/O	Data bus (MB87034 <->data memory)	67	/RD	I	Read strobe	
28	HDB1	I/O			68	/RDG	I	Output control for D0-7,DP
29	HDB2	I/O			69	D0	I/O	Data bus (MB87034 <->internal register)
30	HDB3	I/O			70	D1	I/O	
31	HDB4	I/O			71	D2	I/O	
32	HDB5	I/O		72	D3	I/O		
33	VDD	-	Power supply	73	VDD	-	Power supply	
34	HDB6	I/O	Data bus	74	D4	I/O	Data bus	
35	HDB7	I/O			75	D5		I/O
36	HDBP	I/O			76	D6		I/O
37	A0	I			77	D7		I/O
38	A1	I	Resistor select	78	DP	I/O		
39	A2	I			79	DP0	O	Odd number parity of data bus
40	A3	I			80	INTR	O	Interrupt request

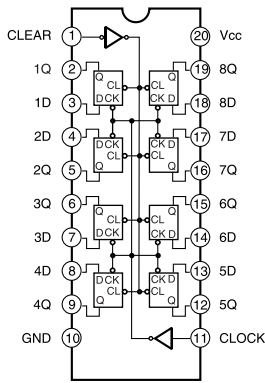
● **PCM1716E (XU829A00) DAC (Digital to Analog Converter)**

(IC805)

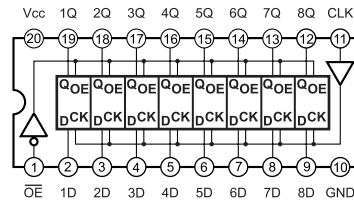
PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	LRCK	I		15	Vcc1	-	Analog power supply (+5V)
2	DATA	I	Data input	16	VOU TL	O	Lch, analog voltage output
3	BCK	I	Bit clock	17	NC	-	
4	CLKO	O	Clock output	18	EXTL	O	Lch, analog output
5	XTI	I	Clock input	19	AGND2L	-	Analog ground
6	XTO	O	Clock out	20	Vcc2L	-	Analog power supply (+5V)
7	DGND	-	Digital ground	21	/ZERO	O	Zero data flag
8	VDD	-	Digital power supply (+5V)	22	/RST	I	Reset
9	Vcc2R	-	Analog power supply (+5V)	23	/CS/IWO	I	Chip select
10	AGND2R	-	Analog ground	24	MODE	I	Mode control select (H: Software, L: Hardware)
11	EXTR	O	Rch, analog output	25	/MUTE	I	Mute control
12	NC	-		26	MD/DM0	I	Mode control data/ De-emphasis select1
13	VOU TR	O	Rch, analog voltage output	27	MC/DM1	I	Mode control BCK/ De-emphasis select2
14	AGND1	-	Analog ground	28	ML/IIS	I	Mode control Latch/ input format select

IC BLOCK DIAGRAM

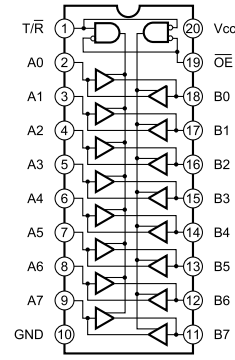
● **SN74HC273NSR** (XH223A00)
Octal D-Type Flip-Flop



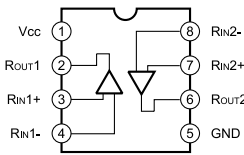
● **SN74HC574NSR** (XH225A00)
Octal D-Type Flip-Flop



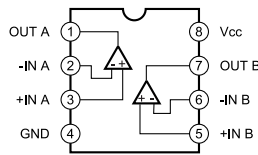
● **HD74LVC245A** (XW148A00)
Octal 3-State Bus Transceiver



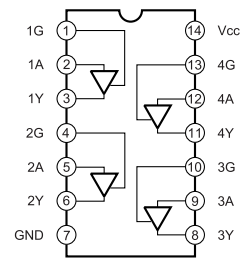
● **DS90C402M** (XW357A00)
Line Receiver



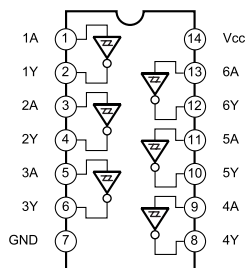
● **NJM4556AMT1** (XQ138A00)
● **OP275GSR** (XV763A00)
OP AMP



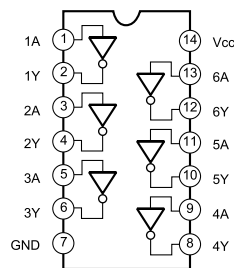
● **TC74HC126AF** (XJ013A00)
Quad Bus Buffer



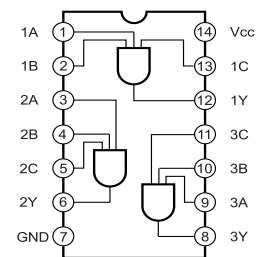
● **TC74HC14AF-TP1** (XD657A00)
Hex Inverter



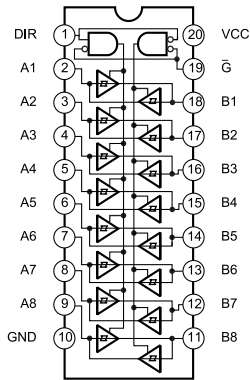
● **TC74VHC04F** (XM332A00)
Hex Inverter



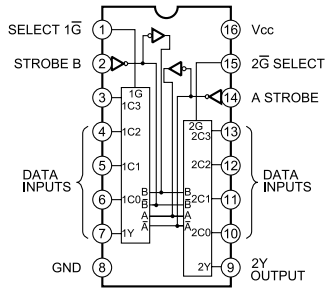
● **TC74VHC11F** (XT812A00)
INVERTER



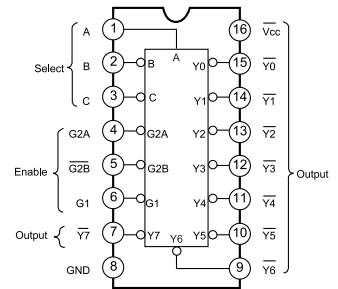
● **TC74VHC245F** (XT487A00)
Octal 3-State Bus Transceiver



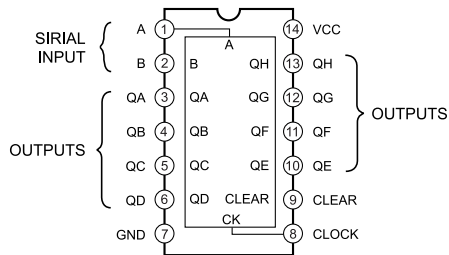
● **TC74VHC153F** (XV794A00)
Dual 4 Channel Multiplexer



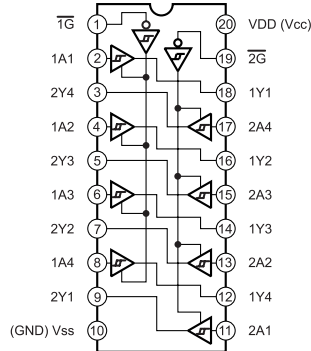
● **TC74VHC138F** (XT015A00)
3 to 8 LINE DECODER



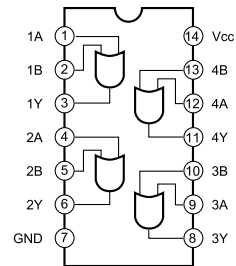
● **TC74VHC164F** (XN967A00)
8-Bit Shift Register



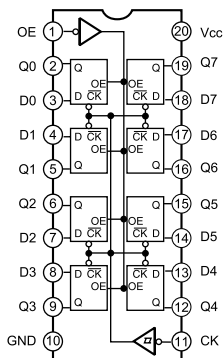
● **TC74VHC244F** (XN969A00)
● **TC74VHC244F** (XT800A00)
Octal 3-State Bus Buffer



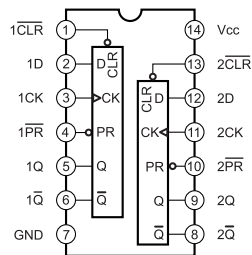
● **TC74VHC32F-TEL** (XR337A00)
Quad 2 Input Or Gate



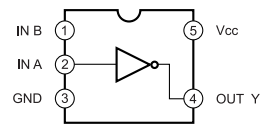
● **TC74VHC374F** (XN972A00)
Octal 3-State D-Type Flip-Flop



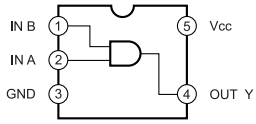
● **TC74VHC74F** (XN964A00)
Dual D-Type Flip-Flop



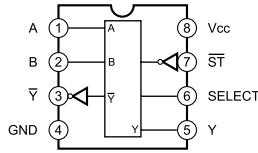
● **TC7SH04FU** (XS775A00)
Inverter



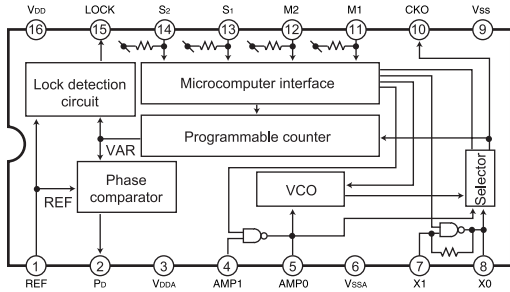
● **TC7SH08FU** (XR680A00)
2 Input And Gate



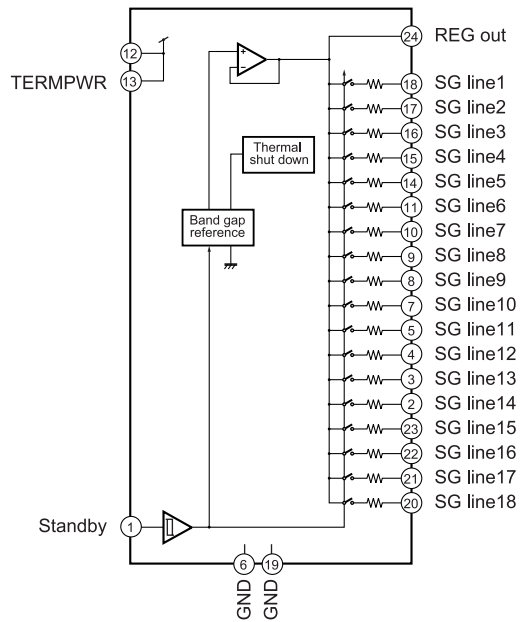
● **TC7WH157FU** (XV865A00)
2-Channel Multiplexer



● **TC9246F** (XR339A00)
PLL



● **AN8612NSB** (XU042A00)
SCSI TERMINATOR



■ TEST PROGRAM

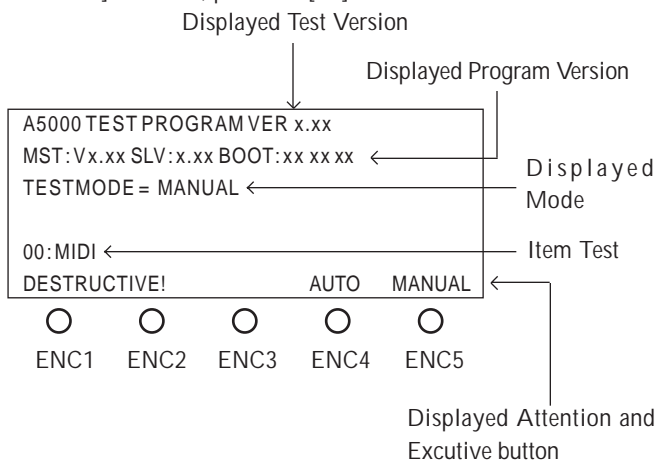
TEST No.	TEST	TEST RESULTS
00	MIDI	OK/NG
01	LCD	ALL DOTS ON/OFF
02	LED/SWITCH	LIT, OK/NG
03	ENCODER	OK/NG
04	CPU (DRAM/EEPROM/DPRAM)	OK/NG
05	WAVE MEMORY	OK/NG
06	SIMM	Displayed CAPACITY/NG ADDRESS (SIMM)
07	DRIVE 1SECTOR/DMA (SCSI)	OK/NG
08	DRIVE 1SECTOR (IDE)	OK/NG
09	FD INSERT/VERIFY	OK/NG
10	128 (64)TONE/DSPRAM	Listening (via DSP RAM)
11	STEREO OUT-L	1 kHz +/- 1 Hz, less than 2.0% distortion, -1 +/- 3 dBm
12	STEREO OUT-R	1 kHz +/- 1 Hz, less than 2.0% distortion, -1 +/- 3 dBm
13	ASSIGNABLE OUT-L	1 kHz +/- 1 Hz, less than 2.5% distortion, -1 +/- 3 dBm
14	ASSIGNABLE OUT-R	1 kHz +/- 1 Hz, less than 2.5% distortion, -1 +/- 3 dBm
15	REC IN (MIC)/SPF	1 kHz +/- 1.5 Hz, less than 3.0% distortion, -1 +/- 4 dBm
16	REC IN (LINE)/SPF	1 kHz +/- 1.5 Hz, less than 2.5% distortion, -1 +/- 4 dBm
17	MUTE	Listening
18	ASSIGNABLE OUT-1	1 kHz +/- 1 Hz, less than 0.5% distortion, 0 +/- 3 dBm
19	ASSIGNABLE OUT-2	1 kHz +/- 1 Hz, less than 0.5% distortion, 0 +/- 3 dBm
20	ASSIGNABLE OUT-3	1 kHz +/- 1 Hz, less than 0.5% distortion, 0 +/- 3 dBm
21	ASSIGNABLE OUT-4	1 kHz +/- 1 Hz, less than 0.5% distortion, 0 +/- 3 dBm
22	ASSIGNABLE OUT-5	1 kHz +/- 1 Hz, less than 0.5% distortion, 0 +/- 3 dBm
23	ASSIGNABLE OUT-6	1 kHz +/- 1 Hz, less than 0.5% distortion, 0 +/- 3 dBm
24	DIGITAL & OPTICAL OUT	Listening, measuring
25	DIGITAL IN	1 kHz +/- 5 Hz, less than 0.2% distortion, 17 +/- 4 dBm
26	OPTICAL IN	1 kHz +/- 5 Hz, less than 0.2% distortion, 17 +/- 4 dBm
27	mLAN I/F (26pin)	
28	mLAN I/F (50pin)	
50	CPU (DRAM/DPRAM) ALL	OK/NG
51	WAVE MEMORY ALL	Displayed CAPACITY/NG ADDRESS
52	SIMM ALL	Displayed CAPACITY/NG ADDRESS
53	DRIVE 100MB VERIFY (SCSI)	OK/NG
54	DRIVE 100MB VERIFY (IDE)	OK/NG
55	DIGITAL I/O	OK/NG
56	OPTICAL I/O	OK/NG
90	SCSI TERM POWER	Displayed CAPACITY +4.4 ~ 5.1 V
91	SCSI TERM SW	Displayed CAPACITY SW ON: 2.85 +/- 0.5 V OFF: 0 +/- 0.5 V
92	REMAIN NOISE	less than -70 dBm, PHONES: less than -62 dBm
93	POWER SUPPLY VOLTAGE	5.00 +/- 0.25 V
94	POWER ON MUTE	less than 200 mVp-p, PHONES: less than 500 mVp-p
98	FACTORY SET	
99	EXIT	

Measuring instruments: oscilloscope, level meter(with a JIS-C filter), distortion meter, AD converter, oscillator
 Jigs: MIDI cable, optional extension board

A. TEST ENTRY

The test program can be entered in either of the two ways.

1. Turn on the A5000/A4000 power switch while pressing the [F1] and the [COMMAND] switches.
2. After turning on the A5000/A4000 power switch, wait a few minutes and while simultaneously pressing the [F1] and the [COMMAND] switches, press the [F6] switch.



If the [ENC4] AUTO switch is pressed, the auto test can be started. If the [ENC5] MANUAL switch is pressed, the manual test can be started. When the test mode is finished, execute the EXIT or stop the power switch.

< Attention to the destroyed data >

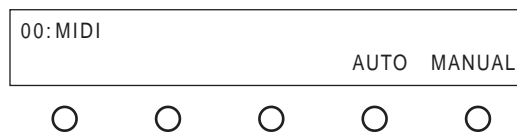
According to the item 04, 07, 08, 09, 50, 53, 54, there's a danger to destroy and initialize the media (Memory and Disk) data placed in the test. Save the back-up and execute.

EEPROM to be tested at the item 04 is memorized the institution of the Master body but this cannot be saved back-up to the media. If the test is normally finished, the institution is kept. But if NG is on, the institution isn't guaranteed. These test are displayed the "DESTRUCTIVE!" at the selected screen.

B. PROCEEDING THROUGH THE TEST

MANUAL MODE

If the test mode is entered, the following screen is displayed.



The test is proceeded to use the [ENC4], [ENC5], [COMMAND] and [ASSIGNABLE].

If the [ASSIGNABLE] switch is pushed, the next test (of the selected present test) is selected and the item test is displayed.

If the [COMMAND] switch is pushed, the last test (of the selected present test) is selected and the item test is displayed.

(If the [ENC1] switch is turned, the item test is selected.)

If the [ENC5] GO switch is pushed, the selected present test is executed.

While executing, the next letters is displayed.



If the test showed the [ENC5] STOP while the execution of the test, the test is stopped.

If the [ENC4] AUTO is pushed, the test is automatically executed in order of the test number.

If the test showed [ENC5] STOP while the execution of the test is pushed, the test is stopped.

If the error is happened, the error is displayed and the test is stopped.

AUTO MODE

If the auto test is executed at the [ENC4] AUTO the test is executed in order of the number.

If the test showed the [ENC5] STOP while the execution of the test is pushed, the test is stopped.

If the error is happened, the error is displayed and the test is stopped.

If the [ENC5] GO switch is pushed, only the stopped item test is executed.

Proceeding through the test when the NG is judged

According to each of the test, if the NG is judged, proceed the following tests.

If the [ENC5] switch is pushed, the selected present test is executed again.

If the [ASSIGNABLE] switch is pushed, the next test (of the selected present test) is selected and the item test is displayed.

If the [COMMAND] switch is pushed, the last test (of the selected present test) is selected and the item test is displayed.

C. TEST

This test program is explained about the manual mode.

00 MIDI

00: MIDI	AUTO MANUAL
----------	-------------

MIDI cable is joined the following and the test will be executed.
MIDI-A-OUT === MIDI-A-IN (A4000,A5000)
MIDI-A-THRU === MIDI-B-IN (A5000)

RESULT OF THE TEST

OK :

00: MIDI	OK
	AUTO MANUAL

NG :

00: MIDI	NG
NG	STOP

END OF THE TEST

After pressing the [ENC5] STOP, the test will be finished.

01 LCD

01: LCD	AUTO MANUAL
---------	-------------

The three patterns are: all dots light, all dots go out and the [STOP] is displayed. This pattern rotates in intervals of one second. Check all dots is on and off on the LCD.

RESULT OF THE TEST

OK :

01: LCD	OK
	AUTO MANUAL

NG : No display

END OF THE TEST

After pressing the [ENC5] STOP, the test will be displayed and finished.

02 LED/SWITCH

02: LED/SW	AUTO MANUAL
------------	-------------

Execute the test. As the required switch name is displayed on the LCD, push the switch. If the switch check is OK, the LED of the next switch will light and the name of the switch will be displayed on the LCD.

If the switch check is NG since the ON signal can not be detected, press another switch. Then the condition will be changed to waiting for the next switch check.

The order of the check switch :

- [KNOB1], [KNOB2], [KNOB3], [KNOB4], [KNOB5],
- [PLAY], [EDIT], [REC], [DISK], [UTILITY],
- [F1], [F2], [F3], [F4], [F5], [F6],
- [COMMAND/EXIT], [ASSIGNABLE], [AUDITION]

02: LED/SW	Push: < ***** >
------------	-----------------

RESULT OF THE TEST

OK :

02: LED/SW	OK
OK	AUTO MANUAL

NG :

02: LED/SW	NG
NG SW # : < ***** >	AUTO MANUAL

= the number of the NG switches

END OF THE TEST

After displaying, the test will be finished.

In this switch test, the test can not be exited along the way. So, if the test needs to be executed from the beginning once more, press any switch 19 times in maximum. Then the test can be finished.

03 ENCODER

03: ENCODER	AUTO MANUAL
-------------	-------------

Rotate the [ENC1] Knob clockwise to more than 10 count and rotate it counter clockwise to more than 10 count. Progressively check the knobs [ENC2], [ENC3], [ENC4] and [ENC5]. Check that OK is displayed.

03: ENCODER	(STOP)
-- -- -- -- --	

RESULT OF THE TEST

OK :

03: ENCODER	(STOP)
OK OK OK OK OK	

NG :

03: ENCODER	(STOP)
OK NG OK OK OK	

In case of the [ENC2] is NG

END OF THE TEST

Press the [ENC5] STOP. If the test is finished, the result of the test will be displayed the following screen.

Press the [ENC5] STOP. If the test is halfway, the test will be finished.

In case of all OK encoders

03: ENCODER	OK
OK	AUTO MANUAL

In case of the NG ENC2

03: ENCODER	NG
OK / NG / OK / OK / OK	AUTO MANUAL

04 CPU (DRAM/EEPROM/DPRAM/FLASH)

04: CPU (DRAM/EEPROM/DPRAM/FLASH) DESTRUCTIVE!	AUTO	MANUAL
---	------	--------

Perform the read/write test of DRAM / EEPROM / Dual Port RAM / Flash ROM. Check that OK is displayed.

RESULT OF THE TEST

OK :

04: CPU (DRAM/EEPROM/DPRAM/FLASH) AUTO	OK	MANUAL
---	----	--------

NG :

04: CPU (DRAM/EEPROM/DPRAM/FLASH) DRAM Read error	NG	AUTO	MANUAL
--	----	------	--------

read error of DRAM

NG :

04: CPU (DRAM/EEPROM/DPRAM/FLASH) Refresh error	NG	AUTO	MANUAL
--	----	------	--------

refresh error of DRAM

NG :

04: CPU (DRAM/EEPROM/DPRAM/FLASH) EEPROM Read error	NG	AUTO	MANUAL
--	----	------	--------

read error of EEPROM

END OF TEST

After displaying, the test will be finished.

05 WAVE RAM

05: WAVE RAM	AUTO	MANUAL
--------------	------	--------

Perform the read/write test of WAVE RAM (the DRAM for wave form stuck the circuit board). Check that OK is displayed.

RESULT OF THE TEST

OK :

OK	AUTO	MANUAL
----	------	--------

NG :

NG	AUTO	MANUAL
----	------	--------

END OF THE TEST

After displaying the result, the test will be finished.

06 SIMM

06: SIMM	AUTO	MANUAL
----------	------	--------

Perform the read/write test of SWP30 register and WAVE MEMORY (SIMM). Check that OK is displayed.

RESULT OF THE TEST

OK :

06: SIMM	OK	
516:** 517:** 518:** 519:**	AUTO	MANUAL

516, 517, 518, 519: CN number

In case of OK ** : the capacity (MByte) of the understanding DRAM

In case of R/W error ** : NG

NG :

06: SIMM SWP access error	NG	AUTO	MANUAL
------------------------------	----	------	--------

In case of SWP30 access error

END OF THE TEST

After displaying the result, the test will be finished. Or push the [ENC5] STOP and cancel.

07 DRIVE 1SECTOR / DMA (SCSI)

07: DRIVE 1SECTOR / DMA (SCSI) DESTRUCTIVE!	ID 4	AUTO	MANUAL
--	------	------	--------

Connect the HDD to the SCSI Bus and execute by pressing the [ENC5] MANUAL.

The SCSI ID of the drive testing on the [ENC3] can be selected. (The default ID can be set by pressing the [ENC3] ID4.)

The data on the SCSI DRIVE may be destroyed, so execute this test after saving the back-up data.

RESULT OF THE TEST

OK :

OK	n / *** / ++++ / #####
----	------------------------

n : SCSI ID (0 - 7)

*** : Production Company Name

+++ : Type

: Version

NG :

NG SCSI device bad condition

Access error

NG :

NG SCSI device read error

Read error

NG :

NG SCSI device write error

Write error

NG :

NG DATA compare error

Verify error

END OF THE TEST

After displaying the result of the test, the test will be finished. Or push on the [ENC5] STOP.

RESULT OF THE TEST

OK :	OK	AUTO	MANUAL
NG :	NG SWP access error	AUTO	MANUAL

END OF THE TEST

After pushing the [ENC5] STOP, the test will be finished.

12 1 kHz STEREO OUT-R

12: STEREO OUT-R	AUTO	MANUAL
------------------	------	--------

Insert the appropriate phone plugs into the STEREO OUT-L, R, ASSIGNABLE OUT-L, R, PHONES terminals. Check the output by using an oscilloscope, an AC voltmeter (with JIS-C filter) and a distortion factor meter. The REC GAIN and the MASTER VOLUME control must be set at maximum for these checks.

- STEREO OUT-L: less than -75 dBm (10 k ohm load)
- STEREO OUT-R: 1 kHz +/- 1 Hz, sine wave, less than 2.0% distortion
-1 +/- 3 dBm (10 k ohm load)
- PHONES (L): less than -60 dBm (33 ohm load)
- PHONES (R): sine wave, less than 3% distortion
+7 +/- 3 dBm (33 ohm load)

While sounding, the LCD shows as follows.

Output on

RESULT OF THE TEST

OK :	OK	AUTO	MANUAL
NG :	NG SWP access error	AUTO	MANUAL

END OF THE TEST

After pushing the [ENC5] STOP, the test will be finished.

13 1 kHz ASSIGNABLE OUT-L

13: ASSIGNABLE OUT-L	AUTO	MANUAL
----------------------	------	--------

Insert the appropriate phone plugs into the STEREO OUT-L, R, ASSIGNABLE OUT-L, R terminals. Check the output wave form and the output level of each output by using an oscilloscope, an AC voltmeter (with JIS-C filter) and a distortion factor meter. The MASTER VOLUME control must be set at maximum for these checks.

- ASSIGNABLE OUT-L: 1 kHz +/- 1 Hz, sine wave, less than 2.5% distortion
-1 +/- 3 dBm (10 k ohm load)
- ASSIGNABLE OUT-R: less than -70 dBm (10 k ohm load)

While sounding, the LCD shows as follows.

Output on

RESULT OF THE TEST

No display

END OF THE TEST

After displaying the [ENC5] STOP, the test will be finished.

14 1 kHz ASSIGNABLE OUT-R

14: ASSIGNABLE OUT-R	AUTO	MANUAL
----------------------	------	--------

Insert the appropriate phone plugs into the STEREO OUT-L, R, ASSIGNABLE OUT-L, R terminals. Check the output wave form and the output level of each output by using an oscilloscope, an AC voltmeter (with JIS-C filter) and a distortion factor meter. The MASTER VOLUME control must be set at maximum for these checks.

- ASSIGNABLE OUT-L: less than -70 dBm (10 k ohm load)
- ASSIGNABLE OUT-R: 1 kHz +/- 1 Hz, sine wave, less than 2.5% distortion
-1 +/- 3 dBm (10 k ohm load)

While sounding, the LCD shows as follows.

Output on

RESULT OF THE TEST

No display

END OF THE TEST

After pushing the [ENC5] STOP, the test will be finished.

15 REC IN (MIC) / SPF

15: REC IN (MIC) / SPF	AUTO	MANUAL
------------------------	------	--------

Insert the appropriate phone plugs into the STEREO OUT-L, R terminals. Check the output wave form and the output level of each output by using an oscilloscope, an AC voltmeter (with JIS-C filter) and a distortion factor meter. The REC GAIN and the MASTER VOLUME control must be set at maximum for these checks.

- Input sine wave signal : -50 dBm, 1 kHz +/- 1 Hz, less than 0.005% distortion
impedance 600 ohm

When inserting in the REC IN-L

- STEREO OUT-L: 1 kHz +/- 1.5 Hz, sine wave, less than 3.0% distortion
-1 +/- 4 dBm (10 k ohm load)
- STEREO OUT-R: less than -55 dBm

When inserting in the REC IN-R
 STEREO OUT-L: less than -55 dBm
 STEREO OUT-R: 1 kHz +/- 1.5 Hz, sine wave, less than 3.0% distortion
 -1 +/- 4 dBm (10 k ohm load)

RESULT OF THE TEST

No display

END OF THE TEST

After pushing the [ENC5] STOP, the test will be finished.

16 REC IN (LINE) / SPF

16: REC IN (LINE) / SPF	AUTO	MANUAL
-------------------------	------	--------

Insert the appropriate phone plugs into the STEREO OUT-L, R terminals. Check the output wave form and the output level of each output by using an oscilloscope, an AC voltmeter (with JIS-C filter) and a distortion factor meter. The REC GAIN and the MASTER VOLUME control must be set at maximum for these checks.

Input sine wave signal : -17 dBm, 1 kHz +/- 1 Hz, less than 0.005% distortion
 impedance 600 ohm

When inserting in the REC IN-L
 STEREO OUT-L: 1 kHz +/- 1.5 Hz, sine wave, less than 2.5% distortion
 -1 +/- 4 dBm (10 k ohm load)
 STEREO OUT-R: less than -65 dBm

When inserting in the REC IN-R
 STEREO OUT-L: less than -65 dBm
 STEREO OUT-R: 1 kHz +/- 1.5 Hz, sine wave, less than 2.5% distortion
 1 +/- 4 dBm (10 k ohm load)

RESULT OF THE TEST

No display

END OF THE TEST

After pushing the [ENC5] STOP, the test will be finished.

17 MUTE

17: MUTE	AUTO	MANUAL
----------	------	--------

If the test is executed, a 1 second sound and a 1 second mute are repeated alternately twice. Check by listening that the output from the STEREO OUT-R terminal will not sound while muting.

While executing, the LCD will show the following test condition.

While sounding

Mute Off

While muting

Muting

RESULT OF THE TEST

OK / NG

END OF THE TEST

After displaying the result, the test will be finished.

18 ASSIGNABLE OUT-1

18: ASSIGNABLE OUT-1	AUTO	MANUAL
----------------------	------	--------

Insert the appropriate phone plugs into the ASSIGNABLE OUT-1 terminal. Check the output wave form and the output level of each output by using an oscilloscope, an AC voltmeter (with JIS-C filter) and a distortion factor meter. Check that the following signal is output.

ASSIGNABLE OUT-1: 1 kHz +/- 1 Hz, sine wave, less than 0.5% distortion
 0 +/- 3 dBm (10 k ohm load)

ASSIGNABLE OUT-2: less than -70 dBm (10 k ohm load)

While sounding, the LCD shows as below.

Output on

RESULT OF THE TEST

No display

END OF THE TEST

After pressing the [ENC5] STOP, the test will be finished.

19 ASSIGNABLE OUT-2

19: ASSIGNABLE OUT-2	AUTO	MANUAL
----------------------	------	--------

Insert the appropriate phone plugs into the ASSIGNABLE OUT-2 terminal. Check the output wave form and the output level of each output by using an oscilloscope, an AC voltmeter (with JIS-C filter) and a distortion factor meter. Check that the following signal is output.

ASSIGNABLE OUT-1: less than -70 dBm (10 k ohm load)
 ASSIGNABLE OUT-2: 1 kHz +/- 1 Hz, sine wave, less than 0.5% distortion
 0 +/- 3 dBm (10 k ohm load)

While sounding, the LCD shows as below.

Output on

RESULT OF THE TEST

No display

END OF THE TEST

After pressing the [ENC5] STOP, the test will be finished.

20 ASSIGNABLE OUT-3

20: ASSIGNABLE OUT-3	AUTO	MANUAL
----------------------	------	--------

Insert the appropriate phone plugs into the ASSIGNABLE OUT-3 terminal. Check the output wave form and the output level of each output by using an oscilloscope, an AC voltmeter (with JIS-C filter) and a distortion factor meter.

ASSIGNABLE OUT-3: 1 kHz +/- 1 Hz, sine wave, less than 0.5% distortion

0 +/- 3 dBm (10 k ohm load)

ASSIGNABLE OUT-4: less than -70 dBm (10 k ohm load)

While sounding, the LCD shows as below.

Output on

RESULT OF THE TEST

No display

END OF THE TEST

After pressing the [ENC5] STOP, the test will be finished.

21 ASSIGNABLE OUT-4

21: ASSIGNABLE OUT-4	AUTO	MANUAL
----------------------	------	--------

Insert the appropriate phone plugs into the ASSIGNABLE OUT-4 terminal. Check the output wave form and the output level of each output by using an oscilloscope, an AC voltmeter (with JIS-C filter) and a distortion factor meter.

ASSIGNABLE OUT-3: less than -70 dBm (10 k ohm load)

ASSIGNABLE OUT-4: 1 kHz +/- 1 Hz, sine wave, less than 0.5% distortion

0 +/- 3 dBm (10 k ohm load)

While sounding, the LCD shows as below.

Output on

RESULT OF THE TEST

No display

END OF THE TEST

After pressing the [ENC5] STOP, the test will be finished.

22 ASSIGNABLE OUT-5

22: ASSIGNABLE OUT-5	AUTO	MANUAL
----------------------	------	--------

Insert the appropriate phone plugs into the ASSIGNABLE OUT-5 terminal. Check the output wave form and the output level of each output by using an oscilloscope, an AC voltmeter (with JIS-C filter) and a distortion factor meter.

ASSIGNABLE OUT-5: 1 kHz +/- 1 Hz, sine wave, less than 0.5% distortion

0 +/- 3 dBm (10 k ohm load)

ASSIGNABLE OUT-6: less than -70 dBm (10 k ohm load)

While sounding, the LCD shows as below.

Output on

RESULT OF THE TEST

No display

END OF THE TEST

After pressing the [ENC5] STOP, the test will be finished.

23 ASSIGNABLE OUT-6

23: ASSIGNABLE OUT-6	AUTO	MANUAL
----------------------	------	--------

Insert the appropriate phone plugs into the ASSIGNABLE OUT-6 terminal. Check the output wave form and the output level of each output by using an oscilloscope, an AC voltmeter (with JIS-C filter) and a distortion factor meter.

ASSIGNABLE OUT-5: less than -70 dBm (10 k ohm load)

ASSIGNABLE OUT-6: 1kHz +/- 1Hz, sine wave, less than 0.5% distortion

less than -70 dBm (10 k ohm load)

While sounding, the LCD shows as below.

Output on

RESULT OF THE TEST

No display

END OF THE TEST

After pressing the [ENC5] STOP, the test will be finished.

24 DIGITAL & OPTICAL OUT

24: DIGITAL & OPTICAL OUT	AUTO	MANUAL
---------------------------	------	--------

Connect the D/A converter in the DIGITAL OUT and OPTICAL OUT terminals. Check each output wave form and each output level of each output by using an oscilloscope. Check the sine wave is output by listening

While sounding, the LCD shows as below.

Output on

RESULT OF THE TEST

No display

END OF THE TEST

After pressing the [ENC5] STOP, the test will be finished.

25 DIGITAL IN

25: DIGITAL IN	AUTO	MANUAL
----------------	------	--------

Insert the appropriate phone plugs into the STEREO OUT-L terminal. Input the signal to the DIGITAL IN terminal. Check the output wave form and the output level of each output by using an oscilloscope, an AC voltmeter (with JIS-C filter) and a distortion factor meter. Check that the following signal is output. And while executing the test, check the error isn't displayed. If the test is performed again, push the STOP and execute the test again. The REC GAIN and the MASTER VOLUME control must be set at maximum for these checks.

Input sine wave signal : 0 dBm, 1 kHz +/- 5 Hz, less than 0.005% distortion
impedance 600 ohm

STEREO OUT-L: 1 kHz +/- 5 Hz, sine wave, less than 0.2% distortion
+17 +/- 4 dBm (10 k ohm load)

RESULT OF THE TEST

OK :	25: DIGITAL IN	OK
	OK	AUTO MANUAL

NG :	25: DIGITAL IN	STOP
	ERROR	

END OF THE TEST

After pressing the [ENC5] STOP, the test will be finished.

26 OPTICAL IN

26: OPTICAL IN	AUTO	MANUAL
----------------	------	--------

Insert the appropriate phone plugs into the STEREO OUT-L terminal. Input the signal to the OPTICAL IN terminal. Check the output wave form and the output level of each output by using an oscilloscope, an AC voltmeter (with JIS-C filter) and a distortion factor meter. Check that the following signal is output. And while executing the test, check the error isn't displayed. If the test is performed again, push the STOP and execute the test again. The REC GAIN and the MASTER VOLUME control must be set at maximum for these checks.

Input sine wave signal : 0 dBm, 1 kHz +/- 5 Hz, less than 0.005% distortion
impedance 600 ohm

STEREO OUT-L: 1 kHz +/- 5 Hz, sine wave, less than 0.2% distortion
+17 +/- 4 dBm (10 k ohm load)

RESULT OF THE TEST

OK :	26: OPTICAL IN	OK
	OK	AUTO MANUAL

NG :	26: OPTICAL IN	STOP
	ERROR	

END OF THE TEST

After pressing the [ENC5] STOP, the test will be finished.

27 mLAN I/F (26pin)

27: mLAN I/F (26pin)	AUTO	MANUAL
----------------------	------	--------

Execute the test. Command to execute to the mLAN circuit board and automatically perform the following items in serial order. Insert the appropriate phone plugs into the STEREO OUT-L, R terminal. Check by listening that the notes of each output are generated by using a speaker.

- 1) Test of connecting board Find the mLAN board is in or out.
- 2) Board test entry Command to execute the test to the mLAN board.
- 3) MEL output test Execute the output (4 system) test from the body to the mLAN board. Concretely, output the sine wave in order for the mLAN board from the body and check the signal of the mLAN board is the appointed level.
- 4) MEL input test Execute the input (1 system) test from the mLAN board to the body. Concretely output the sine wave for the mLAN and the mLAN board outputs the signal to the MEL insert of the body. And the body outputs the signal to the STEREO OUT changing the D/A.
- 5) Inside clock test Execute the test by using the quartz crystal oscillator built-in the sound clock.
- 6) mLAN clock test Change the sound clock from the mLAN to the clock and execute the sound test.
- 7) Board reset Initialize the mLAN board.

According to the 4), 5), 6), check by listening the sine wave is generated. According to the 1), 2), 3), 7), the mLAN circuit board and the body are automatically judged and check the test result on the LCD.

- 4) When executing the MEL insert test, the display is as below.

27: mLAN I/F (26pin)	EXTERNAL MEL CHECK	CONT	STOP
----------------------	--------------------	------	------

- 5) When executing the inside clock test, the display is as below.

27: mLAN I/F (26pin)	USING INTERNAL CLOCK	CONT	STOP
----------------------	----------------------	------	------

6) When executing the mLAN clock test, the display is as below.

27: mLAN I/F (26pin) USING MLANBOARD CLOCK CONT STOP

RESULT OF THE TEST

OK :

27: mLAN I/F (26pin)	OK
AUTO	MANUAL

NG :

27: mLAN I/F (26pin)	NG
AUTO	MANUAL

END OF THE TEST

After pressing the [ENC5] STOP, the test will be finished.

28 mLAN I/F (50pin)

* Only use in the company

50 CPU (DRAM/EEPROM) ALL

50: CPU (DRAM/EEPROM) ALL DESTRUCTIVE! AUTO MANUAL

The all read/write test of the DRAM and the EEPROM is performed. Check that OK is displayed.

RESULT OF THE TEST

OK :

50: CPU (DRAM/EEPROM) ALL	OK
AUTO	MANUAL

NG :

50: CPU (DRAM/EEPROM) ALL	NG
DRAM Read error	AUTO MANUAL

read error of DRAM

NG :

50: CPU (DRAM/EEPROM) ALL	NG
Refresh error	AUTO MANUAL

refresh error of DRAM

NG :

50: CPU (DRAM/EEPROM) ALL	NG
EEPROM Read error	AUTO MANUAL

read error of EEPROM

END OF THE TEST

After displaying the result, the test will be finished.

51 WAVE MEMORY ALL

51: WAVE MEMORY ALL	AUTO	MANUAL
---------------------	------	--------

The all read/write test of the WAVE RAM (the DRAM for wave form stuck the circuit board) is performed. Check that OK is displayed.

RESULT OF THE TEST

OK :

OK	AUTO	MANUAL
----	------	--------

NG :

NG	AUTO	MANUAL
----	------	--------

END OF THE TEST

After displaying the result, the test will be finished.

52 SIMM ALL

52: SIMM ALL	AUTO	MANUAL
--------------	------	--------

The all read/write test of the WAVE MEMORY (SIMM) is performed. Check that OK is displayed.

RESULT OF THE TEST

OK :

52: SIMM ALL	OK
516:** 517:** 518:** 519:**	AUTO MANUAL

516, 517, 518, 519: CN number

In case of OK **: the capacity (MByte) of the understanding DRAM

In case of R/W error **: NG

NG :

52: SIMM ALL	NG
SWP access error	AUTO MANUAL

In case of the SWP30 access error

END OF THE TEST

After displaying the result, the test will be finished.

After pressing the [ENC5] STOP, the test will be finished.

53 DRIVE 100MB VERIFY (SCSI)

53: DRIVE 100MB VERIFY (SCSI) DESTRUCTIVE! ID 4 AUTO MANUAL
--

Connect the HDD to the SCSI Bus and execute the read/write test of the 100MB. Execute by pressing the [ENC5] MANUAL and check that OK is displayed.

The SCSI ID of the drive can be selected by testing on the [ENC3]. (The default ID is the ID4.)

The data on the SCSI DRIVE may be destroyed, so execute this test after saving the back-up data.

RESULT OF THE TEST

OK :

OK	n/**/+++/#
----	------------

n : SCSI ID(0 - 7)

** : Production Company Name

+++ : Type

: Version

NG :	NG SCSI device bad condition Access Error
NG :	NG SCSI device read error Read Error
NG :	NG SCSI device write error Write Error
NG :	NG DATA compare error Verify Error

END OF THE TEST

After displaying the result, the test will be finished.
After pressing the [ENC5] STOP, the test will be finished.

54 DRIVE 100MB VERIFY (IDE)

54: DRIVE 1SECTOR (IDE) DESTRUCTIVE! ID 4	AUTO	MANUAL
--	------	--------

Connect the HDD to the IDE Bus and execute the read/write test of the 100MB. Execute by pressing the [ENC5] MANUAL and check that OK is displayed. The MASTER (0)/SLAVE (1) of the drive can be selected by testing on the [ENC3]. (The default ID is the ID4.)

The data on the IDE DRIVE may be destroyed, so execute this test after saving the back up data.

RESULT OF THE TEST

OK :	OK	AUTO	MANUAL
NG :	NG	AUTO	MANUAL

END OF THE TEST

After displaying the result, the test will be finished.
After pressing the [ENC5] STOP, the test will be finished.

55 DIGITAL I/O

55: DIGITAL I/O	AUTO	MANUAL
-----------------	------	--------

Connect the DIGITAL IN terminal and the DIGITAL OUT terminal and execute the test. Check the test result on the LCD.

RESULT OF THE TEST

OK :	55: DIGITAL I/O OK	AUTO	MANUAL
NG :	55: DIGITAL I/O NG	AUTO	MANUAL

END OF THE TEST

After displaying the result, the test will be finished.

56 OPTICAL I/O

56: OPTICAL I/O	AUTO	MANUAL
-----------------	------	--------

Connect the DIGITAL IN terminal and the DIGITAL OUT terminal and execute the test. Check the test result on the LCD.

RESULT OF THE TEST

OK :	56: OPTICAL I/O OK	AUTO	MANUAL	OK
NG :	56: OPTICAL I/O NG	AUTO	MANUAL	NG

END OF THE TEST

After displaying the result, the test will be finished.

98 FACTORY SET

98: FACTORY SET	AUTO	MANUAL
-----------------	------	--------

Set the A5000/A4000 in the factory shipping data.

RESULT OF THE TEST

Execute the factory set and display the following screen.

98: FACTORY SET	AUTO	MANUAL	OK
-----------------	------	--------	----

END OF THE TEST

After displaying the result, the test will be finished.

99 EXIT

99: EXIT	AUTO	MANUAL
----------	------	--------

Execute the EXIT and finish the test.

D. OTHERS**90 SCSI TERM POWER**

Turning on the A5000/A4000 power switch, test can start after more than 5 seconds. The voltage can be measured the SCSI connector for the internal cannot and the DM circuit board of the CN9-26 pin (the line of the SCSI term power). Check the voltage is over 4.4 V and under 5.1 V.

When executing this test, the SCSI TERM SW is possible to be on or off.

91 SCSI TERM SW

Turning on the A5000/A4000 power switch, the test can start after more than 5 seconds. The voltage can be measured the SCSI connector for the internal connect and the DM circuit board of the CN9-2 pin (the SCSI signal line). Check the voltage of the switch fills the following.

TERM SW ON: 2.85 +/- 0.5 V
 TERM SW OFF: 0.00 +/- 0.5 V

92 REMAIN NOISE

Insert the appropriate phone plugs into the STEREO OUT L, R, ASSIGNABLE OUT-L, R, PHONES terminals. Check each output by using an oscilloscope, an AC voltmeter (with JIS-C filter) and a distortion factor meter.

The MASTER VOLUME control must be set at maximum for these checks.

STEREO OUT-L: Remain Noise less than -70 dBm (10 k ohm load)
 STEREO OUT-R: Remain Noise less than -70 dBm (10 k ohm load)
 ASSIGNABLE OUT-L: Remain Noise less than -70 dBm (10 k ohm load)
 ASSIGNABLE OUT-R: Remain Noise less than -70 dBm (10 k ohm load)
 PHONES (L): Remain Noise less than -62 dBm (33 ohm load)
 PHONES (R): Remain Noise less than -62 dBm (33 ohm load)

93 POWER SUPPLY VOLTAGE

Turning on the A5000/A4000 power switch, test can start after more than 5 seconds. The voltage can be measured the both terminals of the capacitor [C36] on the DM circuit board. Check the voltage of the switch fills the following

Voltage: 5.00 +/- 0.25 V

94 POWER ON/OFF MUTE

Turning on and off check the output of the STEREO OUT-L, R, PHONES,ASSGNABLE OUT-L, R, ASSIGNABLE OUT1-6 terminals by an oscilloscope.

The MASTER VOLUME control must be set at maximum for these checks.

Body :

STEREO OUT-L : less than 200 m Vp-p (10 k ohm load)
 STEREO OUT-R : less than 200 m Vp-p (10 k ohm load)
 ASSIGNABLE OUT-L : less than 200 m Vp-p (10 k ohm load)
 ASSIGNABLE OUT-R : less than 200 m Vp-p (10 k ohm load)
 PHONES (L) : less than 500 m Vp-p (33 ohm load)
 PHONES (R) : less than 500 m Vp-p (33 ohm load)

IO circuit board

ASSIGNABLE OUT-1 : less than 200 m Vp-p (10 k ohm load)
 ASSIGNABLE OUT-2 : less than 200 m Vp-p (10 k ohm load)
 ASSIGNABLE OUT-3 : less than 200 m Vp-p (10 k ohm load)
 ASSIGNABLE OUT-4 : less than 200 m Vp-p (10 k ohm load)
 ASSIGNABLE OUT-5 : less than 200 m Vp-p (10 k ohm load)
 ASSIGNABLE OUT-6 : less than 200 m Vp-p (10 k ohm load)

■ ERROR MESSAGES

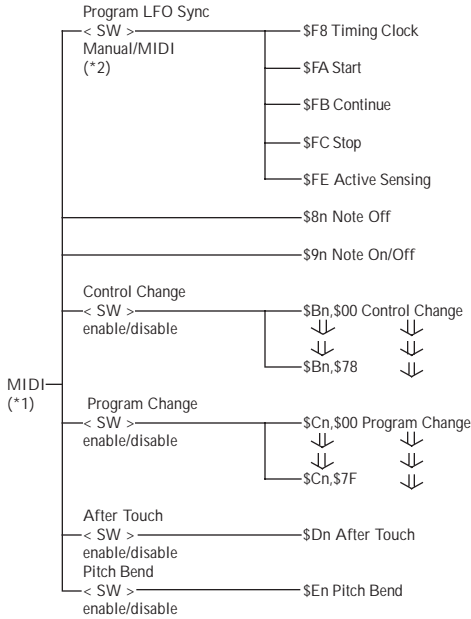
Here is a list of the error messages that will appear when an incorrect operation is performed or when a setting is incorrect.

Audio CD is required.	An audio CD is not loaded into the external CD-ROM drive.
Audition requires more memory.	There is not enough wave memory available to use the AUDITION function. Direct playback from the disk is not possible.
Bulk data error.	Processing of a bulk dump failed.
Bulk protect switch is ON.	Bulk data or a SCSI message was received when the bulk protect switch was "on."
Cannot copy Volume to FD.	Cannot copy a volume unit to a floppy disk.
Cannot create sample (>16MW).	An attempt was made to create a sample larger than 16 Mwords (32 megabytes).
Cannot find associated file.	The voice file associated with the voice data could not be located.
Cannot find disk.	Not ready for disk operation.
Cannot find CD-R.	Cannot prepare the CD-ROM drive for operation.
Cannot find file.	The specified file does not exist.
Cannot find SCSI or IDE disk.	SCSI or IDE disk could not be found.
Cannot revert this sample.	The revert function cannot be used with newly created samples which have no been saved or imported samples.
Cannot write to this disk.	An attempt has been made to write to an unwriteable CD-ROM or other disk.
CD-R size overflow.	The data to be written exceeds the capacity of the CD-R disk.
DIG or OPT signal input is required.	No digital signal is present at the DIGITAL IN or OPTICAL IN terminal.
Disk drive is not ready.	The disk is not ready for saving or loading.
Disk is duplicated in list.	Duplicate backup source disks have been specified.
Disk is not formatted.	The disk is not formatted for the A5000/A4000.
Disk is write protected.	The disk is write protected, and writing could not be performed.
Disk read/write error.	An error occurred while reading or writing to/from disk.
File is being accessed.	You attempted to access a file which was undergoing some type of processing.
MIDI buffer is full.	The A5000/A4000's processing was not able to keep up with MIDI input.
MIDI is busy.	You attempted to execute a bulk dump from the front panel while a bulk dump or parameter change etc. was being processed.
MIDI receive error.	A MIDI receive error occurred.
Name already exists.	A file on disk or in memory with the specified name already exists.
Non-existent track or index.	The audio CD loaded into the external CD-ROM drive does not have the specified track number or index number.
Not enough disk area or too many items.	There is not enough disk space to complete the operation, or the total number of samples/sample banks which can be saved to disk has been exceeded.
Param memory full or too many samples.	The operation cannot be completed because not enough parameter memory is available, or the number of samples, sample banks, etc., which can be retained in memory has been exceeded.
Please set device number.	Transmission or reception of bulk data was attempted with the device number turned off.
Sample Bank is selected in list.	Sample banks cannot be written to an audio CD.
Sample processing failed.	When executing a waveform processing command, the specified command could not be executed due to insufficient free space in the work area of wave memory, or for some other reason.
SIMM configuration error.	The A5000/A4000 was not able to start up, due to the fact that expansion SIMM's are not installed in pairs, or because the usage order of the expansion slots is incorrect etc.
SCSI terminator or device error.	A SCSI error has occurred. Check terminators and connections and try again.
Some samples are copy protected.	You have attempted to export or write copy-protected samples to an audio CD.
Too many samples.	The operation cannot be completed because the number of target samples is too great. Up to 128 samples can be arranged at one time, and maximum number of samples that can be contained in a sample bank is 127.
Too many takes.	The sample could not be created, either because the maximum number of 64 was exceeded when consecutively recording with New+, or because an identically-named sample already exists.
Try physical format.	Logical formatting failed. Try physical formatting.
Unknown disk or file format.	Either the contents of the file have been damaged, or it is the wrong format.
Unsupported file format.	The file is corrupted, or has an unsupported format.
Unsupported file name.	The file name could not be detected by the A5000/A4000.
Unsupported sampling frequency.	Sample that do not have a 44.1 kHz sampling rate cannot be written to an audio CD.
Verification error.	A verification error occurred while writing to disk.
Wave memory error.	An error occurred in wave memory.
Wave memory full.	The specified command could not be executed due to insufficient free space in wave memory.

MIDI DATA FORMAT

1. MIDI reception/transmission conditions block diagram

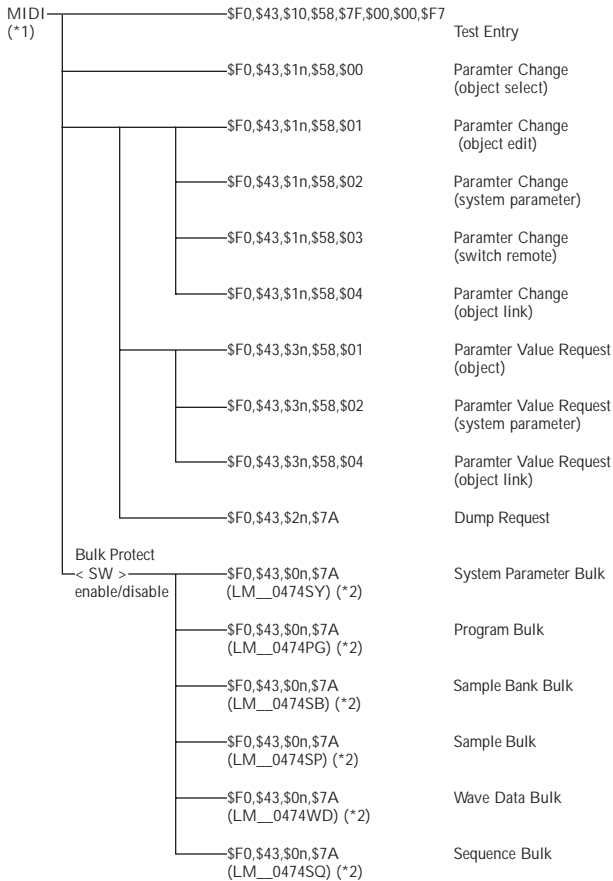
< MIDI reception conditions > 1/3
 nMIDI receive channel
 SWdisable SW.



(*1) For the A5000 the same applies to both A/B inputs
 (*2) For the A5000 one of the A/B inputs can be selected.

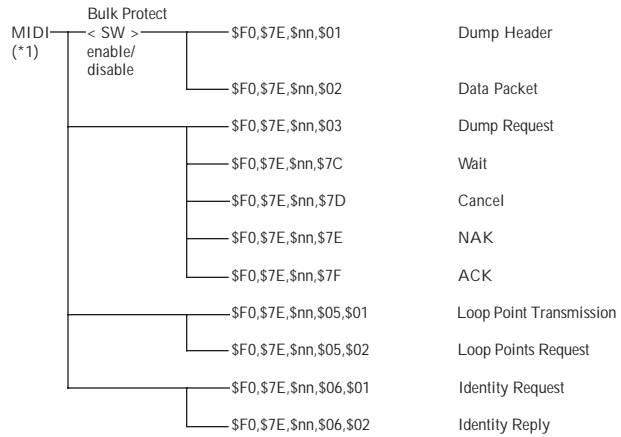
< MIDI reception conditions > 2/3

SW.....BULK protect SW.
 n.....Device Number



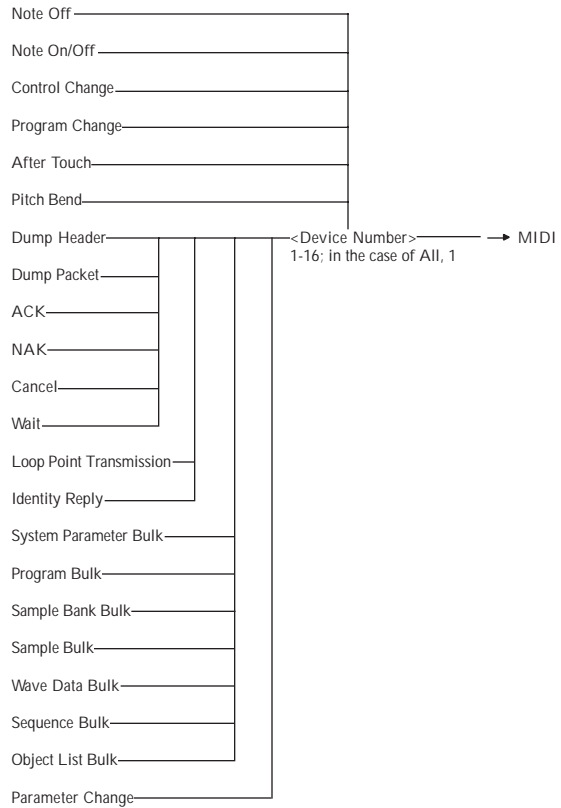
(*1) For the A5000 one of the A/B inputs can be selected.
 (*2) For the A5000 each is LM 0475**.

< MIDI reception conditions > 3/3
 SW.....BULK protect SW.
 nn.....Device Number



(*1) For the A5000 one of the A/B inputs can be selected.

< MIDI transmission conditions >



2. Channel messages

Channel messages are received as follows.

When Program Mode = Single and Omni SW is on, The Note ON/OFF, Control Change, Pitch Bend, After Touch, and Program Change channels have no meaning.

When Program Change SW is enabled and Program Mode = Single the Basic Receive Channel is used; when Program Mode = Multi the Part 1 receive channel is used. No program change occurs when off. However, when a program change is received during internal MIDI sequencer recording, the program change is not recorded even if the Program Change SW is off.

Transmission is performed when the internal MIDI sequencer is playing, and when the KNOB Control function and FKey Play function are being used.

When the MIDI sequencer is playing, the MIDI events that are played back are transmitted to the internal tone generator, and also simultaneously transmitted via MIDI OUT. When Knob control used, a value related to the number of rotations is transmitted for the selected Ch and Control#.

When the FKey Play function is used, Note On/Off messages will be transmitted on the specified channel with the specified note number and velocity. The velocity used when transmitting a Note Off message is fixed. Note Off messages will have a velocity of 0 if the form \$8n is used, and if the form \$9n is used the velocity will be determined case by case.

2.1. Reception

2.1.1. Note off

Note range = C-2-G8
Velocity range = ignored

2.1.2. Note on/off

Note range = C-2-G8
Velocity range = 0-127

2.1.3. Polyphonic aftertouch

Not received.

2.1.4. Control changes

The following parameters can be controlled.

Parameters which function for each program.

cntrl#	parameter	data range
5	Program Portamento Time	0 - 127
0-120	Program Portamento Rate/Time	0 - 127 *
0-120	LFO S/H Speed	0 - 127 *
0-120	AD Input Pan	0 - 127 *
0-120	AD Input Level	0 - 127 *
0-120	AD Input L Pan	0 - 127 *
0-120	AD Input R Pan	0 - 127 *
0-120	AD Input L Level	0 - 127 *
0-120	AD Input R Level	0 - 127 *
0-120	Program Level	0 - 127 *
0-120	EF1 Level	0 - 127 *
0-120	EF1 Pan	0 - 127 *
0-120	EF1 Width	0 - 127 *
0-120	EF1 Parameter 1 - 16	0 - 127 *
0-120	EF2 Level	0 - 127 *
0-120	EF2 Pan	0 - 127 *
0-120	EF2 Width	0 - 127 *
0-120	EF2 Parameter 1 - 16	0 - 127 *
0-120	EF3 Level	0 - 127 *
0-120	EF3 Pan	0 - 127 *
0-120	EF3 Width	0 - 127 *
0-120	EF3 Parameter 1 - 16	0 - 127 *
0-120	EF4 Level	0 - 127 * (A5000 only)
0-120	EF4 Pan	0 - 127 * (A5000 only)
0-120	EF4 Width	0 - 127 * (A5000 only)
0-120	EF4 Parameter 1 - 16	0 - 127 * (A5000 only)
0-120	EF5 Level	0 - 127 * (A5000 only)
0-120	EF5 Pan	0 - 127 * (A5000 only)
0-120	EF5 Width	0 - 127 * (A5000 only)
0-120	EF5 Parameter 1 - 16	0 - 127 * (A5000 only)
0-120	EF6 Level	0 - 127 * (A5000 only)
0-120	EF6 Pan	0 - 127 * (A5000 only)
0-120	EF6 Width	0 - 127 * (A5000 only)
0-120	EF6 Parameter 1 - 16	0 - 127 * (A5000 only)
0-120	Program LFO Depth	0 - 127 *
0-120	Control 1 Range	0 - 127 *
0-120	Control 2 Range	0 - 127 *
0-120	Control 3 Range	0 - 127 *
0-120	Control 4 Range	0 - 127 *

Parameters marked by "*" depend on the Program Control settings.

Parameters which function for each MIDI channel of a program

cntrl#	parameter	data range
7	Volume (Level)	0 - 127
10	Pan	0 - 127
64	Sustain	0 - 127
65	Portament ON/OFF	0 - 127
66	Sostenute	0 - 127

Parameters which function for samples or sample banks

cntrl#	parameter	data range
0-120	Pitch Mod Depth	0 - 127 *
0-120	Amp Mod Depth	0 - 127 *
0-120	Cutoff Mod Depth	0 - 127 *
0-120	Cutoff Bias	0 - 127 *
0-120	Filter Q/Width	0 - 127 *
0-120	Pan Bias	0 - 127 *
0-120	Pitch Bias	0 - 127 *
0-120	Sample Level	0 - 127 *
0-120	LFO Speed	0 - 127 *
0-120	LFO Delay	0 - 127 *
0-120	AEG Attack	0 - 127 *
0-120	AEG Decay	0 - 127 *
0-120	AEG Sustain Level	0 - 127 *
0-120	AEG Release	0 - 127 *
0-120	PEG Attack	0 - 127 *
0-120	PEG Decay	0 - 127 *
0-120	PEG Release	0 - 127 *
0-120	PEG Init Level	0 - 127 *
0-120	PEG Sustain Level	0 - 127 *
0-120	FEG Attack	0 - 127 *
0-120	FEG Decay	0 - 127 *
0-120	FEG Release	0 - 127 *
0-120	FEG Init Level	0 - 127 *
0-120	FEG Sustain Level	0 - 127 *
0-120	FEG Level	0 - 127 *
0-120	Pitch Bend	0 - 127 *
0-120	Wave Start Address	0 - 127 *
0-120	Cutoff Distance	0 - 127 *
0-120	Filter Gain	0 - 127 *
0-120	Sample Portamento Rate/Time	0 - 127 *
0-120	Sample Control 1 Range	0 - 127 *
0-120	Sample Control 2 Range	0 - 127 *
0-120	Sample Control 3 Range	0 - 127 *
0-120	Sample Control 4 Range	0 - 127 *
0-120	Sample Control 5 Range	0 - 127 *
0-120	Sample Control 6 Range	0 - 127 *

Parameters marked by "*" depend on the Sample Control settings

2.1.5. Mode messages

Messages which function always

cntrl#	parameter	data range
120	All sound off	0 - 127
121	Reset all controllers	0 - 127
123	All notes off	0 - 127

Messages which function for samples or sample banks

cntrl#	parameter	data range
126	mono mode	0 - 127
127	poly mode	0 - 127

2.1.6. Program changes

When a program change message is received, the corresponding program is selected for playback and editing. Nothing occurs if the Program Change SW is disabled (even when internal sequencer recording is off). If Program Mode = Single, program change is received via the Basic Receive Channel (any receive channel when Omni is on). When Program Mode = Multi the Part 1 receive channel is used.

2.1.7. Pitch bend

The 7 bits of the MSB are used.

For functions marked "*" indicates Program (or Sample) control" in "Control Change" of 3.1.4, pitch bend can be used for ctrl#.

2.1.8. Channel aftertouch

Received.

For functions marked "*" indicates Program (or Sample) control" in "Control Change" of 2.1.4, channel aftertouch can be used for ctrl#

3. Realtime messages

3.1. Reception

3.1.1. Active sensing

Once active sensing is received, monitoring will begin, and if no MIDI input appears for an interval longer than approximately 400 msec, the MIDI receive buffer will be cleared, and the tone generator will be damped.

3.1.2 Timing Clock, Start, Continue, Stop

When Program LFO Sync is set to MIDI, the LFO frequency and phase, the frequency of tempo-synchronized effects, and other time settings can be controlled via reception of Timing Clock (\$F8), Start (\$FA), CONTINUE (\$FB) and STOP (\$FC) messages.

4. UNIVERSAL SYSTEM EXCLUSIVE

4.1. SAMPLE DUMP STANDARD

Transmission occurs when sample bulk dump is carried out using Format=SDS#nnnn or a Sample Dump Request is received.

The A5000/A4000 will automatically detect whether the MIDI connections are an open loop or a closed loop, and will automatically switch to use or not use hand shaking.

When the channel number and device number matches for each message that message is effective. The message is processed regardless of the device number when the received channel number is \$7F.

The sample number is in the range of 0-1024 (displayed as 1-1025), and samples will automatically be assigned to sample objects. For transmission, these numbers or the specified number will be used. For reception, sample numbers in the range of 0-16383 will be recognized, and the sample will be kept as "MIDI nnnnn" where sample number nnnnn is added to the name.

4.1.1. Dump Request

0	11110000	\$F0	
1	01111110	\$7E	
2	0nnnnnnn	nnnnnn = Channel Number	
3	00000011	\$03	
4	0sssssss	sssssss = Sample number (LSB first)	
5	0sssssss	sssssss =	
6	01110111	\$F7	

When this message is received, the A5000/A4000 will search for the correspondingly-numbered sample, and if that sample exists, a dump header will be transmitted. If the corresponding sample does not exist, processing will be terminated. This message is not transmitted.

4.1.2. ACK

0	01110000	\$F0	
1	01111110	\$7E	
2	0nnnnnnn	nnnnnn = Channel Number	
3	01111111	\$7F	
4	0pppppppp	ppppppp = Packet number	
5	01110111	\$F7	

This message indicates that the receiving device correctly received a packet. "Packet number" indicates the number of the packet which was received correctly. This message is transmitted and received.

4.1.3. NAK

0	01110000	\$F0	
1	01111110	\$7E	
2	0nnnnnnn	nnnnnn = Channel Number	
3	01111110	\$7E	
4	0pppppppp	ppppppp = Packet number	
5	01110111	\$F7	

This message indicates that the receiving device received a packet incorrectly. "Packet number" indicates the number of the packet which was received incorrectly. This message is transmitted and received.

4.1.4. Cancel

0	01110000	\$F0	
1	01111110	\$7E	
2	0nnnnnnn	nnnnnn = Channel Number	
3	01111101	\$7D	
4	0pppppppp	ppppppp = Packet number	
5	01110111	\$F7	

This message indicates that a dump is to be terminated. "Packet number" indicates the packet which was terminated. This message is transmitted and received.

4.1.5. Wait

0	01110000	\$F0	
1	01111110	\$7E	
2	0nnnnnnn	nnnnnn = Channel Number	
3	01111100	\$7C	
4	0pppppppp	ppppppp = Packet number	
5	01110111	\$F7	

This message indicates a pause during a dump. This message is transmitted and received.

4.1.6. Dump Header

0	11110000	\$F0	
1	01111110	\$7E	
2	0nnnnnnn	nnnnnn = Channel Number	
3	00000001	\$01	
4	0sssssss	sssssss = Sample number (LSB first)	
5	0sssssss	sssssss =	
6	0eeeeeee	eeeeeee = Sample format	
7	0ffffff	ffffff = Sample period (LSB first)	
8	0ffffff	ffffff =	
9	0ffffff	ffffff =	
10	0ggggggg	ggggggg = Sample length (LSB first)	
11	0ggggggg	ggggggg =	
12	0ggggggg	ggggggg =	
13	0hhhhhhh	hhhhhhh = Sustain loop start point (LSB first)	
14	0hhhhhhh	hhhhhhh =	
15	0hhhhhhh	hhhhhhh =	
16	0iiiiiii	iiiiiii = Sustain loop end point (LSB first)	
17	0iiiiiii	iiiiiii =	
18	0iiiiiii	iiiiiii =	
19	0pppppppp	ppppppp = Loop type	
20	11110111	\$F7	

This is the header portion of a dump.

Name	Range	Contents
Sample format	8 - 28	Number of bits in one sample word
Sample period	0 - 2097151	Sample rate (nSec units)
Sample length	0 - 2097151	Amount of data (word units)
Sustain Loop start point	0 - 2097151	Loop start address (word units)
Sustain Loop end point	0 - 2097151	Loop end address (word units)
Loop type	\$00/\$01/\$7F	Loop type
	\$00=forward only, \$01=backward/forward, \$7F=Loop off	

This message is transmitted and received.

4.1.7. Data Packet

0	11110000	\$F0	
1	01111110	\$7E	
2	0nnnnnnn	nnnnnn = Channel Number	
3	00000010	\$02	
4	0pppppppp	ppppppp = Packet number	
5	0ddddddd	ddddddd = Sample data (120byte)	
		↓	
124	0ddddddd	ddddddd	
125	01111111	1111111 = Checksum	
126	11110111	\$F7	

This is the data portion of a dump. This message is transmitted and received.

4.2. MULTIPLE LOOP POINT MESSAGES

4.2.1. Loop Point Transmission

0	01110000	\$F0	
1	01111110	\$7E	
2	0nnnnnnn	nnnnnn = Channel Number	
3	00000101	\$05	
4	00000001	\$01	
5	0sssssss	sssssss = Sample number (LSB first)	
6	0sssssss	sssssss =	
7	0bbbbbbb	bbbbbbb = Loop number (LSB first)	
8	0bbbbbbb	bbbbbbb =	
9	0ccccccc	ccccccc = Loop type	
10	0ttttttt	ttttttt = Loop start address (LSB first)	
11	0ttttttt	ttttttt =	
12	0ttttttt	ttttttt =	
13	0eeeeeee	eeeeeee = Loop end address (LSB first)	
14	0eeeeeee	eeeeeee =	
15	0eeeeeee	eeeeeee =	
16	11110111	\$F7	

This is loop point data.

Name	Range	Contents
Loop number	0 - 16383	Loop number 16383 (\$7F, \$7F) means to delete all loops
Loop type		\$00/\$01/\$7F Loop type \$00=forward only, \$01=backward/forward, \$7F=Loop off
Loop start address	0 - 2097151	Loop start address (word units)
Loop end address	0 - 2097151	Loop end address (word units)

If the sample contains a release loop, this message is transmitted after the sample dump. Alternatively, this message is transmitted in reply to a Loop Point Request message.

4.2.2. Loop Point Request

0	01110000	\$F0
1	01111110	\$7E
2	0nnnnnnn	nnnnnn = Channel Number
3	0000101	\$05
4	00000010	\$02
5	0sssssss	sssssss = Sample number (LSB first)
6	0sssssss	sssssss =
7	0bbbbbbb	bbbbbbb = Loop number (LSB first)
8	0bbbbbbb	bbbbbbb =
9	01110111	\$F7

This message requests loop points.

Name	Range	Contents
Loop number	0 — 16383	Loop number 16383 (\$7F,\$7F) Loop number 16383 (\$7F, \$7F) requests all loops

This message is only received.

4.3. INQUIRY MESSAGE

4.3.1. Identity Request

0	01110000	\$F0
1	01111110	\$7E
2	0nnnnnnn	nnnnnn = Channel Number
3	0000110	\$06
4	00000001	\$01
5	01110111	\$F7

This message requests device-specific information. This message is only received.

4.3.2. Identity Reply

0	11110000	\$F0
1	01111110	\$7E
2	0nnnnnnn	nnnnnn = Channel Number
3	0000110	\$06
4	00000010	\$02
5	01000011	\$43 = Manufacturers System Exclusive ID code
6	0ffffff	ffffff = Device family code (LSB first)
7	0ffffff	ffffff =
8	0ddddddd	ddddddd = Device family number code (LSB first)
9	0ddddddd	ddddddd =
10	0vvvvvvv	vvvvvvv = Software revision level. Format device specific
11	0vvvvvvv	vvvvvvv = (LSB first)
12	0vvvvvvv	vvvvvvv =
13	0vvvvvvv	vvvvvvv =
14	11110111	\$F7

This message is returned in response to an Identity Request message asking for device-specific information.

Name	Range	Contents
Device family code	\$0041	LM
Device family number code	\$01DA	#0474 (*1)
Software revision level	\$nnnn	A5000/A4000 software version

(*1) For the A5000 the range is \$01DB, and the content is #0475.

This message is only transmitted in response to an Identity Request message.

5. YAMAHA SYSTEM EXCLUSIVE

5.1. Bulk dump

Transmission occurs when a bulk dump transmit command is executed or a dump request is received.

This message can be received if bulk protect is off.

Data format

0	01110000	\$F0
1	01000011	\$43
2	0000nnnn	nnnn = Device Number
3	01111010	\$7A
4	0bbbbbbb	byte count
5	0bbbbbbb	byte count
6	01001100	\$4C(ASCII"L")
7	01001101	\$4D(ASCII"M")
8	00100000	\$20(ASCII" ")
9	00100000	\$20(ASCII" ")
10	00110000	\$30(ASCII"0")
11	00110100	\$34(ASCII"4")
12	00110111	\$37(ASCII"7")
13	00110100	\$34(ASCII"4") (*1)
14	0mmmmmmm	mmmmmmm = data format name ending
15	0mmmmmmm	mmmmmmm = data format name ending

16	0ccccccc	object name (ASCII 16byte)
↓	↓	↓
31	0ccccccc	
32	0ddddddd	ddddddd = data
↓	↓	↓
	0sssssss	sssssss = check_sum
	11110111	\$F7

(*1) 00110101 \$35(ASCII"5") for the A5000.

The data format name ending in bytes 14 and 15 specifies the type of bulk data, as follows.

mm	Data type
"SY"	System parameter bulk dump
"PG"	Program bulk dump
"SB"	Sample bank bulk dump
"SP"	Sample bulk dump
"WD"	Wave data bulk dump
"SQ"	Sequence bulk dump
"OL"	Object list bulk dump

Note) mm is ASCII code

object name is a 16-character name for each object. Program object names are the program number of each program (example: "001 "). System parameters and object lists are always "SystemParameters" and "Object List ", respectively. The data section is divided into byte 1, which is the upper nibble, and byte 2, which is the lower nibble. See chart 1 for details.

The byte is all data between the byte count and checksum.

The checksum is the exclusive-or value of all bytes between the byte count and checksum. For each bulk dump, the number of transmitted bytes between the byte count and checksum is less than 4096. When the amount of data to be transmitted is greater than this, it is divided into 4096 byte blocks transmitted between byte count and checksum data. F7 is transmitted when all data has been transmitted. From the second block onward the header from byte 6 to byte 31 is not included.

5.2. Dump request

Bulk dump transmission is performed when a dump request is received.

0	01110000	\$F0
1	01000011	\$43
2	0010nnnn	nnnn = Device Number
3	01111010	\$7A
4	01001100	\$4C(ASCII"L")
5	01001101	\$4D(ASCII"M")
6	00100000	\$20(ASCII" ")
7	00100000	\$20(ASCII" ")
8	00110000	\$30(ASCII"0")
9	00110100	\$34(ASCII"4")
10	00110111	\$37(ASCII"7")
11	00110100	\$34(ASCII"4") (*1)
12	0mmmmmmm	mmmmmmm = data format name ending
13	0mmmmmmm	mmmmmmm = data format name ending
14	0ccccccc	
↓	↓	↓
29	0ccccccc	object name (ASCII 16byte)
30	11110111	\$F7

(*1) 00110101 \$35(ASCII"5") for the A5000.

The data format name ending in bytes 12 and 13 specifies the type of transmitted data, as follows.

mm	Data type
"SY"	System parameter bulk dump
"PG"	Program bulk dump
"SB"	Sample bank bulk dump
"SP"	Sample bulk dump
"WD"	Wave data bulk dump
"SQ"	Sequence bulk dump
"OL"	Object list bulk dump

Note) mm is ASCII code

object name is a 16-character name for each object. Program object names are the program number of each program (example: "001 "). System parameters and object lists do not have an object name, and are recognized by their data format name.

5.3. Parameter change

For changes to the value of an object parameter, first the object is selected via parameter change (object select) reception, then the value is changed via parameter change (object edit) reception. The object selection remains effective until the next object select is received, thus a number of changes to the value of the same object can be carried through successive object edit reception.

Transmitted when a parameter value request is received.

5.3.1. Parameter change (object select)

0	01110000	\$F0	
1	01000011	\$43	
2	0001nnnn	nnnn = Device Number	
3	01011000	\$58 g=22,h=0	
4	00000000	\$00	
5	0ccccccc		
↓	↓		object name (ASCII 16byte)
20	0ccccccc		
22	0ttttttt	object type	
21	11110111	\$F7	

Functions as an object select message.
 This message specifies the object.
 object name is a 16-character name for each object. Program object names are the program number of each program (example: "001").

The object type is shown in the following table.

t	Data type
20(\$14)	Program
17(\$11)	Sample Bank
16(\$10)	Sample
2(\$02)	Wave data
19(\$13)	Sequence

5.3.2. Parameter change (object edit)

0	11110000	\$F0	
1	01000011	\$43	
2	0001nnnn	nnnn = Device Number	
3	01011000	\$58 g=22,h=0	
4	00000001	\$01	
5	0ppppppp		
↓	↓		parameter number P1-P6 (6byte)
10	0ppppppp		
11	0ddddd		data
↓	↓		
	0ddddd		
	11110111	\$F7	

Changes the value of the object parameter specified by object select.
 The parameters comply with P1, P2 — P6 in chart 2.
 The number of data bytes depends on the parameter. The data section is divided into byte 1, which is the upper nibble, and byte 2, which is the lower nibble. See chart 2 for details.

5.3.3. Parameter change (system parameter)

0	11110000	\$F0	
1	01000011	\$43	
2	0001nnnn	nnnn = Device Number	
3	01011000	\$58 g=22,h=0	
4	00000010	\$02	
5	0ppppppp		
↓	↓		parameter number P1-P6 (6byte)
10	0ppppppp		
11	0ddddd		data
↓	↓		
	0ddddd		
	01110111	\$F7	

This message is a parameter change for system parameters.
 The parameters comply with P1, P2 — P6 in chart 2.
 The number of data bytes depends on the parameter. The data section is divided into byte 1, which is the upper nibble, and byte 2, which is the lower nibble. See chart 2 for details.

5.3.4. Parameter change (switch remote)

0	11110000	\$F0	
1	01000011	\$43	
2	0001nnnn	nnnn = Device Number	
3	01011000	\$58 g=22,h=0	
4	00000011	\$03	
5	0ppppppp	switch number	
6	00000000	\$00	
↓	↓		
10	00000000	\$00	
11	0ddddd	data	
27	11110111	\$F7	

This message performs remote control of switches.
 For the switch numbers, refer to table 2.
 With the exception of switch numbers 123-127, data of \$00-\$3F turns the switch off, and data of \$40-\$7F turns the switch on.
 For switch numbers 123-127 (knob encoders), a value of 64 less than the data specifies the number of pulses which correspond to rotation (30 pulses per rotation). Positive numbers are rotation toward the right, and negative numbers are rotation toward the left.
 This message is received only.

5.3.5. Parameter request (object)

0	11110000	\$F0	
1	01000011	\$43	
2	0011nnnn	nnnn = Device Number	
3	01011000	\$58 g=22,h=0	
4	00000001	\$01	
5	0ppppppp		
↓	↓		parameter number P1-P6 (6byte)
10	0ppppppp		
11	11110111	\$F7	

This message requests transmission of the parameter of the specified object as a parameter change.
 The parameters comply with P1, P2 — P6 in chart 2.
 This message is received only.

5.3.6. Parameter request (system parameter)

0	11110000	\$F0	
1	01000011	\$43	
2	0011nnnn	nnnn = Device Number	
3	01011000	\$58 g=22,h=0	
4	00000010	\$02	
5	0ppppppp		
↓	↓		parameter number P1-P6 (6byte)
10	0ppppppp		
11	11110111	\$F7	

This message requests transmission of a system parameter as a parameter change.
 The parameters comply with P1, P2 — P6 in chart 2.
 This message is received only.

5.3.7. Object Link Change

0	11110000	\$F0	
1	01000011	\$43	
2	0001nnnn	nnnn = Device Number	
3	01011000	\$58 g=22,h=0	
4	00000100	\$04	
5	0ccccccc		
↓	↓		upper object name (ASCII 16byte)
20	0ccccccc		
21	0ttttttt	upper object type	
22	0ccccccc		
↓	↓		lower object name (ASCII 16byte)
37	0ccccccc		
38	0ttttttt	lower object type	
39	0ddddd	data (0:link off, 1:link on)	
40	11110111	\$F7	

Changes the link condition between specified objects (between Program and Sample/ Sample Bank Program is upper, and between Sample Bank and Sample is upper). Nothing occurs when an object is selected which is not changeable, or which requires samples to be copied.
 object name is a 16-character name for each object. Program object names are the program number of each program (example: "001").

The object type is shown in the following table.

t	Data type
20(\$14)	Program
17(\$11)	Sample Bank
16(\$10)	Sample

5.3.8. Object Link Request

0	11110000	\$F0	
1	01000011	\$43	
2	0011nnnn	nnnn = Device Number	
3	01011000	\$58 g=22,h=0	
4	00000100	\$04	
5	0ccccccc		
↓	↓		upper object name (ASCII 16byte)
20	0ccccccc		
21	0ttttttt	upper object type	
22	0ccccccc		
↓	↓		lower object name (ASCII 16byte)
37	0ccccccc		
38	0ttttttt	lower object type	
39	0ddddd	data (0:link off, 1:link on)	
40	11110111	\$F7	

When received the link condition between specified objects (between Program and Sample/ Sample Bank Program is upper, and between Sample Bank and Sample is upper) is transmitted in object link change format. This message is received only.

The object type is shown in the following table.

t	Data type
20(\$14)	Program
17(\$11)	Sample Bank
16(\$10)	Sample

Table1 Bulk Dump

Item	Type	Description	data byte			
			1st	2nd	3rd	4th
offset	decimal	Address offset	—			
data size	UC	1 byte (unsigned 8 bit)	b7-b0	—	—	—
	SC	1 byte (signed 8 bit, 2's complement)	sign,b6-b0	—	—	—
	US	2 byte (unsigned 16 bit)	b15-b8	b7-b0	—	—
	SS	2 byte (signed 16 bit, 2's complement)	sign,b14-b8	b7-b0	—	—
	UL	4 byte (unsigned 32 bit)	b31-b24	b23-16	b15-b8	b7-b0
	SL	4 byte (signed 32 bit, 2's complement)	sign,b30-b24	b23-16	b15-b8	b7-b0
	*n	wn bytes of each data type		—		
value	c	All displayable ASCII codes except ¥	—			
	b	Bitmap type Refer to the name column for bit position	—			
	—	Unused or internal use only (0 not appropriate)	—			
name	[]	Parameter block Refer to each parameter block for details	—			

Each data byte is divided into the upper and lower 4 bits and received/transmitted as 2 bytes of MIDI data.

original data byte	b7,b6,b5,b4,b3,b2,b1,b0	
MIDI 1st byte	0,0,0,0	b7,b6,b5,b4
data 2nd byte	0,0,0,0	b3,b2,b1,b0

1.1 Voice Parameter Bulk Dump

1.1.1 Program Bulk Dump 408+56*(number of samples)byte

offset	data size	value	name
0000	64byte		[Common]
0064	UC*8	c	program name
0072	UC	b	b0:AD in on, b2-1:AD in source, b5-3:effect1-3 connection, b7-6:program LFO sync
0073	UC	b	b2-0:program LFO cycle, b5-3:program LFO wave, b7-6:program LFO initial phase
0074	US	b	b0:MIDI channelA01 controller reset... b15:MIDI channelA16 controller reset
0076	US	b	b0:MIDI channelA01 note on normal/toggle... b15:MIDI channelA16 note on normal/toggle
0078	SC	+/-63	AD in (L) pan
0079	UC	—	reserved
0080	UC	—	reserved
0081	UC	—	reserved
0082	UC	—	reserved
0083	UC	0-127	program level
0084	SC	—	reserved
0085	SC	—	reserved
0086	SC	+/-127	program transpose
0087	SC	-2,-1,0-32	program LFO reset MIDI channel (*2)
0088	UC	0-3	program portamento type
0089	UC	0-127	program portamento rate
0090	UC	0-127	program portamento time
0091	UC	0-127	S/H speed
0092	UC	25-250	program LFO tempo
0093	SC	-1,0-127	program LFO reset note (*2)
0094	US	0-999	number of assigned samples (*1)
0096	120byte		[Effect Parameter]*3 (effect1-3)
0216	16byte	—	reserved
0232	120byte		[Effect Parameter]*3 (effect4-6) (A5000 only)
0352	16byte		[Control]*4 (program control1-4)
0368	US	b	b0:MIDI channel B01 controller reset... b15:MIDI channel B16 controller reset (A5000 only)
0370	US	b	b0:MIDI channel B01 note on normal/toggle... b15:MIDI channel B16 note on normal/toggle (A5000 only)
0372	UC	b	b2-0:effect4-6 connection (A5000 only)
0373	UC	0-12	AD in (L) output1 (*4)
0374	UC	0-127	AD in (L) level1
0375	UC	0-12	AD in (L) output2 (*4)
0376	UC	0-127	AD in (L) level2
0377	SC	+/-63	AD in R pan
0378	UC	0-12	AD in R output1 (*4)
0379	UC	0-127	AD in R level1
0380	UC	0-12	AD in R output2 (*4)
0381	UC	0-127	AD in R level2
0382	UC*16	0-127	program LFO step wave value1-16
0398	UC	b	b2-0:total steps of step wave, b4-3:step wave slope
0399	9byte	—	reserved
0408	56*n byte		[Easy Edit Parameter]*(number of samples)

(*1) Number of samples/sample banks for which ToPgm is on.
 (*2) -2:off, -1:AUDITION, 0-15:A01-16, 16:basic receive channel, 17-32:B01-16(A5000 only)
 (*3) -1:all
 (*4) Refer to *8 of *2.1.1 Program Parameters*.

1.1.2 Sample Bank Bulk Dump 312+20*(number of samples)byte

offset	data size	value	name
0000	64byte		[Common]
0064	224byte		[Sample Parameter]
0288	UL	b	sample bank value enable (*1)
0292	UL	b	sample bank value enable (*2)
0296	UL	b	sample bank value enable (*3)
0300	UL	—	reserved
0304	UC	0-127	number of assigned samples
0305	UC*7	—	reserved
0312	20*n byte		[Sample Bank Member]*(number of samples)

(*1) b31(MSB) — b0(LSB):P2=31 — 0
 (*2) b31(MSB) — b0(LSB):P2=63 — 32
 (*3) b31(MSB) — b0(LSB):P2=95 — 64
 P2, above, applies to P2 = 0-88 of the "Sample Parameter" block of *2.1.4 Parameter Block."

1.1.3 Sample Bulk Dump 336byte

offset	data size	value	name
0000	64byte		[Common]
0064	UC*16	c	linked wave object name L (*1)
0080	UC*16	c	linked wave object name R (*1)
0096	UL*2	—	reserved
0104	UL*2	—	reserved
0112	224byte		[Sample Parameter]

(*1) No assignment when the first byte is \$00

1.1.4 Wave Data Bulk Dump 72+2*(wave data word size)byte

offset	data size	value	name
0000	64byte		[Common]
0064	SS	—	reserved
0066	US	—	reserved
0068	US	—	reserved
0070	US	—	reserved
0072	US*n		wave data (n='size' in [Common])

1.1.5 Sequence Bulk Dump 72+(sequence data byte size)byte

offset	data size	value	name
0000	64byte		[Common]
0064	US	50-250	original tempo
0066	US	—	reserved
0068	US	—	reserved
0070	US	—	reserved
0072	UC*n		sequence data (n='size' in [Common])

1.1.6 Object List Bulk Dump 17*(number of all objects)byte

offset	data size	value	name
0000	UC		object type (*1)
0001	UC*16	c	name
:			
:			Repeat for all objects saved in memory, from obj type to name.
:			

(*1) sample:16, sample bank:17, sequence:19, program:20"

1.1.7 Parameter Block

[Common] 64byte

offset	data size	value	name
0000	UC		object type (*1)
0001	UC	—	reserved
0002	UC*16	c	name
0018	UC*2	—	reserved
0020	UL		size (*2)
0024	UC*16	—	reserved
0040	UC*16	—	reserved
0056	UC	—	reserved
0057	UC*3	—	reserved
0060	UL	—	reserved

(*1) sample:16, sample bank:17, sequence:19, program:20
 (*2) wave data word size for wave data bulk dump, sequence data word size for sequence bulk dump, 0 in all other cases.

[Control] 4byte

offset	data size	value	name
0000	UC	0-126	control device
0001	UC	0-m	control function (*1)
0002	UC	0-3	control type
0003	SC	+/-63	control range

(*1) program:m=71(A4000),128(A5000), sample:m=36
Refer to *9 or *2.1.1. Program Parameters,* *11 of *2.1.4 Parametere Block.*

[Sample Parameter] 224byte

offset	data size	value	name
0000	24byte	---	reserved
0024	UL	b	b0:linked to program001 --- b31:program032
0028	UL	b	b0:linked to program033 --- b31:program064
0032	UL	b	b0:linked to program065 --- b31:program096
0036	UL	b	b0:linked to program097 --- b31:program128
0040	UC	b	b0:sample bank member (*8), b1:mono sample, b2:expanded (*1)
0041	UC	b	b0:reserved, b1:mono mode, b2:key x-fade on, b3:reserved, b4:fixed pitch on, b7-6:EQ type
0042	UC	0-32	MIDI receive channel (*5)
0043	UC	0-13	pitch bend type
0044	UC	0-24	pitch bend range
0045	SC	+/-127	coarse tune
0046	UC	0-127	original key L
0047	UC	0-127	original key R (*7)
0048	US	1-65535	sampling frequency L
0050	US	1-65535	sampling frequency R (*7)
0052	SC	+/-63	fine tune L
0053	SC	+/-63	fine tune R (*7)
0054	SS*2	---	reserved
0058	UC	0-127,128	key range high (>=low) (*2)
0059	SC	-1,0-127	key range low (<=high) (*3)
0060	UC	---	reserved
0061	UC	0-5	loop mode
0062	US	8000-15999	loop tempo 80.00-159.99
0064	UL	0-16777215	wave start address L
0068	UL	0-16777215	wave start address R (*7)
0072	UL	0-16777215	wave length L
0076	UL	0-16777215	wave length R (*7)
0080	UL	0-16777215	loop start address L
0084	UL	0-16777215	loop start address R (*7)
0088	UL	0-16777215	loop length L (end - start +1)
0092	UL	0-16777215	loop length R (end - start +1) (*7)
0096	SC	+/-63	start address velocity sensitivity
0097	UC	0-16	filter type (*9)
0098	UC	0-127	filter cutoff frequency
0099	UC	0-127	filter Q/width
0100	UC	0-127	cutoff key scaling break point 1 (<=2)
0101	UC	0-127	cutoff key scaling break point 2 (>=1)
0102	SC	+/-127	cutoff key scaling level 1
0103	SC	+/-127	cutoff key scaling level 2
0104	SC	+/-63,64-68	cutoff velocity sensitivity (*4)
0105	SC	+/-63,64-68	Q/width velocity sensitivity (*4)
0106	SC	+/-7	detune
0107	SC	+/-63	dephase
0108	SC	+/-63	expand width
0109	UC	0-63	random pitch
0110	UC	0-127	sample level
0111	SC	-64, +/-63	pan (*10)
0112	UC	0-127	velocity low limit
0113	UC	+/-127	velocity offset
0114	UC	0-127	velocity range high (>=low)
0115	UC	0-127	velocity range low (<=high)
0116	UC	0-127	level key scaling break point 1 (<=2)
0117	UC	0-127	level key scaling break point 2 (>=1)
0118	UC	0-127	level key scaling level 1
0119	UC	0-127	level key scaling level 2
0120	SC	+/-127	velocity sensitivity
0121	UC	0-16	alternate group number
0122	UC	4-58	EQ frequency
0123	SC	52-76	EQ gain
0124	UC	10-120	EQ width
0125	SC	+/-63	cutoff distance
0126	UC	0-127	FEG attack rate
0127	UC	0-127	FEG decay rate
0128	UC	0-127	FEG release rate
0129	SC	+/-127	FEG init level
0130	SC	+/-127	FEG attack level
0131	SC	+/-127	FEG sustain level
0132	SC	+/-127	FEG release level
0133	SC	+/-7	FEG rate key scaling
0134	SC	+/-63	FEG rate velocity sensitivity
0135	SC	+/-63	FEG attack level velocity sensitivity
0136	SC	+/-63	FEG level velocity sensitivity
0137	UC	0-127	PEG attack rate
0138	UC	0-127	PEG decay rate
0139	UC	0-127	PEG release rate
0140	SC	+/-127	PEG init level
0141	SC	+/-127	PEG attack level
0142	SC	+/-127	PEG sustain level
0143	SC	+/-127	PEG release level
0144	SC	+/-7	PEG rate key scaling
0145	SC	+/-63	PEG rate velocity sensitivity

0146	SC	+/-63	PEG level velocity sensitivity
0147	UC	+/-63	PEG range
0148	UC	0-127	AEG attack rate
0149	UC	0-127	AEG decay rate
0150	UC	0-127	AEG release rate
0151	UC*2	---	reserved
0153	UC	0-127	AEG sustain level
0154	UC	---	reserved
0155	UC	0-2	AEG attack mode
0156	SC	+/-7	AEG rate key scaling
0157	SC	+/-63	AEG rate velocity sensitivity
0158	UC	0-3	LFO wave
0159	UC	0-127	LFO speed
0160	UC	0-127	LFO delay time
0161	UC	b	b0:LFO sync on, b1:cutoff mod phase invert on, b2:pitch mod phase invert on
0162	UC	0-127	cutoff mod depth
0163	UC	0-127	pitch mod depth
0164	UC	0-127	amplitude mod depth
0165	UC*4	---	reserved
0169	SC	+/-31	filter gain
0170	US*5	---	reserved
0180	UL	0-16777215	wave end address
0184	UL	0-16777215	loop end address
0188	24byte	---	[Control] *6 (sample control1-6)
0212	UC	0-127	velocity x-fade high
0213	UC	0-127	velocity x-fade low
0214	UC	0-12	output1
0215	UC	0-127	output1 level
0216	UC	0-12	output2
0217	UC	0-127	output2 level
0218	UC	0-5	sample portamento type
0219	UC	0-127	sample portamento rate
0220	UC	0-127	sample portamento time
0221	UC*3	---	reserved

(*1) 1 for mono samples when detune or dephase is not +/-0
 (*2) 128:"=Orig"
 (*3) -1:"=Orig"
 (*4) 64-68:"Rnd1"-."Rnd5"
 (*5) 0-15:A01-16, 16:basic receive channel, 17-32:B01-16(A5000 only)
 (*6) -64:"Rnd"
 (*7) R=L
 (*8) 1: depends on any sample bank.
 (*9) Refer to *7 or *2.1.4 Parameter Block.*

[Sample Bank Member] 20byte

offset	data size	value	name
0000	UC*16	c	assigned sample name
0016	UL	---	reserved

[Easy Edit Parameter] 56byte

offset	data size	value	name
0000	UC*16	c	assigned sample(bank) name
0016	UL	---	reserved
0020	UC	---	assigned object type (*1)
0021	SC	-1,0-32	MIDI receive channel assign (*4)
0022	SC	+/-127	level offset
0023	SC	+/-127	velocity sensitivity
0024	SC	+/-127	pan offset
0025	SC	+/-127	velocity x-fade high offset
0026	SC	+/-127	fine tune offset
0027	SC	+/-127	velocity x-fade low offset
0028	SC	+/-127	coarse tune offset
0029	SC	-1,0-12	output1 (*5)
0030	UC	0-127	key limit high (>=low)
0031	UC	0-127	key limit low (<=high)
0032	SC	+/-127	key range shift
0033	UC	0-127	velocity limit high (>=low)
0034	UC	0-127	velocity limit low (<=high)
0035	UC	b	b0:portamento, b2:mono mode, b4:key x-fade on, b6:reserved (*3)
0036	SC	-1,0-16	alternate group number (*2)
0037	SC	+/-127	AEG attack rate offset
0038	SC	+/-127	AEG decay rate offset
0039	SC	+/-127	AEG release rate offset
0040	SC	-1,0-12	output2 (*5)
0041	SC	+/-127	filter cutoff offset
0042	SC	+/-63	filter gain offset
0043	SC	+/-31	filter Q/width offset
0044	SC	+/-127	cutoff distance offset
0045	SC	---	reserved
0046	SC	---	reserved
0047	SC	+/-127	output1 level offset
0048	SC	---	reserved
0049	SC	---	reserved
0050	SC	+/-127	output2 level offset
0051	UC	0-1	MIDI control on
0052	UC	---	reserved
0053	UC*3	---	reserved

(*1) sample:16, sample bank:17
 (*2) -1:"=sample" (*3) Each bn and bn+1 is 1:"=sample".
 (*4) -1:"=sample", 0-15:A01-A16, 16:basic receive channel, 17-32:B01-16(A5000 only)
 (*5) -1:"=sample", Refer to *8 of *2.1.1 Program Parameters.*

[Effect Parameter] 40byte

offset	data size	value	name
0000	UC	0-1	bypass
0001	UC	0-127	input level
0002	UC	0-127	output level
0003	SC	+/-63	output pan
0004	UC	0-5	output width
0005	SC	-126-0	effect type
0006	UC	0-96	effect type
0007	UC	—	reserved
0008	US*16	—	effect parameter1-16

1.2. System Parameter Bulk Dump

■ 1.2.1 System Parameter Bulk Dump 4064byte

offset	data size	value	name
0000	UC*16	—	reserved
0016	SC	+/-63	master fine tune
0017	SC	+/-127	master coarse tune
0018	SC	+/-127	master transpose
0019	UC	0-17	velocity curve
0020	UC	0-31	MIDI basic receive channel
0021	UC	0-5	stereo to assignable out
0022	UC	b	b0:omni on, b1:program change enable, b2:wave address auto length lock, b3:auto zero, b4:auto snap, b5:audition with easy edit, b6:audition with effect, b7:play&load
0023	UC	-1,0-32	knob2 control MIDI transmit channel (*3)
0024	UC	-1,0-32	knob3 control MIDI transmit channel (*3)
0025	UC	-1,0-32	knob4 control MIDI transmit channel (*3)
0026	UC	-1,0-32	knob5 control MIDI transmit channel (*3)
0027	UC	0-120	knob2 control device
0028	UC	0-120	knob3 control device
0029	UC	0-120	knob4 control device
0030	UC	0-120	knob5 control device
0030	UC	0-32	fkey1 play MIDI transmit channel
0032	UC	0-32	fkey2 play MIDI transmit channel
0033	UC	0-32	fkey3 play MIDI transmit channel
0034	UC	0-32	fkey4 play MIDI transmit channel
0035	UC	0-32	fkey5 play MIDI transmit channel
0036	UC	0-32	fkey6 play MIDI transmit channel
0037	UC	0-127	fkey1 play note number
0038	UC	0-127	fkey2 play note number
0039	UC	0-127	fkey3 play note number
0040	UC	0-127	fkey4 play note number
0041	UC	0-127	fkey5 play note number
0042	UC	0-127	fkey6 play note number
0043	UC	1-127	fkey1 play velocity
0044	UC	1-127	fkey2 play velocity
0045	UC	1-127	fkey3 play velocity
0046	UC	1-127	fkey4 play velocity
0047	UC	1-127	fkey5 play velocity
0048	UC	1-127	fkey6 play velocity
0049	UC	0-4	stereo output level offset
0050	UC	4-40	total EQ low boost frequency
0051	UC	52-76	total EQ low boost gain
0052	UC	b	b3-0:loop remix variation, b7-4:loop remix type
0053	UC	4-40	total EQ low frequency
0054	UC	52-76	total EQ low gain
0055	UC	10-120	total EQ low width
0056	UC	4-58	total EQ mid frequency
0057	UC	52-76	total EQ mid gain
0058	UC	10-120	total EQ mid width
0059	UC	28-58	total EQ high frequency
0060	UC	52-76	total EQ high gain
0061	UC	10-120	total EQ high width
0062	UC	0-1	program mode
0063	UC	b	b0:loop remix auto audition, b1:knob control MIDI out, b2:fkey play MIDI out
0064	UC*32	0-127	multi part A01-B16 program number1-128
0096	360byte	—	loop remix registered data
0456	UC	0-7	loop remix zone start point
0457	UC	1-8	loop remix zone end point (>start)
0458	UC	0-4	assignable L&R output level offset
0459	UC	0-4	assignable 1&2 output level offset
0460	UC	0-4	assignable 3&4 output level offset
0461	UC	0-4	assignable 5&6 output level offset
0462	UC	0-4	DIG&OPT output level offset
0463	UC	—	reserved
0464	UC	0-7	self SCSI ID
0465	UC*3	—	reserved
0468	UL	b	b9:IDE save mount on b8:IDE master mount on b7-0:SCSI ID7-0 mount on
0472	UL	—	reserved
0473	UC	0-98	top partition 1-99
0474	UC*6	—	reserved
0480	US	—	reserved
0482	US	b	b15-12:effect type1 favorite parameter1 b11-8:effect type1 favorite parameter2 b7-4:effect type1 favorite parameter3 b3-0:effect type1 favorite parameter4
0484	US*95	b	effect type2-96 favorite parameters

0674	US*31	—	reserved
0736	UC	—	reserved
0737	UC	0-1	effect edit type
0738	UC	0-4	knob2 control type
0739	UC	0-4	knob3 control type
0740	UC	0-4	knob4 control type
0741	UC	0-4	knob5 control type
0742	UC	0-5	assignable key function
0743	UC	0-1	audition key function
0744	UC	0-1	page mode at mode change
0745	UC	0-1	page mode at function change
0746	UC	0-1	note display type
0747	UC*4	—	reserved
0751	UC	0-3	end address display type
0752	UC	0-3	import view
0753	UC	0-1	knob1 type
0754	UC*4	—	reserved
0758	UC	0-2	sort type at sample select page
0759	UC	0-2	sort type at tree view page
0760	UC	0-2	sort type at samplebank page
0761	UC	0-7	CD-R SCSI ID
0762	UC	0-4	CD-R write speed
0763	UC*37	—	reserved
0800	120byte	—	[Effect Parameter]*3 (rec effect1-3)
0920	UC	0-3	record type
0921	UC	0-1	record sample mono/stereo
0922	UC	0-4	record input
0923	UC	0-3	record frequency (*1)
0924	UC	0-5	pre trigger time
0925	UC	0-1	start trigger type
0926	UC	0-1	stop trigger type
0927	UC	0-63	start edge level
0928	UC	0-63	stop edge level
0929	SC	0-2	record map to
0930	UC	-1,0-127	record key range low (*4)
0931	UC	0-127,128	record key range high (*5)
0932	SC	0-127	record original key
0933	UC	0-1	auto normalize on
0934	SC	-1,0-7	external control SCSI ID (*2)
0935	UC	1-99	external control start track
0936	UC	1-99	external control start index
0937	UC	0-5	monitor output
0938	UC	0-127	monitor level
0939	UC	0-127	click level
0940	US	8000-15999	click tempo 80.00-159.99
0942	UC	1-15	click beat
0943	UC	0-1	monitor on
0944	UC	0-1	record map manual/auto
0945	UC	0-127	record map auto original key
0946	UC	0-1	record map key while/all
0947	UC*8	—	reserved
0955	UC*16	—	reserved
0971	UC	0-1	AD input gain line/mic
0972	UC*3	—	reserved
0975	UC*5	—	reserved
0980	UC*8	—	reserved
0988	UC*2	—	reserved
0990	UC	0-1	bulk protect
0991	UC	0-1	after touch disable
0992	UC	0-1	control change disable
0993	UC	0-1	pitch bend disable
0994	UC	—	reserved
0995	UC	0-17	MIDI device number
0996	UC	0-1	SysEx receive port (reserved in A4000)
0997	UC*7	—	reserved
-----Regist. Parameters-----			
1004	224byte	—	[Sample Parameter]
1228	120byte	—	[Effect Parameter]*3 (effect1-3)
1348	16byte	—	reserved
1364	120byte	—	[Effect Parameter]*3 (effect4-6) (A5000 only)
1484	16byte	—	[Control]*4 (program control1-4)
500	US	b	b0:MIDI channel B01 controller reset... b15:MIDI channel B16 controller reset (A5000 only)
1502	US	b	b0:MIDI channel B01 note on normal/toggle... b15:MIDI channel B16 note on normal/toggle... (A5000 only)
1504	UC	b	b2-0:effect connect (effect4-6)
1505	UC	0-12	AD in (L) output1
1506	UC	0-127	AD in (L) level1
1507	UC	0-12	AD in (L) output2
1508	UC	0-127	AD in (L) level2
1509	SC	+/- 63	AD in R pan
1510	UC	0-12	AD in R output1
1511	UC	0-127	AD in R level1
1512	UC	0-12	AD in R output2
1513	UC	0-127	AD in R level2
1514	UC*16	0-127	program LFO step wave value1-16
1530	UC	b	b2-0: step wave total steps, b4-3:step wave slope
1531	UC*9	—	reserved
1540	UC*8	—	reserved
1548	UC	b	b0:AD in on, b2-1:AD in source, b5-3:effect connection(effect1-3), b7-6:program LFO sync
1549	UC	b	b2-0:program LFO cycle, b5-3:program LFO wave, b7-6:program LFO initial phase

1550	US	b	b0:MIDI channel A01 controller reset...
1552	US	b	b15:MIDI channel A16 controller reset
1554	SC	+/-63	b0:MIDI channel A01 note on normal/toggle... b15:MIDI channel A16 note on normal/toggle
1555	UC	—	AD in (L) pan
1556	UC	—	reserved
1557	UC	—	reserved
1558	UC	—	reserved
1559	UC	0-127	program level
1560	SC	—	reserved
1561	SC	—	reserved
1562	SC	+/-127	program transpose
1563	SC	-2,-1,0-32	program LFO reset MIDI channel (*6)
1564	UC	0-3	program portamento type
1565	UC	0-127	program portamento rate
1566	UC	0-127	program portamento time
1567	UC	0-127	S/H speed
1568	UC	25-250	program LFO tempo
1569	SC	-1,0-127	program LFO reset note (*7)
1570	UC*10	—	reserved
1580	UC	0-1	sequence MIDI port B/A
1581	UC*15	—	reserved
1596	UC	0-1	DIG&OPT output 20bit/24bit
1597	UC*2467	—	reserved

(*1) In relation to 44.1 KHz for analog in, for digital in the rates are 0:x1, 1:x1/2, 2:x1/4, 3:x1/8.
 (*2) -1:off
 (*3) -1:AUDITION
 (*4) 128:"=Orig"
 (*5) -1:"=Orig"
 (*6) -2:off, -1:AUDITION, 0-15:A01-A16, 16:basic receive channel, 17-32:B01-16 (A5000 only)
 (*7) -1:all

Table 2 Parameter Change

Item	Type	Description	data byte			
			1st	2nd	3rd	4th
P1—P6	decimal	Parameter Number	—			
	—	don't care	—			
data size	UC	1 byte (unsigned 8 bit)	b7-b0	—	—	—
	SC	1 byte (signed 8 bit, 2's complement)	sign,b6-b0	—	—	—
	US	2 byte (unsigned 16 bit)	b15-b8	b7-b0	—	—
	SS	2 byte (signed 16 bit, 2's complement)	sign,b14-b8	b7-b0	—	—
	UL	4 byte (unsigned 32 bit)	b31-b24	b23-16	b15-b8	b7-b0
	SL	4 byte (signed 32 bit, 2's complement)	sign,b30-b24	b23-16	b15-b8	b7-b0
	*n	n bytes of each data type	—	—		
value	c	All displayable ASCII codes except ¼	—			
	b	Bitmap type Refer to the name column for bit position	—			
	—	Unused or internal use only (0 not appropriate)	—			
name	[]	Parameter block Refer to each parameter block for details	—			

2.1 Object Edit
 Each data byte is divided into the upper and lower 4 bits and received/transmitted as 2 bytes of MIDI data.

original data byte	b7,b6,b5,b4,b3,b2,b1,b0
MIDI 1st byte	0,0,0,0,b7,b6,b5,b4
data 2nd byte	0,0,0,0,b3,b2,b1,b0

2.1.1 Program Parameter

P1	P2	P3	P4	P5	P6	data size	data value	name
0								[Common]
1	0	—	—	—	—	UC*8	c	program name (read only)
1	1	0-31	—	—	—	UC	0,1	controller reset for MIDI ch A01-B16 (*5)
1	2	0-31	—	—	—	UC	0,1	note on normal/toggle for MIDI ch A01-B16 (*5)
1	3	—	—	—	—	UC	0,1	AD in on
1	4	—	—	—	—	UC	0-2	AD in source
1	5	—	—	—	—	SC	+/-63	AD in (L) pan
1	6	—	—	—	—	UC	0-12	AD in (L) output1 (*8)
1	7	—	—	—	—	UC	0-127	AD in (L) output1 level
1	8	—	—	—	—	UC	0-12	AD in (L) output2 (*8)
1	9	—	—	—	—	UC	0-127	AD in (L) output2 level
1	10	—	—	—	—	UC	0-127	program level
1	11	—	—	—	—	UC	0-6	program LFO cycle
1	12	—	—	—	—	UC	0,1	program LFO sync
1	13	—	—	—	—	SC	+/-127	program transpose
1	14	—	—	—	—	UC	25-250	program LFO tempo
1	15	—	—	—	—	UC	0-6	program LFO wave
1	16	—	—	—	—	UC	0-3	program portamento type
1	17	—	—	—	—	UC	1-127	program portamento rate
1	18	—	—	—	—	UC	1-127	program portamento time
1	19	—	—	—	—	UC	0-127	S/H speed
1	20	—	—	—	—	US	0-999	number of assigned samples

1	21	0-5	0	—	—	UC	0,1	effect1-6 bypass (*6)
1	21	0-5	1	—	—	UC	0-127	effect1-6 input level (*6)
1	21	0-5	2	—	—	UC	0-127	effect1-6 output level (*6)
1	21	0-5	3	—	—	SC	+/-63	effect1-6 output pan (*6)
1	21	0-5	4	—	—	UC	0-87	effect1-6 type (*6)
1	21	0-5	5	0-15	—	SS	—	effect1-6parameter1-16 (*6)
1	21	0-5	6	—	—	UC	0-5	effect1-6 output (*6)
1	21	0-5	7	—	—	SC	-126-0	effect1-6 width (*6)
1	22	0-3	0	—	—	UC	0-126	program control device 1-4
1	22	0-3	1	—	—	UC	0-128	program control function 1-4 (*9)
1	22	0-3	2	—	—	UC	0-3	program control type 1-4
1	22	0-3	3	—	—	SC	+/-63	program control range 1-4
1	23	—	—	—	—	UC	0-4	effect1-3 connection
1	24	—	—	—	—	UC	0-3	program LFO initial phase
1	25	—	—	—	—	UC	-2,-1,0-32	program LFO reset MIDI channel (*2)
1	26	—	—	—	—	UC	-1,0-127	program LFO reset note (*3)
1	27	—	—	—	—	SC	+/-63	AD in R pan
1	28	—	—	—	—	UC	0-12	AD in R output1 (*8)
1	29	—	—	—	—	UC	0-127	AD in R output1 level
1	30	—	—	—	—	UC	0-12	AD in R output2 (*8)
1	31	—	—	—	—	UC	0-127	AD in R output2 level
1	32	—	—	—	—	UC	0-4	effect4-6 connection (A5000 only)
1	33	—	—	—	—	UC	0-6	total steps of program LFO step wave
1	34	—	—	—	—	UC	0-3	program LFO step wave slope
1	35	0-15	—	—	—	UC	0-127	program LFO step wave value1-16

Easy Edit Parameters
 P2 x 100 + P3 is the number of the sample (bank) assigned to the program.
 P3 = 0-98 only when P2 = 9.

2	0-9	0-99	0	—	—	UC *16	c	assigned sample(bank) name (read only) (*10)
2	0-9	0-99	1	—	—	—	—	reserved
2	0-9	0-99	2	—	—	SC	-1,0-32	MIDI receive channel assign (*7)
2	0-9	0-99	3	0	—	SC	+/-127	level offset
2	0-9	0-99	4	0	—	SC	+/-127	pan offset
2	0-9	0-99	5	0	—	SC	+/-127	fine tune offset
2	0-9	0-99	6	0	—	SC	+/-127	coarse tune offset
2	0-9	0-99	7	—	—	UC	0-127	key limit high (>=low)
2	0-9	0-99	8	—	—	UC	0-127	key limit low (<=high)
2	0-9	0-99	9	—	—	UC	+/-127	key range shift
2	0-9	0-99	10	—	—	UC	0-127	velocity limit high (>=low)
2	0-9	0-99	11	—	—	UC	0-127	velocity limit low (<=high)
2	0-9	0-99	12	—	—	SC	-1,0,1	portamento (*4)
2	0-9	0-99	13	—	—	SC	-1,0,1	mono mode (*1)
2	0-9	0-99	14	—	—	SC	-1,0,1	key x-fade on (*1)
2	0-9	0-99	15	—	—	—	—	reserved
2	0-9	0-99	16	—	—	SC	-1,0-16	alternate group number (*1)
2	0-9	0-99	17	0	—	SC	+/-127	AEG attack rate offset
2	0-9	0-99	18	0	—	SC	+/-127	AEG release rate offset
2	0-9	0-99	19	0	—	SC	+/-127	filter cutoff offset
2	0-9	0-99	20	0	—	SC	+/-31	filter Q/width offset
2	0-9	0-99	21	—	—	SC	-1,0-12	output1 (*8)
2	0-9	0-99	22	0	—	SC	+/-127	output1 level offset
2	0-9	0-99	23	—	—	SC	-1,0-12	output2 (*8)
2	0-9	0-99	24	0	—	SC	+/-127	output2 level offset
2	0-9	0-99	25	—	—	UC	0,1	MIDI control on
2	0-9	0-99	26	—	—	—	—	reserved
2	0-9	0-99	27	0	—	SC	+/-127	AEG decay rate offset
2	0-9	0-99	28	0	—	SC	+/-63	filter gain offset
2	0-9	0-99	29	0	—	SC	+/-127	cutoff distance offset
2	0-9	0-99	30	0	—	SC	+/-127	velocity x-fade low offset
2	0-9	0-99	31	0	—	SC	+/-127	velocity x-fade high offset
2	0-9	0-99	32	0	—	SC	+/-127	velocity sensitivity
2	0-9	0-99	33	—	—	UC	—	reserved

(*1) -1:"=sample"
 (*2) -2:off, -1:AUDITION, 0-15:A01-16, 16:basic receive channel, 17-32:B01-16 (A5000 only)
 (*3) -1:all
 (*4) -1:"=sample", 0:off, 1:"=program"
 (*5) A4000, P3=0-15
 (*6) A4000, P3=0-2
 (*7) -1:"=sample", 0-15:A01-A16, 16:basic receive channel, 17-32:B01-16 (A5000 only)
 (*8)

value	output1	output2	
-1	=sample	=sample	(Easy Edit only)
0	off	off	
1	stereo out	assignL&R	
2	effect1	assign1&2	
3	effect2	assign3&4	
4	effect3	assign5&6	
5	assignL&R	DIG&OPT	
6	assign1&2	stereo out	
7	assign3&4	effect1	
8	assign5&6	effect2	
9	DIG&OPT	effect3	
10	effect4	effect4	(A5000 only)
11	effect5	effect5	(A5000 only)
12	effect6	effect6	(A5000 only)

(*9)

value	function
0	off
1	portamento rate/time
2	LFO S/H speed
3	AD in L&R pan
4	AD in L&R level
5	program level
6	effect1 output level
7	effect1 pan
8	effect1-parameter1
...	...
23	effect1-parameter16
24	effect2 output level
25	effect2 pan
26	effect2-parameter1
...	...
41	effect2-parameter16
42	effect3 output level
43	effect3 pan
44	effect3-parameter1
...	...
59	effect3-parameter16
60	effect1 width
61	effect2 width
62	effect3 width
63	program LFO depth
64	AD in L pan
65	AD in R pan
66	AD in L level
67	AD in R level
68	program control1 range
...	...
71	program control4 range
72	effect4-parameter1
...	...
87	effect4-parameter16
88	effect4 output level
89	effect4 pan
90	effect4 width
91	effect5-parameter1
...	...
106	effect5-parameter16
107	effect5 output level
108	effect5 pan
109	effect5 width
110	effect6-parameter1
...	...
125	effect6-parameter16
126	effect6 output level
127	effect6 pan

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(*10) No assignment when the first byte is \$00

2.1.2 Sample Bank Parameter

P1	P2	P3	P4	P5	P6	data size	data value	name
0								[Common]
1	0	—	—	—	—	UL*4	—	reserved
1	1	—	—	—	—	UC	0-127	number of assigned samples
1	2	0-126	—	—	—	UC*16	c	assigned sample name (read only)(*2)
1	3	0-126	—	—	—	UL	—	reserved
1	4	0-88	—	—	—	UC	0,1	sample bank value enable (*1)
2								[Sample Parameter]

(*1) 0-88 of P3 refers to P2 of the "Sample Parameter" block.
(*2) No assignment when the first byte is \$00.

2.1.3 Sample Parameter

P1	P2	P3	P4	P5	P6	data size	data value	name
0								[Common]
1	0	0-1	—	—	—	UC*16	c	linked wave object name L,R (read only) (*1)
1	1	0-1	—	—	—	UL	—	reserved
1	2	0-1	—	—	—	UL	—	reserved
2								[Sample Parameter]

(*1) No assignment when the first byte is \$00.

2.1.4 Parameter Block

P1	P2	P3	P4	P5	P6	data size	data value	name
0	0	—	—	—	—	UC	16,17,20	object type (*1) (read only)
0	1	—	—	—	—	UC	—	reserved
0	2	—	—	—	—	UC*16	c	name (read only)
0	3	—	—	—	—	UC	—	reserved
0	4	—	—	—	—	UL	—	reserved

(*1) sample:16, sample bank:17, program:20

[Sample Parameter]

P1	P2	P3	P4	P5	P6	data size	data value	name
2	0	0-127	—	—	—	UC	0,1	linked to program1-128 (read only)
2	1	—	—	—	—	UC	0,1	sample bank member (*5) (read only)
2	2	—	—	—	—	UC	0-2	0:stereo,1:mono,2:expanded (*1) (read only)
2	3	—	—	—	—	UC	0-32	MIDI receive channel (*6)
2	4	—	—	—	—	UC	0-13	pitch bend type
2	5	—	—	—	—	UC	0-24	pitch bend range
2	6	0-1	—	—	—	UC	0-127	original key L,R
2	7	0-1	—	—	—	US	1-65535	sampling frequency L,R (Hz)
2	8	0-1	—	—	—	SC	+/-63	fine tune L,R
2	9	—	—	—	—	SC	+/-127	coarse tune
2	10	—	—	—	—	UC	0-127,128	key range high (>=low)(*2)
2	11	—	—	—	—	SC	-1,0-127	key range low (<=high)(*3)
2	12	—	—	—	—	UC	0-5	loop mode
2	13	—	—	—	—	UL	0-16777215	wave start address
2	14	0	—	—	—	UL	0-16777215	wave length (end - start + 1)
2	15	—	—	—	—	UL	0-16777215	wave end address (> start)
2	16	—	—	—	—	UL	0-16777215	loop start address
2	17	0	—	—	—	UL	0-16777215	loop length (end - start + 1)
2	18	—	—	—	—	UL	0-16777215	loop end address (> start)
2	19	—	—	—	—	SC	+/-63	start address velocity sensitivity
2	20	—	—	—	—	US	8000-15999	loop tempo 80.00-159.99
2	21	—	—	—	—	UC	0-16	filter type (*7)
2	22	—	—	—	—	UC	0-127	filter cutoff frequency
2	23	—	—	—	—	UC	0-31	filter Q/width
2	24	0-1	—	—	—	SC	0-127	cutoff key scaling break point 1,2 (1<=2)
2	25	0-1	—	—	—	SC	0 +/-127	cutoff key scaling level 1,2
2	26	—	—	—	—	SC	+/-63,64-68	cutoff velocity sensitivity (*4)
2	27	—	—	—	—	SC	+/-63,64-68	Q/width velocity sensitivity (*4)
2	28	—	—	—	—	UC	0,1	fixed pitch on
2	29	—	—	—	—	SC	+/-7	detune
2	30	—	—	—	—	SC	+/-63	dephase
2	31	—	—	—	—	SC	+/-63	expand width
2	32	—	—	—	—	UC	0-63	random pitch
2	33	—	—	—	—	UC	0-127	sample level
2	34	—	—	—	—	SC	-64,+/-63	pan (*10)
2	35	—	—	—	—	UC	0-127	velocity low limit
2	36	—	—	—	—	SC	+/-127	velocity offset
2	37	—	—	—	—	UC	0-127	velocity range high (>=low)
2	38	—	—	—	—	UC	0-127	velocity range low (<=high)
2	39	0-1	—	—	—	UC	0-127	level key scaling break point 1,2 (1<=2)
2	40	0-1	—	—	—	UC	0-127	level key scaling level 1,2
2	41	—	—	—	—	SC	+/-127	velocity sensitivity
2	42	—	—	—	—	UC	0-5	sample portamento type
2	43	—	—	—	—	UC	0,1	mono mode
2	44	—	—	—	—	UC	0,1	key x-fade on
2	45	—	—	—	—	—	—	reserved
2	46	—	—	—	—	UC	0-127	velocity x-fade low
2	47	—	—	—	—	UC	0-127	velocity x-fade high
2	48	—	—	—	—	UC	0-16	alternate group number (*8)
2	49	—	—	—	—	UC	4-58	EQ frequency
2	50	—	—	—	—	SC	52-76	EQ gain
2	51	—	—	—	—	UC	10-120	EQ width
2	52	—	—	—	—	SC	+/-63	cutoff distance
2	53	0-2	—	—	—	UC	0-127	FEG rate attack,decay, release
2	54	0-3	—	—	—	SC	+/-127	FEG level init,attack, sustain,release
2	55	—	—	—	—	SC	+/-7	FEG rate key scaling
2	56	—	—	—	—	SC	+/-63	FEG rate velocity sensitivity
2	57	—	—	—	—	SC	+/-63	FEG attack level velocity sensitivity
2	58	—	—	—	—	SC	+/-63	FEG level velocity sensitivity
2	59	0-2	—	—	—	UC	0-127	PEG rate attack,decay, release
2	60	0-3	—	—	—	SC	+/-127	PEG level init,attack, sustain,release
2	61	—	—	—	—	SC	+/-7	PEG rate key scaling
2	62	—	—	—	—	SC	+/-63	PEG rate velocity sensitivity
2	63	—	—	—	—	SC	+/-63	PEG level velocity sensitivity
2	64	—	—	—	—	SC	+/-63	PEG range
2	65	0-2	—	—	—	UC	0-127	AEG rate attack,decay, release
2	66	0-1	—	—	—	UC	0-127	AEG sustain level
2	66	3	—	—	—	—	—	reserved
2	67	—	—	—	—	SC	+/-7	AEG rate key scaling
2	68	—	—	—	—	SC	+/-63	AEG rate velocity sensitivity
2	69	—	—	—	—	UC	0-2	AEG attack mode
2	70	—	—	—	—	UC	0-3	LFO wave
2	71	—	—	—	—	UC	0-127	LFO speed
2	72	—	—	—	—	UC	0-127	LFO delay time
2	73	—	—	—	—	UC	0,1	LFO sync on
2	74	—	—	—	—	UC	0,1	LFO pitch mod phase invert on
2	75	—	—	—	—	UC	0,1	LFO cutoff mod phase invert on
2	76	—	—	—	—	UC	0-127	cutoff mod depth
2	77	—	—	—	—	UC	0-127	pitch mod depth
2	78	—	—	—	—	UC	0-127	amplitude mod depth
2	79	—	—	—	—	UC	0-12	output1 (*9)
2	80	—	—	—	—	UC	0-127	output1 level
2	81	—	—	—	—	UC	0-12	output2 (*9)
2	82	—	—	—	—	UC	0-127	output2 level
2	83	0-5	0	—	—	UC	0-126	control device 1-6
2	83	0-5	1	—	—	UC	0-36	control function 1-6 (*11)
2	83	0-5	2	—	—	UC	0-3	control type 1-6

2	83	0-5	3	—	—	SC	+/-63	control range 1-6
2	84	—	—	—	—	SC	+/-31	filter gain
2	85	—	—	—	—	UC	0-2	EQ Type
2	86	—	—	—	—	—	—	reserved
2	87	—	—	—	—	UC	1-127	sample portamento rate
2	88	—	—	—	—	UC	1-127	sample portamento time

(*1) mono samples for which 2:detune or dephase is not +/-0.

(*2) 128:"=Orig"

(*3) -1:"=Orig"

(*4) 64-68:"Rnd1"- "Rnd5"

(*5) 1: depends on any sample bank.

(*6) 0-15:A01-16, 16:basic receive channel, 17-32:B01-16 (A5000 only)

(*7)

value	filter type
0	Bypass
1	LowPass1
2	LowPass2
3	HiPass1
4	HiPass2
5	BandPass
6	BandElim
7	LowPass3
8	Peak1
9	Peak2
10	2Peaks
11	2Dips
12	DualLPFs
13	LPF+Peak
14	DualHPFs
15	HPF+Peak
16	LPF+HP

(Note 8) 0:off

(Note 9)

value	output1	output2
0	off	off
1	stereo out	assignL&R
2	effect1	assign1&2
3	effect2	assign3&4
4	effect3	assign5&6
5	assignL&R	DIG&OPT
6	assign1&2	stereo out
7	assign3&4	effect1
8	assign5&6	effect2
9	DIG&OPT	effect3
10	effect4	effect4
11	effect5	effect5
12	effect6	effect6

(A5000 only)

(A5000 only)

(A5000 only)

(Note 10) -64:"Rnd"

(Note 11)

value	function
0	off
1	pitch mod depth
2	amp mod depth
3	cutoff mod depth
4	cutoff bias
5	filter Q/width
6	pan bias
7	pitch bias
8	level
9	LFO speed
10	LFO delay
11	AEG attack rate
12	AEG release rate
13	PEG attack rate
14	PEG release rate
15	FEG atck rate
16	FEG release rate
17	pitch bend
18	start address
19	FEG level
20	cutoff distance
21	filter gain
22	portamento rate/time
23	AEG decay rate
24	AEG sustain level
25	FEG decay rate
26	FEG init level
27	FEG sustain level
28	PEG decay rate
29	PEG init level
30	PEG sustain level
31	sample control1 range
...	...
36	sample control6 range

2.2 System Parameter

Each data byte is divided into the upper and lower 4 bits and received/transmitted as 2 bytes of MIDI data.

original data byte	b7,b6,b5,b4,b3,b2,b1,b0
MIDI 1st byte	0,0,0,0,b7,b6,b5,b4
data 2nd byte	0,0,0,0,b3,b2,b1,b0

2.2.1 System Parameter

P1	P2	P3	P4	P5	P6	data size	data value	name
1	1	0	—	—	—	SC	+/-63	master fine tune
1	1	1	—	—	—	SC	+/-127	master coarse tune
1	1	2	—	—	—	SC	+/-127	master transpose
1	1	3	—	—	—	UC	0-17	velocity curve
1	1	4	—	—	—	UC	0-31	MIDI basic receive channel (*3)
1	1	5	—	—	—	UC	0,1	MIDI basic channel omni on
1	1	6	—	—	—	UC	0,1	MIDI program change receive enable
1	1	7	0-3	—	—	UC	-1,0-32	knob2-5 control MIDI transmit channel (*1)
1	1	8	0-3	—	—	UC	0-120	knob2-5 control device
1	1	9	0-5	—	—	UC	0-32	fkey1-6 play MIDI transmit channel (*4)
1	1	10	0-5	—	—	UC	0-127	fkey1-6 play note number
1	1	11	0-5	—	—	UC	0-127	fkey1-6 play velocity
1	1	12	—	—	—	SC	52-76	total EQ low boost gain
1	1	13	—	—	—	UC	4-40	total EQ low boost frequency
1	1	14	—	—	—	SC	52-76	total EQ low gain
1	1	15	—	—	—	UC	4-40	total EQ low frequency
1	1	16	—	—	—	UC	10-120	total EQ low width
1	1	17	—	—	—	SC	52-76	total EQ mid gain
1	1	18	—	—	—	UC	4-58	total EQ mid frequency
1	1	19	—	—	—	UC	10-120	total EQ mid width
1	1	20	—	—	—	SC	52-76	total EQ high gain
1	1	21	—	—	—	UC	28-58	total EQ high frequency
1	1	22	—	—	—	UC	10-120	total EQ high width
1	1	23	—	—	—	UC	0-5	stereo to assignable out
1	1	24	—	—	—	UC	0,1	wave address auto length lock (*2)
1	1	25	—	—	—	UC	0,1	wave address auto zero (*2)
1	1	26	—	—	—	UC	0,1	wave address auto snap (*2)
1	1	27	—	—	—	UC	0-4	stereo output level offset
1	1	28	—	—	—	UC	0,1	audition with easy edit
1	1	29	—	—	—	UC	0,1	audition with effect
1	1	30	—	—	—	UC	0-9	loop remix type
1	1	31	—	—	—	UC	0-7	loop remix variation
1	1	32	—	—	—	UC	0,1	play&load
1	1	33	—	—	—	UC	0,1	program mode
1	1	34	0-31	—	—	UC	0-127	multi part A01-B16 program number1-128 (*5)
1	1	35	—	—	—	UC	0,1	loop remix auto audition
1	1	36	—	—	—	UC	0-7	loop remix zone start point
1	1	37	—	—	—	UC	1-8 (>start)	loop remix zone end point
1	1	38	0-4	—	—	UC	0-4	assignable output level offset (*6)
1	1	39	—	—	—	UC	0,1	knob control MIDI out
1	1	40	—	—	—	UC	0,1	fkey play MIDI out

(*1) -1:AUDIRION, 0-15:A01-16, 16:basic receive channel, 17-32:B01-16(A5000 only)

(*2) Of the three, several will not sound simultaneously.

(*3) 0-15:A01-A16, 16-31:B01-B16 (A5000 only)

(*4) 0-15:A01-A16, 16:basic receive channel, 17-32:B01-16(A5000 only)

(*5) A4000, P4=0-15

(*6) 4000, P4=0-1

2.3 Switch Remote

Data bytes are not divided, but are received as 1 byte of MIDI data.

2.3.1 Switch Remote

P1	P2	P3	P4	P5	P6	data size	data value	name
0	0	0	0	0	0	UC	0-127	FKEY1 (*1)
1	0	0	0	0	0	UC	0-127	FKEY2 (*1)
2	0	0	0	0	0	UC	0-127	FKEY3 (*1)
3	0	0	0	0	0	UC	0-127	FKEY4 (*1)
4	0	0	0	0	0	UC	0-127	FKEY5 (*1)
5	0	0	0	0	0	UC	0-127	FKEY6 (*1)
6	0	0	0	0	0	UC	0-127	[COMMAND/EXIT] (*1)
7	0	0	0	0	0	UC	0-127	[ASSIGNABLE] (*1)
8	0	0	0	0	0	UC	0-127	[AUDITION] (*1)
9	0	0	0	0	0	UC	0-127	[PLAY] (*1)
10	0	0	0	0	0	UC	0-127	[EDIT] (*1)
11	0	0	0	0	0	UC	0-127	[REC] (*1)
12	0	0	0	0	0	UC	0-127	[DISK] (*1)
13	0	0	0	0	0	UC	0-127	[UTILITY] (*1)
14	0	0	0	0	0	UC	0-127	KNOB1 SW (*1)
15	0	0	0	0	0	UC	0-127	KNOB2 SW (*1)
16	0	0	0	0	0	UC	0-127	KNOB3 SW (*1)
17	0	0	0	0	0	UC	0-127	KNOB4 SW (*1)
18	0	0	0	0	0	UC	0-127	KNOB5 SW (*1)
20	0	0	0	0	0	UC	0-127	[COMMAND/EXIT]+[ASSIGNABLE] (*1)
21	0	0	0	0	0	UC	0-127	[COMMAND/EXIT]+[AUDITION] (*1)
123	0	0	0	0	0	UC	0-127	KNOB1 ENCODER
124	0	0	0	0	0	UC	0-127	KNOB2 ENCODER
125	0	0	0	0	0	UC	0-127	KNOB3 ENCODER
126	0	0	0	0	0	UC	0-127	KNOB4 ENCODER
127	0	0	0	0	0	UC	0-127	KNOB5 ENCODER

(Note 1) 0-63: Switch off, 64-127: Switch on

■ MIDI IMPLEMENTATION CHART

YAMAHA [Professional Sampler]
Model A5000/A4000 MIDI Implementation Chart

Date:14-SEP-1999
Version : 1.0

Function...	Transmitted	Recognized	Remarks
Basic Default Channel Changed	1 - 16 1 - 16	1 - 16 1 - 16	memorized
Mode Default Messages Altered	x x *****	1,2,3,4 POLY,MONO(M=1) x	memorized
Note Number : True voice	0 - 127 *****	0 - 127 0 - 127	
Velocity Note ON Note OFF	o v=1-127 x	o v=1-127 x	
After Key's Touch Ch's	x o	x o	
Pitch Bender	o	o *1	7 bit resolution
Control Change	5 o 7 o 10 o 64 o 65 o 66 o 0-120 o	o *1 o *1 o *1 o *1 o *1 o *1 o *1	portamento time volume pan sustain portamento sostenuto (assignable)
Prog Change : True #	x *****	o 0 - 127 *1 o 0 - 127	
System Exclusive	o	o *2	object etc.
Common : Song Pos. : Song Sel. : Tune	x x x	x x x	
System : Clock Real Time: Commands	x x	o *3 o *3	
Aux :All Sound OFF :Reset All Cntrls :Local ON/OFF :All Notes OFF Mes- :Active Sense sages:Reset	x x x x x x	o o x o o x	
Notes:	*1 receive if each receive filter = enable. *2 receive if device No is not off. *3 receive if program LFO sync = MIDI		

Mode 1 : OMNI ON , POLY
Mode 3 : OMNI OFF, POLY

Mode 2 : OMNI ON ,MONO
Mode 4 : OMNI OFF,MONO

o : Yes
x : No

A5000/A4000

PARTS LIST

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OVERALL ASSEMBLY	2
ELECTRICAL PARTS.....	5

Note) DESTINATION ABBREVIATIONS

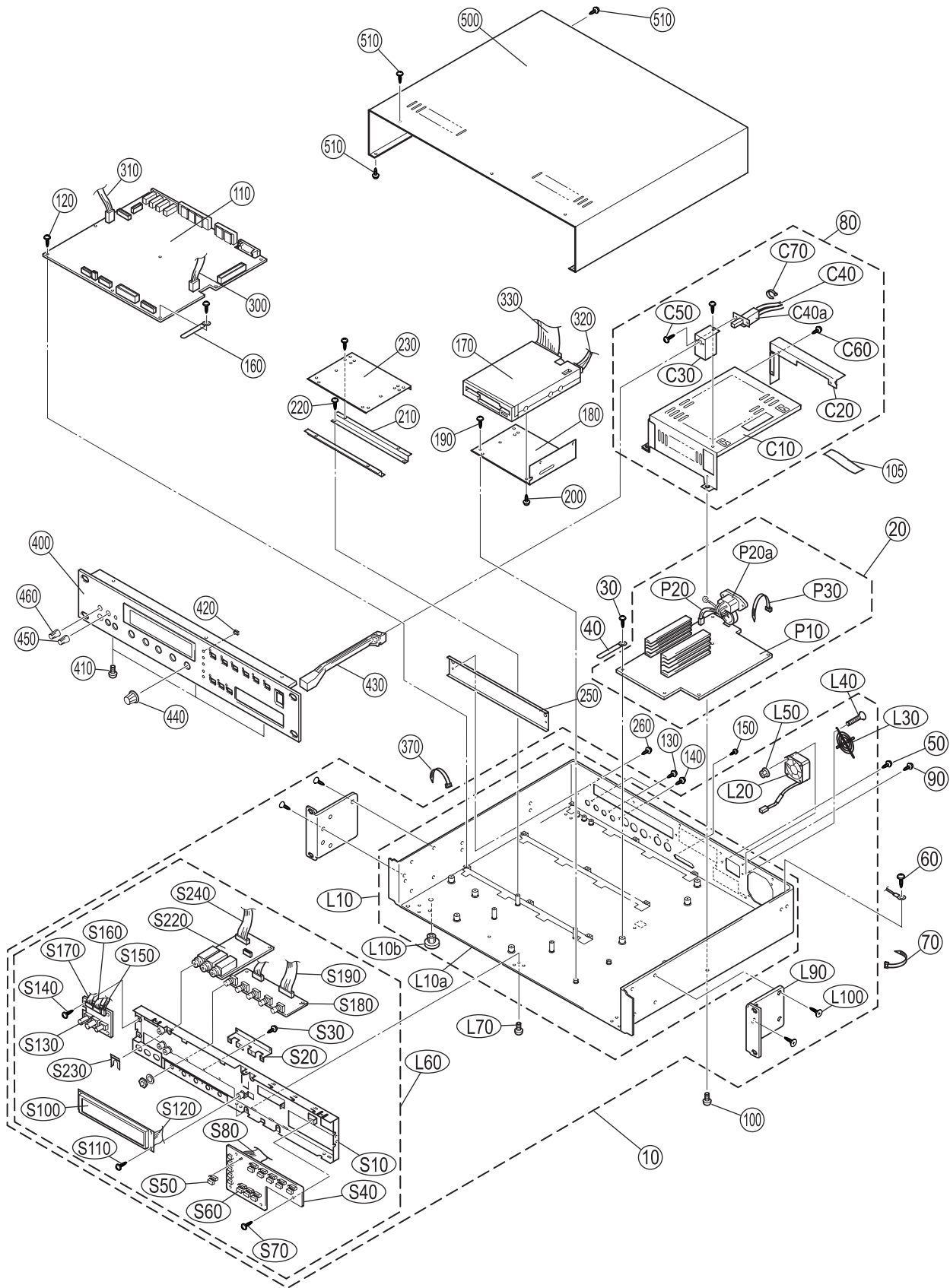
A: Australian model	M: South African model
B: British model	O: Chinese model
C: Canadian model	Q: South-east Asia model
D: German model	T: Taiwan model
E: European model	U: U.S.A. model
F: French model	V: General export model (110V)
H: North European model	W: General export model (220V)
I: Indonesian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

■ WARNING

Components having special characteristics are marked \triangle and must be replaced with parts having specifications equal to those originally installed.

- The numbers in "QTY" shows quantities for each unit.
- The parts with "—" in "Part No." are not available as spare parts.
- The second letter of the shaded () parts number is I, not one.
- The second letter of the shaded () parts number is O, not zero.

OVERALL ASSEMBLY



REF NO.	PART NO.	DESCRIPTION		REMARKS	QTY	RANK
		OVERALL ASSEMBLY		A5000,A4000		
	--	Overall Assembly		A5000J (V480850)		
	--	Overall Assembly		A5000U (V480860)		
	--	Overall Assembly		A5000EB (V480870)		
	--	Overall Assembly	J	A4000J (V480880)		
	--	Overall Assembly	U	A4000U (V480890)		
	--	Overall Assembly	E	A4000EB (V480900)		
10	--	Lower Case Assembly		A5000 (V481190)		
10	--	Lower Case Assembly		A4000 (V481200)		
20	--	Circuit Board Assembly	PS	J, U (V481220)		
20	--	Circuit Board Assembly	PS	E, B (V481230)		
30	EP600130	Bind Head Tapping Screw-B	3.0X6 MFZN2Y		7	01
40	CB502030	Cord Binder	S-75B			01
50	EP630220	Bind Head Tapping Screw-P	3.0X8 MFZN2BL		2	01
60	EG340190	Bind Head Tapping Screw-B	4.0X8 MFZN2BL			01
70	CB069250	Cord Holder	BK-1			01
80	--	PS Cover Assembly		(V481210)		
90	VQ049800	Bonding Tapping Screw-B	3.0X10 MFZN2BL		3	01
100	EG340190	Bind Head Tapping Screw-B	4.0X8 MFZN2BL		2	01
105	--	Adhesive Tape	12X50m	(VP83460)	2	
*	110	V4312000	Circuit Board	DM		
*	110	V4312100	Circuit Board	DM	A5000 A4000	
	120	EP600130	Bind Head Tapping Screw-B	3.0X6 MFZN2Y		13 01
	130	VQ049800	Bonding Tapping Screw-B	3.0X10 MFZN2BL		2 01
	140	EP630220	Bind Head Tapping Screw-P	3.0X8 MFZN2BL		4 01
*	150	VV342700	Pan Head Screw	2.5X6 SUS		2
	160	CB502030	Cord Binder	S-75B		3 01
	170	V3075300	Floppy Disk Drive	MF355F-3252MG F		16
	180	--	FDD Bracket	(V477100)		
	190	EP600130	Bind Head Tapping Screw-B	3.0X6 MFZN2Y		4 01
	200	EG330020	Bind Head Screw	3.0X4		4
	210	--	FDD Angle	(V471690)		2
	215	V5536600	Cushion Tape			2
	220	EP600130	Bind Head Tapping Screw-B	3.0X6 MFZN2Y		4 01
	230	--	HDD Bracket	(V481250)		
	240	EP600130	Bind Head Tapping Screw-B	3.0X6 MFZN2Y		4 01
	250	VU931300	I/O Cover			06
	260	V2134800	Bonding Screw-S	3.0X8 MFZN2BL		3
	300	--	Connector Assembly	DM(D)-PS 5P	(V453690)	
	310	--	Connector Assembly	DM(A)-PS 4P	(V453700)	
*	320	V4537100	Connector Assembly	FDD-PS 2P		
*	330	VV332200	Connector Assembly	MAIN-FD 34P		
	370	CB069250	Cord Holder	BK-1		01
*	400	V4811700	Front Panel Assembly		A5000	
*	400	V4811800	Front Panel Assembly		A4000	
	410	EP600130	Bind Head Tapping Screw-B	3.0X6 MFZN2Y		3 01
	420	VM825700	Mode Button		PLAY,EDIT,REC,DISK,UTILITY	5 03
	430	VF888700	Push Rod		POWER ON/OFF	03
	440	VU931600	Knob	ENCODER	A5000 1,2,3,4,5	5 03
*	440	V5424000	Knob	ENCODER	A4000 1,2,3,4,5	5
	450	VP826500	Knob	(small)	REC VOLUME	03
	460	VP826800	Knob	(small)	MASTER VOLUME	03
*	500	V4717100	Top Cover			
	510	V2134800	Bonding Screw-S	3.0X8 MFZN2BL		16
	--	Lower Case Assembly		A5000 (V481190)		
	--	Lower Case Assembly		A4000 (V481200)		
*	L10	V5069500	Bottom Assembly	A5000		
*	L10	V5069700	Bottom Assembly	A4000		
	L10a	--	Bottom Cover	A5000 (V471560)		
	L10a	--	Bottom Cover	A4000 (V471570)		
	L10b	V4346500	Foot	FF-008		4 02
*	L20	V4773000	Fan Assembly			
	L30	--	Fan Guard	(V506250)		
*	L40	V4814400	Flat Head Screw	3.0X25 MFNI33		4
	L50	VA211900	Hexagonal Nut	3.0 MFZN2Y		4 01
	L60	--	Sub Panel Assembly	(V481240)		
	L70	EP600130	Bind Head Tapping Screw-B	3.0X6 MFZN2Y		5 01
	L90	VV487100	Angle Bracket, Rack			2 06
*	L100	V5069300	Flat Head Tapping Screw-S	4.0X6 MFZN2BL		8
	L150	VC362700	Ferrite Core			2 04
	L160	CB069250	Cord Holder	BK-1		2 01
	L170	EP600130	Bind Head Tapping Screw-B	3.0X6 MFZN2Y		4 01
	--	Circuit Board Assembly	PS	J, U (V481220)		

*: New Parts

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REF NO.	PART NO.	DESCRIPTION		REMARKS	QTY	RANK
	--	Circuit Board Assembly	PS	E, B (V481230)		
* △	P10	V3612600 Power Supply Unit		J, U		
* △	P10	V3612700 Power Supply Unit		E, B		
	P20	V4537900 Connector Assembly	ACIN-PS			
* △	P20a	VL785200 AC-IN Connector	AC-P01CR02			03
	P30	CB069250 Cord Holder	BK-1			01
	--	PS Cover Assembly		(V481210)		
	C10	-- PS Cover		(V471730)		
	C20	-- Fan Cover		(V471740)		
	C30	-- PSW Cover		(V471750)		
* △	C40	V4538000 Connector Assembly	PSW-PS 2P			
	C40a	VP184000 Push Switch	SDDL B1			03
	C50	V2134800 Bonding Screw-S	3.0X8 MFZN2BL		2	
	C60	VQ049800 Bonding Tapping Screw-B	3.0X10 MFZN2BL		5	01
	C70	CB069250 Cord Holder	BK-1		2	01
	--	Sub Panel Assembly		(V481240)		
	S10	-- Sub Panel		(V471640)		
	S20	-- RE Angle		(V471680)		
	S30	EP600130 Bind Head Tapping Screw-B	3.0X6 MFZN2Y		7	01
	S40	VV331600 Circuit Board	PNA			13
	S50	VT810300 Push Button	PRO R3	F1-F6	6	03
	S60	VT839000 Push Button	PRO R3	COMMAND/EXIT ASSIGNABLE_AUDITION	3	03
	S70	V2644100 Cup Tapping Screw-B	3.0X6 MFZN2Y		4	01
	S80	-- Connector Assembly	PNA-DM 30P	(V531500)		
	S100	V2557100 LCD	LCD			24
	S105	VV319500 LCD Spacer			2	03
	S110	EP600130 Bind Head Tapping Screw-B	3.0X6 MFZN2Y		4	01
	S120	-- FFC Cable	P=1.25-K-14-280	(V481420)		
* △	S130	V4457400 Circuit Board	VR			
	S140	EP600130 Bind Head Tapping Screw-B	3.0X6 MFZN2Y		4	01
	S150	-- Connector Assembly	3P-250 KRD-KRD	(VK10360)		
	S160	-- Connector Assembly	VR-JK 8P	(V453760)		
	S170	-- Connector Assembly	VR-DM 8P-540	(V453740)		
* △	S180	V4457200 Circuit Board	RE			
	S190	-- Connector Assembly	13P-150 KRD-KRD	(VK10180)		
* △	S220	V4457300 Circuit Board	JK			
	S230	ES200210 Hexagonal Nut	12.0 14X2 MFNI33		3	01
	S240	-- Connector Assembly	JK-DM 14P-390	(V453750)		
		ACCESSORISE		A5000,A4000		
* △	VT119800	AC Cord	J 7A 125V 3P 2.5M	J		06
* △	VB927800	AC Cord	CSA	U		08
* △	VB928000	AC Cord	VDE	E		08
* △	VP204400	AC Cord	BS 3P	B		10
* △	VQ240200	Adapter, AC Cord	KPR-24	J		06
* △	V5314800	Connector Assembly	DM-IDE-IDE			
* △	V5314900	Connector Assembly	DM-SCSI 50P			
* △	V4537200	Connector Assembly	ZIP(IDE)-PS 4P			
* △	V4537300	Connector Assembly	HDD-PS 4P			
	--	CD-ROM	74 min. 12cm	(XY007A0)		
* △	XY008A00	CD-ROM	74 min. 12cm	(XY009A0)		
	--	CD-ROM	74 min. 12cm	(XY010A0)		
	--	CD-ROM	74 min. 12cm	(XY011A0)		
	--	CD-ROM	74 min. 12cm	(XY012A0)		
	--	CD-ROM	74 min. 12cm	(XY013A0)		
	--	CD-ROM	74 min. 12cm	(XY014A0)		
	--	CD-ROM	74 min. 12cm	(XY015A0)		
	--	CD-ROM	74 min. 12cm	(XY016A0)		
* △	XY302A00	Floppy Disk	DEMO1 3.5 1.			
* △	XY303A00	Floppy Disk	DEMO2 3.5 1.			
* △	XY304A00	Floppy Disk	DEMO3 3.5 1.			
* △	XY305A00	Floppy Disk	DEMO4 3.5 1.			

*: New Parts

RANK: Japan only

ELECTRICAL PARTS

REF NO.	PART NO.	DESCRIPTION		REMARKS	QTY	RANK
		ELECTRICAL PARTS		A5000,A4000		
*	V4312000	Circuit Board	DM	A5000 (XW129C0)		
*	V4312100	Circuit Board	DM	A4000 (XW129C0)		
*	V4457300	Circuit Board	JK	(XW531B0)		
*	VV331600	Circuit Board	PNA	(XS547A0)		13
*	V4457200	Circuit Board	RE	(XW473B0)		
*	V4457400	Circuit Board	VR	(XW573B0)		
*	V4312000	Circuit Board	DM	A5000 (XW129C0)		
	VU931500	Holder, Jack				03
CN1	VN394900	Connector, FFC	52045 14P TE			01
CN2	VF283100	Connector Base Post	PH-14P TE			01
CN3	VK270200	Straight Header	HIF3FC30PA-2.54DSA			04
CN4	VK270300	Straight Header	HIF3FC40PA-2.54DSA			05
CN5	VH343800	Connector Header	HIF3FC-34PA2.54DSA			03
CN6	VL536600	Connector Header	HIF3FC-50PA2.54DSA			03
CN9	VL536600	Connector Header	HIF3FC-50PA2.54DSA			03
CN14	VV331100	Connector	FCN-235D050-L/L#0G	SCSI		05
CN16	VB389900	Connector Base Post	PH- 3P TE			01
CN508	LB932050	Base Post Connector	VH- 5P TE			01
CN516	VV345900	SIMM Socket	SX3LB-72S-1.27DSA			04
-519	VV345900	SIMM Socket	SX3LB-72S-1.27DSA			04
CN521	--	Jumper Header	RF 6P TE	(VG51850)		
CN800	VF283100	Connector Base Post	PH-13P TE			01
CN801	VB390400	Connector Base Post	PH- 8P TE			01
CN802	LB918040	Base Post Connector	XH 4P TE			01
CN803	VK270300	Straight Header	HIF3FC40PA-2.54DSA			05
CN804	VM673300	Header	HIF3FC26PA-2.54DSA			03
D1	VT332900	Diode	1SS355 TE-17			01
D2	VT332900	Diode	1SS355 TE-17			01
D3	VS597600	Diode	RB160L-40 TE25			01
D10	VT332900	Diode	1SS355 TE-17			01
-15	VT332900	Diode	1SS355 TE-17			01
D101	VT332900	Diode	1SS355 TE-17			01
-136	VT332900	Diode	1SS355 TE-17			01
D500	VS201100	Diode	D1F60			01
D501	VS201100	Diode	D1F60			01
D800	VT332900	Diode	1SS355 TE-17			01
-807	VT332900	Diode	1SS355 TE-17			01
EM500	VV345800	Filter (chip)	NFM61R00T361			02
-502	VV345800	Filter (chip)	NFM61R00T361			02
EM800	VV345800	Filter (chip)	NFM61R00T361			02
-810	VV345800	Filter (chip)	NFM61R00T361			02
EM811	VD542700	LC Filter	DSS306-93F223Z1			01
IC1	XW795A00	IC	HD6437043AE00F	CPU		11
IC2	XV932A00	IC	MSM5118160D-60J	DRAM 16M		12
IC3	XV932A00	IC	MSM5118160D-60J	DRAM 16M		12
*	IC6	XW988B00	28F800B5	FLASH ROM L 475BV100		
*	IC7	XW800B00	28F800B5	FLASH ROM H 475AV100		
IC8	XI939A00	IC	HD63266F	FDC		09
IC9	XQ595A00	IC	SED1335F0B	LCDC		08
IC10	XV377A00	IC	24LC32A-I/SN	} EEPROM 32K		
IC10	XY229A00	IC	AT24C32-10SI			
IC11	XS323A00	IC	D65611GB-039-3B	GATE ARRAY		05
IC13	XJ013A00	IC	TC74HC126AF	BUS BUFFER		03
IC14	XV411A00	IC	W24258S-70LE-EL10	SRAM 256K		07
IC15	VN686000	Photo Coupler	PC410T			04
IC16	VN686000	Photo Coupler	PC410T			04
IC17	XL122A00	IC	PST572CMT-R	SYSTEM RESET		02
IC20	XT015A00	IC	TC74VHC138F	DECODER		02
IC21	XT015A00	IC	TC74VHC138F	DECODER		02
IC22	XH225A00	IC	SN74HC574NSR	D-FF		03
IC23	XH225A00	IC	SN74HC574NSR	D-FF		03
IC24	XH223A00	IC	SN74HC273NSR	D-FF		01
IC25	XH223A00	IC	SN74HC273NSR	D-FF		01
IC26	XV794A00	IC	TC74VHC153F	MULTIPLEXER		
-28	XV794A00	IC	TC74VHC153F	MULTIPLEXER		
IC30	XN967A00	IC	TC74VHC164F	SHIFT REGISTER		03
IC31	XT487A00	IC	TC74VHC245F	TRANSCEIVER		03
IC32	XN969A00	IC	TC74VHC244F	BUS BUFFER		03
IC33	XT487A00	IC	TC74VHC245F	TRANSCEIVER		03
-37	XT487A00	IC	TC74VHC245F	TRANSCEIVER		03
IC38	XS720A00	IC	TC74HC245AF	TRANSCEIVER		03
IC39	XD657A00	IC	TC74HC14AF-TP1	INVERTER		02
IC40	XM332A00	IC	TC74VHC04F	INVERTER		01

*: New Parts

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REF NO.	PART NO.	DESCRIPTION	REMARKS	QTY	RANK
IC42	XR337A00	IC	TC74VHC32F-TEL	OR	01
IC43	XR337A00	IC	TC74VHC32F-TEL	OR	01
IC44	XN883A00	IC	TC7W14FU	INVERTER	02
IC45	XT812A00	IC	TC74VHC11F(EL)	INVERTER	01
IC46	XR337A00	IC	TC74VHC32F-TEL	OR	01
* IC49	XY363A00	IC	TC7WH04FU	INVERTER	
* IC50	XW948A00	IC	TC7WH08FU	AND	
IC51	XH223A00	IC	SN74HC273NSR	D-FF	01
IC52	XK851A00	IC	MB87034PF	SPC	12
IC53	XN972A00	IC	TC74VHC374F	D-FF	03
IC54	XN972A00	IC	TC74VHC374F	D-FF	03
IC56	XN964A00	IC	TC74VHC74F	D-FF	02
IC58	XN967A00	IC	TC74VHC164F	SHIFT REGISTER	03
* IC61	XY107B00	IC	28F800B5	FLASH ROM 475DV100	
* IC62	XY106B00	IC	28F800B5	FLASH ROM 475CV100	
IC63	XV733A00	IC	CY7C136-55NC	DPRAM	10
IC64	XV733A00	IC	CY7C136-55NC	DPRAM	10
IC65	XV932A00	IC	MSM5118160D-60J	DRAM 16M	12
IC66	XV932A00	IC	MSM5118160D-60J	DRAM 16M	12
IC69	XS775A00	IC	TC7SH04FU	INVERTER	01
IC70	XT015A00	IC	TC74VHC138F	DECORDER	02
IC72	XN964A00	IC	TC74VHC74F	D-FF	02
IC73	XR337A00	IC	TC74VHC32F-TEL	OR	01
IC75	XW795A00	IC	HD6437043AE00F	CPU	11
* IC76	XU042A00	IC	AN8612NSB-E1	SCSI TERMINATOR	
IC77	XS720A00	IC	TC74HC245AF	TRANSCEIVER	03
IC78	XS775A00	IC	TC7SH04FU	INVERTER	01
* IC79	XW946A00	IC	TC7WH00FU	NAND	
IC80	XS775A00	IC	TC7SH04FU	INVERTER	01
-82	XS775A00	IC	TC7SH04FU	INVERTER	01
IC84	XS775A00	IC	TC7SH04FU	INVERTER	01
IC86	XR337A00	IC	TC74VHC32F-TEL	OR	01
IC87	XN964A00	IC	TC74VHC74F	D-FF	02
IC88	XS775A00	IC	TC7SH04FU	INVERTER	01
IC89	XR680A00	IC	TC7SH08FU	AND	
-91	XR680A00	IC	TC7SH08FU	AND	
* IC92	XW948A00	IC	TC7WH08FU	AND	
* IC93	XW948A00	IC	TC7WH08FU	AND	
IC94	XR337A00	IC	TC74VHC32F-TEL	OR	01
* IC96	XY363A00	IC	TC7WH04FU	INVERTER	
* IC97	XY363A00	IC	TC7WH04FU	INVERTER	
IC98	XS775A00	IC	TC7SH04FU	INVERTER	01
IC503	XS369A00	IC	D65636GF-104-3B9	SPF	07
IC504	XV077A00	IC	MSM514260C-60JS	DRAM 4M	07
IC505	XV077A00	IC	MSM514260C-60JS	DRAM 4M	07
IC506	XS725A00	IC	TC203C760HF-002	SWP30B	19
IC507	XS725A00	IC	TC203C760HF-002	SWP30B	19
* IC508	XW148A00	IC	HD74LVC245A	TRANSCEIVER	
IC509	XS516A00	IC	UPC2933T-E1	REGULATOR +3.3V	03
IC515	XS775A00	IC	TC7SH04FU	INVERTER	01
IC516	XS370A00	IC	D65621GF-028-3B9	GATE ARRAY	06
IC519	XS516A00	IC	UPC2933T-E1	REGULATOR +3.3V	03
* IC520	XW148A00	IC	HD74LVC245A	TRANSCEIVER	
* IC522	XW148A00	IC	HD74LVC245A	TRANSCEIVER	
* IC524	XW148A00	IC	HD74LVC245A	TRANSCEIVER	
* IC526	XW148A00	IC	HD74LVC245A	TRANSCEIVER	
-533	XW148A00	IC	HD74LVC245A	TRANSCEIVER	
IC534	XV932A00	IC	MSM5118160D-60J	DRAM 16M	12
IC535	XV932A00	IC	MSM5118160D-60J	DRAM 16M	12
* IC536	XY110A00	IC	XC9536-10VQ44C	CPLD	
IC538	XS720A00	IC	TC74HC245AF	TRANSCEIVER	03
IC539	XV865A00	IC	TC7WH157FU	MULTIPLEXER	02
-541	XV865A00	IC	TC7WH157FU	MULTIPLEXER	02
IC802	XN964A00	IC	TC74VHC74F	D-FF	02
IC803	XV763A00	IC	OP275GSR	OP AMP	05
IC804	XU829A00	IC	PCM1716E	DAC	06
IC805	XU829A00	IC	PCM1716E	DAC	06
IC806	XV763A00	IC	OP275GSR	OP AMP	05
IC807	XU770A00	IC	PCM1800E/2K	A/D CONVERTER	07
IC808	XV763A00	IC	OP275GSR	OP AMP	05
IC809	XV763A00	IC	OP275GSR	OP AMP	05
IC810	XQ138A00	IC	NJM4556AMT1	OP AMP	03
IC811	XR339A00	IC	TC9246F-TEL	PLL	04
IC812	XT487A00	IC	TC74VHC245F	TRANSCEIVER	03
-814	XT487A00	IC	TC74VHC245F	TRANSCEIVER	03

*: New Parts

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REF NO.	PART NO.	DESCRIPTION		REMARKS	QTY	RANK
IC815	XS534A00	IC	NJM78M05DLA	REGULATOR +5V		02
IC816	XS775A00	IC	TC7SH04FU	INVERTER		01
IC821	XT487A00	IC	TC74VHC245F	TRANSCEIVER		03
IC822	XW357A00	IC	DS90C402M	LINE RECEIVER		07
* IC823	XY618A00	IC	TC7SH32F	OR		
J99	VG518300	Jumper Header	RF 2P TE			01
J100	VG518300	Jumper Header	RF 2P TE			01
JK1	VI466400	DIN Connector	3 DIN YKF51-5046	MIDI IN/OUT/THRU		04
JK2	VK519000	DIN Connector	5P3 YKF51-50	MIDI IN/THRU		04
JK800	VB312600	Phone Jack	YKB21-5012	ASSIGN OUT-L		02
JK801	VB312600	Phone Jack	YKB21-5012	ASSIGN OUT-R		02
JK802	VB312600	Phone Jack	YKB21-5012	STEREO OUT L/MONO		02
JK803	VB312600	Phone Jack	YKB21-5012	STEREO OUT R		02
L2	VS740100	Chip Inductance	BLM21B751S 2125			03
L11	VS740100	Chip Inductance	BLM21B751S 2125			03
-31	VS740100	Chip Inductance	BLM21B751S 2125			03
L52	VS740100	Chip Inductance	BLM21B751S 2125			03
L802	VQ724900	Chip Inductance	BK2125HM601-T			01
L807	VR579900	Chip Inductance	BK2125HS601-T			01
-826	VR579900	Chip Inductance	BK2125HS601-T			01
L827	VA078900	Jumper Wire	0.55			05
L828	VA078900	Jumper Wire	0.55			05
RA1	RE047100	Resistor Array	10KX4			01
-3	RE047100	Resistor Array	10KX4			01
RA4	RE046470	Resistor Array	4.7KX4			01
-6	RE046470	Resistor Array	4.7KX4			01
RA7	RE045100	Resistor Array	100X4			01
-10	RE045100	Resistor Array	100X4			01
RA11	RE046330	Resistor Array	3.3KX4			01
-14	RE046330	Resistor Array	3.3KX4			01
RA15	RE045100	Resistor Array	100X4			01
RA16	RE047100	Resistor Array	10KX4			01
-36	RE047100	Resistor Array	10KX4			01
RA37	RE044470	Resistor Array	47X4			01
-53	RE044470	Resistor Array	47X4			01
RA61	RE047100	Resistor Array	10KX4			01
-66	RE047100	Resistor Array	10KX4			01
RA67	RE044470	Resistor Array	47X4			01
-72	RE044470	Resistor Array	47X4			01
RA74	RE044470	Resistor Array	47X4			01
-84	RE044470	Resistor Array	47X4			01
RA85	RE047100	Resistor Array	10KX4			01
-95	RE047100	Resistor Array	10KX4			01
RA500	RE047100	Resistor Array	10KX4			01
RA502	RE047100	Resistor Array	10KX4			01
RA506	RE044680	Resistor Array	68X4			01
RA511	RE044680	Resistor Array	68X4			01
RA512	RE044680	Resistor Array	68X4			01
RA515	RE044680	Resistor Array	68X4			01
RA516	RE044680	Resistor Array	68X4			01
RA519	RE044680	Resistor Array	68X4			01
RA520	RE044680	Resistor Array	68X4			01
RA523	RE044680	Resistor Array	68X4			01
-538	RE044680	Resistor Array	68X4			01
RA539	RE047100	Resistor Array	10KX4			01
RA800	RE047100	Resistor Array	10KX4			01
RA801	RE047100	Resistor Array	10KX4			01
SW1	KA401270	Slide Switch	SSS212	SCSI TERMINATOR		03
* TH1	V2429100	Protector Switch	MINI SMDC100-02			
TR1	VJ927100	Transistor	2SC2712 Y			01
TR2	VD303700	Transistor	2SC3326 A,B TE85R			01
-12	VD303700	Transistor	2SC3326 A,B TE85R			01
TR800	VJ927200	Transistor	2SA1162 O,Y			01
TR802	VJ927200	Transistor	2SA1162 O,Y			01
X1	VV762900	Quartz Crystal Unit	7M SMD-49			03
X2	VR870700	Quartz Crystal Unit	10M SMD-49			04
X3	VP864900	Quartz Crystal Unit	16M SMD-49			04
* X4	V4332300	Quartz Crystal Unit	8M DOC-49S1			
X5	VV762900	Quartz Crystal Unit	7M SMD-49			03
X500	VV345500	Quartz Crystal Unit	DOC-49S5			05
* ZD1	VU304700	Zener Diode	PTZ 6.2ATE25 6.2V			
* -3	VU304700	Zener Diode	PTZ 6.2ATE25 6.2V			
	UR829100	Electrolytic Cap.	1000 10.0V	C:550		01
	UU137470	Electrolytic Cap.-FW	47.00 16.0V	C:899,900,941-946		
	UU138470	Electrolytic Cap.-FW	470.00 16.0V	C:882,883		01

*: New Parts

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REF NO.	PART NO.	DESCRIPTION		REMARKS	QTY	RANK
	UU167470	Electrolytic Cap.-FW	47.00 50.0V	C:801,802,807,808,831,832,842 843,851,852,860,861,868,869 889,890,902,906		01
	VV546700	Tantalum Capacitor (chip)	47 10V M	C:613,614		03
	VY844800	Capacitor (chip)	22 16V	C:856,872		01
	UE046470	Electrolytic Cap. (chip)	4.7 25V RV2	C:62		01
	UE066100	Electrolytic Cap. (chip)	1 50V RV2	C:105		01
	UF027220	Electrolytic Cap. (chip)	22 10V	C:839,840		01
	UF027330	Electrolytic Cap. (chip)	33 10V	C:812,813,821,823,824,826		01
	UF027470	Electrolytic Cap. (chip)	47 10V	C:35,36,114,115		01
	UF028100	Electrolytic Cap. (chip)	100 10V	C:47,511,513,549,557,590,592 594,596,887		01
	UF037100	Electrolytic Cap. (chip)	10 16V	C:6,9,12,15,20,73,74,120,121 142,145,148,150,161-164		01
	UF037100	Electrolytic Cap. (chip)	10 16V	C:816,818,822,825		01
	UF037470	Electrolytic Cap. (chip)	47 16V	C:870,871,913,917,918		01
	UF038100	Electrolytic Cap. (chip)	100 16V	C:848,877,912		01
	UF047220	Electrolytic Cap. (chip)	22 25V	C:850		01
	UF138220	Electrolytic Cap. (chip)	220 16V UUR1C2	C:609		01
	UF148100	Electrolytic Cap. (chip)	100 25V UUR1E1	C:849		01
	UF157470	Electrolytic Cap. (chip)	47 35V UUR1V4	C:891		01
	UF167470	Electrolytic Cap. (chip)	47 50V UUR1H4	C:611		01
	VR326200	Mylar Capacitor (chip)	0.01 16V J	C:622-625,809,814,833-836,841 847,853,857-859,866,867,875 924-932,947-956,961,962		01
	VR327500	Mylar Capacitor (chip)	0.0001 50V J	C:853,862,863		01
	VY846100	Mylar Capacitor (chip)	0.47 16V J	C:874		02
	VI192500	Carbon Resistor (chip)	100.0 1/10 D	R:824,825,962,963		01
	VI193200	Carbon Resistor (chip)	200.0 1/10 D	R:812-815		01
	VI194500	Carbon Resistor (chip)	680 1/10 D	R:844,845		01
	VI194900	Carbon Resistor (chip)	1.0K 1/10 D	R:832,833,852,853,862,863		01
	VI195400	Carbon Resistor (chip)	1.6K 1/10 D	R:834,835,844,845		01
	VI195700	Carbon Resistor (chip)	2.2K 1/10 D	R:842,843		01
	VI196600	Carbon Resistor (chip)	4.7K 1/10 D	R:854,855		01
	VI197400	Carbon Resistor (chip)	10.0K 1/10 D	R:836,837,846,847,883-886,919 920		01
	VI198100	Carbon Resistor (chip)	20.0K 1/10 D	R:848,849		01
	VI199000	Carbon Resistor (chip)	47.0K 1/10 D	R:838-841,850,851,856,857		01
	VI200000	Carbon Resistor (chip)	100.0K 1/10 D	R:818,819		01
	UB012470	Monolithic Ceramic Cap.	B 470P 50V K	C:3,42,139,844,845		01
	UB044100	Monolithic Ceramic Cap.	F 0.01 50V Z	C:23,24,151-160,543,620,621 805		01
	UB051100	Monolithic Ceramic Cap.	SL 10P 50V D	C:40,41		01
	UB051150	Monolithic Ceramic Cap.	SL 15P 50V J	C:873		01
	UB051220	Monolithic Ceramic Cap.	SL 22P 50V J	C:1,2,16,17,137,138,864,865		01
	UB052330	Monolithic Ceramic Cap.	SL 330P 50V J	C:837,838,854,855		01
	UB245100	Monolithic Ceramic Cap.	F 0.1 25V Z	C:4,5,7,8,10,11,14,18,19,21,22 25-34,37,39,43,46,48-50,52- 61,63,69-72,75-77,82,83,85- 89,91-95,97-104,106-109,111- 113,116-119,122-125,129,131 133,134,136,140,141,143,144 146,147,149,165,167-174,176- 179,500-506,510,512,514-521 523-537,540,542,546,551-553 556,558,560,562,566-572,577- 585,587,589,591,593,595,606- 608,610,612,615-618,626,803 804,806,876,884-886,888,892 914,915,919,940		01
	UB245100	Monolithic Ceramic Cap.	F 0.1 25V Z	C:911,939		01
	VJ899000	Monolithic Ceramic Cap.	CH 5P 50V C	C:45		01
	VJ899200	Monolithic Ceramic Cap.	CH 7P 50V D	C:44		01
	RD155100	Carbon Resistor (chip)	100.0 1/4 J	R:864-867,948,949		01
	RD155470	Carbon Resistor (chip)	470.0 1/4 J	R:826,827		01
	RD250000	Carbon Resistor (chip)	0.0 0.0 J	R:75,76,82,84,86,153,167,185 199,530,531,539,543,556,558 577,876-879,894,895,956- 959,973,974,978		01
	RD254100	Carbon Resistor (chip)	10.0 0.1 J	R:966		01
	RD254470	Carbon Resistor (chip)	47.0 0.1 J	R:43,71,72,155,156,220,532 545-549,564,804		01
	RD254680	Carbon Resistor (chip)	68.0 0.1 J	R:211-218,506,508,550-555		01
	RD255100	Carbon Resistor (chip)	100.0 0.1 J	R:193,200,210,221-243,246,522 559-563,871,943,964,965		01

*: New Parts

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REF NO.	PART NO.	DESCRIPTION	REMARKS	QTY	RANK	
	RD255220	Carbon Resistor (chip)	220.0 0.1 J	976	01	
	RD255510	Carbon Resistor (chip)	510.0 0.1 J	R:6,8-15,162	01	
	RD255560	Carbon Resistor (chip)	560.0 0.1 J	R:67	01	
	RD256100	Carbon Resistor (chip)	1.0K 0.1 J	R:28-32	01	
	RD256120	Carbon Resistor (chip)	1.2K 0.1 J	R:1,16,17,37-41,157,953,975	01	
	RD256150	Carbon Resistor (chip)	1.5K 0.1 J	R:19-27	01	
	RD256330	Carbon Resistor (chip)	3.3K 0.1 J	R:872	01	
	RD256470	Carbon Resistor (chip)	4.7K 0.1 J	R:7,163	01	
	RD256560	Carbon Resistor (chip)	5.6K 0.1 J	R:44,523-525,528	01	
	RD256820	Carbon Resistor (chip)	8.2K 0.1 J	R:35,36	01	
	RD257100	Carbon Resistor (chip)	10.0K 0.1 J	R:48	01	
				R:3,4,18,45,46,49,55-61,63,68 69,73,74,78,87-91,93-96,98- 100,111,112,121-128,130-152 154,159,160,164-166,172-178 180,181,184,186-191,194,197 202,204,219,244,245,507,514 -516,519,520,526,527,566-573 578,579,805,809,821,829-831 858-861,868,869,880-882,887 891-893,954,955,960,961,977		01
	RD258100	Carbon Resistor (chip)	100.0K 0.1 J	R:808,828,889,890,971,972	01	
	RD258220	Carbon Resistor (chip)	220.0K 0.1 J	R:870,888	01	
	V4808300	Carbon Resistor (chip)	1.0K 1/2 J	R:195,196	01	
	VU977200	Carbon Resistor (chip)	100.0 1/0 J	R:92	01	
	HF757100	Carbon Resistor	10.0K 1/4 J	R:247	01	
	V4312100	Circuit Board	DM	A4000 (XW129C0)		
	VU931500	Holder, Jack	4		03	
CN1	VN394900	Connector, FFC	52045 14P TE		01	
CN2	VF283100	Connector Base Post	PH-13P TE		01	
CN3	VK270200	Straight Header	HIF3FC30PA-2.54DSA		04	
CN4	VK270300	Straight Header	HIF3FC40PA-2.54DSA		05	
CN5	VH343800	Connector Header	HIF3FC-34PA2.54DSA		03	
CN6	VL536600	Connector Header	HIF3FC-50PA2.54DSA		03	
CN9	VL536600	Connector Header	HIF3FC-50PA2.54DSA		03	
CN14	VV331100	Connector	FCN-235D050-L/L#0G	SCSI	05	
CN16	VB389900	Connector Base Post	PH- 3P TE		01	
CN508	LB932050	Base Post Connector	VH- 5P TE		01	
CN516	VV345900	SIMM Socket	SX3LB-72S-1.27DSA		04	
-519	VV345900	SIMM Socket	SX3LB-72S-1.27DSA		04	
CN521	--	Jumper Header	RF 6P TE	(VG51850)		
CN800	VF283100	Connector Base Post	PH-13P TE		01	
CN801	VB390400	Connector Base Post	PH- 8P TE		01	
CN802	LB918040	Base Post Connector	XH 4P TE		01	
CN803	VK270300	Straight Header	HIF3FC40PA-2.54DSA		05	
CN804	VM673300	Header	HIF3FC26PA-2.54DSA		03	
D2	VT332900	Diode	1SS355 TE-17		01	
D3	VS597600	Diode	RB160L-40 TE25		01	
D10	VT332900	Diode	1SS355 TE-17		01	
-13	VT332900	Diode	1SS355 TE-17		01	
D101	VT332900	Diode	1SS355 TE-17		01	
-136	VT332900	Diode	1SS355 TE-17		01	
D500	VS201100	Diode	D1F60		01	
D800	VT332900	Diode	1SS355 TE-17		01	
-803	VT332900	Diode	1SS355 TE-17		01	
D804	VV220700	Diode	RB501V-40		01	
-806	VV220700	Diode	RB501V-40		01	
D807	VT332900	Diode	1SS355 TE-17		01	
EM500	VV345800	Filter (chip)	NFM61R00T361		02	
-502	VV345800	Filter (chip)	NFM61R00T361		02	
EM800	VV345800	Filter (chip)	NFM61R00T361		02	
-810	VV345800	Filter (chip)	NFM61R00T361		02	
EM811	VD542700	LC Filter	DSS306-93F223Z1		01	
IC1	XW795A00	IC	HD6437043AE00F	CPU	11	
IC2	XV932A00	IC	MSM5118160D-60J	DRAM 16M	12	
IC3	XV932A00	IC	MSM5118160D-60J	DRAM 16M	12	
*	IC6	XW988B00	28F800B5	FLASH ROM L 475BV100		
*	IC7	XW800B00	28F800B5	FLASH ROM H 475AV100		
	IC8	XI939A00	HD63266F	FDC	09	
	IC9	XQ595A00	SED1335F0B	LCDC	08	
*	IC10	XV377A00	24LC32A-I/SN	} EEPROM 32K		
*	IC10	XY229A00	AT24C32-10SI			
	IC11	XS323A00	D65611GB-039-3B	GATE ARRAY	05	
	IC13	XJ013A00	TC74HC126AF	BUS BUFFER	03	

*: New Parts

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REF NO.	PART NO.	DESCRIPTION	REMARKS	QTY	RANK	
IC14	XV411A00	IC	W24258S-70LE-EL10		SRAM 256K	07
IC15	VN686000	Photo Coupler	PC410T			04
IC17	XL122A00	IC	PST572CMT-R		SYSTEM RESET	02
IC20	XT015A00	IC	TC74VHC138F		DECODER	02
IC21	XT015A00	IC	TC74VHC138F		DECODER	02
IC22	XH225A00	IC	SN74HC574NSR		D-FF	03
IC23	XH225A00	IC	SN74HC574NSR		D-FF	03
IC24	XH223A00	IC	SN74HC273NSR		D-FF	01
IC25	XH223A00	IC	SN74HC273NSR		D-FF	01
IC26	XV794A00	IC	TC74VHC153F		MULTIPLEXER	
-28	XV794A00	IC	TC74VHC153F		MULTIPLEXER	
IC30	XN967A00	IC	TC74VHC164F		SHIFT REGISTER	03
IC31	XT487A00	IC	TC74VHC245F		TRANSCIEVER	03
IC32	XN969A00	IC	TC74VHC244F		BUS BUFFER	03
IC33	XT487A00	IC	TC74VHC245F		TRANSCIEVER	03
-37	XT487A00	IC	TC74VHC245F		TRANSCIEVER	03
IC38	XS720A00	IC	TC74HC245AF		TRANSCIEVER	03
IC39	XD657A00	IC	TC74HC14AF-TP1		INVERTER	02
IC40	XM332A00	IC	TC74VHC04F		INVERTER	01
IC42	XR337A00	IC	TC74VHC32F-TEL		OR	01
IC43	XR337A00	IC	TC74VHC32F-TEL		OR	01
IC45	XT812A00	IC	TC74VHC11F(EL)		INVERTER	01
IC46	XR337A00	IC	TC74VHC32F-TEL		OR	01
* IC49	XY363A00	IC	TC7WH04FU		INVERTER	
* IC50	XW948A00	IC	TC7WH08FU		AND	
IC51	XH223A00	IC	SN74HC273NSR		D-FF	01
IC52	XK851A00	IC	MB87034PF		SPC	12
IC53	XN972A00	IC	TC74VHC374F		D-FF	03
IC54	XN972A00	IC	TC74VHC374F		D-FF	03
IC56	XN964A00	IC	TC74VHC74F		D-FF	02
IC58	XN967A00	IC	TC74VHC164F		SHIFT REGISTER	03
* IC72	XW875A00	IC	TC74VHC74F-EL		D-FF	
* IC76	XU042A00	IC	AN8612NSB-E1		SCSI TERMINATOR	
IC77	XS720A00	IC	TC74HC245AF		TRANSCIEVER	03
IC78	XS775A00	IC	TC7SH04FU		INVERTER	01
* IC79	XW946A00	IC	TC7WH00FU		NAND	
IC80	XS775A00	IC	TC7SH04FU		INVERTER	01
-82	XS775A00	IC	TC7SH04FU		INVERTER	01
IC84	XS775A00	IC	TC7SH04FU		INVERTER	01
IC86	XR337A00	IC	TC74VHC32F-TEL		OR	01
IC87	XN964A00	IC	TC74VHC74F		D-FF	02
IC88	XS775A00	IC	TC7SH04FU		INVERTER	01
IC89	XR680A00	IC	TC7SH08FU		AND	
-91	XR680A00	IC	TC7SH08FU		AND	
* IC92	XW948A00	IC	TC7WH08FU		AND	
IC94	XR337A00	IC	TC74VHC32F-TEL		OR	01
* IC96	XY363A00	IC	TC7WH04FU		INVERTER	
* IC97	XY363A00	IC	TC7WH04FU		INVERTER	
IC98	XS775A00	IC	TC7SH04FU		INVERTER	01
IC503	XS369A00	IC	D65636GF-104-3B9		SPF	07
IC505	XV077A00	IC	MSM514260C-60JS		DRAM 4M	07
IC507	XS725A00	IC	TC203C760HF-002		SWP30B	19
* IC508	XW148A00	IC	HD74LVC245A		TRANSCIEVER	
IC509	XS516A00	IC	UPC2933T-E1		REGULATOR +3.3V	03
IC515	XS775A00	IC	TC7SH04FU		INVERTER	01
IC516	XS370A00	IC	D65621GF-028-3B9		GATE ARRAY	06
* IC520	XW148A00	IC	HD74LVC245A		TRANSCIEVER	
* IC522	XW148A00	IC	HD74LVC245A		TRANSCIEVER	
* IC524	XW148A00	IC	HD74LVC245A		TRANSCIEVER	
* IC526	XW148A00	IC	HD74LVC245A		TRANSCIEVER	
* -533	XW148A00	IC	HD74LVC245A		TRANSCIEVER	
IC534	XV932A00	IC	MSM5118160D-60J		DRAM 16M	12
IC535	XV932A00	IC	MSM5118160D-60J		DRAM 16M	12
* IC536	XY110A00	IC	XC9536-10VQ44C		CPLD	
IC538	XS720A00	IC	TC74HC245AF		TRANSCIEVER	03
IC539	XV865A00	IC	TC7WH157FU		MULTIPLEXER	02
-541	XV865A00	IC	TC7WH157FU		MULTIPLEXER	02
IC802	XN964A00	IC	TC74VHC74F		D-FF	02
IC803	XV763A00	IC	OP275GSR		OP AMP	05
IC804	XU829A00	IC	PCM1716E		DAC	06
IC805	XU829A00	IC	PCM1716E		DAC	06
IC806	XV763A00	IC	OP275GSR		OP AMP	05
IC807	XU770A00	IC	PCM1800E/2K		A/D CONVERTER	07
IC808	XV763A00	IC	OP275GSR		OP AMP	05
IC809	XV763A00	IC	OP275GSR		OP AMP	05

*: New Parts

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REF NO.	PART NO.	DESCRIPTION		REMARKS	QTY	RANK
IC810	XQ138A00	IC	NJM4556AMT1	OP AMP		03
IC811	XR339A00	IC	TC9246F-TEL	PLL		04
IC812	XT487A00	IC	TC74VHC245F	TRANSCEIVER		03
-814	XT487A00	IC	TC74VHC245F	TRANSCEIVER		03
IC815	XS534A00	IC	NJM78M05DLA	REGULATOR +5V		02
IC816	XS775A00	IC	TC7SH04FU	INVERTER		01
IC821	XT487A00	IC	TC74VHC245F	TRANSCEIVER		03
IC822	XW357A00	IC	DS90C402M	LINE RECEIVER		07
* IC823	XY618A00	IC	TC7SH32F	OR		
J99	VG518300	Jumper Header	RF 2P TE			01
JK1	VI466400	DIN Connector	3 DIN YKF51-5046	MIDI IN/OUT/THRU		04
JK800	VB312600	Phone Jack	YKB21-5012	ASSIGN OUT-L		02
JK801	VB312600	Phone Jack	YKB21-5012	ASSIGN OUT-R		02
JK802	VB312600	Phone Jack	YKB21-5012	STEREO OUT L/MONO		02
JK803	VB312600	Phone Jack	YKB21-5012	STEREO OUT R		02
L2	VS740100	Chip Inductance	BLM21B751S 2125			03
L11	VS740100	Chip Inductance	BLM21B751S 2125			03
-19	VS740100	Chip Inductance	BLM21B751S 2125			03
L26	VS740100	Chip Inductance	BLM21B751S 2125			03
-31	VS740100	Chip Inductance	BLM21B751S 2125			03
L802	VQ724900	Chip Inductance	BK2125HM601-T			01
L807	VR579900	Chip Inductance	BK2125HS601-T			01
-826	VR579900	Chip Inductance	BK2125HS601-T			01
L827	VA078900	Jumper Wire	0.55			
L828	VA078900	Jumper Wire	0.55			
RA1	RE047100	Resistor Array	10KX4			01
-3	RE047100	Resistor Array	10KX4			01
RA4	RE046470	Resistor Array	4.7KX4			01
-6	RE046470	Resistor Array	4.7KX4			01
RA7	RE045100	Resistor Array	100X4			01
-10	RE045100	Resistor Array	100X4			01
RA11	RE046330	Resistor Array	3.3KX4			01
-14	RE046330	Resistor Array	3.3KX4			01
RA15	RE045100	Resistor Array	100X4			01
RA16	RE047100	Resistor Array	10KX4			01
-36	RE047100	Resistor Array	10KX4			01
RA37	RE044470	Resistor Array	47X4			01
-53	RE044470	Resistor Array	47X4			01
RA95	RE047100	Resistor Array	10KX4			01
RA500	RE047100	Resistor Array	10KX4			01
RA502	RE047100	Resistor Array	10KX4			01
RA511	RE044680	Resistor Array	68X4			01
RA512	RE044680	Resistor Array	68X4			01
RA515	RE044680	Resistor Array	68X4			01
RA516	RE044680	Resistor Array	68X4			01
RA519	RE044680	Resistor Array	68X4			01
RA520	RE044680	Resistor Array	68X4			01
RA523	RE044680	Resistor Array	68X4			01
-538	RE044680	Resistor Array	68X4			01
RA539	RE047100	Resistor Array	10KX4			01
RA800	RE047100	Resistor Array	10KX4			01
RA801	RE047100	Resistor Array	10KX4			01
SW1	KA401270	Slide Switch	SSS212	SCSI TERMINATOR		03
* TH1	V2429100	Protector Switch	MINI SMDC100-02			
TR1	VJ927100	Transistor	2SC2712 Y			01
TR2	VD303700	Transistor	2SC3326 A,B TE85R			01
-12	VD303700	Transistor	2SC3326 A,B TE85R			01
TR800	VJ927200	Transistor	2SA1162 O,Y			01
TR802	VJ927200	Transistor	2SA1162 O,Y			01
X1	VV762900	Quartz Crystal Unit	7M SMD-49			03
X2	VR870700	Quartz Crystal Unit	10M SMD-49			04
X3	VP864900	Quartz Crystal Unit	16M SMD-49			04
* X4	V4332300	Quartz Crystal Unit	8M DOC-49S1			
X500	VV345500	Quartz Crystal Unit	DOC-49S5			05
* ZD1	VU304700	Zener Diode	PTZ 6.2ATE25 6.2V			
* -3	VU304700	Zener Diode	PTZ 6.2ATE25 6.2V			
	UR829100	Electrolytic Cap.	1000 10.0V	C:550		01
	UU137470	Electrolytic Cap.-FW	47.00 16.0V	C:899,900,941-946		01
	UU138470	Electrolytic Cap.-FW	470.00 16.0V	C:882,883		01
	UU167470	Electrolytic Cap.-FW	47.00 50.0V	C:801,802,807,808,831,832,842 843,851,852,860,861,868,869 889,890,902,906		01
	VV546700	Tantalum Capacitor (chip)	47 10V M	C:613,614		03
	VY844800	MUSE Capacitor (chip)	22 16V	C:856,872		01
	UE046470	Electrolytic Cap. (chip)	4.7 25V RV2	C:62		01

*: New Parts

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REF NO.	PART NO.	DESCRIPTION		REMARKS	QTY	RANK
	UE066100	Electrolytic Cap. (chip)	1 50V RV2	C:105		01
	UF027220	Electrolytic Cap. (chip)	22 10V	C:839,840		01
	UF027330	Electrolytic Cap. (chip)	33 10V	C:812,813,821,823,824,826		01
	UF027470	Electrolytic Cap. (chip)	47 10V	C:35,36		01
	UF028100	Electrolytic Cap. (chip)	100 10V	C:47,513,549,590,592,594,596		01
	UF037100	Electrolytic Cap. (chip)	10 16V	C:6,9,12,15,20,73,74,161,162 816,818,822,825		01
	UF037470	Electrolytic Cap. (chip)	47 16V	C:870,871,913,917,918		01
	UF038100	Electrolytic Cap. (chip)	100 16V	C:848,877,912		01
	UF047220	Electrolytic Cap. (chip)	22 25V	C:850		01
	UF138220	Electrolytic Cap. (chip)	220 16V UUR1C2	C:609		01
	UF148100	Electrolytic Cap. (chip)	100 25V UUR1E1	C:849		01
	UF157470	Electrolytic Cap. (chip)	47 35V UUR1V4	C:891		01
	UF167470	Electrolytic Cap. (chip)	47 50V UUR1H4	C:611,		01
	VR326200	Mylar Capacitor (chip)	0.01 16V J	C:622-625,809,814,833-836,841 847,853,857-859,866,867,875 924-932,947-956,961,962		01
	VY846100	Mylar Capacitor (chip)	0.47 16V J	C:874		02
	VI192500	Carbon Resistor (chip)	100.0 1/10 D	R:824,825,962,963		01
	VI193200	Carbon Resistor (chip)	200.0 1/10 D	R:812-815		01
	VI194500	Carbon Resistor (chip)	680 1/10 D	R:844,845		01
	VI194900	Carbon Resistor (chip)	1.0K 1/10 D	R:832,833,852,853,862,863		01
	VI195400	Carbon Resistor (chip)	1.6K 1/10 D	R:834,835		01
	VI195700	Carbon Resistor (chip)	2.2K 1/10 D	R:842,843		01
	VI196600	Carbon Resistor (chip)	4.7K 1/10 D	R:854,855		01
	VI197400	Carbon Resistor (chip)	10.0K 1/10 D	R:836,837,846,847,883-886,919 920		01
	VI198100	Carbon Resistor (chip)	20.0K 1/10 D	R:848,849		01
	VI199000	Carbon Resistor (chip)	47.0K 1/10 D	R:838-841,850,851,856,857		01
	VI200000	Carbon Resistor (chip)	100.0K 1/10 D	R:818,819		01
	UB012470	Monolithic Ceramic Cap.	B 470P 50V K	C:3,42,844,845		01
	UB044100	Monolithic Ceramic Cap.	F 0.01 50V Z	C:23,151-160,543,620,621,805		01
	UB051100	Monolithic Ceramic Cap.	SL 10P 50V D	C:40,41		01
	UB051150	Monolithic Ceramic Cap.	SL 15P 50V J	C:873		01
	UB051220	Monolithic Ceramic Cap.	SL 22P 50V J	C:1,2,16,17,864,865		01
	UB052330	Monolithic Ceramic Cap.	SL 330P 50V J	C:837,838,854,855		01
	UB245100	Monolithic Ceramic Cap.	F 0.1 25V Z	C:4,5,7,8,10,11,14,18,19,21,22 26-34,37,39,43,46,48-50,52- 56,58-61,63,69-72,75-77,82, 83,85,86,88,89,91-95,97-104 106-109,129,131,134,165,167 -174,176,178,179,500-506, 512,514-521,523-525,540,542 546,551-552,558,560,562,566 -572,577-585,587,589,591,593 595,607-608,610,612,615-618 626,803,804,806,876-881,884 -886,888,892,911,914,915 919,920,939,940		01
	VJ899200	Monolithic Ceramic Cap.	CH 7P 50V D	C:44,45		01
	RD155100	Carbon Resistor (chip)	100.0 1/4 J	R:864-867,948,949		01
	RD155470	Carbon Resistor (chip)	470.0 1/4 J	R:826,827		01
	RD250000	Carbon Resistor (chip)	0.0 0.0 J	R:75,76,80,82,84,86,185,199,530 531,539,543,577,873-875,879 894,895,956-959,973,974,978		01
	RD254100	Carbon Resistor (chip)	10.0 0.1 J	R:966		01
	RD254470	Carbon Resistor (chip)	47.0 0.1 J	R:43,71,72,220,532,545-549,564		01
	RD254680	Carbon Resistor (chip)	68.0 0.1 J	R:211-218,508,550-552		01
	RD255100	Carbon Resistor (chip)	100.0 0.1 J	R:221-240,243,246,522,529 559-563,578,579,871,943 964,965,976		01
	RD255220	Carbon Resistor (chip)	220.0 0.1 J	R:6,11-15		01
	RD255510	Carbon Resistor (chip)	510.0 0.1 J	R:67		01
	RD255560	Carbon Resistor (chip)	560.0 0.1 J	R:28-32		01
	RD256100	Carbon Resistor (chip)	1.0K 0.1 J	R:1,16,37-41,953,975		01
	RD256120	Carbon Resistor (chip)	1.2K 0.1 J	R:19-27		01
	RD256150	Carbon Resistor (chip)	1.5K 0.1 J	R:872		01
	RD256330	Carbon Resistor (chip)	3.3K 0.1 J	R:7		01
	RD256470	Carbon Resistor (chip)	4.7K 0.1 J	R:44,523-525,528		01
	RD256560	Carbon Resistor (chip)	5.6K 0.1 J	R:35,36		01
	RD256820	Carbon Resistor (chip)	8.2K 0.1 J	R:48		01
	RD257100	Carbon Resistor (chip)	10.0K 0.1 J	R:3,4,18,45,46,49,55-61,63,68 69,73,74,87-91,93-96,98-100 174,175,178,180,181,184,186-		01

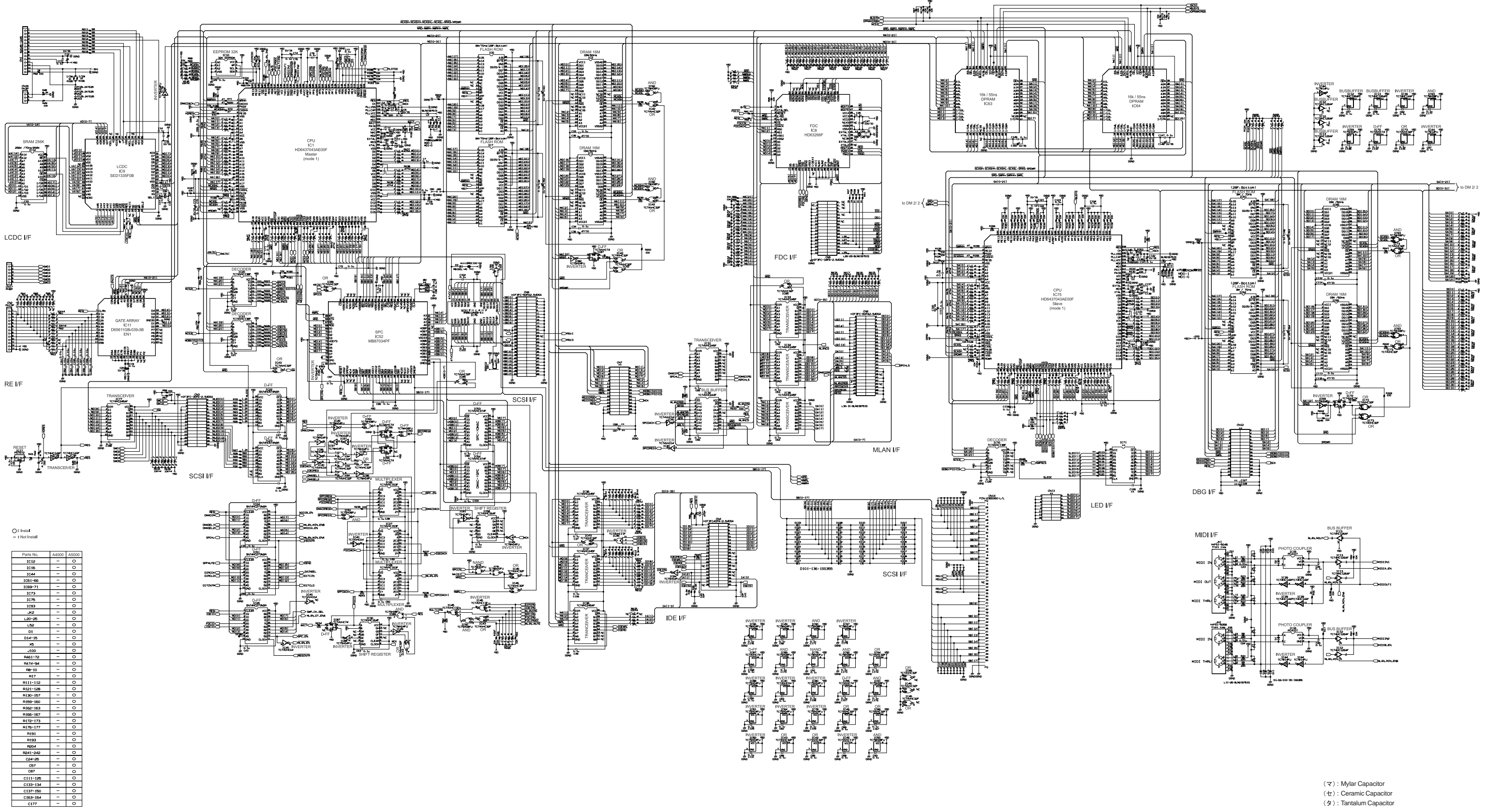
*: New Parts

RANK: Japan only

REF NO.	PART NO.	DESCRIPTION		REMARKS	QTY	RANK
				190,194,197,202,219,244 245,247,507,514,515,519,520 526,527,566-573,801,805,809 821,829-831,858-861,868,869 880-882,887,891-893,954,955 960,961,977		
	RD257470	Carbon Resistor (chip)	47.0K 0.1 J	R:804		01
	RD258100	Carbon Resistor (chip)	100.0K 0.1 J	R:808,828,889,890,971,972		01
	RD258220	Carbon Resistor (chip)	220.0K 0.1 J	R:870,888		01
*	V4808300	Carbon Resistor (chip)	1.0K 1/2 J	R:195,196		
	VU977200	Carbon Resistor (chip)	100.0 1/0 J	R:92,200,210		01
	V4457300	Circuit Board	JK	(XW531B0)		
CN1	VB390400	Connector Base Post	PH- 8P TE			01
CN2	VE352600	Connector Base Post	PH-14P TE			01
EMI3	FZ007050	LC Filter EMI	MT-B271KB			
EMI4	FZ007050	LC Filter EMI	MT-B271KB			
IC1	XW487A00	IC	OP275GP	OP AMP		
IC2	XW487A00	IC	OP275GP	OP AMP		
J1	VA078900	Jumper Wire	0.55			
JK1	VY961000	Phone Jack	YKB21-5257	PHONE		
JK2	V5114100	Phone Jack	HLJ4416 JACK	INPUT L		
JK3	V5114100	Phone Jack	HLJ4416 JACK	INPUT R		
L1	VA078900	Jumper Wire	0.55			
L2	VA078900	Jumper Wire	0.55			
L3	VB835000	Coil	FL5R200QNT			01
L4	VB835000	Coil	FL5R200QNT			01
TR1	IC287820	Transistor	2SC2878 A,B			01
TR2	IC287820	Transistor	2SC2878 A,B			01
	UU167470	Electrolytic Cap.-FW	47.00 50.0V	C:3,4,7,8,13,14,17,18		01
	UU137470	Electrolytic Cap.-FW	47.00 16.0V	C:9,12		01
	UA354100	Mylar Capacitor	0.01 50V J	C:1,2,20,23		01
	UA352100	Mylar Capacitor	100P 50V J	C:5,6		01
	VF611200	Monolithic Ceramic Cap.	0.1 50V Z	C:10,11,15,16		02
	VC323900	Metal Film Resistor	100.0K 1/4 F	R:1,2,5,7,		01
	VC328800	Metal Film Resistor	10.0K 1/4 F	R:3,4,6,8-10		01
	VC331200	Metal Film Resistor	100.0K 1/4 F	R:15,16		01
	HF458220	Carbon Resistor	220.0K 1/4 J	R:11		01
	HF456470	Carbon Resistor	4.7K 1/4 J	R:13,14		01
	VV331600	Circuit Board	PNA	(XS547A0)		13
C1	UJ838100	Electrolytic Cap.	100.00 16.0V			01
SW10	VK701100	Push Switch	SKHQFN GREEN	PLAY,EDIT,REC,DISK		02
-14	VK701100	Push Switch	SKHQFN GREEN	UTILITY		02
SW1	VU420200	Push Switch	EVQ PJH 05K	F1-F6.COMMAND/EXIT.		01
-9	VU420200	Push Switch	EVQ PJH 05K	ASSIGNABLE,AUDITION		01
RA1	VK270200	Straight Header	HIF3FC30PA-2.54DSA			04
D1	VR492000	Diode	1SS133			01
-14	VR492000	Diode	1SS133			01
LED1	VT838500	LED	SLZ-135B-08-T1 RE			01
-9	VT838500	LED	SLZ-135B-08-T1 RE			01
RA1	VB187300	Resistor Array	EXB-F9E472J5	}		01
RA1	VE331200	Resistor Array	RGLD8X472J	}		01
*	V4457200	Circuit Board	RE	(XW473B0)		
4	VA078900	Jumper Wire	0.55			
5	--	Connector Assembly	RE-DM	(V518450)		
CN1	VF283100	Connector Base Post	PH-13P TE			01
D1	VB941200	Diode	1SS133,1SS176			01
-5	VB941200	Diode	1SS133,1SS176			01
EC1	V4441800	Rotary Encoder	EC11B1524209	F1-F5		
-5	V4441800	Rotary Encoder	EC11B1524209			
	HF456470	Carbon Resistor	4.7K 1/4 J	R:1-5		01
*	V4457400	Circuit Board	VR	(XW573B0)		
CN1	VB858700	Connector Base Post	PH- 8P SE			01
CN2	VB858700	Connector Base Post	PH- 8P SE			01
CN3	VB858200	Connector Base Post	PH- 3P SE			01
VR1	VZ037000	Rotary Variable Resistor	A 20.0K RK14K12C	MASTER VOLUME		03
VR2	VZ037000	Rotary Variable Resistor	A 20.0K RK14K12C	REC VOLUME		03
VR3	V3820700	Rotary Variable Resistor	B 10K RK09K1130A5R	contrast		01
△ *	10	V3612600	Power Supply Unit	J, U		
△ *	10	V3612700	Power Supply Unit	E, B		
△	40a	VP184000	Push Switch	SDDL1		03

*: New Parts

RANK: Japan only

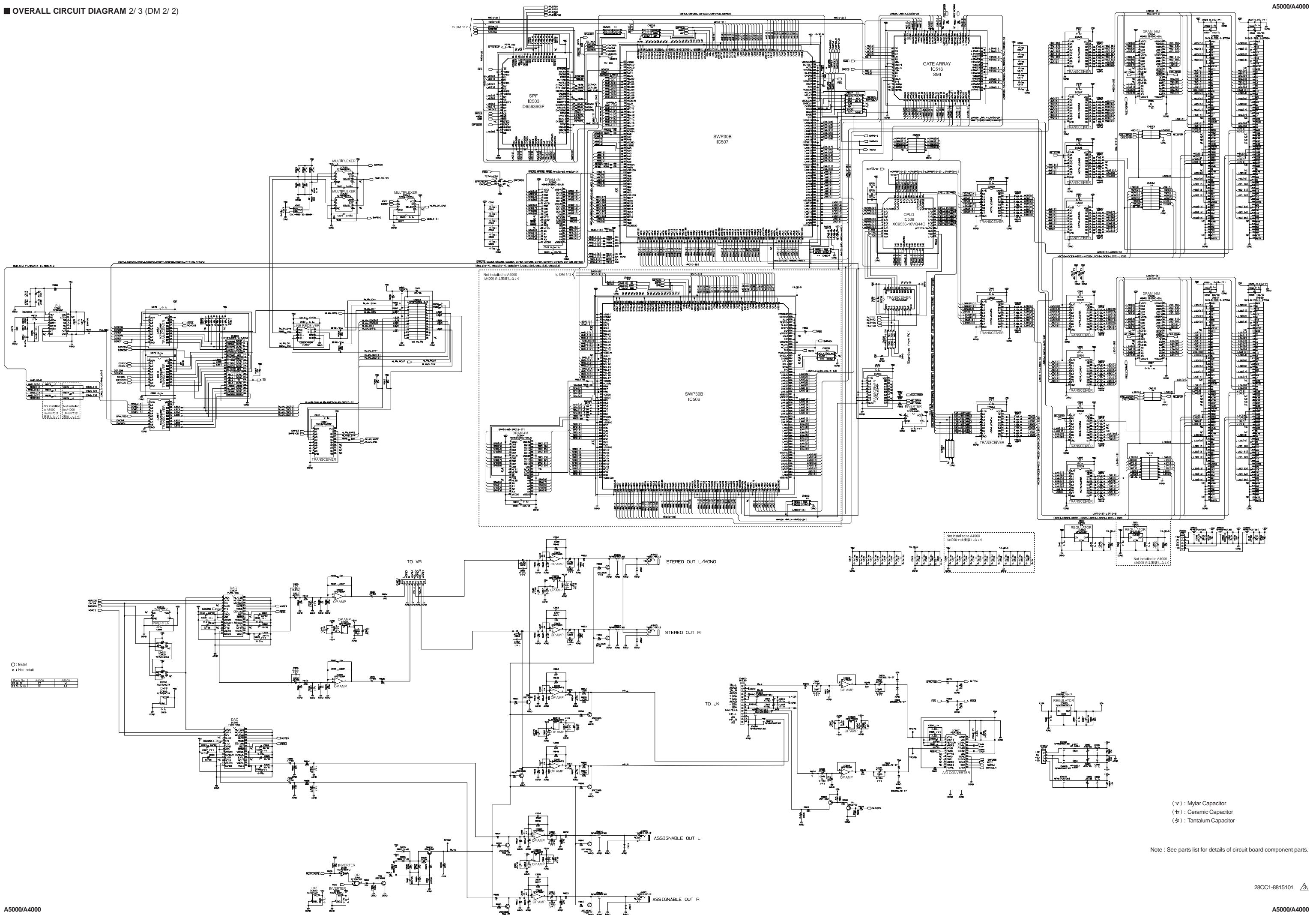


○: Install
 - : Not install

Parts No.	A4000	A5000
IC12	-	○
IC16	-	○
IC44	-	○
IC61-65	-	○
IC69-71	-	○
IC73	-	○
IC78	-	○
IC93	-	○
J2	-	○
J20-25	-	○
L82	-	○
Q1	-	○
Q14-15	-	○
R5	-	○
J700	-	○
R41-73	-	○
R474-94	-	○
R6-10	-	○
R17	-	○
R111-112	-	○
R121-126	-	○
R130-157	-	○
R159-160	-	○
R162-163	-	○
R166-167	-	○
R172-173	-	○
R176-177	-	○
R191	-	○
R193	-	○
R204	-	○
R241-242	-	○
C24-25	-	○
C37	-	○
C37	-	○
C111-126	-	○
C133-134	-	○
C137-150	-	○
C169-184	-	○
C177	-	○

(M): Mylar Capacitor
 (C): Ceramic Capacitor
 (T): Tantalum Capacitor

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

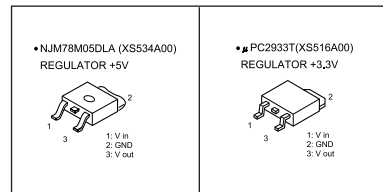
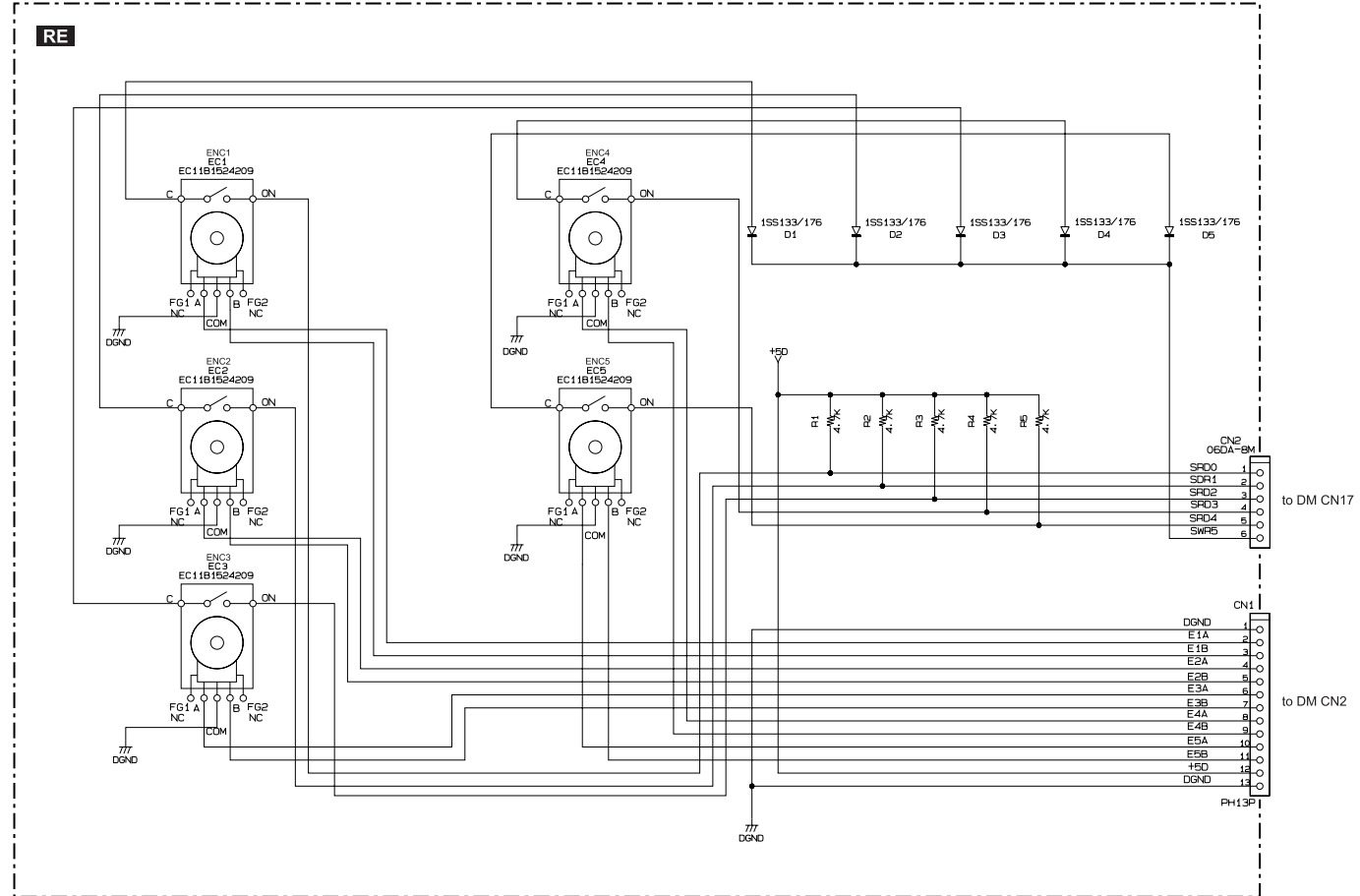
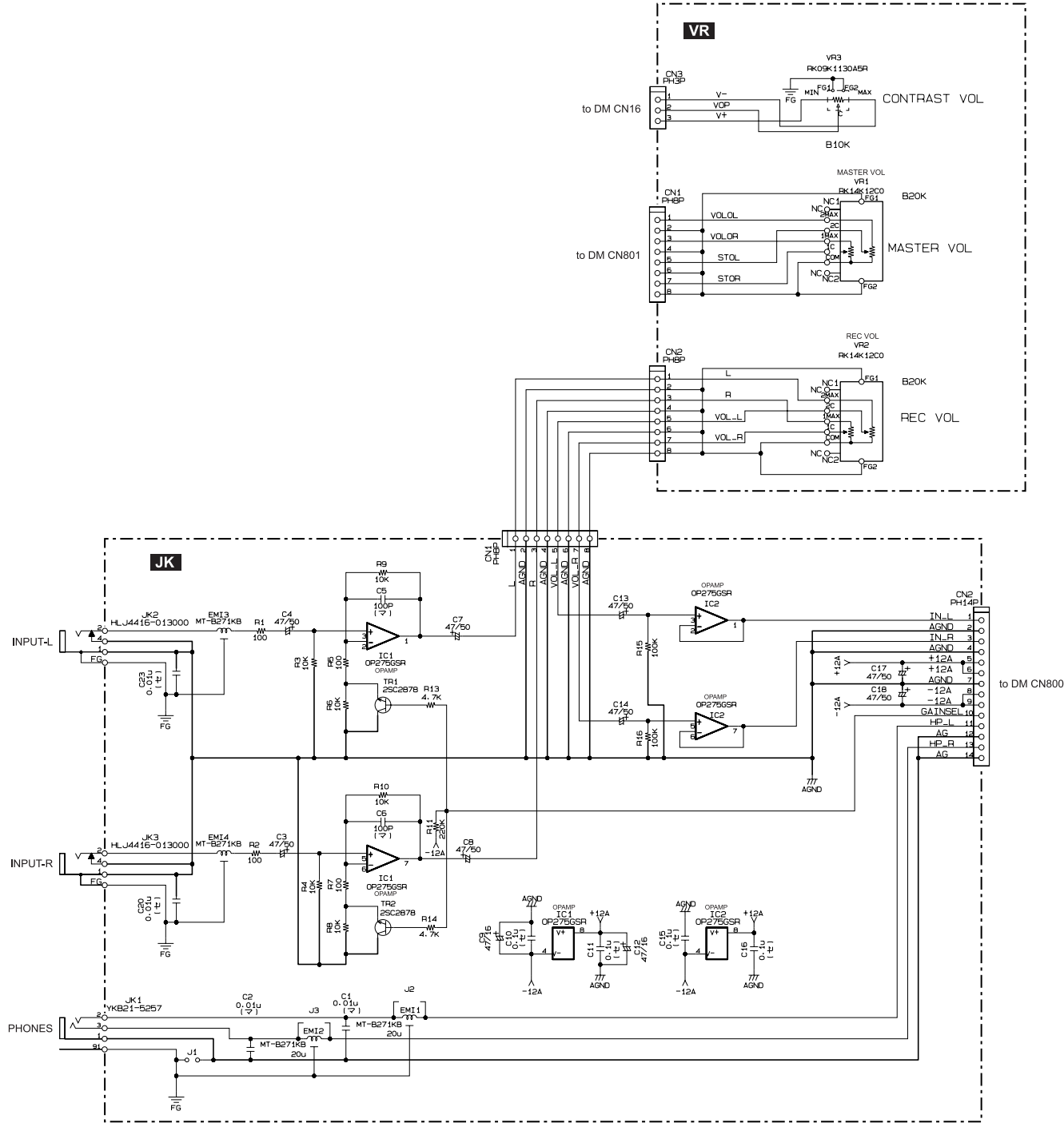


○ Install
 × Not install

Symbol	Symbol	Symbol
○	×	○
Install	Not install	Install

(マ) : Mylar Capacitor
 (セ) : Ceramic Capacitor
 (タ) : Tantalum Capacitor

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

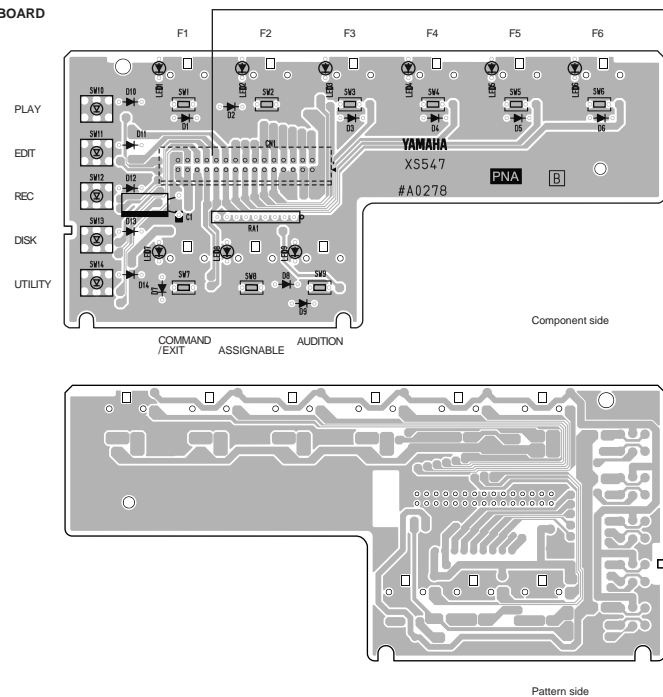


(マ) : Mylar Capacitor
(セ) : Ceramic Capacitor
(タ) : Tantalum Capacitor

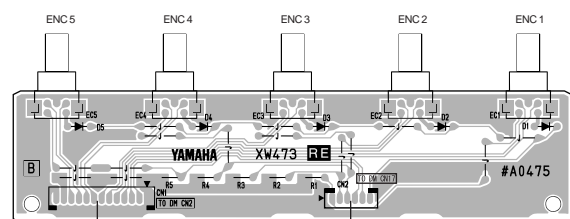
Note : See parts list for details of circuit board component parts.

JK : 28CC1-8815102
RE : 28CC1-8815103
VR : 28CC1-8815104

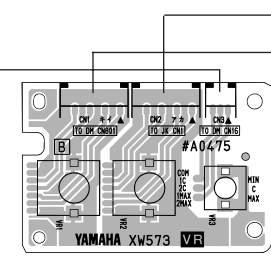
•PNA CIRCUIT BOARD



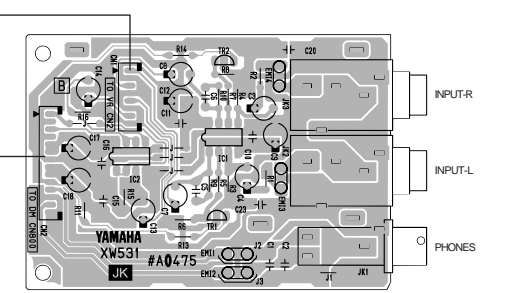
•RE CIRCUIT BOARD



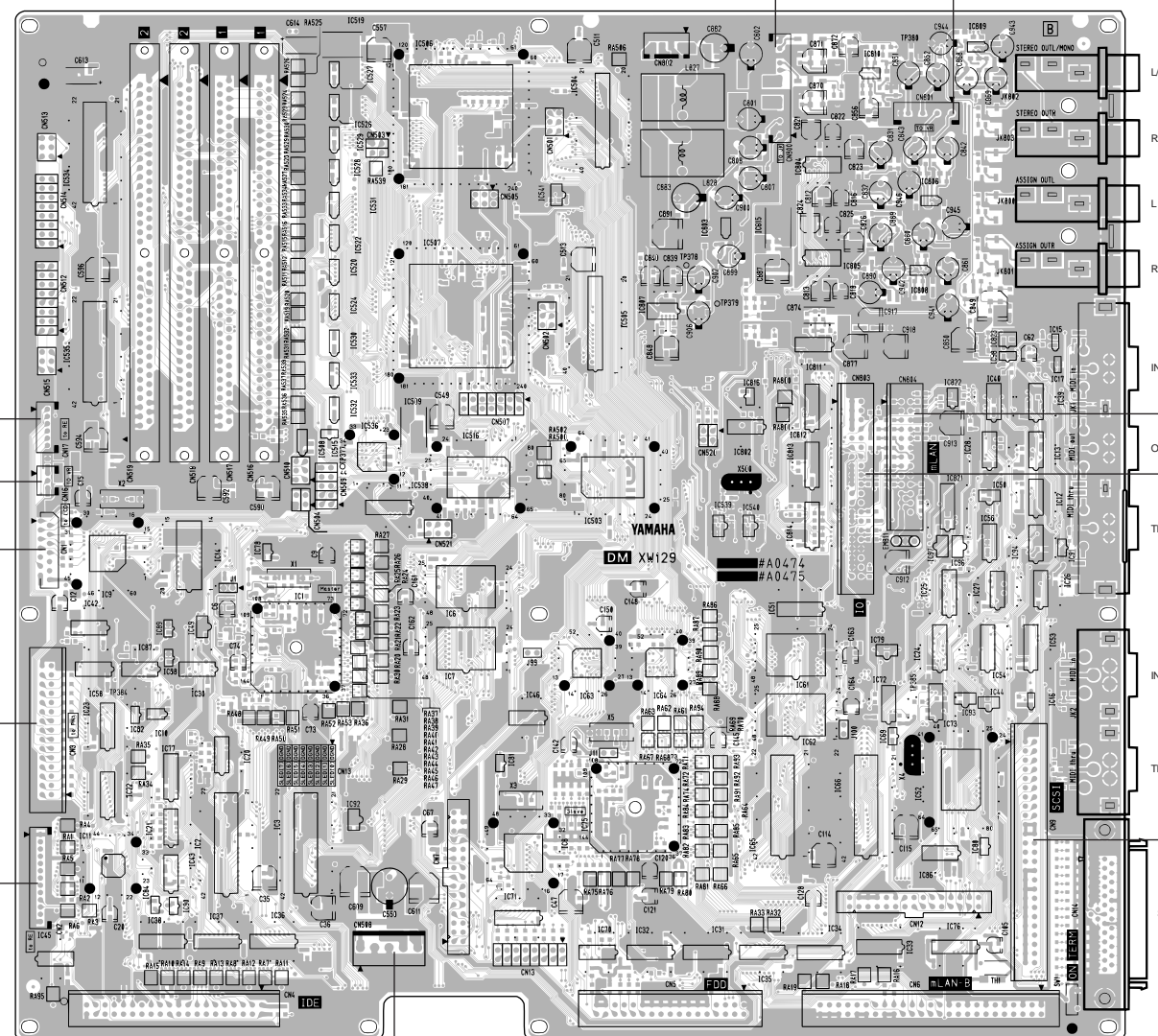
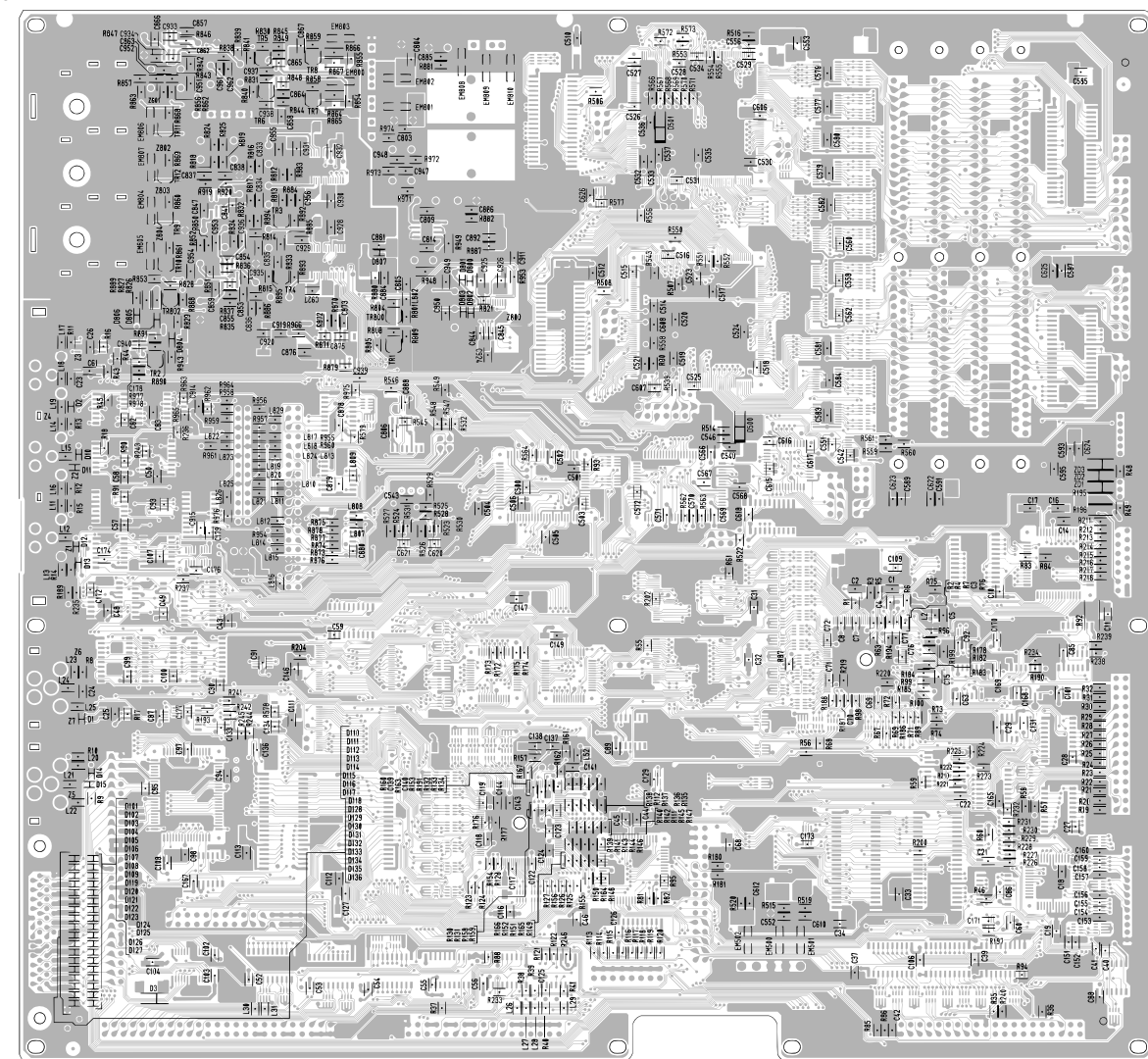
•VR CIRCUIT BOARD



•JK CIRCUIT BOARD



•DM CIRCUIT BOARD



- DM : 2NA-V431200
- PNA : 2NA-V431210
- RE : 2NA-V431220
- JK : 2NA-V431230
- VR : 2NZ-V431240

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