



DEVELOPMENTAL

Sega Developer Technical Support Newsletter

SEGA TOPS HOLIDAY, YEARLY SALES PROJECTIONS

SEGA SATURN INSTALLED BASE REACHES 1.6 MILLION IN U.S., 7 MILLION WORLDWIDE

REDWOOD CITY, Calif., January 13, 1997 — Sega® of America today announced that sales of its Sega Saturn™ videogame console exceeded the company's 1996 projections delivering an installed base of 1.6 million in North America. Worldwide Sega Saturn sales to date total more than seven million units. Sega Saturn game sales jumped 175 percent compared to 1995, totaling 5.5 million units of first- and third-party software sold in 1996 in North America.

"Strong titles and good value drove sales beyond our expectations this year, especially during the holidays, when retailers were reporting that Sega Saturn sales surpassed the competition by as much as 2-to-1," said Shoichiro Irimajiri, chairman and CEO, Sega of America.

Sega sold 1.3 million Sega Saturn systems to retail in 1996, with 1.2 million selling through to consumers. Combined with the 400,000 systems sold through in 1995, the total installed base reached 1.6 million. The North American Sega Saturn installed base is expected to reach at least 1.7 million by the end of the company's fiscal year, March 31, 1997.

Sega's "three pack" promotion helped boost sales in December alone to more than 500,000 Sega Saturn units, up 300 percent over November sales. Under the promotion, consumers received three free arcade translation games ("Virtua Fighter™ 2", "Daytona USA™" and "Virtua Cop™") with the purchase of a Sega Saturn. The "three free" promotion is one of the most successful consumer initiatives for increasing hardware sales volume in Sega's history", said Ted Hoff, executive vice president of sales and marketing, Sega of America. "To keep the momentum going well into the new year, we're extending the promotion until March 31. Our research shows that once consumers play our games, they're hooked on Sega Saturn."

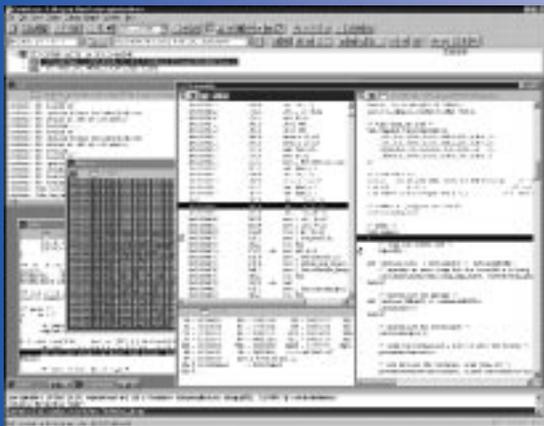
During the promotion, software sales continued to rise as much as 400 percent from November to December. Sega sold 2.7 million first-party games, while third-party game sales reached 2.8 million, totaling 5.5 million Sega Saturn games purchased in 1996. There are 214 games available for the Sega Saturn system — more games than Sony PlayStation and Nintendo 64 combined offered in 1996. Sega's game plan for 1997 includes expanding the Sega Saturn library with new arcade-to-home translations — including the ground-breaking "Virtua Fighter™ 3" game — a competitive sports line-up, new character games featuring Sonic the Hedgehog™, and all the best third-party games.

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For further information and demonstrations visit Cross Products' web site at
<http://www.crossprod.co.uk>

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or
contact Sega DTS



The powerful new debugging tool from...

Developed for game programmers and approved by Sega, its the easiest way to test your code and quickly locate and fix bugs.



- Runs on Windows® 95, Windows NT™ 3.51/4.0 and SGI Indy as a native 32-bit windows application.
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- Includes a vast superset of SNASM2 debugging features.
- Has a fast and intuitive user interface that you can drive from the mouse or keyboard. Includes dockable toolbars, right-click menus, tooltips and on-line, context sensitive help.
- A fully supported Japanese version is available for Windows 95 and Windows NT.
- Provides extensive software breakpoint configuration including data accesses within memory ranges and breakpoints on external peripheral accesses.
- Provides multiple CartDev support for developing multiple player games.
- Its fully Integrated Development Environment (IDE) lets you edit, compile and download your program all from within CodeScape.
- Lets you easily pick up where you left off by saving its entire configuration in a session file when you exit.
- Fonts and colors are configurable for each region type or each processor (or even for each individual region) so you can see at a glance which regions are associated.
- Allows you to set variable update rates or disable updates completely so your program gets 100% of the processor time.

The Windows 95/NT version of **CodeScape** is available as an upgrade for existing Saturn development systems for (U.S.) **\$400** directly from Cross Products.

Tip for people converting from PC.

If you've got a complete or nearly complete project to port to Saturn you'll find the CartDev RAM buffer board a valuable add-on. It expands the Saturn's system memory by 16MBytes so you can port the product in its complete form before starting to compact code/data and add overlays. The boards are available from Cross Products for (U.S.) \$500 and replaces the current CartDev cartridge which plugs into the Development Saturn.

Domino's Interactivity Hits the DTS WWW

Have you checked out the DTS WWW Environment lately? Our new FAQ and Developer Discussion pages bring a new level of interactivity to our Website. With our enhanced FAQ section, we'll be bringing you our technical support database to you, literally. Using a Lotus Domino server we've linked our WWW site to our own call tracking database allowing developers to search through a myriad of questions and answers mirroring DTS's knowledge database. Hundreds of new FAQs will soon be available to answer questions ranging from the stupid to the sublime. If you can't find the answer there, then hop on over to the Developer Discussion and share your questions, answers, and tips with the rest of the Sega development community. This Q&A section is designed to give Sega developers their own centralized discussion arena where Saturn development knowledge can be shared by one and all.



What else is new on the DTS site? Just that....a *What's New* page. Ever wanted to know what's new in the Sega DTS WWW environment, but didn't want to spend the time browsing through all the sections? Well now it's easy to find out what's new. Just click on the red *What's New* text located on the main page and you can quickly scan the history of content updates and revisions since you've dropped by last. A hint of what you'll find: updates to the SGL, SBL and Sound Development Tools.

ST-151 DEAR DEVELOPERS,

The Sega Saturn Software Development Standards Manual (ST-151) has been revised to provide you with more helpful information. Please take note of the following changes:

- We have reformatted the manual so that all sections labeled as *Required Compliance Items* and *Recommended Compliance Items* will be considered as "A-Bugs" & "B-Bugs" respectively.
- We have added the Multi-disc standards (see Chapter 10).
- Of particular importance...we have also clarified one of our standards regarding peripheral disconnect during gameplay (see Chapter 2.2.2).

Check for the updated ST-151-R4 on the DTS Website at <http://www.dts.sega.com/docs/docs.htm> in mid-February.



DMA Programming

Q. Using DMA_ScuMemCopy(), a copy from one WORK_RAM_H area to another does not work. What could be the reason for this?

A. *SCU_DMA* is for DMA transfers between different buses. For transfers within the same space, use *CPU_DMA* or a software transfer. Examples of transfers possible with *SCU_DMA*:

```
WorkRAM_H <-> VDP1
WorkRAM_H <-> VDP2
WorkRAM_H <-> SCSP
CD Buffer -> WorkRAM_H
CD Buffer -> VDP1
CD Buffer -> VDP2
CD Buffer -> SCSP
```

SGL Programming CD Access

Q. I want to check whether the CD tray is open: how should I do this?

A. Use the following method to check whether the CD tray is open.

```
if ( CDC_GetHirqReq() &
CDC_HIRQ_DCHG ) {
    SYS_EXECDMP(); /
* Call "Multi-Player" */
}
```

This code should only be used in the following circumstances: In the main loop, in vertical blanking interrupt handling, and in the CD error exception handling routine. Any other methods for carrying out a tray open check are not guaranteed.

See "FAQ" continued on page 4

BEST KNOWN A-BUGS part 2

Peripherals

Q. What happens if different devices of different types are plugged into the "Multi-tap"?

A. *The library outputs the peripheral data collected by SMPC aligned on [SIZE + 2] boundaries. At this point, any surplus peripheral data is skipped.*

Except for the peripheral ID processing and the data boundary alignment, the contents of the data are not changed, so even if there are devices of different types there should be no problem.

A user program should determine the type of peripheral connected from the peripheral ID and peripheral size.

Example:

If the ID is [PER_ID_DGT], and the size is [PER_SIZE_DGT] or above, then a digital device is connected.

SGL Programming CD Access

Q. Using SGL, I want to preserve the contents of the VDP1 frame buffer, and superimpose a sprite (without deletion); what settings should I use to do this?

A. *This may be slightly different from the processing you want to carry out, but there is a `slGetFrameData` function. Using this function, you can save the contents of the frame buffer, and use them in the next frame. There are, however, memory limitations, and the contents of VDP2 are not reflected. Therefore, in practical use, it is more or less impossible to use it for a full frame.*

A-Bug **Bad ID Table and incorrect SYS.ID information on the CD-ROM**

Examples

Information on the Master Rom Release Form (MRRF) does NOT match the ID Table and SYS.ID information on the CD write-once disc. The MRRF indicates that the product is to be sold only in Japan, but the ID on the CD-ROM is E (Europe) or the target area code indicates that the software targets all regional areas.

Solution

An updated and fully completed MRRF must always accompany master CD-ROM submissions. The contents of the MRRF are used to check the CD-ROM ID Table and SYS.ID. Entries such as delivery date, version no., and peripherals supported MUST be the SAME on both items. The only acceptable version no. for final code is V1.000. Refer to ST-040-R4/Saturn Disc Format Standards Specs. Sheet ver. 1.0 (<http://www.dts.sega.com/docs/docs.htm>) which contains SYSTEM ID sample code listings. Below is an example of the ID code for the fictitious game "NAZO-NO GAME (Maze Game)."

```
SEGA_SEGASATURN
SEGA TP T-85          Third party number
Y-8501G V1.000       Product number and version number
19960515CD-1/1      Delivery date and number of CDs
J                    Target area symbol (* see below)
J                    Target peripheral device (** see below)
NAZO NO GAME        Game title
.
For JAPAN           Target area code
```

In particular, note that the target area code is separate from the SYSTEM ID and must be entered in the OBJ file after the security code.

* J: Japan (NTSC)	T: Southeast Asia (NTSC)	
U: North America (NTSC)	E: Europe (PAL)	
** A: Mission stick	J: Joy pad	R: Data cartridge
C: Communication cable	K: Keyboard	S: Steering (racing controller)
D: Modem	L: Level converter (serial modem)	T: Tap
E: 3D Controller (analog input support only)	V: Voice recognition (dictator)	X: X-BAND (game opponent intro. sys.)
F: FDD	M: Mouse	W: Extension RAM cartridge
G: Gun	P: MPEG	

Note: All games must be compatible with, but not necessarily support (see ST-151/Saturn Software Development Standards), the 6 Player Tap and/or Mission Stick. If the game does not allow more than 2 players at once or does not support the Mission Stick, these peripherals should not be marked on the MRRF or the CD-ROM ID table.

A-Bug **Script File Violations**

Examples

The CPY.TXT, ABS.TXT & BIB.TXT are not there or left blank. MODE1 is being used, but the SESSION value is not set to CDROM. MODE1 is being used, but the Postgap value is not 150.

Solution

For MODE, Postgap & sample script file details, refer to the Appendix in ST-040-R4. Additionally, IPGNUSRC.zip (<http://www.dts.sega.com/tools/tools.htm>) explains very clearly, how to create a correct IP.BIN. All DSK files need to include at least one redbook audio track. In your script file: PAUSE 150 is required **before** all audio tracks; POSTGAP 150 is required **after** all data tracks; and if you have multiple data tracks, a PREGAP 150 is used **before** the additional data tracks.

```
CopyrightFileIdentifier   "??_CPY.TXT"   } *** Place these TXT
AbstractFileIdentifier    "??_ABS.TXT"   } files on
BibliographicFileIdentifier "??_BIB.TXT" } the CD-ROM.
```

*** Below is information about the cpy, abs & bib text files which use Super Fighter 2 as an example. Remember: substitute specific information for your game title & rename the "??" appropriately.

CopyrightFileIdentifier	SF2_CPY.TXT
Contents of SF2_CPY.TXT for 1st Party titles:	Copyright SEGA ENTERPRISES, LTD. 1995, 1996
Contents of SF2_CPY.TXT for 3rd Party titles:	Copyright "YOUR COMPANY INFORMATION"
AbstractFileIdentifier	SF2_ABS.TXT
Contents of example file SF2_ABS.TXT:	The SEGA Saturn software "Super Fighter 2" is a conversion of the competitive action arcade game "Super Fighter." It captures the action and fun of the original version and includes many new elements that are unique to Saturn.
BibliographicFileIdentifier	SF2_BIB.TXT
Contents of SF2_BIB.TXT:	Conversion source original game: "Super Fighter 2" (SEGA ENTERPRISES, LTD. 1996)

EDTS

Exposed

Who are those handsome chaps? Those fabulous guys are the European Developer Technical Support team. Established from the very beginning of Saturn development, they have since dedicated their lives to probing the darkest most corners of the Saturn architecture (Yeah, right). But who are the men behind the myth (or should that read mirth)....



Colin Carter - Developer Technical Support Manager

Founder, patron saint and evangelist of EDTS. From a diverse background in the army as

an electronics technician, moving into games programming on

such classic machines as the Amiga and CD32.

Colin is the department's health and fitness consultant (although no one ever listens), never shying away from performing his legendary Step lessons in front of hordes of admiring women (who's writing this?).

Ed Hollingshead - Senior Software Engineer

An ex-Saturn programmer bringing his knowledge to bear in the technical support world,

Ed is a veteran of the computer industry. At anytime he can delve into his vast vat of knowledge to pick out a tasty morsel of information to satisfy anyone's curiosity. For instance, anyone mentioning the word 'darts' or 'cooking' will soon realize the power of Ed's enthusiasm. He's been known to produce a veritable banquet of oriental cuisine, although he's never shared it with anyone in EDTS. Hint, hint!

Tamer Tahsin - Hardware Engineer

From the very early days of hi-tech gadgets such as valves, Tamer has been at the forefront of consumer electronics. Ask anything about the intricacies of development systems and tools and Tam's ya man. To relax from the stresses of daily work, a good game of squash (racquet ball) is his ideal solution. (How come he always looks so tired in the mornings, then?)

Thomas Szirtes - Software Engineer

Nick-named 'Inspector Gadget' because his desk resembles Cape Canaveral's mission control, Tom has been known to collect the odd piece of equipment (even if it's of no use).

Amongst other things, Tom specializes in music programming and is often seen hanging around the seedy jazz bars of Soho

with a keyboard under his arm. Secretly a musician at heart (although he doesn't like to talk about it), recognized authority on Herbie Hancock, and is soon to support Maceo Parker in one of his numerous bands.

Richard Jacques - Musician, Sega Digital Studio Europe

Classically trained at the Royal Academy of Music from an early age, in his hands any instrument becomes a deadly weapon (he can

even play some too). Well known in Saturn musical circles, Richard has been pioneering new frontiers of Chip music development. Want to know who did that cool music on Saturn Sonic 3D Blast? Well it's yours truly, Jingle Jacques.

James Burns - Technical Support Engineer

Newcomer to the group, and recently relocated from Ireland (yes, a truly international department), James has the fearsome task of learning the Saturn in a short period of time. His claim to fame is having met Sugar-Ray Leonard (welter-weight boxing champion) in his youth which inspired him to take up amateur boxing. Watch this space!



Starting from the bottom going clockwise: Colin Carter, Ed Hollingshead, Tamer Tahsin, Thomas Szirtes, Richard Jacques, James Burns

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DOCUMENTATION

Listed below is the complete set of Saturn documentation as of January 31, 1997. If you wish to order a complete set of Saturn documentation, contact us by e-mail or fax us your request. **DTS e-mail: dts@sega.com / Fax: (415) 802-1717**
The documents listed below are available on the DTS WWW Environment.

NOTE: DOCUMENT ST-151-R3 IS CURRENTLY BEING UPDATED AND WILL INCLUDE STANDARDS FOR NETLINK AND MULTIPLE DISK GAMES - LOOK FOR IT ON THE DTS WWW IN MID-FEBRUARY.

Document Name	Document #
SATURN PROGRAMMING MANUAL VOL. 1	
Saturn Introduction Manual	ST-155-062094
Sega of America-Introduction to Saturn Game Development	13-Apr-94
Saturn Overview Manual(temporary version 1)	ST-103-R1-040194
SCU User's Manual	ST-097-R5-072694
SCU Final Specifications: Precautions	ST-210-110194
SMPC User's Manual	ST-169-R1-072694
SMPC Sample Program User's Manual	ST-214-111594
Saturn SCSP User's Manual	ST-077-R2-052594
SEGA Saturn Dual CPU User's Guide	ST-202-R1-120994
SATURN PROGRAMMING MANUAL VOL. 2	
VDP1 User's Manual	ST-013-R3-061694
VDP1 User's Manual Supplement	ST-013-SP1-052794
VDP2 User's Manual	ST-058-R2-060194
SATURN DEVELOPMENT TOOLS MANUAL	
NEW Sega Saturn Software Development Standards	ST-151-R4-020596
Boot ROM User's Manual	ST-079B-R3-011895
Disc Format Standard Specifications Ver. 1.0	ST-040-R4-051795
Backup System Production Standard	ST-203-100494
SATURN Demo - Demo File Loader Specifications Ver. 1.20	ST-250-R1-031296
SCU DSP Assembler User's Manual	ST-240-A-042795
SCU DSP Assembler User's Manual Addendum	ST-240-A-SP1-052295
SCU DSP Simulator User's Manual	ST-240-B-042795
SCU DSP Simulator User's Manual Addendum	ST-240-B-SP1-052295
CD Development Tool Description File	ST-211-110494
Virtual CD System User's Manual	ST-129-R2-093094
Virtual CD Supplementary Manual	ST-129-R2-SP1-061995
Virtual CD System (Release 3) Limitations	ST-182-081294
Write Once CD-R System User's Manual	ST-201-B-092994
SEGA BASIC LIBRARY (SBL)	
Saturn System Library User's Guide ver. 1.0	ST-162-R1-092994
System Library User's Manual	ST-162-062094
Program Library User's Guide 1	ST-136-R2-093094
Branching Playback Library User's Manual	ST-136-D-R2-082495
Program Library User's Guide 2	ST-157-R1-092994
Program Library User's Guide 3	ST-135-R4-092295
DLL Library User's Manual	ST-200-092994
External Specification Doc. Saturn Stream System	ST-098-031194
SATURN GRAPHIC LIBRARY (SGL)	
SGL Developer's Manual Tutorial	ST-237-R1-051795
SGL Developer's Manual Reference	ST-238-R1-051795
SATURN GRAPHICS TOOLS MANUAL	
3D Editor 1.72US (ReadMe, Release Notes)	SGT-DISK-102795
MapEditor 1.81E (ReadMe, Release Notes, Basics)	SGT-DISK-102795
ScreenEditor 1.07E (ReadMe, Release Notes, Basics)	SGT-DISK-102795
QuickViewer 3.17US (ReadMe, Release Notes)	SGT-DISK-102795
Sega2DViewer 1.0US (ReadMe)	SGT-DISK-102795
SegaConverter 4.83E (ReadMe, Release Notes)	SGT-DISK-102795
SegaPainter 1.11US (ReadMe, Animation, Menu, Palette/Color, Tool Palette)	SGT-DISK-102795
SpriteEditor 1.36US (ReadMe, Release Notes, Basics)	SGT-DISK-102795
Saturn/32X Graphics References ver. 2.0	ST-124-R1-091394
SATURN SOUND TOOLS MANUAL	
Sound Development Manual ver, 1.1	ST-081-R5-062894
Saturn Sound Simulator Manual	ST-168-R3-011895
Wave Editor User's Manual	ST-099-R1-042594
SCSP Waveform Editor Technical Specifications	ST-067-121593
Tone Editor User's Manual	ST-068-R1-042594
Tone Editor User's Manual Addendum: File Format	ST-235-030795
SCSP/DSP Effect Module Specifications	ST-069-121693
DSP Linker User's Manual	ST-070-R1-031094
dAsms User's Manual	ST-228-R1-030595
Parameter Editor User's Manual	ST-227-R1-030595
Saturn Sound Tools Manual Supplement	ST-198-R1-121594
Saturn Sound Driver Implementation Manual	ST-241-042795
Saturn Sound Driver System Interface Version 3.03	ST-166-R4-012395
Standard MIDI File: Converter Specifications	ST-066-121593
Sound Programming Debugger User's Manual	ST-065-R1-031494
Microcomputing Developing Int. Environment for Macintosh	ST-080-R2-050994
PRELIMINARY SATURN DOCUMENTS	
CD Communication Interface (PAPER ONLY)	ST-162-B-R1-042795
Stream System Library User's Manual (PAPER ONLY)	ST-136-B-R3-052395
Analog Joypad User's Manual version 0.60	ST-277-040596
PRELIMINARY TECHNICAL BULLETINS	
#42 - Cautions on using SMPC	ST-TECH-42
#44 - Shuttle Mouse Data Format version 1.00	ST-TECH-44
#45 - Saturn Keyboard Data Format version 1.00	ST-TECH-45
#46 - Saturn Date Cartridge Manual version 1.00	ST-TECH-46
NEW #47 - Extended RAM cartridge Manual version 1.02	ST-TECH-47
NEW #48 - SEGASaturn Development Tool Segments	ST-TECH-48
NEW #51 - Restrictions for the MC68EC000 Sound CPU and SCSP	ST-TECH-51

Saturn Cinepak and Saturn Netlink documentation are also available upon request. Please contact DTS for more information.

Status Check

In order to serve you better and refine our existing databases, we need to stay informed of any changes with our developers that may affect the distribution of material from DTS. Please take a moment to fill out the information below and mail or fax it to Sega @ (415) 802-1717, or e-mail us at <dts@sega.com>.

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