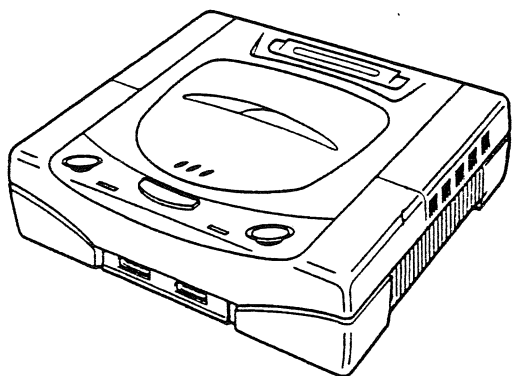


SEGATM SERVICE MANUAL

SEGA SATURN (PAL)



NO.	013 - 1
ISSUED	JUNE, 1995

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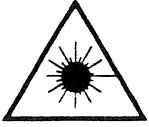
Sega Enterprises, Ltd.

PROTECTION OF EYES FROM LASER BEAM DURING SERVICING

This set employs laser. Therefore, be sure to follow carefully the instructions below when servicing.

Warning

When servicing, do not approach the laser exit with the eye too closely. In case it is necessary to confirm laser beam emission. Be sure to observe from a distance of more than 30 cm from the surface of the objective lens on the optical pick-up block.



Caution: Invisible laser radiation when open and interlocks defeated avoid exposure to beam.

Caution

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

This console is classified as a CLASS I LASER product.

SAFETY PRECAUTIONS

Notice: Comply with all cautions and safety related notes located on or inside the cabinet and on the chassis.

1. When replacing a chassis in the console, all the protective devices must be put back in place, such as barriers, non-metallic knobs, adjustment and compartment covers/shields, isolation resistors/capacitors, etc.
2. When service is required, observe the original lead-dress. Extra precautions should be taken to assure correct lead dress in the high voltage circuit.
3. Always use the manufacturer's replacement components. Especially critical components as indicated on the circuit diagram should not be replaced by other manufacturer's. Furthermore, where a short-circuit has occurred, replace those components that indicate evidence of overheating.

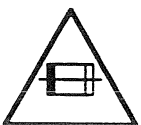
PRODUCT SAFETY NOTICE

Many electrical and mechanical parts have special safety-related characteristics. These are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual. Electrical components having such features are identified by marking with a $\triangle$ in the parts list in this Service Manual. The use of a substitute replacement component which does not have the same safety characteristics as the SEGA recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards. Product Safety is continuously under review and new instructions are issued from time to time.

CAUTION ON FUSE REPLACEMENT

Caution: For continued protection against risk of fire, replace only with same type, amperage, volt fuse.

Attention: Afin d'assurer une protection permanente contre tout risque d'amorçage électrique, remplacer uniquement par un fusible de meme type et de amperes volts.



This symbol indicates a Fast Operating Type Fuse.



This symbol indicates a Time Lag Type Fuse.

SATURN **COMPATABILITY**

Audio CD:

The normal audio Compact Disc is playable on the Saturn machine, and can be altered with all the effects of a modern Hi-fi and more. Surround sound, vocal cut-out for Karaoke, program sequence of tracks and shuffle to name but a few. You need no extra equipment to play music CDs on your Saturn.

CD+G:

CD and Graphics are a format where simple visuals can appear on the screen that relate to the music. These visuals might include stills of the band, or other pictures. You need to buy no extra equipment to use CD+G on your Saturn.

CD+EG:

CD and extended graphics is a new medium ready to be utilised by the music community. It is basically an enhanced version of what is described above in CD+G. You need no extra equipment to use CD+EG on your Saturn.

MPEG:

MPEG is the standard industry format for compressing Full Motion Video footage. This means that the footage takes up less disk space, and when it is to be viewed, the MPEG program decodes the footage and plays it on screen. The MPEG add-on is needed in order to use the MPEG video CDs and Philips CDi. At the current rate of compression one movie can fit on two CDs.

CDi:

Developed by Philips, CDi is an interactive CD format that can be used in a variety of educational and entertainment purposes. Using video footage and CD quality sound CDi has become an industry leader in the field of interactive fun. The MPEG add-on is required to access the full range of CDi software

Kodak Photo CD:

Photos stored on CD have theoretically infinite life, are always picture perfect and will never fade or be otherwise damaged. The Saturn can access Kodak Photo CDs with the use of another Saturn CD which allows the user to see display the photos in various ways. There are many Kodak Photo CD stores open in the major cities.

Frame Buffering: A technique to maximise graphic display performance by letting the graphics processor chip “set aside” images it has already calculated, allowing it to work on generating the next fraction of a seconds visual images, all while the screen is still busy painting the last fraction of a second’s display.

Playfields: The background(s), anything that is on screen that it not a sprite. When two playfields (layers of bacground) are contolled properly, parrallax scrolling can result. The Sega Saturn has a whole chip dedicated to controlling backgrounds (the VDP2 or Video Display Processor 2”) that can generate 5 distict layers of background at the same time.

Polygons/Second: (1000’s of) The number of polygons of a given size that can be drawn on the screen in one second. This figure does not include the size of the polygons, nor their texturing, shading, or lighting.

Realtime: An important adjective that usually indicates the game display is being re-calculated every second, taking into account the full effects of the player’s actions. When reffering to a game’s response or speed, it means the game responds instantly to the player’s commands.

Render: Drawing 3D graphical objects on a computer or game machine. “BUG” and “Clockwork Knight” are filled with beautifully rendered characters.

Texture Mapping: Copying a bit-map onto the faces of selected polygons to give the illusion of surface texture. “Daytona USA” is a great example of a texture mapped game.

Wireframe: A connect the dots approach to showing graphical objects by drawing lines between sets of points that make up a geometric outline.

Dynamic Perspective: Constantly changing the point of view (“camera angle”) so that the players feel that they are weaving in and around the on-screen action. Typically requires strong scaling and rotational capabilities. This can be seen on Sega Sports games on Saturn.

1. SPECIFICATIONS

Ratings

Model	MK – 80200-50
Power supply	AC220-240 V 50/60 Hz
Power consumption	Approx. 20 W
Operating environment	Temperature 5 °C to 35 °C Humidity 10% to 80% RH (no condensation)
Dimensions	260 mm(W) × 230 mm(L) × 83 mm(H) (10.2 inches) × (9.0 inches) × (3.2 inches)

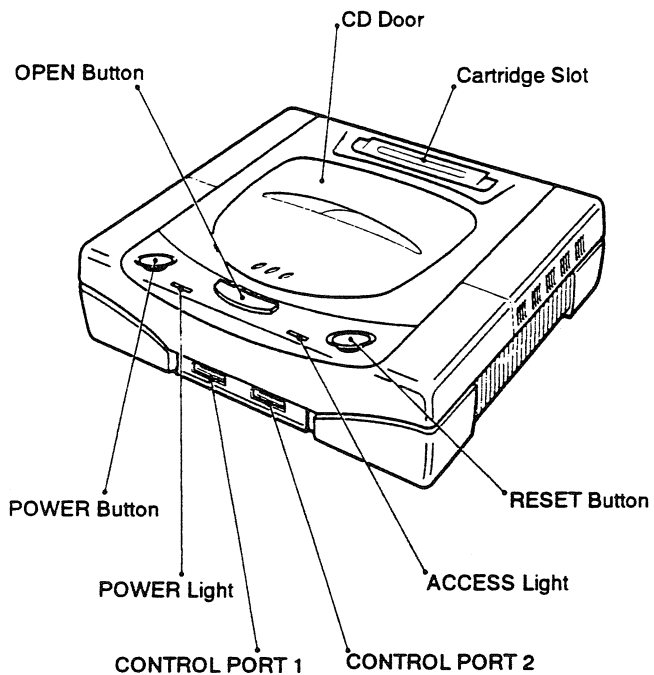
Specifications

CPU	Master	32bit RISC SH2 (28.4 MHz, 25MIPS)
	Slave	32bit RISC SH2 (28.4 MHz, 25MIPS)
	Sound	68EC000 (11.3 MHz)
Memories	Work RAM	16 Mbit
	Video RAM	12 Mbit
	Sound RAM	4 Mbit
	CD Buffer RAM	4 Mbit
	IPL ROM	4 Mbit
	Backup RAM	256 Kbit
Graphics	Resolution	320 × 224 dot etc.
	Colors	1024/2048 (16,770,000 simultaneous transmission)
	Sprite	Enlargement, Reducation, Rotation, Transformation
Scroll	5 screen maximum	
	XY Scroll	4
	Rotation	2
	Enlargement / reduction	2
	Window	2
	Special features	Vertical cell scroll
		Lateral line scroll
		Enlargement / reduction
CG Functions	Polygons	Specialized hardware
	Special features	Wire frame
		Flat shading
		Gouraud shading
Sound	PCM & FM sound source	32 channels 16 bit sampling Sampling rate 44.1 kHz max. Audio DSP
CD-ROM	Intelligent double-speed CD drive	

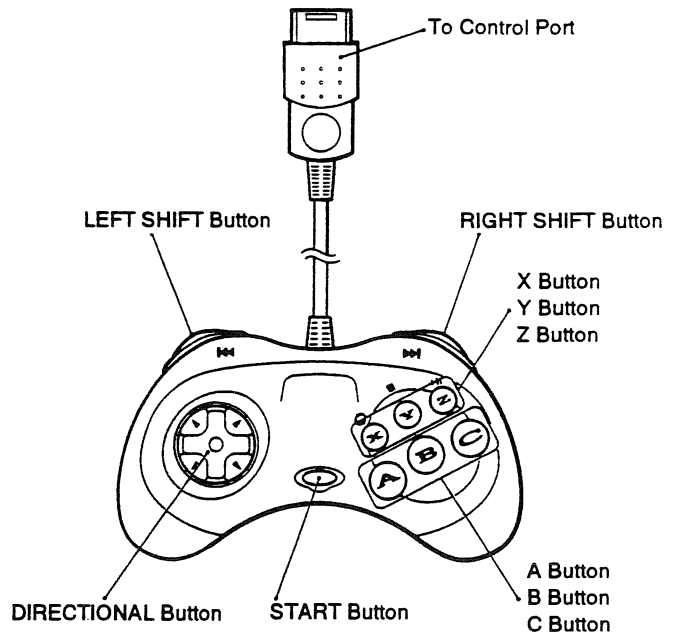
【Note】 Characteristics and specifications may be changed without notice.

2. IDENTIFYING PARTS

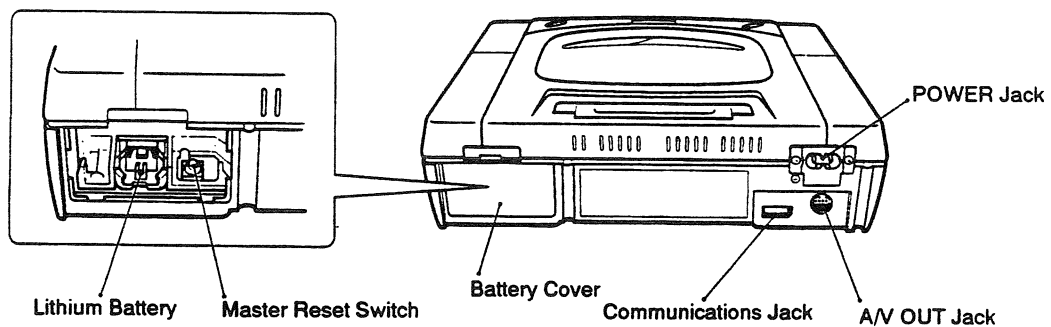
2-1. Front View of Console



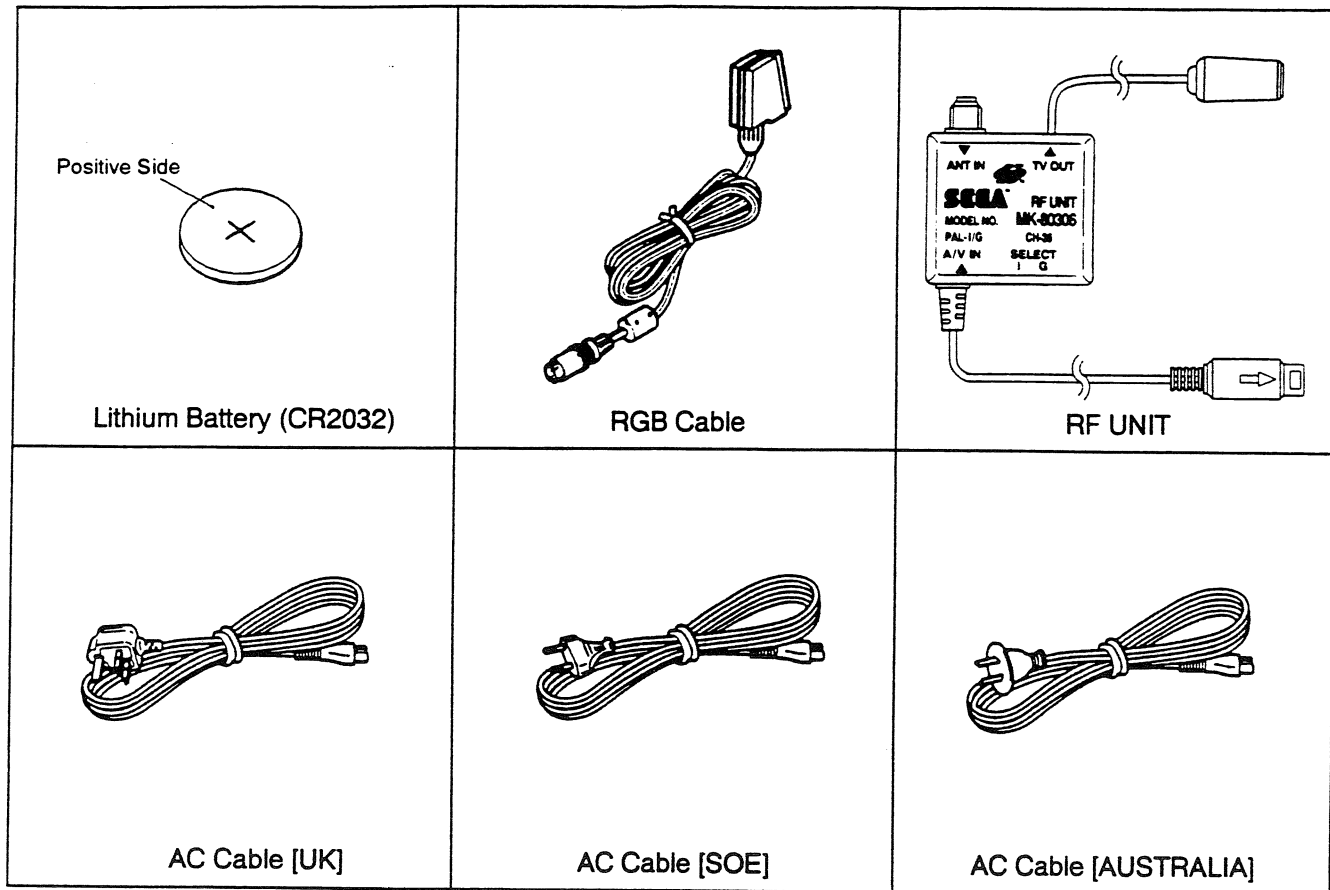
2-3. Control pad



2-2. Back View of Console



3. ACCESSORIES



4. IDENTIFICATIONS AND LOCATIONS OF CIRCUIT BOARDS

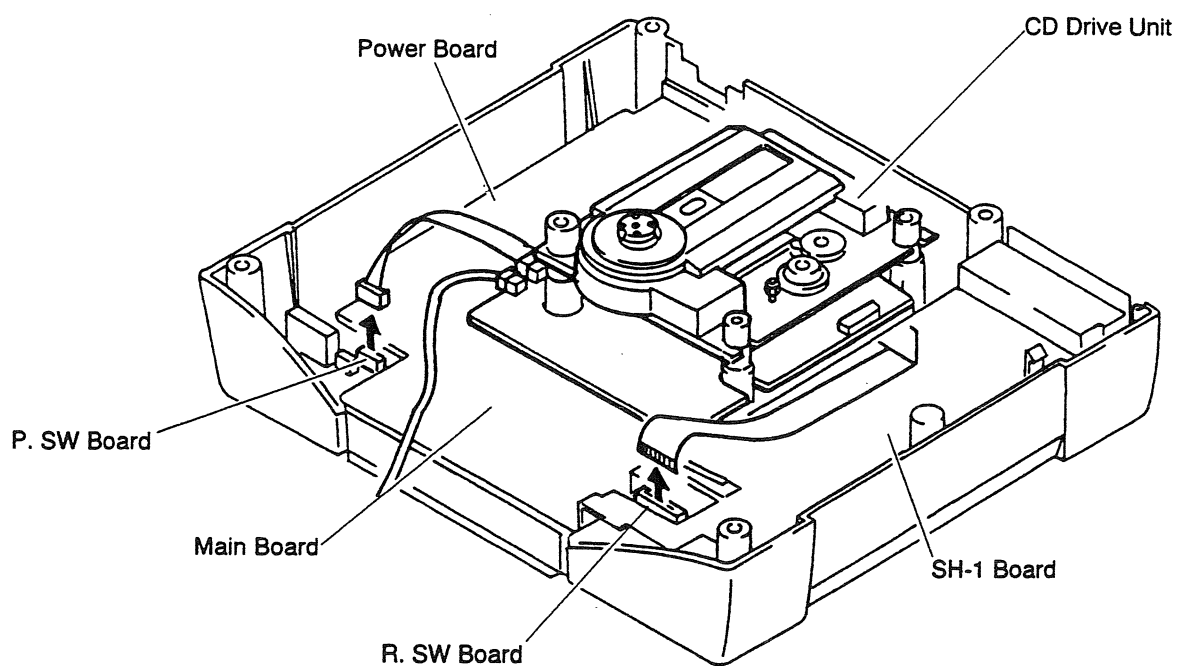


Fig. 4-1

5. DISASSEMBLY PROCEDURE

5-1. Top Case Removal

- 1) Remove six screws (A) and then the top case in the direction of the arrow.

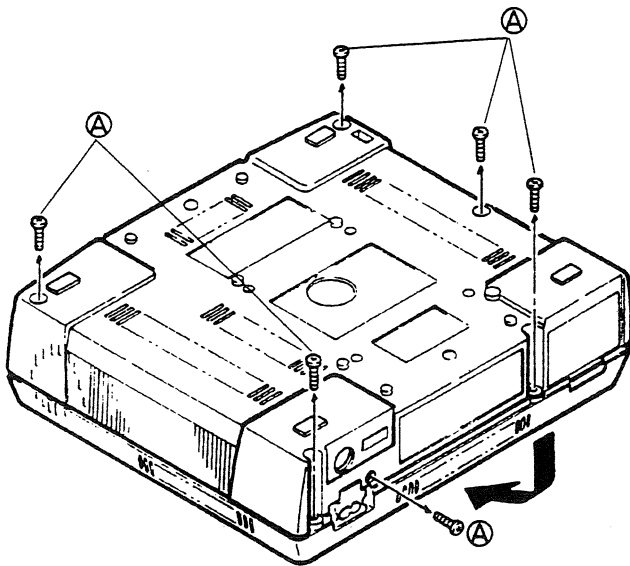


Fig. 5-1

5-3. CD Drive Unit Removal

- 1) Disconnect two connectors and one flat cable.
- 2) Remove the CD drive unit in the direction of arrow (G).

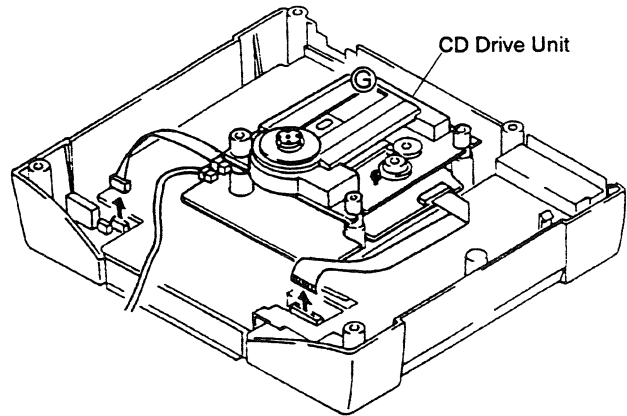


Fig. 5-3

5-2. CD Compartment Lid Removal

- 1) Remove two screws (B) and then the bracket lid CD spring.
- 2) Remove spring (C).
- 3) Remove two screws (D) and then the oil dumper.
- 4) Push the lever in the direction of arrow (E) to release the boss and then push the lever in the direction of arrow (F) to remove the CD compartment lid.

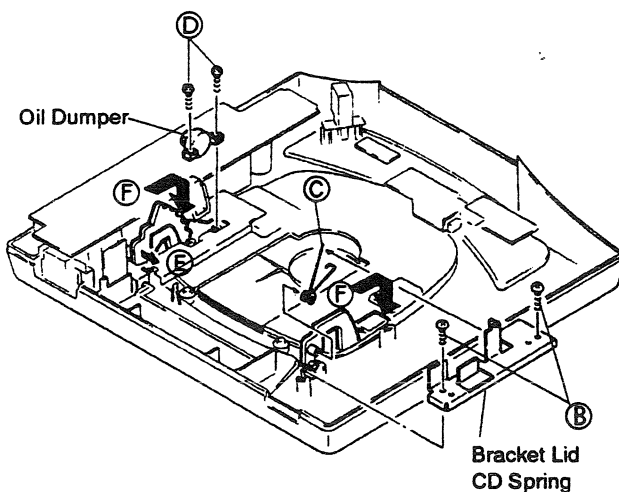


Fig. 5-2

5-4. SH-1 Board Removal

- 1) Remove four screws (H) and then the top shield plate.
- 2) Remove screw (I) and release three tabs, then lift the SH-1 board in the direction of arrow (J) to remove it.

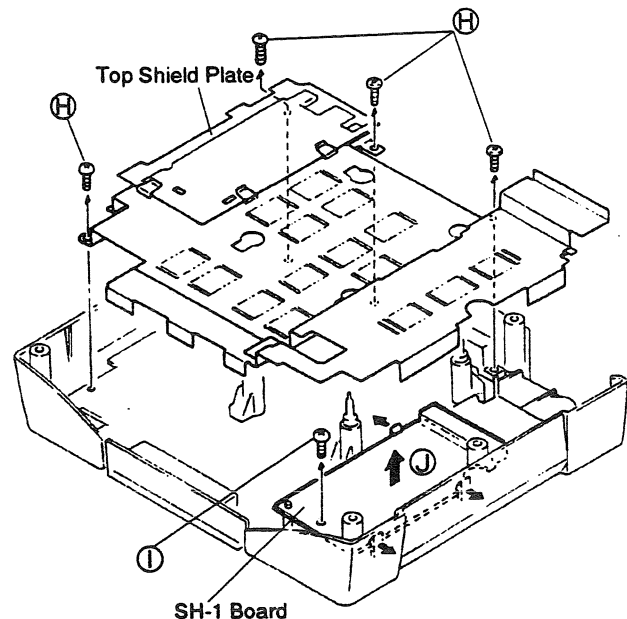


Fig. 5-4

5-5. Main Board Removal

- 1) Remove four screws (K) holding the CD drive unit supports.
- 2) Remove five screws (L) and then the main board.

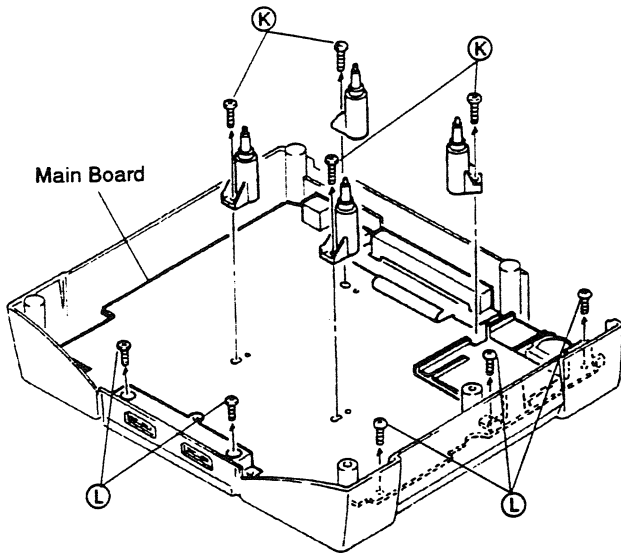


Fig. 5-5

5-6. Power, Power Indicator and R. SW Boards Removal

- 1) Remove three screws (M) and then the power board.
- 2) Remove screw (N) and then the power indicator board.
- 3) Remove two screws (O) and then the R. SW board.

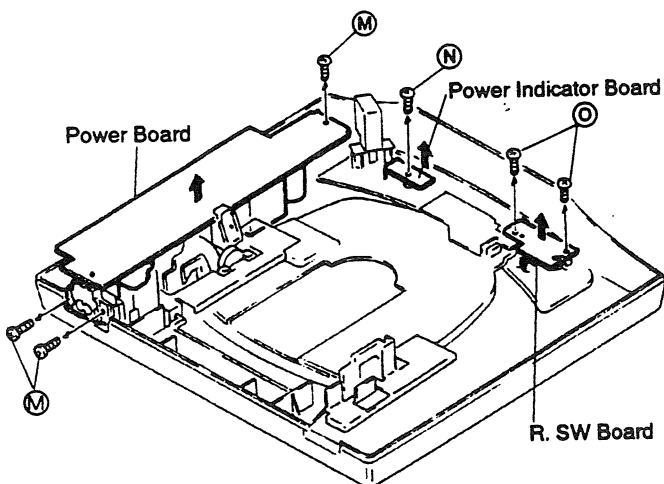


Fig. 5-6

6. CD DRIVE MAINTENANCE AND ADJUSTMENT

6-1. Maintenance of Pickup

1) Checking the laser diode

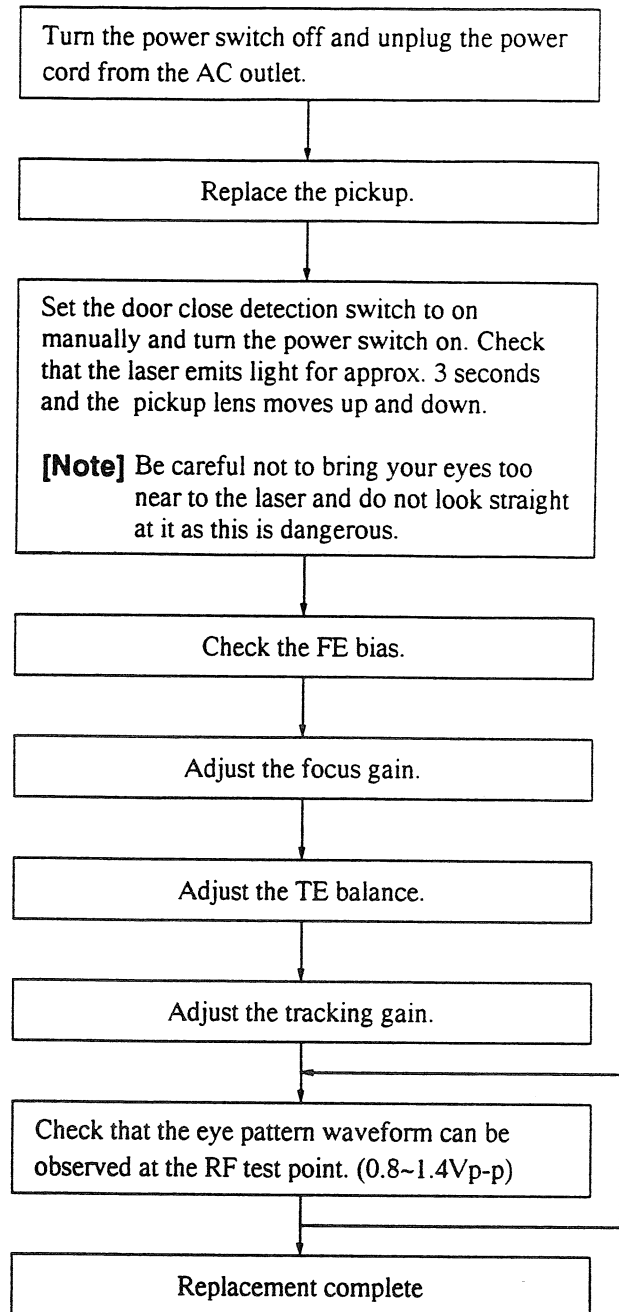
As the laser diode wears out, the RF level (amplitude of eye pattern) becomes lower.

Check that the RF level is 0.8V – 1.4Vp-p during maintenance. If the RF level is less than 0.8Vp-p then the pickup should be replaced.

2) Variable resistor on the APC board

The variable resistor attached to the pickup on the APC board is used to adjust the output power of the laser. This adjustment is done at the factory and can not be performed in the field. If the laser's output power is low, the laser diode has worn out and should be replaced. Adjusting this variable resistor may cause damage to the laser diode.

6-2. Laser Pickup Replacement Procedure

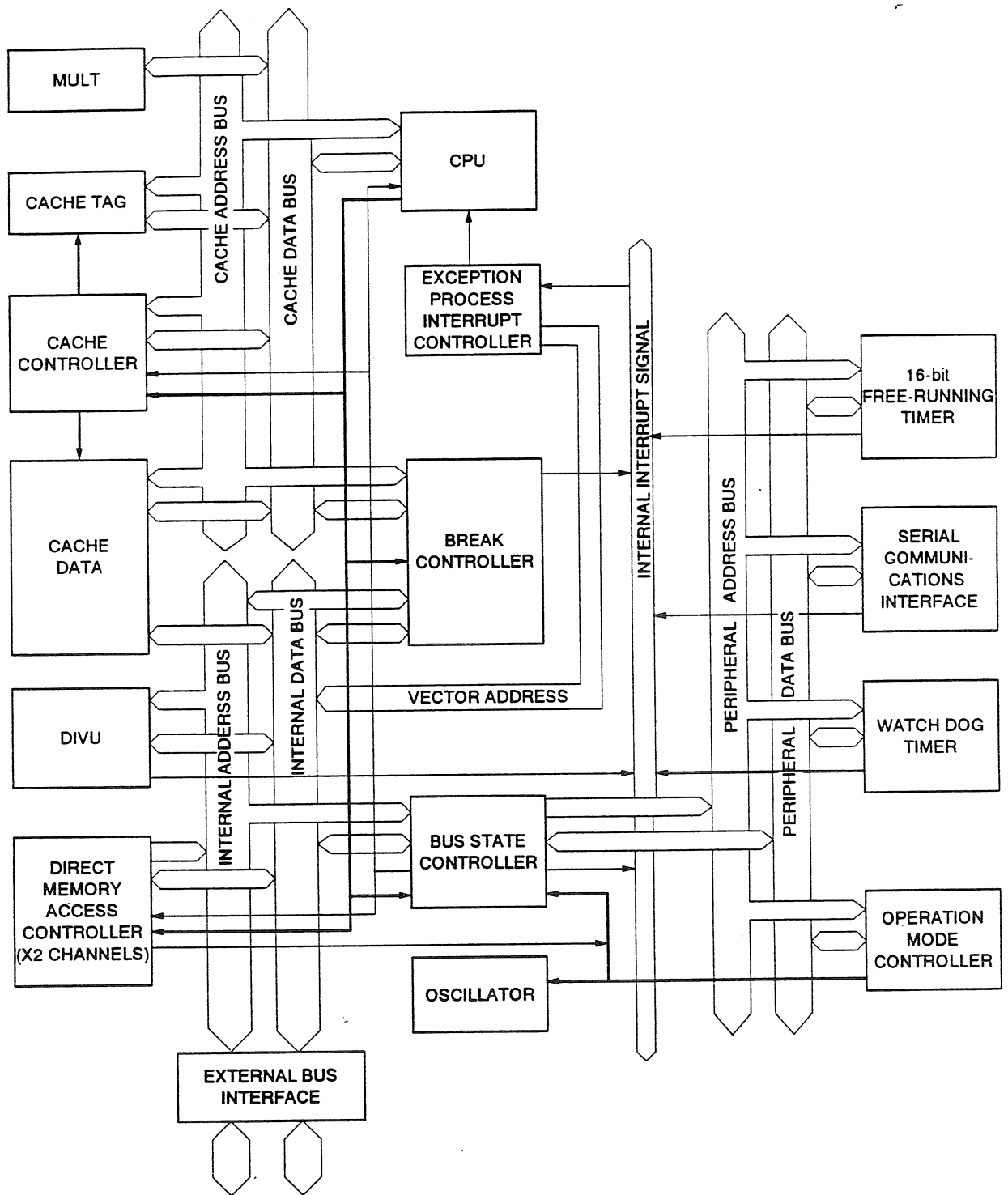


[Note] Since the adjustments influence each other, it may be necessary to repeat them 2 to 3 times.

No.	I/O	Pin Name	Function
41	I/O	A9	Address bus
42	—	VSS6	Power supply (0V)
43	I/O	A10	Address bus
44		A11	
45		A12	
46		A13	
47		A14	
48	—	VCC6	Power supply (5V)
49	I/O	A15	Address bus
50	—	VSS7	Power supply (0V)
51	I/O	A16	Address bus
52		A17	
53		A18	
54	—	VCC7	Power supply (5V)
55	I/O	A19	Address bus
56	—	VSS8	Power supply (0V)
57	I/O	A20	Address bus
58		A21	
59		A22	
60	—	VCC8	Power supply (5V)
61	I/O	A23	Address bus
62	—	VSS9	Power supply (0V)
63	I/O	A24	Address bus
64		A25	
65		A26	
66	O	DACK0	DMAC0 acknowledge
67	—	VCC9	Power supply (5V)
68	O	DACK1	DMAC1 acknowledge
69	—	VSS10	Power supply (0V)
70	I	DREQ0	DMAC0 request
71	I	DREQ1	DMAC1 request
72	O	$\overline{CS0}$	Chip select 0
73	O	$\overline{CS1}$	Chip select 1
74	O	$\overline{CS2}$	Chip select 2
75	O	$\overline{CS3}$	Chip select 3
76	I/O	$\overline{BS}$	Bus cycle start
77	I/O	$\overline{RD}/\overline{WR}$	Read/write
78	—	VSS11	Power supply (0V)
79	O	$\overline{RAS}$, $\overline{CE}$	RAS for DRAM/SDRAM, CE for PSRAM
80	O	$\overline{CAS}$, $\overline{OE}$	CAS for SDRAM/OE for PSRAM
81	O	$\overline{CASHH}$, $\overline{DQMUU}$, $\overline{WE3}$	Each memory most significant byte select signal
82	O	$\overline{CASHL}$, $\overline{DQMUL}$, $\overline{WE2}$	Each memory 2nd significant byte select signal
83	O	$\overline{CASLH}$, $\overline{DWMLU}$, $\overline{WE1}$	Each memory 3rd significant byte select signal
84	—	VCC10	Power supply (5V)
85	O	$\overline{CASLL}$, $\overline{DQMLL}$, $\overline{WE0}$	Each memory least significant byte select signal
86	—	VSS12	Power supply (0V)
87	O	$\overline{RD}$	Read pulse
88	O	CKE	SDRAM clock enable control
89	I	$\overline{WAIT}$	Hardware wait request
90	O	$\overline{BEN}$	Reserve
91	—	VSS13	Power supply (0V)
92	I	$\overline{BACK}$, $\overline{BRLS}$	Bus right permission in slave mode/Bus right acknowledge in master mode.
93	O	$\overline{BREQ}$, $\overline{BGR}$	Bus right request in slave mode/Bus right acknowledge in master mode
94	O	$\overline{WDTOVF}$	Watch dog timer output
95	O	FTOB	Free-running timer output B
96	—	VCC11	Power supply (5V)
97	O	FTOA	Free-running timer output A
98	—	VSS14	Power supply (0V)
99	I	FTI	Free-running timer input
100	I	FTCI	Free-running timer clock input
101	I	RXD	Serial data input
102	O	TXD	Serial data output
103	I/O	SCK	Serial clock input/output

No.	I/O	Pin Name	Function
104	–	VCC(PLL)12	Power supply (5V) of built-in PLL
105	I	MD0	Operation mode pin
106	–	VSS(PLL)15	Power supply (0V) of built-in PLL
107	I	MD1	Operation mode pin
108	O	CAP1	External capacitor connection pin for PLL
109		CAP2	
110	I	MD2	Operation mode pin
111	O	CKPACKN	Clock pause acknowledge output
112	I	CKPREQN	Clock pause request input
113	–	VCC13	Power supply (5V)
114	–	N.C	Not connected.
115	–	VSS16	Power supply (0V)
116	–	N.C	Not connected.
117	I	MD3	Operation mode pin
118	I/O	CKIO	System clock input/output
119	I	MD4	Operation mode pin
120		MD5	
121	–	VSS17	Power supply (0V)
122	I	RES	Reset
123	–	VCC14	Power supply (5V)
124	O	IVECF	Interrupt vector fetch cycle
125	I	NMI	Non-maskable interrupt request
126	I	IRL3	External interrupt factor input
127		IRL2	
128		IRL1	
129		IRL0	
130	I/O	D0	Data bus
131		D1	
132	–	VCC15	Power supply (5V)
133	I/O	D2	Data bus
134	–	VSS18	Power supply (0V)
135	I/O	D3	Data bus
136		D4	
137		D5	
138		D6	
139	–	VCC16	Power supply (5V)
140	I/O	D7	Data bus
141	–	VSS19	Power supply (0V)
142	I/O	D8	Data bus
143		D9	
144		D10	

■ Block Diagram



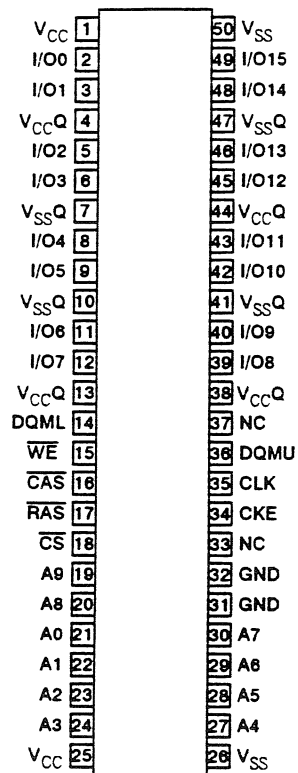
IC3/4/11 4-Mbit SDRAM

IC HM5241605TT-17 TSOP
Parts No. : 315-0928-17

IC UPD4504161G5-A12 TSOP
Parts No. : 315-1022-12

IC HM5241605TT-15 TSOP
Parts No. : 315-0928-15

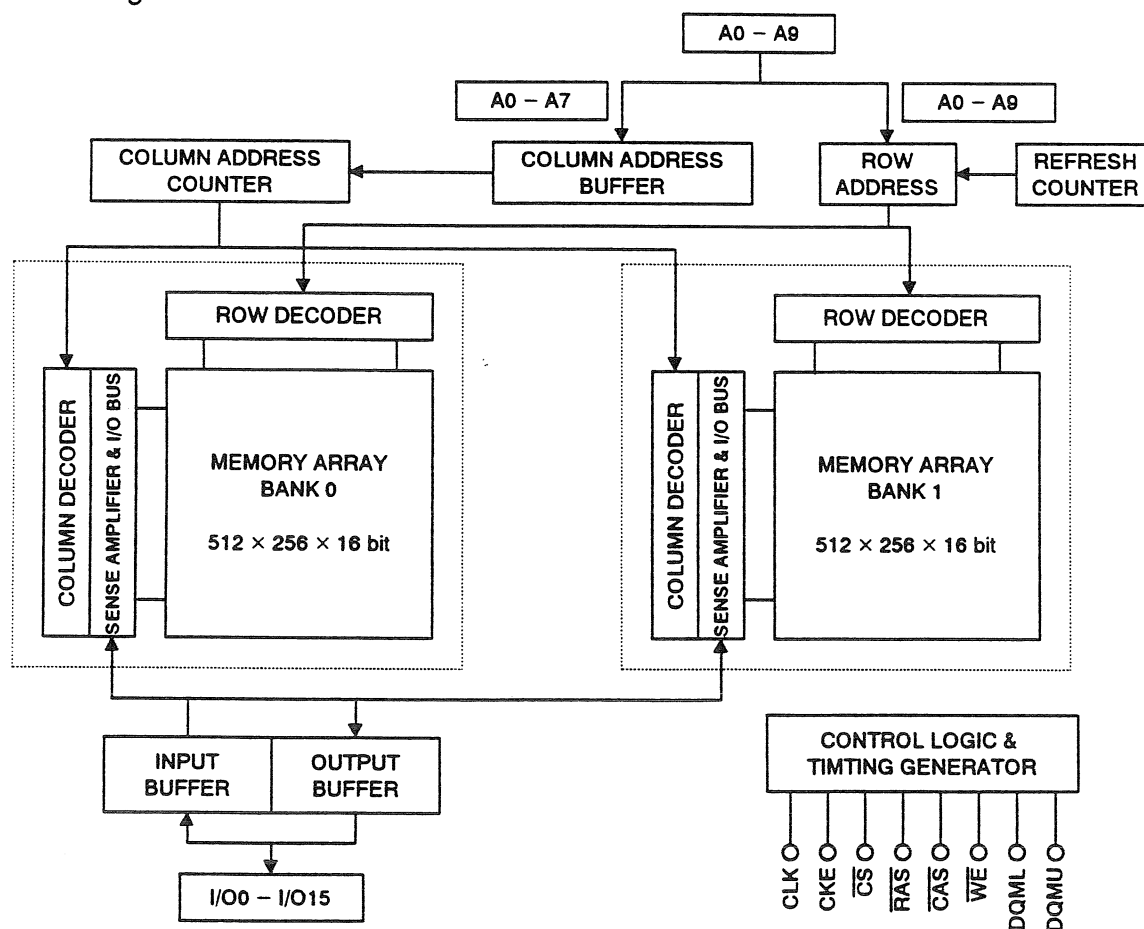
Top View & Pin Layout



Pin Name

Pin Name	Function
A0-A9	Address inputs Row addresses A0-A8 Column addresses A0-A7 Bank select address A9
I/O0-I/O15	Data inputs/outputs
$\overline{CS}$	Chip select
$\overline{RAS}$	Row address strobe command
$\overline{CAS}$	Column address strobe command
$\overline{WE}$	Write enable
DQMU	High-order byte input/output mask
DQML	Low-order byte input/output mask
CLK	Clock input
CKE	Clock enable
V_{CC}	Power supply
V_{SS}	Ground
V_{CCQ}	Power supply of I/O pins
V_{SSQ}	Ground of I/O pins
NC	Not connected

Block Diagram

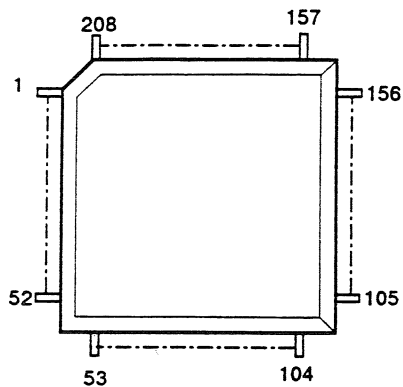


IC5 SCU (Custom Gate Array)

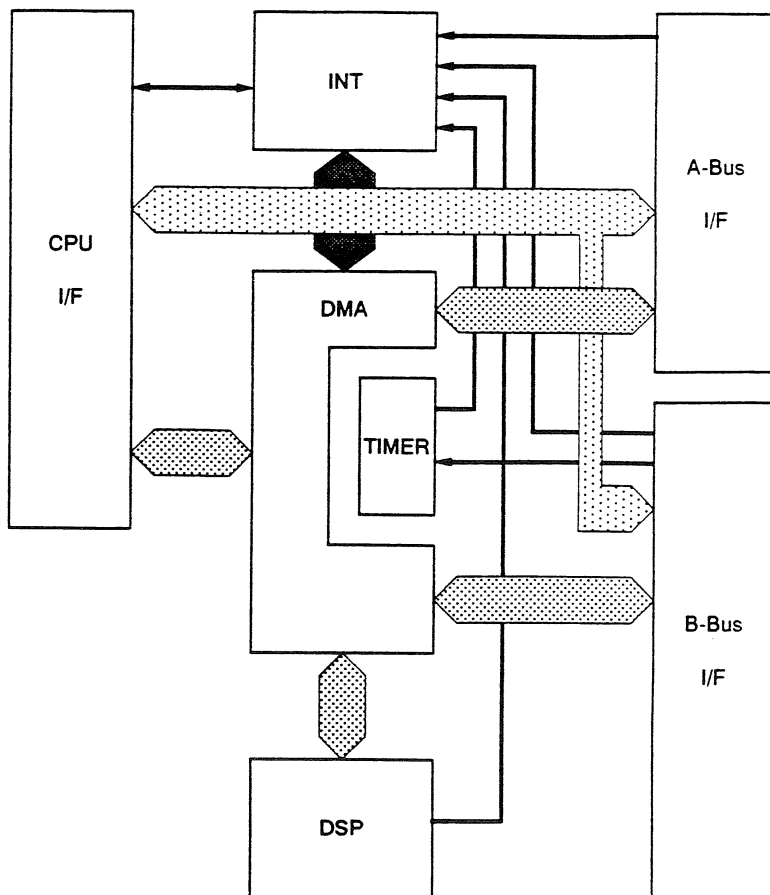
IC CUSTOM CHIP SCU QFP

Parts No. : 315-5688

■ Top View



■ Block Diagram



■ Description

No.	I/O	Name	Function
1	—	VSS	GND
2	I/O	AD4	A-bus data bit 4
3	I/O	AD5	A-bus data bit 5
4	I/O	AD6	A-bus data bit 6
5	I/O	AD7	A-bus data bit 7
6	I/O	AD8	A-bus data bit 8
7	I/O	AD9	A-bus data bit 9
8	I/O	AD10	A-bus data bit 10
9	—	VDD	Power supply +5V
10	I/O	AD11	A-bus data bit 11
11	—	VSS	GND
12	I/O	AD12	A-bus data bit 12
13	I/O	AD13	A-bus data bit 13
14	I/O	AD14	A-bus data bit 14
15	I/O	AD15	A-bus data bit 15
16	O	AA0	A-bus address bit 0
17	O	AA1	A-bus address bit 1
18	O	AA2	A-bus address bit 2
19	—	VSS	GND
20	O	AA3	A-bus address bit 3
21	—	VDD	Power supply +5V
22	O	AA4	A-bus address bit 4

No.	I/O	Pin Name	Function
23	O	AA5	A-bus address bit 5
24	O	AA6	A-bus address bit 6
25	O	AA7	A-bus address bit 7
26	O	AA8	A-bus address bit 8
27	–	VSS	GND
28	O	AA9	A-bus address bit 9
29	O	AA10	A-bus address bit 10
30	O	AA11	A-bus address bit 11
31	–	VDD	Power supply +5V
32	O	AA12	A-bus address bit 12
33	O	AA13	A-bus address bit 13
34	O	AA14	A-bus address bit 14
35	–	VSS	GND
36	O	AA15	A-bus address bit 15
37	O	AA16	A-bus address bit 16
38	O	AA17	A-bus address bit 17
39	O	AA18	A-bus address bit 18
40	O	AA19	A-bus address bit 19
41	–	VDD	Power supply +5V
42	O	AA20	A-bus address bit 20
43	–	VSS	GND
44	O	AA21	A-bus address bit 21
45	O	AA22	A-bus address bit 22
46	O	AA23	A-bus address bit 23
47	O	AA24	A-bus address bit 24
48	O	AFC0	A-bus function code bit 0
49	O	AFC1	A-bus function code bit 1
50	O	$\overline{\text{AAS}}$	A-bus address strobe
51	O	$\overline{\text{ACS0}}$	A-bus chip select 0
52	–	VSS	GND
53	O	$\overline{\text{ACS1}}$	A-bus chip select 1
54	O	$\overline{\text{ACS2}}$	A-bus chip select 2
55	–	VDD	Power supply +5V
56	I	$\overline{\text{AWAIT}}$	A-bus external wait
57	I	$\overline{\text{AIRO}}$	A-bus external interrupt factor
58	I	$\overline{\text{TEST}}$	Test mode selection (normally, input “H”)
59	O	$\overline{\text{ARD}}$	A-bus read pulse
60	O	$\overline{\text{AWRU}}$	A-bus byte 0 (AD15~8) write pulse
61	O	$\overline{\text{AWRL}}$	A-bus byte 1 (AD7~0) write pulse
62	–	VSS	GND
63	O	$\overline{\text{ATIM0}}$	A-bus external access timing 0
64	O	$\overline{\text{ATIM1}}$	A-bus external access timing 1
65	O	$\overline{\text{ATIM2}}$	A-bus external access timing 2
66	I/O	BD0	B-bus address/data bit 0
67	I/O	BD1	B-bus address/data bit 1
68	I/O	BD2	B-bus address/data bit 2
69	–	VDD	Power supply +5V
70	I/O	BD3	B-bus address/data bit 3
71	–	VSS	GND
72	I/O	BD4	B-bus address/data bit 4
73	I/O	BD5	B-bus address/data bit 5
74	I/O	BD6	B-bus address/data bit 6
75	I/O	BD7	B-bus address/data bit 7
76	I/O	BD8	B-bus address/data bit 8
77	I/O	BD9	B-bus address/data bit 9
78	I/O	BD10	B-bus address/data bit 10
79	–	VDD	Power supply +5V
80	I/O	BD11	B-bus address/data bit 11
81	–	VSS	GND
82	I/O	BD12	B-bus address/data bit 12
83	I/O	BD13	B-bus address/data bit 13
84	I/O	BD14	B-bus address/data bit 14

No.	I/O	Pin Name	Function
85	I/O	BD15	B-bus address/data bit 15
86	I	$\overline{\text{IRQ}}\text{L}$	Light pen interrupt
87	I	$\overline{\text{IRQ}}\text{V}$	VDP2•V blank interrupt
88	I	$\overline{\text{IRQ}}\text{H}$	VDP2•H blank interrupt
89	I	$\overline{\text{BRDY}}\text{2}$	VDP2 data ready
90	O	$\overline{\text{BCS}}\text{2}$	VDP2 chip select
91	O	$\overline{\text{BADD}}\text{T}$	B-bus address/data switching signal
92	—	VSS	GND
93	O	$\overline{\text{BDT}}\text{EN}$	B-bus data enable
94	—	VDD	+5V Power supply
95	O	$\overline{\text{BCS}}\text{S}$	SCSP chip select
96	I	$\overline{\text{BRDY}}\text{S}$	SCSP data ready
97	I	$\overline{\text{IRQ}}\text{S}$	SCSP interrupt
98	O	$\overline{\text{BCS}}\text{1}$	VDP1 chip select
99	I	$\overline{\text{BRDY}}\text{1}$	VDP1 data ready
100	I	$\overline{\text{IRQ}}\text{1}$	VDP1 interrupt
101	I/O	CA0	C-bus address bit 0
102	I/O	CA1	C-bus address bit 1
103	I/O	CA2	C-bus address bit 2
104	—	VSS	GND
105	—	VDD	+5V Power supply
106	I/O	CA3	C-bus address bit 3
107	I/O	CA4	C-bus address bit 4
108	I/O	CA5	C-bus address bit 5
109	I/O	CA6	C-bus address bit 6
110	—	VSS	GND
111	I/O	CA7	C-bus address bit 7
112	I/O	CA8	C-bus address bit 8
113	I/O	CA9	C-bus address bit 9
114	I/O	CA10	C-bus address bit 10
115	—	VSS	GND
116	I/O	CA11	C-bus address bit 11
117	—	VDD	+5V Power supply
118	I/O	CA12	C-bus address bit 12
119	I/O	CA13	C-bus address bit 13
120	I/O	CA14	C-bus address bit 14
121	—	VSS	GND
122	I/O	CA15	C-bus address bit 15
123	I/O	CA16	C-bus address bit 16
124	I/O	CA17	C-bus address bit 17
125	I/O	CA18	C-bus address bit 18
126	I/O	CA19	C-bus address bit 19
127	—	VDD	+5V Power supply
128	I/O	CA20	C-bus address bit 20
129	—	VSS	GND
130	I/O	CA21	C-bus address bit 21
131	I/O	CA22	C-bus address bit 22
132	I/O	CA23	C-bus address bit 23
133	I/O	CA24	C-bus address bit 24
134	I/O	CD0	C-bus data bit 0
135	I/O	CD1	C-bus data bit 1
136	I/O	CD2	C-bus data bit 2
137	—	VSS	GND
138	I/O	CD3	C-bus data bit 3
139	—	VDD	+5V Power supply
140	I/O	CD4	C-bus data bit 4
141	I/O	CD5	C-bus data bit 5
142	I/O	CD6	C-bus data bit 6
143	I/O	CD7	C-bus data bit 7
144	—	VSS	GND
145	I/O	CD8	C-bus data bit 8
146	I/O	CD9	C-bus data bit 9

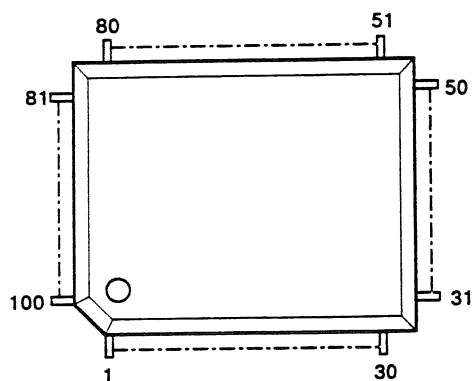
No.	I/O	Pin Name	Function
147	I/O	CD10	C-bus data bit 10
148	I/O	CD11	C-bus data bit 11
149	–	VDD	+5V Power supply
150	I/O	CD12	C-bus data bit 12
151	–	VSS	GND
152	I/O	CD13	C-bus data bit 13
153	I/O	CD14	C-bus data bit 14
154	I/O	CD15	C-bus data bit 15
155	I/O	CD16	C-bus data bit 16
156	I/O	CD17	C-bus data bit 17
157	–	VSS	GND
158	I/O	CD18	C-bus data bit 18
159	I/O	CD19	C-bus data bit 19
160	–	VDD	+5V Power supply
161	I/O	CD20	C-bus data bit 20
162	I/O	CD21	C-bus data bit 21
163	I/O	CD22	C-bus data bit 22
164	–	VSS	GND
165	I/O	CD23	C-bus data bit 23
166	I/O	CD24	C-bus data bit 24
167	I/O	CD25	C-bus data bit 25
168	I/O	CD26	C-bus data bit 26
169	I/O	CD27	C-bus data bit 27
170	–	VDD	+5V Power supply
171	I/O	CD28	C-bus data bit 28
172	–	VSS	GND
173	I/O	CD29	C-bus data bit 29
174	I/O	CD30	C-bus data bit 30
175	I/O	CD31	C-bus data bit 31
176	I	CCS1	C-bus chip select 1
177	I	CCS2	C-bus chip select 2
178	O	CCS3	C-bus chip select 3
179	–	VSS	GND
180	I	RESET	Initial reset
181	I	CLK28	System clock
182	I/O	CRDWR	C-bus read/write
183	I	CRD	C-bus read pulse
184	–	VDD	+5V Power supply
185	I/O	CDQMUU	SDRAM byte 0 (CD31-24) write pulse
186	I/O	CDQMUL	SDRAM byte 1 (CD23-16) write pulse
187	I/O	CDQMLU	SDRAM byte 2 (CD15-8) write pulse
188	I/O	CDQMLL	SDRAM byte 3 (CD7-0) write pulse
189	–	VSS	GND
190	O	RAS	SDRAM RAS
191	O	CAS	SDRAM CAS
192	O	CWAIT	C-bus external wait
193	–	VDD	+5V Power supply
194	I	CIVECF	C-bus interrupt vector fetch sycle
195	O	CIRL0	C-bus external interrupt factor 0
196	O	CIRL1	C-bus external interrupt factor 1
197	O	CIRL2	C-bus external interrupt factor 2
198	O	CIRL3	C-bus external interrupt factor 3
199	–	VSS	GND
200	O	CBREQ	C-bus right request
201	I	CBACK	C-bus right acknowledge
202	I	MIREQ	System manager interrupt
203	O	AA25	A-bus address bit 25
204	I/O	AD0	A-bus data bit 0
205	I/O	AD1	A-bus data bit 1
206	I/O	AD2	A-bus data bit 2
207	I/O	AD3	A-bus data bit 3
208	–	VDD	+5V Power supply

IC6 DCC

IC CUSTOM CHIP DCC QFP

Parts No. : 315-5778

Top View



Pin Name

No.	I/O	Name
1	I	TEST1
2	O	TEST0
3	O	BEN
4	O	BDIR
5	-	VSS
6	O	DA0
7	O	DA1
8	O	DA2
9	O	DA3
10	O	DA4
11	O	DA5
12	O	DA6
13	O	DA7
14	O	DA8
15	-	VSS
16	-	VDD
17	O	$\overline{\text{DRAS0}}$
18	O	$\overline{\text{DRAS1}}$
19	O	$\overline{\text{DRAS2}}$
20	O	$\overline{\text{DRAS3}}$
21	O	$\overline{\text{DUCAS}}$
22	O	$\overline{\text{DLCAS}}$
23	O	$\overline{\text{DWE}}$
24	O	$\overline{\text{DOE}}$
25	-	VSS
26	-	VDD
27	I	A1
28	I	A2
29	I	A3
30	I	A4
31	I	A5
32	I	A6
33	I	A7
34	I	A8

No.	I/O	Name
35	I	A9
36	I	A10
37	I	A11
38	I	A12
39	I	A13
40	-	VSS
41	-	VDD
42	I	A14
43	I	A15
44	I	A16
45	I	A17
46	I	A18
47	I	A19
48	I	A20
49	I	A21
50	I	A22
51	I	A23
52	I	A24
53	-	VSS
54	O	$\overline{\text{IREQ1}}$
55	O	$\overline{\text{IREQ2}}$
56	-	VDD
57	I	$\overline{\text{IVECF}}$
58	I	$\overline{\text{RD/WR}}$
59	I	$\overline{\text{RD}}$
60	-	VSS
61	I	$\overline{\text{CS2}}$
62	I	$\overline{\text{CS1}}$
63	I	$\overline{\text{CS0}}$
64	O	$\overline{\text{WAIT}}$
65	-	VDD
66	-	VSS
67	I	$\overline{\text{WTIN}}$
68	I	WE1

No.	I/O	Name
69	I	WE0
70	-	VSS
71	O	$\overline{\text{BACK}}$
72	O	$\overline{\text{EXBACK}}$
73	O	$\overline{\text{BRLS}}$
74	-	VSS
75	I	$\overline{\text{BGR}}$
76	I	$\overline{\text{BREQ}}$
77	I	$\overline{\text{EXBREQ}}$
78	O	MFT1
79	O	SFT1
80	-	VDD
81	I	CK
82	-	VSS
83	I	$\overline{\text{RESET}}$
84	I	BS
85	I	$\overline{\text{EWT}}$
86	O	$\overline{\text{IOCE}}$
87	O	$\overline{\text{EXTCE0}}$
88	O	$\overline{\text{EXTCE1}}$
89	O	$\overline{\text{EXTCE2}}$
90	-	VSS
91	-	VDD
92	I	$\overline{\text{HINT}}$
93	I	$\overline{\text{VINT}}$
94	I	$\overline{\text{DECON}}$
95	O	$\overline{\text{ROMCE}}$
96	O	$\overline{\text{SMPCE}}$
97	O	$\overline{\text{SRAMCE}}$
98	O	$\overline{\text{MOE}}$
99	O	$\overline{\text{MWR}}$
100	-	VSS

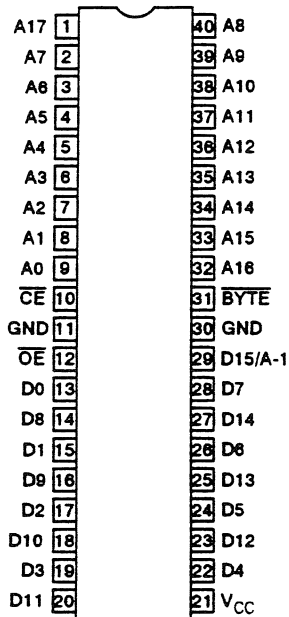
IC7 IPL ROM

OS SATURN IPL-ROM PAL DIP

Parts No. : EPR-17933

Parts No. : MPR-17933

Top View & Pin Layout



Pin Name

A0-A17	Address inputs
$\overline{\text{CE}}$	Chip enable
$\overline{\text{OE}}$	Output enable
GND	Ground
BYTE	
D0-D15	Data inputs/outputs
V _{CC}	+5V power supply

IC8 BACKUP RAM

IC CXK58267AM-10L SOP

Parts No. : 315-0948-10

IC UPD43257B-10LL SOP

Parts No. : 315-0930-10

IC M5M5255BFP-12LL SOP

Parts No. : 315-0964-10

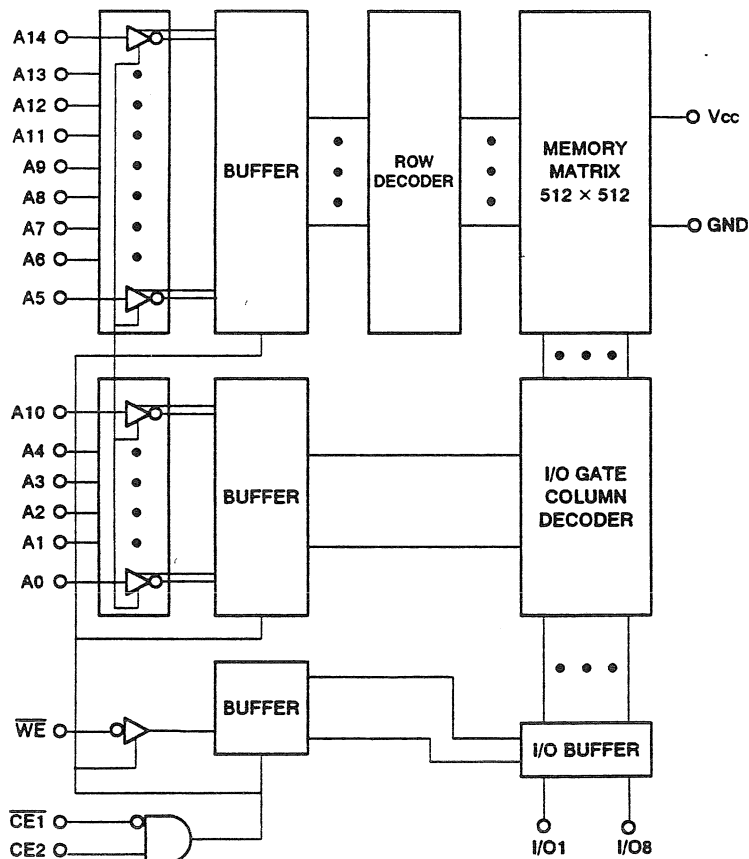
IC SRM20257LLM10 SOP

Parts No. : 315-0965-10

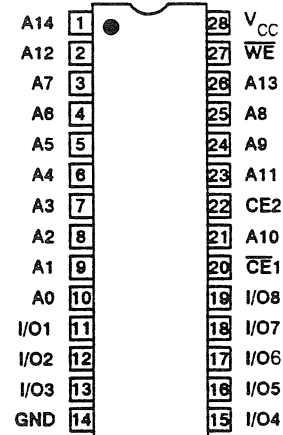
IC UM62257M-70LL SOP

Parts No. : 315-1002-70

Block Diagram



Top View & Pin Layout



Description

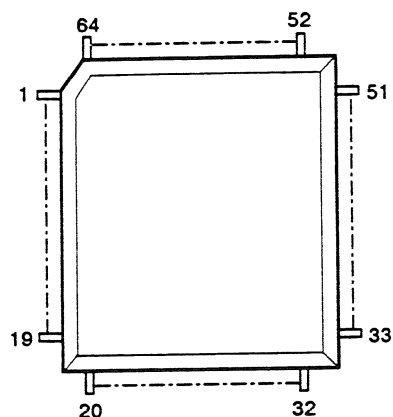
Name	Function
A0-A14	Address inputs
I/O1-I/O8	Data inputs/outputs
$\overline{\text{CE1}}$, CE2	Chip enable inputs
$\overline{\text{WE}}$	Write enable input
V _{CC}	+5V power supply
GND	Ground

IC9 SMPC

IC CUSTOM CHIP SMPC QFP

Parts No. : 315-5744

■ Top View



■ Description

No.	I/O	Name	Function
1	-	R70	Not connected.
2		R71	
3	I/O	R72	Reset control
4		R73	
5	I	R50	Jumper configuration input
6		R51	
7		R52	
8		R53	
9	-	TEST	Not connected → GND
10	I/O	OSC1	Clock 3
11		OSC2	
12	-	GND	Ground
13	I/O	X2	Clock 4
14		X1	
15		RESET	Master reset input
16	-	VCC	Power
17	I	CS	Chip select input
18	I	R/W	Read/write input
19	I/O	A1	Address bus
20		A2	
21		A3	
22		A4	
23		A5	
24		A6	
25	I/O	DB0	Data bus
26		DB1	
27		DB2	
28		DB3	
29		DB4	
30		DB5	
31		DB6	
32		DB7	

No.	I/O	Name	Function
33	I/O	PIO0A	Control pad
34		PIO1A	
35		PIO2A	
36		PIO3A	
37		PIO4A	
38		PIO5A	
39		PIO6A	
40	I/O	PIO0B	Control pad
41		PIO1B	
42		PIO2B	
43		PIO3B	
44		PIO4B	
45		PIO5B	
46		PIO6B	
47	I	EXL	Input
48	I	INT0/D13	Input
49		INT2/RO1	Backup RAM reset control
50	I/O	D0	Reset control
51		D1	
52	-	D2	Not connected.
53	I/O	D3	Reset control
54		D4	
55		D5	
56		D6	
57		D7	
58		D8	
59		D9	
60		D10	
61	I/O	R60	Reset control
62		R61	
63	-	R62	Not connected.
64		R63	

IC10 VDP1

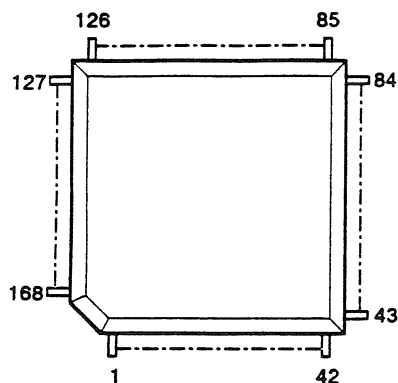
IC CUSTOM CHIP VDP1 QFP

Parts No. : 315-5689

IC CUSTOM CHIP VDP1 S QFP

Parts No. : 315-5883

■ Top View



■ Description

No.	I/O	Name	Function
1	—	NC	Not connected.
2	O	VRAMA7	Address bus (VRAM)
3		VRAMA8	
4		VRAMA9	
5	—	VSS	Ground for I/O pin
6	O	VCLK	Clock (VRAM)
7	O	$\overline{\text{VUDQM}}$	Upper byte input/output mask (VRAM)
8	O	$\overline{\text{VLDQM}}$	Lowerbyte input/output mask (VRAM)
9	—	VSS	Ground for internal circuit
10	O	$\overline{\text{VCASN}}$	Column address asserted (VRAM)
11	O	$\overline{\text{VRASN}}$	Row address asserted (VRAM)
12	—	VCC	Power supply
13	O	$\overline{\text{VWEN}}$	Write enable (VRAM)
14	O	$\overline{\text{VCSN}}$	Chip select (VRAM)
15	I	MCLK	Master clock
16	—	$\overline{\text{RESETN}}$	Reset
17	—	VSS	Ground for I/O pin
18	—	$\overline{\text{CSN}}$	Chip select
19	—	$\overline{\text{ADN}}$	Address/data select
20	—	$\overline{\text{DTEN}}$	Data enable
21	O	$\overline{\text{IRON}}$	Interrupt request
22	O	$\overline{\text{READYN}}$	Ready
23	O	VBUS0	Address/data bus (Syscon)
24		VBUS1	
25		VBUS2	
26	—	VSS	Ground for I/O pin
27	O	VBUS3	Address/data bus (Syscon)
28		VBUS4	
29		VBUS5	
30		VBUS6	
31		VBUS7	
32	—	VCC	Power supply
33	O	VBUS8	Address/data bus (Syscon)
34		VBUS9	
35		VBUS10	
36		VBUS11	
37	—	VSS	Ground for internal circuit
38	O	VBUS12	Address/data bus (Syscon)
39		VBUS13	
40		VBUS14	

No.	I/O	Name	Function
41	O	VBUS15	Address/data bus (Syscon)
42	-	NC	Not connected.
43		NC	
44	O	FOA0	Address bus (FB0)
45		FOA1	
46		FOA2	
47	-	VSS	Ground for I/O pin
48	O	FOA3	Address bus (FB0)
49	O	FOA4	Address bus
50	O	FOA5	Frame buffer (FB0)
51	O	FOA6	Address bus (FB0)
52	-	VCC	Power supply
53	O	FOA7	Address bus (FB0)
54		FOA8	
55		FOA9	
56	O	FOCSN	Chip select (FB0)
57	-	VSS	Ground for internal circuit
58	O	FOWEN	Write enable (FB0)
59	O	FOCLK	Clock (FB0)
60	O	FRRASN	Row address asserted (FB0)
61	O	FOCASN	Column address asserted (FB0)
62	O	FOLDQM	Lower byte input/output mask (FB0)
63	O	FOUDQM	Upper byte input/output mask (FB0)
64	-	VSS	Ground for I/O pin
65	O	F0D0	Data bus (FB0)
66		F0D1	
67		F0D2	
68		F0D3	
69		F0D4	
70	-	VSS	Ground for internal circuit
71	O	F0D5	Data bus (FB0)
72		F0D6	
73		F0D7	
74		F0D8	
75	-	VCC	Power supply
76	O	F0D9	Data bus (FB0)
77		F0D10	
78		F0D11	
79		F0D12	
80	-	VSS	Ground for I/O pin
81	O	F0D13	Data bus (FB0)
82		F0D14	
83		F0D15	
84	-	NC	Not connected.
85		NC	
86	O	F1D0	Data bus (FB1)
87		F1D1	
88		F1D2	
89	-	VSS	Ground for I/O pin
90	O	F1D3	Data bus (FB1)
91		F1D4	
92		F1D5	
93		F1D6	
94	-	VCC	Power supply
95	O	F1D7	Data bus (FB1)
96		F1D8	
97		F1D9	
98		F1D10	
99	-	VSS	Ground for internal circuit
100	O	F1D11	Data bus (FB1)
101		F1D12	
102		F1D13	
103		F1D14	
104		F1D15	

No.	I/O	Name	Function
105	–	VSS	Ground for I/O pin
106	O	FICLK	Clock (FB1)
107	O	FICSN	Chip select (FB1)
108	O	FIWEN	Write enable (FB1)
109	O	FIRASN	Row address asserted (FB1)
110	O	FICASN	Column address asserted (FB1)
111	O	FILDQM	Lower byte input/output mask (FB1)
112	–	VSS	Data bus (FB1)
113	O	FIUDQM	Lower byte input/output mask (FB1)
114	O	FIA0	Address bus (FB1)
115		FIA1	
116		FIA2	
117	–	VCC	Power supply
118	O	FIA3	Address bus (FB1)
119		FIA4	
120		FIA5	
121	O	FIA6	Address bus (FB1)
122	–	VSS	Ground for I/O pin
123	O	FIA7	Address bus (BF1)
124	O	FIA8	
125	O	FIA9	
126	–	NC	Not connected.
127			
128	–	HTIMN	Horizontal sync timing
129	–	VTIMN	Vertical sync timing
130	O	V2CLK	Video clock (1/2 MCLK)
131	–	VSS	Ground for I/O pin
132	O	VOUT0	Display start address/video data
133	O	VOUT1	
134	O	VOUT2	
135	O	VOUT3	
136	–	VCC	Power supply
137	O	VOUT4	Display start address/video output data
138	O	VOUT5	Video output data
139	O	VOUT6	
140	O	VOUT7	
141	–	VSS	Ground for internal circuit
142	O	VRAMD0	VRAM data bus
143	O	VRAMD1	
144	O	VRAMD2	
145	O	VRAMD3	
146	O	VRAMD4	
147	–	VSS	Ground for I/O pin
148	O	VRAMD5	VRAM data bus
149	O	VRAMD6	
150	O	VRAMD7	
151	O	VRAMD8	
152	O	VRAMD9	
153	O	VRAMD10	
154	–	VSS	Ground for internal circuit
155	O	VRAMD11	VRAM data bus
156	O	VRAMD12	
157	O	VRAMD13	
158	O	VRAMD14	
159	–	VCC	Power supply
160	O	VRAMD15	VRAM data bus
161	O	VRAMA0	VRAM address bus
162	O	VRAMA1	
163	O	VRAMA2	
164	O	VRAMA3	
165	O	VRAMA4	
166	O	VRAMA5	
167	O	VRAMA6	
168	–	NC	Not connected.

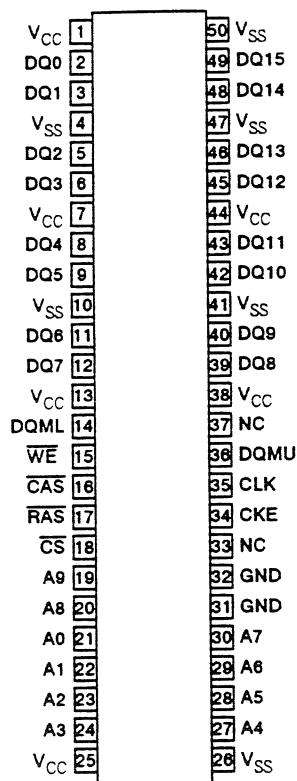
IC12/13/15/16

IC UPD4502161G5-A12 TSOP NEC
Parts No. : 315-0910-12

IC HM5221605TT-17 TSOP HITACHI
Parts No. : 315-1017-17

IC LC382161T-17 TSOP SANYO
Parts No. : 315-1012-17

Top View & Pin Layout



Pin Name

A0-A9	Address inputs
DQ0-DQ5	Data inputs/outputs
CLK	System clock input
CKE	Clock enable
$\overline{CS}$	Chip select
$\overline{RAS}$	Row address strobe command
$\overline{CAS}$	Col / address strobe command
$\overline{WE}$	Write enable
DQML, DQMU	DQ mask enable
V _{CC}	Supply voltage
V _{SS} , GND	Ground
NC	No connection

Description

No.	I/O	Pin Name	Function
1, 7, 13, 25, 38, 44, 50	—	VCC	Power supply of internal circuits.
4, 10, 26, 41, 47, 50	—	VSS	Ground pins.
2, 3, 5, 6, 8, 9, 11, 12, 39, 40, 42, 43, 45, 46, 48, 49	I/O	DQ1-DQ16	I/O pins are the same as conventional DRAM.
14, 36	I	DQML, DQMU	DQMU controls upper byte and DQML controls lower byte input/output buffers. In read mode, DQMU, DQML control output buffer impedance like conventional $\overline{OE}$. If DQMU, DQML is high, output buffers become high impedance. If DQMU, DQML is low, output buffers become low impedance. If DQMU, DQML is low, output buffers become low impedance. And when device in write mode, DQMU, DQML control word mask. If DQMU, DQML is high input data is not written to memory cell. If DQMU, DQML is low input data is written to memory cell.
15, 16, 17	I	$\overline{WE}$ $\overline{CAS}$ $\overline{RAS}$	$\overline{WE}$ $\overline{CAS}$ $\overline{RAS}$ have the same names with conventional DRAM. But these pins have different definitions with conventional ones. All of these pins only define command cycle definition. For detail information see command table.
18	I	$\overline{CS}$	$\overline{CS}$ low start the command input cycle. When $\overline{CS}$ is high, all input are not referenced. But even if $\overline{CS}$ is high, internal operations i.e. bank active or burst are not changed.
19	I	A9	A9 is bank select signal (BS). In command cycle, A9=low select bank A and A9=high select bank B.

No.	I/O	Pin Name	Function
20, 21-24, 27-30	I	A0-A8	Row address (AX0-AX6, AX8) is determined by A0-A8 level at the bank active command cycle CLK rising edge. (AX7 is don't care.) Column address (AY0-AY7) is determined by A0-A7 level at read or write command cycle CLK rising edge. And this column address become burst access start address. A8 define precharge mode command cycle, both banks are precharged. But A8=low in when A8=high in precharge command cycle, only one bank that is selected A9 (BS) is precharged. And when A8=high in read or write command cycle, the precharge cycle start automatically after the last data in burst accessing.
31, 32	—	GND	Ground
33, 37	—	NC	Not connected.
34	I	CKE	CKE determine next CLK is valid or not. If CKE is high next CLK rising edge is valid. But if CKE is low, next CLK is invalid. If CLK rising edge is invalid, internal clock is not asserted and μ PD4504161 becomes halt operation. And when μ PD4502161 does not in burst mode and CKE is negated, μ PD4502161 enter power down mode. During power down mode CKE must keep low level.
35	I	CLK	CLK is the master clock input pin. The other inputs signals are referenced at CLK rising edge.

IC14 VDP2

IC CUSTOM CHIP VDP2 QFP YAMAHA

Parts No. : 315-5690

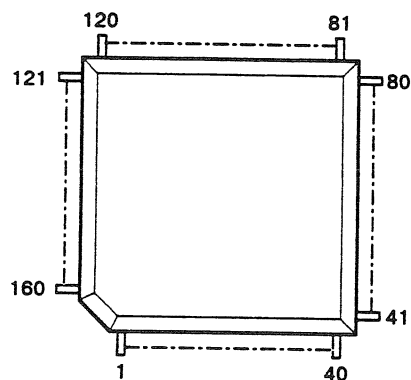
IC CUSTOM CHIP VDP2 QFP HH

Parts No. : 315-5690-02

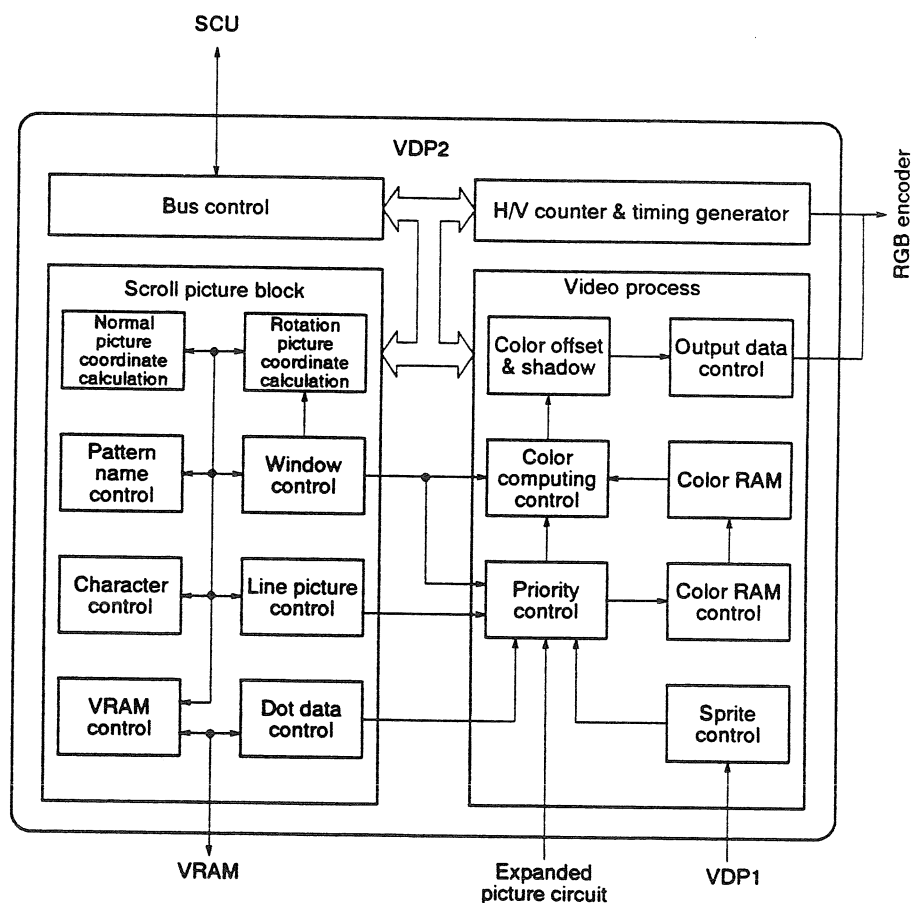
IC CUSTOM CP VDP2 S QFP YAMAHA

Parts No. : 315-5890

Top View



Block Diagram



No.	I/O	Pin Name	Function
1	O	RBCS	VRAM-B chip select
2	O	RBRAS	VRAM-B row address strobe
3	O	RBCAS	VRAM-B column address strobe
4	O	RBWE	VRAM-B write enable
5	—	VSS	GND
6	O	RBLDM	VRAM-B DQ low-order mask enable
7	O	RBU DM	VRAM-B DQ high-order mask enable
8	O	RBA0	VRAM-B address bit 0
9	O	RBA1	VRAM-B address bit 1
10	—	VDD	+5V power supply
11	O	RBA2	VRAM-B address bit 2
12	O	RBA3	VRAM-B address bit 3
13	O	RBA4	VRAM-B address bit 4
14	O	RBA5	VRAM-B address bit 5
15	—	VSS	GND
16	O	RBA6	VRAM-B address bit 6
17	O	RBA7	VRAM-B address bit 7
18	O	RBA8	VRAM-B address bit 8
19	O	RBA9	VRAM-B address bit 9
20	I/O	VD0	SYS CON interface data bit 0
21	I/O	VD1	SYS CON interface data bit 1
22	I/O	VD2	SYS CON interface data bit 2
23	I/O	VD3	SYS CON interface data bit 3
24	—	VSS	GND
25	I/O	VD4	SYS CON interface data bit 4
26	I/O	VD5	SYS CON interface data bit 5
27	I/O	VD6	SYS CON interface data bit 6
28	I/O	VD7	SYS CON interface data bit 7
29	—	VDD	+5V power supply
30	I/O	VD8	SYS CON interface data bit 8
31	I/O	VD9	SYS CON interface data bit 9
32	I/O	VD10	SYS CON interface data bit 10
33	I/O	VD11	SYS CON interface data bit 11
34	I/O	VD12	SYS CON interface data bit 12
35	I/O	VD13	SYS CON interface data bit 13
36	—	VSS	GND
37	I/O	VD14	SYS CON interface data bit 14
38	I/O	VD15	SYS CON interface data bit 15
39	I	AD	SYS CON interface address/data selection
40	I	DTEN	SYS CON interface data enable
41	O	READY	SYS CON interface data ready
42	I	CS	SYS CON interface chip select
43	—	VDD	+5V power supply
44	O	VINT	SYS CON interface vertical interrupt
45	O	HINT	SYS CON interface horizontal interrupt
46	I	EXLAT	External latch strobe input
47	I	EXSYN	External sync signal input
48	I/O	EXBG0	External input data bit 0 / Test input/output (in test mode)
49	I/O	EXBG1	External input data bit 1 / Test input/output (in test mode)
50	I/O	EXBG2	External input data bit 2 / Test input/output (in test mode)
51	I/O	EXBG3	External input data bit 3 / Test input/output (in test mode)
52	—	VSS	GND
53	I/O	EXBG4	External input data bit 4 / Test input/output (in test mode)
54	I/O	EXBG5	External input data bit 5 / Test input/output (in test mode)
55	I/O	EXBG6	External input data bit 6 / Test input/output (in test mode)
56	I/O	EXBG7	External input data bit 7 / Test input/output (in test mode)
57	I/O	EXBG8	External input data bit 8 / Test input/output (in test mode)
58	I/O	EXBG9	External input data bit 9 / Test input/output (in test mode)
59	I/O	EXBG10	External input data bit 10 / Test input/output (in test mode)
60	I/O	EXBG11	External input data bit 11 / Test input/output (in test mode)
61	I/O	EXBG12	External input data bit 12 / Test input/output (in test mode)
62	I/O	EXBG13	External input data bit 13 / Test input/output (in test mode)
63	I/O	EXBG14	External input data bit 14 / Test input/output (in test mode)

No.	I/O	Pin Name	Function
64	I/O	EXBG15	External input data bit 15 / Test input/output (in test mode)
65	I/O	EXBG16	External input data bit 16 / Test input/output (in test mode)
66	I/O	EXBG17	External input data bit 17 / Test input/output (in test mode)
67	–	VSS	GND
68	I/O	EXBG18	External input data bit 18 / Test input/output (in test mode)
69	I/O	EXBG19	External input data bit 19 / Test input/output (in test mode)
70	I/O	EXBG20	External input data bit 20 / Test input/output (in test mode)
71	I/O	EXBG21	External input data bit 21 / Test input/output (in test mode)
72	I/O	EXBG22	External input data bit 22 / Test input/output (in test mode)
73	I/O	EXBG23	External input data bit 23 / Test input/output (in test mode)
74	I	EXON	External input data display timing
75	–	VDD	+5V power supply
76	I	CLK	Main clock input
77	O	EXSL	External video select signal
78	I	RESET	Initial reset input
79	I	NTSC	NTSC/PAL selection
80	–	VSS	GND
81	–	AVSS	GND of linear RGB
82	O	R	Linear R output
83	O	G	Linear G output
84	O	B	Linear B output
85	–	AVDD	+5V power supply of linear RGB
86	O	CSYNC	Composite sync signal output
87	O	VSNC	Vertical sync signal output
88	O	HSNC	Horizontal sync signal output
89	–	VDD	+5V power supply
90	O	DCLK	Dot clock output
91	O	HTIM	VDP1 interface H timing
92	O	VTIM	VDP1 interface V timing
93	I/O	FBD0	VDP1 interface data bit 0
94	I/O	FBD1	VDP1 interface data bit 1
95	I/O	FBD2	VDP1 interface data bit 2
96	I/O	FBD3	VDP1 interface data bit 3
97	–	VSS	GND
98	I/O	FBD4	VDP1 interface data bit 4
99	I/O	FBD5	VDP1 interface data bit 5
100	I/O	FBD6	VDP1 interface data bit 6
101	I/O	FBD7	VDP1 interface data bit 7
102	O	RAA0	VRAM- A address bit 0
103	O	RAA1	VRAM- A address bit 1
104	O	RAA2	VRAM- A address bit 2
105	O	RAA3	VRAM- A address bit 3
106	–	VSS	GND
107	O	RAA4	VRAM- A address bit 4
108	O	RAA5	VRAM- A address bit 5
109	O	RAA6	VRAM- A address bit 6
110	O	RAA7	VRAM- A address bit 7
111	–	VDD	+5V power supply
112	O	RAA8	VRAM- A address bit 8
113	O	RAA9	VRAM- A address bit 9
114	O	RACS	VRAM=A chip select
115	O	RARAS	VRAM- A row address strobe
116	–	VSS	GND
117	O	RACAS	VRAM- A column address strobe
118	O	RAWE	VRAM- A write enable
119	O	RALDM	VRAM- A DQ low - order mask enable
120	O	RAUDM	VRAM- A DQ high - order mask enable
121	I/O	RAD0	VRAM- A data bit 0
122	I/O	RAD1	VRAM- A data bit 1
123	I/O	RAD2	VRAM- A data bit 2
124	I/O	RAD3	VRAM- A data bit 3
125	–	VSS	GND
126	I/O	RAD4	VRAM- A data bit 4

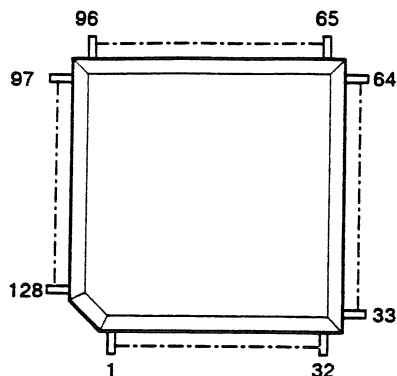
No.	I/O	Pin Name	Function
127	I/O	RAD5	VRAM – A data bit 5
128	I/O	RAD6	VRAM – A data bit 6
129	I/O	RAD7	VRAM – A data bit 7
130	–	VDD	+5V power supply
131	I/O	RAD8	VRAM – A data bit 8
132	I/O	RAD9	VRAM – A data bit 9
133	I/O	RAD10	VRAM – A data bit 10
134	I/O	RAD11	VRAM – A data bit 11
135	–	VSS	GND
136	I/O	RAD12	VRAM – A data bit 12
137	I/O	RAD13	VRAM – A data bit 13
138	I/O	RAD14	VRAM – A data bit 14
139	I/O	RAD15	VRAM – A data bit 15
140	O	RCLK	VRAM – A/B clock
141	I	TEST	Test mode selection (normally, connected to VDD)
142	I/O	RBD0	VRAM – B data bit 0
143	I/O	RBD1	VRAM – B data bit 1
144	I/O	RBD2	VRAM – B data bit 2
145	I/O	RBD3	VRAM – B data bit 3
146	–	VSS	GND
147	I/O	RBD4	VRAM – B data bit 4
148	I/O	RBD5	VRAM – B data bit 5
149	I/O	RBD6	VRAM – B data bit 6
150	I/O	RBD7	VRAM – B data bit 7
151	–	VDD	+5V power supply
152	I/O	RBD8	VRAM – B data bit 8
153	I/O	RBD9	VRAM – B data bit 9
154	I/O	RBD10	VRAM – B data bit 10
155	I/O	RBD11	VRAM – B data bit 11
156	–	VSS	GND
157	I/O	RBD12	VRAM – B data bit 12
158	I/O	RBD13	VRAM – B data bit 13
159	I/O	RBD14	VRAM – B data bit 14
160	I/O	RBD15	VRAM – B data bit 15

IC17 SCSP

IC CUSTOM CHIP SCSP QFP YAMAHA

Parts No. : 315-5687

■ Top View



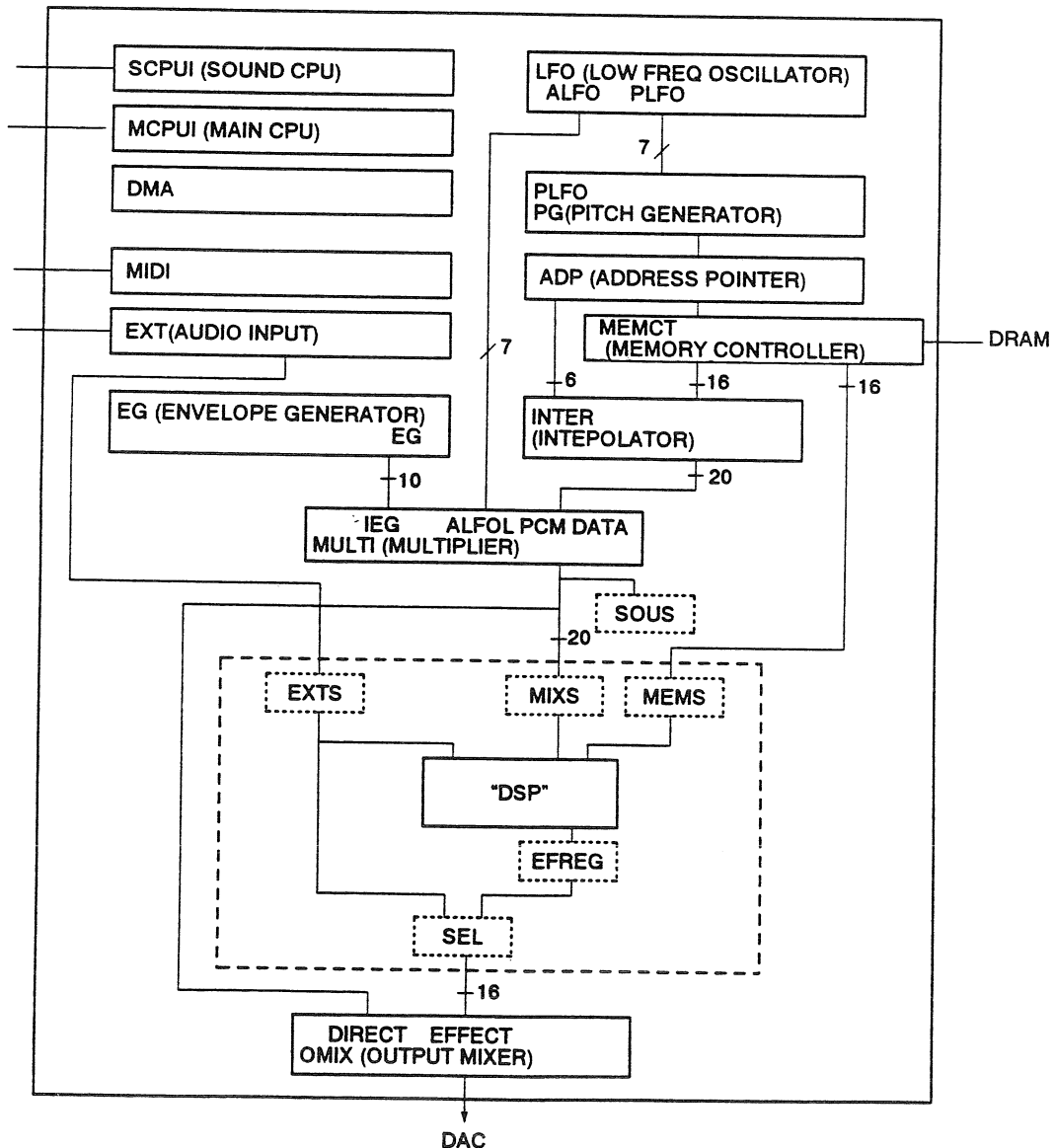
■ Description

No.	I/O	Pin Name	Function
1	I/O	MCD6	MCPU data bus
2		MCD5	
3		MCD4	
4		MCD3	
5	—	VSS	GND
6	I/O	MCD2	MCPU data bus
7		MCD1	
8		MCD0	
9	O	MCRDYN	Ready signal to MCPU
10	O	MCINTN	Interrupt request to MCPU
11	—	VDD	Power supply (5v)
12	I	RESETN	SCSP reset input
13	—	VSS	GND
14	I	MACK	SCSP master clock: 512fs (22.58MHz)
15	I	INT2N	SCSP external interrupt request input
16		INT1N	
17		INT0N	
18	—	VDD	Power supply (5v)
19	I	ESD	Digital audio interface serial data input
20	I	EBCK	Digital audio interface BCK
21	I	ELRCK	Digital audio interface LRCK
22	I	MIDIINP	MIDI input
23	—	VSS	GND
24	O	MIDIOUT	MIDI output
25	O	MRASN	RAS signal
26	O	MWEUN	Write signal corresponding to MD[15-8]
27	O	MWELN	Write signal corresponding to MD[7-0]
28	O	MCAS0N	CAS signal
29		MCASIN	
30	O	MOEN	Sound memory data output enable
31	—	VDD	Power supply (5v)
32	O	MA0	Sound memory address
33		MA1	
34		MA2	
35		MA3	
36		MA4	
37		MA5	
38	—	VSS	GND
39	O	MA6	Sound memory address
40		MA7	
41		MA8	
42	I/O	MD0	Sound memory data

No.	I/O	Pin Name	Function
43	I/O	MD1	Sound memory data
44		MD2	
45	—	VDD	Power supply (5V)
46	I/O	MD3	Sound memory data
47		MD4	
48		MD5	
49		MD6	
50		MD7	
51		MD8	
52	—	VSS	GND
53	I/O	MD9	Sound memory data
54		MD10	
55		MD11	
56		MD12	
57		MD13	
58		MD14	
59	—	VDD	Power supply (5V)
60	I/O	MD15	Sound memory data
61	O	DSD	DAC interface serial data output
62	O	DBCK	DAC interface BCK
63	O	DLRCK	DAC interface LRCK
64	O	DSCK	DAC interface system clock [256fs clock]
65	I	SCA23	SCPU address bus
66		SCA22	
67		SCA21	
68		SCA20	
69		SCA19	
70	—	VSS	GND
71	I	SCA18	SCPU address bus
72		SCA17	
73		SCA16	
74		SCA15	
75		SCA14	
76		SCA13	
77		SCA12	
78		SCA11	
79		SCA10	
80	—	VDD	Power supply (5V)
81	I	SCA9	SCPU address bus
82		SCA8	
83		SCA7	
84		SCA6	
85		SCA5	
86		SCA4	
87		SCA3	
88		SCA2	
89		SCA1	
90	—	VSS	GND
91	I	SCFC0	SCPU status input
92		SCFC1	
93		SCFC2	
94	I	SCWTN	SCPU write
95	I	SCLDSN	SCPU SCD [7-0] strobe
96	I	SCUDSN	SCPU SCD [15-8] strobe
97	I	SCASN	SCPU address strobe
98	—	TESTN	LSI test signal (Not connected)
99	—	VDD	Power supply (5V)
100	O	SCDTAKN	SCPU data acknowledge
101	O	SCAVECN	SCPU auto vector interruptu specification
102	O	SCIPL0N	SCPU interrupt level specification
103		SCIPL1N	
104		SCIPL2N	
105	I/O	SCD0	SCPU data bus

No.	I/O	Pin Name	Function
106	I/O	SCD1	SCPU data bus
107	—	VSS	GND
108	I/O	SCD2	SCPU data bus
109		SCD3	
110		SCD4	
111		SCD5	
112		SCD6	
113		SCD7	
114		SCD8	
115	—	VDD	Power supply (5V)
116	I/O	SCD9	SCPU data bus
117		SCD10	
118		SCD11	
119	—	VSS	GND
120	I/O	SCD12	SCPU data bus
121		SCD13	
122		SCD14	
123		SCD15	
124	—	VSS	GND
125	I	MCCSN	Select signal from MCPUI
126	I	MCCK	28 MHz clock from MCPUI
127	—	VDD	Power supply (5V)
128	I/O	MCD7	MCPU data bus

■ SCSP Chip Block Diagram

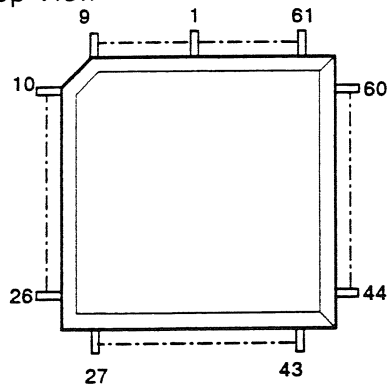


IC18 SOUND CPU (68000)

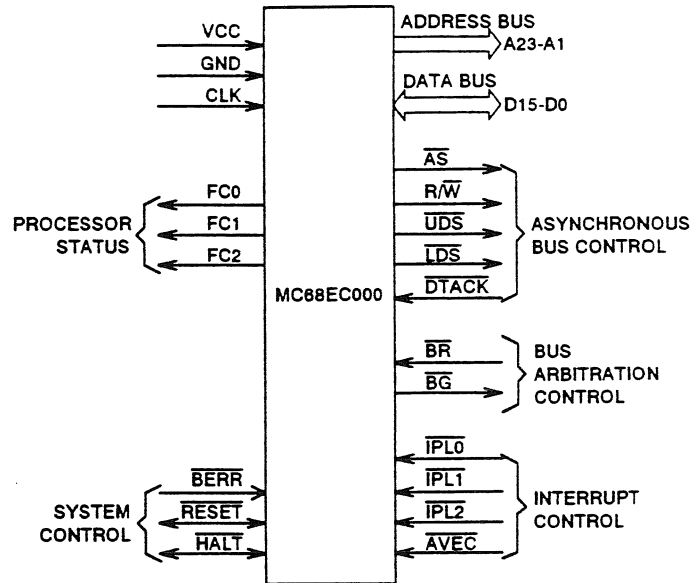
IC MC68EC000FN12 PLCC MOTOROLA

Parts No. : 315-0941

Top View



Signal Description



Description

No.	I/O	Name	Function
1	—	GND	
2	I/O	D4	Data bus
3		D3	
4		D2	
5		D1	
6		D0	
7	O	AS	Address strobe
8		UDS	Upper data strobe
9		LDS	Lower data strobe
10		R/W	Read/write
11	I	DTACK	Data transfer acknowledge
12	O	BG	Bus grant
13	I	BR	Bus request
14	—	VCC	Power
15	—	GND	Ground
16	I	CLK	Clock
17	—	GND	Ground
18	—	GND	Ground
19	I	MODE	8 bit/16 bit select
20	I/O	HALT	Halt
21	I/O	RESET	Reset
22	—	NC	Not connected
23	I	AVEC	
24	I	BERR	Bus error
25	I	IPL2	Interrupt control
26		IPL1	
27		IPL0	
28	O	FC2	Processor status
29		FC1	
30		FC0	
31	O	A0	Address bus
32		A1	
33		A2	
34		A3	

No.	I/O	Name	Function
35	—	GND	Ground
36	O	A4	Address bus
37		A5	
38		A6	
39		A7	
40		A8	
41		A9	
42		A10	
43		A11	
44		A12	
45		A13	
46		A14	
47		A15	
48		A16	
49		A17	
50		A18	
51		A19	
52		A20	
53	—	VCC	Power
54	O	A21	Address bus
55		A22	
56		A23	
57	—	GND	Ground
58	I/O	D15	Data bus
59		D14	
60		D13	
61		D12	
62		D11	
63		D10	
64		D9	
65		D8	
66		D7	
67		D6	
68		D5	

IC19 Sound DRAM

IC HM514270AJ-8 SOJ HITACHI

Parts No. : 315-0777-80

IC UPD424270LE-70 SOJ NEC

Parts No. : 315-0739-70

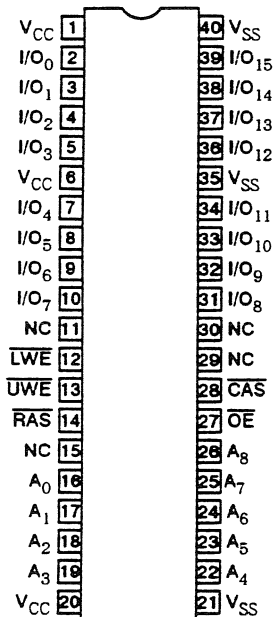
IC HM514270A3-7 SOJ HITACHI

Parts No. : 315-0777-70

IC MN414270SJ-08 SOJ PANASONIC

Parts No. : 315-0822-80

■ Top View & Pin Layout



Input State				Output State	Operation Mode
$\overline{\text{RAS}}$	$\overline{\text{CAS}}$	$\overline{\text{UWE}}$	$\overline{\text{LWE}}$		
H	H	D	D	Open	Standby
H	L	H	H	Valid	Standby
L	L	H	H	Valid	Read cycle
L	L	L 2)	L 2)	Open	Early write cycle
L	L	L 2)	L 2)	Underlined	Delayed write cycle
L	L	H $\rightarrow$ L	H $\rightarrow$ L	Valid	Read modified write cycle
L	H	D	D	Open	$\overline{\text{RAS}}$ only refresh cycle
H $\rightarrow$ L	L	D	D	Open	$\overline{\text{CAS}}$ before $\overline{\text{RAS}}$ refresh cycle
L	H $\rightarrow$ L	H	H	Valid	High-speed page mode read cycle
L	H $\rightarrow$ L	L 2)	L 2)	Open	High-speed page mode early write cycle
L	H $\rightarrow$ L	L 2)	L 2)	Underlined	High-speed page mode delayed write cycle
L	H $\rightarrow$ L	H $\rightarrow$ L	H $\rightarrow$ L	Valid	High-speed page mode read modified write cycle

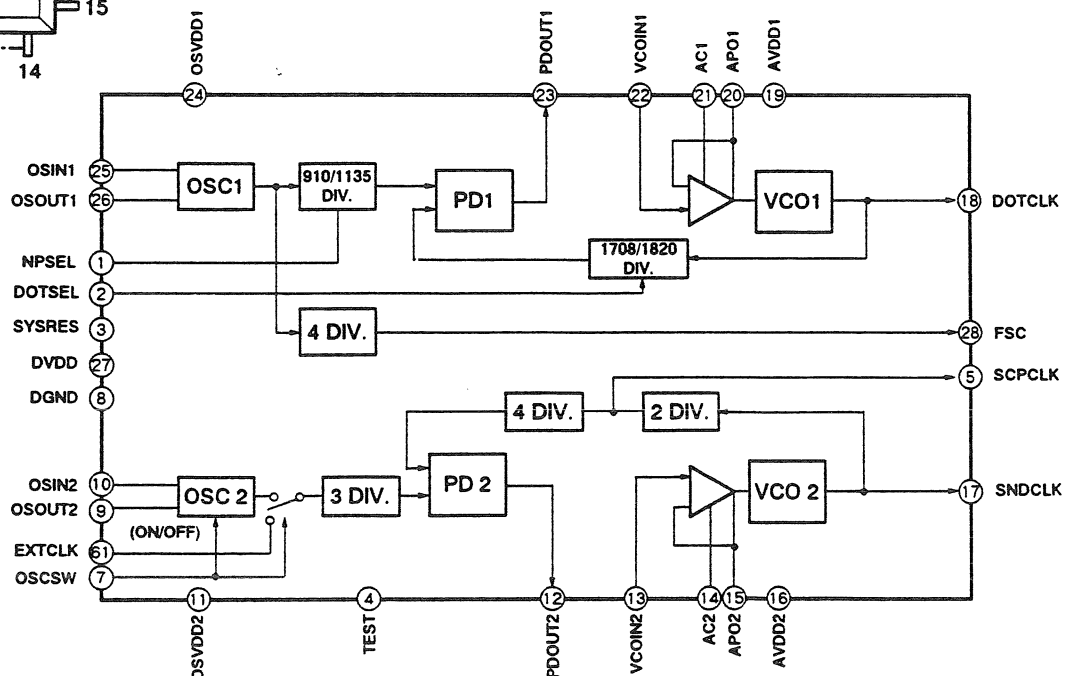
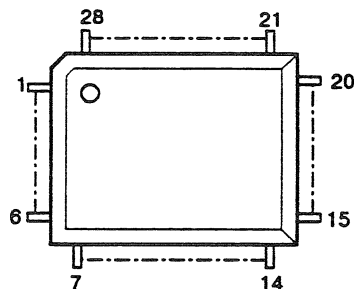
Note: H=High(inactive), L=Low(active), D=Don't care.

IC20 PLL

IC CUSTOM CHIP PLL HQFP

Parts No. : 315-5746

■ **Top View**



No.	I/O	Name	Function
1	I	NPSEL	NTSC (5V)/PAL (0V) mode switching control
2		DOTSEL	320PIX (0V)/352PIX (5V) mode switching control
3		SYSRES	Reset (0V reset)
4		TEST	Test pin
5	O	SCPCLK	Clock signal output
6	I	EXTCLK	External clock input / CMOS I with pull-down resistor incorporated
7		OSCSW	Crystal oscillation/external clock signal input switching control (5V: Crystal oscillation, 0V: External clock signal) / CMOS I with pull-up resistor incorporated
8	—	DGND	Ground of digital circuits
9	O	OSOUT2	Crystal oscillator output (OSC2) / Oscillation output O
10	I	OSIN2	Crystal oscillator input (OSC2) / Oscillation input I
11	—	OSVDD2	VDD of crystal oscillator (OSC2)
12	O	PDOUT2	Phase detector (PD2) output
13	I	VCOIN2	VCO2 input / Analog I
14	—	AC2	Phase compensator pin / Analog
15	O	APO2	VCO2 amp output / Analog O
16	—	AVDD2	Analog VDD of VCO2
17	I/O	SNDCLK	Clock signal output
18		DOTCLK	Clock signal output
19	—	AVDD1	Analog VDD of VCO1
20	O	APO1	VCO1 amp output / Analog O
21	—	AC1	Phase compensator pin / Analog
22	I	VCOIN1	VCO1 input / Analog
23	O	PDOUT1	Phase detector (PD1) output
24	—	OSVDD1	VDD of crystal oscillator (OSC1)
25	I	OSIN1	Crystal oscillator input (OSC1) / Oscillation input I
26	O	OSOUT1	Crystal oscillator output (OSC1) / Oscillation output O
27	—	DVDD	VDD of digital circuits
28	O	FSC	Clock output signal

IC CXA1645M SOP SONY
Parts No. : 315-5314

The block diagram illustrates the internal architecture of the video processor, organized into two main horizontal sections connected by a central vertical bus. The top section, representing the output stage, includes blocks for R-OUT, G-OUT, B-CUT, VIDEO OUT, Y/C MIX, 75 DRIVER, and REGULATOR. The bottom section, representing the input and processing stage, includes blocks for CLAMP, MATRIX, DELAY, CLAMP, SYNC ADD, BPF, R-Y Modulator, B-Y Modulator, PHASE SHIFTER, and PULSE GEN. The central vertical bus connects the output of the MATRIX block to the input of the CLAMP and SYNC ADD blocks. The input and output pins are labeled along the top and bottom edges of the diagram.

Top Pins (Left to Right): GND2 (24), ROUT (23), GOUT (22), BOUT (21), CVOUT (20), VCC2 (19), FO (18), YTRAP (17), YOUT (16), COUT (15), VREF (14), IREF (13).

Bottom Pins (Left to Right): GND1 (1), RIN (2), GIN (3), BIN (4), NC (5), SCIN (6), NPIN (7), BFOUT (8), YCLPC (9), SYNCIN (10), NC (11), VCC1 (12).

Internal Blocks and Connections:

- Input Stage:** RIN, GIN, and BIN are connected to CLAMP blocks. SCIN is connected to the SIN-PULSE block. NPIN is connected to the PHASE SHIFTER. BFOUT is connected to the PHASE SHIFTER. YCLPC is connected to the PULSE GEN. SYNCIN is connected to the SYNC ADD block.
- Processing Stage:** The output of the MATRIX block is connected to the CLAMP and SYNC ADD blocks. The output of the CLAMP block is connected to the R-Y Modulator. The output of the SYNC ADD block is connected to the B-Y Modulator. The output of the R-Y Modulator is connected to the B-Y Modulator. The output of the B-Y Modulator is connected to the BPF block.
- Output Stage:** The output of the BPF block is connected to the 75 DRIVER. The output of the 75 DRIVER is connected to the COUT pin. The output of the REGULATOR is connected to the VREF pin. The output of the Y/C MIX block is connected to the YOUT pin. The output of the VIDEO OUT block is connected to the CVOUT pin.

Description

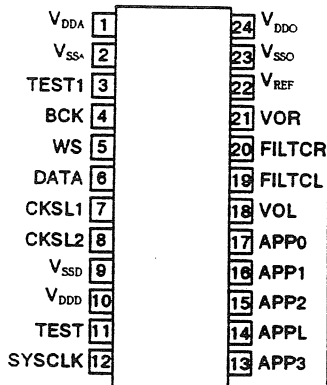
No.	I/O	Pin Name	Function
1	—	GND1	Ground of circuits other than RGB, composite video and Y/C output circuits.
2	I	RIN	Analog RGB signal inputs. The signals should be input with 100% = 1 V _{p-p} (max.).
3		GIN	
4		BIN	
5	—	NC	Not connected.
6	I	SCIN	Subcarrier input
7	I	NPIN	NTSC/PAL mode switching pin
8	O	BFOUT	BF pulse monitoring output
9	—	YCLPC	Time constant which determines the Y signal clamp is connected.
10	I	SYNC IN	Composite sync signal input. Receives it at the TTL level.
11	—	NC	Not connected.
12	—	VCC1	Power supply of circuit other than RGB, composite video and Y/C output
13	—	IREF	Pin to determine the internal reference current level.
14	—	VREF	Internal reference voltage pin.
15	O	COOUT	Chroma signal output. Can drive a 75 Ω load.
16	O	YOUT	Y (luma) signal output. Can drive a 75 Ω load.
17	—	YTRAP	Reduces cross-color caused by subcarrier frequency components contained in the Y signal.
18	—	FO	Adjusts fo of the internal filter. Connect the following resistor between this pin and ground depending on the NTSC or PAL mode.
19	—	VCC2	Power supply of RGB, composite video and Y/C output circuits.
20	O	CVOUT	Composite video signal output. This can drive a 75 Ω load.
21	O	BOOUT	Analog RGB signal outputs. These can drive a 75 Ω load.
22		GOOUT	
23		ROOUT	
24	—	GND2	Ground of RGB, composite video and Y/C output circuits.

IC22 DAC

IC TDA1386T SOP PHILIPS

Parts No. : 313-5313

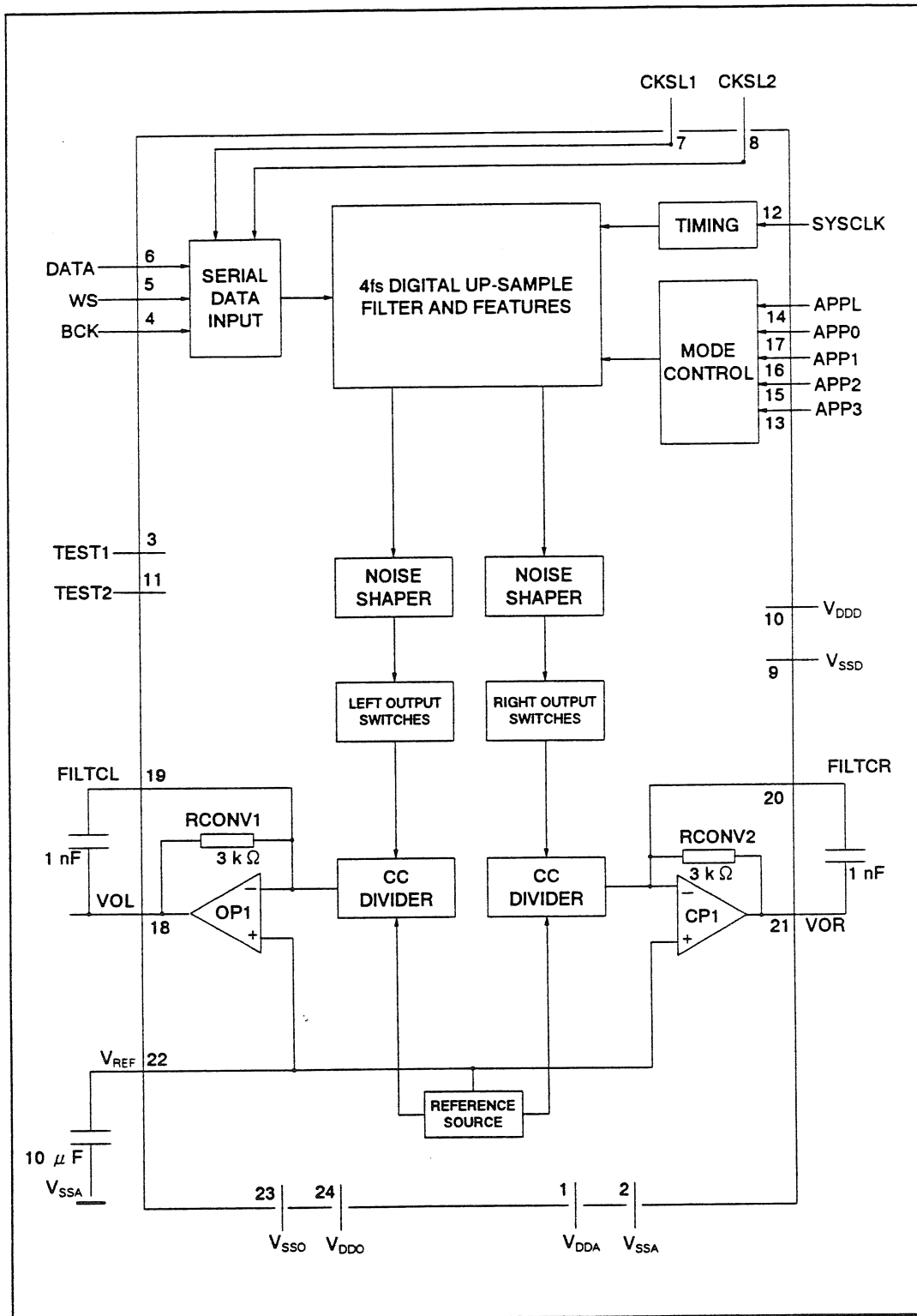
Top View



Description

No.	I/O	Pin Name	Function
1	—	VDDA	Analog supply voltage
2	—	VSSA	Analog ground
3	I	TEST1	Test input 1; pin should be connected to ground.
4	I	BCK	Bit clock input.
5	I	WS	Word select input.
6	I	DATA	Data input.
7	I	CKSL1	Format selection 1.
8	I	CKSL2	Format selection 2.
9	—	VSSD	Digital ground
10	—	VDDD	Digital supply voltage.
11	I	TEST2	Test input 2; pin should be connected to ground.
12	—	SYSCLK	System clock 256 fs
13	I	APP3	Application mode 3 input.
14	I	APPL	Application mode selection input.
15	I	APP2	Application mode 2 input.
16	I	APP1	Application mode 1 input.
17	I	APP0	Application mode 0 input.
18	O	VOL	Left channel output.
19	—	FILTCL	Capacitor for left channel first-order filter function, should be connected between pins 19 and 18.
20	—	FILTCR	Capacitor for right channel first-order filter function, should be connected between Pins 20 and 21.
21	O	VOR	Right channel output.
22	—	VREF	Internal reference voltage for output channels (0.5V _{DDO} typ.).
23	—	VSSO	Operational amplifier ground.
24	—	VDDO	Operational amplifier supply voltage.

■ Block Diagram

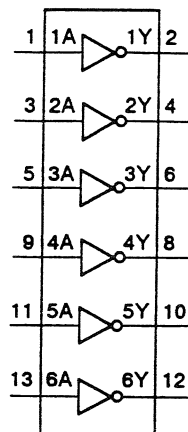
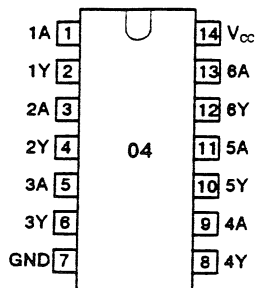


IC23/24 74VHC04

IC 74VHC04 SOP 300MIL

Parts No. : 314-0632

■ Top View & Pin Layout

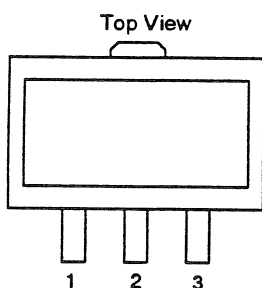


IC25

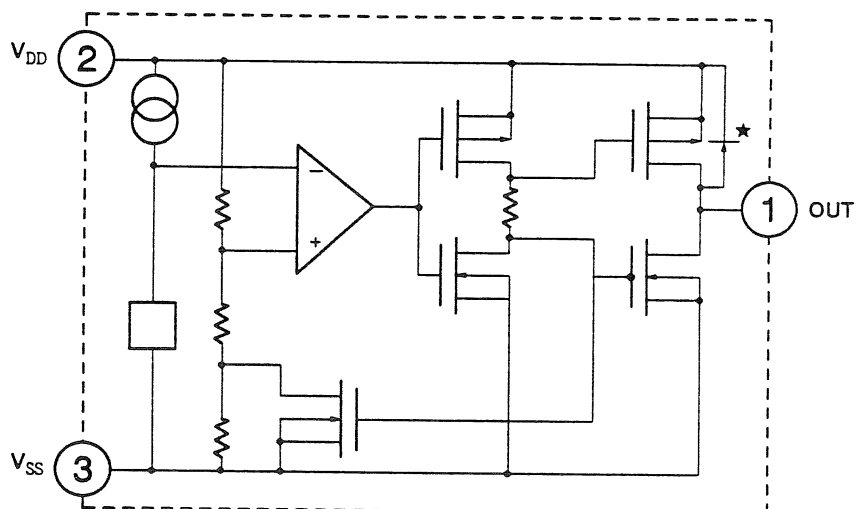
IC S-80741AL-A5 CHIP

Parts No. : 313-5322

■ Top View



1 OUT
2 VDD
3 VSS

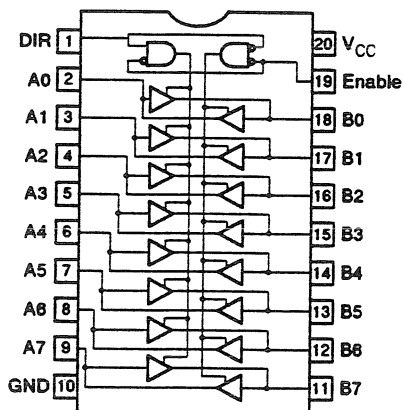


IC26/27/29/30 74LS245

IC 74LS245 SOP 300MIL

Parts No. : 314-0563

■ Top View & Pin Layout



■ Function Table

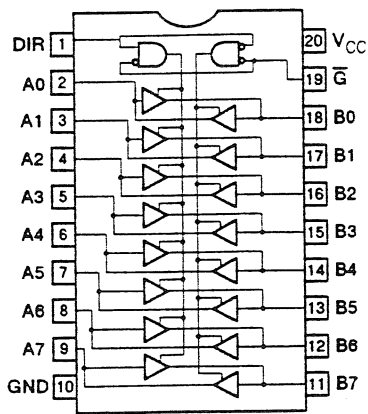
Enable $\bar{G}$	Direction Control DIR	Operation
L	L	B data to A bus
L	H	A data to B bus
H	X	Isolation

H : High level
L : Low level
X : "H" or "L" level

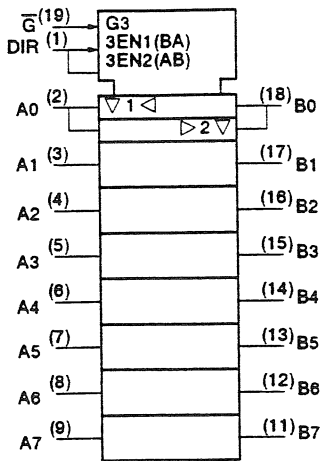
IC28 OCTAL BUS TRANSCEIVER

IC 74ACT245 SOP 300MIL
Parts No. : 314-0649

■ Top View



■ Logical Operation Circuit



■ Truth Value Table

INPUT		FUNCTION		OUTPUT STATE
$\overline{G}$	DIR	A BUS	B BUS	
L	L	OUTPUT	INPUT	A=B
L	H	INPUT	OUTPUT	B=A
H	X	High impedance		Z

X: Don't care
Z: High impedance

IC31/32 DRAM

IC HM514260AJ-7 SOJ
Parts No. : 315-0947-70

IC KM416C256BJ-7 SOJ SAMSUNG
Parts No. : 315-0983-70

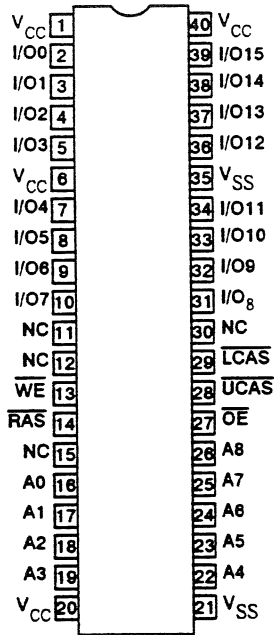
IC UPD424260LE-70-E2 SOJ NEC
Parts No. : 315-0985-70

IC MB814260-70PJ-G SOJ FUJITSU
Parts No. : 315-0984-70

IC TC514260BJ-70 SOJ TOSHIBA
Parts No. : 315-0986-70

IC HY514260BJC-70 SOJ HYUNDAI
Parts No. : 315-1030-70

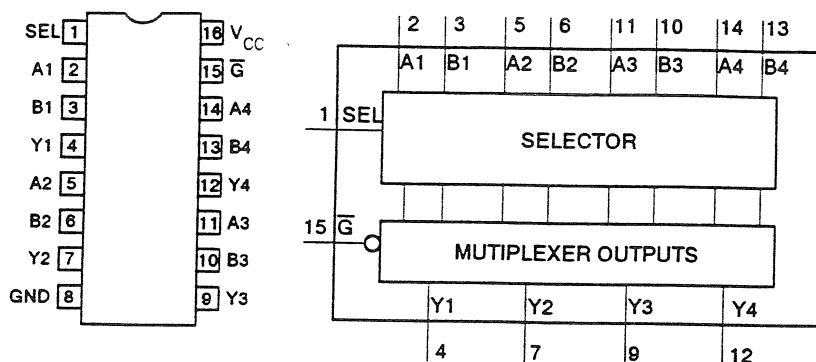
■ Top View



IC33

IC 74HC157 SOP
Parts No. : 314-0634

Top View



Description

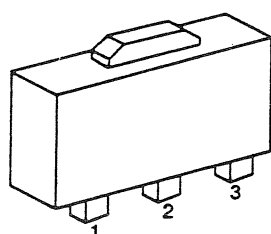
No.	Name	Function
1	SEL	Common data select input
2	A1	Data inputs from source 0
3	B1	Data inputs from source 1
4	Y1	Multiplexer outputs
5	A2	Data inputs from source 0
6	B2	Data inputs from source 1
7	Y2	Multiplexer outputs
8	GND	Ground (0V)
9	Y3	Multiplexer outputs
10	B3	Data inputs from source 1
11	A3	Data inputs from source 0
12	Y4	Multiplexer outputs
13	B4	Data inputs from source 1
14	A4	Data inputs from source 0
15	G-bar	Enable input (active LOW)
16	V _{cc}	Positive supply voltage

IC34

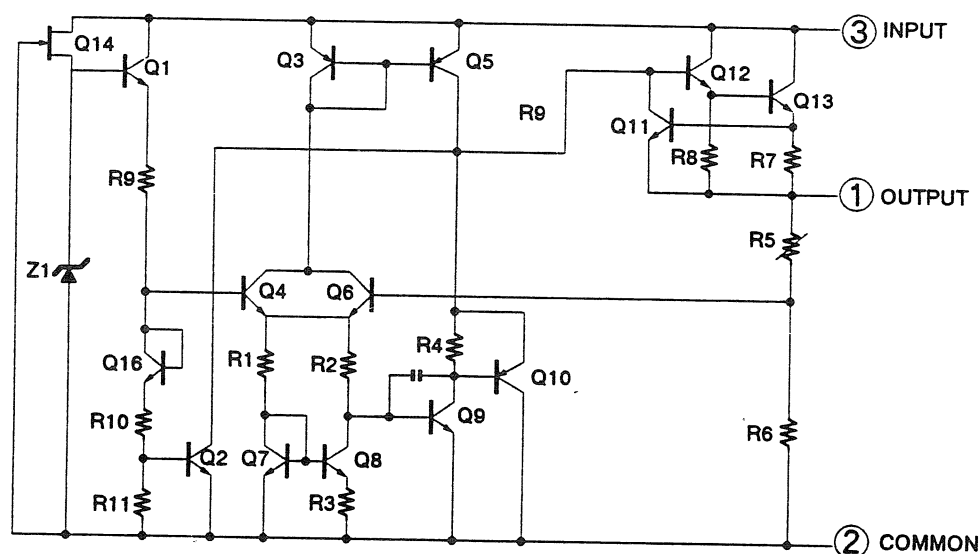
IC UPC78L05T CHIP
Parts No. : 313-5323

IC TA78L05F CHIP
Parts No. : 313-5323-01

Top View



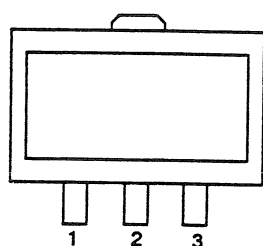
1. OUTPUT
2. COMMON (SHIELD PLATE)
3. INPUT



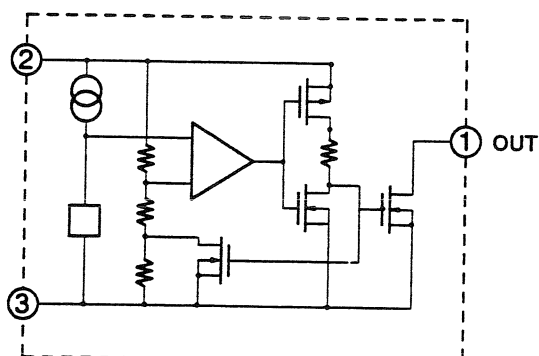
IC35

IC S-80723AN-DL CHIP
Parts No. : 313-5328

Top View



1. OUT
2. VDD
3. VSS



SH1 BOARD IC101 SH1 CPU

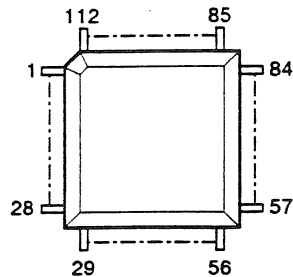
IC CUSTOM CHIP SH1 QFP

Parts No. : 315-5785

IC CUSTOM CHIP SH1A QFP

Parts No. : 315-5785A

Top View



Description

No.	I/O	Pin Name	Function
1		$\overline{\text{IRQ L}}$	Host command interrupt input (level detection)
2		$\overline{\text{IRQ H}}$	CD-ROM sync detection, subcode sync detection interrupt input (level detection)
3		VSS	Ground
4	I/O	AD0	Data input/output
5		AD1	
6		AD2	
7		AD3	
8		AD4	
9		AD5	
10		AD6	
11		AD7	
12	—	VSS	Ground
13	I/O	AD8	Data input/output
14		AD9	
15	—	VCC	+5V
16	I/O	AD10	Data input/output
17		AD11	
18		AD12	
19		AD13	
20		AD14	
21		AD15	
22	—	VSS	Ground
23	O	A0	Address output
24		A1	
25		A2	
26		A3	
27		A4	
28		A5	
29		A6	
30		A7	
31	—	VSS	Ground
32	O	A8	Address output
33		A9	
34		A10	
35		A11	
36		A12	
37		A13	
38		A14	
39		A15	
40	—	VSS	Ground
41	O	A16	Address output
42		A17	
43	—	VCC	+5V
44	O	A18	Address output
45		A19	
46		A20	
47		A21	
48	O	NC	Not connected.
49	O	CASH	DRAM CASH output

No.	I/O	Pin Name	Function
50	O	$\overline{\text{CS2}}$	CS2 output (GA, MPEG, other area 2 access)
51	O	$\overline{\text{CASL}}$	DRAM CASL output
52		VSS	Ground
53	I	$\overline{\text{TIOCA0}}$	MPEG A data transfer (DMA3) request input (edge detection)
54	O	$\overline{\text{RAS}}$	DRAM CASL output
55	I/O	$\overline{\text{CS6}}$	CS6 output (area 6 access)
56	—	NC	Not connected.
57	O	$\overline{\text{WRL}}$	WRL output
58	O	$\overline{\text{WRH}}$	WRH output
59	O	$\overline{\text{RD}}$	RD output
60	O	$\overline{\text{RESET}}$	GA reset output. Lo: RESET, Hi: Release
61	—	VSS	Ground
62	O	NC	Not connected.
63	O	$\overline{\text{IROOUT}}$	Spare (Spare to output "Lo" during interrupt process)
64	I	$\overline{\text{TIOCA1}}$	MPEG V data transfer (DMA2) request input (edge detection)
65	O	NC	Not connected.
66	O	$\overline{\text{DACK0}}$	DMA0 (for CD-ROM sector data input) ACK output (to GA)
67	I	$\overline{\text{DREQ0}}$	DMA0 (for CD-ROM sector data input) REQ input (from GA)
68	O	$\overline{\text{DACK1}}$	DMA1 (for host data input/output) ACK output (to GA)
69	I	$\overline{\text{DREQ1}}$	DMA1 (for host data input/output) REQ output (from GA)
70	—	VCC	+5V
71	O	CK	SH—1 system clock output (20MHz) (to GA)
72	—	VSS	Ground
73	I	EXTAL	A crystal oscillator is connected.
74	I	XTAL	A crystal oscillator is connected.
75	—	VCC	+5V
76	I	NM1	+5V
77	—	VSS	Ground
78	—	NC	Not connected.
79	I	$\overline{\text{RESET}}$	Reset input (reset at "Lo")
80	I	MD0	MCU operation mode setting pins. The built-in ROM is effective.
81		MD1	
82		MD2	
83	—	VCC	+5V
84	—	VCC	+5V
85	—	VCC	+5V (power supply of analog circuits)
86	—	VREF	+5V (analog reference power supply)
87	—	NC	Ground (not used)
88		NC	
89		NC	
90		NC	
91	—	AVSS	Ground (analog ground)
92	—	NC	Ground (not used)
93	I	VCD	Input to detect whether VCD is connected or not. Lo: CD drive connected, Hi: VCD connected.
94	—	NC	Ground (not used)
95	—	NC	Ground
96	—	VSS	Ground
97	I	$\overline{\text{MPEGA IRQ}}$	MPEG A interrupt input (edge detection)
98	I	$\overline{\text{MPEGV IRQ}}$	MPEG V interrupt input (edge detection)
99	—	VCC	+5V
100	I	$\overline{\text{COMSYN}}\overline{\text{C}}$	CD communications start signal input. Lo: Start, Hi: In the middle
101	I	$\overline{\text{COMREQ}}$	CD communications sync interrupt input (edge detection). Lo: During clock transfer, Hi: During interval.
102	—	NC	Not connected.
103	—	NC	Not connected.
104	O	DEMP	Deemphasis output. Lo: DEMP OFF, Hi: DEMP ON
105	—	NC	Not connected.
106	—	VSS	Ground
107	I	CDATA	CD communications data input (SCK0 used)
108	O	HDATA	CD communications data output (SCK0 used)
109	I	$\overline{\text{TEST}}$	Test control input. Lo: Test mode, Hi: Normal mode
110	O	TDATA	Test data output
111	O	COMCLK	CD communications clock output (SCK0 used)
112	O	TCLK	Clock output for test data

SH1 BOARD IC102 DRAM

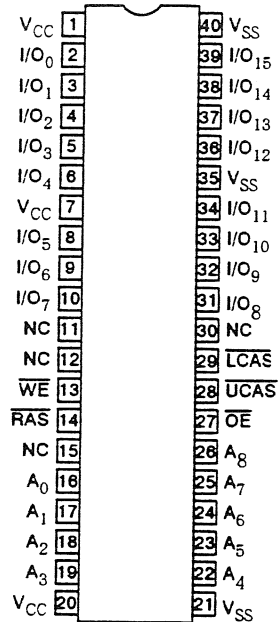
IC HM514260AJ-8 SOJ

IC HM514260AJ-7 SOJ

Parts No. : 315-0947-80

Parts No. : 315-0947-70

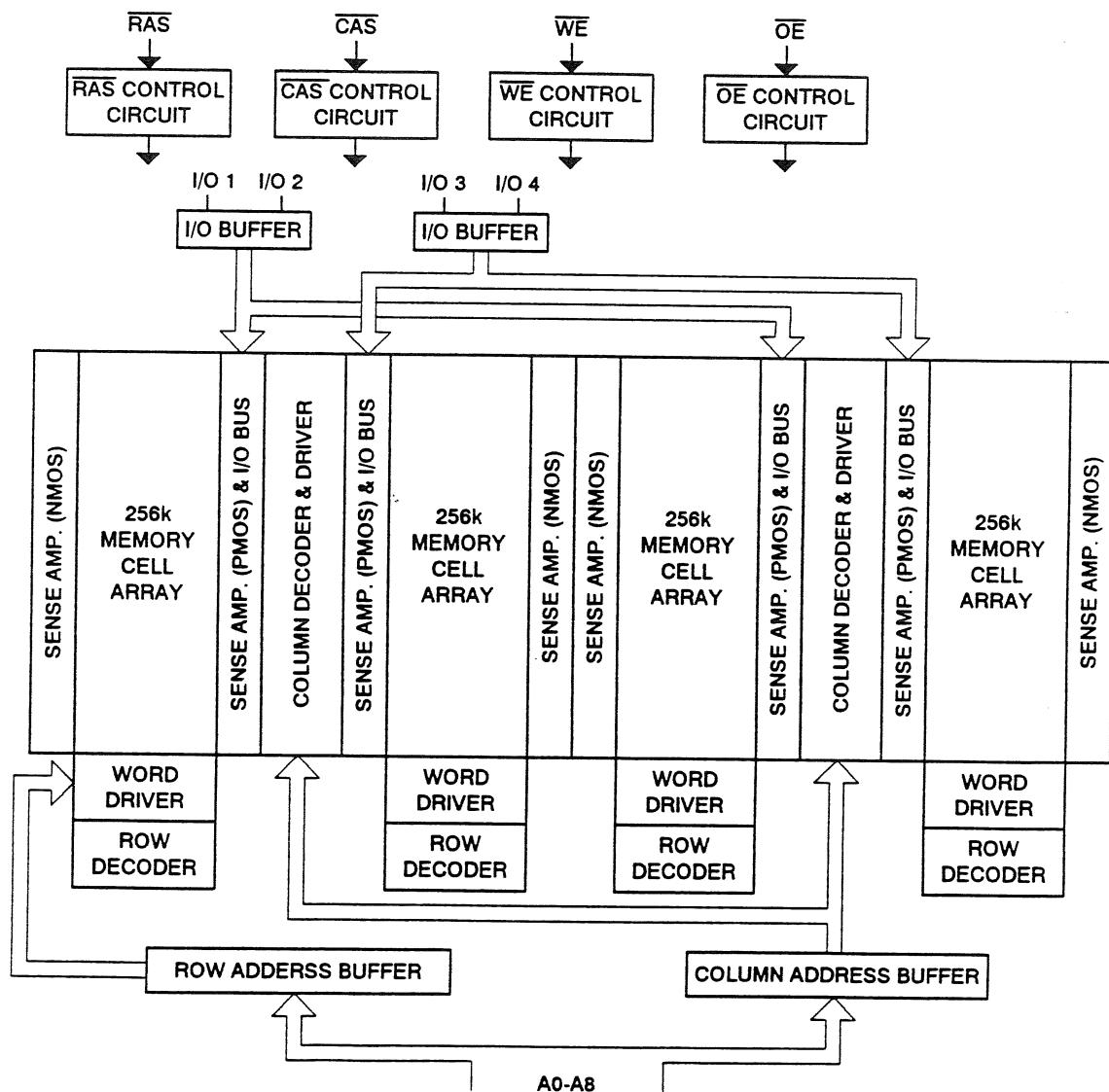
Top View & Pin Layout



Pin Name

Pin Name	Function
A0-A8	address input
A0-A8	Refresh address input
I/O1-I/O4	Data input/output
$\overline{\text{RAS}}$	Row address strobe
$\overline{\text{CAS}}$	Column address strobe
$\overline{\text{WE}}$	Write enable
$\overline{\text{OE}}$	Output enable
V_{CC}	Power supply (+5V)
V_{SS}	Ground

Block Diagram

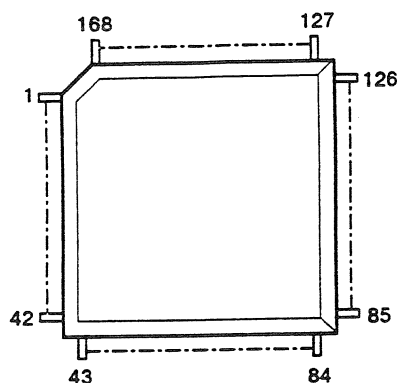


SH1 BOARD IC103

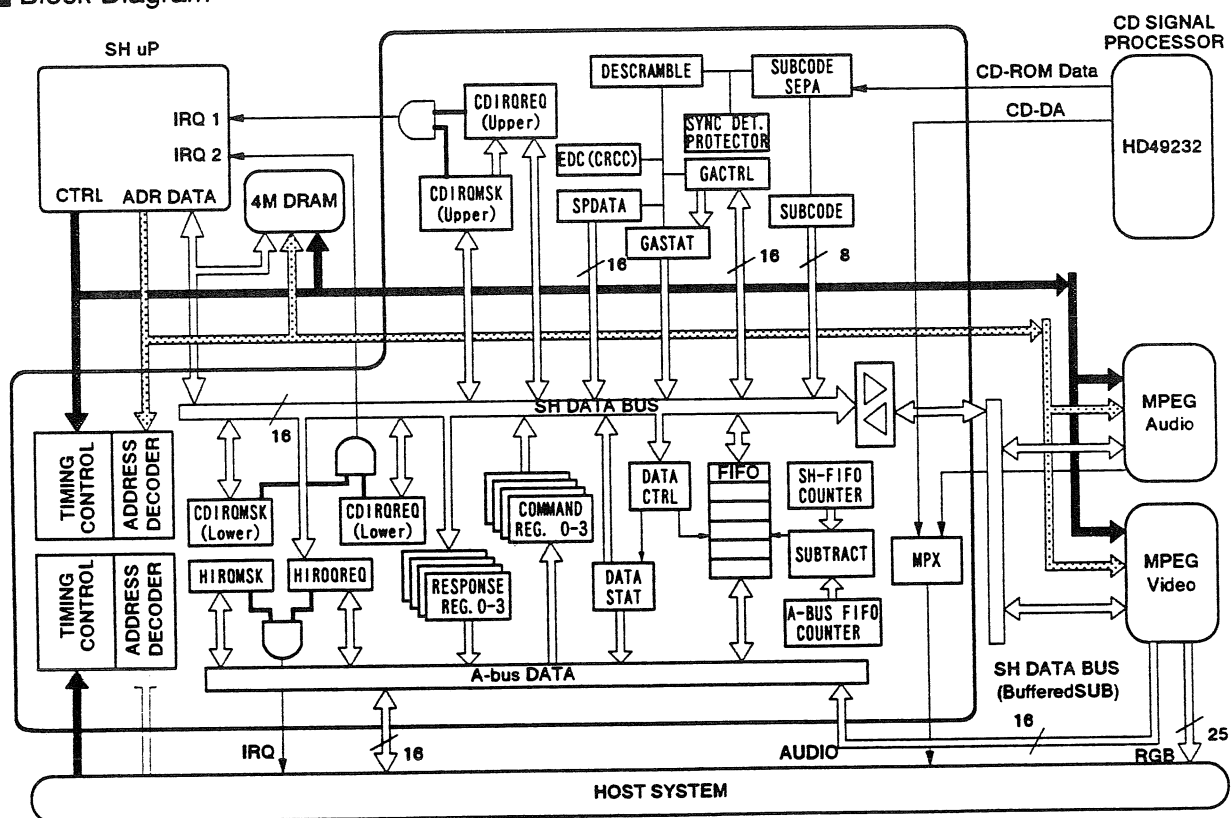
IC CUSTOM CHIP OCU YGR019A

Parts No. : 315-5873

Top View



Block Diagram



■ Description

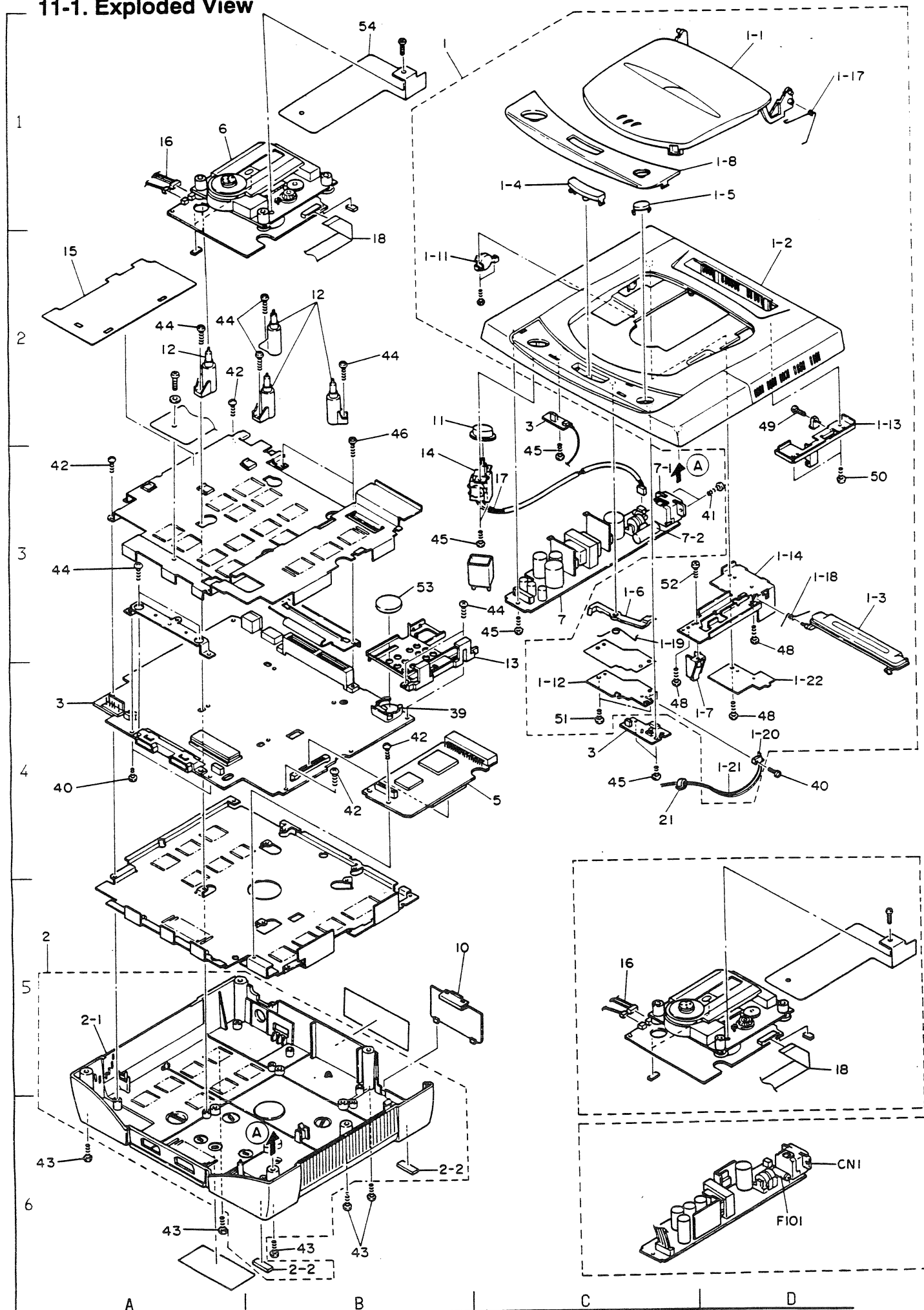
No.	I/O	Name	Function
1	I	MVPRT	Video transparency control signal
2	I	MVR7	Video red color data
3		MVR6	
4		MVR5	
5		MVR4	
6		MVR3	
7	—	VCC	Power supply
8	—	VSS	Ground
9	I	MVG7	Video green color data
10		MVG6	
11		MVG5	
12		MVG4	
13		MVG3	
14	I	MVB7	Video blue color data
15	—	VSS	Ground
16	I	MVB6	Video blue color data
17		MVB5	
18		MVB4	
19		MVB3	
20	I	AA1	A-BUS address bus
21		AA2	
22		AA3	
23	—	VSS	Ground
24	I	AA4	A-BUS address bus
25		AA16	
26		AA17	
27		AA18	
28	I	ACS2	Chip select signal from A-BUS
29	I	WTRS	Wait control signal used to transfer MPEG video frame data
30	—	VSS	Ground
31	O	FDACK	MPEG video frame data transfer control signal
32	O	MVCS	MPEG video chip select signal
33	O	MACS	MPEG audio chip select signal
34	O	TP5	Test pin
35	—	VCC	Power supply
36	—	VSS	Ground
37	I	RESET	Gate array system reset signal
38	I	MABICK	Sync clock used to transfer MPEG audio serial data
39	I	MASDATAI	MPEG audio serial data signal
40	I	MALRCLK	Clock used to detect MPEG audio serial data L/R
41	I	TP2	Test pin
42	I	SCS6	SH chip select 6
43	—	VSS	Ground
44	I	SDL0	SH uP subdata bus
45		SDL1	
46		SDL2	
47		SDL3	
48		SDL4	
49	—	VCC	Power supply
50	—	VSS	Ground
51	I	SDL5	SH uP subdata bus
52		SDL6	
53		SDL7	
54		SDL8	
55		SDL9	
56		SDL10	

No.	I/O	Name	Function
57	–	VSS	Ground
58	I	SDL11	SH uP subdata bus
59		SDL12	
60		SDL13	
61		SDL14	
62		SDL15	
63	–	VCC	Power supply
64	–	VSS	Ground
65	I	SA21	SH uP address bus
66		SA20	
67		SA4	
68		SA3	
69		SA2	
70	I	SRD	SH uP read enable signal
71	–	VSS	Ground
72	I	SHCK	20MHz clock
73	I	SA1	SH uP address bus
74	I	IRQOUT	SH uP interrupt factor generation signal
75	I	SCS2	SH uP chip select 2
76	I	DACK1	Channel 1 DMA transfer response
77	–	VCC	
78	–	VSS	Ground
79	I	DACK0	Channel 0 DMA transfer response
80	I	CASH	DRAM control signal
81		CASL	
82	I	SWRH	SH uP upper byte write enable signal
83	I	SWRL	SH uP lower byte write enable signal
84	I	SA19	SH uP address bus
85	I	TP3	Test pin
86	–	VSS	Ground
87	O	DSWR	Delayed write cycle control signal
88	O	DREQ1	Channel 1 DMA transfer request
89	O	DREQ0	Channel 0 DMA transfer request
90	I	SDH15	SH uP main data bus
91	–	VCC	Power supply
92	–	VSS	Ground
93	I	SDH14	SH uP main data bus
94		SDH13	
95		SDH12	
96		SDH11	
97		SDH10	
98	–	VSS	Ground
99	I	SDH9	Power supply
100		SDH8	SH uP main data bus
101		SDH7	
102		SDH6	
103		SDH5	
104	–	VCC	Power supply
105	–	VSS	Ground
106	I	SDH4	SH uP main data bus
107		SDH3	
108		SDH2	
109		SDH1	
110		SDH0	
111	O	SIRQH	SH uP upper byte (CD-ROM) interrupt signal
112	–	VSS	Ground

No.	I/O	Name	Function
113	O	SIRQL	SH uP lower byte (A-BUS) interrupt signal
114	O	BCK	Audio serial data sync clock
115	O	LRCK	Audio L/R channel switching signal
116	—	VCC	Power supply
117	O	SD	Audio serial data
118	O	SUBCK	Subcode input clock
119	—	VCC	Power supply
120	—	VSS	Ground
121	I	CFCK0	Frame sync signal
122	I	SUBOUT	CD subcode data
123	I	SI	Subcode block sync signal
124	I	DAS	CD-DA audio serial data
125	I	CKX	CD audio serial data sync clock
126	I	MPX	CD audio L/R channel switching signal
127	—	VSS	Ground
128	I	C2F	C2 error flag
129	I	SMPX	CD-ROM data byte sync signal
130	I	SDAS	CD-ROM serial data
131	I	SCKX	CD-ROM serial data bit sync signal
132	—	VSS	Ground
133	—	VCC	Power supply
134	—	VSS	Ground
135	I	ATIM1	A-BUS timing control signal
136		ATIM0	
137	I	ARD	A-BUS read signal
138	—	VSS	Ground
139	I	AFC0	A-BUS timing control signal
140	I	AWR0	A-BUS lower byte write signal
141	I	AWR1	A-BUS upper byte write signal
142	I	AFC1	A-BUS timing control signal
143	—	VSS	Ground
144	O	AWAIT	A-BUS wait control signal
145	O	AIRQ	A-BUS interrupt signal
146	—	T	Test signal for scan pass
147	I	AD0	A-BUS data bus
148		AD1	
149	—	VCC	Power supply
150	—	VSS	Ground
151	I	AD2	A-BUS data bus
152		AD3	
153		AD4	
154		AD5	
155	—	VSS	Ground
156	I	AD6	A-BUS data bus
157		AD7	
158		AD8	
159		AD9	
160		AD10	
161	—	VCC	Power supply
162	—	VSS	Ground
163	I	AD11	A-BUS data bus
164		AD12	
165		AD13	
166		AD14	
167		AD15	
168	—	VSS	Ground

11. EXPLODED VIEW & PARTS LIST

11-1. Exploded View



11-2. Mechanical Parts List

Ref. No.	Parts No.	Description	Ref. No.	Parts No.	Description
1	610-5862	ASSY TOP CASE SATURN EUR [1]	54	601-7815	STAELE PROTECTION SHEET SAT
1	610-5927	ASSY TOP CASE SATURN AUS [2]			
1-1	610-5864	ASSY LID CD SATURN EUR			
1-2	253-7015	TOP CASE SATURN EUR			
1-3	253-7013	LID CRTG SATURN USA			
1-4	253-6917-03	BUTTON OPEN SATURN USA			
1-5	253-6919-03	BUTTON RESET SATURN USA			
1-6	253-6920	BUTTON OPEN LEVER SATURN JPN			
1-7	253-7012	MOUNT POWER UNIT PCB SAT USA			
1-8	253-7010	PANEL DEC. FRONT SATURN USA			
1-11	601-7774	OIL DUMPER SATURN			
1-12	250-5404	BRACKET LEVER SATURN JPN			
1-13	250-5423	BRACKET LID CD SPRING SAT USA			
1-14	250-5424A	BRACKET LID CD HOLDER SAT USA A			
1-17	125-5125	SPRING LID CD SATURN JPN			
1-18	125-5126	SPRING LID CRTG SATURN JPN			
1-19	125-5127	SPRING ARM SATURN JPN			
1-20	510-5068	DETECTOR SW SPPB11			
1-21	600-6536	WIRE HARN 2P FOR DETECTOR USA			
1-22	601-7726	PLATE SEVER SMALL SATURN JPN			
2	610-5863	ASSY BOTTOM CASE SATURN USA			
2-1	253-7016	BOTTOM CASE SATURN EUR			
2-2	601-7658	RUBBER FOOT SATURN JPN			
3	837-11492	ASSY IC BD SATURN VAO PAL			
5	838-10834	IC BD SATURN SH1			
6	610-5679-20	ASSY CD DRIVE UNIT SATURN			
6	610-5679-21				
7	400-5271	AC POWER UNIT SATURN EUR			
7	400-5272	AC POWER UNIT SATURN EUR			
△7-1	601-7672	INLET FOR UL/CSA SATURN			
△7-2	514-5066	FUSE 1.6A 080026			
10	253-6915-03	LID BATTERY SATURN EUR			
11	253-6918-03	BUTTON POWER SATURN USA			
11	253-6918A-03	BUTTON POWER SATURN USA A			
12	253-6921	MOUNT MECHA SATURN JPN			
13	253-6932	SLIDE RAIL SATURN JPN			
14	510-5069	POWER SW SDDL			
15	601-7979	PLATE SEVER LARGE SATURN USA			
16	600-6416	WIRE HARN 5P FOR ST CD			
17	600-6560	WIRE HARN 2P FOR P. SW NEW			
18	600-6431	FFC 20P L=180MM			
18	600-6431-01	FFC 20P L=180MM			
21	270-5094	FERRITE CORE BP53RB120070060M			
21	270-5095	FERRITE CORE L6 T12. 5X5. 5X7			
38	250-5417	BRACKET 9P CONN HOLDER			
39	253-6922	BAT HOLDER SATURN MATSUSHITA			
40	029-000034	B-TITE SCR PH 3X8			
41	029-000034-0B	B-TITE SCR PH BLK 3X8			
42	029-000035	B-TITE SCR PH 3X10			
43	029-000035-0B	B-TITE SCR PH BLK 3X10			
44	029-000036	B-TITE SCR PH 3X12			
45	029-000049	B-TITE SCR BRH 2. 6X8			
46	029-000061	B-TITE SCR PH 3X14			
47	029-000063	S-TITE SCR BI H2X4			
48	029-000049	B-TITE SCR BRH 2. 6X8			
49	029-000049-0B	B-TITE SCR BRH BLK 2. 6X8			
50	029-000052	B-TITE SCR PH 2X8			
51	029-000067-0B	B-TITE SCR BRH BLK 2. 6X6			
52	029-000064	S-TITE SCR PH 2X8			
53	401-0054	BATTERY CR2032/1F			

[Note] [1].....EUR [2].....AUSTRALIA

11-3. Electrical Parts List

Circuit No.	Parts No.	Description	Circuit No.	Parts No.	Description
11-3-1. IC BD STARN MAIN VAO USA					
IC1	315-0922A	IC HD6417095F28 QFP HITACHI	IC31	315-0985-70	IC UPD424260LE-70-E2 SOJ NEC
IC1	315-0998	IC HD6417095SF28 QFP HITACHI	IC31	315-0986-70	IC TC514260BJ-70 SOJ TOSHIBA
			IC31	315-0983-70	IC KM416C256BJ-7 SOJ SUMSUNG
IC2	315-0922A	IC HD6417095F28 QFP HITACHI	IC31	315-0984-70	IC MB814260-70PJ-G SOJ FUJITSU
IC2	315-0998	IC HD6417095SF28 QFP HITACHI	IC31	315-1030-70	IC HY514260BJC-70 SOJ HYUNDAI
IC3	315-0928-17	IC HM5241605TT-17 TSOP HITACHI	IC32	315-0947-70	IC HM514260AJ-7 SOJ
IC3	315-1022-12	IC UPD4504161G5-A12 TSOP NEC	IC32	315-0985-70	IC UPD424260LE-70-E2 SOJ NEC
IC3	315-0928-15	IC HM5241605TT-15 TSOP HITACHI	IC32	315-0986-70	IC TC514260BJ-70 SOJ TOSHIBA
			IC32	315-0983-70	IC KM416C256BJ-7 SOJ SUMSUNG
IC4	315-0928-17	IC HM5241605TT-17 TSOP HITACHI	IC32	315-0984-70	IC MB814260-70PJ-G SOJ FUJITSU
IC4	315-1022-12	IC UPD4504161G5-A12 TSOP NEC	IC32	315-1030-70	IC HY514260BJC-70 SOJ HYUNDAI
IC4	315-0928-15	IC HM5241605TT-15 TSOP HITACHI			
IC5	315-5688	IC CUSTOM CHIP SCU QFP YAMAHA	IC33	314-0634	IC 74HC157 SOP
IC6	315-5778	IC CUSTOM CHIP DCC QFP TOSHIBA	IC34	313-5323	IC UPC78L05T CHIP NEC
			IC34	313-5323-01	IC TA78L05F CHIP TOSHIBA
IC7	EPR-17933	OS SATURN IPL-ROM PAL DIP	IC35	313-5328	IC S-80723AN-DL CHIP SEIKO
IC7	MPR-17933	OS SATURN IPL-ROM PAL DIP			
IC8	315-0948-10	IC CXK58267AM-10L SOP	CN1	209-5070	EDGE CONN 134P N630-9523-T006
IC8	315-0930-10	IC UPD43257B-10LL SOP	CN1	209-5070A	EDGE CONN 134P N630-9523-T006A
IC8	315-0964-10	IC M5M5255BFP-12LL SOP	CN2	209-5074	CONN 9P*2 CSS5018-0101R
IC8	315-0965-10	IC SRM20257LLM10 SOP	CN2XA	NOT USED	NOT USED
IC8	315-1002-70	IC UM62257M-70LL SOP	CN2XB	NOT USED	NOT USED
IC9	315-5744	IC CUSTOM CHIP SMPC QFP	CN3	212-5453	CONN 6P B5P6-VH
			CN4	212-5440	CONN 100P FX6A-100S-0.8SV2
IC10	315-5689	IC CUSTOM CHIP VDP1 QFP	CN5	212-5431	MINI DIN CONN 10P FOR A/V HOSI
IC10	315-5883	IC CUSTOM CHIP VDP1 S QFP	CN5	212-5481	MINI DIN 10P TCS7716-432010
			CN5X	NOT USED	NOT USED
IC11	315-0928-17	IC HM5241605TT-17 TSOP HITACHI	CN6	209-5075	CONN 11P TCX3072-010100 HOSHID
IC11	315-1022-12	IC UPD4504161G5-A12 TSOP NEC	CN8	212-5454	CONN 5P B4(5)B-PH-K-S
IC11	315-0928-15	IC HM5241605TT-15 TSOP HITACHI	CN9	212-5454	CONN 5P B4(5)B-PH-K-S
			CN10	NOT USED	NOT USED
IC12	315-0910-12	IC UPD4502161G5-A12 TSOP NEC	CN11	NOT USED	NOT USED
IC12	315-1017-17	IC HM5221605TT-17 TSOP HITACHI			
IC12	315-1012-17	IC LC382161T-17 TSOP SANYO	CN12	212-5457	CONN 3P SJ21-03WT
IC13	315-0910-12	IC UPD4502161G5-A12 TSOP NEC	SW3	510-5063	TACT SW SKEYAC ALPS
IC13	315-1017-17	IC HM5221605TT-17 TSOP HITACHI			
IC13	315-1012-17	IC LC382161T-17 TSOP SANYO	D1	481-5072	DIODE CHIP 1SS184 TOSHIBA
IC14	315-5690	IC CUSTOM CHIP VDP2 QFP YAMAHA	D2	481-5168	DIODE CHIP HRW0202A HITACHI
IC14	315-5690-02	IC CUSTOM CHIP VDP2 QFP HH	D2	481-5199	DIODE CHIP 1SS377 TOSHIBA
IC14	315-5890	IC CUSTOM CP VDP2 S QFP YAMAHA	D2	481-5201	DIODE CHIP RB415D ROHM
IC15	315-0910-12	IC UPD4502161G5-A12 TSOP NEC	D3	481-5168	DIODE CHIP HRW0202A HITACHI
IC15	315-1017-17	IC HM5221605TT-17 TSOP HITACHI	D3	481-5199	DIODE CHIP 1SS377 TOSHIBA
IC15	315-1012-17	IC LC382161T-17 TSOP SANYO	D3	481-5201	DIODE CHIP RB415D ROHM
IC16	315-0910-12	IC UPD4502161G5-A12 TSOP NEC			
IC16	315-1017-17	IC HM5221605TT-17 TSOP HITACHI	D4	481-5072	DIODE CHIP 1SS184 TOSHIBA
IC16	315-1012-17	IC LC38161T-17 TSOP SANYO	D5	481-5179	DIODE CHIP MA153A MATSUSHITA
IC17	315-5687	IC CUSTOM CHIP SCSP QFP YAMAHA	D6	481-5168	DIODE CHIP HRW0202A HITACHI
IC18	315-0941	IC MC68EC000FN12 PLCC MOTOROLA	D6	481-5199	DIODE CHIP 1SS377 TOSHIBA
			D6	481-5201	DIODE CHIP RB415D ROHM
IC19	315-0777-80	IC HM514270AJ-8 SOJ HITACHI	TR1	482-5126	XSTR 2SC1623 L5..7 CHIP NEC
IC19	315-0739-70	IC UPD424270LE-70 SOJ NEC	TR2	482-5125-01	XSTR 2SA812 CHIP M5..6 NEC
IC19	315-0777-70	IC HM514270AJ-7 SOJ HITACHI	TR3	482-5260	XSTR 2SD2114K(V.W)CHIP ROHM
IC19	315-0822-80	IC MN414270SJ-08 SOJ PANASONIC	TR4	482-5260	XSTR 2SD2114K(V.W)CHIP ROHM
IC20	315-5746	IC CUSTOM CHIP PLL HQFP			
IC21	313-5314	IC CXA1645M SOP SONY	L1	180-5137	CHIP INDUCTOR 100UH 10% KOA
IC22	313-5313	IC TDA1386T SOP PHILIPS	L1	180-5137-01	P. COIL CHIP 100UH ELJFA101KF
IC23	314-0632	IC 74VHC04 SOP 300MIL			
IC24	314-0632	IC 74VHC04 SOP 300MIL	L2	180-5137	CHIP INDUCTOR 100UH 10% KOA
			L2	180-5137-01	P. COIL CHIP 100UH ELJFA101KF
IC25	313-5322	IC S-80741AL-A5 CHIP SEIKO			
IC26	314-0563	IC 74LS245 SOP 300MIL	L3	180-5142	P. COIL CHIP 100UH LQH3C101K04
IC27	314-0563	IC 74LS245 SOP 300MIL	L3	180-5142-01	P. COIL CHIP 100UH NLFC322522T
IC28	314-0649	IC 74ACT245 SOP 300MIL			
IC29	314-0563	IC 74LS245 SOP 300MIL	L4	180-5142	P. COIL CHIP 100UH LQH3C101K04
			L4	180-5142-01	P. COIL CHIP 100UH NLFC322522T
IC30	314-0563	IC 74LS245 SOP 300MIL			
IC31	315-0947-70	IC HM514260AJ-7 SOJ	L5	180-5142	P. COIL CHIP 100UH LQH3C101K04
			L5	180-5142-01	P. COIL CHIP 100UH NLFC322522T

Circuit No.	Parts No.	Description	Circuit No.	Parts No.	Description
L6	180-5142	P. COIL CHIP 100UH LQH3C101K04	C11	151-0265	CAP CER CP 0.1UF 25V ZF2125
L6	180-5142-01	P. COIL CHIP 100UH NLFC322522T	C12	151-0265	CAP CER CP 0.1UF 25V ZF2125
L8	180-5142	P. COIL CHIP 100UH LQH3C101K04	C13	151-0265	CAP CER CP 0.1UF 25V ZF2125
L8	180-5142-01	P. COIL CHIP 100UH NLFC322522T	C14	151-0265	CAP CER CP 0.1UF 25V ZF2125
L9	180-5142	P. COIL CHIP 100UH LQH3C101K04	C15	151-0265	CAP CER CP 0.1UF 25V ZF2125
L9	180-5142-01	P. COIL CHIP 100UH NLFC322522T	C16	151-0265	CAP CER CP 0.1UF 25V ZF2125
L10	180-5142	P. COIL CHIP 100UH LQH3C101K04	C17	NOT USED	NOT USED
L10	180-5142-01	P. COIL CHIP 100UH NLFC322522T	C18	151-0265	CAP CER CP 0.1UF 25V ZF2125
FB3	NOT USED	NOT USED	C19	151-0265	CAP CER CP 0.1UF 25V ZF2125
FB4	476-2330-J-10	RES CHIP 33 OHM 1/10W 5%	C20	151-0265	CAP CER CP 0.1UF 25V ZF2125
FB5	NOT USED	NOT USED	C21	151-0307	CAP CER CP 0.022UF 50V ZF2125
FB6	NOT USED	NOT USED	C22	151-0307	CAP CER CP 0.022UF 50V ZF2125
FB7	NOT USED	NOT USED	C23	151-0621	CAP CER CP 30PF 50V JCH2125
FB8	NOT USED	NOT USED	C24	151-0621	CAP CER CP 30PF 50V JCH2125
FB9	NOT USED	NOT USED	C25	151-0305	CAP CER CP 1000PF 50V KB2125
FB10	NOT USED	NOT USED	C26	151-0521	CAP CER CP 470PF 50V SL2125
FB13	NOT USED	NOT USED	C27	151-0318	CAP CER CHIP 33PF 50V CH2125
FB15	NOT USED	NOT USED	C28	151-0307	CAP CER CP 0.022UF 50V ZF2125
FB16	NOT USED	NOT USED	C29	151-0307	CAP CER CP 0.022UF 50V ZF2125
FB17	NOT USED	NOT USED	C30	151-0478	CAP CER CP 27PF 50V CH2125
FB18	479-5005-0000	RES CHIP 0 OHM 1/10W 2125	C31	151-0377	CAP CER CP 100PF 50V KCH2125
EMI2	271-0045	EMI FILTER STB101KB TAIYO	C32	151-0307	CAP CER CP 0.022UF 50V ZF2125
EMI3	271-0045	EMI FILTER STB101KB TAIYO	C33	NOT USED	NOT USED
EMI5	271-0045	EMI FILTER STB101KB TAIYO	C34	NOT USED	NOT USED
EMI6	271-0045	EMI FILTER STB101KB TAIYO	C35	151-0320	CAP CER CP 68PF 50V J CH2125
EMI7	271-0045	EMI FILTER STB101KB TAIYO	C36	NOT USED	NOT USED
EMI8	271-0045	EMI FILTER STB101KB TAIYO	C37	151-0265	CAP CER CP 0.1UF 25V ZF2125
EMI9	271-0045	EMI FILTER STB101KB TAIYO	C38	151-0265	CAP CER CP 0.1UF 25V ZF2125
EMI10	271-0045	EMI FILTER STB101KB TAIYO	C39	151-0265	CAP CER CP 0.1UF 25V ZF2125
EMI11	271-0045	EMI FILTER STB101KB TAIYO	C40	151-0270	CAP CER CP 47PF 50V KSL2125
EMI12	271-0045	EMI FILTER STB101KB TAIYO	C41	151-0592	CAP CER CP 5PF/50V CCH2125
EMI13	271-0045	EMI FILTER STB101KB TAIYO	C42	151-0265	CAP CER CP 0.1UF 25V ZF2125
EMI14	271-0045	EMI FILTER STB101KB TAIYO	C43	151-0265	CAP CER CP 0.1UF 25V ZF2125
EMI15	271-0045	EMI FILTER STB101KB TAIYO	C44	151-0361	CAP CER CP 15PF 50V CH2125
EMI16	271-0045	EMI FILTER STB101KB TAIYO	C45	NOT USED	NOT USED
EMI17	271-0045	EMI FILTER STB101KB TAIYO	C46	NOT USED	NOT USED
EMI18	271-0045	EMI FILTER STB101KB TAIYO	C47	151-0318	CAP CER CHIP 33PF 50V CH2125
EMI19	271-0045	EMI FILTER STB101KB TAIYO	C48	NOT USED	NOT USED
EMI20	271-0045	EMI FILTER STB101KB TAIYO	C49	NOT USED	NOT USED
EMI21	271-0045	EMI FILTER STB101KB TAIYO	C50	151-0319	CAP CER CHIP 20PF 50V CH2125
EMI22	271-0045	EMI FILTER STB101KB TAIYO	C51	151-0319	CAP CER CHIP 20PF 50V CH2125
EMI23	271-0045	EMI FILTER STB101KB TAIYO	C52	151-0265	CAP CER CP 0.1UF 25V ZF2125
EMI24	271-0045	EMI FILTER STB101KB TAIYO	C53	151-0265	CAP CER CP 0.1UF 25V ZF2125
EMI25	271-0045	EMI FILTER STB101KB TAIYO	C54	151-0265	CAP CER CP 0.1UF 25V ZF2125
EMI26	271-0045	EMI FILTER STB101KB TAIYO	C55	151-0265	CAP CER CP 0.1UF 25V ZF2125
EMI27	271-0045	EMI FILTER STB101KB TAIYO	C56	151-0265	CAP CER CP 0.1UF 25V ZF2125
EMI28	271-0045	EMI FILTER STB101KB TAIYO	C57	151-0265	CAP CER CP 0.1UF 25V ZF2125
EMI29	271-0045	EMI FILTER STB101KB TAIYO	C58	151-0265	CAP CER CP 0.1UF 25V ZF2125
EMI30	271-0045	EMI FILTER STB101KB TAIYO	C59	151-0265	CAP CER CP 0.1UF 25V ZF2125
EMI31	271-0045	EMI FILTER STB101KB TAIYO	C60	151-0265	CAP CER CP 0.1UF 25V ZF2125
EMI32	271-0045	EMI FILTER STB101KB TAIYO	C61	151-0265	CAP CER CP 0.1UF 25V ZF2125
EMI33	271-0045	EMI FILTER STB101KB TAIYO	C62	151-0265	CAP CER CP 0.1UF 25V ZF2125
EMI34	271-0045	EMI FILTER STB101KB TAIYO	C63	151-0305	CAP CER CP 1000PF 50V KB2125
EMI35	271-0045	EMI FILTER STB101KB TAIYO	C64	151-0305	CAP CER CP 1000PF 50V KB2125
C1	151-0307	CAP CER CP 0.022UF 50V ZF2125	C65	NOT USED	NOT USED
C2	151-0521	CAP CER CP 470PF 50V SL2125	C66	151-0265	CAP CER CP 0.1UF 25V ZF2125
C3	151-0265	CAP CER CP 0.1UF 25V ZF2125	C67	151-0265	CAP CER CP 0.1UF 25V ZF2125
C4	151-0307	CAP CER CP 0.022UF 50V ZF2125	C68	151-0265	CAP CER CP 0.1UF 25V ZF2125
C5	151-0521	CAP CER CP 470PF 50V SL2125	C69	151-0265	CAP CER CP 0.1UF 25V ZF2125
C6	151-0265	CAP CER CP 0.1UF 25V ZF2125	C70	151-0265	CAP CER CP 0.1UF 25V ZF2125
C7	151-0265	CAP CER CP 0.1UF 25V ZF2125	C71	151-0265	CAP CER CP 0.1UF 25V ZF2125
C8	151-0265	CAP CER CP 0.1UF 25V ZF2125	C72	151-0265	CAP CER CP 0.1UF 25V ZF2125
C9	151-0265	CAP CER CP 0.1UF 25V ZF2125	C73	151-0265	CAP CER CP 0.1UF 25V ZF2125
C10	151-0265	CAP CER CP 0.1UF 25V ZF2125	C74	151-0265	CAP CER CP 0.1UF 25V ZF2125
			C75	151-0265	CAP CER CP 0.1UF 25V ZF2125
			C76	151-0265	CAP CER CP 0.1UF 25V ZF2125
			C77	151-0265	CAP CER CP 0.1UF 25V ZF2125

Circuit No.	Parts No.	Description	Circuit No.	Parts No.	Description
C78	151-0265	CAP CER CP 0.1UF 25V ZF2125	CE4	151-0622	CAP CER CP 1UF 16V ZF3216
C79	151-0265	CAP CER CP 0.1UF 25V ZF2125	CE6	150-0313-04	CAP E CP 100UF6.3V MV6.3VC100M
C80	151-0265	CAP CER CP 0.1UF 25V ZF2125	CE6	150-0313-01	CAP E CP 100UF 6.3V ECEVOJA101
C81	151-0265	CAP CER CP 0.1UF 25V ZF2125	CE6	150-0313-03	CAP E CP 100UF6.3V UWX0J101MCR
C82	151-0265	CAP CER CP 0.1UF 25V ZF2125	CE6	150-0313-05	CAP E CP 100UF 6.3V REV
C83	151-0265	CAP CER CP 0.1UF 25V ZF2125	CE15	150-0464	CAP E CP 10UF16V MV16VC10MD55
C84	151-0265	CAP CER CP 0.1UF 25V ZF2125	CE15	150-0464-01	CAP E CP 10UF 16V ECEV1CA100
C85	151-0265	CAP CER CP 0.1UF 25V ZF2125	CE15	150-0464-02	CAP E CP 10UF 16V UWX1C100MCR1
C86	151-0265	CAP CER CP 0.1UF 25V ZF2125	CE15	150-0464-03	CAP E CP 10UF16V REV
C87	151-0265	CAP CER CP 0.1UF 25V ZF2125	CE16	150-0464	CAP E CP 10UF16V MV16VC10MD55
C88	151-0265	CAP CER CP 0.1UF 25V ZF2125	CE16	150-0464-01	CAP E CP 10UF 16V ECEV1CA100
C89	151-0265	CAP CER CP 0.1UF 25V ZF2125	CE16	150-0464-02	CAP E CP 10UF 16V UWX1C100MCR1
C90	151-0265	CAP CER CP 0.1UF 25V ZF2125	CE16	150-0464-03	CAP E CP 10UF16V REV
C91	151-0265	CAP CER CP 0.1UF 25V ZF2125	CE18	150-0313-04	CAP E CP 100UF6.3V MV6.3VC100M
C92	NOT USED	NOT USED	CE18	150-0313-01	CAP E CP 100UF 6.3V ECEVOJA101
C93	NOT USED	NOT USED	CE18	150-0313-03	CAP E CP 100UF6.3V UWX0J101MCR
C94	NOT USED	NOT USED	CE18	150-0313-05	CAP E CP 100UF 6.3V REV
C95	NOT USED	NOT USED	CE19	150-0313-04	CAP E CP 100UF6.3V MV6.3VC100M
C96	151-0270	CAP CER CP 47PF 50V KSL2125	CE19	150-0313-01	CAP E CP 100UF 6.3V ECEVOJA101
C97	NOT USED	NOT USED	CE19	150-0313-03	CAP E CP 100UF6.3V UWX0J101MCR
C98	NOT USED	NOT USED	CE19	150-0313-05	CAP E CP 100UF 6.3V REV
C99	NOT USED	NOT USED	CE20	150-0464	CAP E CP 10UF16V MV16VC10MD55
C102	NOT USED	NOT USED	CE20	150-0464-01	CAP E CP 10UF 16V ECEV1CA100
C103	151-0265	CAP CER CP 0.1UF 25V ZF2125	CE20	150-0464-02	CAP E CP 10UF 16V UWX1C100MCR1
C104	151-0265	CAP CER CP 0.1UF 25V ZF2125	CE20	150-0464-03	CAP E CP 10UF16V REV
C105	151-0265	CAP CER CP 0.1UF 25V ZF2125	CE21	150-0464	CAP E CP 10UF16V MV16VC10MD55
C106	151-0265	CAP CER CP 0.1UF 25V ZF2125	CE21	150-0464-01	CAP E CP 10UF 16V ECEV1CA100
C107	151-0265	CAP CER CP 0.1UF 25V ZF2125	CE21	150-0464-02	CAP E CP 10UF 16V UWX1C100MCR1
C108	151-0265	CAP CER CP 0.1UF 25V ZF2125	CE21	150-0464-03	CAP E CP 10UF16V REV
C109	151-0298	CAP CER CP 100PF 50V JSL2125	CE22	150-0496	CAP E CP 4.7UF 25V MV25VC4R7M
C110	151-0298	CAP CER CP 100PF 50V JSL2125	CE22	150-0496-01	CAP E CP 4.7UF 25V ECEV1EA4R7
C111	151-0592	CAP CER CP 5PF/50V CCH2125	CE22	150-0496-02	CAP E CP 4.7UF25V UWX1E4R7MCR1
C112	NOT USED	NOT USED	CE22	150-0496-03	CAP E CP 4.7UF25V REV
C114	NOT USED	NOT USED	CE23	150-0464	CAP E CP 10UF16V MV16VC10MD55
C115	151-0265	CAP CER CP 0.1UF 25V ZF2125	CE23	150-0464-01	CAP E CP 10UF 16V ECEV1CA100
C116	151-0265	CAP CER CP 0.1UF 25V ZF2125	CE23	150-0464-02	CAP E CP 10UF 16V UWX1C100MCR1
C117	151-0265	CAP CER CP 0.1UF 25V ZF2125	CE23	150-0464-03	CAP E CP 10UF16V REV
C118	151-0265	CAP CER CP 0.1UF 25V ZF2125	CE24	150-0423	CAP E CP 220UF 4V MV4VC220MF55
C119	151-0265	CAP CER CP 0.1UF 25V ZF2125	CE24	150-0423-01	CAP E CP 220UF 4V ECEVOGA221
C120	151-0265	CAP CER CP 0.1UF 25V ZF2125	CE24	150-0423-02	CAP E CP 220UF 4V UWX0G221MCR1
C121	151-0298	CAP CER CP 100PF 50V JSL2125	CE24	150-0423-03	CAP E CP 220UF 4V REV
C122	151-0298	CAP CER CP 100PF 50V JSL2125	CE25	150-0423	CAP E CP 220UF 4V MV4VC220MF55
C123	151-0298	CAP CER CP 100PF 50V JSL2125	CE25	150-0423-01	CAP E CP 220UF 4V ECEVOGA221
C124	151-0298	CAP CER CP 100PF 50V JSL2125	CE25	150-0423-02	CAP E CP 220UF 4V UWX0G221MCR1
C125	NOT USED	NOT USED	CE25	150-0423-03	CAP E CP 220UF 4V REV
C126	NOT USED	NOT USED	CE26	150-0423	CAP E CP 220UF 4V MV4VC220MF55
C127	151-0265	CAP CER CP 0.1UF 25V ZF2125	CE26	150-0423-01	CAP E CP 220UF 4V ECEVOGA221
C129	151-0320	CAP CER CP 68PF 50V J CH2125	CE26	150-0423-02	CAP E CP 220UF 4V UWX0G221MCR1
C130	151-0623	CAP CER CP 1UF 16V ZF2125	CE26	150-0423-03	CAP E CP 220UF 4V REV
C131	151-0623	CAP CER CP 1UF 16V ZF2125	CE27	150-0423	CAP E CP 220UF 4V MV4VC220MF55
C132	151-0623	CAP CER CP 1UF 16V ZF2125	CE27	150-0423-01	CAP E CP 220UF 4V ECEVOGA221
C133	151-0623	CAP CER CP 1UF 16V ZF2125	CE27	150-0423-02	CAP E CP 220UF 4V UWX0G221MCR1
C134	151-0623	CAP CER CP 1UF 16V ZF2125	CE27	150-0423-03	CAP E CP 220UF 4V REV
C135	151-0623	CAP CER CP 1UF 16V ZF2125	CE28	150-0423	CAP E CP 220UF 4V MV4VC220MF55
C136	151-0623	CAP CER CP 1UF 16V ZF2125	CE28	150-0423-01	CAP E CP 220UF 4V ECEVOGA221
C137	151-0623	CAP CER CP 1UF 16V ZF2125	CE28	150-0423-02	CAP E CP 220UF 4V UWX0G221MCR1
C138	151-0623	CAP CER CP 1UF 16V ZF2125	CE28	150-0423-03	CAP E CP 220UF 4V REV
C139	151-0623	CAP CER CP 1UF 16V ZF2125	CE29	150-0423	CAP E CP 220UF 4V MV4VC220MF55
C140	151-0623	CAP CER CP 1UF 16V ZF2125	CE29	150-0423-01	CAP E CP 220UF 4V ECEVOGA221
C141	151-0623	CAP CER CP 1UF 16V ZF2125	CE29	150-0423-02	CAP E CP 220UF 4V UWX0G221MCR1
CE1	151-0623	CAP CER CP 1UF 16V ZF2125	CE29	150-0423-03	CAP E CP 220UF 4V REV
CE2	151-0622	CAP CER CP 1UF 16V ZF3216	CE30	150-0505-02	CAP E CP 220UF10V UUR1A221MBR
CE3	150-0313-04	CAP E CP 100UF6.3V MV6.3VC100M	CE31	150-0464	CAP E CP 10UF16V MV16VC10MD55
CE3	150-0313-01	CAP E CP 100UF 6.3V ECEVOJA101			
CE3	150-0313-03	CAP E CP 100UF6.3V UWX0J101MCR			
CE3	150-0313-05	CAP E CP 100UF 6.3V REV			

Circuit No.	Parts No.	Description	Circuit No.	Parts No.	Description
CE31	150-0464-01	CAP E CP 10UF 16V ECEV1CA100	R21	476-2222-J-10	RES CHIP 2.2KOHM 1/10W 5%
CE31	150-0464-02	CAP E CP 10UF 16V UWX1C100MCR1	R22	476-2111-J-10	RES CHIP 110 OHM 1/10W 5%
CE31	150-0464-03	CAP E CP 10UF16V REV	R24	476-2303-J-10	RES CHIP 30KOHM 1/10W 5%
CE32	153-0120	CAP TANT CHIP 10UF 6.3V NEC	R25	476-2303-J-10	RES CHIP 30KOHM 1/10W 5%
CE32	153-0120-01	CAP TANT CHIP 10UF 6.3V PANA	R26	476-2362-J-10	RES CHIP 3.6KOHM 1/10W 5%
CE32	153-0120-02	CAP TANT CHIP 10UF 6.3V NICH1	R27	476-2363-J-10	RES CHIP 36KOHM 1/10W 5%
CE32	153-0120-03	CAP TANT CHIP 10UF 6.3V TOWA	R28	476-2621-J-10	RES CHIP 620 OHM 1/10W 5%
CE33	150-0494	CAP E CP 22UF 6.3V MV6.3VC22M	R29	NOT USED	NOT USED
CE33	150-0494-01	CAP E CP 22UF 6.3V ECEVOJA220	R30	476-2102-J-10	RES CHIP 1KOHM 1/10W 5%
CE33	150-0494-02	CAP E CP 22UF6.3V UWX0J220MCR1	R31	476-2102-J-10	RES CHIP 1KOHM 1/10W 5%
CE33	150-0494-03	CAP E CP 22UF 6.3V REV	R32	476-2102-J-10	RES CHIP 1KOHM 1/10W 5%
CE34	150-0494	CAP E CP 22UF 6.3V MV6.3VC22M	R33	476-2222-J-10	RES CHIP 2.2KOHM 1/10W 5%
CE34	150-0494-01	CAP E CP 22UF 6.3V ECEVOJA220	R35	476-2473-J-10	RES CHIP 47KOHM 1/10W 5%
CE34	150-0494-02	CAP E CP 22UF6.3V UWX0J220MCR1	R36	476-2750-J-10	RES CHIP 75 OHM 1/10W 5%
CE34	150-0494-03	CAP E CP 22UF 6.3V REV	R37	476-2750-J-10	RES CHIP 75 OHM 1/10W 5%
CE35	150-0501	CAP E CP 47UF 6.3V MV6.3VC47M	R38	476-2750-J-10	RES CHIP 75 OHM 1/10W 5%
CE35	150-0501-01	CAP E CP 47UF 6.3V ECEVOJA470	R39	476-2750-J-10	RES CHIP 75 OHM 1/10W 5%
CE35	150-0501-02	CAP E CP 47UF6.3V UWX0J470MCR1	R40	476-2750-J-10	RES CHIP 75 OHM 1/10W 5%
CE35	150-0501-03	CAP E CP 47UF 6.3V REV	R41	476-2750-J-10	RES CHIP 75 OHM 1/10W 5%
CE37	150-0464	CAP E CP 10UF16V MV16VC10MD55	R42	476-2163-F-10	RES CHIP 16KOHM 1/10W 1%
CE37	150-0464-01	CAP E CP 10UF 16V ECEV1CA100	R43	476-2101-J-10	RES CHIP 100 OHM 1/10W 5%
CE37	150-0464-02	CAP E CP 10UF 16V UWX1C100MCR1	R44	476-2101-J-10	RES CHIP 100 OHM 1/10W 5%
CE37	150-0464-03	CAP E CP 10UF16V REV	R45	476-2104-J-10	RES CHIP 100KOHM 1/10W 5%
CE38	NOT USED	NOT USED	R46	476-2104-J-10	RES CHIP 100KOHM 1/10W 5%
CE42	150-0464	CAP E CP 10UF 16V MV16VC10MD55	R47	476-2472-J-10	RES CHIP 4.7KOHM 1/10W 5%
CE42	150-0464-01	CAP E CP 10UF 16V ECEV1CA100	R48	476-2201-J-10	RES CHIP 200 OHM 1/10W 5%
CE42	150-0464-02	CAP E CP 10UF 16V UWX1C100MCR1	R49	476-2472-J-10	RES CHIP 4.7KOHM 1/10W 5%
CE42	150-0464-03	CAP E CP 10UF 16V REV	R50	476-2472-J-10	RES CHIP 4.7KOHM 1/10W 5%
CE45	150-0504	CAP E 330UF USR0J331MCA1TD	R66	476-2472-J-10	RES CHIP 4.7KOHM 1/10W 5%
CE46	150-0504	CAP E 330UF USR0J331MCA1TD	R67	476-2105-J-10	RES CHIP 1MOHM 1/10W 5%
CE47	150-0463	CAP E CP 1UF 50V MV50VC1MD55	R68	476-2334-J-10	RES CHIP 330KOHM 1/10W 5%
CE47	150-0463-01	CAP E CP 1UF 50V ECEV1HA010	R69	476-2103-J-10	RES CHIP 10KOHM 1/10W 5%
CE47	150-0463-02	CAP E CP 1UF 50V UWX1H010MCR1	R74	476-2103-J-10	RES CHIP 10KOHM 1/10W 5%
CE47	150-0463-03	CAP E CP 1UF 50V REV	R96	NOT USED	NOT USED
CE48	150-0463	CAP E CP 1UF 50V MV50VC1MD55	R97	NOT USED	NOT USED
CE48	150-0463-01	CAP E CP 1UF 50V ECEV1HA010	R98	476-2103-J-10	RES CHIP 10KOHM 1/10W 5%
CE48	150-0463-02	CAP E CP 1UF 50V UWX1H010MCR1	R99	NOT USED	NOT USED
CE48	150-0463-03	CAP E CP 1UF 50V REV	R100	476-2103-J-10	RES CHIP 10KOHM 1/10W 5%
CE49	150-0501	CAP E CP 47UF 6.3V MV6.3VC47M	R101	476-2103-J-10	RES CHIP 10KOHM 1/10W 5%
CE49	150-0501-01	CAP E CP 47UF 6.3V ECEVOJA470	R102	476-2103-J-10	RES CHIP 10KOHM 1/10W 5%
CE49	150-0501-02	CAP E CP 47UF 6.3V UWX0J470MCR1	R103	476-2103-J-10	RES CHIP 10KOHM 1/10W 5%
CE49	150-0501-03	CAP E CP 47UF 6.3V REV	R104	476-2103-J-10	RES CHIP 10KOHM 1/10W 5%
CE50	150-0501	CAP E CP 47UF 6.3V MV6.3VC47M	R105	476-2103-J-10	RES CHIP 10KOHM 1/10W 5%
CE50	150-0501-01	CAP E CP 47UF 6.3V ECEVOJA470	R106	476-2103-J-10	RES CHIP 10KOHM 1/10W 5%
CE50	150-0501-02	CAP E CP 47UF 6.3V UWX0J470MCR1	R107	476-2103-J-10	RES CHIP 10KOHM 1/10W 5%
CE50	150-0501-03	CAP E CP 47UF 6.3V REV	R108	476-2103-J-10	RES CHIP 10KOHM 1/10W 5%
CE52	150-0464	CAP E CP 10UF 16V MV16VC10MD55	R109	476-2103-J-10	RES CHIP 10KOHM 1/10W 5%
CE52	150-0464-01	CAP E CP 10UF 16V ECEV1CA100	R110	476-2103-J-10	RES CHIP 10KOHM 1/10W 5%
CE52	150-0464-02	CAP E CP 10UF 16V UWX1C100MCR1	R111	476-2103-J-10	RES CHIP 10KOHM 1/10W 5%
CE52	150-0464-03	CAP E CP 10UF 16V REV	R112	476-2103-J-10	RES CHIP 10KOHM 1/10W 5%
CE53	150-0501	CAP E CP 47UF 6.3V MV6.3VC47M	R113	476-2103-J-10	RES CHIP 10KOHM 1/10W 5%
CE53	150-0501-01	CAP E CP 47UF 6.3V ECEVOJA470	R114	NOT USED	NOT USED
CE53	150-0501-02	CAP E CP 47UF 6.3V UWX0J470MCR1	R115	NOT USED	NOT USED
CE53	150-0501-03	CAP E CP 47UF 6.3V REV	R116	NOT USED	NOT USED
CE54	150-0520-03	CAP E CP 100UF 10V UWX1AMCR1	R117	NOT USED	NOT USED
CE54	150-0522-03	CAP E CP 100UF 10V UUR1A101MCR	R118	NOT USED	NOT USED
R1	476-2101-J-10	RES CHIP 100 OHM 1/10W 5%	R119	NOT USED	NOT USED
R2	476-2101-J-10	RES CHIP 100 OHM 1/10W 5%	R120	476-2103-J-10	RES CHIP 10KOHM 1/10W 5%
R3	476-2101-J-10	RES CHIP 100 OHM 1/10W 5%	R121	NOT USED	NOT USED
R4	476-2302-J-10	RES CHIP 3KOHM 1/10W 5%	R122	476-2103-J-10	RES CHIP 10KOHM 1/10W 5%
R5	476-2302-J-10	RES CHIP 3KOHM 1/10W 5%	R124	476-2472-J-10	RES CHIP 4.7KOHM 1/10W 5%
R19	476-2105-J-10	RES CHIP 1MOHM 1/10W 5%	R125	476-2472-J-10	RES CHIP 4.7KOHM 1/10W 5%
R20	476-2680-J-10	RES CHIP 68 OHM 1/10W 5%	R126	476-2101-J-10	RES CHIP 100 OHM 1/10W 5%
			R127	476-2101-J-10	RES CHIP 100 OHM 1/10W 5%
			R128	476-2101-J-10	RES CHIP 100 OHM 1/10W 5%
			R129	476-2101-J-10	RES CHIP 100 OHM 1/10W 5%
			R130	476-2101-J-10	RES CHIP 100 OHM 1/10W 5%

Circuit No.	Parts No.	Description	Circuit No.	Parts No.	Description
R131	476-2103-J-10	RES CHIP 10KOHM 1/10W 5%	JP7	NOT USED	NOT USED
R132	476-2103-J-10	RES CHIP 10KOHM 1/10W 5%	JP8	NOT USED	NOT USED
R133	476-2103-J-10	RES CHIP 10KOHM 1/10W 5%	JP9	NOT USED	NOT USED
R134	476-2103-J-10	RES CHIP 10KOHM 1/10W 5%	JP10	NOT USED	NOT USED
R135	476-2103-J-10	RES CHIP 10KOHM 1/10W 5%			
R136	476-2361-J-10	RES CHIP 360 OHM 1/10W 5%	JP11	NOT USED	NOT USED
R137	476-2104-J-10	RES CHIP 100KOHM 1/10W 5%	JP12	NOT USED	NOT USED
R138	476-2103-J-10	RES CHIP 10KOHM 1/10W 5%	JP13	NOT USED	NOT USED
R139	NOT USED	NOT USED	JP14	514-5069	RES CHIP 0 OHM 1/10W 2125
R140	476-2301-J-10	RES CHIP 300 OHM 1/10W 5%	JP15	514-5069	RES CHIP 0 OHM 1/10W 2125
R141	476-2512-J-10	RES CHIP 5.1KOHM 1/10W 5%	JP16	514-5069	RES CHIP 0 OHM 1/10W 2125
R142	476-2222-J-10	RES CHIP 2.2KOHM 1/10W 5%	JP17	514-5069	RES CHIP 0 OHM 1/10W 2125
R143	476-2511-J-10	RES CHIP 510 OHM 1/10W 5%	JP18	NOT USED	NOT USED
R144	476-2511-J-10	RES CHIP 510 OHM 1/10W 5%	JP19	NOT USED	NOT USED
R145	476-2103-J-10	RES CHIP 10KOHM 1/10W 5%	JP20	476-2102-J-10	RES CHIP 1KOHM 1/10W 5%
R146	476-2103-J-10	RES CHIP 10KOHM 1/10W 5%	JP21	NOT USED	NOT USED
R147	476-2103-J-10	RES CHIP 10KOHM 1/10W 5%	JP22	NOT USED	NOT USED
R148	476-2391-J-10	RES CHIP 390 OHM 1/10W 5%	IC SOCKET	213-0113	IC SOCKET 40PIN ICE-406-S-TG T
R149	476-2224-J-10	RES CHIP 220KOHM 1/10W 5%	BS HOL R	029-000034-0B	B-TITE SCR PH BLK 3X8R
R150	476-2511-J-10	RES CHIP 510 OHM 1/10W 5%	BS HOL L	029-000034-0B	B-TITE SCR PH BLK 3X8R
R151	476-2511-J-10	RES CHIP 510 OHM 1/10W 5%	FUSE	600-6458	JUMPER WIRE L=10MM
R152	476-2103-J-10	RES CHIP 10KOHM 1/10W 5%			
R153	NOT USED	NOT USED			
R154	NOT USED	NOT USED			
R155	NOT USED	NOT USED			
R156	NOT USED	NOT USED			
R157	NOT USED	NOT USED			
R158	NOT USED	NOT USED			
R160	479-5005-0000	RES CHIP 0 OHM 1/10W 2125			
RA1	477-0170	R-PK CP 8*10KOHM 1/16W 5% W/C			
RA1	477-0170-02	R-PK CP 8*10KOHM 1/16W 5% W/C			
RA1	477-0170-01	R-PK CP 8*10KOHM 1/16W 5% W/C			
RA2	477-0170	R-PK CP 8*10KOHM 1/16W 5% W/C			
RA2	477-0170-02	R-PK CP 8*10KOHM 1/16W 5% W/C			
RA2	477-0170-01	R-PK CP 8*10KOHM 1/16W 5% W/C			
RA3	477-0170	R-PK CP 8*10KOHM 1/16W 5% W/C			
RA3	477-0170-02	R-PK CP 8*10KOHM 1/16W 5% W/C			
RA3	477-0170-01	R-PK CP 8*10KOHM 1/16W 5% W/C			
RA4	477-0170	R-PK CP 8*10KOHM 1/16W 5% W/C			
RA4	477-0170-02	R-PK CP 8*10KOHM 1/16W 5% W/C			
RA4	477-0170-01	R-PK CP 8*10KOHM 1/16W 5% W/C			
RA5	477-0170	R-PK CP 8*10KOHM 1/16W 5% W/C			
RA5	477-0170-02	R-PK CP 8*10KOHM 1/16W 5% W/C			
RA5	477-0170-01	R-PK CP 8*10KOHM 1/16W 5% W/C			
RA6	477-0170	R-PK CP 8*10KOHM 1/16W 5% W/C			
RA6	477-0170-02	R-PK CP 8*10KOHM 1/16W 5% W/C			
RA6	477-0170-01	R-PK CP 8*10KOHM 1/16W 5% W/C			
RA7	477-0170	R-PK CP 8*10KOHM 1/16W 5% W/C			
RA7	477-0170-02	R-PK CP 8*10KOHM 1/16W 5% W/C			
RA7	477-0170-01	R-PK CP 8*10KOHM 1/16W 5% W/C			
RA8	477-0170	R-PK CP 8*10KOHM 1/16W 5% W/C			
RA8	477-0170-02	R-PK CP 8*10KOHM 1/16W 5% W/C			
RA8	477-0170-01	R-PK CP 8*10KOHM 1/16W 5% W/C			
X1	230-5202	OSC XTAL 17.7344MHZ +-20PPM			
X2	NOT USED	NOT USED			
X3	230-5169	CERAMIC RESONATOR CST4.00MGW			
X4	230-5170-01	XTAL 32.768KHZ +-20PPM SEIKO			
JP1	NOT USED	NOT USED			
JP2	476-2104-J-10	RES CHIP 100KOHM 1/10W 50%			
JP3	NOT USED	NOT USED			
JP4	NOT USED	NOT USED			
JP5	NOT USED	NOT USED			
JP6	NOT USED	NOT USED			
11-3-2. SATURN POWER INDICATOR BD VA0					
CN13	600-6452	WIRE HARN 2P FOR POWER LED			
LD1	390-5511	LED SLB-25MG GREEN			
11-3-3. SATURN R.SW BD VA0					
LD2	390-5568	LED SLB-25DL13F ORANGE			
SW1	510-5063	TACT SW SKEYAC			
CN14	600-6451	WIRE HARN 5P FOR RESET BT			
11-3-4. PC BD SH1 FOR SATURN					
IC101	315-5785	IC CUSTOM CHIP SH1 QFP			
IC101	315-5785A	IC CUSTOM CHIP SH1A QFP			
IC102	315-0947-80	IC HM514260AJ-8 SOJ			
IC103	315-5873	IC CUSTOM CHIP OCU YGR019A			
E101	212-5473	CONN 100P FX6-100P-0.8SV2			
E102	212-5474	CONN 20P SD-52610-2017			
L101	NOT USED	NOT USED			
C101	NOT USED	NOT USED			
C102	NOT USED	NOT USED			
C103	151-0430	CAP CER CP 10PF 50V CH1608			
C104	151-0430	CAP CER CP 10PF 50V CH1608			
C105	151-0418	CAP CER CP 0.01UF/50V BK1608			
C106	151-0418	CAP CER CP 0.01UF/50V BK1608			
C107	151-0418	CAP CER CP 0.01UF/50V BK1608			
C108	NOT USED	NOT USED			
C109	151-0418	CAP CER CP 0.01UF/50V BK1608			
C110	NOT USED	NOT USED			
C111	151-0418	CAP CER CP 0.01UF/50V BK1608			
C112	NOT USED	NOT USED			
C113	NOT USED	NOT USED			
C114	NOT USED	NOT USED			
C115	151-0418	CAP CER CP 0.01UF/50V BK1608			
C116	NOT USED	NOT USED			
C117	NOT USED	NOT USED			
C118	151-0418	CAP CER CP 0.01UF/50V BK1608			
C119	151-0418	CAP CER CP 0.01UF/50V BK1608			
C120	151-0418	CAP CER CP 0.01UF/50V BK1608			

11-4. Accessories/Package List

Circuit No.	Parts No.	Description	No.	Parts No.	Description
C121	150-0501	CAP E CP 47UF 6.3V MV6. 3VC47M	1	610-5861	ASSY CP SAT EUR
C122	NOT USED	NOT USED	2	600-6540	RGB CABLE SATURN PAL [A, B]
C123	151-0418	CAP CER CP 0.01UF/50V BK1608	2	600-6540-01	RGB CABLE SATURN PAL V2 [A, B]
C124	NOT USED	NOT USED	3	610-5865	RF UNIT STURN TOWA PAL-G/I [C]
C125	NOT USED	NOT USED	4	600-6537	AC CABLE SATURN PLUG=MF [A]
C126	NOT USED	NOT USED	4	600-6538	AC CABLE SATURN PLUG=C [B]
C127	NOT USED	NOT USED	4	600-6538-01	AC CABLE SATURN PLUG=C [B]
C128	NOT USED	NOT USED	4	600-6571	AC CABLE SATURN PLUG=S [C]
C129	NOT USED	NOT USED	5	672-2359A	MANUAL HARD SATURN MULTI A [A, B]
C130	NOT USED	NOT USED	5	672-2359B	MANUAL HARD SATURN MULTI B [A, B]
C131	NOT USED	NOT USED	5	672-2450A	MANUAL HARD SATURN AUS A [C]
C132	NOT USED	NOT USED	6	SGM-4349	POLY BAG 340*340*0.05 EXP 6
R101	476-1103-J-16	RES CHIP 10KOHM 1/16W 5%	7	SGM-4363	POLY BAG 200*310*0.05 EXP 6
R102	476-1103-J-16	RES CHIP 10KOHM 1/16W 5%			
R103	476-1103-J-16	RES CHIP 10KOHM 1/16W 5%			
R104	476-1103-J-16	RES CHIP 10KOHM 1/16W 5%			
R105	476-1103-J-16	RES CHIP 10KOHM 1/16W 5%			
R106	476-1472-J-16	RES CHIP 4.7KOHM 1/16W 5%			
R107	476-1472-J-16	RES CHIP 4.7KOHM 1/16W 5%			
R108	476-1472-J-16	RES CHIP 4.7KOHM 1/16W 5%			
R109	476-1222-J-16	RES CHIP 2.2KOHM 1/16W 5%			
R110	476-1472-J-16	RES CHIP 4.7KOHM 1/16W 5%			
R111	NOT USED	NOT USED			
R112	NOT USED	NOT USED			
R113	476-1330-J-16	RES CHIP 33 OHM 1/16W 5%			
R114	NOT USED	NOT USED			
R115	NOT USED	NOT USED			
R116	NOT USED	NOT USED			
R117	NOT USED	NOT USED			
R118	NOT USED	NOT USED			
R119	NOT USED	NOT USED			
RM101	477-0141-01	R-PK CP 4*330HM 1/16W 5%			
RM102	477-0141-01	R-PK CP 4*330HM 1/16W 5%			
RM103	477-0141-01	R-PK CP 4*330HM 1/16W 5%			
RM104	477-0141-01	R-PK CP 4*330HM 1/16W 5%			
X101	230-5196	XTAL 20MHZ SMD-49			
CN1	209-5077	EDGE CONN 100P N630-9523-T005			

【Note】 [A]UK
 [B]SOE
 [C]AUSTRALIA

