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The Flat Speaker Solution

Is the NXT Big Thing Finally Here?

By Mark Fleischmann

There isn't much of a family resemblance between flat-panel video displays and a bunch of boxy speaker enclosures. But while flat TVs have increased in-wall speakers' popularity, many customers with an audiophile bent still balk at in-walls as a solution. Consumers look at the juxtaposition of new video technologies and old-fashioned speakers and ask: Why can't a surround system be as elegant and space-saving as a plasma display panel or an LCD TV?



For almost seven years, NXT, an outgrowth of Mission, the British loudspeaker maker, has been promising an answer. For those not familiar with the technology, NXT is to traditional loudspeakers what plasma monitors are to direct-view CRT sets. It's a radical technological rethinking that yields an almost completely flat loudspeaker, one that can be mounted on — or even built into — environmental surfaces like walls, ceilings, automobile interiors, even video screens. After years of small steps forward, NXT is finally appearing in custom-install products, consumer products, and a variety of other arenas including Britain's House of Commons.

NXT IN THEORY

NXT technology takes two main forms. SurfaceSound is the name given to NXT-licensed flat-panel speakers. There's also a version called SoundVu, which uses an optically transparent panel that can deliver video at the same time; the

screen effectively doubles as a loudspeaker.

Both hinge on what NXT calls Distributed Mode Loudspeaker (DML) technology. All speakers move air, but DML does it differently. In DML, a light but stiff panel is excited by a transducer, a simple motor with a moving coil. This stimulates the material's natural resonance to deliver a range of frequencies. The sounding board of a piano works somewhat the same way.

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For a primitive demo of the basic principle involved, just rap your knuckles on a table.

Because one panel delivers all the audible frequencies (barring the lowest bass; more on that later) there's no need for multiple drivers, crossovers and other parts necessary to conventional speaker designs. In particular, getting rid of the crossover eliminates electronic circuitry and its attendant acoustic vagaries right in the midrange frequencies, where human hearing is most sensitive.

NXT speakers don't require bulky enclosures, as their panels are flat. A flat panel's movement is more complex than the simple in/out piston motion of a cone, more like a series of ripples. Because there's a good deal less coming from behind the driver — cones and domes move backward as much as they move forward — there's no need for a thick enclosure to control the back radiation.

Nor is a grille needed, because the panel is sealed. "Grilles are the enemy of TV manufacturers," says Andrew Williams, U.K. spokesman for NXT. "Designers hate them, acoustic engineers hate them and marketing people hate them. Grilles are a bull's-eye target for kids to shove things into. And they collect dust."

NXT IN PRACTICE

Flat-panel speakers don't have the sweet-spot limitation of conventional speakers. That's because every square inch of the panel's surface emits sound. Gone are the beaming effects of cone and dome drivers, and all the acoustic complications they cause. NXT speakers are said to offer a wider listening angle, more even room coverage and improved intelligibility. They also maintain loudness over a greater distance.

One limitation of the technology, though, is low bass. Panels measuring 3 square feet, designed for PA systems, can reproduce bass down to about 40 to 50 Hz, but those of conventional speaker height/width only go down to about 120 Hz. The limit for SoundVu panels, which must restrict the panel's vibration to prevent visible shimmering, is 200 Hz. The logical solution is to handle bass frequencies with a conventional subwoofer. Another alternative is to use psychoacoustic manipulation to subjectively enhance bass response. For this purpose, NXT has endorsed MaxxBass, a software plug-in from Waves Ltd.

NXT panels can be painted over and hermetically sealed into walls. Variables that affect performance include how the panel is floated/mounted, its weight, damping and the force and placement of the exciter. Bandwidth is mainly a function of the size of the panel and the material used to make it. According to Sam Zamora of Acoustic Specialties, a Minnesota-based manufacturer of NXT speaker products, "Almost any material, like gypsum or drywall, can make sound, but it's not always musical." The company's products use a honeycombed aluminum material, which is resonant and stiff.

Because the NXT approach is so different from traditional speaker driver design, even the specifications have to be looked at in a new way. Distortion is not as much of a factor as it is with conventional designs, because the panel is only moving a few microns at a time, and there are no crossover electronics to introduce distortion. An NXT speaker can handle a lot of power, but because it doesn't consume a lot of amperage, power handling can be better than that of a conventional speaker. Because the speaker has multiple modal points, the traditional method of calculating speaker sensitivity — decibels at one watt and

one meter — doesn't really apply. Sound through an NXT driver is more efficient than through a cone driver, and even if the sensitivity rating was lower on the NXT speaker, the two would sound as loud if heard side by side.

NXT ON THE MARKET

Custom installers should take a look at the Anima line. Though the company's offerings cover a broad array of public spaces, it isn't difficult to see them in residential applications. For instance, the ACC loudspeaker is designed to be hidden in church columns, but columns are common in many homes as well. The AFF RestaurantSound speaker disguises the speaker as a picture frame. And who could resist the AquaSound Bathing Sound Experience?

Acoustic Specialties offers panels ranging in size from 16x12 inches to 60x20 inches. Falling in between is the vertical SR1545, measuring 45x15 inches, and the horizontal SR1524, measuring 24x15 inches. Four of the former and one of the latter are sold as the 5.1HT Signature Reference System (\$2,999). The 1.75-inch-deep panels are made of an aluminum honeycomb material, and come with wall-mount hardware or optional stands. Custom installation might go a step further and seal the panels into the walls around a flat-panel display.



NXT panels can be completely invisible. In this example, the speakers are part of the wall itself.

Another consumer product available in the United States is the Mission FS1 (\$999), a 5.1-channel sat/sub set with satellite speakers that can be wall-mounted or installed on stands.

The drivers are not exactly flat, but use a space-saving tubular design, with outer skins of polypropylene surrounding a fluted core.

HEARD AND SEER

SoundVu, the talking video display, first came to market last year, in NEC ValueStar products. These systems include a 17-inch SoundVu-enabled TFT-LCD, available both as an all-in-one system akin to the Apple iMac, or as a separate monitor included in a PC package. Those products are also Japanese-only, but NEC has plans to produce talking LCDs for the world market.

SoundVu might become a player in everything from cellphones to gas plasma displays. The biggest hurdle for the latter application is the glass used in plasma panels. Glass is a heavy material with an inherently high amount of damping; a lot of power is needed to make it vibrate. Acrylic would work better for SoundVu, according to NXT's Williams.

Wider applications are likely. NXT has a database of more than 200 panel materials — from cardboard and cheap plastics to high-tech sandwiches of glass or carbon fiber with honeycomb or expanded foam cores — with their sonic characteristics logged. Manufacturer licensees can make the most of the database with predictive software that tells how different panels will behave depending on size, material and the type (and placement) of the exciter. "It's totally possible to scale it up," says Williams.

More products are likely to arrive in the future from NXT's 250-plus licensees. They include Acer Computers, DaimlerChrysler, Fujitsu, General Motors,

Hitachi, LG Electronics, Matsushita, NEC, Philips, Pioneer, Siemens, Tanno and TDK. This year, SoundVu will appear in cell phones, according to Williams.

In the meantime, NXT is popping up in all sorts of intriguing places in its home country. In the British Parliament, a debating chamber in the House of Commons conceals flat-panel speakers in wood paneling, brick and masonry. In a London health club, pictures of legendary moments in sports emit music.

NXT may not be courting the consumer-centric custom installer as intensively as it's moving into these other markets. But as more and more consumers adopt flat-panel plasma and LCD displays, the demand for flat-panel speakers is likely to grow. So the installer who gets acquainted with the technology — and how to apply it — may steal a march on the competition.

Mark Fleischmann's Practical Home Theater is now in its second edition. For more information, call (800) 839-8640, or visit www.practicalhometheater.com.

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