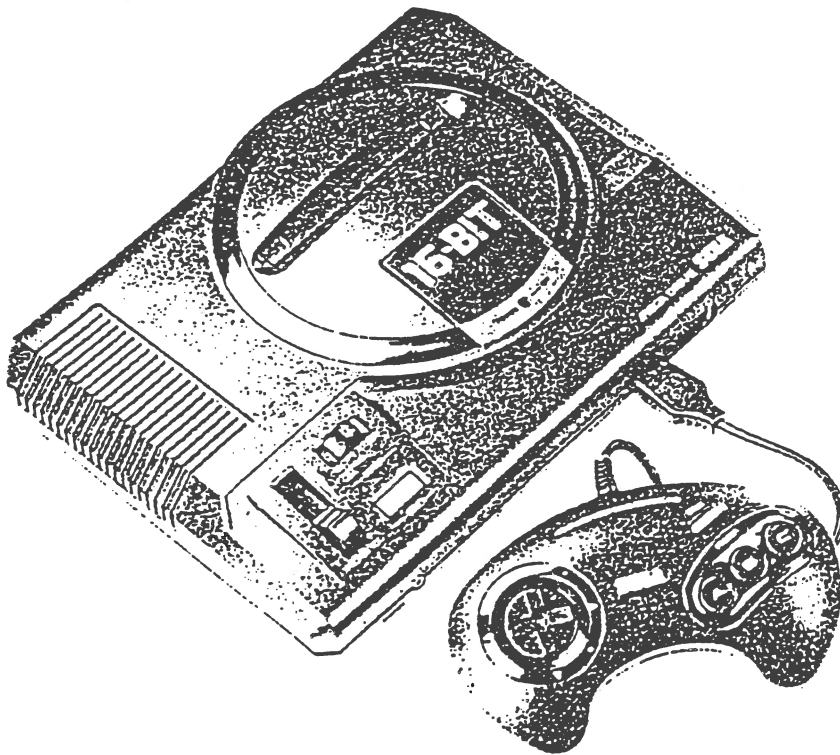




MAINTENANCE MANUAL

PAL - G



August, 1992
SEGA ENTERPRISES, LTD.
Rev. A

MEGA DRIVE MAINTENANCE MANUAL

PAL-G (GERMANY)

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- 11-2c. PC BD M5 PAL VA6.5 MAIN BOARD COMP SIDE LAYER
- 11-2d. PC BD M5 PAL VA6.5 MAIN BOARD SOLD SIDE LAYER

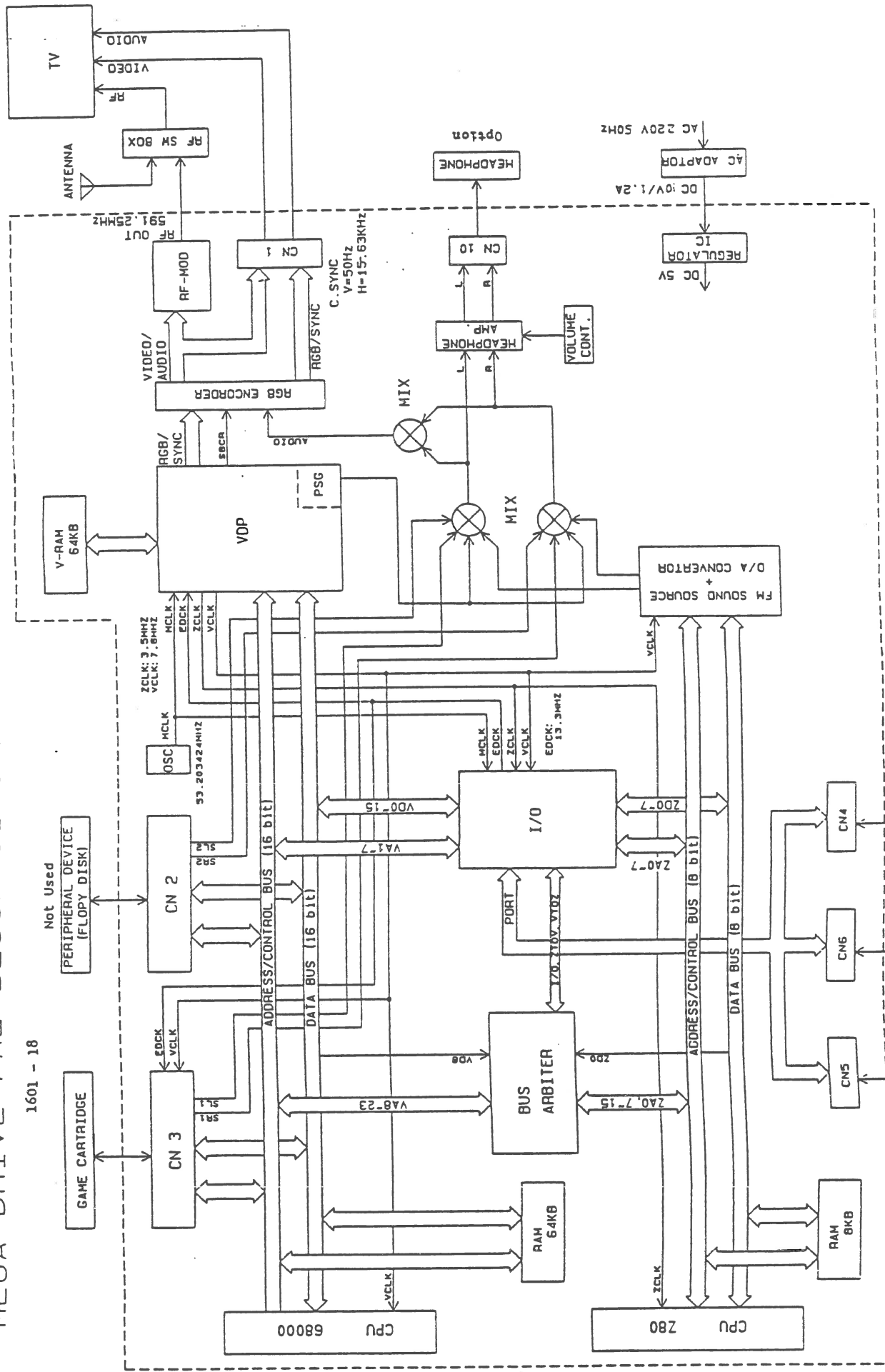
MEGA DRIVE

PAL-G (GERMANY)

BLOCK DIAGRAM

MEGA DRIVE PAL BLOCK DIAGRAM

1601 - 18



MEGA DRIVE

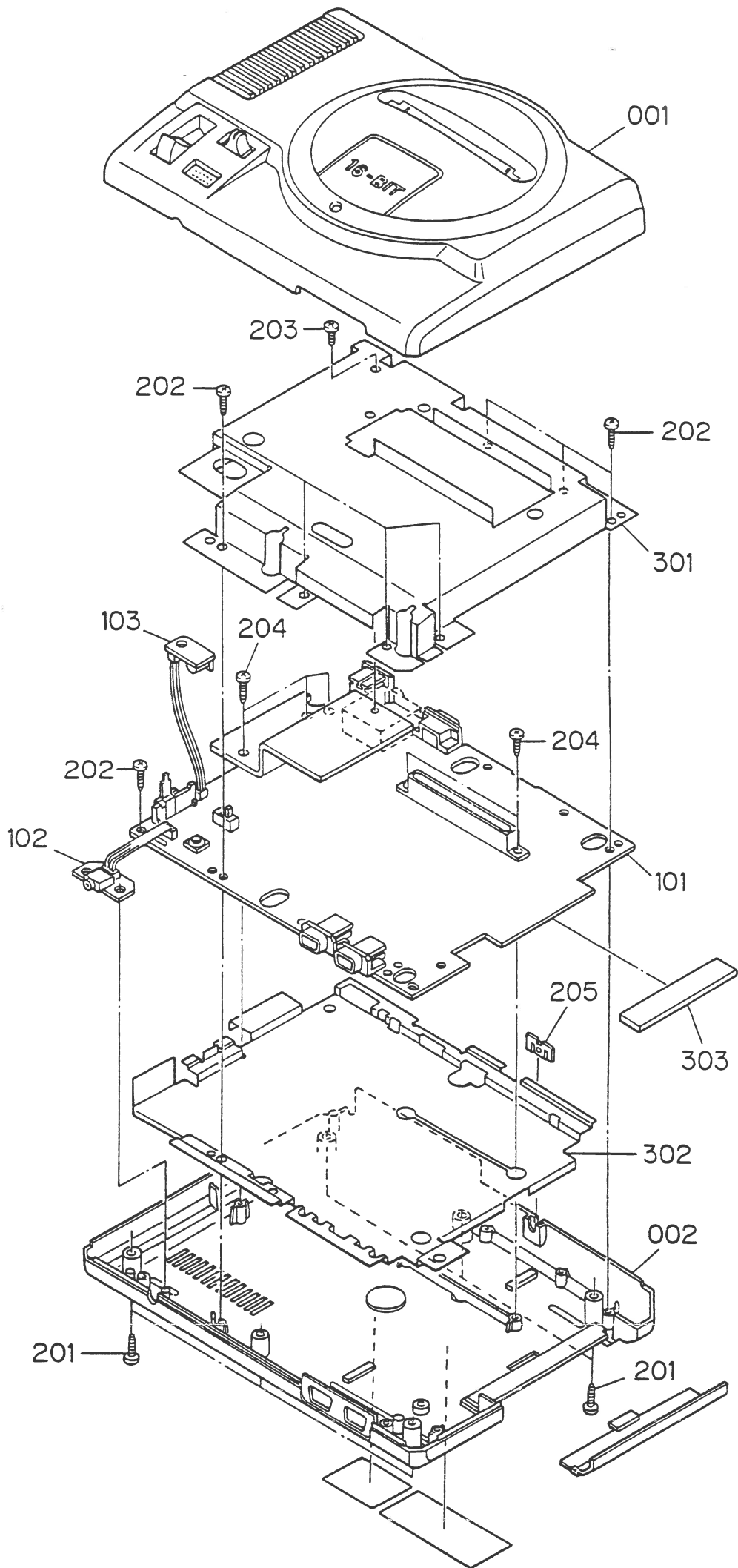
PAL-G (GERMANY)

ASSEMBLY DRAWING

MEGA DRIVE FOR PAL-G

GENERAL REFERENCE NUMBER LIST

REF NO.	PART NO.	DESCRIPTION	V4 QTY	V6.5
001	610-5077-01	ASSY TOP CASE M5 EUROPE	1	
	610-5077-01A	ASSY TOP CASE M5 EUROPE VA		(1)
	610-5283	ASSY TOP CASE M5 VA EUROPE		(1)
002	253-6310-01	BOTTOM CASE M5 PAL-I	1	
	253-6264	LID M5	1	
	253-6310-01A	BOTTOM CASE M5 PAL-I VA6.5		1
	253-6264	LID M5		1
01	837-7459	IC BD M5 VA4 PAL-G	1	
	837-8779	IC BD M5 VA6.5 PAL-G		1
02	839-0199	ASSY SUB BOARD M5	1	1
03	839-0262	ASSY SUB BOARD3 M5	1	1
201	012-0310	TAP SCR PH 3*10	6	6
202	012-0308	TAP SCR PH 3*8	8	8
203	029-0227	DELTITE SCR PH 3*6	1	1
204	029-0097	TAP SCR PH 3*12 BLK	5	5
205	250-5161	PLATE NUT MD	1	1
301	250-5135	SHIELD PLATE M5 TOP	1	1
302	250-5136	SHIELD PLATE M5 BOTTOM	1	1
303	253-6298	60P CARD EDGE COVER	1	1



ASSEMBLY LIST FOR MEGA DRIVE PAL-G

INDEX

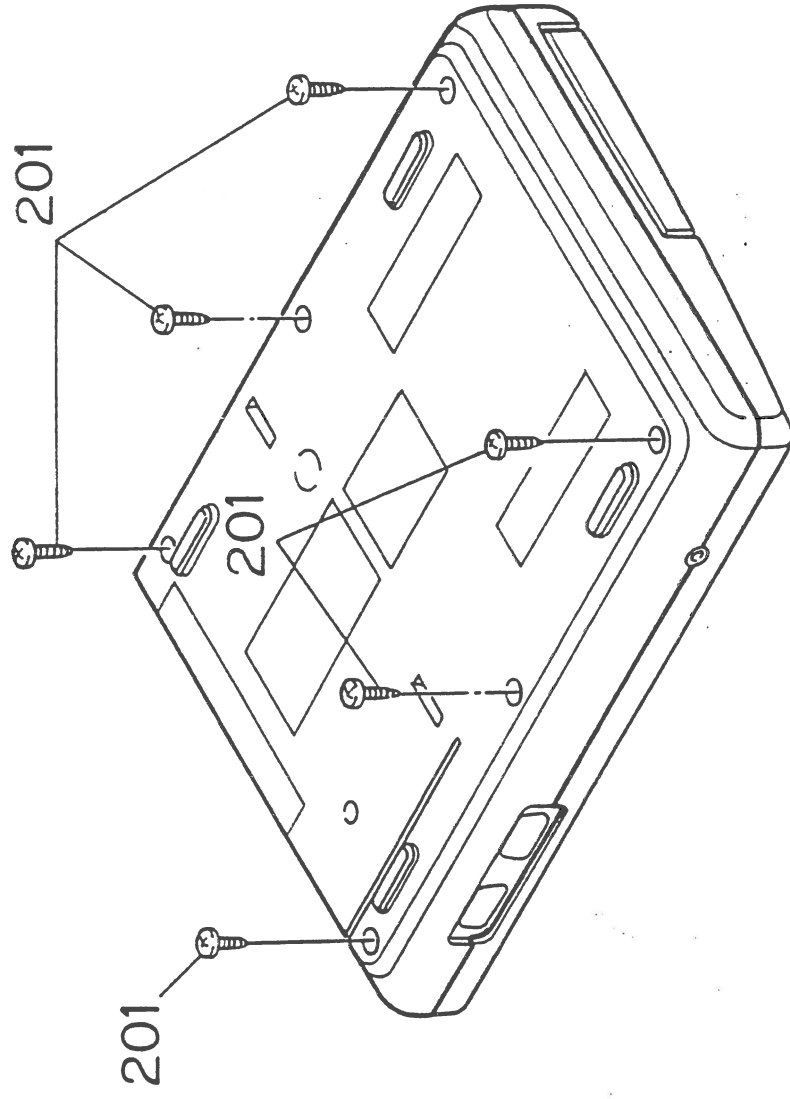
- 1001 TOP CASE ASSEMBLY 1
- 1002 TOP CASE ASSEMBLY 2
- 1003 SHIELD PLATE TOP ASSEMBLY
- 1004 MAIN BOARD ASSEMBLY

PARTS LIST FOR MEGA DRIVE PAL-G

1001 TOP CASE ASSEMBLY 1

REF NO.	PART NO.	DESCRIPTION	QTY
201	012-0310	TAP SCR PH 3*10	6

1001 TOP CASE ASSEMBLY 1

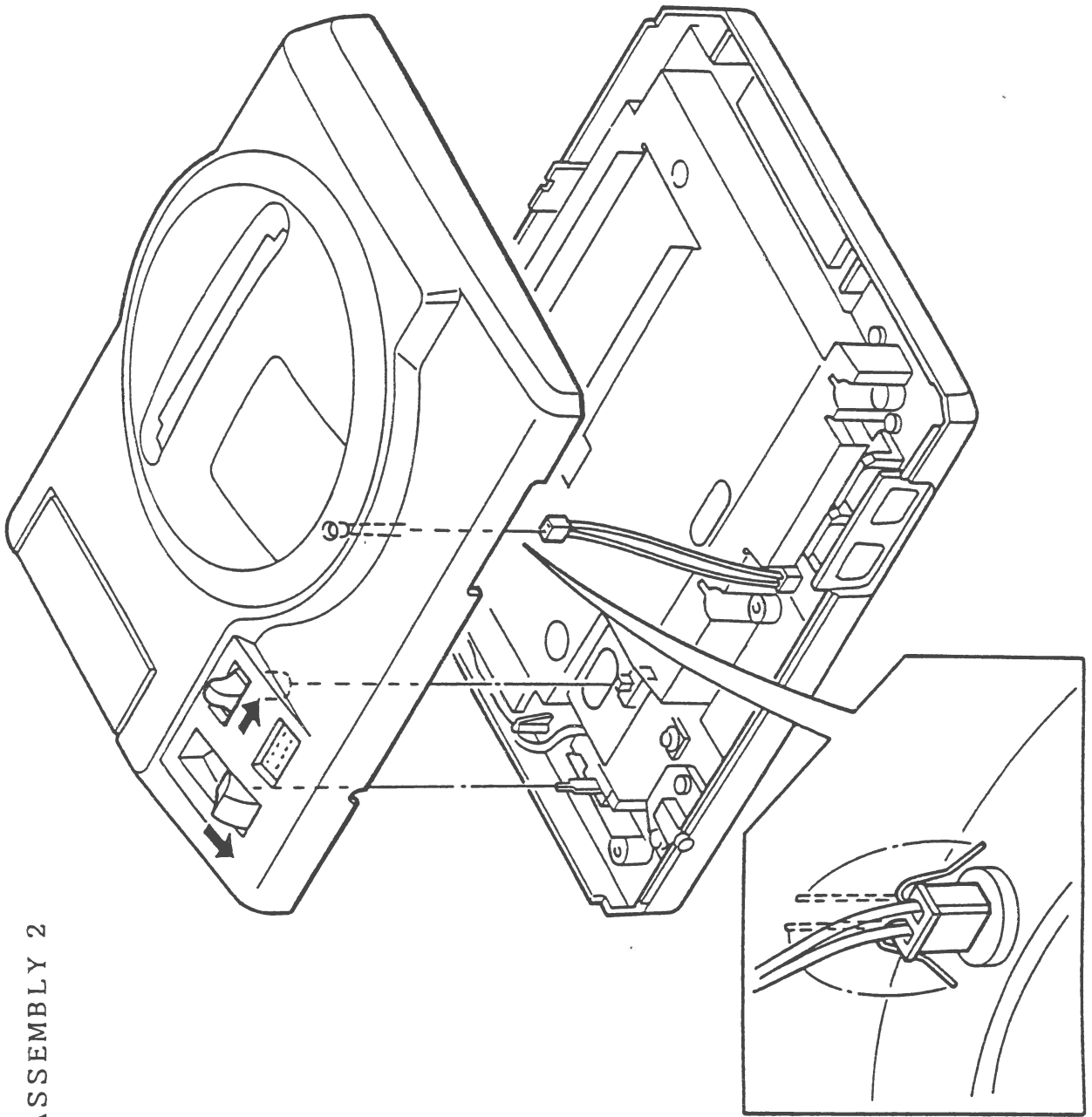


PARTS LIST FOR MEGA DRIVE PAL-G

1002 TOP CASE ASSEMBLY 2

REF NO.	PART NO.	DESCRIPTION	QTY
001	610-5077-01	ASSY TOP CASE M5 EUROPE	(1)
	610-5077-01A	ASSY TOP CASE M5 EUROPE VA	(1)
	610-5283	ASSY TOP CASE M5 VA EUROPE	(1)

1002 TOP CASE ASSEMBLY 2

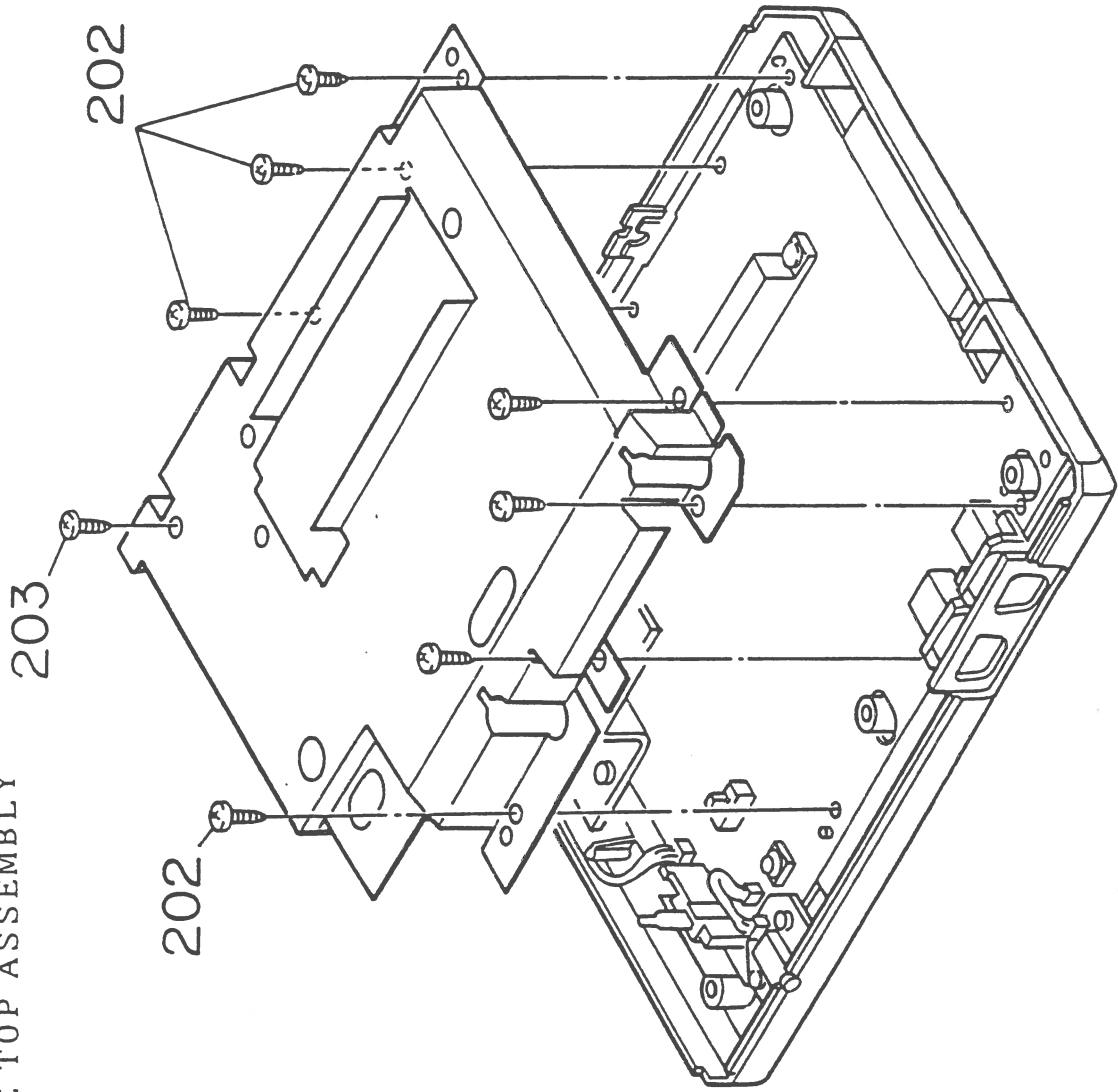


PARTS LIST FOR MEGA DRIVE PAL-G

1003 SHIELD PLATE TOP ASSEMBLY

REF NO.	PART NO.	DESCRIPTION	QTY
202	012-0308	TAP SCR PH 3*8	7
203	029-0227	DELTITE SCR PH 3*6	1
301	250-5135	SHIELD PLATE M5 TOP	1

1003 SHIELD PLATE TOP ASSEMBLY

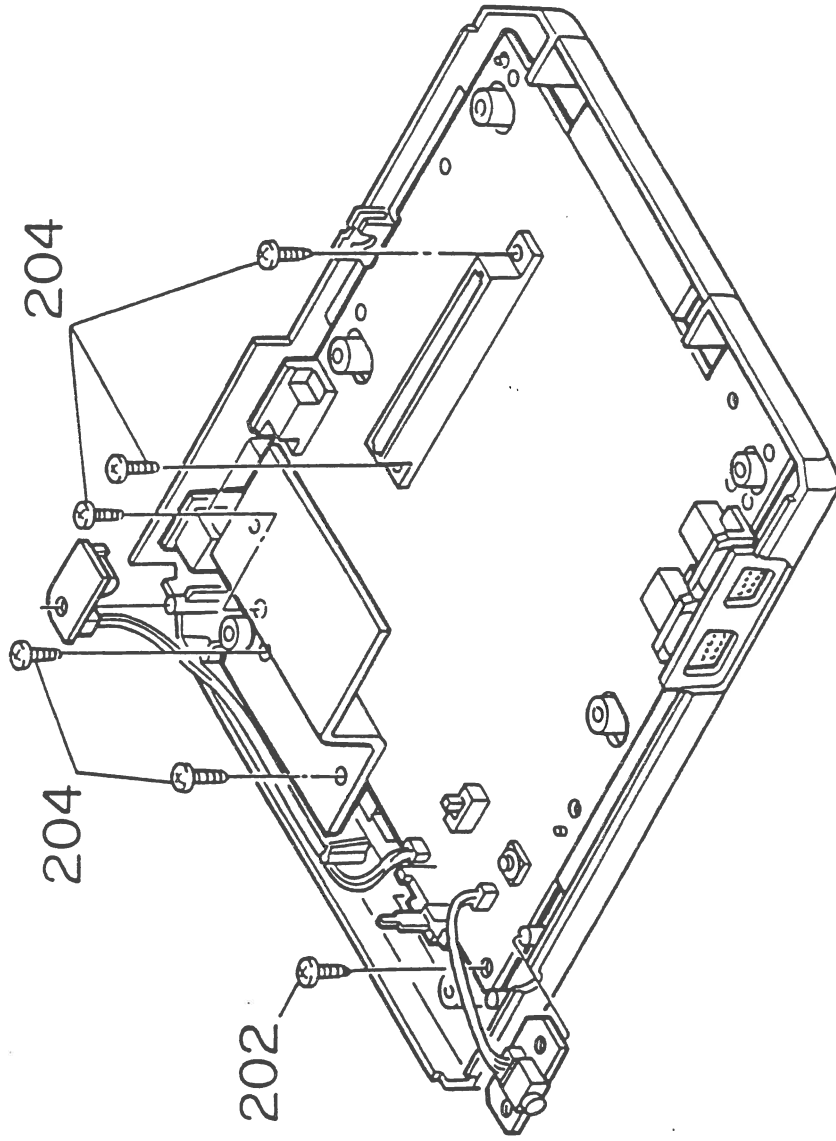


PARTS LIST FOR MEGA DRIVE PAL-G

1004 MAIN BOARD ASSEMBLY

REF NO.	PART NO.	DESCRIPTION	QTY
101	837-7459	IC BD M5 VA4 PAL-G	(1)
	837-8779	IC BD M5 VA6.5 PAL-G	(1)
102	839-0199	ASSY SUB BOARD M5	1
103	839-0262	ASSY SUB BOARD3 M5	1
202	012-0308	TAP SCR PH 3*8	1
204	029-0097	TAP SCR PH 3*12 BLK	5

1004 MAIN BOARD ASSEMBLY



PROCEDURE OF DISASSEMBLY AND ASSEMBLY OF MEGA DRIVE
FOR
PAL-G (GERMANY)

1. DISASSEMBLY

PROCESS 1 : Removing the screws from Bottom Case.

- 1) Upset the unit.
- 2) Remove 6 screws (201) for Bottom Case.

PROCESS 2 : Removing the Top Case.

- 1) Hold up the Top Case to direction (A).
- 2) Remove 2 pin connector from Lead wire of the Power LED fixed on the rear side of Top Case.

PROCESS 3 : Removing Shield Plate and Main Board

- 1) Remove 7 screws (202).
- 2) Remove a screws (203).
- 3) Remove the Shield Plate.
- 3) Remove a screw (202).
- 4) Remove 5 screws (204).
- 4) Remove the Main Board from Bottom Plate.

2. ASSEMBLY

PROCESS 1 : Setting of Main Board

- 1) Set Main Board on the Bottom Case.
At this setting, it is important to coincide each centre of screwing hole in Main Board with corresponding each centre of screwing hole of Bottom Case.
- 2) Fix 5 screws (204).
- 3) Fix 8 screws (202).
- 4) Set the Shield Plate on Main Board.
At this setting, it is important to coincide each holes to the Bosses of Bottom Case.
- 5) Fix a screw (203).
- 6) Fix 7 screws (202)
- 7) At the setting of Sub Boards (for phone and AC Adaptor), it is important to correctly set the holes of Sub Board to Bosses of Bottom Case.

PROCESS 2 : Setting of Top Case

1) Set the Knob of volume to the scale position "0" and power switch knob to off position on the Top Case.

2) Insert two pin connector of power LED lead wire into the lead wire of LED fixed on the rear side of Top Case.

In this insertion, it is important to fit the longer lead wire of LED (anode) to the red lead wire of connector (positive polar).

3) Firmly set the Top Case to Bottom Case.

PROCESS 3 : Screw fixing of Bottom Case.

1) Upset the unit.

2) Fix 6 screws (201) to the Bottom Case.

MEGA DRIVE

PAL-G (GERMANY)

SPARE PARTS LISTS

MEGA DRAIVE SPEAR PARTS LIST FOR PAL-G & PAL-I

No	Parts No.	Description
1	610-5077-01	Assy Top Case M5 Europe (V4)
	610-5077-01A	Assy Top Case M5 Europe VA (V6.5)
	610-5283	Assy Top Case M5 VA Europe (V6.5)
2	253-6310-01	Bottom Case M5 PAL-I (V4)
	253-6310-01A	Bottom Case M5 PAL-I VA6.5
3	315-0328	IC SCN68000C8N64
	315-0555	IC MC68000P8
4	315-0041	IC Z80A
5	315-0413	IC CXK58257AP-10
6	230-5053-A	XTAL OSC 53.693175M
	230-5053-01D	XTAL OSC 53.693175
	230-5053-02A	XTAL OSC 53.693175M
	230-5053-03D	XTAL OSC 53.693M
7	315-5313	IC CUSTOM CHIP YM7101
8	315-5313A	IC CUSTOM CHIP FC1001
9	315-5364	IC CUSTOM CHIP YM6045C
10	315-5402	IC CUSTOM CHIP uPD91258
11	315-5433	IC CUSTOM CHIP uPD92271
12	313-5089	IC YM2612
13	313-5079	IC CXA1034P
14	313-5067	IC CXA1145P
13	509-5240-01	SLIDE SWITCH HSW1699-01-010
14	212-5106-01	DIN CONN 8P B-TYPE UC-0059#2
	212-5106-01	DIN CONN 8P B-TYPE DJ-008-8P-B
	212-5106-01	DIN CONN 8P TCS4490-01-4151
15	200-5086	RF MODULATOR UE-3622 (G-PAL)
	200-5086-01	RF MODULATOR G-PAL MDMT4D011A
	200-5086-02	RF MODULATOR PAL-G YAA21-0496

MEGA DRIVE

PAL-G (GERMANY)

ACCESSORIES LIST

MEGA DRAIVE ACCESSORIES LIST FOR PAL-G (GERMANY)

NO	PARTS NO.	DESCRIPTION
1	610-5327-02	ASSY CONTROL PAD M5 VA EUROPE
	610-5372-01	ASSY CP M5 REV. EUP SE
	610-5376-01	ASSY CP M5 REV. EUP
2	400-5122A	AC ADAPTOR AC220V/DC10V 1.2A
	400-5122B	AC ADAPTOR AC220V/DC10V 1.2A
3	610-5128A	ASSY RF SW BOX W/RF CABLE
	610-5128A-01	RF SW BOX W/RF CABL-A02 MK3088

MEGA DRIVE

PAL-G (GERMANY)

PCB REPAIR PROCEDURE

PCB REPAIR PROCEDURE

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 - 3-1-3-1-2. NO VRES BUT SRES ON
 - 3-1-3-1-3. NO ZRES BUT VRES ON
 - 3-1-3-2. NO VA(0-23) & VD(0-15) ON
 - 3-1-3-3. VA(0-23) ON BUT NO VD(0-15) LINE
 - 3-1-3-4. VRES, ZRES & ZCLK ON BUT NO ZA(0-15) & ZD(0-7)
 - 3-1-3-5. VRES, ZRES & ZCLK ON BUT ZA(0-15), ZD(0-15) STOP AFTER A WHILE
 - 3-2. PICTURE PROBLEM
 - 3-2-1. BLANK SCREEN
 - 3-2-2. SCREEN INTERFERENCE WHEN SHAKE DIN CONNECTOR
 - 3-2-3. BLACK & WHITE SCREEN
 - 3-2-4. CHECKER SCREEN
 - 3-3. SOUND PROBLEM
 - 3-3-1. DRUM SOUND WHEN TURN ON POWER
 - 3-3-2. LOOSE SOUND WHEN SHAKE DIN CONNECTOR
 - 3-3-3. SOUND FROM HEADPHONE BUT NOT FROM DIN CONNECTOR.
 - 3-3-4. SOUND FROM DIN CONNECTOR BUT NOT FROM HEADPHONE
 - 3-3-5. NO SOUND FROM RIGHT OR LEFT HEADPHONE
 - 3-3-6. NOISE FROM HEADPHONE WHEN ADJUST VOLUME LOW

- 3-3-7. NO SOUND BOTH FROM DIN CONNECTOR & HEADPHONE
- 3-3-7-1. NO SOUND SIGNAL FROM IC11(YM-2612)
- 3-3-7-2. NO SOUND EVEN SIGNAL FROM IC11(YM-2612) ON
- 3-3-8. SOUND NOISE FROM DIN CONNECTOR & HEADPHONE
- 3-4. CONTROL PAD MALOPERATION
- 3-4-1 PAD BUTTON ALWAYS ON
- 3-4-1-1. EM FILTER REGISTER IS LESS THAN COUPLE OF 10 OHMS.
- 3-4-1-2. INPUT SIGNALS TO PAD ARE LOW & RESISTER BETWEEN GND IS M-OHM ORDER.
- 3-4-2. CONTROL PAD BUTTON CANNOT TURN ON
- 3-4-3. BUTTON ON CONTROL PAD RANDOM ON
- 3-5. MALFUNCTION WHEN CONNECT TO MEGA CD

2. PCB REPAIR FLOW CHART

START

|
 CHECK VOLTAGE AT POWER SW
 NO
 --?CHECK PATTERN BETWEEN DC IN AND POWER SW, SPECIALLY PCB CRACK

| YES
 VC1, VC2 = +5V ?
 NO
 --?CHECK VCC1 (IC15 7805), VCC2 (IC17 7805) (REFER TO 3-1-1)

| YES
 X'TAL OSCILLATE ?
 NO
 --?VO PCB O.K.?--?REPLACE X'TAL

| YES
 | YES
 CHECK VOLTAGE ON SUB PCB
 SRES ON ?
 NO
 --?VREF IS ABOUT 2V?--?REPLACE XA-1145

| YES
 | YES
 MRES REACH TO 5V WITHIN 1.6SEC.?--? CHECK CR

VRES ON ?
 NO
 --? REFER TO 3-1-3-1-2

| YES
 ZRES ON ?
 NO
 --? VD(0-15)&VA(0-23) O.K? NO
 --? REFER TO 3-1-3-1-3

| YES
 | YES
 BOARD CRACK, SOLDERING PROBLEM, RUST

|
CAN GET PICTURE ?

NO
---? REFER TO 3-2-1

| YES

CORRECT PICTURE

NO
---? B/W SCREEN ?

NO
---? CHECKER SCREEN

| YES

| YES

| YES

REPLACE X'TAL

REFER TO 3-2-4

|
SOUND ON ?

NO
---? REFER TO 3-3

| YES

PAD ON ?

NO
---? REFER TO 3-4

| YES

RUNNING WITH DEMO

|
END

3. PHENOMENON & CAUSE

3-1. NO POWER TURN ON

3-1-1. NO POWER LED ON

- A. PCB CRACK AT DIN CONNECTOR PORTION OR SOLDERING PROBLEM
- B. PATTERN DISCONNECTION BECAUSE OF BOARD CRACK UNDER RADIATION PORTION OR CORROSION
- C. PATTERN CUT BECAUSE OF BOARD CRACK AT POWER SW OR CORROSION
- D. DEFECTIVE IC17

3-1-2. BLACK SCREEN AFTER POWER LED ON

- A. DEFECTIVE X'TAL

3-1-3. GRAY SCREEN AFTER POWER LED ON

3-1-3-1. DEFECTIVE RESET CIRCUIT

3-1-3-1-1. NO SRES

- A. DEFECTIVE IC13 CXA-1145 VRFE (CONSTANT VOLTAGE: 2V)
- B. DEFECTIVE IC14 LM-358 SRES (CONSTANT: 0.3SEC.)

3-1-3-1-2. SRES ON BUT NO VRES (IC4)

- | | | | | |
|--------------|----------|----------|----------|-----------|
| A. VER.0,1,2 | VER.4 | VER.5 | VER.6 | |
| 315-5308 | 315-5364 | 315-5402 | 315-5403 | DEFECTIVE |

3-1-3-1-3. VRES ON BUT NO ZERS

- A. VD(0-15)&VA(0-23) PATTERN DISCONNECTION BECAUSE OF BOARD CRACK OR CORROSION
- B. VER.0,1,2 VER.4 VER.5 VER.6
315-5308 315-5364 315-5402 315-5433 DEFECTIVE
- C. IC1 68000 DEFECTIVE
- D. IC8 315-5313 DEFECTIVE

3-1-3-2. NO VA(0-23) & VD(0-15) LINE ON (IC4)

- | | | | | |
|--------------|----------|----------|----------|-----------|
| A. VER.0,1,2 | VER.4 | VER.5 | VER.6 | |
| 315-5308 | 315-5364 | 315-5402 | 315-5433 | DEFECTIVE |

3-1-3-4. VA(0-23) LINE ON BUT NOT VD(0-15) (IC4)

A. VER.0,1,2 VER.4 VER.5 VER.6
315-5308 315-5364 315-5402 315-5433 DEFECTIVE

3-1-3-5. VRES, ZRES & ZCLK ON BUT ZA(0-15)&ZD(0-7)
STOP AFTER A WHILE

A. IC6 Z80 DEFECTIVE

3-1-3-6. VRES, ZRES & ZCLK ON BUT ZA(0-15)&ZD(0-7)

A. IC11 YM-2612 DEFECTIVE

3-2 PICTURE PROBLEM

3-2-1. BLACK SCREEN

- A. VIDEO SIGNAL LINE DISCONNECTION BECAUSE OF BOARD CRACK AT DIN CONNECTOR
- B. IC13 CXA-1145 DEFECTIVE
- C. PATTERN DISCONNECTION BECAUSE OF BOARD CRACK AT IC13 CXA-1145

3-2-2. SCREEN INTERFERENCE WHEN SHAKE DIN CONNECTOR

- A. DEFECTIVE DIN CONNECTOR
- B. BOARD CRACK AROUND DIN CONNECTOR
- C. MALSOLDERING OF R25 OR C32

3-2-3. B/W SCREEN

- A. DEFECTIVE X'TAL

3-2-4. CHECKER SCREEN

- A. PATTERN DISCONNECTION BECAUSE OF BOARD CRACK AT AD(0-7) & SD(0-7) OF IC9 & 10
- B. DEFECTIVE IC8 315-5313
- C. DEFECTIVE VRAM(IC10)

- 3-3. SOUND PROBLEM
 - 3-3-1. DRUM SOUND WHEN TURN ON POWER (ONLY FOR VER.0)
 - A. SPECIFICATIONS OF S-RAM (IC7) UNEVEN
 - 3-3-2 LOOSE SOUND WHEN SHAKE THE DIN CONNECTOR
 - A. DEFECTIVE DIN CONNECTOR
 - B. CRACKED BOARD AROUND DIN CONNECTOR
 - 3-3-3. SOUND FROM HEADPHONE BUT NOT FROM DIN CONNECTOR
 - A. DEFECTIVE IC13 CXA-1145
 - B. DEFECTIVE IC14 LM358
 - 3-3-4. SOUND FROM DIN CONNECTOR BUT NOT FROM HEADPHONE
 - A. DEFECTIVE IC12 CXA-1034
 - 3-3-5. NO SOUND FROM RIGHT OR LEFT HEADPHONE
 - A. DEFECTIVE IC12 CXA-1034
 - B. DEFECTIVE IC11 YM-2612
 - 3-3-6. NOISE FROM HEADPHONE WHEN ADJUST VOLUME LOW
 - A. CANNOT REPAIR IN CASE OF VER.0
 - B. DEFECTIVE CR OR VR AROUND IC12 CXA-1034
 - C. PATTERN DISCONNECTION BECAUSE OF BOARD CRACK AROUND IC12 CXA-1034
 - 3-3-7. NO SOUND BOTH FROM DIN CONNECTOR AND HEADPHONE
 - 3-3-7-1. NO SOUND SIGNAL FROM IC11 YM-2612
 - A. VER.0,1,2 VER.4 VER.5 VER.6
315-5308 315-5364 315-5402 315-5433 DEFECTIVE
 - B. VD(0-15) LINE PATTERN DISCONNECTION BECAUSE OF BOARD CRACK AROUND ABOVE ICs

3-3-7-2. NO SOUND EVEN SOUND SIGNAL FROM IC11 YM-2612 ON

- A. DEFECTIVE IC6 Z80
- B. DEFECTIVE IC11 YM-2612
- C. ZD(0-7) LINE PATTERN DISCONNECTION BECAUSE OF BOARD CRACK OR CORROSION
- D. DEFECTIVE IC12 CXA-1034
- E. PATTERN DISCONNECTION BECAUSE OF VCC2 POWER BOARD CRACK

3-3-8. NOISE FROM DIN CONNECTOR AND HEADPHONE

- A. DEFECTIVE IC11 YM-2612

3-4. MALFUNCTION OF PAD

3-4-1. PAD BUTTONS ARE ALWAYS ON.

3-4-1-1. RESISTANCE OF EM FILTER BETWEEN GND IS 24-65 Ω .

A. DEFECTIVE EM FILTER

3-4-1-2. PAD INPUT SIGNALS ARE "LOW" LEVEL. RESISTANCE BETWEEN GND IS $M\Omega$.

A. VER.0,1,2,4	VER.5	VER.6	
315-5409	315-5402	315-5433	DEFECTIVE

3-4-2. PAD BUTTON CANNOT ON

A. BOARD CRACK AROUND PAD CONNECTOR			
B. VER.0,1,2,4	VER.5	VER.6	
351-5409	351-5402	351-5433	DEFECTIVE

3-4-3. PAD BUTTON TURN ON AT RANDOM.

A. PATTERN DISCONNECTION BECAUSE OF CRACKED BOARD VA12 LINE.

3-5. NO OPERATION WHEN CONNECT TO MEGA CD

3-5-1. NO PICTURE WHEN CONNECT TO MEGA CD

A. S-RAM (IC-7) INCOMPATIBILITY			
B. VER.0,1,2,4	VER.5	VER.6	
315-5409	315-5402	315-5433	DEFECTIVE

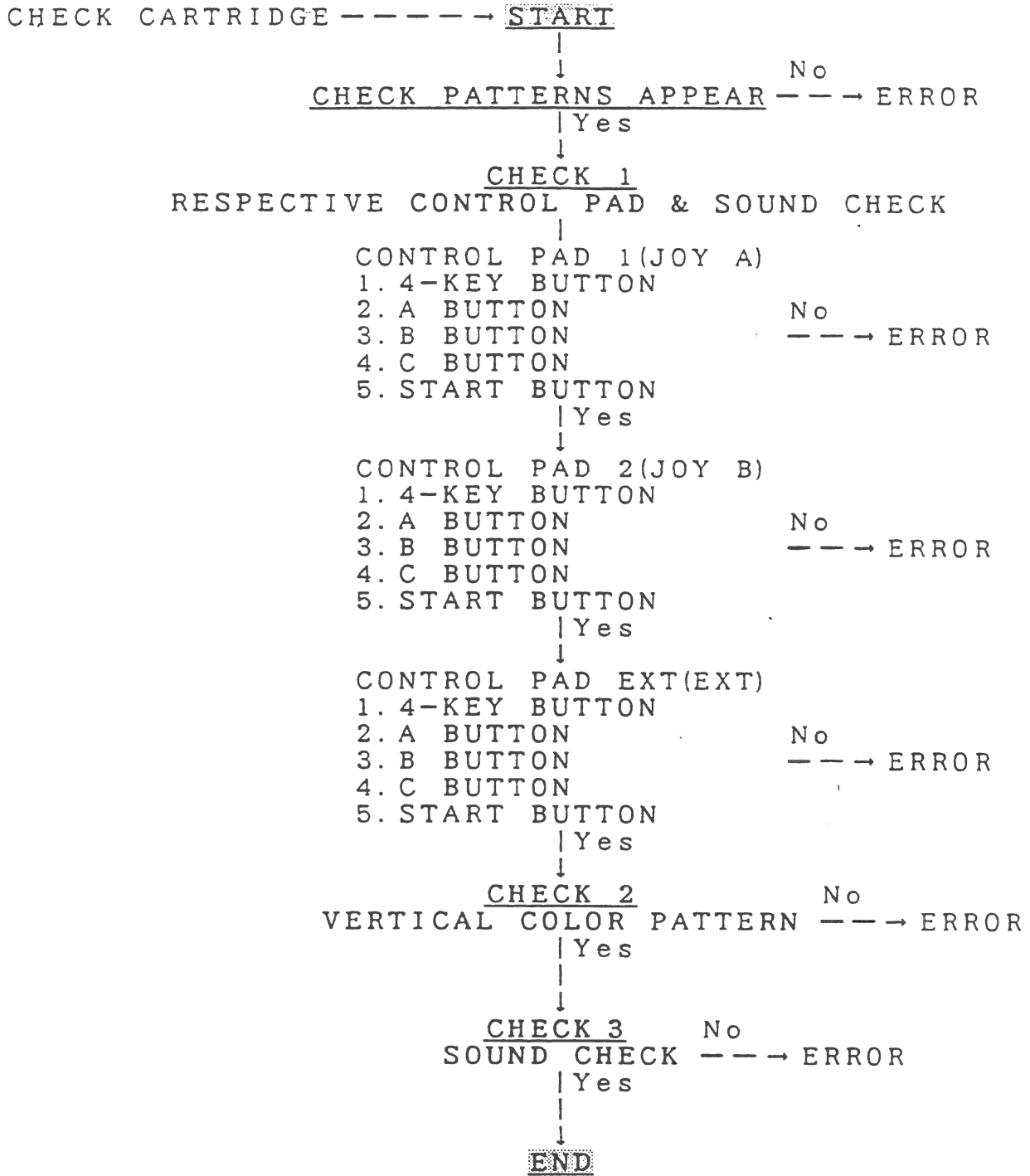
MEGA DRIVE

PAL-G (GERMANY)

SOFT & HARD CHECK MANUAL

SOFT CHECK MANUAL

MEGA DRIVE SOFT CHECK FLOW

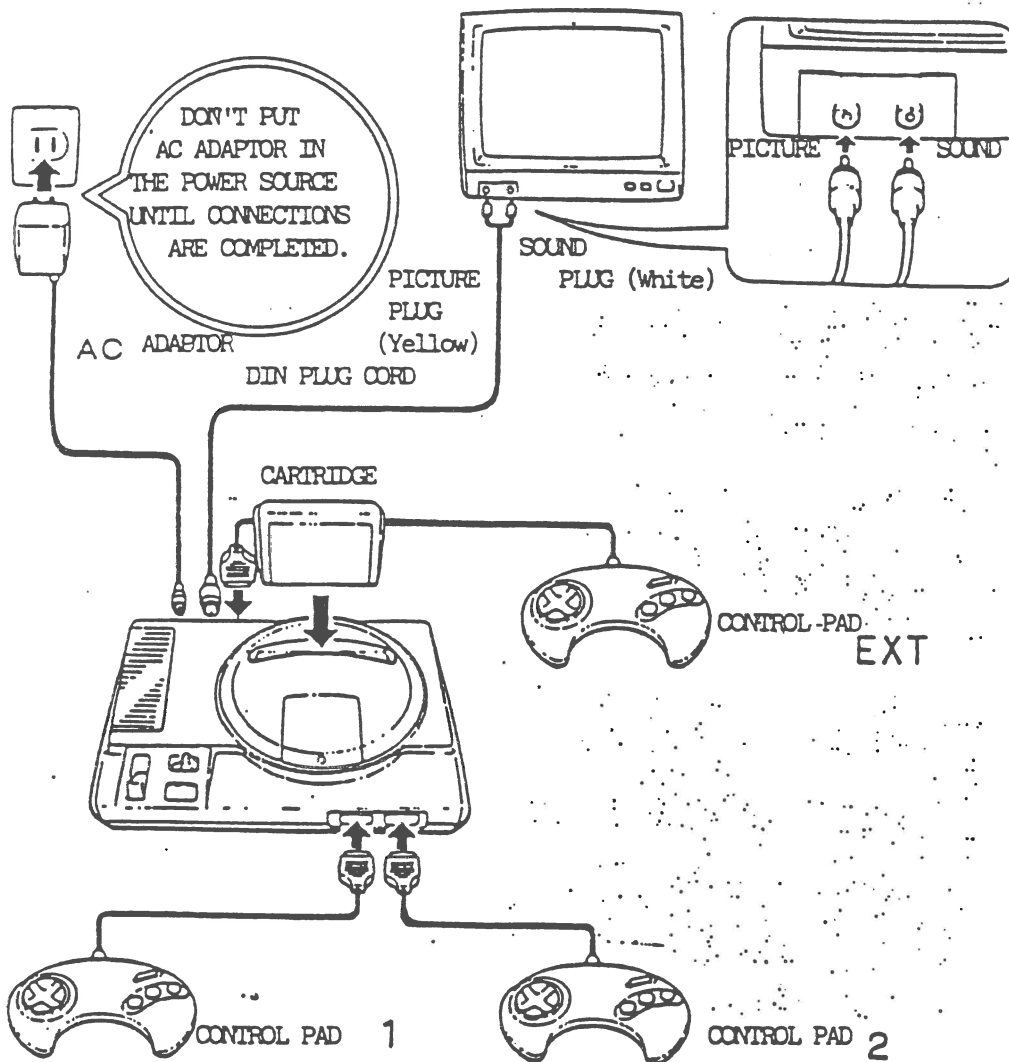


MEGA DRIVE FUNCTION CHECK

☆ HOW TO USE THE CHECK CARTRIDGE ☆

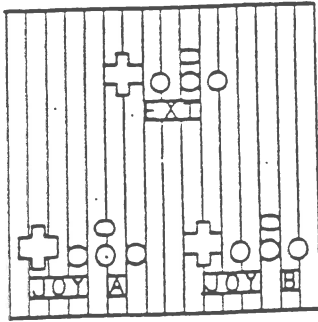
1. Make sure that the power is turned off beforehand and then install the check cartridge on the cartridge connector of the Mega Drive.
2. If the power is turned on, the screen as shown on left is displayed.
3. Check items
 - (1) Checking of the Control pads 1 and 2 and the respective operation buttons of EXT.
 - (2) Checking of the hues of the vertical color patterns.
 - (3) Checking of the tone quality
4. Turn the power off and remove the check cartridge from the Mega Drive.

☆ CONNECTION DIAGRAM ☆



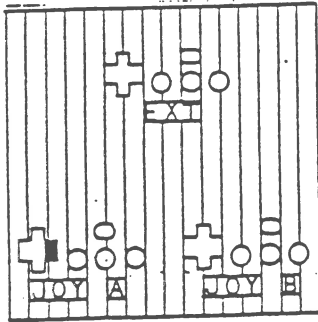
☆ CHECK ORDER ☆

CHECK 1 : RESPECTIVE CONTROL PAD AND SOUND CHECK

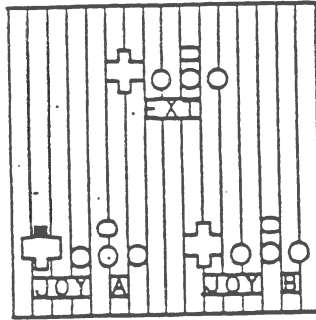


SCREEN DISPLAY

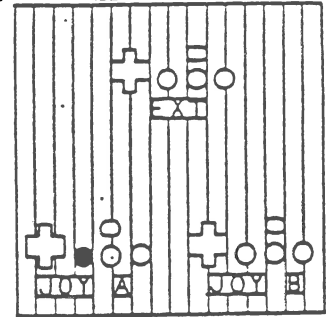
Check the operation, the clicking feeling and if the buttons on the screen change for red display from blue display when pressing the direction button of the control pad (an optional direction), the respective buttons of A, B, C and the START button. At this point, check also if the sound is heard and its tone quality is normal.



RIGHT OF DIRECTION BUTTON

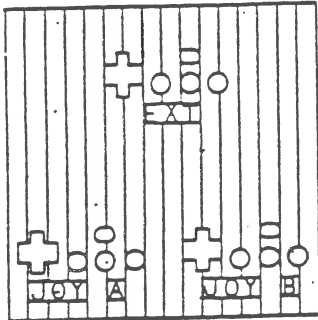


UPSIDE OF DIRECTION BUTTON



BUTTON A

CHECK 2 : CHECK OF THE HUES OF VERTICAL COLOR PATTERNS



COLOR PATTERN DISPLAY

Check if the hues of the vertical color patterns, which are displayed from the time when the power is turned on, are normal.

CHECK 3 : SOUND CHECK

Check if the sound, which are emitted from the time when the power is turned on, is normal.

MEGA DRIVE HARDWARE CHECKER

Aug. 5, 1992
SEGA JAPAN

1. Check Item & Flow

① Z80

Scratch RAM Check

(IC7)



Sound Check



② 68000

DIN CNN Check



Synchronize Signal Check



JOY Port Check



Expansion Slot Check



FM Sound Check



Scratch RAM Check

(IC2 & IC3)



RESET SW Check (Manual)



Volume Check (Manual)

2. Preparation

1. Connect "RF COM Terminal" of Checker to TV Antenna Terminal
2. Connect "RF COM Terminal" of Checker to TV Video Terminal.
* 2 TV sets are required.
3. Connect each terminal of MD to checker
4. Adjust Slide Volume to Max.
5. Turn on Power of MD.
6. Sprite should be came out on each TV screen.
7. Press Reset SW of MD
8. Volume Level Indicator should be came out on each TV screen.
and also noise (Bo-Bo-) come out from TV speaker.
(This noise is stereo sound. So, if you connect headphone to
headphone terminal on MD. Stereo sound check can be done.)
9. Adjust Slide Volume and check Indicator moves as adjusted.
10. Turn off Power of MD.

3. Note

1. Please do not short circuit after turn off the Power for MD
because power is still provided to checker side.

GENESIS HARD CHECKER ERROR LIST

Message メッセージ	Main Cause 主な要因
68KSCRATCH	IC2, IC8
VRAM	IC9, IC10, IC8
Z80 BACK UP	CN3, IC6, IC8
Z80 SCRATCH	IC3, IC6, IC8
Z80 AREA	IC3, IC6, IC8
Z80 RAM	IC6, IC7
EDCK	IC8, IC16
CN2 B2 IC5	CN2B2, IC5
CN4	CN4, IC5
CN5	CN5, IC5
CN6	CN6, IC5
CN2 FDD	CN2, IC4
CN2 A28	CN2A28
CN2 B28	CN2B28
CN3 B12	CN3B12, IC8P39
CN3 B13	CN3B13, IC8P41
CN3 B14	CN3B14, IC8P43
CN3 B18	CN3B18, IC8P110
CN3 B19	CN3B19, IC8P49
CN3 B31	CN3B31, IC4

4/4

RF ERROR	RF MODULATOR
CN1 2PIN	CN1
CN1 3PIN	CN1, IC13
CN1 4PIN	CN1
CN1 5PIN	CN1, IC13
CN1 6PIN	CN1, IC13
CN1 7PIN	CN1, IC13
CN1 8PIN	CN1, IC13
IC4OR6	IC1, IC4, IC6
IC12 ETC	IC12
IC11	IC6, IC8, IC11
IC8 P95	IC8, IC12
CN8 GND	CN8, IC12
CN3 B1	CN3B1, IC12
CN3 B3	CN3B3, IC12
CN2 B29	CN2B29, IC12
CN2 A29	CN2A29, IC12
LR SHORT	CN2, CN3, CN8, IC12

5/25-'89
第3研究開発部

MEGA DRIVE

PAL-G (GERMANY)

PARTS SPECIFICATION

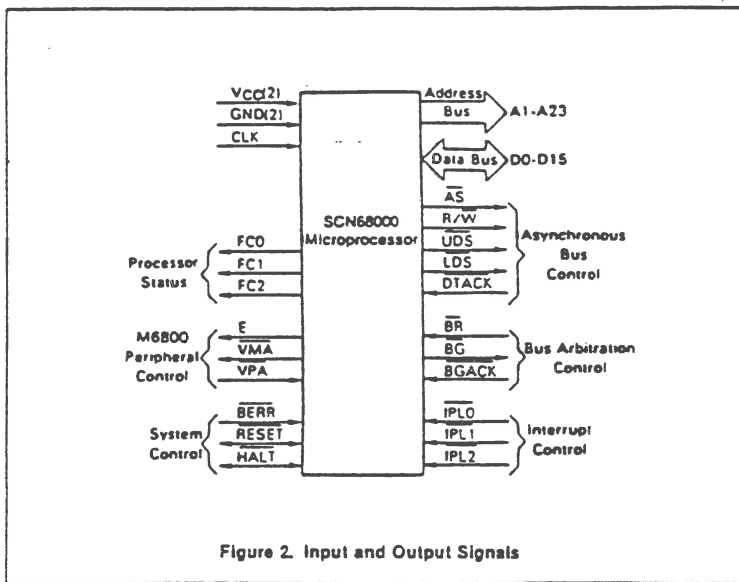


Figure 2. Input and Output Signals

Table 1 SIGNAL SUMMARY

Signal Name	Mnemonic	Input/Output	Active State	Three State
Address Bus	A1-A23	output	high	yes
Data Bus	D0-D15	input/output	high	yes
Address Strobe	AS	output	low	yes
Read/Write	R/W	output	read-high write-low	yes
Upper and Lower Data Strobes	UDS, LDS	output	low	yes
Data Transfer Acknowledge	DTACK	input	low	—
Bus Request	BR	input	low	—
Bus Grant	BG	output	low	no
Bus Grant Acknowledge	BGACK	input	low	—
Interrupt Priority Level	IPL0, IPL1, IPL2	input	low	—
Bus Error	BERR	input	low	—
Reset	RESET	input/output	low	no*
Halt	HALT	input/output	low	no*
Enable	E	output	high	—
Valid Memory Address	VMA	output	low	yes
Valid Peripheral Address	VPA	input	low	—
Function Code Output	FC0, FC1, FC2	output	high	yes
Clock	CLK	input	high	no
Power Input	VCC	input	—	—
Ground	GND	input	—	—

*open drain

Address Bus (A1-A23)

This 23-bit, unidirectional, three-state bus is capable of addressing eight megawords of data. It provides the address for bus operation during all cycles except inter-

rupt cycles. During interrupt cycles, address lines A1, A2, and A3 provide information about what level interrupt is being serviced while address lines A4-A23 are all set to a logic high.

Data Bus (D0-D15)

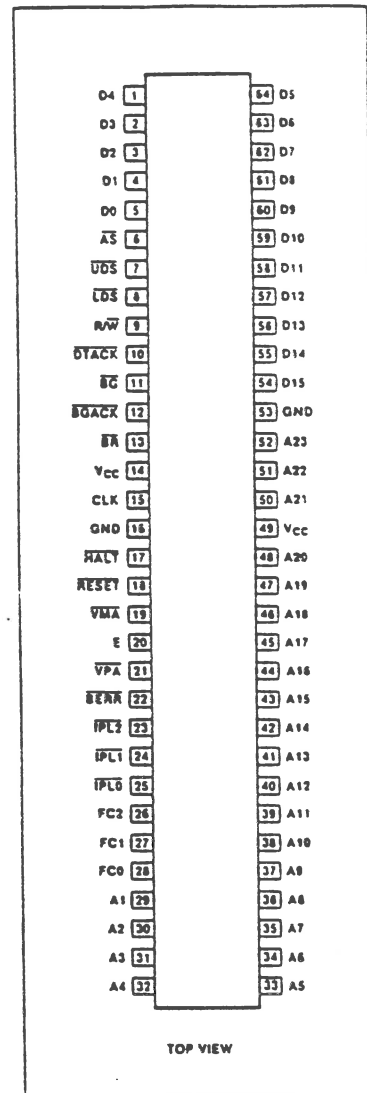
This 16-bit, bidirectional, three state bus is the general purpose data path. It can transfer and accept data in either word or byte length. During an interrupt acknowledge cycle, an external device supplies the interrupt vector on data lines D0-D7.

Asynchronous Bus Control

Asynchronous data transfers are handled using the following control signals:

Address Strobe (AS) — This signal indicates that there is a valid address on the address bus.

PIN CONFIGURATION¹



TOP VIEW

Read/Write (R/W) — This signal defines the data bus transfer as a read or write cycle. The R/W signal also works in conjunction with the upper and lower data strobes as explained in the next paragraph.

Upper and Lower Data Strobes (UDS, LDS) — These signals control the data on the bus as shown in table 2. When the R/W line is high, the processor will read from the data bus as indicated. When the R/W line is low, the processor will write to the data bus as shown.

Data Transfer Acknowledge (DTACK) — This input indicates that the data transfer is completed. When the processor recognizes DTACK during a read cycle, data is latched and the bus cycle is terminated. When DTACK is recognized during a write cycle, the bus cycle is terminated. An active transition of DTACK indicates the termination of a data transfer on the bus.

If the system must run at a maximum rate determined by RAM access times, the relationship between the times at which DTACK and data are sampled is important. All control and data lines are sampled during the SCN68000's clock high time. The clock is internally buffered, which results in some slight differences in the sampling and recognition of various signals. The DTACK signal, like other control signals, is internally synchronized to allow for valid operation in an asynchronous system. If the required setup time (#47)¹ is met during S4, DTACK will be recognized during

TABLE 2 DATA STROBE CONTROL OF DATA BUS

UDS	LDS	R/W	D8-D15	D0-D7
High	High	-	No valid data	No valid data
Low	Low	High	Valid data bits 8-15	Valid data bits 0-7
High	Low	High	No valid data	Valid data bits 0-7
Low	High	High	Valid data bits 8-15	No valid data
Low	Low	Low	Valid data bits 8-15	Valid data bits 0-7
High	Low	Low	Valid data bits 0-7*	Valid data bits 0-7
Low	High	Low	Valid data bits 8-15	Valid data bits 8-15*

*These conditions are a result of current implementation and may not appear on future devices.

S5 and S6, and data will be captured during S6. The data must meet the required setup time (#27). If an asynchronous control signal does not meet the required setup time, it is possible that it may not be recognized during that cycle. Because of this, asynchronous systems must not allow DTACK to precede data by more than parameter #31.

Asserting DTACK (or BERR) on the rising edge of a clock (such as S4) after the assertion of address strobe will allow an SCN68000 system to run at its maximum bus rate. If setup times #27 and #47 are guaranteed, #31 may be ignored.

Bus Arbitration Control

These three signals form a bus arbitration circuit to determine which device will be the bus master device:

Bus Request (\overline{BR}) — This input is wire ORed with all other devices that could be bus masters. It indicates to the processor that some other device desires to become the bus master.

Bus Grant (\overline{BG}) — This output indicates to all other potential bus master devices that the processor will release bus control at the end of the current bus cycle.

Bus Grant Acknowledge (\overline{BGACK}) — This input indicates that some other device has become the bus master. This signal cannot be asserted until the following four conditions are met:

1. A bus grant has been received.
2. Address strobe is inactive, indicating that the microprocessor is not using the bus.

3. Data transfer acknowledge is inactive, indicating that another device is not using the bus.

4. Bus grant acknowledge is inactive, indicating that no other device is still claiming bus mastership.

Interrupt Control ($\overline{IPL0}, \overline{IPL1}, \overline{IPL2}$)

These inputs indicate the encoded priority level of the device requesting an interrupt. Level seven is the highest priority while level zero indicates that no interrupts are requested. The least significant bit is given in $\overline{IPL0}$ and the most significant bit is contained in $\overline{IPL2}$.

System Control

The system control inputs are used to either reset or halt the processor and to indicate to the processor that bus errors have occurred.

Bus Error (\overline{BERR}) — This input informs the processor that there is a problem with the cycle currently being executed. Problems may be the result of nonresponding devices, interrupt vector acquisition failure, illegal access request as determined by a memory management unit, or other application dependent errors. The bus error signal interacts with the halt signal to determine if exception processing should be performed or the current bus cycle should be retried (see Bus Error and Halt Operation for additional information).

Reset (\overline{RESET}) — This bidirectional signal line acts to reset the processor (initiate a system initialization sequence) in response to an external reset signal. An in-

ternally generated reset (result of a reset instruction) causes all external devices to be reset and the internal state of the processor is not affected. A total system reset (processor and external devices) is the result of external HALT and RESET signals applied at the same time (see Reset Operation for additional information).

Halt (\overline{HALT}) — When this bidirectional line is driven by an external device, it will cause the processor to stop at the completion of the current bus cycle. When the processor has been halted using this input, all control signals are inactive and all three-state lines are put in their high-impedance state. When the processor has stopped executing instructions, such as in a double bus fault condition, the halt line is driven by the processor to indicate to external devices that the processor has stopped (see Bus Error and Halt Operation for additional information).

Peripheral Control

These control signals are used to allow the interfacing of synchronous peripheral devices with the asynchronous SCN68000:

Enable (E) — This signal is the enable signal for synchronous type peripheral devices. The period for this output is ten SCN68000 clock periods (six clocks low; four clocks high).

Valid Peripheral Address (\overline{VPA}) — This input indicates that the device or region addressed is a synchronous device and that data transfer should be synchronized with the enable (E) signal. This input also indicates that the processor should use automatic vectoring for an interrupt (see Interface with Synchronous Peripherals for additional information).

Valid Memory Address (\overline{VMA}) — This output is used to indicate to synchronous peripheral devices that there is a valid address on the address bus and the processor is synchronized to enable. This signal is issued only in response to a valid peripheral address (VPA) input which indicates that the peripheral is a synchronous device.

Processor Status (FC0, FC1, FC2)

These function code outputs indicate the state (user or supervisor) and the cycle type currently being executed (see table 3). The information indicated by the function code is valid whenever address strobe (AS) is active.

Table 3 FUNCTION CODE OUTPUTS

FC2	FC1	FC0	Cycle Type
Low	Low	Low	(Undefined, Reserved)
Low	Low	High	User Data
Low	High	Low	User Program
Low	High	High	(Undefined, Reserved)
High	Low	Low	(Undefined, Reserved)
High	Low	High	Supervisor Data
High	High	Low	Supervisor Program
High	High	High	Interrupt Acknowledge

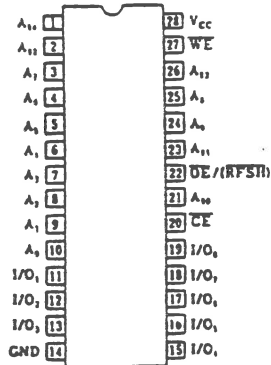
Clock (CLK)

The clock input is a TTL-compatible signal that is internally buffered for development of the internal clocks needed by the processor. The clock input is a constant frequency.

μPD42832C, 42832C-L

262 144 ビット CMOS 疑似スタティック RAM

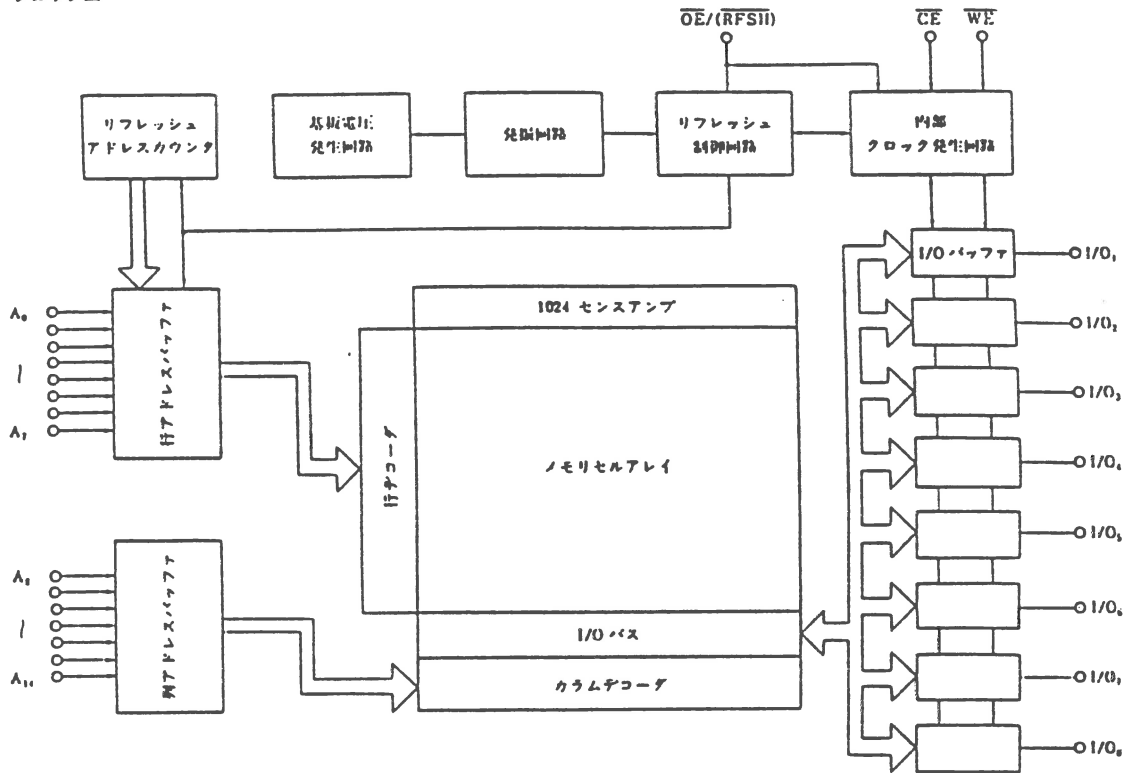
端子接続図(上面図)



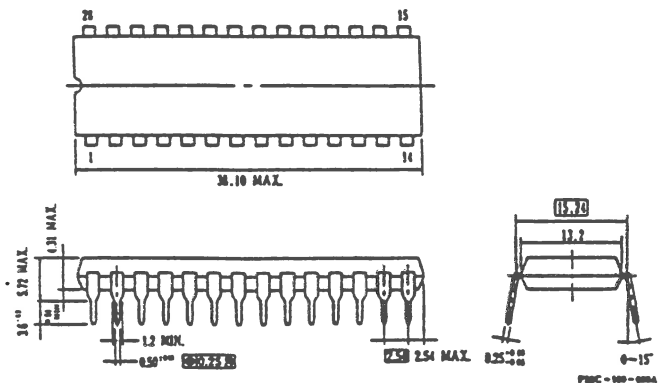
- A₀-A₁₁ : アドレス入力
- I/O₀-I/O₇ : データ入出力
- CE : チップイネーブル入力
- WE : ライトイネーブル入力
- OE/(RFSH) : アウトプットイネーブル入力[※]
- V_{cc} : +5 V 電源
- GND : グランド

※CE ハイレベル時、OE 入力によりリフレッシュとなります。

ブロック図



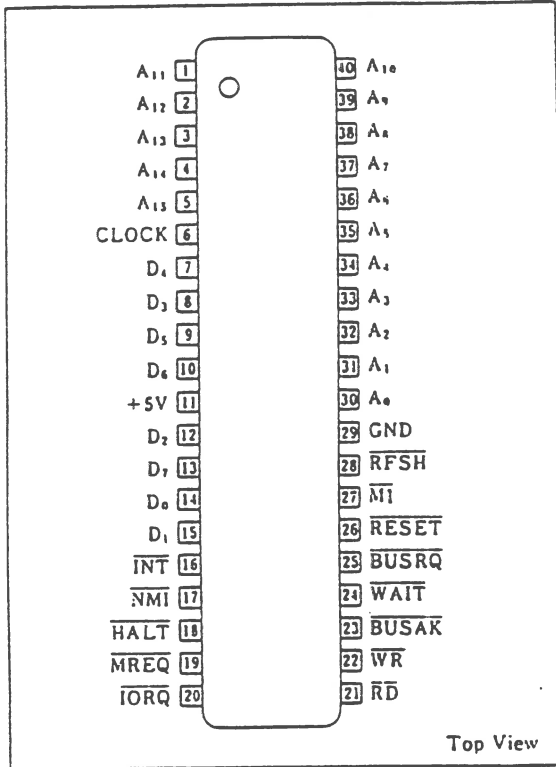
28ピン・プラスチック DIP (600 mil) 外形図(単位: mm)



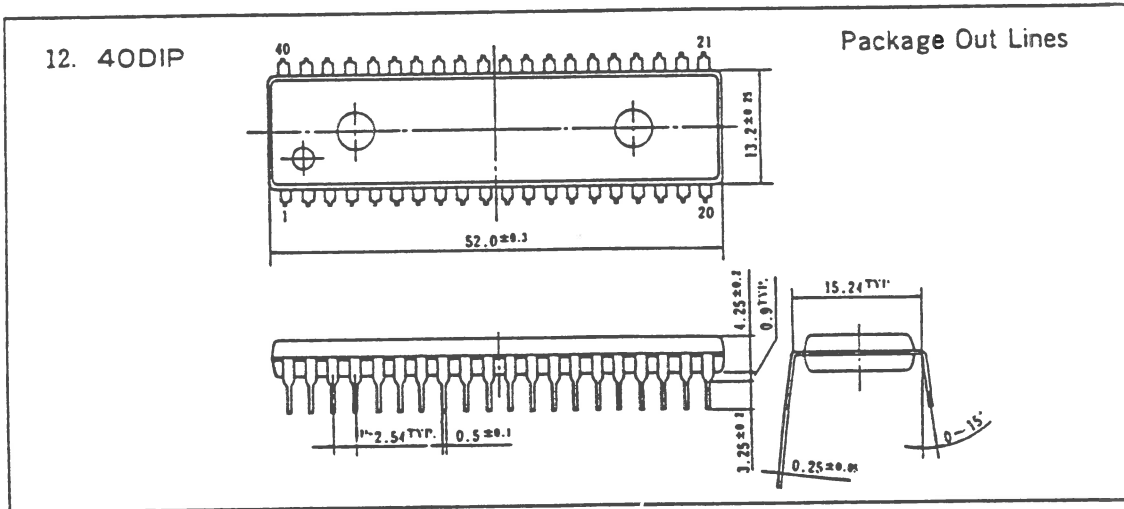
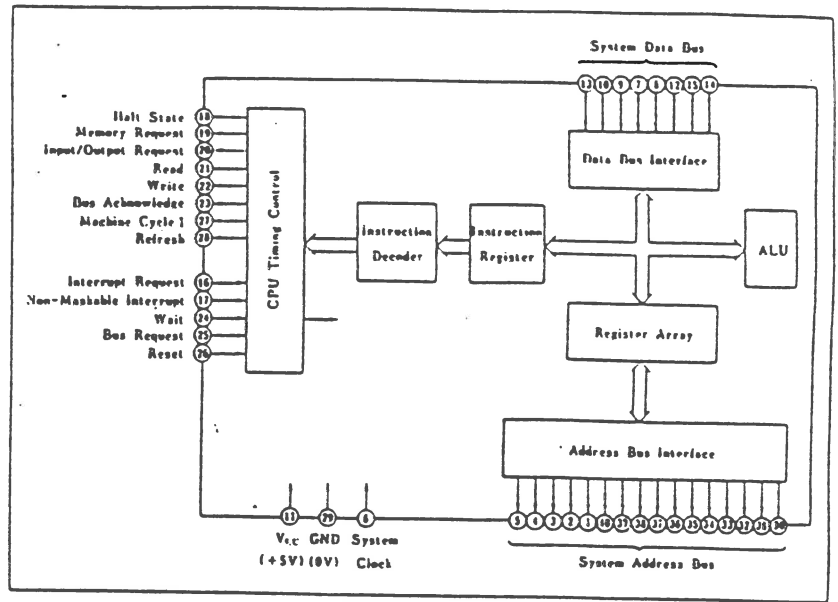
Z80/Z80A CPU

Z80/Z80A Central Processing Unit

■ 端子配置図 / Terminal Connections



■ ブロック図 / Block Diagram



■ 端子機能説明

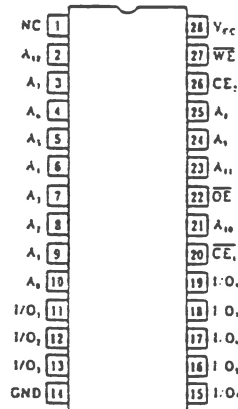
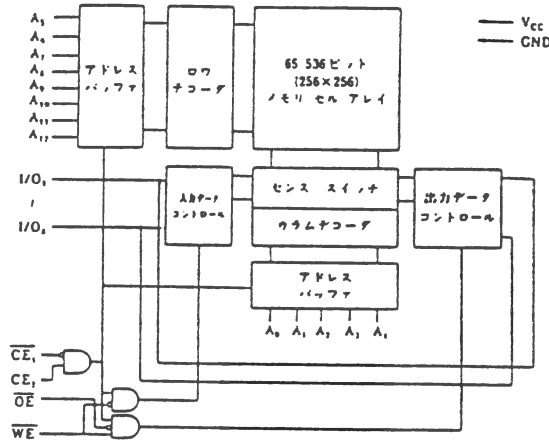
端子名	名称	入力/出力	機能
A ₀ ~A ₁₅	アドレス・バス	3ステート出力	システム・アドレス・バス。
D ₀ ~D ₇	データ・バス	3ステート入出力	システム・データ・バス。
\overline{MI}	マシン・サイクル1	出力	アクティブ"Low"。実行中のマシン・サイクルがOPコードのフェッチ・サイクルであることを示す。
\overline{MREQ}	メモリ要求	3ステート出力	アクティブ"Low"。メモリ読み出し、書き込み動作に対し、アドレス・バスが有効なメモリ・アドレスを出力していることを示す。
\overline{IORQ}	入出力要求	3ステート出力	アクティブ"Low"。入出力デバイスとの読み出し、書き込み動作に対してアドレス・バスの下位8ビットが有効な入出力デバイスのアドレスを出力していることを示す。また割り込み応答時にMIとともに出力し、割り込み応答を示す。
\overline{RD}	メモリ読み出し	3ステート出力	アクティブ"Low"。メモリ、または入出力デバイスからのデータを読み込むタイミングを示す。
\overline{WR}	メモリ書き込み	3ステート出力	アクティブ"Low"。アドレスに指定されたメモリ、または入出力デバイスに書き込む有効データがデータ・バスに乗っていることを示す。
\overline{RFSH}	リフレッシュ信号	出力	アクティブ"Low"。ダイナミックRAM用のリフレッシュ用アドレスがアドレス・バスの下位7ビットに出力されていることを示す。このとき、 \overline{MREQ} も"Low"になる。
\overline{HALT}	ホールド	出力	アクティブ"Low"。HALT命令を実行中であることを示す。内部的にはNOP命令を実行し、メモリ・リフレッシュも行っている。ホールド状態の解除は、RESET、NMI、INT(許可されているとき)によって行われる。
\overline{WAIT}	ウェイト	入力	アクティブ"Low"。アドレス指定されているメモリまたは入出力デバイスが、データ転送準備のできていないことをCPUへ知らせるための信号。この信号が入力されている間CPUは待ち状態を続ける。
\overline{INT}	マスク可能割り込み要求	入力	アクティブ"Low"。入出力デバイスがZ80 CPUに対して割り込みを要求する信号で、割り込み許可フラグがゼロであれば、現在進行中の命令の終わりに、この割り込み要求が受けられる。
\overline{NMI}	マスク不能割り込み要求	入力	アクティブ"Low"。 \overline{INT} より優先度の高い割り込み要求であり、ソフトウェアによって禁止できない。NMIはいつでも受け付けられ、現在進行中の命令が終わると割り込み処理が開始され、Z80 CPUは自動的に0066番地からスタートする。
\overline{RESET}	リセット	入力	アクティブ"Low"。割り込み許可フラグ、プログラム・カウンタの割り込みベクトル・レジスタ、メモリ・リフレッシュ・レジスタをリセットし割り込みモードをモード0にしてZ80 CPUを初期状態にする。
\overline{BUSRQ}	バス要求	入力	アクティブ"Low"。NMIより優先度が高く、現在進行中のマシン・サイクルの終わりで受け付けられる。CPU以外のバスマスタがシステム・バスを制御したいとき"Low"にする。
\overline{BUSAK}	バス応答	出力	アクティブ"Low"。バス要求を受け付けたとき、バス要求を出したバスマスタに対してシステム・バスが制御できることを知らせる。
\overline{CLOCK}	システム・クロック	入力	+5Vの単相クロックを入力する。

μPD4364C

65 536 ビット スタティック CMOS RAM

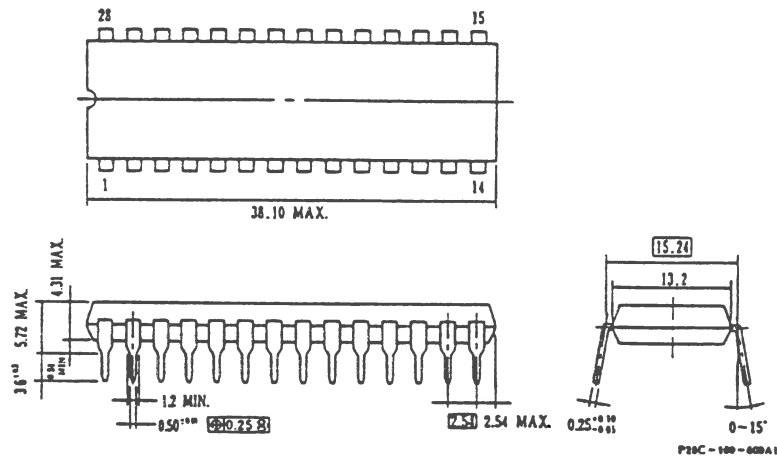
端子接続 (上面図)

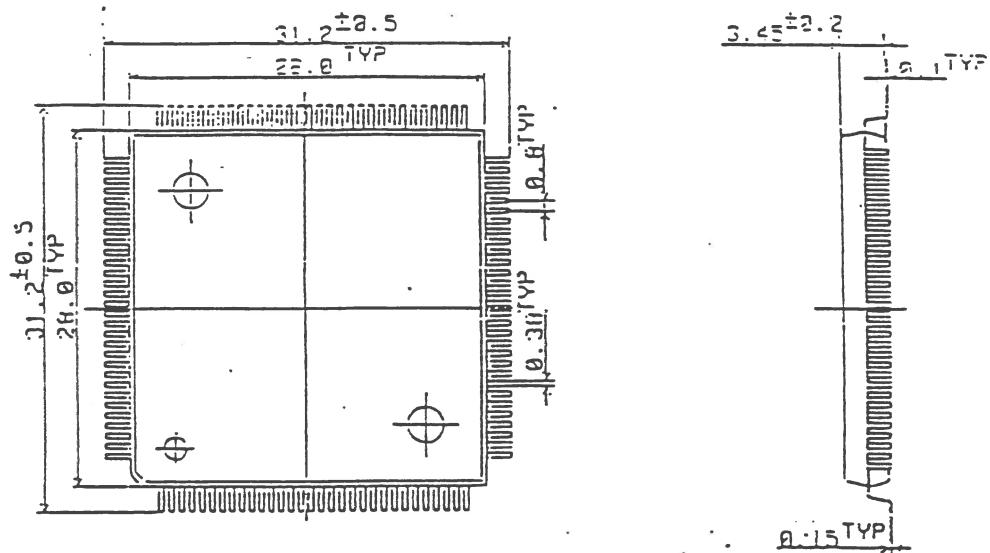
ブロック図



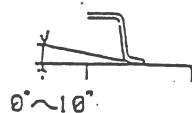
- A₀-A₁₂ : アドレス入力
- I/O₁-I/O₈ : データ入出力
- CE₁, CE₂ : チップイネーブル 1, 2入力
- WE : ライトイネーブル入力
- OE : アウトプットイネーブル入力
- V_{cc} : +5 V 電源
- GND : グランド
- NC : ノーコネクション

28ピン・プラスチック DIP (600 mil) 外形図(単位: mm)



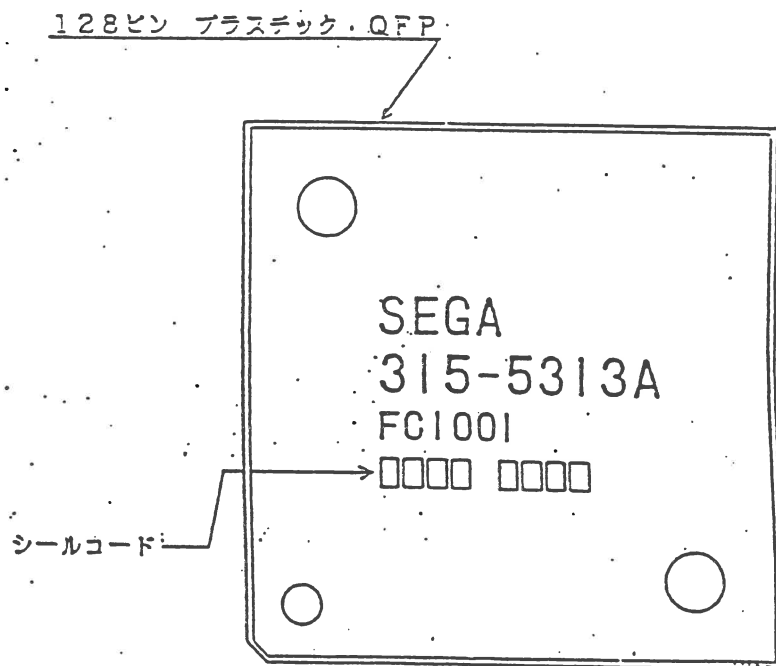


F128S1



PK128 FP1-05-2

捺印図



パッケージ : 128ピン プラスチック QFP

字 体 : Round Gothic または 細ゴシックとする。

端 名表

端 子 機 能 說 明

NO.	NAME	NO.	NAME	NO.	NAME	NO.	NAME
1	SD0	33	AD2	65	CD10	97	GND
2	SD1	34	AD3	66	CD11	98	/INT
3	SD2	35	AD4	67	CD12	99	/BR
4	SD3	36	AD5	68	CD13	100	/BGAK
5	SD4	37	AD6	69	CD14	101	/BG
6	SD5	38	AD7	70	CD15	102	/HREQ
7	SD6	39	/YS	71	CA0	103	/INTAK
8	SD7	40	SPA/B	72	CA1	104	/IPL1
9	/SE1	41	/VSYNC	73	CA2	105	/IPL2
10	/SE0	42	/CSYNC	74	CA3	106	/IORQ
11	SC	43	/HSYNC	75	CA4	107	/RD
12	/RAS1	44	/HL	76	CA5	108	/WR
13	/CAS1	45	SELO	77	CA6	109	/MI
14	/WE1	46	/PAL	78	CA7	110	/AS
15	/WE0	47	/RESET	79	CA8	111	/UDS
16	/OE1	48	SEL1	80	CA9	112	/LDS
17	GND	49	CLK1	81	CA10	113	R/W
18	RDO	50	SBCR	82	CA11	114	/DTAK
19	RDI	51	CLK0	83	CA12	115	/UVR
20	RD2	52	HGX	84	CA13	116	/LWR
21	RD3	53	EDCK	85	CA14	117	/OE0
22	RD4	54	VDD	86	CA15	118	/CAS0
23	RD5	55	CD0	87	CA16	119	/RAS0
24	RD6	56	CD1	88	CA17	120	RA0
25	RD7	57	CD2	89	CA18	121	RA1
26	AGC	58	CD3	90	CA19	122	RA2
27	R	59	CD4	91	CA20	123	RA3
28	G	60	CD5	92	CA21	124	RA4
29	B	61	CD6	93	CA22	125	RA5
30	AVC	62	CD7	94	AYS	126	RA6
31	AD0	63	CD8	95	SOUND	127	RA7
32	AD1	64	CD9	96	AGS	128	VDD

Pin Name	Pin No.	I/O	FUNCTION
CD15-0	55-70	I/O	CPU DATA BUS
CD22-0	71-93	I/O	CPU ADDRESS BUS
/AS	110	I	68000 INTERFACE
/UDS	111	I	
/LDS	112	I	
R/W	113	I	
/DTAK	114	I/O	Z80 INTERFACE
/INTAK	103	I/O	
/IPL1,2	104,105	O	
/BR	99	O	
/BG	101	I/O	WORK RAM(DRAM) ADDRESS / COLOR CODE OUTPUT
/BGAK	100	I/O	
/MI	109	I	
/HREQ	102	I	
/IORQ	106	I	WORK RAM STROBE/CONTROL
/RD	107	I	
/WR	108	I	
/INT	98	O	
RA7-0	120-127	O	VRAM DATA BUS
/RAS0	119	O	
/CAS0	118	O	
/OE0	117	O	
/UVR	115	O	VRAM STROBE/CONTROL
/LWR	116	O	
RD7-0	18-25	I/O	
AD7-0	31-38	I/O	
/RAS1	12	O	VRAM SERIAL DATA BUS
/CAS1	13	O	
/OE1	14	O	
/WE1,0	14, 15	O	
SC	11	O	LIGHT PEN DETECT
SD7-0	1-8	I	
/HL	44	I	
/VSYNC	41	I	
/CSYNC	42	I/O	CRT VSYNC OUTPUT / DOT CLOCK OUTPUT (6.71/5.37MHz)
/HSYNC	43	I/O	
SBCR	50	O	
/YS	39	O	
R,G,B	27-29	O	SUB CARRIER OUTPUT (4.47/3.58MHz CLOCK)
SPA/B	40	O	
/PAL	46	O	
SELO	45	O	
SEL0	48	O	TRANSPARENT OUTPUT
CLK0	51	O	
CLK1	49	O	
EDCK	53	O	
HCK	52	O	LINEAR TIMING INPUT/OUTPUT (OTHER VDP)
/RESET	47	I	
SOUND	95	O	
AGC,AVC	26, 30	O	
AYS,AGS	94, 96	I	SOUND ANALOG GND,VDD
GND	17, 97	I	
DIGITAL GND	17, 97	I	
VDD	54, 128	I	

1. 概要

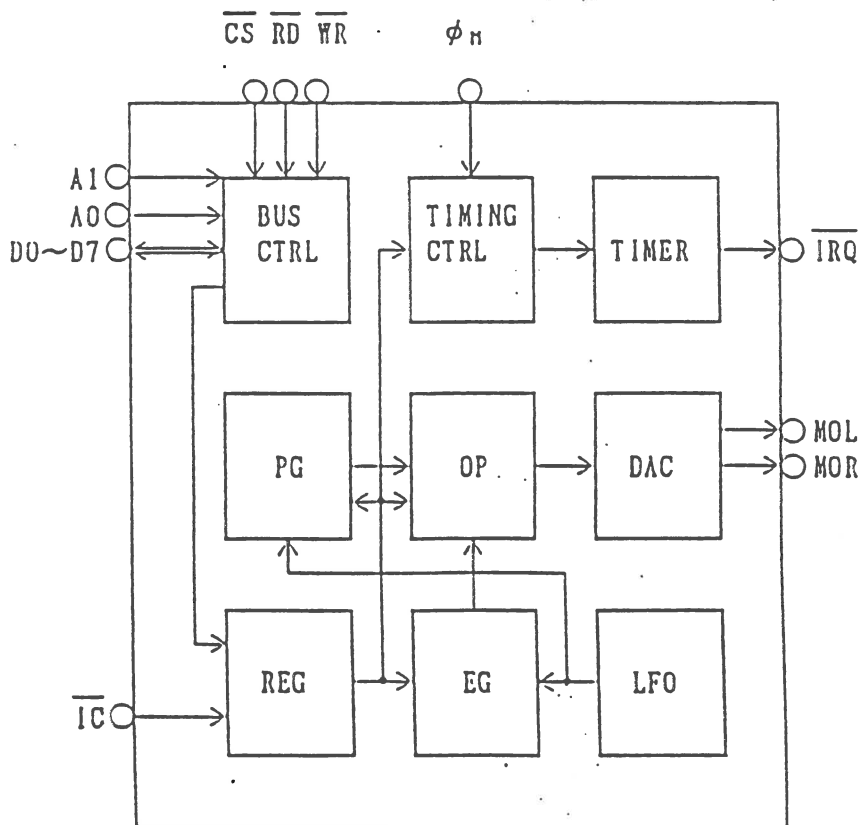
本LSIは、DAコンバータを内蔵したFM方式の音源であり、YM2203のFM音源機能を包含している。

マスタークロック周波数	最高8MHz (内部は6分周して使用)
プロセス	NMOS
パッケージ	24ピンDIP

2. 主要機能

FM発音数	: 6音 (3音追加)
オペレーター数	: 4組 (YM2203と同じ)
アルゴリズム数	: 8種 (YM2203と同じ)
LFO機能	: 振幅・周波数変調、変調有無、LFO周波数設定可能 (追加)
複合正弦波合成	: 6音中1音可能 (YM2203と同じ)
タイマー	: タイマーA、タイマーB (YM2203と同じ)
ステレオ出力	: ON/OFFにより出力制御可能 (追加)
DAコンバータ	: 9ビットDAコンバータ内蔵、CPUから直接出力可能 (追加)

3. ブロック図



4. 端子配置图

GND	1	I	I	24	ϕ_H
D0	2	I/O	I	23	Vcc
D1	3	I/O	I	22	ΔV_{cc}
D2	4	I/O	0	21	MOL
D3	5	I/O	0	20	MOR
D4	6	I/O	I	19	AGND
D5	7	I/O	I	18	A1
D6	8	I/O	I	17	A0
D7	9	I/O	I	16	\overline{RD}
\overline{TEST}	10	I/O	I	15	\overline{WR}
\overline{IC}	11	I	I	14	\overline{CS}
GND	12	I	0	13	\overline{IRQ}

5. 端子機能説明

ϕ_H

マスタークロック入力です。

MOL・MOR

2チャンネルのアナログ出力です。ソースフォロワーで出力されます。

D0~D7

8ビットの双方向データバスです。プロセッサとデータのやり取りをします。

\overline{CS} ・ \overline{RD} ・ \overline{WR} ・A1・A0

D0~D7のデータバスのコントロールをします。

CS	RD	WR	A1	A0	アドレス範囲	内容
0	1	0	0	0	\$21~\$2C	タイマー等のレジスタ・アドレスを書き込みます。
					\$30~\$B6	チャンネル1~3のレジスタ・アドレスを書き込みます。
0	1	0	0	1	\$21~\$2C	タイマー等のレジスタ・データを書き込みます。
					\$30~\$B6	チャンネル1~3のレジスタ・データを書き込みます。
0	1	0	1	0	\$30~\$B6	チャンネル4~6のレジスタ・アドレスを書き込みます。
0	1	0	1	1	\$30~\$B6	チャンネル4~6のレジスタ・データを書き込みます。
0	0	1	0	0	\$XX	ステータスを読み出します。
1	X	X	X	X	\$XX	D0~D7は高インピーダンスになります。

\overline{IRQ}

二つのタイマーから出される割り込み信号です。タイマーにプログラムされた時間が経過すると、低レベルになります。オープンドレインで出力されます。

\overline{IC}

内部レジスタを初期化します。

TEST

本LSIをテストするための端子です。どこにも接続しないで下さい。

GND・AGND

グランド端子です。

Vcc・AVcc

+5V電源端子です。

7. 新たに追加したレジスタ及びビットの機能説明

7. 1 Key-ON/OFF レジスタ

Key-ON/OFF (\$28)

D7	D6	D5	D4	D3	D2	D1	D0
SLOT*				/	CH		

SLOT* : スロットを下表のように指定します。"1"の時、ON。
 CH : チャンネルを下表のように指定します。

D4	第1スロットのON/OFF
D5	第2スロットのON/OFF
D6	第3スロットのON/OFF
D7	第4スロットのON/OFF

D2	D1	D0	
0	0	0	チャンネル 1
0	0	1	チャンネル 2
0	1	0	チャンネル 3
1	0	0	チャンネル 4
1	0	1	チャンネル 5
1	1	0	チャンネル 6

7. 2 LFO関係のレジスタ

LFO FREQ (\$22)

D7	D6	D5	D4	D3	D2	D1	D0
/	/	/	/	LFO	FREQ CTRL		

LFO : "1"の時、LFO ON。
 FREQ CTRL : 周波数を下表のように設定します。

FREQ CTRL	0	1	2	3	4	5	6	7
freq (Hz)	3.98	5.56	6.02	6.37	6.68	9.63	48.1	72.2

LR/AMS/PMS (\$B4~\$B6)

D7	D6	D5	D4	D3	D2	D1	D0
L	R	AMS		/	PMS		

L, R : 出力をLチャンネル、Rチャンネルに指定します。"1"の時、ON。初期値は"1"。
AMS : 振幅変調度を下表のように設定します。
PMS : 位相変調度を下表のように設定します。

PMS	0	1	2	3	4	5	6	7
変調度 (セント)	0	±3.4	±6.7	±10	±14	±20	±40	±80

AMS	0	1	2	3
変調度 (dB)	0	1.4	5.9	11.8

AMON/Decay Rate (\$60~\$6E)

D7	D6	D5	D4	D3	D2	D1	D0
AMON	/	/	DR*				

AMON : スロット毎の振幅変調をON/OFFする。"1"の時、ON。
DR* : Decay Rate

7.3 DAC レジスタ

DAC Data (\$2A)

D7	D6	D5	D4	D3	D2	D1	D0
DAC-D8	DAC-D7	DAC-D6	DAC-D5	DAC-D4	DAC-D3	DAC-D2	DAC-D1

DAC-D8~D1 : DA変換をする時のデータを与えます。

DAC Select (\$2B)

D7	D6	D5	D4	D3	D2	D1	D0
DAC-SEL	/	/	/	/	/	/	/

DAC-SEL : "1"の時、チャンネル6にDAC Dataを出力します。

7.4 Test レジスタ

Test (\$2C)

D7	D6	D5	D4	D3	D2	D1	D0
Test							

このアドレスは、本LSIをテストするために設けられたものであり、all "0" 以外では正常動作しません。



C113
R71

171-5963-20A
171-5963-30

C91
C94
C93

R68
R8
C6

C81

R12
R11

R9
R10

C108
C107
C109
C106

R33
R50

C87
R72
R70
R73

C2

C21
R16
C105

R27
R28
R29
C33
C34
C35
R30
R25

C3

C83

C77

R67

C92

C112

C85
C10

C9

C110
C115
C116
R57
R56
R55

C27
C26
C25
R18
R17
R19
R21

C29
C28
R24
C37
C96

C73

TTTTTTTTTT
TTTTTTTTTT

C17
C78
C102
C88

C103
C16

R20
R22

R23
R74
R64
C69
R65

C90

C7

C19
C82
R69

C18
R14
R15

R1

R54

C22

C8
C14

R34
R35
R36
R40
C45

R52
R37
R38
R39
R43

C39

C47
R41
C48

R42

R43

R58
R66

R49

R51
C46

C89

C75

C76

R6
R7

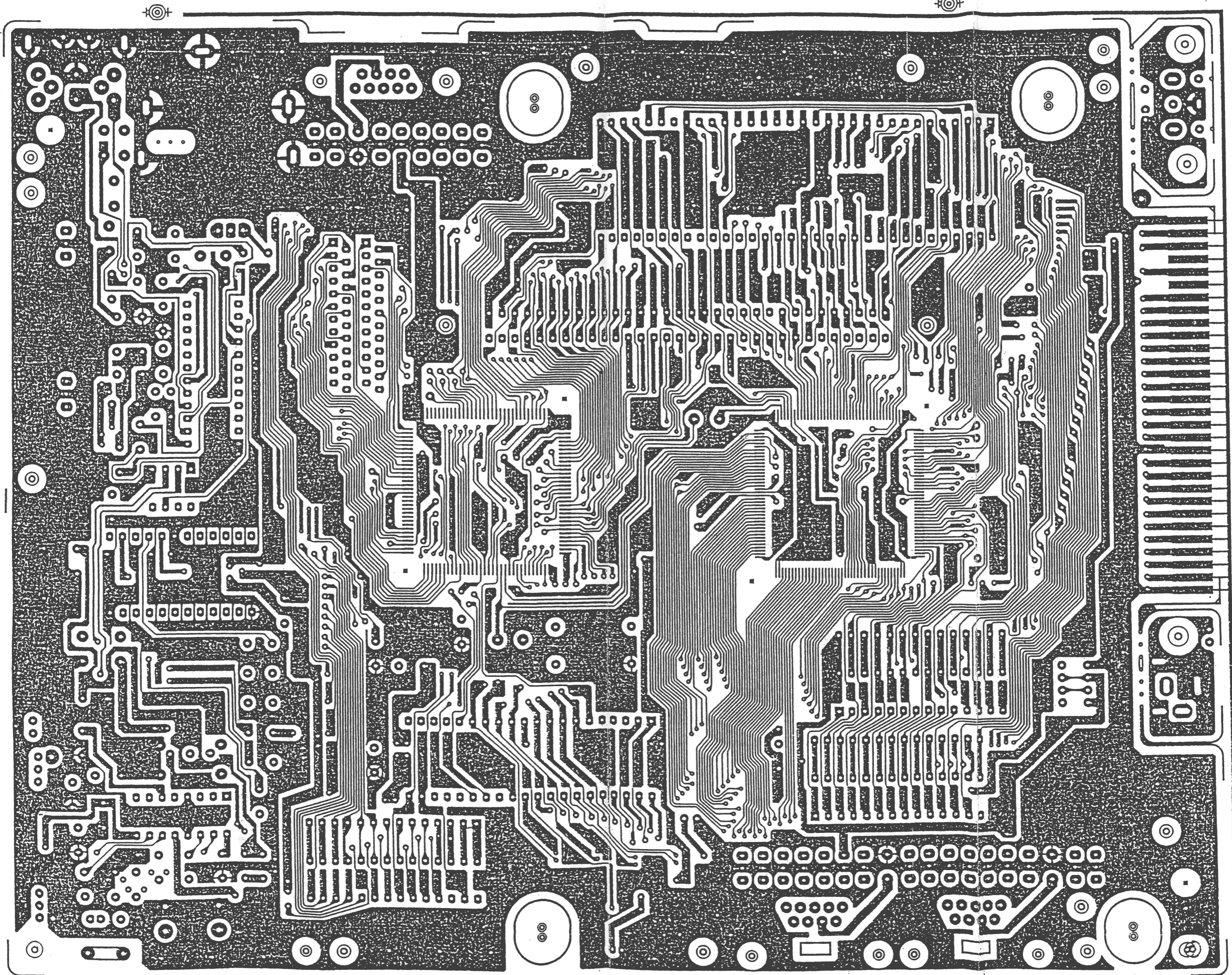
R4
R5

R3
R81
R80
R82
R83
R77
R79
R84
R59
R78
C15

C114

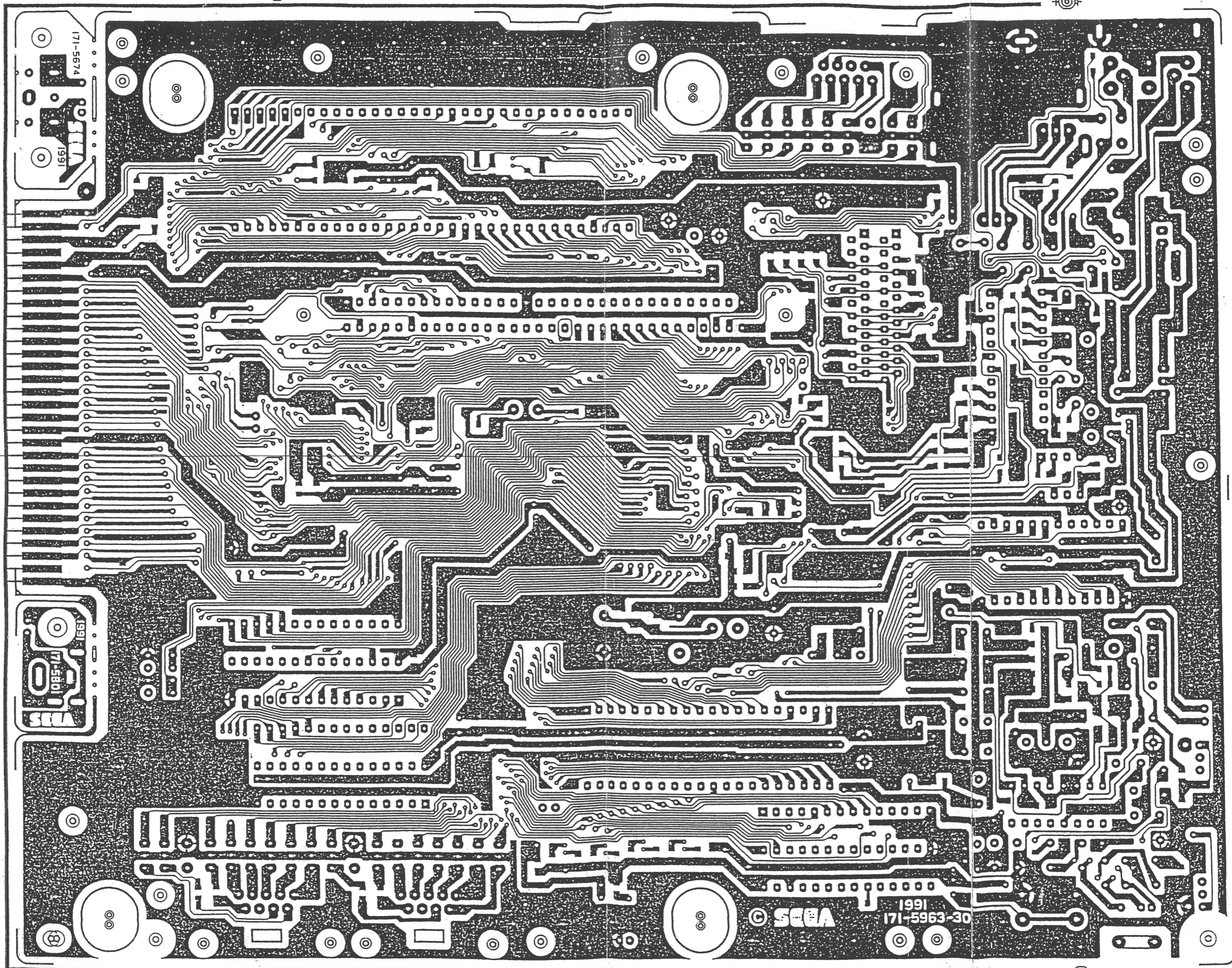
C80





部品面
171-5963-20A
171-5963-30
'91.1.19
'91.5.17 変更

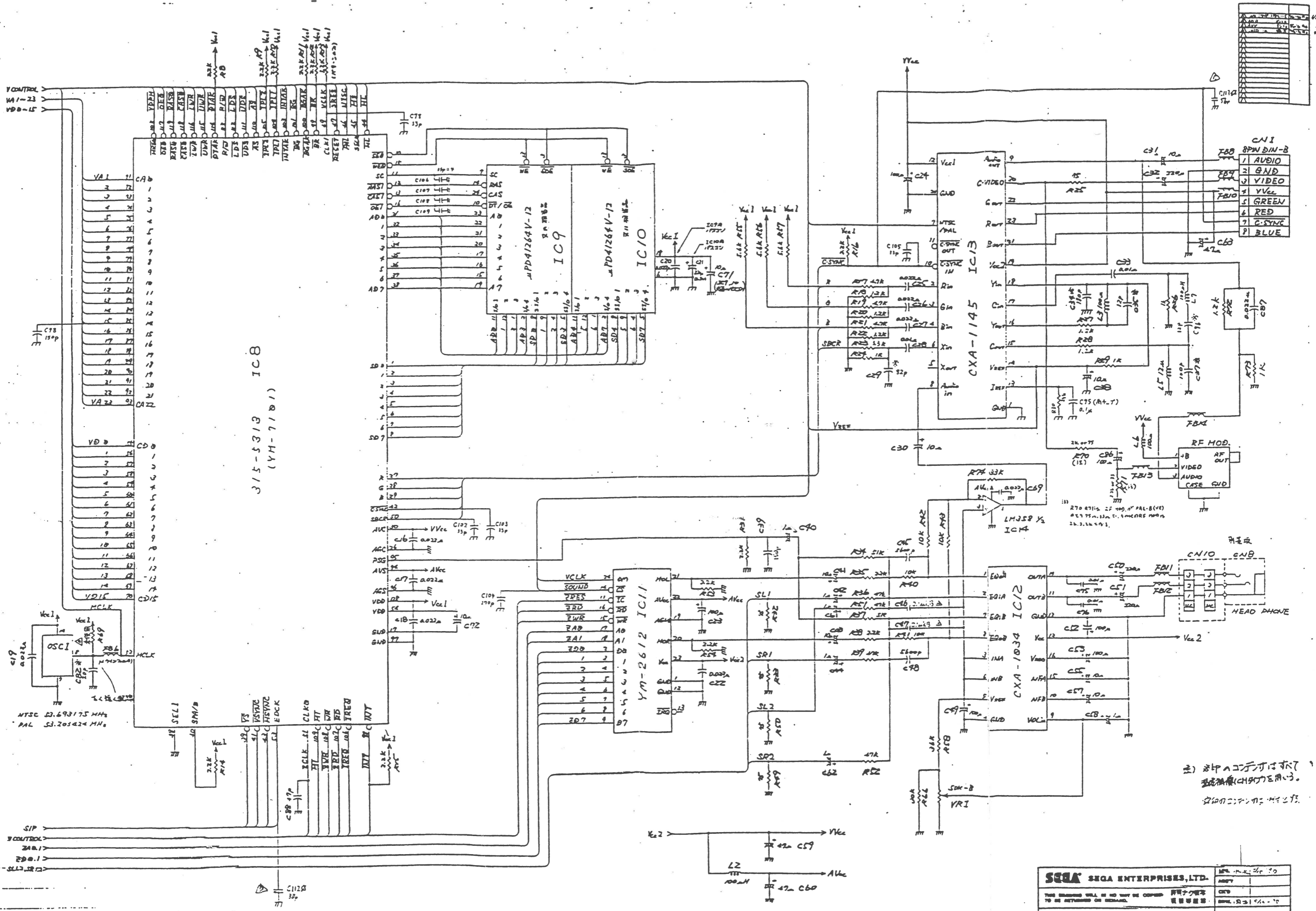
半田
71-5963-204 21
191.5.19
171-5963-30
変更



171-5674
191

191
171-5801

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1991
171-5963-30

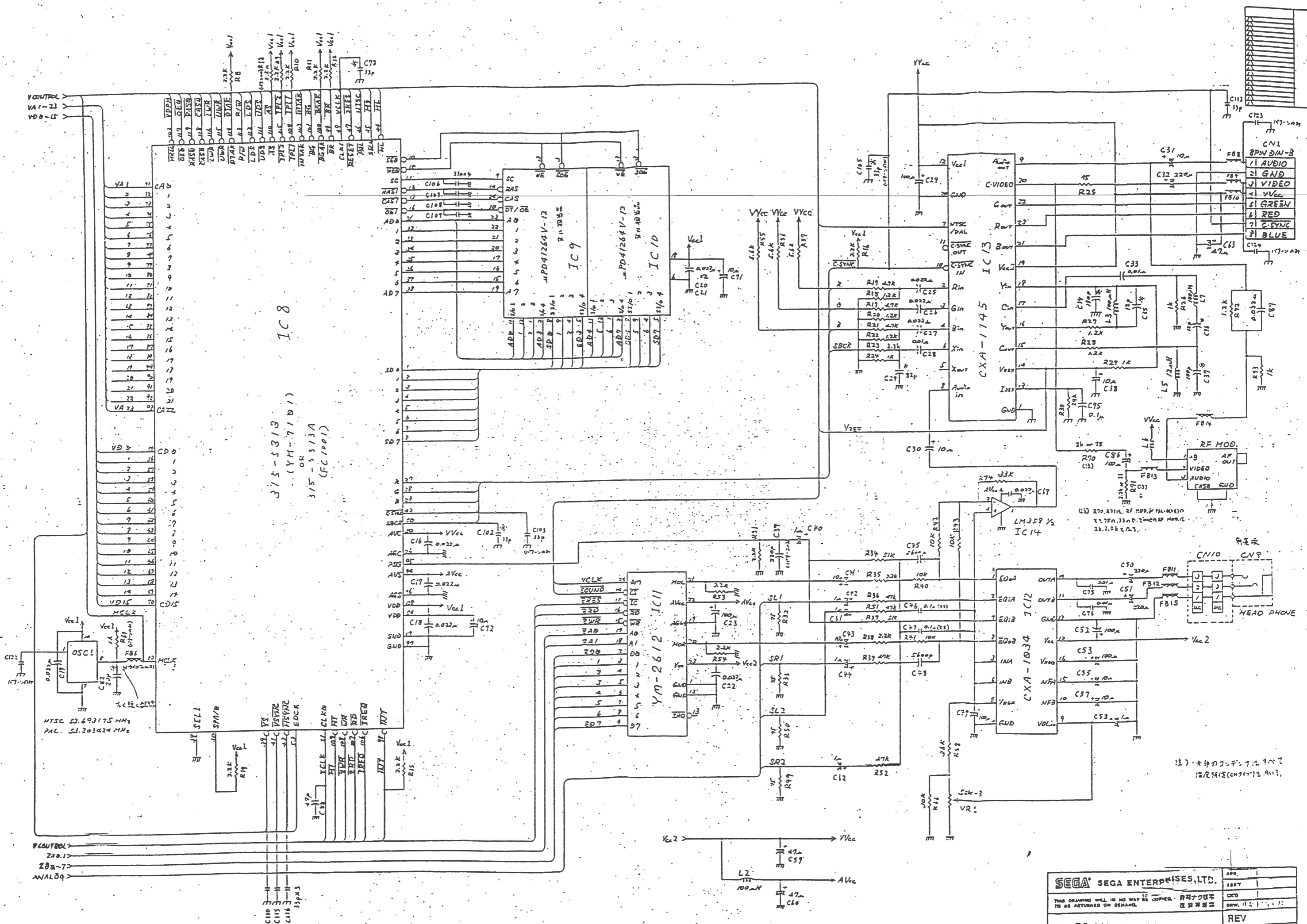


1	Audio
2	GND
3	Video
4	Vcc
5	Green
6	Red
7	C-Sync
8	Blue

1	Audio
2	GND
3	Video
4	Vcc
5	Green
6	Red
7	C-Sync
8	Blue

2) このICは、
 270 0714 27 100, PAL-B (V)
 0.275 1.12 1.12 1.12 1.12 1.12
 26.3.14 1.12

SEGA SEGA ENTERPRISES, LTD.		REV
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PC BD H5 PAL VA4 MAIN		REV
-G Version		171-5872-20
DESCRIPTION		REV



IC8
315-5313
(YM-7101)
OR
315-5313A
(FC1001)

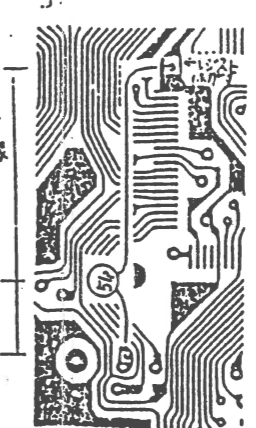
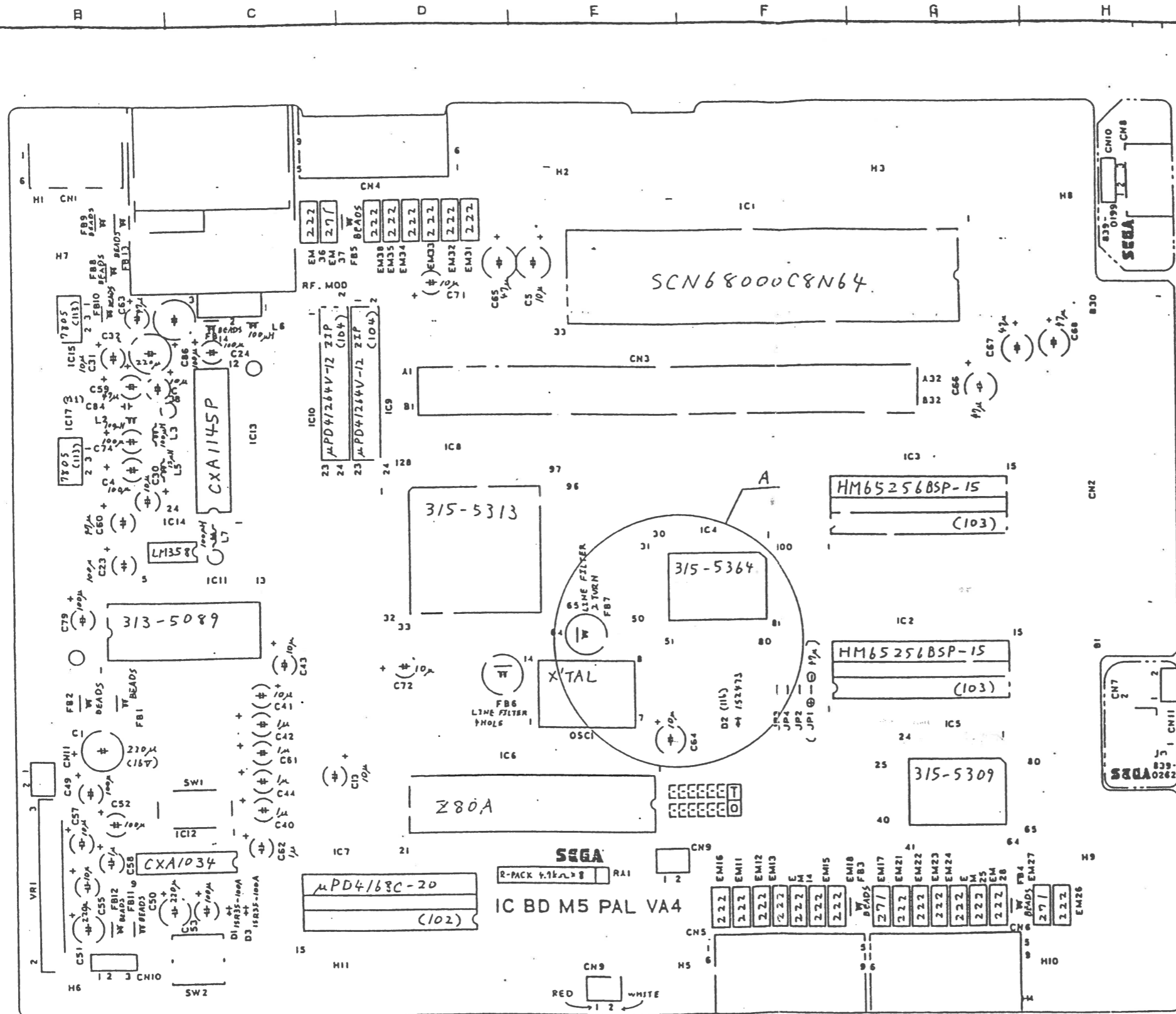
注) 本機のコンデンサはすべて
温度特性(CW77)のもの。

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PC BD M5 PAL VAI.5 -G Version		REV
		171-5913-40

MEGA DRIVE

PAL-G (GERMANY)

MOUNT DIAGRAM



A部詳細図
(部品面より見た図)

図面に示す部分のレジストをはがし、OSCの横のランド間にコンデンサを手付けする。

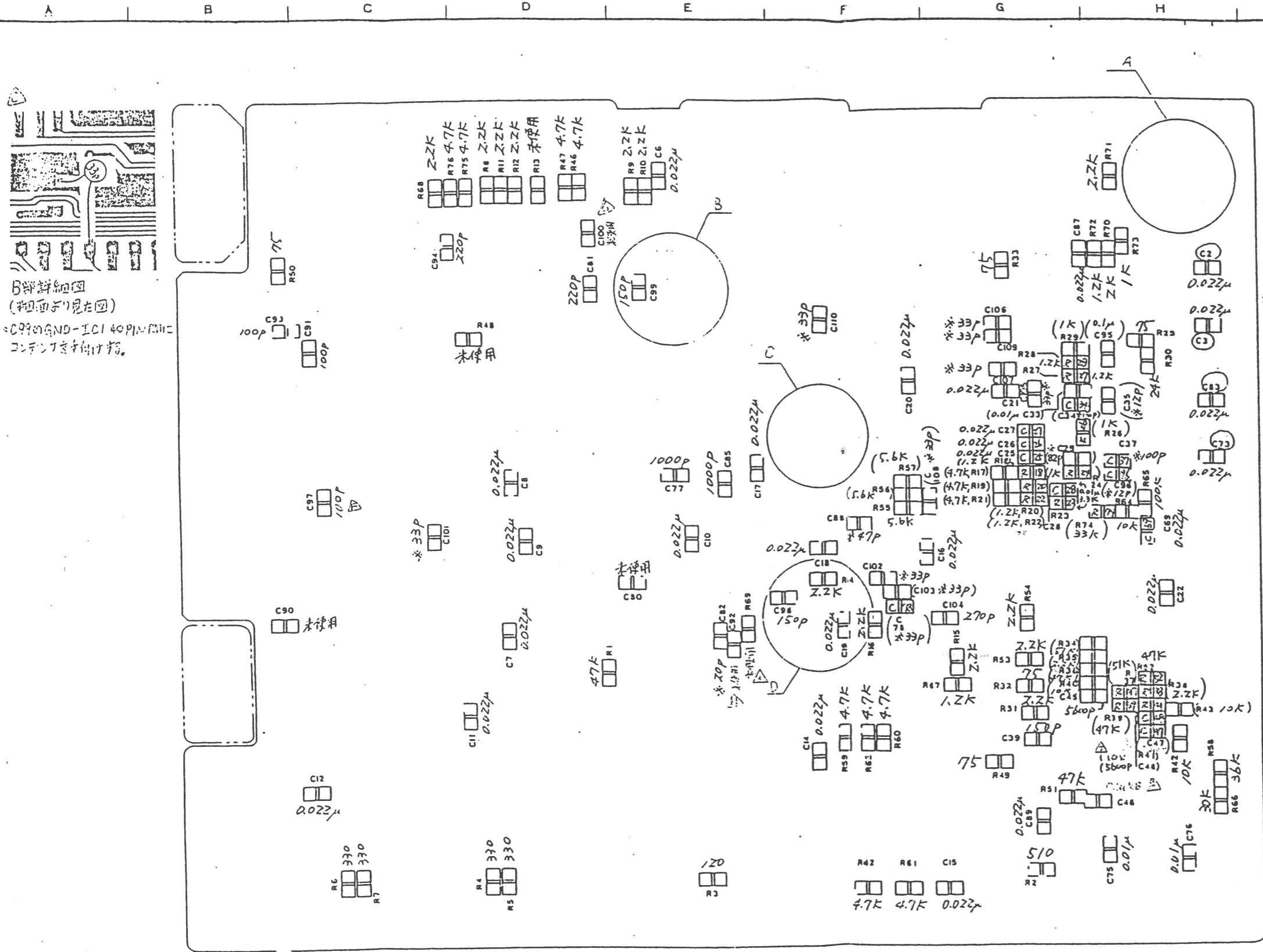
1. 839-0361 (0-V_{cc})において、O₁印で印してあるコンデンサが「直チップ」の場合、C84 (0.1μ) は、手付です。
2. 初製品の取り付けに際しては、()内にP/LEISTのD/No.を記してありますので、P/LEIST手配のこと。
3. CN9は、一番ピンに赤いリード線、2番ピンに白いリード線を手付けしてください。
4. IC2, IC3が 300milピッチのICの場合は1番ピン側に寄せて取り付けしてください。
5. IC7が 300milピッチのICの場合は、15番ピン側に寄せて取り付けしてください。
6. 基板周囲の半田リバーコート部分 (N76ND) は、半田ペーストを塗布し、フラットに仕上げた後にしてください。(半田に凸凹がないこと) (マスキング処理を行う)

MACHINE 機名		SUB-ASSY 機番	
		837-7459	
ALTERATIONS 改訂			
A	IJ	ADD	削除

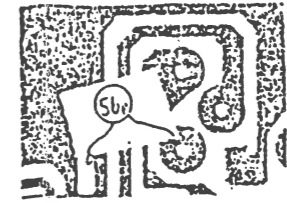
Comp Side

LIMITS UNLESS OTHERWISE SPECIFIED 一般公差		3RD QUAT. PROJ. DRAWING 第三角法		設計・製図 単位		材料		公差	
SCALE 比率		DIM. IN 単位		mm		円形		水	
						1/15-70		1/15-70	
MATERIAL 材料		HEAT TREAT. 熱処理		FINISH 表面処理		REMARK 特記事項		REV.	
IC BD M5 VA4 PAL-9 MAIN						837-7460 (0-2/8)			
DESCRIPTION 名称						PART NO. 部品・部品番号			

837-7460 (0-2/8)



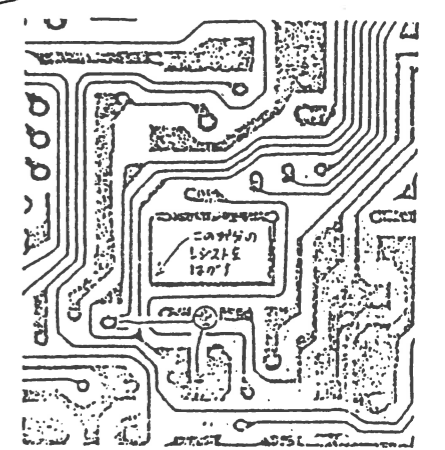
B部詳細図
(詳細面を参照)
IC1のGND-IC1 40PIN PINに
コンデンサを付けず。



A部詳細図
(詳細面を参照)
*CMI 7番PIN-RF.MODのケ
ス間にコンデンサを付けず。

注: シールドに当たる場合
には内側に折り曲げ
ること。

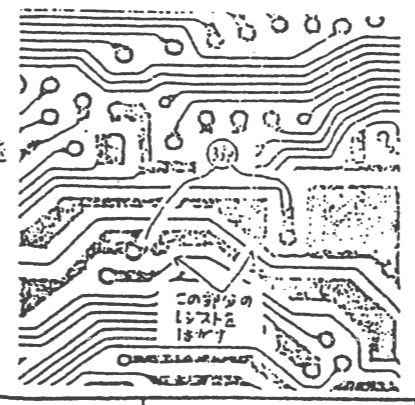
MACHINE 機番		SUB-ASS'Y 組立番	
		337-7460	
ALTERATIONS 改訂			
5H	ADD 150P	追加	
1D			
1A			
7E			
3K	ADD	追加	
3C	WAS 150P	追加	
3D	WAS 150P	追加	
1E	WAS 57P	追加	
2J	ADD NOTE	追加	
5H	WAS 47K	追加	
5E	VOID 1K	追加	



B部詳細図 (詳細面を参照)
○印は示す部分のリストを参照。C19のGND
の間にはコンデンサを付けず。

- 注1. 前面中絶印の付いたコンデンサは
温度特性が17℃以下
Z. 前面中絶印の付いたコンデンサは
温度特性が17℃以下
温度特性が17℃以下
温度特性が17℃以下

部品リスト
(詳細面を参照)
部品リストを参照
部品リストを参照
部品リストを参照



Sold Side

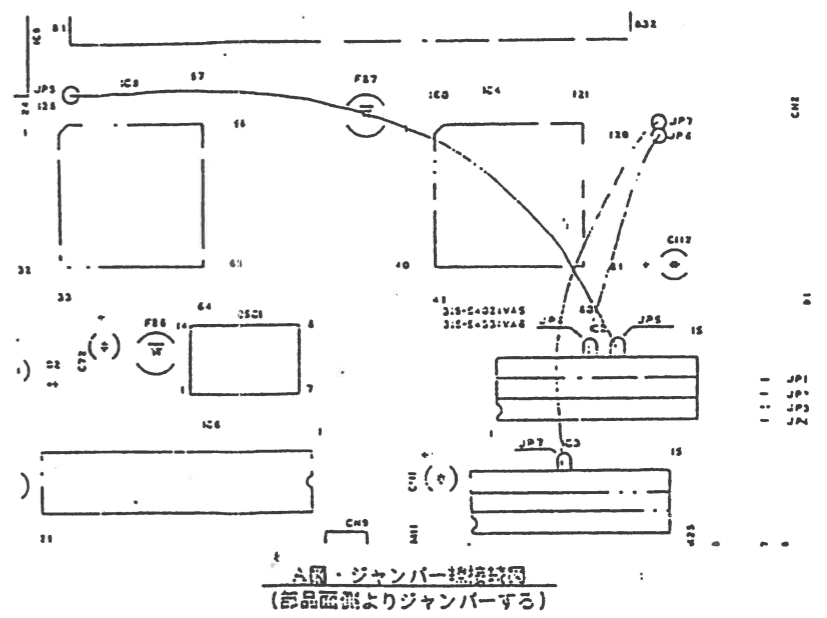
SEGA SEGA ENTERPRISES, LTD.		THE QUALITY WILL BE AS NEAR AS POSSIBLE IT IS KEPT AS NEAR AS POSSIBLE		品質の良し悪し 品質の良し悪し	
LIMITS UNLESS OTHERWISE SPECIFIED 一貫公差		3RD QUAT. PROJ. DRAWING 第三水準図		材料	検査
SCALE 1:1		DIM. IN MM		材料	検査
MATERIAL 材料	HEAT TREAT. 熱処理	FINISH 仕上げ	REMARK 備考	REV.	
PC BD MS VA4 PAL-G CHIP			939-0311 (0-1-8)		
DESCRIPTION 説明			PART NO. 部品番号		

939-0311-152

MACHINE 機番	SUB-ASSY 組立番
837-8168	
ALTERATIONS 改訂	

ジャンパー接続方法

- IC2,3が600milタイプの場合
A図の様にジャンパー線を接続する。
その際、IC2,3に接続されるジャンパー線はICの足に直接半田付けしなければならないので、半田ブリッジの内容には従うこと。
また、JP6,7の2本のジャンパー線は、半田橋からの接続も可能です。
- IC2,3が300milタイプの場合
A図の様にジャンパー線を接続する。
尚、IC2,3に接続されるジャンパー線は、ICの外側の部品穴が未使用になるので、そこに半田付けすること。

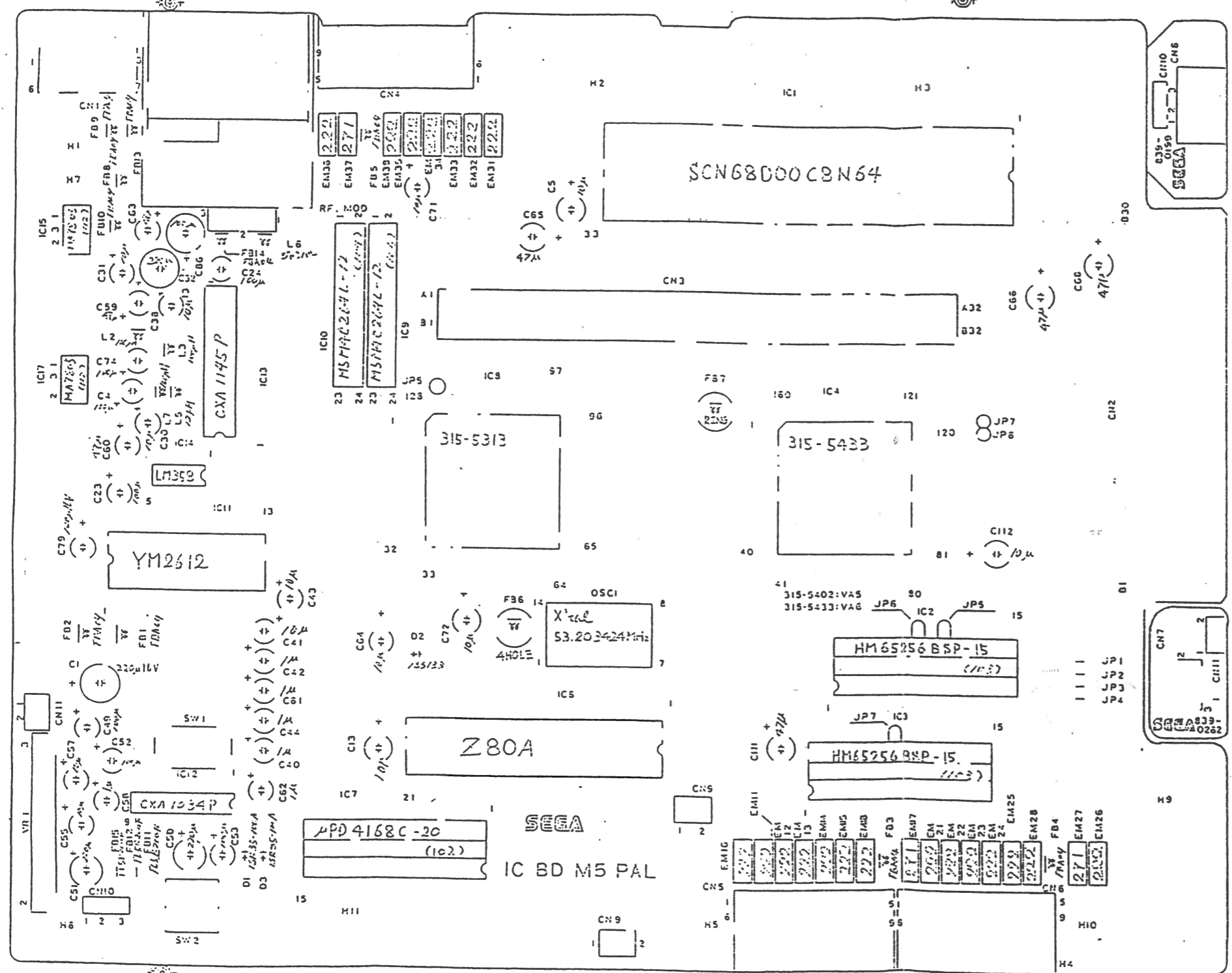


A図・ジャンパー接続図
(部品位置よりジャンパーする)

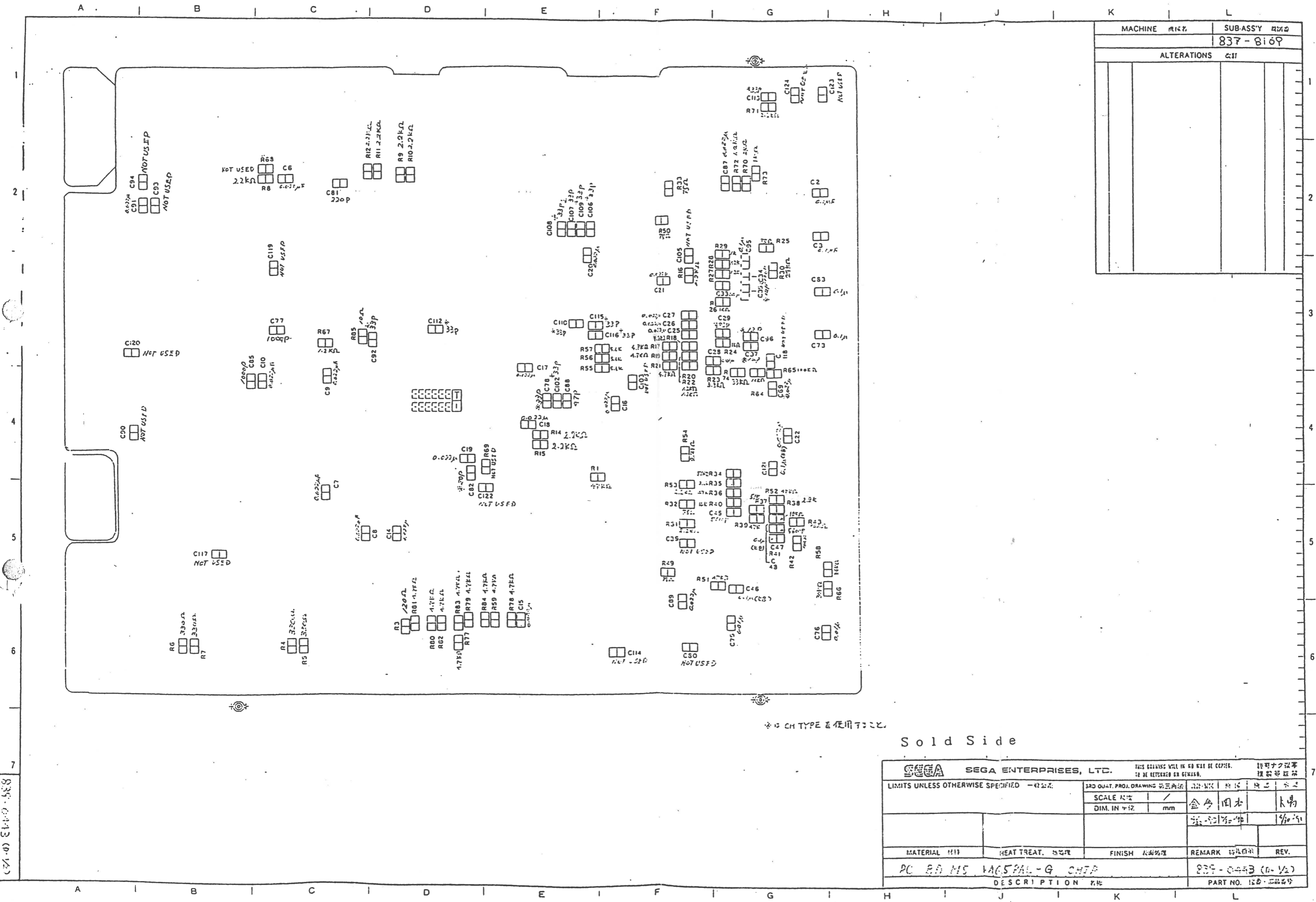
Comp Side

SEGA SEGA ENTERPRISES, LTD.		THIS DRAWING WILL BE KEPT IN ARCHIVE AND MAY BE COPIED. この図面はアーカイブに保管され、複製される場合があります。		15マックス 15マックス	
LIMITS UNLESS OTHERWISE SPECIFIED		3RD QUAT. PROJ. DRAWING 第3四半期プロジェクト図面		15マックス 15マックス	
SCALE 1/20		/		15マックス 15マックス	
DIM IN mm		mm		15マックス 15マックス	
MATERIAL 材料	HEAT TREAT. 熱処理	FINISH 仕上げ	REMARK 備考	REV.	
IC BD M5 VAG PAL-G MAIN				837-8169 (8-1/2)	
DESCRIPTION 記号				PART NO. 部品番号	

- 注: ① 相当品のあるものに関しては、()内にP/LIST
T/D No. を示してあるので、P/LIST等
照のこと。
② CN9は、一番ピンに赤いリード線、2番ピンに白
いリード線を取り付けのこと。
③ IC2, IC3が300milタイプの場合、1
番ピン側に密着して取り付けのこと。
④ IC7が300milタイプの場合、15番ピン側
に密着して取り付けのこと。
⑤ 基板外側の半田リベラ部(ベタGND)は、基板ア
センブリ後、フラットに仕上げること。
(半田に依存凹凸が無いこと。マスキング処理を行
うこと。)



837-8168 (0-2)

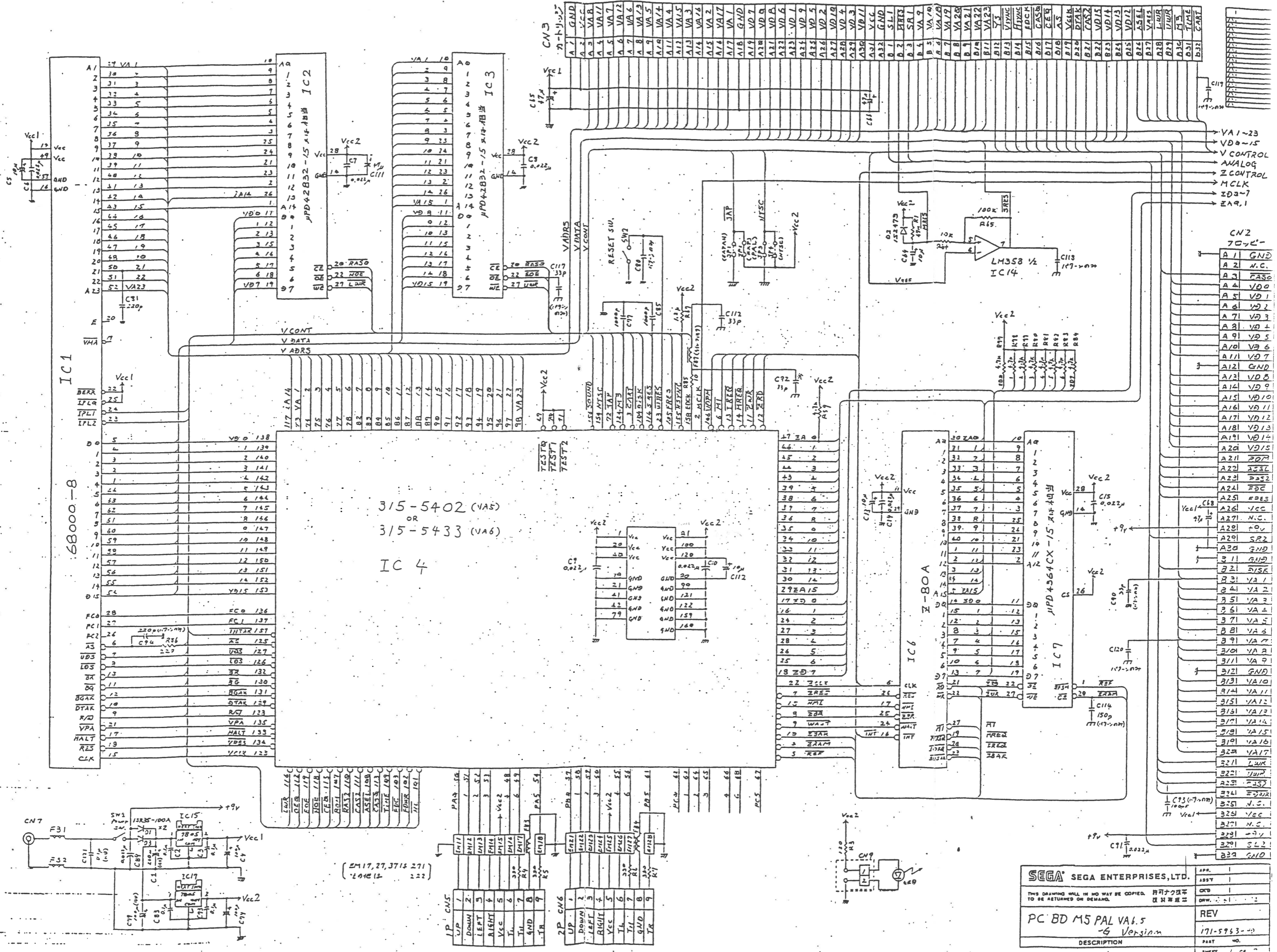


MACHINE	837-8169
SUB-ASSY	
ALTERATIONS	

Sold Side

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LIMITS UNLESS OTHERWISE SPECIFIED 一般公差		3RD QUAT. PROJ. DRAWING 第三阶段 设计图	材料	公差	公差
		SCALE 比率 /	金	本	大
		DIM. IN 寸法 mm			
MATERIAL 材料	HEAT TREAT. 热处理	FINISH 表面処理	REMARK 特記事項	REV.	
PC BOARD VAG5PAL-G CHTP			837-0443 (0-1/2)		
DESCRIPTION 名称			PART NO. 部品番号		

837-0443 (0-1/2)



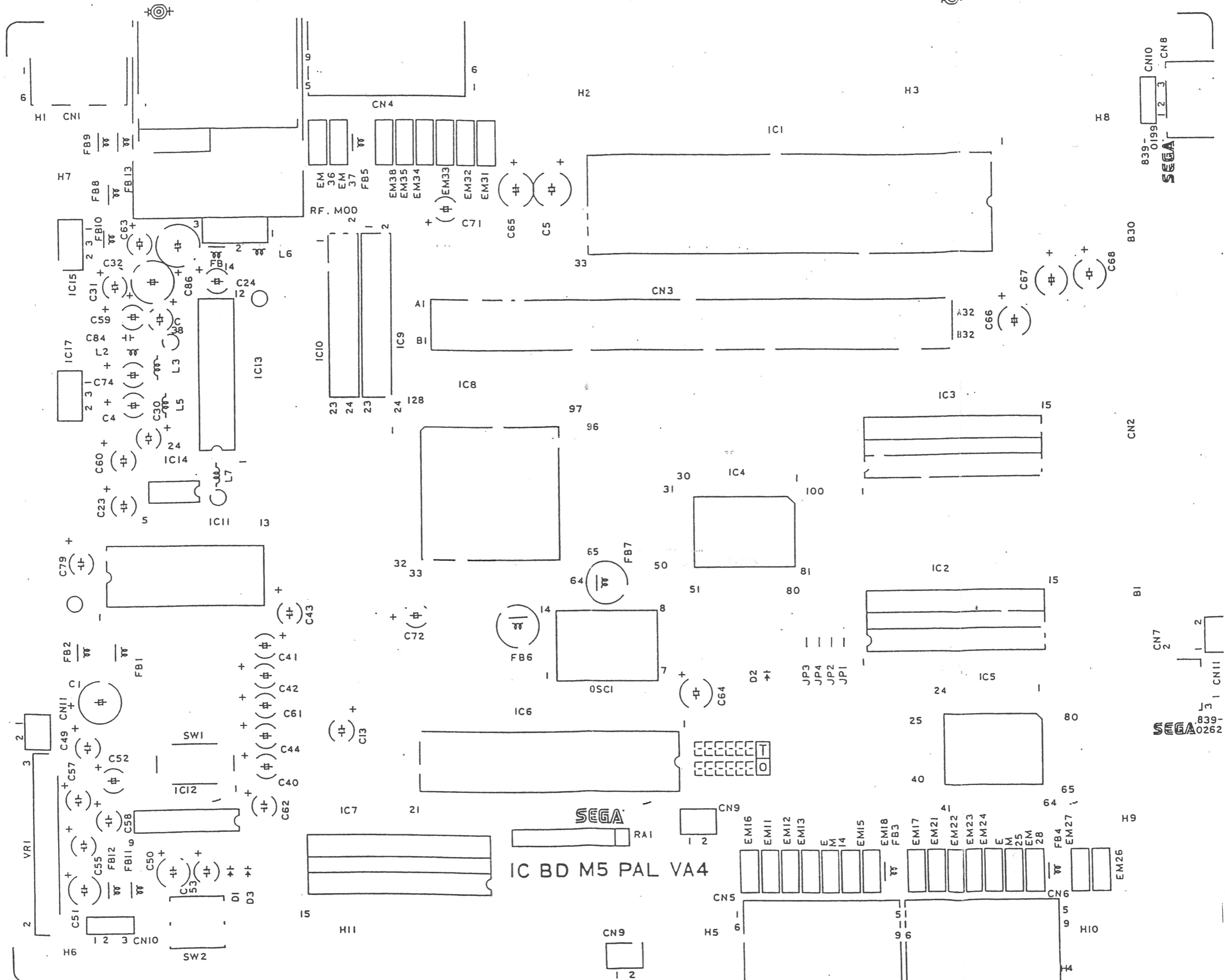
315-5402 (VA5)
OR
315-5433 (VA6)
IC 4

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PC BD M5 PAL V1.5 -& Version		171-5963-00
DESCRIPTION		PART NO.
SHEET 1 OF 2		

MEGA DRIVE

PAL-G (GERMANY)

PCB DESIGN SPEC.



839-0199
SEGA
 CN10
 1 2 3
 CNB

B30

CN2

B1

CN7
 2
 1 2
 CN11

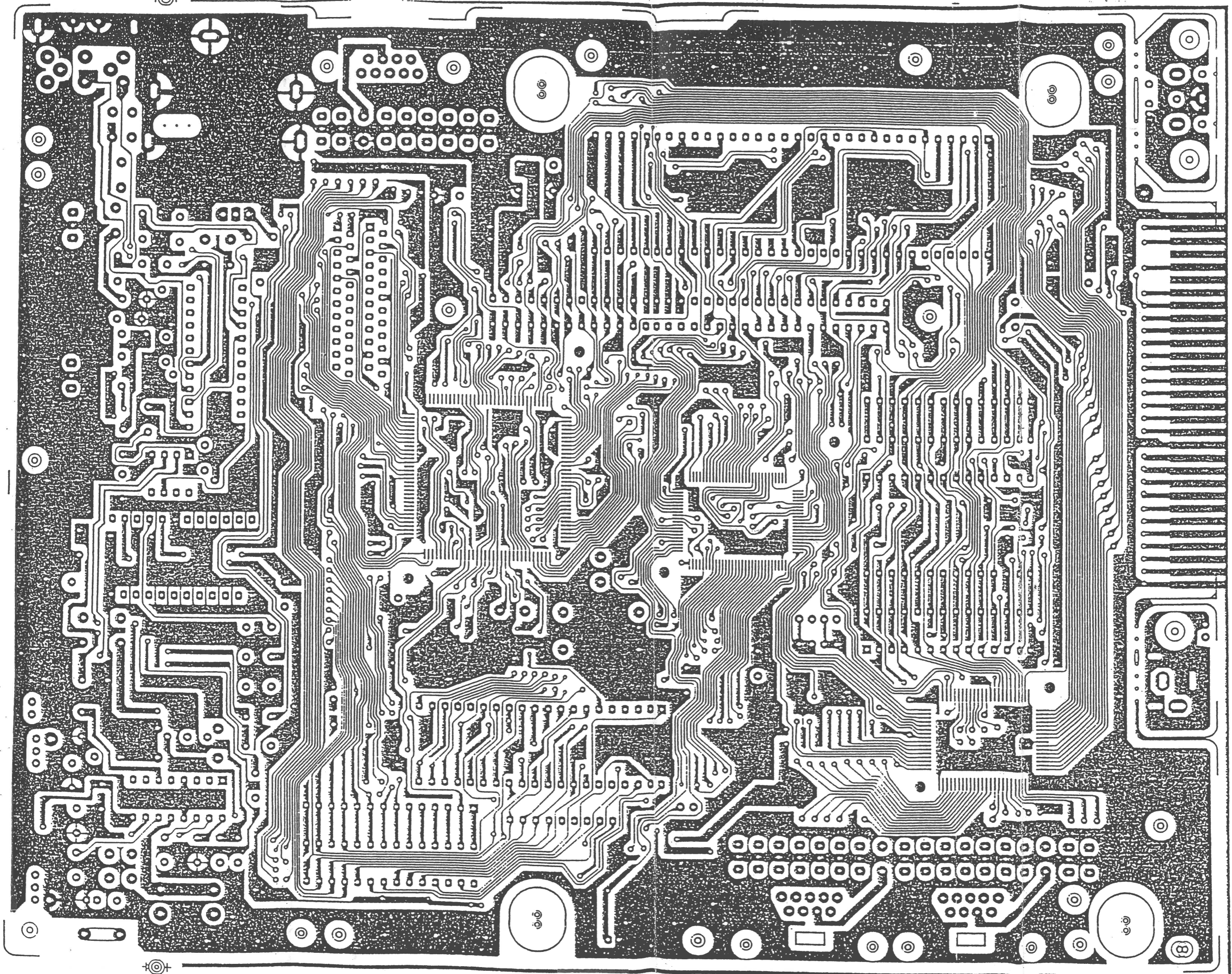
J3
 839-0262
SEGA

SEGA
 RA1
 IC BD M5 PAL VA4

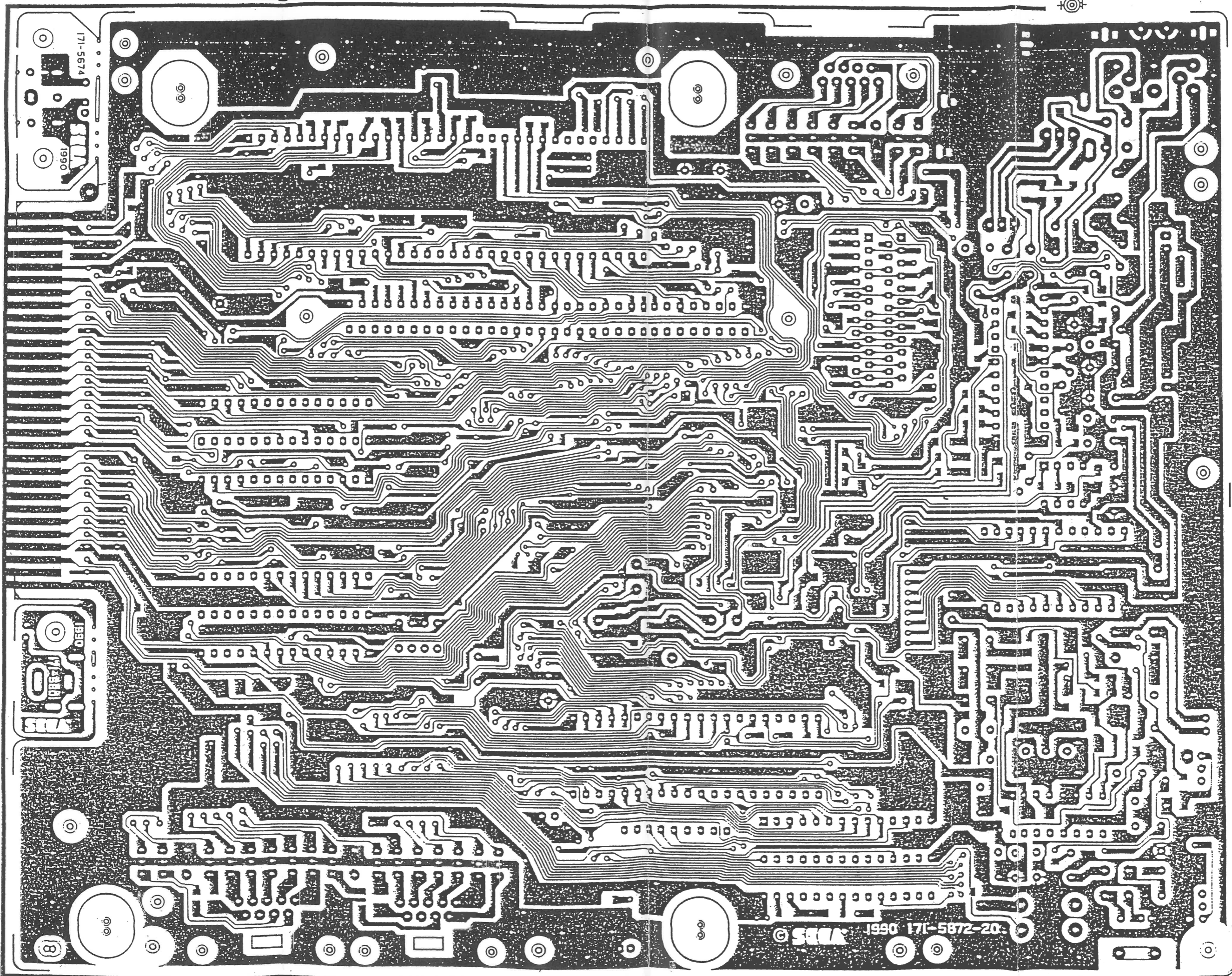
PC BD M5 PAL VA4 MAIN BD Comp Side Mark

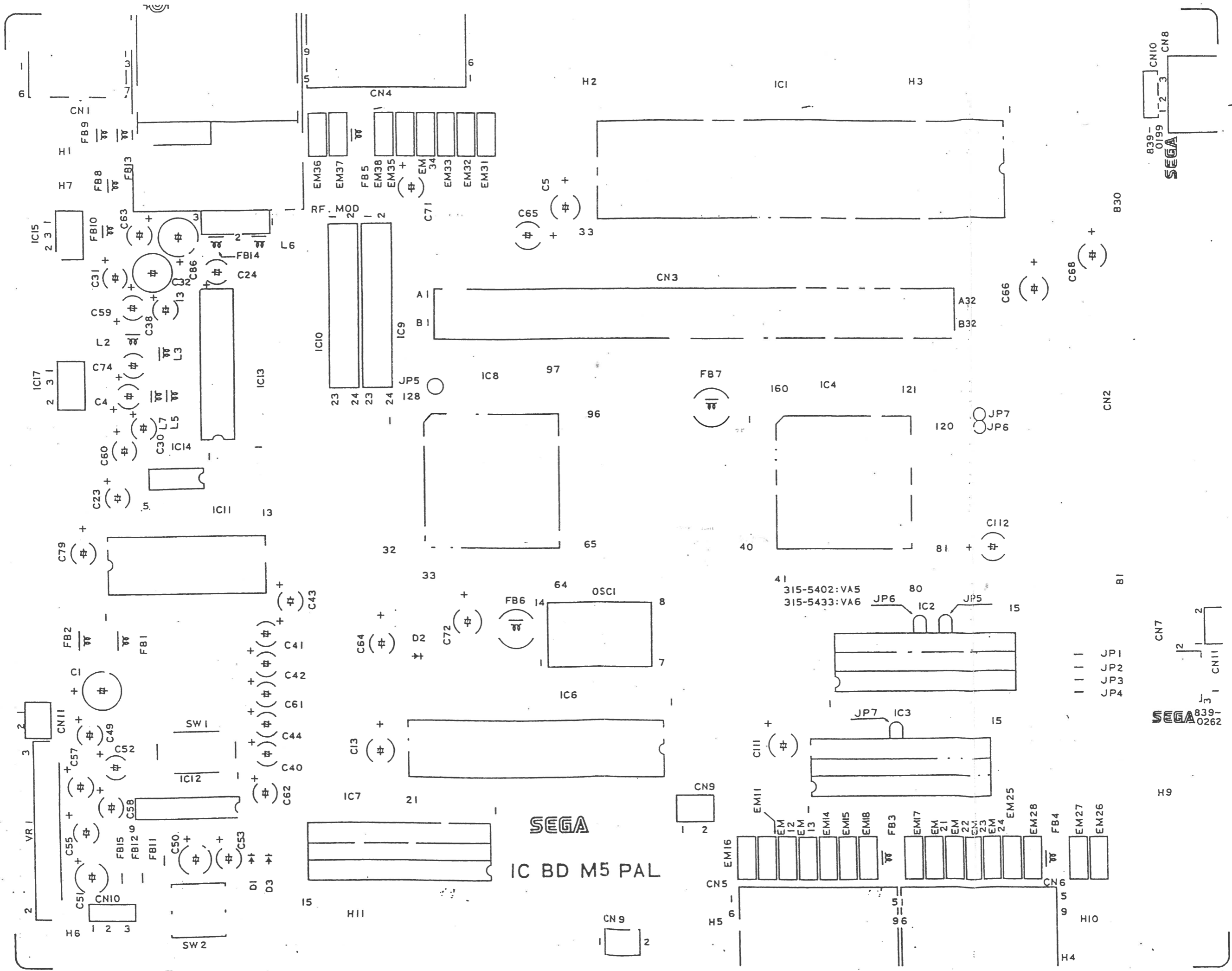
部品面





奥田未



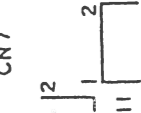
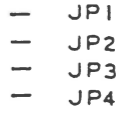


SEGA
IC BD M5 PAL

PC BD M5 PAL VA6.5 MAIN BD Comp Side Mark

91. 1. 19
91. 5. 17 22

171-5963-20A
171-5963-30



H9

B30

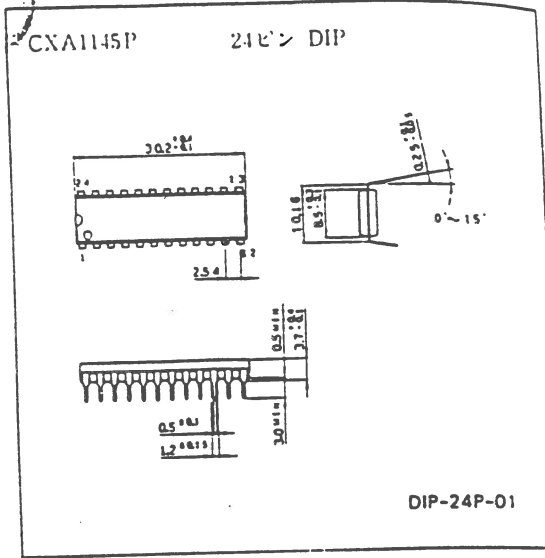
CN2

B1

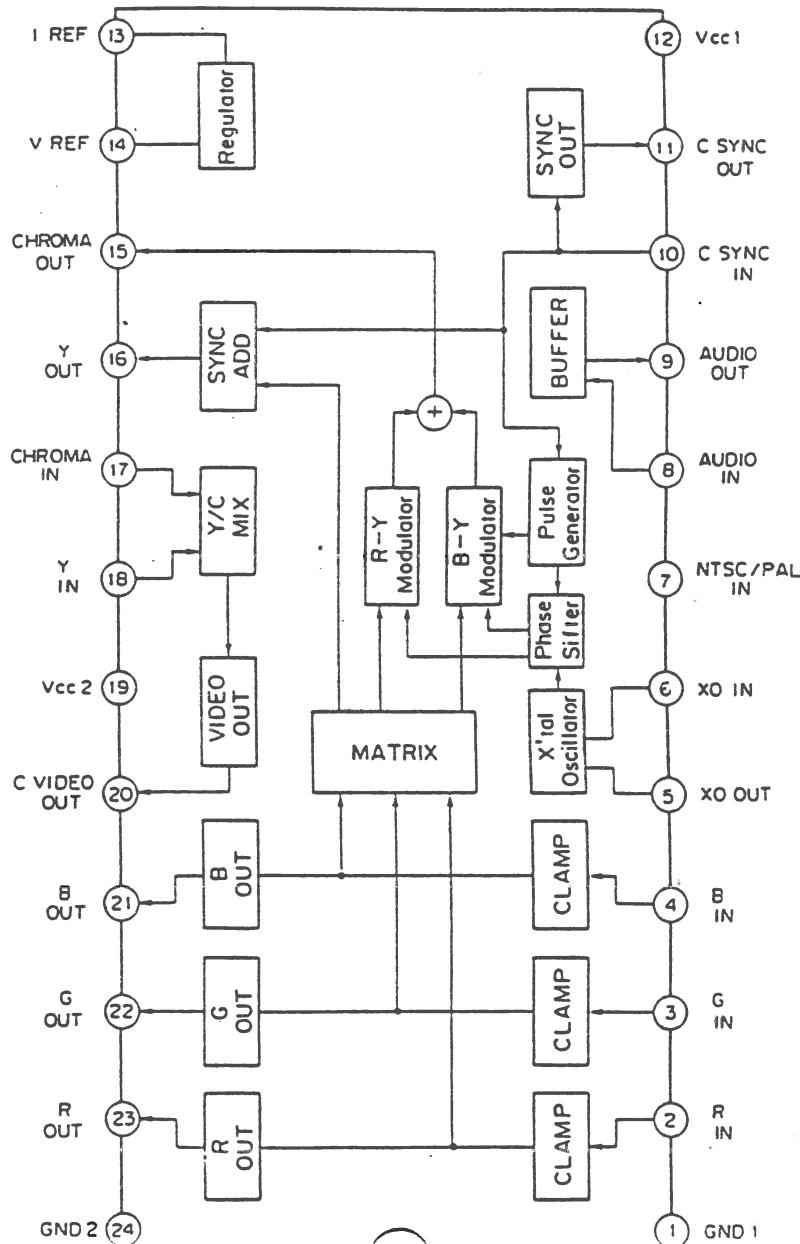
104

MAIN BOARD IC13 1/3 外形寸法図
IC CXA1145P

単位: mm



ブロック図及び端子配列図



端子番号	端子記号	専用回路	端子説明
8	AUDIO IN		オーディオバッファアンプ回路の入力端子です。 入力インピーダンスは約25kΩです。
9	AUDIO OUT		オーディオバッファアンプ回路の出力端子です。
10	C SYNC IN		コンポジットシンク信号の入力端子です。 TTLレベルで入力してください。 L (≤0.8V) 時: SYNC H (≥2.0V)
11	C SYNC OUT		コンポジットシンク信号の出力端子です。 75Ωの負荷を接続駆動する事が出来ます。
12	Vcc 1		RGB出力回路、コンポジットビデオ出力回路以外の回路の電源端子です。

端子番号	端子記号	専用回路	端子説明
1	GND 1		RGB出力、コンポジットビデオ出力回路以外の回路のGND端子です。GND 2とは出来るだけ低いインピーダンスで接続して下さい。
2, 3, 4	R IN, G IN, B IN		アナログRGB信号の入力端子です。 100% = 1Vppで入力して下さい。 クランプの調整を少なくするため、出来るだけ低いインピーダンスで入力する必要があります。
5	XO OUT		X'nal OSC用の端子です。 内部発振で使用する場合は水晶発振子を接続します。 また、外部発振で使用する場合には、カップリングコンデンサを挿して6番端子 XO IN に入力してください。 サブキャリアの入力レベルは400mVpp ~ 1,000mVppで入力してください。 外部発振で使用する場合には十分差込みが多い場合にはクロマ信号の位相特性が悪化する恐れがあります。
6	XO IN		
7	NTSC, PAL IN		NTSC, PALモードの切りかえ端子です。 Vcc NTSC GND PAL

端子番号	端子記号	等価回路	端子説明
13	I REF		内部の基準電流を決める端子です。訂正を加えてGNDに接続します。
14	V REF		内部の基準電圧端子です。 10 μ F程度のコンデンサで接続して下さい。
15	C OUT		クロマ信号出力端子です。 17番端子 (C IN) との間にはBPF (バンドパスフィルタ) を接続します。
16	Y OUT		Y信号出力端子です。 18番端子 (Y IN) との間にはDL (ダイレイライン) を接続します。
17	C IN		BPF (バンドパスフィルタ) で高調波を除いたクロマ信号を入力する端子です。

端子番号	端子記号	等価回路	端子説明
18	Y IN		DL (ダイレイライン) で遅延されたY信号を入力する端子です。
19	Vcc2		RGB出力回路、コンポジットビデオ出力回路の電源端子です。 大電流が流れるため十分なコンデンサでデカップリングして下さい。
20	C VIDEO OUT		Y, C MIX回路の出力端子です。コンポジットビデオ信号が出力されます。75 Ω の負荷を直接駆動することが出来ます。
21 22 23	B OUT G OUT R OUT		アナログRGB信号の出力端子です。 75 Ω の負荷を直接駆動することが出来ます。
24	GND2		RGB出力回路、コンポジット出力回路のGND端子です。 GND1とは異なるだけ低いインピーダンスで接続して下さい。

MEGA DRIVE


PAL-G (GERMANY)

PARTS LIST OF PCB


D. NO.	DESCRIPTION	PART. NO.	NOTE
	PC BD M5 VA4 PAL-G CHIP	839-0361	
	HEAT SINK M5-02	530-5038-02	
IC 1	IC SCN68000C8N64	315-0328	
IC 2	IC HM65256BSP-15 (HITACHI)	315-0371-15	ONE OF THESE 300mil 917*15 1番ピン例に準じ
	IC μ PD42832C-15 (NEC)	315-0370-15	
	IC TC51832-12 (TOSHIBA)	315-0471	
IC 3	IC HM65256BSP-15 (HITACHI)	315-0371-15	ONE OF THESE 300mil 917*15 1番ピン例に準じ
	IC μ PD42832C-15 (NEC)	315-0370-15	
	IC TC51832-12 (TOSHIBA)	315-0471	
IC 4	IC CUSTOM CHIP YM6045C (YAMAHA)	315-5364	
IC 5	IC CUSTOM CHIP YM6046 (YAMAHA)	315-5309	
IC 6	IC Z80A (ZILOG/NEC)	315-0041	
IC 7	IC μ PD4168C-20 (NEC)	315-0298	
	IC μ PD4168C-15 (NEC)	315-0298-15	
	IC μ PD4168C-15-SG (NEC)	315-0298-15S	
	IC μ PD4364C-15 (NEC)	315-0441-15	
	IC μ PD4364CX (NEC)	315-0465	ONE OF THESE
	IC MB8464A-15L (FUJITSU)	315-0330	300mil 917*15 1番ピン例に準じ
	IC TMM2064-15 (TOSHIBA)	315-0335	
	IC TMM2063-12 (TOSHIBA)	315-0374	
	IC HM6264L-120 (SANKO)	315-0530	
IC 8	IC CUSTOM CHIP YM7101 (YAMAHA)	315-5313	ONE OF THESE
	IC CUSTOM CHIP FU1001 (YAMAHA)	315-5313A	

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△	ADD 全ノ		ASS'Y
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			DRW. 国本 9/17 '90
		IC-BD M5 VA4 PAL-G MAIN	REV
		DESCRIPTION	837-7460
			PART NO.
			SHEET 1 OF 9


D. NO.	DESCRIPTION	PART. NO.	NOTE
IC 9	IC M5M4C264L-12 (MITSUBISHI)	315-0515	ONE OF THESE (ZIP TYPE)
	IC M5M4C264L-15 (MITSUBISHI)	315-0515-15	
	IC μ PD41264V-12 ZIP (NEC)	315-0453	
	IC MB81461-12 ZIP (FUJITSU)	315-0423	
	IC HM53461ZP-12 (HITACHI)	315-0481	
	IC TMS4461-12SDL (T.I)	315-0525	
IC 10	IC M5M4C264L-12 (MITSUBISHI)	315-0515	ONE OF THESE (ZIP TYPE)
	IC M5M4C264L-15 (MITSUBISHI)	315-0515-15	
	IC μ PD41264V-12 ZIP (NEC)	315-0453	
	IC MB81461-12 ZIP (FUJITSU)	315-0423	
	IC HM53461ZP-12 (HITACHI)	315-0481	
	IC TMS4461-12SDL (T.I)	315-0525	
IC 11	IC YM2612 (YAMAHA)	313-5089	
IC 12	IC CXA1034 (SONY)	313-5079	ONE OF THESE
	IC AN7108 (MATUSITA)	313-5144	
IC 13	IC CXA1145P (SONY)	313-5067	
IC 14	IC LM358	313-5020	
IC 15	IC MA7805UC (NEC)	313-0092	ONE OF THESE
	IC MC7805CT (MOTOROLA)	313-5092	
IC 17	IC MA7805UC (NEC)	313-0092	ONE OF THESE
	IC MC7805CT (MOTOROLA)	313-5092	
OSC 1	X'TAL 53.203424MHz \pm 20ppm TXC-2	230-5058	(T.Q.C.)

ALTERATION		 SEGA SEGA ENTERPRISES, LTD.	APR. 小丸 2/17 '90
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		IC-BD M5 VA4 PAL-G MAIN DESCRIPTION	DRW. 図本 2/14-'90
			REV
			837-7460
			PART NO.
			SHEET 2 OF 9

D. NO.	DESCRIPTION	PART. NO.	NOTE
R 1	RES CHIP 47k Ω 1/8W \pm 5%	476-0473-J-08	
R 2	RES CHIP 510 Ω 1/8W \pm 5%	476-0511-J-08	
R 3	RES CHIP 120 Ω 1/8W \pm 5%	476-0121-J-08	
R 4	RES CHIP 330 Ω 1/8W \pm 5%	476-0331-J-08	
R 5	RES CHIP 330 Ω 1/8W \pm 5%	476-0331-J-08	
R 6	RES CHIP 330 Ω 1/8W \pm 5%	476-0331-J-08	
R 7	RES CHIP 330 Ω 1/8W \pm 5%	476-0331-J-08	
R 8	RES CHIP 2.2k Ω 1/8W \pm 5%	476-0222-J-08	
R 9	RES CHIP 2.2k Ω 1/8W \pm 5%	476-0222-J-08	
R 10	RES CHIP 2.2k Ω 1/8W \pm 5%	476-0222-J-08	
R 11	RES CHIP 2.2k Ω 1/8W \pm 5%	476-0222-J-08	
R 12	RES CHIP 2.2k Ω 1/8W \pm 5%	476-0222-J-08	
R 13	RES CHIP 1.2k Ω 1/8W \pm 5%	476-0122-J-08	NO USE
R 14	RES CHIP 2.2k Ω 1/8W \pm 5%	476-0222-J-08	
R 15	RES CHIP 2.2k Ω 1/8W \pm 5%	476-0222-J-08	
R 16	RES CHIP 2.2k Ω 1/8W \pm 5%	476-0222-J-08	
R 17	RES CHIP 4.7k Ω 1/8W \pm 5%	476-0472-J-08	
R 18	RES CHIP 1.2k Ω 1/8W \pm 5%	476-0122-J-08	
R 19	RES CHIP 4.7k Ω 1/8W \pm 5%	476-0472-J-08	
R 20	RES CHIP 1.2k Ω 1/8W \pm 5%	476-0122-J-08	
R 21	RES CHIP 4.7k Ω 1/8W \pm 5%	476-0472-J-08	
R 22	RES CHIP 1.2k Ω 1/8W \pm 5%	476-0122-J-08	
R 23	RES CHIP 3.3k Ω 1/8W \pm 5%	476-0332-J-08	
R 24	RES CHIP 1k Ω 1/8W \pm 5%	476-0102-J-08	
R 25	RES CHIP 75 Ω 1/8W \pm 5%	476-0750-J-08	
R 26	RES CHIP 1k Ω 1/8W \pm 5%	476-0102-J-08	

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			PC-BD M5 VA4 PAL-G CHIP	DRW. <i>JK</i> 9/17 '90
			DESCRIPTION	REV
				839-0361
				PART NO.
				SHEET 4 OF 8


D. NO.	DESCRIPTION	PART. NO.	NOTE
R 27	RES CHIP 1.2k Ω 1/8W \pm 5%	476-0122-J-08	
R 28	RES CHIP 1.2k Ω 1/8W \pm 5%	476-0122-J-08	
R 29	RES CHIP 1k Ω 1/8W \pm 5%	476-0102-J-08	
R 30	RES CHIP 24k Ω 1/8W \pm 5%	476-0243-J-08	
R 31	RES CHIP 2.2k Ω 1/8W \pm 5%	476-0222-J-08	
R 32	RES CHIP 75 Ω 1/8W \pm 5%	476-0750-J-08	
R 33	RES CHIP 75 Ω 1/8W \pm 5%	476-0750-J-08	
R 34	RES CHIP 51k Ω 1/8W \pm 5%	476-0513-J-08	
R 35	RES CHIP 2.2k Ω 1/8W \pm 5%	476-0222-J-08	
R 36	RES CHIP 47k Ω 1/8W \pm 5%	476-0473-J-08	
R 37	RES CHIP 51k Ω 1/8W \pm 5%	476-0513-J-08	
R 38	RES CHIP 2.2k Ω 1/8W \pm 5%	476-0222-J-08	
R 39	RES CHIP 47k Ω 1/8W \pm 5%	476-0473-J-08	
R 40	RES CHIP 10k Ω 1/8W \pm 5%	476-0103-J-08	
R 41	RES CHIP 10k Ω 1/8W \pm 5%	476-0103-J-08	
R 42	RES CHIP 10k Ω 1/8W \pm 5%	476-0103-J-08	
R 43	RES CHIP 10k Ω 1/8W \pm 5%	476-0103-J-08	
R 46	RES CHIP 4.7k Ω 1/8W \pm 5%	476-0472-J-08	
R 47	RES CHIP 4.7k Ω 1/8W \pm 5%	476-0472-J-08	
R 48	RES CHIP 4.7k Ω 1/8W \pm 5%	476-0472-J-08	NO USE
R 49	RES CHIP 75 Ω 1/8W \pm 5%	476-0750-J-08	
R 50	RES CHIP 75 Ω 1/8W \pm 5%	476-0750-J-08	
R 51	RES CHIP 47k Ω 1/8W \pm 5%	476-0473-J-08	
R 52	RES CHIP 47k Ω 1/8W \pm 5%	476-0473-J-08	
R 53	RES CHIP 2.2k Ω 1/8W \pm 5%	476-0222-J-08	
R 54	RES CHIP 2.2k Ω 1/8W \pm 5%	476-0222-J-08	

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			DRW. 図本 3/17-190
		PC-BD M5 VA4 PAL-G CHIP	REV
		DESCRIPTION	839-0361
			PART NO.
			SHEET 5 OF 8


D. NO.	DESCRIPTION	PART. NO.	NOTE
C 27	CAP CER CHIP 0.022 μ F 25V ZF	151-0227	
C 28	CAP CER CHIP 0.01 μ F 16V KB	151-0228	
C 29	CAP CER CHIP 82pF 50V CH	151-5019	
C 33	CAP CER CHIP 0.01 μ F 16V KB	151-0228	
C 34	CAP CER CHIP 180pF 50V CH	151-0234	
C 35	CAP CER CHIP 12pF 50V CH	151-5018	
C 37	CAP CER CHIP 100pF 50V CH	151-5020	
C 39	CAP CER CHIP 150pF 50V SL	151-5021	
C 45	CAP CER CHIP 5600pF 16V KB	151-5016	
C 46	CAP CER CHIP 0.1 μ F 25V KB	151-5015	
C 47	CAP CER CHIP 0.1 μ F 25V KB	151-5015	
C 48	CAP CER CHIP 5600pF 16V KB	151-5016	
C 69	CAP CER CHIP 0.022 μ F 25V ZF	151-0227	
C 73	CAP CER CHIP 0.022 μ F 25V ZF	151-0227	(パルパ形の場合) ONE OF THESE (角パルパ形の場合)
	CAP CER CHIP 0.1 μ F 25V ZF	151-0245	
C 75	CAP CER CHIP 0.01 μ F 16V KB	151-0228	
C 76	CAP CER CHIP 0.01 μ F 16V KB	151-0228	
C 77	CAP CER CHIP 1000pF 50V KB	151-0232	
C 78	CAP CER CHIP 33pF 50V CH	151-5025	
C 80	_____	_____	
C 81	CAP CER CHIP 220pF 50V KB	151-0230	
C 82	CAP CER CHIP 20pF 50V CH	151-5022	
C 83	CAP CER CHIP 0.022 μ F 25V ZF	151-0227	(パルパ形の場合) ONE OF THESE (角パルパ形の場合)
	CAP CER CHIP 0.1 μ F 25V ZF	151-0245	
C 85	CAP CER CHIP 1000pF 50V KB	151-0232	
C 87	CAP CER CHIP 0.022 μ F 25V ZF.	151-0227	

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				ASS'Y
			CK'D	
			DRW. 国本	9/14-'90
			REV	
			839-0361	
			PART NO.	
			SHEET 2 OF 6	


D. NO.	DESCRIPTION	PART. NO.	NOTE
C 88	CAP CER CHIP 47pF 50V CH	151-5026	
C 89	CAP CER CHIP 0.022μF 25V ZF	151-0227	
C 90	CAP CER CHIP 33pF 50V CH	151-5025	NO USE
C 91	CAP CER CHIP 100pF 50V SL	151-0229	
C 92	CAP CER CHIP 51pF 50V CH	151-5023	NO USE
C 93	CAP CER CHIP 100pF 50V SL	151-0229	
C 94	CAP CER CHIP 220pF 50V KB	151-0230	
C 95	CAP CER CHIP 0.1μF 25V ZF	151-0245	
C 96	CAP CER CHIP 12pF 50V CH	151-5018	
C 97	CAP CER CHIP 100pF 50V SL	151-0229	
C 98	CAP CER CHIP 150pF 50V SL	151-5021	
C 99	CAP CER CHIP 150pF 50V SL	151-5021	
C100	CAP CER CHIP 33pF 50V CH	151-5025	NO USE
C101	CAP CER CHIP 33pF 50V CH	151-5025	
C102	CAP CER CHIP 33pF 50V CH	151-5025	
C103	CAP CER CHIP 33pF 50V CH	151-5025	
C104	CAP CER CHIP 270pF 50V KB	151-5024	
C105	CAP CER CHIP 33pF 50V CH	151-5025	
C106	CAP CER CHIP 33pF 50V CH	151-5025	
C107	CAP CER CHIP 33pF 50V CH	151-5025	
C108	CAP CER CHIP 33pF 50V CH	151-5025	
C109	CAP CER CHIP 33pF 50V CH	151-5025	
C110	CAP CER CHIP 33pF 50V CH	151-5025	

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			DRW. 坂本 2/14-'90
		PC-BD M5 VA4 PAL-G CHIP	REV
			839-0361
		DESCRIPTION	PART NO.
			SHEET 3 OF 8


D. NO.	DESCRIPTION	PART. NO.	NOTE
	PC BD M5 PAL VA4 MAIN	171-5872-20	
C 2	CAP CER CHIP 0.022 μ F 25V ZF	151-0227	(マルチチップの場合) ONE OF THESE
	CAP CER CHIP 0.1 μ F 25V ZF	151-0245	
C 3	CAP CER CHIP 0.022 μ F 25V ZF	151-0227	(マルチチップの場合) ONE OF THESE
	CAP CER CHIP 0.1 μ F 25V ZF	151-0245	
C 6	CAP CER CHIP 0.022 μ F 25V ZF	151-0227	
C 7	CAP CER CHIP 0.022 μ F 25V ZF	151-0227	
C 8	CAP CER CHIP 0.022 μ F 25V ZF	151-0227	
C 9	CAP CER CHIP 0.022 μ F 25V ZF	151-0227	
C 10	CAP CER CHIP 0.022 μ F 25V ZF	151-0227	
C 11	CAP CER CHIP 0.022 μ F 25V ZF	151-0227	
C 12	CAP CER CHIP 0.022 μ F 25V ZF	151-0227	
C 14	CAP CER CHIP 0.022 μ F 25V ZF	151-0227	
C 15	CAP CER CHIP 0.022 μ F 25V ZF	151-0227	
C 16	CAP CER CHIP 0.022 μ F 25V ZF	151-0227	
C 17	CAP CER CHIP 0.022 μ F 25V ZF	151-0227	
C 18	CAP CER CHIP 0.022 μ F 25V ZF	151-0227	
C 19	CAP CER CHIP 0.022 μ F 25V ZF	151-0227	
C 20	CAP CER CHIP 0.022 μ F 25V ZF	151-0227	
C 21	CAP CER CHIP 0.022 μ F 25V ZF	151-0227	
C 22	CAP CER CHIP 0.022 μ F 25V ZF	151-0227	
C 25	CAP CER CHIP 0.022 μ F 25V ZF	151-0227	
C 26	CAP CER CHIP 0.022 μ F 25V ZF.	151-0227	

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		PC BD M5 VA4 PAL-G CHIP	DRW. 風本 9/14-90
		DESCRIPTION	REV
			839-0361
			PART NO.
			SHEET 1 OF 6


D. NO.	DESCRIPTION	PART. NO.	NOTE
SW 2	TACTIL PUSH SW (ALPS)	510-5019	} ONE OF THESE
	TACT SWITCH SKEVAA (ALPS)	509-5207	
CN 1	DIN CONN 8P B-TYPE (UNION)	212-5106	
CN 3	EDGE CONNECTOR 64P (MITSUMI)	209-5026	
CN 4	D-9P ANGLE TYPE (UNION)	209-5027	
CN 5	D-SUB 9P ANGLE TYPE (UNION)	209-5017-01	
CN 6	D-SUB 9P ANGLE TYPE (UNION)	209-5017-01	
CN 9	LED SOCKET/CABLE (UNION)	600-5110-02	} ONE OF THESE 1番ピンは、2番ピンに接続する。
	LED SOCKET WITH CNN L=110mm (W.P.)	600-5820	
RA 1	R-PACK 8x472 1/8W W/COMMON	477-0106-472	
RF MOD.	RF MODULATER YAA21-0496 (JALCO)	200-5086-02	
	SUMI TUBE F L=15mm	310-5029-15	C72のFに接続する。
	SCREW LOCK (10 pos.)	090-0012	
	GRS THRM 200GR/TUBE (2 pos.)	601-0076	JC15, J17の HEAT SINK内に挿入
	EYLET 3.5x7 (2 pos.)	048-0001	} ONE OF THESE CN3 固定用
	EYLET #6x3.5x8 (2 pos.)	048-0002	
	TAP SCR PH 3x8 (4 pos.)	012-0308	CN5, 6 固定用
	M SCR PH 3x8 (2 pos.)	000-0308	CN4 固定用
	DELTITE SCR PH M3x6 (4 pos.)	029-0227	JC15, J17, HEAT SINK 固定用

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		IC BD M5 VA4 PAL-G MAIN	DRW. 岡本 9/4-'90
		DESCRIPTION	REV
			837-7460
			PART NO.
			SHEET 9 OF 9


D. NO.	DESCRIPTION	PART. NO.	NOTE
EM 26	EMI FILTER STX222MB (TAIYO U.)	271-0007	
EM 27	EMI FILTER STB271KB (TAIYO U.)	271-0006	
EM 28	EMI FILTER STX222MB (TAIYO U.)	271-0007	
EM 31	EMI FILTER STX222MB (TAIYO U.)	271-0007	
EM 32	EMI FILTER STX222MB (TAIYO U.)	271-0007	
EM 33	EMI FILTER STX222MB (TAIYO U.)	271-0007	
EM 34	EMI FILTER STX222MB (TAIYO U.)	271-0007	
EM 35	EMI FILTER STX222MB (TAIYO U.)	271-0007	

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			DRW. 水 9/14 '90
IC BD M5 VA4 PAL-G MAIN		REV	
DESCRIPTION		837-7460	
		PART NO.	
		SHEET 7 OF 9	


D. NO.	DESCRIPTION	PART. NO.	NOTE
EM 36	EMI FILTER STX222MB (TAIYO U.)	271-0007	
EM 37	EMI FILTER STB271KB (TAIYO U.)	271-0006	
EM 38	EMI FILTER STX222MB (TAIYO U.)	271-0007	
FB 1	BEADS INDUCTOR FBA04VA600VB (TAIYO)	271-0005-1	
FB 2	BEADS INDUCTOR FBA04VA600VB (TAIYO)	271-0005-1	
FB 3	BEADS INDUCTOR FBA04VA600VB (TAIYO)	271-0005-1	
FB 4	BEADS INDUCTOR FBA04VA600VB (TAIYO)	271-0005-1	
FB 5	BEADS INDUCTOR FBA04VA600VB (TAIYO)	271-0005-1	
FB 6	LINE FILTER 4HOLE BALUN TYPE (TAIYO)	270-5027	
FB 7	LINE FILTER RING TYPE CORES 2T (TAIYO)	270-5029	
FB 8	BEADS INDUCTOR FBA04VA600VB (TAIYO)	271-0005-1	
FB 9	BEADS INDUCTOR FBA04VA600VB (TAIYO)	271-0005-1	
FB 10	BEADS INDUCTOR FBA04VA600VB (TAIYO)	271-0005-1	
FB 11	BEADS INDUCTOR FBA04VA600VB (TAIYO)	271-0005-1	
FB 12	BEADS INDUCTOR FBA04VA600VB (TAIYO)	271-0005-1	
FB 13	BEADS INDUCTOR FBA04VA600VB (TAIYO)	271-0005-1	
FB 14	BEADS INDUCTOR FBA04VA600VB (TAIYO)	271-0005-1	
VR 1	SLIDE VOL CONT 50KB RS20H11 (ALPS)	220-5248	
SW 1	SLIDE SW HSW1699-01-010 (HOSIDEN)	509-5240-01	

ALTERATION		 SEGA SEGA ENTERPRISES, LTD.	APR. 水 7/17 '90
			ASS'Y
		THIS DRAWING WILL IN NO WAY BE COPIED. TO BE RETURNED ON DEMAND.	CK'D
			DRW. 原 本 8/14-'90
		IC BD M5 VA4 PAL-G MAIN	REV
			837-7460
		DESCRIPTION	PART NO.
			SHEET 8 OF 9


D. NO.	DESCRIPTION	PART. NO.	NOTE
EM 16	EMI FILTER STX222MB (TAIYO U.)	271-0007	
EM 17	EMI FILTER STB271KB (TAIYO U.)	271-0006	
EM 18	EMI FILTER STX222MB (TAIYO U.)	271-0007	
EM 21	EMI FILTER STX222MB (TAIYO U.)	271-0007	
EM 22	EMI FILTER STX222MB (TAIYO U.)	271-0007	
EM 23	EMI FILTER STX222MB (TAIYO U.)	271-0007	
EM 24	EMI FILTER STX222MB (TAIYO U.)	271-0007	
EM 25	EMI FILTER STX222MB (TAIYO U.)	271-0007	

ALTERATION		 SEGA SEGA ENTERPRISES, LTD.	APR. 水木 9/17 '90
			ASS'Y
		THIS DRAWING WILL IN NO WAY BE COPIED. TO BE RETURNED ON DEMAND.	CK'D
		IC BD M5 VA4 PAL-G MAIN DESCRIPTION	DRW. 国本 9/14-'90
			REV
			837-7460
			PART NO.
			SHEET 6 OF 9


D. NO.	DESCRIPTION	PART. NO.	NOTE
C 79	CAP E 100 μ F 16V U-TYPE	150-0059	
C 84	CAP CER 0.1 μ F 16V	151-0060	1.7 μ F 50Vに代り、7 μ F 50Vに交換する
C 86	CAP E 100 μ F 10V U-TYPE	150-0047	
C 92	CAP CER 51pF 50V	151-0072	IC4の左側に貼付された部品を右側に貼付する
C100	CAP CER 33pF 50V	151-0020	IC8の下部に貼付された部品を上部に貼付する
C111	CAP CER 33pF 50V	151-0020	IC7の下部に貼付された部品を上部に貼付する
C112	CAP CER 33pF 50V	151-0020	IC8の下部に貼付された部品を上部に貼付する
C113	CAP CER 56pF 50V CH	151-0279	IC1の下部に貼付された部品を上部に貼付する
JP 1	CAP E 47 μ F 10V U-TYPE	150-0062	
EM 11	EMI FILTER STX222MB (TAIYO U.)	271-0007	
EM 12	EMI FILTER STX222MB (TAIYO U.)	271-0007	
EM 13	EMI FILTER STX222MB (TAIYO U.)	271-0007	
EM 14	EMI FILTER STX222MB (TAIYO U.)	271-0007	
EM 15	EMI FILTER STX222MB (TAIYO U.)	271-0007	

ALTERATION	 SEGA SEGA ENTERPRISES, LTD.		APR. 批准 9/17 '90
			ASS'Y
	THIS DRAWING WILL IN NO WAY BE COPIED. TO BE RETURNED ON DEMAND.		CK'D
			DRW. 図本 2/4 - '90
IC-BD M5 VA4 PAL-G MAIN			REV
DESCRIPTION			837-7460
			PART NO.
			SHEET 5 OF 9

D. NO.	DESCRIPTION	PART. NO.	NOTE
C 40	CAP E 1 μ F 50V U-TYPE	150-0009	
C 41	CAP E 10 μ F 16V U-TYPE	150-0023	
C 42	CAP E 1 μ F 50V U-TYPE	150-0009	
C 43	CAP E 10 μ F 16V U-TYPE	150-0023	
C 44	CAP E 1 μ F 50V U-TYPE	150-0009	
C 49	CAP E 100 μ F 10V U-TYPE	150-0047	
C 50	CAP E 220 μ F 10V U-TYPE	150-0126	
C 51	CAP E 220 μ F 10V U-TYPE	150-0126	
C 52	CAP E 100 μ F 10V U-TYPE	150-0047	
C 53	CAP E 100 μ F 10V U-TYPE	150-0047	
C 55	CAP E 10 μ F 16V U-TYPE	150-0023	
C 57	CAP E 10 μ F 16V U-TYPE	150-0023	
C 58	CAP E 1 μ F 50V U-TYPE	150-0009	
C 59	CAP E 47 μ F 10V U-TYPE	150-0062	
C 60	CAP E 47 μ F 10V U-TYPE	150-0062	
C 61	CAP E 1 μ F 50V U-TYPE	150-0009	
C 62	CAP E 1 μ F 50V U-TYPE	150-0009	
C 63	CAP E 47 μ F 10V U-TYPE	150-0062	
C 64	CAP E 10 μ F 16V U-TYPE	150-0023	
C 65	CAP E 47 μ F 10V U-TYPE	150-0062	
C 66	CAP E 47 μ F 10V U-TYPE	150-0062	
C 67	CAP E 47 μ F 10V U-TYPE	150-0062	
C 68	CAP E 47 μ F 10V U-TYPE	150-0062	
C 71	CAP E 10 μ F 16V U-TYPE	150-0023	
C 72	CAP E 10 μ F 16V U-TYPE	150-0023	
C 74	CAP E 100 μ F 10V U-TYPE	150-0047	

ALTERATION		 SEGA SEGA ENTERPRISES, LTD.	APR. 九九 9/17'90
			ASS'Y
		THIS DRAWING WILL IN NO WAY BE COPIED. TO BE RETURNED ON DEMAND.	CK'D
			DRW. 国本 3/1-90
		IC-BD M5 VA4 PAL-G MAIN	REV
			837-7460
		DESCRIPTION	PART NO.
			SHEET 4 OF 9

D. NO.	DESCRIPTION	PART. NO.	NOTE
D 1	DIODE 1SR35-100A RADIAL	481-5038-01	
D 2	DIODE 1S2473 RADIAL	481-0149-01	} ONE OF THESE
	DIODE 1SS133 AXIAL	481-5045	
D 3	DIODE 1SR35-100A RADIAL	481-5038-01	
L 2	PEAKING COIL 100 μ H 03TYPE RADIAL	180-5060	} ONE OF THESE
	PEAKING COIL 100 μ H 02TYPE AXIAL	180-5032	
L 3	PEAKING COIL 100 μ H 03TYPE RADIAL	180-5060	} ONE OF THESE
	PEAKING COIL 100 μ H 02TYPE AXIAL	180-5032	
L 5	PEAKING COIL 12 μ H 03TYPE RADIAL	180-5059	} ONE OF THESE
	PEAKING COIL 12 μ H 02TYPE AXIAL	180-5033	
L 6	PEAKING COIL 100 μ H 03TYPE RADIAL	180-5060	} ONE OF THESE
	PEAKING COIL 100 μ H 02TYPE AXIAL	180-5032	
L 7	PEAKING COIL 100 μ H 03TYPE RADIAL	180-5060	} ONE OF THESE
	PEAKING COIL 100 μ H 02TYPE AXIAL	180-5032	
C 1	CAP E 220 μ F 16V U-TYPE	150-0159	
C 4	CAP E 100 μ F 10V U-TYPE	150-0047	
C 5	CAP E 10 μ F 16V U-TYPE	150-0023	
C 13	CAP E 10 μ F 16V U-TYPE	150-0023	
C 23	CAP E 100 μ F 10V U-TYPE	150-0047	
C 24	CAP E 100 μ F 10V U-TYPE	150-0047	
C 30	CAP E 10 μ F 16V U-TYPE	150-0023	
C 31	CAP E 10 μ F 16V U-TYPE	150-0023	
C 32	CAP E 220 μ F 10V U-TYPE	150-0126	
C 38	CAP E 10 μ F 16V U-TYPE	150-0023	

ALTERATION	 SEGA ENTERPRISES, LTD.		APR. 44 9/17 '90
			ASS'Y
	THIS DRAWING WILL IN NO WAY BE COPIED. TO BE RETURNED ON DEMAND.		CK'D
			DRW. 124 9/14 '90
IC-BD M5 VA4 PAL-G MAIN		REV	
		837-7460	
DESCRIPTION		PART NO.	
		SHEET 3 OF 8	

D. NO.	DESCRIPTION	PART. NO.	NOTE
R 55	RES CHIP 5.6kΩ 1/8W ±5%	476-0562-J-08	
R 56	RES CHIP 5.6kΩ 1/8W ±5%	476-0562-J-08	
R 57	RES CHIP 5.6kΩ 1/8W ±5%	476-0562-J-08	
R 58	RES CHIP 36kΩ 1/8W ±5%	476-0363-J-08	
R 59	RES CHIP 4.7kΩ 1/8W ±5%	476-0472-J-08	
R 60	RES CHIP 4.7kΩ 1/8W ±5%	476-0472-J-08	
R 61	RES CHIP 4.7kΩ 1/8W ±5%	476-0472-J-08	
R 62	RES CHIP 4.7kΩ 1/8W ±5%	476-0472-J-08	
R 63	RES CHIP 4.7kΩ 1/8W ±5%	476-0472-J-08	
R 64	RES CHIP 10kΩ 1/8W ±5%	476-0103-J-08	
R 65	RES CHIP 100kΩ 1/8W ±5%	476-0104-J-08	
R 66	RES CHIP 30kΩ 1/8W ±5%	476-0303-J-08	
R 67	RES CHIP 1.2kΩ 1/8W ±5%	476-0122-J-08	
R 68	RES CHIP 2.2kΩ 1/8W ±5%	476-0222-J-08	
A R 69	RES CHIP 1kΩ 1/8W ±5%	476-0102-J-08	NO USE
R 70	RES CHIP 2kΩ 1/8W ±5%	476-0202-J-08	
R 71	RES CHIP 2.2kΩ 1/8W ±5%	476-0222-J-08	
R 72	RES CHIP 1.2kΩ 1/8W ±5%	476-0122-J-08	
R 73	RES CHIP 1kΩ 1/8W ±5%	476-0102-J-08	
R 74	RES CHIP 33kΩ 1/8W ±5%	476-0333-J-08	
R 75	RES CHIP 4.7kΩ 1/8W ±5%	476-0472-J-08	
R 76	RES CHIP 4.7kΩ 1/8W ±5%	476-0472-J-08	

ALTERATION				SEGA SEGA ENTERPRISES, LTD.	APR. 虫丸 9/17 '90
A	VOID 橋本	12/13 '90	虫丸		ASS'Y
				THIS DRAWING WILL IN NO WAY BE COPIED. TO BE RETURNED ON DEMAND.	
				CK'D	
				DRW. 国本	9/14 '90
				REV	
				839-0361	
				PART	NO.
				SHEET 6 OF 6	
				PC-BD M5 VA4 PAL-G CHIP	
				DESCRIPTION	

PART NO. : 837-8779
 DESCRIPTION : IC BD M5 VA6.5 PAL-G

LINE	LOCATE	DNO OR	PART NO.	DESCRIPTION
1.00	CHIP1	1	839-0443	PC BD M5 VA6 PAL-G CHIP
2.00	HEAT SINK	2	530-5038-02	HEAT SINK M5-02
3.00	IC 1	101	1 315-0328	IC SCN68000C8N64
4.00	IC 1	101	2 315-0555	IC MC68000P8
5.00	IC 2	103	1 315-0371-15	IC HM65256BSP-15
6.00	IC 2	103	2 315-0370-15	IC UPD42832C-15
7.00	IC 2	103	3 315-0471	IC TC51832-12
8.00	IC 3	103	1 315-0371-15	IC HM65256BSP-15
9.00	IC 3	103	2 315-0370-15	IC UPD42832C-15
10.00	IC 3	103	3 315-0471	IC TC51832-12
11.00	IC 4	105	315-5433	IC CUSTOM CHIP UPD92271
12.00	IC 6	107	315-0041	IC Z80A
13.00	IC 7	102	1 315-0298	IC UPD4168C-20
14.00	IC 7	102	2 315-0298-15	IC UPD4168C-15
15.00	IC 7	102	3 315-0298-15S	IC UPD4168C-15-SG
16.00	IC 7	102	4 315-0441-15	IC UPD4364C-15
17.00	IC 7	102	5 315-0465	IC UPD4364CX
18.00	IC 7	102	6 315-0330	IC MB8464A-15L
19.00	IC 7	102	7 315-0335	IC TMM2064-15
20.00	IC 7	102	8 315-0374	IC TMM2063-12
21.00	IC 7	102	9 315-0530	IC HM6264L-120
22.00	IC 7	102	10 315-0573	IC KM6264BL-12 DIP600
23.00	IC 7	102	11 315-0574	IC KM6264BLS-12L DIP300
24.00	IC 7	102	12 315-0618	IC HM6265L-90
25.00	IC 7	102	13 315-0457	IC HY6264LP-15
26.00	IC 7	102	14 315-0458	IC KM4264L-15
27.00	IC 8	106	315-5313	IC CUSTOM CHIP YM7101
28.00	IC 9	104	1 315-0515	IC M5M4C264L-12 ZIP
29.00	IC 9	104	2 315-0515-15	IC M5M4C264L-15 ZIP
30.00	IC 9	104	3 315-0453	IC UPD41264V-12 ZIP
31.00	IC 9	104	4 315-0423	IC MB81461-12 ZIP
32.00	IC 9	104	5 315-0481	IC HM53461ZP-12 ZIP
33.00	IC 9	104	6 315-0525	IC TMS4461-12SDL ZIP
34.00	IC 9	104	7 315-0616	IC V53C261Z10 ZIP
35.00	IC 9	104	8 315-0622	IC KM424C64Z-10 ZIP
36.00	IC 9	104	9 315-0623	IC MSM51C262-10ZS ZIP
37.00	IC 10	104	1 315-0515	IC M5M4C264L-12 ZIP
38.00	IC 10	104	2 315-0515-15	IC M5M4C264L-15 ZIP
39.00	IC 10	104	3 315-0453	IC UPD41264V-12 ZIP
40.00	IC 10	104	4 315-0423	IC MB81461-12 ZIP
41.00	IC 10	104	5 315-0481	IC HM53461ZP-12 ZIP
42.00	IC 10	104	6 315-0525	IC TMS4461-12SDL ZIP
43.00	IC 10	104	7 315-0616	IC V53C261Z10 ZIP
44.00	IC 10	104	8 315-0622	IC KM424C64Z-10 ZIP
45.00	IC 10	104	9 315-0623	IC MSM51C262-10ZS ZIP
46.00	IC 11	108	313-5089	IC YM2612
47.00	IC 12	109	1 313-5079	IC CXA1034P
48.00	IC 12	109	2 313-5144	IC AN7108
49.00	IC 13	110	313-5067	IC CXA1145P
50.00	IC 14	111	313-5020	IC LM358
51.00	IC 15	112	1 313-0092	IC MA7805UC
52.00	IC 15	112	2 313-5092	IC MC7805CT
53.00	IC 17	112	1 313-0092	IC MA7805UC
54.00	IC 17	112	2 313-5092	IC MC7805CT
55.00	OSC 1	113	230-5058	OSC 53.203424M 20PPM
56.00	D 1	114	481-5038-01	DIODE 1SR-35-100A RADIAL
57.00	D 2	115	1 481-0149-01	DIODE 1S2473 RADIAL
58.00	D 2	115	2 481-5045	DIODE 1SS133 AXIAL
59.00	D 3	114	481-5038-01	DIODE 1SR-35-100A RADIAL
60.00	L 2	117	1 180-5060	PEAKING COIL 100UH 03TYPE RA

PARTS LIST

PART NO. : 837-8779
 DESCRIPTION : IC BD M5 VA6.5 PAL-G

LINE	LOCATE	DNO	OR	PART NO.	DESCRIPTION
61.00	L 2	117	2	180-5032	PEAKING COIL 100UH LAL02TA101K
62.00	L 3	117	1	180-5060	PEAKING COIL 100UH 03TYPE RA
63.00	L 3	117	2	180-5032	PEAKING COIL 100UH LAL02TA101K
64.00	L 5	116	1	180-5059	PEAKING COIL 12UH 03TYPE RA
65.00	L 5	116	2	180-5033	PEAKING COIL 12UH LAL02TA120K
66.00	L 6	143		600-5061	JUMPER WIRE 5MM
67.00	L 7	117	1	180-5060	PEAKING COIL 100UH 03TYPE RA
68.00	L 7	117	2	180-5032	PEAKING COIL 100UH LAL02TA101K
69.00	C 1	124		150-0159	CAP E 220UF 16V U-TYPE
70.00	C 4	121		150-0047	CAP E 100UF 10V U-TYPE
71.00	C 5	119		150-0023	CAP E 10UF 16V U-TYPE 20%
72.00	C 13	119		150-0023	CAP E 10UF 16V U-TYPE 20%
73.00	C 23	121		150-0047	CAP E 100UF 10V U-TYPE
74.00	C 24	121		150-0047	CAP E 100UF 10V U-TYPE
75.00	C 30	119		150-0023	CAP E 10UF 16V U-TYPE 20%
76.00	C 31	119		150-0023	CAP E 10UF 16V U-TYPE 20%
77.00	C 32	123		150-0126	CAP E 220UF 10V U-TYPE 20%
78.00	C 38	119		150-0023	CAP E 10UF 16V U-TYPE 20%
79.00	C 40	118		150-0009	CAP E 1UF 50V U-TYPE 20%
80.00	C 41	119		150-0023	CAP E 10UF 16V U-TYPE 20%
81.00	C 42	118		150-0009	CAP E 1UF 50V U-TYPE 20%
82.00	C 43	119		150-0023	CAP E 10UF 16V U-TYPE 20%
83.00	C 44	118		150-0009	CAP E 1UF 50V U-TYPE 20%
84.00	C 49	121		150-0047	CAP E 100UF 10V U-TYPE
85.00	C 50	123		150-0126	CAP E 220UF 10V U-TYPE 20%
86.00	C 51	123		150-0126	CAP E 220UF 10V U-TYPE 20%
87.00	C 52	121		150-0047	CAP E 100UF 10V U-TYPE
88.00	C 53	121		150-0047	CAP E 100UF 10V U-TYPE
89.00	C 55	119		150-0023	CAP E 10UF 16V U-TYPE 20%
90.00	C 57	119		150-0023	CAP E 10UF 16V U-TYPE 20%
91.00	C 58	118		150-0009	CAP E 1UF 50V U-TYPE 20%
92.00	C 59	120		150-0062	CAP E 47UF 10V U-TYPE
93.00	C 60	120		150-0062	CAP E 47UF 10V U-TYPE
94.00	C 61	118		150-0009	CAP E 1UF 50V U-TYPE 20%
95.00	C 62	118		150-0009	CAP E 1UF 50V U-TYPE 20%
96.00	C 63	120		150-0062	CAP E 47UF 10V U-TYPE
97.00	C 64	119		150-0023	CAP E 10UF 16V U-TYPE 20%
98.00	C 65	120		150-0062	CAP E 47UF 10V U-TYPE
99.00	C 66	120		150-0062	CAP E 47UF 10V U-TYPE
100.00	C 68	120		150-0062	CAP E 47UF 10V U-TYPE
101.00	C 71	119		150-0023	CAP E 10UF 16V U-TYPE 20%
102.00	C 72	119		150-0023	CAP E 10UF 16V U-TYPE 20%
103.00	C 74	121		150-0047	CAP E 100UF 10V U-TYPE
104.00	C 79	122		150-0059	CAP E 100UF 16V U-TYPE 20%
105.00	C 86	121		150-0047	CAP E 100UF 10V U-TYPE
106.00	C111	120		150-0062	CAP E 47UF 10V U-TYPE
107.00	C112	119		150-0023	CAP E 10UF 16V U-TYPE 20%
108.00	EM 11	126		271-0007	EMI FILTER STX222MB
109.00	EM 12	126		271-0007	EMI FILTER STX222MB
110.00	EM 13	126		271-0007	EMI FILTER STX222MB
111.00	EM 14	126		271-0007	EMI FILTER STX222MB
112.00	EM 15	126		271-0007	EMI FILTER STX222MB
113.00	EM 16	126		271-0007	EMI FILTER STX222MB
114.00	EM 17	125		271-0006	EMI FILTER STB271KB
115.00	EM 18	126		271-0007	EMI FILTER STX222MB
116.00	EM 21	126		271-0007	EMI FILTER STX222MB
117.00	EM 22	126		271-0007	EMI FILTER STX222MB
118.00	EM 23	126		271-0007	EMI FILTER STX222MB

PART NO. : 837-8779
 DESCRIPTION : IC BD M5 VA6.5 PAL-G

LINE	LOCATE	DNO	OR	PART NO.	DESCRIPTION
119.00	EM 24	126		271-0007	EMI FILTER STX222MB
120.00	EM 25	126		271-0007	EMI FILTER STX222MB
121.00	EM 26	126		271-0007	EMI FILTER STX222MB
122.00	EM 27	125		271-0006	EMI FILTER STB271KB
123.00	EM 28	126		271-0007	EMI FILTER STX222MB
124.00	EM 31	126		NOT USED	NOT USED
125.00	EM 32	126		NOT USED	NOT USED
126.00	EM 33	126		NOT USED	NOT USED
127.00	EM 34	126		NOT USED	NOT USED
128.00	EM 35	126		NOT USED	NOT USED
129.00	EM 36	126		NOT USED	NOT USED
130.00	EM 37	125		NOT USED	NOT USED
131.00	EM 38	126		NOT USED	NOT USED
132.00	FB 1	127		271-0005-1	BEADS INDUCTOR FBA04VA600VB-00
133.00	FB 2	127		271-0005-1	BEADS INDUCTOR FBA04VA600VB-00
134.00	FB 3	127		271-0005-1	BEADS INDUCTOR FBA04VA600VB-
135.00	FB 4	127		271-0005-1	BEADS INDUCTOR FBA04VA600VB-00
136.00	FB 5	127		NOT USED	NOT USED
137.00	FB 6	128		270-5027	LINE FILTER 4HOLE BALUN TYPE
138.00	FB 7	129		270-5029	LINE FILTER RING TYPE
139.00	FB 8	127		271-0005-1	BEADS INDUCTOR FBA04VA600VB-00
140.00	FB 9	127		271-0005-1	BEADS INDUCTOR FBA04VA600VB-00
141.00	FB 10	127		271-0005-1	BEADS INDUCTOR FBA04VA600VB-00
142.00	FB 11	130		270-5045	LINE FILTER WIND 20UH FL5R200F
143.00	FB 12	130		270-5045	LINE FILTER WIND 20UH FL5R200F
144.00	FB 13	127		271-0005-1	BEADS INDUCTOR FBA04VA600VB-00
145.00	FB 14	127		271-0005-1	BEADS INDUCTOR FBA04VA600VB-00
146.00	FB 15	130		270-5045	LINE FILTER WIND 20UH FL5R200F
147.00	VR 1	131		220-5248	SLIDE VOL CONT 50KOHM RS20H111
148.00	SW 1	133		509-5240-01	SLIDE SWITCH HSW1699-01-010
149.00	SW 2	132	1	510-5019	TACTILE PUSH SW SKEVAA
150.00	SW 2	132	2	509-5207	TACT SW SKEVAA ALPS
151.00	CN 1	135	1	212-5106	DIN CONN 8P B-TYPE UC-0059#2
152.00	CN 1	135	2	212-5106-01	DIN CONN 8P B-TYPE DJ-008-8P "
153.00	CN 1	135	3	212-5106-02	DIN CONN 8P TCS4490-01-4151
154.00	CN 3	134		209-5026	EDGE CONNECTOR 64P MITSUMI
155.00	CN 4	136		209-5027	D-SUB 9P ANGLE TYPE UI-0095#01
155.10	CN 4	136		NOT USED	NOT USED
156.00	CN 5	137	1	209-5017-01	D-SUB 9P ANGLE TYPE UC-0060#2
157.00	CN 5	137	2	209-5017-03	DIN SUB 9P ANGLE TYPE TOSK
158.00	CN 5	137	3	209-5017-04	D-SUB 9P ANGLE CMP1100-010010
159.00	CN 6	137	1	209-5017-01	D-SUB 9P ANGLE TYPE UC-0060#2
160.00	CN 6	137	2	209-5017-03	DIN SUB 9P ANGLE TYPE TOSK
161.00	CN 6	137	3	209-5017-04	D-SUB 9P ANGLE CMP1100-010010
162.00	CN 9	138	1	600-5110-02	LED SOCKET/CABLE UJ-0263#01
163.00	CN 9	138	2	600-5820	LED SKT WITH CNN L=110 MM
164.00	RF MOD.	139	1	200-5086	RF MODULATER UE3622 (G-PAL)
165.00	RF MOD.	139	2	200-5086-01	RF MODULATOR G-PAL MDMT4D011A
166.00	RF MOD.	139	3	200-5086-02	RF MODULATER PAL-G YAA21-0496
167.00	JP 5	140		600-5941-150	CA VINYL AWG22 UL1430 L=150MM
168.00	JP 6	142		600-5941-60	CA VINYL AWG22 UL1430 L=60MM
169.00	JP 7	141		600-5941-90	CA VINYL AWG22 UL1430 L=90MM
170.00	SL CN4L	144		090-0012	SCREW-LOCK
171.00	SL CN4R	144		090-0012	SCREW LOCK
172.00	SL CN5L	144		090-0012	SCREW LOCK
173.00	SL CN5R	144		090-0012	SCREW LOCK
174.00	SL CN6L	144		090-0012	SCREW LOCK
175.00	SL CN6R	144		090-0012	SCREW LOCK

PART NO. : 837-8779
 DESCRIPTION : IC BDM5 VA6.5 PAL-G

LINE	LOCATE	DNO	OR PART NO.	DESCRIPTION
176.00	SL HSU	144	090-0012	SCREW LOCK
177.00	SL HSD	144	090-0012	SCREW LOCK
178.00	SL IC15	144	090-0012	SCREW LOCK
179.00	SL IC17	144	090-0012	SCREW LOCK
180.00	GRS IC15	145	601-0076	TML JNT CMPD 200G/TUBE(AMICON)
181.00	GRS IC17	145	601-0076	TML JNT CMPD 200G/TUBE(AMICON)
182.00	TS CN5L	201	012-0308	TAP SCR PH 3*8
183.00	TS CN5R	201	012-0308	TAP SCR PH 3*8
184.00	TS CN6L	201	012-0308	TAP SCR PH 3*8
185.00	TS CN6R	201	012-0308	TAP SCR PH 3*8
186.00	MS-GN4L	202	000-0308	M-SCR-PH-PHILL-ISO-M3*8
187.00	MS-GN4R	202	000-0308	M-SCR-PH-PHILL-ISO-M3*8
188.00	DS HSU	203	029-0227	DELTITE SCR PH M3*6
189.00	DS HSD	203	029-0227	DELTITE SCR PH M3*6
190.00	DS IC15	203	029-0227	DELTITE SCR PH M3*6
191.00	DS IC17	203	029-0227	DELTITE SCR PH M3*6
192.00	EYLET CN3L	204	1 048-0001	EYLET 3.5*7
193.00	EYLET CN3L	204	2 048-0002	EYLET 6*3.5*8
194.00	EYLET CN3R	204	1 048-0001	EYLET 3.5*7
195.00	EYLET CN3R	204	2 048-0002	EYLET 6*3.5*8

PART NO. : 837-8779
 DESCRIPTION : IC BD M5 VA6.5 PAL-G

NE	LOCATE	DNO	OR PART NO.	DESCRIPTION
1.00	PCB	1	1 171-5963-30	PC BD M5 PAL VA5 MAIN
2.00	C 2	115	151-0265	CAP CER CP 0.1UF 25V ZF 2125
3.00	C 3	115	151-0265	CAP CER CP 0.1UF 25V ZF 2125
4.00	C 6	113	151-0307	CAP CER CP 0.022UF 50V ZF2125
5.00	C 7	113	151-0307	CAP CER CP 0.022UF 50V ZF2125
6.00	C 8	113	151-0307	CAP CER CP 0.022UF 50V ZF2125
7.00	C 9	113	151-0307	CAP CER CP 0.022UF 50V ZF2125
8.00	C 10	113	151-0307	CAP CER CP 0.022UF 50V ZF2125
9.00	C 14	113	151-0307	CAP CER CP 0.022UF 50V ZF2125
10.00	C 15	113	151-0307	CAP CER CP 0.022UF 50V ZF2125
11.00	C 16	113	151-0307	CAP CER CP 0.022UF 50V ZF2125
12.00	C 17	113	151-0307	CAP CER CP 0.022UF 50V ZF2125
13.00	C 18	113	151-0307	CAP CER CP 0.022UF 50V ZF2125
14.00	C 19	113	151-0307	CAP CER CP 0.022UF 50V ZF2125
15.00	C 20	113	151-0307	CAP CER CP 0.022UF 50V ZF2125
16.00	C 21	113	151-0307	CAP CER CP 0.022UF 50V ZF2125
17.00	C 22	113	151-0307	CAP CER CP 0.022UF 50V ZF2125
18.00	C 25	113	151-0307	CAP CER CP 0.022UF 50V ZF2125
19.00	C 26	113	151-0307	CAP CER CP 0.022UF 50V ZF2125
20.00	C 27	113	151-0307	CAP CER CP 0.022UF 50V ZF2125
21.00	C 28	112	151-0312	CAP CER CP 0.01UF 50V KB2125
22.00	C 29	105	151-0337	CAP CER CHIP 82PF 50V CH2125
23.00	C 33	112	151-0312	CAP CER CP 0.01UF 50V KB2125
24.00	C 34	108	151-0309	CAP CER CP 180PF 50V CH2125
25.00	C 35	101	151-0336	CAP CER CHIP 12PF 50V CH2125
26.00	C 37	106	151-0334	CAP CER CP 100PF 50V J CH 2125
27.00	C 39	910	NOT USED	NOT USED
28.00	C 45	111	151-0311	CAP CER CP 5600PF 50V KB2125
29.00	C 46	114	151-0269	CAP CER CP 0.1UF 25V K 2125
30.00	C 47	114	151-0269	CAP CER CP 0.1UF 25V K 2125
31.00	C 48	111	151-0311	CAP CER CP 5600PF 50V KB2125
32.00	C 69	113	151-0307	CAP CER CP 0.022UF 50V ZF2125
33.00	C 73	115	151-0265	CAP CER CP 0.1UF 25V ZF 2125
34.00	C 75	112	151-0312	CAP CER CP 0.01UF 50V KB2125
35.00	C 76	112	151-0312	CAP CER CP 0.01UF 50V KB2125
36.00	C 77	110	151-0305	CAP CER CP 1000PF 50V KB2125
37.00	C 78	103	151-0318	CAP CER CHIP 33PF 50V CH 2125
38.00	C 80	910	NOT USED	NOT USED
39.00	C 81	109	151-0310	CAP CER CP 220PF 50V SL2125
40.00	C 82	102	151-0319	CAP CER CHIP 20PF 50V CH2125
41.00	C 83	115	151-0265	CAP CER CP 0.1UF 25V ZF 2125
42.00	C 85	110	151-0305	CAP CER CP 1000PF 50V KB2125
43.00	C 87	113	151-0307	CAP CER CP 0.022UF 50V ZF2125
44.00	C 88	104	151-0270	CAP CER CP 47PF 50V K SL 2125
45.00	C 89	113	151-0307	CAP CER CP 0.022UF 50V ZF
46.00	C 90	910	NOT USED	NOT USED
47.00	C 91	113	151-0307	CAP CER CP 0.022UF 50V ZF
48.00	C 92	103	151-0318	CAP CER CHIP 33PF 50V CH
49.00	C 93	910	NOT USED	NOT USED
50.00	C 94	910	NOT USED	NOT USED
51.00	C 95	115	151-0265	CAP CER CP 0.1UF 25V ZF
52.00	C 96	101	151-0336	CAP CER CHIP 12PF 50V CH
53.00	C102	103	151-0318	CAP CER CHIP 33PF 50V CH
54.00	C103	910	NOT USED	NOT USED
55.00	C105	910	NOT USED	NOT USED
56.00	C106	103	151-0318	CAP CER CHIP 33PF 50V CH
57.00	C107	103	151-0318	CAP CER CHIP 33PF 50V CH
58.00	C108	103	151-0318	CAP CER CHIP 33PF 50V CH

PARTS LIST

PART NO. : 837-8779
 DESCRIPTION : IC BD M5 VA6.5 PAL-G

LINE	LOCATE	DNO	OR PART NO.	DESCRIPTION
59.00	C109	103	151-0318	CAP CER CHIP 33PF 50V CH
60.00	C110	103	151-0318	CAP CER CHIP 33PF 50V CH
61.00	C112	103	151-0318	CAP CER CHIP 33PF 50V CH
62.00	C113	103	151-0318	CAP CER CHIP 33PF 50V CH
63.00	C114	910	NOT USED	NOT USED
64.00	C115	103	151-0318	CAP CER CHIP 33PF 50V CH
65.00	C116	103	151-0318	CAP CER CHIP 33PF 50V CH
66.00	C117	910	NOT USED	NOT USED
67.00	C118	910	NOT USED	NOT USED
68.00	C119	910	NOT USED	NOT USED
69.00	C120	910	NOT USED	NOT USED
70.00	C121	114	151-0269	CAP CER CP 0.1UF 25V K
71.00	C122	910	NOT USED	NOT USED
72.00	C123	910	NOT USED	NOT USED
73.00	C124	910	NOT USED	NOT USED
74.00	R 1	132	476-2473-J-10	RES CHIP 47KOHM 1/10W 5%
75.00	R 3	118	476-2121-J-10	RES CHIP 120 OHM 1/10W 5%
76.00	R 4	119	476-2331-J-10	RES CHIP 330 OHM 1/10W 5%
77.00	R 5	119	476-2331-J-10	RES CHIP 330 OHM 1/10W 5%
78.00	R 6	119	476-2331-J-10	RES CHIP 330 OHM 1/10W 5%
79.00	R 7	119	476-2331-J-10	RES CHIP 330 OHM 1/10W 5%
80.00	R 8	123	476-2222-J-10	RES CHIP 2.2KOHM 1/10W 5%
81.00	R 9	123	476-2222-J-10	RES CHIP 2.2KOHM 1/10W 5%
82.00	R 10	123	476-2222-J-10	RES CHIP 2.2KOHM 1/10W 5%
83.00	R 11	123	476-2222-J-10	RES CHIP 2.2KOHM 1/10W 5%
84.00	R 12	123	476-2222-J-10	RES CHIP 2.2KOHM 1/10W 5%
85.00	R 14	123	476-2222-J-10	RES CHIP 2.2KOHM 1/10W 5%
86.00	R 15	123	476-2222-J-10	RES CHIP 2.2KOHM 1/10W 5%
87.00	R 16	123	476-2222-J-10	RES CHIP 2.2KOHM 1/10W 5%
88.00	R 17	125	476-2472-J-10	RES CHIP 4.7KOHM 1/10W 5%
89.00	R 18	121	476-2122-J-10	RES CHIP 1.2KOHM 1/10W 5%
90.00	R 19	125	476-2472-J-10	RES CHIP 4.7KOHM 1/10W 5%
91.00	R 20	121	476-2122-J-10	RES CHIP 1.2KOHM 1/10W 5%
92.00	R 21	125	476-2472-J-10	RES CHIP 4.7KOHM 1/10W 5%
93.00	R 22	121	476-2122-J-10	RES CHIP 1.2KOHM 1/10W 5%
94.00	R 23	124	476-2332-J-10	RES CHIP 3.3KOHM 1/10W 5%
95.00	R 24	120	476-2102-J-10	RES CHIP 1KOHM 1/10W 5%
96.00	R 25	117	476-2750-J-10	RES CHIP 75 OHM 1/10W 5%
97.00	R 26	120	476-2102-J-10	RES CHIP 1KOHM 1/10W 5%
98.00	R 27	121	476-2122-J-10	RES CHIP 1.2KOHM 1/10W 5%
99.00	R 28	121	476-2122-J-10	RES CHIP 1.2KOHM 1/10W 5%
100.00	R 29	120	476-2102-J-10	RES CHIP 1KOHM 1/10W 5%
101.00	R 30	128	476-2243-J-10	RES CHIP 24KOHM 1/10W 5%
102.00	R 31	123	476-2222-J-10	RES CHIP 2.2KOHM 1/10W 5%
103.00	R 32	117	476-2750-J-10	RES CHIP 75 OHM 1/10W 5%
104.00	R 33	117	476-2750-J-10	RES CHIP 75 OHM 1/10W 5%
105.00	R 34	133	476-2513-J-10	RES CHIP 51KOHM 1/10W 5%
106.00	R 35	123	476-2222-J-10	RES CHIP 2.2KOHM 1/10W 5%
107.00	R 36	132	476-2473-J-10	RES CHIP 47KOHM 1/10W 5%
108.00	R 37	133	476-2513-J-10	RES CHIP 51KOHM 1/10W 5%
109.00	R 38	123	476-2222-J-10	RES CHIP 2.2KOHM 1/10W 5%
110.00	R 39	132	476-2473-J-10	RES CHIP 47KOHM 1/10W 5%

PART NO. : 837-8779
 DESCRIPTION : IC BD M5 VA6.5 PAL-G

LINE	LOCATE	DNO OR PART NO.	DESCRIPTION
111.00	R 40	127 476-2103-J-10	RES CHIP 10KOHM 1/10W 5%
112.00	R 41	127 476-2103-J-10	RES CHIP 10KOHM 1/10W 5%
113.00	R 42	127 476-2103-J-10	RES CHIP 10KOHM 1/10W 5%
114.00	R 43	127 476-2103-J-10	RES CHIP 10KOHM 1/10W 5%
115.00	R 49	117 476-2750-J-10	RES CHIP 75 OHM 1/10W 5%
116.00	R 50	117 476-2750-J-10	RES CHIP 75 OHM 1/10W 5%
117.00	R 51	132 476-2473-J-10	RES CHIP 47KOHM 1/10W 5%
118.00	R 52	132 476-2473-J-10	RES CHIP 47KOHM 1/10W 5%
119.00	R 53	123 476-2222-J-10	RES CHIP 2.2KOHM 1/10W 5%
120.00	R 54	123 476-2222-J-10	RES CHIP 2.2KOHM 1/10W 5%
121.00	R 55	126 476-2562-J-10	RES CHIP 5.6KOHM 1/10W 5%
122.00	R 56	126 476-2562-J-10	RES CHIP 5.6KOHM 1/10W 5%
123.00	R 57	126 476-2562-J-10	RES CHIP 5.6KOHM 1/10W 5%
124.00	R 58	131 476-2363-J-10	RES CHIP 36KOHM 1/10W 5%
125.00	R 59	125 476-2472-J-10	RES CHIP 4.7KOHM 1/10W 5%
126.00	R 64	127 476-2103-J-10	RES CHIP 10KOHM 1/10W 5%
127.00	R 65	134 476-2104-J-10	RES CHIP 100KOHM 1/10W 5%
128.00	R 66	129 476-2303-J-10	RES CHIP 30KOHM 1/10W 5%
129.00	R 67	121 476-2122-J-10	RES CHIP 1.2KOHM 1/10W 5%
130.00	R 68	910 NOT USED	NOT USED
131.00	R 69	910 NOT USED	NOT USED
132.00	R 70	122 476-2202-J-10	RES CHIP 2KOHM 1/10W 5%
133.00	R 71	123 476-2222-J-10	RES CHIP 2.2KOHM 1/10W 5%
134.00	R 72	121 476-2122-J-10	RES CHIP 1.2KOHM 1/10W 5%
135.00	R 73	120 476-2102-J-10	RES CHIP 1KOHM 1/10W 5%
136.00	R 74	130 476-2333-J-10	RES CHIP 33KOHM 1/10W 5%
137.00	R 77	125 476-2472-J-10	RES CHIP 4.7KOHM 1/10W 5%
138.00	R 78	125 476-2472-J-10	RES CHIP 4.7KOHM 1/10W 5%
139.00	R 79	125 476-2472-J-10	RES CHIP 4.7KOHM 1/10W 5%
140.00	R 80	125 476-2472-J-10	RES CHIP 4.7KOHM 1/10W 5%
141.00	R 81	125 476-2472-J-10	RES CHIP 4.7KOHM 1/10W 5%
142.00	R 82	125 476-2472-J-10	RES CHIP 4.7KOHM 1/10W 5%
143.00	R 83	125 476-2472-J-10	RES CHIP 4.7KOHM 1/10W 5%
144.00	R 84	125 476-2472-J-10	RES CHIP 4.7KOHM 1/10W 5%
145.00	R 85	116 476-2100-J-10	RES CHIP 10 OHM 1/10W 5%

PARTS LIST

PART NO. : 839-0262
DESCRIPTION : ASSY SUB BOARD3 M5

LINE	DNO OR Q/U	SB	PART NO.	DESCRIPTION
1.00	1	1.000	171-5801	PC BD M5 USA SUB 3
2.00	101 1	1.000	212-5004	PIN PLUG FOR DC/NP UC-005G#1
3.00	101 2	1.000	212-5004-01	PIN PLUG FOR DC/NP DJ-005P-A
4.00	101 3	1.000	212-5004-02	PIN PLUG FOR DC/NP HEC0470-01

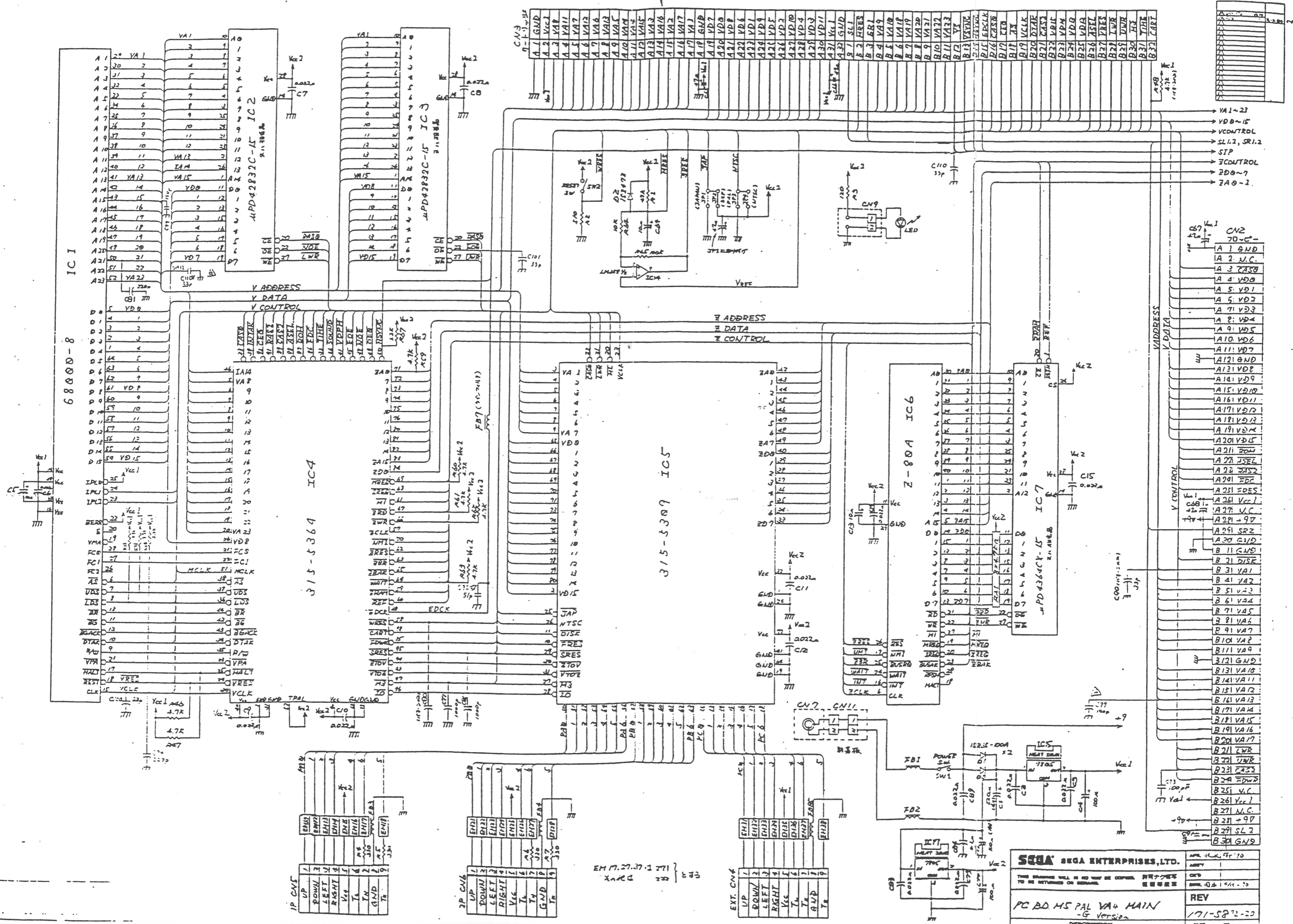
PART NO. : 839-0199
DESCRIPTION- : ASSY SUB BOARD M5

LINE	LOCATE	DNO OR	PART NO.	DESCRIPTION
1.00	PCB	1	171-5674	PC BOARD M5 SUB
2.00	CN10	101	210-5035	STEREO MINI JK HSJ0871-01-440

MEGA DRIVE

PAL-G (GERMANY)

S C H E M A T I C D I A G R A M



SEGA ENTERPRISES, LTD.

THIS BOARD WILL BE RETURNED TO THE CUSTOMER ONLY IF THE BOARD IS RETURNED TO THE COMPANY.

REV 1.1

PC BD. MS PAL VA4 MAIN
-G Version

DESCRIPTION

REV 171-5872-20