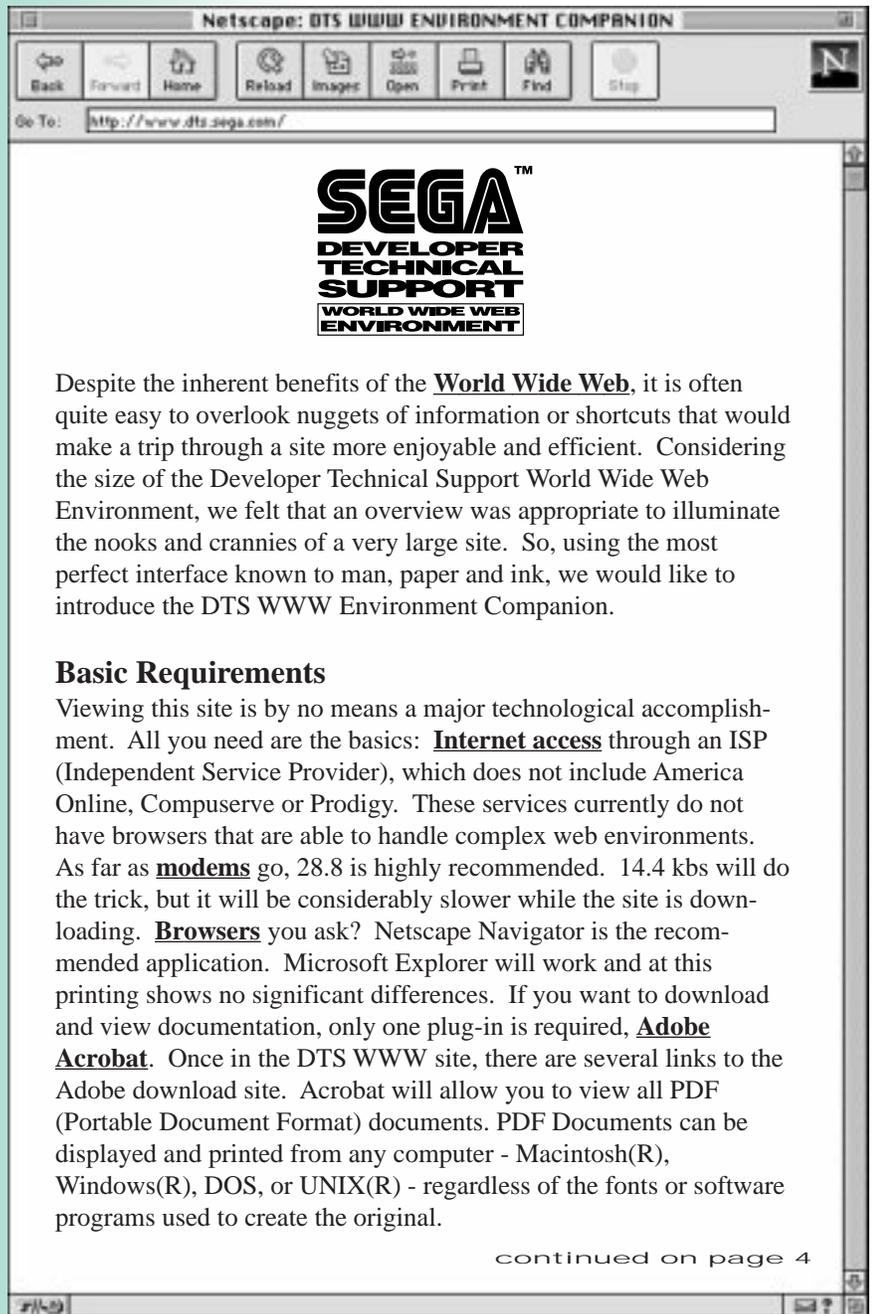


# THE DTS WWW COMPANION

LESS THAN FOUR MONTHS OLD AND THE DTS WWW IS FAST BECOMING AN ESSENTIAL SATURN DEVELOPMENT TOOL



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**MAKE A  
NOTE**

**all tech bulletins  
now available  
on the  
DTS WWW  
([www.dts.sega.com](http://www.dts.sega.com))**

## DEVELOPERS BECOMING SMUG

SATURN MASTER USER'S GROUP  
GROWS TO REFLECT THE  
SATURN'S DEVELOPMENT SURGE

SMUG is moving along at a rapid pace now boasting over 64 members worldwide. SMUG stands for the Saturn Master User's Group and is an e-mail forum where questions can be thrown out and answered through the experience of other developers. SMUG is a list server where you may e-mail SMUG directly and the mail will explode to all users worldwide. Remember, SMUG is a service provided by developers and for developers, and although SEGA assists in its administration, it does not edit submissions or responses. Take advantage of the chance to talk directly to other developers and be SMUG about it. To get your name added to the SMUG server, send an e-mail saying "I want to be SMUG" to [merritt@sega.com](mailto:merritt@sega.com). After your status as a registered Saturn developer is verified, you will be added to the list.

## STAMP R.I.P. FAX MACHINE D.O.A. E-MAIL B.M.O.C

TIMES ARE CHANGING AND THAT  
MEANS EVERYONE NEEDS  
A MODEM

More and more announcements will be leaving DTS via e-mail only as we create a second list called SEGA\_SEZ. This list will include announcements about DTS events, Web Updates, etc. But we can't reach you if you don't have your e-mail address on file with us. If you're not sure, or if you're sure we do not have your e-mail, send it in to [maramba@sega.com](mailto:maramba@sega.com) and then you too can hear what SEGA\_SEZ.

# QSOUND

## an overview

TIPS AND TRICKS FROM ONE OF  
SEGA'S LEADING VENDORS



The extremely flexible nature of the Saturn Custom Sound Processor (SCSP) allows for a wide variety of audio processing algorithms to be applied to music and sound effects created for the Saturn. In addition to effects such as reverberation and chorusing, the QSound positional audio algorithms are available, allowing sounds to be placed around the listener, well outside of the space between the speakers creating a 3D-like soundscape. This article describes the steps required to create sounds that can take advantage of these algorithms. Like the rest of the Saturn sound tools, using QSound requires coordination between the sound designer and the programmer. In this issue, we'll look at what is required from the sound designer:

### DSP Linker

The QSound DSP module is available in eLinker. eLinker is an enhanced version of the standard DSP linker and is available from DTS. It provides all the reverb and other algorithms that are in Linker, with the addition of the QSound and other modules. QSound is available in 4 and 8-input versions. Each input can be assigned a different position in space around the listener independently and can be updated dynamically by either the sound designer or game programmer. The first task for the sound designer is to create a DSP program that includes the QSound module. This is done easily, in the same way that reverb and other effects are created:

### Start up eLinker

Create 4 input modules

Set the input sources to channels 1,2,3,4 (for example)

Select "Effect Modules..." from the Window menu

Select the module QSound4

Create 2 output modules

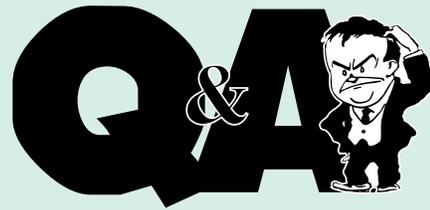
Set the outputs to channels 0 and 1 (for example)

Connect the 4 inputs to the 4 QSound4 inputs

Connect the 2 QSound4 outputs to the 2 outputs

Link and Download

See "QSOUND" continued on page 6



- Q When I compile any of the SBL6.0 samples, the compilation process fails at the link stage. How can I fix this?
- A *To ensure proper compilation and linking of the SBL6.0 samples with GCC, replace your ../segasmp/lib/saturn.lnk with the updated link file called LINK.ZIP. This file can be found on the DTS WWW and BBS.*
- Q How can frames be manually changed on Saturn, allowing frame rates less than 60/second to be manipulated?
- A *Use auto triggering, then manually change frames via the bits FCM and FCT. To erase, write a "transparent poly" the size of the screen.*
- Q When the routine getseqstat is called immediately after a sequence has been started, I get a status of "no sequence running."
- A *The library routine getseqstat can not be called too quickly after the sequence has just been started, because it will return a status of no sequence playing.*
- Q I'm having problems hooking up the Hitachi I/F board in an Intel brand motherboard.
- A *This might be a memory address conflict. The only free address that works is B000.*
- Q In the SND\_CtrlDirMidi Function (page 23 of ST-135-R3) there is a seq\_no parameter which is the "Sound Control Number". Is this the same parameter that is used in the Sequence function?
- A *Seq\_no is the Sound control number. Up to 127 direct Midi commands can be fired off on each sound control number (vs. 1 sequence). It is a good idea to keep the Direct Midi commands to one specific sound control number. Seq\_pri refers to the priority level of that Midi direct command, 0 being the highest.*

# THE DTS WWW ENVIRONMENT

## EXPOSED



### ACCESS



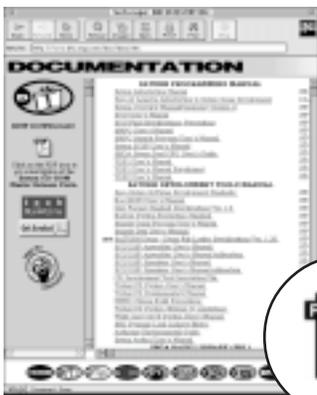
Due to the level of secure material in this site, we thought it prudent to have certain security measures in place. The first line of defense is password protection. All developers using the site must be registered with DTS and be issued a username and password. All nonregistered members wishing to have access to the site may submit their pertinent information through the "non-member" area found on the entry page of the site. The second line of defense is the reissuing of passwords and usernames **every 90 days**. These steps along with a few others that we won't mention will go a long way in ensuring our work along with yours stays secure.



*Never consider the DTS WWW finished. Check the front page at least every three days to see what's been added.*

### FRAMES

Not since New Coke and colored contact lenses has a technology been met with such mixed emotions. Yet, here at DTS we have a reason for their use as well as some features that allow for their removal. First, the reason. Considering the amount of information that needs to be distributed to the developer, Netscape Frames were an ideal way to increase navigability and information on a given page. The Sidebar is reserved for late breaking news and important data that needs to be in plain view of the user. The bottom navigation bar is there for the reasons of ease of navigation and convenience. Having these two areas independent of the main area relieves the user from spending most of their time scrolling and sifting through long lists of information.



*PDF Documents are currently being used for documents found in Documentation and Hardware. Back issues of the DTS newsletter are in PDF as well.*



*If you do not have the Adobe Acrobat plug-in you can get it from the DTS WWW site or at <http://www.adobe.com/Acrobat/readstep.html>*



*Use this button! This is a direct link to the webmaster. It is located in each section of the site. Gripe, suggest or compliment, doesn't matter. We love to hear from our developers.*

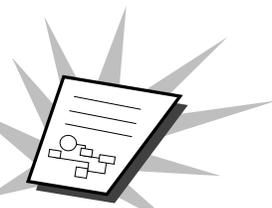


*If you hate Frames that much, go ahead and push them out of the way. All frames within the DTS WWW are adjustable.*

### DOWN THE ROAD

It's pretty safe to say this web thing is not a fad, so this site will be around for a while. In order to keep it as fresh and useful as the day we fired it up, we have a few plans for its future. A search engine is under construction and will be in place by the end of the summer. A discussion area will be established to allow direct communication between developer and Sega. An Audio section is also being developed and any input you would like to give in its construction is welcome.

# SATURN TECHNICAL BULLETINS



Below is a comprehensive listing of all tech bulletins available. They can be found in the DOCUMENTATION component of the DTS WWW site.

- #1 - Saturn CD Drive Duty Ratio Restrictions
- #2 - Pre-emphasis Prohibited
- #3 - Information Regarding CD Burning
- #4 - Saturn Software Development Standards
- #5 - Error Checking for Data Errors
- #6 - Saturn System Functions
- #7 - Saturn Disc Format Specification Change
- #8 - CD Communication Interface
- #9 - Size Value for Saturn Memory Manager
- #10 - SCU Specification Changes
- #11 - Disc Format Standards Specification Revision
- #12 - SCU DMA, Boot ROM, and Vblank Precautions
- #13 - VRAM Bank Splitting
- #14 - Use of VRAM for Bit Maps
- #15 - VDP1 User's Manual Correction
- #16 - SCU DSP Instruction Clarification
- #17 - Mission Stick Specifications
- #18 - Limitation of Default Interrupt Processing Routine
- #19 - GFS\_Init Settings
- #20 - Program Library User's Guide 1 Corrections
- #21 - GFS\_Init and GFS\_LoadDir Function Errors
- #22 - VDP1 and VDP2 Resolution Specification Changes
- #23 - VDP Interlace Settings
- #24 - Changing VDP2 Screen Resolution
- #25 - Palette Format Sprite Display
- #26 - Obtaining CD Directory Information
- #27 - Limitations in Monoral or Language Setting
- #28 - Using Dual CPUs on the SEGA SATURN
- #29 - Setting CD-DA Volume in Applications
- #30 - Temporary Files Created When Building Disc Image
- #31 - Changes in Area Symbols
- #32 - Differences in Sega Saturn Hardware and Peripheral Color/Form Factor
- #33 - Additional VDP2 Restrictions
- #34 - Sega Saturn Mission Stick Application Manual
- #35 - Change in the 1st Read File Load Area Size
- #36 - Saturn Hardware Chip Initialization
- #37 - VDP2 Specification Changes
- #38 - Arcade Racer Application Manual
- #39 - Supplemental Information on the SCU-DMA Transfer Byte Count
- #40 - Additional Sega Saturn Compatible Peripheral ID Character Codes
- #41 - Saturn Stunner/Virtua Gun User's Manual Version 1.00
- #SOA-1 - GFS Library Usage
- #SOA-2 - Casting VDP1 Shadows on VDP2 Backgrounds
- #SOA-3 - SEGA Saturn CD Door-Open Standard
- #SOA-4 - Saturn System Disks
- #SOA-5 - VCD I/F Board Installation
- #SOA-6 - VDP2 Cycle Pattern Registers
- #SOA-7 - Sprite Transparency
- #SOA-8 - Saturn SCU DSP Tutorial
- #SOA-9 - Saturn SCU DSP Programmer's Reference
- #SOA-10 - Saturn SCU DSP Demonstration Program
- #SOA-11 - VDP2 Rotating Backgrounds
- #SOA-12 - Security Codes in the IP.BIN File

## ROGER HECTOR

VICE PRESIDENT/GENERAL MANAGER  
OF THE SEGA TECHNICAL INSTITUTE

Since 1993, Roger Hector has served as Vice President and General Manager of the Sega Technical Institute (STI). Last February, Developer Technical Support (DTS) moved under STI where it now resides.

Starting his career in the game industry in 1976, Roger went to the only place that mattered then, Atari. Working on such hits as *Battlezone* and *Warlords*, Roger became

head of Atari's Corporate Research and Development. Leaving Atari, he pursued his entrepreneurial interests and began his own coin-op and consumer game company, Sente Technologies. Catching the eye of Atari Founder, Nolan Bushnell, Sente Tech-

nologies was purchased by Bushnell in 1982 and was later acquired by Bally in 1984.

As the industry began to gel for another renaissance, Roger entered the doors of Electronic Arts and oversaw production of such titles as *Skate or Die* and *Michael Jordan Vs Larry Bird*. From there he went on to help start the Walt Disney Software Company where he oversaw all product development of PC and cartridge software such as *The Animation Studio*, and *Mickey's Castle of Illusion*.

Joining Sega of America in 1992, Roger managed the daily operations of STI which has produced the *Sonic the Hedgehog* series on Genesis. Today, Roger is involved in all things Sonic and even the new, yet to be released, coin op title: *Die Hard*, as well as overseeing product development, acquisitions, testing and DTS.

Roger envisions a very bright future for DTS and Sega overall. "[Sega's] a solid organization dedicated to providing the very best in tech support. Relations with Sega of Japan have never been closer, and Sega is actually utilizing it's global technical resources like never before."

When asked what keeps him sane outside of the workplace, Roger responded appropriately, "There is nothing about this business that is sane. I do however, try to spend as much time as possible sitting on my boat."



ROGER HECTOR

VP/GM of STI

You now have a valid QSound DSP program. You should notice that the QSound4 module uses 52 steps and 45 words of COEF RAM, leaving some additional room for other effects if desired.

### Tone Editor

The next step is to edit the tone banks to properly use the QSound DSP module. This requires some non-intuitive settings from within the Tone Editor, but it is relatively straightforward. As you recall, each layer within a tone bank can be assigned to a DSP effect input channel. Also, the effect send level and direct level can be set. In order for a sound to be played and placed in space using QSound, it must be routed to one of the four (or eight) inputs that were assigned when the DSP module was created.

In our example, these are inputs 1-4. This is done by setting the Effect Select in the layer window which will route the sound to one of the 4 QSound inputs. The effects level is then used to control the master volume for the sound. Then, the direct level for this layer must be set to 0. This is very important, since the QSound DSP module handles all processing of the sound. If the direct level is not set to 0, the QSound process will not work properly. If you do not hear any sound after setting the Direct Level to 0, the QSound DSP program is not running. Go to the SoundSimulator and make sure the QSound DSP program is selected. Finally, the mixer for the tone bank must be set properly. Select the correct mixer from the Display /Mixer menu. Open the mixer and set the output pan position for the outputs that were assigned in the QSound DSP program (0 and 1 in our example). Set the Effect PAN for channel 0 to full left and the pan for channel 1 to full right. Set the Effect Level for each channel to the desired level (remember, the direct level is 0, so this level can be set high), but they must be set to the same value.

### Reviewing, the steps to edit a layer are:

*Set the Effect Select to the desired QSound input*

*Set the Direct Level to 0*

*Set the Effect Send to the desired output level*

*Edit the Mixer*

*Set the 2 Effect Levels of the output channels to the desired level, but they must be the same*

*Set the Effect PAN for the first channel to full left, the second channel to full right*

### Moving Sounds around using MIDI

Sega has set the QSound position parameter to Midi Controller #80. Valid data values range from 0 to 30. When set at 0, the QSound module will place a sound approximately 90 degrees to the players left, over their shoulder. Likewise, when set to 30, the sound will appear 90 degrees to the players right. Values outside of the range 0-30 can cause unpredictable results.

The 4 (8) QSound position values are set by sending a MIDI message (for example in the score) on a particular MIDI channel. MIDI channel 1 always sets the QSound position of input #1, channel 2 always sets the position of QSound input #2, etc. Note that the MIDI channel of the MIDI message determines which QSound input position value is modified. This can cause some peculiar results if you are not careful. For example, if a particular sound is routed to QSound input #1 (as set in the Tone Editor), only MIDI control #80 messages on MIDI channel 1 will change the location of the sound. This is true even if the sound is played on another MIDI channel.

For an example showing how sounds can be controlled using QSound, on the June '96 DTS CD, in "Other:QSound" directory is a full sound tool-based demonstration of QSound along with the MIDI score that plays the demonstration.

**For further information contact QSound Labs at:**

403-291-2492 or [www.qsound.ca](http://www.qsound.ca)

**Next Issue:** Addressing the QSound environment from a programmer's perspective.



Animetix has announced that Sega of America will be distributing its GAMUT-SG and GAMUT-SGm series of plug-in applications for 3D Studio R4 and 3D Studio MAX. Sega will be offering registered Saturn developers the option of purchasing GAMUT-SG separately or bundled with Autodesk's 3D Studio R4 rendering and modelling software. When GAMUT-SGm for 3D Studio MAX ships in Q3 of 1996, registered Saturn developers will also be able to purchase this product directly from Sega.

Animetix is a privately owned software development company based in Vancouver, Canada. The company has created products for several organizations, including Autodesk, Softimage, and Microsoft, as well as a number of plug-in products for 3D Studio.

Animetix Technologies Inc. can be reached by phone at (604) 608 1941, by e-mail at [adamw@axionet.com](mailto:adamw@axionet.com), or interactively via our web page at <http://www.animetix.com>. All trademarks are those of their respective holders.

# DOCUMENTATION

Listed below is the complete set of Saturn documentation as of July 19, 1996. If you wish to order a complete set of Saturn documentation, contact us by e-mail or use the Fax Back section on the last page of the newsletter. **DTS e-mail: dts@sega.com / Fax: (415) 802-1717**

Document Name	Document #
<b>SATURN PROGRAMMING MANUAL VOL. 1</b>	
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
<b>SATURN PROGRAMMING MANUAL VOL. 2</b>	
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
<b>SATURN DEVELOPMENT TOOLS MANUAL</b>	
Sega Saturn Software Development Standards .....	ST-151-R3-082295
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
Sample Game Program User's Manual .....	ST-159-R1-092994
Sample Data User's Manual .....	ST-160-R1-092994
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
MPEG Stream Build Precautions .....	ST-129-R2-SP2-082495
Virtual CD System (Release 3) Limitations .....	ST-182-081294
Write Once CD-R System User's Manual .....	ST-201-B-092994
SH2 Dynamic Load Linkage Editor .....	ST-019-R1-B-050994
Authoring Environmental Guide .....	ST-091-R1-062794
Saturn Author User's Manual .....	ST-164-062794
<b>SEGA BASIC LIBRARY (SBL)</b>	
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 Software Library Release 3.01 Supplemental Disk .....	ST-208-110194
<b>SATURN GRAPHIC LIBRARY (SGL)</b>	
SGL Developer's Manual Tutorial .....	ST-237-R1-051795
SGL Developer's Manual Reference .....	ST-238-R1-051795
<b>SATURN GRAPHICS TOOLS MANUAL</b>	
3D Editor1.72US (ReadMe, Release Notes) .....	SGT-DISK-102795
MapEditor1.81E (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
<b>SATURN SOUND TOOLS MANUAL</b>	
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 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

# 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](mailto:dts@sega.com)>.*

Company \_\_\_\_\_

E-mail address \_\_\_\_\_

URL \_\_\_\_\_

Personnel no longer with your company who receive newsletter?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Title changes of personnel who receive the newsletter.

\_\_\_\_\_  
\_\_\_\_\_  
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Developer Technical Support  
150 Shoreline Dr., Dept. 448  
Redwood City, CA 94065