Design requirements for automotive displays

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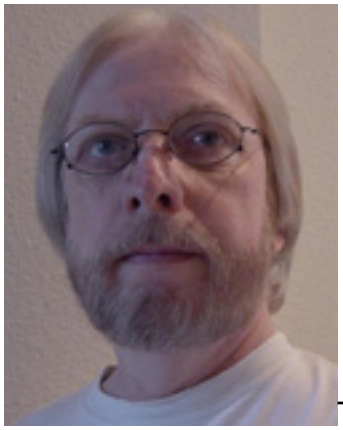


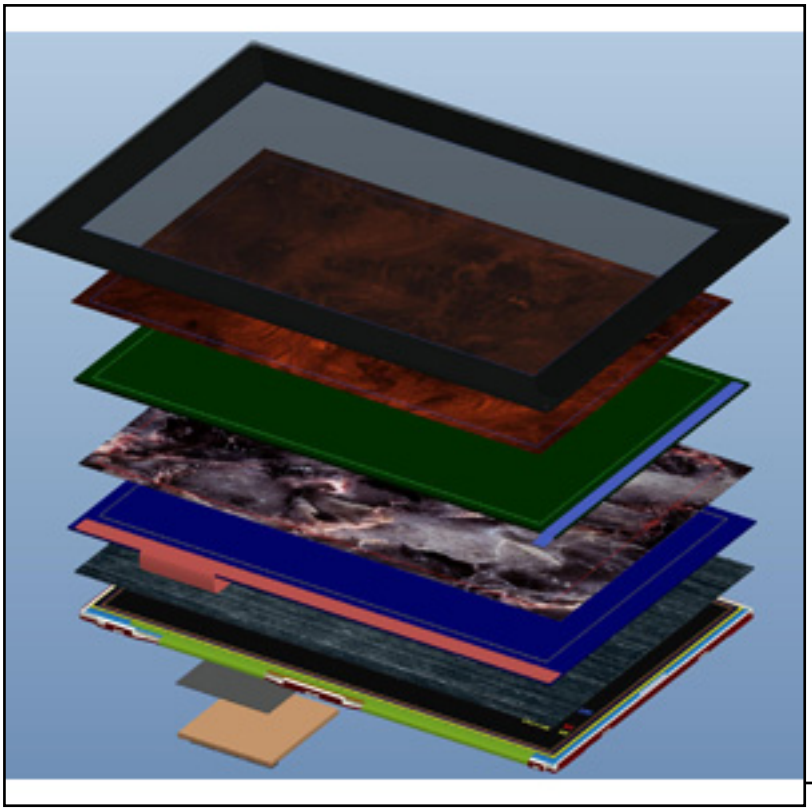
Touch panel demand continues to rapidly increase and applications utilizing this advanced technology are expanding into a wide variety of markets. According to DisplaySearch, projected capacitive touch panels have surpassed resistive touch panels in shipments and revenue. Enhanced durability and increased functionality are just a couple of benefits projected capacitive touch panels provide that resistive touch panels fall short. The industrial design of projected capacitive touch panels, which became popular via smartphones and tablets, appeals to manufacturers that want to upgrade the look and feel of their product. This technology is not just for smartphones anymore; manufacturers are catching on and realizing that incorporating a touch panel will upgrade their next-generation products and appeal to the masses.

Products such as medical devices, interactive gaming machines and in-car navigation systems are being taken to the next level by incorporating a touch interface. Adding a touch panel eliminates the need for mechanical buttons and gives an industrial look and feel to the device. Touch interaction also provides a user-friendly experience, which is quickly becoming expected by consumers. With daily interaction via touch with smartphones and tablets, consumers are automatically trying to use touch as a driver for other devices. Touch provides a convenience to consumers by offering quick response times, touch, swipe and gestures.

The multi-touch functionality of projected capacitive touch panels is conducive to collaborative work and is extremely valuable in environments where multiple people need to interactive with the same device at the same time. In-car navigation systems are a great example. Incorporating a touch device into the dashboard of a car can serve multiple purposes: The touch panel could be only the navigation system, or the entire panel could provide driving directions while a different quadrant of the panel controls the radio and a third quadrant controls the heating and cooling. Pending the size of the touch panel, it could even eliminate all the buttons located in the dash.

Projected capacitive touch panels make the above in-car navigation system

scenario a reality. The all-glass construction provides a durable, scratch resistant surface that can be incorporated into a bezel-free design which in turn keeps dirt, debris and chemicals out of the device. The multi-touch functionality provided by certain touch panel providers ensures the ability to share the touch panel. Adding a touch panel to an automotive application is an upgrade for the dashboard, but it is not as simple as just removing the current buttons and inserting a touch panel, specific design criteria and testing needs to be conducted prior to installation.



The automotive industry has specific requirements when it comes to incorporating displays into a vehicle. These requirements encompass mechanical reliability and validation test plans, including vibration, collision and thermal cycle endurance and also test plans for electrical compliance. Included in electrical compliance testing, to name a few, is RF and magnetic field immunity as well as supply line transients and ESD discharge. All of these tests come into play because reliability and safety are major factors when designing a touch panel for inside an automobile. In order to meet these requirements, it is imperative that the discussions with the touch panel provider occur early on to make sure that the design reflects the voice of the customer yet also passes automotive testing.

Additionally, there are considerations involving what specific types of touch gestures are required. Based on the overall design and desired functionality, the touch panel may only need single touch gesture support, such as tap or drag, or two touch gestures, such as pinch or rotate. Even more complex multi-touch gesturing can be supported, such as simultaneous touches and/or gestures, from two different users. Using this advanced type of gesturing will dictate additional touch panel characteristics like pinch-separation, adjacent key suppression and false touch detection.

Once the detailed design requirements are discussed with the touch panel provider,

3D drawings (Figure 1) can be developed and sent to the customer's design team for review. After review and approval of the design is complete, samples will be built and tested against all automotive requirements to ensure a passing grade.

Projected capacitive touch panels upgrade and enhance a wide variety of devices in multiple industries. By outlining design requirements and discussing final product desires with a touch panel provider early on, adding a touch panel can be done correctly in a time efficient manner. Medical devices, gaming and in-car navigation systems are just a few industries that have made the innovative decision to upgrade their product offerings. With the rapid growth in the demand for touch panels, many more industries will be following suit.

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