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Consumer Products Division

SEGA SATURN

SMPC Sample Program

(tentative title)

User's Manual

Ver. 0.56/Edition 0.2

Doc. # ST-214-111594

REFERENCES

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   Kyoritsu Publishing Co., LTD.
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   1978

3. *IBM Dictionary of Computing*
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   New York, New York
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SEGA SATURN
SMPC Sample Program

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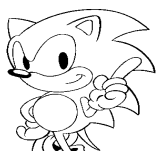
Contents



0. Introduction

This manual explains the SMPC sample program (tentative title).

0.1 Terms Used in This Manual

The terms used in this manual are explained below.

Peripheral:	General term for control pads, joysticks, etc., which are connected into the port(s) at the front of the Saturn unit and are primarily used to control characters, etc., in games.
Port:	Refers to the connectors on the front of the Saturn unit. Looking at the front of the Saturn unit, the connector on the left is port 1 and the connector on the right is port 2.
Port Number:	This is 1 or 2 when a peripheral is connected directly to a port. If a Multi-tap, etc., for expanding the number of ports is connected, then the numbers are 1-1, 2-3, and etc.

0.2 Changes from Version 0.50

1. Addition of a SMPC command test mode.
   Enables issuing of all types of SMPC commands.
2. Expantion of the maximum number of peripherals.
   Expands the number of peripherals that can handle from 12 to 30.
3. Addition of the peripherals which are compatible with the port monitor.
   Improved compatibility for the clocked serial peripherals.

1. Program Overview

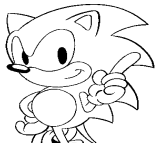
1.1 Program Objective

The primary purpose of this program is to issue commands to the SMPC, acquire peripheral data, etc. It enables to check peripherals by using connected peripherals to move sprites on the screen.

1.2 Program Functions

This program has the following functions (modes).

1. Peripheral port monitor (sprite version).
   Monitors information of the peripherals connected to each port. Also moves sprites on the screen.
2. Peripheral port monitor (RBG (rotation scroll) version).
   Monitors peripheral information as well. Moves the scroll screen plane on which information is displayed.
3. SMPC status display.
   Displays the status returned from the SMPC by INTBACK.
4. GAME (tentative title).
   Cannot be used for this version.
5. Paint Tools (tentative title).
   Enables the drawing of simple figures on screen using the mouse.
6. SMPC Command Test (added in this version).
   Issues the various kinds of SMPC commands.



2. Main Menu

2.1 Main Menu Screen

The following menu is displayed first once the program is executed.

```
>PORT MONITOR(SPRITE)
 PORT MONITOR(RBG)
 SMPC STATUS DISPLAY
 GAME
 PAINT TOOL
 COMMAND TEST
```

Select the functions to be executed from the menu using the pad.

2.2 Menu Operation

1. The peripherals that can be used in menu operation are either the standard Saturn pad, the Mega Drive 3-button pad, the Mega Drive 6-button pad, analog joysticks, steering controllers, or the Saturn keyboard (these are referred to as "peripherals that are used in menu operation" hereafter).

2. Of the peripherals that are used in menu operations, the peripheral connected to the port with the smallest number is the one that actually operates menu screens. The peripherals that are used in screen operations are confirmed in the small window at the bottom right corner of the screen.

   ```
   3B PAD
    P2-1
   ```
   Indicates Mega Drive 3-button pad connected to port 2-1.

3. If no peripherals that can be used in menu operation are connected, then a message is displayed in the window at the bottom right of the screen indicating that the unit is waiting for a peripheral to be connected.

   ```
   NOT
   READY!
   ```
   This message is displayed when a peripheral is not connected.

4. If another peripheral that can be used in menu screens is connected, pressing the peripheral start button permits operation of menus on that peripheral.

5. If a peripheral that is being used to operate menu screens is disconnected when other peripherals that are used to operate menu screens are still connected, the control shifts to the peripheral connected to the port with the smallest number.

6. The triangular cursor is moved by pressing the top or bottom of the + key and selection is made by pressing the A or C button. If the selected menu item cannot be executed, then "NOT AVAILABLE" is displayed and returns to the menu.

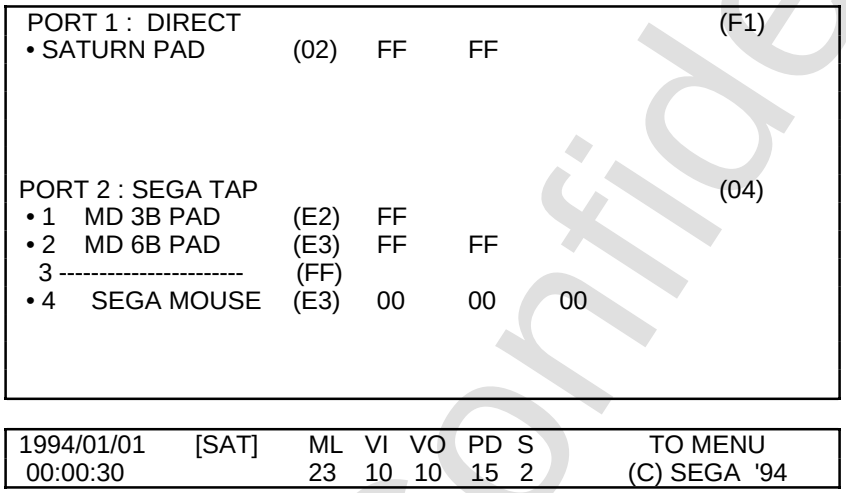
7. To return to the main menu from any menu other than the main menu, press the C button and START button at the same time on any peripheral that is connected. Menu operations are then performed by the peripheral on which the C button and START button were pressed.

3. Peripheral Port Monitor

The port monitor displays data from the various types of peripherals connected to the peripheral ports of the Saturn unit. With this version, the maximum number of peripherals that can be used is 30 (when a clocked serial 15P is connected to both ports 1 and 2). However, the peripherals displayed on the screen are only the first seven connected to each of ports 1 and 2.

3.1 Peripheral Port Monitor Screen

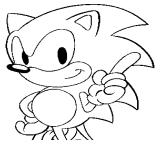
The following screen is displayed when "PORT MONITOR(SPRITE)" or "PORT MONITOR(RBG)" is selected from the main menu.



Port Monitor Screen

1. Port Status Display Area
   Displays the status of each of ports 1 and 2.

Display (Port Status)	Status
UNKNOWN OR NO DEVICE(F0)	Nothing is connected or a device that SMPC does not recognize is connected.
DIRECT(F1)	Peripheral is connected directly.
MULTI-TERMINAL 6(16)	Multi-Terminal 6 is connected.
SEGA TAP(04)	SEGA Tap is connected.
CLOCKED SERIAL (21-2F)	Clocked serial peripheral is connected.
ILLEGAL PORT ID(xx)	Displayed when the correct port status cannot be obtained for some reason. This may also be displayed when some non-compatible peripherals are connected. "xx" will change depending on the status.



2. Peripheral Name Display Area
   Displays the types and ID of connected peripherals. When multi-terminal 6 or SEGA tap is connected, a number is affixed at the beginning of the peripheral name.

Display (Saturn ID)		Peripheral
----------	(FF)	Nothing is connected or a device that SMPC does not identify is connected.
SATURN PAD	(02)	Saturn standard pad
ANALOG STICK	(15)	Analog joy stick
KEY BOARD	(14)	Saturn keyboard
STEERING CTRL	(13)	Steering controller
MD 3B PAD	(E1)	Mega Drive 3-button pad
MD 6B PAD	(E2)	Mega Drive 6-button pad
SEGA MOUSE	(E3)	SEGA mouse

   Peripherals not listed in the above table are not compatible with this version.

3. Peripheral Data Display Area
   Displays data returned by peripherals. Refer to the SMPC manual for the details of the peripheral data.

4. Time Display Area
   Displays the date and time based on the real-time clock of the SMPC.

5. Program Status Area
   Displays the main loop count and V-blank IN/OUT interrupt count in a 2-digit hexadecimal number, and the total number of bytes of peripheral data and the SMPC interrupt count in decimal number.

Display (Meaning)	Description
ML (main loop count) (00H-FFH)	Counts up using the main loop of the program.
VI/VO (V-blank IN/OUT interrupt count) (00H-FFH)	Counts up using the V-blank interrupt function (a 16 dividing value is displayed).
PD (the total number of bytes of peripheral data) (02–)	Displays the total number of bytes in the peripheral data (includes for the port ID 2 bytes).
SM (SMPC interrupt count) (1–)	Displays the number of times the SMPC interrupt occures in 1/60th of a second; normally 2 to 3 times.

3.2 Sprite Version Operation

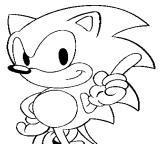
In the sprite version, sprites on the screen can be moved by all connected peripherals.

A ball-shaped sprite is assigned to each peripheral. The peripheral connected to port 1 is red and the peripheral connected to port 2 is blue. When peripherals are connected to SEGA tap or Multi-tap 6, the numbers are assigned to the balls. Therefore, the color and the number of the ball indicate which peripheral port number is used to operate the ball.

Peripheral		Operation
Saturn standard pad Mega Drive 3-button pad Mega Drive 6-button pad	+ key	Ball movement
	A button	Quadruple-speed while depressed
	X button	Toggles between variable and fixed enlargement modes
	Y button	Enlargement
	Z button	Reduction
	Start	Moves to initial position and changes to fixed mode
Analog joy stick	Joy stick	Moves (digital, analog)
	A button	Quadruple-speed while depressed (only during digital movement)
	B button	Digital movement while depressed
	X button	Toggles between variable and fixed enlargement modes
	Throttle	Enlarges and reduces ball
	Start	Moves to initial position and changes to fixed mode
SEGA mouse	Move	Moves ball
	Left click	Enlarges ball horizontally by two times
	Right click	Enlarges ball vertically by two times
	Start	Moves to initial position
Steering controller	Steering	Moves ball left and right (digital, analog)
	Shift lever	Moves ball up and down
	A button	Quadruple-speed while depressed (only during digital movement)
	B button	Digital movement while depressed
	X button	Toggles between variable and fixed enlargement modes
	Y button	Enlargement
	Z button	Reduction
	Start	Moves to initial position and changes to fixed mode
Saturn keyboard	Cursor keys	Moves ball
	Z key	Quadruple-speed while depressed
	A key	Toggles between variable and fixed enlargement modes
	S key	Enlargement
	D key	Reduction
	ESC key	Moves to initial position and changes to fixed mode

Variable/Fixed Enlargement Modes

In the variable enlargement ratio mode, the ball can be enlarged or reduced by using the Enlarge/Reduce button. In the enlargement ratio fixed mode, the ball size is fixed at 16 x 16 pixels.



3.3 RBG Version Operation

The RBG version of the port monitor is basically the same as the sprite version; the data display screen is operated by the peripheral and not by the sprite.

The peripherals that operates in the RBG version are the peripherals used in the menu screen. The operating method is shown in the table below.

Button	Function
+ key	Scrolls the screen up and down, and left and right
A button	Enlarges the screen
B button	Reduces the screen
C button	Not used
X button	Not used
Y button	Not used
Z button	Not used
L button	Not used
R button	Not used
START	Returns the screen to its initial status

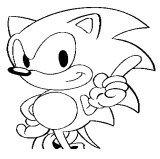
4. SMPC Status Display

Displays OREG0-15, i.e., SMPC status, in hexadecimal or binary. See the SMPC manual for details on OREG.

No particular operations are performed in the SMPC STATUS DISPLAY. Return to the main menu by simultaneously pressing the C button and START button on a peripheral that can be used to operate menus.

```
00  (00:00000000)     STE/RESD
01  (19:00011001)     YEAR H
02  (94:10010100)     YEAR L
03  (61:01100001))    WEEKDAY/MONTH
04  (11:00010001))    DAY
05  (01:00000001))    HOUR
06  (34:00110100)     MINUTE
07  (28:00101000)    SECOND
08  (03:00000011)    CART CODE
09  (0F:00001111)    AREA CODE
10  (2F:00101111)    SYSTEM STATUS 1
11  (40:01000000)    SYSTEM STATUS 2
12  (00:00000000)    SMEM1 DATA
13  (00:00000000)    SMEM2 DATA
14  (00:00000000)    SMEM3 DATA
15  (00:00000000)    SMEM4 DATA
```

```
1994/01/01  [SAT]      ML  VI  VO  PD  S        TO MENU
  01:34:28             00   00  00   10   2     (C) SEGA 94
```

5. Game (Tentative Title)

Cannot be used in this version.

6. Paint Tools (Tentative Title)

Paint tools allows the drawing of points, lines and circles on the screen with the mouse. The following three functions are used in this version; curved lines (upper left icon), straight lines (adjacent icon) and boxes (icon below the free-hand icon). Use the left button on the mouse to select an icon. There is no action when icons other than above are selected.

Free Curved-Line Tool
Draws a curved line by moving the mouse while holding down the left button.

Straight-Line Tool
Click the left mouse button where the line is to be started and click it again where the line to be end. When a line is drawn, the end point becomes the starting point of the next line, thus allowing line to be drawn continuously.

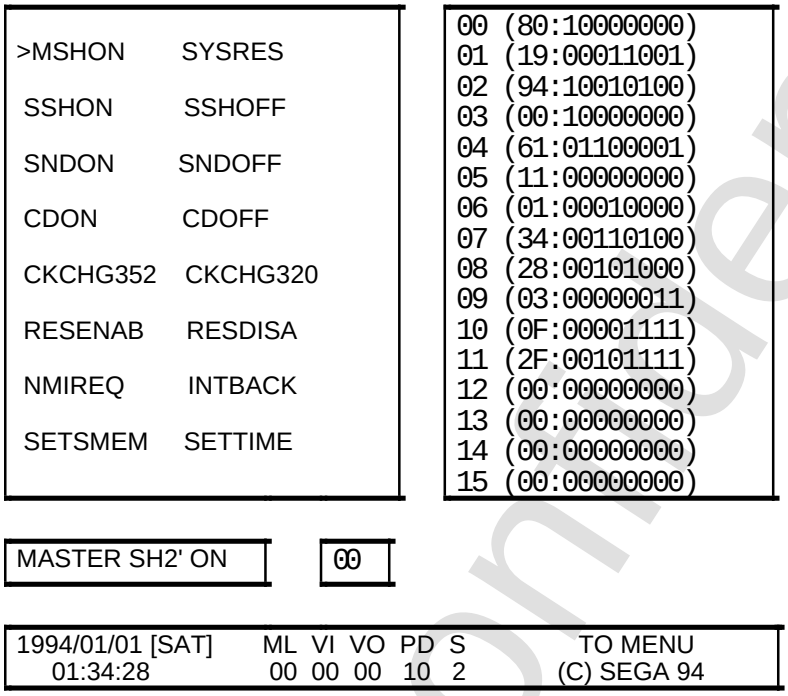
Box Tool
As with the straight-line tool, use the mouse to set the starting and ending corners of rectangles. To draw boxes continuously, begin with the starting corner again.

Always connect the mouse to be used for the paint tools to port 1-1.
To return to the menu, press the C button and START button simultaneously on a peripheral other than the mouse.

7. SMPC Command Test

Of the 16 different commands, 14 (other than clock check) can be issued for the SMPC.

7.1 SMPC Command Test Screen

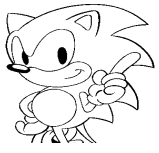


SMPC Command Test Screen

1. Command Menu
   A list of the commands issued to the SMPC is displayed here. Select the command to be issue from them.

2. SMPC Status Area
   The SMPC status after issuing the command is displayed. Refer to the SMPC manual for more information on status.

3. Command Name/Code Display Area
   The command name and command code of the current cursor position is displayed here.



7.2 SMPC Command Test Operation

The command test operation is nearly the same as that of the main menu. Select a command using the + key and enter it using the A or C button.

Press the B button to return to the main menu. Do not press the C and START buttons at the same time.

- SETSMEM and SETTIME commands
  When these commands are selected, a small window will open for input of a 4-byte memory value or time and date to be input. Use the left and right arrows to move the cursor and the up and down arrows to increase or decrease a value. Input with the A or C buttons and cancel with the B button. Invalid dates or times can be set as well.

- CLKCHG352, CLKCHG320 and INTBACK commands
  No command is issued when any of these commands are selected.