

LinuxWorks Rocks with PhatNoise

Founded in 1999, PhatNoise®, Inc. designs innovative automotive digital-media jukebox systems that permit digital-music enthusiasts the opportunity to listen to high-quality digital audio files transferred from personal computer systems for playback on car stereos.

The company's flagship PhatNoise Car Audio System enables consumers to locate, manage, play, and interact with digital-audio content across multiple devices and environments, and features the capability to store virtually thousands of digital audio tracks. Unsurprisingly, PhatNoise's innovative technology and product designs have garnered significant attention in the automotive aftermarket and both the car-audio and consumer-electronics markets alike.



PHATNOISE

Defining the product

Responding to a lack of sophisticated digital-media playback devices available for the automotive environment, PhatNoise created a next-generation digital jukebox intended for 'anytime, anywhere' digital-media entertainment. Unlike older systems that were costly, lacking in solid technical design, and difficult to install and use, the PhatNoise Car Audio System is a comprehensive music management system that includes a digital audio player, embedded software, and an intuitive digital-media application for managing huge libraries of digital music files. In fact, the product's advanced engineering, intuitive design, and easy integration with existing car stereos has earned it the "Best Overall Product" and "Best Car Product" awards at the MP3 Summit 2000 and "Maverick Processor Design Winner of the Year" honor by Cirrus Logic®, Inc. in 2000.

The PhatNoise Car Audio System is the industry's first complete automotive digital-media jukebox system. The PhatNoise system, based on LynuxWorks' BlueCat Linux, includes PhatNoise Music Manager software, a high-capacity removable digital-media cartridge, a USB docking station, and the PhatBox in-car server.



Fundamentally an MP3 player that functions similar to a CD changer, the PhatNoise system efficiently stores thousands of music files transferred from a consumer's personal computer to a vehicle, affording hours of unlimited digital-music entertainment on-the-go. The company's innovative music management software lets users seamlessly access, organize, transfer, and play a wide assortment of digital music files, including WMA, MP3, and WAV formats. The software also features PhatNoise's patent-pending dynamic playlist-generation technology, which expediently organizes and updates music playlists automatically according to consumers' personal musical preferences.

A better way to play

During the preliminary design phase of the PhatNoise Car Audio System, the company envisioned an MP3-like jukebox, powered by an internal computer emulating a vehicle CD changer. Already having set the industry standard in audio compression for factory integration, PhatNoise sought leading technology partners to lend their expertise to other aspects of product development.

One of the primary drivers identified for the initial project was an interface from a Cirrus Logic processor to standard hard-disk drives. A second component consisted of audio integration with Linux® drivers that would enable a Linux

kernel to support audio on a Cirrus Logic system-on-a-chip, ARM®-based processor.

Acting on the recommendation of Cirrus Logic, PhatNoise approached LynuxWorks™ to evaluate its Linux-based solution. Recognizing the need for a powerful, comprehensive Linux operating system, PhatNoise ultimately selected LynuxWorks' open-source Linux environment, BlueCat® Linux. "We are an innovative company that likes to do our own development. However, after meeting with LynuxWorks' professional consulting staff, we realized that it was far more cost-effective and beneficial for us to use their expertise than to try and solve the

problem ourselves," said Dan Benyamin, director of embedded systems at PhatNoise.

A complete Linux solution

Tailored for embedded development and deployment, LynuxWorks' BlueCat Linux is uniquely constructed to be a stable, commercial-grade embedded operating system providing immediate productivity and optimized performance through: packages that are tailored to varying requirements for tools and technical support; a comprehensive set of tools and board-support packages for developing, debugging and deploying Linux into embedded environments; 15 years of LynuxWorks expertise and experience in embedded operating systems, the UNIX® programming model, and POSIX®.

BlueCat Linux scales from small consumer-type devices to large-scale multi-CPU systems. It provides a risk-free path to hard real-time performance through its compatibility with the LynuxWorks LynxOS® real-time operating system. Should real-time capabilities become a requirement, BlueCat Linux application code will run unmodified on LynxOS, preserving and extending development investments.

The BlueCat Linux package is backed by a variety of optional support packages that offer software engineering, technical support, consulting and LynuxWorks' professional services. "LynuxWorks provided what we needed to get the job done," said Benyamin.

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—Dan Benyamin, Director, Embedded Systems, PhatNoise, Inc.



Delivering on the promise

Both LynuxWorks engineers worked closely with PhatNoise over a two-month period to complete the initial project and assure that all system components functioned appropriately.

"Often, integration is as much a problem as the initial development," said Benyamin. "It is a binary problem—it either works or it doesn't. LynuxWorks was committed to making sure that it worked with the rest of the components of the product."

The mutually rewarding collaboration between LynuxWorks and PhatNoise has led to an industry first: a comprehensive, user-friendly digital-media jukebox system targeted for the automotive market.

Moving forward, the two companies are continuing to build on their partnership with the development of additional prototypes for new PhatNoise media entertainment products.



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