Tuning up with the 64 Studio and JAD audio Linux distros

MUSIC MAKERS

The 64 Studio and JAD Linux distributions specialize in tools for the audiophile. **BY DAVE PHILLIPS**

On July 27 of this year developers Daniel James and Free Ekanayaka released 64 Studio 2.0, a Debian Etch-based Linux distribution optimized for professional-quality multimedia performance and production. The system's kernel has been compiled for optimal real-time performance, and the expected Linux applications base has been extended with 64 Studio's suite of powerful audio/ video tools and programs, all built for a pure 64-bit environment.

I tried out 64 Studio 2.0 (Figure 1) on some practical daily tasks here at Studio Dave, a home business that in-cludes a small-scale studio for teaching and music production. I use 64 Studio for all my work at the computer, not just for music production. 64 Studio's default applications base provides most of my necessary software, but if I need something that was not included in the original installation, I can usually find it in the standard Etch repositories.

This report also includes a non-scientific performance comparison between 64 Studio and the outstanding JAD – another Linux distribution with an audio emphasis. This study was not intended to be conclusive, but the results indicate that there is more to the issue than a consideration of raw speed.

A Little Tech Talk

First, I'll answer the most frequently asked question regarding this system: Yes, it's fast, very fast. I'll look at some numbers later, but for now, you can take my word for it: 64 Studio is fast.

AMD's publicity statements list applications that are likely to benefit from 64-bit advantages, specifically mentioning digital music production, video editing, real-time media streaming, image/video/signal processing, and voice recognition. The Linux applications arsenal now includes excellent 64-bit software for all those categories, and much of that software is included with 64 Studio.

64 Studio's Debian Etch core is pure 64-bit. According to Debian documentation, this officially supported port consists of a kernel for all AMD 64-bit CPUs with the AMD64 extension and all Intel CPUs with the EM64T extension. Specific advantages over the i386 architecture in-
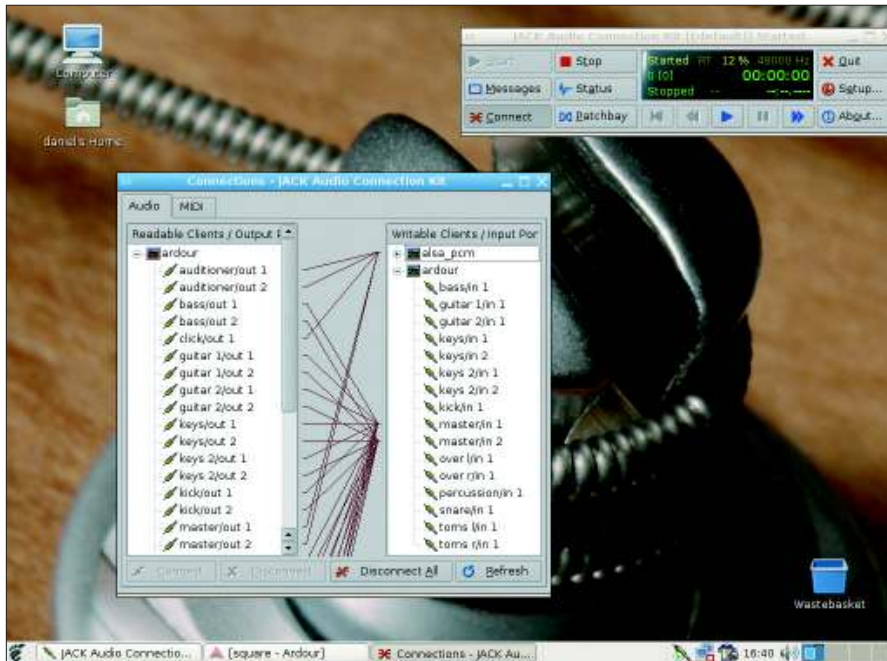
Figure 1: 64 Studio is a complete 64-bit, Debian-based Linux system with an audio focus.

clude notable advances in memory management (with support for up to 64TB of physical memory), floating-point calculation (SSE2), and other compiler optimizations. The documentation further notes kernel support for native execution of 32-bit binaries, thanks to libraries provided by the ia32-libs package.

Here at Studio Dave, I run 64 Studio on a machine built around an AMD64 3200+ (a 2GHz processor) on a Gigabyte motherboard with 2GB of memory and a 320GB SATA hard-disk. An M-Audio Delta 66 manages the digital audio I/O; hardware MIDI I/O is handled by a Creative Labs PCI128.

Not incidentally, this machine was built to be quiet, with an Antec Sonata II case, a Zalman CPU fan, and a fanless nVidia GeForce 7600 GS video card. The box isn't absolutely silent, but at this point, my laptop is much louder.

Installation & Configuration

My hard disk crashed shortly after I was contacted about writing this article. Most of my material on that disk was backed up, so I took the opportunity to upgrade to a larger capacity SATA drive and to install the most current 64 Studio 2.0. I downloaded the ISO on another machine, burned the DVD, and booted it up on the 64-bit box. Installation and basic configuration was largely a matter of accepting default decisions. Hardware detection was thorough – no problems

were reported – and soon I was ready to restore my preferences (with much assistance from apt/Synaptic and the Debian package repositories).

Running the System

As a music professional, my primary interest is in 64 Studio's audio system and applications set. Current stable versions of ALSA and JACK provide basic and advanced sound capabilities, with excellent support for my audio and MIDI hard-

ware. The default applications list includes software for all my usual sound and music activities, including composing and editing MIDI sequences (Rosegarden, seq24), recording my own music and performances by my students (Ardour, Figure 2), editing and processing audio files (Audacity, ReZound), and typesetting music for high-quality printing (LilyPond).

Everything worked out of the box, but I'm careful about my hardware. On the Linux Audio Users mail list, I asked my colleagues for advice and experience regarding my intended purchases, and of course, I searched Google for technical specifications and other reports. I didn't need to change much at the system level. 64 Studio's JACK settings are conservative by default, so I reconfigured them with QJackCtl, and I am now operating JACK with a comfortable 5.8 milliseconds latency. I also added two more sound devices to the system, a task easily accomplished thanks to advice in the 64 Studio FAQ.

I have some long-established practices in my production work. First, I'm a fanatic about weight. I jettisoned the Gnome desktop immediately to install Fluxbox, despite having more than sufficient hardware resources. Next, I must have support for my preferred applications. For recording and mixing, I rely on Ardour, Audacity and ReZound for
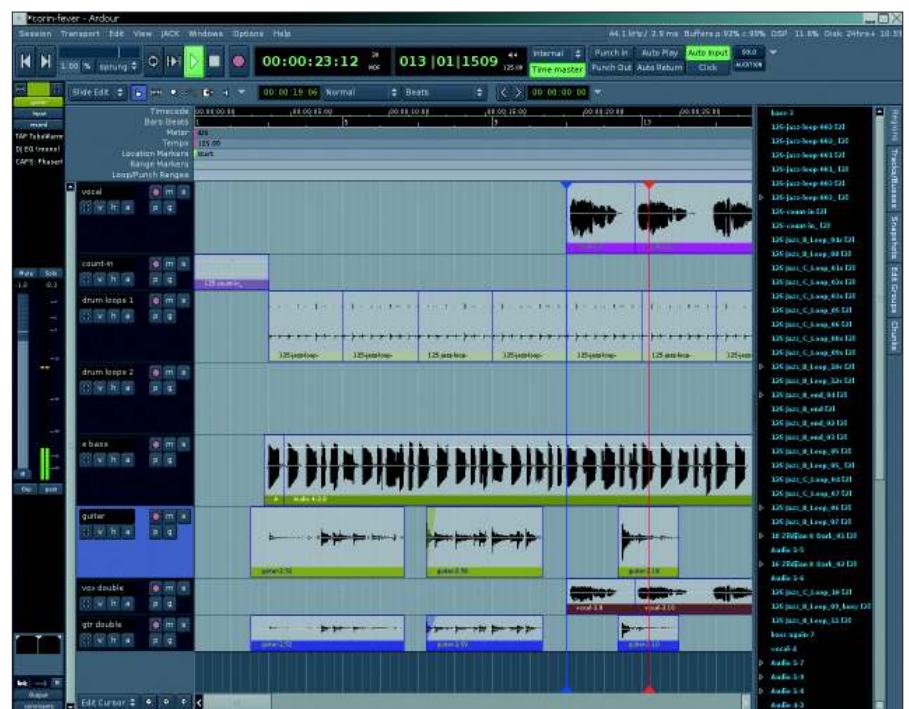

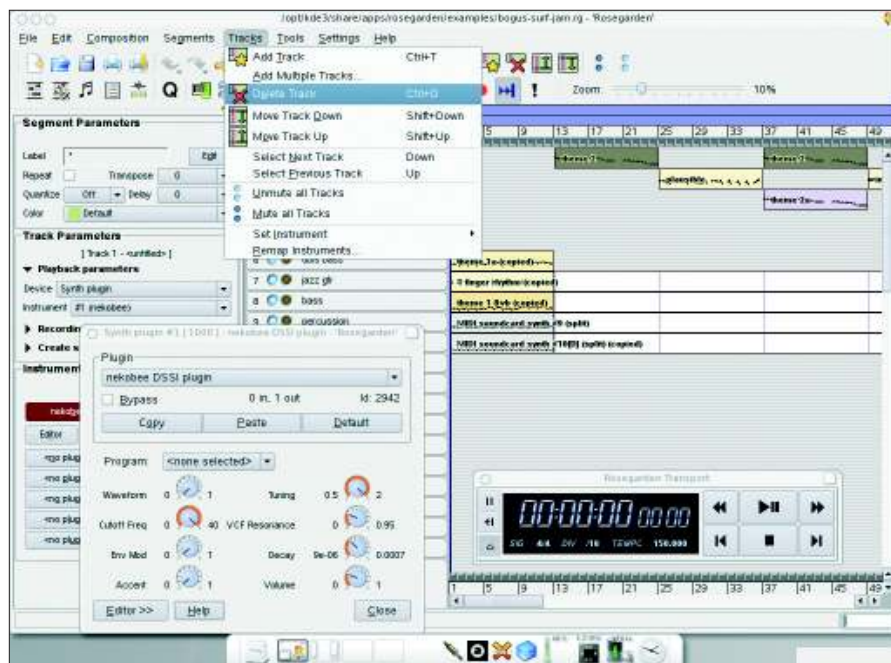Figure 2: 64 Studio with the Ardour2 digital audio workstation.

Figure 3: JAD comes with the Rosegarden music composition and editing environment.

sound file editing, and a DOS sequencer for MIDI composition. Other indispensable items include QJackCtl, JACK-Rack (an effects rack), and QSynth (a soundfont synthesizer). QSynth requires a user-installed sound font, and of course, the DOS sequencer is not included with 64 Studio, but everything else on my required list was present and ready to roll.

I also needed the DOSemu and Wine system emulators, but neither package is available from 64 Studio's default repositories. Fortunately, 64 Studio uses the apt package management system, and I can install packages from any Debian repository. With a little help from Synaptic (a GUI for apt) I installed a build-essentials package for compiling applications myself. I then downloaded the DOSemu source code from its homepage, compiled it, and installed it, and DOSemu was ready for use. Next, I tried to build Wine, but I hit some show-stopping errors. I was unable to resolve the problem, but a Google search found a backported package for 32-bit Wine (version 0.9.34) compiled for the AMD64 platform. I installed it with dpkg, and it works perfectly. I'll have more to say about the Wine/64 Studio connection later in this article.

Documentation & Support

Information and documentation modes include the standard FAQs, forums, mail lists, and IRC channel (#64studio on Freenode). Developer Tim Hall recently began work on *The Creative Desktop*, a community project to produce a helpful manual for new users. The general plan is simple enough: quickly bring new users up to speed on system installation and configuration, then show them the basic invocation and use of the applications. The work currently includes well-written tutorials on JACK, Ardour, Rosegarden, and Hydrogen, as well as a series of tutorials on some of 64 Studio's 2D graphics programs.

Tim plans to expand coverage to 3D graphics, animation techniques, publishing, web design, video editing, and of course, more audio applications tutorials, and he invites members of the community to join the project.

Beyond the standard channels, commercial support is available from 64 Studio Ltd., with pricing based on the expected use of the system in a small studio with up to three machines. Interested readers should visit the 64 Studio website [1] for up-to-date information regarding support plans and pricing.

Going Live

64 Studio is designed for people who want to realize visions – people who are willing and able to learn new ways of doing things. However, these same people will not struggle long with system complexities: they have work to do and they want to get on with it. Can 64 Studio fit their needs ? I think so, but poten-

tial users don't need to take my word – they can try it themselves. A "live" disc image is available for testing the system without installing it.

The live version costs the same as the standard installable image (US$ 0 + download + disc), and it works nicely. I'm helping a friend migrate from Windows to Linux. He's very excited with what he's found on the live disc, and he's looking forward to replacing Windows completely with 64 Studio.

JAD

The JackLab Audio Distribution (JAD) [2] is a 32-bit multimedia-optimized Linux system based on openSUSE 10.2 (Figure 3). JAD's designers have added many of the same enhancements found in 64 Studio, including a kernel built for preemption and real-time performance. The audio applications set includes the usual suspects, with the significant addition of explicit support for Wine and the wineasio driver. This feature should attract Windows-based musicians who would like to move to Linux without losing their investment in VST plugins. The Wine/wineasio combination also supports impressive performance from Reaper, a popular audio/MIDI sequencer for Windows.

"The 32-bit system also has this advantage over its 64-bit competitor: you can build Ardour with VST support. Yes, Ardour can be compiled with integrated VST support, but only for personal use, and the distribution of VST-enabled binaries is prohibited. Ardour's VST support also requires Wine, but it prefers its own internal mechanism over the wineasio solution. Before you rush off for the code, be advised that the default JAD installation does not provide a complete toolchain for compiling software, nor are all required packages available from the repositories. Building ArdourVST isn't rocket science, but you'll need to do some legwork to make it happen.

Installation & Configuration

As with 64 Studio, installation and configuration were uncomplicated and utterly successful. My system and applications requirements are essentially the same for JAD as for 64 Studio, and adding any needed packages is a straightforward task with the Smart package manager. Among its virtues, Smart downloads

and installs packages concurrently, giving it the edge in speed over apt.

Running the System

I run JAD on a machine with an AMD64 3800+ CPU (2.4GHz) on a Gigabyte motherboard with 1GB of memory and a 230GB SATA hard-disk. My audio hardware is similar to what I use with 64 Studio, with an M-Audio Delta 66 for digital audio I/O and a Creative Labs SBLive Value for external MIDI.

This machine was also built to be quiet, with an Antec case and a Zalman CPU fan, but it currently contains an nVidia GeForce 7300 GS video card with a rather noisy fan (soon to be replaced by another fanless card).

Most of my remarks regarding 64 Studio's applications base apply to JAD, with some notable exceptions. DOSemu and Wine are available as packages in the standard repositories, more software synthesis languages are available (e.g., SuperCollider3 and ChucK), and the Macromedia Flash player can be found in JAD's default repos. Many other appli-

cations are available that have not yet been ported to 64-bit versions.

Documentation & Support

Pointers to tutorials and other documentation can be found on the JAD Wiki [3]. General questions regarding JAD can be posted on its support forum, but you're likely to get faster service in the #jacklab IRC channel on Freenode.

JAD's roadmap includes improved documentation, and developer Michael Bohle has indicated that work on a comprehensive JAD manual may begin soon. See the JAD website for documentation status reports and links to other information resources.

Permanent Addition

JAD has become my preferred 32-bit system. To be particular, I like running Ardour and Reaper with VST/VSTi plugins, and I like using the JOST multi-format plugin host (LADSPA, DSSI, native Linux VST) with Sequencer Plus or seq24. I'm also attracted by some of its non-musical features, such as the default color

schemes and the lively IRC chat room. JAD is a permanent addition to Studio Dave, and I look forward to its evolution.

Benchmarks, Real and Personal

The original vision for this article was to compare 64 Studio with another media-optimized system such as AGNULA. Alas, that pioneering Linux audio distribution now rests in peace, but its progeny includes Free Ekanayaka, 64 Studio's chief technical developer.

I felt that a blow-by-blow comparison would not yield much useful guidance for my readers, so I decided to do something a little different. I've been running JAD as my main 32-bit system, in a pre-release of version 1.0. JAD has some unique characteristics that distinguish it from other popular multimedia Linux distros, and I thought I could do right by both systems by comparing their strengths. Both 64 Studio and JAD are running on similar machines, with just enough difference perhaps to balance the hardware factors in the equation.

The 64 Studio box is the lesser-powered machine, giving it the underdog status. Following is a gentle estimation that considers each system's advantages within its host environment. You can decide which system offers the greater value. For real benchmarks, visit AMD's website. The company takes its claims quite seriously, and their test suite includes Cakewalk's SONAR and Sony's Vegas Studio. They have plenty of colored charts and graphs, so if it's numbers you need, consult AMD.

My somewhat more casual test suite included a high-quality synthesizer, a digital audio workstation, and an audio/MIDI sequencer running under Wine. As indicated, the testing hardware is unequal. The JAD box has the faster CPU, but the 64 Studio machine has more memory and a faster hard disk. Thus, these test results must be regarded as utterly unscientific.

Test #1: ZynAddSubFX

For my first test, I started JACK and opened the excellent ZynAddSubFX synthesizer. I created a layer of five instruments, set them all to receive on MIDI channel 1, then I played as large a chord as the synth could handle without xruns (audio dropouts or other discontinuities) or other audio breakdowns.

I used the seq24 MIDI sequencer to create an arpeggiated chord of 25 notes covering a span of seven octaves, then I looped that pattern at 69 beats per minute. In 64 Studio, QJackCtl reported no xruns with ZynAddSubFX playing a total of 125 voices, but the layer did stretch the limits of my playback system until I lowered the note-on velocities. JAD cleanly handled four layers with the same MIDI sequence. A fifth layer was less reliable and caused some xruns.

Test #2: Ardour2

Ardour's performance under 64 Studio is noteworthy. A recent project involved more than 200 audio segments spread over 12 tracks with eight active plugins. JACK reported no xruns, and Ardour's DSP usage never exceeded 11 %.

I loaded the same session into Ardour on my JAD system; JACK again reported no xruns, but DSP usage averaged 22 % during playback, spiking to 26 %. I have processing cycles to spare on both machines, but the difference is at least superficially striking. The JAD box contains the more powerful CPU, yet performance in this test was significantly better on my 64 Studio iron.

Test #3: Reaper

Reaper is a powerful audio/MIDI sequencer for Windows and Mac OS X. Reaper also runs under Wine, so I decided to compare its performance on the two distributions.

To be fair, it's an unbalanced comparison. Wine supports a 64-bit build, but the binary will not run 32-bit software. However, a 32-bit version can be built for a true 64-bit system, so I looked for an appropriate Debian package.

I found and installed the Wine and libwine packages (version 0.9.34) and set the sound system to OSS in winecfg, and behold, I had Reaper running under 32-bit Wine in a 64-bit system.

Unfortunately a connection to JACK is not possible in that environment, so low-latency performance is unlikely. Indeed, on my 64 Studio, Wine Reaper reports an expected latency between 26 and 160 milliseconds.

Wine is much happier on JAD's native 32-bit system, and the wineasio driver lets Reaper run here with latencies from 2 to 6 milliseconds.

VST support is available on both systems. Under JAD, Wine with the ASIO driver provides a transparent environment, so that any ASIO-aware program that will run under Wine should have no troubles loading and running VST and VSTi plugins (Figure 4).

Your possibilities are more restricted under Wine in 64 Studio, but Reaper can be employed as a host for 32-bit plugins in situations that are not latency-critical. At the last, I've concluded that, given a fast enough processor, Wine's OSS sound support may be acceptable in an optimized 64-bit system, but the native 32-bit JACK/wineasio combination delivers more satisfying performance.

Outro

Having choices such as JAD and 64 Studio is like having to decide between better and better.

Despite their current differences, in many ways, these systems tend toward the same end: 64 Studio has a 32-bit version, complete with Wine/wineasio support, and JAD will eventually be ported to 64-bits; both systems run Java, both do Flash, and both have live disc images. Your choice of 64-bit system or 32-bit system will depend on your critical needs. ■

Figure 4: energyXT2 runs Reaktor in JAD 1.0 (screenshot courtesy of Michael Bohle).

INFO

[1] 64 Studio 2.0: *http://64studio.com/*

[2] Jacklab (home of JAD): *http://jacklab.net/jacklaborg/english/*

[3] JAD wiki: *http://wiki.jacklab.net/index. php/Main_Page*