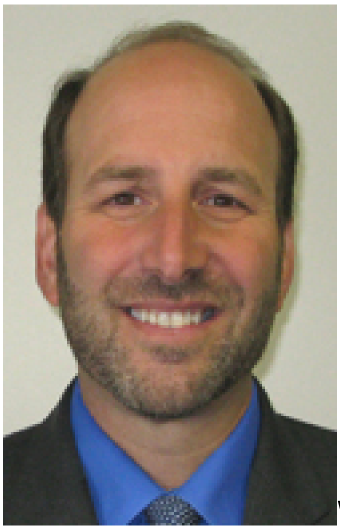
Design Talk: Year in Review

Increasing Ruggedization and Viewability in Mobile Displays

By William S. Bandel, DuPont Display Enhancements, www.vertak.dupont.com [1]

When designing displays for mobile applications it’s often a balancing act between increasing ruggedization and keeping the product’s weight down. These two seemingly opposite ideas can be solved by optically bonding substrates to the LCD front surface thereby eliminating the air gap which increases ruggedization without adding weight. Additional benefits resulting from the removal of the air gap include: the elimination of condensation and fogging, better viewing experience, thinner display designs and the reduction of parallax issues especially in tablet PC applications

Another concern for mobile displays is outdoor readability. In displays using a non-bonded cover glass, the ambient light reflects off three interfaces resulting in as much as 13.5% reflectance. One approach to increasing viewability is to use coverplates treated with anti-reflective (AR) coatings. However this solution only minimizes light reflectivity and doesn’t address the need for greater display contrast. Instead, you can optically bond the AR-coated substrate directly to the LCD eliminating the air gap between the two reflective surfaces of the cover glass and the LCD allowing great reductions in reflectance and reducing the number of anti-reflective treatments needed. With optical bonding, the contrast ratio can increase by as much as 400% verses a non-bonded display.

For these reasons, optical bonding should be considered when designing displays that are going into high-performance consumer or industrial mobile applications. Since DuPont first developed DuPont™ Vertak™ direct bonding technology for optical bonding, it has been used extensively in marine electronics, medical applications, commercial avionics, notebook and tablet PCs, and touch screen devices. Vertak™ technology has continued to withstand the highly-demanding environmental challenges faced by these displays supporting stable performance under extreme temperatures and altitudes by increasing outdoor readability up to 400%, enhancing impact and scratch resistance by 300%, improving durability to withstand shock and vibration, providing a barrier to stains, dirt, moisture and scratches, and even enabling thinner and lighter display designs.

Timing: Oscillators in a Modern Circuit

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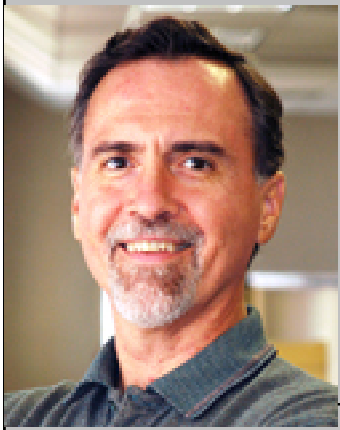

Timing is critical to the operation of a modern digital system. A variety of techniques and solutions may be used to create a clock source, but whether the required frequency is a few kilohertz or over 100MHz, designers must consider factors including cost, power consumption, footprint, stability over temperature and supply voltage, and generated noise.

Oscillator Technologies

There are broadly two strategies for generating a clock signal: either by inducing electrical oscillations in an amplifier circuit or by forcing a precision-machined quartz crystal or a piezoelectric ceramic chip to oscillate at a pre-determined resonant frequency. A wide variety of components, ICs and integrated oscillators are available that allow designers to use either solution to achieve a best fit for a given set of system requirements.

Choose Your Horse

The wide variety of silicon, crystal and ceramic oscillators currently available presents designers with powerful options when selecting a timing source. Aspects such as cost, power consumption and environmental demands dominate the decision-making process. Some distributors are able to provide support in the selection of the most appropriate device type through easily accessible online datasheets backed by in-house technical experts and a field-based technical sales force. Examining the clock-selection options for a microcontroller such as the Microchip PIC24F family highlights how designers must consider the relative merits of each technology.

Conclusion

System requirements in relation to clock signals vary widely depending on the application. In general, those requiring higher clock frequencies tend to place more stringent demands on the performance of the clock source. Fortunately designers can choose from a number of technologies and implementations, including discrete components, self-contained clock ICs using silicon, quartz or ceramic technology, and on-chip oscillators, to satisfy those demands in the most cost- and space-efficient way.

Links:
[1] http://www.vertak.dupont.com/
[2] http://www.newark.com/