

SEGATM SERVICE MANUAL

GENESIS II /MEGA DRIVE II (PAL-B/I/G, RGB)

NO.	001-1
ISSUED	AUGUST, 1993

SUPPLEMENT

The specifications of IC1 on page 16
are corrected as follows.

Sega Enterprises, Ltd.

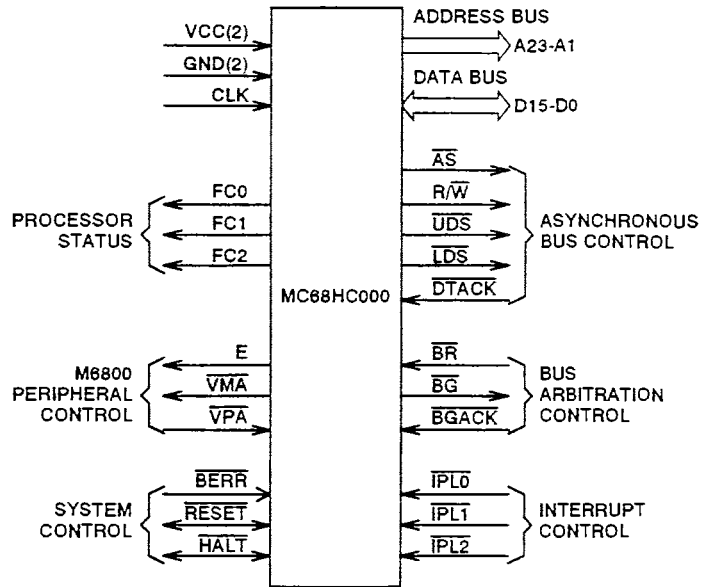
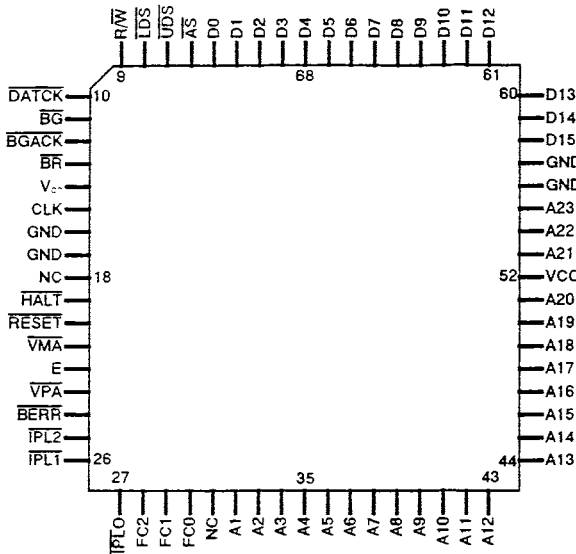
IC1 16/32-Bit Microprocessor

IC MC68HC000FN8

IC HD68HC000CP8

Top View & Pin Layout

Signal Description



Description

No.	Pin Name	I/O	Function
1	D ₄	I/O	Data Bus
2	D ₃		
3	D ₂		
4	D ₁		
5	D ₀		
6	AS	O	Address Strobe
7	UDS	O	Upper Data Strobe
8	LDS	O	Lower Data Strobe
9	R/W	O	Read/Write
10	DTACK	I	Data Transfer Acknowledge
11	BG	O	Bus Grant
12	BGACK	I	Bus Grant Acknowledge
13	BR	I	Bus Request
14	V _{CC}	-	Power Supply
15	CLK	I	Clock
16	V _{SS}	-	GND
17	V _{SS}	-	GND
18	NC	-	Not Connected
19	HALT	I/O	Halt
20	RES	I/O	Reset
21	VMA	O	Valid Memory Address
22	E	O	Enable

No.	Pin Name	I/O	Function
23	VPA	I	Valid Peripheral Address
24	BERR	I	Bus Error
25	IPL ₂	I	Interrupt Control
26	IPL ₁		
27	IPL ₀		
28	FC ₂	O	Processor Status
29	FC ₁		
30	FC ₀		
31	N.C.	-	
32	A ₁	O	Address Bus
33	A ₂		
34	A ₃		
35	A ₄		
36	A ₅		
37	A ₆		
38	A ₇		
39	A ₈		
40	A ₉		
41	A ₁₀		
42	A ₁₁		
43	A ₁₂		
44	A ₁₃		
45	A ₁₄		

No.	Pin Name	I/O	Function
46	A ₁₅	O	Address Bus
47	A ₁₆		
48	A ₁₇		
49	A ₁₈		
50	A ₁₉		
51	A ₂₀	-	Power Supply
52	V _{CC}		
53	A ₂₁		
54	A ₂₂	O	Address Bus
55	A ₂₃	I/O	Data Bus
56	V _{SS}		
57	V _{SS}		
58	D ₁₅		
59	D ₁₄		
60	D ₁₃		
61	D ₁₂		
62	D ₁₁		
63	D ₁₀		
64	D ₉		
65	D ₈		
66	D ₇		
67	D ₆		
68	D ₅		

Differences between MEGA DRIVE and MEGA DRIVE 2

● Electrical Components

Note: For components marked (*), components equivalent to those listed and made by other companies can also be used.

Component	MEGA DRIVE	MEGA DRIVE 2	Remarks
MAIN CPU	MC68000 DIP (*)	HC68HC000FN8 PLCC (*)	Package changed.
SUB CPU	Z80A DIP	Z84C0006 QFP (*)	Package changed.
VIDEO DISPLAY PROCESSOR	CUSTOM CHIP YM7101	CUSTOM CHIP FC1001	Integrated into one chip.
BUS ARBITER	CUSTOM CHIP UPD92271GD-001		
FM SOUND SOURCE	YM2612		
RGB ENCODER	MB3514	Same as on left	
REGULATOR IC	MA7805UC (*)	UPC7805HF (*)	
OP AMP	LM358 DIP	LM324 SOP (*)	Integrated with op amp.
HEADPHONE AMP	CXA1034P		
MEMORY FOR MAIN CPU	TC51382-12 DIP (*)	TC51832AFL-10 SOP (*)	Package changed.
MEMORY FOR SUB CPU	KM6264BL-12 DIP600 (*)	KM6264BLG-10 SOP (*)	Package changed.
MEMORY FOR VDP	UPD41264V-12 (*)	Same as on left	
OSCILLATOR	OSC 53. 203424M20PPM (*)	Same as on left	
SUB BOARD FOR DC JACK	Yes	No	Integrated into main board.
SUB BOARD FOR HEADPHONE JACK	Yes	No	As the headphone jack is omitted.

● Features

Item	MEGA DRIVE	MEGA DRIVE 2	Remarks
HEADPHONE JACK	Yes	No	
HEADPHONE VOLUME	Yes	No	
RF OUT/CH SWITCH	Yes	No	Integrated with RF unit.
POWER SWITCH	Slide switch	Push-button	
DC JACK	Pin plug for DC/NP	CONN DC JACK EIAJ 3 HEC3100	Changed as the AC adapter has been changed.
RESET SWITCH	Tact push button	Same as on left	
AC ADAPTER	1.2 A	0.85 A	Same as for MASTER SYSTEM II.

Differences between GENESIS and GENESIS 2

● Electrical Components

Note: For components marked (※), components equivalent to those listed and made by other companies can also be used.

Component	GENESIS	GENESIS 2	Remarks
MAIN CPU	MC68HC000FN8 (※)	Same as on left (※)	
SUB CPU	Z80A DIP	Z84C0006 QFP	Package changed.
VIDEO DISPLAY PROCESSOR	CUSTOM CHIP FC1004	Same as on left	Integrated into one chip.
BUS ARBITER			
FM SOUND SOURCE			
RGB ENCODER	CXA1145M-16	Same as on left	
REGULATOR IC	UPC7805HF	Same as on left	
OP AMP	LM324	Same as on left	
HEADPHONE AMP	LM324	Same as on left	Integrated with op amp.
MEMORY FOR MAIN CPU	TC51832FL-10 (※)	Same as on left	
MEMORY FOR SUB CPU	MB8464A-80 (※)	Same as on left	
MEMORY FOR VDP	UPD41264V-12 (※)	Same as on left	
OSCILLATOR	XTAL OSC 53.693175 (※)	Same as on left	
SUB BOARD FOR HEADPHONE JACK	Yes	No	As the headphone jack is omitted.

● Features

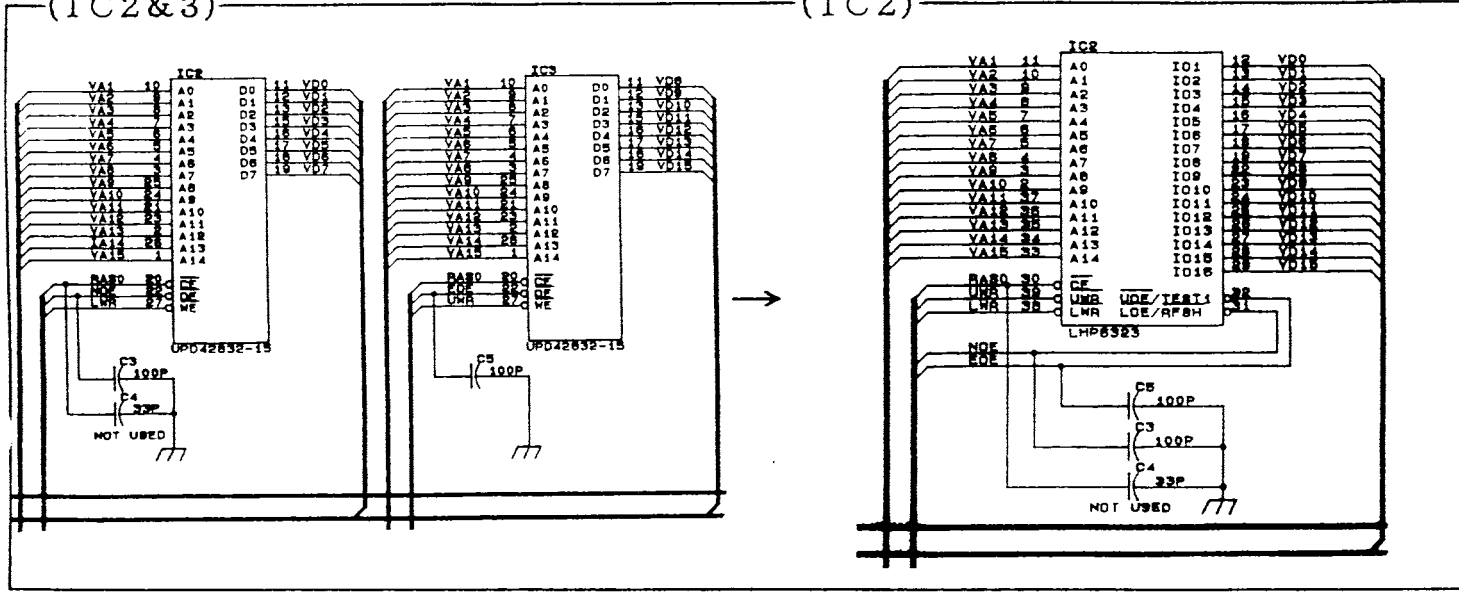
Item	GENESIS	GENESIS 2	Remarks
HEADPHONE JACK	Yes	No	
HEADPHONE VOLUME	Yes	No	
RF OUT/CH SWITCH	Yes	No	Integrated with RF unit.
POWER SWITCH	Slide switch	Push-button	
DC JACK	Pin plug for DC/NP	CONN DC JACK EIAJ 3 HEC3100	Changed as the AC adapter has been changed.
RESET SWITCH	Tact push button	Same as on left	
AC ADAPTER	1.2 A	0.85 A	Same as for MASTER SYSTEM II.

DIFFERENCES BETWEEN Ver.0 AND Ver.1
FOR MEGA DRIVE 2/GENESIS 2

1) Schematic Diagram

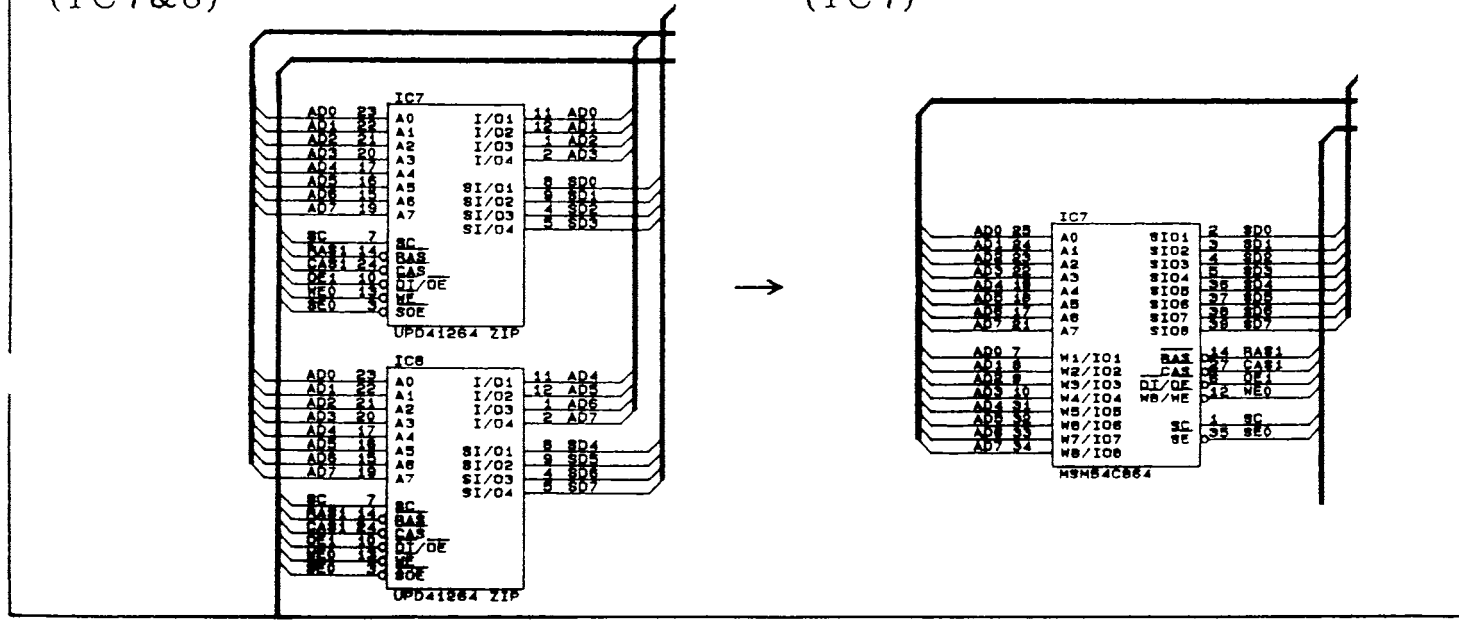
MEGA DRIVE 2/GENESIS 2 (Ver.0)
(IC2&3)

MEGA DRIVE 2/GENESIS 2 (Ver.1)
(IC2)



(IC7&8)

(IC7)



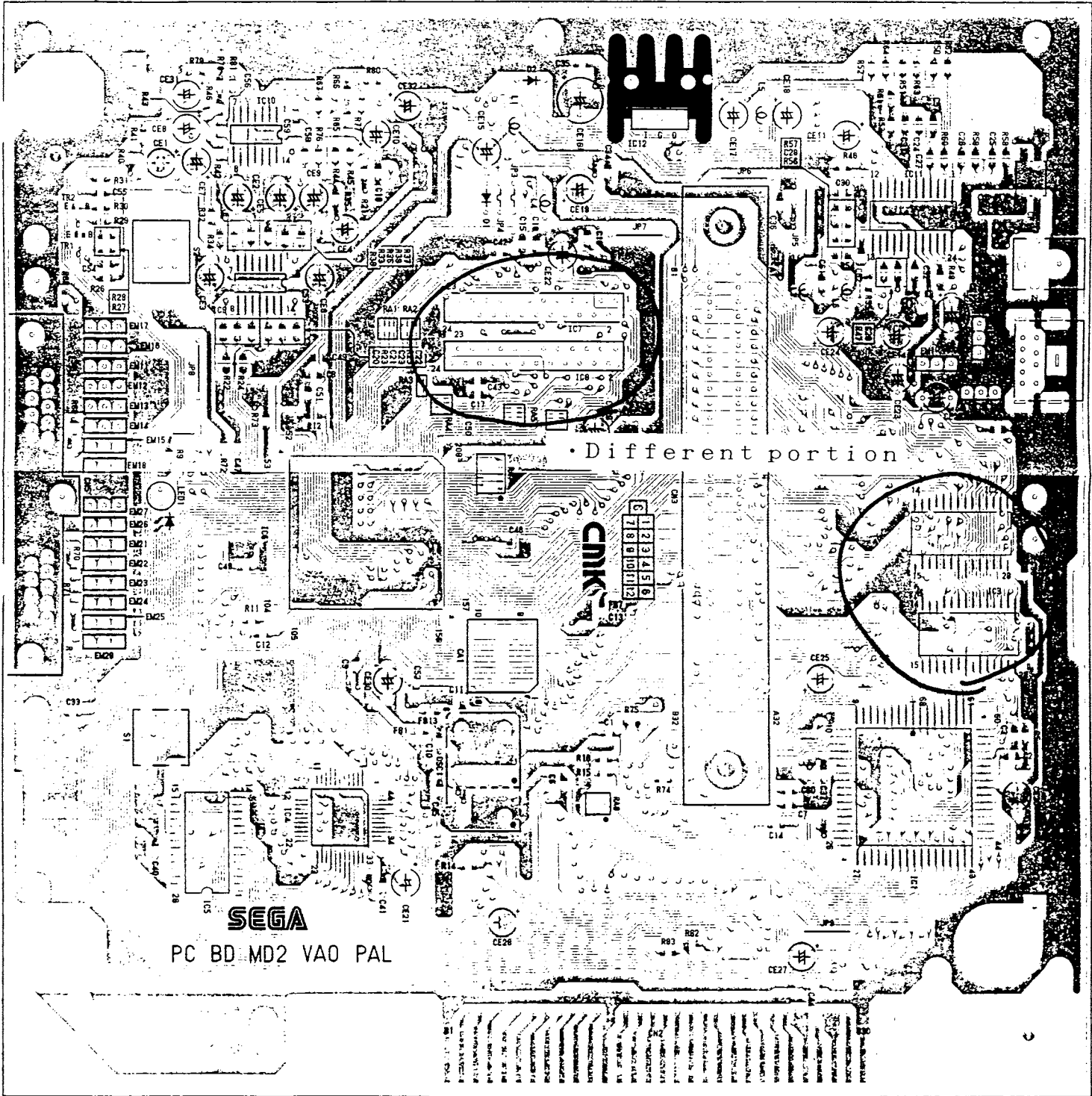
2) Circuit Board Diagram

·See the attached.

*RAM INTO
CUSTOM PACK
UNL-
MIEA PARTS NUMBERS*

MEGA DRIVE 2 / GENESIS 2 (Ver. 0)

in dir

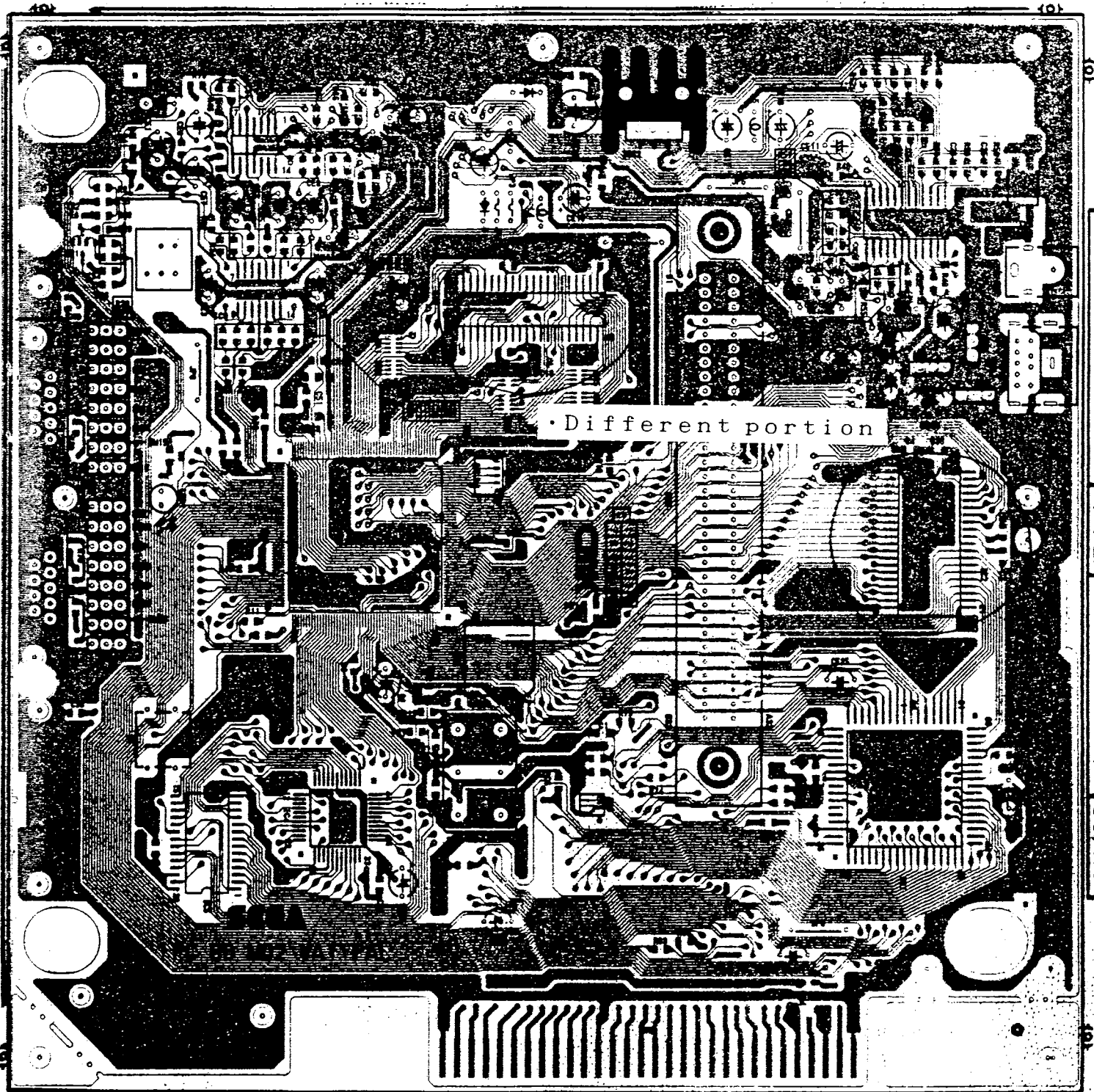


• Different portion

SEGA
PC BD MD2 VAO PAL

MEGA DRIVE 2 / GENESIS 2 (Ver. 1)

NEW VERSION
R-64 CUT MEMBER

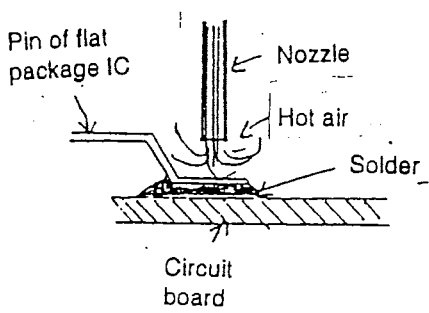


Different portion

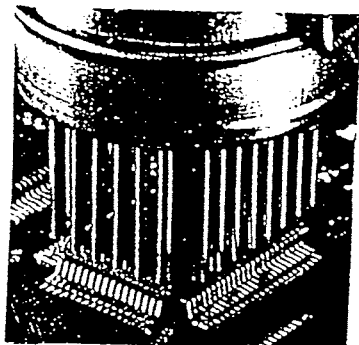
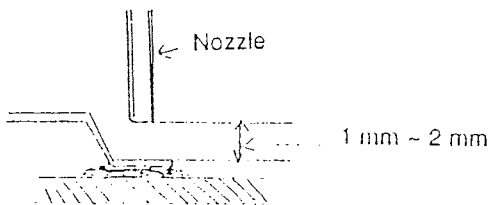
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Flat Package IC Removal

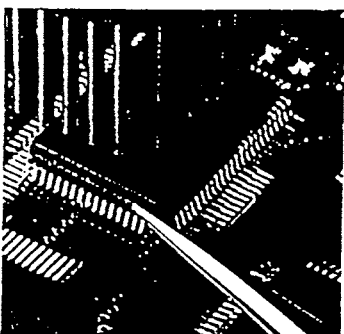
(1) Use a hot-air IC unsoldering machine to remove the flat package IC.



(2) Keep a space of approx. 1-2 mm between the IC remover's nozzle and flat package IC.

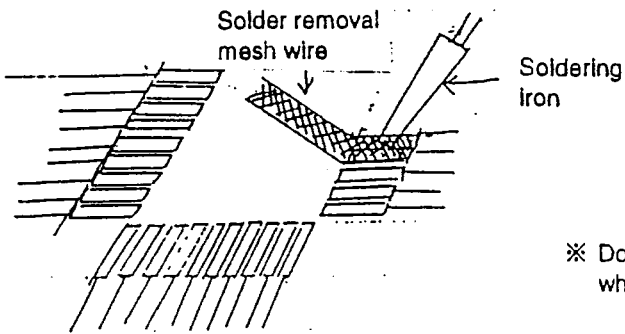


(3) After 20-30 seconds, the solder starts to melt; use tweezers to remove the IC.



※ The time required to melt the solder depends on the diameter of the nozzle.

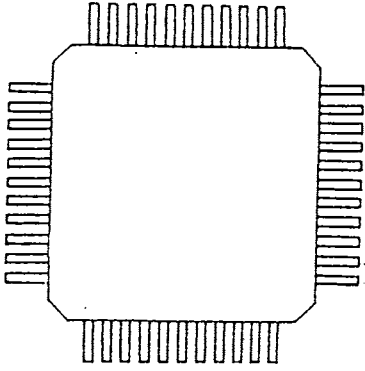
(4) After removing the IC, use the soldering iron and solder removal mesh wire to absorb the solder remaining on the circuit board.



※ Do not apply force to the solder removal mesh wire and soldering iron when removing the solder since the pattern is likely to peel off.

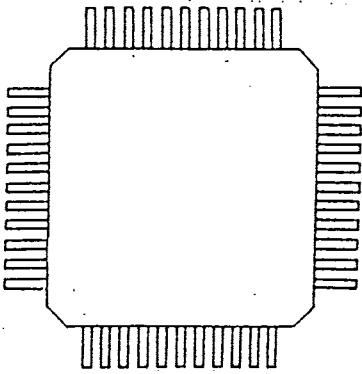
Flat Package IC Installation

- (1) Coat the circuit board from which the flat package IC has been removed with flux.

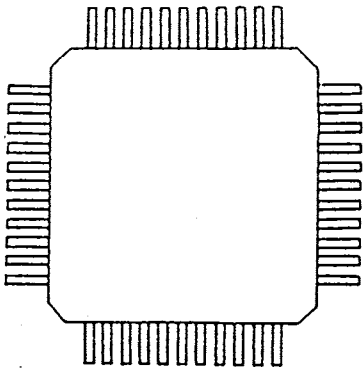


- (2) Place the good flat package IC to match the pattern on the board.

- (3) Temporarily fix the flat package IC at the four corners so it does not move.



- (4) Solder all pins of the flat package IC.



※ Be careful not to short the pins since the spaces between the pins are very narrow.

- (5) After soldering, use thinner to rinse away the remaining flux.

- (6) Use a magnifying glass to check that there is no short-circuit.

SEGA™ SERVICE MANUAL

GENESIS II / MEGA DRIVE II (PAL-B/I/G, RGB)



NO.	001-2
ISSUED	DECEMBER, 1993

SUPPLEMENT (Version 1)

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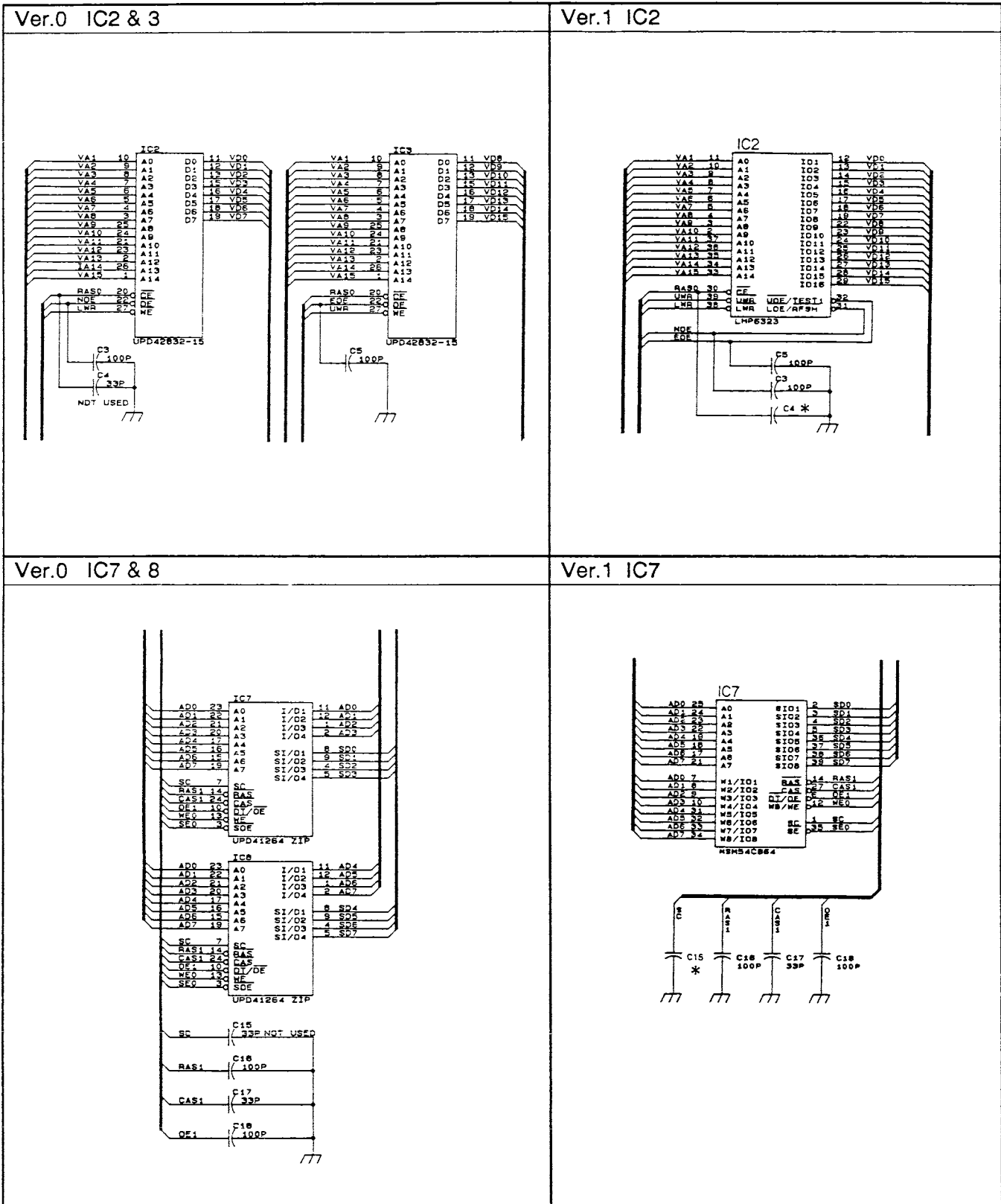
Sega Enterprises, Ltd.

BEFORE USING THIS SERVICE MANUAL

• This service manual includes the MEGA DRIVE II /GENESIS II Ver. 1 data.

1. DIFFERENCES BETWEEN Ver.0 AND Ver.1

1-1. Schematic Diagram



1-2. Difference Table and Parts List

Circuit No.	Ver. 0		Ver. 1		Remarks
	Part No.	Description	Part No.	Description	
	837-9602-S 837-9602-SM 837-9602F 837-9603	IC BD MD2 VA0S USA (CBA) IC BD MD2 VA0SM USA (CBA) IC BD MD2 VA0F USA (CBA) IC BD MD2 VA0 EUR (CBA)	837-9793-S 837-9793-SM 837-9793-F 837-9794	IC BD MD2 VA1S USA (CBA) IC BD MD2 VA1SM USA (CBA) IC BD MD2 VA1F USA (CBA) IC BD MD2 VA1 EUR (CBA)	
IC2	315-0547-10A 315-0677-A 315-0759-85A 315-0759-10A 315-0760-12A	IC HM65256BLFP-10 SOP IC TC51832FL-10 SOP IC TC51832AFL-85 SOP IC TC51832AFL-10 SOP IC LH59P832N-12 SOP	315-0810 315-0811 315-0812 315-1819	IC LH5P1632N-15 SOP40P IC LC331632M-12 SOP40P IC HM651632DFP-15 SOP IC TC511632FL-10 SOP	
IC3	315-0547-10A 315-0677-A 315-0759-85A 315-0759-10A 315-0760-12A	IC HM65256BLFP-10 SOP IC TC51832FL-10 SOP IC TC51832AFL-85 SOP IC TC51832AFL-10 SOP IC LH59P832N-12 SOP	NOTHING	NOTHING	
IC7	315-0515 315-0515-15 315-0453 315-0423 315-0481 315-0525 315-0616 315-0622 315-0623 315-5543	IC M5M4C264L-12 ZIP IC M5M4C264L-15 ZIP IC UPD41264V-12 ZIP IC MB81461-12 ZIP IC HM53461ZP-12 ZIP IC TMS4461-12SDL ZIP IC V53C261Z10 ZIP IC KM424C64Z-10 ZIP IC MSM51C262-10ZS ZIP IC KM424C64Z-12 ZIP	315-0795-80 315-0820 315-0850	IC MSM54C864-80JS SOP40P IC KM428C64J-10 SOJ IC HM53861J-8 SOJ	NTSC-F
IC8	315-0515 315-0515-15 315-0453 315-0423 315-0481 315-0525 315-0616 315-0622 315-0623 315-5543	IC M5M4C264L-12 ZIP IC M5M4C264L-15 ZIP IC UPD41264V-12 ZIP IC MB81461-12 ZIP IC HM53461ZP-12 ZIP IC TMS4461-12SDL ZIP IC V53C261Z10 ZIP IC KM424C64Z-10 ZIP IC MSM51C262-10ZS ZIP IC KM424C64Z-12 ZIP	NOTHING	NOTHING	
CE1	150-0418	CAP E 10UF 16V U-TYPE L=5MM	150-0023	CAP E 10UF 16V U-TYPE 20%	
CE33	NOT USED	NOT USED	150-0062	CAP E 47UF 10V U-TYPE	PAL
C11	NOT USED	NOT USED	151-0372	CAP CER CP 33PF 50V KB2125	
C30	151-0309	CAP CER CP 180PF 50V CH2125	151-0354 NOT USED	CAP CER CP 100PF 50V CH2125 NOT USED	PAL NTSC-SM
C61	151-0265	CAP CER CP 0.1UF 25V ZF2125	151-0336	CAP CER CHIP 12PF 50V	PAL
C63	NOTHING	NOTHING	NOT USED	NOT USED	PAL
R42	476-2472-J-10	RES CHIP 4.7kOHM 1/10W 5%	476-2752-J-10	RES CHIP 7.5kOHM 1/10W 5%	
R43	476-2472-J-10	RES CHIP 4.7kOHM 1/10W 5%	476-2752-J-10	RES CHIP 7.5kOHM 1/10W 5%	
R44	476-2472-J-10	RES CHIP 4.7kOHM 1/10W 5%	476-2752-J-10	RES CHIP 7.5kOHM 1/10W 5%	
R45	476-2472-J-10	RES CHIP 4.7kOHM 1/10W 5%	476-2752-J-10	RES CHIP 7.5kOHM 1/10W 5%	
R81	476-2682-J-10	RES CHIP 6.8kOHM 1/10W 5%	476-2472-J-10	RES CHIP 4.7kOHM 1/10W 5%	

CAUTIONS WHEN REPLACING PARTS

Four ICs shown in the table below are assigned as the service parts for IC6.

No.	Parts No.	Description
1	315-5660	IC CUSTOM CHIP FC1004 REV. YAMAHA
2	315-5660-02	IC CUSTOM CHIP FC1004
3	315-5660-01	IC CUSOTM CHIP FC1004 AMJ
4	315-5708-01	IC CUSTOM CHIP FC1004 AMK

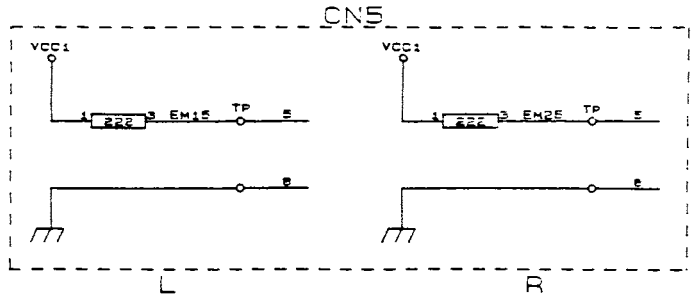
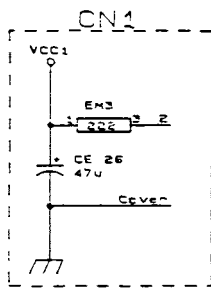
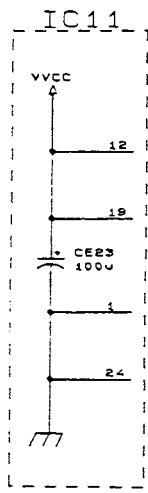
If one of numbers 1-4 is used for IC6, mount C1, C4 and C15 according to the following table.

No.	Parts No.	Description	IC6			
			No.1	No.2	No.3	No.4
C1	151-0316	CAP CER CP 20PF 50V J CH 2125	×	×	○	○
C4	151-0363	CAP CER CP 47PF 50V CH 2125	×	×	×	○
C15	476-2102-J-10	RES CHIP 1kOHM 1/10W 5%	×	×	○	×

× : NOT MOUNTED
○ : MOUNTED

2-3. Schematic Diagram-3

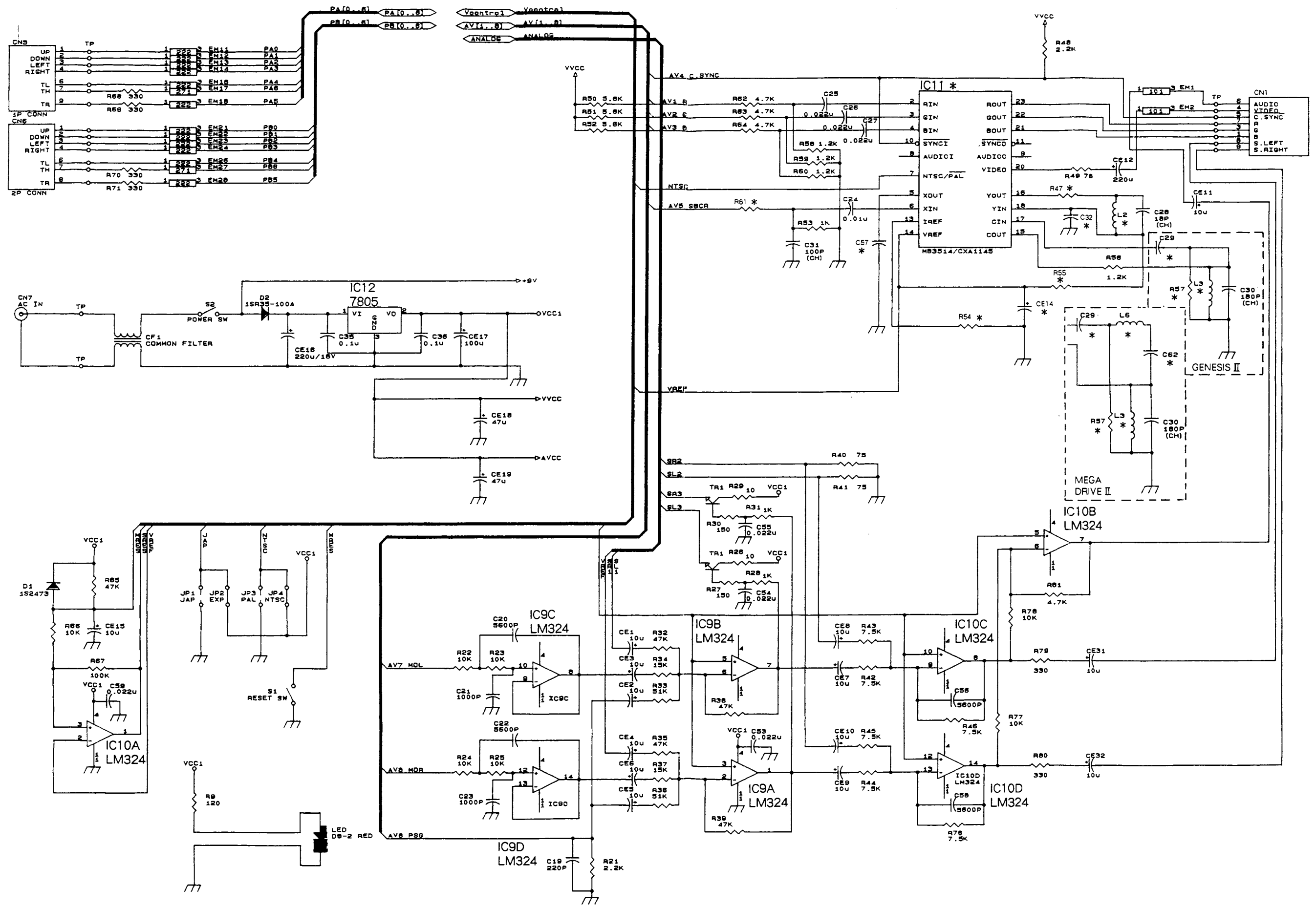
F
E
D
C
B
A



* Difference Table for Diagram - 4

CIRCUIT No.	GRID	GENESIS II			MEGA DRIVE II
		TYPE-S	TYPE-F	TYPE-SM	
IC11	E-6	CXA1145M	MB3154PF	KA2195D	MB3514PF
C29	D-7	0.01 µ F	0.01 µ F	NOT USED	0.01 µ F
C32	E-6	180pF	15pF	NOT USED	15pF
C57	D-5	NOT USED	100pF	NOT USED	100pF
C62	D-7	NOT USED	NOT USED	NOT USED	12pF
CE14	D-6	10 µ F	220 µ F	10 µ F	220 µ F
R47	E-6	1.2K	12K	NOT USED	12K
R54	D-6	24K	NOT USED	24K	NOT USED
R55	D-6	1K	10K	NOT USED	10K
R57	D-7	330 OHM	330 OHM	NOT USED	1K
R61	E-5	10K	4.7K	10K	4.7K
L2	E-7	100 µ H	100 µ H	NOT USED	100 µ H
L3	D-7	12 µ H	12 µ H	NOT USED	12 µ H
L6	D-7	NOT USED	NOT USED	NOT USED	100 µ H

2-4. Schematic Diagram-4

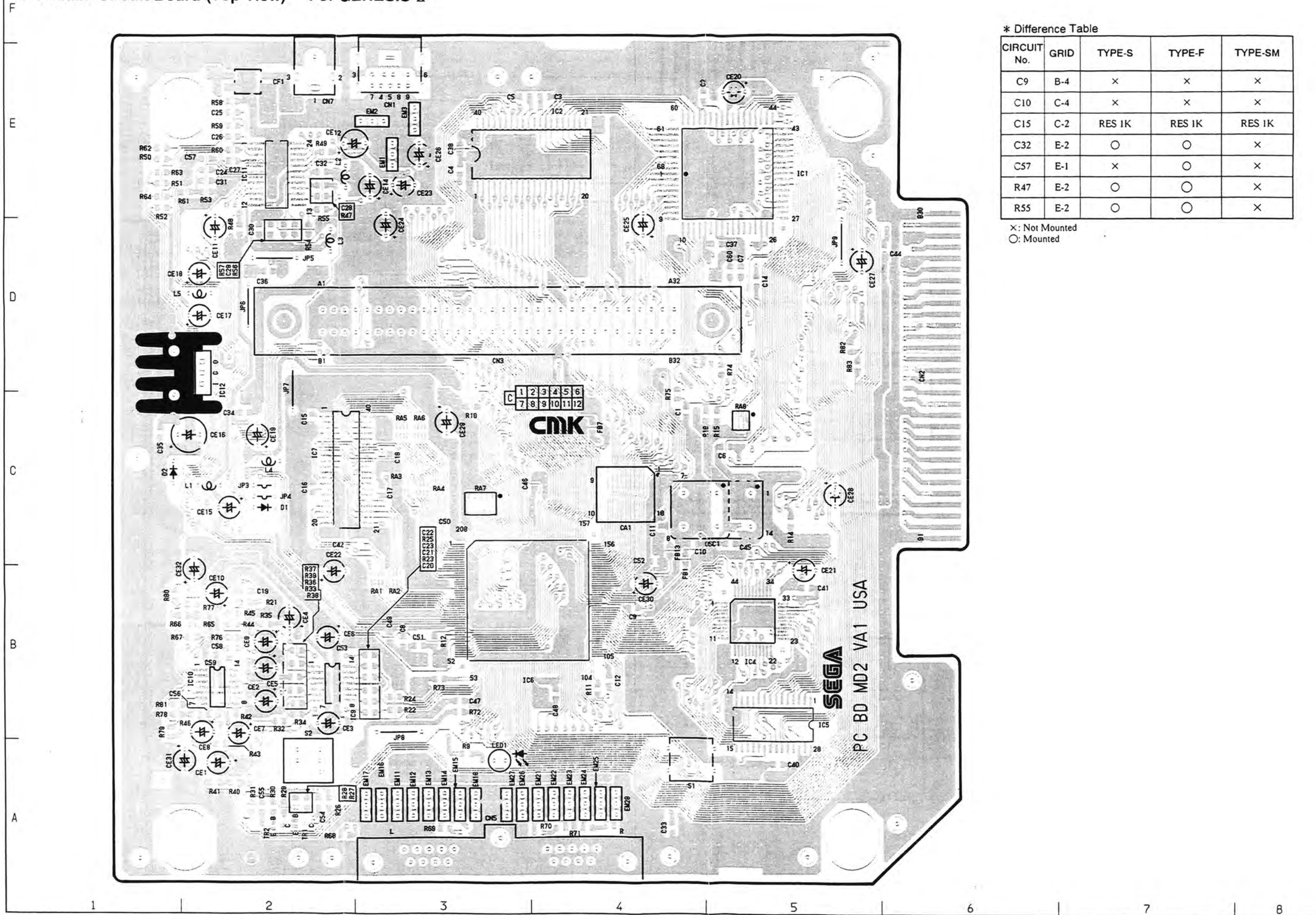


F
E
D
C
B
A

1 2 3 4 5 6 7 8

3. CIRCUIT BOARD DIAGRAM (Version 1)

3-1. Main Circuit Board (Top View) – For GENESIS II –

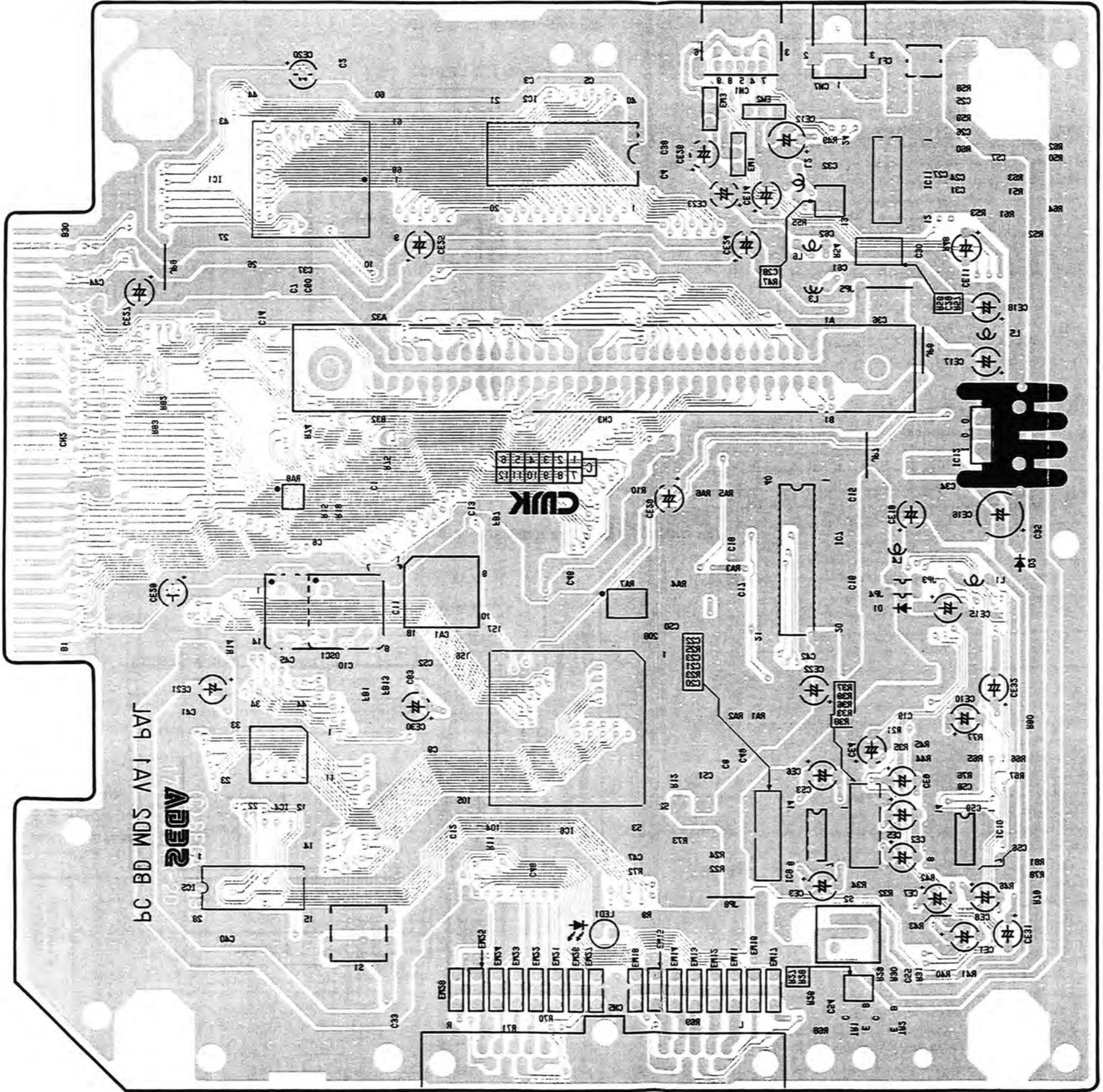


* Difference Table

CIRCUIT No.	GRID	TYPE-S	TYPE-F	TYPE-SM
C9	B-4	×	×	×
C10	C-4	×	×	×
C15	C-2	RES 1K	RES 1K	RES 1K
C32	E-2	○	○	×
C57	E-1	×	○	×
R47	E-2	○	○	×
R55	E-2	○	○	×

×: Not Mounted
○: Mounted

3-4. Main Circuit Board (Bottom View) – For MEGA DRIVE II –

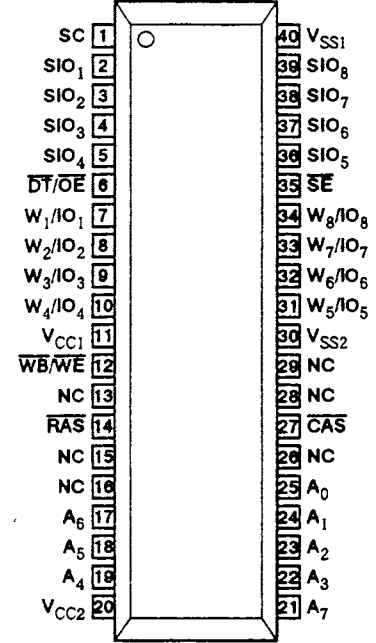


1 2 3 4 5 6 7 8

4. PARTS SPECIFICATIONS

IC2 315 - 0810
 IC LH5P1632N-15 SOP40P

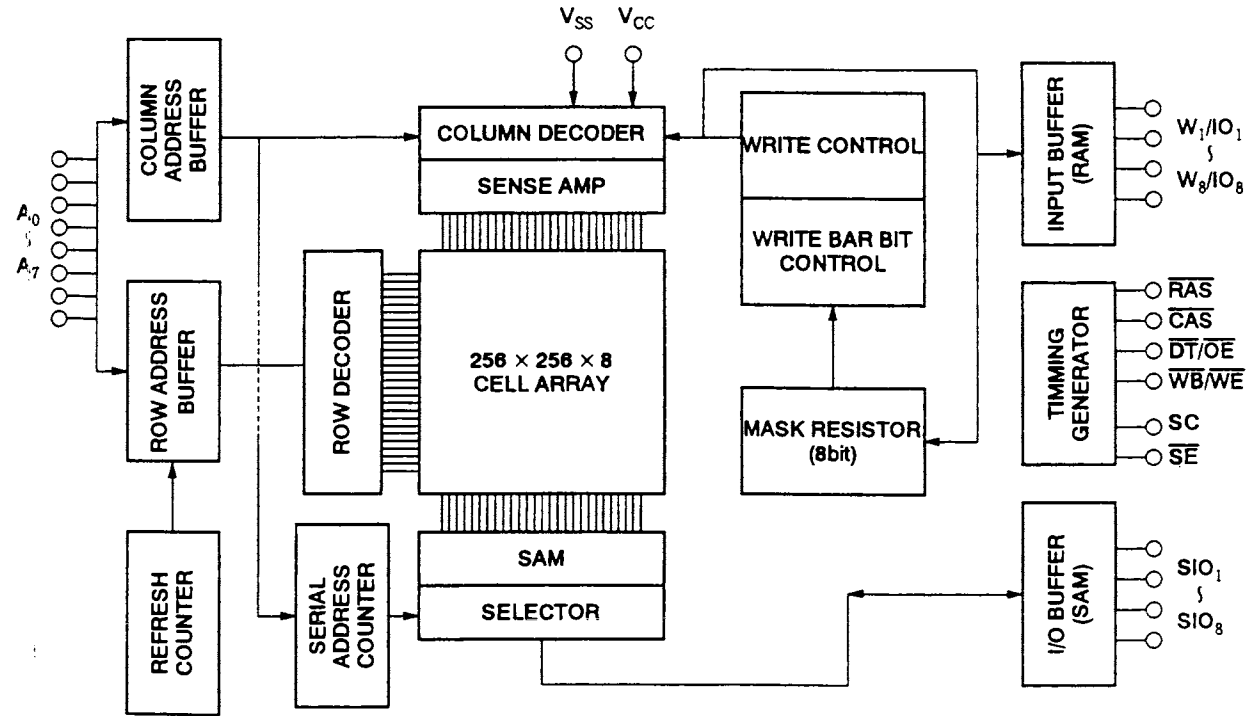
Top View & Pin Layout



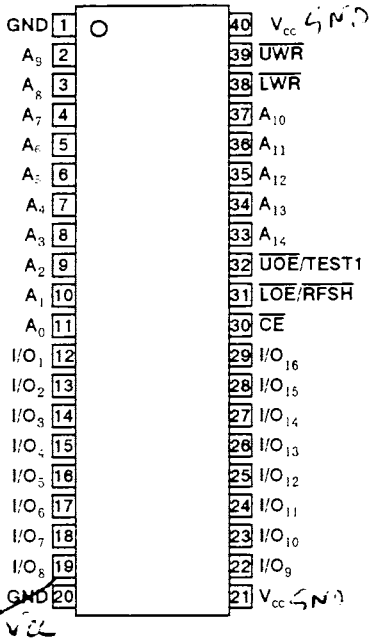
Pin Name

Pin Name	Function
A ₀ ~A ₇	Address input
RAS	Row address strobe
CAS	Column address strobe
DT/OE	Data transfer/output enable
WB/WE	Write bar bit/Write enable
W ₁ /IO ₁ ~ W ₈ /IO ₈	Write mask/data I/O
SC	Serial clock
SE	Serial enable
SIO ₁ ~SIO ₈	Serial data I/O
V _{CC} /V _{SS}	Power supply (5V)/ Ground
NC	Not connected

Block Diagram



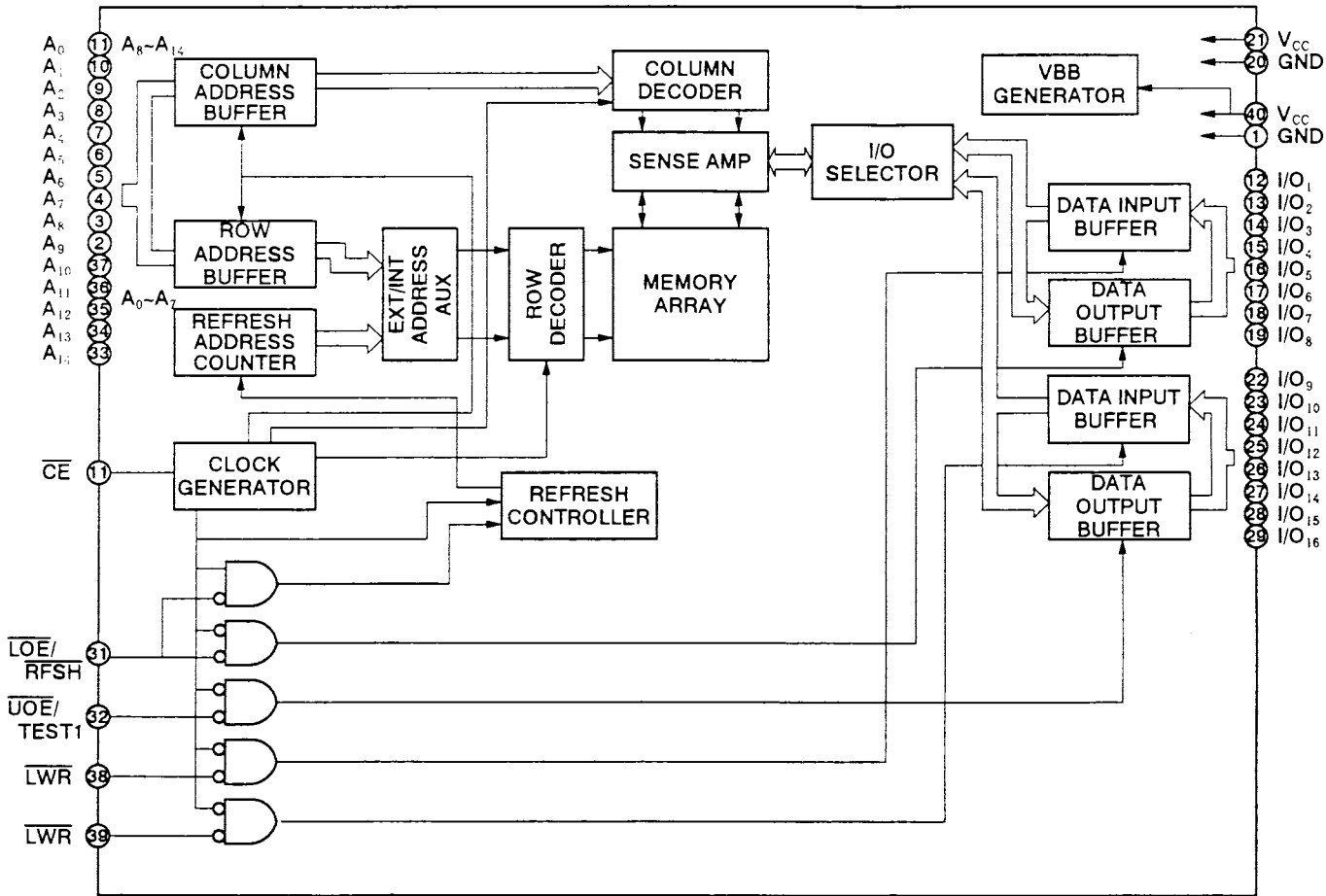
■ Top View & Pin Layout



■ Pin name

Pin Name	Function
A ₀ -A ₁₄	Address input
\overline{UWR}/UWR	Write enable
$\overline{LOE}/RFSH, \overline{UOE}$	Output enable/refresh input
\overline{CE}	Chip enable input
I/O ₁ ~I/O ₁₆	Data input/output
V _{cc}	Power supply
GND	Ground

■ Block Diagram



SEGA™