

## Case Study

# Darveen's Vehicle Mount Computers VT-558HB and VT-858HB: The Secret Weapon of Smart Ports

Yangshan Port, a marvel located in the southeast of Shanghai, is one of the reasons why Port of Shanghai has been ranked first in the world for container throughput for 13 consecutive years. In 2022, the throughput surpassed the 47.3 million TEU mark, with Yangshan Port contributing over 50%, handling 23.912 million TEUs and solidifying its status as the world's largest intelligent container port.

Yangshan Port is not only breathtaking for its enormous throughput, but also for its stunning technology and construction feats. It stands as an artificial offshore port constructed on the islands of Greater and Lesser Yangshan through land reclamation. It is connected to the Pudong New Area of Shanghai by the 32.5-kilometer Donghai Bridge, about 104 kilometers away from the international deep-sea shipping route. Moreover, the channel depth here exceeds 16 meters, ensuring the smooth passage of large vessels, making Yangshan Port a global shipping center.

The first and second phases of the Yangshan Port are operated by Shanghai Shengdong International

Container Terminal Co., Ltd. With a quay length of 3,000 meters, it offers nine deep-water container berths, equipped with 37 bridge cranes, 92 rubber-tired cranes, and 330 container trailers. This infrastructure is capable of accommodating the world's largest 20,000 TEU container ships, resembling a giant in the realm of modernized ports. Similarly, the third phase of the port is operated by Shanghai Guandong International Container Terminal Co., Ltd., with a total quay length of 2,200 meters. It comprises seven deep-water container berths equipped with 35 bridge cranes, 80 rubber-tired cranes, and 260 container trailers,



providing safe berthing for large container ships from around the world.

### Digital Transformation to Realize Smart Ports

As global logistics demand continues to grow, the number and demand for port containers are rising constantly. While container throughput reaches new highs, Yangshan Port is also constantly breaking new ground in new technologies to enhance automation capabilities and expand port operations to meet the challenges of future demand.

In the operation of a modern smart port, optimizing work plans and scheduling is a key focus. By intelligently analyzing real-time data based on the actual situation of the port, it becomes possible to formulate reasonable work plans and schedules for personnel and equipment. This ensures the optimal management of the storage and retrieval order of containers, reducing waiting time and operating costs. Therefore, providing an instant information interaction platform for port operating personnel and mobile machinery is an essential infrastructure that must be implemented.

### Requirements for Vehicle Mount Computers

It is very complex to carry out real-time synchronous information release and central control scheduling for personnel and equipment. In addition to meeting the software requirements, selecting an appropriate hardware solution is crucial based on local conditions.

In the Yangshan Port project, customers have specific requirements for the installation of rugged vehicle terminals, including:

- Supports 4G/LTE dedicated network communication
- Stable operation in working temperatures of -20°C to 70°C
- Rugged design, salt spray resistant, IP65 or higher dustproof and waterproof grade
- Compliant with automotive-grade shock and vibration standards
- Supports Windows 7 or higher operating system
- Supports a variety of wireless communication modes, such as 2.4G/5.8G Wi-Fi, 4G/5G, GPS/Beidou positioning, etc.

Only a connected vehicle mounted terminal can fully utilize the 4G/5G network to comprehensively cover all port areas, ensuring the smoothness and efficiency of the process. Additionally, the vehicle-mounted computer must be able to withstand the harsh weather conditions of the port and various harsh usage such as vehicle vibrations, impact of foreign objects, frequent violent operations, and so on.



### Darveen's Rugged Vehicle Mount Computers Provide Powerful Technical Support for Smart Ports

After testing numerous rugged hardware solutions, Shanghai Shengdong and Shanghai Guandong finally chose Darveen's [rugged vehicle mount computers VT-558HB](#) and [VT-858HB](#). It has been proven that

- Integrated easy-to-operate user-friendly touchscreen

Darveen's VT-558HB and VT-858HB are ideal choices in terms of reliability and efficiency in the harsh environments of port terminals, where sunlight, salt, humidity, and extreme temperatures can significantly impact daily operations. The aluminum alloy casing of Darveen's VT-558HB and VT-858HB is not only corrosion-resistant, but also has excellent heat dissipation performance. Additionally, they feature IP65 dust and water protection to ensure resilience against the challenges of high salt-spray port environments.

The 7-inch and 12.1-inch touchscreens of these two terminals can be used with gloves and operate in both high and low temperatures, as well as in vehicle vibration environments. They also support a wide range of voltage inputs from 8 to 36 V DC, various power input sources, and uninterrupted Wi-Fi, 4G/5G data transmission and data communication. Darveen's rugged vehicle terminals provide a robust technological backbone for smart ports.

### **Darveen's VT-558HB and VT-858HB Meet CTOS Requirements**

At the Yangshan Deepwater Port Phase I, II, and III terminals, Shanghai Shengdong and Shanghai

Guandong have successfully deployed [VT-558HB](#) and [VT-858HB](#) on various mobile loading and unloading equipment, including bridge cranes, rubber-tired cranes, and container trailers. Integrated with the Container Terminal Operation System (CTOS) software, in a way that tightly integrates graphics and data, the vehicle terminals have successfully monitored and presented all aspects of the port in real time. They intuitively display the status of ship loading and unloading, berth usage, yard cargo stacking, machinery operation, and gate receiving and sending containers.

In this project, Darveen not only supplied customized 4G LTE dedicated networked vehicle terminals that fully meet the customer's hardware requirements, but also provided a comprehensive installation plan and service. Darveen played a crucial role in significantly improving the efficiency of ship loading and unloading at the port, optimizing yard utilization, and enhancing control at the container terminal gate. These enhancements contribute to the comprehensive improvement of the economic benefits of the entire port. With its professional technical capabilities, Darveen addresses and solves customer problems effectively.

## About Darveen

Established in 2007, Darveen has been dedicated to developing rugged industrial computer solutions tailored to the unique needs of various vertical industries. Our product lines include in-vehicle computers, industrial panel PCs, rugged tablets, embedded box computers, and industrial monitors. Darveen's vehicle-mounted computer solutions have successfully helped hundreds of container terminals in streamlining their processes and operations. With nearly 20 years of experience in product design and manufacturing, Darveen's products have gained widespread acceptance in diverse markets, including container terminals, warehousing, manufacturing, industrial equipment, mining, and special vehicle fleets.

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