



Case Study

A Reliable HMI Panel PC Solution for CNC Machining Applications

As CNC machining and intelligent manufacturing continue to advance, Reliable Human Machine Interface (HMI) systems are essential for efficient, continuous production. The customer, a long-time provider of industrial automation solutions, needed a rugged panel PC capable of stable operation in harsh environments affected by dust, oil mist, metal particles, vibration, temperature fluctuations, and unstable power supply. The solution needed to support equipment operation and real-time monitoring while helping maintain stable system performance and reduce unplanned downtime.

Customer Background

The customer is a globally recognized company in the fields of industrial automation and smart manufacturing, with extensive experience and expertise in automation technology and manufacturing solutions. The company focuses on CNC systems, laser products, machining solutions, and smart manufacturing technology, and provides customized development, talent training, and comprehensive after-sales service

to help manufacturers continuously improve production efficiency, automation levels, and overall manufacturing competitiveness.

Application Scenario

In CNC machining environments, the customer required a reliable human-machine interface (HMI) panel computer to support equipment operation, real-time monitoring, and production management.

The industrial HMI panel is installed on or near the CNC equipment, allowing operators to monitor equipment status, retrieve operating information, adjust parameters, and perform control and management tasks through an intuitive touchscreen interface, enabling them to respond quickly to changing production conditions and maintain an efficient machining process.

During round-the-clock continuous production, the system must operate in a harsh environment filled with CNC dust, oil mist, metal particles, vibration, shock, temperature

fluctuations, and potential power interruptions. Real-time communication with the cloud management platform via 4G/5G/Wi-Fi enables precise, real-time quality traceability throughout the entire production process, effectively reducing the risk of unexpected downtime and ensuring stable production.



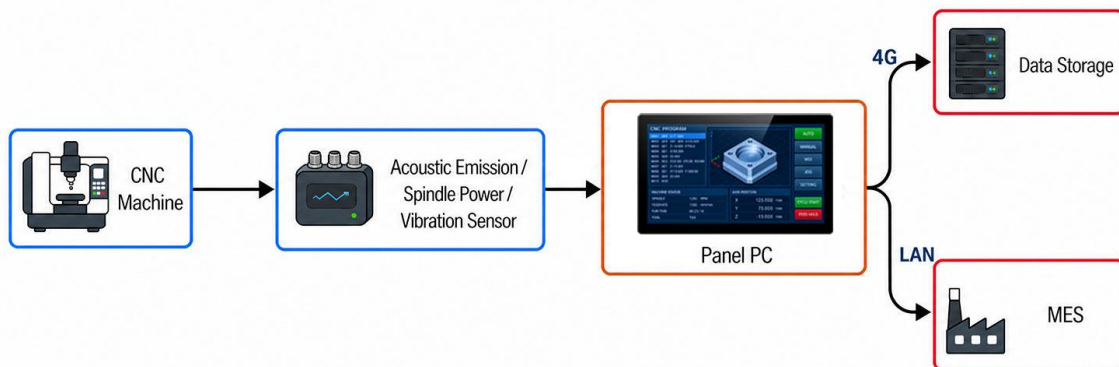
Challenges

- **Dust, Oil Mist, and Metal Particles:** The CNC machining environment exposes industrial computers to dust, oil mist, and airborne metal particles, which can affect system reliability.
- **Unstable Power Supply:** Power fluctuations or unexpected interruptions can cause system shutdowns, production disruptions, and potential data loss.
- **24-Hour Continuous Operation:** CNC applications require a reliable computing system that can maintain stable performance during continuous operation.
- **Vibration and Shock:** Continuous equipment movement and mechanical operation generate vibration and shock, posing challenges to the durability and stability of industrial hardware.
- **High and Low Temperature Environments:** Temperature fluctuations in manufacturing environments require industrial computers to operate reliably under harsh thermal conditions.

- **Diverse Installation Requirements:** CNC equipment installation sites are complex with many space constraints, requiring a variety of mounting solutions.

Solution: DPC-6122S Panel PC

- **IP65-Rated Panel:** The one-piece flat front panel meets the IP65 protection rating, helping shield the system from dust and industrial contaminants.
- **Reliable Processing Performance:** Powered by an Intel® Core™ i5-1235U processor, the DPC-6122S delivers the computing performance required for CNC applications.
- **Wide Operating Temperature Range:** The operating temperature range of -10°C to 50°C supports deployment in demanding manufacturing environments.
- **Vibration Resistance:** The DPC-6122S is designed to withstand 5 to 500 Hz of vibration, ensuring stable operation in environments with continuous equipment movement.
- **Built-in UPS Protection:** A built-in 2600 mAh lithium battery UPS helps keep the system running during power interruptions and reduces the risk of unexpected downtime.
- **Built-in Wireless Connectivity:** Built-in Wi-Fi and 4G dual wireless connectivity ensure reliable data transmission.
- **Multiple On-Site Mounting Options:** Supports cabinet mounting for enhanced protection of the HMI system, and can be paired with a magnetic mounting bracket for flexible positioning and placement of the HMI system.



Alternative Solution: RPC-9210 Panel PC

Since DPC-6122S is a customized model, customers who prefer a standardized solution can opt for Darveen [RPC-9210](#) as an alternative. [RPC-9210](#) is a 21.5-inch rugged panel PC purpose-built for harsh industrial environments, featuring a full IP66-rated enclosure and equipped with M12 connectors, meeting the stability and reliability requirements of CNC machining equipment. In terms of connectivity, [RPC-9210](#) supports Wi-Fi 6E, 4G and 5G wireless connectivity, and can be paired with an external antenna for stable, high-speed data transmission. It also complies with the MIL-STD-810G/H standard, offering excellent shock and vibration resistance, and supports an operating range of -20°C to 55°C for wide-temperature operation,

as well as a 9–36V DC wide-range power input, ensuring stable operation in complex and demanding industrial environments.



About Darveen

Established in 2007, Darveen is dedicated to developing rugged industrial computing solutions tailored to the diverse needs of vertical industries. Our product portfolio includes vehicle mount computers, industrial panel PCs, industrial displays, embedded box computers, and rugged tablets. With nearly two decades of experience in product design and manufacturing, Darveen's solutions are widely adopted in smart ports, warehousing and logistics, and heavy-duty vehicle applications. Riding the Industry 4.0 wave, Darveen is expanding its reach into edge computing, smart manufacturing, industrial automation, healthcare, and marine sectors.

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