



# G-BOND

Advanced Optical Enhancements

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# GDS leads the market in improving the performance and protection of flat panel displays

**Using advanced technology to overcome the optical problems with LCD screens, we offer advanced optical solutions and bonding at affordable prices.**

Because commercially available LCD displays do not offer enough brightness, they often produce a 'washed out' image when used outdoors or in other high ambient light conditions.

The exclusive G-BOND process from GDS results in a greater reduction of light reflections compared to other display enhancement technologies.

## GDS Worldwide

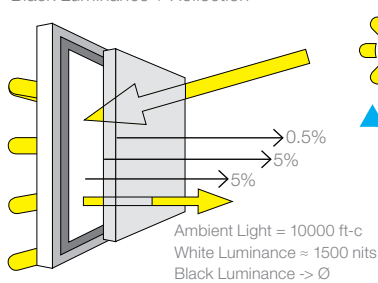
GDS has been providing advanced display solutions for 30 years, serving the needs of the most demanding industries. GDS offers a reliable partnership from research to developing leading-edge display products, with vertically integrated in-house manufacturing, seamless global service, legacy support and long-term continuity of supply.





# How G-BOND technology operates

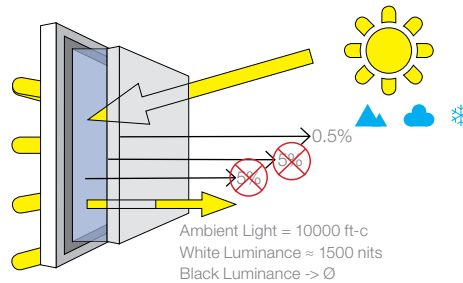
$$\frac{\text{White Luminance + Reflection}}{\text{Black Luminance + Reflection}} = \text{Contrast Ratio}$$



$$\text{Reflection} = 10000 \text{ ft-c} \times 10.5\% = 1050 \text{ nits}$$

$$\frac{1500+1050}{0+1050} = 2.4:1 \text{ Contrast}$$

Each transition point, air to glass or glass to air, reflects over 4% of the ambient light. These reflections reduce the contrast and readability of the display, especially in high ambient, uncontrollable lighting applications.



$$\text{Reflection} = 10000 \text{ ft-c} \times 0.5\% = 50 \text{ nits}$$

$$\frac{1500+50}{0+50} = 31:1 \text{ Contrast}$$

Direct bonding eliminates the two internal points of reflection. With AR coatings on the front, overall reflections drop to less than 1%. The lack of an air-gap increases thermal conductivity, preventing heat build-up. Additionally, solid bond prevents moisture from forming on the inside of the front cover glass.

These formulas are simplified to demonstrate the Contrast Ratio and are indicative of how the bonding application works under sunlight conditions.

# What is GDS G-BOND technology?

**GDS G-BOND technology is a cost-effective, display-enhancing lamination process which allows a cover glass (anti-reflective, acrylic, touch screen) to be optically bonded directly onto the front of a flat LCD panel.**

By eliminating the air-gap between the display and the cover surface glass, as well as improving outdoor legibility and ruggedization, GDS G-BOND technology resolves many of the optical and environmental challenges related to:

- sunlight and high ambient light conditions
- extreme operating environments (i.e. temperature, humidity, vibrations, shocks)

GDS G-BOND also allows the front cover surface to be repaired or replaced if necessary (i.e. due to vandalism, failure, etc). This ensures the best Total Cost of Ownership of the display system and avoids its premature disposal when problems arise.

The advanced process of GDS G-BOND allows displays of 70"+ to be optically bonded.

# Benefits of optical bonding

## **Optical**

- G-BOND reduces the reflective loss from all surfaces to less than 1% using an AR coated glass
- G-BOND increases contrast by 3-5 times minimum
- G-BOND helps to solve parallax problems

## **Environment**

- G-BOND eliminates the air gap, preventing moisture and condensation behind the cover surface
- G-BOND eliminates the need for cleaning by preventing dust from collecting between the flat panel and the cover surface
- G-BOND increases thermal conductivity, lowering the display temperature
- Appropriate front cover surface can improve scratch and impact resistance

## **Mechanical**

- G-BOND reduces the gravity effect on large screen flat panels
- G-BOND avoids the airflow pressure required in air-gap outdoor solutions



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## Available Features

### **Contrast Enhancing Windows**

**AR Glass:** Heat strengthened • Diffusion levels between 90 and 105 gloss

• Up to 6mm in thickness

**ITO and Heater:** ITO: 13 Ohms/sq or 4 Ohms/sq • AR and Heater glass

• AR and ITO glass • AR, ITO and Heater

**Privacy Film Added:** 3M louvered film can be laminated behind either windows or touch screens prior to optical bonding

**Touch Screens:** Projective capacitive • Resistive • Capacitive • SAW • IR touch

### **Active and Passive Brightness Enhancements**

**Active Brightness:** LED rail replacements • Third party and proprietary high

bright LED and CCFL backlights **Passive Brightness Films:** DBEF • BEFs • ESR

## Applications and Markets

**Transportation:** Marine navigation • GPS • Avionics • In-vehicle

computer systems **Medical:** Ambulatory • Patient monitors • Medical imaging

**Test and Measurement:** Portable logic analyzers • Oscilloscopes

**Point of Sale:** ATMs • Order verification kiosks **Information:** Kiosks

• Advertising • E-signage **Military:** Ruggedized PC • Portable devices

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