Mobile Computing and Data Collection in Digital Forklift Systems

As warehouse intelligence continues to advance, the automation and informatization levels of forklifts in warehouses have also been significantly enhanced. In the past, warehouse management relied on manual retrieval and paper-based record verification to collect data, which was prone to human errors, reduced efficiency, and could not achieve real-time monitoring and data analysis. The new-generation intelligent warehouse logistics can be assisted by various technologies, including vehicle-mounted computer computing, wireless transmission, cloud services, RFID, UWB positioning, and sensors. Through the deployment of barcode scanners and handheld devices, it realizes real-time data collection and command delivery, thereby accelerating the flow of goods in a flexible operating mode. This provides more accurate and real-time data support for warehouse management.

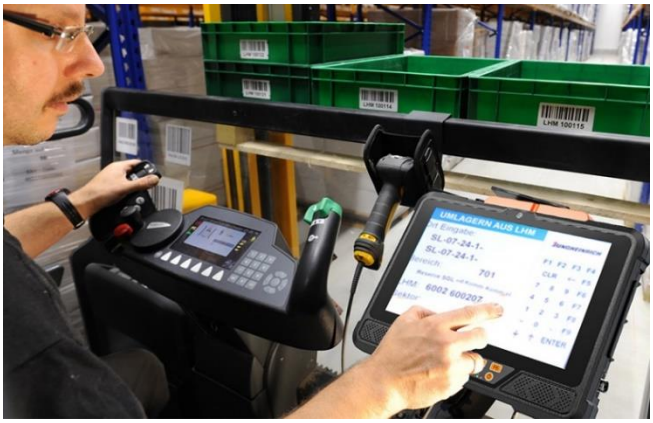
Data collection within the warehouse is essential. Rugged tablet PCs come with touchscreen input, similar to all-in-one vehicle computers. Nevertheless, the more prevalent input devices are barcode scanners and RFID readers.

In warehouse, the management center sends instructions to the forklift mounted computer via a wireless network, directing the driver to relocate goods to the designated location. The driver uses a barcode scanner to scan and identify each piece of goods and then sends the goods' information and operation results back to the backend system.

When handling large quantities of goods with a broader reading range, the RFID reader proves advantageous for rapid data collection and tracking, as it does not require individual contact or precise scanning. This is done by installing an RFID detection antenna on the front fork, scanning the RFID tags on multiple goods at once and then transmitting the collected data to the RFID reader. Finally, the data is inputted to the vehicle mount computer through wired or wireless means, thus completing the automatic identification of goods. This data can be sent back to the backend server at any time.

Common Applications

Data collection in warehouse forklifts provides a variety of common applications. Here are a few:



Cargo Tracking: Using barcode scanners or RFID technology, forklifts can track and record the location and movement of each piece of cargo. This helps ensure inventory accuracy and improves inventory visibility.

Picking and Receiving: Whether picking goods from the shelves or storing goods in the warehouse, data collection and cargo identification can indicate the aisle and shelf where the goods belong through the inventory system, expediting the goods receiving and delivery process.

Inventory Management: Through real-time data collection, warehouse management systems can track inventory levels, ensuring the accuracy of replenishment and inventory on the shelves. This helps reduce inventory losses and issues of overstocking or understocking.

Operational Records: The data collection system on the forklift can record the working time and workload of the workers. This aids in monitoring productivity and optimizing operational management.

Requirements

Key factors to consider when installing vehicle mount computers or rugged tablet computers on forklifts:

- **User-friendly Interface**

The computer installed on the forklift should be equipped with a responsive all-in-one touchscreen for operator input. Users can choose between resistive or capacitive screens

depending on their applications. Resistive screens are more suitable for dusty or humid environments, while capacitive screens offer multi-touch functionality for more responsive applications. Moreover, keyboard input is also common in warehouse applications.

- **Rugged Durability**

The computer hardware must be durable enough to withstand the challenges of various industrial environments, including extreme temperatures, accidental drops, and the strong vibrations generated by the forklift during operation. This requires the computer to have a high level of IP waterproof and dustproof protection and a fanless cooling solution to ensure stability for long-term operation.

- **Connectivity**

Forklifts in warehouses need to be connected to a variety of peripherals, such as barcode scanners, RFID readers, mobile printers, and headsets. These peripherals all need to be connected to a forklift PC, which must have a variety of I/O interfaces.

- **Wireless Communication**

The forklift mounted computer should have robust wireless extension capabilities, including Bluetooth, Wi-Fi 6E, 4G LTE/5G, to enhance the strength of remote signals. This ensures real-time communication and data transmission without delays.

- **Power Supply**

The forklift mounted computer should have a stable, wide-range power input to prevent damage to the computer and peripheral devices caused by power surges.

Solutions

To ensure the stable execution of intelligent warehouse tasks, Darveen provides vehicle mount computers and rugged tablet solutions. These computers are designed to be installed on material handling vehicles and can withstand harsh warehouse environments and demanding workloads.

For situations that require a larger screen or physical keyboard input, Darveen's vehicle mount computer VT series is the ideal choice. They are suitable for installation on vehicles such as forklifts, stackers, and tractors. For situations that require the computer to be easily moved between forklifts, or operators must leave the forklift to perform tasks, Darveen's rugged tablet RTC series provides greater flexibility. The RTC series can be removed from the forklift and carried as a patrol application. Additionally, the RTC series itself also has 2D barcode reader and UHF RFID capabilities. Leveraging Darveen's rugged industrial computer products enables the fulfillment of diverse requirements in warehouse management.

Darveen's vehicle mount computer and rugged tablets offer the following advantages:

- **Wide Range of Product Choices**

Darveen's vehicle mount computer VT series offers a variety of sizes, ranging from 7 to 12.1 inches and supports capacitive touchscreen and resistive touchscreen, with available operating systems including Windows and Android. The VT series also offers models with QWERTY keyboards or function keys. The rugged tablet RTC series offers 8- and 10.1-inch options, also supporting Windows and Android operating systems.

- **Rugged Design**

The VT series has a robust, corrosion-resistant aluminum alloy case. The entire device meets the IP65 dust and water resistance level and incorporates a fanless, 8-36 VDC wide-voltage power input design. It complies with the US military MIL-STD-810G shock and vibration test standards. RTC series tablets are designed for mobile tasks and field operations, featuring a high level of protective design. The entire machine is IP67 rating and meets the MIL-STD-810H shock and vibration test standards.

- **Rich I/O Connectivity**

The VT series has a wealth of interfaces, including USB, COM, GbLAN, DIO (4 in/ 2 out), CAN bus, and can also be expanded with M12 waterproof connectors. The RTC series provides USB, USB Type-C, LAN, and aviation plug (two of USB, RS232, and DC-in can be selected). It can meet the connection needs of various peripherals.

- **Wireless Communication**

Both the VT series and RTC series offer a variety of wireless connectivity options, including Wi-Fi, Bluetooth, 4G LTE/5G, and GNSS. This can provide on-site workers and warehouse centers with the latest data transmission and high-efficiency work efficiency, allowing them to access real-time important information and communication.

- **Versatile Accessories**

The VT series and RTC series are suitable for all warehouse vehicle installation and usage requirements. The VT series offers a variety of vehicle mounting brackets, industrial IP65 keyboards, sunshades, antennas with different dBi gain units, and mobile power supplies with IP65 M12 connectors. The RTC Android series is equipped with a 10,000mAh detachable large-capacity battery and a hand strap that can be easily removed from the forklift to meet the needs of long-term tasks and provide greater flexibility.

Recommended Products

	VT Windows Series Vehicle Mount Terminal • 7” to 12.1” LCD with resistive or capacitive touch • Intel Celeron/Core-i processor • Supports Windows, Linux OS • Supports WiFi, Bluetooth, LTE, 5G, GPS, CAN
	VT Android Series Vehicle Mount Terminal • 7” to 12.1” LCD with resistive or capacitive touch • ARM RK3288/3399 • Supports Android OS • Supports WiFi, Bluetooth, LTE, 5G, GPS, CAN
	Windows Rugged Tablet • Intel Jasper Lake Celeron processor • 8”/10.1” HD LCD display with capacitive touch • High-capacity removable battery • Support serial port and LAN (RJ-45) port • Optional 2D barcode, RFID (HF/UHF), ID card, fingerprint module • IP65 and MIL-STD-810G certified

	Android Rugged Tablet • ARM-based high performance Octa-Core processor • 8”/10.1” HD LCD display with capacitive touch • High-capacity removable battery • Support serial port and LAN(RJ-45) port • Optional 2D barcode, RFID (HF/UHF), ID card, fingerprint module • IP65 and MIL-STD-810G certified

For more information visit www.darveen.com | Send us an email to sales@darveen.com.