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NEWS RELEASE

3-D Hits Your Dashboard

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Peek down the aisle of your favorite electronics store today and your eyes are likely to pop. Your HDTV that was a leading-edge entertainment center just a year or two ago already is tumbling over the edge of obsolescence.

Today the banner of innovation flies over 65-inch 4K Ultra HD smart TVs, with four times the pixel count of HD. Moreover, the same TV set also supports 3-D image – along with a Web browser, apps and a voice-activated remote. In the next aisle, you're likely to discover new virtual-reality devices for mobile phones that immerse consumers in video environments.

Now, sit in your car and compare those with your vehicle displays. Even if your car uses colorful digital graphics, most displays show a flat, two-dimensional image.

Take heart. The auto industry is working hard to adopt the trends erupting in consumer electronics. Some automakers are designing displays to look more like consumer tablets, no longer embedding them in the instrument panel. For both driver information and infotainment, they are moving away from traditional layered menu systems to more of a flat consumer style interfaces with icons or tabs.

However, making the instrument cluster more interesting and customizable has been more challenging. The instrument cluster needs to convey information at a glance so designers have held onto 2-D and mechanical gauges to which drivers are accustomed. Yet, updated approaches soon will change even the venerable speedometer and fuel gauge.

A traditional cluster incorporates two large mechanical gauges with moving pointers, separated by a small to

medium size display that renders 2-D images. However, many vehicle manufacturers are asking for enhanced graphical image quality with increased resolution. This is perceived to provide better quality, as users now expect the same image quality as high-end consumer devices.

With the advent of even more advanced driver assistance systems, automotive manufacturers need to provide more information to the driver, which necessitates larger displays. This has resulted in the adoption of fully reconfigurable instrument clusters where traditional mechanical gauges, small displays and warning telltales are replaced by one larger TFT display – typically 12.3 inches. Some carmakers have started presenting the graphics using 3-D rendering, however most have tried to replicate a traditional mechanical gauge look and feel. The challenge with 3-D rendering is that that objects assume more of a 3-D appearance when they are moving around the screen, because the shadows, reflection and lighting on the object is changing; the eye is tricked into thinking it is a solid object. Traditional gauges and most instrument cluster images are stationary, so it is difficult to make those objects look truly three-dimensional in a 2-D display.

3-D displays have been available for some time and have been used in the consumer industry, but have not been adopted in the automotive industry due to a number of constraints with the technology such as eye strain, limited or restricted angle viewing and potential nausea. Some even require glasses which would be unacceptable for an automotive application.

A new multi-layer display technology has been developed that allows stationary objects to appear three dimensional and solid. This multi-layer cluster uses the same thin-film-transistor (TFT) screen technology used in TVs, smartphones and cars but has two panels—with one screen placed in front of the other. A proprietary graphics rendering plug-in partitions shading and color between the two layers to make the objects appear solid and three-dimensional. The dial of the gauge may be on the background TFT, while the pointer and rim are depicted on the front screen, producing the 3-D effect. The current resolution of this multi-layer cluster is 1280 x 480 per screen, and within two years it will likely increase to 1920 x 720.

This technology not only provides solid 3-D looking objects, but has the benefit of being totally reconfigurable so the graphics and layout can be completely changed at the touch of a button. The cluster can be customized by the automaker for different vehicle models and brands, and potentially by the driver to match his or her preferences.

This 3-D cluster is only the beginning of automotive three-dimensional graphics design. As autonomous vehicles begin cruising the highways in future years, the cluster will likely become more immersive – showing buildings, landscapes and obstacles surrounding the vehicle. When steering wheels are not needed, the cluster screen can display 3-D movies, games or video calls.

When you drive away from the electronics store, be kind to your old-school in-vehicle electronics; it's on its way out, too.

Chris Round is a technical sales manager at Visteon. He has 26 years of experience in the automotive electronics field and has bachelor's and master's degrees in engineering. He is responsible for developing instrument cluster and HUD design proposals for Visteon's customers as well as presenting new product technology. Chris is an active member of the SAE and enjoys motorsports as well as mountain and road biking.