SEGA SC-3000

To BASIC LEVEL III

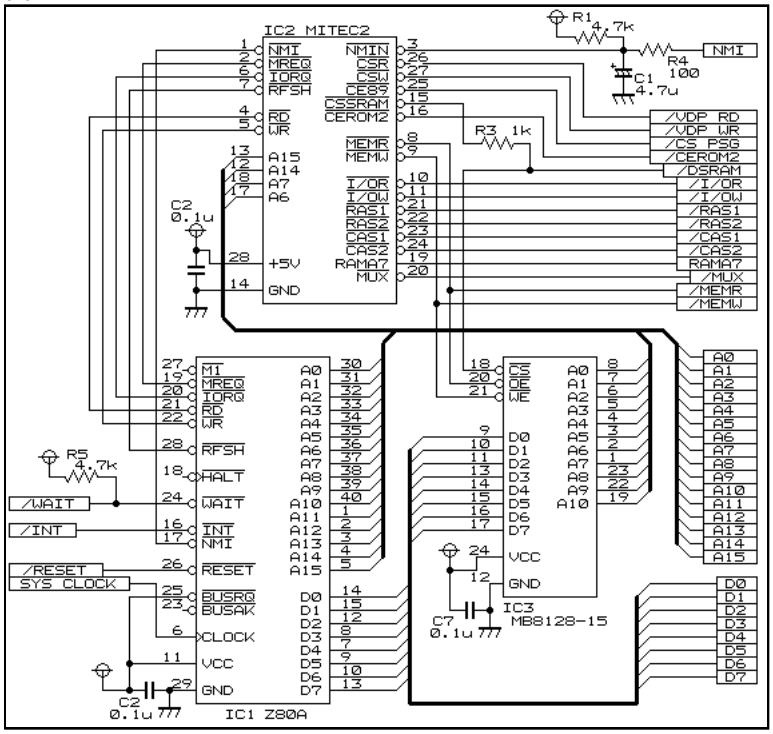
SEGA SG-3000 specs

CPU	D780C-1 (Z80A) 3.579MHz
VDP	TMS9918A
PSG	SN76489
ROM	Supplied by slot
RAM	2KB (expandable)
V-RAM	16KB

The low-priced personal computer released by Sega Enterprise's Personal Computer Division has the minimum design.
It is regrettable that the 5-slot expansion unit was not released due to various considerations for expansion.
In the TV program "PC Space Daisakusen-Save the Idol", the sponsor was Sega, so SG-1000 was presented to the guest.
SC-3000 is used for PC Fukuwarai of program games
There is a complaint that BASIC is a little slow and / INT is fixed in ROM without hooking.
However, it is good that the memory can be easily added because the RAM in the main body can be prohibited.

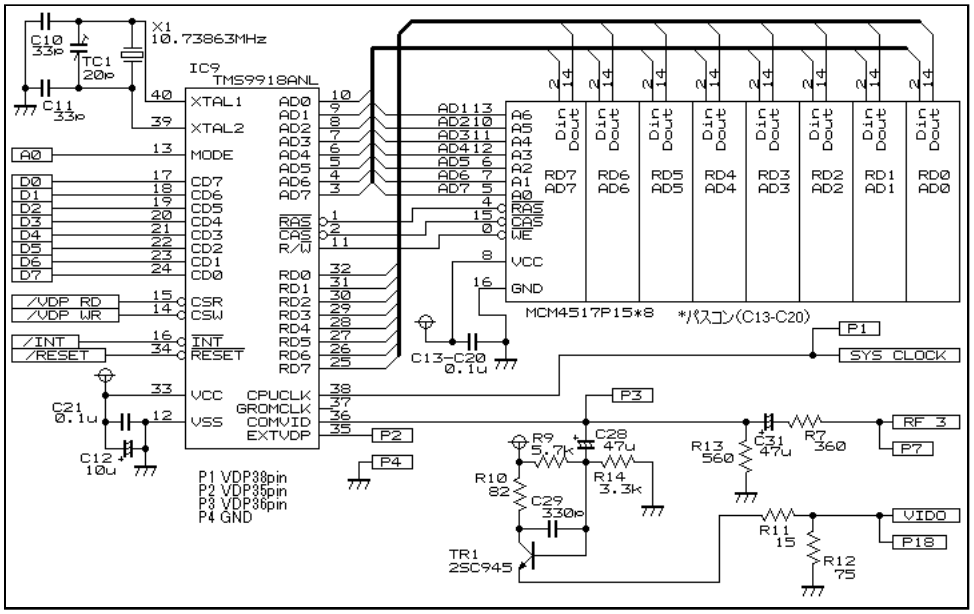
Also, since the custom chip refreshes the D-RAM and decodes the I / O port, the inside is simple.
It seems that there was a plan from SC-1000 to SC-5000, and this is the only SC-3000 that was actually released.
Network system using CATV at the same time as the disk system SF-7000
There was a plan for SEGA DOS, but it seems that it was just an experiment

CPU



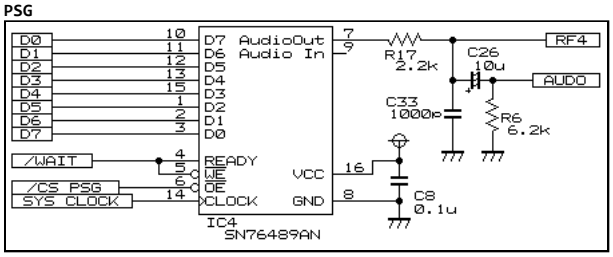
CPU uses NEC PD780-1 Clock is about 3.579MHz
Interrupt is assigned to mode 1, NMI is assigned to the RESET key (pause key), and INT is assigned to VSYNC from VDP.
/ OSRAM is connected to / CS of SRAM in the main body and can be prohibited by setting it to 1.

VDP



VDP uses TI TMS9918A and CPUCLOCK is used as the system clock (about 3.579MHz).

PSG

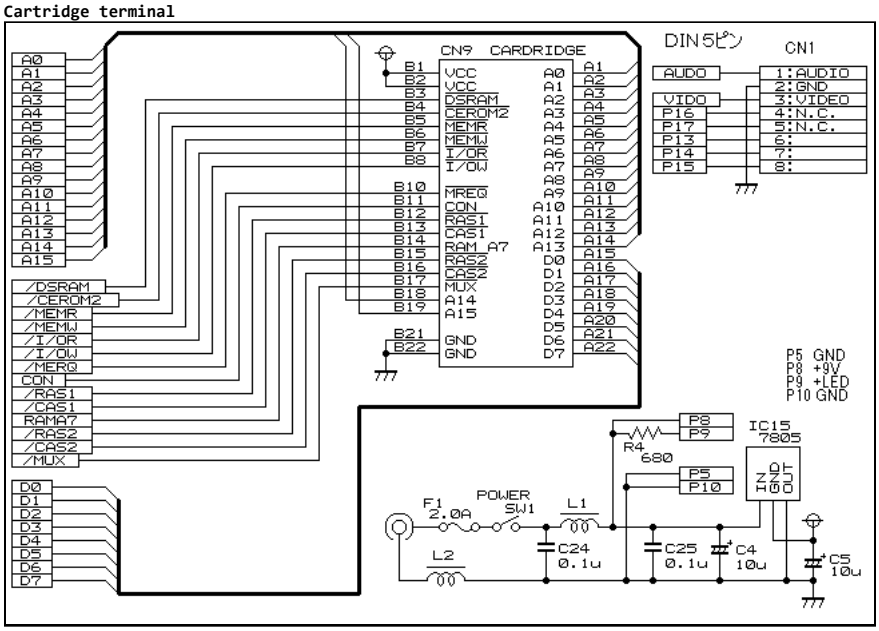


SN76489AN is used, the clock is 3.759MHz, MSB is connected to D0, LSB is connected to D7.
/ WE and READY signals are connected
/ WAIT is a pull-up of R5 (4.7k) and is connected to / WAIT of CPU.

ROM
ROM is not built in the main body, it will be supplied by cartridge or card (card catcher required)
Mega ROM is controlled by the mapper inside the cartridge (portrait of Loretta)

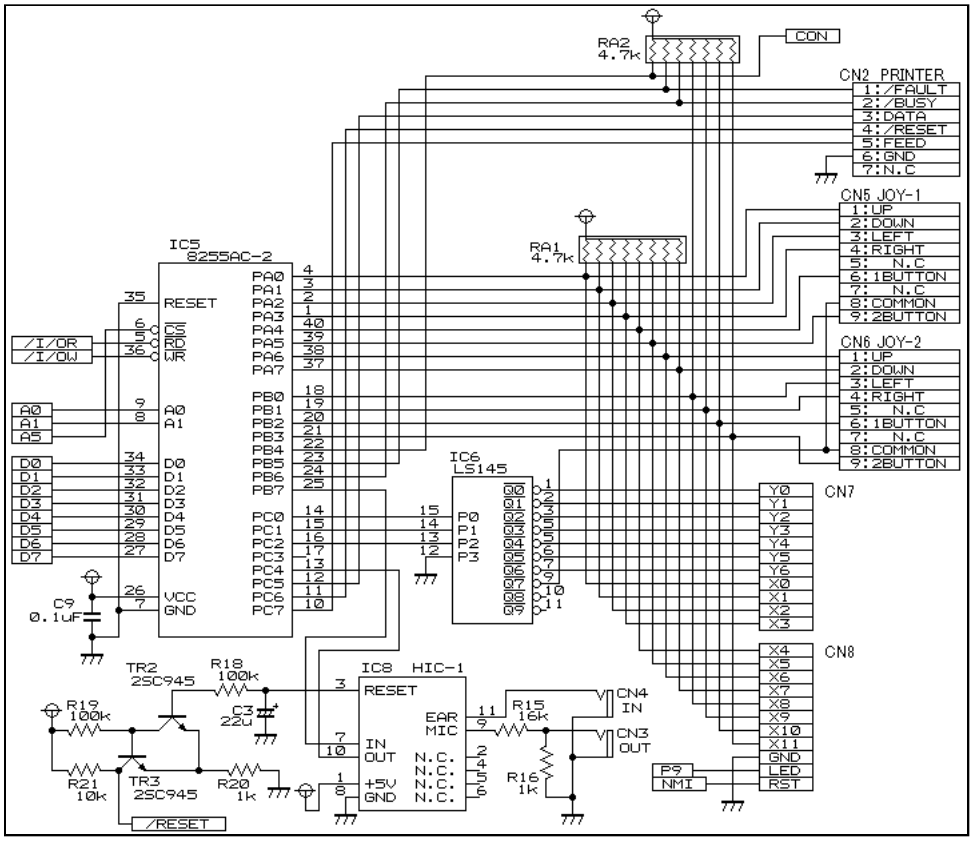
RAM
RAM is 2KB (0C000H-0C7FFH) in the main body
You can disable the use of RAM in the main unit from the cartridge (B3 terminal is always 1).
This is designed to allow new additions
Since the D-RAM control signal is output from the cartridge terminal, it is possible to expand the memory of D-RAM and S-RAM.

Cartridge terminal



B7 / I / OR and B8 / I / OR are port 0C0H-0FFH.

I / O port



000H-03FH: Unused
040H-07FH: PSG SN76489, using port 07FH
080H-0BFH: VDP TMS9918A, port 0BEH-0BFH used
0C0H-0DFH: Keyboard + JOY terminal, port 0DCH-0DFH is used
0E0H-0FFH: SF-7000 for expansion

Port 07FH
This is the port of PSG SN76489.

Port 0BEH-0BFH
This is the port of VDP TMS9918A.

Keyboard, JOY pad terminal, cassette terminal, serial printer terminal
Port 0DCH: PA key data
d7: KEY PA7 (input)
d6: KEY PA6 (input)
d5: KEY PA5 (input)
d4: KEY PA4 (input)
d3: KEY PA3 (input)
d2: KEY PA2 (input)
d1: KEY PA1 (input)
d0: KEY PA0 (input)

Port 0DDH: PB key data, CMT, serial printer, cartridge terminal
d7: CMT LOAD (input)
d6: SPR BUSY (input)
d5: SPR / FAULT (input)
d4: EXT / CONT (input)
d3: KEY PB3 (input)
d2: KEY PB2 (input)
d1: KEY PB1 (input)
d0: KEY PB0 (input)

Port 0DEH: PC key select, CMT, serial printer
d7: SPR / FEED (output)
d6: SPR / RESET (output)
d5: SPR DATA (output)
d4: CMT SAVE (output)
d3: CMT MOTOR (output) 1 = On, 0 = Off (not implemented)
d2: KEY SEL P2 (output)
d1: KEY SEL P1 (output)
d0: KEY SEL P0 (output)

Port 0DFH: 8255 CW

SF-7000 (SC-3000 dedicated expansion unit) port
Equipped with one 3-inch compact floppy (CF) drive (belt drive drive)
Memory is RAM64KB (D-RAM64KB), IPL ROM4KB
RS-232C (Baud rate can be set with a jumper inside the main unit, but it is fixed by soldering)
Equipped with a printer terminal of Centnix specifications

However, there is no expansion terminal
FDC interrupts cannot be used because all SC-3000 interrupts are used.
Therefore, it is designed to port FDC / INT.

FDCμD765AC port
0E0H: Status register
0E1H: Data register

PPI μD8255AC-2 port
0E4H: PA
d7:-
d6:-
d5:-
d4:-
d3:-
d2: FDD INDEX
d1: PRT BUSY
d0: FDD FDCINT

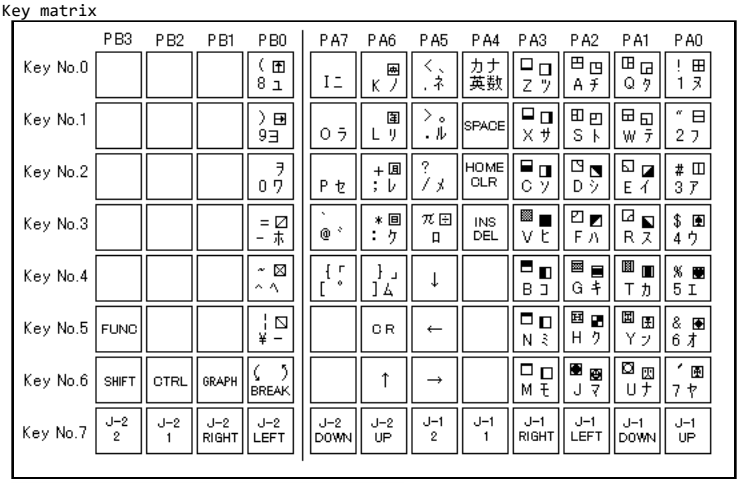
0E5H: PB
d7: PRT DB7
d6: PRT DB6
d5: PRT DB5
d4: PRT DB4
d3: PRT DB3
d2: PRT DB2
d1: PRT DB1
d0: PRT DB0

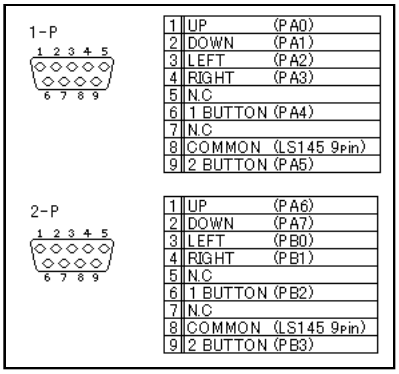
0E6H: PC
d7: PRT / STROBE
d6: SYS / ROM SEL 1 = RAM selected, 0 = IPL ROM selected
d5: FDD? ?? ?? Unknown 1 = Start drive, 0 = Stop drive
d4:-
d3: FDD RESET 1 = reset, 0 = not reset
d2: FDD TC
d1: FDD / MOTOR ON 1 = Motor off, 0 = Motor on
d0: FDD / INUSE

0E7H: 8255 CW

RS-232C (μD8251AFC) port
0E8H: Data register
0E9H: Control register

Key matrix

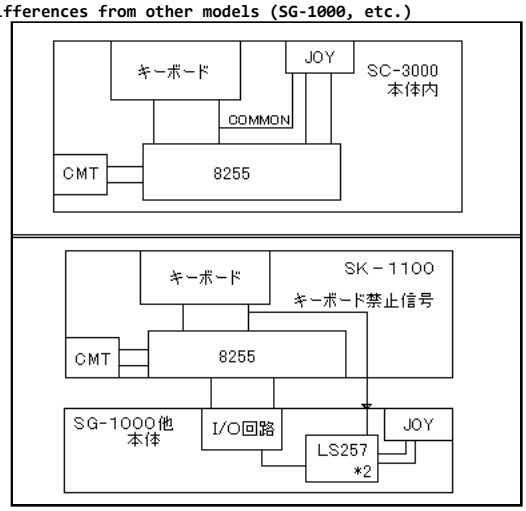




SC-3000 is different from SG-1000 and SEGA MARK III

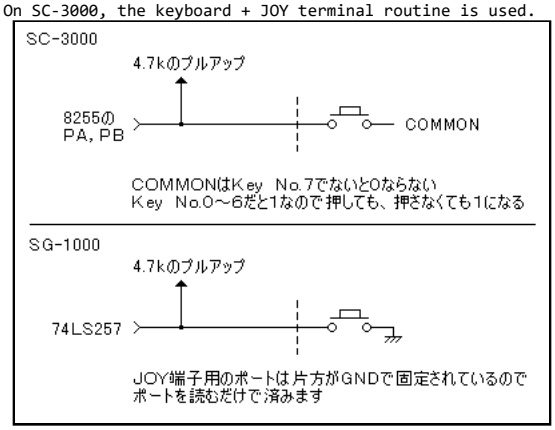
I / O is performed on all 8255 ports.
Then, when Key No. 7 is selected, the 8-pin (GND in other models) of JOY terminals 1 and 2 becomes "0".
JOY data can be read by PA7-0 and PB3-0 as well as the keyboard.
Since there is no + 5V and GND, the rapid fire pad cannot be used.
Direction and button 1 and button 2 are 1 = off, 0 = on

Differences from other models (SG-1000, etc.)



Since it is designed as a personal computer, it has a D-RAM refresh circuit and outputs it to the cartridge terminal.
The JOY terminal is reading on the port of 8255, there is no VCS, there is no GND, and it is the selector of LS145.
When the JOY terminal is selected, it is set to 0 (COMMON).
On other models + SK-1100, when reading the keyboard, the JOY terminal is prohibited and the key data is read.
When reading the JOY terminal, the keyboard is prohibited and the data of the JOY terminal in the main unit is read.

Because there are two types, keyboard + JOY terminal and JOY terminal only
To support both, check if the keyboard is connected
You need to have two routines, one with only the JOY terminal and one with a keyboard.
On SC-3000, the keyboard + JOY terminal routine is used.



Since the keyboard is integrated, when the keyboard is operated, vibration tends to cause poor contact between the main unit and the cassette, and it is
You cannot use it with confidence unless you fold the paper and fill the gap between the main body and the cartridge to prevent runaway.

JOY terminal
For SC-3000
PPI control direction, trigger button can be input / output

For SG-1000 and MARK III
LS257 control direction, trigger button is input only

For master system
Custom chip control direction is input only, trigger button can be input / output

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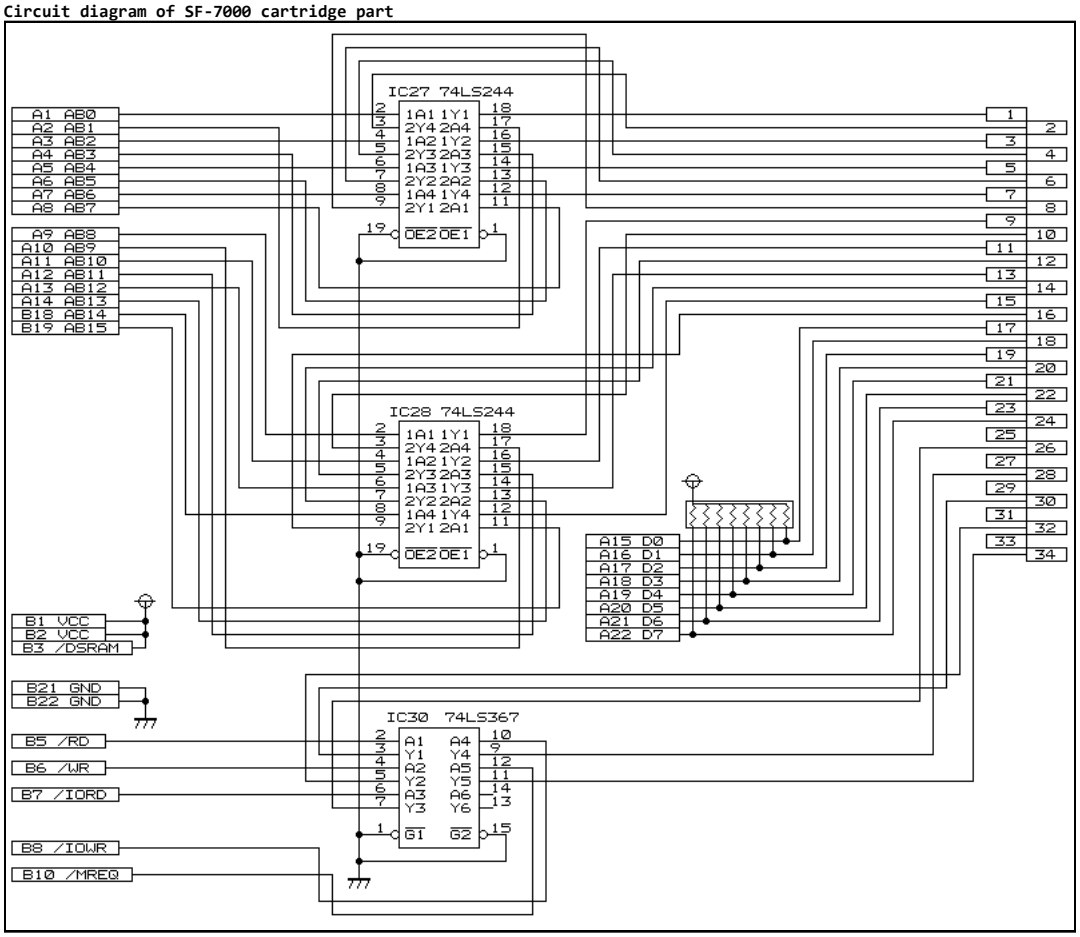
Empty pattern of the main body
Late lots have a pattern in which TTL ICs, etc. are placed near VDP (171-5048).
LS04 is listed in the system clock pattern used in overseas PAL specification SC-3000.
Because the TMS9928 and TMS9992 do not output a 3.579 MHz clock signal for the system.
A system clock (for CPU and PSG) is required separately from the one for VDP.
Therefore, in the new lot, use the same main board as the Japanese (NTSC) specifications and PAL specifications.
It is designed to be handled with a small number of changes. (PAL specifications have a video circuit on the sub board)

Also, change the VDP to TMS9928 and install a system clock circuit.
Remove the jumper of the system clock in the center of the board (jumper that straddles the hole of the spacer that attaches the sub board)
Add a jumper to the system clock marked on the board
If you make a matrix circuit from the color difference of VDP, you should be able to output analog RGB.

Also, the video terminal pattern can be changed to an RGB terminal connector.

Circuit diagram of SF-7000 cartridge part



It is a bus buffer for connecting to the SF-7000 main unit.
Since the RAM of the main body (SF-7000) uses self-refresh D-RAM MN4264 * 8, it is not necessary to refresh the cartridge.

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