

Background

Despite the advent of high end, high resolution graphic displays, (segment) Liquid Crystal Displays (LCD) can be a preferred technology when component cost, ease of interface, low power and risk of obsolescence are of importance. A custom LCD requires an upfront investment to design the size, shape and position of the different segments. In addition, once the design is submitted for fabrication, the design can no longer change. With a tooling cost ranging from \$1,500 to \$5,000 (depending on the LCD size) and a lead time of 4+ months to receive the first parts, the design has to be perfect the first time, otherwise it can add a detrimental delay to the project's schedule.

Problem

How can someone rapid prototype the different design concepts and test them within the context of the target application so that the design cycle is shortened and the result is perfect before committing to the final order?

Solution

R&D CORE has encountered the above problem and came up with a highly effective, low cost solution. After considering a few low-tech options, such as creating stencils (films with the segment areas cut out) and placing them on a light table, we quickly gravitated towards using a smart device, such as Apple's iPod Touch. The device was linked to a computer through the WiFi network and it was set up to reproduce the computer's desktop. The iPod was then placed inside a mock-up case to simulate the end product with a display window that matched the size of the target LCD. The experiments done with this setup ranged from evaluating the visibility of the segments from different distances to optimizing the exact placement and size of the segments to create a highly pleasing aesthetic result. In addition, we determined the level of brightness our LCD required to work in different environments and tested the need for, and the effect of, special anti-glare films, tinted display windows etc. Finally, we took the prototyping one step further and updated the iPod's display in real-time in response to the product's but-



Fig. 1 – R&D CORE's Organic Font

tons to simulate and optimize the User Interface / Experience while we were waiting for the first production parts to arrive. Therefore, the lead time for the parts introduced no delay to our schedule. The above method allowed us to test multiple iterations of the LCD design in very short time and to continue with our development without having the actual LCD in our hands. Upon receiving the actual displays, their integration to the physical product was immediate and seamless.

Results

Thanks to this rapid prototyping method, R&D CORE created a highly organic font design (Fig. 1) that can be used on segment displays to replicate the visual quality of high end, high resolution displays. This work has resulted in R&D CORE obtaining four European Union Design Patents (No. 001354542-0001-0004). The designs are available for licensing; please contact us at: info@rndcore.com for further details.

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