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BoraGear's ZigBee-Enabled Fans Enable Remote Monitoring, Control

Users can monitor the temperature of their equipment racks, and receive email alerts when something goes awry; Control4 boasts interoperability.

Aug. 11, 2008 — by [DrFlick](#)

At [CEDIA Expo 2008](#) BoraGear is releasing a line of ultra-quiet cooling fans for A/V gear and other heat-producing equipment.

The really coooool part is that they can be monitored and controlled through a [ZigBee](#) interface, more specifically, the new ZigBee Pro interface (See [page 2](#) for more details on ZigBee Pro.)



I usually do not pay much attention to fan systems. You put them in, hope they are keeping the equipment below a dangerous temperature, and then assume they will keep working forever.

What caught my eye about the new suite of cooling solutions from BoraGear is that they are touting a ZigBee Pro interface. Although I'm a big fan (so to speak) of 802.15.4 RF and ZigBee standards, I was curious why anyone would want to ZigBee-enable a cooling fan product.

What Makes the Fans so Cool

Although the fans operate as stand-alone products, all of BoraGear's fan products are ZigBee Pro compatible using an optional module (plug-in daughter card) with an external antenna for signal strength.

When used with certain ZigBee-enabled automation systems, the fans can be programmed to monitor the temperature of the rack or cabinet, provide operational status, and control of the fans from a touchscreen or other device.

Another built-in feature is that the ZigBee module provides an extra ZigBee node to strengthen or extend the home's ZigBee-based wireless mesh network.

"Now that ZigBee Pro is taking off and the chip sets and development tools are readily available, we finally have a robust wireless standard that lives up to the quality of our products," says John Dorsey, BoraGear's president. "We believe ZigBee Pro is the future of wireless connectivity in the home. Other wireless technologies are less capable when it comes to robustness, scalability, and reliability."

So Why Put an Interface on a Fan?

The rule of thumb is that for every 10 degrees over the temperature of 85 degrees, the life of A/V gear is cut in half, according to BoraGear.

All of the company's standard fan assemblies incorporate a 12V output to flag an automation system if any individual fan in the chassis fails.

Meanwhile, the ZigBee Pro interface constantly transmits ZigBee messages with the fan status plus the temperature in the rack. This information allows you to configure a variety of automatic notifications, like an email or text message, back to your company as part of a proactive service agreement.

Dorsey says that BoraGear's fan cores and relay card are rated at 100,000 hours of continuous use. The card includes surge protection and reverse voltage protection.

Works with Control4

The initial release of the ZigBee Pro interface includes drivers for integrating with [Control4](#), although others are in the works, Dorsey says.

"We have a lot of experience with Control4 and ZigBee in-house and that just seemed like a logical starting point," he adds.

The fans that ship with the optional ZigBee Pro module incorporate an ID button – just press it to import the product directly into Control4's Composer software.

Dorsey explains that the programmer doesn't need to learn anything new in the Control4 software to incorporate the fans.

How the Fans Keep Quiet

BoraGear uses three design elements for all of its cooling fans to reduce the primary causes of noise.

- **Quiet fan cores.** The fans do not need to be throttled back to reduce noise or to extend their life.
- **Mechanical isolation.** All of the fan cores use soft silicone mounts instead of bolting them directly to the chassis. This reduces the vibration noise typically associated with cooling systems.
- **Offset grills.** All designs have the grills located at a distance calculated for each fan size, which reduces the natural air flow turbulence to an absolute minimum. This increases the efficiency of the air flow and the overall cooling system.

"An added benefit of our fan cores is that their efficiency not only makes them ultra-quiet, but also allows them to move a lot of air," says Tim Rhoads, BoraGear's director of technology. "We design our enclosures to make sure they don't reduce the fan core's inherent efficiency, transmit any mechanical noise of the fan or add any turbulence noise."

Rhoads also indicates that BoraGear does not use filters, which can add noise and dramatically reduce airflow.

In addition, he says, the company's largest closet evacuator incorporates a patented back draft damper that "creates virtually no reduction in fan airflow."

He claims that the spring-loaded back draft damper typically used in the A/V world reduces airflow by more than 50 percent.

Rhoads points to BoraGear's Kona model that "uses efficiency instead of brawn" to cool

individual components such as big amplifiers. The company's "mathematically designed approach" directs cool air across the entire top of the amp, not just a few small areas.

"This simulates normal convection and makes the amp think it's not in a rack," says Rhoads. "No turbulence, no hot spots, just a flat cool zone directly above the amp that removes its heat quietly and effectively."

For this reason, he claims, you can get by with a 1U fan (2 inches deep) for any heat-generating component.

Pricing and availability still are getting fleshed out, but will be available by [CEDIA Expo 2008](#).

BoraGear plans to beat the competition's price points for similar class products, the company says.

BoraGear is in booth 370.

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BoraGear uses the EmberZNet PRO 3.1 ZigBee Pro-compliant chip sets and driver stacks.

Because these have gone through the ZigBee Pro interoperability and compliance certification process, this ensures the BoraGear products will interoperate well with the other ZigBee Pro and ZigBee 2006-based products.

Being ZigBee Pro-based also means they also can take advantage of the enhanced security, power management, and network scalability of this new standard for low-powered, low speed wireless connectivity.

These are some of the additional features enabled by the Ember implementation of the ZigBee Pro Feature Set:

- **BETTER MOBILE SUPPORT:** Handles end nodes that may move around within the ZigBee Pro network topology like remotes and key fobs.
- **MORE SECURE:** Supports security extensions for advanced network encryption and device security.
- **MORE RESILIENT:** Supports Frequency Agility features that allow the network to dynamically change channels in the face of interference.
- **BETTER POWER MANAGEMENT:** Supports more efficient and deeper power modes for "sleepy" end nodes.
- **DENSER NETWORKS:** Assures better network stability even when dozens of routing nodes are within close proximity via intelligent table management.
- **LARGER NETWORKS:** Incorporates Stochastic Addressing, Many-to-One Source Routing, and Asymmetric Link Handling that allow the network to grow to thousands of nodes.

This chart spells out some [differences between ZigBee and ZigBee Pro](#).



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