DuPont Display Enhancements
DUPONT™ DIRECT BONDING TECHNOLOGY

DuPont™ Direct Bonding Technology dramatically improves the outdoor readability and durability of liquid crystal displays (LCDs) in a wide variety of applications, including tablet personal computers, marine electronics, cell phones and handheld devices.

What is DuPont™ Direct Bonding?

Using industry-leading adhesive technology and a cost-effective lamination process, DuPont™ Direct Bonding consists of bonding an anti-reflective glass or filter element directly onto the front of an LCD to significantly improve sunlight readability and ruggedization. Direct Bonding also enables lighter and thinner displays by eliminating the need for a traditional glass coverplate.

DuPont is able to offer this advanced technology – traditionally reserved for specialized avionics, military, and other specialized applications – cost-effectively to manufacturers of consumer displays.

Launched in 2005, our manufacturing facility in Shenzhen, China specializes in high-volume, cost-effective Direct Bonding for consumer displays. This ISO-certified facility – the first of its kind in Asia – provides supply chain efficiencies and high manufacturing yields.
**An Inherently Better Design and Process**

DuPont™ Direct Bonding consists of optically bonding an anti-reflective glass, plastic or touch sensor to the front of a flat panel display. To overcome many of the display design challenges inherent in electronic devices using traditional coverplates, the front substrate is bonded to the display using a proprietary process and adhesive. Combining the benefits of both silicone and epoxy alternatives, this advanced adhesive is resistant to delamination, discoloration or bubbling.

**Typical design challenges of coverplates:**
- Multiple surfaces have high reflectivity
- Extremely susceptible to scratching
- Air gaps between display and coverplate
- Susceptible to condensation
- Issues with parallax

**DuPont™ Direct Bonding advantages:**
- Single surface has low reflectivity
- Less susceptible to scratching
- No air gap between display and coverplate allows for thinner design
- Prevents condensation
- Better viewing
- Additional durability and ruggedization

**Available Features**

DuPont offers numerous glass thicknesses and optional finishes to meet a variety of application requirements.

**Glass Thickness** – Four standard glass thicknesses are offered with other options available upon request.

**Anti-Glare (AG) Etch** – This chemical surface treatment scatters specular reflections into a wide viewing cone to reduce the apparent image of the source. The amount of etching affects the surface gloss which is expressed in a “gloss level”. A rougher etch provides a lower gloss level.

**Anti-Reflective (AR) Coatings** – These multi-layer coatings reduce the reflection from the glass surface and may be placed over non-AG or AG etched glass.

**Anti-Smudge (AS) Coatings** – These hydrophobic nano-coatings may be applied to an AR-coated glass to reduce the visibility of fingerprints and ease the cleaning of coated glass.
Design Options

**In-Frame Bonding** – With this method, the cover glass is bonded to the LCD area only, inside the frame of the original LCD. There is no mechanical link to the frame of the LCD and the LCD must be mounted via the mounting holes of the OEM panel.

**On-Frame Bonding** – In this process, the cover glass is bonded to all or part of the front bezel of the original LCD and to the full LCD front surface. Unlike in-frame bonding, the glass size used has very few constraints and the cover glass can be used as a mounting surface.

**Over-Frame Bonding** – This approach consists of bonding the cover glass to all or part of the front bezel of the original LCD and can extend beyond the LCD bezel frame up to a maximum of 1.0”. Like on-frame bonding, the cover glass can be used as a mounting surface.

Superior Performance Even in Challenging Environments

DuPont™ Direct Bonding is ideal for use in high ambient light, severe temperatures and other extreme environments. It dramatically improves stability and increases a display’s contrast ratio and ruggedization by over 300 percent.
For more information on how we can put our display enhancement expertise and resources to work for you, please visit www.displayenhancements.dupont.com or contact:

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