Design with Leading Display Technologies

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Compared to commercial grade displays, industrial displays require ruggedness and longevity, and they must be able to operate in a wide range of temperatures and weather conditions. Industrial displays are usually designed with longer life using more reliable materials for the backlight module and optical film. Normally industrial displays will come with better optical performance and higher brightness of around 500 cd/m² compared with 200 ~300 cd/m² for commercial grade LCDs. As industrial applications become more diverse and demanding, industrial displays need to come in a variety of sizes and value-added solutions such as sunlight readable and water/dust proof to meet diverse application environments. To optimize customer’s applications, Advantech provides value-added display solutions with leading display technologies which allow flexible customization and more suitable display products to customers. Among the core technologies, Advantech focuses on optical enhancement technologies such as sunlight readable, ultra high brightness, optical bonding and touchscreen integration. All of these in-house technologies are developed and manufactured in our own class 10,000/1,000 clean room.

In-house Design and Manufacturing Capabilities

Advantech is committed to developing brighter, clearer and more durable industrial displays and has built class 10,000/1,000 LCD clean room with ISO
certification to develop our own technologies and in Taiwan, China Kunshan and North America. With monthly capacity of 30,000 pieces and our in-house capabilities, Advantech can bring high add-on value, cost-efficiency, and higher quality features to our products. Moreover, our LCD clean room is committed to the highest quality and reliability of our products and services. All of these manufacturing and solutions are processed in our Class 10,000 grade clean room with ISO 9001/14001 certification. Among core display technologies, Advantech focuses on sunlight readable, ultra high brightness, optical bonding, and versatile touch screen integration with industry-leading 5-year extended warranty. We also provide on-demand value-added display solutions and tailor-made industrial display solutions to fit and fulfill all customers’ application needs.

**Sunlight Readable Solution**

**Industry-Leading Ultra High Brightness Technology**

For outdoor applications such as automated parking systems and outdoor digital signage which are normally installed under strong sunlight conditions, better sunlight readability is needed. Given that most displays are used in indoor applications, a display with a brightness of only 250~400 cd/m² will make the image look washed out because the ambient sunlight is stronger and of a higher value than the display itself, so reflections will make reading and viewing difficult. Also, in applications where touch screens are deployed, touch screens reduce the light that is emitted from the display making them look faded. So to solve this, Advantech developed an ultra high brightness solution with an in-house designed LED backlight module. In order to provide higher 1200 nit brightness, and still keep low power consumption, Advantech designed its own backlight modules, including LED light bar and light guide. The LED light bar is designed with high efficiency low power LEDs with a particular layout design for thermal solutions which consumes 20% less power than competing models, and keeps display surface temperatures under 40°C. This also provides even better color saturation and uniformity. The specialized light guide will also optimize the optical performance of LEDs and provide the best brightness efficiency. Our ultra high brightness technology achieves excellent sunlight readability and uses a smart auto-dimming function so that the display can adjust its brightness by detecting the current ambient
light conditions and adjusting the display accordingly. The detected ambient light will be submitted as different levels of voltage input for the LED driver board, which then generates different voltages to compensate the backlight brightness of the display. For example, at noon when the sunlight is very strong, the display provides strong backlight for good visibility, but during the night, the display decreases the backlight brightness to save power and provide just enough visibility. The IDK-2000 series is perfectly designed for all variable light conditions and is the best choice for outdoor applications.

**Cost-Efficient Anti-Reflection Solution**

For fully out-door environments, ultra high brightness technology delivers excellent visibility and meets harsh environment requirements. For semi-outdoor applications where the sunlight is not that strong, Advantech provides an economical solution which laminates an anti-reflective film onto the display, reducing the light reflection by less than 2% with a clearer image compared with the original display. With a class 10,000 clean room and professional facilities, we have the capability to manufacture displays with antireflection film lamination. We use polarizer lamination machines to place the anti-reflection film onto the display surface, and in order to keep the display as flat as possible without bubbles, we use autoclave machines to deliver a quality assured product. Our anti-reflection solution is ideal for semi-outdoor applications like kiosk and vending machines.

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**Advanced Optical Bonding Solution**

Advantech’s optical bonding solution delivers a ruggedized design and a more
visible solution for outdoor applications. Traditionally, for touch screens or tempered glass we’ll use an adhesive tape to affix them which is most common, but sometimes this creates an air gap in between which can cause high light reflection and reduces the brightness. So to avoid light absorption by reflection, we inject optical adhesive in between the display panel and the top layer which reduces reflection rates to 0.2% and gives it higher brightness and better contrast ratio without impacting on power consumption. Furthermore, Advantech’s specially formulated optical adhesive provides good transparency, high yield production, and UV resistance to avoid yellowing. The injection machine provides precise adhesive injection after the heating process to make the optical adhesive harden quickly.

**Touchscreen Integration Solutions**

More and more displays need interactive interfaces to communicate with end users, therefore, touch panel demand has increased. Normally we put the touch screen on top of the display, and we usually use air bonding manufacturing to put the tape with adhesive on the inactive area around the perimeter of the module. Advantech standard touch panel integrated solution – IDK-1000 series, uses air bonding manufacturing to provide the most cost effective solution for touch panels and also high yield production. All the touch panel assembly will be done in our 10,000 grade clean room. This provides a clean environment and avoids too many particles getting in between the panel and touch screen. Moreover, Advantech implemented an OQC process flow and rules to ensure the quality of the touch panel assembly. With strict production of fixtures for touchscreens, and OQC examination, Advantech provides a worry free touch panel assembly solution for all our customers.

**Touch Controller with Versatile OS Drivers**

Apart from a touchscreen integration solution, Advantech also provides compatible touch controllers with combo interfaces for RS232 and USB, and also with OS drivers including Win10, Win 7, Windows XP, Embedded XP, Mac, Linux, Android, and DOS. Advantech provides integrated industrial display solutions to deliver faster time-to-market for embedded system integrators. Not merely a hardware provider, Advantech also develops
value-added complete solutions for a wide array of industrial display applications. Most important of all, Advantech provides compatible display solutions with embedded platforms and will keep developing new technology for display solutions in order to continually service system integrators in the industrial field.

Power management is an important issue for industrial applications that run 24/7. Advantech designs a smart auto-sensor on the LED backlight for its ultra high brightness displays, IDK-2000 series. The display can automatically adjust its brightness to the external environment, thus significantly saving energy up to 50%.