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SEGA OF AMERICA, INC.
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SATURN Demo-Demo File Loader Specifications

Library Version 1.20
2/5/1996

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Chapter	Page	Correction

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Revision History

- **Release 1 (Version 1.11) 8/23/1995**

Major improvements in all feature areas.

- **Release 2 (Version 1.12) 12/06/1995**

- Change in exit function initialization processing. Disabled interrupts. Eliminated halts of the slave CPU by the SMPC.
- Added exit function name `SYS_Exit`.
- Added **Function Code 2** processing to the exit function (execute IP check and run unconditionally).

- **Release 3 (Version 1.20) 2/5/1996**

- Changed reference area address for DemoDemo data from 60020CCH to 6000CCCH. Associated libraries were also modified for concurrence (GFS Ver. 2.10, SYS Ver. 2.10).
- Added *copy to SYSTEM ID save area* processing in the Interface module. Changed memory map for Interface and Kernel modules.
- Eliminated root directory file count limitation (previously limited to 254 files).
- Eliminated the `exit` function and standardized on the SYS library function `SYS_Exit`.
- Added the `FLD_INIT_DDS` function macro to the interface module.

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1. Outline

This manual describes external specifications for the Demo-Demo File Loader.

1.1 System Configuration

The File Loader will be abbreviated as FLD in this manual.

Library symbol: **FLD** (File LoaDer)

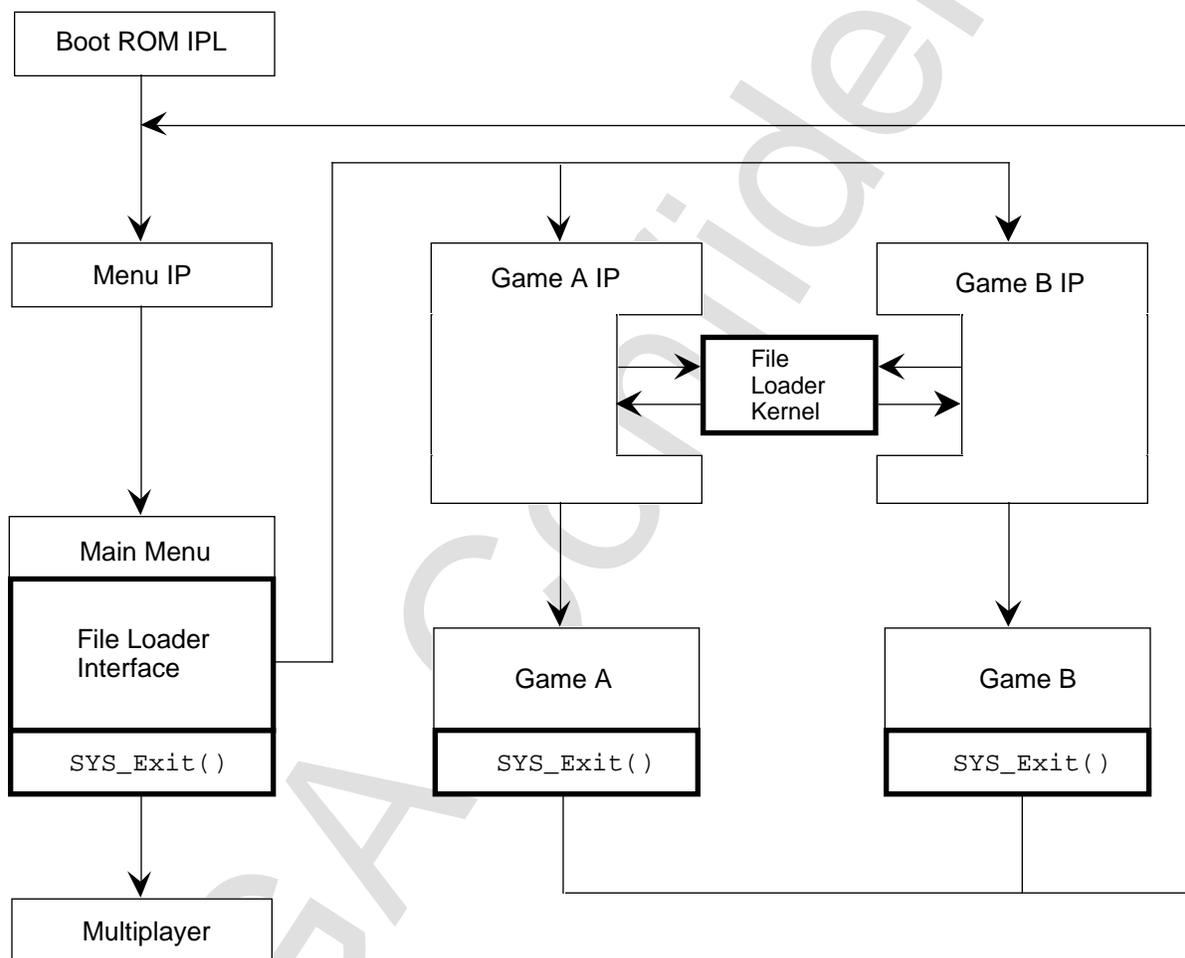


Figure 1 Demo-Demo Software System Configuration

The Demo-Demo File Loader comprises a file loader that loads a game selected in the Demo-Demo Software (DDS) menu into work RAM, and an exit function (`SYS_Exit()`) that is called when exiting the game.

The File Loader is divided into a menu interface and a kernel that loads the first read file of the game.

1.2 Functions and Features

The use of the File Loader in the following way enables Multi-GFS and the exit function to be linked to game programs, so games can be developed without regard for whether they are product versions or Demo-Demo versions.

1. Game Startup

Demo-Demo games are started up by the File Loader interface and kernel. Since the game IP is executed as is, initialization is the same as in the startup of a normal game. Therefore, the reliability of operation is improved.

2. Multi-GFS Support

The files and directory structure used by each game are set up in a separate subdirectory for each game. It is therefore not necessary to consider filename conflicts between games, and the filenames used can be the same as those in the actual games.

Multi-GFS allows files in game subdirectories to be accessed without any modification to the product version program.

3. Game Exit

Executing the exit function during Demo-Demo operation brings up the menu; execution during the operation of the game starts up the Multiplayer.

2. File Loader Specifications

2.1 Interface

1. Process

- (a) Load IP of game selected in menu to address 6002000H.
- (b) Copy the entire SYSTEM ID (100H bytes from 6002000H) to the SYSTEM ID save area (60000C00H).
- (c) Copy part of SYSTEM ID (20H bytes from 60020E0H) to the SYSTEM ID parameter area (60002A0H).
- (d) Load the Demo-Demo data into the SYSTEM ID save area (4 bytes from 6000CCCH). Specifically, rewrite the part of the SYSTEM ID save area shown in Figure 2.1. The Demo-Demo data is accessed by the Multi GFS, the SYS_Exit function and the FLD kernel.
- (e) Load the File Loader kernel (FLD_KNL.BIN) at 200000H.
- (f) Rewrite the first read function hook table (6002270H) value to the 200000H address.
- (g) Jump to the IP security code (6002100H) and start up the game.

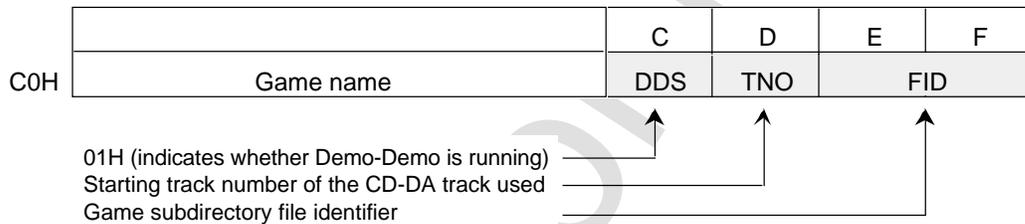


Figure 2.1 SYSTEM ID Rewrite

2. Memory Map

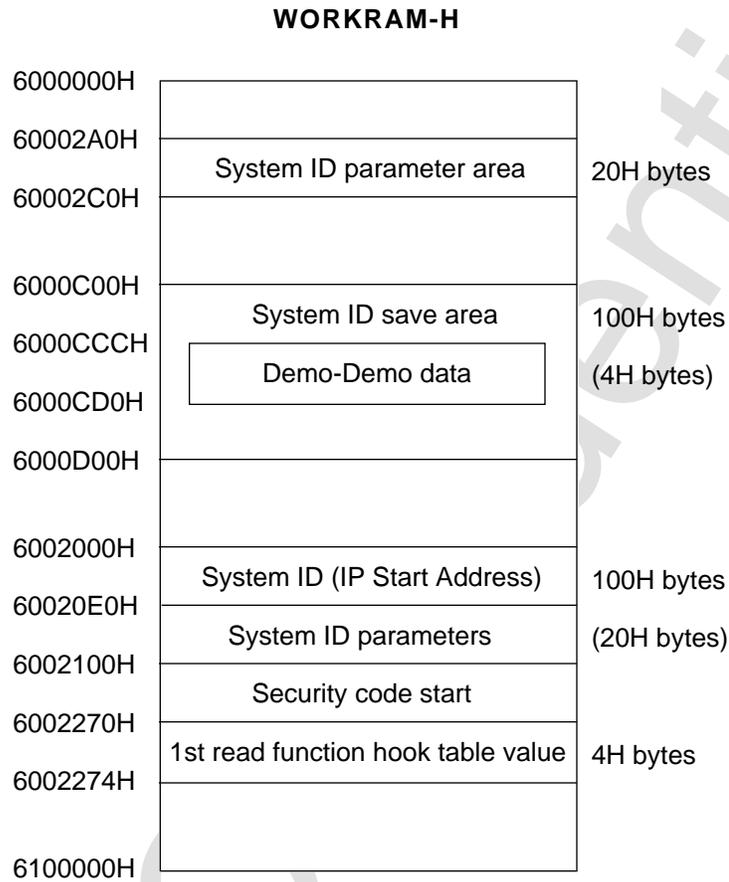


Figure 2.2 Interface Memory Map

3. Notes

Execution of the IP `sys_init.obj` from both the menu and game can cause the system to crash when the Multiplayer is started up from a game or the reset button is pressed.

To avoid this problem, the following should be observed:

- (a) Do not link `sys_init.obj` to the menu IP.
- (b) Do not modify the following menu settings.
 - Cache mode
 - Sector length (`CDC_SetSctLen`)

2.2 Kernel

The File Loader kernel is called from the IP instead of the first read process routine in boot ROM (kernel filename: `FLD_KNL.BIN`).

1. Process

- (a) Re-register VBLANK-IN interrupt routine in the interrupt vector table (vector number 40). (Patch processing performed on `sys_sec.obj`)
- (b) Move to game subdirectory. This subdirectory stores the selected game.
- (c) Load the first read file (file where `fid` is 2) and transfer to first read address.

2. Memory Map

WORKRAM-L		
200000H	Hook table	4H bytes
200004H	Reserved area	FCH bytes
200100H	Area reserved for kernel program	1F00H bytes
202000H		
300000H	Free space	

The pointer to the first read file load function is stored in the hook table.
The first read file load function exists within the kernel program.

Figure 2.3 Kernel Memory Map

3. Hook Table Placement

Assign the hook table to the initialization data section (`SEGA_D`) and designate the memory area at link-time.

3. Exit Function Specifications

The exit function uses parameter values to perform one of the following exit processes: IP check and execution, Multiplayer user interface screen startup, infinite loop execution.

1. IP Check & Execution

The Demo-Demo IP is loaded and executed using a boot ROM service routine. The following initialization process is performed at that time (when operated as a stand-alone product, the Multiplayer is started up).

- (a) Disable interrupts (CPU status register, SCU interrupt mask register)
- (b) Change system clock to 26 MHz (halts the slave CPU) *
- (c) CD subsystem soft reset
- (d) Set stack pointer to the default value (6002000H)

* An SMPC exit wait is not required (infinite loop may occur because of timing)
Using the SMPC slave CPU halt command is not allowed.

2. Multiplayer Startup

Start up the Multiplayer using the `SYS_EXECDMP` function macro.

3. Infinite loop Execution

Used for debugging.

4. Demo-Demo Software Disk Configuration

The configuration of the Demo-Demo software CD is shown in Table 4.1

Table 4.1 Disk Configuration

Track	File	Description
CD ROM track	<pre> ├── Menu program ├── Menu data ├── Game1_IP.BIN ├── ... ├── FLD_KNL.BIN ├── Game 1 │ ├── Game 1 program │ ├── Game 1 data │ └── ... ├── Game 2 │ └── ... └── ... </pre>	<p>Place menu program, data and game IP's in the root directory.</p> <p>File Loader kernel</p> <p>Create a separate subdirectory for each game and program, and place programs and data.</p>
CD-DA track		CD-DA files not used

* The maximum number of directory nesting levels including the root directory is 8. Therefore, the maximum number of levels that can be used by a game is 7.

5. FLD File Overview

1. Files required to use the FLD library

Table 5.1 Files required to use the FLD library

* The exit function is supplied as `SYS_Exit` in the system program library `sega_sys.lib` (ver. 2.10 and later).

2. Files required to create FLD library

Table 5.2 Files required to create FLD library

3. SEGA libraries required to create FLD library

Table 5.3 SEGA libraries required to create FLD library