

Don't Deploy a Mainstream Platform For High-Performance Computing Applications, Like Oil and Gas.

We often hear that different hardware is aimed at different applications, when in reality, there's not a lot different about the hardware that's supplied by the ODM. And that's not necessarily a bad thing—it's the ODM's job to provide the highest level of performance that's needed for the application, and include the hooks for the end customer can configure the platform for the application.

To that end, Embedded Computing Design spent some time with Dennis Ting, the Director of Product Strategy for Wincomm Corp., to understand the needs within high-performance computing applications, like oil and gas, chemical manufacturing, and power generation.

Embedded Computing Design (ECD): What is different from a hardware perspective in a system aimed at oil and gas verses something like a data center, or other more mainstream application?

Ting: First, the hardware must pass C1D2 or ATEX certification, which isn't needed for all applications. For oil and gas, chemical manufacturing, or power generation, the IEC 60529 standard specifies a variety of Ingress Protection (IP) ratings that signify how resistant a system is to objects, dust, water, and even submersion, while ISO 20653 ratings dictate resiliency against water steams.

	Water jets (IEC 60529)	Underwater (IEC 60529)	Steam jets (ISO 20653 replaces DIN 40050)
1	IP65	—	—
2	IP66	—	—
3	IP66	IP68	—
4	IP66	IP67	IP69K
5	IP66	IP68	IP69K

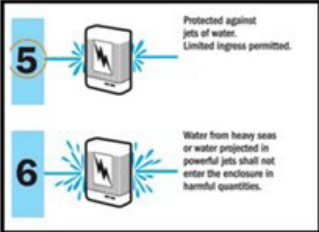
 5 Protected against jets of water. Limited ingress permitted.	 7 Protection against the effects of immersion in water between 15 cm and 1 m for 30 minutes.	 8 Protection against the effects of immersion in water under pressure for long periods.
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Figure 1. Industrial-grade systems are typically rated from IP66 up to IP69K, the highest ingress protection grade against high-pressure, high-temperature steam and water jets. (Source: [Phoenix Contact](#))

Ting: Keep in mind that the more heavily packaged a system is, the more susceptible it is to overheating. The repercussions of overheating and sparks in explosive settings are obvious, but the ways in which electronic subsystems could contribute to an explosion are not. They range from optical transmission components and fieldbus ports up to the system enclosure itself. IECEx standards, many of which have been converted to IEC standards, define the various levels of explosion prevention a system can achieve.

ECD: How can you improve operational efficiency with the HMI that's used in applications like oil and gas, chemical manufacturing, and power generation?

Ting: With automation control systems that are deployed in hazardous environments, it's often difficult to adopt a human-machine interface (HMI) due to the explosion-proof certification that's needed. For example, in oil and gas, complex process control is needed at all stages, including exploring, extraction, and transportation. A panel PC that employs a vision interface is helpful to improve process-control efficiency, yet it's more conducive to an explosion. Therefore, extra care is required in the design process. Hence, the most logical path forward is to partner with an electronic design and manufacturing company with extensive knowledge of the technologies, regulations, and environments in which these devices will operate.

ECD: What type of communications are required for these deeply embedded applications? Is there a role for 5G?

Ting: There are typically six supported options for communication: WiFi (IEEE802.11ac/b/g/n), Bluetooth (Classic 1.0 - 2.0), EtherNet/IP, PROFIBUS DP, DeviceNet, and CC-Link. All would need to be industrial grade and explosion-proof certified and offer a coverage field ranging from 10 m to 1.2 km. They currently aren't a requirement for 5G, but if necessary, it could be leveraged through a USB interface. Note that very few 5G modules have received explosion-proof certification.

ECD: You may not always have access to tech support in potentially remote areas. How does that effect a customer's choices/options?

Ting: That's very true, and it's why all Wincomm-designed products must include the proper communication. During the global pandemic, many of the communications moved online (from being served by actual people), and is now more accepted by end users. However, receiving explosion-proof certification for connected panel PCs for harsh environments can be difficult. For instance, typical antennas fulfill the basic system requirements. However, they often fail the drop tests. Wincomm employs a Polyoxymethylene (POM) cover to make the flat antenna more robust. A specially designed POM-based PCB antenna can be streamlined enough to fit most installations.

ECD: What solutions are available from Wincomm for the applications discussed here?

Ting: For pharmaceutical, chemical, and energy manufacturing applications that require the platform to be water and dust proof, and also contain an HMI, Wincomm offers its WTP series, designed with stainless steel for anti-oxidation and easy cleaning. It's IP66/69K certified. And then for similar applications, but hazardous environments, we have our WTPE series, which has received explosion-proof certification, and operates in a wide temperature range.



Competitors often use aluminum housings to keep costs down.

Figure 2. Wincomm leverage the benefits of stainless steel for robust enclosures in its WTP and WTPE series.

ECD: Many of Wincomm's competitors have similar offerings. So, why should a developer choose Wincomm products?

Ting: First of all, it requires a deep investment to provide HMI solutions for hazardous environments. Hence, the number of competitors is limited. And Wincomm works with multiple partners to differentiate its products for long-term deployment.

Specifically, Wincomm offers a flexible combination of four ports which could consist of USB 2.0 and LAN ports, or two COM ports, or two USB and one COM to link the extended devices on the hazardous area. Currently, Wincomm is the only vendor to offer such a configuration for hazardous environments. In addition, compared to other players, Wincomm provides high-performance panel PCs, leveraging our thermal design capability for T5 certification.

Wincomm is one of Taiwan's leading manufacturer of medical and industrial computers and related embedded computing products. Wincomm designs and develops all-in-one panel PCs, monitors, rugged box PCs, and embedded software products for a broad range of industries and applications. Wincomm also builds integrated Application-Ready Platforms to enable various IoT solution verticals, such as smart healthcare, smart factory, smart city, and smart transportation. Founded in 1993, Wincomm is an ISO14001, ISO9001, and ISO13485 certified company. It is headquartered in Science-Based Industrial Park (SBIP), Hsinchu, Taiwan, with overseas sales offices in the USA and Japan.

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