retroDrive

The Sega™ Simulator

RELEASE NOTES

retroDrive is a Windows application for emulating games written for various Sega video game systems. retroDrive currently emulates the Sega Genesis and the Sega 32X.

My motivation for writing retroDrive is to develop methods for emulating the various Sega video game platforms, and perhaps other hardware in the future. retroDrive sometimes lacks certain features because of this, as I'm more interested in improving the emulation technology than I am in adding special effects or extra options. These extra options will come with time; they just aren't my main focus.

I also want to mention that writing an emulator can be difficult because of the large number of games available for the various platforms. Because of this, it's nearly impossible to test every game as I make changes and "improvements." Therefore, it is likely that new games are broken from one release to the next. If your favorite game doesn't work, just send me an e-mail and I'll add it to my list of games that need to be fixed. I've set up a special e-mail address for sending suggestions and bug reports: retrodrive@tmeekins.com. A future version of retroDrive will have a bug reporting feature built-in.

retroDrive Release 5 Notes (03/02/2002)

- A number of small Genesis bugs has been fixed.
- A new .ini system has been developed so I can start tweaking games for better compatibility. A future release will take more advantage of the new system.
- Added a Rom Information dialog box.
- Added a Debugging Log dialog box. Mainly used by me during development, but perhaps others will find it interesting.
- Added drag-and-drop capabilities. Just drag a Rom image or a Zip file containing a Rom Image to retroDrive and it will run. However, you can't drag to the retroDrive icon. This feature is nice if you have a lot of Roms in one directory since the Windows file open dialog box is very slow.
- All 32X Bios Rom's are now emulated and are no longer required for running games.

- Fixed a bug in the 32X sound emulation, and it now sounds very good. (assuming you have a fast enough machine to run 50/60 fps!)
- I fixed a number of 32X bugs and have achieved my highest compatibility to date. Several games that were broken in recent releases, such as Virtua Racing and Kolibri are working again. Knuckles and Chaotix finally runs!! This is by far the most requested fix for retroDrive! Several of the bug fixes required slowing up the emulator, but I've tried to offset by further optimizing the 32X emulation.

retroDrive Release 4 Notes (11/23/2001)

Several bug fixes. Some 32X games that I broke previously should be working again (or least working better), and a new game, RBI Baseball 32X is partially working for the first time.

retroDrive Release 3 Notes (09/29/2001)

I've been busy working on retroDrive recently and have lots of things under development and coming soon. This update includes a number of bug fixes and a few newly broken games (soon to be fixed). I've also been able to tweak the speed of the emulator and it's much faster now and I believe I can make a lot faster than this. And best for last, retroDrive now has 32X PWM sound!! If you're computer is a bit too slow for the audio to sound correct, turn on the frame skip mode, though it could make the games harder to play.

retroDrive Release 2 Notes (06/21/2001)

I've written a brand-new emulation core which drives the entire emulator. This results in much better timing and synchronization amongst the various hardware components and improves the emulation speed. I've also fixed some bugs that were added in the previous release by accident (such as Contra not scrolling.)

retroDrive Release 1 Notes (05/22/2001)

I haven't worked on the emulator for nearly six months, so I decided to go ahead and release the latest version. I can't remember if anything is broken in this version, but more than likely it's better than any previous version. I'm hoping to get working on the emulator again real soon, as I have some really cool ideas.

Changes:
- Tweaked PSG balancing and fixed a bug in it.
- Major architectural changes to the 68000 emulation.
- Fixed a big problem with the Genesis sound emulation. Nearly all sound problems have been fixed!
- Fixed a bug with the Genesis sprites.
- Fixed 32X memory timing.
- Fixed bug in window title.

- Numerous optimizations to the memory architecture.
- Rewrote portions of the memory system into x86 assembly.
- Many speed-ups in the SH2 and 68000 code.
- Battery Ram now auto-loads and auto-saves.
- Numerous bug fixes.

GeNSX Version 0.96 Release Notes (08/13/2000)

Welcome to the latest version and it comes with a new name. Probably not the greatest name, but it's catchy, short, and unique. This version has much more compatibility and faster 32X emulation. I've added game state loading but haven't had time to get saving in for this release. Another great feature is that Zipped roms (and save states) are now supported. For now, only the first compatible file in a zip will be loaded, but I plan on adding a dialog if there is more than one file in the zip (especially for save states.) I had also planned some more Direct-X rendering tweaks, but ran out of time.

Changes:
- Edge-Enhancement from the menu didn't work, only from the keyboard. This has been fixed.
- Fixed Genesis hang bug.
- Fixed embarrassing typo in menus ☺.
- Fixed SH2 divider.
- SH2 optimizations.
- ZIP file support.
- Added Genesis bank switching.
- Fixed Wani Wani World.
- Added Save State Loading (.GS0)
- New SH2 & 32X memory architecture.
- Fixed bug 68000 disassembler.
- Fixed bug in Genesis VDP writes.
- Added undocumented Genesis Hscroll.
- Fixed Genesis DMA bug.
- Fixed full-screen rendering bug.
- Fixed Genesis DMA timings.
- Fixed Genesis CRAM DMA.

Vegas Version 0.94b Release Notes (06/27/2000)

This is a special test release build of Vegas. I've completely updated the rendering engine and I'd like to get as much feedback as possible on how well it works. If you have frame rate issues, please send me e-mail. I'm mainly interested in frame rates when playing Genesis games. 32X emulation is still slow overall, you don't need to tell me that. Please report CPU, graphics card, and what rendering mode you have problems with. Also mention if full-screen was any different from windows mode. I'm hoping this release is

compatible with more graphics cards and is faster. Oh, be sure the game isn't PAL, as they run at 50fps. Also, with the new updates, I think frame-skip works a bit better.

Speeds on my 2 computers are:
PPro 200, Banshee, 30-40fps
P3 600, GeForce256, 60fps

Changes:
- Fixed 4 bugs dealing with shadow and hilight mode.
- Tweaked some Genesis DMA code.
- Wrote new rendering pipeline.
- Wrote new scanline and screen rendering effects.
- Rewrote DirectX code.

Vegas Version 0.94 Release Notes (06/20/2000)

This newest release of Vegas features much better 32X compatibility and improved Genesis compatibility. In addition, the Genesis sound and timing have been tweaked. Many Genesis games are nearly perfect now! The number of non-working games is quite small now! I've also created a web page for Vegas and I'll be updating it regularly with updates.

Changes:
- Changed some audio flag logic. Several more Genesis games now work.
- Switched from Microsoft C compiler to Intel C compiler.
- Completely re-wrote all timing and clock systems.
- Fixed a sound bug introduced in release 0.92. Seems there's a bug in the Microsoft release libraries. Going back to the debug libraries has fixed the sound bug. Hmmm….
- Optimized sprite rendering. Reduced some memory overhead.
- Fixed a bug in 32X/Genesis signal mixing.
- Fixed a typo in the 32X palette code.
- Fixed a bug in the debugger.
- SH2 cache emulation. Some more 32X games work.
- FM enhancements. Sounds much nicer.
- SH2 optimizations.
- Fixed a bug in 68000 STOP instruction.
- Changed full screen mode to use double-buffering instead of triple buffering.
- Rewrote DREQ.
- Fixed 32X division bug.
- Fixed bug in 32X auto-fill.
- Fixed bug in Genesis BG color.
- Fixed bugs in disassembler.
- Fixed bug reading controllers.

- F3 will pause the emulator.
- More information in title bar. Now shows name of hardware and territory.
- You may now display the frame rate.
- Added undocumented Z80 opcodes to disassembler.
- Fixed interrupt bug in 32X mode.
- Fixed a video mixing bug.
- Several rendering optimizations.

Vegas Version 0.92 Release Notes (04/10/2000)

It seems the reception of Vegas has been good and I am happy. Unhappily though, the inclusion of 32X emulation has kept a lot of people from realizing how well the Genesis emulation is. But then, I guess w/o the 32X emulation, Vegas would probably have been lost in the ever increasing list of Genesis emulators.

In my haste to release the first version, I accidentally forgot to list any credits for Vegas. Vegas was entirely written by myself, however, I did "borrow" some code. The 68k core was lifted from an early version of Mame and was written by Bernd Schmidt and Markus Gietzen. I also made some massive changes to the 68k code. The Z80 core was by Marcel de Kogel and the FM synthesis by Tatsuyuki Satoh. All other code was written by myself, including the SH7604 emulation.

This update fixes a few more Genesis games. I believe my Genesis compatibility is very high, though I do have a very short list of games that need more work. If you come across any Genesis games with problems, feel free to let me know, and I'll add them to my list of problem games. Some games are difficult to fix as the original games have bugs in them, yet they still magically work due to timing quirks in the Genesis hardware. Getting the emulation good enough for these broken games to work w/o breaking every other game is really difficult. I'm not the first to notice these "bugs" since I've also found some "fixed" Roms that actually have the bugs patched. So, beware…

This update also fixes a bunch of bugs in the 32X emulation, so a whole bunch more games work. Though, I must admit, the two most wanted games, Knuckles and Virtua Racing and not working yet. I've made some small improvements to the performance, but there's a long ways to go. I just ordered a copy of VTune and Intel's C compiler, so when that arrives in a few weeks, I'll start digging deeper into the performance. I may eventually create separate executables for MMX and SSE. Using SIMD pipelining should really help the rendering performance.

Changes:
- Fixed a stupid typo in interrupt clearing. A whole bunch of 32X games now work.
- Small change to FM sound. Not sure, but possible improvement to some games.
- Improved SH2 speed (5 to 10fps increase on my system)
- Fixed SH2 Word writes. Fixes a lot of graphic glitches and some 32X games run better.

- Fixed some bank switching. More 32X games work!
- Simplified FM timers. Strider 2 and Grind Stormer (among others) now play music.
- I accidentally deleted a line before the 0.9 release. It's been replaced. Red Zone and Subterrania now work again.
- Fixed window split. Dragonball Z looks better now.
- Optimized BGA rendering.
- Fixed a typo when reading 32X interrupt flags. Didn't affect any games.
- Found another stupid typo in the PWM flags. Toughman 32X runs further.

Vegas Version 0.90 Release Notes (04/05/2000)

Version 0.90 is the first public release of Vegas. Vegas started in January 1998 as an experimental project to see if it was possible to emulate the hardware of a gaming system on a home computer. I knew I could do a decent emulation, but I never expected the results to be as good as they eventually were. Why did I wait so long to release Vegas? I never planned on releasing it, though over time the quality and compatibility were high enough that I decided the rest of the world should have the chance to play around with it. What I found most amazing was that the basic emulation was quite trivial. In fact, the total hours of development on Vegas is quite small. The reason for the long stretch of time from start to this eventual release is simply that I'm very busy and months passed with no work being done. Most of Vegas was written over weekends. That said, don't expect updates at any scheduled date.

What is Vegas? Vegas is an attempt to emulate the Sega Genesis (Sega Mega-Drive) and the Sega 32X. The 32X emulation in Vegas still has a number of compatibility and performance issues, but I feel the Genesis emulation is good enough to finally release. In future releases, I may add Sega Master System and Sega Game Gear emulation. Because I don't have the time to play every game through to end, I haven't done thorough testing. Feel free to let me know of any games that don't work properly, but please don't e-mail any ROM images.

What is missing from Vegas? Technically, nothing is missing. Vegas emulates every single feature of the core Genesis system (and 32X.) However, controller emulation is limited. Currently I only support keyboard play, but I will eventually add DirectInput support. Another feature I feel that is important, but missing, is saving backup-ram to the computer's hard drive. Also planned is support for 6-button controllers and the Sega Menacer. These features will eventually be added to Vegas.

How is the joypad mapped?

START	Enter
UP	Up Arrow

DOWN	Down Arrow
LEFT	Left Arrow
RIGHT	Right Arrow
A	Z
B	X
C	C

Performance and Compatability Issues:

retroDrive uses a 16-bit rendering engine. Any 15/16-bit bit-depth format is supported. However, if you wish to run retroDrive in a window, you will need to set your desktop to 15/16-bit bit-depth. If you run in full screen mode, you don't need to adjust your desktop depth, however, if you go to windowed mode, the rendering may look funny.

retroDrive uses the computer's sound card for timing. If you do not have a sound card, then the windows timer will be used instead. However, the windows timer is not very accurate, so frame rates will vary between 56 and 64 fps. If you have a sound card, the frame rate should stay steady at 60 fps. (If you're playing a PAL [European] game, then replace all references to 60 fps with 50 fps.)

Cool Features

Emulates all rendering features of the Genesis without the need for setting menu options. retroDrive dynamically analyzes the scene being rendered and switches between rendering engines on the fly. This is why some simple games run at higher frame rates than more complex games. Typically, games with column shifting and windowing are the slowest.

16-bit renderer instead of 8-bit renderer allows for shadow and hilight effects. In addition, a blurring effect has been added to simulate the blurry NTSC signal generated by the Genesis.

Automatic detection of country of origin. The country code can be changed from the menus to emulate the Genesis running in different countries. There are some games which have different features depending on which country the hardware is set to. retroDrive properly emulates the timing differences between PAL and NTSC.

Interlace mode is also emulated. In windowed mode, the number of scanlines is doubled but the image stays stretched to the windowed view. It looks quite nice. In full screen mode, the renderer attempts to emulate interlacing by rendering alternating scanlines. Which scanline is rendered also toggles each frame so you end up with a flickering image quite similar to the actual hardware.