Toppling Boundaries: Supercharged Music-Making on the Road

CAKEWALK by Roland

"Everyone wants to take their studio mobile now: touring artists on the road, bands in rehearsal studios, or anyone who wants to produce music wherever they become inspired—with the Intel® Core™ i7 mobile processor and SONAR 8.5, musicians will be able to have the full power of their recording studio anywhere they want it."*

*- Carl Jacobson,
Vice President of Marketing,
Cakewalk*

The best music tends to be spontaneous, whether captured live at a festival or recorded just before closing time in a little-known jazz club. For those times when the creative instincts strike or the right mesh of musicians and mood comes together, having the equivalent to a full-fledged mobile studio at hand can be the key to preserving those evanescent musical interludes.

Until recently, the processing power gap between the computer back in the studio and the notebook in hand used to be sizable, ruling out any serious music capture or editing on-the-go. That picture has changed dramatically with the release of the Intel® Core™ i7 mobile processor, a perfect match for the software capabilities of Cakewalk's latest release of SONAR* 8.5. The Intel Core i7 mobile processor also makes a fitting companion for Cakewalk's V-Studio* 100, providing the processing muscle to layer on effects, fly through complex mixes, and keep the latency down during live recording and mixing.

It's all about liberating musicians—freeing them from the confines of the studio and providing the processing power and tools to elevate musical expression in the field to new levels. The fact that this is now possible on a machine that weighs less than the phone book for a mid-size American city is a testament to technological progress made in the last few years.

"As an artist, I've always loved pushing the boundaries of technology. The Intel® Core™ i7 processor redefined processing for music production, and now the [Intel] Core i7 mobile processor has removed the physical boundaries for music production. Inspiration can happen anywhere, and now—whether I'm in a studio in LA, a concert hall in Vienna, or on a flight in-between—I can harness my full creative abilities."

- Justin Lassen, Game Composer and Remix Producer

A New Era for Music Creation

The quest for the ideal portable recording platform has been a long one—particularly for those musicians unwilling to compromise the strength of their creative vision to the constraints of an underpowered laptop computer. The problem has been that as the capabilities and processing power of laptop machines have increased, the demands and requirements of audio applications have increased at a far greater pace. The trends have been driven by a number of advances on the software side: more sophisticated virtual instruments, more elaborately modeled effects, a raft of innovative audio plug-ins, the need to accommodate greater numbers of tracks in response to the vision of recording artists, the complexities of surround-sound mixes, and similar demands.

The release of the mobile version of the Intel Core i7 processor changes the equation dramatically, bringing the same level of processing power and multi-threading capabilities to laptop computers as artists experience in a studio environment. The dynamics of this monumental advance in field-recording capabilities is likely to change the face of music creation, and it has definitely changed the way companies such as Cakewalk approach the challenge of setting up a portable music production system.

The Cakewalk Story

In 1987, Greg Hendershott, the current CEO of Cakewalk, was an active philosophy major at Oberlin, but he also had an interest in software engineering, as well as being a musician and keyboard player. From these interests, a novel idea was born: to create a software program that would let people make music on a personal computer. The initial program, developed as an experiment, was a sequencer and it worked well enough that Hendershott decided to take out a small ad in a magazine to see if he could sell a few copies. The first few responses paid for the ad, so he placed another one, and the small software publishing enterprise continued to steadily grow, with Hendershott writing code, handling support calls, and shuffling packages to UPS every day. He named the program Cakewalk after seeing the term in a dictionary, thinking that the word suggested ease of use, a fitting association for his software program.

In a twentieth anniversary interview with Create Digital Music,[1] Hendershott commented on his selection of a name for his bootstrapped company: "So the name of the company was 12 Tone Systems—because it's everyone's favorite, most accessible style of music. [laughs] I thought it was kind of fun. For many years, people would call up and say, 'Is this Cakewalk?' I decided, instead of correcting people, we'd just change the name of the company to Cakewalk and that'd be simpler."

Today, Cakewalk is one of the strongest and most influential players on the computer music scene. Their success story includes millions of musicians worldwide using Cakewalk products to make music, including a number of Grammy*- and Emmy*-winning producers, composers, sound designers, and engineers.

Of the current Cakewalk product catalog, Michael Hoover, executive vice president of products, said, "Cakewalk provides a vast range of products to help people at various levels of ability be more creative. We have entry-level products for music hobbyists and music enthusiasts. We have a series of digital audio workstations, such as SONAR Producer, and virtual instruments, such as Rapture*—which are designed for professional musicians, composers, and producers. We recently released a line of high quality yet affordable music hardware for musicians: dedicated audio interfaces and studio monitors. And, we have new top of the line integrated hardware and software solutions, including SONAR V-Studio 700, which is a complete music production system that brings together everything you need."

"Creative people love to explore the new possibilities provided by the latest technology. They are always trying to get one more track, they are always trying to get one more virtual instrument, one more layer of sound, one more added dimension to their mix. The beauty of this Intel® Core™ i7 mobile processor is that they are able to do more: more tracks, more simultaneous effects, more virtual instruments, bigger banks of sound with their virtual instruments, and now they can do it anytime, anyplace."

- Michael Hoover, Executive Vice President of Products, Cakewalk

Figure 1. V-Studio 100 offers the freedom of portable recording, and it plays well with notebooks.

Working with Intel

Cakewalk and Intel have collaborated together for well over a decade. Cakewalk was one of the first companies to adopt multi-threading in an audio application, and the company continues to work closely with Intel on threading enhancements, tuning, and optimization of each successive generation of SONAR.

"Cakewalk's association with Intel helps Cakewalk's business," noted Carl Jacobson, "because by our working together with Intel, musicians ultimately have a better experience making music. Through our co-development relationship with Intel, where Intel helps us optimize our code for the latest platforms, we are able to create better products for musicians. We are able to take care of the technologies so that musicians are able to focus on what they want to focus on: which is being creative and making music."

"Cakewalk's business is also further helped by our relationship with Intel," Jacobson continued, "because we have a strong co-marketing relationship. Working with Intel validates our position as a technology leader because Intel is the technology leader in the processor space, and it reinforces everything that we are saying about SONAR being optimized for multi-core and SONAR being optimized for 64-bit. It is true. People believe it, and we are able to reach more people by working together. We help Intel out at some of their shows and show off some cool applications, and Intel helps us out at our shows by being able to show the latest technology."

The advent of 64-bit processors and operating systems on personal computers propelled a number of advances in applications, particularly those that routinely handled large volumes of complex data. Following

Figure 2. Take an entire compact studio on-site with the V-Studio* 100 and SONAR* VS running on a notebook powered by the Intel® Core™ i7 mobile processor.

in their tradition of keeping pace with the latest hardware advances, Cakewalk underwent an ambitious re-engineering of SONAR to add 64-bit capabilities to the program. Once again, Intel assisted in the engineering effort.

"What really propelled SONAR into the technology-leading position in the marketplace," Jacobson said, "was when we introduced the x64 version of SONAR. We worked very closely with Intel to make sure that we were optimized for x64. When we introduced that technology advance, we were the very first company to have a 64-bit application

and nobody else had seen anything like that. Customers were able to access vast amounts of RAM that they could never access before. Their music projects would render faster, they would get more performance out of the machine, it enabled more tracks, it enabled more simultaneous virtual instruments, more simultaneous effects. That is one way that we have worked together with Intel, and we have continued to work closely together optimizing our software. In fact, in the most recent version of SONAR 8, we spent a lot of time working on the core application itself."

"There are real benefits that a Cakewalk SONAR 8.5 customer or, even more so, a V-Studio* 100 customer will experience with an Intel® Core™ i7 mobile processor-based notebook. The way I look at the Intel Core i7 mobile processor is this: the walls are coming down. Before you were confined to a desk and how inspiring is sitting at a desk? It is not. Creativity knows no boundaries and now your tools don't either: you can capture the inspiration where it happens."*

- Carl Jacobson, Vice President of Marketing, Cakewalk

"Rather than add some creative features," he continued, "we took a look at the application and streamlined it and streamlined the code. We overhauled the engine. We optimized it even more for multi-core and x64. Our benchmarks showed results between a 30 to a 240 percent increase in performance."

"What I love about working with Intel," Jacobson said, "is that—beyond the fact they are a technology leader in the marketplace—they are really amazing people who are passionate about enabling creativity. That value is totally in sync with what we are trying to do at Cakewalk. We have a passion about helping musicians make music and we get to work with awesome people who share those values."

Threading, Tuning, and Optimization

SONAR 8.5 was designed to be a scalable application and from the engine's inception, according to Noel Borthwick, chief technical officer at Cakewalk, it was designed to take advantage of multi-core processing. "We ultimately balance more load across any available resources," Borthwick said. "We will access all four virtual cores that are made available through hyper-threading, and we will intelligently distribute everything so that you have a very balanced workload."

"What is interesting about working with the Intel Core i7 mobile processor and in applications such as SONAR," he continued, "when you have a very complicated project that has hundreds of tracks and multiple virtual instruments and multiple effects and multiple mix settings, occurring all simultaneously, all of those are distinct events that all have to happen, in time, in sync, at the same time. SONAR has to keep those events precisely orchestrated and fully synchronized, and with the power provided by the Intel Core i7 processor and now the Intel Core i7 mobile processor more of those events can occur and all of those events can happen at low latencies and closer to real-time.

"As you turn a knob, you want to hear it happen," Borthwick said. "The processing power is the key. The beauty of the Intel Core i7 mobile processor is that it enables musicians to focus on making music and the technology just gets the job done."

"We've seen how much more powerful SONAR* 8 can be with the Intel® Core™ i7 processor. They were so efficient together that we had to create new benchmarks for what was possible for audio and music. Knowing that those gains are available now as a mobile experience is a huge opportunity for our customers."

- Noel Borthwick, Chief Technical Officer, Cakewalk

Figure 3. SONAR* 8.5 supports large numbers of tracks while minimizing latency.

The Best Processor on the Planet Goes Mobile

Having earned kudos throughout the industry for benchmark-shattering performance, Intel Core i7 processor technology has been re-engineered into a compact, power-efficient package to meet the requirements of the mobile workforce. Code-named Clarksfield, the Intel Core i7 mobile processor packs a prodigious amount of quad-core processing power into a compact form factor, meeting the expectations of professionals whose work in the field requires the highest levels of performance. Projects in the field benefit from the low-power usage design, extending battery life and enabling the mobile lifestyle.

Based on the revolutionary Nehalem architecture and manufactured with 45nm technology, the Intel Core i7 mobile processor does not scrimp on features. It includes the full slate of capabilities that earned a name for its predecessor, including:

- **Intel® Turbo Boost Technology**, which varies the processor clock speed to accommodate demanding tasks

- **Intel® Hyper-Threading Technology**, for handling up to eight individual instruction threads across the four available cores

- **Intel® QuickPath Interconnect**, for maximizing data transfer speeds (up to 25.6 GB per second) across memory, chipsets, and processors

- **Integrated Memory Controller**, for improving memory bandwidth and reducing latency

Digital media professionals working with audio or video applications will experience unprecedented performance when using their favorite tools and programs on a notebook powered by the Intel Core i7 mobile processor. Well-threaded applications, such as SONAR Producer, achieve substantial performance gains, both from the benefits of optimization and the inherent capability of the Intel Core i7 mobile processor architecture to direct available processing power to where it is most needed and to take maximum advantage of all available cores and threads.

For more information about the intelligent performance of the Intel Core i7 mobile processor and the architecture that lets it shape itself to everything you do, go to www.intel.com/technology/architecture-silicon/next-gen/

"SONAR* 8 is incredibly powerful with unlimited tracks and lots of effects: the possibilities are amazing. Now, a musician can take a laptop with the [Intel®] Core™ i7 mobile processor and be able to access all of that functionality. They no longer need to have both a desktop and a laptop to get their work done. Musicians can enjoy the same level of power and be able to bring it on the road to enjoy the freedom provided by a mobile studio experience."

- Gina Garda, Director of Business Development, Cakewalk

The Affordable Processing Powerhouse: Intel® Core™ i5 Processor

Built using the proven architecture and speed-demon performance that have made the Intel Core i7 processor a present-day legend, the Intel® Core™ i5 processor brings impressive performance to the desktop in a surprisingly cost-effective package.

The Intel Core i5 processor incorporates many of the key features of Intel Core i7 processing technology, including Intel® Turbo Boost Technology, Intel® Hyper-Threading Technology 2, and Intel® Smart Cache. The net result is intelligent performance on demand, well suited to applications in the digital media realm. With this level of processing power on tap, desktop users experience the benefits of Intel's next-generation dynamically scalable microarchitecture at a very reasonable price point.

Collaborative engineering work between Cakewalk and Intel ensures that audio and video applications can take maximum advantage of the available four cores and eight threads, significantly reducing the time required for compute-intensive operations, such as digital signal processing, mix-downs, video processing, compositing, multi-track audio editing, and similar operations.

Intel® Hyper-Threading Technology makes a return appearance, accelerating applications by handling up to eight threads on four cores.

Coupled with the Intel® 5 Series Chipset based on advanced Intel® graphics technology, the Intel Core i5 processor offers a value proposition to mainstream computer users, gamers, and digital media artists that is hard to resist.

"The studio is now mobile. With the [Intel®] Core™ mobile processor, when an artist does his live performance, he will be able to record it and now he is able to do all the editing and production right on the laptop. So, there is no need to bring it back to the studio. He can share the experience from wherever he is. If he is on the road, he has everything he needs with him."

- Gina Garda, Director of Business Development, Cakewalk

Learn More

For details on the performance capabilities of next-generation Intel® Core® i7 processors, visit:
www.intel.com/performance

For an interview with Cakewalk founder Greg Hendershott, conducted on the 20-year
anniversary of the company by Create Digital Music, go to
http://createdigitalmusic.com/2007/11/12/interview-cakewalk-founder-greg-hendershott-20-years-on/

For more information about SONAR* 8, visit
www.cakewalk.com/SONAR

For more information about the SONAR* V-Studio* family, visit
www.sonarvstudio.com

For a survey of the latest forum discussions about Cakewalk products, go to
http://forum.cakewalk.com/default.aspx

For more about Justin Lassen's works, go to
www.justinlassen.com