

INTERIORS

A SUPPLEMENT TO WARD'S AUTOWORLD

ELECTRONICS, MANUFACTURING & AESTHETICS

AN UPDATE ON THE LATEST TRENDS AND TECHNOLOGY

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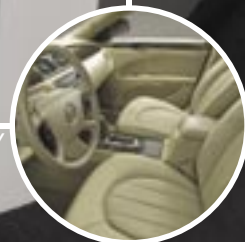
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GM has shown off numerous concept vehicles in recent years featuring flat-panel technology that turned entire instrument panels and door panels into loudspeakers, including the GMC Terracross truck.

Thin is In

Magna's Intier Automotive is hoping to expand its low-volume NXT flat-panel speaker technology into the high-volume end of its business. By Drew Winter

Auto makers have been downsizing car audio systems since they were first introduced. Now, more and more capabilities are being sandwiched into only a few square inches in a vehicle's center stack.

Bulky multi-disc CD and DVD players, capable of holding six discs or more at a time, once had to be relegated to the trunk. Now, some are compact enough to sit up front, eating up a minimal amount of prime real estate on the instrument panel.

Soon, MP3 players that are more compact will replace even these cleverly packaged designs.

But while all the other parts of entertainment systems have been growing ever smaller, traditional loudspeakers remain almost as bulky as they were when cars had only AM radios and Las Vegas had one Elvis.

Just like they did in the olden days, audio system speakers today still need to be seated in deep holes in interior door panels and rear package trays. They also require mounting brackets, and their assembly eats up precious man hours in OEM and

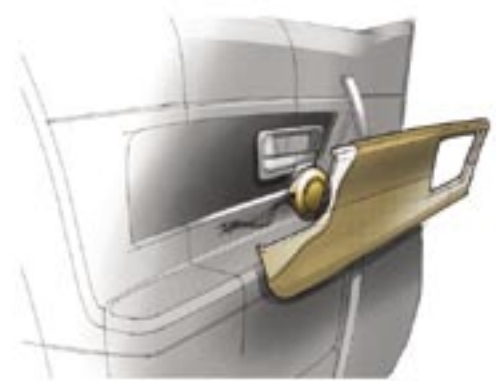
supplier plants.

What's more, with today's high-end vehicle sound systems using a dozen or more speakers, they steal crucial storage space, and the big magnets they use start to add up to a significant amount of weight.

But now, that too is changing.

For at least five years, auto makers such as General Motors Corp., DaimlerChrysler AG, Fiat Auto SpA and major suppliers such as Magna International Inc.'s Intier Automotive, Johnson Controls Inc., Visteon Corp. and Owens-Corning have been experimenting with NXT flat-panel speaker technology in automotive applications. Based in the U.K., NXT plc specializes in inventing and licensing its technology to others.

Already used extensively on everything from laptop computers to home entertainment systems, NXT's electronic "exciters" can create top quality stereo sound when used in conjunction with a wide variety of materials, rather than the paper cones used in conventional speakers.



Intier's AudioLITE flat-panel speaker system allows almost all interior trim surfaces to be turned into an audio speaker. That allows traditional speaker locations to be turned into storage areas.

Intier currently produces plastic, water-resistant flat-panel speakers for the RV market.

Wire up one of these small devices to an audio system, attach it to an ordinary plastic interior door panel and – incredibly – the door panel sounds as good as a premium loudspeaker.

With a minimum thickness requirement of less than an inch, NXT's SurfaceSound speakers can be fabricated into almost any size and shape.

The potential this technology offers for enhancing interior design, as well as reducing costs and weight, has not been lost on the auto industry. Back in 2002, NXT was predicting vehicles featuring the technology would be in production by 2004 or 2005, but so far it has not appeared in high-volume applications.

British specialty car maker TVR features the technology on several of its models, and more applications are rumored to be close to production.

The technology debuted in automo-

tive on several concept cars during 2001 and 2002. GM has shown off numerous concept vehicles in recent years featuring NXT technology that turned entire instrument panels and door panels into loudspeakers, from the Buick Bengal and Cadillac Cien show cars to the Pontiac REV and GMC Terracross.

NXT speakers used in the Buick Bengal concept were only 0.5 ins. (1.3 cm) deep, compared with the 3- to 4-in. (7.6-10.2 cm) depth of traditional audio speakers.

The exciters also can be located in headliners, headrests and even window visors, points out Tom Bailey, advanced development manager-new business products at Intier.

One of the many benefits of this design freedom: Speakers can be located in higher locations in the rear of SUVs and minivans where the sound isn't obstructed by cargo.

Intier currently produces a speaker system called AudioLITE that is available on recreational vehicles. The key selling point is the flat speakers are weather resistant and can easily be

mounted on the outside of the vehicles.

However Bailey and Intier clearly have their sights set on high-volume applications.

Intier's facility in Brighton, MI, produces 12,000 to 14,000 interior door panels per day made from low-density structural reaction-injection molded polyurethane plastic (LD-SRIM) for products such as GM's GMT800 full-size trucks.

During a visit, Intier officials showed off a new high-speed process the company has developed for mounting the NXT exciters directly to the interior of the door panels.

Besides the design flexibility, Intier engineers say NXT speakers can reduce the weight of a conventional audio system by 10% to 15%. On big, elaborate systems used in RVs, that can be as much as 30 lbs. (14 kg).

While the technology is taking off in Europe first, applications combining LD-SRIM panels with the NXT technology could start appearing in the '08 or '09 model year, Intier sources say. ■



Bigger and *Better*

Husky's QTI injection molding machine.

*Lear is 1st buyer of giant new
Husky molding machine
By Drew Winter*

Husky Injection Molding Systems Inc. unveils a new plastic injection-molding machine at its technical center in Novi, MI, that is designed to improve aesthetics and boost productivity at Tier 1 suppliers that make large plastic parts.

Called the Quadloc-Tandem-Index (QTI) injection molding system, the machine – the size of a small building – can mold large assemblies incorporating different materials and multiple components at the same time, which provides styling, quality and productivity advantages.



Husky's Novi tech center.

Among the benefits: the process can eliminate squeaks and rattles in interior parts because it fuses separate components tightly together during molding, replacing adhesives and fasteners. Because it also allows different types and colors of plastic to be molded together, it also can eliminate downstream painting and coating operations.

Interior supplier Lear Corp. is the first buyer. It will launch three production programs in the next two years using the machine.

Kenneth W. Shaner, Lear vice president-manufacturing engineering, says the QTI machine will enable the supplier to produce interiors for mid-range cars and trucks that will have superior fit and finish characteristics, yet be more cost-effective to produce.

Husky's Novi Technical Center has become the development hub for the company's automotive customers and ground zero for some of the auto industry's most adventurous projects involving plastics.

Until fairly recently the facility housed the world's largest dual-platen

injection molding machine, twice the size of anything in the industry. It was capable of injecting more than 100 lbs. (45 kg) of thermoplastic at one time, enough to create half of a car body in one shot with thermoplastic polyethylene terephthalate (PET) – the plastic used in pop bottles.

Developed in collaboration with the Chrysler Group in the late 1990s as part of an ambitious program to build plastic-

bodied cars, the project eventually was sidelined by technical problems and a regime change at the auto maker.

A Husky official says the machine was used for numerous development projects with other customers after that and then was sold to a non-automotive company who has asked not to be identified. The new, considerably smaller QTI machine sits in its footprint at the facility. ■

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JCI Ikonos concept features PMB, MCI and PFIP technology.



Injection Selection

*Johnson Controls offers choice
of molding technologies*
By Mike Sutton

Door panel constructed
with PMB process.

Johnson Controls Inc. says its new line of CraTec interior processes for injection-molded plastic interior components is helping auto makers respond to consumers' increasing desire for attractive, high-quality interiors in affordable vehicles.

Combining craftsmanship and technology, the CraTec Partial Mold-Behind (PMB), Multi-Color Injection (MCI) and Partial Foam-in-Place (PFIP) interior systems first were highlighted by JCI's Ikanos interior concept vehicle that bowed at the 2005 North American International Auto Show in Detroit.

The systems offer auto makers increased design and materials flexibility, better component integration and craftsmanship and, ultimately, reduced expense and time spent manufacturing interior panels, Bill Fluharty, vice president-JCI Industrial Design, says at the supplier's technology center in Holland, MI.



PMB is one of the highlights of JCI's evolving portfolio, Fluharty says. Its advanced injection-molding process dramatically reduces the steps needed to produce high-quality interior panels that incorporate various materials, textures and colors.

Debuting recently with the production of the door panels for the '05 Mitsubishi Eclipse and '06 Chevrolet Impala, PMB does away with the traditional "fussy" operation of molding a plastic panel and then separately constructing and assembling various soft textile components and trim pieces to be installed later as a complete unit.

Using the '05 Mitsubishi Eclipse door inner as an example, the PMB process begins with the forming of a soft plastic/foam center panel incorporating the armrest and speaker cavity. This process allows designers to place soft materials where passengers directly interact with the panel, while still reducing the overall number of steps needed to manufacture the complete unit.

Once the soft component is formed, it is placed in an injection-molding machine, where the hard plastic main panel is formed around it. The process allows the hard and soft plastics to fuse together and form a complete panel with only miniscule gaps between materials.

The process also reduces fumes produced during manufacturing by eliminating the traditional adhesives needed to bond different materials together. The uniform, adhesive-free construction process also improves buzz, squeak and rattle performance, JCI says.

In addition to door panels, JCI also is planning to apply the PMB process to seatbacks, floor consoles and cargo systems.

MCI is a unique 1-piece injection-molding process that yields a 2-color substrate for interior panels without additional molding or painting.

By sequentially injecting two separate plastics into a mold, the two materials fuse together to form a continuous,

multi-colored interior panel, which has uniform color and texture.

This process, which can be used for door panels, instrument panels (IPs), floor consoles, trim and cargo systems, simplifies and enhances the design process; reduces production scrap; and improves overall quality by providing a gap-free finish, JCI says.

Currently, JCI has five MCI door-panel and floor-console programs with multiple auto makers for '07 model vehicles.

MCI's biggest benefit is that it allows for greater creativity and brand differentiation in interior design while optimizing tooling investments, says Fluharty.

PFIP is a process by which the skin of a panel is joined with the main substrate and then later injected with soft foam to form a padded, luxurious texture. This allows designers to place soft padding wherever they like and eliminates the need to tediously vacuum wrap a complete panel with a soft cover material.

PFIP also can improve the overall quality of an interior, as well as lower costs by reducing the number of manufacturing steps, JCI says.

The IP of the '05 Mazda6 was the first application of PFIP.

By themselves, these manufacturing processes improve production efficiency over standard methods while allowing for increased design flexibility, JCI says. But the supplier says it also is capable of combining the elements of its CraTec interior line to provide even more design and manufacturing flexibility.

CraTec Plus is such a process and is highlighted by JCI's Ikanos concept vehicle interior, which includes various combinations of JCI's three CraTec processes to showcase what the next generation of JCI interiors may look like.

In addition to PMB, MCI and PFIP molded interior panels, Ikanos also shows off JCI's advanced instrument cluster display, a power-sliding floor console and a powered, flat-folding cargo floor that includes a specially patterned carpet designed to stay flat and not bundle up when the seatbacks are raised.

JCI says CraTec Plus will appear first on the door panel of an '07 model vehicle, which will incorporate MCI and PFIP technology. ■



Lear says it provides 80% of the interior content for Buick Lucerne and integrates components from other suppliers.

Scaling Back

GM rethinks interior integrator strategy, wants greater control By Brian Corbett

General Motors Corp. is altering a 4-year-old initiative to have suppliers lead integration efforts for its North American vehicle interiors, a company executive says.

“We will still rely on suppliers doing the coordination, but we are becoming the ‘parent’ again,” Bo Andersson, GM vice president-global purchasing and supply chain, tells *Ward’s*. “We didn’t achieve what we expected to achieve.”

GM made the decision to scale back its lead-integrator program about eight months ago as it re-evaluated its global sourcing strategy. GM wants greater control of interior design and the sourcing of components.

In an effort to improve the interior quality of its cars and trucks, considered one of the auto maker’s biggest weaknesses, GM began naming lead interior integrators in 2001, choosing Tier 1 suppliers to oversee other parts makers involved in the development of vehicle cabins.

Johnson Controls Inc., for instance, was picked in May 2001 to be responsible for developing the interior for GM’s next-generation minivans, which debuted in late 2004. In addition, JCI was picked to manage the interiors for midsize cars.

Because the decision to change course was made relatively recently, the strategy is being scaled back at different rates, depending on the vehicle platform, with suppliers still maintaining the lead role for some programs and GM now managing others.

As recently as February, Lear Corp. issued a press release highlighting its role in designing and developing complete interiors for the upcoming Cadillac DTS and Buick Lucerne fullsize sedans, which are due out later this year. Lear says it provides about 80% of the interior content for the luxury-car program

and also integrates components from other suppliers.

GM announced in 2002 Lear would be the lead interior integrator for the next-generation fullsize pickups, while Magna International Inc.’s Intier would take the lead on the fullsize SUVs. GM has altered that strategy as the next-generation GMT900 truck platform nears production next year. Andersson tells *Ward’s* the GMT900 program will have a “mix” between suppliers and GM coordinating interior integration.

Besides improving its interiors, GM hoped the outsourcing strategy would cut development time and reduce costs. All three objectives have been attained, at least at some level.

But GM announced a major executive reorganization March 1 aimed at globalizing its purchasing operations as well as research and development, product development and design. To reduce manufacturing complexity, GM is standardizing components for use around the world. Procurement decisions for seat frames, for example, now are being made through one purchasing agent for all GM architectures globally.

Having a strategy that focuses solely on North American vehicle interiors does not fit GM’s new global structure. “We see the vehicle much more at the component level,” Andersson says.

The auto maker also wanted to re-connect with the Tier 2 and 3 suppliers and hopes to achieve better component prices.

“We also saw that instead of doing many of the parts in-house, the suppliers just out-sourced it, and typically had a mark-up fee that made them uncompetitive,” Andersson says. “And we see a lot of the creativity in interiors coming from Tier 2, Tier 3 (suppliers). We want to have that direct contact.” ■

– with Tom Murphy