



# John Deere

## Front panel integration

### The challenge

The poor viewability and durability of LCD displays, along with glare and condensation problems, are issues that have long presented themselves in the automotive manufacturing industry. Unfortunately, there had not been a cost-effective, quality solution available.

John Deere, a major manufacturer of industrial and farming transportation and machinery, was experiencing issues with glare and condensation on their tractor displays. The customer came to GMN to find a display integration solution that would not only handle the elements, but also the day-to-day abuse that it would sustain on the job.

### Project goals

- **Employ a display integration solution that:**
  - **Can withstand environmental conditions and average daily abuse**
  - **Has improved sunlight readability**
- **Consolidate integration to one supplier and streamline manufacturing**

### The solution

In their search for a new display supplier, their Tier 1 supplier, Panjit America, recommended GMN for the job. Although now, GMN has been providing front panel integration solutions for decades, at the time we were approached by John Deere, our only user interface capabilities were membrane switches, key panels, and some touchscreen integration. Therefore, to ensure that we could deliver a high-quality display solution, the GMN product development and engineering support teams began by conducting research to uncover the right solution. After evaluating several options, GMN identified a possible solution known

CASE STUDY

as liquid optical bonding (LOB) through Dupont™, which was ideally suited to the customers' requirements.

The LOB solution offers a high-performance adhesive combined with a proven bonding process that cancel out issues experienced by traditional cover plates. This technology eliminates the air gap between the touchscreens and the display. In this process, the touchscreen is adhered to the display with a clear adhesive that fills the gap where reflection, yellowing, and condensation usually form. Once the process is complete, the sunlight readability, durability, contrast, clarity and shock resistance of the display are enhanced significantly.

**LOB INCREASES**

- ☑ **SUNLIGHT READABILITY**
- ☑ **DURABILITY**
- ☑ **CONTRAST**
- ☑ **CLARITY**
- ☑ **SHOCK RESISTANCE**

One unique aspect of this solution is the adhesive. Finding the perfect adhesive proved to be difficult, but without a workable adhesive, the waste produced would significantly increase the cost per part. That's where the Dupont™ Vertak® liquid optically clear adhesive (LOCA) bonding technology came in. When applied between the LCD and a touch system, this technology significantly increases LCD readability in bright sunlight while also providing dramatically improved impact resistance, overall durability, and protection from moisture and dust intrusion. Not only does LOCA provide these benefits, but it is also a re-workable material, which limits scrap rates. GMN is proud to have licensed with our partner DuPont™ and their Vertak® LOCA bonding technology to provide our customers with the very latest in display enhancement capabilities.

After GMN presented this bonding solution to John Deere and they awarded us the program, the customer realized GMN had the capabilities for the entire display assembly. GMN's dedicated plastics group in Beaverton, OR molded the plastic housings and decorated the plastic parts. The displays are assembled and tested by GMN as well. By developing these processes, GMN was able to fulfill the

role of multiple suppliers – streamlining John Deere's supply chain and improving overall traceability. The innovation and problem-solving this solution required led to the development of a long and successful partnership between GMN and John Deere.

GMN now has a successful license and process in place for LOB. With our investment in set-up, equipment, and the development process, GMN is among

the few LOB manufacturers in the U.S. and one of only two that use the DuPont™ Vertak® system. This is the cornerstone of GMN's commitment to the automotive industry. GMN

**NEARLY  
50%  
REDUCED  
REFLECTANCE**

Automotive's shift to LOB technology has transformed the dependability of the LCD display. The GMN LOB process is ideal for use in high ambient light, severe temperatures, and other extreme environments. The LOB capability and integrated assembly expertise acquired through this process ensures quick turnaround and efficient project management for our automotive clients' center console programs.

NEARLY  
**300%**  
IMPROVED IMPACT  
RESISTANCE

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